

iBridge Monitor Product List

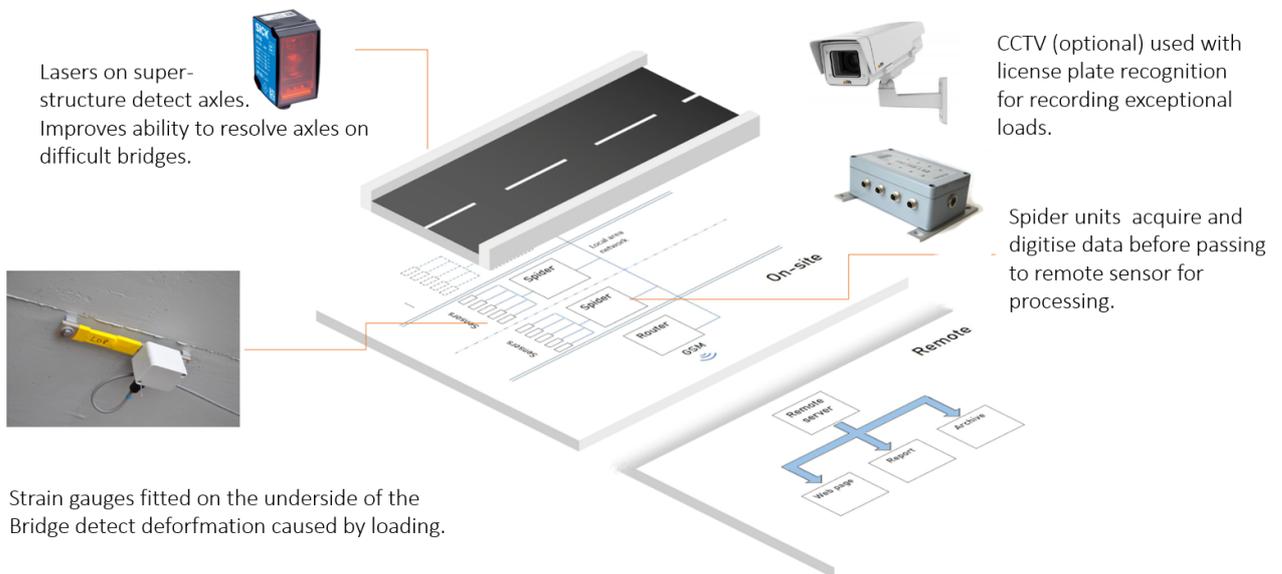


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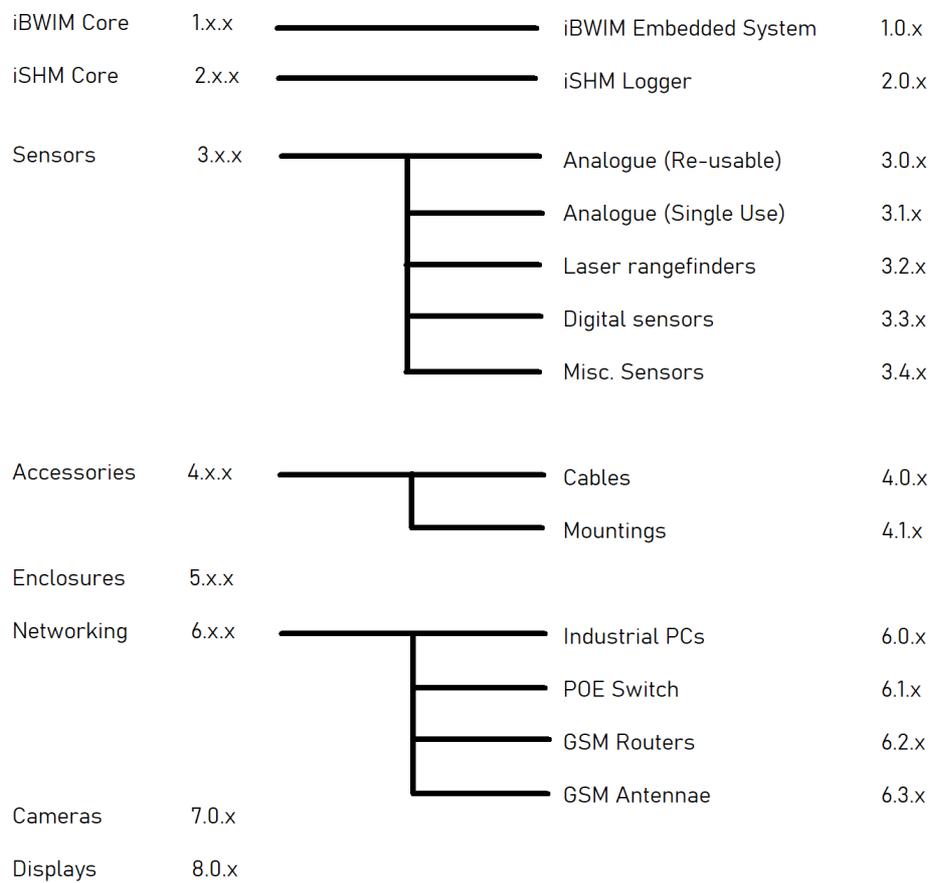
iBridge Monitors

