

# LAG 14 ER Series

Leak detector system

## Technical Data Sheet



## Description

Leak detector system for double-skin tanks designed for flammable liquid storage, consisting of a control unit, a sensor and a tank for the detection liquid. The control unit and sensor are connected to each other by two signal cables at a maximum distance of 50 m. In the event of a leak from the interstitial space of the storage tank, the level of liquid in the control tank falls, with the result that the electrodes are no longer immersed in the detection liquid. This causes a change in their resistive potential, sending a signal to the control unit, which immediately actuates the visual and acoustic signal generators.



### LAG 14 ER

Leak detector system for double-skin tanks designed for flammable liquid storage, consisting of:

- electronic control unit with visual (LED) and acoustic alarm signal generator, and supplementary output contact.
- anti-static tank for leak detection liquid that can be installed in a hazardous area.
- intrinsically safe resistive sensor.

Power supply 230 V, 50 Hz

Rated power 5 VA

Voltage-free NO relay 3A - 250V

Maximum sensor connection distance 50m with shielded cable

Suitable for in-ground storage tanks with a capacity of up to approximately 60,000 litres and for above-ground storage tanks with a capacity of up to approximately 20,000 litres. For higher-capacity storage tanks, additional control tanks without sensor are available to order.

To fit the detector system, use the complete set of LAGMS Series accessories.

**Compliant with LVD 2014/35/EU - EMC 2014/30/EU - ATEX 2014/34/EU**  
**ATEX classification: G EEx ia IIC / EEx ia IIB.**

Type	Part No.	Weight (kg)
LAG 14 ER	0190150	1.40

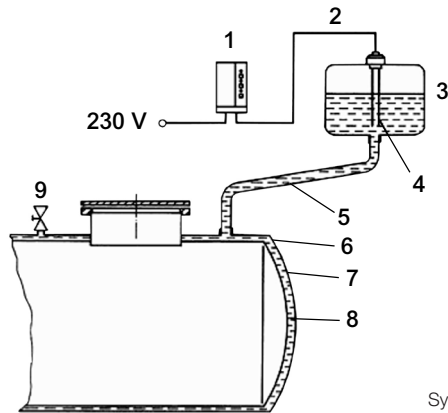
### LAGMS

Complete set of accessories for fitting the LAG 14 ER leak detector system on double-skin storage tanks, consisting of:

- threaded nipple (1") for connection to storage tank, complete with EPDM pipe
- fittings for connection with the leak detection liquid tank
- threaded nipple (1") with bleed test valve



Type	Part No.	Weight (kg)
LAGMS	0196150	1.62



System composition

**Key**

- 1) Control unit
- 2) Signal cable
- 3) Control tank
- 4) Sensor
- 5) Connection pipe
- 6) Outer wall
- 7) Interstitial space
- 8) Inner wall
- 9) Test valve

Control unit technical features	
Supply voltage	230 V - 50 Hz
Rated power	5 VA
Voltage-free NO relay	250 V - 3A
Relay fuse	T 2A
Acoustic alarm (at a distance of 1 metre)	Minimum 70 dB (A)
Maximum sensor connection distance	50 m
Storage tank capacity	In-ground: max. capacity 60,000 litres Above-ground: max. capacity 20,000 litres
IP rating	IP 30
Room temperature	from - 5°C to 40°C

Sensor technical features	ia intrinsically safe circuit	ib intrinsically safe circuit
Electrodes	V 2 A, Ø 3 mm	
Maximum values	UO = 16.8 V, Ik = 57 mA P = 240 mW, linear	UO = 16.8 V, Ik = 57 mA P = 240 mW, linear
Maximum permitted external capacity	180 nF for ICC, 675 nF for IIB	390 nF for ICC, 1.5 mF per IIB
Maximum permitted external inductance	1 mH for ICC, 8 mH for IIB	11 mH for ICC, 43 mH for IIB
Internal capacity and inductance	negligible	negligible

Control tank technical features	
Control tank material	Antistatic polymer
Sensor housing	Polymer Ø 34 mm
Total volume	9.7 litres
Effective volume	4.5 litres
Connection pipe	EDPM Ø 14x3
Room temperature	from -5 to 50°C

## Operation

The **LAG 14 ER Series** system monitors the liquid-filled interstitial space between the inner and outer walls of double-skin storage tanks. In the event of a leak from any point of the storage tank, whether internal or external, the detection liquid leaks out, causing its level to fall. The sensor electrodes are therefore no longer immersed. The control unit detects a change in resistance and actuates a visual alarm, followed by an acoustic alarm, while at the same time energising a relay.

