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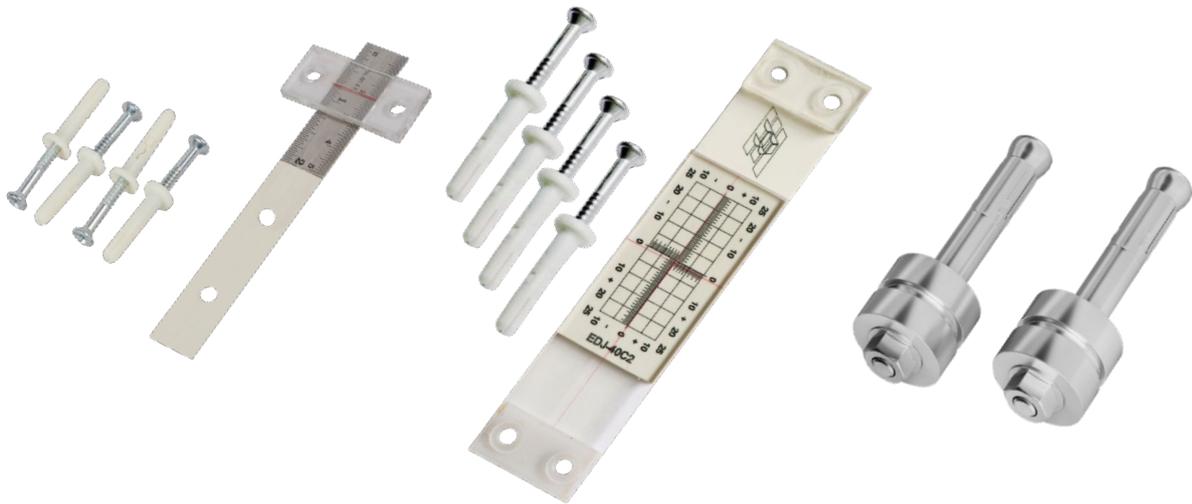
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USERS' MANUAL

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## MECHANICAL CRACK METER

MODEL EDJ-40C/EDJ-40C2/EDJ-41M



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## 1 INTRODUCTION

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Crack meters are used for measurement of cracks in the structures, dams etc. Encardio-rite provides three different types of crack meters:

- Mechanical uniaxial crack meter- Model EDJ-40C
- Mechanical biaxial crack meter- Model EDJ-40C2
- Mechanical crack meter with datum blocks- Model EDJ-41M

The crack meters are installed across the existing cracks and it then measures the relative displacement. The procedure of installation and monitoring of the crack meters are described in this manual.

## 2 MECHANICAL UNIAXIAL CRACK METER-EDJ-40C

### 2.1 Introduction

The Encardio-rite model EDJ-40C mechanical crack meter is available in two versions; with a marking of 50 mm or 100 mm as shown in figure 1. It is ideally suited for measuring the change in width of a surface crack to a resolution of 0.5 mm. It is used to monitor cracks in concrete/rock structures and buildings affected by nearby construction or excavation activities.

### 2.2 General Description

The model **EDJ-40C** mechanical crack meter consists of a graduated scale with a resolution of 0.5 mm and a transparent acrylic plate with a hairline cursor mark. The graduated scale and the transparent acrylic plate are assembled across the crack with expandable anchors in 5 mm diameter holes drilled to a depth of 30 mm as shown in the figure 1.

