



TEST, SURVEY & LOCATION EQUIPMENT CATALOGUE INDEX

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ALLEGRO QX FIELD COMPUTER

When facing a long day of close interval, DCVG or periodic surveys, the Allegro QX field computer is the one instrument you want to have. With an integrated camera, glare-resistant color display, high-performance battery, and a tactile QWERTY keyboard that makes it easy to enter data, the Allegro QX has everything you need to assess facilities, leaks, atmospheric corrosion and valves.

DATASHEET

ALLEGRO QX FIELD COMPUTER



Features include

- •An integrated DVM that delivers accuracy of 0.25 percent when reading DC voltage even in the presence of up to 100 volts of AC interference and a highly-accurate, WAAS-enabled internal GPS.
- •A QWERTY keyboard and full number pad.
- •An integrated camera that allows you to instantly add atmospheric inspection photos to your inspection record.
- •A color VGA display with a resolution that's four times better than previous models and is easy to read, even in direct sunlight.
- •The option to couple the Allegro QX with RFID technology to make site visits 100 percent verifiable.
- •A quick-charging lithium-ion battery that will last for up to fourteen hours of nonstop surveying.

Why Choose the Allegro QX?

- •Add pictures and log data faster The Allegro QX speeds data collection with full PCS integration and an internal GPS that can automatically record survey latitude and longitude. You can also use the integrated camera to take time-stamped, high-resolution photos and instantly embed them in your PCS inspection record.
- •lt's designed for oil and gas compliance The Allegro QX supports common survey types and presents data graphically through live waveforms and more.
- •lt's easy to use The QWERTY keyboard and full number pad ease data entry, the large display is easy to view in all lighting conditions, and the internal WAAS-enabled GPS antenna provides coordinates quickly and accurately.
- •lt's fully integrated Features include full integration with PCS along with a DVM, an internal GPS, and software that can conduct synchronized, interrupted surveys.
- •You can depend on it A single battery charge will last all day, even in nonstop survey conditions. Plus, you can pair it with RFID technology to improve data reliability.
- •It lets you log data faster The Allegro QX speeds data collection with full PCS integration and an internal GPS that can automatically record survey latitude and longitude. You can also use the integrated camera to take time-stamped, high-resolution photos and instantly embed them into your inspection record.





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ALLEGRO QX FIELD COMPUTER

Environmental Specifications

Water and Dust Resistance: IP66 rating

Operating Temperature: 32oF to 131oF (0oC to 55oC)

Storage Temperature: -22oF to 158oF (-30oC to

70oC)

Shock Resistance: Resists shocks as specified by MIL-

STD-810G Method 516.6

Software Specifications

Operating System: Microsoft Windows Embedded

Handheld 6.5.3

Mechanical and General Specifications

Size: 5.4 in x 10.2 in x 2.5 in

Weight: 2 lbs, 8 oz

Battery: Lithium-ion | 3.7 VDC @ 10,600 mAh | 38.7 Wh | Lasts up to 14 hours under

continuous survey conditions | Charges in 2-4 hours

Display: 4.2 inch active-viewing area | TFT color VGA (640 x 480) | Projected capacitive touch

interface | Scratch-resistant, chemically strengthened glass | High-visibility backlit LCD

Wireless: Bluetooth® 2.1, class 1.5, range 100 ft | Wi-Fi 802.11 b/g/n with extended range | 3G

GSM (microSIM) pentaband worldwide (optional)

Sensors: Compass | X-Y level

Keyboard: Full numeric and QWERTY keypad | Adjustable key backlight

Camera: 5 megapixel with autofocus and video | LED illuminator (includes flashlight feature) |

Photos tagged with time and date

GPS: High-sensitivity GPS and GLONASS receiver (u-blox) | SBAS accuracy: 2 m | Autonomous

accuracy: 5 m | Internal antenna

Ports: RS-232C 9-pin D connector | USB host (full A) | USB client (micro B) | 12-24 VDC input |

3.5 mm audio jack | I/O docking port | 3-pin trigger (M8 female)

Certifications: MIL-STD-810G | FCC Class B | CE Marking | Industry Canada | EN60950 Safety

DVM Specifications

Working Voltage (DC): 250 V max. on primary input | 500 mV max. on shunt input*

Working Voltage (AC): 175 V max. on primary input | 350 mV max. on shunt input*

Input Impedance: 100 M Ω on primary input | 100 k Ω on shunt input*

Measurement Category: CAT II 250V

*This input has a range and impedance specially designed for measuring shunts more accurately. **Accuracy shown is for operation in temperatures from 15oC to 35oC. Annual calibration is required to maintain DVM accuracy



DATASHEET

ALLEGRO QX FIELD COMPUTER



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DIGITAL EARTH TESTERS

DET4TC2 and DET4TCR2Digital Ground Testers

DESCRIPTION

Megger's DET4 family of ground testing instruments offers a comprehensive solution to your ground stake and soil resistivity testing needs.

The standard instrument comes with test leads, stakes, terminal adaptors for bare wire, batteries and calibration certificate are delivered in a tough carry case which has space to accommodate all the instrument accessories - everything you need to start testing in one kit.

- IP54 rated
- 2, 3 and 4 point testing
- Attached Rod Technique (ART)
- Stakeless measurements
- User selectable test frequency
- Dry cell or rechargeable versions
- User selectable output voltage
- Simple one button operation
- Robust carry case
- Backlit display
- Delivered with calibration certificate

Megger's DET4 family of ground testing instruments offers a comparison resistivity testing needs. The standard instrument comes with test leads, stakes, terminal adaptors for bare wire, batteries and calibration certificate are delivered in a tough carry case which has space to accommodate all the instrument accessories - everything you need to start testing in one kit.

The DET4TC2 and DET4TCR2 are designed for extended temperature range use with an IP54 rated enclosure making them genuinely outdoor instruments. The instrument provides all the functions required for ground system testing: variable frequency 2 pole, 3 pole, 4 pole, Attached Rod Technique (ART), stakeless, leakage current and ground noise voltage measurement.