### Sensor

The control tank, mounted on the top of the storage tank by means of a fitting in the base of the former, is connected to the highest point of the interstitial space in the storage tank by means of a pipe. This means that the control tank is the highest point of the interstitial space to be monitored. The LAG container is filled to half its capacity with detection liquid. The sensor is fitted in the top of the control tank so that its tips are immersed in the detection liquid. Both electrodes are connected to the control unit by a 2-core cable.

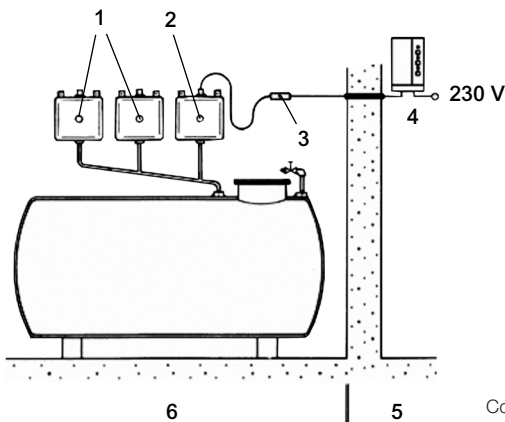
### Control unit

The control unit continuously monitors the resistance value between the two electrodes of the sensor. In normal conditions, the green light is ON, resistance is less than 5 kΩ, the red light is OFF and the relay is in the rest position (voltage-free contact open). If the resistance at the electrodes exceeds 5 kΩ, the control unit indicates a leak by switching on the red light and actuating the acoustic signal generator and the relay, which is thus energised with the contacts closed. The Power of the acoustic signal generator can be reduced by pressing the "Reset" pushbutton.

## Sizing

The LAG 14 ER leak detection system must be sized according to the type of tank to be protected and the capacity of the interstitial space.

Depending on these two parameters, it may be necessary to use additional control tanks, which must be connected to the one equipped with the sensor.



### Key

- 1) Additional control tanks
- 2) Control tank with sensor
- 3) Pull-box
- 4) Control unit
- 5) Unclassified area
- 6) Explosion risk classified area

Connection of additional control tanks

Number of control tanks with sensor + additional control tanks	Volume (litres) of interstitial space IN-GROUND tank	Volume (litres) of interstitial space ABOVE-GROUND tank
1+0	0-450	0-157.5
1+1	450-900	157.5-315
1+2	900-1350	315-472.5
1+3	1350-1800	472.5-630
1+4	1800-2250	630-787.5

The percentage of detection liquid to be added to the water in the interstitial space also varies according to the type of tank:

- IN-GROUND tanks: 1 litre of additive x 100 litres of liquid in the interstitial space
- ABOVE GROUND tanks: 1 litre of additive x 35 litres of liquid in the interstitial space

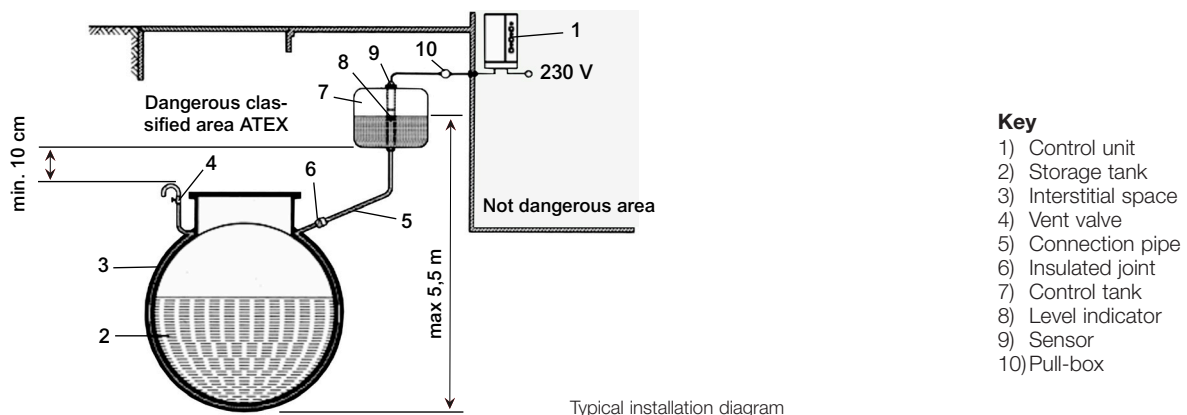
The detection liquids listed below passed tests conducted by BAM (the German Federal Institute for Materials Research and Testing) in accordance with the requirements governing testing principles for leak detectors for TRbF 501 and 502 storage tanks and pipes. They passed tests of fungicide effects and compatibility with heating oil, diesel and petroleum, and can therefore be used with liquid-filled leak detectors.

