

The CoTEC Model C31 25kV Line Tester

The C31 is built to a proven design using the highest-grade components. Manufactured in stainless steel, aluminium and glass-fibre, the body is sealed to IP65 and is highly resistant to corrosion. The C31 is user friendly, requiring only a single press of a button. The large easy to read Meter is manufactured to military specification DEF STAN 66-9, filled with dry nitrogen and sealed to IP68. It is designed to withstand extreme shock, vibration, temperature, dirt and humidity. The instrument dial is finished in matt white with large black numerals reading from 0V to 30kV in increments of 5kV with a red line at 25kV. Set in the dial are two high intensity LEDs, one green and one red.

The C31 is comprised of three parts; (1) the tester, which comes in a tough protective carry case (2) a high voltage probe hook, shrouded for use in wet weather, and (3) an 8 metre length of 50mm² aluflex cable with standard rail clamp. Also included is a battery charger for charging the C31's internal Nickel Metal Hydroxide batteries.

The C31 incorporates a number of important safety features including; **Dual independent circuitry**, meaning the analogue meter and the LED indicators work completely independent of each other, if one circuit fails, the other will keep on working for your safety. **Automatic Meter Prover** operates every time the tester is turned on, proves the electrical and mechanical operation of the analogue meter. **Triple Resistor Sets**, ensure that in the unlikely event of one HV resistor failing, the remaining ones are sufficient to safely protect the operator and the equipment. The resistors are tested at 40 KV AC. **The 50mm² Aluflex grounding cable** will safely conduct the full force of the OHL system in the event of a catastrophic failure of the equipment, such as direct contact with the overhead line. **Automated Test Cert Validation**, warning lights flash when test certificate has expired.

Safety Advice

IMPORTANT - READ THIS BEFORE FIRST USING THIS EQUIPMENT
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This equipment should only be used by competent trained personnel.

1. First check that the equipment has a valid test certificate, this should be displayed on labels affixed to both halves of the tester. Also ensure that the HV probe and the tester bears exactly the same serial number with the tester suffixed 'A' and the HV probe suffixed 'B'
2. Visually inspect the equipment for signs of damage, check along the length of the HV probe for any splits or cracks, check the aluflex cable is not damaged and that the crimped lugs are soundly fastened. If in doubt, do not use.
3. Make sure that the tester HV Probe is clean and free from any contamination that may be conductive at high voltages.
4. Always use the C31 tester in conjunction with approved operating rods and a primary insulator pole with a valid test certificate.
5. Do not use the C31 tester in extremes of wet weather.
6. **ALWAYS** ensure that the rail clamp is firmly attached to the rail track **BEFORE** the C31 tester is applied to the overhead line. **NEVER** move or remove the clamp while the tester is still attached to the overhead line.

WARNING – Failure to observe procedure 6 may result in the operator receiving a low current but very high voltage electric shock.

Operation

1. Before each test; observe the safety advice given in the previous section.
2. Screw the HV probe into the body of the tester, taking care not to over tighten.
3. Attach the aluflex cable to the tester at the fastening point below the meter. Ensure that the mating surfaces are clean and that the lug is firmly attached to the tester body.

