

Series ADS Hydraulic-Magnetic Circuit Breakers

- Small, lightweight
- VDE/UL/CSA recognized
- International Approvals
- Ratings: 0.1 A to 100 A



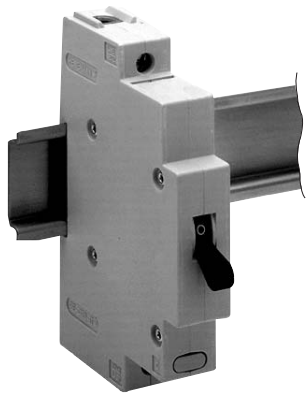
Heinemann® Circuit Breakers



ISO 9001 Certified
ISO 14001 Certified

Type

ADS



Contents

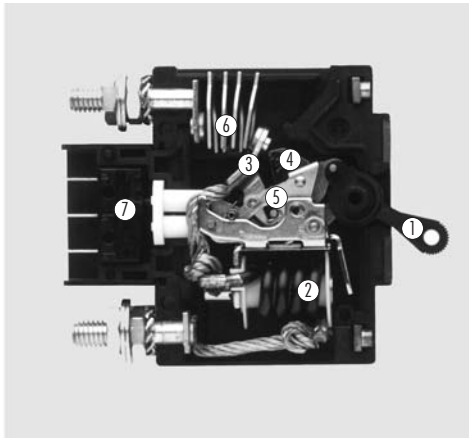
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Remark: After use of circuit breaker when scraped the law of the country will apply.

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.

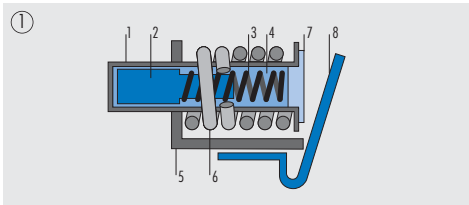
Heinemann is a registered trademark.

Description



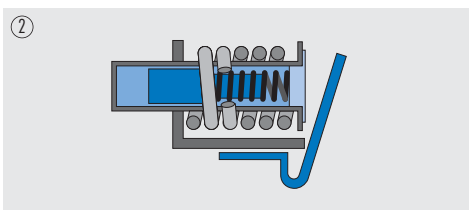
- 1 The handle has two positions only «ON» and «OFF», giving an unmistakable visual indication of the switch position. However, the MID-TRIP versions have three. (See working principle page 17).
- 2 Tripping of all AS hydraulic-magnetic MCB's is caused by excess current through the solenoid. This is 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 AS MCB's can also be supplied with auxiliary contacts.

Principle

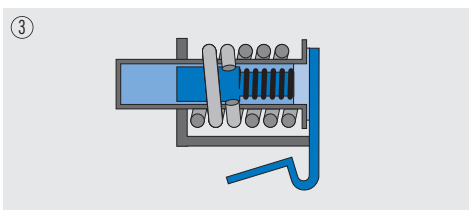


The load current is either at or below the nominal rating of the breaker - The core remains at the end of the tube opposite to the armature.

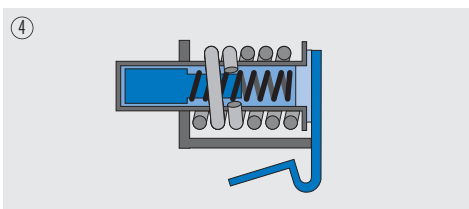
1. tube / 2. core / 3. spring / 4. fluid / 5. frame /
6. coil (sensor) / 7. pole piece / 8. armature



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.



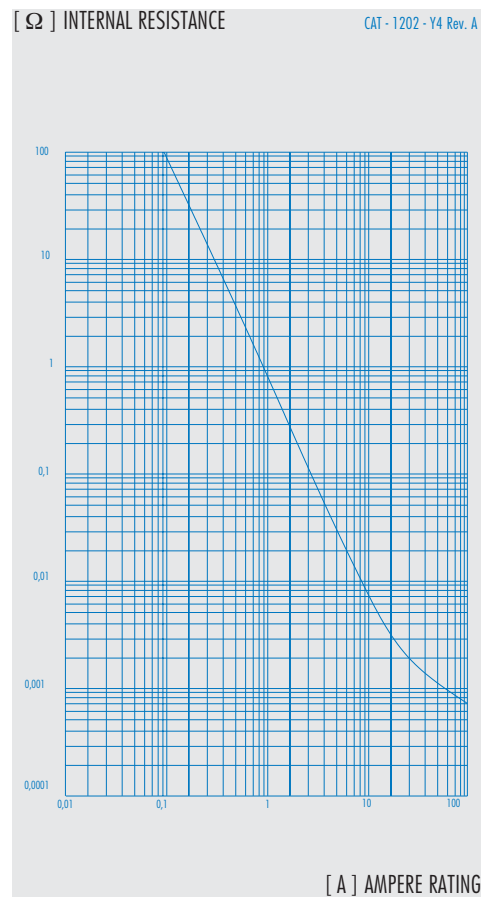
On heavy overloads or short circuits, the flux produced by the coil alone, regardless of core position, is sufficient to pull in the armature - The breaker trips. This circuit interruption occurs with no intentional delay.

