



COCKPIT CONTROLS WHEELS & GRIPS

Selection Guide



ABOUT CROUZET

Crouzet is an independent company **manufacturing mechatronic components for demanding applications in Aerospace & Transportation, Energy, Building and Machinery Industry.**

Crouzet provides **Switches and Sensors, Electromechanical Actuators, Electrical Protection Equipment, Cockpit Controls, Automation Controllers and Relays, and Instrumentation Services.**

Since 1921, Crouzet has a heritage of close collaboration with customers in the development of products, from standard components to fully customized solutions.

Crouzet's customers and partners can rely on our teams worldwide to always meet and often exceed their expectations. Driven by innovation, our experts are focused on designing and delivering the right product for the right application.

Crouzet is your trusted partner of choice to face industrial challenges of today and tomorrow.

WORLDWIDE PRESENCE



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: FAOX2

SOLUTIONS FOR DESIGN, INNOVATION AND INDUSTRIALISATION



Crouzet's factories in Valence, France

PROJECT TEAM

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.



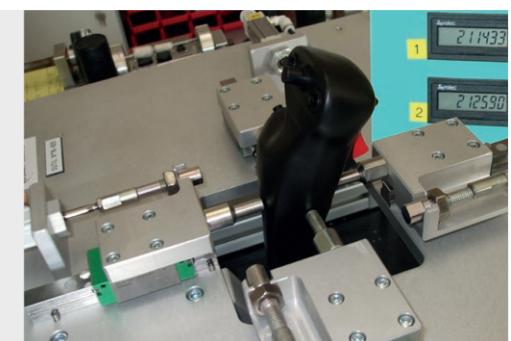
3. INNOVATION

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



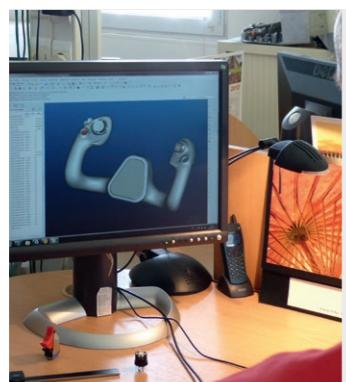
1. PROJECT START-UP

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



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



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)

