

COCKPIT CONTROLS WHEELS & GRIPS

Selection Guide



ABOUT CROUZET

100+ YEARS MANUFACTURING THE FUTURE *Together*

We design and manufacture **Mechatronic Products** to turn engineering ideas into real world applications

OUR MARKETS



OUR PRODUCTS



OUR SERVICES

MRO

SPARES

INSTRUMENTATION

WE ARE GLOBAL

2000+ collaborators,
10 Manufacturing Plants,
9 Sales Offices & 4 R&D Labs

📍 HEADQUARTERS ■ SALES OFFICES



PROGRAMS

OUR REPUTATION IS RECOGNIZED GLOBALLY BY THE MAJOR PLAYERS IN THE AEROSPACE MARKET. A NON-EXHAUSTIVE LIST OF CUSTOMERS INCLUDES:



AIRBUS, AIRBUS HELICOPTERS, ANTONOV, BELL, BOEING, BOMBARDIER, DASSAULT, EMBRAER, GULFSTREAM, HAL, IAI, IRKUT, LEONARDO, LIEBHERR, MIL HELICOPTER, NH INDUSTRIE, NORDAM, PILATUS, SAFRAN LANDING SYSTEMS, SAFRAN NACELLES, SOCATA, SUKHOI, UTAS, WOODWARD...



QUALITY OF SERVICE THROUGHOUT THE LIFE OF THE PROGRAM

- › We have the internal expertise to ensure manufacturing engineering goes smoothly
- › We use up-to-date logistic tools such as IDE to provide quality service
- › Our quality is of the highest level: ISO 9001, ISO 14001, OHSAS 18001, AS/JIS Q/ EN 9100, NADCAP Welding, FAA approved (FAR 21 & FAR 145)
- › Our production organisation is EASA part 21 approved
- › Our after-market services, EASA part 145 approved, include a specific customer support department, distributors all around the world, and an AOG service
- › NATO code: FA0X2

SOLUTIONS FOR DESIGN, INNOVATION AND INDUSTRIALISATION

PROJECT TEAM



Crouzet's factories in Valence, France

Crouzet puts in place a project team that provides you with a partnership of experts throughout all your program phases: drawing up the specification, feasibility, development, performance testing, control of pre-production, optimisation of logistical parameters, long-term support for the design and product tracking.

1. PROJECT START-UP

After first contact, Crouzet business engineers will work with you to identify your goals and constraints in order to draw up a product performance specification and to take in account the key factors of success for your projects



2. DESIGN OFFICE

With more than 50 years of experience, Crouzet has mastered the necessary technologies for developing and industrialising complete sensor offer as well as to customise products:

- › Mechanical (CAD-3D)
- › Magnetic
- › Electromechanical
- › Electronic (EMC, EMI)



3. INNOVATION

Based on their experience in a wide range of sectors, Crouzet's design offices share common objectives:

- › Taking an innovative approach to market standards and the best technologies
- › Combining a number of technologies to create innovative concepts

4. TEST LABORATORY

Crouzet laboratories are equipped with facilities for testing all our products from design to production. Either with simulation or real-life tests (electrical, mechanical life and environmental withstand). Crouzet products are validated, tested and tracked throughout the project development process



5. PRODUCTION

Aerospace products require highly-tailored solutions for demanding applications. Our state-of-the-art production facilities certified to the highest quality standards, ensure that Crouzet products meet the level of performance that is needed in this critical environment

6. LOGISTICS

In order to meet the demands of the aerospace industry, Crouzet logistics are based on industry approved practices:

- › Just-in-time processes
- › Partnerships with our suppliers
- › Capacity to deliver within 24 hours

The Crouzet delivery platform also optimizes logistics through output and guarantees your lead times



GRIPS

WORLD LEADER



Our man machine interfaces for both Commercial and Military aerospace markets have been designed, manufactured & delivered for more than four decades. Crouzet wide range of grip designs enables us to provide quick and accurate responses to any customer's needs or requirements.

For over 50 years, Crouzet has been providing technically-advanced custom grips for major programs worldwide with best in class quality and logistical excellence. The performance speaks for itself and has resulted in both a solid commercial relationship and a mutual understanding with our global customer base.

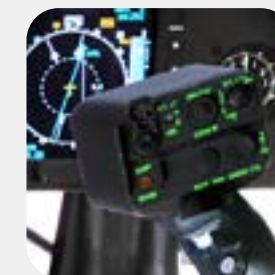


STRENGTHS

- › Crouzet defined the modular concept for helicopter grips. This heritage enables Crouzet to meet 100% of a customer's needs relative to ergonomics. Modifications to pushbutton configurations can be performed quickly thanks to our exclusively-incorporated removable front face, with optional backlighting.
- › This unique design approach not only gives Crouzet customers increased flexibility, but it greatly reduces the customisation lead-time. Production can continue and minor changes are easily accommodated at final assembly.
- › Customisation



Front face by day



Front face by night

Example: illuminated front panel



- 1- HAL collective
- 2- Leonardo Helicopters
- 3- HAL cyclic
- 4- Airbus Helicopters

CONTROL WHEELS

WORLD EXPERT

For over 50 years, Crouzet has been providing technically-advanced custom yokes for major programs worldwide with best in class quality and logistical excellence.

The performance speaks for itself and has resulted in both a solid commercial relationship and a mutual understanding of critical customer needs.

BECAUSE THE FIRST FEELING OF THE COCKPIT IS THE CONTROL WHEEL

The quality of the man machine interface in an Aircraft cockpit is a major concern to the Aircraft designer and the operator alike. The comfort and aesthetics of Crouzet handwheels are of great importance to Crouzet.



1- Socata
2- Antonov
3- Embraer
4- Gulfstream
5- Bombardier



STRENGTHS

- › Crouzet's significant experience has been developed over many decades. We pride ourselves in being able to assist Aircraft manufacturer in specification finalization, thus avoiding costly mistakes.
- › Crouzet world class, highly experienced Management, Engineering and Quality teams stand ready to offer their competence and are available to support your program needs immediately.
- › The success of your program can be accomplished with Crouzet fully integrated test facilities.
- › Crouzet's design approach is fully tested and certified: both the wheels and components are already flying in aircraft worldwide.
- › Yokes and components are low cost leaders in terms of maintenance and operational expenses.
- › Crouzet has a worldwide spare part distribution network capable of supporting the Aircraft manufacturer and their customers.

