Tečaji z električnim varnostnim stikalom
Hinges With Built-In Safety Switch

METALIKA KACIN

Slovenija
(+386) 04 510 53 60
info@metalika-kacin.com
Hrvatska
(+385) 051 213 060
hrvatska@metalika-kacin.com
Srbija
(+381) 011 25 21 756
srbija@metalika-kacin.com

Hinges with built-in safety switch

SUPER-technopolymer

MATERIAL

- **Hinge body**: self-extinguish high-rigidity SUPER-technopolymer, black or grey colour RAL 7040 (C33).
- **Rotation pin**: glass-fibre reinforced polyamide-based tecnopolymer (PA), black or grey colour RAL 7040 (C33).
- **Assembly kit** (see assembly instructions):
  - n°4 technopolymer covers (fig.3).
  - n°4 technopolymer bushings (fig.4 and fig.5).
  - n°2 thermoplastic elastomer safety plugs (fig.7) to guarantee IP67 protection class.
- **Switch**: four slow action electrical contacts with double interruption Zb shaped (see IEC EN 60947-5-1) wich can be set in normally open (NO) or normally closed (NC) mode in production.

Positive opening in compliance with IEC EN 60947-5-1 annex K: the separation of the electrical contacts is the direct result of an actuator action on which an action force is applied by means of non elastic elements, that is to say not dependant on, for example, spring-like elements.
The contact elements guarantee a self-cleaning action of the silver-alloy pastes.
Thanks to its housing made out of SUPER-technopolymer, the CFSW hinge guarantees the double insulation of the internal circuits, therefore there is no need of grounding connection. Furthermore, the housing protects the electric contacts from shocks, atmospheric agents and accidental penetration of tools.

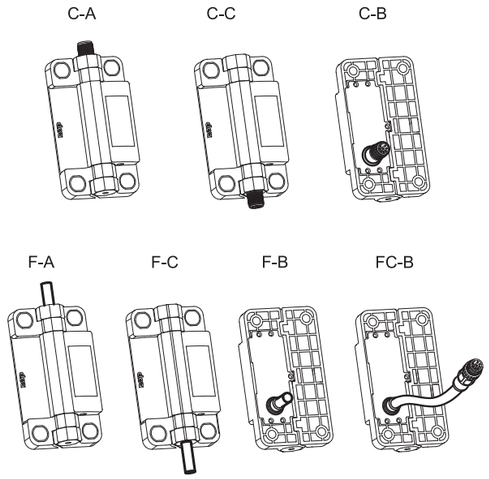
STANDARD EXECUTIONS

CFSW. hinge must be mounted with the side containing the microswitch on the fixed part (frame structure) and the other side on the movable part (door). The executions shown below refer to the hinges with the micro-switch on the right side.

- **C-A**: 8 pole male connector, top axial output.
- **C-C**: 8 pole male connector, bottom axial output.
- **C-B**: 8 pole male connector, back output.
- **F-A**: 2 or 5 m cable, 8 conductors, top axial output.
- **F-C**: 2 or 5 m cable, 8 conductors, bottom axial output.
- **F-B**: 2 or 5 m cable, 8 conductors, back output.
- **FC-B**: 0,2 m cable, with 8 pole male connector, back output.

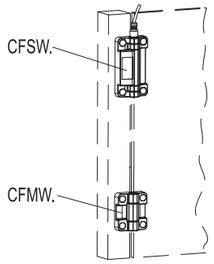
Cable type: UL/CSA STYLE 2587 8 X AWG 22.
Contact blocks in the standard execution:

- **NO-NC-NO-NC**: 2 NO contacts + 2 NC contacts.
- **NO-NC-NC-NC**: 1 NO contact + 3 NC contacts.



FEATURES AND APPLICATIONS

- Hinge with built-in multiple switch is a safety device because in case of accidental opening of doors, machine protections, or safety doors on machines and production equipment, it automatically breaks off the power supply hence protecting the operators.
- This hinge can be subject to frequent cleaning cycles and can be used in any situation or environment where a special attention to cleaning and hygiene is requested, thanks to the IP67 protection class and the use of stainless steel elements for closing the hinge body.
- Limited size, different assembly and output options (cable/connector) make this product easy to install on the most common aluminium profiles (30 mm minimum wide).
- Easy to assemble: the built-in safety multiple switch and the hinge come in one piece offering a very easy and fast assembly. This is a big advantage in comparison with some traditional systems which require to set up separately a hinge and a safety switch connected by a special pin to replace the standard pin of the hinge.
- Universal usage: CFSW. hinges can be assembled on the most common aluminium profiles.
- By using a redundant system, the CFSW hinges allow to have a system design up to SIL3 in compliance with IEC 62061, PLe in compliance with EN ISO 13849-1 or security category 4 in compliance with EN 954-1 with redundant structure.



ACCESSORIES ON REQUEST

- FC.M12x1: extensions with 8 pole M12 female axial connector.
- PMW. (see page 1433): assembly plate on T-slot profiles.

SPECIAL EXECUTIONS ON REQUEST

- Operating angle of the hinge other than from 0° to 180°, every 15°, where the system frame/door requires a special execution.
- NC and NO contact blocks setting (up to 4 NC).
- NO and NC ovelapping contacts.

ASSEMBLY INSTRUCTIONS

CFSW. hinge can be assembled in three different modes:

- With M6 UNI 5933 ISO 10642 countersunk-head screw (not supplied) and screw cover supplied in the kit (fig. 3) to avoid free access to screws.
- With cylindrical-head screw with hexagon socket M6 UNI 5931 ISO 4762 (not supplied) to set with the bushing supplied in the kit (fig.4).
- With M6 UNI 5588 ISO 4032 nut (not supplied) and the bushing supplied in the kit (fig.5). This kind of assembly makes the hinge totally tamper-proof preventing any tampering.
- Fit the hinge side with the built-in microswitch on the fixed part (the frame) and the other side on the door.
- Leave the least clearance between the holes in the mounting walls and the diameter of the setscrews (Max 0.5 mm). The suggested tightening torque should not be exceeded: 5 Nm.
- The hinge must not be used as a mechanical end-stroke either for door maximum opening or for closed door. For this purpose we recommend using external mechanical stops to prevent the door from opening completely against the hinge body assembled on the frame (fig.1) or exceeding the angle where the two interconnected surfaces are on the same plane (fig.2).
- CFSW. hinge is generally assembled with one or more complementary hinges CFMW. (on page 1434) . In case of horizontal door opening or of a limited weight it is possible to use one hinge only.
- The connection cables must always be protected against mechanical damages.

CONTACTS AND CABLES

The built-in safety switch is available with 4 contacts which can be set in production in the normally closed NC or normally open NO mode.

- NC contact with positive opening is mainly used for safety applications. The use of more than one NC switches reduces the risk of error of the single commutation.
- NO contact can be used simultaneously with the NC contact thanks to their electrical separation. The use of NO together with NC contacts guarantees a safety diversification.
- Cable with M12x1 connector following the shown circuit scheme.

ROTATION ANGLE (APPROXIMATE VALUE)

Max 180° (0° and +180° being 0° the condition where the two interconnected surfaces are on the same plane fig.1). The switching angle (see Built-in safety multiple switch functioning and maintenance) is guaranteed from this position. The condition where the two interconnected surfaces are on the same plane is to be strictly verified because the hinge must not be stressed by any negative angle (fig. 2).

Cable/connector/extension* wiring
*(see accessory on request)

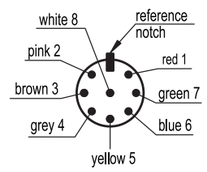


Fig.1

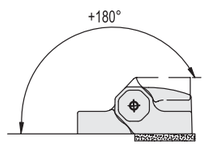


Fig.2

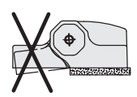
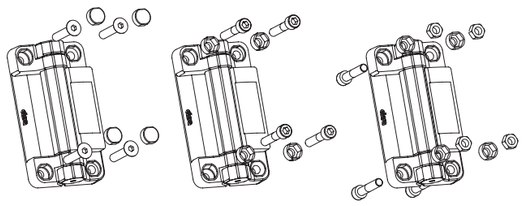
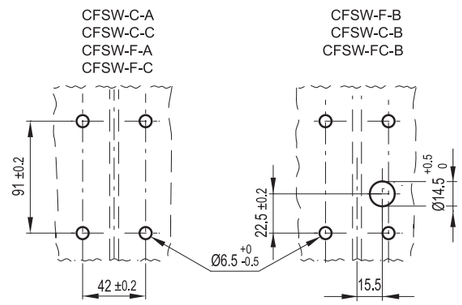


Fig.3 Fig.4 Fig.5



Drilling template



Approved by IMQ CA02.04800
In compliance with: EN 60947-1/2007+ EN 60947-5-1 : 2004 + A1/2009
Low voltage control auxiliaries
Approved by UL: E360222

Double insulation

Positive opening in compliance with EN 60947-5-1

Category of usage (values approved by IMQ)		**CFSW-C..** (connector)	**CFSW-F..** (cable)
AC15 standard IEC 60947-5-1 Typical applications: electromagnetic load controls in alternating current	24 V	-	4 A
	120 V	-	4 A
	250 V	-	4 A
	400 V	-	4 A
DC13 standard IEC 60947-5-2 Typical applications: electromagnet controls in direct current	24 V	2 A	2 A
	125 V	-	0.4 A
	250 V	-	0.3 A

Remark: the category of usage AC 15 2A 24V may be applied to CFSW-C.., even though this category is not certified by IMQ, since it is not provided for the standards in use.

BUILT-IN SAFETY MULTIPLE SWITCH FUNCTIONING AND MAINTENANCE

- The operating angle (see travel diagram) is set at 5° (we suggest to check it according to UNI EN ISO 13857).
- To guarantee the safety protection function, the hinge must be able to turn at least by 11° (see travel diagram), equivalent to the forced opening of the NC contacts by the actuator (positive opening).
- The adjustment of the operating angle can be modified, in case of doors with large dimensions, till 1° of width before the start up of the hinge by means of a screwdriver turning the assembly screw clockwise (fig.6).

