Adex MCCB : NIRAPOD 2

Moulded Case Circuit Breaker

16A-1600A & 15kA-75kA

Adex MCCB Nirapod 2 meets all the need of customers conforming to IEC 60947.2 requirements and suitable for all applications in:

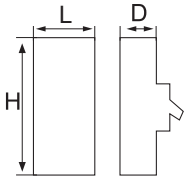
> industry
> constructions
> infrastructures
> utilities

NIRAPOD 2

Molded Case Circuit Breaker

The NIRAPOD 2 series of mccb provides the circuit protection & isolation according to IEC 60947.2 using

- thermal magnetic trip units
- electronics / microprocessor based trip units which offers:
  - ■ Over current protection
  - ■ Short circuit protection
  - ■ Isolation to IEC 60947.2

Breaker type			E	N	S	E	N	S
Frame size			**FN 100**			**FN 250**		
Rated current		In	15,20, 25, 30, 40 50, 60, 80, 100			160. 200, 250		
Rated insulation voltage		Ui	690			690		
Rated operational voltage		Ue	550			550		
Number of poles			3/4			3/4		
Rated short - circuit current:								
Rated ultimate breaking capacity, 415V AC, Icu		(KA)	18	25	35	18	25	35
Rated service breaking capacity, Ics		(kA rms)	60%Icu					
Rated impulse withstand voltage, Uimp		(V)	6000			6000		
Over current & short circuit trip unit	Thermal & magnetic release		■	■	■	■	■	■
	electronics/microprocessor based trip units							
Utilization	main circuit		A			A		
category	auxiliary circuit		AC - 15			AC - 15		
Outline dimensions 	L (mm)	3P	75	75	75	105	105	105
		4P	100	100	100	140	140	140
	H (mm)	3P	130	130	130	165	165	165
		4P	130	130	130	158	158	158
	D (mm)	3P	60	60	60	60	60	60
		4P	60	60	60	60	60	60

NIRAPOD 2

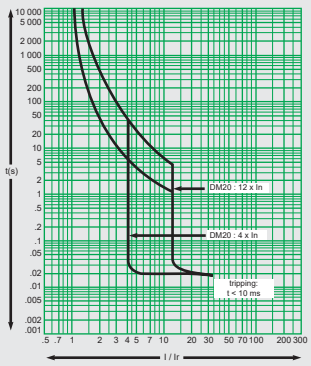
Molded Case Circuit Breaker

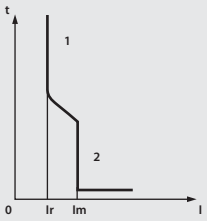
E	N	S	E	N	S	E	N	S	S	M	M1	H1	M	H	M	H	M	H	M	H
AM 100			**AM 160**			**AM 250**			**AM 400**		**AM 630**		**AM 800**		**AM 1000**		**AM 1250**		**AM 1600**	
10, 16, 25, 32 40, 50, 63, 80, 100			160			200, 250			315 - 400		500 - 630		800		1000		1250		1600	
750			750			750			750		750		750		750		750		750	
690			690			690			690		690		690		690		690		690	
3/4			3/4			3/4			3/4		3/4		3/4		3/4		3/4		3/4	
18	25	36	18	25	36	18	25	36	36	50	45	65	50	75	50	75	50	75	50	75
75%	100%	100%	75%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
6000			8000			8000			8000		8000		8000		8000		8000		8000	
■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
Q22DE (page 05) & Q22ME (page 07)						Q22DE (page 05) Q22ME (page 07)			Q23DE & Q53DE (page 06) Q43ME (page 08)				Q20DE & Q53DE (page 06)							
A			A			A			A		A		B		B		B		B	
AC - 15			AC - 15			AC - 15			AC - 15		AC - 15		AC - 15		AC-15		AC-15		AC-15	
105	105	105	105	105	105	105			140		140		210		210		210		210	
140	140	140	140	140	140	140			185		185		280		280		280		280	
158	158	158	158	158	158	158			255		255		327		327		327		327	
158	158	158	158	158	158	158			255		255		327		327		327		327	
86	86	86	86	86	86	86			110		110		151		151		151		151	
86	86	86	86	86	86	86			110		110		151		151		151		151	

NIRAPOD 2

Molded Case Circuit Breaker
Protections:

FN100 3PDM1-100





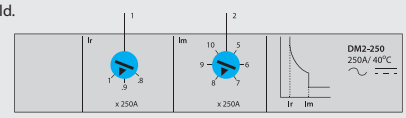
1 overload protection threshold
2 short-circuit protection pick-up

