AM... / DM... / BM... / CM... Limit Switches

Metal Casing IP66

Description

Applications

Easy to use, electromechanical limit switches offer specific qualities:

- Visible operation.
- Able to switch strong currents (10 A conventional thermal current).
- Electrically separated contacts.
- Precise operating points (consistency).
- Immune to electromagnetic disturbances.

They are purpose-built detection devices thanks to these characteristics:

- Presence/absence.
- Positioning and travel limit.
- Objects passing/counting.

Description

The AM... and DM... series are made of zinc alloy (Zamak). The limit switches BM... and CM... series are realized in aluminium material, therefore they are mechanically more resistant and three times lighter than the ones in zinc alloy. All metal limit switches have a degree protection of IP 66.

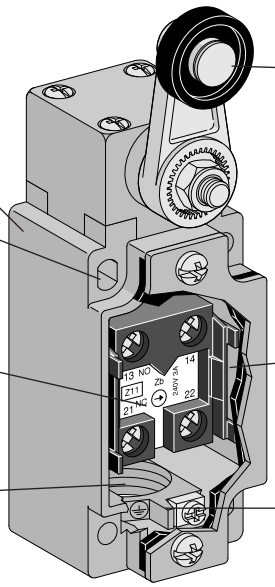
The casing come in 4 dimension: – AM... 30 mm. width – BM... 40 mm. width – DM... 50 mm. width – CM... 60 mm. width

Casing
- 30 mm. width with standardized dimensions acc. to EN 50047
- 40 mm. width with standardized dimensions acc. to EN 50041
- 50 mm. width
- 60 mm. width

Mounting the casing
- 2 x M4 screws on top part for 30 mm. width
- 2 or 4 x M5 screws for 40 mm. width
- 2 or 4 x M4 screws on top part for 50 mm. width
- 2 x M5 screws on top part for 60 mm. width

Contact Block:
- Contact configuration: NO + NC, 2 NO, 2 NC, 2NO + 1NC, 1NO + 2NC, 3NC, 3NO (only for BM and CM series)
- Positive opening operation
- Snap action or slow action
- Contacts are electrically separated

Connecting terminals:
- Block of 2 contacts: M3.5 (+, –) pozidriv 2 screw
- Block of 3 contacts: M3 (+, –) screw
- Screw head with captive cable clamp
- Markings conform with IEC 60947-1, IEC 60947-5-1 standards



A variety of operating heads:
- Plain plunger
- Roller plunger
- Roller lever, adjustable or not, etc.

Assembled using 4 x M3 screws for 30 and 50 mm width.
Assembled using 4 x M4 screws for 40 and 50 mm width.

Cover:
- Closed using 3 x ø 3 screws for 30 mm width.
- Closed using 4 x ø 3 screws for 50 mm width.
- Closed using 2 x ø 4 screws for 40 mm width.
- Closed using 4 x ø 4 screws for 60 mm width.

One piece sealing gasket to ensure tightness.

Electrical connection:
- 1 x cable gland for AM series
- 1 x cable gland for BM series
- 3 x cable gland for CM series
- 3 x cable gland for DM series

Symbols

Example:	B	M	1	E	41	Z	1	1
Structure:		M						

Casing width:
A = 30 mm width + 1 cable inlet
B = 40 mm width + 1 cable inlet
D = 50 mm width + 3 cable inlets
C = 60 mm width + 3 cable inlets

Metal casing

Electrical connection
1: cable inlets for PG13.5 cable gland
2: cable inlets for 1/2 NPT cable gland
3: cable inlets for PG11 cable gland (only for AM and DM series)
4: cable inlets for M16 x 1,5 cable gland (only for AM and DM series)
5: cable inlets for M20 x 1,5 cable gland

Operating heads
T: plastic heads **F:** metal heads . . (AM and DM series)
P: plastic heads **E:** metal heads . . (BM and CM series)

