









**FEV300**  
Electrical Vehicle Charging  
Station Test Adapter  
*Users Manual*

## Introduction

The FEV300 (the Product or test adapter) tests the functions and the safety of charging stations mode 3 for AC charging. The adapter imitates a car and opens up a charging cycle (activate voltage/current output). This adapter allows you to conduct tests in combination with appropriate test instruments like Installation Tester, multimeter and/or Scope Meters (oscilloscope). With this adapter, charging stations can be tested in accordance with IEC/EN 61851-1 and IEC/HD 60364-7-722.

## Symbols

Table 1. Symbols

Symbol	Description
	WARNING. RISK OF DANGER.
	WARNING. HAZARDOUS VOLTAGE. Risk of electric shock.
	Consult user documentation.
	Earth
	Double Insulated.
<b>CAT II</b>	Measurement Category II is applicable to test and measuring circuits connected directly to utilization points (socket outlets and similar points) of the low-voltage MAINS installation.
<b>PE</b>	PE Protective Earth.
<b>CP</b>	CP Control Pilot.
	Vehicles not requiring ventilation for indoor charging areas.
	Vehicles requiring ventilation for indoor charging areas.
	This product complies with the WEEE Directive and its marking requirements. The affixed label indicates that you must not discard this electrical/electronic product in domestic household waste. Do not dispose of this product as unsorted municipal waste. For information about take-back and recycling programs available in your country, see the Fluke website.

## Product Disposal

Dispose of the Product in a professional and environmentally appropriate manner:

- Delete personal data on the Product before disposal.
- Put the Product in the electrical waste.

## Contact Fluke

Fluke Corporation operates worldwide. For local contact information, go to our website: [www.fluke.com](http://www.fluke.com)

To register your product, view, print, or download the latest manual or manual supplement, go to our website.

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## Safety Information

A **Warning** identifies conditions and procedures that are dangerous to the user. A **Caution** identifies conditions and procedures that can cause damage to the Product or the equipment under test.

### Warning

To prevent the possibility of electric shock or personal injury:

- Read all safety information before you use the Product.
- Do not alter the Product and use only as specified, or the protection supplied by the Product can be compromised.
- Carefully read all instructions.
- Do not use the Product if it operates incorrectly.
- Do not touch voltages >30 V ac rms, 42 V ac peak, or 60 V dc.
- Limit operation to the specified measurement category, voltage, or amperage ratings.
- Do not exceed the Measurement Category (CAT) rating of the lowest-rated individual component of a Product, probe, or accessory.
- Comply with local and national safety codes. Use personal protective equipment (approved rubber gloves, face protection, and flame-resistant clothes) to prevent shock and arc blast injury where hazardous live conductors are exposed.
- Do not operate the Product with covers removed or the case open. Hazardous voltage exposure is possible.
- Do not use a current measurement as an indication that a circuit is safe to touch. A voltage measurement is necessary to know if a circuit is hazardous.
- Remove the input signals before you clean the Product.
- Use only specified replacement parts.
- Have an approved technician repair the Product.
- Do not use cable assembly if there is damage. Examine the cable assembly for damaged insulation, exposed metal. Check cable assembly continuity.
- Measure a known voltage first to make sure that the Product operates correctly.
- Do not use the Product around explosive gas, vapor, or in damp or wet environments.
- Do not use the Product if it is altered or damaged.
- Examine the case before you use the Product. Look for cracks or missing plastic. Carefully look at the insulation around the terminals.
- Do not use cable assembly if they are damaged. Examine the cable assembly for damaged insulation and measure a known voltage.
- Use only accessory supplied with the Product.



- **Only connect the Product to the charging stations as indicated in the Specification section.**
- **Use the Product within the operating range only. The operating range is specified in the Specification section.**

## ***Transport and Storage***

Please keep the original packaging for future transport (for example, if calibration is necessary). Any transport damage due to faulty packaging will be excluded from warranty claims.

