

# NOARK®

Catalog

## Power Circuit Breakers A32 Switch Disconnectors ASD32



[na.noark-electric.com](http://na.noark-electric.com)

## Company Overview

### About us

**NOARK Electric** is a global manufacturer of low-voltage electrical components for industrial applications. We specialize in motor controls and circuit protection for original equipment manufacturers. Our mission is to provide customers with the highest quality products at an exceptional value and back them with world-class service and support. Every NOARK product is tested and certified to the highest industry standards and covered by our exclusive five-year limited warranty.

#### Research and Development

The entire portfolio of high-quality NOARK products is designed for manufacturing and assembly (DFMA). Each component is developed in-house by our engineering team to meet the strictest standards and performance requirements. This dedication to excellence has led to the development of patented technology found in many of our products.

#### World-class Manufacturing

After being thoroughly tested, approved and certified – each NOARK product is sent into production at our state-of-the-art manufacturing facilities. This allows us to maintain strict quality control standards throughout the manufacturing process. In addition, NOARK Electric adheres to a policy of environmental protection and sustainability.

#### North American Distribution

NOARK's primary distribution center is located in Pomona, CA, with the aim of ensuring prompt and reliable deliveries of the entire product range to our customers all over North America. Our supply chain team works closely with our factories and logistics partners to ensure the availability of our products on the North American market and provide logistics services on the level which our customers expect.

NOARK Electric is a wholly subsidiary of the largest electrical manufacturing group in Asia with over 30 thousand employees and sales revenue of \$10 billion USD. We have corporate facilities in Los Angeles, Shanghai and Prague to service the requirements of individual markets and countries.

**140+** Countries  
**300+** Overseas Distributors  
**20** Overseas Subsidiaries  
**22** Logistics Centers  
**3** R & D Centers  
**10,000,000+** Sq.Ft. Manufacturing Space  
**30,000+** Employees Worldwide



# Power Circuit Breakers

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# POWER CIRCUIT BREAKERS



# A32/ASD32

## Power Circuit Breakers

### Product overview

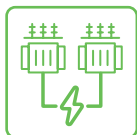
The NOARK Electric range of A32 Power Circuit Breakers is available with current ratings up to 3200 A. With a wide offering of available protection, measuring and additional functions, the A32 is the ideal solution for many applications. They are engineered to meet or exceed the unique and demanding requirements of today's global power distribution systems.

A32 Power Circuit Breakers conform with ANSI C37.13, C37.16, C37.17 and C37.50 standards. They are true UL 1066 listed low voltage power circuit breakers, designed for the highest performance requirements of switchgear and specialty enclosure applications. A32 Power Circuit Breakers provide specific ratings, features and monitoring to optimize performance when applied in power distribution equipment and enclosures. The A32 is also offered also as a switch disconnect.



Current rating from:

**800A ~ 3200A**



Rated operating voltage:

**254Vac, 508Vac, 635Vac**



M type (LED) control  
unit working temperature:

**-40°C ~ 70°C**

- Interrupting current and short-time withstand current rating up to **100kA @ 635 Vac**
- 10000 times mechanical life & 6000 times electrical life without maintenance
- Fixed and drawout versions
- 3 and 4 pole configurations
- Can be used for 50Hz and 60Hz.

## Power Circuit Breakers

### Product overview

- **Zone-selective interlocking** - Improve coordination for multiple control units short time protection and ensure the continuous running of your system
- **Arc flash reduction maintenance mode** - Reduces the risk of injury and damage
- **Triple color indication** - Clear identification of breaker running status
- **Fixed and drawout versions** - Easy maintenance and replacement
- **Rotating terminals** - Allows for convenient and flexible installation
- **Ready for closing indication** - Added safety while powered on

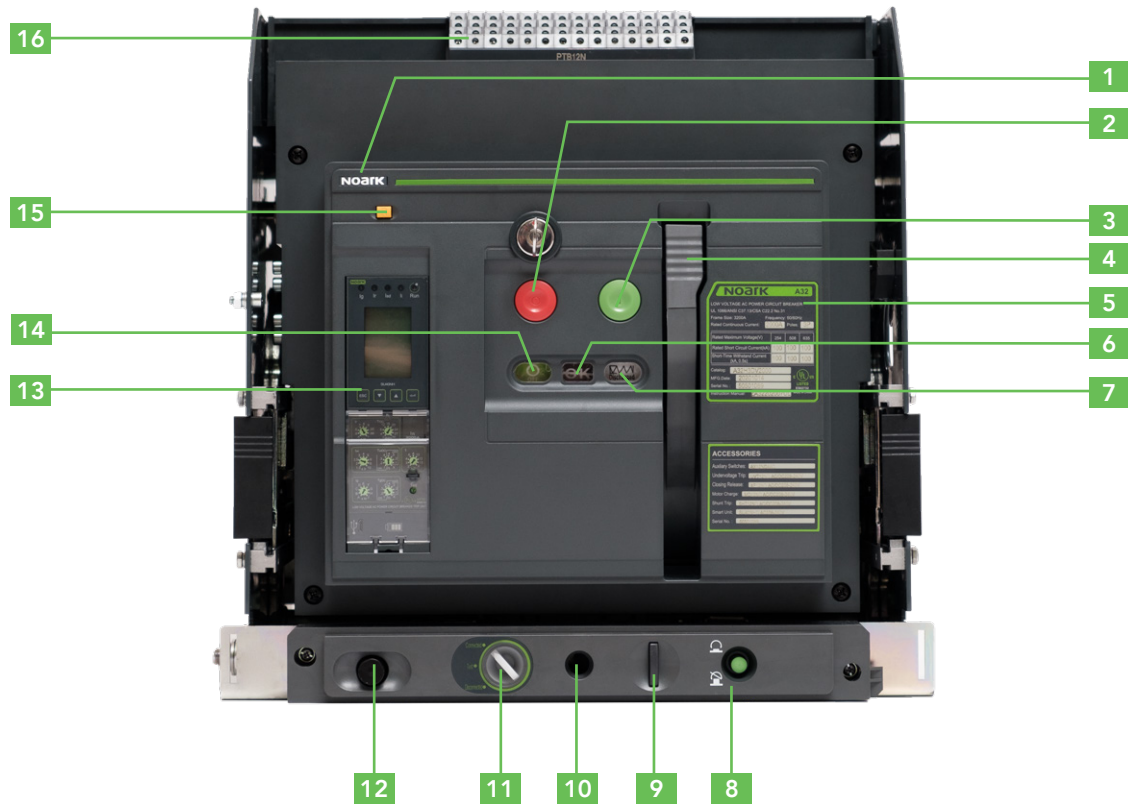
## Power Circuit Breakers







### A32/ASD32 Specifications

A32 Power Circuit Breakers			A32Q	A32R	A32H
Pole			3P/4P		
Installation			Fixed/Drawout		
Rated current(A)			Fixed:800/1600/2000/2500 Drawout:800/1600/2000/2500/3200		
Rated Maximum Voltage(V)			254/508/635		
Frequency(Hz)			50/60		
Interrupting rating at rated maximum voltage (kA)	254V		65	85	100
	508V		65	85	100
	635V		65	85	100
Short time withstand current (kA)	254V		65	85	100
	508V		65	85	100
	635V		65	85	100
Operating time(ms)	Open		60~70		
	Close		<40		
Life cycle(time)	Mechanical	Without maintenance	10000	10000	10000
	Electrical	Without maintenance	6000	6000	6000
Enclosure dimension HxWxD(in/mm)	Drawout	3P	21.65×23.62×18.11(550×520×460) Ventilation area 9092mm <sup>2</sup>		
		4P	21.65×25×18.11(550×635×460) Ventilation area 11963mm <sup>2</sup>		
	Fixed	3P	21.65×20.47×14.17(550×520×360)		
		4P	21.65×25×14.17(550×635×360)		
ASD32 Switch Disconnectors			ASD32Q	ASD32R	ASD32H
Pole			3P/4P		
Installation			Fixed/Drawout		
Rated current(A)			Fixed:800/1600/2000/2500 Drawout:800/1600/2000/2500/3200		
Rated Maximum Voltage(V)			254/508/635		
Frequency(Hz)			50/60		
Short time withstand current(kA)	254V		65	85	100
	508V		65	85	100
	635V		65	85	100
Life cycle(time)	Mechanical	Without maintenance	10000	10000	10000
	Electrical	Without maintenance	6000	6000	6000
Enclosure dimension HxWxD(in/mm)	Drawout	3P	21.65×23.62×18.11(550×520×460) Ventilation area 9092mm <sup>2</sup>		
		4P	21.65×25×18.11(550×635×460) Ventilation area 11963mm <sup>2</sup>		
	Fixed	3P	21.65×20.47×14.17(550×520×360)		
		4P	21.65×25×14.17(550×635×360)		

## Power Circuit Breakers

### Feature Identification



- |  |   |
|--|---|
| <p><b>1</b> Brand</p> <p><b>2</b> Opening push-button (O)</p> <p><b>3</b> Closing push-button (I)</p> <p><b>4</b> Manual spring charge handle</p> <p><b>5</b> Nameplate</p> <p><b>6</b> Closing ready indicator</p> <p>a) Ready </p> <p>b) Not ready </p> <p><b>7</b> Spring charged/discharged indicator</p> <p>a) Spring charged </p> <p>b) Spring discharged </p> <p><b>8</b> Cassette position lock<br/>(Manually reset after insertion)</p> | <p><b>9</b> Padlock</p> <p><b>10</b> Rotary handle operation hole</p> <p><b>11</b> Indicator for Disconnect, Test, Connect position</p> <p><b>12</b> Rotary handle</p> <p><b>13</b> Control Unit</p> <p><b>14</b> Main contact position indicator</p> <p>a) Opening </p> <p>b) Closing </p> <p><b>15</b> Trip reset button</p> <p><b>16</b> Control circuit wiring terminal</p> |
|--|---|



## Power Circuit Breakers

### A32 Fixed Type

## A32/ASD32 Product Selection Guide

A	32	H	3	F	H	800
<b>NOARK UL 1066 Power Circuit Breakers</b>	<b>Frame Size</b>	<b>Interrupting/Short time withstanding Current</b>	<b>Poles</b>	<b>Installation</b>	<b>Terminal Connection</b>	<b>Rated Current</b>
A: Circuit Breakers ASD: Non-automatic switches	32: 3200 A	Q: 65kA R: 85kA H: 100kA	3: 3 Pole 4: 4 Pole	F: Fixed D*: Drawout	H: Horizontal V**: Vertical	800: 800A 1600: 1600A 2000: 2000A 2500: 2500A 3200: 3200A

A32/ASD32 do not include cassette (sold separately). See page 09

\* 3200A only provided with drawout type

\*\* 3200A only provided with vertical type (contact NOARK sales for other configuration)

A32 Fixed type			3 Pole		4 Pole	
Interrupting	Rated current	Terminal connection	Catalog Number	Part Number	Catalog Number	Part Number
65kA	800A	Horizontal	A32Q3FH800	1800000	A32Q4FH800	1800017
	1600A		A32Q3FH1600	1800001	A32Q4FH1600	1800018
	2000A		A32Q3FH2000	1800002	A32Q4FH2000	1800019
	2500A		A32Q3FH2500	1800003	A32Q4FH2500	1800020
	800A	Vertical	A32Q3FV800	1800004	A32Q4FV800	1800021
	1600A		A32Q3FV1600	1800005	A32Q4FV1600	1800022
	2000A		A32Q3FV2000	1800006	A32Q4FV2000	1800023
	2500A		A32Q3FV2500	1800007	A32Q4FV2500	1800024
85kA	800A	Horizontal	A32R3FH800	1800034	A32R4FH800	1800051
	1600A		A32R3FH1600	1800035	A32R4FH1600	1800052
	2000A		A32R3FH2000	1800036	A32R4FH2000	1800053
	2500A		A32R3FH2500	1800037	A32R4FH2500	1800054
	800A	Vertical	A32R3FV800	1800038	A32R4FV800	1800055
	1600A		A32R3FV1600	1800039	A32R4FV1600	1800056
	2000A		A32R3FV2000	1800040	A32R4FV2000	1800057
	2500A		A32R3FV2500	1800041	A32R4FV2500	1800058
100kA	800A	Horizontal	A32H3FH800	1800068	A32H4FH800	1800085
	1600A		A32H3FH1600	1800069	A32H4FH1600	1800086
	2000A		A32H3FH2000	1800070	A32H4FH2000	1800087
	2500A		A32H3FH2500	1800071	A32H4FH2500	1800088
	800A	Vertical	A32H3FV800	1800072	A32H4FV800	1800089
	1600A		A32H3FV1600	1800073	A32H4FV1600	1800090
	2000A		A32H3FV2000	1800074	A32H4FV2000	1800091
	2500A		A32H3FV2500	1800075	A32H4FV2500	1800092

## Power Circuit Breakers

### A32 Drawout Type

A32 Drawout type			3 Pole		4 Pole	
Interrupting	Rated current	Terminal connection	Catalog Number	Part Number	Catalog Number	Part Number
65kA	800A	Horizontal	A32Q3DH800	1800008	A32Q4DH800	1800025
	1600A		A32Q3DH1600	1800009	A32Q4DH1600	1800026
	2000A		A32Q3DH2000	1800010	A32Q4DH2000	1800027
	2500A		A32Q3DH2500	1800011	A32Q4DH2500	1800028
	800A	Vertical	A32Q3DV800	1800012	A32Q4DV800	1800029
	1600A		A32Q3DV1600	1800013	A32Q4DV1600	1800030
	2000A		A32Q3DV2000	1800014	A32Q4DV2000	1800031
	2500A		A32Q3DV2500	1800015	A32Q4DV2500	1800032
3200A		A32Q3DV3200	1800016	A32Q4DV3200	1800033	
85kA	800A	Horizontal	A32R3DH800	1800042	A32R4DH800	1800059
	1600A		A32R3DH1600	1800043	A32R4DH1600	1800060
	2000A		A32R3DH2000	1800044	A32R4DH2000	1800061
	2500A		A32R3DH2500	1800045	A32R4DH2500	1800062
	800A	Vertical	A32R3DV800	1800046	A32R4DV800	1800063
	1600A		A32R3DV1600	1800047	A32R4DV1600	1800064
	2000A		A32R3DV2000	1800048	A32R4DV2000	1800065
	2500A		A32R3DV2500	1800049	A32R4DV2500	1800066
3200A		A32R3DV3200	1800050	A32R4DV3200	1800067	
100kA	800A	Horizontal	A32H3DH800	1800076	A32H4DH800	1800093
	1600A		A32H3DH1600	1800077	A32H4DH1600	1800094
	2000A		A32H3DH2000	1800078	A32H4DH2000	1800095
	2500A		A32H3DH2500	1800079	A32H4DH2500	1800096
	800A	Vertical	A32H3DV800	1800080	A32H4DV800	1800097
	1600A		A32H3DV1600	1800081	A32H4DV1600	1800098
	2000A		A32H3DV2000	1800082	A32H4DV2000	1800099
	2500A		A32H3DV2500	1800083	A32H4DV2500	1800100
3200A		A32H3DV3200	1800084	A32H4DV3200	1800101	