Operating heads: codes 10 - 99

Contact block

11:	1 NO + 1 NC contacts
20:	2 NO contacts
02:	2 NC contacts
12P:	1 NO + 2 NC contacts
21P:	2 NO + 1 NC contacts
03P:	3 NC contacts

Only for BM and CM series:

12:	1 NO + 2NC contacts
21:	2 NO + 1 NC contacts
03:	3 NC contacts
30:	3 NO contacts

Z:	Snap action
W:	Slow action (contact dependent)
X:	Slow action non-overlapping late make
Y:	Slow action overlapping early make

- **Ordering details** . . . . . page 30 to 39, page 45 to 62
- **Standards** . . . . . page 4
- **Terminology** . . . . . page 6

General Technical Data

		Metal Casing
Standards		Devices conform with international IEC 60947-5-1 and European EN 60947-5-1 standards
Certifications - Approvals		UL - CSA - IMQ - EAC
Air temperature near the device		
– during operation	°C	– 25 ... + 70
– for storage	°C	– 30 ... + 80
Climatic withstand		According to IEC 60068-2-3 and salty mist according to IEC 60068-2-11
Mounting positions		All positions are authorised
Shock withstand (according to IEC 60068-2-27 and EN 60068-2-27)		50g* (1/2 sinusoidal shock for 11 ms) no change in contact position
Resistance to vibrations (acc. to IEC 60068-2-6 and EN 60068-2-6)		25g (10 ... 500 Hz) no change in position of contacts greater than 100 µs
Protection against electrical shocks (acc. to IEC 60536)		Class I
Degree of protection (according to IEC 60529 and EN 60529)		IP 66**
Consistency (measured over 1 million operations)		0.05 mm (upon closing point)
Minimum actuation speed	m/s	Slow action contacts 0.060 / Snap action contacts 0.001

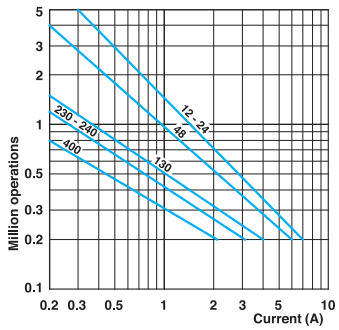
Electrical Data

Rated insulation voltage U_i			500 V (degree of pollution 3) (400 V for contacts type Z02, X12P, X21P, W03P)
- according to IEC 60947-1 and EN 60947-1			A 600, Q 600 (A 300, Q 300 for AM... and DM... series and contacts type X12P, X21P, W03P)
- according to UL 508 and CSA C22-2 n° 14			
Rated impulse withstand voltage U_{imp} (according to IEC 60947-1 and EN 60947-1)		kV	6 (4kV for contacts type X12P, X21P, W03P)
Conventional free air thermal current I_{th} (according to IEC 60947-5-1) θ < 40 °C		A	10
Short-circuit protection U_e < 500 V a.c. - gG (gl) type fuses		A	10
Rated operational current			
I_e / AC-15 (according to IEC 60947-5-1)	24 V - 50/60 Hz	A	10
	120 V - 50/60 Hz	A	6
	400 V - 50/60 Hz	A	4
I_e / DC-13 (according to IEC 60947-5-1)	24 V - d.c.	A	6
	125 V - d.c.	A	0.55
	250 V - d.c.	A	0.4
Switching frequency		Cycles/h	3600
Load factor			0.5
Resistance between contacts		mΩ	25
Connecting terminals			M3.5 (+, –) pozidriv 2 screw with cable clamp (M3 for 3 poles contacts type)
Terminal for protective conductor			M3.5 (+, –) pozidriv 2 screw with cable clamp
Connecting capacity		1 or 2 x mm²	0.75 ... 2.5 (0.34... 1.5 for 3 poles contact type)
Terminal marking			According to IEC 60947-5-1
Mechanical durability		Millions of operations	15 AM•F/T 11; 12; 30...34; 38 — 30 BM•E 11...13; 21...23; 31...33 10 DM•F/T 41...46; 51...55; 61...75 — 25 CM•E 41...44; 51...54; 61...75 >5 14; 35; 36; 39; 91...93; 98 — 10 91...93; 99
Electrical durability (according to IEC 60947-5-1)			Utilization categories AC-15 and DC-13 (Load factor of 0.5 according to curves below)