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



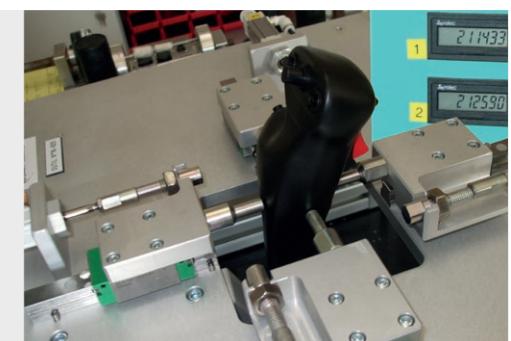
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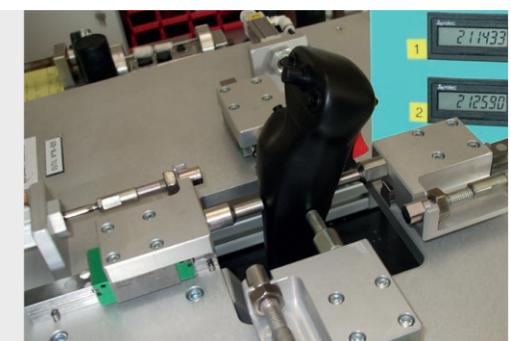
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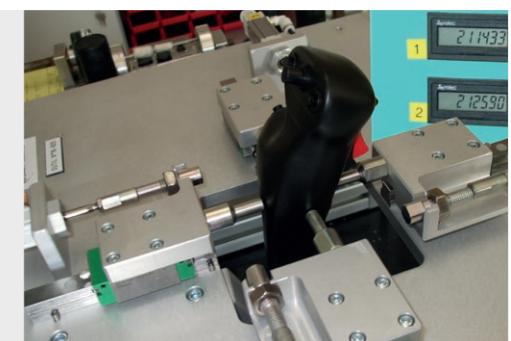
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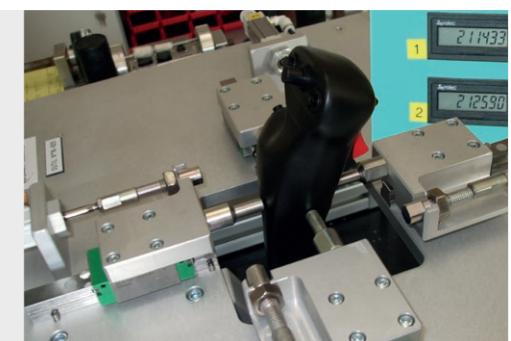
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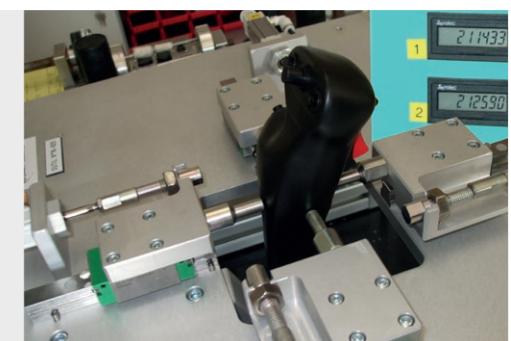
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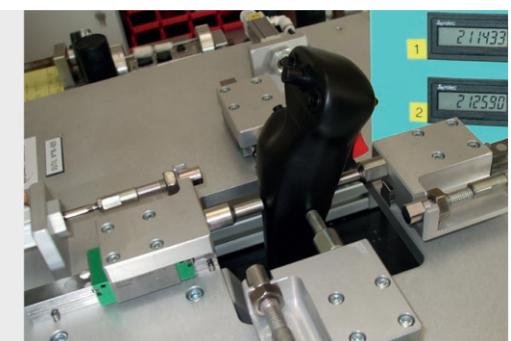
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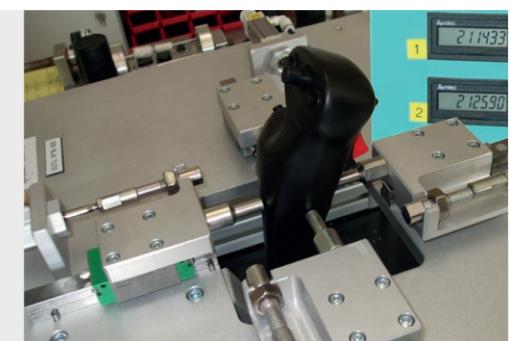
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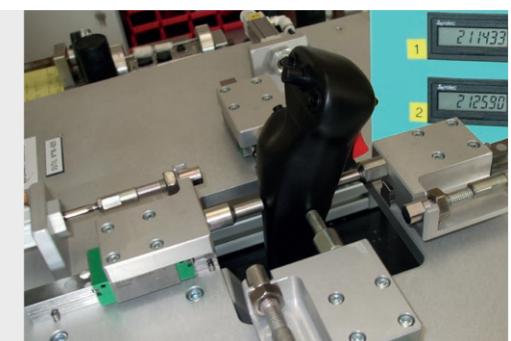
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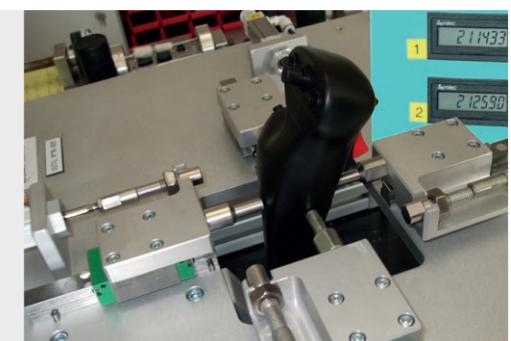
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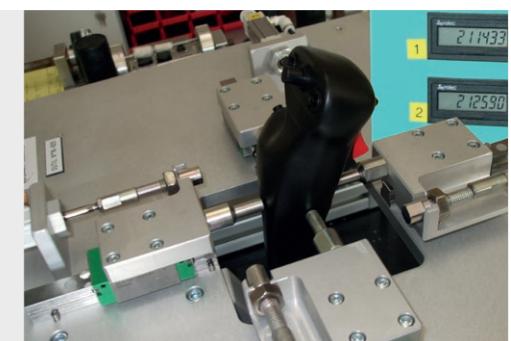
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GRIPS

WORLD LEADER



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



Example: illuminated front panel

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.



