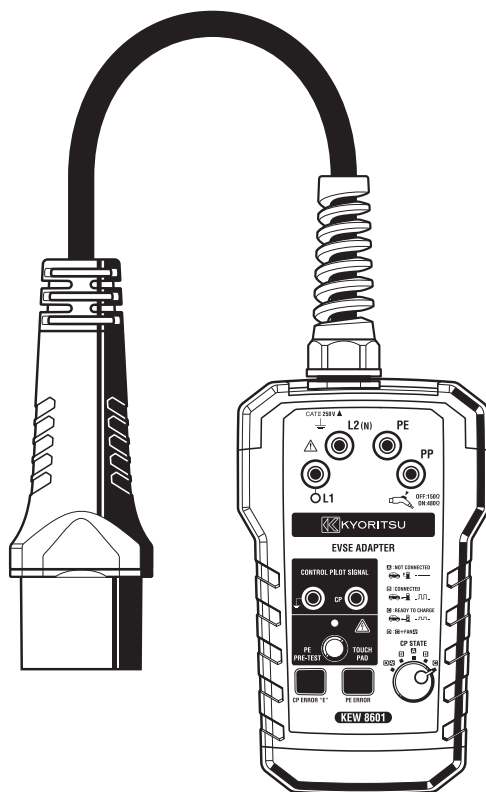


取扱説明書
Instruction manual

日本語

English



EVSE アダプタ / EVSE ADAPTER

KEW 8601



共立電気計器株式会社
KYORITSU ELECTRICAL
INSTRUMENTS WORKS, LTD.

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1. Unpacking

Thank you for purchasing our EVSE adapter KEW 8601.
The following table is a list of the items included with the instrument.

1	Instrument	KEW 8601 x1
2	Carrying case	MODEL 9202 x1
3	Instruction manual	x1

2. Safety precautions

This instrument has been designed, manufactured, and tested according to IEC 61010: Safety requirements for electrical equipment for measurement and delivered in the best condition after passing quality control tests.

This instruction manual contains warnings and safety rules which must be observed by the user to ensure safe operation of the instrument and to maintain it in safe condition. Therefore, read through these operating instructions before starting to use the instrument.

DANGER

- Read through and understand instructions contained in this manual before starting to use the instrument.
- Keep the manual at hand to enable quick reference whenever necessary.
- The instrument is to be used only in its intended applications.
- Understand and follow all the safety instructions contained in the manual.
- When connecting and using the other measuring instrument together with KEW 8601, read through and understand the instruction manual for the instrument to be used with.

It is essential that the above instructions are adhered to. Failure to follow the instructions may cause injury, instrument damage and/or damage to the equipment under test. KYORITSU is by no means liable for any damage resulting from the instrument in contradiction to these cautionary notes.

The symbol  indicated on the instrument means that the user must refer to the related parts in the manual for safe operation of the instrument. It is essential to read the instructions wherever the symbol  appears in the manual.

-  **DANGER:** is reserved for conditions and actions that are likely to cause serious or fatal injury.
-  **WARNING:** is reserved for conditions and actions that can cause serious or fatal injury.
-  **CAUTION:** is reserved for conditions and actions that can cause injury or instrument damage.

DANGER

- Do not attempt to make measurements in the presence of flammable gasses: otherwise, the use of the instrument may cause sparking, which can lead to an explosion.
- Never attempt to use the instrument if its surface or your hand is wet.
- Never open the rear cover during a measurement.
- The instrument should be used only in its intended applications or conditions: otherwise, safety functions equipped with the instrument don't work, and instrument damage or serious personal injury may be caused.
- Verify proper operation of the instrument on a well-known source before you start using.

WARNING

- Do not use the instrument or test leads if any abnormal conditions, such as broken cover or exposed metal parts are noted.
- Never install substitute parts or make any modifications to the instrument.
Send the instrument to your local KYORITSU distributor for repair or recalibration.

CAUTION

- Use a slightly damp cloth with neutral detergent or water for cleaning. Do not use abrasives or solvents.
- This instrument isn't waterproof. Do not let the instrument get wet. Otherwise, it may cause malfunction.
- If the instrument is wet, make sure to let it dry before putting it into storage.