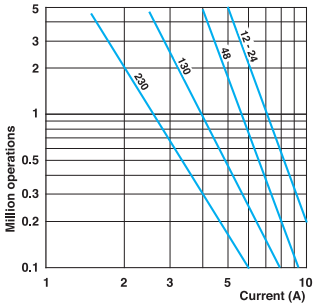
* except for AM/DM•F42, F52, F55: 25 g. - ** except for AM/DM•F52, F55, F73, F74, T92, T93 and BM/CM•E54, P92, P93, E92, E93, P92, P93: the degree of protection is IP65 — IMQ listed values

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

AC-15 - Snap action



AC-15 - Slow action



DC-13		Snap action	Slow action
		Power breaking for a durability of 5 million operating cycles	
Voltage	24 V	9.5 W	12 W
Voltage	48 V	6.8 W	9 W
Voltage	110 V	3.6 W	6 W

• **Ordering details** ..... page 30 to 39, page 45 to 62

AM_F / AM_T Limit Switches

Metal Casing IP66 - 30 mm. width

Electrical Connection

AM1: one cable inlet for PG 13,5 Cable Gland

AM2: one cable inlet for 1/2" NPT Cable Gland

AM3: one cable inlet for PG11 Cable Gland

AM4: one cable inlet for M16 x 1,5 Cable Gland

AM5: one cable inlet for M20 x 1,5 Cable Gland

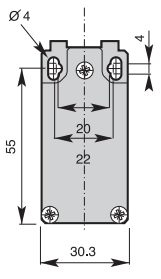
Operating Head Type

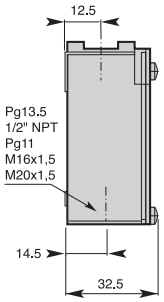
	F11 - Plain Metal plunger	F12 - Metal roller plunger	T14 - Metal plunger with dust protection cup	T21 - Plain plunger with M18x1 fixing nuts T2101 - Plain plunger with M12x1 fixing nuts
Conformity / ⊕ (N.C. contact with positive opening operation)	EN 50047 ⊕	EN 50047 ⊕	EN 50047 ⊕	⊕
Max actuation speed [m/s]	0,5	0,3	0,5	0,5
Min. force [N] or torque [Nm]: actuation / positive opening operation	15 / 30	12 / 30	15 / 30	15 / 30