The instrument is easy to use with a large rotary selector switch and one-press test button, both of which permit operation with gloved hands. Unlike some instruments, the design negates the need for a shorting link when making two pole measurements.

There are no hidden functions with the instrument: clearly labelled auxiliary controls are used to select the test frequency (94 Hz, 105 Hz, 111 Hz and 128 Hz), output voltage (50 V or 25 V where local standards apply) and to switch the backlight on or off. The optional MCC CLAMP augments the traditional fall-of-potential measurement method with ART (Attached Rod Technique) which allows electrode testing without disconnection and also leakage current measurements down to 1 mA. A second optional clamp, the MVC CLAMP, enables true stakeless measurements to be made in situations where driving stakes is not practical. The clear, easy-to-read display provides excellent contrast and viewing angle making the instrument ideally suited to outdoor use.

The display is backlit, extending the operational environment of the instrument to cable cellars and other dark locations.



EARTH TESTERS







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DIGITAL EARTH TESTERS

Ingress protection

IP54

C stake, P stake and Noise check

Automatic

Noise rejection

40 V pk to pk

2-wire, 3-wire, 4-wire test

Yes, no shorting links required

No disconnect testing (ART)

Yes, with MCC CLAMP

Stakeless measurement

Yes, with MCC CLAMP and MVC CLAMP

Instrument output

Voltage: ±25 V or ±50 V at 94 Hz, 105 Hz, 111 Hz and 128 Hz

Current: 4.5 mA or 0.45 mA or 0.045 mA

Ground current range with clamp

0.5 mA to 19.9 A

Ground current accuracy

5% ±3 digits

Ground voltage range

0 to 100 V ac

Ground voltage accuracy

2% ±2 V

Resistance ranges 2, 3, 4 pole: 0.01Ω to $200 k\Omega$

ART: $0.01~\Omega$ to $200~\text{k}\Omega$ Stakeless: $0.01~\Omega$ to $200~\Omega$

Resistance accuracy

2P measurements: 2% ±3 digits 3P measurements: 2% ±3 digits 4P measurements: 2% ±3 digits ART measurements: 5% ±3 digits Stakeless measurements: 7% ±3 digits

Maximum probe resistance

Rp limit: 200 k Ω (50 V output voltage) Rc limit: 200 k Ω (50 V output voltage)

Limits reduced to $100~k\Omega$ for 25~V output voltage Limits reduced to $5~k\Omega$ for $0.01~\Omega$ resolution

Display

31/2 digit high contrast liquid crystal, backlit

Battery type

DET4TC2: 8 off AA (LR6) cells

DET4TCR2: 8 off AA (LR6) NiMH rechargeable cells

Operating temperature range

-15 °C to +55 °C / 5 °F to 131 °F

Storage temperature range

-40 °C to +70 °C / -40 °F to 158 °F

Safety

Complies with the requirements of IEC61010-1 100V CAT IV between terminal pairs.*

FMC

In accordance with IEC61326-1

Standards Compliance Complies with the requirements of KEMA K85B

Complies with the following parts of EN61557, "Electrical safety in low voltage distribution systems up to 1,000 V a.c. and 1500 V d.c. - Equipment for testing, measuring or monitoring of protective measures".

and 1500 V d.c. - Equipment for testing, measuring or monitoring of protective measures". Part 1 - General requirements

Part 5 - Resistance to earth

DATASHEET 3.3

EARTH TESTERS



The instrument offers a wide measurement range of 0.01Ω a to 200 k Ω , ground noise voltage measurement from 1 V to 100 V and ground current from 1 mA to 20 A. Accurate results can be obtained in electrically noisy environments since the instrument is capable of rejecting noise voltages of 40 V peak to peak and the user can select different test frequencies to minimise the effect of interference. The DET4TC2 digital ground tester is powered from 8 AA batteries which are widely available and deliver excellent testing time. The DET4TCR2 is powered from rechargeable AA cells. The battery charger is built in and the instrument is supplied with an AC/DC adaptor. For both instruments, the battery status is display using a bargraph. The Megger ground testers comply with stringent safety standards and are rated to 100 V CAT IV. They also

have selectable 25 V or 50 V output for compliance with IEC 61557-5.

Dimensions

203 mm x 148 mm x 78 mm (8 in x 5.8 in x 3 in) **Weight**

1kg (2.2lb) *The CAT IV 100 V rating is dependant on the use of a lead set of at least this rating, for example the optional two wire leadset part number 1001-



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ALLEGRO SURVEY ACCESSORIES

CIS Pack Model MP-100-WC consists of three (3) equipment components identified as the backpack, survey meter tray and the pulsed wire chainer. These three (3) equipment components specifications are outlined by the following sections.



BACKPACK SPECIFICATIONS

Pack Construction: The pack's structure is a unique concept in load bearing for equipment mounting. The pack utilizes a simple design of H-Gear shoulder straps and webbed belt.

Webbing: The shoulder straps are heavily padded. The hip belt, shoulder straps, and pack webbing are designed to wick away perspiration.

Suspension System : High performance suspension system adjusts to accommodate virtually any size surveyor even with bulky cold weather gear.

Survey Wire Tray: UHMW high-dielectric plastic, back-mounted survey wire tray equipped with pre-wired 5/8-inch arbor. Hip Belt: Hip belt contains water bottle and holder for additional 3-inch survey wire spool pouch. Assembled: Fully wired to accept voltmeter/data collector and data probe(s). Weight 6 lbs (weight does not include survey wire or data collector)

Accessories Data Collector Mount Custom mounting brackets upon customers' request



FEATURES

- Lightweight
- Rugged Construction
- Ergonomic Design
- Modified to accommodate surveyor's requirements.
- Survey Meter Tray and Survey Wire Tray constructed of extremely high-abrasive and impact-resistant UHMW plastic.
- Pack equipped with Pulsed Wire Chainer.
- Survey Meter Tray provided a stable platform for data collector along with survey test probe ports.
- Backpack and Survey Meter Tray straps are adjustable to fit any surveyor.
- Fully self-contained and pre-wired ready for use.