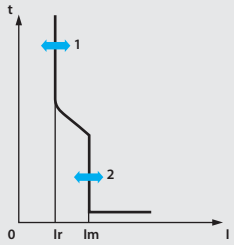
(a) Thermal-magnetic trip units type: DM1

> Thermal setting: Fixed In
> Magnetic Instanteneous Short Circuit trip : Fixed

(b) Thermal-magnetic trip units type: DM2

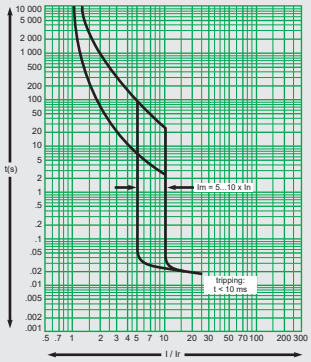
Protection
The protection functions may be set using the adjustment dials.
Overload protection
Thermal protection with an adjustable threshold.
Short-circuit protection
Magnetic protection with a fixed or adjustable pick-up, depending on the rating.
Protection of the fourth pole
On four-pole circuit breakers, the trip units can be of the:
4P 3d type (neutral unprotected),
4P 3d + N/2 type (neutral protection at 0.5 In) or 4p 4d type (neutral protection at In).



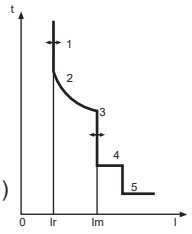


1 overload protection threshold
2 short-circuit protection pick-up

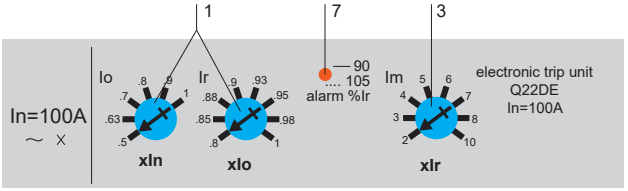
AM250 3PDM200/250



(c) electronic trip units type: Q22DE



1. long-time threshold (overload protection)
2. long-time tripping delay
3. short-time pick-up (short-circuit protection)
4. short-time tripping delay
5. instantaneous pick-up (short-circuit protection)
6. load indication



for protection of power distribution circuits

Electronic trip unit type: Q22DE

The protection functions may be set using the adjustment dials

Overload Protection

True rms long-time protection with an adjustable threshold

Short-circuit protection

Short-time and instantaneous protection:
> short-time protection with an adjustable pick-up and fixed tripping delay
> instantaneous protection with fixed pick-up
ratings : 16A - 250A; 25kA-150kA
operating voltage : 400-690V 3phase AC 50Hz

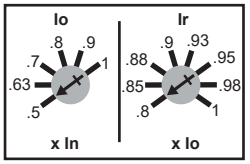
A LED on the front panel indicates :
> ON when the load is > 90% of Ir setting
> FLASHING when the load is > 105% of the Ir setting
suitable for Isolation as defined by IEC 60947.2

Electronic trip units		Q22DE				
Ratings (A)	In 20 to 70 °C	40	80	100	160	250
Circuit breaker	AM100 E/N/S	■	-	■	-	-
	AM160 E/N/S	■	■	■	■	-
	AM 250 E/N/S	■	■	■	■	■
Overload protection (long time)						
Current setting	Ir = In x ...	0.4...1				
		48 settings				
Time delay (s)	at 1.5 x Ir	90...180				
(min...max.)	at 6 x Ir	5...7.5				
	at 7.2 x Ir	3.2...5.0				
Short-circuit protection (Short Time)						
Pick-up (A)	Im = Ir x ...	2...10				
Accuracy ±15%		8 settings delay (ms)				fixed
	max. resettable time	⩽40				
	max. break time	⩽46				
Short-circuit protection (Instantaneous)						
Pick-up (A)	Ii	fixed ⩾ 11 x In				

Setting example:

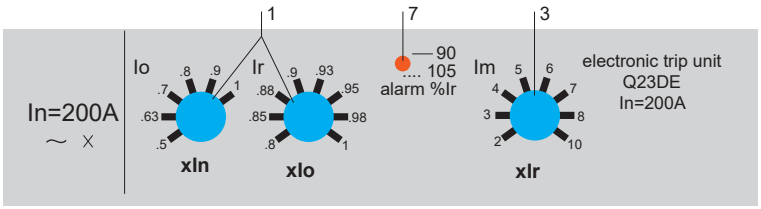
What is the overload-protection threshold of a AM250 circuit breaker equipped with an Q22DE 160 A trip set to Io = 0.5 and Ir = 0.8

Answer:
In x Io x Ir = 160 x 0.5 x 0.8 = 64 A.

