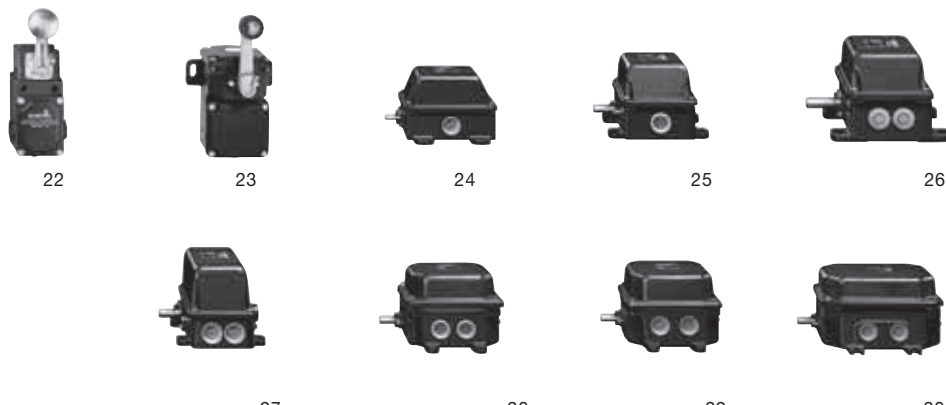


Selection tables: position switches and limit switches

Contact combinations

Enclosures - models						Default contacts		Image	Page
						Ordering suffix			
						Contact NO			
						Contact NC			
						Light limit switches	M 660/6600	1	1-34
							M 6610/6620	2	1-38
							EM 14	3	1-42
							ES 14	3	1-42
							ES13	4	1-52
							E 12	5	1-63
							ES 51	6	1-74
							ES/EM 41/411	7	1-86
							M 330	8	1-100
							ES/EM 61	9	1-107
						Medium heavy limit switches	T/M 015	10	1-114
							T 016	11	1-114
							T/M 017	12	1-114
							U 431	13	1-120
							U 432	14	1-121
							U 433	15	1-121
							U 434	16	1-121
							T 422	17	1-124
							T/M 441	18	1-124
							T 452	19	1-124
						Heavy limit switches	T/M 461	20	1-125
							T 470	21	1-125
							T/M 035	22	1-130
							T/M 250	23	1-131
							TS 064	24	1-132
							MS 064	24	1-133
							T. 064	25	1-135
							M. 064 L	25	1-137
							M. 064 R	25	1-136
							T. 067	26	1-138
						M. 471 R	27	1-141	
						T 130	28	1-142	
						T 136	29	1-144	
						T 240	30	1-143	

M= snap action
T = slow action
¹⁾ = by default 1-pole change-over contact
* = all contact combinations possible
(apart from only NC contact or only NO contact)

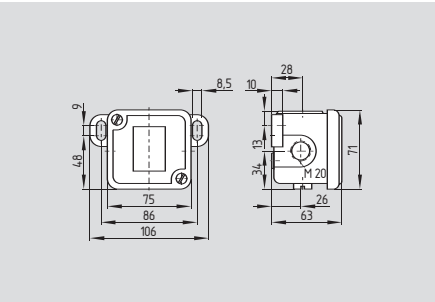
Contact configuration right/left	Image	Page	2 contacts		3 contacts			
Ordering suffix			10/10	01/01	10/11	11/01	10/02	20/01
Contact NO			2		2	1	1	2
Contact C N				2	1	2	2	1
T 250	23	1-131	T	T	T	T	T	T
T. 064	24	1-135						
T. 067	26	1-138	T	T				
T. 471	27	1-139						
M. 471	27	1-140						
T 246	30	1-145						

