

Operating and Maintenance Instructions W-4/2/EN/7
 for fire dampers of the
 type FK-K90 with approval No. Z-41.3-321
 type FKN-K90 with approval No. Z-41.3-318 and
 type E01-K90 with approval No. Z-41.3-323

Attention!

- Work should only be carried out only by specialists
- Observe general Health and Safety regulations
- Release mechanism, pneumatic actuator and electrical actuator must be accessible
- Depending on the installation situation additional inspection openings may need to be arranged in the adjacent ventilation ducts for internal inspections of the casing
- Spare parts in accordance with Spare Parts Price List EP/4/2/D/...



Lubricating points: Lubricate only if not moving smoothly.
 Use only oils and fats free of resin and acid as lubricants.



If the fire damper is actuated the drive rods follow the movement sequence indicated by the arrow. Do not touch the marked areas if the fire damper is in operation because of injury danger.

Impure and damp air may impair continuous functional safety. That is why all fire dampers have to be serviced every six months after the ventilation system has been commissioned. If two successive services do not reveal any functional faults the fire dampers need only be serviced at yearly intervals.

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Operating and Maintenance Instructions for Fire Dampers of the Types FK-K90 · FKN-K90 · E01-K90

W-4/2/EN/7

Fig. 1

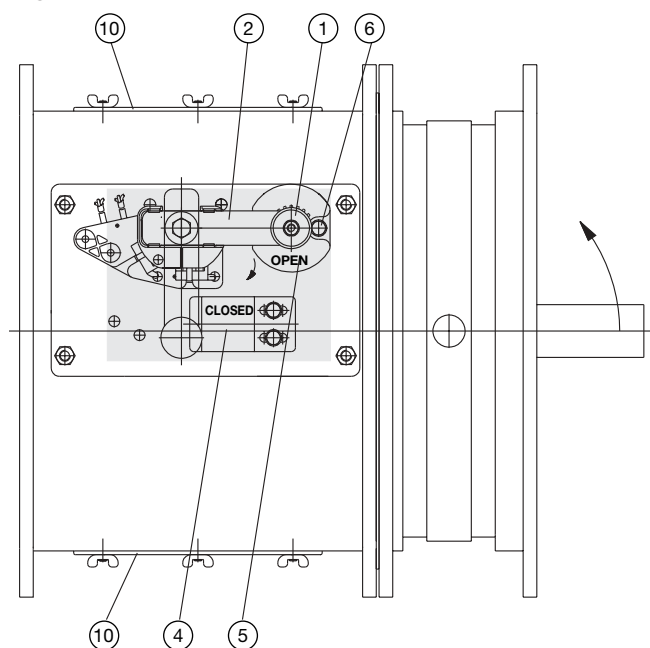
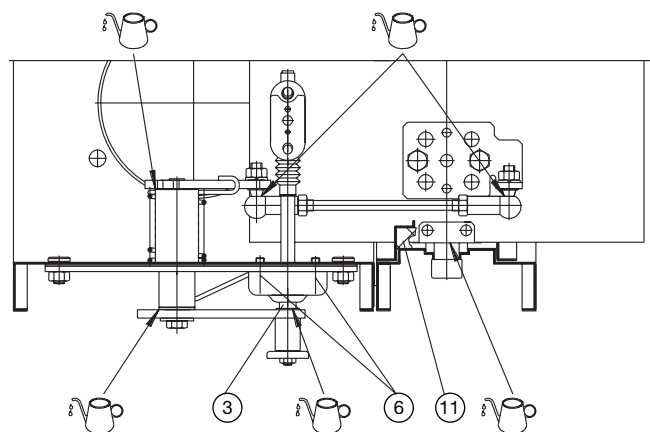
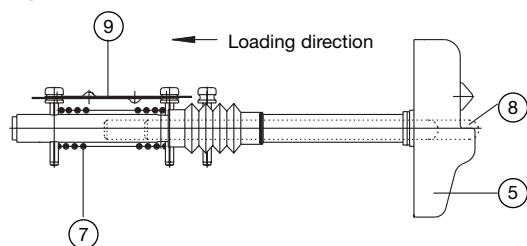


Fig. 2



Shown: linkage with ball-and-socket joint,
optionally bolt

Fig. 3



Instruction for Operation and Maintenance

I Basic version

1. External inspection

1.1 Visual inspection

- Check the fire damper for damage
- Carry out the necessary cleaning activities

1.2 Inspection of the locking device

- Hold the manual lever item ② in the starting position
- Pull the collar item ① of the manual lever item ② and release again
- Return movement must be automatic (self-acting)

1.3 Manual release – close the damper blade

- Pull the collar item ① of the manual lever
- Release lever to allow rotation
- The damper blade must close automatically (self-acting)
- The manual lever must engage in CLOSED position behind the locking device item ④

1.4 Open the damper blade

- Pull the collar item ① of the manual lever item ②
- Open the damper blade
- Engage spring loaded pin item ③ into the release mechanism item ⑤

Repeat the manual release procedure several times as described under point 1.3.