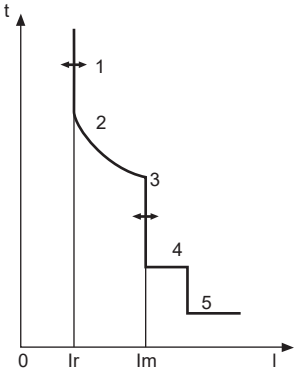


NIRAPOD 2

Molded Case Circuit Breaker
Protection of distribution Circuits



(d) Q23DE: electronic trip units



1 long-time threshold (overload protection)
2 long-time tripping delay
3 short-time pick-up (short-circuit protection)
4 short-time tripping delay
5 instantaneous pick-up (short-circuit protection)
6 load indication

for protection of distribution circuits

Electronic trip unit type: Q23DE

The protection functions may be set using the adjustment dials

Overload Protection

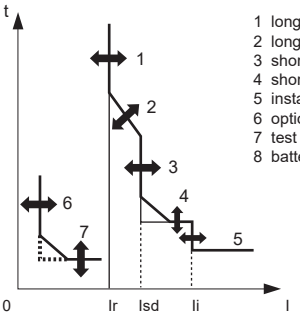
Long-time protection with an adjustable threshold and fixed tripping delay
> Io base setting (6-position dial from 0.5 to 1)
> Ir fine adjustment (8-position dial from 0.8 to 1)

Short-circuit protection

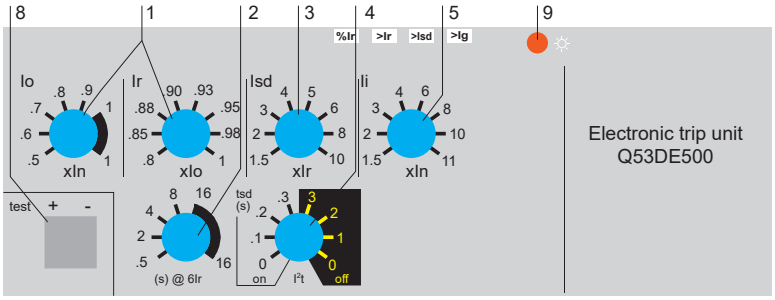
Short-time and instantaneous protection:
> short-time protection with an adjustable pick-up and fixed tripping delay
> instantaneous protection with fixed pick-up
ratings : 160A - 630A; 25kA-150kA
operating voltage : 400-690V 3phase AC 50Hz

A LED on the front panel indicates :
> ON when the load is > 90% of Ir setting
> FLASHING when the load is > 105% of the Ir setting
suitable for Isolation as defined by IEC 60947.2

(e) Q53DE: trip units

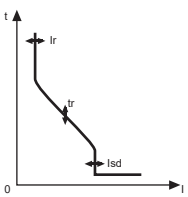


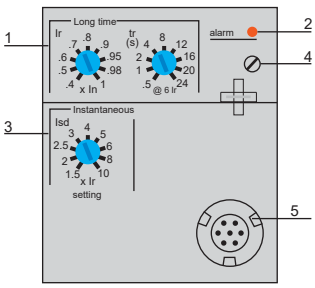
1 long-time threshold (overload protection)
2 long- time tripping delay
3 short- time pick-up (short-circuit protection)
4 short- time tripping delay
5 instantaneous pick-up (short-circuit protection)
6 optional earth- fault pick-up
7 test connector
8 battery and lamp test pushbutton



Protection: microprocessor based protection unit with earth fault & time adjustment type Q53DE & Q20DE
> Long time overload protection with adjustable threshold & tripping delay
- Io base setting (6-dial from 0.5 to 1)
- Ir fine adjustment (8 position dial from 0.8 to 1)
> Short circuit protection:
- short time & instantaneous protection
- short-time protection with adjustable pick-up and tripping delay with or without constant I^2t
- Ii (Instantaneous) short circuit protection, adjustable threshold
> earth fault protections (optional)
ratings : 315A - 630A-1600A; 50kA-70kA
operating voltage : 400-690V 3phase AC 50Hz
A LED on the front panel indicates :
> ON when the load is > 90% of Ir setting
> FLASHING when the load is > 105% of the Ir setting
suitable for Isolation as defined by IEC 60947.2

Q20DE: trip units





1 long-time threshold and tripping delay
2 overload alarm (LED)
3 instantaneous pick- up
4 fixing screw for long- time rating plug
5 test connector