The adapter must be stored in dry, closed areas. In case of an adapter being transported in extreme temperatures, a minimum recovery time of 2 hours is required prior to any operation.

## ***Available measurements and product description***

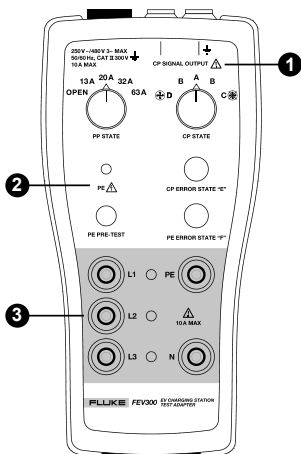
- PE Pre-Test (potential presence of dangerous voltage at PE terminal by mistake) – touch electrode and LED.
- Phase indicator (presence of all three phase voltages measured to N) – three LED's.
- PP State simulation (open, 13 A, 20 A, 32 A, 63 A) – rotary switch.
- CP State simulation (state A, B, C , D ) – rotary switch.
- CP Error state "E" simulation (CP signal short-circuited to PE) – push button.
- PE Error state "F" (Earth Fault) simulation (interruption of PE conductor) – push button.
- Measurements on live conductors (L1, L2, L3 and N) and on PE conductor – five 4 mm safety sockets for connection to Installation Testers (for example, FLUKE 166x series). This allows safety measurements via the measuring terminals like:
  - earth bond
  - insulation
  - loop/line impedance
  - RCD trip test
- Test of CP signal – two 4 mm safety sockets for connection to a multimeter or oscilloscope.

## ***Optional Accessories***

- FEV300-CON-TY1 Type 1 Plug for Test Adapter EV Charging
- FEV300-CON-TY2 Type 2 Plug for Test Adapter EV Charging

## Description of Warning Marks on Front Panel

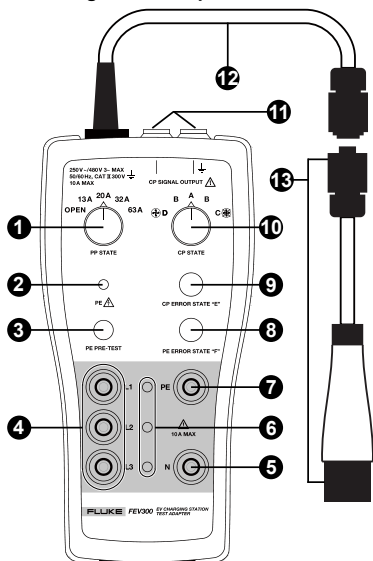
Figure 1. Front panel warning marks



- 1 Terminals with low voltage output (approx. +/- 12V) powered by the charging station. Terminal marked with  $\perp$  is connected to PE. Use for test purposes only. In the case of wrong wiring or error of the charging station, these terminals may present a hazard.
- 2 High danger of electric shock is present when PE Pre-Test indicator illuminates while performing PE pre-test (see **PE Pre-Test**). In this case, stop further testing immediately. Make sure you sufficiently connect your body to earth/ground while doing this test.
- 3 Dangerous voltages are/may be present at L1, L2, L3, N and PE terminals while the test adapter is plugged in to the charging station. Use the test sockets for test purposes only. Do not supply any appliance or charge an electric vehicle via these connectors. In case of wrong wiring or error of the charging station, terminals N and PE may present a hazard.

