



TEKLAB
LIQUID LEVEL SENSORS

SPECIALISTS IN
LIQUID LEVEL SENSORS
AND ELECTRONIC CONTROLLERS



LIQUID LEVEL SENSORS

ELECTRO-OPTIC SYSTEMS

OPTICAL LEVEL SWITCHES

State of the Art in Liquid Level Sensors

Teklab is a dynamic company that, with more than 30 years of experience in electronics development, can today offer a wide range of Infra-Red liquid level switches in order to meet the growing market demand. From many years Teklab exports Italian made products to different customers in many countries all over the world.



Teklab is an ISO 9001:2008 certified Company



Specialists in Liquid Level Sensors and Electronic Controllers

Teklab has a wide range of liquid level sensors based on digital technology.

All the liquid level sensors are low cost, high technology products and have undergone stringent quality control tests. They are programmable by microcontroller and their body material is compatible with most common chemical agents, food, beverage, oils and fuel.

These electro-optic liquid level sensors are designed to match the specific needs of demanding customers in every field. Typical applications for our sensors include refrigeration and air conditioning systems, medical, food & beverage, pharmaceutical, petrochemicals, heavy duty automobiles, hydraulic reservoirs, machine tools, home appliances, vending machines etc.

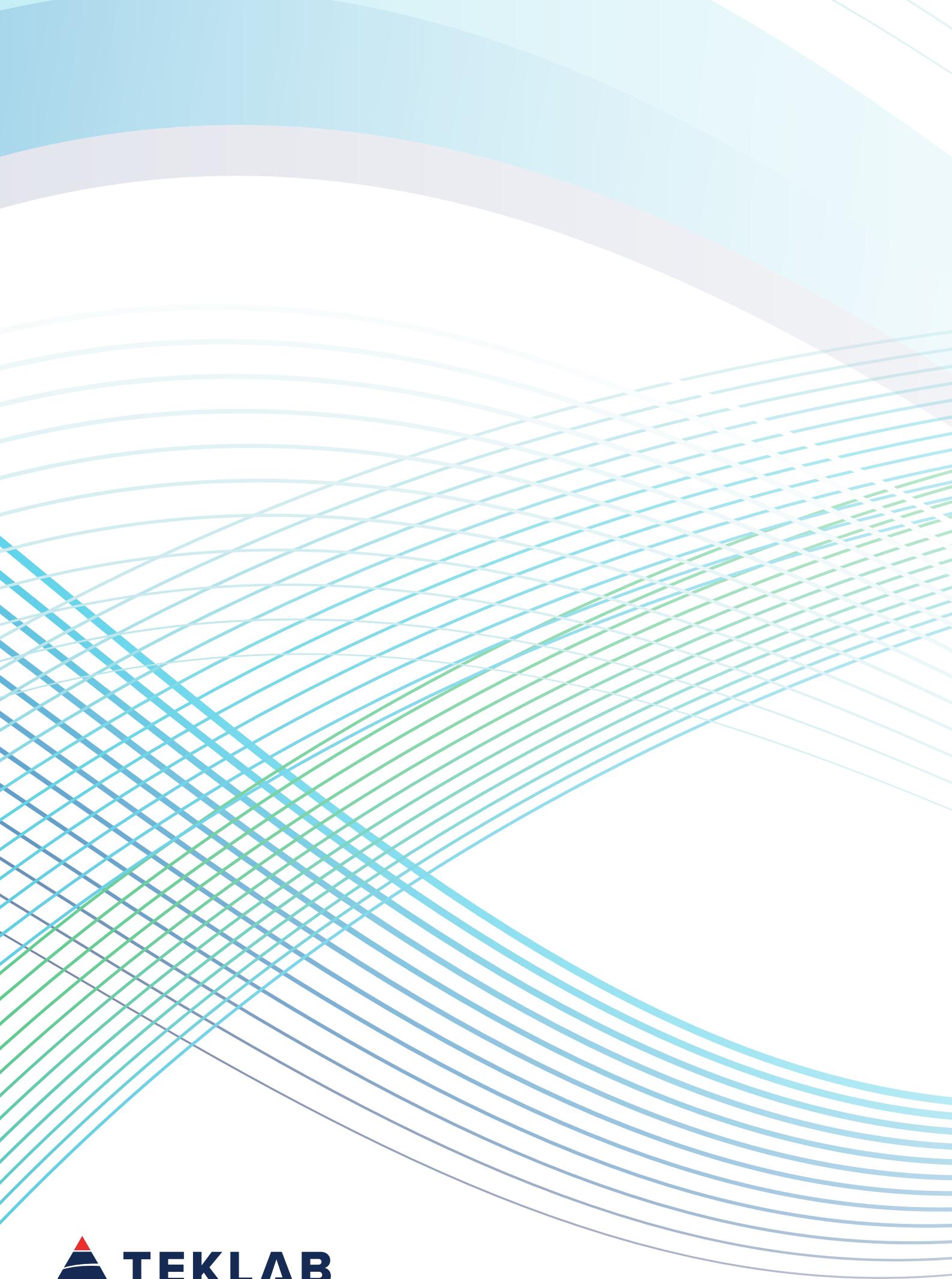
Apart from traditional sensors based on pressure, floatation, conductivity etc, Teklab offers a wide range of IR liquid level sensors based on infra red emission technology. These liquid

level sensors have the advantages of small size, reliability, no moving parts, long life, efficacy and economy.

These tiny units are ideal for point level sensing applications where dependability and economy are important. The liquid level sensors are suitable for high, intermediate as well as low level detection. They are easy to install and can be tank top, side or bottom fitted. Being solid state switching they are rugged and highly dependable over the entire life of the sensor, having no moving parts.

The IR liquid level sensors are impervious to the hardness or the conductivity of liquid. Hence they can be used anywhere in the world under any environment as it is without requiring any special fine tuning. The output switching can be delayed programmatically in these liquid level sensors depending on application.

You are in safe hands with Teklab!



INDEX

Oil Level Regulators / Adapters

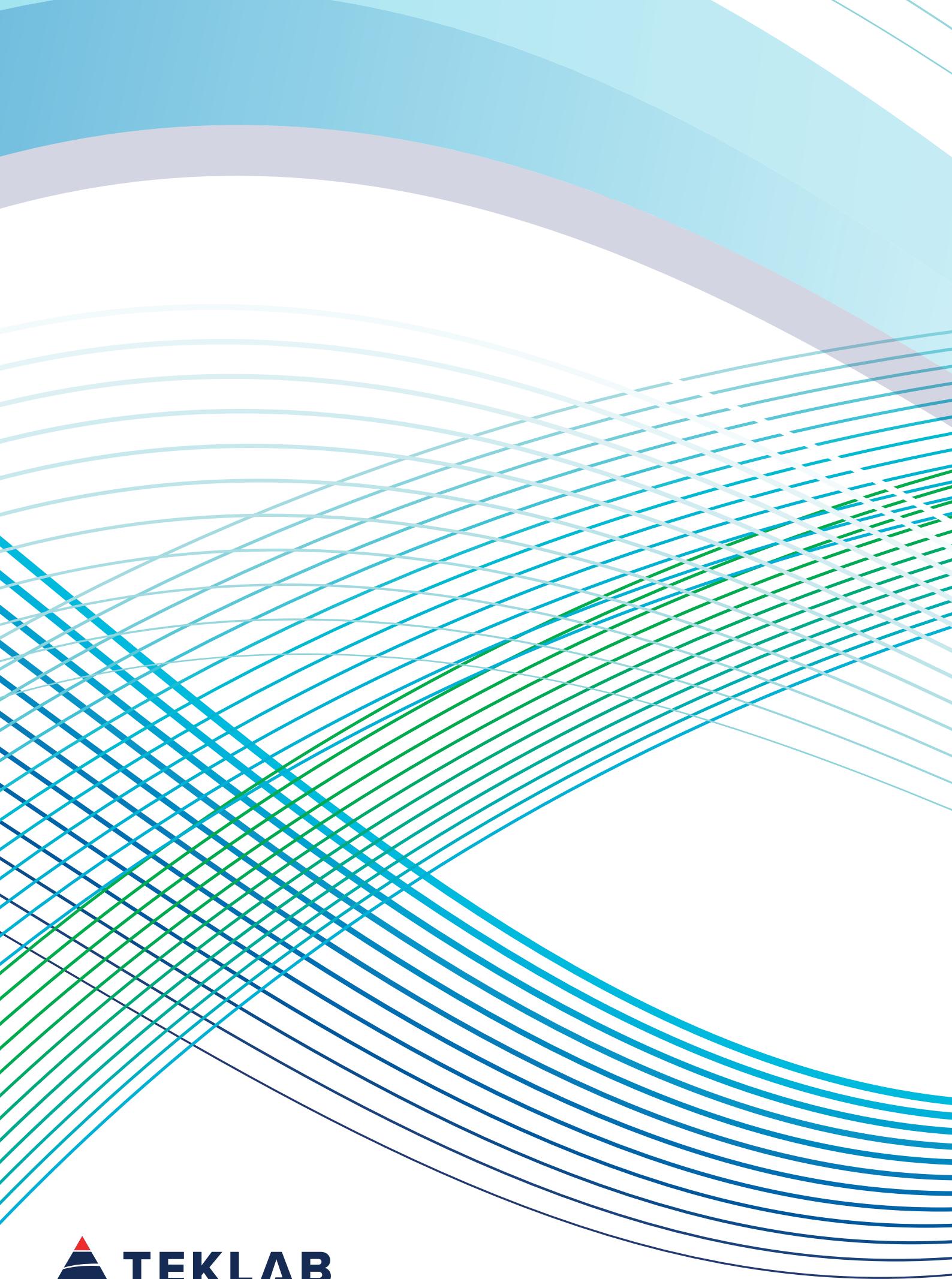
Innovative Communication Technology	pag.	8
TK4MB Enhanced Oil Level Regulator with integrated Modbus RTU Connectivity	pag.	10
TK4MB@46 bar Oil Level Regulator with integrated Modbus RTU connectivity	pag.	12
TK4 @46 bar with integrated connectivity capabilities	pag.	14
TK3+ @46 bar	pag.	16
TK4MB@80 bar Oil Level Regulator with integrated Modbus RTU connectivity	pag.	18
TK4 @80 bar with integrated connectivity capabilities	pag.	20
TK3+ @80 bar	pag.	22
TK4MB@130 bar Oil Level Regulator with integrated Modbus RTU connectivity	pag.	24
TK4 @130 bar with integrated connectivity capabilities	pag.	26
TK3+ @130 bar	pag.	28
Adapters Addendum	pag.	30

Level Switches

Level Control Unit TK1+	pag.	34
Optical Level Control Unit LC-XT / LC-XP	pag.	36
Optical Level Control Unit LC-PH	pag.	38
Optical Level Control Unit LC-PS	pag.	40
Optical Level Control Unit ROTALOCK RLK02	pag.	42

Sensors

K25 Level Switch for High Pressure environments with 4÷20 mA analog temperature output	pag.	46
Ex Electro-Optic Level Switch for explosive environments	pag.	48
K11 Level Switch	pag.	50





OIL LEVEL REGULATORS

Innovative Communication Technology



Main Features

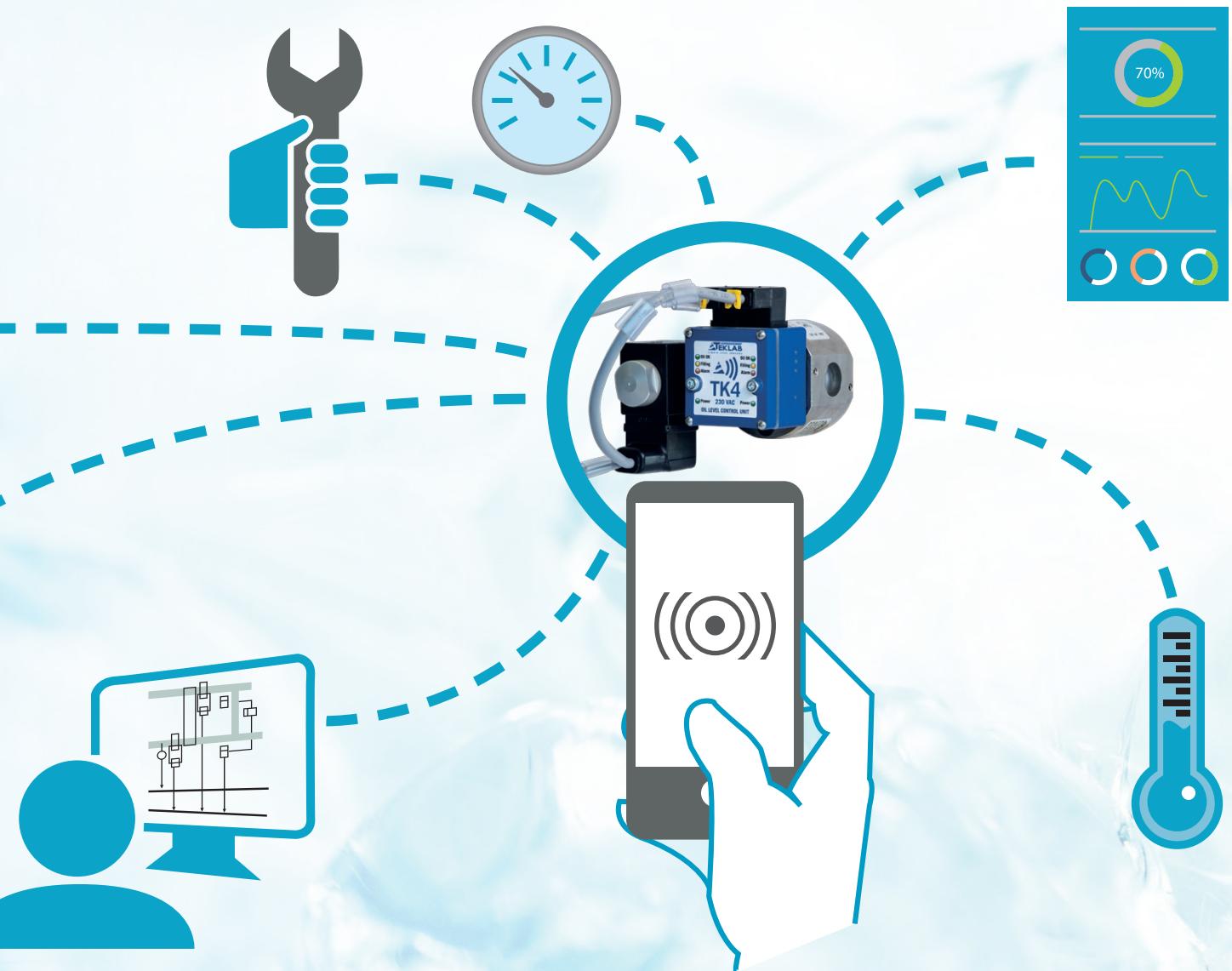
TK4 combines the established reliability and ease of installation of TK3 and TK3+ with **revolutionary connectivity capabilities** which opens new and interesting usage scenarios for the product.

TK4 in fact integrates a **wireless near field communication protocol** that allows users to interact with the oil level regulator to expand product's features.

The communication technology adopted is:

- **Extremely easy-to-use:** data accessible without disassembling enclosures and connecting cables.
- **Powered / not powered operating:** several information accessible also when the electronics is not powered (useful for quick and easy in-house customization).

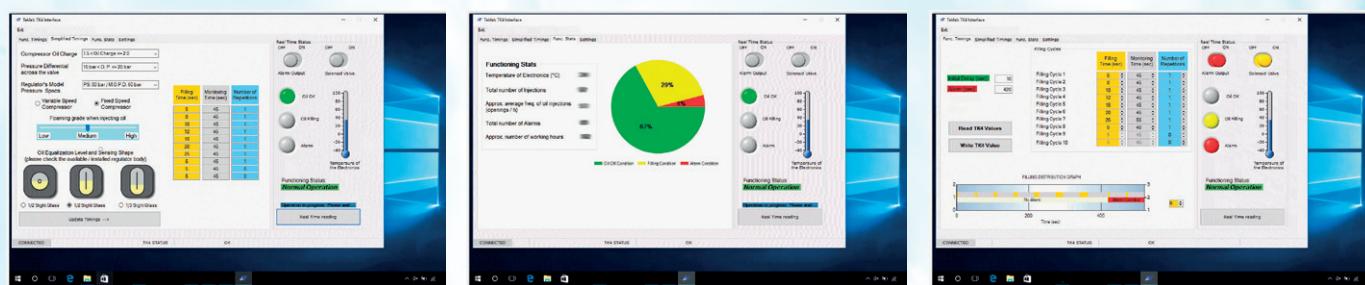
- **Highly compact and cost effective:** the product keeps its very compact design and there is no need for expensive devices.
- **Highly safe:** password protected point to point single link with limited range of operation to avoid unwanted changes from unauthorized personnel.
- **Really Flexible:** possibility of modifying functioning parameters and verify working conditions (also in real time) to optimize system's operation.
- **Open for the future:** Teklab is continuously in contact with customers for adding features to the product.



Typical applications are:

- verification of product operation status and system operating conditions during normal maintenance operations.
- functioning timings customization.
- alarm timings customization.

Note. Customizations possible both “off line” (factory setting before shipping and installation) and “on line” (on the field system adjustment / optimization).