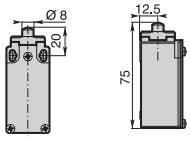
Additional Technical Datas

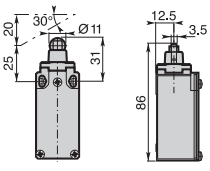
		F11 - Plain Metal plunger	F12 - Metal roller plunger	T14 - Metal plunger with dust protection cup	T21 - Plain plunger with M18x1 fixing nuts T2101 - Plain plunger with M12x1 fixing nuts
Z11 Snap Action Contacts (1NO + 1NC)	Order Code	AM•F11Z11	AM•F12Z11	AM•T14Z11	AM•T21Z11
	Operation Diagram	0 1.3 2.5 4.1 5.6 mm	0 2.5 4.7 7.6 9.6 mm	0 1.3 2.5 4.1 5.6 mm	0 1.3 2.5 4.1 5.6 mm
X11 Non overlapping Slow Action Contacts (1NO + 1NC)	Order Code	AM•F11X11	AM•F12X11	AM•T14X11	AM•T21X11
	Operation Diagram	0 1.6 3.2 5.6 mm 2.5	0 3.2 6.0 9.6 mm 4.6	0 1.6 3.2 5.6 mm 2.5	0 1.6 3.2 5.6 mm 2.5
Y11 Overlapping Slow Action Contacts (1NO + 1NC)	Order Code	AM•F11Y11	AM•F12Y11	AM•T14Y11	AM•T21Y11
	Operation Diagram	0 2.9 4.5 5.6 mm 1.5	0 5.3 8.2 9.6 mm 3.0	0 2.9 4.5 5.6 mm 1.5	0 2.9 4.5 5.6 mm 1.5
W02 Slow Action Contacts (2NC)	Order Code	AM•F11W02	AM•F12W02	AM•T14W02	AM•T21W02
	Operation Diagram	0 1.5 3.1 5.6 mm	0 3.0 5.9 9.6 mm	0 1.5 3.1 5.6 mm	0 1.5 3.1 5.6 mm
W20 Slow Action Contacts (2NO) ⊗	Order Code	AM•F11W20	AM•F12W20	AM•T14W20	AM•T21W20
	Operation Diagram	0 1.4 5.6 mm	0 2.8 9.6 mm	0 1.4 5.6 mm	0 1.4 5.6 mm
Z02 Snap Action Contacts (2NC)	Order Code	AM•F11Z02	AM•F12Z02	AM•T14Z02	AM•T21Z02
	Operation Diagram	0 1.3 2.4 4.0 5.6 mm	0 2.5 4.5 7.4 9.6 mm	0 1.3 2.4 4.0 5.6 mm	0 1.3 2.4 4.0 5.6 mm
X12P Non overlapping Slow Action Contacts (1NO + 2NC)	Order Code	AM•F11X12P	AM•F12X12P	AM•T14X12P	AM•T21X12P
	Operation Diagram	0 1.8 3.4 5.6 mm 3.1	0 3.6 6.4 9.6 mm 5.7	0 1.8 3.4 5.6 mm 3.1	0 1.8 3.4 5.6 mm 3.1
X21P Non overlapping Slow Action Contacts (2NO + 1NC)	Order Code	AM•F11X21P	AM•F12X21P	AM•T14X21P	AM•T21X21P
	Operation Diagram	0 1.8 3.4 5.6 mm 3.1	0 3.6 6.4 9.6 mm 5.7	0 1.8 3.4 5.6 mm 3.1	0 1.8 3.4 5.6 mm 3.1
W03P Slow Action Contacts (3NC)	Order Code	AM•F11W03P	AM•F12W03P	AM•T14W03P	AM•T21W03P
	Operation Diagram	0 1.8 3.4 5.6 mm	0 3.6 6.4 9.6 mm	0 1.8 3.4 5.6 mm	0 1.8 3.4 5.6 mm
Weight (packing per unit)	[kg]	0,180	0,190	0,165	0,175

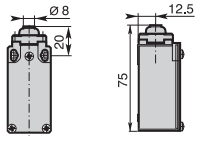
Dimensions (in mm)

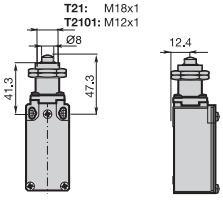












• Travel, operation diagrams and technical data .... pages 7, 11

Utilization precautions ..... pages 14, 15

T3• - Plastic roller lever
T30: on plastic plunger
T31: on metal plunger

EN 50047 ⊕
1,0
7 / 24

T3• - Plastic roller lever
T32: on metal plunger
T34: on plastic plunger

⊕
1,0
7, / 24

T38 - Adjustable plastic roller lever on metal plunger
T39 - Same as above with dust protection cup

