

## **Series JS** Hydraulic-Magnetic Circuit Breakers

- Small, lightweight
- VDE/UL/CSA recognized
- UL 489 listed to 5000 A
- International Approvals
- Available for marine applications
- Ratings: 0.1 A to 50 A



**Heinemann®** Circuit Breakers

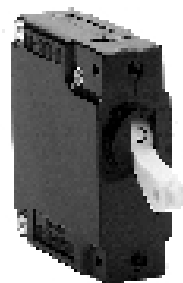


ISO 9001 Certified  
ISO 14001 Certified

Type

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JAS



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JBS



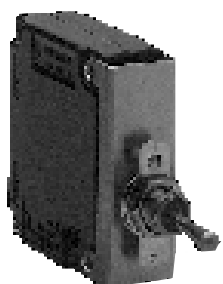
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JCS



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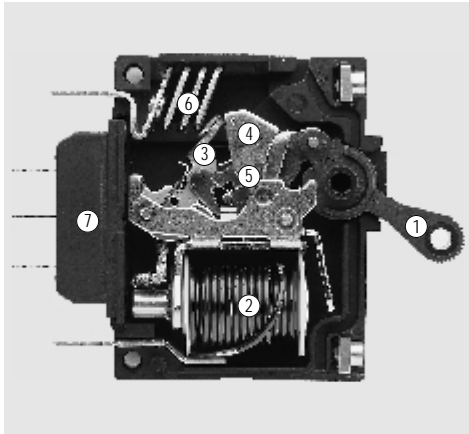
JES



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.

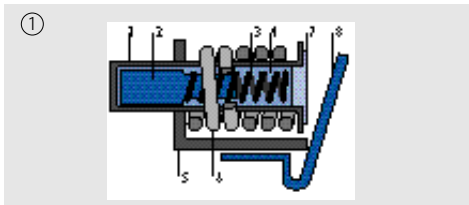
Heinemann is a registered trademark.

Description



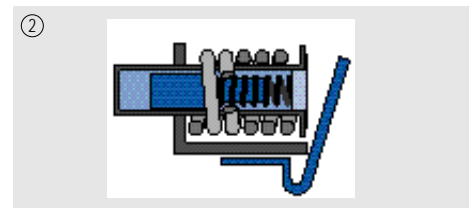
- 1 The handle has two positions only «ON» and «OFF», giving an unmistakable visual indication of the switch position. However, the MID-TRIP versions have three. (See working principle page 24).
- 2 Tripping of all JS hydraulic-magnetic MCB's is caused by excess current through the solenoid. This is 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

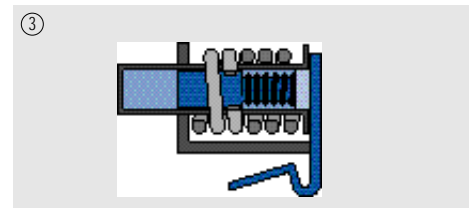


The load current either at or below the nominal rating of the breaker - The core remains at the end of the tube opposite the armature.

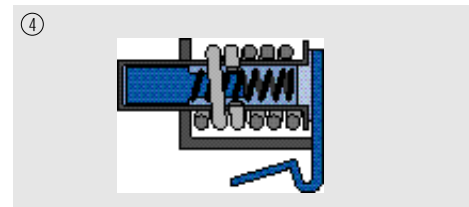
1. tube / 2. core / 3. spring / 4. fluid / 5. frame / 6. coil (sensor) / 7. pole piece / 8. armature



Moderate overload - The core is moving.



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



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.

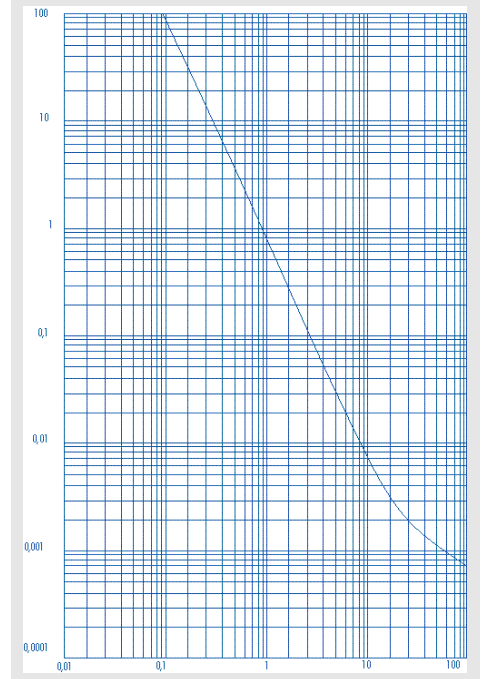
**Technical characteristics**

Temperature	- 40°C + 85°C
Humidity	IEC 68-2-3 and MIL - STD - 202 Method 103 Test A
Protection	IEC 529 IP 00 Back terminals sealing IP 40 Front sealing
Shock	IEC 68-2-27 MIL - STD - 202, method 213 cond 1 100 G, 6 ms or 50 G, 11 ms
Vibration	IEC 68-2-6 MIL - STD - 202, method 204 10 to 500 Hz 10 G amplitude 1,52 mm
Life	10 000 switching operations with 6000 at rated current 50/60 Hz
Approx. weights	1 pole 65 g 2 poles 140 g 3 poles 210 g 4 poles 280 g
Approvals	UL - CSA and VDE. In conformity with IEC 950
Dielectric strength	3750 V AC 50/60 Hz
Insulation resistance	100 M under 500 V DC
Auxiliary switches Rated current	220 V AC : 10 A 24 V DC : 8 A (resistive) 220 V AC : 0,1 A (contact AgAuPt)
Time delay	Wide range available

**Resistance and impedance values**

**Tolerance limits of internal resistance**

[ ] INTERNAL RESISTANCE CAT - 1202 - Y4 Rev. A



[ A ] AMPERE RATING

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 Icu = Ics
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	1000 A
	JA.S - JB.S - JC.S	2 - 4	400 V	50/60/400 Hz	0,1 - 25 A	1000 A
	JE.S	2 - 3	400 V	50/60/400 Hz	0,1 - 25 A	1000 A
	JA.S - JB.S - JC.S - JE.S	1 - 2	80 V	DC	0,1 - 30 A	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	0,1 - 30 A	1500 A ①
	JE.S	3	415 V	50/60 Hz	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	1	80 V	DC	0,1 - 15 A	1000 A ②
	JE.S	1	80 V	DC	0,1 - 15 A	1000 A ②
	JA.S	1	32 V	DC	0,1 - 50 A	5000 A ②
	UL 489 (LISTED) Category (DITT)	JA.S	1	65 V	DC	0,1 - 30 A

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

① Serie fuse required: In fuse not more than 4 x In of the protector.  
② Serie fuse not required.

Safety standards IEC 950

JS circuit breakers comply with the 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

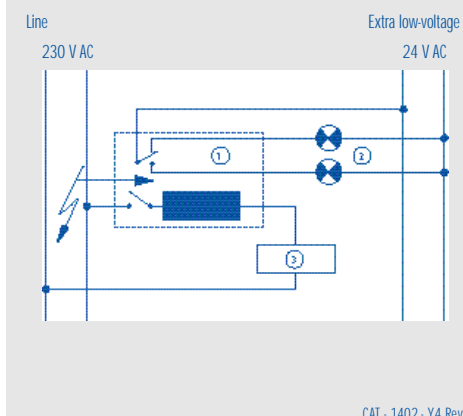
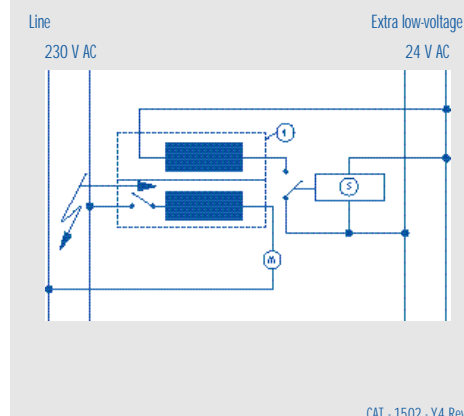


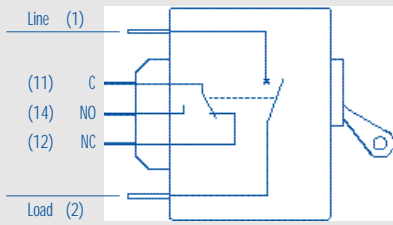
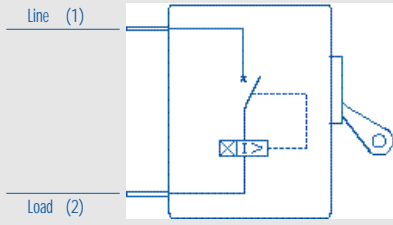
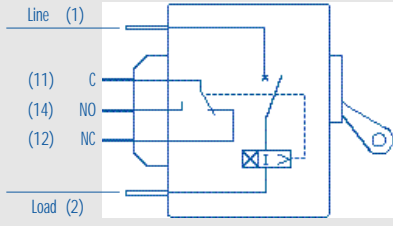
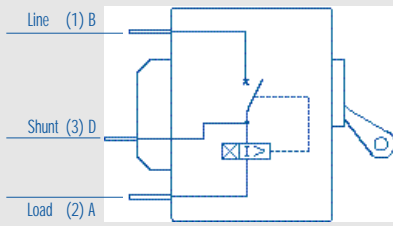
Figure 2

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: <b>4</b>	Codes															
<p><b>Switch</b></p> <p>Construction represented: 12</p>  <p style="text-align: right; font-size: small;">CAT - 1602 - Y4 Rev. C</p>	<p>Switch only (without coil) with or without auxiliary contact.</p>	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: right;">Auxiliary contact</td> <td style="text-align: left;">Code</td> <td></td> </tr> <tr> <td style="text-align: right;">without</td> <td style="text-align: left;">0</td> <td></td> </tr> <tr> <td style="text-align: right;">1</td> <td style="text-align: left;">12</td> <td></td> </tr> </table>	Auxiliary contact	Code		without	0		1	12		<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: right;">0</td> </tr> <tr> <td style="text-align: right;">12</td> </tr> </table>	0	12				
Auxiliary contact	Code																	
without	0																	
1	12																	
0																		
12																		
<p><b>Series Trip</b></p> <p>Construction represented: 3, 8, 38</p>  <p style="text-align: right; font-size: small;">CAT - 1702 - Y4 Rev. B</p>	<p>The contacts and the coil are in series. This is the current execution of the JS circuit breaker. It is often used as main switch at the same time.</p>	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: right;">Start overcurrent</td> <td style="text-align: left;">8x</td> <td style="text-align: left;">15x</td> <td style="text-align: left;">22x</td> </tr> <tr> <td style="text-align: right;">Code</td> <td style="text-align: left;">3</td> <td style="text-align: left;">8</td> <td style="text-align: left;">38</td> </tr> </table>	Start overcurrent	8x	15x	22x	Code	3	8	38	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: right;">3</td> </tr> <tr> <td style="text-align: right;">8</td> </tr> <tr> <td style="text-align: right;">38</td> </tr> </table>	3	8	38				
Start overcurrent	8x	15x	22x															
Code	3	8	38															
3																		
8																		
38																		
<p><b>Series Trip with auxiliary contact</b></p> <p>Construction represented: 2, 9, 39</p>  <p style="text-align: right; font-size: small;">CAT - 1802 - Y4 Rev. B</p>	<p>The contacts and the coil are in series. Auxiliary contacts are placed behind the circuit breaker and mechanically connected to the releasing system.</p>	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: right;">Start overcurrent</td> <td style="text-align: left;">8x</td> <td style="text-align: left;">15x</td> <td style="text-align: left;">22x</td> </tr> <tr> <td style="text-align: right;">Aux. contact</td> <td style="text-align: left;">Code</td> <td></td> <td></td> </tr> <tr> <td style="text-align: right;">1</td> <td style="text-align: left;">2</td> <td style="text-align: left;">9</td> <td style="text-align: left;">39</td> </tr> </table>	Start overcurrent	8x	15x	22x	Aux. contact	Code			1	2	9	39	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: right;">2</td> </tr> <tr> <td style="text-align: right;">9</td> </tr> <tr> <td style="text-align: right;">39</td> </tr> </table>	2	9	39
Start overcurrent	8x	15x	22x															
Aux. contact	Code																	
1	2	9	39															
2																		
9																		
39																		
<p><b>Shunt Trip</b></p> <p>Construction represented: 5, 22 32</p>  <p style="text-align: right; font-size: small;">CAT - 1902 - Y4 Rev. B</p>	<p>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. With this execution it is also possible to adjust the tripping through a potentiometer between the load terminals.</p>	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: right;">Start overcurrent</td> <td style="text-align: left;">8x</td> <td style="text-align: left;">15x</td> <td style="text-align: left;">22x</td> </tr> <tr> <td style="text-align: right;">Code</td> <td style="text-align: left;">5</td> <td style="text-align: left;">22</td> <td style="text-align: left;">32</td> </tr> </table>	Start overcurrent	8x	15x	22x	Code	5	22	32	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: right;">5</td> </tr> <tr> <td style="text-align: right;">22</td> </tr> <tr> <td style="text-align: right;">32</td> </tr> </table>	5	22	32				
Start overcurrent	8x	15x	22x															
Code	5	22	32															
5																		
22																		
32																		

