Functions and characteristics

General overview
Detailed contents

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.

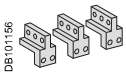
PB100762-60

DB101123

DB101124

PB100763-56

DB101156



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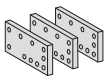

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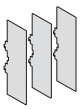

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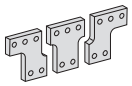


General overview
Detailed contents


PB100764-56


DB100766-56


DB100765-56

Circuit breakers and switch-disconnectors
NT06 to NT16 and NW08 to NW63

NT and NW selection criteria

	Masterpact NT				Masterpact NW	
	Standard applications			Special applications	Standard applications	
	NT630-1600 H1	NT630-1600 H2	NT630-1000 L1	NT630-1600 H10	NW800-1600 N1	NW800-4000 H1
Type of application	Standard applications with low short-circuit currents	Applications with medium-level short-circuit currents	Limiting circuit breaker for protection of cable-type feeders or upgraded transformer ratings	1000 V systems, e.g. mines and wind power	Standard applications with low short-circuit currents	Circuit breaker for industrial sites with high short-circuit currents
Icu/Ics at 440 V	42 kA	50 kA	130 kA	-	42 kA	65 kA
Icu/Ics at 1000 V	-	-	-	20 kA	-	-
Icu/Ics at 500 V DC L/R < 15 ms	-	-	-	-	-	-
Position of neutral	Left	Left	Left	Left	Left	Left or right
Fixed	F	F	F	F	F	F
Drawout	D	D	D	D	D	D
Switch-disconnector version	Yes	No	No	Yes	Yes	Yes
Front connection	Yes	Yes	Yes	Yes	Yes	Yes up to 3200 A
Rear connection	Yes	Yes	Yes	Yes	Yes	Yes
Type of Micrologic control unit	A, P, H	A, P, H	A, P, H	A, consult us for P and H	A, P, H	A, P, H

Masterpact NT06 to NT16 installation characteristics

Circuit breaker		NT06, NT08, NT10				NT12, NT16		
Type		H1	H2	L1	H10	H1	H2	H10
Connection								
Drawout	FC	■	■	■	■	■	■	■
	RC	■	■	■	■	■	■	■
Fixed	FC	■	■	■	■	■	■	■
	RC	■	■	■	■	■	■	■
Dimensions (mm) H x W x D								
Drawout	3P	322 x 288 x 277						
	4P	322 x 358 x 277						
Fixed	3P	301 x 276 x 196						
	4P	301 x 346 x 196						
Weight (kg) (approximate)								
Drawout	3P/4P	30/39						
Fixed	3P/4P	14/18						

Masterpact NW08 to NW63 installation characteristics

Circuit breaker		NW08, NW10, NW12, NW16					NW20				
Type		N1	H1	H2	L1	H10	H1	H2	H3	L1	H10
Connection											
Drawout	FC	■	■	■	■	-	■	■	■	■	-
	RC	■	■	■	■	■	■	■	■	■	■
Fixed	FC	■	■	■	-	-	■	■	-	-	-
	RC	■	■	■	-	-	■	■	-	-	-
Dimensions (mm) H x W x D											
Drawout	3P	439 x 441 x 395									
	4P	439 x 556 x 395									
Fixed	3P	352 x 442 x 297									
	4P	352 x 537 x 297									
Weight (kg) (approximate)											
Drawout	3P/4P	90/120									
Fixed	3P/4P	60/80									

(1) *Except 4000 A.*

				Special applications				
	NW800-4000 H2	**NW2000-4000 H3**	**NW800-2000 L1**	**NW H10**	**NW H2 with anti-corrosion protection**	**NW1000-4000 DC N**	**NW1000-4000 DC H**	**NW earthing switch**
	High-performance circuit breaker for heavy industry with high short-circuit currents	Incoming device with very high performance for critical applications	Limiting circuit breaker for protection of cable-type feeders or upgraded transformer ratings	1000 V systems, e.g. mines and wind power	Environments with high sulphur contents	DC system	DC system	Installation earthing
	100 kA	150 kA	150 kA	-	100 kA	-	-	-
	-	-	-	50 kA	-	-	-	-
	-	-	-	-	-	35 kA	85 kA	-
	Left or right	Left	Left	Left	Left or right	-	-	-
	F	-	-	-	-	F	F	-
	D	D	D	D	D	D	D	D
	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Yes up to 3200 A	Yes up to 3200 A	Yes up to 3200 A	No	Yes up to 3200 A	No	No	Yes up to 3200 A
	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	A, P, H	A, P, H	A, P, H	A, consult us for P and H	A, P, H	DC Micrologic	DC Micrologic	-

	NW25, NW32, NW40				**NW40b, NW50, NW63**	
	H1	**H2**	**H3**	**H10**	**H1**	**H2**
	■ (1)	■ (1)	■ (1)	-	-	-
	■	■	■	■	■	■
	■ (1)	■ (1)	-	-	-	-
	■	■	-	-	■	■
					479 x 786 x 395	
					479 x 1016 x 395	
					352 x 767 x 297	
					352 x 997 x 297	
					225/300	
					120/160	

Circuit breakers and switch-disconnectors
NT06 to NT16

PB100767-46

Common characteristics

Number of poles		3/4
Rated insulation voltage (V)	**Ui**	1000
Impulse withstand voltage (kV)	**Uimp**	12
Rated operational voltage (V AC 50/60 Hz)	**Ue**	690/1000
Suitability for isolation	IEC 60947-2	
Degree of pollution	IEC 60664-1	3

Circuit-breaker characteristics as per IEC 60947-2

Rated current (A)	**In**	at 40 °C/50 °C (1)
Rating of 4th pole (A)		
Sensor ratings (A)		
Type of circuit breaker		
Ultimate breaking capacity (kA rms)	**Icu**	220/415 V
V AC 50/60 Hz		440 V
		525 V
		690 V
		1000 V
Rated service breaking capacity (kA rms)	**Ics**	% Icu
Utilisation category		
Rated short-time withstand current (kA rms)	**Icw**	0.5 s
V AC 50/60 Hz		1 s
		3 s
Integrated instantaneous protection (kA peak ±10 %)		
Rated making capacity (kA peak)	**Icm**	220/415 V
V AC 50/60 Hz		440 V
		525 V
		690 V
		1000 V
Break time (ms) between tripping order and arc extinction		
Closing time (ms)		

Circuit-breaker characteristics as per NEMA AB1

Breaking capacity (kA)	240 V
V AC 50/60 Hz	480 V
	600 V

Switch-disconnector characteristics as per IEC 60947-3 and Annex A

Type of switch-disconnector		
Rated making capacity (kA peak)	**Icm**	220 V
AC23A/AC3 category V AC 50/60 Hz		440 V
		525/690 V
		1000 V
Rated short-time withstand current (kA rms)	**Icw**	0.5 s
AC23A/AC3 category V AC 50/60 Hz		1 s
		3 s
Ultimate breaking capacity Icu (kA rms) with an external protection relay Maximum time delay: 350 ms		690 V

Mechanical and electrical durability as per IEC 60947-2/3 at In/Ie

Service life	Mechanical	with maintenance		
C/O cycles x 1000		without maintenance		
Type of circuit breaker **Rated current**			**In (A)**	
C/O cycles x 1000	Electrical	without maintenance		440 V (4)
IEC 60947-2				690 V
				1000 V
Type of circuit breaker or switch-disconnector **Rated operationnal current**			**Ie (A)**	**AC23A**
C/O cycles x 1000	Electrical	without maintenance		440 V (4)
IEC 60947-3				690V
Type of circuit breaker or switch-disconnector **Rated operationnal current**			**Ie (A)**	**AC3 (5)**
Motor power				380/415 V (kW)
				440 V (kW)
C/O cycles x 1000	Electrical	without maintenance		440 V (4)
IEC 60947-3 Annex M/IEC 60947-4-1				690 V

(1) 50 °C: rear vertical connected. Refer to temperature derating tables for other connection types.
(2) See the current-limiting curves in the "additional characteristics" section.
(3) SELLIM system.
(4) Available for 480 V NEMA.
(5) Suitable for motor control (direct-on-line starting).

Sensor selection

Sensor rating (A)	250 (1)	400	630	800	1000	1250	1600
Ir thresold setting(A)	100 to 250	160 to 400	250 to 630	320 to 800	400 to 1000	500 to 1250	640 to 1600

***(1)** For NT02 rating, please consult us.*

	NT06				NT08	NT10	NT12			NT16
	630				800	1000	1250			1600
	630				800	1000	1250			1600
	400 to 630				400 to 800	400 to 1000	630 to 1250			800 to 1600
	H1	**H2**	**L1 (2)**	**H10**			**H1**	**H2**	**H10**	
	42	50	150	-			42	50	-	
	42	50	130	-			42	50	-	
	42	42	100	-			42	42	-	
	42	42	25	-			42	42	-	
	-	-	-	20			-	-	20	
	100 %						100 %			
	B	B	A	B			B	B	B	
	42	36	10	20			42	36	20	
	42	36	-	20			-	36	20	
	24	20	-	-			24	20	-	
	-	90	10 x In (3)	-			-	90	-	
	88	105	330	-			88	105	-	
	88	105	286	-			88	105	-	
	88	88	220	-			88	88	-	
	88	88	52	-			88	88	-	
	-	-	-	42			-	-	42	
	25	25	9	-			25	25	-	
	< 50						< 50			
	42	50	150	-			42	50	-	
	42	50	100	-			42	50	-	
	42	42	25	-			42	42	-	
	HA	**HA10**					**HA**	**HA10**		
	75	-					75	-		
	75	-					75	-		
	75	-					75	-		
	-	42					-	42		
	36	20					36	20		
	36	20					36	20		
	20	20					20	20		
	36						36			
	25									
	12.5									

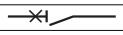
	H1	**H2**	**L1**	**H10**	**H1**	**H2**	**L1**	**H10**	**H1**	**H2**	**L1**	**H10**	**H1**	**H2**	**H10**	**H10**	**H1**	**H2**
	630				**800**				**1000**				**1250**			**1600**		
	6	6	3	-	6	6	3	-	6	6	3	-	6	6	-	-	6	6
	3	3	2	-	3	3	2	-	3	3	2	-	3	3	-	-	3	3
	-	-	-	0.5	-	-	-	0.5	-	-	-	0.5	-	-	0.5	0.5	-	-
	H1/H2/HA																	
	630				**800**				**1000**				**1250**			**1600**		
	6				6				6				6			6		
	3				3				3				3			3		
	H1/H2/HA																	
	500				**630**				**800**				**1000**			**1000**		
	⩽ 250				250 to 335				335 to 450				450 to 560			450 to 560		
	⩽ 300				300 to 400				400 to 500				500 to 630			500 to 630		
	6																	
	-																	

Circuit breakers and switch-disconnectors
NW08 to NW63

PB100768-36

PB100769-70

Common characteristics

Number of poles		3/4
Rated insulation voltage (V)	**Ui**	1000/1250
Impulse withstand voltage (kV)	**Uimp**	12
Rated operational voltage (V AC 50/60 Hz)	**Ue**	690/1150
Suitability for isolation	IEC 60947-2	
Degree of pollution	IEC 60664-1	4 (1000 V) / 3 (1250 V)

Circuit-breaker characteristics as per IEC 60947-2

Rated current (A)		at 40 °C / 50 °C (1)
Rating of 4th pole (A)		
Sensor ratings (A)		
Type of circuit breaker		
Ultimate breaking capacity (kA rms) V AC 50/60 Hz	**Icu**	220/415/440 V 525 V 690 V 1150 V
Rated service breaking capacity (kA rms)	**Ics**	% Icu
Utilisation category		
Rated short-time withstand current (kA rms) V AC 50/60 Hz	**Icw**	1 s 3 s
Integrated instantaneous protection (kA peak ±10 %)		
Rated making capacity (kA peak) V AC 50/60 Hz	**Icm**	220/415/440 V 525 V 690 V 1150 V
Break time (ms) between tripping order and arc extinction		
Closing time (ms)		

Circuit-breaker characteristics as per NEMA AB1

Breaking capacity (kA) V AC 50/60 Hz		240/480 V 600 V

Unprotected circuit-breaker characteristics:

Tripping by shunt trip as per IEC 60947-2

Type of circuit breaker		
Ultimate breaking capacity (kA rms) V AC 50/60 Hz	**Icu**	220...690 V
Rated service breaking capacity (kA rms)	**Ics**	% Icu
Rated short-time withstand current (kA rms)	**Icw**	1 s 3 s
Overload and short-circuit protection with external protection relay: short-circuit protection, maximum delay: 350 ms (4)		
Rated making capacity (kA peak) V AC 50/60 Hz	**Icm**	220...690 V

Switch-disconnector characteristics as per IEC 60947-3 and Annex A

Type of switch-disconnector		
Rated making capacity (kA peak) **AC23A/AC3 category** V AC 50/60 Hz	**Icm**	220...690 V 1150 V
Rated short-time withstand current (kA rms) **AC23A/AC3 category** V AC 50/60 Hz	**Icw**	0.5 s 1 s 3 s

Mechanical and electrical durability as per IEC 60947-2/3 at In/Ie

Service life	Mechanical	with maintenance		
C/O cycles x 1000		without maintenance		
Type of circuit breaker **Rated current**			**In (A)**	
C/O cycles x 1000 IEC 60947-2	Electrical	without maintenance		440 V (5) 690 V 1150 V
Type of circuit breaker or switch-disconnector **Rated operational current**			**Ie (A)**	**AC23A**
C/O cycles x 1000 IEC 60947-3	Electrical	without maintenance		440 V (5) 690 V
Type of circuit breaker or switch-disconnector **Rated operational current**			**Ie (A)**	**AC3 (6)**
Motor power				380/415 V (kW) 440 V (5) (kW) 690 V (kW)
C/O cycles x 1000 IEC 60947-3 Annex M/IEC 60947-4-1	Electrical	without maintenance		440/690 V (5)

(1) 50 °C: rear vertical connected. Refer to temperature derating tables for other connection types.
(2) See the current-limiting curves in the "additional characteristics" section.
(3) Equipped with a trip unit with a making current of 90 kA peak.
(4) External protection must comply with permissible thermal constraints of the circuit breaker (please consult us). No fault-trip indication by the SDE or the reset button.
(5) Available for 480 V NEMA.
(6) Suitable for motor control (direct-on-line starting).

Circuit breakers and switch-disconnectors
NW08 to NW63

Sensor selection

Sensor rating (A)	250 (1)	400	630	800	1000	1250	1600	2000	2500	3200	4000	5000	6300
Ir thresold setting(A)	100 to 250	160 to 400	250 to 630	320 to 800	400 to 1000	500 to 1250	630 to 1600	800 to 2000	1000 to 2500	1250 to 3200	1600 to 4000	2000 to 5000	2500 to 6300

(1) *For NW02 rating, please consult us.*

	NW08	NW10	NW12	NW16		NW20					NW25	NW32	NW40		NW40b	NW50	NW63
	800	1000	1250	1600		2000					2500	3200	4000		4000	5000	6300
	800	1000	1250	1600		2000					2500	3200	4000		4000	5000	6300
	400 to 800	400 to 1000	630 to 1250	800 to 1600		1000 to 2000					1250 to 2500	1600 to 3200	2000 to 4000		2000 to 4000	2500 to 5000	3200 to 6300
	N1	**H1**	**H2**	**L1 (2)**	**H10**	**H1**	**H2**	**H3**	**L1 (2)**	**H10**	**H1**	**H2**	**H3**	**H10**	**H1**	**H2**	
	42	65	100	150	-	65	100	150	150	-	65	100	150	-	100	150	
	42	65	85	130	-	65	85	130	130	-	65	85	130	-	100	130	
	42	65	85	100	-	65	85	100	100	-	65	85	100	-	100	100	
	-	-	-	-	50	-	-	-	-	50	-	-	-	50	-	-	
	100 %					100 %					100 %				100 %		
	B					B					B				B		
	42	65	85	30	50	65	85	65	30	50	65	85	65	50	100	100	
	22	36	50	30	50	36	75	65	30	50	65	75	65	50	100	100	
	Without	Without	190	80	Without	Without	190	150	80	Without	Without	190	150	Without	Without	270	
	88	143	220	330	-	143	220	330	330	-	143	220	330	-	220	330	
	88	143	187	286	-	143	187	286	286	-	143	187	286	-	220	286	
	88	143	187	220	-	143	187	220	220	-	143	187	220	-	220	220	
	-	-	-	-	105	-	-	-	-	105	-	-	-	105	-	-	
	25	25	25	10	25	25	25	25	10	25	25	25	25	25	25	25	
	< 70					< 70					< 70				< 80		
	42	65	100	150	-	65	100	150	150	-	65	100	150	-	100	150	
	42	65	85	100	-	65	85	100	100	-	65	85	100	-	100	100	
		HA	**HF (3)**			**HA**	**HF (3)**				**HA**	**HF (3)**			**HA**		
		50	85			50	85				55	85			85		
	100 %					100 %					100 %				100 %		
		50	85			50	85				55	85			85		
		36	50			36	75				55	75			85		
		Without	Without			Without	Without				Without	Without			Without		
		105	187			105	187				121	187			187		

	NW08/NW10/NW12				NW16			NW20			NW25/NW32/NW40			NW40b/NW50/NW63	
	NA	**HA**	**HF**	**HA10**	**HA**	**HF**	**HA10**	**HA**	**HF**	**HA10**	**HA**	**HF**	**HA10**	**HA**	
	88	105	187	-	105	187	-	105	187	-	121	187	-	187	
	-	-	-	105	-	-	105	-	-	105	-	-	105	-	
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	42	50	85	50	50	85	50	50	85	50	55	85	50	85	
	-	36	50	50	50	50	50	50	50	50	55	75	50	85	
	25							20						10	
	12.5							10						5	
	N1/H1/H2	**L1**	**H10**					**H1/H2**	**L1**	**H10**	**H1/H2**	**H3**	**H10**	**H1**	**H2**
	800/1000/1250/1600							**2000**			**2500/3200/4000**			**4000b/5000/6300**	
	10	3	-					8	3	-	5	1.25	-	1.5	1.5
	10	3	-					6	3	-	2.5	1.25	-	1.5	1.5
	-	-	0.5					-	-	0.5	-	-	0.5	-	-
	H1/H2/NA/HA/HF							**H1/H2/H3/HA/HF**						**H1/H2/HA**	
	800/1000/1250/1600							**2000**			**2500/3200/4000**			**4000b/5000/6300**	
	10							8			5			1.5	
	10							6			2.5			1.5	
	H1/H2/HA/HF							**H1/H2/H3/HA/HF**							
	800	**1000**	**1250**		**1600**			**2000**							
	335 to 450	450 to 560	560 to 670		670 to 900			900 to 1150							
	400 to 500	500 to 630	500 to 800		800 to 1000			1000 to 1300							
	⩽ 800	800 to 1000	1000 to 1250		1250 to 1600			1600 to 2000							
	6														

Micrologic control units
Overview of functions

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, P and H control units, advanced functions are managed by an independent microprocessor.

Micrologic name codes

2.0 A
X Y Z

X: type of protection
- 2 for basic protection
- 5 for selective protection
- 6 for selective + earth-fault protection
- 7 for selective + earth-leakage protection.

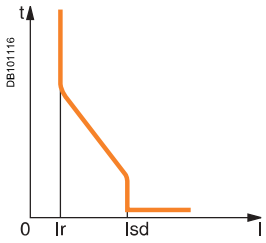
Y: control-unit generation
Identification of the control-unit generation.
"0" signifies the first generation.

Z: type of measurement
- A for "ammeter"
- P for "power meter"
- H for "harmonic meter".


PB100772-32

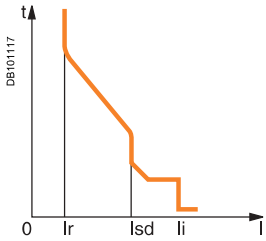
Current protection

Micrologic 2: basic protection



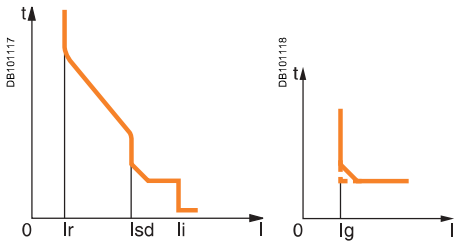
Protection:
long time
+ instantaneous

Micrologic 5: basic protection



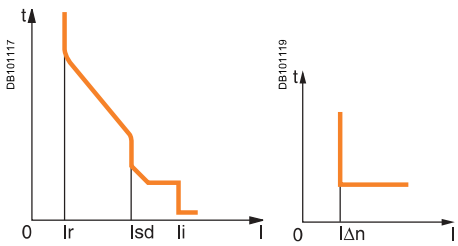
Protection:
long time
+ short time
+ instantaneous

Micrologic 6: selective + earth-fault protection



Protection:
long time
+ short time
+ instantaneous
+ earth fault

Micrologic 7: selective + earth-leakage protection



Protection:
long time
+ short time
+ instantaneous
+ earth leakage

Measurements and programmable protection

A: ammeter

- I_1, I_2, I_3, I_N, $I_{earth-fault}$, $I_{earth-leakage}$ and maximeter for these measurements
- fault indications
- settings in amperes and in seconds.

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 A

5.0 A

5.0 P

5.0 H

6.0 A

6.0 P

6.0 H

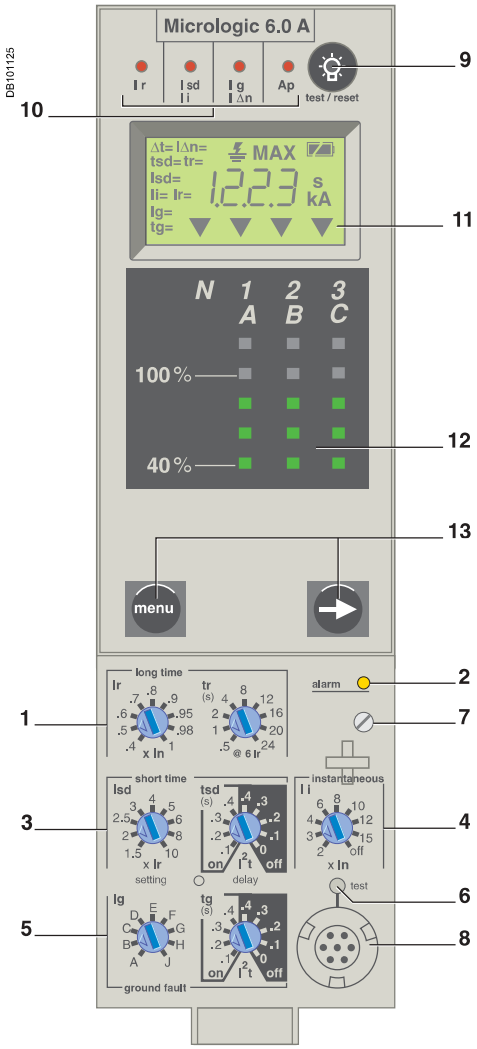
7.0 A

7.0 P

7.0 H

Micrologic control units
Micrologic A "ammeter"

Micrologic A control units protect power circuits.
They also offer measurements, display, communication and current maximeters.
Version 6 provides earth-fault protection, version 7 provides earth-leakage protection.



1 *Long-time current setting and tripping delay.*
2 *Overload signal (LED) at 1.125 Ir.*
3 *Short-time pick-up and tripping delay.*
4 *Instantaneous pick-up.*
5 *Earth-leakage or earth-fault pick-up and tripping delay.*
6 *Earth-leakage or 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.*

Protection settings

Protection thresholds and delays are set using the adjustment dials.
The selected values are momentarily displayed in amperes and in seconds.

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.
The long-time rating plug "OFF" enables to cancel the overload protection.

Short-circuit protection
Short-time (rms) and instantaneous protection.
Selection of I^2t type (ON or OFF) for short-time delay.

Earth fault protection
Residual or source ground return.
Selection of I^2t type (ON or OFF) for delay.

Residual earth-leakage protection (Vigi).
Operation without an external power supply.
Protected against nuisance tripping.
DC-component withstand class A up to 10 A.

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 In (4P 3d + N/2), neutral protection at In (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.

"Ammeter" measurements

Micrologic A control units measure the true rms value of currents.
They provide continuous current measurements from 0.2 to 20 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 I_1, I_2, I_3, I_N, I_g, $I_{\Delta n}$, 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 0.05 In, measurements are not significant. Between 0.05 and 0.2 In, accuracy is to within 0.5% In + 1.5% of the reading.

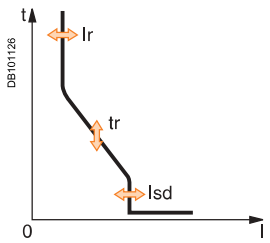
Communication option

In conjunction with the COM communication option, the control unit transmits the following:
- setting values
- all "ammeter" measurements
- tripping causes
- maximeter reset.

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

Protection — Micrologic 2.0 A

Long time											
Current setting (A)	**Ir** = In x …		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 Ir			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 Ir	12.5	25	50	100	200	300	400	500	600
	Accuracy: 0 to -20 %	6 x Ir	0.7(1)	1	2	4	8	12	16	20	24
	Accuracy: 0 to -20 %	7.2 x Ir	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)	**Isd** = Ir x …		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								

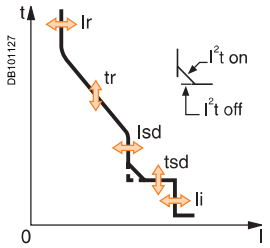


Ammeter — Micrologic 2.0 A

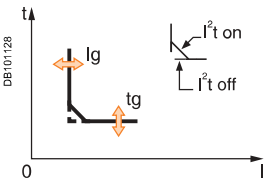
Continuous current measurements						
Display from 20 to 200 % of In		I1	I2	I3	IN	
Accuracy: 1.5 % (including sensors)		No auxiliary source (where I > 20 % In)				
Maximeters		I1 max	I2 max	I3 max	IN max	

Protection — Micrologic 5.0 / 6.0 / 7.0 A

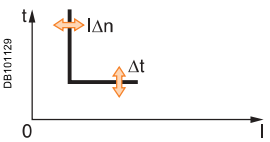
Long time			**Micrologic 5.0 / 6.0 / 7.0 A**								
Current setting (A)	**Ir** = In x …		0.4	0.5	0.6	0.7	0.8	0.9	0.95	0.98	1
Tripping between 1.05 and 1.20 x Ir			Other ranges or disable by changing long-time rating plug								
Time setting		**tr (s)**	0.5	1	2	4	8	12	16	20	24
Time delay (s)	Accuracy: 0 to -30 %	1.5 x Ir	12.5	25	50	100	200	300	400	500	600
	Accuracy: 0 to -20 %	6 x Ir	0.7(1)	1	2	4	8	12	16	20	24
	Accuracy: 0 to -20 %	7.2 x Ir	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)	**Isd** = Ir x …		1.5	2	2.5	3	4	5	6	8	10
Accuracy: ±10 %											
Time setting tsd (s)	Settings	I²t Off	0	0.1	0.2	0.3	0.4				
		I²t On	-	0.1	0.2	0.3	0.4				
Time delay (ms) at 10 x Ir	**tsd** (max resettable time)		20	80	140	230	350				
(I²t Off or I²t On)	**tsd** (max break time)		80	140	200	320	500				
Instantaneous											
Pick-up (A)	**Ii** = In x …		2	3	4	6	8	10	12	15	off
Accuracy: ±10 %											
Time delay			Max resettable time: 20 ms Max break time: 80 ms								



Earth fault			**Micrologic 6.0 A**								
Pick-up (A)	**Ig** = In x …		A	B	C	D	E	F	G	H	J
Accuracy: ±10 %	In ⩽ 400 A		0.3	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1
	400 A < In < 1250 A		0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1
	In ⩾ 1250 A		500	640	720	800	880	960	1040	1120	1200
Time setting tg (s)	Settings	I²t Off	0	0.1	0.2	0.3	0.4				
		I²t On	-	0.1	0.2	0.3	0.4				
Time delay (ms)	**tg** (max resettable time)		20	80	140	230	350				
at In or 1200 A (I²t Off or I²t On)	**tg** (max break time)		80	140	200	320	500				



Residual earth leakage (Vigi)			**Micrologic 7.0 A**								
Sensitivity (A)	**IΔn**		0.5	1	2	3	5	7	10	20	30
Accuracy: 0 to -20 %											
Time delay Δt (ms)	Settings		60	140	230	350	800				
	Δt (max resettable time)		60	140	230	350	800				
	Δt (max break time)		140	200	320	500	1000				



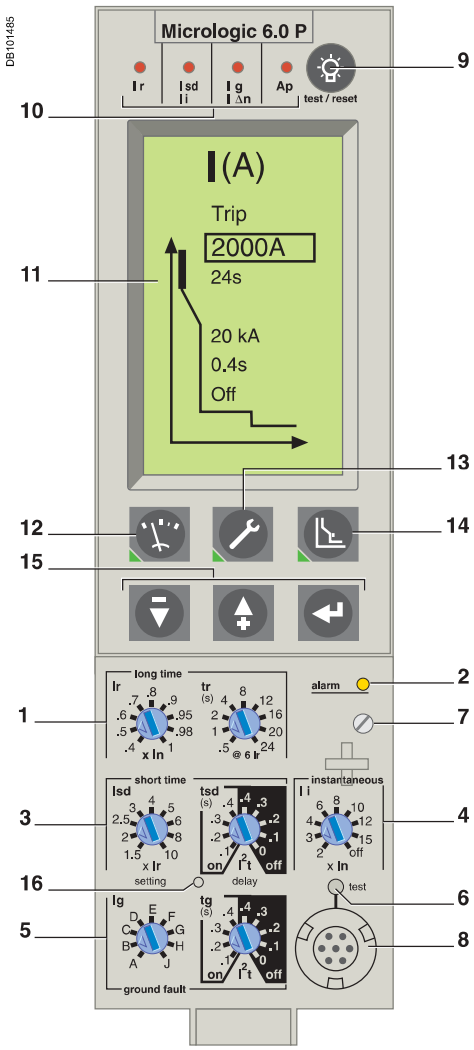
Ammeter — Micrologic 5.0 / 6.0 / 7.0 A

Continuous current measurements							
Display from 20 to 200 % of In		I1	I2	I3	IN	Ig	IΔn
Accuracy: 1.5 % (including sensors)		No auxiliary source (where I > 20 % In)					
Maximeters		I1 max	I2 max	I3 max	IN max	Ig max	IΔn max

***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 control units
Micrologic P "power"

Micrologic P control units include all the functions offered by Micrologic A. In addition, they measure voltages and calculate power and energy values. They also offer new protection functions based on currents, voltages, frequency and power reinforce load protection.



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 *Earth-leakage or earth-fault pick-up and tripping delay.*
6 *Earth-leakage or earth-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 settings ..... +
The adjustable protection functions are identical to those of Micrologic A (overloads, short-circuits, earth-fault and earth-leakage 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 In (4P 3d + N/2), neutral protection at In (4P 4d) and neutral protection at 1,6 In (4P 3d + 1,6N). Neutral protection at 1,6 In 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 In (4P 3d + N/2), neutral protection at In (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.

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 crest 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.

Histories and maintenance indicators.....
The last ten trips and alarms are recorded in two separate history files. Maintenance indications (contact wear, operation cycles, etc.) are recorded for local access.

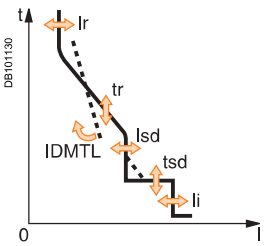
Indication option via programmable contacts
The M2C (two contacts) and M6C (six contacts) auxiliary contacts may be used to signal threshold overruns or status changes. They can be programmed using the keypad on the Micrologic P control unit or remotely using the COM option.

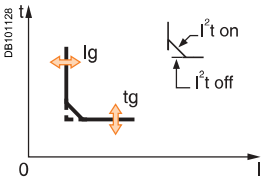
Communication option (COM)
The communication option may be used to:
- remotely read and set parameters for the protection functions
- transmit all the calculated indicators and measurements
- signal the causes of tripping and alarms
- consult the history files and the maintenance-indicator register.
- maximeter reset.

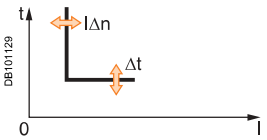
An event log and a maintenance register, stored in control-unit memory but not available locally, may be accessed in addition via the COM option.

Protection — Micrologic 5.0 / 6.0 / 7.0 P

Long time (rms)			**Micrologic 5.0 / 6.0 / 7.0 P**								
Current setting (A)	**Ir** = In x …		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 Ir			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 Ir	12.5	25	50	100	200	300	400	500	600
	Accuracy: 0 to -20 %	6 x Ir	0.7(1)	1	2	4	8	12	16	20	24
	Accuracy: 0 to -20 %	7.2 x Ir	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)	**Isd** = Ir x …		1.5	2	2.5	3	4	5	6	8	10
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 Ir	**tsd** (max resettable time)		20	80	140	230	350				
(I^2t Off or I^2t On)	**tsd** (max break time)		80	140	200	320	500				
Instantaneous											
Pick-up (A)	**Ii** = In x …		2	3	4	6	8	10	12	15	off
Accuracy: ±10 %											
Time delay			Max resettable time: 20 ms Max break time: 80 ms								
Earth fault			**Micrologic 6.0 P**								
Pick-up (A)	**Ig** = In x …		A	B	C	D	E	F	G	H	J
Accuracy: ±10 %	In ⩽ 400 A		0.3	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1
	400 A < In < 1250 A		0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1
	In ⩾ 1250 A		500	640	720	800	880	960	1040	1120	1200
Time setting tg (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)	**tg** (max resettable time)		20	80	140	230	350				
at In or 1200 A (I^2t Off or I^2t On)	**tg** (max break time)		80	140	200	320	500				
Residual earth leakage (Vigi)			**Micrologic 7.0 P**								
Sensitivity (A)	**IΔn**		0.5	1	2	3	5	7	10	20	30
Accuracy: 0 to -20 %											
Time delay Δt (ms)	Settings		60	140	230	350	800				
	Δt (max resettable time)		60	140	230	350	800				
	Δt (max break time)		140	200	320	500	1000				

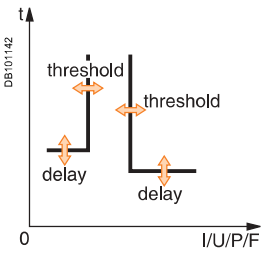






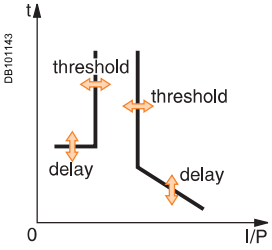
Alarms and other protection — Micrologic 5.0 / 6.0 / 7.0 P

Current		**Seuil**	**Temporisation**
Déséquilibre de courant	**Iunbalance**	0.05 to 0.6 Iaverage	1 to 40 s
Max. de courant moyen	**Imax demand** : I1, I2, I3, IN,	0.2 In to In	15 to 1500 s
Earth fault alarm			
	I⏚	20 A to 1200 A	1 to 10 s
Voltage			
Voltage unbalance	**Uunbalance**	2 to 30 % x Uaverage	1 to 40 s
Minimum voltage	**Umin**	100 to Umax between phases	1.2 to 5 s
Maximum voltage	**Umax**	Umin to 1200 between phases	1.2 to 5 s
Power			
Reverse power	**rP**	5 to 500 kW	0.2 to 20 s
Frequency			
Minimum frequency	**Fmin**	45 to Fmax	1.2 to 5 s
Maximum frequency	**Fmax**	Fmin to 440 Hz	1.2 to 5 s
Phase sequence			
Sequense (alarm)	**ΔØ**	Ø1/2/3 or Ø1/3/2	0.3 s



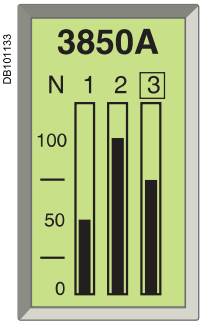
Load shedding and reconnection — Micrologic 5.0 / 6.0 / 7.0 P

Measured value		**Seuil**	**Temporisation**
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

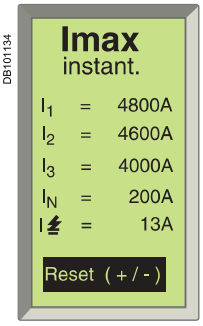


Note: *all current-based protection functions require no auxiliary source.*
Voltage-based protection functions are connected to AC power via a voltage measurement input built into the circuit breaker.

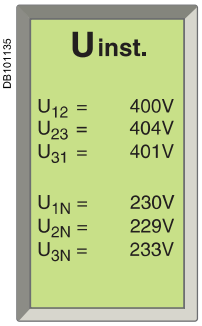
Micrologic control units
Micrologic P "power"



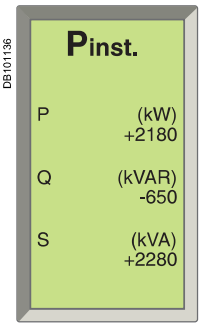
Default display.



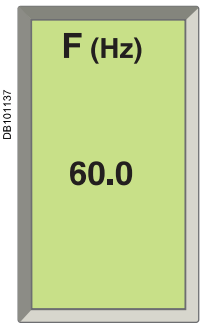
Display of a maximum current.



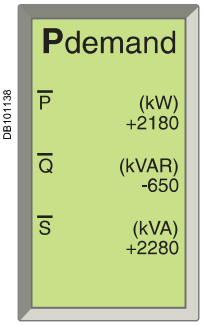
Display of a voltage.



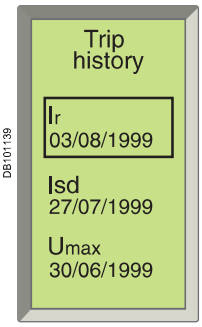
Display of a power.



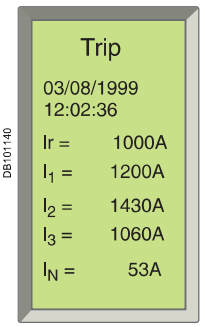
Display of a frequency.



Display of a demand power.



Display of a tripping history.



Display after tripping.

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.

Measurements

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	E-fault		E-leakage	
I max rms	A	1	2	3	N
	A	E-fault		E-leakage	
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	E-fault		E-leakage	
I max demand	A	1	2	3	N
	A	E-fault		E-leakage	
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.

Histories

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

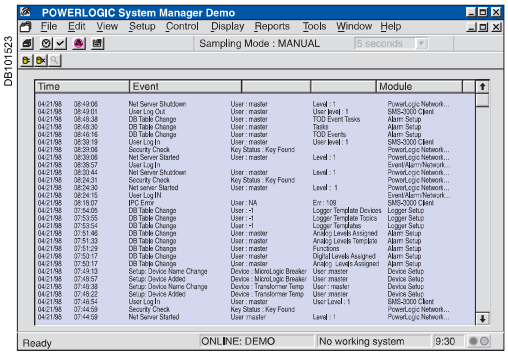
- ■ tripping history:
  - □ type of fault
  - □ date and time
  - □ values measured at the time of tripping (interrupted current, etc.)
- ■ alarm history:
  - □ type of alarm
  - □ date and time
  - □ values measured at the time of the alarm.

Maintenance indicators (with COM option)

A number of maintenance indicators may be called up on the screen:

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

Micrologic control units
Micrologic P "power"



DB101523

Display of an event log on a supervisor.

With the communication option

Additional measurements, maximeters and minimeters
Certain measured or calculated values are only accessible with the COM communication option:
- I peak / $\sqrt{2}$, $(I_1 + I_2 + I_3)/3$, I unbalance
- load level in % Ir
- total power factor.

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

Event log
All events are time stamped.
- trips
- beginning and end of alarms
- 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.

Maintenance register
Used as an aid in troubleshooting and to better plan for device maintenance operations.
- highest current measured
- operation counter
- number of test-kit connections
- number of trips in operating mode and in test mode
- contact-wear indicator.

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
- 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.)
- 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.

Accuracy of measurements (including sensors)
- voltage (V) 0.5 %
- current (A) 1.5 %
- frequency (Hz) 0.1 %
- power (W) and energy (Wh) 2 %.

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.

Micrologic control units
Micrologic H "harmonics"

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	E-fault		E-leakage	
I max rms	A	1	2	3	N
	A	E-fault		E-leakage	
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 Iharmonics	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	E-fault		E-leakage	
I max demand	A	1	2	3	N
	A	E-fault		E-leakage	
Power					
P, Q, S demand	W, Var, VA	Totals			
P, Q, S max demand	W, Var, VA	Totals			

Maximeters

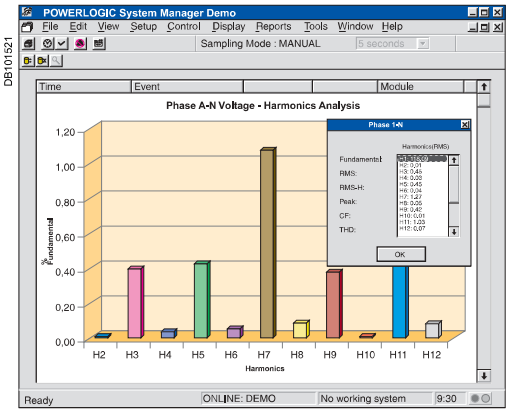
Only the current maximeters may be displayed on the screen.

Histories and maintenance indicators

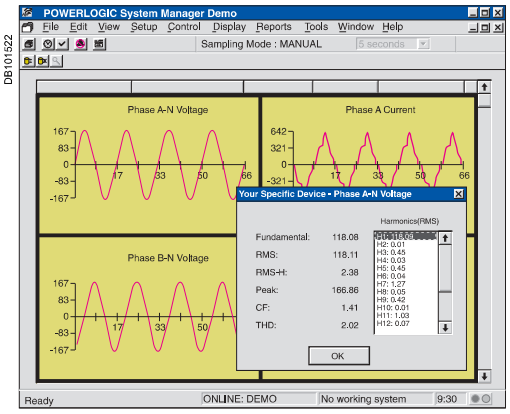
These functions are identical to those of the Micrologic P.

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

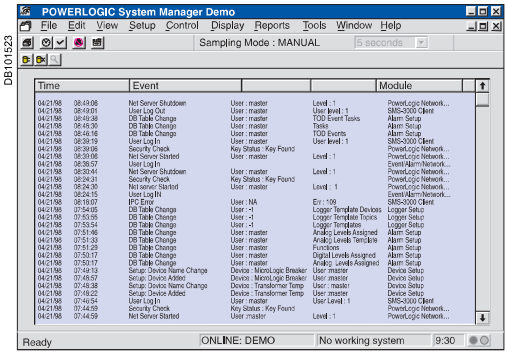
Micrologic control units
Micrologic H "harmonics"



Display of harmonics up to 21th order.



Waveform capture.



Log.

With the communication option

Additional measurements, maximeters and minimeters
Certain measured or calculated values are only accessible with the COM communication option:
- I peak / $\sqrt{2}$ ($I_1 + I_2 + I_3$)/3, $I_{unbalance}$
- 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).

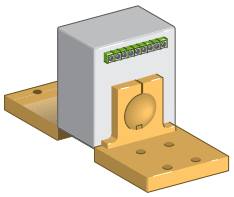
Accuracy of measurements (including sensors)
- voltage (V) 0.5 %
- current (A) 1.5 %
- frequency (Hz) 0.1 %
- power (W) and energy (Wh) 2 %
- total harmonic distortion 1 %

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.

DB101524



External sensor (CT).

PB100834-48

Rectangular sensor.

PB100836-32

External sensor for source ground return protection.

External sensors

External sensor for earth-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 earth-fault protection (with Micrologic A, P and H)..

The rating of the sensor (CT) must be compatible with the rating of the circuit breaker:
- NT06 to NT16: TC 400/1600
- NW08 to NW20: TC 400/2000
- NW25 to NW40: TC 1000/4000
- NW40b to NW63: TC 2000/6300.

For oversized neutral protection the sensor rating must be compatible with the measurement range: 1.6 x IN (available up to NW 40 and NT 16).

Rectangular sensor for earth-leakage protection
The sensor is installed around the busbars (phases + neutral) to detect the zero-phase sequence current required for the earth-leakage protection. Rectangular sensors are available in two sizes.
Inside dimensions (mm)
- 280 x 115 up to 1600 A for Masterpact NT and NW
- 470 x 160 up to 4000 A for Masterpact NW.

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) and for earth-leakage protection (Micrologic 7...).
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.

PB100773-32

Long-time rating plug

Four 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 (for further details, see the characteristics on pages 25 and 27).
As standard, control units are equipped with the 0.4 to 1 plug.

Setting ranges										
Standard	Ir = In x...	0.4	0.5	0.6	0.7	0.8	0.9	0.95	0.98	1
Low-setting option	Ir = In x...	0.4	0.45	0.50	0.55	0.60	0.65	0.70	0.75	0.8
High-setting option	Ir = In x...	0.80	0.82	0.85	0.88	0.90	0.92	0.95	0.98	1
Off plug		No long-time protection (Ir = In for Isd setting)								

Important: *long-time rating plugs must always be removed before carrying out insulation or dielectric withstand tests.*

PB101026-32

External 24 V DC power-supply module

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 control unit, this module makes it possible to display currents of less than 20 % of In.
With the Micrologic P and H, it can be used to display fault currents after tripping.

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; towards the end of 2004, the available output current will be increased from 200 mA to 1 A
- ripple < 1 %
- dielectric withstand : 3.5 kV rms between input/output, for 1 minute
- overvoltage category: as per IEC 60947-1 cat. 4.

PB100771-24

Battery module

The battery module makes it possible to use the display even if the power supply to the Micrologic control unit is interrupted and still commucating with the supervisor.

Characteristics
- battery run-time: 12 hours (approximately)
- mounted on vertical backplate or symmetrical rail.

PB100774-32

M2C.

PB100781-32

M6C.

M2C, M6C programmable contacts

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

Characteristics			M2C/M6C
Minimum load			10 mA/24 V
Breaking capacity (A) p.f.: 0.7	V AC	240	5
		380	
	V DC	24	1.8
		48	1.5
		125	0.4
		250	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).

PB100775-32

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 earth-fault and earth-leakage protection function remains accessible.

Characteristics

- transparent cover for basic Micrologic and Micrologic A 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.

PB100837-68

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 earth-fault protection
  - inhibition of the thermal memory.

The test kit with PC offers in addition:
- the test report (software available on request).

Communication
COM option in Masterpact

The COM option is required for integration of the circuit breaker or switch-disconnector in a supervision system.
Masterpact uses the Digipact or Modbus communications protocol for full compatibility with the SMS PowerLogic electrical-installation management systems.
An external gateway is available for communication on other networks:
- *Profibus*
- *Ethernet…*

Eco COM is limited to the transmission of metering data and does not allow the control of the circuit breaker.

DB100782-26

Digipact "device" communication module.

DB100777-26

Digipact "chassis" communication module.

DB100782-26

Modbus "device" communication module.

DB100802-27

Modbus "chassis" communication module.

For fixed devices, the COM option is made up of:
- a "device" communication module, installed behind the Micrologic control unit and supplied with its set of sensors (OF, SDE ,PF and CH micro-contacts) and its kit for connection to XF and MX1 communicating voltage releases.

For drawout devices, the COM option is made up of:
- a "device" communication module, installed behind the Micrologic control unit and supplied with its set of sensors (OF, SDE, PF and CH micro-contacts) and its kit for connection to XF and MX1 communicating voltage releases
- a "chassis" communication module supplied separately with its set of sensors (CE, CD and CT contacts).

