Limit switches
OsiSense XC Special

Catalogue



Simply easy!™

Telemecanique
Sensors

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Limit switches
OsiSense XC Special

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Limit switches
OsiSense XC Standard

Design		Miniature format	Compact format, CENELEC EN50047	
		Metal, pre-cabled	Plastic, 1 cable entry	Plastic, 2 cable entries
				
Enclosure		Metal	Plastic, double insulated	
Modularity		Head, body and connection modularity	Head, body and cable entry modularity	Head and body modularity
Conformity/Certifications		UL, CSA, CCC, GOST	CENELEC EN 50047 UL, CSA, CCC, GOST	
Body dimensions (w x h x d) in mm		30 x 50 x 16	31 x 65 x 30	58 x 51 x 30
Head		Linear movement (plunger) Rotary movement (lever) Rotary movement, multidirectional Same heads for ranges XCMD, XCKD, XCKP and XCKT		
Contact blocks				
2 electrically separate contacts	snap action with positive opening operation	•	•	•
	slow break with positive opening operation	•	•	•
2 same polarity contacts	snap action	–	–	–
	slow break	–	–	–
3 electrically separate contacts	snap action with positive opening operation	•	•	•
	slow break with positive opening operation	•	•	•
4 electrically separate contacts	snap action with positive opening operation	•	–	–
	slow break with positive opening operation	–	–	–
4 contacts (2 x 2 same polarity contacts)	snap action	–	–	–
Degree of protection IP/IK		IP 66, IP 67, IP 68, IK 06	IP 66, IP 67, IK 04	
Operating temperature		- 25°C... + 70°C		
Connection	**Screw terminals**	–	1 entry for ISO M16 or M20, Pg 11, Pg 13.5 cable gland or 1/2" NPT, PF 1/2	2 entries for ISO M16 or Pg 11 cable gland or 1/2" NPT (using adaptor)
	Pre-cabled	Ø 7.5 PvR, CEI, halogen free, depending on model	–	
	Connector	Integral or remote M12 or remote 7/8"-16UN	M12	–
Type reference		**XCMD**	**XCKP**	**XCKT**
Pages		Please refer to our catalogue “Limit switches OsiSense XC Standard”		

Compact format, CENELEC EN50047	Compact format, with reset		
Metal, 1 cable entry	**Plastic, 1 cable entry**	**Plastic, 2 cable entries**	**Metal, 1 cable entry**
			
Metal	Plastic, double insulated		Metal
Head, body and connection modularity	–		
CENELEC EN 50047 UL, CSA, CCC, GOST	UL, CSA, GOST		
31 x 65 x 30	31 x 65 x 30	58 x 51 x 30	31 x 65 x 30
Linear movement (plunger) Rotary movement (lever) Rotary movement, multidirectional Same heads for ranges XCMD, XCKD, XCKP and XCKT	Linear movement (plunger) Rotary movement (lever)		
●	●	●	●
●	●	●	●
–	–	–	–
–	–	–	–
●	–	–	–
●	–	–	–
–	–	–	–
–	–	–	–
–	–	–	–
IP 66, IP 67, IK 06	IP 66, IP 67, IK 04 and IK06 (for XCDR)		
- 25°C... + 70°C			
1 entry for ISO M16 or M20, Pg 11, Pg 13.5 cable gland or 1/2" NPT, PF 1/2	1 entry for ISO M20 or Pg 13.5 cable gland or 1/2" NPT	2 entries for ISO M16 or Pg 11 cable gland or 1/2" NPT (using adaptor)	1 entry for ISO M20 or Pg 13.5 cable gland or 1/2" NPT
–			
M12	–		
XCKD	**XCPR**	**XCTR**	**XCDR**
Please refer to our catalogue “Limit switches OsiSense XC Standard”			

Limit switches
OsiSense XC Standard

Design		**"Classic" format**		**EN 50041 format**	**Industrial EN50041 format**
		Metal, 3 cable entries	**Metal, 1 cable entry**	**Plastic, 1 cable entry**	**Metal, 1 cable entry or connector**
					
Enclosure		Metal		Plastic, double insulated	Metal
Modularity		Head, body and operator modularity			
Conformity/Certifications		UL, CSA, CCC (XCKM), GOST		CENELEC EN 50041 UL, CSA, CCC, GOST	
Body dimensions (w x h x d) in mm		63 x 64 x 30	52 x 72 x 30	40 x 72.5 x 36	40 x 77 x 44 42.5 x 84 x 36
Head		Linear movement (plunger) Rotary movement (lever) Rotary movement, multidirectional			
Contact blocks					
2 electrically separate contacts	snap action with positive opening operation	●	●	●	●
	slow break with positive opening operation	●	●	●	●
2 same polarity contacts	snap action	–	–	–	●
	slow break	–	–	–	–
3 electrically separate contacts	snap action with positive opening operation	●	●	●	●
	slow break with positive opening operation	●	●	●	●
4 electrically separate contacts	snap action with positive opening operation	–	–	–	–
	slow break with positive opening operation	–	–	–	–
4 contacts (2 x 2 same polarity contacts)	snap action	–	–	●	●
Degree of protection IP/IK		IP 66, IK 06		IP 65, IK 03	IP 66, IK 07
Operating temperature		- 25°C... + 70°C			- 25°C... + 70°C - 40°C or + 120°C depending on model
Connection	**Screw terminals (entry for cable gland)**	3 entries for ISO M20 or Pg 11 cable gland or 1/2" NPT	1 entry incorporating cable gland or tapped 1/2" NPT	1 entry for ISO M20 or Pg 13.5 cable gland	1 entry for ISO M20 or Pg 13.5 cable gland or 1/2" NPT
	Connector	–			Integral M12 or 7/8"-16UN
Type reference		**XCKM**	**XCKL**	**XCKS**	**XCKJ**
Pages		Please refer to our catalogue "Limit switches OsiSense XC Standard"			

Limit switches
OsiSense XC Basic

Miniature format	Compact format EN 50047		Compact format, with reset knob	
Plastic, pre-cabled	**Plastic, 1 cable entry**	**Plastic, 2 cable entries**	**Plastic, 1 cable entry**	**Plastic, 2 cable entries**
				
Plastic, double insulated	Plastic, double insulated			
–				
UL, CSA, CCC, GOST	CENELEC EN 50047 UL, CSA, CCC, GOST		UL, CSA, CCC, GOST	
30 x 50 x 16	31 x 65 x 30	59 x 51 x 30	31 x 65 x 30	59 x 51 x 30
Linear movement (plunger) Rotary movement (lever) Rotary movement, multidirectional				
•	•	•	•	•
–	•	•	•	•
–	–	–	–	–
– –	– •	• –	– •	• –
–	•	–	•	–
–	–	–		–
–	–	–		–
–	–	–		–
IP 65, IK 04				
- 25°C... + 70°C				
–	1 entry for ISO M20 or Pg 11 cable gland Other cable entries *(3)*: ISO M16 x 1.5 and PF 1/2 (G1/2)	2 entries for ISO M16 or Pg 11 cable gland or 1/2" NPT (using adaptor)	1 entry for ISO M20 or Pg 11 cable gland Other cable entries *(3)*: ISO M16 x 1.5 and PF 1/2 (G1/2)	2 entries for ISO M16 or Pg 11 cable gland or 1/2" NPT (using adaptor)
Ø 7.5 PvR, CEI, halogen free, depending on model	–			
XCMN	**XCKN**	**XCNT**	**XCNR**	**XCNTR**
Please refer to our catalogue “Limit switches OsiSense XC Standard”				

Limit switches
OsiSense XC Special

Design/Applications	Very severe applications	Very severe material handling applications	For hoisting and material handling applications (XCR); for conveyor belt shift monitoring (XCRT)	For hoisting and material handling applications	Subminiature format and microswitch. Applications requiring high precision and a low operating force
	Metal, 1 cable entry	Metal, 3 cable entries	Metal or polyester, 1 cable entry	Metal or plastic, 3 cable entries	Plastic, pre-cabled
					
Enclosure	Metal	Metal	Metal or polyester	Metal or plastic	Polyester
Features	Head and body modularity	–	–	–	–
Conformity/Certifications	UL, CSA, GOST	CSA, GOST	CSA (XCR) CCC (XCR), GOST	CE, UL, CSA, CCC, GOST	CE, UL
Body dimensions (w x h x d) in mm	40 x 81 x 41	77 x 83 x 44	85 x 95 x 75	118 x 77 x 59 (metal) 118 x 77 x 67 (plastic)	Depending on type
Head	Linear movement (plunger) or rotary movement (lever)	Linear movement (plunger)	Rotary movement (lever)	Rotary movement (lever)	–
Contact blocks					
2 electrically separate contacts					
snap action with positive opening operation	–	–	–	–	–
slow break with positive opening operation	–	●	–	–	–
2 same polarity contacts					
snap action	●	–	–	–	●
slow break	–	●	–	–	–
3 electrically separate contacts					
snap action with positive opening operation	–	–	–	–	–
slow break with positive opening operation	–	–	–	–	–
4 electrically separate contacts					
snap action with positive opening operation	–	–	●		–
slow break with positive opening operation	–	–	●	●	–
4 contacts (2 x 2 same polarity contacts), snap action	●	–	●	–	–
Degree of protection IP/IK	IP 65/IK 08	IP 65	IP 54/IK 07 or IP 65 depending on model	IP 66/IK 07 (metal) IP 65/IK 04 (plastic)	IP 67 or IP 40 depending on model IP 00 (tags)
Operating temperature	- 25°C... + 70°C; - 40° C or + 120° C (XC2J depending on model)				
Connection					
Screw terminals (entry for cable gland)	1 entry with integral cable gland	3 tapped entries for Pg 13.5 cable gland	1 tapped entry for Pg 13.5 cable gland	3 tapped entries for Pg 13.5 cable gland or tapped M20 x 1.5	Tag connections or pre-wired depending on model
Pre-cabled	–				
Connector	–				
Type reference	**XC2J**	**XC1AC**	**XCR XCRT**	**XCKMR XCKVR**	**XEP**
Pages	8 and 20	26	32	33	46 and 48

Limit switches
Preventa XCS
Safety switches

Safety limit switches and guard switches Preventa XCS								
Standard		**With lever or hinge**	**Actuator operated**					**Coded magnetic for detection without contact**
Miniature format	**Compact format**	**Compact format**	**Miniature format**	**Compact format**	**Industrial format with or without locking**		**Rectangular format with solenoid interlocking**	**Rectangular or cylindrical format**
Metal, pre-cabled	**Metal or plastic, 1 cable entry**	**Plastic, 1 or 2 cable entries**	**Plastic, pre-cabled**	**Plastic, 1 or 2 cable entries**	**Metal, 1 cable entry**		**Metal, 2 cable entries or plastic, 1 cable entry**	**Coded magnetic switch or coded magnetic system, pre-cabled or connector**
					Without locking	With locking, manual unlocking		



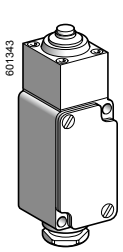
Metal	Metal or plastic	Plastic, double insulated	Plastic, double insulated		Metal	Metal	Plastic, double insulated	Plastic
–		–	–		–	–		
UL, CSA		UL, CSA	UL, CSA	UL, CSA, GOST	UL, CSA, GOST			CE, UL, CSA, TÜV, GOST depending on model
30 x 50 x 16	34 x 65 x 34.5	Depending on type	30 x 78 x 15	30 x 93 x 30 52 x 114 x 30	40 x 60 x 44	98 x 146 x 44 110 x 93.5 x 33		Depending on type
Linear movement (plunger) or rotary movement (lever)		Rotary movement (lever)	Turret head		Turret head	Turret head		–
–		–	–	•	–	–		Depending on model
–		•	•		–	–	•	
–		–	–	•	–	–		
–		•	•		–	–	•	
•		•	–	•	–	–		
•		•	•		•	•	–	
–		–	–		–	–		
–		–	–		–	–		
•	–	–	–		–	–		
IP 66, IP 67 IP 68 (XCSM) IK 06 (XCSM & XCSD) IK 04 (XCSP)		IP 67	IP 67		IP 67	IP 67		IP 66, IP 67 IP 69K depending on model
- 25°C... + 70°C		- 25°C... + 70°C	- 25°C... + 70°C		- 25°C... + 70°C	- 25°C... + 70°C		- 25°C... + 70°C
XCSP and XCSD: 1 entry for Pg 13.5 or M20 cable gland or 1/2" NPT		Depending on model: 1 or 2 entries for Pg 13.5 or ISO M20 cable gland or 1/2" NPT	Depending on model: 1 or 2 entries for ISO M16 or Pg 11 cable gland or 1/2" NPT		1 entry for ISO M20 or Pg 13.5 cable gland or 1/2" NPT	Depending on model: 1 or 2 entries for Pg 13.5 or ISO M20 cable gland or 1/2" NPT		–
XCSM: Ø 7.5 cable, PvR		–	XCSMP: Ø 7.5 cable, PvR		–	–		PVC cable
–		–	–		–	–		Remote M8, remote M12 or integral M12 depending on model
XCSM	**XCSP XCSD**	**XCSPL, XCSPR XCSTL, XCSTR**	**XCSMP**	**XCSPA XCSTA**	**XCSA**	**XCSB XCSC**	**XCSE**	**XCSTE**	**XCSDM/C/P/R XCSDM3/4**

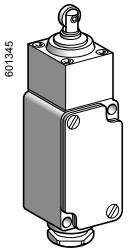
Please refer to our catalogue “Preventa XCS safety switches”

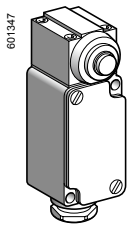
Limit switches
OsiSense XC Special
For very severe applications, type XC2J

■ XC2J
with 1 cable entry

□ With head for linear movement (plunger)

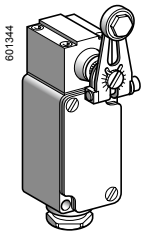


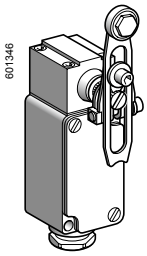


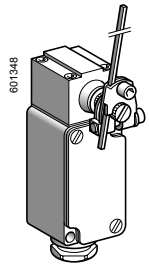


Page 10

□ With head for rotary movement (lever)







Page 10

Limit switches
OsiSense XC Special
For very severe applications, type XC2J

Environment characteristics

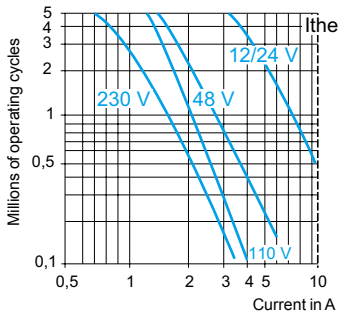
Conformity to standards	Products	IEC/EN 60947-5-1, IEC 60337-1, VDE 0660-200, UL 508, CSA C22-2 n° 14
	Machine assemblies	IEC/EN 60204-1, NF C 79-130
Product certifications	Standard version	CSA 300 V ⎓ HD, 60 W ∿
	Special version	UL 250 V ∿ HD Listed, CSA 300 V ∿ HD, 60 W with 1/2" NPT tapped cable entry
Protective treatment	Standard version	"TC"
Ambient air temperature	For operation	- 25…+ 70°C. Special adaptable sub-assemblies: - 40°C or + 120°C
	For storage	- 40…+ 70°C
Vibration resistance		10 gn (10…500 Hz) conforming to IEC 60068-2-6
Shock resistance		25 gn (18 ms) conforming to IEC 60068-2-27
Electric shock protection		Class I conforming to IEC 60536 and NF C 20-030
Degree of protection		**IP 65 conforming to IEC 60529, IP 657 conforming to NF C 20-010**
Repeat accuracy		0.01 mm on the tripping points, with 1 million operating cycles for head with end plunger
Cable entry		1 entry incorporating cable gland. Clamping capacity: 6…13.5 mm

Contact block characteristics

Rated operational characteristics		**∿ AC-15; A300 (Ue = 240 V, Ie = 3 A)** **⎓ DC-13; Q300 (Ue = 250 V, Ie = 0.27 A), conforming to IEC 60947-5-1 Appendix A, EN 60947-5-1**
Rated insulation voltage		500 V conforming to IEC 60947-5-1, group C conforming to NF C 20-040, 300 V conforming to CSA C22-2 n° 14
Resistance across terminals		≤ 25 mΩ conforming to NF C 93-050 method A or IEC 60255-7 category 3
Short-circuit protection		10 A cartridge fuse type gG (gl)
Connection	Screw clamp terminals	**XCKZ01**: clamping capacity, min: 1 x 0.5 mm², max: 2 x 2.5 mm² **XESP10●1**: clamping capacity, min: 1 x 0.75 mm², max: 2 x 1.5 mm²
Minimum actuation speed		0.001 m/minute
Electrical durability		■ Conforming to IEC 60947-5-1 Appendix C ■ Utilisation categories AC-15 and DC-13 ■ Maximum operating rate: 3600 operating cycles/hour ■ Load factor: 0.5

XCKZ01, XESP1021, XESP1031

AC supply
50/60 Hz ∿
inductive circuit

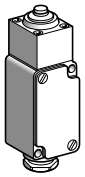
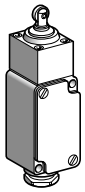
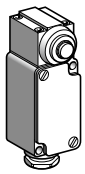
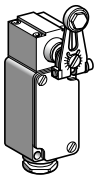
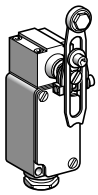
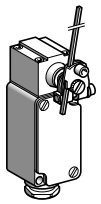


DC supply ⎓	Voltage **V**	**24**	**48**	**120**
	Power broken in W for 5 million operating cycles **W** ⌒⌒⌒	10	7	4

Limit switches

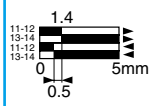
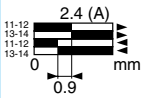
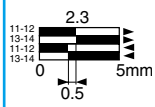
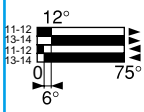
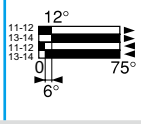
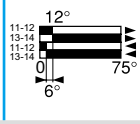
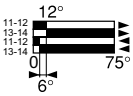
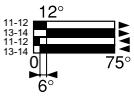
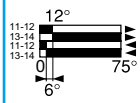
OsiSense XC Special

For very severe applications, type XC2J
Complete switches, fixed body,
1 cable entry incorporating cable gland

Type of head	**Plunger**			**Rotary**		
						
Type of operator	Metal end plunger	Steel roller plunger	Metal side plunger	Thermoplastic roller lever *(1)*	Variable length thermoplastic roller lever *(1)*	Steel rod lever ⌀ 3 mm *(1)*

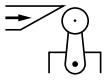
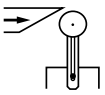
(1) Adjustable throughout 360°.

References

Single-pole CO snap action XCKZ01 						
	ZC2JC1 + ZC2JE61 	**ZC2JC1 + ZC2JE62** 	**ZC2JC1 + ZC2JE63** 	**Actuation from left AND right**		
				ZC2JC1 + ZC2JE01 + ZC2JY11 	**ZC2JC1 + ZC2JE01 + ZC2JY31** 	**ZC2JC1 + ZC2JE01 + ZC2JY51** 
				Actuation from left OR right		
				ZC2JC1 + ZC2JE05 + ZC2JY11 	**ZC2JC1 + ZC2JE05 + ZC2JY31** 	**ZC2JC1 + ZC2JE05 + ZC2JY51** 
Weight (kg)	0.555	0.560	0.600	0.605	0.620	0.605

Contact operation ■ *closed* □ *open* — *(A) = cam displacement*

Complementary characteristics not shown under general characteristics (page 9)

Switch actuation	On end	By 30° cam	On end	By 30° cam		By any moving part
Type of actuation						
Maximum actuation speed	0.5 m/s			1.5 m/s		
Mechanical durability (in millions of operating cycles)	**30**	**25**	**30**			
Minimum tripping force or torque	18 N		26 N	**With head ZC2JE01**: 0.30 N.m **With head ZC2JE05**: 0.20 N.m		
Cable entry	1 tapped entry incorporating metal cable gland. Clamping capacity 6 to 13.5 mm					

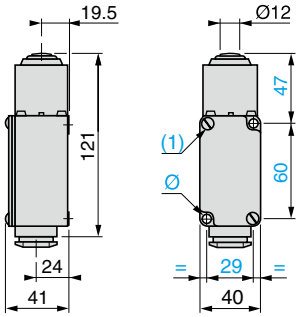
Other versions Switches with gold flashed contacts. Special protective treatments.
Please consult our Customer Care Centre.

Limit switches

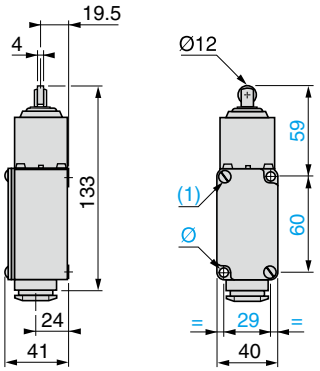
OsiSense XC Special

For very severe applications, type XC2J
Complete switches, fixed body,
1 cable entry incorporating cable gland

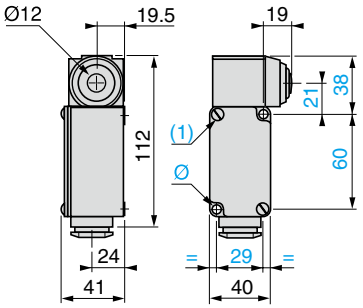
ZC2JC1 + ZC2JE61



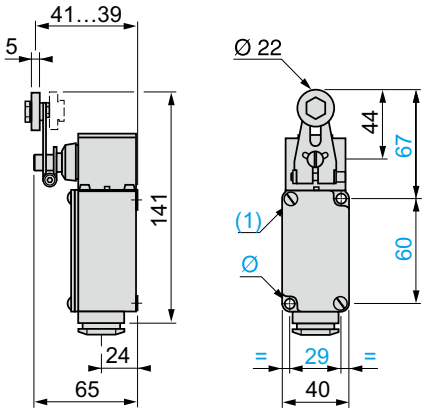
ZC2JC1 + ZC2JE62



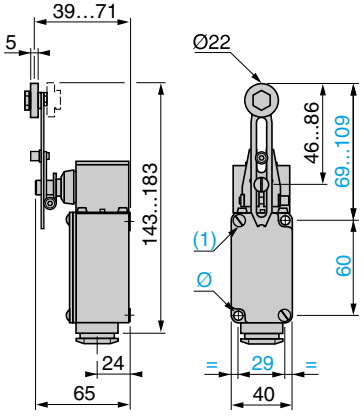
ZC2JC1 + ZC2JE63



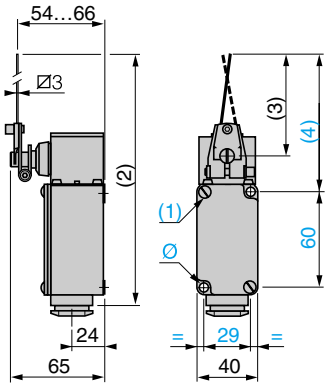
ZC2JC1 + ZC2JE0● + ZC2JY11



ZC2JC1 + ZC2JE0● + ZC2JY31



ZC2JC1 + ZC2JE0● + ZC2JY51

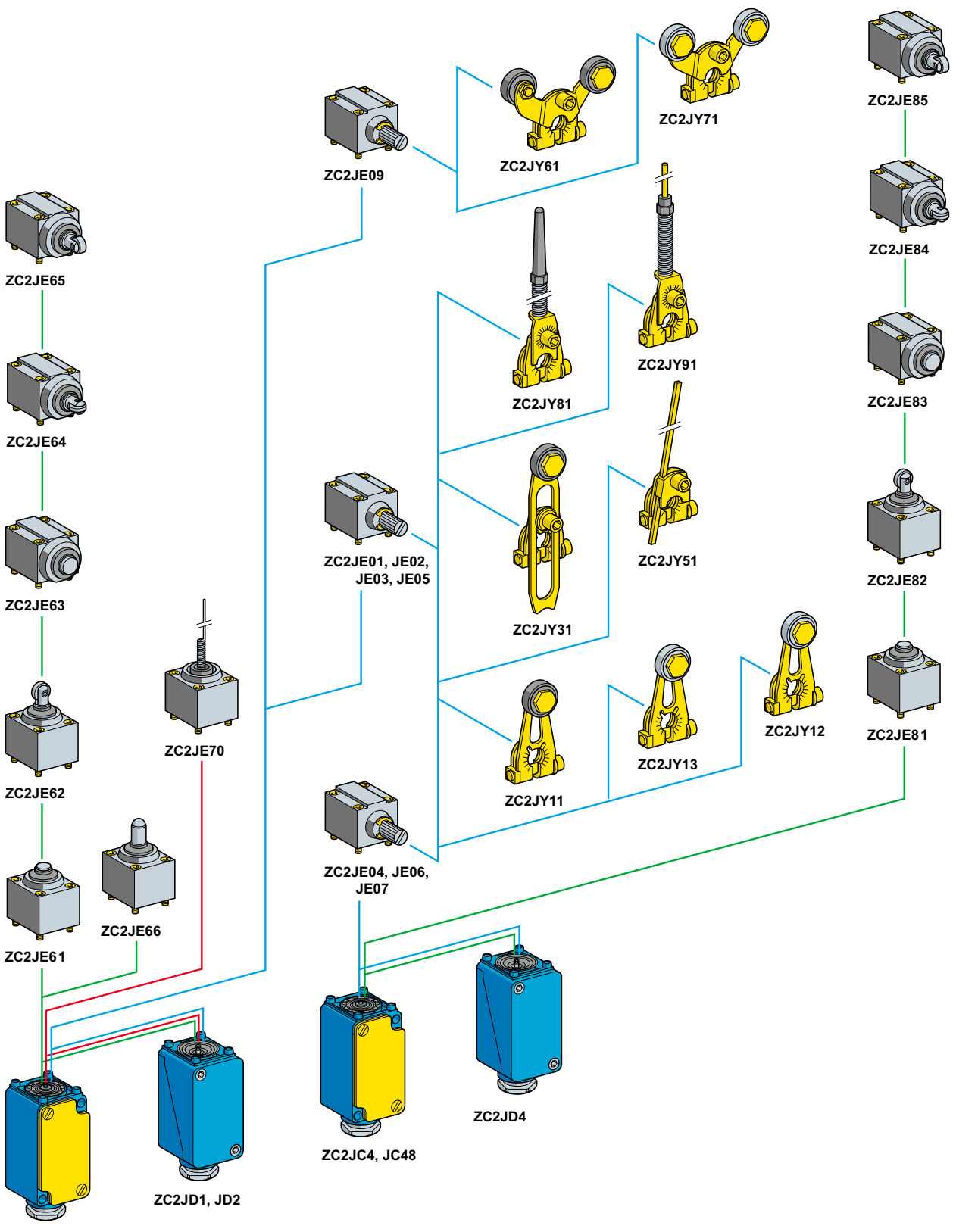


(1) Fixing from the rear: by 2 M5 screws.
Depth of thread on switch: 10 mm.
(2) 222 max.
(3) 125 max.
(4) 148 max.
Ø: Fixing from the front via 2 holes Ø 5.5.
Cable gland incorporated (all XC2JC models).

