Masterpact
LV air circuit breakers

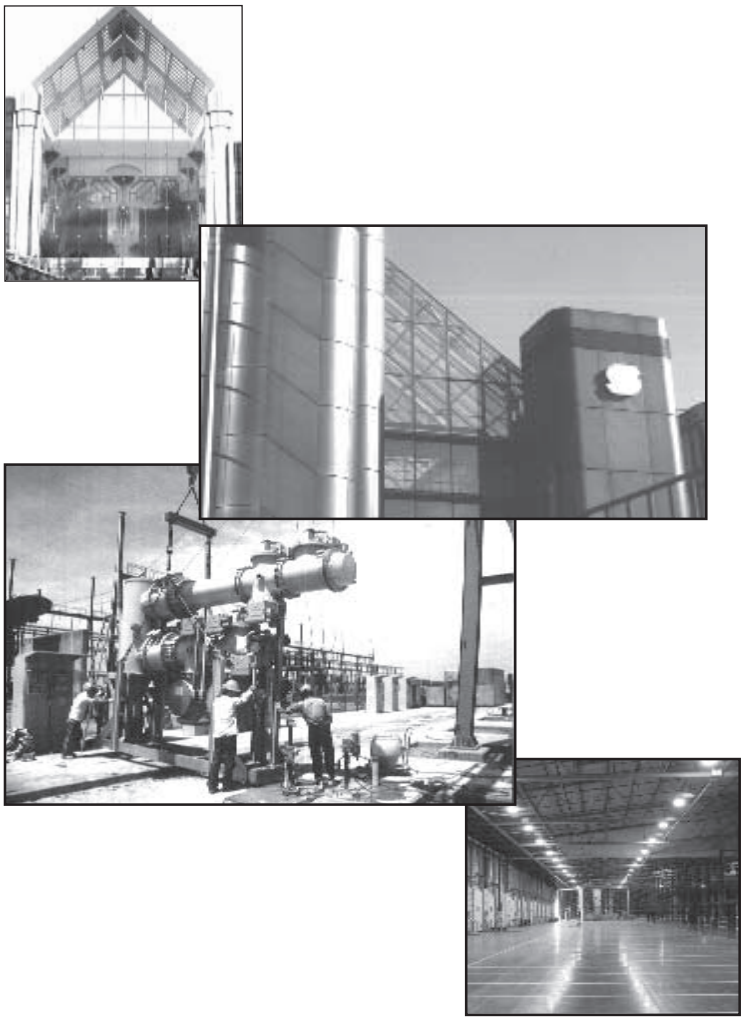
GROUPE SCHNEIDER

Merlin Gerin ■ Modicon ■ Telemecanique

Masterpact: the market leader for air circuit breakers

With a range from 800 to 6300 Amps and a comprehensive list of accessories, Masterpact can provide solutions for all types of LV applications.

Masterpact combined with its associated range of moulded case circuit breakers, Compact NS offers the most advanced LV circuit protection solutions available; with unrivaled support and after sales services.



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LV air circuit breakers and switch-disconnectors

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Section 1

LV air circuit breakers and switch-disconnectors

Masterpact 800 to 6300 Amp

Product Panorama

1

General characteristics

Masterpact circuit breakers are used to protect and control low-voltage distribution systems. They may be installed in main LV switchboards, as incoming units, bus-sections and main outgoing circuits. Masterpact is a complete range offering a **large selection of performance levels:**

- Ratings from 800 to 6300 A AC, from 1000 to 8000 A DC;
- Breaking capacity from 50 to 150 kA rms;
- Operational voltages 690 V AC, 1000 V DC.

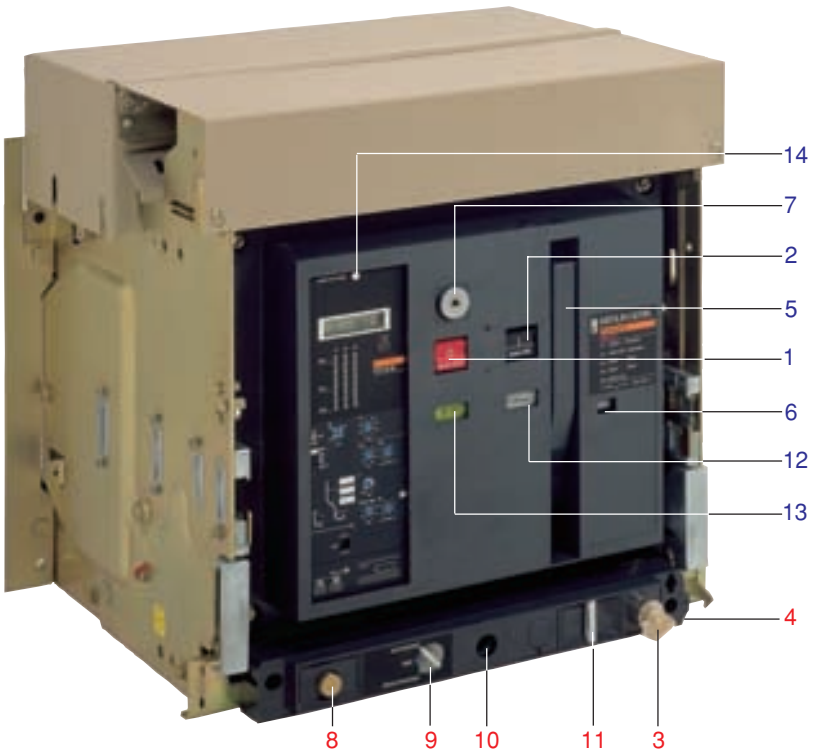
Versions

- 3 or 4 poles;
- Fixed or drawout versions;
- Current-limiting version up to 2500 A;
- Wide range of control units offering multiple functions.

Circuit breakers designed for all applications

- 1000 V AC version;
- DC version;
- Versions for corrosion atmospheres;
- Source-changeover version;
- Merchant-marine and military versions.

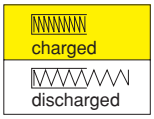
Masterpact circuit breakers **comply with all major international standards** and meet T2 tropicalisation criteria.



Front face

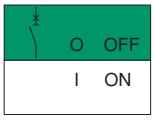
1 Opening push-button (O)
2 Closing push-button (I)
3 Keylock for "connected", "disconnected" or "test" position
4 Door interlock
5 Stored-energy-mechanism charging handle
6 Operations counter
7 "Open" position keylock
8 Racking handle storage
9 Functional position indicator: "connected", "test" and "disconnected"
10 Controls on fixed chassis (accessible with cubicle door closed)
11 Padlocking facilities for "connected", "disconnected" or "test" position
12 Stored-energy-mechanism status indicator

- "charged"
- "discharged"

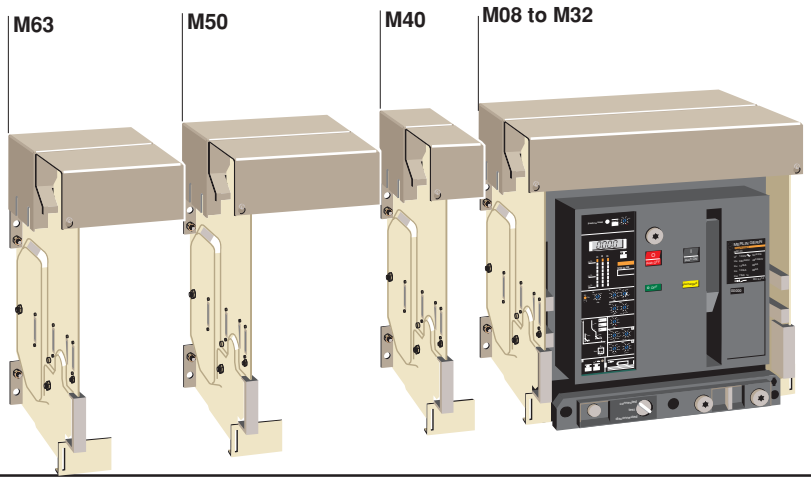


13 Main-contact position indicator

- "OFF" (O);
- "ON" (I).



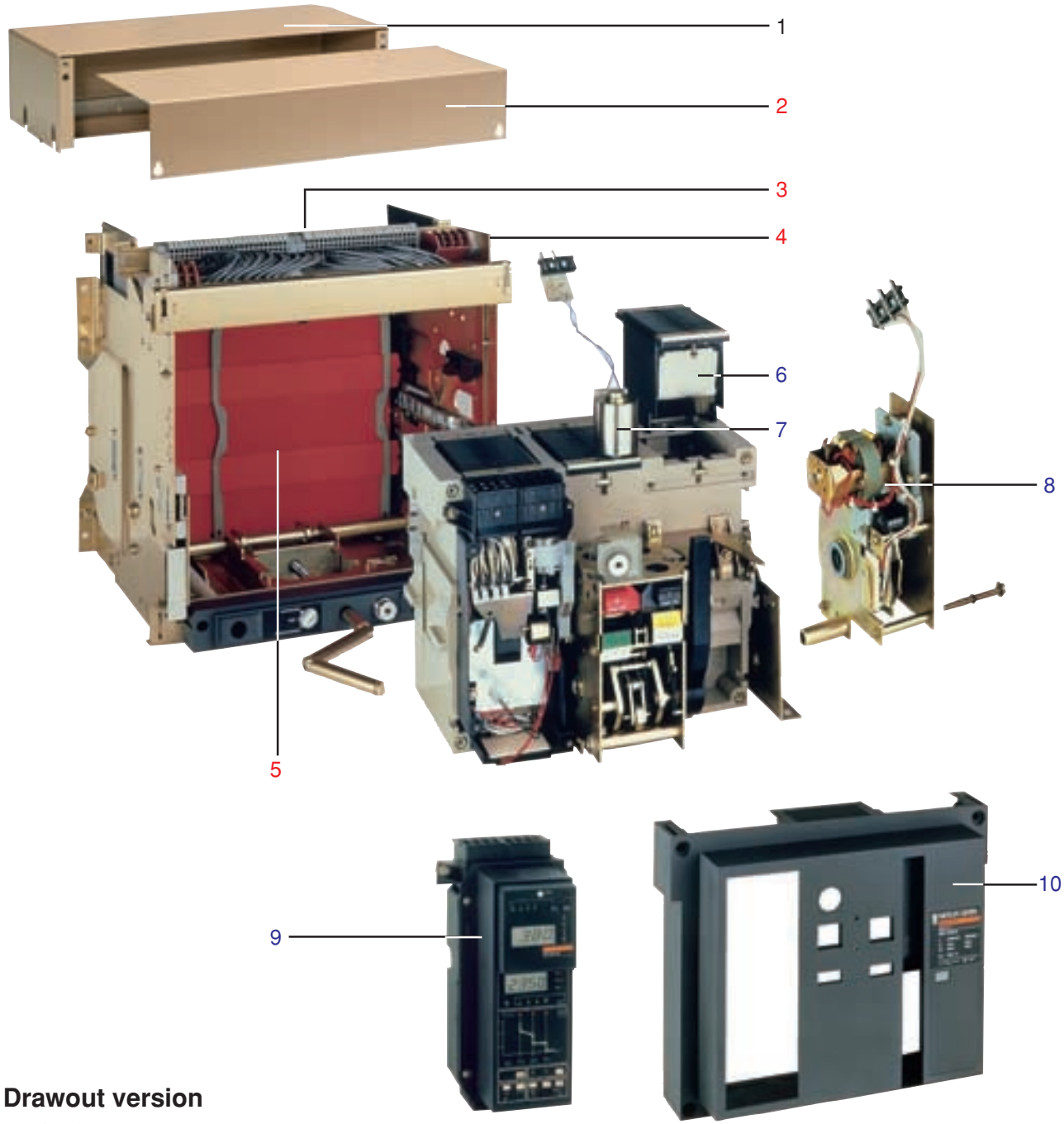
14 Fault-trip indicator/breaker reset button
LV circuit-breaker: blue figures



Reduced dimensions

- AC circuit breakers:
  - A single frame size from 800 to 3200 A,
  - Common height and depth from 800 to 6300 A;
- DC circuit breakers:
  - Common height and length from 1000 to 8000 A for operational voltages of up to 500 V DC,
  - Common height and length from 1000 to 4000 A for operational voltages greater than 500 V DC.

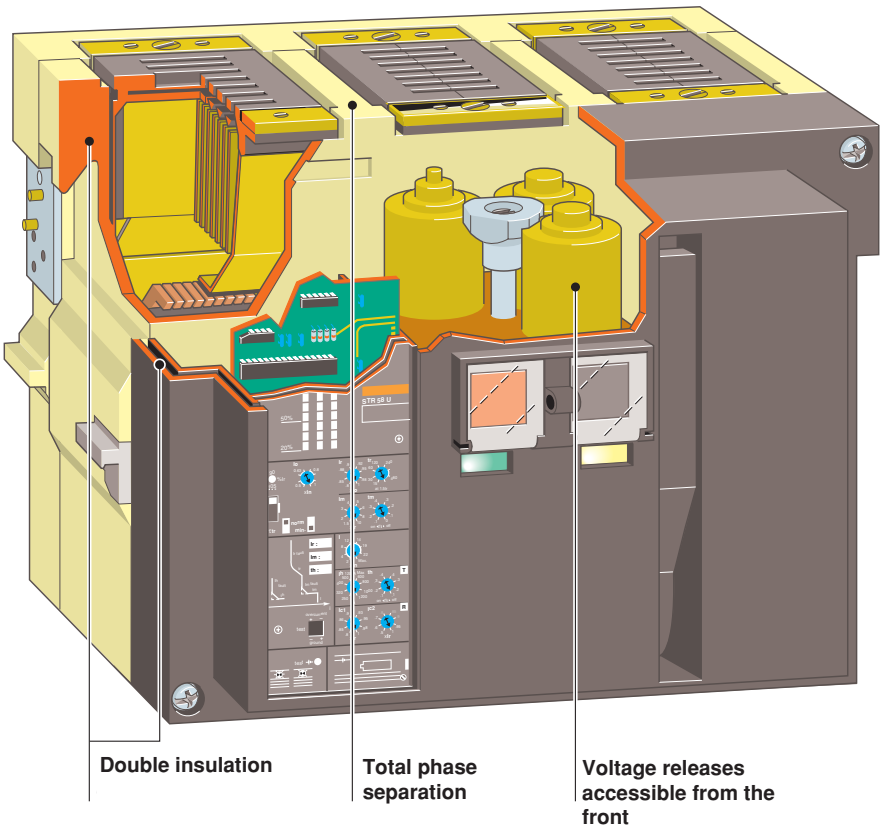
General characteristics



Drawout version

1 Arc chute cover
2 Auxiliary terminal shield
3 Auxiliaries connection block
4 Fixed chassis
5 Safety shutters
6 Arc chute
7 Remote control voltage release
8 Motor for electrical charging of stored energy mechanism
9 Control unit (AC system)
10 Front cover

General characteristics



Safety and reliability

- Compact with minimum maintenance requirements (main contacts easily accessible with wear indication feature). No preventative maintenance required
- Double insulation of the front face;
- Positive contact indication;
- Auxiliary devices can be fitted on site without adjustment;
- Fewer parts than conventional ranges (by a factor of 5-10);
- A trip interlock ensures that the circuit breaker is open during connection and disconnection;
- Connection via either top or bottom terminals;
- Fully tropicalised as standard.

Stored energy operating mechanism

Masterpact circuit breakers are operated via a stored energy mechanism for instantaneous opening and closing.
The mechanism can be charged either manually or electrically and closing and opening operations can be initiated either from the local pushbuttons on the circuit breaker front face, or by remote control.

Common auxiliaries from 800 A to 6300 A

Auxiliaries

- The auxilliars are accessible from the front, and are mounted in a separate compartment insulated from the main power circuits;
- Secured by a single screw;
- Adjustment-free;
- Site adaptable

Other possibilities

Fixed circuit breaker

Automatic source-changeover controller

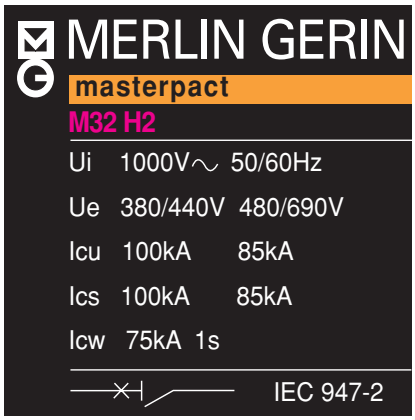
- **Fixed circuit breaker**
  The fixed circuit breaker is derived from the moving part of the drawout circuit breaker by adding a fixing bracket on each side.
- **Switch version**
  The switch (unprotected) version is derived directly from the standard circuit breaker, but does not include a control unit or magnetic trip element. Versions include:
  - ☐ standard: type HI
  - ☐ high performance: type HF, equipped with a protection system that instantaneously opens the circuit breaker in the event of closure onto a s/c fault condition (STR18I)
- **Earthing switch**
  A special earthing switch is available on request for the M08 to M40H drawout vesions, 3 or 4 poles. Please consult us.*
- **1000 V AC circuit breakers**
- **Source changeover system**

*M40 - 3 pole only

- **Available solutins:**
  - ☐ Mechanical interlocking for 2 or 3 circuit breakers, adaptable to various source changeover configurations;
  - ☐ Automatic source-changeover controller, which is easily configured to any two suitably equipped circuit breakers (electrically charged operating mechanism, etc.);
  - ☐ 3 mechanically (rod assembly) interlocked circuit breakers, adaptable to various source-changeover configurations;
  - ☐ Complete assembly including 2 mechanically (rod assembly) interlocked circuit breakers and an automatic source-changeover controller, adaptable to various source-changeover configurations. Ready for connection.

General characteristics

Conformity with standards



Standardised characteristics indicated on the rating plate:
Ui: rated insulation voltage
Ue: rated operational voltage
Icu: ultimate breaking capacity, for various values of the rated operational voltage Ue
Ics: service breaking capacity
Icw: short-time withstand current
: suitable for isolation

Masterpact circuit breakers comply with all the major international standards:
- International standard IEC 947-2; & EN 60947-2
- North American standards (please consult us): UL 489, ANSI C37-50, CSA C22-2, NEMA AB1 et SG3;
- Japanese standards: JIS 160 and C 8372.

They also comply with the following national standards:
- France NF C 63-120;
- Germany VDE 0660;
- United Kingdom BS EN 60947-2;
- Australia AS ;
- Italy CEI.

Masterpact circuit breakers comply with the specifications of the marine classification companies (Veritas, Lloyd's Register of Shipping, Det Norske Veritas, etc.).

IEC 947-2 & BS EN 60947-2

This standard replaces IEC 157-1, applicable since 1973.
The circuit breaker selection criteria remain unchanged, but the new standard provides the user with a better guarantee concerning quality and performance.
Circuit breakers are now subjected to tests that are more representative of real operating conditions.
- **Icu :** the ultimate breaking capacity, which must be greater than or equal to the 3-phase short-circuit current at the point of installation of the circuit breaker, a value unlikely to be reached under real conditions;
- **Ics :** the service breaking capacity, generally expressed as a percentage of the ultimate breaking capacity (25, 50, 75 or 100 % of Icu). It corresponds to a short-circuit current that is more likely to be reached under real conditions. The circuit breaker must continue to operate normally after having interrupted a current equal to Ics three times;
  All Masterpact circuit breakers have a Ics value equal to 100% of Icu
- **Icw :** short-time withstand current for circuit breakers belonging to category B (category B refers to circuit breakers with time discrimination and category A to those without time discrimination).
  Furthermore, IEC 947-2 & BS EN 60947-2 takes into account recent technological advances:
- Suitability for isolation recognised for circuit breakers having passed additional electrical and mechanical tests;
- industrial earth-fault circuit breakers covered by an appendix;
- Definition of tests designed to ensure coordination between two circuit breakers.

Tropicalisation

As standard, Masterpact circuit breakers comply with NF C 63-100 standard level 2 conditions (95 % relative humidity at 45 °C or 80 % at 55 °C, hot and humid climate conditions). They also comply with the following standards:
- IEC 68-2-30 damp heat;
- IEC 68-2-2 dry heat;
- IEC 68-2-11 salt spray;
- IEC 68-2-1 low temperatures during storage.

Corrosive atmospheres: Special grease or other surface coatings available (please consult us).

Pollution degree

Masterpact circuit breakers are certified for operation in pollution degree IV environments as defined by IEC standard 947 (industrial environments).

