



a.p. van den berg  
*The CPT factory*

# Icone Magneto Module

easy access to additional data with a click-on module



## features

- modular plug & play extension to the Icone data acquisition system
- detection of objects containing magnetisable metal
- detection in three orthogonal directions up to a 2 m radius
- equipped with its own inclinometer in X- and Y-direction
- Icone and CPT rods also available in non-magnetisable nitronic steel
- can be combined with 5, 10 and 15 cm<sup>2</sup> Icones
- automatically recognized by Ifield software and Icontrol datalogger

creating tools that move your business

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## Introduction

Unknown structures and obstacles are risk factors in the execution of earth and foundation works. To avoid damage and interruptions of work, these underground elements should be identified and mapped. A lot of underground structures and obstacles contain metal. The combination of this physical

property and the natural presence of a magnetic field provides grounds for a very effective detection method.

## The earth's magnetic field

The earth's magnetic field consists of magnetic field lines that run from North to South. Objects containing magnetisable metal exert a magnetic pull on the earth's magnetic field distorting the natural pattern of this field and causing a local magnetic field. These anomalies can be detected and localized with a magnetometer. For this purpose A.P. van den Berg has developed the Icone Magneto Module.

## Application of the Icone Magneto Module

The Icone Magneto Module contains sensors that detect objects containing magnetisable metal, such as unexploded ordnance (UXO), sheet piles, ground anchors, reinforced concrete objects and "live" power cables. While the module is pushed into the soil, its sensors are able to measure anomalies in three orthogonal directions with an accuracy of  $0.02 \mu\text{T}$ . Depending on the size and metal properties of the object, the detection range can have a radius of up to 2 m.

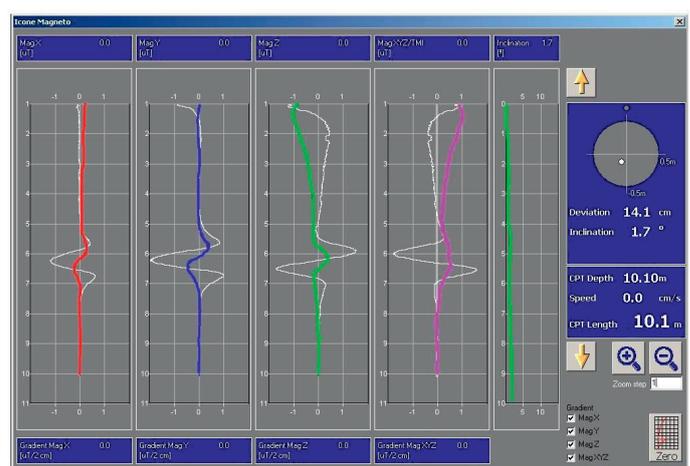
The Magneto Module is equipped with its own inclinometer in X- and Y-direction, to allow for accurate registration of the position. To avoid influence on the measurements, the CPT rods are also available in non-magnetisable nitronic steel. With pushing equipment from A.P. van den Berg, the pushing rate can be varied from 2 cm/s to 20 cm/s. Also the gradients of the orthogonally measured anomalies are determined and displayed. Alarm values can be set to signal large changes in these measured values. The Magneto Module can be applied both onshore and offshore and has a 1,000 m water depth rating.

## Specifications

Length	600 mm without Icone
Diameter	44 mm
Weight	4.8 kg without Icone
Magnetometer	-measuring range $-100/+100 \mu\text{T}$ -accuracy $0.02 \mu\text{T}$
Inclinometer	-measuring range $-25^\circ / +25^\circ$ -accuracy $1^\circ$ (FRO)
Available data transfer	-4 wire Icone cable inside rods -Wireless Optical data transfer
Connector	Quadrax swivel to Icone Lemo 4-pins to Icontrol
Operating temperature	$0^\circ$ to $50^\circ\text{C}$

## Modular concept (plug & play)

When required, the standard CPT-parameters can be measured simultaneously if the module's tip is replaced by an Icone. These parameters are cone tip resistance ( $q_c$ ), sleeve friction ( $f_s$ ), pore water pressure ( $u$ ) and inclination ( $I_x/y$ ). Both the Icone Magneto Module as well as the Icone are part of a modular data acquisition concept, developed by A.P. van den Berg, that is based on fully digital data transfer. The system consists of a digital data logger, called Icontrol and Ifield software for real-time data presentation. Due to smart application of digital technology, multiple parameters can be retrieved by several modules, even combined in one test. Besides the Icone for standard CPT and the Icone Magneto, modules are available for seismic, vane and conductivity testing. Upon connection, the Icontrol data logger and Ifield software will automatically recognize the specific cone and/or module(s), so plug & play!



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