EN 50047 ⊕
1,0
7 / 24

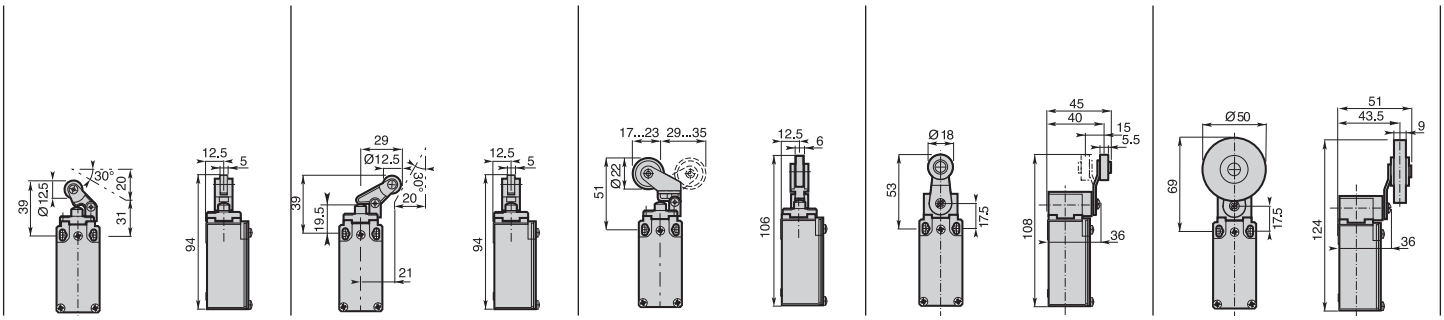
F4• - Ø 18 roller lever
F41: nylon roller
F43: metal roller

EN 50047 ⊕
1,5
0,10 / 0,32

F42 - Ø 50 rubber roller lever

⊕
1,5
0,10 / 0,32

AM•T3•Z11	**AM•T3•Z11**	**AM•T3•Z11**	**AM•F4•Z11**	**AM•F42Z11**
AM•T3•X11	**AM•T3•X11**	**AM•T3•X11**	**AM•F4•X11**	**AM•F42X11**
AM•T3•Y11	**AM•T3•Y11**	**AM•T3•Y11**	**AM•F4•Y11**	**AM•F42Y11**
AM•T3•W02	**AM•T3•W02**	**AM•T3•W02**	**AM•F4•W02**	**AM•F42W02**
AM•T3•W20	**AM•T3•W20**	**AM•T3•W20**	**AM•F4•W20**	**AM•F42W20**
AM•T3•Z02	**AM•T3•Z02**	**AM•T3•Z02**	**AM•F4•Z02**	**AM•F42Z02**
AM•T3•X12P	**AM•T3•X12P**	**AM•T3•X12P**	**AM•F4•X12P**	**AM•F42X12P**
AM•T3•X21P	**AM•T3•X21P**	**AM•T3•X21P**	**AM•F4•X21P**	**AM•F42X21P**
AM•T3•W03P	**AM•T3•W03P**	**AM•T3•W03P**	**AM•F4•W03P**	**AM•F42W03P**
0,170	**0,175**	**0,175**	**0,235**	**0,255**