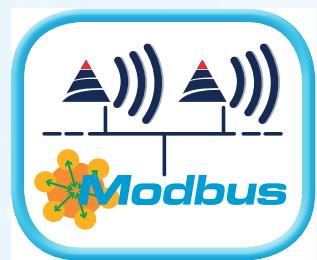


Ordering Codes

PRODUCT	CODE
NANO INTERFACE	TK4-PRG-NANO

TK4MB

Enhanced Oil Level Regulator with integrated Modbus RTU Connectivity



Main Features

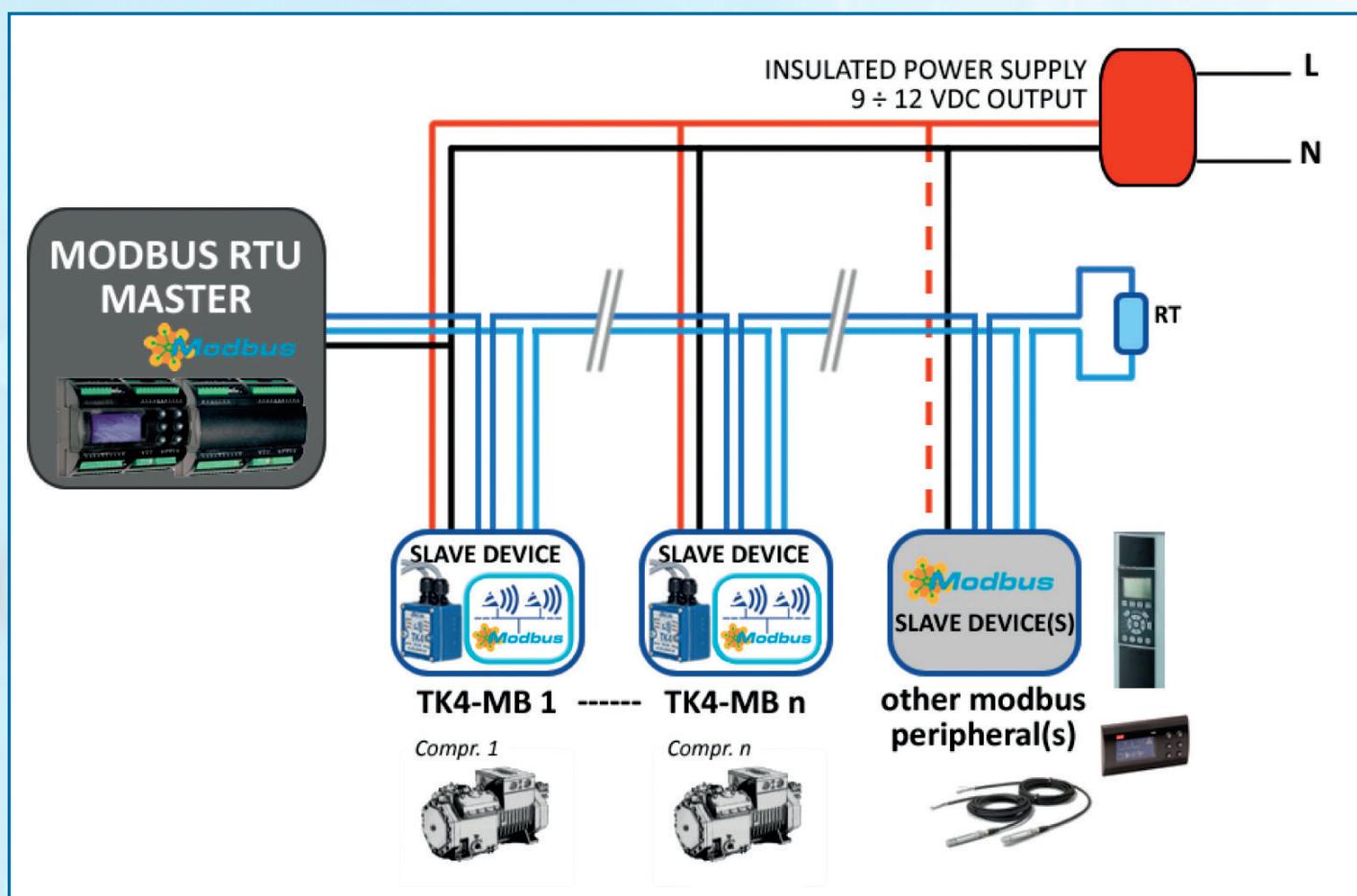
TK4-MB combines the established reliability and ease of installation of TK3+ with **revolutionary flexibility** of standard TK4 extending its connectivity capabilities through the introduction of wired serial interface based on Modbus RTU protocol.

TK4-MB in fact integrates two possibilities of communication interface:

- A wired serial interface based on Modbus RTU protocol.
- A wireless near field communication protocol that allows users to interact easily and directly with the oil level regulator using a Windows based PC or an Android device (Mobile Phone or Tablet).

The **TK4-MB** is designed to be connected to widely diffused **Modbus RTU networks** as a slave node opening the possibility of having the availability of info about working conditions of the product and thus of the system. Consequently it is possible to have remote monitoring of the compressor pack even further reliable and effective letting it possible to optimize systems performances, to prevent and manage alarms and to elaborate accurate maintenance plans.

Here is an example of typical connection:



Reading and Writing Register Commands are processed according to standard Modbus RTU protocol (www.modbus.org) to allow easy integration and maximum flexibility.

Example of parameters accessible on the serial bus are: Valve and Alarm contact status, Functioning Timings, Time to Alarm, Logging info, etc.

The wireless proximity communication with the TK4 is established simply connecting the supplied USB dongle to the PC or to the Android device (Tablet or Smartphone) and launching the dedicated App.

This solution is:

- Extremely easy-to-use: data accessible without disassembling enclosures and connecting cables.
- Powered / not powered operating: several information accessible also when the electronics is not powered (useful for quick and easy in-house customization).
- Highly compact and cost effective: the product keeps its very compact design and there is no need for expensive devices.
- Highly safe: password protected point to point single link with limited range of operation to avoid unwanted changes from unauthorized personnel.
- Really Flexible: possibility of modifying functioning parameters and verify working conditions (also in real time) to optimize system's operation.
- Open for the future: Teklab is continuously in contact with customers for adding features to the product.



It can be used for direct customization of working parameters and working serial settings of the Modbus protocol (like Device Address, baud rate, etc) letting it very easy to integrate the product on any system.

A screenshot of the 'Teklab TK4 Interface Application - Advanced' software. The interface includes tabs for 'Real Time', 'Product Setting', 'General Stats', 'Last Alarms', '7 Days Log', 'Last Hours Detail', 'Previous 24h Detail', 'Functioning Timings Info', and 'Modbus'. On the left, there are fields for 'Device Address' (set to 105), 'Parity' (Even selected), and 'Baud Rate' (19200 bps selected). Below these are buttons for 'Import Modbus Parameters from the module' and 'Update Modbus parameters on the module'. In the center, there is a 'Modbus' logo with two blue wavy lines above it. To the right, there are sections for 'Modbus Parameters' (with tables for Modbus Address, Modbus Function, and Modbus Register), 'Communication Status' (showing 'TK4 INTERFACE CONNECTED' and 'TK4 DETECTED'), 'Firmware 10.02', 'TEKLAB ELECTRONICS', 'TK4 Oil Level Regulator with integrated connectivity capabilities', 'Password Protection' (current status: Unlocked), and 'Functioning Conditions Summary' (a pie chart showing Oil OK condition (52%), Oil Filling condition (0%), Alarm condition (49%), and Oil Injections (377469)). There are also graphs for 'Oil Level Restore - Filling Mode (%)' and 'Functioning Timings (Oil OK duration (%))'.

Typical applications are:

- verification of product operation status and system operating conditions from remote control rooms (using Modbus interface).
- verification of product operation status and system operating conditions during normal maintenance operations directly on the unit without the needing of any connection (using wireless interface).
- functioning timings customization for system's optimization.
- alarm timings customization for better system's monitoring.

12 TK4MB @46 bar
Oil Level Regulator with integrated Modbus RTU connectivity

SUITABLE FOR CO₂ SYSTEMS



Some advantages of this solution:

- Modbus RTU Serial connection to system controller
- Extremely compact dimensions
- Left/Right mounting possibility with the same TK4-MB
- Reduction of the number of junctions in the circuit with less possibility of having leakages

- Usage of less components (simplified circuit and easier warehouse management)
- Simplified Installation (cost savings in terms of installation time)
- Revolutionary connectivity capabilities.

Main Features

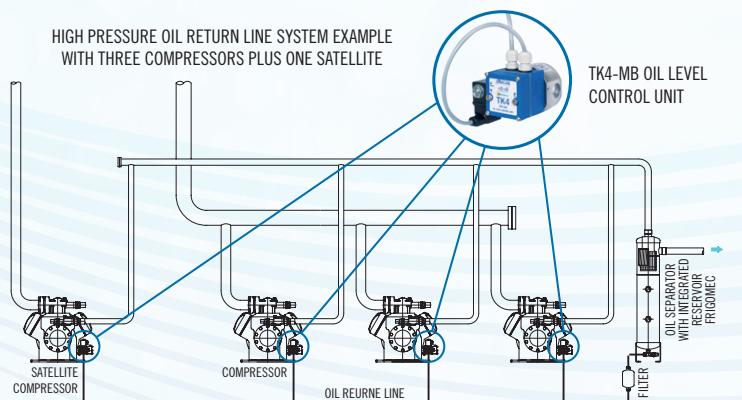
- High reliability ensured by absence of mechanical moving parts.
- Sight glass and electronic LEDs can be checked on the same side where is more comfortable to do inspections.
- Well consolidated steel with fused glass technology with absence of seals ensures no leakage and good chemical compatibility.
- Direct sight glass replacement (3/4/6 holes flange connection).
- 24 VAC / 230 VAC power supply options.

- Easy maintenance of the coil of the valve and of the Electro-Optic sensor that can be easily replaced without emptying or depressurizing the plant.
- 230 VAC /2A alarm relay output suitable for direct connection in the security chain of the system.
- Adapters suitable for various types of compressors.
- Unit conform to directives 2014/30/UE and 2014/35/UE.

Application Description

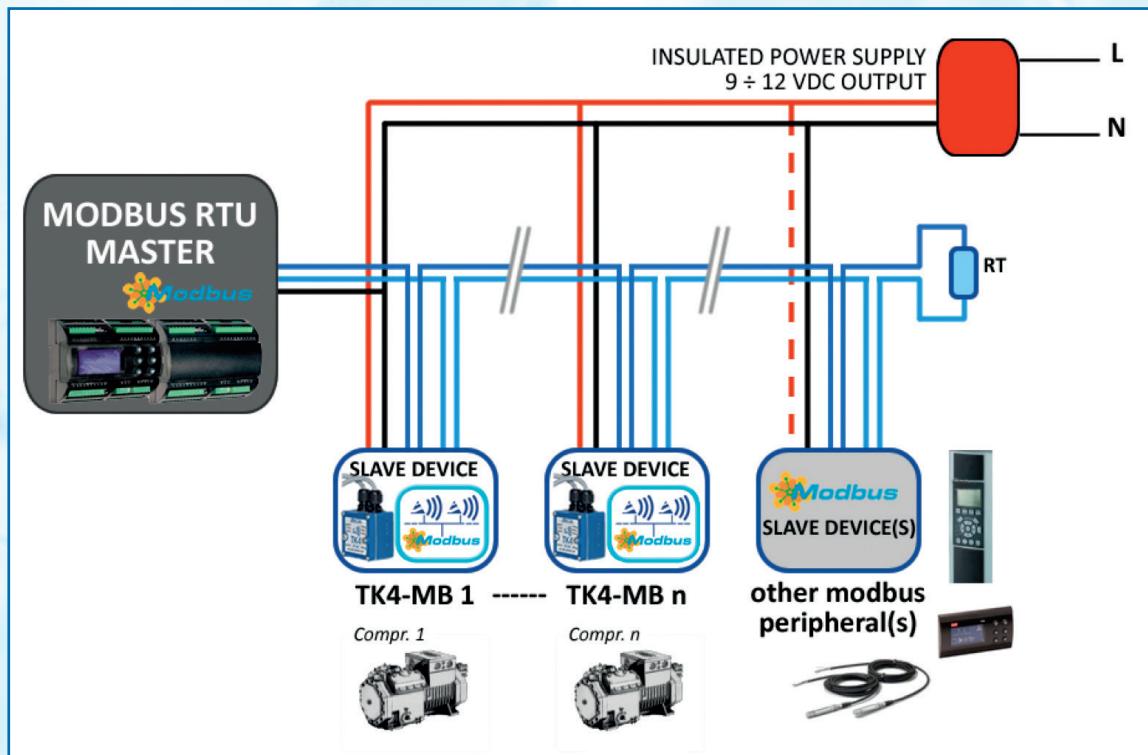
The TK4-MB is designed to control the oil level in the compressor crankcase in order to avoid the compressor to run without oil and so improve its lifetime. TK4-MB monitors the oil level with the embedded electro-optic sensor and comprises a solenoid valve for oil filling and a relay output contact to give an alarm.

HIGH PRESSURE OIL RETURN LINE SYSTEM EXAMPLE WITH THREE COMPRESSORS PLUS ONE SATELLITE



SUPPLY VOLTAGE	24 VAC \pm 10% or 230 VAC \pm 10% depending on model
SUPPLY CURRENT	Each TK4MB requires 20VA (depending on the solenoid valve)
ELECTRICAL CONNECTION	EN175301-803 Connector / Spare wires
OUTPUT SIGNAL	Contact free relay output NO and NC
RELAY OUTPUTS	Up to 230VAC @2A
HOUSING MATERIAL	Nickel plated steel + fused glass PA glass fibre reinforced
ENCLOSURE PROTECTION CLASS	IP 65
MEDIA TEMPERATURE	-40°C÷+85°C
AMBIENT TEMPERATURE	-40°C÷+60°C
MAX WORKING PRESSURE	46 bar (higher pressure limits available on different TK4-MB models)
MOPD	26 bar (higher pressure limits available on different TK4-MB models)
OIL RETURN LINE	7/16 – 20 UNF male
CABLE TYPE	PVC cable CEI 20-22. Working temp.: -20 ÷ +70 °C (fixed laying)

Modbus RTU typical application



Ordering Codes

ELECTRICAL CONNECTION POWER SUPPLY	CABLE GLANDS 3 m
24 V	TK4MB-A50AB13-01
230 V	TK4MB-A50BB13-01

Program interfaces available. Suggested ordering codes
not include oil strainer element. Adapters must be
ordered separately.

TK4 @46 bar

Oil Level Regulator with integrated connectivity capabilities



CONNECTORS VERSION



TWO MOUNTING POSSIBILITIES WITH THE SAME PRODUCT (LEFT/RIGHT)

CABLE GLANDS VERSION



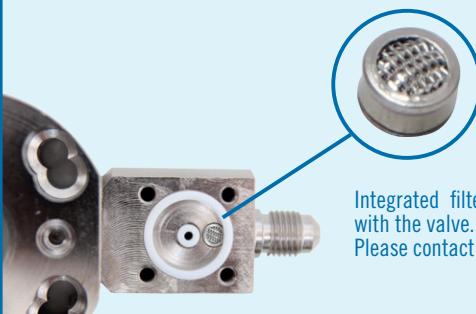
TWO MOUNTING POSSIBILITIES WITH THE SAME PRODUCT (LEFT/RIGHT)

Some advantages of this solution:

- Extremely compact dimensions
- Left/Right mounting possibility with the same TK4
- Reduction of the number of junctions in the circuit with less possibility of having leakages
- Usage of less components (simplified circuit and easier warehouse management)
- Simplified Installation (cost savings in terms of installation time)
- Revolutionary connectivity capabilities.

Main Features

- High reliability ensured by absence of mechanical moving parts.
- Sight glass and electronic LEDs can be checked on the same side where is more comfortable to do inspections.
- Well consolidated steel with fused glass technology with absence of seals ensures no leakage and good chemical compatibility.
- Direct sight glass replacement (3/4/6 holes flange connection).
- 24 VAC / 230 VAC power supply options.



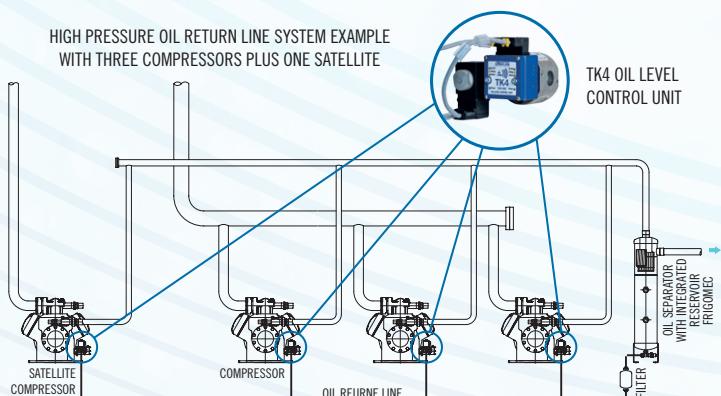
Integrated filtering element in series with the valve.
Please contact Teklab for more info.

- Easy maintenance of the coil of the valve and of the Electro-Optic sensor that can be easily replaced without emptying or depressurizing the plant.
- 230 VAC /2A alarm relay output suitable for direct connection in the security chain of the system.
- Adapters suitable for various types of compressors.
- Unit conform to directives 2014/30/UE and 2014/35/UE.

Application Description

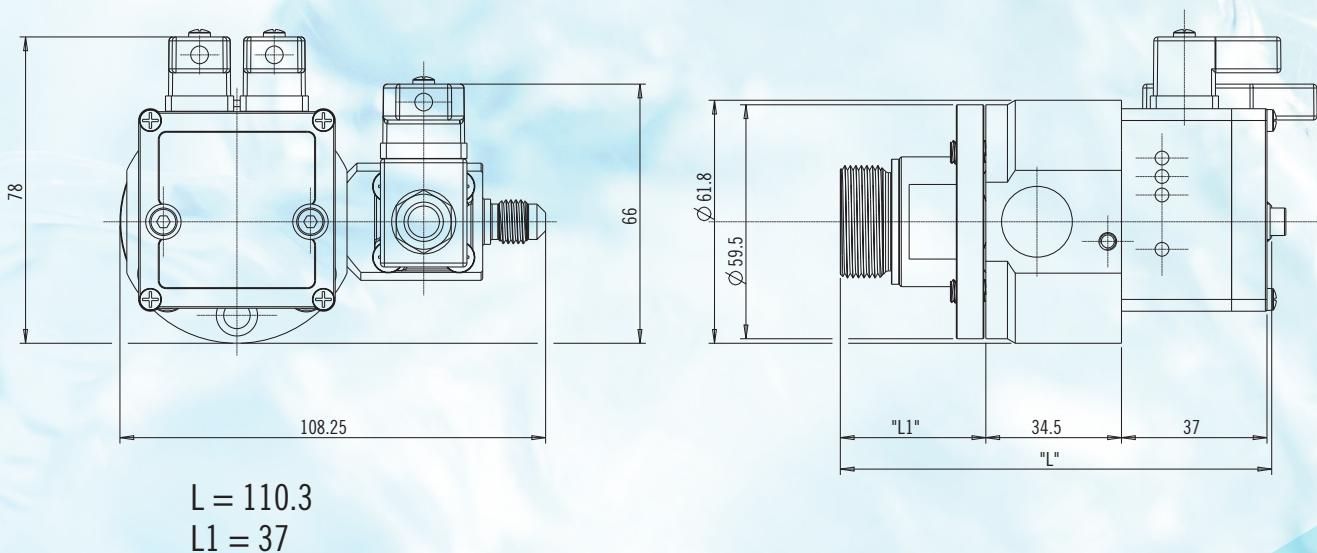
The TK4 is designed to control the oil level in the compressor crankcase in order to avoid the compressor to run without oil and so improve its lifetime. TK4 monitors the oil level with the embedded electro-optic sensor and comprises a solenoid valve for oil filling and a relay output contact to give an alarm.