## Power Circuit Breakers

### ASD32 Fixed Type

ASD32 Fixed type			3 Pole		4 Pole	
Withstand	Rated current	Terminal connection	Catalog Number	Part Number	Catalog Number	Part Number
65kA	800A	Horizontal	ASD32Q3FH800	1800102	ASD32Q4FH800	1800119
	1600A		ASD32Q3FH1600	1800103	ASD32Q4FH1600	1800120
	2000A		ASD32Q3FH2000	1800104	ASD32Q4FH2000	1800121
	2500A		ASD32Q3FH2500	1800105	ASD32Q4FH2500	1800122
	800A	Vertical	ASD32Q3FV800	1800106	ASD32Q4FV800	1800123
	1600A		ASD32Q3FV1600	1800107	ASD32Q4FV1600	1800124
	2000A		ASD32Q3FV2000	1800108	ASD32Q4FV2000	1800125
	2500A		ASD32Q3FV2500	1800109	ASD32Q4FV2500	1800126
85kA	800A	Horizontal	ASD32R3FH800	1800136	ASD32R4FH800	1800153
	1600A		ASD32R3FH1600	1800137	ASD32R4FH1600	1800154
	2000A		ASD32R3FH2000	1800138	ASD32R4FH2000	1800155
	2500A		ASD32R3FH2500	1800139	ASD32R4FH2500	1800156
	800A	Vertical	ASD32R3FV800	1800140	ASD32R4FV800	1800157
	1600A		ASD32R3FV1600	1800141	ASD32R4FV1600	1800158
	2000A		ASD32R3FV2000	1800142	ASD32R4FV2000	1800159
	2500A		ASD32R3FV2500	1800143	ASD32R4FV2500	1800160
100kA	800A	Horizontal	ASD32H3FH800	1800170	ASD32H4FH800	1800187
	1600A		ASD32H3FH1600	1800171	ASD32H4FH1600	1800188
	2000A		ASD32H3FH2000	1800172	ASD32H4FH2000	1800189
	2500A		ASD32H3FH2500	1800173	ASD32H4FH2500	1800190
	800A	Vertical	ASD32H3FV800	1800174	ASD32H4FV800	1800191
	1600A		ASD32H3FV1600	1800175	ASD32H4FV1600	1800192
	2000A		ASD32H3FV2000	1800176	ASD32H4FV2000	1800193
	2500A		ASD32H3FV2500	1800177	ASD32H4FV2500	1800194

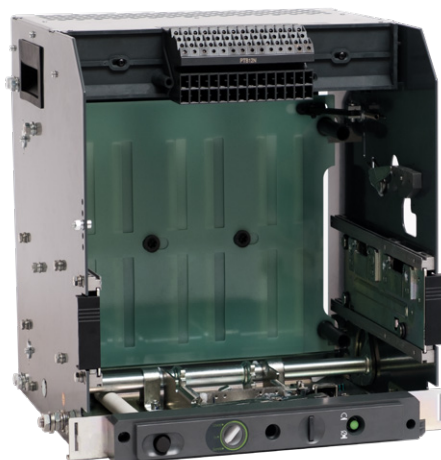
## Power Circuit Breakers

### ASD32 Drawout Type

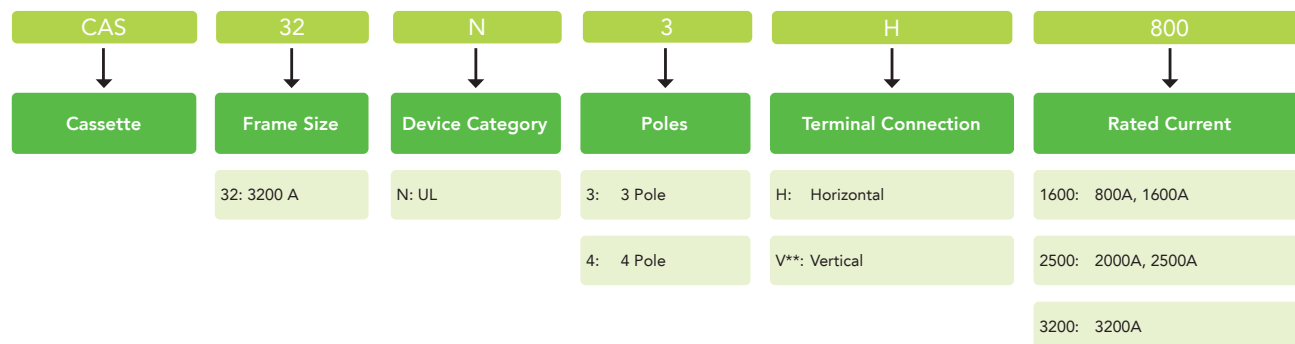
ASD32 Drawout type			3 Pole		4 Pole	
Interrupting	Rated current	Terminal connection	Catalog Number	Part Number	Catalog Number	Part Number
65kA	800A	Horizontal	ASD32Q3DH800	1800110	ASD32Q4DH800	1800127
	1600A		ASD32Q3DH1600	1800111	ASD32Q4DH1600	1800128
	2000A		ASD32Q3DH2000	1800112	ASD32Q4DH2000	1800129
	2500A		ASD32Q3DH2500	1800113	ASD32Q4DH2500	1800130
	800A	Vertical	ASD32Q3DV800	1800114	ASD32Q4DV800	1800131
	1600A		ASD32Q3DV1600	1800115	ASD32Q4DV1600	1800132
	2000A		ASD32Q3DV2000	1800116	ASD32Q4DV2000	1800133
	2500A		ASD32Q3DV2500	1800117	ASD32Q4DV2500	1800134
3200A		ASD32Q3DV3200	1800118	ASD32Q4DV3200	1800135	
85kA	800A	Horizontal	ASD32R3DH800	1800144	ASD32R4DH800	1800161
	1600A		ASD32R3DH1600	1800145	ASD32R4DH1600	1800162
	2000A		ASD32R3DH2000	1800146	ASD32R4DH2000	1800163
	2500A		ASD32R3DH2500	1800147	ASD32R4DH2500	1800164
	800A	Vertical	ASD32R3DV800	1800148	ASD32R4DV800	1800165
	1600A		ASD32R3DV1600	1800149	ASD32R4DV1600	1800166
	2000A		ASD32R3DV2000	1800150	ASD32R4DV2000	1800167
	2500A		ASD32R3DV2500	1800151	ASD32R4DV2500	1800168
3200A		ASD32R3DV3200	1800152	ASD32R4DV3200	1800169	
100kA	800A	Horizontal	ASD32H3DH800	1800178	ASD32H4DH800	1800195
	1600A		ASD32H3DH1600	1800179	ASD32H4DH1600	1800196
	2000A		ASD32H3DH2000	1800180	ASD32H4DH2000	1800197
	2500A		ASD32H3DH2500	1800181	ASD32H4DH2500	1800198
	800A	Vertical	ASD32H3DV800	1800182	ASD32H4DV800	1800199
	1600A		ASD32H3DV1600	1800183	ASD32H4DV1600	1800200
	2000A		ASD32H3DV2000	1800184	ASD32H4DV2000	1800201
	2500A		ASD32H3DV2500	1800185	ASD32H4DV2500	1800202
3200A		ASD32H3DV3200	1800186	ASD32H4DV3200	1800203	

## Power Circuit Breakers

### Cassette Selection Guide



## Cassette Product Selection Guide



Cassette for A32/ASD32			Factory Installed		Field Installable	
Poles	Rated current	Terminal connection	Product	Part Number	Catalog Number	Part Number
3 Poles	800A/1600A	Horizontal	+CAS12N3H1600	1800240	CAS12N3H1600	1800250
	2000A/2500A		+CAS12N3H2500	1800241	CAS12N3H2500	1800251
	800A/1600A	Vertical	+CAS12N3V1600	1800242	CAS12N3V1600	1800252
	2000A/2500A		+CAS12N3V2500	1800243	CAS12N3V2500	1800253
	3200A		+CAS12N3V3200	1800244	CAS12N3V3200	1800254
4 Poles	800A/1600A	Horizontal	+CAS12N4H1600	1800245	CAS12N4H1600	1800255
	2000A/2500A		+CAS12N4H2500	1800246	CAS12N4H2500	1800256
	800A/1600A	Vertical	+CAS12N4V1600	1800247	CAS12N4V1600	1800257
	2000A/2500A		+CAS12N4V2500	1800248	CAS12N4V2500	1800258
	3200A		+CAS12N4V3200	1800249	CAS12N4V3200	1800259

## Control Unit

### Product Overview

The Control Unit is designed to protect the power distribution system and load, suitable for 50/60Hz grid. It is primarily used for power distribution and feeder protection. It also provides protection for the circuits and power equipment against overload, short circuit, ground fault, current unbalance, over voltage, under voltage, over frequency, under frequency and reactive power. The Control Unit insures the grid is running properly with a load monitor, demand protection and zone interlock. It provides valuable grid status information by measuring current, voltage, power, frequency, energy, and harmonics. The Control Unit also records fault, alarm, operation, max history current, and contact wear. For power grids with network communication, the Control Unit can be used as a remote end in power automation to accurately monitor telemetry, tele-signaling, telecontrol, and teleregulation.

### Measurement

The Control Unit provide measurements and electrical parameters calculation.

### Protection

The protection units for power distribution, available in the standard versions LI, LSI and LSIG and additional protection functions, are suited to all distribution systems.



### Diagnostics

The diagnostics function allows users to follow the status and operating condition of the circuit breaker in real time.

### Communication

The Control Unit can be easily integrated into modern supervision systems through RS-485, Modbus communication protocol.

# Control Unit

## Product Overview

The A32 control units are designed for use in a wide range of applications. The complete, flexible protection control unit can be adapted to the actual level of protection required, independently of the complexity of the system. They have different performances, to meet any requirement, from simple to advanced applications.

- Control Unit 2.0 series with LI protection
- Control Unit 3.0 series with LSI protection
- Control Unit 4.0 series with LSI<sub>G</sub> protection

All the three types of control units are available in 3 variants with suffix M, A, and H.

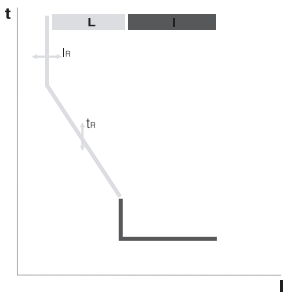
- **M** - The variant M is basic type with the integrated LED display;
- **A** - For version A, it is Ammeter type with the integrated LCD display, offers additional detailed current analysis, it means that detailed information about currents can be shown on the integrated LCD display;
- **H** - The most complex variant H provides full net analysis including measuring and calculation of harmonic content, with the integrated LCD display.

## Control Unit

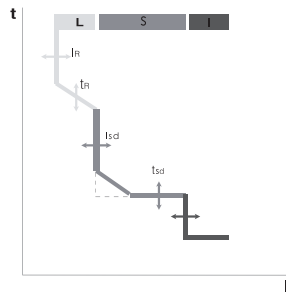
### Product Overview

#### Overview

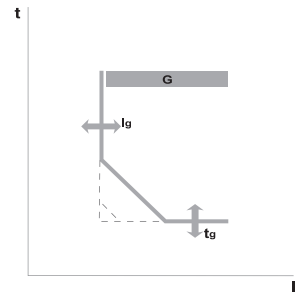
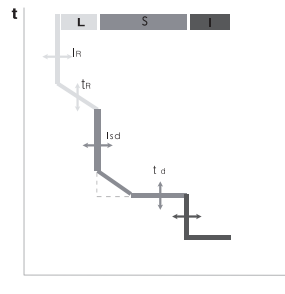
Control Unit 2.0  
LI Protection



Control Unit 3.0  
LSI Protection



Control Unit 4.0  
LSIG Protection



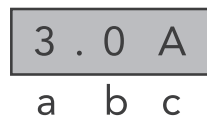
#### Table of Models

Protection type	Measurement type
a 2: LI protection 3: LSI protection 4: LSIG protection	c Basic type M Ammeter type A Harmonics type H Note: M type is LED display; A and H types are LCD display.
Design version	
b Distinguish the design version of the Controlunit. "0" means the first version.	