General characteristics

Maximum dependability

All Masterpact circuit breakers can also be used as disconnectors (suitable for isolation) as specified by IEC 947-2 & BS EN 60947-2. They bear the corresponding symbol on the front cover:

This characteristic considerably increases the dependability of the circuit breaker. The conditions specified by IEC 947-3 & BS EN 60947-3 for this function are:

- positive contact indication;
- impulse withstand: 8 kV at sea level;
- very low leakage current, checked on new circuit breakers which have been subjected to tests which simulate full service life.

Positive contact indication

All Masterpact circuit breakers offer positive contact indication. It can indicate the "OFF" position only if the contacts are effectively open and a suitable distance apart.

Installation

Masterpact circuit breakers may be installed on horizontal metal surfaces or on rails. They are secured by four points accessible at the bottom of the chassis (drawout versions) or on either side of the circuit breaker (fixed versions). A single door cut-out is required for the entire range and provides access to the Masterpact controls (see the description on page 6).

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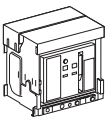
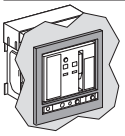
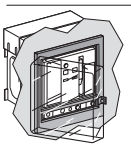
Degree of protection

(as defined by IEC 529)

	Circuit breaker installed free standing	IP 30-5
	Circuit breaker installed in a cabinet with access to controls through a door cut-out	IP 40-5
	Circuit breaker installed in a cabinet behind a door with a cut-out fitted with a sealed, transparent cover	IP 54-9

Installation

2500 A Masterpact circuit breaker

Top: front connection terminals
Bottom: vertical terminals

Masterpact circuit breakers are the product of Merlin Gerin's vast experience in the field of power circuit breakers. They incorporate all the qualities of traditional air circuit breakers while drawing on certain advantages which are specific to moulded-case circuit breakers. In particular, they require no preventive maintenance.

Ease of installation

Masterpact is a complete and modularity designed range.

- 10 ratings;
- 3 breaking-capacity levels;
- 6 control units;
- a complete range of auxiliaries and accessories;
- Three and four-pole devices, fixed and drawout versions.

Masterpact circuit breakers are easy to incorporate in switchboards.

- A single frame size from 800 to 3200 A, enabling standard columns to be designed and utilised for the vast majority of applications.
- Zero upper safety clearance due to the use of arc chute covers, on both the fixed and drawout versions.
- Certain control units can be supplied with multi functional measurement units which eliminates the need for busbar mounted C/Ts, panel mounted relays and additional auxiliary wiring.
- Auxiliaries are the same for the entire range and are easily adapted to the circuit breaker (only a screwdriver is required).

Masterpact circuit breakers are easy to connect to the main distribution system.

- All types of connections are available (horizontal and vertical terminals, front and mixed connections);
- Connections are possible with bars of any thickness;
- Connection to the input power source is possible on the upper or lower terminals of the circuit breakers.

Except 1000V AC versions.

See pages 22/23

Continuity of service

Masterpact circuit breakers are designed with continuity of service in mind. The result is:

- Total time discrimination on the H1 circuit breakers and maximum discrimination on H2 circuit breakers;
- Circuit breakers which do not require any periodic maintenance;
- High electrical endurance: 10 000 operations at 1600 A and 3 cycles at 50 kA, without maintenance;
- Preventive tripping indications: load-shedding indication switch, long-time threshold overrun alarm, etc.;
- Easy access is provided to the main contacts, which are fitted as standard with mechanical wear indicators. As an alternative the STR68 will provide: Stadard - local wear indication(LED) Optional - remote contact wear indication

Operating safety

The insulating casing of Masterpact circuit breakers provides for:

- Complete operator safety with:
  - ☐ Double insulation of the front face (class II),
  - ☐ Auxiliary circuits mounted within a compartment insulated from the main power circuits;
- Increased switchboard safety with:
  - ☐ Each pole effectively isolated in its own housing,
  - ☐ limitation of EMC

Positive contact indication

The position indicator cannot indicate «open» unless the poles are effectively separated by the required distance.
The circuit breakers **automatically open during racking in and out**.

Reliability

- Masterpact circuit breakers comprise ten times fewer parts than traditional devices. They are easier to produce and more reliable.
- The Masterpact circuit-breaker factory is certified ISO 9002;
- The design of Masterpact circuit breakers is modular with delayed differentiation (highest possible number of common parts on all models). The result is shorter delivery times and enhanced reliability.

DC circuit breakers

Fixed Masterpact DC circuit breaker

Drawout Masterpact DC circuit breaker

DC circuit breakers

Masterpact DC circuit breakers are available in fixed and drawout versions.

- 5 available ratings from 1000 to 8000 A;
- 2 breaking capacities, 100 kA at 500 V, 50 kA at 750 and 1000 V;
- A version offering instantaneous short-circuit protection with an adjustable, magnetic trip unit (DINA);
- A switch (unprotected) version.

note: up to 125 V DC, the devices in the AC range (M08 to M63) may be used for the switch version only, in which case a three-pole, type HI device should be used, with:

- 1 pole for the positive polarity;
- 1 pole for the negative polarity;
- 1 pole left unused.

Auxiliaries

All the auxiliaries designed for the Masterpact AC circuit breakers may be used on the DC versions, with the exception of the position switches, indicating the connected (CE), disconnected (CD) and test (CT) positions.

Auxiliary connections are made via one or two manually disconnectable plugs that remain accessible from the front.

Accessories

Standard Masterpact DC range equipment includes an arc-chute cover (CC) and, on drawout versions, safety shutters (VO).

Interphase barriers (EIP) are not available for the DC range.

Device identification
M 20 H1

Breaking capacity;
- H1: H2: high performance;
- L1: current limiting;
- DC: direct current.

Rating
- rated current / 100.

Family
- Masterpact: LV power air circuit breaker.

Weights and dimensions

Masterpact circuit breakers and switch-disconnectors

Type

Dimensions and weights

Dimensions W x H x D (mm)	drawout	3P
		4P
	fixed	3P
		4P
Maximum weight (kg)	drawout	3P
		4P
	fixed	3P
		4P

Masterpact circuit breakers and switch-disconnectors

Type

Dimensions and weights

Dimensions W x H x D (mm)	drawout	3P
		4P
	fixed	3P
		4P
Maximum weight (kg)	drawout	3P
		4P
	fixed	3P
		4P

Masterpact 1000 V circuit breakers

Type

Dimensions and weights

dimensions W x H x D (mm)	drawout	3P
		4P
Maximum weight (kg)	drawout	3P
		4P

Masterpact DC circuit breakers

Type of pole connections

Number of poles

Dimensions and weights

Dimensions W x H x D (mm)	drawout version
	fixed version
Weight (kg)	drawout version
	fixed version
	chassis only

sensor selection

In (A)	**200**	**250**	**320**	**400**	**500**	**600**	**630**	**800**	**1000**	**1200**
Ir threshold settings (A)	80 to 200	100 to 250	125 to 320	160 to 400	200 to 500	240 to 600	250 to 630	320 to 800	400 to 1000	480 to 1200
In (A)	**1250**	**1600**	**2000**	**2500**	**3000**	**3200**	**4000**	**5000**	**6000**	**6300**
Ir threshold settings (A)	500 to 1250	640 to 1600	800 to 2000	1000 to 2500	1200 to 3000	1280 to 3200	1600 to 4000	2000 to 5000	2400 to 6000	2500 to 6300

The table above indicates:

- All the available sensor ratings (current transformers) In;
- The limits of the long time Ir settings.

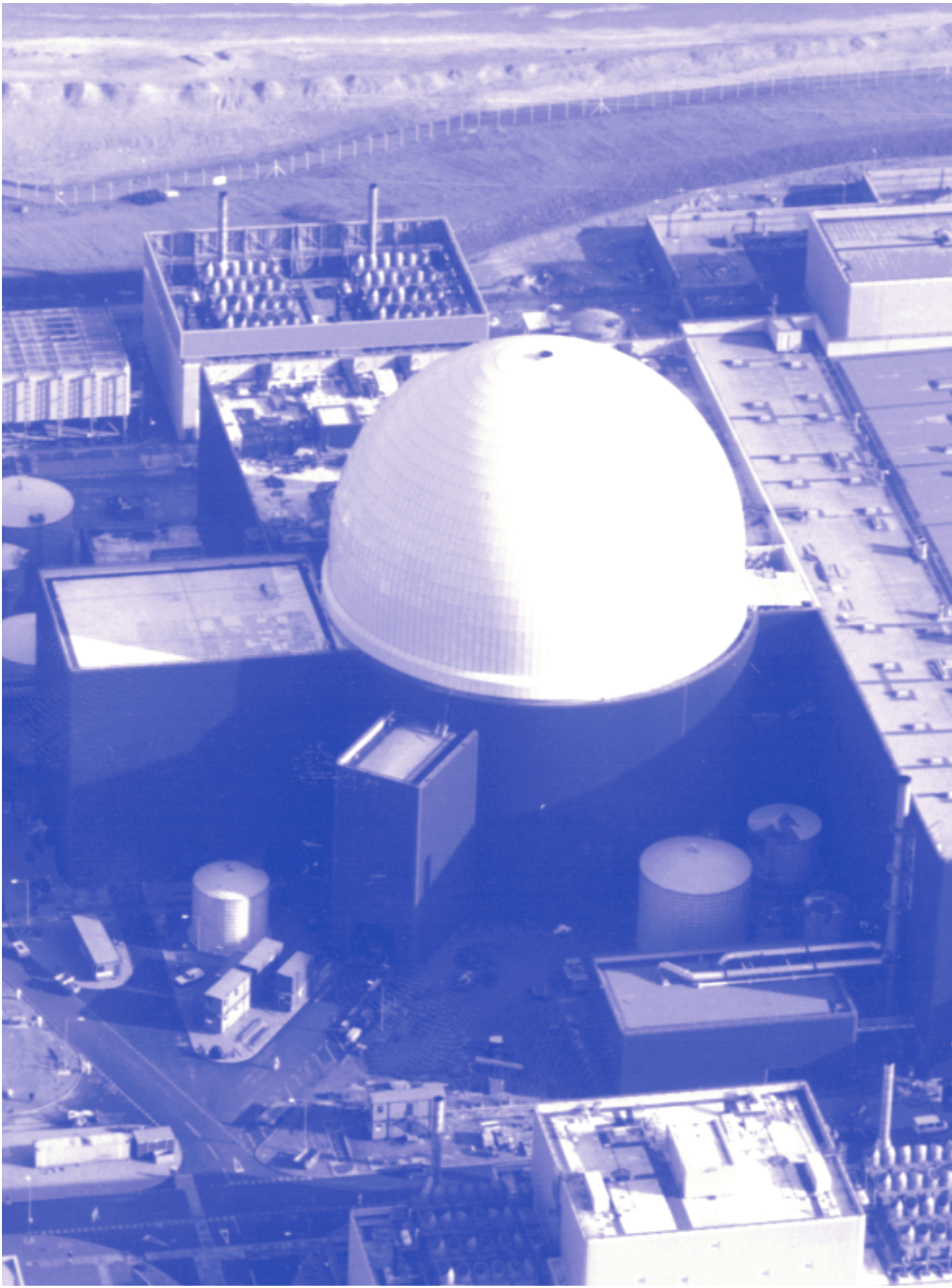
* for connection details see page no 98

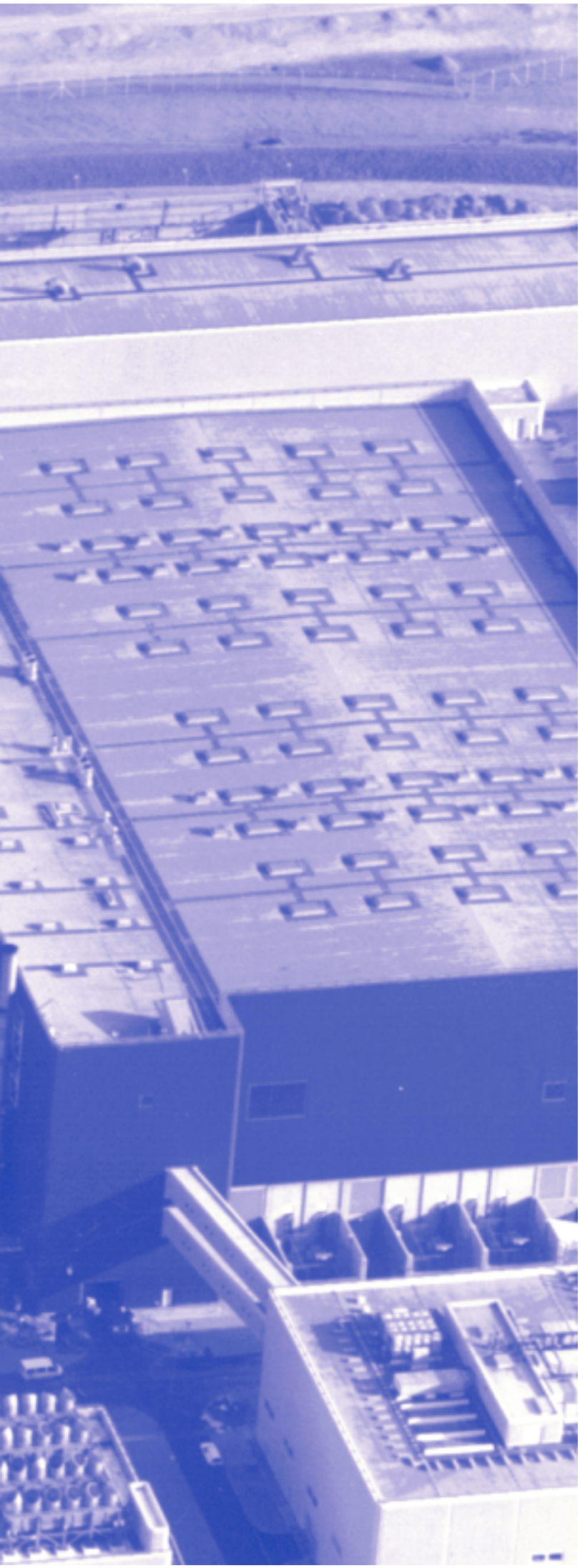
Weights and dimensions

	M08	M10	M12	M16		M20		M25		M32
	H1/H2/L1 HI/HF	H1/H2/L1 HI/HF	H1/H2/L1 HI/HF	H1/H2 HI/HF	L1	H1/H2 HI/HF	L1	H1/H2 HI/HF	L1	H1/H2 HI/HF
	435 x 439 x 367	435 x 439 x 367	435 x 439 x 367	435 x 439 x 367		435 x 439 x 367		435 x 439 x 367		435 x 439 x 367
	550 x 439 x 367	550 x 439 x 367	550 x 439 x 367	550 x 439 x 367		550 x 439 x 367		550 x 439 x 367		550 x 439 x 367
	422 x 356 x 290	422 x 356 x 290	422 x 356 x 290	422 x 356 x 290		422 x 356 x 290		422 x 356 x 290		422 x 356 x 290
	537 x 356 x 290	537 x 356 x 290	537 x 356 x 290	537 x 356 x 290		537 x 356 x 290		537 x 356 x 290		537 x 356 x 290
	65	65	65	69	82	82	130	82	130	130
	80	80	80	85	102	102	150	102	150	150
	43	43	43	46	55	55	80	55	80	80
	54	54	54	58	69	69	90	69	90	90
	M40	**M50**	**M63**							
	H1/H2 HI/HF	H1/H2 HI/HF	H1/H2 HI/HF							
	550 x 439 x 367	815 x 484 x 367	1045 x 484 x 367							
	815 x 484 x 367	1045 x 484 x 367	1045 x 484 x 367							
	537 x 356 x 290	802 x 356 x 290								
	801 x 356 x 290									
	150	215	245							
	200	230	265							
	90	110								
	110									

	M08	M10	M12	M16	M20	M25	M32
	H1	H1	H1	H1	H1	H1	H1
	435 x 439 x 367	435 x 439 x 367	435 x 439 x 367	435 x 439 x 367	435 x 439 x 367	435 x 439 x 367	435 x 439 x 367
	550 x 439 x 367	550 x 439 x 367	550 x 439 x 367	550 x 439 x 367	550 x 439 x 367	550 x 439 x 367	550 x 439 x 367
	65	65	65	69	82	82	130
	80	80	80	85	102	102	15

	M10DC		M20DC		M40DC		M60DC	M80DC
	D or H*	E, F or J*	D or H*	E, F or J*	D or H*	E, F or J*	G*	G*
	3	4	3	4	3	4	2	2
	435x439x536	550x439x536	435x439x536	550x439x536	435x439x641	550x439x641	550x439x484	550x439x484
	438x404x393	553x404x393	438x404x393	553x404x393	438x404x530	553x404x530		
	125	160	125	160	135	170	150	150
	65	80	65	80	65	80	80	80
	80	100	80	100	90	110	90	90





Section 2

LV air circuit breakers and switch-disconnectors

Masterpact 800 to 6300 Amp

Perfomance and functionality

2

Circuit breaker selection

Masterpact M16 H1

Masterpact circuit breakers			
Number of poles			
Electrical characteristics as per IEC 947-2 and BSEN 60947-2			
Rated current (A)	**In**	40 °C	
Rating of 4th pole (A)			
Rated insulation voltage (V)	**Ui**		
Rated impulse withstand voltage (kV)	**Uimp**		
Rated operational voltage (V)	**Ue**	AC 50/60 Hz	
Type of circuit breaker			
Ultimate breaking capacity (1) (kA rms)	**Icu**	AC 50/60 Hz	220/415 V
			440 V
			500/690 V
Service breaking capacity	**Ics**	(% Icu)	
Short-time withstand current (kA rms)	**Icw**	AC 50/60 Hz	0.5 s
			1 s
			3 s
Making capacity (kA peak)	**Icm**	AC 50/60 Hz	220/415 V
			440 V
			500/690 V
Electrodynamic withstand (kA peak)			
Utilisation category			
Suitability for isolation			
Break time			
Closing time			
Endurance (C-O cycles) x 1000	mechanical	with maintenance	
		no maintenance	
	electrical	no maintenance	440 V - In
			690 V - In
	motor control (AC3-947-4) **(2)**		690 V
Electrical characteristics as per standard Nema AB1			
Breaking capacity (kA)			480 V
			600 V
Protection (see following page)			
Sensor ratings (A) (see page 14)			
Control unit Protection type	instantaneous	STR 18 M	
	distribution	STR 28 D	
	selective	STR 38 S	
	universal	STR 58 U	
		STR 68 U	
Installation and connections			
Connection			
Version	drawout		
	fixed		
Indication and measurement auxiliaries			
Auxiliary switches			
Electronic trip unit related functions			
Control auxiliaries			
Auxiliary releases (MN, MNR, MX, XF)			
Motor mechanism (MCH)			
Operation counter (CDM)			
Installation and connection accessories			
Locking by padlock or keylock			
Safety shutters (VO) (standard)			
Interphase barriers (EIP)			
Partitioning fixture (AC)			
Arc-chute cover (CC) (standard)			
Terminal-block cover (CB) (standard)			
Door frame (CDP)			
Transparent cover (CCP)			
Mismatch protection (standard)			

(1) Defined for a power factor of 0.25 if 20 < kA rms ≤ 50 or 0.20 of kA rms > 50.
(2) Closing at 6 x Ie and opening at 0.17 x Un.
(3) For control unit STR 68 U, the minimum rating In is 400 A.

