



REFLECTIVE TYPE OPTICAL BEAM SMOKE DETECTOR

**RK 90 R
RK 90 RS**

TECHNICAL MANUAL

**TECHNICAL INSTRUCTIONS FOR
INSTALLATION, SETUP AND
MAINTENANCE**

NOTE - the version RK90RS is not equipped with the detection circuit of Turbulence. Therefore no items related to this function are included. Keep in mind this indication while reading and using these instructions.

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STANDARD STARTING CONDITION

(Factory preset - Read ahead)

- SW1 - position 1 (minimum threshold level)
- SW2 - position 1 (minimum threshold level)
- JP1 - position 2-3 (optical allignment on)
- JP2-JP3- position 2-3 (alarm and turbulence relays NC)
- JP4 - position 1-2 (fault relay NC)
- JP5 - position 1-2 (memory OFF)
- JP7 - not inserted (maximum transmitter power)
- JP8 - not inserted (alarm relay normally deactivated)
- P1 - adjustment trimmer at half scale

QUICK INSTALLATION

The procedure below is intended for trained personnel with previous experience in installing EDS Beam Smoke Detectors RK90R(S). If you don't have the needed experience please refer to the standard installation procedure of this manual. On our site www.eds.eu is available a video with instructions for installing the RK90R(S).

- 1 - Mount the RK90R(S) detector**
- 2 - Connect the cables**
- 3 - Set the JP2-JP3-JP4-JP5-JP7 jumpers (see pag.10)**
- 4 - Do the optical alignment with the lamp**
- 5 - Set the JP7 jumper according to the detector/reflector distance (tab.pag.9)**
- 6 - Set JP1 in ON position (Alignment) (pag.10)**
- 7 - Optimize the device signal using:**
 - the P1 trimmer
 - the adjustment screws V1-V2-V3 on the optical block
 - a multimeter (or the STS01 meter)
 - Blue/Red Led signal level indication (see table on fig.8)
- 8 - Regulate the signal between 4,7V and 5V with the P1 trimmer .**
- 9 - Verify the operation obscuring the reflector**
- 10 - Select the desired sensitivity of the Obscuration circuit with the SW2 selector (40-50-60-70%)**
- 11 - Select the desired sensitivity of the Turbulence (Heat) circuit with the SW1 selector (if used - not present in -S version)**
- 12 - Set JP1 in the OFF position to activate the device**
- 11 - Close the cover within 5 minutes**
- 12 - Wait at least 5 minutes for the device to become operational**
- 13 - Perform operational tests**

REFLECTIVE TYPE OPTICAL BEAM SMOKE DETECTOR RK90R

The RK90R(S) detector is a new design microprocessor linear smoke detector, that bases its working concept on the interaction between the smoke present in a room and an infrared beam emitted by a transmitter and reflected by an optical reflector (fig.1).

The normal installation consists in mounting the detector on a wall of the room to be protected and in fixing the FX reflector (FX01, FX02, FX03 etc. depending on the distance) on the opposite wall.

For a correct installation, we recommend to read and follow our instructions carefully.

The excellent working results of the device will widely compensate the time spent reading these instructions.

1 - QUALIFIED PERSONNEL

All the operations of installation, setup, startup, maintenance and verifications of operation of the RK90R(S) detector must only be performed by qualified personnel. These people are qualified for their experience, specialization courses and knowledge of the current standards and of the technical specifications, features and usage method of the product.

These people therefore are able to avoid errors or damages and assure an optimal functioning of the product.

2 - RELEVANT STANDARDS

2.1 - For the installation in European Community countries you must follow the EC standard EN54-14 (Fire detection and fire alarm systems).

In extraeuropean countries you should follow the relevant international and national standards.

3 - INSTALLATION

3.1 - For the installation of the RK90R(S) detector, we suggest to use, in addition to the normal tools (drill, expansion plugs, etc) also the following tools:

- 1 - 7mm "C" key
- 1 - alignment lamp (we recommend to use LAL02 lamp) or an electric torch with powerful and focused beam)
- 1 - Multimeter (we recommend an analog hand Multimeter or our analog STS01 meter (optional) to be plugged on the special connector positioned on detector's circuit).

3.2 - Unscrew the two fixing screws (fig. 2) and remove the cover

3.3 - Install the device at a distance from the ceiling within the 10% of the height of the room to be protected.

This distance can be varied by the system designer if particular environmental conditions exist. Wall fixing must be done with care using the holes provided inside the enclosure. If the wall is a solid masonry one, expansion plugs are enough for fixing.

It's extremely important that the fixing wall or surface is rigid and not subject to deformations.



3.4 - Get the cables inside through the holes obtained breaking the suitable zones marked on the sides of the detector's base.

It is important to use a suitable chock with a connecting pipe to avoid that the dust penetrates inside the device, possibly causing failure to its correct functioning.

3.5 - Install the reflector FX on the opposite wall and at the same height of the detector. It is not necessary that the FX is exactly in front of and perpendicular to the detector (a small angular shift is possible in all directions).

We recommend, for cables economy, to install the detector as near as possible to the alarm control unit.

4 - CABLE CONNECTIONS

4.1 - The low detector's power consumption (14 mA with normally open alarm relay contact (NO) and 28 mA with normally closed alarm relay contact (NC)), allows to use small size sections cables. We suggest to use a shielded cable with 10 conductors + shield (2x0,75 mm² for power conductors + 8x0,22 mm² for the signal conductors) for a distance up to 1 Km. In such way it is possible to get a remote connection of the following signals:

- smoke alarm relay contact (terminals C1-N1)
- turbulence (heat) alarm relay contact (terminals C2-N2)
- fault relay contact (terminals C3-N3)
- analog 0-5V output (for remote signal level measurement)

The shield of the cable must be connected as in fig.11.

5 - ELECTRICAL CONNECTIONS AND INITIAL SETUP

5.1 - Connect the device cables as shows on the labels facing the terminal board. The given symbols indicate what follows:

- **(V+) - (V -)** - Power supply terminals 11 - 30 Vdc.
- **(C1) - (N1)** - Normally closed smoke alarm relay contact. The connection is valid when the detector is not in an alarm state and the JP2 is in 2-3 position. If JP2 is positioned on 1-2 the contact results normally open. C1-N1 terminals are voltage free.
- **(C2) - (N2) (not present in -S version)** - Normally closed turbulence alarm relay contact. The connection is valid when the detector is not in an alarm state and the JP3 is in 2-3 position. If JP3 is positioned on 1-2 the contact it results normally open. C2-N2 terminals are voltage free.
- **(C3) - (N3)** - Normally closed fault relay contact. Fault relay is normally activated (intrinsic safety). Connection is valid when the detector is not in fault state and JP4 jumper is in 1 - 2 position. If JP4 is in 2-3 position the contact is normally open. C3-N3 terminals are voltage free.
- **(SIG)** - 0-5V analog output terminal. To use only during allignment.

5.2 - JUMPER SETTINGS

JP1 - To enter/exit the optical alignment procedure. To activate the procedure of optical alignment, JP1 must be in 2-3 (ON) position. To deactivate the procedure of optical alignment JP1 must be in 1-2 (OFF) position.

- **JP1** position 2-3 (ON).....alignment procedure on
- **JP1** posizione 1-2 (OFF)... alignment procedure off

JP2 - JP3 - JP4 To set the output contacts respectively of Alarm relay, Turbulence relay (if present) and Fault relay to normally closed NC or normally open NO (chap. 5.1). The RK90R(S) detector is normally factory preset with normally closed NC contacts. For the alarm relay the indication of JP2 is valid if JP8 is in OFF position.

