# Application Diagram

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## 2-Axis
### Inclination Sensor Module
**Model : DWL-5000XY Series**

RS232 | RS485 | Bluetooth | USB

## Application diagram 1 - Multiple Sensor Modules

### Application diagram

Peripheral Devices

Digi-Pas® 2-Axis Multiple Module Input — Module 1 · · · · Up to 4 Modules

RS485 Interface

Control Box

Relay output

Interfaces

Indicator / Signal
e.g. siren, light, pneumatic valve, solenoid valve, motor controller, etc.

Bluetooth (optional) | USB | RS232/RS485

PC Sync Software | Computer | PLC
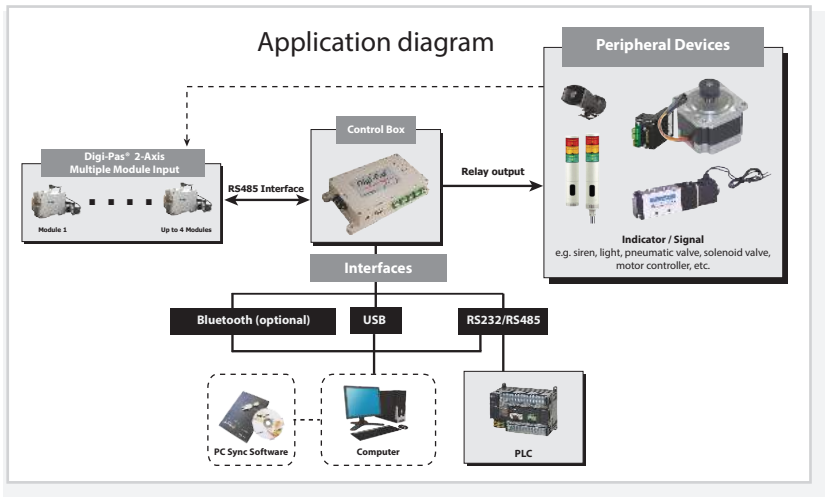
## Application diagram 2 - Single Sensor Module

RS485 to RS232/USB Converter

Computer | PC Sync Software

Digi-Pas® 2-Axis Single Sensor Module Input

RS485 Interface

RS485 to RS232 Converter

PLC

## Software Features Comparison

| Features | Pc Sync Free Edition | Pc Sync Pro Edition |
|---|:---:|:---:|
| Relay Contact Output | | ✔ |
| SMART 2D BUBBLE * | | ✔ |
| Single-Axis Angle Meter | ✔ | ✔ |
| Dual-Axis Angle Meter | ✔ | ✔ |
| Single-Axis Angle Graph | ✔ | ✔ |
| Dual-Axis Angle Graph | | ✔ |
| Vibrometer Graph | | ✔ |

## Sensor Module Dimension

90mm

33mm

FRONT    SIDE

60mm

TOP

Inclination Sensor Modules

Control Box

PC-Sync Software

®Registered Design

## Accuracy
## ± 0.01° (175μm/M)
## ± 0.001° (18μm/M)

ANGLE | VIBRO | Relay Contact Output | Multiple I/O Protocols

IP65 WATER PROOF | °C TEMPERATURE COMPENSATED

### Application diagram

Peripheral Devices

Digi-Pas® 2-Axis Multiple Module Input — Module 1 · · · · Up to 4 Modules

RS485 Interface

Control Box

Relay output

Indicator / Signal
e.g. siren, light, pneumatic valve, solenoid valve, motor controller, etc.

Interfaces

Bluetooth (optional) | USB | RS232/RS485

PC Sync Software | Computer | PLC

## PC System Requirements

User's PC is recommended the following items to be installed for using the PC Sync Software:
- Microsoft framework 3.5 for 32bit Windows OS or Microsoft framework 4.0 for 64bit Windows OS
- Windows XP service pack 3 / Windows Vista / Windows 7

The following item are required:
At least 1 GB RAM, at least 100MB free disk space on hard drive, Microsoft Excel 2007 or above, USB 2.0 Port or RS232 Port, Bluetooth adapter (for Bluetooth connection)
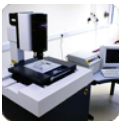
## Applications :

