

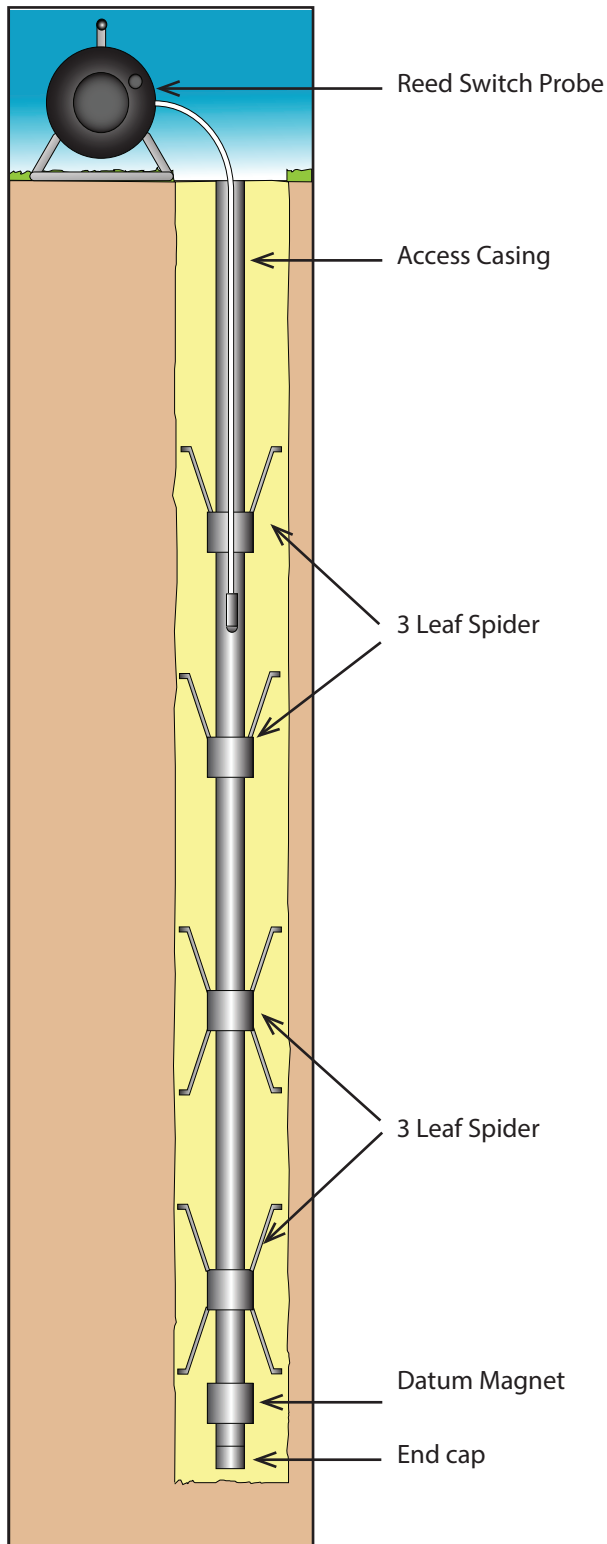
# Magnetic Extensometer Systems GXM Range

The Geosense® GEO-XM settlement system is used typically to monitor settlement and heave in foundations, excavations and embankments



# Magnetic Extensometer Systems

## Overview



### SYSTEM SUMMARY

The Geosense® GEO-XM settlement system is a magnet extensometer system used typically to monitor settlement and heave in foundations, excavations and embankments.

Data received identifies the depth and position where settlement has occurred as well as the total amount of settlement.

It can also be installed behind retaining structures, such as sheet piles and slurry walls, and above underground openings, such as tunnels and shafts.

### OPERATION

The system comprises a Reed Switch Probe, a mm graduated tape on a reel and an access tube along which magnetic targets are positioned. The magnets are coupled to the surrounding soil and move up or down as heave or settlement occurs.

Readings are obtained by drawing the probe through the access pipe to find the depth of the magnets. When the probe enters a magnetic field, a reed switch closes, activating a light and buzzer. The operator then refers to graduations on the cable and notes the depth of the magnet.

When the access tube is anchored in stable ground, the depth of each magnet is referenced to a datum magnet fixed to the bottom section of the access tube. Any settlement or heave of the ground being measured will cause the magnets to move along the axis of the pipe.

If the bottom of the access tube is not in stable ground, the depths of the magnets must be referenced to the top of the pipe, which is optically surveyed before readings are taken.

### SYSTEM ACCURACY

The accuracy of the system will depend on the accuracy and resolution of the Reed Switch Probe together with the repeatability of the measurements by the operator.

Typical system accuracy is  $\pm 1$ mm.

# Magnetic Extensometer Systems

## System Components

The following items are used in a typical magnet extensometer system.

### REED SWITCH PROBE 1 & 2

Used to determine the location of magnetic sensors. A centraliser can be used to guide the tape down the centre if inclinometer access casing is used.

### ACCESS CASING/TUBE 3, 4 & 5

Inclinometer access casing (70mm) or tube (33mm) allows the Reed Switch Probe to be lowered down to identify the position of the magnetic targets. Once installed, the borehole is backfilled with grout.

