

DOL 51

Ammonia sensor



For other language variants of this document we refer to www.dol-sensors.com or your local dealer.

1 Product description

The DOL 51 is an electrochemical sensor designed to measure ammonia levels in livestock houses and air cleaners with very high humidity. The sensor consists of a sensor element, a house, a dust filter, and a convection cap with heating connected to the housing with a cable. The sensor element and filter can be replaced as required, and the sensor element is supplied in a can for additional protection.

The sensor is meant for stationary mounting for continuous measuring of the ammonia concentration.

2 Product survey



140312 DOL 51 Ammonia Sensor w/heat

DOL 51 measures the ammonia in the livestock house air.



140314 DOL 51 Sensor Element

Sensor element for DOL 51.



140236 DOL 53 dust filter (5 pcs.)

Dust filters for DOL 51 and DOL 53. Set of 5 pieces.



140299 DOL 53 – test gas adapter

Used for gas test of DOL 51 and DOL 53.

3 Installation

Mount the sensor in the mounting lug at the top of the sensor, filter facing down. The offset from vertical must be max. 15° (see figure 1). DOL 51 must be mounted so that it is accessible in connection with maintenance and must not be subjected to splash water.

Ensure free air passage around the sensor filter. Do not expose it to direct sunlight as this will affect the measurements.

DOL 51 must warm up for half an hour before being ready to measure (see the section of LED indication).

The sensor must be placed in middle of the livestock house or in the center between walls/filters when used in an air cleaner. Make sure there is an adequate distance to walls and air inlets.



DOL 51 must not be suspended from the electric cable.

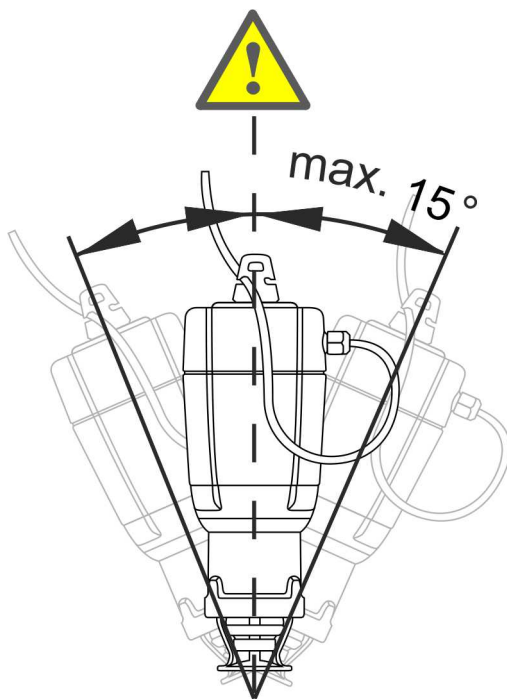


Figure 1: DOL 51 must be mounted vertically with the sensor pointing down; +/- 15° at a location with low vibration and, as far as possible, stable temperatures.

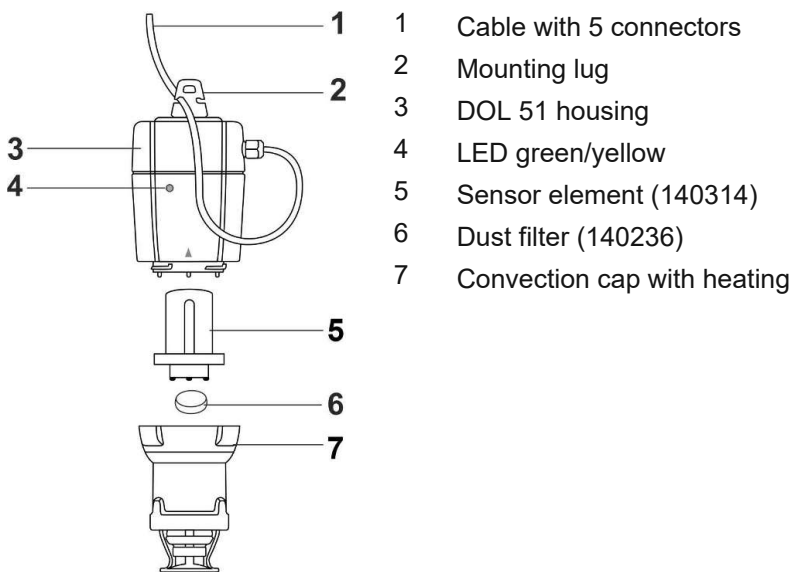


Figure 2: DOL 51.

4 Connection



Installation, servicing and troubleshooting of all electrical equipment must be carried out by qualified personnel in compliance with the applicable national and international standard EN 60204-1 and any other EU standards that are applicable in Europe.