After the adjustment is done, the safety plug must be fit (not removable) to guarantee protection class IP67 (fig.7).
The functioning points shown in the travel diagram undergo the same variation as the operating angle (ex: operating angle 1°, positive operating angle 7°).
Under normal conditions of use, when the mechanical life of the device is over, the operating angle can get to 3° from the starting angle.

- We suggest to check prior to the start up and then periodically the proper functioning of the CFSW. hinge.

When the protection is opened the machine must immediately stop. When the protection is opened at any degrees, the machine must not be able to start.

WARNINGS

- The choice and use of CFSW. hinge is the responsibility of the customer who will check that the relevant application is compliant to the safety regulations in force in the actual operating conditions.
- Using CFSW. hinges always implies a full knowledge of and compliance with the safety regulations in force, including UNI EN ISO 13849-1, IEC EN 60204-1, UNI EN ISO 14119 and EN ISO 12100.
- The hinge must always be assembled and connected by qualified operators who have to check regularly the hinge perfect functioning.
- The hinge with built-in safety switch CFSW. must not be used in environments with frequent temperature changes which can cause condensation, in the presence of explosive or flammable gasses and must always be protected by a proper fuse (see Electrical features table).
- The structure of CFSW hinge must not be modified and the back cover has never to be removed: an improper installation or tampering of the hinge with built-in safety switch can make the protection ineffective and cause serious damages.
- During handling and storage the shown environmental conditions have to be observed.

Category of usage (values approved by UL)	**CFSW-F-A CFSW-F-C CFSW-F-B** (cable)			**CFSW-C-A CFSW-C-C CFSW-C-B** (connector)
C 300 AC control	120 V	1.5 A	Therm. current 2.5 A	24 V / 2 A limited voltage-limited current / class 2 circuit
	240 V	0.75 A		
Q 300 DC control	125 V	0.55 A	Therm. current 2.5 A	
	250 V	0.27 A		

Fig.6

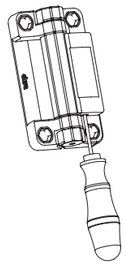
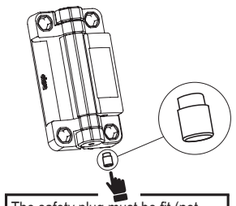
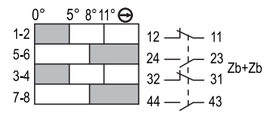


Fig.7

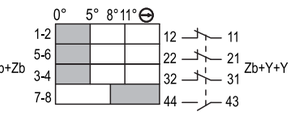


The safety plug must be fit (not removable) to guarantee protection class IP67.

Stroke diagram **2NO+2NC** (production setting)



Stroke diagram **1NO+3NC** (production setting)



The diagrams refer to the hinge with the operating angle set in production.
The operating angle can be reduced (max. adjustment: 4°).

How to read the diagram

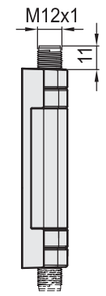
Mechanical features (values approved by IMQ)	**Electrical features** (values approved by IMQ)	
Type of contacts: Ag 999	Thermic power Ith	Cable 4 A
		Connector 2.5 A
Maximum working frequence: 600 cycles/hour *	Short-circuit protection: 4A 500V gG	
Mechanical life-span (test carried in compliance with IEC EN 60947-5-1 regulation): 10^6	Seal voltage at nominal pulse	Cable 4 Kv
		Connector 2.5 Kv
	Insulation nominal UI voltage	Cable: 400 Vac
		Connector: 30 Vac/Vdc
Protection class of the housing EN60529: IP67 *	Minimum force (torque for positive opening of contact): 0.5 Nm	
Speed of operation: minimum 2° / sec., maximum 90° / sec.	Short circuit conditioned current: 1000 A	
	Pollution degree: 3	
	B10d = 2000000	
	Tm = 20 years	

* A cycle of operations is equivalent to one closure and one opening as required by the standard EN60947-5-1.

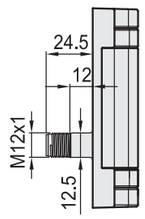
** Fit the safety plug to guarantee IP67 protection (fig.7)

For CFSW-C..(connector) it is the customer's responsibility to check the protection class guaranteed by the connector of the cable used.

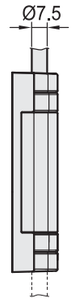
CFSW-C-A
CFSW-C-C



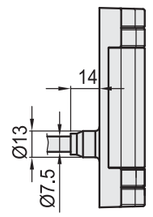
CFSW-C-B



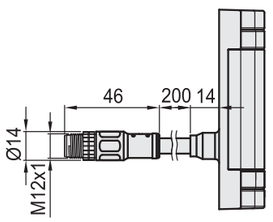
CFSW-F-A
CFSW-F-C

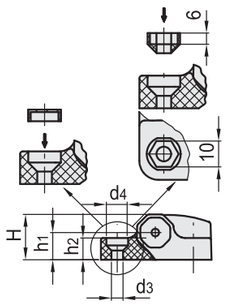


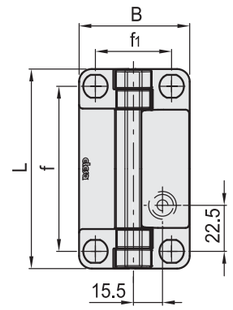
CFSW-F-B



CFSW-FC-B

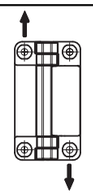
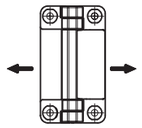
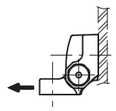






Code	Description	Code	Description	L	B	f	f1	H	h1	h2	d3	d4	C# [Nm]	⚖
426601	CFSW.110-6-2NO+2NC-C-A	426601-C33	CFSW.110-6-2NO+2NC-C-A-C33	110	60	91±0.242±0.2		25	15	12	6.5	12	5	150
426602	CFSW.110-6-2NO+2NC-C-C	426602-C33	CFSW.110-6-2NO+2NC-C-C-C33	110	60	91±0.242±0.2		25	15	12	6.5	12	5	150
426603	CFSW.110-6-2NO+2NC-C-B	426603-C33	CFSW.110-6-2NO+2NC-C-B-C33	110	60	91±0.242±0.2		25	15	12	6.5	12	5	150
426611	CFSW.110-6-2NO+2NC-F-A-2	426611-C33	CFSW.110-6-2NO+2NC-F-A-2-C33	110	60	91±0.242±0.2		25	15	12	6.5	12	5	280
426612	CFSW.110-6-2NO+2NC-F-C-2	426612-C33	CFSW.110-6-2NO+2NC-F-C-2-C33	110	60	91±0.242±0.2		25	15	12	6.5	12	5	280
426613	CFSW.110-6-2NO+2NC-F-B-2	426613-C33	CFSW.110-6-2NO+2NC-F-B-2-C33	110	60	91±0.242±0.2		25	15	12	6.5	12	5	280
426615	CFSW.110-6-2NO+2NC-F-A-5	426615-C33	CFSW.110-6-2NO+2NC-F-A-5-C33	110	60	91±0.242±0.2		25	15	12	6.5	12	5	475
426616	CFSW.110-6-2NO+2NC-F-C-5	426616-C33	CFSW.110-6-2NO+2NC-F-C-5-C33	110	60	91±0.242±0.2		25	15	12	6.5	12	5	475
426617	CFSW.110-6-2NO+2NC-F-B-5	426617-C33	CFSW.110-6-2NO+2NC-F-B-5-C33	110	60	91±0.242±0.2		25	15	12	6.5	12	5	475
426619	CFSW.110-6-2NO+2NC-FC-B	426619-C33	CFSW.110-6-2NO+2NC-FC-B-C33	110	60	91±0.242±0.2		25	15	12	6.5	12	5	475
426661	CFSW.110-6-1NO+3NC-C-A	426661-C33	CFSW.110-6-1NO+3NC-C-A-C33	110	60	91±0.242±0.2		25	15	12	6.5	12	5	150
426662	CFSW.110-6-1NO+3NC-C-C	426662-C33	CFSW.110-6-1NO+3NC-C-C-C33	110	60	91±0.242±0.2		25	15	12	6.5	12	5	150
426663	CFSW.110-6-1NO+3NC-C-B	426663-C33	CFSW.110-6-1NO+3NC-C-B-C33	110	60	91±0.242±0.2		25	15	12	6.5	12	5	150
426671	CFSW.110-6-1NO+3NC-F-A-2	426671-C33	CFSW.110-6-1NO+3NC-F-A-2-C33	110	60	91±0.242±0.2		25	15	12	6.5	12	5	280
426672	CFSW.110-6-1NO+3NC-F-C-2	426672-C33	CFSW.110-6-1NO+3NC-F-C-2-C33	110	60	91±0.242±0.2		25	15	12	6.5	12	5	280
426673	CFSW.110-6-1NO+3NC-F-B-2	426673-C33	CFSW.110-6-1NO+3NC-F-B-2-C33	110	60	91±0.242±0.2		25	15	12	6.5	12	5	280
426675	CFSW.110-6-1NO+3NC-F-A-5	426675-C33	CFSW.110-6-1NO+3NC-F-A-5-C33	110	60	91±0.242±0.2		25	15	12	6.5	12	5	475
426676	CFSW.110-6-1NO+3NC-F-C-5	426676-C33	CFSW.110-6-1NO+3NC-F-C-5-C33	110	60	91±0.242±0.2		25	15	12	6.5	12	5	475
426677	CFSW.110-6-1NO+3NC-F-B-5	426677-C33	CFSW.110-6-1NO+3NC-F-B-5-C33	110	60	91±0.242±0.2		25	15	12	6.5	12	5	475
426679	CFSW.110-6-1NO+3NC-FC-B	426679-C33	CFSW.110-6-1NO+3NC-FC-B-C33	110	60	91±0.242±0.2		25	15	12	6.5	12	5	475

Suggested tightening torque for assembly screws.

	AXIAL STRESS	RADIAL STRESS	90° ANGLED STRESS
Resistance tests			
Description	Max limit static load Sa [N]	Max limit static load Sr [N]	Max limit static load S90 [N]
CFSW.110	2100	2800	1300

For CFSW. hinges with built-in safety multiple switch, the reference value supplied is the max limit static load (Sa, Sr, S90), since these hinges can be used as safety devices. Above this value, the material may break, thus prejudicing the hinge functionality. Obviously a suitable factor, according to the importance and safety level of the specific application, must be applied to this value. The load values shown in the tables of the different hinges are the result of tests carried out in our laboratories under controlled temperature and humidity (23°C-50% R.H.), under given conditions of use and for a limited period of time.