The following symbols are used and marked on the tester and in this instruction manual. Please carefully check before starting to use the instrument.

Symbols

	User must refer to the explanations in the instruction manual for safety purpose.
	AC
	Double or reinforced insulation
	(Functional) Earth terminal
	Crossed-out wheel bin symbol (according to WEEE Directive: 2002/96/EC) indicating that this electrical product may not be treated as household waste, but that it must be collected and treated separately.

3. Features

This adapter KEW8601, simulating an EV (Electric Vehicle), can be used for interfacing the EV charge stations, commonly named EVSE (Electric Vehicle Service Equipment), and performs operation check and electrical safety tests of EVSE.

In combination with a Multi-Function tester (not included), this adapter also allows to carry out various electrical installation safety tests from the EVSE socket.

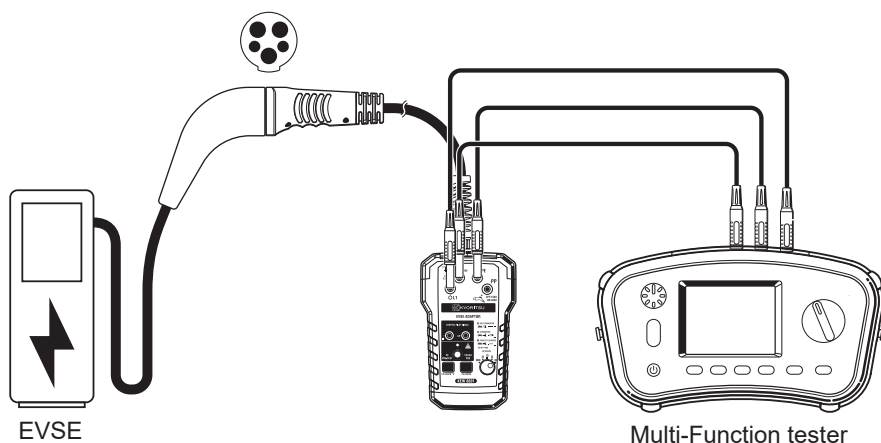


Fig.3-1
Examples of connection

Note: This adapter is designed for testing Type 1 EVSE Mode 2 and Mode 3 for AC charging.

Available functions:

- Pre-Test
verifies that there is no presence of dangerous voltage at the grounded PE terminal.
- CP (Control Pilot) state check
varies Control Pilot signal (resistance between CP-PE) to simulate various vehicle states (A/B/C/D) for EVSE operation check.
- CP (Control Pilot) signal error simulation
simulates the state that CP signal short-circuited to PE and confirm that EVSE stops AC power flow.

- PE (Earth fault) error simulation
simulates an interruption of PE conductor (or disconnected state) and confirm that EVSE stops AC power flow.
- Live LED
indicates voltage of the charge plug of EVSE.
- CP (Control Pilot) signal output terminal
is connected to an oscilloscope to analyze Control Pilot signal.
- Measuring terminals
are available for connection with a measuring instrument (multi-function tester, etc.) to perform various tests.