Circuit breaker selection

	M08			M10			M12			M16		
	3, 4			3, 4			3, 4			3, 4		
	800			1000			1250			1600		
	800			1000			1250			1600		
	1000			1000			1000			1000		
	8			8			8			8		
	690			690			690			690		
	H1	**H2**	**L1**	**H1**	**H2**	**L1**	**H1**	**H2**	**L1**	**H1**	**H2**	**L1**
	65	100	130	65	100	130	65	100	130	65	100	130
	65	100	110	65	100	110	65	100	110	65	100	110
	65	85	65	65	85	65	65	85	65	65	85	65
	100 %	100 %	100 %	100 %	100 %	100 %	100 %	100 %	100 %	100 %	100 %	100 %
	65	65	12	65	65	12	65	65	12	65	65	17
	50	50	12	50	50	12	50	50	12	50	50	17
	32	32	12	32	32	12	32	32	12	32	32	12
	143	220	286	143	220	286	143	220	286	143	220	286
	143	220	242	143	220	242	143	220	242	143	220	242
	143	187	143	143	187	143	143	187	143	143	187	143
	143	143	24	143	143	24	143	143	24	143	143	34
	B	B	B	B	B	B	B	B	B	B	B	B
	■			■			■			■		
	25 to 30 ms without intentional time delay and 9 ms for type L1											
	70 ms											
	20	20	20	20	20	20	20	20	15	20	20	15
	10	10	10	10	10	10	10	10	10	10	10	10
	10	10	3	10	10	2.7	10	10	2.5	10	10	2.2
	10	10	3	10	10	2.7	10	10	2.5	10	10	2.2
	10	10	-	10	10	-	10	10	-	10	10	-
	65	100	-	65	100	-	65	100	-	65	100	-
	65	65	-	65	65	-	65	65	-	65	65	-
	200 to 800 **(3)**			200 to 1000 **(3)**			200 to 1250 **(3)**			200 to 1600 **(3)**		
	■	■		■	■		■	■		■	■	
	■	■		■	■		■	■		■	■	
	■	■	■	■	■	■	■	■	■	■	■	■
	■	■	■	■	■	■	■	■	■	■	■	■
	■	■	■	■	■	■	■	■	■	ⓝ	ⓝ	ⓝ
	Front and rear connections											
	■			■			■			■		
	■			■			■			■		
	■			■			■			■		
	■			■			■			■		
	■			■			■			■		
	■			■			■			■		
	■			■			■			■		
	■			■			■			■		
	■			■			■			■		
	■			■			■			■		
	■			■			■			■		
	■			■			■			■		
	■			■			■			■		
	■			■			■			■		
	■			■			■			■		
	■			■			■			■		

Circuit breaker selection

Masterpact M50 H1

Masterpact circuit breakers			
Number of poles			
Electrical characteristics as per IEC 947-2 and BS EN 60947-2			
Rated current (A)	**In**	40 °C	
Rating of 4th pole (A)			
Rated insulation voltage (V)	**Ui**		
Rated impulse withstand voltage (kV)	**Uimp**		
Rated operational voltage (V)	**Ue**	AC 50/60 Hz	
Type of circuit breaker			
Ultimate breaking capacity (1) (kA rms)	**Icu**	AC 50/60 Hz	220/415 V
			440 V
			500/690 V
Service breaking capacity	**Ics**	(% Icu)	
Short-time withstand current (kA rms)	**Icw**	AC 50/60 Hz	0.5 s
			1 s
			3 s
Making capacity (kA peak)	**Icm**	AC 50/60 Hz	220/415 V
			440 V
			500/690 V
Electrodynamic withstand (kA peak)			
Utilisation category			
Suitability for isolation			
Break time			
Closing time			
Endurance (C-O cycles) x 1000	mechanical	with maintenance	
		no maintenance	
	electrical	no maintenance	440 V - In
			690 V - In
	motor control (AC3-947-4) **(2)**		690 V
Electrical characteristics as per standard Nema AB1			
Breaking capacity (kA)			480 V
			600 V
Protection (see following pages)			
Sensor ratings (A) (see page 14)			
Control unit Protection type	instantaneous	STR 18 M	
	distribution	STR 28 D	
	selective	STR 38 S	
	universal	STR 58 U	
		STR 68 U	
Installation and connections			
Connection			
Version	drawout		
	fixed		
Indication and measurement auxiliaries			
Auxiliary switches			
Electronic trip unit related functions			
Control auxiliaries			
Auxiliary releases (MN, MNR, MX, XF)			
Motor mechanism (MCH)			
Operation counter (CDM)			
Installation and connection accessories			
Locking by padlock or keylock			
Safety shutters (VO) (standard)			
Interphase barriers (EIP)			
Partitioning fixture (AC)			
Arc-chute cover (CC) (standard)			
Terminal-block cover (CB) (standard)			
Door frame (CDP)			
Transparent cover (CCP)			
Mismatch protection (standard)			

(1) Defined for a power factor of 0.25 if 20 < kA rms ≤ 50 or 0.20 of kA rms > 50.
(2) Closing at 6 x Ie and opening at 0.17 x Un.
(3) For control unit STR 68 U, the minimum rating In is 400 A.
(4) 83% if Ue ⩽ 440 V.
(5) Consult us for full rated neutral.

Circuit breaker selection

M20			M25			M32		M40		M50		M63	
3, 4			3, 4			3, 4		3, 4		3, 4		3, 4	
2000			2500			3200		4000		5000		6300	
2000			2500			3200		4000		2500 **(5)**		3200	
1000			1000			1000		1000		1000		1000	
8			8			8		8		8		8	
690			690			690		690		690		690	
H1	**H2**	**L1**	**H1**	**H2**	**L1**	**H1**	**H2**	**H1**	**H2**	**H1**	**H2**	**H1**	**H2**
75	100	130	75	100	130	75	100	75	100	100	150	100	150
75	100	110	75	100	110	75	100	75	100	100	150	100	150
75	85	65	75	85	65	75	85	75	85	85	85	85	85
100 %	100 %	100 %	100 %	100 %	100 %	100 %	100 %	100 %	100 %	100 %	100 % **(4)**	100 %	100 % **(4)**
75	75	17	75	75	17	75	75	75	75	100	100	100	100
75	75	17	75	75	17	75	75	75	75	100	100	100	100
57	57	17	75	75	17	75	75	75	75	100	100	100	100
165	220	286	165	220	286	165	220	165	220	220	330	220	330
165	220	242	165	220	242	165	220	165	220	220	330	220	330
165	187	143	165	187	143	165	187	165	187	187	187	187	187
165	165	34	165	165	34	165	165	165	165	220	220	220	220
B	B	B	B	B	B	B	B	B	B	B	B	B	B
■			■			■		■		■		■	
25 to 30 ms without intentional time delay and 9 ms for type L1													
70 ms								80 ms					
15	15	15	15	15	15	15	15	10	10	10	10	10	10
10	10	10	10	10	10	10	10	5	5	5	5	5	5
9	9	2	8	8	1.8	4	4	3	3	3	3	2	2
7	7	2	6	6	1.8	2.6	2.6	2.5	2.5	2.5	2.5	1.5	1.5
7	7	-	6	6	-	2.6	2.6	2.5	2.5	2.5	2.5	1.5	1.5
75	100	-	75	100	-	75	100	75	100	100	125	100	150
75	75	-	75	75	-	75	75	75	75	100	100	100	100
200 to 2000 **(3)**			300 to 2500 **(3)**			600 to 3200		2000 to 4000		2000 to 5000		2000 to 6300	
■	■		■	■		■	■	■	■	■	■	■	■
■	■		■	■		■	■	■	■	■	■	■	■
■	■	■	■	■	■	■	■	■	■	■	■	■	■
■	■	■	■	■	■	■	■	■	■	■	■	■	■
■	■	■	■	■	■	■	■	■	■	■	■	■	■
Front and rear connections								Rear connections					
■			■			■		■		■		■	
■			■			■		■		■ (3P only)			
■			■			■		■		■		■	
■			■			■		■		■		■	
■			■			■		■		■		■	
■			■			■		■		■		■	
■			■			■		■		■		■	
■			■			■		■		■		■	
■			■			■		■		■		■	
■			■			■		■		■		■	
■			■			■		■		■		■	
■			■			■		■		■		■	
■			■			■		■		■		■	
■			■			■		■		■		■	
■			■			■		■		■		■	
■			■			■		■		■		■	

Circuit breaker selection
Masterpact 1000V AC

Masterpact M20 H1 1000 V

Masterpact 1000 V AC circuit breakers			
Number of poles			
Electrical characteristics as per IEC 947-2 and EN 60947-2			
Rated current (A)	**In**	40 °C	
Rating of 4th pole (A)			
Rated insulation voltage (V)	**Ui**		
Rated impulse withstand voltage (kV)	**Uimp**		
Rated operational voltage (V)	**Ue**	AC 50/60 Hz	
Type of circuit breaker			
Ultimate breaking capacity (1) (kA rms)	**Icu**	AC 50/60 Hz	220/415 V
			440 V
			500/690 V
			1000 V
Service breaking capacity	**Ics**	(% Icu)	
Short-time withstand current (kA rms)	**Icw**	AC 50/60 Hz	0.5 s
			1 s
			3 s
Making capacity (kA peak)	**Icm**	AC 50/60 Hz	220/415 V
			440 V
			500/690 V
			1000 V
Electrodynamic withstand (kA peak)			
Utilisation category			
Suitability for isolation			
Break time			
Closing time			
Endurance (C-O cycles) x 1000	mechanical	with maintenance	
		no maintenance	
	electrical	no maintenance	440 V - In
			690 V - In
	motor control (AC3-947-4) **(2)**		690 V
Protection (see following pages)			
Sensor ratings (A) (see page 14)			
Control unit Protection type	instantaneous	STR 18 M	
	distribution	STR 28 D	
	selective	STR 38 S	
	universal	STR 58 U	
		STR 68 U	
Installation and connections			
Connection			
Version	drawout		
	fixed		
Indication and measurement auxiliaries			
Auxiliary switches			
Electronic trip unit related functions			
Control auxiliaries			
Auxiliary releases (MN, MNR, MX, XF)			
Motor mechanism (MCH)			
Operation counter (CDM)			
Installation and connection accessories			
Locking by padlock or keylock			
Safety shutters (VO) (standard)			
Interphase barriers (EIP)			
Partitioning fixture (AC)			
Arc-chute cover (CC) (standard)			
Terminal-block cover (CB) (standard)			
Door frame (CDP)			
Transparent cover (CCP)			
Mismatch protection (standard)			

(1) Defined for a power factor of 0.25 if 20 < kA rms ≤ 50 or 0.20 of kA rms > 50.
(2) Closing at 6 x Ie and opening at 0.17 x Un.
(3) For control unit STR 68 U, the minimum rating In is 400 A.

Circuit breaker selection
Masterpact 1000V AC

	M08	M10	M12	M16	M20	M25	M32
	3, 4	3, 4	3, 4	3, 4	3, 4	3, 4	3, 4
	800	1000	1250	1600	2000	2500	3200
	800	1000	1250	1600	2000	2500	3200
	1000	1000	1000	1000	1000	1000	1000
	8	8	8	8	8	8	8
	1000	1000	1000	1000	1000	1000	1000
	H1	**H1**	**H1**	**H1**	**H1**	**H1**	**H1**
	65	65	65	65	75	75	75
	65	65	65	65	75	75	75
	65	65	65	65	75	75	75
	45	45	45	45	45	45	45
	100 %	100 %	100 %	100 %	100 %	100 %	100 %
	45	45	45	45	45	45	45
	45	45	45	45	45	45	45
	32	32	32	32	45	45	45
	95	95	95	95	95	95	95
	143	143	143	143	165	165	165
	143	143	143	143	165	165	165
	143	143	143	143	165	165	165
	143	143	143	143	165	165	165
	B	B	B	B	B	B	B
	■	■	■	■	■	■	■
	25 to 30 ms without intentional time delay and 9 ms for type L1						
	70 ms						
	20	20	20	20	15	15	15
	10	10	10	10	10	10	10
	10	10	10	10	9	8	4
	10	10	10	10	7	6	2.6
	10	10	10	10	7	6	2.6
	200 to 800 **(3)**	200 to 1000 **(3)**	200 to 1250 **(3)**	200 to 1600 **(3)**	200 to 2000 **(3)**	300 to 2500 **(3)**	600 to 3200
	■	■	■	■	■	■	■
	■	■	■	■	■	■	■
	■	■	■	■	■	■	■
	■	■	■	■	■	■	■
	■	■	■	■	■	■	■
	Rear connections only / supply by upstream terminals mandatory						
	■	■	■	■	■	■	■
	■	■	■	■	■	■	■
	■	■	■	■	■	■	■
	■	■	■	■	■	■	■
	■	■	■	■	■	■	■
	■	■	■	■	■	■	■
	■	■	■	■	■	■	■
	ⓝ	■	■	■	■	■	■
	■	■	■	■	■	■	■
	■	■	■	■	■	■	■
	■	■	■	■	■	■	■
	■	■	■	■	■	■	■
	■	■	■	■	■	■	■
	■	■	■	■	■	■	■
	■	■	■	■	■	■	■

Switch-disconnectors

Masterpact M10

Masterpact switch-disconnectors			
Number of poles			
Electrical characteristics as per IEC 947-2 and EN 60947-2			
Rated current (A)	**In**	40 °C	
Rating of 4th pole (A)			
Rated insulation voltage (V)	**Ui**		
Rated impulse withstand voltage (kV)	**Uimp**		
Rated operational voltage (V)	**Ue**	AC 50/60 Hz	
Type of switch-disconnector			
Short-time withstand current (kA rms)	**Icw**	AC 50/60 Hz	0.5 s
			1 s
			3 s
Making capacity (kA peak)	**Icm**	AC 50/60 Hz	440 V
			500/690 V
Electrodynamic withstand (kA peak)			
Suitability for isolation			
Closing time			
Endurance (C-O cycles) x 1000	mechanical	with maintenance	
		no maintenance	
	electrical	no maintenance	440 V - In
			690 V - In
	motor control (AC3-947-4) **(1)**		690 V
Protection			
	STR 08 dummy unit (no protection)		
	STR 18I (protection against short-circuits when closing)		
Installation and connections			
Connection			
Version	drawout		
	fixed		
Indication and measurement auxiliaries			
Auxiliary switches			
Control auxiliaries			
Auxiliary releases (MN, MNR, MX, XF)			
Motor mechanism (MCH)			
Operation counter (CDM)			
Installation and connection accessories			
Locking by padlock or keylock			
Safety shutters (VO) (standard)			
Interphase barriers (EIP)			
Partitioning fixture (AC)			
Arc-chute cover (CC) (standard)			
Terminal-block cover (CB) (standard)			
Door frame (CDP)			
Transparent cover (CCP)			
Mismatch protection (standard)			

(1) Closing at 6 x Ie and opening at 0.17 x Un.

Switch-disconnectors

	M08		M10		M12		M16	
	3, 4		3, 4		3, 4		3, 4	
	800		1000		1250		1600	
	800		1000		1250		1600	
	1000		1000		1000		1000	
	8		8		8		8	
	690		690		690		690	
	HI	**HF**	**HI**	**HF**	**HI**	**HF**	**HI**	**HF**
	65	65	65	65	65	65	65	65
	50	50	50	50	50	50	50	50
	32	32	32	32	32	32	32	32
	105	143	105	143	105	143	105	143
	105	143	105	143	105	143	105	143
	143	143	143	143	143	143	143	143
	■		■		■		■	
	70 ms							
	20	20	20	20	20	20	20	20
	10	10	10	10	10	10	10	10
	10	10	10	10	10	10	10	10
	10	10	10	10	10	10	10	10
	10	10	10	10	10	10	10	10
	■		■		■		■	
		■		■		■		■
	Front and rear connections							
	■		■		■		■	
	■		■		■		■	
	■		■		■		■	
	■		■		■		■	
	■		■		■		■	
	■		■		■		■	
	■		■		■		■	
	■		■		■		■	
	■		■		■		■	
	■		■		■		■	
	■		■		■		■	
	■		■		■		■	
	■		■		■		■	
	■		■		■		■	
	■		■		■		■	

Switch-disconnectors

Masterpact M50 HI

Masterpact switch-disconnectors			
Number of poles			
Electrical characteristics as per IEC 947-2 and EN 60947-2			
Rated current (A)	**In**	40 °C	
Rating of 4th pole (A)			
Rated insulation voltage (V)	**Ui**		
Rated impulse withstand voltage (kV)	**Uimp**		
Rated operational voltage (V)	**Ue**	AC 50/60 Hz	
Type of switch-disconnector			
Short-time withstand current (kA rms)	**Icw**	AC 50/60 Hz	0.5 s
			1 s
			3 s
Making capacity (kA peak)	**Icm**	AC 50/60 Hz	440 V
			500/690 V
Electrodynamic withstand (kA peak)			
Suitability for isolation			
Closing time			
Endurance (C-O cycles) x 1000	mechanical	with maintenance	
		no maintenance	
	electrical	no maintenance	440 V - In
			690 V - In
	motor control (AC3-947-4) **(1)**		690 V
protection			
	STR 08 dummy unit (no protection)		
	STR 18 I (protection against short-circuits when closing)		
Installation and connections			
Connection			
Version	drawout		
	fixed		
Indication and measurement auxiliaries			
Auxiliary switches			
Control auxiliaries			
Auxiliary releases (MN, MNR, MX, XF)			
Motor mechanism (MCH)			
Operation counter (CDM)			
Installation and connection accessories			
Locking by padlock or keylock			
Safety shutters (VO) (standard)			
Interphase barriers (EIP)			
Partitioning fixture (AC)			
Arc-chute cover (CC) (standard)			
Terminal-block cover (CB) (standard)			
Door frame (CDP)			
Transparent cover (CCP)			
Mismatch protection (standard)			

(1) Closing at 6 x Ie and opening at 0.17 x Un.

Switch-disconnectors

	M20		M25		M32		M40		M50		M63	
	3, 4		3, 4		3, 4		3, 4		3, 4		3, 4	
	2000		2500		3200		4000		5000		6300	
	2000		2500		3200		4000		2500		3200	
	1000		1000		1000		1000		1000		1000	
	8		8		8		8		8		8	
	690		690		690		690		690		690	
	HI	**HF**	**HI**	**HF**	**HI**	**HF**	**HI**	**HF**	**HI**	**HF**	**HI**	**HF**
	75	75	75	75	75	75	75	75	100	100	100	100
	75	75	75	75	75	75	75	75	100	100	100	100
	57	57	75	75	75	75	75	75	100	100	100	100
	105	165	105	165	105	165	105	165	187	220	187	220
	105	165	105	165	105	165	105	165	187	220	187	220
	121	165	121	165	165	165	165	165	220	220	220	220
	■		■		■		■		■		■	
	70 ms						80 ms					
	15	15	15	15	15	15	10	10	10	10	10	10
	10	10	10	10	10	10	10	5	5	5	5	5 5
	9	9	8	8	4	4	3	3	3	3	2	2
	7	7	6	6	2.6	2.6	2.5	2.5	2.5	2.5	1.5	1.5
	7	7	6	6	2.6	2.6	2.5	2.5	2.5	2.5	1.5	1.5
	■		■		■		■		■		■	
		■		■		■		■		■		■
	Front and rear connections						Rear connections					
	■		■		■		■		■		■	
	■		■		■		■		■ (3P only)			
	■		■		■		■		■		■	
	■		■		■		■		■		■	
	■		■		■		■		■		■	
	■		■		■		■		■		■	
	■		■		■		■		■		■	
	■		■		■		■		■		■	
	■		■		■		■		■		■	
	■		■		■		■		■		■	
	■		■		■		■		■		■	
	■		■		■		■		■		■	
	■		■		■		■		■		■	
	■		■		■		■		■		■	
	■		■		■		■		■		■	

DC circuit breaker selection

The DC range is available in two versions:
- Switch (unprotected) version with (STR08I);
- Circuit-breaker version with instantaneous short-circuit protection with an adjustable, magnetic trip unit (DINA).

note: for voltages up to 125 V DC, the devices in the AC range (M08 to M63) may be used **only in the switch version**, in which case a three-pole type HI device should be used, with:
- 1 pole for the positive polarity;
- 1 pole for the negative polarity;
- 1 pole unused.