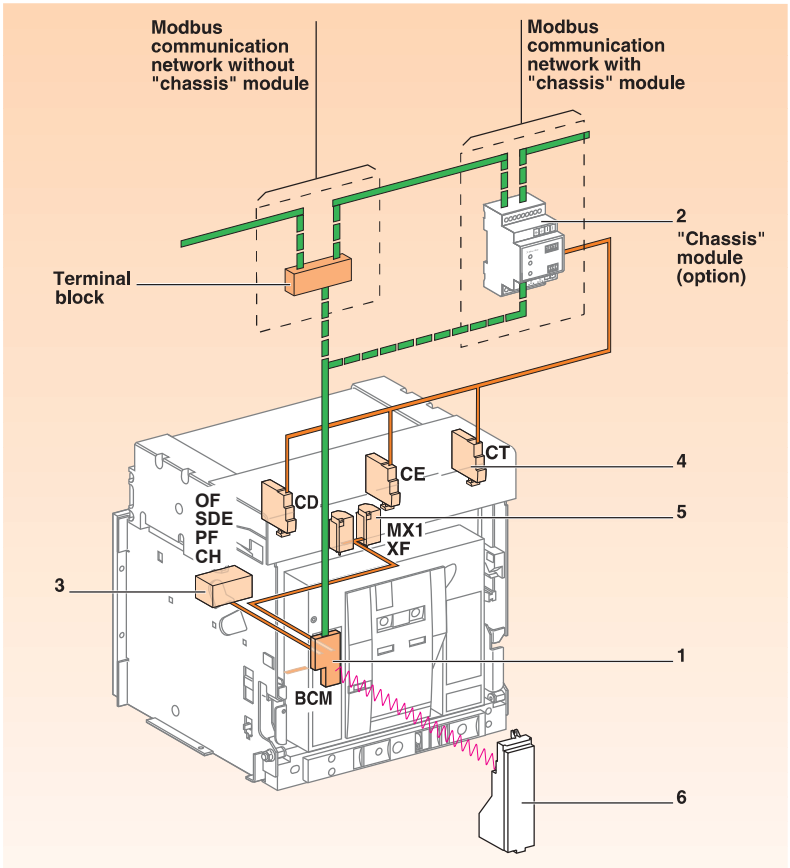
Status indication by the COM option is independent of the device indication contacts. These contacts remain available for conventional uses.

Digipact or Modbus "Device" communication module
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.

Digipact or Modbus "chassis" communication module
This module is independent of the control unit. With Modbus "chassis" communication module, this module makes it possible to address the chassis and to maintain the address when the circuit breaker is in the disconnected position.
Consumption: 30 mA, 24 V.

XF and MX1 communicating voltage releases
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.

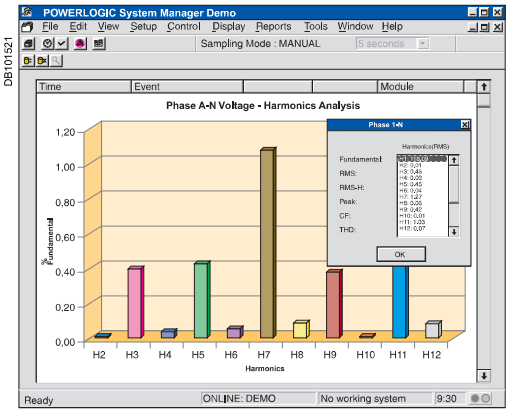
DB102189



1 *"Device" communication module.*
2 *"Chassis" communication module (option).*
3 *OF, SDE, PF and CH communicating "device" sensors.*
4 *CE, CD and CT communicating "chassis" sensors.*
5 *MX1 and XF communicating release.*
6 *Control unit.*

: *Hard wire.*
: *Communication bus.*

Communication
Overview of functions



The Masterpact circuit breakers and switch-disconnectors are compatible with the Digipact or Modbus COM option.

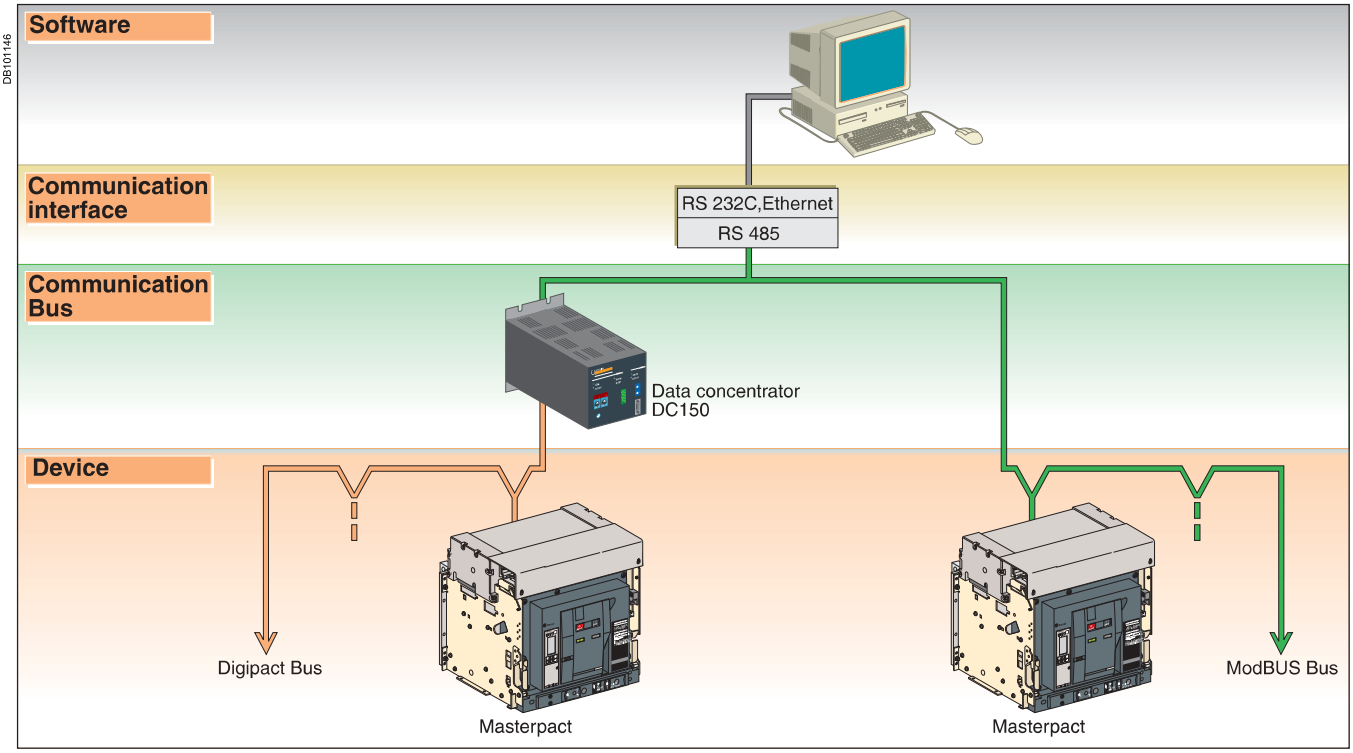
The COM option may be used to:
- identify the device
- indicate status conditions
- control the device.

Depending on the different types of Micrologic (A, P, H) control units, the COM option also offers:
- setting of the protection and alarms functions
- analysis of the AC-power parameters for operating-assistance and maintenance purposes.

	Switch-disconnector with communication bus		Circuit breaker with communication bus					
	Digipact	Modbus	Digipact			Modbus		
Device identification								
Address	■	■	A	P	H	A	P	H
Rating	-	-	A	P	H	A	P	H
Type of device	-	-					P	H
Type of control unit	-	-	A	P	H	A	P	H
Type of long-time rating plug	-	-	A	P	H	A	P	H
Signalisation d'états								
ON/OFF OF	■	■	A	P	H	A	P	H
Spring charged CH	■	■	A	P	H	A	P	H
Ready to close PF	■	■	A	P	H	A	P	H
Fault-trip SDE	-	-	A	P	H	A	P	H
Connected/disconnected/ test position CE/CD/CT	■	■	A	P	H	A	P	H
Controls								
ON/OFF MX/XF	■	■	A	P	H	A	P	H
Spring charging	-	-						
Reset of the mechanical indicator	-	-						
Protections and alarms settings								
Reading of protections settings			A	P	H	A	P	H
Writing of fine settings in the range imposed by the adjustment dials							P	H
Reading/writing of alarms (load shedding and reconnect, M2C, etc.)							P	H
Reading/writing of custom alarms								H
Operating and maintenance aids								
Measurement								
Current			A	P	H	A	P	H
Voltages, frequency, power, etc.				P	H		P	H
Power quality: fundamental, harmonics								H
Programming of demand metering							P	H
Fault readings								
Type of fault						A	P	H
Interrupted current							P	H
Waveform capture								
On faults								H
On demand or programmed								H
Histories and logs								
Trip history							P	H
Alarm history							P	H
Event logs							P	H
Indicators								
Counter operation			A	P	H	A	P	H
Contact wear							P	H
Maintenance register							P	H

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

Communication
Masterpact in a communication network



Devices

Circuit breakers equipped with Micrologic control units may be connected to either a Digipact or Modbus communication bus. The information made available depends on the type of Micrologic control unit (A, P or H) and on the type of communication bus (Digipact or Modbus).
Switch-disconnectors can be connected to the Digipact or Modbus communication bus. The information made available is the status of the switch-disconnector.

Communication bus

Digipact bus

The Digipact bus is the internal bus of the low-voltage switchboard in which the Digipact communicating devices are installed (Masterpact with Digipact COM, PM150, SC150, UA150, etc.). This bus must be equipped with a DC150 data concentrator (see the Powerlogic System catalogue).

Addresses
Addressing is carried out by the DC150 data concentrator.

Number of devices
The maximum number of devices that may be connected to the Digipact bus is calculated in terms of "communication points". These points correspond to the amount of traffic the bus can handle. The total number of points for the various devices connected to a single bus must not exceed 100.
If the required devices represent more than 100 points, add a second Digipact internal bus.

Communicating device	Number of points
DC150 data concentrator	4
Micrologic + Digipact COM	4
PM150	4
SC150	4
UA150	4

Length of bus
The maximum recommended length for the Digipact internal bus is 200 meters.

Bus power source
Power is supplied by the DC150 data concentrator (24 V).

Communication
Masterpact in a communication network

Modbus bus
The Modbus RS485 (RTU protocol) system is an open bus on which communicating Modbus devices (Masterpact with Modbus COM, PM300, Sepam, Vigilohm, etc.) are installed. All types of PLCs and microcomputers may be connected to the bus.

Addresses
The Modbus parameters (address, baud rate, parity) are entered using the keypad on the Micrologic A, P or H. For a switch-disconnector, it is necessary to use the RSU (Remote Setting Utility) Micrologic utility.
The software layer of the Modbus protocol can manage up to 255 addresses (1 to 255).
The "device" communication module comprises three addresses linked to:
- circuit-breaker manager
- measurement manager
- protection manager.

The "chassis" communication module comprises one address linked to:
- the chassis manager.

The division of the system into four managers secures data exchange with the supervision system and the circuit-breaker actuators.
The manager addresses are automatically derived from the circuit-breaker address @xx entered via the Micrologic control unit (the default address is 47).

Logic addresses		
@xx	Circuit-breaker manager	(1 to 47)
@xx + 50	Chassis manager	(51 to 97)
@xx + 200	Measurement managers	(201 to 247)
@xx + 100	Protection manager	(101 to 147)

Number of devices
The maximum number of devices that may be connected to the Modbus bus depends on the type of device (Masterpact with Modbus COM, PM500, Sepam, Vigilohm, etc.), the baud rate (19200 is recommended), the volume of data exchanged and the desired response time. The RS485 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).

Communication interface
The Modbus bus may be connected to the central processing device in any of three manners:
- direct link to a PLC. The communication interface is not required if the PLC is equipped with a Modbus port
- direct link to a computer. The Modbus (RS485) / Serial port (RS232) communication interface is required
- connection to a TCP/IP (Ethernet) network. The Modbus (RS485) / TCP/IP (Ethernet) communication interface is required.

Software
To make use of the information provided by the communicating devices, software with a Modbus driver must be used.

Micrologic utilities
This is a set of software that may be used with a PC to:
- display the variables (I, U, P, E, etc.) with the RDU (Remote Display Utility)
- read/write the settings with the RSU (Remote Setting Utility)
- remotely control (ON / OFF) the device with the RCU (Remote Control Utility).

Micrologic utilities are available upon request

SMS (System Manager Software)
SMS is a software to monitor LV and/or MV electrical energy.
The SMS family includes a software range depending on the application and function, from single product monitoring to the management of a multiple building:
- Power Meter and Circuit Monitor units
- LV devices
- Sepam units.

Communication
Masterpact and the MPS100 Micro Power Server

The MPS100 Micro Power Server:
■ notifies maintenance staff when any preset alarm or trip is activated by the Micrologic trip unit, automatically sending an e-mail and/or SMS
■ data logs are periodically forwarded by e-mail
■ the e-mails are sent via an Ethernet local area network (LAN) or remotely via modem.

PB100823-42

PB100804-60

MPS100 Micro Power Server.

PB100799-68

Main LV switchboard.

PB100877-67

Monitoring of your main LV switchboard via embedded web pages in the MPS100 accessible with a standard web browser.

Micro Power Server makes data collection easy for monitoring Masterpact/Compact circuit breakers

Now, more than ever, there is a need to monitor electrical distribution systems in industrial and large commercial applications. The key to managing all equipment, maximising efficiencies, reducing costs and increasing up time is having the right tools.
Micro Power Server MPS100 is designed to withstand harsh electrical environments and provide a consistent flow of easy to interpret information.

Micro Power Server is designed for unattended operation within the main LV switchboard

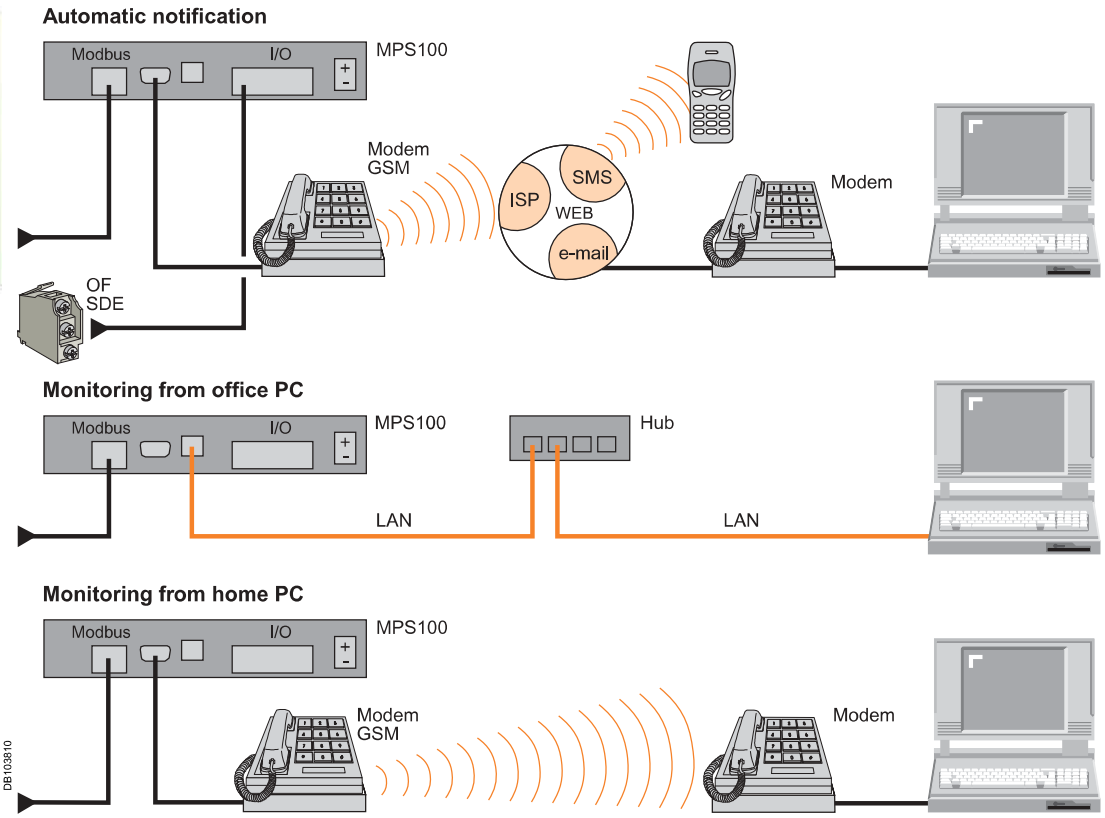
The MPS100 is a self-contained facility information server that serves as a stand-alone device for power system monitoring.
It is used to transfer power system information via a standard web browser over an Ethernet local area network (LAN) or via modem, making it possible to view power system information on a PC with an Ethernet connection.
In either capacity, the Micro Power Server functions as a web server for Micrologic trip unit and Power Meter (PM500) supervision, automatically notifying (e-mail and/or SMS) maintenance staff when any preset alarm or trip is activated in the Micrologic trip unit.

Benefits

- view your main LV switchboard without installing software on your local PC, eliminating the need for a dedicated PC with specific software
- Micro Power Server allows centralised monitoring, so you no longer waste precious time walking around the facility to collect data
- view your main LV switchboard via a modem connection (GSM or switched network), avoiding the need for a LAN
- maintenance people are automatically notified at any time, wherever they are, so you do not have to stay in front of a monitor all day long
- data logs can be periodically forwarded by sending e-mails to the relevant people (maintenance, accounting, application service provider) automatically
- possibility to monitor/notify six external events (limit switches, auxiliary switches...)
- back-up of Micrologic trip unit settings in the memory of the MPS100, so you know where to retrieve it when necessary.

Communication
Masterpact and the MPS100 Micro Power Server

Typical architecture



It is possible to combine the different types of architecture.

Micrologic trip unit.

Power Meter PM500.

Short Message Service (SMS).

Supported Modbus devices

- Micrologic trip units
- Power Meters (PM500, PM700, PM800...).

Maximum recommended connected devices is 10.

Features

- access to the power system via a standard PC web browser
- real-time data displayed with an intuitive and user friendly interface (dashboard)
- Ethernet Modbus TCP/IP connectivity directly to the LAN or via modem (Point to Point Protocol services)
- SMTP (Simple Mail Transfer Protocol) client (capacity to send e-mail)
- local logging of data such as energy, power, current…
- set-up and system configuration through MPS100 embedded HTML pages
- user interface translatable in any language, factory settings in English and French
- 6 inputs/2 outputs (no-volt contact)
- DHCP (Dynamic Host Configuration Protocol) client.

Technical characteristics

Power supply	24 V DC ±15 %, consumption = 250 mA
Operating temperature	0 to +50 °C
Rugged compact metal housing	35 x 218 x 115 mm (H x W x D)

Additional information available at: http://194.2.245.4/mkt/microser.nsf
User name: MPS, Password: MPS100

Part numbers

MPS100 Micro Power Server	**33507**

Connections
Overview of solutions

Three types of connection are available:
- *vertical or horizontal rear connection*
- *front connection*
- *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.
For the 6300 A circuit breaker, only vertical connection is available.

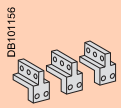
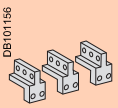
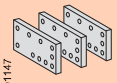
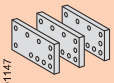
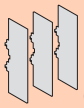
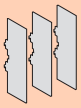
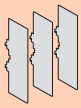
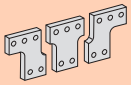
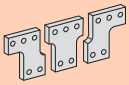
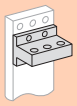
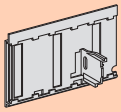
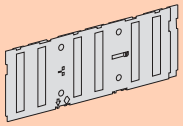
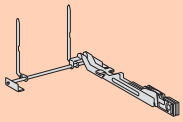
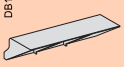
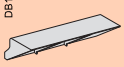
Front connection

Front connection is available for NW fixed and drawout versions up to 3200 A.

Mixed connection

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

Connections
Optional accessories

Type of accessory	Masterpact NT06 to NT16				Masterpact NW08 to NW63			
	Fixed		Drawout		Fixed		Drawout	
	Front connection	Rear connection	Front connection	Rear connection	Front connection	Rear connection	Front connection	Rear connection
Vertical connection adapters	 DB101156		 DB101156					
Cable lug adapters	 DB101147		 DB101147					
Interphase barriers	 DB101148 *(1)*			 DB101149 *(1)*		 DB101149 *(2)*		 DB101149 *(2)*
Spreaders	 DB101150		 DB101150					
Disconnectable front-connection adapter						 DB101151		
Safety shutters with padlocking			 DB101152				 DB101153	
Shutter position indication and locking							 DB101154	
Arc chute screen	 DB101155 *(3)*	 DB101155 *(4)*						

(1) Mandatory for voltages > 500 V.
(2) Except for an NW40 equipped for horizontal rear connection, and for fixed NW40b-NW63.
(3) Mandatory for 1000 V and for fixed NT front-connection versions with vertical-connection adapters oriented towards the front.
(4) Mandatory for 1000 V.

Masterpact M replacement kit

A set of connection parts is available to allow replacement of a Masterpact M08 to M32 circuit breaker by a Masterpact NW without modifying the busbars (please consult us).

Mounting on a switchboard backplate using special brackets

Masterpact NT and NW 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.

Connections
Optional accessories

PB100790-32

Vertical-connection adapters
Mounted on front-connected devices or chassis, the adapters facilitate connection to a set of vertical busbars.

PB100791-32

Cable-lug adapters
Cable-lug adapters are used in conjunction with vertical-connection adapters.
They can be used to connect a number of cables fitted with lugs.
To ensure adequate mechanical strength, the connectors must be secured together via spacers (**catalogue number 07251**).

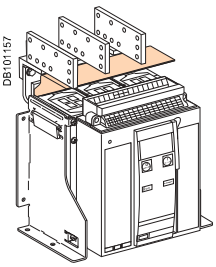
PB100779-32

Interphase barriers
These barriers are flexible insulated partitions used to reinforce isolation of connection points in installations with busbars, whether insulated or not.
For Masterpact NT/NW devices, they are installed vertically between rear connection terminals. They are mandatory for NT devices at voltages > 500 V.

PB100792-32

Spreaders
Mounted on the front or rear connectors, spreaders are used to increase the distance between bars in certain installation configurations.

DB101157



Arc chute screen
For fixed Masterpact NT front-connection versions and with vertical-connection adapters oriented towards the front, an arc chute screen must be installed to respect safety clearances.

For Masterpact NT 1000 V, an arc chute screen must be installed to respect safety clearances.

Connections
Optional accessories

PB100793-48

Disconnectable front-connection adapter

Mounted on a fixed front-connected device, the adapter simplifies replacement of a fixed device by enabling fast disconnection from the front.

PB100794-48

Safety shutters

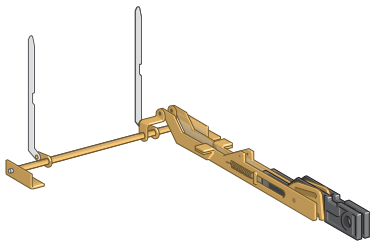
Mounted on the chassis, the safety shutters automatically block access to the disconnecting contact cluster when the device is in the disconnected or test positions (degree of protection IP 20) When the device is removed from its chassis, no live parts are accessible.
The shutter-locking system is made up of a moving block that can be padlocked (padlock not supplied). The block:

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

For Masterpact NW08 to NW63
A support at the back of the chassis is used to store the blocks when they are not used:

- 2 blocks for NW08 to NW40
- 4 blocks for NW40b to NW63.

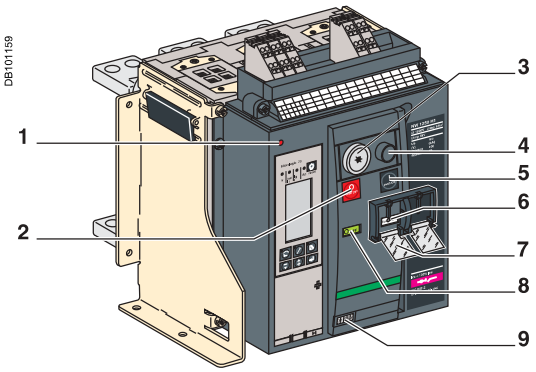
DB101158



Shutter position indication and locking on front face

This option located on the chassis front plate indicates that the shutters are closed. It is possible to independently or separately padlock the two shutters using one to three padlocks (not supplied).

Locking
On the device



1 *Reset button for mechanical trip indication.*
2 *OFF pushbutton.*
3 *OFF position lock.*
4 *Electrical closing pushbutton.*
5 *ON pushbutton.*
6 *Springs charged indication.*
7 *Pushbutton locking.*
8 *Contact position indication.*
9 *Operation counter.*

PB100811-32

Access to pushbuttons protected by transparent cover.

PB100810-32

Pushbutton locking using a padlock.

PB100812-32

OFF position locking using a padlock.

PB100813-30

OFF position locking using a keylock.

Pushbutton locking

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

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.

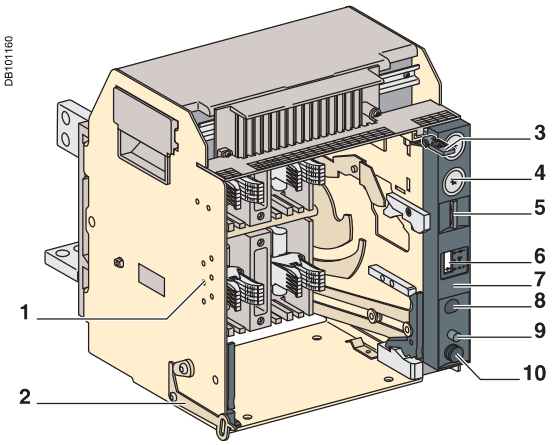
Profalux and Ronis keylocks are compatible with each other.
A locking kit (without locks) is available for installation of one or two keylocks (Ronis, Profalux, Kirk or Castell).

Accessory-compatibility
For Masterpact NT: 3 padlocks or 1 keylock
For Masterpact NW: 3 padlocks and/or 2 keylocks

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.

Locking
On the chassis



1 *Mismatch protection.*
2 *Door interlock.*
3 *Racking interlock.*
4 *Keylock locking.*
5 *Padlock locking.*
6 *Position indicator.*
7 *Chassis front plate (accessible with cubicle door closed).*
8 *Racking-handle entry.*
9 *Reset button.*
10 *Racking-handle storage.*

"Disconnected" position locking by padlocks.

"Disconnected" position locking by keylocks.

Door interlock.

Racking interlock.

Mismatch protection.

"Disconnected" position locking

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).

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

The "connected", "disconnected" and "test" positions are shown by an indicator. The exact position is obtained when the racking handle blocks. A release button is used to free it.
On request, the "disconnected" position locking system may be modified to lock the circuit breaker in any of the three positions, "connected", "disconnected" and "test".

Door interlock catch

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. It 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

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

Cable-type door interlock

This option is identical for fixed and drawout versions.

Racking interlock between crank and OFF pushbutton

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

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

Mismatch protection

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 P and H control units.

PB100806-32

ON/OFF indication contacts (OF) (microswitch type).

PB100807-20

ON/OFF indication contacts (OF) (rotary type).

PB100820-32

Additional "fault-trip" indication contacts (SDE).

PB100816-32

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 AC12/DC12	Standard			Minimum load: 100 mA/24 V	
		V AC	240/380	6	10/6 (1)
			480	6	10/6 (1)
			690	6	6
		V DC	24/48	2.5	10/6 (1)
			125	0.5	10/6 (1)
			250	0.3	3
	Low-level			Minimum load: 2 mA/15 V DC	
		V AC	24/48	5	6
			240	5	6
			380	5	3
		V DC	24/48	5/2.5	6
			125	0.5	6
			250	0.3	3

(1) *Standard contacts: 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.

SDE				NT/NW
Supplied as standard				1
Maximum number				2
Breaking capacity (A) p.f.: 0.3 AC12/DC12	Standard			Minimum load: 100 mA/24 V
		V AC	240/380	5
			480	5
			690	3
		V DC	24/48	3
			125	0.3
			250	0.15
	Low-level			Minimum load: 2 mA/15 V DC
		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) p.f.: 0.3 AC12/DC12	Standard			Minimum load: 100 mA/24 V
		V AC	240/380	6
			480	6
			690	6
		V DC	24/48	2.5
			125	0.8
			250	0.3
	Low-level			Minimum load: 2 mA/15 V DC
		V AC	24/48	5
			240	5
			380	5
		V DC	24/48	2.5
			125	0.8
			250	0.3

Indication contacts

PB100817-32

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

PB100778-52

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

PB100781-32

*M6C programmable contacts:
circuit-breaker external relay with six independent changeover contacts controlled from the circuit breaker via a three-wire connection.*

"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.

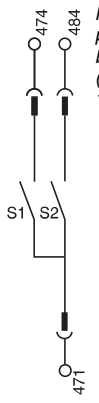
				NT	NW
Contacts				**CE/CD/CT**	**CE/CD/CT**
Maximum number	Standard			3 2 1	3 3 3
	with additional actuators				9 0 0
					6 3 0
					6 0 3
Breaking capacity (A)	Standard			Minimum load: 100 mA/24 V	
p.f.: 0.3		V AC	240	8	8
AC12/DC12			380	8	8
			480	8	8
			690	6	6
		V DC	24/48	2.5	2.5
			125	0.8	0.8
			250	0.3	0.3
	Low-level			Minimum load: 2 mA/15 V DC	
		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 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.
They indicate:
- the type of fault
- instantaneous or delayed threshold overruns.
- They may be programmed:
- with instantaneous return to the initial state
- without return to the initial state
- with return to the initial state following a delay.

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

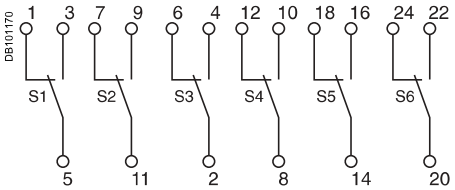
DB101161



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

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

DB101170



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.*

PB100765-56

***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.

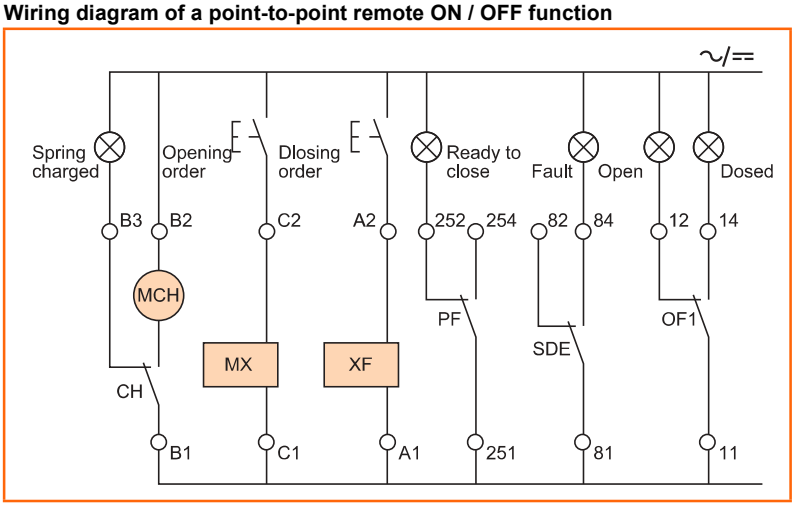
The remote ON / OFF function is used to remotely open and close the circuit breaker. It is made up of:
- an electric motor (MCH) equipped with a "springs charged" limit switch contact (CH)
- two voltage releases:
  - a closing release (XF)
  - an opening release (MX).

Optionally, other functions may be added:
- a "ready to close" contact (PF)
- an electrical closing pushbutton (BPFE)
- remote reset following a fault.

A remote-operation function is generally combined with:
- device ON / OFF indication (OF)
- "fault-trip" indication (SDE).

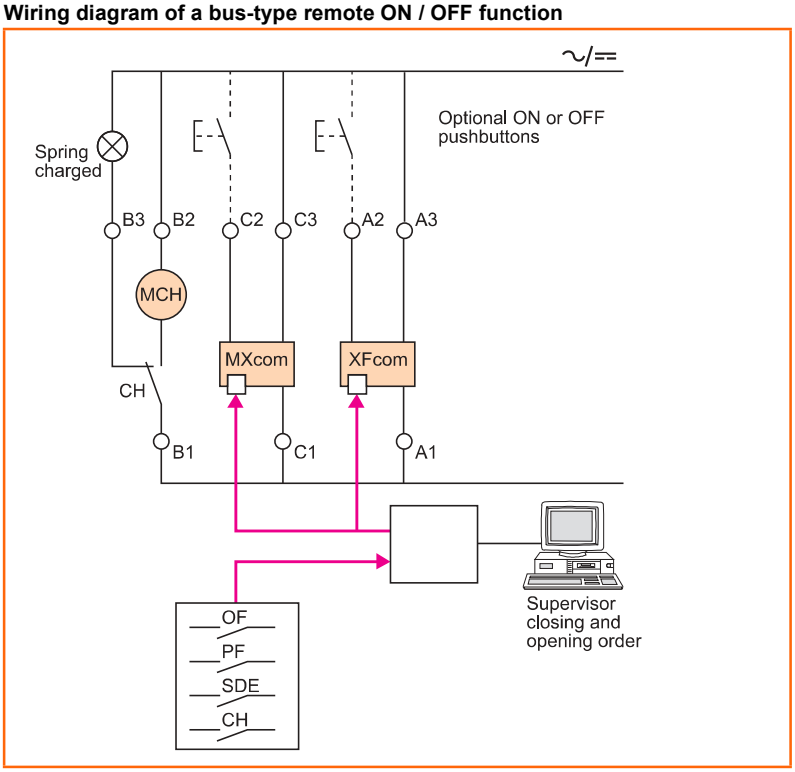
Wiring diagram of a point-to-point remote ON / OFF function

DB101163



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

DB101165



Remote operation
Remote ON / OFF

PB100797-23

Electric motor (MCH) for Masterpact NT.

PB100808-32

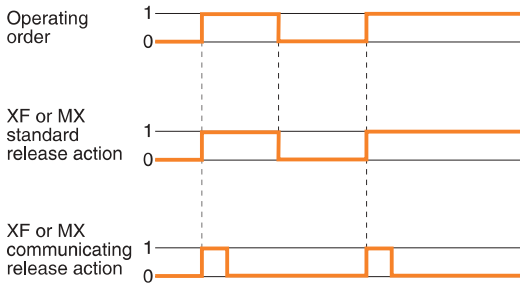
Electric motor (MCH) for Masterpact NW.

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 - 200/240 - 277- 380/415 - 400/440 - 480
	V DC	24/30 - 48/60 - 100/125 - 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

DB101179



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 maintened 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	MX
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	0.7 to 1.1 Un
Consumption (VA or W)		Hold: 4.5 Pick-up: 200 (200 ms)	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)	50 ms ±10

PB100809-16

XF and MX voltage releases.

"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.

PB100816-16

"Ready to close" contacts (PF).

Characteristics				NT/NW
Maximum number				1
Breaking capacity (A) p.f.: 0.3 AC12/DC12	Standard			Minimum load: 100 mA/24 V
		V AC	240/380	5
			480	5
			690	3
		V DC	24/48	3
			125	0.3
			250	0.15
	Low-level			Minimum load: 2 mA/15 V DC
		V AC	24/48	3
			240	3
			380	3
		V DC	24/48	3
			125	0.3
			250	0.15

Remote operation
Remote ON / OFF

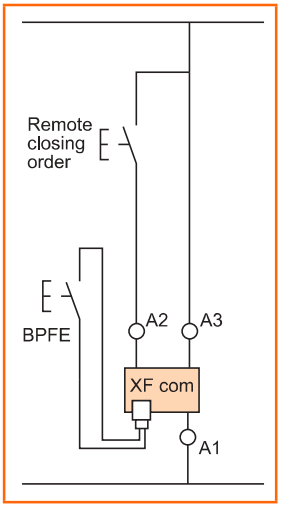
PB100798-56

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.

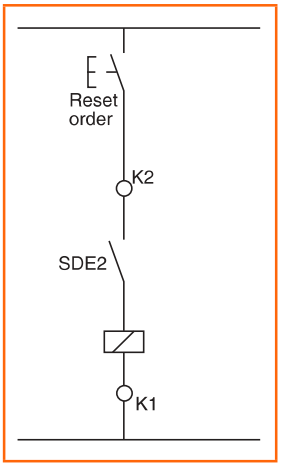
DB101167



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.

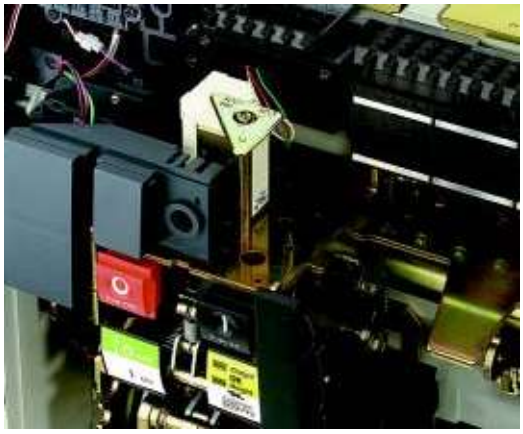
DB101169



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.

Remote operation
Remote tripping

PB100819-68



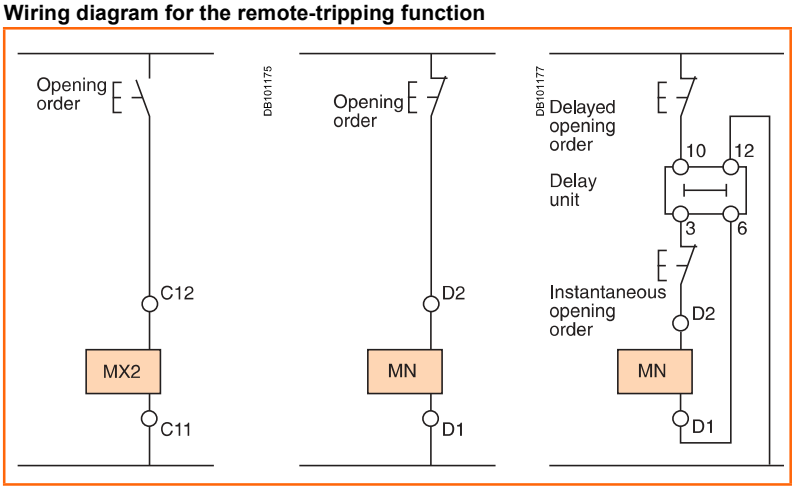
DB100809-16

MX or MN voltage release.

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 (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 (200 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 V DC	24 - 48 - 100/130 - 200/250 - 380/480 24/30 - 48/60 - 100/130 - 200/250	
Operating threshold	Opening Closing	0.35 to 0.7 Un 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	
V AC 50-60 Hz /DC	Adjustable	48/60 - 100/130 - 200/250 - 380/480	
Operating threshold	Opening	0.35 to 0.7 Un	
	Closing	0.85 Un	
Consommation du retardateur	Pick-up: 200 (200 ms)		Hold: 4.5
Circuit-breaker response time at Un	Non-adjustable	0.25 s	
	Adjustable	0.5 s - 0.9 s - 1.5 s - 3 s	

Accessories

PB100821-68

Auxiliary terminal shield (CB)

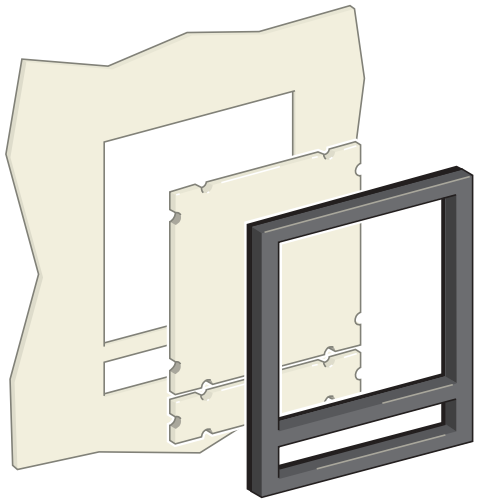
Optional equipment mounted on the chassis, the shield prevents access to the terminal block of the electrical auxiliaries.

PB100822-32

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



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.

Transparent cover (CP) 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.

Escutcheon (CDP) with blanking plate.

PB100776-42

Transparent cover (CP) for escutcheon.

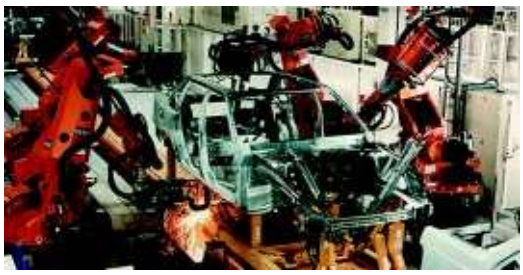
Source-changeover systems
Presentation

PB100843

PB100844

Service sector:
- *hospital operating rooms*
- *safety systems for tall buildings*
- *computer rooms (banks, insurance companies, etc.)*
- *lighting systems in shopping centres.*

PB100845



Industry:
- *assembly lines*
- *propulsion systems on ships*
- *essential auxiliaries in thermal power stations...*

PB100846

PB100847

Infrastructure:
- *port and railway installations*
- *runway lighting systems*
- *control systems for military installations...*

Manual source-changeover systems
A manual source-changeover system is made up of:
- 2 devices (for connecting rod systems) or 2 to 3 devices (for cable systems)
- a connecting-rod or cable type mechanical interlocking system.

Remote-operated source-changeover systems
This is the most commonly employed system. No intervention by human operators is required. The switch from the normal to the replacement source is controlled electrically.
A remote-operated source-changeover system is made up of two or three circuit breakers or switch-disconnectors linked by:
- an electrical interlocking system implemented in a number of manners
- a mechanical interlocking system that protects against the consequences of an electrical malfunction and inhibits incorrect manual operation.

Automatic source-changeover systems
An automatic controller may be added to a remote-operated source-changeover system for automatic source control according to programmable operating modes. This solution provides optimal energy management:
- switching to a replacement source depending on any external conditions
- management of power sources
- regulation
- emergency source replacement, etc.

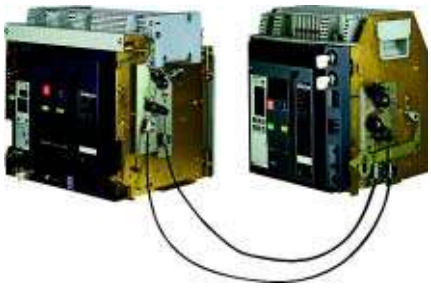
A communications function for dialogue with a supervisor is available for the automatic controller.

Communication option
The communication option must not be used to control the opening or closing of source-changeover system circuit breakers. It should be used only to transmit measurement data or circuit-breaker status.
The eco COM option is perfectly suited to these equipments.

Source-changeover systems
Mechanical interlocking

Electrical interlocking of two or three devices is used to create a remote-operated source-changeover system.
A basic mechanical interlocking system enhances the reliability of system operation.

PB100826-56



Interlocking of two devices using cables.

Interlocking of two devices using cables

To ensure a continuous supply of power, certain electrical installations are connected to two power sources:
- a normal source N
- a replacement source R which supplies the installation when source N is not available.

A source-changeover system switches between the two sources. The system may include an automatic controller which manages switching according to external conditions. A source-changeover system may comprise two or three circuit breakers or switch-disconnectors.

Interlocking of two devices using connecting rods

The two devices must be stack mounted.
This function requires:
- an adaptation fixture on the right side of each device
- a set of connecting rods with no-slip adjustments.

The complete interlock kit is supplied for assembly by the customer.
Maximum vertical distance between the fixing planes: 900 mm.

Combinations of Masterpact Normal and Replacement source devices

Devices to be interlocked		NT		NW	
		Fixed	Drawout	Fixed	Drawout
NT	Fixed	■	-	-	-
	Drawout	-	■	-	-
NW	Fixed	-	-	■	■
	Drawout	-	-	■	■

Interlocking of two or three devices using cables

Using cables, the devices may be stack mounted or installed side-by-side.

Interlocking of two devices (Masterpact NT or NW)
This function requires:
- an adaptation fixture on the right side of each device
- a set of cables with no-slip adjustments.

Maximum distance between the fixing planes (vertical or horizontal): 2000 mm with a radius greater or equal to 100 mm.
For cases requiring greater distances between fixing planes, please consult us.

Interlocking of three devices (only Masterpact NW)
This function requires:
- an adaptation fixture (different for each type of interlocking) on the right side of each device
- two or three sets of cables with no-slip adjustments.

Maximum distance between the fixing planes (vertical or horizontal): 1000 mm with a radius greater or equal to 100 mm.
For cases requiring greater distances between fixing planes, please consult us.

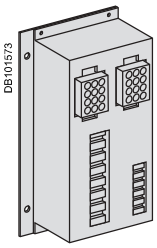
Installation
The complete interlock kit is supplied for assembly by the customer.

Combinations of Masterpact Normal and Replacement source devices

All combinations of Masterpact NT and NW devices may be used together in a source-changeover system. Interlocked devices may be fixed or drawout, three or four pole, with different ratings and sizes.

Source-changeover systems
Electrical interlocking

Electrical interlocking is used with the mechanical interlocking system. It controls switching between sources. An automatic controller may be added to take into account information from the distribution system.



IVE unit.

Electrical interlocking requires an electrical control device.
This function can be implemented in one of two ways:
- using the IVE electrical interlocking unit
- by an electrician using the electrical systems presented in the diagrams in the "Source-changeover systems" section of this catalogue.

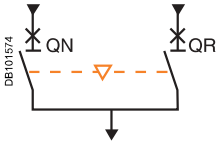
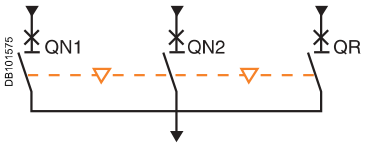
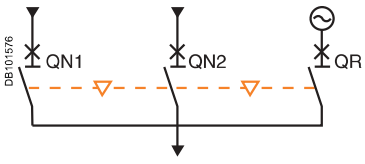
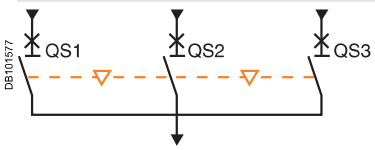
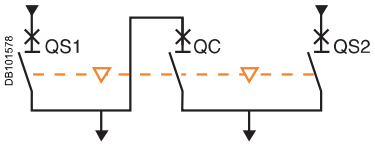
Characteristics of the IVE unit

- external connection terminal block:
  - inputs: control of devices
  - outputs: status of the SDE contacts on the Normal and Replacement source devices
- connector to the two Normal and Replacement source devices:
  - inputs:
    - status of the OF contacts on each device (ON or OFF)
    - status of the SDE contacts on the Normal and Replacement source devices
  - outputs: power supply for motor mechanisms
- control voltage:
  - 24 to 250 V DC
  - 48 to 415 V 50/60 Hz
  - 440 V 60 Hz.

The control voltage for the IVE electrical interlocking unit must be identical to that of the operating mechanism.

Necessary equipment

Each device must be equipped with:
- a remote-operation system made up of:
  - MCH gear motor
  - MX or MN opening release
  - XF closing release
  - PF "ready to close" contact
- an available OF contact
- one to three CE connected-position contacts for drawout devices.

Types of mechanical interlocking	Possible combinations	Typical electrical diagrams	Diagram no.
2 devices			
	**QN** **QR** 0 0 1 0 0 1	■ electrical interlocking with lockout after fault: ■ automatic control with lockout after fault: □ permanent replacement source (with IVE) □ engine generator set (with IVE) ■ BA/UA controller (with IVE) ■ electrical interlocking with lockout after fault:	 **51156904** **51156905** **51156903**
3 devices: 2 "Normal" sources and 1 "Replacement" source			
	**QN1** **QN2** **QR** 0 0 0 1 1 0 0 0 1	■ electrical interlocking: □ without lockout after fault □ with lockout after fault	 **51156906** **51156907**
3 devices: 2 "Normal" sources and 1 "Replacement" source with source selection			
	**QN1** **QN2** **QR** 0 0 0 1 0 0 0 0 1 1 1 0 0 1 0	■ automatic control with engine generator set: □ without lockout after fault (with MN) □ with lockout after fault (with MN)	 **51156908** **51156909**
3 devices: 3 sources, only one device			
	**QS1** **QS2** **QS3** 0 0 0 1 0 0 0 1 0 0 0 1	■ electrical interlocking: □ without lockout after fault □ with lockout after fault	 **51156910** **51156911**
3 devices: 2 sources + 1 coupling			
	**QS1** **QC** **QS2** 0 0 0 1 0 1 1 1 0 0 1 1 1 0 0 (1) 0 0 1 (1) *(1) possible by forcing operation*	■ electrical interlocking: □ without lockout after fault □ with lockout after fault ■ automatic control with lockout after fault	 **51156912** **51156913** **51156914**

"Lockout after fault" option. This option makes it necessary to manually reset the device following fault tripping.