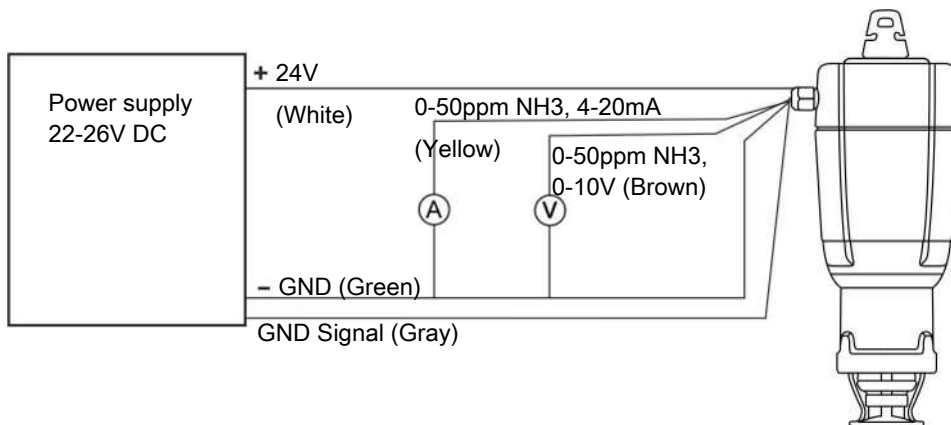


Figure 3: Connections.

Name	Wire color
24V supply voltage	White
0-10V, 0-50ppm NH ₃	Brown
4-20mA, 0-50ppm NH ₃	Yellow
GND	Green
GND Signal	Gray

5 Functions

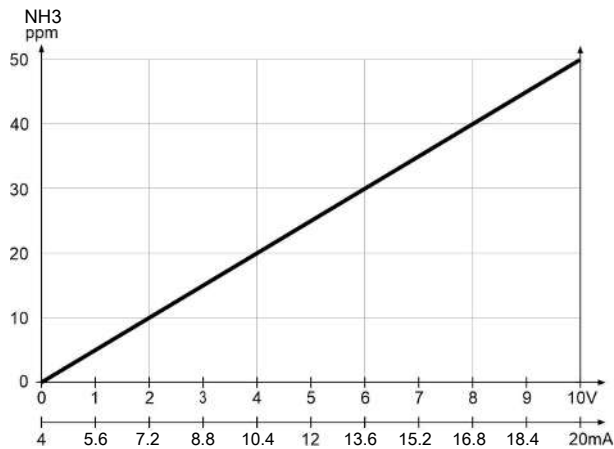











Figure 4: Functional graph.

6 LED indication

LED indication	Sensor status	Action
 YELLOW flashing slowly	Incorrect electrical supply or interrupted supply.	Check installation for cable break. Check the power supply unit of the control unit. Check electric voltage in the junction box or at the sensor element with a multimeter.
	Short circuit in supply cable.	Check installation for short circuit.
	Overtoltage or undervoltage at the DOL 51 housing.	Check electric voltage at the DOL 51 housing with a multimeter.
	Incorrect voltage (e.g. 230 V AC) applied, electronics damaged.	Replace the DOL 51 housing.
	DOL 51 housing is defective.	Replace the DOL 51 housing, contact the supplier.
 Alternating GREEN and YELLOW	Sensor is warming up to be ready for measurements, signal level 0V and 4mA.	No activity. Flashing stops after max. 30 minutes.
 Constant GREEN	Normal operation.	
 GREEN flashing quickly	The ammonia concentration is between 40-60 ppm, which is used to test the sensor. The sensor is working, but it works as if it is in test mode.	No activity. Flashing stops after max. 5 minutes.
 Constant YELLOW	Internal fault detected by electronics, signal level 0 V.	Replace the DOL 51 housing.
 YELLOW flashing quickly	There is very little ammonia in the livestock house – under 5 ppm, the sensor output is 0V.	Replace the sensor element, if the fault continues for more than one day.

LED indication	Sensor status	Action
 GREEN flashing quickly	Concentration measurement is above 52.5 ppm, outside the measuring range.	Ventilate with fresh air.
 GREEN/GREEN/ GREEN/YELLOW	Age monitoring, sensor element is older than 1½ years, service life is expired; see date on sensor element type plate.	Replace the sensor element.
 YELLOW/YELLOW/ YELLOW/GREEN	Heating defective.	Replace the DOL 51 housing.

