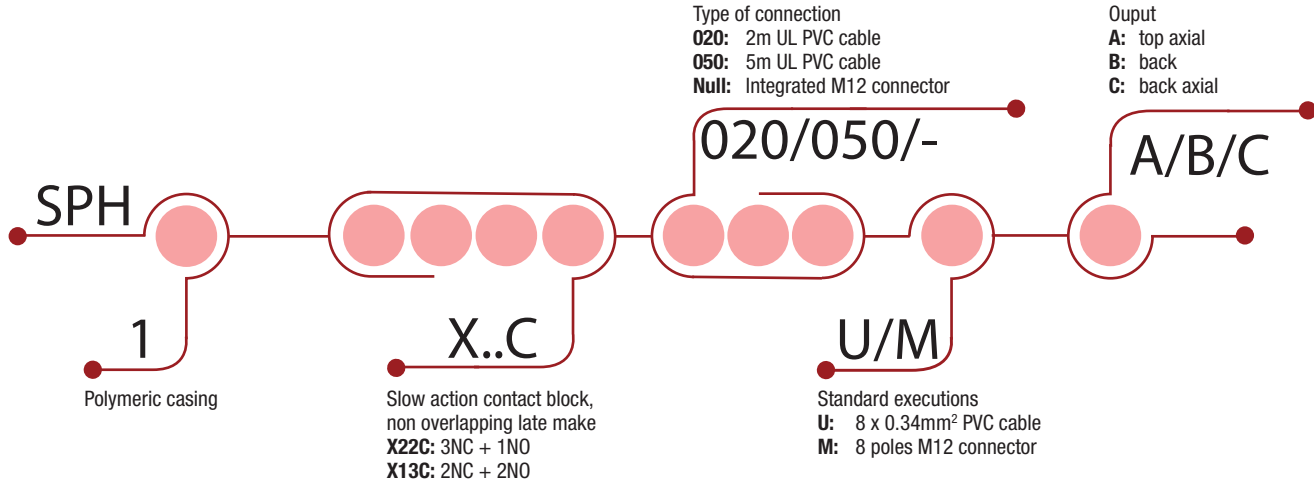


Safety Hinges

APPROVALS: UL 508 / CSA C22-2 N. 14



HOW IS IT MADE?

01 Electrical connection

- Cable 8x0,34 mm² PVC
- Cable standard lengths: 2m and 5m
- M12 8 poles connector

02 Contact Block

- Positive opening operation
- 2NO+2NC or 1NO+3NC slow action contacts
- Electrically separated contacts

03 Totally sealed for IP 67 protection degree

04 Casing

- Made of self-extinguishing technopolimer

05 Mounting screw

- 4 x M6 screws UNI 5933 ISO 10642 countersunk-head screws
- 4 x cylindrical head screws with hexagon socket M6 UNI 5931 ISO 4762
- 4 x M6 UNI 5588 ISO 4032 nut
- Screws and nuts are not supplied



Complementary Mechanical hinges



Safety Hinges

Description

APPLICATIONS

Within the range of safety devices, Comepi has created a new hinge with multiple integrated circuit which can suit all applications where high security is combined with a modern and sophisticated design. Thanks to its small sizes and numerous mounting options and connection (cable/connectors), the device is easily installed on most common aluminium profiles (minimum width 30 mm.). Its installation is also facilitated by the integration of a safety switch integrated into a single body, thus avoiding the need to separately install a mechanical hinge and a safety switch connected via a special pin.