Source-changeover systems
Associated automatic controllers

By combining a remote-operated source-changeover system with an integrated BA or UA automatic controller, it is possible to automatically control source transfer according to user-selected sequences. These controllers can be used on source-changeover systems comprising 2 circuit breakers.
For source-changeover systems comprising 3 circuit breakers, the automatic control diagram must be prepared by the installer as a complement to to diagrams provided in the "electrical diagrams" section of this catalogue.

PB100855

BA controller.

PB100856

UA controller.

Controller		BA	UA
Compatible circuit breakers		All Compact NS and Masterpact circuit breakers	
4-position switch			
Automatic operation		■	■
Forced operation on "Normal" source		■	■
Forced operation on "Replacement" source		■	■
Stop (both "Normal" and "Replacement" sources off)		■	■
Automatic operation			
Monitoring of the "Normal" source and automatic changeover		■	■
Generator set startup control			■
Generator set shutdown control			■
Load shedding and reconnection of non-priority circuits			■
Changeover to the "Replacement" source if one of the phases of the "Normal" phase is absent			■
Test			
By opening the P25M circuit breaker supplying the controller		■	
By pressing the test button on the front of the controller			■
Indications			
Circuit breaker status indication on the front of the controller: on, off, fault trip		■	■
Automatic mode indicating contact		■	■
Other functions			
Selection of type of "Normal" source (single-phase or three-phase)			■
Voluntary transfer to "Replacement" source (e.g. energy management commands)		■	■
During peak-tariff periods (energy management commands), forced operation on "Normal" source if "Replacement" source not operational			■
Additional contact (not part of controller). Transfer to "Replacement" source only if contact is closed (e.g. used to test the frequency of UR).		■	■
Setting of maximum startup time for the replacement source			■
Options			
Communication option		■	
Power supply			
Control voltages (1)	220 to 240 V 50/60 Hz	■	■
	380 to 415 V 50/60 Hz	■	■
	440 V 60 Hz	■	■
Operating thresholds			
Undervoltage	0.35 Un ⩽ voltage ⩽ 0.7 Un	■	■
Phase failure	0.5 Un ⩽ voltage ⩽ 0.7 Un		■
Voltage presencevoltage	voltage ⩾ 0.85 Un	■	■
Characteristics of output contacts			
Rated thermal current (A)	8		
Minimum load	10 mA at 12 V		

		CA				DC	
Utilisation category (IEC 60947-5-1)		AC12	AC13	AC14	AC15	DC12	DC13
Operational current (A)	24 V	8	7	5	6	8	2
	48 V	8	7	5	5	2	-
	110 V	8	6	4	4	0.6	-
	220/240 V	8	6	4	3	-	-
	250 V	-	-	-	-	0.4	-
	380/415 V	5	-	-	-	-	-
	440 V	4	-	-	-	-	-
	660/690 V	-	-	-	-	-	-

(1) The controller is powered by the ACP auxiliaries control plate. The same voltage must be used for the ACP plate, the IVE unit and the circuit breaker motor mechanisms. If this voltage is the same as the source voltage, then the "Normal" and "Replacement" sources can be used directly for the power supply. If not, a BC type or equivalent isolation transformer must be used.

Display modules

Perfectly integrated in the Compact and Masterpact ranges, Display modules are designed for use with Micrologic control units to provide instant and highly intuitive access to all the information provided by the circuit breakers, including device status, current, voltage and power values, etc.

PB100830-58

DMB300 display module: basic and harmonic measurements.

PB100832-66

DMC300 display module: measurements, harmonic analysis, diagnosis.

DMB300 and DMC300 display modules use the power and communications capabilities of the Micrologic control units to centralise the display of electrical values, status conditions and alarms of one or more Compact or Masterpact circuit breakers.
The mounting and cabling system for the display modules ensures fast, easy and reliable installation.
Start-up is immediate with no configuration or programming required.
Display modules are high-performance devices combining:
- simple and easy-to-read dials
- powerful and accurate digital processing.

Their small size and extensive communications capabilities make for easy and flexible installation and operation.

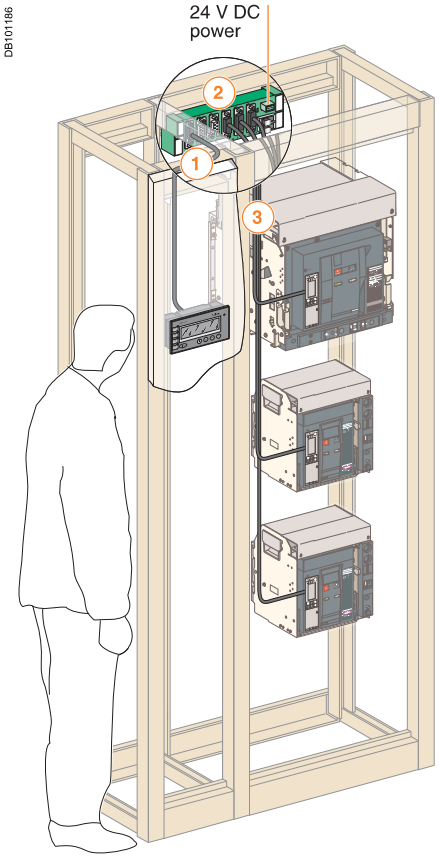
Display modules	DMB300			DMC300		
Associated circuit breakers						
Type	Compact or Masterpact equipped with Micrologic control units					
Number	1 to 4			1 to 16		
Display						
Screen type	Black and white			Colour, touch screen		
Screen size	240 x 64 pixels			5", 320 x 240 pixels		
Entry	5 buttons			Touch screen		
Information displayed						
Currents (per phase)						
Currents I1, I2, I3, IN	A	P	H	A	P	H
Maximum current	A	P	H	A	P	H
Earth-fault and earth-leakage currents	A	P	H	A	P	H
Demand current		P	H		P	H
Maximum demand current		P	H		P	H
Total harmonic distortion (THD)			H			H
Maximum total harmonic distortion			H			H
Amplitudes of individual harmonics						H
Voltages						
Phase-to-phase voltages (U_{1-2}, U_{2-3}, U_{3-1})		P	H		P	H
Minimum/maximum phase-to-phase voltages		P	H		P	H
Phase-to-neutral voltages (V_{1-N}, V_{2-N}, V_{3-N})		P	H		P	H
Minimum/maximum phase-to-neutral voltages					P	H
Frequency		P	H		P	H
Voltage imbalance (% per phase)		P	H		P	H
Total harmonic distortion (% per phase)			H			H
Maximum total harmonic distortion (% per phase)			H			H
Amplitudes of individual harmonics			H			H
Power						
Active (P), reactive (Q) and apparent (S) power			H		P	H
Power factor and cosφ		P	H		P	H
Maximum power (P, Q, S)		P	H		P	H
Demand power (P, Q, S)		P	H		P	H
Maximum demand power		P	H		P	H
Metering						
Active, reactive and apparent energy		P	H		P	H
On-line help						
	On-line help is available for each type of information supplied by the module					
Circuit-breaker diagnostics						
Identification of control units	A	P	H	A	P	H
Reading of protections	A	P	H	A	P	H
Circuit-breaker status	A	P	H	A	P	H
Type of trip	A	P	H	A	P	H
Current alarms		P	H		P	H
Maintenance indicator					P	H
Installation diagnosis						
Indication of faulty devices				A	P	H
Fault log				A	P	H
Installation and start-up						
Mounting	Mounted through door, without tools, using 6 spring-clips supplied with the mod.					
Connection	Prefabricated wiring systems					

Associated Micrologic control unit
A = Micrologic A
P = Micrologic P
H = Micrologic H

Display modules

Wiring system
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 display module and the communications modules on the Micrologic control units.

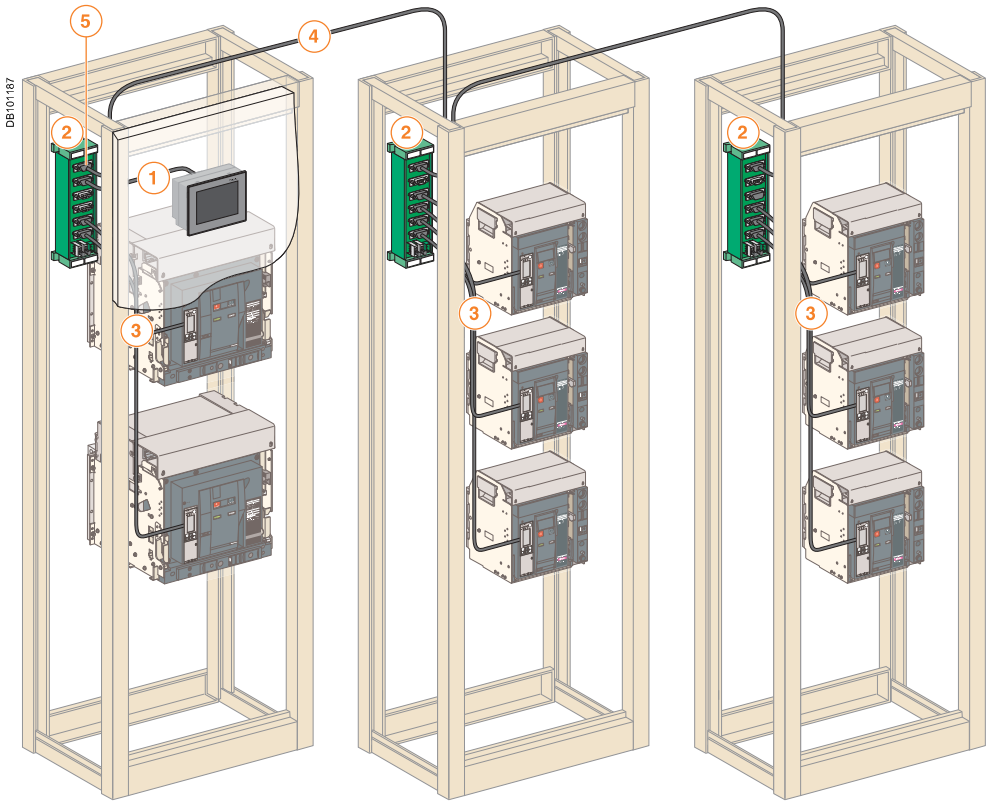
Connection of DMC300 display module



Masterpact circuit breakers equipped with Micrologic control units and the ModBus COM option.

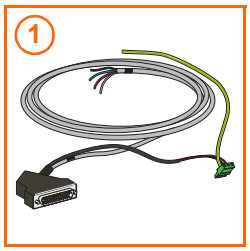
Connection of DMB300 display module

Maximum distance between module and circuit breaker: 1200 m.



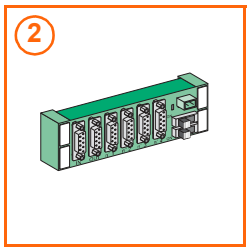
Masterpact circuit breakers equipped with Micrologic control units and the ModBus eco COM option.

DB101181



CDM 303:
Connection cable between display module and junction block.

DB101182

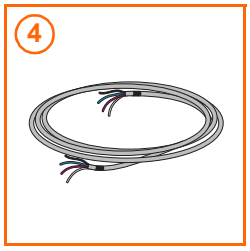


CJB 306 junction block.

DB101183

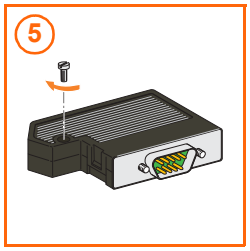
CCP 303:
Connection cable between Masterpact or Compact and junction block.

DB101184



CCR 301:
Roll of RS 485 cable (2 RS 485 wires + 2 power supply wires).

DB101185

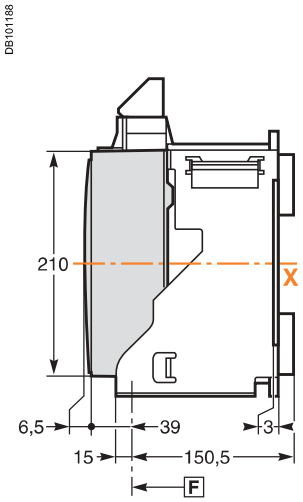


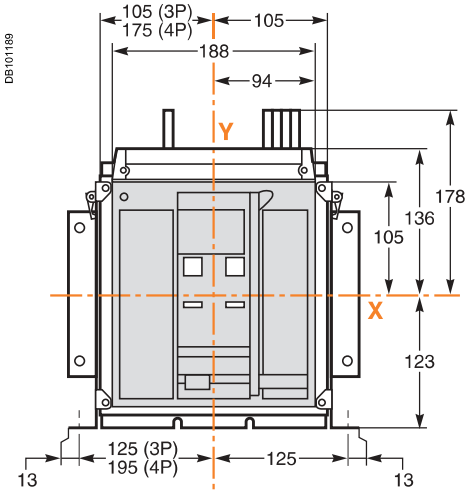
CSD 309:
SubD 9-pin connector for colour-coded connection of wires to screw terminals.

Dimensions and connection

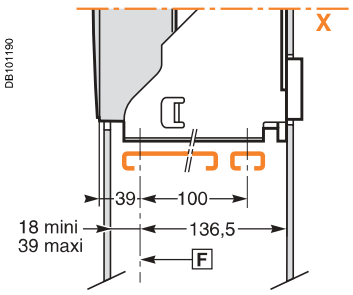
NT06 to NT16 circuit breakers
Fixed 3/4-poles device

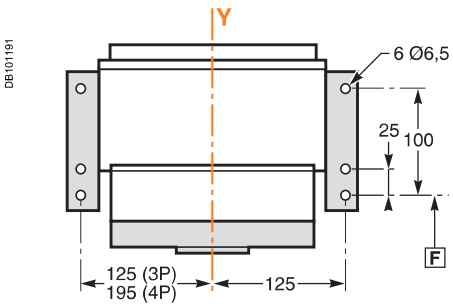
Dimensions



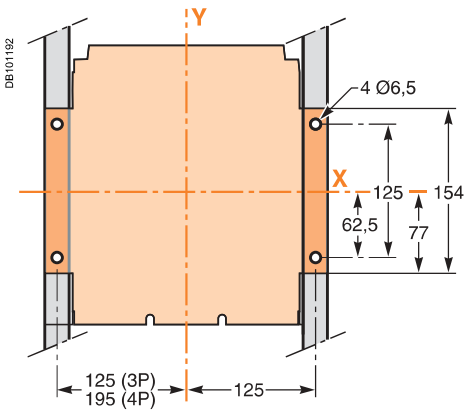


Bottom mounting (on base plate or rails)

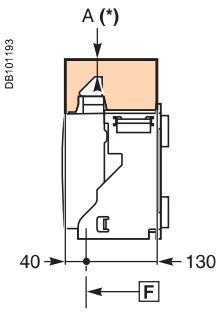


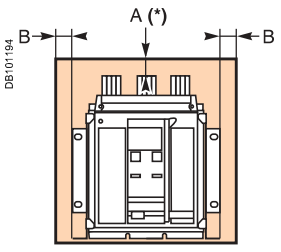


Rear mounting detail (on upright or backplate)

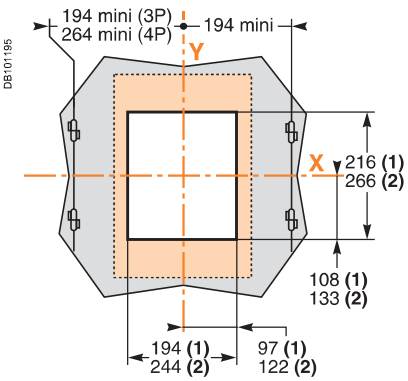


Safety clearances

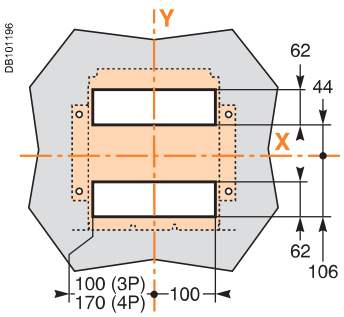




Door cutout



Rear panel cutout



For voltages < 690 V

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

For 1000 V

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

F : *datum.*

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

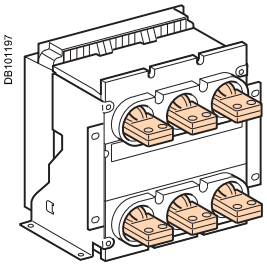
(3) *With a minimum distance between bars of 65 mm (A and B) if the bars are not insulated.*

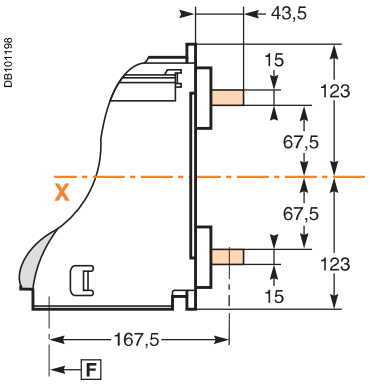
Note: *X and Y are the symmetry planes for a 3-pole device.*
A(*) *An overhead clearance of 50 mm is required to remove the arc chutes. An overhead clearance of 20 mm is required to remove the terminal block.*

NT06 to NT16 circuit breakers
Fixed 3/4-poles device

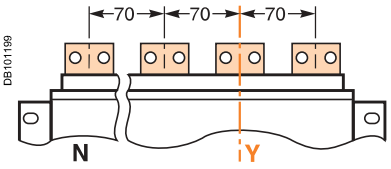
Connections

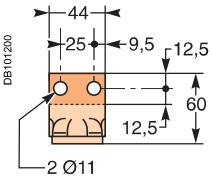
Horizontal rear connection



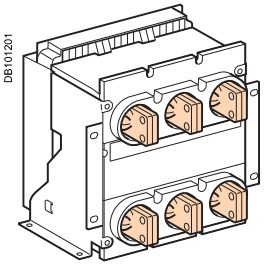


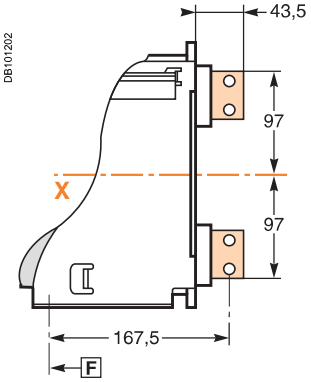
Detail



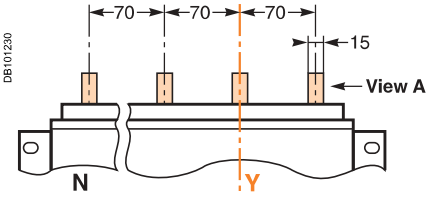


Vertical rear connection

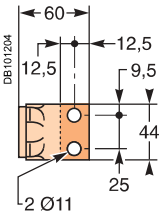




Detail

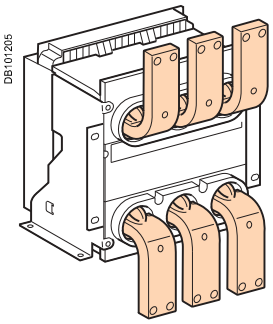


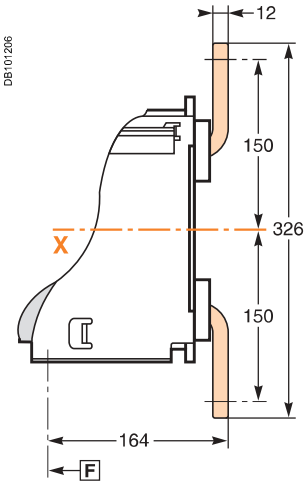
o



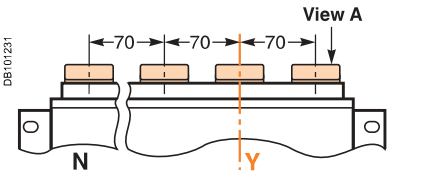
View A detail.

Front connection

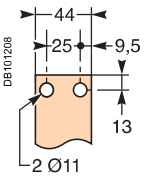




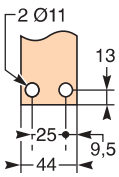
Detail



Top connection



Bottom connection



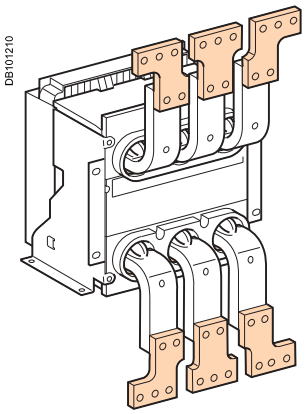
View A detail.

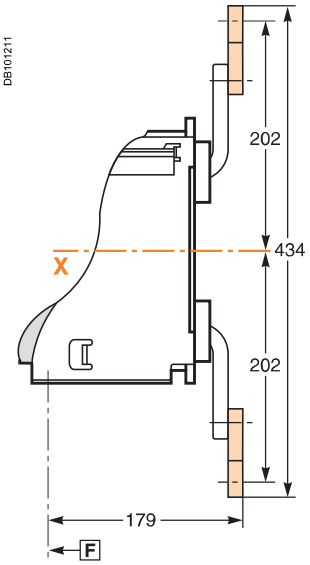
Note: *recommended connection screws:* ***M10*** *class 8.8.*
Tightening torque: ***50 Nm*** *with contact washer.*

NT06 to NT16 circuit breakers
Fixed 3/4-poles device

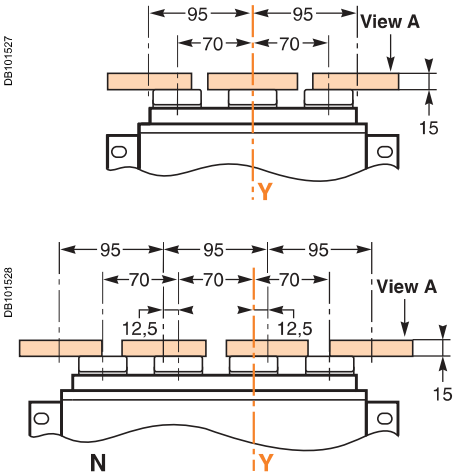
Connections

Front connection with spreaders

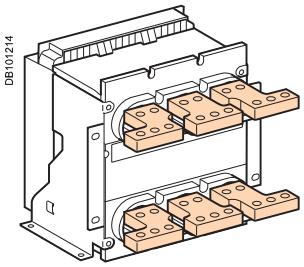


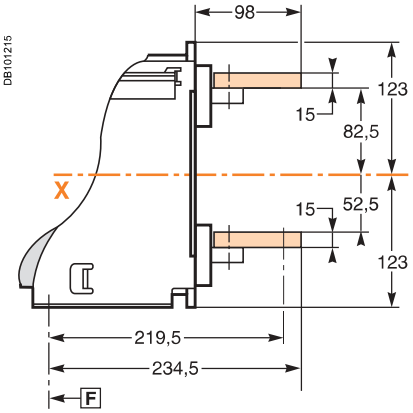


Detail

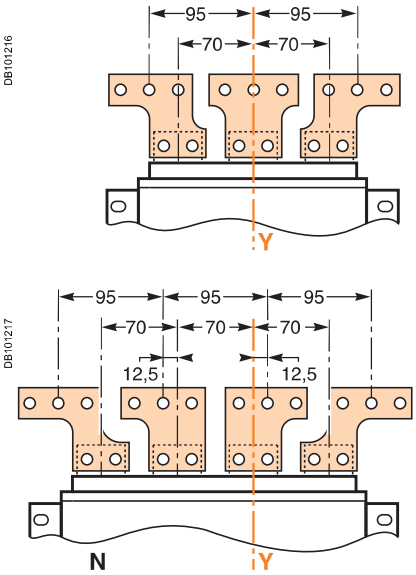


Rear connection with spreaders



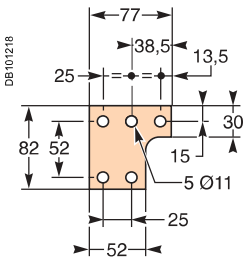


Detail

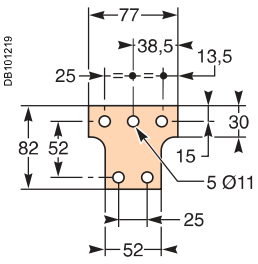


Spreader detail

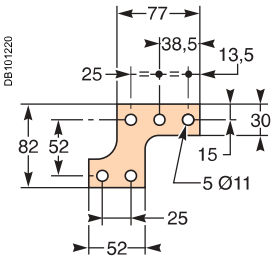
Middle left or middle right spreader for 4P.



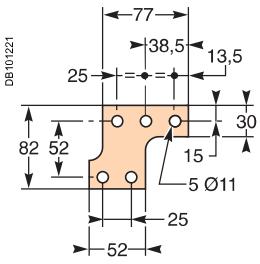
Middle spreader for 3P.



Left or right spreader for 4P.



Left or right spreader for 3P.



View A detail.

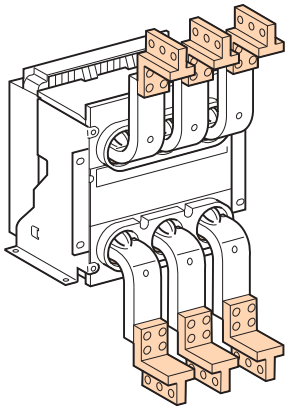
F : *datum.*

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

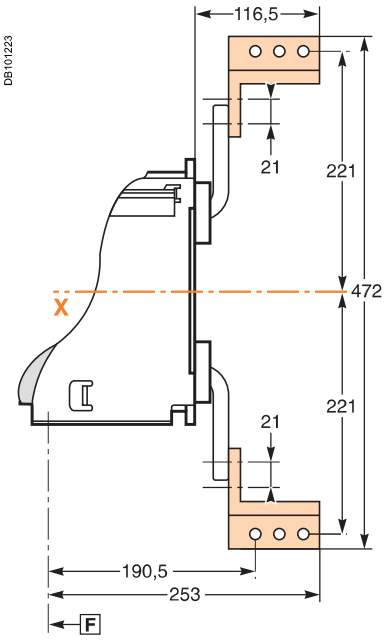
Connections

Front connection via vertical connection adapters

DB101222

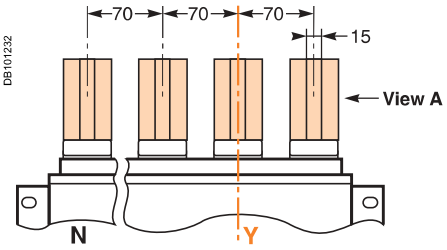


DB101223

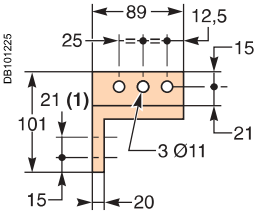


Detail

DB101232



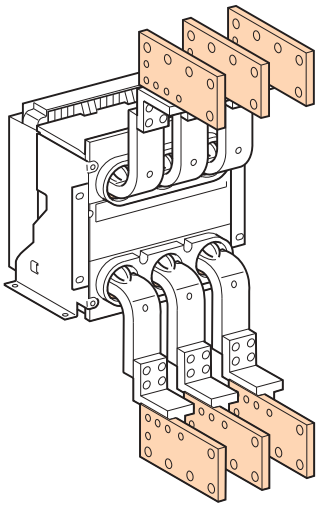
DB101225



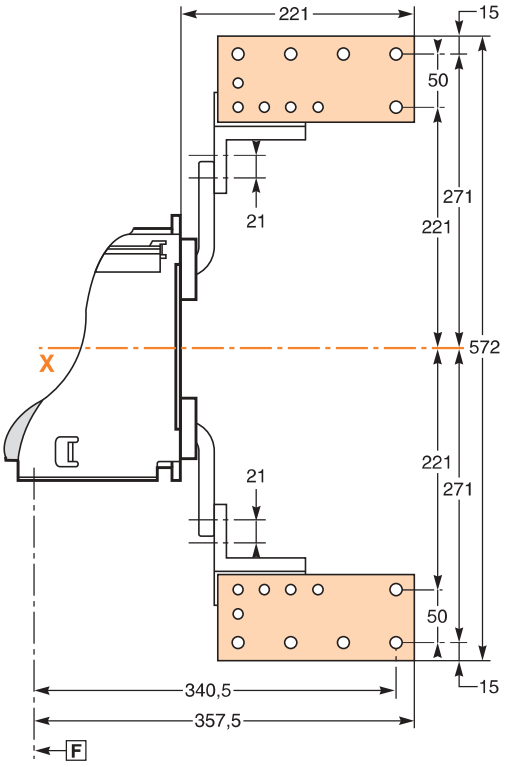
View A detail.

Front connection via vertical connection adapters fitted with cable-lug adapters

DB101226

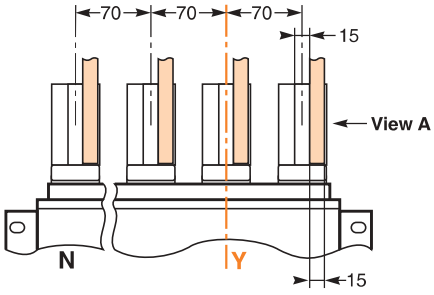


DB101227

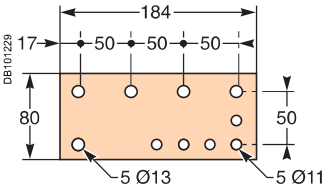


Detail

DB101233



DB101229



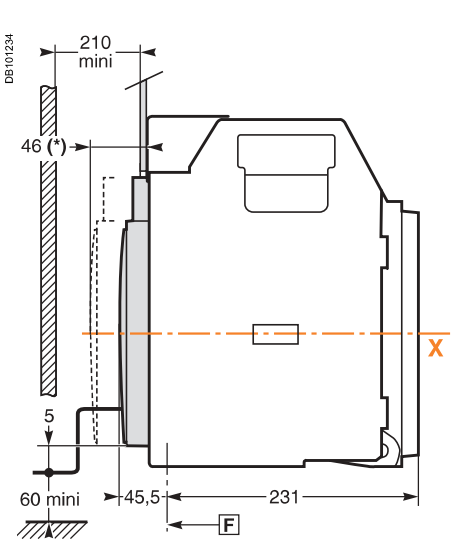
View A detail.

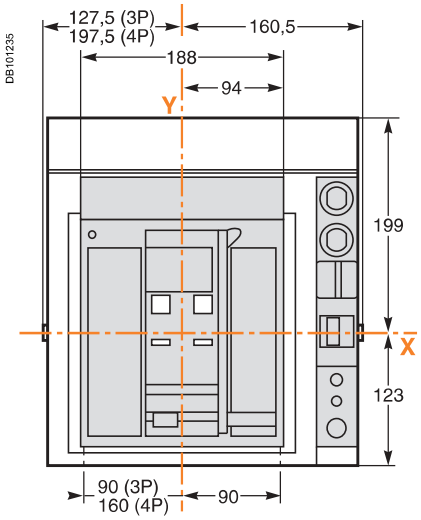
Note: *recommended connection screws:* ***M10*** *class 8.8. Tightening torque:* ***50 Nm*** *with contact washer.*

(1) *2 connection possibilities on vertical connection adapters (21 mm between centres).*

NT06 to NT16 circuit breakers
Drawout 3/4-poles device

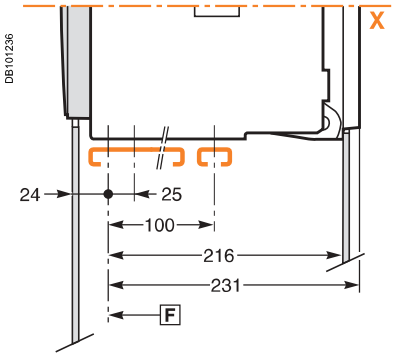
Dimensions

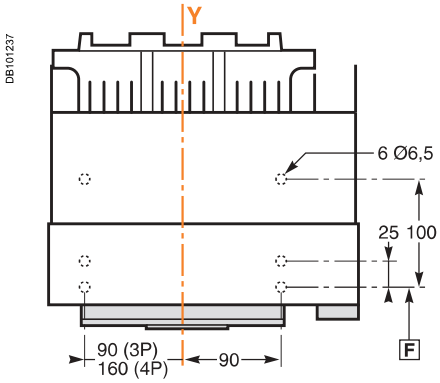




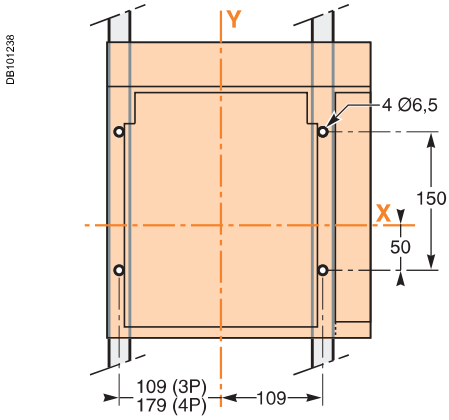
(*) Disconnected position.

Bottom mounting (on base plate or rails)

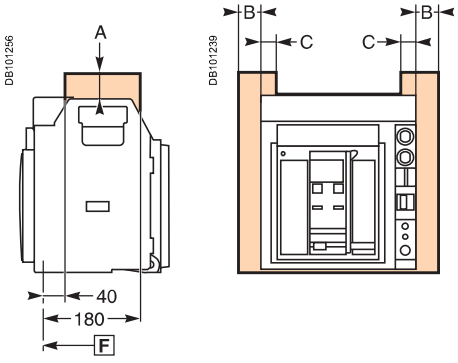




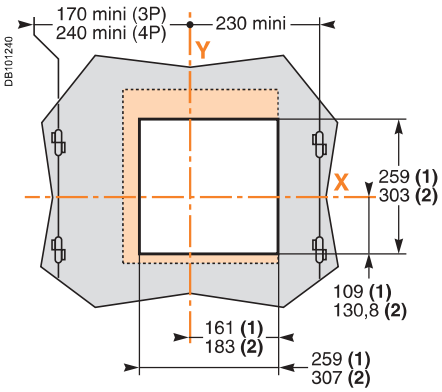
Rear mounting detail (on upright or backplate)



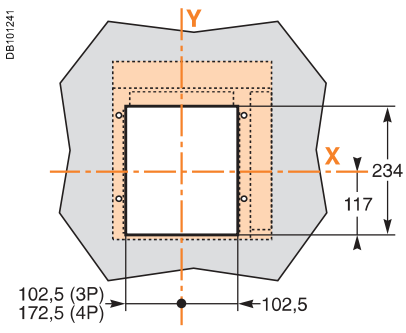
Safety clearances



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

F : *datum.*

***(1)** Without escutcheon.*

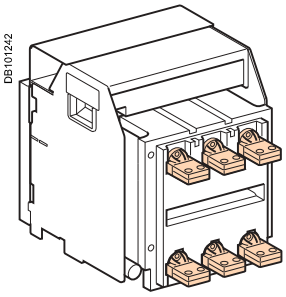
***(2)** With escutcheon.*

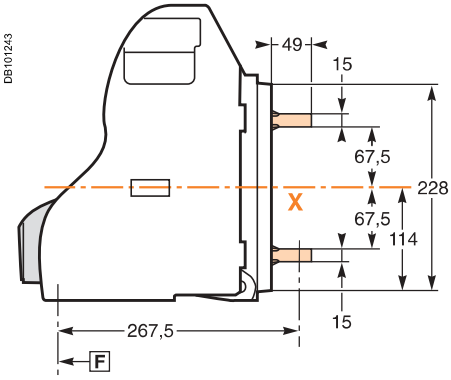
***Note:** X and Y are the symmetry planes for a 3-pole device.*

NT06 to NT16 circuit breakers
Drawout 3/4-poles device

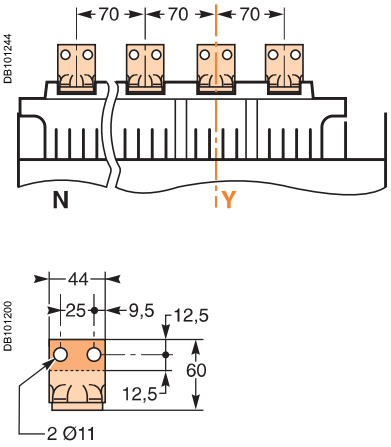
Connections

Horizontal rear connection

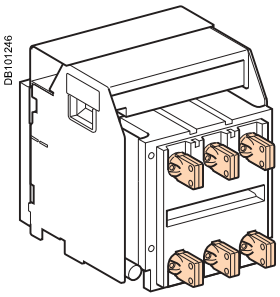


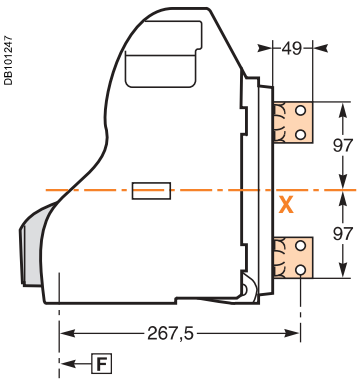


Detail

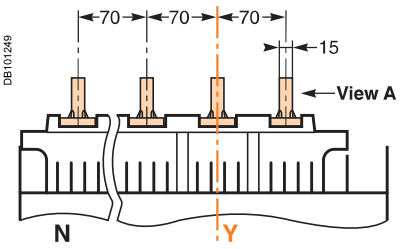


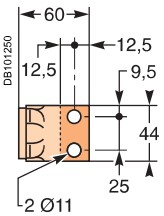
Vertical rear connection





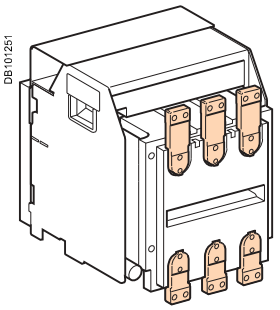
Detail

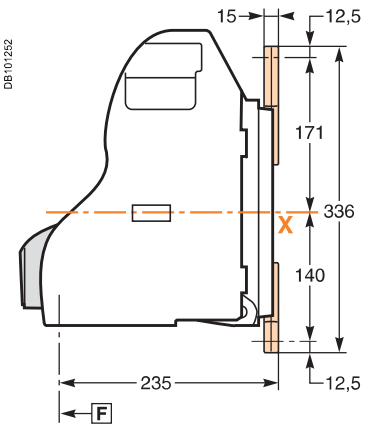




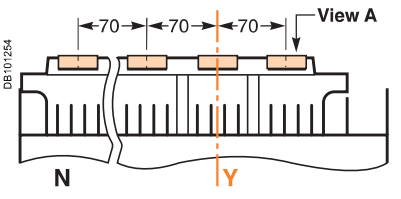
View A detail.

Front connection

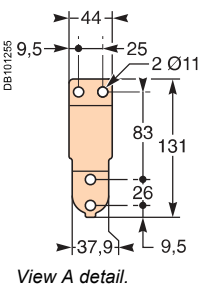




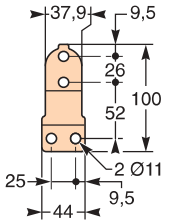
Detail



Top connection



Bottom connection



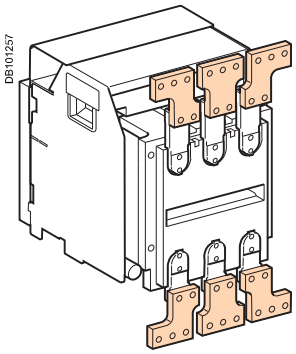
View A detail.

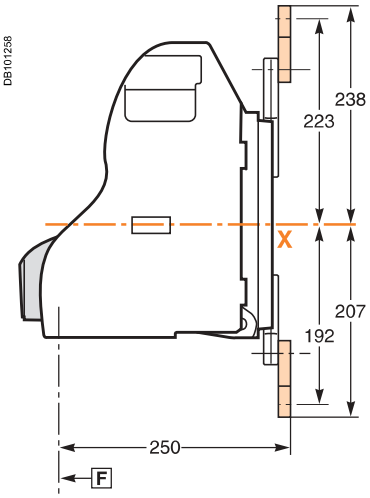
Note: *recommended connection screws:* ***M10*** *class 8.8.*
Tightening torque: ***50 Nm*** *with contact washer.*

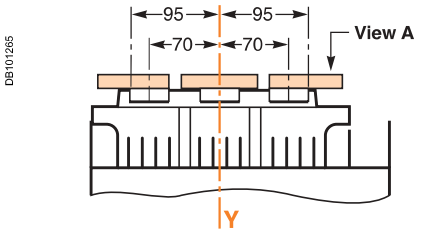
NT06 to NT16 circuit breakers
Drawout 3/4-poles device

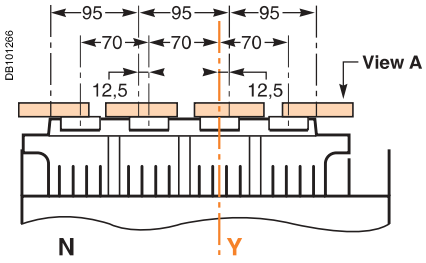
Connections

Front connection with spreaders



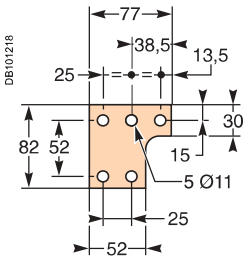






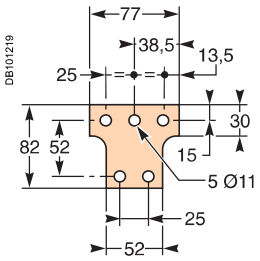
Spreader detail

Middle left or middle right spreader for 4P.

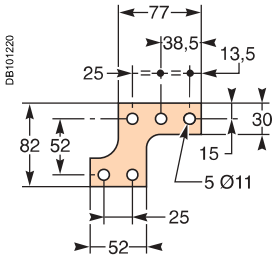


View A detail.

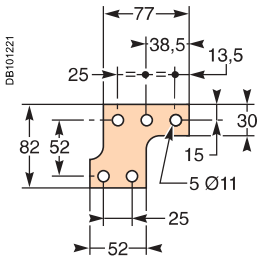
Middle spreader for 3P.



Left or right spreader for 4P.



Left or right spreader for 3P.

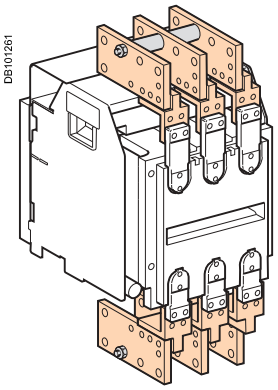


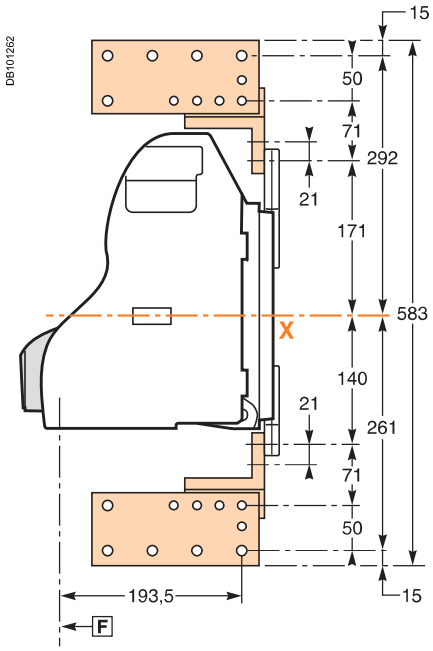
F : datum.

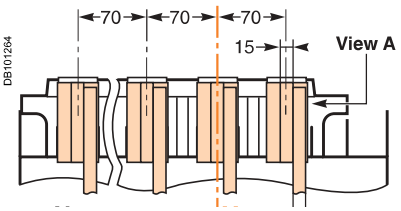
***Note:** X and Y are the symmetry planes for a 3-pole device.*

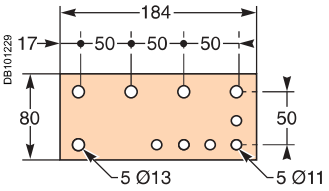
Connections

Front connection via vertical connection adapters fitted with cable-lug adapters







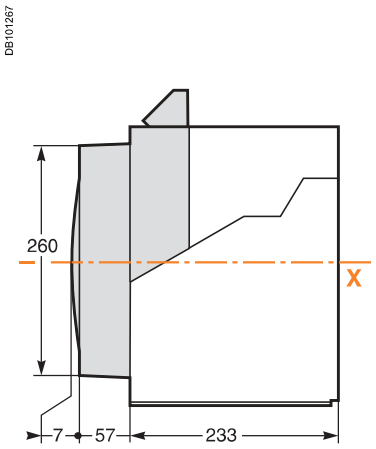


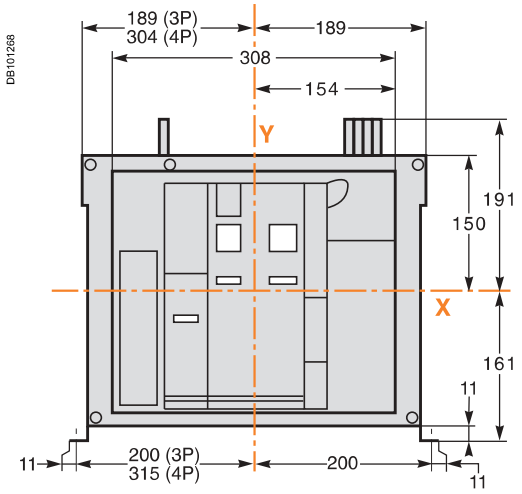
View A detail.

Note: *recommended connection screws:* ***M10*** *class 8.8.*
Tightening torque: ***50 Nm*** *with contact washer.*

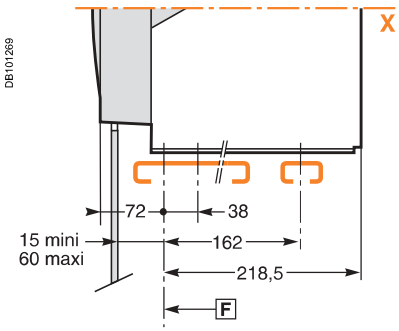
NW08 to NW32 circuit breakers
Fixed 3/4-poles device

Dimensions

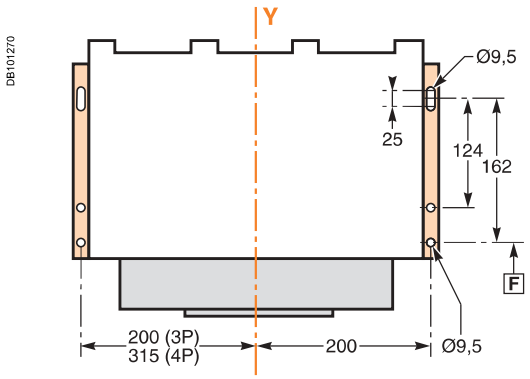




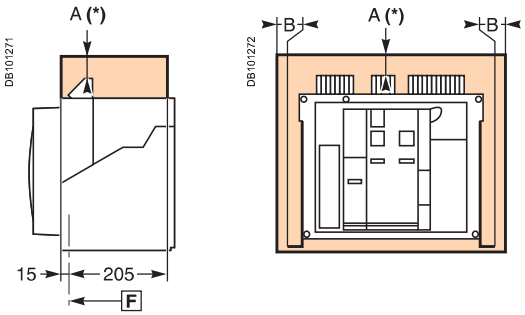
Mounting on base plate or rails



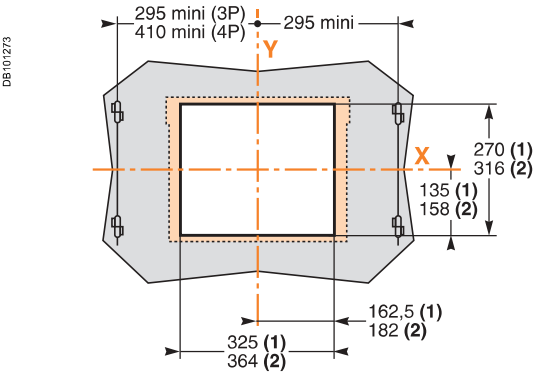
Mounting detail



Safety clearances



Door cutout



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

F : datum.

