



# Magnetic Settlement System Reed Switch Probe Instruction Manual

## ***Principle of operation***

The RST Magnetic Settlement System – Reed Switch Probe is a simple, reliable system designed to monitor settlement or heave in rock, soil and different types of manmade structures. The system consists of an access pipe, target magnets, probe and readout unit.

The Reed Switch Probe employs a high accuracy, NBS traceable or polyethylene coated, non-stretch, flat tape that is permanently marked in 1/100ft. and/or 1mm graduations. Ring magnets elevation can be read from the tape. The moisture resistant electronics and a standard 9-volt battery are also housed in the reel hub. Both the tape and the probe are supplied on a sturdy winding reel with a braking system. The brake is applied by tightening the thumbscrew on the back side of the reel frame. The Reed Switch Probe serial number and tape length are labeled on the sticker at the front of the reel flange.

The Reed Switch Probe is featured with a shrouded stainless probe, LEDs, and a buzzer.

The probe is a normally open, simple reed switch that closes upon entering the magnetic field of the target anchor. A two-conductor tape serves to both lower the probe and connect the probe to the circuit board. The switch closes upon entering magnetic field, the signal amplified, causing a beeping sound and LED flashing on the electronics readout on the reel. Anchor elevation is then read directly from the tape.

Magnets are arranged within the anchor to yield a uniform, axial magnetic field with a well-defined null zone. Ceramic magnets, rather than ferrous magnets, are used for their consistent magnetic properties:

- There is no significant change in field strength with time.
- The magnets are unaffected by most groundwater regimes.
- There is no appreciable difference in field strength with temperature.
- Field strength is unaffected by impact.

Like an inclinometer installation, Reed Switch Probe utilize the bottom of the borehole as a reference datum. Typically, the borehole is drilled to stable ground and a datum reference magnet installed. If site conditions preclude the use of the bottom of the borehole as a datum, optical survey methods must be used at the borehole collar.

Settlement or heave is determined by comparing subsequent readings to the initial datum readings.

## ***Measuring magnetic rings elevation***

To measure magnetic rings elevation in boreholes, standpipes or wells:

- 1. Press the ON button to turn on the Reed Switch Probe.**
- 2. Reed Switch Probe will initially beeps 3 times and a number of LEDs (depending on the battery level) will flashes 3 times to indicate the current battery status.** If there is only 1 or 2 LEDs flashing, the battery should be replaced soon.
- 3. Reed Switch Probe will then turn into stand-by mode and the far left LED will keep flashing.** (The Reed Switch Probe will shut off automatically if there is no activity for 2 minutes.)
- 4. Lower the probe into borehole, standpipe, or well.**
- 5. Once the probe comes in contact with magnetic field, the buzzer will beep and the LEDs will flash.**
- 6. Read the mark on the tape to determine the Anchor elevation.**

### ***Replacing with the new Reed Switch Probe electronic (If applicable)***

1. Remove the old Reed Switch Probe electronic unit including the housing.
2. Unplug the electronic connector that is connected to the tape.
3. Plug the electronic connector from the new Reed Switch Probe electronic to the tape.
4. Replace the new Reed Switch Probe electronic with the housing onto the reel's flange.
5. Replace the instruction sticker onto the reel's flange with the new instruction sticker.

### ***Cautions***

- **Resulting pressures can destroy the housing seals and sensor.**
- **Use the Instrument between -10 degrees Centigrade and +40 degrees Centigrade.**
- **Remove batteries during long-term storage.**
- **9-volt Alkaline cell is recommended.**