PUSHBUTTONS & ACCESSORIES

MORE THAN 200 ELECTRICAL COMBINATIONS

By manufacturing its own switches, Crouzet offers its customers all the benefits of vertical integration: cost control, short lead times, and proven dependable quality.

The available range of pushbuttons and accessories makes it possible to provide

STRENGTHS

- › Tactile effect
- › Simple integration
- › Calculator designed
- › Variety of shapes
- › Wide range of colours
- › Customized design



CUSTOMIZED DESIGN

- › Choose from over 200 references, or let us help you design your custom component.

QuickFix®

Innovative pushbutton fastening solution



Extensive research at Crouzet has resulted in industrialized and manufactured control grips, pushbuttons (one pole, two pole, 2, 3, 4 and 5 ways trim, trigger, joysticks, transducer) and many other accessories.

Additionally, Crouzet is able to design dedicated functions for any customer application.



PANORAMIC RANGE

PUSHBUTTONS	1 pole		2 pole	3 pole	4 pole
	Ø12	Ø14	Ø14		
					
Waterproof front face	Y/N		Y/N	N	N
Function	NO, NC or NO/NC		2 x NO/NC	3 x NO/NC	4 x NO/NC
Button	Ø4, Ø5, Ø7, Ø9.4 short or round or rectangular		Ø5, Ø9.4 or rectangular	Ø9	Ø8
Color	Black/Red/Grey/White/Blue		Black/Red/Grey/White/Blue	Black	Red
Terminal	Silver or Gold		Silver or Gold	Gold	Gold
Accessories	Monostable flap Bistable flap Bistable flap with auxiliary contact Electroluminescent ring		Monostable flap Bistable flap Bistable flap with auxiliary contact Electroluminescent ring	Monostable flap Bistable flap Bistable flap with auxiliary contact	Monostable flap Bistable flap Bistable flap with auxiliary contact

MULTIWAY	2-way		2-way + validation	4-way	4-way double pole	4-way + validation
	Ø16	Ø18	Ø24	Ø16	Ø24	Ø24
						
Waterproof front face	Y/N	N	Y	Y/N	Y	Y
Function	NO	NO	NO	NO	NO	NO, NO/NC
Button	Rectangular, Concave, Convex	Convex	Cone, Concave, Convex, Castle	Concave, Cone, Convex, Long bat, Medium bat, short bat	Cone	Cone, Concave, Chinese, Castle
Color	Black	Black	Black	Black	Black/Grey	Black
Terminal	Silver or Gold	Silver or Gold	Silver or Gold	Silver, Gold or Tined	Silver	Silver or Gold

TRIGGER	1 position	2 positions
		
Waterproof front face	Y/N	Y/N
Function	NO, NC or NO/NC	2 x NO/NC or 4 x NO/NC
Color	Red/Black/Grey	Red/Black/Grey
Terminal	Silver or Gold	Silver or Gold

TRIM SWITCH	2-way		2-way + validation	4-way + validation
	Ø24	Customized	Ø24	Ø24
				
Waterproof front face	N		N	N
Function	2 x NO/NC + 2 x NO/NC		2 x NO + NO	4 x NO + NO
Button	Chinese	Pyramidal	Round	Round
Color	Black		Black	Black
Terminal	Gold		Silver	Silver

ROCKER	3 positions	3 positions	5 positions
			
Waterproof front face	N	N	N
Function	1x NO/NC + 1x NO/NC	2x NO/NC + 2x NO/NC	1x NO/NC + 1x NO/NC + 1x NO/NC + 1x NO/NC
Button	Rectangular	Gendarme	Rectangular
Color	Black	Black	Black
Terminal	Silver	Silver	Silver

TOGGLE (CONSULT US)	2 positions		3 positions	
	Ø6	Ø12	Ø6	Ø12
				
Waterproof front face	N	N	N	N
Function	1x NO + 1x NC	2 x NO + 2 x NC	2 x NO + 2 x NC	2 x NO + 2 x NC
Color	Black/Chrome	Black/Chrome	Chrome	Black/Chrome
Terminal	Silver	Gold	Silver	Silver or Gold
Accessories	Grey cap			

BUTTON PROTECTION			
Circular	Metallic flap guard	Plastic flap guard	Plastic flap guard with auxiliary contacts
			



PUSHBUTTONS

1 POLE

			Color	Electrical configuration					QuickFix® 
Ø 12	1 pole Double-throw	No seal	black	NO	◆	83450701	83450712	83450738	◆
				NO/NC	83450714	83450702	83450717 83450718 83450720 83450728	◆	◆
			red	NO	◆	83450704	◆	◆	◆
				NO/NC	◆	83450703	83450719	◆	◆
			grey	NO	◆		83450711	◆	◆
		Front face seal	black	NO/NC	83450724	83450713 83450716 83450715 83450732	83450723	◆	83450301
			red	NO/NC	◆	83450708	83450722	◆	◆
			grey	NO/NC	◆	83450707	83450721	◆	◆
			blue	NO/NC	◆	83450729	◆	◆	◆

