

TECHNICAL MANUAL

Level monitoring relay (universal, 1 or 2 levels) RL-SA EKF

1 DESCRIPTION

Level monitoring relay RL-SA EKF is an electronic switching device with an embedded microcontroller, designed to monitor the level of conductive liquids and to control electric pump motors. The relay can be used both for filling and emptying the reservoirs with a delay off timer. The relay can accept control signal from either two or three sensors. The EKF sensors with a dry contact output can be used (refer to wiring diagrams).

NOTE! Level sensors shall be ordered separately.

WARNING! Do not use the relay with flammable or explosive liquids. The level monitoring relay complies with IEC 61000-4-4:2012.

2 TECHNICAL DATA

Table 1

Characteristics	Values	
	RL-SA	RL-SA-12-240
Rated voltage, V AC, 50-60 Hz	230	12-240
Rated impulse voltage, V	400	
Power consumption, VA	≤1,5	
Sensitivity, kOhm	from 5 to 100	
Set-point accuracy, %	≤5	
Repeatability, %	≤0,2	
Power interruption	Min 200 ms.	
Electrical endurance, cycles	100 000	
Mechanical endurance, cycles	1 000 000	
Contact	1 C/O (one change-over)	
Rated load current	1x8A at 230 V AC1	
Max. altitude above sea level, m	2000	

Table 1 continued

Characteristics	Values	
	RL-SA	RL-SA-12-240
Degree of protection	IP20	
Pollution degree	3	
Operating temperature, °C	-5 to +40	
Storage temperature, °C	-25 to +75	
Connection	Screw terminals, max. wire cross-section 2,5 mm ²	

3 INSTALLATION AND OPERATION

Operation

The relay measures the resistance between the common contact "C" and the contacts of the maximum "MAX" and minimum "MIN" levels. If the resistance drops below the set limit (in conductive liquids) or is absent (dry contact closed), the liquid has reached the preset level. Various control circuits can be implemented depending on sensor arrangement, trip delay time (T) and load connection (pump motors). When the relay is OFF, the change-over contact is in position 11-12, when the relay is ON, the contact is in position 11-14.

Setup:

1. Install and secure the relay in the intended location.
2. Select the operating procedure either with two or three sensors.
3. Connect the relay as per wiring diagram.
4. Energize the relay, the "U" LED will light up green.
5. Set the sensitivity (for conductivity sensors). Connect and place "MAX" and "C" electrodes in the tank and fill it up. Rotate the sensitivity dial until the "Φ" LED lights up.
6. Set the required response delay time.

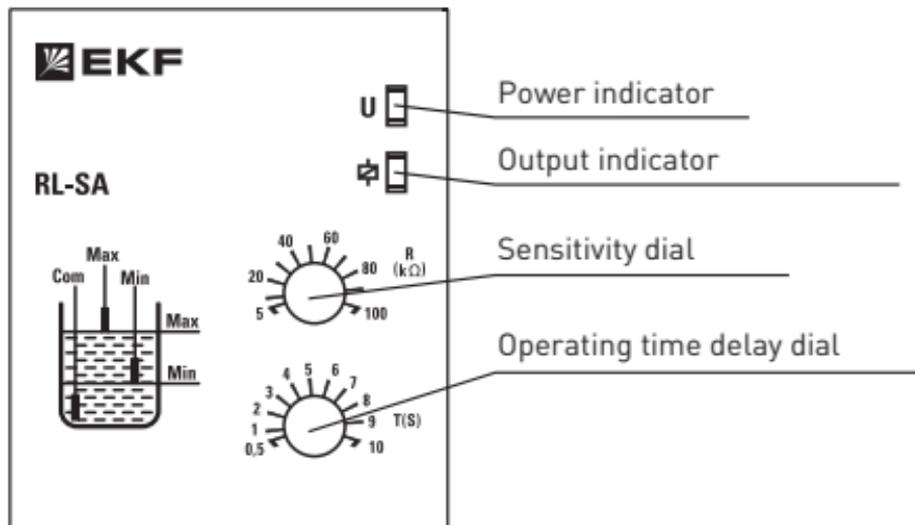


Fig. 1 - Control panel

4 TYPES OF CONNECTED SENSORS

EKF recommends the basic types of sensors but not limits to as follows:

Contact (electrode) is a steel rod with a wire or a contact screw at the one end for connection to the relay. The contact can also be a bare wire, but this version is not safe, as over time the wire will oxidize, and resistance will decline, leading to the system malfunction. The most commonly used sensor is the conductivity sensor.