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ALLEGRO SURVEY ACCESSORIES

DATASHEET 3.4

> **ALLEGRO SURVEY ACCESSORIES**



Survey Probes

Height Range Dimensions 38" - 47"

Weight 1.2 lbs.

Material Aluminum tubing

Heavy-duty non-slip vinyl for strength Grip and durability contoured, ribbed

surfaced with flange

Multi-conductor cord with standard

tinned copper conductor.

Cord Material Conductors have Poly-propylene

insulation with an outer PVC jacket.

Wire is 28 awg. 7/36" strand

Cord Current Rating 0.5 amps

Cord Max Voltage 120V

3-PIN jack for connecting with data **Cord Connections** collector's remote trigger port

Right angle stackable banana plug

1' coiled cord length expandable to **Cord Length** 5'

1/4" - 20 female connector in **Half-Cell Connections** tapered blue cone to connect into

half-cell

Wired with a rain resistant data entry **Data Entry** button located in the top of the

survey probe hand grip

Fully wired to connect with most data collectors/meters with remote data Set-up

entry by the data entry button





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GPS PORTABLE CURRENT INTERRUPTER

Rugged GPS DC Interrupter for Cathodic Protection Surveying designed for the industry ensuring easy, safe and reliable operation in all conditions.

Main Features

- GPS for time synchronisation of 1ms
- Microprocessor driven
- Fully programmable
- Solid state relay (SSR) rated 1-60V 0-100A DC
- GPS DC Interrupter operator settings;

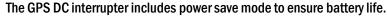
Operator can set the following cycle parameters:

- Start date and time
- Stop date and time
- Start on command
- Repeat Start/Stop hourly/daily/weekly/monthly
- Start with Off or On
- 0.1s to 99.9s On / Off periods

Supply

The GPS Interrupter can be powered from the following

- Built in D cell rechargeable (or non-rachargable) batteries (upto 5 days operation)
- External 12V battery i.e car battery
- AC mains 100-260V AC



- Battery condition indicator
- · Antenna; non powered GPS antenna with magnetic base
- IP66 Case
- Display and keypad, OLED graphical screen and 5 way navi-pad
- Operating temperature -20 to +70°C
- Storage temperature -40 to +85°C
- · Auxiliary relay drive capacity 0.5A
- · RS485 Modbus RTU ready
- SSR is surge protected

Dimensions;

- Length 250mm
- Width 300mm
- Depth 200mm
- Colour Orange

Each GPS DC Interrupter comes with

- 100A Integrated SSR
- Mains cable and power supply
- External Battery cable
- · CP DC power cables
- · Operating Manual
- 10 recharable batteries

Other GPS DC Interrupters available

- 100A SSR
- 240A SSR
- 450A SSR



DATASHEET





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INSULATION TESTERS MODEL: RF-IT

The Model RF-IT is a highly sensitive device used to test above ground pipeline insulators. This affordable unit is also fantastic for flange bolts shorts. The automatic RF-IT allows the operator to pinpoint the precise contact point. The RF-IT emits an audible beep. When the operator gets closer to the point of contact the unit starts beeping faster. At the same time, the sliding scale LCD meter moves from right to left

Features

- Hand Held Instrument
- · Easily locates shorted bolts, replaces bolt to bolt
- Use on structure with or without CP
- · Uses Radio Frequency to test effectiveness of above ground insulators
- Auto Shut-Off feature

Includes

- Probe, Red with lead wire and needle point tip
- Probe, Black with needle point tip
- · Additional needle tips, stored in small black vinyl tubes
- · (6) AA Batteries
- Instructions Manual
- Warranty Card



INSULATION TESTERS







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INSULATION TESTERS MODEL: CE-IT

The CE-IT gives fast and accurate testing of below ground insulators and road crossing casings. This fully automatic unit tests the insulator without any adjustment by the operator needed.

Features

- · Gives test results via digital display
- •Results given
 - Effectiveness of Buried Pipe Insulators
 - · Isolation condition of pipelines in road crossing casings
- Good to indicate broken wire
- Automatic off to ensure long battery life

Included

- Instrument
- •(6) AA Batteries
- Connector with leads and clamps
- Instructions Manual

CE-IT Capabilities

- •Senses & Replicates:External polarity, External Voltage,
- Analogues, Internal Voltage Reference with External Voltage
- •Measures flowing current throughout the testing cycle
- •Gives result of test considering the above tested parameters
- •Battery life exceeds 50 hours



INSULATION TESTERS







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MULTIMETERS AND CLAMPMETERS

170 Series Digital Multimeters

These meters have the features needed to find most electrical, electro-mechanical and heating and ventilation problems. They are simple to use and have significant improvements over Fluke's original 70 Series like, True-RMS, more measurement functions, conformance to the latest safety standards, and a much larger display that's easier to view.

Feature	175	177	179
True-RMS measurements	AC	AC	AC
Digital display counts, updates 4 times per second	6000	6000	6000
Display backlight		•	•
Analog bargraph / segments, updates 40 times per second	33 Segments	33 Segments	33 Segments
Auto and Manual ranging	•	•	•
Display Hold and AutoHOLD®	•	•	•
Min-Max-Average recording mode with Min/Max Alert	•	•	•
Temperature readings (bead thermocouple probe included)			•
Smoothing mode allows filtering of rapidly changing inputs	•	•	•
Audible continuity and diode test	•	•	•
Test lead alert	•	•	•
Unsafe voltage alert warns for voltages above 30V	•	•	•
Low battery indication	•	•	•
Ergonomic case with integrated holster	•	•	•
Easy battery and fuse exchange without opening the	•	•	•
complete case	•	•	•
Selectable sleep mode preserves battery life	•	•	•