Example of suitability check

P = weight of the door [N]
P_1 = additional extra load [N]
W = width of the door
D = distance [metres] between the centre of gravity of the door and the hinge axis. In normal conditions D = W/2
D_1 = distance [metres] between the hinge axis and the additional extra load application point
N = number of hinges
k = safety factor
d_T = sum of the distances (metres) of all the hinges from the hinge of reference ($d_T = d_1 + d_2 + ... + dn$). In case of only two hinge assembled, d_T is simply the distance between them.

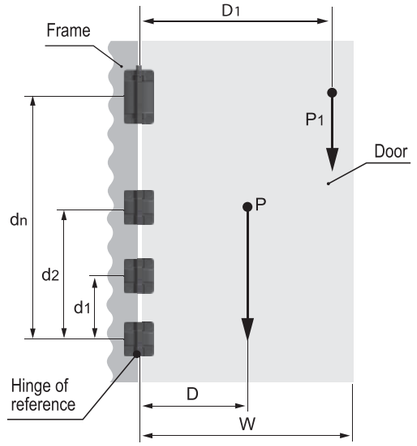
Conditions to be checked in order to ensure a correct functioning with two or more hinges.

$$\frac{(P+P1)}{N} \cdot k < Sa$$

$$\frac{[(P \cdot D)+(P1 \cdot D1)]}{d_T} \cdot k < Sr$$

$$\frac{[(P \cdot D)+(P1 \cdot D1)]}{d_T} \cdot k < S90$$

Hinged door on a vertical axis



The technical designer must use suitable safety factors (k) according to the type of application and function of the CFSW. hinge.

Example hinge CFSW.110-6-2NO+2NC-C-A

P = 294 N (30 Kg) D = 0,4 m N = 3
d_T = 1,5 m d_2 = 1 m d_1 = 0,5 m
P_1 = 196 N (20 Kg) D_1 = 1,2 m

$$\frac{490}{3} = 163 \cdot k < 2100$$

$$\frac{[(294 \cdot 0,4)+(196 \cdot 1,2)]}{1,5} = 235,2 \cdot k < 2800$$

$$\frac{[(294 \cdot 0,4)+(196 \cdot 1,2)]}{1,5} = 235,2 \cdot k < 1300$$

The examples shown here must be considered only as explanatory, since they are not applicable to all the different applications, conditions of use, ways of assembly which can actually take place. In practice, the technical designer, after applying a suitable safety factor (k) must also test the chosen product to check its suitability.
For further general technical information, refer to the guidelines.

CFSW. and CFMW. assembly kit for profiles

SUPER-technopolymer

PLATE
Glass-fibre reinforced polyamide (PA) SUPER-technopolymer, black colour, matte finish.

SCREWS AND NUTS
AISI 304 stainless steel.

FEATURES AND APPLICATIONS
PMW assembly plate allows the mounting of CFSW.110 and CFMW.110 hinges on standard profiles of 30, 35, 40, 45 and 50 mm with T-slot.
The mounting on profiles of 40 mm can also be performed without the use of assembly plate.
The fixing screws of the plate to the profile are not accessible after the assembly of the hinges (Fig. 1). Therefore, even with the use of PMW assembly plate, CFSW. and CFMW. hinges remain tamperproof.
The supply of the plate includes:
- 2 countersunk screws M6x12 (for CFSW.110).
- 2 countersunk screws M6x14 (for CFMW.110).
- 2 M6 hexagonal nuts, assembled into the plate, necessary for the fixing of the hinge to the plate.

Plates of different dimensions can be combined in case of door and doorframe made with profiles of different dimensions (Fig.2).

ASSEMBLY INSTRUCTIONS
- Fix the plate on the profile in the desired position by using M6 countersunk head screws (not included in the supply) and the relative dowels for T-slot type GN 505 (see page 979) (not included in supply).
- Fit CFSW.110 or CFMW.110 hinge (fig. 1) on the relative plate by using M6 countersunk head screws (included in the supply).
- Place the closing caps properly (included in the supply of the hinge).

TECHNICAL DATA
The use of PMW plate, properly assembled as indicated in the assembly instructions, guarantees the max limit static load of CFSW. and CFMW.

Fig.1

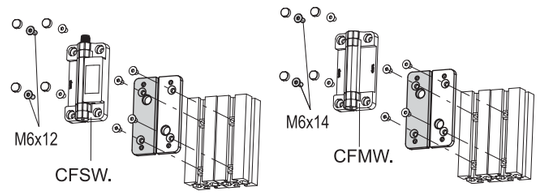
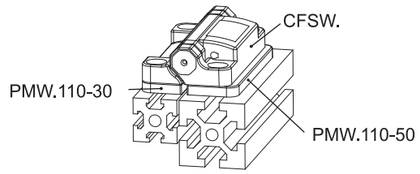
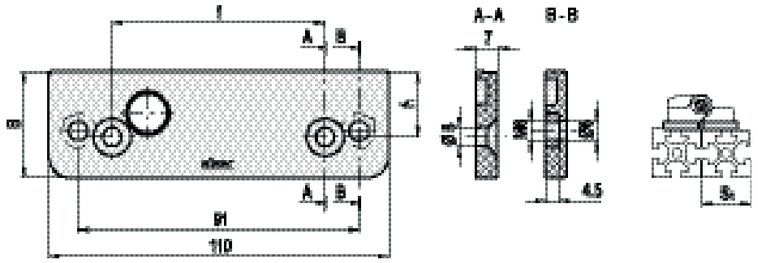


Fig.2





Code	Description	s1	B	f	f1	⚖
51901	PMW.110-30	30	28	73	14.5	26
51903	PMW.110-35	35	28	72	16.5	27
51904	PMW.110-40	40	28	70.5	19	29
51905	PMW.110-45	45	34	69	21	31
51907	PMW.110-50	50	34	69	24	28

CFMW.

Hinges

SUPER-technopolymer

MATERIAL
Glass-fibre reinforced polyamide (PA) SUPER-technopolymer, black or grey colour RAL 7040 (C33), matte finish.

ROTATING PIN
Glass-fibre reinforced polyamide based (PA) technopolymer, black or grey colour RAL 7040 (C33).

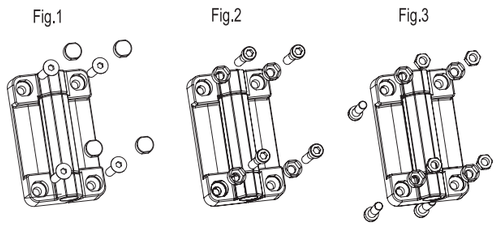
ASSEMBLY KIT (SEE ASSEMBLY):
- n°4 technopolymer covers (fig.1).
- n°4 technopolymer bushings (fig.2 and fig.3).

MOUNTING
CFMW. hinge can be assembled in three different modes:
- With M6 UNI 5933 ISO 10642 countersunk-head screw (not supplied) and screw cover supplied in the kit (fig. 1) to avoid free access to screws.
- With cylindrical-head screw with hexagon socket M6 UNI 5931 ISO 4762 (not supplied) to set with the bushing supplied in the kit (fig.2).
- With M6 UNI 5588 ISO 4032 nut (not supplied) and the bushing supplied in the kit (fig.3). This kind of assembly makes the hinge totally tamper-proof preventing any tampering.

FEATURES AND APPLICATIONS
The different assembly options make this product easy to install on the most common aluminium profiles (30 mm minimum side).
CFMW. hinge can be assembled with CFSW. hinge with built-in safety switch. CFSW. (see page 1428).

ROTATION ANGLE (APPROXIMATE VALUE)
Max 180° (0° and +180° being 0° the condition where the two interconnected surfaces are on the same plane).
Do not exceed the rotation angle limit so as not to prejudice the hinge mechanical performance.
The condition where the two interconnected surfaces are on the same plane is to be strictly verified because the hinge must not be stressed by any negative angle (fig.4).
To choose the convenient type and the right number of hinges for your application, see the Guidelines (on page 1368).

Fig.1 Fig.2 Fig.3



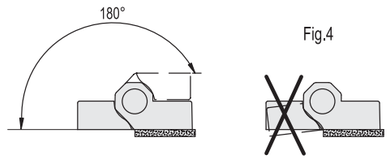
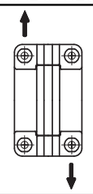
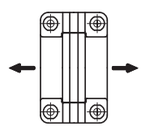
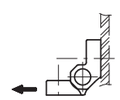
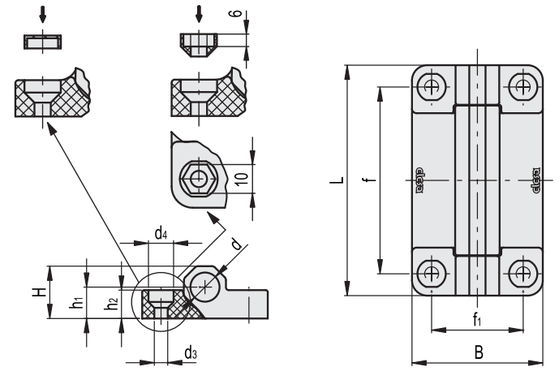


Fig.4

Resistance tests	AXIAL STRESS	RADIAL STRESS	90° ANGLED STRESS
			
Description	Max. limit stati load Sa [N]	Max. limit stati load Sr [N]	Max. limit stati load S90 [N]
CFMW.70	4500	7600	5800
CFMW.110	2100	2800	1300

The max static load is the value above which the material may break thus prejudicing the hinge functionality use. Obviously, a suitable factor, according to the importance and the safety level of the specific application must be applied to this value.



Code	Description	Code	Description	L	B	f±0.25	f1 ±0.25	H	h1	h2	d	d3	d4	C# [Nm]	⚖
425951	CFMW.70-SH-6	425951-C33	CFMW.70-SH-6-C33	70	60	50	42	25	15	15	13.5	6.5	12	5	80
425956	CFMW.110-SH-6	425956-C33	CFMW.110-SH-6-C33	110	60	91	42	25	15	15	12	6.5	12	5	125

Suggested tightening torque for assembly screws.

