FLUKE®

Fluke FEV350 EV Charging Station Analyzer

Test the safety and functionality of AC electrical vehicle charging stations with the all-in-one tool that is safe, portable, and easy to use.

The FEV350 is a complete solution for safety and performance testing of AC EV charging stations with Type 2 or Type 1 connectors. Designed for technicians required to perform and document multiple tests quickly and efficiently without carrying multiple tools. The solution includes the TruTest EV Charging software module for documentation and reporting. The solution performs the available measurements below in addition to the supporting measurements with Fluke's compatible multifunction installation testers for installation certification/inspections via wireless Bluetooth connection, wiring configuration diagrams, and info screens for seamless integration with TruTest software for report generation. The Fluke FEV350 provides predetermined test plans and pass/fail indications on measurement results to simplify analysis and time spent testing. The FEV350 EV Charging Station Analyzer is designed in accordance with IEC/EN 61851-1 and IEC/HD 60364-7-72.

MAIN APPLICATIONS

- Safety testing of charging stations
- Functional testing of charging stations
- Troubleshooting/repair of charging stations

Available measurements:

- PE (protective) earth pre-test to ensure no dangerous voltage is present
- visual inspection
- 30 mA RCD + 6 mA RDC-DD trip test
- nominal voltage + phase sequence
- auto control pilot (CP) with waveform analysis
- proximity pilot
- error testing

Supported measurements with compatible Fluke multi-function testers:

- earth bond
- insulation
- loop/line Impedance

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Function Selection

PE Pre-Test to check if hazardous voltage is present

Press up/down and left/right arrow keys to select features on the display

Neutral

Color LCD display
On-screen instructions provide an easy walkthrough of tests and provide a Pass/Fail indication on all test results.

Easily analyze EV charging performance
Auto Control Pilot simulates various vehicle states with on-screen feedback of nominal results and waveform analysis.

Power button

L1, L2, L3

Protective earth

Color screen with integrated interface

On-screen instructions provide an easy walkthrough of tests and provide a Pass/Fail indication on all test results.

Easily analyze EV charging performance

Auto Control Pilot simulates various vehicle states with on-screen feedback of nominal results and waveform analysis.

## Auto control pilot and waveform analysis
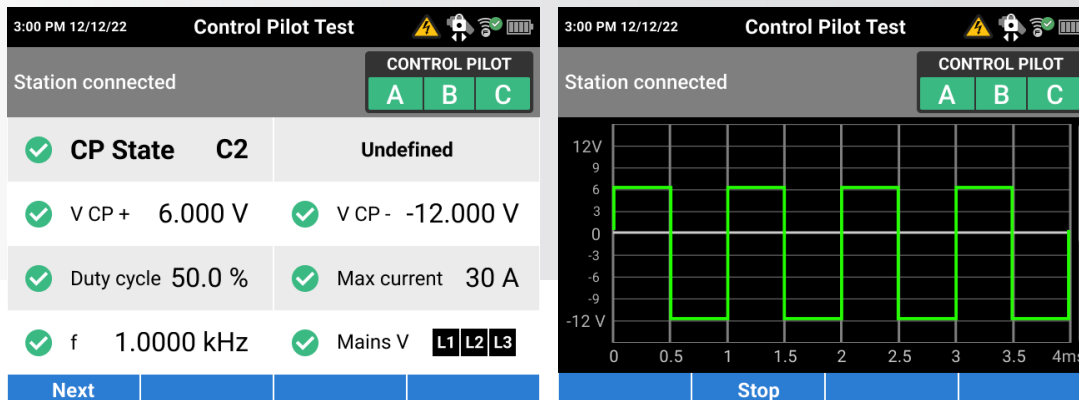
TruTest™
Data Management and Reporting Software
with EVSE Module

Spend less time processing test results and compiling reports

The reporting necessary to close out projects can be challenging and time-consuming. Cover all your certification and documentation needs through the modern, fast, and reliable software platform of TruTest™. TruTest™ allows for EV Charging asset management, data storage, and reporting on a single platform. Whether you are analyzing Control Pilot waveforms or safety testing the system, proper data management is critical for producing easy-to-understand reports for clients. Compatible with the Fluke FEV350 EV Charging Analyzer, TruTest™ Software allows you to quickly import measurement results directly from your EV charging analyzer to the computer, organize and analyze the data, compare individual asset data against previous measurements imported and provide a comprehensive and visual client report.