NIRAPOD 2
Molded Case Circuit Breaker

Motor Protective Molded Case Circuit Breaker

Thermal-magnetic trip unit MP for protection of motor & control devices

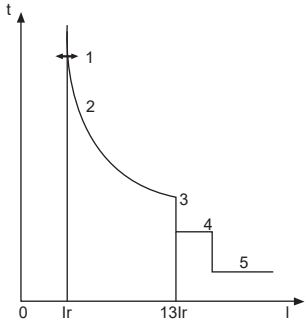
This circuit breakers are specially designed for the protection of motors & its control devices rated upto 37kW and provide short circuit protection & can withstand the surge current to start the motor and suitable for isolation as defined by IEC 60947.2 standard

operating voltage : 400-690V 3phase AC 50Hz

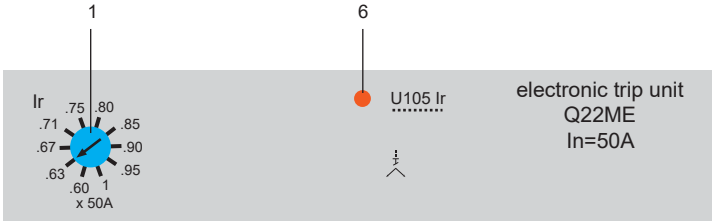
adjustable pick-up from 6...14 x In

MP trip units								
Rating (A)	at 65°C	In	2.5	6.3	12.5	25	50	100
AM 100 circuit breaker			■	■	■	■	■	■
Pick-up		Im	setting					
			6...14 x In					

Electronic trip unit type Q22ME



1 long-time threshold
2 tripping class 12 as defined by IEC 60947-4
3 short- time pick-up
4 short- time tripping delay
5 instantaneous pick-up
6 load indication



For protection of motors & its control devices

Electronic trip unit type: Q22ME

> overload protection
- Long time protection with adjustable Ir threshold, in compliance with tripping class 10 as defined by IEC 60947.4

> Short circuit protection
- short time & instantaneous protection:

> phase-unbalance protection
- this function complies with the stipulations of standard IEC60947- 4.1 and trips the circuit breaker

The circuit breaker opening time is between 3.5 and 6 seconds LED on the front panel indicates the load status

ratings : 16A - 250A; 25kA-150kA

operating voltage : 400-690V 3phase AC 50Hz

suitable for Isolation as defined by IEC 60947.2

Q22ME trip unit				
Ratings (A)	20 to 70°C	20...100	150	220
	AM 100 E/N/S	■	-	-
	AM 160 E/N/S	■	■	-
	AM 250 E/N/S	■	■	■
Overload protection (Long Time)				
Current setting	Ir	adjustable, 10 settings 0.6.....1 x In		
Tripping class (IEC 60947-4)		10		
Time delay (s) (min...max.)		fixed		
	at 1.5 x Ir	120...320		
	a 6 x Ir	6...15		
	at 7.2 Ir	4...10		
Motor-overload indication		LED		
Phase-unbalance protection in compliance with IEC 60947-4.1				
Tripping threshold		⩾ 40% unbalance		
Time delay		3.5 to 6 seconds		
Short- circuit protection (short Time)				
Pick-up	Isd	fixed, 13 x Ir		
Accuracy		± 20%		
Max. resettable time (ms)		fixed, 10		
Max. break time		60		
short- circuit protection (Instantaneous)				
Pick-up	Ii	fixed, 15 x In		

NIRAPOD 2

Molded Case Circuit Breaker

Motor Protective Type

For protection of motors & its control devices

Electronic trip unit type: Q43ME

Overload protection

> True (rms) long-time protection with an adjustable threshold:
- Io base setting (5 settings from 0.5 to 0.8) and Ir fine adjustment (8 settings from 0.8 to 1)
- adjustable tripping delay, in compliance with tripping classes 10A, 10 and 20 as defined by IEC 60947-4.

The protection unit Q43ME offers two motor-cooling time constants, associated with the motor starting class:
- short cooling time constant (the same as the heating time constant), providing maximum continuity of service and satisfactory motor protection
- long cooling time constant (four times the heating time constant), providing maximum motor protection.

Short-circuit protection

Short time and instantaneous protection:
- short-time protection with adjustable pick-up and fixed tripping delay
- instantaneous protection with fixed pick-up.