### DATUM MAGNET 6

The datum magnet is fixed directly to the bottom section of access pipe to serve as a reference. It is used when the bottom of the pipe is anchored in stable ground.

### SPIDER MAGNET 7 & 8

Spider magnets are used to locate the magnetic target at specific positions along the access casing/ tube. They are available with three legs or six legs. In the six-leg version, the spider magnet is attached to the access casing/ tube and the legs compressed for installation using a chain and pin. They are released when the magnet is positioned at the specified depth. The three-leg version can be pushed down from the surface after the pipe is installed.

### PLATE MAGNET 9

Plate magnets are used in soil or fill when adding further sections of tubing. They are positioned at the specified elevation and then covered with fill material compacted to the same specifications as the surrounding fill.

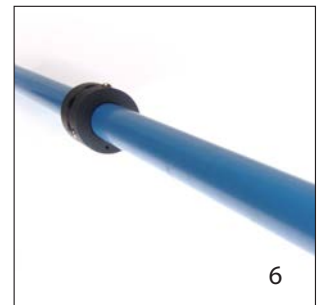
### TELESCOPIC SECTIONS 10

Telescopic sections are installed when settlement or heave is expected to exceed 3%.

### INSTALLATION TOOLS

A range of tools is available for installation of the 3 leg spider magnet.

Note: The spider legs are only used to maintain the position of the magnetic target until it is grouted.

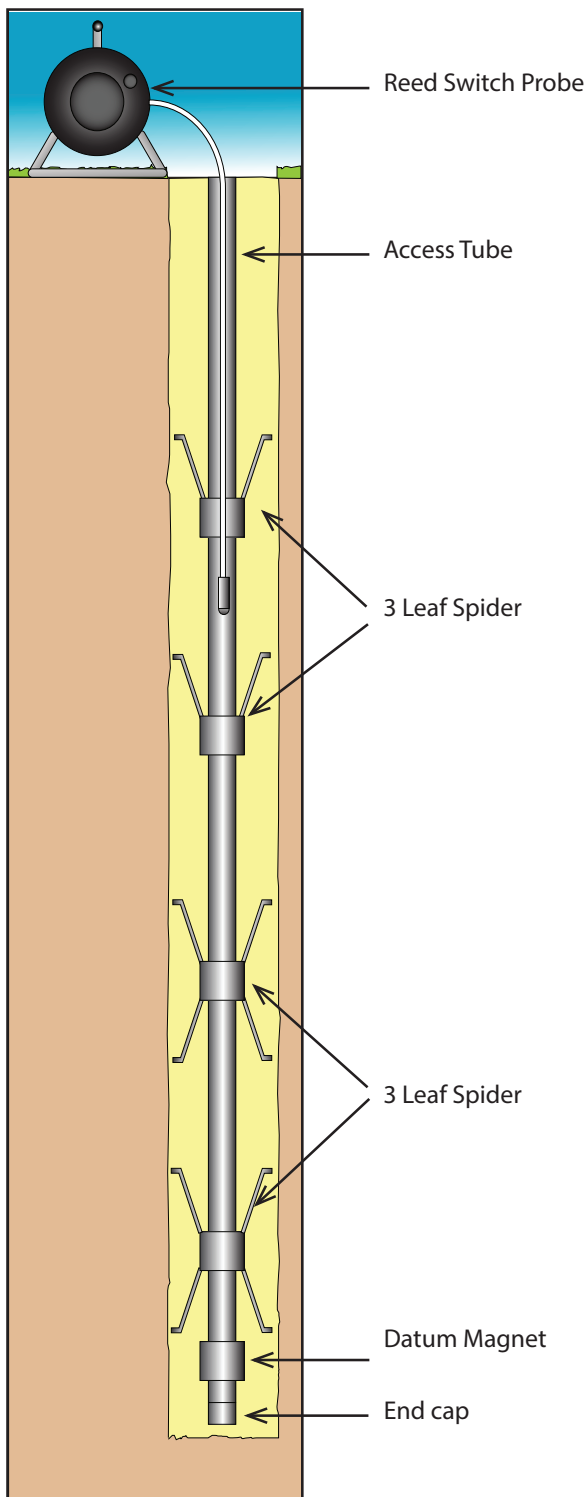


# Magnetic Extensometer Systems

## GXM-100

The Type GXM-100 system comprises a series of 3 or 6 leaf spider magnetic targets positioned on the outside of flush jointed 33mm access tubing.

Settlement is measured by the relative position of the 3 or 6 leaf magnetic targets using a Reed Switch Probe lowered down through the central access tube.