JP5 - Activate the alarm Memory function or to deactivate that function (detector automatically resets alarm output)

- position 1-2 alarm Memory OFF. When the detector gets out of alarm condition it automatically resets alarm output
- position 2-3 alarm Memory ON. In case of alarm, the detector's alarm output persists until power supply is switched off for at least 5 seconds

JP6 - Microprocessor reset (SW reset)

JP7 - Jumper to set the power level of the detector according to its distance from the reflector.

The maximum distance path between detector and reflector permitted for RK90R depends on the chosen reflector type : 25m with FX01 - 40m with FX02 - 50m with FX03

- JP7 OFF.....high power, from half maximum to maximum distance
- JP7 ON.....low power, for distances shorter than half maximum

JP8 - Selection of alarm relay operational mode: normally activated or deactivated

- JP8 OFF - Alarm relay normally deactivated (in case of alarm the relay gets activated). In this case the indication is according to figure 10 (diagrams of the terminal block and the typical scheme of connection to a control system to terminated lines)
- JP8 ON - Alarm relay normally activated (in case of alarm the relay gets deactivated). In this case the indication of 10 figure is inverted

6 - OPERATION

6.1 - The RK90R(S) detector is equipped with 2 detection circuits of the smoke produced by a fire Obscuration and Turbulence. The _S versions only have the Obscuration circuit.

• **Obscuration** - circuit sensitive to obscuration. This circuit bases its operation on the attenuation of the infrared beam intensity, along the optical path between the transmitter and the receiver, caused by smoke presence.

• **Turbulence (not present in -S version)** - circuit sensitive to turbulence. During the beginning phase of a fire, generally there are some clouds of smoke and warm air, that rise up to the ceiling. When these clouds and warm air intercept the infrared beam produced by the detector, they cause a perturbation of it, because they generate changes of optical and physics characteristics in the

transmission mean of the infrared beam. This variations are obviously time related. A suitable circuit has been designed to detect these variations and, when these reach the programmed amplitude and duration in time, an alarm signals is generated.

The signal amplitude and the response delay of this circuit are selectable in 4 steps that define 4 sensitivity levels. The advantage offered by this circuit is a great speed of fire detection, because it is detected in a dynamic way in its initial phase.

7 - OPTICAL ALIGNMENT

7.1 - Go on with the optical alignment of the detector. To ease the operation, we suggest to do it in low ambient light conditions and to proceed in the following way:

- Place an optical alignment lamp, able to project a focused and sufficiently intense light beam, in front of the FX reflector (fig.3- we recommend the EDS alignment lamp LAL02).
- Direct the light beam of the lamp to the lenses of the detector
- Look at the screen that is behind the lens, inside the detector. On it you will see a bright point that represents the image of the lamp
- Adjust the optical block using his special screws V1-V2-V3 with a key, so that the bright point falls in the center where a small hole is present through which the photodiode is visible (fig.4). It's important that the bright point falls on the photoemitting zone of the photodiode. This zone is represented by the small dark dot in the center of the photodiode. In such way the detector will be perfectly aligned with the FX.

8 - SETUP OF OBSCURATION CIRCUIT

Setup operations of the electric signal must be performed according to the following sequence:

8.1 - Do not power up the detector.

8.2 - Set up JP7 according to the distance between detector and FX with reference to the table fig.7 (FX01-FX02-FX03 ecc.).

8.3 - Set the jumper of Initial Optical Allignment JP1 (fig.9) to ON position (2- 3, Alignment) to activate the initial setup mode.

8.4 - Power UP the detector.

8.5 - The blue led and the red one will start to work in the way described ahead in the chap. 8.12. Before reading that chapter read the following.

8.6 - The P1 trimmer (regulation of the signal level) is factory preset to the 50-60% and it corresponds to a signal of around 5V at the maximum distance.

8.7 - To get the best results in the following operations, we recommend to use a measuring instrument (Multimeter), preferably an analog needle type, for better control of the variations of the signal during the setup. Good results are also obtained using analog meter STS01 (optional), designed for this application, that must be connected on the special connector CN4, set on the printed circuit of the detector (v. fig. 11). If you don't have a Multimeter or the STS01, you can perform the setup operations anyway, evaluating the signal level with the frontal Leds indications as described in chap.8.12.

8.8 - if available, connect a 5V fullscale Multimeter between the SIG terminal and the negative power supply one and read the analog output signal. Instead of the Multimeter it is possible to use the STS01 meter (optional - fig. 11). If the output signal is very low, it means that the operations of optical alignment, described in chapter 5, have not been performed in the right way and therefore must be repeated.

8.9 - The transmitter of the detector emits a conic beam which shape and dimension, in relation with the distance between detector and FX, are explained in figures 5-6. It's important that the FX is in the center of the detector's conic beam because, under these conditions, even if some small movements of the wall, on which the transmitter is mounted on, (caused by deformations), the reflector remains always within the beam and therefore active.

To obtain this, the operations of fine centering with output signal measuring, explained below, must be performed with care.

8.10 - Adjust the signal around 3V acting on the trimmer P1 (fig.9). **Attention! - Whether to get the 3V is necessary to adjust the trimmer counterclockwise to almost zero or, if turning the trimmer with small movements, you notice big changes on the signal level, this means that the signal sent by the transmitter and returned from the reflector is too powerful. In this case it is necessary to decrease the power of the TX inserting jumper JP7 ON which reduces the power to about half. If this action is not enough, you need to use a smaller reflector or obscure a portion of the reflector surface in order to reduce the reflective surface.**

After performing these steps, the potentiometer P1 to get the 3V becomes simple and non-critical.

8.11 - Search for the maximum output signal optimizing the optical alignment of the detector acting slowly and in sequence on the 3 screws of regulation V1-V2-V3 present on the optical block. This procedure takes some time but, if performed well, it assures a perfect operation of the detector for many years. We suggest to use the following procedure:

- On the detector slowly turn the screw V1 clockwise and then look at the value of the signal visualized on a Multimeter. If the signal increased (for example from 3V it rised to 3,5V), then again turn the screw V1 of the detector clockwise and then look at the value of the signal.
- Continue with this procedure as long as the signal increases. When it has the tendency to decrease instead, stop the operation on the screws V1 of the detector returning to the previous position.
- If during the operation the signal overcomes 4,5V, **to avoid the saturation**, act on the trimmer P1 to bring the signal back to 3 V, allowing the best evaluation of the variations of the signal.
- After finding out the maximum level signal acting on the screw V1, perform the same operations on the screws V2 and V3.

In such way the best possible position of optical allignment is reached. This procedure is important because it will assure a perfect operation of the detector for long time

8.12 - If you don't have a Multimeter, it is still possible to get good results in the optical alignment of the detector, looking at the detector's blue and red leds indications. Operation is the following:

- 1 flash of the blue Led: 1 Volt
- 1 flash of the red Led: 0.5 Volts
- if the signal is smaller of 0.5V the blue led and red one are off
- if the signal in the range 0.5-1 V the red led flashes once,

remains off for 2 seconds and then it repeats the sequence

- if signal is among 1-1.5 V the blue led flashes once, remains off for 2 seconds and then it repeats the sequence
- if signal is among 1.5-2V the blue led flashes once and the red led flashes once. They remain off for 2 seconds and then the sequence is repeated
- if signal is among 2-2.5 V the blue led flashes 2 times, remains off for 2 seconds and then it repeats the sequence
- if signal is among 2.5-3V the blue led flashes 2 times and the red led flashes once. They remain off for 2 seconds and then the sequence is repeated
- same type of indication up to 4 V
- if the signal overcomes 4 V, the blue led flashes faster and faster as the frequency signal increases up to 4.7V
- when the signal overcomes the 4.7V and in the range 4.7V - 4.9V, the blue led is continously ON. This is the position of optimal setup
- if the signal gets over 4.9V the two blue and red leds are permanently on. **This is the saturation indication.**

The table of fig.8 recaps the leds operation.