Limit switches

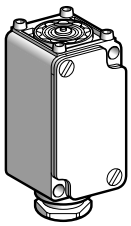
OsiSense XC Special

For very severe applications, type XC2J
Fixed or plug-in body
Variable composition



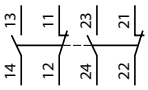
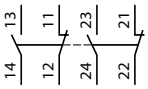
Plunger head
Rotary head
Multi-directional head

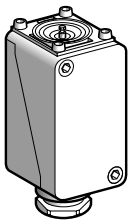
Limit switches
OsiSense XC Special
For very severe applications, type XC2J
Fixed or plug-in body
Adaptable sub-assemblies



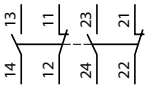
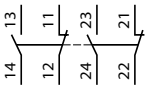
ZC2JC●

Bodies with contacts for plunger or rotary head

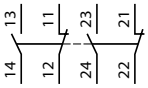
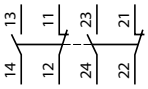
Type	With contact block	Scheme	Reference	Weight kg
Fixed bodies (see operation page 18)				
1 step	Single-pole 1 CO snap action (XCKZ01)		**ZC2JC1**	0.355
	Double-pole 2 CO simultaneous, snap action (XESP1021)		**ZC2JC2**	0.355
2 step	Double-pole 2 CO staggered, snap action (XESP1031)		**ZC2JC4**	0.355

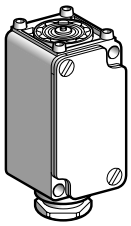


ZC2JD●

Plug-in bodies (see operation page 18)				
1 step	Single-pole CO snap action		**ZC2JD1**	0.380
	Double-pole 2 CO simultaneous, snap action		**ZC2JD2**	0.380
2 step	Double-pole 2 CO staggered, snap action		**ZC2JD4**	0.380

Bodies incorporating gold flashed contacts, for plunger or rotary head

Type	With contact block	Scheme	Reference	Weight kg
Fixed bodies (see operation page 18)				
1 step	Single-pole 1 CO snap action (XCKZ018)		**ZC2JC18**	0.355
	Double-pole 2 CO simultaneous, snap action (XESP1028)		**ZC2JC28**	0.360
2 step	Double-pole 2 CO staggered, snap action (XESP1038)		**ZC2JC48**	0.360

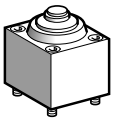


ZC2JC●8

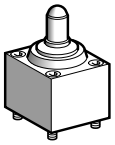
Operation:
page 18

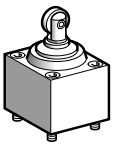
Dimensions:
pages 18 and 19

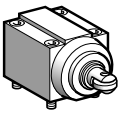
Limit switches
OsiSense XC Special
For very severe applications, type XC2J
Fixed or plug-in body
Adaptable sub-assemblies

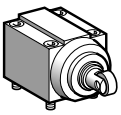

ZC2JE●1


ZC2JE●3


ZC2JE66


ZC2JE●2


ZC2JE●4

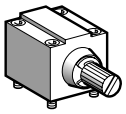

ZC2JE●5

Plunger heads

Type of operator	Compatible bodies	Maximum actuation speed	Reference	Weight kg
For actuation on end				
End plunger metal	ZC2J●1 ZC2J●2	0.5 m/s	**ZC2JE61**	0.195
	ZC2J●4	0.5 m/s	**ZC2JE81**	0.195
Side plunger metal	ZC2J●1 ZC2J●2	0.5 m/s	**ZC2JE63**	0.240
	ZC2J●4	0.5 m/s	**ZC2JE83**	0.240
For actuation by 30° cam				
End ball bearing plunger	ZC2J●1 ZC2J●2	0.1 m/s	**ZC2JE66**	0.205
End roller plunger steel	ZC2J●1 ZC2J●2	1 m/s	**ZC2JE62**	0.200
	ZC2J●4	1 m/s	**ZC2JE82**	0.200
Side plunger with horizontal roller steel	ZC2J●1 ZC2J●2	0.6 m/s	**ZC2JE64**	0.245
	ZC2J●4	0.6 m/s	**ZC2JE84**	0.245
Side plunger with vertical roller steel	ZC2J●1 ZC2J●2	0.6 m/s	**ZC2JE65**	0.245
	ZC2J●4	0.6 m/s	**ZC2JE85**	0.245

Operation: page 18
Dimensions: pages 18 and 19

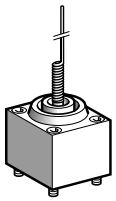
Limit switches
OsiSense XC Special
For very severe applications, type XC2J
Fixed or plug-in body
Adaptable sub-assemblies



ZC2JE0●

Rotary heads (without operating lever)

Type	Compatible bodies	Maximum actuation speed	Reference	Weight kg
Spring return (see operation page 18)				
Actuation from left **AND** right	ZC2J●1 ZC2J●2	1.5 m/s	**ZC2JE01**	0.210
	ZC2J●4	1.5 m/s	**ZC2JE04**	0.210
Actuation from left	ZC2J●1 ZC2J●2	1.5 m/s	**ZC2JE02**	0.210
	ZC2J●4	1.5 m/s	**ZC2JE06**	0.210
Actuation from right	ZC2J●1 ZC2J●2	1.5 m/s	**ZC2JE03**	0.210
	ZC2J●4	1.5 m/s	**ZC2JE07**	0.210
Actuation from left **OR** right (see page 60)	ZC2J●1 ZC2J●2	1.5 m/s	**ZC2JE05**	0.210
Stay put (see page 60)				
Actuation from left **AND** right	ZC2J●1 ZC2J●2	1.5 m/s	**ZC2JE09**	0.210



ZC2JE70

Multi-directional head (with operator)

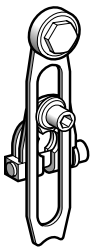
Type of operator	Compatible bodies	Maximum actuation speed	Reference	Weight kg
For actuation by any moving part (see operation page 18)				
"Cat's whisker"	ZC2J●1 ZC2J●2	1 m/s in any direction	**ZC2JE70**	0.190

Operation: page 18

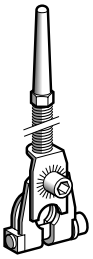
Dimensions: pages 18 and 19

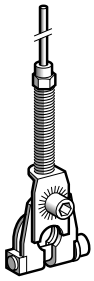
Limit switches
OsiSense XC Special
For very severe applications, type XC2J
Fixed or plug-in body
Adaptable sub-assemblies

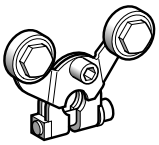

ZC2JY1●

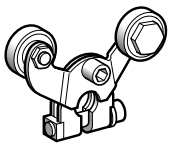

ZC2JY31


ZC2JY51


ZC2JY81


ZC2JY91


ZC2JY71


ZC2JY61

Operating levers for rotary heads

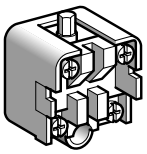
Description		Reference	Weight kg
For actuation by 30° cam			
Roller lever *(1)*	Thermoplastic	**ZC2JY11**	0.030
	Steel	**ZC2JY13**	0.040
	Steel, ball bearing mounted	**ZC2JY12**	0.040
Variable length roller lever *(1)*	Thermoplastic	**ZC2JY31**	0.045
For actuation by any moving part			
Rigid rod lever	Steel ⌀ 3 mm, L = 125 mm (1)	**ZC2JY51**	0.035
Spring lever *(1)*		**ZC2JY81**	0.040
Spring-rod lever *(1)*		**ZC2JY91**	0.040
For actuation by specific cam (only for operation with head ZC2 JE09, see page 60)			
Forked arm with rollers thermoplastic *(1)*	1 track	**ZC2JY71**	0.055
	2 track	**ZC2JY61**	0.055

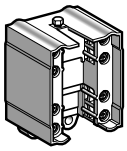
(1) Adjustable throughout 360°

Other versions — Other operating levers for rotary heads.
Please consult our Customer Care Centre.

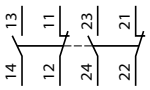
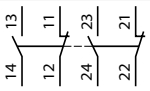
Operation: page 18
Dimensions: pages 18 and 19

Limit switches
OsiSense XC Special
For very severe applications, type XC2J
Fixed or plug-in body
Adaptable sub-assemblies

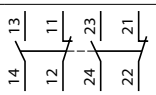
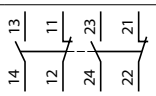

XCKZ01


XESP10●1

Contact blocks

Type of contact	Scheme	For body	Reference	Weight kg
Single-pole 1 CO snap action		ZC2JC1	**XCKZ01**	0.050
Double-pole 2 CO simultaneous, snap action		ZC2JC2	**XESP1021**	0.045
Double-pole 2 CO staggered, snap action		ZC2JC4	**XESP1031**	0.045

Contact blocks with gold flashed contacts

Type of contact	Scheme	For body	Reference	Weight kg
Single-pole 1 CO snap action		ZC2JC18	**XCKZ018**	0.050
Double-pole 2 CO simultaneous, snap action		ZC2JC28	**XESP1028**	0.055
Double-pole 2 CO staggered, snap action		ZC2JC48	**XESP1038**	0.055

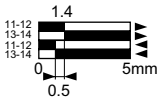
Operation: page 18
Dimensions: pages 18 and 19

Limit switches
OsiSense XC Special
For very severe applications, type XC2J
Fixed or plug-in body
Adaptable sub-assemblies

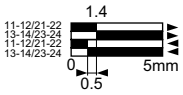
Operation (function diagrams)

Heads ZC2JE61, ZC2JE66 with body

ZC2J●1

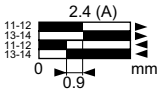


ZC2J●2

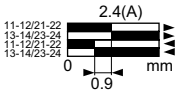


Head ZC2JE62 with body

ZC2J●1

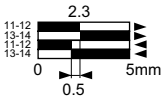


ZC2J●2

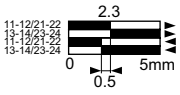


Head ZC2JE63 with body

ZC2J●1

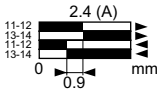


ZC2J●2

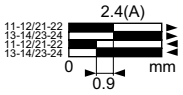


Heads ZC2JE64, ZC2JE65 with body

ZC2J●1

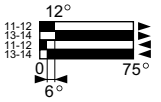


ZC2J●2

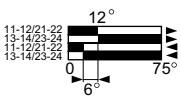


Heads ZC2JE01, ZC2JE02, ZC2JE03, ZC2JE05 with body

ZC2J●1

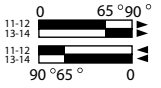


ZC2J●2

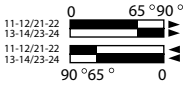


Head ZC2JE09 with body

ZC2J●1

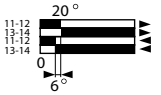


ZC2J●2

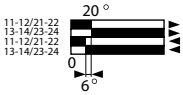


Head ZC2JE70 with body

ZC2J●1

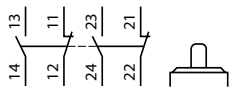
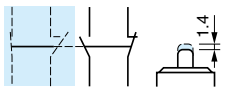
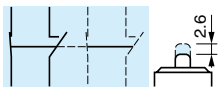


ZC2J●2

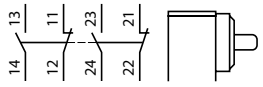
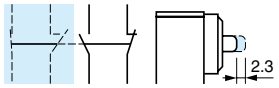
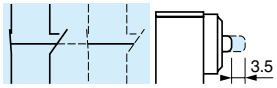


Contact operation — closed — open — (A) = cam displacement

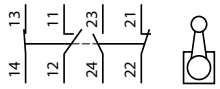
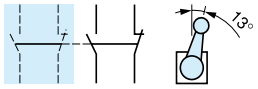
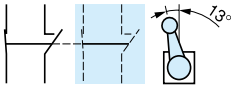
Heads ZC2JE81, ZC2JE82 with body ZC2J●4

Unactuated	1st step	2nd step
		

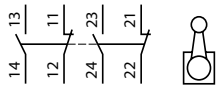
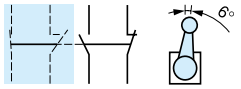
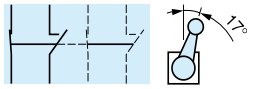
Heads ZC2JE83, ZC2JE84, ZC2JE85 with body ZC2J●4

Unactuated	1st step	2nd step
		

Heads ZC2JE04 with body ZC2J●4

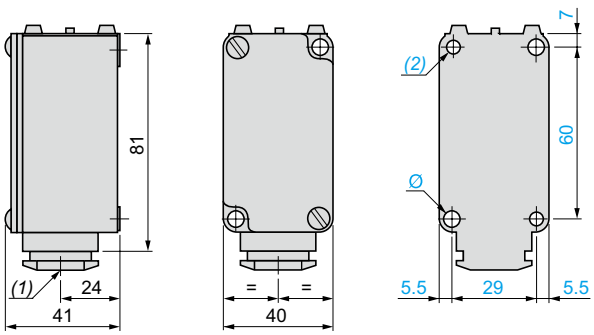
Unactuated	Actuated from left	Actuated from right
		

Heads ZC2JE06, ZC2JE07 with body ZC2J●4

Unactuated	1st step	2nd step
		

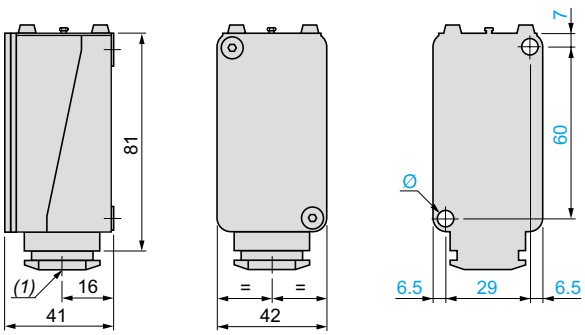
Dimensions

Fixed bodies
ZC2JC1, ZC2JC2, ZC2JC4



(1) Incorporated cable gland
(2) Fixing from the rear by 2 M5 screws, depth of thread on switch: 10 mm
Ø: Fixing from the front via 2 holes Ø 5.5

Plug-in bodies
ZC2JD1, ZC2JD2, ZC2JD4



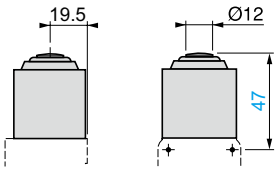
(1) Incorporated cable gland
Ø: Fixing from the rear by 2 M6 screws
Fixing from the front via 2 holes Ø 5.5 (remove front part of switch for access)

References:
pages 13 to 17

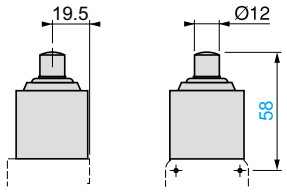
Limit switches
OsiSense XC Special
For very severe applications, type XC2J
Fixed or plug-in body
Adaptable sub-assemblies

Plunger heads

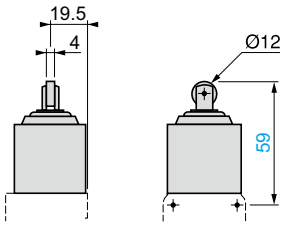
ZC2JE61, ZC2JE81



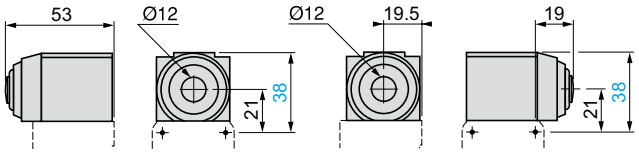
ZC2JE66



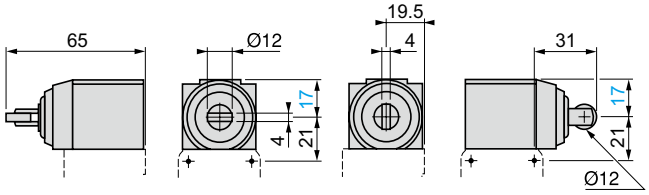
ZC2JE62, ZC2JE82



ZC2JE63, ZC2JE83 (2 position)

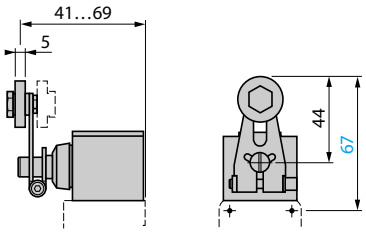


ZC2JE64, ZC2JE84, ZC2JE65, ZC2JE85 (2 position)

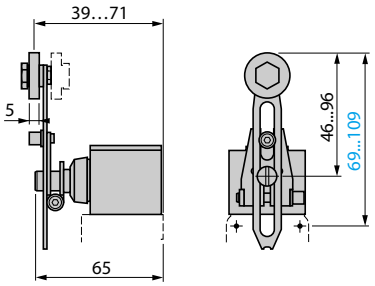


Rotary heads (ZC2JE01 to ZC2JE07) with operating lever

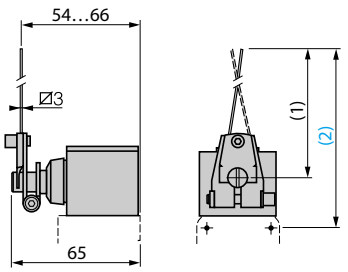
ZC2JY11, ZC2JY12, ZC2JY13



ZC2JY31

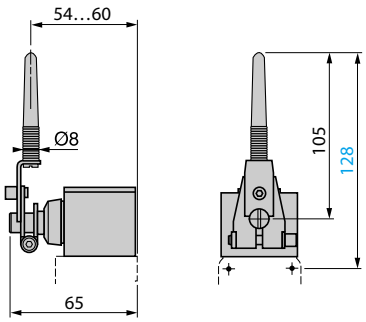


ZC2JY51

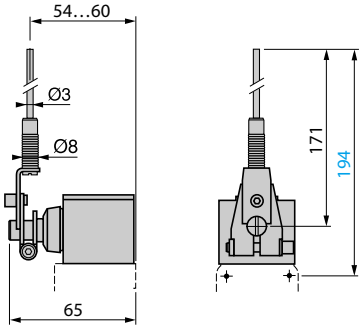


(1) 125 max. *(2) 148 max.*

ZC2JY81

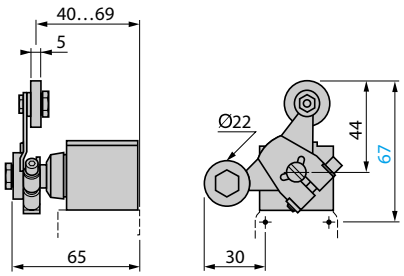


ZC2JY91

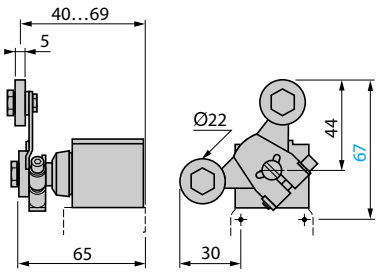


Rotary heads (ZC2JE09) with operating lever

ZC2JY61

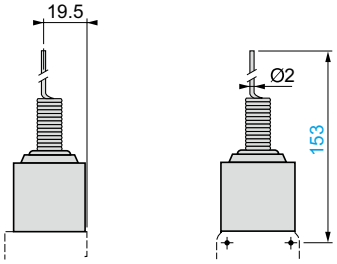


ZC2JY71



Multi-directional heads

ZC2JE70



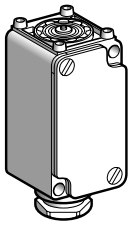
References:
pages 13 to 17

Operation:
page 18

Limit switches

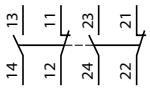
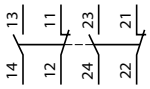
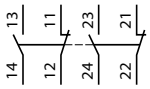
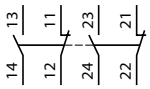
OsiSense XC Special

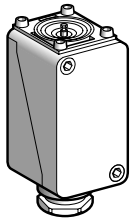
For very severe applications, type XC2J
Fixed or plug-in body, adaptable sub-assemblies for low temperature applications (- 40°C)



ZC2JC●6

Bodies with contacts for plunger or rotary head

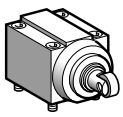
Type	With contact block	Scheme	Reference	Weight kg
Fixed bodies				
1 step	Single-pole 1 CO snap action (XCK Z01)		**ZC2JC16**	0.355
	Double-pole 2 CO simultaneous, snap action (XES P1021)		**ZC2JC26**	0.355
2 step	Double-pole 2 CO staggered, snap action (XES P1031)		**ZC2JC46**	0.355
Plug-in bodies				
1 step	Single-pole CO snap action		**ZC2JD16**	0.380
	Double-pole 2 CO simultaneous, snap action		**ZC2JD26**	0.380
2 step	Double-pole 2 CO staggered, snap action		**ZC2JD46**	0.380



ZC2JD●6

Plunger heads

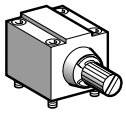
Type of operator	Compatible bodies	Maximum actuation speed	Reference	Weight kg
For actuation on end				
End plunger metal	ZC2J●16 ZC2J●26	0.5 m/s	**ZC2JE616**	0.195
	ZC2J●46	0.5 m/s	**ZC2JE816**	0.195
Side plunger metal	ZC2J●16 ZC2J●26	0.5 m/s	**ZC2JE636**	0.240
	ZC2J●46	0.5 m/s	**ZC2JE836**	0.240
For actuation by 30° cam				
End ball bearing plunger	ZC2J●16 ZC2J●26	0.1 m/s	**ZC2JE666**	0.205
End roller plunger steel	ZC2J●16 ZC2J●26	1 m/s	**ZC2JE626**	0.200
	ZC2J●46	1 m/s	**ZC2JE826**	0.200
Side plunger with horizontal roller steel	ZC2J●16 ZC2J●26	0.6 m/s	**ZC2JE646**	0.245
	ZC2J●46	0.6 m/s	**ZC2JE846**	0.245
Side plunger with vertical roller steel	ZC2J●16 ZC2J●26	0.6 m/s	**ZC2JE656**	0.245
	ZC2J●46	0.6 m/s	**ZC2JE856**	0.245