The float level sensor RLF EKF includes a stem and a float. The float moves freely along the stem. A magnet, built into the float, actuates a reed switch in the stem. As the float moves up with the level of liquid, the magnet closes the reed switch, which, in turn closes the signaling or control circuit.

The float level sensor RL EKF comprises a sealed polymer casing with a floating two-way relay that trips on deviation from its original position. It will switch (open or close) the circuit, sending the signal to the controlled device (pump, valve, etc.).

5 CONNECTION

EKF recommends the basic types of circuits, but not limits to as follows:

Filling

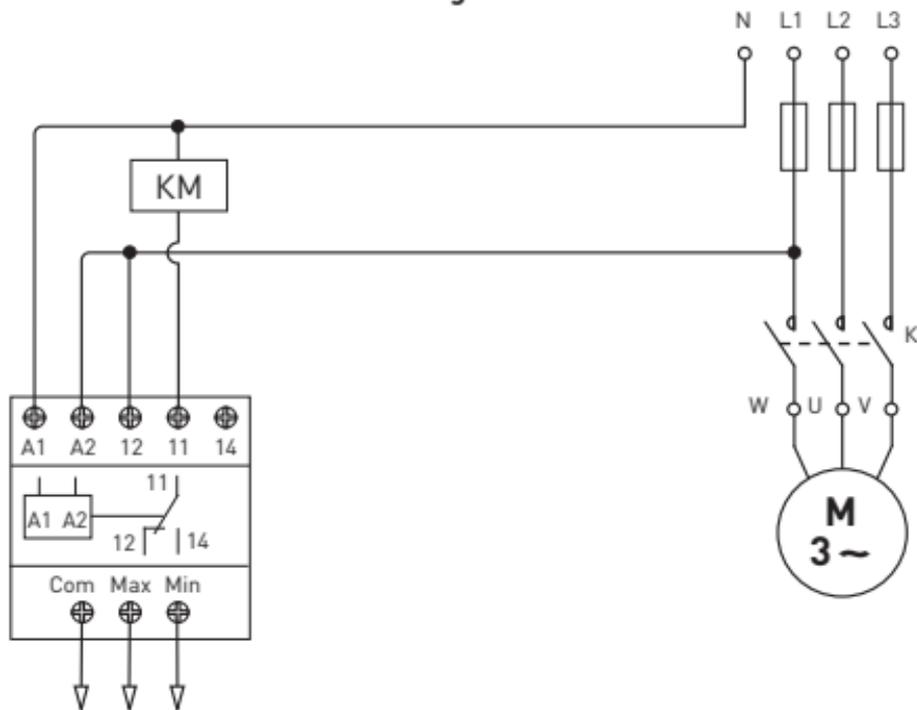


Fig. 2 - Filling wiring diagram

Filling, 3 contacts (electrodes), refer to Figure 3. Connect every sensor wire directly to "Com", "Max" and "Min" contacts. Liquid level is below the minimum (MIN), contacts 11-12 are closed, the pump runs. When the maximum level (MAX) is reached, the relay switches ON with the time delay (T), the contacts switch to position 11-14, the pump stops. The relay is in ON position until the liquid level falls below the minimum (MIN). When the relay switches off with the time delay (T), the contacts switch back to position 11-12, pump starts.