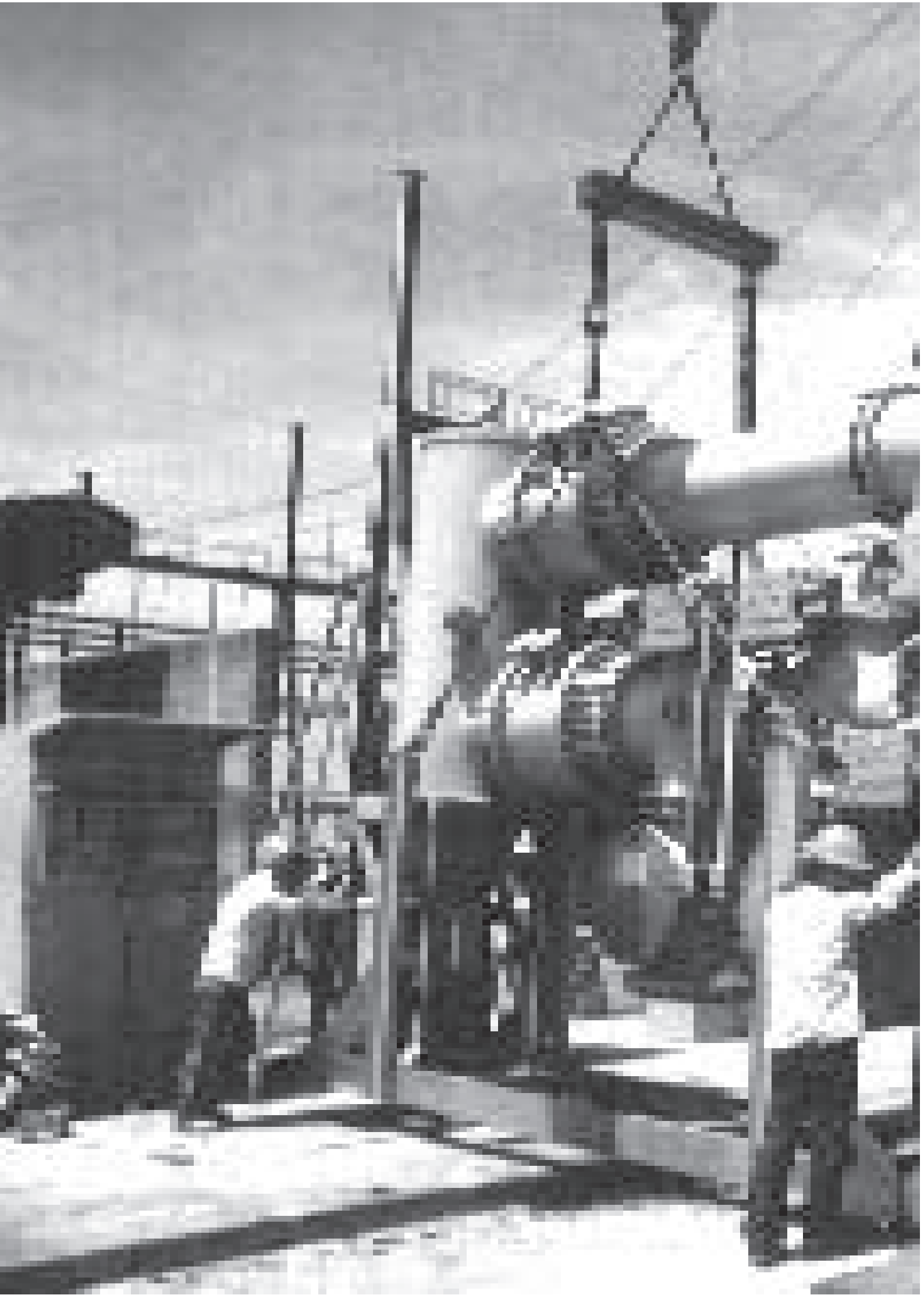
Masterpact DC circuit breakers			
Type of pole connections			
Number of poles			
Electrical characteristics as defined by IEC 947-2 and EN 60947-2			
Rated operational voltage (V DC)		**Ue**	
Rated current (A)		**In**	40 °C
Rated insulation voltage (V)		**Ui**	
Rated impulse withstand voltage (kV)		**Uimp**	
Ultimate breaking capacity (kA rms)		**Icu**	L/R ⩽ 15 ms
Service breaking capacity		**Ics**	(% Icu)
Suitability for isolation			
Utilisation category			
Short-time withstand current		**Icw**	(kA rms, 1 s)
Endurance (C-O cycles)	mechanical	no maintenance	
		with maintenance	
	electrical (at Ue)	no maintenance	
Operating time		total max breaking	
		closing	
Protection			
Adjustable magnetic trip unit (DINA)			
Switch (unprotected) version (STR08I)			
Installation and connections			
Fixed rear connection			
Drawout rear connection			
Indication and measurement auxiliaries			
Auxiliary switches (O, OF, OFSUP)			
"Ready to close" contact (PF)			
"Spring charged" contact (CH)			
Fault trip indication (SDE)			
Connected/disconnected/test position switches (CE, CD, CT)			
Electronic trip-unit functions			
Control auxiliaries			
Auxiliary releases (MN, MNR, MX, XF)			
Motor mechanism (MCH)			
Operation counter (CDM)			
Installation and connection accessories			
Locking by padlock or keylock			
Safety shutters (VO)			
Arc-chute cover (CC)			
Terminal-block cover (CB)			
Interphase barriers (EIP)			
Partitioning fixture (AC)			
Door frame (CDP)			
Transparent cover (CCP)			
Mismatch protection			
Dimensions and weights			
Dimensions W x H x D (mm)		drawout version	
		fixed version	
Weight (kg)		drawout version	
		fixed version	
		chassis only	

(1) Type H : only suitable for 3600 A for an ambient temperature of 40 °C.
(2) Type J : only suitable for 3500 A for an ambient temperature of 40 °C.

■ Optional
□ Standard
* for connection details see page 98

DC circuit breaker selection

	M10DC		M20DC		M40DC		M60DC	M80DC
	D or H*	E, F or J*	D or H*	E, F or J*	D or H*	E, F or J*	G*	G*
	3	4	3	4	3	4	2	2
	250/500	750/1000	250/500	750/1000	250/500	750/1000	250	250
	1000	1000	2000	2000	4000 (1)	4000 (2)	6000	8000
	1000	1000	1000	1000	1000	1000	1000	1000
	8	8	8	8	8	8	8	8
	100	50	100	50	100	50	100	100
	100%	100%	100%	100%	100%	100%	100%	100%
	□	□	□	□	□	□	□	□
	B	B	B	B	B	B	B	B
	100	50	100	50	100	50	100	100
	10 000	10 000	10 000	10 000	5000	5000	5000	5000
	15 000	15 000	15 000	15 000	10 000	10 000	10 000	10 000
	10 000	1600	8500	1600	4000	1600	1600	1600
	30 to 75 ms							
	60 ms							
	■	■	■	■	■	■	■	■
	■	■	■	■	■	■	■	■
	■	■	■	■	■	■		
	■	■	■	■	■	■	■	■
	■	■	■	■	■	■	■	■
	■	■	■	■	■	■	■	■
	■	■	■	■	■	■	■	■
	■	■	■	■	■	■	■	■
	■	■	■	■	■	■	■	■
	■	■	■	■	■	■	■	■
	■	■	■	■	■	■	■	■
	■	■	■	■	■	■	■	■
	□	□	□	□	□	□	□	□
	□	□	□	□	□	□	□	□
	■	■	■	■	■	■	■	■
	■	■	■	■	■	■	■	■
	■	■	■	■	■	■	■	■
	■	■	■	■	■	■	■	■
	435x439x536	550x439x536	435x439x536	550x439x536	435x439x641	550x439x641	550x439x484	550x439x484
	438x404x393	553x404x393	438x404x393	553x404x393	438x404x530	553x404x530		
	125	160	125	160	135	170	150	150
	65	80	65	80	65	80	80	80
	80	100	80	100	90	110	90	90



Section 3

LV air circuit breakers and switch-disconnectors

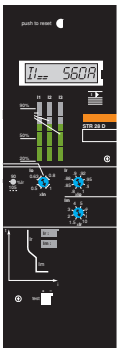
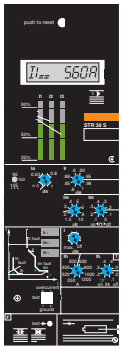
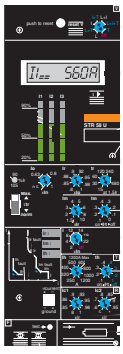
Masterpact 800 to 6300 Amp

Control unit selection

3

Masterpact: Control unit selection

Control unit - overview

Control unit	Application
STR 18 M 	**Adjustable instantaneous (I) for short circuit protection only of single loads, motors, generators and bus section switches**
STR 28 D 	**Adjustable overload (LT) and adjustable instantaneous (I) for basic loads where discrimination with downstream devices is not a major consideration.**
STR 38 S 	**Adjustable overload (LT), adjustable and selective short circuit (ST) and fixed instantaneous (I) for distribution loads and discrimination with downstream devices.**
STR 58 U 	**Adjustable and selective overload (LT), adjustable and selective short circuit (ST) and adjustable instantaneous protection (I) for all types of loads and supplies, plus multi levels of discrimination (including upstream MV)**

Control unit - overview

Standard function	Option	Reference
Local fault trip indicator remote fault trip indication		
Local fault trip indicator remote fault trip indication	Ammeter and bar graph	I
	LT setting overrun LT overrun alarm contact	ALR
Local fault trip indicator remote fault trip indication self monitoring thermal memory	Earth fault protection	T
	Ground fault return	W
	Ammeter and bar graph	I
	LT setting overrun LT overrun alarm contact	ALR
	Differentiated alarm indication	F
	Power supply with battery	PIL
Local fault trip indicator remote fault trip indication self monitoring thermal memory	Earth fault protection	T
	Ground fault return	W
	Ammeter and bar graph	I
	LT setting overrun LT overrun alarm contact	ALR
	Differentiated alarm indication	F
	Dedicated alarm switch	FV
	Zone selective interlocking	Z
	Load monitoring	R
	Communication	C
	Power supply with battery	PIL

Control unit - overview

Control unit	Application
STR 68 M 	**Key pad operation and LCD display of:** **Adjustable and selective overload (LT), adjustable and selective short circuit (ST) and Adjustable instantaneous protection (I) for all types of loads and complex levels of Discrimination (including upstream MV)**

Control unit - overview

	Standard function	Option	Reference
	All STR58U but includes local differentiated fault trip indication and level Remote fault trip indication Local pre-alarm indication Maintenance indicator Self monitoring Ammeter Integral test function Thermal memory	Earth fault protection	T
		Earth fault protection	W
		Load monitoring outputs	(Consult us)
		Remote indication outputs	(Consult us)
		Power measurement display	P
		Data transmission	(Consult us)

General characteristics - STR18M to STR58U

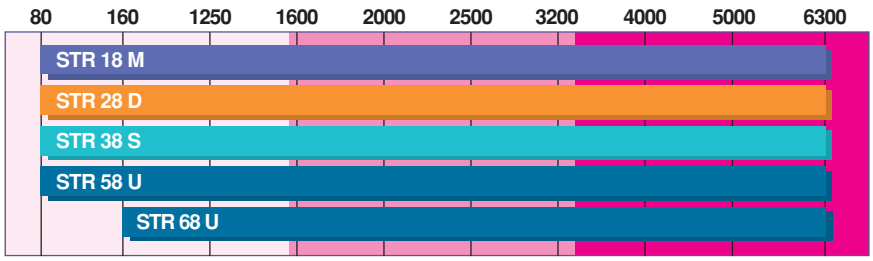
Masterpact M08 to M63 circuit breakers are equipped with microprocessor-based electronic control units.

All the protection functions are powered by the AC system and under normal conditions no auxiliary power supply is required*.

Each control unit of the Masterpact range corresponds to a certain type of application (instantaneous, distribution, selective, universal).
All the STR control units measure the true rms value of the current and are therefore not affected by harmonics that may be present on the system.

*see AD module page no 50 and note 4 page 40

Current settings (A)



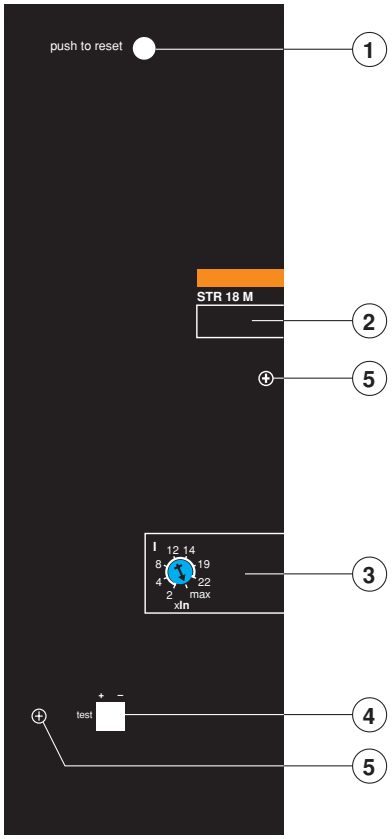
Instantaneous protection

Distribution protection

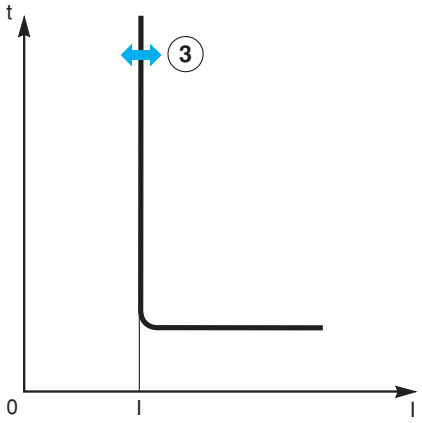
Selective protection

Universal protection

STR 18 M



Protection

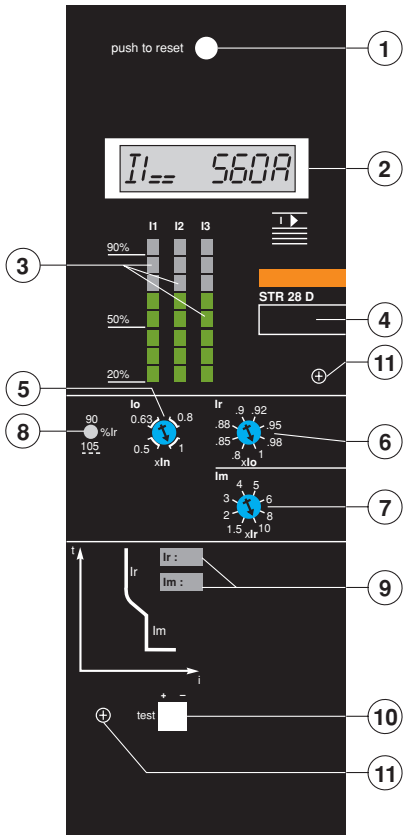


Key:

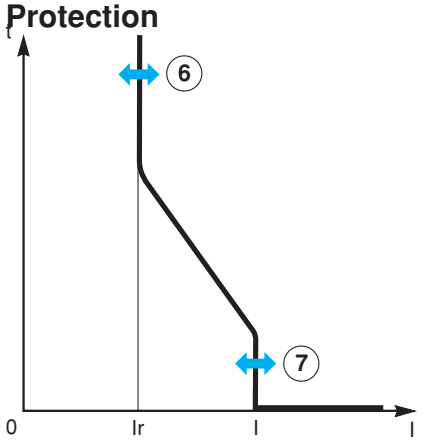
1. Reset button: indicates when the circuit breaker has tripped on a fault and must be pressed (reset) before the circuit breaker can be closed again.
2. Maximum protection rating.
3. Instantaneous pick-up.
4. Test connector.
5. Provision for sealable cover plate screws.

General characteristics - STR18M to STR58U

STR 28 D



Protection



Other functions

- Fault indication;
- Ammeter.

Key:

1 Reset button: indicates when the circuit breaker has tripped on a fault and must be pressed (reset) before the circuit breaker can be closed again.

2 Ammeter digital display.

3 Bar graph indicating load level (% Ir).

4 Maximum protection rating.

5-6 Long-time current setting as a function of: Io x Ir x In.

7 Instantaneous pick-up.

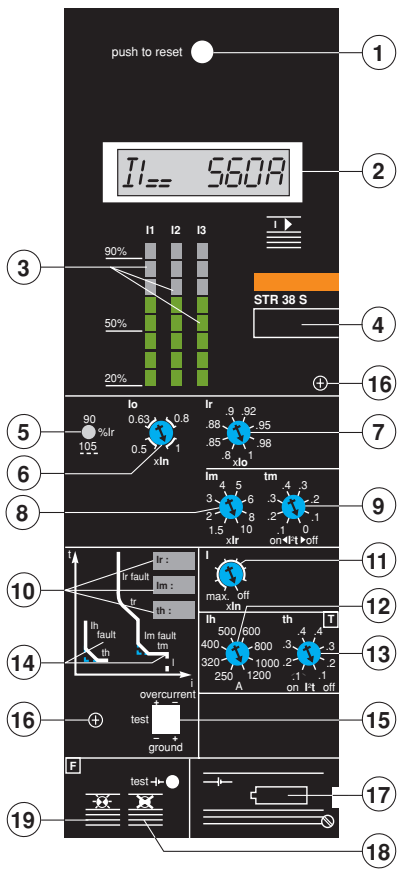
8 Overcurrent indicator LED.

9 Noted settings.

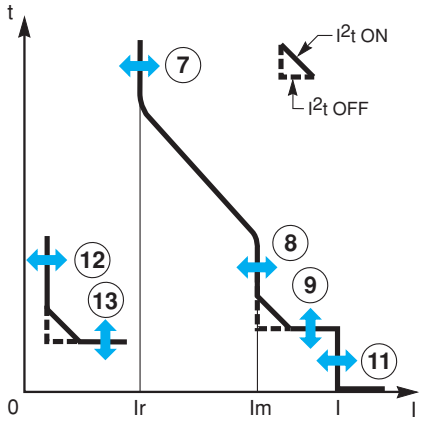
10 Test connector.

11 Provision for sealable cover plate screws.

STR 38 S



Protection



Other functions

- Fault indication;
- Ammeter;
- Indication of type of fault (F).

Key:

1 Reset button: indicates when the circuit breaker has tripped on a fault and must be pressed (reset) before the circuit breaker can be closed again.

2 Ammeter digital display.

3 Bar graph indicating load level (% Ir).

4 Maximum protection rating.

5 Overcurrent indicator LED.

6-7 Long-time current setting as a function of: Io x Ir x In.

8 Short-time pick-up.

9 Short-time delay.

10 Noted settings.

11 Instantaneous pick-up.

12 Earth fault pick-up.

13 Earth fault delay.

14 LEDs indicating tripping on long-time, short-time or earth fault.

15 Test connector.

16 Provision for sealable cover plate screws.

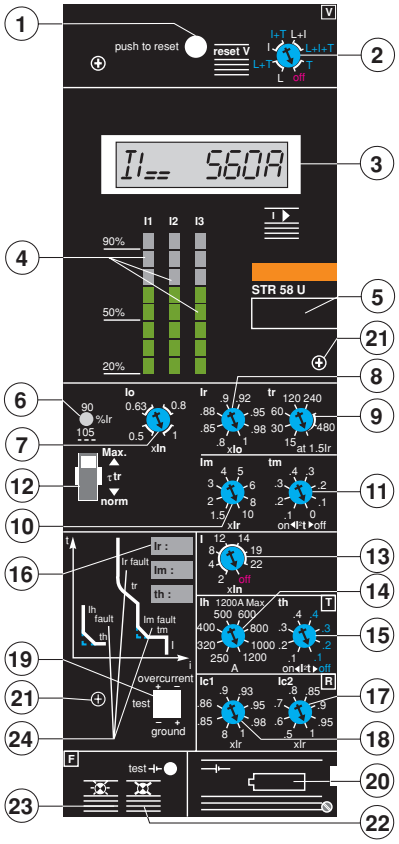
17 Battery supplying backup power for fault indication.

18 Fault indication reset and/or battery test.

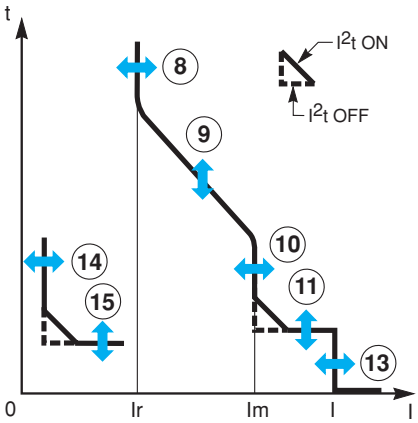
19 Re-indication of last fault.

General characteristics - STR18M to STR58U

STR 58 U



Protection



Other functions

- Fault indication;
- Ammeter;
- Self-monitoring;
- Fault type indication (F);
- Segregated alarm switch for selected fault type (V);
- Zone selective interlocking (Z);
- Load monitoring (R);
- Communication (COM).

Key:

1 Reset button: indicates when the circuit breaker has tripped on a fault and must be pressed (reset) before the circuit breaker can be closed again.

2 Selection of fault type for segregated alarm: Ir and/or Im and/or Ih

L: long-time fault (Ir)

I: short-time fault (Im/I)

T: earth fault (Ih)

3 Ammeter digital display.

4 Bar graph indicating load level (% Ir).

5 Maximum protection rating.

6 Overcurrent indicator LED.

7-8 Long-time current setting as a function of: Io x Ir x In.

