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# ColcheK 2™

## Instruction Manual

V1.1



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## 1.0 Introduction

The ColcheK 2™ is a specialised, non-destructive inspection tool for the detection and estimation of corrosion damage near and below ground level in planted, steel lighting columns and similar structures.

At and just below ground level around lighting columns there is an environment rich in moisture, chlorides and oxygen, an environment which promotes the corrosion of steel structures. The high stress zone for lighting columns is also at ground level, consequently, any loss of metal in this region can significantly reduce the strength of the column and may lead to collapse. Unfortunately, the corrosion can be just below ground level, on the external surface of the column and impossible to see without expensive excavation.

Allowing you to check this critical zone without having to excavate or in any other way prepare the column., the ColcheK 2™ is a unique application of the through transmission, eddy-current inspection technique. No preliminary preparation of the lighting column is required, the low frequency electromagnetic system is non-contacting and does not emit or use any hazardous radiation.

By design, no special skills are required to use the ColcheK 2™ or interpret the results.

The ColcheK 2™ works by comparing the wall thickness of the column at and below ground level with the thickness above ground (around 150mm above ground), At this above ground point there is rarely any major damage, and any significant corrosion can be easily seen.

## 1.1 Unsuitable applications



**NOT suitable for the inspection of the swage joint on lighting columns**



**NOT suitable for the inspection of flange mounted columns**

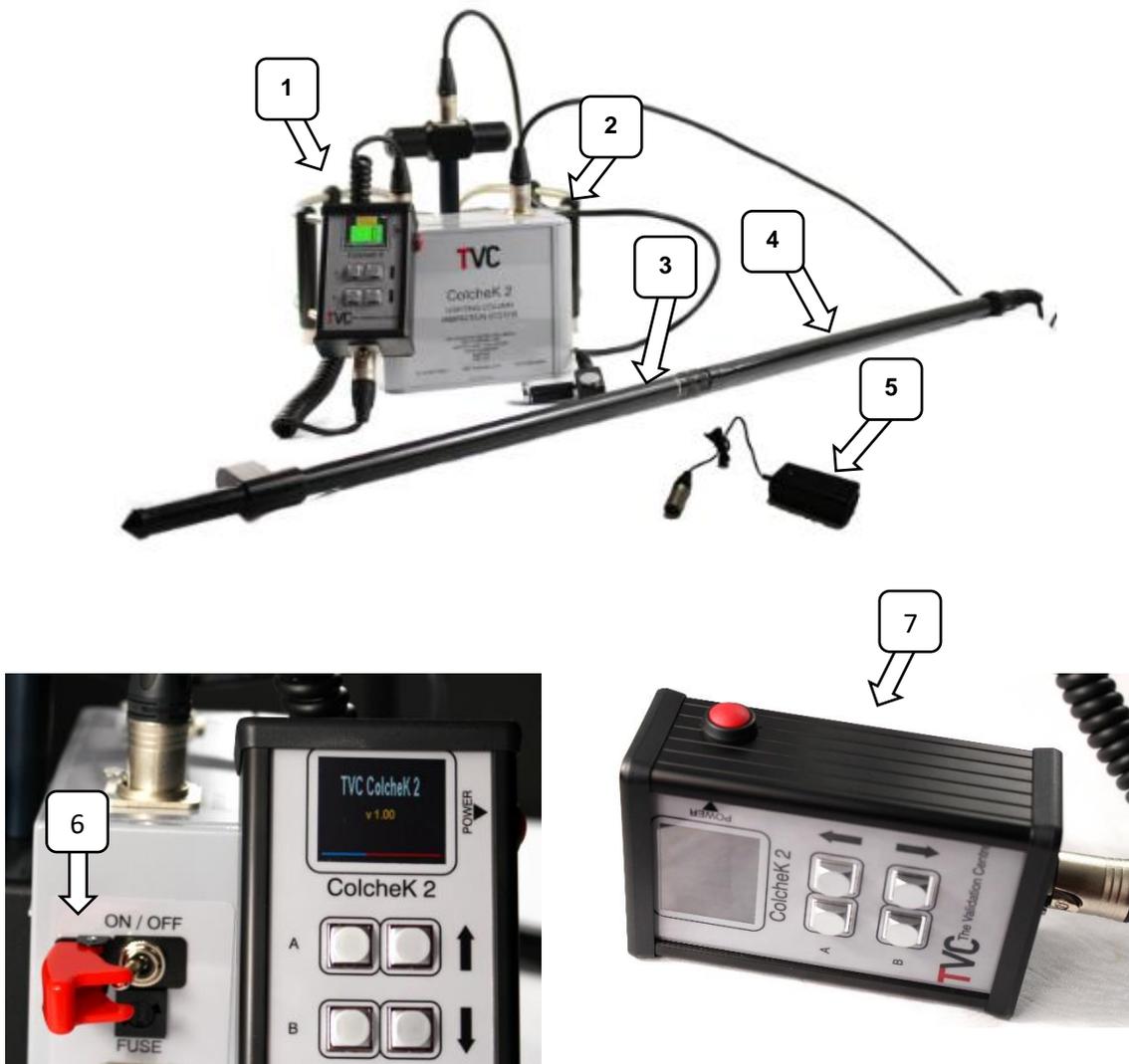


**NOT suitable for the inspection of aluminium or stainless-steel columns**

## 2.0 Complete unit, layout and connections

- 1 Display unit
- 2 ColcheK 2™ unit
- 3 Ultrasonic receiver (optional)
- 4 Probe (shown with optional ultrasonic depth transmitter fitted)
- 5 Battery charger
- 6 On / off switch
- 7 Wake-up button

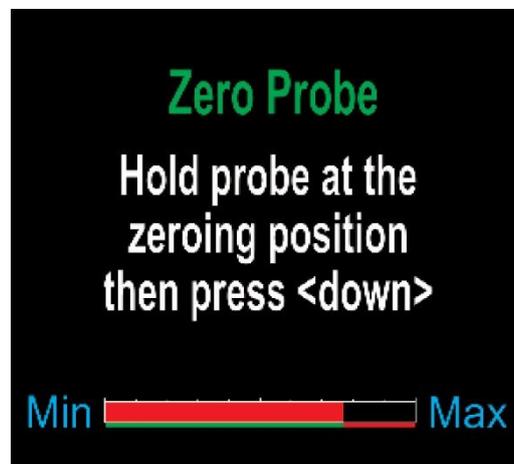
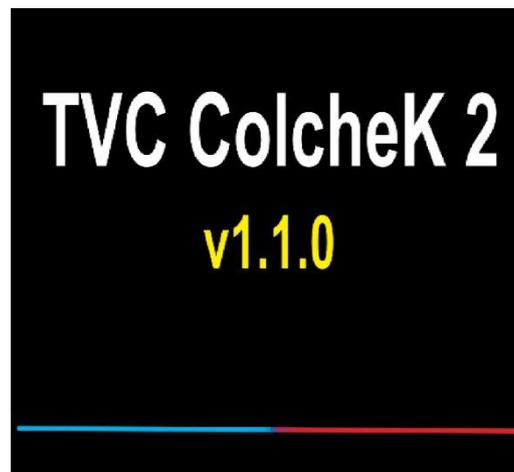
**NB:** The operator also needs a key to open the access doors on the columns.



### 3.0 Lighting column inspection

#### 3.1 Setting up: probe zero

- 1 Determine and observe the electrical safety requirements of the lighting authority.
- 2 Open the access door on the column.
- 3 Visually confirm the state of the column at a level about 150mm (6 inches) above ground level.
- 4 Place the coil system of the ColcheK 2™ around the base of the column.
- 5 Switch the unit on using the main switch and wake the unit up using the “on” control on the display module. The following screens will be seen.



6. Push the probe down the inside of the column, against the wall, until the tip of the probe is just below level with the top coil. See Fig. 1 below. It does not matter where the probe is placed round the circumference of the column.