◆ **CONTACT US FOR ANY MISSING REFERENCE**

Low level - Gold plated

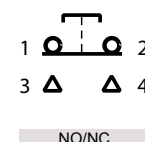
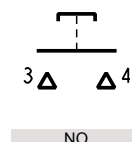
	1 pole	
	No seal	Front face seal
Mechanical characteristics		
Operating force	8 N → 16 N max	8 N → 16 N max
Release force	3 N min	3 N min
Permissible force at end of travel	100 N	100 N
Overtravel	0.4 mm min	0.4 mm min
Total travel	2 mm ± 0.4	2 mm ± 0.4
Return overtravel	0.4 min	0.4 min
Mechanical life	300 000 cycles	100 000 cycles
Electrical characteristics		
Voltage	5 VCC to 115 VAC 400 Hz	5 VCC to 115 VAC 400 Hz
Current (resistive load)	0.1 mA to 7.5 A	0.1 mA to 7.5 A
Current (inductive load)	2 A	2 A
Contact resistance	25 mOhm	25 mOhm
Electrical life	100 000 cycles	100 000 cycles
Dielectric strength	1 200 V	1 200 V
General characteristics		
Case	polyamid 6.6 reinforced with 30% fiberglass	polyamid 6.6 reinforced with 30% fiberglass
Button	acetate resin	acetate resin
Terminal	Soldering lugs W2 silver or gold plated	Soldering lugs W2 silver or gold plated
Waterproof front face	-	MIL STD 810 D-506.2 methode 2
Operating temperature	-55°C → +85°C	-55°C → +85°C
Storage temperature	-55°C → +85°C	-55°C → +85°C
Weight	3.6g ±5% < M < 7.6g ±5%	3.6g ±5% < M < 7.6g ±5%

			Color	Electrical configuration										
Ø 14	1 pole Double-throw	No seal	black	NO/NC	83450501	◆	83450001	◆	83450014	83450025	83450019 83450026 83450030 83450035 83450032	83451001	83450506	83450401 83450402 83450403
			red	NO/NC	83450502	83450511	83450002	83450008	◆	◆	83450029	◆	◆	83450404
			grey	NO/NC	◆	◆	◆	83450017	◆	◆	◆	◆	◆	◆
			white	NO/NC	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
		Front face seal	black	NO/NC	83450512	◆	83450006 83450028	83450012	◆	83450013	◆	83451003 83451004	83450513	◆
			red	NO/NC	83450510	◆	83450007	83450011	◆	◆	◆	◆	◆	◆
			grey	NO/NC	83450509	◆	83450005 83450015	83450010	83450009 83450018	◆	◆	◆	◆	◆
			blue	NO/NC	83450514	◆	83450016	83450036	◆	◆	◆	◆	◆	◆

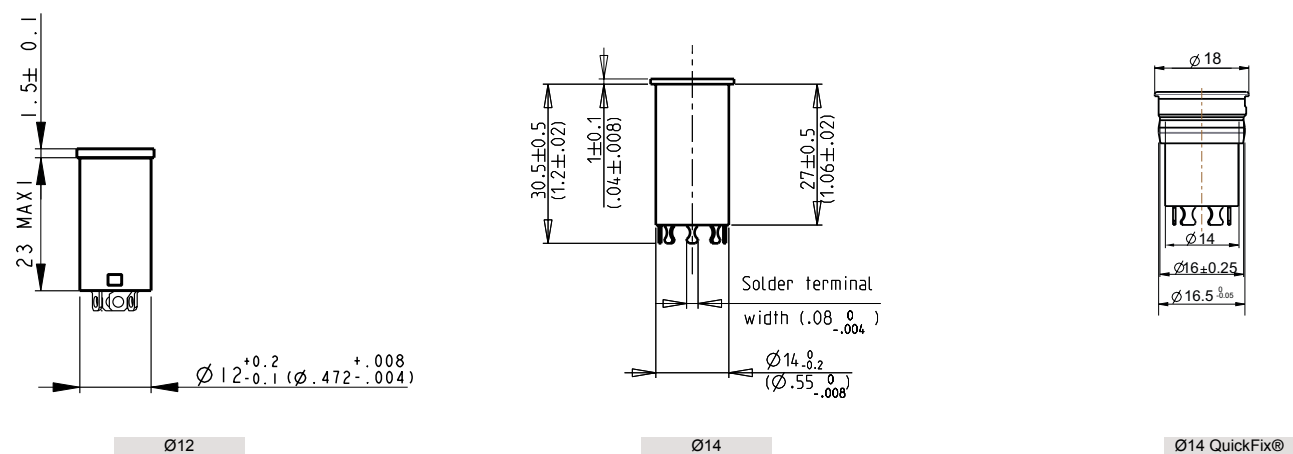
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 Low level - Gold plated

Electrical diagram



Dimensions





PUSHBUTTONS

2, 3 & 4 POLE

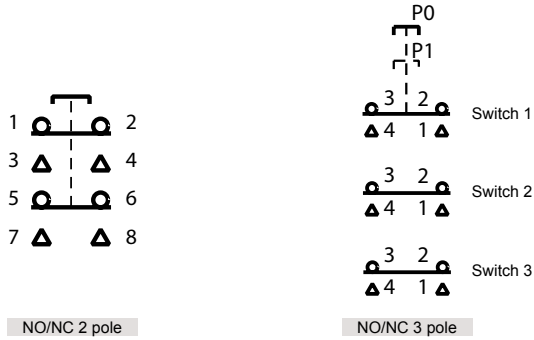
			Color	Electrical Configuration																				
Ø 14	2 pole Double-throw	No seal	black	2 x NO/NC	83453501	♦	♦	♦	83453001	♦	83453005	♦	83453006	♦	♦	♦	♦	♦	♦	83453026	♦	♦	83453506	♦
			red	2 x NO/NC	83453502	♦	♦	♦	83453002	♦	83453015	♦	♦	♦	♦	83453040	83453019	♦	♦	♦	♦	♦	♦	♦
			white	2 x NO/NC	83453516	♦	♦	♦	♦	♦	83453025	♦	♦	♦	♦	♦	♦	♦	♦	♦	♦	♦	♦	♦
			grey	2 x NO/NC	♦	♦	♦	♦	83453018	♦	♦	♦	♦	♦	♦	♦	♦	♦	♦	♦	♦	♦	♦	♦
		Front face seal	black	2 x NO/NC	83453511	♦	83453510	♦	83453012	83453039	83453013	♦	83453017	83453029	83453031	♦	♦	♦	♦	83453014	83453514	♦	♦	♦
			red	2 x NO/NC	83453508	83453512	♦	♦	83453010	83453022	83453033	83453024	83453011	83453023	83453027	♦	♦	83453035	♦	♦	♦	♦	83453311	♦
			grey	2 x NO/NC	83453507	♦	♦	♦	83453008	♦	♦	♦	83453009	♦	♦	♦	♦	♦	♦	♦	♦	♦	83453310	♦
			blue	2 x NO/NC	♦	♦	♦	♦	♦	♦	♦	♦	♦	♦	♦	♦	♦	83453030	♦	♦	♦	♦	♦	♦
	3 pole	No seal	black	3 x NO/NC			♦	83460115		♦				♦	♦		♦	♦				♦	♦	♦
	4 pole		red	4 x NO/NC			♦	♦		♦				♦	♦		♦	83460117				♦		♦