• Travel, operation diagrams and technical data . . . . pages 7, 11

Utilization precautions . . . . . pages 14, 15

AM_F / AM_T Limit Switches

Metal Casing IP66 - 30 mm. width

Electrical Connection

AM1: one cable inlet for PG 13,5 Cable Gland

AM2: one cable inlet for 1/2" NPT Cable Gland

AM3: one cable inlet for PG11 Cable Gland

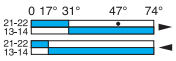
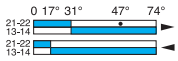
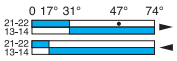
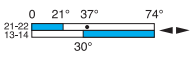
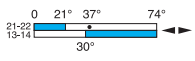
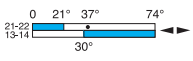
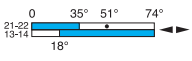
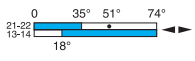
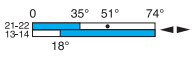
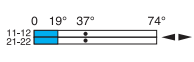
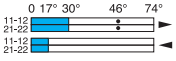
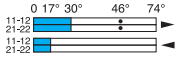
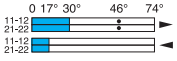
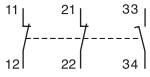
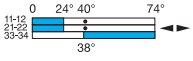
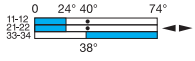
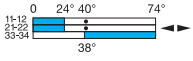
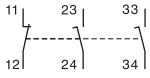
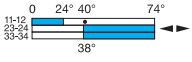
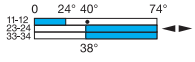
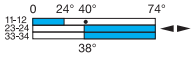
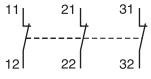
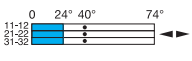
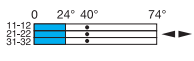
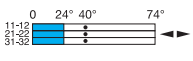
AM4: one cable inlet for M16 x 1,5 Cable Gland

AM5: one cable inlet for M20 x 1,5 Cable Gland

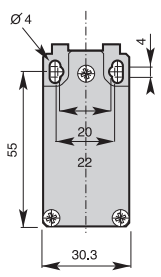
Operating Head Type

	F4• - Ø 18 roller lever F45: nylon roller F46: metal roller	**F5• - Adjustable lever with Ø 18 roller** F51: nylon roller F53: metal roller	**F52 - Adjustable Ø 50 rubber roller lever**
Conformity / ⊖ (N.C. contact with positive opening operation)	⊖	⊖	⊖
Max actuation speed [m/s]	1,5	1,5	1,5
Min. force [N] or torque [Nm]: actuation / positive opening operation	0,10 / 0,32	0,10 / 0,32	0,10 / 0,32

Additional Technical Datas

Z11 Snap Action Contacts (1NO + 1NC)		**Order Code**	**AM•F4•Z11**	**AM•F5•Z11**	**AM•F52Z11**
		Operation Diagram			
X11 Non overlapping Slow Action Contacts (1NO + 1NC)		**Order Code**	**AM•F4•X11**	**AM•F5•X11**	**AM•F52X11**
		Operation Diagram			
Y11 Overlapping Slow Action Contacts (1NO + 1NC)		**Order Code**	**AM•F4•Y11**	**AM•F5•Y11**	**AM•F52Y11**
		Operation Diagram			
W02 Slow Action Contacts (2NC)		**Order Code**	**AM•F4•W02**	**AM•F5•W02**	**AM•F52W02**
		Operation Diagram			
W20 Slow Action Contacts (2NO)		**Order Code**	**AM•F4•W20**	**AM•F5•W20**	**AM•F52W20**
		Operation Diagram			
Z02 Snap Action Contacts (2NC)		**Order Code**	**AM•F4•Z02**	**AM•F5•Z02**	**AM•F52Z02**
		Operation Diagram			
X12P Non overlapping Slow Action Contacts (1NO + 2NC)		**Order Code**	**AM•F4•X12P**	**AM•F5•X12P**	**AM•F52X12P**
		Operation Diagram			
X21P Non overlapping Slow Action Contacts (2NO + 1NC)		**Order Code**	**AM•F4•X21P**	**AM•F5•X21P**	**AM•F52X21P**
		Operation Diagram			
W03P Slow Action Contacts (3NC)		**Order Code**	**AM•F4•W03P**	**AM•F5•W03P**	**AM•F52W03P**
		Operation Diagram			
Weight (packing per unit)	**[kg]**		**0,250**	**0,250**	**0,265**

Dimensions (in mm)



