

Low Voltage

Masterpact NT and NW

UL 489 Listed
LV power circuit breakers
and automatic switches



Schneider
Electric

• WEB2 cat.2015



Over 75 % of Schneider Electric
manufactured products awarded
Green Premium eco-mark



Green Premium, stamping the most eco-friendly products of the industry



**Green
Premium™**
Product

With Green Premium, Schneider Electric commits to be transparent
disclosing extensive and reliable information on environmental impacts
of its products:

Green Premium is the only label
allowing you to develop effectively an
environmental policy and to promote it,
while preserving your business efficiency.

It guarantees compliance with the most
up-to-date environmental regulations,
but it is more than this.

With Green Premium eco-mark,
Schneider Electric helps you:

- Calculate the carbon footprint of
the solutions you offer
- Ensure full regulation compliance about
substances and chemical components
- Deliver all appropriate information
to certify eco-design of your solutions
- Easily manage products end of life,
while ensuring optimized recycling.

RoHS

Schneider Electric applies RoHS requirements to all its products and worldwide,
even for the numerous ones which are not in the scope of the regulation.
Compliance certificates are available for all products involved.

REACH

Schneider Electric applies REACH regulation worldwide, and releases all
information about presence of Substances of Very High-Concern (SVHC)
in its products.

PEP: Product Environmental Profile

For all its products, Schneider Electric publishes the most complete set of
environmental data, including carbon footprint and energy consumption for each
of the life cycle phases, in compliance with ISO 14025 PEPecopassport program.

EoLI: End of Life Instructions

Available at a click, these documents provide:

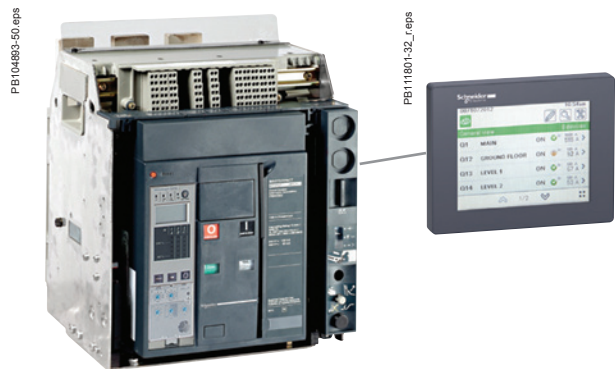
- Recyclability rates of the products
- Information to mitigate personnel hazards during dismantling and before
recycling operations
- Parts identification either for re-use, or for selective treatment to mitigate
environmental hazards, or incompatibility with usual recycling process.



Discover what we
mean by green
and

Check a product!

The original Masterpact has set a new standard for power circuit breakers around the world



The reliability offered by a major brand

Schneider Electric has forged a solid reputation in terms of quality and innovation, continuously integrating the latest technology in all its circuit breakers. Reliability, flexibility and simplicity have always been the top priority. Schneider Electric offers the widest range of products available on the market with frame sizes, accessories and performance characteristics meeting the requirements of all types of applications.

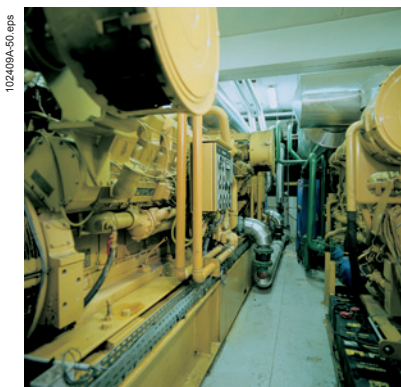


UL 489 Listing

UL 489 Listed products have been tested to ensure they meet a number of criteria related to specific properties, hazards and conditions of use.

UL Listing represents the most widely accepted certification by consumers, regulatory organisations and industry in the United States and Canada.

UL 489 Listed Masterpact



Three performance levels

N : for standard applications.
H : for heavy industry with high short-circuit levels.
L1 : for current-limiting capability.
Intended to raise the performance level of a switchboard when the transformer power rating is increased.



Integration in a communications network

Masterpact can be integrated in a general supervision system to optimise installation operation and maintenance. The communication architecture is open and may be upgraded for interfacing with any protocol.

Automatic switch versions (HF)

The automatic switches are derived directly from the circuit breakers and offer the same features and performance levels.
The HF version includes instantaneous protection to prevent closing on a short-circuit. When closed, the device is protected by an instantaneous override release.

3 frame sizes, 2 families

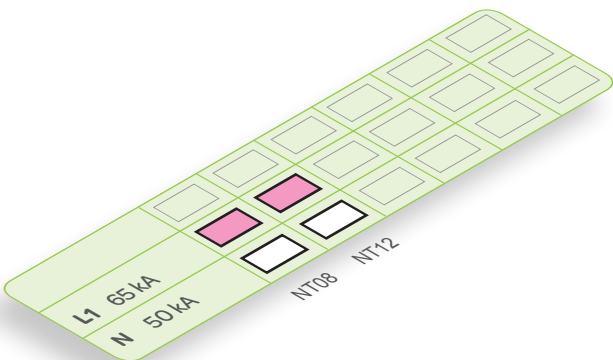


The range of power Masterpack circuit breakers includes two families:

- > Masterpack NT, the world's smallest true power circuit breaker, with ratings of 800 and 1200 A
- > Masterpack NW, in two frame sizes, one for 800 to 3000 A and the other for 4000 and 5000 A ratings.

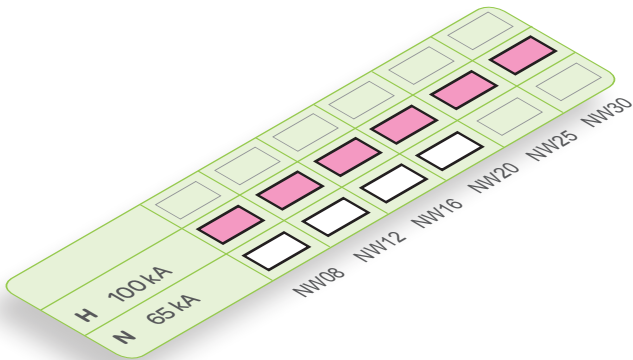
Masterpack NT 800 and 1200 A

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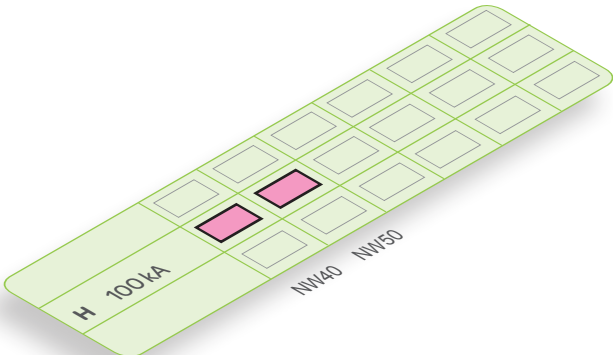
Masterpack NW 800 to 3000 A

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4000 and 5000 A

PB104896-47.eps



Optimised volumes



The smallest circuit breaker in the world

Masterpact NT innovates by offering all the performance of a power circuit breaker in an extremely small volume. The 70 mm pole pitch means a three-pole drawout circuit breaker can be installed in a switchboard section 400 mm wide and 400 mm deep.

Practical installation solutions

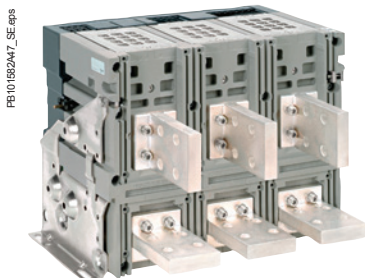
The Masterpact NW range further improves the installation solutions that have built the success of its predecessors. It has been designed to standardise switchboards, optimise volumes and simplify installation:

- > incoming connection to top or bottom terminals
- > no safety clearance required
- > connection:
 - horizontal or vertical rear connection
 - front connection with minimum extra space (NT only)
 - mixed front and rear connections
- > 115 mm pole pitch on all versions.

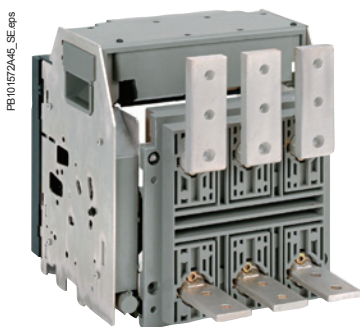
Optimised volumes

Up to 3000 A, Masterpact NW circuit breakers are all the same size, the same as the old M08 to 32 range.

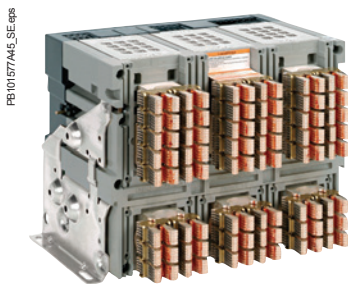
Ease of installation



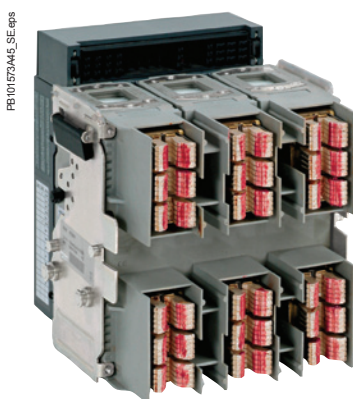
Vertical and horizontal rear connection of a fixed Masterpact NW.



Horizontal rear and front connection of a drawout Masterpact NT.



Clusters fixed on a Masterpact NW device.



Clusters fixed on a Masterpact NT device.

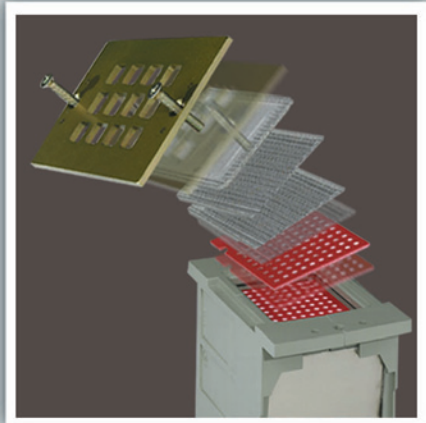
With optimised sizes, the Masterpact NT and NW ranges simplify the design of switchboards and standardise the installation of devices:

- > a single connection layout for Masterpact NT
- > three connection layouts for Masterpact NW:
 - one from 800 to 3000 A
 - one for 4000 A
 - one for 5000 A
- > identical connection terminals from 800 to 5000 A (Masterpact NW)
- > front connection in minimum space
- > rear connection to vertical or horizontal busbars simply by turning the connectors 90 °.
- > disconnecting contact clusters fixed on the device.

Innovation



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Filtered breaking.

Greater dependability... Filtered breaking

patented

The patented design of the arc chutes includes stainless-steel filters. The chutes absorb the energy released during breaking, thus limiting the stresses exerted on the installation. They filter and cool the gases produced, reducing effects perceptible from the outside.

More intelligent trip units...

Today, with the high speed of calculation, the small size of memories and advances in miniaturisation, trip units have become circuit breaker control units offering increasingly powerful functions. They accurately measure system parameters, instantly calculate values, store data, log events, signal alarms, communicate, take action, etc. The Masterpact ranges, equipped with Micrologic control units, constitute both an extremely reliable protective device and an accurate measurement instrument.

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Navigation buttons on a Micrologic P control unit.

User friendly... Intuitive use...

Micrologic control units are equipped with a digital LCD display used in conjunction with simple navigation buttons. Users can directly access parameters and settings. Navigation between screens is intuitive and the immediate display of values greatly simplifies settings. Text is displayed in the desired language.

... backed by incomparable security

patented

Protection functions are separate from the measurement functions and are managed by an ASIC electronic component. This independence guarantees immunity from conducted or radiated disturbances and ensures a high degree of reliability.

A patented "double setting" system for protection functions establishes:

- > a maximum threshold set using the control-unit dials
- > fine adjustments via the keypad or remotely. The fine adjustments for thresholds (to within one ampere) and tripping delays (to within a fraction of a second) are displayed directly on the screen.

The control unit cover can be lead-sealed to prevent uncontrolled access to the dials and protect the settings.

Designed for the future



Compliance with environmental requirements

Schneider Electric fully takes into account environmental requirements, starting right from the design phase of every product through to the end of its service life:

- > the materials used for Masterpact are not potentially dangerous to the environment
- > the production facilities are non-polluting in compliance with the ISO 14001 standard
- > filtered breaking eliminates pollution in the switchboard
- > the energy dissipated per pole is low, making energy losses insignificant
- > the materials are marked to facilitate sorting for recycling at the end of product service life.

Integration in a communication network

Masterpact can be integrated in a general supervision system to optimise installation operation and maintenance. The communication architecture is open, and may be upgraded for interfacing with any protocol.

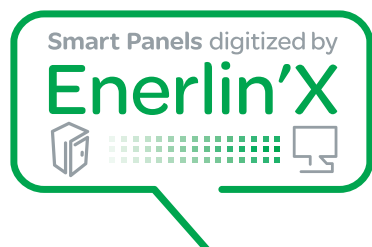
Simple extension and upgrading of installations

Installations evolve, power levels increase and new equipment is required. Masterpact is designed to adapt to these changes:

- > all control units are interchangeable
- > communication with a supervision system is an option that may be added at any time
- > a reserve chassis can be pre-addressed so that system parameters do not have to be modified when a drawout device is installed at a later date
- > any future changes to the products will be designed to ensure continuity with the current ranges, thus simplifying installation extensions and upgrades.

Energy management has never been simpler

Simple-to-install Smart Panels connect your building to real savings in 3 steps



1 Measure

Embedded and stand-alone metering & control capabilities

2 Connect

- > Integrated communication interfaces
- > Ready to connect to energy management platforms

3 Save

- > Data-driven energy efficiency actions
- > Real time monitoring and control
- > Access to energy and site information through on-line services



Smart Panels connect you to energy savings



1 MEASURE

"Smart Panels" mean visible information

Grouping most of the electrical protection, command and metering components, the switchboards are now significant sources of data locally displayed and sent via communication networks.

2 CONNECT

... and ready to be linked to expertise

Smart Panels use reliable, simple to install and use displays, and Ethernet and Modbus interfaces on the Enerlin'X communication system.

Information is safely transmitted through the most efficient networks:

- Modbus SL inside switchboards, between components
- Ethernet, on cable or WiFi, inside the building and connecting switchboards, computers,
- Ethernet on DSL or GPRS, for access to on-line services by Schneider Electric.

Energy experts, wherever they are, are now able to provide advises based on permanently updated data of the building.

3 SAVE



On-site real time monitoring and control

On a touch screen display connected to Ethernet

- shows essential electrical information and alarms concerning the electrical network,
- allows control (open, close, reset...) of various equipments.

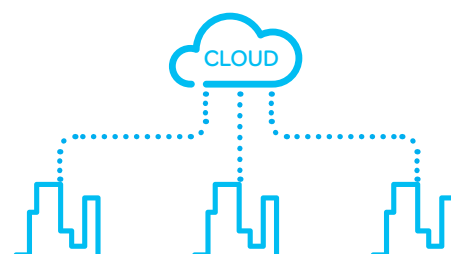
This touch screen is well appreciated for real time value checking and control, directly on the front panel of the main switchboard.

On a PC display with common browser

- shows monitoring web pages hosted into the local Ethernet interface,
- alarm events generate automatic email notifications,
- allows control (open, close, reset...) of various equipments.

Data displayed on graphics or recorded into files are of a great interest for optimizing the use of energy in the building.

As an example, they definitely help validating the change of temperature settings, time scheduling in a Building Management System or other automated devices.



On-line Energy Management services

StruXureWare Energy Operation

automates data collection via an open, scalable, and secure energy management information system.

With the help of the Schneider Electric energy management services team, data is then turned into actionable information to enable customers to understand their facilities' performance on an ongoing basis.

Energy Operation leverages companies' current investments in their existing systems, and can be used to communicate advanced results and performance to a broad audience for a shared understanding throughout an organization.





Presentation

2



Functions and characteristics

A-1



Installation recommendations

B-1



Dimensions and connections

C-1



Electrical diagrams

D-1



Additional characteristics

E-1



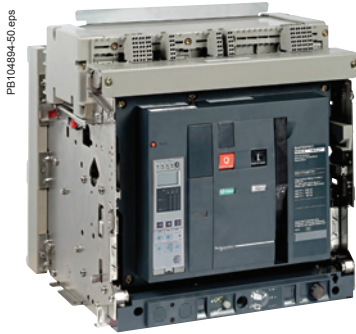
Catalogue numbers

F-1

This chapter describes all the functions offered by Masterpact NT and NW devices. The two product families have identical functions implemented using the same or different components depending on the case.

Circuit breakers and automatic switches

> page A-2



- Ratings:
 - Masterpact NT 800 and 1200 A
 - Masterpact NW 800 to 5000 A
- Circuit breakers type N, H, L1
- Automatic switches type HF
- 3 or 4 poles
- Fixed or drawout versions
- option with neutral on the right (NW only).

Micrologic control units

> page A-8



Ammeter A

- 3.0 A basic protection
- 5.0 A selective protection
- 6.0 A selective + ground-fault protection

Ammeter E

- 2.0 A basic protection
- 5.0 A selective protection
- 6.0 A selective + ground-fault protection

Power meter P

- 5.0 P selective protection
- 6.0 P selective + ground-fault protection

Harmonic meter H

- 5.0 H selective protection
- 6.0 H selective + ground-fault protection
- External sensor for ground-fault protection
- Setting options (long-time rating plug)
- External power-supply module
- Battery module.

Power meter

> page A-20

Masterpact equipped with Micrologic 2/5/6 trip units offer type A (emmeter) or E (energy) metering functions as well as communication. Using Micrologic sensors and intelligence, Compact NSX provides access to measurements of all the main electrical parameters on the built-in screen, on a dedicated FDM121 display unit or via the communication system.

Operating assistance

> page A-23

Integration of measurement functions provides operators with operating assistance functions including alarms tripped by user-selected measurement values, time-stramped event tables and histories, and maintenance indicators.

Switchboard display unit

> page A-24

The main measurement can be read on the built-in screen of Micrologic 2/5/6 trips units. They can also be displayed on the FDM121 switchboard display unit along with pop-up windows signalling the main alarms.

Communication

> page A-32

- COM option in Masterpact.
- Masterpact in a communication network.
- IFM: Modbus interface module.
- IFE: Ethernet interface module.
- I/O application module.
- Electrical Asset Manager.



PB100810-32.eps



PB100813-32.eps



PB100807-20.eps



PB100820-32.eps



Locking

> page A-51

- Pushbutton locking by padlockable transparent cover
- OFF-position locking by padlock or keylock
- Chassis locking in disconnected position by keylock
- Chassis locking in connected, disconnected and test positions
- Door interlock (inhibits door opening with breaker in connected position)
- Racking interlock (inhibits racking with door open)
- Racking interlock between crank and OFF pushbutton
- Automatic spring discharge before breaker removal
- Mismatch protection.

Indication contacts

> page A-53

- Standard or low-level contacts:
 - ON/OFF indication (OF)
 - "fault trip" indication (SDE)
 - carriage switches for connected (CE) disconnected (CD) and test (CT) positions
- Programmable contacts:
 - 2 contacts (M2C)
 - 6 contacts (M6C).

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PB100809-16.eps



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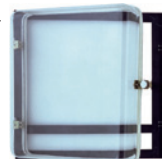


Remote operation

> page A-55

- Remote ON/OFF:
 - gear motor
 - XF closing or MX opening voltage releases
 - PF ready-to-close contact
 - options:
 - Res electrical remote reset
 - BPFE electrical closing pushbutton
- Remote tripping function:
 - MN voltage release:
 - standard
 - adjustable or non-adjustable delay
 - or second MX voltage release.

PB100776-42.eps



PB104323-32.eps



Accessories

> page A-59

- Auxiliary terminal shield
- Operation counter
- Escutcheon
- Transparent cover for escutcheon
- Escutcheon blanking plate.



Presentation

2

Circuit breakers and automatic switches

Masterpact NT08 and NT12 selection and installation A-2

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Circuit breaker and automatic switch characteristics

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Micrologic E "energy" A-12

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and COM Ethernet gateway A-20**Operating-assistance functions**

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Micrologic E trip unit with COM option (ULP) A-24

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Circuit breakers and automatic switches

Masterpact NT08 and NT12 selection and installation

Masterpact NT selection criteria

	Masterpact NT	
	Standard applications NT08 and NT12	
	N	L1
Type of application	Standard applications with low short-circuit currents	Limiting circuit breaker for protection of cable-type feeders or upgraded transformer ratings
Interrupting current (kA rms) at 480 V AC	50 kA	65 kA
Position of neutral	Left	Left
Fixed	F	F
Drawout	D	D
Automatic switch version	Yes	No
Front connection	Yes	Yes
Rear connection	Yes	Yes
Type of Micrologic control unit	A, E, P, H	A, E, P, H

Masterpact NT08 to NT12 installation characteristics

Circuit breaker		NT08/NT12		
Type		N	L1	HF
Connection				
Drawout	FC	■	■	■
	RC	■	■	■
Fixed	FC	■	■	■
	RC	■	■	■
Dimensions (mm) H x W x D				
Drawout	3P	322 x 288 x 277	322 x 288 x 277	322 x 288 x 277
	4P	322 x 358 x 277	-	322 x 358 x 277
Fixed	3P	301 x 276 x 196	301 x 276 x 196	301 x 276 x 196
	4P	301 x 346 x 196	-	301 x 346 x 196
Weight (kg) (approximate)				
Drawout	3P/4P	30/39	30	30/39
Fixed	3P/4P	14/18	14	14/18



Masterpact NW08 to NW50 selection and installation

Masterpact NW selection criteria

	Masterpact NW	
	Standard applications	
	NW08-NW20 N	NW08-NW50 H
Type of application	Standard applications with medium-level short-circuit currents	High-performance circuit breaker for heavy industry with high short-circuit currents
Interrupting current (kA rms) at 480 V AC	65 kA	100 kA
Position of neutral	Left or right	Left or right
Fixed	F	F
Drawout	D	D
Automatic switch version	No	Yes
Front connection	No	No
Rear connection	Yes	Yes
Type of Micrologic control unit	A, E, P, H	A, E, P, H

Masterpact NW08 to NW50 installation characteristics

Disjoncteurs		NW08/NW12/NW16/NW20	NW25/NW30	NW40/NW50
Type		N/H/HF	H/HF	H/HF
Connection				
Drawout	FC	-	-	-
	RC	■	■	■
Fixed	FC	-	-	-
	RC	■	■	■
Dimensions (mm) H x W x D				
Drawout	3P	439 x 441 x 395		479 x 786 x 395
	4P	439 x 556 x 395		479 x 1016 x 395
Fixed	3P	352 x 422 x 297		352 x 767 x 297
	4P	352 x 537 x 297		352 x 997 x 297
Weight (kg) (approximate)				
Drawout	3P/4P	90/120		225/300
Fixed	3P/4P	60/80		120/160



Circuit breaker and automatic switch characteristics

Masterpact NT08 and NT12

PB104893-30 eps



UL 489 Listed circuit breaker characteristics

Rating (A)		
Type of circuit breaker		
Interrupting current (kA rms)		240 V AC, 50/60 Hz
		480 V AC, 50/60 Hz
		600 V AC, 50/60 Hz
Number of poles		
Rated short-time withstand current (kA rms)	Icw	0.5 s
Integrated instantaneous protection (kA rms $\pm 10\%$)		
Close and latch rating (kA rms) V AC 50/60 Hz		
Breaking time (ms)		
Closing time (ms)		

Sensor selection

Sensor rating (A)
Ir threshold setting (A)

UL 489 Listed automatic switch characteristics

Type of automatic switch		
Rated short-time withstand current (kA rms)		220 V AC, 50/60 Hz
		480 V AC, 50/60 Hz
		600 V AC, 50/60 Hz
Number of poles		
Integrated instantaneous protection (kA rms)		

Mechanical and electrical endurance

Endurance rating (C/O cycles x 1000)	mechanical	without maintenance
	electrical	without maintenance

Shipping weights

Number of poles		
Circuit breaker (lb/kg)		
Chassis (lb/kg)		
Connector (lb/kg)		FC
		RC
Pallet (lb/kg)		
Total weight (lb/kg)		
		FC
		RC



NT08		NT12	
800		1200	
N	L1	N	L1
50	100	50	100
50	65	50	65
35	-	35	-
3	3	3	3
35	10	35	10
40	10	40	10
25	10	25	10
25 to 30		25 to 30	
< 50		< 50	

NT08		NT12	
800		1200	
320 to 800		500 to 1200	

NT08		NT12	
HF		HF	
65		65	
50		50	
50		50	
3/4		3/4	
40		40	

NT08/NT12	
12.5	
2.8	

NT08/NT12	
3P	4P
40/18	52/24
36/16	43/20
15/7	20/9
6/3	8/4
10/5	10/5
101/46	125/57
92/42	113/51



Circuit breaker and automatic switch characteristics

Masterpact NW08 to NW50

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UL 489 Listed circuit breaker characteristics

Rating (A)

Type of circuit breaker

Interrupting current (kA rms)		240 V AC 50/60 Hz
		480 V AC 50/60 Hz
		600 V AC 50/60 Hz

Number of poles

Rated short-time withstand current (kA rms)	Icw	1 s
---	-----	-----

Integrated instantaneous protection (kA rms $\pm 10\%$)

Close and latch rating (kA rms) V AC 50/60 Hz

Breaking time (ms)

Closing time (ms)

Sensor selection

Sensor rating (A)

Ir threshold setting (A)

UL 489 Listed automatic switch characteristics

Type of automatic switch

Rated short-time withstand current (kA rms)		240 V AC 50/60 Hz
		480 V AC 50/60 Hz
		600 V AC 50/60 Hz

Number of poles

Integrated instantaneous protection (kA rms)

Mechanical and electrical endurance

Endurance rating (C/O cycles x 1000)	mechanical	with maintenance
		without maintenance
	electrical	without maintenance

Shipping weights

Number of poles

Circuit breaker (lb/kg)

Chassis (lb/kg)

RC connector (lb/kg)

Pallet (lb/kg)

Total weight (lb/kg)



	NW08	NW12	NW16	NW20	NW25	NW30	NW40	NW50
	800	1200	1600	2000	2500	3000	4000	5000
	N	H			H		H	
	65	100			100		100	
	65	100			100		100	
	50	85			85		85	
	3/4	3/4			3/4		3/4	
	42	65			65		85	
	40	40			65		75	
	40	40			40		40	
	25 to 30	25 to 30			25 to 30		25 to 30	
	< 70	< 70			< 70		< 70	

	NW08	NW12	NW16	NW20	NW25	NW30	NW40	NW50
	800	1200	1600	2000	2500	3000	4000	5000
	320 to 800	500 to 1200	630 to 1600	800 to 2000	1000 to 2500	1250 to 3000	1600 to 4000	2000 to 5000

	NW08/NW12/NW16/NW20				NW25/NW30		NW40/NW50	
	HF				HF		HF	
	100				100		100	
	100				100		100	
	85				85		85	
	3/4				3/4		3/4	
	40				65		75	

	NW08/NW12/NW16			NW20	NW25/NW30		NW40/NW50	
	25			20	20		10	
	12.5			12.5	10		5	
	2.8			2.8	1		1	

	NW08/NW12/NW16/NW20				NW25/NW30		NW40/NW50	
	3P	4P			3P	4P	3P	4P
	109/50	142/65			127/58	165/75	227/103	295/134
	97/44	116/53			124/57	149/68	278/126	334/152
	17/8	22/10			26/12	34/15	52/24	68/31
	17/8	17/8			17/8	17/8	39/18	39/18
	240/109	288/130			294/134	356/161	596/271	736/333



All Masterpact circuit breakers are equipped with a Micrologic control unit that can be changed on site. Control units are designed to protect power circuits and loads. Alarms may be programmed for remote indications. Measurements of current, voltage, frequency, power and power quality optimise continuity of service and energy management.

Dependability

Integration of protection functions in an ASIC electronic component used in all Micrologic control units guarantees a high degree of reliability and immunity to conducted or radiated disturbances.

On Micrologic A, E, P and H control units, advanced functions are managed by an independent microprocessor.

Accessories

Certain functions require the Micrologic control unit to be combined with accessories. They are described on [page A-28](#).

The rules governing the various possible combinations can be found in the documentation accessible via the products and service menu of the "www.schneider-electric.com" web site.

Micrologic name codes



X: type of protection

- 2 for basic protection ⁽¹⁾
- 3 for basic protection ⁽²⁾
- 5 for selective protection
- 6 for selective + ground-fault protection.

Y: control-unit generation

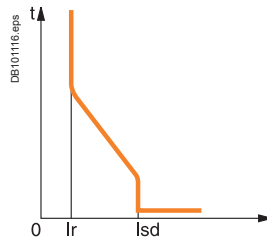
Identification of the control-unit generation. "0" signifies the first generation.

Z: type of measurement

- A for "ammeter"
- E for "energy"
- P for "power meter"
- H for "harmonic meter".

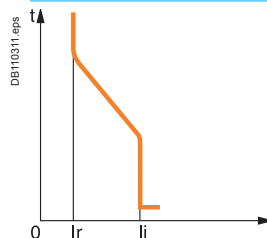
Current protection

Micrologic 2: basic protection ⁽¹⁾



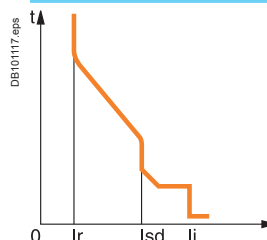
Protection:
long time
+ instantaneous

Micrologic 3: basic protection ⁽²⁾



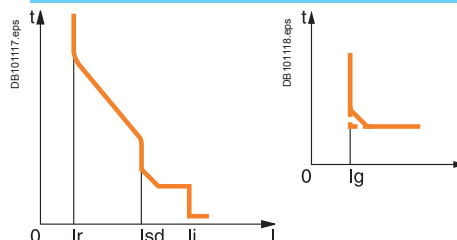
Protection:
long time
+ instantaneous

Micrologic 5: basic protection



Protection:
long time
+ short time
+ instantaneous

Micrologic 6: selective + ground-fault protection



Protection:
long time
+ short time
+ instantaneous
+ ground-fault



⁽¹⁾ Only for Micrologic E.
⁽²⁾ Only for Micrologic A.



Measurements and programmable protection

A: ammeter

- I_1 , I_2 , I_3 , I_N , $I_{\text{ground-fault}}$ and maximeter for these measurements
- Fault indications
- Settings in amperes and in seconds.

E: Energy

- Incorporates all the rms measurements of Micrologic A, plus voltage, power factor, power and energy metering measurements.
- Calculates the current demand value.
- "Quickview" function for the automatic cyclical display of the most useful values (as standard or by selection).

P: A + power meter + programmable protection

- Measurements of V, A, W, VAR, VA, Wh, VARh, VAh, Hz, V_{peak} , A_{peak} , power factor and maximeters and minimeters
- IDMTL long-time protection, minimum and maximum voltage and frequency, voltage and current imbalance, phase sequence, reverse power
- Load shedding and reconnection depending on power or current
- Measurements of interrupted currents, differentiated fault indications, maintenance indications, event histories and time-stamping, etc.

H: P + harmonics

- Power quality: fundamentals, distortion, amplitude and phase of harmonics up to the 31st order
- Waveform capture after fault, alarm or on request
- Enhanced alarm programming: thresholds and actions.

2.0 E



3.0 A



5.0 A



5.0 E



5.0 P



5.0 H



6.0 A



6.0 E



6.0 P

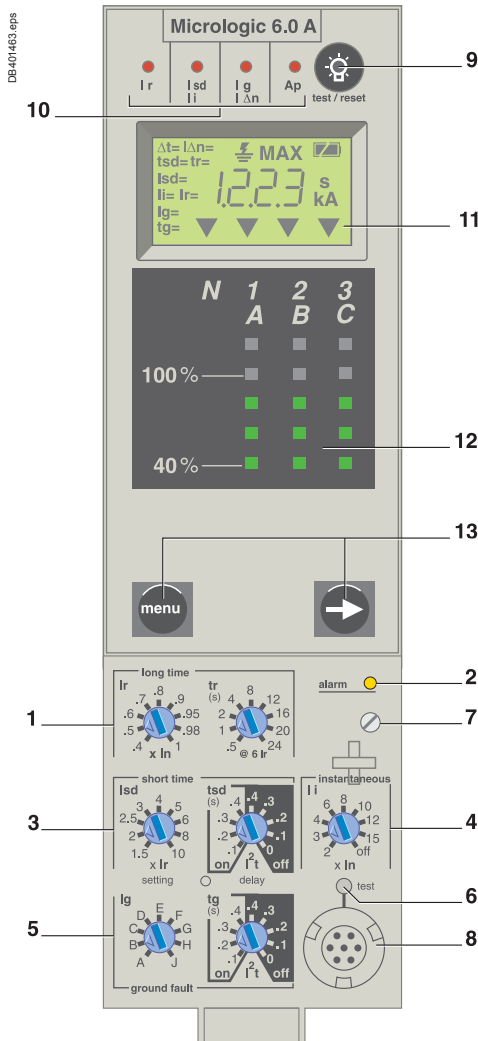


6.0 H





Micrologic A control units protect power circuits. They also offer measurements, display, communication and current maximeters. Version 6 provides earth-fault protection.



- 1 long-time threshold and tripping delay
- 2 overload alarm (LED) at 1,125 Ir
- 3 short-time pick-up and tripping delay
- 4 instantaneous pick-up
- 5 earth-fault pick-up and tripping delay
- 6 earth-fault test button
- 7 long-time rating plug screw
- 8 test connector
- 9 lamp test, reset and battery test
- 10 indication of tripping cause
- 11 digital display
- 12 three-phase bargraph and ammeter
- 13 navigation buttons

"Ammeter" measurements

Micrologic A control units measure the true (rms) value of currents. They provide continuous current measurements from 0.2 to 1.2 In and are accurate to within 1.5 % (including the sensors). A digital LCD screen continuously displays the most heavily loaded phase (Imax) or displays the I₁, I₂, I₃, I_N, I_g, I_{Δn}, stored-current (maximeter) and setting values by successively pressing the navigation button. The optional external power supply makes it possible to display currents < 20 % In. Below 0.1 In, measurements are not significant. Between 0.1 and 0.2 In, accuracy changes linearly from 4 % to 1.5 %.

Communication option

In conjunction with the COM communication option, the control unit transmits the following:

- settings
- all "ammeter" measurements
- tripping causes
- maximeter readings.

Protection

Protection thresholds and delays are set using the adjustment dials.

Overload protection

True rms long-time protection.
Thermal memory: thermal image before and after tripping.
Setting accuracy may be enhanced by limiting the setting range using a different long-time rating plug.
Overload protection can be cancelled using a specific LT rating plug "Off".

Short-circuit protection

Short-time (rms) and instantaneous protection.
Selection of I²t type (ON or OFF) for short-time delay.

Earth-fault protection

Residual or source ground return earth fault protection.
Selection of I²t type (ON or OFF) for delay.

Neutral protection

On three-pole circuit breakers, neutral protection is not possible.
On four-pole circuit breakers, neutral protection may be set using a three-position switch: neutral unprotected (4P 3d), neutral protection at 0.5 Ir (4P 3d + N/2), neutral protection at Ir (4P 4d).

Zone selective interlocking (ZSI)

A ZSI terminal block may be used to interconnect a number of control units to provide total discrimination for short-time and earth-fault protection, without a delay before tripping.

Overload alarm

A yellow alarm LED goes on when the current exceeds the long-time trip threshold.

Fault indications

LEDs indicate the type of fault:

- overload (long-time protection Ir)
- short-circuit (short-time Isd or instantaneous Ii protection)
- earth fault (Ig)
- internal fault (Ap).

Battery power

The fault indication LEDs remain on until the test/reset button is pressed. Under normal operating conditions, the battery supplying the LEDs has a service life of approximately 10 years.

Test

A mini test kit or a portable test kit may be connected to the test connector on the front to check circuit-breaker operation. For Micrologic 6.0 A control units, the operation of earth-fault protection can be checked by pressing the test button located above the test connector.

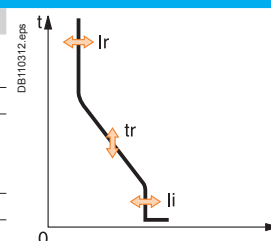
Note: Micrologic A control units come with a transparent lead-seal cover as standard.



Protection

Micrologic 3.0 A

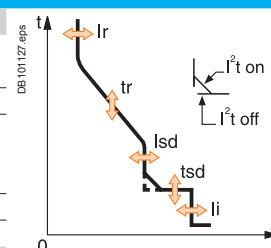
Long time											
Current setting (A)		$I_r = I_n \times \dots$	0.4	0.45	0.5	0.6	0.63	0.7	0.8	0.9	1
Tripping between 1.05 and 1.20 x I_r			Other ranges or disable by changing long-time rating plug								
Time setting		tr (s)	0.5	1	2	4	8	12	16	20	24
Time delay (s)	Accuracy: 0 to -30 %	$1.5 \times I_r$	12.5	25	50	100	200	300	400	500	600
	Accuracy: 0 to -20 %	$6 \times I_r$	0.7 ⁽¹⁾	1	2	4	8	12	16	20	24
	Accuracy: 0 to -20 %	$7.2 \times I_r$	0.7 ⁽²⁾	0.69	1.38	2.7	5.5	8.3	11	13.8	16.6
Thermal memory			20 minutes before and after tripping								
(1) 0 to -40 % - (2) 0 to -60 %											
Instantaneous											
Pick-up (A)		$I_i = I_n \times \dots$	1.5	2	3	4	5	6	8	10	12
Accuracy: ± 10 %											
Time delay			Max resettable time: 20 ms Max break time: 80 ms								



Protection

Micrologic 5.0 A / 6.0 A

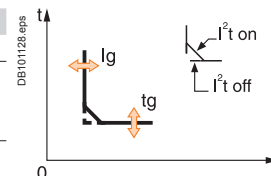
Long time			0.4	0.5	0.6	0.7	0.8	0.9	0.95	0.98	1
Current setting (A)	$I_r = I_n \times \dots$										
Tripping between 1.05 and 1.20 x I_r			Other ranges or disable by changing long-time rating plug								
Time setting		tr (s)	0.5	1	2	4	8	12	16	20	24
Time delay (s)	Accuracy: 0 to -30 %	1.5 x I_r	12.5	25	50	100	200	300	400	500	600
	Accuracy: 0 to -20 %	6 x I_r	0.7 ⁽¹⁾	1	2	4	8	12	16	20	24
	Accuracy: 0 to -20 %	7.2 x I_r	0.7 ⁽²⁾	0.69	1.38	2.7	5.5	8.3	11	13.8	16.6
Thermal memory		20 minutes before and after tripping									
(1) 0 to -40 % - (2) 0 to -60 %											
Short time			1.5	2	2.5	3	4	5	6	8	10
Pick-up (A)	$I_{sd} = I_r \times \dots$										
Accuracy: ± 10 %											
Time setting tsd (s)	Settings	I^2t Off	0	0.1	0.2	0.3	0.4				
		I^2t On	-	0.1	0.2	0.3	0.4				
Time delay (ms) at 10 x I_r (I^2t Off or I^2t On)	tsd (max resettable time)		20	80	140	230	350				
	tsd (max break time)		80	140	200	320	500				
Instantaneous			2	3	4	6	8	10	12	15	off
Pick-up (A)	$I_i = I_n \times \dots$										
Accuracy: ± 10 %											
Time delay		Max resettable time: 20 ms Max break time: 50 ms									



Ground-fault

Micrologic 6.0 A

Pick-up (A)			A	B	C	D	E	F	G	H	J
Accuracy: ± 10 %	$I_g = I_n \times \dots$										
	$I_n \leq 400$ A		0.3	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1
	$400 \text{ A} < I_n < 1250$ A		0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1
Time setting tg (s)	$I_n \geq 1250$ A		500	640	720	800	880	960	1040	1120	1200
	Settings	I^2t Off	0	0.1	0.2	0.3	0.4				
		I^2t On	-	0.1	0.2	0.3	0.4				
Time delay (ms)	tg (max resettable time)		20	80	140	230	350				
	at I_n or 1200 A (I^2t Off or I^2t On)	tg (max break time)	80	140	200	320	500				



Ammeter

Micrologic 3.0 / 5.0 / 6.0 / 7.0 A

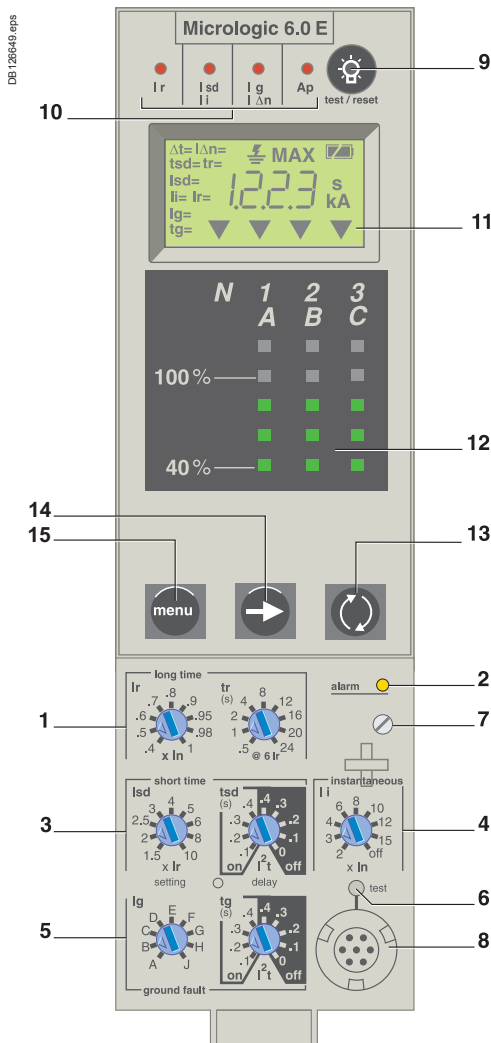
Type of measurements		Range	Accuracy
Instantaneous currents	I_1, I_2, I_3, I_N	$0.2 \times I_n$ to $1.2 \times I_n$	± 1.5 %
	I_g (6.0 A)	$0.2 \times I_n$ to I_n	± 10 %
	$I_{\Delta n}$ (7.0 A)	0 to 30 A	± 1.5 %
Current maximizers of	I_1, I_2, I_3, I_N	$0.2 \times I_n$ to $1.2 \times I_n$	± 1.5 %

Note: all current-based protection functions require no auxiliary source.

The test / reset button resets maximizers, clears the tripping indication and tests the battery.



Micrologic E control units protect power circuits. They also offer measurements, display, communication and current maximeters. Version 6 provides earth-fault protection.



- 1 long-time threshold and tripping delay
- 2 overload alarm (LED) at 1,125 Ir
- 3 short-time pick-up and tripping delay
- 4 instantaneous pick-up
- 5 earth-fault pick-up and tripping delay
- 6 earth-fault test button
- 7 long-time rating plug screw
- 8 test connector
- 9 lamp test, reset and battery test
- 10 indication of tripping cause
- 11 digital display
- 12 three-phase bargraph and ammeter
- 13 navigation button "quick View" (only with Micrologic E)
- 14 navigation button to view menu contents
- 15 navigation button to change menu

(1) Display on FDM121 only.

Note: Micrologic E control units come with a transparent lead-seal cover as standard.

"Energy meter" measurements

In addition to the ammeter measurements of Micrologic A

Micrologic E control units measure and display:

- current demand
- voltages: phase to phase, phase to neutral, average⁽¹⁾ and unbalanced⁽¹⁾
- instantaneous power: P, Q, S
- power factor: PF
- power demand: P demand
- energy: Ep, Eq⁽¹⁾, Es⁽¹⁾.

Accuracy of active energy Ep is 2 % (including the sensors). The range of measurement is the same as current with Micrologic A, depending of an external power supply module (24 V DC).

Communication option

In conjunction with the COM communication option, the control unit transmits the following:

- settings
- all "ammeter" and "energy" measurements
- enable connection to FDM121
- tripping causes
- maximeter / minimeter readings.

Protection

Protection thresholds and delays are set using the adjustment dials.

Overload protection

True rms long-time protection.

Thermal memory: thermal image before and after tripping.

Setting accuracy may be enhanced by limiting the setting range using a different long-time rating plug. Overload protection can be cancelled using a specific LT rating plug "Off".

Short-circuit protection

Short-time (rms) and instantaneous protection.

Selection of I²t type (ON or OFF) for short-time delay.

Earth-fault protection

Source ground return earth fault protection.

Selection of I²t type (ON or OFF) for delay.

Neutral protection

On three-pole circuit breakers, neutral protection is not possible.

On four-pole circuit breakers, neutral protection may be set using a three-position switch: neutral unprotected (4P 3d), neutral protection at 0.5 Ir (4P 3d + N/2), neutral protection at Ir (4P 4d).

Zone selective interlocking (ZSI)

A ZSI terminal block may be used to interconnect a number of control units to provide total discrimination for short-time and earth-fault protection, without a delay before tripping.

Overload alarm

A yellow alarm LED goes on when the current exceeds the long-time trip threshold.

M2C programmable contacts

The M2C (two contacts) programmable contacts may be used to signal events (Ir, Isd, Alarm Ir, Alarm Ig, Ig). They can be programmed using the keypad on the Micrologic E control unit or remotely using the COM option (BCM ULP).

Fault indications

LEDs indicate the type of fault:

- overload (long-time protection Ir)
- short-circuit (short-time Isd or instantaneous Ii protection)
- earth fault (Ig)
- internal fault (Ap).

Trip history

The trip history displays the list of the last 10 trips. For each trip, the following indications are recorded and displayed:

- the tripping cause: Ir, Isd, Ii or Auto-protection (Ap) trips
- the date and time of the trip (requires communication option).

Battery power

The fault indication LEDs remain on until the test/reset button is pressed. Under normal operating conditions, the battery supplying the LEDs has a service life of approximately 10 years.

Test

A mini test kit or a portable test kit may be connected to the test connector on the front to check circuit-breaker operation. For Micrologic 6.0 E control units, the operation of earth-fault protection can be checked by pressing the test button located above the test connector.

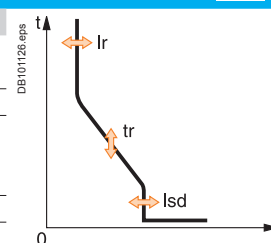


Protection

Micrologic 2.0 E



Long time											
Current setting (A)	$I_r = I_n \times \dots$	0.4	0.45	0.5	0.6	0.63	0.7	0.8	0.9	1	
Tripping between 1.05 and 1.20 x I_r		Other ranges or disable by changing long-time rating plug									
Time setting	t_r (s)	0.5	1	2	4	8	12	16	20	24	
Time delay (s)	Accuracy: 0 to -30 %	1.5 x I_r	12.5	25	50	100	200	300	400	500	600
	Accuracy: 0 to -20 %	6 x I_r	0.7 ⁽¹⁾	1	2	4	8	12	16	20	24
	Accuracy: 0 to -20 %	7.2 x I_r	0.7 ⁽²⁾	0.69	1.38	2.7	5.5	8.3	11	13.8	16.6
Thermal memory		20 minutes before and after tripping									
(1) 0 to -40 % - (2) 0 to -60 %											
Instantaneous											
Pick-up (A)	$I_{sd} = I_r \times \dots$	1.5	2	2.5	3	4	5	6	8	10	
Accuracy: ± 10 %											
Time delay		Max resettable time: 20 ms Max break time: 80 ms									

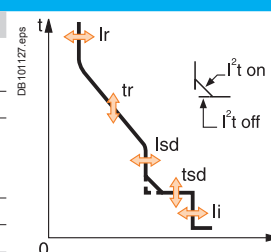


Protection

Micrologic 5.0 / 6.0 E



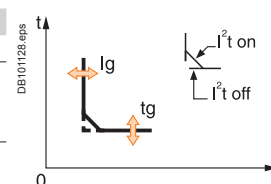
Long time		Micrologic 5.0 / 6.0 E									
Current setting (A)	$I_r = I_n \times \dots$	0.4	0.5	0.6	0.7	0.8	0.9	0.95	0.98	1	
Tripping between 1.05 and 1.20 x I_r		Other ranges or disable by changing long-time rating plug									
Time setting	t_r (s)	0.5	1	2	4	8	12	16	20	24	
Time delay (s)	Accuracy: 0 to -30 %	1.5 x I_r	12.5	25	50	100	200	300	400	500	600
	Accuracy: 0 to -20 %	6 x I_r	0.7 ⁽¹⁾	1	2	4	8	12	16	20	24
	Accuracy: 0 to -20 %	7.2 x I_r	0.7 ⁽²⁾	0.69	1.38	2.7	5.5	8.3	11	13.8	16.6
Thermal memory		20 minutes before and after tripping									
(1) 0 to -40 % - (2) 0 to -60 %											
Short time											
Pick-up (A)	$I_{sd} = I_r \times \dots$	1.5	2	2.5	3	4	5	6	8	10	
Accuracy: ± 10 %											
Time setting t_{sd} (s)	Settings	I^2t Off	0	0.1	0.2	0.3	0.4				
		I^2t On	-	0.1	0.2	0.3	0.4				
Time delay (ms) at 10 x I_r (I^2t Off or I^2t On)	t_{sd} (max resettable time)		20	80	140	230	350				
	t_{sd} (max break time)		80	140	200	320	500				
Instantaneous											
Pick-up (A)	$I_i = I_n \times \dots$	2	3	4	6	8	10	12	15	off	
Accuracy: ± 10 %											
Time delay		Max resettable time: 20 ms Max break time: 50 ms									



Earth fault

Micrologic 6.0 E

Pick-up (A)	$I_g = I_n \times \dots$	A	B	C	D	E	F	G	H	J	
Accuracy: ± 10 %	$I_n \leq 400$ A	0.3	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1	
	$400 \text{ A} < I_n < 1250$ A	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1	
	$I_n \geq 1250$ A	500	640	720	800	880	960	1040	1120	1200	
Time setting t_g (s)	Settings	I^2t Off	0	0.1	0.2	0.3	0.4				
		I^2t On	-	0.1	0.2	0.3	0.4				
Time delay (ms) at I_n or 1200 A (I^2t Off or I^2t On)	t_g (max resettable time)		20	80	140	230	350				
	t_g (max break time)		80	140	200	320	500				



Energy

Micrologic 2.0 / 5.0 / 6.0 E



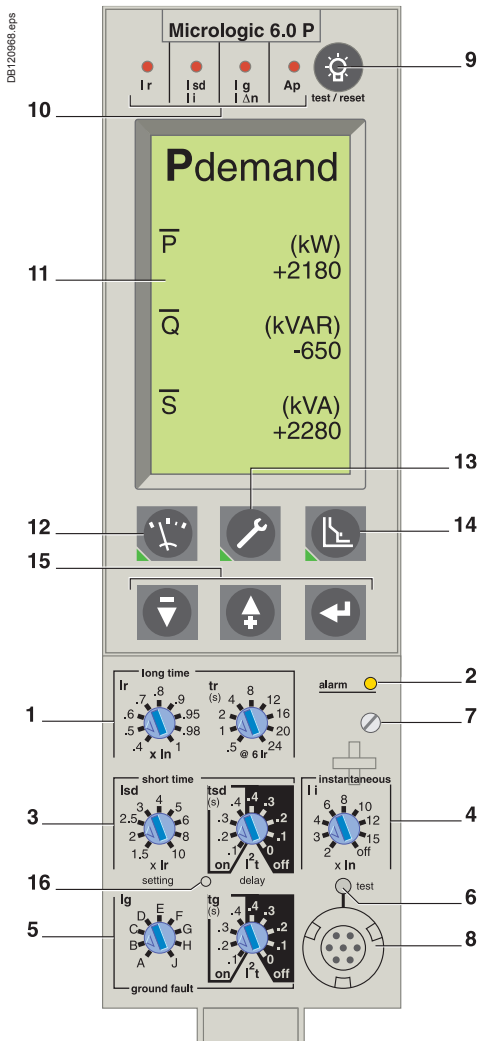
Type of measurements	Range	Accuracy
Instantaneous currents	I_1, I_2, I_3, I_n	± 1.5 %
	I_g (6.0 E)	± 10 %
Current maximeters of	I_1, I_2, I_3, I_n	± 1.5 %
Demand currents of I_1, I_2, I_3, I_g	$0.2 \times I_n$ to $1.2 \times I_n$	± 1.5 %
Voltages	V12, V23, V31, V1N, V2N, V3N	± 0.5 %
Active power	P	± 2 %
Power factor	PF	± 2 %
Demand power	P demand	± 2 %
Active energy	Ep	-10^{10} GWh to 10^{10} GWh

Note: all current-based protection functions require no auxiliary source.

The test / reset button resets maximeters, clears the tripping indication and tests the battery.



Micrologic P control units include all the functions offered by Micrologic A.
In addition, they measure voltages and calculate power and energy values.



- 1 Long-time current setting and tripping delay.
- 2 Overload signal (LED).
- 3 Short-time pick-up and tripping delay.
- 4 Instantaneous pick-up.
- 5 Ground-fault pick-up and tripping delay.
- 6 Ground-fault test button.
- 7 Long-time rating plug screw.
- 8 Test connector.
- 9 Lamp + battery test and indications reset.
- 10 Indication of tripping cause.
- 11 High-resolution screen.
- 12 Measurement display.
- 13 Maintenance indicators.
- 14 Protection settings.
- 15 Navigation buttons.
- 16 Hole for settings lockout pin on cover.

Note: Micrologic P control units come with a non-transparent lead-seal cover as standard.

Protection.....



Protection settings

The adjustable protection functions are identical to those of Micrologic A (overloads, short-circuits and ground-fault protection).

Fine adjustment

Within the range determined by the adjustment dial, fine adjustment of thresholds (to within one ampere) and time delays (to within one second) is possible on the keypad or remotely using the COM option.

IDMTL (Inverse Definite Minimum Time lag) setting

Coordination with fuse-type or medium-voltage protection systems is optimised by adjusting the slope of the overload-protection curve. This setting also ensures better operation of this protection function with certain loads.

Neutral protection

On three-pole circuit breakers, neutral protection may be set using the keypad or remotely using the COM option, to one of four positions: neutral unprotected (4P 3d), neutral protection at 0.5 Ir (4P 3d + N/2), neutral protection at Ir (4P 4d) and neutral protection at 1.6 Ir (4P 3d + 1.6N). Neutral protection at 1.6 Ir is used when the neutral conductor is twice the size of the phase conductors (major load imbalance, high level of third order harmonics).

On four-pole circuit breakers, neutral protection may be set using a three-position switch or the keypad: neutral unprotected (4P 3d), neutral protection at 0.5 Ir (4P 3d + N/2), neutral protection at Ir (4P 4d). Neutral protection produces no effect if the long-time curve is set to one of the IDMTL protection settings.

Programmable alarms and other protection.

Depending on the thresholds and time delays set using the keypad or remotely using the COM option, the Micrologic P control unit monitors currents and voltage, power, frequency and the phase sequence. Each threshold overrun is signalled remotely via the COM option. Each threshold overrun may be combined with tripping (protection) or an indication carried out by an optional M2C or M6C programmable contact (alarm), or both (protection and alarm).

Load shedding and reconnection.....

Load shedding and reconnection parameters may be set according to the power or the current flowing through the circuit breaker. Load shedding is carried out by a supervisor via the COM option or by an M2C or M6C programmable contact.

Indication option via programmable contacts

The M2C (two contacts) and M6C (six contacts) auxiliary contacts may be used to signal threshold overruns or status changes. They can be programmed using the keypad on the Micrologic P control unit or remotely using the COM option.

Communication option (COM)

The communication option may be used to:

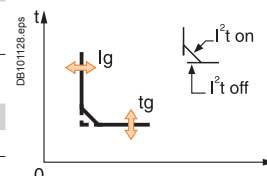
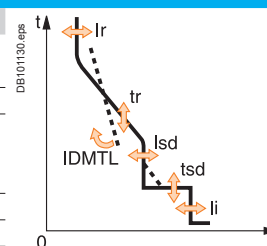
- remotely read and set parameters for the protection functions
- transmit all the calculated indicators and measurements
- signal the causes of tripping and alarms
- consult the history files and the maintenance-indicator register.
- maximeter reset.

An event log and a maintenance register, stored in control-unit memory but not available locally, may be accessed in addition via the COM option.



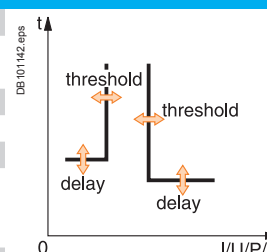
Protection Micrologic 5.0 / 6.0 P

Long time (rms)											
Current setting (A)	$I_r = I_n \times \dots$	0.4	0.5	0.6	0.7	0.8	0.9	0.95	0.98	1	
Tripping between 1.05 and 1.20 x I_r											
Time setting	t_r (s)	0.5	1	2	4	8	12	16	20	24	
Time delay (s)	Accuracy: 0 to -30 %	1.5 x I_r	12.5	25	50	100	200	300	400	500	600
	Accuracy: 0 to -20 %	6 x I_r	0.7 ⁽¹⁾	1	2	4	8	12	16	20	24
	Accuracy: 0 to -20 %	7.2 x I_r	0.7 ⁽²⁾	0.69	1.38	2.7	5.5	8.3	11	13.8	16.6
IDMTL setting	Curve slope	SIT	VIT	EIT	HVFuse	DT					
Thermal memory	20 minutes before and after tripping										
⁽¹⁾ 0 to -40 % - ⁽²⁾ 0 to -60 %											
Short time (rms)											
Pick-up (A)	$I_{sd} = I_r \times \dots$	1.5	2	2.5	3	4	5	6	8	10	
Accuracy: ± 10 %											
Time setting t_{sd} (s)	Settings	I^2t Off	0	0.1	0.2	0.3	0.4				
		I^2t On	-	0.1	0.2	0.3	0.4				
Time delay (ms) at 10 I_r (I^2t Off or I^2t On)	t_{sd} (max resettable time)		20	80	140	230	350				
	t_{sd} (max break time)		80	140	200	320	500				
Instantaneous											
Pick-up (A)	$I_i = I_n \times \dots$	2	3	4	6	8	10	12	15	off	
Accuracy: ± 10 %											
Time delay		Max resettable time: 20 ms Max break time: 50 ms									
Ground-fault		Micrologic 6.0 P									
Pick-up (A)	$I_g = I_n \times \dots$	A	B	C	D	E	F	G	H	J	
Accuracy: ± 10 %	$I_n \leq 400$ A	0.3	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1	
	$400 \text{ A} < I_n < 1250 \text{ A}$	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1	
	$I_n \geq 1250 \text{ A}$	500	640	720	800	880	960	1040	1120	1200	
Time setting t_g (s)	Settings	I^2t Off	0	0.1	0.2	0.3	0.4				
		I^2t On	-	0.1	0.2	0.3	0.4				
Time delay (ms) at I_n or 1200 A (I^2t Off or I^2t On)	t_g (max resettable time)		20	80	140	230	350				
	t_g (max break time)		80	140	200	320	500				



Alarms and other protection Micrologic 5.0 / 6.0 P

Current		Threshold	Delay
Current unbalance	$I_{unbalance}$	0.05 to 0.6 Iaverage	1 to 40 s
Max. demand current	$I_{max\ demand}$: I_1, I_2, I_3, I_N	$0.2 I_n$ to I_n	15 to 1500 s
Ground-fault alarm			
	$I_{\neq}$	10 to 100 % I_n ⁽³⁾	1 to 10 s
Voltage			
Voltage unbalance	$U_{unbalance}$	2 to 30 % x $U_{average}$	1 to 40 s
Minimum voltage	U_{min}	100 to U_{max} between phases	1.2 to 10 s
Maximum voltage ⁽⁴⁾	U_{max}	U_{min} to 1200 between phases	1.2 to 10 s
Power			
Reverse power	rP	5 to 500 kW	0.2 to 20 s
Frequency			
Minimum frequency	F_{min}	45 to F_{max}	1.2 to 5 s
Maximum frequency	F_{max}	F_{min} to 440 Hz	1.2 to 5 s
Phase sequence			
Sequence (alarm)	$\Delta\emptyset$	$\emptyset 1/2/3$ or $\emptyset 1/3/2$	0.3 s



Load shedding and reconnection Micrologic 5.0 / 6.0 P

Measured value		Threshold	Delay
Current	I	0.5 to 1 Ir per phases	20 % tr to 80 % tr
Power	P	200 kW to 10 MW	10 to 3600 s

⁽³⁾ $I_n \leq 400$ A 30 %

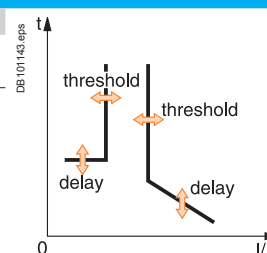
$400 \text{ A} < I_n < 1250$ A 20 %

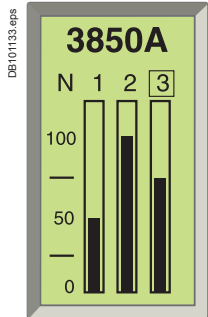
$I_n \geq 1250$ A 10 %

⁽⁴⁾ For 690 V applications, a step-down transformer must be used if the voltage exceeds the nominal value of 690 V by more than 10 %.

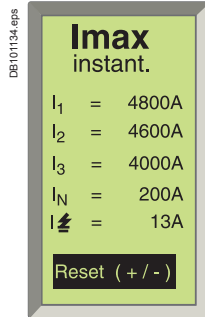
Note: all current-based protection functions require no auxiliary source.

Voltage-based protection functions are connected to AC power via a voltage measurement input built into the circuit breaker.

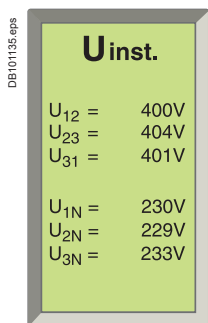




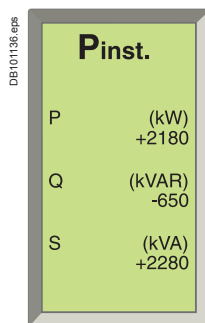
Default display.



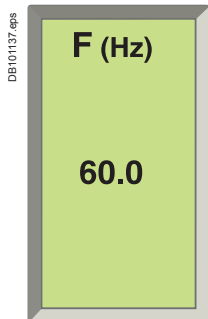
Display of a maximum current.



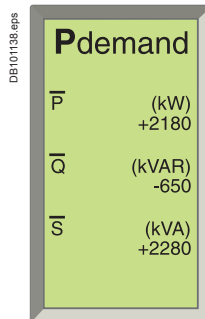
Display of a voltage.



Display of a power.



Display of a frequency.



Display of a demand power.



PME software.

Measurements

The Micrologic P control unit calculates in real time all the electrical values (V, A, W, VAR, VA, Wh, VARh, VAh, Hz), power factors and $\cos \phi$ factors.

The Micrologic P control unit also calculates demand current and demand power over an adjustable time period. Each measurement is associated with a minimeter and a maximeter.

In the event of tripping on a fault, the interrupted current is stored. The optional external power supply makes it possible to display the value with the circuit breaker open or not supplied.

Instantaneous values

The value displayed on the screen is refreshed every second.

Minimum and maximum values of measurements are stored in memory (minimeters and maximeters).

Currents					
I rms	A	1	2	3	N
	A	G-fault			
I max rms	A	1	2	3	N
	A	G-fault			
Voltages					
U rms	V	12	23	31	
V rms	V	1N	2N	3N	
U average rms	V	(U12 + U23 + U31) / 3			
U unbalance	%				
Power, energy					
P active, Q reactive, S apparent	W, Var, VA	Totals			
E active, E reactive, E apparent	Wh, VARh, VAh	Totals consumed - supplied			
		Totals consumed			
		Totals supplied			
Power factor	PF	Total			
Frequencies					
F	Hz				

Demand metering

The demand is calculated over a fixed or sliding time window that may be programmed from 5 to 60 minutes. According to the contract signed with the power supplier, an indicator associated with a load shedding function makes it possible to avoid or minimise the costs of overrunning the subscribed power. Maximum demand values are systematically stored and time stamped (maximeter).

Currents					
I demand	A	1	2	3	N
	A	G-fault			
I max demand	A	1	2	3	N
	A	G-fault			
Power					
P, Q, S demand	W, Var, VA	Totals			
P, Q, S max demand	W, Var, VA	Totals			

Minimeters and maximeters

Only the current and power maximeters may be displayed on the screen.

Time-stamping

Time-stamping is activated as soon as time is set manually or by a supervisor. No external power supply module is required (max. drift of 1 hour per year).

Reset

An individual reset, via the keypad or remotely, acts on alarms, minimum and maximum data, peak values, the counters and the indicators.

Additional measurements accessible with the COM option

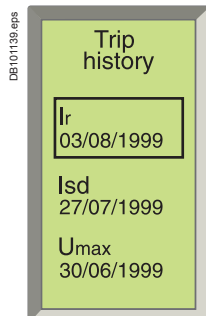
Some measured or calculated values are only accessible with the COM communication option:

- $I_{\text{peak}} / \sqrt{2}$, $(I_1 + I_2 + I_3)/3$, I unbalance
- load level in % Ir
- total power factor.

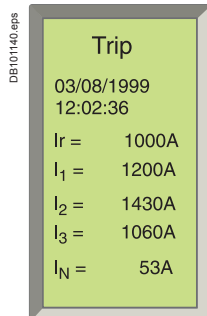
Additional info

Accuracy of measurements (including sensors):

- voltage (V) 0.5 %
- current (A) 1.5 %
- frequency (Hz) 0.1 %
- power (W) and energy (Wh) 2 %



Display of a tripping history.



Display after tripping.

Histories and maintenance indicators.....

The last ten trips and alarms are recorded in two separate history files that may be displayed on the screen.

■ Tripping history:

- ☐ type of fault
- ☐ date and time
- ☐ values measured at the time of tripping (interrupted current, etc.)

■ Alarm history:

- ☐ type of alarm
- ☐ date and time
- ☐ values measured at the time of the alarm.

All the other events are recorded in a third history file which is only accessible through the communication network.

- Event log history (only accessible through the communication network)
- ☐ Modifications to settings and parameters
- ☐ Counter resets
- ☐ System faults:
- ☐ Fallback position
- ☐ Thermal self-protection
- ☐ Loss of time
- ☐ Overrun of wear indicators
- ☐ Test-kit connections
- ☐ etc.

Note: all the events are time stamped: time-stamping is activated as soon as time is set manually or by a supervisor. No external power supply module is required (max. drift of 1 hour per year).

Maintenance indicators with COM option (BCM ULP)

A number of maintenance indicators may be called up on the screen to better plan for device maintenance:

- contact wear
- operation counter:
 - ☐ cumulative total
 - ☐ total since last reset.

Additional maintenance indicators are also available through the COM network, and can be used as an aid in troubleshooting:

- highest current measured
- number of test-kit connections
- number of trips in operating mode and in test mode.

Additional technical characteristics

Safety

Measurement functions are independent of the protection functions.

The high-accuracy measurement module operates independently of the protection module.

Simplicity and multi-language

Navigation from one display to another is intuitive. The six buttons on the keypad provide access to the menus and easy selection of values. When the setting cover is closed, the keypad may no longer be used to access the protection settings, but still provides access to the displays for measurements, histories, indicators, etc.

Micrologic is also multi-language, including the following languages: English, Spanish, Portuguese, Russian, Chinese, French, German...

Intelligent measurement

Measurement-calculation mode:

- energies are calculated on the basis of the instantaneous power values, in two manners:
 - ☐ the traditional mode where only positive (consumed) energies are considered
 - ☐ the signed mode where the positive (consumed) and negative (supplied) energies are considered separately.
- measurement functions implement the new "zero blind time" concept which consists in continuously measuring signals at a high sampling rate. The traditional "blind window" used to process samples no longer exists. This method ensures accurate energy calculations even for highly variable loads (welding machines, robots, etc.).

Always powered

All current-based protection functions require no auxiliary source. Voltage-based protection functions are connected to AC power via a voltage measurement input built into the circuit breaker.

Stored information

The fine setting adjustments, the last 100 events and the maintenance register remain in the control-unit memory even when power is lost.



Micrologic H control units include all the functions offered by Micrologic P. Integrating significantly enhanced calculation and memory functions, the Micrologic H control unit offers in-depth analysis of power quality and detailed event diagnostics. It is intended for operation with a supervisor.

In addition to the Micrologic P functions, the Micrologic H control unit offers:

- in-depth analysis of power quality including calculation of harmonics and the fundamentals
- diagnostics aid and event analysis through waveform capture
- enhanced alarm programming to analyse and track down a disturbance on the AC power system.

Measurements

The Micrologic H control unit offers all the measurements carried out by Micrologic P, with in addition:

- phase by phase measurements of:
 - power, energy
 - power factors
- calculation of:
 - current and voltage total harmonic distortion (THD)
 - current, voltage and power fundamentals
 - current and voltage harmonics up to the 31st order.