Phase-unbalance protection

This function complies with the stipulations of standard IEC 60947-4.1 and trips the circuit breaker whenever a phase-current unbalance of 40% or more occurs. The circuit-breaker opening time is 4 seconds ± 10%

Indications: Overload LED

A LED on the front panel indicates :

> OFF when the load is <1.05Ir

> FLASHING when the load is ≥ 1.05Ir

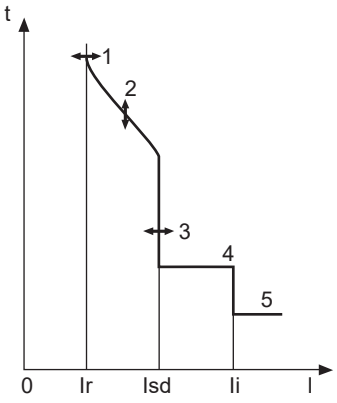
suitable for Isolation as defined by IEC 60947.2

Fault indications

LEDs indicate the type of fault that caused tripping:
- overload (long-time protection) or abnormal component temperature (> Ir)
- short-circuit (short-time protection) or instantaneous (> Isd)
- phase unbalance (LED on the right)
- microprocessor malfunction:
- all four (% Ir), (> Ir), (> Isd) and (phase unbalance) LEDs ON,

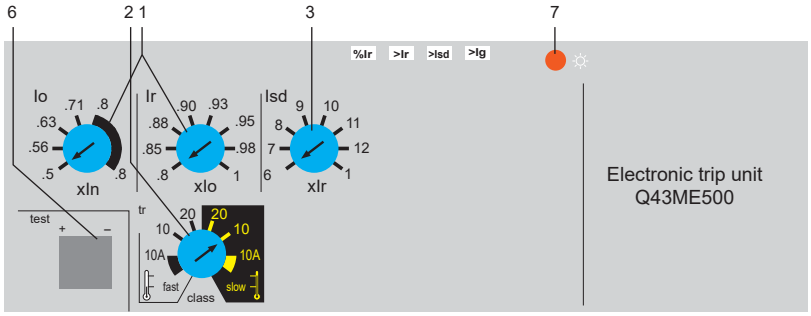
Self monitoring

The circuit breaker trips if a microprocessor fault or an abnormal temperature is detected.



1 long-time threshold
2 tripping class
3 short- time pick-up
4 short- time tripping delay
5 instantaneous pick-up
6 test connector
7 load indication

Electronics type trip unit with magnitude & time adjustment



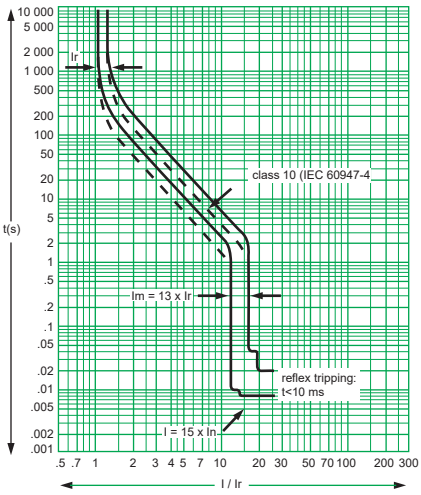
Q43ME trip unit						
Ratings (A)	20 to 70°C	120	200	320	500	
Circuit breakers	AM 400 S/M	■	■	■	■	
	AM 630 M1/H1		- -		-	■
Overload protection (Long Time)						
Current setting	Ir	adjustable, 40 settings -0.4...0.8 x In				
Tripping class (IEC 60947-4)		10A, 10, 20				
Time delay (s)		adjustable				
(min. ... max.)	at 1.5 x Ir	140 .. 195	267 ... 352		430 ... 591	
	at 6 x Ir	5.5 ... 7.1	10.4 ... 13.0		17.1 ... 21.0	
	at 7.2 Ir	4.5 ... 5.5	6.9 ... 8.5		11 ... 14	
Phase-unbalance protection in compliance with IEC 60947-4.1						
Tripping threshold		≥ 40 % unbalance				
Time delay		4 s ± 10 %				
Short- circuit protection (Short Time)						
Pick-up	Isd	adjustable, 8 settings - 6...13 x Ir				
Accuracy		± 15%				
Time delay (ms)		fixed				
max. resettable time		10				
max. break time		60				
Short-circuit protection (instantaneous)						
Pick-up	Ii	fixed - 13 x Ir max.				
Other functions						
Motor overload LED		■				
Indications module		■				
Options						
Communication (COM)		■				

NIRAPOD 2

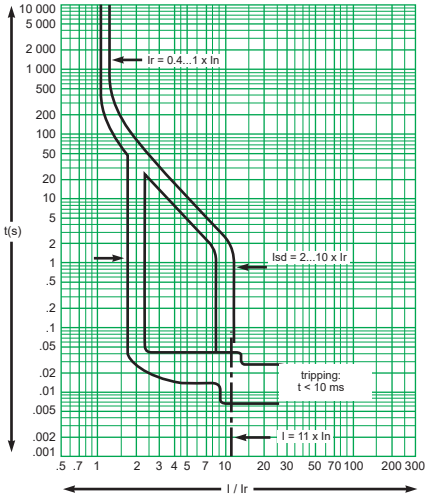
Molded Case Circuit Breaker
Tripping Curves