Diagrams

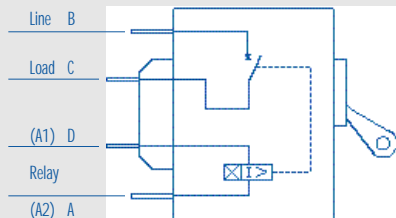
Descriptions

How to order: **4**

Codes

Relay trip

Construction represented: 6, 23, 33



CAT - 2002 - Y4 Rev. D

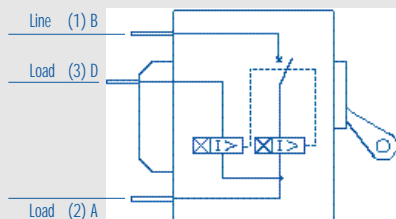
Relay tripping can be used for releasing the circuit breaker by the intermediary of a monitor or a safety device installed at a distance. The contacts are electrically separated from the coil. Consequently, all the currents and voltages within the permissible limits can be used. Coils are either current or voltage sensitive. 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.

Start overcurrent	8x	15x	22x
Aux. contact	Code		
without	6	23	33
1	62		

6  
23  
33  
62

Dual rating

Construction represented: 7, 27, 37



CAT - 2102 - Y4 Rev. B

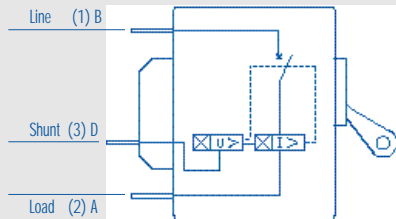
Dual rating circuit breakers are suitable for apparatus operating under two different currents or voltages. As far as possible, the currents must be in the ratio of one to two with a maximum of 10 to 20 A.

Start overcurrent	8x	15x	22x
Code	7	27	37

7  
27  
37

Dual Control (Ducon)

Construction represented: 15, 25



CAT - 2202 - Y4 Rev. B

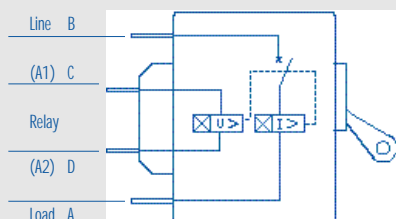
This version is used both for the protection of the load finding itself in series with the circuit breaker and for the release via a voltage. The main coil is in series with the contact and the DUCON coil is shunt trip.

Start overcurrent	8x	15x
Aux. contact	Code	
without	15	25
1	53	

15  
25  
53

Dual Control (Ducon) (Series + Relay)

Construction represented: 16, 26



CAT - 2302 - Y4 Rev. C

Same function as codes 15 and 25, but both coils are electrically separated.

Start overcurrent	8x	15x
Aux. contact	Code	
without	16/66*	26
1	63	

16  
26  
63  
66\*

\* 66, the two coils are electrically separated from the main contact.

Diagrams

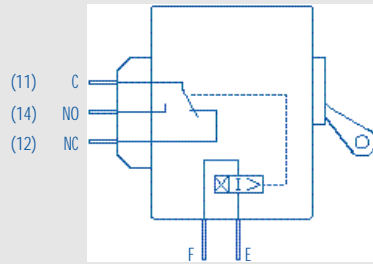
Descriptions

How to order: **4**

Codes

**Relay trip for IEC execution**

Construction represented: 88



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.

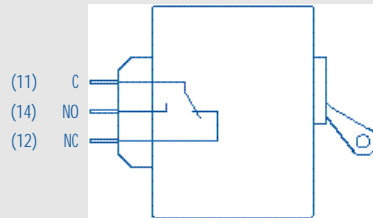
The required minimum creep distance between two galvanically separated electric circuits can thus be attained. (see page 4).

Start overcurrent	8x	15x	22x
Aux. contact	Code		
without	86	76	96
1	88		

76  
86  
88  
96

**Auxiliary contact**

Construction represented: 82



CAT - 17202 - Y4 Rev. A

Auxiliary contact only without main contact and coil.

Aux. contact	Code		
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).

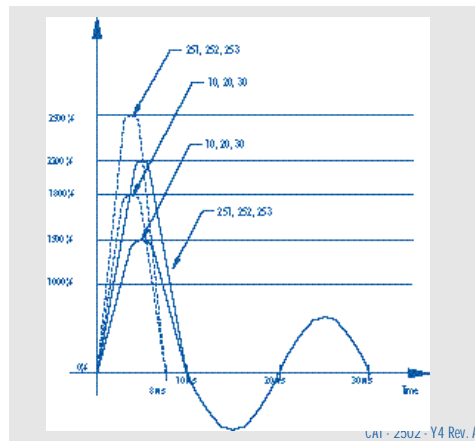
The voltage trip breakers may trip below 100% rated voltage, must trip at 100% and above.

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 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**



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

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

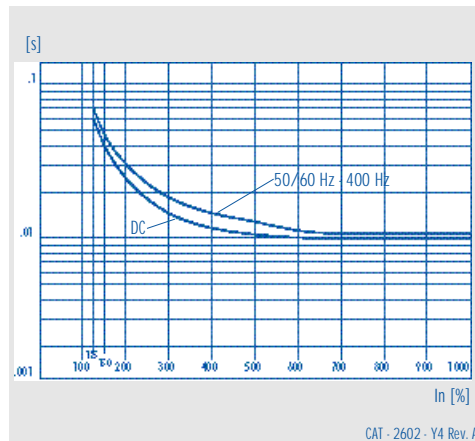
By using JS high-inrush types, unnecessary and dangerous overcalibrations involving use of thicker cables or wires can be avoided, thus saving energy and money.

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 curves P, high-inrush is not possible.

———— 50 Hz  
 - - - - - 60 Hz

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



	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 circuit concerned**

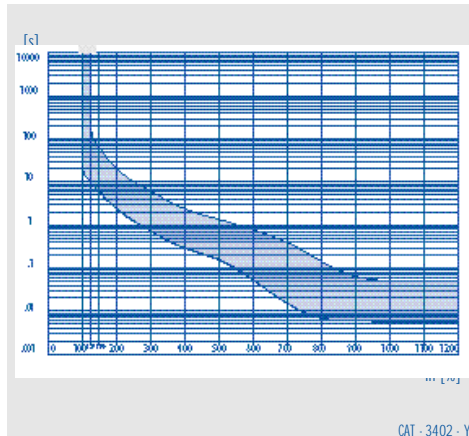
2, 3, 5, 6, 7, 15, 16, 53, 62, 63, 66, 86, 88

**TIME DELAY CURVES**

START OVERLOAD 8 x In

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

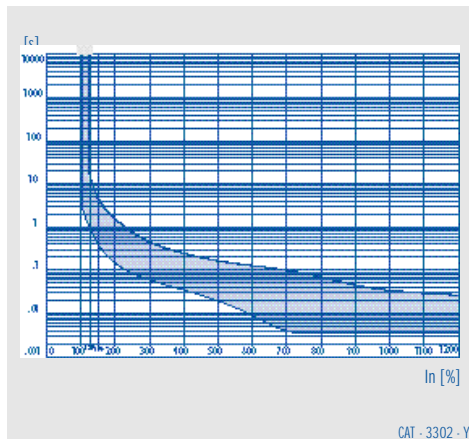
**Curve 2  
50/60 Hz**



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

**MEDIUM DELAY**

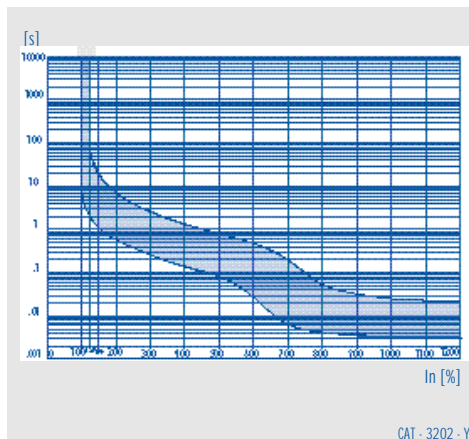
**Curve 3  
50/60 Hz**



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

**SHORT DELAY**

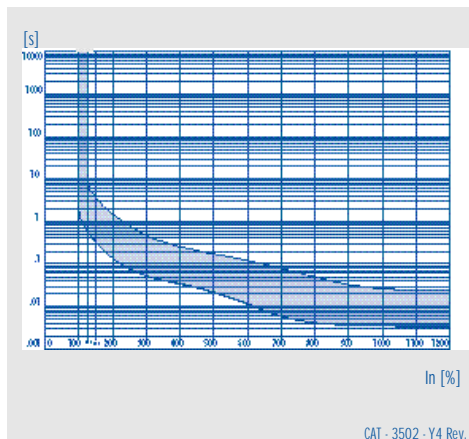
**Curve 2  
DC**



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

**MEDIUM DELAY**

**Curve 3  
DC**

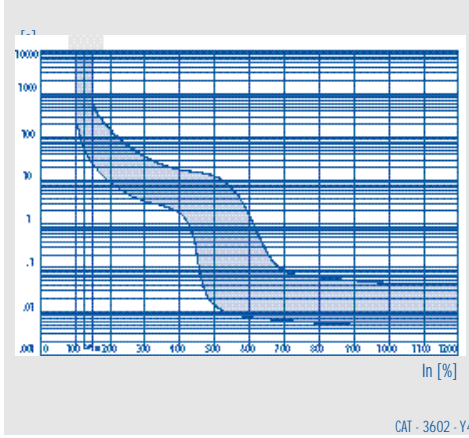


In.%	125	150	200	300	400	500	600	700	800	900	1000	1100	1200
<b>MAX</b>	7.0	3.50	1.40	.420	.250	.180	.120	.080	.0510	.0320	.0260	-	-
<b>MIN</b>	.6	.35	.15	.055	.035	.021	.012	.006	.0041	.0038	.0037	-	-

**SHORT DELAY**

**TIME DELAY CURVES**  
START OVERLOAD 8 x In (Continued)

**Curve 1**  
400 Hz



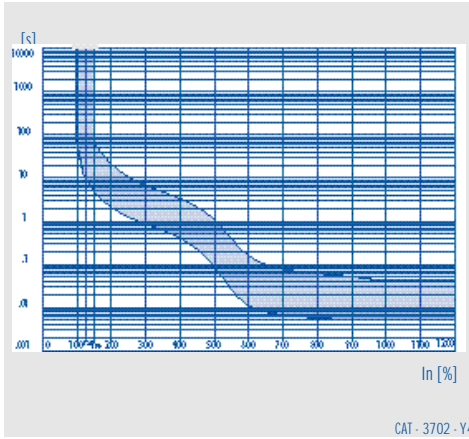
In.%	125	150	200	300	400	500	600	700	800	900	1000	1100	1200
------	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	------	------	------