MULTIMETERS AND CLAMPMETERS









Fluke 17

Functions	Maximum	Max. resolution	175	177	179
Voltage DC	1000V	0.1mV	±(0.15%+2)	±(0.09%+2)	±(0.09%+2)
Voltage AC	1000V	0.1mV	±(1.0%+3)	±(1.0%+3)	±(1.0%+3)
Current DC	10A	0.01mA	±(1.0%+3)	±(1.0%+3)	±(1.0%+3)
Current AC	10A	0.01mA	±(1.5%+3)	±(1.5%+3)	±(1.5%+3)
Resistance	50M Ω	0.1Ω	±(0.9%+1)	±(0.9%+1)	±(0.9%+1)
Capacitance	10000μ F	1nF	±(1.2%+2)	±(1.2%+2)	±(1.2%+2)
Frequency	100kHz	0.01Hz	±(0.1%+1)	±(0.1%+1)	±(0.1%+1)
Temperature	40°C/+400°C	0.1°C			±(1.0%+10)

Accuracies are best accuracies for each function

Battery Life: Alkaline, 200 hrs typical

Weight: 0.42 kg

Size (HxWxD): 190 mm x 85 mm x 45 mm Lifetime Warranty



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MULTIMETERS AND CLAMPMETERS

Fluke 325 True RMS Clamp Meter

The Fluke 325 True-rms Clamp Meter is a reliable, versatile troubleshooting tool for commercial and residential electricians. Featuring a slim design for easy transport and use, and a large display for efficient troubleshooting. In addition to true-rms AC current and voltage on non-linear loads, the 325 measures:

- DC current
- DC voltage
- Temperature
- Frequency

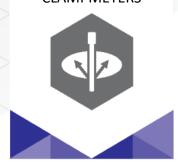
Specifications		
AC Current	Range	40.00A / 400.0A
	Accuracy	2% ± 5 digits (45 Hz to 65 Hz) 2.5% ± 5 digits (65 Hz to 400 Hz)
DC Current	Range	40.00A / 400.0A
	Accuracy	2% ± 5 digits
AC Voltage	Range	600.0V
	Accuracy	1.5% ± 5 digits
DC Voltage	Range	600.0V
	Accuracy	1.0% ± 5 digits
Resistance	Range	$400.0~\Omega$ / $4000~\Omega$ / $40.00~k\Omega$
	Accuracy	1.0% ± 5 digits
Continuity		≤ 30 Ω
Capacitance		0 to 100.0 $\mu F / $ 100 μF to 1000 μF
Frequency		5.0 Hz to 500.0 Hz
AC Response		True-RMS
Backlight		Yes
Data Hold		Yes
Contact Temp		10.0°C to 400.0°C (14.0°F to 752.0°F)
Min/Max		Yes
Size		H x W x D (mm) 207 x 75 x 34 Max wire diameter 30 mm (600 MCM) Weight 283 g
Category rating		CAT III 600 V CAT IV 300 V
Warranty		2 Year

Includes:

- Fluke 325 True-RMS Clamp Meter
- TL75 Test Leads
- Type K Thermocouple
- Two AAA Batteries (Installed)
- · Soft Case

DATASHEET

MULTIMETERS AND CLAMPMETERS









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PIPE LOCATOR GO-FER TYPE

The "GO-FER" is housed in a rugged, indestructible "CYCOLAC" case, and has injection-molded instrument panels for added strength. All electronic components are mounted on a single detachable circuit board for quick and easy maintenance. In addition, convenient battery access is made through removable doors and the transmitter and receiver. Both cases and circuitry are designed to tolerate the most extreme field temperatures, and make the "GO-FER" ideal for use in any environment.

DATASHEET 3.7 PIPE LOCATOR

Quartz Crystal Precision

The All New Detectron "GO-FER" locates buried metal structures with smooth accuracy and ease. Its quartz crystal controlled transmitter fine-tunes the signal for precise location every time. And when it comes to tracing distance, depth penetration and sensitivity, the Model 505 rivals all other Pipe and Cable locators on the market. The "GO-FER" can reach depths as great as 20 feet and tracing distances of 1,000 feet are not uncommon.

Improved Controls

The "GO-FER's" radio frequency receiver allows it to screen out distracting noise while it simultaneously detects cables and pipes with assured precision. The "GO-FER" is also the first locator of its kind to have a separate volume control for reducing signal loudness without sacrificing sensitivity. This feature enables quieter operation in enclosed areas where lower volume is desired.

Quality Accessories

Model 505 comes complete with ground plate/connecting cable and full operating instructions – ready to use! Also available are cushioned earphones, 3-part handle, carrying strap, and a sturdy compartmentalized carrying case. In addition, this prestigious new instrument comes with the Detectron reputation for quality, dependability, and service!

Features

- Quartz Radio Frequency
- •Inductive or Conductive Operation
- On handle finds unknown structures
- •3 Step sensitivity gain
- Very accurate depth location (Triangulation)
- Quartz controlled signal
- •Volume control, independent of sensitivity
- •Battery operated (12) "C" (Rechargeable)

Includes

- •(1) Transmitter
- •(1) Receiver
- •(1) Ground Plate
- •(1) Conductive Connection Cable
- •(12) "C" Cell Batteries
- •Instruction Manual
- •3-Section Handle with Carrying Strap
- Headphones
- Carrying Case





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HOLIDAY DETECTOR APS MODEL

Model: APS High Voltage Holiday Detector "Stick Type"

Model: APS Holiday Detector 800 volts to 35,000 volts in 1 instrument

FEATURES:

Updated Battery - light weight, longer life

- 800v 35000v in one instrument
- Integrated Voltmeter
- · Volume adjustment for use in loud environments
- Super Bright visual holiday indicator
- · Ergonomic handle and grip
- Low battery voltage indicator
- · Regulated voltage
- Push button operation

CONSTRUCTION:

- · Rugged design for long life
- Water & Dust Resistant Carrying Case
- · Weather sealed
- Solid state electronics APPLICATIONS:
- Pipelines and other coated structures
- . Wide variety of coatings materials
- . Thin to thick coatings
- Conforms to NACE International SP0188, SP0274, Sp0490 Also to many ASTM, SSPC, ISO, etc