### ACCESS TUBE

Access Tube OD	33mm
Access Tube ID	25mm
Access Tube Length	1 or 3m
Access Tube Weight	0.6kg/m
Bottom Cap OD	33mm
Material	PVC

### MAGNETIC TARGETS

Spider Magnet	3 & 6 Leaf
Datum Magnet	35 x 60mm
Plate Magnet	33 x 300mm

### ACCESSORIES

Spider Leaf Chain	500mm
Chain Release Pin	
Reed Switch Probe	30, 50, 100, 150, 200m
Installation Tool	30, 50, 100, 150, 200m
Mastic Tape	10m

### ORDERING INFORMATION

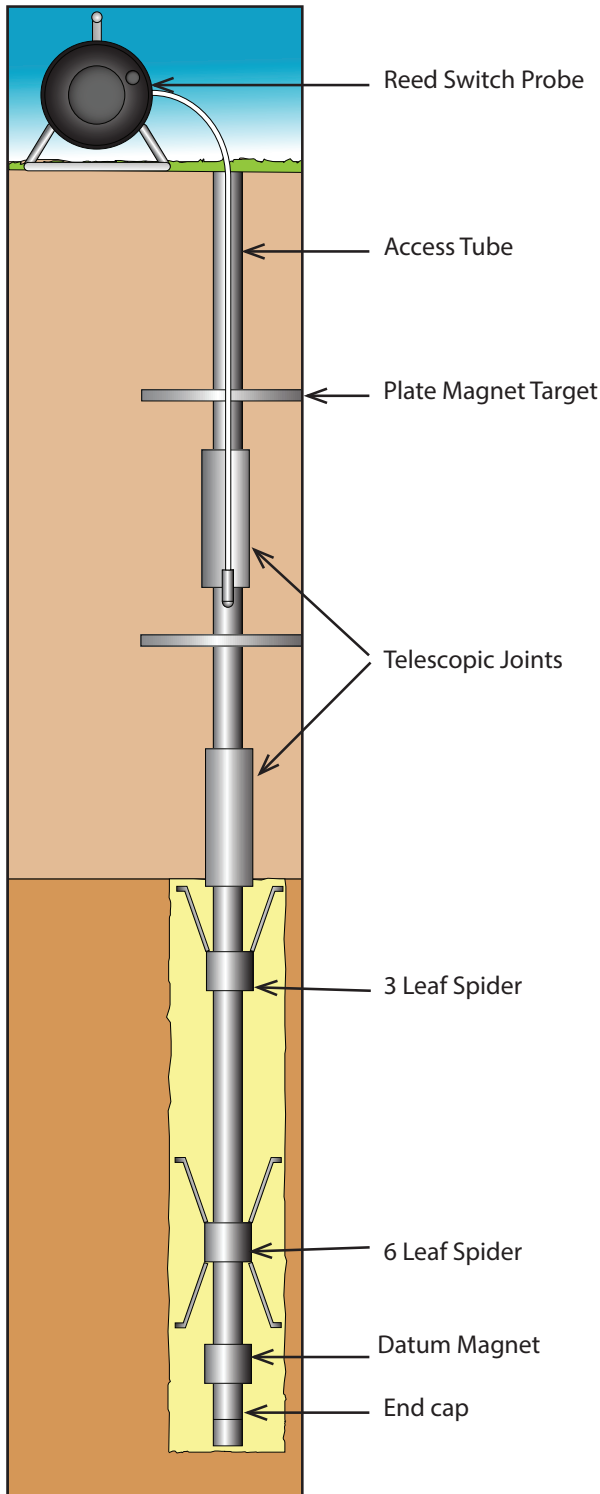
Depth of installation	
Type & number of spider targets	
Number of datum magnets	
Reed Switch Probe range	
Installation tool range	

# Magnetic Extensometer Systems

## GXM-100P

The Type GXM-100P system comprises a series of 3 or 6 leaf spider magnetic targets positioned on the outside of flush jointed access tubing for downhole applications or a series of settlement plates and telescopic joints for applications in fill.

Settlement is measured by the relative position of the magnetic targets using a Reed Switch Probe lowered down through the central access tubing.



### ACCESS TUBE

Access Tubing OD	33mm
Access Tubing ID	25mm
Access Tubing Length	1.5 or 3m
Access Tubing Weight	0.6kg/m
Bottom Cap OD	33mm
Material	PVC

### ACCESS CASING TELESCOPIC SECTION

Telescopic Section OD	42mm
Telescopic Section ID	35mm
Length	500mm
Range	200mm
Weight	0.55kg
Material	PVC

### MAGNETIC TARGETS

Spider Magnet	3 & 6 leaf
Datum Magnet	35 x 60mm
Plate Magnet	33 x 300mm

### ACCESSORIES

Spider Leaf Chain	500mm
Chain Release Pin	
Reed Switch Probe	30, 50, 100, 150, 200m
Installation Tool Range	30, 50, 100, 150, 200m
Mastic Tape	10m