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 solutions for all necessary requirements.

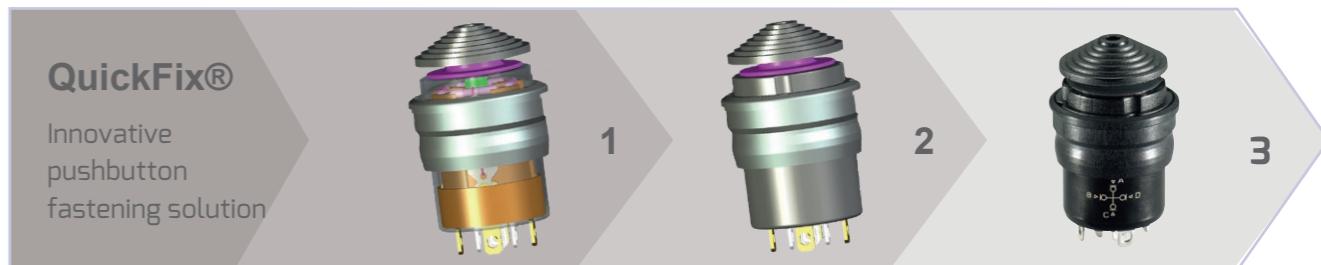
STRENGTHS

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



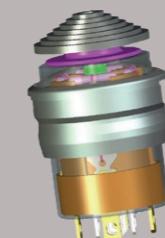
CUSTOMIZED DESIGN

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

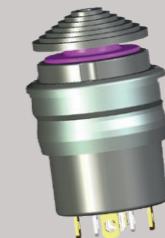


QuickFix®

Innovative
pushbutton
fastening solution



1



2



3

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 |

| THUMBSTICK | Analogic | Analogic + validation |
|-----------------------|----------|-----------------------|
| | Ø14 | Ø24 |
| | | |
| Waterproof front face | Y | Y |
| Function | 0 → 15 V | 0 → 15 V |
| Button | Convex | Convex |
| Color | Black | Black |
| Terminal | Gold | Silver |

| ROCKER | 3 positions | | 3 positions | 5 positions |
|-----------------------|---------------------|---------------------|-------------------------------------------|-------------|
| | | | | |
| Waterproof front face | N | 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 | Silver |

| TOGGLE (CONSULT US) | 2 positions | | 3 positions | Ø12 |
|-----------------------|---------------|-----------------|-----------------|-----------------|
| | 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 | Ø 4 | Ø 7 | Ø 7 + bezel | Ø 7 + bayonet | 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 | | 83450713 83450716 83450715 | 83450723 | ◆ | | 83450301 |
| | | | | ◆ | 83450724 | 83450732 | ◆ | | |
| | | | | NO/NC | ◆ | 83450708 | 83450722 | ◆ | ◆ |
| | | red | NO/NC | ◆ | 83450707 | 83450721 | ◆ | ◆ | |
| | | | 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 | polyamide 6.6 reinforced with 30% fiberglass | polyamide 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% |