Instantaneous values displayed on the screen

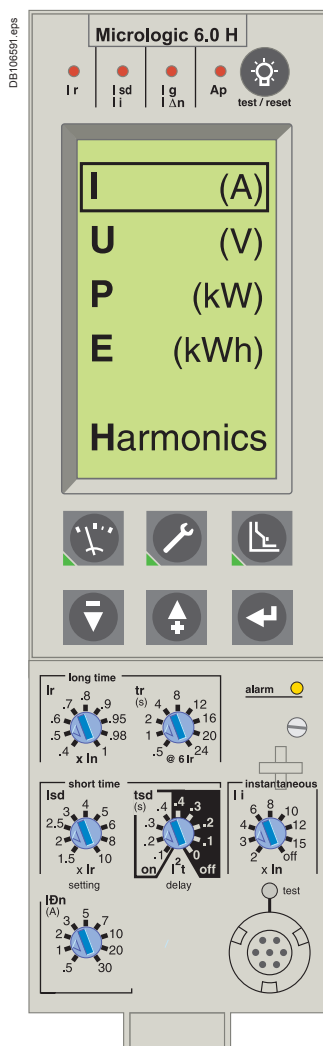
Currents					
I rms	A	1	2	3	N
	A	G-fault			
I max rms	A	1	2	3	N
	A	G-fault			
Voltages					
U rms	V	12	23	31	
V rms	V	1N	2N	3N	
U average rms	V	(U12 + U23 + U31) / 3			
U unbalance	%				
Power, energy					
P active, Q reactive, S apparent	W, Var, VA	Totals	1	2	3
E active, E reactive, E apparent	Wh, VARh, VAh	Totals consumed - supplied			
		Totals consumed			
		Totals supplied			
Power factor	PF	Total	1	2	3
Frequencies					
F	Hz				
Power-quality indicators					
Total fundamentals		U I P Q S			
THD	%	U I			
U and I harmonics	Amplitude	3	5	7	9 11 13
Harmonics 3, 5, 7, 9, 11 and 13, monitored by electrical utilities, are displayed on the screen.					
Demand measurements					
Similar to the Micrologic P control unit, the demand values are calculated over a fixed or sliding time window that may be set from 5 to 60 minutes.					
Currents					
I demand	A	1	2	3	N
	A	G-fault			
I max demand	A	1	2	3	N
	A	G-fault			
Power					
P, Q, S demand	W, Var, VA	Totals			
P, Q, S max demand	W, Var, VA	Totals			

Maximeters

Only the current maximeters may be displayed on the screen.

Histories and maintenance indicators

These functions are identical to those of the Micrologic P.



Note: Micrologic H control units come with a non-transparent lead-seal cover as standard.



With the communication option

Additional measurements, maximeters and minimeters

Certain measured or calculated values are only accessible with the COM communication option:

- $I_{\text{peak}} / \sqrt{2} (I_1 + I_2 + I_3) / 3$, $I_{\text{unbalance}}$
- load level in % Ir
- power factor (total and per phase)
- voltage and current THD
- K factors of currents and average K factor
- crest factors of currents and voltages
- all the fundamentals per phase
- fundamental current and voltage phase displacement
- distortion power and distortion factor phase by phase
- amplitude and displacement of current and voltage harmonics 3 to 31.

The maximeters and minimeters are available only via the COM option for use with a supervisor.

Waveform capture

The Micrologic H control unit stores the last 4 cycles of each instantaneous current or voltage measurement. On request or automatically on programmed events, the control unit stores the waveforms. The waveforms may be displayed in the form of oscillograms by a supervisor via the COM option. Definition is 64 points per cycle.

Pre-defined analogue alarms (1 to 53)

Each alarm can be compared to user-set high and low thresholds. Overrun of a threshold generates an alarm. An alarm or combinations of alarms can be linked to programmable action such as selective recording of measurements in a log, waveform capture, etc.

Event log and maintenance registers

The Micrologic H offers the same event log and maintenance register functions as the Micrologic P. In addition, it produces a log of the minimums and maximums for each "real-time" value.

Additional technical characteristics

Setting the display language

System messages may be displayed in six different languages. The desired language is selected via the keypad.

Protection functions

All current-based protection functions require no auxiliary source. Voltage-based protection functions are connected to AC power via a voltage measurement input built into the circuit breaker.

Measurement functions

Measurement functions are independent of the protection functions.

The high-accuracy measurement module operates independently of the protection module, while remaining synchronised with protection events.

Measurement-calculation mode

An analogue calculation function dedicated to measurements enhances the accuracy of harmonic calculations and the power-quality indicators. The Micrologic H control unit calculates electrical magnitudes using 1.5 x In dynamics (20 x In for Micrologic P).

Measurement functions implement the new "zero blind time" concept

Energies are calculated on the basis of the instantaneous power values, in the traditional and signed modes.

Harmonic components are calculated using the discrete Fourier transform (DFT).

Accuracy of measurements (including sensors)

- voltage (V) 0.5 %
- current (A) 1.5 %
- frequency (Hz) 0.1 %
- power (W) and energy (Wh) 2 %
- total harmonic distortion 1 %.

Stored information

The fine-setting adjustments, the last 100 events and the maintenance register remain in the control-unit memory even when power is lost.

Time-stamping

Time-stamping is activated as soon as time is set manually or by a supervisor no external power supply module is required (max. drift of 1 hour per year).

Reset

An individual reset, via the keypad or remotely, acts on alarms, minimum and maximum data, peak values, the counters and the indicators.



Power Meter functions

Micrologic A/E/P/H control unit with COM option (BCM ULP) and COM Ethernet gateway

In addition to protection functions, Micrologic A/E/P/H control units offer all the functions of Power Meter products as well as operating-assistance for the circuit breaker.

Micrologic A/E/P/H measurement functions are made possible by Micrologic intelligence and the accuracy of the sensors. They are handled by a microprocessor that operates independent of protection functions.

Display



FDM121 display unit (one to one)

The FDM121 switchboard display unit can be connected to a COM option (BCM ULP) using a breaker ULP cord to display all measurements on a screen ⁽¹⁾. The result is a veritable 96 x 96 mm Power Meter.

The FMD121 display unit requires a 24 V DC power supply. The COM option (BCM ULP) unit is supplied by the same power supply via the breaker ULP cord connecting it to the FDM121.

⁽¹⁾ See page D-8.

FDM128 display unit (one to eight)

Using an IFE Ethernet interface for LV breakers.

For all FDM, in addition to the information displayed on the Micrologic LCD, the FDM screen shows demand, power quality and maximeter/minimeter values along with histories and maintenance indicators.

Measurements



Instantaneous rms measurements

The Micrologic continuously display the RMS value of the highest current of the three phases and neutral (Imax). The navigation buttons can be used to scroll through the main measurements.

In the event of a fault trip, the trip cause is displayed.

The Micrologic A measures phase, neutral, ground fault currents.

The Micrologic E offers voltage, power, Power Factor, measurements in addition to the measurements provided by Micrologic A.

The Micrologic P/H offer frequency, cos.φ in addition to the measurements provided by Micrologic E.

Maximeters / minimeters

Every instantaneous measurement provided by Micrologic A or E can be associated with a maximeter/minimeter. The maximeters for the highest current of the 3 phases and neutral, the demand current and power can be reset via the FDM display unit or the communication system.

Energy metering

The Micrologic E/P/H also measures the energy consumed since the last reset of the meter. The active energy meter can be reset via Micrologic keypad or the FDM display unit or the communication system.

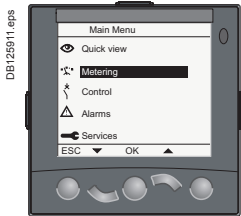
Demand and maximum demand values

Micrologic E/P/H also calculates demand current and power values. These calculations can be made using a block or sliding interval that can be set from 5 to 60 minutes in steps of 1 minute. The window can be synchronised with a signal sent via the communication system. Whatever the calculation method, the calculated values can be recovered on a PC via Modbus communication.

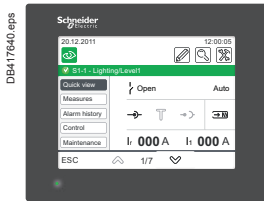
Ordinary spreadsheet software can be used to provide trend curves and forecasts based on this data. They will provide a basis for load shedding and reconnection operations used to adjust consumption to the subscribed power.

Power quality

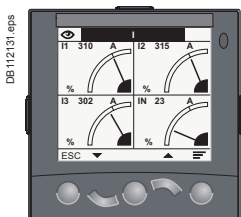
Micrologic H calculates power quality indicators taking into account the presence of harmonics up to the 15th order, including the total harmonic distortion (THD) of current and voltage.



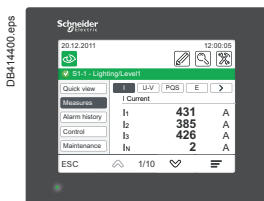
FDM121 display: navigation.



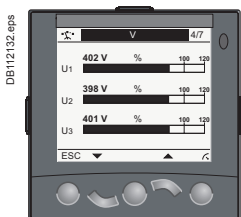
FDM128 display: navigation.



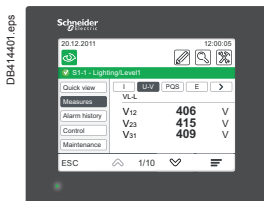
FDM121 display: current.



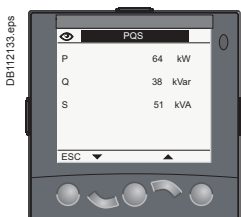
FDM128 display: current.



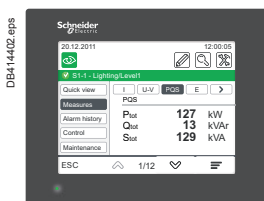
FDM121 display: voltage.



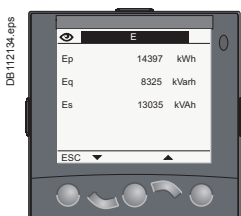
FDM128 display: voltage.



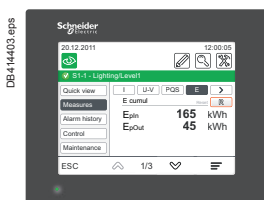
FDM121 display: power.



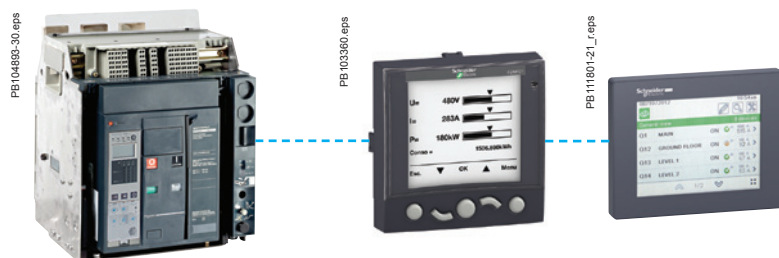
FDM128 display: power.



FDM121 display: consumption.
Examples of measurement screens on the FDM121 display unit.



FDM128 display: consumption.



Micrologic A/E/P/H integrated Power Meter functions				Type		Display	
				A/E	P/H	Micrologic LCD	FDM display
Display of protection settings							
Pick-ups (A) and delays	All settings can be displayed	Ir, tr, Isd, tsd, li, lg, tg	A/E	P/H	■	-	
Measurements							
Instantaneous rms measurements							
Currents (A)	Phases and neutral	I1, I2, I3, IN	A/E	P/H	■	■	
	Average of phases	Iavg = (I1 + I2 + I3) / 3	A/E	P/H	-	■	
	Highest current of the 3 phases and neutral	Imax of I1, I2, I3, IN	A/E	P/H	■	■	
	Ground fault (Micrologic 6)	% Ig (pick-up setting)	A/E	P/H	■	■	
	Current unbalance between phases	% Iavg	- /E	P/H	-	■	
Voltages (V)	Phase-to-phase	V12, V23, V31	- /E	P/H	■	■	
	Phase-to-neutral	V1N, V2N, V3N	- /E	P/H	■	■	
	Average of phase-to-phase voltages	Vavg = (V12 + V23 + V31) / 3	- /E	P/H	-	■	
	Average of phase-to-neutral voltages	Vavg = (V1N + V2N + V3N) / 3	- /E	P/H	-	■	
	Ph-Ph and Ph-N voltage unbalance	% Vavg and % Vavg	- /E	P/H	-	■	
	Phase sequence	1-2-3, 1-3-2	- / -	P/H	■	■ ⁽³⁾	
Frequency (Hz)	Power system	f	- / -	P/H	■	■	
Power	Active (kW)	P, total	- /E	P/H	■	■	
		P, per phase	- /E	P/H	■ ⁽²⁾	■	
	Reactive (kVAR)	Q, total	- /E	P/H	■	■	
		Q, per phase	- / -	P/H	■ ⁽²⁾	■	
	Apparent (kVA)	S, total	- /E	P/H	■	■	
		S, per phase	- / -	P/H	■ ⁽²⁾	■	
	Power Factor	PF, total	- /E	P/H	■	■	
		PF, per phase	- / -	P/H	■ ⁽²⁾	■	
	Cos.φ	Cos.φ, total	- / -	P/H	■ ⁽²⁾	■	
Cos.φ, per phase		- / -	P/H	■ ⁽²⁾	■		
Maximeters / minimizers							
	Associated with instantaneous rms measurements	Reset via FDM121 display unit and Micrologic keypad	A/E	P/H	■	■	
Energy metering							
Energy	Active (kW), reactive (kVARh), apparent (kVAh)	Total since last reset	- /E	P/H	■	■	
Demand and maximum demand values							
Demand current (A)	Phases and neutral	Present value on the selected window	- /E	P/H	■	■	
		Maximum demand since last reset	- /E	P/H	■ ⁽²⁾	■	
Demand power	Active (kWh), reactive (kVAR), apparent (kVA)	Present value on the selected window	- /E	P/H	■	■	
		Maximum demand since last reset	- /E	P/H	■ ⁽²⁾	■	
Calculation window	Sliding, fixed or com-synchronised	Adjustable from 5 to 60 minutes in 1 minute steps ⁽¹⁾	- /E	P/H	-	-	
Power quality							
Total harmonic distortion (%)	Of voltage with respect to rms value	THDU, THDV of the Ph-Ph and Ph-N voltage	- / -	H	■	■	
	Of current with respect to rms value	THDI of the phase current	- / -	H	■	■	

⁽¹⁾ Available via the communication system only.

⁽²⁾ Available for Micrologic P/H only.

⁽³⁾ FDM121 only.



Operating-assistance functions

Micrologic A/E/P/H control unit
with COM option (BCM ULP)

Histories



- trip indications in clear text in a number of user-selectable languages
- time-stamping: date and time of trip.

Maintenance indicators



Micrologic control unit have indicators for, among others, the number of operating cycles, contact wear P/H, load profile and operating times (operating hours counter) of the Masterpact circuit breaker.

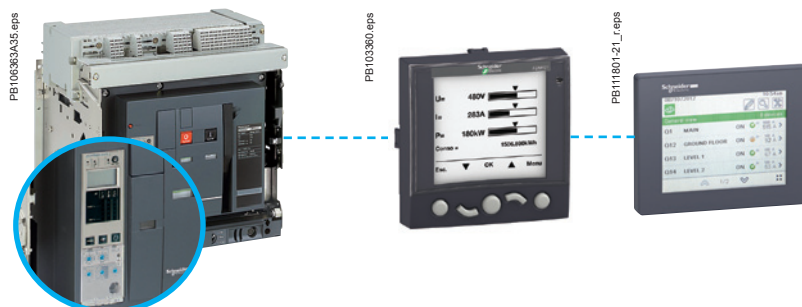
It is possible to assign an alarm to the operating cycle counter to plan maintenance. The various indicators can be used together with the trip histories to analyse the level of stresses the device has been subjected to.

Management of installed devices

Each circuit breaker equipped with a COM option (BCM ULP) can be identified via the communication system:

- serial number
- firmware version
- hardware version
- device name assigned by the user.

This information together with the previously described indications provides a clear view of the installed devices.



Micrologic A/E/P/H operating assistance functions			Type		Display	
			A/E	P/H	Micrologic LCD	FDM display
Operating assistance						
Trip history						
Trips	Cause of tripping	Ir, I _{sd} , I _i , I _g , I _{Δn}	- / E	P/H	■	■
Maintenance indicators						
Counter	Mechanical cycles	Assignable to an alarm	A/E	P/H	-	■
	Electrical cycles	Assignable to an alarm	A/E	P/H	-	■
	Hours	Total operating time (hours) ⁽¹⁾	A/E	P/H	-	-
Indicator	Contact wear	%	- / -	P/H	-	■
Load profile	Hours at different load levels	% of hours in four current ranges: 0-49 % I _n , 50-79 % I _n , 80-89 % I _n and ≥ 90 % I _n	A / E	P/H	-	■

⁽¹⁾ Also available via the communication system.

Additional technical characteristics

Contact wear

Each time Masterpact opens, the Micrologic P/H trip unit measures the interrupted current and increments the contact-wear indicator as a function of the interrupted current, according to test results stored in memory. Breaking under normal load conditions results in a very slight increment. The indicator value may be read on the FDM display. It provides an estimation of contact wear calculated on the basis of the cumulative forces affecting the circuit breaker. When the indicator reaches 100 %, it is advised to inspect the circuit breaker to ensure the availability of the protected equipment.

Circuit breaker load profile

Micrologic A/E/P/H calculates the load profile of the circuit breaker protecting a load circuit. The profile indicates the percentage of the total operating time at four current levels (% of breaker I_n):

- 0 to 49 % I_n
- 50 to 79 % I_n
- 80 to 89 % I_n
- ≥ 90 % I_n.

This information can be used to optimise use of the protected equipment or to plan ahead for extensions.



Switchboard-display functions

Micrologic E trip unit with COM option (ULP)

Micrologic measurement capabilities come into full play with the FDM121 switchboard display. It connects to COM option (ULP) via a breaker ULP cord and displays Micrologic information. The result is a true integrated unit combining a circuit breaker and a Power Meter. Additional operating assistance functions can also be displayed.

FDM121 switchboard display

An FDM121 switchboard display unit can be connected to a ULP IMU using a prefabricated cord to display all measurements, alarms, histories and event tables, maintenance indicators, management of installed devices on a screen. The result is a veritable 96 x 96 mm Power Meter.

The FMD121 display unit requires a 24 V DC power supply.

The FDM121 is a switchboard display unit that can be integrated in the Compact NSX100 to 630 A, Powerpact H/J/L/P/R, Compact NS or Masterpact systems. It uses the sensors and processing capacity of the Micrologic trip unit. It is easy to use and requires no special software or settings. It is immediately operational when connected to the Compact NSX by a simple cord.

Also, it provides monitoring and control with the use of the I/O application module, the motor mechanism module, or the Breaker Status module.

The FDM121 is a large display, but requires very little depth. The anti-glare graphic screen is backlit for very easy reading even under poor ambient lighting and at sharp angles.

Display of Micrologic measurements and alarms

The FDM121 is intended to display Micrologic 5 / 6 measurements, alarms and operating information. It cannot be used to modify the protection settings.

Measurements may be easily accessed via a menu. All user-defined alarms are automatically displayed. The display mode depends on the priority level selected during alarm set-up:

- high priority: a pop-up window displays the time-stamped description of the alarm and the orange LED flashes
- medium priority: the orange "Alarm" LED goes steady on
- low priority: no display on the screen.

All faults resulting in a trip automatically produce a high-priority alarm, without any special settings required. In all cases, the alarm history is updated. Micrologic saves the information in its non-volatile memory in the event of an FDM121 power failure.

Status indications and remote control

When the circuit breaker is equipped with the Breaker Status Module, the FDM121 display can also be used to view circuit breaker status conditions:

- O/F: ON/OFF
- SD: trip indication
- SDE: Fault-trip indication (overload, short-circuit, ground fault).

When the circuit breaker system is equipped with the I/O application module, the FDM121 can monitor and control:

- cradle management
- circuit breaker operation
- light and load control
- custom application.

When the circuit breaker system is equipped with the motor mechanism module, the FDM121 offers remote closing and opening control.

Main characteristics

- 96 x 96 x 30 mm screen requiring 10 mm behind the door (or 20 mm when the 24 V power supply connector is used).
 - White backlighting.
 - Wide viewing angle: vertical $\pm 60^\circ$, horizontal $\pm 30^\circ$.
 - High resolution: excellent reading of graphic symbols.
 - Alarm LED: flashing orange for alarm pick-up, steady orange after operator reset if alarm condition persists.
 - Operating temperature range -10°C to $+55^\circ\text{C}$.
 - CE / UL / CSA marking (pending).
 - 24 V DC power supply, with tolerances 24 V -20 % (19.2 V) to 24 V +10 % (26.4 V).
- When the FDM121 is connected to the communication network, the 24 V DC can be supplied by the communication system wiring system.
- Consumption 40 mA.

Mounting

The FDM121 is easily installed in a switchboard.

- Standard door cut-out 92 x 92 mm.
- Attached using clips.

To avoid a cut-out in the door, an accessory is available for surface mounting by drilling only two 22 mm diameter holes.

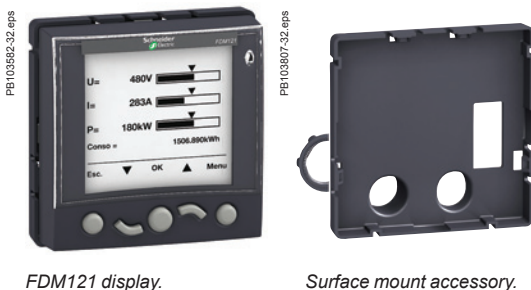
The FDM121 degree of protection is IP54 in front. IP54 is maintained after switchboard mounting by using the supplied gasket during installation.

Connection

The FDM121 is equipped with:

- a 24 V DC terminal block:
 - plug-in type with 2 wire inputs per point for easy daisy-chaining
 - power supply range of 24 V DC -20 % (19.2 V) to 24 V DC +10 % (26.4 V).

A 24 V DC type auxiliary power supply must be connected to a single point on the ULP system. The FDM121 display unit has a 2-point screw connector on the rear panel of the module for this purpose. The ULP module to which the auxiliary power supply is connected distributes the supply via the ULP cable to all the ULP modules connected to the system and therefore also to Micrologic.

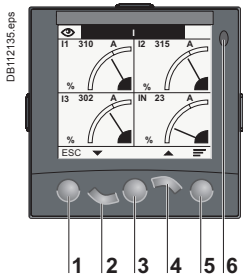


FDM121 display.

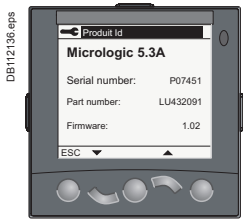
Surface mount accessory.



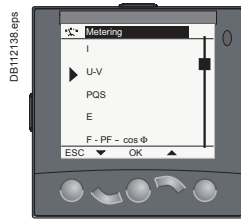
Connection with FDM121 display unit.



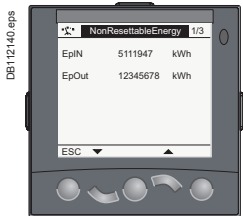
- 1 Escape
- 2 Down
- 3 OK
- 4 Up
- 5 Context
- 6 Alarm LED



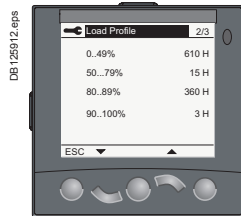
Product identification.



Metering: sub-menu.



Metering: meter.



Services.

- two RJ45 jacks.

The Micrologic connects to the internal communication terminal block on the Masterpack via the breaker ULP cord. Connection to one of the RJ45 connectors on the FDM121 automatically establishes communication between the Micrologic and the FDM121 and supplies power to the Micrologic measurement functions.

When the second connector is not used, it must be fitted with a line terminator.

Navigation

Five buttons are used for intuitive and fast navigation.

The "Context" button may be used to select the type of display (digital, bargraph, analogue).

The user can select the display language (Chinese, English, French, German, Italian, Portuguese, Spanish, etc.).

Screens

Main menu

When powered up, the FDM121 screen automatically displays the ON/OFF status of the device.



Quick view



Alarms



Metering



Services.



Control

When not in use, the screen is not backlit. Backlighting can be activated by pressing one of the buttons. It goes off after 3 minutes.

Fast access to essential information

■ "Quick view" provides access to five screens that display a summary of essential operating information (I, U, f, P, E, THD, circuit breaker On / Off).

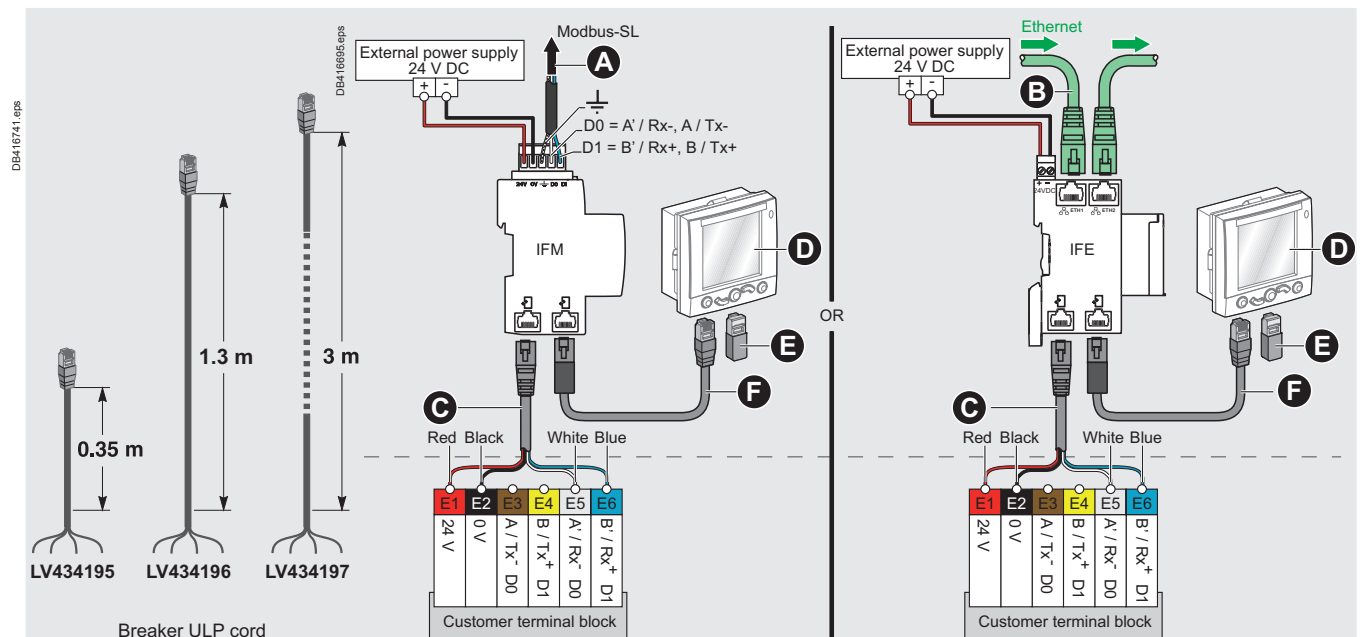
Access to detailed information

■ "Metering" can be used to display the measurement data (I, U-V, f, P, Q, S, E, THD, PF) with the corresponding min/max values.

■ Alarms displays active alarms and the alarm history.

■ Services provides access to the operation counters, energy and maximeter reset function, maintenance indicators, identification of modules connected to the internal bus and FDM121 internal settings (language, contrast, etc.).

Communication components and FDM121 connections



Connections

■ Masterpack is connected to the ULP devices (FDM121 display, IFM, IFE or I/O) unit via the breaker ULP cord.

□ cord available in three lengths: 0.35 m, 1.3 m and 3 m.

□ lengths up to 10 m possible using extensions.

- A** Modbus network
- B** Ethernet network
- C** Breaker ULP cord

- D** FDM121 display
- E** ULP termination
- F** ULP cable



Switchboard-display functions

Micrologic A/E/P/H control unit with COM Ethernet gateway

Micrologic measurement capabilities come into full play with the FDM128 switchboard display. It connects to Ethernet communication via RJ45 port and displays Micrologic information. The result is a true integrated unit combining a circuit breaker and a Power Meter. Additional operating assistance functions can also be displayed.

FDM128 switchboard display

The FDM128 is an intelligent Ethernet display. It collects the data from up to 8 devices via Ethernet network.

The FDM128 switchboard display unit can be connected to a Micrologic COM option (BCM ULP via IFE). It uses the sensors and processing capacity of the Micrologic control unit. It is easy to use and requires no special software or settings.

The FDM128 is a large display, but requires very little depth. The anti-glare graphic screen is backlit for very easy reading even under poor ambient lighting and at sharp angles.

FDM128 switchboard display is designed to manage up to 8 devices (Masterpact NT/NW, Compact NS, Compact NSX or Smartlink).

Display of Micrologic measurements and trips

The FDM128 is intended to display Micrologic A/E measurements, trips and operating information. It cannot be used to modify the protection settings.

Measurements may be easily accessed via a menu.

Trips are automatically displayed.

A pop-up window displays the time-stamped description of the trip.

Status indications

When the circuit breaker is equipped with the Breaker Status Command Module (BSCM) and NSX cord, the FDM128 display can also be used to view circuit breaker status conditions:

- O/F: ON/OFF
- SDE: Fault-trip indication (overload, short-circuit, ground fault)
- CE, CD cradle management with I/O application module.

Remote control

When the circuit breaker is equipped with the BSCM, NSX cord and Communication Motor Mechanism (MTC), the FDM128 display can also be used to control (open/close) the circuit breaker.

Main characteristics

- 115.2 x 86.4 mm with 5.7" QVGA display 320 x 240 pixels.
- Color TFT LCD, LED backlight.
- Wide viewing angle: vertical $\pm 80^\circ$, horizontal $\pm 70^\circ$.
- High resolution: excellent reading of graphic symbols.
- Operating temperature range -10°C to $+55^\circ\text{C}$.
- CE / UL / CSA marking (pending).
- 24 V DC power supply, with tolerances 24 V (limit 20.4 - 28.8 V DC).
- Consumption $\leq 6.8\text{ W}$.

Mounting

The FDM128 is easily installed in a switchboard.

- Standard door hole $\varnothing 22\text{ mm}$.

The FDM128 degree of protection is IP65 in front and IP54.

Connection

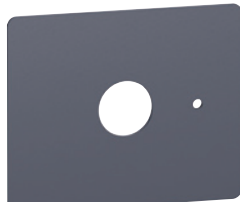
The FDM128 is equipped with:

- a 24 V DC terminal block:
 - power supply range of 24 V DC (limit 20.4 - 28.8 V DC). The FDM128 display unit has a 2-point screw connector on the rear panel of the module for this purpose.
- One RJ45 Ethernet jacks.

The Micrologic connects to the internal communication terminal block on the Masterpact via the breaker ULP cord and Ethernet connection through IFE.



FDM128 display.

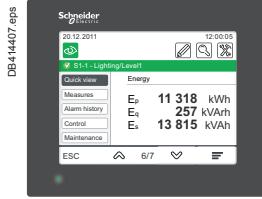


Surface mount accessory.

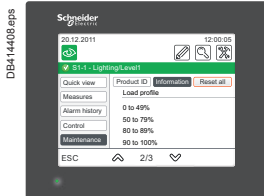




Product identification.



Metering: meter.



Services.

Navigation

Touch screen is used for intuitive and fast navigation.

The user can select the display language (Chinese, English, French, German, Italian, Portuguese, Spanish, etc.).

Screens

Main menu



Quick view



Alarms



Metering



Maintenance.



Control

When not in use, the screen is automatically shifted to low back-lighting.

Fast access to essential information

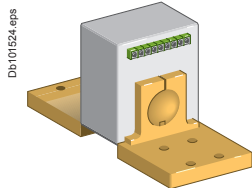
■ "Quick view" provides access to five screens that display a summary of essential operating information (I, U, f, P, E, THD, circuit breaker On / Off).

Access to detailed information

■ "Metering" can be used to display the measurement data (I, U-V, f, P, Q, S, E, THD, PF) with the corresponding min/max values.

■ Alarms displays the trip history.

■ Services provides access to the operation counters, energy and maximeter reset function, maintenance indicators, identification of modules connected to the internal bus and FDM128 internal settings (language, contrast, etc.).



External sensor (CT).



External sensor for source ground return protection.



Long-time rating plug.



External 24 V DC power supply module.

External sensors

External sensor for ground-fault and neutral protection

The sensors, used with the 3P circuit breakers, are installed on the neutral conductor for:

- neutral protection (with Micrologic P and H)
- residual type ground-fault protection (with Micrologic A, E, P and H).

The rating of the sensor (CT) must be compatible with the rating of the circuit breaker:

- NT08 to NT12: TC 400/1600
- NW08 to NW20: TC 400/2000
- NW25 to NW30: TC 1000/4000
- NW40 to NW50: TC 4000/6300.

External sensor for source ground return protection

The sensor is installed around the connection of the transformer neutral point to earth and connects to the Micrologic 6.0 control unit via an MDGF module to provide the source ground return (SGR) protection.

Voltage measurement inputs

Voltage measurement inputs are required for power measurements (Micrologic P or H).

As standard, the control unit is supplied by internal voltage measurement inputs placed downstream of the pole for voltages between 220 and 690 V AC. On request, it is possible to replace the internal voltage measurement inputs by an external voltage input (PTE option) which enables the control unit to draw power directly from the distribution system upstream of the circuit breaker. An 3 m cable with ferrite comes with this PTE option.

Long-time rating plug

Eight interchangeable plugs may be used to limit the long-time threshold setting range for higher accuracy.

The time delay settings indicated on the plugs are for an overload of 6 Ir.

As standard, control units are equipped with the 0.4 to 1 plug.

Plug	Setting ranges $I_r = I_n \times \dots$									
UL Listed	Type A ⁽¹⁾	0.4	0.45	0.5	0.6	0.63	0.7	0.8	0.9	1
	Type B	0.4	0.44	0.5	0.56	0.63	0.75	0.88	0.95	1
	Type C	0.42	0.50	0.53	0.58	0.67	0.75	0.83	0.95	1
	Type D	0.4	0.48	0.64	0.7	0.8	0.9	0.93	0.95	1
	Type E	0.6	0.7	0.75	0.8	0.85	0.9	0.93	0.95	1
	Type F	0.84	0.86	0.88	0.9	0.92	0.94	0.96	0.98	1
	Type G	0.66	0.68	0.7	0.72	0.74	0.76	0.78	0.8	0.82
	Type H	0.48	0.5	0.52	0.54	0.56	0.58	0.6	0.62	0.64

⁽¹⁾ Standard.

External 24 V DC power-supply module (AD)

The external power-supply module makes it possible to use the display even if the circuit breaker is open or not supplied (for the exact conditions of use, see the "electrical diagrams" part of this catalogue).

This module powers both the control unit (100 mA) and the M2C and M6C programmable contacts (100 mA).

With the Micrologic A/E control unit, this module makes it possible to display currents of less than 20 % of I_n .

With the Micrologic P and H, it can be used to display fault currents after tripping.

If the COM option is used, a second dedicated power supply shall be used.

We recommend to use the AD power supply due to its low stray primary secondary capacitance. Good operation of the Micrologic trip unit in noisy environment is not guaranteed with other power supplies.

Characteristics

■ Power supply:

- 110/130, 200/240, 380/415 V AC (+10 %, -15 %)
- 24/30, 48/60, 100/125 V DC (+20 %, -20 %)

■ Output voltage: 24 V DC ± 5 %, 200 mA

■ Ripple < 1 %

■ Dielectric withstand: 3.5 kV rms between input/output, for 1 minute

■ Overvoltage category: as per IEC 60947-1 cat 4.

Micrologic control units

Accessories and test equipment



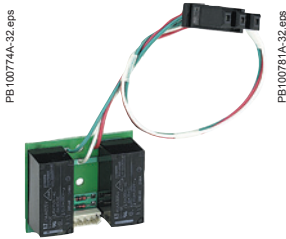
Battery module.

Battery module

The battery module maintains display operation and communication with the supervisor if the power supply to the Micrologic control unit is interrupted. It is installed in series between the Micrologic control unit and the AD module.

Characteristics

- Battery run-time: 4 hours (approximately)
- Mounted on vertical backplate or symmetrical rail.



M2C.



M6C.

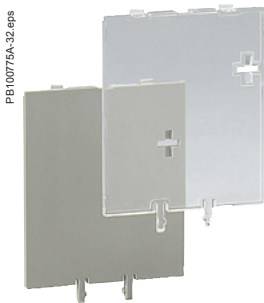
M2C, M6C programmable contacts

These contacts are optional equipment for the Micrologic E, P and H control units. They are described with the indication contacts for the circuit breakers.

Micrologic			Type E	Types P, H
Characteristics			M2C	M2C/M6C
Minimum load			100 mA/24 V	100 mA/24 V
Breaking capacity (A) p.f.: 0.7	V AC	240	5	5
		380	3	3
	V DC	24	1.8	1.8
		48	1.5	1.5
		125	0.4	0.4
250		0.15	0.15	

M2C: 24 V DC power supplied by control unit (consumption 100 mA).

M6C: external 24 V DC power supply required (consumption 100 mA).



Lead-seal cover.

Spare parts

Lead-seal covers

A lead-seal cover controls access to the adjustment dials.

When the cover is closed:

- it is impossible to modify settings using the keypad unless the settings lockout pin on the cover is removed
- the test connector remains accessible
- the test button for the ground-fault protection function remains accessible.

Characteristics

- Transparent cover for basic Micrologic and Micrologic A/E control units
- Non-transparent cover for Micrologic P and H control units.

Spare battery

A battery supplies power to the LEDs identifying the tripping causes. Battery service life is approximately ten years.

A test button on the front of the control unit is used to check the battery condition. The battery may be replaced on site when discharged.



PE100857A-08.eps



Portable test kit.

Test equipment

Hand-held test kit

The hand-held mini test kit may be used to:

- check operation of the control unit and the tripping and pole-opening system by sending a signal simulating a short-circuit
- supply power to the control units for settings via the keypad when the circuit-breaker is open (Micrologic P and H control units).
- Power source: standard LR6-AA battery.

Full function test kit

The test kit can be used alone or with a supporting personal computer.

The test kit without PC may be used to check:

- the mechanical operation of the circuit breaker
- the electrical continuity of the connection between the circuit breaker and the control unit
- operation of the control unit:
 - display of settings
 - automatic and manual tests on protection functions
 - test on the zone-selective interlocking (ZSI) function
 - inhibition of the ground-fault protection
 - inhibition of the thermal memory.

The test kit with PC offers in addition:

- the test report (software available on request).

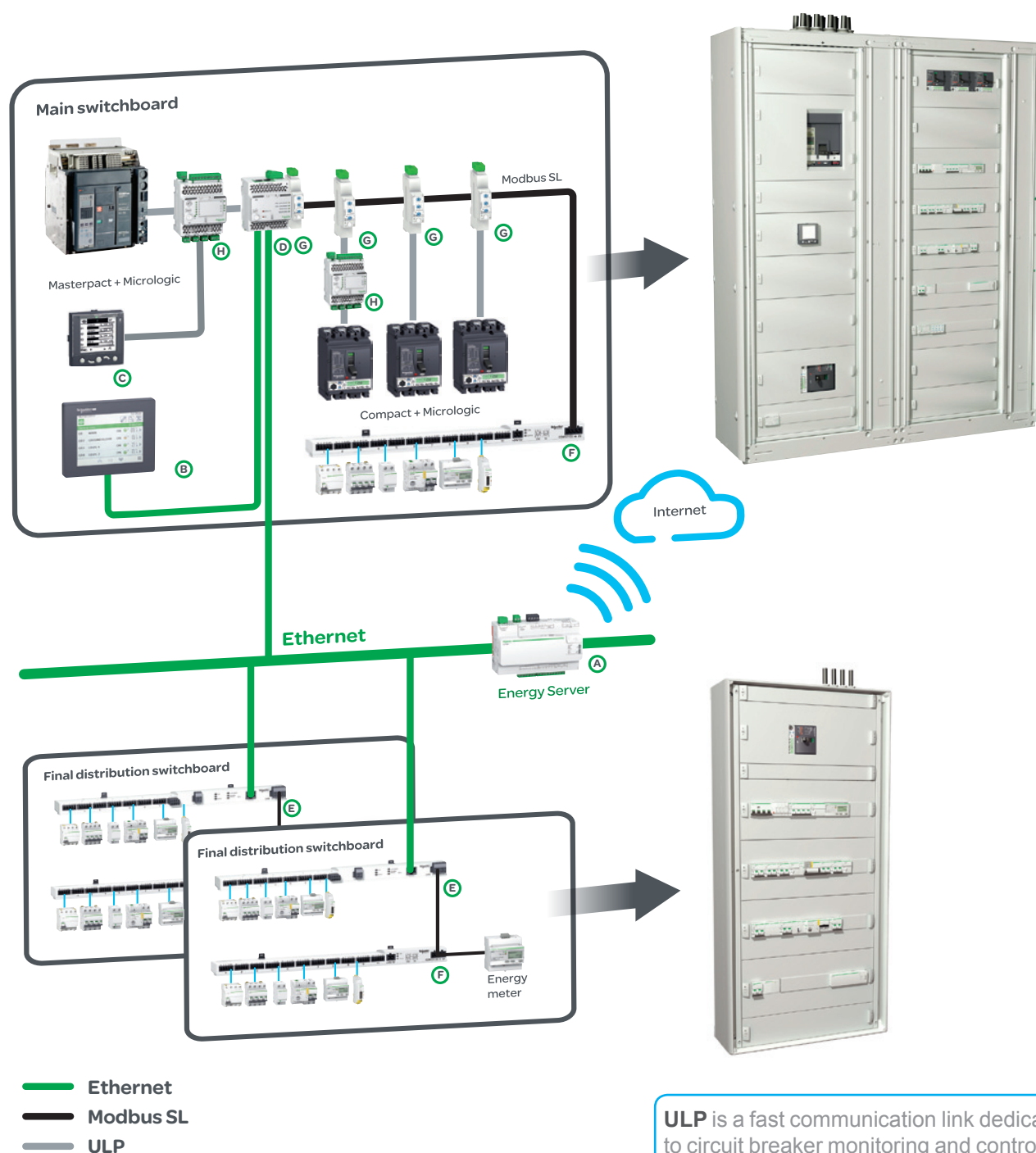




Enerlin'X communication system provides access to status, electrical values and devices control using Ethernet and Modbus SL communication protocols.

Ethernet has become the universal link between switchboards, computers and communication devices inside the building. The large amount of information which can be transferred makes the connection of Enerlin'X digital system to hosted web services of Schneider Electric a reality. More advantages are offered to integrators thanks to configuration web pages available remotely or on the local Ethernet network.

Modbus SL is the most widely used communication protocol in industrial networks. It operates in master-slave mode. The devices (slaves) communicate one after the other with a gateway (master).





Enerlin'X communication devices and displays

	Name	Function	Port		Bin. Input	Analog. Input	Bin. Output	Cial. Ref.
			(to device)	(to server)				
A	 Com'X 200	Energy Server with Ethernet Gateway ⁽¹⁾ function	Modbus Master	Ethernet cable + WiFi	6	2	-	EBX200
B	 FDM128	Ethernet LCD colour touch screen	-	Ethernet	-	-	-	LV434128
C	 FDM121	LCD display for circuit breaker	ULP	-	-	-	-	TRV00121
D		IFE interface + gateway	Modbus Master & ULP	Ethernet	-	-	-	LV434011
		IFE interface	ULP	Ethernet	-	-	-	LV434010
E	 Acti9 Smartlink Ethernet	Ethernet interface with Input/Output functions & Gateway	Modbus Master	Ethernet	14	2	7	A9XMEA08
F	 Acti9 Smartlink Modbus	Modbus interface with Input/Output functions	-	Modbus Slave	22	-	11	A9XMSB11
G	 IFM	Modbus interface for circuit breaker	ULP	Modbus Slave	-	-	-	TRV00210
H	 I/O	Input/Output application module for circuit breaker	ULP	ULP	6	-	3	LV434063

(1) Gateway: transfers data from a network to another (ie.: Modbus to Ethernet).

(2) Interface: transfers data from an equipment to a network (ie.: ULP to Modbus).



Plug and play commissioning tools give a real peace of mind to panel builders as their panels can be functionally checked before delivery.

Commissioning / maintenance tools

Web pages embedded into Com'X 200 and Acti9 Smartlink Ethernet gateways

Access with a standard PC and common browser:

- commissioning,
- communication diagnosis,
- functional tests...

Electrical Asset Manager

Loaded into a standard PC Error free commissioning. Time saving, easier management and maintenance thanks to the advanced services:

- project management,
- configuration of controllers, gateways, ...
- test of communication networks, diagnostic report...

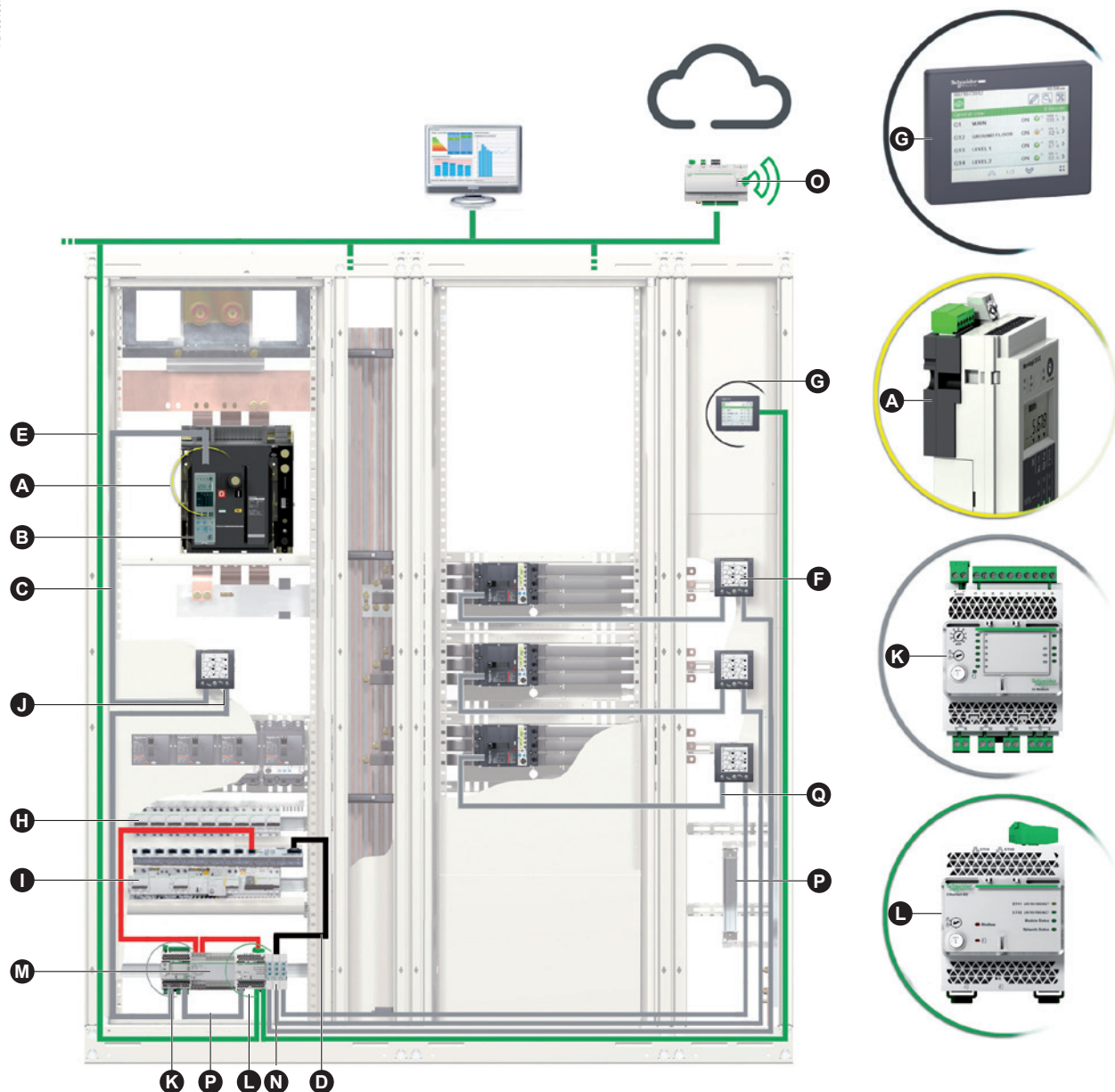


Wiring system ULP

The wiring system is designed for low-voltage power switchboards. Installation requires no tools or special skills.

The prefabricated wiring ensures both data transmission (Modbus protocol) and 24 V DC power distribution for the communications modules on the Micrologic control units.

PF08180 eps



A BCM ULP: Breaker Communication Module with ULP port

B Micrologic control unit

C Breaker ULP cord	0.35 m	LV434195
	1.3 m	LV434196
	3 m	LV434197

D Modbus cable

E Ethernet cable

F FDM121: Front Display Module TRV00121

G FDM128: Front Display Module LV434128

H Smart Link A9XMSB11

I Acti9

J ULP line terminators TRV00880

K I/O (Input/Output) application module LV434063

L IFE: Ethernet interface

M External 24 V DC power supply module

N IFM: Modbus-SL interface TRV00210

O Com'X 200

P ULP cable

0.3 m	TRV00803
0.6 m	TRV00806
1 m	TRV00810
2 m	TRV00820
3 m	TRV00830
5 m	TRV00850

Q NSX cord	0.35 m	LV434200
	1.3 m	LV434201
	3 m	LV434202

— Ethernet
— Modbus
— ULP
— 24 V DC



Overview of functions

PB104804.eps



A: Micrologic with ammeter
E: Micrologic "Energy"
P: Micrologic "Power"
H: Micrologic "Harmonics"

Note: see the description of the Micrologic control units for further details on protection and alarms, measurements, waveform capture, histories, logs and maintenance indicators.

Four functional levels

The Masterpact can be integrated into Ethernet and Modbus communication environment.

There are four possible functional levels that can be combined.

	Switch-disconnectors	Circuit breaker			
Status indications					
ON/OFF (O/F)	■	A	E	P	H
Spring charged CH	■	A	E	P	H
Ready to close	■	A	E	P	H
Fault-trip SDE	■	A	E	P	H
Connected / disconnected / test position CE/CD/CT (I/O application module only)	■	A	E	P	H
Controls					
MX1 open	■	A	E	P	H
XF close	■	A	E	P	H
Measurements					
Instantaneous measurement information	■	A	E	P	H
Averaged measurement information	■		E	P	H
Maximeter / minimeter	■	A	E	P	H
Energy metering	■		E	P	H
Demand for current and power	■		E	P	H
Power quality	■				H
Operating assistance					
Protection and alarm settings		A	E	P	H
Histories		A	E	P	H
Time stamped event tables		A	E	P	H
Maintenance indicators		A	E	P	H

Modbus principle

The Modbus RS 485 (RTU protocol) system is an open bus on which communicating Modbus devices (Compact NS with Modbus COM, Power Meter PM700, PM800, Sepam, Vigilohm, Compact NSX, etc.) are installed. All types of PLCs and microcomputers may be connected to the bus.

Addresses

The Modbus communication parameters (address, baud rate, parity) are entered using the keypad on the Micrologic A, E, P, H. For a switch-disconnector, it is necessary to use the Electrical Asset Manager or RSU (Remote Setting Utility) Micrologic utility.

Number of devices

The maximum number of devices that may be connected to the Modbus bus depends on the type of device (Compact with Modbus COM, PM700, PM800, Sepam, Vigilohm, Compact NSX, etc.), the baud rate (19200 is recommended), the volume of data exchanged and the desired response time. The RS 485 physical layer offers up to 32 connection points on the bus (1 master, 31 slaves).

A fixed device requires only one connection point (communication module on the device). A drawout device uses two connection points (communication modules on the device and on the chassis).

The number must never exceed 31 fixed devices or 15 drawout devices.

Length of bus

The maximum recommended length for the Modbus bus is 1200 meters.

Bus power source

A 24 V DC power supply is required (less than 20 % ripple, insulation class II).

Ethernet principle

Ethernet is a data link and physical layer protocol defined by IEEE 802.10 and 100 Mbps specifications that connects computer or other Ethernet devices. Ethernet is an asynchronous Carrier Sense Multiple Access with Collision detection (referred as CSMA/CD) protocol. Carrier Sense means that the hosts can detect whether the medium (coaxial cable) is idle or busy. Multiple Access means that multiple hosts can be connected to the common medium. Collision Detection means a host detects whether its transmission has collided with the transmission of another host (or hosts).

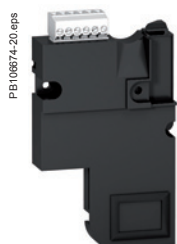
IFE Ethernet interface can be connected to a PC or a laptop over Ethernet. The maximum length of Ethernet cable is 100 meters. IFE Ethernet interface + gateway provides a Modbus TCP/IP gateway over Ethernet to enable Modbus TCP communication from a Modbus TCP master to any Modbus slave devices connected to it. The maximum active Modbus TCP client connection is twelve.

IFE Ethernet interface has an embedded web server (web page).

The Modbus RS 485 (RTU protocol) system is an open bus on which communicating Modbus devices (Compact NS with Modbus COM, Power Meter PM700, PM800, Sepam, Vigilohm, Compact NSX, etc.) are installed. All types of PLCs and microcomputers may be connected to the bus.



All the Masterpact devices can be fitted with the communication function thanks to the COM option. Masterpact uses the Ethernet or Modbus communications protocol for full compatibility with the supervision management systems. Eco COM is limited to the transmission of metering data and status. It is not used to communicate controls.



BCM ULP.



I/O application module.

For fixed and Drawout devices, the common communication option is made up of:

- a BCM ULP module, installed behind the Micrologic control unit and supplied with its set of sensors (OF, SDE, PF and CH micro switches) its kit for connection to XF and MX1 communicating voltage releases and its COM terminal block (inputs E1 to E6). This module is independent of the control unit. It receives and transmits information on the communication network. An infra-red link transmits data between the control unit and the communication module.

Consumption: 30 mA, 24 V.

- IFM, this module required for connection to the network, contains the Modbus address (1 to 99) declared by the user via the two dials in front. It automatically adapts (baud rate, parity) to the Modbus network in which it is installed.

Or

- IFE, the Ethernet interface for LV circuit breaker enables an intelligent modular unit (IMU), for example a Masterpact NT/NW or Compact NSX circuit breaker to be connected to an Ethernet network. Each circuit breaker has its own IFE and a corresponding IP address.

For drawout device the Cradle Management option must be added:

I/O (Input/Output) application module for LV breaker, the I/O application module is delivered with withdrawable devices ordered with the COM option, for cradle management. It must be installed on a DIN rail near the device. It must be connected to the ULP system and to the position contacts (CD, CT, CE) that transmit the position of the device in the cradle.

For communicating remote control, option with XF and MX1 communicating voltage releases must be added:

The XF and MX1 communicating voltage releases are equipped for connection to the "device" communication module.

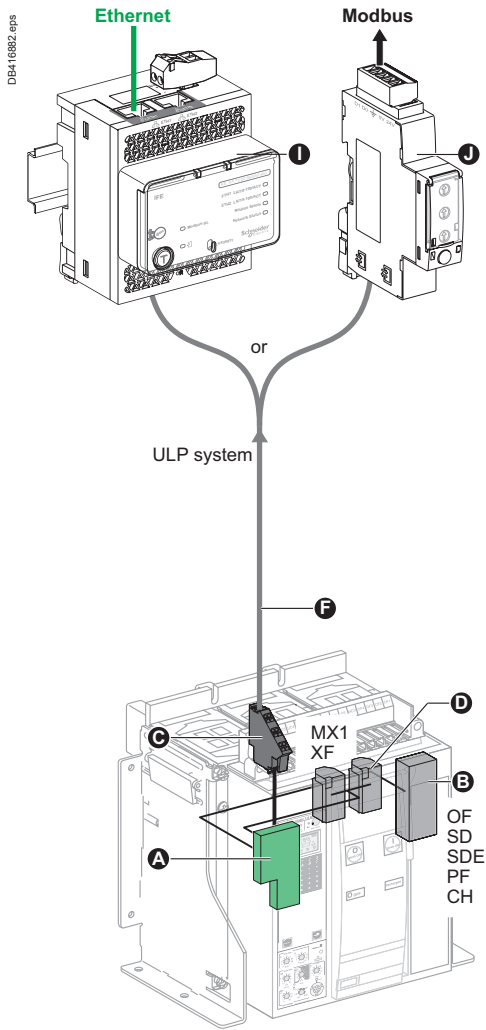
The remote-tripping function (MX2 or MN) are independent of the communication option. They are not equipped for connection to the "device" communication module.



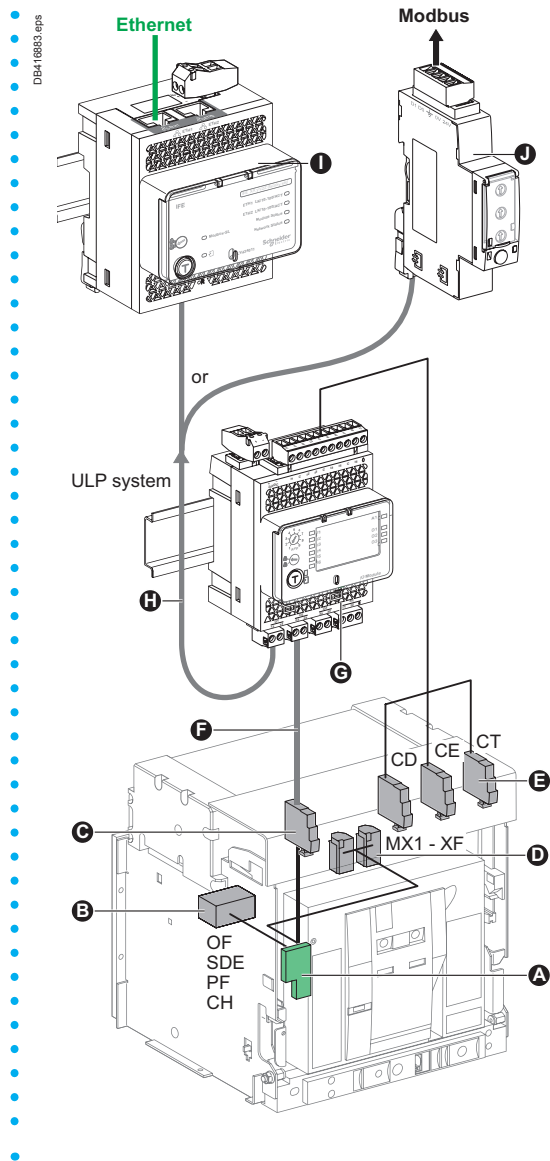
Communication architecture

Electrical operated

Fixed device



Drawout device



- A** BCM ULP
- B** OF, SDE ... microswitches
- C** COM terminal block (E1 to E6)
- D** MX1 and XF communicating voltage releases
- E** CE, CD and CT contacts

- F** Breaker ULP cord
- G** I/O application module
- H** ULP cable
- I** IFE module
- J** IFM module



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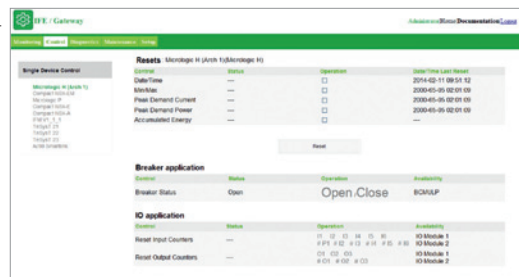
IFE interface, ref.: LV434010

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IFE interface + gateway, ref.: LV434011

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IFE interface, IFE interface + gateway description

Introduction

The IFE interface and IFE interface + gateway enable LV circuit breakers as Masterpact NT/NW, Compact NSX or Powerpact to be connected to an Ethernet network.

IFE interface: ref. LV434010

Provides an Ethernet access to a single LV circuit breaker.

Function

Interface - one circuit breaker is connected to the IFE interface via its ULP port.

IFE interface + gateway: ref. LV434011

Provides an Ethernet access to one or several LV circuit breakers.

Functions

- Interface - one circuit breaker is connected to the IFE interface via its ULP port.
- Gateway: several circuit breakers on a Modbus network are connected via the IFE interface + gateway master Modbus port.

IFE interface, IFE interface + gateway features

- Dual 10/100 Mbps Ethernet port for simple daisy chain connection.
- Device profile web service for discovery of the IFE interface, IFE interface + gateway on the LAN.
- ULP compliant for localization of the IFE interface in the switchboard.
- Ethernet interface for Compact, Masterpact and Powerpact circuit breakers.
- Gateway for Modbus-SL connected devices (IFE interface + gateway only).
- Embedded set-up web pages.
- Embedded monitoring web pages.
- Embedded control web pages.
- Built-in e-mail alarm notification.

Mounting

The IFE interface, IFE interface + gateway are DIN rail mounting devices. A stacking accessory enables the user to connect several IFMs (ULP to Modbus interfaces) to an IFE interface + gateway without additional wiring.

24 V DC power supply

The IFE interface, IFE interface + gateway must always be supplied with 24 V DC. The IFMs stacked to an IFE interface + gateway are supplied by the IFE interface + gateway, thus it is not necessary to supply them separately. It is recommended to use an UL listed and recognized limited voltage/limited current or a class 2 power supply with a 24 V DC, 3 A maximum.

IFE interface, IFE interface + gateway firmware update

The firmware can be updated using:

- FTP
- customer engineering tool.

Required circuit breaker communication modules

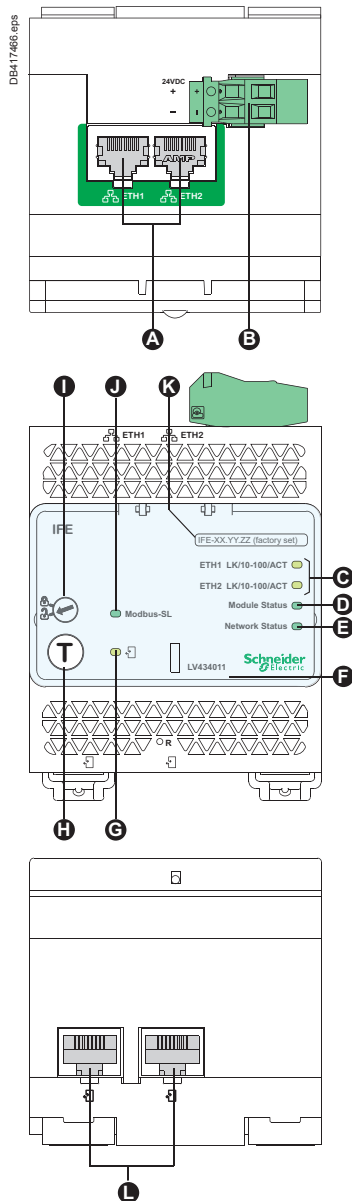
The connection to IFE interface or IFE interface + gateway requires a communication module embedded into the circuit breaker:

- Masterpact NT/NW (Fixed or drawout): BCM ULP communication module
- Drawout Masterpact NT/NW: BCM ULP and its respective I/O (Input/Output) application module.

All connection configurations for Masterpact NT/NW require the breaker ULP cord. The insulated NSX cord is mandatory for system voltages greater than 480 V AC. When the second ULP RJ45 connector is not used, it must be closed with an ULP terminator (TRV00880).

Network communication interface

Characteristic		Value
Type of interface module		Modbus RTU, RS485 serial connection Modbus TCP/IP Ethernet
Transmission	Modbus RS485	Transfer rate: 9,600...19,200 Baud Medium Double shielded twisted pair Impedance 120 Ω
	Ethernet	Transfer rate : 10/100 Mbps Medium STP, Cat5e, straight cable
Structure	Type	Modbus, Ethernet
	Method	Master/Slave
Device type	Modbus	Master
	Ethernet	Server
Turnaround time	Modbus	10 ms
	Ethernet	1 ms
Maximum length of cable	Modbus	1000 m
	Ethernet	100 m
Type of bus connector	Modbus	4-pin connector
	Ethernet	RJ45 (Shielded)



- A** Ethernet 1 and Ethernet 2 communication port.
- B** 24 V DC power supply terminal block.
- C** Ethernet communication LEDs:
- yellow: 10 Mb
 - green: 100 Mb.
- D** Module status LED:
- steady off: no power
 - steady green: device operational
 - steady red: major fault
 - flashing green: standby
 - flashing red: minor fault
 - flashing green/red: self-test.
- E** Network status LED:
- steady off: not power/no valid IP address
 - steady green: connected, valid IP address
 - steady orange: default IP address
 - steady red: duplicated IP address
 - flashing green/red: Self-test.
- F** Sealable transparent cover.
- G** ULP status LED.
- H** Test button (accessible closed cover).
- I** Locking pad.
- J** Modbus traffic status LED (LV434011 only).
- K** Device name label.
- L** ULP ports.

General characteristics

Environmental characteristics

Conforming to standards	UL 508, UL 60950, IEC 60950, 60947-6-2
Certification	cUIUs, GOST, FCC, CE
Ambient temperature	-20 to +70 °C (-4 to +158 °F)
Relative humidity	5–85 %
Level of pollution	Level 3
Flame resistance	ULV0

Mechanical characteristics

Shock resistance	1000 m/s ²
Resistance to sinusoidal vibrations	-5 Hz < f < 8.4 Hz

Electrical characteristics

Resistance to electromagnetic discharge	Conforming to IEC/EN 61000-4-3
Immunity to radiated fields	10 V/m
Immunity to surges	Conforming to IEC/EN 61000-4-5
Consumption	120 mA at 24 V input

Physical characteristics

Dimensions	72 x 105 x 71 mm (2.83 x 4.13 x 2.79 in.)
Mounting	DIN rail
Weight	182.5 g (0.41 lb)

Degree of protection of the installed IO	■ On the front panel (wall mounted enclosure): IP4x ■ Connectors: IP2x ■ Other parts: IP3x
--	--

Connections	Screw type terminal blocks
-------------	----------------------------

Technical characteristics - 24 V DC power supply

Power supply type	Regulated switch type
Rated power	72 W
Input voltage	100–120 V AC for single phase 200–500 V AC phase-to-phase
PFC filter	With IEC 61000-3-2
Output voltage	24 V DC
Power supply out current	3 A

Note: it is recommended to use an UL listed/UL listed recognized limited voltage/Limited current or a class 2 power supply with a 24 V DC, 3 A maximum.

IFE web page description

Monitoring web page

Real time data 67	■
Device logging	■

Control web page

Single device control	■
-----------------------	---

Diagnostics web page

Statistics	■
Device information	■
IMU information	■
Read device registers	■
Communication check	■

Maintenance web page

Maintenance log	■
Maintenance counters	■

Setup web page

Device localization/name	■
Ethernet configuration (dual port)	■
IP configuration	■
Modbus TCP/IP filtering	■
Serial port	■
Date and time	■
E-mail server configuration	■
Alarms to be e-mailed	■
Device list	■
Device logging	■
Device log export	■
SNMP parameters	■
Documentation links	■
Preferences	■
Advanced services control	■
User accounts	■
Web page access	■



IFM Modbus communication interface

PB103798-50 eps



IFM Modbus communication interface.
Ref.: TRV00210.

Function

A IFM - Modbus communication interface - is required for connection of a Masterpact or Compact to a Modbus network as long as this circuit breaker is provided with a ULP (Universal Logic Plug) port. The port is available on respectively a BCM ULP or BSCM embedded module.

The IFM is defined as an IMU (Intelligent Modular Unit) in the ULP connection System documentation.

Once connected, the circuit breaker is considered as a slave by the Modbus master. Its electrical values, alarm status, open/close signals can be monitored or controlled by a Programmable Logic Controller or any other system.

Characteristics

ULP port

2 RJ45 sockets, internal parallel wiring.

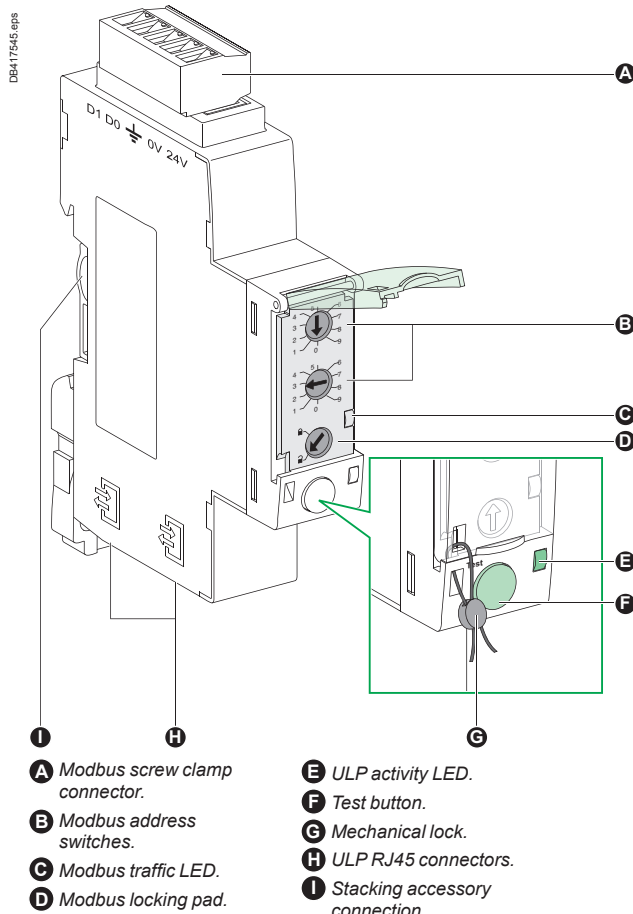
- Connection of a single circuit breaker (eventually via its I/O application module).
- A ULP line terminator or an FDM121 display unit must be connected to the second RJ45 ULP socket.

The RJ45 sockets deliver a 24 VDC supply fed from the Modbus socket.

Built-in test function, for checking the correct connection to the circuit breaker and FDM121 display unit.

Modbus slave port

- Top socket for screw-clamp connector, providing terminals for:
 - 24 VDC input supply (0V, +24 V)
 - Modbus line (D1, D2, Gnd).
 - Lateral socket, for Din-rail stackable connector.
- Both top and lateral sockets are internally parallel wired.
- Multiple IFM can be stacked, thus sharing a common power supply and Modbus line without individual wiring.
 - On the front face:
 - Modbus address setting (1 to 99): 2 coded rotary switches
 - Modbus locking pad: enables or disable the circuit breaker remote control and modification of IFM parameters.
 - Self adjusting communication format (Baud rate, parity).