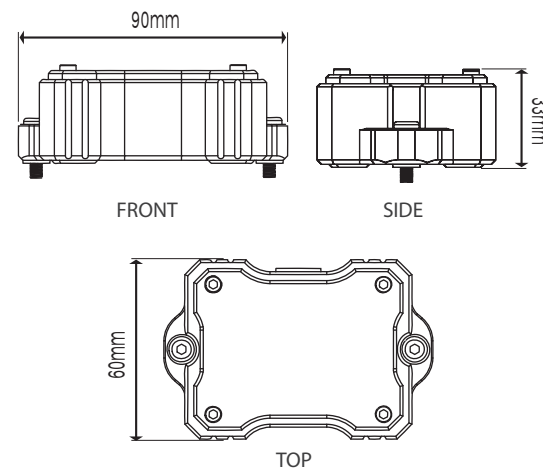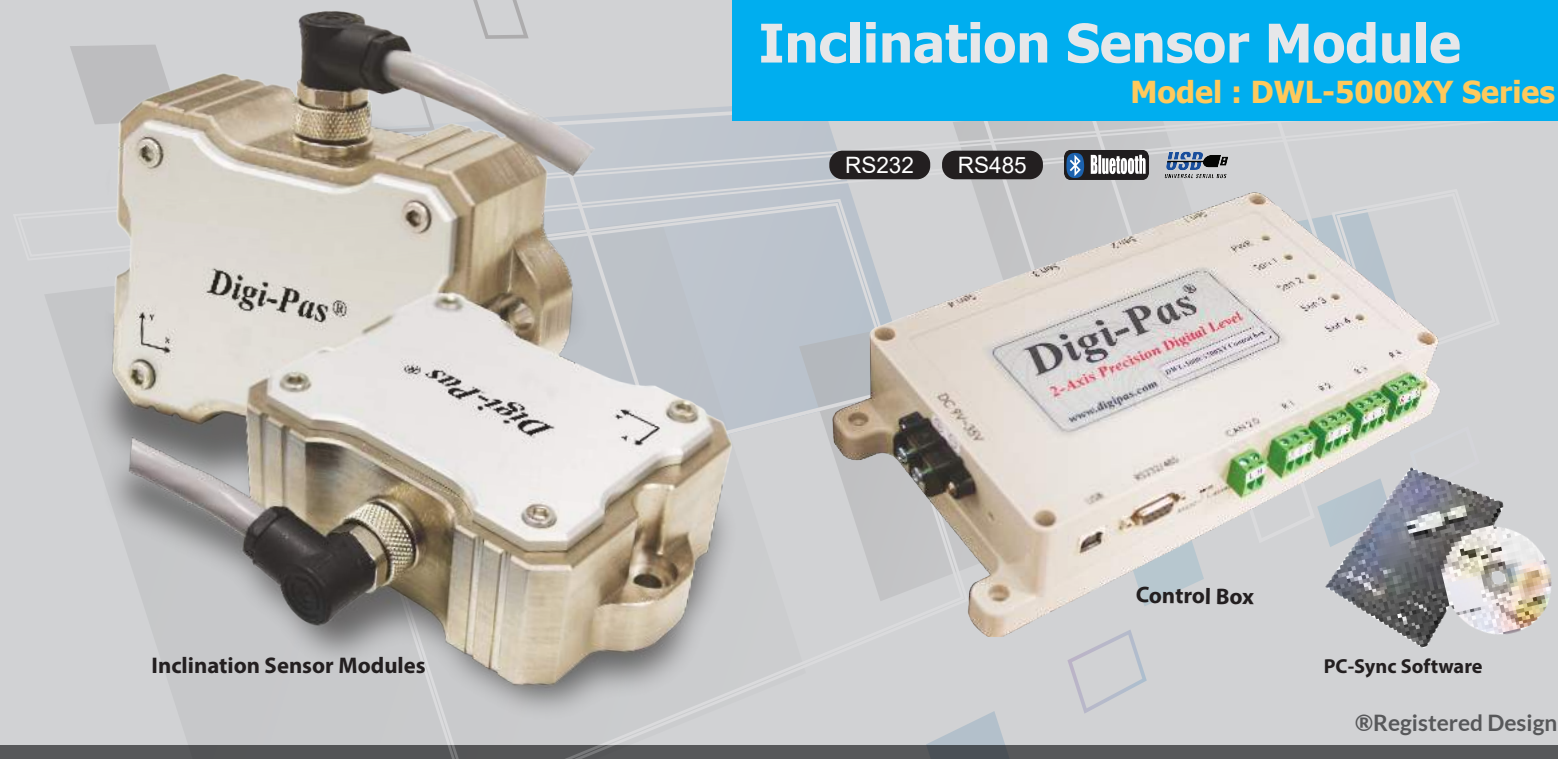Offshore Platform | CNC | Robotic Arm | CMM | Industrial Printer | Satellite Dish | MRI Scanner