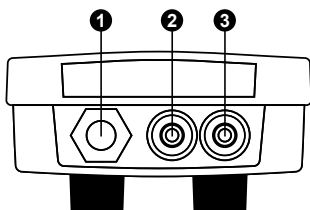
## Operation Elements and Connectors

Figure 2. Front panel function



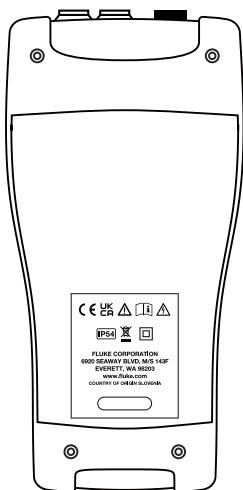
- 1 PP (Proximity Pilot) State rotary switch selector (open, 13A, 20A, 32A and 63A)
- 2 PE Pre-Test warning indicator
- 3 PE Pre-Test touch sensor
- 4 Measuring terminals L1, L2, L3 (black)
- 5 Measuring terminal N (blue)
- 6 Phase indicators of L1, L2, L3 terminals
- 7 Measuring terminal PE (green)
- 8 PE Error state "F" (Earth Fault) button
- 9 CP Error state "E" button
- 10 CP (Control Pilot) State rotary switch selector (state A, B, C, D)
- 11 CP signal output terminals - green terminal (marked with  $\perp$ ) is connected to PE
- 12 Test cable input with 7-pole male connector
- 13 Test cable TYPE 1/2:
  - FEV300-CON-TY2 Type 2 plug for test adapter EV charging or
  - FEV300-CON-TY1 Type 1 plug for test adapter EV charging

Figure 3. Top of the Product



- ❶ Test cable input
- ❷ CP Signal output terminal (yellow)
- ❸ CP Signal output terminal (connected to PE) (green)

Figure 4. Back of the Product



## Testing Charging Stations

### ⚠️⚠️ Warning



To prevent possible electric shock, fire, or personal injury:

- Before starting tests, the operator must be familiar with the following standards: IEC/EN 61851-1, "Electric vehicle conductive charging system - Part 1: General requirements", IEC/HD 60364-7-722 "Low-voltage electrical installations - Part 7-722: Requirements for special installations or locations - Supplies for electric vehicles" and the documentation of the charging station itself.
- Before starting any tests, refer to the local regulations and standards for: safety at work and any relevant publications from the Health and Safety Executive.
- Only skilled persons, competent in verification and the types of tests suitable for installations and charging stations, should do the tests.
- If the wrong types of tests are done or if testing is done in an incorrect sequence then a potentially hazardous situation can occur for both the operator and the DUT (Device Under Test).
- The operator must fully understand the various tests required and how they should be done.
- The charging station must pass the Protective Earth (Ground) PE Pre-Test prior to the operator touching exposed metal surfaces or any other test. If the PE Pre-Test fails, stop further testing. Resolve any faults before proceeding. In case of error, all metal parts of the charging station including output terminals and PE can have hazardous voltage. In this case, there is a high risk of electric shock to the operator and other persons nearby.
- The PE Pre-Test detects the presence of hazardous voltage on Protective Earth but may not detect an open Protective Earth.

### Purpose of the Product

These are the main functions of the Product:

- To simulate connection of an electrical vehicle to the tested charging station (the test adapter simulates electrical vehicle and charging cable). Connection of the Product to a charging station triggers the charging process in the charging station (CP switch at the adapter

shall be in appropriate state). Various cable charging capabilities can be simulated (open, 13 A, 20 A, 32 A and 63 A) as well as all possible electrical vehicle state (state A, B, C  , D  ).

- To provide easy access to charging terminals L1, L2, L3, N, PE and to CP signal terminals to conduct safety and functional testing and connect additional measuring equipment. Charging stations should be tested after installation and tests repeated periodically.