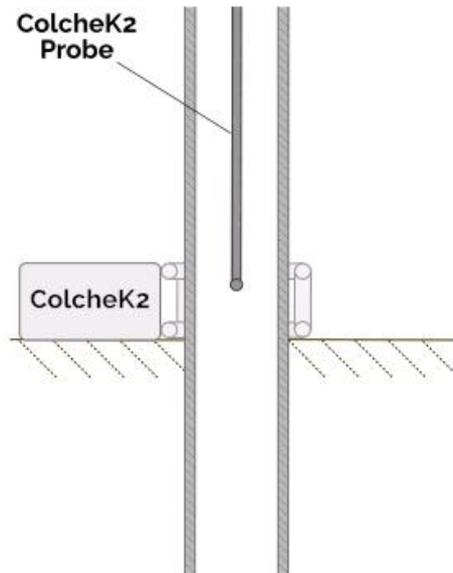
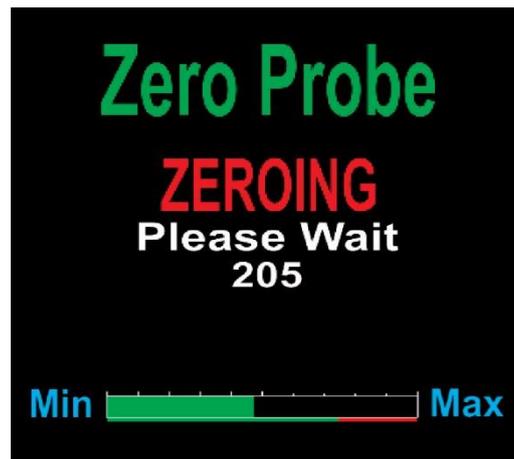
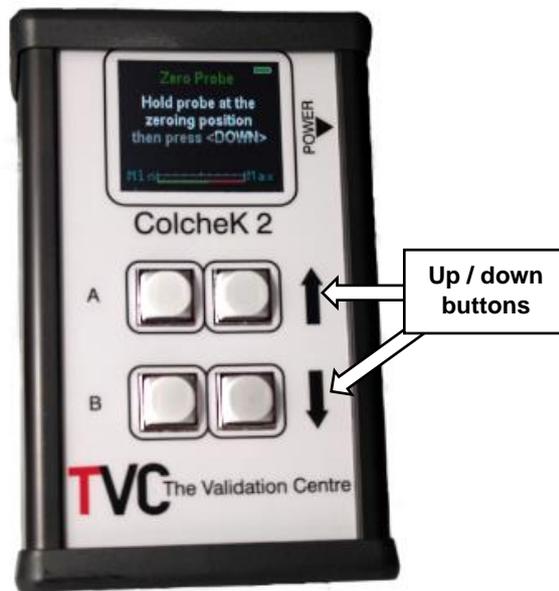


