# Series JS
## Hydraulic-Magnetic Circuit Breakers

- Small, lightweight
- VDE/UL/CSA recognized
- UL 489 A listed
- International Approvals
- Available for marine applications
- Ratings: 0.1 A to 50 A

**Heinemann**® Circuit Breakers

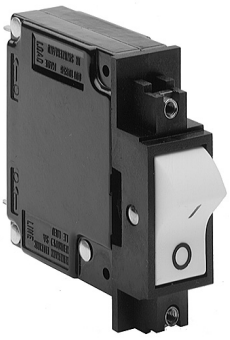
RoHs Compliant
ISO 9001 Certified
ISO 14001 Certified

**Type**

**JAS**

**JBS**

**JCS**



**JES**

**Content**

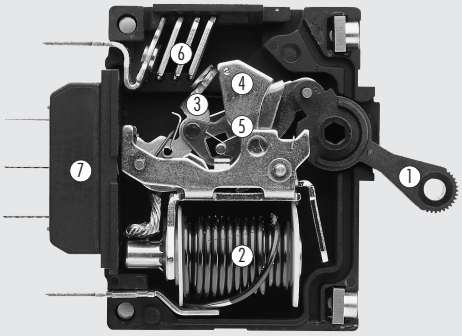


**Remark:** After use of circuit breaker, the unit must be discarded in accordance with local regulations.

The technical information published in this handbook is subject to change without prior notice. Modifications may occur as part of continual improvement of our products.

# HYDRAULIC-MAGNETIC PRINCIPLE

## Description




**1** The handle has two positions only «ON» and «OFF», giving an unmistakable visual indication of the switch position. However, the MID-TRIP versions have three positions (See working principle page 23).

**2** Tripping of all JS hydraulic-magnetic MCB's is caused by excess current through the solenoid. This is designed for the rated currents and is not influenced by the prevailing ambient temperature with regard to its operating point.

**3** For each make and break operation the moving contact arm slides across the lower contact area, thus creating a wiping action which guarantees low contact resistance and, therefore, long life.

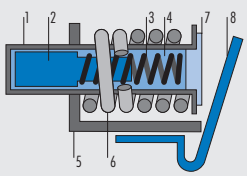
**4** The armature is completely balanced, thus preventing switching off under severe shock and vibration conditions.

**5** The switch mechanism is simple and robust. Designed «trip free» so that it is impossible to hold on the switch against an existing short-circuit.

**6** The arc produced by the switch operation is broken down into a number of smaller arcs by the special shape of the contacts and the extinguishing grids, and is blown out by the magnetic field generated. The arc is formed on special contact surfaces

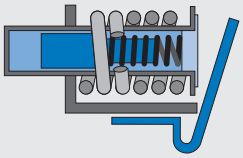
**7** JS MCB's can also be supplied with auxiliary contacts.

## Principle

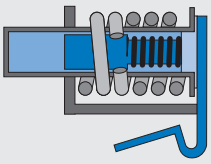
① 


The load current either at or below the nominal rating of the breaker - The core remains at the end of the tube opposite the armature.

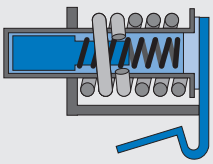
**1**. tube / **2**. core / **3**. spring / **4**. fluid / **5**. frame / **6**. coil (sensor) / **7**. pole piece / **8**. armature

② 

Moderate overload - The core is moving.

③ 

Overload - The core has fully moved to the opposite end of the tube (pole piece) attracting the armature - the breaker has tripped.

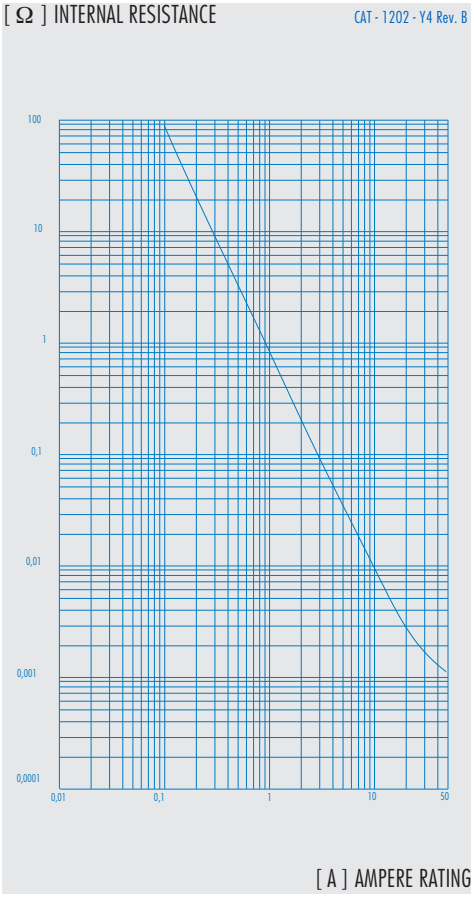
④ 

On heavy overloads or short circuits, the flux produced by the coil alone, regardless of core position, is sufficient to pull in the armature - The breaker trips.
This circuit interruption occurs with no intentional delay.

## Technical characteristics

| | |
|---|---|
| Operating Temperature | - 40°C + 85°C |
| Storage Temperature | -40°C +85°C |
| Humidity | IEC 68-2-3<br>and MIL - STD - 202<br>Method 103 Test A |
| Protection | IEC 529<br>IP 00 Back terminals sealing<br>IP 40 Front sealing<br>IP 65 JES Handle |
| Shock | IEC 68-2-27<br>MIL - STD - 202, method 213<br>cond 1 100 G, 6 ms<br>or 50 G, 11 ms |
| Vibration | IEC 68-2-6<br>MIL - STD - 202, method 204<br>10 to 500 Hz 10 G<br>amplitude 1,52 mm |
| Vibrations (Rail) | IEC 61373<br>Cat. 1<br>Classe B.cE |
| Life | 10 000 switching operations<br>with 6000 at rated current<br>50/60 Hz |
| Approx. weights | 1 pole 65 g = 0.143 lbs<br>2 poles 140 g = 0.308 lbs<br>3 poles 210 g = 0.463 lbs<br>4 poles 280 g = 0.617 lbs |
| Approvals | UL - CSA and VDE.<br>In conformity with IEC 950 |
| Rail Approvals | NFF 16101 - 16102 (A1)<br>NFF 62-001 |
| Dielectric strength | 3750 V AC 50/60 Hz |
| Insulation resistance | 100 MΩ under 500 V DC |
| Auxiliary switches Rated current | 220 V AC : 10 A<br>24 V DC : 8 A (resistive)<br>220 V AC : 0,1 A<br>(contact AgAuPt) |
| Time delay | Wide range available, see pages 8 to 16 |

## Resistance and impedance values




## Tolerance limits of internal resistance

| Current (A) | Tolerances (%) |
|---|---|
| 0,01 to 19,9 | ±25 |
| 20 to 50 | ±35 |

## Approvals VDE-UL-CSA

| | Type | Nb. poles | Rating operating voltage Ue | | Rating current In | Interrupting capacity |
|---|---|---|---|---|---|---|
| DIN EN 60934 | JA.S - JB.S - JC.S - JE.S | 1 | 250 V | 50/60 Hz | 1 - 30 A | 5000 A (PC1) |
| | JA.S - JB.S - JC.S - JE.S | 2 | 415 V | 50/60 Hz | 1 - 30 A | 5000 A (PC1) |
| | JA.S - JB.S - JC.S - JE.S | 1-2 | 80 V | DC | 0,1 - 30 A | 5000 A (PC1) |
| DIN EN 60947-2* certified CENELEC | JA.S - JB.S - JC.S - JE.S | 1 | 230 V | 50/60/400 Hz | 0,1 - 25 A | Icu = Ics 1000 A |
| | JA.S - JB.S - JC.S | 2 - 4 | 400 V | 50/60/400 Hz | 0,1 - 25 A | Icu = Ics 1000 A |
| | JE.S | 2 - 3 | 400 V | 50/60/400 Hz | 0,1 - 25 A | Icu = Ics 1000 A |
| | JA.S - JB.S - JC.S - JE.S | 1 - 2 | 80 V | DC | 0,1 - 30 A | Icu = Ics 1500 A |
| | JA.S - JB.S - JC.S - JE.S | 1 | 65 V | DC | 0,1 - 50 A | Icu = Ics 1500 A |
| UL 1077 CSA C 22.2 | JA.S - JB.S - JC.S | 1 - 4 | 250 V | 50/60 Hz | 0,1 - 30 A | 5000 A ① |
| | JE.S | 1 - 3 | 250 V | 50/60 Hz | 0,1 - 30 A | 5000 A ① |
| | JA.S - JB.S - JC.S | 1 - 4 | 277 V | 50/60 Hz | 0,1 - 30 A | 5000 A ① |
| | JE.S | 1 - 3 | 277 V | 50/60 Hz | 0,1 - 30 A | 5000 A ① |
| | JA.S - JB.S - JC.S | 3 - 4 | 415 V | 50/60 Hz 3 Ø Y | 0,1 - 30 A | 1500 A ① |
| | JE.S | 3 | 415 V | 50/60 Hz 3 Ø Y | 0,1 - 30 A | 1500 A ① |
| | JA.S - JB.S - JC.S | 1 - 4 | 240 V | 400 Hz | 0,1 - 30 A | 1000 A ① |
| | JE.S | 1 - 3 | 240 V | 400 Hz | 0,1 - 30 A | 1000 A ① |
| | JA.S - JB.S - JC.S | 1 - 4 | 65 V | DC | 0,1 - 50 A | 1000 A ② |
| | JE.S | 1 - 3 | 65 V | DC | 0,1 - 50 A | 1000 A ② |
| | JA.S - JB.S - JC.S | 1 - 4 | 72 V | DC | 0,1 - 30 A | 2200 A ② |
| | JE.S | 1 - 3 | 72 V | DC | 0,1 - 30 A | 2200 A ② |
| | JA.S - JB.S - JC.S - JE.S | 1 | 80 V | DC | 0,1 - 20 A | 1000 A ② |
| | JA.S | 1 | 32 V | DC | 0,1 - 30 A | 5000 A ② |
| | JA.S | 1 | 32 V | DC | 31 - 50 A | 5000 A ① |
| UL 489 A (LISTED) Category (DITT) | JA.S | 1 | 80 V | DC | 0,8 - 30 A | 5000 A ② |

* Rating insulation voltage (Ui): 400 V AC
Working shock strength voltage (Uimp): 8 kV, T1/T2 = 1,2/50 µ s
Working category: A

① Serie fuse required: In fuse not more than 4 x In of the protector.
② Serie fuse not required.
③ A clearance of 25 mm for DC and 50 mm for AC is required between the arc vent and conductive surfaces or components.
④ 3 Ø Y
If you have any questions concerning Y circuit, please contact our technical support.

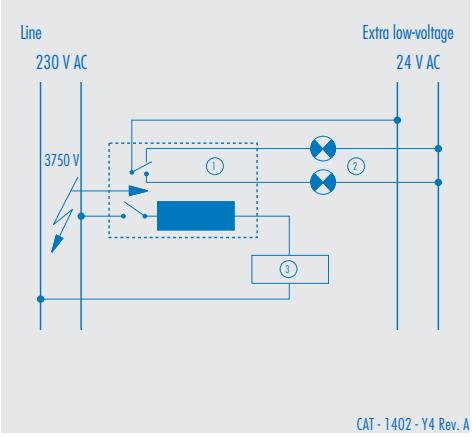
## Safety standards IEC 950

JS circuit breakers comply with international safety standards relating to information processing equipment IEC 950.
In particular, the minimum creep distances (8 mm) between two metal parts of different potential or between the different electrical circuits are respected and the insulation voltage is 3750 V.

The circuit breakers equipped with one auxiliary contact (microswitch) enable low-voltage safety circuits to be simultaneously switched with the protection of an apparatus connected to the mains. (See figures 1 and 2).

### Figure 1

One-pole circuit breaker with auxiliary contacts. The insulation voltage between the main circuits and the safety voltage circuit is 3750 V.

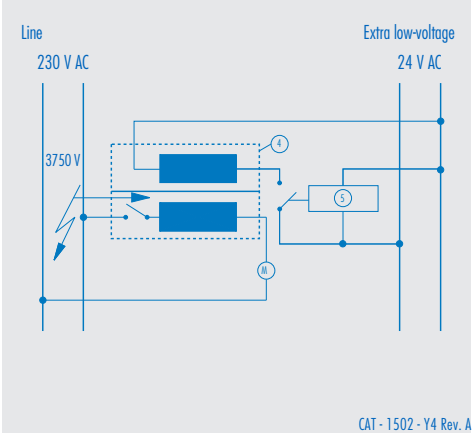



**Description**

1. Circuit breaker with auxiliary contact
2. Signaling
3. Circuit to be protected

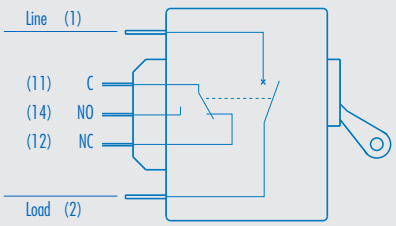
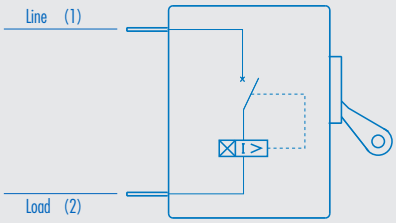
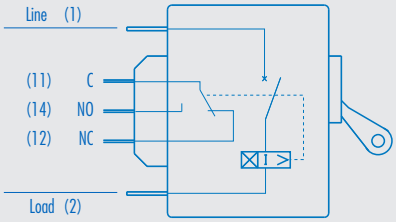
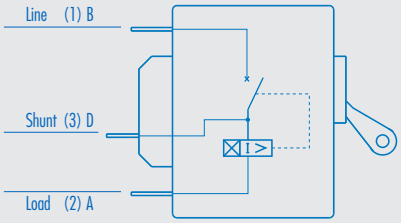
### Figure 2

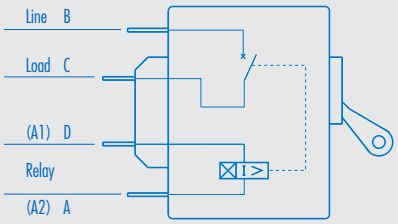
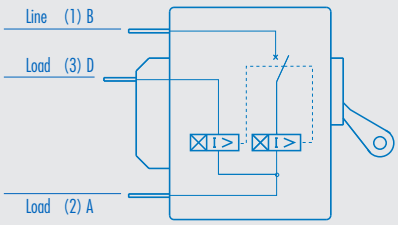
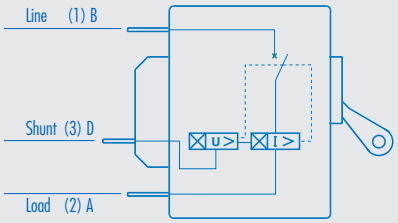
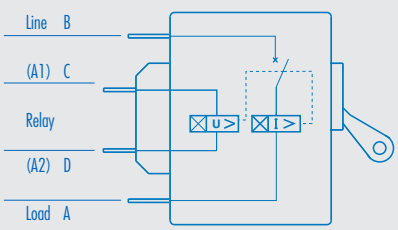
Two-pole circuit breaker for the protection of a motor with electronic remote control.