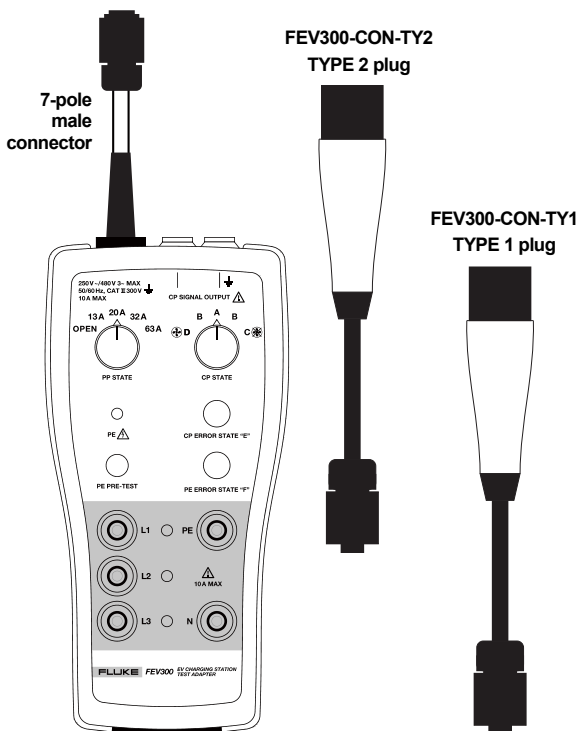
Please refer to the manufacturer's recommendation and national standards which are linked to IEC/HD 60364-6 for initial test or IEC/HD 60364-7-722.

Required tests are:

- Visual inspection
- Continuity of protective conductors and protective bonding (earth bond / PE)
- Insulation resistances
- Loop / line impedance
- RCD trip test
- Function tests (including but not limited to):
  - Vehicle state A, B, C, D,
  - Error handling (error state "E", PE Error state "F" (Earth Fault), ...)
  - Communication (PWM signal)
  - Mechanical locking of EV plug at the charging station
  - Rotary field / phase sequence of output voltage
  - Other tests

## Connection of the Product to Charging Station

Figure 5. Available test cables for the test adapter series



The Product Series can accept the following connection cables:

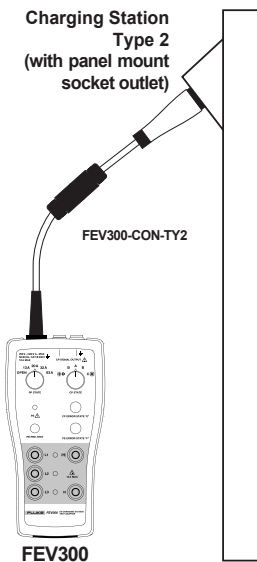
- FEV300-CON-TY2 - Type 2 plug for test adapter EV charging
- FEV300-CON-TY1 - Type 1 plug for test adapter EV charging

Steps for connecting the test adapter to the charging station:

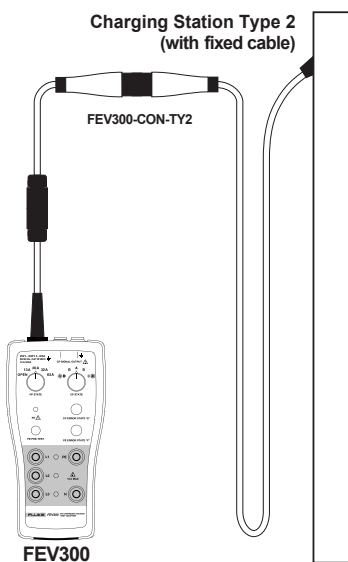
1. Connect the appropriate test cable to the Product.
2. Connect above assembly to the charging station to be tested.

Proper test adapter connection to the charging station is shown in Figures 6, 7, and 8.

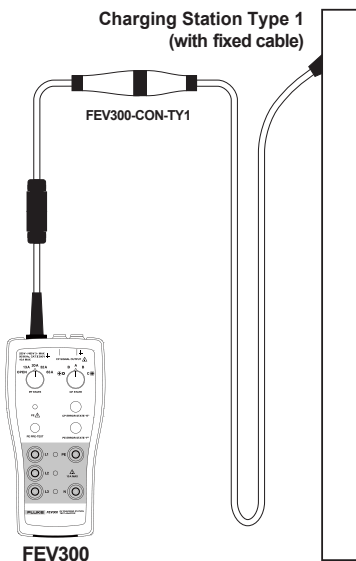
**Figure 6. Test adapter to Type 2 with panel**



