



Features and Benefits

- Online condition monitoring of oils
- Oil condition indicated by LEDs
- Use in stationary and mobile applications possible
- Analogue output sequence for
 - Saturation level
 - Temperature
 - Electrical conductivity and its relative change
 - Dielectric constant and its relative change
- Simple screw in mounting devices

Oil Condition 4 measured variables



Features & Benefits

The HYDACLAB® HLB 1400 is a multifunctional sensor for online monitoring of the condition of standard oils and biodegradable oils in industrial and mobile applications.

The user is informed about changes in the fluids in real time and can implement measures against improper operating conditions without delay.

Assertions can be made about the condition of an oil, e.g. ageing or mixing with other fluids, on the basis of the measured values for the relative change in dielectric constant, the electric conductivity, the saturation level and the temperature.

The measured values as both sequential analogue signal and switching signal (e.g. warning, alarm) are available at the electrical output of the HYDACLAB®. The measurement values can be visualised and configured on various HYDAC display and measurement devices.

Description

Input Data

Saturation Level:	0 ... 100% saturation
Temperature:	-25 .. +100 °C
Dielectric Constant:	1 .. 10
Change in the Dielectric Constant:	-30 .. +30 %
Electrical Conductivity:	0 .. 100 nS/m
Change of Electric Conductivity:	-100 .. 200 %
Operating Pressure:	< 50 bar
Pressure Resistance	< 600 bar
Flow Velocity:	< 5 m/s
Mechanical connection:	G 3/4 A ISO 1179-2
Tightening torque, recommended:	30 Nm
Parts in contact with the fluid:	Mechanical connection: Stainless steel / vacuum-metallised ceramic glass seal thin-film metallic coating / FKM

Specifications

Output Variables

Output Signal 4 .. 20 mA / 0 .. 10 V

Output Variable Saturation Level: (0 .. 100 %)

Calibration accuracy: $\leq \pm 2$ % FS max.

Accuracy¹⁾: $\leq \pm 3$ % FS typ. 1)

Output Variable Temperature: (-25 .. +100 °C)

Accuracy: $\leq \pm 3$ % FS max.

Specifications (cont.)

Output Variable Dielectric Constant Dielectric Constant (temperature compensated): 1 .. 10

Accuracy: $\leq \pm 5 \%$ FS max.

Output Variable Change of Dielectric Constant: $\pm 30 \%$ v. AW

Accuracy: See below 2)

Output variable - electric conductivity (temperature compensated) (not applicable for Mod 001): 0 .. 100 nS/m / 0 .. 10 nS/m selectable

Accuracy: $\leq \pm 5 \%$ FS max.

Output variable - electric conductivity (not applicable for Mod 001): -100 .. 200 %

Accuracy: See below 2)

Switching output (default settings)

Signal 1 (N/C): PNP switching output 250 mA max., switching level $\geq U_B - 4 \text{ V}$

Default value SP1 relative humidity: $\geq 85 \%$

Default value level SP1 temperature: $\geq 80 \%$

Default value level SP1 rel. change in dielectric constant: $\pm 15 \%$

Default value SP1 rel. change in conductivity (not applicable for Mod. 001) $\pm 15 \%$

Ambient conditions

Nominal temperature range +20 .. +80 °C

Storage temperature range / Fluid temperature range -30 .. +100 °C

Fluid compatibility Suited for hydraulic and lubrication oils

 mark EN 61000-6-1 / -2 / -3 / -4

 mark Certificate no.: E318391

Viscosity range 1 .. 5000 cSt

Shock resistance acc. to DIN EN 60068-2-27 50 g / 11 ms / half sine

Vibration resistance acc. to DIN EN 60068-2-6 at 5 .. 2000 Hz 10 g / sine

Protection class acc. to DIN EN 60529 3) IP 67

Other Data

Supply voltage U_B 10 .. 36 V DC

when applied acc. to UL specifications – limited energy – according to 9.3 UL 61010; Class 2; UL 1310/1585; LPS UL 60950

Residual ripple of supply voltage $\leq 5 \%$

Current consumption Max. 100 mA without outputs

Housing Stainless steel

Weight ~ 215 g

Note: Reverse polarity protection, short circuit protection provided.