SPECIFICATIONS:

- Pulse DC output voltage
- Low: 800v to 8,000v
- High: 3,500v to 35,000v
- 100v Resolution (Voltmeter)
- +/- 5% Accuracy Battery operated (6v)
- 110/220v AC Charger

DIMENSIONS:

- 2.5" x 21.5" x 2.75" Instrument only
- 5" x 2.5" x 5.5" Battery box

CARRYING CASE:

40.5" x 17" x 7" (1028.7 x 431.8 x 177.8 mm) 40 lbs. (18.14kg) Shipping Weight* *Weight will vary based upon electrode choices



PIPE LOCATOR







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PERMANENT COPPER / COPPER SULPHATE REFERENCE ELECTRODE

This permanent reference electrode is used to measure Cathodic Protection (CP) potentials on buried pipelines, storage tanks and other buried metallic structures to which CP has been applied. Can be used with a pipeline coupon that allows you to take an IR free potential reading without interruption of the CP system.



CU/CUSO4 REFERENCE ELECTRODE



	STANDARD SPECIFICATION
Electrolyte	Saturated Copper Sulphate Gel (98.4% Min Purity Cu/SO ₄ crystals)
Packaging	Cotton Bag
Electrode Body Materials	Terracotta Clay Pot (Porous), Encapsulated with Epoxy Resin & Concrete Cap
Backfill	75% Gypsum / 20% Bentonite / 5% Sodium Sulphate (or to suit client specification)
Weight (Gross)	Approx 9Kgs net weight Approx 25Kgs gross weight
Dimensions	Approx 152 mm x 305mm (Bare Dimensions) Approx 230mm x 410mm (Packaged Dimensions)
Cable (as standard)	1 x 10mm ² XLPE/PVC stranded copper conductor cable, 600/1000V grade. Black 15m length



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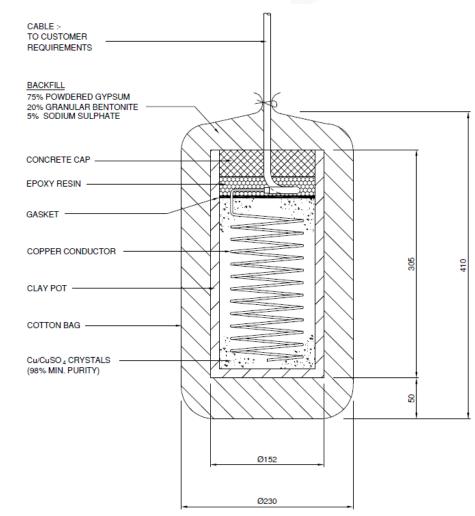
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DATASHEET

CU/CUSO4 REFERENCE ELECTRODE







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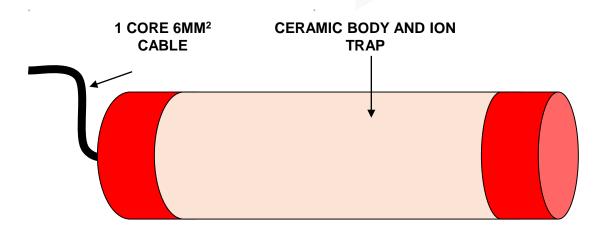
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This permanent reference electrode is used to measure Cathodic Protection (CP) potentials on buried pipelines, storage tanks and other buried metallic structures to which CP has been applied. Can be used with a pipeline coupon that allows you to take an IR free potential reading without interruption of the CP system.



CU/CUSO4 REFERENCE ELECTRODE





STANDARD SPECIFICATION		
Electrolyte	Saturated Copper Sulphate Gel (98.4% Min Purity Cu/SO ₄ crystals)	
Electrode Body Materials	High Temperature Fired Ceramic and Ion Trap.	
Weight (Gross)	Approx 1Kgs net weight	
Dimensions	Approx 36mm Dia x 200mm (Bare Dimensions)	
Cable	As per client request but typically supplied with 1c x 6mm ² XLPE/PVC stranded copper conductor cable, 600/1000V grade, black, 5m length	



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PERMANENT ZINC REFERENCE ELECTRODE

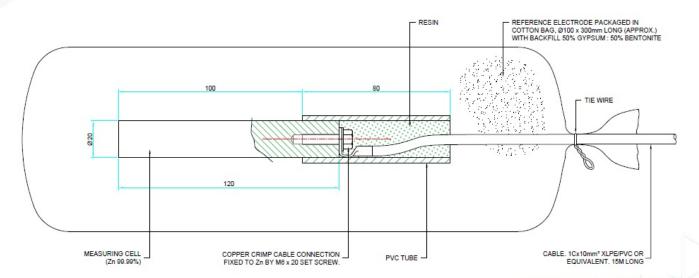
This permanent reference electrode is used to measure Cathodic Protection (CP) potentials on buried pipelines, storage tanks and other buried metallic structures to which CP has been applied. Can be used with a pipeline coupon that allows you to take an IR free potential reading without interruption of the CP system.