8.13 - After doing the operations of fine optical alignment using the Multimeter or the indications of the leds, you must regulate the signal slowly acting on the trimmer P1, between 4.7V and 4.9V. When the signal it is included within this range, the blue led is costantly ON. This it is the position of optimal setup. If the signal overcomes the 4.9V, the detector goes in saturation and the blue and red leds are both ON. Therefore acting on P1, it is necessary to set the signal between 4.7-4.9V so that the red led switches OFF and is only the blue Led remains ON (**to avoid saturation**).

Attention! - This adjustment is not critical. The above procedure is optimal, however, it is sufficient that the signal is just above the 4V and the blue LED is blinking or lit, to have a good calibration. Avoid, however, the saturation (red LED lit). The microprocessor automatically compensates for inaccuracies in the calibration.

If this signal adjustment is critical, or, if turning the trimmer with small movements, you notice big changes on the signal level, review as described in cap. 8.10.

8.14 - It must be checked out that, since the detector bases its operation on the reflection of the projected beam, this reflection is effected by its FX reflector and not by other elements.

To be certain that the signal is produced by the reflection of its FX reflector only and not by other elements, it is useful to do a simple verification. It is necessary to obscure the reflector with a non reflecting screen (opaque). In that case the signal on SIG terminal must decrease under 0,5V. (check indications in the following pages).

8.15 - Select the alarm threshold level of the circuit sensible to Obscuration acting on the selector SW2 keeping in mind the following :

- position 1 - low sensitivity - obscuration alarm threshold set to 70%
- position 2 - low to medium sensitivity - obscuration alarm threshold set to 60%
- position 3 - medium to high sensitivity - obscuration alarm threshold set to 50%
- position 4 - high sensitivity - obscuration alarm threshold set to 40%

8.16 - Sensitivity must be regulated according to the environmental

situation. The setting must normally be a medium sensitivity level, but in case of dusty and perturbed environments, it will be useful to set a lower sensitivity level.

9 - SETUP OF TURBULENCE CIRCUIT (not relevant for -S version)

9.1 - The RK90R detector is equipped with a special additional circuit for the detection of air Turbulence (heat). This circuit is independent from the classic obscuration one and in particular situations it can be used to increase the performance of the detector. If these particular conditions are not present the Turbulence circuit can be left unused.

9.2 - This circuit is particularly useful when, for environmental reasons, the optical beam smoke detector must be installed at distances from the ceiling higher than the nominal. When the fire begins, it produces smoke clouds and hot air bubbles that go up. When these bubbles intercept the infrared beam, they perturbate it because they produce a change of the optical-physical characteristics of infrared beam. These changes are obviously correlated in time. This circuit has been designed to detect these changes and, when these changes reach the programmed amplitude and time length, an alarm signal is generated. The advantage of this circuit is the quicker fire detection, because the fire is detected in its beginning phase. A typical example is the complete protection of the dome of a church with important pictures on its surface. The linear optical beam smoke detectors must be installed at the baseline of the dome and therefore much lower than the ceiling. In this case using the turbulence (heat) detection circuit is very useful to improve the detection.

9.3 - Selection of the sensitivity level of the circuit sensitive to Turbulence(heat).

The operation is performed acting on selector SW1 of the detector that has 4 positions (fig.9).

- sensitivity increases from 1 to 4
- position 1 : minimum sensitivity
- position 4 : maximum sensitivity

The regulation must be done with caution, because with an higher sensitivity a quicker response time is obtained, but also the probability of false alarm is increased. So the sensitivity selection must be done according to the environmental conditions. If these conditions are good, an high sensitivity regulation is possible. If in the environment, because of the normal working conditions, dust's clouds, vapor or smoke are systematically produced, it will be necessary to adjust the sensitivity to a lower level, so that these factors do not generate false alarms.

10 - DETECTOR'S ACTIVATION

10.1 - Set the jumper of Initial Setup JP1 in position 1-2 (OFF)

10.2 - The blue alignment led flashes in a particular way (2 slow flashes- 1 break - 2 fast flashes and then it repeats this sequence)

10.3 - Install the cover. The operation of box closing must be done within 5 minutes. The level of the signal will be decreased because of the absorption caused by the cover.

10.4 - The microcontrolled electronics wait 5 minutes for the installation of the cover and then start a quick procedure (1-2

minutes time) to get the signal of the RK90R(S) back to 4.7-5V.

10.5 - When this adjustment procedure is finished the detector becomes operational. The blue alignment led stops flashing in the way described above (detail chap.10.2) and it begins to flash as described in 10.6.

10.6 - The blue led will emit a short flash every 10 seconds, that indicates the normal operation of the detector. In case of alarm, the frontal red led gets on and remains ON until the alarm state disappears or, if the memory function is set, until the power supply is switched OFF for at least 5 seconds (see chap.14).

11 - SIGNALAUTOCOMPENSATION

11.1 - The inside electronics of the detector is equipped with a special SW function of autocompensation of the signal. If the detector is installed inside a particularly dusty place, the dust deposited on the front cover causes a drop of the signal. This problem is automatically eliminated by the circuit of autocompensation.

12 - OPERATIONAL TEST

12.1 - Verification of the circuit sensitive to Obscuration.

The verification is carried out simply by darkening **the reflector** with an opaque screen. After 10 seconds, the detector's alarm relay must activate / deactivate (chap.5.2 - jumper JP8) and the frontal red alarm led must be switched ON.

After that, remove the screen and the alarm relay switches and the blue led restarts to flash every 10 seconds.

If the memory function is activated, (chap.14) for relay's switching it is necessary to remove the power supply of the detector for at least 5 seconds.

Attention!

- this test must be done darkening the reflector
- the screen must not be positioned in front of the detector

12.2 - Verification of the circuit sensitive to Turbulence/heat (if present) .

Verify the circuit sensitive to Turbulence putting a opaque screen **in front of the reflector** several times with the following sequence (dark / light) and selecting sensitivity with the selector SW1:

- position 1....2 second dark - 2 second light for 10-12 times
- position 3....2 second dark - 2 second light for 8-10 times
- position 2....2 second dark - 2 second light for 6-8 times
- position 4....2 second dark - 2 second light for 4-6 times

After the correct sequence the turbulence relay must be activated.

13 - FAULT OUTPUT

13.1 - The contact of fault/malfunction relay is available on the terminal block of the detector . This relay is normally activated and will become deactivated if the following conditions are verified:

- the signal drops below the 90% setup value (optical beam completely interrupted by an obstacle)

- the circuit of autocompensation has reached the limit (when this happens to proceed, it is necessary to do the maintenance of the detector)
- malfunction (it means breakdown of some component)

Attention: As stated by the relevant standards, the fault output can be used for remote signaling, but must not be used for inhibiting the alarm signal.

13.2 - Total Obscuration Option

It is possible to activate a function for rapid total obscuration (<1 sec, 90%) that activates only the Fault output (30 second delay) and not the Alarm.

This could be useful to indicate that an obstacle was accidentally introduced through the path of the optical beam.

This operational mode is only working when total obscuration is rapid (<1 sec).