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 Terminals sealing IP 40 Front sealing
Shock	IEC 68-2-27 MIL - STD - 202, method 213 (Type ADS 50 G, 6 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	ADS 1 pole 145 g 2 poles 295 g 3 poles 440 g 4 poles 590 g
Approvals	UL - CSA and VDE. In conformity with IEC 950
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 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



Current (A)	Tolerances (%)
0,01 to 19,9	±25
20 to 100	±35

APPROVALS

**Approvals
VDE-UL-CSA**

	Type	Nb. poles	Rating operating voltage Ue	Rating current In	Interrupting capacity Icu = Ics
EN 60947-2* certified CENELEC	AD.S	1	230 V 50/60 Hz	0,1 - 63 A	1500 A
	AD.S	2 - 4	400 V 50/60 Hz	0,1 - 63 A	1500 A
	AD.S	1 - 2	80 V DC	0,1 - 63 A	3000 A
UL 1077 CSA C 22.2	AD.S	3	250 V AC	0,1 - 50 A	5000 A ①
	AD.S	1 - 4	277 V AC	0,1 - 50 A	5000 A ①
	AD.S	3	480 V AC	0,1 - 30 A	3000 A ①
	AD.S	1 - 4	65 V DC	0,1 - 50 A	5000 A ②
	AD.S	1 - 4	80 V DC	0,1 - 50 A	5000 A ①
	AD.S	1 - 4	80 V DC	51 - 63 A	5000 A ③

* 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 between 15 A and 4 times In of the protector.
- ② Serie fuse not required.
- ③ Serie fuse required: In fuse max. 200 A.

**Safety standards
IEC 950**

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

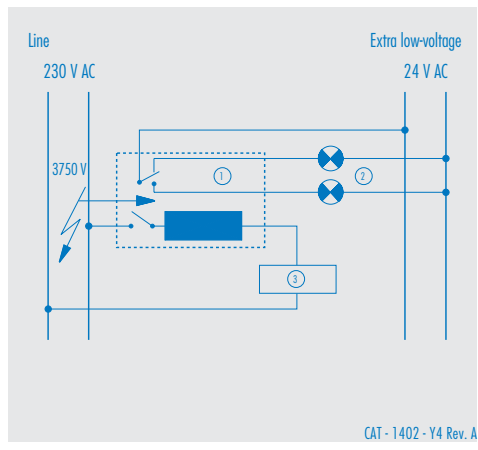
The circuit breakers equipped with one auxiliary contact (microswitch) enable low-voltage safety circuits to be simultaneously switched with the protection of an apparatus connected to the mains. (See figures 1 and 2).

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



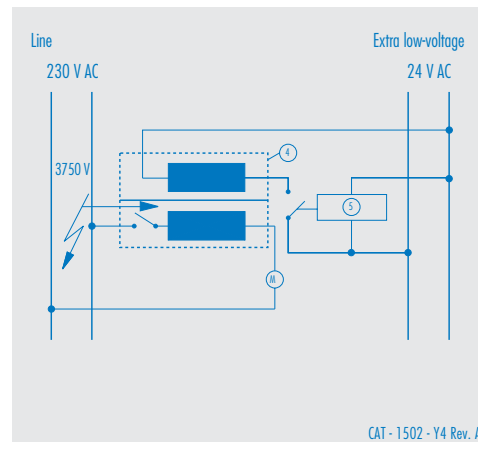
CAT - 1402 - Y4 Rev. A

Figure 2

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

Description

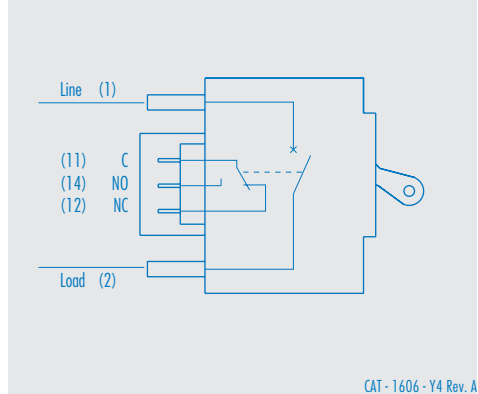
4. Two-pole circuit breaker; protection + low-voltage control
5. Electronic control



CAT - 1502 - Y4 Rev. A

Switch

Construction represented: 12



CAT - 1606 - Y4 Rev. A

Switch only (without coil) with or without auxiliary contact.

Auxiliary contact	Code
without	0
1 HE	12

**0
12**

INTERNAL CIRCUITS

Diagrams

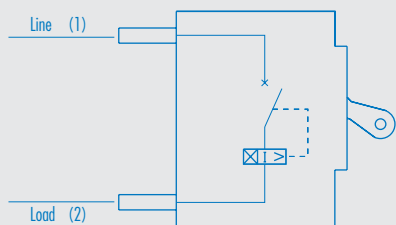
Descriptions

How to order: **4**

Codes

Series Trip

Construction represented: 3, 8, 38



CAT - 1706 - Y4 Rev. A

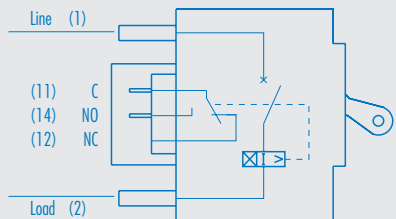
The contacts and the coil are in series. This is the current execution of the AS circuit breaker. It is often used as main switch at the same time.