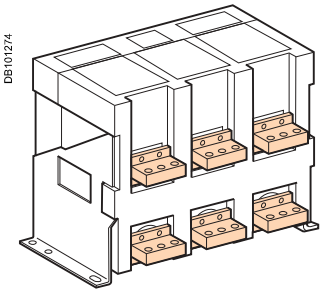
(1) Without escutcheon.
(2) With escutcheon.

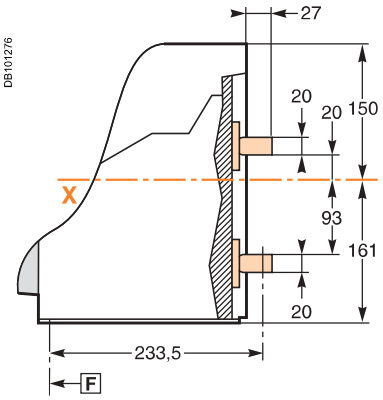
***Note:** X and Y are the symmetry planes for a 3-pole device.*
***A(*)** An overhead clearance of 50 mm is required to remove the arc chutes.*
An overhead clearance of 20 mm is required to remove the terminal block.

NW08 to NW32 circuit breakers
Fixed 3/4-poles device

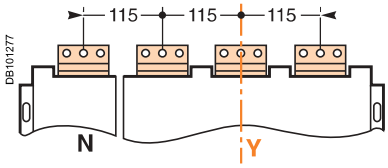
Connections

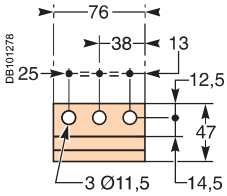
Horizontal rear connection



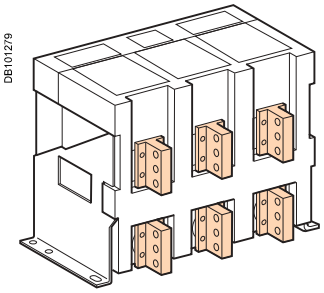


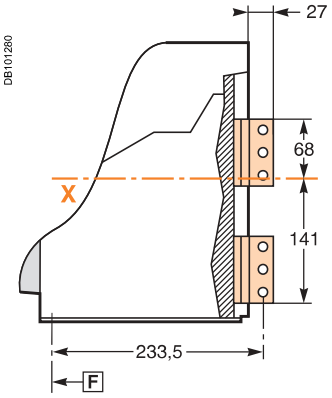
Detail



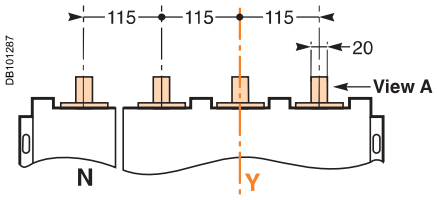


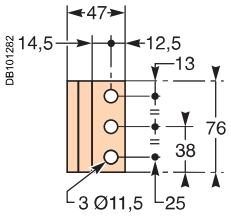
Vertical rear connection





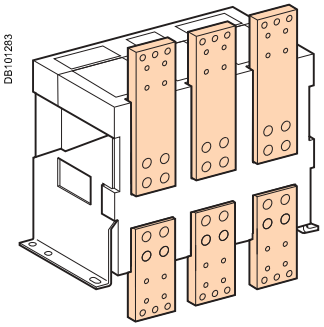
Detail

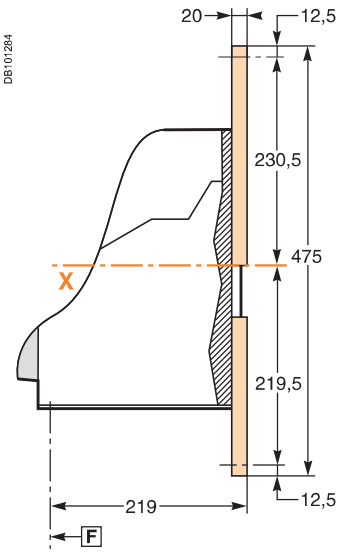




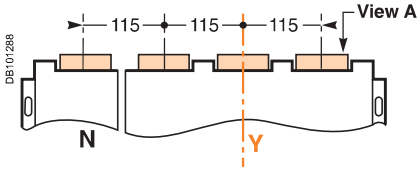
View A detail.

Front connection

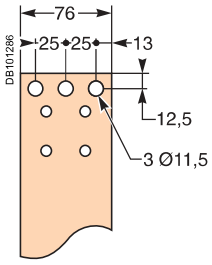




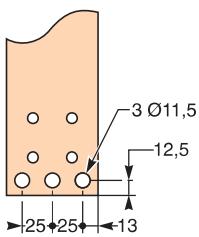
Detail



Top connection



Bottom connection

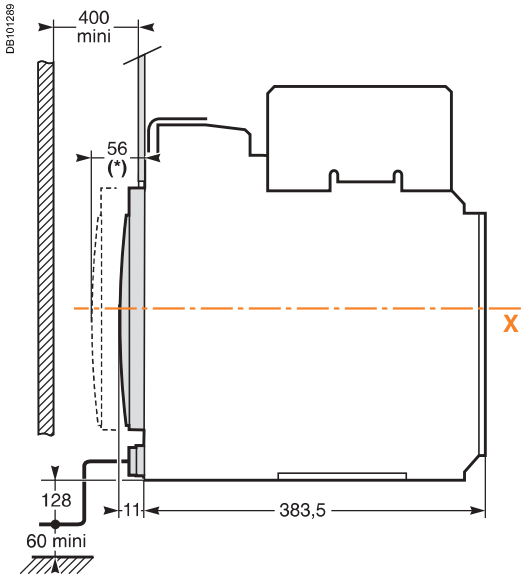


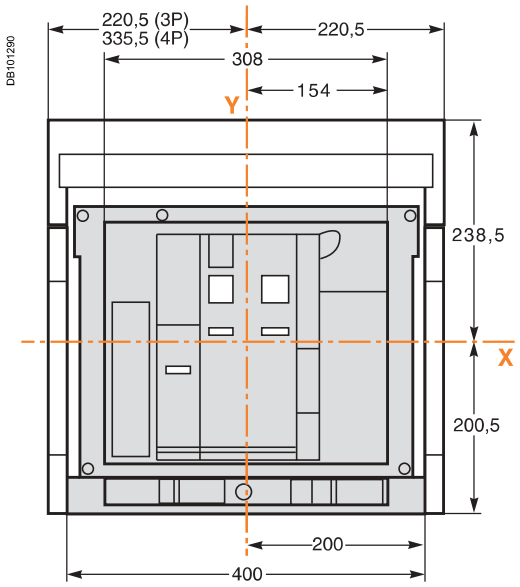
View A detail.

Note: *recommended connection screws:* ***M10*** *class 8.8.*
Tightening torque: ***50 Nm*** *with contact washer.*

NW08 to NW32 circuit breakers
Drawout 3/4-poles device

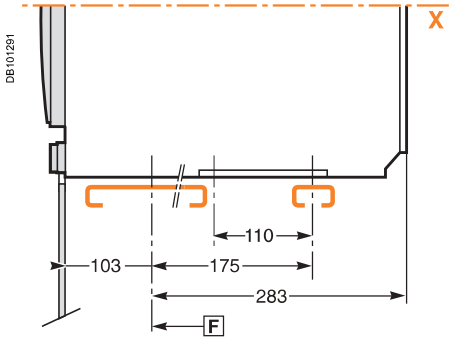
Dimensions



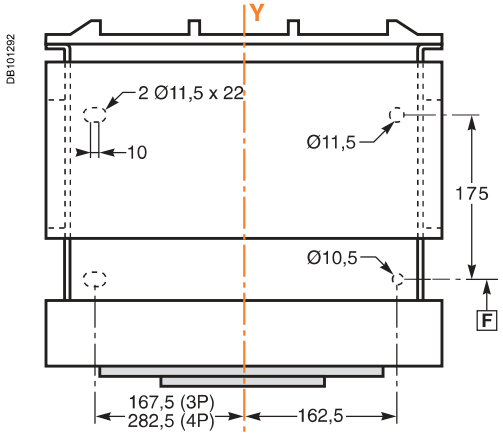


(*) Disconnected position.

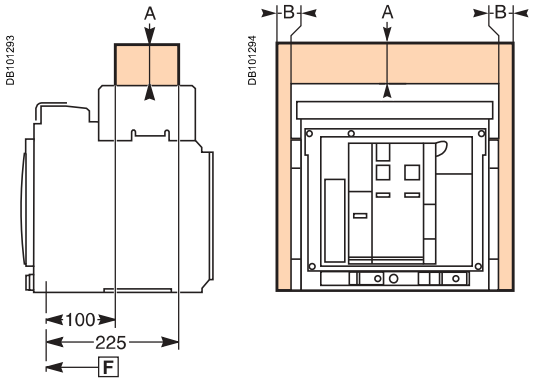
Mounting on base plate or rails



Mounting detail



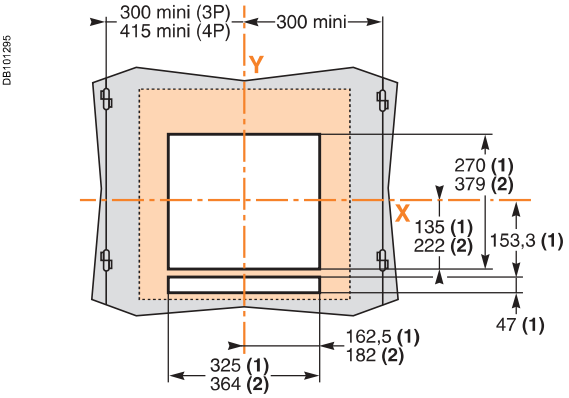
Safety clearances



	Insulated parts	Metal parts	Energised parts
A	0	0	0
B	0	0	60

F : datum.

Door cutout



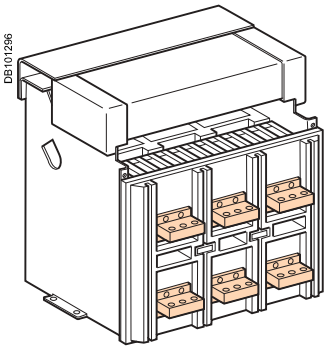
(1) Without escutcheon.
(2) With escutcheon.

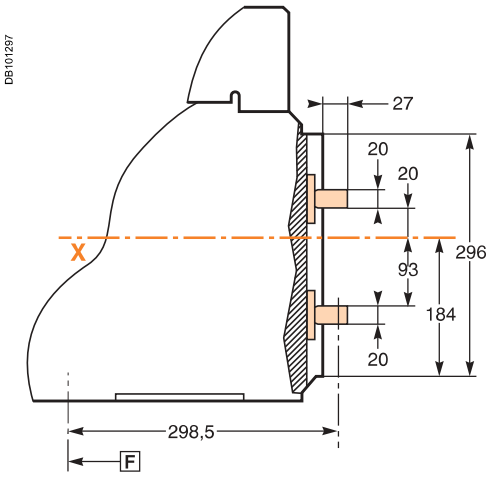
***Note:** X and Y are the symmetry planes for a 3-pole device.*

NW08 to NW32 circuit breakers
Drawout 3/4-poles device

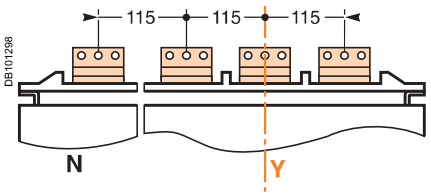
Connections

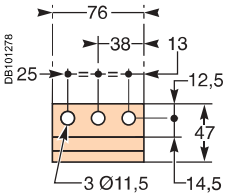
Horizontal rear connection



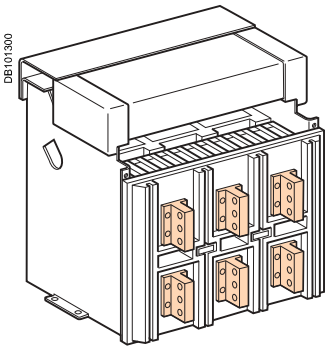


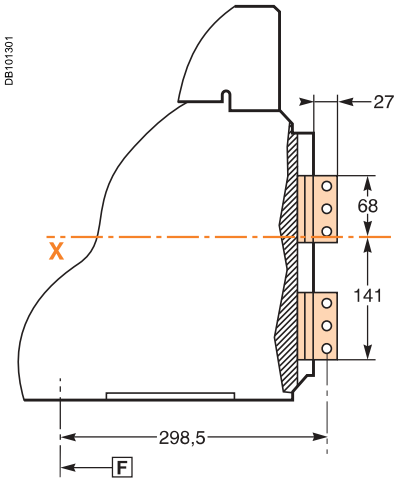
Detail



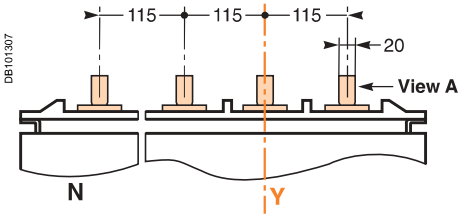


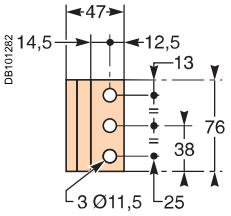
Vertical rear connection





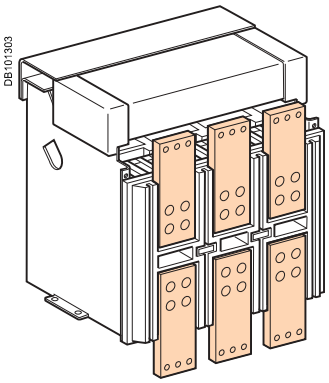
Detail

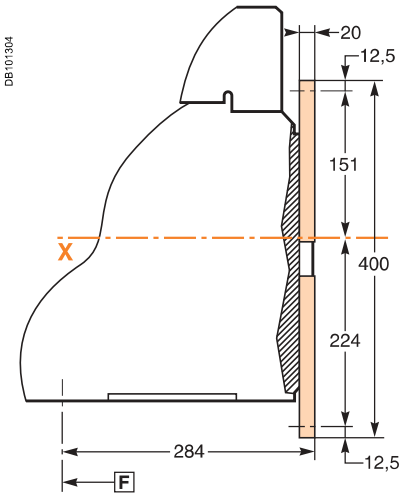




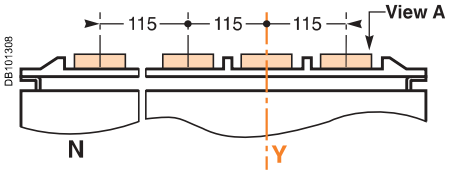
View A detail.

Front connection

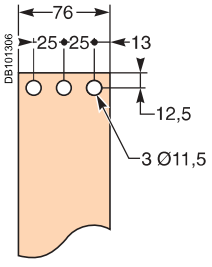




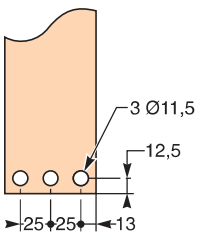
Detail



Top connection



Bottom connection

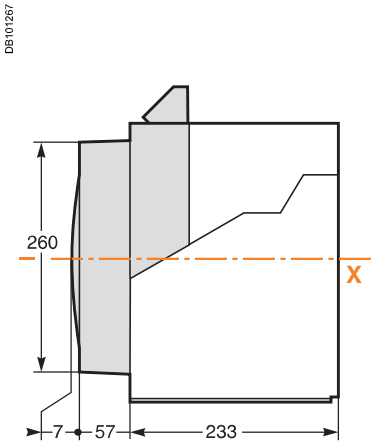


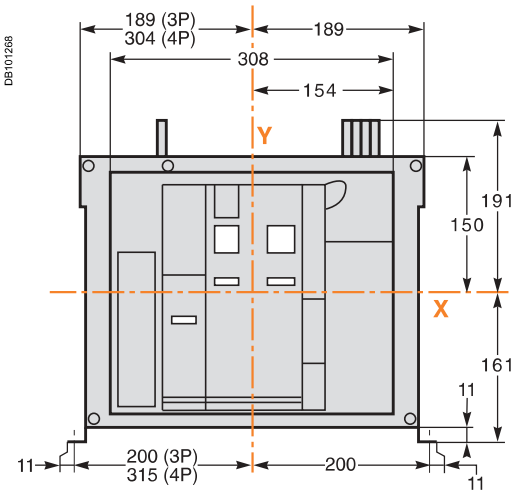
View A detail.

Note: *recommended connection screws:* ***M10*** *class 8.8.*
Tightening torque: ***50 Nm*** *with contact washer.*

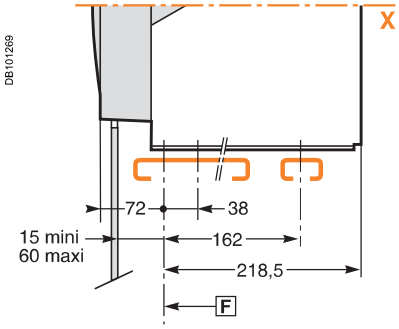
NW40 circuit breakers
Fixed 3/4-poles device

Dimensions

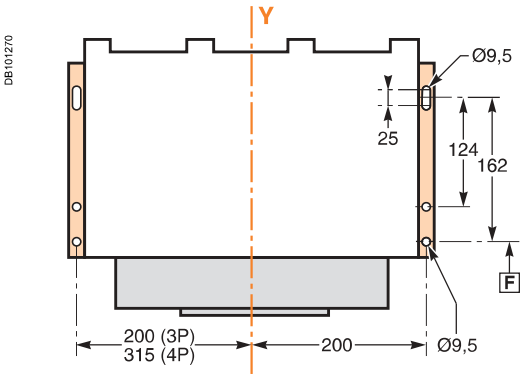




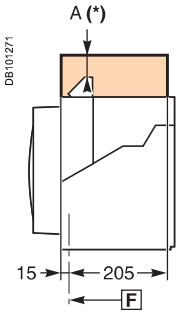
Mounting on base plate or rails

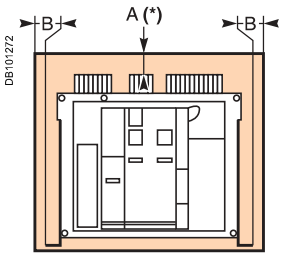


Mounting detail

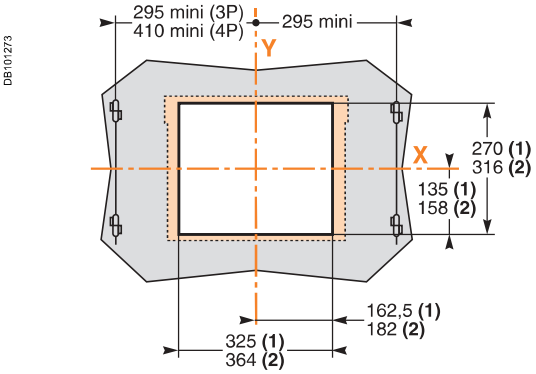


Safety clearances





Door cutout



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

F : *datum.*

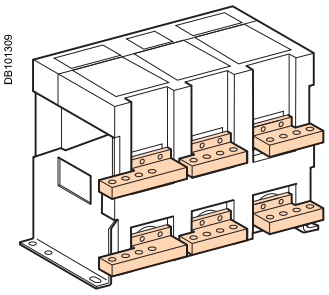
***(1)** Without escutcheon.*
***(2)** With escutcheon.*

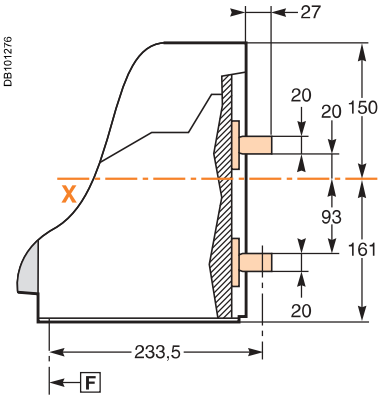
***Note:** X and Y are the symmetry planes for a 3-pole device.*
***A(*)** An overhead clearance of 110 mm is required to remove the arc chutes.*
An overhead clearance of 20 mm is required to remove the terminal block.

NW40 circuit breakers
Fixed 3/4-poles device

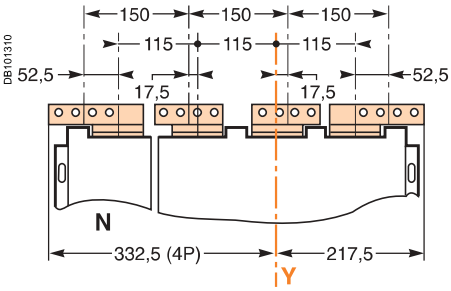
Connections

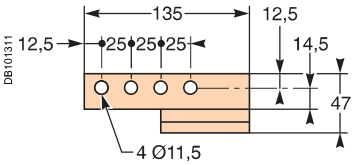
Horizontal rear connection

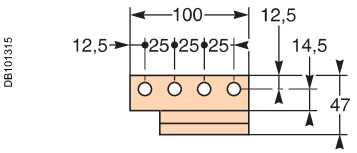




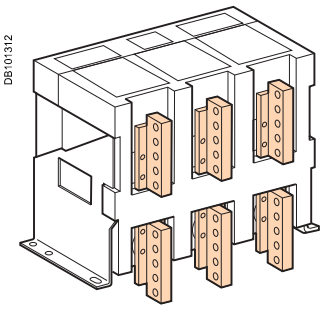
Detail

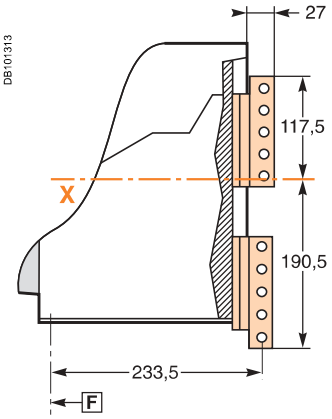




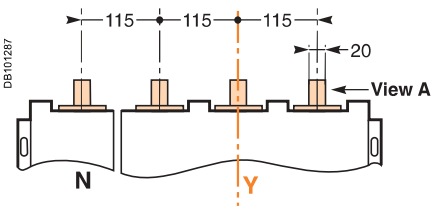


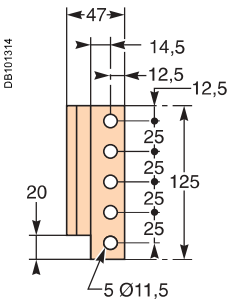
Vertical rear connection





Detail

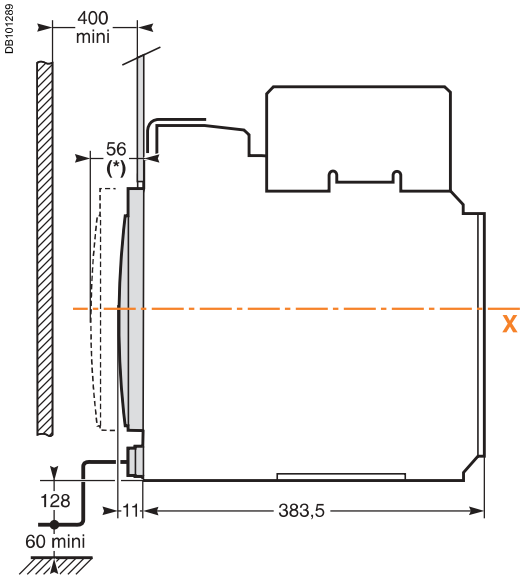


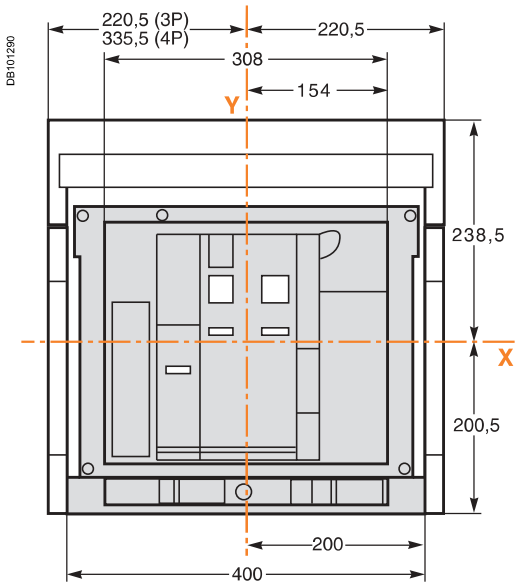


Note: *recommended connection screws:* ***M10*** *class 8.8.*
Tightening torque: ***50 Nm*** *with contact washer.*

NW40 circuit breakers
Drawout 3/4-poles device

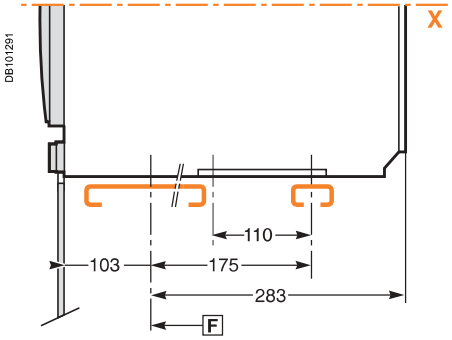
Dimensions



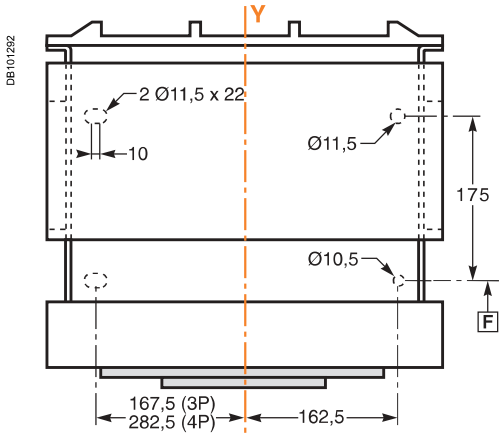


(*) Disconnected position.

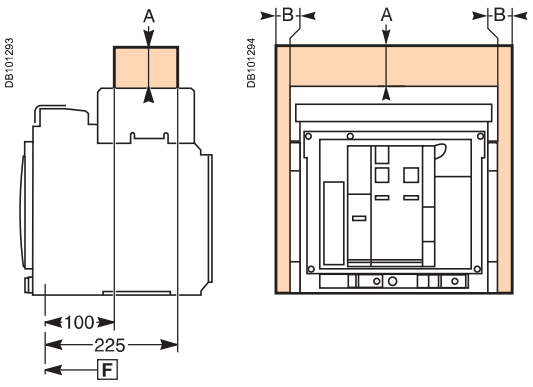
Mounting on base plate or rails



Mounting detail



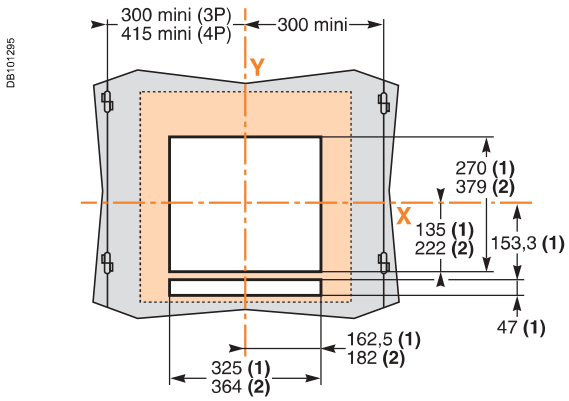
Safety clearances



	Insulated parts	Metal parts	Energised parts
A	0	0	0
B	0	0	60

F : datum.

Door cutout



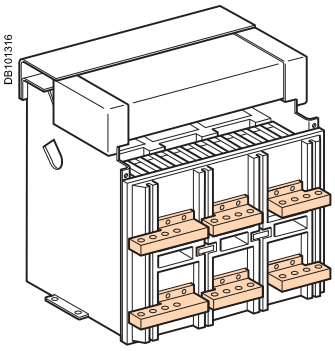
(1) Without escutcheon.
(2) With escutcheon.

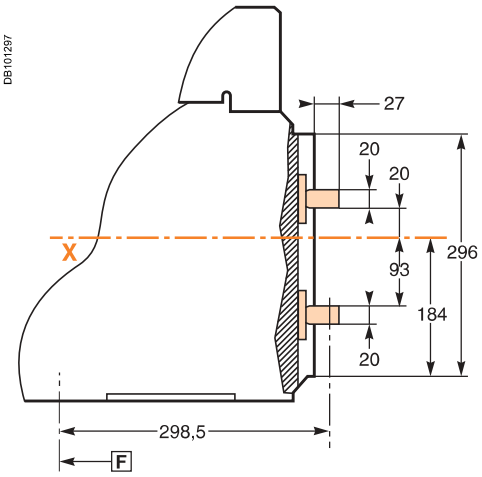
***Note:** X and Y are the symmetry planes for a 3-pole device.*
The safety clearances take into account the space required to remove the arc chutes.

NW40 circuit breakers
Drawout 3/4-poles device

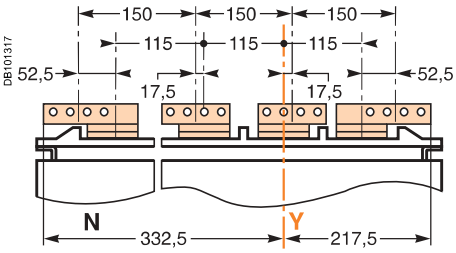
Connections

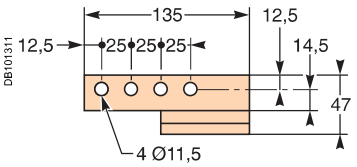
Horizontal rear connection

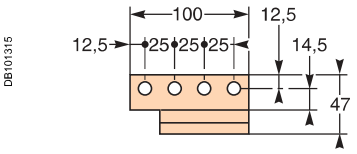




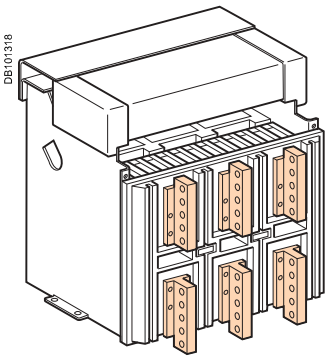
Detail

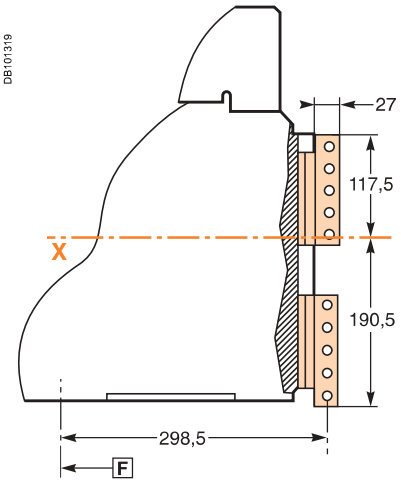


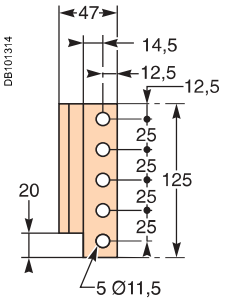




Vertical rear connection

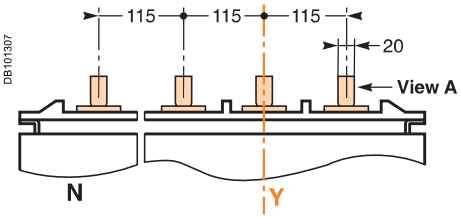






View A detail.

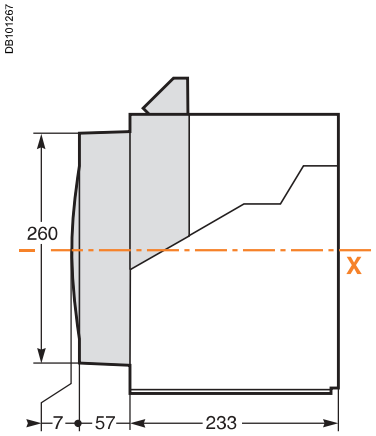
Detail

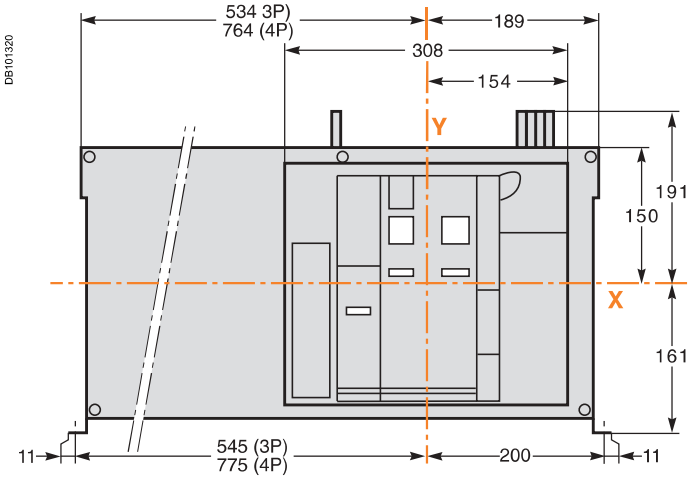


Note: *recommended connection screws:* ***M10*** *class 8.8.*
Tightening torque: ***50 Nm*** *with contact washer.*

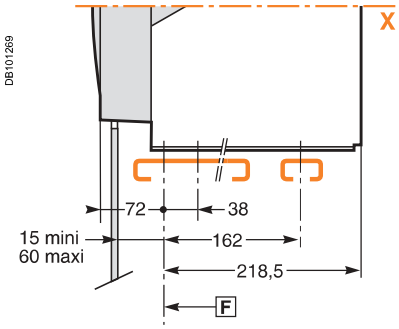
NW40b to NW63 circuit breakers
Fixed 3/4-poles device

Dimensions

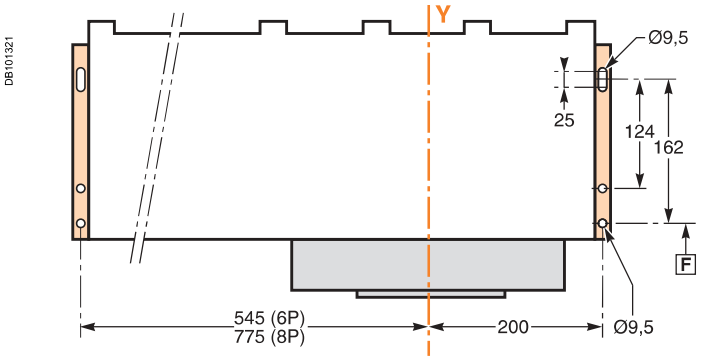




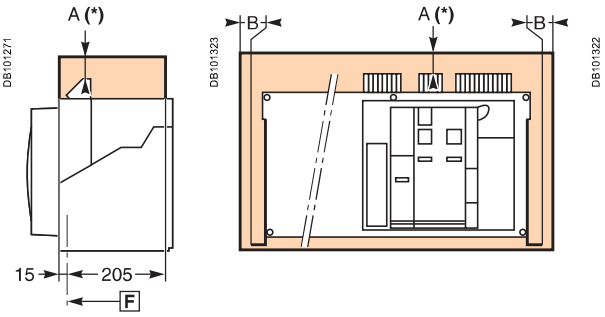
Mounting on base plate or rails



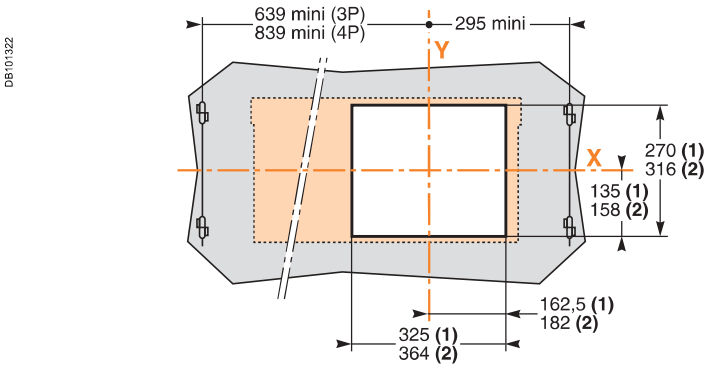
Mounting detail



Safety clearances



Door cutout



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

F : datum.

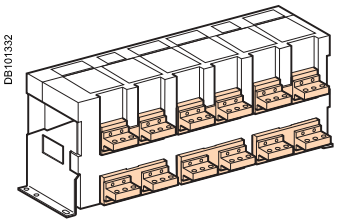
(1) Without escutcheon.
(2) With escutcheon.

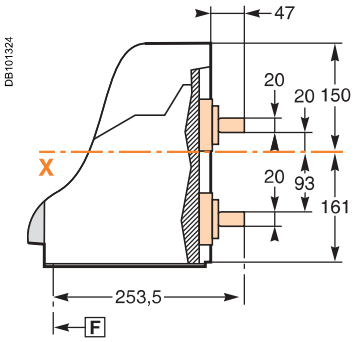
***Note:** X and Y are the symmetry planes for a 3-pole device.*
***A(*)** An overhead clearance of 110 mm is required to remove the arc chutes.*
An overhead clearance of 20 mm is required to remove the terminal block.

NW40b to NW63 circuit breakers
Fixed 3/4-poles device

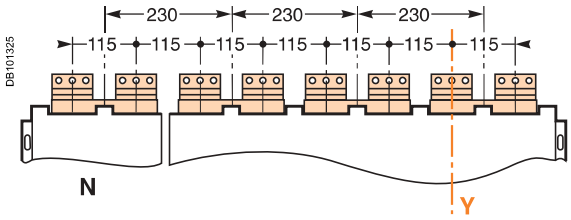
Connections

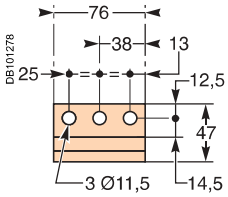
Horizontal rear connection (NW40b - NW50)



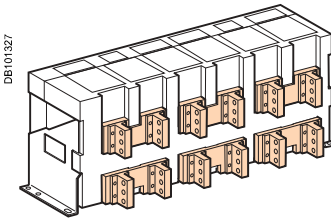


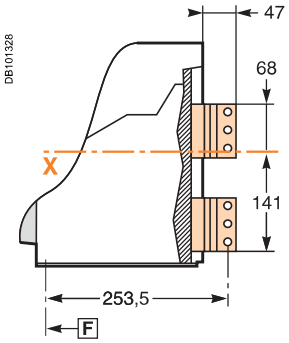
Detail



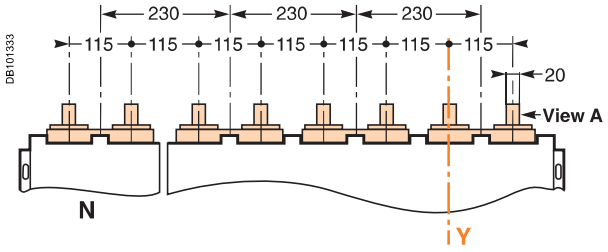


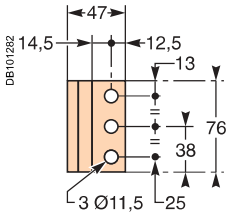
Vertical rear connection (NW40b - NW50)





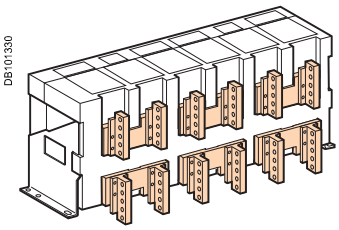
Detail

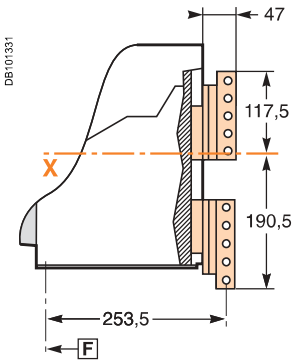




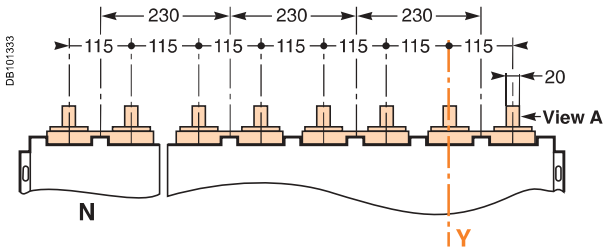
View A detail.

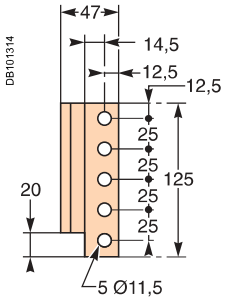
Vertical rear connection (NW63)





Detail



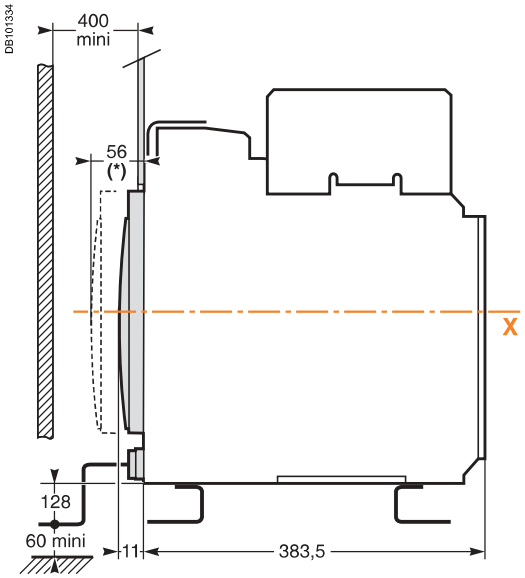


View A detail.

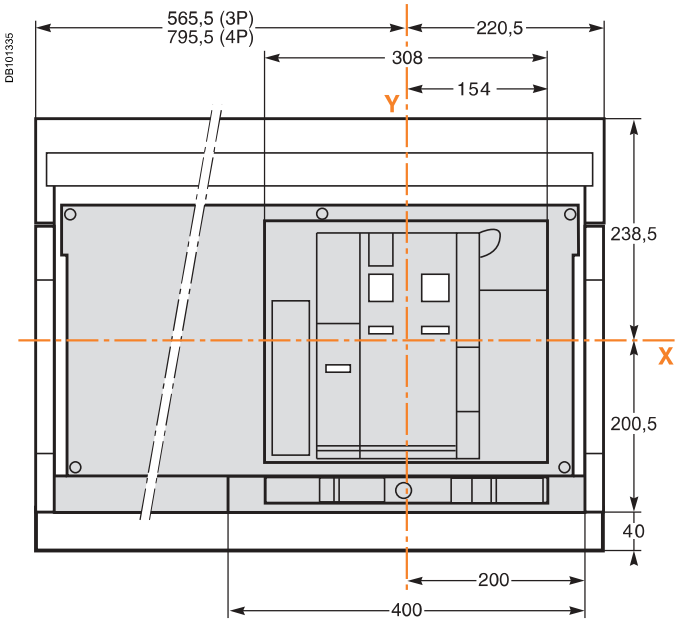
Note: *recommended connection screws:* ***M10*** *s/s class A4 80.*
Tightening torque: ***50 Nm*** *with contact washer.*

NW40b to NW63 circuit breakers
Drawout 3/4-poles device

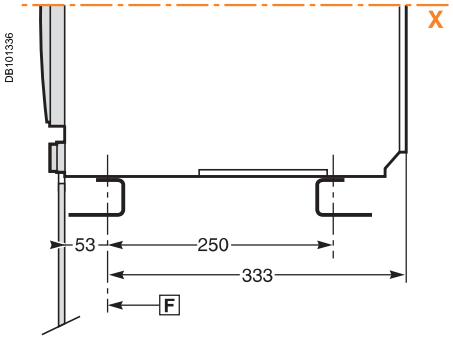
Dimensions



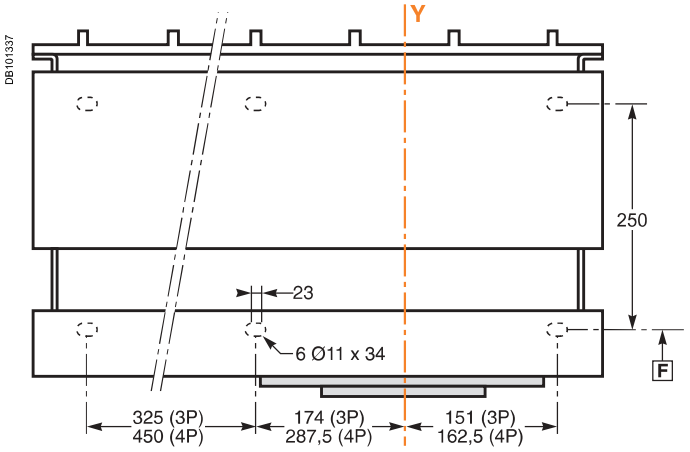
(*) *Disconnected position.*



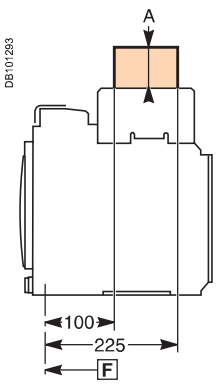
Mounting on base plate or rails

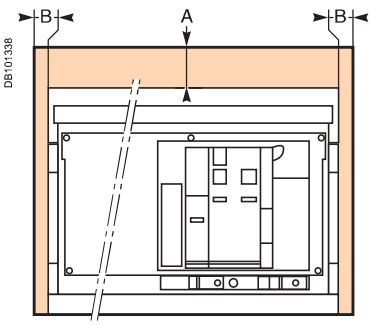


Mounting detail

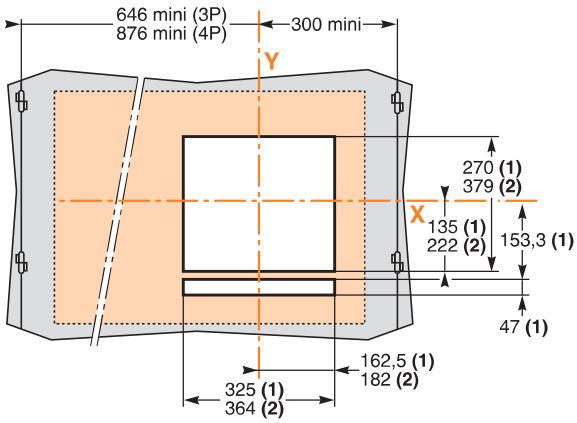


Safety clearances





Door cutout



	Insulated parts	Metal parts	Energised parts
A	0	0	0
B	0	0	60

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

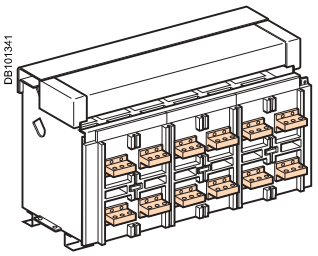
***Note:** X and Y are the symmetry planes for a 3-pole device.*

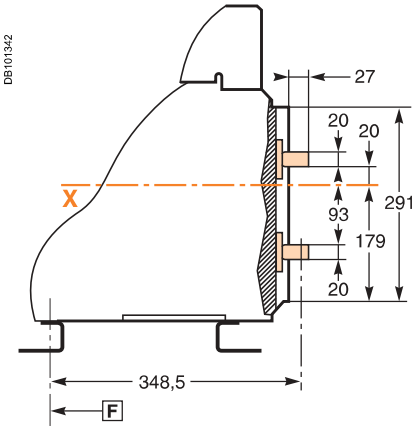
F *: datum.*

NW40b to NW63 circuit breakers
Drawout 3/4-poles device

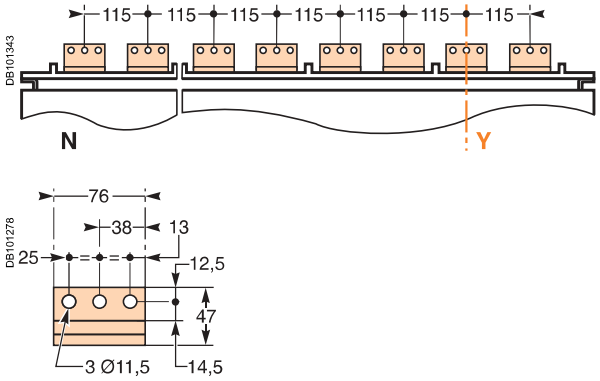
Connections

Horizontal rear connection (NW40b - NW50)

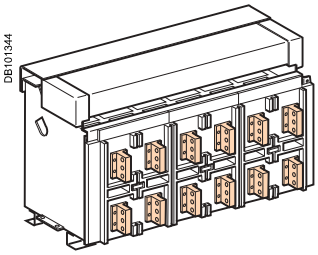


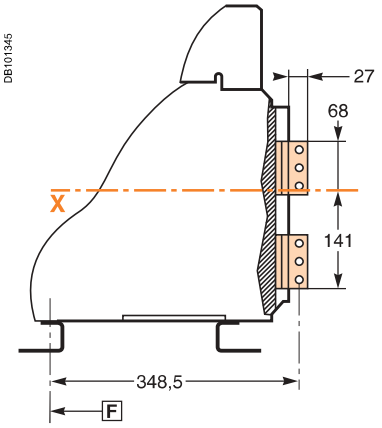


Detail

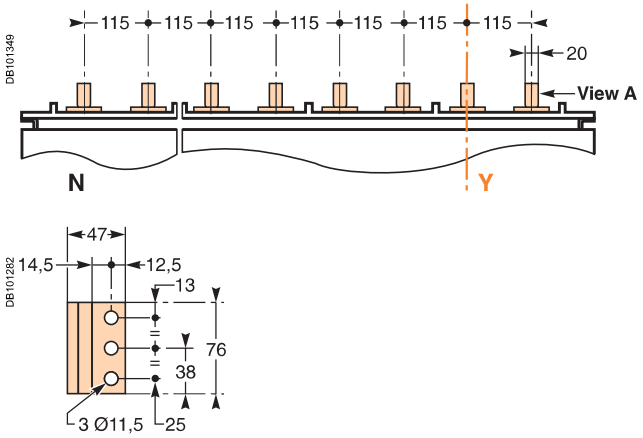


Vertical rear connection (NW40b - NW50)



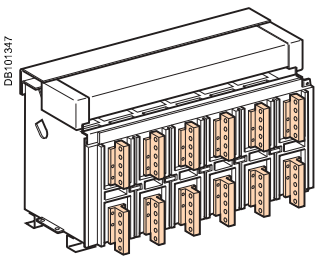


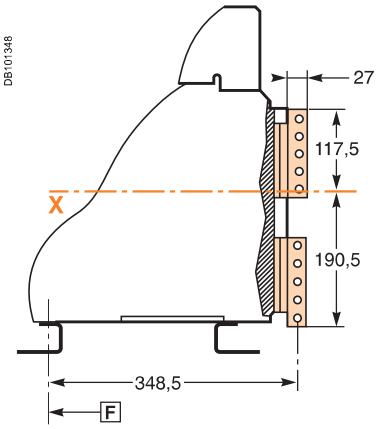
Detail



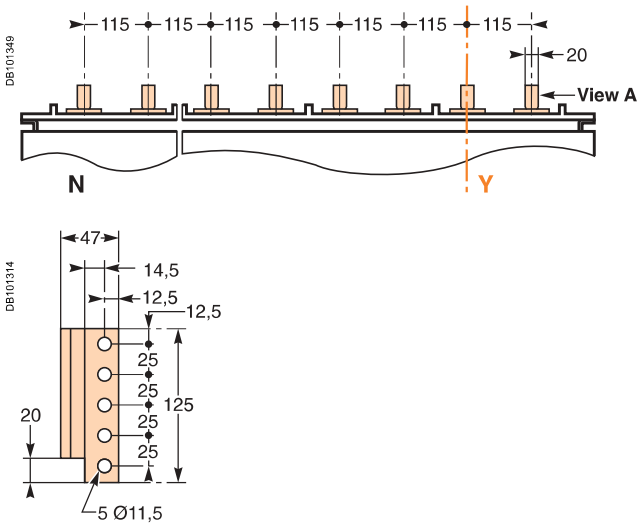
View A detail.