Micro-processor based electronic trip units

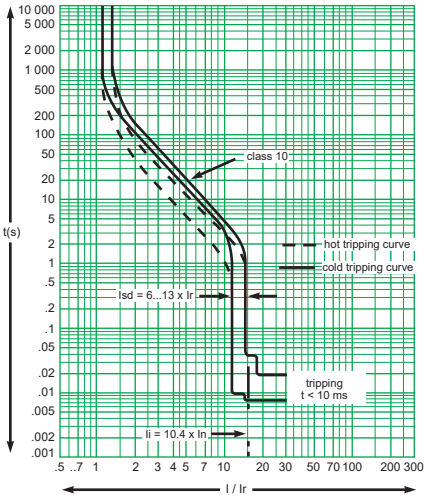
Q22ME electronic trip units



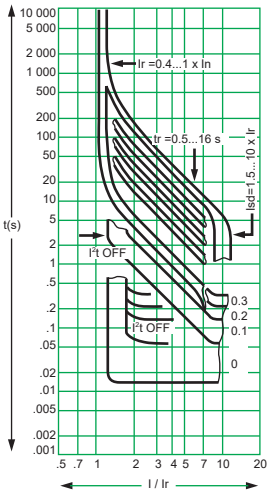
Q23DE electronic trip units



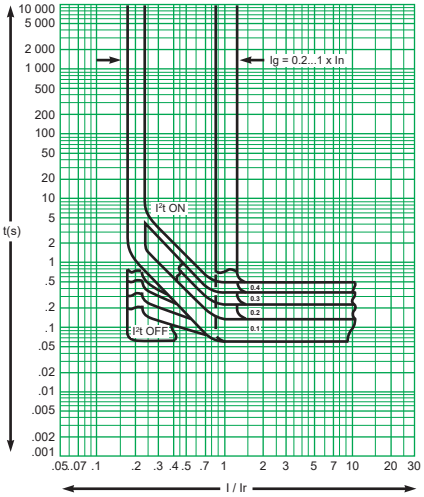
Q43ME electronic trip units



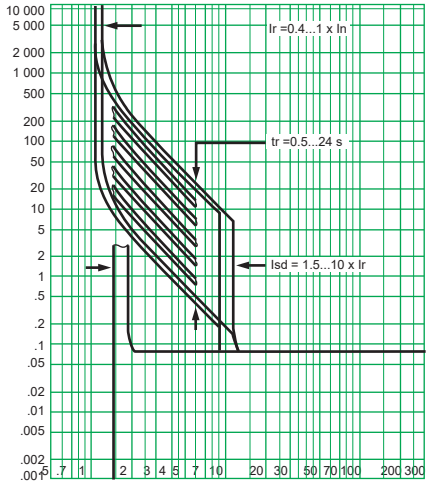
Q53DE electronic control units



Earth-fault protection



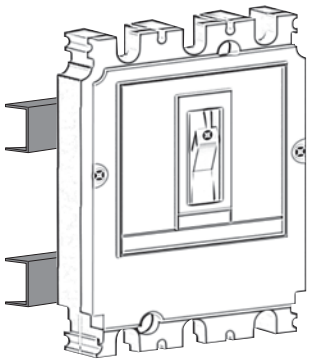
Q20DE Microprocessor control units

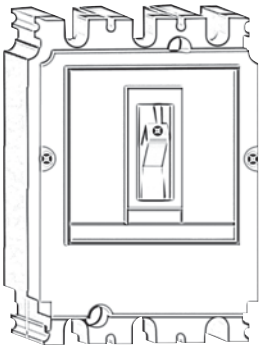


NIRAPOD 2
Molded Case Circuit Breaker

Installation

Fixed circuit breaker
Compact circuit breakers may be mounted vertically, horizontally or flat on their back without any derating of characteristics. Designed for easy installation in the various types of switchboards of each market and country.

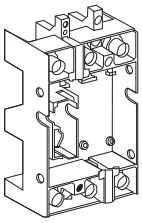




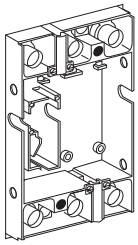
Circuit breaker on a plug-in-base

The plug-in configuration makes it possible to:
- extract and/or rapidly replace the circuit brea without having to touch connections;
- allow for addition of future circuits at a later date.