	1 contact		2 contacts			3 contacts				4 contacts					6 – 10 contacts	
	10	01	11	20	02	21	12	30	03	22	31	13	40	04	33	55
	1		1	2		2	1	3		2	3	1	4		3	5
		1	1		2	1	2		3	2	1	3		4	3	5
			M													
			M													
			M ¹⁾													
			T													
			T													
			M ¹⁾													
			T													
			T/M		T											
			M													
			T/M													
			T/M	T	T											
						T	T	T	T							
										T/M	T	T				
	T	T														
			T	T	T											
						T	T	T	T							
										T	T	T	T	T		
	T	T														
			T/M													
				T	T	T	T									
								T	T	T/M	T	T				
															T*	
			T/M	T	T											
			T/M	T	T	T	T	T	T	T/M	T	T				
						T	T	T	T	T	T	T	T	T		
						M	M	M	M	M	M	M	M	M		
						T	T	T	T							
						M	M	M		M	M		M			
						M	M		M	M		M		M		
			T	T	T											
						M	M			M						
															T*	
								T	T							
																T*

				4 contacts									6 contacts			
10/20	10/20	02/01	01/02	11/11	11/20	11/02	11/11	21/10	30/10	01/03	20/20	02/02	21/21	12/12	30/30	03/03
3	3			2	3	1	2	3	4		4		4	2	6	
		3	3	2	1	3	2	1		4		4	2	4		6
				T	T	T	T	T	T	T						
T	T	T	T													
											T	T	T	T	T	T
											M	M	M	M		M
															T	T

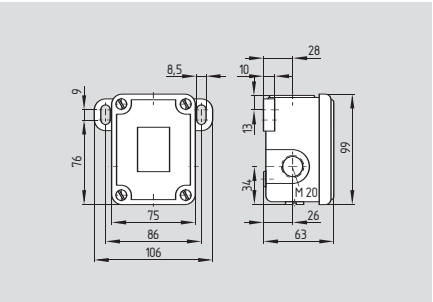
Position and limit switches

T 422



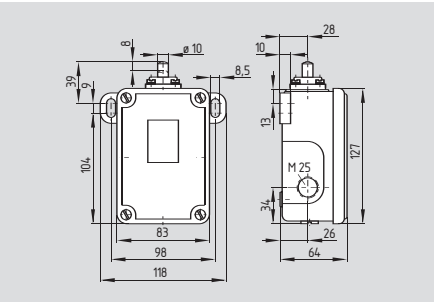
- Metal enclosure
- 1 contact, slow action ⊖
- 2 cable entries
- Protection class IP 65

T/M 441



- Metal enclosure
- 2 contact, slow action ⊖
- Slow action available with overlapping contacts
- Snap action, change-over contact with double break
- 2 cable entries
- Protection class IP 65

T 452



- Metal enclosure
- 2 or 3 contact, slow action ⊖
- Slow action available with overlapping or staggered contacts
- 2 cable entries
- Protection class IP 65

The switch travel of the contacts complies with the T/M 441 or T 422 series (see page 1-126).

Approvals



Ordering details

T① 422-②y-③

No. Replace	Description
①	For the appropriate actuator: see page 1-126 and following
②	01 1 NC
	10 1 NO
③	k Tropical version with ceramic insulation
	t Tropical and temperature- resistant version – 40 °C ... + 200 °C
	1276-2 Gold-plated contacts

Approvals



Ordering details

①② 441-11y③-④-⑤

No. Replace	Description
①	T Slow action ⊖
	M Snap action
②	For the appropriate actuator: see page 1-126 and following
③	ü Slow action with overlapping contacts
④	a Cast iron enclosure
	Aluminium enclosure
⑤	k Tropical version with ceramic insulation
	t Tropical and temperature- resistant version – 40 °C ... + 200 °C
	1276-2 Gold-plated contacts

Approvals



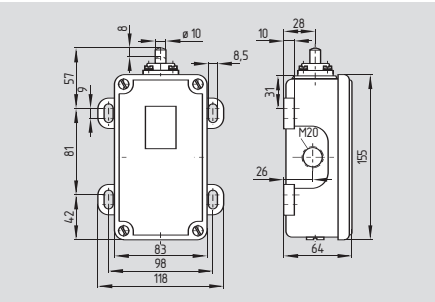
Ordering details

T① 452-②y-③

No. Replace	Description
①	For the appropriate actuator: see page 1-126 and following
②	02 2 NC
	12 1 NO/2 NC
	20 2 NO
	21 2 NO/1 NC
③	k Tropical version with ceramic insulation
	t Tropical and temperature- resistant version – 40 °C ... + 200 °C
	1276-2 Gold-plated contacts