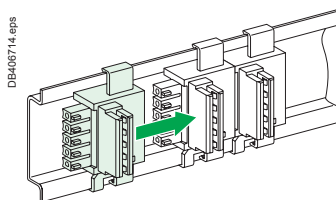
Technical characteristics

IFM Modbus communication interface

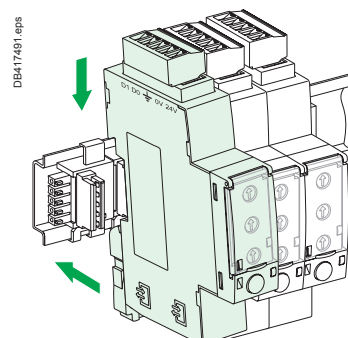
Dimensions	18 x 72 x 96 mm	
Maximum number of stacked IFM	12	
Degree of protection of the installed module	Part projecting beyond the escutcheon	IP4x
	Other module parts	IP3x
	Connectors	IP2x
Operating temperature	-25...+70 °C	
Power supply voltage	24 V DC -20 %/+10 % (19.2...26.4 V DC)	
Consumption	Typical	21 mA/24 V DC at 20 °C
	Maximum	30 mA/19.2 V DC at 60 °C
Certification		
CE	IEC/EN 60947-1	
UL	UL 508 - Industrial Control Equipment	
CSA	No. 142-M1987 - Process Control Equipment	
	■ CAN/CSA C22.2 No. 0-M91 - General requirements - Canadian Electrical Code Part	
	■ CAN/CSA C22.2 No. 14-05 - Industrial Control Equipment	

Simplified IFM installation

Staking IFM

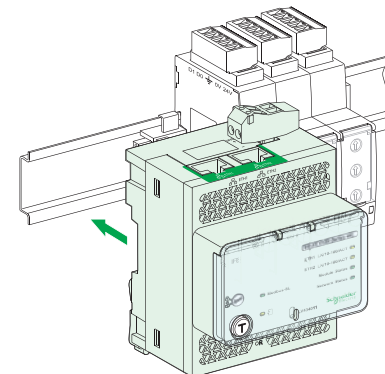
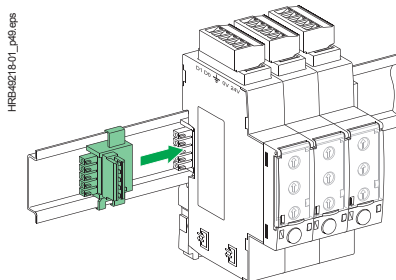


Stacking accessories



Up to 12 stacked IFM

Stacking an IFE interface + gateway with IFMs





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Description

The I/O (Input/Output) application module for LV breaker is part of an ULP system with built-in functionalities and applications to enhance the application needs. The ULP system architecture can be built without any restrictions using the wide range of circuit breakers.

The I/O application module is compliant with the ULP system specifications.

Two I/O application module can be connected in the same ULP network.

The ranges of LV circuit breakers enhanced by the I/O application module are:

- Masterpact NW
- Masterpact NT
- Compact NS1600b-3200
- Compact NS630b-1600
- Compact NSX100-630 A.

I/O (Input/Output) application module for LV breaker resources

The I/O application module resources are:

- 6 digital inputs that are self powered for either NO and NC dry contact or pulse counter
- 3 digital outputs that are bistable relay (5 A maximum)
- 1 analog input for Pt100 temperature sensor.

Pre-defined applications

Pre-defined application adds new functions to the IMU in a simple way:

- selection by the application rotary switch on the I/O application module, defining the application with pre-defined input/output assignment and wiring diagram.
- no additional setting with the customer engineering tool required.

The resources not assigned to the pre-defined application are free for additional user-defined applications:

- cradle management
- breaker operation
- light and load control
- custom.

User-defined applications

User-defined applications are processed by the I/O application module in addition to the pre-defined application selected.

The user-defined applications are available depending on:

- the pre-defined application selected
- the I/O application module resources (inputs and outputs) not used by the application.

The resources required by user-defined applications are assigned using the customer engineering tool:

- protection
- control
- energy management
- monitoring.

Mounting

The I/O application module is a DIN rail mounting device.

Application rotary switch

The application rotary switch enables the selection of the pre-defined application.

It has 9 positions and each position is assigned to a pre-defined application.

The factory set position of the switch is pre-defined application 1.

Setting locking pad

The setting locking pad on the front panel of the I/O application module enables the setting of the I/O application module by the customer engineering tool.

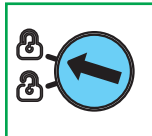
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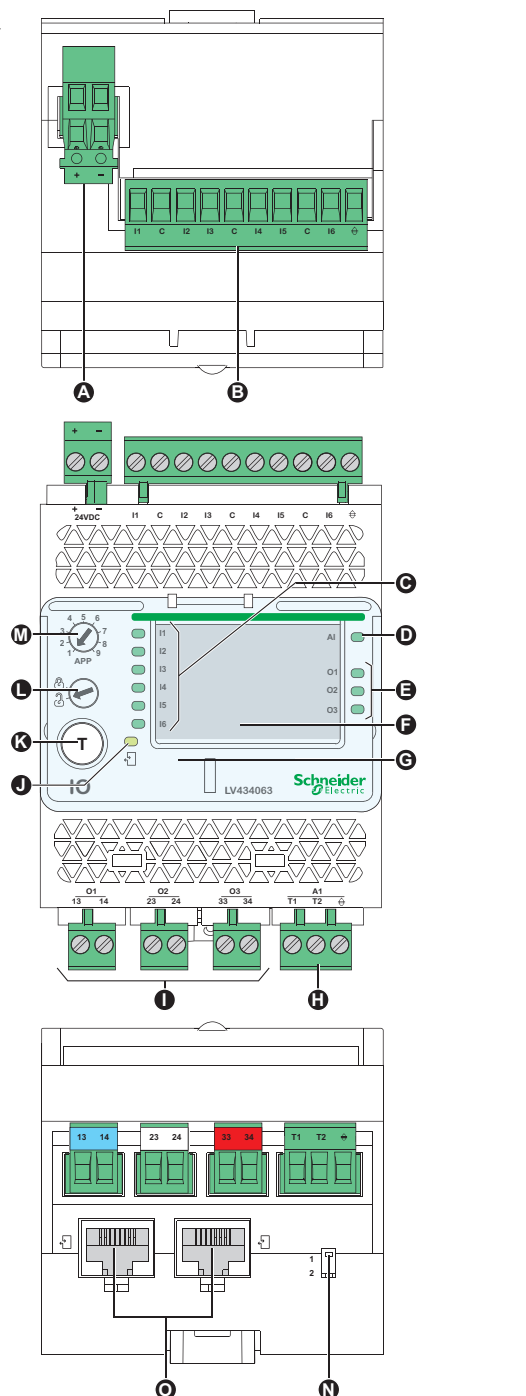


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- A** 24 V DC power supply terminal block.
B Digital input terminal block: 6 inputs, 3 commons and 1 shield.
C 6 input status LEDs.
D Analog input status LED.
E 3 output status LEDs.
F I/O application module identification labels.
G Sealable transparent cover.
H Analog input terminal block.
I Digital output terminal blocks.
J ULP status LED.
K Test/reset button (accessible with cover closed).
L Setting locking pad.
M Application rotary switch: 1 to 9.
N Switch for I/O addressing (I/O 1 or I/O 2).
O ULP connectors.

General characteristics

Environmental characteristics

Conforming to standards	UL 508, UL 60950, IED 60950, 60947-6-2
Certification	cUIUs, GOST, FCC, CE
Ambient temperature	-20 to +70 °C (-4 to +158 °F)
Relative humidity	5–85 %
Level of pollution	Level 3
Flame resistance	ULV0

Mechanical characteristics

Shock resistance	1000 m/s ²
Resistance to sinusoidal vibrations	-5 Hz < f < 8.4 Hz

Electrical characteristics

Resistance to electromagnetic discharge	Conforming to IEC/EN 61000-4-3
Immunity to radiated fields	10 V/m
Immunity to surges	Conforming to IEC/EN 61000-4-5
Consumption	165 mA

Physical characteristics

Dimensions	71.7 x 116 x 70.6 mm (2.83 x 4.56 x 2.78 in.)
Mounting	DIN rail
Weight	229.5 g (0.51 lb)
Degree of protection of the installed I/O application module	- On the front panel (wall mounted enclosure): IP4x - IO parts: IP3x - Connectors: IP2x

Connections	Screw type terminal blocks
-------------	----------------------------

Technical characteristics - 24 V DC power supply

Power supply type	Regulated switch type
Rated power	72 W
Input voltage	100–120 V AC for single phase 200–500 V AC phase-to-phase
PFC filter	With IEC 61000-3-2
Output voltage	24 V DC
Power supply out current	3 A

Note: it is recommended to use an UL listed/UL listed recognized limited voltage/Limited current or a class 2 power supply with a 24 V DC, 3 A maximum.

Digital inputs

Digital input type	Self powered digital input with current limitations as per IEC 61131-2 type 2 standards (7 mA)
Input limit values at state 1 (close)	19.8–25.2 V DC, 6.1–8.8 mA
Input limit values at state 0 (open)	0–19.8 V DC, 0 mA
Maximum cable length	10 m (33 ft)

Note: for a length greater than 10 m (33 ft) and up to 300 m (1,000 ft), it is mandatory to use a shielded twisted cable. The shield cable is connected to the I/O functional ground of the I/O application module.

Digital outputs

Digital output type	Bistable relay
Rated load	5 A at 250 V AC
Rated carry current	5 A
Maximum switching voltage	380 V AC, 125 V DC
Maximum switch current	5 A
Maximum switching power	1250 VA, 150 W
Minimum permissible load	10 mA at 5 V DC
Contact resistance	30 mΩ
Maximum operating frequency	18000 operations/hr (Mechanical) 1800 operations/hr (Electrical)
Digital output relay protection by an external fuse	External fuse of 5 A or less
Maximum cable length	10 m (33 ft)

Analog inputs

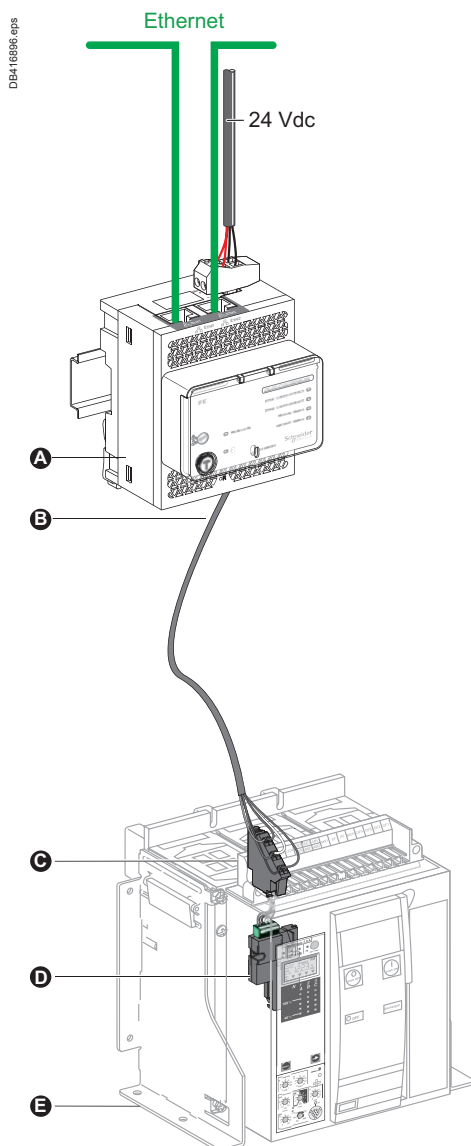
The I/O application module analog input can be connected to a Pt100 temperature sensor		
Range	-30 to 200 °C	-22 to 392 °F
Accuracy	±2 °C from -30 to 20 °C	±3.6 °F from -22 to 68 °F
	±1 °C from 20 to 140 °C	±1.8 °F from 68 to 284 °F
	±2 °C from 140 to 200 °C	±3.6 °F from 284 to 392 °F
Refresh interval	5 s	5 s



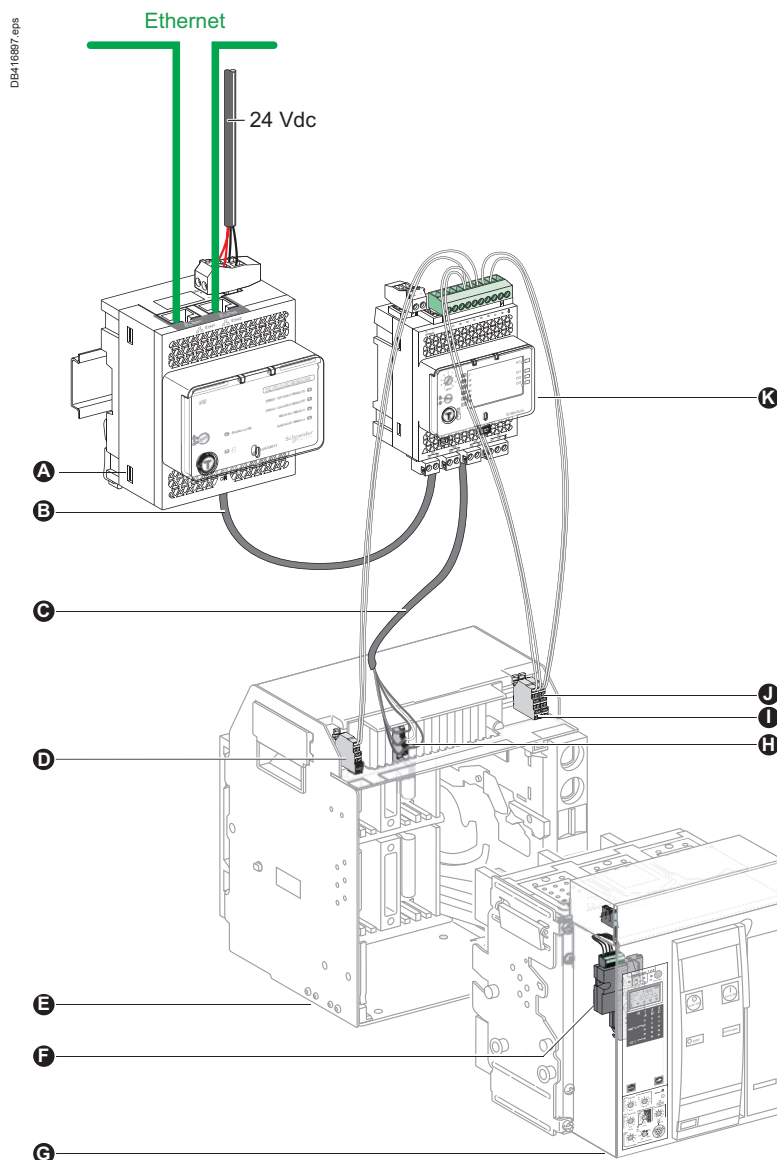
Connection of the IFE to a fixed or drawout Masterpact NT/NW

Connect the IFE to a fixed electrically operated Masterpact NT/NW or circuit breaker using the breaker ULP cord

Connect the IFE to a drawout Masterpact NT/NW or circuit breaker using the breaker ULP cord



- Ⓐ IFE Ethernet interface for LV circuit breaker
- Ⓑ Breaker ULP cord
- Ⓒ Fixed terminal block
- Ⓓ BCM ULP communication module
- Ⓔ Fixed electrically operated circuit breaker

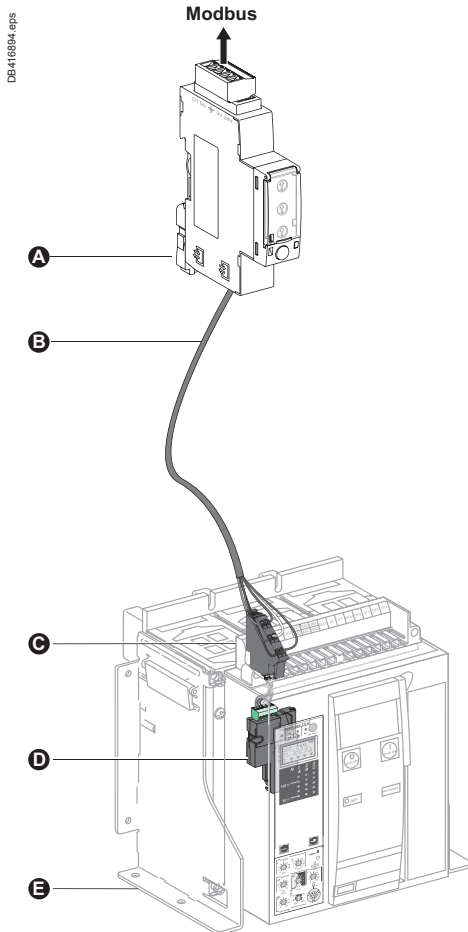


- Ⓐ IFE Ethernet interface for LV circuit breaker
- Ⓑ ULP cable
- Ⓒ Breaker ULP cord
- Ⓓ Circuit breaker disconnected position contact (CD)
- Ⓔ Circuit breaker cradle
- Ⓕ BCM ULP communication module
- Ⓖ Drawout circuit breaker
- Ⓗ Drawout terminal block
- Ⓘ Circuit breaker connected position contact (CE)
- ⓵ Circuit breaker test position contact (CT)
- Ⓚ I/O (Input/Output) application module for LV circuit breaker



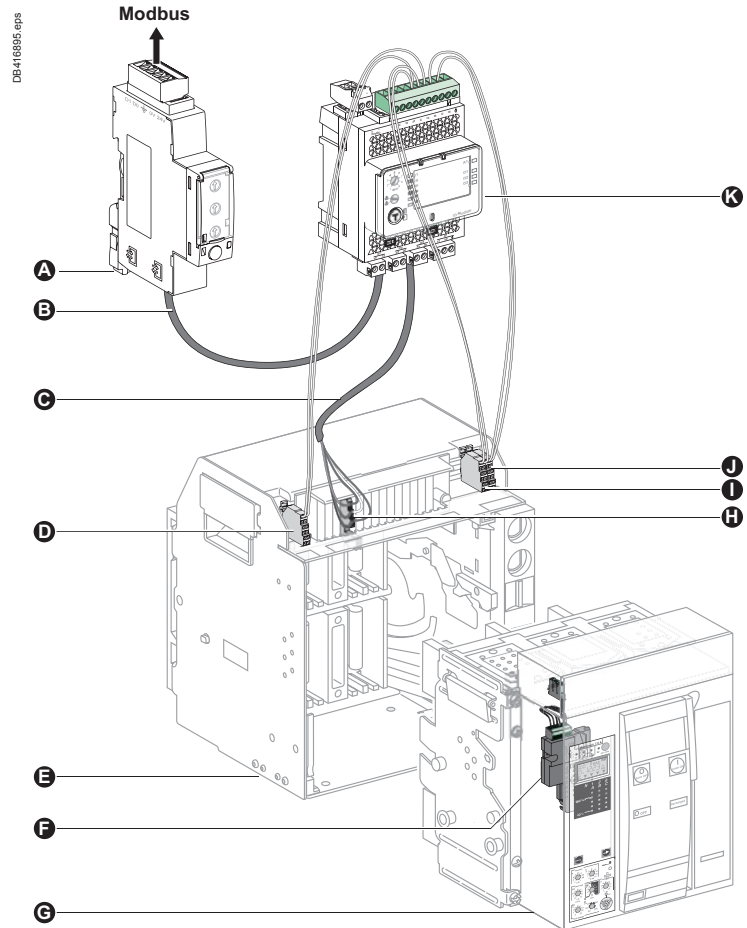
Connection of the IFM to a fixed or drawout Masterpact NT/NW

Connect the IFM to a fixed electrically operated Masterpact NT/NW or circuit breaker using the breaker ULP cord

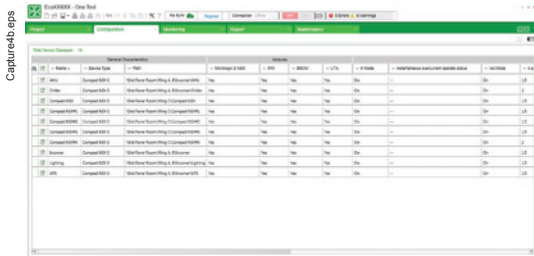
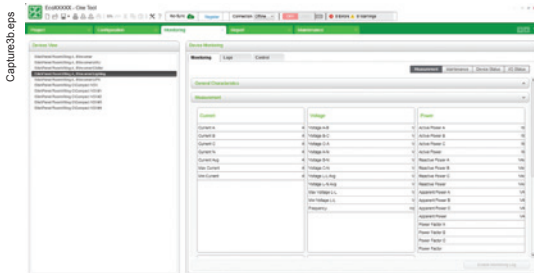
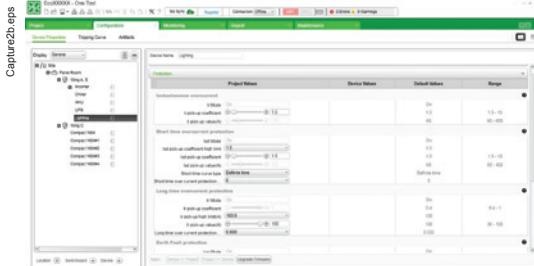
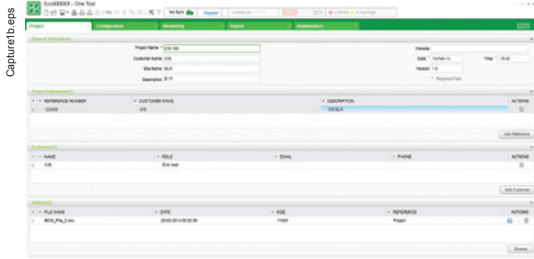


- A** IFM Ethernet interface for LV circuit breaker
- B** Breaker ULP cord
- C** Fixed terminal block
- D** BCM ULP communication module
- E** Fixed electrically operated circuit breaker

Connect the IFM to a drawout Masterpact NT/NW or circuit breaker using the breaker ULP cord



- A** IFM Ethernet interface for LV circuit breaker
- B** ULP cable
- C** Breaker ULP cord
- D** Circuit breaker disconnected position contact (CD)
- E** Circuit breaker cradle
- F** BCM ULP communication module
- G** Drawout circuit breaker
- H** Drawout terminal block
- I** Circuit breaker connected position contact (CE)
- J** Circuit breaker test position contact (CT)
- K** I/O (Input/Output) application module for LV circuit breaker



Introduction

Electrical Asset Manager is a software application that helps the user to manage a project as part of designing, testing, site commissioning, and maintenance of the project life cycle.

It enables the user to prepare the settings of the devices offline (without connecting to the device) and configure them when connected with the devices. Also it provides lot of other value added features for the user to manage the project such as, safe repository in cloud, attach artifacts to each device or at the project level, organize devices in switchboard wise, manage a hierarchical structure of the installation etc.

Compatible devices (configuration and device management)

Electrical Asset Manager is compatible with the following devices:

- Compact NSX100-630 (IEC)
- PowerPact™ (UL) circuit breaker
- Compact NS630b-3200 (IEC)
- Masterpact NT/NW (IEC and UL) circuit breaker
- Acti9 Smartlink.
- Compatible devices (Device Management in the project)
- Switch disconnectors (Compact NSX, Masterpact & PowerPact Family)
- Third party devices.

References:

Electrical Asset Manager software package can be downloaded from our website www.schneider-electric.com.

Features

Electrical Asset Manager supersedes the Schneider Electric customer engineering tools such as Remote setting Utility (RSU) and Remote Control Utility (RCU) with additional features.

Electrical Asset Manager supports the connection of Schneider Electric communicable devices to:

- create projects by device discovery, selection of devices, and import Bill of Material (BOM)
- monitor the status of protection and IO status
- read information (alarms, measurements, parameters)
- check protection discrimination between two devices
- upload and download of configuration or settings in batch mode to multiple devices.
- carry out commands and tests
- generate and print device settings report and communication test report
- manage multiple devices with electrical and communication hierarchy model
- manage artifacts (project documents)
- check consistency in settings between devices on a communication network
- compare configuration settings between PC and device (online)
- download latest firmware.

Electrical Asset Manager enables the user to avail the advanced features of the software once the project is saved in Schneider Electric cloud.



Capture6b.eps

Electrical Asset Manager



Functions

Offline Mode

A project can be built in offline mode through 2 different ways:

- through BOM file import
- through Device Selection.

Additionally, the user can open an existing project and modify the settings offline. The user can do the discrimination curve check and firmware compatibility check for devices in the project.

Online Mode

A project can be built in online mode through device discovery also other than the methods possible through offline method.

Once the project is built, the following functions can be performed in addition to the functions available in offline mode:

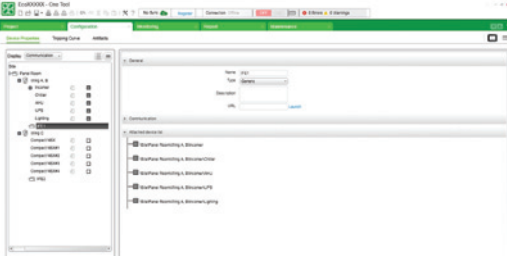
- compare the device parameters with project parameters
- load parameters from project to the device and vice versa
- firmware downloads to the device
- monitor the measurement, maintenance, device status and I/O status
- control functions.

User Interface

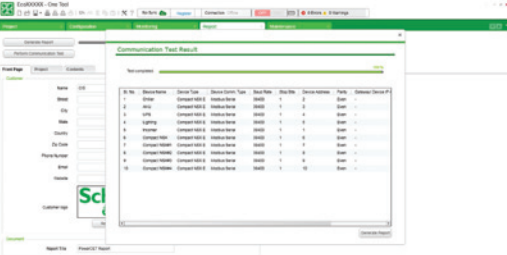
Electrical Asset Manager software provides fast direct access to the project and the devices in the project through different tabs.

- **Project:** to provide the project information including customer details, project references and to add project artifacts (documents related to the project).
- **Configuration:** to build up the tree structure of the project architecture ; to have a table view of the devices added in the project ; to set the parameters of the devices ; to transfer the device settings ; to view the tripping curves; to attach device artifacts and to download the latest firmware, to do the communication test for all the devices and generate the test report.
- **Monitoring:** this allows the user to monitor the real time values of different devices through different sub tabs namely Monitoring, Logs and Control.
- **Reports:** report tab allows you to generate and print a report of the project settings from the report tab. The user details and project characteristics are automatically filled with the details entered in the Project page.

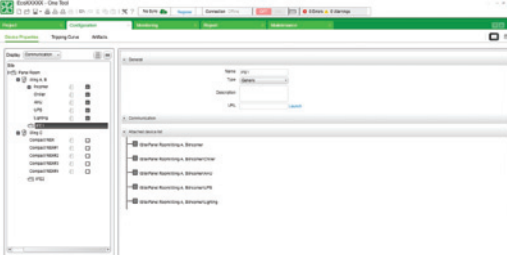
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Three types of connection are available:

- vertical or horizontal rear connection
- front connection (NT only)
- mixed connection.

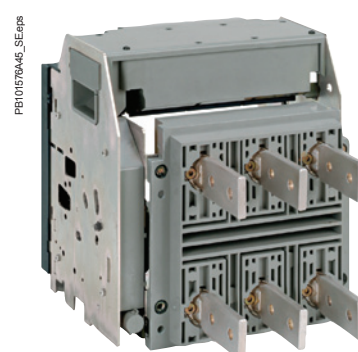
The solutions presented are similar in principle for all Masterpact NT and NW fixed and drawout devices.

Rear connection

Horizontal

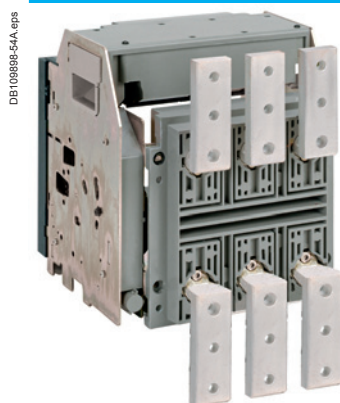


Vertical

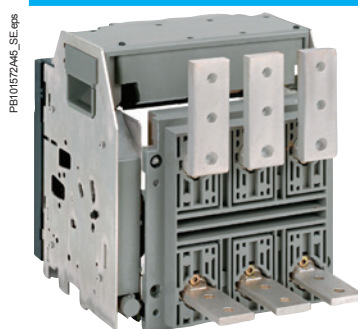


Simply turn a horizontal rear connector 90° to make it a vertical connector.

Front connection (NT only)



Mixed connection



Note: Masterpact circuit breakers can be connected indifferently with bare-copper, tinned-copper and tinned-aluminium conductors, requiring no particular treatment.



Accessories

Mounting on a switchboard backplate using special brackets

Masterpact NT fixed front-connected circuit breakers can be installed on a backplate without any additional accessories.

Masterpact NW circuit breakers require a set of special brackets.

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Safety shutters V0

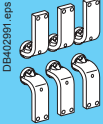
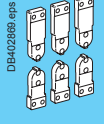
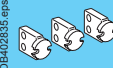
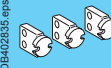
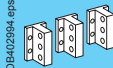
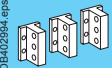
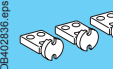
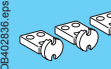
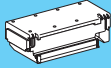
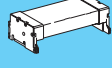
Mounted on the chassis, the safety shutters automatically block access to the disconnecting stabs when the device is in the disconnected or test positions.

When the device is removed from its chassis, no live parts are accessible.

The shutter-locking system in front may be used to:

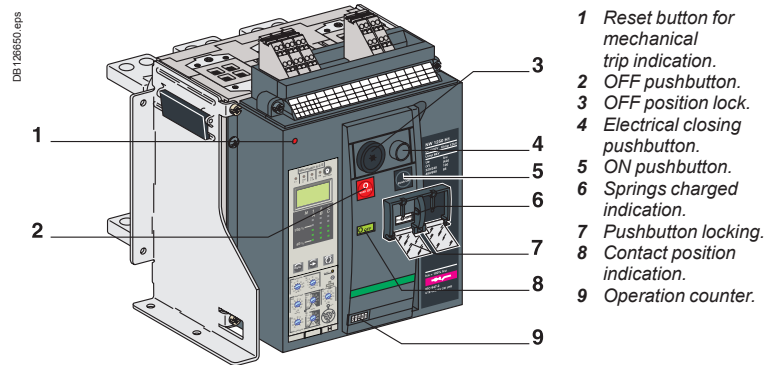
- prevents connection of the device
- locks the shutters in the closed position.



Type of accessory	Masterpact NT08 to NT12				Masterpact NW08 to NW50			
	Fixed Front connection	Rear connection	Drawout Front connection	Rear connection	Fixed Front connection	Rear connection	Drawout Front connection	Rear connection
Connection								
Vertical connection								
Horizontal connection								
Rear connection accessories: arc chute cover								
Rear connection accessories: auxiliary terminal shield								
Rear connection accessories: safety shutters								
Rear connection accessories: brackets for mounting on a backplate								



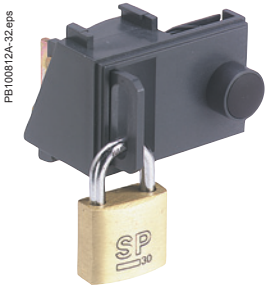
Locking On the device



Access to pushbuttons protected by transparent cover.



Pushbutton locking using a padlock.



OFF position locking using a padlock.



OFF position locking using a keylock.

Pushbutton locking VBP

The transparent cover blocks access to the pushbuttons used to open and close the device.

It is possible to independently lock the opening button and the closing button.

The locking device is often combined with a remote operating mechanism.

The pushbuttons may be locked using either:

- three padlocks (not supplied)
- lead seal
- two screws.

Device locking in the OFF position

VCPO by padlocks - VSPO by keylocks

The circuit breaker is locked in the OFF position by physically maintaining the opening pushbutton pressed down:

- using padlocks (one to three padlocks, not supplied)
- using keylocks (one or two different keylocks, supplied).

Keys may be removed only when locking is effective (Profalux or Ronis type locks).

The keylocks are available in any of the following configurations:

- one keylock
- one keylock mounted on the device + one identical keylock supplied separately for interlocking with another device
- two different key locks for double locking.

Profalux and Ronis keylocks are compatible with each other.

A locking kit (without locks) is available for installation of one or two keylocks (Ronis, Profalux, Kirk or Castell) not supplied.

Accessory-compatibility

For Masterpact NT: 3 padlocks or 1 keylock

For Masterpact NW: 3 padlocks and/or 2 keylocks

Cable-type door interlock IPA

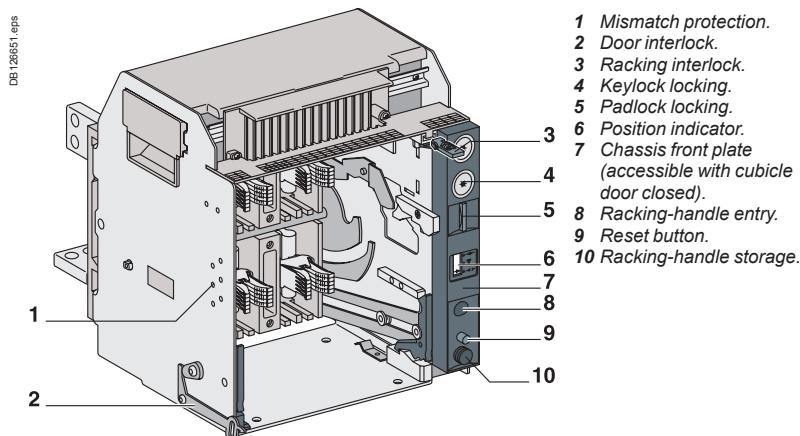
This option prevents door opening when the circuit breaker is closed and prevents circuit breaker closing when the door is open.

For this, a special plate associated with a lock and a cable is mounted on the right side of the circuit breaker.

With this interlock installed, the source changeover function cannot be implemented.



Locking On the chassis



"Disconnected" position locking by padlocks.



"Disconnected" position locking by keylocks.

"Disconnected" position locking

By padlocks (standard) or keylocks (VSPD option)

Mounted on the chassis and accessible with the door closed, these devices lock the circuit breaker in the "disconnected" position in two manners:

- using padlocks (standard), up to three padlocks (not supplied)
- using keylocks (optional), one or two different keylocks are available.

Profalux and Ronis keylocks are available in different options:

- one keylock
- two different keylocks for double locking
- one (or two) keylocks mounted on the device + one (or two) identical keylocks supplied separately for interlocking with another device.

A locking kit (without locks) is available for installation of one or two keylocks (Ronis, Profalux, Kirk or Castell) not supplied.

"Connected", "disconnected" and "test" position locking

The "connected", "disconnected" and "test" positions are shown by an indicator and are mechanically indexed. The exact position is obtained when the racking handle blocks. A release button is used to free it.

As standard, the circuit breaker can be locked only in "disconnected" position.

On request, the locking system may be modified to lock the circuit breaker in any of the three positions: "connected", "disconnected" or "test".



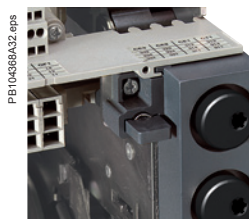
Door interlock.

Door interlock catch VPEC

Mounted on the right or left-hand side of the chassis, this device inhibits opening of the cubicle door when the circuit breaker is in "connected" or "test" position. If the breaker is put in the "connected" position with the door open, the door may be closed without having to disconnect the circuit breaker.

Racking interlock VPOC

This device prevents insertion of the racking handle when the cubicle door is open.



Racking interlock.

Cable-type door interlock IPA

This option is identical for fixed and drawout versions.

Racking interlock between crank and OFF pushbutton IBPO (for NW only)

This option makes it necessary to press the OFF pushbutton in order to insert the racking handle and holds the device open until the handle is removed.

Automatic spring discharge before breaker removal DAE (for NW only)

This mechanism discharges the springs before the breaker is removed from the chassis.



Mismatch protection.

Mismatch protection VDC

Mismatch protection ensures that a circuit breaker is installed only in a chassis with compatible characteristics. It is made up of two parts (one on the chassis and one on the circuit breaker) offering twenty different combinations that the user may select.

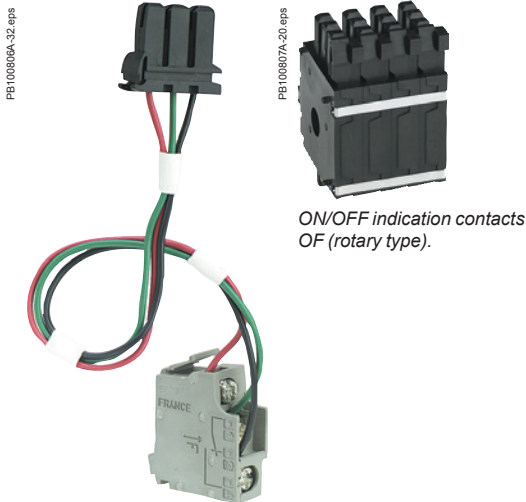
Indication contacts



Indication contacts are available:

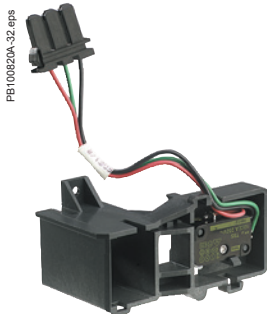
- in the standard version for relay applications
- in a low-level version for control of PLCs and electronic circuits.

M2C and M6C contacts may be programmed via the Micrologic E, P and H control units.

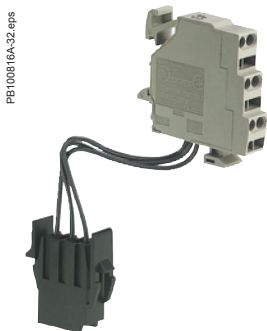


ON/OFF indication contacts
OF (rotary type).

ON/OFF indication contacts
OF (microswitch type)



Additional "fault-trip"
indication contacts SDE.



Combined contacts.

ON/OFF indication contacts OF

Two types of contacts indicate the ON or OFF position of the circuit breaker:

- microswitch type changeover contacts for Masterpact NT
- rotary type changeover contacts directly driven by the mechanism for Masterpact NW. These contacts trip when the minimum isolation distance between the main circuit-breaker contacts is reached.

OF	NT	NW
Supplied as standard	4	4
Maximum number	4	12
Breaking capacity (A) p.f.: 0.3	Minimum load: 100 mA/24 V	
Standard	V AC	240/380
		480
		600/690
	V DC	24/48
		240
		380
Low-level	V AC	24/48
		240
		380
	V DC	24/48
		125
		250

(1) Standard indication contact 10 A ; optional contacts 6 A.

"Fault-trip" indication contacts SDE

Circuit-breaker tripping due to a fault is signalled by:

- a red mechanical fault indicator (reset)
- one changeover contact SDE.

Following tripping, the mechanical indicator must be reset before the circuit breaker may be closed. One SDE is supplied as standard. An optimal SDE may be added. This latter is incompatible with the electrical reset after fault-trip option (Res).

SDE			NT/NW	
Supplied as standard			1	
Maximum number			2	
Breaking capacity (A) p.f.: 0.3	Standard	Minimum load: 100 mA/24 V		
		V AC	240/380	6
			480	2
		V DC	24/48	3
			240	0.3
			380	0.15
	Low-level	Minimum load: 2 mA/15 V		
		V AC	24/48	3
			240	3
			380	3
		V DC	24/48	3
			125	0.3
250	0.15			

Combined "connected/closed" contacts EF

The contact combines the "device connected" and the "device closed" information to produce the "circuit closed" information. Supplied as an option for Masterpact NW, it is mounted in place of the connector of an additional OF contact.

EF	NW		
Maximum number	8		
Breaking capacity (A)	Standard	Minimum load: 100 mA/24 V	
p.f.: 0.3	V AC	240/380	6
		480	6
		600/690	6
	V DC	24/48	2.5
		125	0.8
		250	0.3
	Low-level	Minimum load: 2 mA/15 V	
	V AC	24/48	5
		240	5
		380	5
	V DC	24/48	2.5
		125	0.8
		250	0.3

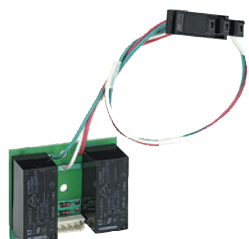


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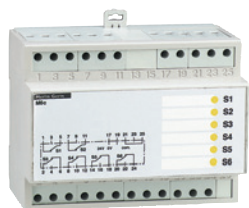
CCE, CD and CT "connected/disconnected/test" position carriage switches

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M2C programmable contacts: circuit-breaker internal relay with two contacts.

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M6C programmable contacts:
circuit-breaker external relay with six independent changeover
contacts controlled from the circuit breaker via a three-wire
connection. (maximum length is 10 meters).

"Connected", "disconnected" and "test" position carriage switches

Three series of optional auxiliary contacts are available for the chassis:

- changeover contacts to indicate the "connected" position CE
- changeover contacts to indicate the "disconnected" position CD. This position is indicated when the required clearance for isolation of the power and auxiliary circuits is reached
- changeover contacts to indicate the "test" position CT. In this position, the power circuits are disconnected and the auxiliary circuits are connected.

Additional actuators

A set of additional actuators may be installed on the chassis to change the functions of the carriage switches.

				NT			NW		
Contacts				CE/CD/CT			CE/CD/CT		
Maximum number	Standard with additional actuators	3	2	1	3	3	3		
					9	0	0		
					6	3	0		
					6	0	3		
Breaking capacity (A) p.f.: 0.3	Standard	Minimum load: 100 mA/24 V							
		V AC	240	8		8			
			380	8		8			
			480	8		8			
	600/690		6		6				
	V DC	24/48	2.5		2.5				
		125	0.8		0.8				
		250	0.3		0.3				
		Low-level	Minimum load: 2 mA/15 V						
	V AC		24/48	5		5			
			240	5		5			
			380	5		5			
	V DC		24/48	2.5		2.5			
			125	0.8		0.8			
			250	0.3		0.3			

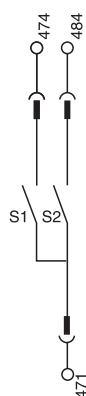
M2C / M6C programmable contacts

These contacts, used with the Micrologic E, P and H control units, may be programmed via the control unit keypad or via a supervisory station with the COM communication option. They require an external power supply module.

The M2C (two contacts) and M6C (six contacts) auxiliary contacts may be used to signal threshold overruns or status changes. They can be programmed using the keypad on the Micrologic P control unit or remotely using the COM option (BCM ULP).

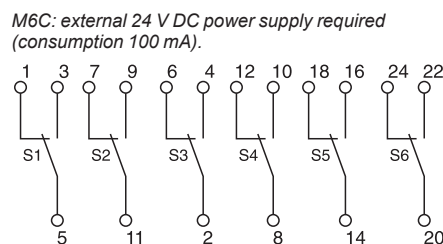
Micrologic		Type E		Type P, H	
Characteristics		M2C		M2C/M6C	
Minimum load		100 mA/24 V		100 mA/24 V	
Breaking capacity (A) p.f.: 0.7	V AC	240	5	5	
		380	3	3	
	V DC	24	1.8	1.8	
		48	1.5	1.5	
		125	0.4	0.4	
		250	0.15	0.15	

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M2C: 24 V DC
power supplied by
control unit
(consumption
100 mA).

DB101170.eps



M6C: external 24 V DC power supply required
(consumption 100 mA).



Remote operation

Remote ON / OFF

Two solutions are available for remote operation of Masterpact devices:

- a point-to-point solution
- a bus solution with the COM communication option.



Note: an opening order always takes priority over a closing order.

If opening and closing orders occur simultaneously, the mechanism discharges without any movement of the main contacts. The circuit breaker remains in the open position (OFF).

In the event of maintained opening and closing orders, the standard mechanism provides an anti-pumping function by blocking the main contacts in open position.

Anti-pumping function. After fault tripping or intentional opening using the manual or electrical controls, the closing order must first be discontinued, then reactivated to close the circuit breaker.

When the automatic reset after fault trip (RAR) option is installed, to avoid pumping following a fault trip, the automatic control system must take into account the information supplied by the circuit breaker before issuing a new closing order or blocking the circuit breaker in the open position (information on the type of fault, e.g. overload, short-time fault, earth fault, earth leakage, short-circuit, etc.).

Note: MX communicating releases are of the impulse type only and cannot be used to lock a circuit breaker in OFF position. For locking in OFF position, use the remote tripping function (2nd MX or MN).

When MX or XF communicating releases are used, the third wire (C3, A3) must be connected even if the communication module is not installed. When the control voltage (C3-C1 or A3-A1) is applied to the MX or XF releases, it is necessary to wait 1.5 seconds before issuing an order. Consequently, it is advised to use standard MX or XF releases for applications such as source-changeover systems.

The remote ON / OFF function is used to remotely open and close the circuit breaker. It is made up of:

- an electric motor MCH equipped with a "springs charged" limit switch contact CH
- two voltage releases:
 - a closing release XF
 - an opening release MX.

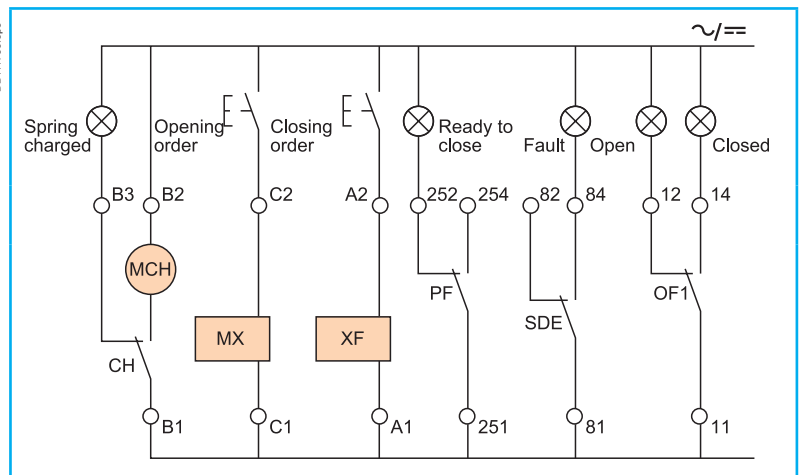
Optionally, other functions may be added:

- a "ready to close" contact PF
- an electrical closing pushbutton BPFE
- remote RES following a fault.

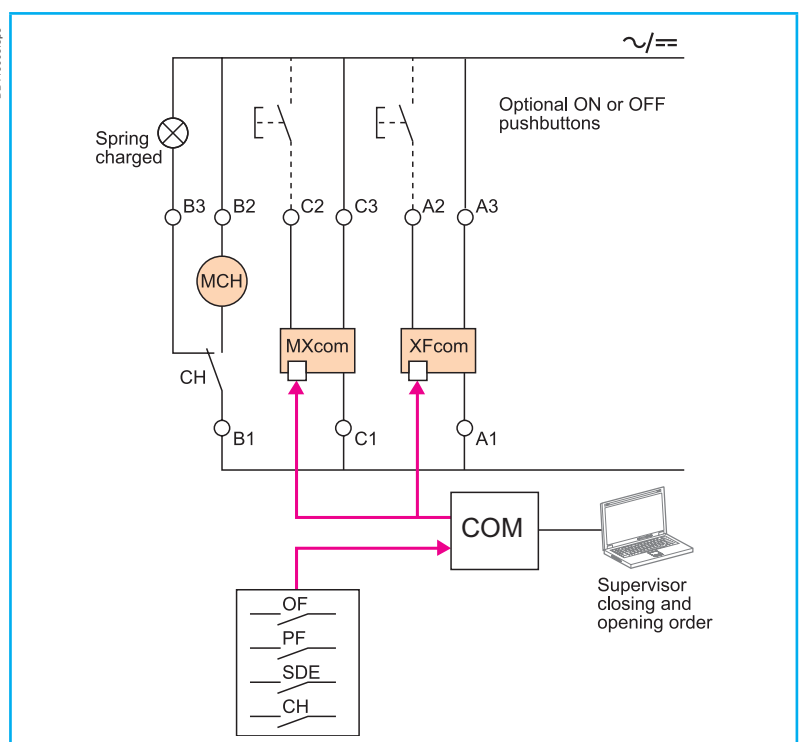
A remote-operation function is generally combined with:

- device ON / OFF indication OF
- "fault-trip" indication SDE.

Wiring diagram of a point-to-point remote ON / OFF function



Wiring diagram of a bus-type remote ON / OFF function





Remote operation

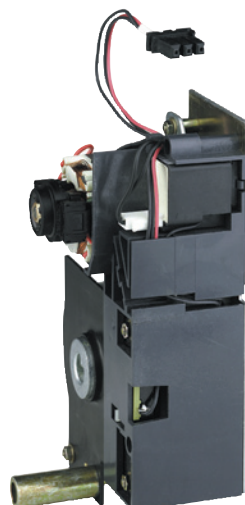
Remote ON / OFF

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Electric motor MCH for Masterpact NT.

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Electric motor MCH for Masterpact NW.

Electric motor MCH

The electric motor automatically charges and recharges the spring mechanism when the circuit breaker is closed. Instantaneous reclosing of the breaker is thus possible following opening. The spring-mechanism charging handle is used only as a backup if auxiliary power is absent.

The electric motor (MCH) is equipped as standard with a limit switch contact (CH) that signals the "charged" position of the mechanism (springs charged).

Characteristics

Power supply	V AC 50/60 Hz	48-60, 100-130, 200-250, 277-415, 380-415, 440-480
	V DC	24-30, 48-60, 100-130, 200-250
Operating threshold	0.85 to 1.1 Un	
Consumption (VA or W)	180	
Motor overcurrent	2 to 3 In for 0.1 s	
Charging time	maximum 3 s for Masterpact NT	
	maximum 4 s for Masterpact NW	
Operating frequency	maximum 3 cycles per minute	
CH contact	10 A at 240 V	

Voltage releases XF and MX

Their supply can be maintained or automatically disconnected.

Closing release XF

The XF release remotely closes the circuit breaker if the spring mechanism is charged.

Opening release MX

The MX release instantaneously opens the circuit breaker when energised. It locks the circuit breaker in OFF position if the order is maintained (except for MX "communicating" releases).

Note: whether the operating order is maintained or automatically disconnected (pulse-type), XF or MX "communicating" releases ("bus" solution with "COM" communication option) always have an impulse-type action (see diagram).

Characteristics

	XF	MX1
Power supply	V AC 50/60 Hz	24, 48, 100-130, 200-250, 277, 380/480
	V DC	12, 24-30, 48-60, 100-130, 200-250
Operating threshold	0.85 to 1.1 Un	
Consumption (VA or W)	Hold: 4.5	
	Pick-up: 200 (200 ms)	
Circuit-breaker response time at Un	55 ms ±10 (Masterpact NT)	
	70 ms ±10 (NW ≤ 4000A)	
	80 ms ±10 (NW > 4000A)	

"Ready to close" contact PF

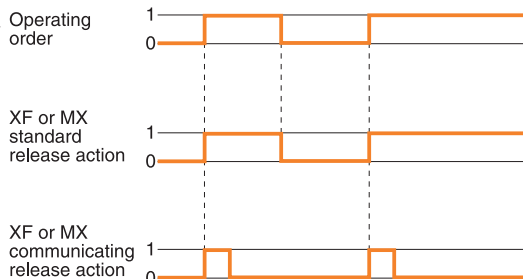
The "ready to close" position of the circuit breaker is indicated by a mechanical indicator and a PF changeover contact. This signal indicates that all the following are valid:

- the circuit breaker is in the OFF position
- the spring mechanism is charged
- a maintained opening order is not present:
- ☐ MX energised
- ☐ fault trip
- ☐ remote tripping (second MX or MN)
- ☐ device not completely racked in
- ☐ device locked in OFF position
- ☐ device interlocked with a second device.

Characteristics

	NT/NW	
Maximum number	1	
Breaking capacity (A) p.f.: 0.3	Standard	Minimum load: 100 mA/24 V
		V AC 240/380 5
		480 5
		600/690 3
		V DC 24/48 3
		125 0.3
		250 0.15
	Low-level	Minimum load: 2 mA/15 V
		V AC 24/48 3
		240 3
		380 3
		V DC 24/48 3
		125 0.3
		250 0.15

DB101179.eps



PB100809A-16.eps

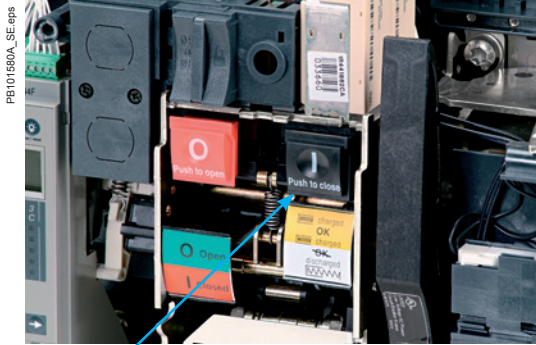


XF and MX voltage releases.

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"Ready to close" contacts PF.



Electrical closing pushbutton (BPFE).

Electrical closing pushbutton BPFE

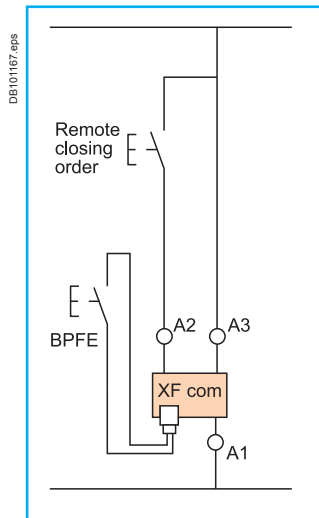
Located on the front panel, this pushbutton carries out electrical closing of the circuit breaker. It is generally associated with the transparent cover that protects access to the closing pushbutton.

Electrical closing via the BPFE pushbutton takes into account all the safety functions that are part of the control/monitoring system of the installation.

The BPFE connects to the closing release XF in place of the COM module.

The COM module is incompatible with this option;

Different types of voltage exist and the XF electromagnet is compulsory if the BPFE option is selected.



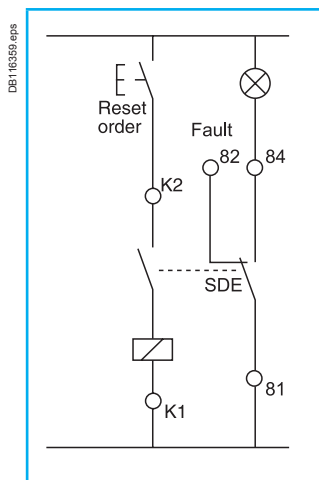
Remote reset after fault trip

Electrical reset after fault trip RES

Following tripping, this function resets the "fault trip" indication contacts SDE and the mechanical indicator and enables circuit breaker closing.

Power supply: 110 / 130 V AC and 200 / 240 V AC.

The use of a XF closing release is compulsory with this option.



Automatic reset after fault trip RAR

Following tripping, a reset of the mechanical indicator (reset button) is no longer required to enable circuit-breaker closing. The mechanical (reset button) and electrical SDE indications remain in fault position until the reset button is pressed.

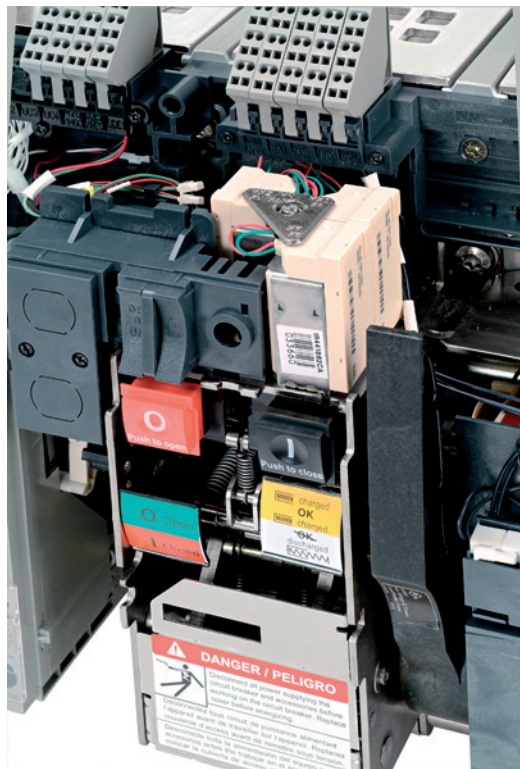
The use of a XF closing release is compulsory with this option.



Remote operation

Remote tripping

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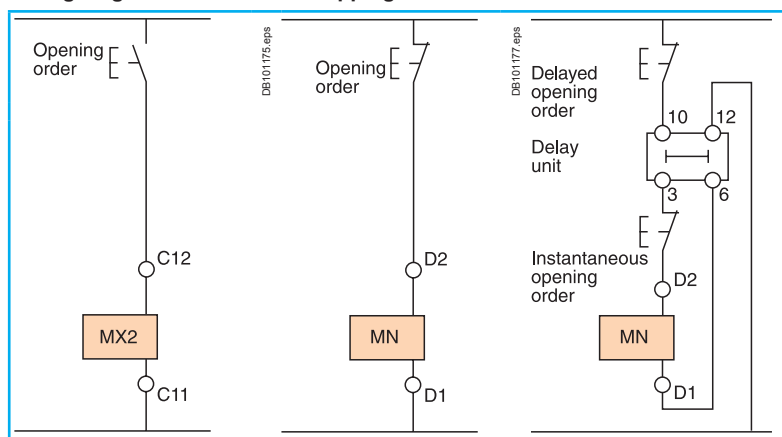
This function opens the circuit breaker via an electrical order. It is made up of:

- a shunt release second MX
- or an undervoltage release MN
- or a delayed undervoltage release MNR: MN + delay unit.

These releases 2nd MX or MN cannot be operated by the communication bus.

The delay unit, installed outside the circuit breaker, may be disabled by an emergency OFF button to obtain instantaneous opening of the circuit breaker.

Wiring diagram for the remote-tripping function



Voltage releases second MX

When energised, the MX voltage release instantaneously opens the circuit breaker. A continuous supply of power to the second MX locks the circuit breaker in the OFF position.

Characteristics

Power supply	V AC 50/60Hz	24, 48, 100-130, 200-250, 277, 380/480
	V DC	12, 24-30, 48-60, 100-130, 200-250
Operating threshold	0.7 to 1.1 Un	
Permanent locking function	0.85 to 1.1 Un	
Consumption (VA or W)	Pick-up: 200 (80 ms)	Hold: 4.5
Circuit-breaker response time at Un	50 ms ±10	

Instantaneous voltage releases MN

The MN release instantaneously opens the circuit breaker when its supply voltage drops to a value between 35 % and 70 % of its rated voltage. If there is no supply on the release, it is impossible to close the circuit breaker, either manually or electrically. Any attempt to close the circuit breaker has no effect on the main contacts. Circuit-breaker closing is enabled again when the supply voltage of the release returns to 85 % of its rated value.

Characteristics

Power supply	V AC 50/60 Hz	24, 48, 100-130, 200-250, 277, 380/480
	V DC	12, 24-30, 48-60, 100-130, 200-250
Operating threshold	Opening	0.35 to 0.7 Un
	Closing	0.85 Un
Consumption (VA or W)	Pick-up: 200 (200 ms)	Hold: 4.5
MN consumption with delay unit (VA or W)	Pick-up: 200 (200 ms)	Hold: 4.5
Circuit-breaker response time at Un	40 ms ±5 for NT	
	90 ms ±5 for NW	

MN delay units

To eliminate circuit-breaker nuisance tripping during short voltage dips, operation of the MN release can be delayed. This function is achieved by adding an external delay unit in the MN voltage-release circuit. Two versions are available, adjustable and non-adjustable.

Characteristics

Power supply	Non-adjustable	100-130, 200-250
	Adjustable	48-60, 100-130, 200-250, 380/480
Operating threshold	Opening	0.35 to 0.7 Un
	Closing	0.85 Un
Consumption of delay unit	Pick-up: 200 (200 ms)	Hold: 4.5
Circuit-breaker response time at Un	Non-adjustable	0.25 s
	Adjustable	0.5 s - 1 s - 1.5 s - 3 s

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MX or MN voltage release.

Accessories



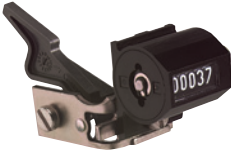
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Auxiliary terminal shield CB

Optional equipment mounted on the chassis, the shield prevents access to the terminal block of the electrical auxiliaries.

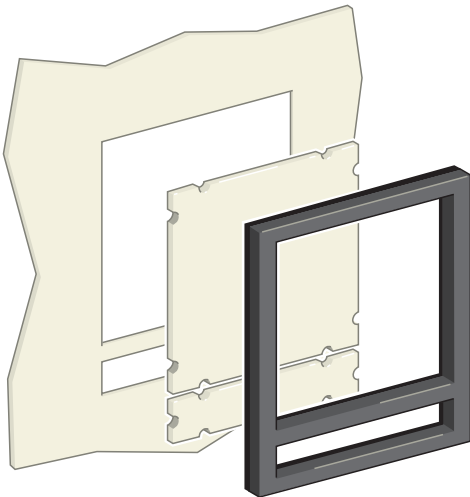
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Operation counter CDM

The operation counter sums the number of operating cycles and is visible on the front panel. It is compatible with manual and electrical control functions.

DB101173.eps



Escutcheon CDP

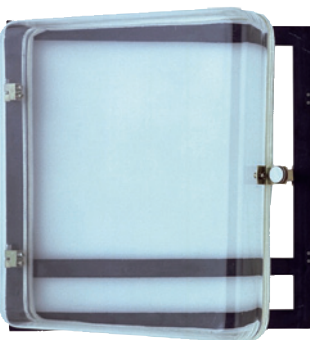
Optional equipment mounted on the door of the cubicle. The escutcheon increases the degree of protection to IP 40 (circuit breaker installed free standing: IP30). It is available in fixed and drawout versions.

Blanking plate OP for escutcheon

Used with the escutcheon, this option closes off the door cut-out of a cubicle not yet equipped with a device. It may be used with the escutcheon for both fixed and drawout devices.

Escutcheon CDP with blanking plate.

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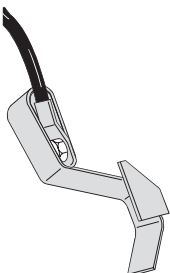


Transparent cover CCP for escutcheon

Optional equipment mounted on the escutcheon, the cover is hinged and secured by a screw. It increases the degree of protection to IP54, IK10. It adapts to drawout devices.

Transparent cover CCP for escutcheon.

DB414776.eps



Grounding kit KMT

This option allows the grounding of the breaker mechanism while the front cover is removed. The grounding is made via the chassis for the drawout version and via the fixation side plate for the fixed version.

Grounding kit KMT.



PD191613-50.eps



Some installations use two supply sources to counter the temporary loss of the main supply.

A source-changeover system is required to safely switch between the two sources. The replacement source can be a generator set or another network.

Manual source-changeover system

or **M**: Manual Transfer Switching Equipment

The simplest way to switch the load.

It is controlled manually by an operator.

The time required to switch from the "N" source to "R" source is variable.

System

2 or 3 mechanically interlocked circuit breakers or
2 switch-disconnectors.

Applications

Small commercial buildings and small and medium industrial activities where the need for continuity of service is significant but not a priority.

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Automatic source-changeover system

or **A**: Automatic Transfer Switching Equipment

An automatic controller may be added to a remote operated source-changeover system. It is possible to automatically control source transfer according to programmed (dedicated controllers) or programmable (PLC) operating modes. These solutions ensure optimum energy management.

The time required to switch from the "N" source to "R" source is fixed.

System

2 or 3 circuit breakers linked by an electrical interlocking system. A mechanical interlocking system protects also against incorrect manual operations, with an automatic control system (dedicated controllers).

Applications

Large infrastructures, industry, critical buildings & process where the continuity of service is a priority.

P100832_104.eps



Remote source-changeover system

or **R**: Remote Transfer Switching Equipment

In this case, no direct human intervention is required. The time required to switch from the "N" source to "R" source is fixed.

System

2 or 3 circuit breakers linked by an electrical interlocking system. A mechanical interlocking system protects also against incorrect manual operations. In this case is necessary to add a PLC controller not dedicated for source-changeover application.

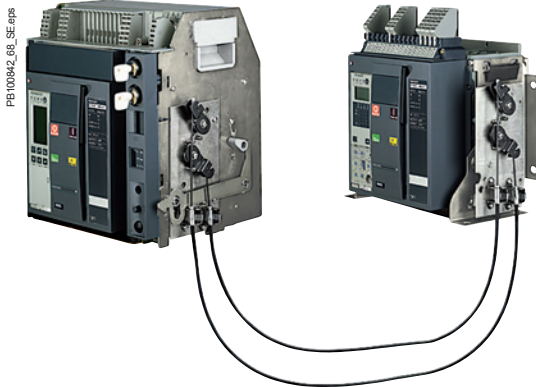
Applications

Industry & Infrastructure where continuity of service requirements are meaningful but not a priority.



Interlocking of devices

Mechanical interlocking



Interlocking of two Masterpact circuit breakers using cable.

Interlocking of two Masterpact NT/NW or up to three Masterpact NW devices using cables

For cable interlocking, the circuit breakers may be mounted one above the other or side-by-side.

The interlocked devices may be fixed or drawout, three-pole or four-pole, and have different ratings and sizes.

Interlocking between two devices (Masterpact NT and NW)

This function requires:

- an adaptation fixture on the right side of each device
- a set of cables with no-slip adjustments
- the use of a mechanical operation counter CDM is compulsory.

The maximum distance between the fixing planes (vertical or horizontal) is 2000 mm.

Interlocking between three devices (Masterpact NW only)

This function requires:

- a specific adaptation fixture for each type of interlocking, installed on the right side of each device
- two or three sets of cables with no-slip adjustments
- the use of a mechanical operation counter CDM is compulsory.

The maximum distance between the fixing planes (vertical or horizontal) is 1000 mm.

Installation

The adaptation fixtures, sets of cables and circuit breakers or switch-disconnectors are supplied separately, ready for assembly by the customer.

Installation conditions for cable interlocking systems:

- cable length: 2.5 m
- radius of curvature: 100 mm
- maximum number of curves: 3.

Possible combinations of “Normal” and “Replacement” source circuit breakers

“Normal N”	“Replacement” R		
	NT06 to NT16	NW08 to NW40	NW40b to NW63
NT06 to NT16			
Ratings 250... 1600 A	■	■	■
NW08 to NW40			
Ratings 320... 4000 A	■	■	■
NW40b to NW63			
Ratings 4000... 6300 A	■	■	■

All combinations of two Masterpact NT and Masterpact NW devices are possible, whatever the rating or size of the devices.

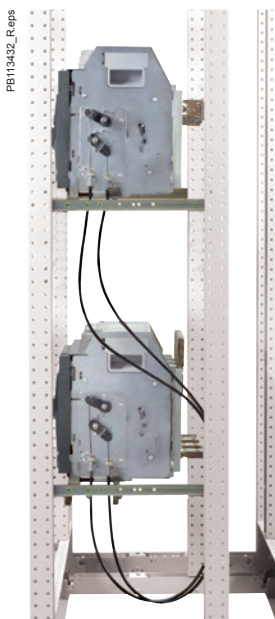
Possible combinations of three device

	NT06 to NT16	NW08 to NW40	NW40b to NW63
NT06 to NT16			
Ratings 250... 1600 A			
NW08 to NW40			
Ratings 320... 4000 A		■	■
NW40b to NW63			
Ratings 4000... 6300 A		■	■

Only Masterpact NW may be used for three-device combinations.

Types of mechanical interlocking and combinations

See catalogue “Source changeover systems”, ref. LVPED211022EN.



Interlocking of two Masterpact circuit breakers using cables.



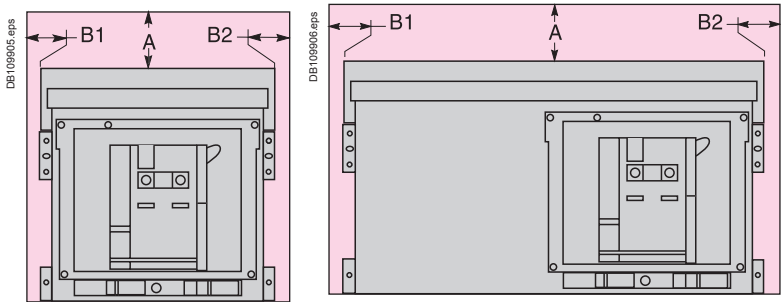


<i>Presentation</i>	2
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<i>Electrical diagrams</i>	D-1
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Safety clearances

Space requirements

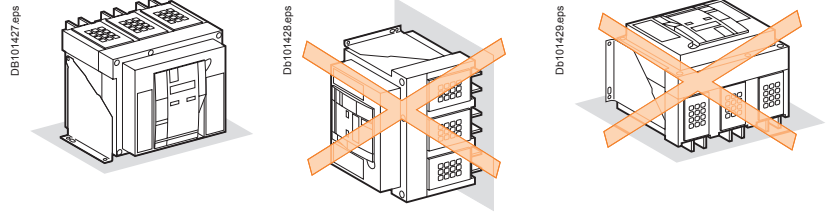


Minimum space	UL 489 Listed			
	A		B1 + B2	
	inch	mm	inch	mm
Insulated parts	0	0	0	0
Metal parts	0	0	4.36	111

Installation in switchboard

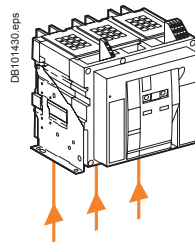


Possible positions



Power supply

Masterpact devices can be supplied either from the top or from the bottom without reduction in performance, in order to facilitate connection when installed in a switchboard.