<b>MAX</b>	-	500	150.0	35.0	19.0	14.000	1.6000	.0800	.0600	.050	.0430	-	-
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<b>MIN</b>	-	25	9.5	3.3	1.9	.015	.0073	.0063	.0055	.005	.0049	-	-
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**LONG DELAY**

**Curve 2**  
400 Hz



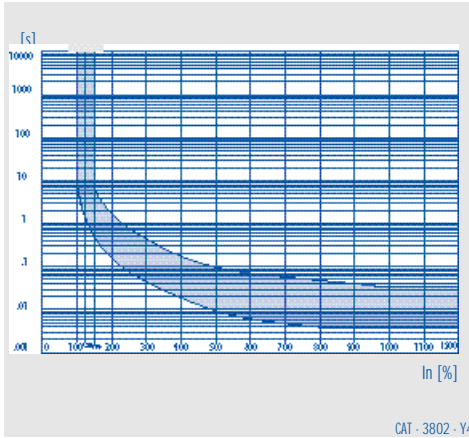
In.%	125	150	200	300	400	500	600	700	800	900	1000	1100	1200
------	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	------	------	------

<b>MAX</b>	-	60	20.0	6.50	3.10	1.00	.160	.0750	.0590	.049	.040	-	-
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<b>MIN</b>	-	5	2.1	.85	.40	.09	.011	.0067	.0055	.005	.005	-	-
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**MEDIUM DELAY**

**Curve 3**  
400 Hz



In.%	125	150	200	300	400	500	600	700	800	900	1000	1100	1200
------	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	------	------	------

<b>MAX</b>	-	5.80	1.80	.460	.18	.10	.0750	.060	.0500	.042	.036	-	-
------------	---	------	------	------	-----	-----	-------	------	-------	------	------	---	---

<b>MIN</b>	-	.55	.17	.049	.02	.01	.0065	.005	.0041	.004	.004	-	-
------------	---	-----	-----	------	-----	-----	-------	------	-------	------	------	---	---

**SHORT DELAY**

**TIME DELAY CURVES**

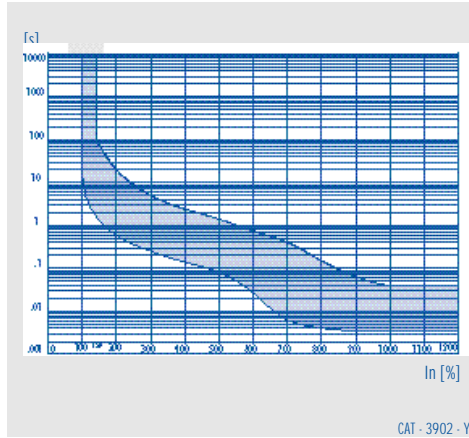
START OVERLOAD 8 x In (Continued)

**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

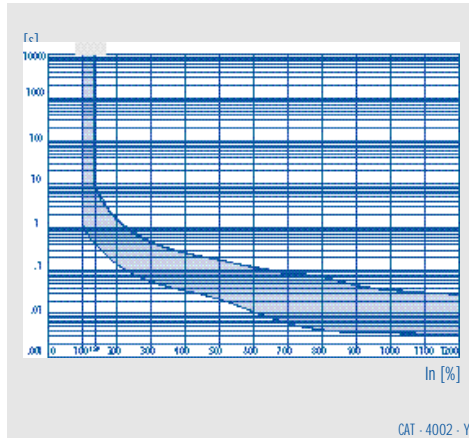
**Curve 2  
50/60 Hz/DC**



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

**MEDIUM DELAY**

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



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

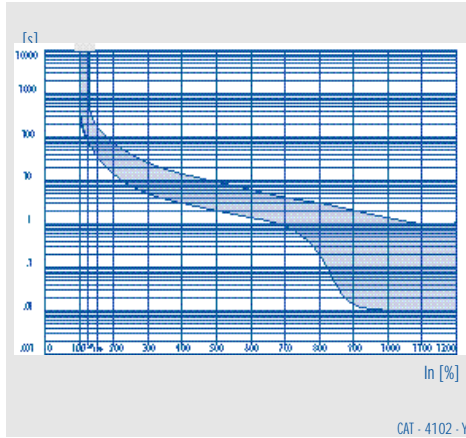
**SHORT DELAY**

**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)

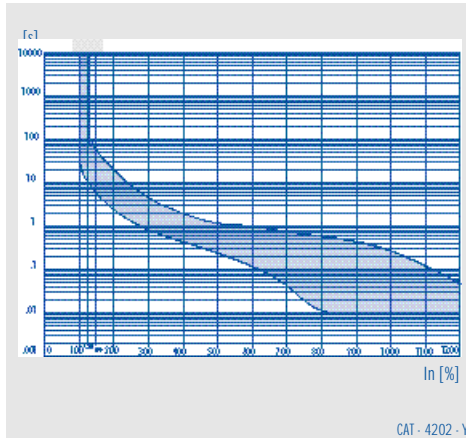
**Curve 10**  
50/60 Hz



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**

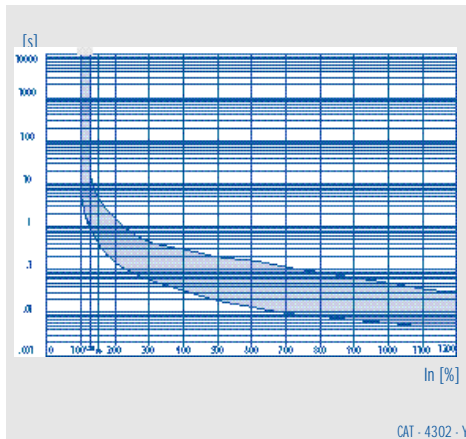
**Curve 20**  
50/60 Hz



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

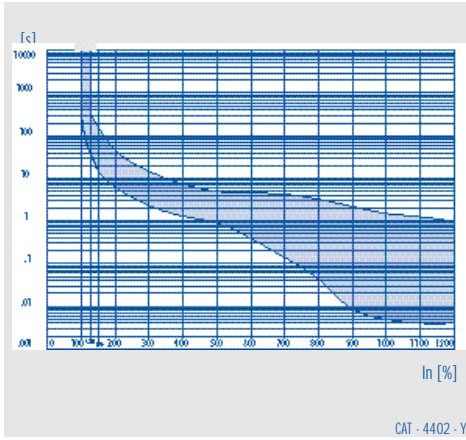


In. %	125	150	200	300	400	500	600	700	800	900	1000	1100	1200
MAX	17	4.50	1.60	.46	.300	.20	.170	.12	.0900	.065	.050	.038	.030
MIN	1	.40	.16	.06	.035	.02	.015	.01	.0085	.007	.006	.005	.005

**SHORT DELAY**

**TIME DELAY CURVES**  
START OVERLOAD 15 x In (Continued)

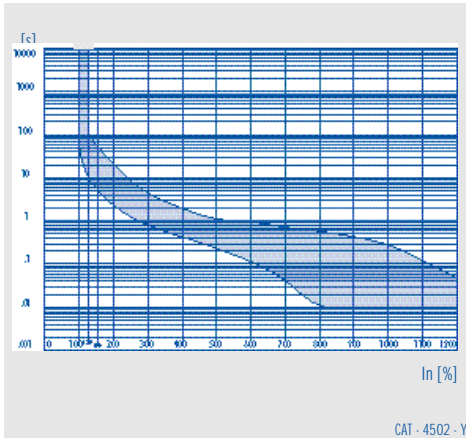
**Curve 10  
DC**



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

**LONG DELAY**

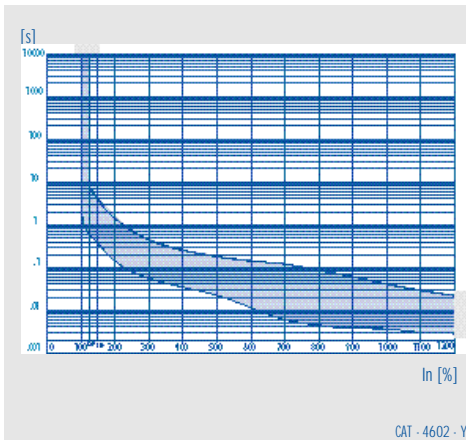
**Curve 20  
DC**



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

**MEDIUM DELAY**

**Curve 30  
DC**



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

**SHORT DELAY**

**TIME DELAY CURVES**

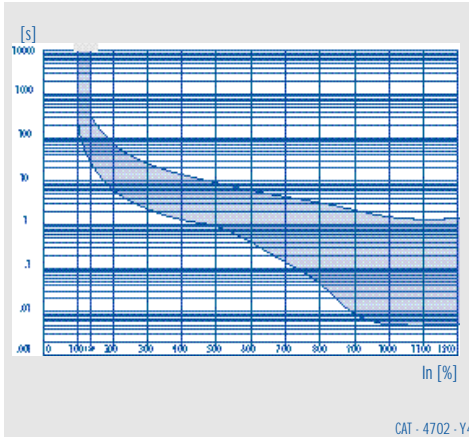
START OVERLOAD 15 x In (Continued)

**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

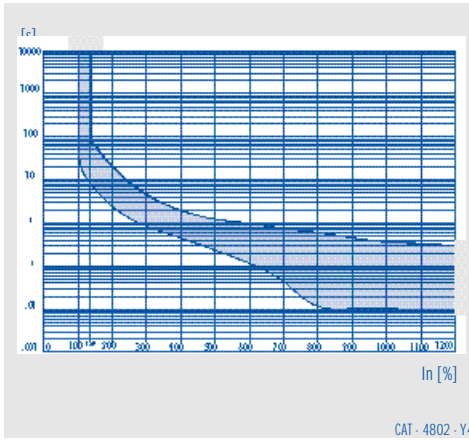
**Curve 10  
50/60 Hz/DC**



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**

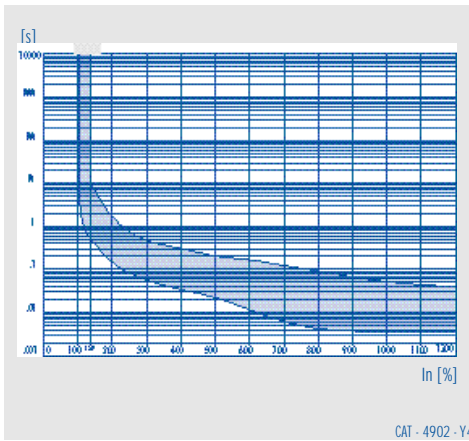
**Curve 20  
50/60 Hz/DC**



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**



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**

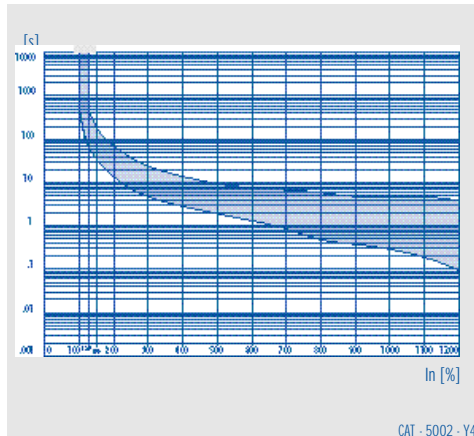


**TIME DELAY CURVES**

START OVERLOAD 22 x In

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

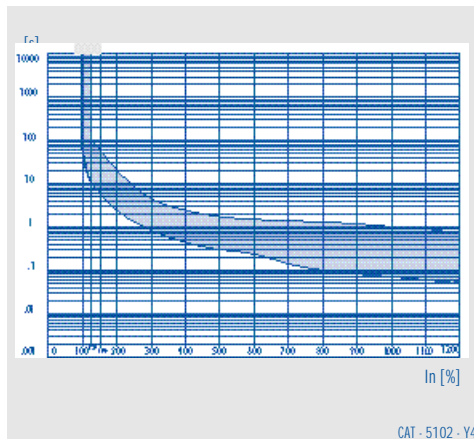
**Curve 251**  
50/60 Hz or DC



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

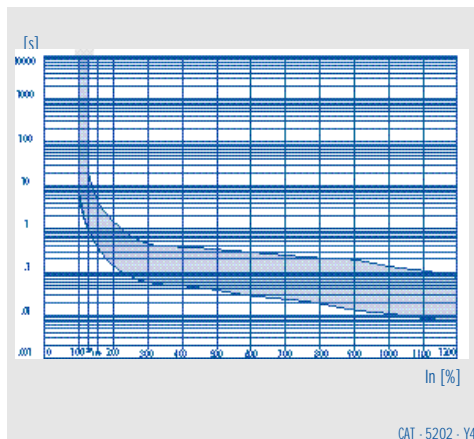
**Curve 252**  
50/60 Hz or DC



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



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**

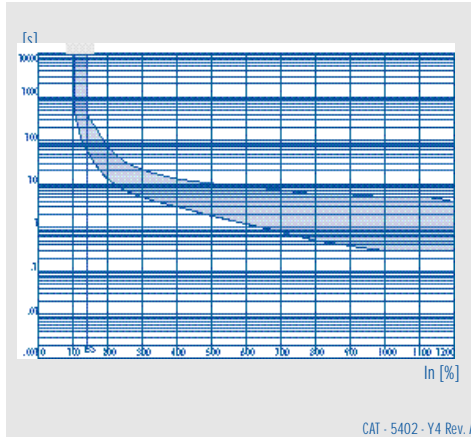
START OVERLOAD 22 x In (Continued)