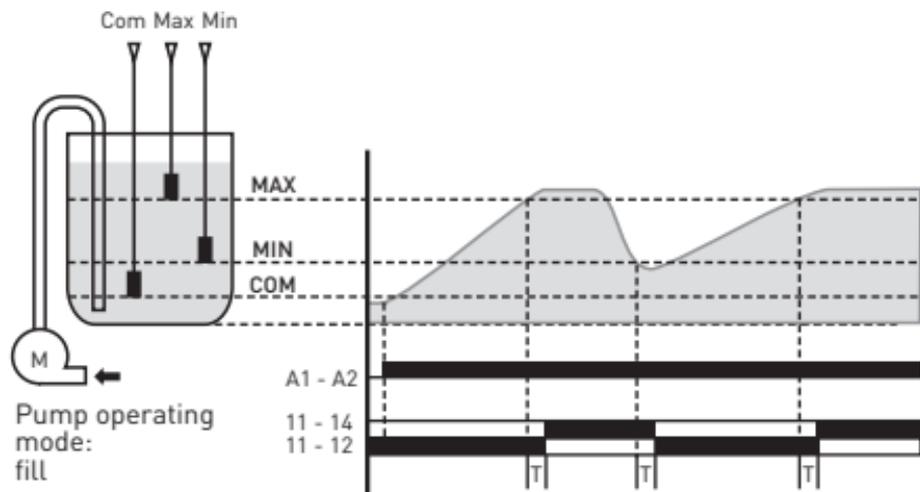


Fig. 3

Filling, two float level sensors RLF, refer to Figure 4. Connect any two wires from sensors to the contact "Com". Connect the wire of the lower sensor to the contact "Min" . Connect the wire of the upper sensor to the contact "Max". The operation sequence is similar to three contacts (electrodes) filling.

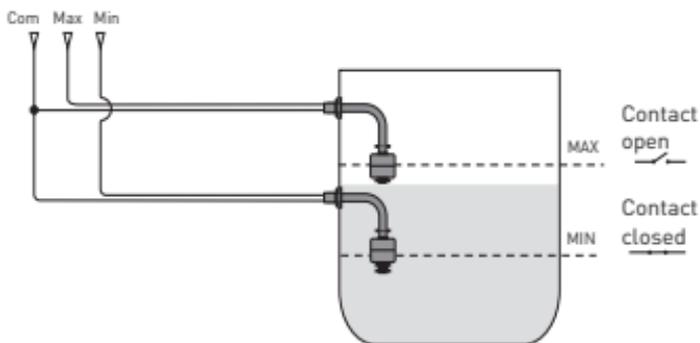


Fig. 4

Filling, two float level sensors RL, refer to Figure 5. Connect two brown wires from the sensor to the contact "Com". Connect the black wire from the lower sensor to the contact "Min". Connect the black wire from the upper sensor to the contact "Max". Do not use the blue wires. The operation sequence is similar to three contacts