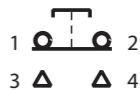
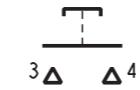
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| | | | Color | Electrical configuration | Ø 5 | Ø 5 + guard | Ø 9.4 | Ø 9.4 short hat | Ø 9.4 short hat + guard | Ø 9.4 round | Ø 9.4 1/4 turn fixation (or bayonet) | Ø 9.4 long travel | concave | QuickFix® |
|---------------------------------------|-----------------|-------|-------|--------------------------|----------|----------------------|----------|----------------------|-------------------------|----------------------------------------------------------|--------------------------------------|-------------------|----------------------------------|-----------|
| Ø 14 1 pole Double-throw | No seal | black | NO/NC | 83450501 | ◆ | 83450001 | ◆ | 83450014 | 83450025 | 83450019 83450026 83450030 83450035 83450032 | 834501001 | 83450506 | 83450401 83450402 83450403 | |
| | | | NO/NC | 83450502 | 83450511 | 83450002 | 83450008 | ◆ | ◆ | 83450029 | ◆ | ◆ | 83450404 | |
| | | red | NO/NC | ◆ | ◆ | ◆ | 83450017 | ◆ | ◆ | ◆ | ◆ | ◆ | ◆ | |
| | | | NO/NC | ◆ | ◆ | ◆ | ◆ | ◆ | ◆ | ◆ | ◆ | ◆ | ◆ | |
| | | grey | NO/NC | 83450509 | ◆ | 83450005 83450015 | 83450010 | 83450009 83450018 | ◆ | ◆ | ◆ | ◆ | ◆ | |
| | | | NO/NC | 83450514 | ◆ | 83450016 | 83450036 | ◆ | ◆ | ◆ | ◆ | ◆ | ◆ | |
| | | | NO/NC | 83450512 | ◆ | 83450006 83450028 | 83450012 | ◆ | 83450013 | ◆ | 83451003 83451004 | 83450513 | ◆ | |
| | Front face seal | black | NO/NC | 83450510 | ◆ | 83450007 | 83450011 | ◆ | ◆ | ◆ | ◆ | ◆ | ◆ | |
| | | | NO/NC | 83450509 | ◆ | 83450005 83450015 | 83450010 | 83450009 83450018 | ◆ | ◆ | ◆ | ◆ | ◆ | |
| | | red | NO/NC | 83450514 | ◆ | 83450016 | 83450036 | ◆ | ◆ | ◆ | ◆ | ◆ | ◆ | |
| | | | NO/NC | 83450512 | ◆ | 83450006 83450028 | 83450012 | ◆ | 83450013 | ◆ | 83451003 83451004 | 83450513 | ◆ | |
| | | | NO/NC | 83450510 | ◆ | 83450007 | 83450011 | ◆ | ◆ | ◆ | ◆ | ◆ | ◆ | |