Start overcurrent	8x	15x	22x
Code	3	8	38

3
8
38

Series Trip with auxiliary contact

Construction represented: 2, 9, 39



CAT - 1806 - Y4 Rev. A

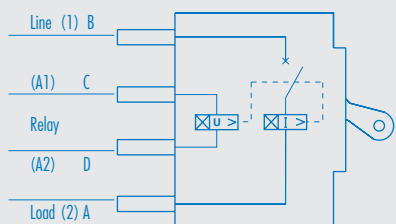
The contacts and the coil are in series. Auxiliary contacts are placed behind the circuit breaker and mechanically connected to the releasing system.

Start overcurrent	8x	15x	22x
Aux. contact	Code		
1 HE	2	9	39

2
9
39

Dual Control (Ducon) (Series + Relay)

Construction represented: 16, 26



CAT - 2306 - Y4 Rev. A

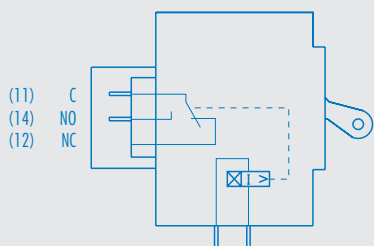
Same function as codes 15 and 25, but both coils are electrically separated.

Start overcurrent	8x	15x
Aux. contact	Code	
without	16	

16
26

Relay trip for IEC execution

Construction represented:



CAT - 2406 - Y4 Rev. A

These internal circuits have no main contact. When combined with another pole, they permit compliance with the safety regulations dictated by IEC 950.

Start overcurrent	8x	15x	22x
Aux. contact	Code		
without			

86

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

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 (P curve) may trip instantaneously between 101 % and 125 % of rated load, must trip instantaneously at 125 % and above. (150 % for 400 Hz).

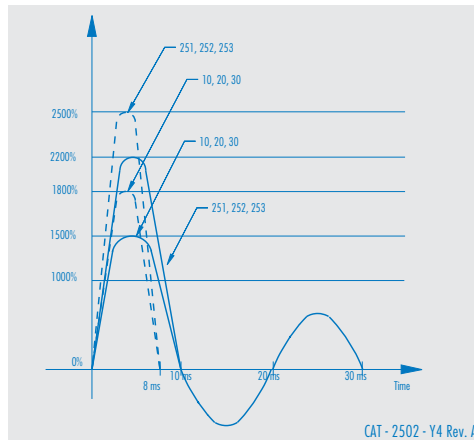
The voltage trip breakers may trip below 100% rated voltage, must trip at 100% and above.

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



AS 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.

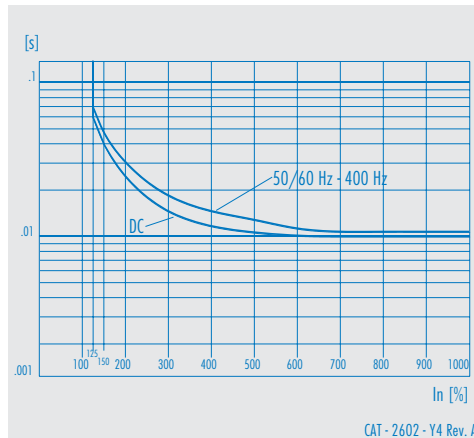
By using AS high-inrush types, unnecessary and dangerous overcalibrations involving use of thicker cables or wires can be avoided, thus saving energy and money.

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 P curves, 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