9 Long-time trip delay

10 Short-time pick-up.

11 Short-time delay.

12 Adjustment of thermal memory after tripping.

13 Anstantaneous pick-up.

14 Earth fault pick-up.

15 Eearth fault delay.

16 Noted settings.

17-18 Load monitoring settings.

19 Test connector.

20 Battery supplying backup power for fault indication.

21 Provision for sealable cover plate screws.

22 Fault indication reset and/or battery test.

23 Re-indication of last fault.

24 LEDs indicating tripping on long-time, short-time or earth fault.

General characteristics - STR18M to STR58U

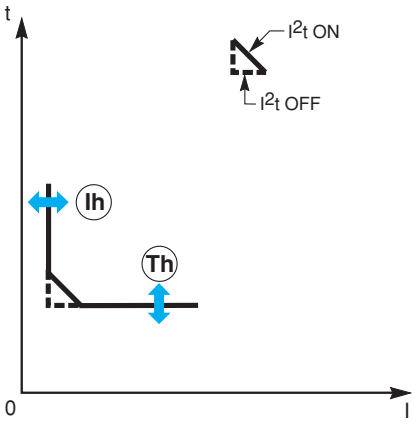
Options for STR control units

Zone selective interlocking (Z)

Zone selective interlocking is achieved when a number of circuit breakers are interconnected in series by a pilot-wire. In the event of a short-time or earth fault, the control unit applies the set time delay only if it receives an overload signal from a downstream circuit breaker. If not, it trips instantaneously. In this way, the fault is cleared rapidly by the nearest circuit breaker. The thermal stresses in the installation are minimised while maintaining time discrimination throughout the entire installation.

Opto-electronic outputs
The use of opto-transistors ensures total isolation between the internal circuits of the control unit and the circuits connected by the user.

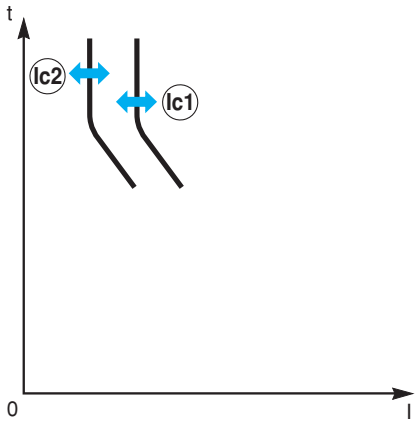
"Earth fault" protection (T or W)



Earth fault curves for the STR 58

This earth fault protection is designed to protect the installation against the risks of fire due to high earth faults (does not provide protection of persons against electrical shock).
Two types of earth protection are available for Masterpact:
- Residual current type (T): the control unit calculates the vectorial sum of the phase and neutral (if distributed) currents;
- Source ground return type (W): the control unit acts directly on the signal received from an external current transformer

Load monitoring (R)



Load monitoring curves for the STR 58

Remote indication of threshold overrun for load-shedding or load-reconnection purposes.

Communication: STR 58 U transmission: STR 68 U

Transmission of the control unit settings, circuit breaker position and current, voltage and power measurements.

Other information that can be transmitted includes the value of the interrupted current, the state of the thermal memory and the maintenance indications

Indication and measurement

- **Ammeter (I):** a digital display continuously indicates the current of the phase with the greatest load (Imax). By pressing a scroll button, it is also possible to display successively the readings of I1, I2, I3,
  Ineutral and Ih.
  In addition, three bargraphs provide an immediate visual indication of the load on each of the three phases.
- **Indication of type of fault (F);**
- **Segregated alarm switch for selected fault type (V)**, control and normal open contact for indication of specifically selected fault type ie. intertripping for restricted earth fault.

Functionality - STR18M to STR58U

STR 58 U

Control unit

Type of circuit breaker

Basic protection

Long time protection LT

current setting (Ir) as a function of Io and Ir	Io = In x ...
settings tripping between 1.05 and 1.20 x Ir	Ir = Io x ...
time delay (tr)	
accuracy: + 0 - 20 %	tr at 1.5 Ir (s)
	tr at 6 Ir (s)
	tr at 7.2 Ir (s)

Short-time protection ST

pick-up (Im) adjustable by Im setting	Im = Ir x ...
time delay (tm)	tm setting with I2t OFF
	tm setting with I2t ON
	max. overcurrent time before tripping (ms)
	max. break time (ms)

Instantaneous protection I

- pick-up setting
- setting range
- accuracy
- OFF switch on front face

Basic functions

Fault indication

for tripping on a fault	indicator button on front face
	fault trip alarm contact (SDE)
for LT setting overrun (optional)	LED (continuous at 0.9 Ir and flashing at 1.05 Ir)
	LT overrun alarm contact
	self-powered

Self-monitoring — internal overheating

Optional functions

Ammeter (I) — display between 0.2 and 1.20 In

- current readings with an accuracy of ± 1.5 % **(1) (3)**
- bargraph indication of current levels with a resolution of 10 %
- self-powered

Earth fault protection: residual current (T) or source ground return (W) type on request

pick-up adjustable by Ih setting	Ih = In x ...
time delay (th)	th setting with I2t ON and I2t OFF
	max. overcurrent time before tripping (ms)
	max. break time (ms)

Indication of type of fault (F) (LT - ST/Inst. - Earth) by LEDs on front face

power supply	with battery module
	with external power supply by AD module

Segregated alarm switch for selected fault type (V) (LT - ST/Inst. - Earth)

- output via relay contact
- power supply by AD module

Zone selective interlocking (Z)

- by opto-electronic contact on ST and earth (T/W) fault

Load monitoring (R)

adjustment of load limit thresholds by Ic1 and Ic2 settings	Ic1 = Ir x ... / Ic2 = Ir x ...
time delay tr1 at 1.5 Ic1	
time delay tr2 at 1.5 Ic2	
output via opto-electronic contact 0.1 A / 240 V	
time delay for load reconnection	

Communication (COM)

2 outputs for data transmission to Dialpact module	
transmitted values	all control unit settings
	alarms: Ir warning, fault type, self-monitoring
	load monitoring thresholds
	current values I1, I2, I3, IN
Power supply by AD module	

(1) Plus the tolerance of the built-in transformers: ± 3 %.

(2) Max = In x ...	H1	H2	L1
630 A 22	28	14	
800 - 1000 A	22	28	10
1200 - 1600 A	22	24	8
2000 A 17	20	6	
2500 A 12	14	6	
3000 - 3200 A	10	12	–
4000 - 6300 A	8	10	–

(3) Continuous display for the phase with the greatest load.

(4) 0.2 x In to 1200 A without external power supply or 0.1 x In with external power supply.

(5) Accuracy with respect to the long time LT protection.

Functionality - STR18M to STR58U

	STR 18 M	STR 28 D	STR 38 S	STR 58 U
	H1, H2	H1, H2	H1, H2, L1	H1, H2, L1
		■	■	■
		0.5 to 1 (4 settings)	0.5 to 1 (4 settings)	0.5 to 1 (4 settings)
		0.8 to 1 (8 settings)	0.8 to 1 (8 settings)	0.8 to 1 (8 settings)
		fixed	fixed	adjustable
		120	120	15 | 30 | 60 | 120 | 240 | 480
		7.5	7.5	0.94 | 1.88 | 3.75 | 7.50 | 15 | 30
		5.2	5.2	0.65 | 1.30 | 2.60 | 5.20 | 10 | 21
			■	■
			1.5 to 10 ± 15 %	1.5 to 10 ± 15 %
			0 | 0.1 | 0.2 | 0.3 | 0.4	0 | 0.1 | 0.2 | 0.3 | 0.4
			0.1 | 0.2 | 0.3	0.1 | 0.2 | 0.3
			0 | 80 | 140 | 230 | 350	0 | 80 | 140 | 230 | 350
			80 | 140 | 230 | 350 | 500	80 | 140 | 230 | 350 | 500
	■	■	■	■
	Im = In x ...	Im = Ir x ...	I = In x ...	I = In x ...
	2 x In to Max **(2)**	1.5 to 10 x Ir	fixed at high set (Max) **(2)**	2 x In to Max **(2)**
	± 15 %	± 15 %	± 20 %	± 15 %
	on type H1		on type H1	on types H1
	■	■	■	■
	■	■	■	■
		■	■	■
	■	■	■	
		■	■	■
		■	■	■
		■	■	■
		I1, I2, I3, IN	I1, I2, I3, IN, Ih	I1, I2, I3, IN, Ih
		I1, I2, I3	I1, I2, I3	I1, I2, I3
		■	■	■
			■	■
			0.1 to 1 (max 1200 A) **(4)** ± 15 %	0.1 to 1 (max 1200 A) **(4)** ± 15 %
			0.1 | 0.2 | 0.3 | 0.4	0.1 | 0.2 | 0.3 | 0.4
			60 | 140 | 230 | 350	60 | 140 | 230 | 350
			140 | 230 | 350 | 500	140 | 230 | 350 | 500
			■	■
			■	■
			■	■
				■
				■
				■
				0.8 to 1 (8 settings) ± 1 % **(5)**
				0.5 x tr
				0.25 x tr
				■
				fixed at 10 s
				■
				■
				■
				■
				■
				■

Masterpact: Control unit selection

General characteristics - STR68U

The STR 68 U control unit offers measurement, supervision and energy management functions.
Microprocessor technology, liquid crystal display and function keys ensure high accuracy and easy adjustment.
The standard STR 68 U control unit provides the following:
- ■ Universal protection;
- ■ Ammeter function;
- ■ Indication of fault type;
- ■ Values of interrupted currents;
- ■ Maintenance indicator;
- ■ Integrated test.

The following options can be added:
- ■ Power measurement module (P);
- ■ "Earth fault" protection module;
- ■ Control and indication modules (M) with or without transmission capabilities.

Certain M modules can provide load monitoring or zone selective interlocking for earth fault protection.

Protection

The STR 68 control unit provides:
- ■ **Overload protection**, with long time protection LT which includes:
- □ Adjustable time delay and selectable thermal memory.
- ■ **Short-circuit protection:**
- □ Delayed, with short time function ST, for which the I2t curve can be selected (on/off) by the user,
- □ Adjustable instantaneous, can be selected (on/off) by the user for HI units only.
- ■ **"Earth" protection** with time discrimination or zone selective interlocking. The protection is of the residual current type as standard (or source ground return type on request).

Additional functions

- ■ Ammeter;
- ■ Maintenance indicator;
- ■ Fault indications and values of the interrupted currents;
- ■ Self-monitoring: in the event of overheating of the control unit or a malfunction of the microprocessor, an alarm signal is transmitted. and the circuit breaker is tripped. To prevent automatic opening a service continuity option can be ordered.
- ■ Test function.

General characteristics - STR68U

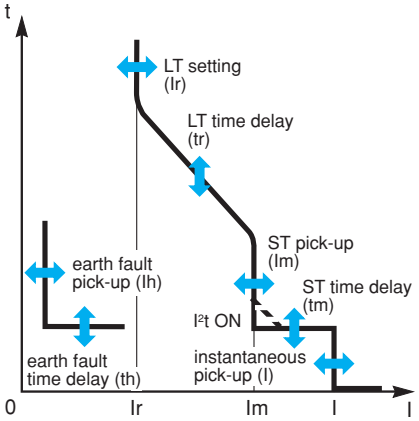
Optional functions

■ **Power measurement (P);**
■ **Indication and control (M)**
Thirty-one different modules offer various combinations of functions including:
☐ Load monitoring,
☐ Trip indication,
☐ Self-monitoring,
☐ Zone selective interlocking for "earth fault" protection,
☐ Transmission of data to a supervisor (SCADA)
(modules M17 to M31 only).
Each STR 68 U control unit can be equipped with only one M module.
For the function offered by each M module, (see page 42).

■ **"Earth fault" protection (T)**
Of the residual current type (or source ground return type on request), it is possible to obtain zone selective interlocking by combining the T option with the appropriate M option.

STR 68 U

Protection



other functions

■ Fault indications with memory;
■ Maintenance indicator;
■ Ammeter;
■ Integrated test;
■ Power measurement;
■ Load monitoring (R);
■ Self-monitoring;
■ Zone selective interlocking for earth faults.

Key:

1 Reset button: indicates when the circuit breaker has tripped on a fault and must be pressed (reset) before the circuit breaker can be closed again.
2 Selection of displayed value (voltage, power, energy, power factor, frequency).
3 Display of current or interrupted current (when flashing).
4 Local fault indication and indication reset.
5 Selection and indication of protection settings.
6 Selection and indication of load monitoring settings.
7 Adjustment and saving of parameter settings.
8 Fittings for sealable cover plate screws.
9 Test connector.
10 Test.
11 Maintenance indicator.

Functionality - STR68U

Control unit		STR 68 U					
Type of circuit breaker		H1. H2. L1					
Basic protection							
Long time protection LT		■					
current setting (Ir) adjustable in 2 % steps	Ir = In x ...	0.4 to 1 (mini 160 A)					
tripping		between 1.05 and 1.20 x Ir					
time delay (tr)		adjustable					
accuracy: + 0 - 20 %	tr at 1.5 Ir (s)	15	30	60	120	240	480
	tr at 6 Ir (s)	0.94	1.88	3.75	7.50	15	30
	tr at 7.2 Ir (s)	0.65	1.30	2.60	5.20	10	21
thermal memory (60 mn)		standard + OFF position					
Short time protection ST		■					
pick-up (Im) adjustable in 4 % steps	Im = Ir x ...	0.4 to 15 ± 10 %					
time delay (tr)	tm setting with I2t OFF	0.1	0.2	0.3	0.4		
	tm setting with I2t ON	0.1	0.2	0.3	0.4		
	max. overcurrent time before tripping (ms)	60	140	230	350		
	max. break time (ms)	140	230	350	500		
thermal memory (10 mn)		standard + OFF position					
Instantaneous protection I		■					
fixed pick-up I (kA)		M08 to M16 : 65. M20 to M63: 75.					
pick-up (I) adjustable in 8 % steps		from In to fixed pick-up (mini at 1.6 kA)					
accuracy		± 15 %					
OFF switch on front face		on type H1					
Basic functions							
Fault indication							
for tripping on a fault	button on front face	■					
	fault trip alarm contact (SDE)	■					
for Ir setting overrun	LED on front face	■					
	self powered	■					
indication of fault type and value of interrupted current	LEDs on front face	■					
	display on ammeter	■					
	power supply	110 V - 220 V - 380 V AC 50/60 Hz					
Self-monitoring	internal overheating and microprocessor errors	■					
Maintenance indicator		■					
displays degree of wear of main contacts		between 0 and 655					
Ammeter		■					
current readings with an accuracy of ± 3 %		I1. I2. I3. Imax					
self-powered		■					
Integrated test		■					

Functionality - STR68U

Optional functions

Earth fault protection: residual current (T) or source ground return (W) type on request			■ (zone selective interlocking with option M)			
pick-up (Ih) adjustable in 2 % steps		Ih = In x ...	0.2 to 1 (maxi 1200 A. mini 160 A) ± 15 %			
time delay (th)		th setting	0.1	0.2	0.3	0.4
		max. overcurrent time before tripping (ms)	60	140	230	350
		max. break time (ms)	140	230	350	500
thermal memory (60 s)			■			
Power measurement (P) (see opposite page for details)			■			
output characteristics			opto-decoupled 0.2 A - 24 V DC			
integrated power supply			■			
voltage measurements	U12. U23. U31		160 to 690 ± 1 %			
	V1N. V2N. V3N		90 to 400 V ± 1 %			
frequency measurement: f			45 to 65 Hz ± 0.5 %			
power factor measurement: cos φ			- 1 to + 1 ± 2.5 %			
instantaneous active power measurement: P			- 9 to 9000 kW ± 5 %			
instantaneous active energy measurement: EP			0 to 9999 MWh ± 5 %			
Indication and control (M): 31 modules (1 per control unit) providing the following combinations:			■			
Load monitoring			2 possible options			
option 1: 2 load limit pick-ups Ic1 and Ic2		Ic1 = In x ...	0.2 to 1 In 2 % steps			
		delay tr1 =	0.5 x tr ± 5 %			
		Ic2 = In x ...	0.2 to 1 In 2 % steps			
		delay tr2 =	0.25 x tr ± 5 %			
option 2: 1 load limit pick-up Ic1		Ic1 = In x ...	0.2 to 1 In 2 % steps			
1 load reconnection pick-up Ic2		delay tr1 =	0.5 x tr ± 5 %			
		Ic2 = In x ...	0.2 to 1 In 2 % steps			
		delay tr2 =	60 s fixed ± 5 %			
Zone selective interlocking			for earth fault protection			
Trip indications						
for type of fault			long-time, short-time, earth			
for self-monitoring **(1)**			alarm			
Transmission						
characteristics		type	RS 485			
		protocol	JBus			
		speed	4800 or 9600 bauds			
		max. number of addresses	255			
values transmitted:		type of fault	tripping on Im, Ir, Ih			
circuit breaker status		self-monitoring	alarm			
		settings	all pick-ups and delays			
		circuit breaker status	open or closed			
values transmitted:		ammeter	currents I1, I2, I3 max			
power system status		voltmeter	voltages U12, U23, U31			
			voltages V1N, V2N, V3N			
		power factor, frequency	cos φ, f			
		instantaneous active power and energy: P. EP	- 9 to 9000 kW. 0 to 9999 MWh ± 5 %			
		instantaneous reactive power and energy: Q. EQ	- 9 to 9000 kVar. 0 to 9999 MVahr ± 5 %			
Power supply			24, 48, 125 V DC or 100, 240 V AC			

(1) Depending on the equipment, the "self-monitoring" alarm signal may or may not trip the circuit breaker, see "service continuity" option.

Functionality - STR68U

Option M selection

Option M can be incorporated in control units type STR68U to provide the following functions:

- RS485 data transmission at 9600 bauds to JBUS protocol;
- Remote signal via opto-electronic output;
- Zone selective interlocking for earth fault protection.

The following table indicates the functions of the different versions, designated m01 to m31.
For terminal wiring see page 138.