Vertical rear connection (NW63)





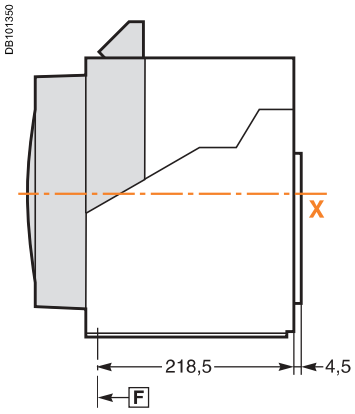
Detail

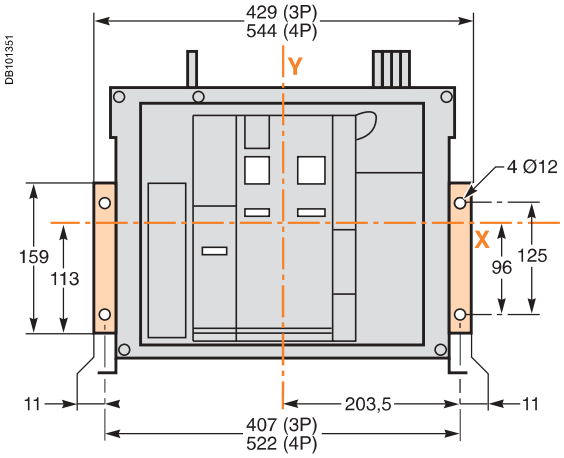


View A detail.

Note: *recommended connection screws:* ***M10*** *s/s class A4 80.*
Tightening torque: ***50 Nm*** *with contact washer.*

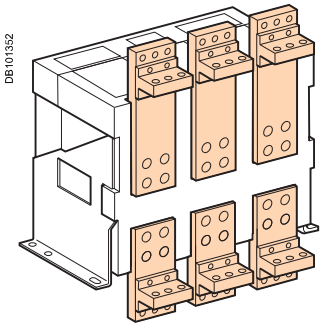
Mounting on backplate with special brackets (Masterpact NW08 to 32 fixed)

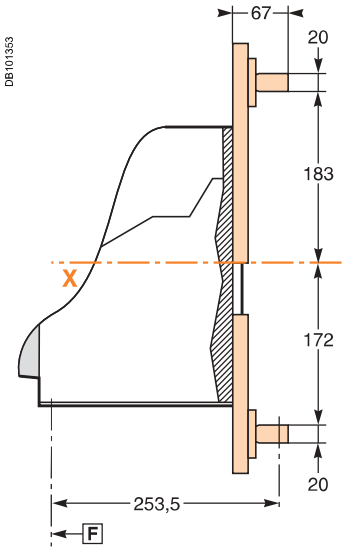




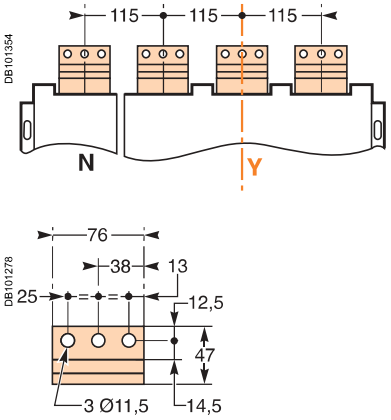
Disconnectable front-connection adapter (Masterpact NW08 to 32 fixed)

Horizontal rear connection



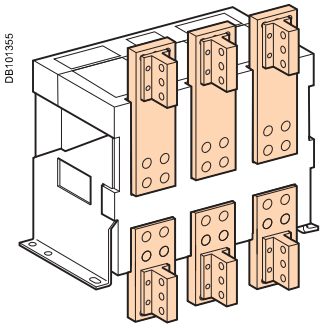


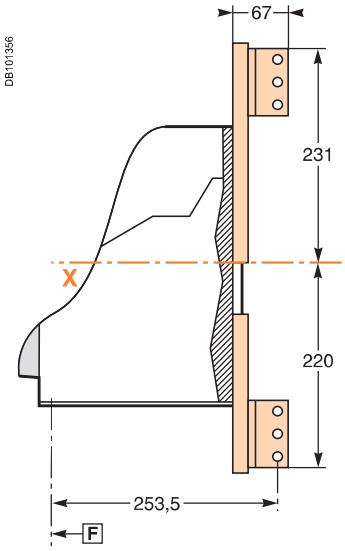
Detail



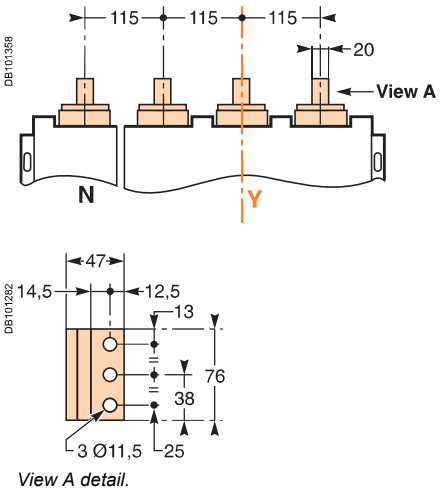
View A detail.

Vertical rear connection





Detail



View A detail.

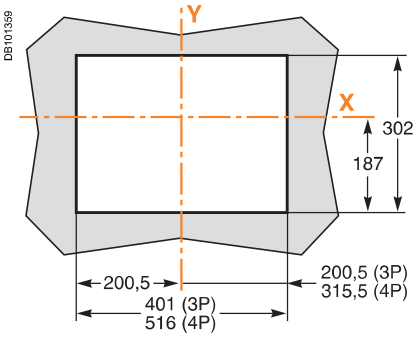
Note: *recommended connection screws:* ***M10*** *class 8.8.*
Tightening torque: ***50 Nm*** *with contact washer.*

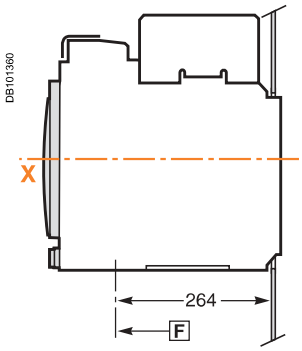
F *: datum.*

Rear panel cutout (drawout devices)

NW08 to NW40

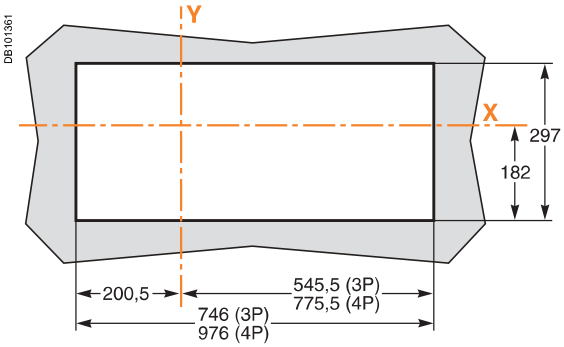
Rear view

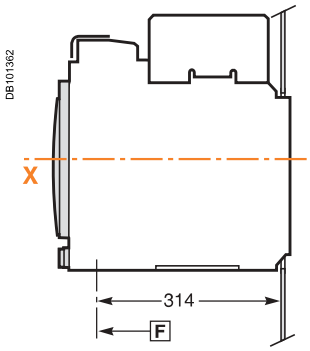




NW40b to NW63

Rear view

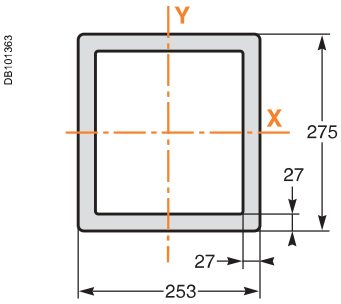




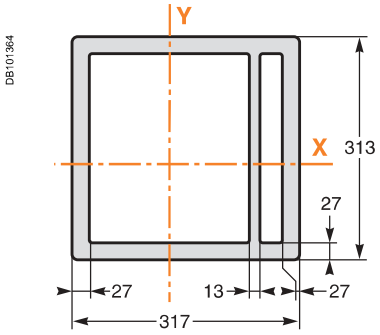
Escutcheon

Masterpact NT

Fixed device

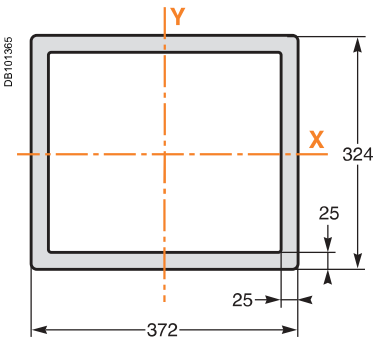


Drawout device

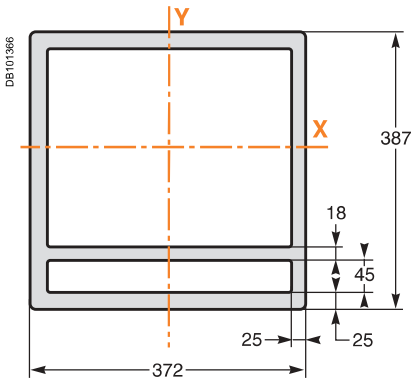


Masterpact NW

Fixed device



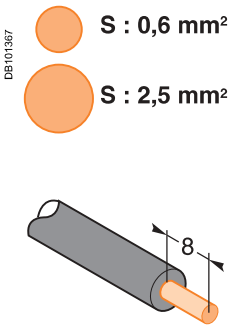
Drawout device

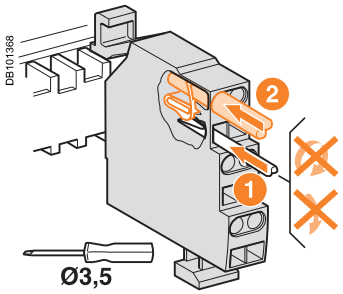


F : *datum.*

NT/NW external modules

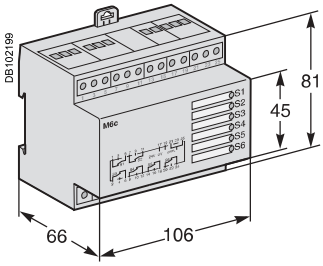
Connection of auxilary wiring to terminal block

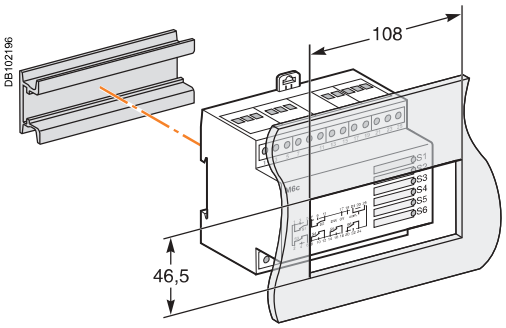




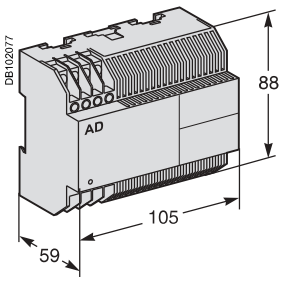
One conductor only per connection point.

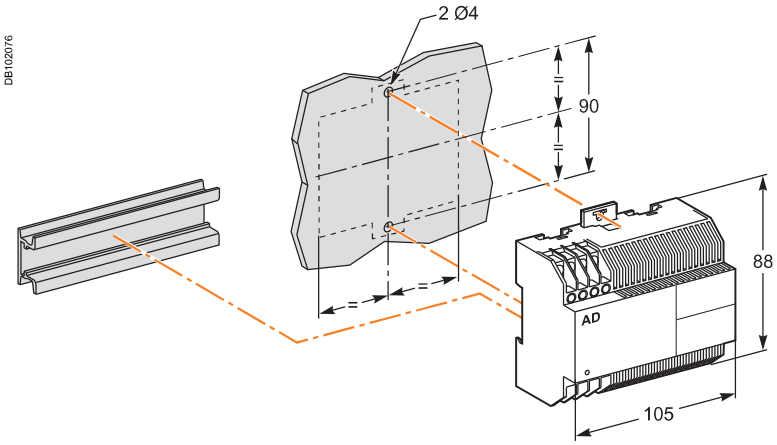
M6C relay module





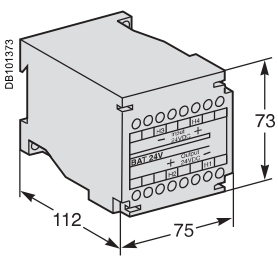
External power supply module (AD)

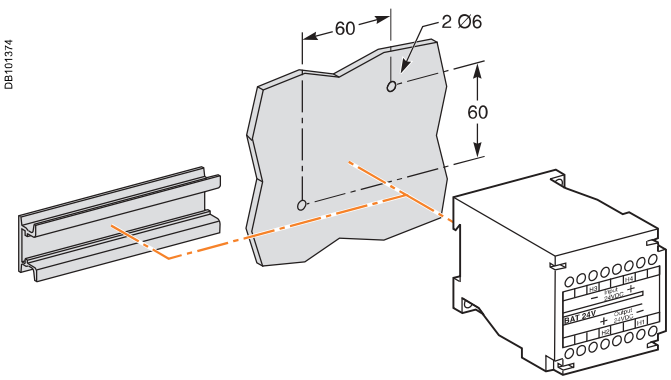




Battery module (BAT)

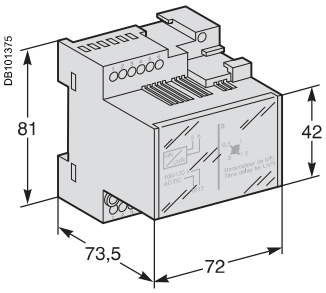
Mounting

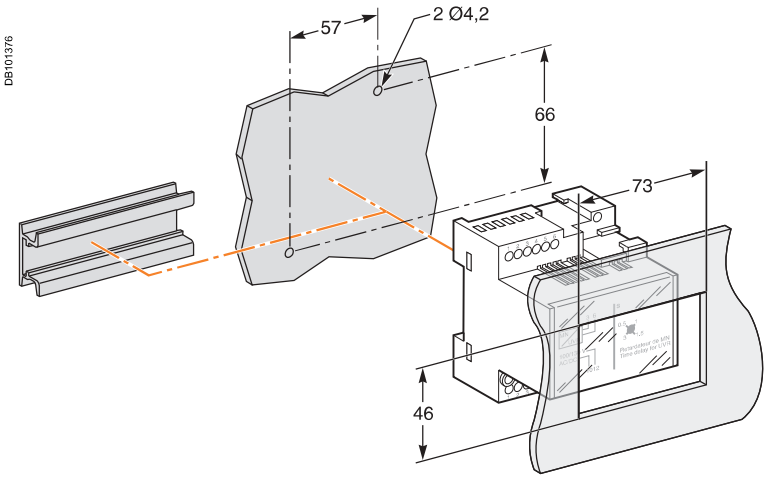




Delay unit for MN release

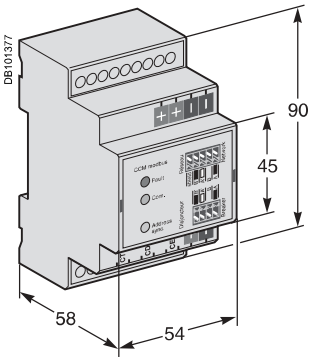
MNR



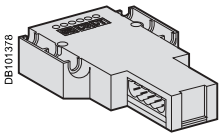


"Chassis" communication module

ModBUS

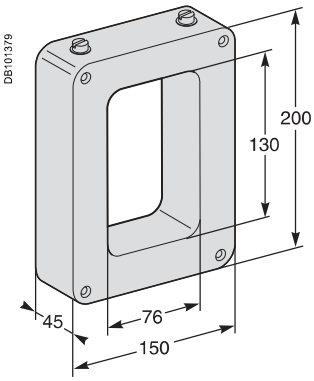


BatiBUS

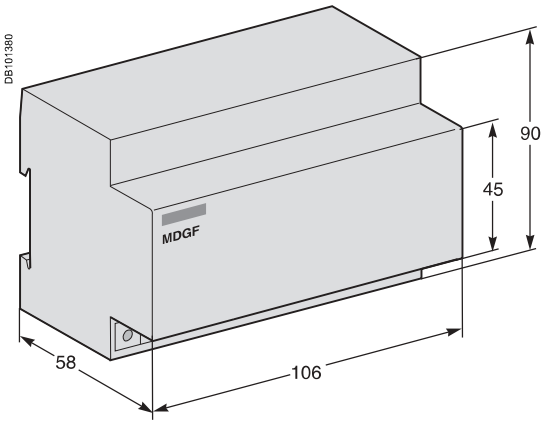


External sensor for source ground return (SGR) protection

Sensor



"MGDF summer" module

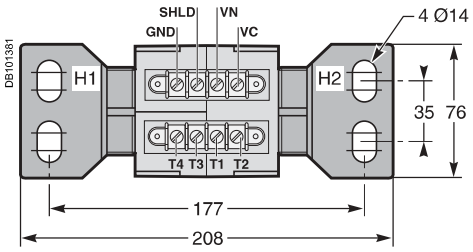


NT/NW external modules

External sensor for external neutral

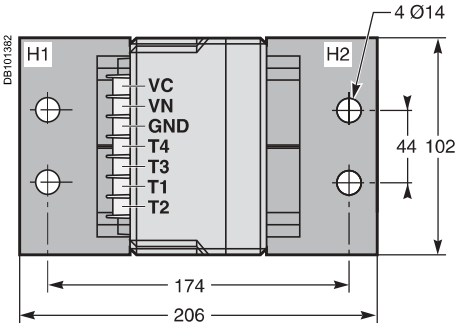
Dimensions

400/1600 A (NT06 to NT16)



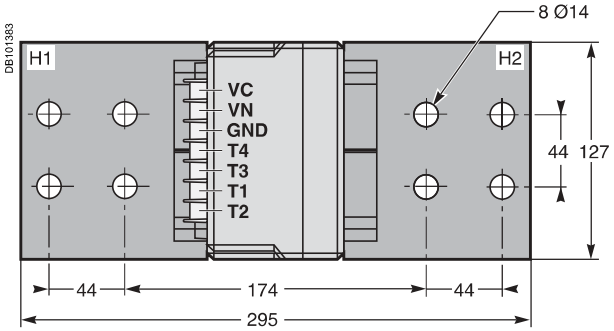
High: 137 mm.

400/2000 A (NW08 to NW20)



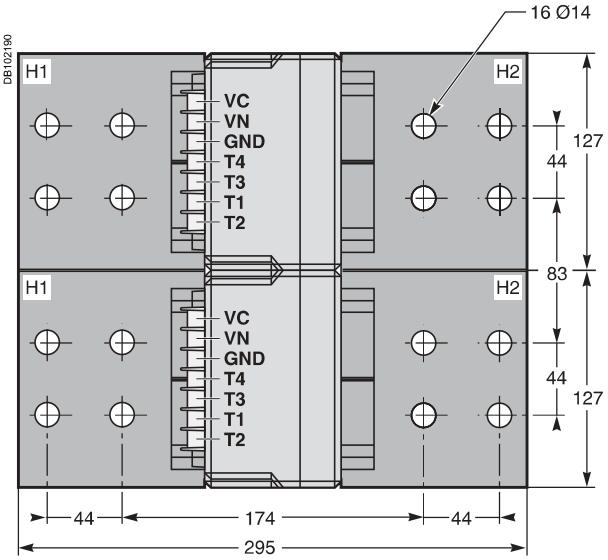
High: 162 mm.

1000/4000 A (NW025 to NW40)



High: 162 mm.

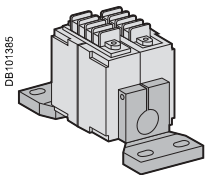
2000/6300 A (NW40b to NW63)



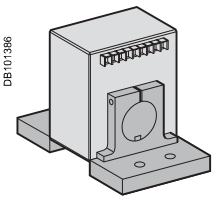
High: 168 mm.

Installation

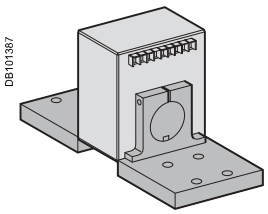
400/1600 A (NT06 to NT16)



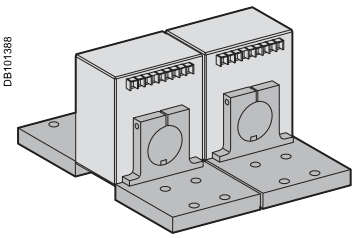
400/2000 A (NW08 to NW20)



1000/4000 A (NW025 to NW40)



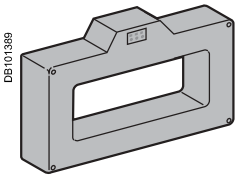
2000/6300 A (NW40b to NW63)

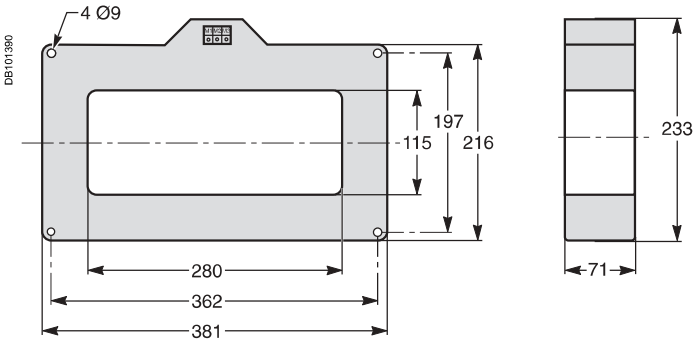


2 identical external sensor shipped as loosed part.

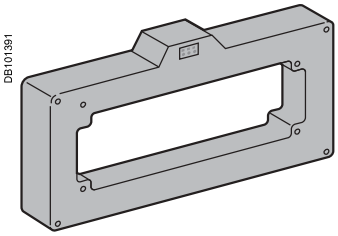
Rectangular sensor for earth leakage protection (Vigi)

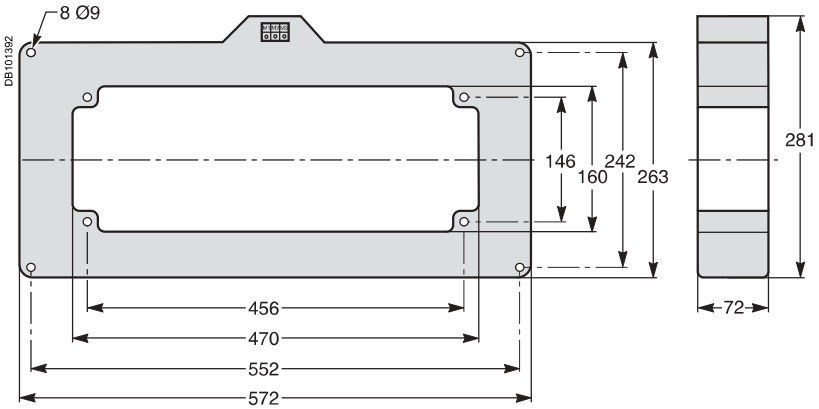
280 x 115 mm window





470 x 160 mm window

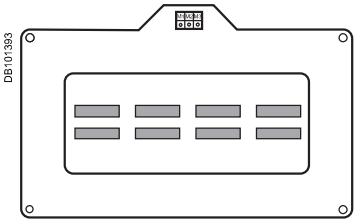




Busbars	I ⩽ 1600 A	I ⩽ 3200
Window (mm)	280 x 115	470 x 160
Weight (kg)	14	18

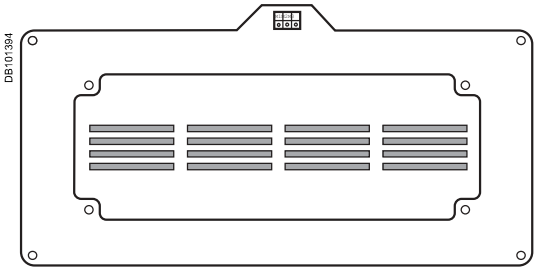
Busbars path

280 x 115 window
Busbars spaced 70 mm centre-to-centre

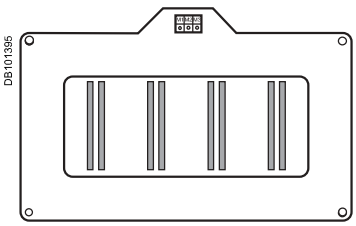


2 bars 50 x 10.

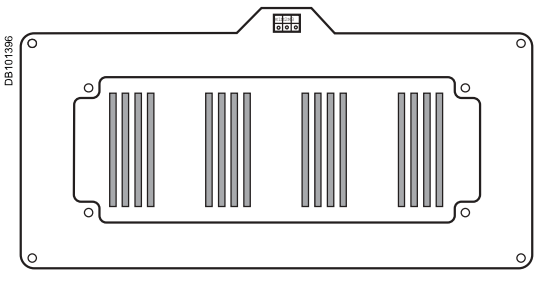
470 x 160 window
Busbars spaced 115 mm centre-to-centre



4 bars 100 x 5.



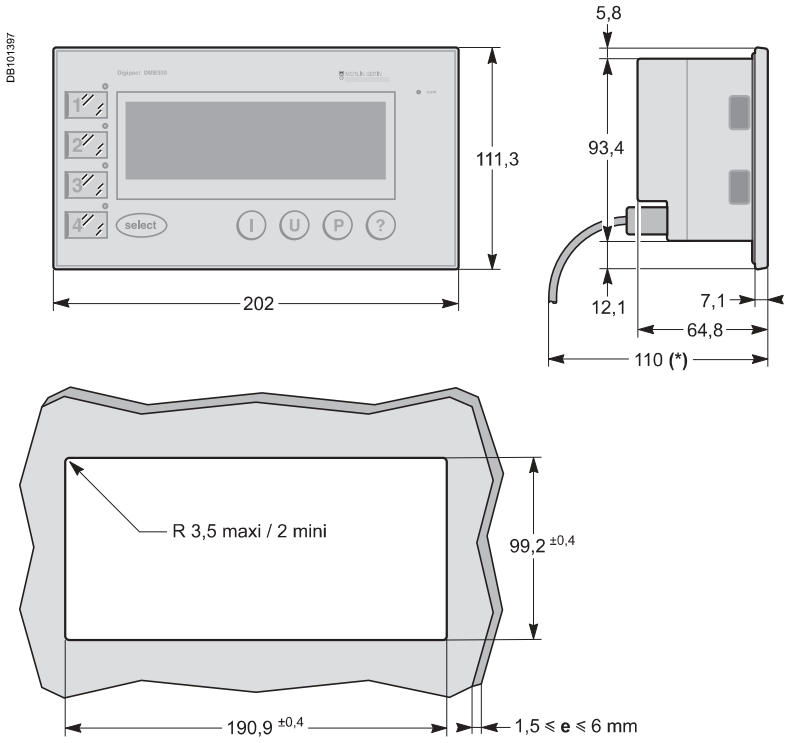
2 bars 100 x 5.



4 bars 125 x 5.

Installation and connection for Digipact DMB300

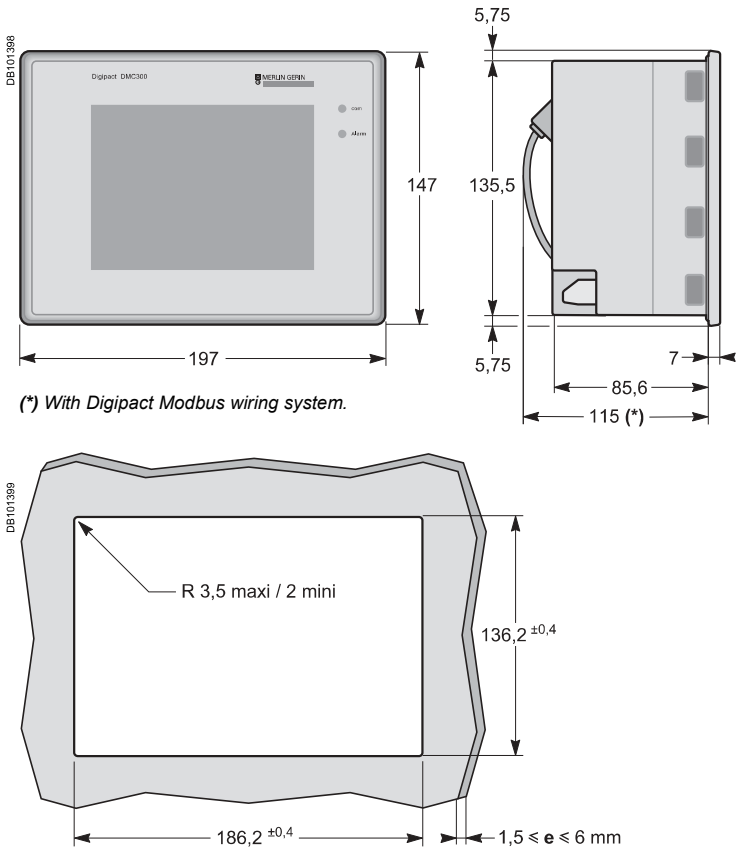
Dimensions and front-panel cut-out



(*) With Digipact wiring system.

Installation and connection for Digipact DMC300

Dimensions and front-panel cut-out



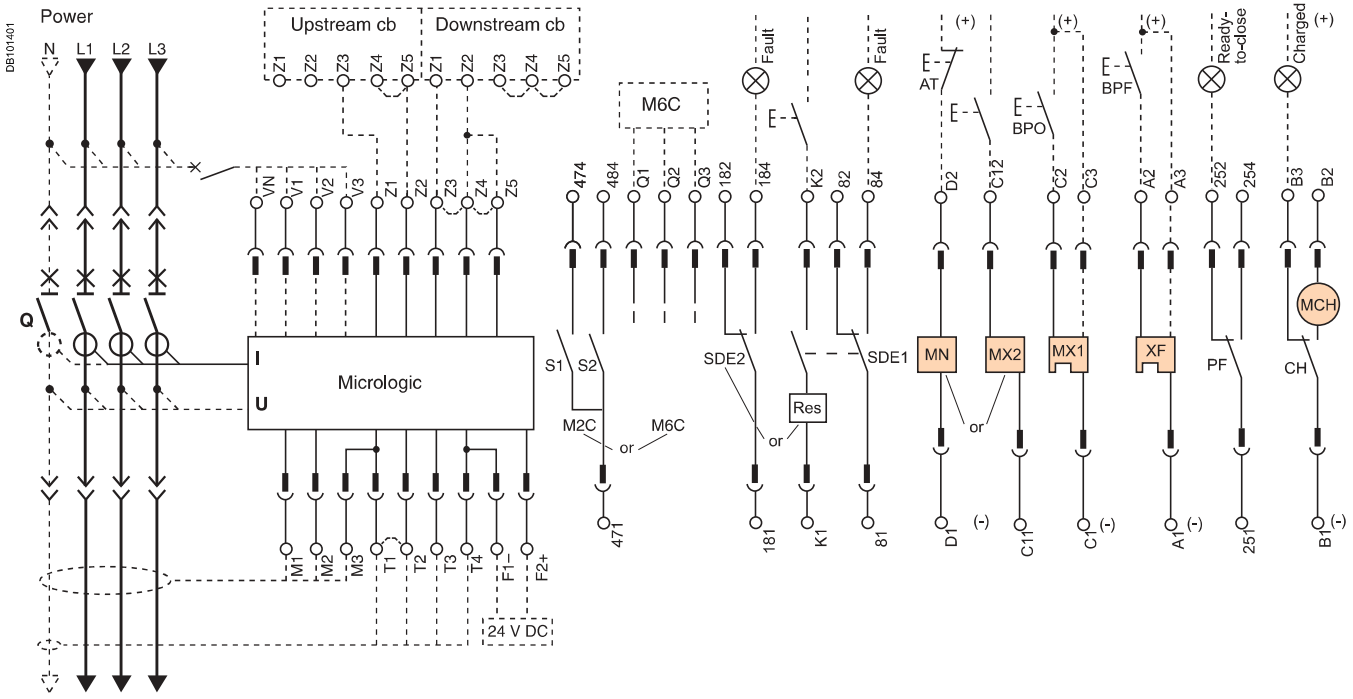
(*) With Digipact Modbus wiring system.

Electrical diagrams

Masterpact NT06 to NT16
Fixed and drawout devices

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

Power | **Control unit** | **Remote operation**



Terminal block marking

Control unit

Com		UC1		UC2		UC3	UC4 / M2C / M6C		
E5	E6	Z5	M1	M2	M3	F2+	V3	484	Q3
E3	E4	Z3	Z4	T3	T4	VN	V2	474	Q2
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	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 (earth fault)
■	■	■	M1 = Vigi module input (Micrologic 7)
■	■	■	**UC2** : T1, T2, T3, T4 = external neutral
■	■	■	M2, M3 = Vigi module input (Micrologic 7)
■	■	■	**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) **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

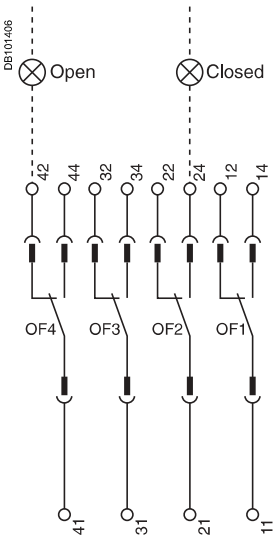
MCH : electric motor

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.*

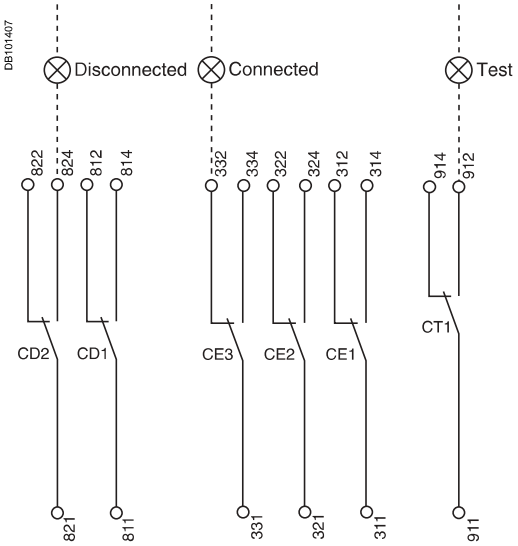
A *: digital ammeter.*
P *: A + power meter + additional protection.*
H *: P + harmonics.*

Masterpact NT06 to NT16
Fixed and drawout devices

Indication contacts



Chassis contacts



Indication contacts

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

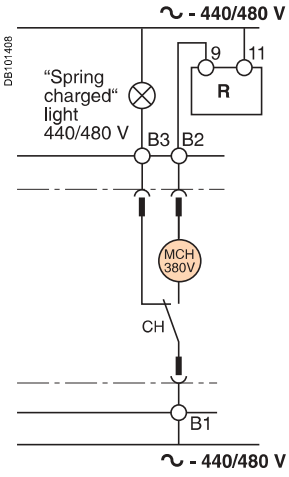
Chassis contacts

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 AC
(380 V motor + additional resistor).



Chassis contacts

CD2 : disconnected position contacts
CD1

CE3 : connected position contacts
CE2
CE1

CT1 : test position contacts

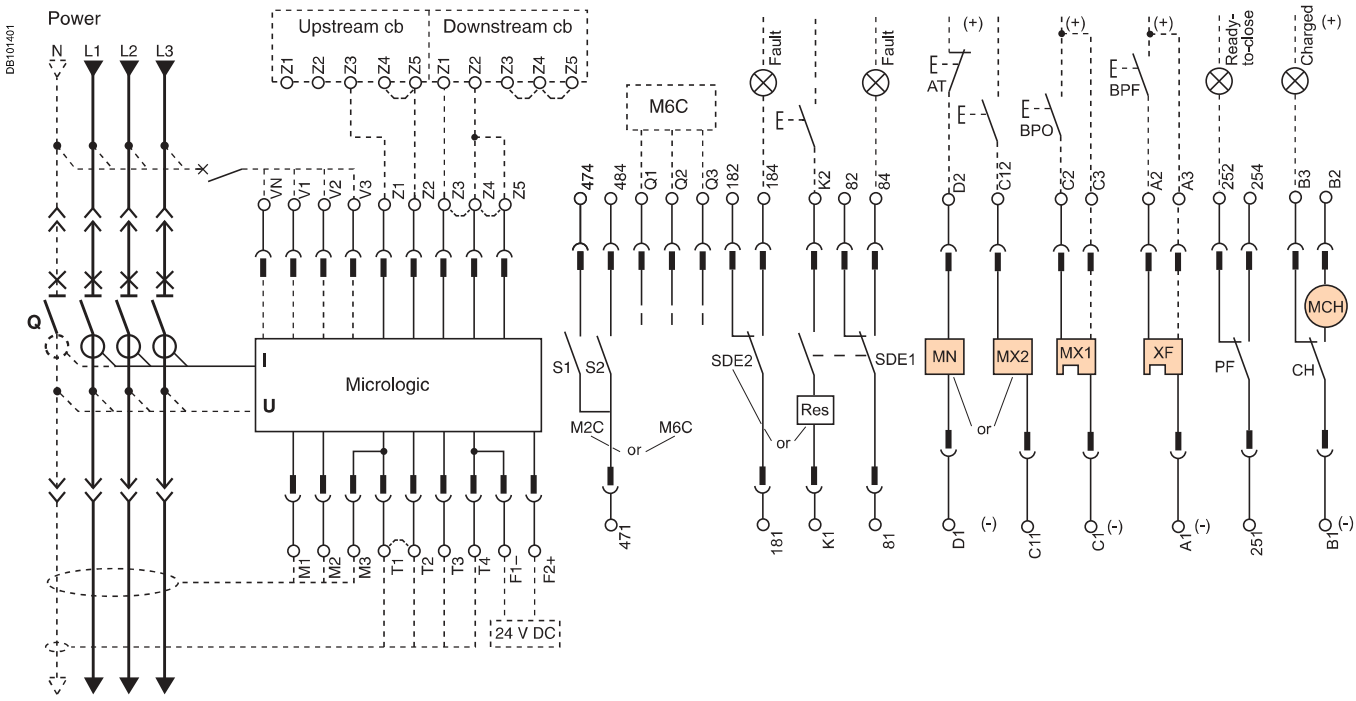
Key:

- *drawout device only.*
- XXX *SDE1, OF1, OF2, OF3, OF4 supplied as standard.*
- *interconnected connections (only one wire per connection point).*

Masterpact NW08 to NW63
Fixed and drawout devices

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

Power | **Control unit** | **Remote operation**



Terminal block marking

Control unit

Com		UC1		UC2		UC3	UC4	M2C / M6C
E5	E6	Z5	M1	M2	M3	F2+	V3	484 / Q3
E3	E4	Z3	Z4	T3	T4	VN	V2	474 / Q2
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	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 (earth fault)
■	■	■	M1 = Vigi module input (Micrologic 7)
■	■	■	**UC2** : T1, T2, T3, T4 = external neutral
■	■	■	M2, M3 = Vigi module input (Micrologic 7)
■	■	■	**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

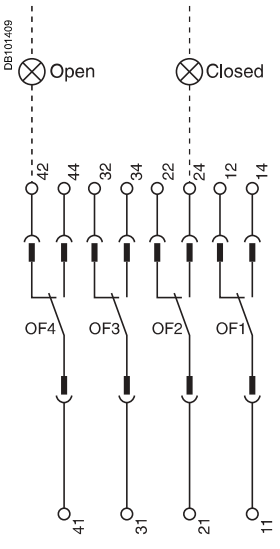
MCH : electric motor

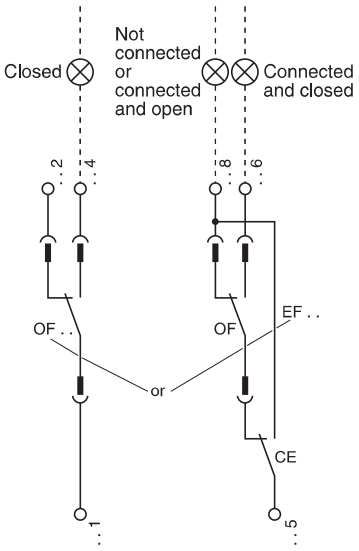
Note: *when communicating MX or XF releases are used, the third wire (C3,A3) must be connected even if the communication module is not installed.*

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

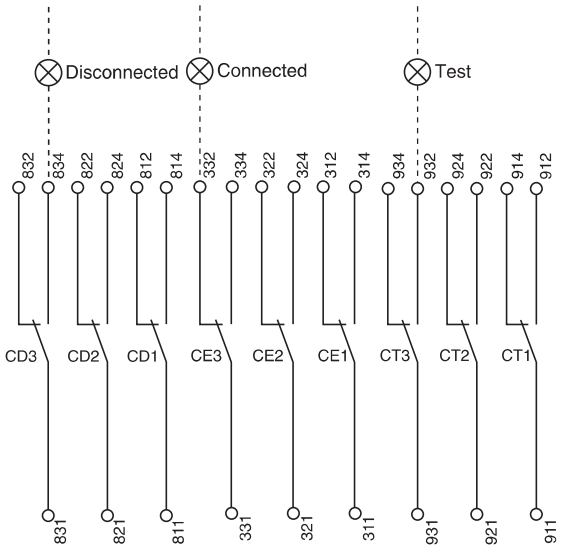
Masterpact NW08 to NW63
Fixed and drawout devices

Indication contacts





Chassis contacts



Indication contacts

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

OF24	OF23	OF22	OF21	OF14	OF13	OF12	OF11
244	234	224	214	144	134	124	114
242	232	222	212	142	132	122	112
241	231	221	211	141	131	121	111

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
OF3
OF2
OF1

OF24 or EF24 Combined "connected-deconnected" indication contacts
OF23 or EF23
OF22 or EF22
OF21 or EF21
OF14 or EF14
OF13 or EF13
OF12 or EF12
OF11 or EF11

Chassis contacts

CD3 disconnected position contacts
CD2
CD1

or

CE6 connected position contacts
CE5
CE4

CE3 connected position contacts
CE2
CE1

CT3 test position contacts
CT2
CT1

or

CE9 connected position contacts
CE8
CE7

or

CD6 disconnected position contacts
CD5
CD4

Key:

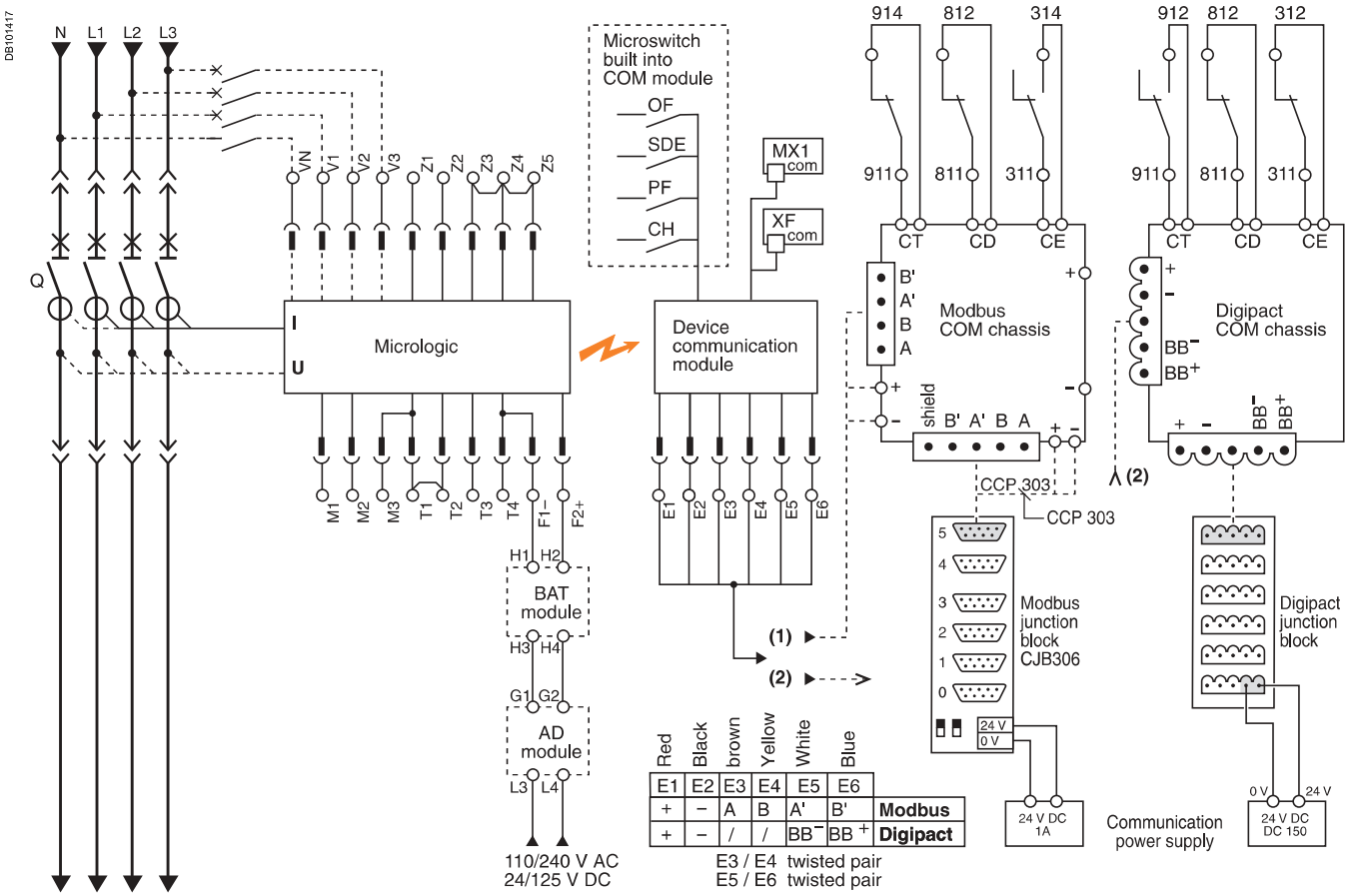
drawout device only.