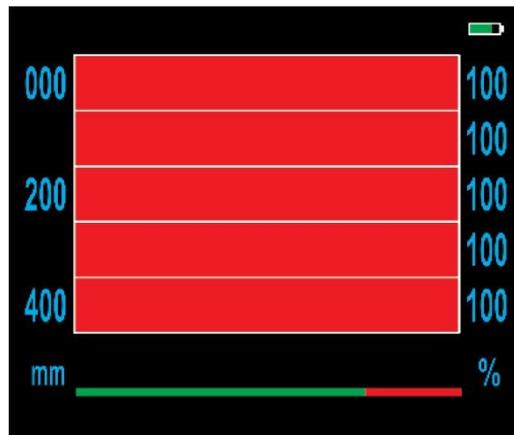
Fig. 1

7. Press the Down button on the display. The system will count down to zero.

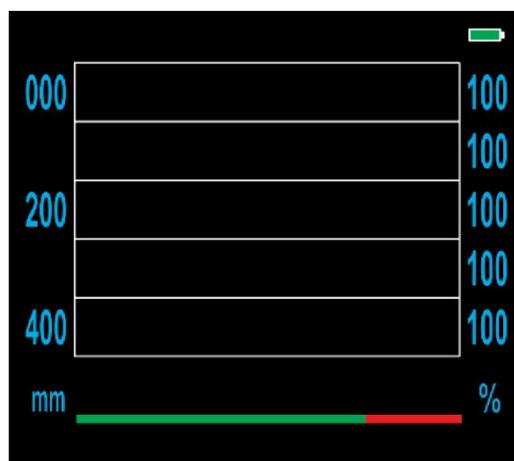




8. Once zero has been reached the system will display 100% on all bar graphs.

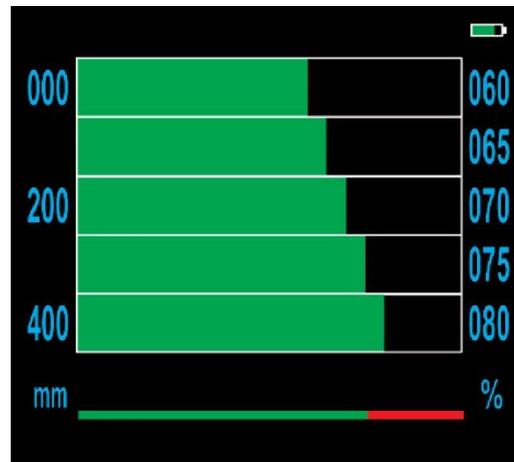


Continue down the column until the probe tip is approx. level with the lower part of the drive coil. The display will read at or near 0.



### 3.2 Inspecting Wall Loss: First scan

If, as you push the probe down the inside of the column, the tip of the probe passes a region where there is wall loss, the bar graph readings will rise above zero, indicating the presence of significant wall loss.



### 3.3 Continuing the Inspection

The probe 'sees' about one third of the circumference. It will not detect a defect on the far side of the column unless the defect is very large.

To ensure that nothing is missed, insert the probe in four positions, roughly equally spaced round the inside of the column. There is no need to reset the calibration at each insertion, once set, it is good for the whole column.

If a re-zero is required, press the Down arrow, re-position the probe to the top part of the drive coil and press the Down arrow again.

### 3.4 Finalising the Inspection

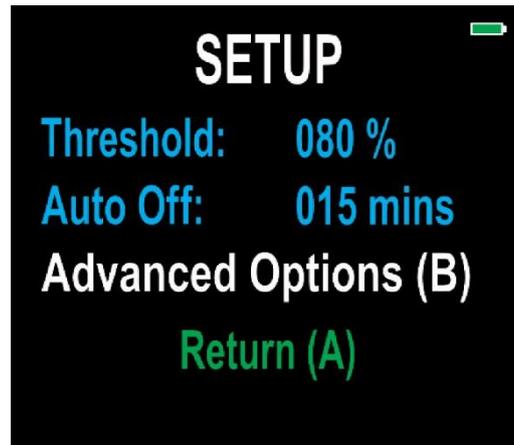
If there is a defect, the four scans will have shown its presence.

If a defect has been found, it is advisable to extend the inspection.

By moving the probe up and down, locate the mid-point of the corrosion area and mark the probe level with the bottom of the door opening. Pull the probe back up until the display reads zero (level with the bottom part of the drive coil and mark the probe. The distance between the two marks is the depth of the defect. Push the probe back down to the defect point and read the appropriate scale on the display. This will be the loss of wall thickness.

Make one or two scans at intermediate positions round the circumference to find the worst area and gain information on the vertical and circumferential extent of the defect.

### 3.5 Setting the Threshold



The ColcheK 2™ has a facility to set an acceptance threshold. Once set, any wall loss area equal to or above the threshold will be indicated on the display, and the display background will turn red.

The bar graph reading on bottom the display will show the threshold setting and give a graphical display of any indications and how close they are to the threshold point. To set the threshold level follow the below instructions:

1. Switch the unit on and 'wake up' as normal.
2. Zero the probe as previously described. If no column is available a temporary zero can be obtained by pushing the Down arrow button. A full zero as described in Section 3.1 will need to be carried out prior to inspection.
3. Press and hold the 'A' button to bring up the 'set up' screen. Use the 'up' arrow button to set the required threshold level.
4. Press the 'A' button to exit the threshold 'set up' screen.
5. The desired threshold is set; inspect as normal.

### 3.6 Setting the Time Off Period

The time off period can be set by following the below instructions.