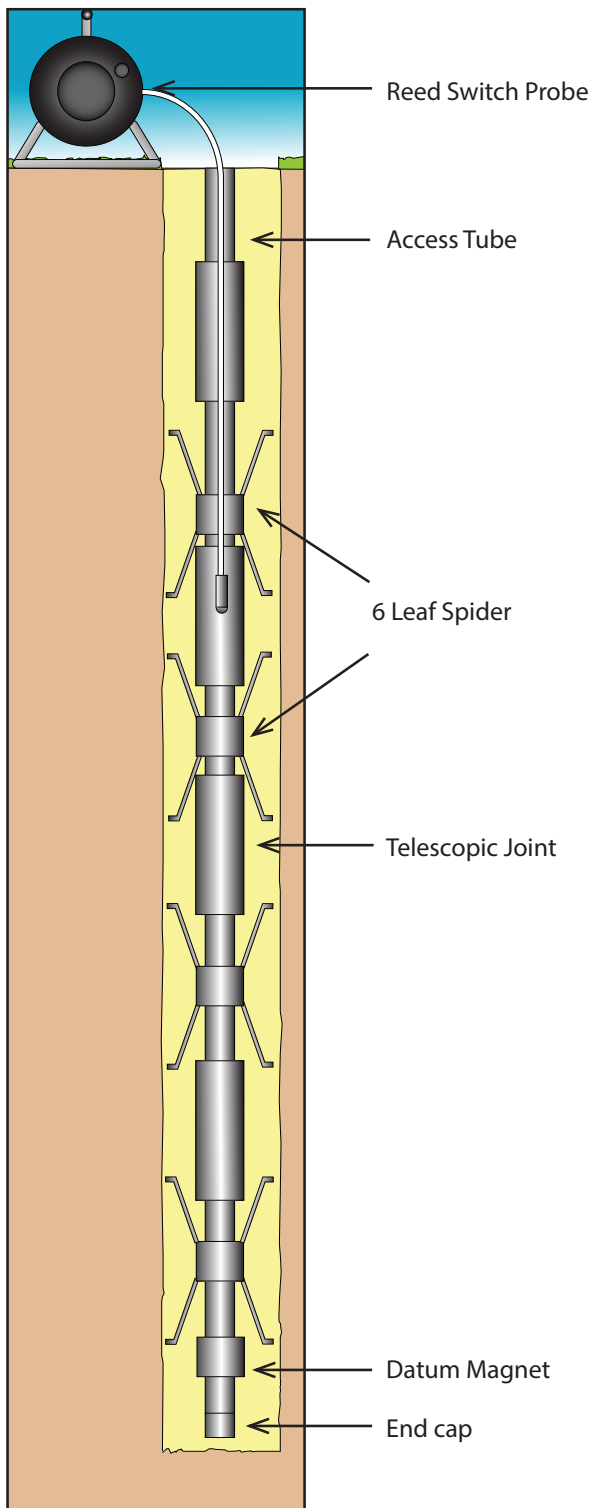
### ORDERING INFORMATION

Depth of installation	
Type & number of spider targets	
Number of datum magnets	
Reed Switch Probe range	
Installation tool range	

# Magnetic Extensometer Systems

**GXM-100T** The Type GXM-100T system comprises a series of 6 leaf spider magnetic targets positioned on the outside of a flush jointed 33mm access tube together with telescopic joints to accommodate higher settlements than the GXM-100.

Settlement is measured by the relative position of the magnetic targets using a Reed Switch Probe lowered down through the central access tubing.



## ACCESS TUBE

Access Tube OD	33mm
Access Tube ID	25mm
Access Tube Length	1.5 or 3m
Access Tube Weight	0.6kg/m
Bottom Cap OD	33mm
Material	PVC

## ACCESS TUBE TELESCOPIC SECTION

Telescopic Section OD	42mm
Telescopic Section ID	35mm
Length	500mm
Range	200mm
Weight	0.55kg
Material	PVC

## MAGNETIC TARGETS

Spider Magnet	6 leaf
Datum Magnet	35 x 60mm

## ACCESSORIES

Spider Leaf Chain	500mm
Chain Release Pin	
Reed Switch Probe	30, 50, 100, 150, 200m
Mastic Tape	10m

## ORDERING INFORMATION

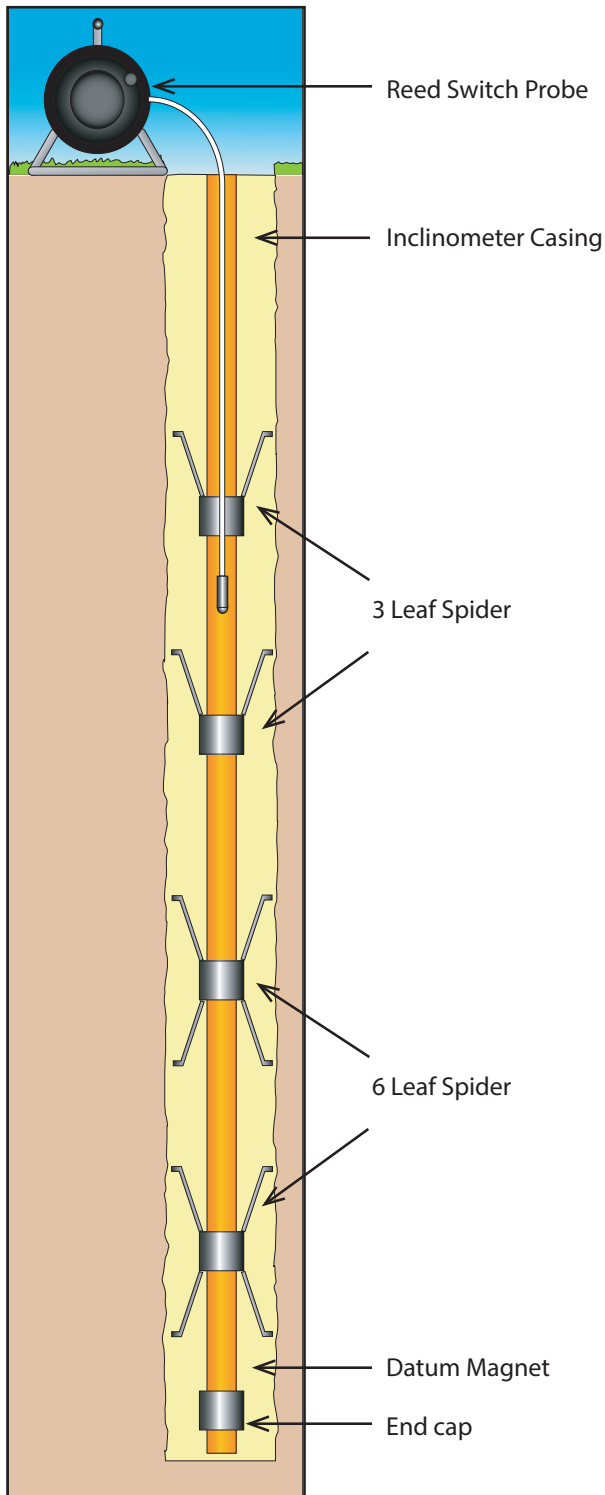
Depth of installation	
Type & number of spider targets	
Number of datum magnets	
Reed Switch Probe range	