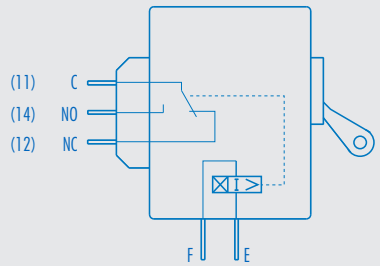
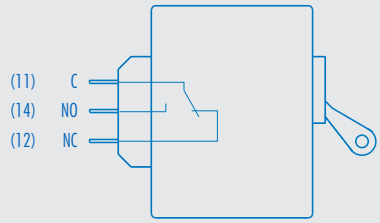



**Description**

4. Two-pole circuit breaker; protection + low-voltage control
5. Electronic control

| | Diagrams | Descriptions | How to order: 4 | Codes |
|---|---|---|---|---|
| **Switch** | Construction represented: 12<br>  <br>CAT - 1602 - Y4 Rev. C | Switch only (without coil) with or without auxiliary contact. | Auxiliary contact: without → Code 0; 1 → Code 12 | **0**<br>**12** |
| **Series Trip** | Construction represented: 3, 8, 38<br>  <br>CAT - 1702 - Y4 Rev. B | The contacts and the coil are in series. This is the current execution of the JS circuit breaker.<br>It is often used as main switch at the same time. | Inrush: 8x → Code 3; 15x → Code 8; 22x → Code 38 | **3**<br>**8**<br>**38** |
| **Series Trip with auxiliary contact** | Construction represented: 2, 9, 39<br>  <br>CAT - 1802 - Y4 Rev. B | The contacts and the coil are in series. Auxiliary contacts are placed behind the circuit breaker and mechanically connected to the releasing system. | Inrush: 8x → Aux. contact 1 → Code 2; 15x → Code 9; 22x → Code 39 | **2**<br>**9**<br>**39** |
| **Shunt Trip** | Construction represented: 5, 22 32<br>  <br>CAT - 1902 - Y4 Rev. B | Enables two loads to be checked by means of a single circuit breaker. However it only releases if there is an overload in the main circuit. The sum of the two nominal currents must not exceed the peak current of the contacts. It is also possible to calibrate the trip point through a potentiometer connected between the shunt terminal (3)D and the load terminal (2)A. | Inrush: 8x → Code 5; 15x → Code 22; 22x → Code 32 | **5**<br>**22**<br>**32** |

| | Diagrams | Descriptions | How to order: 4 | Codes |
|---|---|---|---|---|
| **Relay trip** | Construction represented: 6, 23, 33<br>  <br>CAT - 2002- Y4 Rev. D | Relay tripping can be used for releasing the circuit breaker by the intermediary of a monitor or a safety device installed at a distance. The contacts are electrically separated from the coil. Consequently, all the currents and voltages within the permissible limits can be used. Coils are either current or voltage sensitive.<br>The circuit breaker can be supplied on request with a dielectric strength ranging up to 2500 V on alternating current 50/60 Hz between the coil and the contacts. | Inrush 8x 15x 22x<br>Aux. contact Code<br>without 6 23 33<br>1 62 | **6**<br>**23**<br>**33**<br>**62** |
| **Dual rating** | Construction represented: 7, 27, 37<br>  <br>CAT - 2102 - Y4 Rev. B | Dual rating circuit breakers are suitable for apparatus operating under two different currents or voltages. As far as possible, the currents must be in the ratio of one to two with a maximum of 10 to 20 A. | Inrush 8x 15x 22x<br>Code 7 27 37 | **7**<br>**27**<br>**37** |
| **Dual Control (Ducon)** | Construction represented: 15, 25<br>  <br>CAT - 2202 - Y4 Rev. B | This version is used both for the protection of the load finding itself in series with the circuit breaker and for the release via a voltage. The main coil is in series with the contact and the DUCON coil is shunt trip. | Inrush 8x 15x<br>Aux. contact Code<br>without 15 25<br>1 53 | **15**<br>**25**<br>**53** |
| **Dual Control (Ducon) (Series + Relay)** | Construction represented: 16, 26<br>  <br>CAT - 2302 - Y4 Rev. C | Same function as codes 15 and 25, but both coils are electrically separated. | Inrush 8x 15x<br>Aux. contact Code<br>without 16/66* 26<br>1 63<br><br>* 66, the two coils are electrically separated from the main contact. | **16**<br>**26**<br>**63**<br>**66*** |

| | Diagrams | Descriptions | How to order: 4 | Codes |
|---|---|---|---|---|
| **Relay trip for IEC execution** | Construction represented: 88<br>  <br>CAT - 2402- Y4 Rev. B | These internal circuits have no main contact. When combined with another pole, they permit compliance with the safety regulations dictated by IEC 950.<br><br>The minimum required creepage distance between two galvanically separated electric circuits can thus be attained.<br>(see page 4).<br><br>NB: This breaker should always be combined with one or other poles. | Inrush 8x 15x 22x<br>Aux. contact Code<br>without 86 76 96<br>1 88 | **76**<br>**86**<br>**88**<br>**96** |
| **Auxiliary contact** | Construction represented: 82<br>  <br>CAT - 17202 - Y4 Rev. A | Auxiliary contact only without main contact and coil.<br><br>NB: This breaker should always be combined with one or other poles. | Aux. contact Code<br>1 82 | **82** |

## Tripping specification

How to order: 12

All curves describe breaker response with no preloading. Curves are plotted at an ambient temperature of 25° C, with breakers in the standard wall-mount position.

All circuit breakers shall hold 100% rated load continuously.

Breakers for 50/60 Hz or DC service may trip between 101% and 125% rated load, must trip at 125% and above, as shown on the time-delay curve selected. (150% for 400 Hz).

Non-time-delay circuit breakers may (P curve) trip instantaneously between 101 % and 125 % of rated load, must trip instantaneously at 125 % for 50/60 Hz or DC. (150 % for 400 Hz).

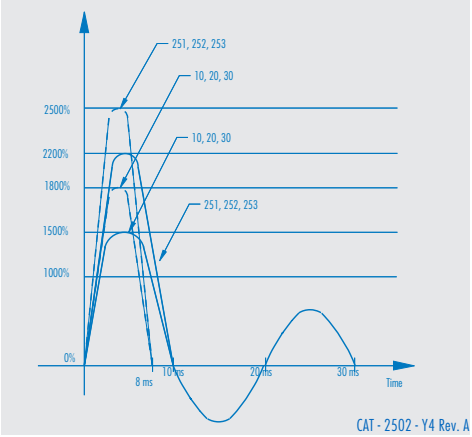
The voltage trip breakers may trip below 100% rated voltage, must trip at 100% and above.

They are only available in no-time-delay construction (P curve).

Time delay curve codes are based on selection of high-inrush values

| | | | | |
|---|---|---|---|---|
| at | 8 X In | curves | 1 - 2 - | 3 |
| at | 15 X In | curves | 10 - 20 - | 30 |
| at | 22 X In | curves | 251 - 252 - | 253 |

## High-inrush rates valid for different curves




CAT - 2502 - Y4 Rev. A

JS circuit breakers are available with various levels of high-inrush currents avoiding nuisance tripping during short starting periodes at turn on.

In the case of motor protection for example, causing a steep wave front transient of very high current amplitude and short duration of overload, the breaker does not trip.

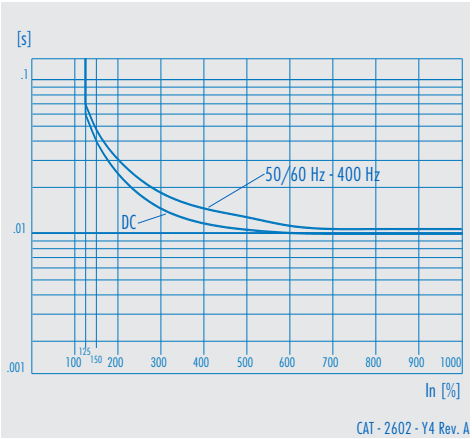
By using JS high-inrush types, unnecessary and dangerous overcalibrations involving use of thicker cables or wires can be avoided, thus saving energy and money.

The magnetic shunt used offers maximum possibilities on half wave which is 10 ms when frequency is 50 Hz. At 60 Hz half wave periode is 8 ms based on value of 1800% instead of 1500% and 2500% instead of 2200% at 50 Hz.

For high-inrush rates see pages 5 and 6. For curve P, high-inrush is not possible.

———— 50 Hz
- - - - - - - 60 Hz

## Curve P 50/60 Hz, 400 Hz, DC




CAT - 2602 - Y4 Rev. A

| In.% | | 125 | 150 | 200 | 300 | 400 | 500 | 600 | 700 | 800 | 900 | 1000 | 1100 | 1200 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 50/60 Hz | MAX | .07 | .048 | .030 | .019 | .0165 | .014 | .012 | .011 | - | .011 | - | - | .011 |
| 400 Hz | MAX | - | .048 | .030 | .019 | .0165 | .014 | .012 | .011 | - | .011 | - | - | .011 |
| DC | MAX | .06 | .040 | .025 | .016 | .0125 | .011 | .010 | .010 | - | .010 | - | - | .010 |

### Internal circuits concerned

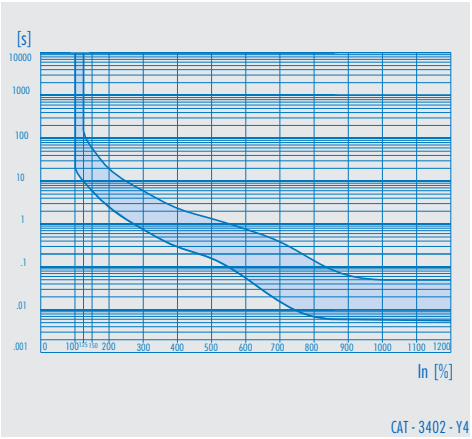
2, 3, 5, 6, 7, 15, 16, 53, 62, 63, 66, 86, 88

## TIME DELAY CURVES

START OVERLOAD 8 x In

INTERNAL CIRCUITS CONCERNED :
2, 3, 5, 6, 7, 15, 16, 53, 62, 63, 66, 86, 88

### Curve 2 50/60 Hz

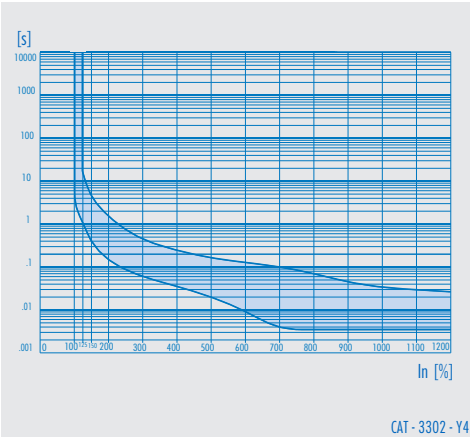



CAT - 3402 - Y4

| In.% | 125 | 150 | 200 | 300 | 400 | 500 | 600 | 700 | 800 | 900 | 1000 | 1100 | 1200 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MAX | 175 | 60 | 20.0 | 5.00 | 2.30 | 1.50 | .750 | .400 | .160 | .065 | .040 | - | - |
| MIN | 10 | 6 | 2.5 | .75 | .30 | .17 | .055 | .016 | .007 | .006 | .005 | - | - |

**MEDIUM DELAY**

### Curve 3 50/60 Hz

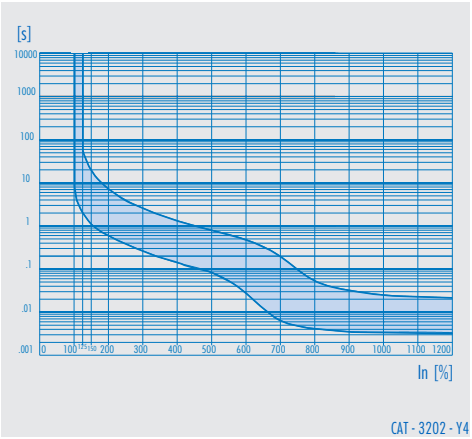



CAT - 3302 - Y4

| In.% | 125 | 150 | 200 | 300 | 400 | 500 | 600 | 700 | 800 | 900 | 1000 | 1100 | 1200 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MAX | 17 | 4.50 | 1.60 | .46 | .250 | .18 | .130 | .100 | .0700 | .0450 | .0350 | - | - |
| MIN | 1 | .40 | .16 | .06 | .035 | .02 | .009 | .004 | .0035 | .0035 | .0035 | - | - |