ZC2JE●56

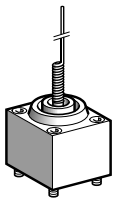
Operation: page 18
Dimensions: pages 18 and 19

Limit switches
OsiSense XC Special
For very severe applications, type XC2J
Fixed or plug-in body, adaptable sub-assemblies for low temperature applications (- 40°C)


ZC2JE0●6

Rotary heads (without operating lever)

Type	Compatible bodies	Maximum actuation speed	Reference	Weight kg
Spring return				
Actuation from left **AND** right	ZC2J●16 ZC2J●26	1.5 m/s	**ZC2JE016**	0.210
	ZC2J●46	1.5 m/s	**ZC2JE046**	0.210
Actuation from left	ZC2J●16 ZC2J●26	1.5 m/s	**ZC2JE026**	0.210
	ZC2J●46	1.5 m/s	**ZC2JE066**	0.210
Actuation from right	ZC2J●16 ZC2J●26	1.5 m/s	**ZC2JE036**	0.210
	ZC2J●46	1.5 m/s	**ZC2JE076**	0.210
Actuation from left **OR** right (see page 60)	ZC2J●16 ZC2J●26	1.5 m/s	**ZC2JE056**	0.210
Stay put (see page 60)				
Actuation from left **AND** right	ZC2J●16 ZC2J●26	1.5 m/s	**ZC2JE096**	0.210


ZC2JE706

Multi-directional head (with operator)

Type of operator	Compatible bodies	Maximum actuation speed	Reference	Weight kg
For actuation by any moving part				
"Cat's whisker"	ZC2J●16 ZC2J●26	1 m/s in any direction	**ZC2JE706**	0.190

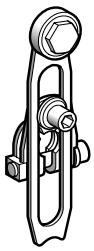
Operation: page 18
Dimensions: pages 18 and 19

Limit switches

OsiSense XC Special

For very severe applications, type XC2J
Fixed or plug-in body, adaptable sub-assemblies for low temperature applications (- 40°C)

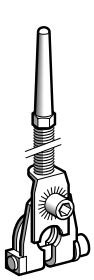

ZC2JY1●

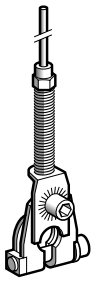

ZC2JY31

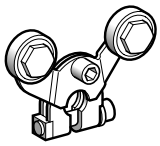

ZC2JY51

Operating levers for rotary heads

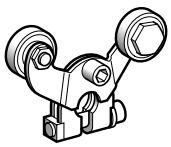
Description		Reference	Weight kg
For actuation by 30° cam			
Roller lever *(1)*	Thermoplastic	**ZC2JY11**	0.030
	Steel	**ZC2JY13**	0.040
	Steel, ball bearing mounted	**ZC2JY12**	0.040
Variable length roller lever *(1)*	Thermoplastic	**ZC2JY31**	0.045
For actuation by any moving part			
Rigid rod lever	Steel ⌀ 3 mm, L = 125 mm *(1)*	**ZC2JY51**	0.035
Spring lever *(1)*		**ZC2JY81**	0.040
Spring-rod lever *(1)*		**ZC2JY91**	0.040


ZC2JY81

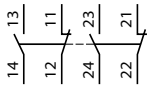
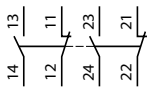

ZC2JY91

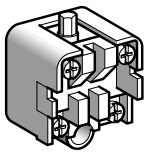

ZC2JY71

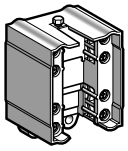
For actuation by specific cam (only for operation with head ZC2 JE096, see page 60)			
Forked arm with rollers thermoplastic *(1)*	1 track	**ZC2JY71**	0.055
	2 track	**ZC2JY61**	0.055


ZC2JY61

Contact blocks

Type of contact	Scheme	For body	Reference	Weight kg
Single-pole 1 CO snap action		ZC2JC16	**XCKZ01**	0.050
Double-pole 2 CO simultaneous, snap action		ZC2JC26	**XESP1021**	0.045
Double-pole 2 CO staggered, snap action		ZC2JC46	**XESP1031**	0.045


XCKZ01


XESP10●1

(1) Adjustable throughout 360°

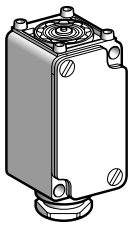
Other versions — Other operating levers for rotary heads.
Please consult our Customer Care Centre.

Operation: page 18
Dimensions: pages 18 and 19

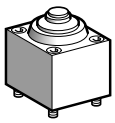
Limit switches

OsiSense XC Special

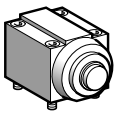
For very severe applications, type XC2J
Fixed body, adaptable sub-assemblies for high temperature applications (+ 120°C)



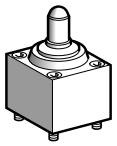
ZC2JC●5



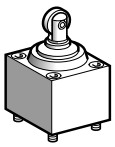
ZC2JE●15



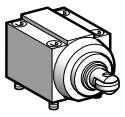
ZC2JE●35



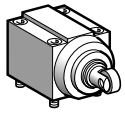
ZC2JE665



ZC2JE●25

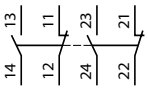
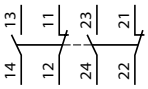


ZC2JE●45



ZC2JE●55

Bodies with contacts for plunger or rotary head

Type	With contact block	Scheme	Reference	Weight kg
Fixed bodies				
1 step	Single-pole 1 CO snap action (XCK Z015)		**ZC2JC15**	0.355
	Double-pole 2 CO simultaneous, snap action (XES P10215)		**ZC2JC25**	0.355
2 step	Double-pole 2 CO staggered, snap action (XES P10315)		**ZC2JC45**	0.355

Plunger heads

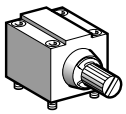
Type of operator	Compatible bodies	Maximum actuation speed	Reference	Weight kg
For actuation on end				
End plunger metal	ZC2JC15 ZC2JC25	0.5 m/s	**ZC2JE615**	0.195
	ZC2JC45	0.5 m/s	**ZC2JE815**	0.195
Side plunger metal	ZC2JC15 ZC2JC25	0.5 m/s	**ZC2JE635**	0.240
	ZC2JC45	0.5 m/s	**ZC2JE835**	0.240
For actuation by 30° cam				
End ball bearing plunger	ZC2JC15 ZC2JC25	0.1 m/s	**ZC2JE665**	0.205
End roller plunger steel	ZC2JC15 ZC2JC25	1 m/s	**ZC2JE625**	0.200
	ZC2JC45	1 m/s	**ZC2JE825**	0.200
Side plunger with horizontal roller steel	ZC2JC15 ZC2JC25	0.6 m/s	**ZC2JE645**	0.245
	ZC2JC45	0.6 m/s	**ZC2JE845**	0.245
Side plunger with vertical roller steel	ZC2JC15 ZC2JC25	0.6 m/s	**ZC2JE655**	0.245
	ZC2JC45	0.6 m/s	**ZC2JE855**	0.245

Operation: page 18
Dimensions: pages 18 and 19

Limit switches

OsiSense XC Special

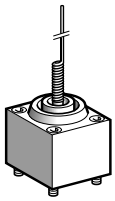
For very severe applications, type XC2J
Fixed body, adaptable sub-assemblies for high temperature applications (+ 120°C)



ZC2JE0●5

Rotary heads (without operating lever)

Type	Compatible bodies	Maximum actuation speed	Reference	Weight kg
Spring return				
Actuation from left **AND** right	ZC2JC15 ZC2JC25	1.5 m/s	**ZC2JE015**	0.210
	ZC2JC45	1.5 m/s	**ZC2JE045**	0.210
Actuation from left	ZC2JC15 ZC2JC25	1.5 m/s	**ZC2JE025**	0.210
	ZC2JC45	1.5 m/s	**ZC2JE065**	0.210
Actuation from right	ZC2JC15 ZC2JC25	1.5 m/s	**ZC2JE035**	0.210
	ZC2JC45	1.5 m/s	**ZC2JE075**	0.210
Stay put (see page 60)				
Actuation from left **AND** right	ZC2JC15 ZC2JC25	1.5 m/s	**ZC2JE095**	0.210



ZC2JE705

Multi-directional head (with operator)

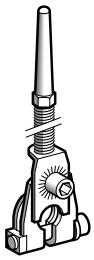
Type of operator	Compatible bodies	Maximum actuation speed	Reference	Weight kg
For actuation by any moving part				
"Cat's whisker"	ZC2JC15 ZC2JC25	1 m/s in any direction	**ZC2JE705**	0.190

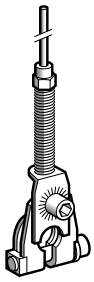
Operation: page 18
Dimensions: pages 18 and 19

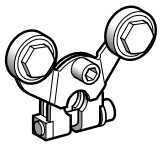
Limit switches
OsiSense XC Special
For very severe applications, type XC2J
Fixed body, adaptable sub-assemblies for high temperature applications (+ 120°C)

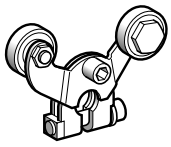

ZC2JY1●

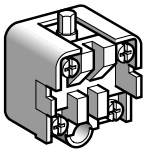

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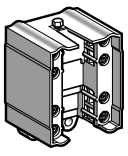

ZC2JY815


ZC2JY915


ZC2JY715


ZC2JY615

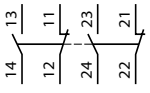
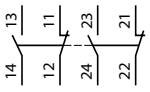

XCKZ015


XESP10●15

Operating levers for rotary heads

Description		Reference	Weight kg
For actuation by 30° cam			
Roller lever *(1)*	Thermoplastic	**ZC2JY115**	0.030
	Steel	**ZC2JY13**	0.040
	Steel, ball bearing mounted	**ZC2JY12**	0.040
Offset roller lever *(1)*	Thermoplastic	**ZC2JY215**	0.035
Variable length roller lever *(1)*	Thermoplastic	**ZC2JY315**	0.035
Variable length offset roller lever *(1)*	Thermoplastic	**ZC2JY415**	0.040
For actuation by any moving part			
Rigid rod lever	Steel ⌀ 3 mm, L = 125 mm *(1)*	**ZC2JY51**	0.035
Spring lever *(1)*		**ZC2JY815**	0.040
Spring-rod lever *(1)*		**ZC2JY915**	0.040
For actuation by specific cam (only for operation with head ZC2JE095, see page 60)			
Forked arm with rollers thermoplastic *(1)*	1 track	**ZC2JY715**	0.055
	2 track	**ZC2JY615**	0.055

Contact blocks

Type of contact	Scheme	For body	Reference	Weight kg
Single-pole 1 CO snap action		ZC2JC15	**XCKZ015**	0.050
Double-pole 2 CO simultaneous, snap action		ZC2JC25	**XESP10215**	0.045
Double-pole 2 CO staggered, snap action		ZC2JC45	**XESP10315**	0.045

(1) Adjustable throughout 360°

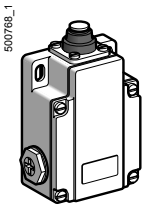
Other versions — Other operating levers for rotary heads.
Please consult our Customer Care Centre.

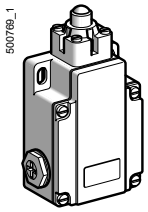
Operation: page 18
Dimensions: pages 18 and 19

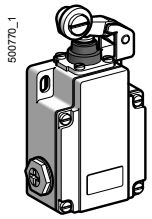
Limit switches
OsiSense XC Special
For material handling applications, type XC1AC

■ XC1AC
with slow break contacts

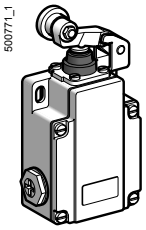
□ With head for linear movement (plunger)

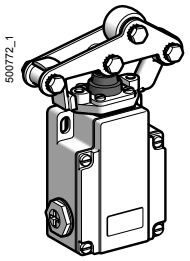






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Limit switches
OsiSense XC Special
For material handling applications, type XC1AC

Environment characteristics

Conformity to standards		IEC/EN 60947-5-1, IEC 60337-1, VDE 0660-200, CSA C22-2 n° 14
Product certifications	Special version	CSA 600 V (ac) HD
Protective treatment	Version	Standard: “TC”. Special: “TH”
Ambient air temperature	For operation	- 25…+ 70°C
	For storage	- 40…+ 70°C
Operating position		All positions
Vibration resistance		9 gn (10…500 Hz) conforming to IEC 60068-2-6
Shock resistance		95 gn (11 ms) conforming to IEC 60068-2-27
Electric shock protection		Class I conforming to IEC 60536 and NF C 20-030
Degree of protection		**IP 65 conforming to IEC 60529 and NF C 20-010**
Mechanical durability		10 million operating cycles
Cable entry		3 tapped entries for n° 13 cable gland

Contact block characteristics

Conventional thermal current		10 A
Rated insulation voltage	Slow break contact blocks	**500 V ∼ and 600 V ⎓ conforming to IEC 60947-5-1, NF C 20-040** **∼ and 600 V ⎓ conforming to CSA C22-2 n° 14**
Resistance across terminals		≤ 8 mΩ
Minimum tripping force		**XC1AC1●1**: 33 N, **XC1AC1●6**: 23 N, **XC1AC1●7**: 29 N
Terminal referencing		Conforming to CENELEC EN 50013
Short-circuit protection		10 A cartridge fuse type gG (gl)
Electrical durability		■ Conforming to IEC 60947-5-1 Appendix C ■ Utilisation categories AC-15 and DC-13 ■ Maximum operating rate: 3600 operating cycles/hour ■ Load factor: 0.5

Slow break contact blocks

AC supply 50/60 Hz ∼ ⌒ inductive circuit — Power broken in **VA**

Voltage **V**	**48**	**110**	**230**
For 1 million operating cycles	450	900	1900
For 3 million operating cycles	170	350	430

DC supply ⎓ ⌒ inductive circuit — Power broken in **W**

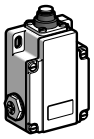
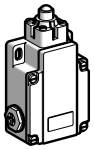
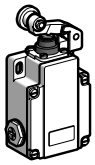
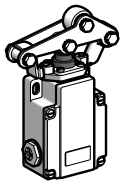
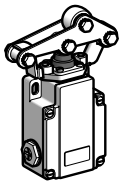
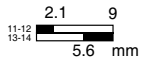
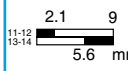
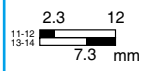
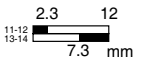
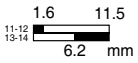
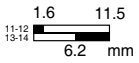
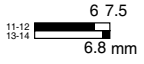
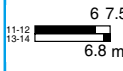
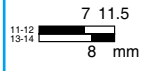
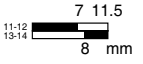
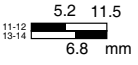
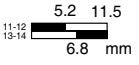
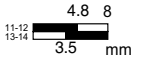
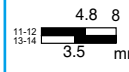
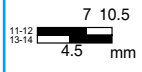
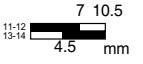
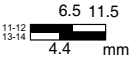
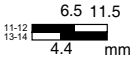
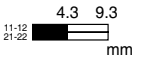
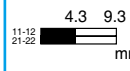
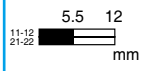
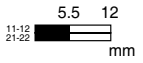
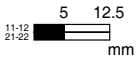
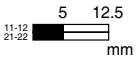
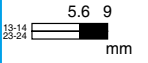
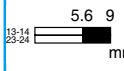
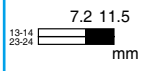
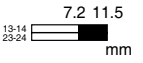
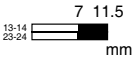
Voltage **V**	**48**	**110**	**230**
For 1 million operating cycles	100	100	95
For 3 million operating cycles	35	40	33

Limit switches

OsiSense XC Special

For material handling applications, type XC1AC

Complete switches with slow break contacts

Type of head	Plunger					
						
Type of operator	End plunger	End ball bearing plunger	Roller lever plunger	Offset roller lever plunger	Reinforced roller lever plunger	Needle bearing mounted roller lever plunger
References of complete switches						
Single-pole CO slow break ZC1AZ11 	**XC1AC111** 	**XC1AC115** 	**XC1AC116** 	**XC1AC118** 	**XC1AC117** 	**XC1AC119** 
2-pole NC + NO break before make, slow break ZC1AZ12 	**XC1AC121** 	**XC1AC125** 	**XC1AC126** 	**XC1AC128** 	**XC1AC127** 	**XC1AC129** 
2-pole NO + NC make before break ZC1AZ13 	**XC1AC131** 	**XC1AC135** 	**XC1AC136** 	**XC1AC138** 	**XC1AC137** 	**XC1AC139** 
2-pole NC + NC simultaneous, slow break ZC1AZ14 	**XC1AC141** 	**XC1AC145** 	**XC1AC146** 	**XC1AC148** 	**XC1AC147** 	**XC1AC149** 
2-pole NO + NO simultaneous, slow break ZC1AZ15 	**XC1AC151** 	**XC1AC155** 	**XC1AC156** 	**XC1AC158** 	**XC1AC157** 	**XC1AC159**
2-pole NC + NC staggered, slow break ZC1AZ16	**XC1AC161**	**XC1AC165**	**XC1AC166**	**XC1AC168**	**XC1AC167**	**XC1AC169**
2-pole NO + NO staggered, slow break ZC1AZ17	**XC1AC171**	**XC1AC175**	**XC1AC176**	**XC1AC178**	**XC1AC177**	**XC1AC179**
Weight (kg)	0.530	0.530	0.595	0.595	0.870	0.870
Contact operation	■ *closed* □ *open*					

Complementary characteristics

Switch actuation	On end	By 30° cam	
Type of actuation			
Maximum actuation speed	0.5 m/s	1 m/s (direction A), 0.5 m/s (direction B) *(1)*	
Cable entry	3 tapped entries for n° 13 (DIN Pg 13.5) cable gland, clamping capacity 9 to 12 mm (2 entries fitted with blanking plug)		
Connection	Screw terminals. Clamping capacity: min. 1 x 0.5 mm², max. 1 x 2.5 mm²		

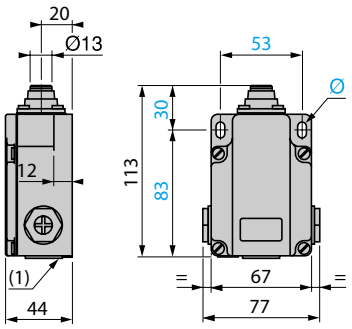
(1) For a 45° cam the maximum actuation speed becomes 0.5 m/s and for a 15° cam, 1 m/s.

Limit switches

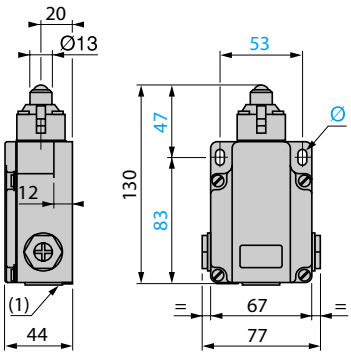
OsiSense XC Special

For material handling applications, type XC1AC
Complete switches with slow break contacts

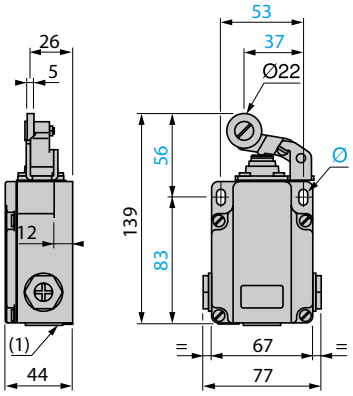
XC1AC1●1



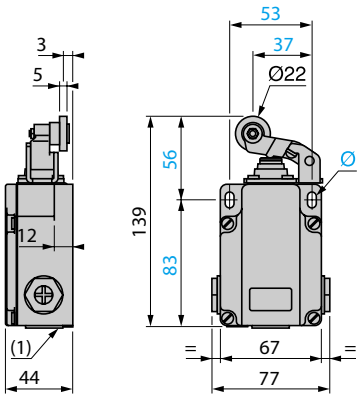
XC1AC1●5



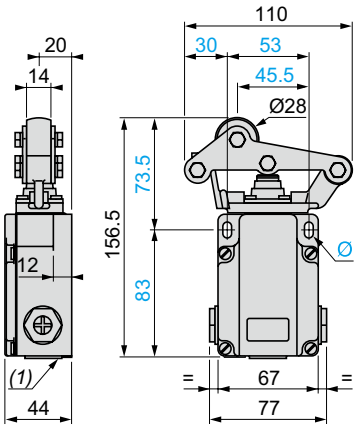
XC1AC1●6



XC1AC1●8

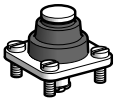


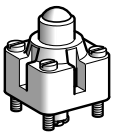
XC1AC1●7, XC1AC1●9

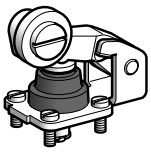


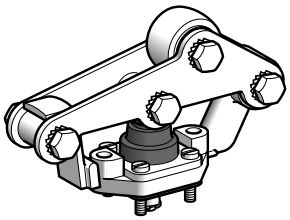
(1) 3 tapped entries for n° 13 cable gland or ISO 20 with adaptor DE9RA1620.
Ø: 2 elongated holes Ø 6.5 x 10.