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◆ Low level - Gold plated

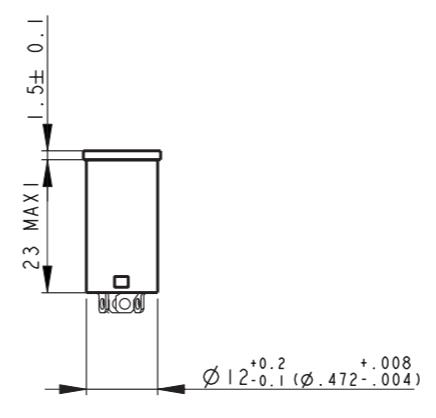
Electrical diagram



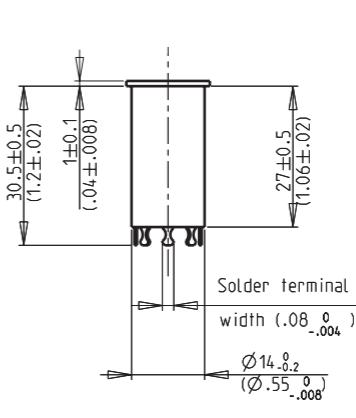
NO

NO/NC

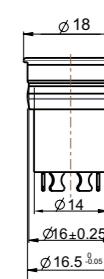
Dimensions



Ø12



Ø14



Ø14 QuickFix®



PUSHBUTTONS 2, 3 & 4 POLE

| | | Color | Electrical Configuration | Ø 5 | Ø 5 +guard | Ø 5 high strength | Ø 8 | Ø 9.4 | Ø 9.4 higher strength | Ø 9.4 short hat | Ø 9.4 short hat+ higher strength | Ø 9.4 short hat+guard | Ø 9.4 short hat+guard + higher strength | Ø 9.4 round | Ø 9.4 luminescent ring | Ø 9.4 screw fixation | Ø 9.4 +wires turn fixation (or bayonet) | Ø 9.4 1/4 long travel | Ø 12 concave | rectangular | rectangular high strength | QuickFix® |
|-------------|------------------------|---------|--------------------------|-----------|------------|-------------------|-----|----------|-----------------------|-----------------|----------------------------------|-----------------------|-----------------------------------------|-------------|------------------------|----------------------|-----------------------------------------|-----------------------|--------------|-------------|---------------------------|-----------|
| 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 | 83453509 | 83453510 | ◆ | 83453012 | 83453039 | 83453013 | ◆ | 83453017 | 83453029 | 83453031 | 83453034 | ◆ | ◆ | ◆ | 83453014 | 83453514 | ◆ | ◆ |
| | | | red | 2 x NO/NC | 83453508 | 83453512 | ◆ | ◆ | 83453010 | 83453036 | 83453022 | 83453033 | 83453024 | 83453011 | 83453023 | 83453021 | 83453027 | ◆ | ◆ | 83453035 | ◆ | ◆ |
| | | 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 | ◆ | ◆ | ◆ |