#### Models

	M	A	H
2.0N		●	
3.0N	●	●	
4.0N	●	●	●

#### Naming of the Control Unit

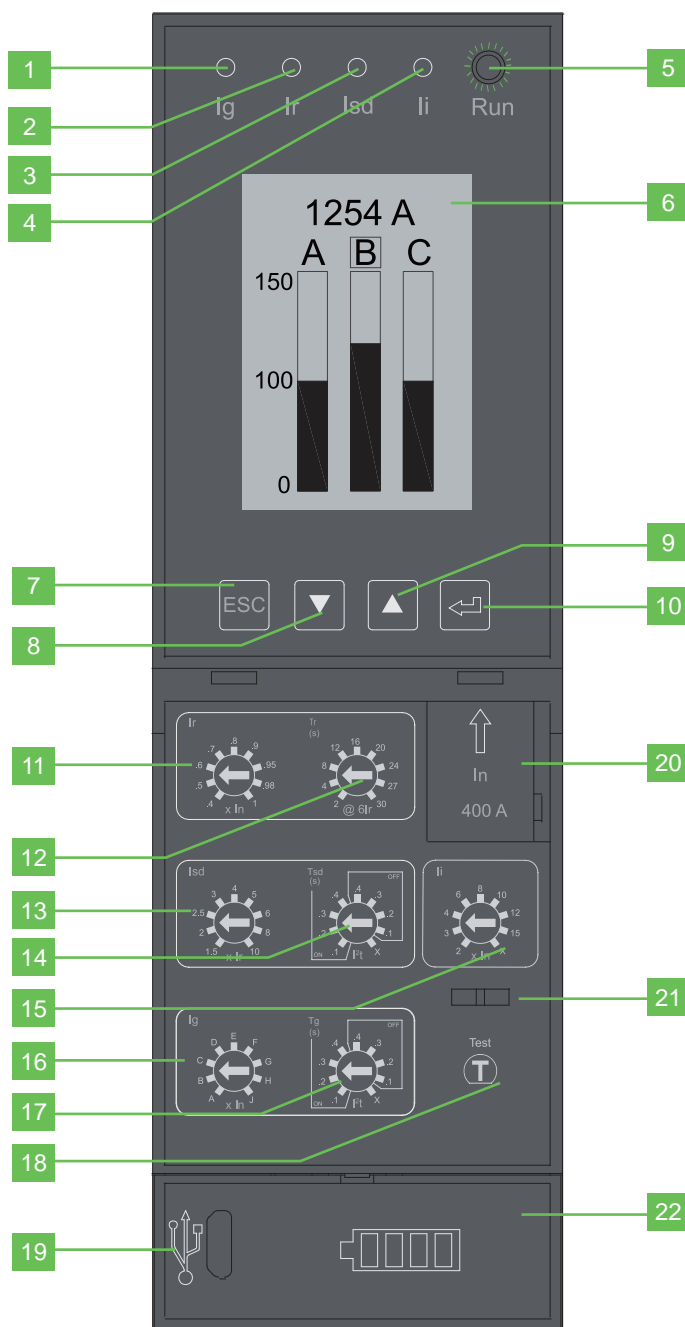




## Control Unit

### Controls and Settings

#### 4.0 Appearance



#### Indicators

- 1 LED fault reason indicator (Ig)
- 2 LED fault reason indicator (Ir)
- 3 LED fault reason indicator (Isd)
- 4 LED fault reason indicator (li)
- 5 Running (real-time status) LED indicator
- 6 A and H model: LCD, three-color backlight, green in normal running, yellow in alarm and red in case of trip due to fault current.  
M model: LED digital tube display.

#### Buttons

- 7 Escape button ESC
- 8 Selection button Down
- 9 Selection button Up
- 10 Enter button

#### Adjustment Interface

- 11 Long time delay current setting Ir
- 12 Long time delay trip time setting tr
- 13 Short time delay current setting Isd
- 14 Short time delay trip time setting tsd
- 15 Instantaneous current setting li
- 16 Ground fault current setting Ig
- 17 Ground fault trip time setting Tg
- 18 Test button: Trip test button
- 19 USB port
- 20 Rating plug
- 21 Transparent cover lock hook
- 22 Battery location

## Control Unit

### Functions

The control unit is used for power distribution protection. It can be configured as Basic type, Ammeter type and Harmonics controllers.

Control unit type	M (Basic type)	A (Ammeter type)	H (Harmonic type)
<b>Protection function</b>			
Long time protection	•	•	•
Overload pre-alarm	•	•	•
Short time protection	•	•	•
Instantaneous protection	•	•	•
Neutral protection	•	•	•
Ground-fault protection	• 4.0	• 4.0	• 4.0
Current unbalance protection	•	•	•
MCR and HSISC protection	•	•	•
Voltage unbalance protection			•
Overvoltage protection			•
Undervoltage protection			•
Over-frequency protection			•
Under-frequency protection			•
Phase sequence protection			•
Reverse active power protection			•
Demand value protection			•
Harmonics protection			•
Thermal memory	•	•	•
<b>Measurement function</b>			
Current measurement	•	•	•
Voltage measurement			•
Frequency measurement			•
Power measurement			•
Power factor measurement			•
Electric energy measurement			•
Demand value measurement			•
Harmonic measurement			•
Test function	•	•	•
Record of operation	•	•	•
<b>Maintenance function</b>			
Trip records	•	•	•
Alarm records	•	•	•
Position change records	•	•	•
Contact wear records		•	•
Load monitoring			•
Zone Selective Interlocking			•
<b>Other functions</b>			
RS485 communication function			•
Digital input/output DI/DO			•
Real time clock		•	•
LED display	•		
Tri-color LCD display		•	•
<b>HMI</b>			
LED status indication	•	•	•
Button operation	•	•	•
Knob setting	•	•	•
USB test port	•	•	•

Note: Please Contact Noark if customers use functions like Load monitor,Zone-Selection Interlocking and digital input/output DI/DO.

## Control Unit

### Functions

Long time delay protection											
Setting Parameters		Setting Range									
Current Setting Ir		(0.4-0.5-0.6-0.7-0.8-0.9-0.95-0.98-1.0)xIn									
Time Setting Tr@6Ir		2s.4s.8s.12s.16s.20s.24s.27s.30s									
Lines current	Trip time(S)										Action time tolerance
<1.0Ir	No trip										-
≥1.2Ir	<1h trip										±10%Or
2.0Ir	18	36	72	108	114	180	216	243	270	Absolute error ±40ms, pick the max value	
6.0Ir	2	4	8	12	16	20	24	27	30		

Long time delay inverse time characteristics,  $t = \frac{(6Ir)^2}{i^2} \times Tr$

Notes:

Tr: Long time delay time; Ir: Long time delay current;

i: Actual current; t: Actual acting time

Short time delay protection				
Setting type		Current setting Isd		Time setting Tsd(S)
Definite time		(1.5-2-2.5-3-4-5-6-8-10)xIr		0.1-0.2-0.3-0.4
Inverse time				X (OFF)
OFF				Action time tolerance
Action characteristic	Tolerance	Lines current	Trip time(s)	±10% Or Absolute error ±40ms, pick the max value
Definite time	±10%	<0.9Isd	No trip	
		≥1.1Isd	0.1,0.2,0.3,0.4	
		0.9Isd	No trip	
Inverse time		≥1.1Isd 且 ≤10Ir	$t = \frac{(10Ir)^2}{i^2} \times Tsd$	
		>10Ir	Trip time per definite time	

Instantaneous protection			
Instantaneous current Ii	Tolerance	Lines current	Trip characteristic
(2-3-4-6-8-10-12-15)xIn + X(OFF)	±10%	I < 0.9Ii	No trip
		I ≥ 1.1Ii	Trip, trip time ≤ 100ms

Ground fault protection										
		Ig definition								
Rated current In	A	B	C	D	E	F	G	H	J	Notes
400A < In ≤ 1200A	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0	xIn
1200 < In	500A	640A	720A	800A	880A	960A	1040A	1120A	1200A	
Setting type	Time setting Tg (S)									
Definite time	0.1-0.2-0.3-0.4									
Inverse time	X(OFF)									
OFF	X(OFF)									
Action characteristic	tolerance	Lines current			Trip time(S)				Action time tolerance	
Definite time	±10%	<0.9Ig			No trip				±10% Or Absolute error ±40ms, pick the max value	
		≥1.1Ig			0.1,0.2,0.3,0.4					
		<0.9Ig			No action					
Inverse time		≥1.1Ig and (I < In or 1200A)			$t = \frac{(1.0In)^2}{i^2} \times Tg$ or $t = \frac{(1200)^2}{i^2} \times Tg$					
		≥1In or 1200A			Trip time per definite time					

Neutral protection	
Setting Range	50%, 100%, OFF

## Control Unit

### Functions

Current Unbalance Protection			
	Min	Max	Step
Start setting	5	60	1%
Start time delay	0.1	40	0.1s
Back setting	5	Start setting	1%
Back time setting	10	200	1s

Current unbalance protection is for phase loss or three-phase current unbalance, provide protection per the unbalance rate of the three phases

Demand Current Protection			
	Min	Max	Step
Start setting	0.2In	In	1A
Start time delay	15	1500	1S
Back setting	0.2In	Start setting	1A
Back time setting	15	3000	1S

Calculate the demand current rms of each phase in a slide time window, provide protection when the current of the max phase exceeds the setting

Current Harmonics Protection			
	Min	Max	Step
Start setting	8	60	0.5%
Start time delay	1	120	1S
Back setting	8	Start setting	0.5%
Back time setting	1	120	1S

Current harmonics protection is to measure the harmonics compared with the fundamental of current which is the total harmonics distortion THD, provide protection when THD exceeds the setting value

Load Monitor Function			
	Min	Max	Step
<b>Load monitor (method 1)</b>			
Load 1 start setting	0.2Ir	1.0Ir	1A
Load 1 start time delay	20	80	1%Tr
Load 2 start setting	0.2Ir	1.0Ir	1A
Load 2 start time delay	20	80	1%Tr
<b>Load monitor (Method 2)</b>			
Start setting	0.2Ir	1.0Ir	1A
Start time delay	20	80	1%Tr
Back setting	0.2Ir	Start setting	1A
Back time setting	10	600	1S

Load monitor protection is for pre-alarm, and can be used to control branch load. Provide protection based on current. There are two methods available

#### Method 1:

Control two branches independently, when the operating values exceed the setting values, the relative setting is delay trip of the Load monitor DO port, control and trip two branch loads, guarantee the power supply for the main system

#### Method 2:

Control only one branch load, when working values exceed the start setting, the relative setting is delay trip of the Load monitor one DO port, trip the branch load; if the value is lower than back setting, the relative setting is delay back of the Load monitor one DO port, re-supply the branch load

# Control Unit

## Functions

Under Voltage Protection			
	Min	Max	Step
Start setting	100	1200	1V
Start time delay	0.2	60	0.1S
Back setting	Start setting	1200	1V
Back time setting	0.2	60	0.1S

Provide protection when the min of the line voltage exceeds the setting.

Over Voltage Protection			
	Min	Max	Step
Start setting	100	1200	1V
Start time delay	0.2	60	0.1S
Back setting	100	Start setting	1V
Back time setting	0.2	60	0.1S

Provide protection when the max of the line voltage exceeds the setting.

Voltage Unbalance Protection			
	Min	Max	Step
Start setting	2	30	1%
Start time delay	0.2	60	0.1S
Back setting	2	Start setting	1%
Back time setting	0.2	60	0.1S

Provide protection based on the unbalance rate of three phases.

Voltage Harmonics Protection			
	Min	Max	Step
Start setting	4	10	0.1%
Start time delay	1	120	1S
Back setting	4	Start setting	0.1%
Back time setting	1	120	1S

By measuring the total harmonics distortion THD which is compared to the fundamental of each line voltage, provide protection when THD exceeds the setting value.

Under Frequency Protection			
	Min	Max	Step
Start setting	45	65	0.5Hz
Start time delay	0.2	5.0	0.1S
Back setting	Start setting	65	0.5Hz
Back time setting	0.2	36	0.1S

Control unit measure the frequency of system voltage, provide protection when frequency is too low.

Over Frequency Protection			
	Min	Max	Step
Start setting	45	65	0.5Hz
Start time delay	0.2	5.0	0.1S
Back setting	45	Start setting	0.5Hz
Back time setting	0.2	36	0.1S

Control unit measure the frequency of system voltage, provide protection when frequency is too high.

## Control Unit

### Functions

Reverse Active Power Protection (Total Active Power)			
	Min	Max	Step
Start setting	5	500	1KW
Start time delay	0.2	20	0.1S
Back setting	5	Start setting	1KW
Back time setting	1.0	36	0.1S

Reverse active power is based on the total power of three phase, provide protection when the power direction is reverse with the setting and higher than the setting

Phase Sequence Protection		
	Setting Range	Note
Action Phase	ABC or ACB	
Action Method	Instantaneous trip	

Phase sequence is based on the voltage of each phase, trip instantaneously when the phase sequence is the same direction with start setting. This function will exit when there is one or multi phase not existing.

#### Making and breaking protection MCR

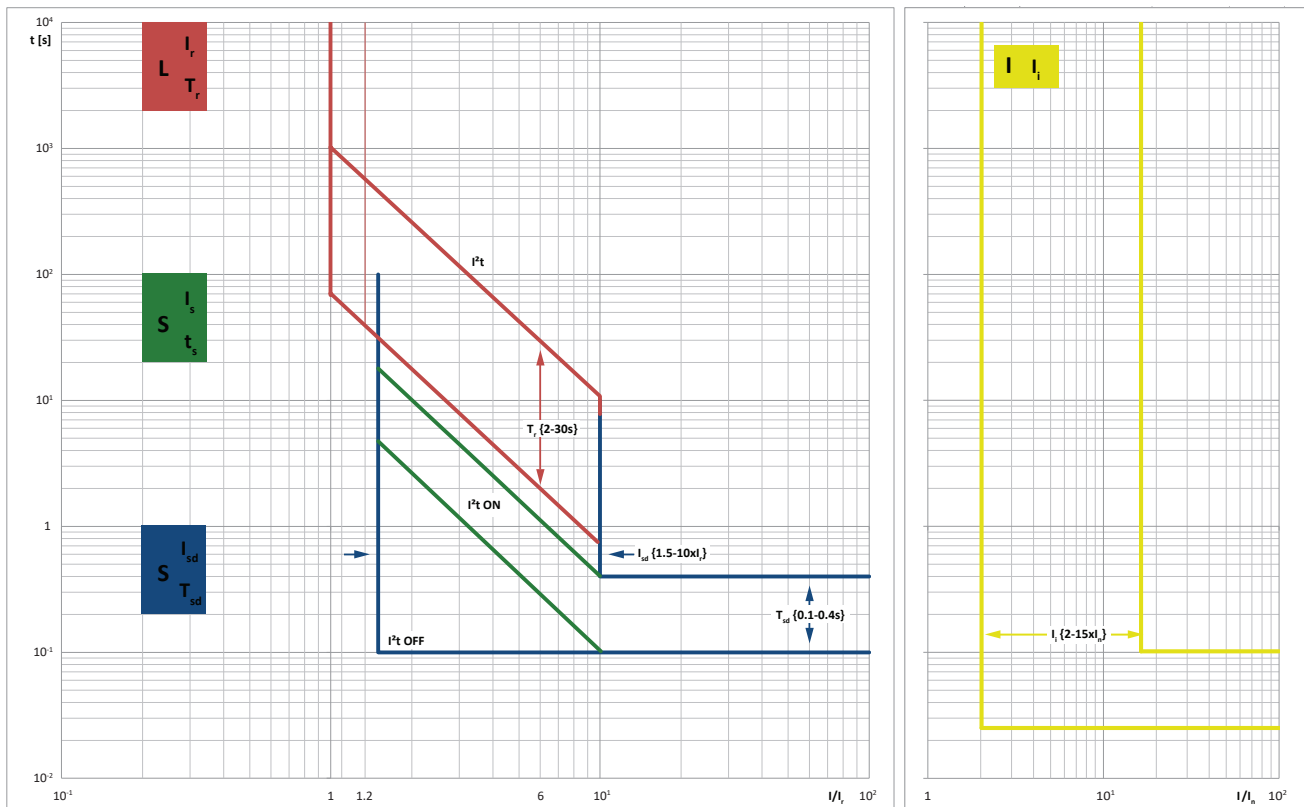
The making protection function is only available within 200ms after breaker's closing. If the current exceeds the setting value, control unit trips. This function will automatically exit after breaker's closing, this function need to connect external auxiliary power.  
Trip time < 50ms.