2. Internal inspection and functional test to simulate a thermal release

2.1 Inspection of the release mechanism

- Execute the manual release as described under point 1.3
- Remove the two fixing screws item ⑥ and pull out the release mechanism item ⑤ frontwards
- Load the compression spring item ⑦ by pressing the release rod item ⑧, as shown in figure 3, until the fusible link item ⑨ can be removed
- When the load is being released, the compression spring must easily move the release rod as far as it will go
- Check the fusible link
- Install the release device (without fusible link) again

Fig. 1 Fire damper in standard construction,
FK-K90 shown

Fig. 2 Fire damper as cross-section view from above,
FK-K90 shown

Fig. 3 Release mechanism

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Fig. 4.1

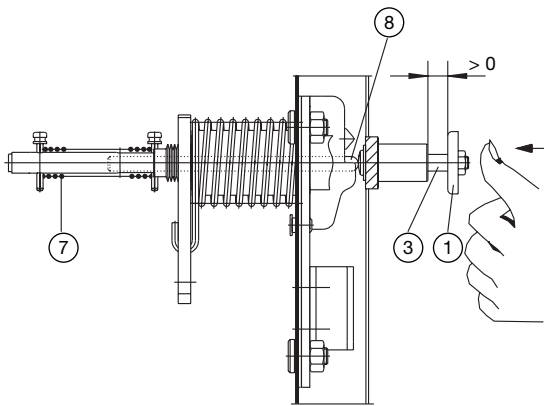
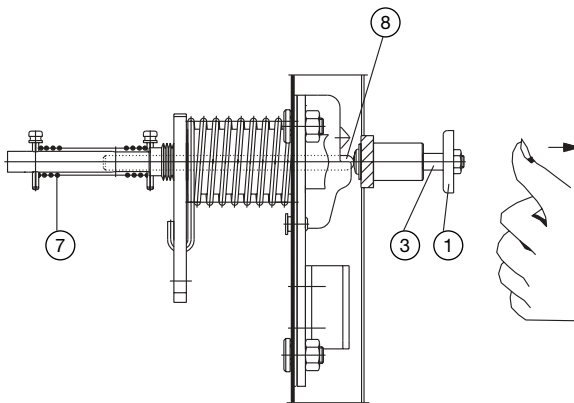


Fig. 4.2



2.2 Functional test to simulate a thermal release

- Open the damper blade, as described under point 1.4
- Push the spring loaded pin assembly items ③ and ① against the release rod item ⑧ as shown in Fig. 4.1
- The compression spring item ⑦ is loaded
- Let go of collar item ①, the compressed spring item ⑦ must push out the release rod item ⑧ as far as is shown in Fig. 4.2 so that the mechanism is released and the damper blade closes on its own
- Dismantle triggering device, as described at 2.1
- Load compression spring item ⑦
- Insert fusible link again, as shown in figure 3
- Reinstall release mechanism

2.3 Internal casing inspection

- Remove the inspection cover item ⑩
- Check the direct visible parts through the inspection opening after inserting a light source
- Check the not directly visible parts by using a suitable hand mirror
- Open the damper blade, as described under point 1.4
- Repeat the visual inspection
- Carry out the necessary cleaning activities, the perimeter seal item ⑪ must not be damaged
- Refit the inspection cover item ⑩ including the associated seal

The fire damper is now ready to use.