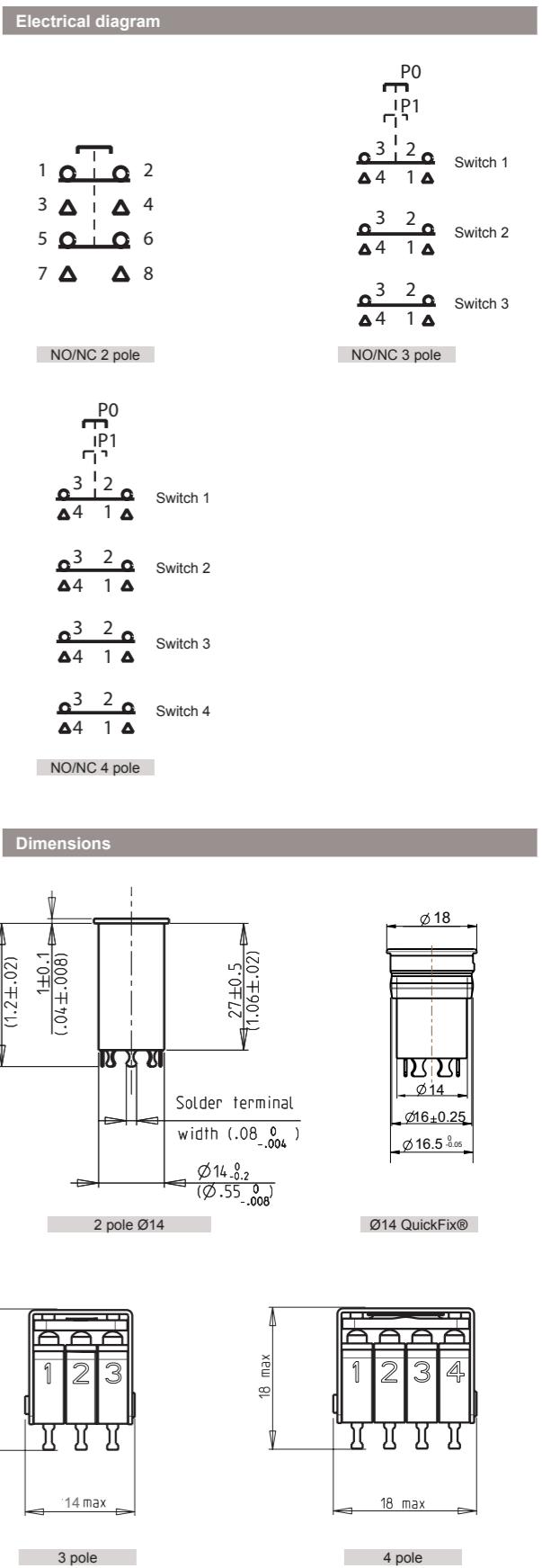
◆ CONTACT US FOR ANY MISSING REFERENCE

Low level - Gold plated

| 2 pole | | 3 pole | | 4 pole | |
|----------------|--|-----------------|--|----------------|----------------|
| No seal | | Front face seal | | No seal | |
| 8 N → 16 N max | | 8 N → 16 N max | | 6.7 N max | 1 N max |
| 3 N min | | 3 N min | | 3 N min | 1.1 N min |
| 100 N | | 100 N | | 100 N | 100 N |
| 0.4 mm min | | 0.4 mm min | | - | - |
| 2 mm ± 0.4 | | 2 mm ± 0.4 | | - | - |
| 0.4 mm min | | 0.4 mm min | | - | - |
| 300 000 cycles | | 100 000 cycles | | 600 000 cycles | 100 000 cycles |

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 |





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 | ◆ | ◆ | ◆ | ◆ | ◆ | |
| | | waterproof front face | black | NO | 83452513 | ◆ | ◆ | ◆ | ◆ | ◆ | ◆ | ◆ | ◆ | 83452528 | ◆ | ◆ | |
| 4D | 2 pole Ø 24 | waterproof front face | black | NO | 83452509 | ◆ | ◆ | ◆ | ◆ | ◆ | ◆ | ◆ | ◆ | 83452528 | ◆ | ◆ | |
| 5D | 1 pole Ø 24 | waterproof front face | black | NO | 83452701 83452706 | ◆ | ◆ | ◆ | ◆ | ◆ | 83452711 83452719 | 83452708 | ◆ | ◆ | ◆ | ◆ | |
| | | | NO/NC | | 83452702 83452707 83452717 | ◆ | ◆ | ◆ | ◆ | ◆ | 83452712 | 83452720 | ◆ | ◆ | ◆ | ◆ | |

◆ CONTACT US FOR ANY MISSING REFERENCE

Low level - Gold plated

| | 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 |

Mechanical characteristics

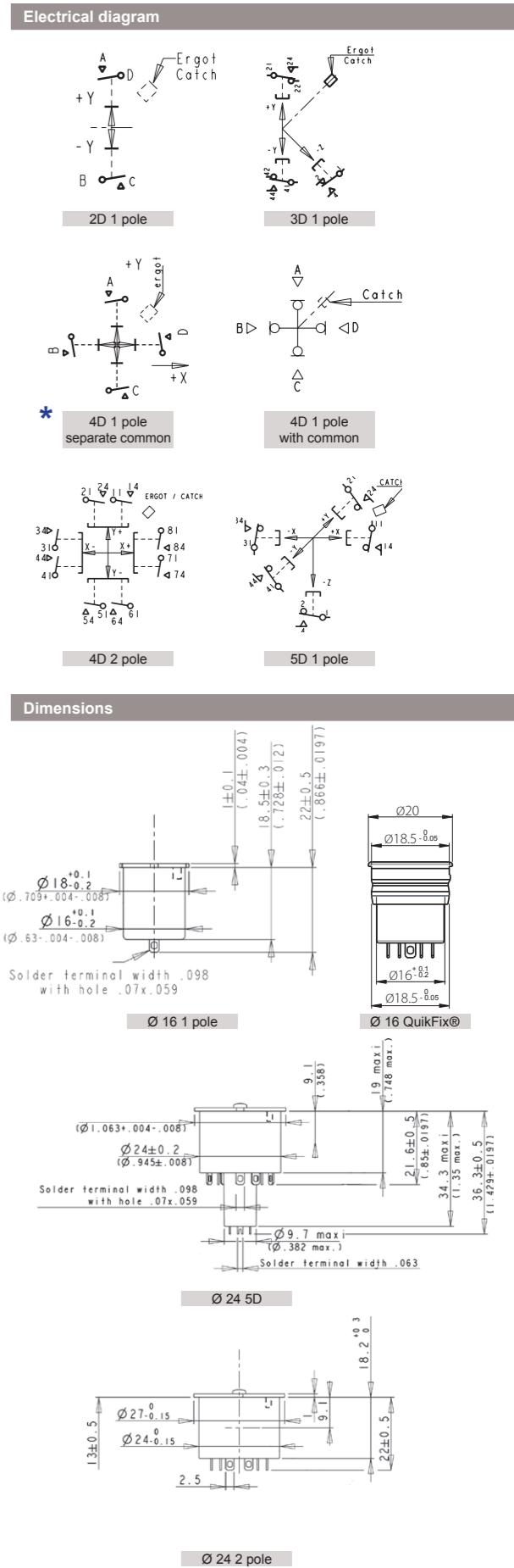
| | | | | | |
|-----------------------------------------|------------------------------|----------------|------------------------------|----------------|----------------|
| Operating force | 3.5 N | 3 N | 3.5 N | 6 N | 3 N |
| Release force | 0.6 N | 0.6 N | 0.6 N | 1 N | 0.6 N |
| Permissible force at end of travel | 70 N max | 70 N max | 70 N max | 70 N max | 70 N max |
| Button strengthess pulling action | 25 N max | 25 N max | 25 N max | 80 N max | 25 N max |
| Button strengthess 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 |
| Current (resistive load) | 0.5 mA to 2 A |
| Current (Inductive load) | 1 A | 1 A | 1 A | 1 A | 1 A |
| Contact resistance | 25 mOhm |
| Contact | silver or gold plated |
| Electrical life | 100 000 cycles |
| Dielectric strength | 1 200 V |