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Low level - Gold plated

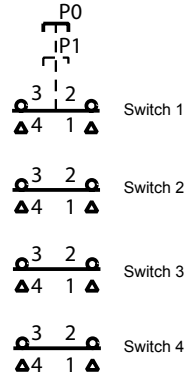
	2 pole		3 pole	4 pole
	No seal	Front face seal	No seal	No seal
Mechanical characteristics				
Operating force	8 N → 16 N max	8 N → 16 N max	6.7 N max	1 N max
Release force	3 N min	3 N min	3 N min	1.1 N min
Permissible force at end of travel	100 N	100 N	100 N	100 N
Overtravel	0.4 mm min	0.4 mm min	-	-
Total travel	2 mm ± 0.4	2 mm ± 0.4	-	-
Return overtravel	0.4 mm min	0.4 mm min	-	-
Mechanical life	300 000 cycles	100 000 cycles	600 000 cycles	100 000 cycles
Electrical characteristics				
Voltage	5 VCC to 115 VAC 400 Hz	5 VCC to 115 VAC 400 Hz	14 VDC to 28 VDC	14 VDC to 28 VDC
Current (resistive load)	0.1 mA to 7.5 A	0.1 mA to 7.5 A	3 mA to 5 A	1 mA to 1 A
Current (inductive load)	2 A	2 A	3 A	2 A
Contact resistance	25 mOhm	25 mOhm	25 mOhm	25 mOhm
Electrical life	100 000 cycles	100 000 cycles	50 000 cycles	100 000 cycles
Dielectric strength	1 200 V	1 200 V	1 200 V	1 200 V
General characteristics				
Case	polyamid 6.6 reinforced with 30% fiberglass	polyamid 6.6 reinforced with 30% fiberglass	diallyl	diallyl
Button	acetate resin	acetate resin	acetate resin	acetate resin
Terminal	Soldering lugs W2 silver or gold plated	Soldering lugs W2 silver or gold plated	Soldering terminal brass, gold plated	Soldering terminal brass, gold plated
Waterproof front face	-	MIL STD 810 D-506.2 methode 2	-	-
Operating temperature	-55°C → +85°C	-55°C → +85°C	-40°C → +70°C	-40°C → +70°C
Storage temperature	-55°C → +85°C	-55°C → +85°C	-55°C → +85°C	-55°C → +85°C
Weight	3.6g ±5% < M < 7.7g ±5%	3.6g ±5% < M < 7.7g ±5%	20g	20g