**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

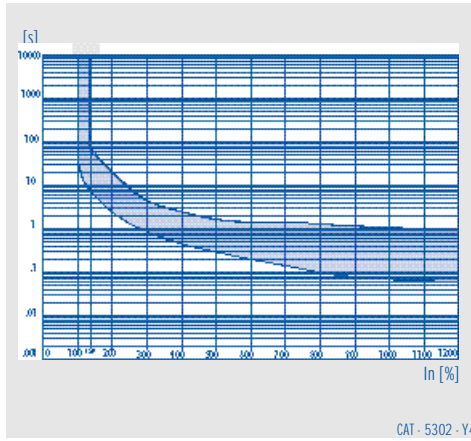
**Curve 251  
50/60 Hz/DC**



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**

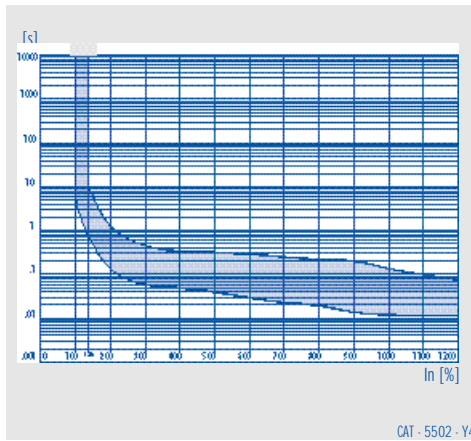
**Curve 252  
50/60 Hz/DC**



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**



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.

**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).

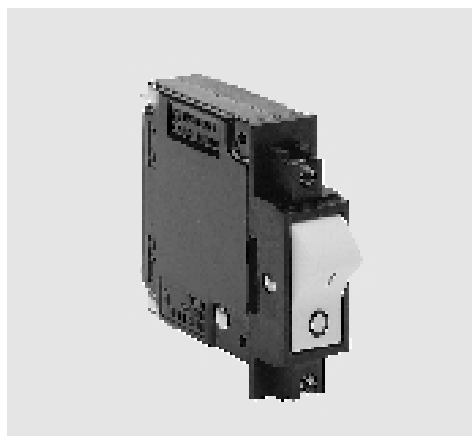
Panel cutouts depends on number of poles.

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

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)**

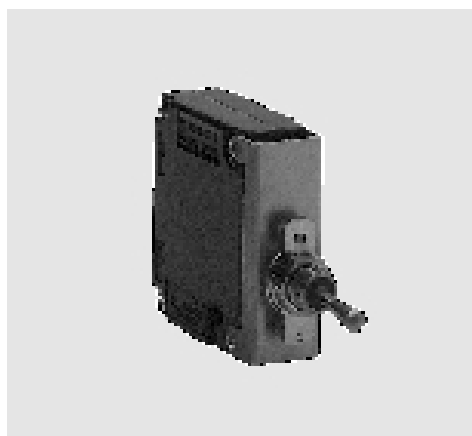


JCS circuit breakers are available with rocker-handles in white, grey or black.

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)**



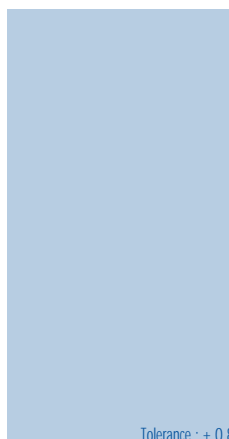
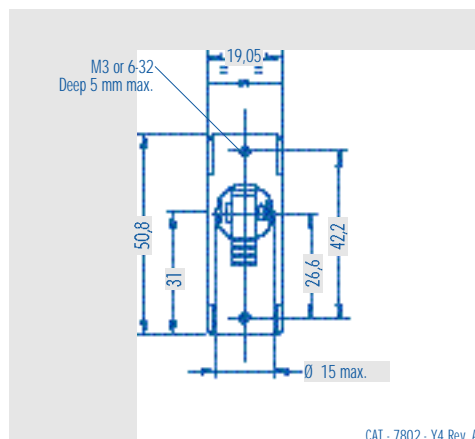
JES circuit breakers are well suited for use where protection against water spray and splash is needed. A moulded-in-place silicon rubber surrounding the bat-type handle effectively prevents water entry. The panel cutout itself is sealed by a captive O-ring at the base of the breaker's threaded gland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

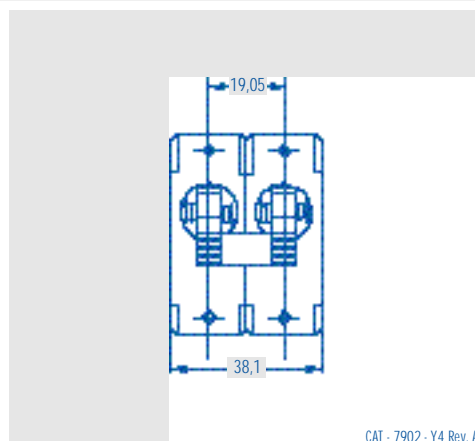
JES circuit breakers are available in 1, 2 or 3 pole execution (one handle only).

Fixing inserts

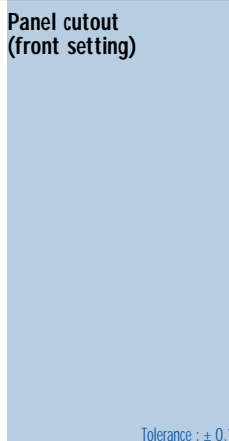
1 pole



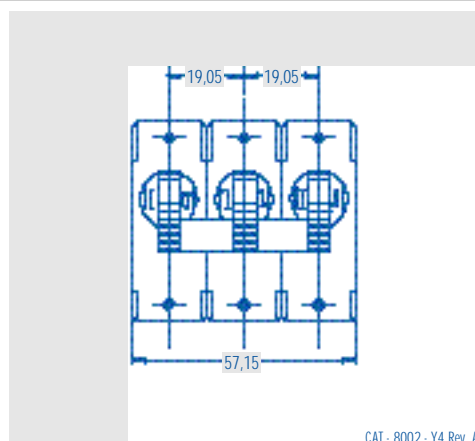
2 poles



Panel cutout (front setting)



3 poles

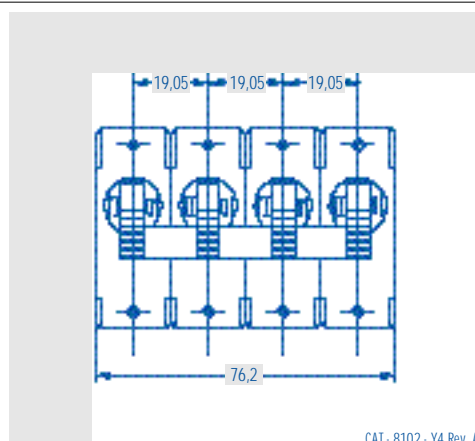


Note

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 30).

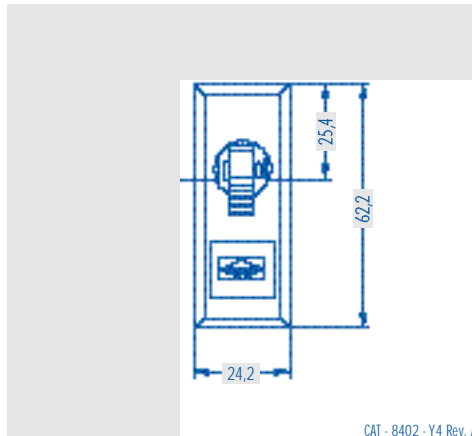
How to order: **5**

4 poles



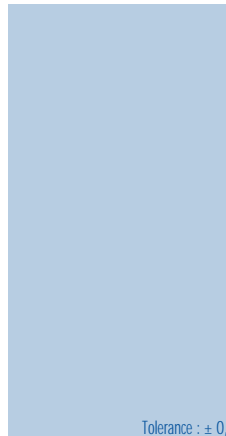
Fixing inserts

1 pole



Tolerance :  $\pm 0,8$

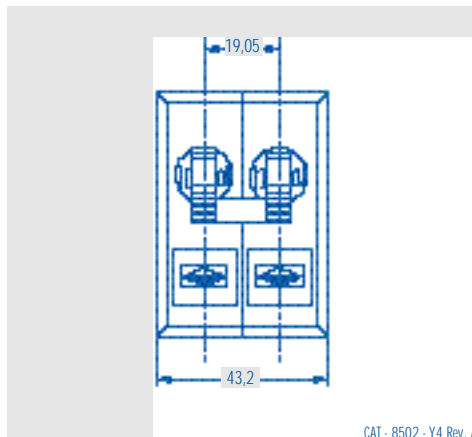
CAT - 8402 - Y4 Rev. A



Tolerance :  $\pm 0,8$

CAT - 8802 - Y4 Rev. A

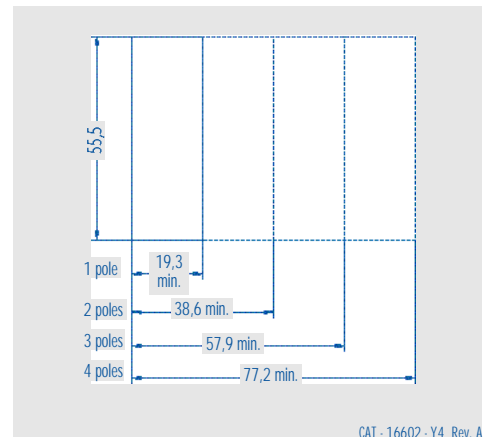
2 poles



Tolerance :  $\pm 0,8$

CAT - 8502 - Y4 Rev. A

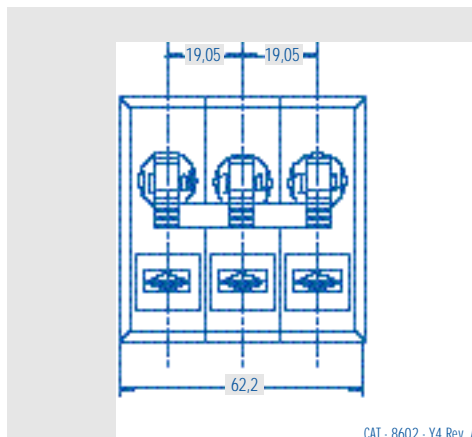
Panel cutout  
(front mounting)



Tolerance :  $\pm 0,1$

CAT - 16602 - Y4 Rev. A

3 poles



Tolerance :  $\pm 0,8$

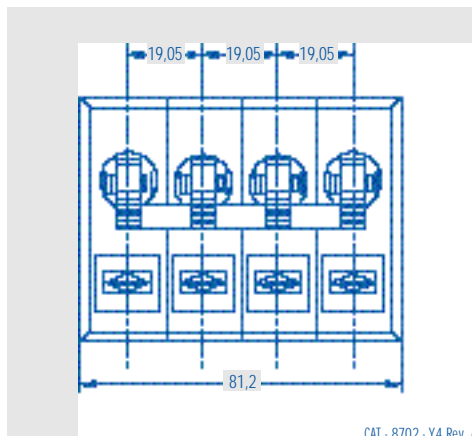
CAT - 8602 - Y4 Rev. A

Note

JBS-types (24,2 mm) are only available with handle on each pole (see page 30).