Simulation of a thermal release

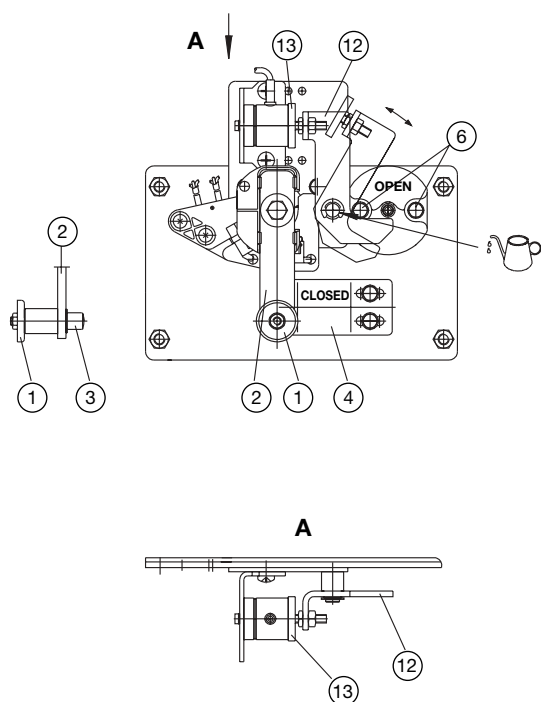
Fig. 4.1 1. Step

Fig. 4.2 2. Step

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Fig. 5



II Basic version with additional triggering by solenoid or electro magnet

3. External inspection – mechanical

3.1 Basic inspection

- Before the start of the work secure fire damper against accidental electrical triggering
- Carry out inspection, as described at 1.1, 1.2 and 1.3
- Pull collar item ① on lever item ②
- Open the fire damper blade
- Engage spring loaded pin item ③ behind lever item ②

3.2 Additional inspection – solenoid

- Observe VDE Guidelines or appropriate regulations (VDE = Union of German Electrical Engineers)
- Compare operating voltage with the data of the solenoid
- Close electrical circuit to solenoid, press button item ①, page 5
- The fire damper blade must close on its own
- Lever must engage in CLOSED position behind the locking plate item ④
- Pivot lever item ⑫ with plate item ⑬ to the solenoid
- The plate item ⑬ must stick to the solenoid
- Pull collar item ① on lever item ②
- Open the fire damper blade
- Engage spring loaded pin item ③ behind lever item ⑫

3.3 Additional inspection – electro magnet

- Observe VDE Guidelines or appropriate regulations (VDE = Union of German Electrical Engineers)
- Compare operating voltage with the data of the electro magnet
- Interrupt circuit to electro magnet
- The fire damper blade must close on its own
- Lever must engage in CLOSED position behind the locking plate item ④
- Pivot lever item ⑫ with plate item ⑬ to the electro magnet
- Pull collar item ① on lever item ②
- The plate item ⑬ must stick to the electro magnet
- Open the fire damper blade
- Engage spring loaded pin item ③ behind lever item ⑫

4. Internal inspection

Carry out inspection, as described at 2

Fig. 5 Basic version with solenoid or electro magnet

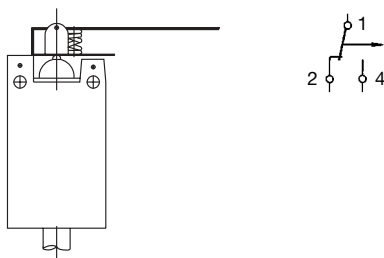
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Limit switch standard version



Limit switch Ex version only for standard construction



Information for electrical wiring

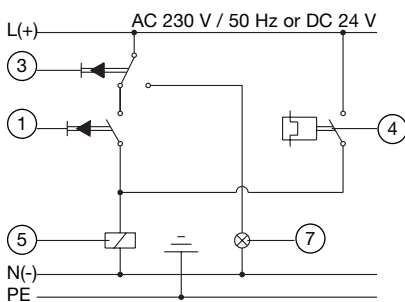
Electrical connection works must only be carried out by specialists.

Notice the VDE regulations or appropriate regulations (VDE = Union of German Electrical Engineers)

5. Wiring of the limit switch
 - Wire the limit switch according to the required indication
 - Limit switches shown in inoperative position
6. Wiring of the electrical fit on components
 - Compare operating voltage with the given data of the fit on components
 - Wiring in accordance with the circuit diagram adjacent
 - Circuit diagrams shown for damper blade in OPEN position
 - For constructions using solenoids or electro magnets (items ⑤ or ⑥) these must be wired in series with the limit switch item ③

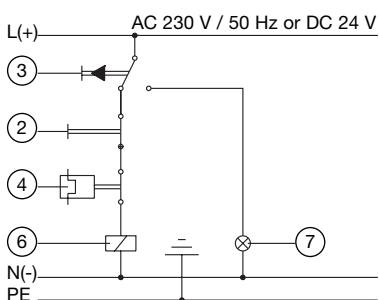
Optionally BUS-Systems can be used to achieve the required function, e.g. control-equipment of TroxNetCom (pre wired for connection).