4. Instrument layout

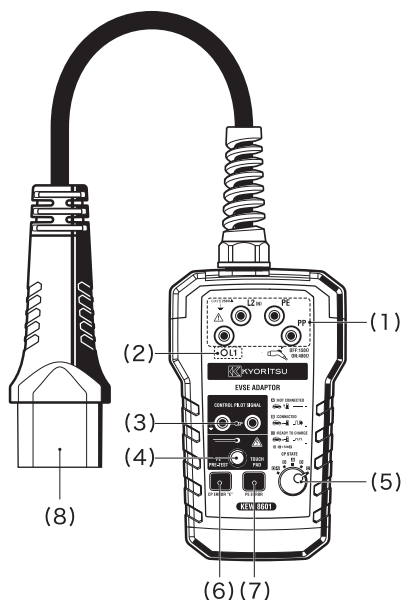


Fig.4-1

General descriptions

	Name	Description
(1)	Measuring terminals	Input terminals for measuring equipment connection (L1, L2(N), PE, PP)
(2)	Live LED	Phase indicator LEDs for L1 terminals
(3)	CP signal output terminal	Output terminal (CP, PE) for CP (Control Pilot) signal check
(4)	Touch pad/ Pre-Test warning LED	Touch pad for Pre-Test/ Warning LED to indicate Pre-Test result
(5)	CP state selector	CP (Control Pilot) state rotary switch selector (A, B, C, D)
(6)	CP ERROR "E" button	CP (Control Pilot) signal error simulation button
(7)	PE ERROR button	PE (Earth Fault) interruption error simulation button
(8)	EVSE connection plug	TYPE 1 plug connector to connect with EVSE

5. Test procedures

5.1 Connection

Connect EVSE connection plug of KEW 8601 to an EVSE to be tested.

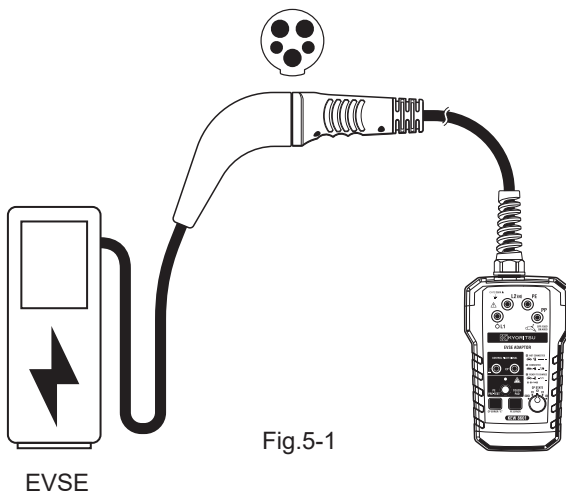


Fig.5-1

5.2 Pre-Test

After connecting with the EVSE under test, touch the touch pad (4) with a bare finger. Normally, the PE conductor is connected to ground and no voltage to ground exists. If a dangerous high voltage is present at the PE conductor, Pre-Test warning LED (4) lights up. In such a case, stop further testing immediately and check the wiring connections. (e.g.: The PE conductor isn't connected to ground or is connected to phase by mistake.)

* Pre-Test must be conducted prior to other tests.

* Touch the touch pad with a bare finger. Do not wear insulated gloves.

Ensure a proper connection to the ground (including your shoes), otherwise, warning indication with (4) Pre-Test warning LED may not be reliable.



Fig.5-2

5.3 CP (Control Pilot) state check

Switch the CP state selector (5) to simulate various vehicle state (A/B/C/D) and check the behavior of EVSE.

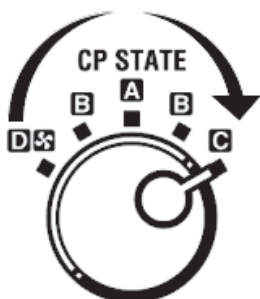


Fig.5-3

- 1) Set the CP state selector (5) to position “A” (car not connected) and connect KEW 8601 to EVSE.
- 2) Turn and set the CP state selector (5) to position “B” (car connected).
(The EVSE under test may require payment information.)
- 3) Turn and set the CP state selector (5) to position “C” or “D”.

* State “D” simulates EVs which use EVSEs installed indoors and require mechanical ventilation. If the EVSE to be tested doesn't have ventilation system, charging process may automatically stop. In such a case, please set the SP state selector to position “C”.

Confirm that EVSE is ready for charging and any of live LEDs light up.

- * If the EVSE isn't ready for charging, turn the CP state selector (5) to “A” and wait for a few minutes. Then turn the CP state selector (5) to position C or D.

Table 1: EV state

Vehicle state	State description
A	Electric vehicle not connected
B	Electric vehicle connected
C	Electric vehicle connected, ready to charge, ventilation not required
D*	Electric vehicle connected, ready to charge, ventilation required

* Vehicle state D is to simulate EVs with batteries that produce hydrogen or other flammable gases when charged. Therefore, in this state, the operation of the ventilation system is required in the test process.