Hinges with built-in safety switch

SUPER-technopolymer

MATERIAL

Self-extinguish high-rigidity SUPER-technopolymer, black colour, matte finish.
Thanks to its housing made out of SUPER-technopolymer, the CFSQ hinge guarantees the double insulation of the internal circuits, therefore there is no need of grounding connection. Furthermore, the housing protects the electric contacts from shocks, atmospheric agents and accidental penetration of tools.

ROTATING PIN

AISI 303 stainless steel.

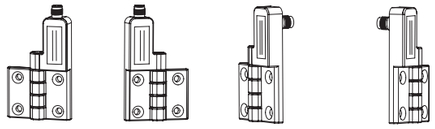
STANDARD EXECUTIONS

Assembly by means of pass-through holes for M6 countersunk-head screws UNI 5933, DIN 7991.
Starting work angle 0°:
- **C-A-D**: axial connector, microswitch on the right.
- **C-A-S**: axial connector, microswitch on the left.
- **C-B-D**: rear connector, microswitch on the right.
- **C-B-S**: rear connector, microswitch on the left.
- **F-A-D**: axial cable, 2 or 5 m length, microswitch on the right.
- **F-A-S**: axial cable, 2 or 5 m length, microswitch on the left.
- **F-B-D**: rear cable, 2 or 5 m length, microswitch on the right.
- **F-B-S**: rear cable, 2 or 5 m length, microswitch on the left.

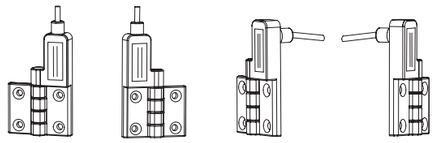
Starting work angle -90°:
- **C-A-D-EA**: axial connector, microswitch on the right.
- **C-A-S-EA**: axial connector, microswitch on the left.
- **C-B-D-EA**: rear connector, microswitch on the right.
- **C-B-S-EA**: rear connector, microswitch on the left.

Cable type: UL/CSA STYLE 2587 3 X AWG 22.

CFSQ-C-A-D
CFSQ-C-A-D-EA
CFSQ-C-A-S
CFSQ-C-A-S-EA
CFSQ-C-B-D
CFSQ-C-B-D-EA
CFSQ-C-B-S
CFSQ-C-B-S-EA



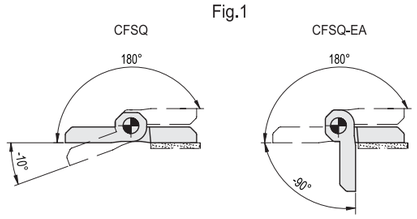
CFSQ-F-A-D
CFSQ-F-A-S
CFSQ-F-B-D
CFSQ-F-B-S



ROTATION ANGLE (APPROXIMATE VALUE)

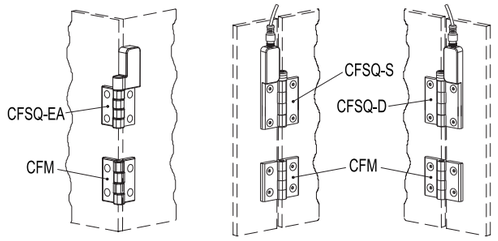
CFSQ: max 190° (-10° and +180° see Fig.1).
CFSQ-EA: max 270° (-90° and +180° see Fig.1).
0° is the condition where the interconnected surfaces are on the same plane.
See Built-in safety switch functioning and maintenance.
The hinge must not be stressed by any negative angle of less than -10° (CFSQ) and -90° (CFSQ-EA).

Fig.1



FEATURES AND APPLICATIONS

- The hinge with built-in switch is a safety device because in case of accidental opening of doors, machine protections, or safety doors on machines and production equipment, it automatically breaks off the power supply hence protecting the operators.
- This hinge can be subject to frequent cleaning cycles and can be used in any situation or environment where a special attention to cleaning and hygiene is requested, thanks to the IP67 protection class and the use of stainless steel elements for closing the hinge body.
- Switch equipped with two contacts: one NC contact and one change-over NO contact, form C, see IEC EN 60947-5-1 standard.
- Switch set with positive opening (in compliance with IEC EN 60947-5-1 standard, K attachment): the contacts break off for the direct movement of an actuator, onto which the working force is applied through non elastic elements.
- Quick release switch: the stroke speed of the contact-holder slider does not depend on the working speed.
- Easy to assemble: the built-in safety switch is integrated into a single body with the hinge, thus offering a very easy and fast assembly. This is a great advantage in comparison with some traditional systems which still require to set up separately a hinge and a safety switch connected by a special pin to replace the standard pin of the hinge.
- Universal usage: CFSQ hinges can be assembled on the most common aluminium profiles.



ACCESSORIES ON REQUEST

- FC.M12x1: extensions with 4 pole M12 female axial connector.

SPECIAL EXECUTIONS ON REQUEST

Operating angle of the hinge other than from 0° to 180°, every 15°, where the system frame/door requires a special execution.

ASSEMBLY INSTRUCTIONS

- Fit the hinge body with the built-in switch on the fixed part (frame) and the other body on the door. The distance between the axis of the hinge pin and the door must be at least 5 mm (fig.3).
- Leave the least clearance between the holes in the mounting walls and the diameter of the setscrews (Max 0.5 mm). The suggested tightening torque should not be exceeded: 5 Nm.
- The hinge must not be used as a mechanical end-stroke either for door maximum opening or for closed door. For this purpose we recommend using external mechanical stops to prevent the door from opening completely against the hinge body assembled on the frame or exceeding the angle where the two interconnected surfaces are on the same plane.
- The CFSQ hinge must always be assembled with at least a second complementary hinge CFM. (CFM.60-45- SH-6 code 425812). In case of horizontal door opening or in general of a limited weight it is possible to use one hinge only.
- The connection cables must always be protected against mechanical damages.

CABLES

- Cable with M12x1 connector using the following circuit scheme.
- Normally Closed contact NC: for safety applications, according to IEC EN 60947-5-1 standard, only the NC contact (for break off) must be used leaving the NO contact unused.
- Normally Open contact NO: the normally open contact can be used only if the hinge is used as status indicator (signalling) in this case also the NC contact can be used simultaneously always as status indicator (signalling).

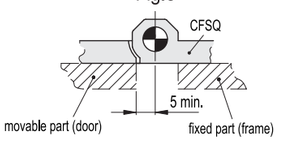
BUILT-IN SAFETY SWITCH FUNCTIONING AND MAINTENANCE

- The angle nominal variation required for switching the microswitch is of 6° (see stroke diagram). In normal conditions of use, when the mechanical life of the device is completed, the nominal variation may increase up to 9 °. We suggest to check the proper functioning of the hinge according to UNI EN ISO 13857.
- For applications with safety protection function, the hinge must be able to turn at least by 15°, equivalent to the forced opening (positive opening) of the contacts by the actuator.
- We suggest to check the proper functioning of the CFSQ hinge prior to the start up and afterwards periodically.
- When the protection is opened the machine must immediately stop. When the protection is opened at any degrees, the machine must not be able to start.

WARNINGS

- The hinge with built-in safety switch must not be used in environments with frequent temperature changes which can cause condensation, in the presence of explosive or flammable gasses.
- The hinge with built-in safety switch must always be protected with a proper fuse (see table).
- The choice and use of the hinge with built-in safety switch is the responsibility of the customer who will check that the relevant application is compliant to the safety standards in force under the actual operating conditions.
- Using CFSQ hinges always implies a full knowledge of and compliance with the safety standards in force, including EN ISO 13849-1, IEC EN 60204-1, UNI EN ISO 14119, EN ISO 12100.
- The hinge must always be assembled and connected by qualified operators who have to check regularly the hinge perfect functioning.

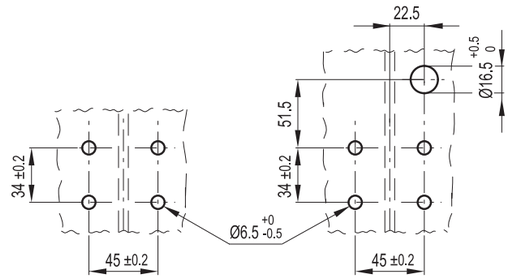
Fig.3



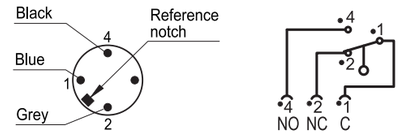
Drilling template

CFSQ-C-A
CFSQ-C-A-EA
CFSQ-F-A

CFSQ-C-B
CFSQ-C-B-EA
CFSQ-F-B

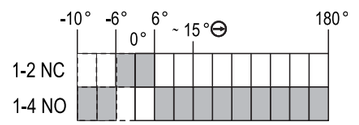


Cable/connector wiring

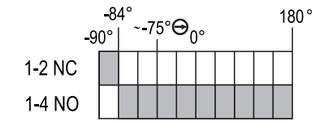


Stroke diagram

CFSQ



CFSQ-EA



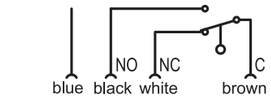
Positive opening

in compliance with EN 60947-5-1

Double insulation

In compliance with:
IEC EN 60947-5-1:2003+A1:2009
Low voltage control auxiliaries
Approved by UL: E360222

Extension cable wiring
(see accessory on request)