1. Switch the unit on and 'wake up' as normal.
2. Zero the probe as previously described. If no column is available a temporary zero can be obtained by pushing the down arrow button. A full zero as described in Section 3.1 will need to be carried out prior to inspection.
3. Press and hold the 'A' button to bring up the 'set up' screen. Use the Down arrow button to set the required off time.
4. Press the 'A' button to exit the Set Up screen.
5. The desired off time is set. Inspect as normal.

### 3.7 Depth reading (optional)

The ColcheK 2™ display has an indication of the depth the probe is at within the column relative to ground level.

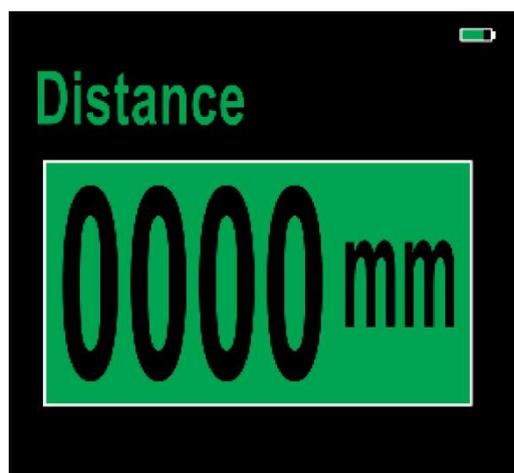
This system uses an ultrasonic transducer and must have a reasonable line of sight between the transmitter mounted on the probe and the receiver fitted inside the column door. To use the depth measurement, follow the below instructions.

1. Fit the ultrasonic transmitter to the probe close to the lower end making sure the transmitter faces upwards and using the splitter cable provided, connect the probe and transmitter to the “probe” connector on the ColcheK 2™. Connect the ultrasonic receiver to the connector on the ColcheK 2™ handle and fit the receiver inside the column with the receiver facing downwards. See Fig 2. below



Fig. 2

2. Position the ColcheK 2™ probe at the zero position (see Fig 1) and zero the ColcheK 2™ as normal.
3. Locate the defect as found before and keeping the probe steady use the ‘B’ button to select the depth meter screen. Read the depth directly off the screen. Press the ‘B’ button again and read the relevant bar graph to confirm the extent of wall loss.



### 3.8 Likely Indications

1. Corrosion zones on lighting columns are large, typically 50mm or more vertically and extending one quarter of the way round the circumference. In looking for significant defects you are not looking for single pinholes.
2. Most columns that have been many years in service will show some corrosion at ground level.
3. What determines *significant wall loss* depends on the following factors.
  - a) The age of the column relative to the wall loss (rate of corrosion)
  - b) The position of the column and its exposure to high winds.
  - c) Potential for additional loads to be put on the column such as festive lights, advertising banners, hanging flower baskets, etc. All the above should be taken in to account when deciding if a column is fit for purpose or not rather than deciding purely on a ColcheK 2™ reading alone.

**NB: Follow the requirements and specifications of the lighting authority.**

4. All columns have a cable access hole. With the usually specified planting depth, the cable access hole is approx. 300mm below ground and will show on the ColcheK 2™ as a point of 100% wall loss. Beware of columns that are not planted deeply.

### 4.0 Frequently Asked Questionns

*Do the electrical cables and switch gear have any effect on the equipment performance?*  
No. Trials have proved they have no influence on the equipment readings.

*Does it matter if the power is on?*  
Not as far as the ColcheK 2™ is concerned, however health and safety precautions should be observed.

*Does it matter if the column is full of water?*  
No. The ColcheK 2™ probe is sealed against the ingress of water.

*Is the system affected by rubbish in the column?*  
No, however tin cans and general rubbish should be carefully removed to allow full access for the ColcheK 2™ probe.

*If the column is beside a wall and the drive coil cannot be fully closed, will this affect the readings?*  
No. Position the drive coil as far round the column as possible. Readings will be unaffected even on the far side of the column.

*What do I do if the column has been planted to deep and the access door interferes with the drive coil position?*  
Do not attempt to set up the ColcheK 2™ on this column. Use the set up from a previous column. While this may not be ideal, significant areas of corrosion will still be indicated.

