WATER IN OIL SENSOR (WIO) Product Overview

The WIO-Sensor technology is a secure on-line system monitoring the water content in oil. Water or moisture is the second largest contamination (after particles) in oil systems with damaging effects on the life time of both the machinery and the oil. Moisture is damaging to engine parts, cylinders, bearings, etc. with resulting mechanical failures and therefore repairs and expensive downtime costs (often ranging between EUR 10,000 – 200,000).

The amount of water a specific oil type can dissolve varies significantly, depending on e.g. the base oil, additives, oxidation, temperature and other factors. The sensors thus require a comprehensive calibration to measure the water content correctly. PAJ sensors have the highest quality and accuracy levels in the industry through elaborate oil calibration & testing methods.

While conventional approaches require taking a small sample of the oil and then analysing it, the sensor provides continuous monitoring of the entire lubricant oil volume, providing early warning of high levels of water content that could damage the machine. As well as providing advance warnings of problems, it can also be used to ensure that separators, filters and driers are only running when actually needed. The sensor is available with an associated terminal box. The terminal box provides power to the sensor, links the sensor to any external condition monitoring system, gives alarms and provides a local visual indication of the water level in the oil.

WIO Sensor

Terminal Box

Oil Types	Applications	Industries	Product Features
• Lube • Gear Box • Turbine • Diesel • Hydraulic • Transformer	• Oil systems • Gear boxes • Turbines • Transformers • Compressors • Hydraulics • Ventilation • Cooling systems • Pumps • Others	• Marine • Power • Processing • Offshore • Renewables • Steel • Food • Paper • Mining • Agriculture • Robotics • Others	• 24/7 monitoring • Highest measuring accuracy • Robustness (for heavy use) • GL approved • MAN Diesel Approved • Calibration certificate • Analogue output or MODBUS • Configuration to exact needs • Thread or ball valve installation • Galvanic isolated • High grade cables • Optional LED buttons & displays • Customised alarm settings • Easy installation

CUSTOMER BENEFITS

- **24/7 monitoring and early warnings (allowing preventive actions)**
- **Increased lifetime of engine parts, cylinders, bearings, etc.**
- **Saved damages and downtime costs**
- **Longer oil lifetime**
- **Saved oil sample costs (and administration)**
- **Potential savings on water filters, separators, etc. (only running when needed)**
- **Avoided commercial costs and negative customer impact (from downtime and delays)**
- **Higher accuracy than most oil sample tests and real time answers**

2013 WATER IN OIL SENSOR PRODUCT RANGE

The sensor is simple to install and easy to connect. It provides a measurement range of 0.01-1.00aw, with accuracy of ±0.03aw and a resolution of better than 0.004aw. The relay alarm contacts are rated for 250V AC by installation with the Terminal Box, with the default alarm settings being 0.50aw and 0.90aw (both adjustable). The sensor works with oils at up to 40 bar pressure with the standard installation, and up to 10 bar pressure with the ball valve installation, and from 0°C to 90°C.

With the standard fitting or ball valve version the WIO sensor can be quickly installed - either as retrofit or in new installations. The sensor functions with or without the terminal boxes. With the many different terminal box configuration possibilities it is easy to configure the systems for the exact customer requirements.

WIO Standard

WIO Ball Valve

WIO200

- 24VDC±10% power supply
- 2 x NC relay outputs 60VAC/1A
- 1 x galvanic isolated analog output 4 - 20mA
- fixed alarm points HA-0.50 aW, HHA 0.90 aW
- manual test function

WIO300

- 24VDC±10% power supply
- 2 x NC relay outputs 60VAC/1A
- 2 x galvanic isolated analog output 4 - 20mA
- RS232 modbus user interface
- adjustable alarm points for HA and HHA (aW/PPM)
- manual test function

WIO400

- 24VDC±10% power supply
- 2 x NC relay outputs 60VAC/1A
- 2 x galvanic isolated analog output 4 - 20mA
- RS485 modbus user interface
- adjustable alarm points for HA and HHA (aW/PPM)
- manual test function

WIO500

- 24VDC±10% power supply
- 2 x NC relay outputs 60VAC/1A
- 2 x galvanic isolated analog output 4 - 20mA
- CANopen modbus user interface
- adjustable alarm points for HA and HHA (aW/PPM)
- manual test function

Extended with WIO300-500 TERMINAL BOX

- 24VDC±10% power supply
- 2 x NC relay outputs 250VAC/2A
- 2 x galvanic isolated analogue output 4 - 20mA
- RS232/RS485/CANopen user interface
- adjustable alarm points for HA and HHA (aw/ppm) via com.-bus
- 4 digit indication display for aW/ppm
- 4 digit indication display for °C/F
- LED indication for H/HH-alarm
- Push button function for H/HH alarm
- Acoustic indication for H/HH alarm
- USB Stick for WIO soft ware

Extended with WIO200 TERMINAL BOX

- 24VDC±10% power supply
- 2 x NC relay outputs 250VAC/2A
- 1 x galvanic isolated analogue output 4 - 20mA
- 4 digit indication display for aw/ppm
- LED indication for H/HH-alarm
- Push button function for H/HH alarm
- Acoustic indication for H/HH alarm

WIO-Software

- settings of HA & HHA alarm points
- monitoring of aW and PPM
- monitoring of the temperature
- status indication of the service intervals
- logfile of the measured data
- Easy to install from USB-Stick
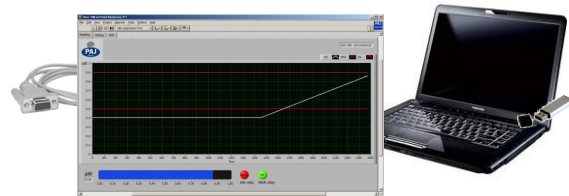
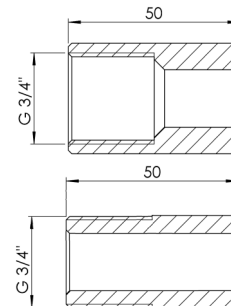## Ball Valve 16mm