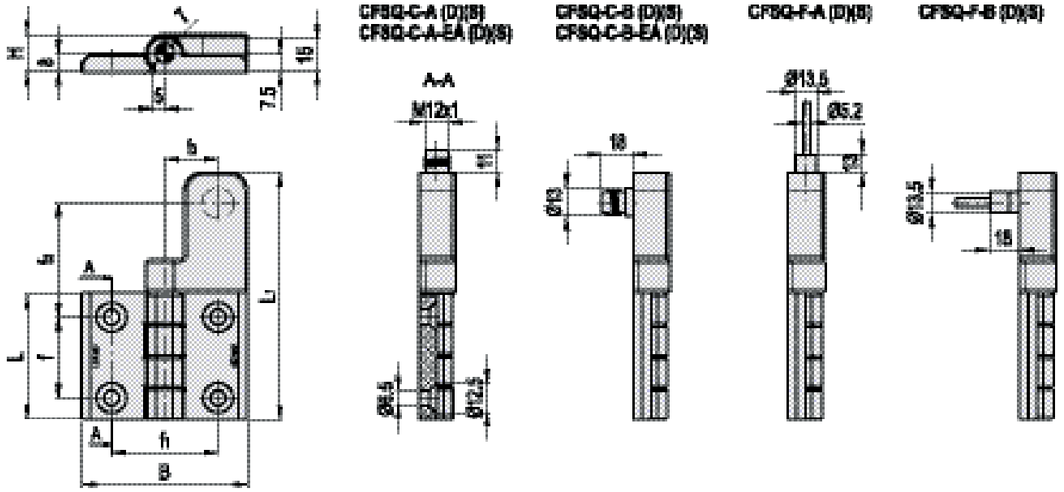


Category of usage		CFSQ-C.. (connector)	CFSQ-F.. (cable)
AC15 standard IEC 60947-5-1 Typical applications: electromagnetic load controls in alternating current	48 V	4 A	4 A
	220 V	4 A	4 A
	440 V	-	3 A
DC13 standard IEC 60947-5-2 Typical applications: electromagnet controls in direct current	24 V	4 A	4 A
	127 V	0.3 A	0.3 A

Description	Electrical features	Environmental rating
CFSQ.60-SH-6-C	4A at 24 Vac/dc (resistive load)	Types 1 and 4X "indoor use only"
CFSQ.60-SH-6-F	B3000 pilot duty 4A at 240 Vac (resistive load) 4A at 240 Vdc (resistive load)	
Environmental conditions for assembly: maximum permissible ambient temperature 40°C		

Mechanical features	Electrical features	
Type of contact: Ag 90 Ni 10	Thermic power Ith	Cable 10 A
		Connector: 4 A
Maximum working frequence: 600 cycles/hour *	Short-circuit protection: 6A gl	
Mechanical life-span (test carried in compliance with IEC EN 60947-5-1): 10^6	Seal voltage at nominal pulse 4 KV	
	Insulation nominal voltage Ui = 250V	
Protection class of the housing EN60529: IP67	Minimum force (torque for positive opening of contact): 0.5 Nm	
Speed of operation: minimum 2° / sec., maximum 90° / sec.	Short circuit conditioned current: 1000 A	
	Pollution degree: 3	
	B10d = 2000000	
	Tm = 20 years	

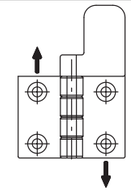
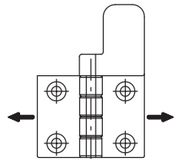
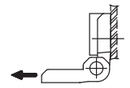
* A cycle of operations is equivalent to one closure and one opening as required by the standard EN60947-5-1.



Code	Description	Code	Description	L	B	L1	f	f1	f2	f3	H	C# [Nm]	⚖
427011	CFSQ.60-SH-6-C-A-D	427011-EA	CFSQ.60-SH-6-C-A-D-EA	53	70	110	34	45	-	-	16	5	96
427013	CFSQ.60-SH-6-C-A-S	427013-EA	CFSQ.60-SH-6-C-A-S-EA	53	70	110	34	45	-	-	16	5	96
427015	CFSQ.60-SH-6-C-B-D	427015-EA	CFSQ.60-SH-6-C-B-D-EA	53	70	110	34	45	51.5	22.5	16	5	96
427017	CFSQ.60-SH-6-C-B-S	427017-EA	CFSQ.60-SH-6-C-B-S-EA	53	70	110	34	45	51.5	22.5	16	5	96

Code	Description	L	B	L1	f	f1	f2	f3	H	C# [Nm]	⚖
427021	CFSQ.60-SH-6-F-A-D-2	53	70	110	34	45	-	-	16	5	196
427023	CFSQ.60-SH-6-F-A-S-2	53	70	110	34	45	-	-	16	5	196
427025	CFSQ.60-SH-6-F-B-D-2	53	70	110	34	45	51.5	22.5	16	5	196
427027	CFSQ.60-SH-6-F-B-S-2	53	70	110	34	45	51.5	22.5	16	5	196
427031	CFSQ.60-SH-6-F-A-D-5	53	70	110	34	45	-	-	16	5	330
427033	CFSQ.60-SH-6-F-A-S-5	53	70	110	34	45	-	-	16	5	330
427035	CFSQ.60-SH-6-F-B-D-5	53	70	110	34	45	51.5	22.5	16	5	330
427037	CFSQ.60-SH-6-F-B-S-5	53	70	110	34	45	51.5	22.5	16	5	330

Suggested tightening torque for assembly screws.

Resistance tests	AXIAL STRESS	RADIAL STRESS	90° ANGLED STRESS
			
Description	Max. limit stati load Sa [N]	Max. limit stati load Sr [N]	Max. limit stati load S90 [N]
CFSQ	2100	2800	1300
CFSQ-EA	1200	1500	600

For CFSQ. hinges with built-in safety switch, the reference value supplied is the max limit static load (Sa, Sr, S90), since these hinges can be used as safety devices. Above this value, the material may break, thus prejudicing the hinge functionality.Obviously a suitable factor, according to the importance and safety level of the specific application, must be applied to this value.The load values shown in the tables of the different hinges are the result of tests carried out in our laboratories under controlled temperature and humidity (23°C-50% R.H.), under given conditions of use and for a limited period of time.

Example of suitability check

P = weight of the door [N]
P_1 = additional extra load [N]
W = width of the door
D = distance [metres] between the centre of gravity of the door and the hinge axis. In normal conditions D = W/2
D_1 = distance [metres] between the hinge axis and the additional extra load application point
N = number of hinges
k = safety factor
d_1 ... d_n = distances (metres) of all the hinges from the hinge of reference
$d_T = d_1 + d_2 + ... + d_n$ In case of only two hinges assembled, d_T is simply the distance between them

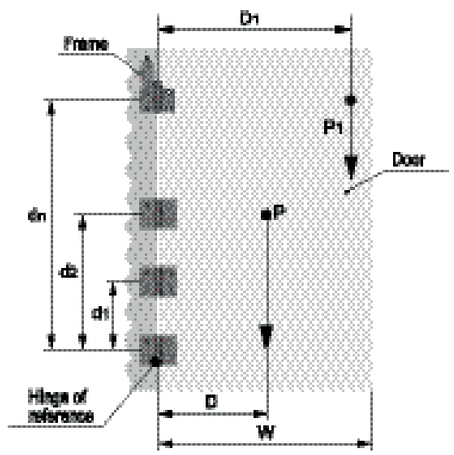
Conditions to be checked in order to ensure a correct functioning with two or more hinges.

$$\frac{(P+P1)}{N} \cdot k < Sa$$

$$\frac{[(P \cdot D)+(P1 \cdot D1)]}{d_T} \cdot k < Sr$$

$$\frac{[(P \cdot D)+(P1 \cdot D1)]}{d_T} \cdot k < S90$$

Hinged door on a vertical axis



The technical designer must use suitable safety factors (k) according to the type of application and function of the CFSQ. hinge.

Example hinge CFSQ.60-SH-6

P = 294 N (30 Kg) D = 0,4 m N = 3
d_T = 1,5 m d_2 = 1 m d_1 = 0,5 m
P_1 = 196 N (20 Kg) D_1 = 1,2 m

$$\frac{480}{3} = 160 \cdot k < 2100$$

$$\frac{[(294 \cdot 0,4)+(196 \cdot 1,2)]}{1,5} = 235,2 \cdot k < 2800$$

$$\frac{[(294 \cdot 0,4)+(196 \cdot 1,2)]}{1,5} = 235,2 \cdot k < 1300$$

The examples shown here must be considered only as explanatory, since they are not applicable to all the different applications, conditions of use, ways of assembly which can actually take place. In practice, the technical designer, after applying a suitable safety factor (k) must also test the chosen product to check its suitability.
For further general technical information, refer to the guidelines.

Hinges with safety switch

Zinc die casting

SPECIFICATION

Types

- Type **A**: Connector plug at the top
- Type **AK**: Cable at the top
- Type **B**: Connector plug from the bottom
- Type **BK**: Cable from the bottom
- Type **C**: Connector plug on the backside, with 0.2 m cable
- Type **CK**: Cable from the back

Zinc die casting
plastic coated
silver metallic

Pin
Stainless Steel AISI 303

INFORMATION

Hinges GN 139.1 with integrated safety switches have been designed for monitoring doors and covers of machines and plants. Opening the door will activate the switch contacts which, in turn, will then e.g. interrupt a protective circuit via break contact (NC) and at the same time signal the door opening by closing a normally open contact element (NO).
The contact blocks are fitted with positive opening slow-action contacts, i.e. they will definitely be separated when activated and have no hysteresis. The angle at which the switching points are reached are adjustable (see contact travel diagram).
Together with the integrated contact blocks, the hinges are a compact, easy to mount unit with an attractive design. The mounting from the back make the hinge more tamper-proof.