- **Easily manage** measurement data from EVSE inspections
- **Quickly create** inspections and reports
- **Control Pilot waveform analysis** with easy pass/fail visuals
- **Compare site data** to previous site data to see changes over time
- **Quickly access** the latest firmware to update your FEV350
- **A free 60-day demo version of TruTest™** is available for download on fluke.com. Purchase a software key to unlock the Lite or Advanced version.
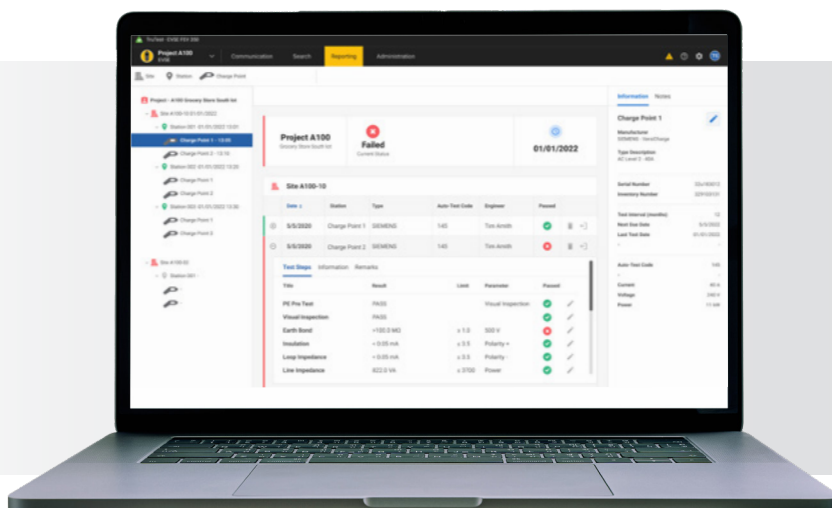
Specifications

General specifications	
Input elctrical ratings	1 Φ: 250 V max, 3 Φ: 230/400V max, 50/60 Hz, max 1 A
Internal power consumption	3 W max
Size (H x W x D)	(263 mm x 123 mm x 63 mm), (10.35 in x 4.84 in x 2.48 in), without the TY1 or TY2 plug
Weight	0.9 kg, without the TY1 or TY2 plug, 1.4 kg, with the TY1 or TY2 plug
Battery	4 x AA/IEC LR6 alkaline or IEC HR6 NiMH
Temperature	
Operating	–10 °C to 40 °C (14 °F to 104 °F)
Storage	–20 °C to 50 °C (-4 °F to 122 °F)
Relative humidity	
Operating	10 % to 85 %, 0 °C to 40 °C, (32 °F to 104 °F), non-condensing
Storage	up to 95 %
Wireless radio, Bluetooth 5.0	
Frequency range	2412 MHz to 2462 MHz
Output power	<100 mW
Altitude	3000 m
Safety	IEC 61010-1: Pollution Degree 2, IEC 61010-2-030, CAT II 300 V, Protection Class II
Performance	IEC 61557-1, IEC 61557-6, IEC 61557-7, IEC 61557-10
Ingress protection	IEC 60529: IP40

Test function specifications

The operational error specification reference for digit counts is defined as ±(% of reading + digit counts). The operational error for other specifications that reference a % are defined as the % of the reading unless otherwise specified. The operational error specification reference temperature for all readings is 23 °C ±5K temperature coefficient of 0.1 %/°C.

Test/function	Display range	Measurement range	Operational error	Nominal values
PE pre-test				
Touch voltage, safe range	≤50 V AC/DC		–50 %	–
Touch voltage, dangerous range	>50 V AC/DC		–50 %	–
Visual inspection	See checklist			
Earth bond, R_{LO}[1]	–			@ >200 mA I_{test}
Insulation, R_{INS}[1]	–			@ 500 V U_{nom}
Loop/Line impedance[1]	–			no trip loop
RCD/RDC-DD pre-test				
U_f	5 V to 110 V		–(0 % + 0 digits), +(10 % + 3 digits)	@ I_{test} 0.33 x IΔN AC
R_e	166 Ω to 3667 Ω		–10 % to +15 %	
RCD test (IΔN 30 mA)				
RCD type A, B/B+, RDC-PD	–			
RCD trip time with AC, half wave, DC (0°, 180°)				
x0.5 (30 mA)	0 ms to 510 ms			
x1 (30 mA)	TN: 0 ms to 310 ms TT @120 V: 0 ms to 310 ms TT @230 V: 0 ms to 210 ms		±(2 % + 3 ms)	@ mains 100 V AC to 253 V AC
x5 (30 mA)	0 ms to 50 ms			
Ramp current (0°, 180°)				
AC @RCD type B/B+	12.0 mA to 36.0 mA, 17 steps with 1.5 mA			
AC half wave @RCD ±1.5 mA type A and RCD-PD	7.5 mA to 48.0 mA, 28 steps with 1.5 mA		±1.5 mA	
DC @RCD type B/B+	12.0 mA to 66.0 mA, 37 steps with 1.5 mA			