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

interconnected connections (only one wire per connection point).

Masterpact NT and NW
Communications option 24 V DC external power supply

Connection of the communications option



None of the control-unit protection functions require an auxiliary source. However, the 24 V DC external power-supply (AD module) is required for certain operating configurations as indicated in the table below.

Circuit breaker	Closed	Open	
Voltage measurement inputs	Powered	Powered	Not powered
M2C, M6C programmable contacts option	Yes	Yes	Yes
Protection function	No	No	No
Display function	No (3)	No (4)	Yes
Time-stamping function	No	No	Yes (5)
Circuit-breaker status indications and control via communications bus	No	No	No
Identification, settings, operation and maintenance aids via communications bus	No (3)	No (4)	Yes

(1) Drawout device equipped with Modbus chassis COM.
(2) Drawout device equipped with Digipact chassis COM.
(3) Except for Micrologic A control units (if current < 20 % In).
(4) Except for Micrologic A control units.
(5) Time setting is manual and can be carried out automatically by the supervisor via the communications bus.

The communications bus requires its own 24 V DC power source (E1, E2). This source is not the same as the 24 V DC external power-supply module (F1-, F2+).

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 voltage measurement inputs are standard equipment on the downstream connectors of the circuit breaker.

External connections are possible using the PTE external voltage measurement input option. With this option, the internal voltage measurement inputs are disconnected and terminals VN, V1, V2, V3 are connected only to the control unit (Micrologic P and H only). 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 and H).

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.

Masterpact NT and NW
Communications option 24 V DC external power supply

Examples using the COM communications option

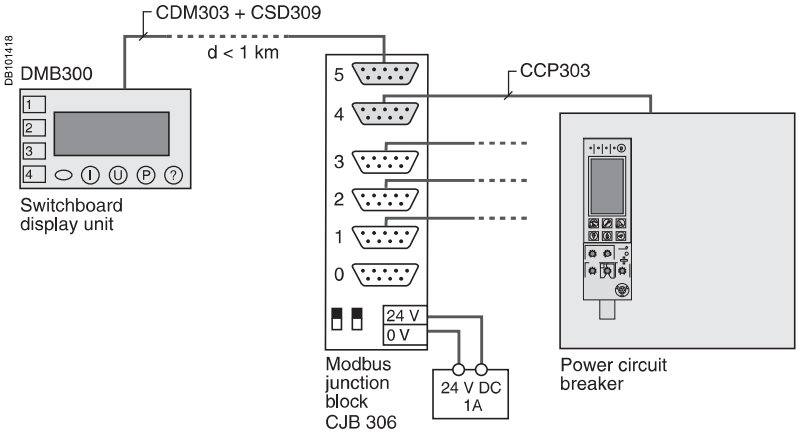
Switchboard display unit

This architecture provides remote display of the variables managed by Micrologic control units equipped with the eco COM Modbus module.

- I (Micrologic A)
- I, U, P, E (Micrologic P)
- I, U, P, E, THD (Micrologic H)

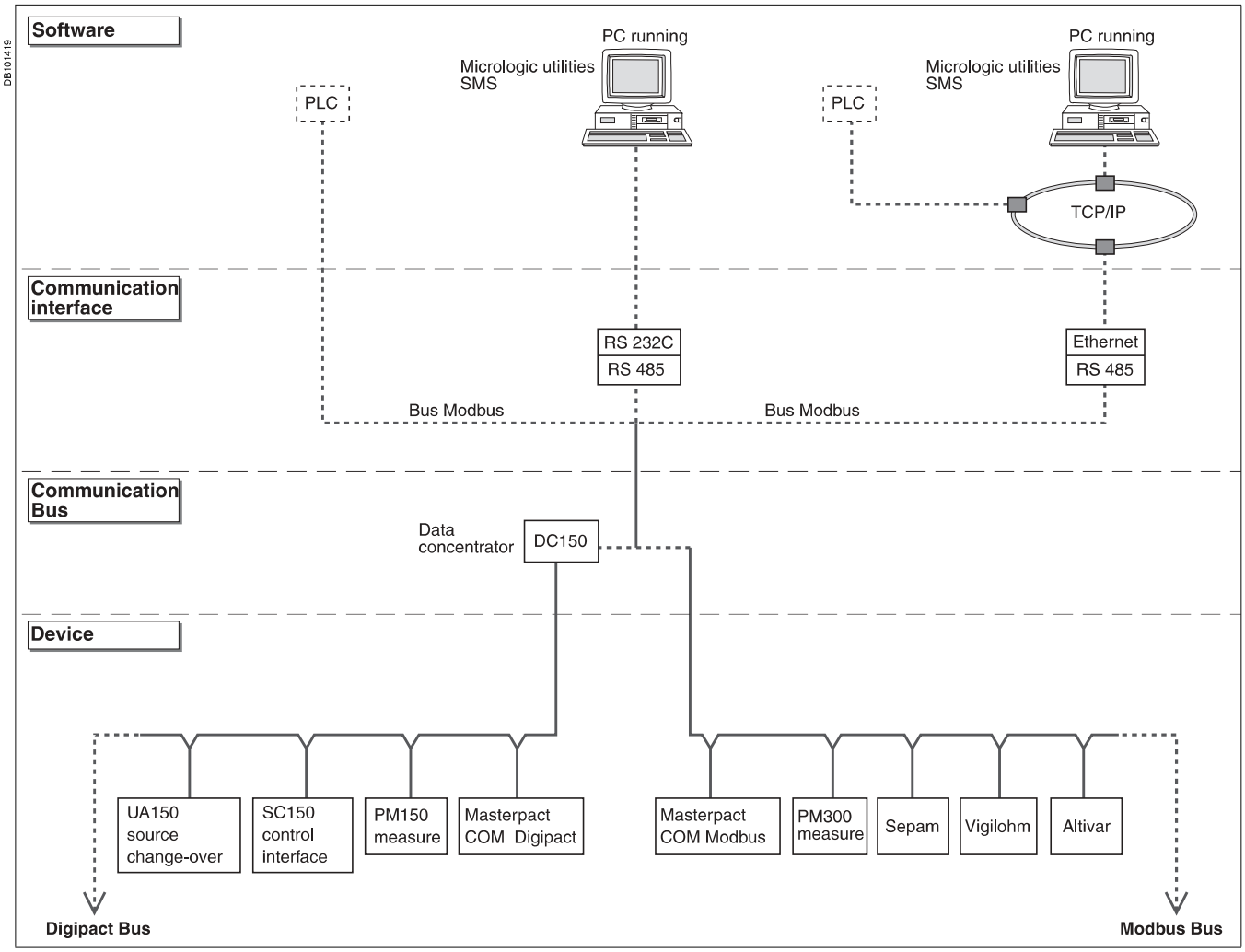
No programming is required.

For Micrologic A control unit (if current < 20 % In), it is recommended to use the 24 V DC external power supply (AD module).



Communicating switchboard

This configuration provides remote display and control of Masterpacts equipped with the Modbus or Digipact COM module. The Digipact bus can be combined with the Modbus bus.



Masterpact NT and NW
Earth-fault and earth-leakage protection
Neutral protection
Zone selective interlocking

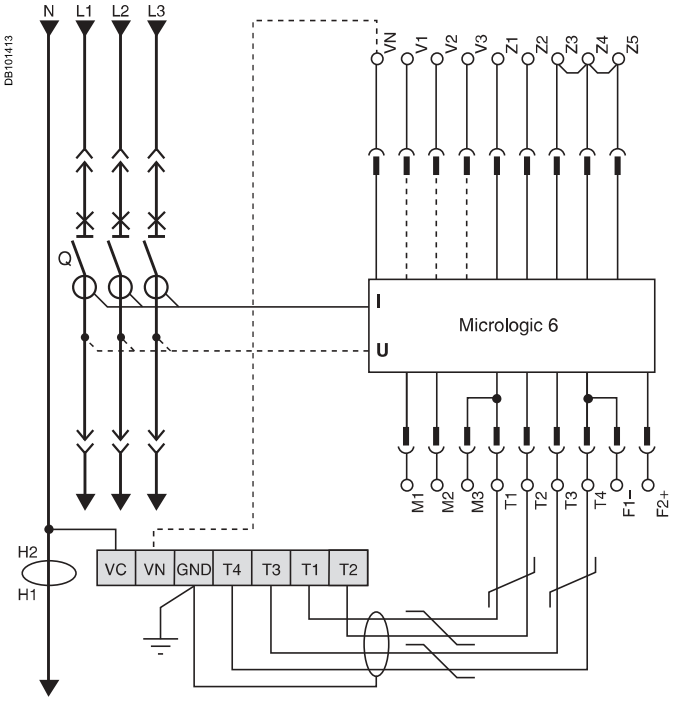
External sensor (CT) for residual earth-fault protection

Connection of current-transformer secondary circuit for external neutral

Masterpact equipped with a Micrologic 6 A/P/H:
- shielded cable with 2 twisted pairs
- T1 twisted with T2
- T3 twisted with T4
- shielding connected to GND on one end only
- maximum length 10 meters
- cable cross-sectional area 0.4 to 1.5 mm^2
- recommended cable: Belden 9552 or equivalent.

If supply is via the top, follow the shematics.
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 earth-fault protection, the current transformer for the external neutral is not necessary.
If the 2000/6300 current transformer is used:
- signals T1 and T2 must be wired in series
- signals T3 and T4 must be wired in parallel.

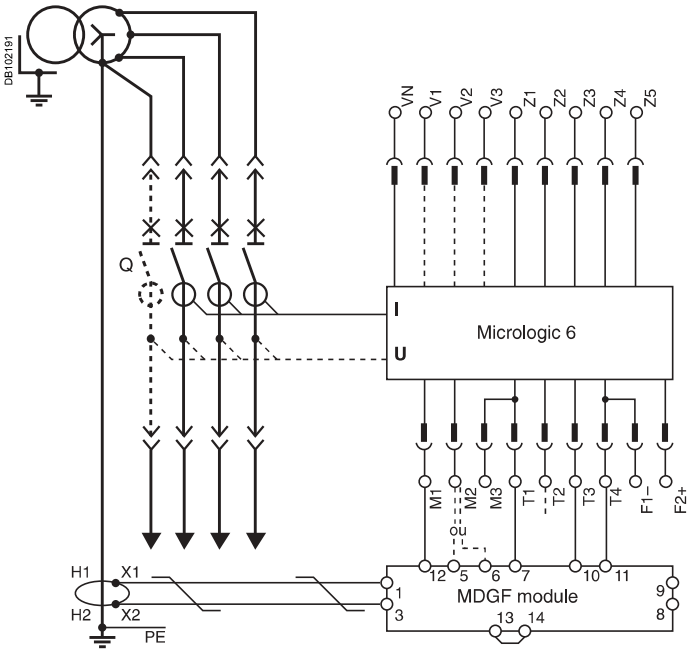
Connection for signal VN is required only for power measurements (3 Ø, 4 wires, 4CTs).



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

Connection of the secondary circuit

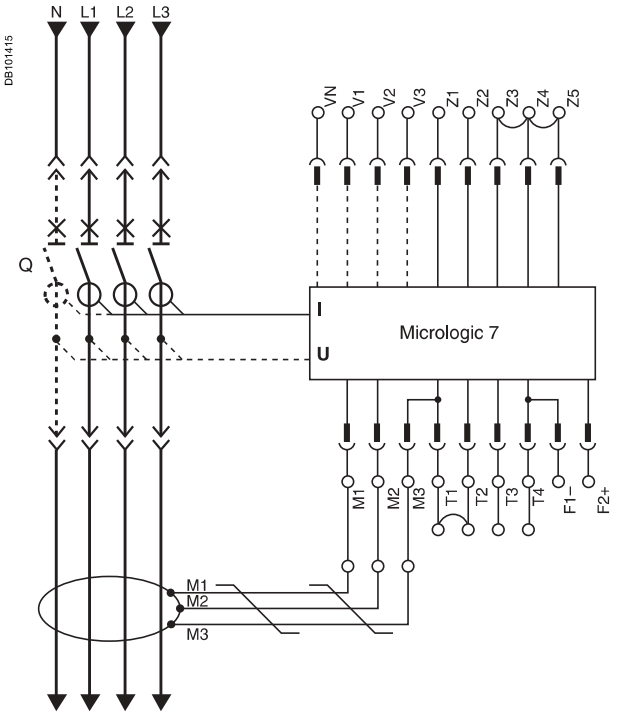
Masterpact equipped with a Micrologic 6 A/P/H:
- unshielded cable with 1 twisted pair
- maximum length 150 meters
- cable cross-sectional area 0.4 to 1.5 mm^2
- terminals 5 and 6 may not be used at the same time
- use terminal 5 for NW08 to 40
- use terminal 6 for NW40b to 63
- recommended cable: Belden 9409 or equivalent.



Masterpact NT and NW
Earth-fault and earth-leakage protection
Neutral protection
Zone selective interlocking

Earth-leakage protection

Connection of the rectangular-sensor secondary circuit
Use the cable shipped with the rectangular sensor.



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 earth-fault protection)
■ four pole circuit breaker:
□ Masterpact equipped with Micrologic A, P or H
□ the current transformer for external neutral is not necessary.

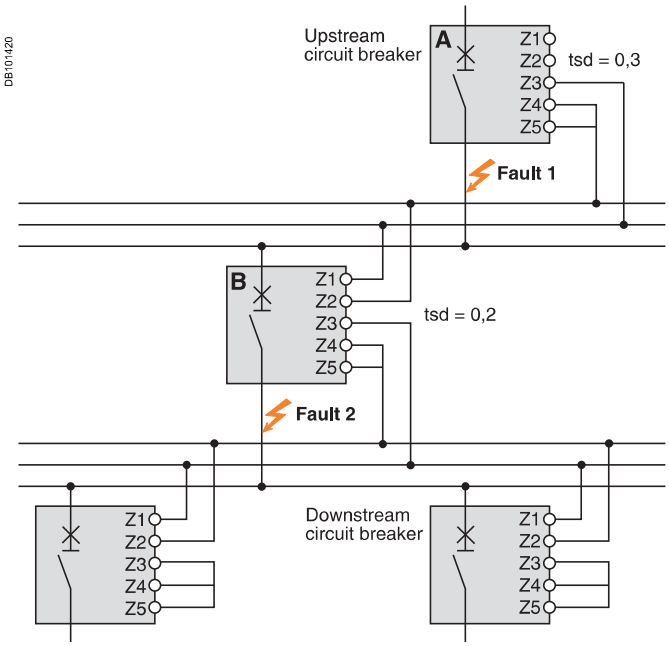
Zone selective interlocking

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/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.

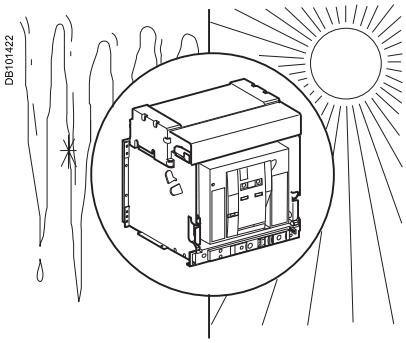
Fault 2.
Circuit breakers A and B detect the fault. Circuit breaker A receives a signal from B and remains closed for the full duration of its tripping delay set to 0.3. Circuit breaker B does not receive a signal from downstream and opens immediately, in spite of its tripping delay set to 0.2.

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



Installation recommendations

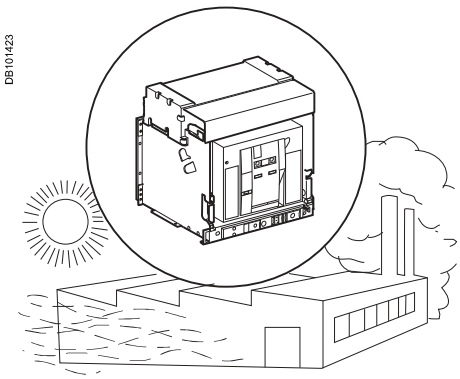
Operating conditions



Ambient temperature

Masterpact devices can operate under the following temperature conditions:
- the electrical and mechanical characteristics are stipulated for an ambient temperature of -5 °C to +70 °C
- circuit-breaker closing is guaranteed down to -35 °C.

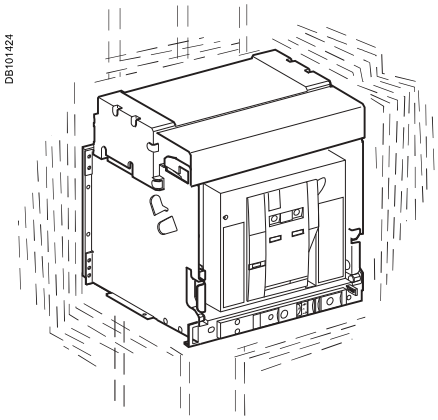
Storage conditions are as follows:
- -40 to +85 °C for a Masterpact device without its control unit
- -25 °C to +85 °C for the control unit.



Extreme atmospheric conditions

Masterpact devices have successfully passed the tests defined by the following standards for extreme atmospheric conditions:
- IEC 68-2-1: dry cold at -55 °C
- IEC 68-2-2: dry heat at +85 °C
- IEC 68-2-30: damp heat (temperature +55 °C, relative humidity 95 %)
- IEC 68-2-52 level 2: salt mist.

Masterpact devices can operate in the industrial environments defined by standard IEC 947 (pollution degree up to 4).
It is nonetheless advised to check that the devices are installed in suitably cooled switchboards without excessive dust.

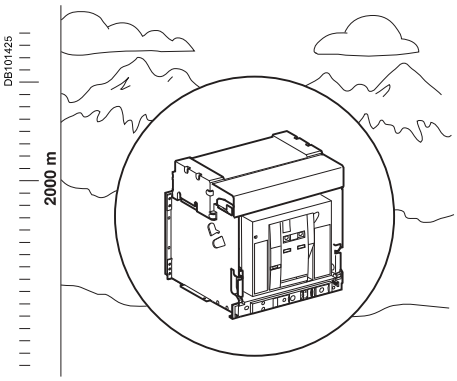


Vibrations

Masterpact devices are guaranteed against electromagnetic or mechanical vibrations.
Tests are carried out in compliance with standard IEC 68-2-6 for the levels required by merchant-marine inspection organisations (Veritas, Lloyd's, etc.):
- 2 to 13.2 Hz: amplitude ±1 mm
- 13.2 to 100 Hz: constant acceleration 0.7 g.

Excessive vibration may cause tripping, breaks in connections or damage to mechanical parts.

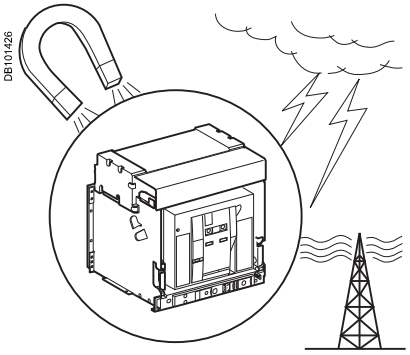
Operating conditions



Altitude

At altitudes higher than 2000 metres, the modifications in the ambient air (electrical resistance, cooling capacity) lower the following characteristics as follows:

Altitude (m)	2000	3000	4000	5000
Dielectric resistance voltage (V)	3500	3150	2500	2100
Average insulation level (V)	1000	900	700	600
Maximum utilisation voltage (V)	690	590	520	460
Average thermal current (A) at 40 °C	1 x In	0.99 x In	0.96 x In	0.94 x In



Electromagnetic disturbances

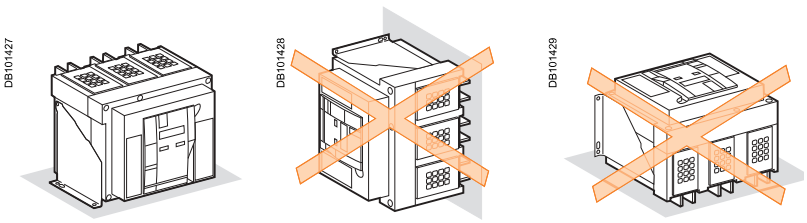
Masterpact devices are protected against:
- overvoltages caused by devices that generate electromagnetic disturbances
- overvoltages caused by atmospheric disturbances or by a distribution-system outage (e.g. failure of a lighting system)
- devices emitting radio waves (radios, walkie-talkies, radar, etc.)
- electrostatic discharges produced by users.

Masterpact devices have successfully passed the electromagnetic-compatibility tests (EMC) defined by the following international standards:
- IEC 60947-2, appendix F
- IEC 60947-2, appendix B (trip units with earth-leakage function).

The above tests guarantee that:
- no nuisance tripping occurs
- tripping times are respected.

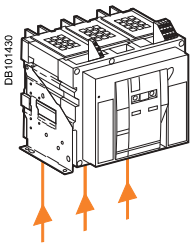
Installation in switchboard

Possible positions



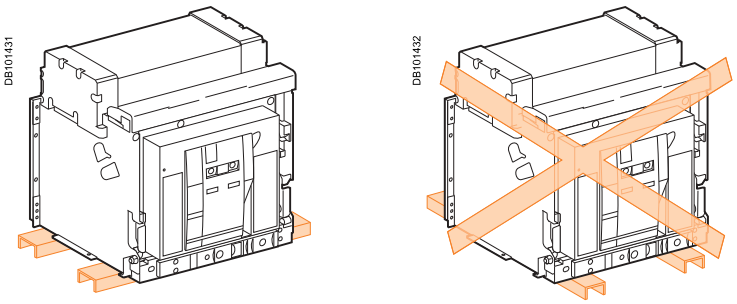
Power supply

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.

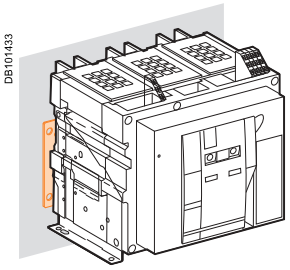


Mounting the circuit-breaker

It is important to distribute the weight of the device uniformily 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.

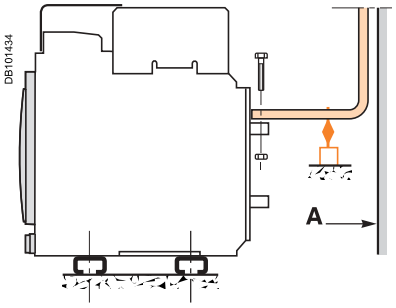


Mounting with vertical brackets.

Installation in switchboard

Partitions

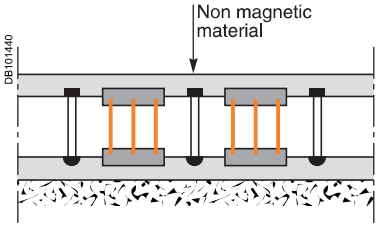
Sufficient openings must be provided in partitions to ensure good air circulation around the circuit breaker; Any partition between upstream and downstream connections of the device must be made of non-magnetic material.
For high currents, of 2500 A and upwards, the metal supports or barriers in the 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.

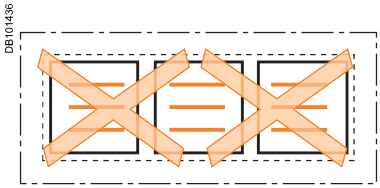


***A** : non magnetic material.*

Busbars (NT, NW)

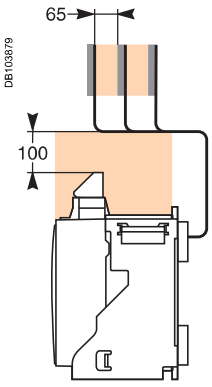
The mechanical connection must be exclude the possibility of formation of a magnetic loop around a conductor.





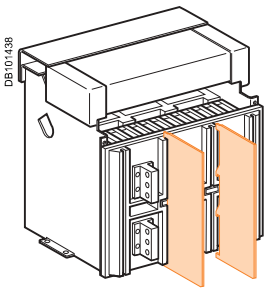
Busbars (NT)

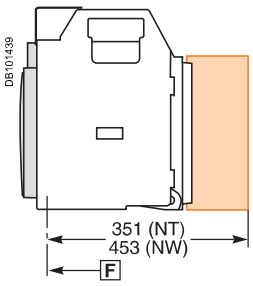
For live busbars installed immediately above the circuit breaker (respecting the 100 mm safety clearance), the distance between bars must be 65 mm minimum.
In a 1000 V system, the bars must be insulated.



Interphase barrier

If the insulation distance between phases is not sufficient (⩽ 14 mm), it is advised to install phase barriers (taking into account the safety clearances).
Mandatory for a Masterpact NT > 500 V.

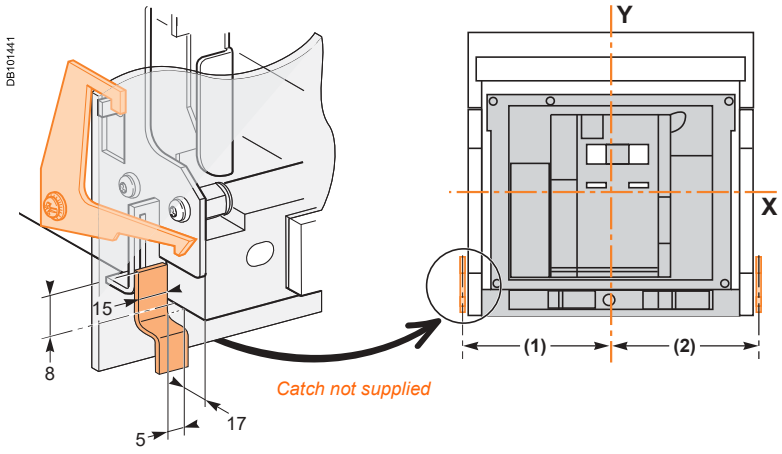




Door interlock catch

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. It the breaker is put in the "connected" position with the door open, the door may be closed without having to disconnect the circuit breaker.

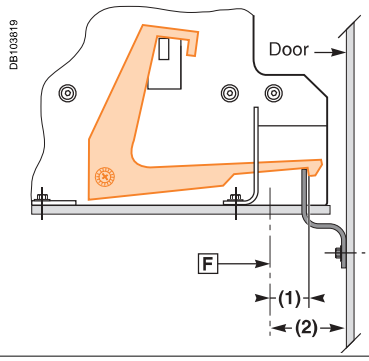


Dimensions (mm)

Type	(1)	(2)
NT08-16 (3P)	135	168
NT08-16 (4P)	205	168
NW08-40 (3P)	215	215
NW08-40 (4P)	330	215
NW40b-63 (3P)	660	215
NW40b-63 (4P)	775	215

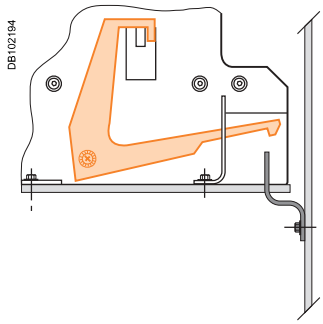
Breaker in "connected" or "test" position

Door cannot be opened



Breaker in "disconnected" position

Door can be opened

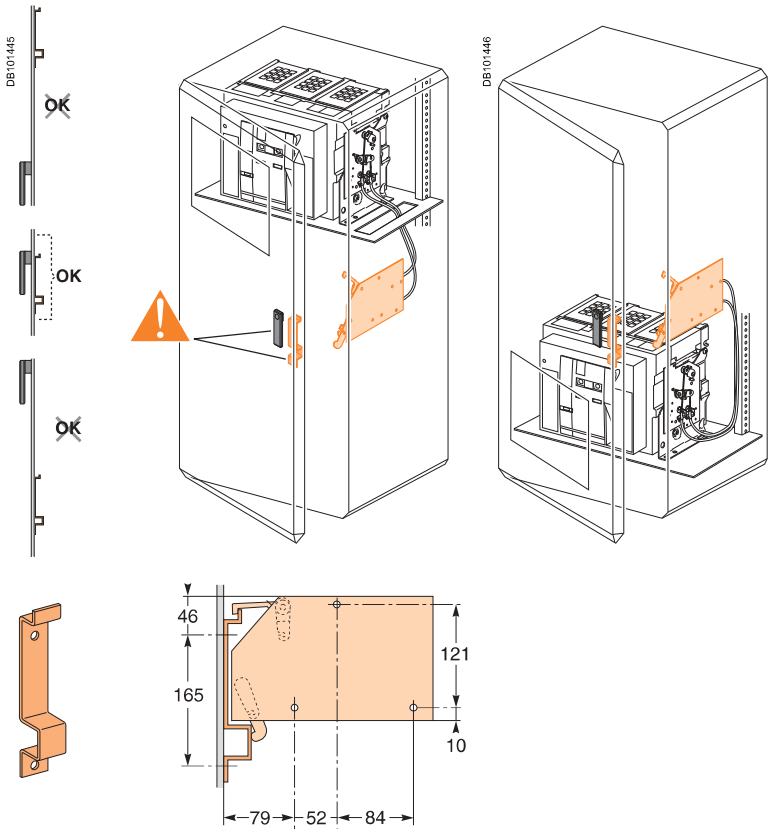


Dimensions (mm)

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.*

Control wiring

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 mm²	1,5 mm²	2,5 mm²	1,5 mm²	2,5 mm²	1,5 mm²
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+)

- 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
- 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 207E2200_Ver6.0.fm/12

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)
- the 24 V DC (E1, E2) power supply for the communication bus must be separate from the external 24 V DC power-supply module for Micrologic control units (F1-, F2+).

E1	E2	E3	E4	E5	E6
+	-	A/Tx⁻	B/Tx⁺	A'/Rx⁻	B'/Rx⁺

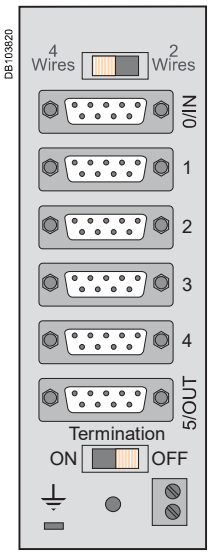
To create a two-wire Modbus communication bus, simply connect Tx⁻ with Rx⁻ and Tx⁺ with Rx⁺.

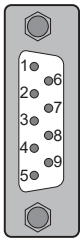
To connect a Modbus slave (Micrologic) to a Modbus master (PLC), connect:

the slave Tx⁻ to the master Rx⁻ the slave Rx⁻ to the master Tx⁻

the slave Tx⁺ to the master Rx⁺ the slave Rx⁺ to the master Tx⁺.

RS485 Modbus Junction Block



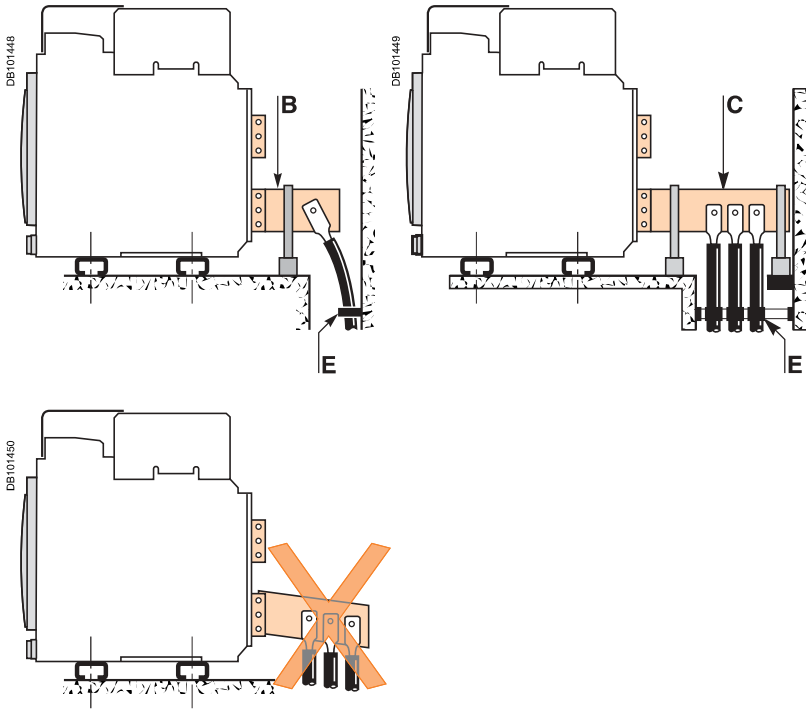


Pins	Signal	Color
1	0 V	Black
2	24 V	Red
3	NC	
4	B' / Rx⁺	Blue
5	B / Tx⁺	Yellow
6	0 V	Black
7	24 V	Red
8	A' / Rx⁻	White
9	A / Tx⁻	Brown

Power connection

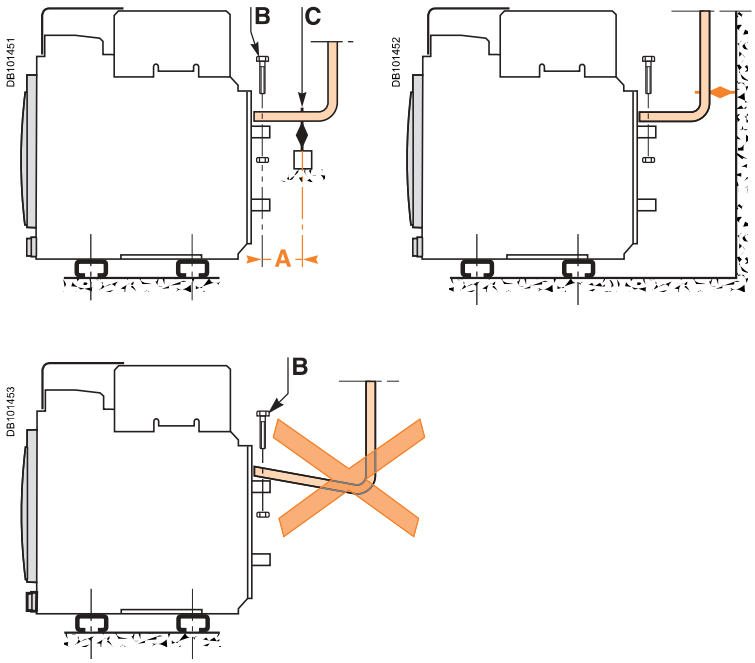
Cables connections

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**.



Busbars 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).



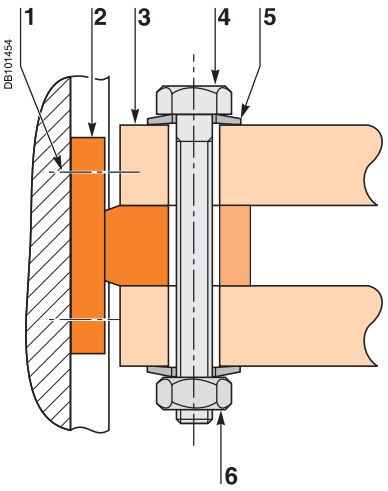
Electrodynamic stresses

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.

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

Power connection

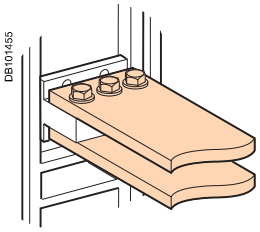


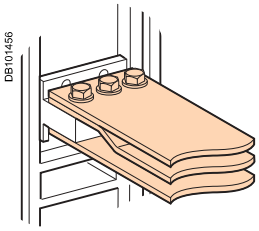
1 Terminal screw factory-tightened to 16 Nm (NW), 13 Nm (NT).
2 Breaker terminal.
3 Busbar.
4 Bolt.
5 Washer.
6 Nut.

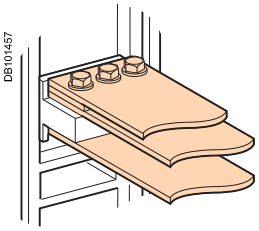
Clamping

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



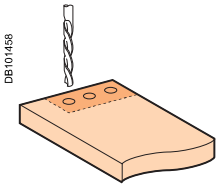


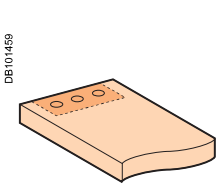


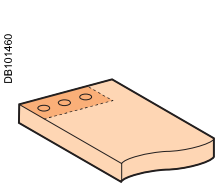
Tightening torques			
Ø (mm) Nominal	**Ø (mm) Drilling**	**Tightening torques (Nm) with grower or flat washers**	**Tightening torques (Nm) with contact or corrugatec washers**
10	11	37.5	50

Busbar drilling

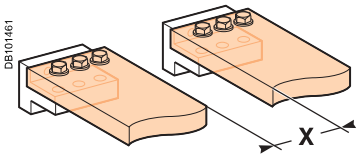
Examples







Isolation distance

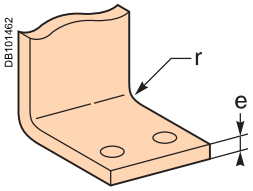


Dimensions (mm)

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).

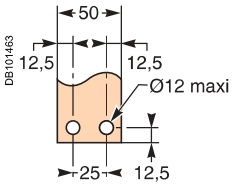


Dimensions (mm)

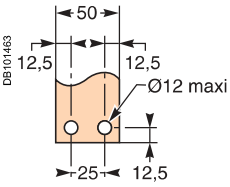
e	Radius of curvature r Min	Recommended
5	5	7.5
10	15	18 to 20

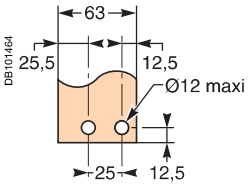
Recommended busbars drilling
Masterpact NT06 to NT16

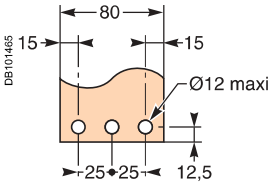
Rear connection



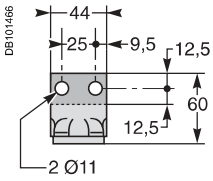
Rear connection with spreaders

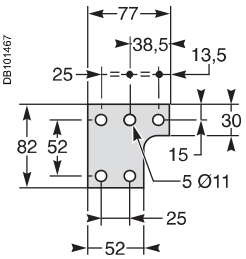




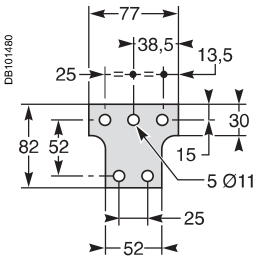


Middle left or middle right spreader for 4P

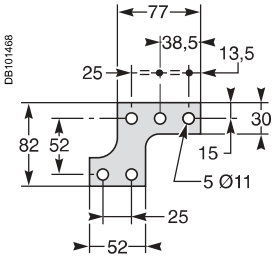




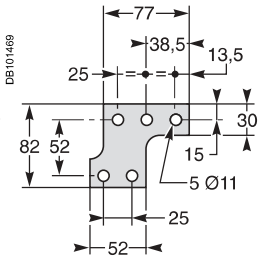
Middle spreader for 3P



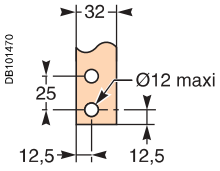
Left or right spreader for 4P

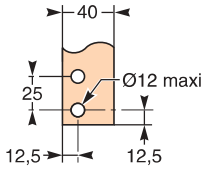


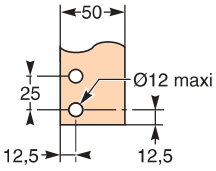
Left or right spreader for 3P

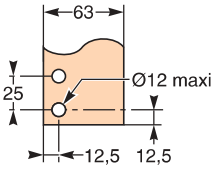


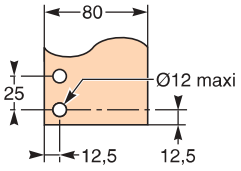
Vertical rear connection

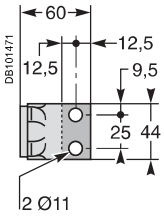




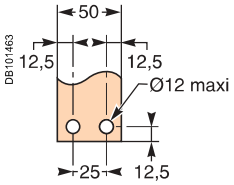




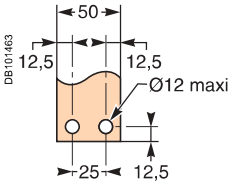


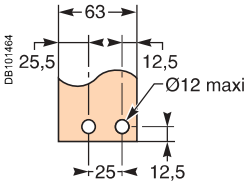


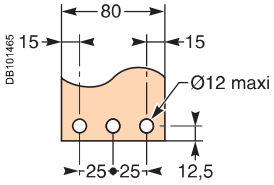
Front connection



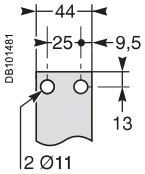
Front connection via vertical connection adapters



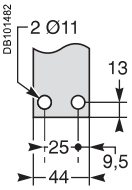


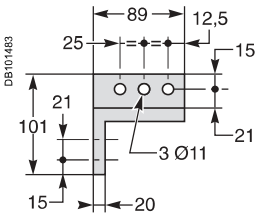


Top connection



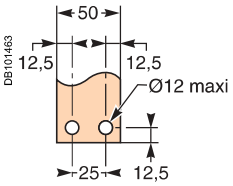
Bottom connection

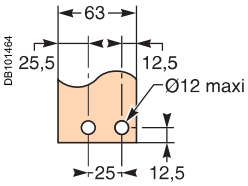


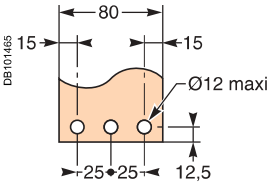


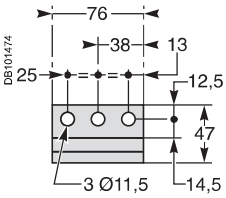
Recommended busbars drilling
Masterpact NW08 to NW63

Horizontal rear connection NW08 to NW32

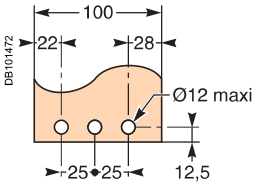


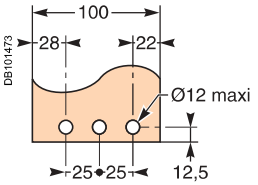


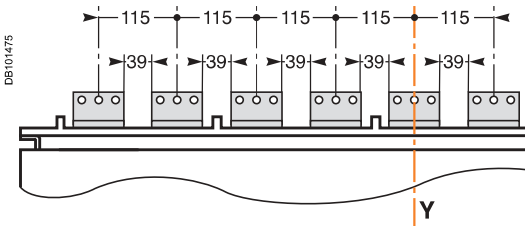




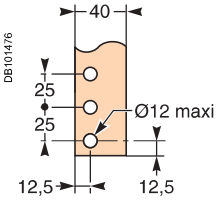
NW40b to NW50

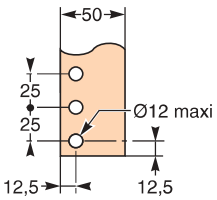


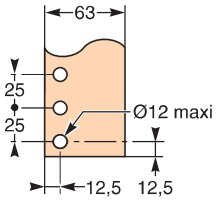


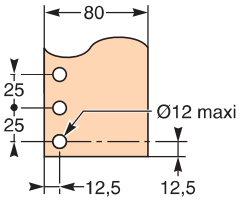


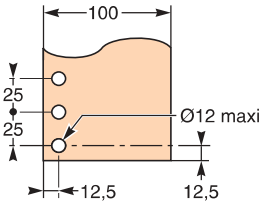
Vertical rear connection NW08 to NW32, NW40b to NW50

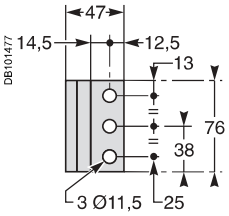




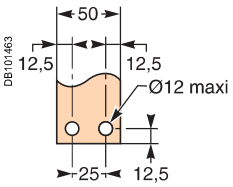


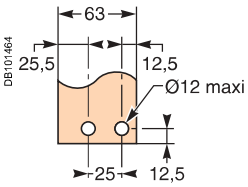


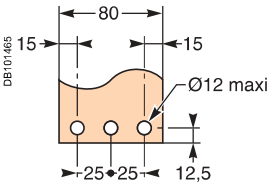




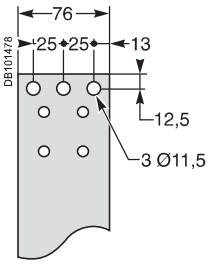
Front connection NW08 to NW32



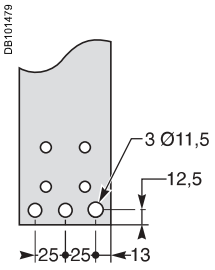




Top connection



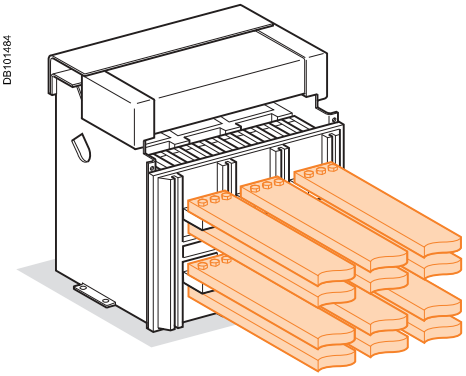
Bottom connection



Busbar sizing

Basis of tables:
- maximum permissible busbars temperature: 100 °C
- Ti: temperature around the circuit breaker and its connection
- busbar material is unpainted copper.