**SHORT DELAY**

### Curve 2 DC

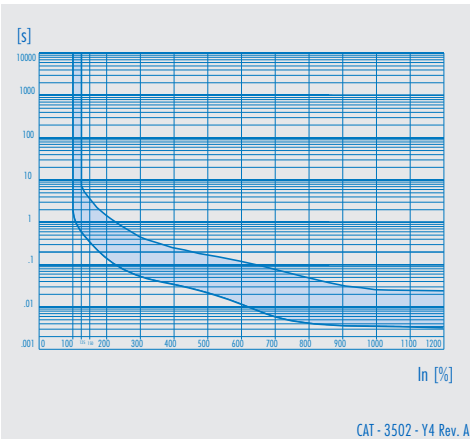



CAT - 3202 - Y4

| In.% | 125 | 150 | 200 | 300 | 400 | 500 | 600 | 700 | 800 | 900 | 1000 | 1100 | 1200 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MAX | 55.0 | 20.0 | 7.50 | 2.80 | 1.40 | .800 | .480 | .2000 | .0510 | .0320 | .0260 | - | - |
| MIN | 2.1 | 1.2 | .60 | .27 | .15 | .085 | .029 | .0065 | .0041 | .0038 | .0037 | - | - |

**MEDIUM DELAY**

### Curve 3 DC




CAT - 3502 - Y4 Rev. A

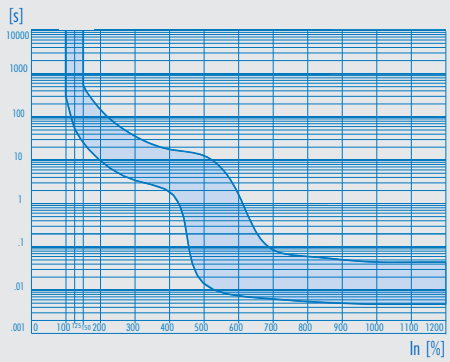
| In.% | 125 | 150 | 200 | 300 | 400 | 500 | 600 | 700 | 800 | 900 | 1000 | 1100 | 1200 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MAX | 7.0 | 3.50 | 1.40 | .420 | .250 | .180 | .120 | .080 | .0510 | .0320 | .0260 | - | - |
| MIN | .6 | .35 | .15 | .055 | .035 | .021 | .012 | .006 | .0041 | .0038 | .0037 | - | - |

**SHORT DELAY**

## TIME DELAY CURVES

START OVERLOAD 8 x In (Continued)

### Curve 1
### 400 Hz

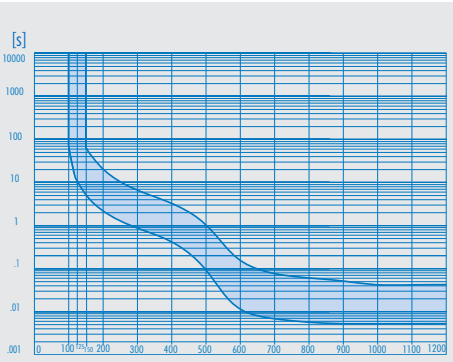



CAT - 3602 - Y4

| In.% | 125 | 150 | 200 | 300 | 400 | 500 | 600 | 700 | 800 | 900 | 1000 | 1100 | 1200 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MAX | - | 500 | 150.0 | 35.0 | 19.0 | 14.000 | 1.6000 | .0800 | .0600 | .050 | .0430 | - | - |
| MIN | - | 25 | 9.5 | 3.3 | 1.9 | .015 | .0073 | .0063 | .0055 | .005 | .0049 | - | - |

**LONG DELAY**

### Curve 2
### 400 Hz

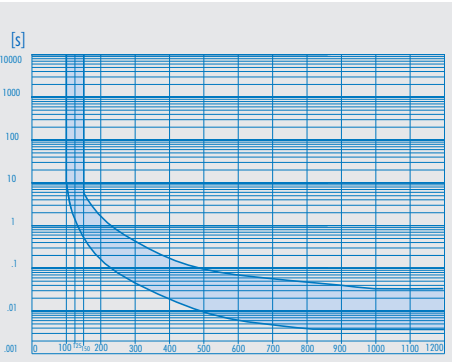



CAT - 3702 - Y4

| In.% | 125 | 150 | 200 | 300 | 400 | 500 | 600 | 700 | 800 | 900 | 1000 | 1100 | 1200 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MAX | - | 60 | 20.0 | 6.50 | 3.10 | 1.00 | .160 | .0750 | .0590 | .049 | .040 | - | - |
| MIN | - | 5 | 2.1 | .85 | .40 | .09 | .011 | .0067 | .0055 | .005 | .005 | - | - |

**MEDIUM DELAY**

### Curve 3
### 400 Hz




CAT - 3802 - Y4

| In.% | 125 | 150 | 200 | 300 | 400 | 500 | 600 | 700 | 800 | 900 | 1000 | 1100 | 1200 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MAX | - | 5.80 | 1.80 | .460 | .18 | .10 | .0750 | .060 | .0500 | .042 | .036 | - | - |
| MIN | - | .55 | .17 | .049 | .02 | .01 | .0065 | .005 | .0041 | .004 | .004 | - | - |

**SHORT DELAY**

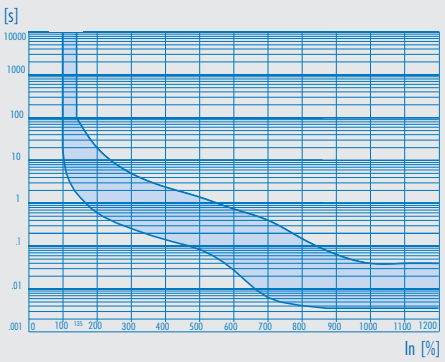
## TIME DELAY CURVES

START OVERLOAD 8 x In (Continued)

COMBINED AC/DC VERSIONS
This type of circuit breaker can be used for 50/60 Hz and DC applications.
In this case the must trip point is rated at 135%.

INTERNAL CIRCUITS CONCERNED :
2, 3

**Curve 2**
**50/60 Hz/DC**

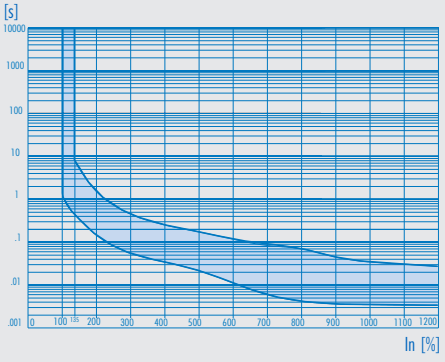



CAT - 3902 - Y4

| In.% | 135 | 200 | 300 | 400 | 500 | 600 | 700 | 800 | 900 | 1000 | 1100 | 1200 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MAX | 100.0 | 20.00 | 5.00 | 2.30 | 1.500 | .750 | .4000 | .1600 | .0650 | .0400 | - | - |
| MIN | 1.8 | .60 | .27 | .15 | .085 | .029 | .0065 | .0041 | .0038 | .0037 | - | - |

**MEDIUM DELAY**

**Curve 3**
**50/60 Hz/DC**




CAT - 4002 - Y4

| In.% | 135 | 200 | 300 | 400 | 500 | 600 | 700 | 800 | 900 | 1000 | 1100 | 1200 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MAX | 7.50 | 1.60 | .460 | .250 | .180 | .130 | .8000 | .0700 | .0450 | .0350 | - | - |
| MIN | .45 | .15 | .055 | .035 | .021 | .012 | .0060 | .0041 | .0038 | .0037 | - | - |

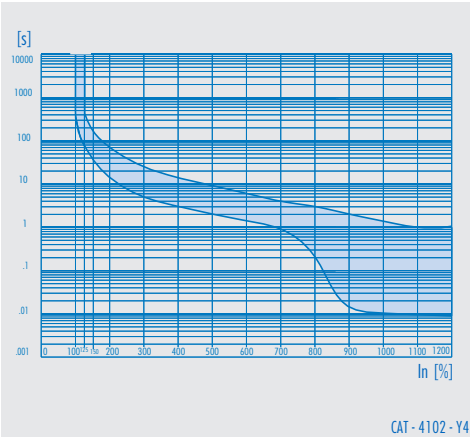
**SHORT DELAY**

## TIME DELAY CURVES

START OVERLOAD 15 x In

INTERNAL CIRCUITS CONCERNED :
8, 9, 22, 23, 25*, 26*, 27, 76 *(only with curve 20 or 30)

### Curve 10 50/60 Hz

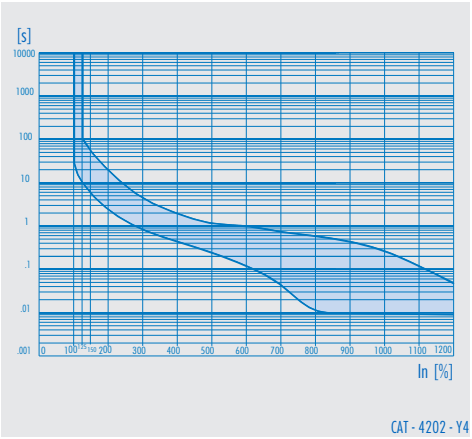



CAT - 4102 - Y4

| In.% | 125 | 150 | 200 | 300 | 400 | 500 | 600 | 700 | 800 | 900 | 1000 | 1100 | 1200 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MAX | 400 | 170 | 70 | 25 | 15 | 9 | 6.0 | 4.00 | 3.00 | 2.000 | 1.500 | 1.000 | 1.000 |
| MIN | 75 | 35 | 15 | 5 | 3 | 2 | 1.5 | .90 | .20 | .015 | .010 | .0095 | .009 |

**LONG DELAY**

### Curve 20 50/60 Hz

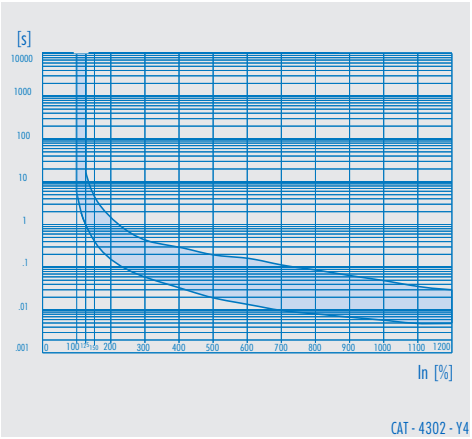



CAT - 4202 - Y4

| In.% | 125 | 150 | 200 | 300 | 400 | 500 | 600 | 700 | 800 | 900 | 1000 | 1100 | 1200 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MAX | 100 | 55 | 20.0 | 4.50 | 2.00 | 1.20 | 1.00 | .750 | .600 | .45 | .29 | .12 | .05 |
| MIN | 10 | 6 | 2.5 | .85 | .45 | .25 | .13 | .045 | .012 | .01 | .01 | .01 | .01 |

**MEDIUM DELAY**

### Curve 30 50/60 Hz

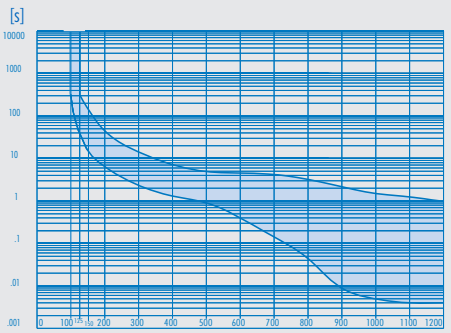



CAT - 4302 - Y4

| In.% | 125 | 150 | 200 | 300 | 400 | 500 | 600 | 700 | 800 | 900 | 1000 | 1100 | 1200 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MAX | 17 | 4.50 | 1.60 | .46 | .300 | .20 | .170 | .12 | .0900 | .065 | .050 | .038 | .030 |
| MIN | 1 | .40 | .16 | .06 | .035 | .02 | .015 | .01 | .0085 | .007 | .006 | .005 | .005 |

**SHORT DELAY**

## Curve 10 DC

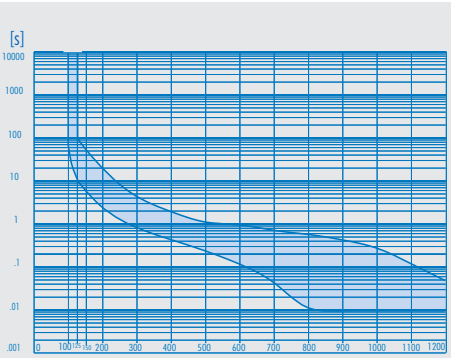



CAT - 4402 - Y4

| In.% | 125 | 150 | 200 | 300 | 400 | 500 | 600 | 700 | 800 | 900 | 1000 | 1100 | 1200 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MAX | 300 | 150 | 45.0 | 15.0 | 7.1 | 5.00 | 4.90 | 4.10 | 3.100 | 2.200 | 1.600 | 1.300 | .850 |
| MIN | 35 | 15 | 6.5 | 2.3 | 1.4 | .90 | .40 | .15 | .045 | .009 | .005 | .004 | .004 |

**LONG DELAY**

## Curve 20 DC

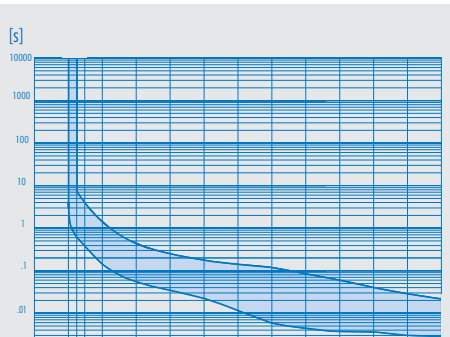



CAT - 4502 - Y4

| In.% | 125 | 150 | 200 | 300 | 400 | 500 | 600 | 700 | 800 | 900 | 1000 | 1100 | 1200 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MAX | 100 | 55 | 20.0 | 4.50 | 2.00 | 1.20 | 1.00 | .750 | .600 | .45 | .29 | .12 | .05 |
| MIN | 10 | 6 | 2.5 | .85 | .45 | .25 | .13 | .045 | .012 | .01 | .01 | .01 | .01 |

**MEDIUM DELAY**

## Curve 30 DC




CAT - 4602 - Y4

| In.% | 125 | 150 | 200 | 300 | 400 | 500 | 600 | 700 | 800 | 900 | 1000 | 1100 | 1200 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MAX | 7.00 | 4.00 | 1.40 | .420 | .250 | .180 | .150 | .120 | .0850 | .0590 | .0400 | .029 | .021 |
| MIN | .60 | .40 | .15 | .055 | .035 | .021 | .012 | .006 | .0041 | .0038 | .0037 | .003 | .003 |

**SHORT DELAY**

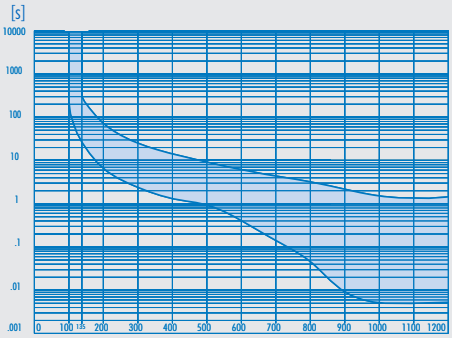
## TIME DELAY CURVES

START OVERLOAD 15 x In (Continued)

COMBINED AC/DC VERSIONS
This type of circuit breaker can be used for 50/60 Hz and DC applications.
In this case the must trip point is rated at 135%.