Test function specifications

Test/function	Display range	Measurement range	Operational error	Nominal values
RDC-DD test (IΔN +6 mA EV)				
Trip time (0°, 180°)				
+3 mA DC	0.000 s to 10.100 s		±(2 % + 3 ms)	@ mains 100 V AC to 253 V AC
+6 mA DC				
+60 mA DC		0 ms to 310 ms		
+200 mA DC		0 ms to 110 ms		
Ramp current (0°, 180°)	smooth ramp 2.0 mA to 6.0 mA		±0.6 mA	
Mains voltage				
L–N, L–PE, N–PE	0 V to 280 V	0 V to 253 V	±(3 % + 3 digits)	R_{IN} L–N: >30 MΩ, R_{IN} L–PE: >10 MΩ, 40 Hz to 70 Hz, crest factor 2, $V_{max\,peak}$: 560 V
L–L	0 V to 490 V	0 V to 440 V		R_{IN} L–L: >30 MΩ, 40 Hz to 70 Hz, crest factor 2, $V_{max\,peak}$: 980 V
Frequency	40.00 Hz to 70.00 Hz		±0.20 Hz	–
Phase sequence	right, left, none	–	voltage imbalance: <20 % voltage difference between phases, phase imbalance: 120° ± 10°	50 V to 280 V phase to N
CP signal analysis				
Voltage	–15.000 V to 15.000 V	–15.000 V to –2.000 V, 2.000 V to 15.000 V	±0.5 %	R_{IN} 1 MΩ 0.9000 kHz to 1.1000 kHz; U_{CP}+ >2.000 V, U_{CP}- <–2.000 V
PWM duty cycle	2.0 % to 98.0 %	3.0 % to 97.0 %	±5 digits	
Current indication	0.0 A to 80.0 A	–	Based on duty cycle[3]	
Frequency	0.9000 kHz to 1.1000 kHz		0.1 %	
CP state indication	A, B, C, D	–	Based on voltage[2]	
	x1, x2	–	Based on frequency[2]	
CP state simulation	A	–	>900 kΩ ±0.2 %	–
	B	–	Upper level: 4610 Ω ±0.2 %[2] Nominal level: 2740 Ω ±0.2 %[2] Lower level: 1870 Ω ±0.2 %[2]	–
	C	–	Upper level: 1723 Ω ±0.2 %[2] Nominal level: 1300 Ω ±0.2 %[2] Lower level: 909 Ω ±0.2 %[2]	–
	D	–	Upper level: 448 Ω ±0.2 %[2] Nominal level: 270 Ω ±0.2 %[2] Lower level: 140 Ω ±0.2 %[2]	–
PP state simulation	open	–	>900 kΩ	–
	13 A		1500 Ω±1.5 %[2]	
	20 A		220 Ω±1.5 %[2]	
	32 A		220 Ω±1.5 %[2]	
	63 (70) A		100 Ω±1.5 %[2]	
	Error		<60 Ω (56 Ω±5 %)	

Test Function Specifications

Test/function	Display range	Measurement range	Operational error	Nominal values
Fault simulation	PE error (earth fault/PE open)	–	–	–
	CP error E @ 0 Ω or 120 Ω		−0 Ω/ +2 Ω, 120 Ω±1.5 %[2]	
	Diode short		–	
	Error D			
PP voltage measurement (Type 2 with socket)	0.10 V to 15.00 V		±(1.0 % + 3 digits)	R_{IN}: 1 MΩ
PP resistor measurement				
Type 2 with cable (R_c)	50.0 Ω to 499.9 Ω, 500 Ω to 5000 Ω		±1.0 %	–
Type 1 with cable (S3, R6, R7)				
CP resistor measurement (R1)	800 Ω to 1200 Ω		±1.0 %	–

[1] The test requires a multi-function tester (MFT). See the documentation of the MFT for the display range, measurement range, and operational error or accuracy values.
[2] According to IEC 61851-1.
[3] According to table A.8 of IEC 61851-1.

Included in test adapter kits

	FEV350/TY2	FEV350/ TY2 PRO	FEV350 TY2/TY1	FEV350 TY2/TY1 PRO	FEV350/KIT
FEV350/BASIC Test Analyzer	•	•	•	•	•
FEV300-CON-TY1			•	•	
FEV300-CON-TY2	•	•	•	•	•
Zero Adapter/TY1			•	•	
Zero Adapter/TY2	•	•	•	•	•
TPAK Magnetic Hanger	•	•	•	•	•
Soft Carrying Bag	•	•	•	•	•
Trutest Software License		•		•	
1664 FC Multifunction Tester					•

Ordering information

FLK-FEV350/TY2
FLK-FEV350/TY2 PRO
FLK-FEV350/TY2/TY1
FLK-FEV350/TY2/TY1 PRO
FLK-FEV350/KIT

Suggested test equipment:
Fluke 1664 FC Installation Multifunction Tester

Visit **www.fluke.com** to get complete details on these products or ask your local Fluke sales representative.

FLK-FEV350/TY2 PRO

FLK-FEV350/TY2/TY1 PRO

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