Front or rear horizontal connection



Masterpact	Maximum service current	Ti : 40 °C		Ti : 50 °C		Ti : 60 °C	
		No. of 5 mm thick bars	No. of 10 mm thick bars	No. of 5 mm thick bars	No. of 10 mm thick bars	No. of 5 mm thick bars	No. of 10 mm thick bars
NT06	400	2b.30 x 5	1b.30 x 10	2b.30 x 5	1b.30 x 10	2b.30 x 5	1b.30 x 10
NT06	630	2b.40 x 5	1b.40 x 10	2b.40 x 5	1b.40 x 10	2b.40 x 5	1b.40 x 10
NT08 ou NW08	800	2b.50 x 5	1b.50 x 10	2b.50 x 5	1b.50 x 10	2b.50 x 5	1b.63 x 10
NT10 ou NW10	1000	3b.50 x 5	1b.63 x 10	3b.50 x 5	2b.50 x 10	3b.63 x 5	2b.50 x 10
NT12 ou NW12	1250	3b.50 x 5	2b.40 x 10	3b.50 x 5	2b.50 x 10	3b.63 x 5	2b.50 x 10
		2b.80 x 5	2b.40 x 10	2b.80 x 5			
NT16 ou NW16	1400	2b.80 x 5	2b.40 x 10	2b.80 x 5	2b.50 x 10	3b.80 x 5	2b.63 x 10
NT16 ou NW16	1600	3b.80 x 5	2b.63 x 10	3b.80 x 5	2b.63 x 10	3b.80 x 5	3b.50 x 10
NW20	1800	3b.80 x 5	2b.63 x 10	3b.80 x 5	2b.63 x 10	3b.100 x 5	2b.80 x 10
NW20	2000	3b.100 x 5	2b.80 x 10	3b.100 x 5	2b.80 x 10	3b.100 x 5	3b.63 x 10
NW25	2200	3b.100 x 5	2b.80 x 10	3b.100 x 5	2b.80 x 10	4b.80 x 5	2b.100 x 10
NW25	2500	4b.100 x 5	2b.100 x 10	4b.100 x 5	2b.100 x 10	4b.100 x 5	3b.80 x 10
NW32	2800	4b.100 x 5	3b.80 x 10	4b.100 x 5	3b.80 x 10	5b.100 x 5	3b.100 x 10
NW32	3000	5b.100 x 5	3b.80 x 10	6b.100 x 5	3b.100 x 10	8b.100 x 5	4b.80 x 10
NW32	3200	6b.100 x 5	3b.100 x 10	8b.100 x 5	3b.100 x 10		4b.100 x 10
NW40	3800		4b.100 x 10		5b.100 x 10		5b.100 x 10
NW40	4000		5b.100 x 10		5b.100 x 10		6b.100 x 10
NW50	4500		6b.100 x 10		6b.100 x 10		7b.100 x 10
NW50	5000		7b.100 x 10		7b.100 x 10		

With Masterpact NT, it is recommanded to use 50 mm wideness bars (see "Recommended busbars drilling").

Example

Conditions:
- drawout version
- horizontal busbars
- T_i: 50 °C
- service current: 1800 A.

Solution:
For T_i = 50 °C, use an NW20 which can be connected with three 80 x 5 mm bars or two 63 x 10 mm bars.

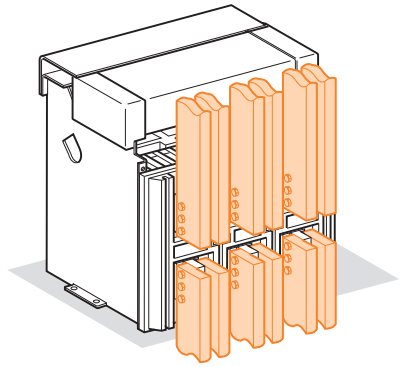
Note: *the values indicated in these tables have been extrapolated from test data and theoretical calculations. These tables are only intended as a guide and cannot replace industrial experience or a temperature rise test.*

Busbar sizing

Basis of tables:
- maximum permissible busbars temperature: 100 °C
- Ti: temperature around the circuit breaker and its connection
- busbar material is unpainted copper.

Rear vertical connection

DB101487



Masterpact	Maximum service current	Ti : 40 °C		Ti : 50 °C		Ti : 60 °C	
		No. of 5 mm thick bars	No. of 10 mm thick bars	No. of 5 mm thick bars	No. of 10 mm thick bars	No. of 5 mm thick bars	No. of 10 mm thick bars
NT06	400	2b.30 x 5	1b.30 x 10	2b.30 x 5	1b.30 x 10	2b.30 x 5	1b.30 x 10
NT06	630	2b.40 x 5	1b.40 x 10	2b.40 x 5	1b.40 x 10	2b.40 x 5	1b.40 x 10
NT08 ou NW08	800	2b.50 x 5	1b.50 x 10	2b.50 x 5	1b.50 x 10	2b.50 x 5	1b.50 x 10
NT10 ou NW10	1000	2b.50 x 5	1b.50 x 10	2b.50 x 5	1b.50 x 10	2b.63 x 5	1b.63 x 10
NT12 ou NW12	1250	2b.63 x 5	1b.63 x 10	3b.50 x 5	2b.40 x 10	3b.50 x 5	2b.40 x 10
NT16 ou NW16	1400	2b.80 x 5	1b.80 x 10	2b.80 x 5	2b.50 x 10	3b.63 x 5	2b.50 x 10
NT16 ou NW16	1600	3b.63 x 5	2b.50 x 10	3b.63 x 5	2b.50 x 10	3b.80 x 5	2b.63 x 10
NW20	1800	2b.80 x 5	1b.80 x 10	2b.80 x 5	2b.50 x 10	3b.80 x 5	2b.63 x 10
NW20	2000	2b.100 x 5	2b.63 x 10	2b.100 x 5	2b.63 x 10	3b.100 x 5	2b.80 x 10
NW25	2200	2b.100 x 5	2b.63 x 10	2b.100 x 5	2b.63 x 10	3b.100 x 5	2b.80 x 10
NW25	2500	4b.80 x 5	2b.80 x 10	4b.80 x 5	2b.80 x 10	4b.100 x 5	3b.80 x 10
NW32	2800	4b.100 x 5	2b.100 x 10	4b.100 x 5	2b.100 x 10	4b.100 x 5	3b.80 x 10
NW32	3000	5b.100 x 5	3b.80 x 10	6b.100 x 5	3b.100 x 10	5b.100 x 5	4b.80 x 10
NW32	3200	6b.100 x 5	3b.100 x 10	6b.100 x 5	3b.100 x 10		4b.100 x 10
NW40	3800		4b.100 x 10		4b.100 x 10		4b.100 x 10
NW40	4000		4b.100 x 10		4b.100 x 10		4b.100 x 10
NW50	4500		5b.100 x 10		5b.100 x 10		6b.100 x 10
NW50	5000		5b.100 x 10		6b.100 x 10		7b.100 x 10
NW63	5700		7b.100 x 10		7b.100 x 10		8b.100 x 10
NW63	6300		8b.100 x 10		8b.100 x 10		

Example

Conditions:
- drawout version
- vertical connections
- T_i: 40 °C
- service current: 1100 A.

Solution :
For T_i = 40 °C use an NT12 or NW12 which can be connected with two 63 x 5 mm bars or with one 63 x 10 mm bar.

Note: *the values indicated in these tables have been extrapolated from test data and theoretical calculations. These tables are only intended as a guide and cannot replace industrial experience or a temperature rise test.*

Temperature derating Power dissipation and input / output resistance

Temperature derating

The table below indicates the maximum current rating, for each connection type, as a function of Ti around the circuit breaker and the busbars.
Circuit breakers with mixed connections have the same derating as horizontally connected breakers.
For Ti greater than 60 °C, consult us.
Ti: temperature around the circuit breaker and its connection.

Version	Drawout										Fixed									
Connection	Front or rear horizontal					Rear vertical					Front or rear horizontal					Rear vertical				
Temp. Ti	40	45	50	55	60	40	45	50	55	60	40	45	50	55	60	40	45	50	55	60
NT06 H1/L1	630					630					630					630				
NT08 H1/L1	800					800					800					800				
NT10 H1/L1	1000					1000					1000					1000				
NT12 H1	1250					1250					1250					1250				
NT16 H1	1600		1520	1480	1430	1600			1560	1510	1600				1550	1600				
NW08 N/H/L	800					800					800					800				
NW10 N/H/L	1000					1000					1000					1000				
NW12 N/H/L	1250					1250					1250					1250				
NW16 N/H/L	1600					1600					1600					1600				
NW20 H1/H2/H3	2000			1980	1890	2000					2000				1920	2000				
NW20 L1	2000		1900	1850	1800	2000					–	–	–	–	–	–	–	–	–	–
NW25 H1/H2/H3	2500					2500					2500					2500				
NW32 H1/H2/H3	3200		3100	3000	2900	3200					3200					3200				
NW40 H1/H2/H3	4000		3900	3750	3650	4000				3850	4000			3900	3800	4000				
NW40b H1/H2	4000					4000					4000					4000				
NW50 H1/H2	5000					5000					5000					5000				
NW63 H1/H2	–	–	–	–	–	6300				6200	–	–	–	–	–	6300				

Power dissipation and input / output resistance

Total power dissipation is the value measured at I_N, 50/60 Hz, for a 3 pole or 4 pole breaker (values above the power $P = 3RI^2$).
The resistance between input / output is the value measured per pole (cold state).

Version	Drawout		Fixed	
	Power dissipation (Watts)	Input/output resistance (µohm)	Power dissipation (Watts)	Input/output resistance (µohm)
NT06 H1/L1	55/115 (H1/L1)	38/72	30/45	26/39
NT08 H1/L1	90/140 (H1/L1)	38/72	50/80	26/39
NT10 H1/L1	150/230 (H1/L1)	38/72	80/110	26/39
NT12 H1	250	36	130	26
NT16 H1	460	36	220	26
NW08 N1	137	42	62	19
NW08 H/L	100	30	42	13
NW10 N1	220	42	100	19
NW10 H/L	150	30	70	13
NW12 N1	330	42	150	19
NW12 H/L	230	27	100	13
NW16 N1	480	37	220	19
NW16 H/L	390	27	170	13
NW20 H/L	470	27	250	13
NW25 H1/H2/H3	600	19	260	8
NW32 H1/H2/H3	670	13	420	8
NW40 H1/H2/H3	900	11	650	8
NW40b H1/H2	550	7	390	5
NW50 H1/H2	950	7	660	5
NW63 H1/H2	1200	7	1050	5

Derating in switchboards

Factors affecting switchboard design

The temperature around the circuit breaker and its connections:
This is used to define the type of circuit breaker to be used and its connection arrangement.

Vents at the top and bottom of the cubicles:
Vents considerably reduce the temperature inside the switchboard, but must be designed so as to respect the degree of protection provided by the enclosure.
For weatherproof heavy-duty cubicles, a forced ventilation system may be required.

The heat dissipated by the devices installed in the switchboard:
This is the heat dissipated by the circuit breakers under normal conditions (service current).

The size of the enclosure:
This determines the volume for cooling calculations.

Switchboard installation mode:
Free-standing, against a wall, etc.

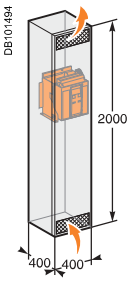
Horizontal partitions:
Partitions can obstruct air circulation within the enclosure.

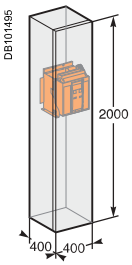
Basis of tables

- switchboard dimensions
- number of circuit-breakers installed
- type of breaker connections
- drawout versions
- ambient temperature outside of the switchboard: T_a (IEC 60439-1).

Masterpact NT06-16 H1/L1 (switchboard 2000 x 400 x 400)

Type		NT06 H1/L1		NT08 H1/L1		NT10 H1/L1		NT12 H1		NT16 H1	
Switchboard composition		4 3 2 1									
Connection type		☰	|||	☰	|||	☰	|||	☰	|||	☰	|||
Busbar dimensions (mm)		2b. 40 x 5		2b. 50 x 5		3b. 63 x 5		3b. 63 x 5	3b. 50 x 5	3b. 80 x 5	3b. 63 x 5
Ventilated switchboard (➡ IP31)	4					H1/L1	H1/L1				
	3	630	630	800	800	1000/1000	1000/1000	1250	1250	1400	1520
T_a = 35 °C	2										
	1										
	4										
	3	630	630	800	800	1000/950	1000/1000	1250	1250	1330	1440
T_a = 45 °C	2										
	1										
	4										
	3	630	630	800	800	1000/890	1000/960	1200	1250	1250	1340
T_a = 55 °C	2										
	1										
Non ventilated switchboard (➡ IP54)	4										
	3	630	630	800	800	1000/960	1000/1000	1250	1250	1330	1400
T_a = 35 °C	2										
	1										
	4										
	3	630	630	800	800	1000/910	1000/980	1220	1250	1260	1330
T_a = 45 °C	2										
	1										
	4										
	3	630	630	800	800	1000/860	1000/930	1150	1230	1200	1260
T_a = 55 °C	2										
	1										

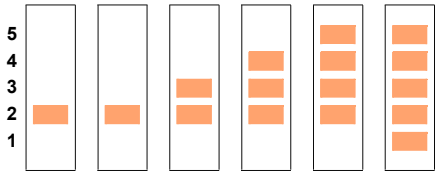
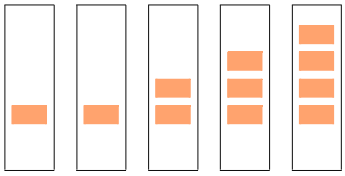


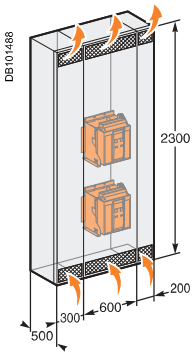


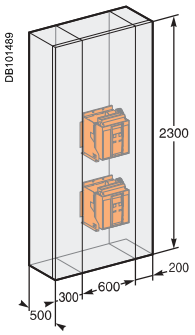
Note: *the values indicated in these tables have been extrapolated from test data and theoretical calculations. These tables are only intended as a guide and cannot replace industrial experience or a temperature rise test.*

Derating in switchboards

Masterpact NT06-08 H1/L1 (switchboard 2300 x 1100 x 500)

Type		**NT06 H1/L1**										**NT08 H1/L1**					
Switchboard composition																	
Connection type																	
Busbar dimensions (mm)		2b. 40 x 5										2b. 50 x 5					
Ventilated switchboard (➡ IP31)	**5**					630	630										800
	4				630	630	630								800	800	800
	3			630	630	630	630							800	800	800	800
T_a = 35 °C	**2**	630	630	630	630	630	630					800	800	800	800	800	800
	1						630										
	5					630	630										800
	4				630	630	630								800	800	800
	3			630	630	630	630							800	800	800	800
T_a = 45 °C	**2**	630	630	630	630	630	630					800	800	800	800	800	800
	1						630										
	5					630	630										800
	4				630	630	630								800	800	800
	3			630	630	630	630							800	800	800	800
T_a = 55 °C	**2**	630	630	630	630	630	630					800	800	800	800	800	800
	1						630										
Non ventilated switchboard (➡ IP54)	**5**					630	630										800
	4				630	630	630								800	800	800
	3			630	630	630	630							800	800	800	800
T_a = 35 °C	**2**	630	630	630	630	630	630					800	800	800	800	800	800
	1						630										
	5					630	630										800
	4				630	630	630								800	800	800
	3			630	630	630	630							800	800	800	800
T_a = 45 °C	**2**	630	630	630	630	630	630					800	800	800	800	800	800
	1						630										
	5					630	630										800
	4				630	630	630								800	800	800
	3			630	630	630	630							800	800	800	800
T_a = 55 °C	**2**	630	630	630	630	630	630					800	800	800	800	800	800
	1						630										

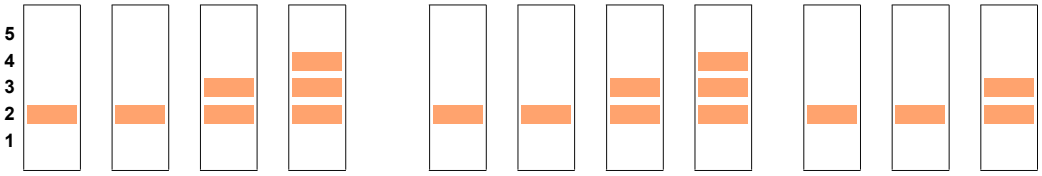
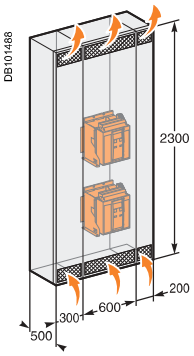


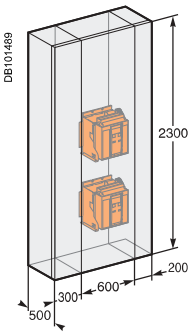


Note: *the values indicated in these tables have been extrapolated from test data and theoretical calculations. These tables are only intended as a guide and cannot replace industrial experience or a temperature rise test.*

Derating in switchboards

Disjoncteurs Masterpact NT10-16 H1/L1 (switchboard 2300 x 1100 x 500)

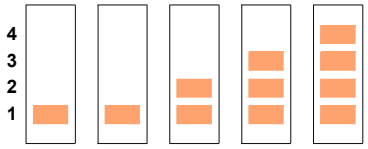
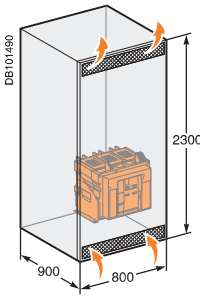
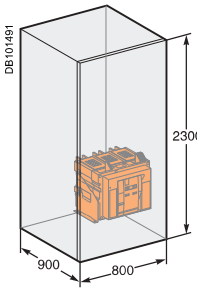
Type		NT10 H1/L1				NT12 H1				NT16 H1		
Switchboard composition												
Connection type												
Busbar dimensions (mm)		3b. 63 x 5				3b. 63 x 5				3b. 80 x 5		
			2b. 63 x 5					3b. 50 x 5				3b. 63 x 5
Ventilated switchboard (➡ IP31)	**5**	H1/L1	H1/L1	H1/L1	H1/L1							
	**4**				1000/1000				1250			
	3			1000/1000	1000/1000			1250	1250			1500
T_a = 35 °C	**2**	1000/1000	1000/1000	1000/1000	1000/1000	1250	1250	1250	1250	1460	1600	1550
	1											
	5											
	4				1000/1000				1250			
T_a = 45 °C	**3**			1000/1000	1000/1000			1250	1250			1420
	2	1000/960	1000/1000	1000/1000	1000/1000	1250	1250	1250	1250	1400	1500	1480
	1											
	5											
	4				1000/920				1250			
T_a = 55 °C	**3**			1000/950	1000/930			1250	1250			1330
	2	1000/900	1000/1000	1000/970	1000/950	1250	1250	1250	1250	1300	1400	1370
	1											
Non ventilated switchboard (➡ IP54)	**5**											
	4				1000/950				1250			
T_a = 35 °C	**3**			1000/1000	1000/960			1250	1250			1370
	2	1000/1000	1000/1000	1000/1000	1000/970	1250	1250	1250	1250	1400	1500	1400
	5											
	4				1000/900				1180			
T_a = 45 °C	**3**			1000/950	1000/910			1250	1190			1300
	2	1000/950	1000/1000	1000/960	1000/930	1250	1250	1250	1220	1350	1430	1320
	5											
	4				1000/850				1120			
T_a = 55 °C	**3**			1000/900	1000/860			1200	1130			1210
	2	1000/880	1000/970	1000/910	1000/870	1210	1250	1210	1150	1250	1350	1250



Note: *the values indicated in these tables have been extrapolated from test data and theoretical calculations. These tables are only intended as a guide and cannot replace industrial experience or a temperature rise test.*

Derating in switchboards

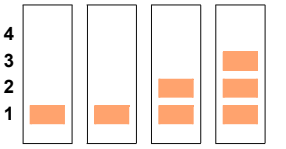
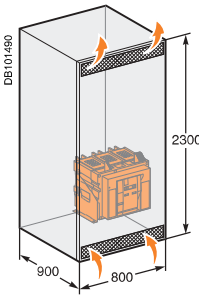
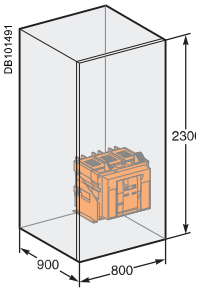
Masterpact NW08-10 N/H/L (switchboard 2300 x 800 x 900)

Type		NW08 N/H/L					NW10 N/H/L			
Switchboard composition										
Connection type										
Busbar dimensions (mm)		2b. 50 x 5					3b. 63 x 5			
							2b. 63 x 5			
Ventilated switchboard (➠ IP31)	**4**					800				
	**3**				800	800				1000
	2			800	800	800			1000	1000
T_a = 35 °C	**1**	800	800	800	800	800	1000	1000	1000	1000
	4					800				
T_a = 45 °C	**3**				800	800				1000
	2			800	800	800			1000	1000
	1	800	800	800	800	800	1000	1000	1000	1000
	4					800				
T_a = 55 °C	**3**				800	800				1000
	2			800	800	800			1000	1000
	1	800	800	800	800	800	1000	1000	1000	1000
Non ventilated switchboard (➠ IP54)	**4**					800				
	**3**				800	800				1000
	2			800	800	800			1000	1000
T_a = 35 °C	**1**	800	800	800	800	800	1000	1000	1000	1000
	4					800				
T_a = 45 °C	**3**				800	800				1000
	2			800	800	800			1000	1000
	1	800	800	800	800	800	1000	1000	1000	1000
	4					800				
T_a = 55 °C	**3**				800	800				1000
	2			800	800	800			1000	1000
	1	800	800	800	800	800	1000	1000	1000	1000

Note: *the values indicated in these tables have been extrapolated from test data and theoretical calculations. These tables are only intended as a guide and cannot replace industrial experience or a temperature rise test.*

Derating in switchboards

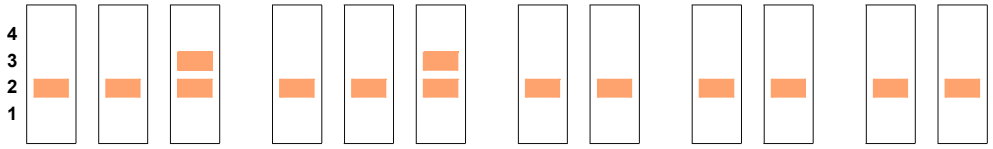
Masterpact NW12-16 N/H/L (switchboard 2300 x 800 x 900)

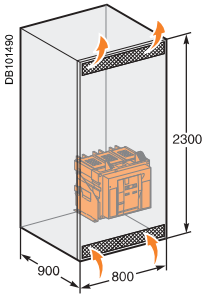
Type		NW12 N1				NW12 H/L				NW16 N1			NW16 H/L		
Switchboard composition															
Connection type															
Busbar dimensions (mm)		3b. 63 x 5				3b. 63 x 5				3b. 80 x 5			3b. 80 x 5		
			3b. 50 x 5				3b. 50 x 5				3b. 63 x 5			3b. 63 x 5	
Ventilated switchboard (➠ IP31)	4														
	3				1250				1250						
T_a = 35 °C	2			1250	1250			1250	1250			1600			1600
	1	1250	1250	1250	1250	1250	1250	1250	1250	1550	1600	1600	1600	1600	1600
	4														
T_a = 45 °C	3				1250				1250						
	2			1250	1250			1250	1250			1500			1600
	1	1250	1250	1250	1250	1250	1250	1250	1250	1470	1600	1600	1600	1600	1600
	4														
T_a = 55 °C	3				1250				1250						
	2			1250	1250			1250	1250			1380			1470
	1	1250	1250	1250	1250	1250	1250	1250	1250	1380	1500	1500	1520	1600	1600
Non ventilated switchboard (➠ IP54)	4														
	3				1240				1250						
T_a = 35 °C	2			1250	1250			1250	1250			1425			1600
	1	1250	1250	1250	1250	1250	1250	1250	1250	1440	1550	1550	1600	1600	1600
	4														
T_a = 45 °C	3				1170				1250						
	2			1210	1210			1250	1250			1360			1500
	1	1200	1250	1250	1250	1250	1250	1250	1250	1360	1470	1470	1500	1600	1600
	4														
T_a = 55 °C	3				1100				1250						
	2			1140	1170			1250	1250			1280			1400
	1	1130	1200	1200	1200	1250	1250	1250	1250	1280	1380	1380	1400	1520	1520

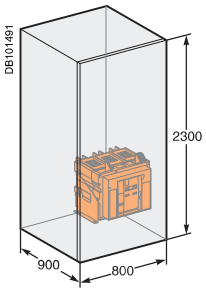
Note: *the values indicated in these tables have been extrapolated from test data and theoretical calculations. These tables are only intended as a guide and cannot replace industrial experience or a temperature rise test.*

Derating in switchboards

Masterpact NW20-40 N/H/L (switchboard 2300 x 800 x 900)

Type		NW20 H1/H2/H3			NW20 L1			NW25 H1/2/3		NW32 H1/2/3		NW40 H1/2/3	
Switchboard composition													
Connection type													
Busbar dimensions (mm)		3b. 100 x 5			3b. 100 x 5			4b. 100 x 5		3b. 100 x 10		4b. 100 x 10	
Ventilated switchboard (➠ IP31)	4												
	3			2000			1830						
T_a = 35 °C	2	2000	2000	2000	2000	2000	2000	2375	2500	3040	3200	3320	3700
	1												
	4												
	3			2000			1750						
T_a = 45 °C	2	2000	2000	2000	1810	1960	1920	2250	2380	2880	3100	3160	3500
	1												
	4												
	3			2000			1640						
T_a = 55 °C	2	2000	2000	2000	1700	1850	1800	2100	2250	2690	2900	2960	3280
	1												
Non ventilated switchboard (➠ IP54)	4												
	3			2000			1750						
T_a = 35 °C	2	2000	2000	2000	1800	1900	1890	2125	2275	2650	2850	3040	3320
	1												
	4												
	3			1900			1660						
T_a = 45 °C	2	1900	1960	1960	1680	1810	1800	2000	2150	2550	2700	2880	3120
	1												
	4												
	3			1780			1550						
T_a = 55 °C	2	1800	1920	1920	1590	1700	1700	1900	2020	2370	2530	2720	2960
	1												

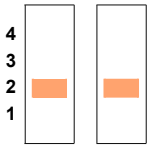
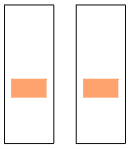
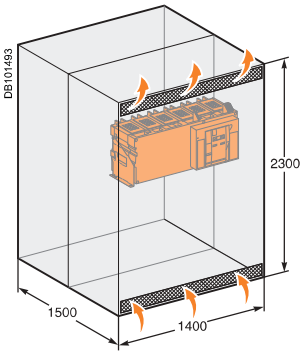
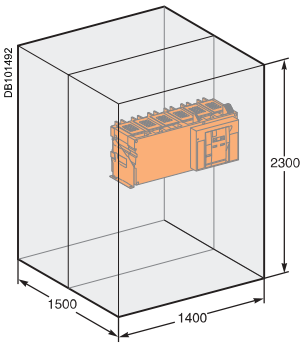




Note: *the values indicated in these tables have been extrapolated from test data and theoretical calculations. These tables are only intended as a guide and cannot replace industrial experience or a temperature rise test.*

Derating in switchboards

Masterpact NW40b-63 H1/H2 (switchboard 2300 x 1400 x 1500)

Type		NW40b H1/H2		NW50 H1/H2		NW63 H1/H2
Switchboard composition						
Connection type						
Busbar dimensions (mm)		5b. 100 x 10		7b. 100 x 10		8b. 100 x 10
Ventilated switchboard (➡ IP31)						
						
	T_a = 35 °C					
	4					
	3					
	2	4000	4000	4700	5000	5850
	1					
	T_a = 45 °C					
	4					
	3					
	2	4000	4000	4450	4850	5670
	1					
	T_a = 55 °C					
	4					
	3					
	2	4000	4000	4200	4600	5350
	1					
Non ventilated switchboard (➡ IP54)						
						
	T_a = 35 °C					
	4					
	3					
	2	4000	4000	4350	4650	5000
	1					
	T_a = 45 °C					
	4					
	3					
	2	4000	4000	4100	4400	5040
	1					
	T_a = 55 °C					
	4					
	3					
	2	3840	3840	3850	4150	4730
	1					

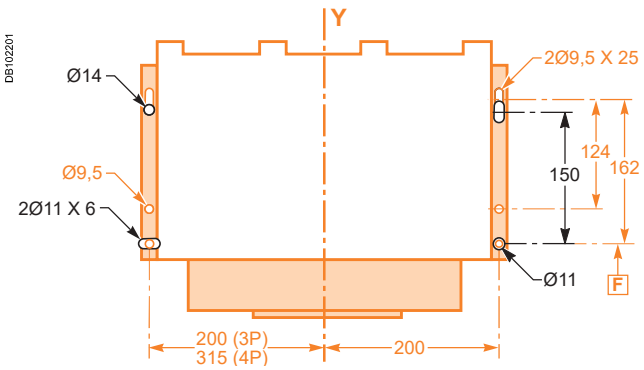
Note: *the values indicated in these tables have been extrapolated from test data and theoretical calculations. These tables are only intended as a guide and cannot replace industrial experience or a temperature rise test.*

Substitution kit
Fixed / drawout devices 800 to 3200 A

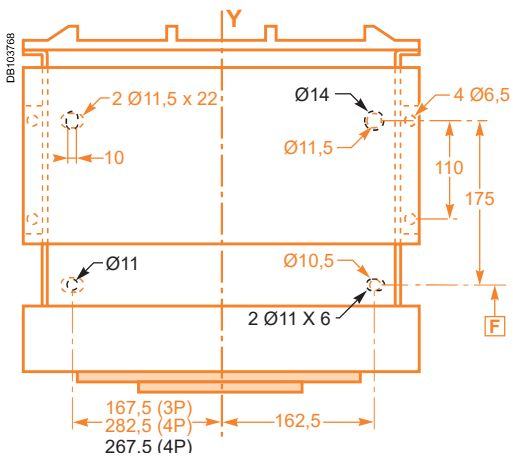
It is possible to replace a **Masterpact (M08 to M32)** with a new **Masterpact (NW08 to NW32)** with the same power rating.
Substitution is possible for the following types of circuit breakers:
- N1, H1, H2 for both fixed and drawout versions
- L1 for drawout versions up to 2000 A.

Mounting diagram

Fixed version



Drawout version



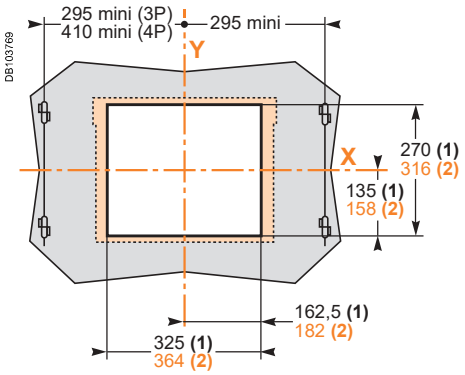
: Masterpact NW
: Masterpact M

Fixing points are identical for Masterpact (M08 to M32) and Masterpact (NW08 to NW32), except for the four-pole chassis.

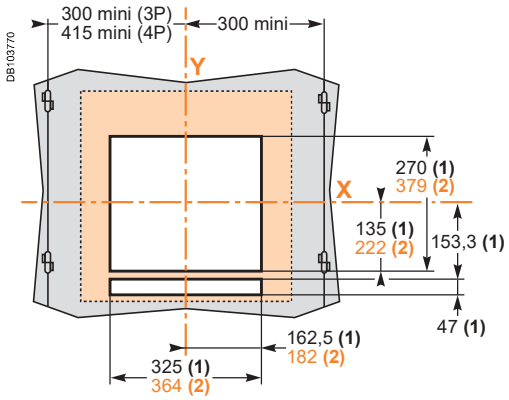
Door cut-out

- without an escutcheon, the cut-out is identical (270 x 325 mm)
- with the former escutcheon, the cut-out is identical (270 x 325 mm)
- with the new escutcheon, the cut-out is different.

Fixed version



Drawout version



Raccordement de puissance

Select a set of retrofit connectors to replace the standard connectors and avoid any modifications to the busbars (see the retrofit section in "orders and quotations").

Note:

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

*References **X** and **Y** represent the symmetry planes for three-pole devices.*

Substitution kit
Fixed / drawout devices
800 to 3200 A

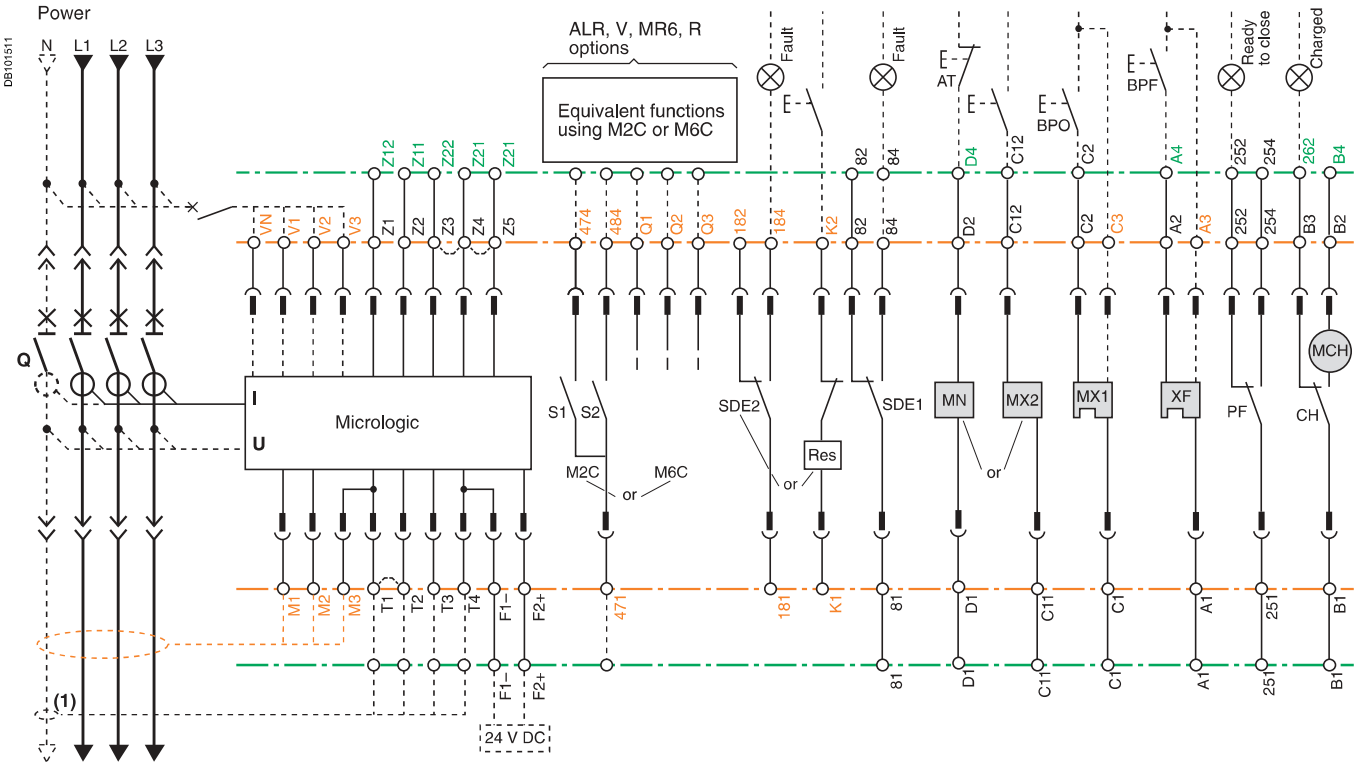
Electrical diagrams

Correspondences between Masterpact NW and Masterpact M terminal blocks.

Power

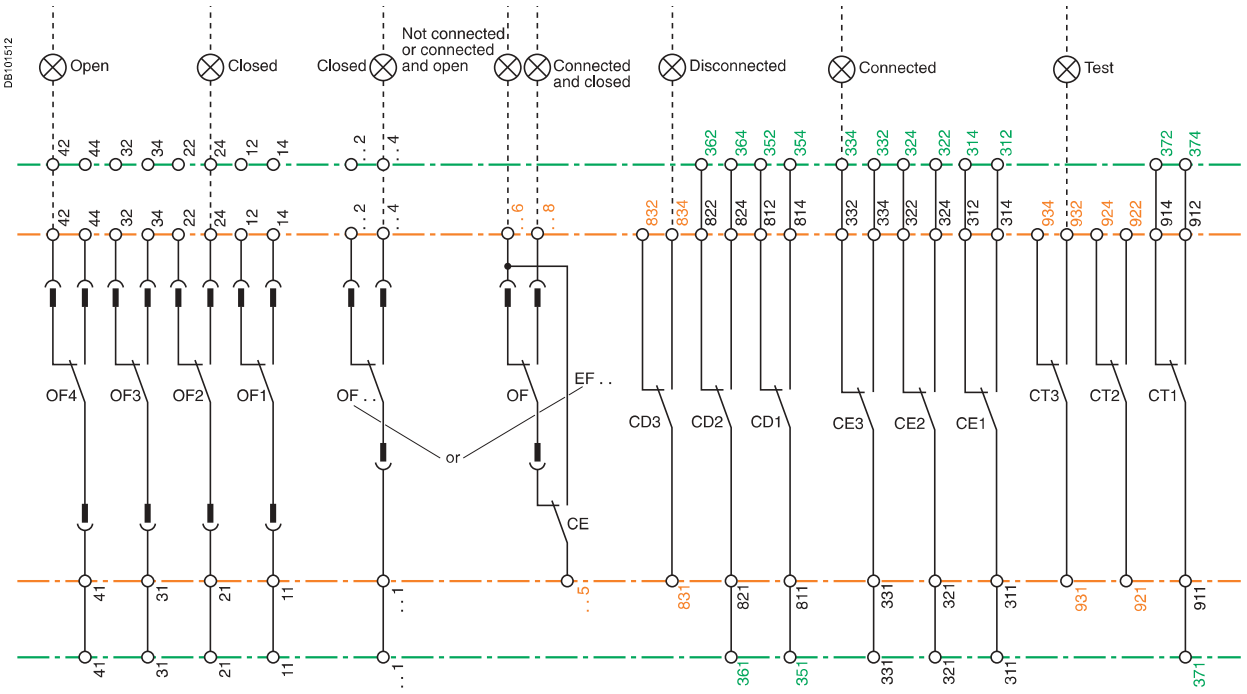
Control unit

Remote operation



Indication contacts

Chassis contacts



Identical to Masterpact M.

Different than Masterpact M.

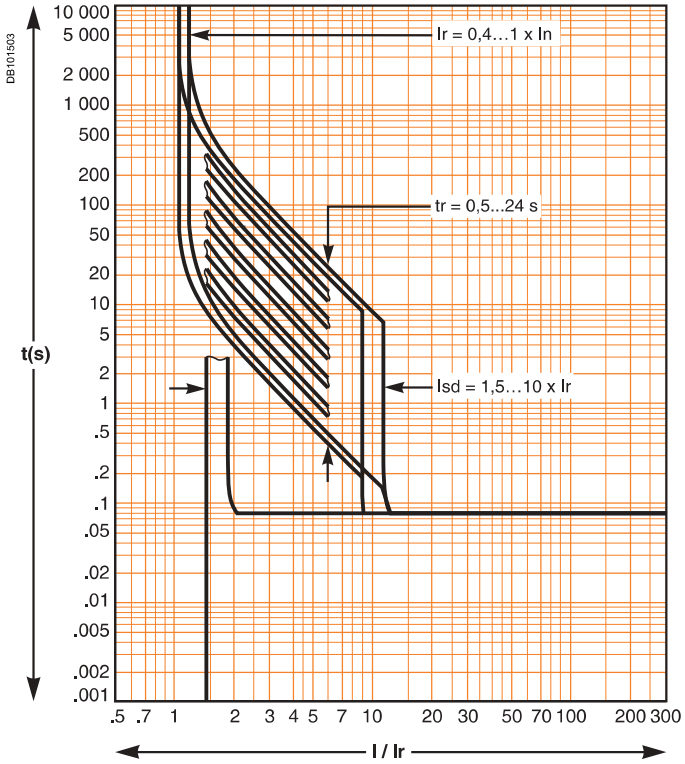
New or additional functions.

(1) *The current transformer for the external neutral must be replaced.*

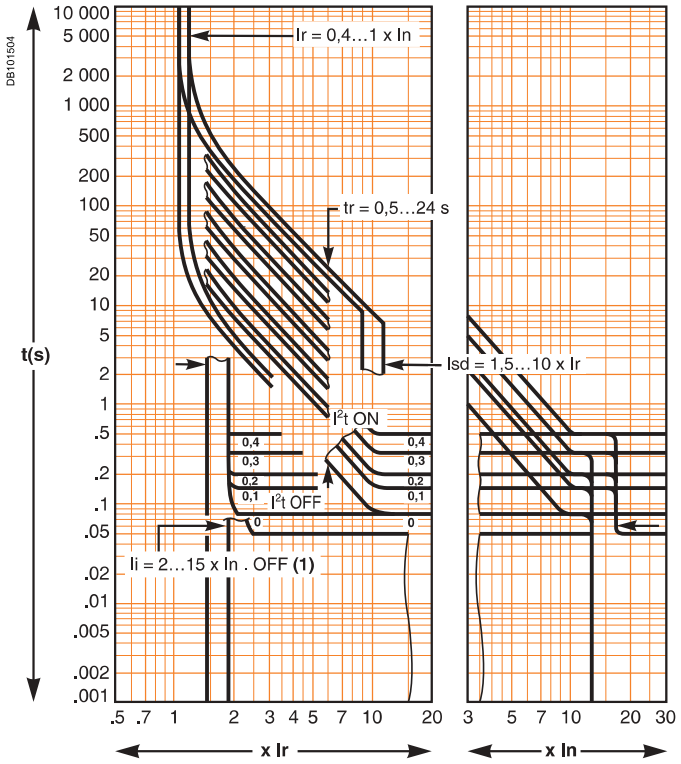
Additional characteristics

Tripping curves

Micrologic 2.0

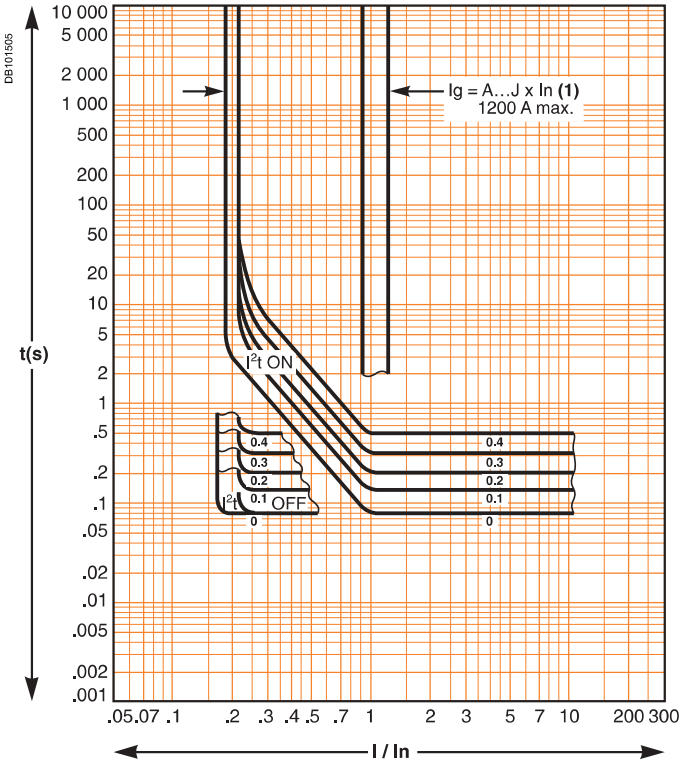


Micrologic 5.0, 6.0, 7.0



Tripping curves

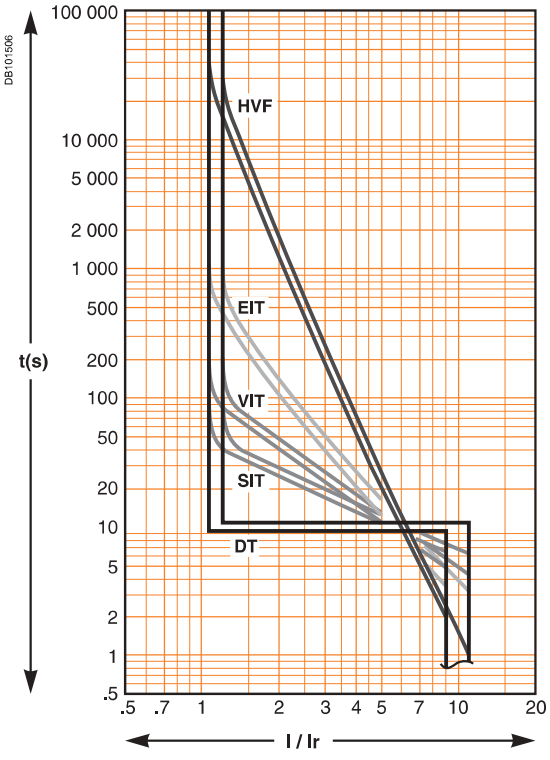
Earth fault protection (Micrologic 6.0)



(1)

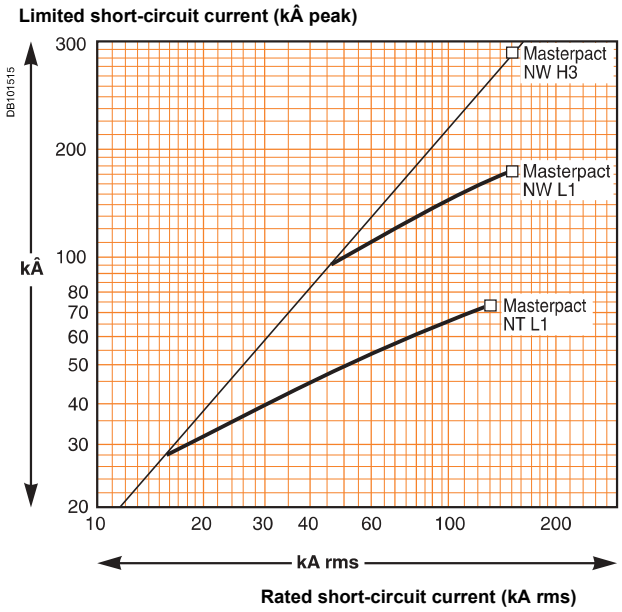
Ig = In x...	A	B	C	D	E	F	G	H	I
Ig < 400 A	0.3	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1
400 A ⩽ Ig ⩽ 1200 A	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1
Ig > 1200 A	500	640	720	800	880	960	1040	1120	1200

IDMTL curve (Micrologic P and H)

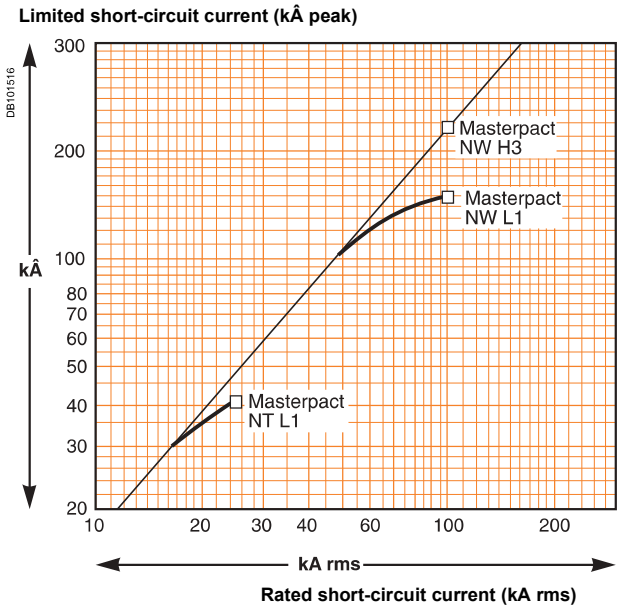


Limitation curves
Current limiting

Voltage 380/415/440 V AC



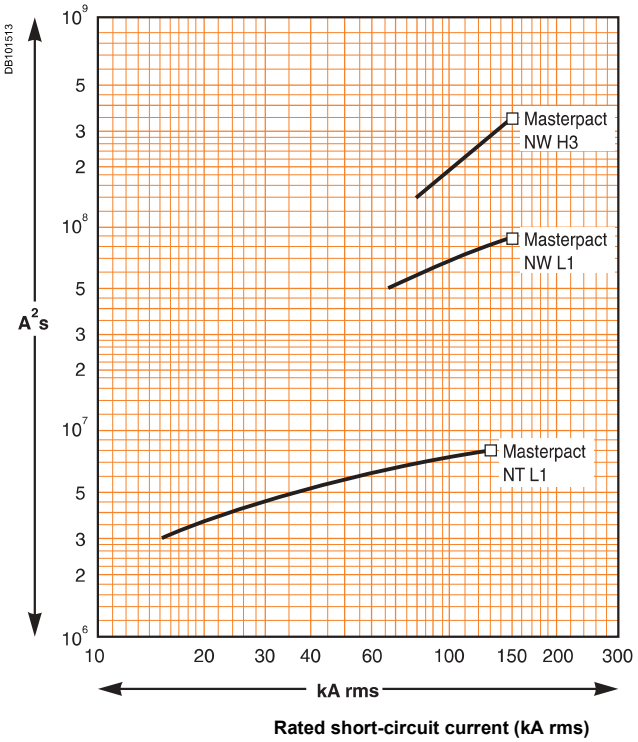
Voltage 660/690 V AC



Limitation curves
Energy limiting

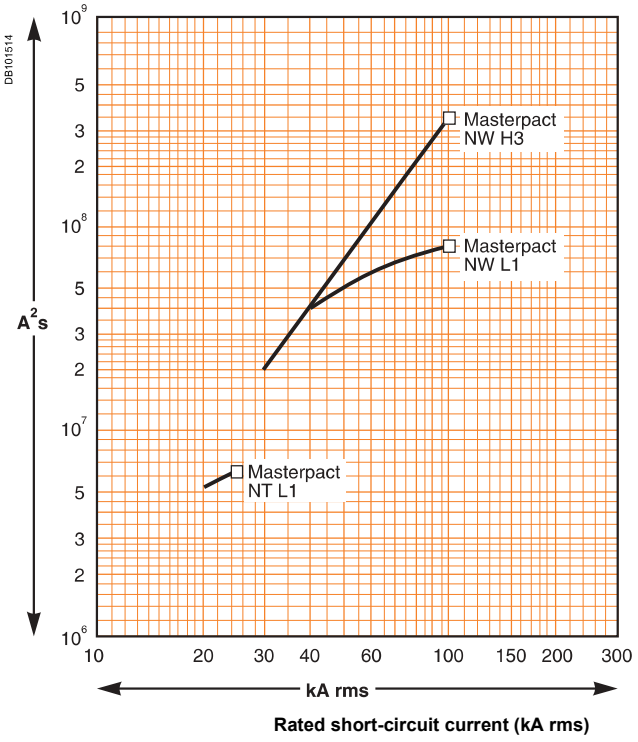
Voltage 380/415/440 V AC

Limited energy



Voltage 660/690 V AC

Limited energy

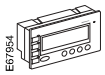


Catalogue numbers, spare parts and order form

Communication bus accessories and Display Modules

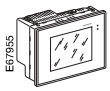
Display modules

DMB300



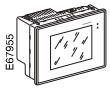
Monochrome display module	Max. 4 breakers	**50894**

DMC300



Color display module	Max. 16 breakers	**50895**

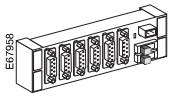
Spare parts



DMC300PCM: DMC300 memory card	**50959**

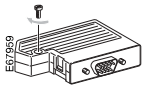
RS485 Modbus pre-wired system

RS485 Modbus junction block



CJB306: 6 SubD 9 pins connectors junction block	**50963**

RS485 Modbus connector



CSD309: 9 pins SubD with screw terminals	**50964**

RS485 Modbus cables

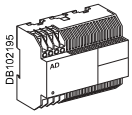
CDM303: display module pre-wired cable, 3 m length	**50960**

CCP303: Masterpact or Compact pre-wired cable (4 RS485 wires + 2 power wires) 3 m length	**50961**

CCR301: RS485 roll cable (2 RS485 wires + 2 power wires) 60 m length	**50965**

External 24 V DC power-supply module

External 24 V DC power-supply module

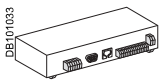


Input	24/30 V DC	**54440**
	48/60 V DC	**54441**
	100/125 V DC	**54442**
	110/130 V AC	**54443**
	200/240 V AC	**54444**
	380/415 V AC	**54445**

Converter

RS485/RS232 (ACE909) 12 V DC power supply included	**59648**	
RS485/RS232	**TSX SCA72**	(1)
RS485/Ethernet	**174 CEV 300-20**	(1)
RS485/Ethernet (SMS compatible)	**EGX 200/400**	(2)

Micro Power Server MPS100



MPS100	**33507**

(1) See catalogue Telemecanique.
(2) See catalogue PowerLogic System.