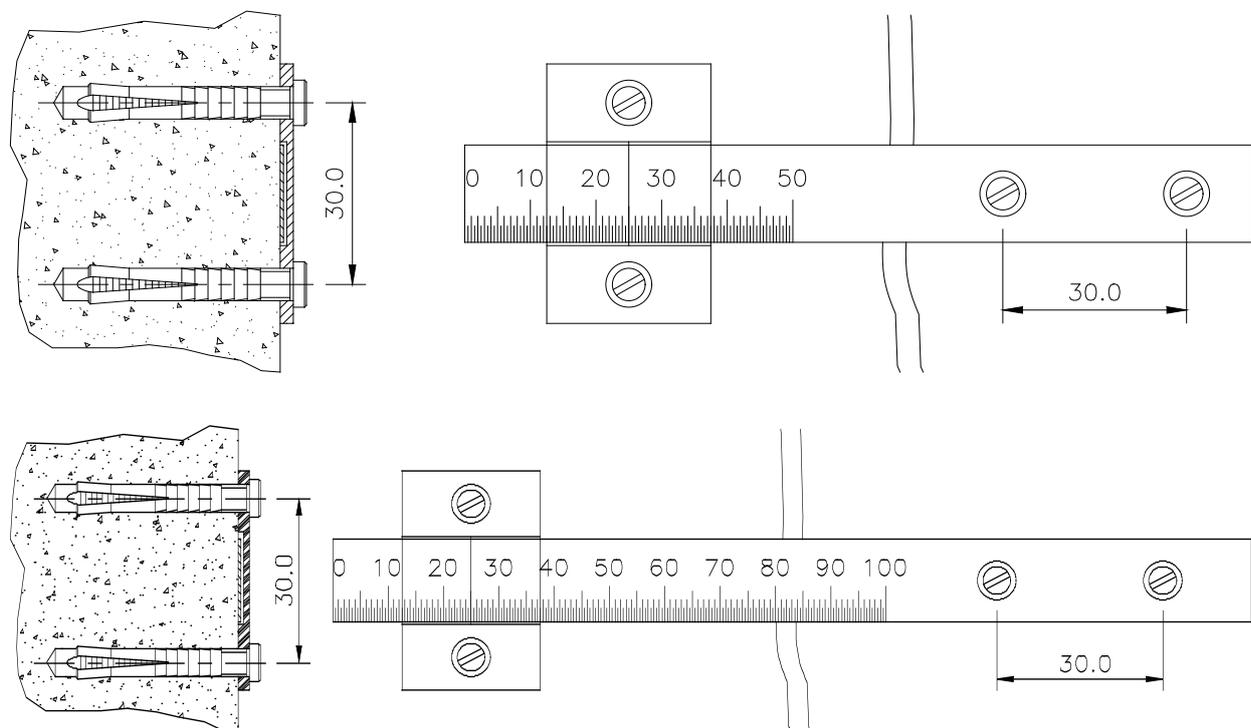


Figure 1: EDJ 40C

### 2.3 Tools required for Installation

- Drill machine
- Drill bit - 5 / 5.5 mm

### 2.4 Installation Procedure

- 1 Drill two 5 mm diameter, 30 mm deep holes on one side of the crack along a line perpendicular to the direction of crack. The holes should be 30 mm apart. Take care that the holes are drilled perpendicular to the surface of the wall. Clean the holes with an air pump.
- 2 Drill another two 5 mm diameter, 30 mm deep holes on the other side of the crack as shown in figure 1.
- 3 Insert the expandable anchors inside the respective holes upto the end.

- 4 Place the graduated scale on the respective expandable anchors and manually tighten the screws.
- 5 Then place the transparent acrylic plate/scale on the respective expandable anchors and manually tighten the screws.
- 6 Check that the transparent acrylic plate/scale with hairline marking is perpendicular to the graduated scale and is aligned properly. If not, loosen the screws and realign the acrylic plate/scale such that the hairline marking is in line with the graduated scale marking.
- 7 Note the initial reading as shown by the marker on the acrylic plate/scale.

## **2.5 Taking Reading**

As the crack opens or closes, the graduated scale and the cursor move relative to each other representing the amount of movement occurring. The reading of the marking is initially noted and is taken as a base. Subsequent readings are then compared with the initial reading to determine the change in the width of the crack.

### 3 MECHANICAL BIAXIAL CRACK METER-EDJ-40C2

#### 3.1 Introduction

The Encardio-rite model EDJ-40C2 is a biaxial mechanical crack meter with a marking of  $\pm 25$  mm (x-axis) or  $\pm 10$  mm (y-axis). It is ideally suited for measuring the change in width of a surface crack to a resolution of 0.5 mm or shearing. It consists of graduated scales on the X and Y-axis and a transparent acrylic plate with a hairline cursor mark for both axes. When installed across the crack, the graduated scale and cursor move relative to each other depending upon crack opening or closing.