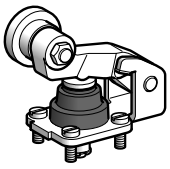
Limit switches
OsiSense XC Special
For material handling applications, type XC1AC
Replacement parts

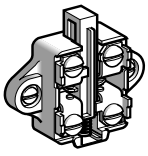

ZC1AC001


ZC1AC005

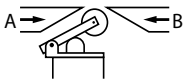
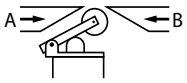
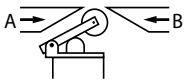
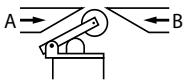

ZC1AC006


ZC1AC007
ZC1AC009


ZC1AC008


ZC1AZ1●

Plunger heads

Type of operator	Maximum actuation speed	Type of actuation	Reference	Weight kg
For actuation on end				
End plunger	0.5 m/s		**ZC1AC001**	0.035
For actuation by 30° cam				
End ball bearing plunger	0.5 m/s		**ZC1AC005**	0.050
Roller lever plunger	1 m/s (direction A) 0.5 m/s (direction B)		**ZC1AC006**	0.100
Reinforced roller lever plunger	1 m/s (direction A) 0.5 m/s (direction B)		**ZC1AC007**	0.375
Offset roller lever plunger	1 m/s (direction A) 0.5 m/s (direction B)		**ZC1AC008**	0.100
Needle bearing mounted roller lever plunger	1 m/s (direction A) 0.5 m/s (direction B)		**ZC1AC009**	3.380

Contact blocks

Type of contact	Scheme	Reference	Weight kg
CO, single-pole		**ZC1AZ11**	0.040
NC + NO break before make		**ZC1AZ12**	0.045
NO + NC make before break		**ZC1AZ13**	0.040
NC + NC simultaneous		**ZC1AZ14**	0.045
NO + NO simultaneous		**ZC1AZ15**	0.045
NC + NC staggered		**ZC1AZ16**	0.040
NO + NO staggered		**ZC1AZ17**	0.040

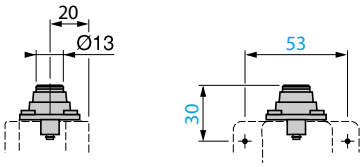
Adaptation plate

Description	Reference	Weight kg
Mounting plate (For replacing an old version type RN-67522 limit switch by an XC1AC limit switch)	**ZC1AZ8**	3.380

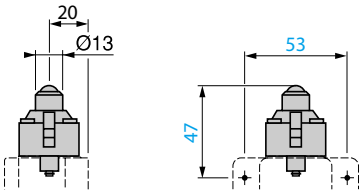
Limit switches
OsiSense XC Special
For material handling applications, type XC1AC
Replacement parts

Dimensions

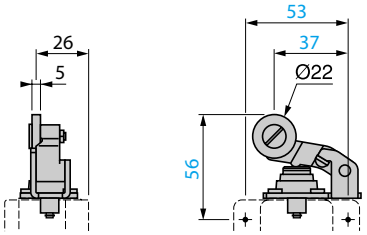
ZC1AC001



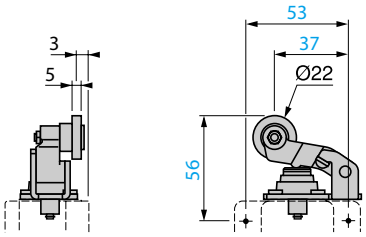
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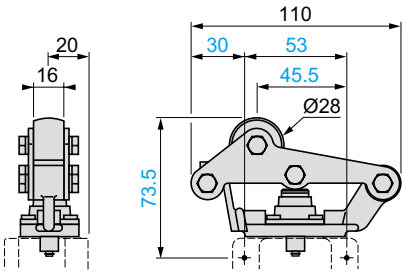
ZC1AC006



ZC1AC008



ZC1AC007, ZC1AC009

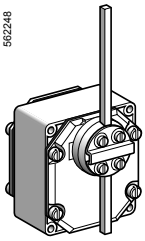


Limit switches
OsiSense XC Special
For hoisting and material handling applications, type XCR

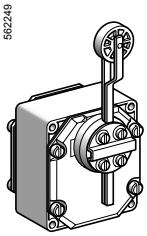
■ XCR

□ With head for rotary movement operators, spring return to off position
1 contact actuation position per direction

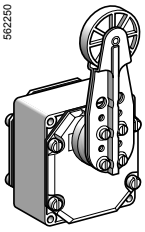
562248



562249



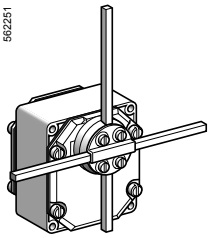
562250



Page 36

□ With head for rotary movement operators, stay put
1 contact actuation position per direction

562251



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Limit switches

OsiSense XC Special

For hoisting and material handling applications, types XCKMR and XCKVR

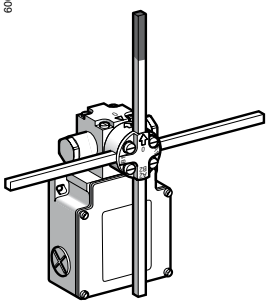
For conveyor belt shift monitoring applications, type XCRT

■ XCKMR (metal)

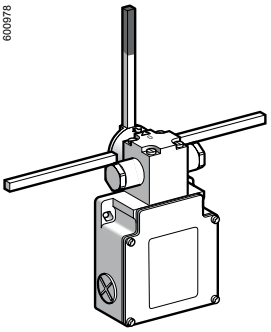
□ With head for rotary movement operators, stay put

4 mechanical actuation positions of 4 contacts
From 2 to 5 electrical positions depending on model

600977



600978



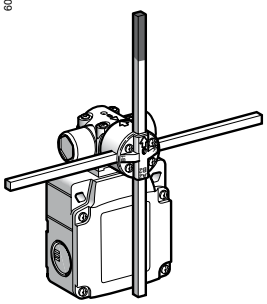
Page 42

■ XCKVR (plastic)

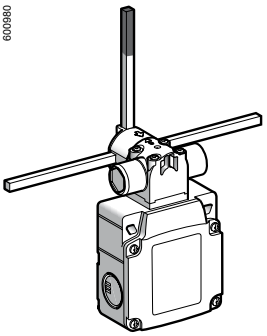
□ With head for rotary movement operators, stay put

4 mechanical actuation positions of 4 contacts
From 2 to 5 electrical positions depending on model

600979



600980



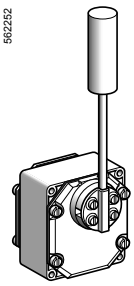
Page 42

■ XCRT

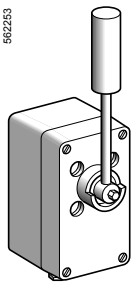
□ With head for rotary movement operators, spring return to off position

2 contact actuation positions per direction
1 contact actuated at 10°, other contact at 18°

562252



562253



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Limit switches

OsiSense XC Special

For hoisting and material handling applications, types XCR, XCKMR and XCKVR
For conveyor belt shift monitoring applications, type XCRT

Environment characteristics

Limit switches		XCR and XCRT	XCKMR (metal)	XCKVR (plastic)
Conformity to standards	Products	EN/IEC 60947-5-1, CSA C22-2 n° 14, CCC	EN/IEC 60947-5-1, CSA C22-2 n° 14, UL 508, CCC	
	Machine assemblies	EN/IEC 60204-1		
Product certifications		**XCRA, B, E, F**: CE, CSA, CCC, GOST	CE, UL, CSA, CCC, GOST	
Protective treatment	Standard version	"TC"		
Ambient air temperature	For operation	- 25…+ 70 °C	- 25…+ 70 °C	- 25…+ 70 °C
	For storage	- 40…+ 70 °C	- 40…+ 85 °C	- 40…+ 70 °C
Vibration resistance	Conforming to EN/IEC 60068-2-6	9 gn (10…500 Hz)	25 gn (10…500 Hz)	25 gn (10…500 Hz)
Shock resistance	Conforming to EN/IEC 60068-2-27	**XCRA, B, E, F:** 68 gn, **XCRT:** 30 gn (18 ms)	50 gn	50 gn
Electric shock protection		Class I conforming to IEC 60536		Class II conforming to IEC 60536
Degree of protection	Conforming to EN/IEC 60529	**XCRA, B, E, F**: IP 65 **XCRT**: IP 65	IP 66	IP 65
Degree of protection against mechanical impacts	Conforming to EN 50102	IK 07	IK 07	IK 04
Materials	Enclosure	Metal (except **XCRT315**: polyester)	Zamak ZP3	(PBT + PC) - GF 30 FR (Valox)
	Cover	Metal (except **XCRT315**: polyester)	DC03 steel	(PBT + PC) - GF 30 FR (Valox)
	Head	Metal	Zamak ZP3	(PBT + PC) - GF 30 FR (Valox)
Cable entry		1 tapped entry for n°13 cable gland	3 tapped entries for n°13 cable gland or tapped M20 x 1.5	1 tapped entry M20 x 1.5. 2 breakout holes for ISO M20 cable gland

Contact block characteristics

Rated operational characteristics	Conforming to EN/IEC 60947-5-1 Appendix A	**XCRA, B, E, F:** ~ AC-15; A300 (Ue = 240 V, Ie = 3 A), Ithe = 10 A ⎓ DC-13 ; Q300 (Ue = 250 V, Ie = 0.27 A) **XCRT:** ~ AC-15; B300 (Ue = 240 V, Ie = 1.5 A/ Ue = 120 V, Ie = 3 A) ⎓ DC-13 ; R300 (Ue = 250 V, Ie = 0.1 A)	~ AC-15 ; A300 (Ue = 240 V, Ie = 3 A), Ithe = 10 A ⎓ DC-13 ; Q150 (Ue = 125 V, Ie = 0.55 A)
Rated insulation voltage		Ui = 500 V degree of pollution 3 conforming to EN/IEC 60947-1 Ui = 300 V conforming to UL 508, CSA C22-2 n° 14	
Rated impulse withstand voltage		U imp = 6 kV conforming to EN/IEC 60947-1, IEC 60664	
Positive operation (depending on model)		NC contacts with positive opening operation conforming to EN/IEC 60947-5-1 Section 3 (except XCRT)	NC contacts with positive opening operation conforming to EN/IEC 60947-5-1 Section 3 (contacts 21-22)
Resistance across terminals		≤ 25 m Ω conforming to NF C 93-050 method A or IEC 60255-7 category 3	
Short-circuit protection		10 A cartridge fuse type gG (gl)	
Connection	Screw clamp terminals	Clamping capacity **XE2N P2151** ou **XCRT**: min: 1 x 0.5 mm², max: 2 x 2.5 mm² **XE2S P2151**: min: 1 x 0.34 mm², max: 2 x 1.5 mm²	Clamping capacity min: 1 x 0.5 mm² max: 2 x 2.5 mm²

Limit switches
OsiSense XC Special
For hoisting and material handling applications, types XCR, XCKMR and XCKVR
For conveyor belt shift monitoring applications, type XCRT

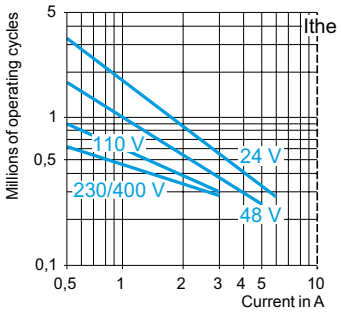
Contact block characteristics (continued)

Electrical durability

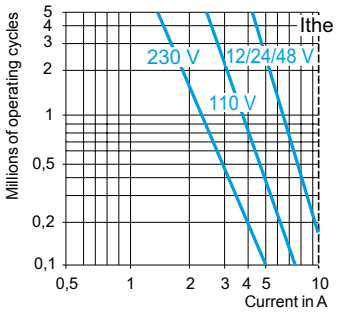
- Conforming to EN/IEC 60947-5-1 Appendix C
- Utilisation categories AC-15 and DC-13
- Maximum operating rate: 3600 operating cycles/hour
- Load factor: 0.5

AC supply
~ 50/60 Hz
⌒ inductive circuit

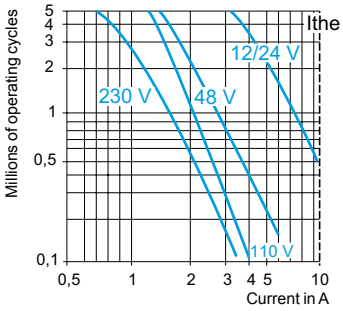
XE2SP2151



XE2NP2151



XCRT contacts



DC supply ⎓

Power broken in W for 5 million operating cycles
W ⌒

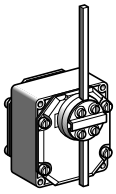
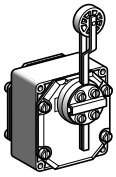
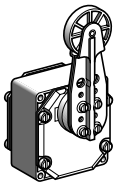
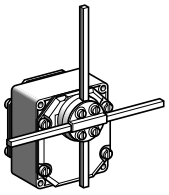
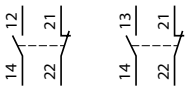
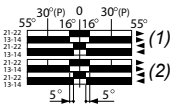
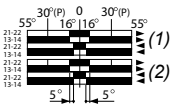
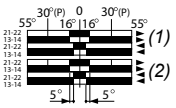
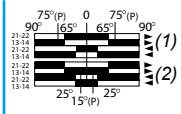
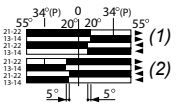
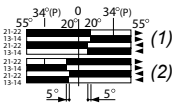
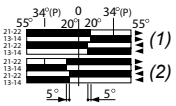
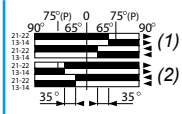
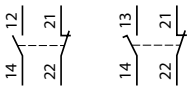
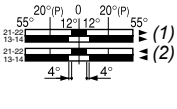
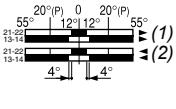
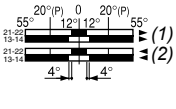
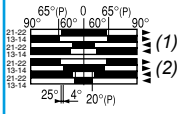
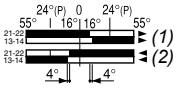
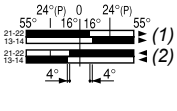
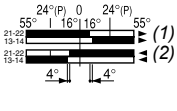
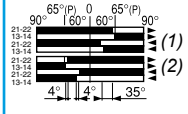
Voltage **V**	**24**	**48**	**120**
XE2S P2151	10	7	4
XE2N P2151	13	9	7
XCRT contacts	10	7	4

For XE2SP2151 on ~ or ⎓ NC and NO contacts simultaneously loaded to the values shown with reverse polarity.

Limit switches

OsiSense XC Special

For hoisting and material handling applications, type XCR
Complete switches with 1 cable entry

Type of head Maximum displacement		Rotary with spring return to off position 55° in each direction			Stay put 90° in each direction
					
Type of operator		Metal rod, ⌀ 6 mm	Thermoplastic roller lever	Large thermoplastic roller lever	Metal rods, ⌀ 6 mm, crossed rods for XCRE●8, "T" rods for XCRF●7
Rod length		1 rod of 200 mm	–	–	**XCRE●●**: 2 rods of 200 mm **XCRF●●**: 1 rod of 200 mm and 1 rod of 300 mm
References of complete switches (⊖ NC contact with positive opening operation)					
Two 2-pole NC + NO snap action XE2SP2151  1st contact 2e contact	Both contacts operate in each direction	**XCRA11** ⊖ *(3)* 	**XCRA12** ⊖ *(3)* 	**XCRA15** ⊖ *(3)* 	**XCRE18** ⊖ *(3)* 
	1 contact operates in each direction	**XCRB11** ⊖ *(3)* 	**XCRB12** ⊖ *(3)* 	**XCRB15** ⊖ *(3)* 	**XCRF17** ⊖ *(3)* 
Two 2-pole NC + NO break before make, slow break XE2NP2151  1st contact 2e contact	Both contacts operate in each direction	**XCRA51** ⊖ *(3)* 	**XCRA52** ⊖ *(3)* 	**XCRA55** ⊖ *(3)* 	**XCRE58** ⊖ *(3)* 
	1 contact operates in each direction	**XCRB51** ⊖ *(3)* 	**XCRB52** ⊖ *(3)* 	**XCRB55** ⊖ *(3)* 	**XCRF57** ⊖ *(3)* 
Weight (kg)		1.110	1.145	1.155	1.135
Contact operation		■ *closed* □ *open*	*(P) = positive opening point* *(1) 1st contact* *(2) 2nd contact*		

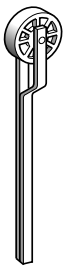
Complementary characteristics

Lever maximum actuation speed		1.5 m/s	
Mechanical durability		10 million operating cycles	
Minimum torque	For tripping	0.45 N.m	0.60 N.m
	For positive opening	0.75 N.m	0.70 N.m
Cable entry		1 entry tapped for n° 13 cable gland conforming to NF C 68-300 (DIN Pg 13.5) Clamping capacity 9 to 12 mm	

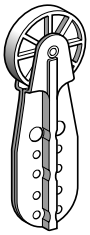
*(3) For a limit switch with watertight reinforced seal (IP 65), add **1** to the end of the reference.*
*Example: **XCRF17** becomes **XCRF171**.*

Dimensions:
page 40

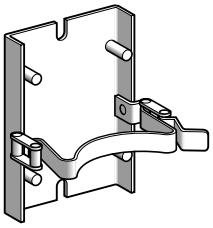
Limit switches
OsiSense XC Special
For hoisting and material handling applications, type XCR



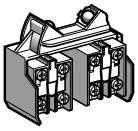
XCRZ02



XCRZ05



XCRZ09



XCRZ1●

Separate components

Description	For switches	Type	Reference	Weight kg
Rod, ⌀ **6 mm**	XCRA XCRB XCRE XCRF	L = 200 mm	**XCRZ03**	0.020
	XCRF	L = 300 mm	**XCRZ04**	0.030
Roller lever thermoplastic roller	XCRA XCRB	–	**XCRZ02**	0.050
Large roller lever thermoplastic roller	XCRA XCRB	–	**XCRZ05**	0.090
Quick fixing/ release bracket	XCRA, XCRB XCRE, XCRF	–	**XCRZ09**	0.520
Contact block (2 contacts) with mounting plate	XCRA, XCRB XCRE, XCRF	2-pole NC + NO snap action	**XCRZ12**	0.135
		2-pole NC + NO break before make, snap action	**XCRZ15**	0.135

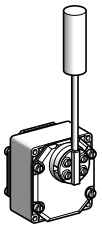
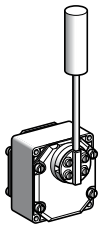
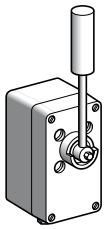
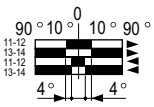
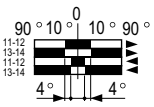
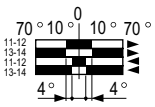
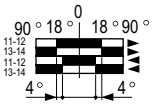
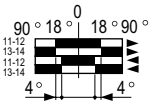
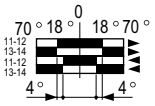
Description	Application	Sold in lots of	Unit reference	Weight kg
Adaptor	Pg 13.5 to ISO M20 x 1.5	5	**DE9RP13520**	0.032

Dimensions:
page 40

Limit switches

OsiSense XC Special

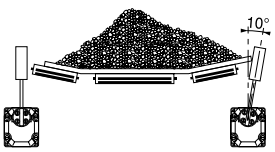
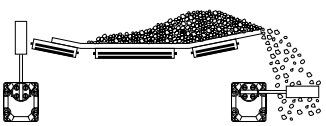
For conveyor belt shift monitoring applications, type XCRT
Complete switches with 1 cable entry

Type of switch	Standard	For corrosive atmospheres	
			
Features	Zinc alloy enclosure Colour: industrial blue Zinc plated steel lever, spring return to off position Cam angles: 10° and 18° Maximum displacement: 90°	Zinc alloy enclosure Colour: blue Stainless steel lever, spring return to off position Cam angles: 10° and 18° Maximum displacement: 90°	Glass reinforced polyester enclosure Colour: grey Stainless steel lever, spring return to off position Cam angles: 10° and 18° Maximum displacement: 70°
References of complete switches			
2 single-pole CO snap action	**XCRT115**	**XCRT215**	**XCRT315**
 1st contact			
 2e contact			
Weight (kg)	1.170	1.170	1.520
Contact operation	■ *closed* □ *open*		

Complementary characteristics

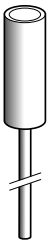
Lever maximum actuation speed	1.5 m/s
Belt maximum speed	4 m/s
Machnical durability	0.3 million operating cycles
Minimum tripping torque	1.7 N.m
Cable entry	1 entry tapped for n° 13 cable gland conforming to NF C 68-300 (DIN Pg 13.5) Clamping capacity 9 to 12 mm

Switch operation

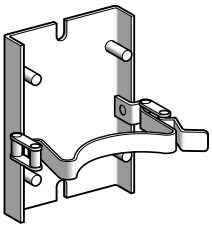
Normal position	Fault signalling	Stopping of the conveyor belt	Maximum rotation
			

Dimensions:
page 41

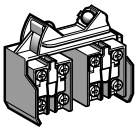
Limit switches
OsiSense XC Special
For conveyor belt shift monitoring applications, type XCRT



XCRZ9●●



XCRZ09



XCRZ42

Separate components

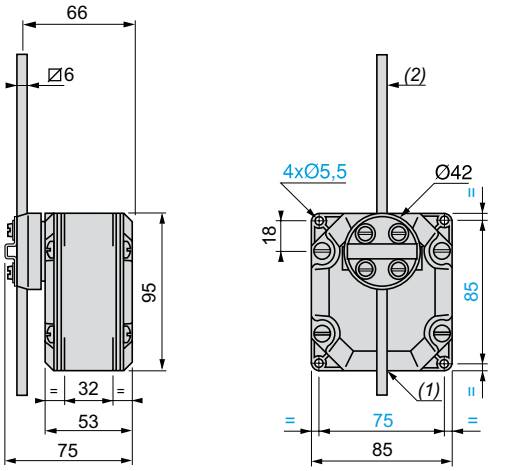
Description	Type	For switches	Reference	Weight kg
Roller with lever	Zinc plated steel	XCRT115 XCRT215	**XCRZ901**	0.230
	Stainless steel	XCRT115 XCRT215	**XCRZ902**	0.230
		XCRT315	**XCRZ903**	0.230
Quick fixing/release bracket	–	XCRT115 XCRT215	**XCRZ09**	0.520
Contact block (2 contacts) with mounting plate	Single-pole CO snap action	XCRT●15	**XCRZ42**	0.135

Description	Application	Sold in lots of	Unit reference	Weight kg
Adaptor	Pg 13.5 to ISO M20 x 1.5	5	**DE9RP13520**	0.032

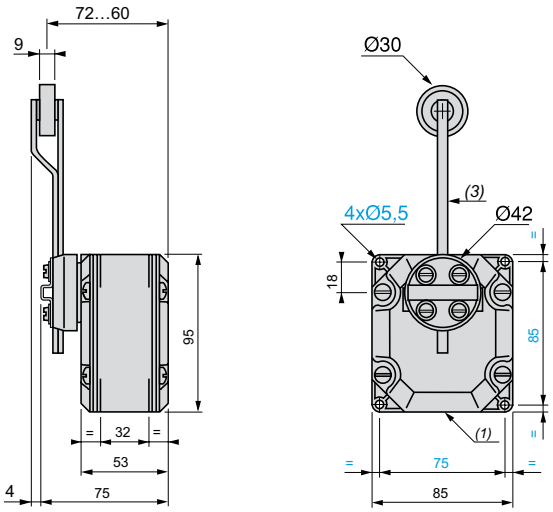
Dimensions:
page 41

Limit switches
OsiSense XC Special
For hoisting and material handling applications, type XCR

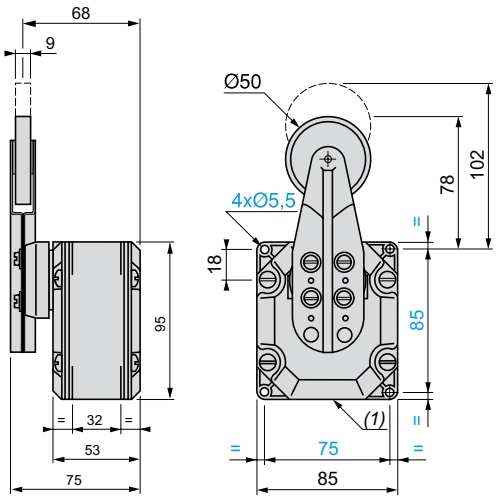
XCRA11, XCRB11, XCRA51, XCRB51



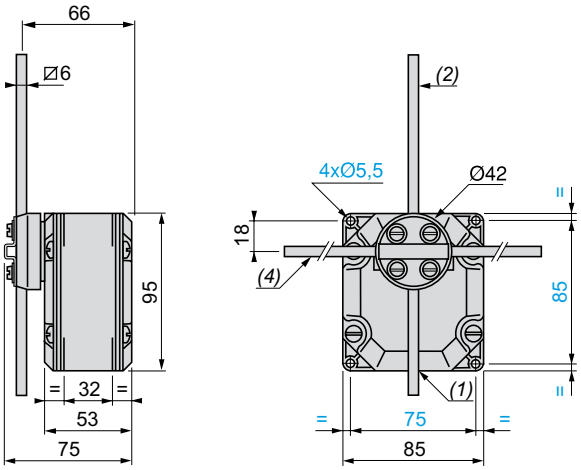
XCRA12, XCRB12, XCRA52, XCRB52



XCRA15, XCRB15, XCRA55, XCRB55



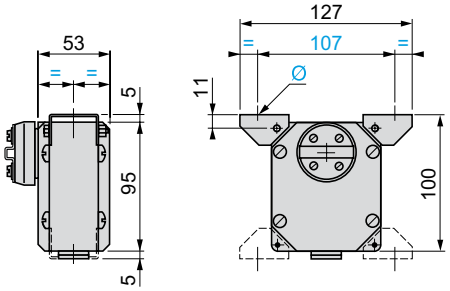
XCRE18, XCRE58, XCRF17, XCRF57



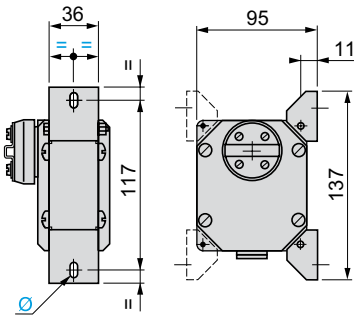
(1) 1 tapped entry for n° 13 cable gland.
(2) Rod length: 200 mm.
(3) Rod + roller length: 160 mm.
(4) Rod length: 300 mm for XCRF17 and XCRF57, 200 mm for XCRE18 and XCRE58.

Supplementary fixing using 2 adjustable lugs (included with switch)

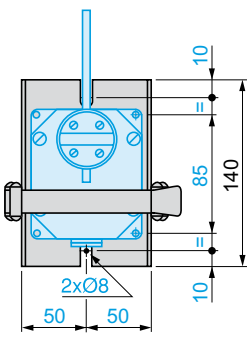
Horizontally positioned



Vertically positioned



Quick fixing/release bracket XCRZ09

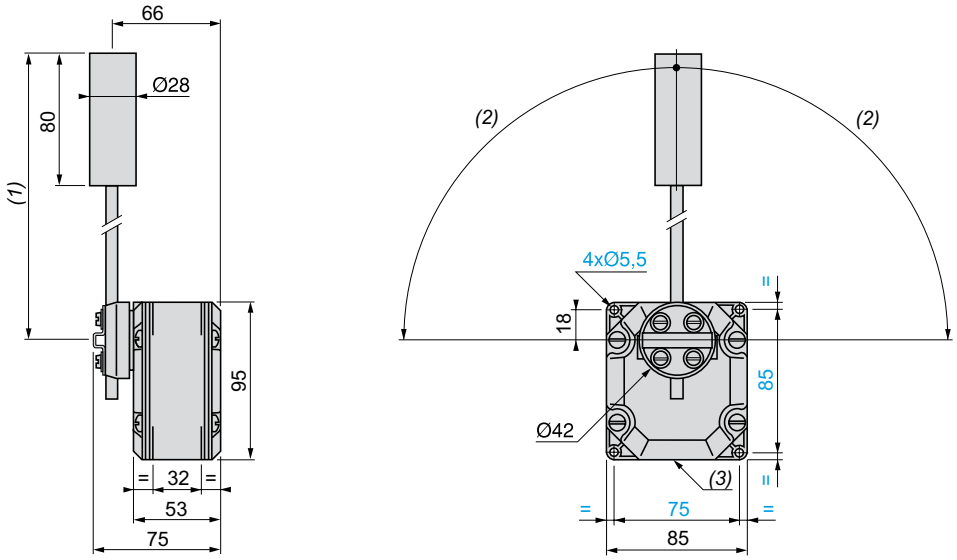


Ø: 1 elongated hole Ø 6 x 8.