Retrofit solutions (*)
Connection for fixed devices

To replace a Masterpact M with a Masterpact NW, order a retrofit device (without connections) and select a set of connectors corresponding to the replaced device.
The Masterpact NW is installed in exactly the same place as the old Masterpact M device, without any modifications required on the switchboard.

Horizontal rear connection

Device to be replaced		Connection to be ordered		
Masterpact M08 to M12				
Type N1/NI				
		3P		**4P**
Top	3 x	**48951**	4 x	**48951**
Bottom	3 x	**48964**	4 x	**48964**
Type H1/H2/HI/HF				
Top	3 x	**48954**	4 x	**48954**
Bottom	3 x	**48965**	4 x	**48965**
Masterpact M16				
Type N1/NI/H1/H2/HI/HF				
Top	3 x	**48954**	4 x	**48954**
Bottom	3 x	**48965**	4 x	**48965**
Masterpact M20 and M25				
Type N1/NI/H1/H2/HI/HF				
Top	3 x	**48957**	4 x	**48957**
Bottom	3 x	**48958**	4 x	**48958**
Masterpact M32				
Type H1/H2/HI/HF				
Top	1 x	**48962**	1 x	**48960**
Bottom	1 x	**48961**	1 x	**48960**

(*) Please contact U2R (Retrofit Replacement Unit).

Retrofit solutions (*)
Connection for drawout devices

To replace a Masterpact M with a Masterpact NW, order a retrofit device (without connections) and select a set of connectors corresponding to the replaced device.
The Masterpact NW is installed in exactly the same place as the old Masterpact M device, without any modifications required on the switchboard.

Vertical rear connection

Device to be replaced		Connection to be ordered		
Masterpact M08 to M12				
Type N1/NI				
		3P		**4P**
Top	3 x	**48966**	4 x	**48966**
Bottom	3 x	**48966**	4 x	**48966**
Type H1/H2/HI/HF				
Top	3 x	**48969**	4 x	**48969**
Bottom	3 x	**48969**	4 x	**48969**
Masterpact M16				
Type N1/NI/H1/H2/HI/HF				
Top	3 x	**48969**	4 x	**48969**
Bottom	3 x	**48969**	4 x	**48969**
Masterpact M20 and M25				
Type N1/NI/H1/H2/HI/HF				
Top	3 x	**48970**	4 x	**48970**
Bottom	3 x	**48970**	4 x	**48970**
Masterpact M32				
Type H1/H2/HI/HF				
Top	1 x	**48974**	1 x	**48978**
Bottom	1 x	**48974**	1 x	**48978**

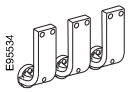
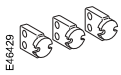
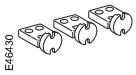
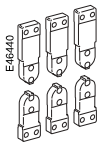
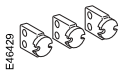
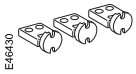
Horizontal rear connection

Device to be replaced		Connection to be ordered		
Masterpact M08 to M12				
Type N1/NI				
		3P		**4P**
Top	3 x	**48951**	4 x	**48951**
Bottom	3 x	**48964**	4 x	**48964**
Type H1/H2/HI/HF				
Top	3 x	**48954**	4 x	**48954**
Bottom	3 x	**48965**	4 x	**48965**
Masterpact M16				
Type N1/NI/H1/H2/HI/HF				
Top	3 x	**48954**	4 x	**48954**
Bottom	3 x	**48965**	4 x	**48965**
Masterpact M20 and M25				
Type N1/NI/H1/H2/HI/HF				
Top	3 x	**48957**	4 x	**48957**
Bottom	3 x	**48958**	4 x	**48958**
Masterpact M32 neutral on left-hand side				
Type H1/H2/HI/HF				
Top	1 x	**48973**	1 x	**48976**
Bottom	1 x	**48973**	1 x	**48977**
Masterpact M32 neutral on right-hand side				
Type H1/H2/HI/HF				
Top	1 x	**48973**	1 x	**48977**
Bottom	1 x	**48973**	1 x	**48976**

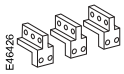
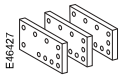
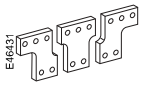
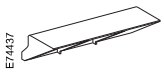
(*) Please contact U2R (Retrofit Replacement Unit)

(*) Installation manual must be ordered separatly, it is not supply with the component

Connection

			3P	4P
Fixed circuit breakers				
Front connection / Replacement kit (3 or 4 parts)				
 E95534	Top or bottom	630/1600 A	**47069**	**47070**
	Installation manual		**47102**	
Rear connection (vertical or horizontal mounting) / Replacement kit (3 or 4 parts)				
 E46429  E46430		630/1600 A	**33584**	**33585**
Vert. mounting. *Horiz. mounting.*	Installation manual		**47102**	
Drawout circuit breakers				
Front connection / Replacement kit (6 or 8 parts)				
 E46440	Top and bottom	630/1600 A	**33588**	**33589**
	Installation manual		**47102**	
Rear connection (vertical or horizontal mounting) / Replacement kit (3 or 4 parts)				
 E46429  E46430		630/1600 A	**33586**	**33587**
Vert. mounting. *Horiz. mounting.*	Installation manual		**47102**	

Connection accessories

		3P	4P
Vertical connection adapters 630/1600 A / Replacement kit (3 or 4 parts)			
 E46426	For fixed and drawout front-connected circuit breakers	**33642**	**33643**
	Installation manual	**47102**	
Cable lug adapters 630/1600 A / Replacement kit (3 or 4 parts)			
 E46427	For fixed and drawout front-connected circuit breakers	**33644**	**33645**
	Installation manual	**47102**	
Spreaders / Replacement kit (3 or 4 parts)			
 E46431	For fixed and drawout front and rear-connected circuit breakers	**33622**	**33623**
	Installation manual	**47102**	
Interphase barriers / Replacement kit (3 or 4 parts)			
 E79151	For fixed and drawout front and rear-connected circuit breakers	**33648**	**33648**
	For drawout rear-connected circuit breakers	**33768**	**33768**
	Installation manual	**47102**	
Arc chute screen (1 part)			
 E74437	For fixed front-connected circuit breakers	**47335**	**47336**
	Installation manual	**47102**	

Masterpact NT
Micrologic control unit, communication option

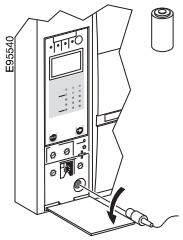
(*) Installation manual must be ordered separatly, it is not supply with the component

Replacement parts for Micrologic control units

Long-time rating plug (limits setting range for higher accuracy) / 1 part

Standard	0.4 at 1 x Ir	**33542**
Low-setting option	0.4 at 0.8 x Ir	**33543**
High-setting option	0.8 at 1 x Ir	**33544**
Without long-time protection	off	**33545**
Installation manual		**33075**

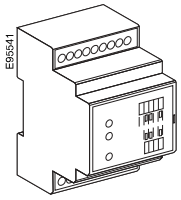
Battery + cover



Battery (1 part)		**33593**
Cover (1 part)	For Micrologic A	**33592**
	For Micrologic P and H	**47067**
Installation manual		**33075**

Communication option

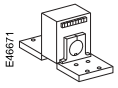
Chassis



Modbus COM	**33852**
Digipact COM	**33855**
6 wires terminal drawout (1 part)	**33099**
6 wires terminal fixed (1 part)	**47075**
Installation manual	**33088**

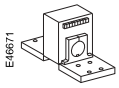
External sensors

External sensor for earth-fault protection (TCE) / 1 part



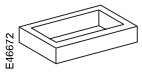
Sensor rating	400/1600 A	**33576**

Source ground return (SGR) earth-fault protection / 1 part



External sensor (SGR)	**33579**
MDGF summing module	**48891**

Rectangular sensor for earth-leakage protection + Vigi cable / 1 part

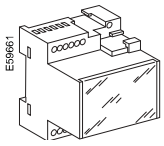


280 mm x 115 mm	**33573**

Vigi cable or external voltage cable / 1 part

Vigi cable or external voltage cable (1 part)	**47090**

External power supply module / 1 part

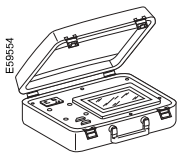


24-30 V DC	**54440**
48-60 V DC	**54441**
100-125 V DC	**54442**
110-130 V AC	**54443**
200-240 V AC	**54444**
380-415 V AC	**54445**

Battery module / 1 part

1 battery	24 V DC	**54446**

Test equipments / 1 part



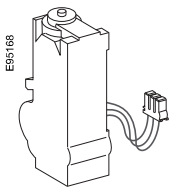
Mini test kit	**33594**
Portable test kit	**33595**
Wiring kit or mini test kit or portable test kit	**33590**
2 pin test cable	**S48908** (*)

(*) Consult us.

(*) Installation manual must be ordered separatly, it is not supply with the component

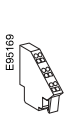
Remote operation

Gear motor

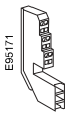


MCH (1 part)

AC 50/60 Hz	48 V	**33186**
	100-130 V	**33176**
	200-240 V	**33177**
	277-415 V	**33179**
	440-480 V	**33179**
	+ resistor	**33193**
DC	24-30 V	**33185**
	48-60 V	**33186**
	100-125 V	**33187**
	200-250 V	**33188**
Terminal block (1 part)	For fixed circuit breaker	**47074**
	For drawout circuit breaker	**33098**



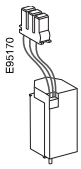
Fixed.



Drawout.

Installation manual		**47103**

Closing and opening release (XF or MX)



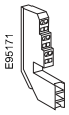
Standard coil (1 part)

AC 50/60 Hz DC	12 V DC	**33658**
	24-30 V AC/DC	**33659**
	48-60 V AC/DC	**33660**
	100-130 V AC/DC	**33661**
	200-250 V AC/DC	**33662**
	277 V AC	**33663**
	380-480 V AC	**33664**

Communicating coil (1 part)

AC 50/60 Hz DC	12 V DC	**33032**
	24-30 V AC/DC	**33033**
	48-60 V AC/DC	**33034**
	100-130 V AC/DC	**33035**
	200-250 V AC/DC	**33036**
	277 V AC	**33037**
	380-480 V AC	**33038**
Terminal block (1 part)	For fixed circuit breaker	**47074**
	For drawout circuit breaker	**33098**

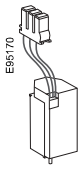
Fixed.



Drawout.

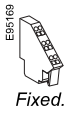
Installation manual		**47103**

Undervoltage release MN

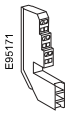


Undervoltage release (1 part)

AC 50/60 Hz	24-30 V DC, 24 V AC	**33668**
DC	48-60 V DC, 48 V AC	**33669**
	100-130 V AC/DC	**33670**
	200-250 V AC/DC	**33671**
	380-480 V AC	**33673**
Terminal block (1 part)	For fixed circuit breaker	**47074**
	For drawout circuit breaker	**33098**



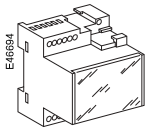
Fixed.



Drawout.

Installation manual		**47103**

MN delay unit



MN delay unit (1 part)

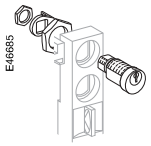
		R (non-adjustable)	**Rr** (adjustable)
AC 50/60 Hz	48-60 V		**33680**
DC	100-130 V	**33684**	**33681**
	200-250 V	**33685**	**33682**
	380-480 V		**33683**
Installation manual			**47103**

Masterpact NT
Chassis locking and accessories

(*) Installation manual must be ordered separatly, it is not supply with the component

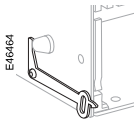
Chassis locking

"Disconnected" position locking / 1 part


E46685

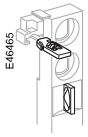
By padlocks		
		Standard
By keylocks		
Profalux	1 lock	**33773**
	1 lock + 1 lock with same key profile	**33774**
	2 locks (different key profiles)	**33775**
1 identical keylock Profalux with the same key:		
	key: random not identified combination	**33173**
	key: random identified 215470 combination	**33174**
	key: random identified 215471 combination	**33175**
Ronis	1 lock	**33776**
	1 lock + 1 lock with same key profile	**33777**
	2 locks (different key profiles)	**33778**
1 identical keylock Ronis with the same key :		
	key: random not identified combination	**33189**
	key: random identified EL24135 combination	**33190**
	key: random identified EL24153 combination	**33191**
	key: random identified EL24315 combination	**33192**
Locking kit without locks for	Profalux	**33769**
	Ronis	**33770**
	Castell	**33771**
	Kirk	**33772**
Installation manual		**47104**

Door interlock / 1 part


E46464

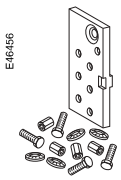
Right and left-hand side of chassis (VPECD or VPECG)		**33172**
Installation manual		**47104**

Racking interlock / 1 part


E46465

Racking interlock (VPOC)		**33788**
Installation manual		**47104**

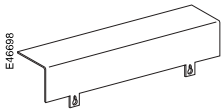
Breaker mismatch protection / 1 part


E46456

Breaker mismatch protection (VDC)		**33767**
Installation manual		**47104**

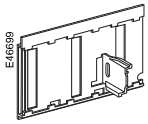
Chassis accessories

Auxiliary terminal shield (CB) / 1 part


E46698

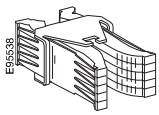
Terminal shield	3P	**33763**
	4P	**33764**
Installation manual		**47104**

Safety shutters + locking / 1 part


E46699

Safety shutters (VO)	3P	**33765**
	4P	**33766**
Installation manual		**47104**
Nota : *the locking of safety shutters is integrated.*		

Clusters



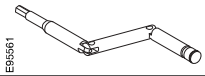
Grease for disconnecting contact clusters (1 kg)	**54122**
1 disconnecting contact cluster for chassis (see table below) 1 part	**33166**

Table : number of clusters required for the different chassis models

Chassis rating (A)	Masterpact NT	
	3P	4P
630	12	18
800	12	18
1000	12	18
1250	12	18
1600	18	24

Nota : *the minimum order is 6 parts.*

Racking handle / 1 part



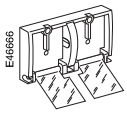
Racking handle	**47098**

Masterpact NT
Circuit breaker locking and accessories

(*) Installation manual must be ordered separatly, it is not supply with the component

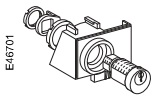
Circuit breaker locking

Pushbutton locking device / 1 part



By padlocks		**33897**
Installation manual		**47103**

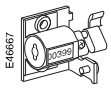
OFF position locking / 1 part



By padlocks + BPFE support		
		47514
By keylocks + BPFE support		
Profalux	1 lock	**47519**
	1 lock + 1 lock with same key profile	**47520**
1 identical keylock Profalux with the same key:		
	key: random not identified combination	**33173**
	key: random identified 215470 combination	**33174**
	key: random identified 215471 combination	**33175**
Ronis	1 lock	**47521**
	1 lock + 1 lock with same key profile	**47522**
1 identical keylock Ronis with the same key :		
	key: random not identified combination	**33189**
	key: random identified EL24135 combination	**33190**
	key: random identified EL24153 combination	**33191**
	key: random identified EL24315 combination	**33192**
Locking kit without locks for	Profalux	**47515**
	Ronis	**47516**
	Kirk	**47517**
	Castell	**47518**
Installation manual		**47103**

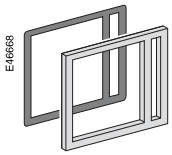
Other circuit breaker accessories

Mechanical operation counter / 1 part



Operation counter CDM	**33895**
Installation manual	**47103**

Escutcheon and accessories / 1 part

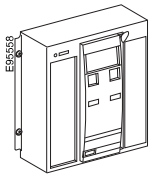


	Fixed	Drawout
Escutcheon	**33718**	**33857**
Transparent cover (IP 54)		**33859**
Escutcheon blanking plate		**33858**

EscutcheonCoverBlanking plate

Installation manual	**47103**

Front cover (3P / 4P) / 1 part

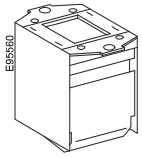


Front cover	**47094**
Installation manual	**47103**

Spring charging handle / 1 part

Spring charging handle	**47092**
Installation manual	**47103**

Arc chute for Masterpact NT / 1 part

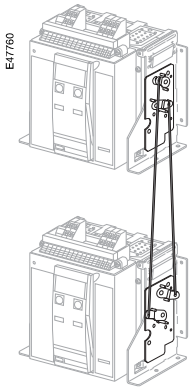


		3P		4P
Type H1	3 x	**47095**	4 x	**47095**
Type L1	3 x	**47096**	4 x	**47096**
Installation manual				**47103**

Masterpact NT
Mechanical interlocking for source changeover

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**

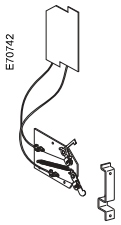
Nota : *the installation manual is enclosed.*

Interlocking using cables (1)

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 2 cables	**33209**

(1) *Can be used with any combination of NT or NW, fixed or drawout devices.*

Cable-type door interlock



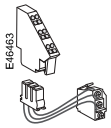
1 complete assembly for Masterpact NT fixed devices	**33920**
1 complete assembly for Masterpact NT drawout devices	**33921**

Nota : *the installation manual is enclosed.*

(*) Installation manual must be ordered separatly, it is not supply with the component

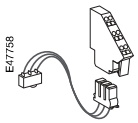
Indication contacts

ON/OFF indication contacts (OF) / 1 part



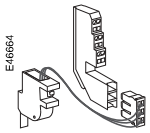
Changeover contacts (6 A - 240 V)		**47076**
1 low-level OF to replace 1 standard OF (4 max.)		**47077**
Wiring	For fixed circuit breaker	**47074**
	For drawout circuit breaker	**33098**
Installation manual		**47103**

"Fault trip" indication contacts (SDE) / 1 part



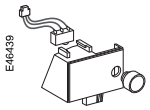
1 additional SDE (5 A - 240 V)		**47078**
1 additional low-level SDE		**47079**
Wiring	For fixed circuit breaker	**47074**
	For drawout circuit breaker	**33098**
Installation manual		**47103**

"Ready to close" contact (1 max.) / 1 part



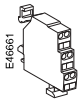
		PF
1 changeover contact (5 A - 240 V)		**47080**
1 low-level changeover contact		**47081**
Wiring	For fixed circuit breaker	**47074**
	For drawout circuit breaker	**33098**
Installation manual		**47103**

Electrical closing pushbutton / 1 part



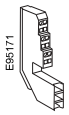
		BPFE
1 pushbutton		**47512**
Installation manual		**47103**

Carriage switches (connected / disconnected / test position) / 1 part



Changeover contacts (6A - 240 V)	
1 connected position contact (3 max.)	**33170**
1 test position contact (1 max.)	**33170**
1 disconnected position contact (2 max.)	**33170**
And/or low-level changeover contacts	
1 connected position contact (3 max.)	**33171**
1 test position contact (1 max.)	**33171**
1 disconnected position contact (2 max.)	**33171**

Auxiliary terminals for chassis alone



3 wire terminal (1 part), terminal block (1 part)	**33098**
Jumpers (10 parts)	**47900**
Installation manual	**47104**

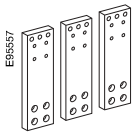
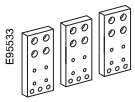
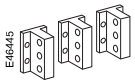
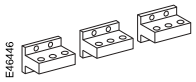
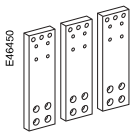
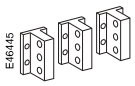
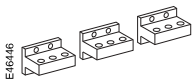
(*) Installation manual must be ordered separatly, it is not supply with the component

Instructions

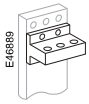
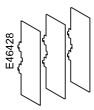
Chassis accessories		**47104**
Circuit breaker accessories		**47103**
Fixed and drawout circuit breaker		**47102**
Micrologic user manual	20 / 50 (French)	**33076**
	20 / 50 (English)	**33077**
	2A / 7A (French)	**33079**
	2A / 7A (English)	**33080**
	5P / 7P (French)	**33082**
	5P / 7P (English)	**33083**
	5H / 7H (French)	**33085**
	5H / 7H (English)	**33086**
NT user manual	French	**47106**
	English	**47107**
Modbus communication notice for manual		**33088**
Micrologic accessories replacement guide		**33075**

(*) Installation manual must be ordered separatly, it is not supply with the component

Connection

			3P	4P
Fixed circuit breakers				
Front connection / Replacement kit (3 or 4 parts)				
	800/1600 A	Top	**47990**	**47991**
	2000/3200 A	Top	**47992**	**47993**
	800/1600 A	Bottom	**47932**	**47933**
	2000/3200 A	Bottom	**47942**	**47943**
	Installation manual		**47950**	
Rear connection (vertical or horizontal mounting) / Replacement kit (3 or 4 parts)				
 *Vertical mounting*	800/2000 A	Vertical	**47964**	**47965**
		Horizontal	**47964**	**47965**
	2500/3200 A	Vertical	**47966**	**47967**
		Horizontal	**47966**	**47967**
	4000 A	Vertical	**47968**	**47969**
		Horizontal	**47970**	**47971**
 *Horizontal mounting*	4000b/5000 A	Vertical 2x	**47966** 2x	**47967**
		Horizontal 2x	**47966** 2x	**47967**
	6300 A	Vertical 2x	**47968** 2x	**47969**
	Installation manual		**47950**	
Drawout circuit breakers				
Front connection / Replacement kit (3 or 4 parts)				
	800/1600 A	Top or bottom	**47960**	**47961**
	2000/3200 A	Top or bottom	**47962**	**47963**
	Installation manual		**47950**	
Rear connection (vertical or horizontal mounting) / Replacement kit (3 or 4 parts)				
 *Vertical mounting*	800/2000 A types N1/H1/H2	Vertical	**47964**	**47965**
	800/1600 A types H3/L1	Horizontal	**47964**	**47965**
	2500/3200 A types H1/H2	Vertical	**47966**	**47967**
	2000/3200 A types H3/L1	Horizontal	**47966**	**47967**
	4000 A	Vertical	**47968**	**47969**
		Horizontal	**47970**	**47971**
 *Horizontal mounting*	4000b/5000 A	Vertical 2x	**47966** 2x	**47967**
		Horizontal 2x	**47966** 2x	**47967**
	6300 A	Vertical 2x	**47968** 2x	**47969**
	Installation manual		**47950**	

Connection accessories

		3P	4P
Disconnectable front-connection adapter for fixed circuit breaker (3 or 4 parts)			
	1600 A	**48464**	**48466**
	2000/3200 A	**48465**	**48467**
	Installation manual	**47950**	
Interphase barriers / Replacement kit (3 parts)			
	For fixed rear-connected circuit breaker	**48599**	**48599**
	For drawout rear-connected circuit breaker	**48600**	**48600**
	Installation manual	**47950**	

Masterpact NW
Micrologic control unit, communication option

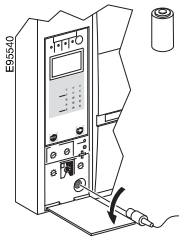
(*) Installation manual must be ordered separatly, it is not supply with the component

Replacement parts for Micrologic control units

Long-time rating plug (limits setting range for higher accuracy) / 1 part

Standard	0.4 at 1 x Ir	**33542**
Low-setting option	0.4 at 0.8 x Ir	**33543**
High-setting option	0.8 at 1 x Ir	**33544**
Without long-time protection	off	**33545**
Installation manual		**33075**

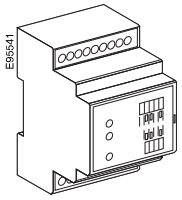
Battery + cover



Battery (1 part)		**33593**
Cover (1 part)	For Micrologic A	**33592**
	For Micrologic P and H	**47067**
Installation manual		**33075**

Communication option

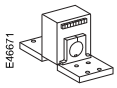
Chassis



Modbus COM	**33852**
Digipact COM	**33855**
6 wires terminal drawout (1 part)	**47850**
6 wires terminal fixed (1 part)	**47075**
Installation manual	**33088**

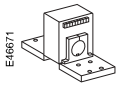
External sensors

External sensor for earth-fault protection (TCE) / 1 part



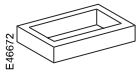
Sensor rating	400/2000 A	**34035**
	1000/4000 A	**34036**
	4000/6300 A	**48182**

Source ground return (SGR) earth-fault protection / 1 part



External sensor (SGR)	**33579**
MDGF summing module	**48891**

Rectangular sensor for earth-leakage protection + Vigi cable / 1 part

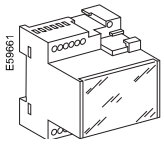


280 mm x 115 mm	**33573**
470 mm x 160 mm	**33574**

Vigi cable or external voltage cable / 1 part

Vigi cable or external voltage cable	**47090**

External power supply module / 1 part

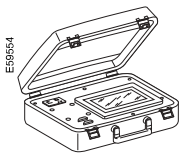


24-30 V DC	**54440**
48-60 V DC	**54441**
100-125 V DC	**54442**
110-130 V AC	**54443**
200-240 V AC	**54444**
380-415 V AC	**54445**

Battery module / 1 part

1 battery	24 V DC	**54446**

Test equipments / 1 part



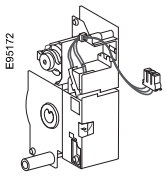
Mini test kit	**33594**
Portable test kit	**33595**
Wiring kit or mini test kit or portable test kit	**33590**
2 pin test cable	**S48908** (*)

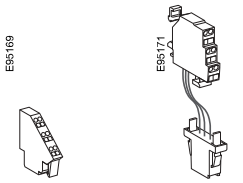
(*) Consult us.

(*) Installation manual must be ordered separatly, it is not supply with the component

Remote operation

Gear motor

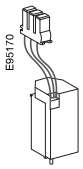


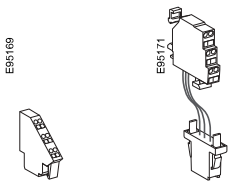


Fixed. *Drawout.*

MCH (1 part)		
AC 50/60 Hz	48 V	**47889**
	100-130 V	**47893**
	200-240 V	**47894**
	250-277 V	**47895**
	380-415 V	**47896**
	440-480 V	**47897**
DC	24-30 V	**47888**
	48-60 V	**47889**
	100-125 V	**47890**
	200-250 V	**47891**
Terminal block (1 part)	For fixed circuit breaker	**47074**
	For drawout circuit breaker	**47849**
Installation manual		**47951**

Closing and opening release (XF or MX)

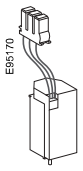


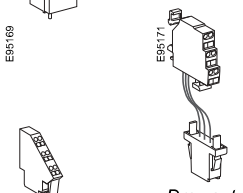


Fixed. *Drawout.*

Standard coil (1 part)		
AC 50/60 Hz DC	12 V DC	**33658**
	24-30 V AC/DC	**33659**
	48-60 V AC/DC	**33660**
	100-130 V AC/DC	**33661**
	200-250 V AC/DC	**33662**
	277 V AC	**33663**
	380-480 V AC	**33664**
Communicating coil (1 part)		
AC 50/60 Hz DC	12 V DC	**33032**
	24-30 V AC/DC	**33033**
	48-60 V AC/DC	**33034**
	100-130 V AC/DC	**33035**
	200-250 V AC/DC	**33036**
	277 V AC	**33037**
	380-480 V AC	**33038**
Terminal block (1 part)	For fixed circuit breaker	**47074**
	For drawout circuit breaker	**47849**
Installation manual		**47951**

Undervoltage release MN

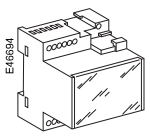




Fixed. *Drawout.*

Undervoltage release (1 part)		
AC 50/60 Hz DC	24-30 V DC, 24 V AC	**33668**
	48-60 V DC, 48 V AC	**33669**
	100-130 V AC/DC	**33670**
	200-250 V AC/DC	**33671**
	380-480 V AC	**33673**
Terminal block (1 part)	For fixed circuit breaker	**47074**
	For drawout circuit breaker	**47849**
Installation manual		**47951**

MN delay unit



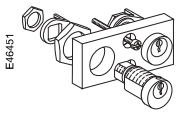
MN delay unit (1 part)			
		R (non-adjustable)	**Rr** (adjustable)
AC 50/60 Hz	48-60 V		**33680**
DC	100-130 V	**33684**	**33681**
	200-250 V	**33685**	**33682**
	380-480 V		**33683**
Installation manual			**47951**

Masterpact NW
Chassis locking and accessories

(*) Installation manual must be ordered separatly, it is not supply with the component

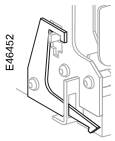
Chassis locking

"Disconnected" position locking / 1 part



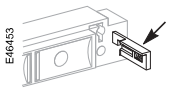
		Standard
By padlocks		
By keylocks		
Profalux	1 lock	**48568**
	1 lock + 1 lock with same key profile	**48569**
	2 locks (different key profiles)	**48570**
1 identical keylock Profalux with the same key:		
	key: random not identified combination	**33173**
	key: random identified 215470 combination	**33174**
	key: random identified 215471 combination	**33175**
Ronis	1 lock	**48572**
	1 lock + 1 lock with same key profile	**48573**
	2 locks (different key profiles)	**48574**
1 identical keylock Ronis with the same key :		
	key: random not identified combination	**33189**
	key: random identified EL24135 combination	**33190**
	key: random identified EL24153 combination	**33191**
	key: random identified EL24315 combination	**33192**
Locking kit without locks for	Profalux, Ronis	**48564**
	Castell	**48565**
	Kirk	**48566**
Installation manual		**47952**

Door interlock / 1 part



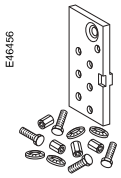
Right and left-hand side of chassis (VPECD or VPECG)	**47914**
Installation manual	**47952**

Racking interlock



5 parts	**48582**
Installation manual	**47952**

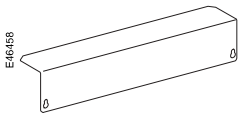
Breaker mismatch protection / 1 part



Breaker mismatch protection (VDC)	**33767**
Installation manual	**47952**

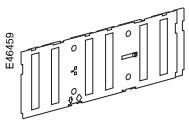
Chassis accessories

Auxiliary terminal shield (CB) / 1 part



800/4000 A	3P	**48595**
	4P	**48596**
4000b/6300 A	3P	**48597**
	4P	**48598**
Installation manual		**47952**

Safety shutters + locking block / 1 part



800/4000 A	3P	**48721**
	4P	**48723**
4000b/6300 A	3P	**48722**
	4P	**48724**
Installation manual		**47952**

Shutter locking block (for replacement) / 1 part

2 parts for 800/4000 A	**48591**
Installation manual	**47952**

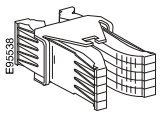
Earthing kit for chassis

	3P	4P
Types for N1/H1/NA/HA		
	48433	**48434**

Nota : *the installation manual is enclosed.*

(*) Installation manual must be ordered separatly,
it is not supply with the component

Clusters



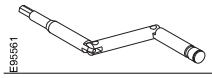
Grease for disconnecting contact clusters (1 kg)	**54122**
1 disconnecting contact cluster for chassis (see table below) (part 1)	**33166**

Table : number of clusters required for the different chassis models

Chassis rating (A)	Masterpact NW 3P				Masterpact NW 4P			
	N1	H1/H2	H3	L1	N1	H1/H2	H3	L1
630								
800	6	12		24	8	16		32
1000	6	12		24	8	16		32
1250	6	12		24	8	16		32
1600	12	12		24	16	16		32
2000		24	24	42		32	32	56
2500		24	24			32	32	
3200		36	36			48	48	
4000		42	42			56	56	
4000b		72				96		
5000		72				96		
6300		72				96		

Nota : *the minimum order is 6 parts.*

Racking handle



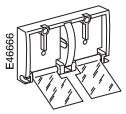
Racking handle	**47944**

Masterpact NW
Circuit breaker locking and accessories

(*) Installation manual must be ordered separatly, it is not supply with the component

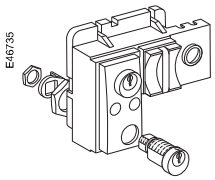
Circuit breaker locking

Pushbutton locking device / 1 part



By padlocks		**48536**
Installation manual		**47951**

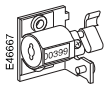
OFF position locking / 1 part



By padlocks / 1 part		
		48539
By padlocks and keylocks / 1 part		
Profalux	1 lock	**48545**
	1 lock + 1 lock with same key profile	**48546**
	2 locks (different key profiles)	**48547**
1 identical keylock Profalux with the same key:		
	key: random not identified combination	**33173**
	key: random identified 215470 combination	**33174**
	key: random identified 215471 combination	**33175**
Ronis	1 lock	**48549**
	1 lock + 1 lock with same key profile	**48550**
	2 locks (different key profiles)	**48551**
1 identical keylock Ronis with the same key :		
	key: random not identified combination	**33189**
	key: random identified EL24135 combination	**33190**
	key: random identified EL24153 combination	**33191**
	key: random identified EL24315 combination	**33192**
Locking kit without locks for	Profalux, Ronis	**48541**
	Kirk	**48542**
	Castell	**48543**
Installation manual		**47951**

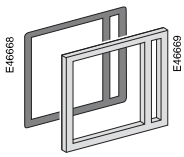
Other circuit breaker accessories

Mechanical operation counter / 1 part

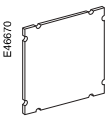


Operation counter CDM	**48535**
Installation manual	**47951**

Escutcheon and accessories / 1 part



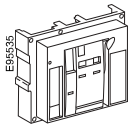
Escutcheon Cover



Blanking plate

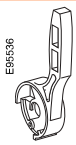
	Fixed	Drawout
Escutcheon	**48601**	**48603**
Transparent cover (IP 54)		**48604**
Escutcheon blanking plate	**48605**	**48605**
Installation manual		**47951**

Front cover (3P / 4P) / 1 part



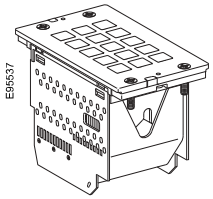
Front cover	**47939**
Installation manual	**47951**

Spring charging handle / 1 part



Spring charging handle	**47940**
Installation manual	**47951**

Arc chute for Masterpact NW / 1 part



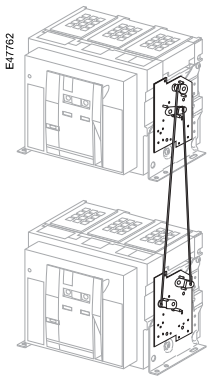
		3P		4P
Type N1	3 x	**47935**	4 x	**47935**
Type H1/H2 (NW08 to NW40)	3 x	**47935**	4 x	**47935**
Type H1/H2 (NW40b to NW63)	6 x	**47936**	8 x	**47936**
Type H3	3 x	**47936**	4 x	**47936**
Type L1	3 x	**47937**	4 x	**47937**
Type NW DC	3 x	**47934**	4 x	**47934**
Installation manual				**47951**

Masterpact NW
Mechanical interlocking for source changeover

(*) Installation manual must be ordered separatly, it is not supply with the component

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**

Can be used with 1 NW fixed + 1 NW drawout.

Nota : *the installation manual is enclosed.*

Interlocking of 2 devices using cables (1)

Choose 2 adaptation sets (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	**33209**

(1) *Can be used with any combination of NT or NW, fixed or drawout devices.*

Interlocking of 3 devices using cables

Choose 3 adaptation (inclusing 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**

Cable-type door interlock

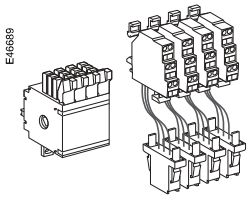
1 complete assembly for Masterpact NW fixed or drawout device	**48614**

Nota : *the installation manual is enclosed.*

(*) Installation manual must be ordered separatly,
it is not supply with the component

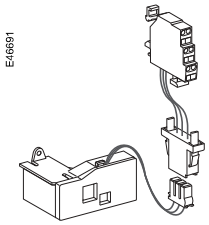
Indication contacts

ON/OFF indication contacts (OF) / 1 part


E46689

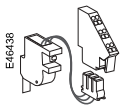
1 additional block of 4 contacts		**47887**
Wiring	For fixed circuit breaker	**47074**
	For drawout circuit breaker	**47849**
Installation manual		**47951**

"Fault trip" indication contacts (SDE) / 1 part


E46691

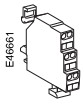
Changeover contact (SDE)	6 A - 240 V	**47915**
	Low-level	**47916**
Wiring	For fixed circuit breaker	**47074**
	For drawout circuit breaker	**47849**
Installation manual		**47951**

"Ready to close" contact (1 max.) / 1 part


E46438

		PF
1 changeover contact (5 A - 240 V)		**47080**
1 low-level changeover contact		**47081**
Wiring	For fixed circuit breaker	**47074**
	For drawout circuit breaker	**47849**
Installation manual		**47951**

"Connected, disconnected, test position" indication contact (carriage switches) / 1 part

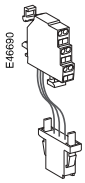

E46661

Changeover contacts	6 A - 240 V	**33170**
CE, CD, CT	Low-level	**33171**
Installation manual		**47952**

Set of additional actuaters for carriage switches / 1 set

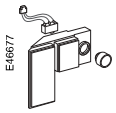
1 set	**48560**

Combined closed / connected contacts for use with 1 auxiliary contact / 1 part


E46690

1 contact (5 A - 240 V)	**48477**
or 1 low-level contact	**48478**
Installation manual	**47952**

Electrical closing pushbutton / 1 part


E46677

	BPFE
1 pushbutton	**48534**
Installation manual	**47951**

Auxiliary terminals for chassis alone

3 wire terminal (1 part)	**47849**
6 wire terminal (1 part)	**47850**
Jumpers (10 parts)	**47900**

Instructions		
Chassis accessories		**47952**
Circuit breaker accessories		**47951**
Fixed and drawout circuit breaker		**47950**
User manual	NW AC (French)	**47954**
	NW AC (English)	**47955**
	NW DC (French)	**47957**
	NW DC (English)	**47958**
Micrologic user manual	20 / 50 (French)	**33076**
	20 / 50 (English)	**33077**
	2A / 7A (French)	**33079**
	2A / 7A (English)	**33080**
	5P / 7P (French)	**33082**
	5P / 7P (English)	**33083**
	5H / 7H (French)	**33085**
	5H / 7H (English)	**33086**
Modbus communication notice for manual		**33088**
Micrologic accessories replacement guide		**33075**

Order form

Masterpact NT and NW order form

To indicate your choice, check the applicable square boxes ☐

and enter the appropriate information in the rectangles ▭

Circuit breaker or switch-disconnector — Quantity

Masterpact type	**NT**	☐	**NW**	☐	
Rating	**A**				▭
Sensor rating	**A**				▭
Circuit breaker	**N1, H1, H2, H3, L1**				▭
Special circuit breaker	**H2 anticorrosion, H10**				▭
Switch-disconnector	**NA, HA, HF, HA10, ES**				▭
Number of poles	**3 or 4**				▭
Brand	**MG**	☐	**SD**		☐
Option: neutral on right side					☐
Type of equipment	Fixed				☐
	Drawout with chassis				☐
	Drawout without chassis (moving part only)				☐
	Chassis alone				☐
Earthing switch kit for chassis					☐

Micrologic control unit

A - ammeter	**2.0**	☐	**5.0**	☐	**6.0**	☐	**7.0** ☐
P - power meter			**5.0**	☐	**6.0**	☐	**7.0** ☐
H - harmonic meter			**5.0**	☐	**6.0**	☐	**7.0** ☐
LR - long-time rating plug	Standard 0.4 to 1 Ir						☐
	Low setting 0.4 to 0.8 Ir						☐
	High setting 0.8 to 1 Ir						☐
	LR OFF						☐
AD - external power-supply module						**V**	▭
BAT - battery module							☐
TCE - external sensor (CT) for neutral and residual earth-fault protection							☐
TCE - external sensor (CT) for over sized neutral (3P - Micrologic P / H) and residual earth-fault protection							☐
TCW - external sensor for SGR protection							☐
Rectangular sensor for earth-leakage protection	NT (280 x 115 mm)						☐
	NW (470 x 160 mm)						☐
PTE - external voltage connector							☐

Communication

COM module	JBus/ ModBus	Device	☐	Chassis	☐
	Digipact	Device	☐	Chassis	☐
Eco COM module	ModBus (for XF or MX communicating release)				☐

Connection

Horizontal	Top	☐	Bottom	☐
Vertical	Top	☐	Bottom	☐
Front	Top	☐	Bottom	☐
Vertical-connection adapters	NT - FC fixed, draw.			☐
Cable-lug adapters	NT - FC fixed, draw.			☐
Arc chute screen	NT - FC fixed			☐
Interphase barriers	NT, NW fixed, drawout			☐
Spreaders	NT fixed, drawout			☐
Disconnectable front connection adapter	NW fixed			☐
Lugs for 240□ or 300□ cables	NT fixed, drawout			▭

Micrologic control unit functions:
2.0 : basic protection (long time + inst.)
5.0 : selective protection (long time + short time + inst.)
6.0 : selective + earth-fault protection (long time + short time + inst. + earth-fault)
7.0 : selective + earth-leakage protection (long time + short time + inst. + earth-leakage)

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	☐
Carriage switches	Low level	☐	6 A-240 V AC	☐
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**	▭
	RAR - automatic reset option			☐
Remote tripping	**MN** - undervoltage release		**V**	▭
	R - delay unit (non-adjustable)			☐
	Res - adjustable delay unit			☐
	2nd MX - shunt release		**V**	▭

Locking

VBP - ON/OFF pushbutton locking (by transparent cover + padlocks) ☐

OFF position locking:

VCPO - by padlocks					☐
VSPO - by keylocks	Keyock kit (w/o keylock)	Profalux	☐	Ronis	☐
	1 keylock	Profalux	☐	Ronis	☐
	2 identical keylocks, 1 key	Profalux	☐	Ronis	☐
	2 keylocks, different keys (NW)	Profalux	☐	Ronis	☐

Chassis locking in "disconnected" position:

VSPD - by keylocks	Keyock kit (w/o keylock)	Profalux	☐	Ronis	☐
		Kirk	☐	Castell	☐
	1 keylock	Profalux	☐	Ronis	☐
	2 identical keylocks, 1 key	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					☐
VIVC - shutter position indication and locking for NW					☐
IBPO - racking interlock between crank and OFF pushbutton for NW					☐
DAE - automatic spring discharge before breaker removal for NW					☐

Accessories

VO - safety shutters on chassis for NT and NW				☐
CDM - mechanical operation counter NT, NW				☐
CB - auxiliary terminal shield for chassis NT, NW				☐
CC - arc chute cover for fixed NT				☐
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	☐