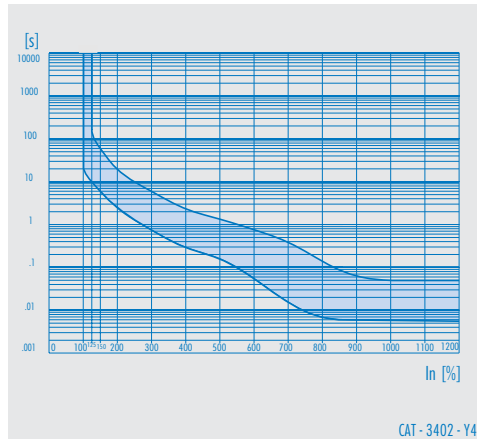
2, 3, 16, 86

TIME DELAY CURVES

START OVERLOAD 8 x In

INTERNAL CIRCUITS CONCERNED :
2, 3, 16, 86

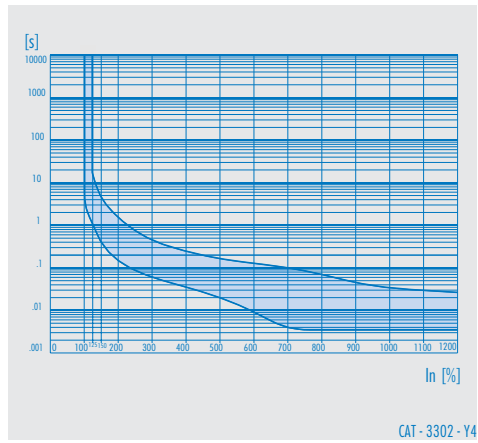
Curve 2
50/60 Hz



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

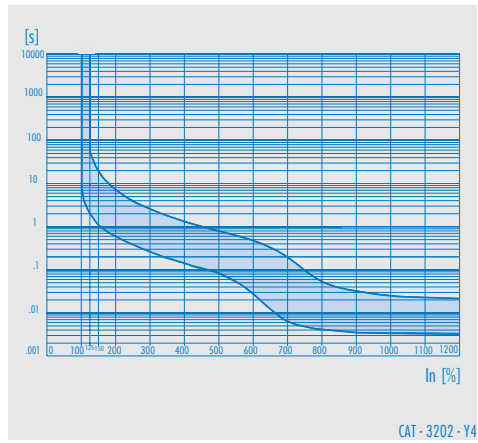
Curve 3
50/60 Hz



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

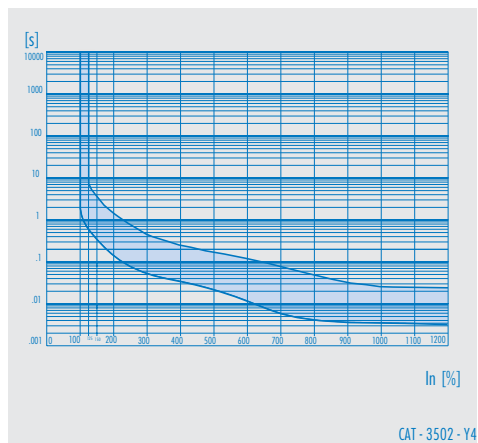
Curve 2
DC



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



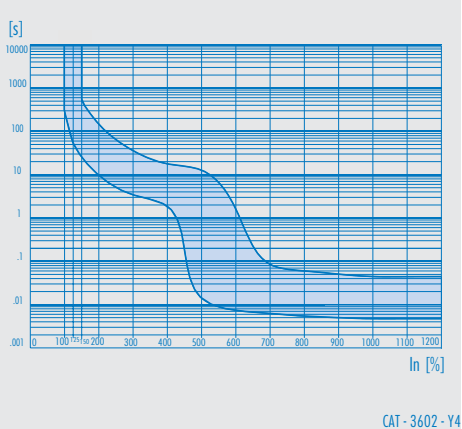
In.%	125	150	200	300	400	500	600	700	800	900	1000	1100	1200
MAX	7.0	3.50	1.40	.420	.250	.180	.120	.080	.0510	.0320	.0260	-	-
MIN	.6	.35	.15	.055	.035	.021	.012	.006	.0041	.0038	.0037	-	-

SHORT DELAY

TIME DELAY CURVES

START OVERLOAD 8 x In (Continued)

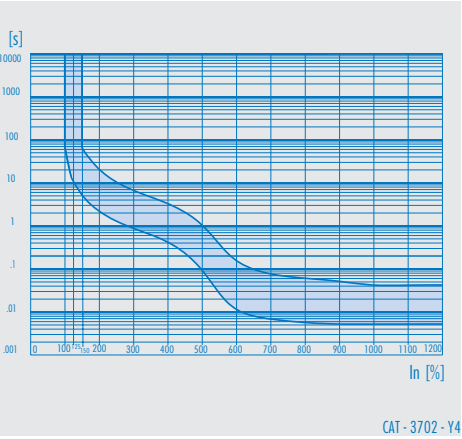
**Curve 1
400 Hz**



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

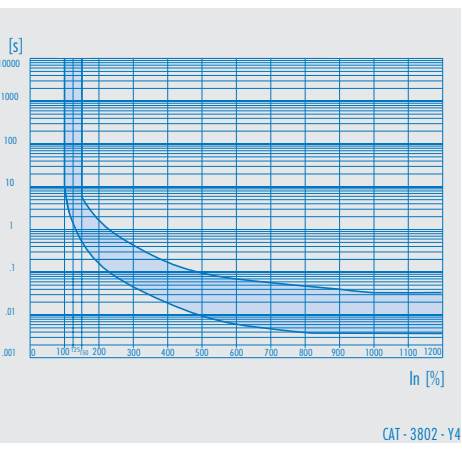
**Curve 2
400 Hz**



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**



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

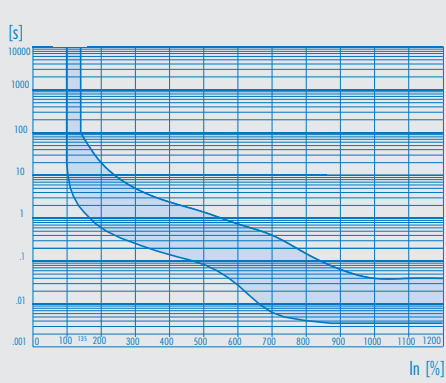
START OVERLOAD $8 \times I_n$ (Continued)

COMBINED AC/DC VERSIONS

This type of circuit breaker can be used for AC 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