DATASHEET 3.15

ZINC REFERENCE ELECTRODE



	STANDARD SPECIFICATION
Cell	Zinc Cell 20mm Dia x 200mm Cell (Zn 99.99%)
Packaging	Reference Electrode Packaged In Cotton Bag, Ø100 X 300mm Long (Approx.)
Backfill	Backfill 50% Gypsum : 50% Bentonite
Weight (Gross)	Approx 3Kgs gross weight
Dimensions	Packaged Dimensions Ø100 x 300mm
Cable (as standard)	1 x 10mm ² XLPE/PVC stranded copper conductor cable, 600/1000V grade. Black 15m length





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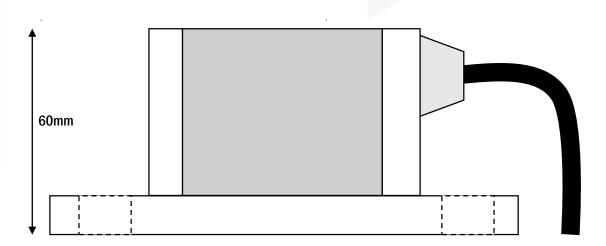
ZINC REFERENCE ELECTRODE WALL MOUNTED

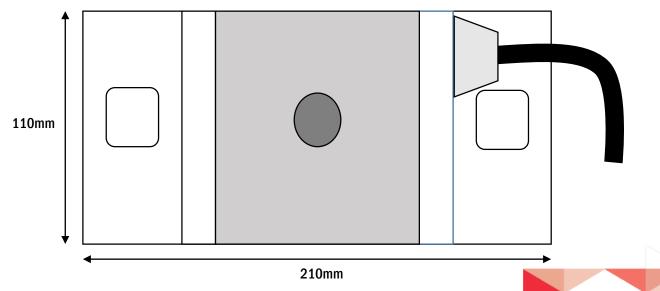
A permanent, pure Zinc (99%) reference electrode for direct wall mounting. The electrode body is constructed of uPVC and the electrode is encapsulated with high quality epoxy resin.

DATASHEET 3.16

ZINC REFERENCE ELECTRODE







A single core cable is provided (length to be clarified by customer).

Cable specification as standard is 1C x 6mm XLPE/PVC

Dimensions and product details are liable to change without notice.



CORROSION CONTROL

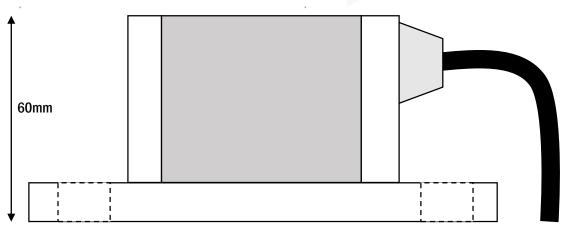
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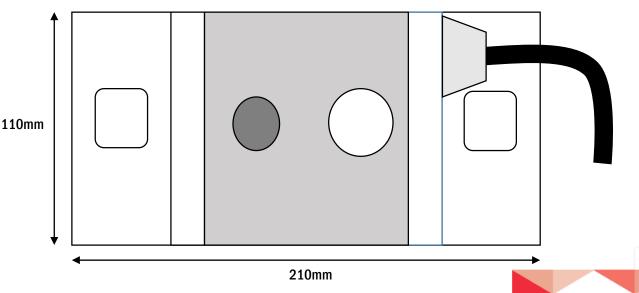
ZINC REFERENCE & POLARISATION ELECTRODE WALL MOUNTED

A permanent, pure Zinc (99%) reference electrode for direct wall mounting. The electrode body is constructed of uPVC and the electrode is encapsulated with high quality epoxy resin.

A separate Steel Coupon is incorporated into the design to facilitate "OFF" readings without disconnecting the Cathodic Protection system.







A 5 core cable is provided (length to be clarified by customer). 2 cores are connected to the reference electrode and 3 cores to the coupon.

Cable specification as standard is 5C x 2.5mm PVC/PVC

Dimensions and product details are liable to change without notice.



CORROSION CONTROL

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SILVER CHLORIDE REFERENCE ELECTRODE WALL MOUNTED

A permanent, Silver Silver Chloride reference electrode for direct wall mounting. The electrode body is constructed of uPVC and the electrode is encapsulated with high quality epoxy resin.



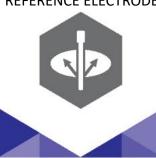
A single core cable is provided (length to be clarified by customer).

Cable specification as standard is 1C x 6mm XLPE/PVC

Dimensions and product details are liable to change without notice.



Ag/AgCl REFERENCE ELECTRODE





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PERMANENT SILVER / SILVER CHLORIDE REFERENCE ELECTRODE FOR CONCRETE – WE10

The silver/silver chloride (Ag/AgCl) elements in all electrodes are manufactured using a "unique" and advanced technique that results in a porous silver matrix. The matrix is then coated with precise quantities of silver/chloride to ensure:

- 1). High Reliability;
- 2). High Stability;
- 3). Greater Accuracy;
- 4). Increased Life Performance.

NOTE:

For our embeddable electrodes we ensure that the pre determined chloride ion concentration around the element is maintained by using an inert electrolyte compatible with the Ag/AgCl chloride element. Ionic continuity to the environment is via a micro-porous sintered disc.

DATASHEET 3.18
AG/AGCL REFERENCE ELECTRODE

OUTER CASING	
MATERIAL:	Acetal body with porous ceramic sintered disc and nylon cable gland
DIMENSIONS:	Length: 62mm (84mm w/ gland); Diameter: 18mm
CERAMIC CYLINDER DIAMETER:	15mm
WEIGHT (W/O CABLE):	22g
SILVER CHLORIDE ELEMENT	
MATERIALS:	Silver compounds are 99.90% pure
DIMENSIONS: Length:	Length: 15mm (+/-2mm); Section: 6mm
SURFACE AREA: :	Geometric: 3cm2 ; Real: 100cm2
ELECTROLYTE:	Inert electrolyte with 0.5 Molar KCI
PERFORMANCE DATA	
STABILITY (POTENTIAL DRIFT AT CONSTANT TEMP AND ENVIRONMENT) :	+/- 5mV (24 Hrs) @ 5μA load
ACCURACY (Vs SCE IN 3% NaCl @20oC):	-5mV +/-5mV
TEMP COEFFICIENT:	-0.65V/ oC
TEMP RANGE:	-5 to 70oC
INTERNAL RESISTANCE:	Less than 500 Ohms
THEORETICAL DESIGN LIFE :	20 years @ 0.1 μA load





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PERMANENT SILVER / SILVER CHLORIDE REFERENCE ELECTRODE FOR CONCRETE – WE50

The silver/silver chloride (Ag/AgCl) elements in all electrodes are manufactured using a "unique" and advanced technique that results in a porous silver matrix. The matrix is then coated with precise quantities of silver/chloride to ensure:

- 1). High Reliability;
- 2). High Stability;
- 3). Greater Accuracy;
- 4). Increased Life Performance.