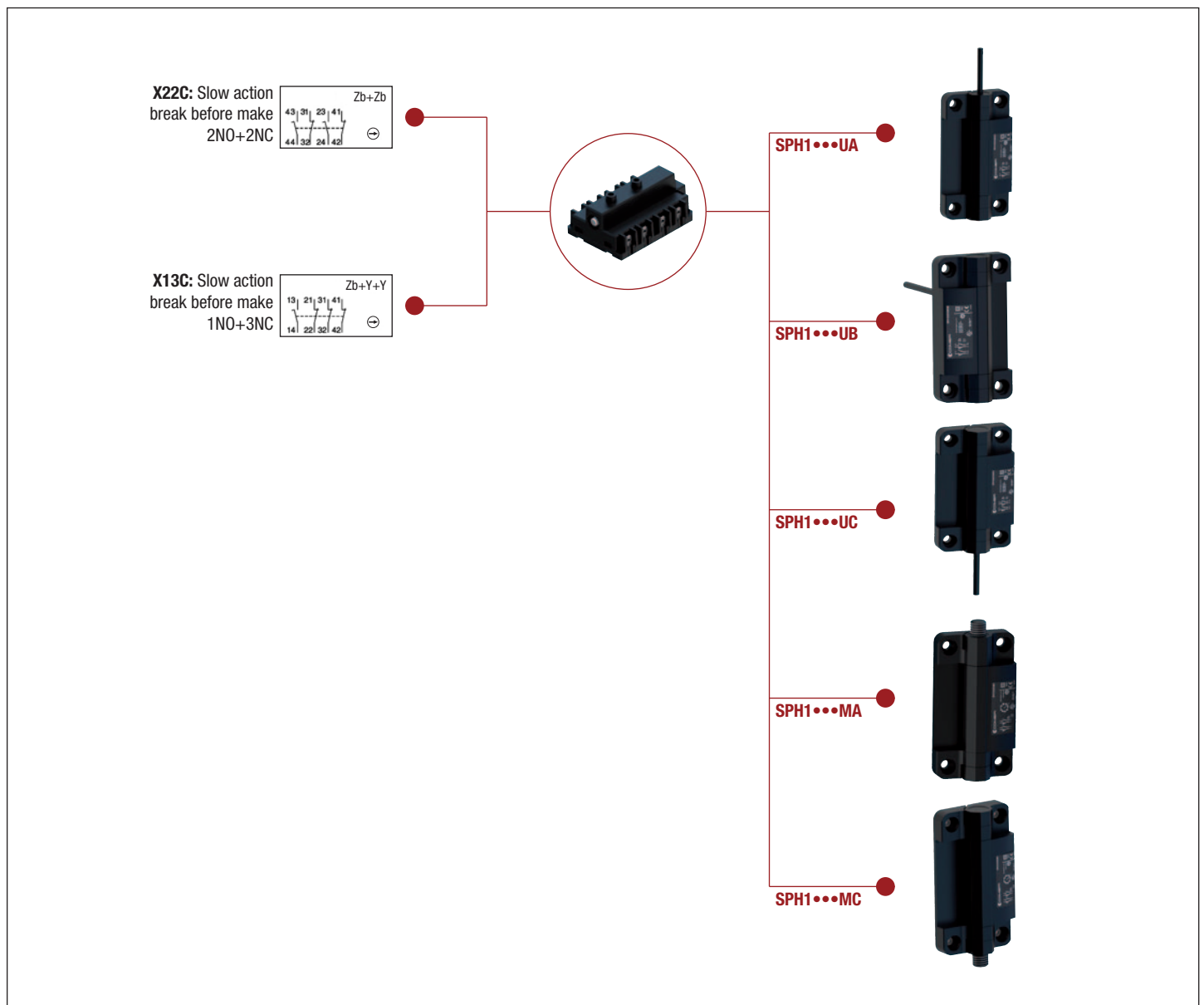
The use of stainless steel components and the degree of protection IP67 permit the hinge to be subjected to frequent washing and to be used in environments where cleanliness and hygiene require maximum attention. The Comepi hinge was developed and manufactured according to the rules set out in IEC international publications and to applicable EN European Standards; the use of a redundant system and a proper configuration allows to obtain a safety system of machinery up to SIL 3 or PLe according to EN ISO 13849-1.

DESCRIPTION

Both the self-extinguishing body of the hinge and the rotation pin are made of technopolymer with high-rigidity capable of resisting to solvents, oils, greases and various chemical agents. The internal switch is composed of 4 slow action double break contacts. The positive opening (according to IEC EN 60947-5-1) is guaranteed on all NC contacts. All the circuits have a low contact resistance thanks to the self-cleaning action of the silver pastes.

Each hinge is supplied with the following kit:

- n°4 technopolymer covers (to avoid free access to screws):
- n°4 technopolymer bushings (for hexagon socket or nut M6).
- n°2 thermoplastic elastomer safety plugs to guarantee IP67 protection degree.



Other versions of cable and electrical contacts are available on request: contact our sales department.