To activate this function operator must insert the JP9 jumper (fig. 9). Test of this function can be done with a piece of non reflecting material quickly covering the reflector. After around 30 seconds of reflector covering, the fault output should be activated.

14-ALARM MEMORY

14.1 - The RK90R(S) is equipped with an alarm memory function that can be switched ON/OFF with the JP5 jumper (fig.9):

- jumper JP5 in position 1-2 - memory not activated (OFF)
- jumper JP5 in position 2-3 - memory activated (ON)

When the memory is activated, if the detector goes in alarm, the Alarm relay and the frontal red led remain activated until the alarm condition disappears and the power supply is not switched off for more than 5 seconds. When the memory is not activated, if the detector goes to alarm, the alarm relay and the frontal led are deactivated as soon as the alarm stops.

14.2 - Memory of configuration and settings data.

In case of black out the inside memory preserves the data. When the power supply is back, the detector, after an initialization of about 2 minutes, returns to normal operation.

15 - FRONTAL LEDS OPERATION

15.1 - The frontal leds of the detector, during normal operation , give the following indications (v. fig.9):

- normal operation: the blue Led flashes every 10 seconds
- alarm: the red led is constantly ON
- limit of compensation, interrupted beam, malfunction: the blue led flashes

16-MAINTENANCE

16.1 - The instrument asks for a simple and periodic maintenance. It can be programmed or made automatic on special signaling of the detector.

During the normal operation and after a certain time from the installation, if the maintenance is not performed, the detector, because of the dirt deposited on the front surface of the cover,

produces a Fault signal because of the drop of the signal over the limit of compensation.

Then it will be the moment to proceed to cleaning of the surface so that to reestablish the initial optical conditions.

16.2 - The operations to be carried out are the following:

- The detector must not be powered
- Clean the cover surface of the detector. You must use a wet cloth with water and some trace of soap. Chemical products like alcohol, ammonia and similar must not be used . The cleaning of the surface is fundamental for the good detector operation
- Verify the inside terminal board tightening the terminals in the case they are loose
- verify the optical alignment in the case of some deformations of the structure on which the detector is installed. In such case then repeat the operations of the chap.8
- power up the device

17 - CHANGING THE SENSITIVITY

17.1- After the installation and after some operation time, if you want to modify the sensitivity of the detector, read what follows:

- remove the cover (it is not necessary to power down the detector)
- modify the sensitivity acting on the SW2 selector
- close the cover

18 - TECHNICAL DATA

- Model: RK90R, RK90RS
- Type: reflective type Optical Beam Smoke Detector
- Manufacturer: EDS srl - V. Cà Nova Zampieri 6 - 37057 S.G. Lupatoto - Verona - ITALY
- Power Supply: 12/24 Vdc
- Power Supply Range: 11- 30 Vdc
- Optical Path Length:
 - 3 - 12 m with FX-07 reflector
 - 10 - 25 m with FX-01 reflector
 - 20 - 40 m with FX-02 reflector
 - 25 - 50 m with FX-03 reflector
- Max. covered area: 750 mq
- Protection against the inversion of polarity
- Digitally codified infrared beam
- Power Consumption:
 - 18,6 mA in normal operation
 - 34 mA with the alarm relay activated
 - 34 mA with the turbulence relay activated
 - 50 mA with both alarm and fault relay activated
- Maximum angular missalignment of the detector: +/- 0,2°
- Maximum angular missalignment of the reflector: +/- 0,2°
- Selection of the obscuration alarm threshold level with a 4 positions switch:
 - position 1 - 70%
 - position 2 - 60%
 - position 3 - 50%
 - position 4 - 40%
- Selection of the turbulence alarm threshold level with a 4 positions switch
- Alarm Relay activation delay: 10 s
- Fault Relay activation delay: 5 s
- Detector's recovery time with alarm memory deactivated: about 5 s
- Detector's recovery time with alarm memory activated: about 5 s (power supply off)
- Working temperature: -10 + 55°C
- Red LED indication: alarm status
- Blue LED indication: operation and compensation limit, interrupted beam, malfunction (fault)
- Alarm Relay: 1A/24 V dc
- Turbulence Relay: 1A/24 V dc
- Fault/Maintenance Relay: 1A/24 V dc
- 0-5 V Analog Output for signal level measuring/visualization
- Dimensions: 162 x 62 x 62 mm.
- Enclosure: autoextinguishing polycarbonate box
- Relevant Standards : EN 54-12, VDS2504-VDS2344
- Certifications: EN54-12/CPD (0786-CPD-20803), VDS2504-VDS2344 (G209131)
- Protection Index: IP 50 (IEC 529-144)
- Weight: 200 gr.

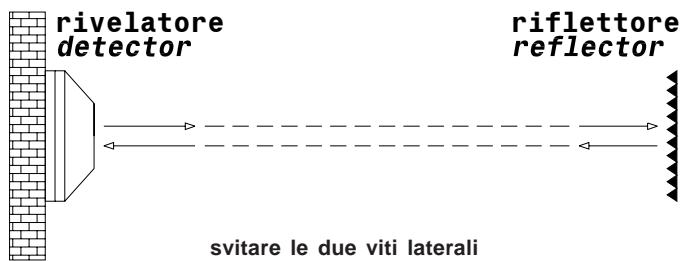
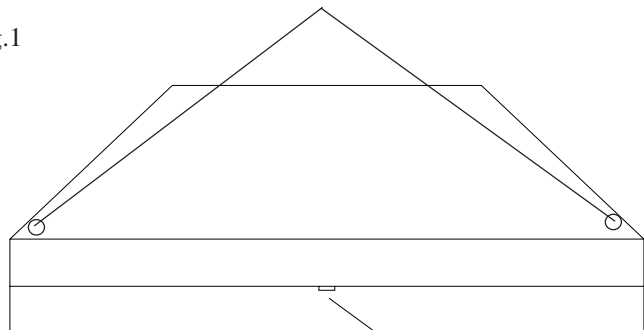