Construction with solenoid



Damper blade shown in **OPEN** position

Construction with electro magnet



Damper blade shown in **OPEN** position

- ① Electrical push-button, supplied by others (close fire damper)
- ② Electric switch, supplied by others (close fire damper)
- ③ Electric limit switch with double changeover contact (open and close circuit)
- ④ Sensor or detector, supplied by others (close fire damper); for release mechanism using power off to close principle, e.g. Trox smoke detector type RM-O/2 or RM-O-VS
- ⑤ Solenoid
- ⑥ Electro magnet
- ⑦ Consumer electrics, supplied by others (e.g. pilot lamp for position indication)

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Fig. 6

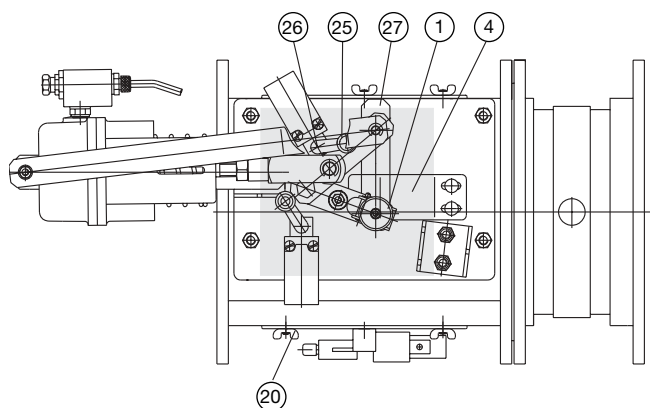


Fig. 7

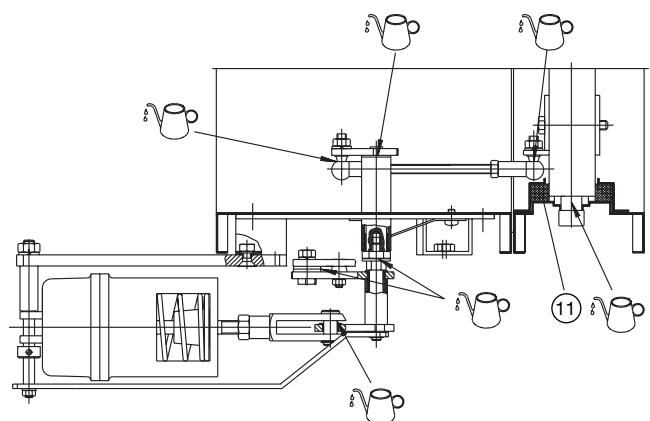


Fig. 8

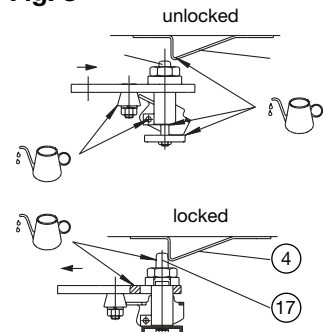
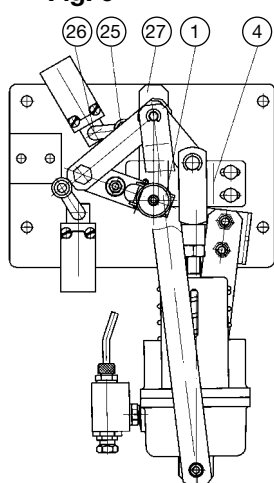


Fig. 9



III Pneumatic actuator 1.2 and 6 bar

The compressed air used must be dry, dust-free and free from compressor oil. The pneumatic actuator of the fire damper must be operated several times with compressed air at monthly intervals so that the lubrication film within the actuator is preserved.