Safety Hinges

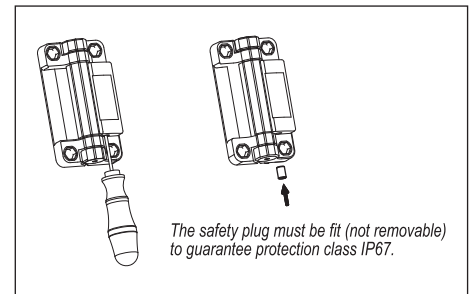
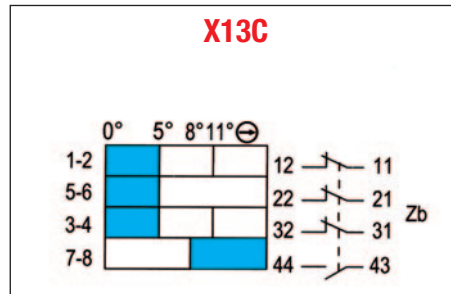
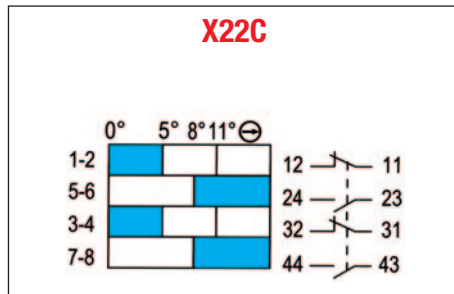
Technical Data

	SPH series	
Standards	IEC 60947-5-1, EN 60947-5-1 UNI EN ISO 14119	
Certifications - Approvals	UL - IMQ - EAC - CCC	
Air temperature near the device		
– during operation	°C	– 20 ... + 80
– for storage	°C	– 20 ... + 80
Mounting positions	All positions are authorized	
Protection against electrical shocks (acc. to IEC 536)	Class II	
Degree of protection (according to IEC 529 and EN 60 529)	IP 67	

Electrical Data

Rated insulation voltage U_i - according to IEC 947-1 and EN 60-947-1 - according to UL 508 and CSA C22-2 n° 14			400 V (degree of pollution 3) (24 V for M12 connector) C 300, Q 300 (class II for M12 connector)
Rated impulse withstand voltage U_{imp} (according to IEC 947-1 and EN 60 947-1)	kV		4 (2,5 for M12 connector)
Conventional free air thermal current I_{th} (according to IEC 947-5-1) $\theta < 40$ °C	A		4 (2,5 for M12 connector)
Short-circuit protection $U_e < 500$ V a.c. - gG (gl) type fuses	A		4
Rated operational current I_e / AC-15 (according to IEC 947-5-1)	24 V - 50/60 Hz	A	4
	120 V - 50/60 Hz	A	4
	250 V - 50/60 Hz	A	4
	400 V - 50/60 Hz	A	4
I_e / DC-13 (according to IEC 947-5-1)	24 V - d.c.	A	2
	125 V - d.c.	A	0.4
	250 V - d.c.	A	0.3
Switching frequency	Cycles/h		1200
Mechanical durability			1 million of operations
B10d			2.000.000 operations

Operating diagrams



As shown in the travel diagrams, the angle of action is set at the factory to 5° (opening of the NC contacts, to be verified according to EN294). This angle and consequently also angles relating to the closure of the NO contact and positive opening of the NC contacts can be adjusted by the installer; in the case of doors of considerable size, the operating angle can be reduced up to 1° operating with a screwdriver on the adjustment screw. The degree of protection IP67 is then secured by inserting the appropriate safety plug (not removable) in the adjustment hole. It is recommended to verify the correct operation of the device before starting up the machine and we suggest to repeat the test periodically.

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 overlapping contacts.

Safety Hinges

Technical Data

Technical data approved by IMQ

Standards	Devices conform with international IEC 60947-5-1 and European EN 60947-5-1 standards	
Degree of protection	IP 67	
Rated insulation voltage U_i	400 V (degree of pollution 3)	
Rated impulse withstand voltage U_{imp}	4 kV (2,5 kV for M12 connector)	
Conventional free air thermal current I_{th}	4 A (2,5 A for M12 connector)	
Short-circuit protection - gG type fuses	4 A	
Rated operational current		
I_e / AC-15	24 V - 50/60 Hz	4 A
	120 V - 50/60 Hz	4 A
	250 V - 50/60 Hz	4 A
	400 V - 50/60 Hz	4 A
I_e / DC-13	24 V - d.c.	2 A
	125 V - d.c.	0.4 A
	250 V - d.c.	0.3 A