ON REQUEST

- Hinges with operation angle > 0°
- Hinges with other contact terminations

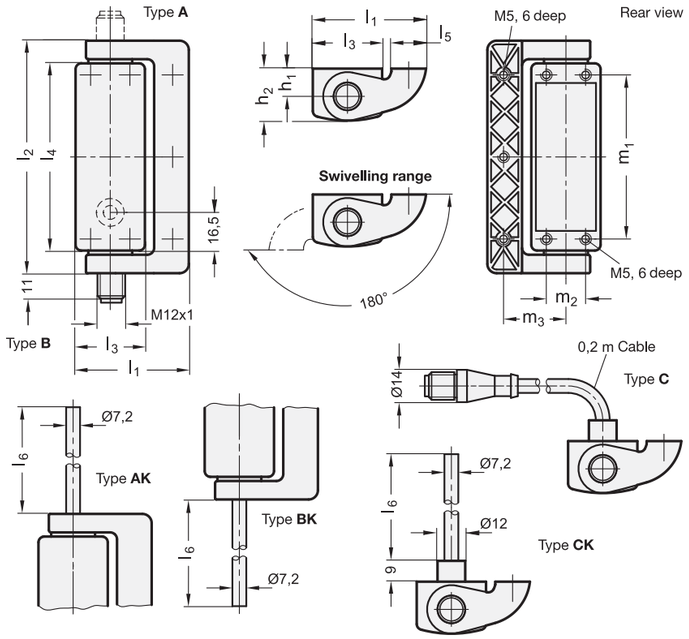
ACCESSORIES

Cable with connection coupling
8-pole, 5 or 10 meters long:

- Cables with conntector coupling GN 330-M12x1-8-G-5 (see page 1448)
- Cables with conntector coupling GN 330-M12x1-8-G-10 (see page 1448)
- Mounting plates, flat GN 139.3 (see page 1444)
- Mounting plates, angled GN 139.4 (see page 1444)

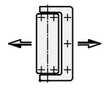
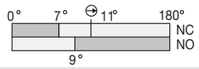
TECHNICAL INFORMATION

- Load rating information of hinges (see page A40)



GN 139.1

Description	l1	l2	l3	l4	l5	l6 in m	h1	h2	m1	m2	m3	⚖
GN 139.1-49-101-A	49	101	30	81	15	-	12	22.5	71	17	27	325
GN 139.1-79-101-A	79	101	30	81	30	-	12	22.5	71	17	50	425
GN 139.1-49-101-AK-2	49	101	30	81	15	2	12	22.5	71	17	27	511
GN 139.1-79-101-AK-2	79	101	30	81	30	2	12	22.5	71	17	50	612
GN 139.1-49-101-AK-5	49	101	30	81	15	5	12	22.5	71	17	27	729
GN 139.1-79-101-AK-5	79	101	30	81	30	5	12	22.5	71	17	50	829
GN 139.1-49-101-B	49	101	30	81	15	-	12	22.5	71	17	27	325
GN 139.1-79-101-B	79	101	30	81	30	-	12	22.5	71	17	50	427
GN 139.1-49-101-BK-2	49	101	30	81	15	2	12	22.5	71	17	27	512
GN 139.1-79-101-BK-2	79	101	30	81	30	2	12	22.5	71	17	50	612
GN 139.1-49-101-BK-5	49	101	30	81	15	5	12	22.5	71	17	27	729
GN 139.1-79-101-BK-5	79	101	30	81	30	5	12	22.5	71	17	50	828
GN 139.1-49-101-C	49	101	30	81	15	-	12	22.5	71	17	27	364
GN 139.1-79-101-C	79	101	30	81	30	-	12	22.5	71	17	50	457
GN 139.1-49-101-CK-2	49	101	30	81	15	2	12	22.5	71	17	27	519
GN 139.1-79-101-CK-2	79	101	30	81	30	2	12	22.5	71	17	50	618
GN 139.1-49-101-CK-5	49	101	30	81	15	5	12	22.5	71	17	27	742
GN 139.1-79-101-CK-5	79	101	30	81	30	5	12	22.5	71	17	50	843

Mechanical features				
Maximum load Information with safety factor	**Load direction**			
Examples of calculation	**l1 = 49**	1500 N	1000 N	1000 N
	l1 = 79	750 N	500 N	500 N
Fixing	from the back, 7 x threads M5, 6 mm deep			
Recommended torque	5 Nm (Screws M5)			
Protection class	IP67 / IP69K (Mind the cable conduit!)		acc. to EN 60529	
Switching principle, contact opening	Slow-action contacts, force-fitted, with positive opening		acc. to IEC 60947-5-1, K	
Contact material	Silver alloy			
Operating travel diagram (scheme)	The switching points are adjustable up to 4° in direction of 0°.			
Maximum operating frequency	600 operating cycles / hour		acc. to IEC 60947-5-1, one operating cycle includes one opening / one closing action	
Mechanical life span	10^6 operating cycles		acc. to IEC 60947-5-1, one operating cycle includes one opening / one closing action	
Actuating speed	min. 2° / second, max. 90° / second		acc. to IEC 60947-5-1, one operating cycle includes one opening / one closing action	

Electrical features / Safety features			
Utilization category	AC 15: 24 Vac / 2A / DC 13: 24 Vdc / 2A (connector plug), AC 15: 250 Vac / 4A / DC 13: 250 Vdc / 0,3 A (cable)		acc. to EN 60947-5-1
Contacts, termination 8-pole connector M12 or cable with 2 m or 5 m length **Pin and cable assignment**			
Type of cable	Type N 7 x0.5 mm², jacket PVC H05VV-F		acc. to IEC 60332-1-2 et seqq.
Short-circuit current	1000 A		acc. to EN 60947-5-1
Rated insulation voltage	30 V AC / 36 V DC (connector plug) / 250 Vac (cable)		
Short-circuit protection	2 A, 500 V, Typ gG (connector plug) / 6 A, 500 V, Typ gG (cable)		
Ambient temperature	- 25 °C up to + 80 °C		
Degree of pollution, external	3		acc. to EN 60947-5-1
Mission time (TM)	20 years		acc. to EN ISO 13849-1
Number of cycles (B10 d)	5 000 000		acc. to EN 61820-2

Approvals, Conformities, Applicability			
Low-voltage switchgear and controlgear CE declaration IMQ: CA02.03746 UL: E 131787	CE IMQ cULus		EN 60947-1/2007 EN 60947-1-5 : 2004 + A1/2009
Safety applications	up to SIL 3 / PL e		acc. to EN ISO 13849-1

For other details and hints contact your sales partner at METALIKA KACIN.

The hinges with safety switch must be mounted and commissioned by qualified technical personnel in compliance with the details given in the operating instruction and with the national and international rules and regulations and the applicable standards. We will assume no statutory liability for missing or incorrect information and for any consequences arising therefrom.

GN 139.2

RoHS

Hinges without safety switch

Zinc die casting

SPECIFICATION

Zinc die casting
plastic coated
silver metallic

Pin
Stainless Steel AISI 303

INFORMATION

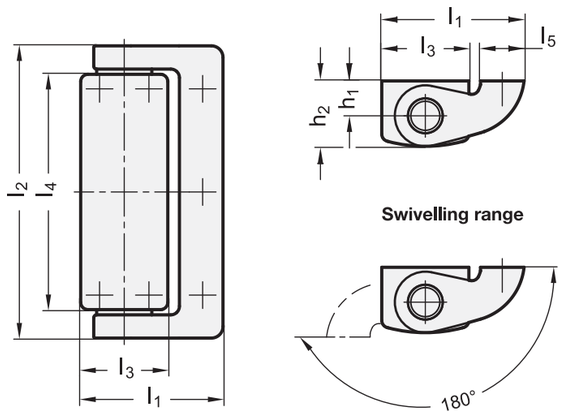
With the exception of the connector plug, hinges without safety switch GN 139.2 do not differ in their external appearance from hinges with safety switch GN 139.1 (see page 1440). With the concealed screw connection at the back, the hinge is also tamper-proof. The compact design combines safety and attractive appearance. The design with broad hinge halves is intended for mounting to glass or polycarbonate doors.

TECHNICAL INFORMATION

- Load rating information of hinges (see page A40)

MECHANICAL FEATURES

Mechanical features of Hinges GN 139.1 (see page 1440)



GN 139.2

Description	l1	l2	l3	l4	l5	h1	h2	m1	m2	m3	⚖
GN 139.2-49-101	49	101	30	81	15	12	22.5	71	17	27	308
GN 139.2-79-101	79	101	30	81	30	12	22.5	71	17	50	400

GN 139.3

Mounting plates

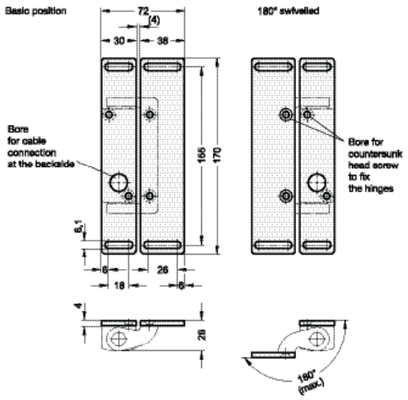
for hinges with safety switch GN 139.1 / GN 139.2, flat

SPECIFICATION

Steel
Zinc plated and plastic coated
silver metallic

INFORMATION

The flat mounting plate GN 139.3 allows the hinges GN 139.1 (see page 1440) / GN 139.2 (see page 1443) to be attached from the front.
The long slotted holes also allow the attachment to profile systems.
Countersunk screws for fixing the hinges to the mounting plate are an included part of the order.



GN 139.3

Description	l	⚖
GN 139.3-170	170	358

GN 139.4

Mounting plates

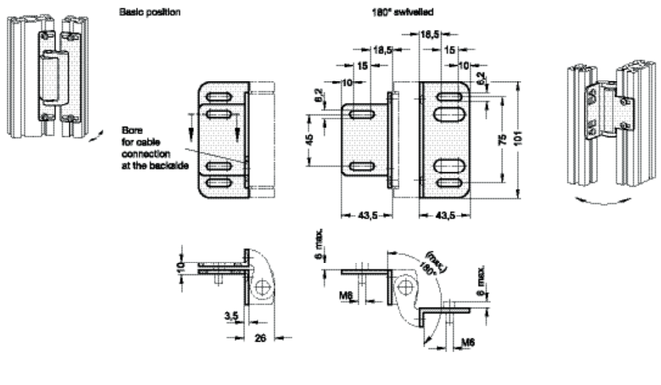
for hinges with safety switch GN 139.1 / GN 139.2, angled

SPECIFICATION

Zinc die casting
plastic coated
silver metallic

INFORMATION

The angled mounting plate GN 139.4 allows the hinges GN 139.1 (see page 1440) / GN 139.2 (see page 1443) to be attached between frame and door, i.e. the door gap.
The long slotted holes also allow the attachment to profile systems.
Countersunk screws for fixing the hinges to the mounting plate are an included part of the order.