Electrical diagram



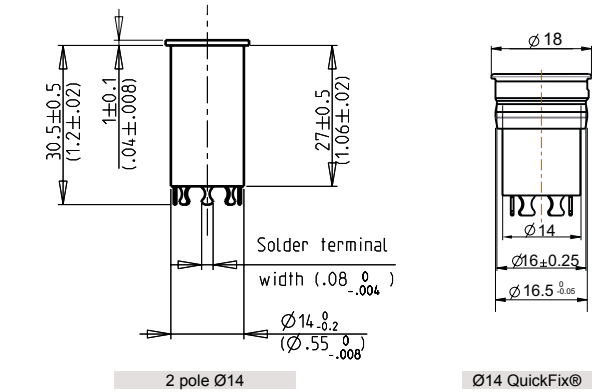
NO/NC 2 pole

NO/NC 3 pole



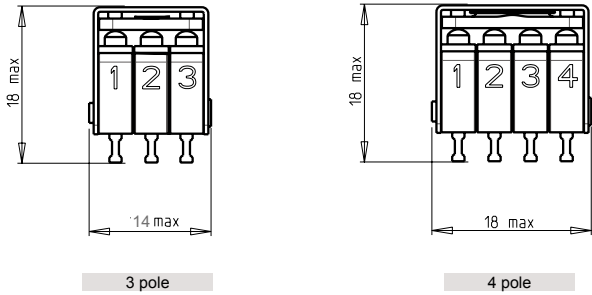
NO/NC 4 pole

Dimensions



2 pole Ø14

Ø14 QuickFix®



3 pole

4 pole



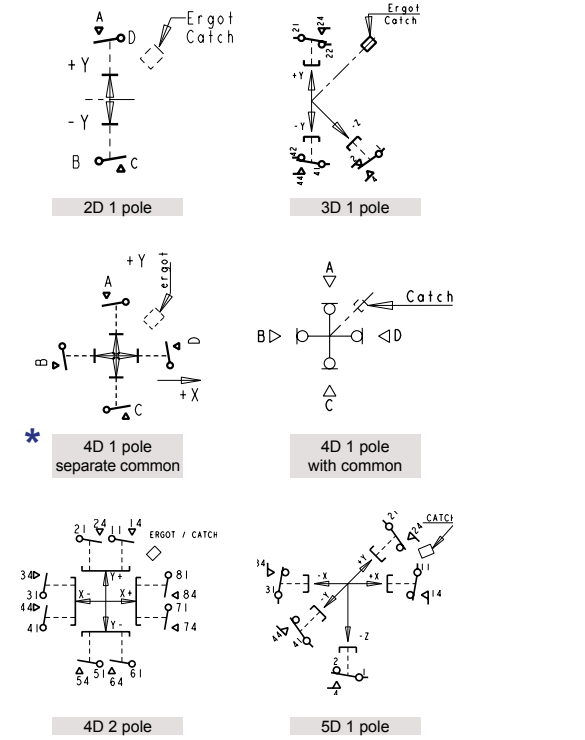
MULTIWAY

			Color	Electrical Configuration	Chinese	Chinese small	Chinese large	Rocker	Convex streak	Convex cross	Concave	Castle	Bat	Square	Convex + insert	QuickFix®
2D	1 pole Ø 16	non waterproof	black	NO	83452506	♦	♦	83452504	83452515	♦	♦	♦	♦	♦	83452531	♦
		waterproof front face	black	NO	♦	♦	♦	83452518	83452519	♦	♦	♦	♦	♦	♦	♦
			grey	NO				83452510								♦
3D	1 pole Ø 24	waterproof front face	black	NO	83452709	♦	♦	♦	83452721 83452722	♦	83452718	♦	♦	♦	♦	♦
4D	1 pole Ø 16	non waterproof	black	NO	83452501 ★ 83452502 83452533	♦	♦	♦	♦	83452538	83452505 83452514	♦	♦	83452520	♦	♦
		waterproof front face	black	NO	★ 83452516 83452521 83452524 83452525 ★ 83452529 83452534 83452572	83452570	★ 83452576	♦	♦	♦	★ 83452523 83452526 83452530 83452543 ★ 83452575	♦	★ 83452535 83452540 83452578	83452527 83452539	♦	83452301
					blue	NO	♦	♦	♦	♦	83452542	♦	♦	♦	♦	♦
					grey	NO	♦	♦	♦	♦	83452511	♦	♦	♦	♦	♦
4D	2 pole Ø 24	waterproof front face	black	NO	83452513	♦	♦	♦	♦	♦	♦	♦	♦	83452528	♦	♦
			grey	NO	83452509	♦	♦	♦	♦	♦	♦	♦	♦	♦	♦	♦
5D	1 pole Ø 24	waterproof front face	black	NO	83452701 83452706	♦	♦	♦	♦	♦	83452711 83452719	83452708 ♦	♦	♦	♦	♦
				NO/NC	83452702 83452707 83452717	♦	♦	♦	♦	♦	83452712	83452720	♦	♦	♦	♦

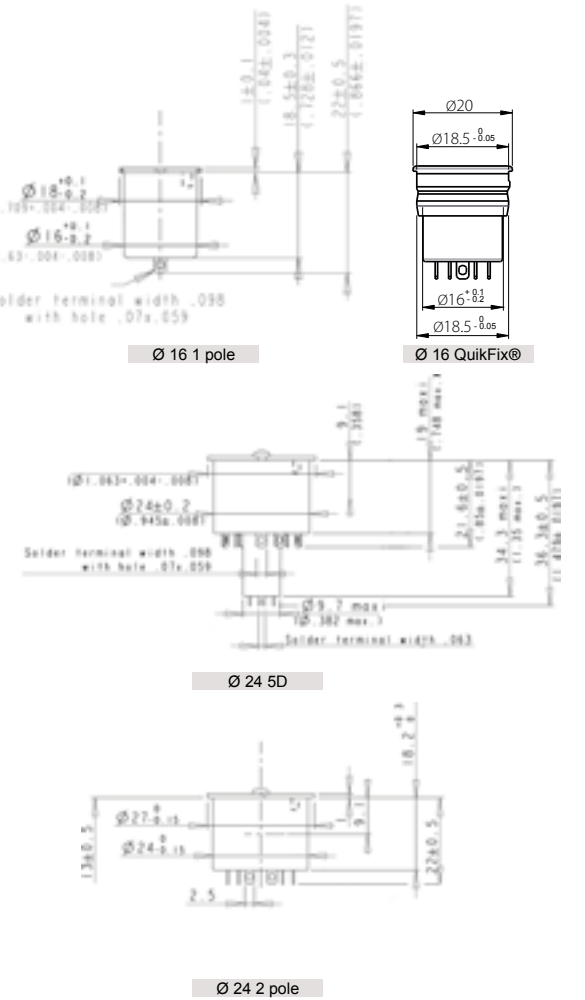
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	2D		3D	4D		4D	5D
	1 pole Ø 16		1 pole Ø 24	1 pole Ø 16		2 pole Ø 24	1 pole Ø 24
	non waterproof	waterproof front face	waterproof front face	non waterproof	waterproof front face	waterproof front face	waterproof front face
Mechanical characteristics							
Operating force	3.5 N		3 N	3.5 N		6 N	3 N
Release force	0.6 N		0.6 N	0.6 N		1 N	0.6 N
Permissible force at end of travel	70 N max		70 N max	70 N max		70 N max	70 N max
Button strengthness pulling action	25 N max		25 N max	25 N max		80 N max	25 N max
Button strengthness pushing action	100 N max		100 N max	100 N max		100 N max	100 N max
Angle measured from axis to full travel	12°		12°	12°		12°	12°
Mechanical life	100 000 up to 500 000 cycles		100 000 cycles	100 000 up to 500 000 cycles		100 000 cycles	100 000 cycles
Electrical characteristics							
Output common	Separate or common		Separate	Separate or common		Separate	Separate
Voltage	5 VCC to 115 VAC 400 Hz		5 VCC to 115 VAC 400 Hz	5 VCC to 115 VAC 400 Hz		5 VCC to 115 VAC 400 Hz	5 VCC to 115 VAC 400 Hz
Current (resistive load)	0.5 mA to 2 A		0.5 mA to 2 A	0.5 mA to 2 A		0.5 mA to 2 A	0.5 mA to 2 A
Current (Inductive load)	1 A		1 A	1 A		1 A	1 A
Contact resistance	25 mOhm		25 mOhm	25 mOhm		25 mOhm	25 mOhm
Contact	silver or gold plated		silver or gold plated	silver or gold plated		silver or gold plated	silver or gold plated
Electrical life	100 000 cycles		100 000 cycles	100 000 cycles		100 000 cycles	100 000 cycles
Dielectric strength	1 200 V		1 200 V	1 200 V		1 200 V	1 200 V
General characteristics							
Case	polyamid 6.6 reinforced with 30% fiberglass		polyamid 6.6 reinforced with 30% fiberglass	polyamid 6.6 reinforced with 30% fiberglass		polyamid 6.6 reinforced with 30% fiberglass	polyamid 6.6 reinforced with 30% fiberglass
Button	acetate resin		acetate resin	acetate resin		acetate resin	acetate resin
Terminal	Solder lugs W2 silver		Solder lugs W2 silver	Solder lugs W2 silver		Solder lugs W2 silver	Solder lugs W2 silver
Waterproof front face	MIL STD 810 D-506.2 methode 2		MIL STD 810 D-506.2 methode 2	MIL STD 810 D-506.2 methode 2		MIL STD 810 D-506.2 methode 2	MIL STD 810 D-506.2 methode 2
Fixation	screw, glue		screw, glue	screw, glue		screw, glue	screw, glue
Operating temperature	-55°C → +85°C		-55°C → +85°C	-55°C → +85°C		-55°C → +85°C	-55°C → +85°C
Storage temperature	-55°C → +85°C		-55°C → +85°C	-55°C → +85°C		-55°C → +85°C	-55°C → +85°C
Weight	7.3g ±5% < M <15.7g ±5%		16g	7.3g ±5% < M <15.7g ±5%		13g	16g

