

# Model 906 Little Dipper

## APPLICATIONS

- Monitor lateral movement of slopes, embankments, trenches and tunnel walls.
- Monitor ground settlement beneath tanks and fills.
- Monitor surface movements by direct burial in shallow boreholes.
- Cast Little Dippers in place to monitor structural deformation.

## ADVANTAGES

- Economical.
- Use with standard inclinometer casing sizes, or by direct burial.
- Use with any cable length.
- High precision – detect movements smaller than 0.1 inch in 100 ft (0.1mm/meter).
- Built with on-board electronics for stable readings over long cables.
- Non corrodible polymer and fiberglass construction.



## INSTALLATION

Little Dipper In-Place Inclinometers are economical biaxial instruments for monitoring the deflection of inclinometer casing. Each Little Dipper connects to the one above by a low-cost fiberglass connecting rod, forming a string of inclinometers in the cased borehole. Two cased borehole installation methods are available:

- 1) Multiple-interval installation, in which universal pivots separate hinged segments. Each segment measures the lateral displacement of a discrete interval in the borehole.
- 2) Multiple-point installation, in which removable fins hold the sensors snugly in the grooves of the

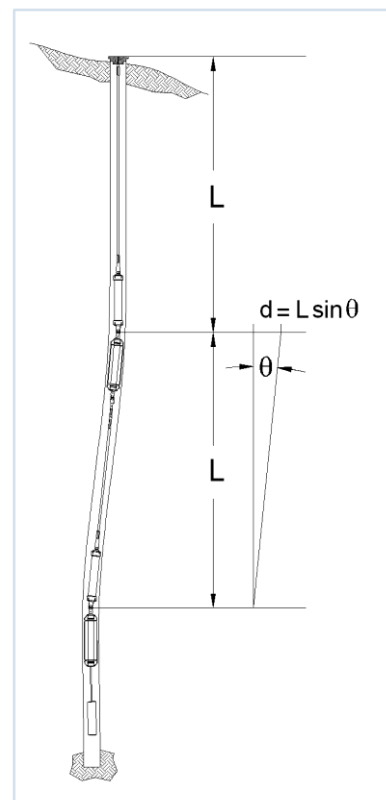
inclinometer casing. With this method your Little Dippers measure rotation at discrete depths in the hole.

In both installation methods the inclinometer string hangs in tension from the top of the casing, giving you the most stable in-place inclinometer configuration.

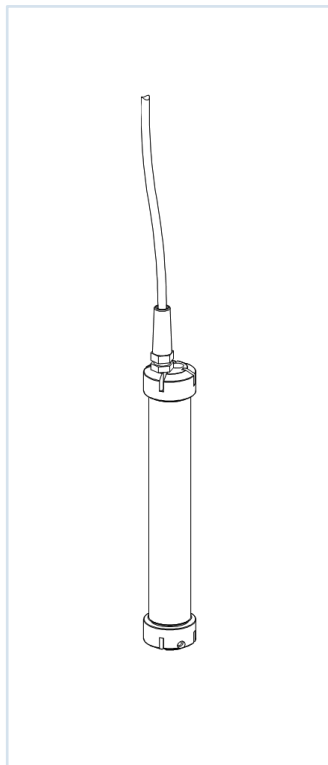
Little Dippers also provide diagnostic, cost-effective results when installed in the ground by direct burial. In this manner deformation of a large area can be monitored by a small array of sensors. They can also be cast in place in retaining walls, caissons and other structures to provide a direct measure of structural movement.

## OPERATION

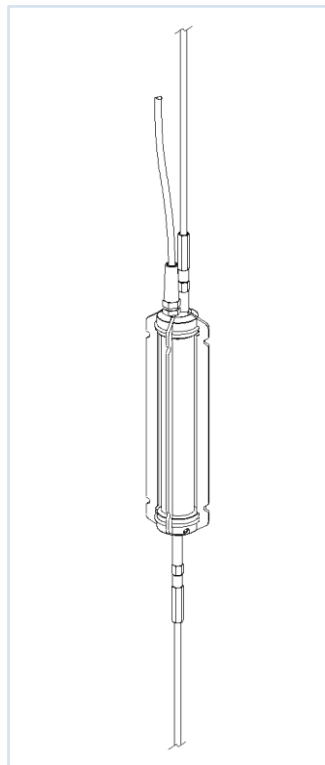
The stable, high-level outputs of Little Dipper In-Place Inclinometers are easily read by all popular data loggers. Jewell Instruments offers complete in-place inclinometer systems specifically tailored to your project requirements. Options include automated loggers, manual readouts and our powerful TBASE II database software for rapid data analysis and reporting.