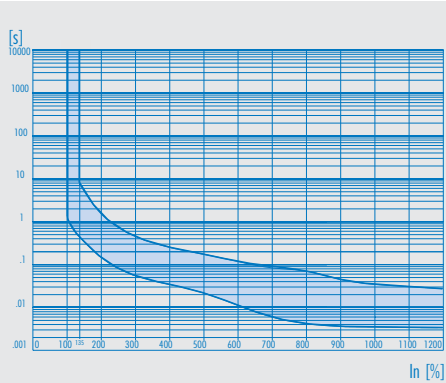


CAT - 3902 - Y4

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	-	-

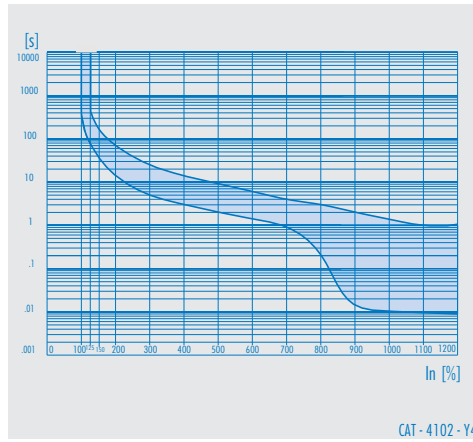
SHORT DELAY

TIME DELAY CURVES

START OVERLOAD 15 x I_n

INTERNAL CIRCUITS CONCERNED :
8, 9, 26* *(with curve 20 or 30 only)

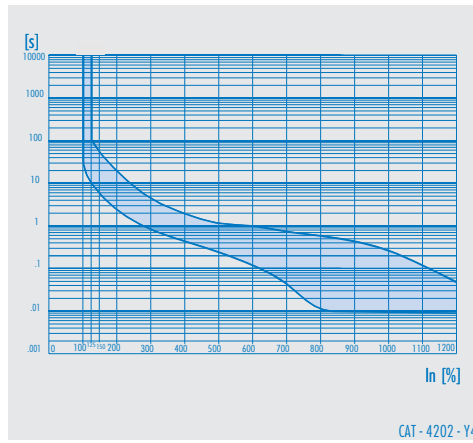
Curve 10 50/60 Hz



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

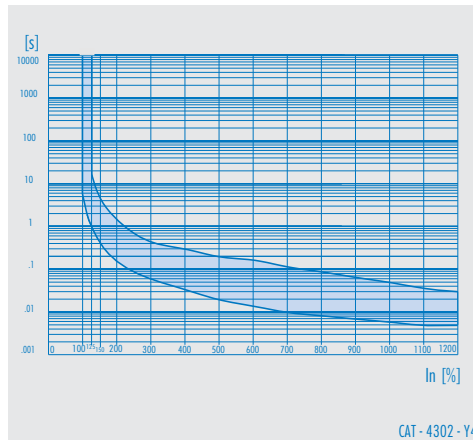
Curve 20 50/60 Hz



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



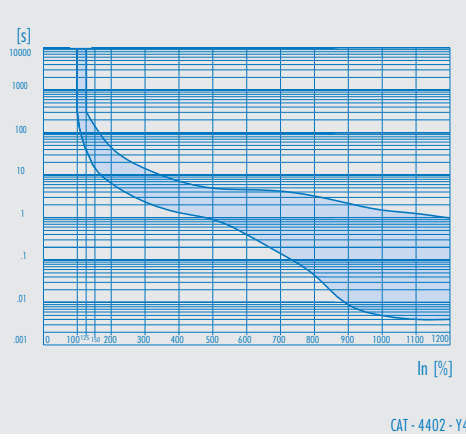
In.%	125	150	200	300	400	500	600	700	800	900	1000	1100	1200
MAX	17	4.50	1.60	.46	.300	.20	.170	.12	.0900	.065	.050	.038	.030
MIN	1	.40	.16	.06	.035	.02	.015	.01	.0085	.007	.006	.005	.005

SHORT DELAY

TIME DELAY CURVES

START OVERLOAD 15 x In (Continued)

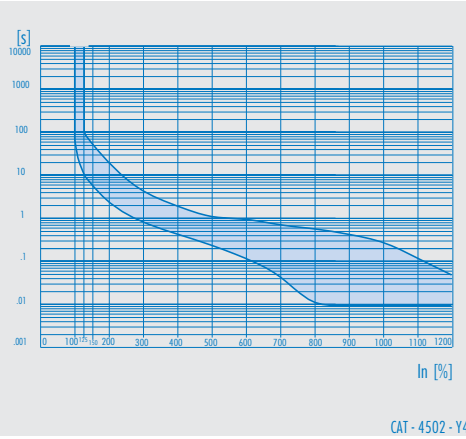
**Curve 10
DC**



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

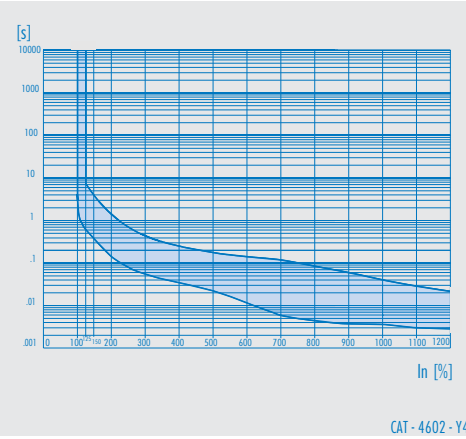
**Curve 20
DC**



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**



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

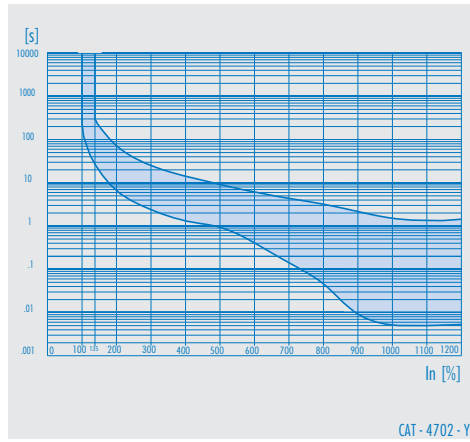
START OVERLOAD 15 x In (Continued)