# Magnetic Extensometer Systems

## GXM-200

The Type GXM-200 system comprises a series of 3 or 6 leaf spider magnetic targets positioned on the outside of a flush jointed inclinometer casing.

Settlement is measured by the relative position of the magnetic targets using a Reed Switch Probe lowered down through the central access casing. Clineation is measured by using a portable inclinometer probe.



### INCLINOMETER ACCESS CASING

Casing OD	70mm	83mm
Casing ID	59mm	71mm
Casing Length	1.5 or 3m	1.5 or 3m
Casing Weight	1.27kg	1.35kg
Material	ABS	ABS
Groove Spiral	<0.005 Rad/3m	<0.005 Rad/3m

### MAGNETIC TARGETS

Spider Magnet	3 & 6 leaf
Datum Magnet	35 x 60mm

### ACCESSORIES

Spider Leaf Chain	500mm
Chain Release Pin	
Reed Switch Probe	30, 50, 100, 150, 200m
Installation Tool Range	30, 50, 100, 150, 200m
Mastic Tape	10m

### ORDERING INFORMATION

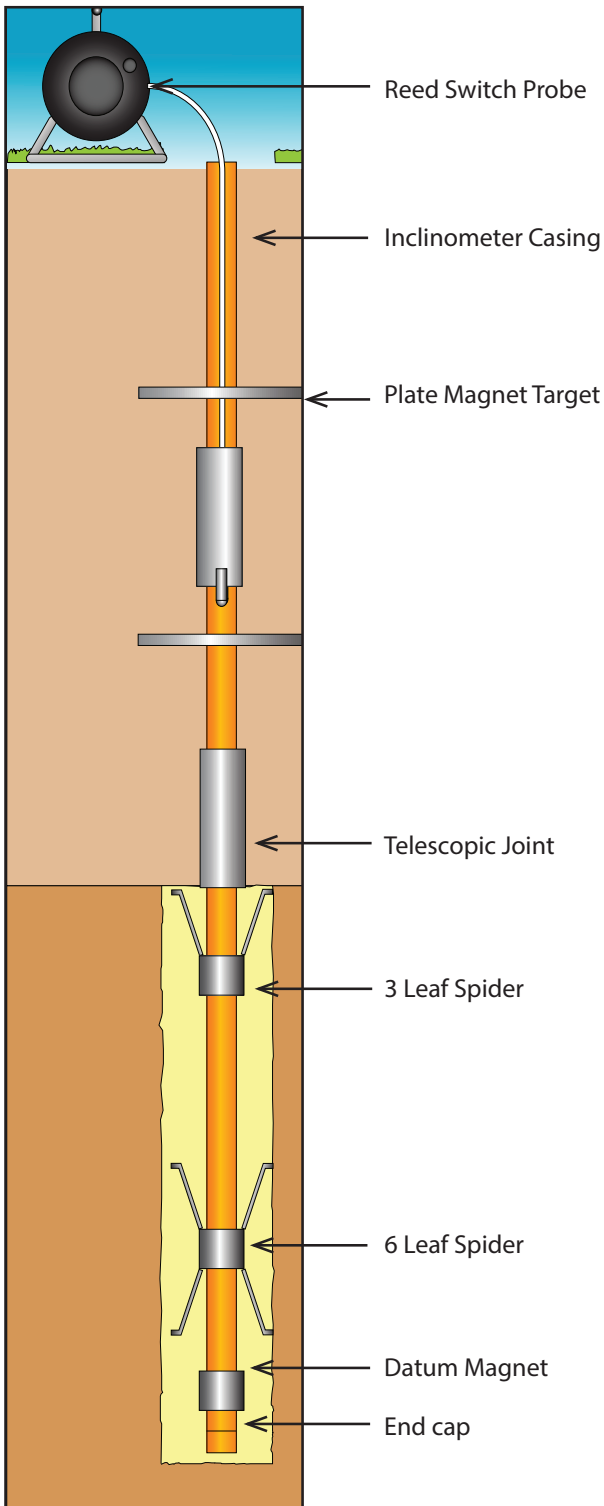
Depth of installation
Type & number of spider targets
Number of datum magnets
Reed Switch Probe range
Installation tool range