HIGH PRESSURE OIL RETURN LINE SYSTEM EXAMPLE
WITH THREE COMPRESSORS PLUS ONE SATELLITE



SUPPLY VOLTAGE	24 VAC \pm 10% or 230 VAC \pm 10% depending on model
SUPPLY CURRENT	Each TK4 requires 20VA (depending on the solenoid valve)
ELECTRICAL CONNECTION	9.4mm Industry Standard Connectors / EN175301-803 Connector or spare wires
OUTPUT SIGNAL	Contact free relay output NO and NC
RELAY OUTPUTS	Up to 230VAC @2A
HOUSING MATERIAL	Nickel plated steel + fused glass PA glass fibre reinforced
ENCLOSURE PROTECTION CLASS	IP 65
MEDIA TEMPERATURE	-40°C \div +85°C
AMBIENT TEMPERATURE	-40°C \div +60°C
MAX WORKING PRESSURE	46 bar (higher pressure limits available on different TK4 models)
MOPD	26 bar (higher pressure limits available on different TK4 models)
OIL RETURN LINE	7/16 – 20 UNF male
CABLE TYPE	PVC cable CEI 20-22. Working temp.: -20 \div +70 °C (fixed laying)

Mechanical Dimensions (connectors version)



Note. - Quotes in mm -. L and L1 can vary depending on the adapter (see Adapters Addendum)

Ordering Codes

ELECTRICAL CONNECTION POWER SUPPLY	CABLE GLANDS 1 m	CONNECTORS 3 m	CONNECTORS 6 m
24 V	TK4-A50AB11-01	TK4-A50AC13-01	TK4-A50AC16-01
230 V	TK4-A50BB11-01	TK4-A50BC13-01	TK4-A50BC16-01

Program interfaces available. Suggested ordering codes not include oil strainer element. Adapters must be ordered separately.

TK3+ @46 bar Oil Level Regulator

CONNECTORS VERSION



TWO MOUNTING POSSIBILITIES WITH THE SAME PRODUCT (LEFT/RIGHT)

CABLE GLANDS VERSION



TWO MOUNTING POSSIBILITIES WITH THE SAME PRODUCT (LEFT/RIGHT)

Some advantages of this solution:

- Extremely compact dimensions
- Left/Right mounting possibility with the same TK3+
- Reduction of the number of junctions in the circuit with less possibility of having leakages
- Usage of less components (simplified circuit and easier warehouse management)
- Simplified Installation (cost savings in terms of installation time).

Main Features

- High reliability ensured by absence of mechanical moving parts.
- Sight glass and electronic LEDs can be checked on the same side where is more comfortable to do inspections.
- Well consolidated steel with fused glass technology with absence of seals ensures no leakage and good chemical compatibility.
- Direct sight glass replacement (3/4/6 holes flange connection).
- 24 VAC / 230 VAC power supply options.

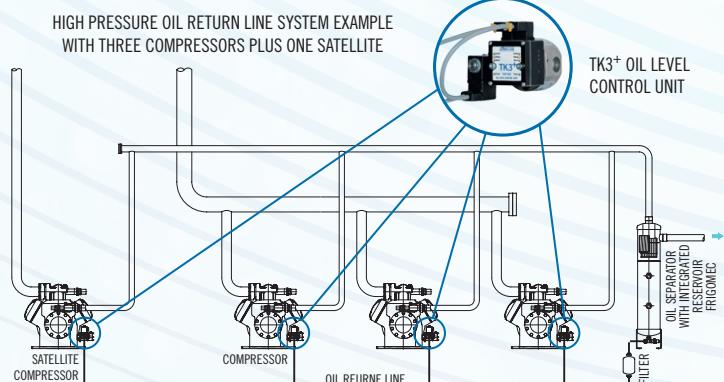


- Easy maintenance of the coil of the valve and of the Electro-Optic sensor that can be easily replaced without emptying or depressurizing the plant.
- 230 VAC /2A alarm relay output suitable for direct connection in the security chain of the system.
- Adapters suitable for various types of compressors.
- Unit conform to directives 2014/30/UE and 2014/35/UE.

Application Description

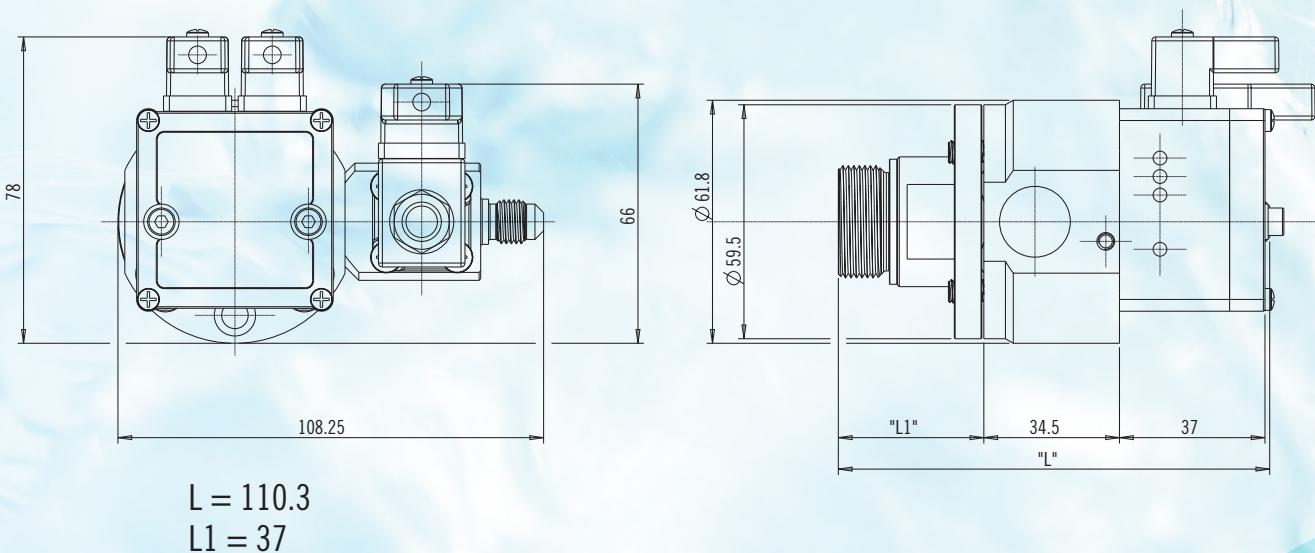
The TK3+ is designed to control the oil level in the compressor crankcase in order to avoid the compressor to run without oil and so improve its lifetime. TK3+ monitors the oil level with the embedded electro-optic sensor and comprises a solenoid valve for oil filling and a relay output contact to give an alarm.

HIGH PRESSURE OIL RETURN LINE SYSTEM EXAMPLE WITH THREE COMPRESSORS PLUS ONE SATELLITE



SUPPLY VOLTAGE	24 VAC \pm 10% or 230 VAC \pm 10% depending on model
SUPPLY CURRENT	Each TK3 ⁺ requires 20VA (depending on the solenoid valve)
ELECTRICAL CONNECTION	9.4mm Industry Standard Connectors / EN175301-803 Connector or spare wires
OUTPUT SIGNAL	Contact free relay output NO and NC
RELAY OUTPUTS	Up to 230VAC @2A
HOUSING MATERIAL	Nickel plated steel + fused glass PA glass fibre reinforced
ENCLOSURE PROTECTION CLASS	IP 65
MEDIA TEMPERATURE	-40°C÷+85°C
AMBIENT TEMPERATURE	-40°C÷+60°C
MAX WORKING PRESSURE	46 bar (higher pressure limits available on different TK3 ⁺ models)
MOPD	26 bar (higher pressure limits available on different TK3 ⁺ models)
OIL RETURN LINE	7/16 – 20 UNF male
CABLE TYPE	PVC cable CEI 20-22. Working temp.: -20 ÷ +70 °C (fixed laying)

Mechanical Dimensions (connectors version)



Note. - Quotes in mm -. L and L1 can vary depending on the adapter (see Adapters Addendum)

Ordering Codes

ELECTRICAL CONNECTION POWER SUPPLY	CABLE GLANDS 1 m	CONNECTORS 3 m	CONNECTORS 6 m
24 V	TK3P-A50AB11-01	TK3P-A50AC13-01	TK3P-A50AC16-01
230 V	TK3P-A50BB11-01	TK3P-A50BC13-01	TK3P-A50BC16-01

Suggested ordering codes not include oil strainer element. Adapters must be ordered separately.

TK4MB @80 bar Oil Level Regulator with integrated Modbus RTU connectivity

SUITABLE FOR CO₂ SYSTEMS

Some advantages of this solution:

- Modbus RTU Serial connection to system controller
- Extremely compact dimensions
- Left/Right mounting possibility with the same TK4-MB
- Reduction of the number of junctions in the circuit with less possibility of having leakages

- Usage of less components (simplified circuit and easier warehouse management)
- Simplified Installation (cost savings in terms of installation time)
- Revolutionary connectivity capabilities.

Main Features

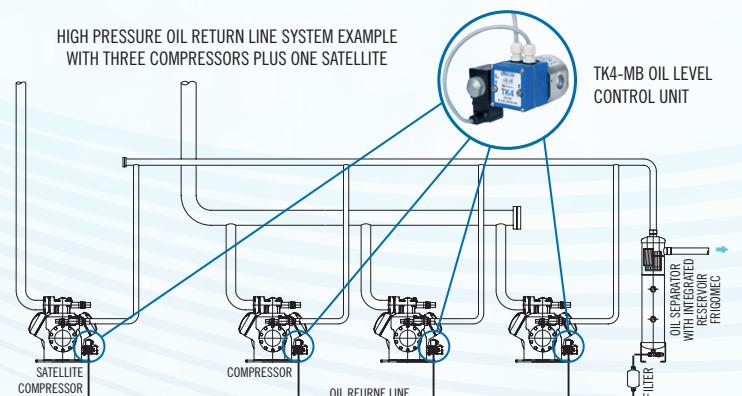
- High reliability ensured by absence of mechanical moving parts.
- Sight glass and electronic LEDs can be checked on the same side where is more comfortable to do inspections.
- Well consolidated steel with fused glass technology with absence of seals ensures no leakage and good chemical compatibility.
- Direct sight glass replacement (3/4/6 holes flange connection).
- 24 VAC / 230 VAC power supply options.

- Easy maintenance of the coil of the valve and of the Electro-Optic sensor that can be easily replaced without emptying or depressurizing the plant.
- 230 VAC /2A alarm relay output suitable for direct connection in the security chain of the system.
- Adapters suitable for various types of compressors.
- Unit conform to directives 2014/30/UE and 2014/35/UE.

Application Description

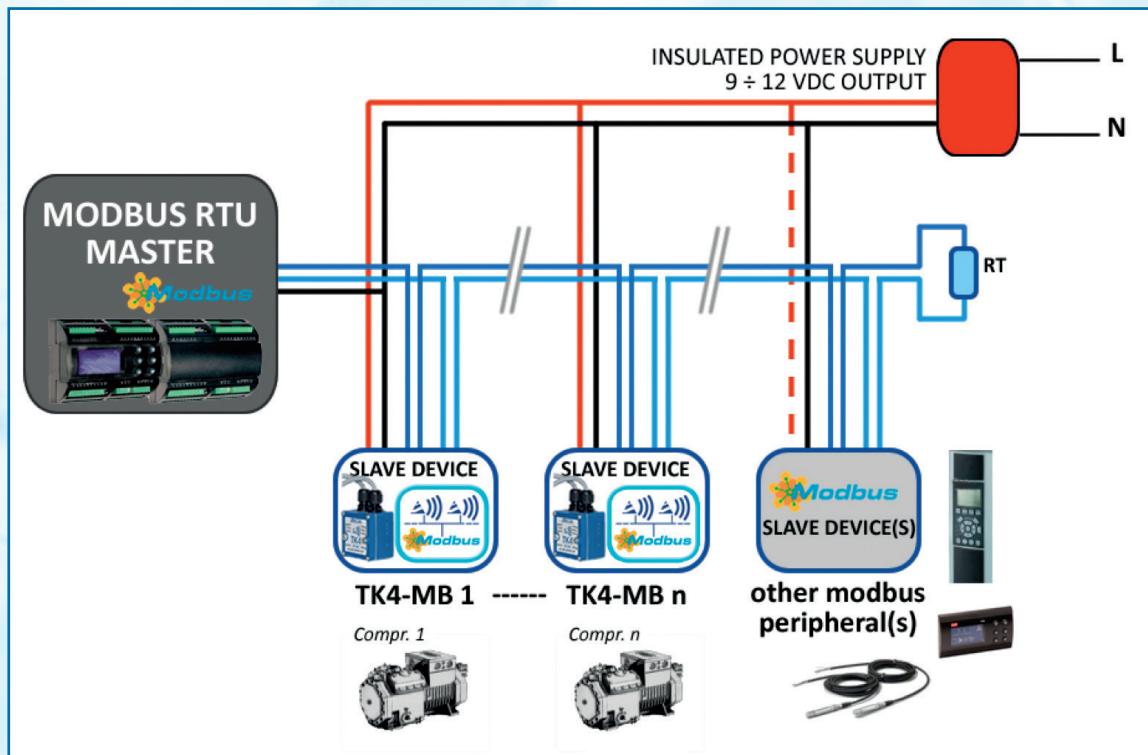
The TK4-MB is designed to control the oil level in the compressor crankcase in order to avoid the compressor to run without oil and so improve its lifetime. TK4-MB monitors the oil level with the embedded electro-optic sensor and comprises a solenoid valve for oil filling and a relay output contact to give an alarm.

HIGH PRESSURE OIL RETURN LINE SYSTEM EXAMPLE WITH THREE COMPRESSORS PLUS ONE SATELLITE



SUPPLY VOLTAGE	24 VAC \pm 10% or 230 VAC \pm 10% depending on model
SUPPLY CURRENT	Each TK4MB requires 30VA (depending on the solenoid valve)
ELECTRICAL CONNECTION	EN175301-803 Connector / Spare wires
OUTPUT SIGNAL	Contact free relay output NO and NC
RELAY OUTPUTS	Up to 230VAC @2A
HOUSING MATERIAL	Nickel plated steel + fused glass PA glass fibre reinforced
ENCLOSURE PROTECTION CLASS	IP 65
MEDIA TEMPERATURE	-40°C÷+85°C
AMBIENT TEMPERATURE	-40°C÷+60°C
MAX WORKING PRESSURE	80 bar (higher pressure limits available on different TK4-MB models)
MOPD	60 bar (higher pressure limits available on different TK4-MB models)
OIL RETURN LINE	7/16 – 20 UNF male
CABLE TYPE	PVC cable CEI 20-22. Working temp.: -20 ÷ +70 °C (fixed laying)

Modbus RTU typical application



Ordering Codes

ELECTRICAL CONNECTION		CABLE GLANDS
POWER SUPPLY		3 m
24 V	TK4MB-C60AA13-02	
230 V	TK4MB-C60BA13-02	

Program interfaces available. Suggested ordering codes
not include oil strainer element. Adapters must be
ordered separately.

TK4 @80 bar

SUITABLE FOR CO₂ SYSTEMS

Oil Level Regulator with integrated connectivity capabilities



CONNECTORS VERSION



TWO MOUNTING POSSIBILITIES WITH THE SAME PRODUCT (LEFT/RIGHT)

CABLE GLANDS VERSION



TWO MOUNTING POSSIBILITIES WITH THE SAME PRODUCT (LEFT/RIGHT)

Some advantages of this solution:

- Extremely compact dimensions
- Left/Right mounting possibility with the same TK4
- Reduction of the number of junctions in the circuit with less possibility of having leakages
- Usage of less components (simplified circuit and easier warehouse management)
- Simplified Installation (cost savings in terms of installation time)
- Revolutionary connectivity capabilities.



Main Features

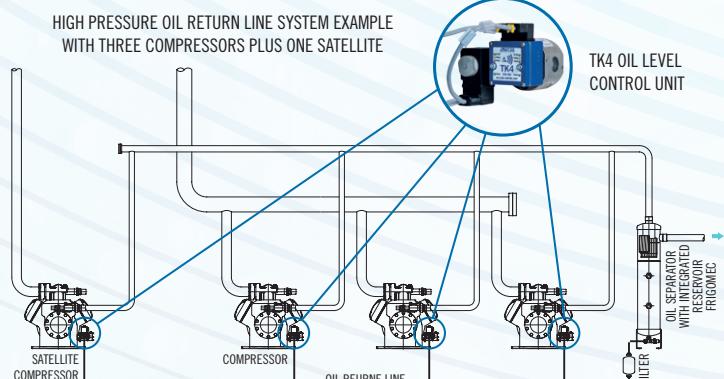
- High reliability ensured by absence of mechanical moving parts.
- Sight glass and electronic LEDs can be checked on the same side where is more comfortable to do inspections.
- Well consolidated steel with fused glass technology with absence of seals ensures no leakage and good chemical compatibility.
- Direct sight glass replacement (3/4/6 holes flange connection).
- 24 VAC / 230 VAC power supply options.

- Easy maintenance of the coil of the valve and of the Electro-Optic sensor that can be easily replaced without emptying or depressurizing the plant.
- 230 VAC /2A alarm relay output suitable for direct connection in the security chain of the system.
- Adapters suitable for various types of compressors.
- Unit conform to directives 2014/30/UE and 2014/35/UE.