INTERNAL CIRCUITS CONCERNED :
8, 9

### Curve 10
### 50/60 Hz/DC

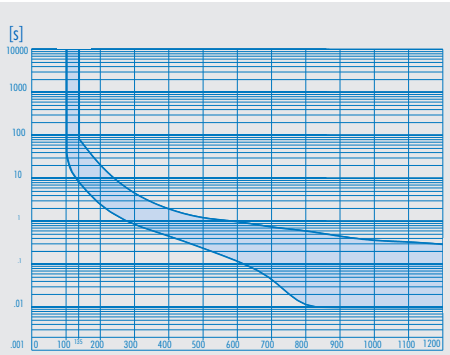



CAT - 4702 - Y4

| In.% | 135 | 200 | 300 | 400 | 500 | 600 | 700 | 800 | 900 | 1000 | 1100 | 1200 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MAX | 280 | 70.0 | 25.0 | 15.0 | 9.00 | 6.00 | 4.10 | 3.100 | 2.200 | 1.600 | - | - |
| MIN | 24 | 6.5 | 2.3 | 1.4 | .90 | .40 | .15 | .045 | .009 | .005 | - | - |

**LONG DELAY**

### Curve 20
### 50/60 Hz/DC

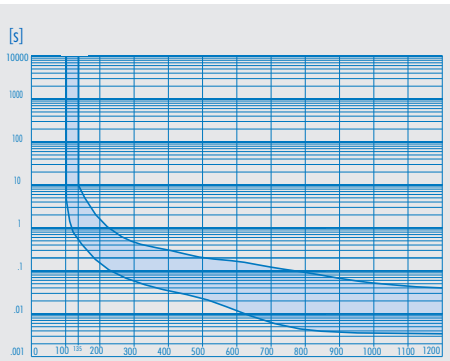



CAT - 4802 - Y4

| In.% | 135 | 200 | 300 | 400 | 500 | 600 | 700 | 800 | 900 | 1000 | 1100 | 1200 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MAX | 85.0 | 20.0 | 4.50 | 2.00 | 1.20 | 1.00 | .750 | .600 | .450 | .290 | - | - |
| MIN | 8.0 | 2.5 | .85 | .45 | .25 | .13 | .045 | .012 | .010 | .010 | - | - |

**MEDIUM DELAY**

### Curve 30
### 50/60 Hz/DC




CAT - 4902 - Y4

| In.% | 135 | 200 | 300 | 400 | 500 | 600 | 700 | 800 | 900 | 1000 | 1100 | 1200 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MAX | 8.80 | 1.60 | .460 | .300 | .200 | .170 | .120 | .0900 | .0650 | .0500 | - | - |
| MIN | .49 | .15 | .055 | .035 | .021 | .012 | .006 | .0041 | .0038 | .0037 | - | - |

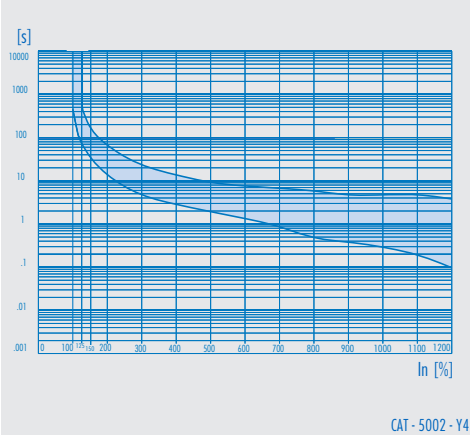
**SHORT DELAY**

## TIME DELAY CURVES

START OVERLOAD 22 x In

INTERNAL CIRCUITS CONCERNED :
32, 33, 37, 38, 39, 96

**Curve 251**
**50/60 Hz or DC**

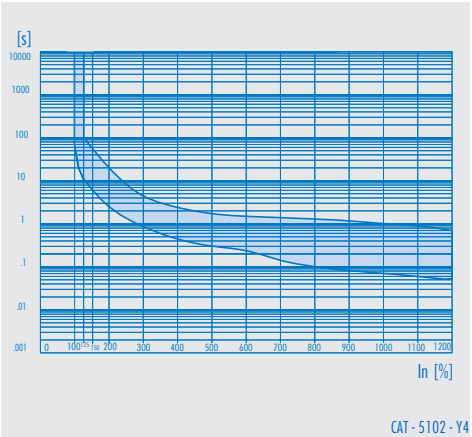



CAT - 5002 - Y4

| In.% | 125 | 150 | 200 | 300 | 400 | 500 | 600 | 700 | 800 | 900 | 1000 | 1100 | 1200 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MAX | 400 | 170 | 70 | 25 | 15 | 9.5 | 8.0 | 7.0 | 6.0 | 5.0 | 5.0 | 5.0 | 4.0 |
| MIN | 75 | 35 | 15 | 5 | 3 | 2.0 | 1.5 | .9 | .5 | .4 | .3 | .2 | .1 |

**LONG DELAY**

**Curve 252**
**50/60 Hz or DC**

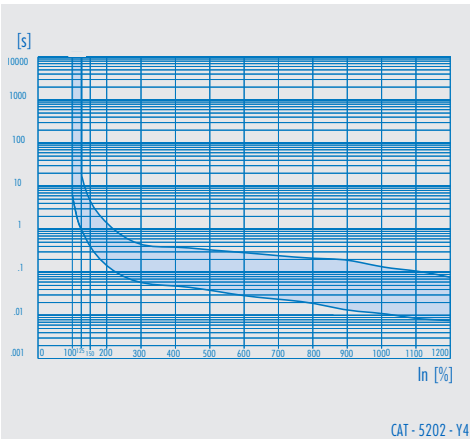



CAT - 5102 - Y4

| In.% | 125 | 150 | 200 | 300 | 400 | 500 | 600 | 700 | 800 | 900 | 1000 | 1100 | 1200 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MAX | 100 | 55 | 20.0 | 4.50 | 2.50 | 1.80 | 1.60 | 1.50 | 1.40 | 1.20 | 1.00 | .90 | .70 |
| MIN | 10 | 6 | 2.5 | .85 | .45 | .30 | .22 | .15 | .10 | .08 | .07 | .06 | .05 |

**MEDIUM DELAY**

**Curve 253**
**50/60 Hz or DC**




CAT - 5202 - Y4

| In.% | 125 | 150 | 200 | 300 | 400 | 500 | 600 | 700 | 800 | 900 | 1000 | 1100 | 1200 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MAX | 17 | 4.50 | 1.60 | .46 | .40 | .35 | .30 | .250 | .220 | .200 | .150 | .120 | .080 |
| MIN | 1 | .40 | .16 | .06 | .05 | .04 | .03 | .025 | .020 | .015 | .012 | .009 | .008 |

**SHORT DELAY**

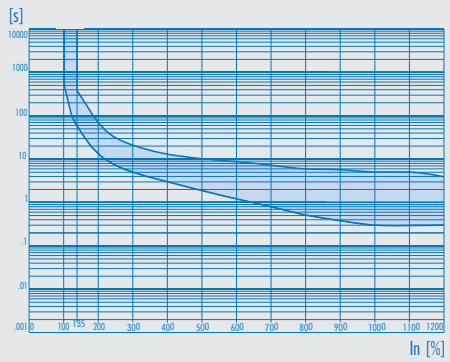
## TIME DELAY CURVES

START OVERLOAD 22 x In (Continued)

COMBINED AC/DC VERSIONS
This type of circuit breaker can be used for 50/60 Hz and DC applications.
In this case the must trip point is rated at 135%.

INTERNAL CIRCUITS CONCERNED :
38, 39

### Curve 251 50/60 Hz/DC

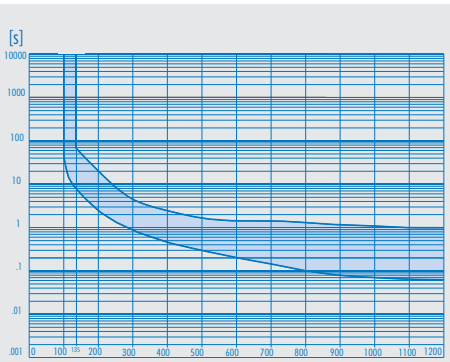



CAT - 5402 - Y4 Rev. A

| In.% | 135 | 200 | 300 | 400 | 500 | 600 | 700 | 800 | 900 | 1000 | 1100 | 1200 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MAX | 400 | 70 | 23 | 13 | 10 | 8.0 | 7.0 | 6.0 | 5.3 | 5.1 | - | - |
| MIN | 60 | 14 | 5 | 3 | 2 | 1.3 | .9 | .5 | .4 | .3 | - | - |

LONG DELAY

### Curve 252 50/60 Hz/DC

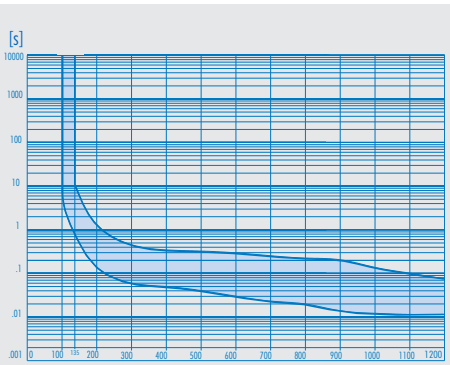



CAT - 5302 - Y4

| In.% | 135 | 200 | 300 | 400 | 500 | 600 | 700 | 800 | 900 | 1000 | 1100 | 1200 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MAX | 75.0 | 20.0 | 4.50 | 2.50 | 1.80 | 1.50 | 1.50 | 1.40 | 1.20 | 1.10 | - | - |
| MIN | 7.5 | 2.5 | .85 | .45 | .30 | .20 | .15 | .10 | .08 | .07 | - | - |

MEDIUM DELAY

### Curve 253 50/60 Hz/DC




CAT - 5502 - Y4

| In.% | 135 | 200 | 300 | 400 | 500 | 600 | 700 | 800 | 900 | 1000 | 1100 | 1200 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MAX | 11.0 | 1.40 | .45 | .35 | .33 | .30 | .230 | .22 | .200 | .130 | - | - |
| MIN | .8 | .15 | .06 | .05 | .04 | .03 | .023 | .02 | .013 | .012 | - | - |

SHORT DELAY

How to order: 1

**Type JAS (front mounting)**

**JAS** circuit breakers are designed for front mounting.

2 inserts are available for screws with M3 or 6/32 threads.

Cutouts are circular (for any thickness of panels between 1-3 mm).

Panel cutouts depends on number of poles.

**JAS** circuit breakers are available in 1, 2, 3 or 4 pole execution.

The screws are not delivered with the breakers, as it depend on the panel thickness.

**Type JBS (snap-in mount breakers)**

**JBS** circuit breakers are identical to JAS type except for the method of mounting. The special spring-clip face plate allows a snap-in function without need of screws or tools.

Cutouts are rectangular (for any thickness of panels between 1-3 mm).

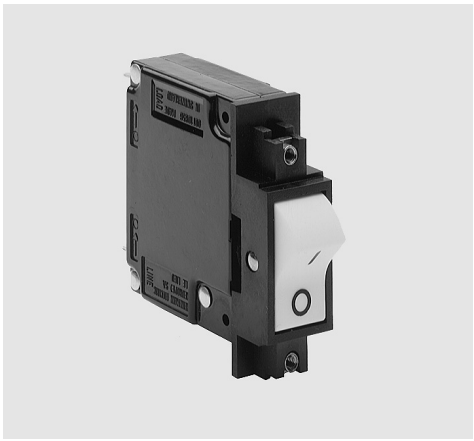
Panel cutouts depends on number of poles.

**JBS** circuit breakers are available in 1, 2, 3 or 4 pole execution, with handle on each pole.

This type of circuit breaker is not available with internal circuits 53, 62, 63, 66, 88.