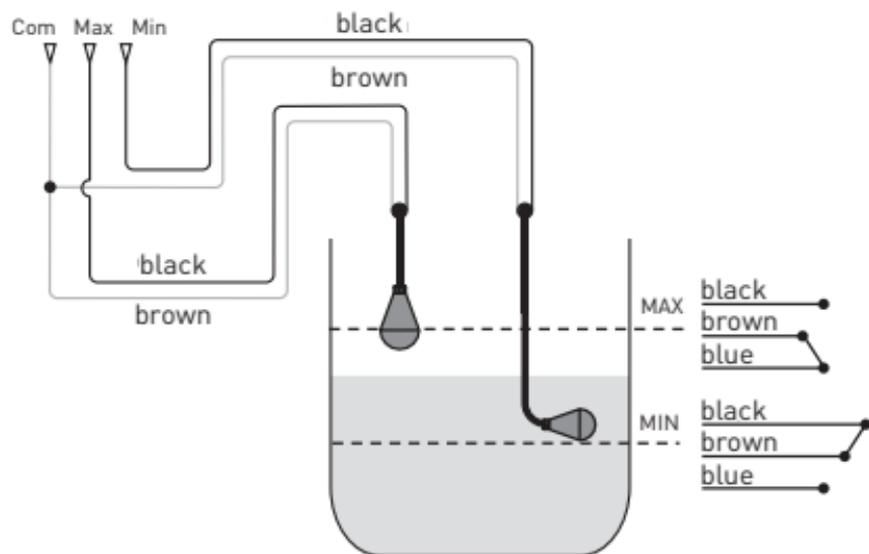


Fig. 5

Emptying

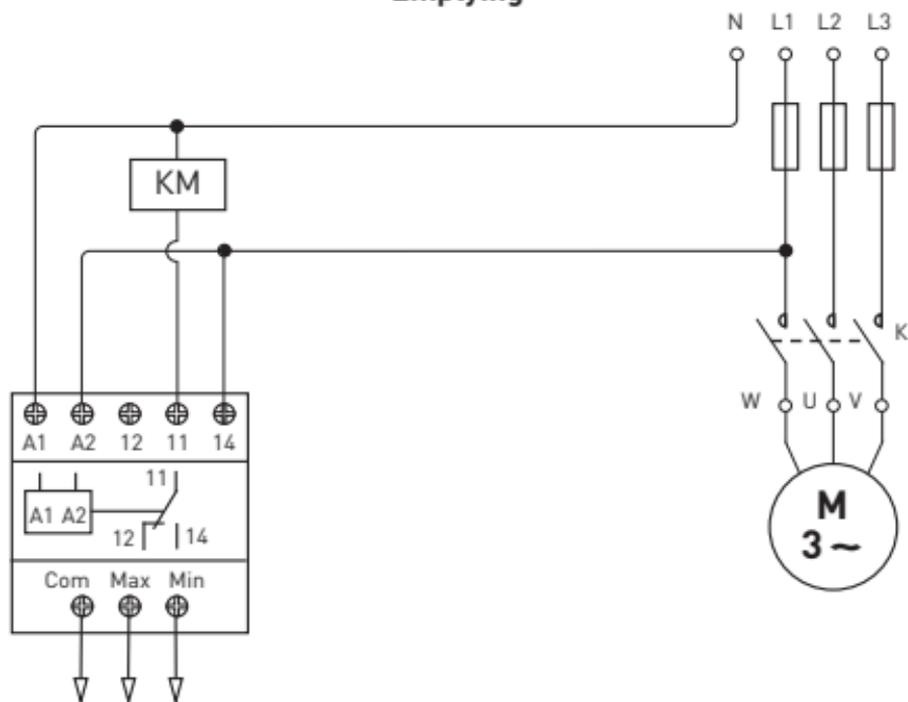


Fig. 6 - Emptying wiring diagram

Emptying, 3 contacts (electrodes), refer to Figure 7. Connect every sensor wire directly to "Com", "Max" and "Min" contacts. Liquid level is over the maximum (MAX), the contacts switch to position 11-14 with the time delay (T), the pump runs. When the minimum level (MIN) is reached, the relay switches off with the time delay (T), the contacts switch to position 11-12, the pump stops. The relay is in OFF position until the liquid level is over the maximum (MAX). When the relay switches on with the time delay (T), the contacts switch to position 11-14, pump starts.

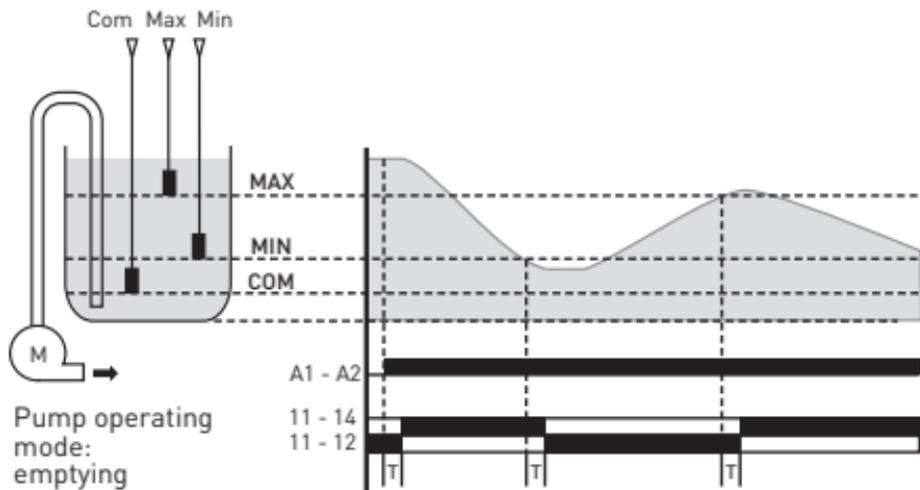


Fig. 7

Emptying, two float level sensors type RLF, refer to Figure 8. Connect any two wires from sensors to the contact "Com". Connect the lower sensor wire to the contact "Min". Connect the upper sensor wire to the contact "Max". The operation sequence is similar to three contacts (electrodes) emptying.

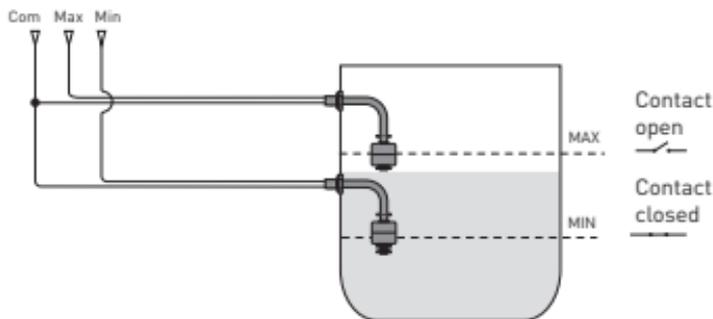


Fig. 8

Emptying, two float level sensors RL, refer to Figure 9. Connect two brown wires from the sensor to the contact "Com". Connect the black wire from the lower sensor to the contact "Min". Connect the black wire from the upper sensor to the contact "Max". Do not use the blue wires. The operation sequence is similar to three contacts (electrodes) emptying.