*Will the system work on non-round columns?*  
Yes. Hexagonal and similar shaped columns can still be inspected using the ColcheK 2™.

*Are readings effected by galvanising, paint and bitumen coatings?*

No. Paint and bitumen are not electrically conducting so are ignored by the ColcheK 2™.

## **5.0 Additional Information**

### **5.1 Switching off**

The machine switches off automatically after the selected time (see Section 3.6). If you have not completed the inspection, just press the 'wake up' button again, briefly, and the unit will re-start with the old settings (there is no need to re-calibrate). If you want to switch the unit off use the main switch on the unit.

### **5.2 Run time**

If the battery started fully charged and the unit were kept switched on continuously, the battery would last approx. 6 hours. Due to the auto switch off and the time taken to walk from column to column and off time between readings, the working life between charges is approx. 8 hours, enough to cover a normal working shift.

### **5.3 Battery status and cut off**

Being battery powered, the ColcheK 2™ has a battery status meter on the display to give the operator an instant indication of battery condition. With a fully charged battery the indicator will be Green and over to the right-hand side, gradually falling to the left as the battery voltage decreases.

The ColcheK 2™ also has a battery cut off circuit which will not allow the unit to switch on when the battery voltage reaches 10.5V. Tests prove that the readings are unaffected until the battery drops below 10 volts so the cut off is set as a safety feature to prevent inaccurate readings being taken.

### **5.4 Battery Charging**

Use the standard 12V charger supplied. The ColcheK 2™ uses a sealed lead-acid battery so there is no danger of over charge or of memory problems with the battery.

### **5.5 Resolution and accuracy**

In a column with reasonable access, a local change of 2% in wall thickness can be detected. The absolute accuracy depends on the extent and nature of the defect but is typically about 5% of wall thickness. Large defects of uniform wall loss give more accurate readings.

### **5.6 Safety considerations**

It is the operator's responsibility to ensure that all safety requirements regarding access to the lighting column are met.

The equipment is totally enclosed.

The maximum differential voltage within the equipment is 30V DC. Power is supplied by a 12V sealed lead-acid battery and protected by a 5A fuse.

The probe has a nylon external case and the internal wiring is further insulated inside the probe to provide double insulation. Provided there is no serious and obvious damage to this double insulation, there is no possibility of contact between the electronics of the equipment and any external electrical system.

The drive coils are transformer isolated from the rest of the electronics. While the current flowing in the drive coils is several amps, the drive voltage is only a few millivolts and there is no arcing hazard.

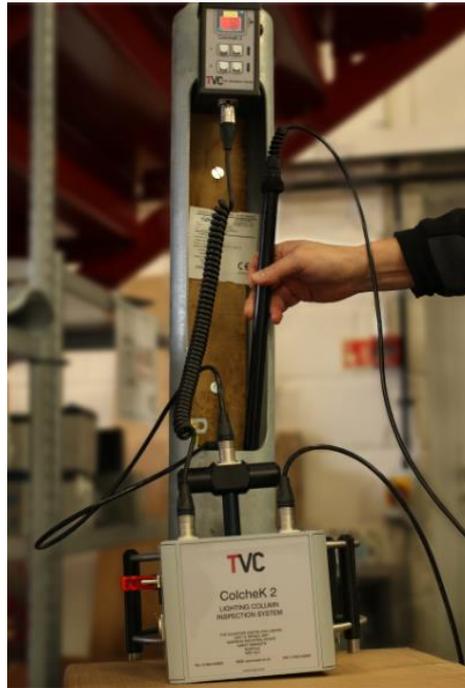
When inspecting the column, the operator must be careful not to dislodge the electrical system in the column.

## **5.6 Disposal**

To meet our obligations under the WEEE directive we have financed a collection point for the recycling of this product once it has reached the end of its normal working life. In these circumstances, please contact us for further instructions.

For further information on equipment calibration or disposal, please contact TVC.

## 6.0 Annex 1: Unit Set Up and Internal View Set Up



**Full unit set up**



**Internal view**