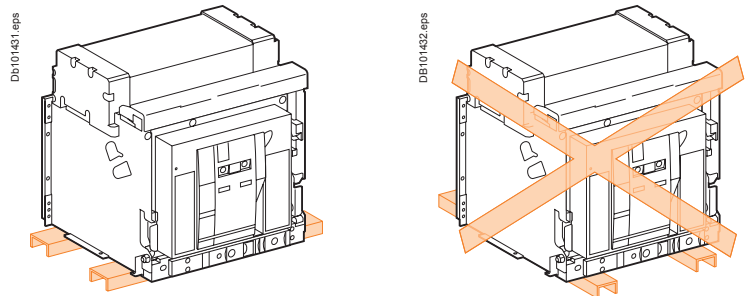
Mounting the circuit-breaker

It is important to distribute the weight of the device uniformly over a rigid mounting surface such as rails or a base plate.

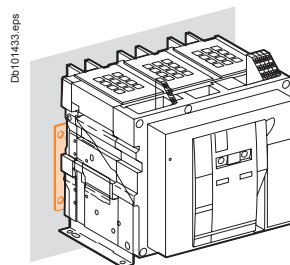
This mounting plane should be perfectly flat (tolerance on support flatness: 2 mm).

This eliminates any risk of deformation which could interfere with correct operation of the circuit breaker.

Masterpact devices can also be mounted on a vertical plane using the special brackets.



Mounting on rails.



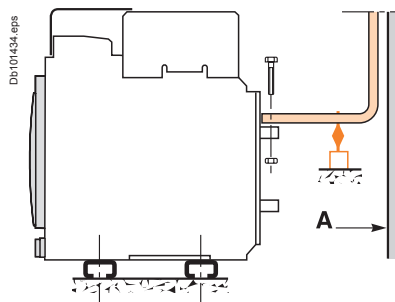
Mounting with vertical brackets.



Partitions

Sufficient openings must be provided in partitions to ensure good air circulation around the circuit breaker; Any partition between upstream and downstream connections of the device must be made of non-magnetic material.

For high currents, of 2500 A and upwards, the metal supports or barriers in the immediate vicinity of a conductor must be made of non-magnetic material **A**. Metal barriers through which a conductor passes must not form a magnetic loop.

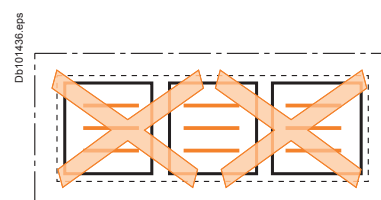
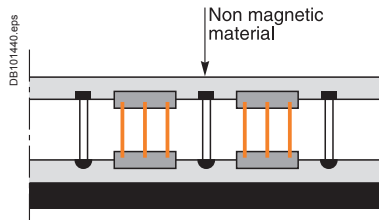


A : non magnetic material.



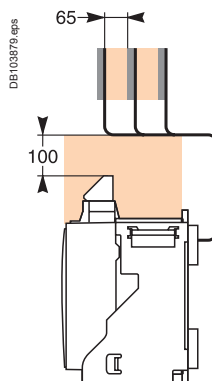
Busbars (NT, NW)

The mechanical connection must exclude the possibility of formation of a magnetic loop around a conductor.



Busbars (NT)

For live busbars installed immediately above the circuit breaker (respecting the 100 mm safety clearance), the distance between bars must be 65 mm minimum. In a 1000 V system, the bars must be insulated.



Door interlock

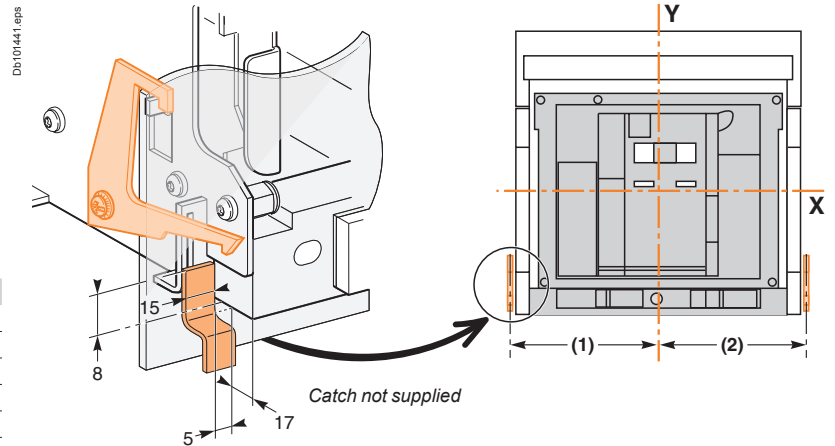


Door interlock

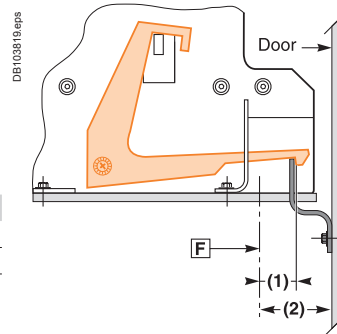
Mounted on the right or left-hand side of the chassis, this device inhibits opening of the cubicle door when the circuit breaker is in "connected" or "test" position. If the breaker is put in the "connected" position with the door open, the door may be closed without having to disconnect the circuit breaker.

Dimensions (mm)

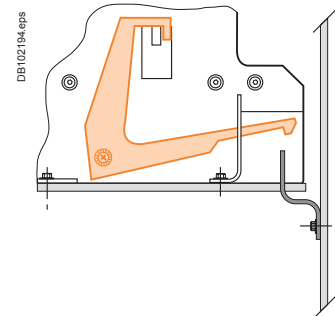
Type	(1)	(2)
NT08-12 (3P)	135	168
NT08-12 (4P)	205	168
NW08-30 (3P)	215	215
NW08-30 (4P)	330	215
NW40-50 (3P)	660	215
NW40-50 (4P)	775	215



Breaker in "connected" or "test" position
Door cannot be opened



Breaker in "disconnected" position
Door can be opened



Dimensions (mm)

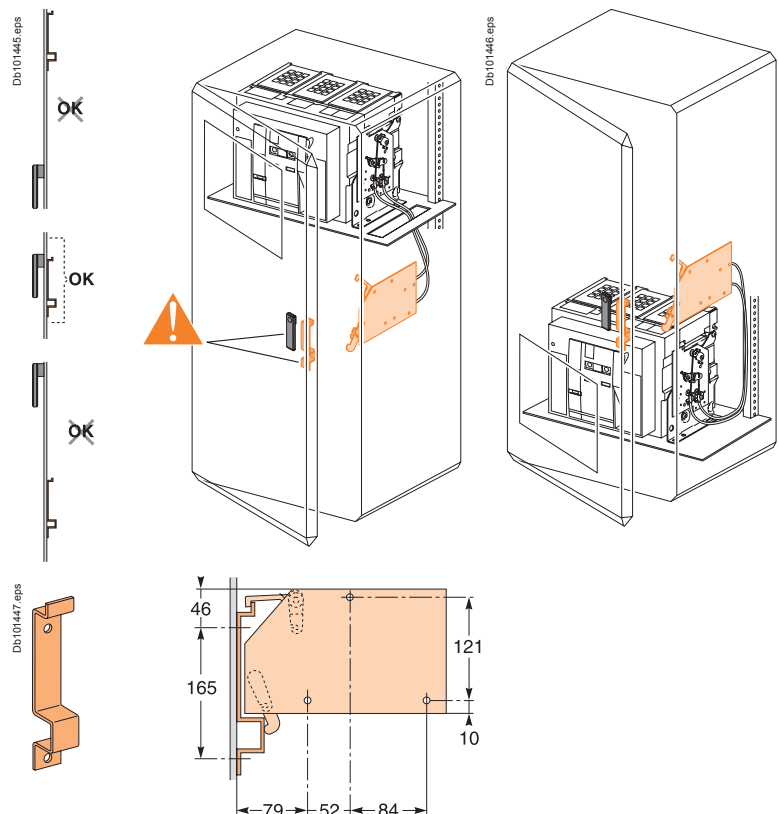
Type	(1)	(2)
NT	5	23
NW	83	103

Cable-type door interlock

This option prevents door opening when the circuit breaker is closed and prevents circuit breaker closing when the door is open.

For this, a special plate associated with a lock and a cable is mounted on the right side of the circuit breaker.

With this interlock installed, the source changeover function cannot be implemented.



Note: the door interlock can either be mounted on the right side or the left side of the breaker.

F: datum.



Wiring of voltage releases

During pick-up, the power consumed is approximately 150 to 200 VA. For low control voltages (12, 24, 48 V), maximum cable lengths are imposed by the voltage and the cross-sectional area of cables.

Recommended maximum cable lengths (meter)

		12 V		24 V		48 V	
		2.5 mm ²	1.5 mm ²	2.5 mm ²	1.5 mm ²	2.5 mm ²	1.5 mm ²
MN	U source 100 %	-	-	58	35	280	165
	U source 85 %	-	-	16	10	75	45
MX-XF	U source 100 %	21	12	115	70	550	330
	U source 85 %	10	6	75	44	350	210

Note: the indicated length is that of each of the two wires.

24 V DC power-supply module

External 24 V DC power-supply module for Micrologic (F1-, F2+)

(see [page D-2](#) and [page D-4](#))

- Do not connect the positive terminal (F2+) to earth
- The negative terminal (F1-) can be connected to earth, except in IT systems
- A number of Micrologic control units and M6C modules can be connected to the same 24 V DC power supply (the consumption of a Micrologic control unit or an M6C module is approximately 100 mA)
- Do not connect any devices other than a Micrologic control unit or an M6C module. **If voltage > 480 AC or in environment with a high level of eletromagnetic disturbance.**
- The maximum length for each conductor is ten metres. For greater distances, it is advised to twist the supply wires together
- The 24 V DC supply wires must cross the power cables perpendicularly. If this is difficult, it is advised to twist the supply wires together
- The technical characteristics of the external 24 V DC power-supply module for Micrologic control units are indicated on [page A-18](#).

Communication bus

- Do not connect the positive terminal (E1) to earth
- The negative terminal (E2) can be connected to earth
- A number of "device" or "chassis" communication modules can be connected to the same 24 V DC power supply (the consumption of each module is approximately 30 mA).

Note: Wiring of ZSI: It is recommended to use twisted shielded cable. The shield must be connected to earth at both ends.

Power connection

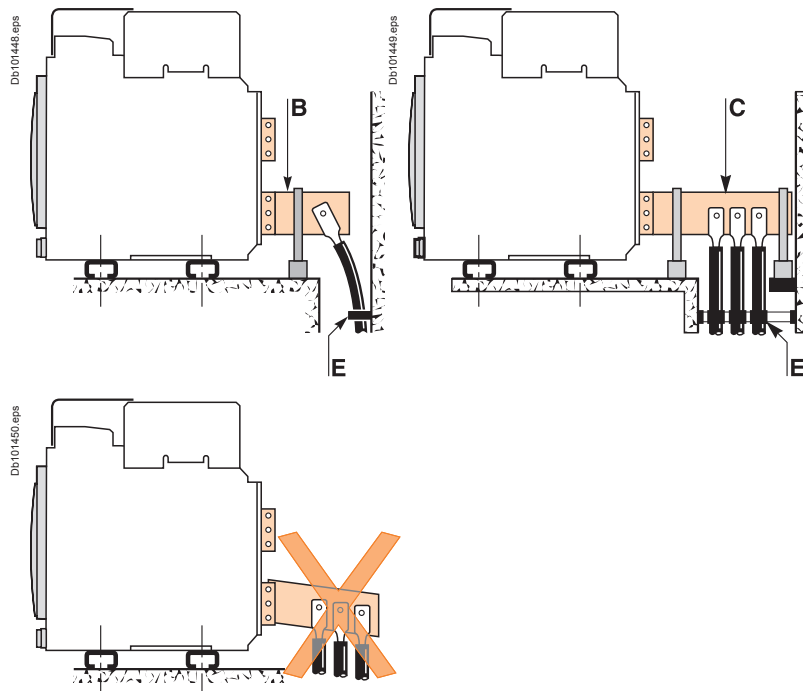


Cable connections

If cables are used for the power connections, make sure that they do not apply excessive mechanical forces to the circuit breaker terminals.

For this, make the connections as follows:

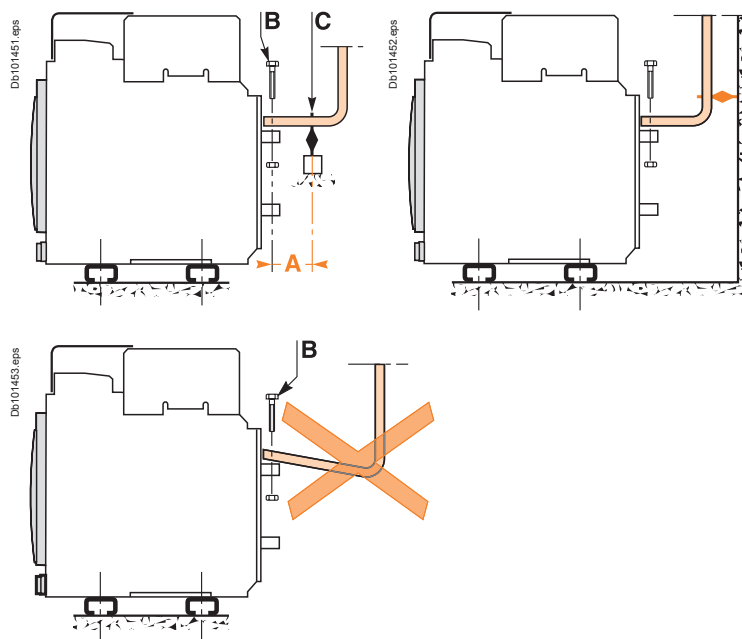
- extend the circuit breaker terminals using short bars designed and installed according to the recommendations for bar-type power connections:
 - for a single cable, use solution **B** opposite
 - for multiple cables, use solution **C** opposite.
- in all cases, follow the general rules for connections to busbars:
 - position the cable lugs before inserting the bolts
 - the cables should firmly secured to the framework **E**.



Busbar connections

The busbars should be suitably adjusted to ensure that the connection points are positioned on the terminals before the bolts are inserted **B**.

The connections are held by the support which is solidly fixed to the framework of the switchboard, such that the circuit breaker terminals do not have to support its weight **C**. (This support should be placed close to the terminals).

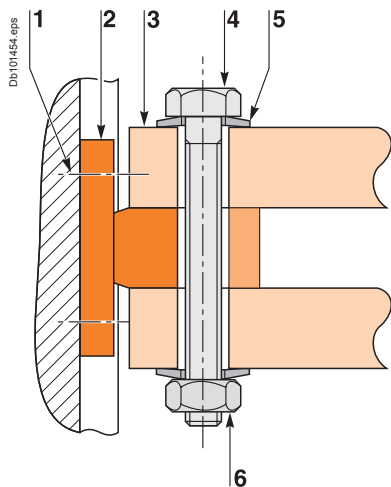


Electrodynamic stresses

The first busbar support or spacer shall be situated within a maximum distance from the connection point of the breaker (see table below). This distance must be respected so that the connection can withstand the electrodynamic stresses between phases in the event of a short circuit.

Maximum distance A between busbar to circuit breaker connection and the first busbar support or spacer with respect to the value of the prospective short-circuit current

Icc (kA)	30	50	65	80	100	150
Distance A (mm)	350	300	250	150	150	150



- 1 Terminal screw factory-tightened to 16 Nm (NW), 13 Nm (NT).
- 2 Breaker terminal.
- 3 Busbar.
- 4 Bolt.
- 5 Washer.
- 6 Nut.

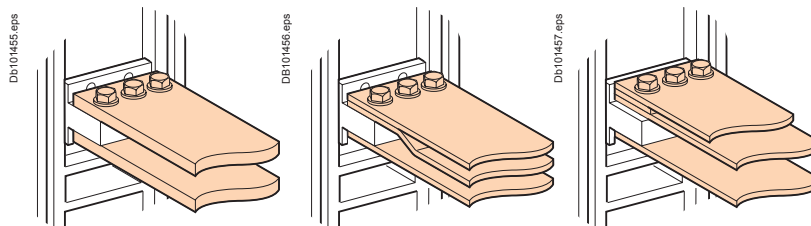
Clamping

Correct clamping of busbars depends amongst other things, on the tightening torques used for the nuts and bolts. Over-tightening may have the same consequences as under-tightening.

For connecting busbars (Cu ETP-NFA51-100) to the circuit breaker, the tightening torques to be used are shown in the table below.

These values are for use with copper busbars and steel nuts and bolts, class 8.8. The same torques can be used with AGS-T52 quality aluminium bars (French standard NFA 02-104 or American National Standard H-35-1).

Examples

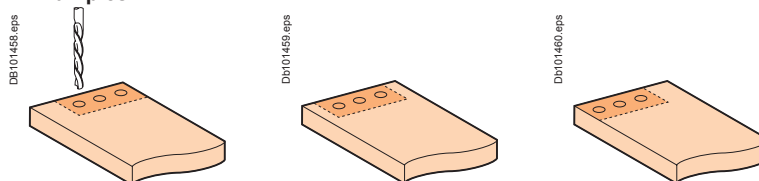


Tightening torques

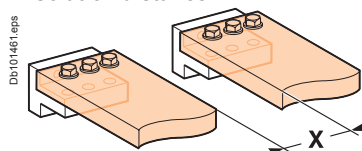
Ø (mm) Nominal	Ø (mm) Drilling	Tightening torques (Nm) with grower or flat washers	Tightening torques (Nm) with contact or corrugated washers
10	11	37.5	50

Busbar drilling

Examples



Isolation distance

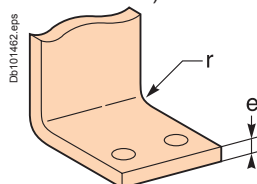


Dimensions (mm)

Ui	X min
600 V	8 mm
1000 V	14 mm

Busbar bending

When bending busbars maintain the radius indicated below (a smaller radius would cause cracks).



Dimensions (mm)

e	Radius of curvature (r) Min	Recommended
5	5	7.5
10	15	18 to 20



Selection table fixed Masterpact NT/NW

Installation recommendations

The requirements for the connectors and connection bars are shown in the table below.

Note: the installer is responsible for the connection of the bars to the circuit breaker connectors. The bars must be supported by the switchboard framework, with no weight on the connectors.

Bar dimensions

Circuit breaker		Standard	Connector	Connection bars	
Rating (A)	Type			Number	Dimensions
800, 1200	N/H/L1/HF	UL 489	RC-H, RC-V, FC	1	0.25 x 3 in. (6 x 76 mm)
1600	N/H/HF	UL 489	RC-H, RC-V, FC	2	0.25 x 3 in. (6 x 76 mm)
2000	N/H/HF	UL 489	RC-H	3	0.25 x 3 in. (6 x 76 mm)
			RC-V	2	0.25 x 4 in. (6 x 102 mm)
2500	H/HF	UL 489	RC-H	5	0.25 x 3 in. (6 x 76 mm)
			RC-V	2	0.25 x 5 in. (6 x 127 mm)
3000	H/HF	UL 489	RC-H	8	0.25 x 3 in. (6 x 76 mm)
			RC-V	4	0.25 x 4 in. (6 x 102 mm)
4000	H/HF	UL 489	RC-H	4	0.25 x 6 in. (6 x 152 mm)
			RC-V	4	0.25 x 5 in. (6 x 127 mm)
5000	H/HF	UL 489	RC-H	8	0.25 x 6 in. (6 x 152 mm)
			RC-V	6	0.25 x 5 in. (6 x 127 mm)

RC-H: horizontal rear connection.

RC-V: vertical rear connection.

FC: front connection.

Note: FC for Masterpact NT only.



Power connection

Selection table

drawout Masterpact NT/NW

Installation recommendations

The requirements for the connectors and connection bars are shown in the table below.

Note: the installer is responsible for the connection of the bars to the circuit breaker connectors. The bars must be supported by the switchboard framework, with no weight on the connectors.

Bar dimensions

Circuit breaker		Standard	Connector	Connection bars	
Rating (A)	Type			Number	Dimensions
800, 1200	N/H/L 1/HF	UL 489	RC-H, RC-V, FC	1	0.25 x 3 in. (6 x 76 mm)
1600	N/H/L 1/HF	UL 489	RC-H, RC-V, FC	2	0.25 x 3 in. (6 x 76 mm)
2000	N/H/HF	UL 489	RC-H	3	0.25 x 3 in. (6 x 76 mm)
			RC-V	2	0.25 x 4 in. (6 x 102 mm)
2500	H/HF	UL 489	RC-H	5	0.25 x 3 in. (6 x 76 mm)
			RC-V	2	0.25 x 5 in. (6 x 127 mm)
3000	H/HF	UL 489	RC-H	8	0.25 x 3 in. (6 x 76 mm)
			RC-V	4	0.25 x 4 in. (6 x 102 mm)
4000	H/HF	UL 489	RC-H	4	0.25 x 6 in. (6 x 152 mm)
			RC-V	4	0.25 x 5 in. (6 x 127 mm)
5000	H/HF	UL 489	RC-H	8	0.25 x 6 in. (6 x 152 mm)
			RC-V	6	0.25 x 5 in. (6 x 127 mm)

RC-H: horizontal rear connection.

RC-V: vertical rear connection.

FC: front connection.

Note: FC for Masterpact NT only.



<i>Presentation</i>	2
<i>Functions and characteristics</i>	A-1
<i>Installation recommendations</i>	B-1

NT08 and NT12 circuit breakers

Fixed 3/4-pole device	C-2
Fixed 3-pole device	C-3
Fixed 4-pole device	C-6
Drawout 3/4-pole device	C-10
Drawout 3-pole device	C-11
Drawout 4-pole device	C-14

NW08 to NW30 circuit breakers

Fixed 3/4-pole device	C-18
Fixed 3-pole device	C-19
Fixed 4-pole device	C-22
Drawout 3/4-pole device	C-26
Drawout 3-pole device	C-27
Drawout 4-pole device	C-30

NW40 and NW50 circuit breakers

Fixed 3/4-pole device	C-34
Fixed 3-pole device	C-35
Fixed 4-pole device	C-38
Drawout 3/4-pole device	C-40
Drawout 3-pole device	C-41
Drawout 4-pole device	C-45

NT/NW external modules **C-48**

FDM121 switchboard display **C-52**

FDM128 switchboard display **C-53**

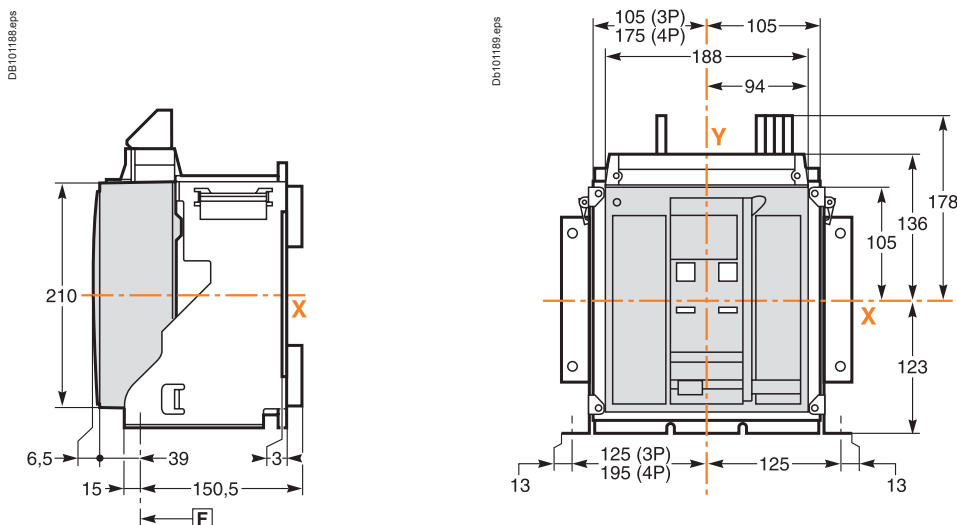
<i>Electrical diagrams</i>	D-1
<i>Additional characteristics</i>	E-1
<i>Catalogue numbers</i>	F-1



NT08 and NT12 circuit breakers

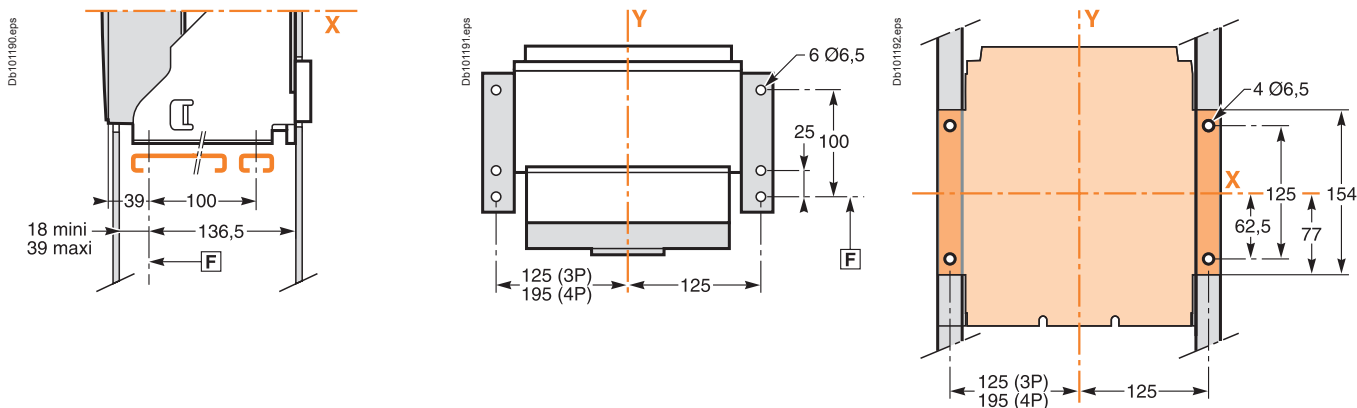
Fixed 3/4-pole device

Dimensions



Bottom mounting (on base plate or rails)

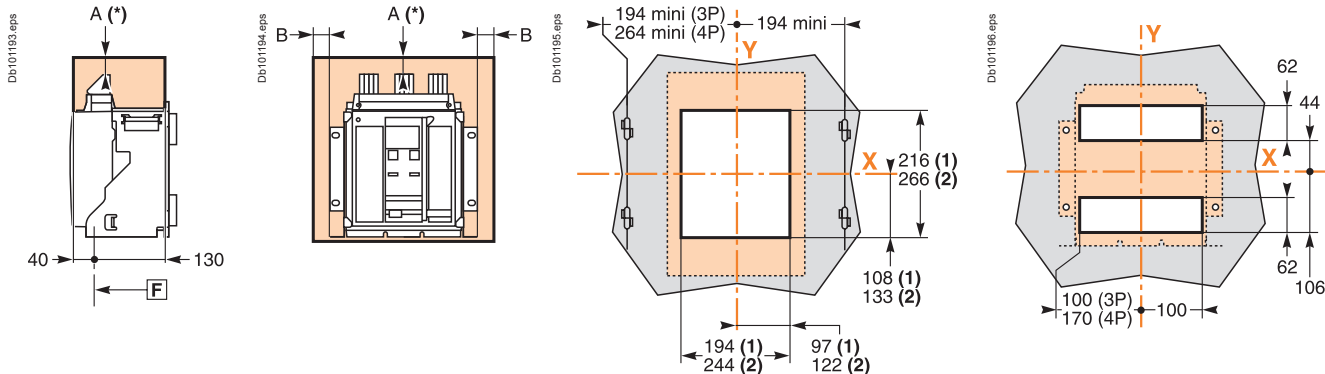
Rear mounting detail (on upright or backplate)



Safety clearances

Door cutout

Rear panel cutout



For voltages < 690 V

	Parts Insulated	Metal	Energised
A	0	0	100
B	0	0	60

F: datum.

- (1) Without escutcheon.
(2) With escutcheon.

Note: dimensions in mm.

For 1000 V

	Parts Insulated	Metal	Energised
A	0	100	500 (3)
B	0	50	100 (3)

(3) With a minimum distance between bars of 65 mm (A and B) if the bars are not insulated.

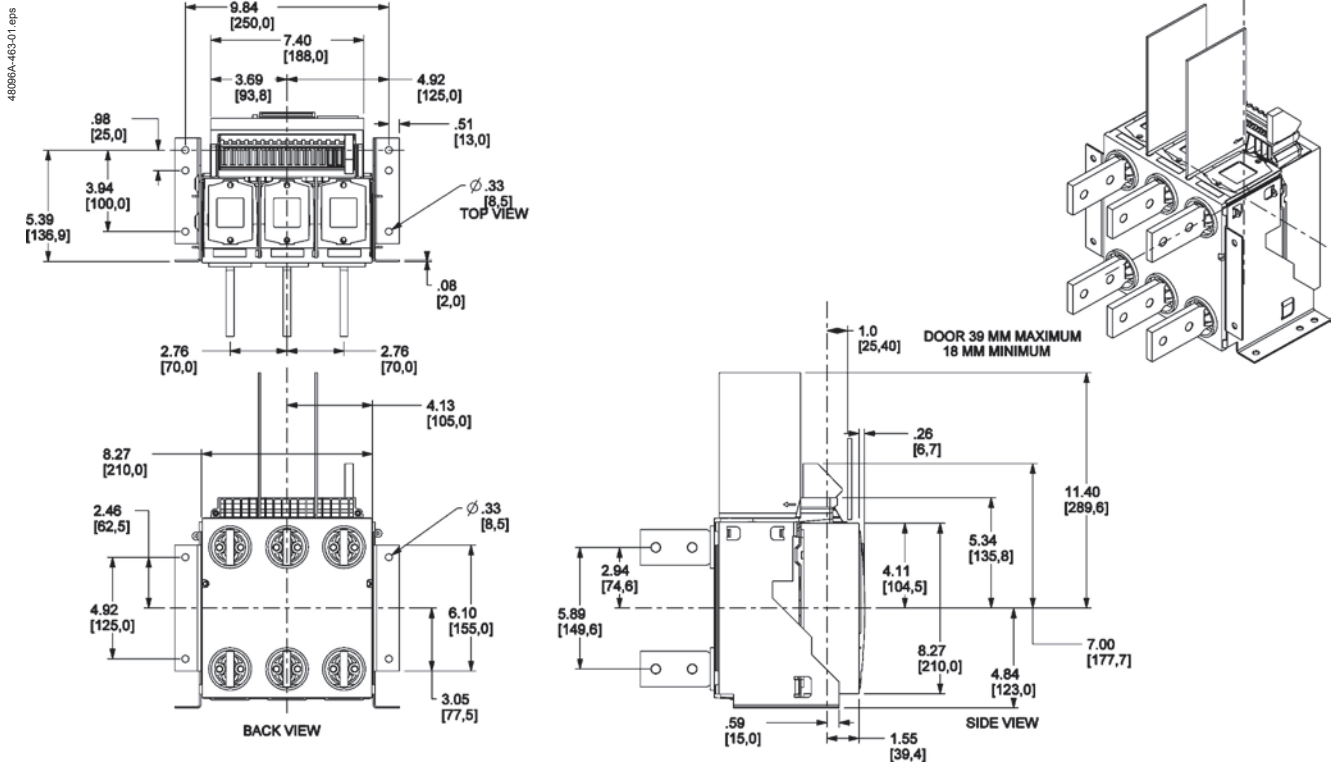
Note: X and Y are the symmetry planes for a 3-pole device.
A(*) An overhead clearance of 50 mm is required to remove the arc chutes.
An overhead clearance of 20 mm is required to remove the terminal block.



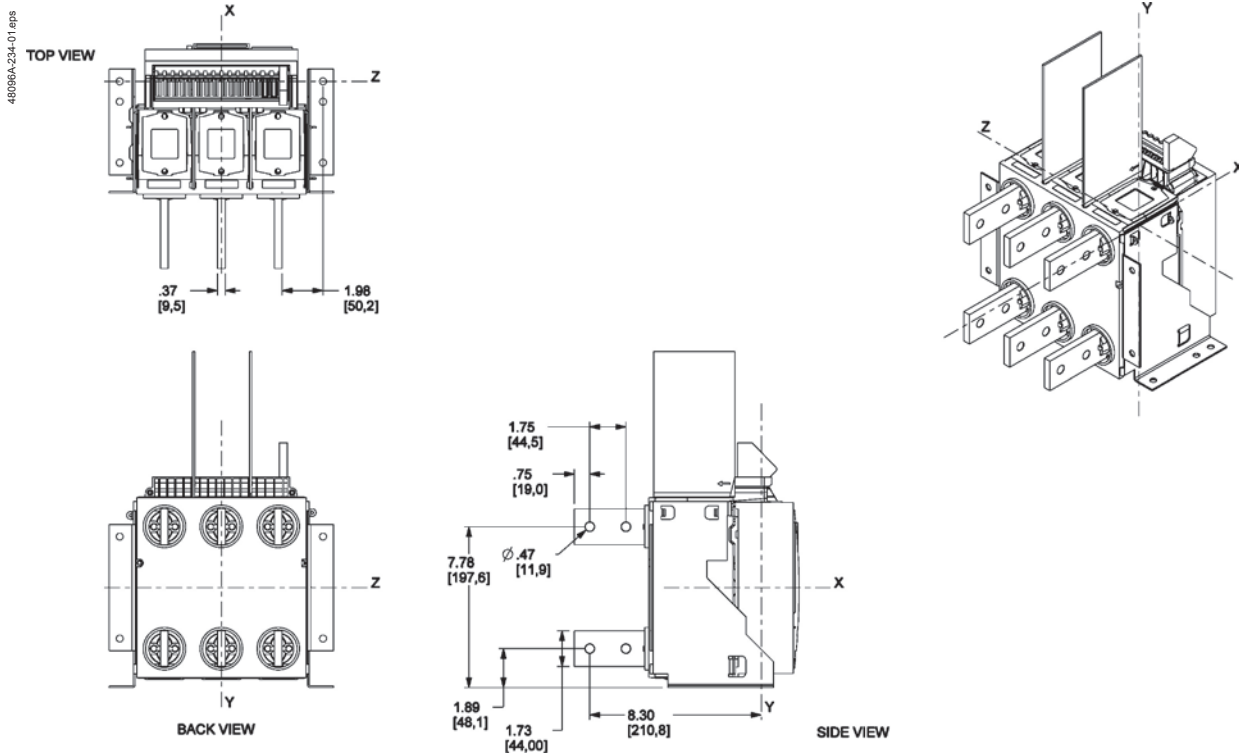
Fixed 3-pole device

Connections

General dimensions for all versions



Vertical rear connection

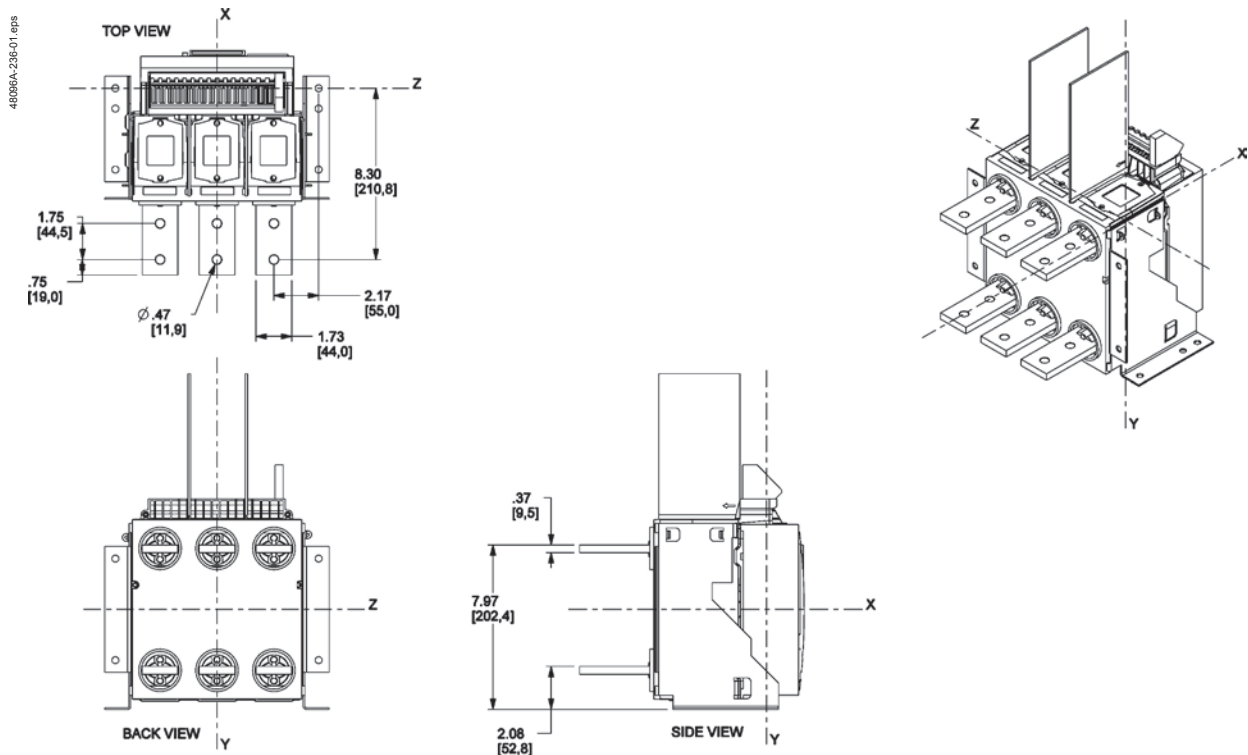


Note: dimensions in square brackets are in mm and other dimensions are in inches.

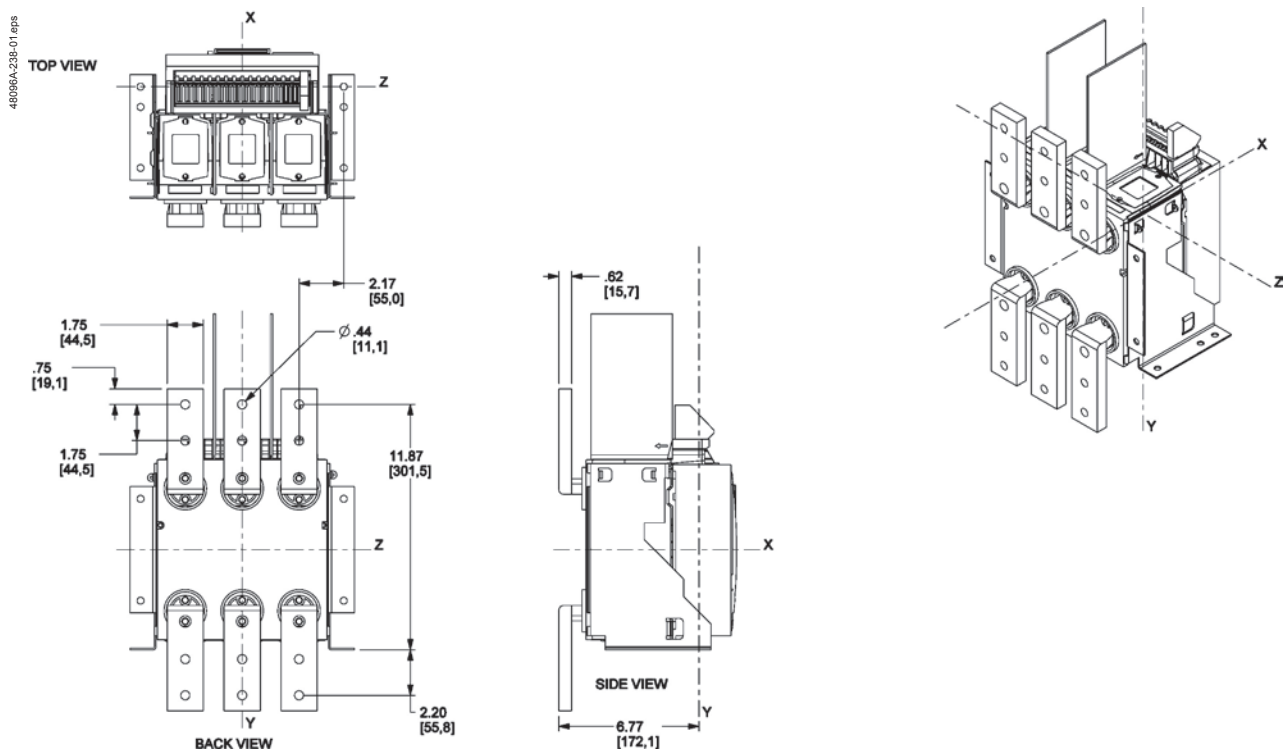


Connections

Horizontal rear connection



Front connection



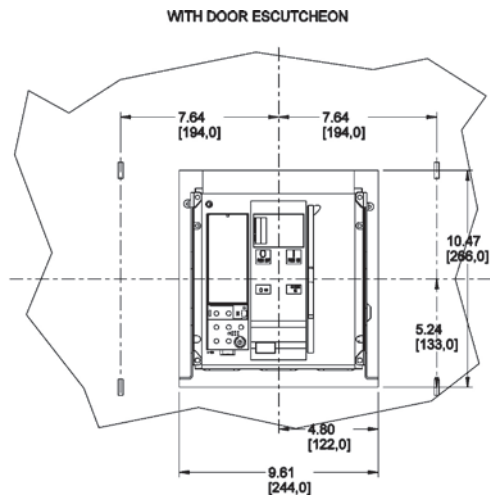
Note: dimensions in square brackets are in mm and other dimensions are in inches.



Connections

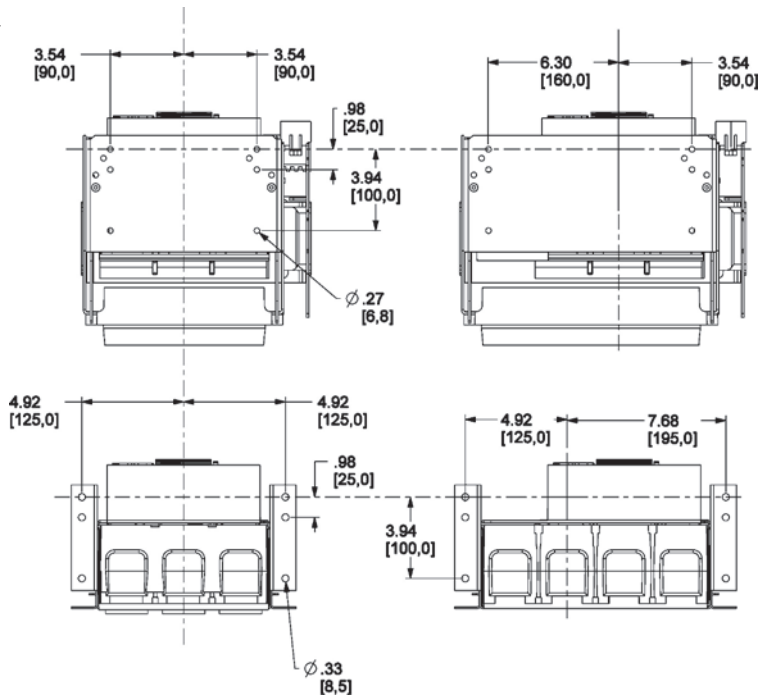
Door cutout

DB402349.eps



"Pan" Dimensions

48096A-462-01.eps

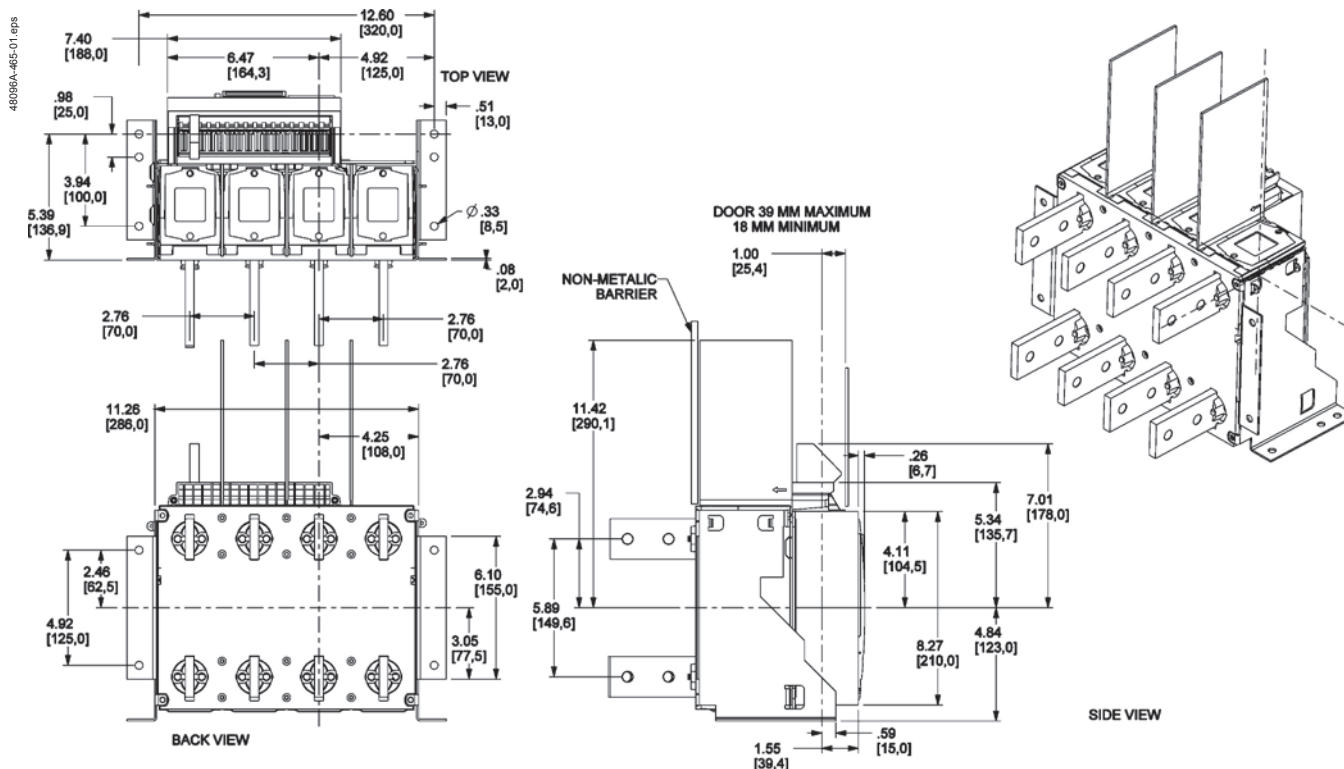


Note: dimensions in square brackets are in mm and other dimensions are in inches.

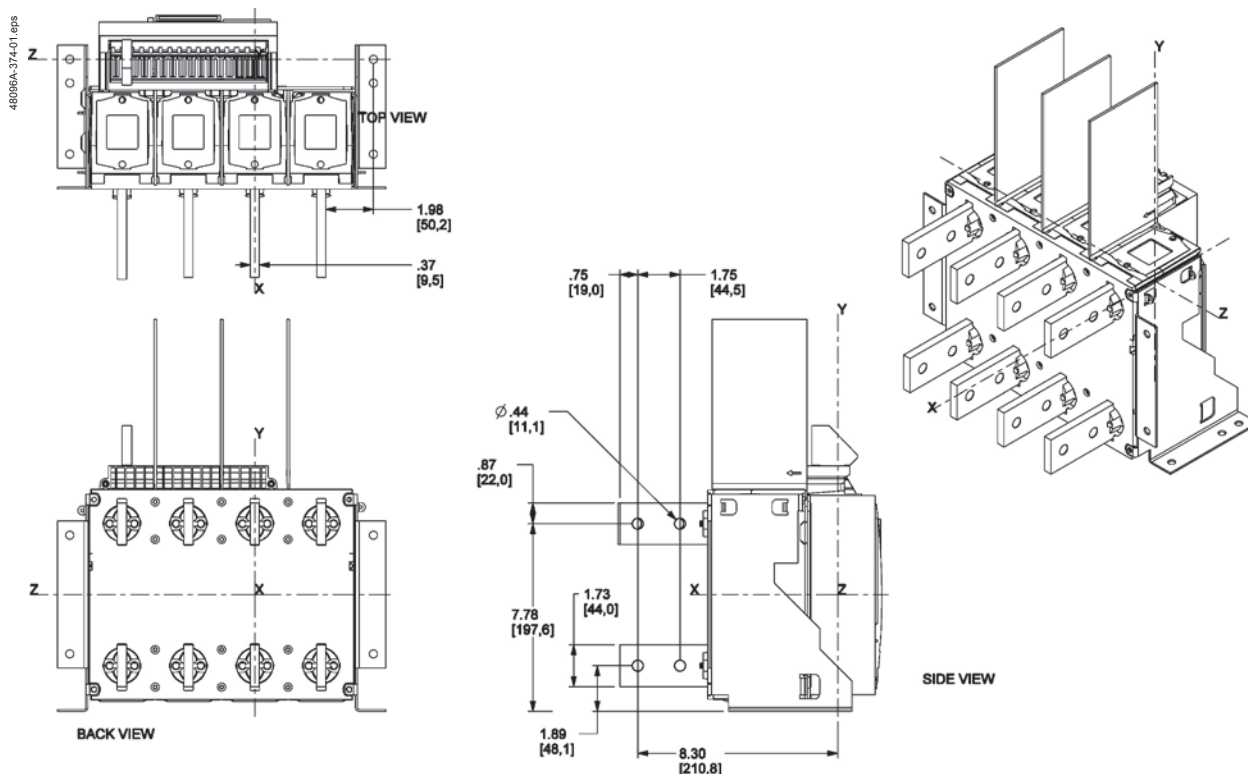


Connections

General dimensions for all versions



Vertical rear connection

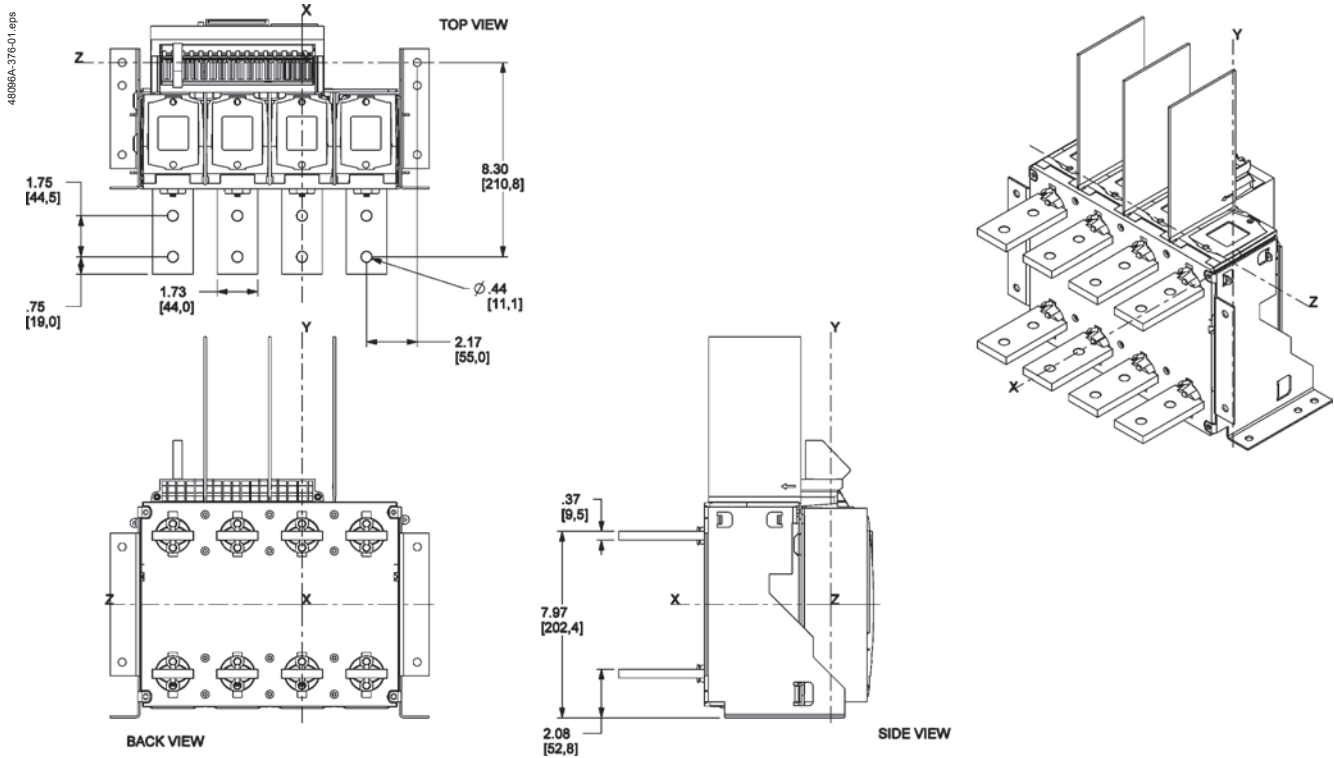


Note: dimensions in square brackets are in mm and other dimensions are in inches.

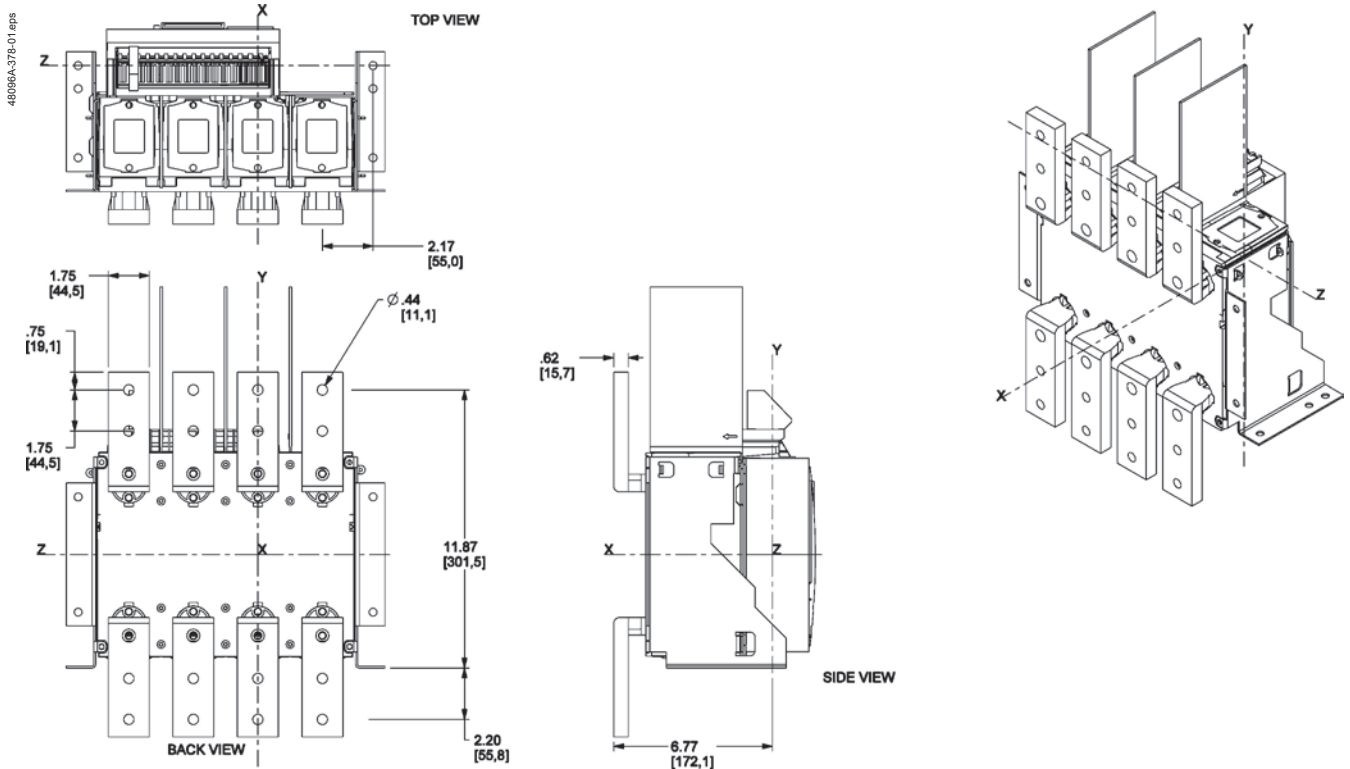


Connections

Horizontal rear connection



Front connection



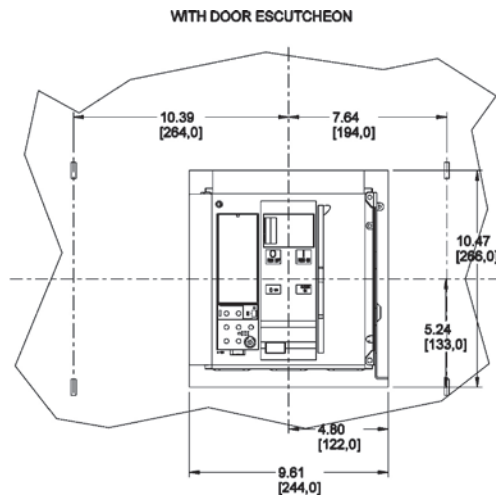
Note: dimensions in square brackets are in mm and other dimensions are in inches.



Connections

Door cutout

DE402950.dwg

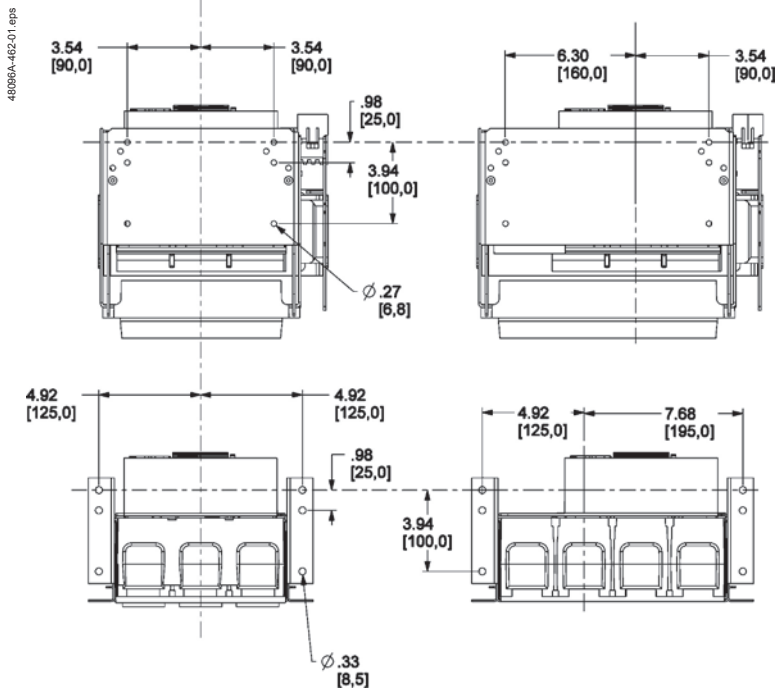


Note: dimensions in square brackets are in mm and other dimensions are in inches.



Connections

"Pan" Dimensions



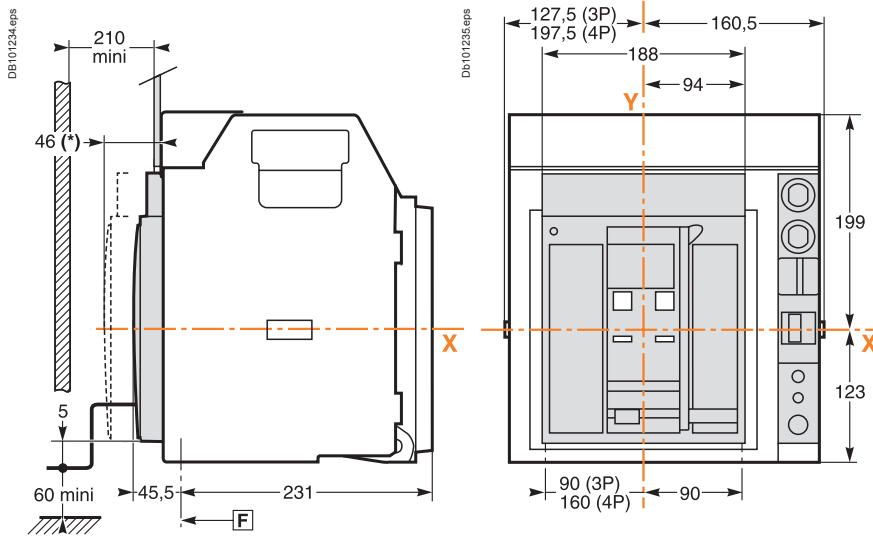
Note: dimensions in square brackets are in mm and other dimensions are in inches.



NT08 and NT12 circuit breakers

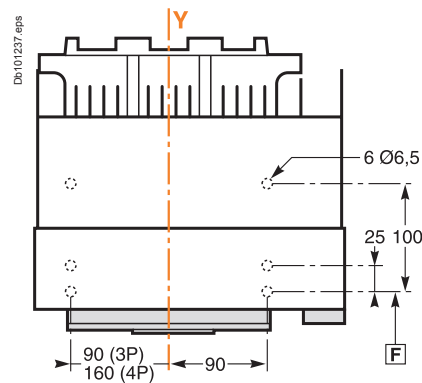
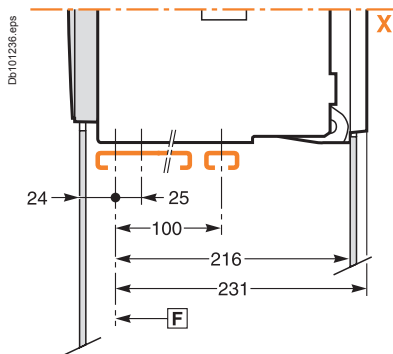
Drawout 3/4-pole device

Dimensions

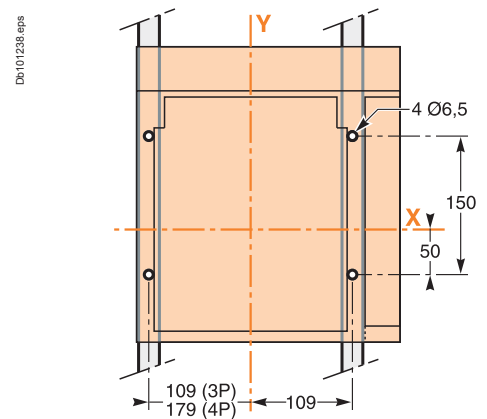


(*) Disconnected position.

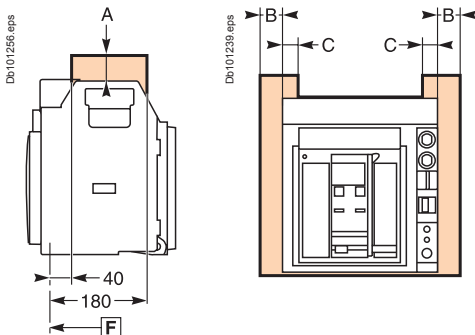
Bottom mounting (on base plate or rails)



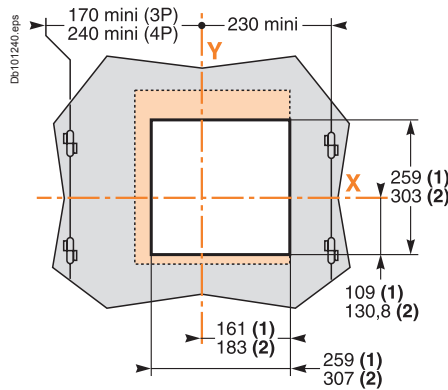
Rear mounting detail (on upright or backplate)



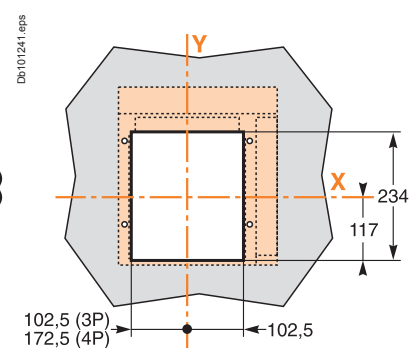
Safety clearances



Door cutout



Rear panel cutout



For voltages < 690 V or equal to 1000 V

	Parts		
	Insulated	Metal	Energised
A	0	0	30
B	10	10	60
C	0	0	30

Note: dimensions in mm.

F: datum.

(1) Without escutcheon.
(2) With escutcheon.

Note: X and Y are the symmetry planes for a 3-pole device.



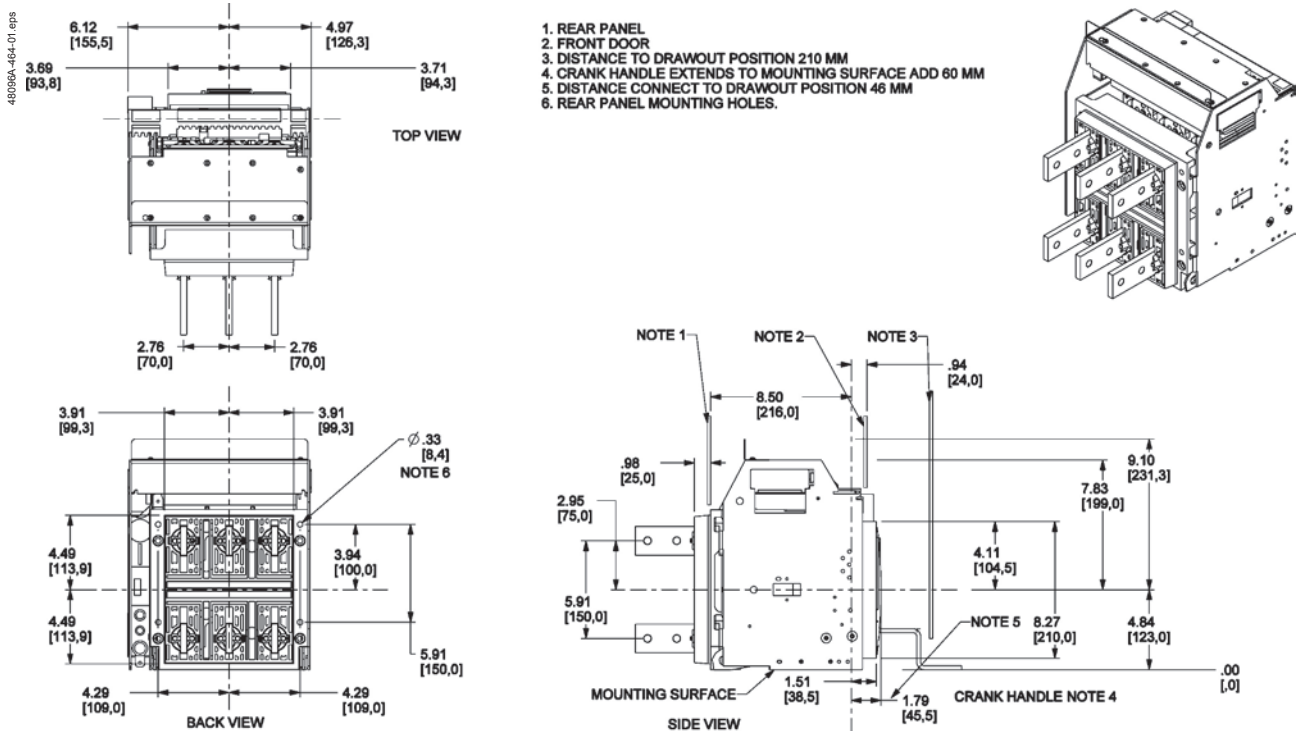
Drawout 3-pole device

Dimensions of Masterpact NT 3-pole device

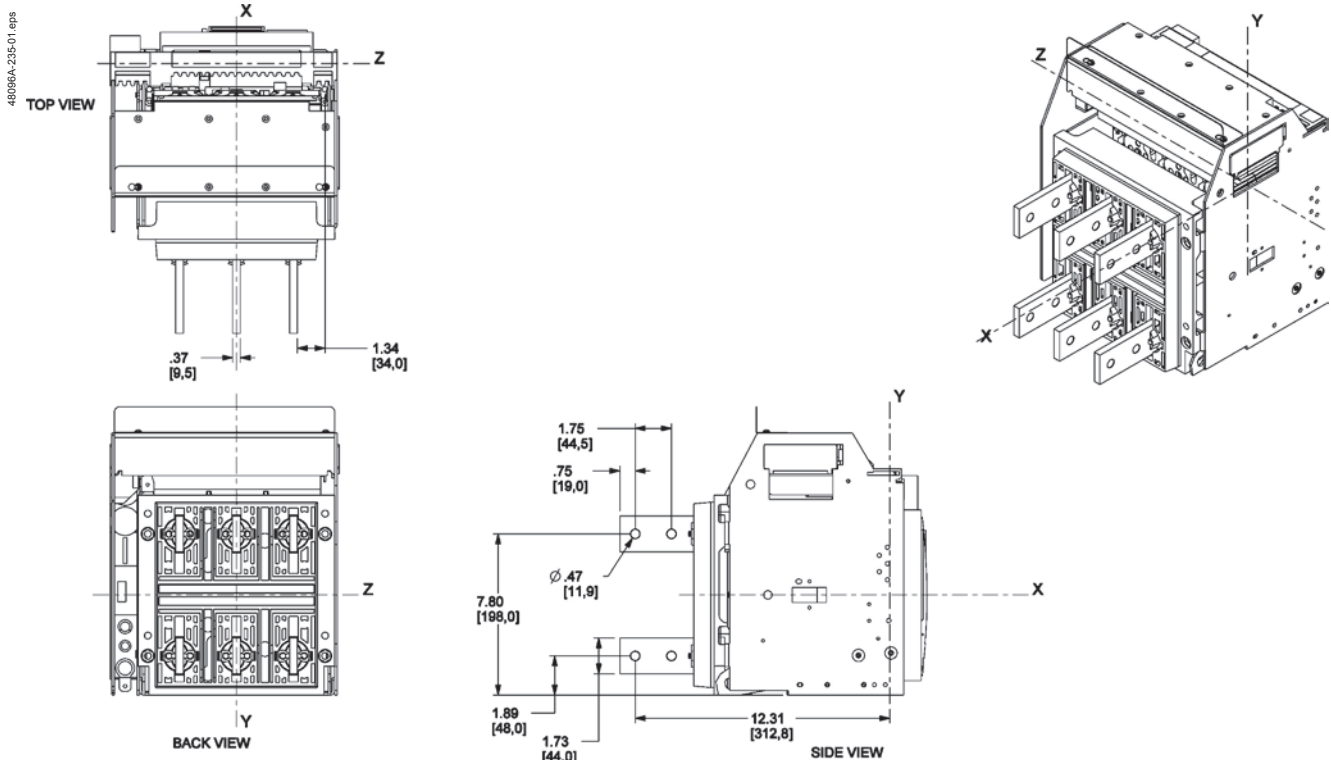
Number of poles	Rating	Dimension (H x W x D)		Vent areas		Bottom	
		In	mm	Top In ²	mm ²	In ²	mm ²
3P	800 A and 1200 A	18.25 x 13 x 9.5	463.5 x 330.2 x 214.3	9	5806	9	5806

Connections

General dimensions for all versions



Vertical rear connection

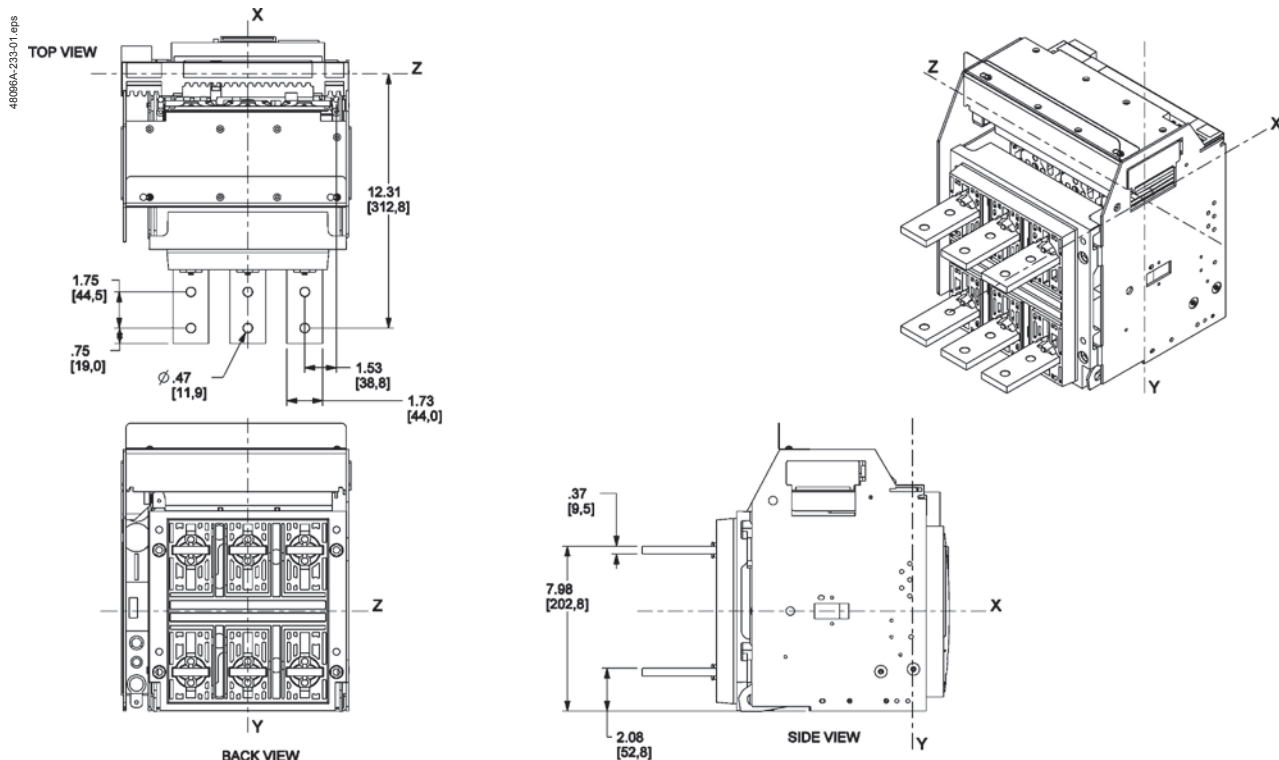


Note: dimensions in square brackets are in mm and other dimensions are in inches.