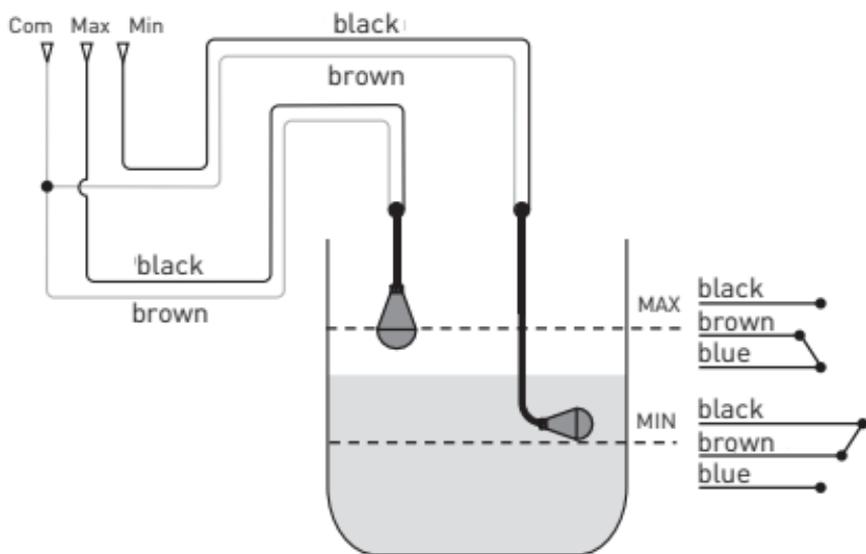


Fig. 9

Level maintaining

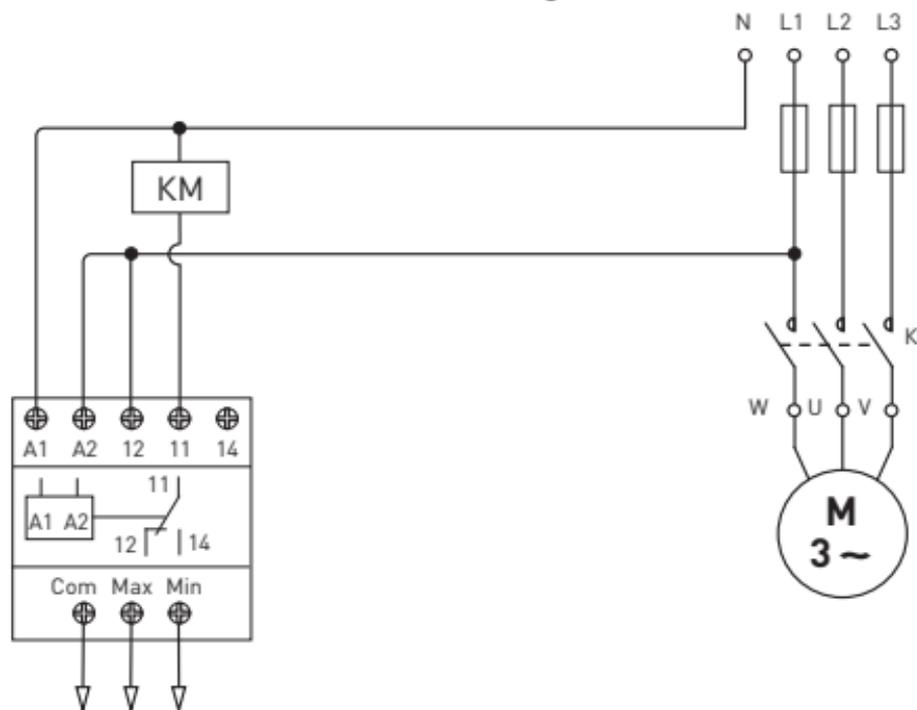


Fig. 10 - Level maintaining wiring diagram

Level maintaining, two contacts (electrodes), refer to Figure 11. Connect the wires from the sensors to the contact "Min" and the closed contacts "Com" - "Max". Liquid level is below the setting (MIN), contacts 11-12 are closed, the pump runs. When the preset level (MIN) is reached, the relay switches ON with the time delay (T), the contacts switch to position 11-14, the pump stops. The relay is in ON position until the liquid level falls below the setting (MIN). When the relay switches off with the time delay (T), the contacts switch back to position 11-12, pump starts.