#### Service short circuit protection HSISC

The service short circuit protection is only available later than 200ms after the breaker is closed. If the current exceeds the setting value, control unit trips.  
Trip time < 50ms.

## Control Unit Trip Curves

### Current characteristics



- L - long time delay overload protection
- S - short circuit delay short circuit protection
- I - instantaneous short circuit protection

## Control Unit

### Trip Curves

#### Current characteristics - L protection

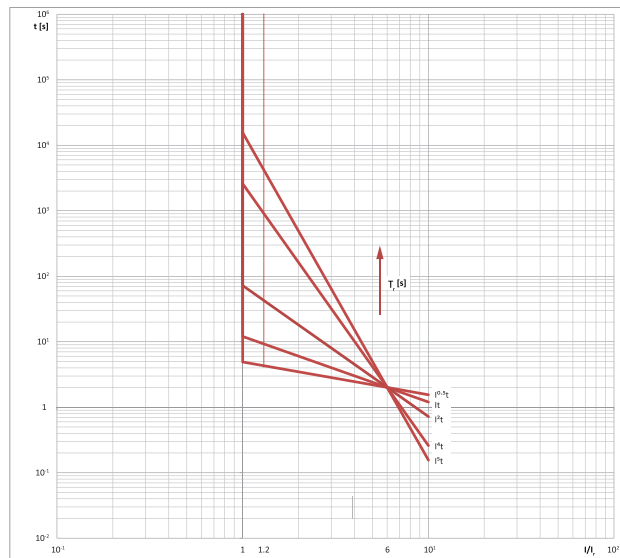
#### L Protection (Long time delay overload protection)

Coarse setting of  $I_r$  and  $T_r$  by means of mechanical selectors at trip unit. Fine setting is accessible via Control Unit menu.

Time delay is set as an inverse time function of current.

$$t = ((6 \times I_r) / I)^n \times T_r$$

The respective characteristics slope defined by coefficient  $n$  can be selected in trip unit menu. Available curves are with  $n = 0.5, 1, 2, 4,$  and  $5$ . Value  $n = 2$  is set as default parameter.



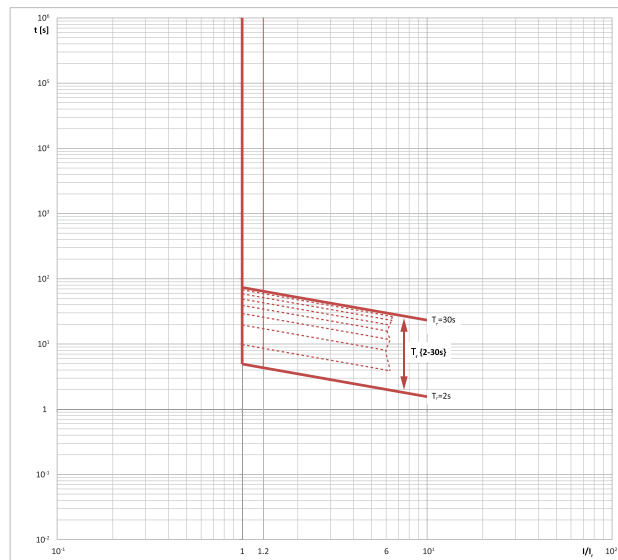
Shaping of tripping curve for L protection by means of  $n$ -power coefficient in inverse time delay function. Selection of the  $n$  coefficient is accessible via tripping unit Control Unit maximum current limit is defined by setting of  $I_{sd}$  or  $I_i$ .



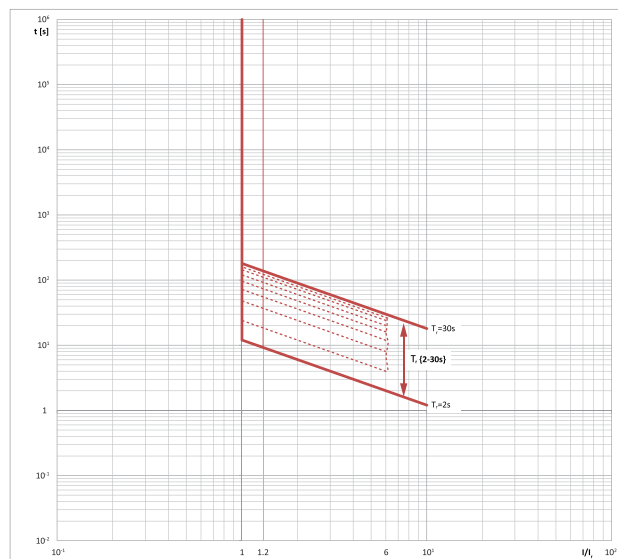
# Control Unit

## Trip Curves

### Current characteristics - L protection



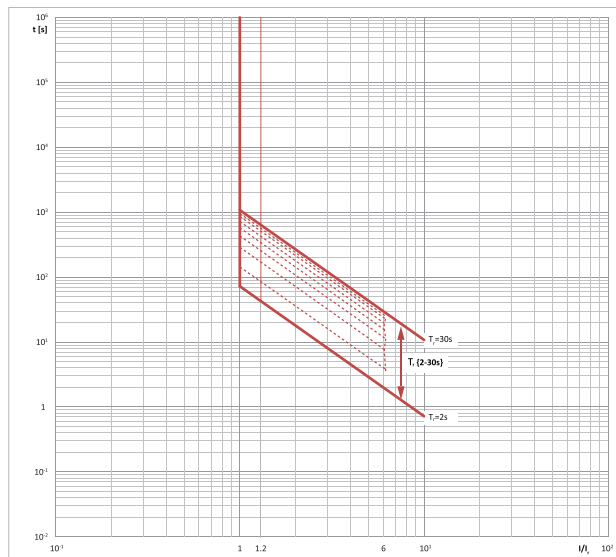
Setting range of L protection curve with inverse function power coefficient  $n=0.5$ .



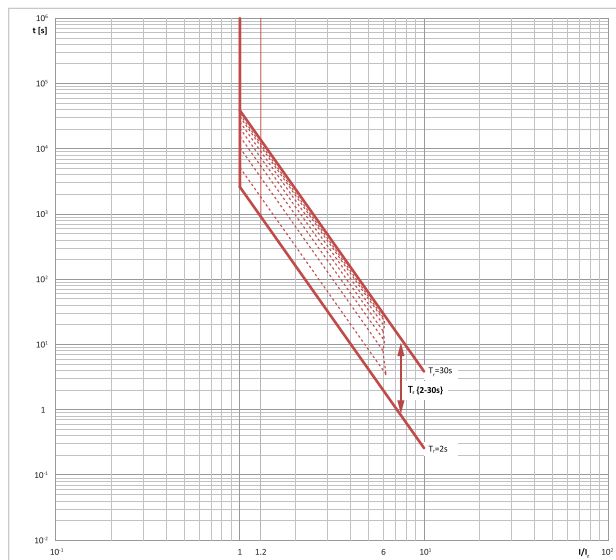
Setting range of L protection curve with inverse function power coefficient  $n=1$ .

## Control Unit Trip Curves

### Current characteristics - L protection



Setting range of L protection curve with inverse function power coefficient  $n=2$ .

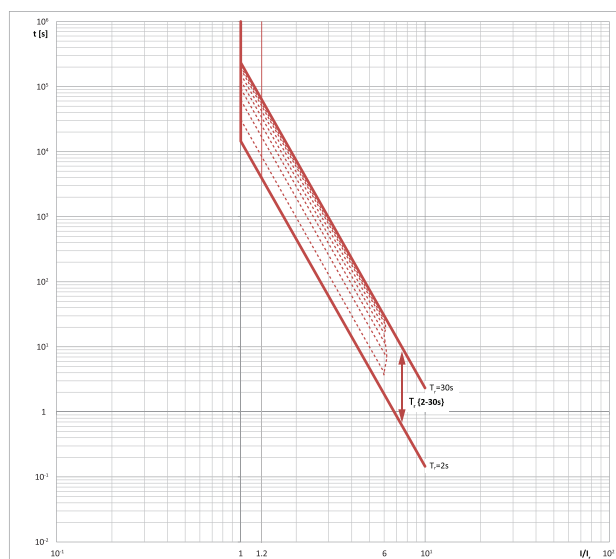


Setting range of L protection curve with inverse function power coefficient  $n=4$ .

# Control Unit

## Trip Curves

### Current characteristics - L protection



Setting range of L protection curve with inverse function power coefficient  $n=5$ .

## Control Unit

### Trip Curves

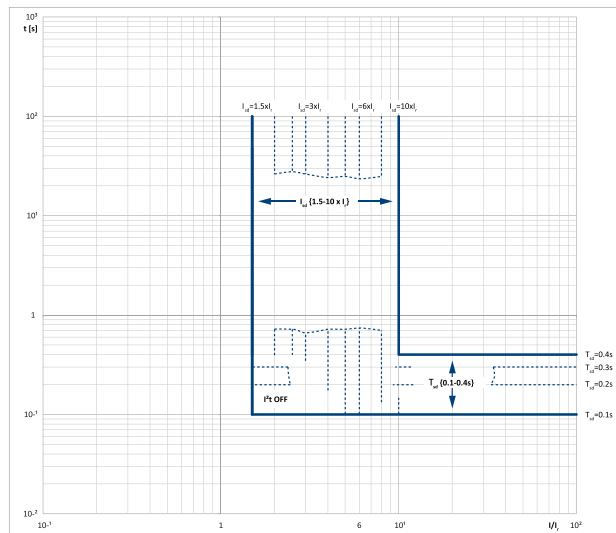
#### Current characteristics - S protection

S protection (Short delay short circuit protection)

Coarse setting of  $I_{sd}$  and  $T_{sd}$  by means of mechanical selectors at trip unit SU. Fine setting is accessible via Control Unit menu.

Time delay can be set as an inverse time function of current ( $I^2t$ ) or as fixed  $T_{sd}$  ( $I^2t$  OFF). The inverse function is expressed as

$$t_s = ((10 \times I_r) / I)^2 \times T_{sd}$$

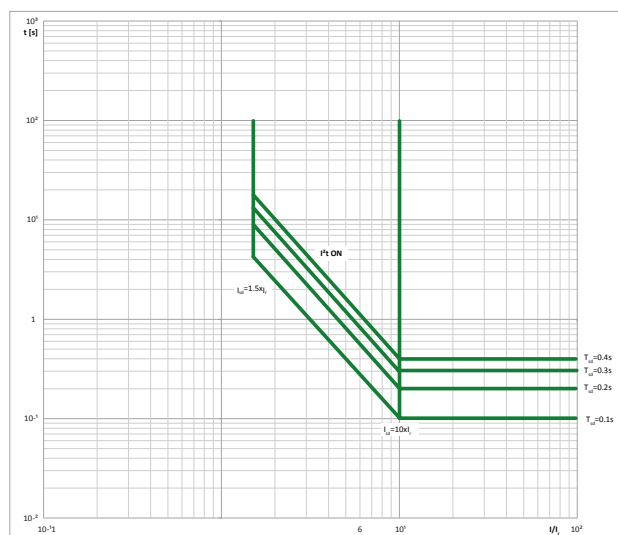


Setting range of S protection curve with fixed tripping time ( $I^2t$  OFF)

# Control Unit

## Trip Curves

### Current characteristics - S protection



Effect of inverse time function  $I^2t$

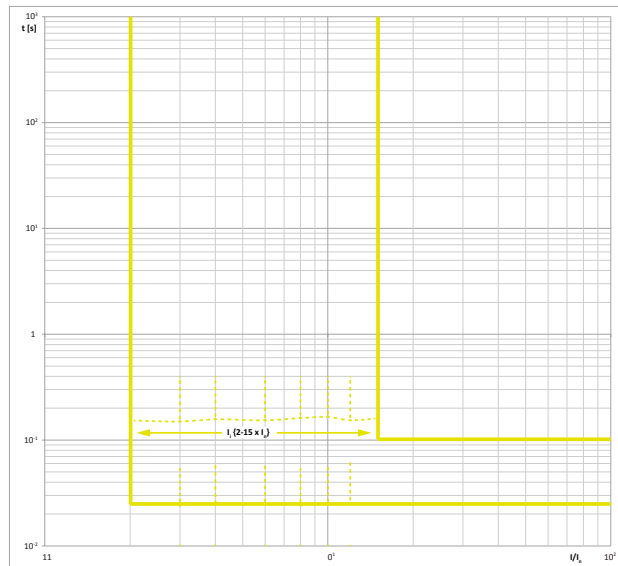
## Control Unit

### Trip Curves

#### Current characteristics - I protection

#### I protection (Instantaneous short circuit protection)

Coarse setting of  $I_i$  by means of mechanical selectors at Control Unit. Fine setting is accessible via Control Unit menu.