The use of other detection liquids in the interstitial spaces is not permitted.

Manufacturer	Additive	BAM approvals
Hoechst AG DE-84508 Gendorf	Antifrogen N, Leak detection liquid Hoechst	1.3/9790 - 5.1/3436 1.3/10723 - 5.1/3833
Dow Chemical Europe CH-8810 Horgen	DOWCAL 20 Leak detection liquid	1.3/9557 - 5.1/3371
Chem. Werke Hüls DE-49448 Marl	ILEXAN-Leak detection liquid, concentrate	1.3/9829 - 5.1/3465
Gunter Schröder DE-2100 Hamburg 90	WBC 961 Leak detection liquid	1.3/8981 - 5.1/3347
Deutsche Pentosin W. DE-22880 Wedel	Pentosin-Indikol-concentrate	1.3/8758 - 5.1/3398
Deutsche Shell DE-65934 Frankfurt	Glycoshell 1 Leak detection liquid	1.3/4281 - 5.1/3457
Wilhelm E. H. Biesterfeld DE-21079 Hamburg 90	WBC 962 Leak detection liquid	1.3/11805 - 5.1/4836
BASF AG DE-67063 Ludwigshafen	Glymin und Glymin NF Leak detection liquid	1.3/11477 - 5.1/4372 1.4/12481 - 5.1/5861
Chemische Industrielle GmbH DE-20095 Hamburg 1	KOREX TB 86 IV Leak detection liquid	1.3/11622 - 5.1/4570
Dow Chemical Europe CH-8810 Horgen	DOWCAL 10 Leak detection liquid	1.3/11621 - 5.1/4543
Deutsche Avia Mineralöl GmbH DE-81675 München 80	AVILUB Leak detection liquid	1.3/11477-N1 - 5.1/4372-N1
Metasco Chem. Techn. Prod. DE-65191 Wiesbaden	FAUCH 950 Leak detection liquid	1.3/11477-N2 - 5.1/4372-N2

## Installation

For correct operation of the **LAG 14 ER Series** system, all the components must be installed in accordance with the simple requirements shown in the figure below. The control tank, complete with sensor, can be installed in a hazardous area (ATEX classified as zone 1 or 2) at least 100 mm above the highest point of the vent, and in such a way that the piezometric level of the control liquid does not exceed 5.5 metres. The control unit must always be installed in non-hazardous areas. Electrical transitions from hazardous to non-hazardous areas must be made as laid down in harmonised standards pursuant to ATEX 2014/34/EU.



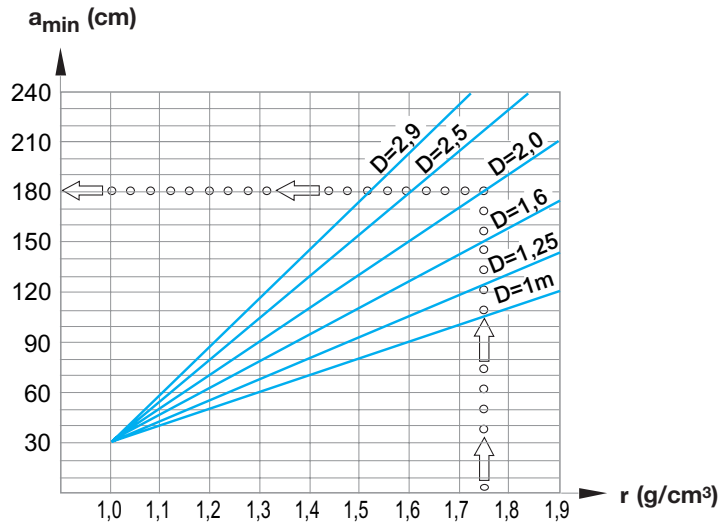
The minimum distance from the top of the storage tank to the control tank depends on the density of the control liquid and the diameter (or height) of the storage tanks to be monitored.

The minimum distance can be calculated using the following formulae.