General characteristics

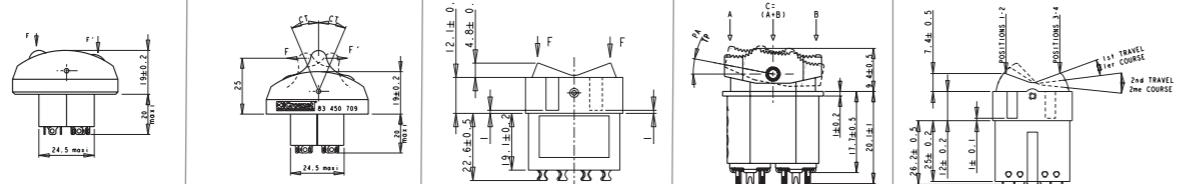
| | | | | | |
|-----------------------|---------------------------------------------|---------------------------------------------|---------------------------------------------|---------------------------------------------|---------------------------------------------|
| Case | polyamid 6.6 reinforced with 30% fiberglass |
| Button | acetate resin |
| Terminal | Solder lugs W2 silver |
| Waterproof front face | MIL STD 810 D-506.2 methode 2 |
| Fixation | screw, glue |
| Operating temperature | -55°C → +85°C |
| Storage temperature | -55°C → +85°C |
| Weight | 7.3g ±5% < M < 15.7g ±5% | 16g | 7.3g ±5% < M < 15.7g ±5% | 13g | 16g |



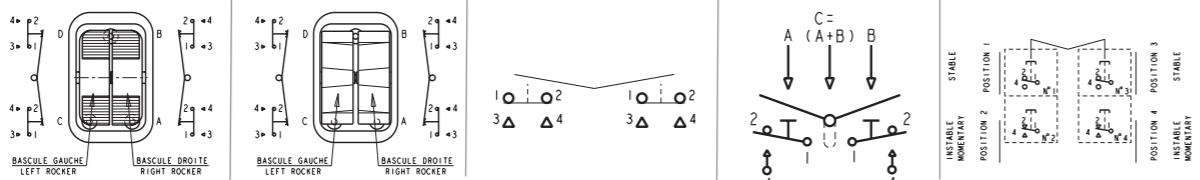


ROCKER SWITCH

| 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 32 VDC |
| Current (resistor) | 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 |
| 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 |
| 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 |
| Weight | 35g | 35g | 18g | 12g | 29g |