Setting range of  $I_i$  protection.

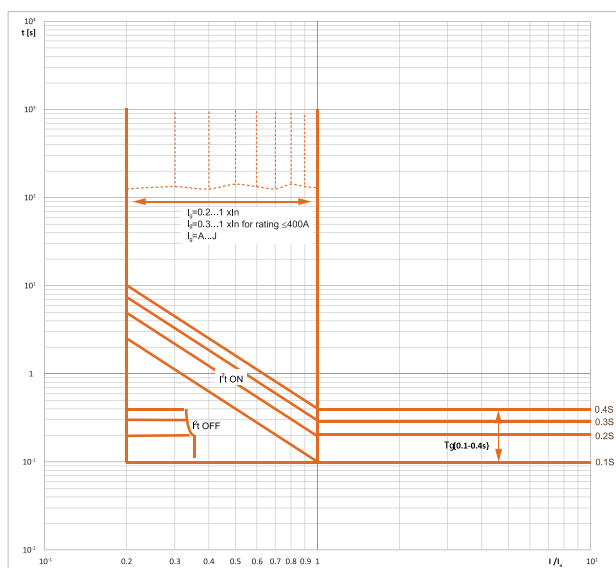
# Control Unit

## Trip Curves

### Current characteristics - G protection

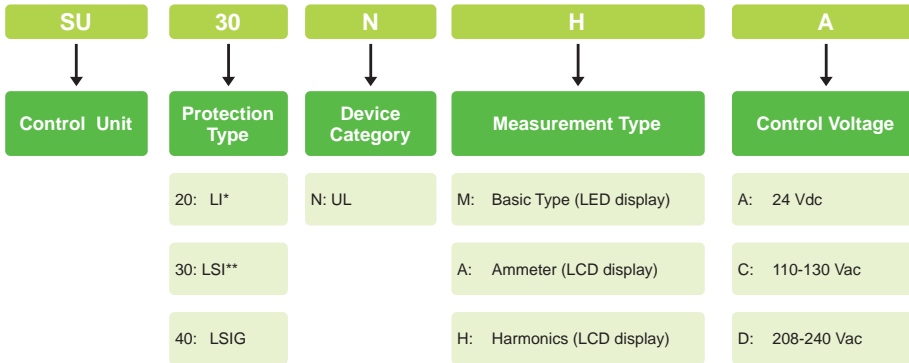
#### G protection (Ground fault protection)

Protection against residual currents to grounding or PE conductors caused by (short-circuit) connection of L conductor with PE potential.



Setting range of G protection curve.

## Control Unit Selection Guide



\* Available on A type only

\*\* Available on M and A type only

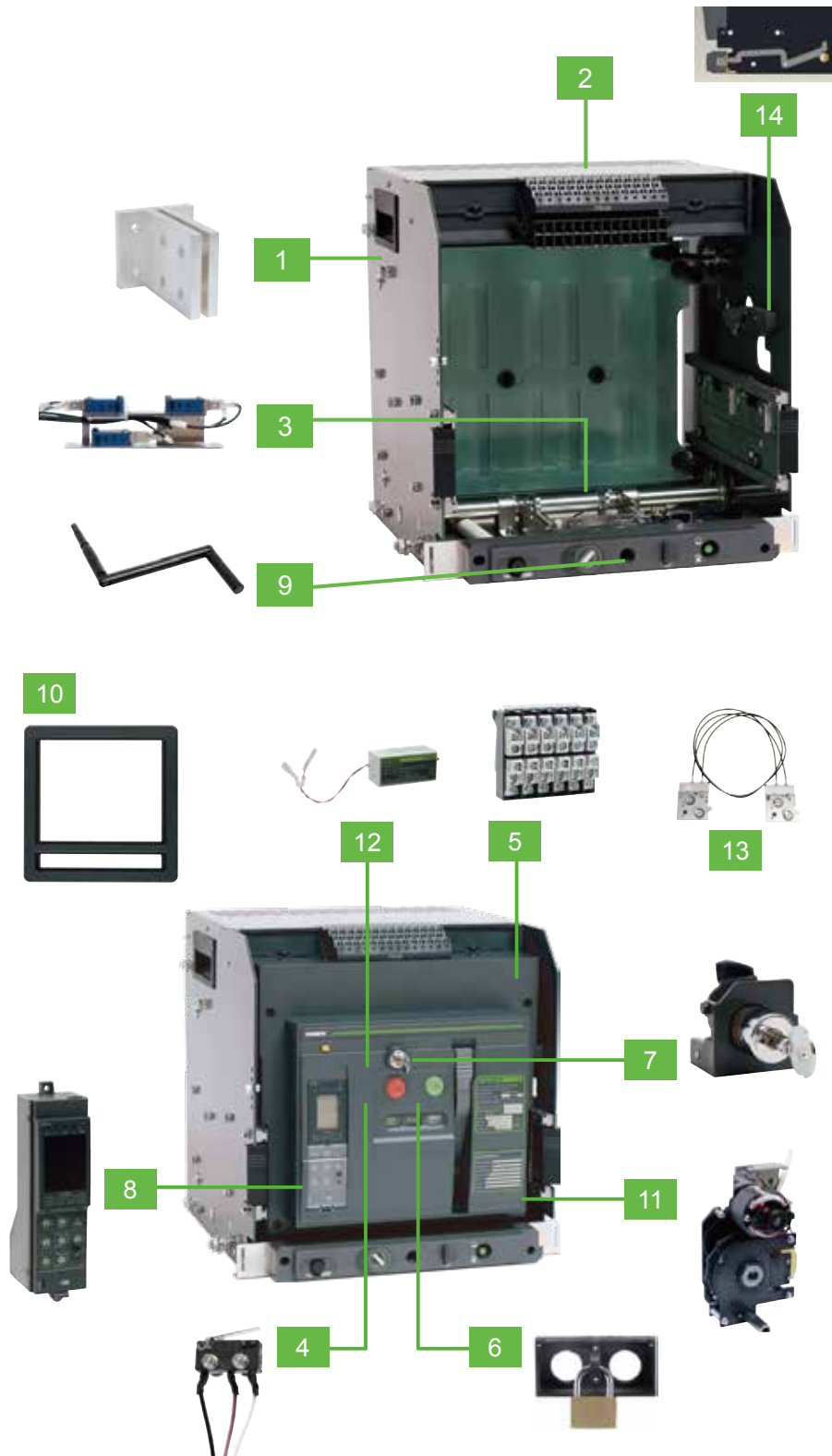
Control unit			Factory Installed		Field installable	
Type	Protection	Control voltage	Catalog Number	Part Number	Catalog Number	Part Number
M type Basic Power Protection	LSI	24VDC	+SU30NMA	1800207	SU30NMA	1800225
	LSI	120VAC	+SU30NMC	1800208	SU30NMC	1800226
	LSI	240VAC	+SU30NMD	1800209	SU30NMD	1800227
	LSIG	24VDC	+SU40NMA	1800213	SU40NMA	1800231
	LSIG	120VAC	+SU40NMC	1800214	SU40NMC	1800232
	LSIG	240VAC	+SU40NMD	1800215	SU40NMD	1800233
A type Ammeter	LI	24VDC	+SU20NAA	1800204	SU20NAA	1800222
	LI	120VAC	+SU20NAC	1800205	SU20NAC	1800223
	LI	240VAC	+SU20NAD	1800206	SU20NAD	1800224
	LSI	24VDC	+SU30NAA	1800210	SU30NAA	1800228
	LSI	120VAC	+SU30NAC	1800211	SU30NAC	1800229
	LSI	240VAC	+SU30NAD	1800212	SU30NAD	1800230
	LSIG	24VDC	+SU40NAA	1800216	SU40NAA	1800234
	LSIG	120VAC	+SU40NAC	1800217	SU40NAC	1800235
	LSIG	240VAC	+SU40NAD	1800218	SU40NAD	1800236
H type Harmonic	LSIG	24VDC	+SU40NHA	1800219	SU40NHA	1800237
	LSIG	120VAC	+SU40NHC	1800220	SU40NHC	1800238
	LSIG	240VAC	+SU40NHD	1800221	SU40NHD	1800239





## Accessories

### Product Overview



## Accessories

### Product Overview

An extensive range of accessories are available for the A32 power (air) circuit breakers. Each accessory can be installed as an independent unit thanks to the modular architecture of the A32. This makes installation and maintenance simple for technicians.

1	Rear connection plate	9	Racking handle
2	Cassette	10	Door frame
3	Position Indicator	11	Motor Operator
4	Ready to close contact	12	Under-voltage Release
5	Auxiliary contact		Shunt Trip Release
6	Pushbutton Lock Device		Closing Release
7	OFF position key lock	13	Mechanical Interlocks with Cables
8	Control Unit	14	Door interlocks for Drawout type

## Accessories

### Selection Guide

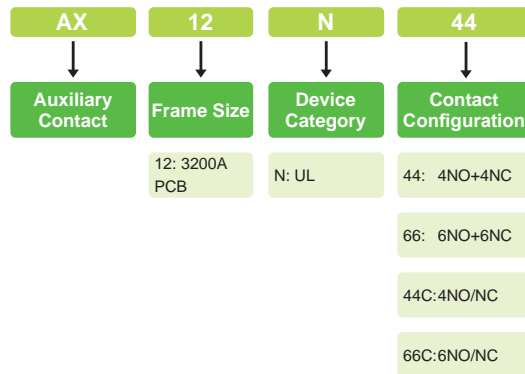
#### Auxiliary Contact

Monitors ON/OFF position of power circuit breaker or Non-automatic switch remotely.

Contact configuration:

44: 4NO and 4NC; 66: 6NO and 6NC;

44C: 4NO or 4NC; 66C: 6NO or 6NC.



Rated Operating Voltage:  
240/480 Vac, 110/220 Vdc

Rated Operating Current:

.25 A @ 110 Vdc

.25 A @ 220 Vdc

5 A @ 240 Vac

2 A @ 480 Vac

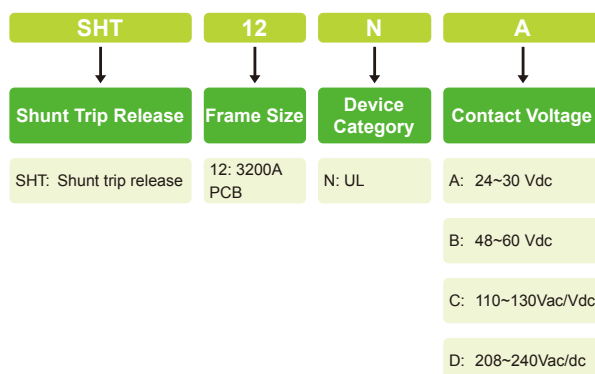
Auxiliary contact		Factory Installed			Field Installable	
Frame size	Breaker/Switch	Contacts	Catalog Number	Part Number	Catalog Number	Part Number
A32/ASD32	Fixed	4NO+4NC	+AX12NF44	1800286	AX12NF44	1800290
		6NO+6NC	+AX12NF66	1800287	AX12NF66	1800291
		4NO/NC	+AX12NF44C	1800288	AX12NF44C	1800292
		6NO/NC	+AX12NF66C	1800289	AX12NF66C	1800293
	Drawout	4NO+4NC	+AX12ND44	1800294	AX12ND44	1800298
		6NO+6NC	+AX12ND66	1800295	AX12ND66	1800299
		4NO/NC	+AX12ND44C	1800296	AX12ND44C	1800300
		6NO/NC	+AX12ND66C	1800297	AX12ND66C	1800301

## Accessories

### Selection Guide

### Shunt Trip Release

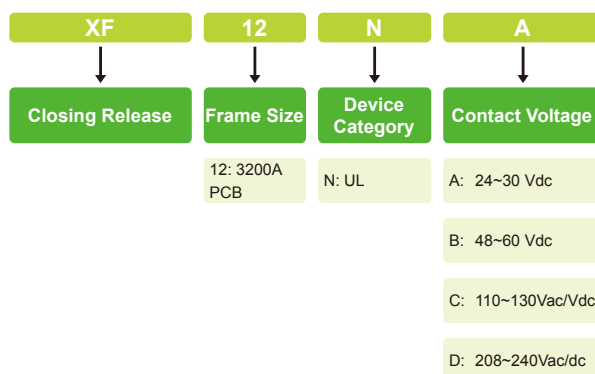
Opens the circuit breaker instantaneously when the coil is energized by a voltage input.



Shunt Trip Release		Factory Installed		Field Installable	
Frame size	Control voltage	Catalog Number	Part Number	Catalog Number	Part Number
A32/ASD32	24-30VDC	+SHT12NA	1800268	SHT12NA	1800272
	48-60VDC	+SHT12NB	1800269	SHT12NB	1800273
	110-130VAC/DC	+SHT12NC	1800270	SHT12NC	1800274
	208-240VAC/DC	+SHT12ND	1800271	SHT12ND	1800275

### Closing Release

Remotely closes the circuit breaker when the coil is energized by a voltage input.