# Magnetic Extensometer Systems

## GXM-200P

The Type GXM-200P system comprises a series of 3 or 6 leaf spider magnetic targets positioned on the outside of flush jointed inclinometer access casing for downhole applications or a series of settlement plates and telescopic joints for applications in fill.

Settlement is measured by the relative position of the magnetic targets using a Reed Switch Probe lowered down through the central access casing. Clination is measured by using a portable inclinometer probe.



### INCLINOMETER ACCESS CASING

Casing OD	70mm	83mm
Casing ID	59mm	71mm
Casing Length	1.5 or 3m	1.5 or 3m
Casing Weight	1.27kg	1.35kg
Material	ABS	ABS
Groove Spiral	<0.005 Rad/3m	<0.005 Rad/3m

### ACCESS CASING TELESCOPIC SECTION

Telescopic Section OD	70mm	83mm
Compressed Length	508mm	508mm
Extended Length	660mm	660mm
Range	152mm	152mm
Weight	0.77kg	0.90kg
Material	ABS	ABS
Groove Spiral	<0.005 Rad/3m	<0.005 Rad/3m

### MAGNETIC TARGETS

Spider Magnet	3 & 6 leaf	3 & 6 leaf
Plate Magnet	70 x 300mm	83 x 300mm
Datum Magnet	70 x 100 mm	85 x 110 mm

### ACCESSORIES

Spider Leaf Chain	500mm
Spider Chain Release Pin	
Reed Switch Probe	30, 50, 100, 150, 200m
Installation Tool Range	30, 50, 100, 150, 200m
Mastic Tape	10m

### ORDERING INFORMATION

Depth of installation	
Type & number of spider targets	
Number of datum magnets	
Reed Switch Probe range	
Installation tool range	

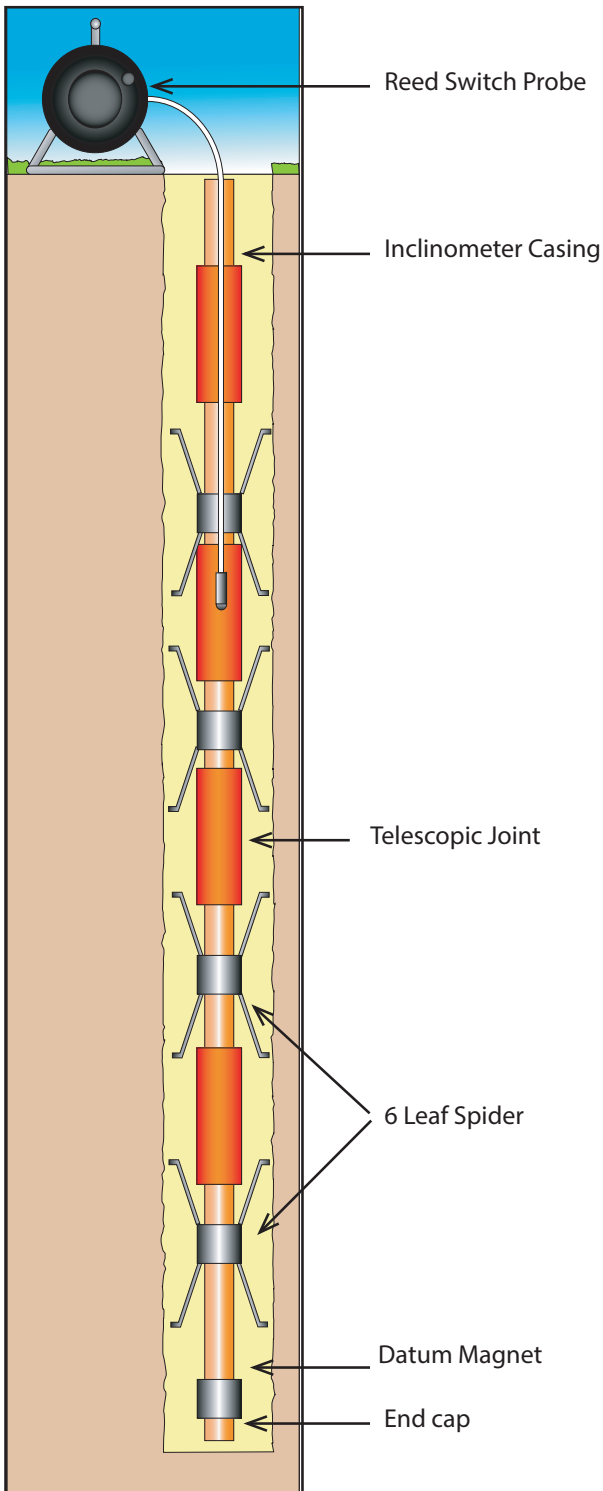


# Magnetic Extensometer Systems

## GXM-200T

The Type GXM-200T system comprises a series of 6 leaf spider magnetic targets positioned on the outside of a flush jointed inclinometer access casing together with telescopic joints to accommodate higher settlements than the GXM-200.