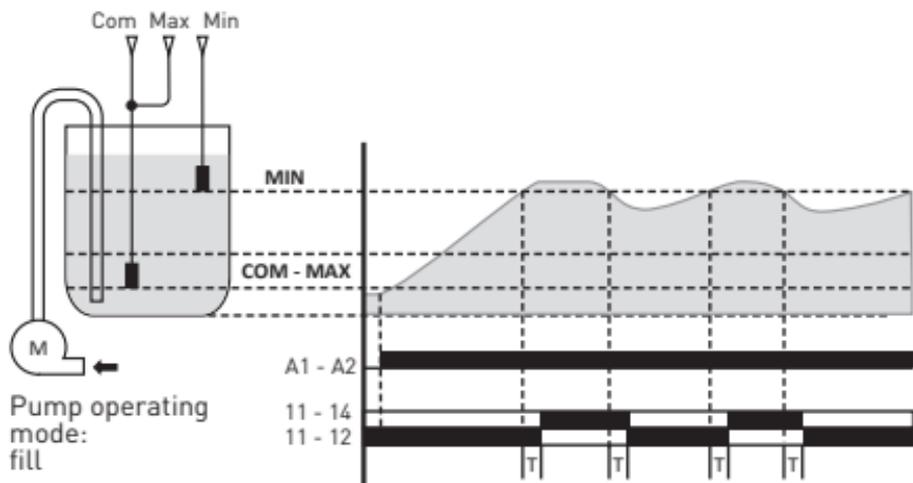


Fig. 11

Level maintaining, one float level sensor RLF, refer to Figure 12. Connect any wire from the sensor to the closed contacts "Com" - "Max". Connect the other wire to the contact "Min". The operation sequence is similar to two contacts (electrodes) level maintaining.

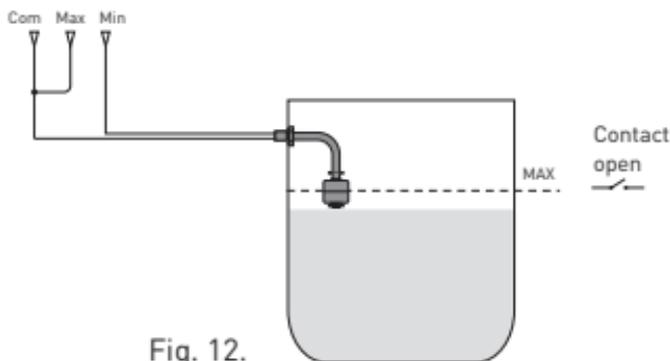


Fig. 12.

Level maintaining, one float level sensor RL, refer to Figure 13. Connect the brown wire from the sensor to the contact "Com". Connect the black wire from the sensor to the contact "Min". Do not use the blue wire. The operation sequence is similar to two contacts (electrodes) level maintaining.