PSP manufactures, installs and runs two types of bridge monitor: iBWIM systems for measuring heavy goods vehicles, and iSHM systems for monitoring the long term structural integrity of bridges. In practice, the systems we install are often hybrids of these approaches—for instance using iBWIM to measure the dynamic loading of a bridge to make predictions about fatigue. Furthermore, many of the components used in iBWIM can also be used in iSHM systems. Because of this overlap, this product list will cover components for both iSHM and iBWIM systems.



Product Numbering

Our products are ordered in a decimal structure; for instance all our sensors have item numbers 3.x.x, and within this group the digital sensors are named 3.3.x. The numbering structure is shown below.



Embedded Systems



iBWIM Spider V5 (105-1)

- Data grabber, 8 strain gauges, 1 temp. probe, 2 current loop channels.
- Acquires strain signals with 32bit ADC.
- Sampling rates from 500-3000 Hz.
- Power supply via PoE, battery, or solar cell.
- Forms part of LAN, communicates with server via router.



iSHM Logger (205-1)

- Data grabber.
- Acquires strain signals with 32bit ADC.
- Sampling rates from 500-3000 Hz.
- Power supply via PoE, battery, or solar cell.

Sensors

Analogue Sensors (Voltage)

Standard Strain Sensor (301-1)



- Inherent temperature correction with two strain gauges in a bridge circuit.
- Any residual temperature effects are removed in software using on-board temp. sensor.
- Aluminium body, suitable for long term measurements.
- Suitable for concrete and steel bridges.

Standard Strain Sensor, Magnetic Fixing (301-2)



- Uses magnetic fixings for attachment to steel bridges.
- Inherent temperature correction with two strain gauges in a bridge circuit.
- Any residual temperature effects are removed in software using on-board temp. sensor.
- Aluminium body, suitable for long term measurements.
- Suitable for concrete and steel bridges.

Ring Sensor (302-1)



- High sensitivity strain measurement.
- Strain gauges connected in full-bridge circuit.
- Used on concrete and steel bridges
- Residual temperature compensation with on-board sensor and software.

PT1000 Temperature Probe (303-1)



- Platinum resistance thermometer
- 1000 Ω @ 0°C
- Used for internal bridge temperature and external environmental measurements.



Acceleration Sensor (2g) (304-1)

- 3 axis accelerometer.
- Working range: $\pm 2g$.
- Resolution: 0.001g
- Residual temperature compensation with on-board sensor and software.



Acceleration Sensor (4g) (304-2)

- 3 axis accelerometer.
- Working range: $\pm 4g$.
- Resolution: 0.001g
- Residual temperature compensation with on-board sensor and software.