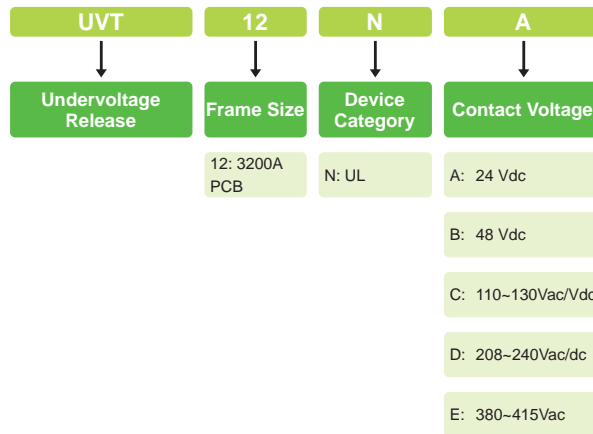
Closing Release		Factory Installed		Field Installable	
Frame size	Control voltage	Product	Part Number	Product	Part Number
A32/ASD32	24-30VDC	+XF12NA	1800260	XF12NA	1800264
	48-60VDC	+XF12NB	1800261	XF12NB	1800265
	110-130VAC/DC	+XF12NC	1800262	XF12NC	1800266
	208-240VAC/DC	+XF12ND	1800263	XF12ND	1800267

## Accessories

### Selection Guide

#### Undervoltage Release

Opens the breaker when the supply voltage falls to 30–60% of rated voltage. If the release is not energized to 85% of its supply voltage, the circuit breaker cannot be closed electrically or manually.



Undervoltage Release		Factory Installed		Field Installable	
Frame size	Control voltage	Catalog Number	Part Number	Catalog Number	Part Number
A32/ASD32	24VDC	+UVT12NA	1800276	UVT12NA	1800281
	48VDC	+UVT12NB	1800277	UVT12NB	1800282
	110-130VAC/DC	+UVT12NC	1800278	UVT12NC	1800283
	200-240VAC/DC	+UVT12ND	1800279	UVT12ND	1800284
	380-415VAC	+UVT12NE	1800280	UVT12NE	1800285

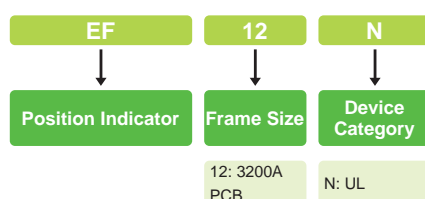
## Accessories

### Selection Guide

#### Position Indicator

Indicates the position of the breaker - connected, testing, disconnected. For drawout type devices only. 3 CO contacts, one contact for each breaker position.

Connected to secondary terminals #58, 59, 60 (Connected), #61, 62, 63 (Test), #64, 65, 66 (Disconnected). Factory installed only - in the scope of delivery there are additional secondary terminals #58-66



Position Indicator	Factory Installed Only	
Frame size	Catalog Number	Part Number
A32/ASD32	+EF12N	1800302

#### OFF Position Keylock

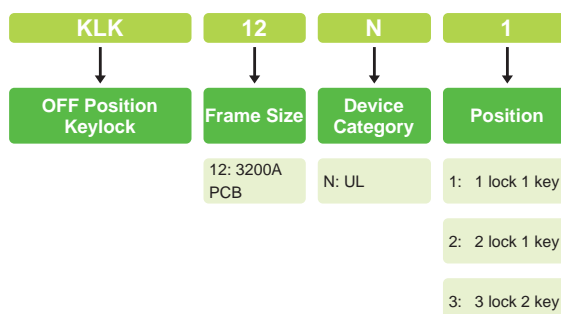
For A32 Power circuit breaker and ASD32 Non-automatic switch.

Blocks the breaker in the OFF position to ensure the breaker can not be closed.

One circuit breaker is provided with one lock and one key.

Two circuit breakers are provided with two locks and one key.

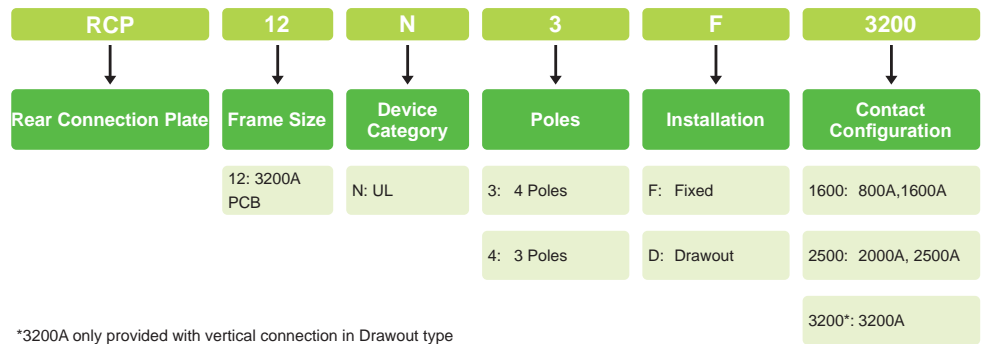
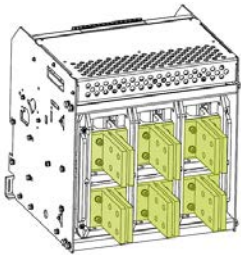
Three circuit breakers are provided with three locks and two keys.



Off Position Keylock		Factory Installed		Field Installable	
Frame size	Configuration	Catalog Number	Part Number	Catalog Number	Part Number
A32/ASD32	1 lock 1 key	+KLK12N1	1800316	KLK12N1	1800319
	2 locks 1 key	+KLK12N2	1800317	KLK12N2	1800320
	3 locks 2 keys	+KLK12N3	1800318	KLK12N3	1800321

## Accessories Selection Guide

### Rear Connection Plate



Rear Connection Plate				Field Installable		
Frame size	Poles	Breaker/Switch	Rated current	Catalog Number	Part Number	
A32/ASD32	3P	Fixed	800A/1600A	RCP12N3F1600	1800340	
		Fixed	2000A/2500A	RCP12N3F2500	1800341	
		Drawout	800A/1600A	RCP12N3D1600	1800342	
		Drawout	2000A/2500A	RCP12N3D2500	1800343	
		Drawout	3200A	RCP12N3D3200	1800344	
	4P	Fixed	800A/1600A	800A/1600A	RCP12N4F1600	1800345
		Fixed	2000A/2500A	2000A/2500A	RCP12N4F2500	1800346
		Drawout	800A/1600A	800A/1600A	RCP12N4D1600	1800347
		Drawout	2000A/2500A	2000A/2500A	RCP12N4D2500	1800348
		Drawout	3200A	3200A	RCP12N4D3200	1800349



## Accessories Selection Guide

### Selection Guide

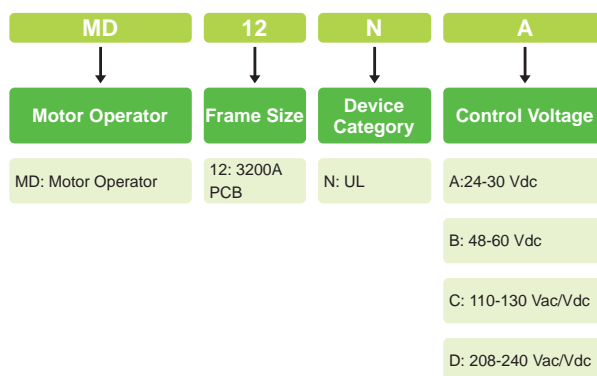
#### Motor Operator

Charges the closing spring of mechanism when the circuit breaker is closed.

Factory installed only.

Mechanical charging handle can be used with or without power supply.

Equipped with a limit switch contact which signals that spring is charged.



Motor Operator		Factory Installed		Field Installable	
Frame size	Control voltage	Catalog Number	Part Number	Catalog Number	Part Number
A32/ASD32	24-30VDC	+MD12NA	1800304	MD12NA	1800308
	48-60VDC	+MD12NB	1800305	MD12NB	1800309
	110-130VAC/DC	+MD12NC	1800306	MD12NC	1800310
	208-240VAC/DC	+MD12ND	1800307	MD12ND	1800311

#### Ready To Close Contact

This device is intended to be installed in A32 series power circuit breaker depending on customer's requirements. It is used to indicate whether the operating mechanism can be closed.



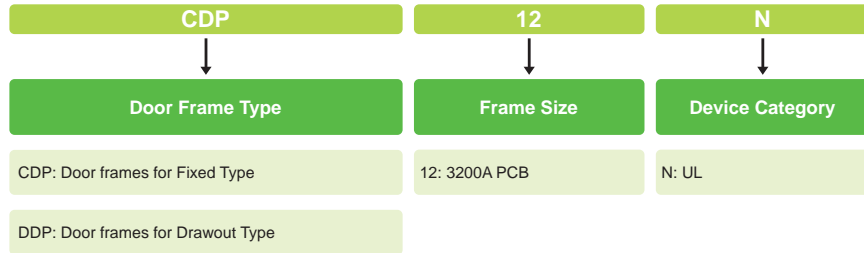
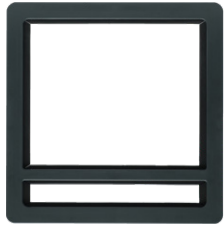
Ready to close contact		Factory Installed Only	
Frame size	Catalog Number	Part Number	
A32/ASD32	+PF12N	1800312	

## Accessories

### Selection Guide

#### Door Frame

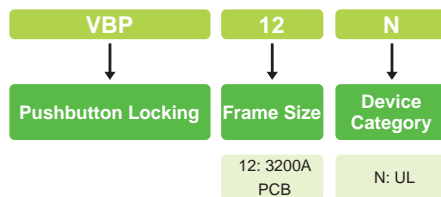
IP40 Protection



Doorframes for Fixed Type		Field Installable	
Frame size	Breaker/Switch	Catalog Number	Part Number
A32/ASD32	Fixed	CDP12N	1800324
	Drawout	DDP12N	1800325

#### Pushbutton Locking Cover

Prevents access to the control push button of the breaker.  
Factory installed only. Lock is not included



Pushbutton Locking	Factory Installed Only	
Frame size	Catalog Number	Part Number
A32/ASD32	+VBP12N	1800314

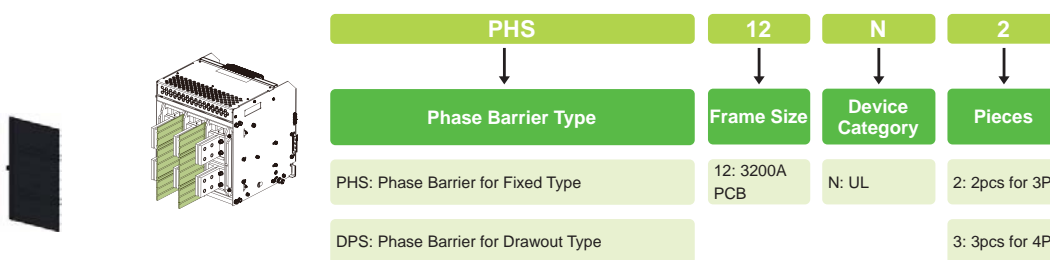
## Accessories

### Selection Guide

#### Phase Barrier

Provides improved isolation between main terminals.

Delivered as set (2pcs for 3P version, 3 pcs for 4P version)



Phase Barrier		Factory Installed		Field Installable		
Frame size	Breaker/Switch	Quantity	Catalog Number	Part Number	Catalog Number	Part Number
A32/ASD32	Fixed	2 pcs for 3 poles	+PHS12N2	1800330	PHS12N2	1800334
	Fixed	3 pcs for 4 poles	+PHS12N3	1800331	PHS12N3	1800335
	Drawout	2 pcs for 3 poles	+DPS12N2	1800332	DPS12N2	1800336
	Drawout	3 pcs for 4 poles	+DPS12N3	1800333	DPS12N3	1800337

## Accessories Selection Guide

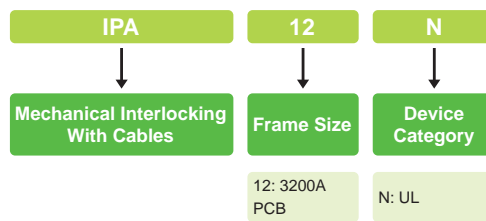
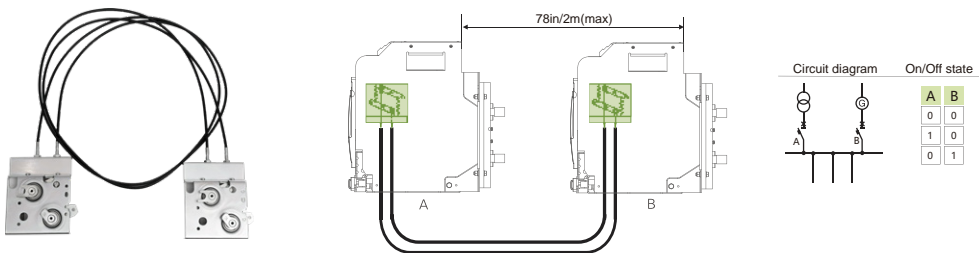
### Mechanical Interlocking With Cables

For interlocking of 2 or 3 (in preparation) breakers.

Cable length for maximum distance of mounting positions of interlocks 78in(2m).

Suitable for A32 Power circuit breaker and ASD32 Non-automatic switch

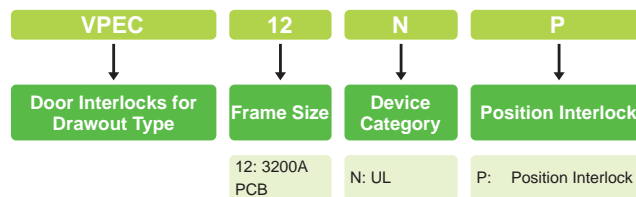
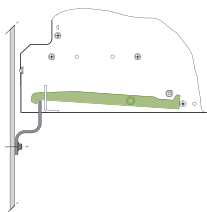
2 interlocks and 2 cables (2 breakers version), 3 interlocks and 6 cables (3 breakers version)



Mechanical Interlocks with Cables	Factory Installed		Field Installable	
Frame size	Catalog Number	Part Number	Catalog Number	Part Number
A32/ASD32	+IPA12N	1800338	IPA12N	1800339

### Door Interlock

Ensures that door of distribution board cannot be open when the circuit breaker is closed or in test position.