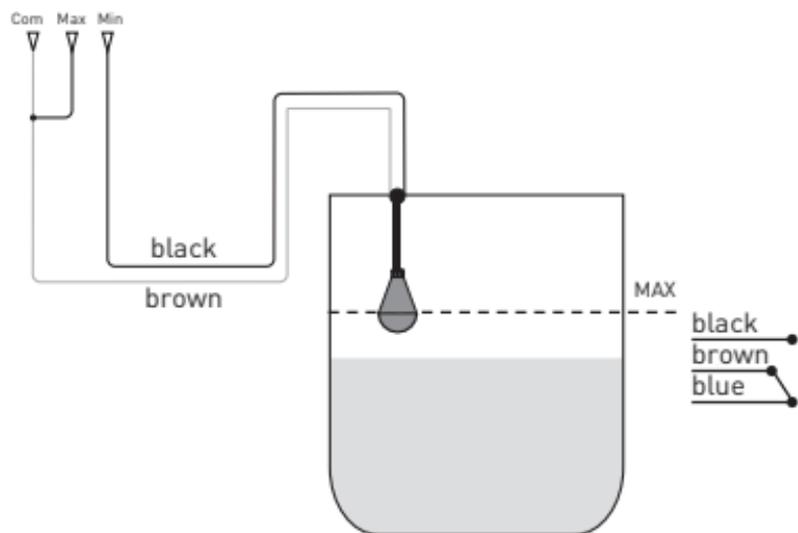


Fig. 13

Overfill protection

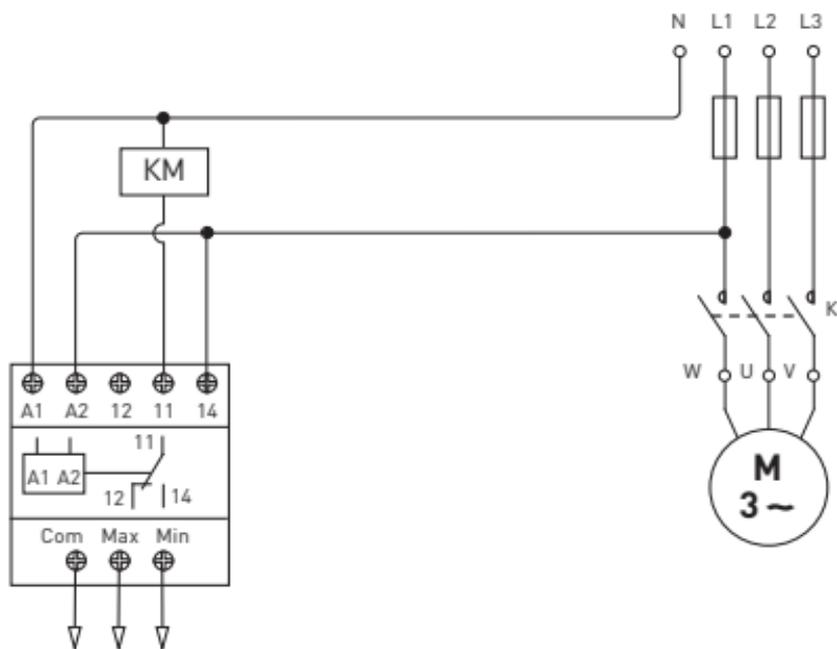


Fig. 14 - Overfill protection wiring diagram

Overfill protection, two contacts (electrodes), refer to Figure 15. Connect the wires from the sensors to the contact "Min" and the closed contacts "Com" – "Max". Liquid level is over the setting (MAX), the contacts switch to position 11-14 with the time delay (T), the pump starts. When the preset level (MIN) is reached, the relay switches off with the time delay (T), the contacts switch to position 11-12, the pump stops. The relay is in OFF position until the liquid level is over the maximum (MAX). When the relay switches on with the time delay (T), the contacts switch to position 11-14, pump starts.

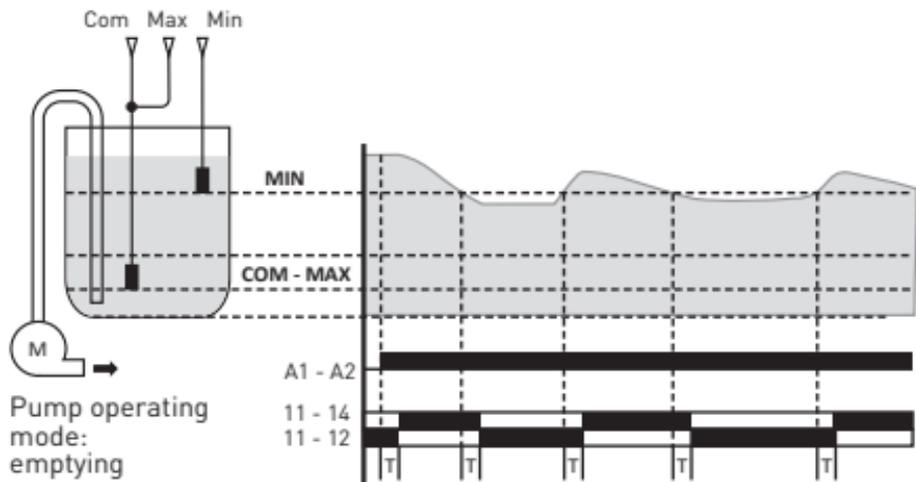


Fig. 15

Overflow protection, one float level sensor RLF, refer to Figure 16. Connect any wire from the sensor to the closed contacts "Com" - "Max". Connect the other wire to the contact "Min". The operation sequence is similar to two contacts (electrodes) overflow protection .