4. Fasten the other end of the aluflex cable firmly to the rail track using the rail clamp, again ensuring that the mating surfaces achieve a good electrical connection.
5. Depress the button at the rear of the meter housing and hold for approximately one second. The C31 will then commence a start up diagnostic routine. (a) First the C31 will perform a lamp test; this is indicated by both red and green LEDs flashing brightly. If you do not see both colours return the tester for repair. (b) At the same time as the lamp test, the meter prover should rotate the pointer to read 30KV (c) Following the lamp test/meter prover there will be a short pause while the C31 checks the internal battery, if the battery level is low the operator will next see a single red LED flashing slowly. Please note; a low battery warning will not prevent the test from proceeding, but the operator is advised to recharge the batteries at the earliest opportunity. (d) The battery check is immediately followed by a system check, if all is well the next thing the operator will see is a steady green light, this means the C31 is active and you may proceed with live line testing.
6. Apply the HV probe to the overhead line by the hook at the tip of the probe. The tester has an over-reach collar that also acts as a rain hood, the over-reach limit is indicated by a fluorescent yellow band at the top of the rain hood.
7. Take great care not to overshoot the overhead line and make contact with the metal casing of the C31 as this would cause irreparable damage to the tester. Once applied to the line, the C31 will indicate the precise voltage on the analogue meter, also the LED indication will change over from green to red if the line voltage exceeds 11KV $\pm 500V$ in accordance with Railtrack specification.
8. When using the C31 to prove isolation before working on the OHL system, always test on a live conductor first to prove the instrument is working properly, then check again after the line has been isolated.
9. The C31 will turn itself off after 5 minutes. However, the analogue meter operates from the power in the overhead line and will read continuously for as long as there is power on the line. To prevent overheating do not keep the C31 tester attached to a live conductor for longer than 10 minutes at a time.
10. HANDLE WITH CARE - When removing the tester from the overhead line, take care not to drop the tester on the ground. Although the gauge is resistant to shock, the instrument's internal movement may be permanently damaged by a heavy impact.

Troubleshooting

The tester wont come on at all when the button is pressed	(a) Button press too short (b) Button press much too long (c) Flat battery (d) Fault	Press button for 1 second Press button for 1 second Charge battery Return for repair
Tester lights flash briefly then go off when button is pressed	(a) Flat battery (b) Circuit fault	Charge battery Return for repair
Meter does not display voltage or reads low. Green light on when I know the line is live	(a) Poor ground connection (b) Equipment fault	Check aluflex ground connections Return for repair
LEDs work OK no meter reading	(a) Damaged meter	Return for repair
Meter reads very high / is noisy or gets very hot	(a) Possible HV probe fault	Do not use ! Return for repair
Red light flashes repeatedly 5 short flashes + 1 long flash	(a) Tester is out of certification (b) Fault	Return to Cotec for testing & date reset

Precautions during wet weather use

Although the C31 is designed for use in all weather conditions, care must be exercised to ensure that the tester is kept as dry as practicable during use and completely dry and clean when not in use. Keep the time that the tester is in contact with a live conductor to a minimum and in any case not exceeding one minute.

STAY SAFE! - DO NOT USE THE TESTER IN EXTREMES OF WET WEATHER!

Storage

Disassemble the tester after use and place the C31 instrument body back into its protective case (especially during transport) Take care to protect the male thread on the HV probe from damage. Store the tester in a dry place If at all possible. If the tester is not going to be used for a long period, fully charge the batteries before storage and re-charge every six months.

Periodic Maintenance

Keep the tester clean by using a damp cloth and wipe dry with a clean paper towel. Grease can be removed using a cloth and a mild detergent solution and wiping dry with a clean paper towel. Never immerse any part of the HV probe in water. Clean threads and treat occasionally with a very small amount of lubricant such as 'copperslip'

The C31 tester requires calibration testing and certification once a year. The HV probe should be replaced after 5 years or at anytime if it's resistance falls below 35 Megohms.

Specification

Range	0 to 30 Kilovolts AC
LED Change over	11.0 KV \pm 500V
Test Duration	<25 KV 10 minutes >25 KV 1 minute
Absolute Maximum Rating	40 Kilovolts AC
Accuracy	Analogue 2 %
Operating temperature	Analogue -40° to +70°C LED -10° to +50°C
Test current	0 to 200 μ A
Seal rating	Tester body IP65 (HV probe & Gauge IP68)



Complies with the following standards;

BS EN 61243-2 :1998 Class D Outdoor type
EC Directive 89/336/EEC
BS EN 50121-1 : 2000 Railway Application
Railtrack Specification RT/E/PS/0003 : 2000

Railtrack approved – Cert No. PA05/1514

Warranty

The C31 live line tester is fully guaranteed for 12 months. There are no user serviceable parts inside. Opening the tester automatically invalidates the warranty.

C31- _____



**Type C31
25KV AC
Live Line Tester**

Instructions for use

**READ THIS BEFORE
USING THIS EQUIPMENT**

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