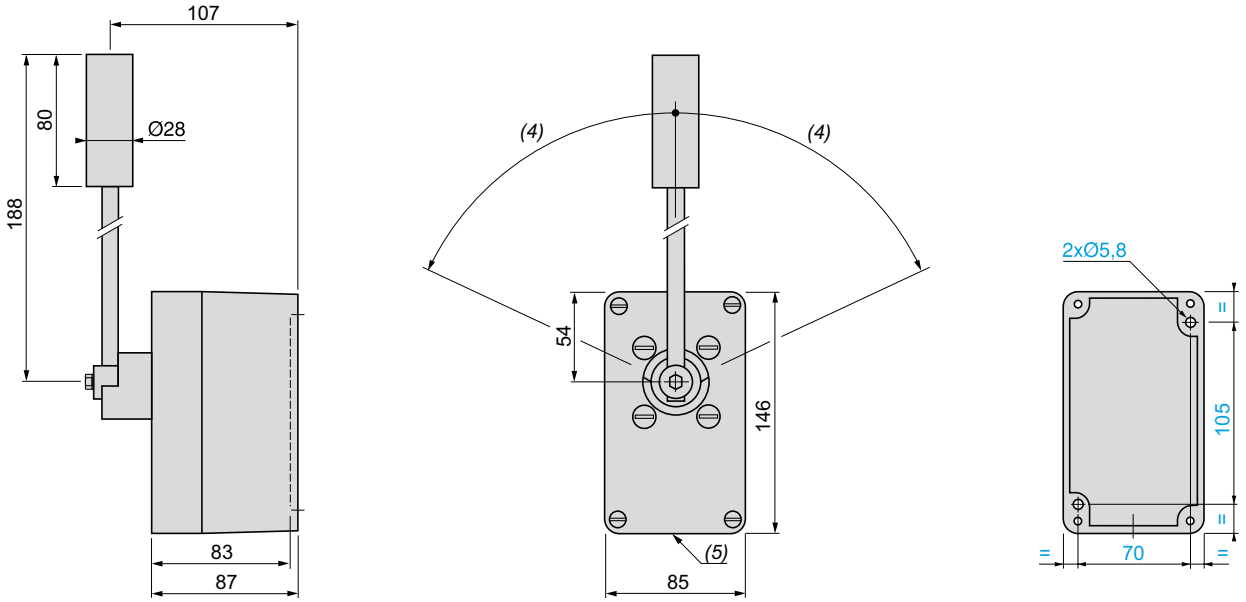
Characteristics: pages 34 to 36
References: page 36

Limit switches
OsiSense XC Special
For conveyor belt shift monitoring applications, type XCRT

XCRT115, XCRT215



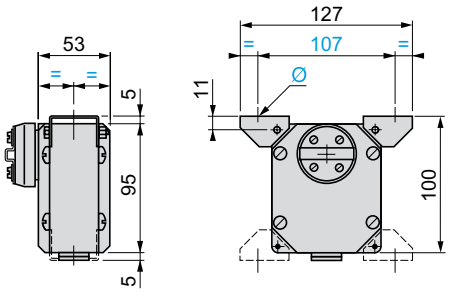
XCRT315



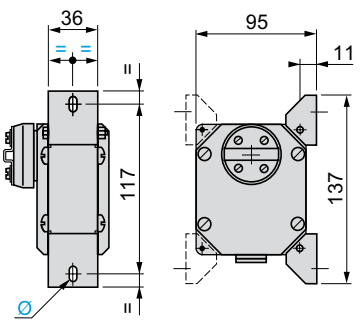
(1) 200 max., 83 min.
(2) 90° max.
(3) 1 tapped entry for n° 13 cable gland.
(4) 70° max.
(5) 1 plain entry for n° 13 cable gland.

Supplementary fixing using 2 adjustable lugs (included with XCRT115 and XCRT215)

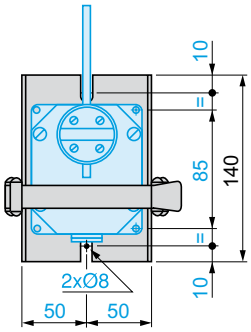
Horizontally positioned



Vertically positioned



Quick fixing/release bracket XCRZ09



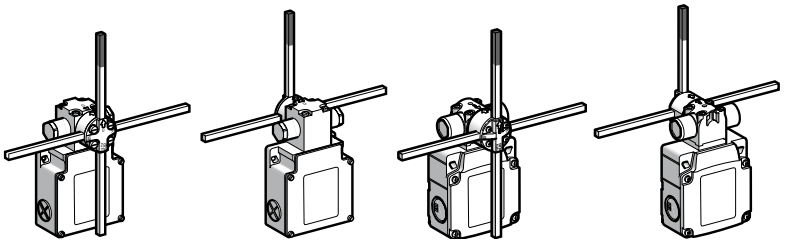
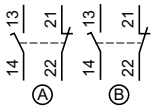
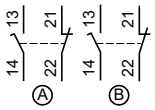
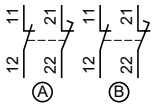
Ø: 1 elongated hole Ø 6 x 8.

Characteristics: pages 34 to 38
References: page 38
Operation: page 38

Limit switches

OsiSense XC Special

For hoisting and material handling applications, type XCKMR and XCKVR
Complete switches with 3 cable entries

Type of operating head	Rotary			
				
Material	Metal		Plastic	
Type of operator	With cruciform metal rods	With cruciform metal rods, reversed head	With cruciform metal rods	With cruciform metal rods, reversed head
References				
"By pass" switches				
 **2 x 2-pole NC+NO break before make, slow break (XE2NP2151)**	**XCKMR24SR1H29**	**–**	**XCKVR24SR1H29**	**–**
"Single speed" switches				
 **2 x 2-pole NC+NO break before make, slow break (XE2NP2151)**	**XCKMR44D1H29**	**XCKMR44D2H29**	**XCKVR44D1H29**	**XCKVR44D2H29**
"Double speed" switches (⊖ NC contact with positive opening operation on contacts 21-22)				
 **2 x 2-pole NC+NC break before make, slow break (non interchangeable contacts)**	**XCKMR54D1H29** *(1)*	**XCKMR54D2H29** *(1)*	**XCKVR54D1H29**	**XCKVR54D2H29**
Weight (kg)	0.684	0.684	0.320	0.320

Complementary characteristics

Switch actuation	Horizontal	Horizontal	
Permissible actuation area on the rods	Between 65 and 95 mm from the axis of the fixing screws on the body		
Minimum actuation speed	0.1 m/mn	0.1 m/mn	
Maximum actuation speed *(2)*	1.5 m/s	1.5 m/s	
Minimum force or torque For tripping	0.5 N.m	0.5 N.m	
For positive opening	0.75 N.m	0.75 N.m	
Mechanical durability	2 million operating cycles	1 million operating cycles	
Setting up	Rods included with the switch: for customer assembly		

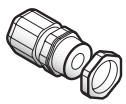
References of separate components



XCRZ03



XCRZ03R



DE9PEM20010

Description	Reference	Weight kg
Rod Ø 6 mm, L = 200 mm	**XCRZ03**	0.020
Rod Ø 6 mm, L = 200 mm with red mark	**XCRZ03R**	0.020
Plastic cable gland ISO M20	**DE9PEM20010**	0.010

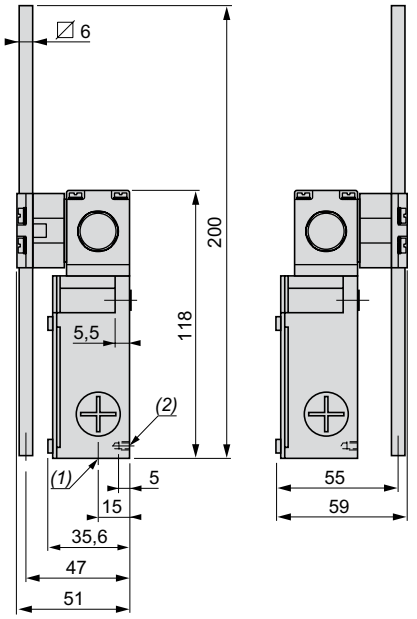
*(1) For complete switches with entry for Pg 13.5 cable gland, delete H29 from the end of the reference. Example: **XCKMR54D1H29** becomes **XCKMR54D1**.*
(2) For an actuation point on the rod between 65 and 95 mm from the axis of the fixing screws on the body.

Limit switches
OsiSense XC Special
For hoisting and material handling applications, type XCKMR and XCKVR
Complete switches with 3 cable entries

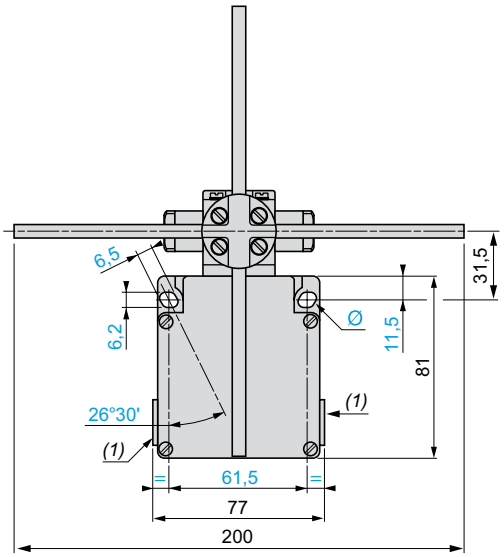
Dimensions

Metal limit switches

XCKMR24SR1H29, XCKMR44D1H29 and **XCKMR54D1H29**



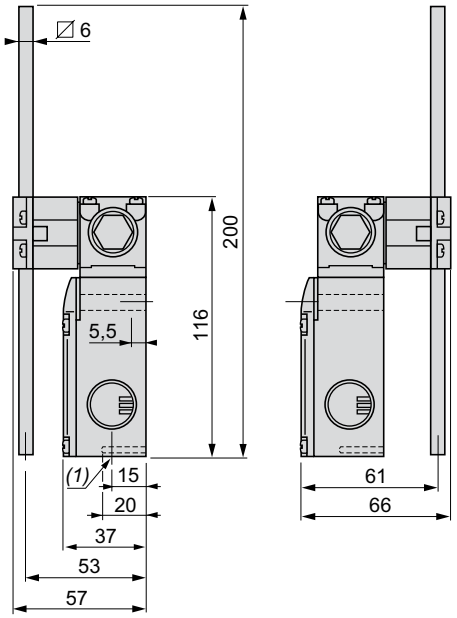
XCKMR44D2H29 and **XCKMR54D2H29**



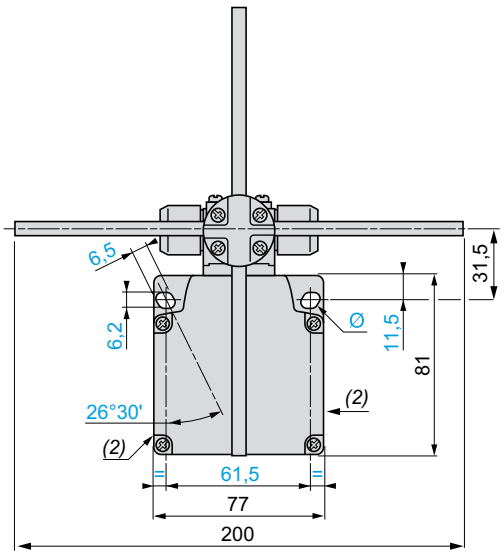
(1) XCKMR●●●●H29 = 3 tapped entries ISO M20 x 1.5.
XCKMR●●● = 3 tapped entries for Pg 13.5 cable gland.
(2) 2 centring holes Ø 3.9 ± 0.2, for cover fixing holes alignment.
Ø: 2 elongated holes 6.2 x 6.5, inclined at 26°30' to the vertical axis, for M5 screws.

Plastic limit switches

XCKVR24SR1H29, XCKVR44D1H29 and **XCKVR54D1H29**



XCKVR44D2H29 and **XCKVR54D2H29**

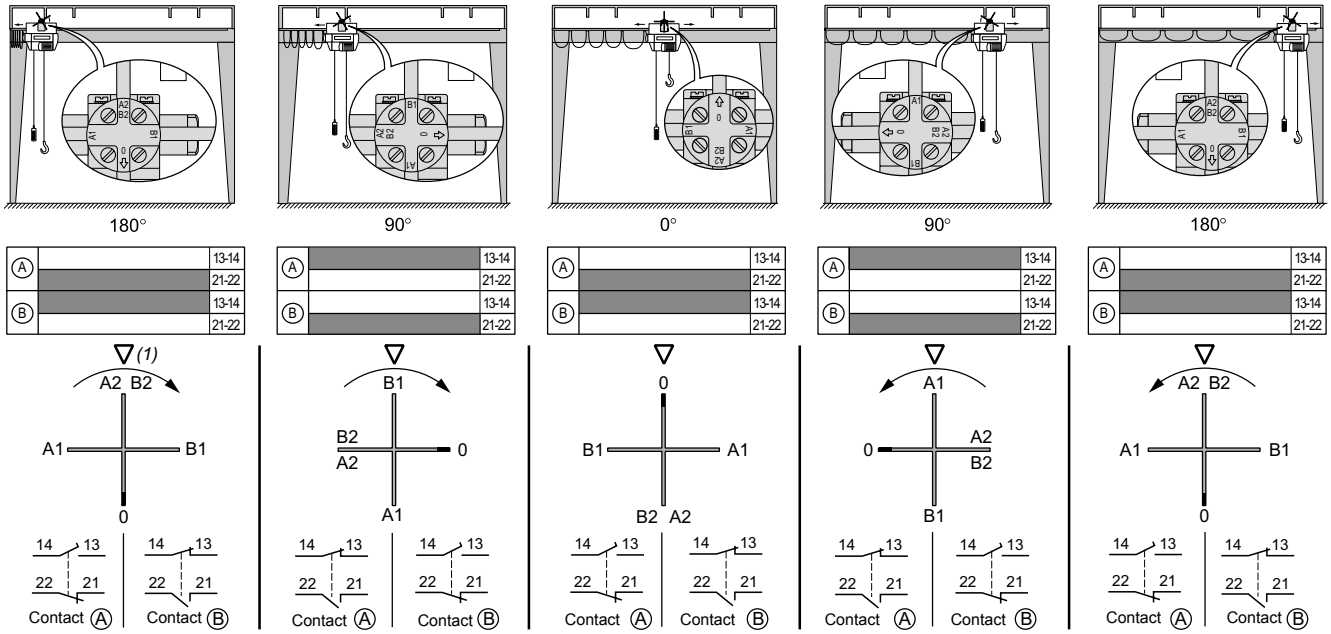


(1) 1 tapped entry ISO M20 x 1.5.
*(2) 2 knock-out holes for ISO M20 cable gland (reference: **DE9 PEM20010**).*
Ø: 2 elongated holes 6.2 x 6.5, inclined at 26°30' to the vertical axis, for M5 screws.

Limit switches
OsiSense XC Special
For hoisting and material handling applications, type XCKMR and XCKVR
Complete switches with 3 cable entries

Operation

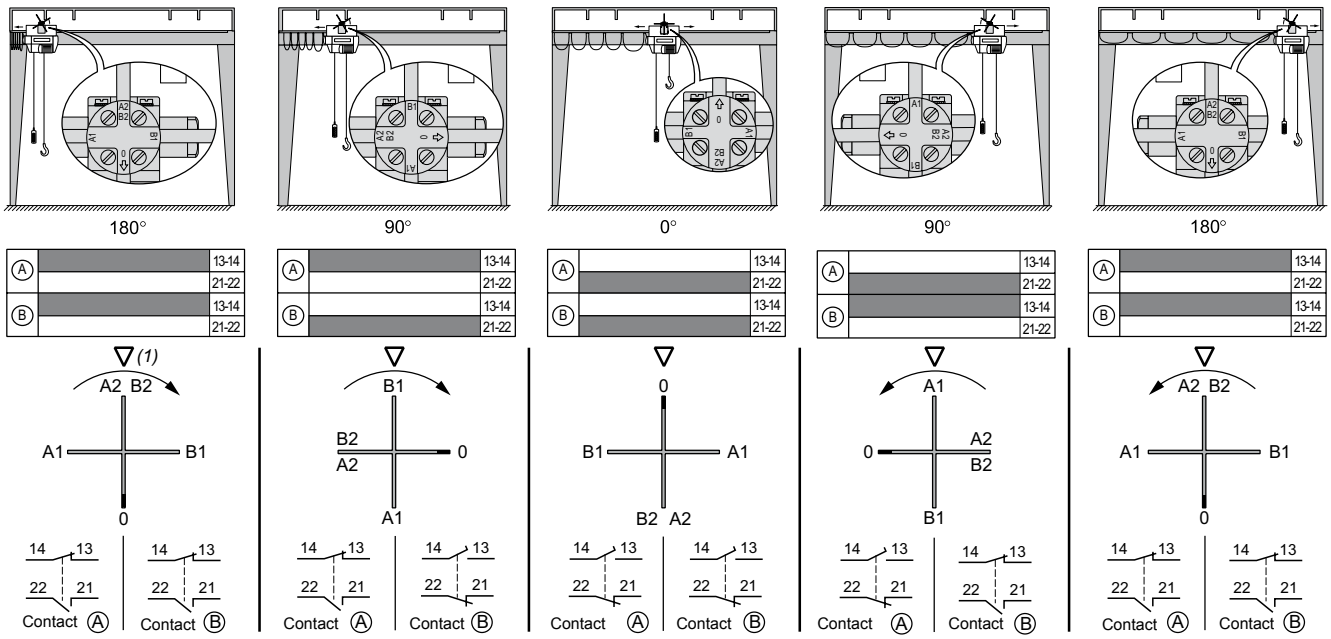
Limit switches XCK●R24SR1H29: “By pass”



(1) Triangle symbol marked on top of head.

or : direction of rotation.

Limit switches XCK●R44D●H29: “Single speed”

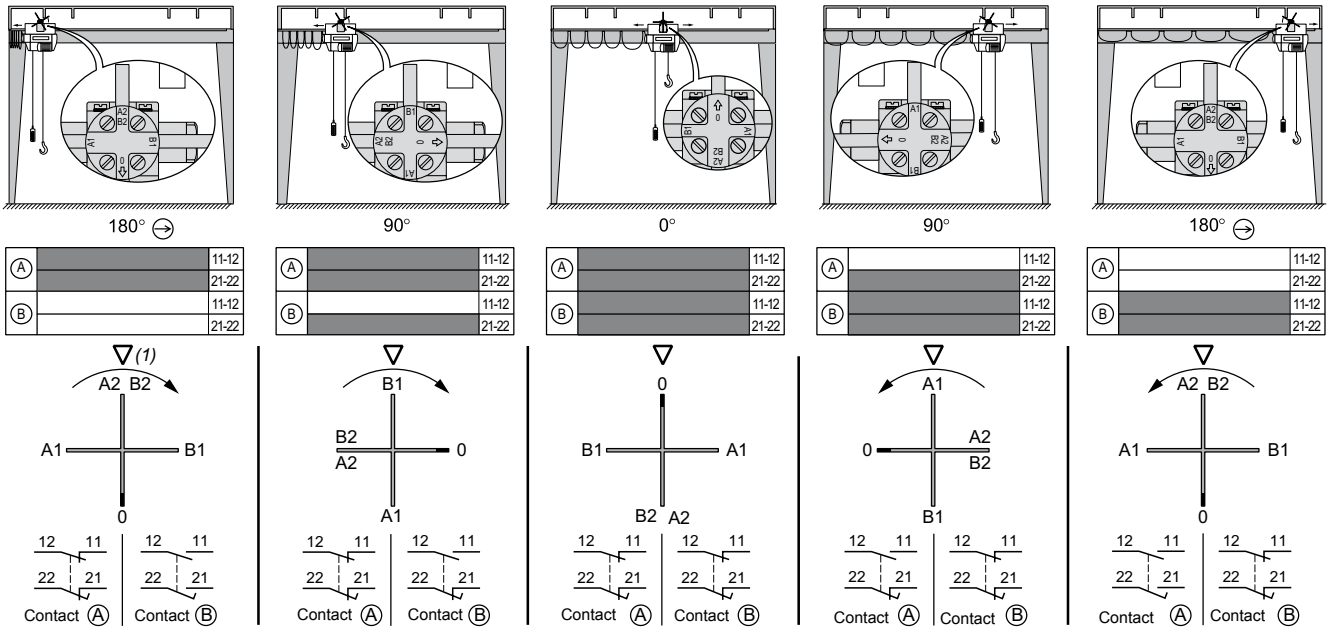


(1) Triangle symbol marked on top of head.

or : direction of rotation.

Limit switches
OsiSense XC Special
For hoisting and material handling applications, type XCKMR and XCKVR
Complete switches with 3 cable entries

Operation (continued)
Limit switches XCK●R54D●●●●: "Double speed"



(1) Triangle symbol marked on top of head.

or : direction of rotation.

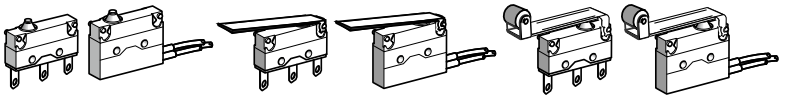
Miniature snap switches

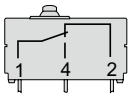
OsiSense XC Special

Subminiature design, DIN 41635 B format, sealed
Sub-subminiature design, DIN 41635 D format

References

Subminiature design, DIN 41635 B format, sealed



Type of operator		Plunger	Flat lever *(1)*	Roller lever *(1)*
 **Single-pole CO snap action** Wiring: 1 Black 2 Grey 4 Blue	**2.8 mm cable clip tag connections**	**XEP4E1W7** *(3)*	**XEP4E1W7A326** *(3)*	**XEP4E1W7A454** *(3)*
	Weight (g)	2.4	3.1	3.2
	Pre-cabled connections	**XEP4E1FD** *(3)*	**XEP4E1FDA326** *(3)*	**XEP4E1FDA454** *(3)*
	Weight (g)	14.1	14.8	14.9
Separate components	**Flat lever** *(2)*	**ZEP4L326** *(3)*	–	–
	Weight (g)	0.7	–	–
	Roller lever *(2)*	**ZEP4L454** *(3)*	–	–
	Weight (g)	0.8	–	–

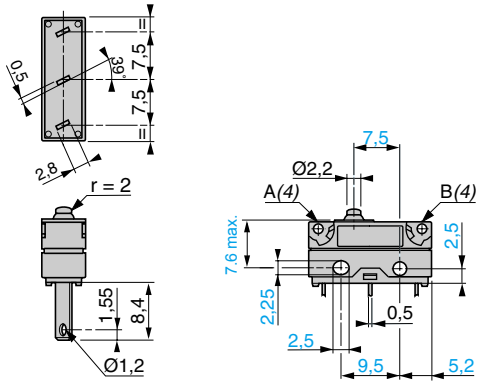
Sub-subminiature design, DIN 41635 D format



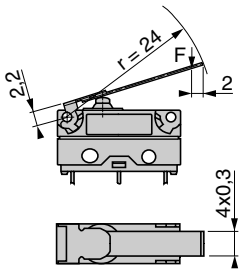
Type of operator		Plunger	Flat lever *(1)*
 **Single-pole CO snap action**	**Solder tag connections**	**XEP5P1W2** *(3)*	**XEP5P1W2Z55B** *(3)*
	Weight (g)	1.4	1.9

Dimensions

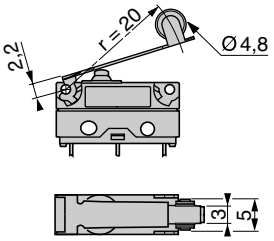
XEP4E1W7



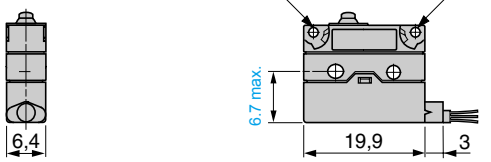
XEP4E1W7A326



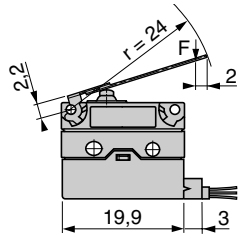
XEP4E1W7A454



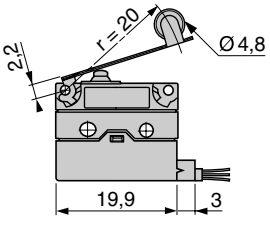
XEP4E1FD



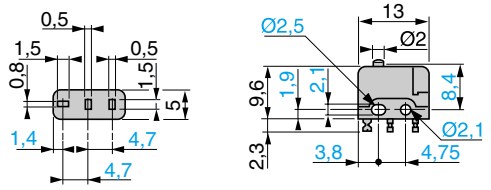
XEP4E1FDA326



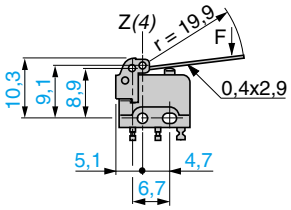
XEP4E1FDA454



XEP5P1W2



XEP5P1W2Z55B



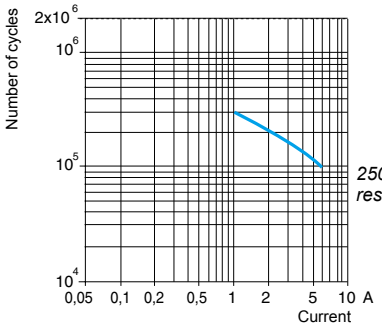
(1) In order to avoid damage to the fixing spigots, removal of the lever from complete products is not recommended.
*(2) Levers only for mounting on basic (plunger) snap switches (**XEP4E1W7** and **XEP4E1FD**).*
(3) Switches sold in lots of 5.
(4) A, B, Z: lever fixing positions.