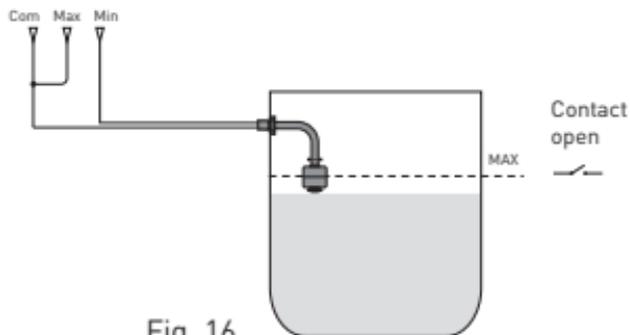


Fig. 16

Overflow protection, one float level sensor RL, refer to Figure 17. Connect the brown wire from the sensor to the contact "Com". Connect the black wire from the sensor to the contact "Min". Do not use the blue wire. The operation sequence is similar to two contacts (electrodes) overflow protection .

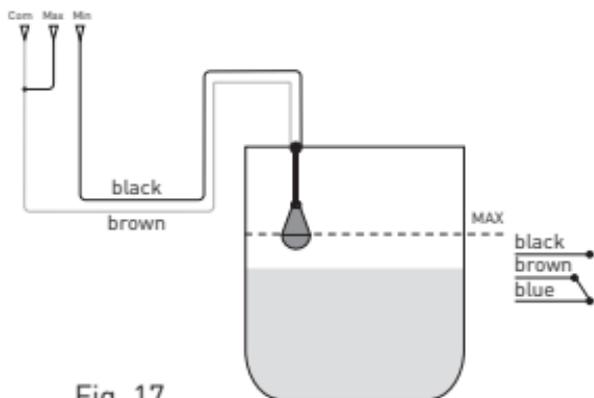


Fig. 17

6 OVERALL DIMENSIONS



Fig. 18

7 OPERATING CONDITIONS

Operating temperature: from -5°C to +40°C.

Max. altitude above sea level: 2000 m.

8 DELIVERY SCOPE

1. Level monitoring relay RL-SA - 1 pc.
2. Technical manual - 1 pc.

9 SAFETY REQUIREMENTS

Do not operate relays with visible mechanical damage.

The relays conform to IEC 61140 Class 0 for protection against electrical shock and must be installed in Class 1 enclosures or higher.

10 MAINTENANCE

For maintenance, follow national safety rules for operation of electrical installations.

Under normal operating conditions, visually inspect the relay and check the set modes and trigger time every 6 months.

Tighten the clamping screws during the inspection, as they may become loose due to cyclical changes in the ambient temperature and material flow.

The relay must be installed and maintained by qualified personnel. Follow the wiring diagram when connecting the relay.

Do not install the relay without protective cover in any area exposed to water or direct sunlight.

11 DISPOSAL

Life-expired and failed relays shall be disposed of in compliance with the national and local laws and regulations in force.

12 TRANSPORTATION AND STORAGE

Relays can be transported by any means of enclosed transport that protects the packaged products from mechanical impact and weather exposure.

The relays shall be stored in the original package indoors at the ambient temperature from -25°C to +75°C and relative humidity of max. 80% at +25°C.

13 MANUFACTURER'S WARRANTY

The manufacturer guarantees the relays comply with the declared characteristics, provided that consumers observe the operation, transportation and storage conditions and requirements.

Warranty period: 7 years from the date of sale.

Shelf life: 7 years.

Service life: 10 years.

Manufacturer: For information, refer to the product packaging.

Importer and EKF trademark service representative: EKF ELECTRICAL SOLUTION – FZCO, Dubai Silicon Oasis, DDP, Building A2, Dubai, United Arab Emirates.

Importer and EKF trademark service representative on the territory of the Russian Federation:

000 «Electroresheniya», Otradnaya st., 2b bld. 9, 5th floor, 127273, Moscow, Russia. Tel.: +7 (495) 788-88-15.

Importer and EKF trademark service representative on the territory of the Republic of Kazakhstan:

T00 «Energoresheniya Kazakhstan», Kazakhstan, Almaty, Bostandyk district, Turgut Ozal st., 247, apt 4.

14 CERTIFICATE OF ACCEPTANCE

Level monitoring relay RL-SA EKF has been approved for operation.

Date of manufacture:

For information, refer to the product package or housing.

Technical control stamp



EAC



v3

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