Electrical diagram



Dimensions





ROCKER SWITCH

Electrical configuration	3 positions			3 positions + validation	5 positions
	2 x NO/NC + 2 x NO/NC	2 x NO/NC + 2 x NO/NC	1 x NO/NC + 1 x NO/NC	1 x NO/NC + 1 x NO/NC	1 x NO/NC + 1 x NO/NC
Flat	83450706	♦	83450503	83454201	83450505
Gendarme	♦	83450709	♦	♦	♦

Mechanical characteristics					
Operating force per direction	9 N max	4 N max	10 N max	2.5 N	17 N → 25 N
Release force	1.2 N min	0.6 N min	2 N min	2 N min	2 N min
Permissible force at end of travel	50 N	40 N	80 N	80 N	80 N
Mechanical life	100 000 cycles	400 000 cycles	100 000 cycles	50 000 cycles	100 000 cycles
Electrical characteristics					
Voltage	5 VDC to 28 VDC	5 VDC to 28 VDC	5 VDC to 28 VDC	5 VDC to 28 VDC	5 VDC to 32 VDC
Current (resistor)	1 mA to 5 A	1 mA to 5 A	1 mA to 5 A	1 mA to 5 A	1 mA to 5 A
Current max @ 30VCC (self)	2 A	2 A	3.5 A	4 A	2 A
Current max @ 115VAC 400Hz (self)	2 A	2 A	2.5 A	1 A	2 A
Contact resistance	25 mOhm	25 mOhm	25 mOhm	25 mOhm	25 mOhm
Electrical life per direction	100 000 cycles	200 000 cycles	100 000 cycles	50 000 cycles	50 000 cycles
General characteristics					
Case	black polyamid 6.6	black polyamid 6.6	black polyamid 6.6	aluminum alloy	black polyamid 6.6
Actuator	black polyamid 6.6	black polyamid 6.6	resin acetate	aluminum alloy	resin acetate
Terminal	solder lugs, silver plated	solder lugs, silver plated	solder lugs, silver plated	solder lugs, silver plated	solder lugs, silver plated
Contact	silver	silver	silver	silver	silver
Operating temperature	-55°C → +85°C	-55°C → +85°C	-55°C → +85°C	-40°C → +70°C	-15°C → +60°C
Storage temperature	-55°C → +85°C	-55°C → +85°C	-55°C → +85°C	-55°C → +85°C	-55°C → +85°C
Weight	35g	35g	18g	12g	29g

Dimensions				

Electrical diagram				



TRIGGER

		1 position						2 positions						
		non waterproof			waterproof			non waterproof			waterproof			
Color		black	red	grey	black	red	grey	black	red	grey	black	red	grey	
Electrical configuration		2 x NO/NC	2 x NO/NC	2 x NO/NC	1 x NO/NC	2 x NO/NC	2 x NO/NC	2 x NO/NC	2 x NO/NC	4x NO/NC	2 x NO/NC	2 x NO/NC	2 x NO/NC	2 x NO/NC
MOM		83574008	83574004	83574009	83574507	83574504	83574502	83574007	83574001	◆	83574010	83574514	83574555 83574505	83574501
MOM + FLAP GUARD		◆	83574006	◆	◆	83574503	◆	83574011	83574013	83574512	◆	◆	83574509 83574511 83574559	◆
MOM + LOCKING HOLE		◆	◆	◆	◆	◆	◆	83574012	◆	◆	◆	◆	◆	◆
MOM + FLAP+ LOCKING HOLE		◆	◆	◆	◆	◆	◆	◆	83574014	◆	◆	◆	◆	◆