GN 139.4

Description	l	⚖
GN 139.4-101	101	241

GN 139.6

Hinges without safety switch

Stainless Steel

SPECIFICATION

Stainless Steel precision casting
- AISI 316L
- polished, Ra < 0.8 µm

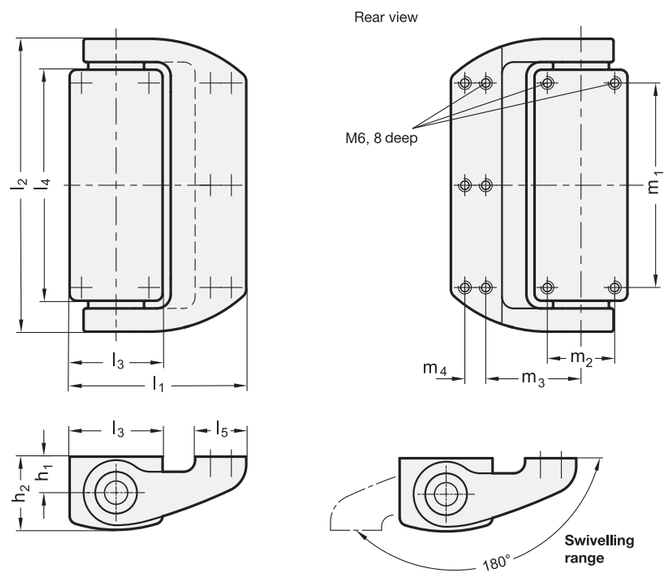
Pin
Stainless Steel AISI 316L

INFORMATION

With the exception of the connector plug, the hinge without safety switch GN 139.6 do not differ in their external appearance from hinges with safety switch GN 139.5 (see page 1445). With the concealed screw connection at the back, the hinge is also tamper-proof.
The compact design combines safety and attractive appearance.
The design with broad hinge halves is intended for mounting to glass or polycarbonate doors.

TECHNICAL INFORMATION

- Stainless Steel characteristics (see page A26)
- Load rating information of hinges (see page A40)
- Mechanical features of Hinges GN 139.5 (see page 1446)



GN 139.6 STAINLESS STEEL

Description	l1	l2	l3	l4	l5	h1	h2	m1	m2	m3	m4	⚖
GN 139.6-76-126	76	126	40	99.4	22	15.5	31.5	88	29	41	9	909

Hinges with safety switch

Stainless Steel

SPECIFICATION

Types

- Type **A**: Connector plug at the top
- Type **B**: Connector plug from the bottom
- Type **C**: Connector plug at the back (with 0.2 m cable)
- Type **CK**: Cable from the back

Stainless Steel precision casting

- AISI 316L
- polished, Ra < 0.8 µm

Pin
Stainless Steel AISI 316L

INFORMATION

Hinges GN 139.5 with integrated safety switches have been designed for monitoring doors and covers of machines and plants. Opening the door will activate the switch contacts which, in turn, will then e.g. interrupt a protective circuit via break contact (NC) and at the same time signal the door opening by closing a normally open contact element (NO). The contact blocks are fitted with positive opening slow-action contacts, i.e. they will definitely be separated when activated and have no hysteresis. The angle at which the switching points are reached are adjustable.
Together with the integrated contact blocks, the hinges are a compact, easy to mount unit with an attractive design. The mounting from the back make the hinge more tamper-proof. Hinges GN 139.6 (see page 1447) without switching function act as additional hinges, e.g. for larger doors or gates where several hinges are required.

TECHNICAL INFORMATION

- Stainless Steel characteristics (see page A26)
- Load rating information of hinges (see page A40)

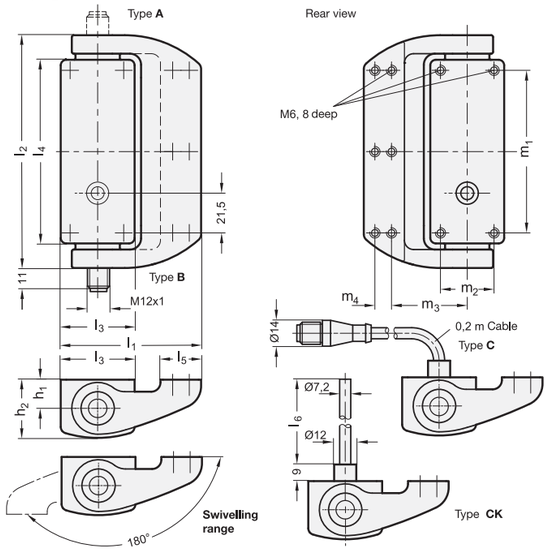
ACCESSORY

Cable with connector coupling
8-pole, 5 or 10 meter long:

- Cables with conntector coupling GN 330-M12x1-8-G-5 (see page 1448)
- Cables with conntector coupling GN 330 -M12x1-8-G-10 (see page 1448)

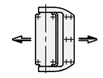
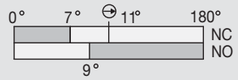
ON REQUEST

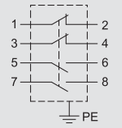
- Hinges with operating angle > 0°
- Hinges with other contact loadings



GN 139.5 — **STAINLESS STEEL**

Description	l1	l2	l3	l4	l5	l6	l7	l8	m1	m2	m3	m4	⚖
GN 139.5-76-126-A	76	126	40	99.4	22	-	15.5	31.5	88	29	41	9	1055
GN 139.5-76-126-B	76	126	40	99.4	22	-	15.5	31.5	88	29	41	9	1058
GN 139.5-76-126-C	76	126	40	99.4	22	-	15.5	31.5	88	29	41	9	1100
GN 139.5-76-126-CK-2	76	126	40	99.4	22	2	15.5	31.5	88	29	41	9	1034
GN 139.5-76-126-CK-5	76	126	40	99.4	22	5	15.5	31.5	88	29	41	9	1283

Mechanical features				
Maximum load Information with safety factor Examples of calculation	Load direction			
	F max.	2000 N	2000 N	2000 N
Fixing	from the back, 10 x threads M6, 8 mm deep			
Recommended torque	10 Nm (Screws M6)			
Protection class	IP67 / IP69K (Mind the cable conduit!)		acc. to EN 60529	
Switching principle, contact opening	Slow-action contacts force-fitted, with positive opening		acc. to IEC 60947-5-1, K	
Contact material	Silver alloy			
Operating travel diagram (scheme)	The switching points are adjustable up to 2° in direction of 0°.			
Maximum operating frequency	600 operating cycles / hour		acc. to IEC 60947-5-1, one operating cycle includes one opening and one closing action	
Mechanical life span	10^6 operating cycles		acc. to IEC 60947-5-1, one operating cycle includes one opening and one closing action	
Actuating speed	min. 2° / second, max. 90° / second		acc. to IEC 60947-5-1, one operating cycle includes one opening and one closing action	

Electrical features / Safety features			
Utilization category	AC 15: 24 Vac / 2A / DC 13: 24 Vdc / 2A (connector plug), AC 15: 250 Vac / 4A / DC 13: 250 Vdc / 0,3 A (cable)		acc. to EN 60947-5-1
Contacts, termination 8-pole connector M12 or 9 wire cable with 2 m or 5 m length Pin and cable assignment			1 - black 2 - black-white 3 - red 4 - red-white 5 - brown 6 - blue 7 - purple 8 - purple-white PE - yellow-green (only type CK)
Type of cable	9x0,34 mm², PVC H05VV-F, black		acc. to IEC 60332-1
Short-circuit current	1000 A		acc. to EN 60947-5-1
Rated insulation voltage	30 V AC / 36 V DC (connector plug) / 250 Vac (cable)		
Short-circuit protection	2 A, 500 V, Typ gG (connector plug) / 3 A, 500 V, Typ gG (cable)		
Ambient temperature	- 25 °C up to + 80 °C		
Degree of pollution, external	3		acc. to EN 60947-5-1
Safety parameters	B10: 1 000 000, B10 d: 5 000 000, B10 / B10 d: 20%		acc. to EN ISO 13849-1

Approvals, Conformities, Applicability			
Low-voltage switchgear and controlgear CE declaration EAC and UL certified	CE EAC cULus		EN 60947-1/2007 EN 60947-1-5 : 2004 + A1/2009
Safety applications	up to SIL 3 / PL e		acc. to EN ISO 13849-1

For other details and hints contact your sales partner at METALIKA KACIN.
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Cables with connector coupling M12x1

SPECIFICATION

Types

- Type **G**: Connector coupling straight
- Type **W**: Connector coupling 90° angled

Handle (Housing)
Plastic
Polyurethan-Elastomer TPU

Cable (Outer sheath)
Polyurethan PUR
black

Temperature resistance: -40 °C ... +90 °C

Insulating resistance: > 10^9 Ω

Degree of pollution: 3 / 2
according to EN 60664-1

Protection class: IP67
(in screwed condition)
according to EN 60529

Connecting nut M12x1
Brass, nickel plated

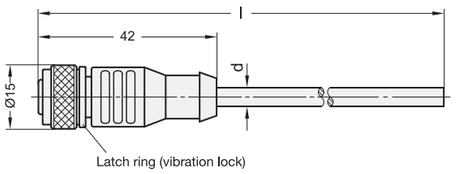
INFORMATION

Cables with connector coupling M12x1 GN 330 are used in conjunction with standard elements which have an electric switching function.