Without data transmission

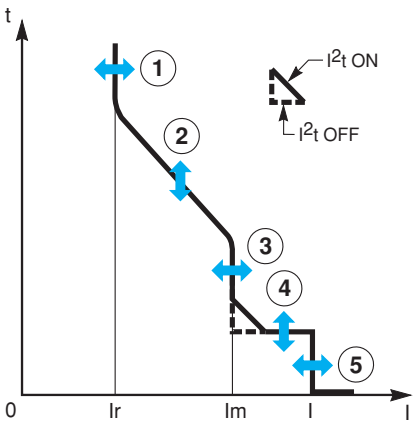
Option	m01	m02	m03	m04	m05	m06	m07	m08	m09	m10	m11	m12	m13	m14	m15	m16
Remoting																
Load monitoring and control																
Pick-up Ic1 indication		■	■	■	■	■	■	■			■		■	■		
load shedding		■	■	■	■	■	■		■	■	■	■	■	■	■	
Pick-up Ic2 indication		■	■		■						■					
load shedding		■		■	■		■		■	■	■		■	■		
load reconnection			■			■						■			■	
Fault indications																
Ir	■	■	■	■		■	■	■	■	■		■				■
Im/I	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Ih							■	■	■	■	■	■	■	■	■	■
Self-monitoring	■			■	■	■		■	■				■		■	■
Zone selective interlocking																
on the earth fault protection								■		■		■		■	■	

With data transmission

Option	m17	m18	m19	m20	m21	m22	m23	m24	m25	m26	m27	m28	m29	m30	m31	
Data transmission																
all parameters (see page xxxx)	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
Remoting																
Load monitoring and control																
Pick-up Ic1 indication							■			■		■				
load shedding								■	■		■		■	■	■	
Pick-up Ic2 indication												■				
load shedding													■			
load reconnection														■		
Fault indications																
Ir		■														
Im/I		■	■	■							■	■				
Ih					■					■						
Self-monitoring		■		■		■									■	
Zone selective interlocking																
On the earth fault protection					■	■	■	■								

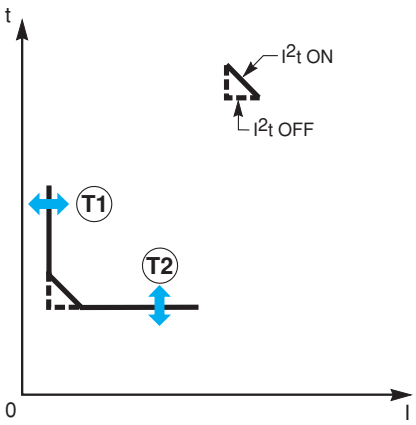
Operating zones

Basic functions: long time LT, short time ST, instantaneous INST



overcurrent settings
1 : LT setting Ir (long time)
2 : LT time delay tr (long time)
3 : ST pick-up Im (short time)
4 : ST time delay tm (short time)
5 : INST pick-up I (instantaneous)

Earth fault protection (option T)



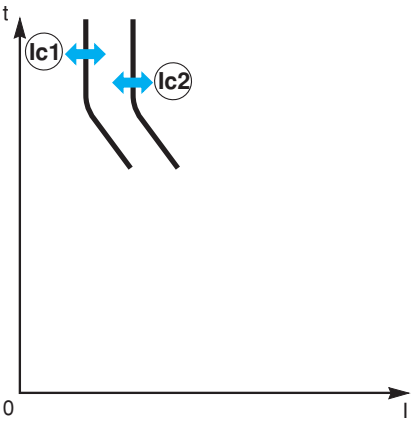
earth fault protection settings
T1 : earth fault pick-up Ih
T2 : earth fault time delay th

Factory adjustments
The STR68U control unit is factory adjusted as follows:

LT	setting Ir		In
	time delay tr		480 s
ST	pick-up Im		4 In
	time delay tm		0,2 s
INST	pick-up I		maxi
T	earth fault pick-up Ih		0,2 In
	time delay th		0,1 s
	load monitor	Ic1	In
		Ic2	In

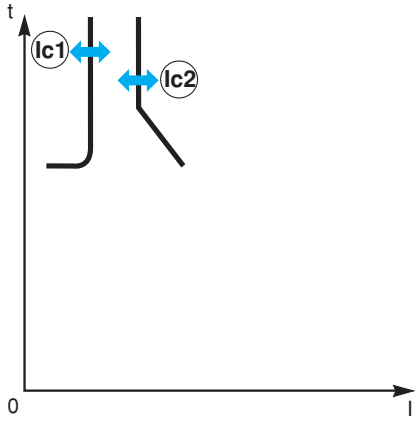
load monitoring and control (option M)

Operation with 2 load limit pick-ups



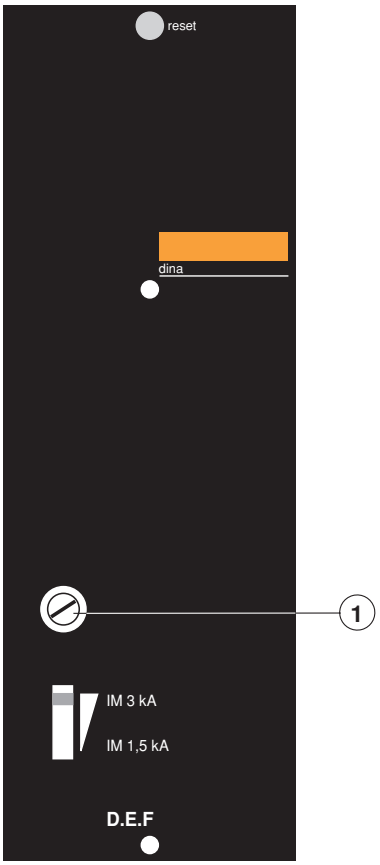
load monitoring and control settings
Ic1 pick-up (load limit)
Ic2 pick-up (load limit)

Operation with 1 load limit and 1 load reconnection pick-up



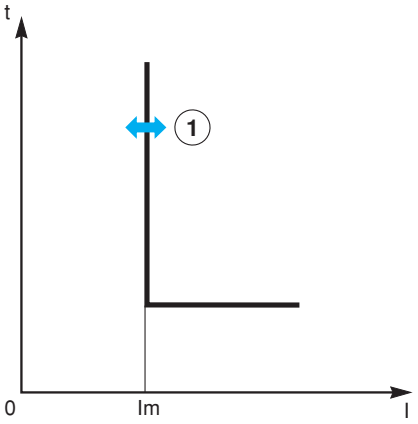
load monitoring and control settings
Ic1 pick-up (load limit)
Ic2 pick-up (load reconnection)

General characteristics and functions
DINA for DC applications



Trip-unit selection

The DINA trip unit is an adjustable, instantaneous magnetic trip unit that provides protection against short circuits **(1)**. There are seven versions of the DINA trip unit offering different magnetic setting thresholds (see the selection table below). Overload protection must be provided by an external relay (not supplied).
Similar to the AC version, this trip unit is equipped as standard with four auxiliary switches (2 O + 2 F) and a fault-trip indication switch (SDE).



Selection table

Im adjustable (accuracy ± 20 %)	**M10-20-40DC**	**M60-80DC**
1.5 to 3 kA	■	
3 to 6 kA	■	
6 to 12 kA	■	
10 to 20 kA	■	
9 to 18 kA		■
12 to 24 kA		■
20 to 40 kA		■

Accessories

Battery module (PIL)

Complementary to the F option for STR 38 and STR 58 trip units. Enables recall of the last fault trip indication, without the need for an external power source.

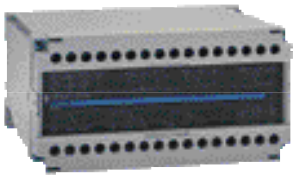
Interface module ET44

Compulsory with the data transmission option on the STR 68 trip unit, the ET44 interface module allows:

- Setting of the transmission speed;
- Circuit breaker address selection

- Remote operation of the circuit breaker via connection to building management SCADA systems

Power supply: 24 V DC with galvanic isolation, or AD type power module.



relay module (MR6)

For relaying of information from outputs of modules m01 to m32 of control unit STR 68 via output changeover contacts

10 A/220 V AC or 3 A/24 V DC.

Power supply module (AD) is required.

Power supply module (AD)

These modules can be used to power control unit complementary functions which cannot be self-powered by the built-in current transformers:

- STR 38 and STR 58: fault type indication (F);
- STR 58: segregated alarm switch (V);
- STR 58: communication option (COM);
- STR 28, STR 38, STR 58: ammeter (I) for load less than 20% of In.

- STR 68: indication and saving of measurements, alarms, maintenance indicator…;
- MR6 module.

These modules protect the trip unit from transient overvoltages due to galvanic isolation.

Available voltages:

- AC 50/60 Hz: 110 V, 220 V or 380 V (–20 %; +15 %) (consumption 10 VA);
- DC : 24/30 V, 48/60 V, 125 V (±20 %) (consumption 10 W).

Battery module (BAT)

Providing a complement to the AD module, the battery module provides backup power for display indications and maintenance indicator data in the event of a power failure. Float connected between the power supply and the control unit, it ensures a backup time of approximately:

- 12 h with STR 38 and STR 58 control units;
- 1.5 h with STR 68 control unit.

Installation: on vertical plate or symmetrical rail. (ambient temperature from: 0 °C to +50 °C).

Mini test kit (BU)

This self-contained portable unit is used:

- For control unit STR 68, to power, check and carry out adjustments and tests on the breaker/control unit assembly;
- For other control units, to check control unit operation and breaker tripping.

Power supply: five 9 V alkaline batteries (not supplied).

This test kit is common to the Masterpact, Compact NS, C, CM ranges.

Portable test kit for STR 18 to STR 58

The calibration test kit is used to check the operation of the trip unit by measuring the actual trip time:

- Long-time protection;
- Short-time protection;
- Instantaneous protection;
- Earth-fault protection;

Power supply: 110, 220 V AC 50/60 Hz.

This test kit is common to the Masterpact, Compact NS, C, CM ranges.

Dialpact modules (cont.)

Voltage measurement

EU Dialpact modules provide measured and visual indication of voltage and frequency.
The EU module maximum consumption is 100 mA (24 V DC).

Power measurement

EP Dialpact modules provide measured and visual indication of voltage and frequency, active and reactive powers and kw
The EP module maximum consumption is 250 mA (24 V DC).

Function	Dialpact module			
	EU11	EU13	EP11	EP13
Current per phase			■	■ □
Maximum current in any one phase			■	■ □
Bargraph of the current per phase			■	■
Voltage between phases	■	■ □	■	■ □
Voltage between phases and neutral	■	■ □	■	■ □
Voltage balance bargraph	■	■	■	■
Frequency	■	■ □	■	■ □
Power factor			■	■ □
Active power			■	■ □
Reactive power			■	■ □
Active energy			■	■ □
Reactive energy			■	■ □

■ : On Dialpact module front panel.
□ : Transmitted by BatiBUS.

Transmission

- Between Masterpact breakers fitted with an STR 58 control unit with the COM option and BatiBUS field bus network, via an ET23 transmission module;
- Between a BatiBUS field bus network and a JBUS supervisory network via an ET34 Dialpact module. This module ensures compatibility between switchboards equipped with Dialpact modules and the STR 68 control unit, as well as with the Vigilohm System.

The ET module maximum consumption is 50 mA (24 V DC).

Function	Dialpact module	
	ET23	ET34
Circuit breaker to BatiBUS interface	■	
COM to BatiBUS interface	■	
BatiBUS to JBUS interface		■
BatiBUS activity LED	■	■
JBUS activity LED		■
JBUS 9600 baud output		■

Power supply

All Dialpact modules require:
- 24 V DC for the modules;
- 15 V DC for BatiBUS.

Dialpact modules maximum consumption at 24 V DC:
- ES, EC and ET: 50 mA;
- EU: 100 mA;
- EP: 250 mA (1 module is made of 2 units).

BatiBUS point maximum consumption at 15 V DC: 2 mA.

All these requirements are covered by 4 Dialpact power supply modules with 5-pin standard connectors that supply both 24 V and 15 V:
- For installations requiring 1 A maximum at 24 V DC, use an EA, ED125 or ED24/48 Dialpact module, depending on the available voltage supply;
- For installations requiring more than 1 A at 24 V DC, use an ED24/48 Dialpact module and connect it to a suitable 24 V DC power supply.

The Dialpact ED24/48 module supplies the 15 V DC required by the BatiBUS points.

Characteristics	Dialpact module		
	EA	ED125	ED24/48
Input	100/240 V AC	125 V DC	24/48 V AC
Dialpact output	24 V DC 1 A	24 V DC 1 A	24 V DC 1 A
BatiBUS output	■	■	■

Auxiliary power supplies

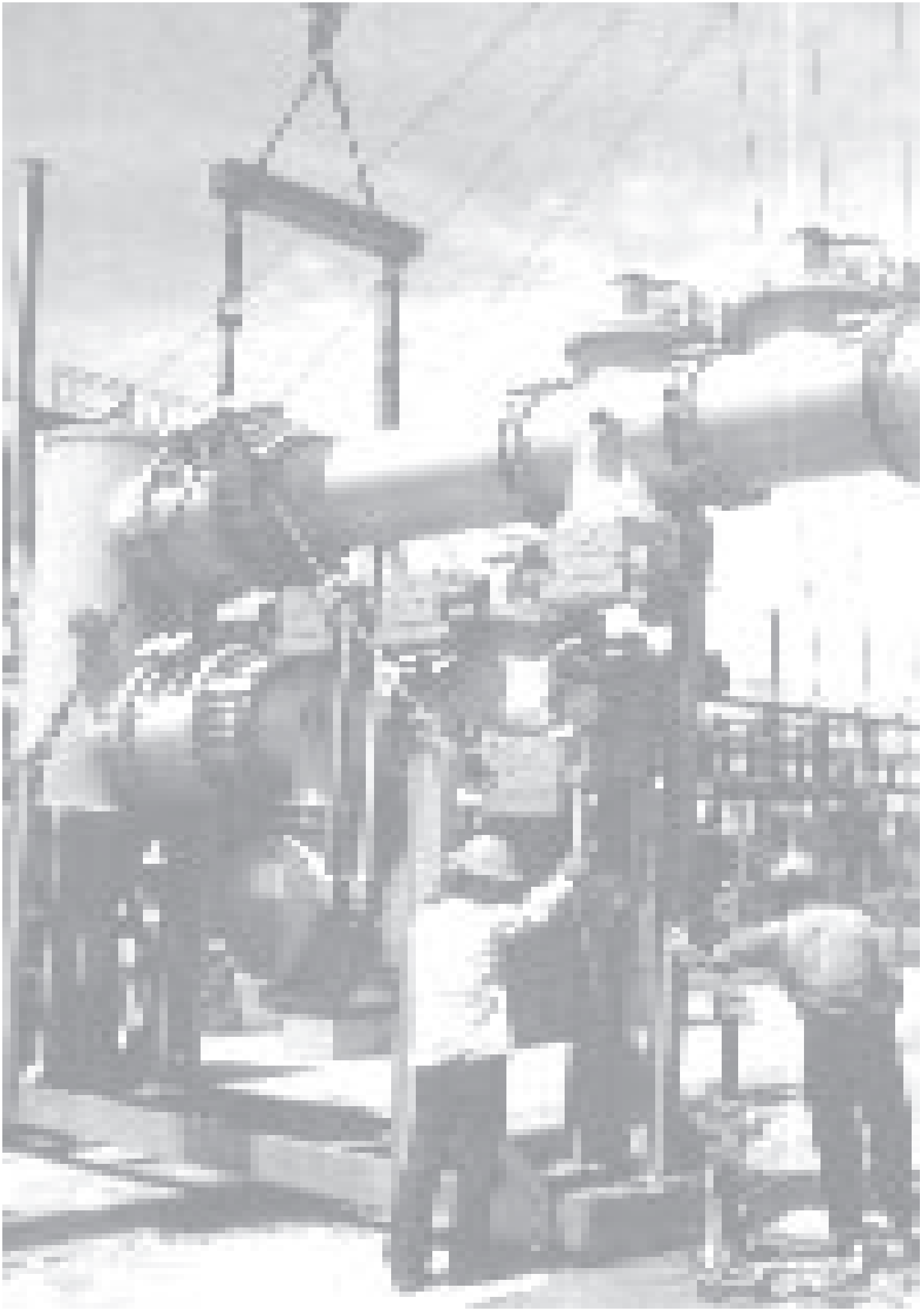
The protection functions and most of the options available for the STR control units are self-powered. An auxiliary power supply is nevertheless required for certain uses.

		Self-powered	Auxiliary power supply			
			Direct connection	AD + BAT modules	Terminals	Battery
STR 28 / 58						
Protection : LT, ST, INST		Yes				
Option I	if I ≥ 20% In	Yes				
	if I < 20% In	No	No **(1)**	Yes **(2)**	F1/F2	No
Option F		No	No **(1)**	Yes	F1/F2	Yes
Option FV		No	No **(1)**	Yes	F1/F2	No
Option ALR		Yes				
Option R		Yes				
Option T/W	if Ih ≥ 0.2 x In	Yes				
	if Ih < 0.2 x In	No	No **(1)**	Yes	F1/F2	No
STR 68						
Protection : LT, ST, INST, T, W		Yes				
Other functions : see next page						

(1) Not recommended: possible with a 24 V DC source, class 2, 1 Watt, ripple factor < 1%.
(2) Display will in this case be "✻✻✻✻". Auxiliary supply allows recall of max values.

Auxiliary power supplies (cont)

	Self-powered	Auxiliary power supply	AD + BAT modules	Terminals	Battery	Characteristics
Protection						
LT, ST and inst.	yes					
Other functions for STR 28 / 58						
Option I	yes	If: I < 20 % In for non-standard bargraph, possible with U between 24 V DC 1w, ripple factor <10 %	If: i < 20 % In for bargraph	F1.F2		Display: I1, I2, I3, Imax, In, Ih for bargraph function
Option F		As for option I	Yes (BAT if power supply is unreliable)	F1.F2	Yes 2 mn display	LED indication on front face (Ir, Im/I, Ih)
Option FV		As for option I	Yes	F1.F2		LED indication on front face (Ir, Im/I, Ih) + contact V
Option ALR	yes					Contact for LT setting alarm
Option R	yes					2 contacts for Ic1 and Ic2
Option T/W	yes	As for option I if setting is 0.1	Yes if setting is 0.1			Earth fault protection
Other functions STR 68						
Indications on front face		110/220/380 V AC	Yes	F1.F2		
Indications m01 to m16			Yes	F11.F12		
Transmission m17 to m32 + ET44		24-48/125 V DC 100-240 V AC	Yes	F11.F12		
P measurement		24-48/125 V DC 100-240 V AC		cn1 + cn2 –		Display of U, F, power, and energy
P measurement + Transmission (m17 to m32 + ET44)	Powered by modul P	24-48/125 V DC 100-240 V AC	BAT for backup power (terminals h1 to h4)	cn1 + cn2 –		Display of U, F, power, and energy Transmission of the same values + active and reactive components (JBUS interface)



Section 4

LV air circuit breakers and switch-disconnectors

Masterpact 800 to 6300 Amp

Accessories

page

4

releases

There are two main types of voltage releases which can be used for remote opening of Masterpact circuit breakers.

A)Undervoltage releases

■ Instantaneous (MN)type
This release instantaneously opens the breaker when its supply voltage drops below a value between 70 % and 35 % of its rated voltage.
If the release is not energised, the breaker cannot be closed (either manually of electrically). Any attempt to close will have no effect on the main contacts.
It shall only be possible to close the circuit breaker when the supply to the releases reaches 85% of the rated voltage.

■ Time delayed (MNR)
To prevent the breaker tripping in the event of transient voltage dip an optional time delayed unit is available.
This optional time delay unit offers the facility of instantanious remote opening for emergency situations.

B)Shunt release (MX)

This release instantaneously opens the breaker when energised. The supply can be maintained or automatically disconnected. If connected in series with an internal auxiliary contact (OF).

Closing release (XF)

The closing release enables remote closing of the circuit breaker when the springs are charged. The closing release can also act as an inherrent anti-pumping device, if the voltage supply is maintained after closing.

Note: anti-pumping function:
After the circuit breaker has been opened, either by fault trip, manual or electrical operation, the closing coil must be de-energised to enable re-closing of the circuit breaker.

Characteristics	Undervoltage release			Closing release
	MN	MNR	MX	XF
Breaker response time at Un	90 ms ± 5	0.5 s-0.9 s 1.5 s-3 s	50 ms ± 10	70 ms + 10, – 15 ⩽ 3 200 A 80 ms ±10 > 3 200 A
Operating thresholds				
Opening	from 0.35 to 0.7 Un		0.7 to 1.1 Un	
Closing	0.85 Un			0.85 to 1.1 Un
Power supply				
AC 50/60 Hz (V)	100 - 110/127 - 200 - 220/250 - 277 - 380/415 - 440/480 - 500/525(*)			
consumption (VA)	20			
DC (V) **(**)**	24 - 30 - 48 - 60 - 100/110 - 125 - 200/220 - 250			
consumption (W)	15			

Release combinations
Each Masterpact circuit breaker can be equipped with:
1 MX + 1 MN + 1 XF, or
2 MX + 1 XF

(*) 500/525 V AC not available for MNR.

(**) MNR: DC, 125 V only.

Auxiliary switches

In addition to the main contact position indication, 3 auxiliary switch blocks are available to indicate breaker open or closed.

- **Standard: 4 contacts (O)** (2 normally open 2 normally closed);
- **Optional: 4 directly-operated double break changeover switches (OF)** which operate only when the minimum isolating distance between the main contacts is reached;
- **Optional: 24 additional changeover switches (OFSUP block).** These microswitches can be parallel connected in pairs to increase the rated current and breaking capacity (for drawout version only).

Double break changeover switches "OF"

Additional changeover switches ("OFSUP" block)

"Ready to close" contact (PF)

Optional:
This contact simultaneously indicates the following:

- Breaker is open;
- Stored-energy mechanism is charged;
- Mechanism is correctly reset;
- Breaker opening pushbutton is not locked;
- No opening order is present.

This contact can be series connected to the closing release (XF) to disable the anti-pumping function.

Connected/disconnected position carriage switches

In addition to the front mounted "connected/ test/disconnected" position indicator, two sets of **optional** carriage switches are available for the fixed chassis of drawout type circuit breakers.

- **A block of 4 changeover switches** to indicate "connected" position (CE);
- **A block of 2 changeover switches** to indicate "disconnected" position (CD). The disconnected position is indicated only when the minimum isolating distance between the main and auxiliary circuits has been achieved.

By series connection of these contacts additional test indication can be achieved.

- **1 changeover switch** to indicate "test" position (CT).

Changeover switches to indicate "connected" position "CE"

"Spring charged" contact (CH)

In addition to the local mechanical indicator and the "ready to close" contact, the gear-motor limit switch changeover contact can indicate that the operating mechanism is ready (spring charged). This contact is supplied as standard with the gear motor.