**Figure 7. Test adapter to Type 2 with fixed cable**



**Figure 8. Test adapter to Type 1 with fixed cable**

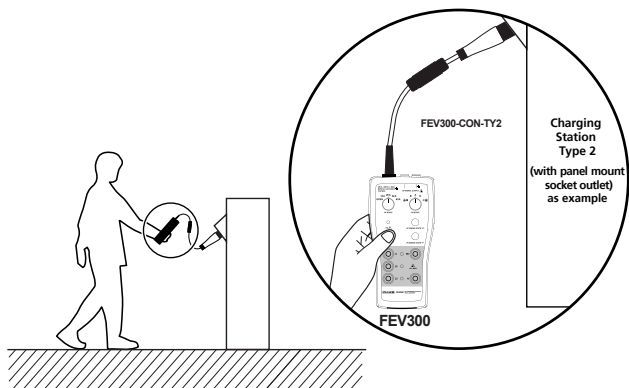




## Testing a charging station

### PE Pre-Test

Figure 9. PE pretest



The PE Pre-Test is a safety feature of the Product. The PE Pre-Test allows the operator to test the PE conductor for possible presence of dangerous voltage against earth.

In normal circumstances, the PE conductor is connected to earth and therefore has no voltage against earth. However, if the PE conductor is not connected to earth (for example, connected to phase by mistake or PE is interrupted) the situation may be hazardous.

Operator skin contact is required on the PE PRE-TEST touch sensor (do not wear gloves) as well as a suitable operator reference to a known earth ground (through the operator's shoes or other clothing). Do not touch any metal parts of the charging station while performing this test. In case of improper connection to earth (for example, isolated placement of your body) this indication may be not reliable.

#### Test procedure:

1. Connect the test adapter to the charging station.
2. Touch the touch sensor with a bare finger. If PE warning indicator (item ②, Figure 2) illuminates, then dangerous voltage is present at PE conductor and metal parts of the charging station. Stop further testing immediately and check for a possible wiring fault of the tested PE conductor.

**⚠** In case of this error, PE terminal carries hazardous voltage. There is a high risk of electric shock to the operator and other persons nearby!

Possible errors are:

- PE interrupted / not connected
- PE carries voltage (for example, connected to phase)

#### **⚠⚠ Warning**

- **The PE Pre-Test detects the presence of hazardous voltage on Protective Earth but may not detect an open Protective Earth.**

### Proximity Pilot (PP) State (Cable Simulation)

To simulate various current capabilities of the charging cable, connect the test adapter to the charging station and set the PP State rotary switch (item ①, Figure 2). The adapter simulates the current capabilities with different resistances connected between PP and PE conductors. See Table 2 for the correlation between resistance and current capability of the charging cable.

*Note*

*If the charging station has a fixed cable with vehicle connector then this setting of PP is not used in all.*

**Table 2. Correlation between resistance and current capability of the charging cable.**

Marking of cable current capability	Resistance between PP and PE
No cable	Open ( $\infty$ )
13 A	1.5 k $\Omega$
20 A	680 $\Omega$
32 A	220 $\Omega$
63 A	100 $\Omega$

### Control Pilot (CP) State (Vehicle Simulation)

Use the CP State rotary switch selector (item ⑩, Figure 2), to simulate various vehicle states when the test adapter is connected to the charging station. Vehicle states are simulated with different resistances connected between CP and PE conductors. Correlation between resistance and vehicle states is shown in Table 3.