7 Trouble shooting instructions

Error	Cause	Action
Packaging is damaged.	Damage in transit.	Contact the supplier in case the sensor element is damaged.
No measurement on the control unit.	Electrical connection faulty or interrupted.	Check installation for cable break.
	DOL 51 aligned incorrectly, not vertical.	Install the sensor in accordance with mounting instructions, vertical +/- 15°.
	Sensor element is faulty or used up.	Replace the sensor element.
	DOL 51 housing is defective.	Replace the DOL 51 housing.
Incorrect measurement on the control unit.	The dust filter is clogged.	Replace the dust filter. Check the sensitivity with test gas.
Unexpected measurement on the control unit.	Brief interference pulses <5 seconds.	Interference caused by electrical equipment, e.g. lighting, fans or heaters. Identify device and suppress interference.
Unstable measured value.	Dynamic signal fluctuations with a period of more than 5 seconds can arise from turbulence with fresh air.	Not activity, continue to monitor.
Wet sensor.	The sensor was cleaned with water.	Wipe the sensor dry.
	Condensation.	
Black fluid is leaking from the sensor element.	The sensor element is defective.	Replace the sensor element.
No heat in the convection cap.	Heating defective. Possibly due to a faulty cable between DOL 51 housing and the convection cap.	Replace the DOL 51 housing.

8 Maintenance

The sensor element must be replaced after 1½ years of operation at the latest, see date on the sensor element type plate.

Carry out the daily visual inspection to see if the sensor is ready for operation.

Have specialists carry out the annual inspection and sensitivity check.



Replace the dust filter in front of the sensor element, if clogged. A clogged filter prolongs the response time of the sensor element. This affects the sensitivity. The dust filter must always be replaced prior to checking the sensitivity.



DOL 51 must be removed during cleaning and disinfection.

Do not expose the DOL 51 housing to air in the livestock house without the sensor element mounted, it is however, okay to replace the element in the livestock house.

Cleaning

Clean the sensor surface with lukewarm water. Check for mechanical damage.

Transport



The sensor must be transported in the original packing in air traffic. Otherwise the sensor may lose its measuring sensitivity.

9 Technical data

		DOL 51, 0-10V, 4-20mA, 0-50ppm NH₃	
Specification		Parameter	Unit
Output	Voltage range	0 - 10	VDC
	Power range	4 - 20	mA
	Load for voltage output	> 500 - < 10M	Ω
	Recommended load, voltage output	> 100	kΩ
	Load for current output	> 100 - < 470	Ω
NH ₃	Measuring range	0 - 50	ppm NH ₃
	Voltage resolution	0.2	V/ppm NH ₃
	Resolution	0.32	mA/ppm
	Signal transmission resolution	0.5	ppm NH ₃
	Accuracy	1.5 ppm or ±10% of the measured value	ppm NH ₃
	Long term drift	< ±10% of the measured value	%
	Time constant: T50	≤ 30	sec.
Supply voltage		22 - 26	VDC
Supply current		< 200	mA
Temperature, operation		0 - +50	°C
Temperature, storage		-20 - +60	°C
Humidity		15 - 100	%RH
Pressure		700 - 1300	hPa

		DOL 51, 0-10V, 4-20mA, 0-50ppm NH₃	
Max. storage time (sensor element)	See date on sensor can		
Warranty sensor element	1	years	
Expected lifetime of sensor element	Not beyond the date on the sensor element type plate	1½	years
IP classification	IP65		
Cable length	6	m	
Cable conductor size	5 x 0.25 (5 x AWG23)	mm ²	
Max. cable length at 0.75 mm ²	20	m	
Max. cable length at 1.5 mm ²	40	m	
Dimensions (diameter/width)	75	mm	
Dimensions (length)	225	mm	
Weight	600	g	
Approvals	CE UKCA		

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9.1 Dimensioned sketch

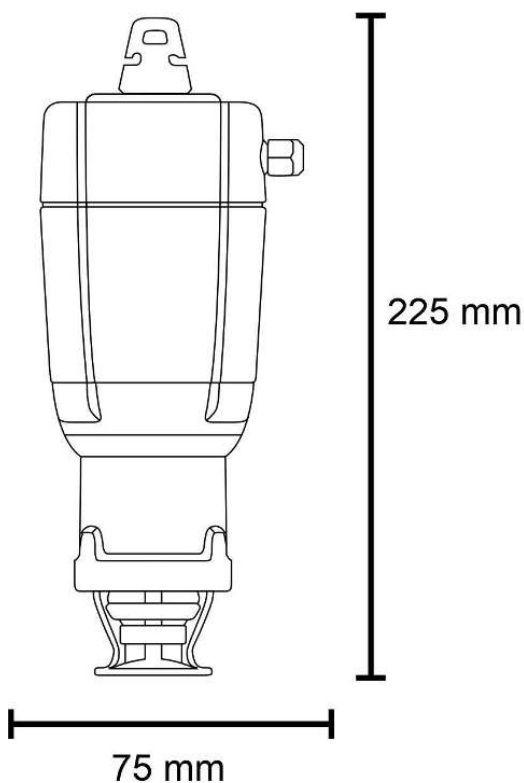


Figure 5: Dimensions in mm.