Quite few EVSEs have ventilation system since most EVs use lithium-ion batteries and that don't generate flammable gasses when charged. Confirm that EVSEs that don't have ventilation system won't be ready for charge at vehicle state D.

5.4 CP (Control Pilot) signal error simulation

With a press of CP ERROR “E” button (6) can simulate the behavior of EVSE where there’s a short-circuit between CP and PE conductors.

- 1) Turn and set the CP state selector (5) to position “C” or “D”.
 - * State “D” simulates EVs which use EVSEs installed indoors and require mechanical ventilation. If the EVSE to be tested doesn’t have ventilation, charging process may automatically stop. In such a case, please set the SP state selector to position “C”.
- 2) Press the CP ERROR “E” button (6) and confirm the charging process is aborted and further charging is prevented.



CP ERROR “E”

Fig.5-4

5.5 PE (Earth fault) error simulation

With a press of PE ERROR button (7) can simulate the interruption of the PE conductor (or disconnected state).

- 1) Turn and set the CP state button (5) to position “C” or “D”.
 - * State “D” simulates EVs which use EVSEs installed indoors and require mechanical ventilation. If the EVSE to be tested doesn’t have ventilation, charging process may automatically stop. In such a case, please set the SP state selector to position “C”.
- 2) Press the PE ERROR button (7) and confirm the charging process is aborted and further charging is prevented.



PE ERROR

Fig.5-5

5.6 Various tests combined with measuring instrument

Various tests such as voltage and insulation resistance measurements can be performed by connecting a measuring instrument (multi-function tester, etc.) to the measuring terminal (1) of KEW 8061.

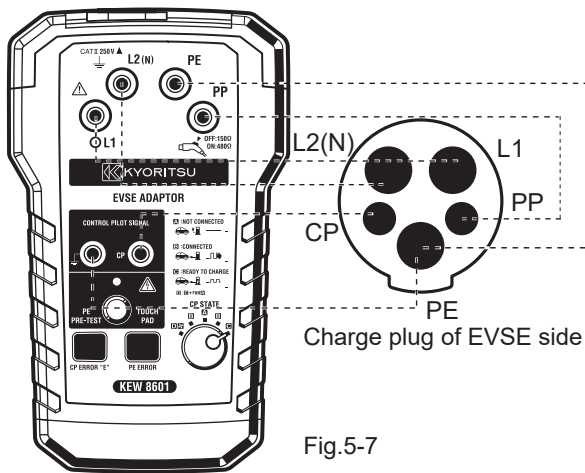
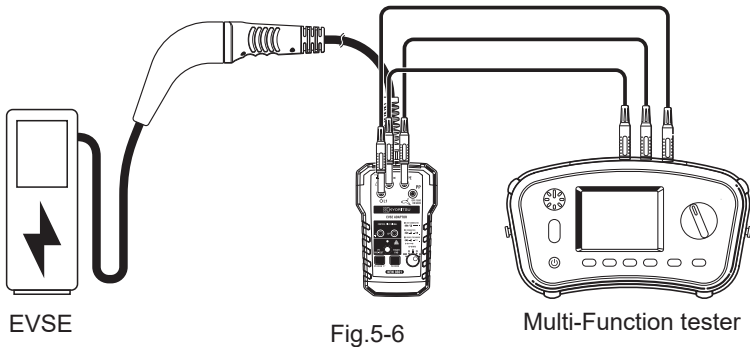
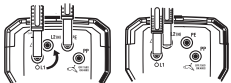
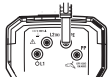
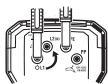
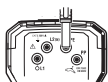
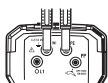
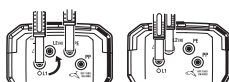
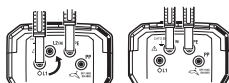
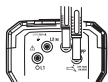


Table 2: Terminals

Terminal	Description
L1, L2(N)	Charging line
PE	Protective earth
PP	Proximity pilot
CP	Control pilot