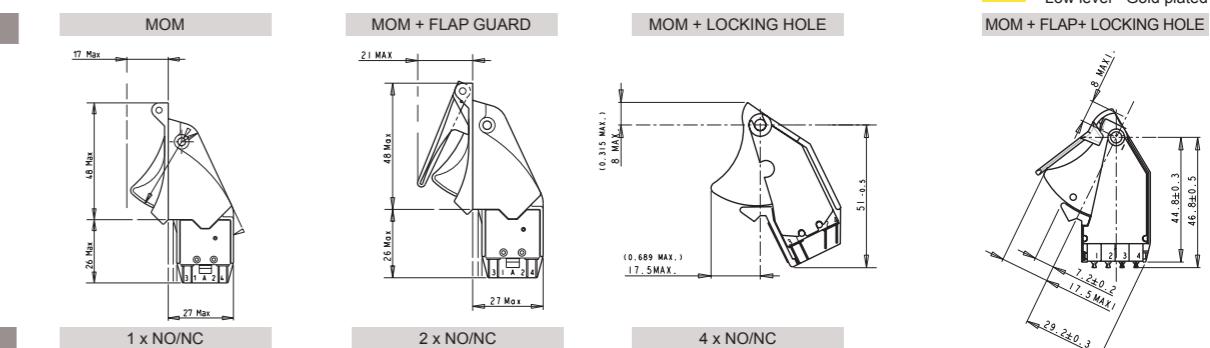


Electrical diagram

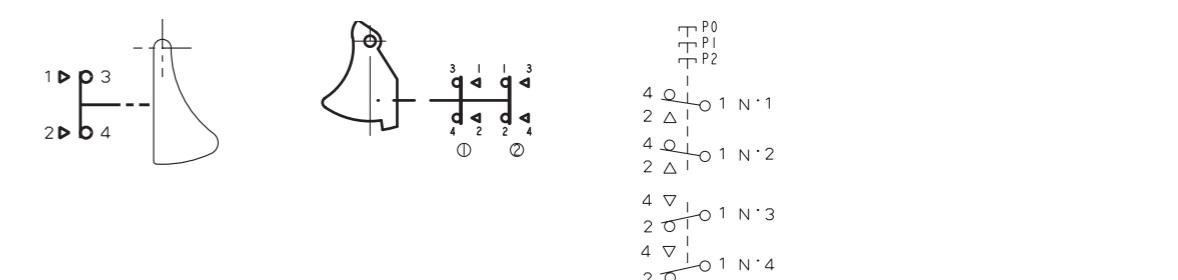


TRIGGER

| | | 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 |
| MOM | | 83574008 | 83574004 | 83574009 | 83574507 | 83574504 | 83574502 | 83574007 | 83574001 | ◆ | 83574010 | 83574514 | 83574555 83574505 |
| 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 |
| Electrical characteristics | | | | | | | | | | | | | |
| Voltage | 14 VDC to 30 VDC | 14 VDC to 30 VDC | 14 VDC to 32 VDC | 5 VDC to 14 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 polyamide 6.6 | black polyamide 6.6 | black polyamide 6.6 | Thermoplastic inox | Thermoplastic inox | Thermoplastic inox | black polyamide 6.6 | black polyamide 6.6 | black polyamide 6.6 | black polyamide 6.6 | Thermoplastic inox | Thermoplastic inox | Thermoplastic inox |
| Button | Acetate resin | Acetate resin | Acetate resin | Acetate resin | Acetate resin | Acetate resin |
| Terminal | solder lugs, copper nickel | solder pin | solder lugs, copper nickel |
| Contact | silver | | silver | silver | silver | silver |
| Operating temperature | -55°C → +85°C | -15°C → +60°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 |
| Weight | 40g | 22g | 22g | 25g | 27g | 25g | 22g | 22g | 38g | 22g | 25g | 27g | 25g |



Electrical diagram





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 | 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

| Round | | Chinese | | Pyramidal | |
|-------|--|---------|--|-----------|--|
| | | | | | |
| | | | | | |
| | | | | | |



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