Settlement is measured by the relative position of the magnetic targets using a Reed Switch Probe lowered down through the central access casing. Clineation is measured by using a portable inclinometer probe.



### INCLINOMETER ACCESS CASING

Casing OD	70mm	83mm
Casing ID	59mm	71mm
Casing Length	1.5 or 3m	1.5 or 3m
Casing Weight	1.27kg	1.35kg
Material	ABS	ABS
Groove Spiral	<0.005 Rad/3m	<0.005 Rad/3m

### ACCESS CASING TELESCOPIC SECTION

Telescopic Section OD	70mm	83mm
Compressed Length	508mm	508mm
Extended Length	660mm	660mm
Range	152mm	152mm
Weight	0.77kg	0.90kg
Material	ABS	ABS
Groove Spiral	<0.005 Rad/3m	<0.005 Rad/3m

### MAGNET TARGETS

Spider Magnet	6 leaf	6 leaf
Datum Magnet	70 x 100 mm	85 x 110 mm

### ACCESSORIES

Spider Leaf Chain	500mm
Release Pin	
Reed Switch Probe	30, 50, 100, 150, 200m
Mastic Tape	10m

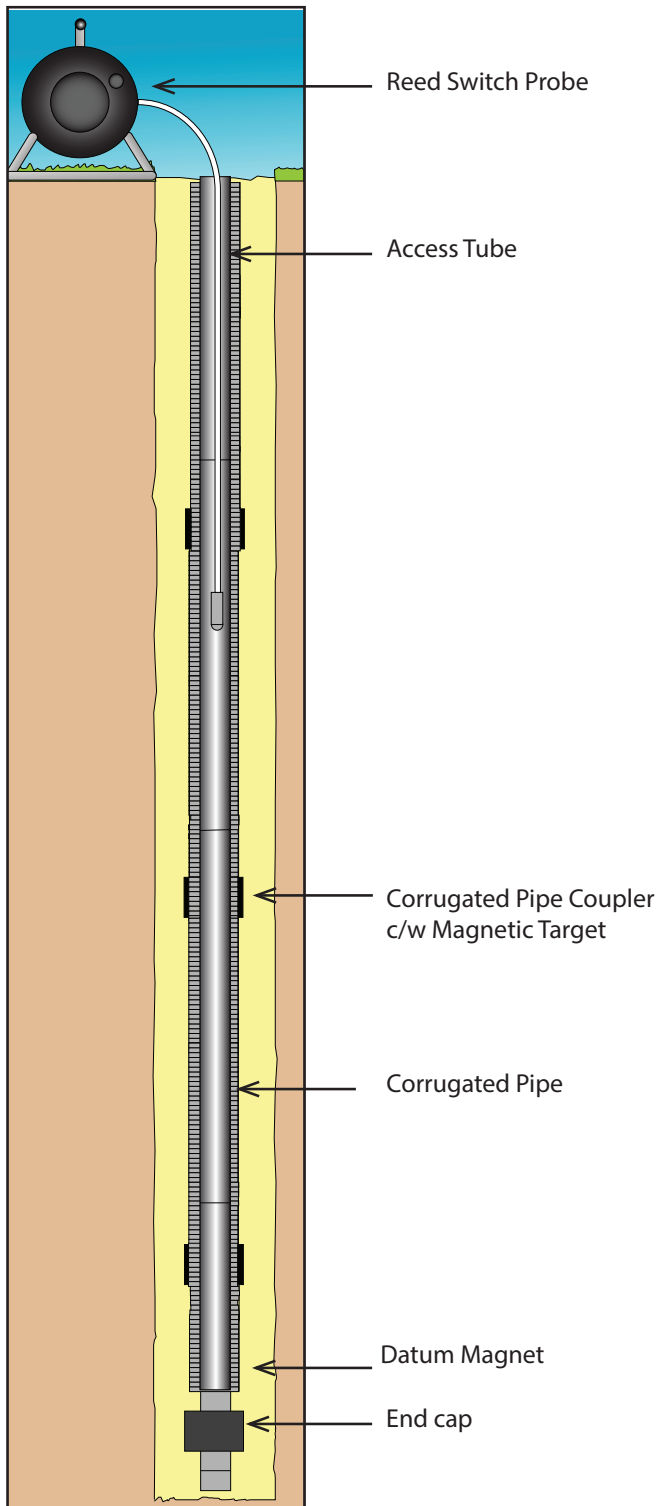
### ORDERING INFORMATION

Depth of installation	
Type & number of spider targets	
Number of datum magnets	
Reed Switch Probe range	

# Magnetic Extensometer Systems

## GXM-300

The Type GXM-300 system comprises flush-threaded 33mm access tube inside corrugated pipe for applications where high settlement is expected. The corrugated pipe couplers act as magnetic targets as well as connecting the corrugated pipe together. Settlement is measured by the relative position of the magnetic targets using a Reed Switch Probe lowered down through the central access casing.



