Safety door switches with partially or full stainless steel body

# F3S-TGR-KM15/-KM16/-KH16

## This safety door switches use a stainless steel head or even a full stainless steel body to increase the robustness.

- 2NC/1NO, 2NC/2NO or 3NC contacts
- Key entry turnable to back side
- 4 key insertion positions
- 3 M20 conduit entries
- Positive break contacts (to IEC 60947-5-1)



## Model Number Structure

### Switch

F3S-TGR-K□ □-□
1 2 3

**1.** Housing Material:
M: Stainless steel head / Plastic body
H: Full stainless steel version
**2.** Housing dimension:
15: W 54 x L 88.4 x H 34.5 mm
16: W 58 x L 100.4 x H 34.5 mm (Stainless steel head)
W 58 x L 103.5 x H 39.5 mm (Full stainless steel version)
**3.** Contacts:
21: 2NC/1NO
30: 3NC

### Operation Key

F39-TGR-K□
1

**1.** Operation Key Type
AM: Standard key for metal head
F: Flat key for horizontal mounting
PF: Flexible key with plastic body
HF: Flexible key with die cast body
HFH: Flexible key with stainless steel body

## Ordering Information

### Switches

| Type | Housing | Conduit | Contacts | Order code |
|---|---|---|---|---|
|  | Plastic body with metal head | 3 × M20 | 2NC/1NO<br>Slow action | **F3S-TGR-KM15-21** |
| | | | 3NC<br>Slow action | **F3S-TGR-KM15-30** |
|  | Plastic body with metal head | | 2NC/2NO<br>Slow action | **F3S-TGR-KM16-22** |
| | | | 3NC<br>Slow action | **F3S-TGR-KM16-30** |
|  | Full stainless steel body | | 2NC/2NO<br>Slow action | **F3S-TGR-KH16-22** |
| | | | 3NC<br>Slow action | **F3S-TGR-KH16-30** |

# Specifications

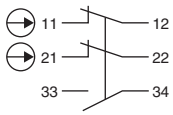
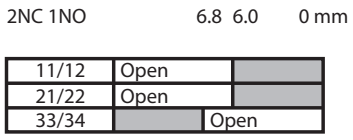
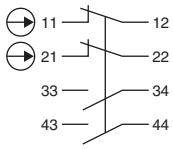
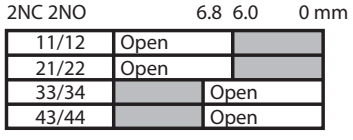
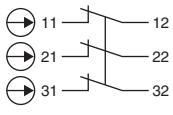
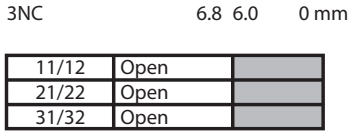
| Item | | F3S-TGR-KM15 | F3S-TGR-KM16 | F3S-TGR-KH16 |
|---|---|---|---|---|
| **Standards** | | ISO 14119, IEC 60947-5-1, EN 60204-1, UL508,<br>EN ISO 13849-1: up to PLe[*1]<br>EN 62061: up to SIL3*1 | | |
| **Reliability B10d** | | $2.5 \times 10^6$ operations at 100mA load | | |
| **Proof test interval (Life)** | | 35 years[*2] | | |
| **Utilization category** | | AC15 A300 3 A | | |
| **Thermal current (Ith)** | | 5 A | | |
| **Rated insulation/Withstand voltages** | | 500 VAC/2,500 VAC | | |
| **Rated travel for positive opening** | | 8 mm | | |
| **Actuator entry minimum radius** | | 175 mm standard, 100 mm flexible | | |
| **Maximum approach/Withdrawal speed** | | 600 mm/s | | |
| **Body dimensions (W × H × D)** | | 54 × 88.4 × 34.5 mm | 58 × 100.4 × 34.5 mm | 58 × 103.5 × 39.5 mm |
| **Fixing** | | 2 × M5, 40 mm distance | 4 × M5, 40 mm distance | |
| **Conduit entry** | | M20 | | |
| **Material** | **Body** | Polyester | | Stainless steel 316 |
| | **Head** | Stainless steel 316 | | |
| **Enclosure Protection** | | IP67 | | IP69K |
| **Temperature Range** | | –25 to 80°C | | |
| **Vibration** | | IEC 68-2-6, 10-55 Hz +1 Hz, Excursion: 0.35 mm, 1 octave/min | | |

[*1.] Depending upon system architecture

[*2.] The safety functions and mechanics must be tested regularly. For applications were infrequent guard access is foreseeable, the system must have a manual function test to detect possible accumulation of faults. At least once per month for Ple Cat3/4 or once per year for PLd Cat3 (EN ISO 13849-1). Where possible it is recommended that the control system of the machine demands and monitors these tests and stops or prevents the machine from starting if the test is not done. (see ISO 14119)

**Note:** If used correctly with an OMRON safety control unit “G9SE/G9SA/G9SP” a single KM (KH) switch can achieve performance level PLc According to EN ISO 13849. To achieve PLe 2* KM (KH) switches have to be used for same safety function. For more details on how to achieve a certain PL please refer to EN ISO 13849.