• Travel, operation diagrams and technical data .... pages 7, 11

Utilization precautions ..... pages 14, 15

AM_F / AM_T Limit Switches

Metal Casing IP66 - 30 mm. width

F55 - Adjustable lever with adjustable Ø 50 rubber roller

1,5
0,10 / 0,32

F61 - Nylon actuator with stainless steel spring

1,5
0,10 / –

F7• - Adjustable rod lever
F71: stainless steel rod Ø3
F72: fiberglass rod Ø3
F75: square steel rod 3x3

1,5
0,10 / 0,32

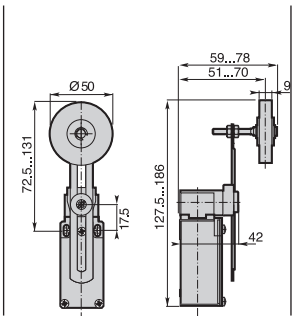
F7• - Adjustable Ø 6 rod lever
F73: nylon rod
F74: fiberglass rod

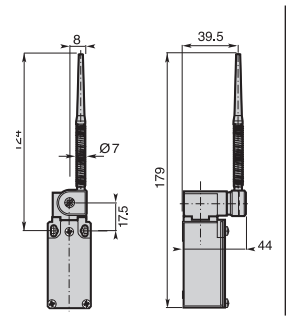
1,5
0,10 / 0,32

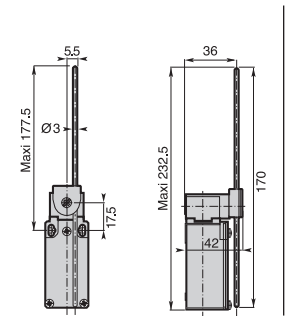
T91: Stainless steel spring multidirectional actuator

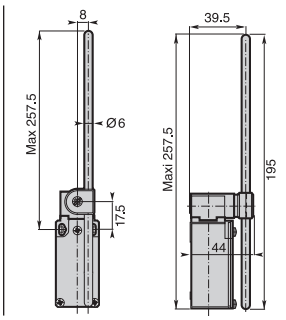
1,0
0,12 / –

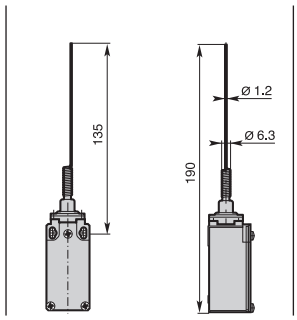
AM•F55Z11	**AM•F61Z11**	**AM•F7•Z11**	**AM•F7•Z11**	**AM•F91Z11**
AM•F55X11	**AM•F61X11**	**AM•F7•X11**	**AM•F7•X11**	**AM•F91X11**
AM•F55Y11	**AM•F61Y11**	**AM•F7•Y11**	**AM•F7•Y11**	**AM•F91Y11**
AM•F55W02	**AM•F61W02**	**AM•F7•W02**	**AM•F7•W02**	**AM•F91W02**
AM•F55W20	**AM•F61W20**	**AM•F7•W20**	**AM•F7•W20**	**AM•F91W20**
AM•F55Z02	**AM•F61Z02**	**AM•F7•Z02**	**AM•F7•Z02**	**AM•F91Z02**
AM•F55X12P	**AM•F61X12P**	**AM•F7•X12P**	**AM•F7•X12P**	**AM•F91X12P**
AM•F55X21P	**AM•F61X21P**	**AM•F7•X21P**	**AM•F7•X21P**	**AM•F91X21P**
AM•F55W03P	**AM•F61W03P**	**AM•F7•W03P**	**AM•F7•W03P**	**AM•F91W03P**
0,265	**0,245**	**0,245**	**0,255**	**0,175**