7. External inspection

7.1 Visual inspection

- Check fire damper for damage
- Clean as necessary

7.2 Check the locking device

- Pull collar item ① and release again
- It must return on its own

7.3 Manual triggering – close the fire damper blade

- Release wing screw item ⑭, Fig. 10, on triggering device item ⑳
- Angle lever item ⑮ pivots in the direction of the arrow
- Pneumatic valve item ⑯ operates
- Compressed air is isolated; air drained from pneumatic valve item ⑯
- The damper blade must close on its own
- Engage spring loaded pin item ⑰ behind the triggering item ④

8. Internal inspection

8.1 Internal casing inspection:

- Remove electric plug item ⑱ of the solenoid valve item ⑲ after releasing the securing screw
- Dismantle triggering device item ⑳
- Through the open inspection aperture, with a light source, check directly visible parts
- Clean as necessary; in the process the perimeter seal item ⑪ must not be damaged

Fig. 6 Fire damper - H < 400 mm with pneumatic actuator (drawn FK-K90 with 1.2 bar pneumatic pressure)

Fig. 7 Fire damper - H < 400 mm as cross-section view from above (drawn FK-K90 with 1.2 bar pneumatic pressure)

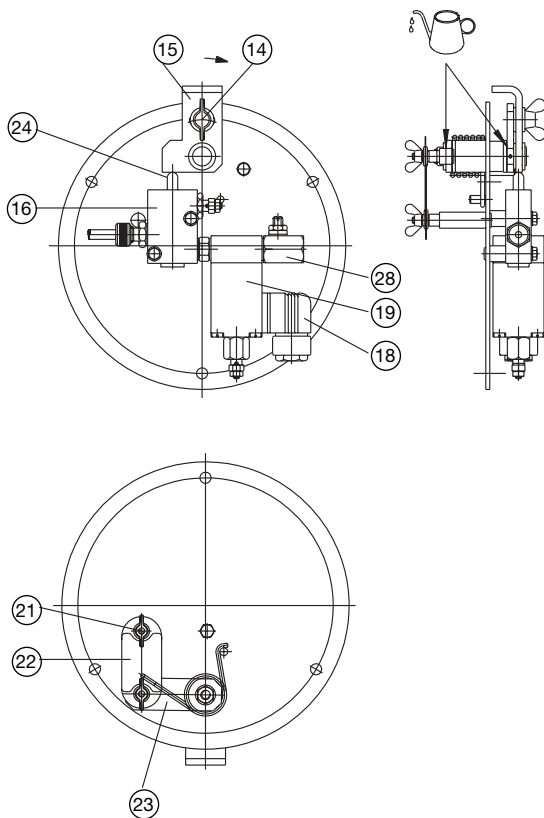
Fig. 8 Locking device

Fig. 9 Arrangement of pneumatic actuator
Fire damper - H ≥ 400 mm

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Fig. 10



8.2 Testing triggering device

- Dismantle wing nut item ⑲
- Remove fusible link item ⑳
- Check lever item ㉓ for ease of movement
- Press the spring loaded pin item ㉔ of the pneumatic valve and release again
- The pin must bounce back to original position on its own
- Check fusible link for external damage
- If no damage is visible, refit the fusible link again
- Mount triggering device including relevant seal, in the process check the position indicated on the notice plate
- Reattach electric plug item ⑱ on the solenoid valve item ⑲

9. Open the fire damper blade

- Pivot angle lever item ⑮ against the direction of the arrow
- Press pneumatic valve item ⑯
- Stop angle lever with wing screw item ⑭
- Pivot roller lever item ㉕, Figs 6 and 9, by turning fixing screw item ㉖ in the direction of the arrow until lever item ㉗ is in contact with the roller of item ㉕
- The circuit to the solenoid valve is closed
- Compressed air is applied to the pneumatic actuator
- The piston on the pneumatic actuator must move out without vibration
- The locking device unlocks automatically
- The fire damper opens in approx. 2 – 5 seconds
- If necessary, adjust flow control valve item ㉘ again
- Carry out manual triggering, as described at 1.3 again
- Open the fire damper blade

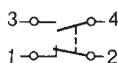
The fire damper is now ready to use.