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JCL-2-03999-99-00-50

**Digi-Pas®** DWL-5000XY and DWL-5500XY are **2-Axis Inclination Sensor Modules** that specifically designed to be integrated into machine/equipment/structure with capability of real-time simultaneous monitoring of plane levelling position, 2D tilt angles, vibration measurement and data logging function when used with the **'Plug and Play' PC Sync Software**. These intelligent modules are embedded with advanced MEMS sensor technology, developed for application engineers to ensure precision structural stability or angular position on any desired object.

These smart inclination sensor modules are tough, durable, IP65 waterproof , shock resistance, small footprint and enabled to communicate with external peripheral devices through various protocols such as **USB, RS232, RS485, & wireless Bluetooth**.

*Innovation & Technology Driven* ™

**Products tested by TÜV SÜD, SGS** accredited body to comply with CE, FCC & RoHS, calibrated traceable to UKAS, JIS, NIST & DIN, and manufactured under SGS certified ISO quality standards:

CE FC C RoHS

# 2-Axis Inclination Sensor Module

## Technical Specification

| Model | DWL-5000XY | DWL-5500XY |
|---|---|---|
| Measurement Range (Single Axis Mode) | 0.00° to ± 90.00° | 0.000° to ± 10.000° |
| Measurement Range (Dual Axis Mode) | 0.00° to ± 15.00° | 0.000° to ± 5.000° |
| Resolution | 0.01° (175 µm/M or 0.002 in/ft) | 0.001° (18 µm/M or 0.0002 in/ft) |
| Accuracy | ± 0.01° at 0° to 2.00° ± 0.03° at other angles | ± 0.001° at 0° to 2.000° ± 0.003° at other angles |
| Repeatability | ± 0.01° (175 µm/M or 0.002 in/ft) | ± 0.001° (18 µm/M or 0.0002 in/ft) |
| Cross Axis Error | Negligible (± 0.0025°) | Negligible (± 0.00025°) |
| Vibrometer (Relative g) | 1.0 | 2.0 |
| Response time | 10ms (milliseconds) | 500ms (milliseconds) |
| Power Supply | 9V DC | |
| IO communication protocols | RS232/ RS485: 8 Data bits, no parity, 1 stop bits, 115200bps USB 2.0 or Wireless Bluetooth connectivity (optional) | |
| Sensor Module Waterproof Rating | IP65 | |
| Sensor Module Base Material | Aluminium | Steel / Aluminium |
| Sensor Module Dimension (mm) | 90 x 60 x 33 | |
| Sensor Module Weight (approx.) | 400g | 600g |
| Operating Temperature | -20°C to +70°C | |
| Storage Temperature | -30°C to +80°C | |

Note : Product Specification and appearance are subjected to change for product improvement without prior notice.

### ACCREDITATION

DWL-5000XY Series Tilt Sensor Modules accuracy is verified by accredited 3rd party independent calibration & test bodies and National Metrology Centre traceable to SI standard and NIST, JIS, UKAS & DIN under CIPM MRA.

## Advantages of Digi-Pas® 2-Axis Inclination Sensor Module

- **PLANAR & WIDE ANGLE RANGE MEASUREMENT**
  Precision levelling and tilt angles measurement essentially involve simultaneous 2-dimensional planes rather than single-axis. Digi-Pas® 2-axis intelligent tilt sensor modules having high precision and wide measurement range are capable of providing real-time levelling & vibration readings that empower application engineers to continuously monitor machine/equipment/structure angular positional status precisely and speedily.

  These small footprint MEMS driven 2-axis sensor modules effectively eliminate the limitations of using multiple single-axis sensors or bulky pendulum based sensors to achieve 2D levelling and planar angular measurements.

- **PROGRAMMABLE & USER-DEFINABLE SYSTEM**
  Digi-Pas® 2-axis tilt sensor module system is designed to be integrated into precision machine/equipment/structure enabling application engineers to instantly access angular positional status without the need for tedious and time-consuming programming.