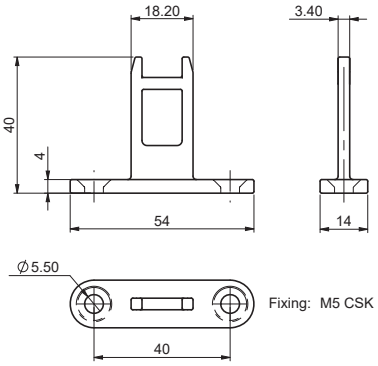
# Contact Form

| Model | Contact | Contact form | Operating pattern |
|---|---|---|---|
| F3S-TGR-K_-21 | 2NC/1NO |  |  |
| F3S-TGR-K_-22 | 2NC/2NO |  |  |
| F3S-TGR-K_-30 | 3NC |  |  |

## Operation Keys

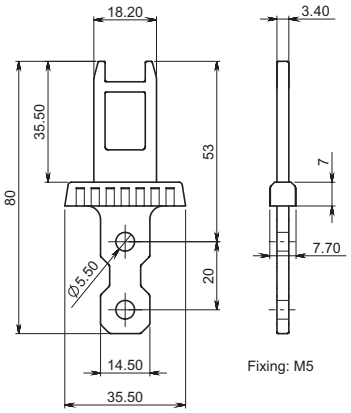
### F39-TGR-KAM





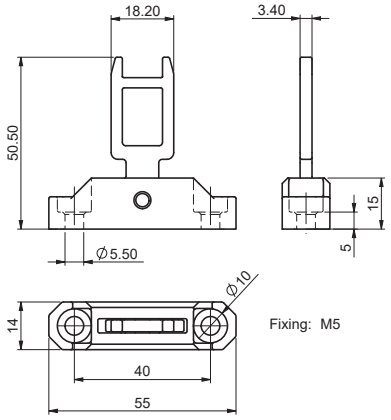

### F39-TGR-KF





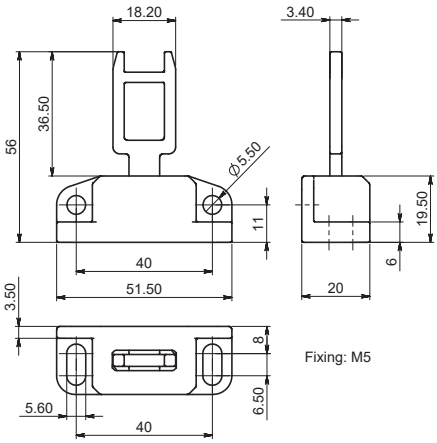

### F39-TGR-KPF






### F39-TGR-KHF
### F39-TGR-KHFH





## 7. Recommendation of connector

Use the connector with thread section of 9 mm long or less. In the case of the connector with longer thread section, protruded part may interfere with the other parts inside the body. Use below listed connector to secure IP67.

| Size connector | Manufacturer | Type | Adequate cable Diameter |
|---|---|---|---|
| M20 | LAPP | ST-M20 × 1.5<br>5311-1020 | 7.0 to 13.0 mm |

When use LAPP's products, use together with a seal packing which is sold separately (Type name GPM20.) and tighten with proper tightening torque.

LAPP is a German manufacturer.

## 8. Storage

Do not keep the switch in dusty, humid place and any place where gas may be present for example H2S, SO2, NH3, HNO3, Cl2.

## 9. Others

- Do not impose excessive force on the key top while the operation key is inserted into the switch body or drop the switch with the operation key inserted to avoid the deformation of the key or the breakage of the switch body.
- Confirm that the seal rubber has no abnormality and then use it. If the seal rubber is displaced or floated, or if foreign matters adhere to the seal rubber, the seal rubber will lose its sealing capability.
- Do not use any screw other than correct one, or the sealing capability of the seal rubber will deteriorate.

Please do a regular check in premeditation for this switch.