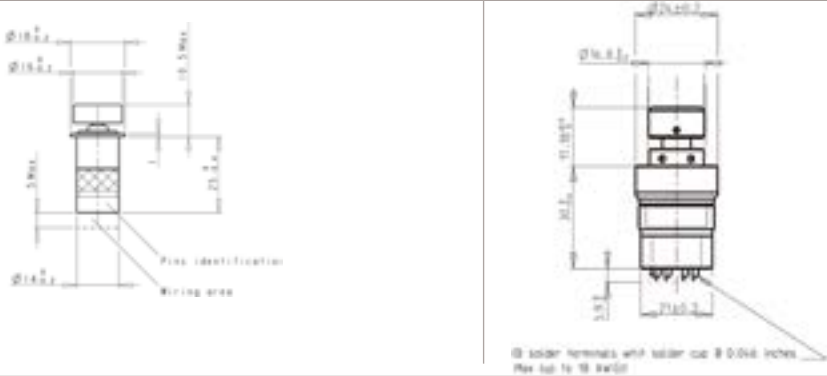
Mechanical characteristics													
Operating force first position	12 N	30 N	12 N	16 N	20 N	16 N	12 N	12 N	12 N	12 N	20 N	20 N	20 N
Release force first position	2 N	2 N	2 N	4 N	4 N	4 N	2 N	2 N	2 N	2 N	4 N	4 N	4 N
Operating force second position	-	-	-	-	-	-	40 N	40 N	30 N	30 N	33 N	33 N	33 N
Total travel first position	14°	11°	14°	9°	14°	12°	12°	12°	12°	12°	12°	12°	12°
Total travel second position	-	-	-	-	-	-	22°	22°	22°	22°	22°	22°	22°
Mechanical life	100 000 cycles	100 000 cycles	100 000 cycles	100 000 cycles	100 000 cycles	100 000 cycles	100 000 cycles	100 000 cycles	100 000 cycles	100 000 cycles	100 000 cycles	100 000 cycles	100 000 cycles
Electrical characteristics													
Voltage	14 VDC to 30 VDC	14 VDC to 30 VDC	14 VDC to 30 VDC	14 VDC to 30 VDC	14 VDC to 30 VDC	14 VDC to 30 VDC	14 VDC to 30 VDC	14 VDC to 30 VDC	14 VDC to 30 VDC	14 VDC to 30 VDC	5 VDC to 32 VDC	14 VDC to 30 VDC	14 VDC to 30 VDC
Current (resistor)	6 A	6 A	6 A	6 A	6 A	6 A	6 A	6 A	2 A	6 A	20 mA	6 A	6 A
Current max @ 30VCC (self)	3 A	3 A	3 A	3 A	3 A	3 A	3 A	3 A	-	3 A	-	3 A	3 A
Electrical endurance	50 000 cycles	100 000 cycles	50 000 cycles	50 000 cycles	50 000 cycles	50 000 cycles	50 000 cycles	50 000 cycles	100 000 cycles	50 000 cycles	50 000 cycles	50 000 cycles	50 000 cycles
General characteristics													
Case	black polyamid 6.6	black polyamid 6.6	black polyamid 6.6	Thermoplastic inox	Thermoplastic inox	Thermoplastic inox	black polyamid 6.6	black polyamid 6.6	black polyamid 6.6	black polyamid 6.6	Thermoplastic inox	Thermoplastic inox	Thermoplastic inox
Button	Acetate resin	Acetate resin	Acetate resin	Acetate resin	Acetate resin	Acetate resin	Acetate resin	Acetate resin	Acetate resin	Acetate resin	Acetate resin	Acetate resin	Acetate resin
Terminal	solder lugs, copper nickel	solder lugs, copper nickel	solder lugs, copper nickel	solder lugs, copper nickel	solder lugs, copper nickel	solder lugs, copper nickel	solder lugs, copper nickel	solder lugs, copper nickel	solder pin	solder lugs, copper nickel	solder lugs, copper nickel	solder lugs, copper nickel	solder lugs, copper nickel
Contact	silver	silver	silver	silver	silver	silver	silver	silver		silver	silver	silver	silver
Operating temperature	-55°C → +85°C	-15°C → +85°C	-55°C → +85°C	-35°C → +75°C	-35°C → +75°C	-35°C → +75°C	-55°C → +85°C	-55°C → +85°C	-15°C → +60°C	-55°C → +85°C	-35°C → +75°C	-35°C → +75°C	-35°C → +75°C
Storage temperature	-55°C → +85°C	-55°C → +85°C	-55°C → +85°C	-55°C → +85°C	-55°C → +85°C	-55°C → +85°C	-55°C → +85°C	-55°C → +85°C	-55°C → +85°C	-55°C → +85°C	-55°C → +85°C	-55°C → +85°C	-55°C → +85°C
Weight	40g	22g	22g	25g	27g	25g	22g	22g	38g	22g	25g	27g	25g

Dimensions	MOM	MOM + FLAP GUARD	MOM + LOCKING HOLE	MOM + FLAP+ LOCKING HOLE
Electrical diagram	1 x NO/NC	2 x NO/NC	4 x NO/NC	

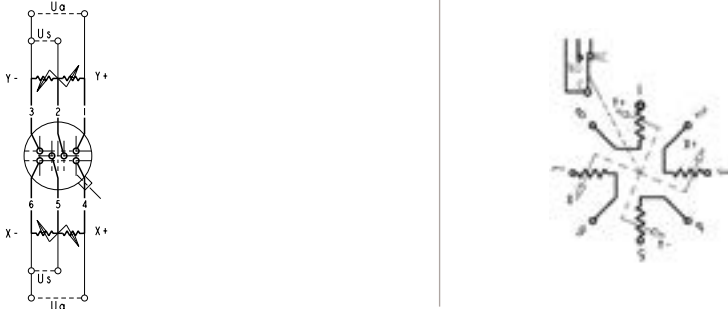


ANALOG TRANSDUCER

Electrical configuration	Analogic		
	Standard	Waterproof	Validation
Concave 	83459004	83459010	83459008
Mechanical characteristics			
Operating force	13.5 N	13.5 N	7 N
Maximum torque on knob	0.3 mN	0.3 mN	0.3 mN
Permissible force at end of travel	20 N max	20 N max	13.5 N
Validation travel	-	-	3 mm max
Half force MTBF	10 000 000 cycles	10 000 000 cycles	1 000 000 cycles
Mechanical life	300 000 cycles	300 000 cycles	50 000 cycles
Electrical characteristics			
Nominal voltage	0 → 15 VDC	0 → 15 VDC	0 → 15 VDC
Normal sensitivity	0.1 V/N	0.1 V/N	0.1 V/N
Hysteresis	± 0.035 V	± 0.035 V	± 0.1 V
Sensibility temperature coefficient	± 0.2% /SN/°C	± 0.2% /SN/°C	± 0.2% /SN/°C
Linearity error	± 0.07 VDC	± 0.07 VDC	± 0.07 VDC
General characteristics			
Case	inox	inox	inox
Actuator			
Terminal	solder terminal	solder terminal	solder terminal
Front face humidity resistance	MIL STD 810D /506-2/proced 2	DO 160 E/ED 14E/section 6 cat B	MIL STD 810D /506-2/proced 2
Dielectric strength	50 V	50 V	50 V
Insulation resistance	> 10 MΩ@50V	> 10 MΩ@50V	> 10 MΩ@50V
Contact	silver	silver	silver
Operating temperature	-55°C → +85°C	-55°C → +85°C	-55°C → +85°C
Storage temperature	-55°C → +85°C	-55°C → +85°C	-55°C → +85°C
Weight	24g	24g	100g
Dimensions			