#### 3.2 General Description

The model **EDJ-40C2** biaxial mechanical crack meter (refer to figure 2) consists of a graduated scale with a resolution of 0.5 mm and a transparent acrylic plate with a hairline cursor mark. The graduated scale and the transparent acrylic plate is assembled across the crack with expandable anchors in 5 mm diameter holes drilled to a depth of 30 mm as shown in the figure 2.

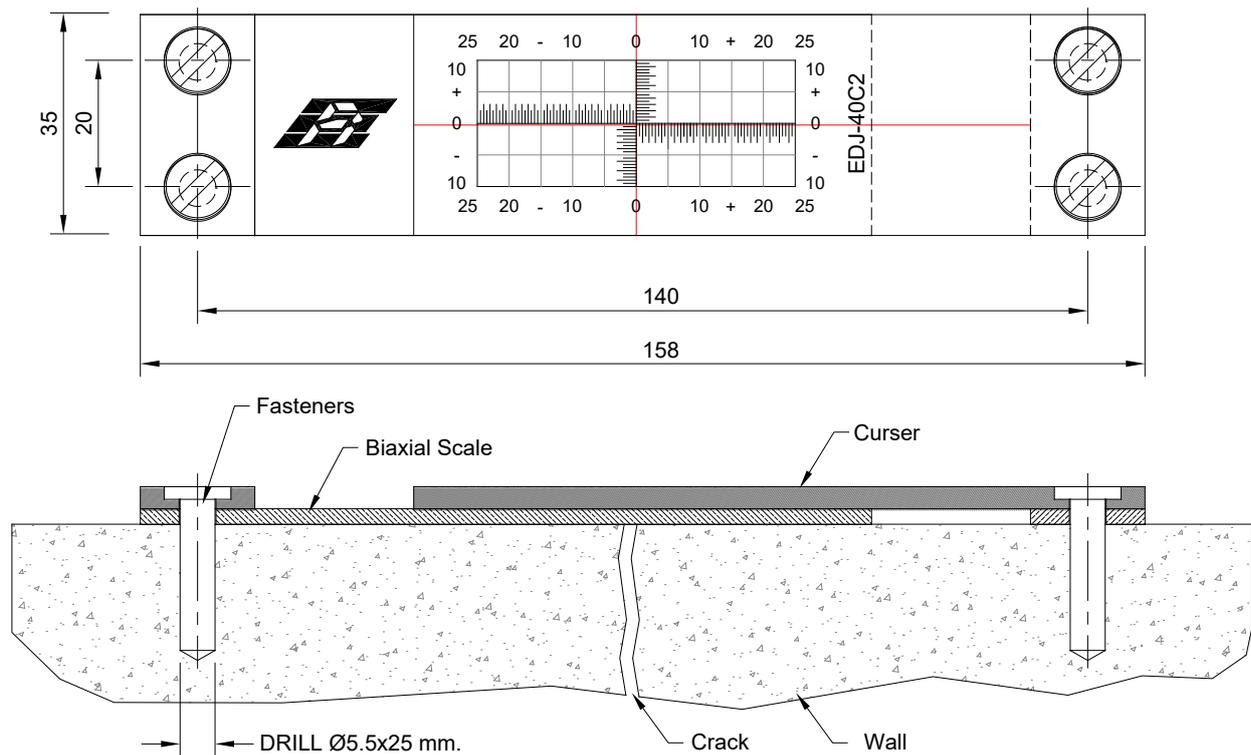


Figure 2: EDJ 40C2

### 3.3 Tools required for Installation

- Drill machine
- Drill bit 5 / 5.5 mm

### 3.4 Installation Procedure

1. Drill two 5 mm diameter, 30 mm deep holes on one side of the crack along a x-axis hairline marking perpendicular to the direction of crack. The holes should be 30 mm apart. Take care that the holes are drilled perpendicular to the surface of the wall. Clean the holes with an air pump.
2. Drill another two 5 mm diameter, 30 mm deep holes 140 mm apart from the first ones on the other side of the crack as shown in figure 2.
3. Insert the expandable anchors (preferable HILTI HPS-1 5/5x25) inside the respective holes upto the end.
4. Place the graduated scale on the respective expandable anchors and manually tighten the screws.
5. Then place the transparent acrylic plate on the respective expandable anchors and manually tighten the screws.
6. Check that the transparent acrylic plate with y-axis hairline marking is perpendicular to the graduated scale and is aligned properly. If not, loosen the screws and realign the acrylic plate such that the hairline marking is in line with the graduated scale marking.
7. Note the initial reading as shown by the marker on the acrylic plate.