Calibration Control (305-1)

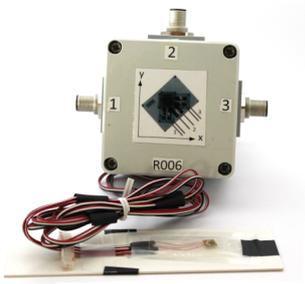
- Used to annotate test measurements .
- For iBWIM calibration

Single Use Sensors



Full Bridge Strain Sensor (311-1)

- Fatigue measurement for SHM
- Steel bridges, esp. welds
- Disposable elements glued in position.



Rosette Shear Sensor (312-1)

- Fatigue measurement.
- Point measurement, sensor fixed in place with adhesive.
- Uses 3 strain gauges ($k=2.16$)
- Steel bridges.

Laser Rangefinders (Current Loop)



Laser Rangefinder DT50-2 (320-1)

- Working range 0.2-10m (depending on target reflectivity)
- Accuracy ± 10 mm
- Laser Class II
- Current loop interface.
- BWIM and SHM
- Various mounting methods available on request
- 3rd Party SICK AG (Waldkirch, Germany)



Laser Rangefinder DT35 (320-2)

- Working range 0.05-12m (depending on target reflectivity)
- Accuracy ± 10 mm
- Laser Class II
- Current loop interface.
- BWIM
- Various mounting methods available on request
- 3rd Party SICK AG (Waldkirch, Germany)

Digital Sensors



Positioning Laser (331-1)

- Used with array sensor to measure deflection of structural element and displacement between elements.
- Can also be used as sub-component of curvature sensor, more information on request. • SHM
- Typical range: 2-3m
- Class II laser
- Non-nodal component.



Position Sensitive Detector (332-1)

- Used with laser to measure deflection of structural element and displacement between elements..
- SHM
- Can also be used as sub-component of curvature sensor, more information on request. • Typical range: 2-3m
- Accuracy 1 μm
- Nodal component.



Inclination Sensor (333-1)

- 3-axis inclinometer.
- Measures attitude of structural element.
- Used for SHM
- Accuracy 0.03°



Environmental Sensor (334-1)

- Measures temperature and relative humidity.
- Used for SHM



Displacement Sensor (335-1)

- Measures the distance between two structural elements.
- Used for SHM
- Typ. working range 20cm, longer distances on request
- Mounting bracket on enquiry • Accuracy 1mm



Time of Flight Sensor (336-1)

- Component of our vehicle identification system.
- Used to profile vehicles for iBWIM
- Working range upto 5m
- Used as part of sensor array, mounting information available on request.

Accessories and consumables

Cable Set 5 (403-1)

- Connects sensors with Spider or PSPLogger.
- 1,2,3,4,5m, 5 Core, x2

Power Cable (405-1)

- 5m, outdoor.
- 230 V ac

Laser cable (406-3)

- Used to connect SICK lasers (items 320-1 and 320-2) to Spider (10m)

LAN cable (407-1)

- Ethernet 10m

iBWIM antenna (408-1)

- Used for data transfers on WLAN or GSM

Camera Post (410-1)

DT35 or DT50 Laser Mounting Bracket (411-1)

Camera Triggering



MultiTrigger Box (430-1)

- Allows Spider unit to trigger multiple cameras.
- Cameras can be synchronised with BWIM measurements.
- Cabling depends on bridge and sensor layout.

Framework

Housing



iBWIM cabinet 12V (501-1)

- Robust steel cabinet.
- Houses battery, charger, 12V supply voltage.
- the PoE switch and the router for iBWIM.



Off-grid SHM cabinet 12V (501-2)

- Robust steel cabinet.
- Houses battery, charger, 12V supply voltage.
- the PoE switch and the router for iBWIM.

Networking



IPC2U

Industrial PC (601-1)

- Industrial PC used as software router.
- Hosts the SpiderServer and SpiderClient software.
- Allows analysis software to run locally on-site.



POE Switch (610-1)

- Ethernet switch.
- Supplies power over Ethernet to enabled devices.



RUT-240 (620-1)

- Industrial router.
- GSM, WAN.