Miniature snap switches
OsiSense XC Special
Subminiature design, DIN 41635 B format, sealed
Sub-subminiature design, DIN 41635 D format

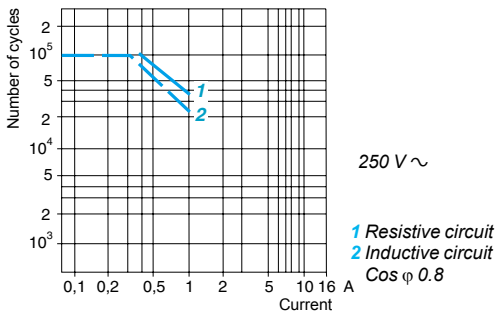
Switch type			XEP4E1●●, XEP5P1W2 Plunger	XEP4E1●●A326, XEP5P1W2Z55B Flat lever	XEP4E1●●A454 Roller lever
Environment characteristics					
Lever fixing position *(1)*			–	A	A
Switch actuation			On end	Horizontal	
Product certifications			CE, IEC 60947-5-1, EN 60947-5-1, c UR us, UL 1054, EN 61058		
Degree of protection			IP 67 **XEP4E1FD●●**, case IP 67 and tags IP 00 **XEP4E1W7●●**, case IP 40 and tags IP 00 **XEP5P1W2●●**		
Operating temperature			- 40...+ 105°C **XEP4E1FD●●**, - 40...+ 125°C **XEP4E1W●●●●** and **XEP5P1●●●**		
Materials	Case		Polyester **XEP4**, diallyl-phtalate **XEP5**		
	Lever		–	Stainless steel	Stainless steel, glass reinforced polyamide roller
	Contact		AgCdO **XEP4E1●●**, Ag **XEP5**		
	Tags		Tinned brass **XEP4E1W●●●**, gold plated brass **XEP5P1●●**		
Mechanical characteristics					
		Lever fixing position *(1)*			
Maximum tripping force	XEP4	A	2.5 N	0.63 N	0.83 N
		B	2.5 N	1.25 N	1.67 N
	XEP5		2 N	0.80 N	–
Minimum release force	XEP4	A	0.80 N	0.20 N	0.27 N
		B	0.80 N	0.40 N	0.53 N
	XEP5		0.40 N	0.15 N	–
Maximum permissible end of travel force	XEP4	A	10 N	2.5 N	3.33 N
		B	10 N	5 N	6.67 N
	XEP5		10 N	–	–
Tripping point (TP) *(2)*	XEP4	A	8.40 +/- 0.3 mm	10.7 +/- 1.7 mm	15.5 +/- 1.4 mm
		B	8.40 +/- 0.3 mm	9.6 +/- 1.0 mm	14.5 +/- 0.9 mm
	XEP5		8.40 mm	9.20 mm	–
Maximum differential travel	XEP4	A	0.13 mm	0.52 mm	0.39 mm
		B	0.13 mm	0.26 mm	0.20 mm
	XEP5		0.06 mm	0.25 mm	–
Minimum overtravel	XEP4	A	0.60 mm	2.40 mm	1.80 mm
		B	0.60 mm	1.20 mm	0.90 mm
	XEP5		0.10 mm	–	–
Inter-contact distance	XEP4		0.4 mm		
	XEP5		0.3 mm		
Mechanical durability	XEP4		2 million operating cycles		
	XEP5		0.1 million operating cycles		
Electrical characteristics					
Operational characteristics	XEP4		AC-15: B300 (Ue: 240 V, Ie: 1.5 A) DC-13: R300 (Ue: 250 V, Ie: 0.1 A) conforming to IEC 60947-5-1, EN 60947-5-1 Appendix A 125-250 V AC 6.0 A conforming to UL 1054 6 (1) A 250 V AC 10 000 cycles conforming to EN 61058		
	XEP5		AC-15: D300 (Ue: 240 V, Ie: 0.3 A) conforming to IEC 60947-5-1, EN 60947-5-1 Appendix A		
Thermal current	XEP4		7.5 A on 250 V (50/60 Hz)		
	XEP5		8.5 A on 250 V (50/60 Hz)		
Connection	XEP4		**XEP4E1W7●**: 2.8 mm clip tags **XEP4E1FD**: Pre-cabled (horizontally in-line), 3 x 0.5 mm², length 0.5 m		
	XEP5		Solder tags		

Operating curves

XEP4E1●●



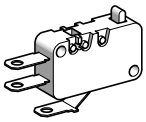
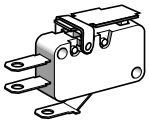
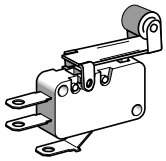
XEP5P1●●

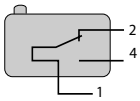


(1) Miniature snap switches fitted with a lever are supplied with the lever fixed in position A (see page 46). For basic (plunger) snap switches, it is possible to fix the lever in position A or B, depending on the required tripping conditions (see page 46).
(2) Position of the operator in relation to the switch fixings (fixing hole centre line) at the instant the switch contact changes state.

Miniature snap switches
OsiSense XC Special
Miniature design, DIN 41635 A format

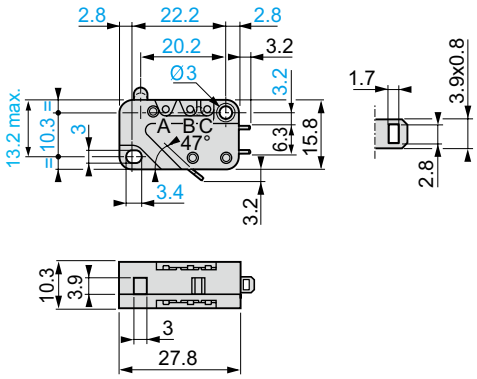
References

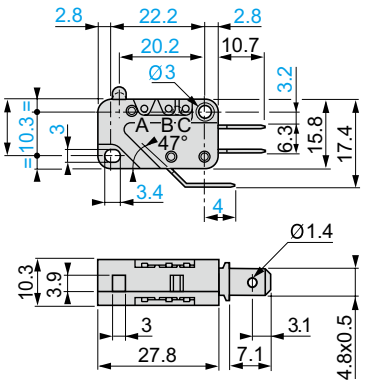
Type of operator			Plunger	Flat lever *(1)*	Roller lever *(1)*
 Single-pole CO snap action	Standard contacts	Solder tags	**XEP3S1W2** *(2)*	**XEP3S1W2B524** *(2)*	**XEP3S1W2B529** *(2)*
		4.8 mm cable clip tags	**XEP3S1W6** *(2)*	**XEP3S1W6B524** *(2)*	**XEP3S1W6B529** *(2)*
		6.35 mm cable clip tags	**XEP3S1W3** *(2)*	**XEP3S1W3B524** *(2)*	**XEP3S1W3B529** *(2)*
		Weight (g)	5.6	6.3	6.6
	Very low operating force contacts	Solder tags	**XEP3S2W2** *(2)*	**XEP3S2W2B524** *(2)*	**XEP3S2W2B529** *(2)*
		4.8 mm cable clip tags	**XEP3S2W6** *(2)*	**XEP3S2W6B524** *(2)*	**XEP3S2W6B529** *(2)*
		6.35 mm cable clip tags	**XEP3S2W3** *(2)*	**XEP3S2W3B524** *(2)*	**XEP3S2W3B529** *(2)*
		Weight (g)	5.6	6.3	6.6
Separate components	**Flat lever** *(3)*		**ZEP3L524** *(2)*		
	Weight (g)		0.7		
	Roller lever *(3)*		**ZEP3L529** *(2)*		
	Weight (g)		1		

Dimensions

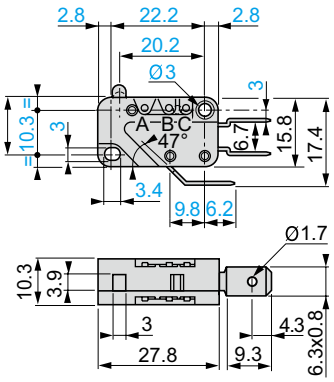
XEP3S●W2



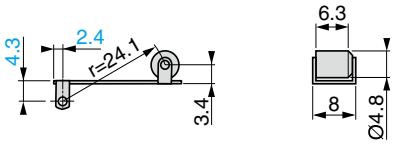
XEP3S●W6



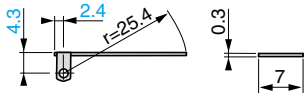
XEP3S●W3



ZEP3L529



ZEP3L524



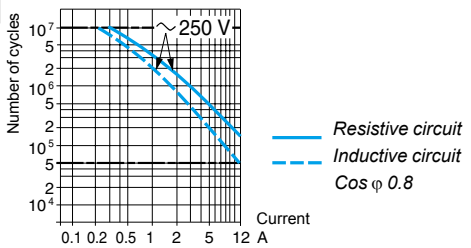
(1) In order to avoid damage to the fixing spigots, removal of the lever from complete products is not recommended.
(2) Switches sold in lots of 10.
(3) Levers only for mounting on basic (plunger) snap switches (XEP3S●W2, XEP3S●W3, XEP3S●W6), in fixing positions A, B or C.

Miniature snap switches
OsiSense XC Special
Miniature design, DIN 41635 A format

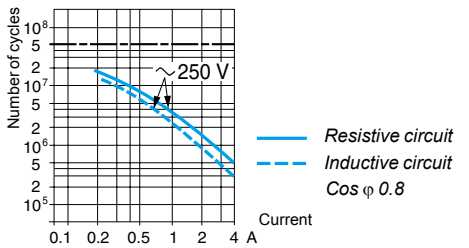
Switch type			XEP3S●W2	XEP3S●W2B254	XEP3S●W2B259
Type of operator			Plunger	Flat lever	Roller lever
Environment characteristics					
Lever fixing position *(1)*			–	B	B
Switch actuation			On end	Horizontal	
Product certifications			⎓ UR us, CE, IEC/EN 60947-5-1, UL 1054, EN 61058-1		
Degree of protection			Case IP 40 and tags IP 00		
Operating temperature			- 25...+ 125°C		
Materials	Case		Polyester		
	Lever		–	Stainless steel	Stainless steel, glass reinforced polyamide roller
	Contact		AgNi		
Mechanical characteristics					
	Lever fixing position *(1)*				
Maximum tripping force	Standard	A	0.8 N	0.2 N	
		B	0.8 N	0.4 N	
		C	0.8 N	0.53 N	
	Very low force	A	0.25 N	0.06 N	
		B	0.25 N	0.13 N	
		C	0.25 N	0.17 N	
Minimum release force	Standard	A	0.20 N	0.05 N	
		B	0.20 N	0.10 N	
		C	0.20 N	0.13 N	
	Very low force	A	0.05 N	0.01N	
		B	0.05 N	0.03 N	
		C	0.05 N	0.03 N	
Maximum permissible end of travel force	Standard, very low force	A	20 N	5 N	
		B	20 N	10 N	
		C	20 N	13 N	
Tripping point (TP) *(2)*	Standard, very low force	A	14.70 $^{+/- 0.4}$ mm	15.20 $^{+/- 2.5}$ mm	20.5 $^{+/- 2.9}$ mm
		B	14.70 $^{+/- 0.4}$ mm	15.20 $^{+/- 1.0}$ mm	20.5 $^{+/- 1.5}$ mm
		C	14.70 $^{+/- 0.4}$ mm	15.20 $^{+/- 0.8}$ mm	20.5 $^{+/- 1.2}$ mm
Maximum differential travel	Standard, very low force	A	0.35 mm	1.40 mm	
		B	0.35 mm	0.70 mm	
		C	0.35 mm	0.53 mm	
Minimum overtravel	Standard	A	1.20 mm	4.80 mm	
		B	1.20 mm	2.40 mm	
		C	1.20 mm	1.80 mm	
	Very low force	A	1.10 mm	4.40 mm	
		B	1.10 mm	2.20 mm	
		C	1.10 mm	1.65 mm	
Inter-contact distance			0.40 mm		
Mechanical durability for 2/3 overtravel	Standard		20 million operating cycles		
	Very low force		50 million operating cycles		
Electrical characteristics					
Operational characteristics	Standard		AC-15: B300 (Ue: 240 V, Ie: 1.5 A) DC-13: R300 (Ue: 250 V, Ie: 0.1 A) conforming to IEC/EN 60947-5-1 Appendix A 125-250 V AC 10,1 A - 1/2 HP conforming to UL 1054 12 (3) A 250 V AC 10 000 cycles conforming to EN 61058-1		
	Very low force		AC-15: D300 (Ue: 240 V, Ie: 0.3 A) conforming to IEC/EN 60947-5-1 Appendix A 125-250 V AC 4 A - 1/10 HP conforming to UL 1054 4 *(1)* A 250 V AC 50 000 cycles conforming to EN 61058-1		
Thermal current	Standard		15 A on 250 V (50/60 Hz)		
	Very low force		5 A on 250 V (50/60 Hz)		
Connection			**XEP3S●W2**: solder tags, **XEP3S●W6**: 4.8 mm cable clip tags, **XEP3S●W3**: 6.35 mm cable clip tags		

Operating curves

XEP3S1●●

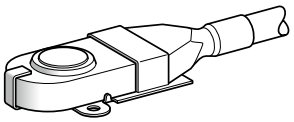
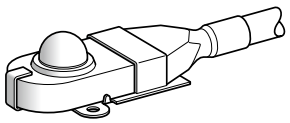
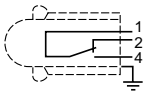


XEP3S2●●



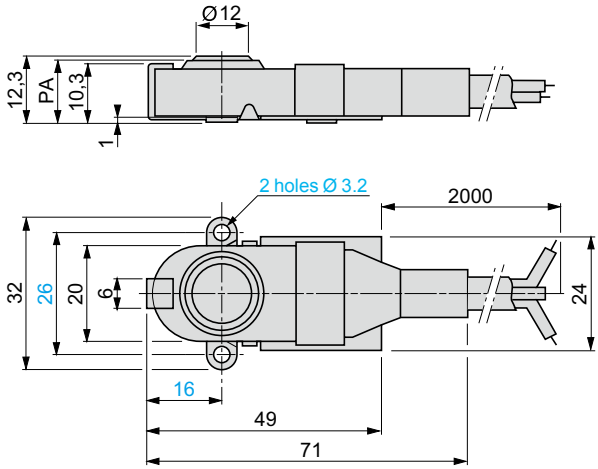
(1) Miniature snap switches fitted with a lever are supplied with the lever fixed in position B (see page 48). For basic (plunger) snap switches, it is possible to fix the lever in position A, B or C, depending on the required tripping conditions (see page 48).
(2) Position of the operator in relation to the switch fixings (fixing hole centre line) at the instant the switch contact changes state.

Miniature snap switches
OsiSense XC Special
Sealed design
Pre-cabled

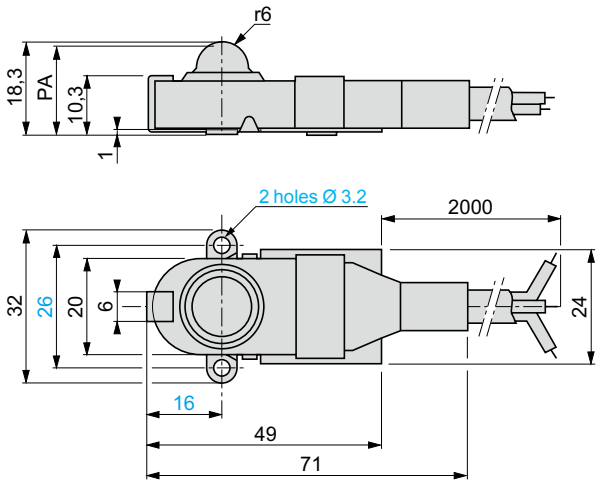
Type of head	Plunger (fixing by the body)	
		
Type of operator	Head with flat plunger	Head with domed encased plunger
References		
 **Single-pole CO snap action** Wiring: 1 Black 2 Brown 4 Blue	**XC010L2**	**XC011L2**
Weight (kg)	0.145	0.150

Dimensions

XC010L2



XC011L2



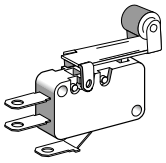
Miniature snap switches
OsiSense XC Special
Sealed design
Pre-cabled

Switch type		XC010L2	XC011L2
Environment characteristics			
Switch actuation		On end, flat plunger *(1)*	On end, domed plunger *(1)*
Product certifications		CE, IEC 60947-5-1	
Degree of protection		IP 66	
Operating temperature		0...+ 85°C	
Materials	Internal housing	Metal	
	Casing	Nitrile	
	Fixing support	Steel, zinc passivated	
	Contact	Ag	
Mechanical characteristics			
Maximum tripping force		5.3 N	
Minimum release force		1.5 N	
Maximum permissible end of travel force		30 N	
Tripping point (TP) *(2)*		$11.4^{\pm 0.4}$ mm	$17.4^{\pm 0.5}$ mm
Maximum differential travel		0.2 mm	
Minimum overtravel		0.2 mm	
Inter-contact distance		0.5 mm	
Mechanical durability		2 million operating cycles	
Electrical characteristics			
Operational current		1 A on 24 V (50/60 Hz)	
Thermal current/insulation voltage		12 A/60 V	
Connection		A05 VVF cable, 3 x 0.75 mm^2, length 2 metres, external diameter ≤ 7.6 mm	
Electrical durability		AC-15: 0.5 million operating cycles	

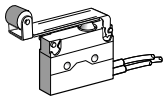
(1) Manual actuation must be made by an intermediate insulated part, in order to meet basic safety requirements.
One of the two fixing holes must also be used as an earth protection terminal.
(2) Distance between the base of the switch and the top of the plunger at the instant the contact changes state (see dimensions, page 50).

Miniature snap switches
OsiSense XC
Miniature design
General

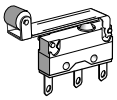
Presentation



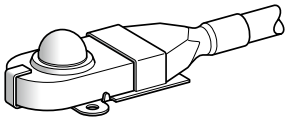
XEP3



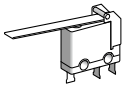
XEP4E1W●



XEP4E1FD●

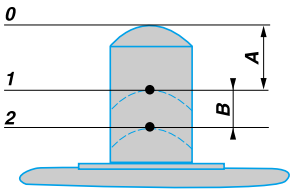


XC0

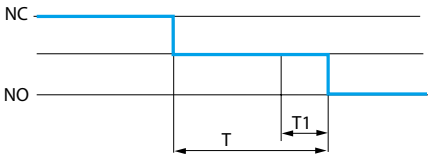


XEP5

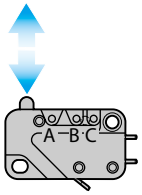
Terminology



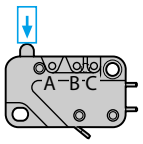
Mechanical characteristics



T1: bounce time
T: changeover time



Mounting



Electromechanical detection

- OsiSense XC miniature snap switches, featuring electromechanical technology, assure the following functions:
  - detection of presence or absence,
  - detection of position.

Actuation of the operator (plunger or lever) on the miniature snap switch causes the electrical contact to change state. This information can then be processed by a PLC controlling the installation.
OsiSense XC miniature snap switches can be used both in industrial applications and the building sector.

Features

- OsiSense XC miniature snap switches incorporate a CO snap action, single break, contact. They are characterised by:
  - high electrical ratings for their very small size,
  - short tripping travel,
  - low tripping force,
  - high repeat accuracy on the tripping points,
  - long service life.

Forces

- Maximum tripping force:
  maximum force which must be applied to the operator to move it from the rest (unactuated) position to the trip position (tripping point).
- Minimum release force:
  value to which the force on the operator must be reduced to allow the snap action mechanism to return to its rest (unactuated) position.
- Maximum permissible end of travel force:
  maximum force that can be applied to the operator at the end of its travel without damaging the switch.

Position/Travel

1 *Tripping point: position of the operator in relation to the switch fixings (fixing hole centre line) at the instant the switch contact changes state.*
A *Differential travel: distance between the tripping point and the position at which the snap action mechanism returns to its initial state on release of the operator.*
2 *Overtravel limit: position of the operator when an extreme force has moved it to the effective end of its available travel.*
B *Overtravel: distance between the tripping point and the overtravel limit.*

The reference point for the figures given for forces and travel is a point F, which is situated on the plunger in the case of a basic switch or at 3 mm from the end of the plain lever in the case of a lever operated switch.

Changeover time

- This is the time taken by the moving contact when moving from one fixed contact to another until it becomes fully stable (contact bounce included).
- This time is related to the inter-contact distance, the mechanical characteristics of the snap action mechanism and the mass of the moving element. However, due to the snap action mechanisms used, the time is largely independent to the speed of operation. It is normally less than 20 milliseconds (including bounce times of less than 5 ms).

Operating speed and maximum usable operating rate

- Our miniature snap switches are suitable for a wide range of operating speeds: generally, from 1 mm/mn to 1 m/s.
- The maximum usable operating rate on a light electrical load may be as high as 10 operations/second.

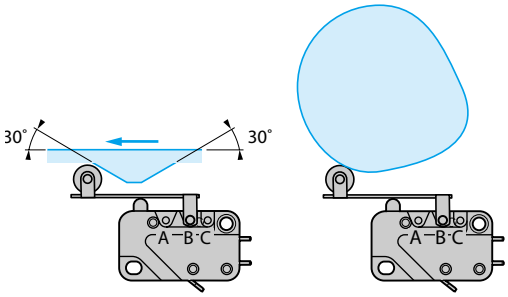
Mounting and operation

- To conform to the leakage paths and air gaps in standards EEC 24 - EN/IEC 61058 - EN/IEC 60947:
  - an insulation pad must be inserted between the snap switch and the fixing surface if the latter is metal.
  - manual operation of a metal actuator must only be carried out with the aid of an intermediate actuator made of an insulating material.
- The installer must ensure adequate protection against direct contact with the output terminals.

Actuation method

- Direct operation:
  - the plunger should preferably be actuated along its axis. However, the majority of our miniature snap switches will accept skewed operation provided the angle of actuation is not more than 45°.
    The travel of the actuator must not be limited to only reaching the tripping point. The actuator must always be operated in such a manner so that the plunger reaches a point at least 0.5 times the stated overtravel value of the switch. Steps must also be taken to ensure that it does not reach its end of travel nor exceed the maximum permissible end of travel force.

Characteristics (continued)



Actuation method (continued)

- Lever operators
  - when actuation is by a roller lever, force should preferably be applied in the direction shown in the diagrams opposite.
  - where the movements involved are fast, the ramp should be so designed as to ensure that the operator is not subjected to any violent impact or abrupt release.