Application Description

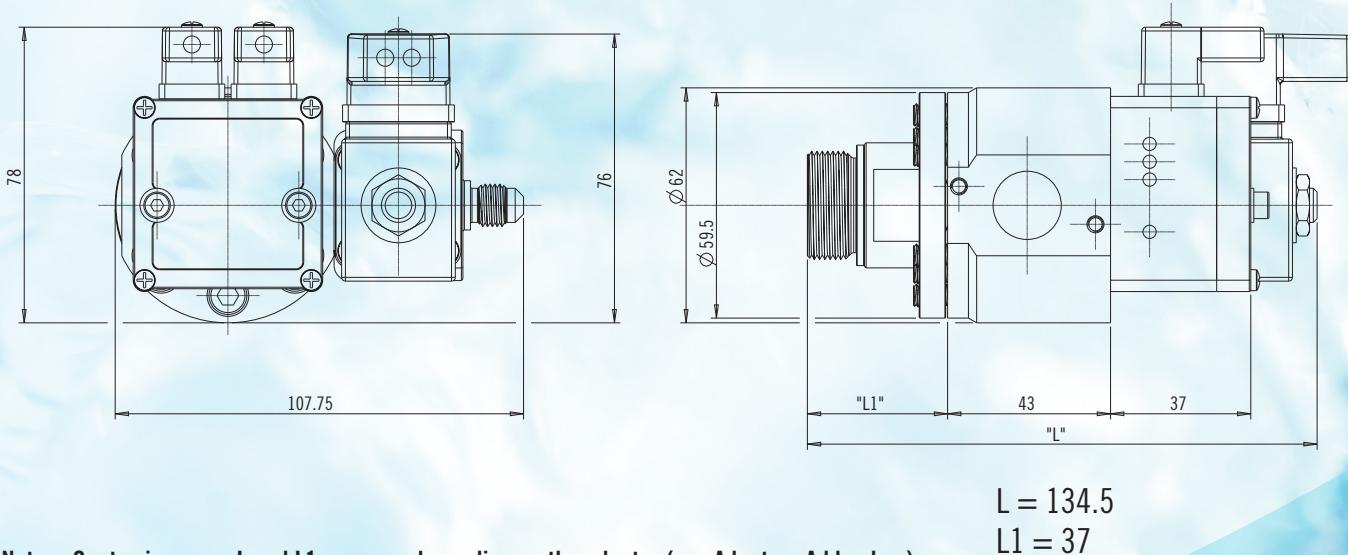
The TK4 is designed to control the oil level in the compressor crankcase in order to avoid the compressor to run without oil and so improve its lifetime. TK4 monitors the oil level with the embedded electro-optic sensor and comprises a solenoid valve for oil filling and a relay output contact to give an alarm.

HIGH PRESSURE OIL RETURN LINE SYSTEM EXAMPLE WITH THREE COMPRESSORS PLUS ONE SATELLITE



SUPPLY VOLTAGE	24 VAC \pm 10% or 230 VAC \pm 10% depending on model
SUPPLY CURRENT	Each TK4 requires 30VA (depending on the solenoid valve)
ELECTRICAL CONNECTION	9.4mm Industry Standard Connectors / EN175301-803 Connector or spare wires
OUTPUT SIGNAL	Contact free relay output NO and NC
RELAY OUTPUTS	Up to 230VAC @2A
HOUSING MATERIAL	Nickel plated steel + fused glass PA glass fibre reinforced
ENCLOSURE PROTECTION CLASS	IP 65
MEDIA TEMPERATURE	-40°C \div +85°C
AMBIENT TEMPERATURE	-40°C \div +60°C
MAX WORKING PRESSURE	80 bar (higher pressure limits available on different TK4 models)
MOPD	60 bar (higher pressure limits available on different TK4 models)
OIL RETURN LINE	7/16 – 20 UNF male
CABLE TYPE	PVC cable CEI 20-22. Working temp.: -20 \div +70 °C (fixed laying)

Mechanical Dimensions (connectors version)



Note. - Quotes in mm -. L and L1 can vary depending on the adapter (see Adapters Addendum)

$$\begin{aligned}L &= 134.5 \\L1 &= 37\end{aligned}$$

Ordering Codes

ELECTRICAL CONNECTION POWER SUPPLY	CABLE GLANDS 1 m	CONNECTORS 3 m	CONNECTORS 6 m
24 V	TK4-C60AA11-02	TK4-C60AC13-02	TK4-C60AC16-02
230 V	TK4-C60BA11-02	TK4-C60BC13-02	TK4-C60BC16-02

Program interfaces available. Suggested ordering codes not include oil strainer element. Adapters must be ordered separately.

TK3+ @80 bar Oil Level Regulator

SUITABLE FOR CO₂ SYSTEMS

CONNECTORS VERSION



TWO MOUNTING POSSIBILITIES WITH THE SAME PRODUCT (LEFT/RIGHT)

CABLE GLANDS VERSION



TWO MOUNTING POSSIBILITIES WITH THE SAME PRODUCT (LEFT/RIGHT)

Some advantages of this solution:

- Extremely compact dimensions
- Left/Right mounting possibility with the same TK3+
- Reduction of the number of junctions in the circuit with less possibility of having leakages
- Usage of less components (simplified circuit and easier warehouse management)
- Simplified Installation (cost savings in terms of installation time).

Main Features

- High reliability ensured by absence of mechanical moving parts.
- Sight glass and electronic LEDs can be checked on the same side where is more comfortable to do inspections.
- Well consolidated steel with fused glass technology with absence of seals ensures no leakage and good chemical compatibility.
- Direct sight glass replacement (3/4/6 holes flange connection).
- 24 VAC / 230 VAC power supply options.

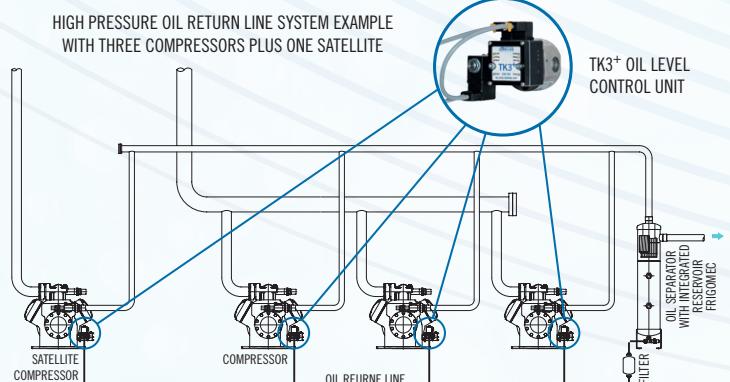


- Easy maintenance of the coil of the valve and of the Electro-Optic sensor that can be easily replaced without emptying or depressurizing the plant.
- 230 VAC /2A alarm relay output suitable for direct connection in the security chain of the system.
- Adapters suitable for various types of compressors.
- Unit conform to directives 2014/30/UE and 2014/35/UE.

Application Description

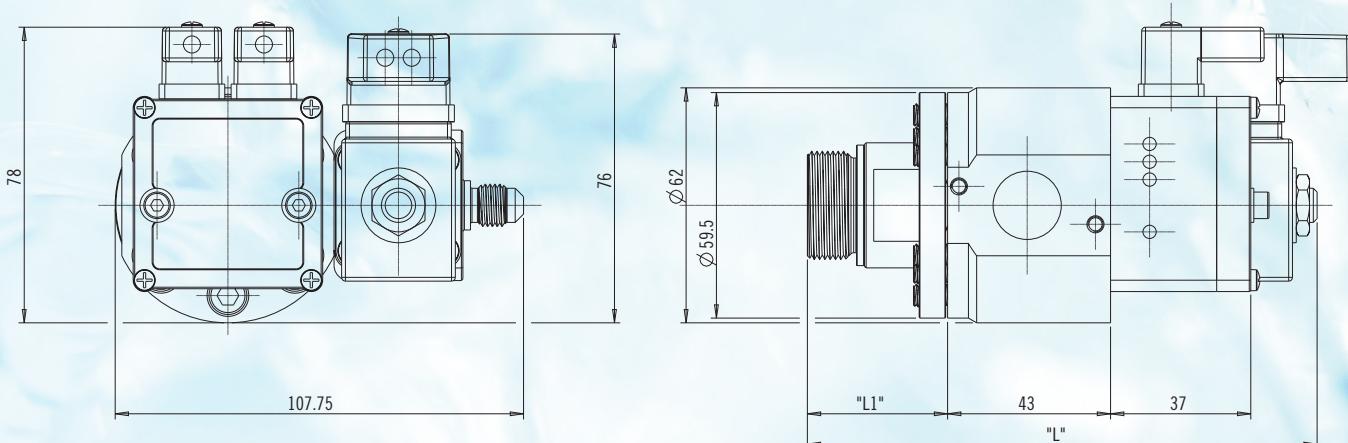
The TK3+ is designed to control the oil level in the compressor crankcase in order to avoid the compressor to run without oil and so improve its lifetime. TK3+ monitors the oil level with the embedded electro-optic sensor and comprises a solenoid valve for oil filling and a relay output contact to give an alarm.

HIGH PRESSURE OIL RETURN LINE SYSTEM EXAMPLE WITH THREE COMPRESSORS PLUS ONE SATELLITE



SUPPLY VOLTAGE	24 VAC \pm 10% or 230 VAC \pm 10% depending on model
SUPPLY CURRENT	Each TK3 ⁺ requires 30VA (depending on the solenoid valve)
ELECTRICAL CONNECTION	9.4mm Industry Standard Connectors / EN175301-803 Connector or spare wires
OUTPUT SIGNAL	Contact free relay output NO and NC
RELAY OUTPUTS	Up to 230VAC @2A
HOUSING MATERIAL	Nickel plated steel + fused glass PA glass fibre reinforced
ENCLOSURE PROTECTION CLASS	IP 65
MEDIA TEMPERATURE	-40°C÷+85°C
AMBIENT TEMPERATURE	-40°C÷+60°C
MAX WORKING PRESSURE	80 bar (higher pressure limits available on different TK3 ⁺ models)
MOPD	60 bar (higher pressure limits available on different TK3 ⁺ models)
OIL RETURN LINE	7/16 – 20 UNF male
CABLE TYPE	PVC cable CEI 20-22. Working temp.: -20 ÷ +70 °C (fixed laying)

Mechanical Dimensions (connectors version)



Note. - Quotes in mm -. L and L1 can vary depending on the adapter (see Adapters Addendum)

L = 134.5
L1 = 37

Ordering Codes

ELECTRICAL CONNECTION POWER SUPPLY	CABLE GLANDS 1 m	CONNECTORS 3 m	CONNECTORS 6 m
24 V	TK3P-C60AA11-02	TK3P-C60AC13-02	TK3P-C60AC16-02
230 V	TK3P-C60BA11-02	TK3P-C60BC13-02	TK3P-C60BC16-02

Suggested ordering codes not include oil strainer element. Adapters must be ordered separately.

TK4MB @130 bar

Oil Level Regulator with integrated Modbus RTU connectivity

SUITABLE FOR CO₂ SYSTEMS

Some advantages of this solution:

- Modbus RTU Serial connection to system controller
- Extremely compact dimensions
- Left/Right mounting possibility with the same TK4-MB
- Reduction of the number of junctions in the circuit with less possibility of having leakages

- Usage of less components (simplified circuit and easier warehouse management)
- Simplified Installation (cost savings in terms of installation time)
- Revolutionary connectivity capabilities.

Main Features

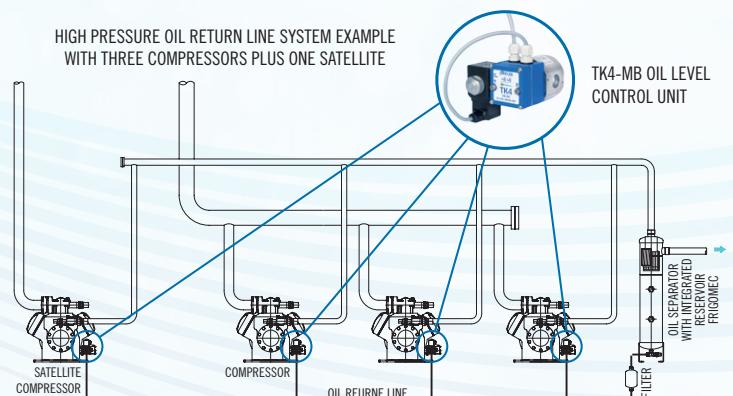
- **High reliability** ensured by absence of mechanical moving parts.
- **Sight glass and electronic LEDs** can be checked **on the same side** where is **more comfortable** to do **inspections**.
- Well consolidated steel with fused glass technology with absence of seals ensures **no leakage** and **good chemical compatibility**.
- **Direct sight glass replacement** (3/4/6 holes flange connection).
- 24 VAC / 230 VAC power supply options.

- **Easy maintenance of the coil** of the valve and of the **Electro-Optic sensor** that can be easily replaced **without emptying or depressurizing the plant**.
- 230 VAC /2A alarm relay output suitable for **direct connection** in the security chain of the system.
- **Adapters** suitable for various types of compressors.
- **Unit conform to directives 2014/30/UE and 2014/35/UE.**

Application Description

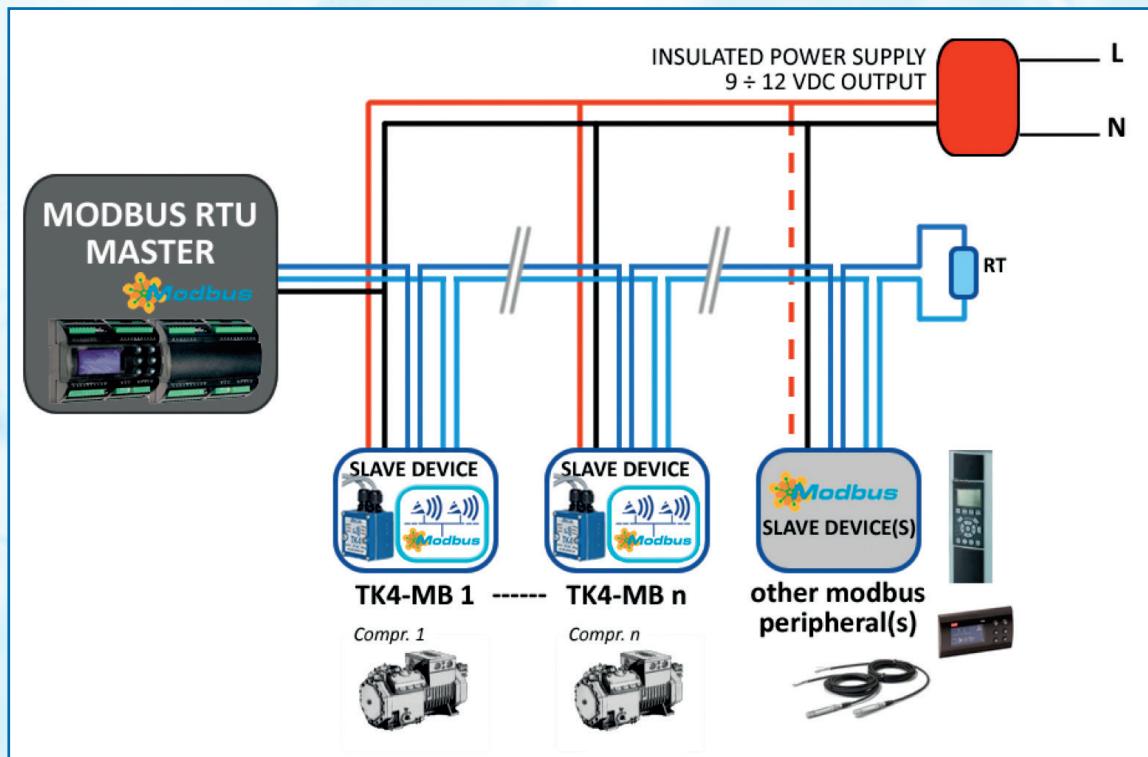
The TK4-MB is designed to control the oil level in the compressor crankcase in order to avoid the compressor to run without oil and so improve its lifetime. TK4-MB monitors the oil level with the embedded electro-optic sensor and comprises a solenoid valve for oil filling and a relay output contact to give an alarm.

HIGH PRESSURE OIL RETURN LINE SYSTEM EXAMPLE WITH THREE COMPRESSORS PLUS ONE SATELLITE



SUPPLY VOLTAGE	24 VAC \pm 10% or 230 VAC \pm 10% depending on model
SUPPLY CURRENT	Each TK4MB requires 30VA (depending on the solenoid valve)
ELECTRICAL CONNECTION	EN175301-803 Connector / Spare wires
OUTPUT SIGNAL	Contact free relay output NO and NC
RELAY OUTPUTS	Up to 230VAC @2A
HOUSING MATERIAL	Nickel plated steel + fused glass PA glass fibre reinforced
ENCLOSURE PROTECTION CLASS	IP 65
MEDIA TEMPERATURE	-40°C÷+85°C
AMBIENT TEMPERATURE	-40°C÷+60°C
MAX WORKING PRESSURE	130 bar (higher pressure limits available on different TK4-MB models)
MOPD	100 bar (higher pressure limits available on different TK4-MB models)
OIL RETURN LINE	7/16 – 20 UNF male
CABLE TYPE	PVC cable CEI 20-22. Working temp.: -20 ÷ +70 °C (fixed laying)

Modbus RTU typical application

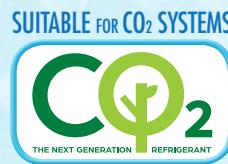


Ordering Codes

ELECTRICAL CONNECTION		CABLE GLANDS
POWER SUPPLY		3 m
24 V	TK4MB-F60AA13-03	
230 V	TK4MB-F60BA13-03	

Program interfaces available. Suggested ordering codes
not include oil strainer element. Adapters must be
ordered separately.

TK4 @130 bar Oil Level Regulator with integrated connectivity capabilities



CONNECTORS VERSION



TWO MOUNTING POSSIBILITIES WITH THE SAME PRODUCT (LEFT/RIGHT)

CABLE GLANDS VERSION



TWO MOUNTING POSSIBILITIES WITH THE SAME PRODUCT (LEFT/RIGHT)

Some advantages of this solution:

- Extremely compact dimensions
- Left/Right mounting possibility with the same TK4
- Reduction of the number of junctions in the circuit with less possibility of having leakages
- Usage of less components (simplified circuit and easier warehouse management)
- Simplified Installation (cost savings in terms of installation time)
- Revolutionary connectivity capabilities.

Main Features

- High reliability ensured by absence of mechanical moving parts.
- Sight glass and electronic LEDs can be checked on the same side where is more comfortable to do inspections.
- Well consolidated steel with fused glass technology with absence of seals ensures no leakage and good chemical compatibility.
- Direct sight glass replacement (3/4/6 holes flange connection).
- 24 VAC / 230 VAC power supply options.

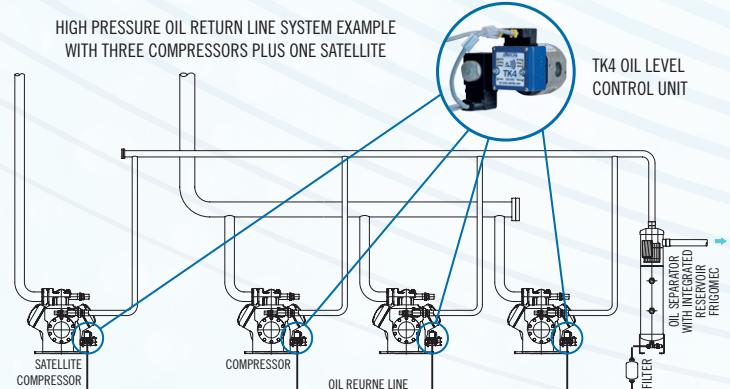


- Easy maintenance of the coil of the valve and of the Electro-Optic sensor that can be easily replaced without emptying or depressurizing the plant.
- 230 VAC /2A alarm relay output suitable for direct connection in the security chain of the system.
- Adapters suitable for various types of compressors.
- Unit conform to directives 2014/30/UE and 2014/35/UE.