  The angular measurement system enables user-defined settings to activate any external connected peripheral devices at ease.

## Sensor Module Overview

- High accuracy of 2-axis angle/level measurement of 0.01° or 0.001° (depending on model)
- Built-in Vibrometer for real-time vibration measurement
- User-friendly Professional PC Sync Software to configure the tilt sensor modules (OPTIONAL)
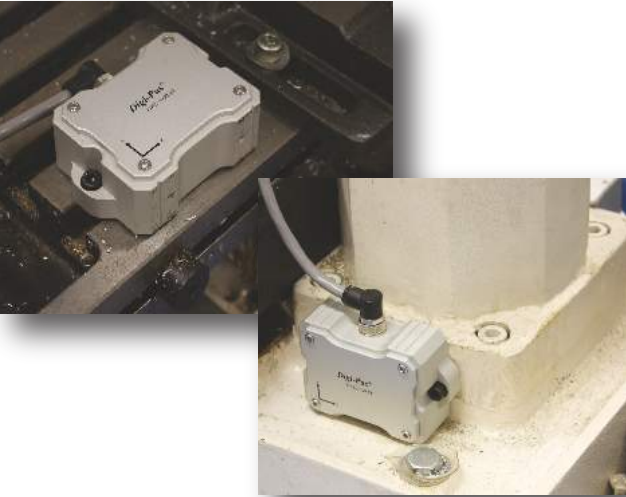
## Control Box Overview

- Programmable Relay Contacts Outputs:
  Enables user-defined tilt angle/vibration range limits settings to trigger peripheral devices
  (e.g. siren/alarm, valve, motor, strobe lights, etc.)
- Multiple I/O communication protocols
  i.e. USB, RS232, RS485 & Wireless Bluetooth connectivity (optional)

**Control Box**

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# Professional PC Sync Software

The PC Sync Software is a 'plug & play' interface software (embedded with National Instrument software) that enables application engineers to remote access to multiple tilt sensor modules instantly via wireless Bluetooth connectivity/ USB cable/ RS232 for plane levelling, 2D tilt angles and vibration measurement. With the remote real-time data acquisition, logging & analysis features, the software offers a comprehensive solution without the need for tedious and time-consuming programming.

## PC Sync Software Features
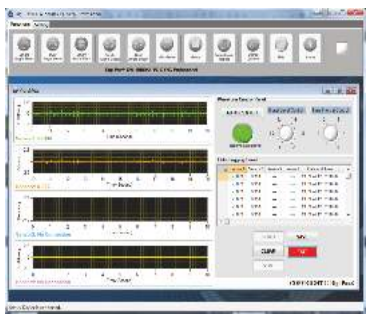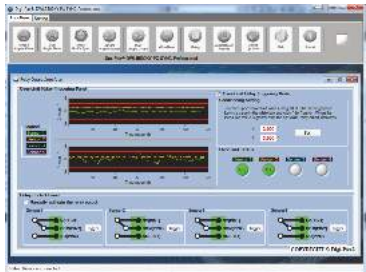
### Relay Contact Output

- Enables user to define pre-set condition to activate any connected peripheral devices e.g. siren/alarm, valve, motor, strobe lights, etc.
- User-defined settings, real-time feedback of relay output status and tilt sensor module measurement readings can be seen at a glance on PC screen

### SMART 2D BUBBLE®

- View and record real-time 2-axis angles readings from a selected tilt sensor module
- Simultaneous display of graphical bull's eye (with auto range feature) and numeric formats
- Plane surface's elevation point clearly indicated by Smart 2D Bubble®

### Single-Axis & Dual-Axis Angle Graphs

- Distinctive line graph display and numerical readings of angle/levelling measurement from multiple tilt sensor modules
- Enables identification and comparison of real-time results among multiple connected tilt sensor modules
- Enables data saving in Excel format

### VibroMeter Graph

- Numeric and graphical display of vibration magnitude and pattern/graph for effective vibration conditions assessment
- Simultaneous display of Vibrographs for multiple operating tilt sensor modules
- Fast sampling rate at 10ms (milliseconds) per data capture

### Single-Axis & Dual-Axis Angle Meters

- Graphical and numerical display for real-time single-axis or dual-axis angle readings of multiple tilt sensor modules
- Large, easy-to-read display with units in degree(°), mm/M or In/Ft

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