Fixing - Tightening torque

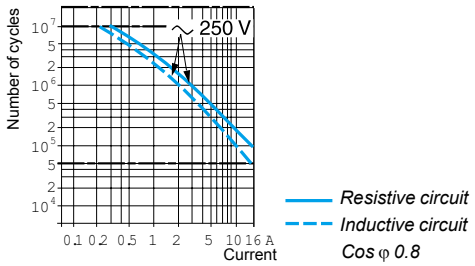
- The tightening torque of the fixing screws must conform to the following values:

Ø of fixing screw		2	2.5	3	3.5	4
Tightening torque (cm.N)	Maximum	25	35	60	100	150
	Minimum	15	25	40	60	100

Resistance to mechanical shock and vibration

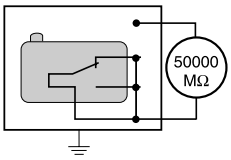
- Resistance to shock and vibration depends on the mass of the moving parts and on the forces holding the contacts together.
- In general, for a miniature snap switch without accessory:
  - vibration > 10 gn, 10 to 500 Hz,
  - shock > 50 gn, 11 ms 1/2 sine wave.

Electrical characteristics



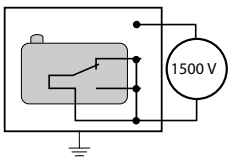
Operating curves

- These indicate the electrical life of the miniature snap switches under standard conditions (20°C, 1 cycle/2 seconds), by showing the number of switching operations which can be performed with given types of load. For sealed snap switches, the operating rate is 1 cycle/6s.



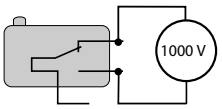
Insulation resistance

- The insulation resistance of the miniature snap switches is generally greater than 50,000 MΩ, measured at 500 V DC.



Dielectric strength

- The dielectric strength of our miniature snap switches is generally superior to:
  - 1500 Volts between live parts and earth,
  - 1000 Volts between contacts,
  - 600 Volts between contacts for switches with an inter-contact distance less than 0.3 mm.



Presentation

Electromechanical detection

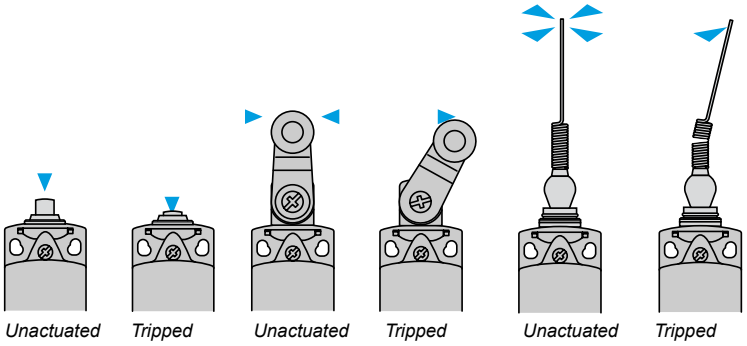
Limit switches are used in all automated installations and also in a wide variety of applications, due to the numerous advantages inherent to their technology.
They transmit data to the logic processing system regarding:
- presence/absence,
- passing,
- positioning,
- end of travel.

Simplicity of installation, advantages

- **From an electrical viewpoint**
- galvanic separation of circuits,
- models suitable for low power switching combined with good electrical durability,
- very good short-circuit withstand in coordination with appropriate fuses,
- total immunity to electromagnetic interference,
- high rated operational voltage.
- **From a mechanical viewpoint**
- NC contacts with positive opening operation,
- high resistance to the different ambient conditions encountered in industry (standard tests and specific tests under laboratory conditions),
- high repeat accuracy, up to 0.01 mm on the tripping points.

Detection movements

■ Linear movement (plunger) ■ Rotary movement (lever) ■ Multi-directional movement



Terminology

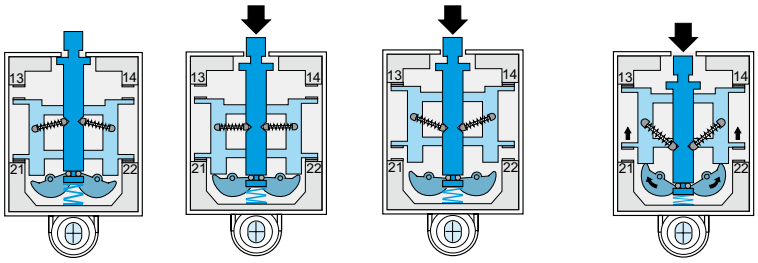
Rated value of a quantity	■ This replaces the term “nominal value”. ■ It is the fixed value for a specific function.
Utilisation categories:	■ AC-15 replaces AC-11: control of an electromagnet on AC, test 10 Ie/Ie. ■ AC-12: control of a resistive load on AC or static load isolated by opto-coupler. ■ DC-13 replaces DC-11: control of an electromagnet on DC, test Ie/Ie.
Positive opening travel	■ Minimum travel from the initial movement of contact actuator to the position required to accomplish positive opening operation.
Positive opening force	■ The force required on the contact actuator to accomplish positive opening operation.
Switching capacity	■ Ithe is no longer a rated value but a conventional current used for heating tests. **Example:** for category A300 the corresponding operational current, Ie maximum, is 6 A-120 V or 3 A-240 V, the equivalent Ithe being 10 A.
Positive opening operation	■ A limit switch complies to this specification when all the closed contact elements of the switch can be changed, with certainty, to the open position (no flexible link between the moving contacts and the operator of the switch, to which an actuating force is applied). ■ All limit switches incorporating either a slow break contact block or a snap action NC + NO (form Zb), NC + NO + NO, NC + NC + NO, NC + NC + NO + NO contact block are positive opening operation, in complete conformity with standard IEC 60947-5-1 Appendix K.

Limit switches
OsiSense XC
General

Contact blocks

Snap action contacts

- Snap action contacts are characterised by different tripping and reset points (differential travel).
- The displacement speed of the moving contacts is not related to the speed of the operator.
- This feature ensures satisfactory electrical performance in applications involving low speed actuators.

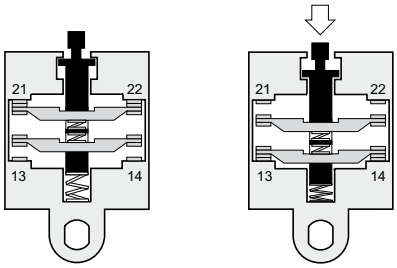


Unactuated state *Approach travel* *Contact change of state* *Positive opening*

Slow break contacts

- Slow break contacts are characterised by identical tripping and resetting points.
- The displacement speed of the moving contacts is equal, or proportional, to the speed of the operator (which must not be less than 0.1 m/s = 6 m/minute).

The opening distance is also dependent on the distance travelled by the operator.



Electrical durability for normal loads

- Normally, for inductive loads, the current value is less than 0.1 A (sealed), i.e. values of 3 to 40 VA sealed and 30 to 1000 VA inrush, depending on the voltage.
  For this type of application the electrical durability will exceed 10 million operating cycles.

Application example: XCKJ161 + LC1D12●●●● (7 VA sealed, 70 VA inrush).
Electrical durability = 10 million operating cycles.

Switching capacity

1 *Normal industrial PLC input type 1 (PLC: industrial programmable logic controllers)*
2 *Normal industrial PLC input type 2*
3 *Switching capacity conforming to IEC 60947-5-5, utilisation category AC-15, DC-13*

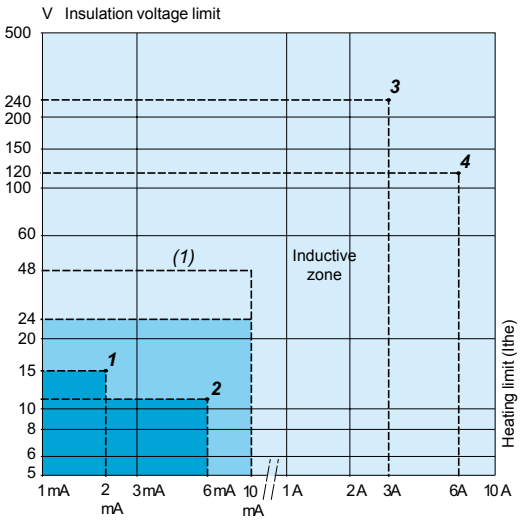
A300	240 V	3 A	B300	240 V	1.5 A
Q300	250 V	0.27 A	R300	250 V	0.13 A

4 *Switching capacity conforming to IEC 60947-5-1, utilisation category AC-15, DC-13*

A300	120 V	6 A	B300	120 V	3 A
Q300	125 V	0.55 A	R300	125 V	0.27 A

Electrical durability for small loads

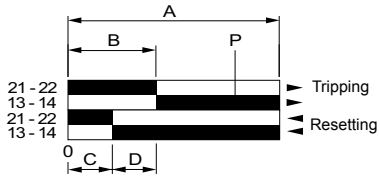
- The use of limit switches with programmable controllers is becoming more common.
- With small loads, limit switches offer the following levels of reliability:
- □ failure rate of less than 1 for 100 million operating cycles using snap action contacts (contacts XE2SP),
- □ failure rate of less than 1 for 20 million operating cycles using slow break contacts (contacts XE●NP and XE3SP).
- □ failure rate of less than 1 for 5 million operating cycles using contacts XCMD.

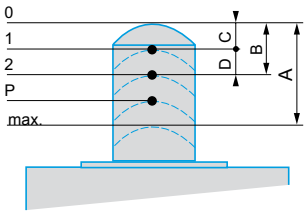


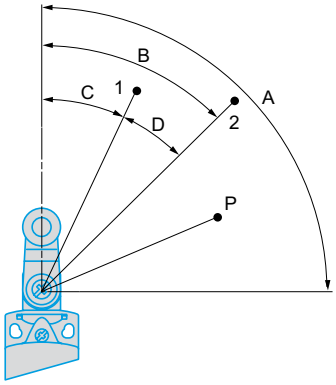
		Range of use		
Standard contacts Continuous service (frequent switching)	XE2SP2151, P3151			
	XE2NP●●●●			
	Contacts of XCMD XE3●P●●●●			
Gold flashed contacts on resistive load	Occasional service Infrequent switching, ≤ 1 operating cycle/ day, and/or corrosive atmosphere			(1)

(1) Usable up to 48 V/10 mA.

Contact blocks (continued)







Functional diagrams of snap action contacts

■ **Example: NC + NO**

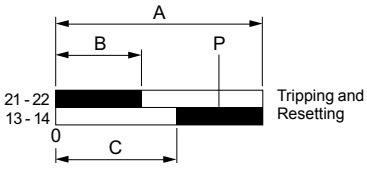
A - Maximum travel of operator in millimetres or degrees.
B - Tripping travel of contact.
C - Resetting travel of contact.
D - Differential travel = B - C.
P - Point from which positive opening is assured.

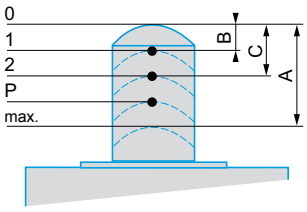
□ Linear movement (plunger)

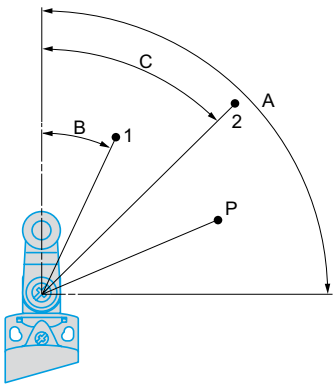
1 - Resetting point of contact.
2 - Tripping point of contact.
A - Maximum travel of operator in millimetres.
B - Tripping travel of contact.
C - Resetting travel of contact.
D - Differential travel = B - C.
P - Point from which positive opening is assured.

□ Rotary movement (lever)

1 - Resetting point of contact.
2 - Tripping point of contact.
A - Maximum travel of operator in degrees.
B - Tripping travel of contact.
C - Resetting travel of contact.
D - Differential travel = B - C.
P - Point from which positive opening is assured.







Functional diagrams of slow break contacts

■ **Example: NC + NO break before make**

A - Maximum travel of operator in millimetres or degrees.
B - Tripping and resetting travel of contact 21-22.
C - Tripping and resetting travel of contact 13-14.
P - Point from which positive opening is assured.

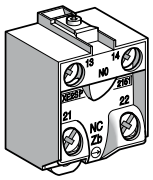
□ Linear movement (plunger)

1 - Tripping and resetting points of contact 21-22.
2 - Tripping and resetting points of contact 13-14.
A - Maximum travel of operator in millimetres.
B - Tripping and resetting travel of contact 21-22.
C - Tripping and resetting travel of contact 13-14.
P - Positive opening point.

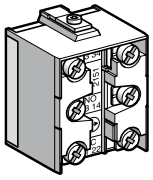
□ Rotary movement (lever)

1 - Tripping and resetting points of contact 21-22.
2 - Tripping and resetting points of contact 13-14.
A - Maximum travel of operator in degrees.
B - Tripping and resetting travel of contact 21-22.
C - Tripping and resetting travel of contact 13-14.
P - Positive opening point.

Contact blocks (continued)



XE2●P screw clamp terminal connections

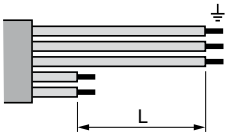


XE3●P screw clamp terminal connections

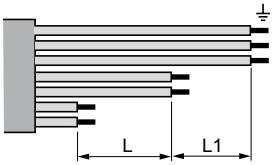
Mounting

Contact connections

- ■ Tightening torque:
  - □ minimum tightening torque ensuring the nominal characteristics of the contact: 0.8 N.m,
  - □ maximum tightening torque without damage to the terminals: 1.2 N.m for **XE2●P**, 1 N.m for **XE3●P**.
- ■ Connecting cable: cable preparation lengths:
  - □ for **XE2●P**, L = 22 mm,
  - □ for **XE2●P3●●●**, L = 45 mm,

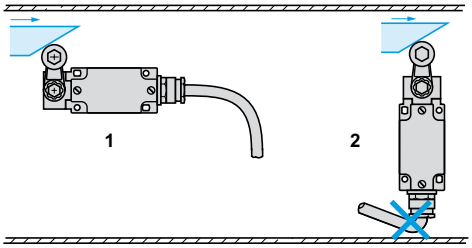


- □ for **XE3●P**, L = 14 mm, L1 = 11 mm.



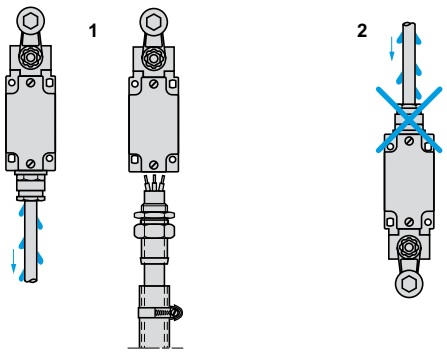
Sweep of connecting cable

1 *Recommended*
2 *To be avoided*



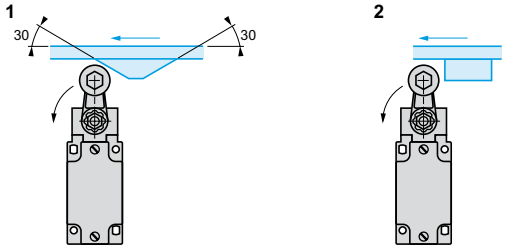
Position of cable gland

1 *Recommended*
2 *To be avoided*



Type of cam

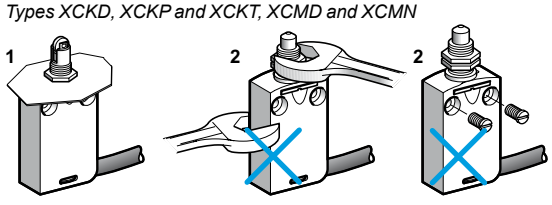
1 *Recommended*
2 *To be avoided*



Mounting and fixing limit switches by the head

1 *Recommended*
2 *Forbidden*

Types XCKD, XCKP and XCKT, XCMD and XCMN



Limit switches
OsiSense XC
General

Setting-up

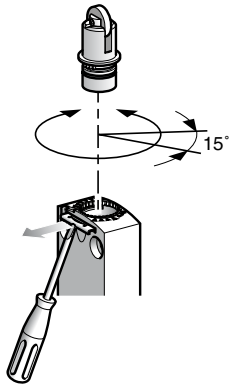
Tightening torque

- The minimum torque is that required to ensure correct operation of the switch.
- The maximum torque is the value which, if exceeded, will damage the switch.

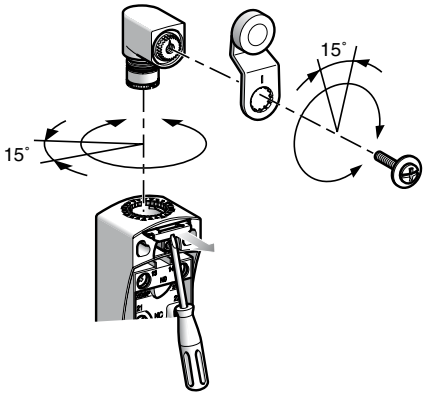
Range	Item	Torque (N.m)	
		Min.	Max.
Compact design XCKD, XCKP, XCKT	Cover	0.8	1.2
	Fixing screw for lever on rotary head	1	1.5
Miniature design XCMD, XCMN	–	–	–
	Fixing screw for lever on rotary head	1	1.5
Compact design XCKN	Cover	0.8	1.2
	Fixing screw for lever on rotary head	1	1.5
Classic design XCKJ	Cover	1	1.5
	Fixing nut for lever on rotary head	1	1.5
Classic design XCKS	Cover	0.8	1.2
	Fixing nut for lever on rotary head	1	1.5
Classic design XCKM, XCKML, XCKL	Cover	0.8	1.2
	Fixing nut for lever on rotary head	1	1.5

Types XCKD, XCKP, XCKT, XCMD

- Adjustable in 3 planes:



All the heads can be adjusted in 15° steps throughout 360°, in relation to the body.

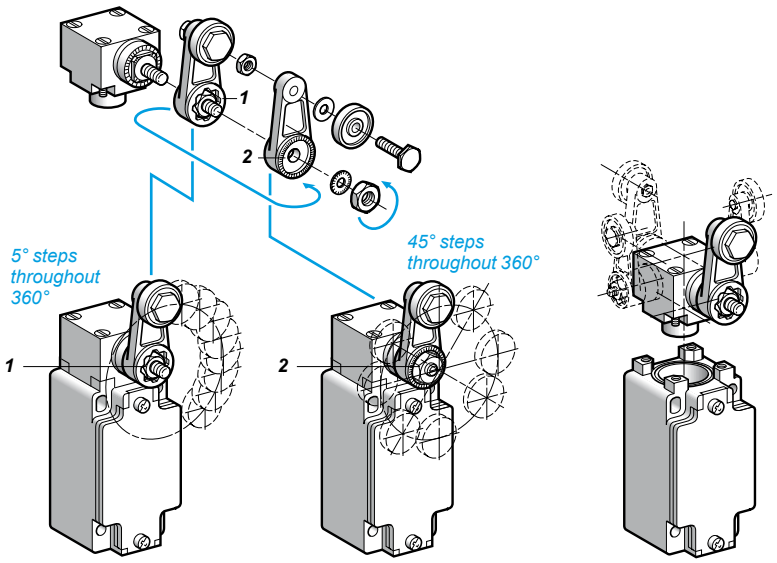


All the levers can be adjusted in 15° steps throughout 360°, in relation to the horizontal axis of the head.

Type XCKJ

- Adjustable throughout 360° in 5° steps, or in 45° steps by reversing the lever or its mounting.

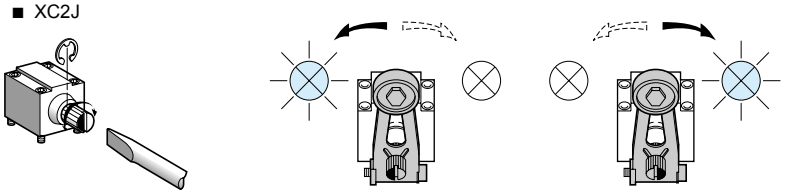
1 *Reversed* α = 5°
2 *Forward* α = 45°



Setting-up (continued)

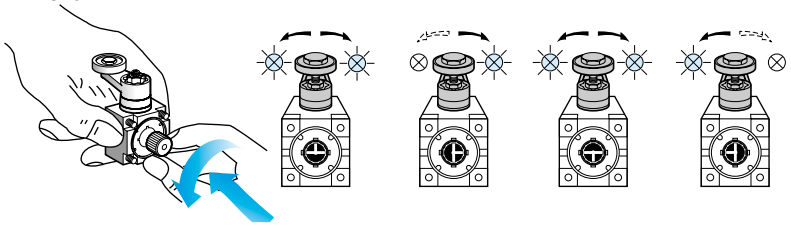
Direction of actuation programming

■ XC2J



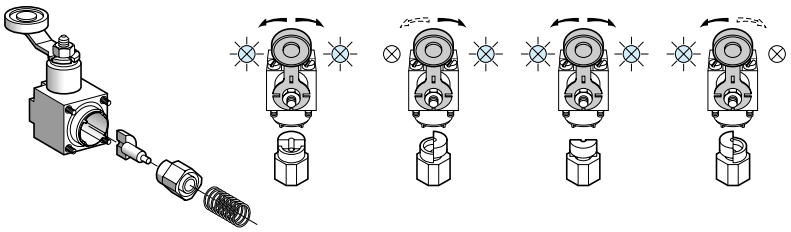
Head ZC2JE05

■ XCKJ



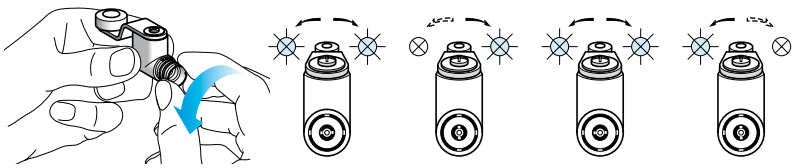
Head ZCKE05

■ XCKS



Head ZCKD05

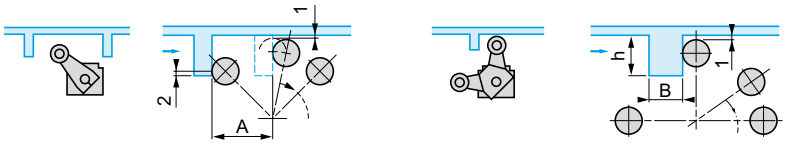
■ XCKD, XCKP, XCKT and XCMD



Head ZCE05

Specific cams for heads ZCKE09 and ZC2JE09

1 *0.5 mm min.*
2 *2 mm min.*



A = length of lever + 11 mm
ZCKE09*: 13 < h < 18 mm and B = 12 mm max.*
ZC2JE09*: 14 < h < 24 mm and B = 6 mm max.*

Reminder of the standards

The majority of Schneider Electric products comply to national standards (for example French NF C standards, German DIN standards), European standards (for example CENELEC) or international standards (for example IEC). These standards rigidly stipulate the characteristic requirements of the designated products (for example IEC 60947 relating to low voltage switchgear and control gear).
These products, when correctly used, enable the production of control equipment assemblies, machine control equipment or installations conforming to their own specific standards (for example IEC 60204 for the electrical equipment of industrial machines).

IEC 60947-5-1

Insulation coordination (and dielectric strength)	■ The standard IEC 60664 defines 4 categories of prospective transient overvoltages. It is important for the user to select control circuit components which are able to withstand these overvoltages. To these ends, the manufacturer states the rated impulse withstand voltage (U imp) applicable to the product.
Terminal connections	■ The cabling capacity, mechanical robustness and durability of the terminals, as well as the ability to resist loosening, are verified by standardised tests. ■ Terminal reference marking conforms to standard IEC 60947-5-1 Appendix M .
Switching capacity	■ With maximum electrical load. A single designation (A300 for example) enables indication of the contact block characteristics related to its utilisation category.
Positive opening operation (IEC 60947-5-1 Appendix K)	■ For contacts used in safety applications (end of travel, emergency stop device, etc.) the assurance of positive opening is required (see IEC 60204, EN 60204) after each test, the opening of the contact being verified by testing with an impulse voltage (2500 V).
Electrical symbols for contacts	 ■ Form Za, the 2 contacts (NO + NC) are the same polarity.  ■ Form Zb, the 2 contacts (NO + NC) are electrically separate.
Symbol for positive opening	 ■ Simplified version  ■ Complete symbol

CENELEC EN 50047

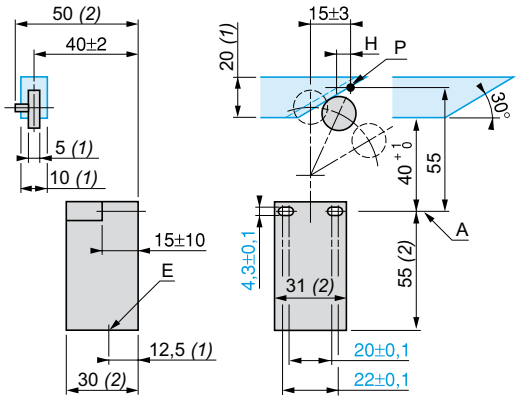
The European standards organisation CENELEC, which has 14 member countries, has defined in this standard the first type of limit switch.