**Table 3. Correlation between resistance, vehicle state and CP voltage signal.**

Marking of Vehicle State	Electric Vehicle (EV) State	Resistance between CP and PE	Voltage at CP terminal
A	Electric vehicle (EV) not connected	Open ( $\infty$ )	A1: +12 V or A2: $\pm 12$ V PWM (1 kHz)
B	Electric vehicle (EV) connected, not ready to charge	2.74 k $\Omega$	B1: +9 V or B2: +9 V / -12 V PWM (1 kHz)
C	Electric vehicle (EV) connected, ventilation not required, ready to charge	882 $\Omega$	C1: +6 V or C2: +6 V / -12 V PWM (1 kHz)
D	Electric vehicle (EV) connected, ventilation required, ready to charge	246 $\Omega$	D1: +3 V or D2: +3 V / -12 V PWM (1 kHz)

### Initiating a charging cycle:

1. Turn CP switch to A position and connect the adapter cable to the charging station.
2. Turn CP switch to B position and wait 3 to 5 seconds – in commercial stations this may initiate a station to ask for payment information
3. Turn CP switch to either C or D position depending on the type of a car you wish to simulate (respectively with or without indoor charging area ventilation requirement) to start the charging cycle.

#### Note

*If the station does not begin the charging cycle, turn the CP switch to position A. Then turn the CP switch to position B and wait 3 to 5 seconds. Then turn the CP switch to position C or D. Some EV charging stations require a time delay to establish a proper connection when CP State B is selected.*

The red LED indicates that the charging station opened for the charging cycle and voltage is present at the adapter terminals.

### Verification of CP signal and the charging station's preset maximum charging current

Control Pilot function uses Pulse Width Modulation (PWM):

The purpose of this CP function is communication between a charging station and a vehicle. The duty cycle of the PWM Pulse Width Modulation signal defines the maximum available charging current.

**For details of communication protocol please refer to IEC/EN 61851-1 and the documentation of the manufacturer of the charging station.**

CP output terminals are connected to CP and PE conductors of the charging station under test via the test cable. The green socket is connected to PE. These outputs are for connection of a meter with a duty cycle function or an oscilloscope to check the waveform and amplitude of the CP signal.

### Verification of the maximum charging current with a multimeter or oscilloscope

Set the maximum charging current of the charging station using the internal selection of the charging station itself (please follow therefore the documentation of the manufacturer of the charging station). The value of the maximum charging station current should not exceed the max current allowed by the gauge of the charging cable, the gauge of the installed electrical wires and breaker according to the National Electrical Code.

### Testing maximum charging current:

1. Connect adapter to the charging station and start a charging process by selecting either state C or D using rotary switch, depending on the type of simulated car, to start the charging cycle.
2. Connect multimeter or oscilloscope set to Duty Cycle to the Control Pilot (CP) terminals located on the top of the adapter. See Figure 3, use items ② and ③. Make sure to connect COM input of the meter to the Green (PE) output of the CP terminal.
3. Read the duty cycle value and translate to maximum charging current using the below formulas or a quick reference table (based on IEC/EN 61851-1 standard).

8 % ≤ Duty Cycle < 10 %, Maximum current = 6 A

10 % ≤ Duty Cycle ≤ 85 %, Maximum current = (duty cycle %) x 0.6

85 % < Duty Cycle ≤ 96 %, Maximum current = (duty cycle % - 64) x 2.5

96 % < Duty Cycle ≤ 97 %, Maximum current = 80 A

See detailed calculations in Table 4.

**Table 4. Calculations of max. charging current on basis of duty cycle.**

Duty Cycle (%)	Max Amps	Duty Cycle (%)	Max Amps	Duty Cycle (%)	Max Amps
8	6.0	40	24.0	70	42.0
10	6.0	41	24.6	71	42.6
11	6.6	42	25.2	72	43.2
12	7.2	43	25.8	73	43.8
13	7.8	44	26.4	74	44.4
14	8.4	45	27.0	75	45.0
15	9.0	46	27.6	76	45.6
16	9.6	47	28.2	77	46.2
17	10.2	48	28.8	78	46.8
18	10.8	49	29.4	79	47.4
19	11.4	50	30.0	80	48.0
20	12.0	51	30.6	81	48.6
21	12.6	52	31.2	82	49.2
22	13.2	53	31.8	83	49.8
23	13.8	54	32.4	84	50.4
24	14.4	55	33.0	85	51.0
25	15.0	56	33.6	86	55.0
26	15.6	57	34.2	87	57.5
27	16.2	58	34.8	88	60.0
28	16.8	59	35.4	89	62.5
29	17.4	60	36.0	90	65.0
30	18.0	61	36.6	91	67.5
31	18.6	62	37.2	92	70.0
32	19.2	63	37.8	93	72.5
33	19.8	64	38.4	94	75.0
34	20.4	65	39.0	95	77.5
35	21.0	66	39.6	96	80.0
36	21.6	67	40.2	97	80.0
37	22.2	68	40.8		
38	22.8	69	41.4		