COMBINED AC/DC VERSIONS

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

INTERNAL CIRCUITS CONCERNED :
8, 9

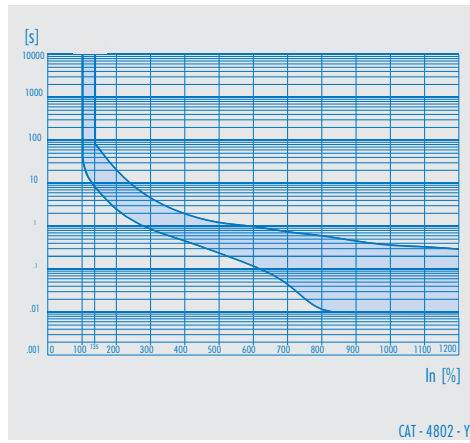
Curve 10 50/60 Hz/DC



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

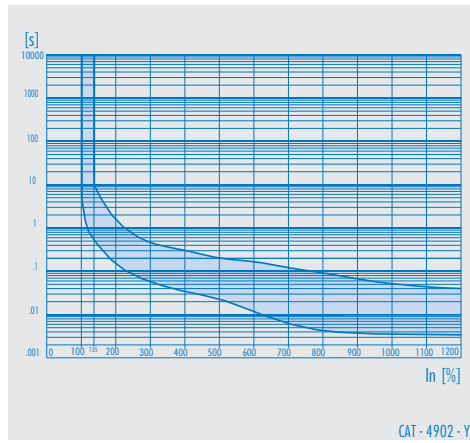
Curve 20 50/60 Hz/DC



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	-	-

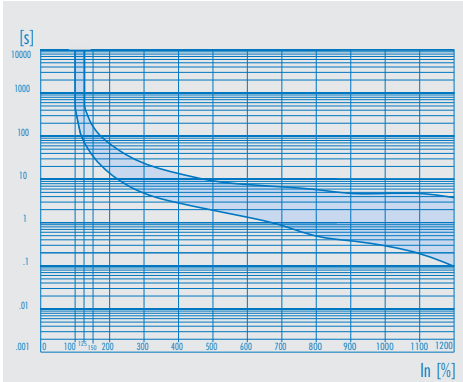
SHORT DELAY

TIME DELAY CURVES

START OVERLOAD 22 x I_n

INTERNAL CIRCUITS CONCERNED :
38

Curve 251 50/60 Hz or DC

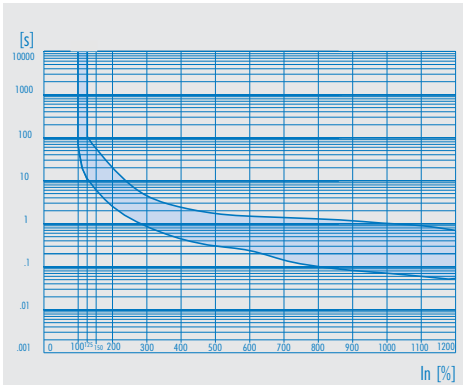


CAT - 5002 - Y4

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

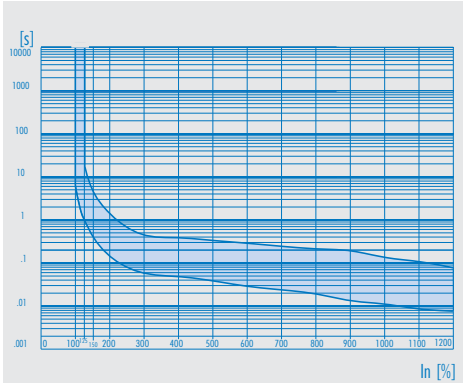


CAT - 5102 - Y4

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)

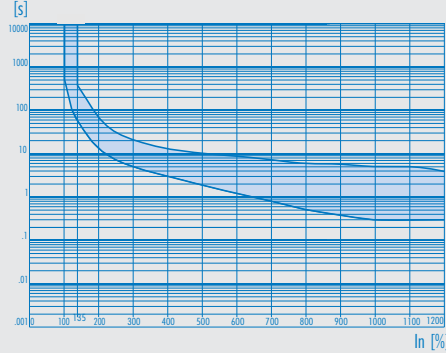
COMBINED AC/DC VERSIONS

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

INTERNAL CIRCUITS CONCERNED :