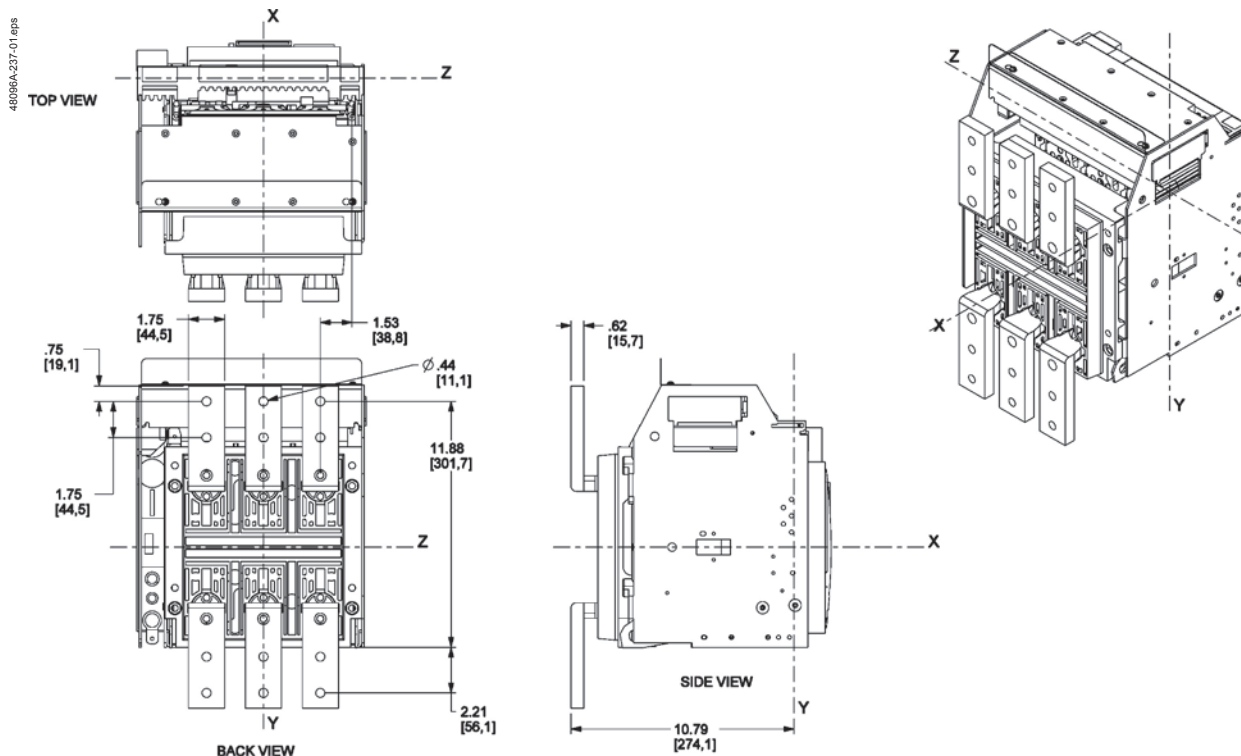


Connections

Horizontal rear connection



Front connection

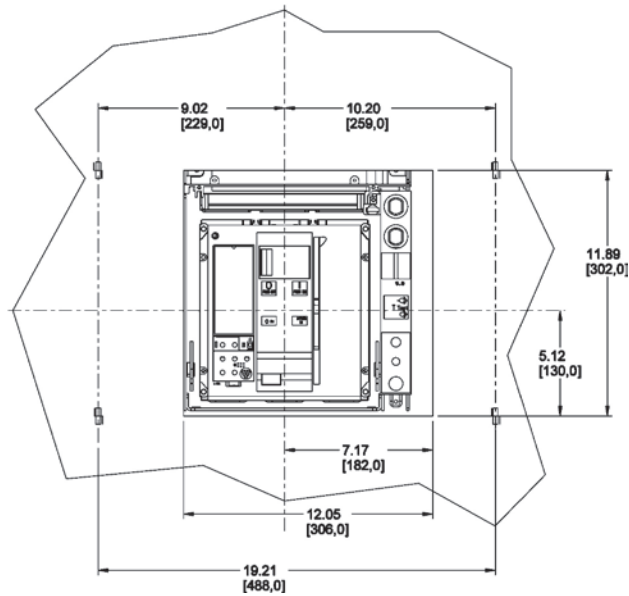


Note: dimensions in square brackets are in mm and other dimensions are in inches.

Door cutout

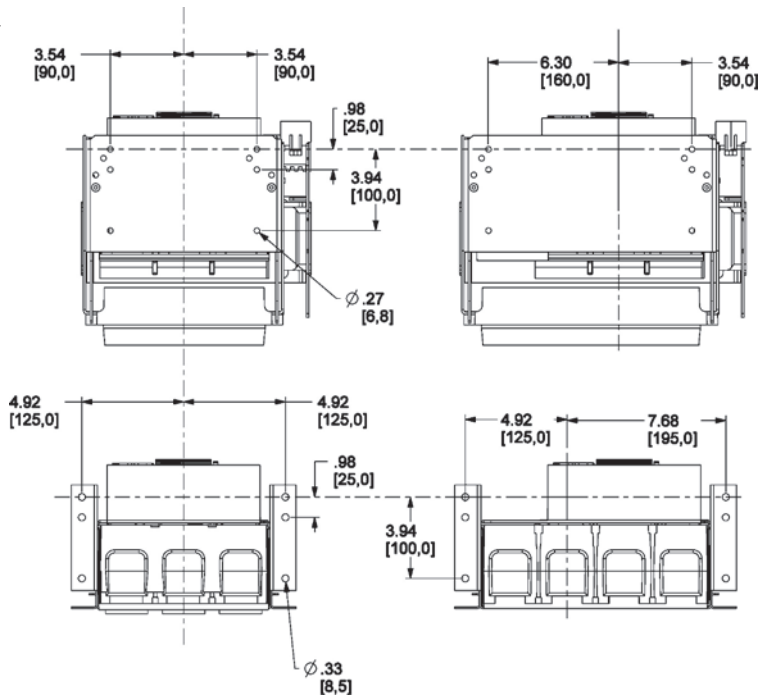
DB402951.eps

WITH DOOR ESCUTCHEON



"Pan" Dimensions

48096A-462-01.eps



Note: dimensions in square brackets are in mm and other dimensions are in inches.

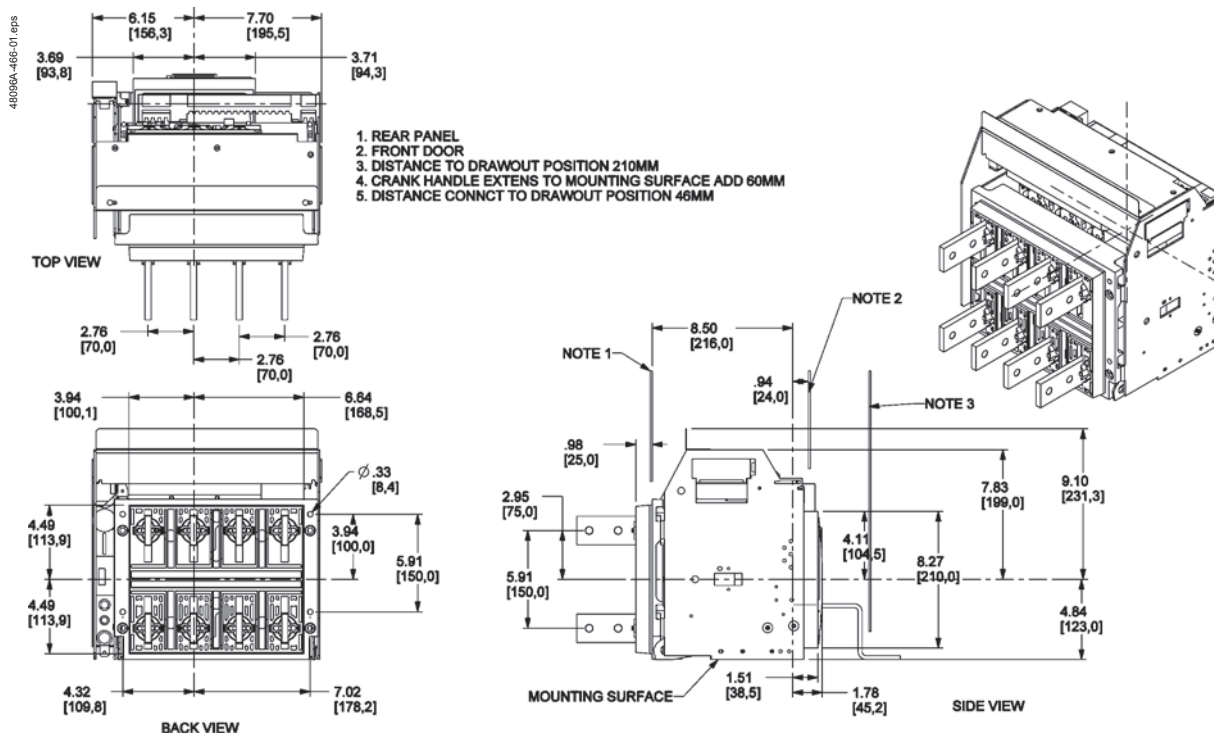


Dimensions of Masterpact NT 4-pole device

Number of poles	Rating	Dimension (H x W x D)		Vent areas		Bottom	
		In	mm	Top In ²	mm ²	In ²	mm ²
4P	800 A and 1200 A	18.25 x 15.8 x 9.5	463.5 x 401.3 x 214.3	9	5806	9	5806

Connections

General dimensions for all versions

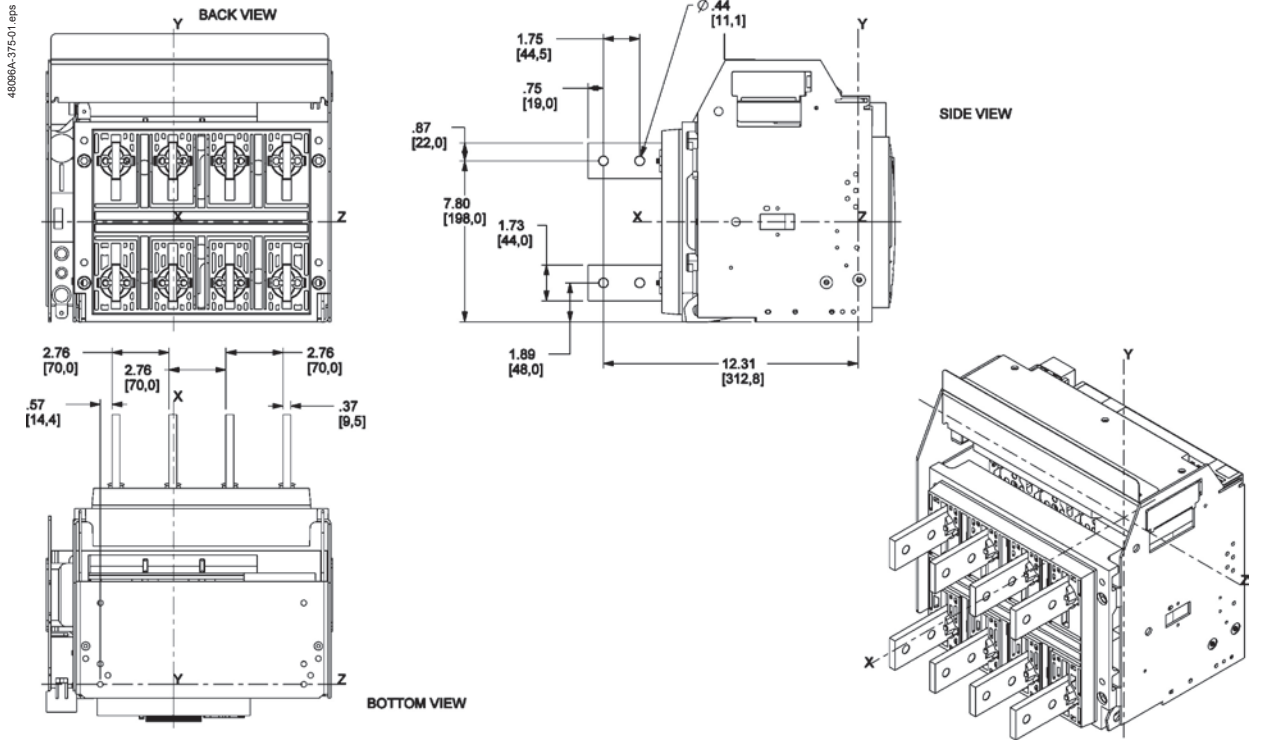


Note: dimensions in square brackets are in mm and other dimensions are in inches.

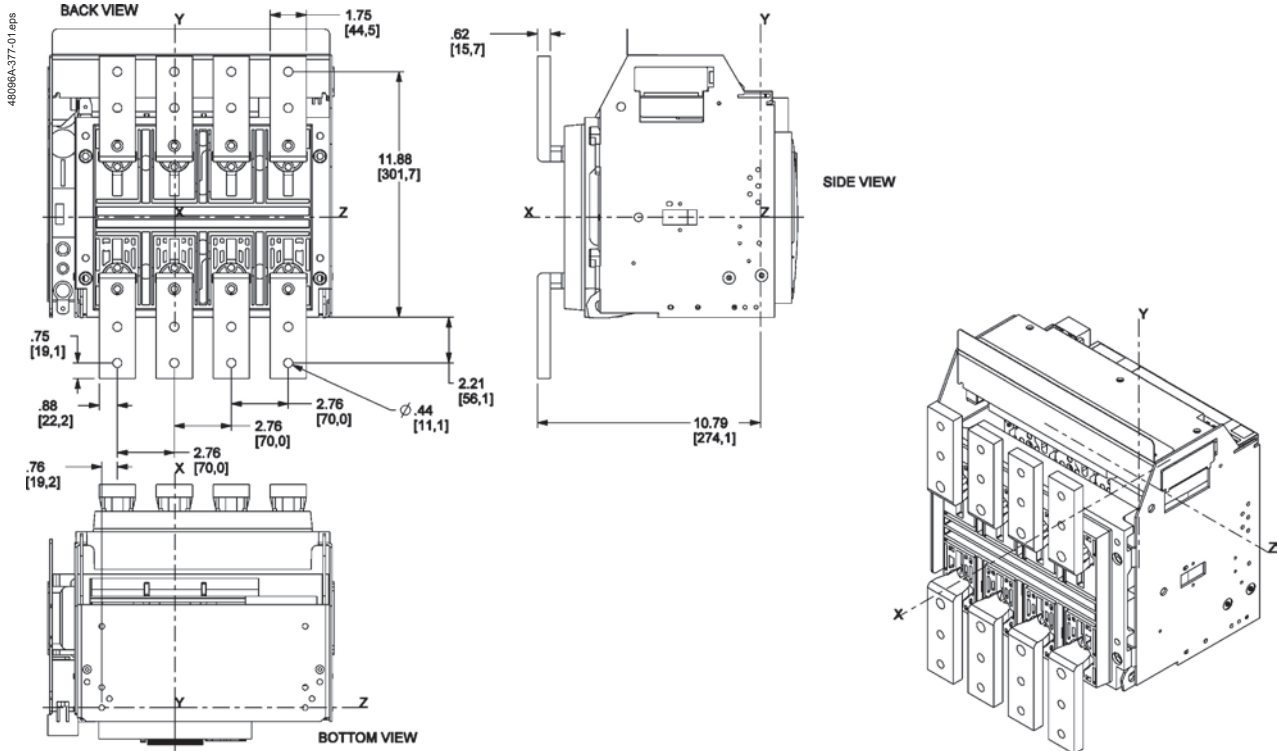


Connections

Vertical rear connection



"Pan" Dimensions

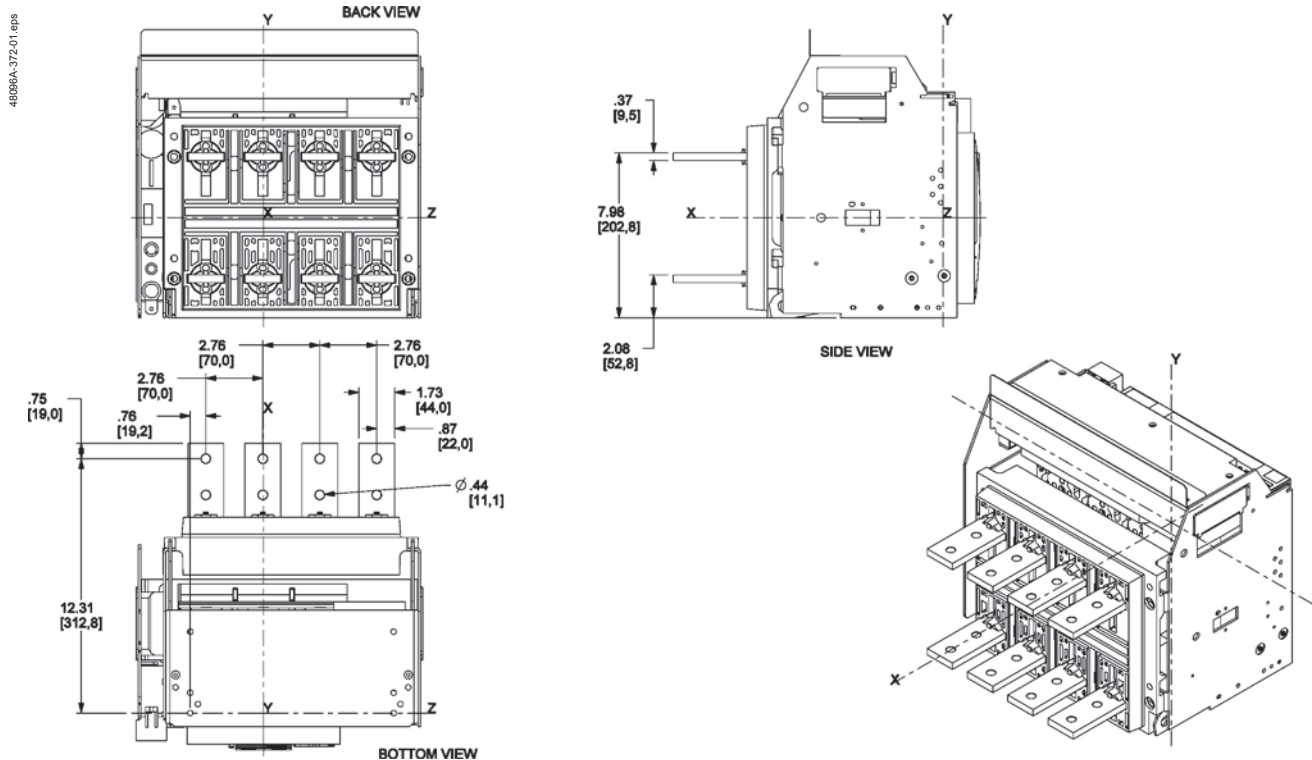


Note: dimensions in square brackets are in mm and other dimensions are in inches.

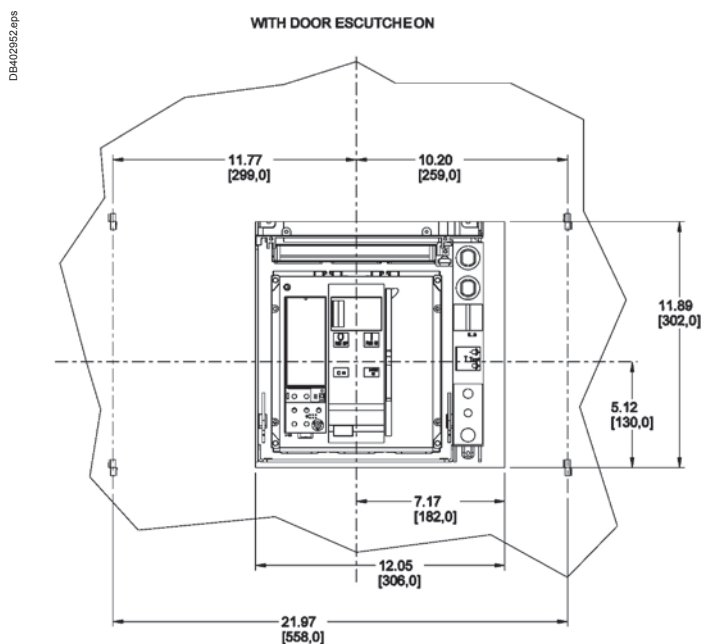


Connections

Horizontal rear connection



Door cutout

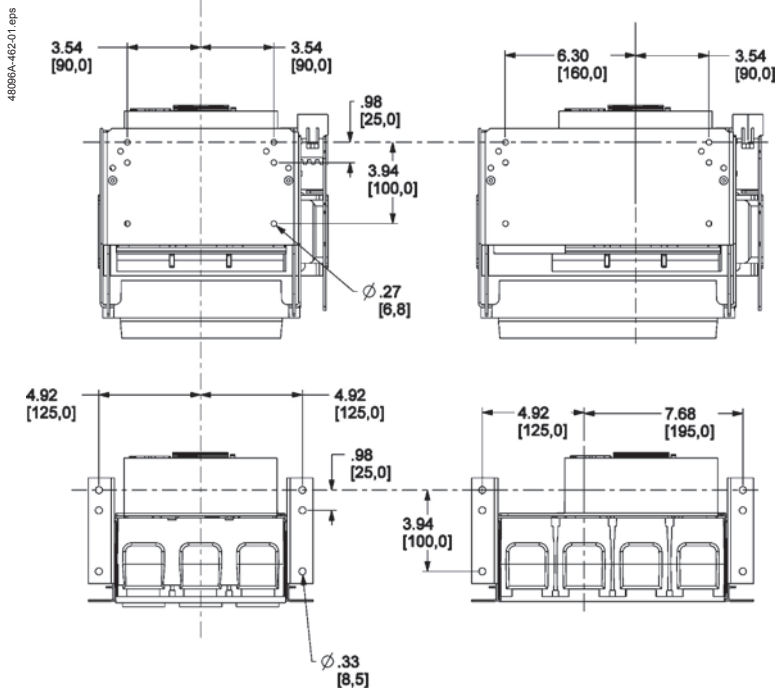


Note: dimensions in square brackets are in mm and other dimensions are in inches.



Connections

"Pan" Dimensions

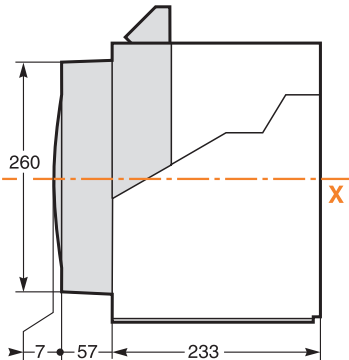


Note: dimensions in square brackets are in mm and other dimensions are in inches.

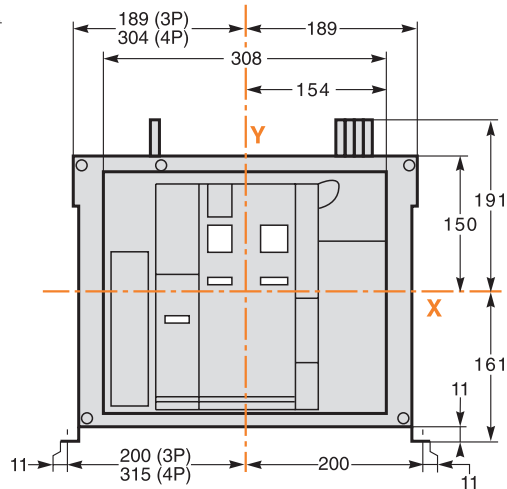


Dimensions

Db101267.eps

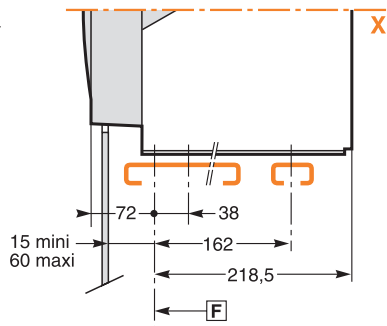


Db101268.eps



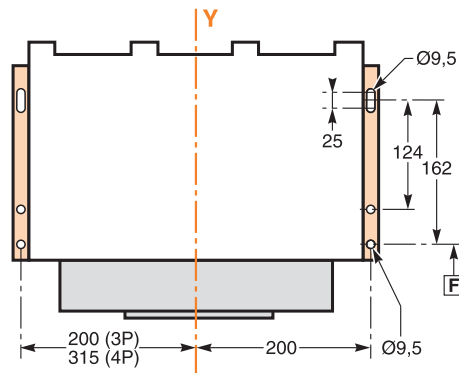
Mounting on base plate or rails

Db101269.eps



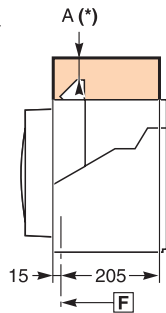
Mounting detail

Db101270.eps

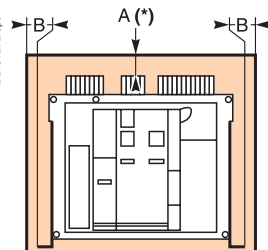


Safety clearances

Db101271.eps

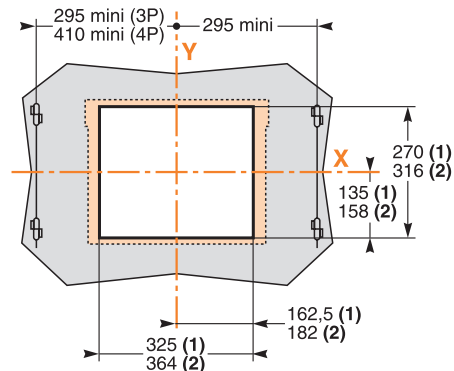


Db101272.eps



Door cutout

Db101273.eps



	Parts Insulated	Metal	Energised
A	0	0	100
B	0	0	60

Note: dimensions in mm.

F : datum.

(1) Without escutcheon.

(2) With escutcheon.

Note: X and Y are the symmetry planes for a 3-pole device.

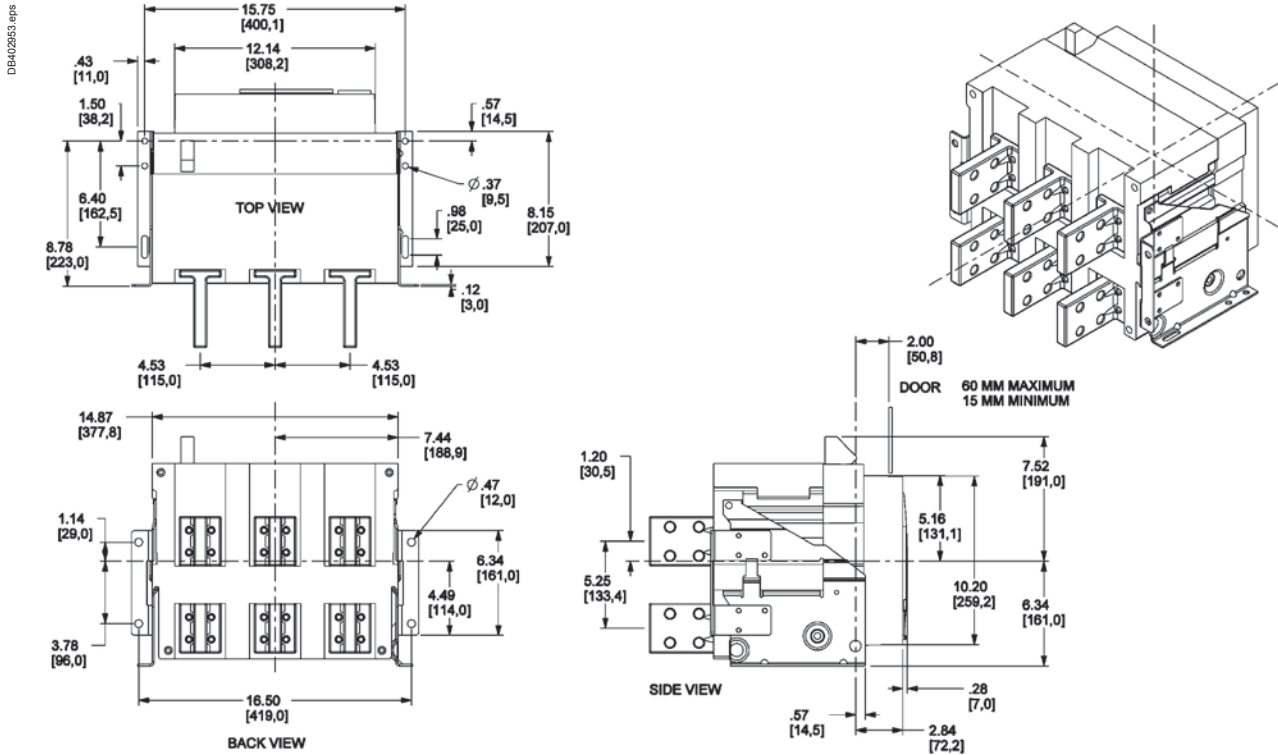
A(*) An overhead clearance of 110 mm is required to remove the arc chutes.
An overhead clearance of 20 mm is required to remove the terminal block.



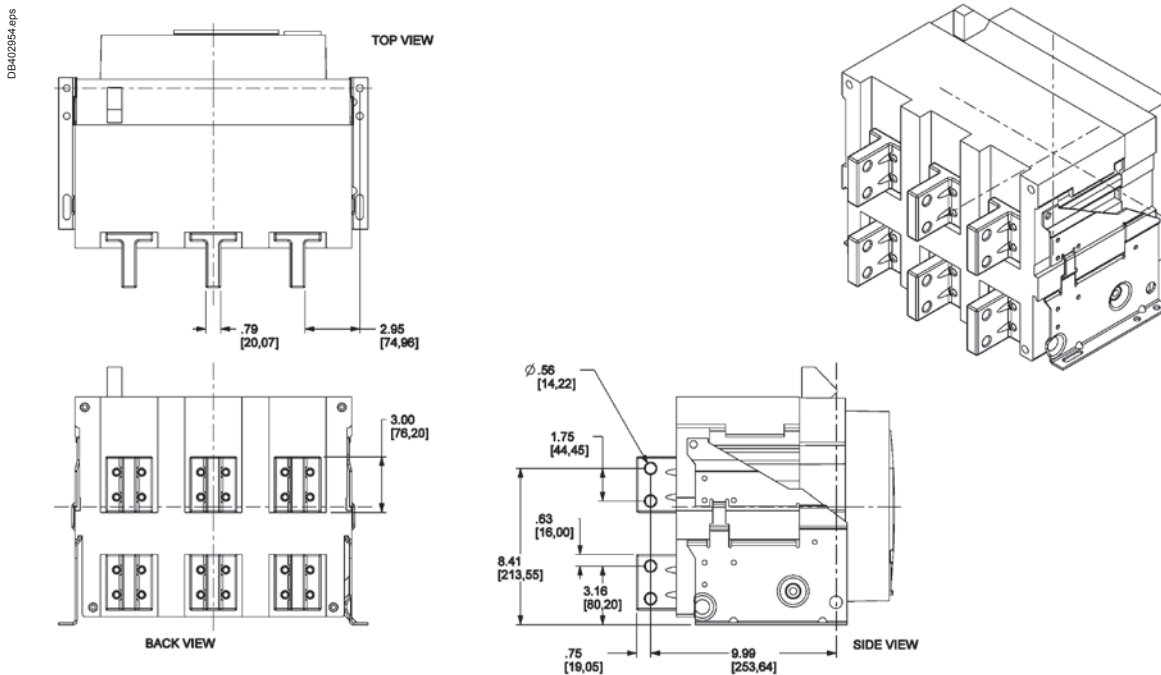
Fixed 3-pole device

Connections

General dimensions for all versions



Vertical rear connection from 800 A to 2000 A



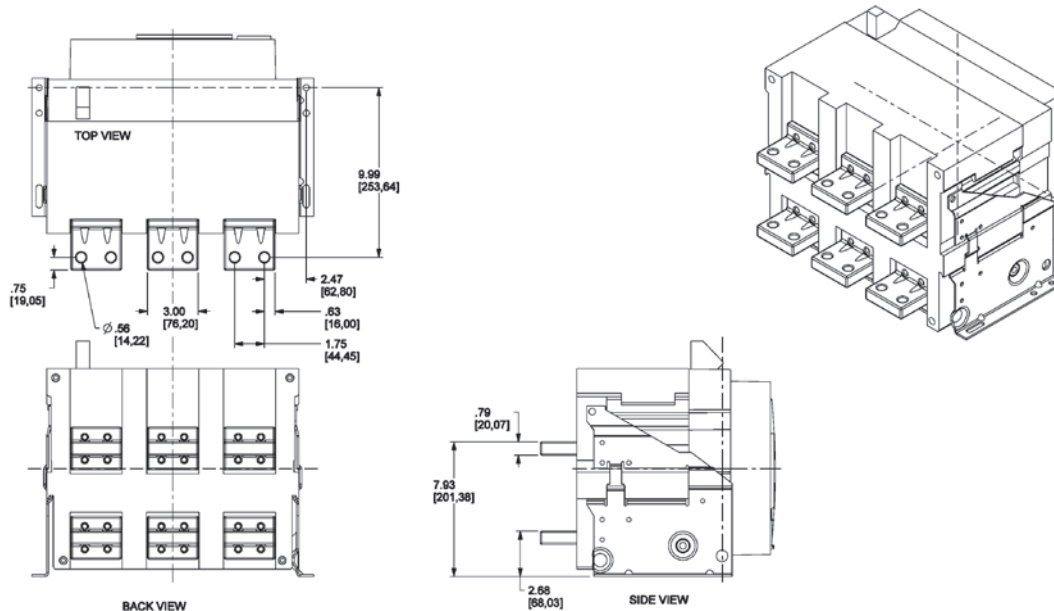
Note: dimensions in square brackets are in mm and other dimensions are in inches.



Connections

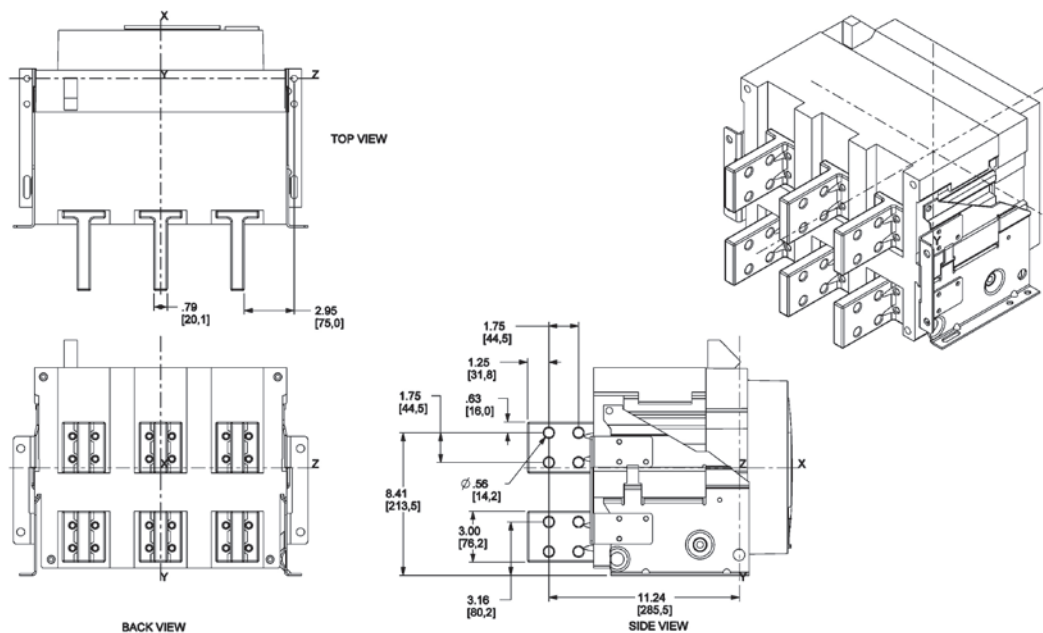
Horizontal rear connection from 800 A to 2000 A

DE402955.eps



Horizontal rear connection from 2500 A to 3000 A

DE402956.eps

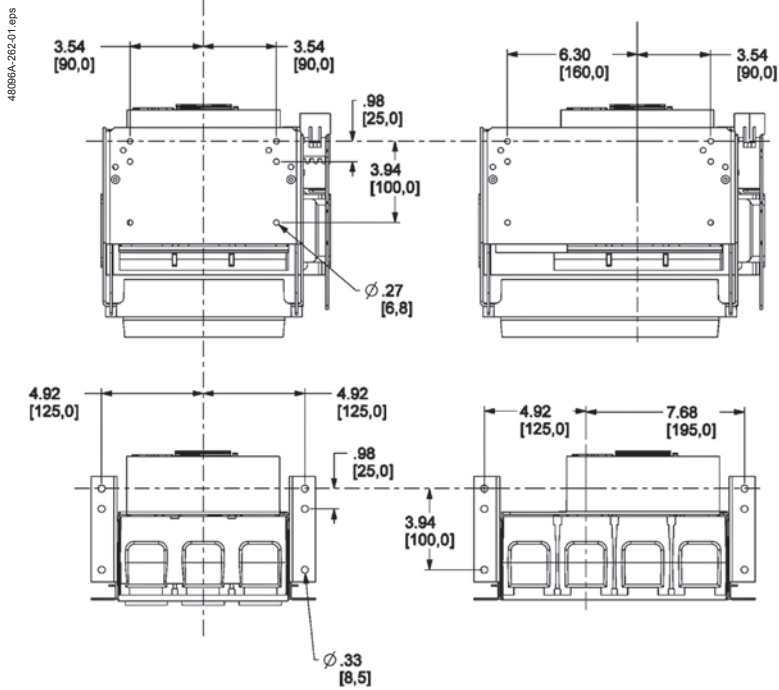


Note: dimensions in square brackets are in mm and other dimensions are in inches.

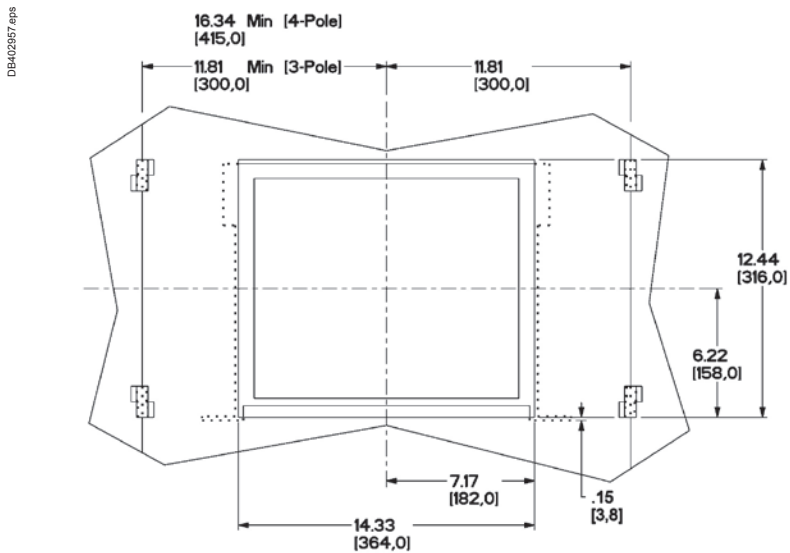


Connections

Horizontal rear connection from 2500 A to 3000 A



Door cutout from 800 A to 3000 A



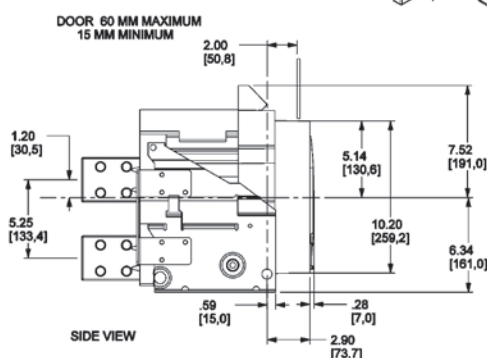
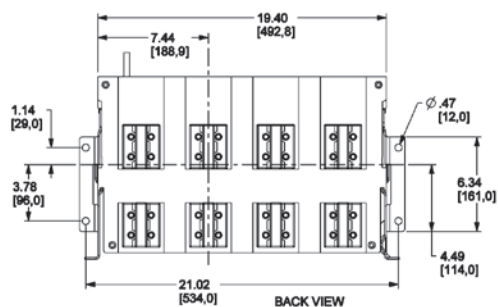
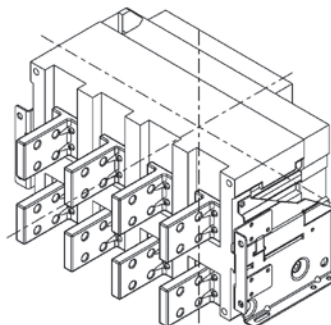
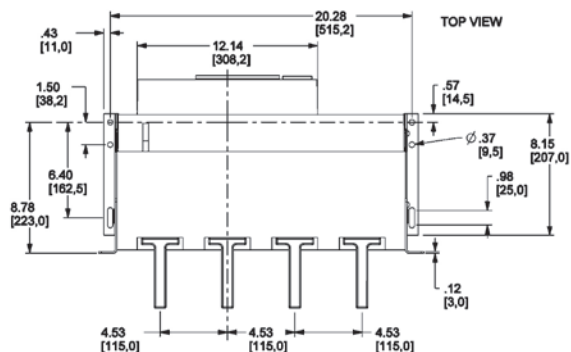
Note: dimensions in square brackets are in mm and other dimensions are in inches.



Connections

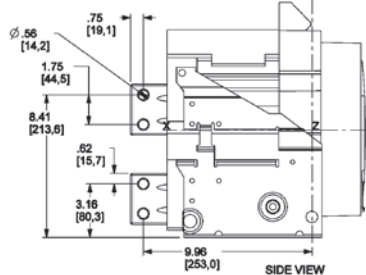
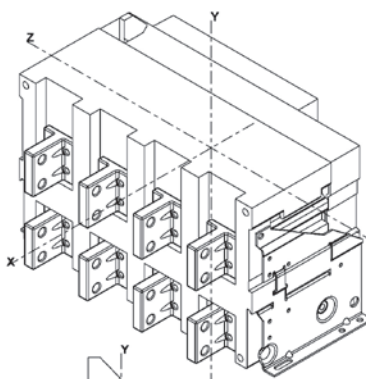
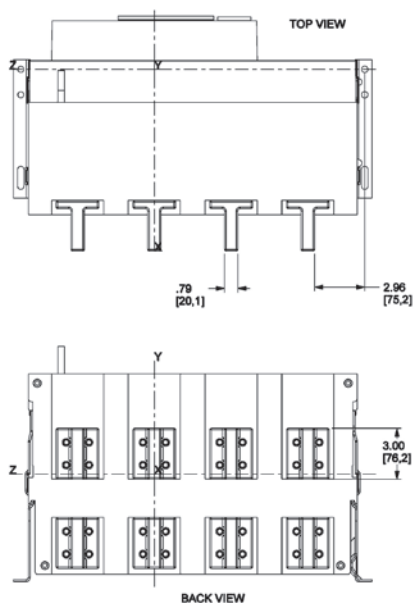
General dimensions for all versions

DB402959.eps



Vertical rear connection from 800 A to 2000 A

DB402959.eps



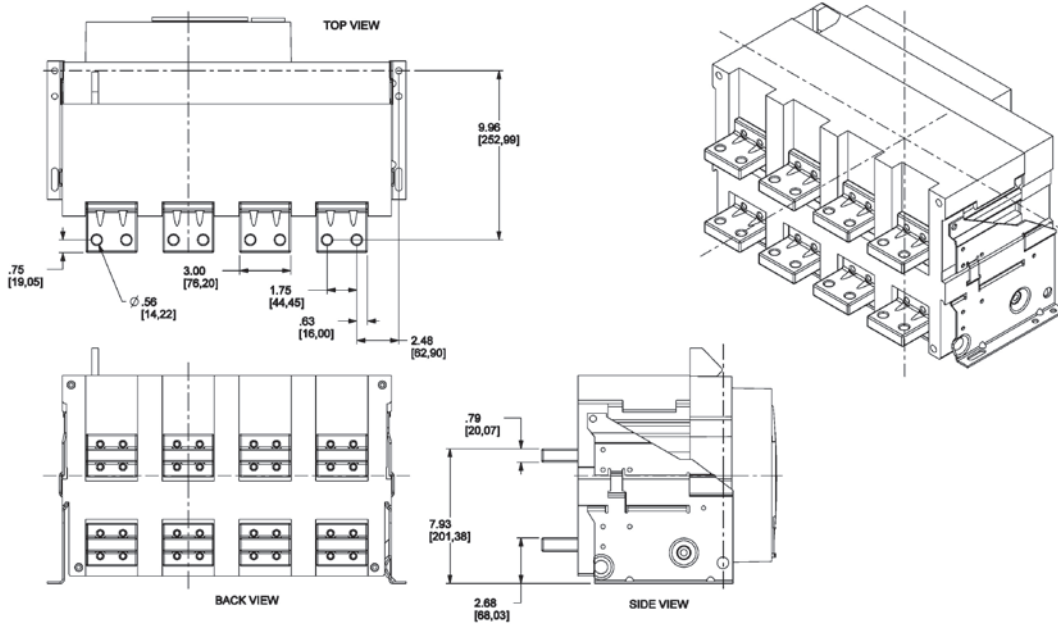
Note: dimensions in square brackets are in mm and other dimensions are in inches.



Connections

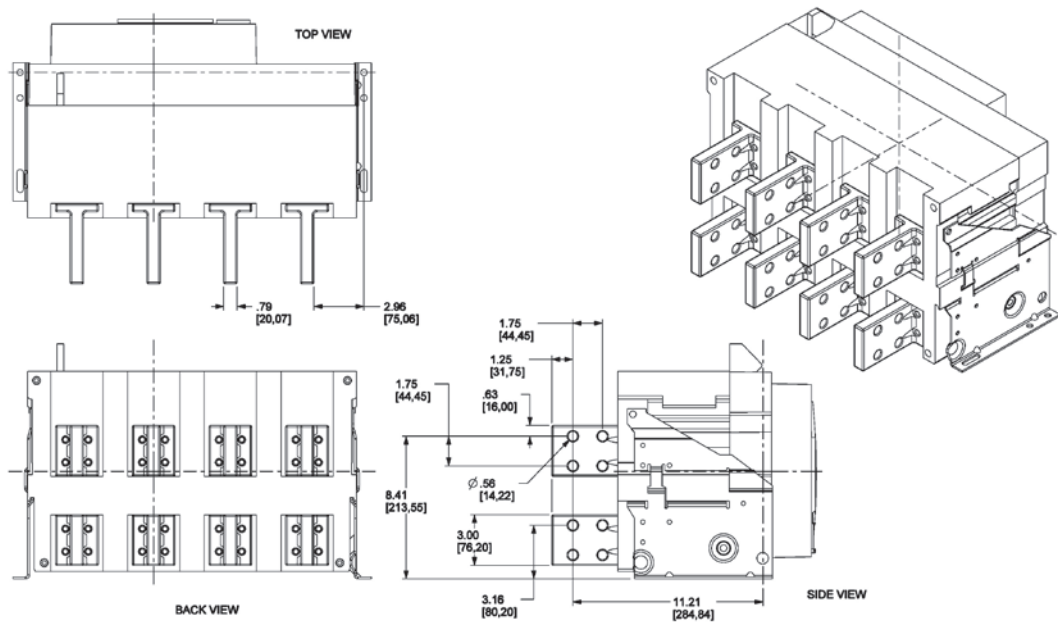
Horizontal rear connection from 800 A to 2000 A

DB402860.eps



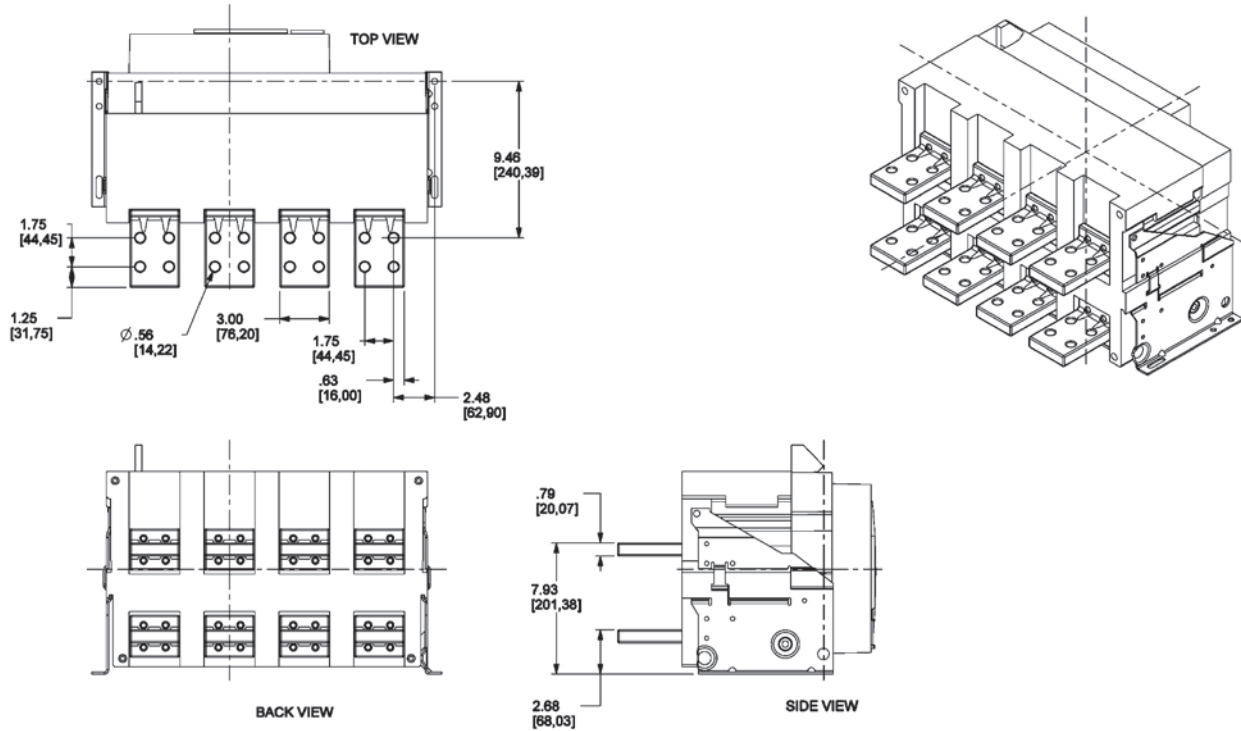
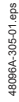
Vertical rear connection from 2500 A to 3000 A

DB402861.eps



Note: dimensions in square brackets are in mm and other dimensions are in inches.

Horizontal rear connection from 2500 A to 3000 A



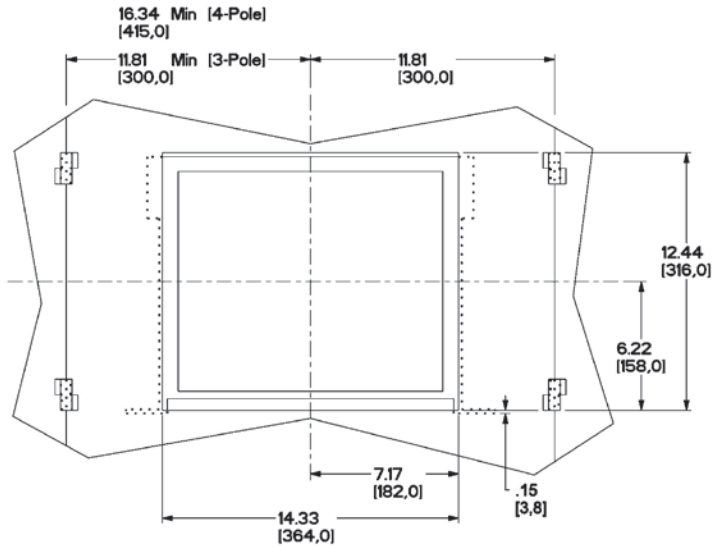
Note: dimensions in square brackets are in mm and other dimensions are in inches.



Connections

Door cutout from 800 A to 3000 A

DB402962.eps



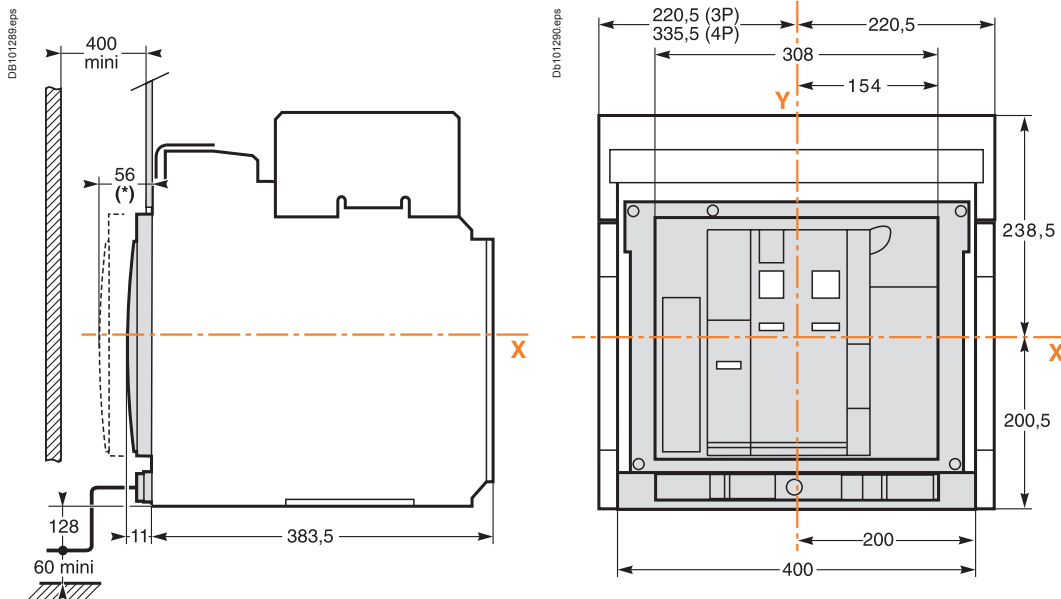
Note: dimensions in square brackets are in mm and other dimensions are in inches.



NW08 to NW30 circuit breakers

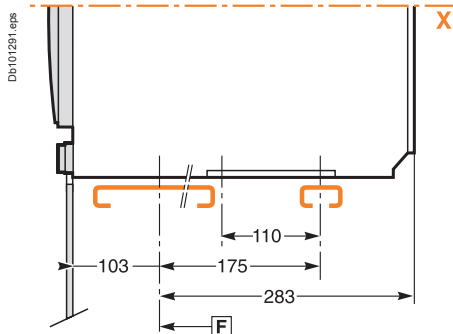
Drawout 3/4-pole device

Dimensions

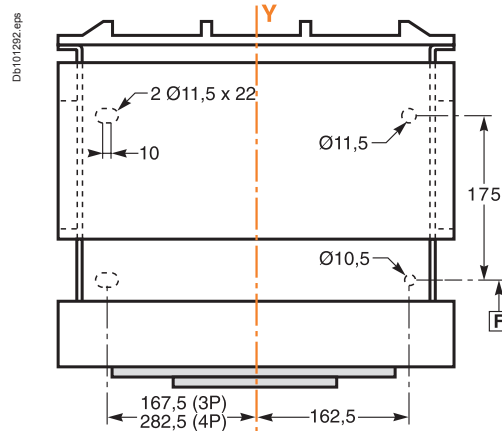


(*) Disconnected position.

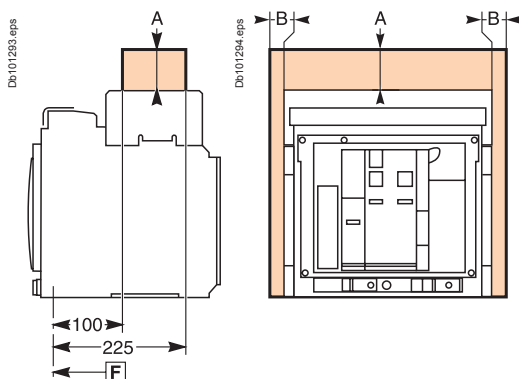
Mounting on base plate or rails



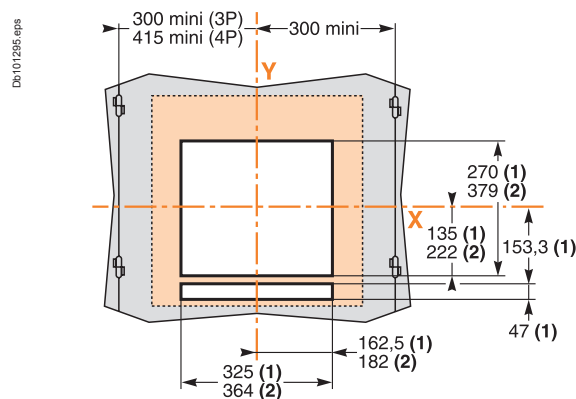
Mounting detail



Safety clearances



Door cutout



	Parts Insulated	Metal	Energised
A	0	0	0
B	0	0	60

Note: dimensions in mm.

F : datum.

(1) Without escutcheon.

(2) With escutcheon.

Note: X and Y are the symmetry planes for a 3-pole device.



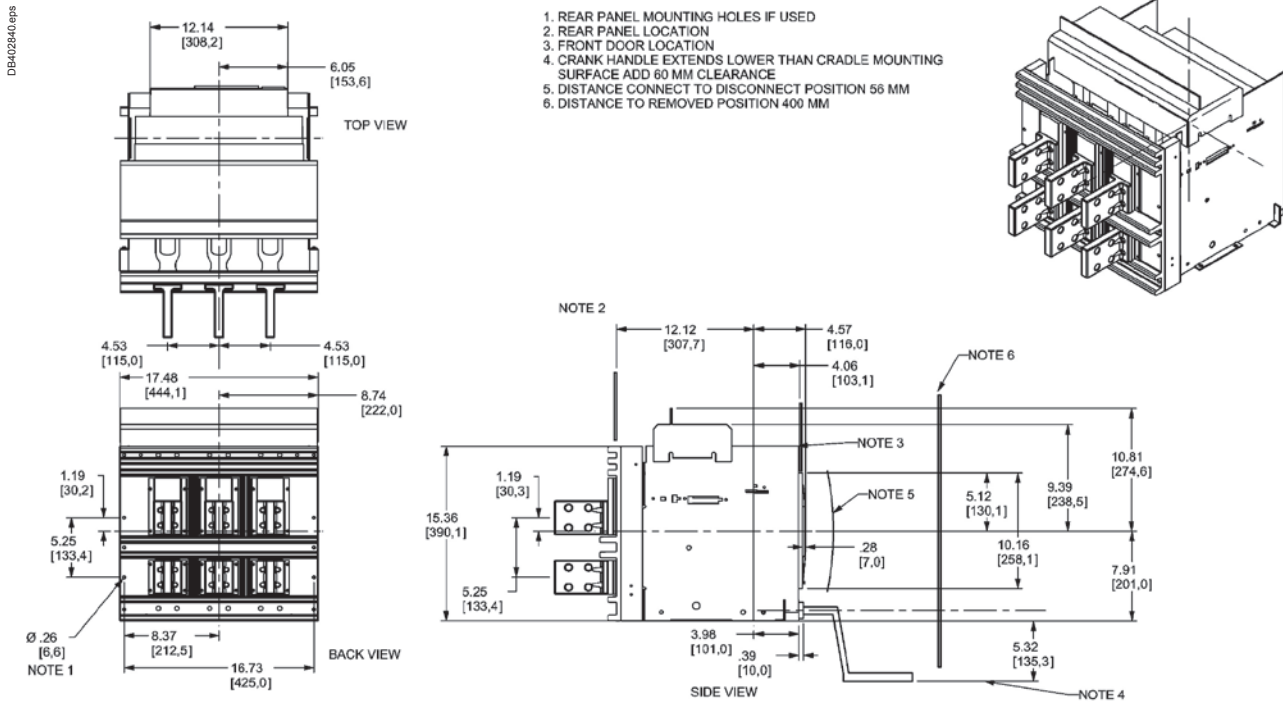
Drawout 3-pole device

Dimensions of Masterpact NW 3P

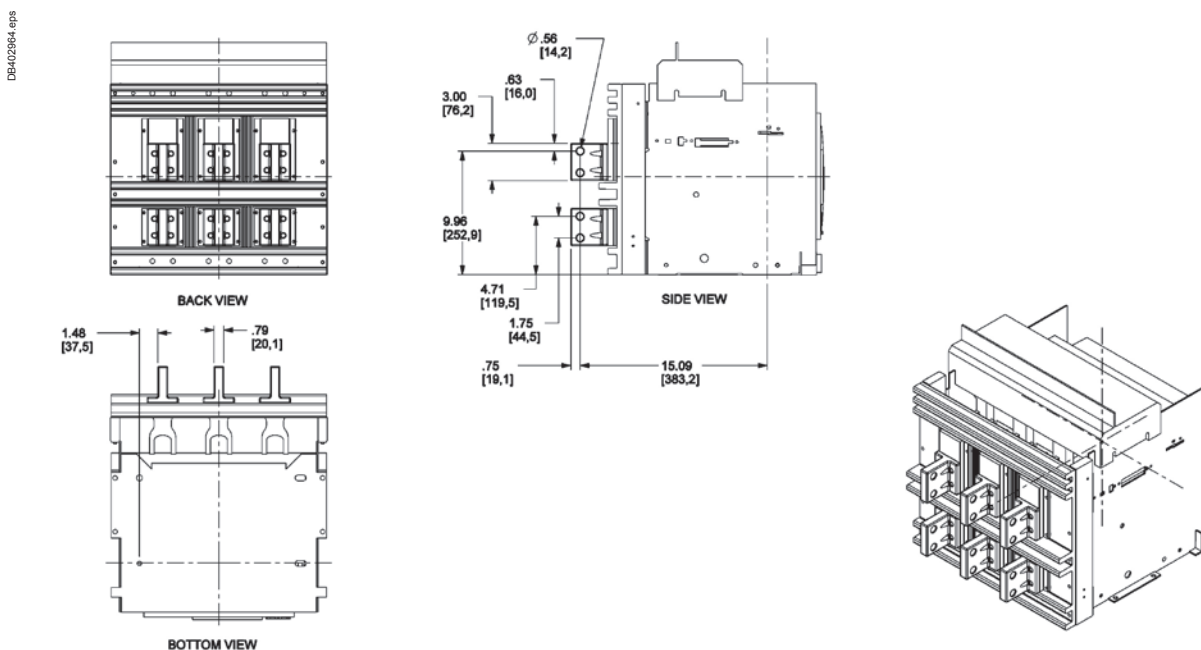
Number of poles	Rating	Dimension (H x W x D)		Vent areas		Bottom	
		In	mm	Top In ²	mm ²	In ²	mm ²
3P	Up to 3000 A	18.37 x 24 x 15.75	466.6 x 609.6 x 400	16.62	10720	16.62	10720
	4000 A and 5000 A	21.75 x 36 x 15.75	552.5 x 914.4 x 400	16.62	10720	16.62	10720

Connections

General dimensions for all versions



Vertical rear connection from 800 A to 2000 A



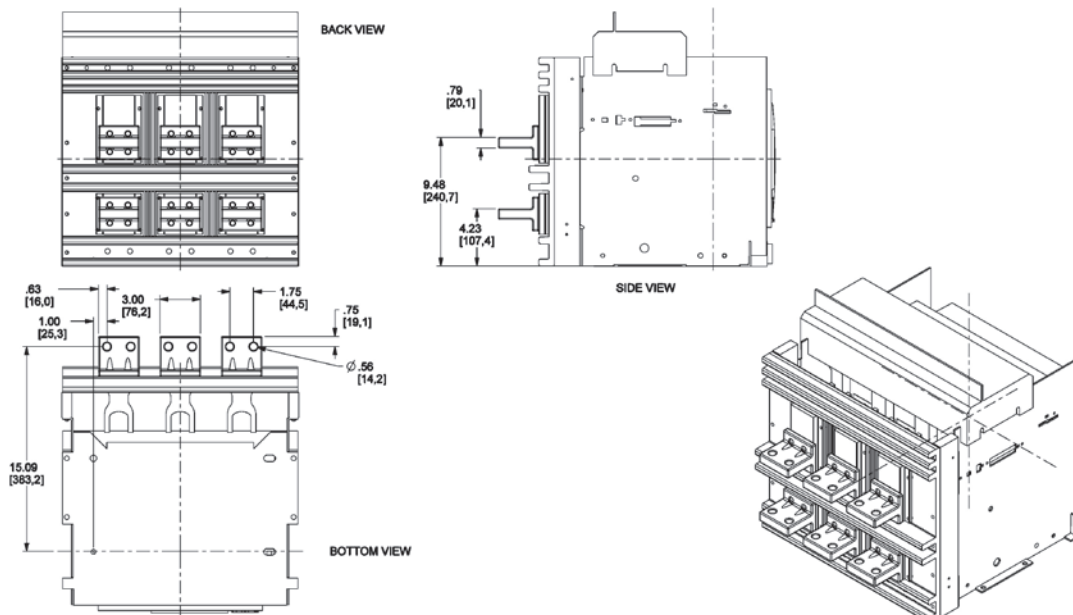
Note: dimensions in square brackets are in mm and other dimensions are in inches.