It defines 4 variants of devices (forms A, B, C, E).
Limit switches XCKP, XCKD and XCKT conform to standard EN 50047.

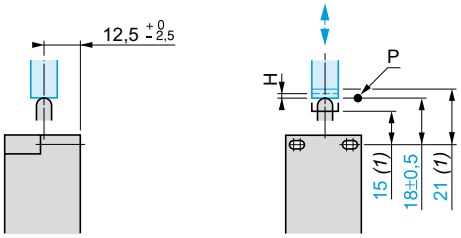
(1) Minimum value
(2) Maximum value

A: reference axis
H: differential travel
P: tripping point
E: cable entry

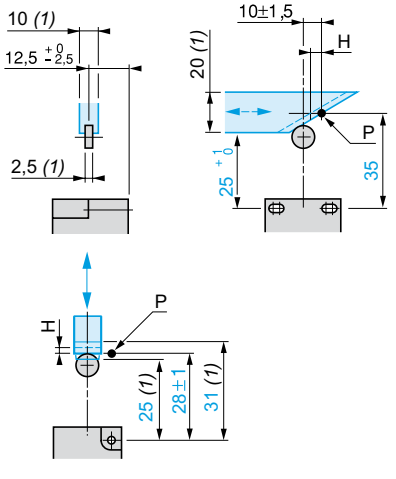
Form A, with roller lever



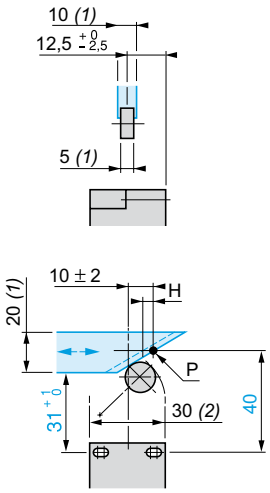
Form B, with end plunger (rounded)



Form C, with end roller plunger



Form E, with roller lever for 1 direction of actuation



Reminder of the standards (continued)

CENELEC EN 50041

The European standards organisation CENELEC, which has 14 member countries, has defined in this standard the second type of limit switch.

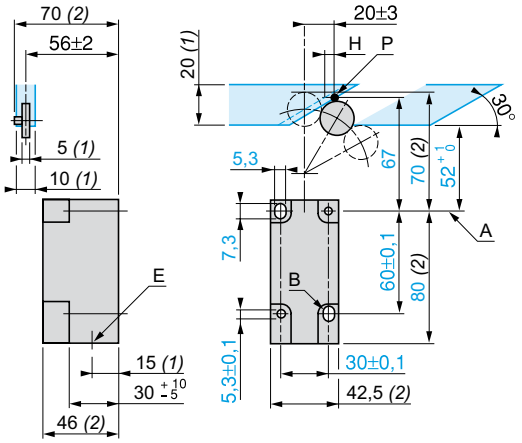
It defines 6 variants of devices (forms A, B, C, D, F, G). Limit switches XCKJ and XCKS conform to standard EN 50041.

(1) Minimum value
(2) Maximum value

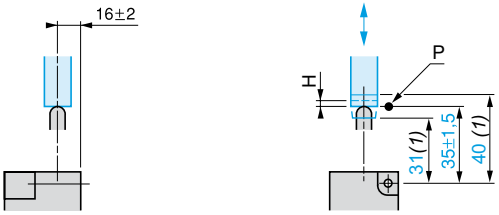
A: reference axis
B: optional elongated holes
H: differential travel
P: tripping point
E: cable entry

Za: tripping zone
Sa: tripping threshold

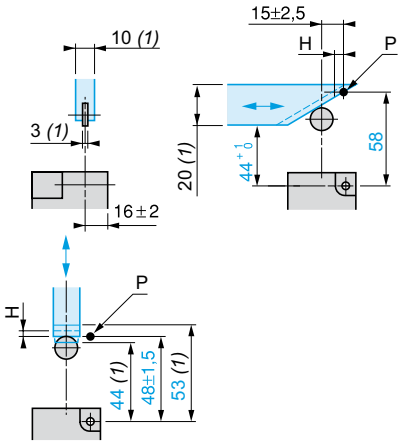
Form A, with roller lever



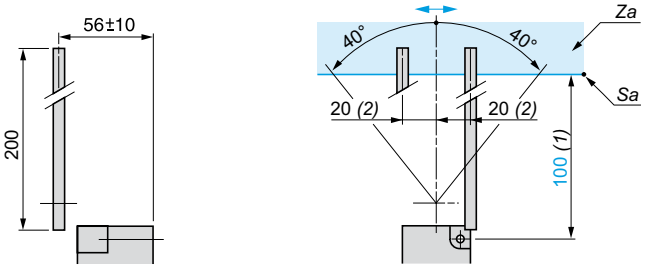
Form B, with end plunger (rounded)



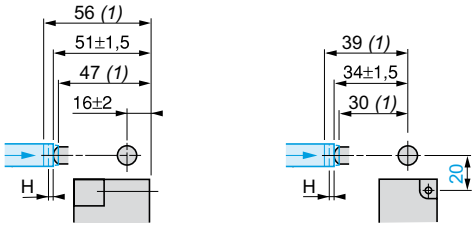
Form C, with end roller plunger



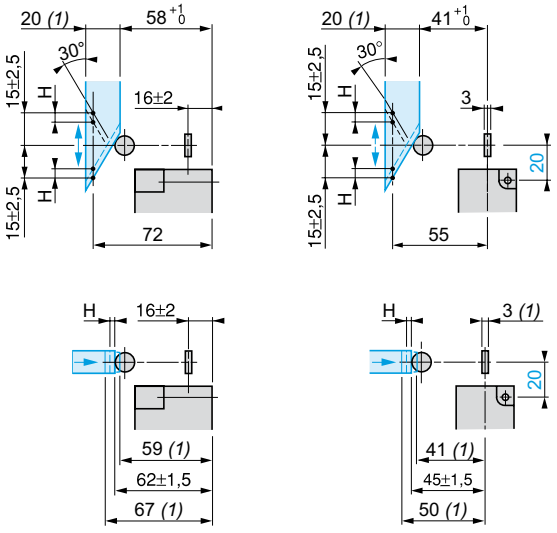
Form D, with rod lever



Form F, with side plunger (rounded)



Form G, with side roller plunger



Depending on the climatic and environmental conditions in which the equipment is placed, Telemecanique Sensors can offer specially adapted products to meet your requirements.

In order to make the correct choice of protective finish, two points should be remembered:
- the prevailing climate of the country is never the only criterion,
- only the atmosphere in the immediate vicinity of the equipment need be considered.

All climates treatment “TC”

This is the standard treatment for Telemecanique Sensors brand equipment and is suitable for the vast majority of applications. It is the equivalent of treatments described as “Klimafest”, “Climateproof”.
In particular, it meets the requirements specified in the following publications:
- Publication UTE C 63-100 (method I), successive cycles of humid heat at:
+ 40 °C and 95 % relative humidity.
- DIN 50016 - Variations of ambient conditions within a climatic chamber:
+ 23 °C and 83 % relative humidity,
+ 40 °C and 92 % relative humidity.

It also meets the requirements of the following marine classification societies: BV-LR-GL-DNV-RINA.

Characteristics

- Steel components are usually treated with zinc. When they have a mechanical function, they may also be painted.
- Insulating materials are selected for their high electrical, dielectric and mechanical characteristics.
- Metal enclosures have a stoved paint finish, applied over a primary phosphate protective coat, or are galvanised (e.g. some prefabricated busbar trunking components).

Limits for use of “TC” (All climates) treatment

- “TC” treatment is suitable for the following temperatures and humidity:

Temperature (°C)	**Relative humidity** (%)
20	95
40	80
50	50

“TC” treatment is therefore suitable for all latitudes and in particular tropical and equatorial regions where the equipment is mounted in normally ventilated industrial premises. Being sheltered from external climatic conditions, temperature variations are small, the risk of condensation is minimised and the risk of dripping water is virtually non-existent.

Extension of use of “TC” (All climates) treatment

In cases where the humidity around the equipment exceeds the conditions described above, or in equatorial regions if the equipment is mounted outdoors, or if it is placed in a very humid location (laundries, sugar refineries, steam rooms, etc.), “TC” treatment can still be used if the following precautions are taken:
- The enclosure in which the equipment is mounted must be protected with a “TH” finish (see next page) and must be well ventilated to avoid condensation and dripping water (e.g. enclosure base plate mounted on spacers).
- Components mounted inside the enclosure must have a “TC” finish.
- If the equipment is to be switched off for long periods, a heater must be provided (0.2 to 0.5 kW per square decimetre of enclosure), that switches on automatically when the equipment is turned off. This heater keeps the inside of the enclosure at a temperature slightly higher than the outside surrounding temperature, thereby avoiding any risk of condensation and dripping water (the heat produced by the equipment itself during normal running is sufficient to provide this temperature difference).
- Special considerations for “Operator dialog” and “Detection” products:
for certain pilot devices, the use of “TC” treatment can be extended to outdoor use provided their enclosure is made of light alloys, zinc alloys or plastic material. In this case, it is also essential to ensure that the degree of protection against penetration of liquids and solid objects is suitable for the applications involved.

"TH" treatment for hot and humid environments

This treatment is suitable for hot and humid atmospheres where installations are regularly subject to condensation, dripping water and the risk of fungi.

In addition, plastic insulating components are resistant to attacks from insects such as termites and cockroaches. These properties have often led to this treatment being described as "Tropical Finish", but this does not mean that all equipment installed in tropical and equatorial regions must systematically have undergone "TH" treatment. On the other hand, certain operating conditions in temperate climates may well require the use of "TH" treated equipment (see limitations for use of "TC" treatment).

Special characteristics of "TH" treatment

■ All insulating components are made of materials which are either resistant to fungi or treated with a fungicide, and which have increased resistance to creepage (Standards IEC 60112, NF C 26-220, DIN 5348).
■ Metal enclosures receive a top-coat of stoved, fungicidal paint, applied over a rust inhibiting undercoat. Components with "TH" treatment may be subject to a surcharge *(1)*. Please consult your Customer Care Centre.

Protective treatment selection guide

Surrounding environment	Duty cycle	Internal heating of enclosure when not in use	Type of climate	Protective treatment of equipment	Protective treatment of enclosure
Indoors					
No dripping water or condensation	Unimportant	Not necessary	Unimportant	"TC"	"TC"
Presence of dripping water or condensation	Frequent switching off for periods of more than 1 day	No	Temperate	"TC"	"TH"
			Equatorial	"TH"	"TH"
		Yes	Unimportant	"TC"	"TH"
	Continuous	Not necessary	Unimportant	"TC"	"TH"
Outdoors (sheltered)					
No dripping water or dew	Unimportant	Not necessary	Temperate	"TC"	"TC"
			Equatorial	"TH"	"TH"
Exposed outdoors or near the sea					
Frequent and regular presence of dripping water or dew	Frequent switching off for periods of more than 1 day	No	Temperate	"TC"	"TH"
			Equatorial	"TH"	"TH"
		Yes	Unimportant	"TC"	"TH"
	Continuous	Not necessary	Unimportant	"TC"	"TH"

These treatments cover, in particular, the applications defined by methods I and II of guide UTE C 63-100.

Special precautions for electronic equipment

Electronic products always meet the requirements of "TC" treatment. A number of them are "TH" treated as standard.

Some electronic products (for example: programmable controllers, flush mountable controllers CCX and flush mountable operator terminals XBT) require the use of an enclosure providing a degree of protection to at least IP 54, as defined by standards IEC 60664 and NF C 20 040, for use in industrial applications or in environmental conditions requiring "TH" treatment.

These electronic products, including flush mountable products, must have a degree of protection to at least IP 20 (provided either by their own enclosure or by their installation method) for restricted access locations where the degree of pollution does not exceed 2 (a test booth not containing machinery or other dust producing activities, for example).

Special treatments

For particularly harsh industrial environments, Telemecanique Sensors is able to offer special protective treatments. Please consult your Customer Care Centre.

(1) A large number of the Telemecanique Sensors brand products are "TH" treated as standard and are, therefore, not subject to a surcharge.

Standardisation

Conformity to standards

Telemecanique Sensors products satisfy, in the majority of cases, national (for example: BS in Great Britain, NF in France, DIN in Germany), European (for example: CENELEC) or international (IEC) standards. These product standards precisely define the performance of the designated products (such as IEC 60947 for low voltage equipment).
When used correctly, as designated by the manufacturer and in accordance with regulations and correct practices, these products will allow users to build equipment, machine systems or installations that conform to their appropriate standards (for example: IEC 60204-1, relating to electrical equipment used on industrial machines).
Telemecanique Sensors is able to provide proof of conformity of its production to the standards it has chosen to comply with, through its quality assurance system.
On request, and depending on the situation, Telemecanique Sensors can provide the following:

- a declaration of conformity,
- a certificate of conformity (ASEFA/LOVAG),
- a homologation certificate or approval, in the countries where this procedure is required or for particular specifications, such as those existing in the merchant navy.

Code	Certification authority		Country
	Name	Abbreviation	
ANSI	American National Standards Institute	ANSI	USA
BS	British Standards Institution	BSI	Great Britain
CEI	Comitato Elettrotecnico Italiano	CEI	Italy
DIN/VDE	Verband Deutscher Electrotechniker	VDE	Germany
EN	Comité Européen de Normalisation Electrotechnique	CENELEC	Europe
GOST	Gosudarstvenne Komitet Standartov	GOST	Russia
IEC	International Electrotechnical Commission	IEC	Worldwide
JIS	Japanese Industrial Standards Committee	JISC	Japan
NBN	Institut Belge de Normalisation	IBN	Belgium
NEN	Nederlands Normalisatie Institut	NNI	Netherlands
NF	Union Technique de l'Electricité	UTE	France
SAA	Standards Association of Australia	SAA	Australia
UNE	Asociacion Española de Normalizacion y Certificacion	AENOR	Spain

European EN standards

These are technical specifications established in conjunction with, and with approval of, the relative bodies within the various CENELEC member countries (European Union, European Free Trade Association and many central and eastern European countries having «member» or «affiliated» status). Prepared in accordance with the principle of consensus, the European standards are the result of a weighted majority vote. Such adopted standards are then integrated into the national collection of standards, and contradictory national standards are withdrawn.
European standards incorporated within the French collection of standards carry the prefix NF EN. At the 'Union Technique de l'Electricité' *(Technical Union of Electricity)* (UTE), the French version of a corresponding European standard carries a dual number: European reference (NF EN …) and classification index (C …).
Therefore, the standard NF EN 60947-4-1 relating to motor contactors and starters, effectively constitutes the French version of the European standard EN 60947-4-1 and carries the UTE classification C 63-110.
This standard is identical to the British standard BS EN 60947-4-1 or the German standard DIN EN 60947-4-1.
Whenever reasonably practical, European standards reflect the international standards (IEC).
With regard to automation system components and distribution equipment, in addition to complying with the requirements of French NF standards, Telemecanique Sensors brand components conform to the standards of all other major industrial countries.

Regulations

European Directives

Opening up of European markets assumes harmonisation of the regulations pertaining to each of the member countries of the European Union.
The purpose of the European Directive is to eliminate obstacles hindering the free circulation of goods within the European Union, and it must be applied in all member countries. Member countries are obliged to transcribe each Directive into their national legislation and to simultaneously withdraw any contradictory regulations. The Directives, in particular those of a technical nature which concern us, only establish the objectives to be achieved, referred to as "essential requirements".
The manufacturer must take all the necessary measures to ensure that his products conform to the requirements of each Directive applicable to his production.
As a general rule, the manufacturer certifies conformity to the essential requirements of the Directive(s) for his product by affixing the CE mark.
The CE mark is affixed to Telemecanique Sensors brand products concerned, in order to comply with French and European regulations.

Significance of the CE mark

- The CE mark affixed to a product signifies that the manufacturer certifies that the product conforms to the relevant European Directive(s) which concern it; this condition must be met to allow free distribution and circulation within the countries of the European Union of any product subject to one or more of the E.U. Directives.
- The CE mark is intended solely for national market control authorities.
- The CE mark must not be confused with a conformity marking.

European Directives (continued)

For electrical equipment, only conformity to standards signifies that the product is suitable for its designated function, and only the guarantee of an established manufacturer can provide a high level of quality assurance.
For Telemecanique Sensors brand products, one or several Directives are likely to be applicable, depending on the product, and in particular:

- the Low Voltage Directive 2006/95/EC: the CE mark relating to this Directive has been compulsory since 16th January 2007.
- the Electromagnetic Compatibility Directive 89/336/EEC, amended by Directives 92/31/EEC and 93/68/EEC: the CE mark on products covered by this Directive has been compulsory since 1st January 1996.

ASEFA-LOVAG certification

The function of ASEFA (Association des Stations d'Essais Française d'Appareils électriques - *Association of French Testing Stations for Low Voltage Industrial Electrical Equipment)* is to carry out tests of conformity to standards and to issue certificates of conformity and test reports.
ASEFA laboratories are authorised by the French authorisation committee (COFRAC).
ASEFA is now a member of the European agreement group LOVAG (Low Voltage Agreement Group). This means that any certificates issued by LOVAG/ASEFA are recognised by all the authorities which are members of the group and carry the same validity as those issued by any of the member authorities.

Quality labels

When components can be used in domestic and similar applications, it is sometimes recommended that a "Quality label" be obtained, which is a form of certification of conformity.

Code	Quality label	Country
CEBEC	Comité Electrotechnique Belge	Belgium
KEMA-KEUR	Keuring van Electrotechnische Materialen	Netherlands
NF	Union Technique de l'Electricité	France
ÖVE	Österreichischer Verband für Electrotechnik	Austria
SEMKO	Svenska Electriska Materiel Kontrollanatalten	Sweden

Product certifications

In some countries, the certification of certain electrical components is a legal requirement. In this case, a certificate of conformity to the standard is issued by the official test authority.
Each certified device must bear the relevant certification symbols when these are mandatory:

Code	Certification authority	Country
CSA	Canadian Standards Association	Canada
UL	Underwriters Laboratories	USA
CCC	China Compulsory Certification	China

Note on certifications issued by the Underwriters Laboratories (UL). There are two levels of approval:

"Recognized" (FU)
The component is fully approved for inclusion in equipment built in a workshop, where the operating limits are known by the equipment manufacturer and where its use within such limits is acceptable by the Underwriters Laboratories.
The component is not approved as a "Product for general use" because its manufacturing characteristics are incomplete or its application possibilities are limited.
A "Recognized" component does not necessarily carry the certification symbol.

"Listed" (UL)
The component conforms to all the requirements of the classification applicable to it and may therefore be used both as a "Product for general use" and as a component in assembled equipment. A "Listed" component must carry the certification symbol.

Marine classification societies

Prior approval (= certification) by certain marine classification societies is generally required for electrical equipment which is intended for use on board merchant vessels.

Code	Classification authority	Country
BV	Bureau Veritas	France
DNV	Det Norske Veritas	Norway
GL	Germanischer Lloyd	Germany
LR	Lloyd's Register	Great Britain
NKK	Nippon Kaiji Kyokaï	Japan
RINA	Registro Italiano Navale	Italy
RRS	Register of Shipping	Russia

Note

For further details on a specific product, please refer to the "Characteristics" pages in this catalogue or consult your Customer Care Centre.

Degrees of protection against the penetration of solid bodies, water and personnel access to live parts

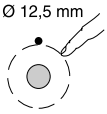
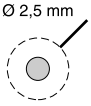
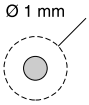
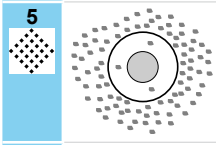
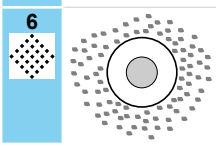
The European standard EN 60529 dated October 1991, IEC publication 529 (2nd edition - November 1989), defines a coding system (IP code) for indicating the degree of protection provided by electrical equipment enclosures against accidental direct contact with live parts and against the ingress of solid foreign objects or water. This standard does not apply to protection against the risk of explosion or conditions such as humidity, corrosive gasses, fungi or vermin.
Certain equipment is designed to be mounted on an enclosure which will contribute towards achieving the required degree of protection (example : control devices mounted on an enclosure).
Different parts of an equipment can have different degrees of protection (example : enclosure with an opening in the base).
Standard NF C 15-100 (May 1991 edition), section 512, table 51 A, provides a cross-reference between the various degrees of protection and the environmental conditions classification, relating to the selection of equipment according to external factors.
Practical guide UTE C 15-103 shows, in the form of tables, the characteristics required for electrical equipment (including minimum degrees of protection), according to the locations in which they are installed.

IP ●●● code

The IP code comprises **2 characteristic numerals** (e.g. **IP 55**) and may include **an additional letter** when the actual protection of personnel against direct contact with live parts is better than that indicated by the first numeral (e.g. IP 20C).
Any characteristic numeral which is unspecified is replaced by an X (e.g. IP XXB).

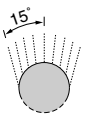
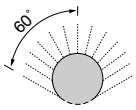
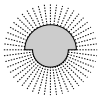
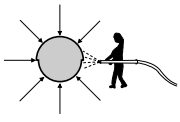
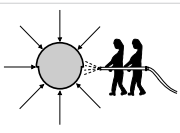
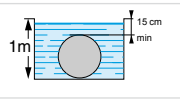
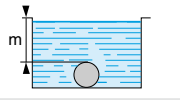
1st characteristic numeral:

corresponds to protection of the equipment against penetration of solid objects and protection of personnel against direct contact with live parts.

	Protection of the equipment		Protection of personnel
0	Non-protected		Non-protected
1	Ø 50 mm 	Protected against the penetration of solid objects having a diameter greater than or equal to 50 mm	Protected against direct contact with the back of the hand (accidental contacts).
2	Ø 12,5 mm 	Protected against the penetration of solid objects having a diameter greater than or equal to 12.5 mm.	Protected against direct finger contact.
3	Ø 2,5 mm 	Protected against the penetration of solid objects having a diameter greater than or equal to 2.5 mm.	Protected against direct contact with a Ø 2.5 mm tool.
4	Ø 1 mm 	Protected against the penetration of solid objects having a diameter greater than or equal to 1 mm.	Protected against direct contact with a Ø 1 mm wire.
5		Dust protected (no harmful deposits).	Protected against direct contact with a Ø 1 mm wire.
6		Dust tight.	Protected against direct contact with a Ø 1 mm wire.

2nd characteristic numeral:

corresponds to protection of the equipment against penetration of water with harmful effects.

0	Non-protected	
1		Protected against vertical dripping water, (condensation).
2		Protected against dripping water at an angle of up to 15°.
3		Protected against rain at an angle of up to 60°.
4		Protected against splashing water in all directions.
5		Protected against water jets in all directions.
6		Protected against powerful jets of water and waves.
7		Protected against the effects of temporary immersion.
8		Protected against the effects of prolonged immersion under specified conditions.

Additional letter:

corresponds to protection of personnel against direct contact with live parts.

A	With the back of the hand.
B	With the finger.
C	With a Ø 2.5 mm tool.
D	With a Ø 1 mm wire.

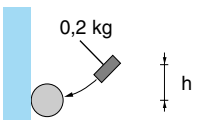
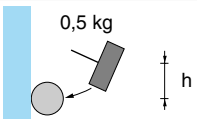
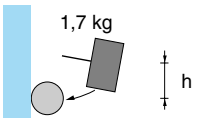
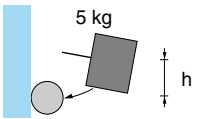
Degrees of protection against mechanical impact

The European standard EN 50102 dated March 1995 defines a coding system (IK code) for indicating the degree of protection provided by electrical equipment enclosures against external mechanical impact.
Standard NF C 15-100 (May 1991 edition), section 512, table 51 A, provides a cross-reference between the various degrees of protection and the environmental conditions classification, relating to the selection of equipment according to external factors.
Practical guide UTE C 15-103 shows, in the form of tables, the characteristics required for electrical equipment (including minimum degrees of protection), according to the locations in which they are installed.

IK ●● code

The IK code comprises **2 characteristic numerals** (e.g. **IK 05**).

2 characteristic numerals:
corresponding to a value of impact energy.

		h (cm)	Energy (J)
00	Non-protected		
01		7.5	0.15
02		10	0.2
03		17.5	0.35
04		25	0.5
05		35	0.7
06		20	1
07		40	2
08		30	5
09		20	10
10		40	20

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Schneider Electric Industries SAS

Head Office
35, rue Joseph Monier
F-92500 Rueil-Malmaison
France

www.tesensors.com

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