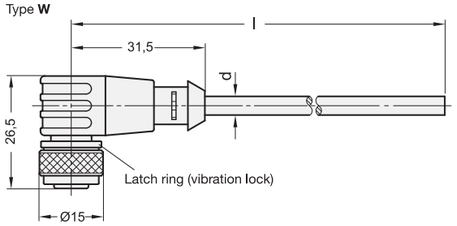
ON REQUEST

- other cable lengths l

Type **G**

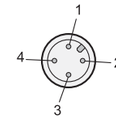
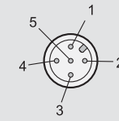
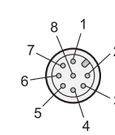
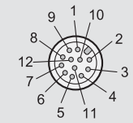


Type **W**



GN 330

Description	Connector	Number of contacts	l	⚖
GN 330-M12x1-4-G-5	M 12 x 1	4	5	160
GN 330-M12x1-5-G-5	M 12 x 1	5	5	210
GN 330-M12x1-8-G-5	M 12 x 1	8	5	230
GN 330-M12x1-12-G-5	M 12 x 1	12	5	250
GN 330-M12x1-4-G-10	M 12 x 1	4	10	399
GN 330-M12x1-8-G-10	M 12 x 1	8	10	512
GN 330-M12x1-12-G-10	M 12 x 1	12	10	468
GN 330-M12x1-8-W-5	M 12 x 1	8	5	265
GN 330-M12x1-12-W-5	M 12 x 1	12	5	246
GN 330-M12x1-8-W-10	M 12 x 1	8	10	400
GN 330-M12x1-12-W-10	M 12 x 1	12	10	460

Cable with plug-in connector	d Outside diameter	Cross-section	Operating voltage acc. to IEC 60 664-1	Current load rating acc. to IEC 60512-3	Contact assignment
4-pole (4-wire)	5	4 x 0.34 mm²	max. 250 V	4 A	 1 - brown 2 - white 3 - blue 4 - black
5-pole (5-wire)	5	5 x 0.34 mm²	max. 60 V	4 A	 1 - brown 2 - white 3 - blue 4 - black 5 - grey
8-pole (8-wire)	6	8 x 0.25 mm²	max. 30 V	2 A	 1 - white 2 - brown 3 - green 4 - yellow 5 - grey 6 - pink 7 - blue 8 - red
12-pole (12-wire)	6	12 x 0.14 mm²	max. 30 V	1.5 A	 1 - brown 2 - blue 3 - white 4 - green 5 - pink 6 - yellow 7 - black 8 - grey 9 - red 10 - purple 11 - grey / pink 12 - red / blue

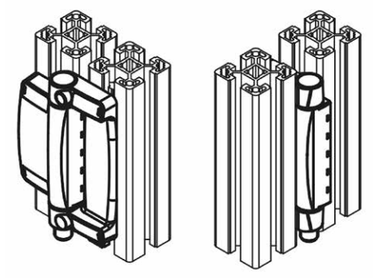
OTHER CABLE PROPERTIES

This adaptable cable, suitable for drag chains, features and outer jacket made of PUR and a core insulation made of polypropylene. It is free of PVC, silicon and halogens. UL and CSA approvals are available.

The cable is also resistant to oil, chemical, hydrolysis, microbes and welding sparks and flame retardant under IEC 60332-2-2 which makes the cable the perfect choice in many applications.

Security hinge switches

Item description/product images



Description

Material:
Housing, die-cast zinc.
Housing cover, plastic, self-extinguishing.
Hinge bolts, die-cast zinc/steel C45.
Contacts, silver-nickel alloy 10.

Note:
The security hinge switches are used for monitoring the position of swing-hinged safety doors, protective hatches and hoods. The protective device is monitored directly in the hinge.
By the universally pre-set versions, the switching angle is freely adjustable over the entire working range. A mounting aid ensures the quick alignment to doors and posts.

The additional hinges have the same appearance and dimensions as the security hinge switches.

Application:
- Special machine construction
- Electronics industry
- Packaging machines
- Enclosures/profile systems
- Machine tools
- Measuring, processing, testing and laboratory technology

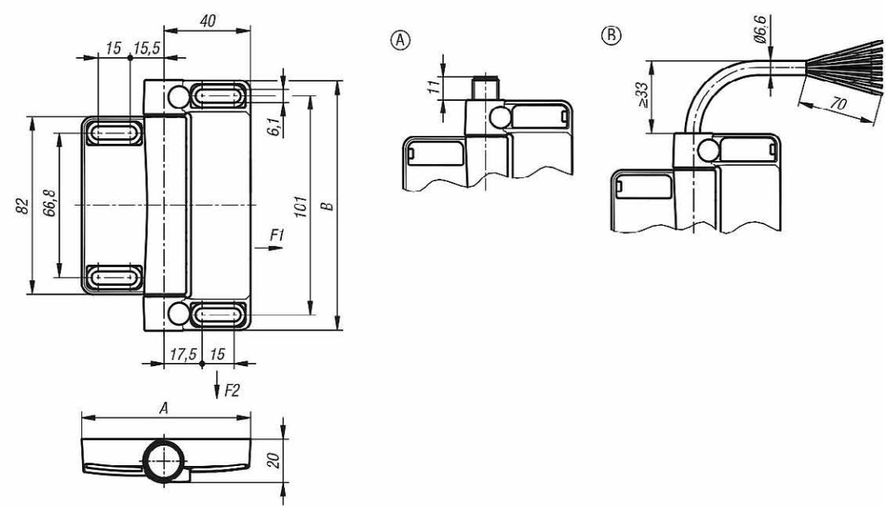
Assembly:
4x DIN 7984 or DIN EN ISO 4762 M6 socket head screws,
Tightening torque 4.3 Nm
General assembly instructions can be found in the accompanying operating instructions.

Advantages:
- Suitable for protection on swivel hatches
- Minimum assembly required, especially on conventional aluminium profiles
- Optimum integration into the surrounding structure
- Additional protection against tampering
- Hardly any mechanical wear

1499

Security hinge switches

Drawings



Overview of items

Security hinge switches

Order No.	Item	Form	A	B	Default setting	Contacts	Connection type	Connection position	F1 max. kN	F2 max. kN
1499.781161111	Security Hinge Switch	A	78	116	external mounting	1C / 20	connector	bottom	5	5
1499.781161112	Security Hinge Switch	A	78	116	external mounting	1C / 20	connector	top	5	5
1499.781162111	Security Hinge Switch	A	78	116	universal	1C / 20	connector	bottom	5	5
1499.781162112	Security Hinge Switch	A	78	116	universal	1C / 20	connector	top	5	5
1499.781161121	Security Hinge Switch	B	78	116	external mounting	1C / 20	cable	bottom	5	5
1499.781161122	Security Hinge Switch	B	78	116	external mounting	1C / 20	cable	top	5	5
1499.781162121	Security Hinge Switch	B	78	116	universal	1C / 20	cable	bottom	5	5
1499.781162122	Security Hinge Switch	B	78	116	universal	1C / 20	cable	top	5	5
1499.78116	Additional Hinge	-	78	116	-	-	-	-	5	5

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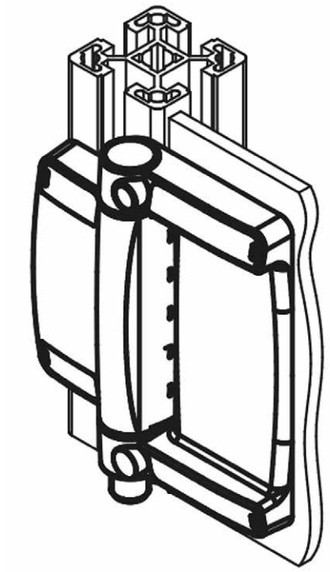
Security hinge switches long version

Item description/product images



Description

Material:
Housing, die-cast zinc.
Housing cover, plastic, self-extinguishing.
Hinge bolts, die-cast zinc/steel C45.
Contacts, silver-nickel alloy 10.

Note:
The security hinge switches are used for monitoring the position of swing-hinged safety doors, protective hatches and hoods. The protective device is monitored directly in the hinge.
By the universally pre-set versions, the switching angle is freely adjustable over the entire working range. A mounting aid ensures the quick alignment to doors and posts.

The additional hinges have the same appearance and dimensions as the security hinge switches.

Application:
- Special machine construction
- Electronics industry
- Packaging machines
- Enclosures/profile systems
- Machine tools
- Measuring, processing, testing and laboratory technology

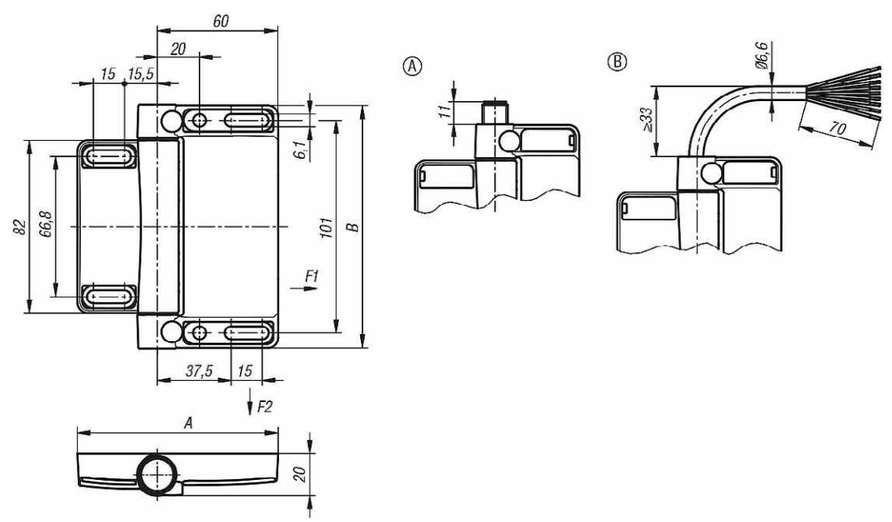
Assembly:
4x DIN 7984 or DIN EN ISO 4762 M6 socket head screws,
Tightening torque 4.3 Nm
General assembly instructions can be found in the accompanying operating instructions.

Advantages:
- Suitable for protection on swivel hatches
- Minimum assembly required, especially on conventional aluminium profiles
- Optimum integration into the surrounding structure
- Additional protection against tampering
- Hardly any mechanical wear

1501

Security hinge switches long version

Drawings



Overview of items

Security hinge switches long version

Order No.	Item	Form	A	B	Default setting	Contacts	Connection type	Connection position	F1 max. kN	F2 max. kN
1501.981161111	Security Hinge Switch	A	98	116	external mounting	1C / 20	connector	bottom	5	5
1501.981161112	Security Hinge Switch	A	98	116	external mounting	1C / 20	connector	top	5	5
1501.981162111	Security Hinge Switch	A	98	116	universal	1C / 20	connector	bottom	5	5
1501.981162112	Security Hinge Switch	A	98	116	universal	1C / 20	connector	top	5	5
1501.981161121	Security Hinge Switch	B	98	116	external mounting	1C / 20	cable	bottom	5	5
1501.981161122	Security Hinge Switch	B	98	116	external mounting	1C / 20	cable	top	5	5
1501.981162121	Security Hinge Switch	B	98	116	universal	1C / 20	cable	bottom	5	5
1501.981162122	Security Hinge Switch	B	98	116	universal	1C / 20	cable	top	5	5
1501.98116	Additional Hinge	-	98	116	-	-	-	-	5	5

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