#### **Error states:**

Duty Cycle = 0 % (Duty Cycle < 3 %), State F or E (see IEC/EN 61851-1 Standard); no charging allowed

Duty Cycle = 5 % (4.5 % ≤ Duty Cycle ≤ 5.5 %), Indicates that digital communication is needed

7 % < Duty Cycle < 8 %, Error state; no charging allowed

Duty Cycle = 100 %, State B1, C1 or D1; no charging allowed

#### **CP Error state "E" simulation**

Use CP Error "E" button (see Figure 2, item 9) to simulate a CP Error. When CP Error state "E" is pushed, the test adapter makes a short circuit between CP and PE through internal diode. As a result, the pending charging process is aborted and new charging processes are prevented.

#### **PE Error state "F" (Earth Fault) simulation**

Use the PE Error state "F" button (see Figure 2, item 8) to simulate an interruption of the PE conductor. The pending charging process is aborted and new charging processes are prevented.

## Phase indicator

The phase indicator consists of three LED's, one for each phase (see Figure 2, item 6). When the test adapter is connected to the charging station and phase voltages are present at the charging connector, the LED indicators will illuminate.

### Notes:

- *If the neutral (N) conductor is not present or it is interrupted, LED indicators will not indicate possible voltage presence at L1, L2 and L3 conductors. The LED indicators cannot be used for phase sequence testing.*
- *If the charging station has only a single-phase output, only one LED will illuminate.*

## Measuring terminals L1, L2, L3, N and PE

Measuring terminals (see Figure 2, item 4, 5 and 7) are directly connected to L1, L2, L3, N and PE conductors of the tested charging station via the test cable. Use these terminals for measuring purposes only. Do not draw current over a longer period or supply anything else.

The terminals can be used to perform measurements like earth bond, insulation, loop/line impedance, RCD trip test, voltage and Power Quality. An appropriate measurement instrument (for example the FLUKE 166x series) is needed.

## Maintenance

When using the test adapter in compliance with the user manual, no special maintenance is required. However, should functional errors occur during normal operation, the after sales service will repair your instrument. Please contact the local service office.

## Cleaning

### Warning

- **Prior to cleaning, disconnect the test cable from all measurement circuits.**
- **Never use acid-based detergents or solvent liquids for cleaning.**
- **After cleaning, do not use the Product until the Product is dried completely.**

To clean the Product, use a wet cloth and a mild household detergent.

# Specifications

## General Features

Input voltage .....	Up to 250 V (single phase system) / up to 480 V (three phase system), 50/60 Hz, max 10 A
Internal power consumption .....	3 W max.
FEV300-CON-TY2 Plug .....	AC charging mode 3, suitable to IEC 62196-2 type 2 socket outlet or fixed cable with vehicle connector (type 2, 7P three-phase)
FEV300-CON-TY1 Plug .....	AC charging mode 3, suitable to IEC 62196-2 type 1 or SAE J1772 with vehicle connector (type 1, 5P single-phase)
Dimensions (H × W × D) .....	110 mm × 45 mm × 220 mm (4.3 in × 1.8 in × 8.7 in) length without connection cable and test cable
Weight (including type 1 or type 2 connection cable) .....	Approx. 1 kg (2.2 lb)
Safety standards.....	IEC/EN 61010-1, pollution degree 2 IEC/EN 61010-2-030, CAT II 300 V, protection class II
Ingress protection .....	IEC 60529: IP54 (housing) IEC 60529: IP54 (Measuring terminals with protection caps in place, connector/ plug in connected condition or with protection caps in place, otherwise IP20)
Operating temperature .....	-20 °C to 40 °C (-4 °F to 104 °F)
Storage temperature .....	-20 °C to 50 °C (-4 °F to 122 °F)
Operating humidity range .....	10 % to 85 % relative humidity non-condensing
Storage relative humidity .....	0 % to 85 % non-condensing
Operating altitude .....	2000 m (6561 ft) max.