Application Description

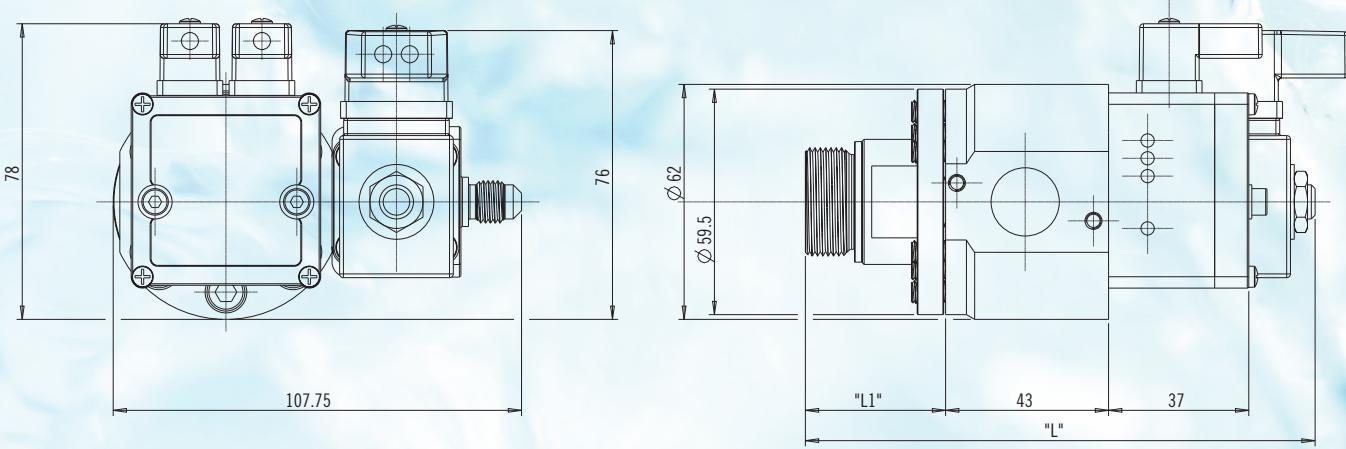
The TK4 is designed to control the oil level in the compressor crankcase in order to avoid the compressor to run without oil and so improve its lifetime. TK4 monitors the oil level with the embedded electro-optic sensor and comprises a solenoid valve for oil filling and a relay output contact to give an alarm.

HIGH PRESSURE OIL RETURN LINE SYSTEM EXAMPLE WITH THREE COMPRESSORS PLUS ONE SATELLITE



SUPPLY VOLTAGE	24 VAC \pm 10% or 230 VAC \pm 10% depending on model
SUPPLY CURRENT	Each TK4 requires 30VA (depending on the solenoid valve)
ELECTRICAL CONNECTION	9.4mm Industry Standard Connectors / EN175301-803 Connector or spare wires
OUTPUT SIGNAL	Contact free relay output NO and NC
RELAY OUTPUTS	Up to 230VAC @2A
HOUSING MATERIAL	Nickel plated steel + fused glass PA glass fibre reinforced
ENCLOSURE PROTECTION CLASS	IP 65
MEDIA TEMPERATURE	-40°C \div +85°C
AMBIENT TEMPERATURE	-40°C \div +60°C
MAX WORKING PRESSURE	130 bar (higher pressure limits available on different TK4 models)
MOPD	100 bar (higher pressure limits available on different TK4 models)
OIL RETURN LINE	7/16 – 20 UNF male
CABLE TYPE	PVC cable CEI 20-22. Working temp.: -20 \div +70 °C (fixed laying)

Mechanical Dimensions (connectors version)



Note. - Quotes in mm -. L and L1 can vary depending on the adapter (see Adapters Addendum)

L = 134.5
L1 = 37

Ordering Codes

ELECTRICAL CONNECTION POWER SUPPLY	CABLE GLANDS 1 m	CONNECTORS 3 m	CONNECTORS 6 m
24 V	TK4-F60AA11-03	TK4-F60AC13-03	TK4-F60AC16-03
230 V	TK4-F60BA11-03	TK4-F60BC13-03	TK4-F60BC16-03

Program interfaces available. Suggested ordering codes not include oil strainer element. Adapters must be ordered separately.

TK3+ @130 bar Oil Level Regulator

SUITABLE FOR CO₂ SYSTEMS

CONNECTORS VERSION



TWO MOUNTING POSSIBILITIES WITH THE SAME PRODUCT (LEFT/RIGHT)

CABLE GLANDS VERSION



TWO MOUNTING POSSIBILITIES WITH THE SAME PRODUCT (LEFT/RIGHT)

Some advantages of this solution:

- Extremely compact dimensions
- Left/Right mounting possibility with the same TK3+
- Reduction of the number of junctions in the circuit with less possibility of having leakages
- Usage of less components (simplified circuit and easier warehouse management)
- Simplified Installation (cost savings in terms of installation time).



Main Features

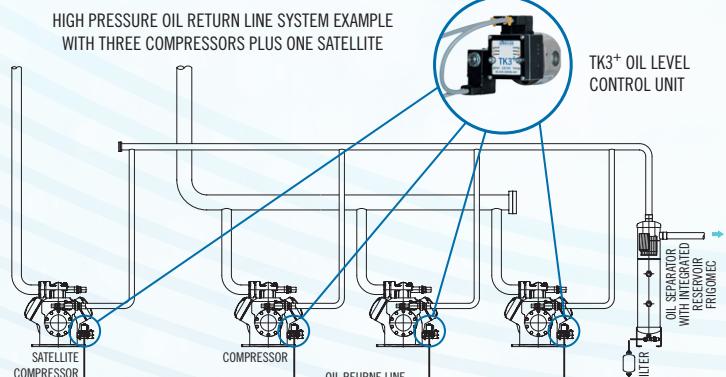
- High reliability ensured by absence of mechanical moving parts.
- Sight glass and electronic LEDs can be checked on the same side where is more comfortable to do inspections.
- Well consolidated steel with fused glass technology with absence of seals ensures no leakage and good chemical compatibility.
- Direct sight glass replacement (3/4/6 holes flange connection).
- 24 VAC / 230 VAC power supply options.

- Easy maintenance of the coil of the valve and of the Electro-Optic sensor that can be easily replaced without emptying or depressurizing the plant.
- 230 VAC /2A alarm relay output suitable for direct connection in the security chain of the system.
- Adapters suitable for various types of compressors.
- Unit conform to directives 2014/30/UE and 2014/35/UE.

Application Description

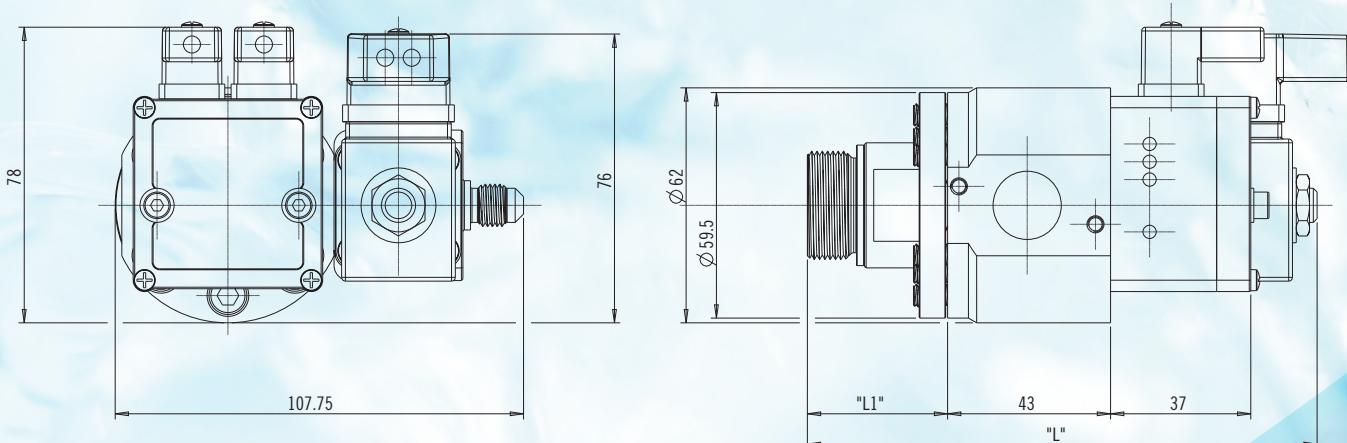
The TK3+ is designed to control the oil level in the compressor crankcase in order to avoid the compressor to run without oil and so improve its lifetime. TK3+ monitors the oil level with the embedded electro-optic sensor and comprises a solenoid valve for oil filling and a relay output contact to give an alarm.

HIGH PRESSURE OIL RETURN LINE SYSTEM EXAMPLE WITH THREE COMPRESSORS PLUS ONE SATELLITE



SUPPLY VOLTAGE	24 VAC \pm 10% or 230 VAC \pm 10% depending on model
SUPPLY CURRENT	Each TK3+ requires 30VA (depending on the solenoid valve)
ELECTRICAL CONNECTION	9.4mm Industry Standard Connectors / EN175301-803 Connector or spare wires
OUTPUT SIGNAL	Contact free relay output NO and NC
RELAY OUTPUTS	Up to 230VAC @2A
HOUSING MATERIAL	Nickel plated steel + fused glass PA glass fibre reinforced
ENCLOSURE PROTECTION CLASS	IP 65
MEDIA TEMPERATURE	-40°C \div +85°C
AMBIENT TEMPERATURE	-40°C \div +60°C
MAX WORKING PRESSURE	130 bar (higher pressure limits available on different TK3+ models)
MOPD	100 bar (higher pressure limits available on different TK3+ models)
OIL RETURN LINE	7/16 – 20 UNF male
CABLE TYPE	PVC cable CEI 20-22. Working temp.: -20 \div +70 °C (fixed laying)

Mechanical Dimensions (connectors version)



Note. - Quotes in mm -. L and L1 can vary depending on the adapter (see Adapters Addendum)

L = 134.5
L1 = 37

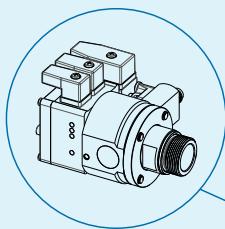
Ordering Codes

ELECTRICAL CONNECTION POWER SUPPLY	CABLE GLANDS 1 m	CONNECTORS 3 m	CONNECTORS 6 m
24 V	TK3P-F60AA11-03	TK3P-F60AC13-03	TK3P-F60AC16-03
230 V	TK3P-F60BA11-03	TK3P-F60BC13-03	TK3P-F60BC16-03

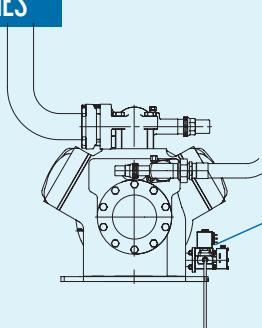
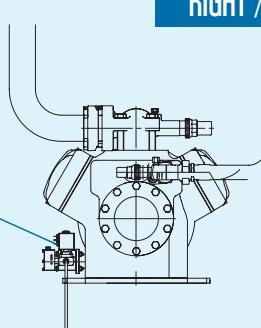
Suggested ordering codes not include oil strainer element. Adapters must be ordered separately.

Adapters Addendum

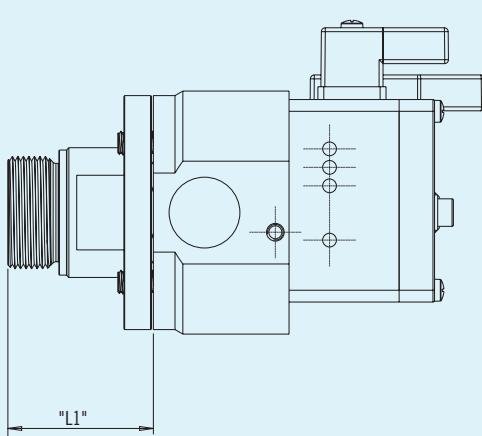
RIGHT / LEFT MOUNTING POSSIBILITIES



TK3 Right Model Mounting Example



TK3 Left Model Mounting Example



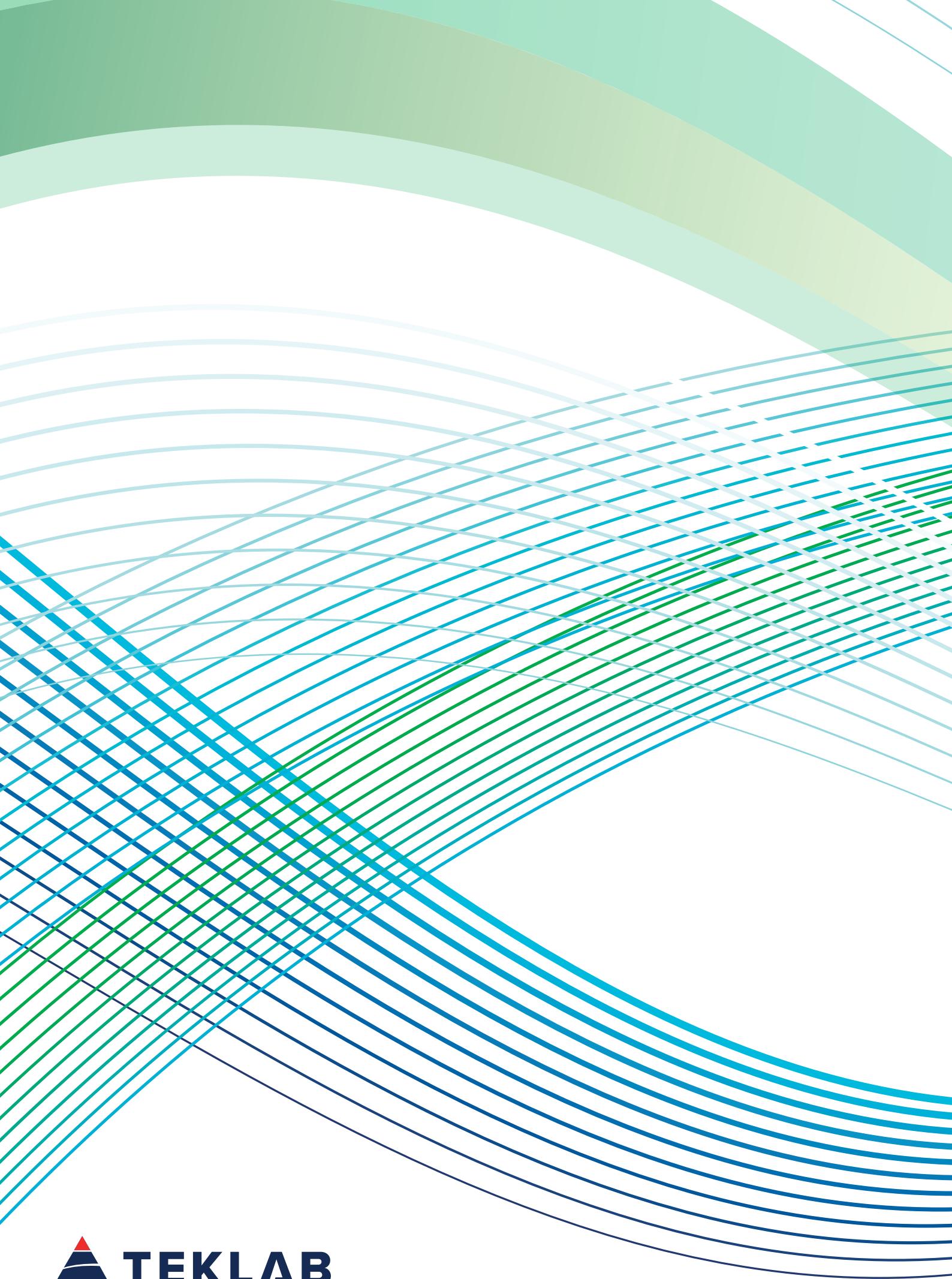
MEASURES

ADAPTER	"L1"
No adapter (Direct Mounting)	-
1-1/8" - 18 UNEF	34
3/4" NPT	34
3/4/6 holes (50 MM)	50
1"GAS	43
RLK 1" 3/4 - 12 UNF	53,4
M36 X 1,5	45
3/4/6 holes (22 MM)	22
RLK 1" 1/4 - 12 UNF	41,4

Selection Table (some examples based on compressor brand/model)

COMPRESSOR FAMILY / MODE	SELECTION
ARCTIC CIRCLE	G2; G4; G6 0 or 3
BITZER	4G; 4H; 4J; 4NC; 4NHC-20K; 4PC; 4PHC-15K; 4TC; 4THC-12K; 4VC; 4VHC-10K; 4VNC; 4Z; 6F; 6G; 6H; 6J; 8FC; 8GC; S4; S6; 0 or 3
	2CHC-4K; 2DC; 2DHC-3K; 2EC; 2EHC-3K; 2FC; 2FHC-3K; 2GC; 2GHC-2K; 2HC; 2HHC-2K; 2JC; 2JHC-07K; 2KC; 2KHC-05K; 4CC; 4CHC-9K; 4DC; 4DHC-7K; 4EC; 4EHC-6K; 4FC; 4FHC-5K; 4KTC-10K 1
	ZL; ZM 2
	HA 4; HA 5; HA6; HG 4; HG 5; HG 6; HG 7; HG 8; HGX4/310-4; HGX4/385-4; HGX4/464-4; HGX4/555-4 0 or 3
BOCK	HA12; HA22; HA34; HG12 ;HG22; HG34; HGX12P/40-4; HGX12P/50-4; HGX12P/60-4; HGX12P/75-4; HGX22P/110-4; HGX22P/125-4; HGX22P/160-4; HGX22P/190-4; HGX34P/215-4; HGX34P/555-4 1
CARRIER	EA; ER; 0 or 3
COPELAND	4CC; 6CC; D2; D3; D4; D6.H; D6.S; D9; DM 0 or 3
	ZF; ZS 2
DORIN	K Series (except the listed for adapter 1); SCC500 B; SCC750 B; SCC1500 B; SCC1900 B; SCC2000 B; SCC2500 B; SCS340 D; SCS351 D; SCS362 D; SCS373 D; SCS385 D; SCS3K8 D; H Series(except the listed for adapter 1) 0 or 3
	H1; K100CC; K100CS; K150CC; K150CS; K180CC; K180CS; K200CC; K230CS; K235CC; K240SB; K400CC; K50CS; K75CC; K75CS; SCC250 B; SCC300 B ; SCC350 B; SCC380 B 1
FRASCOLD	A; A-SK; B; D; D-SK; F; F-SK; Q-SK; S; S-SK; V; W; Z 0 or 3
PRESTCOLD	P2; P3; P4; P6; P8; P9 0 or 3
L'UNITÉ HERMÉTIQUE	TAG; TAH 1
MANEUROPE	LT; MT; SM; SZ; 1

TK3 SELECTION	ADAPTER	CODE	
0	No Adapter (Direct mounting)		
1	1-1/8" - 18 UNEF	TKX-A001	
2	3/4" NPT	TKX-A002	
3	3/4/6 holes flange (also as a spacer 50 mm)	TKX-A003	
4	1" GAS	TKX-A004	
5	Rotalock 1" 3/4 - 12 UNF	TKX-A005	
6	M36 x 1,5	TKX-A006	
7	3/4/6 holes flange (also as a spacer 22 mm)	TKX-A0070	
8	Rotalock 1" 1/4 - 12 UNF	TKX-A008	
9	Direct injection for 26 bar MOPD model	TKX-ADI2	
10	Direct injection for other models	TKX-ADI3	





LEVEL SWITCHES

Level Control Unit TK1+

SUITABLE FOR CO₂ SYSTEMS

Main Features

- The absence of mechanical moving parts ensures **High reliability**
- **24VAC / 230VAC power supply options**
- **Easy installation (sight-glass replacement)**
- Well consolidated steel with fused glass technology ensures **no leakage** and good chemical compatibility
- Electronic sensor **can be easily replaced** without emptying and/or depressurizing the plant due to the two parts design
- **Direct mounting possibility** / adapters suitable for various types of compressors
- **Customizable delays** on request
- Unit conform to directives 2014/30/UE and 2014/35/UE.