- Complete solution for WIO-Sensor with external thread
- Complete solution for WIO-Sensor with internal thread
- Easy to install and to use
- Fixed mounting of WIO-Sensor
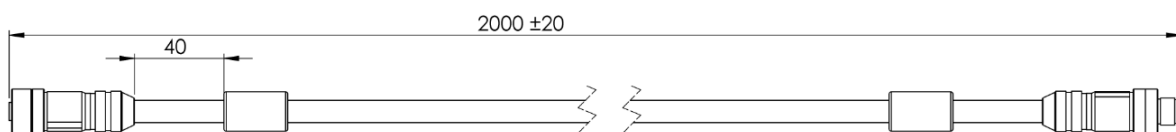- Able to expand with ISO228/1 G3/4 adapter
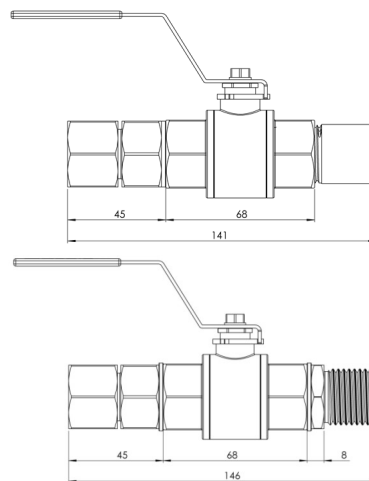
Pipe unit

- Special adapter unit for WIO-Sensors
- Fix mounting and simple solution

Wire types

- Standard 2m
- Can also be ordered as 15m, 20m, 30m or 50m.

Product list

WI	Water In Oil Sensor						
	L G D H T	Lubrication Oil Gear Box Oil Diesel Oil Hydraulic Oil Transformer Oil					
		1 2	Standard sensor pipe Sensor Ball valve pipe				
			A B C D	No user interface RS232 Modbus user interface RS485 Modbus user interface CanOpen Modbus user interface			
				50 xx	Standard H-Alarm 0,50 aW xx must be from 10 to 80 (0,10 – 0,80 aW)		
					90 xx	Standard HH-Alarm 0,90 aW xx must be from 20 to 90 (0,20 – 0,90 aW)	
WI	L	1	A	50	90	This is an order example of standard WIL 200A sensor	

TER						Terminal box	
	A					Sensor 200	No user interface
	B					Sensor 300	RS232 Modbus user interface
	C					Sensor 400	RS485 Modbus user interface
	D					Sensor 500	CanOpen user interface
	A	0				No button, no display	
		1				No button, 1 x display aW	
		2				No button, 1 x display ppm	
		3				2 x button , No Display with LED indicator for HA & HHA w/ acoustic alarm	
		4				2 x button, 1 x Display aW with LED indicator for HA & HHA w/ acoustic alarm	
		5				2 x button, 1 x display ppm with LED indicator for HA & HHA w/ acoustic alarm	
	B / C / D	0				No button, no display	
		1				No button, 1 x display to indicate aW	
		2				No button, 1 x display to indicate ppm	
		3				2 x button, no display with LED indicator for HA & HHA w/ acoustic alarm	
		4				2 x button, 1 x display aW with LED indicator for HA & HHA w/ acoustic alarm	
		5				2 x button, 1 x display ppm with LED indicator for HA & HHA w/ acoustic alarm	
		6				2 x button, 2 x display to indicate aW and °C w/ LED indicator & acoustic alarm	
		7				2 x button, 2 x display to indicate ppm and °C w/ LED indicator & acoustic alarm	
		8				2 x button, 2 x display to indicate aW and °F w/ LED indicator & acoustic alarm	
		9				2 x button, 2 x display to indicate ppm and °F w/ LED indicator & acoustic alarm	
			A			Standard 8 pin female & male connector	
			B			Gland PG9	
			C			Gland PG11	
			D			Gland PG13,5	
				A		Output/outlet to machinery/control system—Gland PG9	
				B		Gland PG11	
				C		Gland PG13,5	
				D		Gland PG16	
					02	Standard 2 m cable with female & male connector 2 pieces	
					15	15 m cable with female & male connector 2 pieces	
					20	20 m cable with female & male connector 2 pieces	
					30	30 m cable with female & male connector 2 pieces	
					50	50 m cable with female & male connector 2 pieces	
TER	B	1	A	C	02	This is an order example of a 300/RS232 terminal box	

ACC		Accessory equipment			
	SW1	Additional USB sticks with SW for Communication with PC and sensor (per USB stick)			
	PI1	Complete Ball Valve adapter with internal thread			
	PI2	Complete Ball Valve adapter with external thread			
	PI3	Pipe unit ¾" with internal thread			
	PI4	Pipe unit ¾" with external thread			
ACC	PI1	This is an order example of Accessory equipment			

RC		Re-calibration of sensors						
	L G D H T	Lubrication Oil Gear Box Oil Diesel Oil Hydraulic Oil Transformer Oil						
		1 2	Standard sensor pipe Sensor Ball valve pipe					
			A B C D	No user interface RS232 Modbus user interface RS485 Modbus user interface CanOpen user interface				
				50 xx	Standard H-Alarm 0,50 aW xx must be from 10 to 80 (0,10 – 0,80 aW)			
					90 xx	Standard HH-Alarm 0,90 aW xx must be from 20 to 90 (0,20 – 0,90 aW)		
RC	L	1	A	50	90	Order example of re-calibration of standard WIL 200A sensor		

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