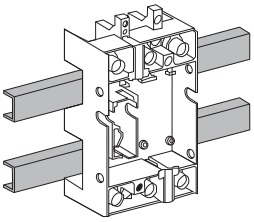
Adex AM630
on a plug-in-base



mounting on a backplate



mounting through a front panel



mounting on rails

Protection against direct contacts with power circuits
- circuit breaker plugged in: IP 4;
- circuit breaker removed: IP 2;
- circuit breaker removed, base equipped with shutters: IP 4.

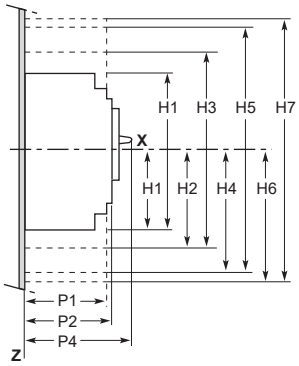
Parts of a plug-in configuration
- Compact circuit breaker (FC version)
- set of power connections that are added to the circuit breaker;
- plug-in base for mounting on a panel or on rails;
- insulating screen, to be used when the circuit breaker is mounted on a backplate with front connections;
- safety trip, to be installed on the circuit breaker, that causes automatic tripping if the circuit breaker is ON before engaging or withdrawing it. The safety trip does not prevent circuit breaker operation, even when the circuit breaker is disconnected;
- mandatory short terminal shields.

Connections
The plug-in base is equipped with terminals which, depending on their orientation, serve for front and rear connection.
These terminals can be replaced with spreaders.
For installation on a backplate with rear connections, these terminals must be replaced with long insulated terminal. All terminals may be fitted with bare-cable connectors.
Accessories
The insulating accessories can be used to:
- protect against direct contact;
- increase insulation between phase:

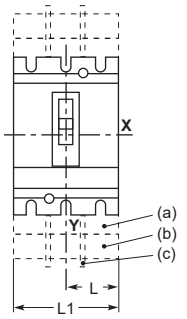
NIRAPOD 2
Molded Case Circuit Breaker

Adex AM 100 to 630 (fixed version)

Dimensions

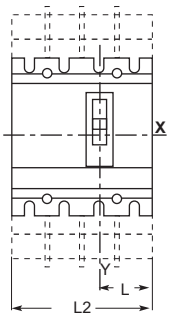


2 poles or 3 poles



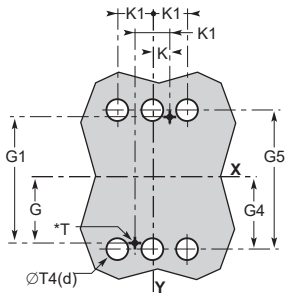
(a) short terminal shields.
(b) long terminal shields
(available for spreaders
on AM 400 to 630, pitch 52.5:
L1 = 157.5 mm
L2 = 210 mm).
(c) interphase barriers

4 poles



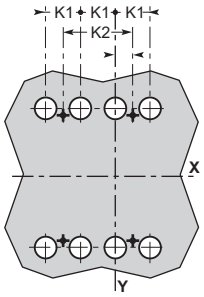
Mounting

On backplate
2 poles or 3 poles



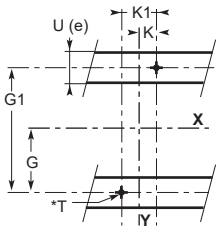
(b) for rear connection only. for two -pole circuit breakers the centre hole is not necessary