fig.1

svitare le due viti laterali
unscrew the two sides screws



inserire la punta
del cacciavite
e ruotare

insert the
screwdriver tip
and turn

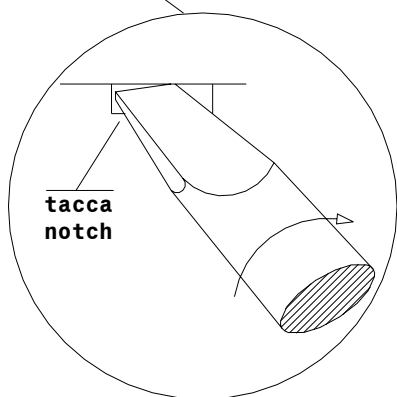


fig.2

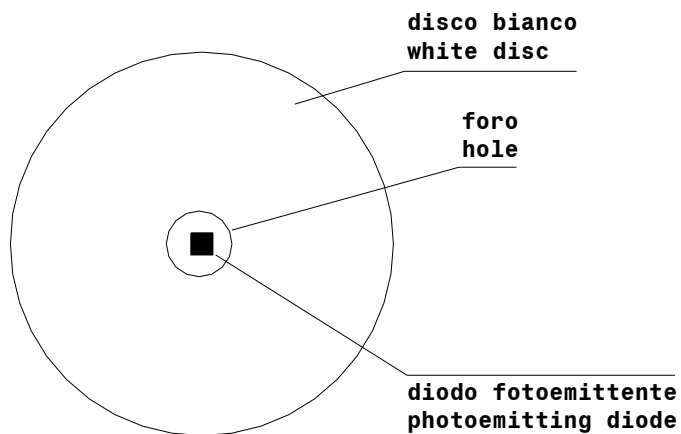


fig.4

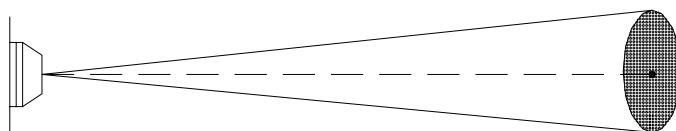


fig.5

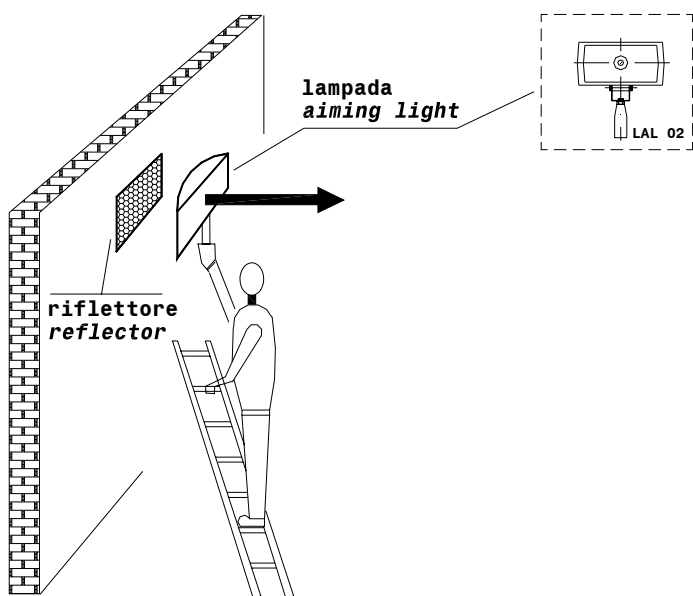


fig.3

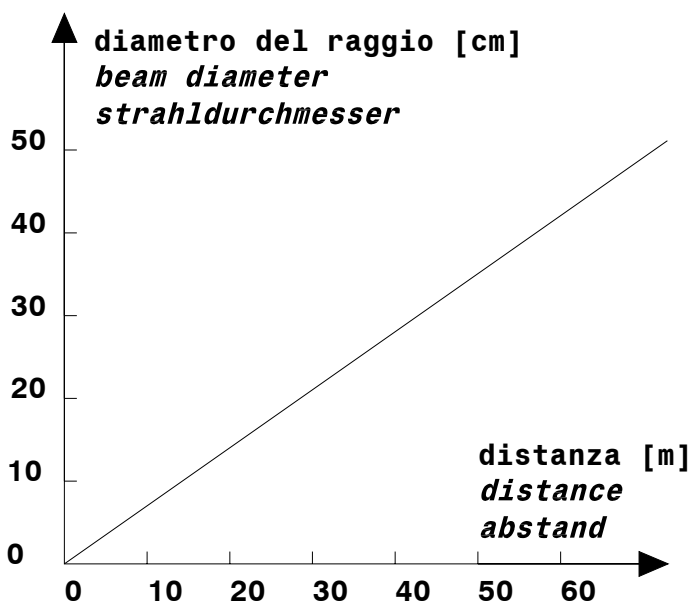


fig.6

<i>DISTANCE SELECTION WITH JP7</i>		
<i>REFLECTOR</i>	<i>POSITION</i>	<i>DISTANCE [m=]</i>
<i>FX07</i>	<i>ON</i>	<i>3-6</i>
	<i>OFF</i>	<i>6-15</i>
<i>FX01</i>	<i>ON</i>	<i>10-15</i>
	<i>OFF</i>	<i>15-25</i>
<i>FX02</i>	<i>ON</i>	<i>20-30</i>
	<i>OFF</i>	<i>30-40</i>
<i>FX03</i>	<i>ON</i>	<i>25-35</i>
	<i>OFF</i>	<i>35-50</i>

fig.7

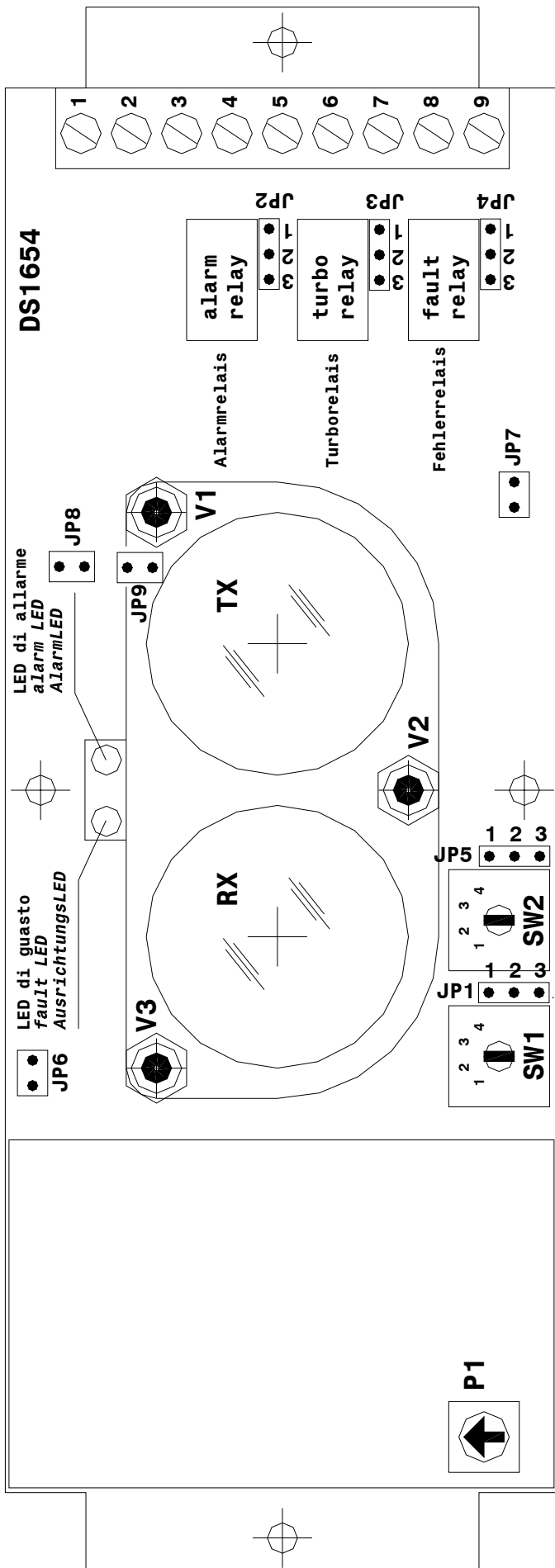
LEDS OPERATION		
VOLT	Blue Led Flashes number	Red Led Flashes number
< 0,5	OFF	OFF
0,5-1	OFF	1
1-1,5	1	OFF
1,5-2	1	1
2-2,5	2	OFF
2,5-3	2	1
3-3,5	3	OFF
3,5-4	3	1
4-4,7	Variable -/+	OFF
4,7-4,95	Light ON	OFF
> 4,95 saturation	Light ON	Light ON

fig.8

TABLE OF REFLECTORS AVAILABLE

MODELLO MODELS	DIMENSIONI DIMENSION (mm)	RIFLETTORI - PORTATA OTTICA REFLECTORS - OPTICAL RANGE											
		RK80R		RK60R		RK70R		RK75R		RK100R		RK90R	
		Minimo Minimum	Massimo Maximum	Minimo Minimum	Massimo Maximum	Minimo Minimum	Massimo Maximum	Minimo Minimum	Massimo Maximum	Minimo Minimum	Massimo Maximum	Minimo Minimum	Massimo Maximum
FX-01	D=85	2	70	2	50	2	30	2	30	30	70	10	25
FX-02	180X90	5	90	5	70	3	45	3	45	40	80	20	40
FX-03	205X185	10	110	8	90	5	60	5	60	45	100	25	50
FX-04	175X60					2	20	2	20				
FX-05	185X80					2	30	2	30				
FX-06	185X50					2	30	2	30				
FX-07	18X40					2	20	2	20			6	20
FX-08	D=24					1	18	1	18			4	18
FX-09	40X60	2	45	2	40	2	35	2	35	10	40	14	35
FX-10	100X100	5	90	5	70	5	50	5	50	30	80	20	50
FX-11	D=15					1	15	1	15			1,5	15

INTERNAL PARTS



P1 - Signal level regulation trimmer. P1 is factory preset to 50-60%, that corresponds to a 5V signal for the maximum distance.