Application Description

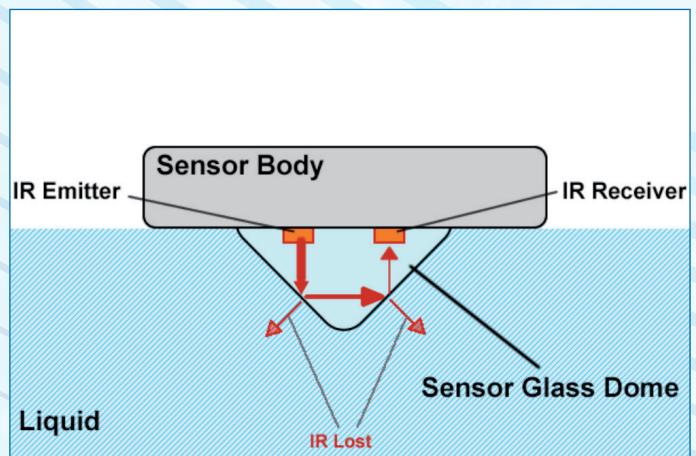
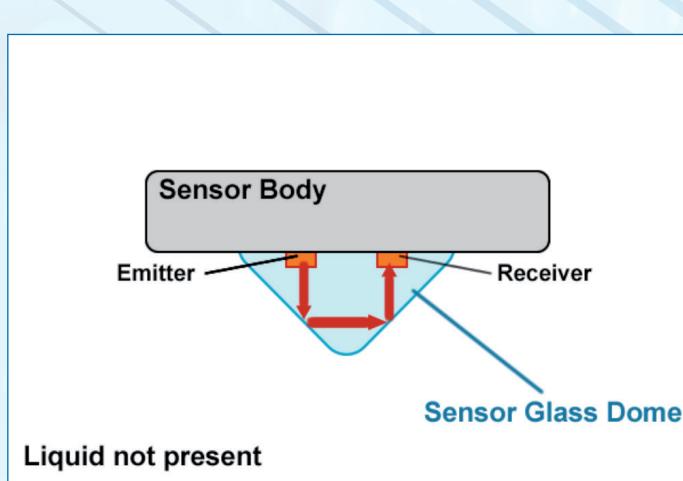
TK1+ series is especially designed for use in level monitoring for HVAC&R market.

TK1+ can be mounted directly on the crankcase of the compressor, on the oil reservoir, oil separator or liquid receiver.

This product is very reliable and suitable for working in heavy environments.

LEDs integrated in the electronic module allow to verify the liquid status.

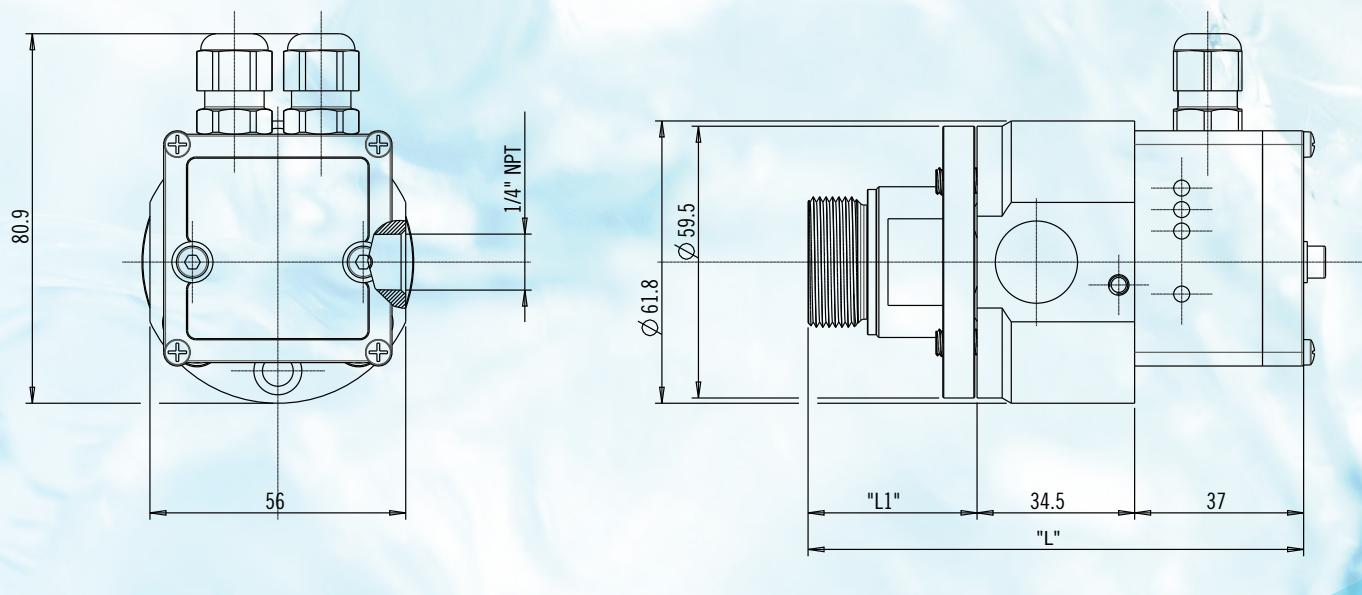
The two parts design allows the fast replacement of the electronic parts without depressurizing the system.



The electronic module of the TK1+ contains an infrared-ray emitter and an optical receiver. In air (liquid not present), all the light emitted is reflected – internally – by the dome and then redirected to the receiver. When the liquid reaches the sensor dome, a big amount of the light emitted is lost in the liquid and the sensor senses its presence.

SUPPLY VOLTAGE	24 VAC \pm 10% or 230VAC \pm 10% depending on model
SUPPLY CURRENT	Each TK1 Electronic module requires 10VA.
ELECTRICAL CONNECTION	Cable wiring or connectors with molded cables depending on model
OUTPUT SIGNAL	Contact free relay output NO and NC
RELAY OUTPUTS	Up to 230VAC @2A
HOUSING MATERIAL	Nickel plated steel + fused glass PA glass fibre reinforced
ENCLOSURE PROTECTION CLASS	IP 65
MEDIA TEMPERATURE	-40°C \div +85°C
AMBIENT TEMPERATURE	-40°C \div +60°C
MAX WORKING PRESSURE	46 bar or 100 bar depending on model
OIL RETURN LINE	1/4" NPT female connection
CABLE TYPE	PVC cable CEI 20-22. Working temp.: -20 \div +70 °C (fixed laying)

Mechanical Dimensions



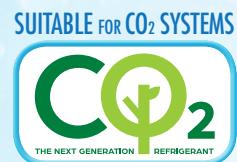
$$\begin{aligned} L &= 101.5 \\ L_1 &= 37 \end{aligned}$$

Note. - Quotes in mm -. L and L1 can vary depending on the adapter (see Adapters Addendum)

Ordering Codes

ELECTRICAL CONNECTION POWER SUPPLY	CABLE GLANDS	
	1 m	3 m
24 V	TK1P-KIT-0150-03	TK1P-KIT-0130-03
230 V	TK1P-KIT-01E0-03	TK1P-KIT-01C0-03

Optical Level Control Unit LC-XT / LC-XP



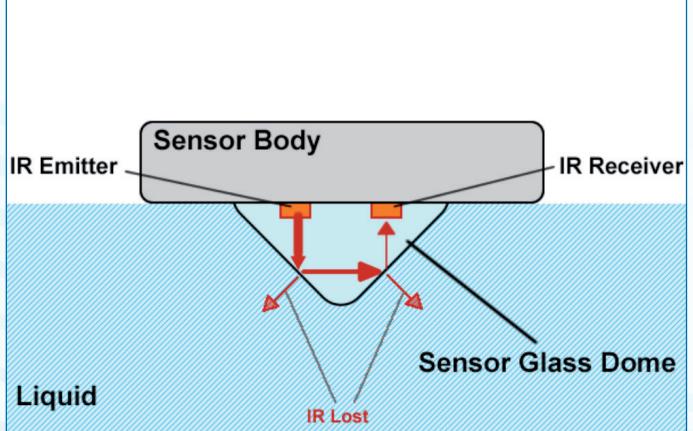
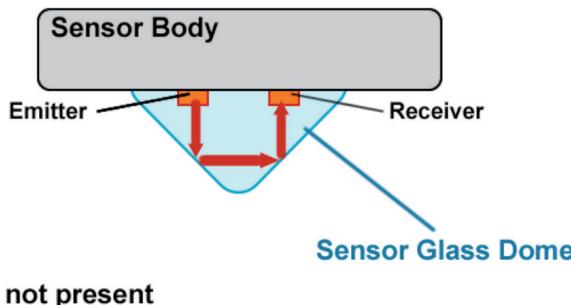
Main Features

- The absence of mechanical moving parts ensures **High reliability**
- Well consolidated steel with fused glass technology ensures **no leakage** and good chemical compatibility
- Electronic sensor **can be easily replaced** without emptying and/or depressurizing the plant due to the two parts design
- **No need for calibrations on the field**
- **Direct mounting** onto various types of compressors (M20x1.5 or 1"1/8 – 18 UNEF adapter) and tanks (1/2"NPT adapter), etc...
- **Customizable delays** on request
- Unit conform to directives 2014/30/UE and 2014/35/UE.

Application Description

The optical level switch has been designed for use in level monitoring applications for the control of low viscosity liquids. It comprises an optical sensor and an output switch. It is realized in two parts to let it possible to replace the electronics without the needing of emptying or depressurizing the plant. The sensor is suitable as minimum or maximum alarm. Delays can be introduced in order to satisfy particular needing or avoid false alarms.

Operating Principle



The sensor contains an infrared-ray emitter and an optical receiver. In air (liquid not present), all the light emitted is reflected – internally – by the dome and then redirected to the receiver. When the liquid reaches the sensor dome, a big amount of the light emitted is lost in the liquid and the sensor senses its presence.

SUPPLY VOLTAGE ($\pm 10\%$)	230VAC@50Hz / 115VAC@60Hz / 24 VAC@50/60Hz / 24VDC depending on selected model
ELECTRONIC PROTECTIONS	Transient over voltage protection
ELECTRICAL CONNECTION	EN 175301-803A connector (EX DIN 43650 size A)
OUTPUT SIGNAL	Solid state output Normally Open or Normally Closed in air.
SUPPLY CURRENT	20mA max. during normal operation
OUTPUT MAX. CURRENT	Up to 100 mA
HOUSING MATERIAL	Stainless steel / Nickel plated steel
ENCLOSURE PROTECTION CLASS	IP 65
WORKING TEMPERATURE RANGE	-40°C ÷ +125°C
MAX PRESSURE	46 bar (LC-XT model) 120 bar (LC-XP model)
TORQUE TIGHTEN	50 Nm for adapter installation on the system. Hand Screw with strength the sensor to the adapter

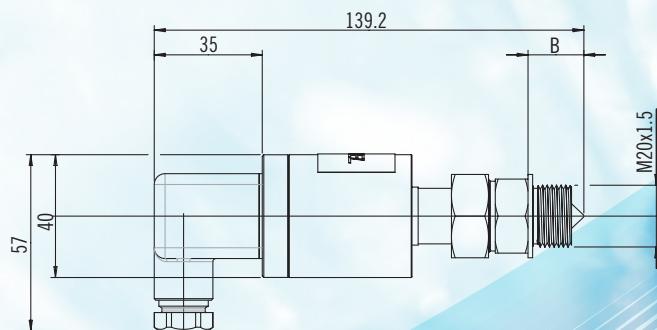
Ordering Codes

Power supply/ Adapters	24VAC/DC Normally Open (In air)	24VAC/DC Normally Closed (In air)	230VAC Normally Open (In air)	230VAC Normally Closed (In air)
1/2 NPT	LC-XT707100001001A00 LC-XP707100001001A00	LC-XT707101001001A00 LC-XP707101001001A00	LC-XT707D00001001A00 LC-XP707D00001001A00	LC-XT707D01001001A00 LC-XP707D01001001A00
3/4 NPT	LC-XTA07100001001A00 LC-XPA07100001001A00	LC-XTA07101001001A00 LC-XPA07101001001A00	LC-XTA07D00001001A00 LC-XPA07D00001001A00	LC-XTA07D01001001A00 LC-XPA07D01001001A00
1" NPT	LC-XTB07100001001A00 LC-XPB07100001001A00	LC-XTB07101001001A00 LC-XPB07101001001A00	LC-XTB07D00001001A00 LC-XPB07D00001001A00	LC-XTB07D01001001A00 LC-XPB07D01001001A00
M20X1,5	LC-XT607100001001A00 LC-XP607100001001A00	LC-XT607101001001A00 LC-XP607101001001A00	LC-XT607D00001001A00 LC-XP607D00001001A00	LC-XT607D01001001A00 LC-XP607D01001001A00
1" 1/8 UNEF	LC-XT807100001001A00 LC-XP807100001001A00	LC-XT807101001001A00 LC-XP807101001001A00	LC-XT807D00001001A00 LC-XP807D00001001A00	LC-XT807D01001001A00 LC-XP807D01001001A00
1" 1/4 RLK	LC-XTC07100001001A00	LC-XTC07101001001A00	LC-XTC07D00001001A00	LC-XTC07D01001001A00

Different Activation and Deactivation Delays available on request.

	THREAD	DIMENSIONS B (MM)
	1/2 NPT	24
	3/4 NPT	22
	1" NPT	27,9
	M20 X 1,5	18,1
	1 - 1/8" UNEF	19
	1" 1/4 RLK	30

Mechanical Dimensions



EXAMPLE

Note. - Quotes in mm.

Optical Level Control Unit LC-PH up to 120 bar



Main Features

- The absence of mechanical moving parts ensures **High reliability**
- Well consolidated steel with fused glass technology ensures **no leakage** and good chemical compatibility
- Electronic sensor **can be easily replaced** without emptying and/or depressurizing the plant due to the two parts design
- **No need for calibrations on the field**
- **Direct mounting** onto various types of compressors (M20x1.5 or 1"1/8 – 18 UNEF adapter) and tanks (1/2"NPT adapter), etc...
- **Customizable delays** on request
- **Integrated status LED** available on request
- **Revolutionary connectivity capabilities**
- **Unit conform to directives 2014/30/UE and 2014/35/UE.**

Application Description

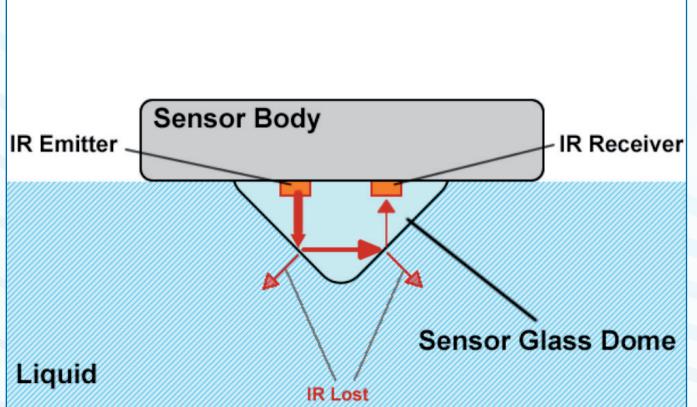
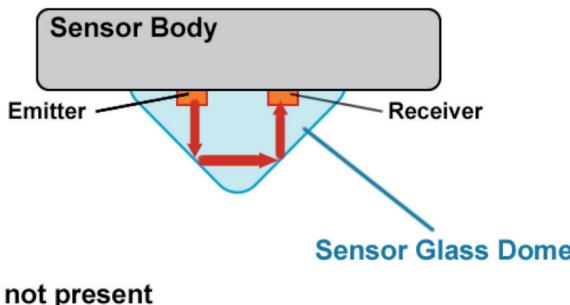
The optical level switch LC-PH has been designed for use in level monitoring applications for the control of low viscosity liquids. It comprises an optical sensor and an output switch. It is realized in two parts to let it possible to replace the electronics without the needing of emptying or depressurizing the plant.

The sensor is suitable as minimum or maximum alarm.

Delays can be introduced in order to satisfy particular needing or avoid false alarms.

Typical customizable functions: Activation Delay, Deactivation delay, others, ...

Operating Principle



The sensor contains an infrared-ray emitter and an optical receiver. In air (liquid not present), all the light emitted is reflected – internally – by the dome and then redirected to the receiver. When the liquid reaches the sensor dome, a big amount of the light emitted is lost in the liquid and the sensor senses its presence.