### 3.5 Taking Reading

As the crack opens or closes, the graduated scale and the cursor move relative to each other representing the amount of movement occurring. The reading of the marking is initially noted and is taken as a base. Subsequent readings are then compared with the initial reading to determine the change in the width of the crack and vertical movement across a crack.

## 4 MECHANICAL CRACK METER WITH DATUM/MOUNTING BLOCKS-EDJ-41M

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### 4.1 Introduction

The Encardio-rite model EDJ-41M mechanical crack meter is ideally suited for measuring the change in width of a surface crack to a resolution of 0.01 mm. It is used to monitor cracks in concrete/rock structures and buildings affected by nearby construction or excavation activities.

### 4.2 General Description

The model **EDJ-41M** mechanical crack meter consists of two stainless steel round datum blocks (2) that are installed on either side of the crack. Each datum block has a groove on the surface to assist in taking readings. A through mounting hole helps mounting the datum block on concrete, masonry or rock surface using an expandable anchor (1).

The distance between the grooves of the datum blocks is initially measured by a digital inside calliper with a resolution of 0.01 mm. Subsequent readings are then compared with the initial reading to determine the magnitude of the changes in the displacement across the crack.

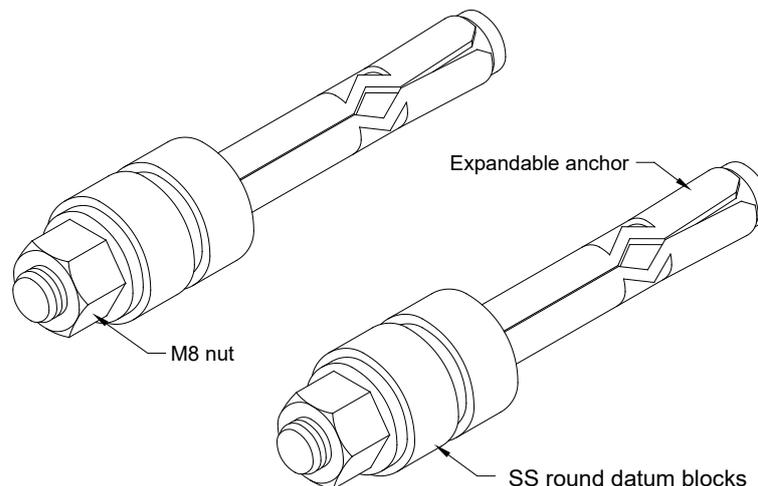


Figure 3: EDJ 41M

### 4.3 Tools required for installation

- Drill Machine
- Drill bit 5mm

### 4.4 Installation Procedure

- 1 Drill two 10 mm diameter, 75 mm deep holes on either side of the crack along a line perpendicular to the crack. The holes should be around 50 mm apart (as close as possible on either side of the crack). The holes must be drilled perpendicular to the surface and cleaned by an air pump.
- 2 Insert the expandable anchors inside the respective holes up to the end. Place each datum block on the shaft of respective expandable anchor and tighten the M8 nut (3) with a spanner.
- 3 Take the initial reading between the grooves of the datum blocks with a Vernier Caliper and record along with the ambient temperature in the observation sheet.

#### 4.5 Taking Reading

As the crack opens or closes, the installed datum/mounting blocks move relative to each other representing the amount of movement occurring. The reading of the marking is initially noted and is taken as a base. Subsequent readings are then compared with the initial reading to determine the change in the width of the crack.

*Procedure to monitor the datum blocks*

Place the external jaws of Vernier Caliper on the grooves provided on the datum/mounting blocks as shown in the figure 4 and then note down the scale reading.



Figure 4: Taking readings of the datum/mounting blocks with Vernier Caliper