**JBS** dummy frontal plates are available, to be fitted on cutouts larger than MCB's. Ordering part No. 20808.

**Type JCS (rocker-handle breakers)**



**JCS** circuit breakers are available with rocker-handles in white, black or red.

**JCS** circuit breakers are designed for front mounting. Threads with M3 or 6-32.

**JCS** circuit breakers are available in 1, 2, 3 or 4 pole execution.

**Type JES (sealed front mounting) IP 65**

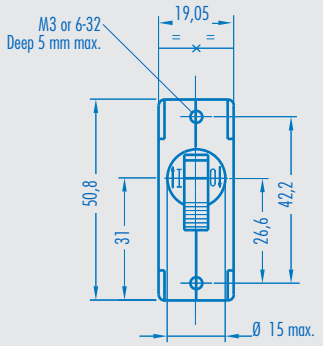
**JES** circuit breakers are well suited for use where protection against water spray and splash is needed.
A moulded-in-place silicon rubber surrounding the bat-type handle effectively prevents water entry.
The panel cutout itself is sealed by a captive O-ring at the base of the breaker's theaded gland bushing.

**JES** breakers are easy to fit. A lock washer and the captive O-ring provide a firm pressure-tight fit when the hex nut is tightened.

**JES** circuit breakers are available in 1, 2 or 3 pole execution (one handle only).

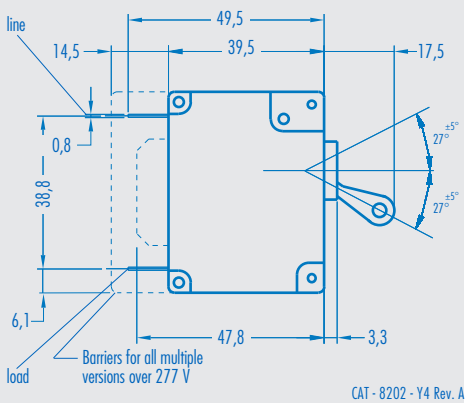
## Fixing inserts

### 1 pole




Tolerance : ± 0,8

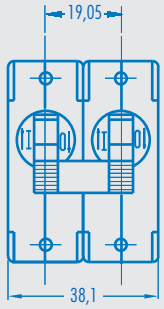
CAT - 7802 - Y4 Rev. A




Tolerance : ± 0,8

CAT - 8202 - Y4 Rev. A

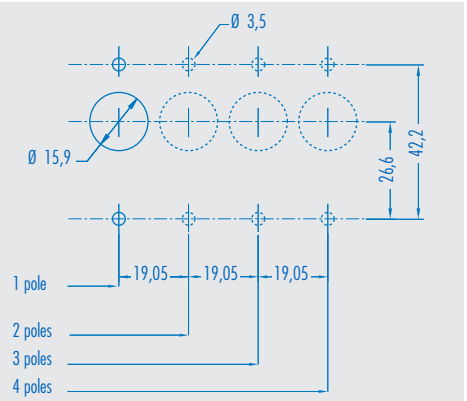
### 2 poles




Tolerance : ± 0,8

CAT - 7902 - Y4 Rev. A

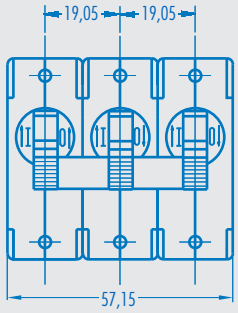
### Panel cutout (front setting)




Tolerance : ± 0,1

CAT - 8302 - Y4 Rev. A

### 3 poles




Tolerance : ± 0,8

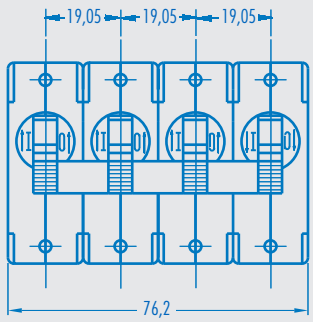
CAT - 8002 - Y4 Rev. A

### Note

Multipole circuit breakers JAS-type are also available with one single handle only up to 3 poles and 2 handles for 4 pole version (see page 29).

How to order: 5

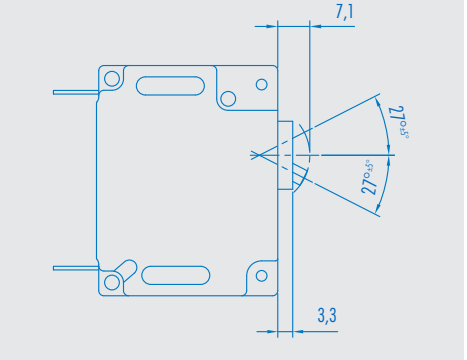
### 4 poles




Tolerance : ± 0,8

CAT - 8102 - Y4 Rev. A

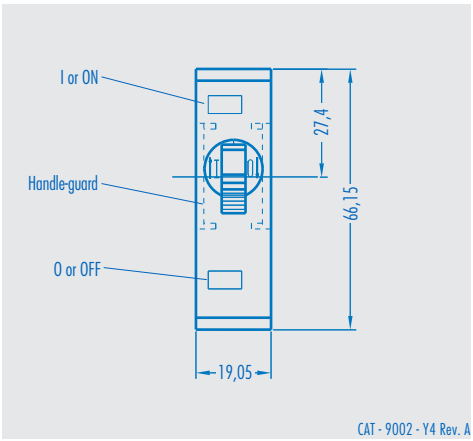
### 1 pole Short-Handle



# DIMENSIONS OF JBS 19,05 TYPE

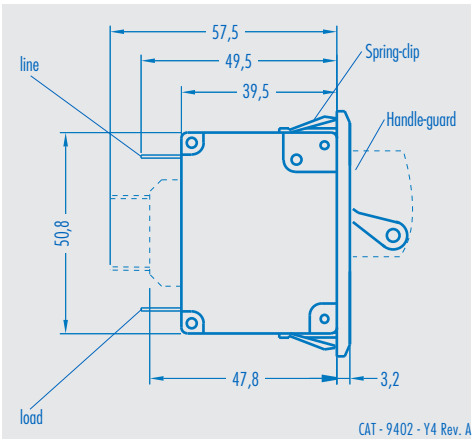
## Fixing inserts

### 1 pole




CAT - 9002 - Y4 Rev. A

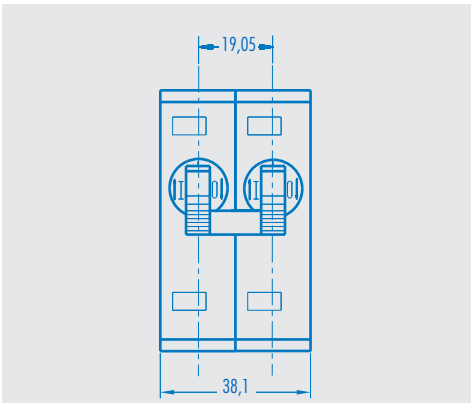
Tolerance : ± 0,8




CAT - 9402 - Y4 Rev. A

Tolerance : ± 0,8

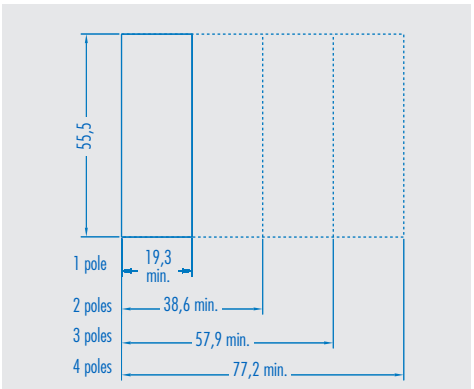
### 2 poles




CAT - 9102- Y4 Rev. A

Tolerance : ± 0,8

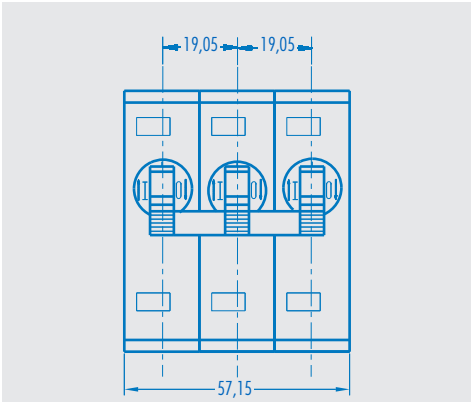
### Panel cutout (front mounting)




CAT - 16602 - Y4 Rev. A

Tolerance : ± 0,1

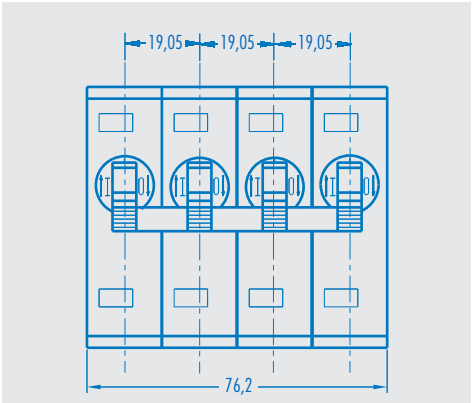
### 3 poles




CAT - 9202 - Y4 Rev. A

Tolerance : ± 0,8

### 4 poles

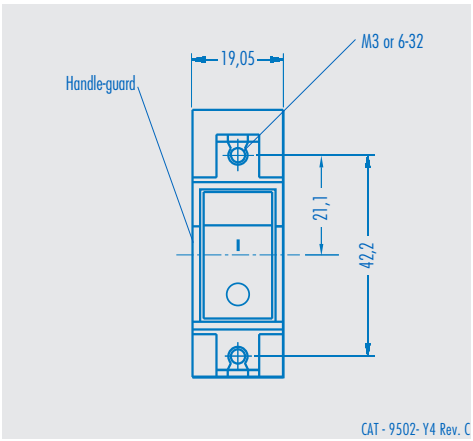



CAT - 9302 - Y4 Rev. A

Tolerance : ± 0,8

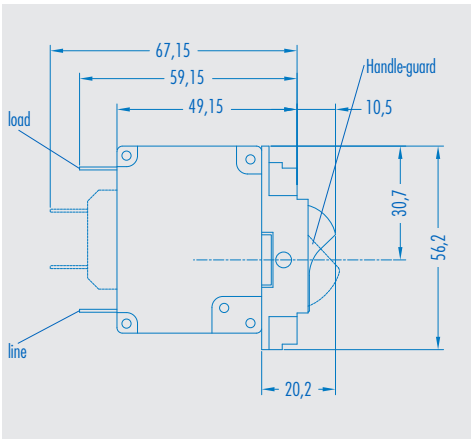
## Fixing inserts

### 1 pole



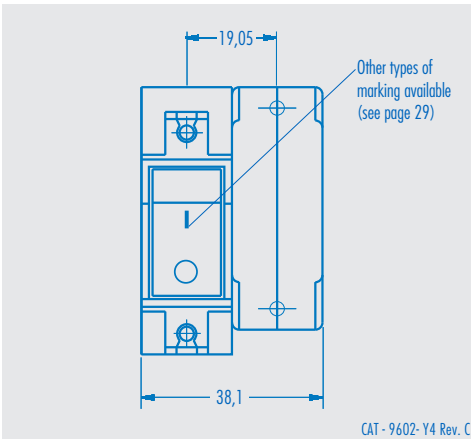

CAT - 9502- Y4 Rev. C

Tolerance : ± 0,8




Tolerance : ± 0,8

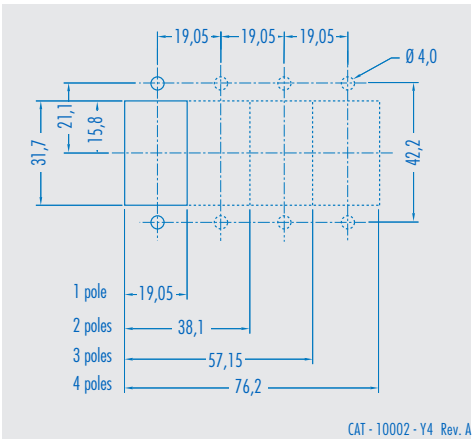
### 2 poles




CAT - 9602- Y4 Rev. C

Tolerance : ± 0,8

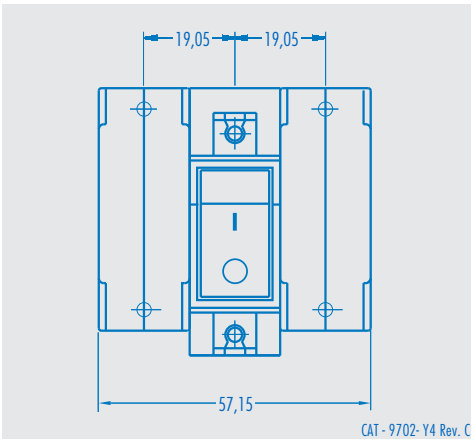
### Panel cutout (front mounting)




CAT - 10002 - Y4 Rev. A

Tolerance : ± 0,1

### 3 poles




CAT - 9702- Y4 Rev. C

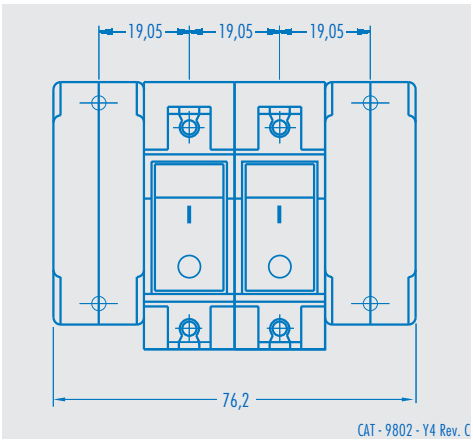
Tolerance : ± 0,8

### Note

Multipole circuit breakers JCS-type are available with one single handle only up to 3 poles and 2 handles for 4 pole version (see page 29).

