CATHODIC PROTECTION

DDRC 3

DDRC 3 (DCVG Technique)

The new DDRC 3 is the latest generation of coating defect detector. It makes it possible to search for pipelining defects using the DCVG technique (Direct Current Voltage Gradient).

ADVANTAGES OF DDRC 3

Thanks to its electronic processing, the DDRC 3 is 10 times more sensitive than other DCVG equipments.

- ➔ Detect defects earlier and operate through resistive soil (dry or porous asphalt) at 10cm.
- ➔ Perfectly filtered (no influence of stray currents and alternative currents 50/60 Hz).
- ➔ Self-adjusting system (patented) = no need to adjust the off-set manually.
- ➔ Possibility of using sticks without electrodes.

Technical data:

DDRC (detector):

- Autonomy: 8 hours.
- Input sensitivity: 20 micro volts.
- Input impedance: 1 Giga-ohm.
- Measurement: scales to 3, 10, 30, 100, 300, 1000, 3000 mV.
- Dimensions: 325 mm X 210 mm X 90 mm.
- Weight: 1.7 kg.

SR-DDRC (interrupter):

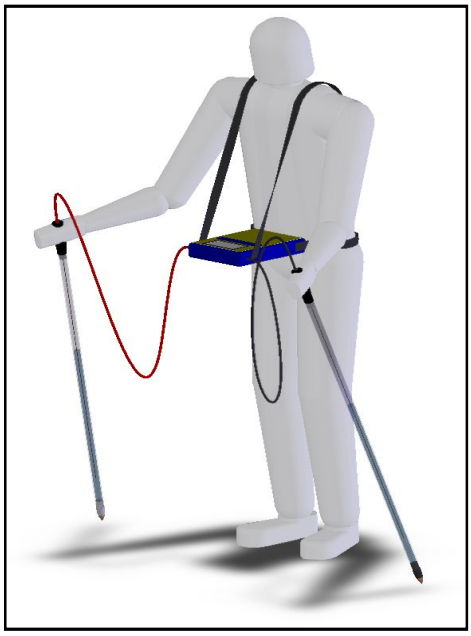
- Autonomy: 24 hours with charged batteries.
- Contact resistance when closed: <10 milli-ohms
- Switching capacity: 100 volts at 30 Amps (or 100 Amps in option).
- Dimensions: 185 mm X 105 mm X 85 mm
- Weight: 1.2 kg.

Detection principle:

Its detection principle is based on the separation of the gradients emitted by a rectifier from interference gradients (stray currents, telluric currents). This is done by the means of two electrodes sticks.

A satellite synchronised interrupter (SR-DDRC) at a frequency of one hertz is placed in series within the pipe supply connection. Pulses flow at the level of the gradients within the ground and are read by the DDRC 3.

An operator holds the electrodes with the arms stretched out and with the line of the shoulders parallel to the pipe.
The device then defines a direction to the right or to the left, indicating the direction of the gradients (these gradients are proportional to the current flowing within the pipe). The operator moves with a "crab" motion along the pipe under examination in such a way as to observe an increase in the amplitude of the gradients. Once the operator has walked beyond a defect, the directions of the gradients reverse. The operator then walks back in order to balance the gradients where his/her electrodes indicate. The perpendicular from the midpoint of the straight line formed by the rods at this location indicates where the pipelining fault lies.



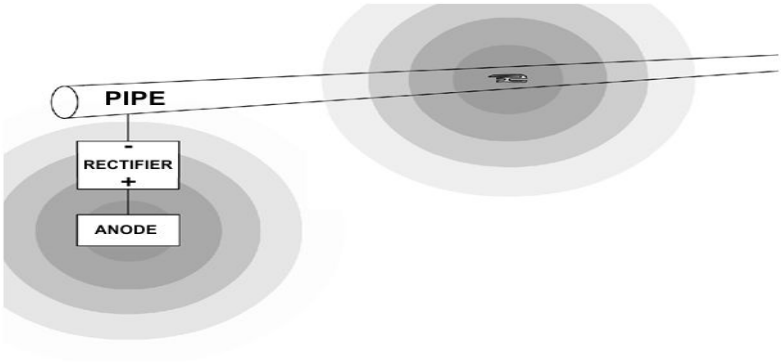
The DDRC 3 synchronizes to the interrupter and will only analyze the gradients at the cutoff of the rectifier to display the difference between the value of rectifier “on” and rectifier “off”. Through a patented process, the display is not subjected to any interference caused by the potential between the two electrodes. Therefore, the device does not entail any tedious settings and allows for accurate, precise and effective measurements

Basic principle:

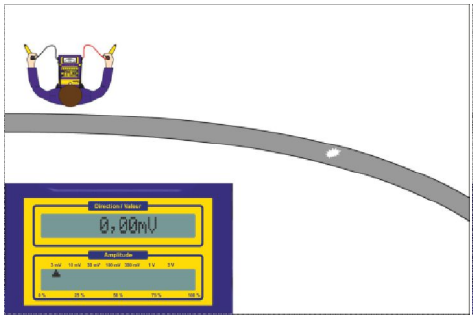
All emitted current returns to the source. As part of cathodic protection, the current emitted by the rectifier passes through the anode cables, the anodes, the ground, the faults, any eventual control points, the structure, and the structure's cables, eventually returning to the source (the rectifier).