NOTE:

For our embeddable electrodes we ensure that the pre determined chloride ion concentration around the element is maintained by using an inert electrolyte compatible with the Ag/AgCl chloride element. Ionic continuity to the environment is via a micro-porous sintered disc.

DATASHEET 3.18
AG/AGCL REFERENCE ELECTRODE

OUTER MODEL CASING	
MATERIAL:	Acetal body with porous ceramic sintered disc and
	nylon cable gland
DIMENSIONS:	Length: 82mm (104mm w/ gland); Diameter: 20mm
CERAMIC CYLINDER DIAMETER:	15mm
WEIGHT (W/O CABLE):	33g
SILVER CHLORIDE ELEMENT	
MATERIALS:	Silver compounds are 99.90% pure
DIMENSIONS: Length:	Length: 20mm (+/- 2mm); Section: 6mm
SURFACE AREA: :	Geometric: 4cm2 ; Real: 100cm2
ELECTROLYTE:	Inert electrolyte with 0.5 Molar KCI
PERFORMANCE DATA	
STABILITY (POTENTIAL DRIFT AT CONSTANT TEMP AND	+/- 5mV (24 Hrs) @ 5μA load
ENVIRONMENT):	
ACCURACY (Vs SCE IN 3% NaCI @20oC):	-5mV +/-5mV
TEMP COEFFICIENT:	-0.65V/ oC
TEMP RANGE:	-5 to 70oC
INTERNAL RESISTANCE:	Less than 500 Ohms
THEORETICAL DESIGN LIFE :	25 years @ 0.1 μA load





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PERMANENT SILVER / SILVER CHLORIDE REFERENCE ELECTRODE FOR CONCRETE – WE100

The silver/silver chloride (Ag/AgCl) elements in all electrodes are manufactured using a "unique" and advanced technique that results in a porous silver matrix. The matrix is then coated with precise quantities of silver/chloride to ensure:

- 1). High Reliability;
- 2). High Stability;
- 3). Greater Accuracy;
- 4). Increased Life Performance.

NOTE:

For our embeddable electrodes we ensure that the pre determined chloride ion concentration around the element is maintained by using an inert electrolyte compatible with the Ag/AgCl chloride element. Ionic continuity to the environment is via a micro-porous sintered disc.

DATASHEET 3.18
AG/AGCL REFERENCE ELECTRODE

OUTER MODEL CASING				
MATERIAL:	Acetal body with porous ceramic sintered disc and nylon			
With Elling.	cable gland			
DIMENSIONS:	Length: 110mm (133mm w/ gland); Diameter: 22mm			
CERAMIC CYLINDER DIAMETER:	20mm			
WEIGHT (W/O CABLE):	70g			
SILVER CHLORIDE ELEMENT				
MATERIALS:	Silver compounds are 99.90% pure			
DIMENSIONS: Length:	Length: 50mm (+/-2mm); Section: 5mm x 5mm			
SURFACE AREA: :	Geometric: 10cm2 ; Real: 500cm2			
ELECTROLYTE:	Inert electrolyte with 0.5 Molar KCI			
PERFORMANCE DATA				
STABILITY (POTENTIAL DRIFT AT CONSTANT TEMP AND	+/- 1mV (24 Hrs) @ 5µA load			
ENVIRONMENT):				
ACCURACY (Vs SCE IN 3% NaCI @20oC):	-5mV +/-5mV			
TEMP COEFFICIENT:	-0.65V/ oC			
TEMP RANGE:	-5 to 70oC			
INTERNAL RESISTANCE:	Less than 500 Ohms			
THEORETICAL DESIGN LIFE :	30 years @ 0.1 μA load			





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PERMANENT SILVER / SILVER CHLORIDE REFERENCE ELECTRODE FOR SOIL

The silver/silver chloride (Ag/AgCl) elements in all electrodes are manufactured using a "unique" and advanced technique that results in a porous silver matrix. The matrix is then coated with precise quantities of silver/chloride to ensure:

- 1). HIGH RELIABILITY;
- 2). HIGH STABILITY;
- 3). GREATER ACCURACY;
- 4). INCREASED LIFE PERFORMANCE.

NOTE:

The WE200 reference electrode consists of a highly stable silver/silver chloride element enclosed in an acetal housing and surrounded by a solid electrolyte (with 0.5M chloride ion concentration), an enlarged micro porous ceramic plug allows contact with the electrolyte and ionic conduction.

These electrodes can be directly installed into moist soil but in dry soils the electrode impedance and that can be very high in relation to the impedance of the measuring

but in dry soils the electrode impedance and that can be very high in relation to the impedance of the measuring circuit. Thus, it would be essential that the reference electrode is bagged in a conductive backfill i.e. bentonite, gypsum and sodium sulphate and the measuring circuit has a high impedance, preferably 30MegOhm or greater.

OUTER CASING		
MATERIAL:	Acetal body with porous ceramic cylinder and nylon	
	cable gland	
DIMENSIONS:	Length: 260mm (283mm w/ gland); Diameter:	
	35mm	
CERAMIC CYLINDER DIAMETER:	19mm	
WEIGHT (W/O CABLE):	400g	
SILVER CHLORIDE ELEMENT		
MATERIALS:	Silver compounds are 99.90% pure	
DIMENSIONS: Length:	50mm (+/- 2mm); Section: 5mm x 5mm	
SURFACE AREA: Geometric:	10cm2; Real: 500cm2	
ELECTROLYTE:	Inert electrolyte with 0.5 Molar KCI	
PERFORMANCE DATA		
STABILITY (POTENTIAL DRIFT AT	+/- 1mV (24 Hrs) @ 5μA load	
CONSTANT TEMP AND		
ENVIRONMENT):		
ACCURACY (Vs SCE IN 3% NaCI	-5mV +/-5mV	
@20oC):		
TEMP COEFFICIENT:	-0.65V/ oC	
TEMP RANGE:	-5 to 70oC	
INTERNAL RESISTANCE:	Less than 500 Ohms	
THEORETICAL DESIGN LIFE:	30 years @ 0.1 μA load	