Technical data approved by UL

Standards	Devices conform with UL 508
Utilization categories	
Cable "U-Type"	C300, Q300
Connector / Cable+Connector "M-Type"	24 V / 2 A Class II

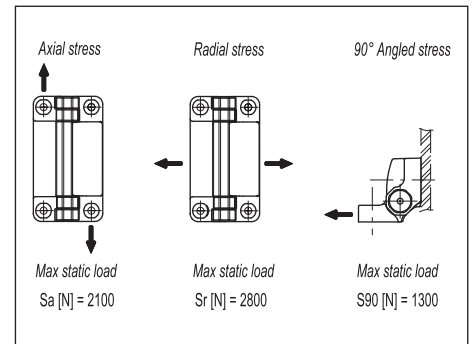
For the complete list of approved products, contact our technical department

IMPLEMENTATION

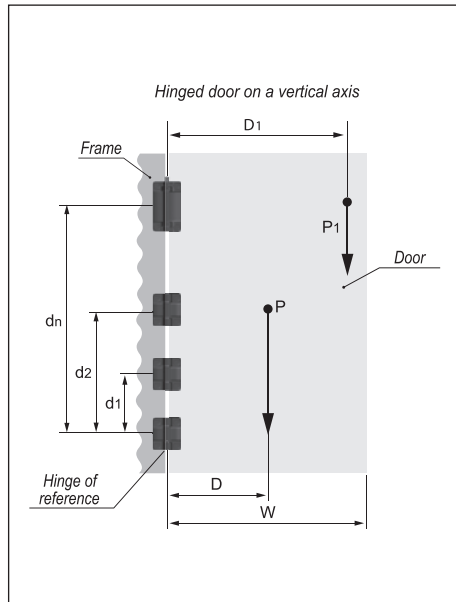
Determination of maximum applicable load

For SPH1 hinges with built-in safety multiple switch, the reference value supplied is the max limit static load (S_a , S_r , S_{90}), 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]
- P1** 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 $D = W/2$
- D1** distance [metres] between the hinge axis and the additional extra load application point
- N** number of hinges
- k** safety factor
- dT** sum of the distances [metres] of all the hinges from the hinge of reference ($d = d_1 + d_2 + \dots + d_n$). In case of only two hinge assembled, d is simply the distance between them

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

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

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

$$\frac{[(P \cdot D)+(P1 \cdot D1)]}{d_T} \cdot k < S_{90}$$

The technical designer must use suitable safety factors (k) according to the type of application and function of the SPH1 hinge.

$$P = 294 \text{ N (30 Kg)} \quad D = 0,4 \text{ m} \quad N = 3$$

$$d_T = 1,5 \text{ m} \quad d_2 = 1 \text{ m} \quad d_1 = 0,5 \text{ m}$$

$$P_1 = 196 \text{ N (20 Kg)} \quad D_1 = 1,2 \text{ m}$$

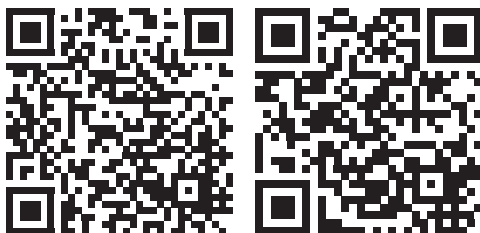
$$\frac{490}{3} = 163 \cdot k < 2100$$

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

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

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.



Download
Instruction sheet – Safety Hinges
CE declaration

Safety Hinges

Polymeric casing - IP67

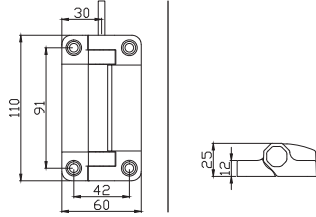
Electrical connection:

Replace the symbol “●●●” with the length of the cable desired

020: Cable length 2m

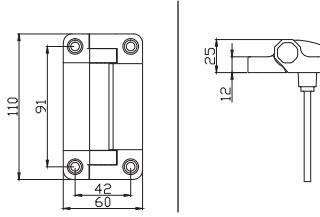
050: Cable length 5m

Top axial exit with cable



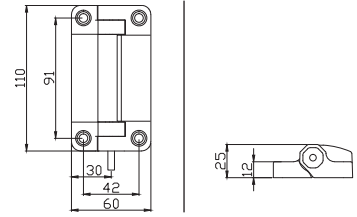
Min. actuating torque 0,5 Nm 
 Weight 280 g
 Operating diagram Page