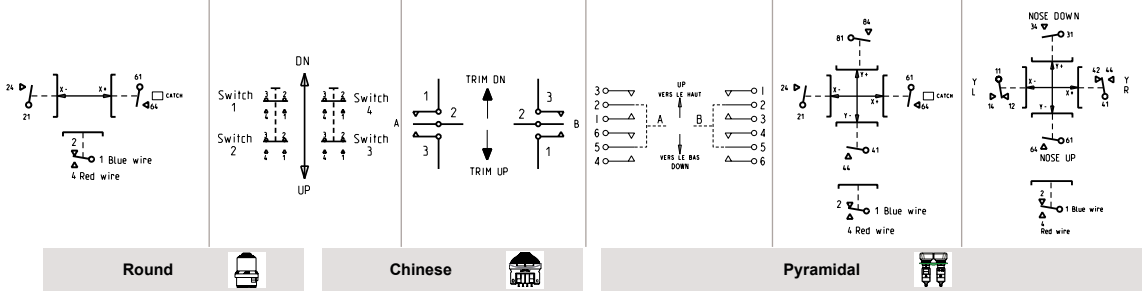


Electrical diagram

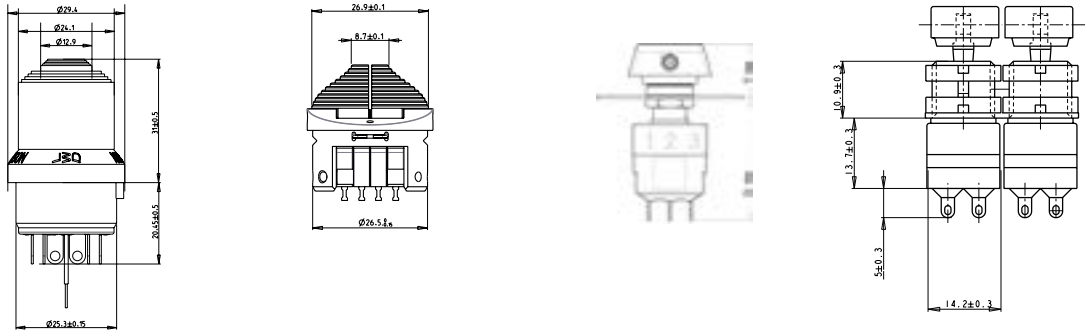


TRIM SWITCH

Color	2 directions + validation	2 directions			4 directions + validation	
	black	black	black	black	black	
Electrical configuration	2 x NO + NO	2 x NO/NC + 2 x NO/NC	1 x NO/NC + 1 x NO/NC	2 x NO/NC + 2 x NO/NC	4 x NO + NO	2 x NO + 2 x NC + NO
Chinese 		83460208				
Pyramidal 			83460109	79255317		
Round 	83452564				83452541 83452544 83452561	◆
Round bayonet 	◆				◆	83452580
Mechanical characteristics						
Operating force per direction	6.5 N max	6.3 N max	◆	◆	6.5 N max	6.5 N max
Release force	3 N min	1.1 N min	◆	◆	3 N min	3 N min
Permissible force at end of travel	70 N	100 N	◆	◆	70 N	70 N
Validation operating force	6 N	◆	◆	◆	6 N	6 N
Validation release force	2 N	◆	◆	◆	2 N	2 N
Validation pushing action maximum	100 N	◆	◆	◆	100 N	100 N
Total travel	12°	15°	13°	13°	12°	12°
Mechanical life	300 000 cycles	150 000 cycles	100 000 cycles	100 000 cycles	300 000 → 500 000 cycles	300 000 cycles
Electrical characteristics						
Voltage	5 VDC to 28 VDC	14 VDC to 28 VDC	14 VDC to 28 VDC	14 VDC to 28 VDC	5 VDC to 28 VDC	5 VDC to 28 VDC
Current (resistor)	0.5 mA to 10 A	1 mA to 1 A	0.1 A	0.16 A	0.5 mA to 10 A	0.5 mA to 10 A
Current max @ 30VCC (self)	10 A	2 A	4 A	4 A	10 A	10 A
Current max @ 30VCC (self)	10 A	-	-	-	10 A	10 A
Current max @ 120VAC 400Hz (self)	1 A	-	-	-	1 A	1 A
Contact resistance	25 mOhm	25 mOhm	10 mOhm	10 mOhm	25 mOhm	25 mOhm
Electrical endurance	100 000 cycles	150 000 cycles	100 000 cycles	100 000 cycles	100 000 cycles	100 000 cycles
Dielectric strength	600 V @1mA	1 200 V			600 V @1mA	600 V @1mA
General characteristics						
Case	polyamid 6.6 reinforced with 40% fiberglass	AU4G black	Diallyl phthalate	Diallyl phthalate	polyamid 6.6 reinforced	polyamid 6.6 reinforced
Button	black polyamid 6.6	AU4G black	black polyamid 6.6	black polyamid 6.6	black polyamid 6.6	black polyamid 6.6
Terminal	solder lugs, silver plated	solder lugs, silver plated	solder lugs, silver plated	solder lugs, silver plated	solder lugs, silver plated	solder lugs, silver plated
Contact	silver	silver	gold plated	gold plated	silver	silver
Operating temperature	-55°C → +85°C	-40°C → +70°C	-40°C → +70°C	-40°C → +70°C	-55°C → +85°C	-55°C → +85°C
Storage temperature	-55°C → +85°C	-55°C → +85°C	-55°C → +85°C	-55°C → +85°C	-55°C → +85°C	-55°C → +85°C
Weight	40g	35g	30g	40g	40g	40g
Electrical diagram						



Dimensions



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