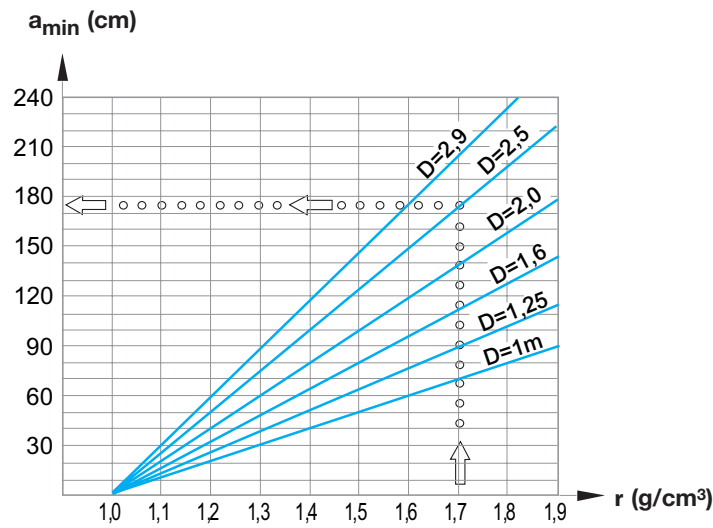
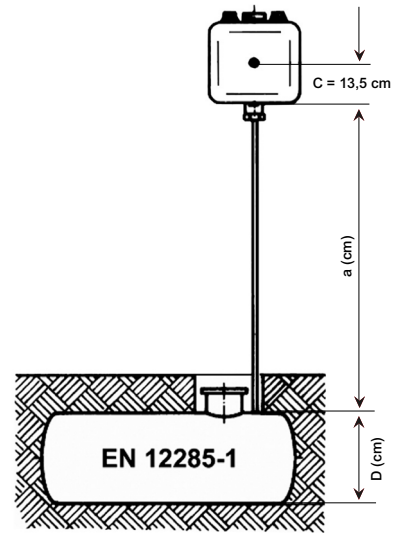
IN-GROUND tanks:  $a_{\min} = Dx(r-1) + 30$        $r = \text{density (g/cm}^3\text{)}$   
 $a_{\min} = \text{minimum distance (cm)}$   
 $D = \text{tank diameter (cm)}$

ABOVE-GROUND tanks:  $a_{\min} = Dx(r-1)$

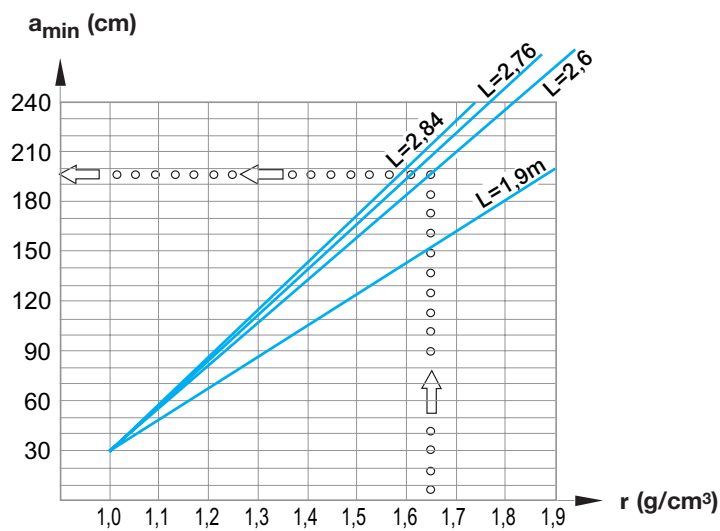
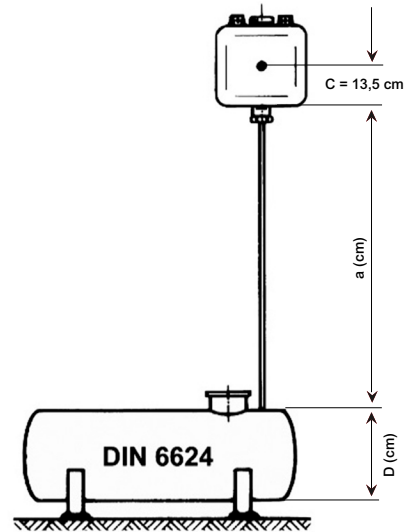
or can be determined directly from the diagrams below.