4 poles

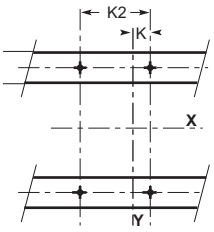


On rails

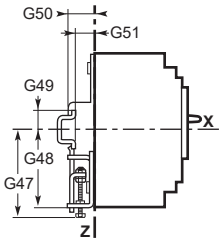
2 poles or 3 poles



4 poles



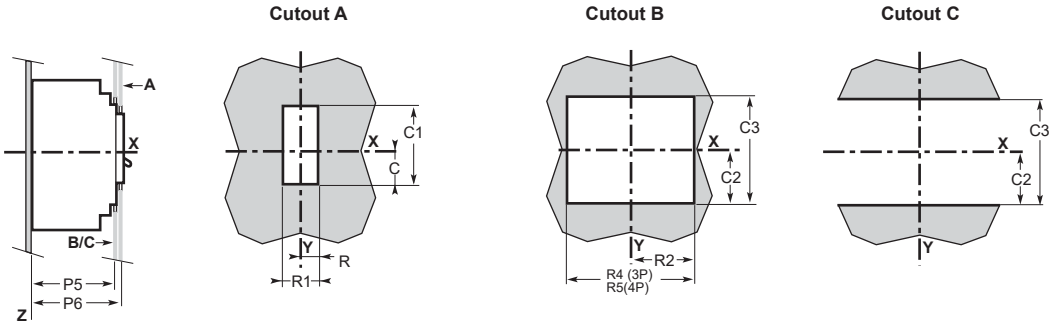
On DIN rail with adapter plate

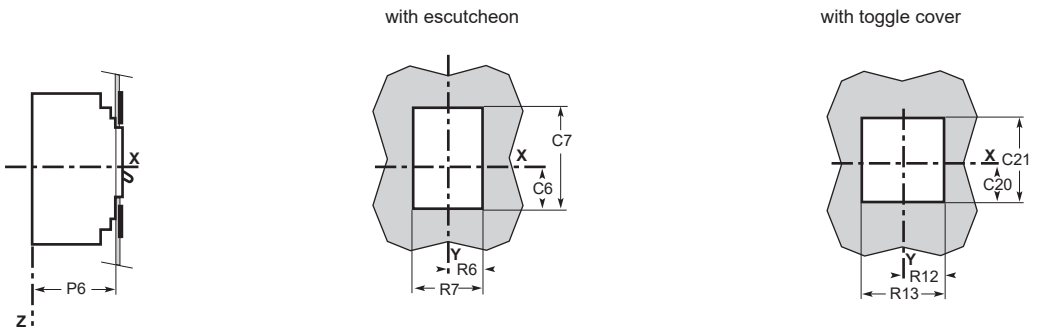


NIRAPOD 2
Molded Case Circuit Breaker

Front panel cutouts

fixed or plug-in circuit breaker





Dimensions (mm)

Type	C	C1	C2	C3	C6	C7	C20	C21	G	G1	G4
AM100/160/250 E/N/S	29	76	54	108	43	104	34	86	62.5	125	70
AM400/630 S/M M1/H1	41.5	116	92.5	184	56.5	146	46.5	126	100	200	113.5

Type	G5	G47	G48	G49	G50	G51	H	H1	H2	H3	H4
AM100/160/250 E/N/S	140	95	75	13.5	23	17.5	80.5	161	94	188	160.5
AM400/630 S/M M1/H1	227						127.5	255	142.5	285	240

Type	H5	H6	H7	K	K1	K2	L	L1	L2	P1	P2
AM100/160/250 E/N/S	321	178.5	357	17.5	35	70	52.5	105	140	81	86
AM400/630 S/M M1/H1	480	237	474	22.5	45	90	70	140	185	95.5	110

Type	P4	P5	P6	R	R1	R2	R4	R5	R6	R7	R12
AM 100/160/250 E/N/S	111	83	88	14.5	29	54	108	143	29	58	43
AM400/630 S/M M1/H1	168	107	112	31.5	63	71.5	143	188	46.5	93	63

Type	R13	∅T	∅T4	U							
AM100/160/250 E/N/S	86	6	12	⩽32							
AM400/630 S/M M1/H1	126	6	12	⩽32							

NIRAPOD 2

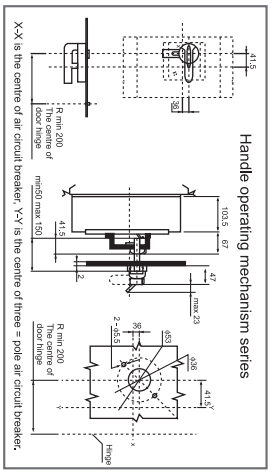
Molded Case Circuit Breaker

Accessories Available

Rotary handles:

direct rotary handle

Extended rotary handle



Rotary handle operating mechanism

A-1 Type handle

Locking of the rotary handles : key adapter
Interlocking : with toggles
with rotary handles

Front panel escutcheons

Plug-in kits : plug-in base FC/RC & power connections

Withdrawable kits : fixed part for base moving parts for circuit breaker

Electrical auxiliaries

a) Auxiliary contacts:
> 1NO + 1 NC contacts
> 2 NO + 2 NC contacts
> 4NO + 4 NC contacts

Shunt release for 100, 160 Frame

b) Alarm & signaling contacts:
> 1 NO + 1 NC contacts

c) Voltage releases :
AC voltage : 24V, 48V, 110V-130V, 220V-240V & 380V-415V 50/60Hz
DC voltage : 12V, 24V, 30V, 48V, 60V, 125V &250V

d) Motor voltage :-

AC voltages:	DC voltages:
48V-60V 50/60Hz	24 - 30V
110V - 130V 50/60Hz	48 - 60V
220V - 240V 50/60Hz	110 - 130V
380V - 415V 50/60Hz	

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