FS (Full Scale) = relative to complete measuring range

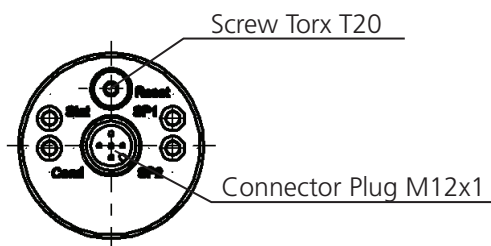
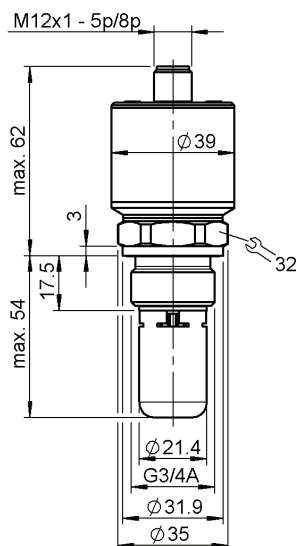
IV (Initial Value)

- 1) The max. accuracy achievable when measuring relative humidity is heavily dependent on the type of fluid or fluid additive used. More precise information on this is available on request.
- 2) The accuracies when defining the change of dielectric constant and the electrical conductivity depend on the application, the oil type and the auto-calibration of the sensor. Detailed information available on request.
- 3) Environmental conditions according to 1.4.2 UL 61010-1; C22.2 no. 61010-1
- 4) With mounted mating connector in corresponding protection type

Oil Condition Sensor HYDACLAB®

HLB 1400

Dimensions



M12x1, 5-pin	Pin	Output: 1C000	Output: 00S12
	1	+U _B	+U _B
	2	SP1/AA1	RS485B
	3	GND	GND
	4	SP2/AA2	RS485A
	5	HSI	HSI
HSI = HYDAC Sensor Interface (HYDAC's own communication interface)			
SP = Switching point			
AA = Analogue output (sequence)			

M12x1, 8-pole	Pin	Output: 1CS12
	1	+U _B
	2	SP1/AA1
	3	GND
	4	PE
	5	HSI
	6	RS485A
	7	RS485B
	8	SP2/AA2
HSI = HYDAC Sensor Interface (HYDAC's own communication interface)		
SP = Switching point		
AA = Analogue output (sequence)		

Pin Connections

Display Read-out and Configuration Options

HMG 510

Portable double channel data recorder, especially designed for the display of measured values in combination with HSI and condition monitoring sensors
Order no.: 909889

HMG 2500 / HMG 4000

Portable data recorders with full colour graphics for displaying, recording and processing measured values as well as for the configuration of HSI and condition monitoring sensors

CSI-B-2

Interface module, enables the configuration of HSI and condition monitoring sensors using HYDAC PC software CMWIN
Order no.: 920134

Information on other read-out options can be found on our website at www.hydac.com or please contact your HYDAC representative

Model Number Selection

How to Build a Valid Model Number for a Schroeder HLB:

BOX 1	BOX 2	BOX 3	BOX 4	BOX 5	BOX 6
HLB 1					

Example: NOTE: One option per box

BOX 1	BOX 2	BOX 3	BOX 4	BOX 5	BOX 6
HLB 1	4	J	8	1C000	000

= HLB4J81C000-000

BOX 1	BOX 2	BOX 3
Type	Series	Mechanical Connection
HLB 1 = XXXX	4 = 4 measured variables: - saturation (rel. humidity) - temperature - electric conductivity (not for Mod 01) - dielectric constant (DC)	J = G 3/4 A ISO 1179-2

BOX 4	BOX 5
Electrical Connection	Signal Technology
8 = male M12X1, 5 pole (mating connector not supplied) P = male M12X1, 8 pole (mating connector not supplied)	<u>5 pole:</u> 1C000 = 1 switching output / analogue output 00S12 = RS 485 CANopen (only available on request) IO-Link (only available on request) <u>8 pole:</u> 1CS12 = switching output / analogue output / RS 485

BOX 6
Modification Number
000 = Standard 001 = General info

Accessories

Appropriate accessories, such as mating connectors, can be found in the Accessories brochure.

Notice

HLB 14J8-1C000-001 serves as one-to-one replacement for HLB 1300. The analogue output 2 of this device is pre-set in a way