How to order: **5**

4 poles

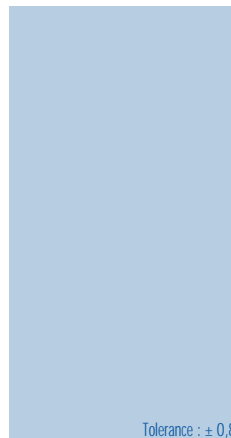
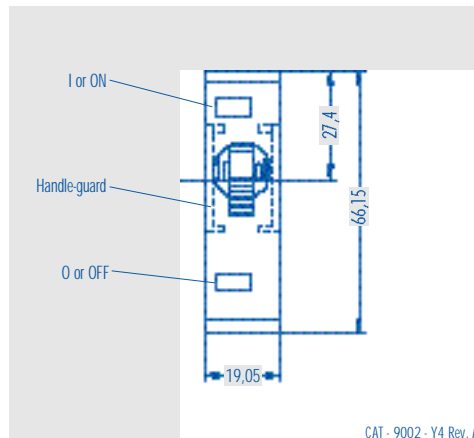


Tolerance :  $\pm 0,8$

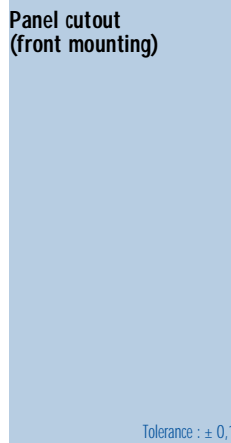
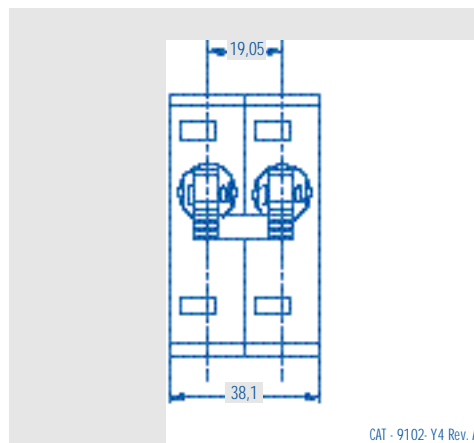
CAT - 8702 - Y4 Rev. A

Fixing inserts

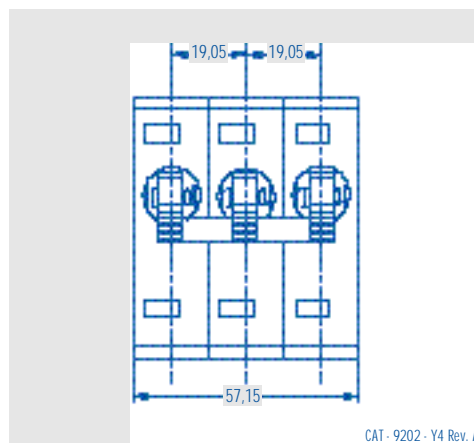
1 pole



2 poles



3 poles

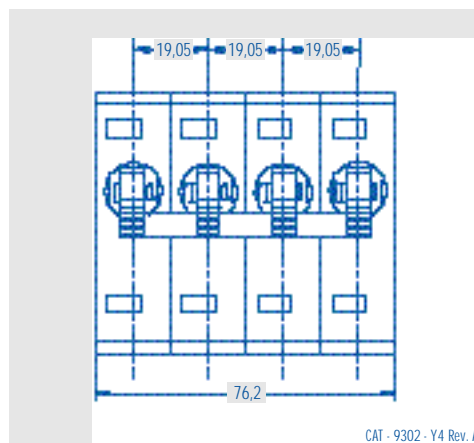


**Note**

Multipole circuit breakers JBS-type (19,05 mm) are also available with one single handle only up to 3 poles and 2 handles for 4 pole version (see page 30).

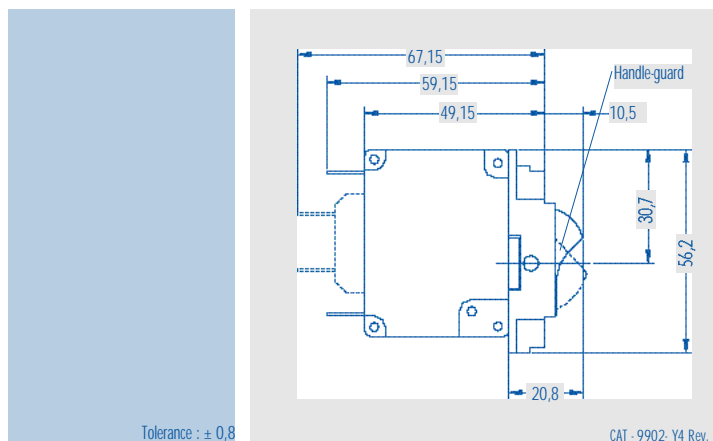
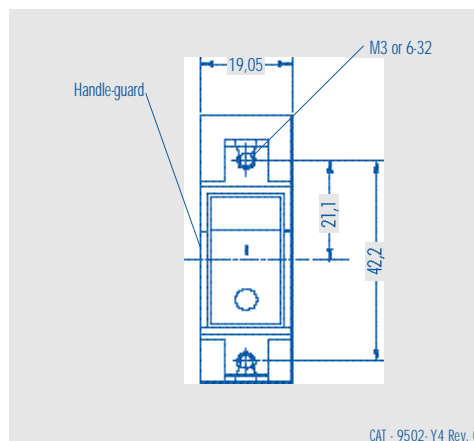
How to order: **5**

4 poles

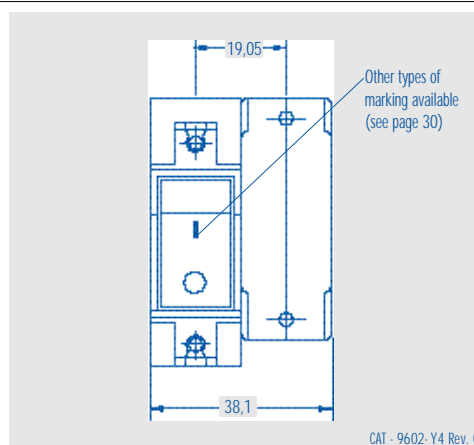


Fixing inserts

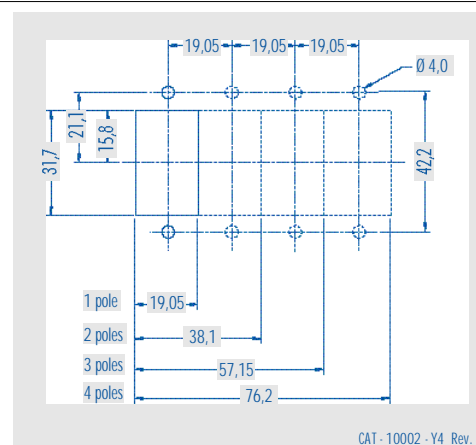
1 pole



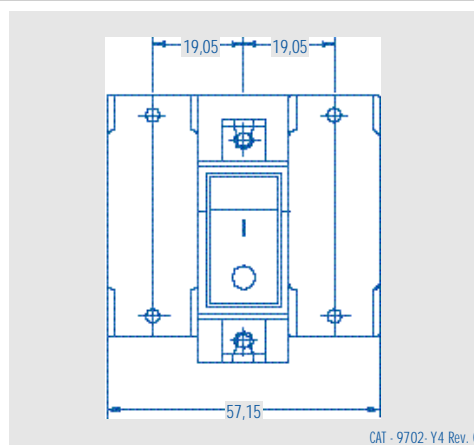
2 poles



Panel cutout (front mounting)



3 poles

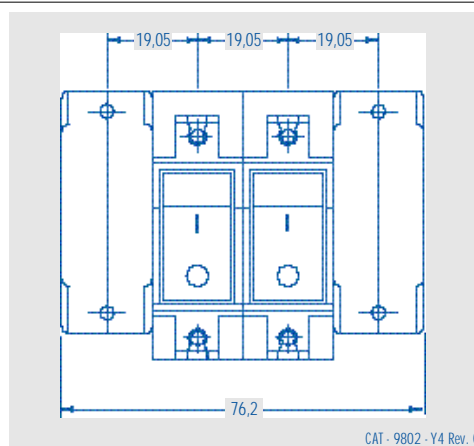


Note

Multipole circuit breakers JCS-type are also available with one single handle only up to 3 poles and 2 handles for 4 pole version (see page 30).

How to order: **5**

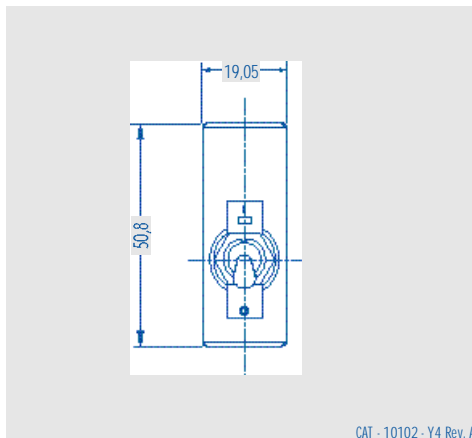
4 poles



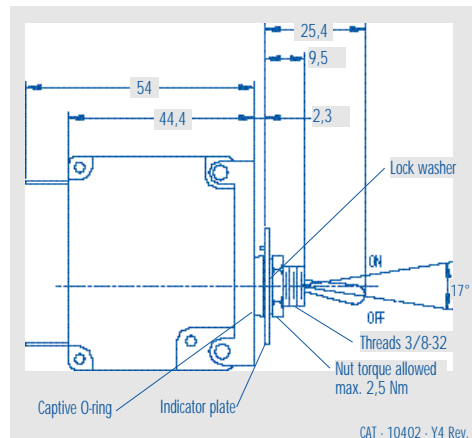
Fixing inserts

1 pole

Tolerance : ± 0,8

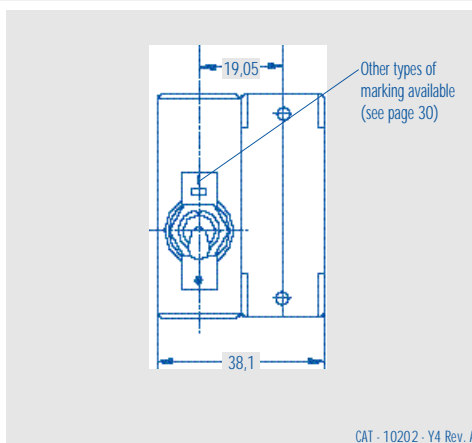


Tolerance : ± 0,8



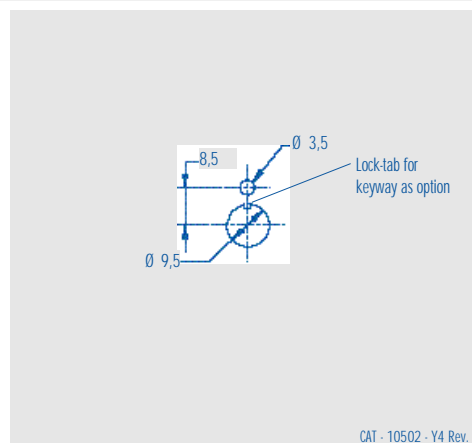
2 poles

Tolerance : ± 0,8



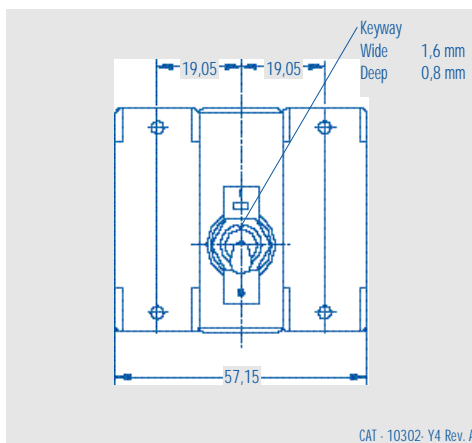
Panel cutout  
(front mounting)