Fault-trip indication (SDE)

As standard and independent from the differentiated fault indications on the control unit, any fault-trip is indicated by:

- 1 fault-trip indicator/reset button;
- 1 changeover contact (SDE).

The reset button must always be pressed after a fault-trip to enable breaker re-closing.
Optional: automatic reset, allowing remote breaker closing without local resetting.

Contact characteristics

Auxiliary contacts	**Type**	**O**	**OF**	**OFSUP**	**SDE**	**PF**	**CE**	**CD**	**CT**	**CH**
quantity	changeover		4	24	1	1	4	2	1	1
	NO	2 NO								
	NC	2 NC								
Current rating (A)		10	10	10	10	10	10	10	10	10
breaking capacity	110 V		15							
AC 50/60 Hz (A rms.)	240 V	10	10	10	10	10	10	10	10	10
pf ≥ 0.3	380 V	6	10	6	5	5	6	6	6	6
	480 V	6	10	6			6	6	6	6
	600 V	3	6	3			3	3	3	3
DC (A)	48 V	3	5	3	3	3	3	3	3	3
L/R										

Electrical charging mechanism

Is an optional extra to the standard manual charging mechanism. The motor charges and automatically recharges the stored-energy spring upon breaker closing which enables fast O.C.O. cycle without re-charging.
The manual mechanism remains available for emergency charging.

The electrical operating mechanism for remote operation should include:
- Gear motor(MCH);
- Closing release (XF);
- Shunt release (MX) or an undervoltage release (MN) for opening;
- "Springs charged" limit switch changeover contact (CH).

The addition of the electrical operating mechanism does not alter the overall circuit breaker dimensions.

Characteristics		Geared motor MCH
Power supply	50/60 Hz (V)	100/127 - 200/240 - 250/277 - 380 - 415 - 440 - 480
	consumption (VA)	180
	DC (V)	24/30 - 48/60 - 100/125 - 200/250
	consumption (W)	180
Motor start-up surge		2 to 3 In for 0.1 s
Charging time		3 to 4 s

Operation counter (CDM)

Provided as an option to the electrical operating mechanism. The operational counter provides numerical indication of the circuit breaker open/close operating cycles.

Safety shutters (VO)

Standard: mounted on the chassis of the drawout version, the safety shutters automatically prevent access to the live isolating contacts when the breaker is in the disconnected or test position (degree of protection IP 20).

Shutter lock (VVC)

Optional: mounted on the chassis of the drawout version, a removable and lockable slide (padlocks not supplied) is used to:
- lock the shutters in the closed position;,
- hold the shutters in the open position.

A support is provided at the back of the frame to hold the slide when not in use.

Fixed portion of drawout circuit breakers with safety shutters

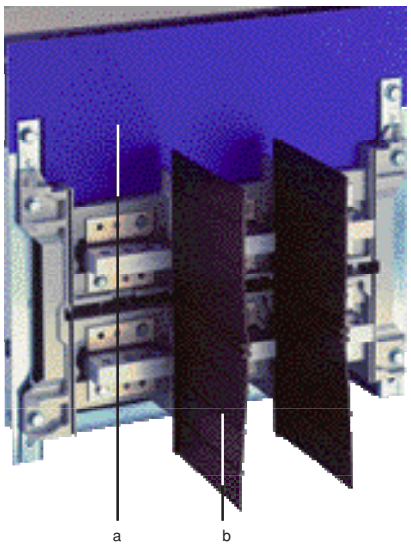
Arc chute cover (CC)

Standard: attached to the fixed portion of drawout circuit breakers, this cover eliminates the requirement for a safety clearance above the breaker (this option is not compatible with versions fitted with front (top) connection).

Terminal shield (CB)

Standard: attached to the fixed portion of drawout circuit breakers, this cover prevents access to the electrical auxiliary connection terminals.

Fixed portion of drawout circuit breakers with arc chute and terminal shield



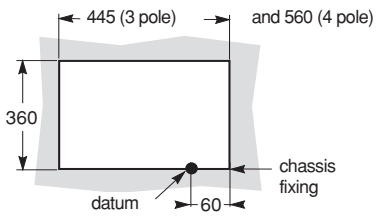
a: Partitioning fixture (AC)
b: Interphase barrier (EIP)

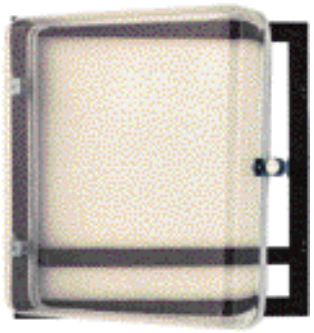
Interphase barrier (EIP)

Optional: attached to the fixed portion of drawout circuit breakers, insulated partitions for vertical installation between busbar connection pads to:
- Reinforce insulation at connection points in instalations having sheathed or insulated busbars
- Prevent arc propagation to the breaker in the event of a line side fault on the main busbars.

partitioning fixture (AC)

Optional: attached to the fixed portion of drawout breakers (except when equipped with front connections), this fixture provides IP30 partitioning between the breaker compartment (accessible from the front) and the busbar connections (located in the rear). It simplifies partition cut-outs.
Example of partition cut-out for Masterpact M08 to M32.





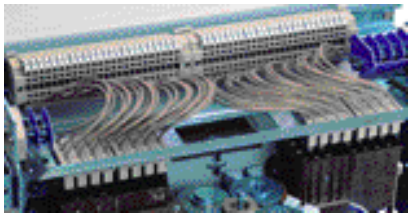
Door escutcheon (CDP)

Standard: fixed to the cublicle door, this frame provides an equipment seal function (degree of protection IP 405).
Suitable for fixed and drawout patterns.

Transparent cover (CCP)

Optional: hinge-mounted and equipped with screw type locking device, this cover is designed for use with the door escutcheon (CDP). It provides a degree of protection of IP549.
Suitable for fixed and drawout patterns.

Auxiliaries for fixed version



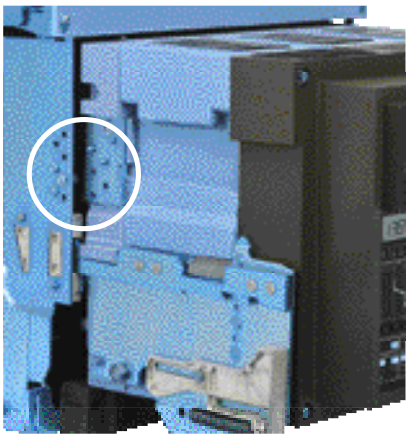
Auxiliaries for drawout version

Auxiliary connection

Fixed version
Connection by one or two plugs, disconnectable and accessible from the front (screwless tunnel terminals for flex cable up to 2.5 mm^2).

Drawout version
- **Standard:** connection to a terminal block in the front of the fixed frame (screwless tunnel terminals for flex cable up to 2.5 mm^2).
  The breaker auxiliary circuits are connected by connection blocks that operate automatically to isolate the auxiliaries when the breaker is in "disconnected" position.
  On request, an additional 5-way terminal block (BS) is available to provide five common points.

"Connected/disconnect/test" position contacts
Installed on the fixed chassis, these contacts are directly connected by 6.35 mm connectors.



Breaker rating/type interlock

Standard: for drawout version only, this systems allows only the correctly matched breakers (rating, type wiring, etc.) to be inserted in a given fixed frame.
Two matching parts (1 for the fixed chassis and 1 for the moving portion) can be used to create 20 different user selected combinations.

Earth connection (standard)
The earth connection terminal (drawout pattern) is on the left hand side of the chassis. It is marked with the symbol ⏚

Pushbutton locking device

Optional: this padlockable device (padlocks not supplied) prevents direct operation of the circuit breaker by preventing operation of the "on" and "off" pushbuttons. This locking device is provided with sealing facility as standard.

"Off" position locking device

Optional: key lock for locking the breaker in the "off" position by use of a Profalux, Castell or key lock.

Pushbutton locking device	
By padlocks (not supplied)	**VBP**

"Off " position locking device (1)	
1 Profalux key lock	**VSPA1**
2 Profalux key locks, identical profiles	**VSPA2**
adaptation fixture for 1 Profalux key lock, lock not supplied	**VSPRAC**
On request	
1 Ronis key lock	**VSRA1**
2 Ronis key locks, identical profiles	**VSRA2**
Adaptation for 1 Castell key lock, lock not supplied	**VSCA**
Adaptation for 1 Kirk key lock, lock not supplied	**VSKA**

"Disconnected", "connected" and "test" position locking (1)

Located on the cassette and accessible with the cubicle door locked, this system is available in two versions:

- ■ "Disconnected" position locking;
- □ As standard by a padlocking device (1 to 3 padlocks not supplied),
- □ **Optional:** by a locking device with 1 or 2 Profalux key locks;
- ■ "Disconnected", "connected" and "test" position locking (optional);
- □ By a padlocking device, with 1 to 3 padlocks not supplied (VEC),
- □ By a locking device, with 1 or 2 Profalux key locks (VSPEC),

Padlocks	1 keylock	2 keylocks
"disconnected" standard		
"disconnected" standard	"disconnected" optional	
"disconnected" standard	"disconnected" optional	"disconnected" optional
"disconnected, connected"*		
"disconnected, connected"*	"disconnected, connected"*	
"disconnected, connected"*	"disconnected, connected" *	"disconnected, connected"*

* Optional

Remarks

- ■ The keylocks are of the captive key type, i.e. key free when locked;
- ■ Profalux and Ronis keylocks can be used together;
- ■ A second Profalux or Ronis lock, identical to the one mounted on the chassis, can be supplied separately.

(1) Keylock types
Profalux B24 D4Z
Ronis 1351 B
Kirk CN22-12
Castell SK7113/1
Trayvou L1P1E

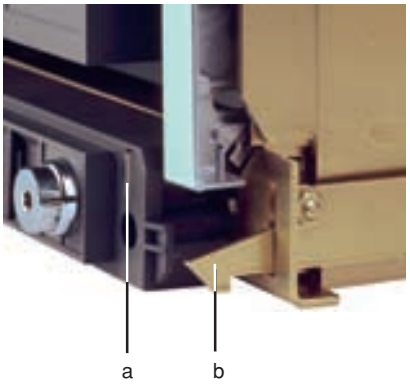
Accessories

"Disconnected" position locking

By padlocks (not supplied)	as standard
1 Profalux key lock	**VSPC1**
2 Profalux key locks, identical key codes	**VSPC2**
2 Profalux key locks, different key codes	2 **VSPC1**
Adaptation fixture for Profalux key lock (lock not supplied)	**VSPRCC**
On request	
1 Ronis key lock	**VSRC1**
2 Ronis key locks, identical key codes	**VSRC2**
2 Ronis key locks, different key codes	2 **VSRC1**
Adaptation fixture for Castell key lock (lock not supplied)	**VSCC**
Adaptation fixture for Kirk key lock (lock not supplied)	**VSKC**
Adaptation fixture for Trayvou key lock (lock not supplied)	**VSTC**

"Disconnected", "connected" and "test" position locking

By padlocks (not supplied)	**VEC**
1 Profalux key lock	**VSEPC**
2 Profalux key lock, different key codes	2 **VSEPC**
On request	
1 Ronis key lock	**VSERC**
2 Ronis key locks, differents key codes	2 **VSERC**
Adaptation fixture for Castell key lock (lock not supplied)	**VSECC**
Adaptation fixture for Kirk key lock (lock not supplied)	**VSEKC**



a: Racking interlock
b: Door latch

Door interlock

Optional: mounted on the chassis, this lock prevents the cubicle door from being opened when the breaker is in the "connected" position. If the breaker is racked into the "connected" position with the door open, the door can be closed without disconnecting the breaker.

Racking interlock

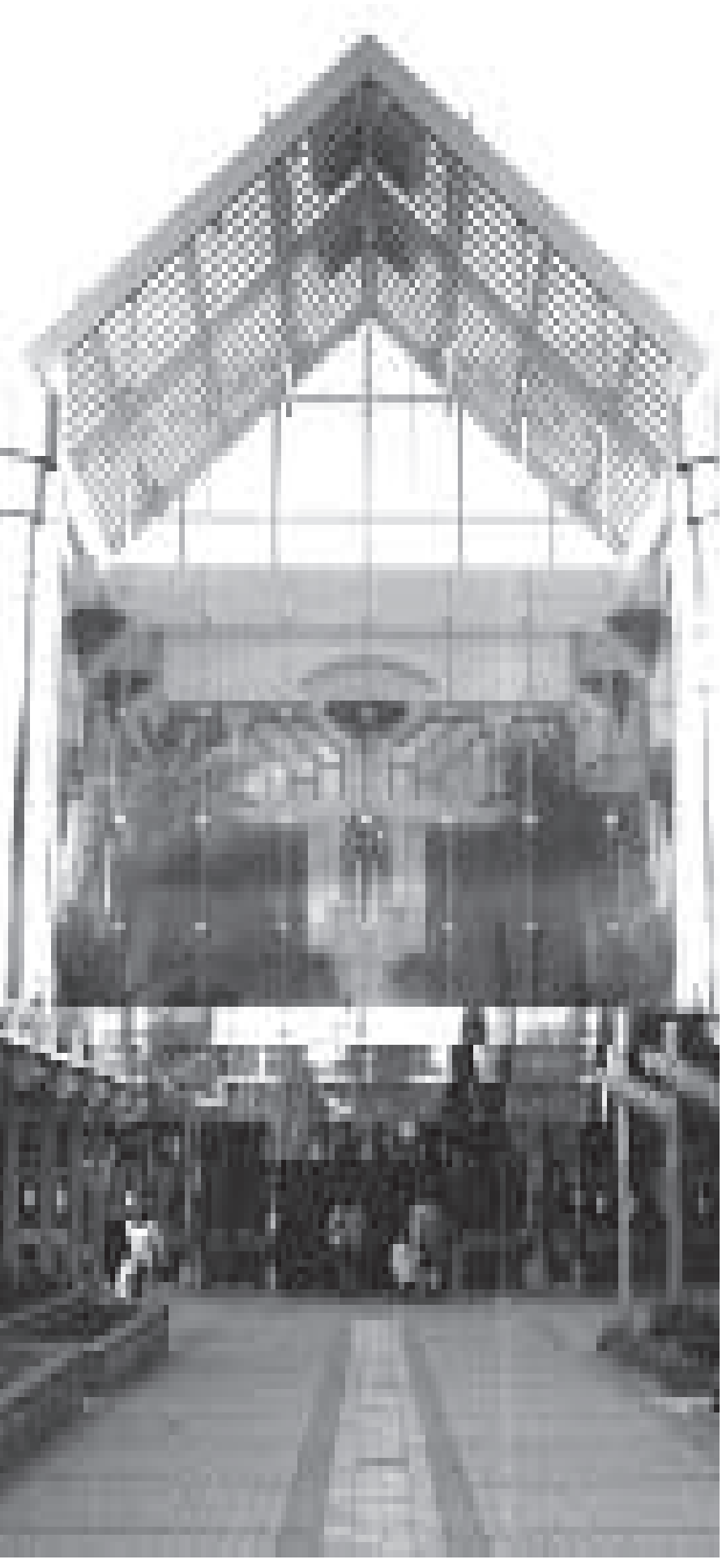
Optional: this lock prevents insertion of the breaker racking handle when the cubicle door is open. It can be defeated by pressing on the unlocking mechanism.

Withdrawal/spring charged interlock

Optional: this lock prevents withdrawal of the breaker from the chassis when the springs are charged.
Incompatible with MN or MNR release.

Door interlock	
right-hand side	**VPECD**
left-hand side	**VPECG**
Racking interlock	**VPOC**
Withdrawal/spring charged interlock	**VEAA**

Section 5



LV air circuit breakers and switch-disconnectors

Masterpact 800 to 6300 Amp

Source changeover systems

Auto source changeover controllers

5

Masterpact:
Manual source changeover systems

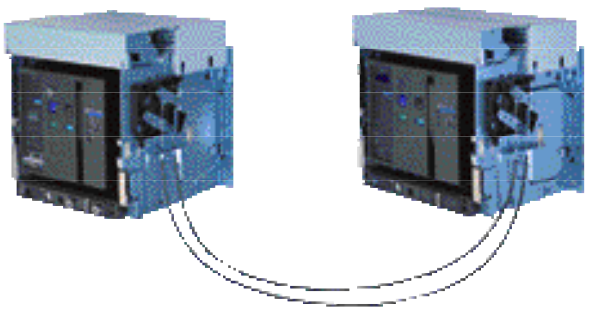
Mechanical interlocking by connecting rods for 2 or 3 vertically-mounted breakers

This comprises:

- 2 or 3 Masterpact circuit breakers or switch-disconnectors;
- An adaptation fixture on the right side of each breaker;
- 1 or 2 sets of connecting rods with no-slip adjustments;

The complete interlock kit is supplied for assembly by the customer.
The changeover system with interlocking by connecting rods is also available in a version which is factory mounted on a steel frame.

Maximum distance between fixing planes: 900 mm.



Mechanical interlocking by cables for 2 side-by-side breakers

This comprises:

- 2 Masterpact circuit breakers or switch-disconnectors;
- An adaptation fixture on the right side of each breaker;
- A set of cables with no-slip adjustments; The complete kit is supplied for assembly by the customer.

Distance between fixing planes:

- Maximum: 2 000 mm;
- Minimum: breaker height with arc chute cover (see pages 130).

Device combinations

All combinations are possible: fixed and drawout versions, three pole and four pole, different current ratings, circuit breakers or switch disconnectors.
All control units can be used on the circuit breakers.

Assembly and installation

The various parts of the Masterpact automatic source-changeover system are mounted and connected by the user. No circuit breaker modifications are required. The wiring diagrams are shown on pages XX.

The Masterpact automatic source-changeover system may also be supplied factory-wired and mounted on a metal frame.

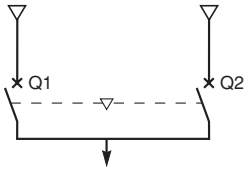
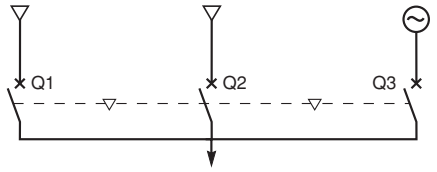
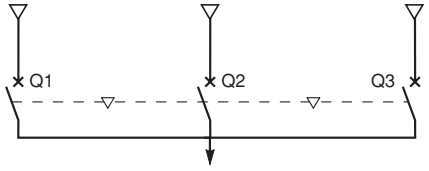
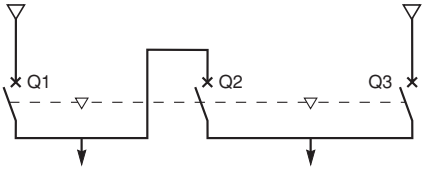
Automatic source-changeover systems
Automatic control: by customer

The electrical interlocking system and automatic control system for multiple sources must be wired by the user and used in conjunction with the mechanical interlocking system.
Typical wiring configurations are available on request. See examples below.

Necessary auxiliaries and accessories
To implement the configurations detailed below, each Masterpact circuit breaker must be equipped with:

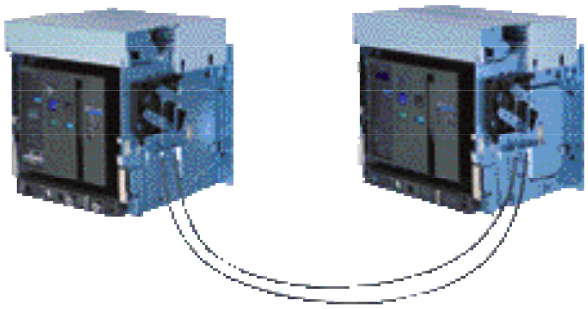
- A motor mechanism (MCH);
- A shunt release (MX);
- A "ready to close" contact (PF);
- A block of 4 changeover switches (OF);
- An additional terminal block (BS) and a block of 4 "connected" position switches (CE) for changeover systems incorporating drawout breakers.

Option with "lockout after fault"
With this option, the circuit breaker must be reset manually after a fault trip.

