

# MIT-SCAN2-BT

Measuring system for the non-destructive and accurate measurement of dowel positions in concrete pavements



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**Joints in concrete pavements of highways, airport runways and container areas are exposed to stresses and strains due to traffic and temperature variation. Steel dowel bars and tiebars are built into joints, to support the transfer of loads across the joints and to maintain the elevation of adjacent slabs at the joints. The type and the number of dowels and tiebars as well as their accurate positions and tolerable displacements are accurately determined, to ensure the long-term performance of the joints.**

## **Accurate and effective**

Since 2001, a new standard for the non-destructive measurement of dowel bars has been achieved with the measurement system MIT-SCAN-2. Also international partners rely on the accuracy of the system. Several States in the USA and Provinces in Canada specify the use of the measurement system for the operation of dowel bar inserters.

## **The measuring system.**

MIT-SCAN2-BT consists of a compact rail-guided measuring device, an easily assembled GRP\* rail system and a Pocket PC (\*robust glas fiber reinforced plastic).

## **Software for controlling and data analysis**

The Pocket PC communicates with the measuring device via a Bluetooth connection. The software MagnoNorm, that runs on the Pocket PC, controls the action of the device. The measurement data can be automatically recorded, reviewed and analyzed on-site. The software MagnoProof has been created for a more detailed data evaluation and the creation of reports on a Desktop PC.

## EASY HANDLING, FAST AND ACCURATE DATA ANALYSIS

### Positioning of the device

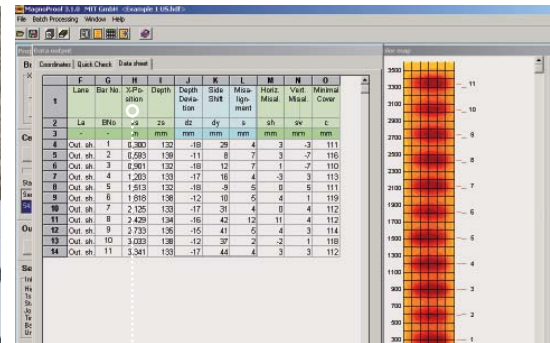
Performing a measurement is very simple. The mobile rail system is placed along the joint. Afterwards, the measuring device is set on the rail.

### Measuring

The measuring device is pulled slowly over the rails. The control of the measurement is done by a Pocket PC, that communicates wirelessly with the measuring device. During the measurement the covered distance and the recorded data are shown on the display of the Pocket PC.

### Analysis

Once the measuring data is collected, the software application MagnoNorm calculates the position of the dowel bars and error parameters - side shift, horizontal and vertical misalignment and depth error. Reports conforming to standards and a three-dimensional presentation of dowel bar positions can be created and printed with the software MagnoProof. This is a post processing software application, that allows the rapid analysis of large quantities of measurements. MagnoProof provides additional tools for the analysis of strongly deviating dowel bar positions and for the handling of complicated measuring situations.



#### Precise.

Exact positioning of the measuring device

#### Easy.

Software with a user-friendly handling

#### Effective.

Numerical and graphical presentation of results

## ADVANTAGES AT A GLANCE

- Specialized system for the measurement of dowel bar and tiebar positions (including bars in dowel baskets)
- Easy handling, assembly and transport
- Accurate and fast non-destructive measurement of dowel positions
- Easy control of the measurement and on-site analysis with a Pocket PC
- High precision: Depth and misalignments of bars can be determined with a tolerance of  $\pm 4$  mm, side shift with a tolerance of  $\pm 8$  mm (peak to peak)
- Efficient inspection of long route sections (500-600 joints of 16 m length per day)
- Measurements completed immediately after joint cutting
- Comprehensive analysis and visualization of data and measuring results with the Desktop software

## MEASURING METHOD

MIT-SCAN2-BT operates using the principles of the eddy current method (pulse induction method). By means of a sensor field, a high sampling rate and an accurate distance measurement in the moving direction of the measuring device, magnetic answering fields are recorded.

## MIT-SCAN2-BT – TECHNICAL DATA

Technical data			Delivered components
<b>Measuring device</b>	Size	116 x 65.5 x 9.5 cm (45.7 x 25.8 x 3.7 in)	<ul style="list-style-type: none"> <li>- Measuring device</li> <li>- Battery (built in)</li> <li>- Charger</li> <li>- Operating manual</li> <li>- Transport box</li> </ul>
	Weight	16.5 kg / (36.4 lbs)	
	Operating voltage	12 V	
	Battery	Lead-gel: 12 V / 7.2 Ah	
	Operating time	8 hours	
	Charging time	4 hours	
<b>Rail system</b>	Length of rail segments	1.0 m (3.3 ft) standard	<ul style="list-style-type: none"> <li>- Rail segments of GRP (robust glas fiber reinforced plastic), 1.0 m (3.3 ft)</li> <li>- Crossties with wheels</li> <li>- End segments, 0.5 m (1.7 ft)</li> <li>- Knurled screws</li> <li>- Transport box</li> </ul>
	Rail width	1.18 m (3.9 ft)	
	Total length	10.0 m (32.8 ft) standard	
<b>Pocket PC CASIO IT800</b>	Size	78 x 159 x 25 mm	<ul style="list-style-type: none"> <li>- CASIO IT600 (with large battery pack)</li> <li>- Memory card</li> <li>- Cradle</li> <li>- USB cable</li> <li>- Software MagnoNorm</li> <li>- Software MagnoProof</li> <li>- Operating manuals</li> </ul>
	Operating system	Windows CE 6.5 engl.	
	Color display	3.7"	
	Processor	Marvell PXA320	
	RAM	128 MB	
	Weight	324 g	
<b>Scope of validity</b>			
<b>Depth</b>	110 mm ... 190 mm (4.3 in ... 7.5 in)		
<b>Side shift</b>	max. 80 mm (3.2 in)		
<b>Horizontal misalignment</b>	max. 40 mm (1.6 in)		
<b>Vertical misalignment</b>	max. 40 mm (1.6 in)		
<b>Tolerances</b>			
<b>Repeatability</b>	2 mm (0.1 in)		
<b>Path measurement</b>	$\pm (3 \text{ mm} + 0.3 \% \text{ of the distance}) / \pm (0.15 \text{ in} + 0.3 \% \text{ of the distance})$		
<b>Depth</b>	$\pm 4 \text{ mm} (0.2 \text{ in})$		
<b>Side shift</b>	$\pm 8 \text{ mm} (0.3 \text{ in})$		
<b>Horizontal misalignment</b>	$\pm 4 \text{ mm} (0.2 \text{ in})$		
<b>Vertical misalignment</b>	$\pm 4 \text{ mm} (0.2 \text{ in})$		
<b>Environment</b>			
<b>Operating temperature</b>	-5° C ... 50° C (23°F ... 122°F)		
<b>Storage temperature</b>	-10° C ... 50° C (14°F ... 122°F)		
<b>Humidity</b>	Operates on wet surfaces and on walkable green concrete		
<b>Daily output</b>	500-600 joints (for 16.0 m / 52 ft joint length)		

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