How to order: 5

### 4 poles

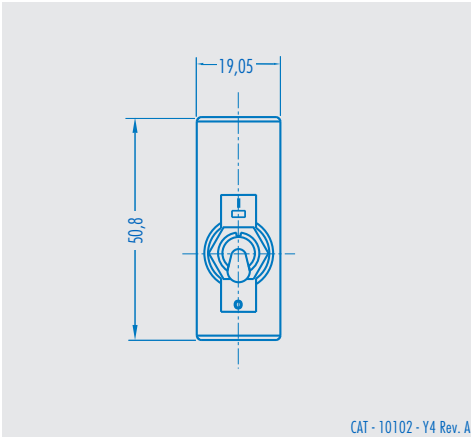



CAT - 9802 - Y4 Rev. C

Tolerance : ± 0,8

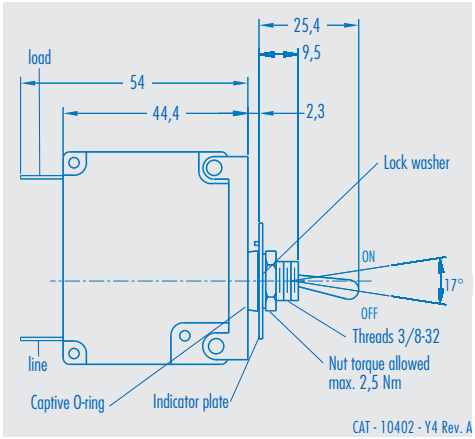
## Fixing inserts

### 1 pole




CAT - 10102 - Y4 Rev. A

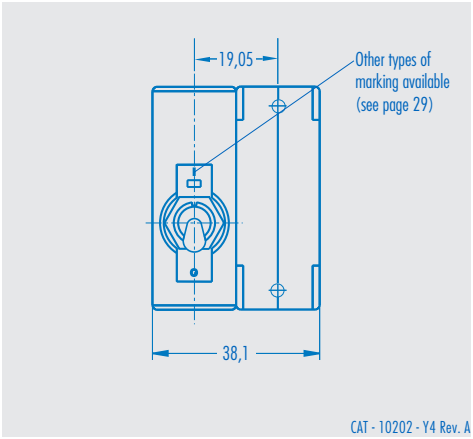
Tolerance : ± 0,8




CAT - 10402 - Y4 Rev. A

Tolerance : ± 0,8

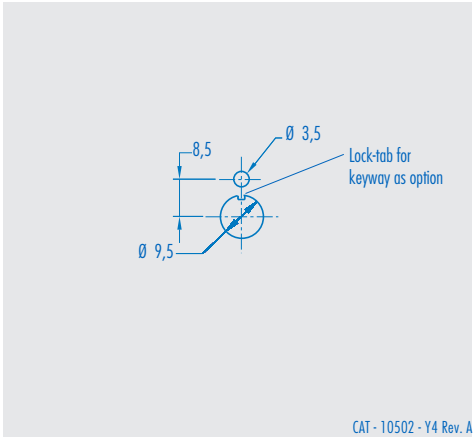
### 2 poles




CAT - 10202 - Y4 Rev. A

Tolerance : ± 0,8

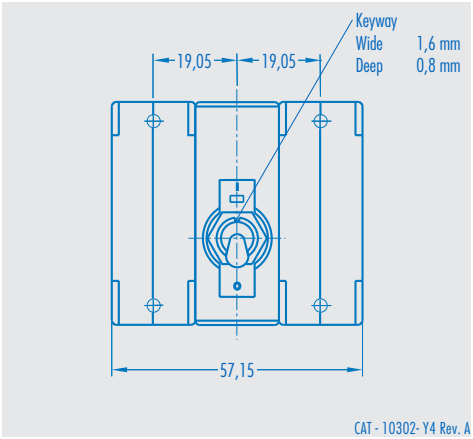
### Panel cutout (front mounting)




CAT - 10502 - Y4 Rev. A

Tolerance : ± 0,1

### 3 poles




CAT - 10302- Y4 Rev. A

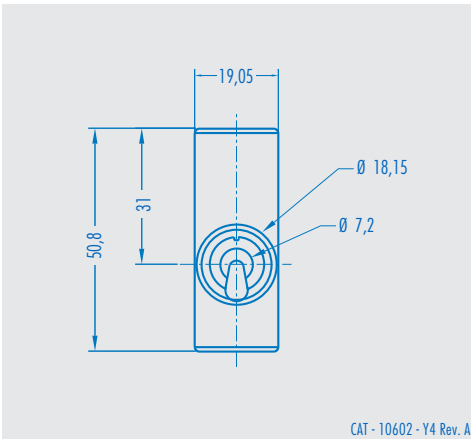
Tolerance : ± 0,8

### Note

When the indicator plate with lock-tab is used, it is necessary to assure sealing that the lock-tab hole goes not through the panel (thickness of panel min. 3 mm, deep of blind-hole 2 ± 0,1 mm).

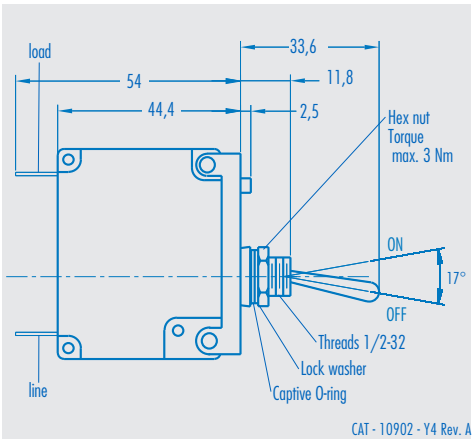
## Fixing inserts

### 1 pole
**Indicator plate is not available**




CAT - 10602 - Y4 Rev. A

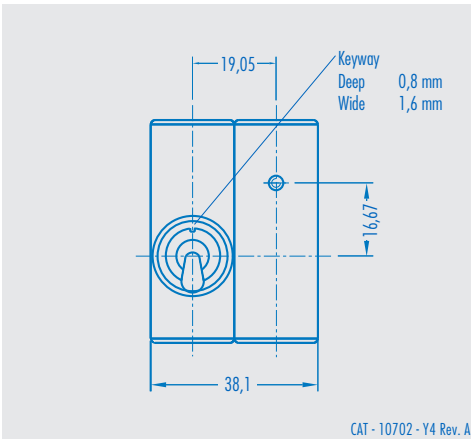
Tolerance : ± 0,8




CAT - 10902 - Y4 Rev. A

Tolerance : ± 0,8

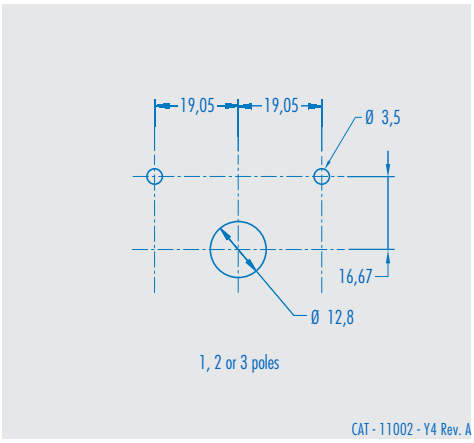
### 2 poles
**Indicator plate is not available**




CAT - 10702 - Y4 Rev. A

Tolerance : ± 0,8

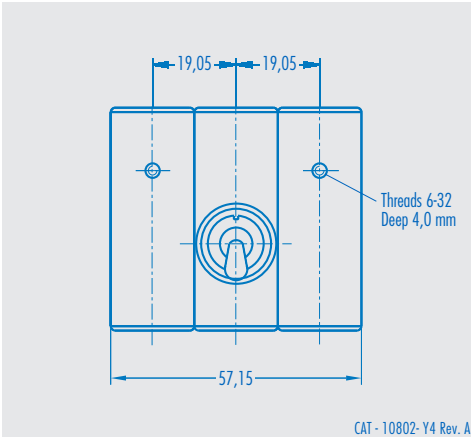
### Panel cutout (front mounting)




CAT - 11002 - Y4 Rev. A

Tolerance : ± 0,1

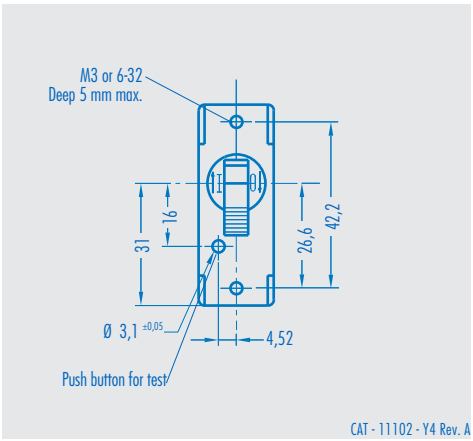
### 3 poles
**Indicator plate is not available**




CAT - 10802- Y4 Rev. A

Tolerance : ± 0,8

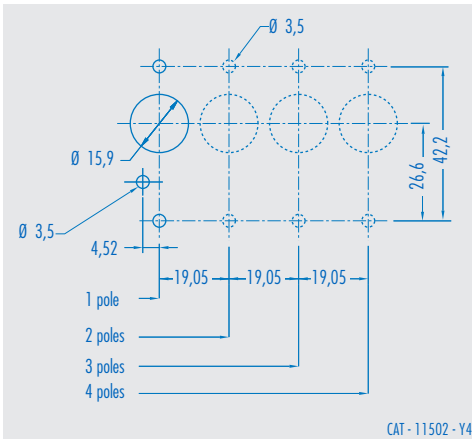
## Option for type JAS




Tolerance : ± 0,8

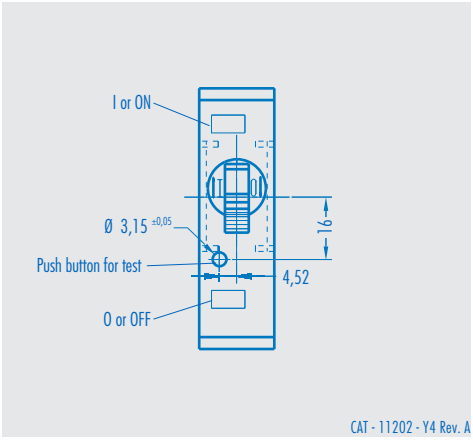
CAT - 11102 - Y4 Rev. A

## Panel cutout




CAT - 11502 - Y4

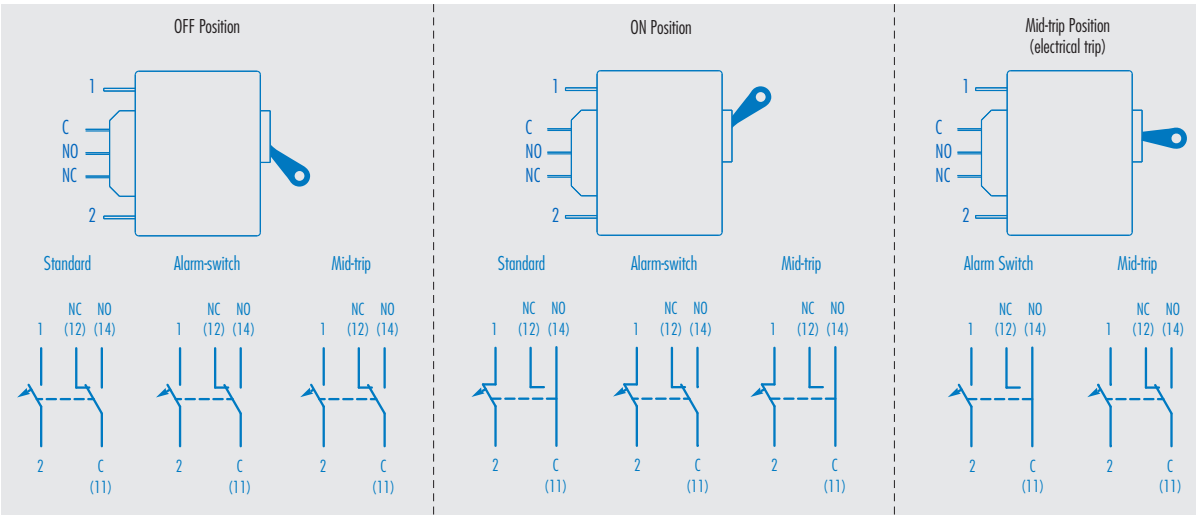
## Option for type JBS




Tolerance : ± 0,8

CAT - 11202 - Y4 Rev. A

## MID-TRIP / ALARM-SWITCH circuit breaker




**Types** **JAA, JAB, JAM, JAN**
**JBA, JBB, JBM, JBN**

Conventional circuit breakers have two handle positions : ON and OFF

The MID-TRIP/ALARM-SWITCH versions have three : ON / ELECTRICAL OFF (MID-TRIP) and MANUAL OFF
which allows immediate visual identification of an electrically tripped circuit breaker (handle jumps to the MID-TRIP position) among other installed disconnected units.

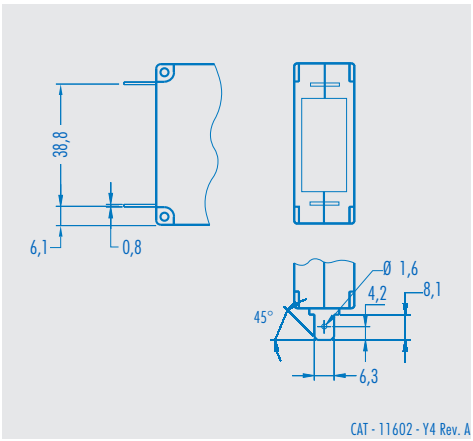
The optional integrated test button offers the advantage to verify the electrical trip functions without injecting an overcurrent (simulation).

Adding auxiliary contacts turns the JAS or JBS MID-TRIP breakers into a sophisticated ALARM-SWITCH one that can also indicate when the main contacts have been electrically opened.

