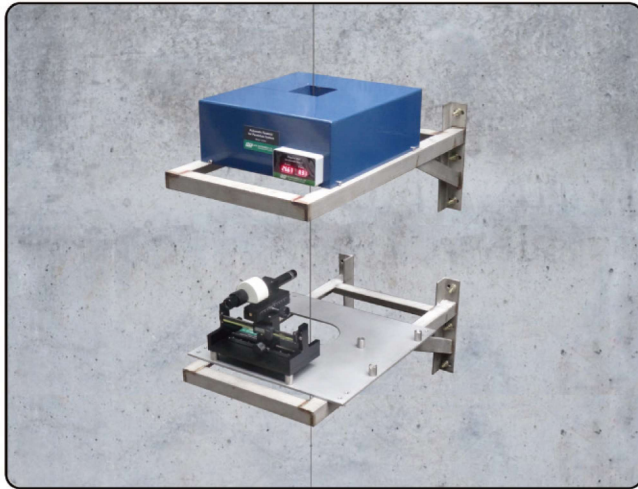


Pendulum system



Description

The **Pendulum system** has two types as direct type of model **8100** and Inverted type of model **8200**.

The direct type consists of an oil tank, an anchor kit installed on the upper side of the measured unit and a wire.

It is good for installing on ground structures at great height. The wire is kept taut because of the heavy weight of the oil tank installed on the ground. The fixed anchor is installed on the upper part of the structure and the wire is hanging on the anchor throughout the readout on the level of the ground beginning spot.

The inverted type is made up of grouting anchor on the stable ground, readout units in the middle, a float unit afloat with a wire on the upper part, and a wire that connected the upper and the lower part.

This type is for an underground structures and the fixing point is on the bottom line. The upper wire is connected with floats that keep the balance as far as each displacement in case of any sloping or displacement. Right below of floats, the readout units are located that are installed at support frame. The wire stuck on the goes through the U-shaped notch up to the float unit.

[Automatic pendulum readout]

It is required to use Charge Coupled Device (CCD) in order to decide the wire position inside of readout.

In case the wire is touched at inside of automatic pendulum readout, it should not operate correctly so that it is needed to install carefully. It is possible to replace the automatic pendulum readout without moving or dispatching of the wire. Outer mounted digital display show data of X and Y axis of the wire. This data is collected every 2 seconds and to be transferred to collect system by RS485 cable that connected at the automatic pendulum readout.

[Optical pendulum readout / manual]

There is a scope on the X and Y axis rail. It is required to quadrature to a line of site with wire and then, it is possible to read the current position.

Specification

| Model | | 8100 (Direct type) | 8200 (Inverted type) |
|------------------------------------|---|---|-------------------------|
| Manual pendulum readout (8100M) | Range | $\pm 75\text{mm}$ (X,Y) | |
| | Resolution | 0.1mm | |
| | Accuracy | $\pm 0.1\text{mm}$ | |
| Automatic pendulum readout (8100A) | Applied sensor | CCD laser | |
| | Range | $\pm 25\text{mm}$ (X,Y) | |
| | Resolution | 7.5 μm | |
| | Accuracy | More than $\pm 0.05\text{mm}$ | |
| | RMS error | Less than $\pm 0.04\text{mm}$ | |
| | Temperature | -15 $^{\circ}\text{C}$ ~60 $^{\circ}\text{C}$ | |
| | Communication | RS-485 | |
| | Analog output | 4-20mA | |
| | Power consumption | Less than 500mA | |
| | Relative humidity | More than 95% | |
| | Water proof | IP67 | |
| Power | AC 85~220V or 24VDC | | |
| Dimensions | 308 \times 330 \times 145mm | | |
| Dimension of wire | $\varnothing 1.6\text{mm}$ stainless steel wire | | |
| Accessories | ① Anchor unit ② Weight ③ Oil tank | ① Float unit ② Float tank ③ Support frame anchor ④ Grouting anchor | |

Applications

The pendulum system of model 8100 direct type and model 8200 Inverted type have the same method as a perpendicular level with a plumb, which can measure the horizontal relative displacement between a dam and rock foundation at a vertical line.

- Construct structures in a nuclear power plant, measure displacement of piers of a bridge
- Measure any shifts of foundation at construction.
- Need any foundation data for measurement (inverted type)
- Use as basic data by the inverted type direct type for a ground construction and the inverted type for an underground one