Connections

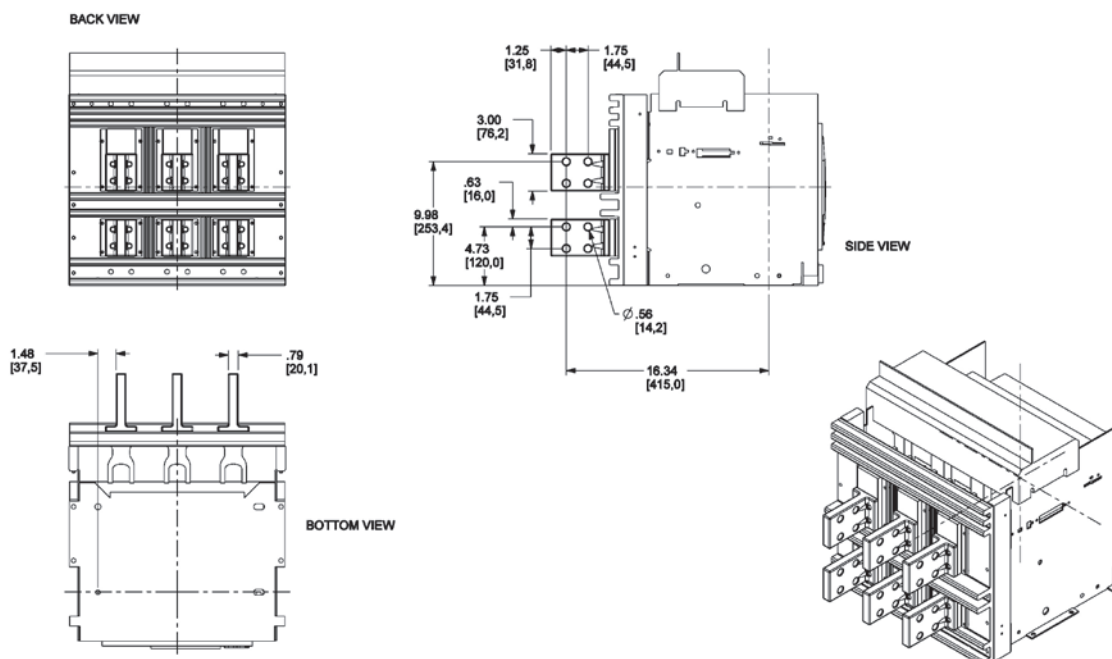
Horizontal rear connection from 800 A to 2000 A

DE402841.eps



Vertical rear connection from 2500 A to 3000 A

DE402842.eps



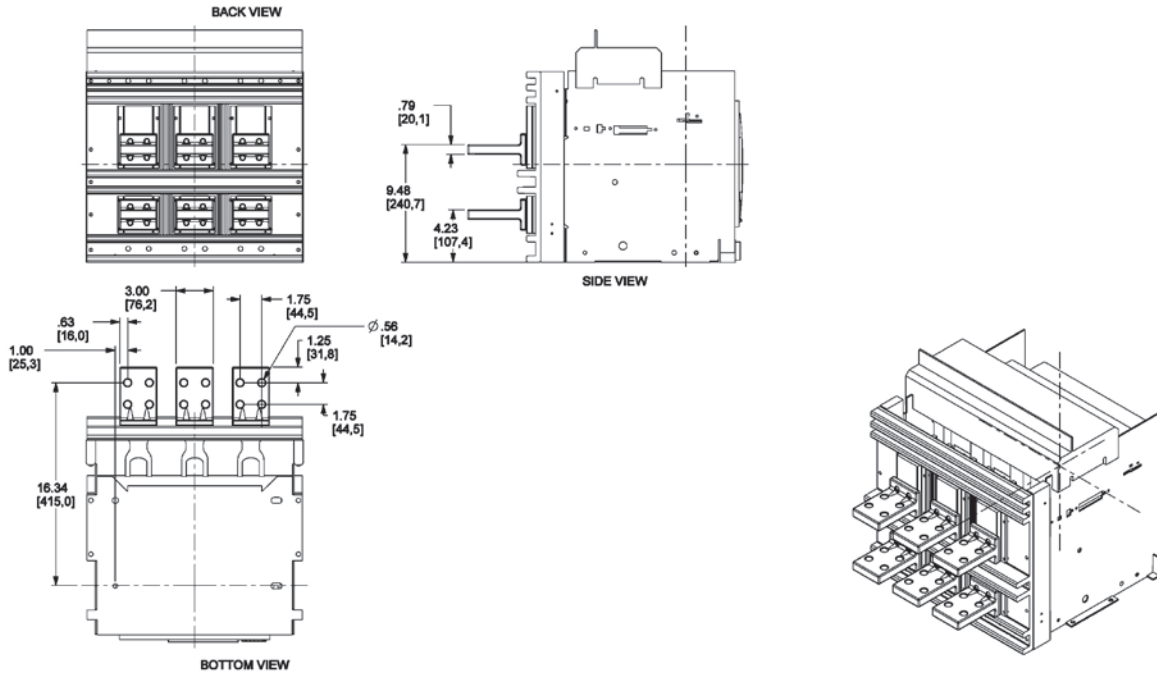
Note: dimensions in square brackets are in mm and other dimensions are in inches.



Connections

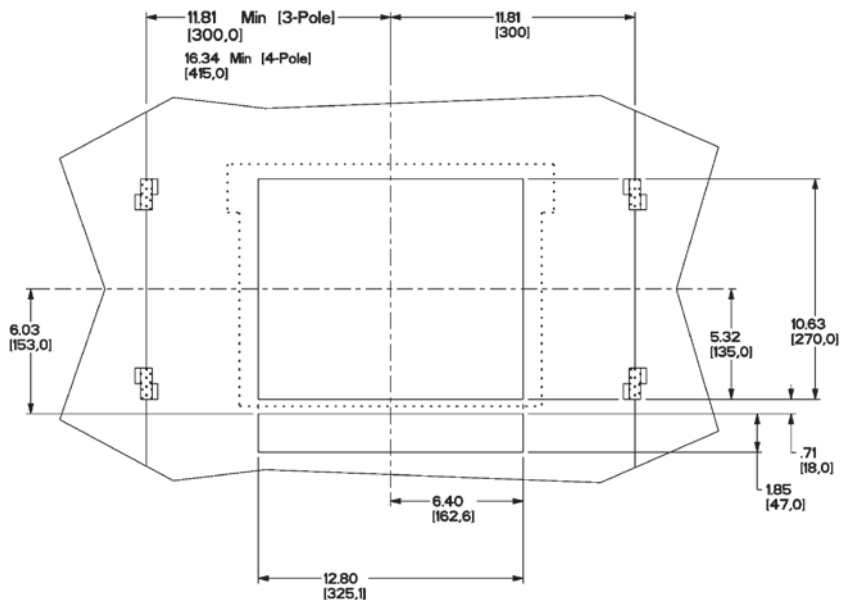
Horizontal rear connection from 2500 A to 3000 A

DB402843.eps



Door cutout from 800 A to 3000 A

DB402844.eps



Note: dimensions in square brackets are in mm and other dimensions are in inches.



NW08 to NW30 circuit breakers

Drawout 4-pole device

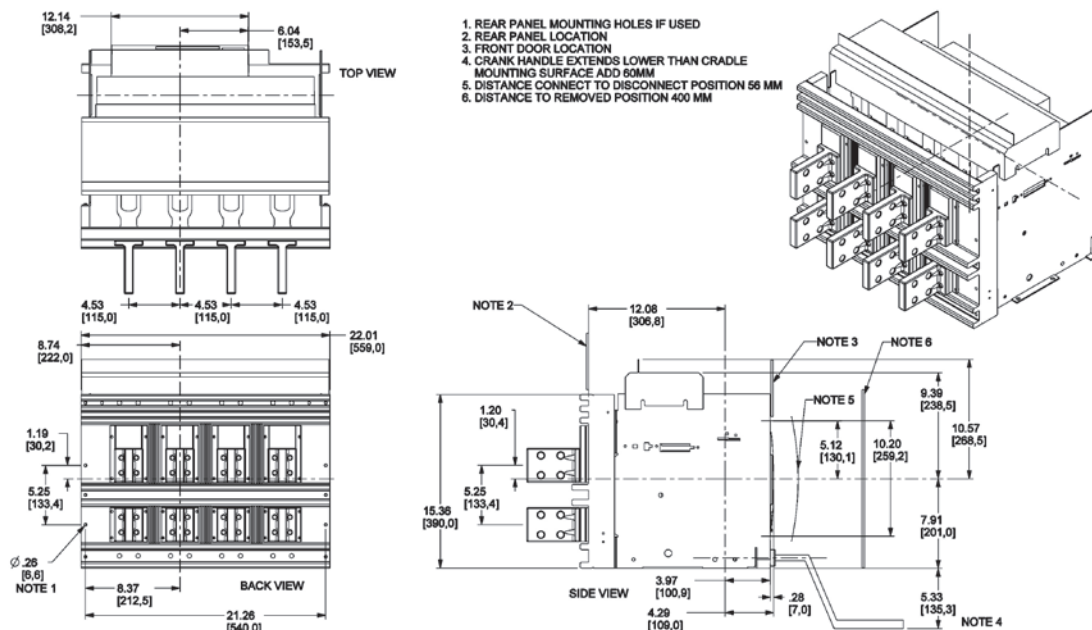
Dimensions of Masterpact NW 4P

Number of poles	Rating	Dimension (H x W x D)		Vent areas		Bottom	
		In	mm	Top In ²	mm ²	In ²	mm ²
4P	Up to 3000 A	18.37 x 30 x 15.75	466.6 x 762.0 x 400	16.62	10720	16.62	10720
	4000 A and 5000 A	21.75 x 45 x 15.75	552.5 x 1168.4 x 400	16.62	10720	16.62	10720

Connections

General dimensions for all versions

DB402945.eps



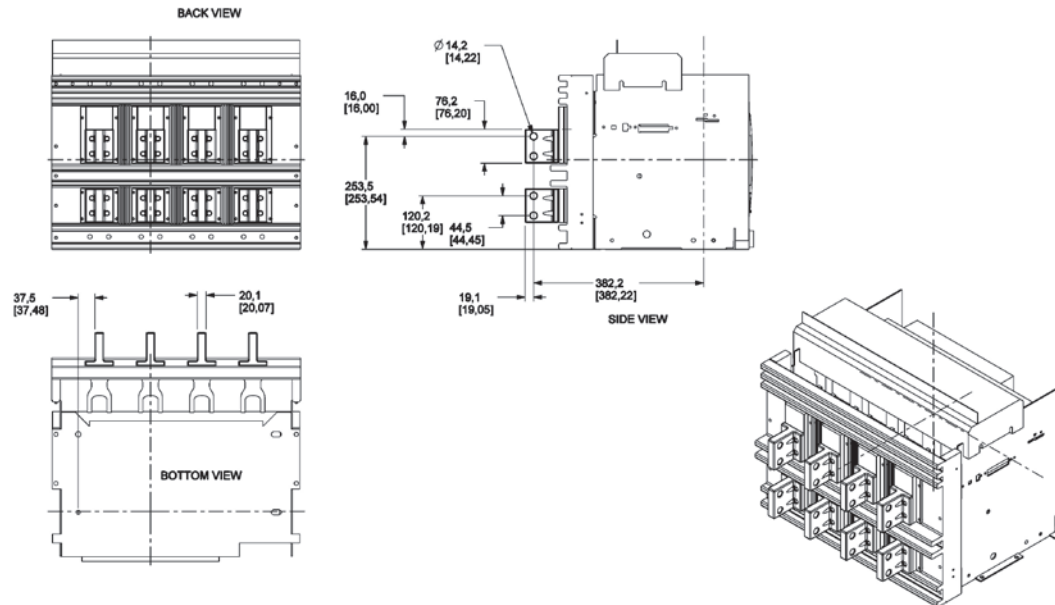
Note: dimensions in square brackets are in mm and other dimensions are in inches.



Connections

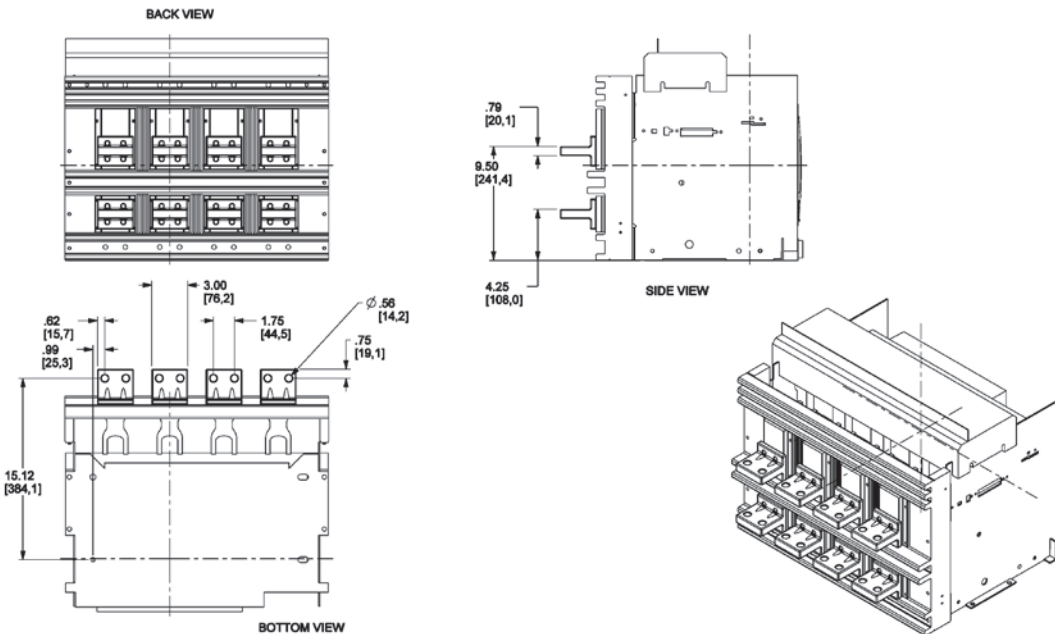
Vertical rear connection from 800 A to 3000 A

DB402846.eps



Horizontal rear connection from 800 A to 3000 A

DB402847.eps



Note: dimensions in square brackets are in mm and other dimensions are in inches.



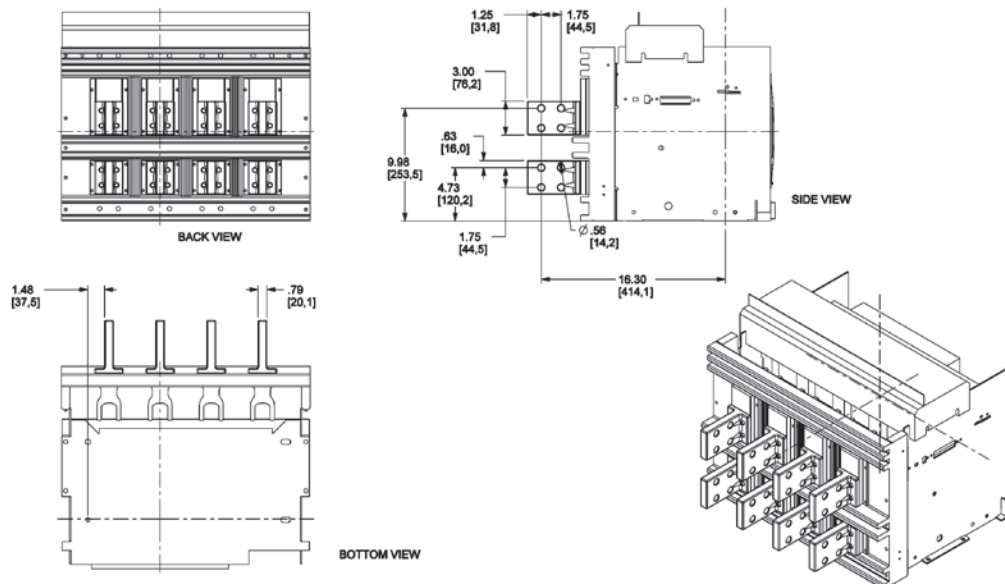
NW08 to NW30 circuit breakers

Drawout 4-pole device

Connections

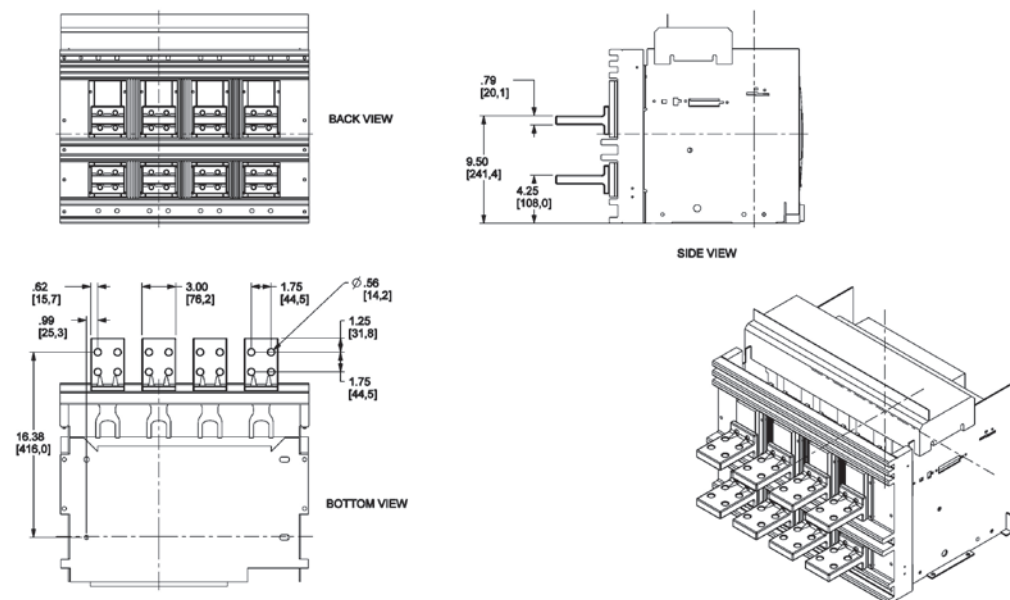
Vertical rear connection from 2500 A to 3000 A

DE402849.eps



Horizontal rear connection from 2500 A to 3000 A

DE402849.eps



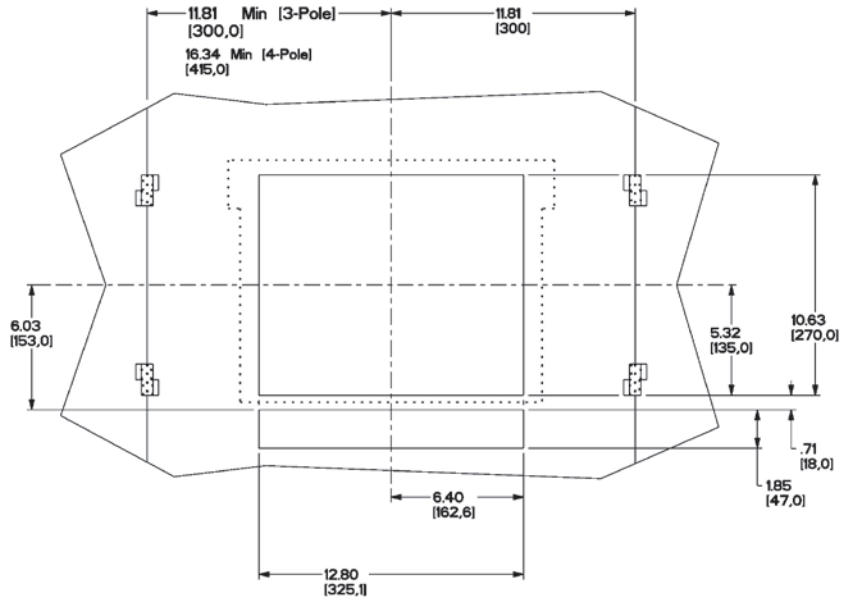
Note: dimensions in square brackets are in mm and other dimensions are in inches.



Connections

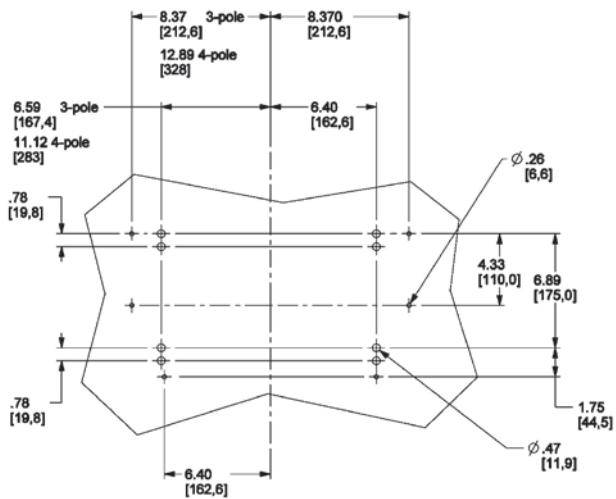
Door cutout from 800 A to 3000 A

DB402844.eps



Chassis mounting from 800 A to 3000 A

DB106033A.eps



Note: dimensions in square brackets are in mm and other dimensions are in inches.

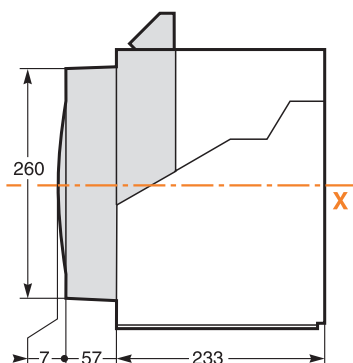


NW40 and NW50 circuit breakers

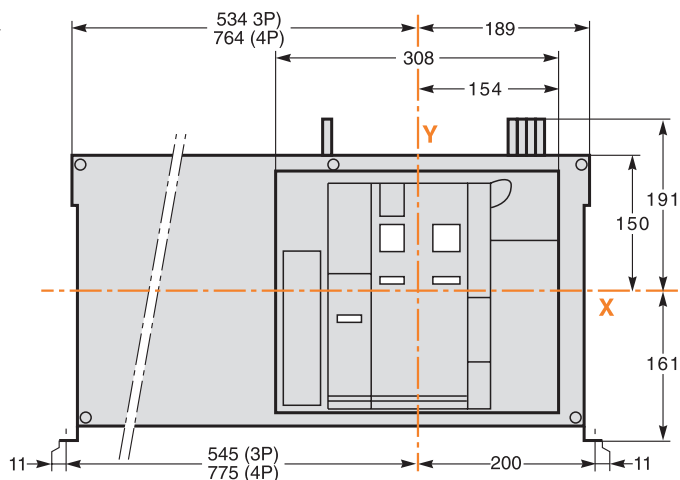
Fixed 3/4-pole device

Dimensions

Db101287.eps

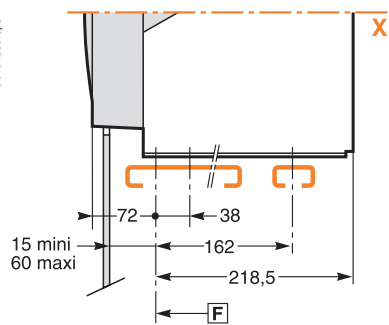


Db101320.eps



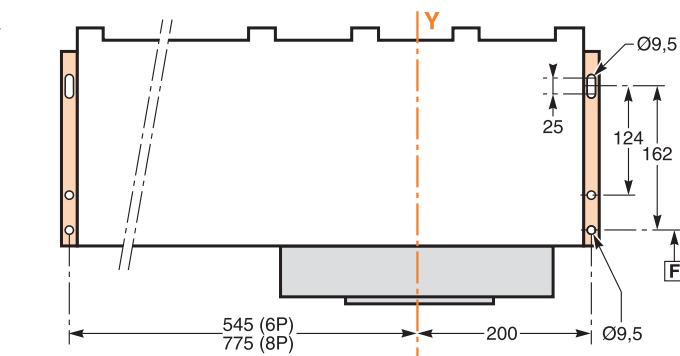
Mounting on base plate or rails

Db101289.eps



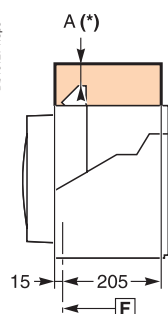
Mounting detail

Db101321.eps

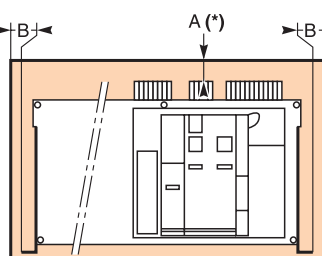


Safety clearances

Db101271.eps

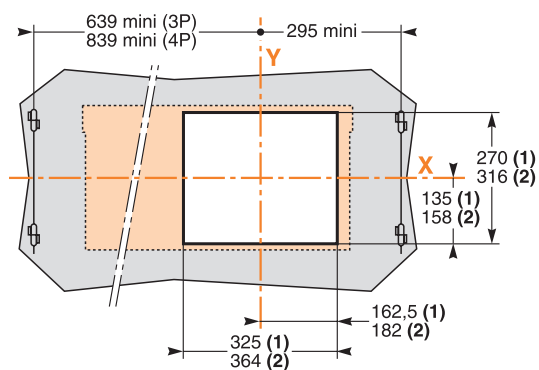


Db101323.eps



Db101322.eps

Door cutout



	Parts Insulated	Metal	Energised
A	0	0	100
B	0	0	60

Note: dimensions in mm.

F: datum.

(1) Without escutcheon.

(2) With escutcheon.

Note: X and Y are the symmetry planes for a 3-pole device.

A(*) An overhead clearance of 110 mm is required to remove the arc chutes.
An overhead clearance of 20 mm is required to remove the terminal block.

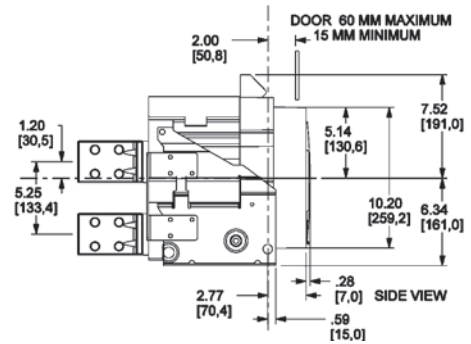
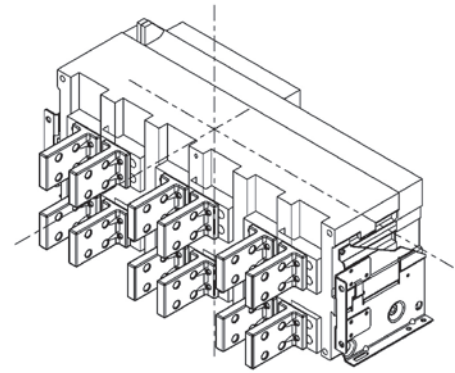
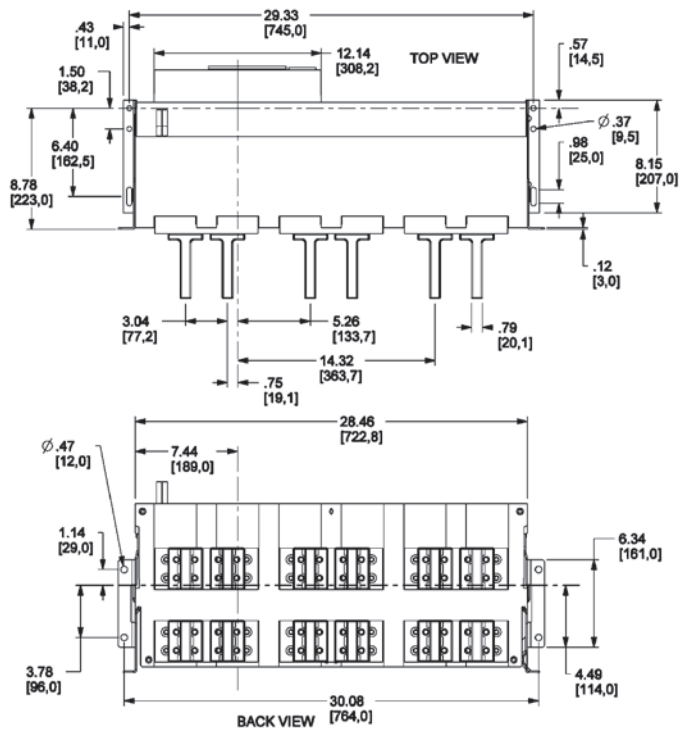


Fixed 3-pole device

Connections

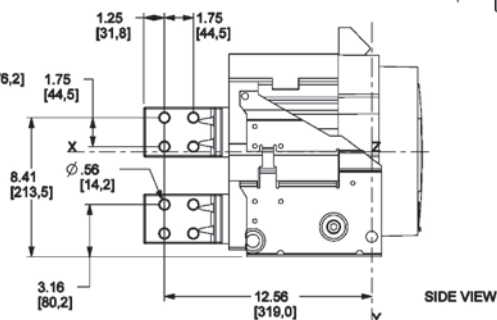
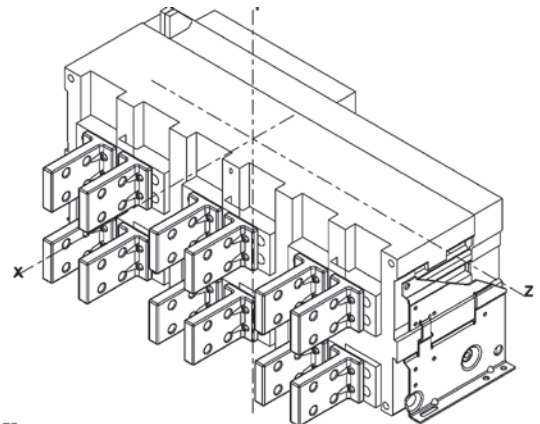
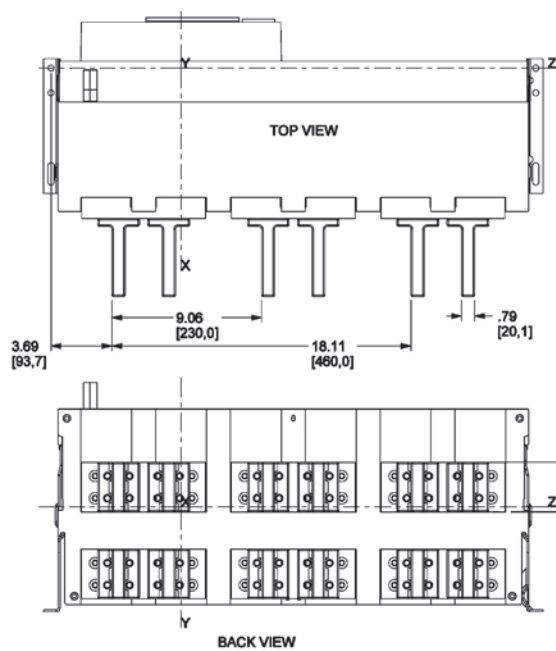
General dimensions for all versions

DS402851.eps



Vertical rear connection 4000 A and 5000 A

48096A-267-01.eps



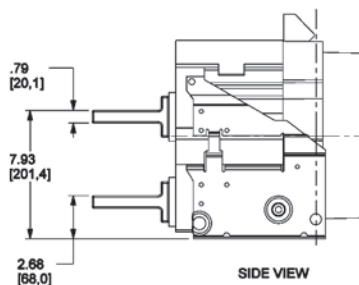
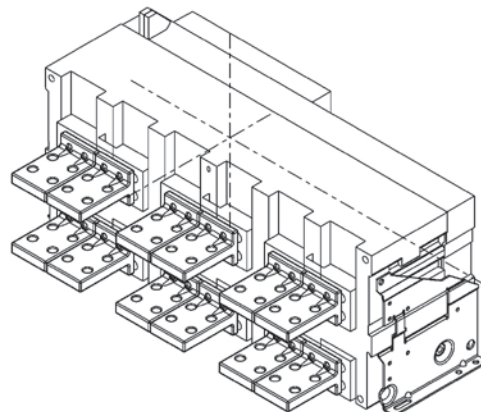
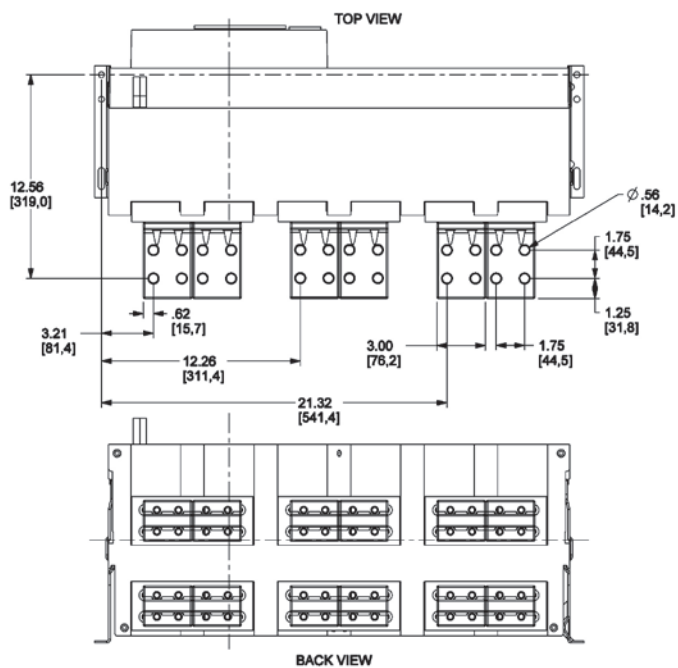
Note: dimensions in square brackets are in mm and other dimensions are in inches.



Connections

Horizontal rear connection 4000 A and 5000 A

DB402850.eps



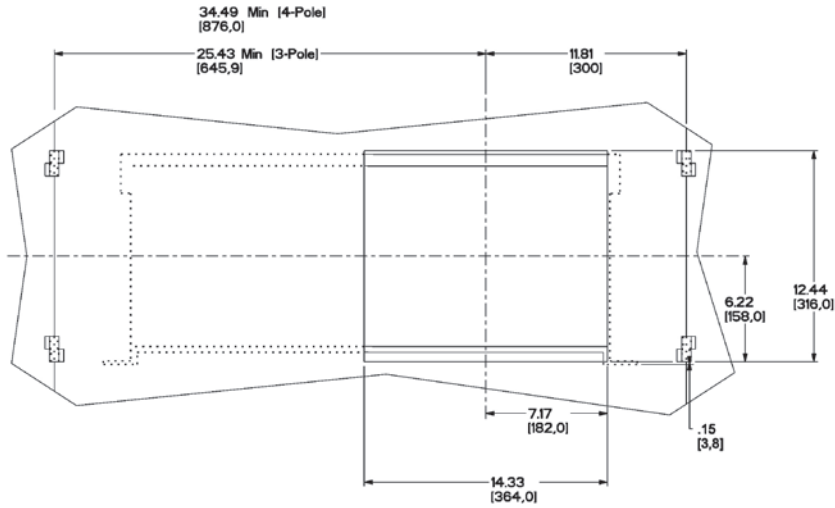
Note: dimensions in square brackets are in mm and other dimensions are in inches.



Connections

Door cutout 4000 A et 5000 A

DB402963.eps



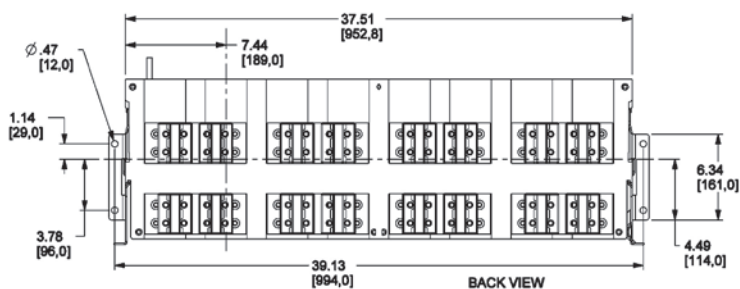
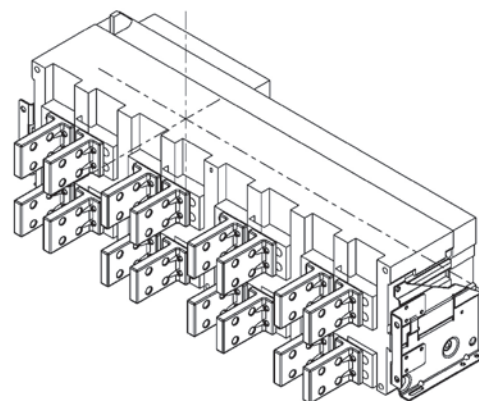
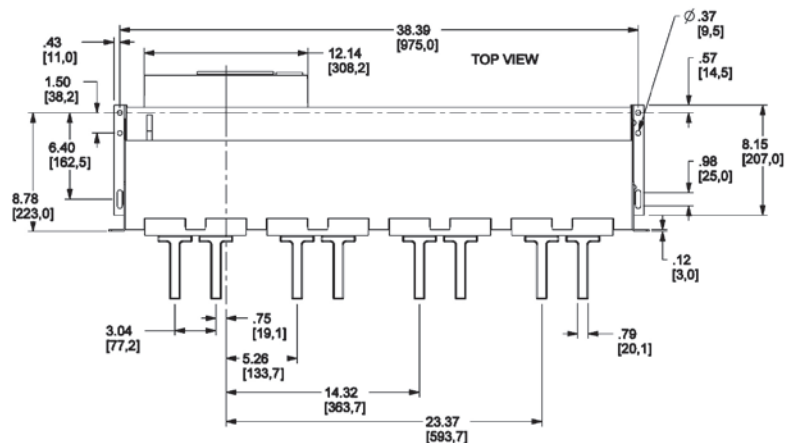
Note: dimensions in square brackets are in mm and other dimensions are in inches.



Connections

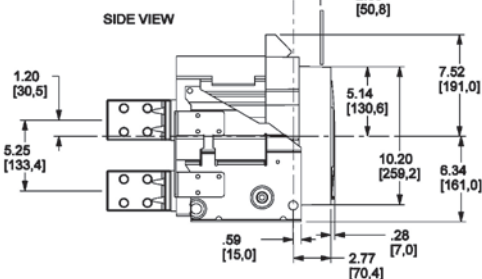
General dimensions for all versions

DB402852.eps



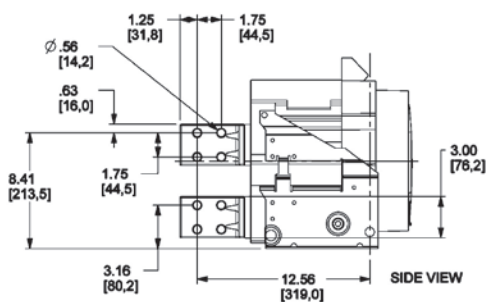
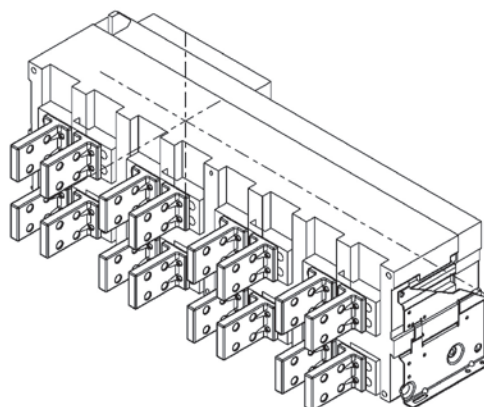
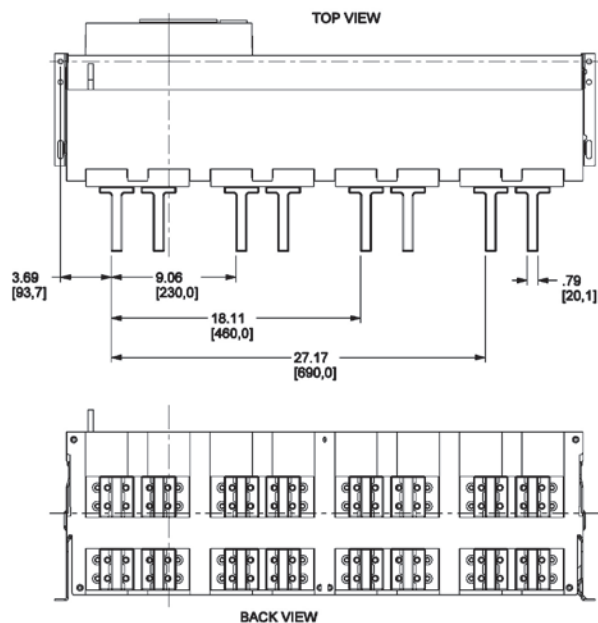
DOOR 60 MM MAXIMUM
15MM MINIMUM

SIDE VIEW



Vertical rear connection 4000 A and 5000 A

48036A-34E-01.eps



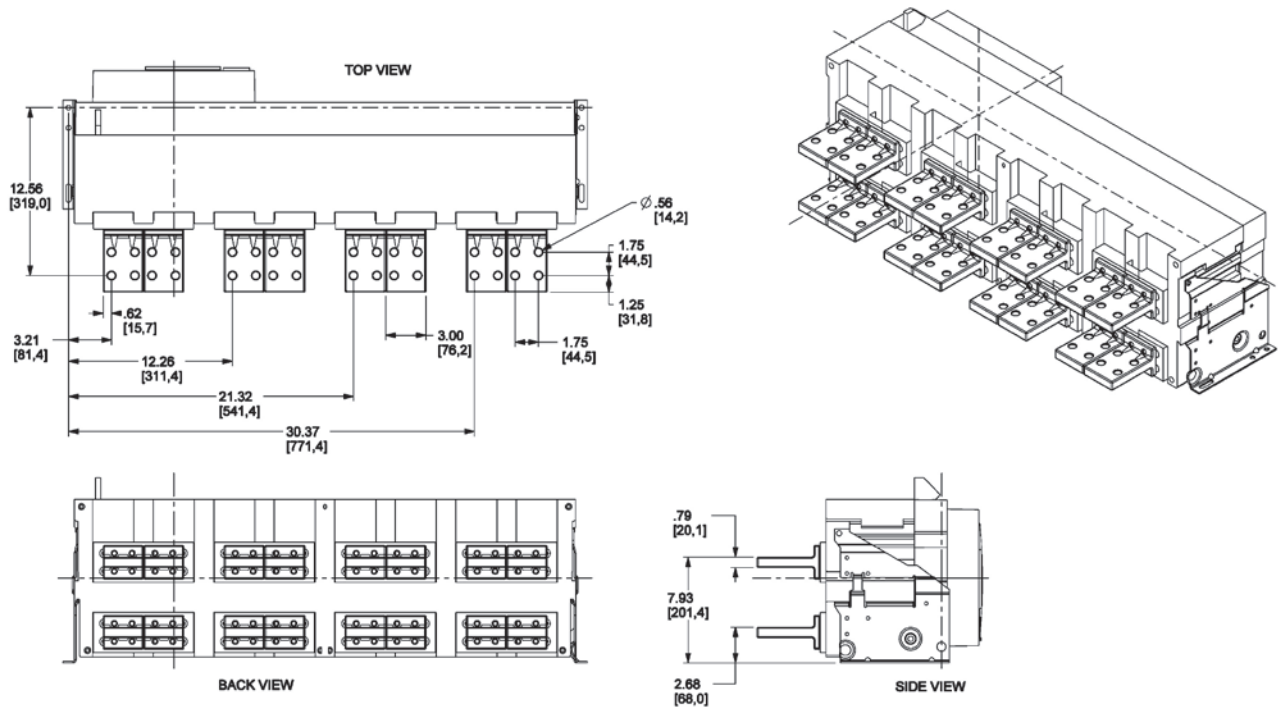
Note: dimensions in square brackets are in mm and other dimensions are in inches.



Connections

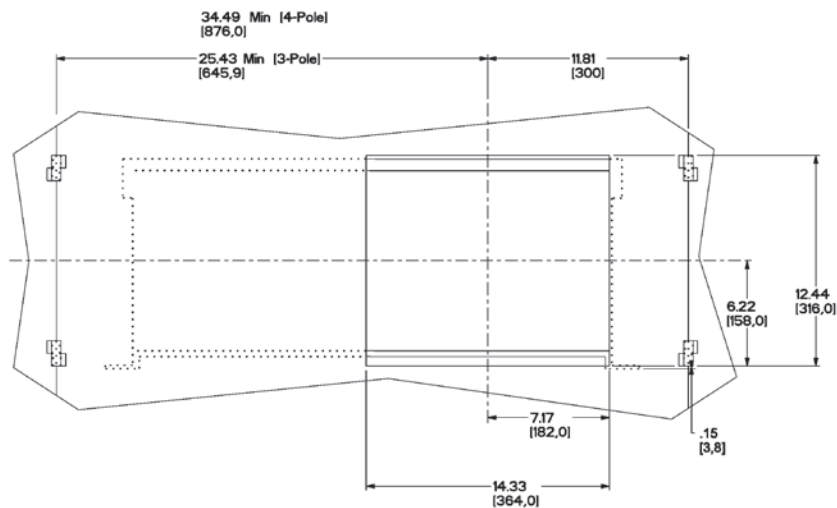
Horizontal rear connection 4000 A and 5000 A

DB402865.eps



Door cutout 4000 A and 5000 A

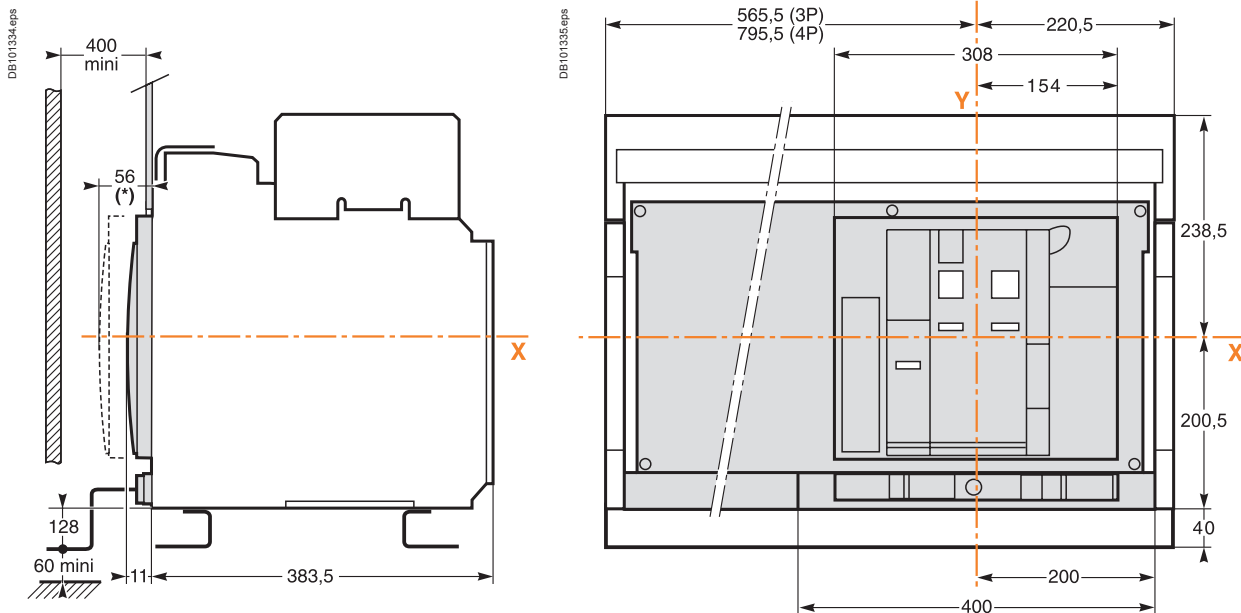
DB402863.eps



Note: dimensions in square brackets are in mm and other dimensions are in inches.



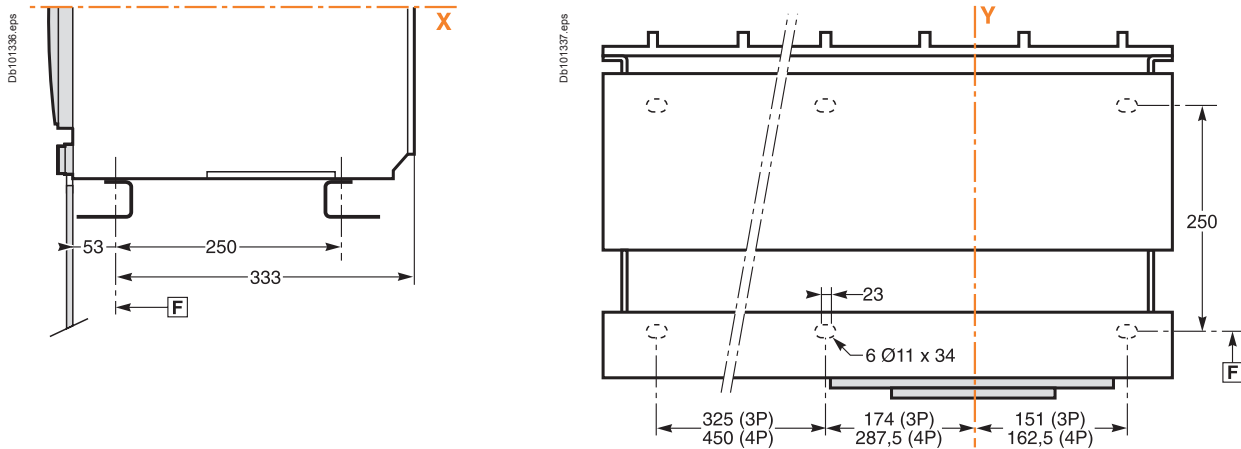
Dimensions



(*) Disconnected position.

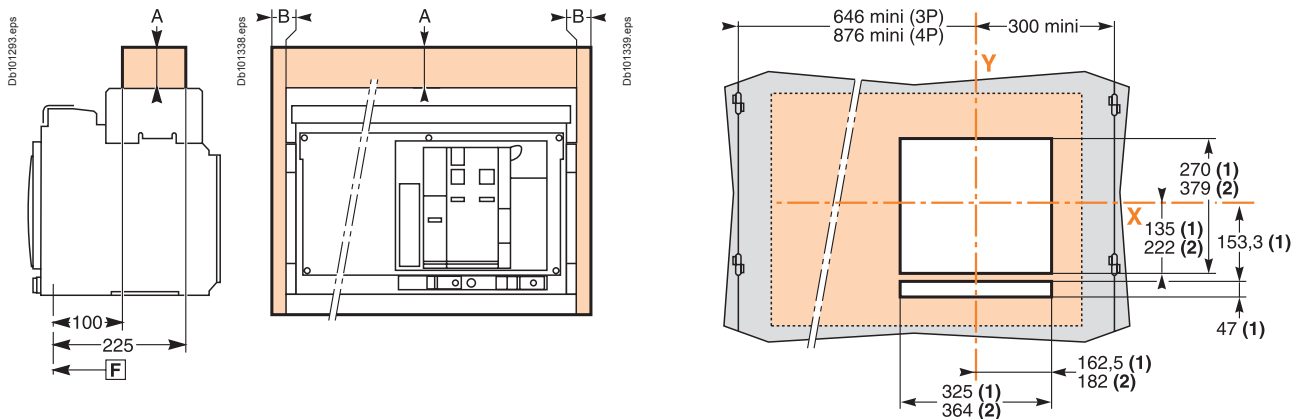
Mounting on base plate or rails

Mounting detail



Safety clearances

Door cutout



F : datum.

(1) Without escutcheon.
(2) With escutcheon.

Note: X and Y are the symmetry planes for a 3-pole device.

Note: dimensions in mm.

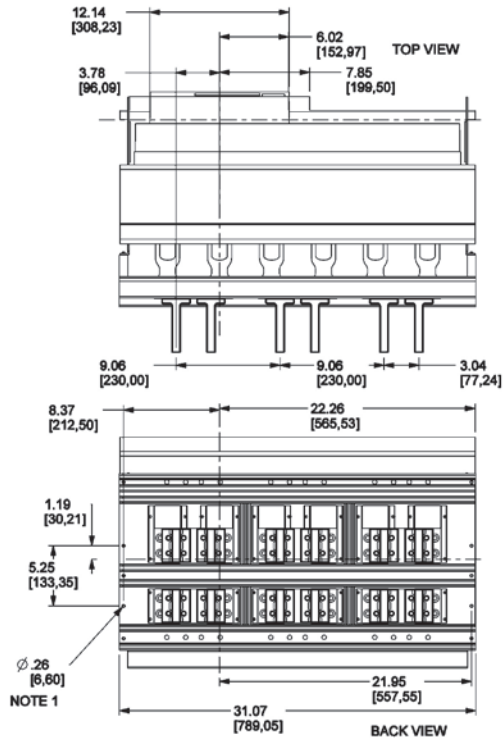


Drawout 3-pole device

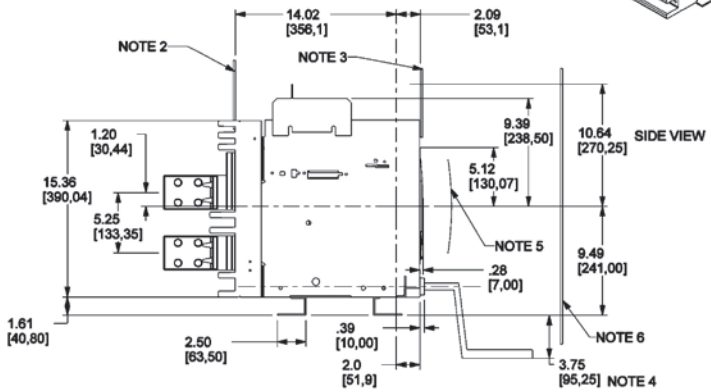
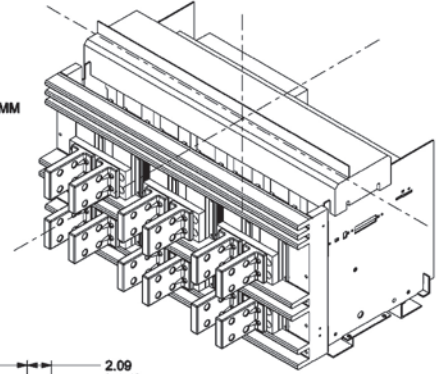
Connections

General dimensions for all versions

DB402855.eps

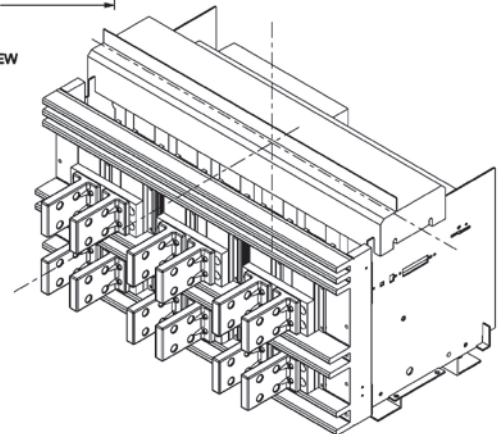
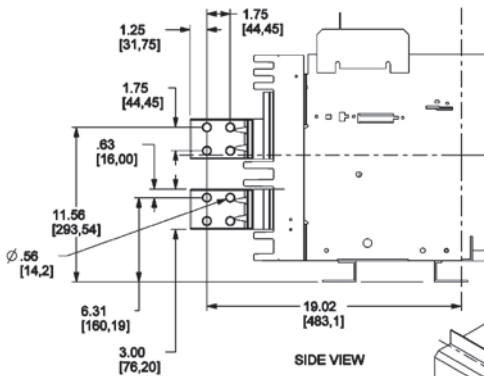
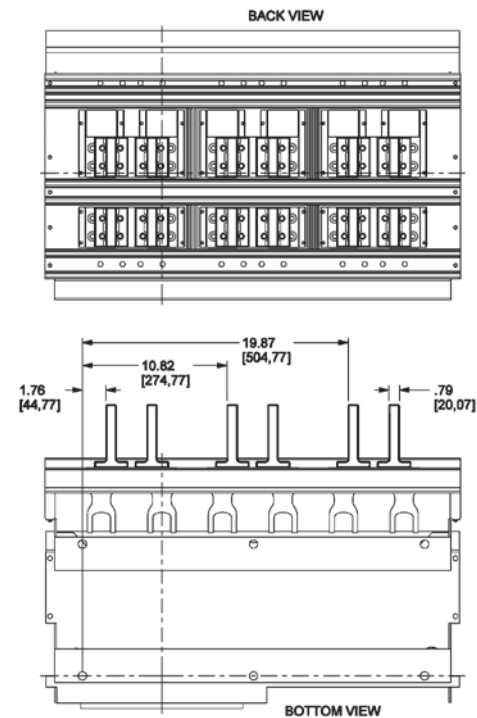


1. REAR MOUNTING PANEL HOLES IF USED
2. REAR PANEL LOCATION
3. FRONT DOOR LOCATION
4. CRANK HANDLE EXTENDS LOWER THAN CRADLE MOUNTING SURFACE ADD 60MM
5. DISTANCE CONNECT TO DISCONNECT POSITION 56MM
6. DISTANCE TO DRAWNOUT POSITION 400MM



Vertical rear connection 4000 A and 5000 A

DB402855.eps



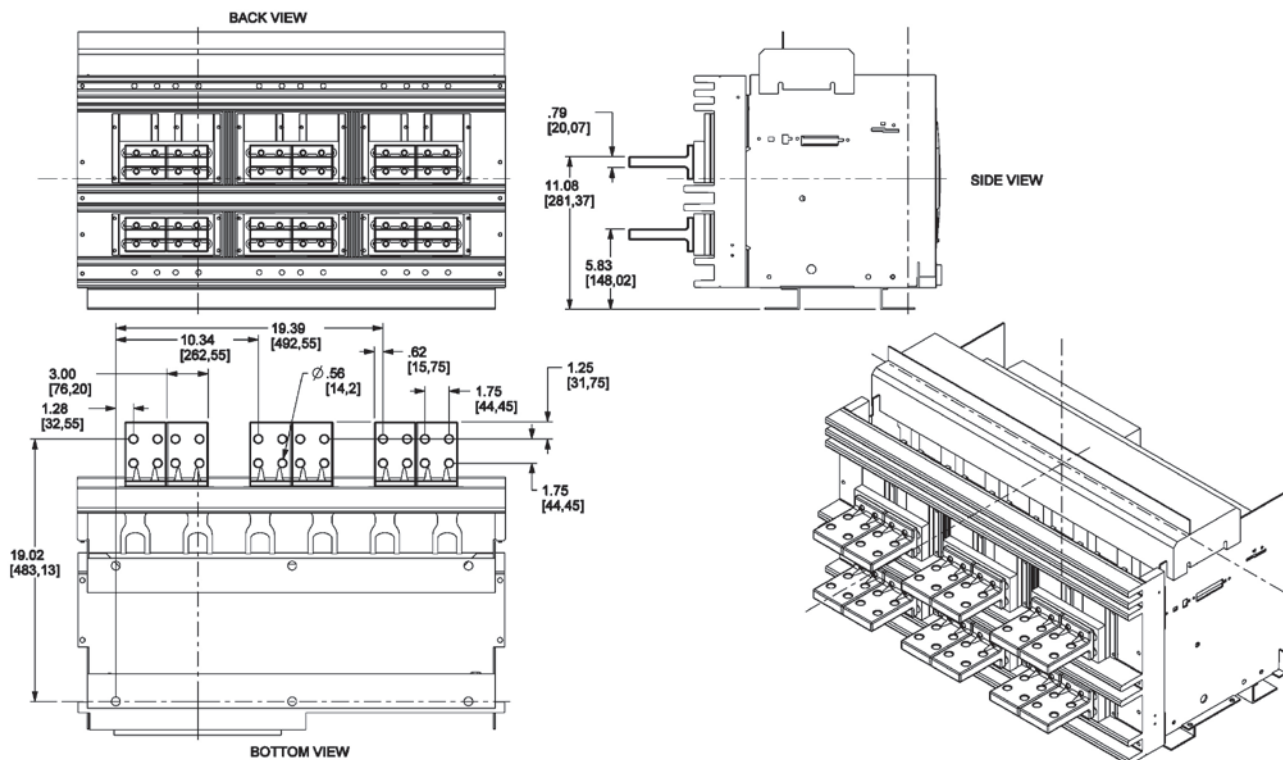
Note: dimensions in square brackets are in mm and other dimensions are in inches.



Connections

Horizontal rear connection 5000 A

DE402854.eps



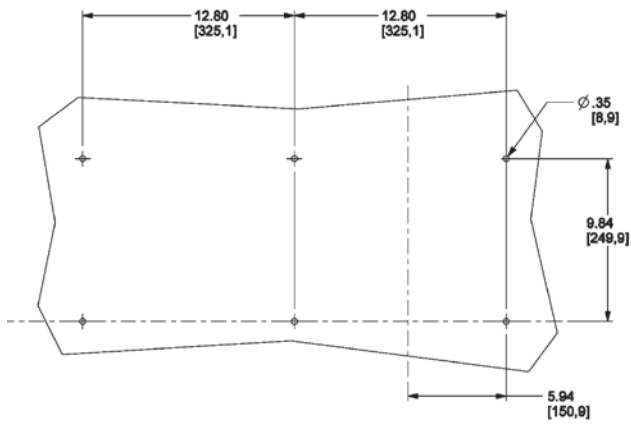
Note: dimensions in square brackets are in mm and other dimensions are in inches.



Connections

Cradle mounting from 4000 A and 5000 A

DB 109034A.eps

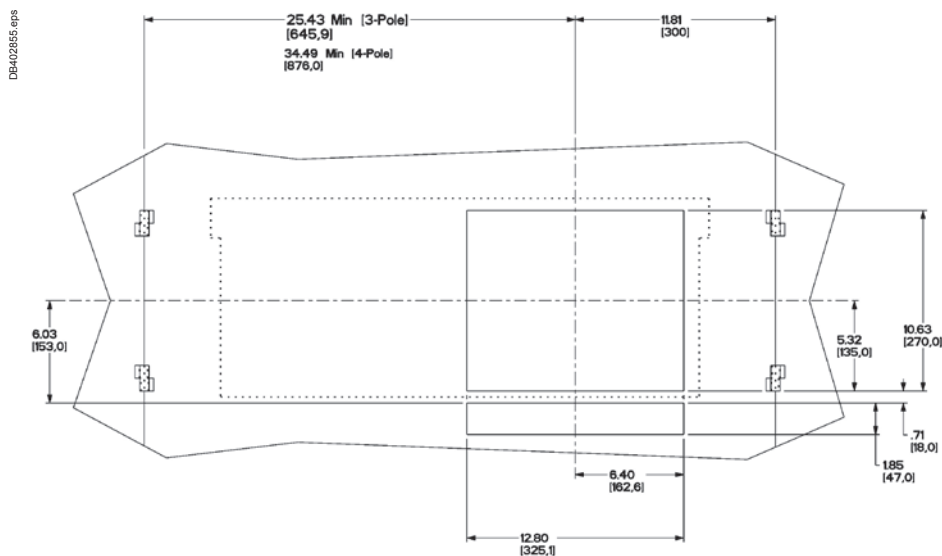


Note: dimensions in square brackets are in mm and other dimensions are in inches.



Connections

Door cutout 5000 A



Note: dimensions in square brackets are in mm and other dimensions are in inches.

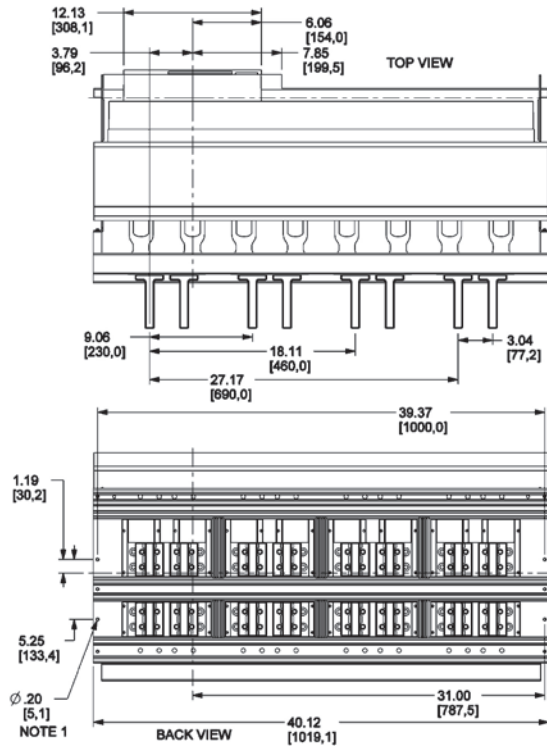


Drawout 4-pole device

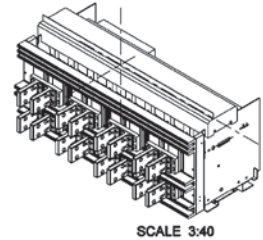
Connections

General dimensions for all versions

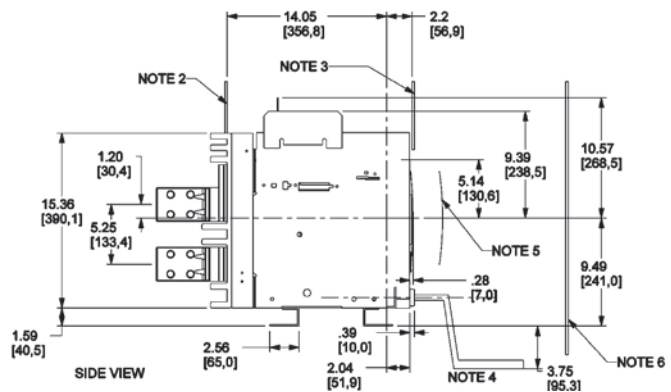
DB402855.eps



1. REAR MOUNTING PANEL HOLES IF USED
2. REAR PANEL LOCATION
3. FRONT DOOR LOCATION
4. CRANK HANDLE EXTENDS LOWER THAN CRADLE MOUNTING SURFACE ADD 60 MM
5. DISTANCE CONNECT TO DISCONNECT POSITION 56 MM
6. DISTANCE TO REMOVED POSITION 400 MM



SCALE 3:40



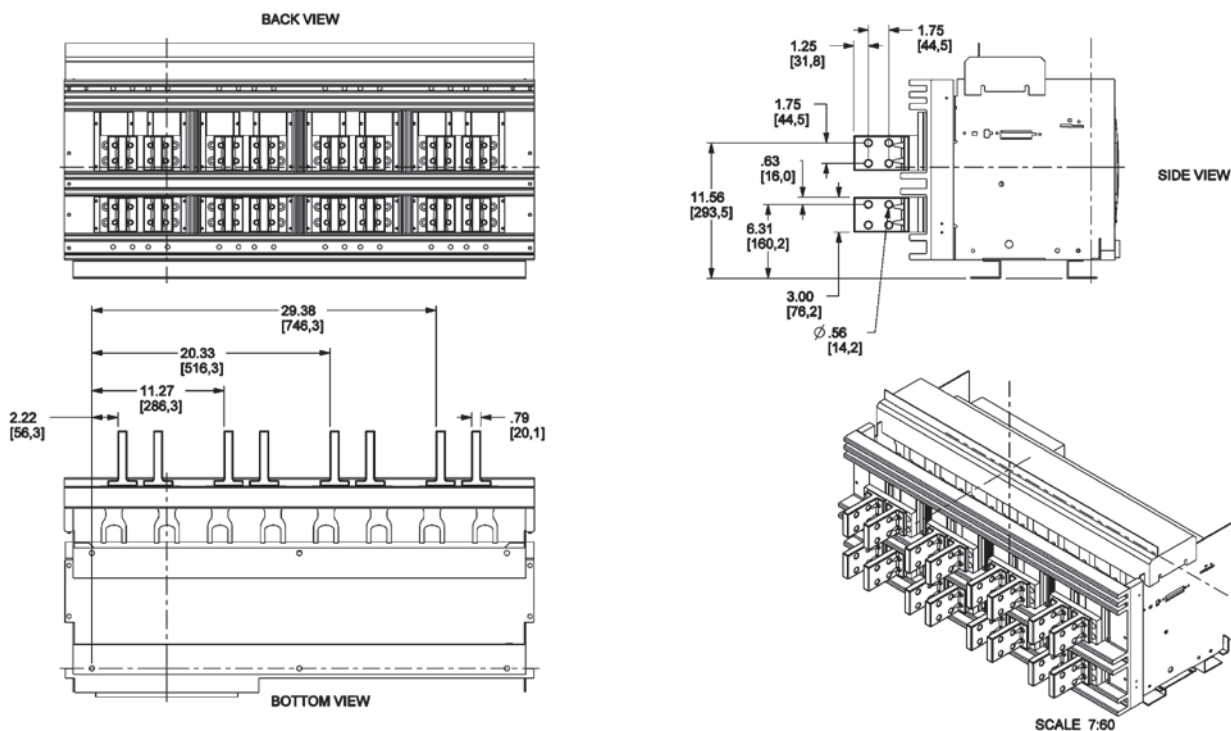
Note: dimensions in square brackets are in mm and other dimensions are in inches.