Table 3: Relationship of measuring terminal and CP state selector at each test

Type of test	Terminal	Connection	CP state selector
Voltage	L1, L2(N), PE		C
Earth continuity	PE		A
Insulation resistance (Charging cable)	L1, L2(N), PE*		A
Earth resistance (Precision measurement)	PE		A
Earth resistance (Simplified measurement)	L2(N), PE		C
LOOP impedance	L1, L2(N), PE		C
RCD	L1, L2(N), PE		C
Unlock button (Release button) Operation check	PP, PE		A
CPLT signal check	CP, PE		A / B / C / D

* KEW 8061 cannot measure insulation resistance between L1-L2(N).

5.7 CP (Control Pilot) signal output check

Analysis of CP signal is possible with the connection of CP signal output terminals (3) and an oscilloscope (not included).

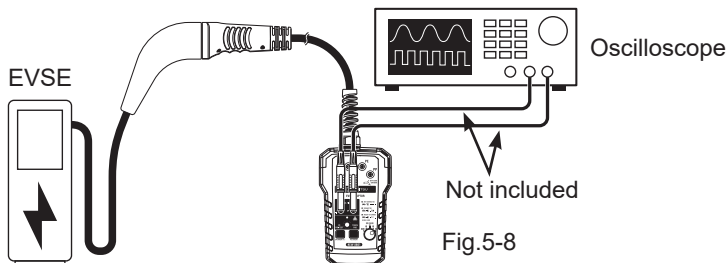


Fig.5-8

Duty cycle of Control Pilot signal indicates the state of EVSE or allowable max. charging current.

Table 4: Max charging current depending on duty cycle

CP duty cycle D_{in}	Max. charging current
$8\% \leq D_{in} < 10\%$	6 A
$10\% \leq D_{in} \leq 85\%$	$D_{in} \times 0.6$ A
$85\% < D_{in} \leq 96\%$	$(D_{in} - 64) \times 2.5$ A

- * Duty cycle indicating that EVSE is not generating charging current.
- $D_{in} < 3\%$: Charging not allowed.
 - $3\% < D_{in} < 7\%$: Indicates digital communication will be used.
 - $7\% < D_{in} < 8\%$: Charging not allowed.
 - $D_{in} > 97\%$: Charging not allowed.

Table 5: CP terminal voltage depending on each vehicle state

Vehicle state	CP terminal voltage
A* ¹	+12V
B	+9V/-12V (1kHz)
C	+6V/-12V (1kHz)
D	+3V/-12V (1kHz)
E* ²	0V
F* ³	-12V

- * 1 The earth of the adapter will be disconnected by pressing PE ERROR (7). As a result, CP terminal voltage of vehicle state B/ C/ D will be equal to that of vehicle state A.
- * 2 Vehicle state E: Error due to the failure of power supply (Error can be simulated by pressing CP ERROR "E" (6).
- * 3 Vehicle state F: Unable to use EVSE. (Unsimulatable)

6. Specifications

- Rated voltage and frequency : 250 V max.
: 50/ 60Hz
- Altitude : 2000 m or less
- Operating temp. & hum. range : 0 to 40°C, RH 80 % or less (no condensation)
- Storage temp. & hum. range : -10 to 50°C, RH 80 % or less (no condensation)
- Applicable standards : IEC / EN 61010-1, -2-030 CATII 250V, IEC 60529 IP40
- Cable length : Approx. 250 mm
- Dimension : KEW 8601 (excluding the plug part)
172(L) × 105(W) × 57(D)mm
Plug part
175(L) × 60(W) × 53(D)mm
- Weight : Approx. 840g
- Accessories : Instruction manual x 1
Carrying case MODEL 9202 x 1

MEMO

English

DISTRIBUTOR

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KYORITSU ELECTRICAL INSTRUMENTS WORKS, LTD.

2-5-20, Nakane, Meguro-ku,

Tokyo, 152-0031 Japan

Phone: +81-3-3723-0131

Fax: +81-3-3723-0152

Factory: Ehime, Japan

www.kew-ltd.co.jp