Fig. 10 Triggering device

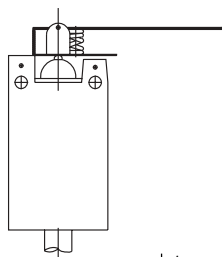
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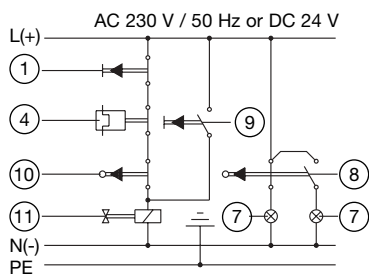
Limit switch standard version



Ex version

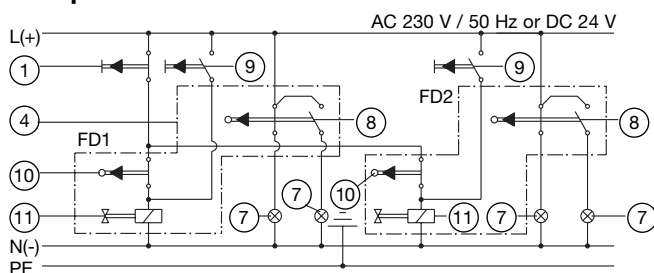


Individual control



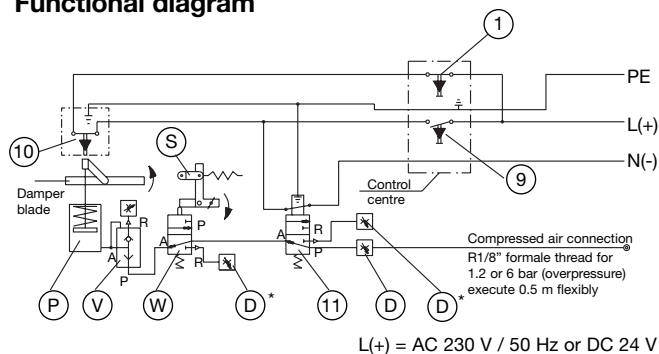
Damper blade shown in **OPEN** position

Group control



Damper blade shown in **OPEN** position

Functional diagram



Damper blade shown in **OPEN** position

Information for electrical wiring

Electrical connection works must only be carried out by specialists.

Notice the VDE regulations or appropriate regulations (VDE = Union of German Electrical Engineers).

10. Wiring of the electrical fit on components

- Compare operating voltage with the given data of the electrical fit on components
- Wiring in accordance with the circuit diagram adjacent
- Circuit diagrams shown for damper blade in OPEN position
- Limit switch item ⑩ must, in principle, be wired in series with the solenoid valve item ⑪
- Group-controlled fire dampers may be opened only via separate control circuits, button or switch item ⑨
- To be opened, the button or switch item ⑨ must be pressed until the fire damper has reached the OPEN position

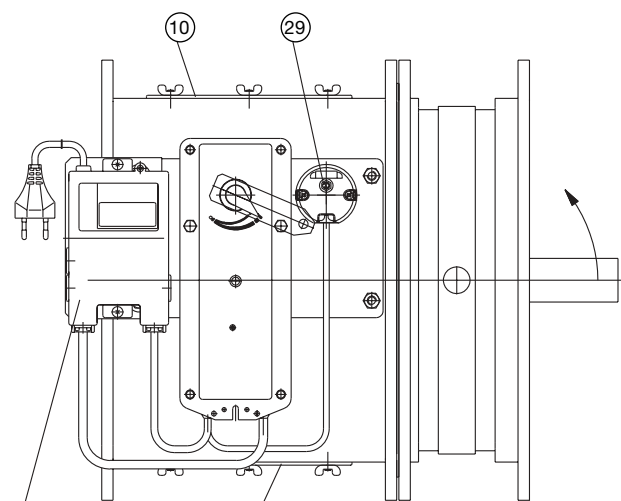
Optionally BUS-Systems can be used to achieve the required function, e.g. control-equipment of TroxNetCom (pre wired for connection).

- ① Electrical push-button, supplied by others (close fire damper)
- ④ Sensor or detector, supplied by others (close fire damper); for release mechanism using power off to close principle, e.g. Trox smoke detector type RM-O/2 or RM-O-VS
- ⑦ Consumer electrics, supplied by others (e.g. pilot lamp for position indication)
- ⑧ Electrical limit switch with double change-over contact (open and close circuit)
- ⑨ Electrical push-button or switch with timing relay, supplied by others (open fire damper)
- ⑩ Electric limit switch – Break circuit to the solenoid valve item ⑪ in case of pressure loss (fire damper closes)
- ⑪ 3/2 way solenoid valve (if no current, supply of compressed air isolated)
- Ⓓ Adjustable throttle valves (the valves marked * are omitted in case of 1.2 bar pneumatic actuator)
- Ⓔ Pneumatic actuator (operating pressure 1.2 or 6 bar)
- Ⓕ Fusible link, release temperature 72°C
- Ⓖ Quick-exhaust valve (only for pneumatic actuator 1.2 bar)
- Ⓗ 3/2 way pneumatic valve (pneumatic cylinder venting in the case of fusible link release)