38

Curve 251 50/60 Hz/DC

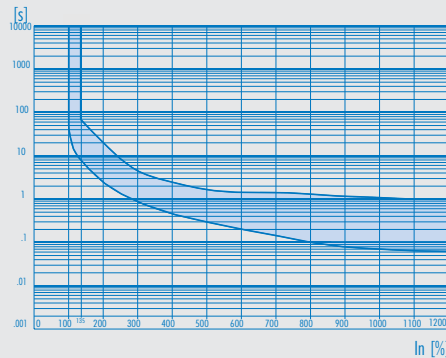


CAT - 5402 - Y4 Rev. A

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

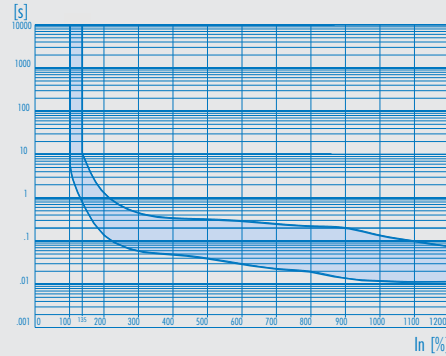


CAT - 5302 - Y4

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



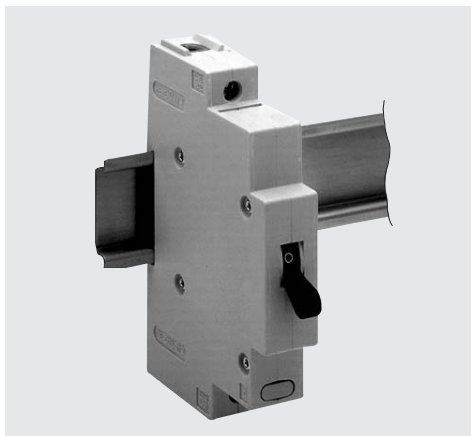
CAT - 5502 - Y4

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 ADS
(DIN RAIL
mount breaker)**



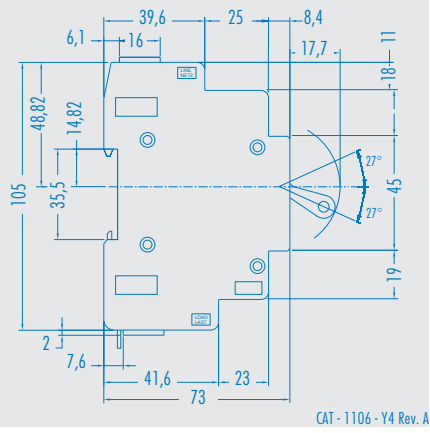
ADS circuit breakers are designed to be mounted on standard 35 mm. DIN RAIL (DIN EN 50022).

ADS circuit breakers are available in 1, 2, 3 or 4 pole execution up to 63 Amps max.

ADS circuit breakers are available with internal circuit codes 0, 2, 3, 6, 8, 9, 12, 16, 26, 38, 39 and 86.

DIMENSIONS OF ADS TYPE

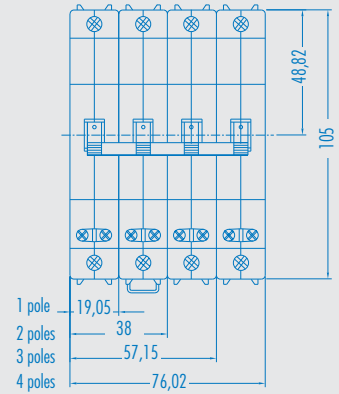
Left side view



Tolerance : $\pm 0,8$

CAT - 1106 - Y4 Rev. A

Front view

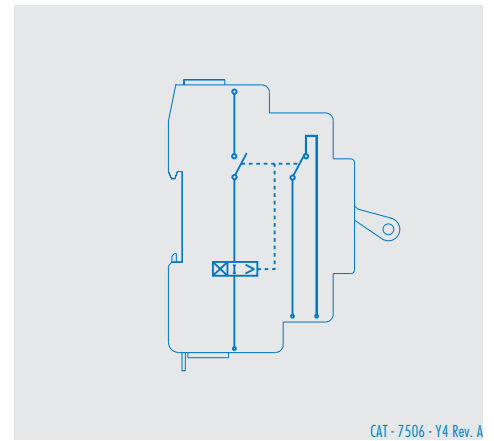


Tolerance : $\pm 0,8$

CAT - 7706 - Y4 Rev. A

Top view

Description



CAT - 7506 - Y4 Rev. A

ADS circuit breakers are designed for 35 mm. symmetrical DIN RAIL (DIN EN 50022) mounting.

ADS type is available with integrated auxiliary contact NO (code 61) or NC (code 62).

Current rating max. up to 63 Amps.

Internal circuit codes available : 0, 2, 3, 6, 8, 9, 12, 16, 26, 38, 39 and 86.

Size of wire for main contact : max 25mm².
Size of wire for aux. contact : max 4mm².

Technical characteristics

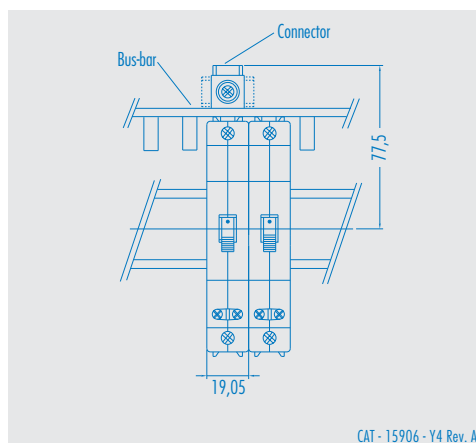
Bus-bar for common feed and isolated connector for bus-bar.

Standard length	approx. 1000 mm.
Material	E-CuF2, section 16 mm ² .
Isolation material	plastic, unaffected by changes of temperature < 80°C.
Nominal rating current	80 A.