Connections

Vertical rear connection 5000 A

DE402857.eps



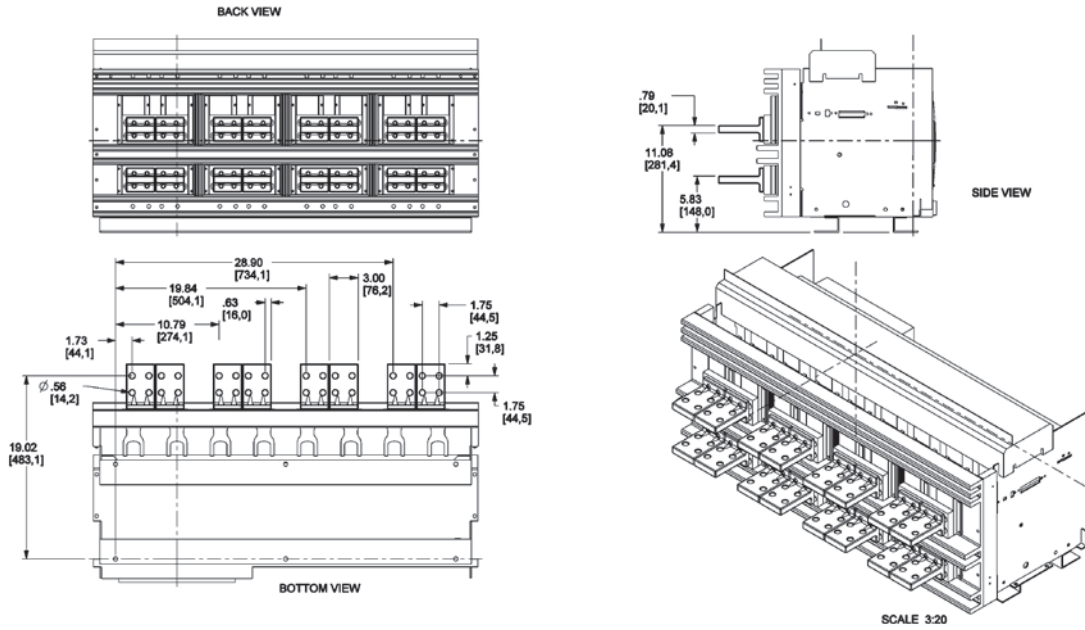
Note: dimensions in square brackets are in mm and other dimensions are in inches.



Connections

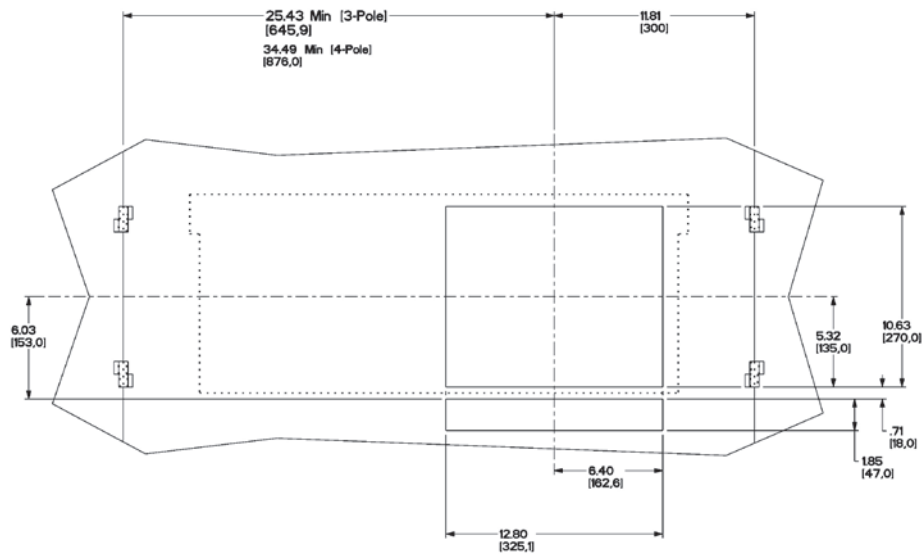
Horizontal rear connection from 4000 A to 5000 A

DB402855.eps



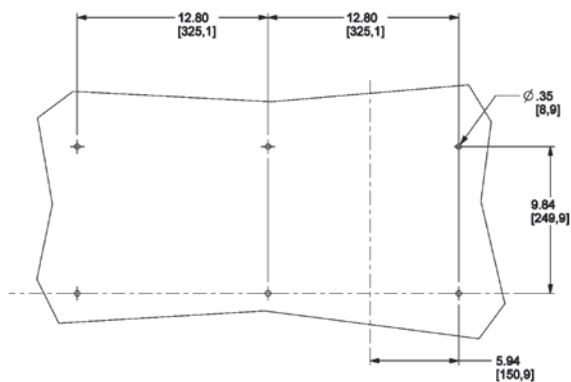
Door cutout 5000 A

DB402855.eps



Chassis mounting from 4000 A and 5000 A

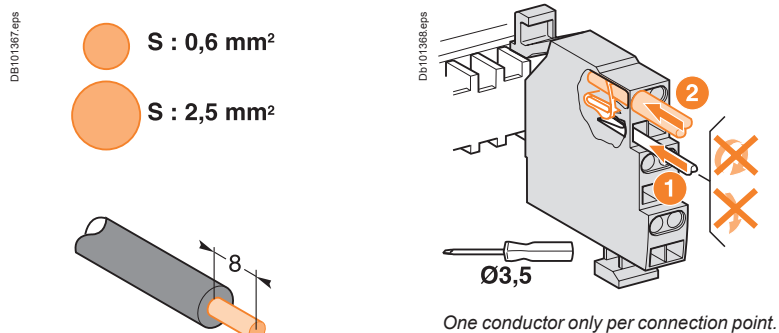
DB103034A.eps



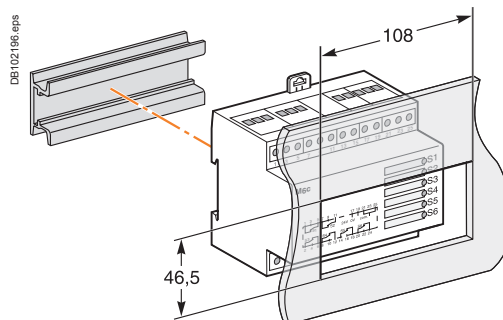
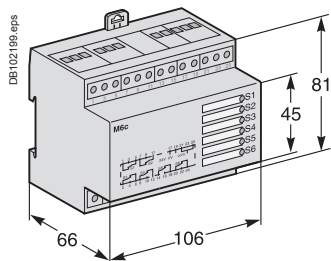
Note: dimensions in square brackets are in mm and other dimensions are in inches.



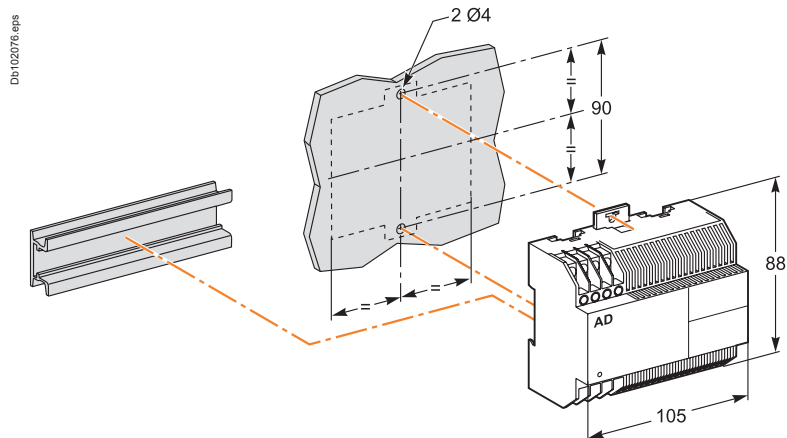
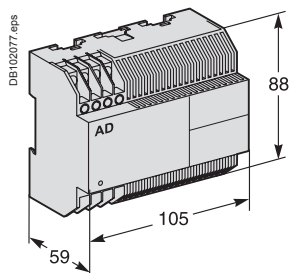
Connection of auxiliary wiring to terminal block



Relay module

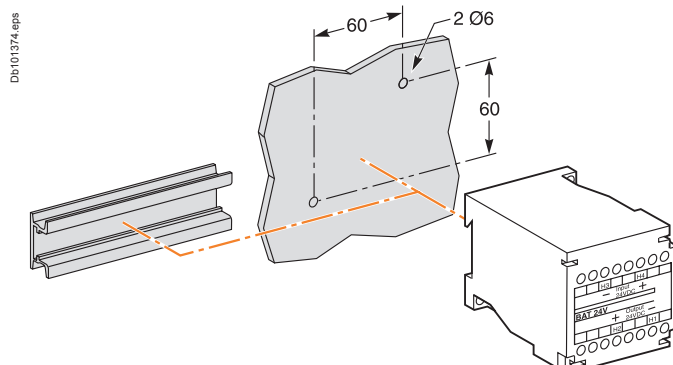
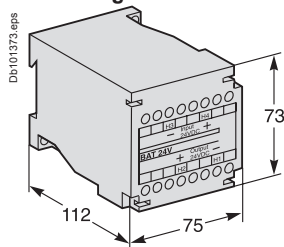


External power supply module (AD)



Battery module (BAT)

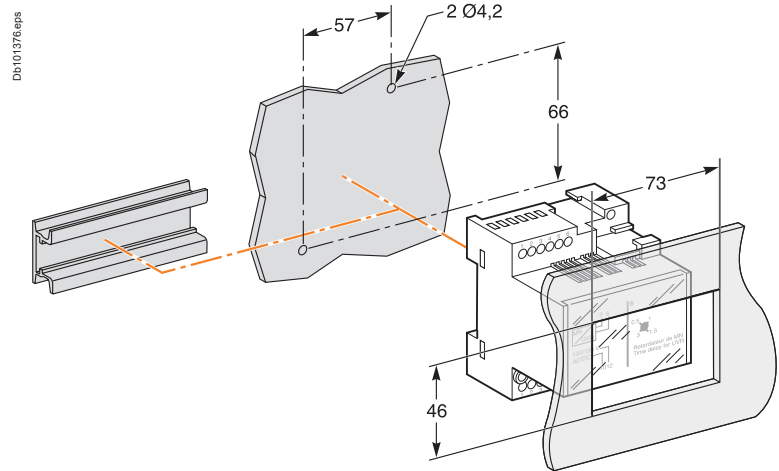
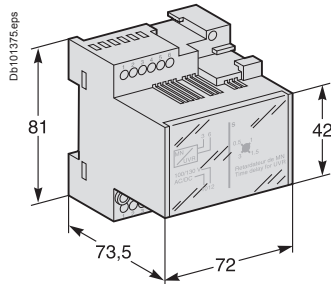
Mounting





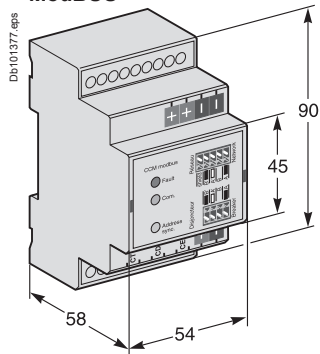
Delay unit for MN release

MNR



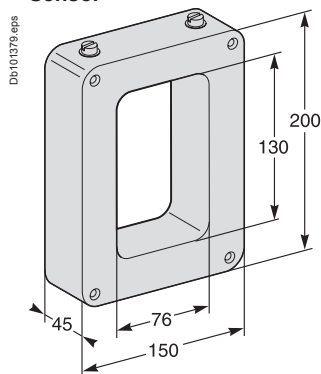
"Chassis" communication module

ModBUS

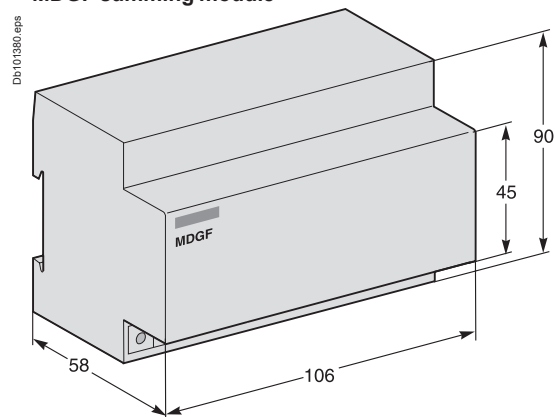


External sensor for source ground return (SGR) protection

Sensor

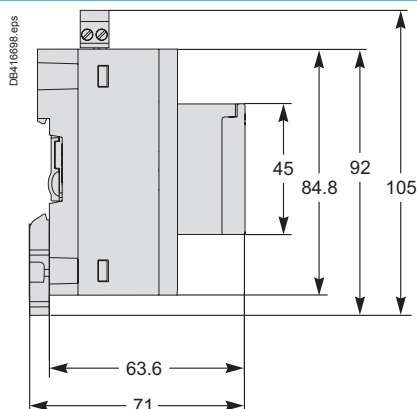
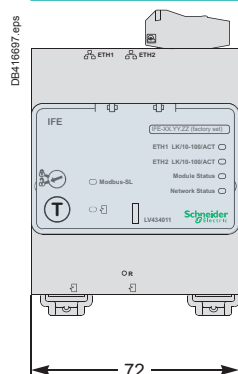


MDGF summing module

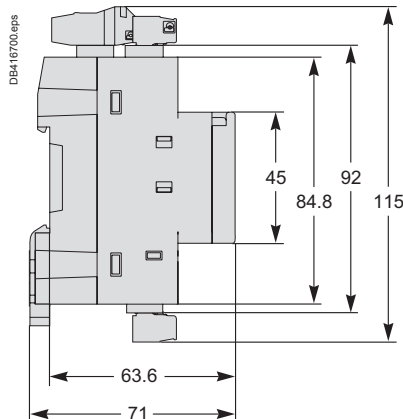
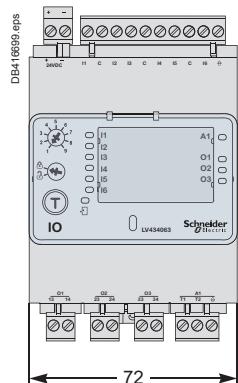




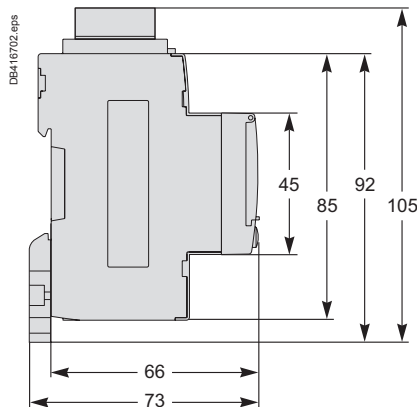
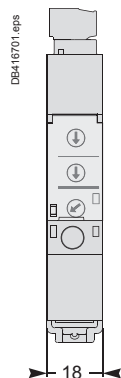
IFE - Ethernet interface



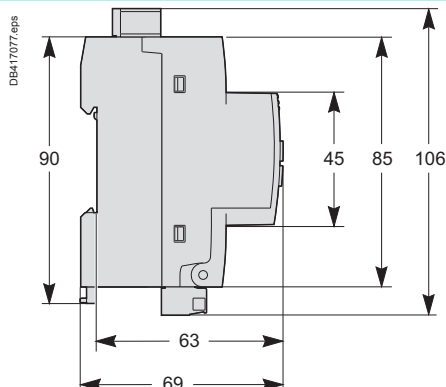
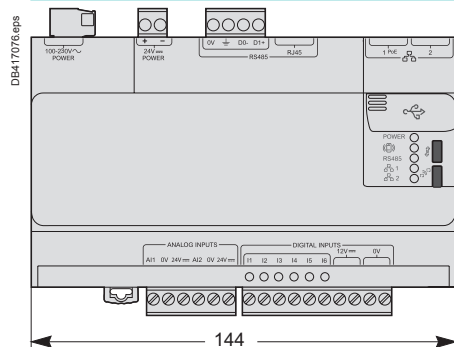
I/O (Input/Output) application module



IFM - Modbus-SL interface



Com'X 200

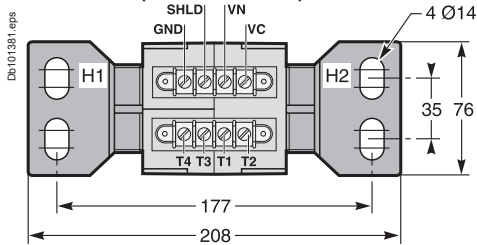




External sensor for external neutral

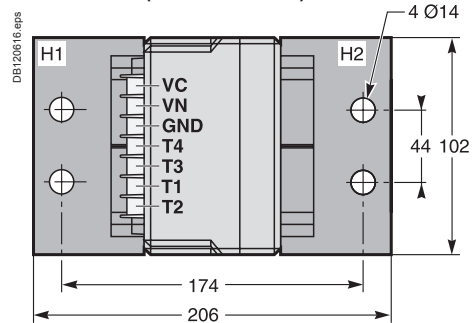
Dimensions

400/1600 A (NT08 and NT12)



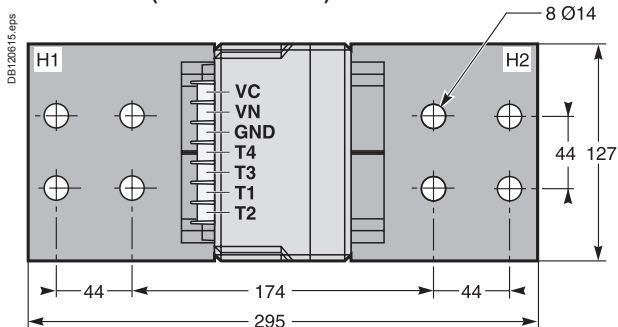
Height: 137 mm.

400/2000 A (NW08 to NW20)



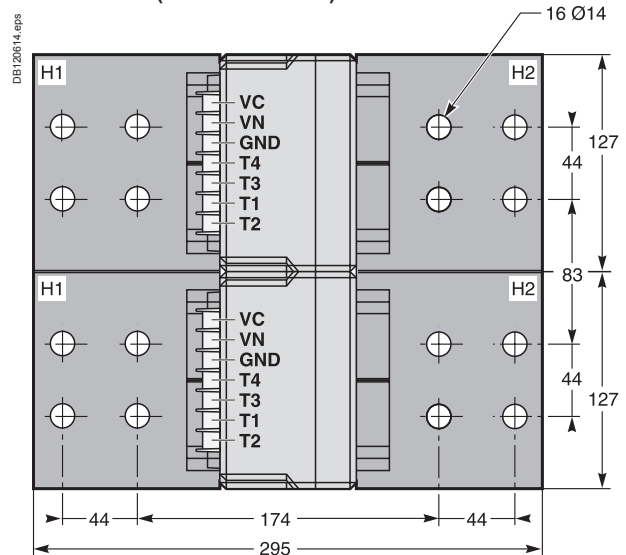
Height: 162 mm.

1000/4000 A (NW25 and NW30)



Height: 162 mm.

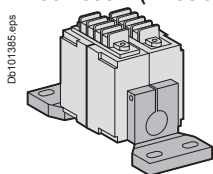
4000/5000 A (NW40 and NW50)



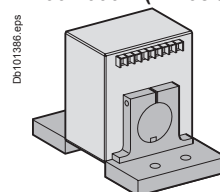
Height: 168 mm.

Installation

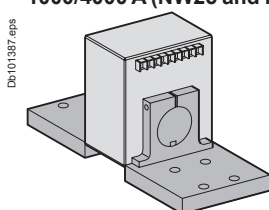
400/1600 A (NT08 and NT12)



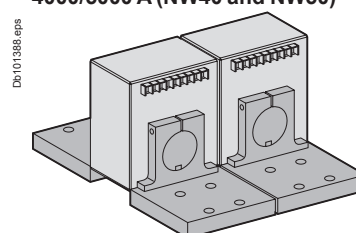
400/2000 A (NW08 to NW20)



1000/4000 A (NW25 and NW30)



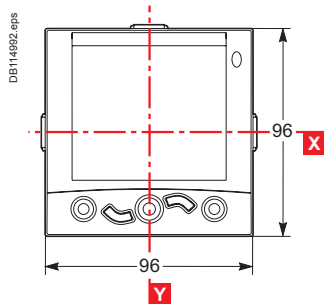
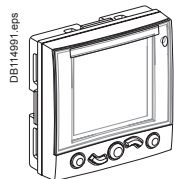
4000/5000 A (NW40 and NW50)



2 current sensors supplied separately

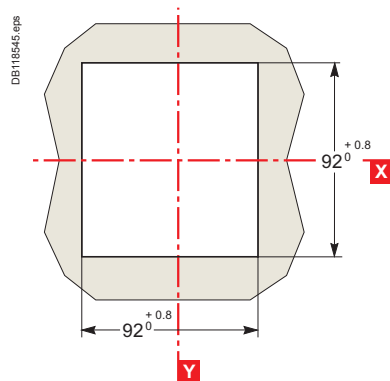
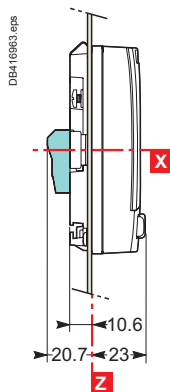
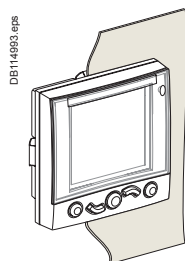


Dimensions

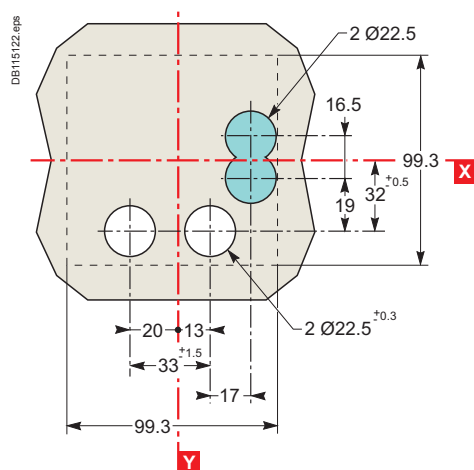
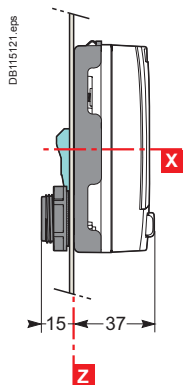
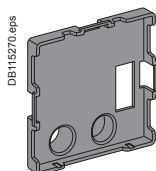
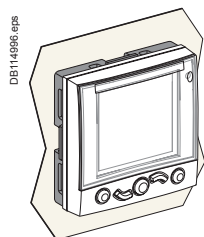


Mounting

Through panel



On panel



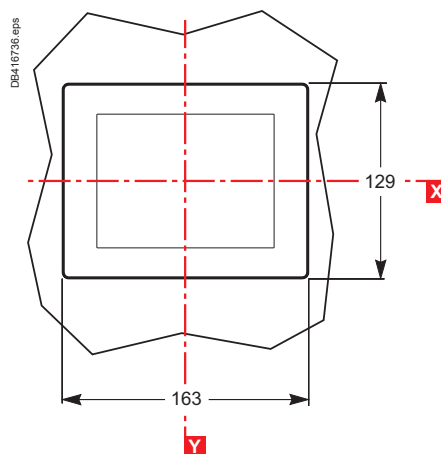
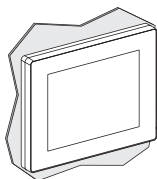
Connector (optional).

FDM128 switchboard display



Dimensions

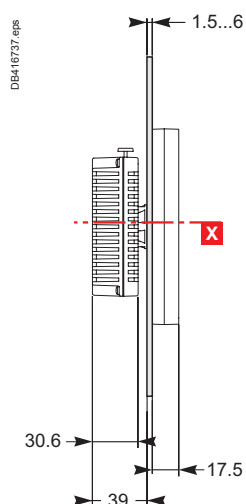
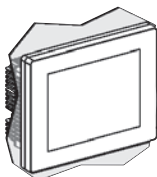
DB416703.eps



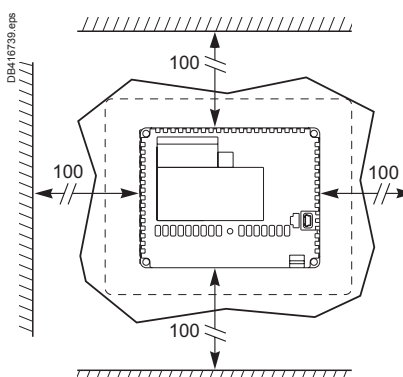
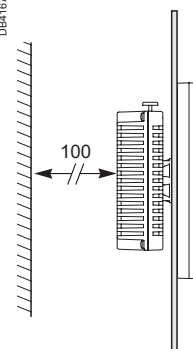
Mounting

On panel

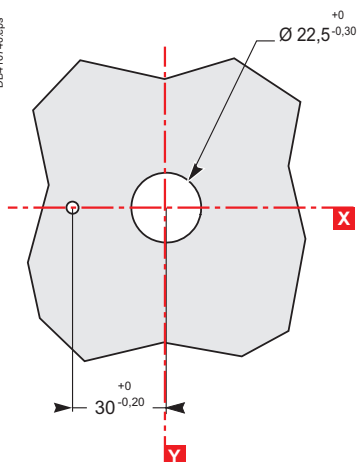
DB416704.eps



DB416738.eps



DB416740.eps



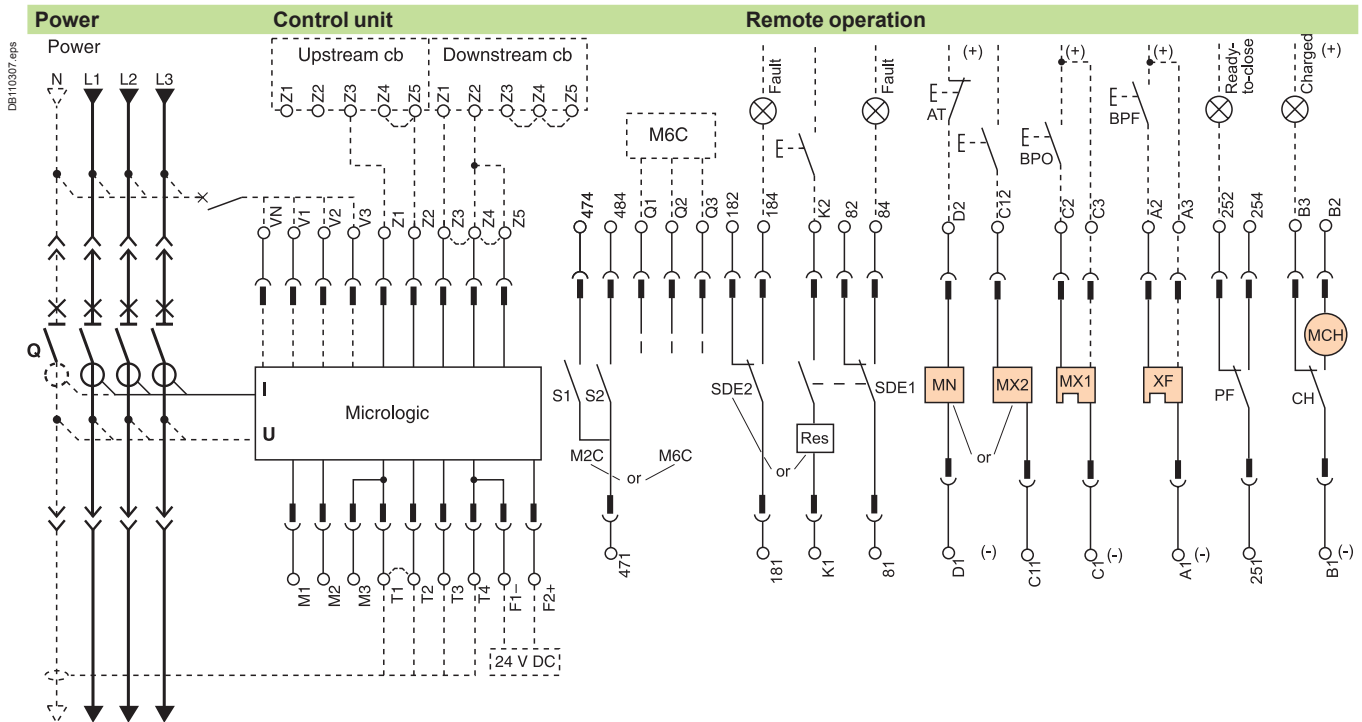




<i>Presentation</i>	2
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Masterpact NT08 to NT12	
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The diagram is shown with circuits de-energised, all devices open, connected and charged and relays in normal position.



Terminal block marking	Control unit									
	Com		UC1		UC2		UC3		UC4 / M2C / M6C	
	O	O	O	O	O	O	O	O	O	O
	E5	E6	Z5	M1	M2	M3	F2+	V3	/ 484 /	Q3
	O	O	O	O	O	O	O	O	O	O
	E3	E4	Z3	Z4	T3	T4	VN	V2	/ 474 /	Q2
	O	O	O	O	O	O	O	O	O	O
	E1	E2	Z1	Z2	T1	T2	F1-	V1	/ 471 /	Q1

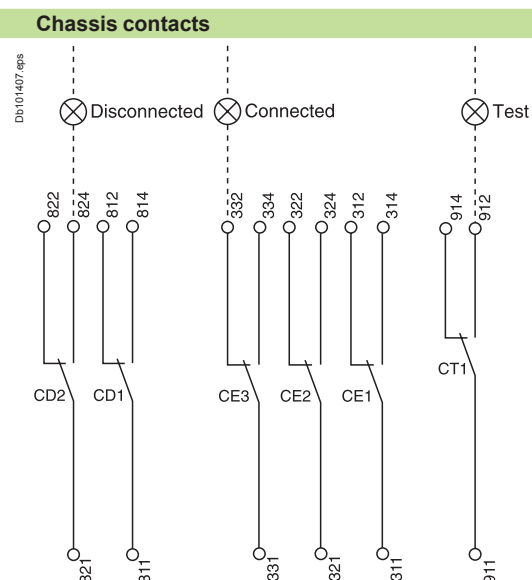
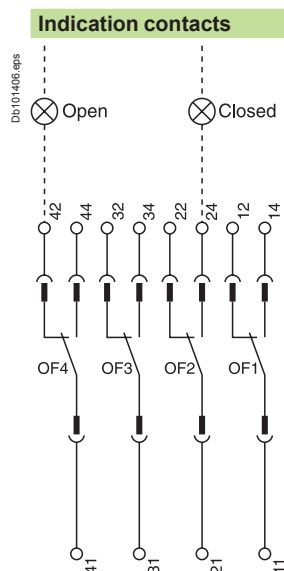
Remote operation									
SDE2 / RES		SDE1	MN / MX2		MX1	XF	PF	MCH	
									
184	K2	84	D2 / C12		C2	A2	254	B2	
									
182		82			C3	A3	252	B3	
									
181	K1	81	D1 / C11		C1	A1	251	B1	

A	E	P	H	Control unit
■	■	■	■	Com : E1-E6 communication
■	■	■	■	UC1 : Z1-Z5 zone selective interlocking Z1 = ZSI OUT SOURCE Z2 = ZSI OUT ; Z3 = ZSI IN SOURCE Z4 = ZSI IN ST (short time) Z5 = ZSI IN GF (ground-fault)
■	■	■	■	UC2 : T1, T2, T3, T4 = external neutral
■	■	■	■	UC3 : F2+, F1- external 24 DC power supply external voltage connector (must be connected to the neutral with a 3P circuit breaker)
			■	UC4 : External Voltage Connector (PTE option) or
			■	M2C : 2 programmable contacts (external relay) ext. 24 V DC power supply required.
			■	or
			■	M6C : 6 programmable contacts to be connected to the external module M6C) ext. 24 V DC power supply required.

Remote operation							
SDE2 : fault-trip indication contact or Res : remote reset							
SDE1 : fault-trip indication contact (supplied as standard)							
MN : undervoltage release or MX2 : shunt release							
MX1 : shunt release (standard or communicating)							
XF : closing release (standard or communicating)							
PF : ready-to-close contact							
MCH : electric motor (*).							

Note: when communicating MX or XF releases are used, the third wire (C3, A3) must be connected even if the communication module is not installed.

A : digital ammeter.
E : digital energy.
P : A + power meter + additional protection.
H : P + harmonics.



Indication contacts

OF4	OF3	OF2	OF1
44	34	24	14
42	32	22	12
41	31	21	11

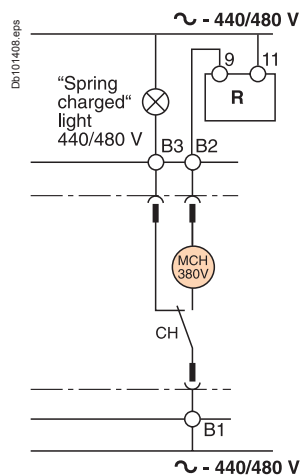
Chassis contacts

CD2	CD1	CE3	CE2	CE1	CT1
824	814	334	324	314	914
822	812	332	322	312	912
821	811	331	321	311	911

Indication contacts

OF4 / OF3 / OF2 / OF1 : ON/OFF indication contacts

(*) **Spring charging motor 440/480 V CA**
(380 V motor + additional resistor).



Chassis contacts

CD2 : disconnected position contacts
CD1 : disconnected position contacts
CE3 : connected position contacts
CE2 : connected position contacts
CE1 : connected position contacts
CT1 : test position contacts

Key:

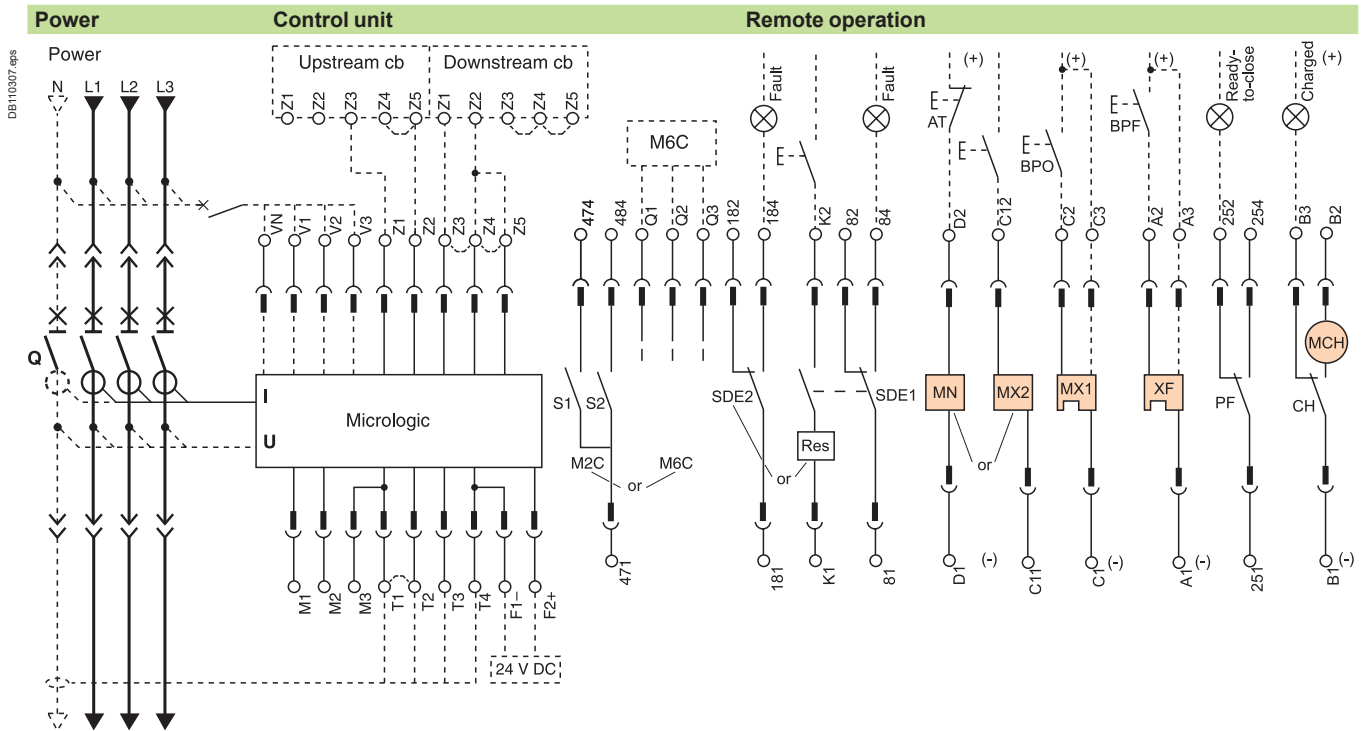
drawout device only.

SDE1, OF1, OF2, OF3, OF4 supplied as standard.

interconnected connections
(only one wire per connection point).



The diagram is shown with circuits de-energised, all devices open, connected and charged and relays in normal position



Terminal block marking	Control unit							
	Com	UC1	UC2	UC3	UC4	M2C / M6C		
	O O	O O	O O	O O	O O	O O	O O	O O
	E5 E6	Z5 M1	M2 M3	F2+	V3	484 / Q3		
	O O	O O	O O	O O	O O	O O	O O	O O
	E3 E4	Z3 Z4	T3 T4	VN	V2	474 / Q2		
	O O	O O	O O	O O	O O	O O	O O	O O
	E1 E2	Z1 Z2	T1 T2	F1-	V1	471 / Q1		

Remote operation							
SDE2 / RES	SDE1	MN / MX2	MX1	XF	PF	MCH	
O O	O O	O O	O O	O O	O O	O O	O O
184 K2	84	D2 / C12	C2	A2	254	B2	
O O	O O	O O	O O	O O	O O	O O	O O
182	82		C3	A3	252	B3	
O O	O O	O O	O O	O O	O O	O O	O O
181 K1	81	D1 / C11	C1	A1	251	B1	

A	E	P	H	Control unit
■	■	■	■	Com : E1-E6 communication
■	■	■	■	UC1 : Z1-Z5 zone selective interlocking Z1 = ZSI OUT SOURCE Z2 = ZSI OUT ; Z3 = ZSI IN SOURCE Z4 = ZSI IN ST (short time) Z5 = ZSI IN GF (ground-fault)
■	■	■	■	UC2 : T1, T2, T3, T4 = external neutral
■	■	■	■	UC3 : F2+, F1- external 24 DC power supply VN external voltage connector (must be connected to the neutral with a 3P circuit breaker)
		■	■	UC4 : External Voltage Connector (PTE option)
		■	■	M2C : 2 programmable contacts (internal relay) ext. 24 V DC power supply required
		■	■	or M6C : 6 programmable contacts (to be connected to the external module M6C) ext. 24 V DC power supply required

Remote operation							
SDE2 : fault-trip indication contact or Res : remote reset							
SDE1 : fault-trip indication contact (supplied as standard)							
MN : undervoltage release or MX2 : shunt release							
MX1 : shunt release (standard or communicating)							
XF : closing release (standard or communicating)							
PF : ready-to-close contact							
MCH : electric motor							

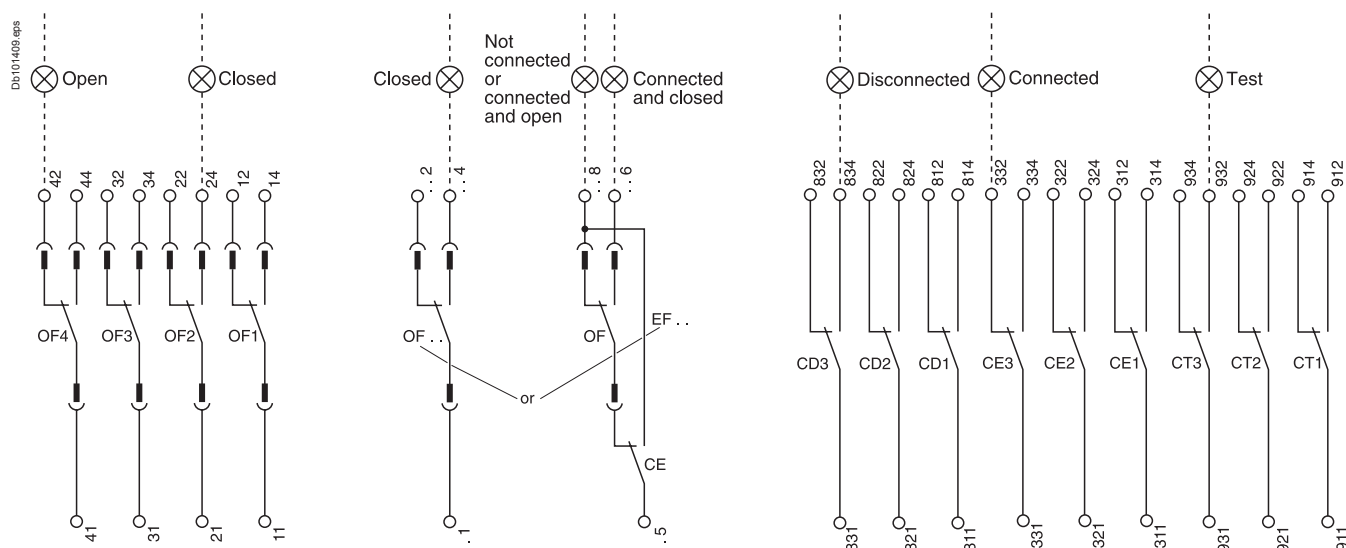
Note : when communicating MX or XF releases are used, the third wire (C3, A3) must be connected even if the communication module is not installed.

A : digital ammeter.
E : digital energy.
P : A + power meter + additional protection.
H : P + harmonics.



Indication contacts

Chassis contacts



Indication contacts

OF4	OF3	OF2	OF1	OF24	OF23	OF22	OF21	OF14	OF13	OF12	OF11
44	34	24	14	244	234	224	214	144	134	124	114
42	32	22	12	242	232	222	212	142	132	122	112
41	31	21	11	241	231	221	211	141	131	121	111
				or	or	or	or	or	or	or	or
				EF24	EF23	EF22	EF21	EF14	EF13	EF12	EF11
				248	238	228	218	148	138	128	118
				246	236	226	216	146	136	126	116
				245	235	225	215	145	135	125	115

Chassis contacts

CD3	CD2	CD1	CE3	CE2	CE1	CT3	CT2	CT1
834	824	814	334	324	314	934	924	914
832	822	812	332	322	312	932	922	912
831	821	811	331	321	311	931	921	911
			or					
			CE6	CE5	CE4			
			364	354	344			
			362	352	342			
			361	351	341			
						or		
						CE9	CE8	CE7
						394	384	374
						392	382	372
						391	381	371

Indication contacts

OF4 :	ON/OFF indication contacts	OF24 or	Combined
OF3		EF24	"connected-deconnected"
OF2		OF23 or	indication contacts
OF1		EF23	
		OF22 or	
		EF22	
		OF21 or	
		EF21	
		OF14 or	
		EF14	
		OF13 or	
		EF13	
		OF12 or	
		EF12	
		OF11 or	
		EF11	

Chassis contacts

CD3	disconnected	CE3	connected	CT3	test position
CD2	position	CE2	position	CT2	contacts
CD1	contacts	CE1	contacts	CT1	
or				or	
CE6	connected			CE9	connected
CE5	position			CE8	position
CE4	contacts			CE7	contacts
				or	
				CD6	disconnected
				CD5	position
				CD4	contacts

Key:

drawout device only.

SDE1, OF1, OF2, OF3, OF4 supplied as standard.

interconnected connections
(only one wire per connection point).



Masterpact NT and NW

Ground-fault protection

Neutral protection

Zone selective interlocking

External sensor (CT) for residual ground-fault protection

Connection of current-transformer secondary circuit for external neutral

Masterpact equipped with a Micrologic 6 A/E/P/H:

- shielded cable with 2 twisted pairs
- T1 twisted with T2
- maximum length 4 meters
- cable cross-sectional area 0.4 to 1.5 mm²
- recommended cable: Belden 9552 or equivalent.

For proper wiring of neutral CT, refer to instruction Bulletin 48041-082-01 shipped with it.

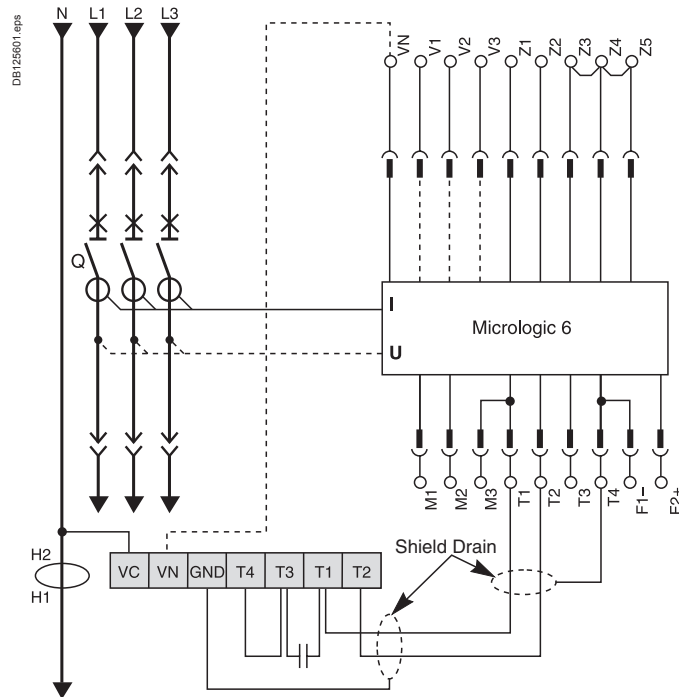
Do not remove factory-installed jumper between T1 and T2 unless neutral CT is connected.

If supply is via the top, follow the schematics.

If supply is via the bottom, control wiring is identical; for the power wiring, H1 is connected to the source side, H2 to the load side.

For four-pole versions, for residual ground-fault protection, the current transformer for the external neutral is not necessary.

Connection for signal VN is required only for power measurements (3 Ø, 4 wires, 4 CTs).

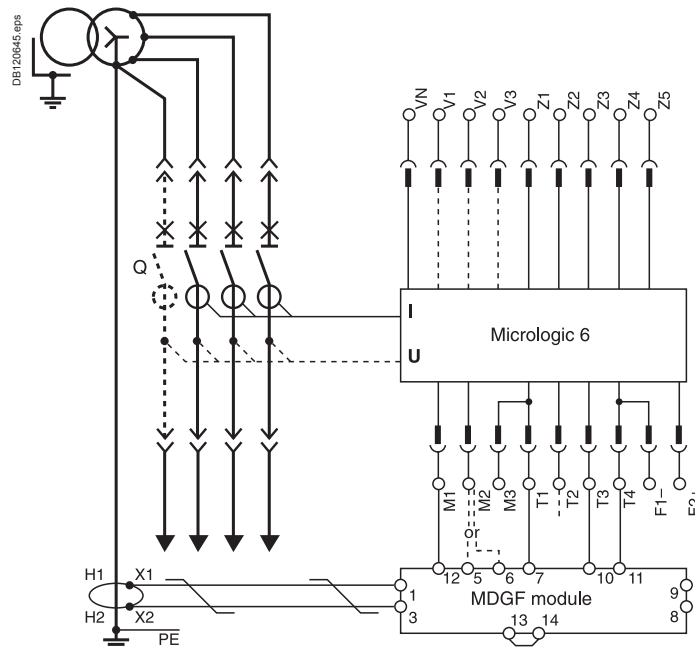


External transformer for source ground return (SGR) ground-fault protection

Connection of the secondary circuit:

Masterpact equipped with a Micrologic 6 A/E/P/H:

- unshielded cable with 1 twisted pair
- maximum length 150 meters
- cable cross-sectional area 0.4 to 1.5 mm²
- terminals 5 and 6 may not be used at the same time
- use terminal 5 for NW08 to 30
- use terminal 6 for NW40 to 50
- recommended cable: Belden 9409 or equivalent.





Neutral protection

- three pole circuit breaker:
 - Masterpact equipped with Micrologic P or H
 - the current transformer for external neutral is necessary (the wiring diagram is identical to the one used for the residual ground-fault protection)
- four pole circuit breaker:
 - Masterpact equipped with Micrologic A, E, P or H
 - the current transformer for external neutral is not necessary

Zone selective interlocking

Zone-selective interlocking is used to reduce the electrodynamic forces exerted on the installation by shortening the time required to clear faults, while maintaining time discrimination between the various devices.

A pilot wire interconnects a number of circuit breakers equipped with Micrologic A/E/P/H control units, as illustrated in the diagram above.

The control unit detecting a fault sends a signal upstream and checks for a signal arriving from downstream. If there is a signal from downstream, the circuit breaker remains closed for the full duration of its tripping delay. If there is no signal from downstream, the circuit breaker opens immediately, regardless of the tripping-delay setting.

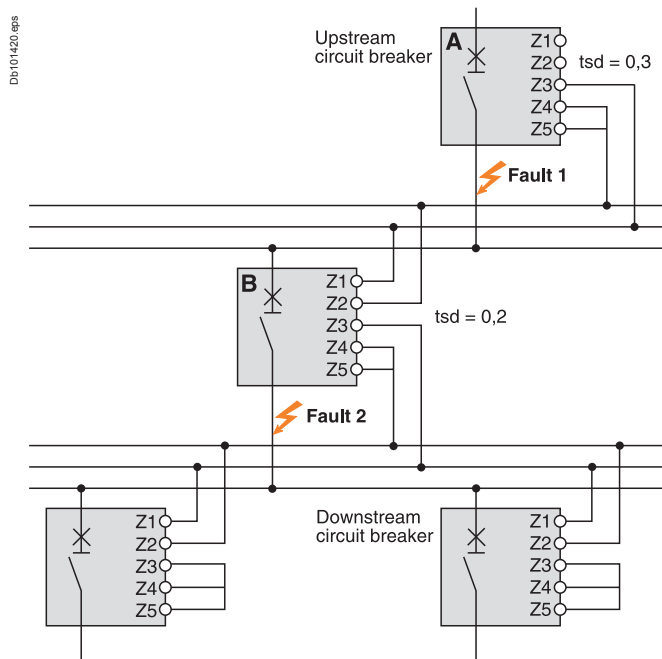
Fault 1:

Only circuit breaker A detects the fault. Because it receives no signal from downstream, it opens immediately, regardless of its tripping delay set to 0.3.

Fault 2:

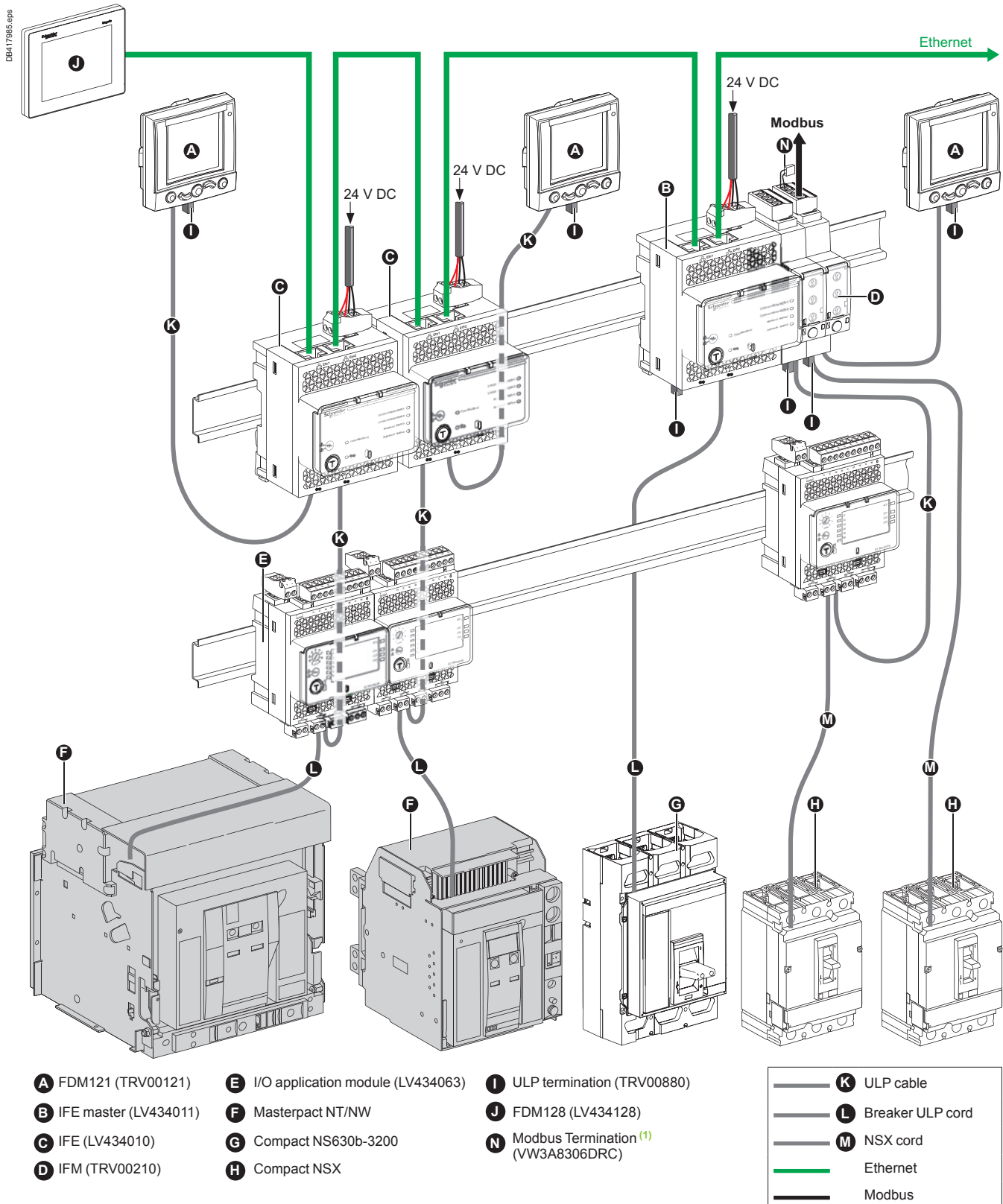
Circuit breakers A and B detect the fault. Circuit breaker A receives a signal from B and remains closed for the full duration of its tripping delay set to 0.3. Circuit breaker B does not receive a signal from downstream and opens immediately, in spite of its tripping delay set to 0.2.

Note: the maximum permissible distance between two devices is 3000 m. A downstream circuit breaker can "control" up to ten upstream circuit breakers.





Communication architecture



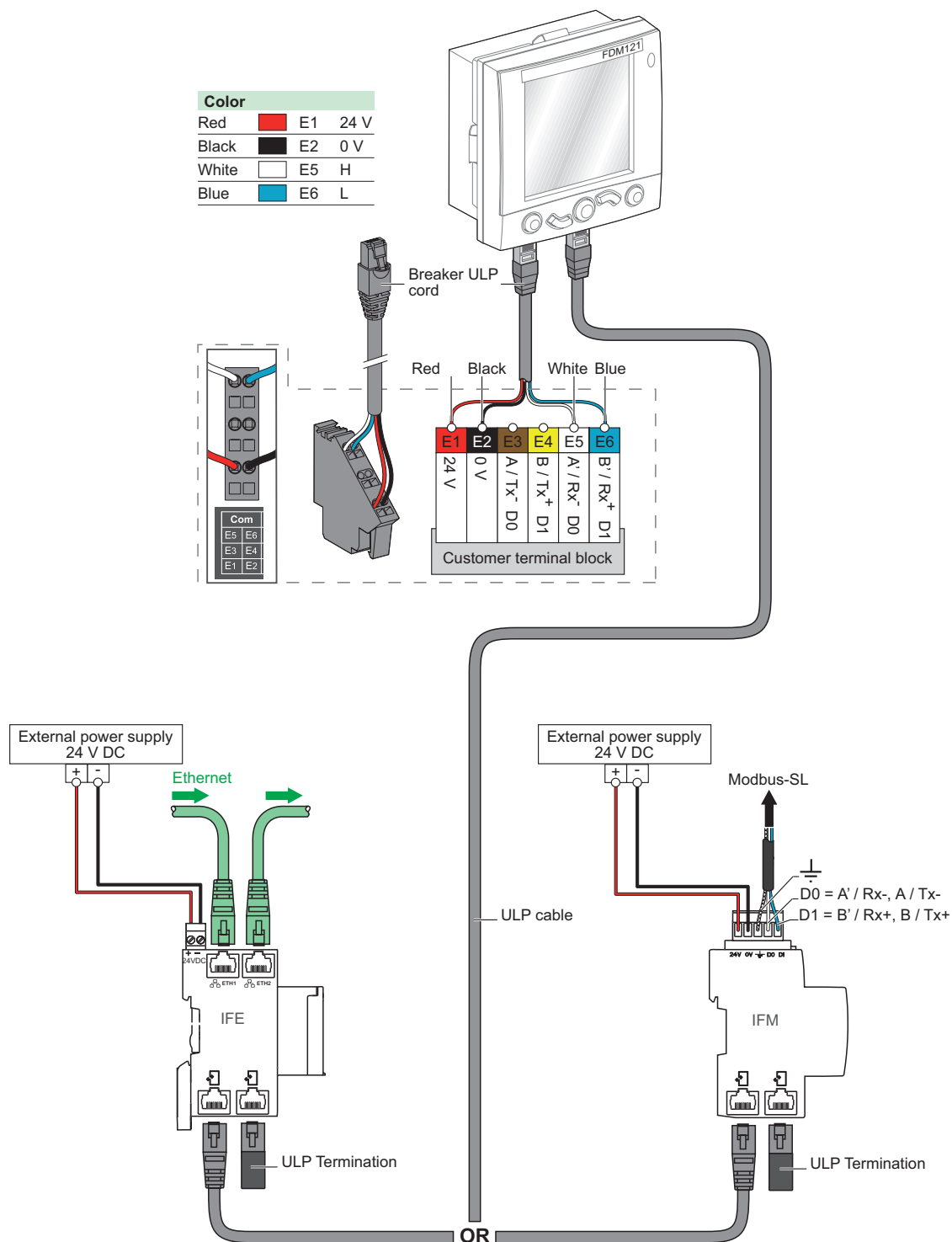
⁽¹⁾ Modbus termination is mandatory, see ULP system user guide TRV99101.



Fixed, electrically operated Masterpact NT and NW

Connection to the communication interface module

DB416707-eps

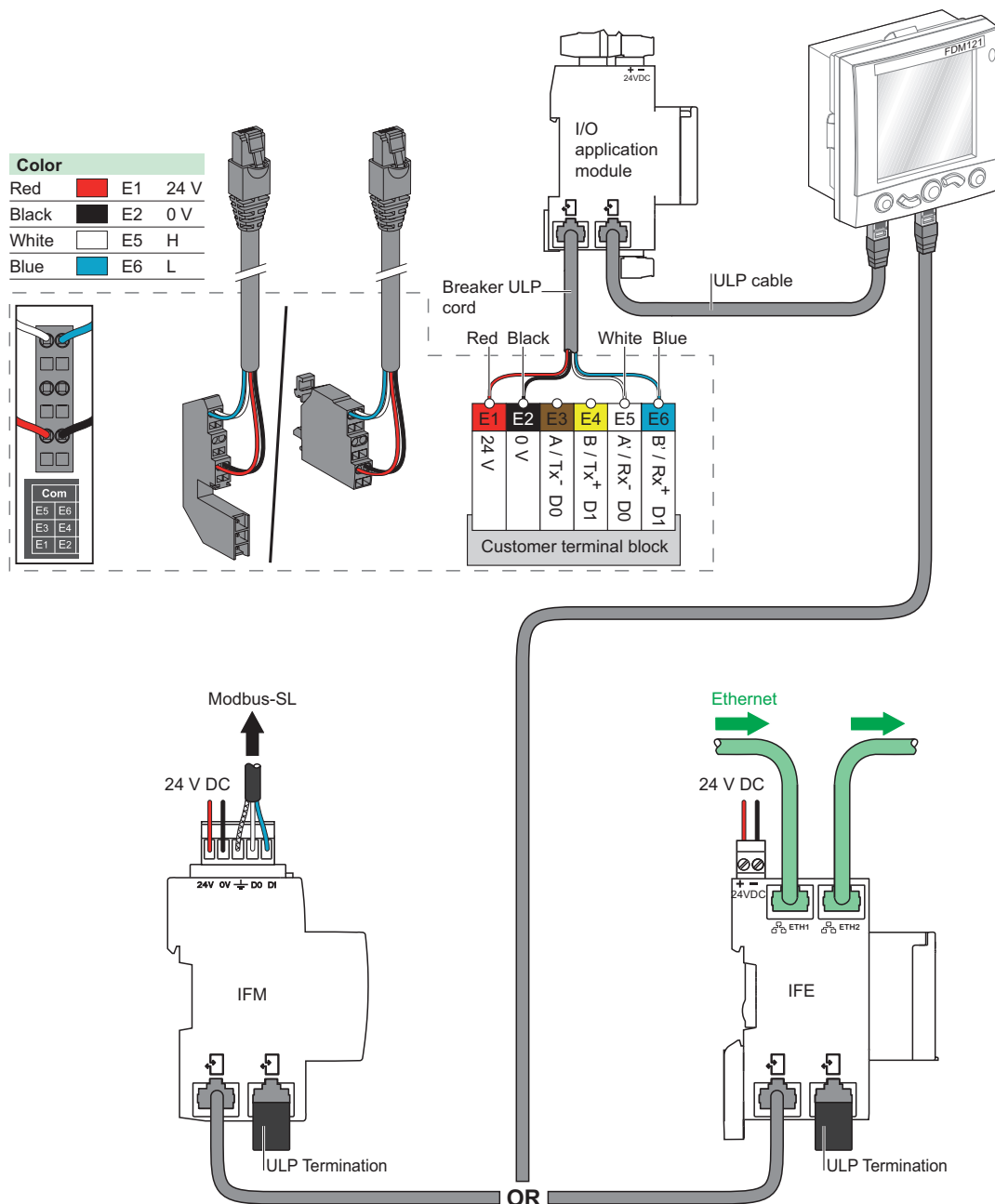




Withdrawable Masterpact NT and NW

Connection to the I/O and communication interface module

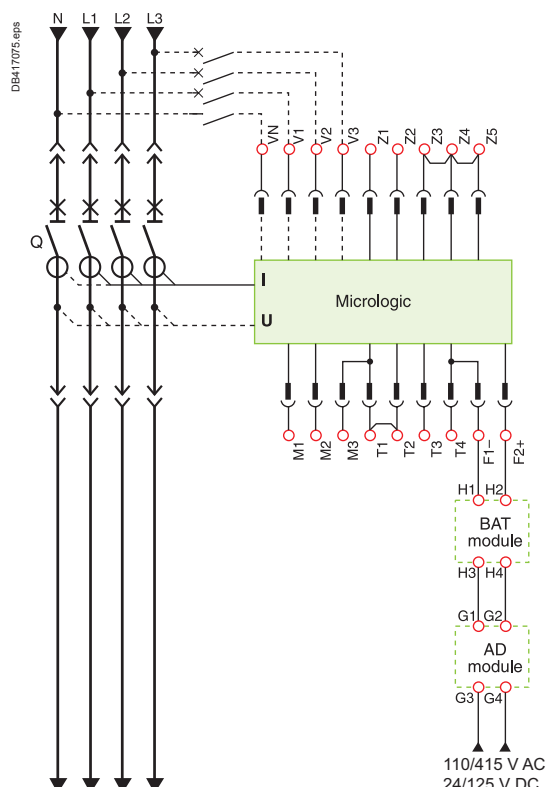
D0416708.eps





Masterpact NT and NW

24 V DC external power supply AD module



- The 24 V DC external power-supply (AD module) for the Micrologic control unit (F1- F2+) is not required for basic protections LSIG.
- The 24 V DC external power-supply (AD module) for the programmable contact M2C/M6C is required.
- The 24 V DC external power-supply for the BCM ULP communication module (E1-E2) is required. The same 24 V DC external power supply can be used for the communication devices (IFE, IFM, I/O, FDM).
- If the 24 V DC external power supply (AD module) is used to supply Micrologic control unit, this power supply shall be used only for supplying Micrologic control units and M2C/M6C.
- The dedicated AD power supplies shall be used only for the Micrologic trip units. If the COM option is used, a second dedicated 24 V DC external power supply shall be used.
- With Micrologic A/E, it is recommended to connect 24 V DC external power-supply (AD module) to the Micrologic control unit (F1- F2+) in order to keep available the display and the energy metering, even if Current < 20 % In.

Note: in case of using the 24 V DC external power supply (AD module), maximum cable length between 24 V DC (G1, G2) and the control unit (F1-, F2+) must not exceed 10 meters.

The BAT battery module, mounted in series upstream of the AD module, ensures an uninterrupted supply of power if the AD module power supply fails.

The internal voltage taps are connected to the bottom side of the circuit breaker.

With Micrologic P/H, external voltage taps are possible using the PTE option.

With this option, the internal voltage taps are disconnected and the voltage taps are connected to terminals VN, V1, V2, V3.

The PTE option is required for voltages less than 220 V and greater than 690 V (in which case a voltage transformer is compulsory). For three-pole devices, the system is supplied with terminal VN connected only to the control unit (Micrologic P).

When the PTE option is implemented, the voltage measurement input must be protected against short-circuits. Installed as close as possible to the busbars, this protection function is ensured by a P25M circuit breaker (1 A rating) with an auxiliary contact (cat. no. 21104 and 21117). This voltage measurement input is reserved exclusively for the control unit and must not ever be used to supply other circuits outside the switchboard.

Connection

The maximum length for each conductor supplying power to the trip unit or M6C module is 10 m.

Do not ground F2+, F1-, or power supply output:

- the positive terminal (F2+) on the trip unit must not be connected to earth ground
- the negative terminal (F1-) on the trip unit must not be connected to earth ground
- the output terminals (- and +) of the 24 V DC power supply must not be grounded.

Reduce electromagnetic interference:

- the input and output wires of the 24 V DC power supply must be physically separated as much as possible
- the 24 V DC wires (output of the 24 V DC power supply) shall be twisted together.
- the 24 V DC wires (output of the 24 V DC power supply) must cross all power cables perpendicularly
- power supply conductors must be cut to length. Do not loop excess conductor.