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Fig. 11

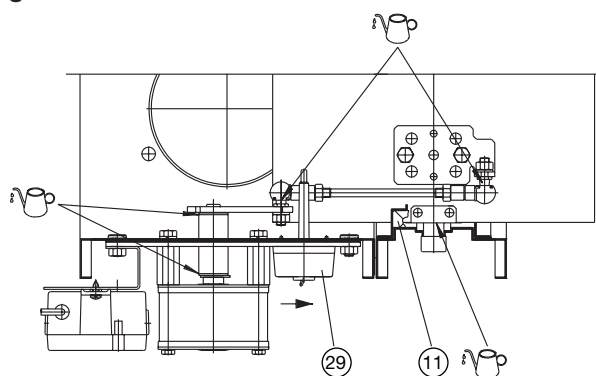


Power supply unit
BKN230-24-1 TR
(optional)

Comment: Control unit BKS24-1 TR (optional),
wiring supplied by others

**Spring return actuator type BLF for combinations of
sizes up to B x H = 797 x 400 mm.**

Fig. 12



IV Spring return electric actuator (power off to close)

11. External inspection

11.1 Visual inspection

- Check the fire damper for damage
- Carry out the necessary cleaning activities

11.2 Manual release

- Press the test button item 29 of the thermo-electric release mechanism type BAE72A-S
- The circuit to the actuator is interrupted for as long as the test button is pressed
- The damper blade must close automatically (self-acting) as long as the test button is pressed

12. Internal inspection

12.1 Internal casing inspection:

- Remove the inspection cover item 10
- Check the direct visible parts through the inspection opening after inserting a light source
- Check the not directly visible parts by using a suitable hand mirror
- Carry out the necessary cleaning activities; the perimeter seal item 11 must not be damaged
- Refit the inspection cover item 10 including the associated seal

12.2 Electrical inspection:

- Interrupt the electricity supply to the electric actuator
- The damper blade must close automatically (self-acting)
- Close circuit to the electric actuator
- The damper blade must open automatically (self-acting)

The fire damper is now ready to use.

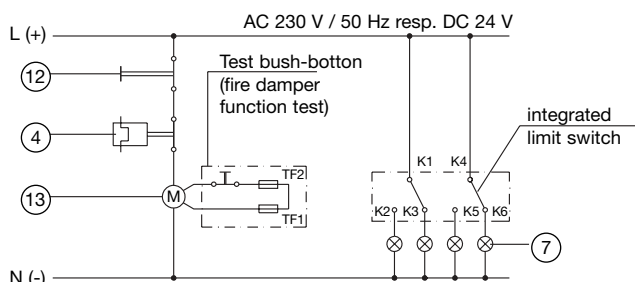
Fig. 11 Fire damper with spring return actuator, type FK-K90 with spring return actuator type BF shown

Fig. 12 Fire damper as cross-section view from above, type FK-K90 with spring return actuator type BF shown

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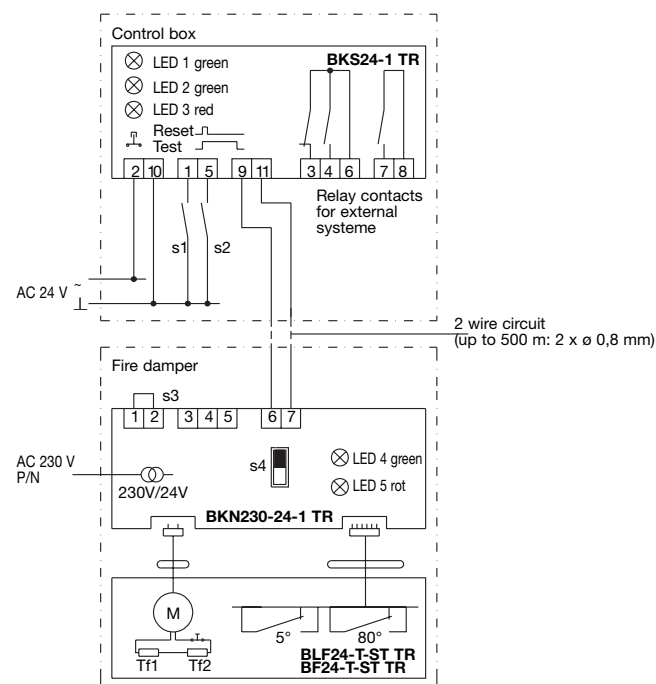
Electrical actuator (power off to close)



Damper blade shown in **OPEN** position

Type BLF230-T TR and BF230-T TR: To isolate from the main power supply, the system must incorporate a device which disconnects the phase conductors (with at least a 3 mm contact gap).