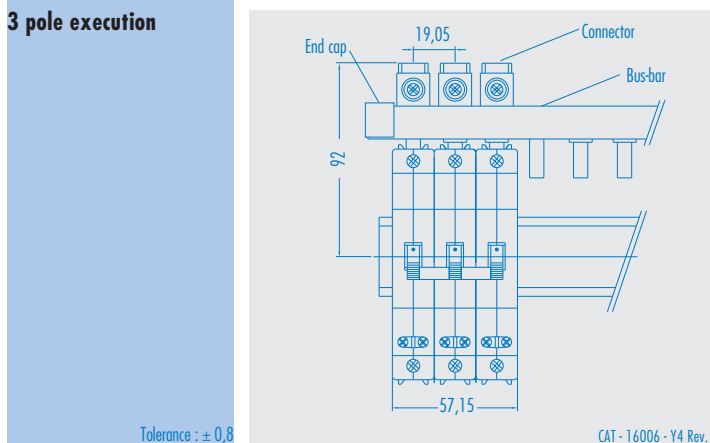
Type	Ordering ref.
1 pole	20100
2 poles	20106
3 poles	20101



1 pole execution



3 pole execution



Connector

Suitable for wire connection: 6-25 mm²

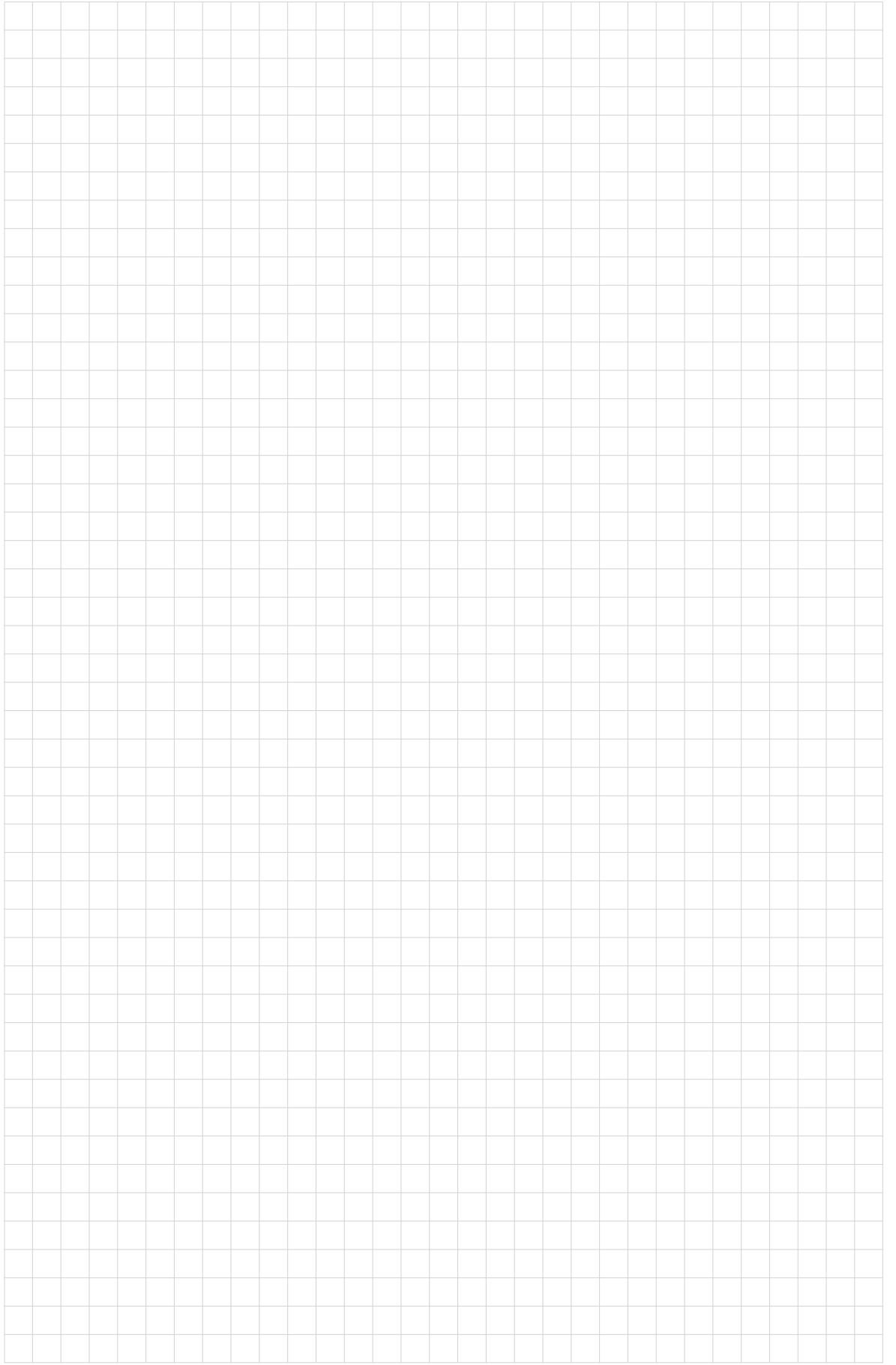
Type	Wire connection	Ordering ref.
1 pole	right	20103
	left	20104
	upper	20105
2 and 3 poles	right	20303
	left	20304
	upper	20305

End cap

End cap for 2 and 3 poles bus-bar (finger protector)

Type	Ordering ref.
2 and 3 poles	20102







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