SUPPLY VOLTAGE ($\pm 10\%$)	230VAC@50Hz / 115VAC@60Hz / 24 VAC@50/60Hz / 24VDC depending on selected model
ELECTRONIC PROTECTIONS	Transient over voltage protection
ELECTRICAL CONNECTION	3 wires cable, 1m length / M12x1 Connector
OUTPUT SIGNAL	Solid state output Normally Open or Normally Closed in air.
SUPPLY CURRENT	20mA max. during normal operation
OUTPUT MAX. CURRENT	Up to 100 mA
HOUSING MATERIAL	Nickel plated steel / PA glass fibre reinforced
ENCLOSURE PROTECTION CLASS	IP 65
WORKING TEMPERATURE RANGE	-40°C ÷ +125°C
MAX PRESSURE	120 bar (for higher pressures, please contact the supplier)
TORQUE TIGHTEN	50 Nm for adapter installation on the system. Hand Screw with strength the sensor to the adapter

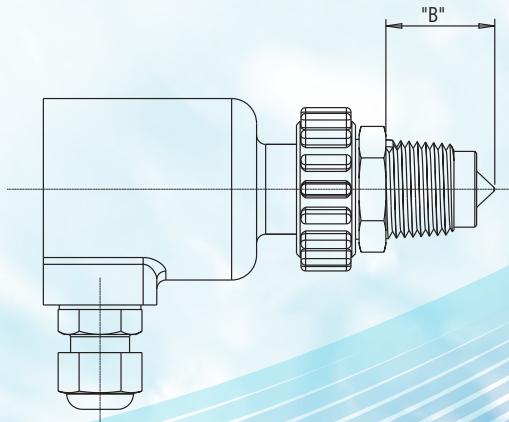
Ordering Codes

Power supply/ Adapters	24VAC/DC Normally Open (in air)	24VAC/DC Normally Closed (in air)	230VAC Normally Open (in air)	230VAC Normally Closed (in air)
1/2 NPT	LC-PH7071000101A	LC-PH7071010101A	LC-PH707D000101A	LC-PH707D010101A
3/4 NPT	LC-PHA071000101A	LC-PHA071010101A	LC-PHA07D000101A	LC-PHA07D000101A
1" NPT	LC-PHB071000101A	LC-PHB071010101A	LC-PHB07D000101A	LC-PHB07D010101A
M20X1,5	LC-PH6071000101A	LC-PH6071010101A	LC-PH607D000101A	LC-PH607D010101A
1" 1/8 UNEF	LC-PH8071000101A	LC-PH8071010101A	LC-PH807D000101A	LC-PH807D010101A
1" 1/4 RLK	LC-PHC071000101A	LC-PHC071010101A	LC-PHC07D000101A	LC-PHC07D010101A

Program interfaces available. See pag. 8 for details.

	THREAD	DIMENSIONS B (MM)
	1/2 NPT	24
	3/4 NPT	22
	1" NPT	27,9
	M20 X 1,5	18,1
	1 - 1/8" UNEF	19
	1" 1/4 RLK	30

Mechanical Dimensions



Optical Level Control Unit

LC-PS up to 46 bar



Main Features

- The absence of mechanical moving parts ensures **High reliability**
- Well consolidated steel with fused glass technology ensures **no leakage** and good chemical compatibility
- Electronic sensor **can be easily replaced** without emptying and/or depressurizing the plant due to the two parts design
- **No need for calibrations on the field**
- **Direct mounting** onto various types of compressors (M20x1.5 or 1"1/8 – 18 UNEF adapter) and tanks (1/2"NPT adapter), etc...
- **Customizable delays** on request
- **Unit conform to directives 2014/30/UE and 2014/35/UE.**

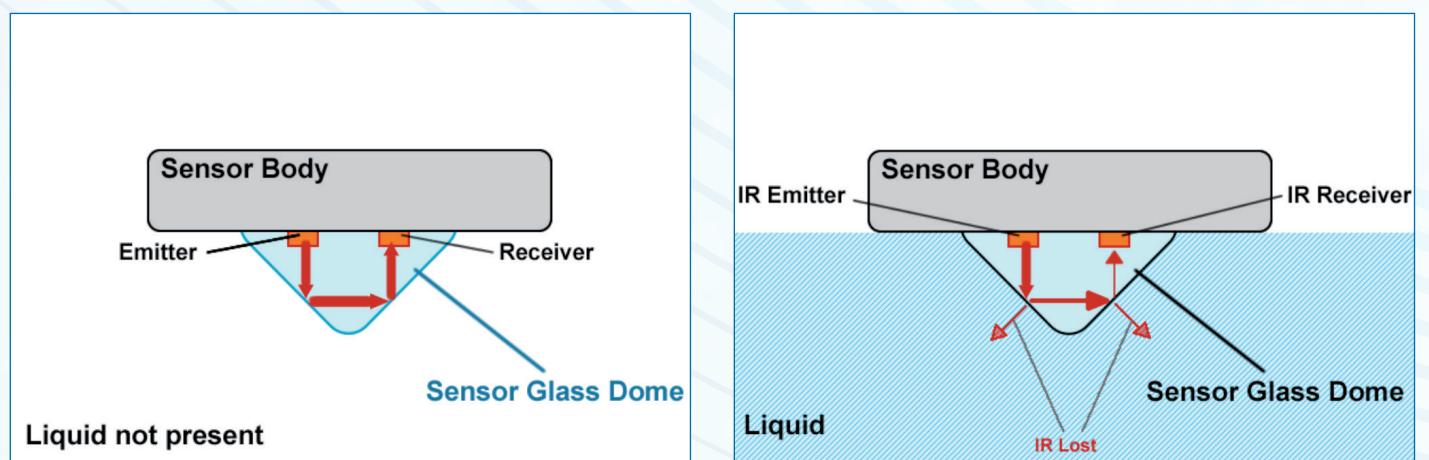
Application Description

The optical level switch LC-PS has been designed for use in level monitoring applications for the control of low viscosity liquids. It comprises an optical sensor and an output switch. It is realized in two parts to let it possible to replace the electronics without the needing of emptying or depressurizing the plant.

The sensor is suitable as minimum or maximum alarm.

Delays can be introduced in order to satisfy particular needing or avoid false alarms.

Operating Principle



The sensor contains an infrared-ray emitter and an optical receiver. In air (liquid not present), all the light emitted is reflected – internally – by the dome and then redirected to the receiver. When the liquid reaches the sensor dome, a big amount of the light emitted is lost in the liquid and the sensor senses its presence.

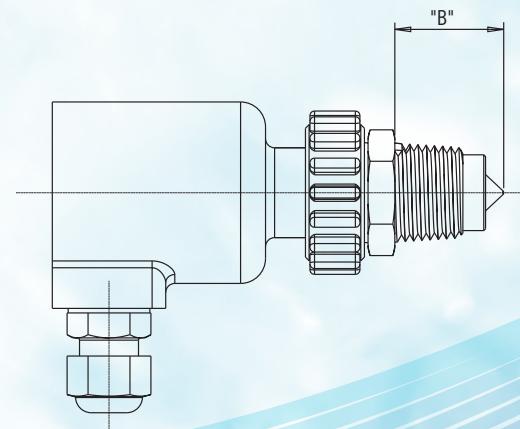
SUPPLY VOLTAGE ($\pm 10\%$)	230VAC@50Hz / 115VAC@60Hz / 24 VAC@50/60Hz / 24VDC depending on selected model
ELECTRONIC PROTECTIONS	Transient over voltage protection
ELECTRICAL CONNECTION	3 wires cable, 1m length
OUTPUT SIGNAL	Solid state output Normally Open or Normally Closed in air.
SUPPLY CURRENT	20mA max. during normal operation
OUTPUT MAX. CURRENT	Up to 100 mA
HOUSING MATERIAL	Nickel plated steel / PA glass fibre reinforced
ENCLOSURE PROTECTION CLASS	IP 65
WORKING TEMPERATURE RANGE	-40°C ÷ +85°C
MAX PRESSURE	46 bar (for higher pressures, please contact the supplier)
TORQUE TIGHTEN	50 Nm for adapter installation on the system. Hand Screw with strength the sensor to the adapter

Ordering Codes

Power supply/ Adapters	24VAC/DC Normally Open (in air)	24VAC/DC Normally Closed (in air)	230VAC Normally Open (in air)	230VAC Normally Closed (in air)
1/2 NPT	LC-PS7071000101A	LC-PS7071010101A	LC-PS707D000101A	LC-PS707D010101A
3/4 NPT	LC-PSA071000101A	LC-PSA071010101A	LC-PSA07D000101A	LC-PSA07D000101A
1" NPT	LC-PSB071000101A	LC-PSB071010101A	LC-PSB07D000101A	LC-PSB07D010101A
M20X1,5	LC-PS6071000101A	LC-PS6071010101A	LC-PS607D000101A	LC-PS607D010101A
1" 1/8" UNEF	LC-PS8071000101A	LC-PS8071010101A	LC-PS807D000101A	LC-PS807D010101A
1" 1/4" RLK	LC-PSC071000101A	LC-PSC071010101A	LC-PSC07D000101A	LC-PSC07D010101A

	THREAD	DIMENSIONS B (MM)
	1/2 NPT	24
	3/4 NPT	22
	1" NPT	27,9
	M20 X 1,5	18,1
	1 - 1/8" UNEF	19
	1" 1/4" RLK	30

Mechanical Dimensions



Optical Level Control Unit

ROTALOCK RLK02



Some advantages of this solution:

- The absence of mechanical moving parts ensures **High reliability**
- Well consolidated steel with fused glass technology ensures **no leakage** and good chemical compatibility
- Electronic sensor **can be easily replaced** without emptying and/or depressurizing the plant due to the two parts design
- **Extended working temperature range**
- **No need for calibrations on the field**
- Rotalock 1" 3/4 - 12 UNF and Rotalock 2" 1/4 - 12 UNF available
- Unit conform to directives 2014/30/UE and 2014/35/UE.

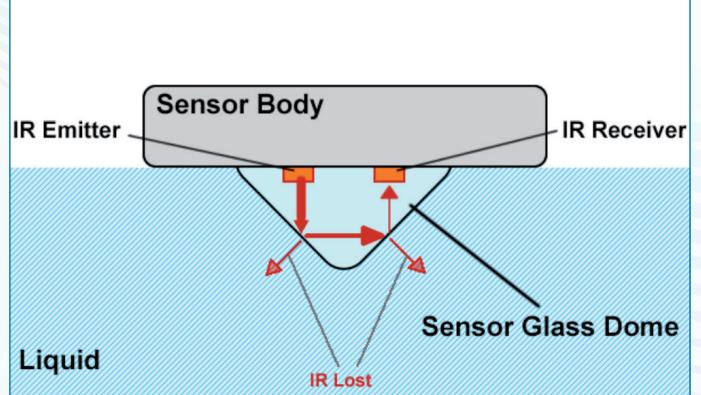
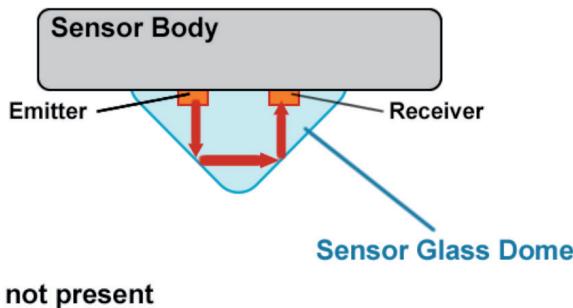
Application Description

The optical level switch has been designed for use in level monitoring applications for the control of low viscosity liquids. It comprises an optical sensor and an output switch. It is realized in two parts to let it possible replacing the electronics without the needing of emptying or depressurizing the plant.

The sensor is suitable as minimum or maximum alarm.

Delays can be introduced in order to satisfy particular needing or avoid false alarms.

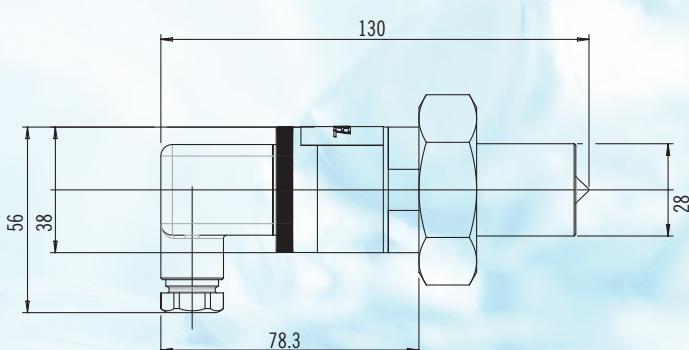
Operating Principle



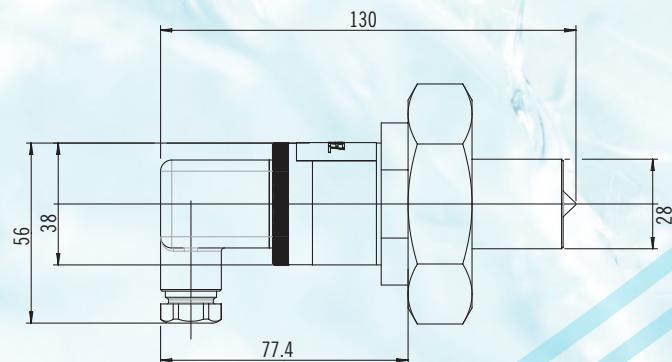
The sensor contains an infrared-ray emitter and an optical receiver. In air (liquid not present), all the light emitted is reflected – internally – by the dome and then redirected to the receiver. When the liquid reaches the sensor dome, a big amount of the light emitted is lost in the liquid and the sensor senses its presence.

SUPPLY VOLTAGE ($\pm 10\%$)	230VAC@50Hz / 115VAC@60Hz / 24 VAC@50/60Hz / 24VDC depending on selected model
ELECTRONIC PROTECTIONS	Transient over voltage protection
ELECTRICAL CONNECTION	EN 175301-803A connector (EX DIN 43650 size A)
OUTPUT SIGNAL	Solid state output Normally Open or Normally Closed in air.
SUPPLY CURRENT	20mA max. during normal operation
OUTPUT MAX. CURRENT	Up to 100 mA
HOUSING MATERIAL	Nickel plated steel
ENCLOSURE PROTECTION CLASS	IP 65
WORKING TEMPERATURE RANGE	-40°C ÷ +125°C
MAX PRESSURE	46 bar (for higher pressures, please contact the supplier)
TORQUE TIGHTEN	50 Nm for adapter installation on the system. Hand Screw with strength the sensor to the adapter

Mechanical Dimensions



**RLK02 ROTALOCK
1" 3/4 - 12 UNF**

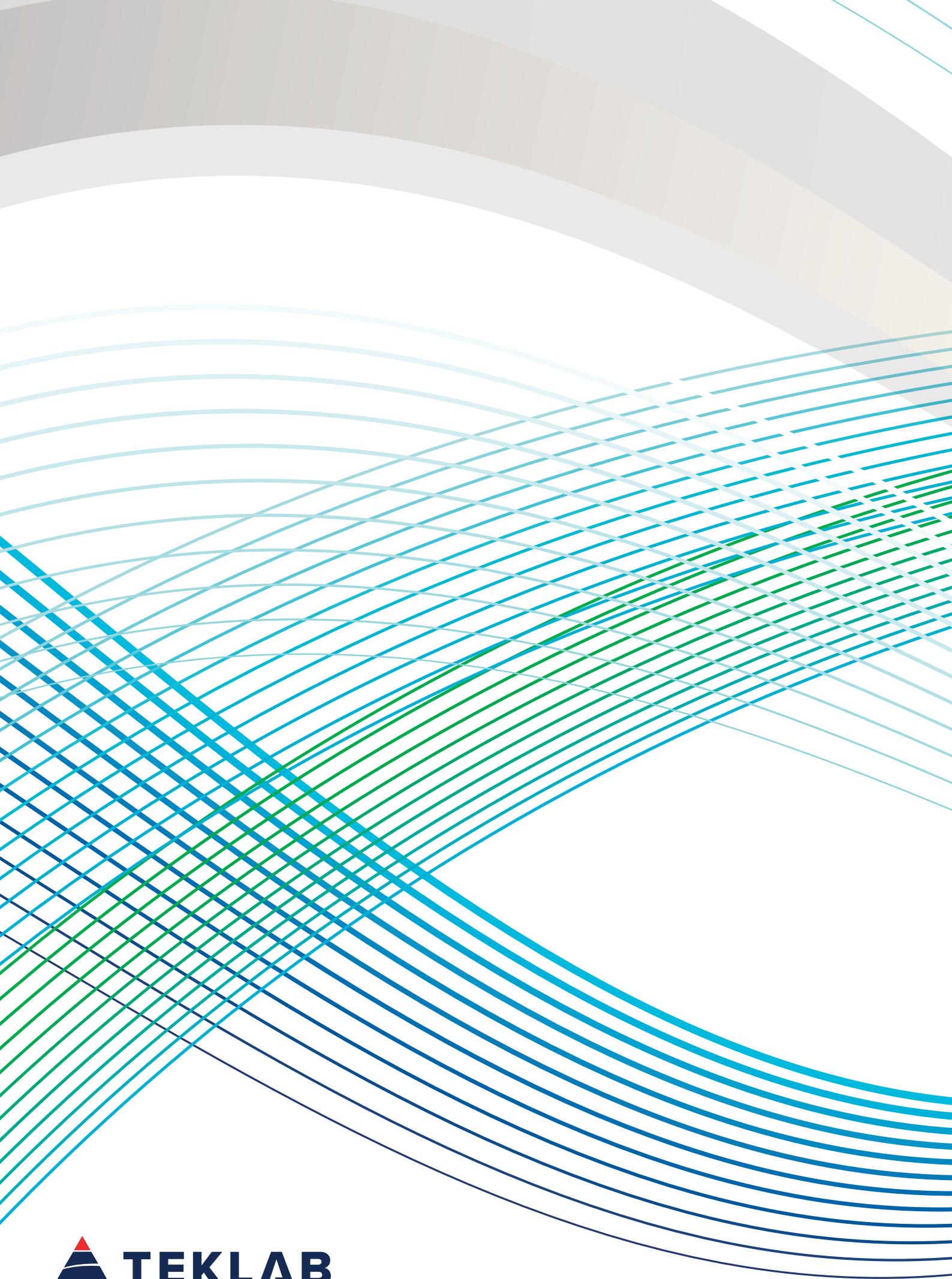


**RLK02 ROTALOCK
2" 1/4 - 12 UNF**

Note. - Quotes in mm.