At the level of the anode the currents are distributed within the ground.
At the level of the lining defect, currents are concentrated and return to the rectifier by means of the pipe.

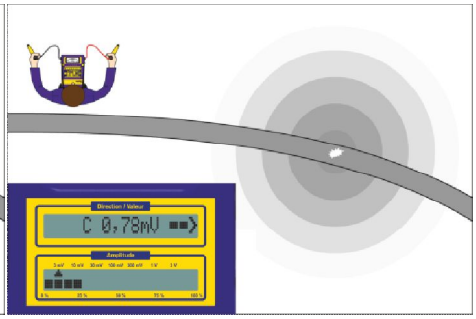
A potential between two points can therefore be observed on the ground, and we can thus establish the direction to take in order to go towards the defect.



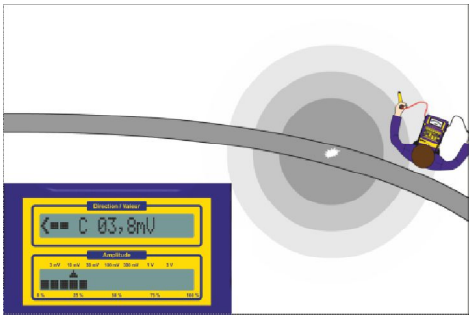
The operator holds the electrodes with the arms stretched out and with the line of the shoulders parallel to the pipe.



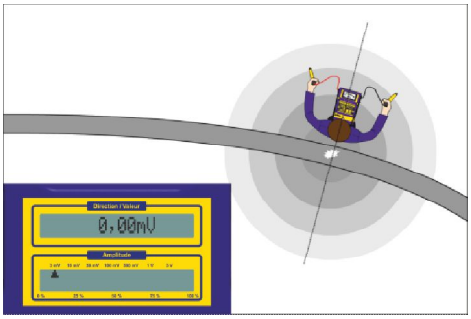
The device indicates the direction of cathodic protection gradients.



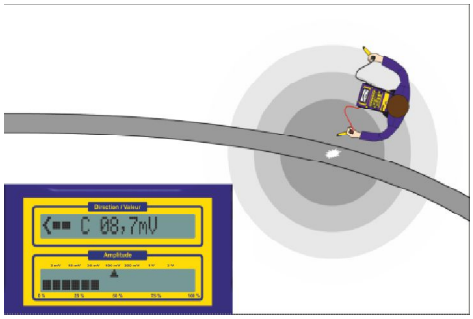
Once the operator walks past a defect, the direction of the gradients reverses.



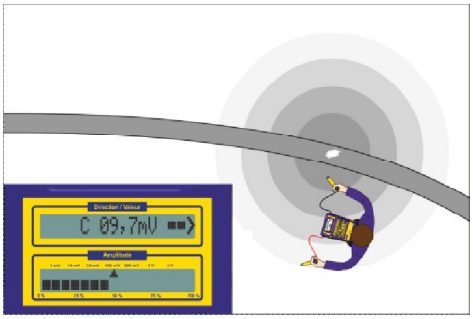
The operator goes back on his/her steps in order to find the point of equilibrium of the gradients, and the defect is identified in a first direction.



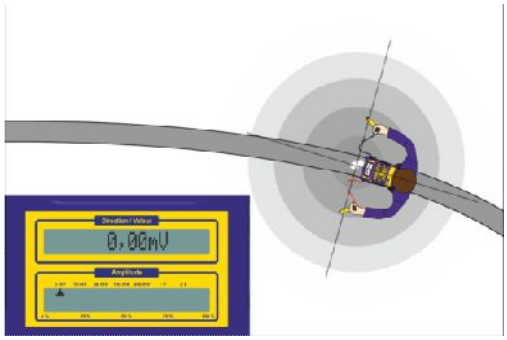
The operator then moves perpendicular to the pipe



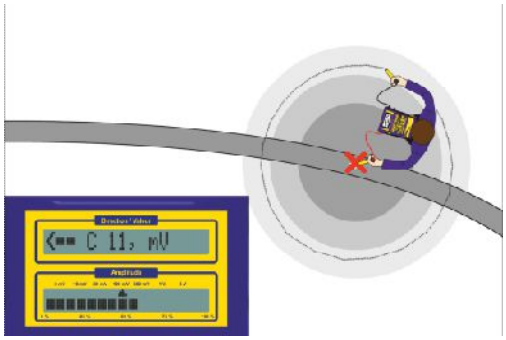
The operator proceeds in the same way as before in order way to identify the defect.



The two alignments then make it possible to draw a cross on the ground.



Once a defect is located, it is necessary to accurately measure the potential of the gradient where the defect is.



System composition:

Pos.	Description
1	Carrying sheath for electrode sticks
2	Electrode sticks
3	Impact-resistant carrying case
4	Charger for DDRC
5	Charger for SRDDRC
6	DDRC 3 (Detector)
7	Holding strap
8	SR-DDRC (Interrupter)
9	Electrode stick connecting leads
10	Copper sulfate $CuSO_4$
11	GPS antenna for SRDDRC

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