Tolerance : ± 0,1



3 poles

Tolerance : ± 0,8

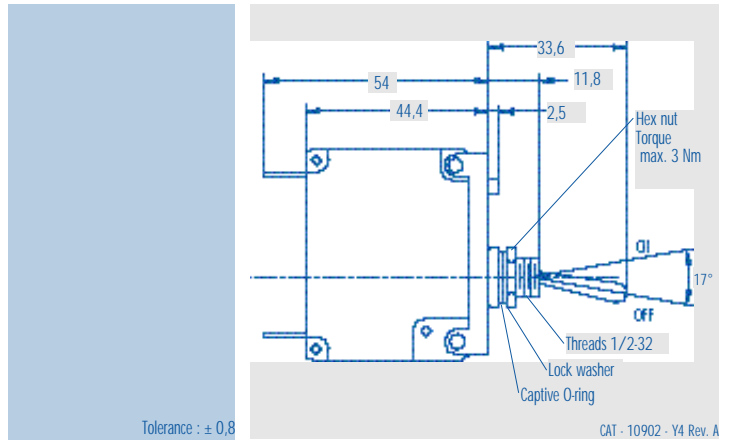
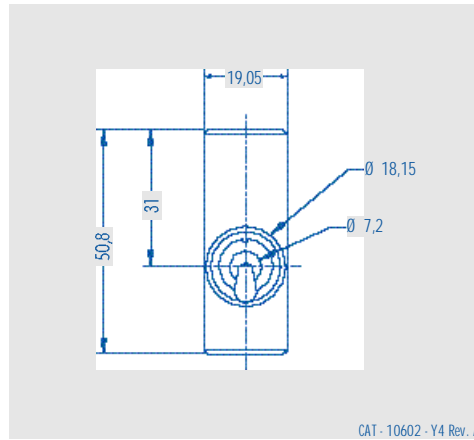


Note

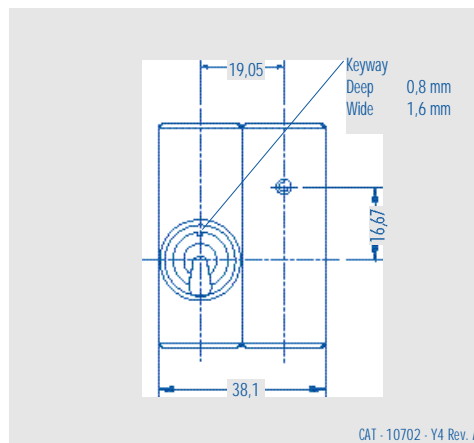
When the indicator plate with lock-tab is used, it is necessary to assure sealing that the lock-tab hole goes not through the panel (thickness of panel min. 3 mm, deep of blind-hole  $2 \pm 0,1$  mm).

Fixing inserts

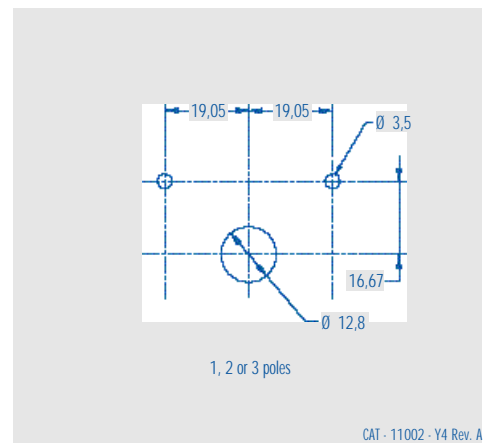
1 pole



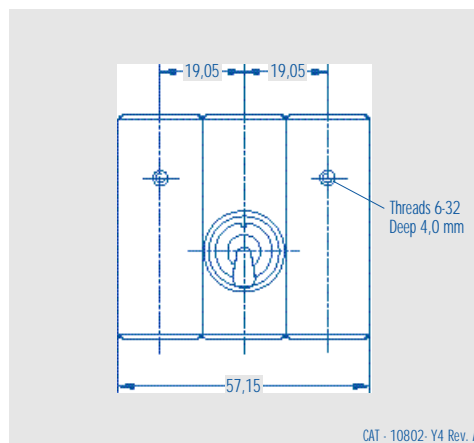
2 poles



Panel cutout (front mounting)

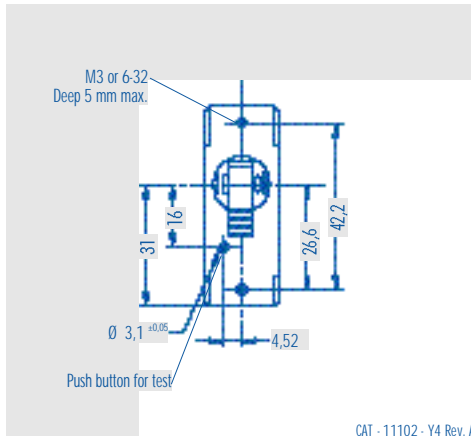


3 poles





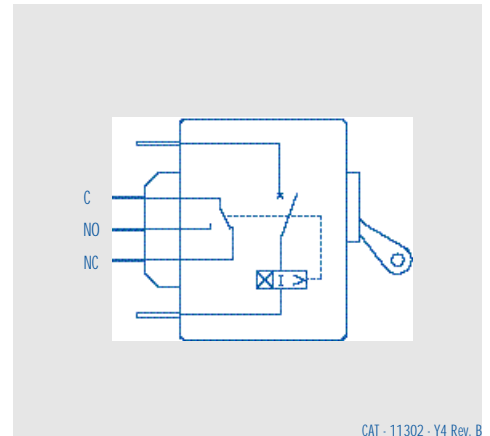
Option for type JAS



Tolerance : ± 0,8

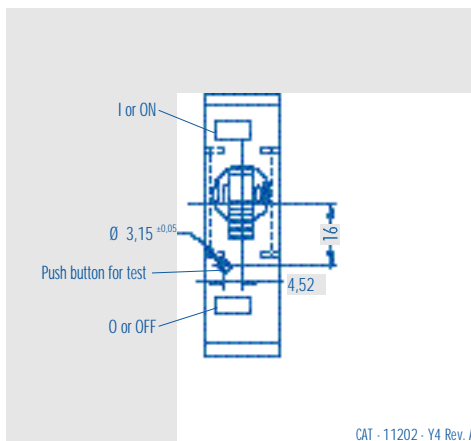
CAT - 11102 - Y4 Rev. A

Manually switched off circuit breaker



CAT - 11302 - Y4 Rev. B

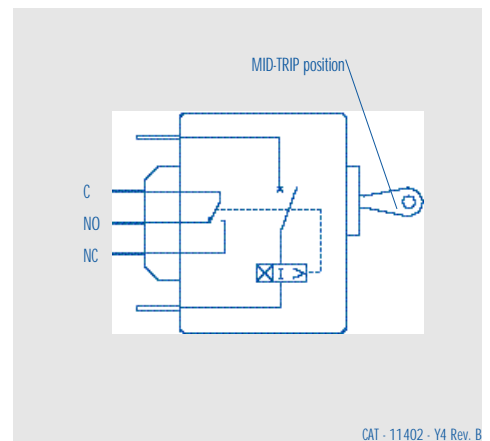
Option for type JBS



Tolerance : ± 0,8

CAT - 11202 - Y4 Rev. A

Electrically switched off circuit breaker



CAT - 11402 - Y4 Rev. B

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

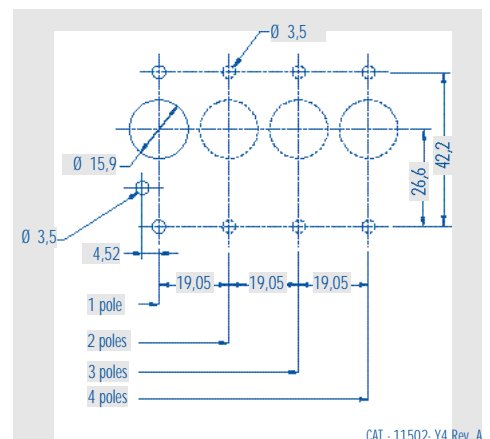
The MID-TRIP/ALARM-SWITCH versions have three :  
- ON  
- ELECTRICAL OFF (MID-TRIP)  
- MANUAL OFF

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 turn 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.

Panel cutout (front mounting)



Tolerance : ± 0,1

CAT - 11502 - Y4 Rev. A

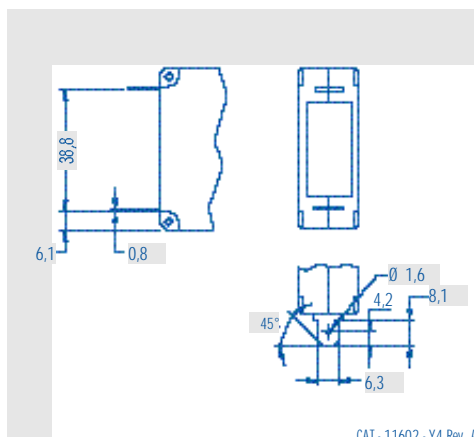
Terminal codes  
A, B, C, D, P, Q, S

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

Codes

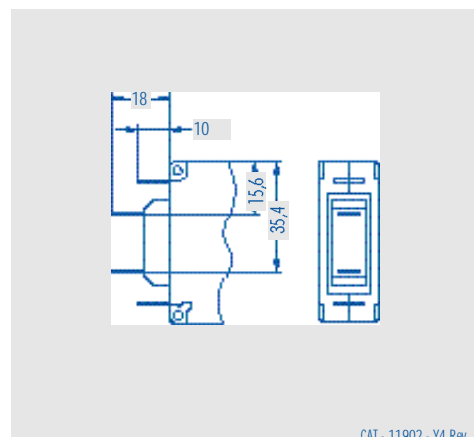
Codes

0  
3  
8  
38



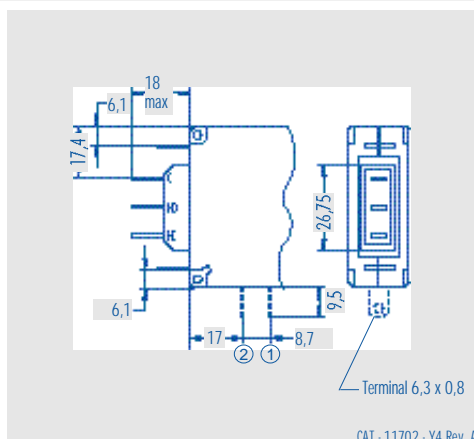
CAT - 11602 - Y4 Rev. A

6  
16  
23  
26  
33



CAT - 11902 - Y4 Rev. A

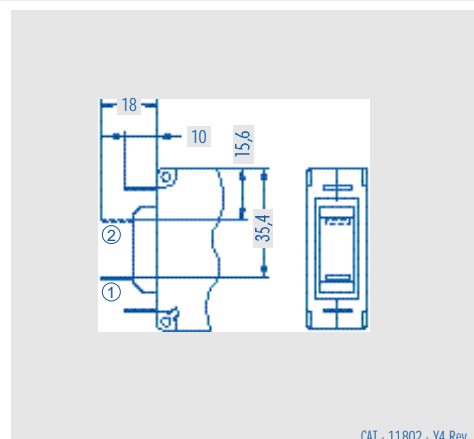
2  
9  
12  
39  
53  
62  
63  
76  
82  
86  
88  
96



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)