Position and limit switches

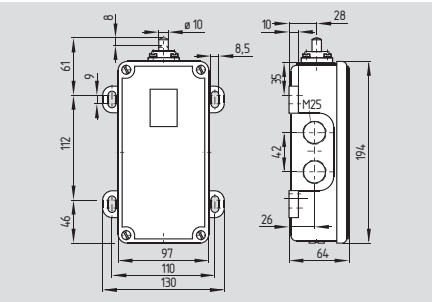
T/M 461



- Metal enclosure
- 3 or 4 contact, slow action $\ominus$
- Slow action available with overlapping or staggered contacts
- Snap action, change-over contact with double break
- 2 cable entries
- Protection class IP 65

The switch travel of the contacts complies with the T/M 441 or T 422 series (see page 1-126).

T 470



- Metal enclosure
- 6 contact, slow action $\ominus$
- Slow action available with overlapping or staggered contacts
- 4 cable entries
- Protection class IP 65

The switch travel of the contacts complies with the T/M 441 or T 422 series (see page 1-126).

Technical data

Standards:	IEC/EN 60947-5-1
Enclosure:	cast iron, galvanised, paint finish
Protection class:	IP 65 to EN 60529
Contact material:	silver
Switching system:	slow or snap action, double break
Contact type:	slow action: change-over contact up to 250 V, with galvanically separated contact bridges snap action: positive break NC contacts $\ominus$
Termination:	screw terminals M 4
Cable section:	max. 2.5 mm ² (incl. conductor ferrules)
U _{imp} :	slow action: 4 kV
U _i :	slow action: 6 kV
I _{the} :	snap action: 250 V
I _e /U _e :	slow action: 400 V
Utilisation category:	suffix -k or -t: 500 V 16 A
Max. fuse rating:	snap action: 4 A / 230 V
Contact opening:	slow action: 4 A / 400 V
Switchover time:	AC-15
Bounce duration:	16 A gG D-fuse
Ambient temperature:	snap action: max. 2 x 2.5 mm
Mechanical life:	slow action: max. 2 x 6,0 mm
Contact life:	snap action: 35 ms
Switching frequency:	slow action: 5 ms
Actuating speed:	– 30 °C ... + 90 °C
	snap action: 5 million operations
	slow action: 10 million operations
	at 1 A / 400 V, cos φ = 0,4
	max. 3000/h
	max. 1 m/s, min. 1 mm/s on plunger

Approvals



Ordering details

①② 461-③y- ④

No. Replace	Description
①	T Slow action $\ominus$
	M Snap action (only for -22y)
②	For the appropriate actuator: see page 1-126 and following
③	03 3 NC
	13 1 NO/3 NC
	22 2 NO/2 NC
	30 3 NO
	31 3 NO/1 NC
④	k Tropical version with ceramic insulation
	t Tropical and temperature-resistant version – 40 °C ... + 200 °C
	1276-2 Gold-plated contacts

Approvals



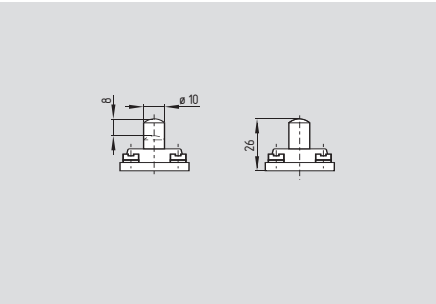
Ordering details

T① 470-②y-③

No. Replace	Description
①	For the appropriate actuator: see page 1-126 and following
②	33 3 NO/3 NC (every other contact combination is possible, except 6 NO contacts or 6 NC contacts)
③	k Tropical version with ceramic insulation
	t Tropical and temperature-resistant version – 40 °C ... + 200 °C
	1276-2 Gold-plated contacts