### ACCESS TUBE

Access Tube OD	33mm
Access Tube ID	25mm
Access Tube Length	1 or 3m
Access Tube Weight	0.6kg/m
Bottom Cap OD	33mm
Material	PVC

### CORRUGATED PIPE

Pipe OD	42mm
Pipe ID	35mm
Length	3m, 50m, coil
Magnetic Target/Coupler	42 x 50mm
Material	PE

### ACCESSORIES

Bottom Cap	43mm
Reed Switch Probe	30, 50, 100, 150, 200m

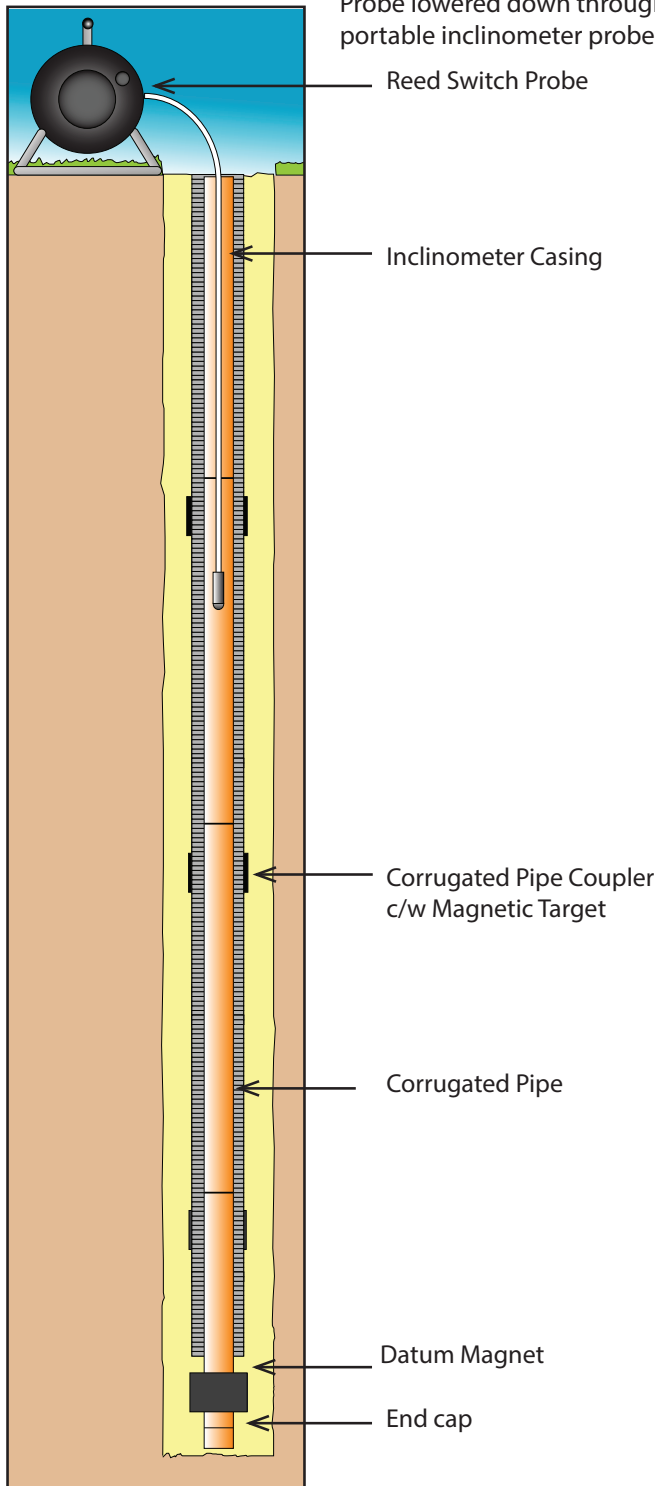
### ORDERING INFORMATION

Depth of installation	
Number of Magnetic Target/Couplers	
Number of couplers	
Reed switch probe range	

# Magnetic Extensometer Systems

## GXM-300i

The Type GXM-300i system comprises flush-coupled inclinometer access casing inside corrugated pipe for applications where high settlement is expected. The corrugated pipe couplers act as magnetic targets as well as connecting the corrugated pipe together. Settlement is measured by the relative position of the magnetic targets using a Reed Switch Probe lowered down through the central inclinometer casing. Clination is measured by using a portable inclinometer probe.



### INCLINOMETER ACCESS CASING

Casing OD	70mm
Casing ID	59mm
Casing Length	1.5 or 3m
Casing Weight	1.27kg
Material	ABS
Groove Spiral	<0.005 Rad/3m

### CORRUGATED PIPE

Pipe OD	100mm
Pipe ID	80mm
Length	3m, 50m, 100m coil
Magnetic Target/Coupler	42 x 50mm
Material	PE

### ACCESSORIES

Bottom Cap	70mm
Reed Switch Probe	30, 50, 100, 150, 200m

### ORDERING INFORMATION

Depth of installation
Number of magnetic target/couplers
Number of couplers
Reed switch probe range



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