SW1 - Sensitivity selector for the turbulence circuit. Sensitivity increases from position 1 to 4. On position 1 it's minimum and in position 4 position it's maximum. **Not present in -S version.**

SW2 - Obscuration circuit selector.

- low sensitivity - position 1 - alarm level for 70% of obscuration
- low/medium sensitivity- position 2 - alarm level for 60% of obscuration
- medium/high sensitivity- position 3 - alarm level for 50% of obscuration
- high sensitivity- position 4 - alarm level for 40% of obscuration

V1-V2-V3 - Optical block regulation screws

JP1 - Activate/deactivate the alignment procedure. To activate the optical alignment procedure, the JP1 jumper must be on 2-3 (ON) position. To deactivate the optical alignment procedure, JP1 jumper must be on 1-2 position (OFF)

- JP1 2-3 position (ON).....alignment procedure activated
- JP1 1-2 position (OFF)optical alignment deactivated

JP2 - JP3 - JP4 - Output relay contact setup jumpers, respectively for: Alarm relay, Turbulence (heat) relay (if present), Fault relay

- 1-2 position - NO contact (output contact Normally Open)
- 2-3 position - NC contact (output contact Normally Closed)

The JP4 (relative to Fault relay) must be set in 1-2 position for the contact to be closed NC, because the Fault relay is factory preset to activated.

The RK90 is factory preset with all jumpers set to NC.

JP5 - Jumper to activate or deactivate the alarm memory function (deactivated=autoreset of the detector)

- 1-2 position memory OFF. When the alarm state ends the detector resets (Auto reset)
- 2-3 position memory ON. In case of alarm, the detector maintains the alarm state till the power supply is switched off for at least 5 second.

JP6 - Microprocessor Reset jumper (resets the SW)

JP7 - Jumper to set the transmitter power according to the distance between detector and the reflector.

The maximum distance between detector and reflector depends on the chosen reflector: 25m with FX01, 40m with FX02, 50m with FX03, etc

- JP7 OFFhigh power for distance between half and maximum path length
- JP7 ONlow power for distance shorter than half maximum path length

JP8 - Set the working mode of the alarm relay

- JP8 OFFalarm relay deactivated
- JP8 ONalarm relay activated

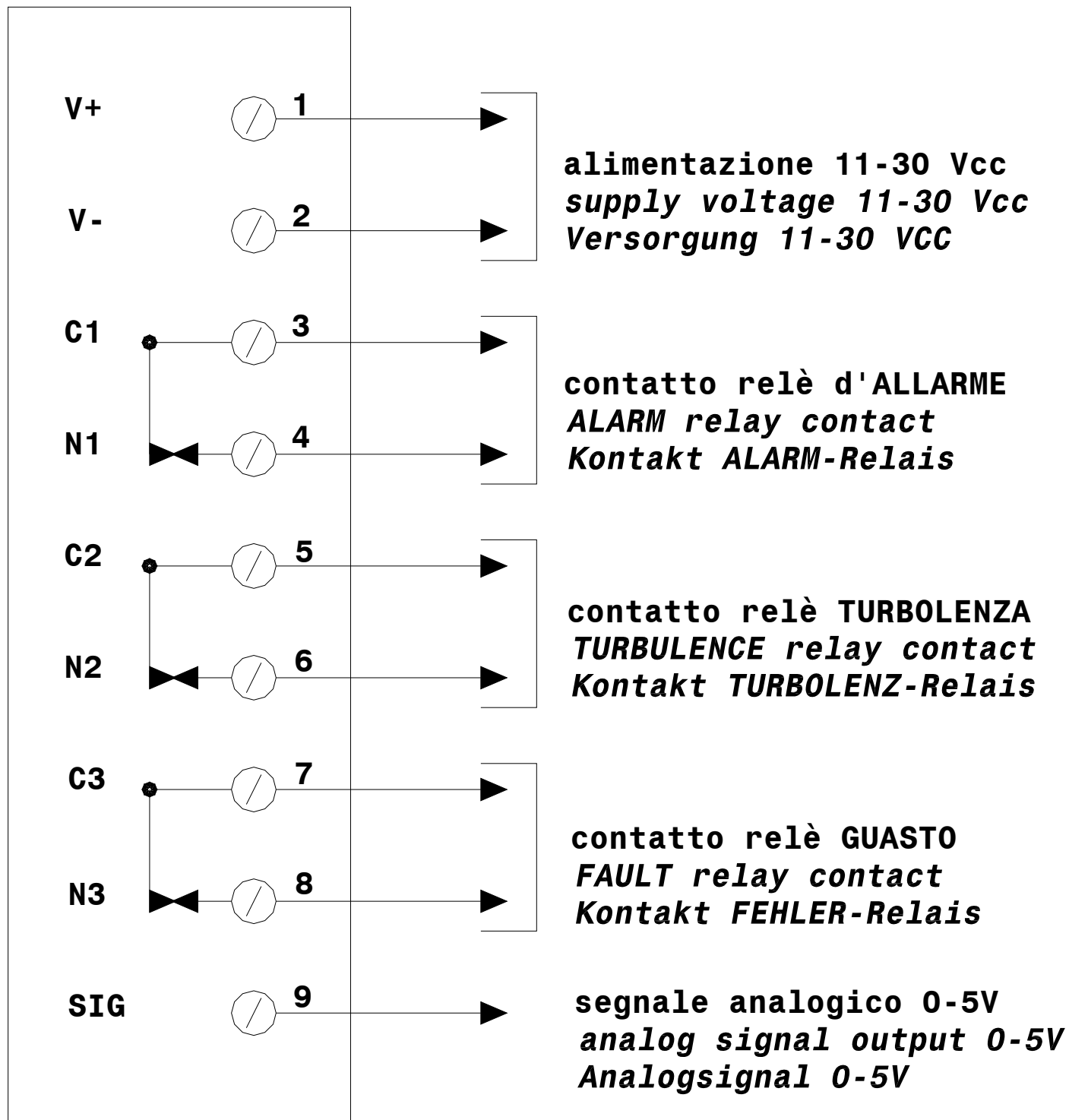
JP9 - Total obscuration fault option- JP9 ON = activated