Position and limit switches

Plunger S



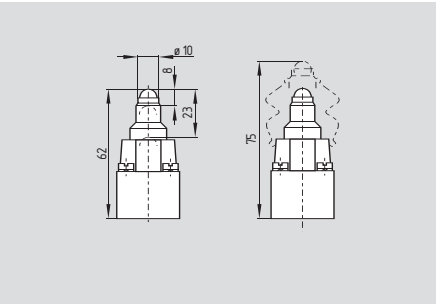
- Actuating speed 1 m/s with an actuating angle of max. 20°

Actuation from the side of the plunger should be avoided, since this reduces the mechanical life of the position switch.

Contact variants

Contacts/ Switch travel	Snap action	Slow action
1 NO / 1 NC	MS 441-11y 	TS 441-11y
1 NC		TS 422-01y
1 NO		TS 422-10y

Telescopic plunger 2S



- Actuating speed 1 m/s with an actuating angle of max. 20°
- Large after travel
- Actuator head with captive metal ball actuator
- Available with bellows to protect against heavy soiling, ordering suffix -q

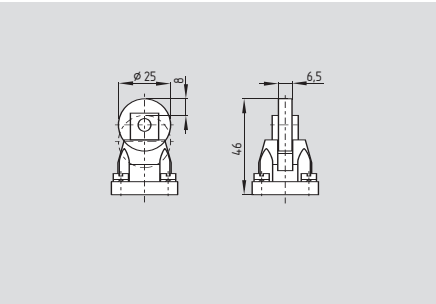
Actuation from the side of the plunger should be avoided, since this appreciably reduces the mechanical life of the position switch.

Contact variants

Contacts/ Switch travel	Snap action	Slow action
1 NO / 1 NC	M2S 441-11y 	T2S 441-11y
1 NC		T2S 422-01y
1 NO		T2S 422-10y

Position and limit switches

Roller plunger R



- Actuating speed 0.5 m/s with an actuating angle of α and $\beta = 30^\circ$
- Plastic roller
- Actuator can be repositioned by 90°
- Metal roller available on request

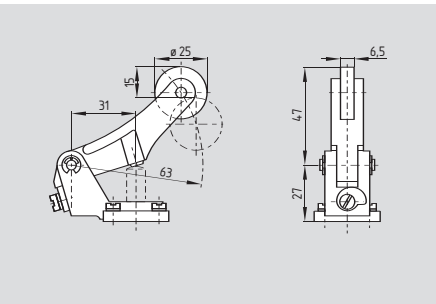
Legend

α : Actuating angle from right of switch axis
 β : Actuating angle from left of switch axis

Contact variants

Contacts/ Switch travel	Snap action	Slow action
1 NO / 1 NC	MR 441-11y 	TR 441-11y
1 NC		TR 422-01y
1 NO		TR 422-10y

Offset roller lever K



- Actuating speed max. 0.5 m/s with an actuating angle of $\alpha = 30^\circ$ and $\beta = 45^\circ$
- Plastic roller
- Actuator head can be repositioned in steps $4 \times 90^\circ$
- Metal roller available on request

Legend

α : Actuating angle from right of switch axis
 β : Actuating angle from left of switch axis

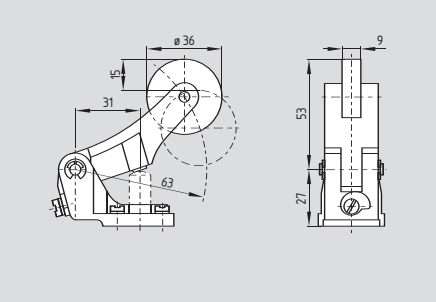
Actuation from the right should be avoided, since this reduces the mechanical life of the position switch.