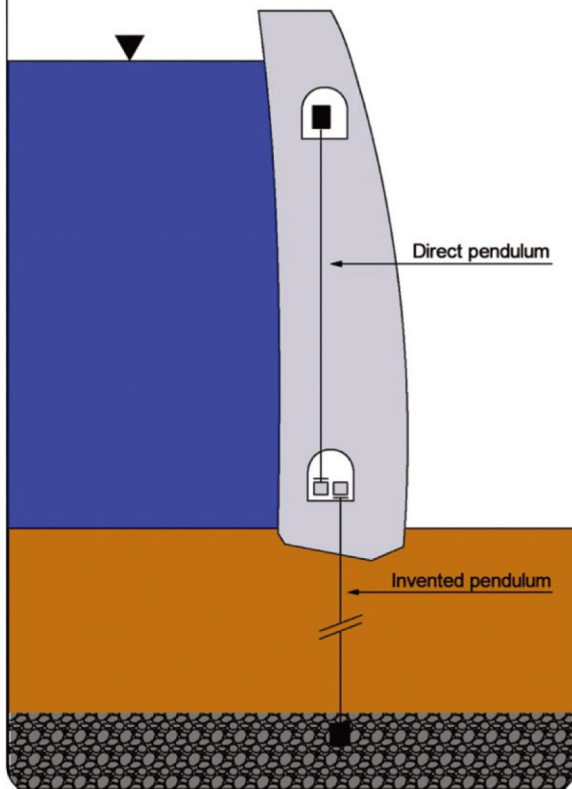
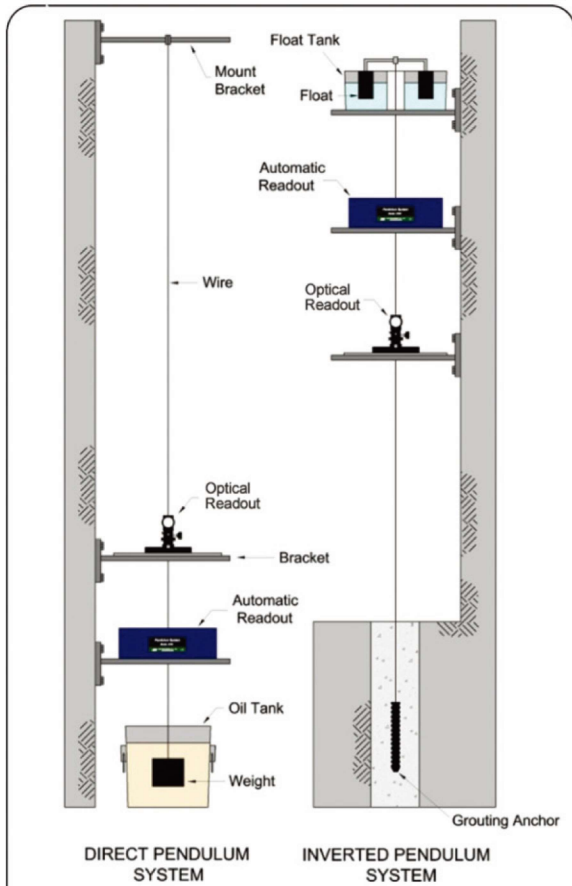
Features

- Easy to install and-operated system
- Semi-permanently used
- Low cost of management
- High reliability and solution
- Highly precise compared with the measurement

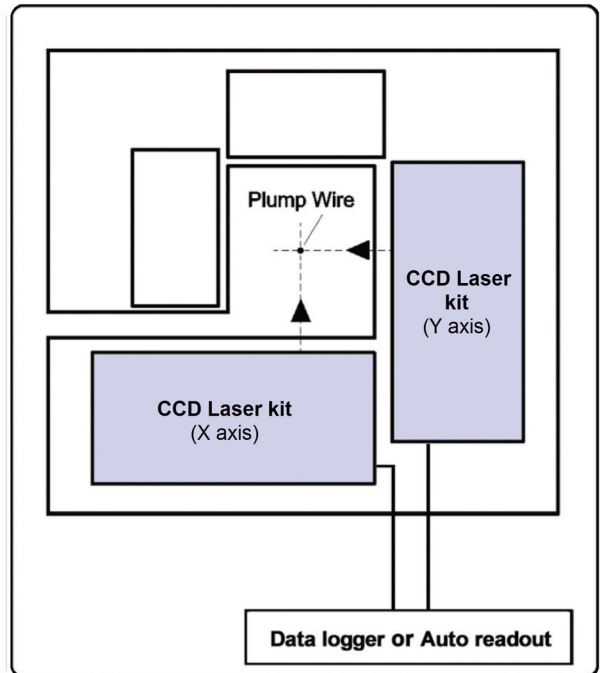
Ordering information

- Type of pendulum
- Setting height and setting distance of wire
- Required setting accessories (mounting bracket)
- Automatic pendulum readout
- Manual pendulum readout

Pendulum system



[Installation of pendulum system]



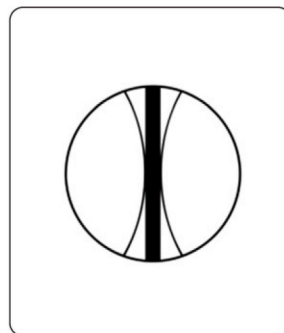
[Measuring principle]



[Optical pendulum readout]



[Automatic pendulum readout]



[Align line of sight]



[Oil tank]



[Float ass'y]