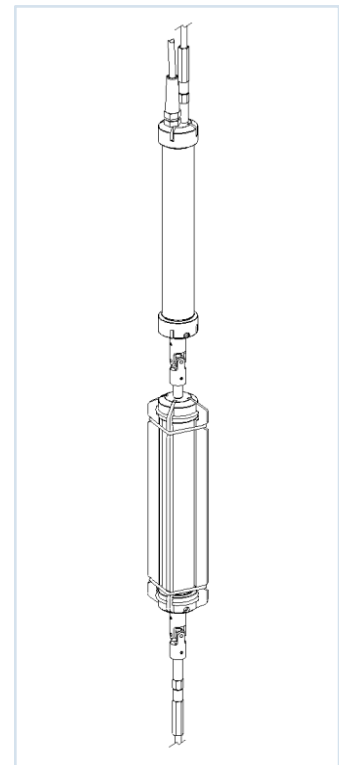
*Little Dippers installed in inclinometer casing*



*Little Dipper Sensor  
Module Direct Burial  
Installation*



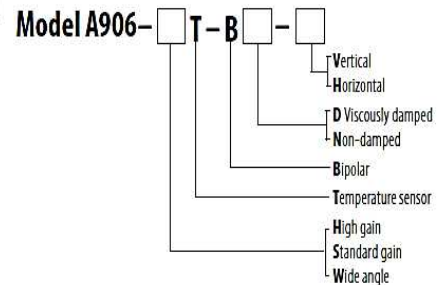
*Little Dipper with Guide  
Fins Multiple-Point  
Installation*



*Little Dipper with Universal  
Pivot Multiple-Interval  
Installation*

	LITTLE DIPPER, HIGH-GAIN VERSION	LITTLE DIPPER, STANDARD VERSION
RANGE & SCALE FACTOR	$\pm 12$ degrees, 4°/ Volt typical	$\pm 30$ degrees, 10°/ Volt typical
RESOLUTION	0.005 degree	0.01 degree
REPEATABILITY	0.01 degree	0.02 degree
LINEARITY	0.8% of full span typical	4% of full span, 1% of half span, typical
TILT OUTPUT	Two orthogonal tilt angles, $\pm 3.0$ Volts per channel, output impedance = 270 Ohms, 0-5V upgrade available	
TIME CONSTANT	0.15 second	
TEMPERATURE COEF.	Scale factor (span): +0.03%/ °C, Zero: $\pm 5$ arc sec/ °C typical	
POWER REQ'TS.	+8 to +24 VDC, reverse polarity protected	
ENVIRONMENTAL	-25° to +70°C operating and storage; submersible to 5 bars (72 psi)	
DIMENSIONS & WEIGHT	9.25 x 1.55 inches dia. (241 x 39 mm). 0.75 lb (0.35 kg)	
MATERIALS	Cylindrical ABS housing. Delrin guide fins and wheel assemblies	
CABLE	Multiconductor, PVC jacket, polypropylene insulation, overall shield, 0.20 inch (5 mm) dia.	

#### ORDER CODES:



#### USEFUL ACCESSORIES:

<b>86816-03</b>	Set of 4 guide fins for 2.75 inch (70 mm) casing
<b>45100</b>	0-5V Output Range Upgrade
<b>86816-04</b>	Set of 4 guide fins for 3.34 inch (85 mm) casing
<b>86803-01</b>	Universal pivot assembly (order guide fins separately)
<b>86801</b>	Fiberglass connecting rod (specify sensor spacing)
<b>86802/86818</b>	Installation kit (hanger and tensioning weight)
<b>70369</b>	Inclinometer cable (specify lengths)