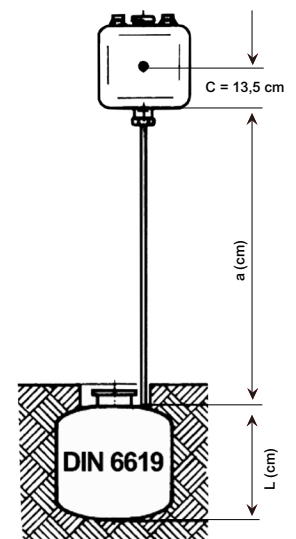
In-ground tanks EN 12285-1



Above-ground tanks DIN 6623, DIN 6624, EN 12285-2



Above-ground tanks DIN 6619

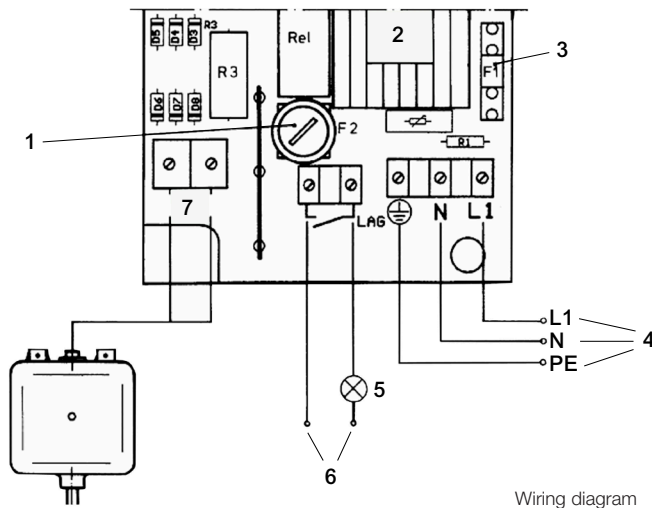


## Electrical connections

The control unit must be connected directly to the 230V–50 Hz power supply using the appropriate N, L1 PE (earth) terminals. The line must be protected with a 10A fuse and made with a cable with section of 3x1.5 mm<sup>2</sup>.

The sensor must be connected to the control unit using a cable with section of 2x1 mm<sup>2</sup> (2x1.5 mm<sup>2</sup> for buried cables) without ever shortening the sensor cable. For installation distances of more than 5 metres, use a shielded cable without ever exceeding the maximum distance of 50 metres.

All electrical connections must be made in accordance with the applicable regulatory requirements in the country of installation.

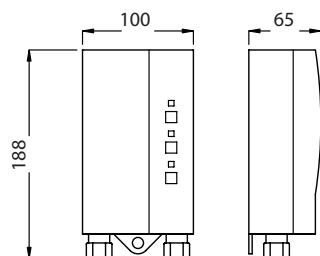


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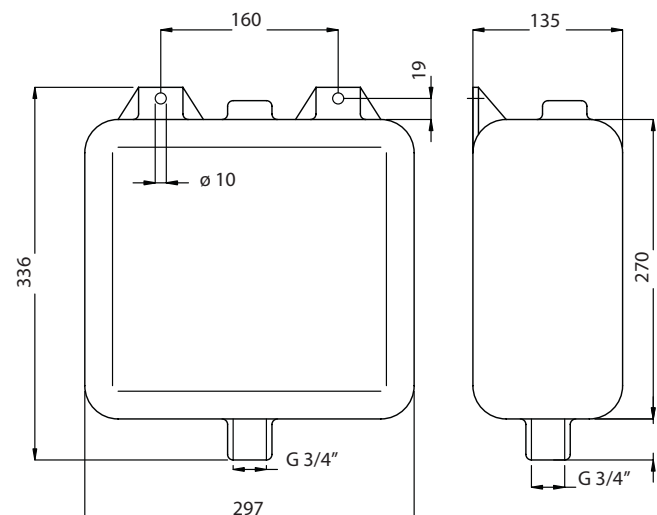
- 1) Relay fuse F2
- 2) Transformer
- 3) Power supply fuse F1
- 4) Power supply terminals
- 5) Remote alarm
- 6) Voltage-free contacts
- 7) Sensor contacts

## Overall dimensions (mm)

### LAG 14 ER



### LAGMS



## Specification text

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### **LAG 14 ER Series**

Leak detector system for double-skin tanks **LAG 14 ER Series** – WATTS brand – designed for flammable liquid storage, consisting of electronic control unit with visual (LED) and acoustic alarm signal generator and additional output contact, anti-static tank for leak detection liquid that can be installed in a hazardous area, and intrinsically safe sensor. Power supply 230 V, 50 Hz. Maximum sensor connection distance 50m with shielded cable.

Suitable for in-ground storage tanks with a capacity of up to approximately 60,000 litres and for above-ground storage tanks with a capacity of up to approximately 20,000 litres. Complete set of fitting accessories, see LAGMS Series.

Compliant with LVD 2014/35/EU - EMC 2014/30/EU - ATEX 2014/34/EU

### **LAGMS Series**

Complete set of accessories **LAGMS Series** – WATTS brand – for fitting the LAG 14 ER leak detector system, consisting of: threaded nipple (1") for connection to storage tank, complete with EPDM pipe, fittings for connection with the leak detection liquid tank, threaded nipple (1") with test and bleed valve.

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