Back exit with cable



Min. actuating torque 0,5 Nm 
 Weight 280 g
 Operating diagram Page 26

Bottom axial exit with cable



Min. actuating torque 0,5 Nm 
 Weight 280 g
 Operating diagram Page 26

Contact Blocks

X22C (2NO+2NC)

SPH1X22C●●●UA

SPH1X22C●●●UB

SPH1X22C●●●UC

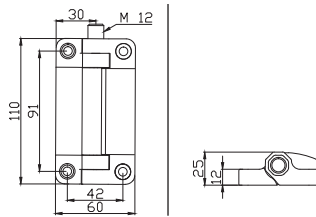
X13C (1NO+3NC)

SPH1X13C●●●UA

SPH1X13C●●●UB

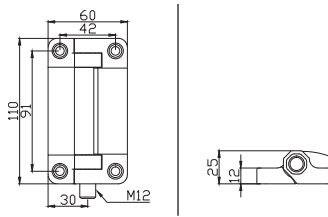
SPH1X13C●●●UC

Top axial exit with M12 connector



Min. actuating torque 0,5 Nm 
 Weight 140 g
 Operating diagram Page 26

Bottom axial exit with M12 connector



Min. actuating torque 0,5 Nm 
 Weight 140 g
 Operating diagram Page 26

Contact Blocks

X22C (2NO+2NC)

SPH1X22CMA

SPH1X22CMC

X13C (1NO+3NC)

SPH1X13CMA

SPH1X13CMC

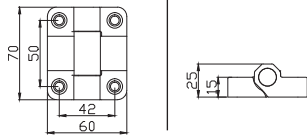
Safety Hinges

Accessories

Complementary mechanical hinges

Fiberglass reinforced technopolymer

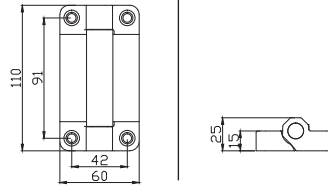
Complementary hinge 70 mm



Peso

85 g

Complementary hinge 110 mm

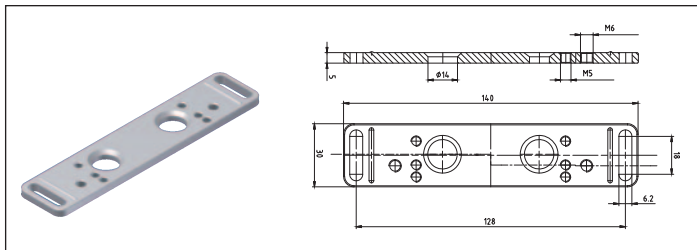


Peso

130 g

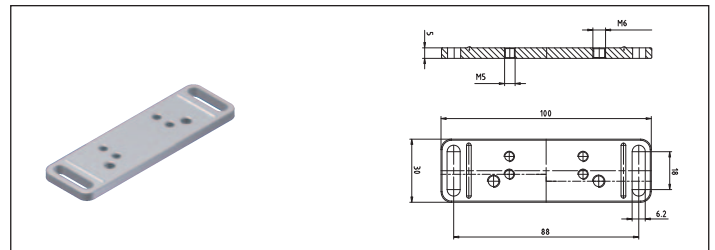
SPH1-COMP1

SPH1-COMP2



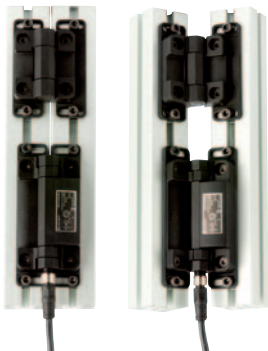
Art **Description**

SPH-FX1 Couple of supports for safety hinges SPH1 series (fixing screws for switch included)



Art. **Description**

SPH-FX2 Couple of supports for complementary hinges SPH1-COMP1 series (fixing screws for switch included)



The mounting brackets are used in the presence of profiles with slots having a different pitch from the standard pitch of the hinge (40 mm).