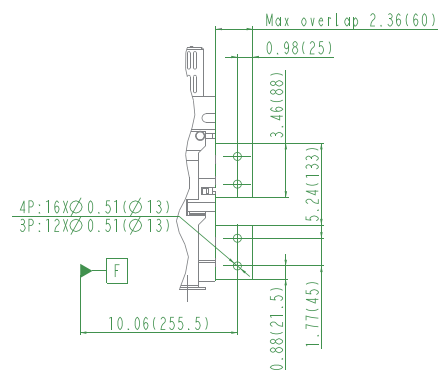
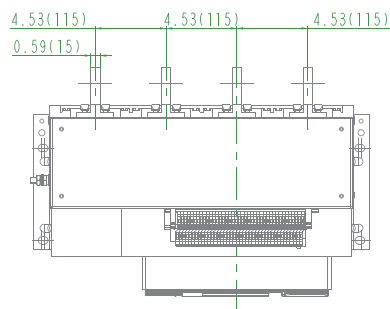
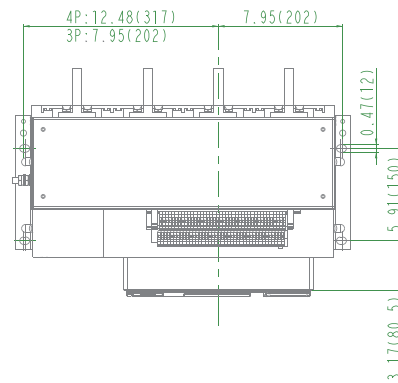
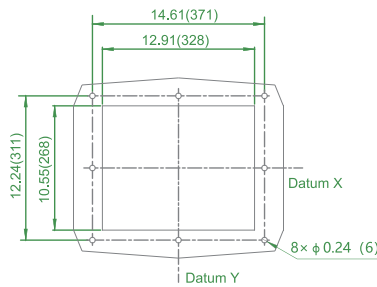
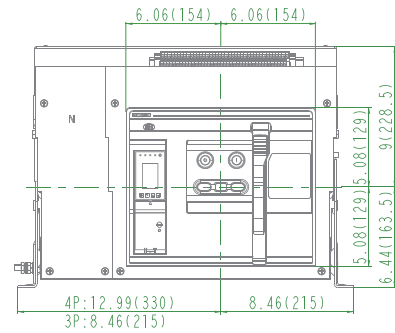
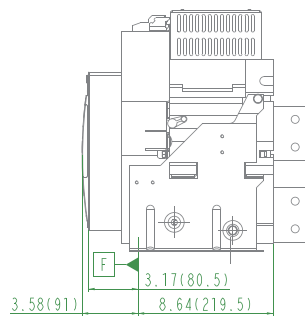
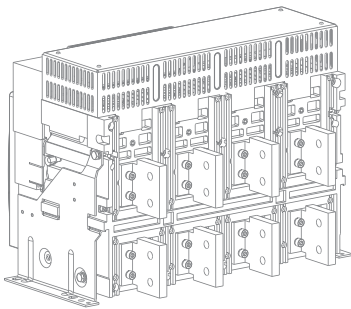


Door Interlocks for Drawout Type		Factory Installed	
Frame size	Interlock type	Catalog Number	Part Number
A32/ASD32	Position interlock	+VPEC12NP	1800326

## Installation Dimensions

**Fixed type**  
**800A/1600A**  
Vertical installation

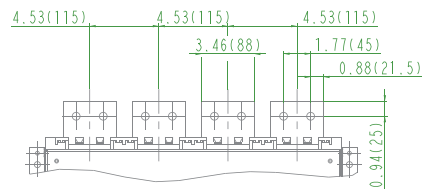
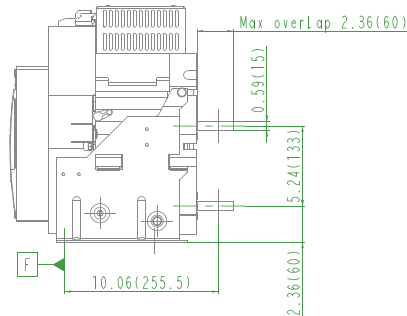
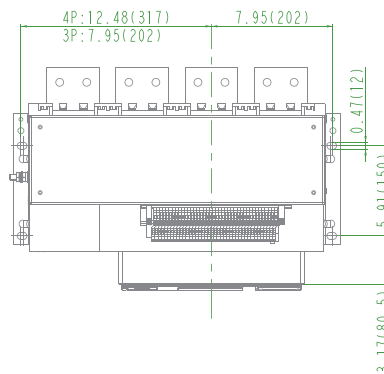
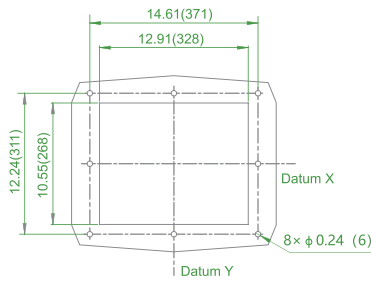
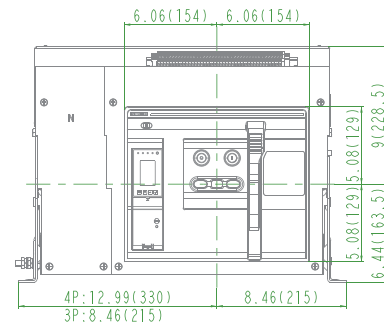
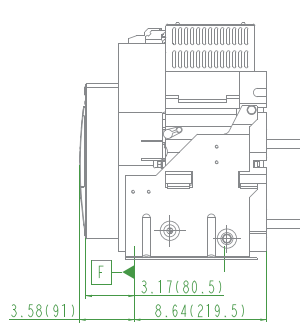
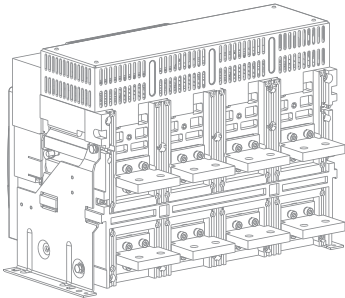
in/mm



## Installation Dimensions

**Fixed type**  
800A/1600A  
Horizontal installation

in/mm



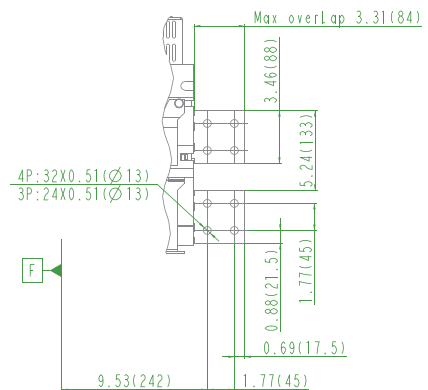
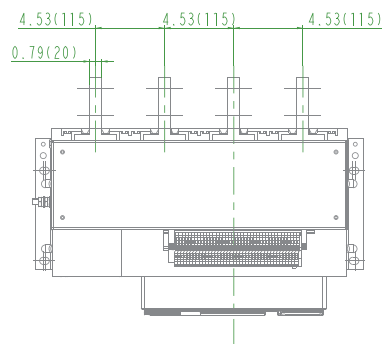
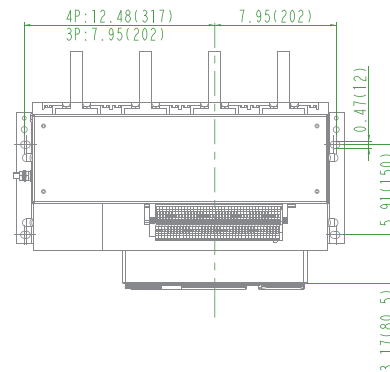
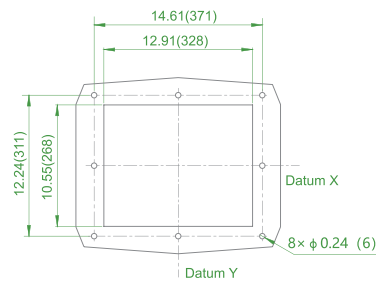
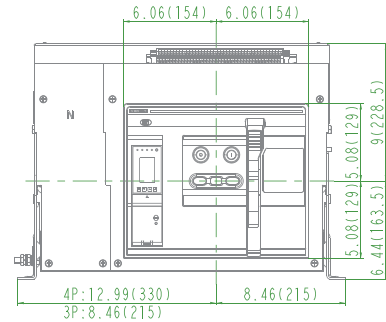
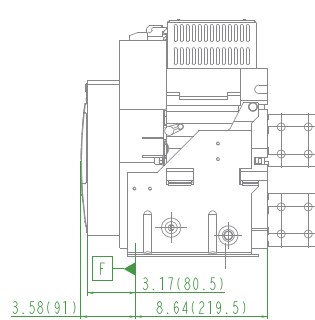
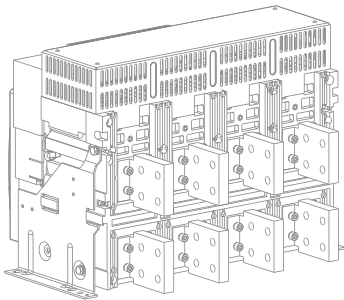
## Installation Dimensions

### Fixed type

### 2000A/2500A

Vertical installation

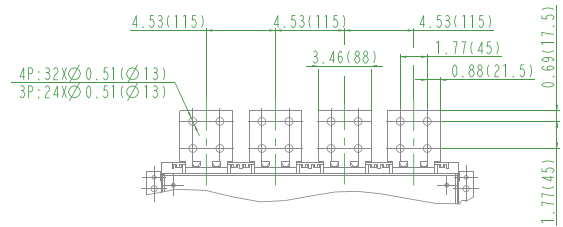
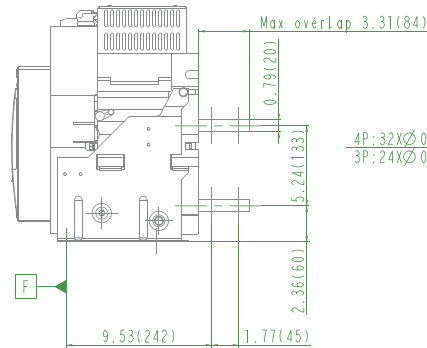
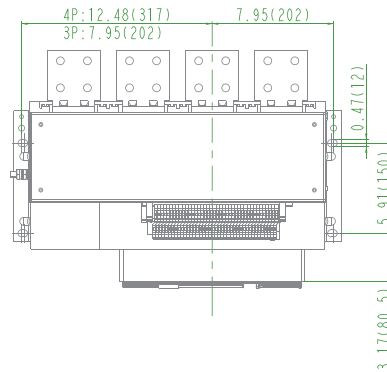
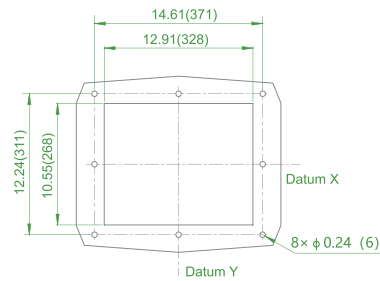
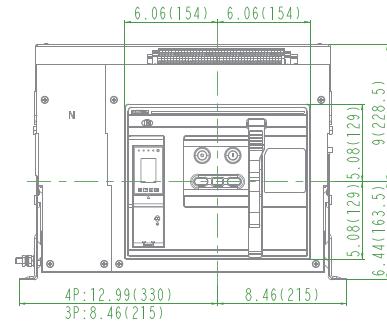
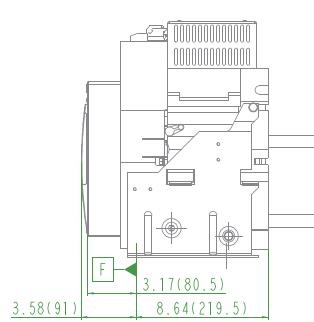
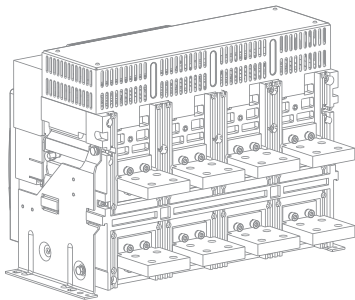
in/mm



## Installation Dimensions

**Fixed type**  
2000A/2500A  
Horizontal installation

in/mm





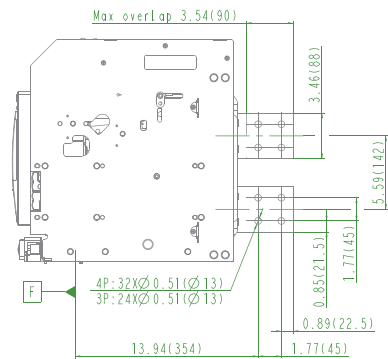
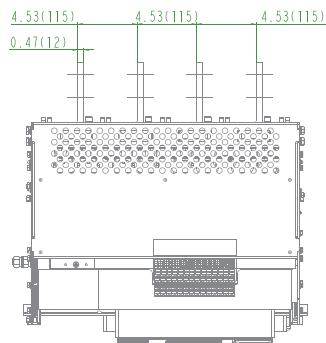
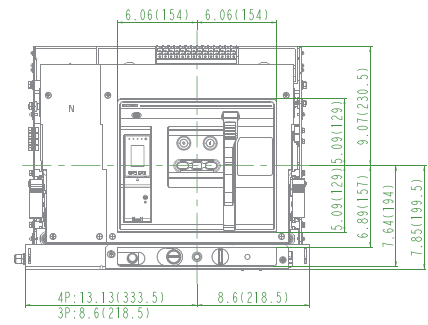
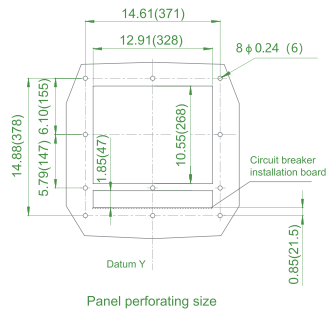
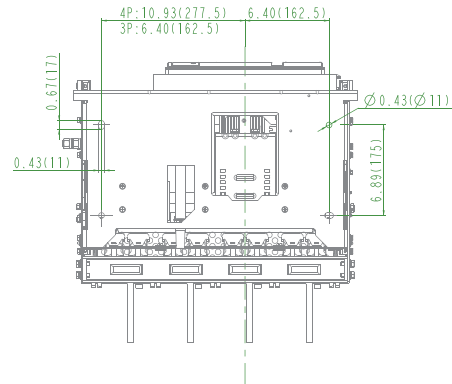
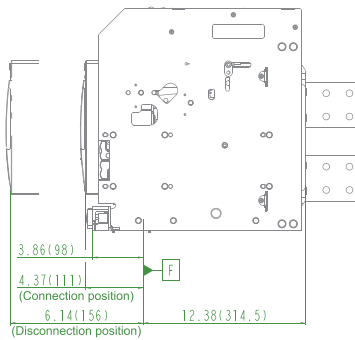
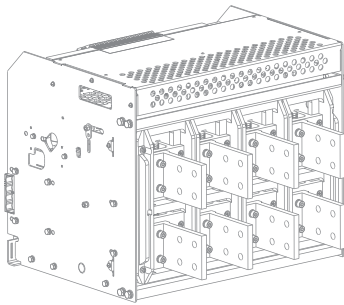
## Installation Dimensions