Control system and monitoring of electrical actuators in conjunction with a power supply or with a power supply and a control unit



- (s1) Electrical switch (open and close fire damper)
- (s2) Reset/Test (external)
- (s3) Smoke detector, optional
(Fire damper closes automatically with a concentration of smoke over the permitted threshold); if (s3) is used, remove link 1, 2
- (s4) Slide switch for functional control or operation when BKS24-1 TR is not installed, directly at the fire damper. If used without BKS24-1 TR, the limit switches "OPEN" and "CLOSED" of the actuator are connected with the terminals 3, 4 and 5 of the BKN230-24-1 TR.

Information for electrical wiring

Electrical connection works must only be carried out by specialists.

Notice the VDE regulations or appropriate regulations (VDE = Union of German Electrical Engineers)

13. Wiring of the electrical fit on components
 - Compare operating voltage with the given data of the electrical fit on components
 - Wiring in accordance with the circuit diagram adjacent
 - Circuit diagram shown for damper blade in OPEN position

Optionally BUS-Systems can be used to achieve the required function, e.g. control-equipment of TroxNetCom (pre wired for connection).

Functional description for the control system and monitoring of electrical actuators in conjunction with a power supply or with a power supply and a control unit

With intact power supply lights on BKS24-1 TR and in BKN230-24-1 TR:

- LED 1 green with fire damper "OPEN"
- LED 1 green flashing, fire damper is opening
- LED 2 green with fire damper "CLOSED"
- LED 2 green flashing, fire damper is closing
- LED 3 and 5 red indicates a fault
- LED 4 green operation (power on actuator)

Position of relay contacts in BKS24-1 TR with intact power supply:

- 8-7 closed with fire damper "OPEN"
- 6-4 closed with fire damper "CLOSED"
- 6-3 closed with fire damper faulty

Position of the relay contacts in the BKS24-1 TR with interrupted power supply:

- 8-7 and 6-4 open
- 6-3 closed

- ④ Sensor or detector, supplied by others (close fire damper); for release mechanism using power off to close principle, e.g. Trox smoke detector type RM-O/2 or RM-O-VS
- ⑦ Consumer electrics, supplied by others (e.g. pilot lamp for position indication)
- ⑫ Electric switch, supplied by others (close and open fire damper)
- ⑬ Electric spring return actuator with integrated limit switches and thermo-electric release mechanism (TF1 = duct outside temperature 72°C and TF2 = duct inside temperature 72°C)




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Maintenance Protocol
 for fire damper
 serial No. 1

Fire damper No. : BSK ...
 Authorisation No. : Z-41.3-321
 General buildings supervision authorisation
 from / valid until : 12. November 2002 / 14. November 2007
 Type : FK-K90
 Triggering device : fusible link / solenoid
 Annex 11 Z-41.3-321

The following maintenance steps were carried out according to general buildings supervision authorisations and Trox Operating and Maintenance Instructions W-4/2/EN/7, Article No. E016KM6,

	prior to Commissioning	next service in: <u>August 03</u>	next service in: <u>February 04</u>	next service in: _____	next service in: _____
External inspection: System: <u>50</u> Item: <u>5.1</u>	✓	✓			
Internal inspection: System: <u>50</u> Item: <u>6</u>	✓	✓			
Additional triggering device: System: <u>50</u> Item: <u>5.3</u>	✓	✓			
without deficits Date/inspector		<u>04.08.03</u> 			
with deficits (see reverse) Date/inspector	<u>03.02.03</u> 				
Deficits repaired Date/inspector	<u>04.02.03</u> 				

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Maintenance Protocol
for fire damper
serial No. 1

Deficits identified during inspection on: 03.02.03

***Sluggishness due to dirt accumulation.
Mortar residue in the vicinity of the drive mechanism must
be removed.***



Deficits identified during inspection on: _____

Deficits identified during inspection on: _____

Deficits identified during inspection on: _____

Sample