**Terminal codes**
**A, B, C, D, P, Q, S**

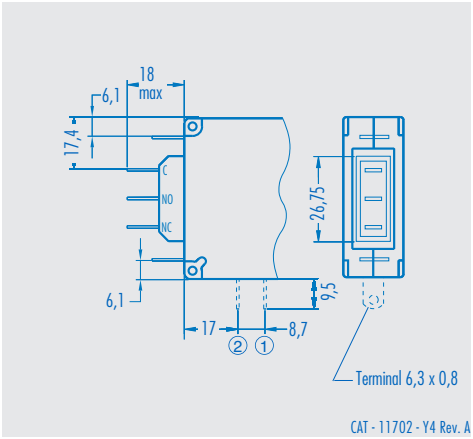
**Codes**

**0**
**3**
**8**
**38**




CAT - 11602 - Y4 Rev. A

**2**
**9**
**12**
**39**
**53**
**62**
**63**
**76**
**82**
**86**
**88**
**96**



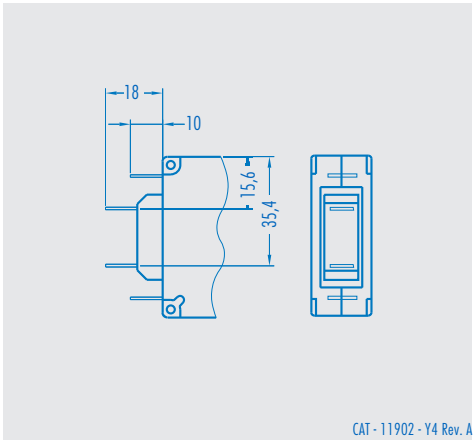

CAT - 11702 - Y4 Rev. A

| | | |
|---|---|---|
| **Without terminals** | ① + ② | Codes 2, 9, 12, 39 |
| **With terminal** | ① | Code 53 |
| **With terminals** | ① + ② | Codes 62, 63 |
| **Without terminals** | ① + ② | Code 82 (without main terminals) |
| **With terminals** | ① + ② | Code 88 (without main terminals) |
| **With terminals** | ① + ② | Codes 76, 86, 96 (without main terminals and auxiliary switch) |

**Terminal codes**
**A, B, C, D, P, Q, S**

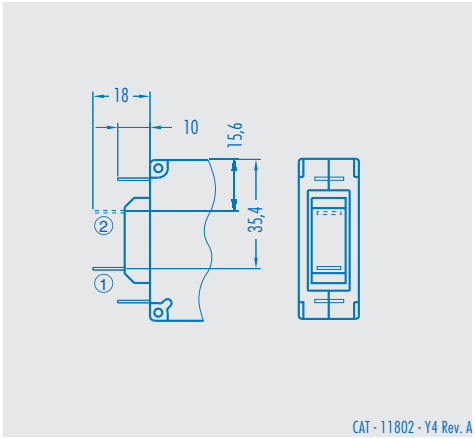
**Codes**

**6**
**16**
**23**
**26**
**33**




CAT - 11902 - Y4 Rev. A

**5**
**7**
**15**
**22**
**25**
**27**
**32**
**37**



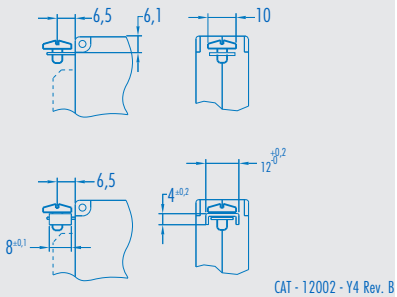

CAT - 11802 - Y4 Rev. A

| | |
|---|---|
| **With terminal ①** | Codes 5, 15, 22, 25, 32 |
| **With terminal ②** | Codes 7, 27, 37 |

**Terminal codes**
**R, T, V, W, K, L, M, N**

**Codes**
**0**
**2**
**3**
**8**
**9**
**12**
**38**
**39**

Screws M4 or M5




CAT - 12002 - Y4 Rev. B

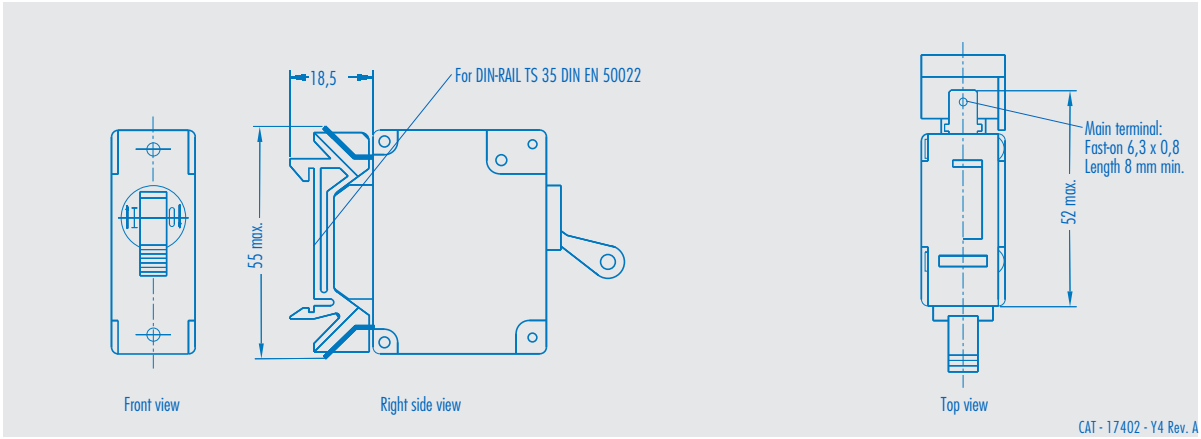
Approvals EN 60947-2 from 20.1 to 25 A: with pressure washer

Approvals EN 60947-2 from 0,02 to 20 A and from 25,1 to 30 A: without pressure washer

Approvals EN 60947-2 up to 25 A: with fast-on

**DIN-RAIL execution**

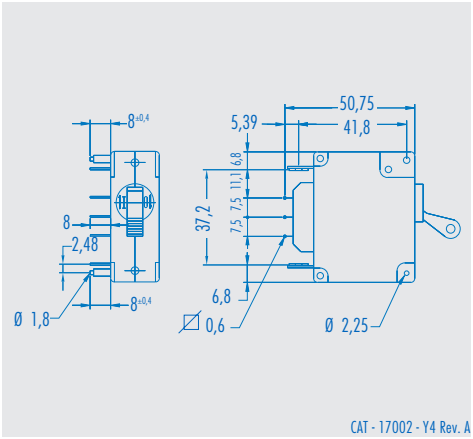
**Code DN**




CAT - 17402 - Y4 Rev. A

**Printed circuit board terminal**

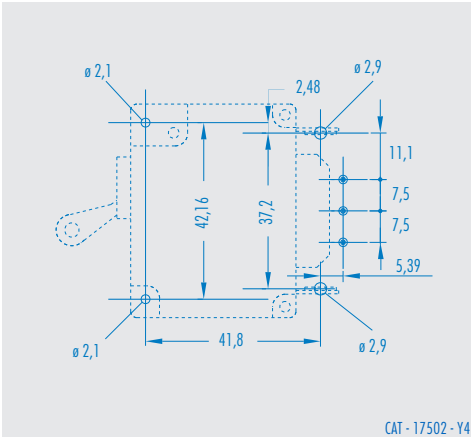
**Codes**
**0**
**2**
**3**
**8**
**9**
**12**
**38**
**39**




CAT - 17002 - Y4 Rev. A

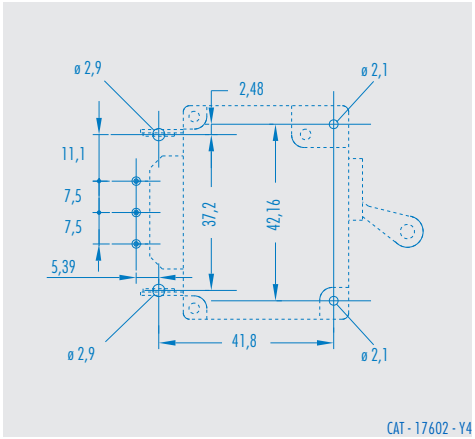
**Panel cut-out for printed circuit board mount application**

**Outlet left (Code 50) (Standard)**




CAT - 17502 - Y4

**Outlet right (Code 51)**




CAT - 17602 - Y4

## AUXILIARY CONTACTS

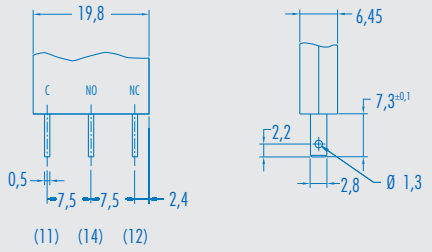
REFERENCE TERMINALS

How to order: 10

**Codes**

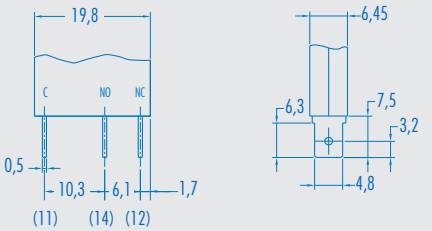
**52**
**54**
**91***
**92***
**(Fast-on terminals 2,8 mm)**

* Reversed contacts




CAT 12102 - Y4 Rev. A

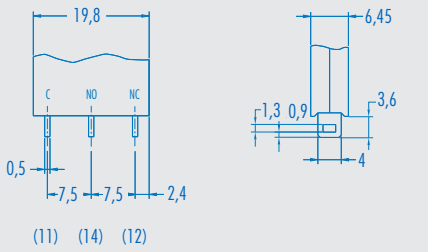
**07**
**(Fast-on terminals 4,8 mm)**
**NO VDE**




CAT 12302 - Y4 Rev. A

**Codes**

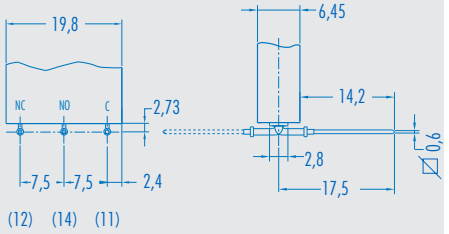
**53**
**(Solder terminals)**




CAT - 12202 - Y4 Rev. B

**40***
**41**
**(Pin-terminals for printed circuit boards)**

* Reversed contacts




CAT 16802 - Y4 Rev. A

Code 40: Pin terminals 90° angle to the left-hand side, circuit breaker front view.
Reversed auxiliary contact. (Standard)

Code 41: Pin terminal 90° angle to the right-hand side, circuit breaker front view.

## TORQUE ALLOWED

**Torque allowed for inserts**

| | Dimensions | Torque |
|---|---|---|
| Inserts | M3; 6 - 32 | 0,6 - 0,8 Nm |

**Torque allowed for terminal screws**

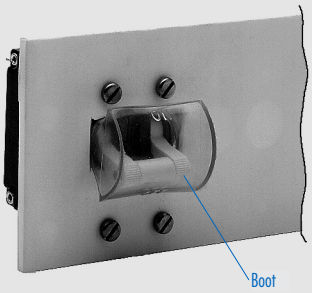
| | Dimensions | Torque |
|---|---|---|
| Screws | M4; M5 | 0,4 - 0,6 Nm |

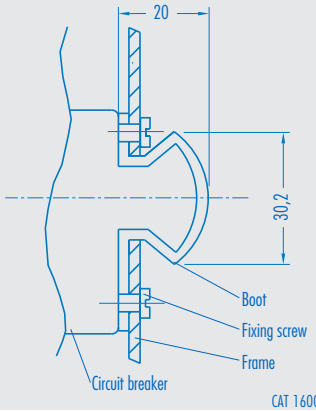
## Boots (IP 65)

This silicone rubber boot insure a perfect water-tight frontal face.

Boots are delivered with 6-32 UNC screw.

| Type | Ordering ref. |
|---|---|
| JA1S | 25108 |
| JA2S | 25109 |
| JA3S | 25110 |



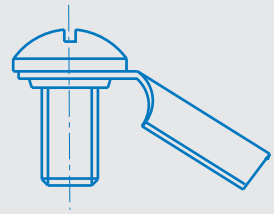




CAT 16002 - Y4 Rev. B

## Push-on screw terminals

The push-on screw terminals of JS, are available with :

| Screw | Ordering ref. |
|---|---|
| 10-32 | 02819 |



CAT 17902 - Y4

## Blanking plate

| Ordering ref. |
|---|
| 20808 |

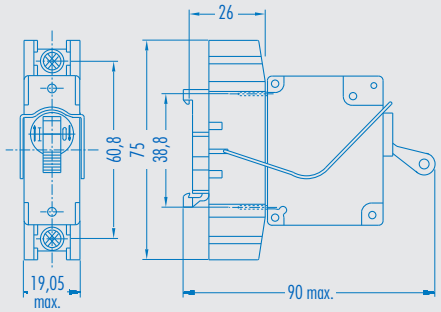
CAT 17702 - Y4

## 35 MM DIN-RAIL ADAPTER

### Without auxiliary contact

Adapter for JS circuit breaker 1-pole without auxiliary contact with plug-in connection 6,35 mm on 35 mm of DIN-Rail mounting, connection M4, with fixing bracket, with clamping base, suitably to 20 Amp.
EN 50022, DIN 46277 T3
UL 1077 recognized component.

| Type | Ordering ref. |
|---|---|
| 1 pole | 20921 |
| 2 poles | 20922 |
| 3 poles | 20923 |