### Drawout type

800A/1600A

Vertical installation

in/mm



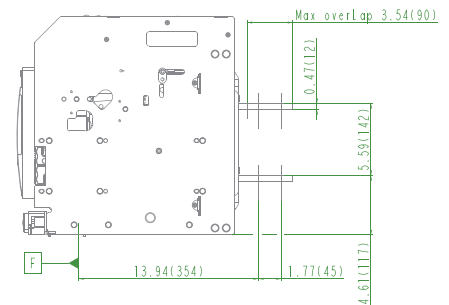
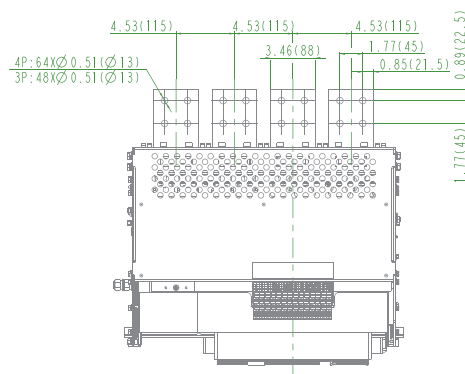
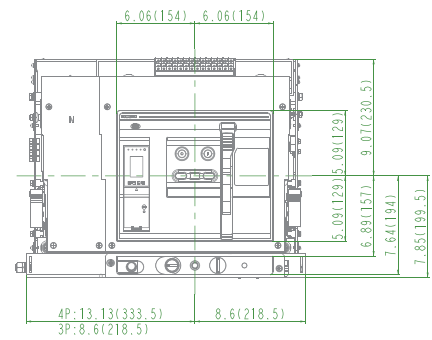
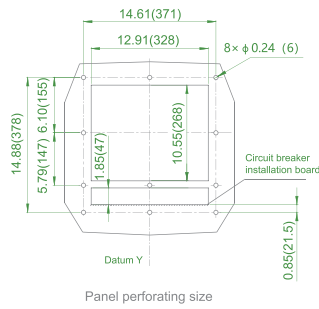
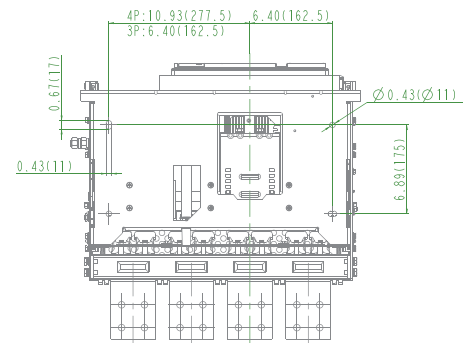
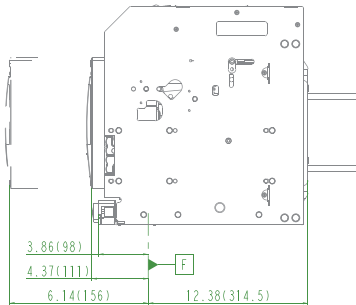
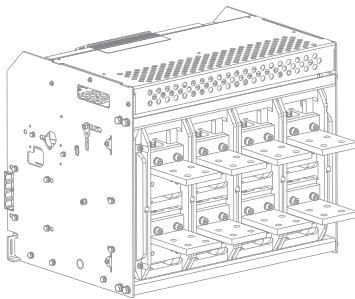
## Installation Dimensions

### Drawout type

800A/1600A

Horizontal installation

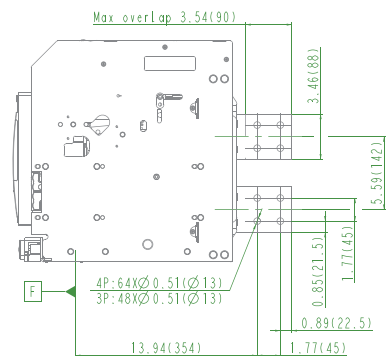
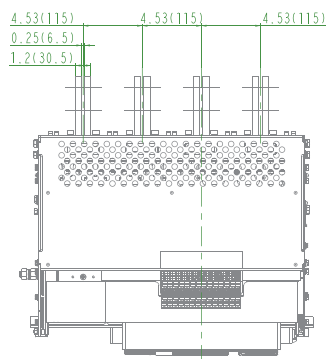
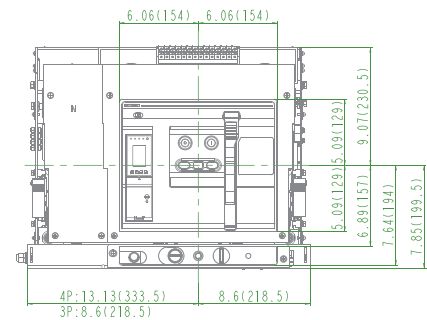
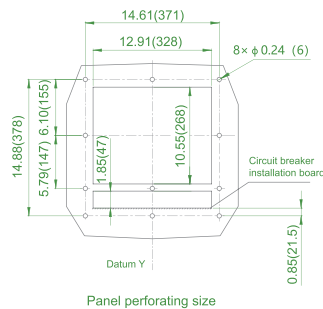
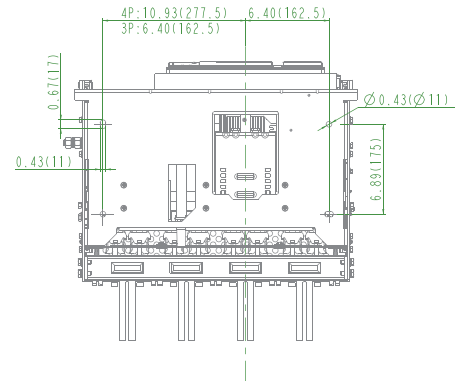
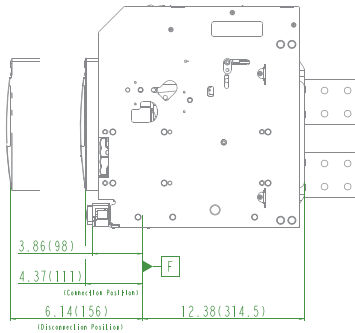
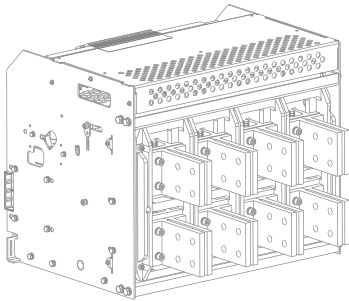
in/mm



## Installation Dimensions

**Drawout type**  
**2000A/2500A**  
Vertical installation

in/mm



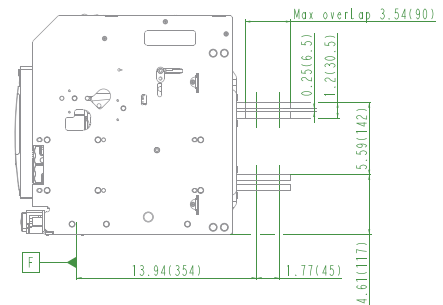
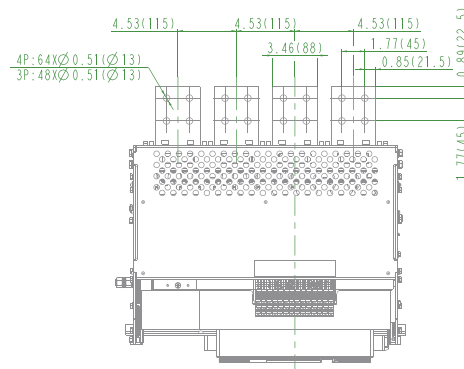
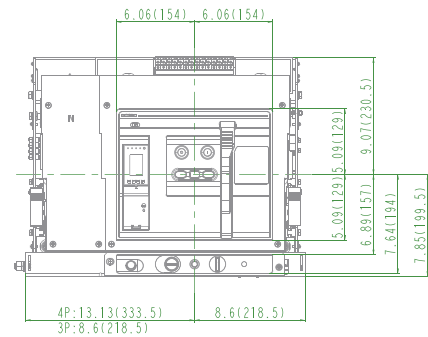
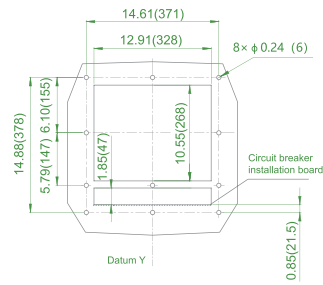
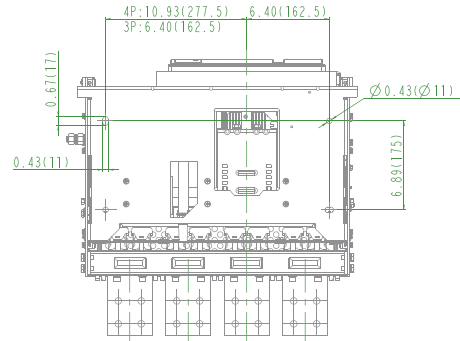
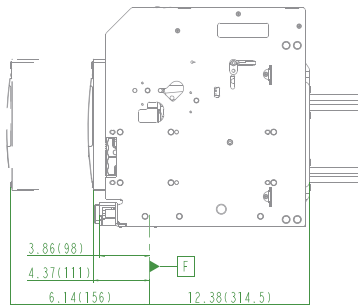
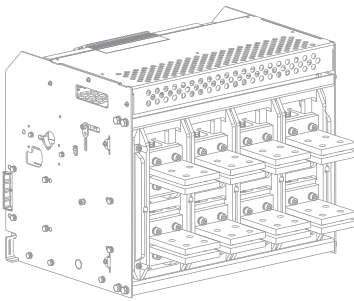
## Installation Dimensions

### Drawout type

### 2000A/2500A

Horizontal installation

in/mm



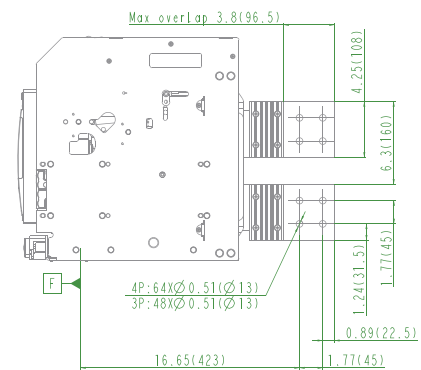
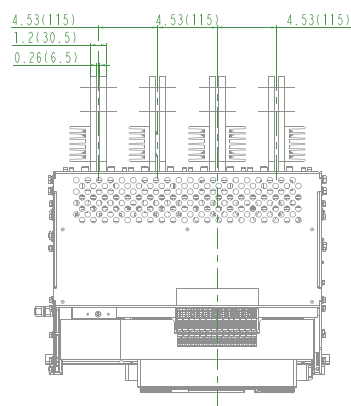
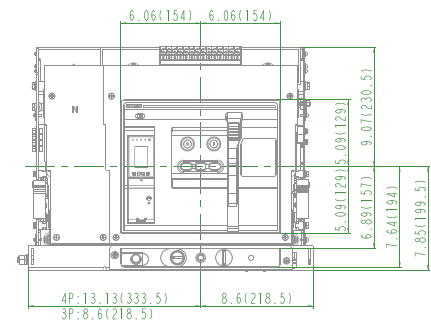
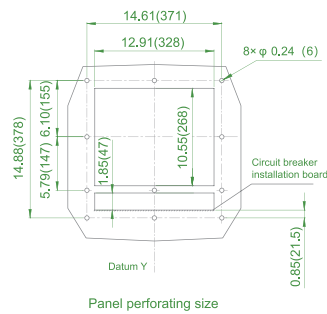
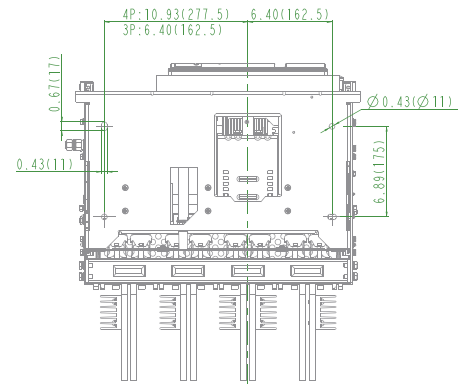
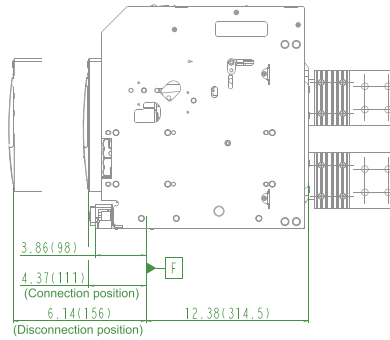
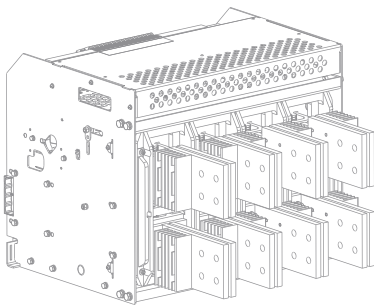
## Installation Dimensions

### Drawout type

3200A

Vertical installation

in/mm



# NOARK®



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