Qu-Spot (620-2)

- Omni-Directional antenna for RUT240.
- Bands: 0.694-0.96GHz, 1.7-2.2GHz, 2.2-2,7GHz.

Third Party Options



IP-Cam Mobotix M15D (701-1)

- General traffic surveillance
- Two cameras, 1 daytime (colour) 1 nighttime (NIR)
- Resolution 3072 x 2048
- Sensitivity @1/60s 0.1lux (day) 0.02 lux (night)



Axis Q1700LE (702-3)

- Automatic License Plate Recognition (ALPR) camera
- Resolution: 2.1Mpix
- Used with 3rd Party ALPR software integrated in our software



Divio TBR 923 (704-1)

- Automatic License Plate Recognition (ALPR) camera
- Resolution: 2592 x 1944
- Used with 3rd Party ALPR software integrated in our software



Variable Message Sign (VMS) (800-1)

- Used to communicate weight measurements to truck driver.
- Model used will depend on type of road.
- Runs from industrial PC, power supply required.
- Placed typ. 300m after measurement point, fibre optic link.

Mechanical Data

Product	ID	IP	Operating Temperature	Dimensions
Spider 5	105-1	IP66	-30..+80°C	222 x 190 x 90mm
iSHM Logger	205-1	IP66	-30..+80°C	222 x 190 x 90mm
Std Strain sensor	301-1	IP66	-30-80°C	220 x 50 x 51mm
Ring Strain sensor	302-1	IP66	-30-80°C	220 x 50 x 51mm
Acceleration sensor	304-1	IP66	-30-80°C	32 x 72 x 43mm
Full bridge strain sensor	311-1	IP66	-30-80°C	65 x 51 x 45mm
Rosette sensor	312-1	IP66	-30-80°C	65 x 51 x 45mm
Laser DT35	320-1	IP67	-30..+55°C	32 x 72 x 43mm
Laser DT50-2	320-2	IP67	-30..+55°C	32 x 72 x 43mm
Curvature (Laser)	331-1	IP66	-30-80°C	220 x 50 x 51mm
Curvature (Sensor)	332-1	IP66	-30-80°C	220 x 50 x 51mm
Inclination sensor	333-1	IP66	-30-80°C	32 x 72 x 43mm
Environmental sensor	334-1	IP66	-30-80°C	32 x 72 x 43mm
Displacement sensor	335-1	IP66	-30-80°C	220 x 100 x 70mm
Temperature sensor	340-1	IP66	-30-80°C	50mm, 6mm diam.
Cable Set 5	403-1	N/A	N/A;	(1m,2m,3m,4m,5m) x 2
Power Cable	405-1	N/A	N/A;	5m
Laser Cable	406-3	N/A	N/A;	10m
LAN Cable	407-1	N/A	N/A;	10m
iBWIM Antenna	408-1	N/A	N/A;	N/A
Camera Post	410-1	N/A	N/A;	N/A
Laser Rangefinder Mounting Bracket	411-1	N/A	N/A;	N/A

Multi-Trigger Box	430-1	N/A	N/A;	N/A
Std Cabinet	501-1	IP55	-30..+60°C	500 x 500 x 300mm
Off-grid Cabinet	511-1	IP55	-30..+60°C	500 x 500 x 300mm
Industrial PC	600-1	IP20	-20..+60°C	73 x 178 x 116mm
POE Switch	610-1	IP20	-20..+60°C	120 x 65 x 159mm
GSM Router	620-1	IP20	-20..+60°C	75 x 82 x 25mm
Qu-Max Firectional Antenna	620-2	IP20	-20..+60°C	272 x 276 x 395mm
Mobotix	701-1	IP66	-20..+50°C	210 x 158 x 207mm
Axis Q1700-LeCam	702-3	IP66	-30..+55°C	161 x 142 x 404mm
Divio TBR 923 Cam	704-1	IP66	-10..+50°C	72 x 63 x 199mm
VMS	800-1	IP66	-30..+55°C	1200 x 1000 x 150mm

Notes

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