fig.9

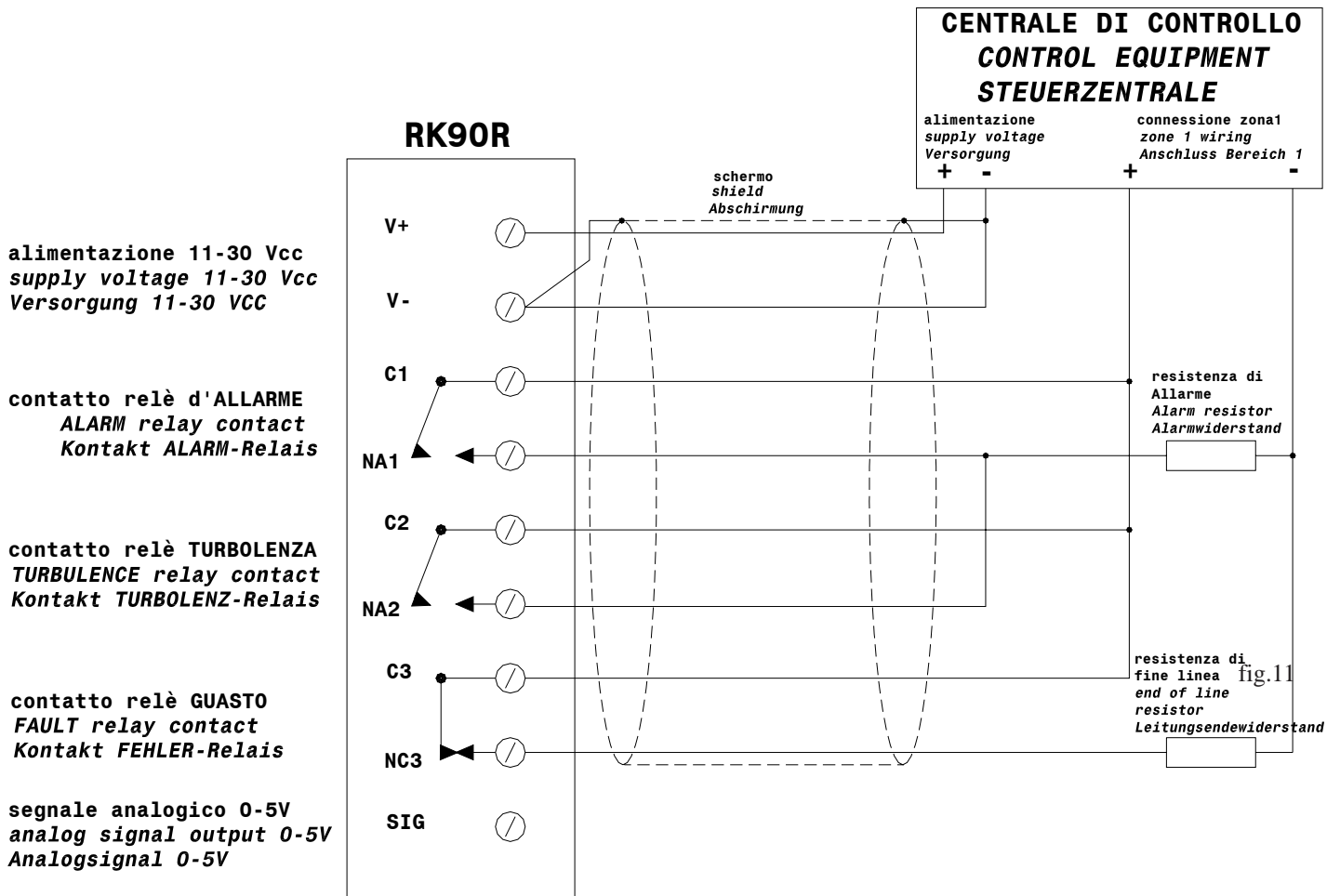
SETTING JUMPERS		
Jumper	Position	Result
JP1	1-2	alignment procedure not activated
	2-3	alignment procedure activated
JP2	1-2	contact Alarm relay normally open NO
	2-3	contact Alarm relay normally closed NC
JP3	1-2	contact Turbulence relay normally open NO
	2-3	contact Turbulence relay normally closed NC
JP4	1-2	contact Fault relay normally closed NC
	2-3	contact Fault relay normally open NO
JP5	1-2	alarm memory is not inserted
	2-3	alarm memory inserted
JP6	ON	reset
	OFF	
JP7	ON	transmitter power less than 1/2
	OFF	maximum transmitter power
JP9	ON	total obscuration Fault option- activated
	OFF	total obscuration Fault option- not activated

SETTING JUMPER JP2 - JP8			
Jumper	Position	Result	JP8
JP2	1-2	ALARM relay contact normally open NO	OFF
	2-3	ALARM relay contact normally closed NC	
JP2	1-2	ALARM relay contact normally closed NC	ON
	2-3	ALARM relay contact normally open NO	

TERMINAL BOARD

RK90R

Example of RK90R(S) connection with a zones Control Unit



Example of RK90R(S) connection with a control unit. In this case, the detector occupies a control unit zone.

In this case the detector is a zone of the system.

The state of the indicated relays correspond to the normal operation condition of the detector.

The alarm output is the one of the Alarm relay (circuit sensible to Obscuration) or the one from the Turbulence relay (circuit sensible to Turbulence (heat) circuit).







The Turbulence relay, if not necessary, can be left unused.

The Fault output is the one from the NC contact of the Fault relay of RK90R(S).

The values of the resistances of Alarm and End of Line will be indicated by the control unit manufacturer.

ACCESSORIES FOR OPTICAL BEAM SMOKE DETECTORS

RK90R/S - RK100R/S - RK100/200B/S

<p>SUP - 90</p> <p>Adjustable bracket for RK90R detector. It allows the installation of the detector in angular positions. It is very useful for installations in museum halls, picture galleries, churches, etc. This bracket allows angle shift of + /- 90° in all the directions.</p>	
<p>ZC - 01</p> <p>Optional base for RK90R detector. It allows the installation of RK90R separated from the wall surface. The base is equipped with breakable zones on the sides to allow the usage of 16 mm diameter cable pipes. It is also equipped with fixing towers to mount the detector lifted from the base, so that a good management of the cables is allowed, before introducing them inside the detector's enclosure. This base is available with the same color of the base of the detector (red or white).</p>	
<p>BLP</p> <p>Laser pointer - The alignment procedure of the detector with its reflector (for reflection detectors RK90R and RK100R) or between TX and RX (for barrier detectors RK100B and RK200B), consists in adjusting the optical support, of which the detectors are equipped, in so that the bright spot of the laser (red dot) falls at the center of the reflector or its opposite element RX.</p> <p>BLP-90..... for RK90R BLP-100..... for RK100R-100B-200B</p>	
<p>STS - 01</p> <p>Small analog meter for analog output signal measuring. It must be used inserting it on suitable connector on the PCB during the operation of optical alignment.</p> <p>Voltage Range: 0-5 V</p>	
<p>EV570 - 5</p> <p>Bar Graph Voltmeter.</p> <p>It allows the remote measuring of the analog output signal of the optical beam smoke detectors RK90R - RK100R - RK100/200B.</p> <p>Voltage Range: 0-5 V</p> <p>SC - 05</p> <p>Plastic box for install of 2 EV570-5 bar graph voltmeters</p> <p>Clear beige color. Dimensions : 97x55.5 mm.</p>	
<p>LAL - 02</p> <p>Optical alignment lamp. The RK series detectors, during installation, must be optically aligned. This lamp is suitable to do an optimal alignment. The operation is done easily in a few minutes and it assures the full functionality of the detectors. The lamp has a L=15m cable with crocodile clips for connection to a 12V battery power supply.</p>	



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 E-mail: eds@eds.eu URL: <http://www.eds.eu>

DECLARATION OF PERFORMANCE
 according to EU Construction Products Regulation N° 305/2011



1 - Unique product identification code :

RK90R, RK100R, RK100B, RK200B, RK90RS, RK100RS, RK100BS, RK200BS

2 - Type, batch or serial number or any other element allowing identification of the construction product as required pursuant to article 11(4) :

RK90R, RK100R, RK100B, RK200B, RK90RS, RK100RS, RK100BS, RK200BS

3 - Intended use or uses of the construction product, in accordance with the applicable harmonised technical specification, as foreseen by the manufacturer :

Smoke detector – Line detector using an optical light beam (EN54-12).
For use in fire detection and alarm systems within buildings.