5  
7  
15  
22  
25  
27  
32  
37

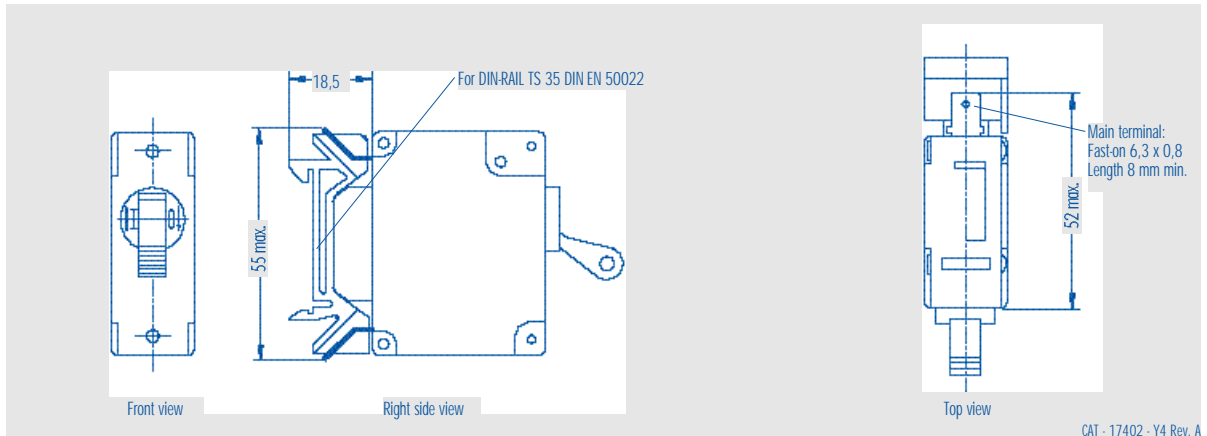


CAT - 11802 - Y4 Rev. A

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

DIN-RAIL execution

Code DN

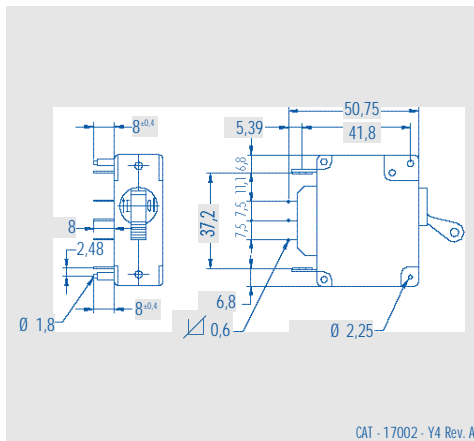


CAT - 17402 - Y4 Rev. A

Printed circuit board terminal

Codes

- 0
- 2
- 3
- 8
- 9
- 12
- 38
- 39



CAT - 17002 - Y4 Rev. A

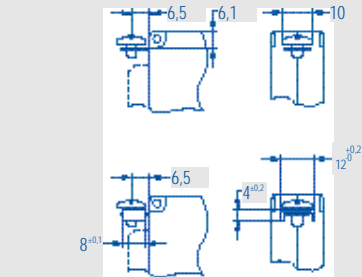
Terminal codes

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

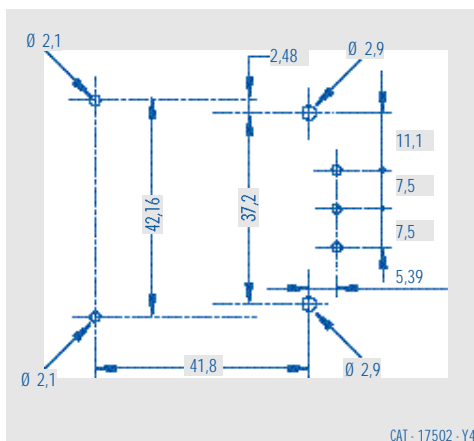
Approvals EN 60947-2 from 20,1 to 25 A: with pressure washer

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

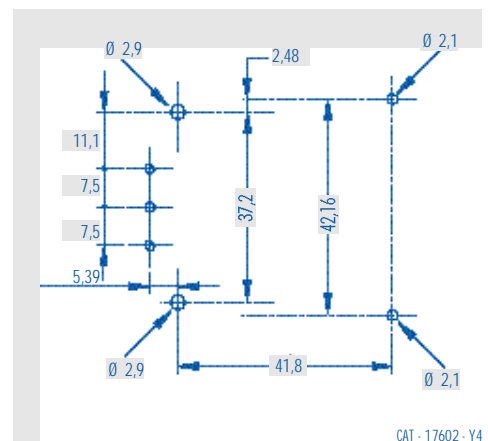
Panel cut-out for printed circuit board mount application

Outlet left



CAT - 17502 - Y4

Outlet right



CAT - 17602 - Y4

**AUXILIARY CONTACTS**  
REFERENCE TERMINALS

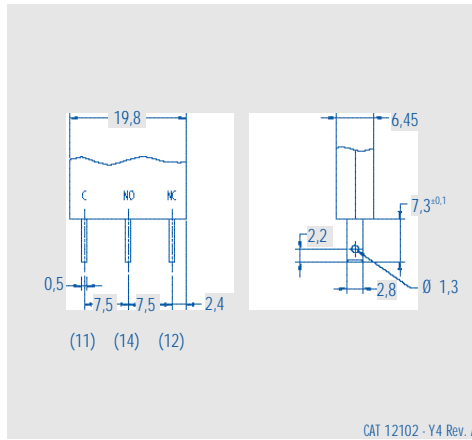
How to order: **10**

Codes

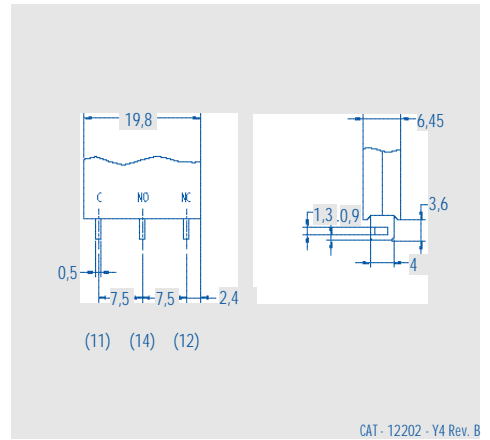
Codes

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

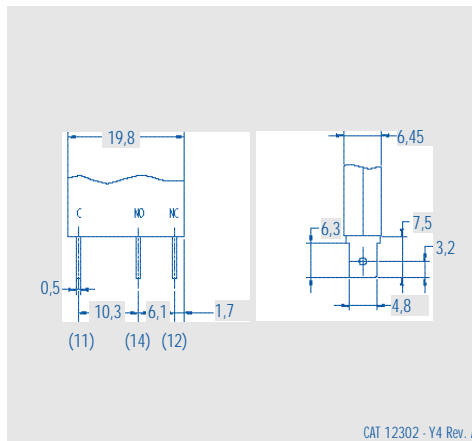
\* Reversed contacts



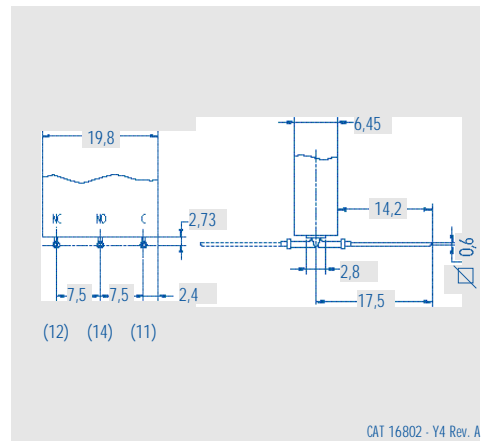
**53**  
(Solder terminals)



**07**  
(Fast-on terminals  
4,8 mm)



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



Code 40: Pin terminals 90° angle to the left-hand side, circuit breaker front view.  
C-terminal on the side of load terminal.

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

**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

**Colour rings  
(one per pole)**

Colour	Ordering ref.	Colour	Ordering ref.
Braun	20841	Green	20846
Black	20842	Blue	20847
Orange	20843	White	20848
Grey	20844	Yellow	20849
Red	20845		



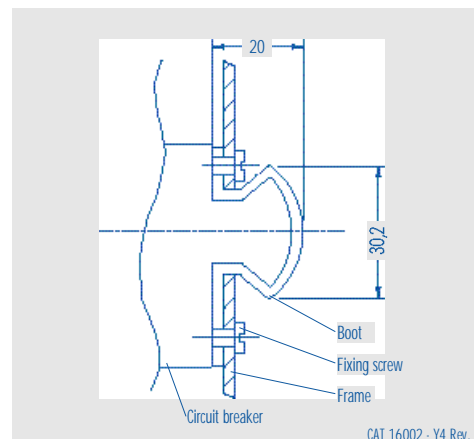
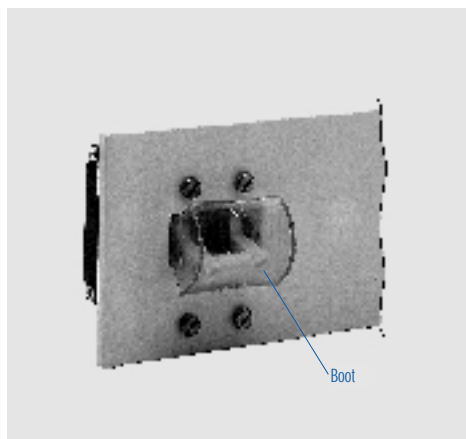
CAT 17802 - Y4 Rev. A

**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

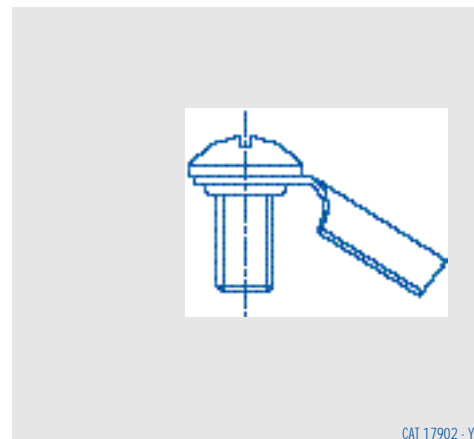


CAT 16002 - Y4 Rev. B

**Push-on screw terminals**

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

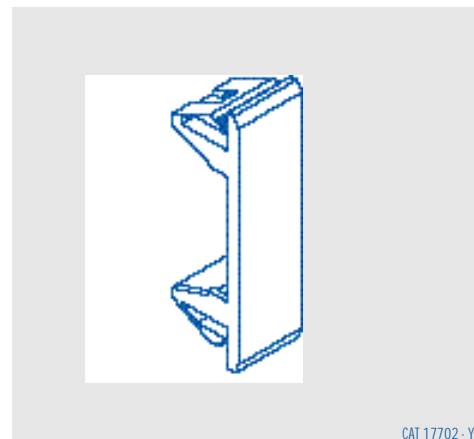
Screw	Ordering ref.
6-32 UNC	02809
M5	02819



CAT 17902 - Y4

**Blanking plate**

Ordering ref.
20808



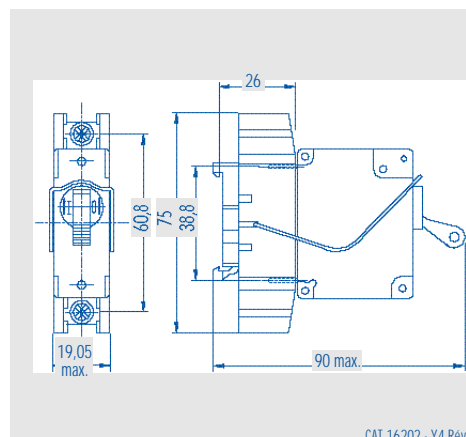
CAT 17702 - Y4

**ACCESSORIES**  
35 MM DIN-RAIL ADAPTER

**Without auxiliary contact**

JS adapter for DIN-Rail mounting 35 mm (DIN EN 50022) is available for 1, 2 or 3 poles, without auxiliary contact.

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



CAT 16202 - Y4 Rev. B

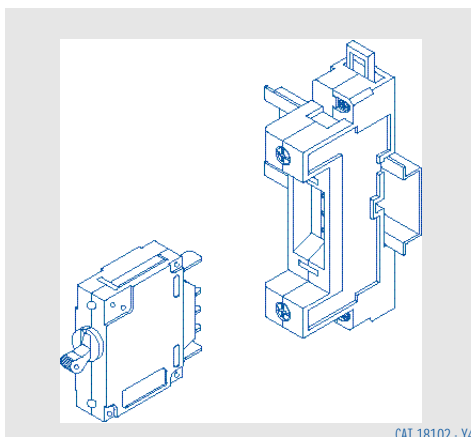
**With auxiliary contact**

Due to the modular construction the new JS adaptors for DIN-Rail mount 35 mm are available for single and multipole applications.