## Functions

PE Pre-Test.....	Visible indication >50 V AC/DC between PE conductor and touch sensor
PP Simulation .....	Open, 13 A, 20 A, 32 A, 63 A
CP States.....	State A, B, C, D
CP Error state "E" .....	On/off (CP signal short-circuited to PE)
PE Error state "F" (Earth fault) .....	On/off (interruption of PE conductor)

## Outputs (for test purpose only)

Measuring terminals L1, L2, L3, N, PE .....	Max. 250/480 V, max. 10 A
CP signal output terminals .....	Approx. +/-12 V

*Caution: In case of wrong wiring or error of the charging station these terminals may be hazardous.*

**LIMITED WARRANTY AND LIMITATION OF LIABILITY**

Each Fluke product is warranted to be free from defects in material and workmanship under normal use and service. The warranty period is three years and begins on the date of shipment. Parts, product repairs, and services are warranted for 90 days. This warranty extends only to the original buyer or end-user customer of a Fluke authorized reseller, and does not apply to fuses, disposable batteries, or to any product which, in Fluke's opinion, has been misused, altered, neglected, contaminated, or damaged by accident or abnormal conditions of operation or handling. Fluke warrants that software will operate substantially in accordance with its functional specifications for 90 days and that it has been properly recorded on nondefective media. Fluke does not warrant that software will be error free or operate without interruption.

Fluke authorized resellers shall extend this warranty on new and unused products to end-user customers only but have no authority to extend a greater or different warranty on behalf of Fluke. Warranty support is available only if product is purchased through a Fluke authorized sales outlet or Buyer has paid the applicable international price. Fluke reserves the right to invoice Buyer for importation costs of repair/replacement parts when product purchased in one country is submitted for repair in another country.

Fluke's warranty obligation is limited, at Fluke's option, to refund of the purchase price, free of charge repair, or replacement of a defective product which is returned to a Fluke authorized service center within the warranty period.

To obtain warranty service, contact your nearest Fluke authorized service center to obtain return authorization information, then send the product to that service center, with a description of the difficulty, postage and insurance prepaid (FOB Destination). Fluke assumes no risk for damage in transit. Following warranty repair, the product will be returned to Buyer, transportation prepaid (FOB Destination). If Fluke determines that failure was caused by neglect, misuse, contamination, alteration, accident, or abnormal condition of operation or handling, including overvoltage failures caused by use outside the product's specified rating, or normal wear and tear of mechanical components, Fluke will provide an estimate of repair costs and obtain authorization before commencing the work. Following repair, the product will be returned to the Buyer transportation prepaid and the Buyer will be billed for the repair and return transportation charges (FOB Shipping Point).

THIS WARRANTY IS BUYER'S SOLE AND EXCLUSIVE REMEDY AND IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. FLUKE SHALL NOT BE LIABLE FOR ANY SPECIAL, INDIRECT, INCIDENTAL OR CONSEQUENTIAL DAMAGES OR LOSSES, INCLUDING LOSS OF DATA, ARISING FROM ANY CAUSE OR THEORY.

Since some countries or states do not allow limitation of the term of an implied warranty, or exclusion or limitation of incidental or consequential damages, the limitations and exclusions of this warranty may not apply to every buyer. If any provision of this Warranty is held invalid or unenforceable by a court or other decision-maker of competent jurisdiction, such holding will not affect the validity or enforceability of any other provision.

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