Contact variants

Contacts/ Switch travel	Snap action	Slow action
1 NO / 1 NC	MK 441-11y 	TK 441-11y
1 NC		TK 422-01y
1 NO		TK 422-10y

Position and limit switches

Offset roller lever J



- Actuating speed max. 0.5 m/s with an actuating angle of $\alpha = 30^\circ$ and $\beta = 45^\circ$
- Plastic roller
- Actuator head can be repositioned in steps $4 \times 90^\circ$
- Metal roller available on request

Legend

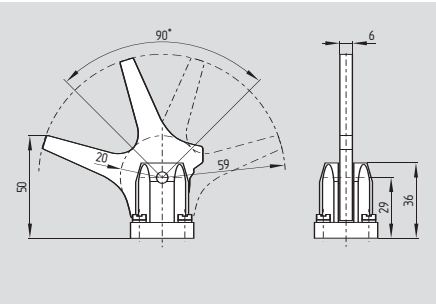
α : Actuating angle from right of switch axis
 β : Actuating angle from left of switch axis

Actuation from the right should be avoided, since this reduces the mechanical life of the position switch.

Contact variants

Contacts/ Switch travel	Snap action	Slow action
1 NO / 1 NC	MJ 441-11y 	TJ 441-11y
1 NC		TJ 422-01y
1 NO		TJ 422-10y

Fork lever 2C



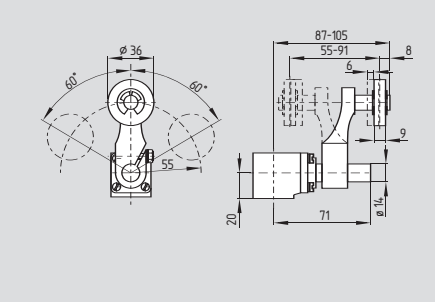
- With latching end position
- Actuating speed max. 0.5 m/s
- Actuator head can be repositioned in steps $4 \times 90^\circ$
- Change in actuating direction by repositioning actuator head
- Case-hardened lever

Contact variants

Contacts/ Switch travel	Snap action	Slow action
1 NO / 1 NC	M2C 441-11y 	T2C 441-11y
1 NC		T2C 422-01y
1 NO		T2C 422-10y

Position and limit switches

Roller lever L



- Actuating speed max. 3 m/s with an actuating angle of α and $\beta = 30^\circ$
- Plastic roller
- In temperature-resistant version, the roller can be mounted in two different positions on the shaft
- Continuous adjustment of lever position 360°
- Lever can be transposed by 180°
- Actuator head can be repositioned in steps $4 \times 90^\circ$
- Metal roller available on request
- Splined shaft and lever available, ordering suffix -1801

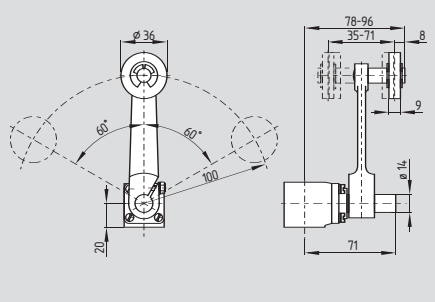
Legend

α : Actuating angle from right of switch axis
 β : Actuating angle from left of switch axis

Contact variants

Contacts/ Switch travel	Snap action	Slow action
1 NO / 1 NC	ML 441-11y	TL 441-11y
1 NC		TL 422-01y
1 NO		TL 422-10y

Roller lever D



- Actuating speed max. 3 m/s with an actuating angle of α and $\beta = 30^\circ$
- Plastic roller
- In temperature-resistant version, the roller can be mounted in two different positions on the shaft
- Continuous adjustment of lever position 360°
- Lever can be transposed by 180°
- Actuator head can be repositioned in steps $4 \times 90^\circ$
- Metal roller available on request
- Splined shaft and lever available, ordering suffix -1801

Legend

α : Actuating angle from right of switch axis
 β : Actuating angle from left of switch axis

Contact variants

Contacts/ Switch travel	Snap action	Slow action
1 NO / 1 NC	MD 441-11y	TD 441-11y
1 NC		TD 422-01y
1 NO		TD 422-10y