<i>Presentation</i>	2
<i>Functions and characteristics</i>	A-1
<i>Installation recommendations</i>	B-1
<i>Dimensions and connections</i>	C-1
<i>Electrical diagrams</i>	D-1

Tripping curves	E-2
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Limitation curves	
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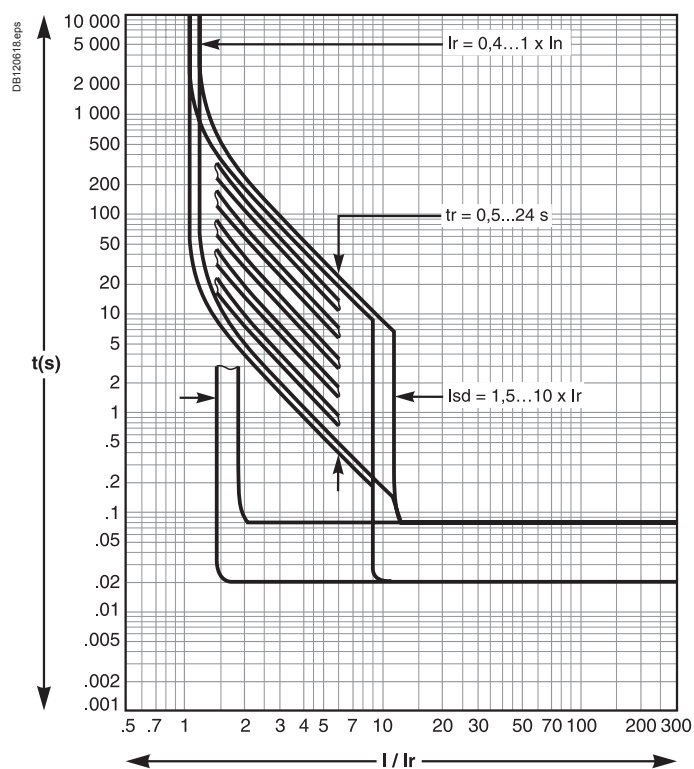
Current limiting	E-4
Energy limiting	E-5

<i>Catalogue numbers</i>	F-1
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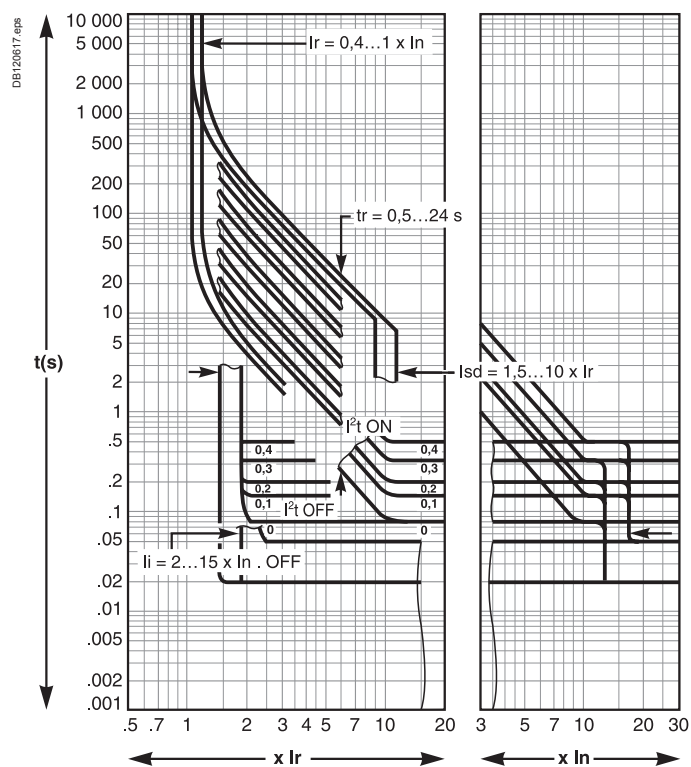


Tripping curves

Micrologic 3.0



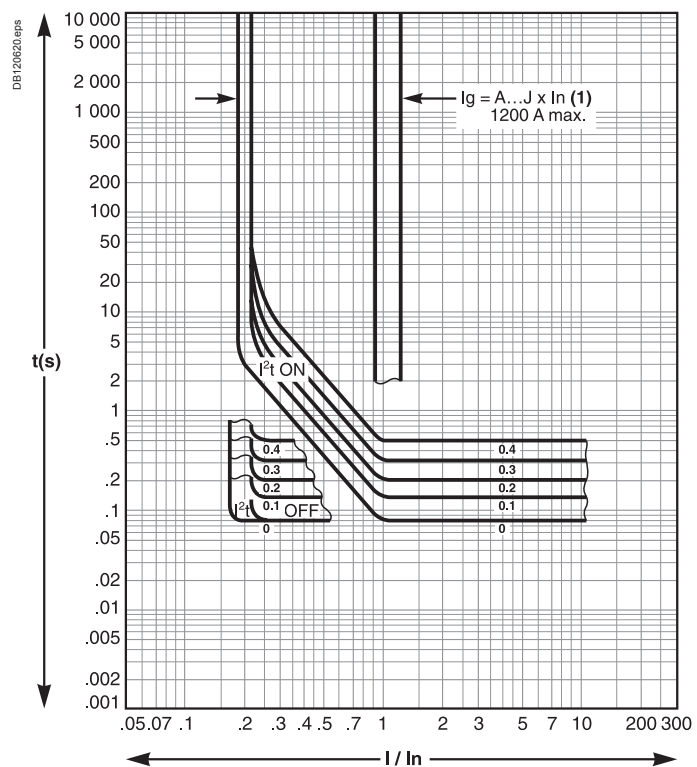
Micrologic 5.0, 6.0





Tripping curves

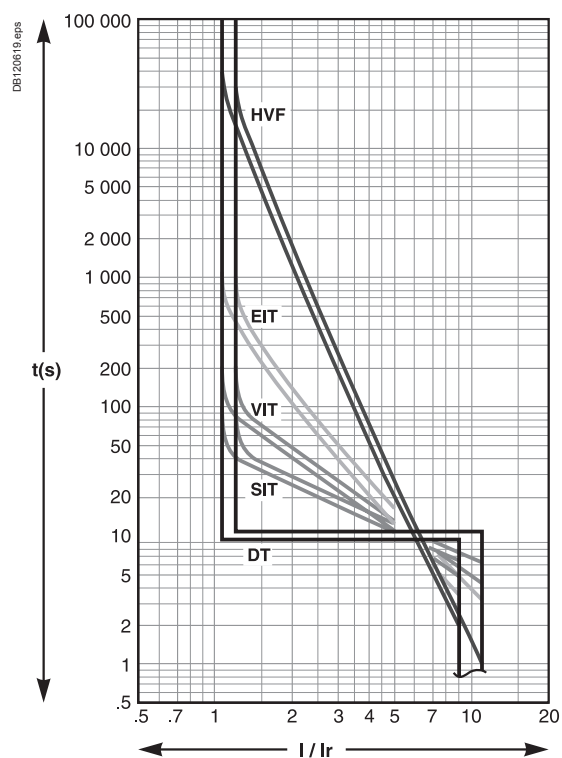
Ground fault protection (Micrologic 6.0)



(1)

$I_g = I_n \times \dots$	A	B	C	D	E	F	G	H	I
$I_g < 400 \text{ A}$	0.3	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1
$400 \text{ A} \leq I_g \leq 1200 \text{ A}$	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1
$I_g > 1200 \text{ A}$	500	640	720	800	880	960	1040	1120	1200

IDMTL curve (Micrologic P and H)

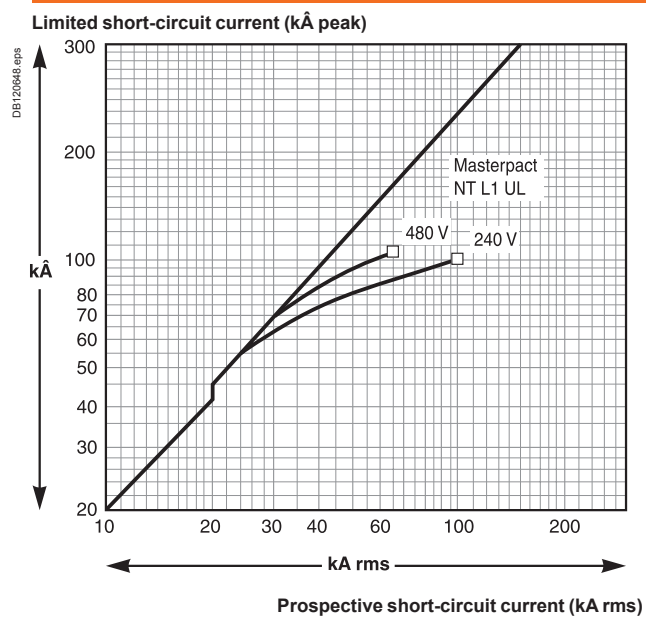




Limitation curves

Current limiting

Voltage 240/480 V AC (UL 489 Listed NT L1)

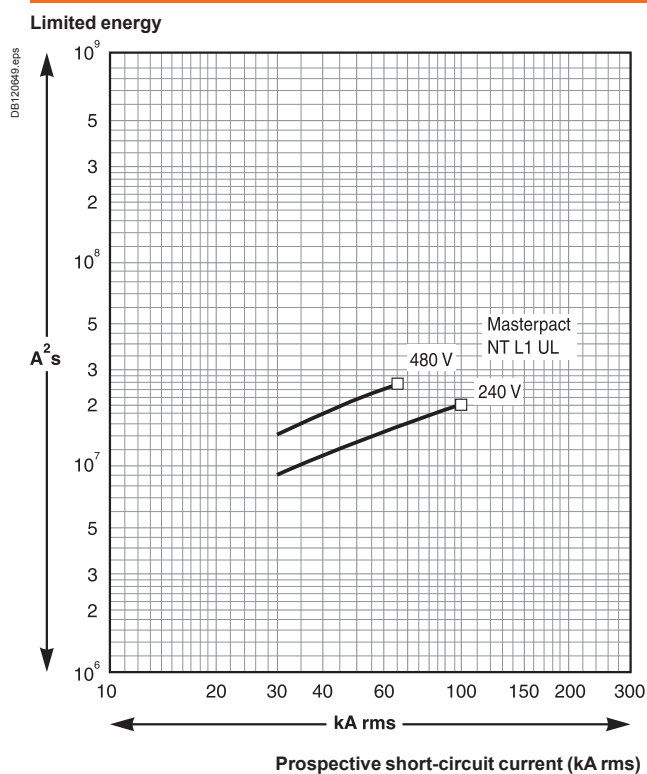




Limitation curves

Energy limiting

Voltage 240/480 V AC (UL 489 Listed NT L1)







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<i>Installation recommendations</i>	B-1
<i>Dimensions and connections</i>	C-1
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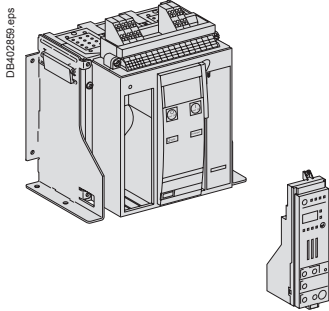
NT08 to NT12 fixed circuit breakers

Circuit breakers

A Masterpact fixed circuit breaker is described by 4 catalogue numbers corresponding to:

- the basic circuit breaker
- a control unit
- top connection see page F-3
- a bottom connection see page F-3 .

A communication option and various auxiliaries and accessories may also be added.



Basic circuit breaker

Type N

	Frame rating	Interrupting current (KAIR RMS for U = 480 V)	3P
NT08	800	50	33631
NT12	1200	50	33633

Type L1

	Frame rating	Interrupting current (KAIR RMS for U = 480 V)	3P
NT08	800	65	33635
NT12	1200	65	33637

Micrologic control unit

Ammeter A

		3P
Micrologic 3.0 A	basic protection	64787
Micrologic 5.0 A	selective protection	64788
Micrologic 6.0 A	selective + earth-fault protection	64854

Energy E

		3P
Micrologic 2.0 E	basic protection	47280
Micrologic 5.0 E	selective protection	47283
Micrologic 6.0 E	selective + earth-fault protection	47288

Power meter P

		3P
Micrologic 5.0 P	selective protection	64789
Micrologic 6.0 P	selective + earth-fault protection	64791

Harmonic meter H

		3P
Micrologic 5.0 H	selective protection	64790
Micrologic 6.0 H	selective + earth-fault protection	64792

Long time rating plug

		3P
Long time rating plug standard A	$I_r = I_n \times 0.4 \text{ to } 1$	As standard
Long time rating plug low setting B	$I_r = I_n \times 0.4 \text{ to } 1$	48819
Long time rating plug high setting C	$I_r = I_n \times 0.42 \text{ to } 1$	48820
Long time rating plug D	$I_r = I_n \times 0.42 \text{ to } 1$	48836
Long time rating plug low setting E	$I_r = I_n \times 0.6 \text{ to } 1$	48837
Long time rating plug high setting F	$I_r = I_n \times 0.84 \text{ to } 1$	48838
Long time rating plug G	$I_r = I_n \times 0.66 \text{ to } 0.82$	48839
Long time rating plug low setting H	$I_r = I_n \times 0.48 \text{ to } 0.64$	48840

Communication option

COM (BCM-ULP)	47405
Eco COM module (BCM-ULP)	47407
IFE Ethernet interface for LV breaker	LV434010
Ethernet interface for LV breakers and gateway	LV434011
IFM Modbus-SL interface module	TRV00210
I/O application module	LV434063

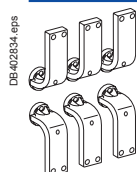
Brand option

Square D Brand	47802
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Connections

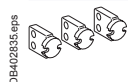
Front connection ⁽¹⁾



800/1200 A	Top	3P	4P
	Bottom	34105 34107	34106 34108

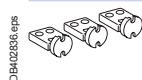
Rear connection ⁽¹⁾

Vertical connection



800/1200 A	Top	3P	4P
	Bottom	34097 34099	34098 34100

Horizontal connection



800/1200 A	Top	3P	4P
	Bottom	34101 34103	34102 34104

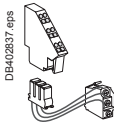
⁽¹⁾ Those connections are used on switch-disconnectors [see page F-13](#).



NT08 to NT12 fixed circuit breakers

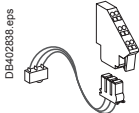
Indication contacts

ON/OFF indication contacts (OF)



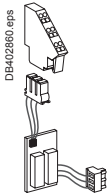
Changeover contacts (6 A - 240 V)	4 - As standard
1 low-level OF to replace 1 standard OF (4 max.)	47339

"Fault trip" indication contacts (SDE)



Changeover contact (5 A - 240 V)	1 - As standard
1 additional SDE (5 A - 240 V)	47340
or 1 additional low-level SDE	47341

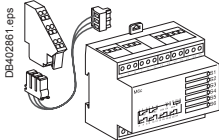
Programmable contacts ⁽¹⁾ (programmed via Micrologic control unit)



2 contacts (M2C) (5 A - 240 V)	47403
6 changeover contacts (M6C) (5 A - 240 V)	47404

⁽¹⁾ For Micrologic control units P and H only.

M2C.



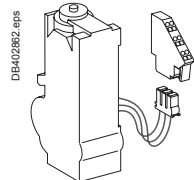
M6C.



Remote operation

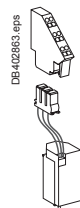
Remote ON/OFF

Gear motor



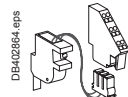
AC 50/60 Hz	48/60 V	MCH
	100/130 V	47391
	200/250 V	47395
	277/415 V	47396
	440/480 V	47398
DC	24/30 V	47400
	48/60 V	47390
	100/130 V	47391
	200/250 V	47392
		47393

Instantaneous voltage releases



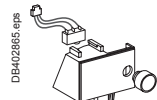
		Closing release	Opening release
Standard		XF	MX
AC 50/60 Hz	12 V DC	47349	47359
	24 V AC/DC	47350	47360
	48 V AC/DC	47351	47361
	120 V AC/DC	47352	47362
	240 V AC/DC	47353	47363
	277 V AC	47354	47364
	380/480 V AC	47355	47365
Communicating		XF com	MX com
AC 50/60 Hz	12 V DC	47310	47320
	24 V AC/DC	47311	47321
	48 V AC/DC	47312	47322
	120 V AC/DC	47313	47323
	240 V AC/DC	47314	47324
	277 V AC	47315	47325
	380/480 V AC	47316	47326

"Ready to close" contact (1 max.)



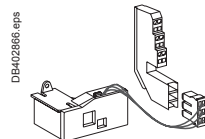
		PF
1 changeover contact (5 A - 240 V)		47342
1 low-level changeover contact (3 A - 240 V)		47343

Electrical closing pushbutton



	BPFE
1 pushbutton	47512

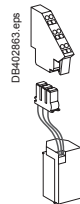
Remote reset after fault trip



Electrical reset	Res
110/130 V AC	47344
220/240 V AC	47345
Automatic reset	RAR
Adaptation	47346

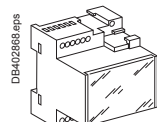
Remote tripping

Instantaneous voltage release



AC 50/60 Hz	12 V DC	2 nd MX	or	MN
	24 V AC/DC	47369		
	48 V AC/DC	47370		47380
	120 V AC/DC	47371		47381
	240 V AC/DC	47372		47382
	277 V AC	47373		47383
	380/480 V AC	47374		
DC		47375		47385

MN delay unit



AC 50/60 Hz	48/60 V AC/DC	R (non-adjustable)	Rr (adjustable)
	100/130 V AC/DC	33684	33680
	200/250 V AC/DC	33685	33681
	380/480 V AC/DC		33682
DC			33683



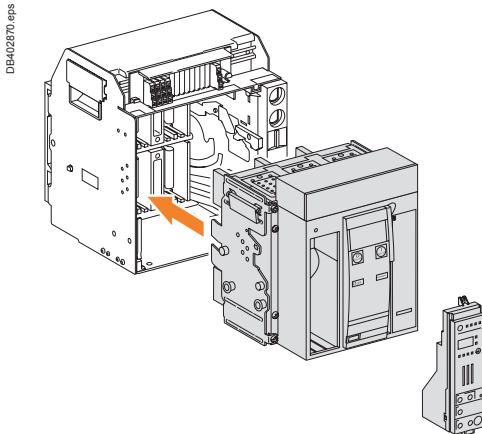
NT08 to NT12 drawout circuit breakers

Circuit breakers

A Masterpact drawout circuit breaker is described by 5 catalogue numbers corresponding to:

- the basic circuit breaker
- a control unit
- a chassis
- a top connection see page F-7
- a bottom connection see page F-7.

A communication option and various auxiliaries and accessories may also be added.



Basic circuit breaker

Type N

	Frame rating	Interrupting current (KAIR RMS for U = 480 V)	3P
NT08	800	50	33781
NT12	1200	50	33783

Type L1

	Frame rating	Interrupting current (KAIR RMS for U = 480 V)	3P
NT08	800	65	33947
NT12	1200	65	33949

Micrologic control unit

Ammeter A

		3P
Micrologic 3.0 A	basic protection	64868
Micrologic 5.0 A	selective protection	64869
Micrologic 6.0 A	selective + earth-fault protection	64867

Energy E

		3P
Micrologic 2.0 E	basic protection	47281
Micrologic 5.0 E	selective protection	47284
Micrologic 6.0 E	selective + earth-fault protection	47292

Power meter P

		3P
Micrologic 5.0 P	selective protection	64870
Micrologic 6.0 P	selective + earth-fault protection	64872

Harmonic meter H

		3P
Micrologic 5.0 H	selective protection	64871
Micrologic 6.0 H	selective + earth-fault protection	64873

Long time rating plug

		3P
Long time rating plug standard A	$I_r = I_n \times 0.4$ to 1	As standard
Long time rating plug low setting B	$I_r = I_n \times 0.4$ to 1	48819
Long time rating plug high setting C	$I_r = I_n \times 0.42$ to 1	48820
Long time rating plug D	$I_r = I_n \times 0.42$ to 1	48836
Long time rating plug low setting E	$I_r = I_n \times 0.6$ to 1	48837
Long time rating plug high setting F	$I_r = I_n \times 0.84$ to 1	48838
Long time rating plug G	$I_r = I_n \times 0.66$ to 0.82	48839
Long time rating plug low setting H	$I_r = I_n \times 0.48$ to 0.64	48840

Communication option

	Chassis (I/O application module)	Circuit breaker (BCM-ULP)
COM (BCM-ULP)	33852	47485
Eco COM module (BCM-ULP)	-	33843
IFE Ethernet interface for LV breaker	LV434010	
IFE Ethernet interface for LV breakers and gateway	LV434011	
IFM Modbus-SL interface module	TRV00210	
I/O application module	LV434063	

Chassis

For type N

	3P
NT08	33951
NT12	33953

For Type L1

	3P
NT08	33971
NT12	33973

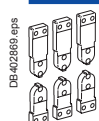
Brand option

Square D Brand	47802
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Connections and chassis locking

Chassis front connection

	800/1200 A		3P	4P
		Top	34119	34120
		Bottom	34121	34122

Chassis rear connection

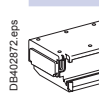
Vertical connection

	800/1200 A		3P	4P
		Top	34111	34112
		Bottom	34113	34114

Horizontal connection

	800/1200 A		3P	4P
		Top	34115	34116
		Bottom	34117	34118

Rear connection accessories

	Arc chute cover		3P/4P	As standard
	Auxiliary terminal shield (CB)			
	Auxiliary terminal shield (CB)	3P		33763
		4P		33764
	Safety shutters			
	Safety shutters (VO)	3P		As standard
		4P		As standard

Chassis locking

Disconnected position locking

	By padlocks		VCPO	As standard
	By Profalux keylocks			
	Profalux	1 lock with 1 key + adaptation kit		33773
		2 locks 1 key + adaptation kit		33774
		2 locks 2 different keys + adaptation kit		33775
	1 keylock Profalux (without adaptation kit):	identical key not identified combination		33173
		identical key identified 215470 combination		33174
		identical key identified 215471 combination		33175
	By Ronis keylocks			
	Ronis	1 lock with 1 key + adaptation kit		33776
		2 locks 1 key + adaptation kit		33777
		2 locks 2 different keys + adaptation kit		33778
	1 keylock Ronis (without adaptation kit):	identical key not identified combination		33189
		identical key identified EL24135 combination		33190
		identical key identified EL24153 combination		33191
		identical key identified EL24315 combination		33192
	Optional disconnected/test/connected position locking			33779
	Adaptation kit (without keylock):	adaptation kit Profalux		33769
		adaptation kit Ronis		33770
		adaptation kit Castell		33771
		adaptation kit Kirk		33772

Door interlock (1 part)

	Right-hand side of chassis (VPECD)	33786
	Left-hand side of chassis (VPECG)	33787

Open door racking interlock (VPOC)

	Racking interlock (VPOC)	33788

Breaker mismatch protection / cradle rejection kits

	Breaker mismatch protection (VDC)	As standard

Racking interlock between racking crank and off position (IBPO)

	Racking interlock (IBPO)	As standard
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Automatic spring discharge (DAE)

	Spring discharge (DAE)	As standard

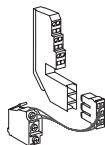
NT08 to NT12 drawout circuit breakers

Indication contacts



ON/OFF indication contacts (OF)

DB402915.eps

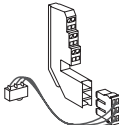


Changeover contacts (6 A - 240 V)
1 low-level OF to replace 1 standard OF (4 max.)

4 - As standard
33806

"Fault trip" indication contacts (SDE)

DB402811.eps

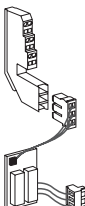


Changeover contact (5 A - 240 V)
1 additional SDE (5 A - 240 V)
or 1 additional low-level SDE

1 - As standard
47430
47431

Programmable contacts ⁽¹⁾ (programmed via Micrologic control unit)

DB402812.eps



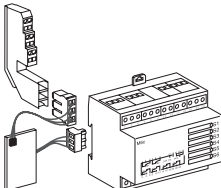
2 contacts M2C (5 A - 240 V)
6 changeover contacts M6C (5 A - 240 V)

47483
47484

⁽¹⁾ For Micrologic control units P and H only.

M2C.

DB402813.eps



M6C.

Carriage switches (connected / disconnected / test position)

DB402916.eps



Changeover contacts (6 A - 240 V)

1 connected position contact (3 max.)
1 test position contact (1 max.)
1 disconnected position contact (2 max.)

33751
33752
33753

And/or low-level changeover contacts

1 connected position contact (3 max.)
1 test position contact (1 max.)
1 disconnected position contact (2 max.)

33754
33755
33756

Auxiliary terminals for chassis alone

3 wire terminal (30 parts)
6 wire terminal (10 parts)
Jumpers (10 parts)

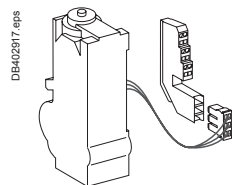
47071
47072
47900



Remote operation

Remote ON/OFF

Gear motor

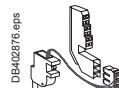


AC 50/60 Hz	48 V	MCH
	100/130 V	47461
	200/250 V	47465
	277/415 V	47466
	440/480 V	47468
DC	24/30 V	47470
	48/60 V	47460
	100/125 V	47461
	200/250 V	47462
		47463

Instantaneous voltage release

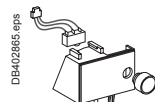
		Closing release	Opening release
Standard		XF	MX
AC 50/60 Hz	12 V DC	47439	33809
	24 V AC/DC	47440	33810
	48 V AC/DC	47441	33811
	120 V AC/DC	47442	33812
	240 V AC/DC	47443	33813
	277 V AC	47444	33814
	380/480 V AC	47445	33815
Communicating		XF com	MX com
AC 50/60 Hz	12 V DC	47411	33791
	24 V AC/DC	47412	33792
	48 V AC/DC	47413	33793
	120 V AC/DC	47414	33794
	240 V AC/DC	47415	33795
	277 V AC	47416	33796
	380/480 V AC	47417	33797

Ready to close contact (1 max.)



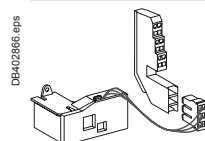
		PF
1 changeover contact (5 A - 240 V)		47432
1 low-level changeover contact (3 A - 240 V)		47433

Electrical closing pushbutton



	BPFE
1 pushbutton	47512

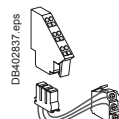
Remote reset after fault trip



Electrical reset	Res
110/130 V AC	47434
220/240 V AC	47435
Automatic reset	RAR
Adaptation	47346

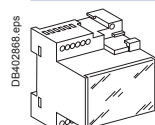
Remote tripping

Instantaneous voltage release



		2 nd MX	or	MN
AC 50/60 Hz	12 V DC	47449		
	24 V AC/DC	47450		33819
	48 V AC/DC	47451		33820
	120 V AC/DC	47452		33821
	240 V AC/DC	47453		33822
	277 V AC	47454		
	380/480 V AC	47455		33824

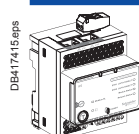
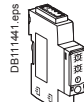
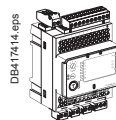
MN delay unit



		R (non-adjustable)	Rr (adjustable)
AC 50/60 Hz	48/60 V AC/DC		33680
	100/130 V AC/DC	33684	33681
	200/250 V AC/DC	33685	33682
	380/480 V AC/DC		33683

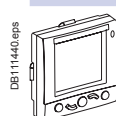


Communication option

	IFE	Ethernet interface for LV breaker	LV434010
		Ethernet interface for LV breakers and gateway	LV434011
	IFM Modbus-SL interface module		TRV00210
	I/O application module		LV434063
	User guide IFE		DOCA0084EN
	User guide I/O application module		DOCA0055EN

Monitoring and control

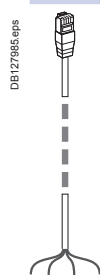
ULP display module ⁽¹⁾

	Switchboard front display module FDM121	TRV00121
	FDM mounting accessory (diameter 22 mm)	TRV00128

Ethernet display module

	Switchboard front display module FDM128	LV434128
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ULP wiring accessories

	Breaker ULP cord L = 0.35 m	LV434195
	Breaker ULP cord L = 1.3 m	LV434196
	Breaker ULP cord L = 3 m	LV434197
	10 Modbus line terminators	VW3A8306DRC ⁽²⁾
	5 RJ45 connectors female/female	TRV00870
	10 ULP line terminators	TRV00880
	10 RJ45/RJ45 male cord L = 0.3 m	TRV00803
	10 RJ45/RJ45 male cord L = 0.6 m	TRV00806
	5 RJ45/RJ45 male cord L = 1 m	TRV00810
	5 RJ45/RJ45 male cord L = 2 m	TRV00820
	5 RJ45/RJ45 male cord L = 3 m	TRV00830
	1 RJ45/RJ45 male cord L = 5 m	TRV00850

⁽¹⁾ For measurement display with Micrologic A, E, P and H.

⁽²⁾ See Telemecanique catalogue.

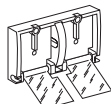


Accessories for NT08 to NT12 fixed or drawout circuit breakers

Circuit breaker locking

Pushbutton locking device

DB402916.eps

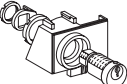


By padlocks

33897

OFF position locking

DB402982.eps



By padlocks + BPFE support

VCPO

47514

By Profalux keylocks

Profalux

1 lock with 1 key + adaptation kit

47519

2 locks 1 key + adaptation kit

47520

1 keylock Profalux
(without adaptation kit):

identical key not identified combination

33173

identical key identified 215470 combination

33174

identical key identified 215471 combination

33175

By Ronis keylocks + BPFE support

Ronis

1 lock with 1 key + adaptation kit

47521

2 locks 1 key + adaptation kit

47522

1 keylock Ronis
(without adaptation kit):

identical key not identified combination

33189

identical key identified EL24135 combination

33190

identical key identified EL24153 combination

33191

identical key identified EL24315 combination

33192

Adaptation kit (without keylock):

adaptation kit Profalux

47515

adaptation kit Ronis

47516

adaptation kit Kirk

47517

adaptation kit Castell

47518

Other circuit breaker accessories

Mechanical operation counter (CDM)

DB117057.eps

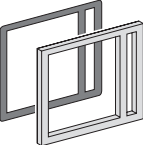


Operation counter CDM

33895

Escutcheon and accessories

DB402922.eps



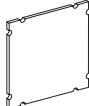
Escutcheon

DB402923.eps



Cover

DB402924.eps



Blanking plate

	Fixed	Drawout
Escutcheon	33718	33857
Transparent cover (IP54)		33859
Escutcheon blanking plate		33858

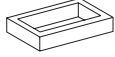


Accessories for NT08 to NT12 fixed or drawout circuit breakers

Accessories for Micrologic control units

Source ground return (SGR) earth fault protection

DB40206 eps



External sensor (SGR)	33579
MDGF summing module	48891

External sensor for neutral + earth-fault protection (TCE)

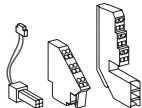
DB402925 eps



CT rating : 400/1600 A	33576
------------------------	-------

Voltage measurement input (for breakers supplied via bottom terminals) (PTE)

DB402927 eps



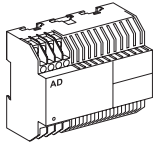
Voltage measurement input.	Fixed	47506
Can be only used for Micrologic control unit H and P.	Drawout	47507

Zone Selective Interlocking option for Micrologic P and H

ZSI	As standard
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External power supply module

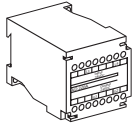
DB105360 eps



24/30 V DC	54440
48/60 V DC	54441
100/125 V DC	54442
110/130 V AC	54443
200/240 V AC	54444
380/415 V AC	54445

Battery module

DB402995 eps



1 battery 24 V	54446
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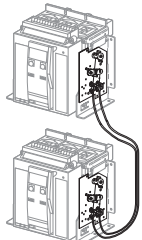
Mechanical interlocking for source changeover

Interlocking using connecting rods

Complete assembly with 2 adaptation fixtures + rods	
2 Masterpact NT fixed devices	33912
2 Masterpact NT drawout devices	33913

Interlocking using cables ⁽¹⁾

DB105604 eps



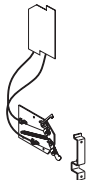
Choose 2 adaptation fixtures (1 for each breaker) + 1 set of cables	
1 adaptation fixture for Masterpact NT fixed devices	33200
1 adaptation fixture for Masterpact NT drawout devices	33201
1 set of cables	33209

⁽¹⁾ Can be used with any combination of NT or NW, fixed or drawout devices.

Circuit breaker locking

Cable-type door interlock

DB40287 eps

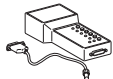


1 complete assembly for Masterpact NT fixed devices	33920
1 complete assembly for Masterpact NT drawout devices	33921

Test equipment

Mini test kit

DB402900 eps



Hand held test kit (HHTK)	33594
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Portable test kit

DB402921 eps



Full function test kit (FFTK)	33595
Test report edition come from FFTK	34559
FFTK test cable 2 pin for STR trip unit	34560
FFTK test cable 7 pin for Micrologic trip unit	33590

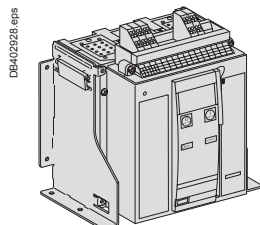


NT08 to NT12 fixed switch-disconnectors

Switch-disconnectors

A Masterpact fixed switch-disconnectors is described by 3 catalogue numbers corresponding to :

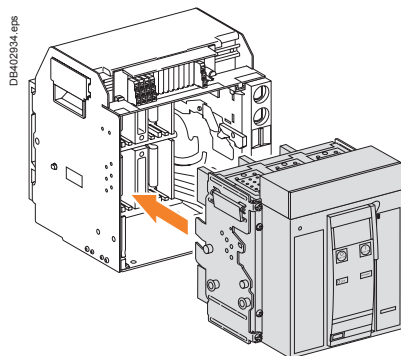
- the basic circuit breaker
- a top connection see page F-3
- a bottom connection see page F-3.



DB402928 eps

A Masterpact drawout switch-disconnectors is described by 4 catalogue numbers corresponding to :

- the basic circuit breaker
- a chassis
- a top connection see page F-7
- a bottom connection see page F-7.



DB402934 eps

Basic fixed switch-disconnector

Type HF

			3P	4P
	Frame rating	Interrupting current (KAIR RMS for U = 480 V)		
NT08	800	50	34039	34040
NT12	1200	50	34041	34042

Communication option

COM Modbus	47405
Micrologic control unit	
Micrologic ELS DINF	As standard

Basic drawout switch-disconnector

Type HF

			3P	4P
	Frame rating	Interrupting current (KAIR RMS for U = 480 V)		
NT08	800	50	34043	34044
NT12	1200	50	34045	34046

Chassis

For type HF

	3P	4P
NT08	33951	33952
NT12	33953	33954

Communication option

	Chassis (I/O application module)	Switch-disconnector (BCM-ULP)
COM (BCM-ULP)	33852	47485
IFE	Ethernet interface for LV breaker	LV434010
	Ethernet interface for LV breakers and gateway	LV434011
IFM Modbus-SL interface module		TRV00210
I/O application module		LV434063
Micrologic control unit		
Micrologic ELS DINF	As standard	



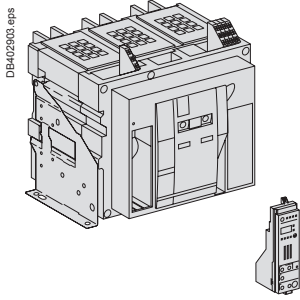
NW08 to NW50 fixed circuit breakers

Circuit breakers

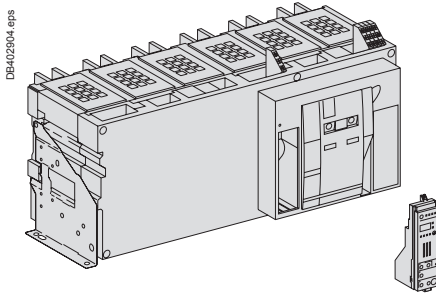
A Masterpact fixed circuit breaker is described by 4 catalogue numbers corresponding to:

- the basic circuit breaker
- a control unit
- a top connection see page F-15
- a bottom connection see page F-15.

A communication option and various auxiliaries and accessories may also be added.



Basic circuit breaker ≤ 3000 A.



Basic circuit breaker > 3000 A.

Basic circuit breaker

Type N			3P	4P
	Frame rating	Interrupting current (KAIR RMS for U = 480 V)		
NW08	800	65	64637	64638
NW12	1200	65	64641	64642
NW16	1600	65	64643	64644
NW20	2000	65	64645	64646

Type H			3P	4P
	Frame rating	Interrupting current (KAIR RMS for U = 480 V)		
NW08	800	100	64659	64660
NW12	1200	100	64663	64664
NW16	1600	100	64665	64666
NW20	2000	100	64667	64668
NW25	2500	100	64669	64670
NW30	3000	100	64671	64672
NW40	4000	100	64673	64674
NW50	5000	100	64675	64676

Micrologic control unit

Ammeter A			3P/4P
Micrologic 3.0 A	basic protection		64787
Micrologic 5.0 A	selective protection		64788
Micrologic 6.0 A	selective + earth-fault protection		64854

Energy E			3P/4P
Micrologic 2.0 E	basic protection		47280
Micrologic 5.0 E	selective protection		47283
Micrologic 6.0 E	selective + earth-fault protection		47288

Power meter P			3P/4P
Micrologic 5.0 P	selective protection		64789
Micrologic 6.0 P	selective + earth-fault protection		64791

Harmonic meter H			3P/4P
Micrologic 5.0 H	selective protection		64790
Micrologic 6.0 H	selective + earth-fault protection		64792

Long time rating plug			3P/4P
Long time rating plug standard A	$I_r = I_n \times 0.4$ to 1		As standard
Long time rating plug low setting B	$I_r = I_n \times 0.4$ to 1		48819
Long time rating plug high setting C	$I_r = I_n \times 0.42$ to 1		48820
Long time rating plug D	$I_r = I_n \times 0.42$ to 1		48836
Long time rating plug low setting E	$I_r = I_n \times 0.6$ to 1		48837
Long time rating plug high setting F	$I_r = I_n \times 0.84$ to 1		48838
Long time rating plug high setting F	$I_r = I_n \times 0.66$ to 0.82		48839
Long time rating plug low setting H	$I_r = I_n \times 0.48$ to 0.64		48840

Communication option

COM (BCM-ULP)		48188
Eco COM module (BCM-ULP)		47406
IFE	Ethernet interface for LV breaker	LV434010
	Ethernet interface for LV breakers and gateway	LV434011
IFM Modbus-SL interface module		TRV00210
I/O application module		LV434063

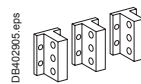
Brand option		
Square D Brand		47802



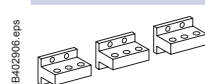
Connections

Rear connection

Vertical connection

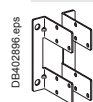
	800-1200 A	Top	3P	4P
		Bottom	64803	64804
	2500/3200 A	Top	64805	64806
		Bottom	64807	64808
	4000/5000 A	Top	64809	64810
		Bottom	64811	64812
			64813	64814

Horizontal connection

	800-1200 A	Top	3P	4P
		Bottom	64815	64816
	2500/3200 A	Top	64817	64818
		Bottom	64819	64820
	4000/5000 A	Top	64821	64822
		Bottom	64823	64824
			64825	64826

Rear connection accessories

Brackets for mounting on a backplate

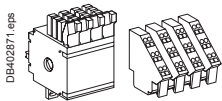
	2 parts	47829
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NW08 to NW50 fixed circuit breakers

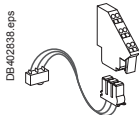
Indication contacts

ON/OFF indication contacts (OF)



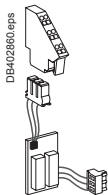
Block of 4 changeover contacts (6 A - 240 V)	1 block - As standard
1 additional block of 4 contacts (2 max.)	48198

Fault trip indication contacts (SDE)



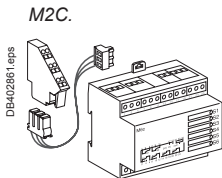
Changeover contact (5 A - 240 V)	1 block - As standard
1 additional SDE (5 A - 240 V)	48200
or 1 additional low-level SDE	48201

Programmable contacts ⁽¹⁾ (programmed via Micrologic control unit)



2 contacts M2C (5 A - 240 V)	47403
6 changeover contacts M6C (5 A - 240 V)	47404

⁽¹⁾ For Micrologic control units P and H only.



M6C.

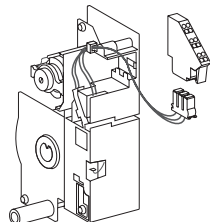


Remote operation

Remote ON/OFF

Gear motor

DB402807.eps



		MCH
AC 50/60 Hz	48/60 V	48207
	100/130 V	48211
	200/250 V	48212
	240/277 V	48213
	380/415 V	48214
	440/480 V	48215
DC	24/30 V	48206
	48/60 V	48207
	100/125 V	48208
	200/250 V	48209

Instantaneous voltage releases

DB402863.eps



		Closing release	Opening release
Standard		XF	MX
AC 50/60 Hz	12 V DC	47349	47359
	24 V AC/DC	47350	47360
	48 V AC/DC	47351	47361
	120 V AC/DC	47352	47362
	240 V AC/DC	47353	47363
	277 V AC	47354	47364
	380/480 V AC	47355	47365
Communicating		XF com	MX com
AC 50/60 Hz	12 V DC	47310	47320
	24 V AC/DC	47311	47321
	48 V AC/DC	47312	47322
	120 V AC/DC	47313	47323
	240 V AC/DC	47314	47324
	277 V AC	47315	47325
	380/480 V AC	47316	47326

Ready to close contact (1 max.)

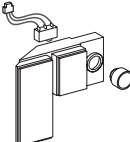
DB402864.eps



	PF
1 changeover contact (5 A - 240 V)	47342
1 low-level changeover contact	47343

Electrical closing pushbutton

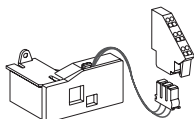
DB402801.eps



	BPFE
1 pushbutton	48534

Remote reset after fault trip

DB402918.eps

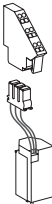


		Res
Electrical reset	110/130 V AC	48202
	220/240 V AC	48203
Automatic reset		RAR
Adaptation		47346

Remote tripping

Instantaneous voltage release

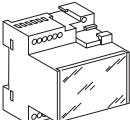
DB402868.eps



		2 nd MX	or	MN
AC 50/60 Hz	12 V DC	47369		
	24 V AC/DC	47370		47380
	48 V AC/DC	47371		47381
	120 V AC/DC	47372		47382
	240 V AC/DC	47373		47383
	277 V AC	47374		
	380/480 V AC	47375		47385

MN delay unit

DB402868.eps



		R (non-adjustable)	Rr (adjustable)
AC 50/60 Hz	48/60 V AC/DC		33680
	100/130 V AC/DC	33684	33681
	200/250 V AC/DC	33685	33682
	380/480 V AC/DC		33683



NW08 to NW50 drawout circuit breakers

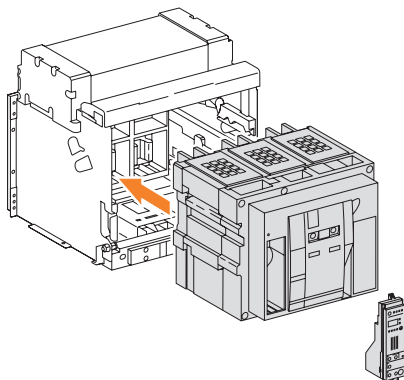
Circuit breakers

A Masterpact drawout circuit breaker is described by 5 catalogue numbers corresponding to:

- the basic circuit breaker
- a control unit
- a chassis
- a top connection see page F-19
- a bottom connection see page F-19.

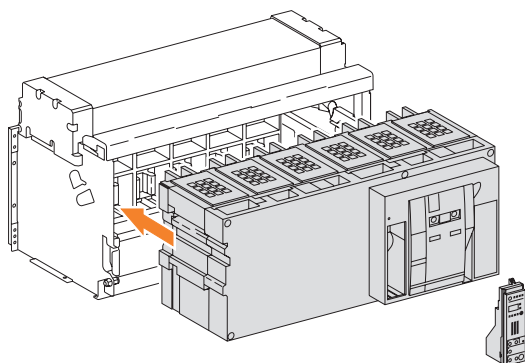
A communication option and various auxiliaries and accessories may also be added.

DE101911.eps



Basic circuit breaker + chassis ≤ 3000 A.

DE101912.eps



Basic circuit breaker + chassis > 3000 A.

Basic circuit breaker

Type N			3P	4P
	Frame rating	Interrupting current (KAIR RMS for U = 480 V)		
NW08	800	65	64647	64648
NW12	1200	65	64651	64652
NW16	1600	65	64653	64654
NW20	2000	65	64655	64656

Type H			3P	4P
	Frame rating	Interrupting current (KAIR RMS for U = 480 V)		
NW08	800	100	64677	64678
NW12	1200	100	64681	64682
NW16	1600	100	64683	64684
NW20	2000	100	64685	64686
NW25	2500	100	64687	64688
NW30	3000	100	64689	64690
NW40	4000	100	64691	64692
NW50	5000	100	64693	64694

Micrologic control unit

Ammeter A			3P/4P
Micrologic 3.0 A	basic protection		64857
Micrologic 5.0 A	selective protection		64858
Micrologic 6.0 A	selective + earth-fault protection		64863

Energy E			3P/4P
Micrologic 2.0 E	basic protection		48498
Micrologic 5.0 E	selective protection		48499
Micrologic 6.0 E	selective + earth-fault protection		48500

Power meter P			3P/4P
Micrologic 5.0 P	selective protection		64859
Micrologic 6.0 P	selective + earth-fault protection		64861

Harmonic meter H			3P/4P
Micrologic 5.0 H	selective protection		64860
Micrologic 6.0 H	selective + earth-fault protection		64862

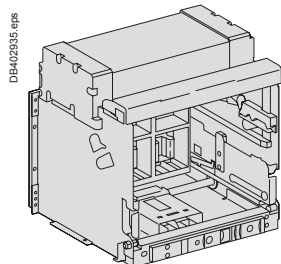
Long time rating plug			3P/4P
Long time rating plug standard A	$I_r = I_n \times 0.4$ to 1		As standard
Long time rating plug low setting B	$I_r = I_n \times 0.4$ to 1		48819
Long time rating plug high setting Chigh setting C	$I_r = I_n \times 0.42$ to 1		48820
Long time rating plug D	$I_r = I_n \times 0.42$ to 1		48836
Long time rating plug low setting E	$I_r = I_n \times 0.6$ to 1		48837
Long time rating plug high setting F	$I_r = I_n \times 0.84$ to 1		48838
Long time rating plug G	$I_r = I_n \times 0.66$ to 0.82		48839
Long time rating plug low setting H	$I_r = I_n \times 0.48$ to 0.64		48840

Communication option

	Chassis (I/O application module)	Circuit breaker (BCM-ULP)
COM (BCM-ULP)	33852	48384
Eco COM module (BCM-ULP)	33852	48385
IFE Ethernet interface for LV breaker		LV434010
Ethernet interface for LV breakers and gateway		LV434011
IFM Modbus-SL interface module		TRV00210
I/O application module		LV434063



Chassis



Chassis ≤ 3000 A.

Type N

	3P	4P
NW08	64715	64716
NW12	64719	64720
NW16	64721	64722
NW20	64723	64724

Type H

	3P	4P
NW08	64727	64728
NW12	64731	64732
NW16	64733	64734
NW20	64735	64736
NW25	64737	64738
NW30	64739	64740
NW40	64741	64742
NW50	64743	64744

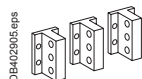
Brand option

Square D Brand

47802

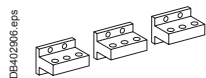
Chassis rear connection

Vertical connection



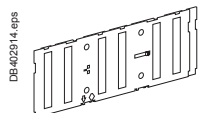
		3P	4P
800-1200 A	Top	64829	64830
	Bottom	64831	64832
2500/3200 A	Top	64833	64834
	Bottom	64835	64836
4000/5000 A	Top	64837	64838
	Bottom	64839	64840

Horizontal connection



		3P	4P
800-1200 A	Top	64841	64842
	Bottom	64843	64844
2500/3200 A	Top	64845	64846
	Bottom	64847	64848
4000/5000 A	Top	64849	64850
	Bottom	64851	64852

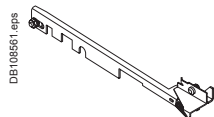
Safety shutters + locking block



800/3000 A	3P	As standard
	4P	As standard
4000/5000 A	3P	As standard
	4P	As standard

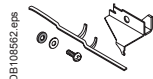
Chassis accessories

Front face shutter locking



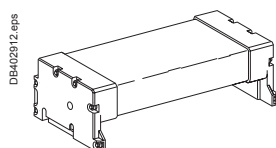
800-5000 A	3P/4P	48931
------------	-------	-------

Shutter indicator



3P/4P	48932
-------	-------

Arc chute cover



3P/4P	As standard
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Auxiliary terminal shield (CB)



800/3000 A	3P	48595
	4P	48596
4000/5000 A	3P	48597
	4P	48598



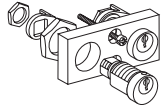
NW08 to NW50 drawout circuit breakers

Chassis locking

Chassis locking

Disconnected position locking

DB40208 eps



By padlocks

VCPO

As standard

By Profalux keylocks

Profalux

1 lock with 1 key + adaptation kit

48568

2 locks 1 key + adaptation kit

48569

2 locks 2 different keys + adaptation kit

48570

1 keylock Profalux
(without adaptation kit):

identical key not identified combination

33173

identical key identified 215470 combination

33174

identical key identified 215471 combination

33175

By Ronis keylocks

Ronis

1 lock with 1 key + adaptation kit

48572

2 locks 1 key + adaptation kit

48573

2 locks 2 different keys + adaptation kit

48574

1 keylock Ronis
(without adaptation kit):

identical key not identified combination

33189

identical key identified EL24135 combination

33190

identical key identified EL24153 combination

33191

identical key identified EL24315 combination

33192

Optional disconnected/test/connected position locking

33779

Adaptation kit (without keylock): adaptation kit Profalux / Ronis

48564

adaptation kit Kirk

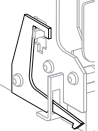
48565

adaptation kit Castell

48566

Door interlock (1 part)

DB40209 eps



Right-hand side of chassis

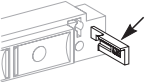
48579

Left-hand side of chassis

48580

Open door racking interlock (VPOC)

DB402910 eps



1 part

48582

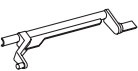
Racking interlock between crank and OFF pushbutton (IBPO)

1 part

As standard

Automatic spring discharge before breaker removal (DAE)

DB402979 eps

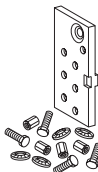


1 part

As standard

Breaker mismatch protection / cradle rejection kits (VDC)

DB402911 eps



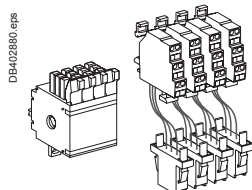
Breaker mismatch protection

As standard



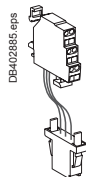
Indication contacts

ON/OFF indication contacts (OF)



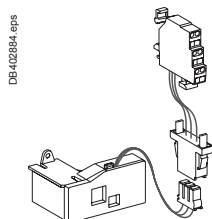
Block of 4 changeover contacts (6 A - 240 V)	1 block - As standard
1 additional block of 4 contacts (2 max.)	48468

Combined closed / connected contacts for use with 1 auxiliary contact (EF)



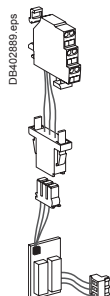
1 contact (5 A - 240 V) (8 max.)	48477
or 1 low-level contact (8 max.)	48478

Fault trip indication contacts (SDE)



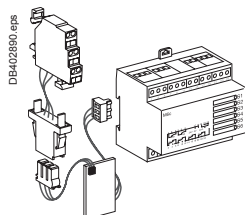
Changeover contact (5 A - 240 V)	1 block - As standard
1 additional SDE (5 A - 240 V)	48475
or 1 additional low-level SDE	48476

Programmable contacts ⁽¹⁾ (programmed via Micrologic control unit)



2 contacts M2C (5 A - 240 V)	48382
------------------------------	--------------

M2C.



or 6 contacts M6C (5 A - 240 V)	48383
---------------------------------	--------------

⁽¹⁾ For Micrologic control units P and H only.

M6C.

Carriage switches (connected / disconnected / test position)



Changeover contacts (8 A - 240 V)	
1 connected position contact (3 max.)	33751
1 test position contact (3 max.)	33752
1 disconnected position contact (3 max.)	33753
and/or low-level changeover contacts	
1 connected position contact (3 max.)	33754
1 test position contact (3 max.)	33755
1 disconnected position contact (3 max.)	33756
Actuator for additional carriage switches	48560

Auxiliary terminals for chassis alone

3 wire terminal (30 parts)	47898
6 wire terminal (10 parts)	47899
Jumpers (10 parts)	47900



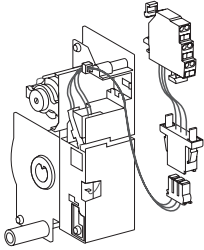
NW08 to NW50 drawout circuit breakers

Remote operation

Remote ON/OFF

Gear motor

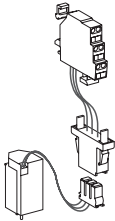
DB402866 eps



AC 50/60 Hz		MCH	
DC	48 V	48522	
	100/130 V	48526	
	200/250 V	48527	
	240/277 V	48528	
	380/415 V	48529	
	440/480 V	48530	
	24/30 V	48521	
	48/60 V	48522	
	100/125 V	48523	
	200/250 V	48524	

Instantaneous voltage releases

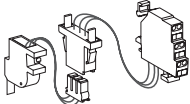
DB402887 eps



		Closing release	Opening release
Standard		XF	MX
AC 50/60 Hz	12 V DC	48480	48490
	24 V AC/DC	48481	48491
	48 V AC/DC	48482	48492
	120 V AC/DC	48483	48493
	240 V AC/DC	48484	48494
	277 V AC	48485	48495
	380/480 V AC	48486	48496
Communicating		XF com	MX com
AC 50/60 Hz	12 V DC	48448	48457
	24 V AC/DC	48449	48458
	48 V AC/DC	48450	48459
	120 V AC/DC	48451	48460
	240 V AC/DC	48452	48461
	277 V AC	48453	48462
	380/480 V AC	48454	48463

Ready to close contact (1 max.)

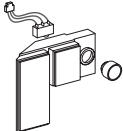
DB402888 eps



		PF
1 changeover contact (5 A - 240 V)		48469
	1 low-level changeover contact	48470

Electrical closing pushbutton

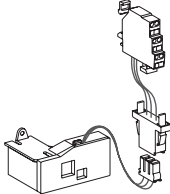
DB402901 eps



		BPFE
1 pushbutton		48534

Remote reset after fault trip

DB402884 eps

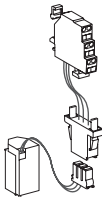


Electrical reset		Res
110/130 V AC		48472
		48473
Automatic reset		RAR
Adaptation		47346

Remote tripping

Instantaneous voltage release

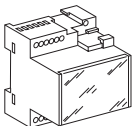
DB402887 eps



		2 nd MX	or	MN
AC 50/60 Hz	12 V DC	48510		
	24 V AC/DC	48511		48501
	48 V AC/DC	48512		48502
	120 V AC/DC	48513		48503
	240 V AC/DC	48514		48504
	277 V AC	48515		
	380/480 V AC	48516		48506

Delay unit

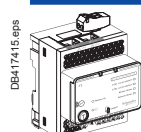
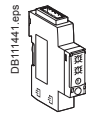
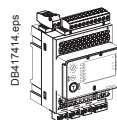
DB402888 eps



		R (non-adjustable)	Rr (adjustable)
AC 50/60 Hz	48/60 V AC/DC		33680
	100/130 V AC/DC	33684	33681
	200/250 V AC/DC	33685	33682
	380/480 V AC/DC		33683

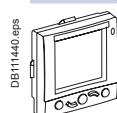


Communication option

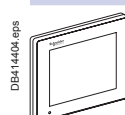
 DB417415.eps	IFE	Ethernet interface for LV breaker	LV434010
		Ethernet interface for LV breakers and gateway	LV434011
 DB111441.eps	IFM Modbus-SL interface module		TRV00210
	I/O application module		LV434063
 DB417414.eps	User guide IFE		DOCA0084EN
	User guide I/O application module		DOCA0055EN

Monitoring and control

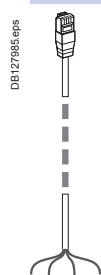
ULP display module ⁽¹⁾

 DB111440.eps	Switchboard front display module FDM121	TRV00121
	FDM mounting accessory (diameter 22 mm)	TRV00128

Ethernet display module

 DB414404.eps	Switchboard front display module FDM128	LV434128
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ULP wiring accessories

 DB127985.eps	Breaker ULP cord L = 0.35 m	LV434195
	Breaker ULP cord L = 1.3 m	LV434196
	Breaker ULP cord L = 3 m	LV434197
 DB111443.eps	10 Modbus line terminators	VW3A8306DRC ⁽²⁾
 DB1115023.eps	5 RJ45 connectors female/female	TRV00870
 DB111444.eps	10 ULP line terminators	TRV00880
 DB111445.eps	10 RJ45/RJ45 male cord L = 0.3 m	TRV00803
	10 RJ45/RJ45 male cord L = 0.6 m	TRV00806
	5 RJ45/RJ45 male cord L = 1 m	TRV00810
	5 RJ45/RJ45 male cord L = 2 m	TRV00820
	5 RJ45/RJ45 male cord L = 3 m	TRV00830
	1 RJ45/RJ45 male cord L = 5 m	TRV00850

⁽¹⁾ For measurement display with Micrologic A, E, P and H.

⁽²⁾ See Telemecanique catalogue.

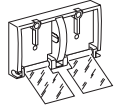


Accessories for NW08 to NW50 fixed and drawout circuit breakers

Circuit breaker locking

Pushbutton locking device

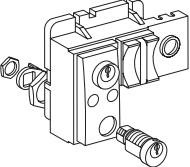
DB402919 eps



By padlocks	48536
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OFF position locking

DB402861 eps



By padlocks		
	VCPO	48539
By Profalux keylocks		
Profalux	1 lock with 1 key + adaptation kit	48545
	2 locks 1 key + adaptation kit	48546
	2 locks 2 different keys + adaptation kit	48547
	1 keylock Profalux (without adaptation kit):	
	identical key not identified combination	33173
	identical key identified 215470 combination	33174
	identical key identified 215471 combination	33175
By Ronis keylocks		
Ronis	1 lock with 1 key + adaptation kit	48549
	2 locks 1 key + adaptation kit	48550
	2 locks 2 different keys + adaptation kit	48551
	1 keylock Ronis (without adaptation kit):	
	identical key not identified combination	33189
	identical key identified EL24135 combination	33190
	identical key identified EL24153 combination	33191
	identical key identified EL24315 combination	33192
Adaptation kit (without keylock):	adaptation kit Profalux / Ronis	48541
	adaptation kit Kirk	48542
	adaptation kit Castell	48543

Cable-type door interlock

DB402867 eps



1 complete assembly for Masterpact NW fixed or drawout device	48614
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Other circuit breaker accessories

Mechanical operation counter

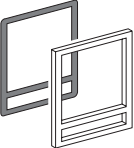
DB117057 eps



Operation counter CDM	48535
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Escutcheon and accessories

DB402892 eps



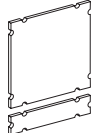
Escutcheon

DB402897 eps



Cover

DB402894 eps



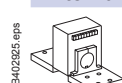
Blanking plate

	Fixed	Drawout
Escutcheon	48601	48603
Transparent cover IP54		48604
Escutcheon blanking plate	48605	48605

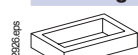


Accessories for Micrologic control units

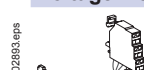
External sensor for neutral + residual earth-fault protection (TCE)

	CT rating: 400/2000 A	34035
	CT rating: 1000/4000 A	34036
	CT rating: 2000/6300 A	48182

Source ground return (SGR) earth fault protection

	External sensor (SGR)	33579
	MDGF summing module	48891

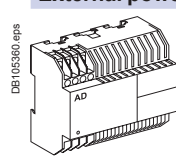
Voltage measurement input (for breakers supplied via bottom terminals) (PTE)

	Voltage measurement input.	Fixed	47506
	Can be only used for Micrologic control unit H and P.	Drawout	48533

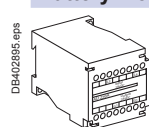
Zone Selective Interlocking option for Micrologic P and H

ZSI	As standard
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External power supply module

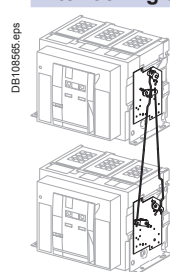
	24-30 V DC	54440
	48-60 V DC	54441
	100-125 V DC	54442
	110-130 V AC	54443
	200-240 V AC	54444
	380-415 V AC	54445

Battery module

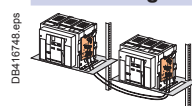
	1 battery 24 V	54446
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Mechanical interlocking for source changeover

Interlocking of 2 devices using connecting rods

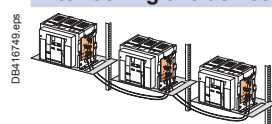
	Complete assembly with 2 adaptation fixtures + rods	
	2 Masterpact NW fixed devices	48612
	2 Masterpact NW drawout devices	48612
	<i>Can be used with 1 NW fixed + 1 NW drawout</i>	

Interlocking of 2 devices using cables ⁽¹⁾

	Choose 2 adaptation fixtures (1 for each device) + 1 set of cables	
	1 adaptation fixture for Masterpact NW fixed devices	47926
	1 adaptation fixture for Masterpact NW drawout devices	47926
	1 set of 2 cables of 2.5 m	33209

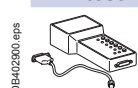
⁽¹⁾ Can be used with any combination of NT or NW, fixed or drawout devices.

Interlocking of 3 devices using cables ⁽¹⁾

	Choose 1 interlocking kit (including 3 adaptation fixtures + cables)	
	3 sources, only 1 device closed, fixed or drawout devices	48610
	2 sources + 1 coupling, fixed or drawout devices	48609
	2 normal + 1 replacement source, fixed or drawout devices	48608

Test equipment

Mini test kit

	Hand held test kit (HHTK)	33594
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Portable test kit

	Full function test kit (FFTK)	33595
	Test report edition come from FFTK	34559
	FFTK test cable 2 pin for STR trip unit	34560
	FFTK test cable 7 pin for Micrologic trip unit	33590



NW08 to NW50 circuit breakers with neutral on the right

Circuit breakers

A 4 pole Masterpact circuit breaker with neutral on the right is described by the same catalogue numbers as a standard 4 pole one, except for the basic circuit breaker and chassis, which are specific.

Basic fixed circuit breaker with neutral on the right

Type H

	Frame rating	Interrupting current (KAIR RMS for U = 480 V)	4P
NW08	800	100	64695
NW12	1200	100	64697
NW16	1600	100	64698
NW20	2000	100	64699
NW25	2500	100	64700
NW30	3000	100	64701
NW40	4000	100	64702
NW50	5000	100	64703

Basic drawout circuit breaker with neutral on the right

Type H

	Frame rating	Interrupting current (KAIR RMS for U = 480 V)	4P
NW08	800	100	64704
NW12	1200	100	64706
NW16	1600	100	64707
NW20	2000	100	64708
NW25	2500	100	64709
NW30	3000	100	64710
NW40	4000	100	64711
NW50	5000	100	64712

Chassis with neutral on the right

Type H

	4P
NW08	64728
NW12	64732
NW16	64734
NW20	64736
NW25	64738
NW30	64740
NW40	64742
NW50	64744



NW08 to NW50

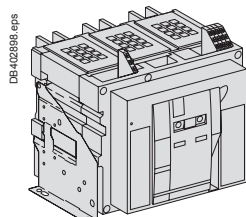
switch-disconnectors

Switch-disconnectors

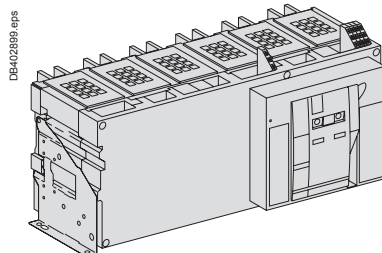
A Masterpact fixed switch-disconnector is described by 3 catalogue numbers corresponding to:

- the basic switch-disconnector
- a top connection see page F-15
- a bottom connection see page F-15.

A communication option and various auxiliaries and accessories may also be added.



Basic switch-disconnector ≤ 3000 A.

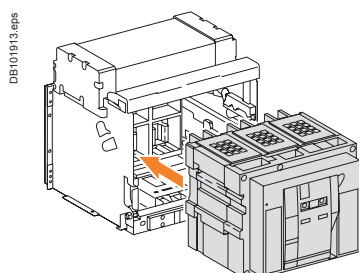


Basic switch-disconnector > 3000 A.

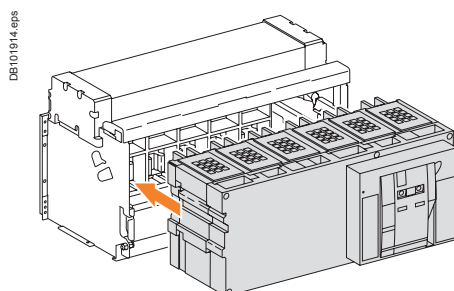
A Masterpact drawout switch-disconnector is described by 4 catalogue numbers corresponding to:

- the basic switch-disconnector
- a chassis
- a top connection see page F-19
- a bottom connection see page F-19.

A communication option and various auxiliaries and accessories may also be added.



Basic switch-disconnector + chassis ≤ 3000 A.



Basic switch-disconnector + chassis > 3000 A.

Basic fixed switch-disconnector

Type HF

			3P	4P
	Frame rating	Interrupting current (KAIR RMS for U = 480 V)		
NW08	800	100	64755	64756
NW12	1200	100	64757	64758
NW16	1600	100	64759	64760
NW20	2000	100	64761	64762
NW25	2500	100	64763	64764
NW30	3000	100	64765	64766
NW40	4000	100	64767	64768
NW50	5000	100	64769	64770

Communication option

	Switch-disconnector (BCM-ULP)
COM (BCM ULP)	48188
Eco COM module (BCM-ULP)	33843
IFE Ethernet interface for LV breaker	LV434010
IFE Ethernet interface for LV breakers and gateway	LV434011
IFM Modbus-SL interface module	TRV00210
I/O application module	LV434063

Basic drawout switch-disconnector

Type HF

			3P	4P
	Frame rating	Interrupting current (KAIR RMS for U = 480 V)		
NW08	800	100	64771	64772
NW12	1200	100	64773	64774
NW16	1600	100	64775	64776
NW20	2000	100	64777	64778
NW25	2500	100	64779	64780
NW30	3000	100	64781	64782
NW40	4000	100	64783	64784
NW50	5000	100	64785	64786

Chassis

Type H/HF

	3P	4P
NW08	64727	64728
NW12	64731	64732
NW16	64733	64734
NW20	64735	64736
NW25	64737	64738
NW30	64739	64740
NW40	64741	64742
NW50	64743	64744

Communication option

	Chassis (I/O application module)	Switch-disconnector (BCM-ULP)
COM (BCM-ULP)	33852	48384
Eco COM module (BCM-ULP)	-	33843
IFE Ethernet interface for LV breaker	LV434010	
IFE Ethernet interface for LV breakers and gateway	LV434011	
IFM Modbus-SL interface module	TRV00210	
I/O application module	LV434063	



Masterpact NT or NW

Circuit breaker and automatic switch

Name of customer:

Address for delivery:

Requested delivery date:

Customer order no.:

To indicate your choices, check the applicable square boxes ☐and enter the appropriate information in the rectangles. ☐

Circuit breaker or automatic switch		Quantity
Masterpact type	NT ☐ NW ☐	
Rating	A ☐	
Sensor rating	A ☐	
Circuit breaker	NT: N, L1 ☐	
	NW: N, H ☐	
Automatic switch	HF ☐	
Number of poles	3 or 4 ☐	
Brand	Schneider Electric ☐ Square D ☐	
Option: neutral on right side (NW only)	☐	
Type of equipment	Fixed ☐	
	Drawout with chassis ☐	
	Drawout without chassis (moving part only) ☐	
	Chassis alone ☐	

Micrologic control unit			
A - ammeter	3.0 ☐	5.0 ☐	6.0 ☐
E - energy	2.0 ☐	5.0 ☐	6.0 ☐
P - power meter	☐	5.0 ☐	6.0 ☐
H - harmonic meter	☐	5.0 ☐	6.0 ☐
LR - long-time rating plug	Standard 0.4 to 1 Ir ☐		
Plug: B, C, D, E, F, G, H	☐		
AD - external power-supply module	V ☐		
BAT - battery module	☐		
TCE - external sensor (CT) for neutral and residual ground-fault protection	☐		
TCW - external sensor for SGR protection	☐		
PTE - external voltage connector	☐		

Communication			
COM module			
Device (BCM-ULP)	with Ethernet interface ☐	Cradle management ☐	
	with Ethernet interface + Gateway ☐	with I/O application module (Chassis) ☐	
	with Modbus interface ☐		

Eco COM module			
Device (BCM-ULP)	with Ethernet interface ☐		
	with Ethernet interface + Gateway ☐		
	with Modbus interface ☐		
Front Display Module (FDM121)		Mounting accessory ☐	
Breaker ULP Cord	L=0.35 m ☐		
	L=1.3 m ☐		
	L=3 m ☐		

Connection			
Horizontal	Top ☐	Bottom ☐	
Vertical	Top ☐	Bottom ☐	
Front (NT only)	Top ☐	Bottom ☐	

(*) For drawout devices, please order 1 Modbus chassis Com module.

Indication contacts

OF - ON/OFF indication contacts

Standard	4 OF 6 A-240 V AC (10 A-240 V AC and low-level for NW)		
Alternate	1 OF low-level for NT	Max. 4	qty ☐
Additional	1 block of 4 OF for NW	Max. 2	qty ☐

EF - combined "connected/closed" contacts

	1 EF 6 A-240 V AC for NW	Max. 8	qty ☐
	1 EF low-level for NW	Max. 8	qty ☐

SDE - "fault-trip" indication contact

Standard	1 SDE 6 A-240 V AC		
Additional	1 SDE 6 A-240 V AC ☐	1 SDE low level ☐	

Programmable contacts

2 M2C contacts ☐	6 M6C contacts ☐
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Carriage switches

Low level ☐	6 A-240 V AC ☐
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CE - "connected" position Max. 3 for NW/NT qty ☐

CD - "disconnected" position Max. 3 for NW - 2 for NT qty ☐

CT - "test" position Max. 3 for NW - 1 for NT qty ☐

AC - NW actuator for 6 CE - 3 CD - 0 CT additional carriage switches qty ☐

Remote operation

Remote ON/OFF	MCH - gear motor	V ☐
	XF - closing voltage release	V ☐
	MX - opening voltage release	V ☐
	PF - "ready to close" contact	Low level ☐
		6 A-240 V AC ☐
	BPFE - electrical closing pushbutton	☐
	RES - electrical reset option	V ☐
Remote tripping	MN - undervoltage release	V ☐
	R - delay unit (non-adjustable)	☐
	Rr - adjustable delay unit	☐
	2 nd MX - shunt release	V ☐

Locking

VBP - ON/OFF pushbutton locking (by transparent cover + padlocks)

OFF position locking:

VCPO - by padlocks

VSPO - by keylocks: Keylock kit (without keylock) Profalux ☐ Ronis ☐

Kirk ☐ Castell ☐

1 keylock Profalux ☐ Ronis ☐

2 identical keylocks, 1 key Profalux ☐ Ronis ☐

2 keylocks, different keys Profalux ☐ Ronis ☐

Chassis locking in "disconnected" position:

VSPD - by keylocks: Keylock kit (without keylock) Profalux ☐ Ronis ☐

Kirk ☐ Castell ☐

1 keylock Profalux ☐ Ronis ☐

1 keylock Profalux ☐ Ronis ☐

2 keylocks, different keys Profalux ☐ Ronis ☐

Optional connected/disconnected/test position lock ☐

VPEC - door interlock On right-hand side chassis ☐

On left-hand side chassis ☐

VPOC - racking interlock ☐

IPA - cable-type door interlock ☐

VDC - mismatch protection (standard) ☐

IBPO - racking interlock between crank and OFF pushbutton for NW (standard) ☐

DAE - automatic spring discharge before breaker removal for NW (standard) ☐

Accessories

VO - safety shutters on chassis for NT and NW (standard) ☒

CDM - mechanical operation counter NT, NW ☐

CB - auxiliary terminal shield for chassis NT, NW ☐

CDP - escutcheon NT, NW ☐

CP - transparent cover for escutcheon NT, NW ☐

OP - blanking plate for escutcheon NT, NW ☐

Brackets for mounting NW fixed ☐ On backplates ☐

Test kits Mini test kit ☐ Portable test kit ☐

IV - shutter position indicator for NW ☐

VV - shutter-locking system for NW ☐

Micrologic control unit functions:

2.0: basic protection (only for Micrologic E)

3.0: basic protection LI

5.0: selective protection (long time + short time + inst.)

6.0: selective + ground-fault protection

(long time + short time + inst. + ground-fault)

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