• Travel, operation diagrams and technical data .... pages 7, 11

Utilization precautions ..... pages 14, 15

AM_F / AM_T Limit Switches

Metal Casing IP66 - 30 mm. width

Electrical Connection

AM1: one cable inlet for PG 13,5 Cable Gland

AM2: one cable inlet for 1/2" NPT Cable Gland

AM3: one cable inlet for PG11 Cable Gland

AM4: one cable inlet for M16 x 1,5 Cable Gland

AM5: one cable inlet for M20 x 1,5 Cable Gland

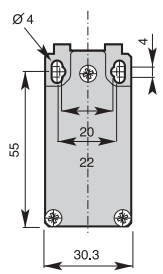
Operating Head Type

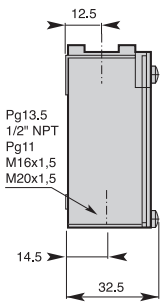
	T92: Multidirectional nylon actuator with stainless steel spring	T93: Stainless steel spring multidirectional actuator	T98: Pull action with ring
Conformity / ⊖ (N.C. contact with positive opening operation)			
Max actuation speed [m/s]	1,0	1,0	0,5
Min. force [N] or torque [Nm]: actuation / positive opening operation	0,12 / –	0,12 / –	30 / –

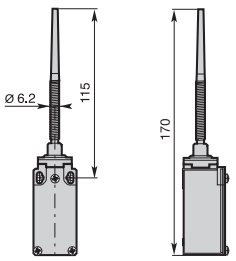
Additional Technical Datas

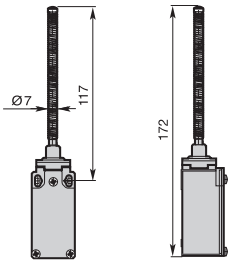
		T92: Multidirectional nylon actuator with stainless steel spring	T93: Stainless steel spring multidirectional actuator	T98: Pull action with ring
Z11 Snap Action Contacts (1NO + 1NC)	Order Code	AM•T92Z11	AM•T93Z11	AM•T98Z11A
	Operation Diagram	0 12° 23°	0 12° 23°	0 0.9 2.0 5.6 mm
X11 Non overlapping Slow Action Contacts (1NO + 1NC)	Order Code	AM•T92X11	AM•T93X11	AM•T98X11A
	Operation Diagram	0 14° 21°	0 14° 21°	0 1.0 5.6 mm 1.9
Y11 Overlapping Slow Action Contacts (1NO + 1NC)	Order Code	AM•T92Y11	AM•T93Y11	AM•T98Y11A
	Operation Diagram	0 25° 12°	0 25° 12°	0 2.0 5.6 mm 0.6
W02 Slow Action Contacts (2NC)	Order Code	AM•T92W02	AM•T93W02	AM•T98W02A
	Operation Diagram	0 14°	0 14°	0 2.0 5.6 mm
W20 Slow Action Contacts (2NO) ⊗	Order Code	AM•T92W20	AM•T93W20	AM•T98W20A
	Operation Diagram	0 13°	0 13°	0 1.8 5.6 mm
Z02 Snap Action Contacts (2NC)	Order Code	AM•T92Z02	AM•T93Z02	
	Operation Diagram	0 12° 22°	0 12° 22°	
X12P Non overlapping Slow Action Contacts (1NO + 2NC)	Order Code	AM•T92X12P	AM•T93X12P	
	Operation Diagram	0 16° 26°	0 16° 26°	
X21P Non overlapping Slow Action Contacts (2NO + 1NC)	Order Code	AM•T92X21P	AM•T93X21P	
	Operation Diagram	0 16° 26°	0 16° 26°	
W03P Slow Action Contacts (3NC)	Order Code	AM•T92W03P	AM•T93W03P	
	Operation Diagram	0 16°	0 16°	
Weight (packing per unit)	**[kg]**	**0,180**	**0,185**	**0,210**

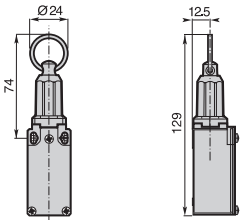
Dimensions (in mm)











• Travel, operation diagrams and technical data .... pages 7, 11

Utilization precautions ..... pages 14, 15