Ordering Codes

Power supply/ Adapters	24VAC/DC Normally Open (in air)	24VAC/DC Normally Closed (in air)	230VAC Normally Open (in air)	230VAC Normally Closed (in air)
1" - 3/4 ROTALOCK	RLK02007100001001A00	RLK02007101001001A00	RLK02007D00001001A00	RLK02007D01001001A00
2" - 1/4 ROTALOCK	RLK02107100001001A00	RLK02107101001001A00	RLK02107D00001001A00	RLK02107D01001001A00





SENSORS

K25 Level Switch for High Pressure environments with 4:20 mA analog temperature output up to 150 bar

SUITABLE FOR CO₂ SYSTEMS



Application Description

The optical level switch has been designed for use in level monitoring applications for the control of oil or liquid CO₂ for transcritical or subcritical applications.

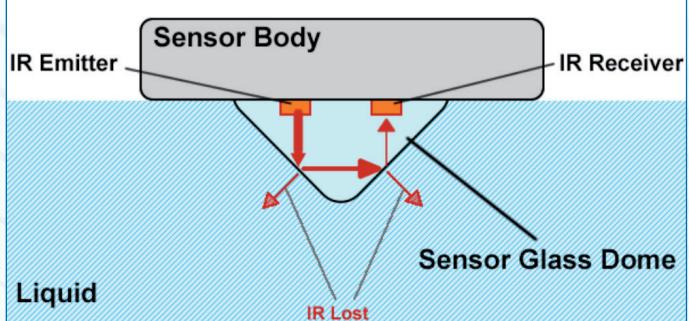
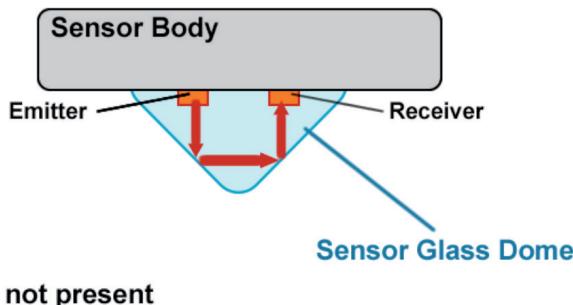
The switch has no moving parts, thus it is particularly suited for monitoring critical media where high reliability is needed.

The sensor provides two outputs:

- the first one – digital – indicates if the liquid is present or absent,
- the second one – analogical – is proportional to the temperature read.

It combines the Level Detection and the Temperature Management with the high pressure resistance up to 150 Bar.

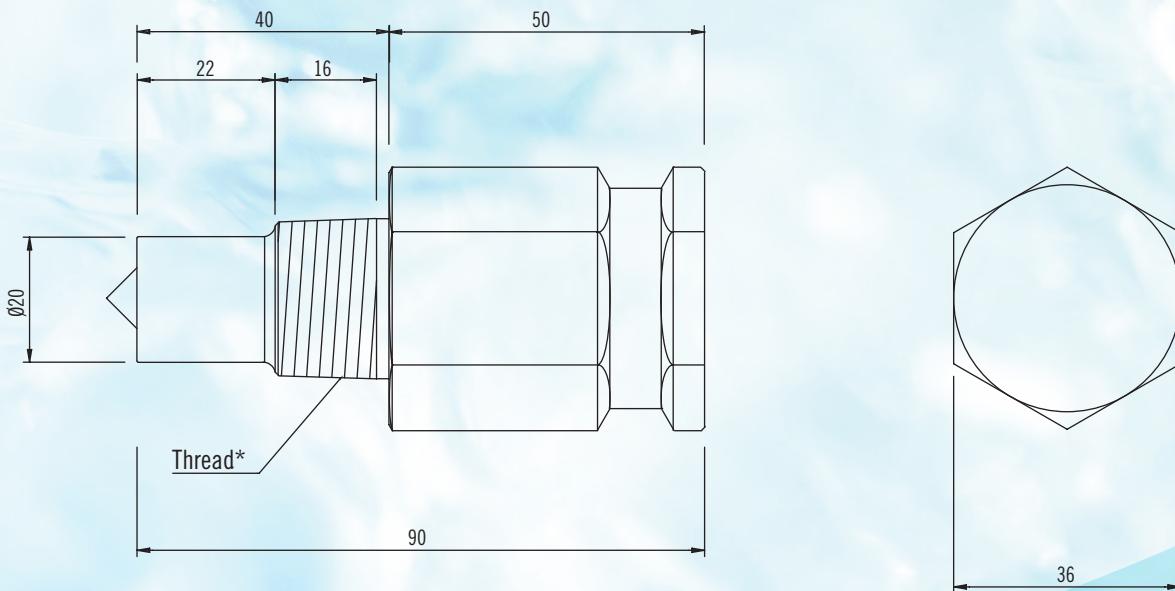
Operating Principle



The sensor contains an infrared-ray emitter and an optical receiver. In air (liquid not present), all the light emitted is reflected – internally – by the dome and then redirected to the receiver. When the liquid reaches the sensor dome, a big amount of the light emitted is lost in the liquid and the sensor senses its presence.

OPERATION MODE	Detect liquid presence with contact
REPEATABILITY	± 2 mm.
BODY MATERIALS	Nickel plated steel
SENSIBLE DOME	Glass
ELECTRONIC PROTECTIONS	Transient over voltage, reverse polarity
MAX. TEMPERATURE RANGE	From -40°C up to $+125^{\circ}\text{C}$
STORAGE TEMPERATURE	From -40°C up to $+125^{\circ}\text{C}$
SUPPLY VOLTAGE	24 VDC $\pm 10\%$
SUPPLY CURRENT (LEVEL SECTION)	20mA max.
OUTPUT TYPE	NPN
DC OUTPUT LOAD CURRENT	up to 50 mA max
OUTPUT MODE	Output Normally Open or Closed in air
TEMPERATURE OUTPUT	Analogical from 4 to 20 mA
DELAY TIMES	Customizables depending on application needings
MAX PRESSURE	up to 150 bar

Mechanical Dimensions



Ordering Codes

SENSOR	CODE
3/4" NPT - Normally open in air	32517308304002003150
3/4" NPT - Normally Closed in air	32517308305002003150

Ex Electro-Optic Level Switch

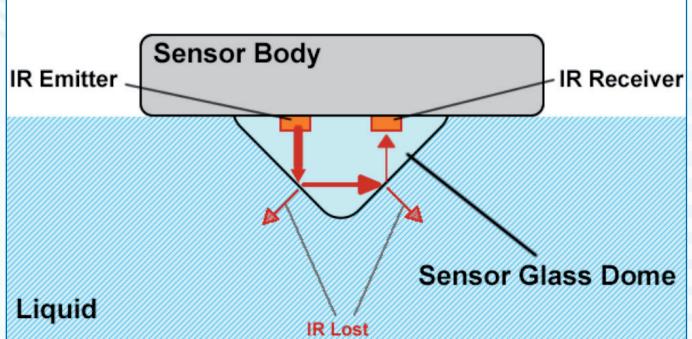
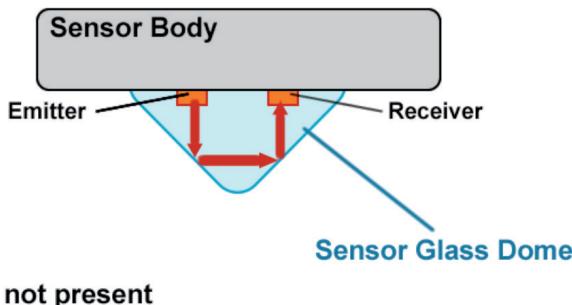
 CE 0948 II 1 G Ex ia IIC T6...T4 Ga



Safety notes

The sensor has been designed and manufactured to achieve the **ia** intrinsically safety, and to work in potential explosive environment – **IIC Group**. Regarding the temperature class of the instrument, please look at the table on next page of this document for more details.

Operating Principle

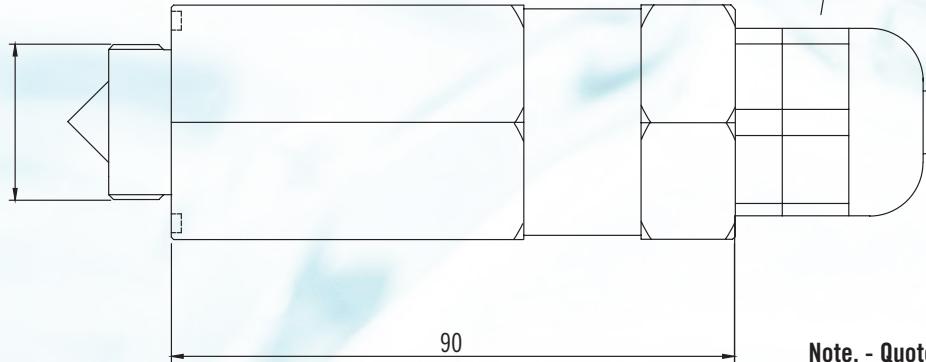
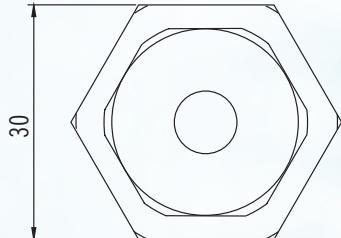


The sensor contains an infrared-ray emitter and an optical receiver. In air (liquid not present), all the light emitted is reflected – internally – by the dome and then redirected to the receiver. When the liquid reaches the sensor dome, a big amount of the light emitted is lost in the liquid and the sensor senses its presence.

Mechanical Dimensions

cable gland M20x1.5

49



Note. - Quotes in mm.

Case features

Body materials:	Stainless Steel AISI 303, 304, 316L
Dome materials:	Glass
Available Body threads:	from 3/8" up to 3/4" GAS cylindrical; from 3/8" up to 3/4" GAS conic; from 3/8" up to 3/4" NPT; from 5/8"-24 up to 1" 1/8-18 UNEF; from M18 up to M30 ISO metric.

POWER SUPPLY	9 ÷ 28 Vdc
STORAGE TEMPERATURE	-20°C ÷ 60°C
OUTPUT TYPE	Open collector
MAX. OUTPUT NPN O.C. SINK CURRENT	40 mA
CABLE CAPACITANCE	140 pF/m
CABLE INDUCTANCE	1,25 µH/m
CABLE RESISTANCE	39 mΩ/m

Safety Parameters

Ui = 30VDC
Ii = 160mA
Pi = 1,2W

Ingress Protection Code:
In front IP68, 20 bar 30min

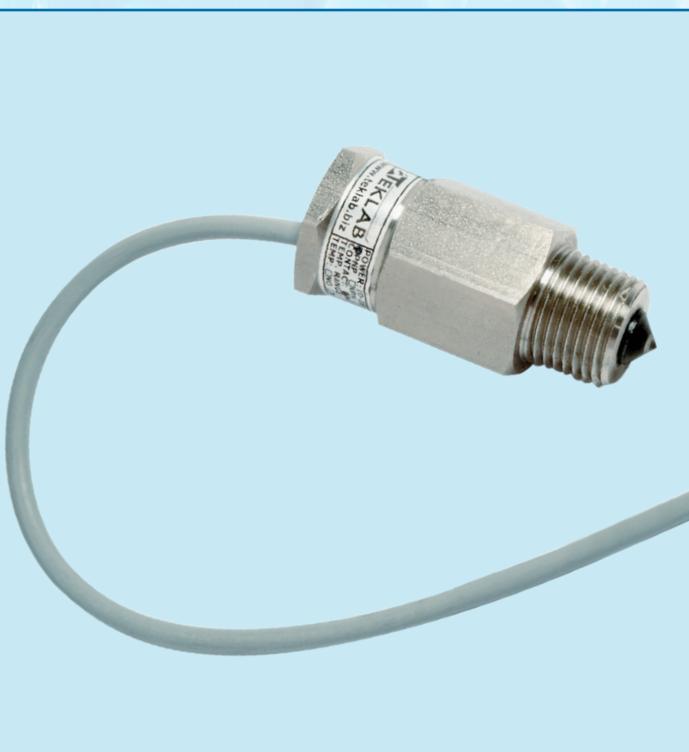
TEMPERATURE CLASS MAX SURFACE TEMPERATURE (Tx)	MAX WORKING TEMPERATURE RANGE AT LIQUID DETECTING POINT (°C)	AMBIENT TEMPERATURE RANGE (°C)
T6	-20 ÷ +60	-20 ÷ +60
T5	-20 ÷ +80	-20 ÷ +60
T4	-20 ÷ +100	-20 ÷ +60

Ordering Codes (T6 code examples with Stainless steel AISI 304 housing)

MOUNTING THREAD	TEMP. CLASS	OUTPUT MODE	CODE NUMBER
3/4" NPT	T6	Normally Open in air	51244001001400
1/2" NPT	T6	Normally Open in air	51249001001400
1" 1/8 -18 UNEF	T6	Normally Open in air	5124B001001400
3/4" NPT	T6	Normally Closed in air	51254001001400
1/2" NPT	T6	Normally Closed in air	51259001001400
1" 1/8 -18 UNEF	T6	Normally Closed in air	5125B001001400

NOTE. An appropriate intrinsically safe interface must be used and installed in strict accordance with sensor's technical documentation.

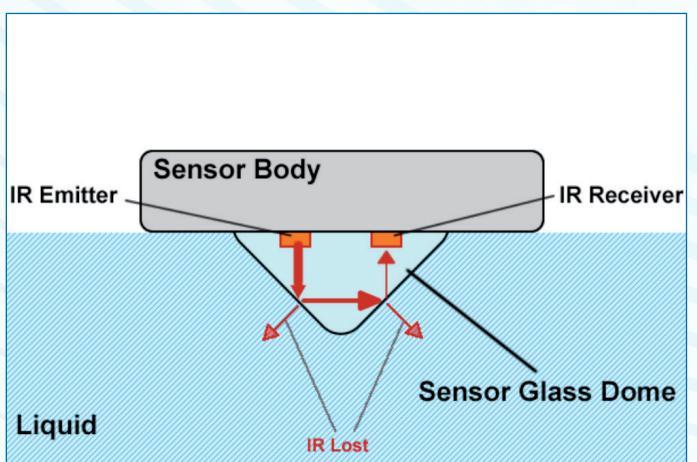
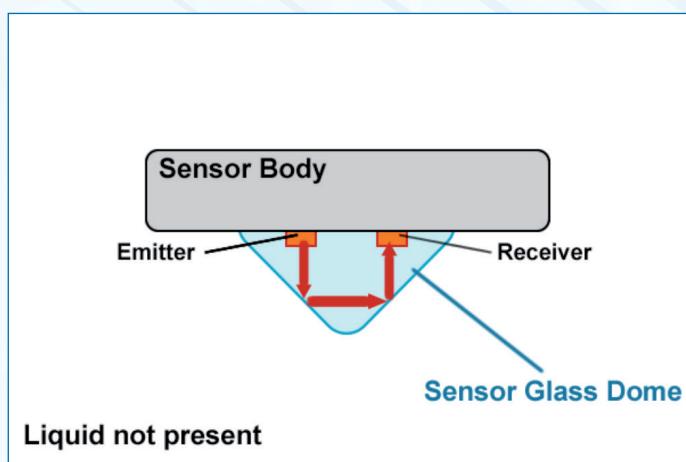
K11 Level Switch



Application Description

K11 level switches are suitable for high pressure applications like pressurized vessels, HVAC and refrigeration, motors etc. They have bodies made of stainless steel and sensor dome made of glass. They are economical, dependable, and compact in size with overall dimensions of 59 x 27 mm and have no moving parts. These level switches use infrared technology for their operation. They have an operating temperature range of -40°C to 125°C. There is a programmable timer inside these K11 level switches that allows a delay time to be set for delaying the output switching. The output modes are closed in presence of liquids and open in air or vice versa. The AC / DC output current is up to 100mA depending on model. These level switches can integrate electronic protections against transient over voltage, and reverse polarity (for DC models). They can withstand maximum pressure of 60 bar.

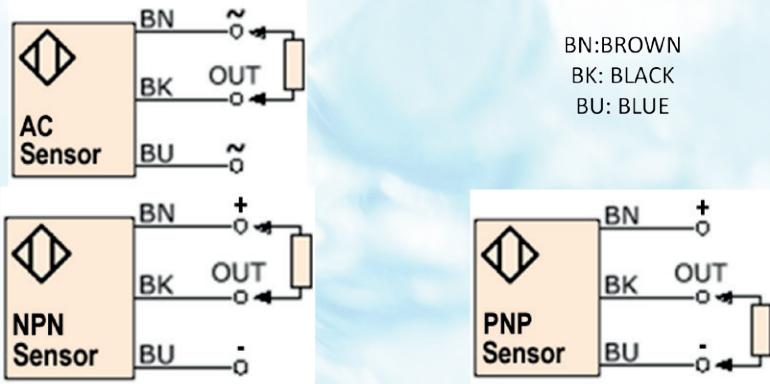
Operating Principle



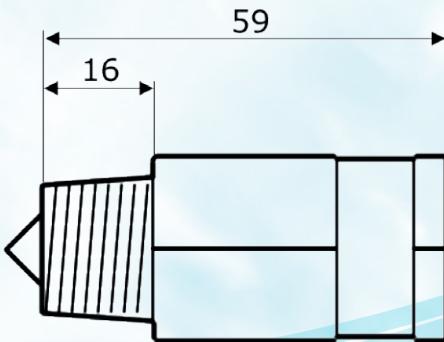
The sensor contains an infrared-ray emitter and an optical receiver. In air (liquid not present), all the light emitted is reflected – internally – by the dome and then redirected to the receiver. When the liquid reaches the sensor dome, a big amount of the light emitted is lost in the liquid and the sensor senses its presence.

OPERATION MODE	Detect liquid presence with contact
REPEATABILITY	± 2 mm.
BODY MATERIALS	Stainless steel or Nickel plated steel
SENSIBLE DOME	Glass
ELECTRONIC PROTECTIONS	Transient over voltage, reverse polarity (for DC models)
MAX. TEMPERATURE RANGE	From -40°C up to $+125^{\circ}\text{C}$
STORAGE TEMPERATURE	From -40°C up to $+125^{\circ}\text{C}$
SUPPLY VOLTAGE	10 – 28 VDC or 24 VAC $\pm 10\%$ 50 or 60 Hz
OUTPUT TYPE	AC output or NPN, NPN open collector, PNP for DC model
AC/DC OUTPUT CURRENT	Up to 100 mA Max (depending on temperature range)
OUTPUT MODE	Output Normally Open or Closed in the air
DELAY TIMES	Customizable depending on application needings
MAX PRESSURE	Up to 60 bar (burst 120 bar)
TORQUE TIGHTEN	15 Ntm

Electrical Connection



Mechanical Dimensions



Note. - Quotes in mm.



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