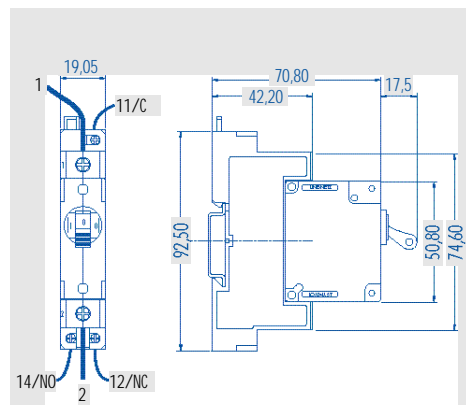
Please note: Order Code always only single.

Ordering ref.

20930



CAT 18102 - Y4



CAT 18202 - Y4

**1** Types

OBLIGATORY	CODE
Toggle	A
Snape-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
2	from left
3 or	to right)
4 poles	
Type E: max. 3 poles	

**3** Frequency and terminals

Fast-on terminals	A**	50/60 Hz	P*	Screws terminals M4	K	Screw terminals M5	T
	B**	DC	Q*		L		V
	C**	400 Hz	S*		N		W
	D**	50/60 Hz/DC	-		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	8 x		15 x		22 x		Description
	without	with	without	with	without	with	
Auxiliary contact	0	12					Switch only (without coil)
Codes	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.

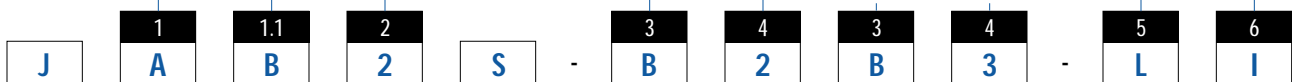
**5** Handle number and position (front view from left to right)

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 center pole
E	Handle on every pole, handle spacers as kit
J	4 poles, 2 handles on center poles, handle spacers as kit
L	Handle on every pole, handle spacers mounted
M	3 poles, 1 handle on center pole + 1 handle on left pole, handle spacers mounted
N	3 poles, 1 handle on center pole + 1 handle on right pole, handle spacers mounted
R	4 poles, 2 handles on center poles, handle spacers mounted
U	3 poles, 1 handle on left pole
W	3 poles, 1 handle on right pole

**6** Colour and inprint of handle (standard black)

Type	Colour	Type	ON/OFF	I/O	I/ON	O/OFF	Without
JAS 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	Metall 3/8		B	J	-	-	
JES	Metall 1/2		-	-	-	S	

\* Standard black



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
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
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
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
24	Type JBS front plate 24,2 mm, snap-in mount
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
51	Type JAS for printed circuit boards, outlet of terminals to the right, circuit breaker front view

## 8 VDE approval

D	Without VDE approval (standard)
H*	Approval EN 60947-2, in conformity with IEC 950
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 approvals

A	Up to : 250 V 50/60 Hz - 240 V 400 Hz - 65 V DC max. 50 A 1 to 4 poles - 72 V DC max. 30 A 1 to 4 poles - 80 V DC max. 15 A 1 pole
NU	Up to : 250 V 50/60 Hz - 240 V 400 Hz - 80 V DC , without UL-CSA approval
L	Up to : 277 V 50/60 Hz
NL	Up to : 277 V 50/60 Hz, without UL-CSA approval
AD	Up to : 415 V 50/60 Hz, only with 3 poles minimum
ND	Up to : 415 V 50/60 Hz, without UL-CSA approval

## 10 Auxiliary contacts

Code	Function	Contact	Terminals	I max. (A) at 220 V AC	
				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 27

## 11 Voltage or current rating V or A

A) To repeat only if poles are different. For breakers with coil in series with contacts, indicate:	$\overline{x \ x \ x \ x \ x} / \overline{x \ x \ x \ x \ x}$ Un or In coil   U = contact voltage
B) For breakers with coil circuit separated of contact circuit, indicate: (internal circuits: 6, 23, 33, and 62) Un possible: (6-250 V AC) (6-125 V DC)	$\overline{x \ x \ x \ x \ x} / \overline{x \ x \ x \ x \ x} / \overline{x \ x \ x \ x \ x}$ Un or In coil   In contact   U = contact voltage
C) For breakers with two coils, indicate: (internal circuits: 7, 15, 16, 25, 26, 27, 37, 53, 63 and 66) Un only possible for 2nd coil: (5-240V AC) (5-125 V DC)	$\overline{x \ x \ x \ x \ x} / \overline{x \ x \ x \ x \ x} / \overline{x \ x \ x \ x \ x}$ In main coil   U = contact voltage   Un 2nd coil

## 12 Time delay curves

See pages 8 to 16

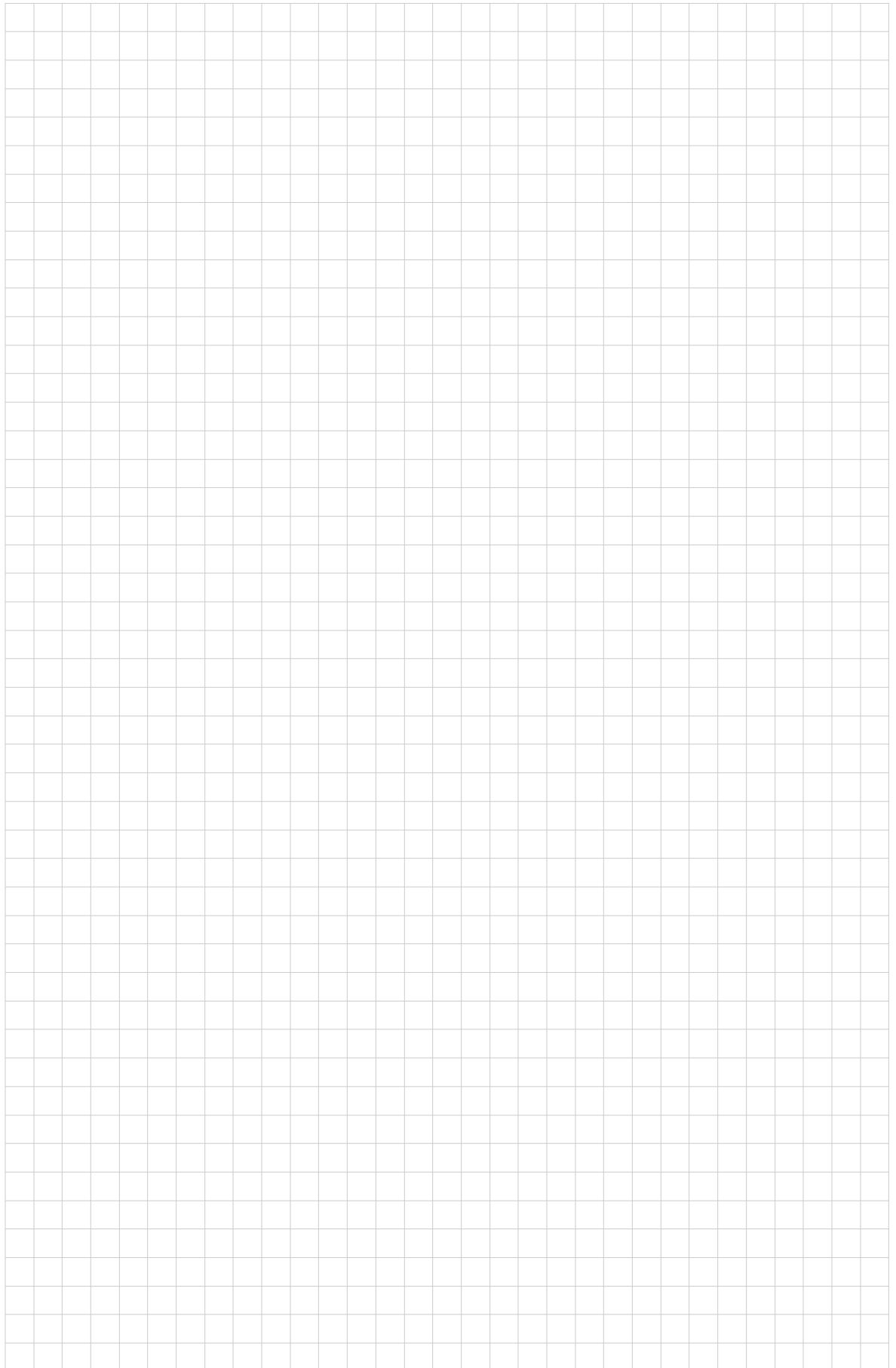
### Additional note

The internal circuits 4 labeled with \* have a standard dielectric strength of  $2 \times U_n + 1000$  V. For 2500 V, indicate code HV.



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.

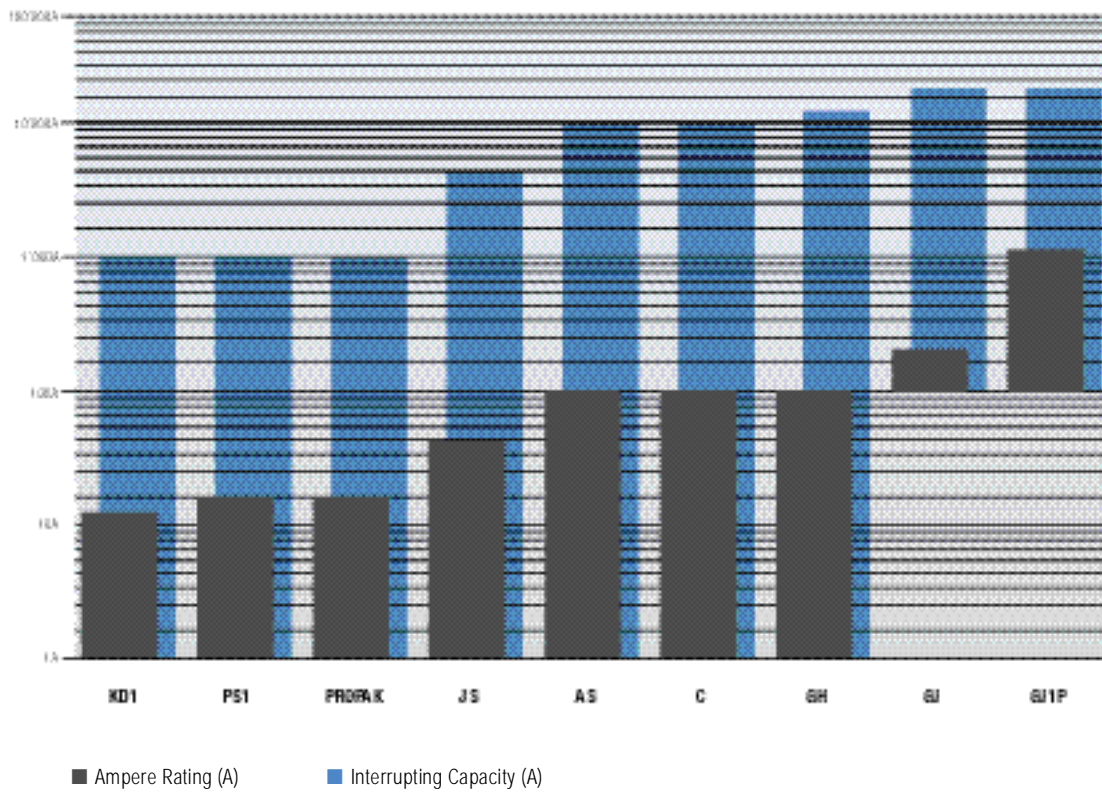




# Highly Reliable Miniature Circuit Protectors and Hydraulic-Magnetic Circuit Breakers

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

## Circuit Breaker Selection Guide



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Commercial Controls Business Unit  
Heinemann Products  
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Fax ++41 21 841 92 00



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