4 - Name, registered trade name or registered trademark and contact address of the manufacturer as required pursuant to article 11(5) :

EDS srl , Via Cà Nova Zampieri 6, San Giovanni Lupatoto (Verona) , 37057, Italy

5 - Where applicable, name and contract address of the authorised representative whose mandate covers the tasks specified in article 12(2) :

Not applicable.

6 - System or systems of assessment and verification of constancy of performance of the construction product as set out in Annex V :

System 1.

7 - In case of the declaration of performance concerning a construction product covered by the harmonised standard:



VdS Schadenverhütung GmbH 0786

Performed type testing and the initial inspection of the manufacturing plant and of the factory production control with continuous surveillance assessment and approval of the factory production control under system 1 and issued the EC certificates of conformity:

0786-CPR-20803

8 - In case of the declaration of performance concerning a construction product for which a European Technical Assessment has been issued :

Not applicable.

9 - Declared Performance. All requirements including all essential characteristics and the corresponding performances for the intended use or uses indicated in 3 have been determined as described in the hEN mentioned in the following.

Essential Characteristics	Performance	Harmonised Technical Specification EN54-12:2002
Nominal activation conditions/Sensitivity/	Pass	4.5, 4.8, 4.10, 5.2, 5.3, 5.4, 5.6, 5.7, 5.8, 5.9, 5.10
Operational reliability	Pass	4.3, 4.4, 4.6, 4.7, 4.9, 5.16, 5.18
Tolerance to supply parameters	Pass	5.5
Performance under fire conditions	Pass	4.2
Duration of operational reliability temperature resistance	Pass	5.11, 5.12
Duration of operational reliability vibration resistance	Pass	5.15
Duration of operational reliability humidity resistance	Pass	5.13, 5.14
Duration of operational reliability corrosion resistance	Pass	5.17

10 - The performance of the product identified in 1 and 2 is in conformity with the declared performance in 9. This declaration of performance is issued under the sole responsibility of the manufacturer identified in 4.

EDS srl, Verona, 01/07/2013

NAME : ENG. POMPOLE GIANCARLO
POSITION : GENERAL MANAGER

SIGNATURE :



EDS WARRANTY GENERAL CONDITIONS

1. OBJECT

EDS S.r.l. - Via Cà Nova Zampieri 6, 37057 S. G. Lupatoto - Verona, Italy (hereinafter "EDS"), guarantees its products to be free from defects in materials or workmanship within the terms and conditions of this Warranty. A product found by EDS to be defective will be repaired or replaced, at the option of EDS, within 24 month after receipt of the product by EDS or an authorized EDS Service Center. Please note that in addition to this policy you may have specific legal rights granted by your national or state laws regarding warranties of consumer products.

2. NOT COVERED

This warranty does not cover products which reached the end of their normal lifespan, does not cover damage resulting from accidents, alteration, neglect, misuse or abuse, lack of reasonable or proper maintenance, corrosion, improper assembly, repairs improperly performed or replacement parts improperly installed, use of replacement parts or accessories not conforming to EDS's specifications, use of component parts not manufactured or supplied by EDS, modifications not recommended or approved in writing by EDS, normal wear and deterioration occasioned by the use of the product. This warranty also does not cover cosmetic imperfections in the surface, finish, or appearance of the product which were apparent or discoverable at the time of purchase of the product or damage occurring during shipment or transport of the product. This warranty also does not cover tools and other consumables or any expenses related to the transportation of the product to or from EDS or an authorized EDS Service Center.

3. PURCHASER

This warranty is made only with the original purchaser of the product and does not extend to any third parties. The rights of the Purchaser under this warranty may not be assigned.

4. TERM

The term of this warranty shall commence on the date of retail purchase and shall continue for a period of 24 month.

5. ENTIRE AGREEMENT

This warranty supersedes any and all oral, express or written warranties, statements or undertakings that may previously have been made, and contains the entire Agreement of the parties with respect to the warranty of the product. Any and all warranties not contained in this Agreement are specifically excluded.

6. DAMAGES

Except as expressly provided by this warranty, EDS shall not be responsible for any incidental or consequential damage associated with the use of the product or a claim under this agreement, whether the claim is based on contract, tort or otherwise. The foregoing statements of warranty are exclusive and in lieu of all other remedies. Some states do not allow the exclusion or limitation of incidental or consequential damages, so this limitation or exclusion may not apply to you.

7. DISCLAIMER

Any implied warranty of merchantability or fitness for a particular purpose and all implied warranties arising from a course of dealing, usage of trade, by statute or otherwise, is hereby strictly limited to the term of this written warranty. This agreement shall be the sole and exclusive remedy available to the Purchaser with respect to the purchase. In the event of any alleged breach of any warranty or any legal action brought by the purchaser based on alleged negligence or other tortious conduct by EDS, the Purchaser's sole and exclusive remedy will be repair or replacement of defective materials as stated above. No dealer and no other agent or employee of EDS is authorized

to modify, extend or enlarge this warranty. The performance of any warranty service under this Agreement is not an admission or agreement that the design or manufacture of a product is defective.

8. PROCEDURE

In the event of a defect covered by this warranty, the purchaser should contact EDS - Via Cà Nova Zampieri 6, 37057 S. G. Lupatoto - Verona, Italy or an authorized EDS Service Center. To be honored, claims must be submitted within the 24 month warranty period (according to the product) and within eight (8) days of discovery of the defect. The determination whether the defect is covered by this warranty is within the sole discretion of EDS. EDS reserves the right to discontinue products and to change specifications for existing products at any time without notice and shall not be obligated to incorporate new features into products previously sold, even if those products are returned under a warranty claim. EDS may replace defective parts with similar parts of similar quality in the event that identical parts are unavailable. The purchaser must obtain advance authorization in writing before returning any product to EDS for warranty inspection. A return authorization number will be issued and must conspicuously appear on the outside of the product's packaging. The issuance of an authorization number does not constitute acceptance of the claim, which will be evaluated by EDS upon its inspection of the product. The product should be cleaned and securely packed to prevent damage during shipment and must be accompanied by a letter specifying or including the following items of information:

- a) dated receipt or other proof of date of retail purchase;
- b) a copy of the warranty;
- c) EDS part number;
- d) detailed description of the problem experienced with the product, including a chronology of efforts made to correct the problem;
- e) identification of the components used in conjunction with the product;
- f) estimate of product usage: (i.e. accumulated mileage or time in service);
- g) your name, address, and written authorization to ship the repaired product back to you freight collect ("C.O.D.");
- h) the product for repair must be shipped to EDS without any charge

9. APPLICABLE LAW

Any disputes arising out of this Agreement or the use of this product will be governed by the laws of the country of Italy and will be decided by the Courts of Verona, Italy.





The information contained in this document have been carefully checked and are reliable. By the way EDS company is not responsible in any way for possible inaccuracies or errors and it reserves the right to perform changes in any part of this document and/or product, to improve the quality, reliability or the design.

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