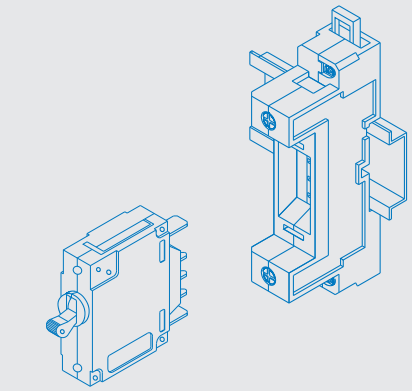



CAT 16202 - Y4 Rév. B

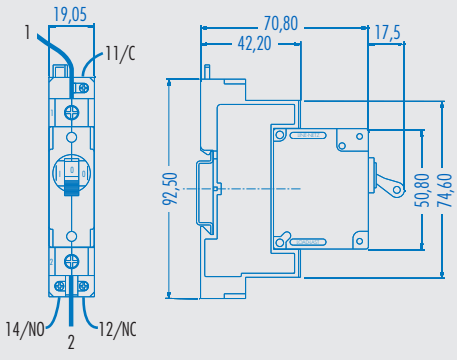
### With auxiliary contact

Adapter for JS circuit breaker 1-pole with or without auxiliary contact with plug-in connection 6,35 mm to 35 mm DIN-Rail mounting,
UL approval:
250 VAC, 30 A
UL approval:
72 VDC, 30 A
auxiliary contact
250 VAC, 10,1 A

| Ordering ref. |
|---|
| 20930 |



CAT 18102 - Y4

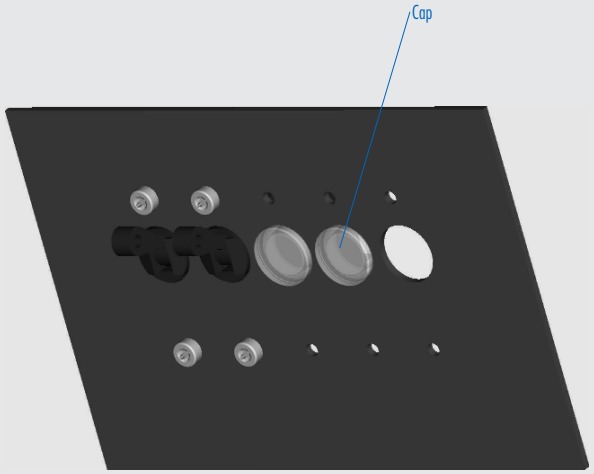



CAT 18202 - Y4

### JAS Cap

This JS Cap is used to hide the aperture that is not used.
Material: Polyethylene
Cut-out dimension: Ø 15,9 mm same as for JS breaker.

| Ordering ref. |
|---|
| 20855 |



## HOW TO ORDER

### 1 Types

| OBLIGATORY | CODE |
|---|---|
| Toggle | A |
| Snap-in mount | B |
| Rocker handle | C |
| Sealed front | E |

### 1.1 Additional code

| OPTIONAL OF ALARM-SWITCH OR MID-TRIP | | | |
|---|---|---|---|
| ALARM-SWITCH | | MID-TRIP | |
| without test | with test | without test | with test |
| A | B | M | N |
| A | B | M | N |
| - | - | - | - |
| - | - | - | - |

### 2 Number of poles

1 (Front view from left to right)
2
3 or 4 poles

Type E: max. 3 poles

### 3 Frequency and terminals

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 50/60 Hz<br>DC<br>400 Hz<br>50/60 Hz/DC | Fast-on terminals | A** | P* | Screws terminals M4 | K | Screws terminals M5 | T |
| | | B** | Q* | | L | | V |
| | | C** | S* | | N | | W |
| | | D** | - | | M | | R |

* Special traction codes are including ampere rating engraved on handle.
** Codes also available for JAS types for printed circuit boards

### 4 Internal circuits

| Start over-current | 10 x<br>8 x | | 18 x<br>15 x | | 25 x<br>22 x | | 60 Hz<br>50 Hz |
|---|---|---|---|---|---|---|---|
| Auxiliary contact | without | with | without | with | without | with | Description |
| Codes | 0 | 12 | | | | | Switch only (without coil) |
| | 3 | 2 | 8 | 9 | 38 | 39 | Serie trip |
| | 5 | | 22 | | 32 | | Shunt trip |
| | 6* | 62* | 23* | | 33* | | Relay trip |
| | 7 | | 27 | | 37 | | Dual rating |
| | 15 | 53 | 25 | | | | DUCON |
| | 16 | 63 | 26 | | | | DUCON (separate coil) serie + relay |
| | 66 | | | | | | DUCON relay + relay |
| | 86 | 88 | 76 | | 96 | | Relay coil |
| | | 82 | | | | | Auxiliary contact only |

* If this kind of protection has to meet IEC 950 requirements the circuit breaker must be ordered with 2 poles.

### 5 Handle number and position (front view from left to right)

| | |
|---|---|
| A | Single pole |
| B | 2 poles, 1 handle on left pole |
| C | 2 poles, 1 handle on right pole |
| D | 3 poles, 1 handle on centre pole |
| E | Handle on every pole, handle spacers as kit |
| J | 4 poles, 2 handles on centre poles, handle spacers as kit |
| L | Handle on every pole, handle spacers mounted |
| M | 3 poles, 1 handle on centre pole + 1 handle on left pole, handle spacers mounted |
| N | 3 poles, 1 handle on centre pole + 1 handle on right pole, handle spacers mounted |
| R | 4 poles, 2 handles on centre poles, handle spacers mounted |
| S | Single pole and short handle (JAS and JBS only) |
| U | 3 poles, 1 handle on left pole |
| W | 3 poles, 1 handle on right pole |

### 6 Colour and inprint of handle

| Type | Colour | Type | ON/OFF | I/O | I/ON O/OFF | Without |
|---|---|---|---|---|---|---|
| JAS<br>JBS | Black | JCS | A | I* | C | R |
| | White | | B | J | K | S |
| | Red | | D | L | T | U |
| | Grey | | G | O | P | Z |
| | Yellow | | F | N | Q | W |
| | Orange | | E | H | M | V |
| | Green | | 1 | 2 | 3 | 4 |
| | Blue | | 5 | 6 | 7 | 8 |
| JES | Metal 3/8 | | B | J | - | - |
| JES | Metal 1/2 | | - | - | - | S |

* Standard version black engraving I/O

| 1 | 1.1 | 2 | | 3 | 4 | 3 | 4 | | 5 | 6 |
|---|---|---|---|---|---|---|---|---|---|---|
| J | A | B | 2 | S | - | B | 2 | B | 3 | - | L | I |

The proposed example is a 2 poles circuit breaker with two toggles, alarm-switch with test, front mounting version to be fitted with 4 screws M3.
The pole left-hand side front view has an auxiliary contact with 2,8 mm quick connect terminals.

## 7 Fixing inserts + other mounting types

| | |
|---|---|
| 01 | Types JAS/JCS, 6-32 UNC inserts, front mounting |
| 04 | Type JAS, M3 inserts, front mounting |
| 04 | Type JCS, M3 inserts, front mounting, without rocker handle guard |
| 05 | Type JCS, M3 inserts, front mounting, with rocker handle guard |
| 06 | Type JCS, 6-32 inserts, front mounting, with rocker handle guard |
| 11 | Type JES, central 3/8-32 UNC thread mounting |
| 18 | Type JBS, front plate 19,05 mm marked ON/OFF, snap-in mount, handle with guard (1 pole only) |
| 19 | Type JBS, front plate 19,05 mm marked ON/OFF, snap-in mount, handle without guard |
| 20 | Type JBS, front plate 19,05 mm marked I/O, snap-in mount, handle with guard (1 pole only) |
| 21 | Type JBS, front plate 19,05 mm marked I/O, snap-in mount, handle without guard |
| 22 | Type JES 1/2-32 UNC thread mounting |
| DN | DIN-RAIL mount. (Switch and serie trip only, without auxiliary switch) |
| 50 | Type JAS for printed circuit boards, outlet of terminals to the left, circuit breaker front view (Standard) |
| 51 | Type JAS for printed circuit boards, outlet of terminals to the right, circuit breaker front view |

## 8 VDE approval (authorized limits see page 4)

| | |
|---|---|
| D | Without VDE approval (standard) |
| H* (EN 60947-2) | In conformity with IEC 950 |
| K (EN 60934) | - |
| W | Without VDE approval, but in conformity with IEC 950 |

*Only internal circuits codes 0, 2, 3, 5, 8, 9, 12, 15, 16, 22, 25, 26, 32, 38, 39, 53 and 86.

## 9 UL-CSA approvalsl (authorized limits see page 4)

| | | |
|---|---|---|
| A | (UL 1077) | Up to : 250 V 50/60 Hz - 240 V 400 Hz - 80 VDC |
| NU | | Up to : 250 V 50/60 Hz - 240 V 400 Hz - 80 V DC , without UL-CSA approval |
| L | (UL 1077) | Up to : 277 V 50/60 Hz |
| NL | | Up to : 277 V 50/60 Hz, without UL-CSA approval |
| AD | (UL 1077) | Up to : 415 V 50/60 Hz, only with 3 poles minimum |
| ND | | Up to : 415 V 50/60 Hz, without UL-CSA approval |
| DU | (UL 489 A listed) | Up to : 65 V DC |

## 10 Auxiliary contacts

| | | | | I max. (A) at 220 V AC | |
|---|---|---|---|---|---|
| Code | Function | Contact | Terminals | UL / CSA | VDE |
| 07 | NO - NC | Ag | 4,8 fast-on | 10.1 | - |
| 40 | NO - NC inv. | Ag | for printed circuit board (left) | 5.0 | 1.0 |
| 41 | NO - NC | Ag | for printed circuit board (right) | 5.0 | 1.0 |
| 52* | NO - NC | Ag | 2,8 fast-on | 10.1 | 1.0 |
| 53 | NO - NC | Ag | solder terminals | 10.1 | 1.0 |
| 54 | NO - NC | AgAuPt | 2,8 fast-on | 0.1 | 0.1 |
| 91 | NO - NC inv. | AgAuPt | 2,8 fast-on | 0.1 | 0.1 |
| 92 | NO - NC inv. | Ag | 2,8 fast-on | 10.1 | 1.0 |

* 52 : standard

Dimensions: See page 26

## 11 Voltage or current rating V or A

1) Serie Circuits
   In - Curve / Voltage *
   NB: for switch only, no curve.
   * Voltage is noted only when it differs from the standard voltage.
2) DuCon Circuits
   In - Curve - VxxxP
   xxx = Volt coil nominal voltage.
3) Relay Circuits
   VxxxP
   xxx = Volt Coil
4) Dual-Rating
   In1/In2 - Curve

## 12 Time delay curves

See pages 8 to 16

## Additional note

The internal circuits 4 labeled with * have a standard dielectric strengh of 2 x Un + 1000 V.

| 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|
| - 04 | - D | - A | - 52 | - 5 | - 2 |

Each pole 5 Amps In with medium delay curve, 8 x In high-inrush = 40 Amps during 10 ms.
The electrical connection is designed for quick-on connectors. This selected type of circuit breaker is UCL-CSA approved at 65 V DC.

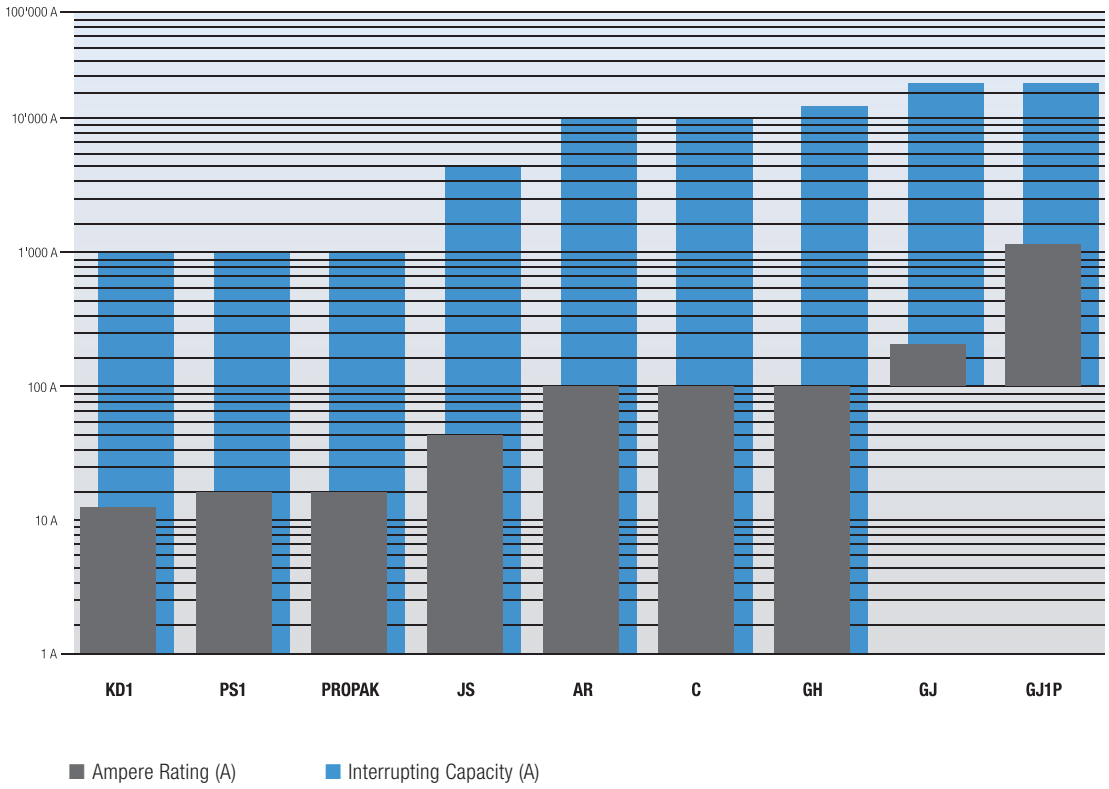
## NOTES

## NOTES

# Highly Reliable Miniature
# Circuit Protectors and Hydraulic-Magnetic Circuit Breakers

For the Widest Selection of Circuit Protection, from 0.01 to 1200 Amperes, look to Heinemann.

Circuit Breaker Selection Guide




Eaton Industries Manufacturing GmbH
Heinemann Products
Place de la Gare
CH-1345 Le Lieu, Switzerland
Tel ++41 21 841 92 11
Fax ++41 21 841 92 00

BR5401SE0006A

CCD-Switzerland@Eaton.com
www.Eaton.com

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