DATASHEET 3.19

AG/AGCL REFERENCE ELECTRODE







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PORTABLE COPPER / COPPER SULPHATE REFERENCE ELECTRODE

Copper/copper sulphate reference electrode with rugged ceramic plug having a conical shaped surface. Designed for use in soft soils. High purity copper rod and robust Lexan tube. Electrode has a transparent "window" to view the condition of the saturated copper sulphate solution. The saturated copper sulphate solution is prepared (inside the Lexan tube) by the end user, according to the provided instructions. Supplied with a charge of copper sulphate crystals inside the Lexan tube



CU/CUSO4 REFERENCE ELECTRODE





Length: 6 3/4 inches

Diameter: 1 3/8 inches

Dry Weight: 5 ounces



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PORTABLE SILVER / SILVER CHLORIDE REFERENCE ELECTRODE

The **Land Kit**, Ag/Ag reference electrode, is supplied with a standard filling solution (3.5 M KCl), which acts as the electrolyte. This is a known electrolyte which can be used where the salinity of the sea water is unknown, as in brackish, fresh water/sea inlets.

This is ideally suited for areas where chlorides would contaminate the standard copper sulfate electrode. These areas would include concrete bridge decks (de-icing salts), swamps and marsh lands.

Includes:

- •Convenient protective carrying case (Item#CAS022)
- •Form-fit foam insert to secure kit components (Item#CAS027)
- •Ag/Ag Electrode:
 - Ag/Ag Tube Assembly (Land) (<u>Item #SUB160</u>)
 - Ag/Ag Rod Assembly (Item #SUB148)

 As (As Plant Assembly (Item #43485))
 - Ag/Ag Plug Assembly (<u>Item #13185</u>)
- •3.5M KCI Electrode Filling Solution, 2oz (Item #13200)
- •Instruction Manual (MAN340)







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PIPELINE TEST COUPON

The BAC test coupon is specially designed for applications where IR free measurements or induced AC current measurements are required.

Various cables and coupon surface area and materials available, please advise requirements when ordering.





Ø80mm x 6mm thick Carbon steel disc with exposed area to suit application.

- Mounted in polycarbonate box sized to suit (typical dimensions of $110 \times 100 \times 50$ mm).
- Cable connection by welded threaded bolt, lug, washers and nut all epoxy resin encapsulated.
- Cable tail: Standard 10 m of XLPE/PVC Other cable types and lengths available upon request.
- Where a permanent reference electrode is installed the Coupon should be located as close to the reference electrode as possible (no more than 300 mm) and in the same backfill as pipeline.



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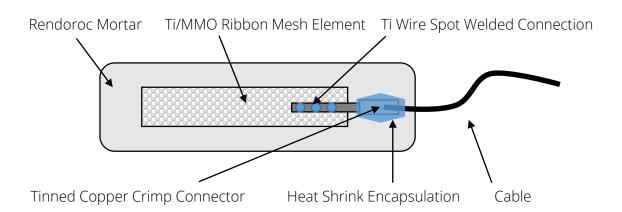
PSEUDO REFERENCE ELECTRODE

The purpose of a "pseudo" reference electrode is to provide a stable electrochemical interface by which to measure differences in potential such as depolarization shift measurements. It does not exhibit a true "half cell potential" so absolute values are meaningless but as it does not interact with the concrete pore solution it's behaviour remains constant.

Dimensions to suit project requirement, however as standard supplied at 30mm Dia x 150mm Length .







24% minimum

Measurement Interface: Ti/MMO Strip

Expected life

Catalyst
Substrate Composition
Coefficient of thermal expansion
Thermal conductivity at 20°C
Electrical resistivity
Modulus of elasticity
Tensile strength
Yield strength
Elongation

>75 years (NACE Standard TM02944-94, when powered as an anode)
Mixed Metal Oxide
Titanium, Grade 1, per ASTM B265
8.7 x 10-5/0K
15.6 W/m OK
0.000056 ohm-cm
105 GPa
245 MPa
175 MPa



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REED SWITCH

A Reed Switch developed for Cathodic Protection applications where switching to facilitate Off readings from a test post facility is required

Technical specification	Standard	Small body
Max. switched voltage	150V	175V
Max. switched current	1.0A	0.25A
Max. switched power	25VA	5VA
Breakdown voltage	250V	200V
Pull in range	70/80AT	20/30AT
Contact Resistance	0.10 ohms	0.10 ohms



REED SWITCH





If requested a budget standard size switch can be made by placing the 0.25A device in the standard encapsulation. These will be distinguished easily from the normal switch as they will use red wires and the standard switch uses black wires.

The device consists of a glass reed switch fully encased in a black epoxy resin 100x15x15mm. The contacts are M12 eyelets crimped on the ends of stiff and flexible single core wires 75mm from the resin. Overall size is 315mm end to end. The wires can be bent by hand to any required shape without difficulty and still maintain that shape over time.

The smaller body switch measures 60x15x15mm and was designed to fit in a space where the fitting of the standard switch was difficult. Its wires are longer by 20mm each so that its overall length is the same as the standard switch.

The reed switch is a normally closed switch and at installation it is wired permanently in series with the anode connection. Operation is by placing a magnet close to the switch, thus causing the switch to open. If a millimeter is connected across the switch connections, then the meter (set to the appropriate scale) will read the current that is diverted through the meter when the reed switch is opened.

The encapsulated reed switch has a maximum rating of 1000mA at 150V DC. This is absolutely the maximum rating and is for a resistive load. The mmf required to effectively operate the switch is 70/80 AT.

Reed Switch Magnet



50mm x 25mm x 10mm



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