Power circuit	Possible combinations			Configuration type	wiring dia.
Interlocking with 2 breakers	Q1	Q2		**Electrical interlocking**	**685363**
	0	0		**Automatic control**	
	0	1		With generator set	**688784**
	1	0		With permanent "alternative" source	**688942**
Interlocking with 3 breakers 2 "mains" sources + 1 "alternative" source	Q1	Q2	Q3	**Automatic control with permanent "alternative" source**	
	0	0	0	With lockout after fault	**685366**
	1	0	0	Without lockout after fault	**688183**
	0	0	1	**Automatic control with generator set**	
	1	1	0	With lockout after fault	**689642**
	0	1	0	Without lockout after fault	**689644**
Interlocking with 3 breakers 3 sources, only one breaker closed	Q1	Q2	Q3	**Electrical interlocking**	
	0	0	0	With lockout after fault	**688188**
	1	0	0	Without lockout after fault	**688187**
	0	1	0		
	0	0	1		
Interlocking with 3 breakers 2 sources + 1 coupling	Q1	Q2	Q3	**Electrical interlocking**	
	0	0	0	With lockout after fault	**688189**
	1	0	0	Without lockout after fault	**688190**
	0	1	0	**Automatic control**	**689651**
	0	0	1		
	1	1	0		
	0	1	1		
	1	0	1		

Masterpact:

Automatic source-changeover systems
Automatic control: by Merlin Gerin controller



Masterpact automatic source-changeover system

Controller

Masterpact source-changeover systems can be used to implement various configurations involving a number of incoming feeders. The two or three Masterpact circuit breakers or switch-disconnectors used are mechanically interlocked to prevent certain combinations of operations.

All types of Masterpact devices may be fitted in combination with each other (fixed and drawout versions, three-pole and four-pole, with different ratings).

The devices may be arranged:

- Vertically, i.e. stack-mounted and interconnected by a set of solid interlock rods.
- Horizontally (two only), i.e. side-by-side and interconnected by a set of Bowden type cables. An electrical interlock must be used when the source changeover is part of an automatic system.

Automatic source-changeover system with 2 devices

A Masterpact automatic source-changeover system with 2 devices comprises:

1 - Circuit breaker QN connected to the "Mains" source;

2 - Circuit breaker QR connected to the "Standby" source;

3 - Mechanical interlocking system by rods or cables;

Automatic control of the system can be provided by adding:

4 - Electrical interlocking unit IVE;

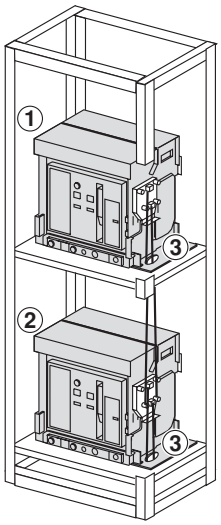
5 - Auxiliaries control plate ACP;

6 - Controller BA or UA.

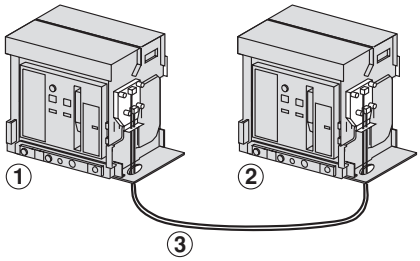
Each Masterpact circuit breaker is equipped with:

- A motor mechanism;
- A shunt release (MX);
- A "ready to close" contact (PF);
- A block of 4 changeover switches (OF);
- An additional terminal block (BS) and a block of 4 "connected" position switches (CE) for source-changeover systems made up of drawout breakers.

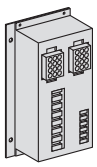
Without controller

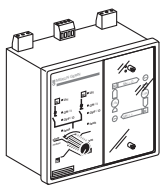


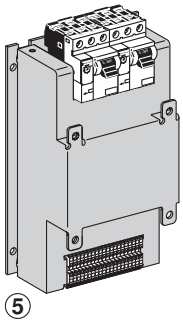
In this case, the automatic control system to initiate changeovers between the "Mains" and "Standby" sources under predefined conditions must be provided by the customer.

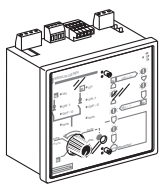


With controller









In this case, conditional changeovers between the "Mains" and "Standby" sources are initiated by a Merlin Gerin controller.

Automatic source-changeover system with 3 devices

A Masterpact automatic source-changeover system with 3 devices consists of:

1 - 2 circuit breakers QN1 and QN2 connected to the "Mains" source;

2 - Circuit breaker QR connected to the "Standby" source;

3 - Mechanical interlocking system by solid rods;

For such applications (consult us) automatic control of the system can be provided by adding:

4 - 2 off electrical interlocking units IVE;

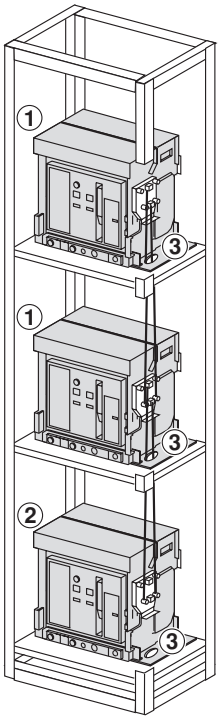
5 - Auxiliaries control plate ACP;

6 - Controller BA or UA.

Each Masterpact circuit breaker is equipped with:

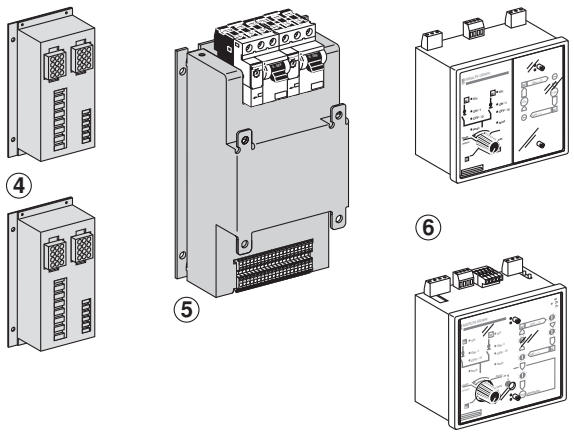
- A motor mechanism;
- A shunt release (MX);
- A "ready to close" contact (PF);
- A block of 4 changeover switches (OF);
- An additional terminal block (BS) and a block of 4 "connected" position switches (CE) for source-changeover systems with drawout breakers.

Without controller



In this case, the automatic control system to initiate changeovers between the "Mains" and "Standby" sources under predefined conditions must be provided by the customer.

With controller



In this case, conditional changeovers between the "Mains" and "Standby" sources are initiated by a Merlin Gerin controller.

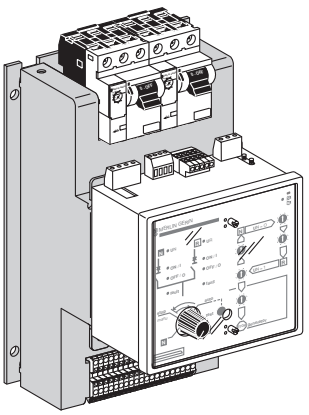
Masterpact:

Automatic source-changeover systems
Controller option selection

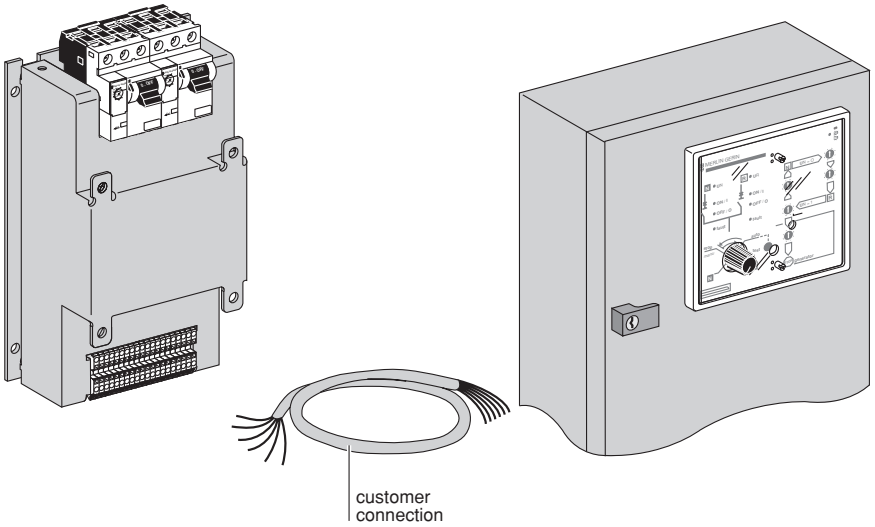
Used together with the auxiliaries control plate ACP, controllers type BA and UA initiate the automatic changeover operations according to the status of the “Mains” and “Standby” sources.

Installation
Two possibilities:

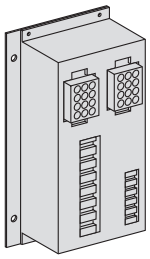
- Mounted directly on the auxiliaries control plate (ACP).



- Mounted on the front of the switchboard. The distance between the controller and the auxiliaries control plate must not exceed 2 metres. The interconnection wiring must be provided by the customer.



Terminal block and electrical interlocking unit: IVE



The terminal block and electrical interlocking unit IVE is used to connect the operating mechanism.
Control voltage:

- 48 to 415V, 50/60 Hz.

The IVE control voltage must be the same as the mechanism voltage.

Auxiliaries control plate ACP

The auxiliaries control plate ACP includes:

- Two P25M circuit breakers supplying and protecting the automatic control circuits for the “Mains” and “Standby” sources. These circuit breakers have an infinite breaking capacity;
- Two relay contactors for the BA or UA controller;
- The terminal block for connection to the controller.

Power supply:
Power is supplied by the “Mains” and “Standby” sources. The control voltage for the auxiliaries control plate must be identical to the IVE unit and the motor mechanisms.

Control voltages

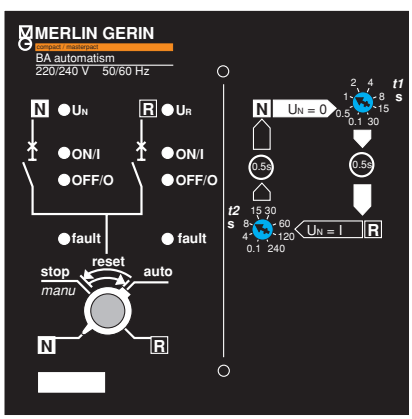
- 220 to 240 V 50/60 Hz;
- 380 to 415 V 50/60 Hz - 440 V 60 Hz.

Installation:
The auxiliaries connections from the ACP to the IVE must be provided by the customer.

* 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, an isolation transformer must be used.

Automatic source-changeover systems controller option selection

controller BA



Front face of controller BA

Time delay settings:
QN: circuit breaker with motor mechanism on "Normal" source,
QR: circuit breaker with motor mechanism on "Replacement" source,
t1: time delay before QN opens when the voltage UN of the "Normal" source disappears,
t2: time delay before QR opens when the voltage UN of the "Normal" source is restored.

The controller type BA can be used with Compact or Masterpact circuit breakers to implement a straight-forward automatic source-changeover system (switching from one source to another depending on the presence of voltage UN on the "mains" source).

Electrical characteristics
Power is supplied from the ACP. The same voltage must be used to supply the ACP plate, the IVE unit and the circuit breaker motor mechanisms. If this voltage is the same as the source voltage, the "mains" and "standby" sources can be used directly for the power supply.
If not, an isolation transformer must be used.

Control voltages
- 220 to 240 V 50/60 Hz;
- 380 to 415 V 50/60 Hz - 440 V 60 Hz.

Operation
- A four-position switch can be used to select:
  - Automatic operation,
  - Forced operation on source N (mains)
  - Forced operation on source R (standby)
  - Stop (both "mains" and "standby" sources off);
- Adjustment of time delays in front:
  - T1 from 0.1 to 30 seconds,
  - T2 from 0.1 to 240 seconds;
- Circuit breaker status indication on the front of the controller: on, off, fault trip;
- Integrated terminal block for connection of the following signals:
  - Inputs:
    - Order for voluntary transfer to source R (e.g. energy management commands),
    - "Standby" source voltage contact: Additional test for UR (not carried out by the controller). Transfer to "standby" source is only possible only if the test is positive,
  - Outputs:
    - Indication of operation in automatic mode.

Connection to the terminal block:

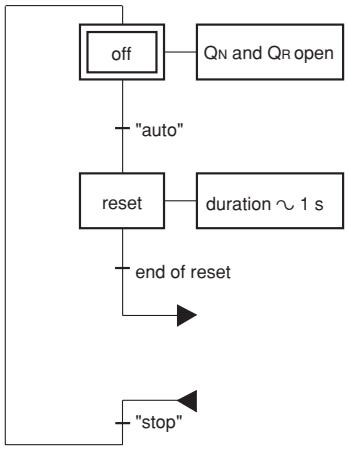
See page XX.

- Controller BA can be **tested by opening the P25M circuit breaker** on the N circuit, thus simulating a failure of UN. See detailed transfer steps on page XX.

Masterpact:

Automatic source-changeover systems controller option selection

■ **4-position switch in "stop" position**

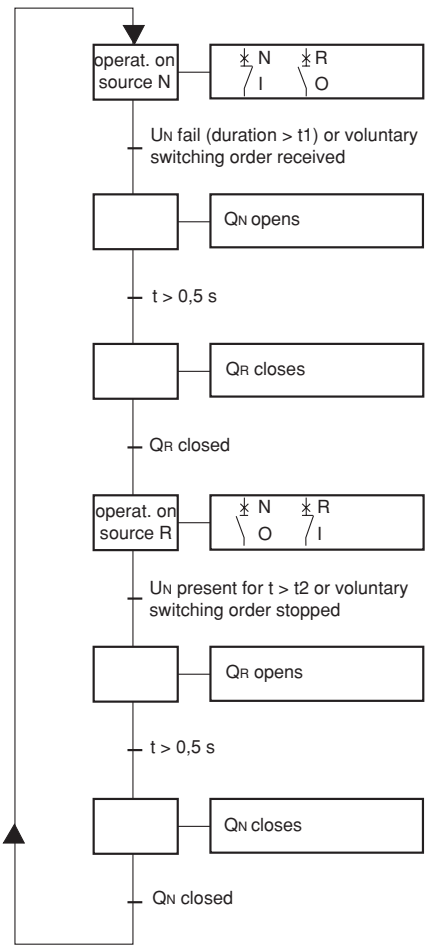


It is not necessary to set controller BA to “stop” position before operating circuit breakers QN or QR manually.

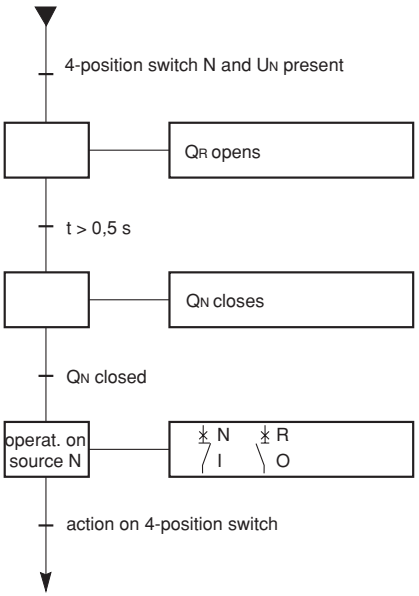
The circuit breakers will return to their initial state when the controller is reset to “auto”.

note: source N = mains
source R = standby

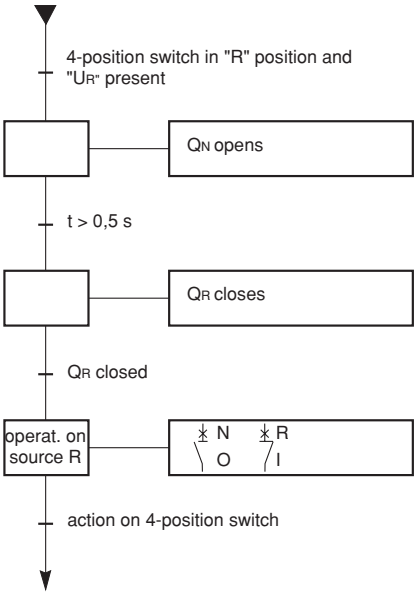
■ **4-position switch in "auto" position (automatic operation)**



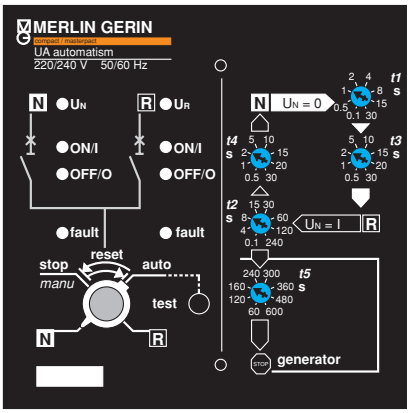
■ **4-position switch in "N " position (forced operation on "mains" source)**



■ **4-position switch in "R" position (forced operation on "standby" source)**



Controller UA



Front face of controller UA

Time delay settings:

QN: Circuit breaker with motor mechanism on “Mains” source,

QR: Circuit breaker with motor mechanism on “Standby” source,

t1: Time delay before QN opens when the voltage UN of the “Mains” source disappears,

t2: Time delay before QR opens when the voltage UN of the “Mains” source is restored,

t3: Time delay before QR closes once QN has opened and the load has been shed,

t4: Time delay before QN closes once QR has opened and the load has been reconnected,

The controller type UA can be used with Compact or Masterpact circuit breakers to implement a source-changeover system offering the following automatic functions:

- Switching from one source to another depending on the presence of voltage UN on the “mains” source;
- Control of an engine generating set;
- Shedding and reconnection of non-priority circuits;
- Switching to the “standby” source in the event of a failure on one of the phases of the “mains” source.

Electrical characteristics

Power is supplied from the ACP. The same voltage must be used to supply the ACP plate plate, the IVE unit and the circuit breaker motor mechanisms. If this voltage is the same as the source voltage, the "mains" and "standby" sources can be used directly for the power supply. If not, a BC type or equivalent isolation transformer must be used.

Control voltages

- 220 to 240 V 50/60 Hz;
- 380 to 415 V 50/60 Hz - 440 V 60 Hz.

Operation

- A four-position switch can be used to select:
  - Automatic operation,
  - Forced operation on source N (mains)
  - Forced operation on source R (standby)
  - Stop (circuit breakers open and manual operation);
- Adjustment of time delays in front:
  - T1 from 0.1 to 30 seconds,
  - T2 from 0.1 to 240 seconds,
  - T3 from 0.5 to 30 seconds,
  - T4 from 0.5 to 30 seconds,
  - T5 from 60 to 600 seconds;
- Circuit breaker status indication on the front of the controller: on, off, fault trip;
- **Test button** on the front of the controller to check the transfer from the “mains” source to the "standby" source and the return to the "mains" source;
- Integrated terminal block for connection of the following signals:
  - Inputs:
    - Order for voluntary transfer to source R (e.g. energy management commands),
    - "Standby" source voltage contact: Additional test for UR (not carried out by the controller). Transfer to "Standby" source only possible if test is positive;
  - Outputs:
    - Control of engine generator set,
    - Load shedding of non-priority circuits,
    - Indication of operation in automatic mode;
- 3 switches provide the following functions:
  - Selection of the type of "Mains" source, i.e. single-phase or three-phase;
  - Enable or disable voluntary energy management transfer if the "Standby" source is not operational;
  - Selection of the maximum tolerated starting time for the engine generator set ("Standby" source): 120 s or 180 s.

Batibus option for controller UA

A communication function can be used to check the following from a remote location:

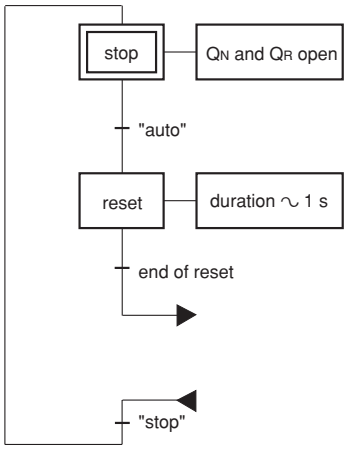
- Status of the circuit breakers (open, closed or fault trip);
- Voltage presence on the "Mains" and "standby" sources;
- Presence of an order forcing operation on the "standby" source (e.g. for energy management purposes);
- Values of settings and configurations,
- Status of the non-priority circuits (whether subject to load shedding or not).

In automatic mode, this communications option also offers the possibility of remote forced operation on the "standby" source.

Masterpact:

Automatic source-changeover systems controller option selection

■ **4-position switch in "stop" position**

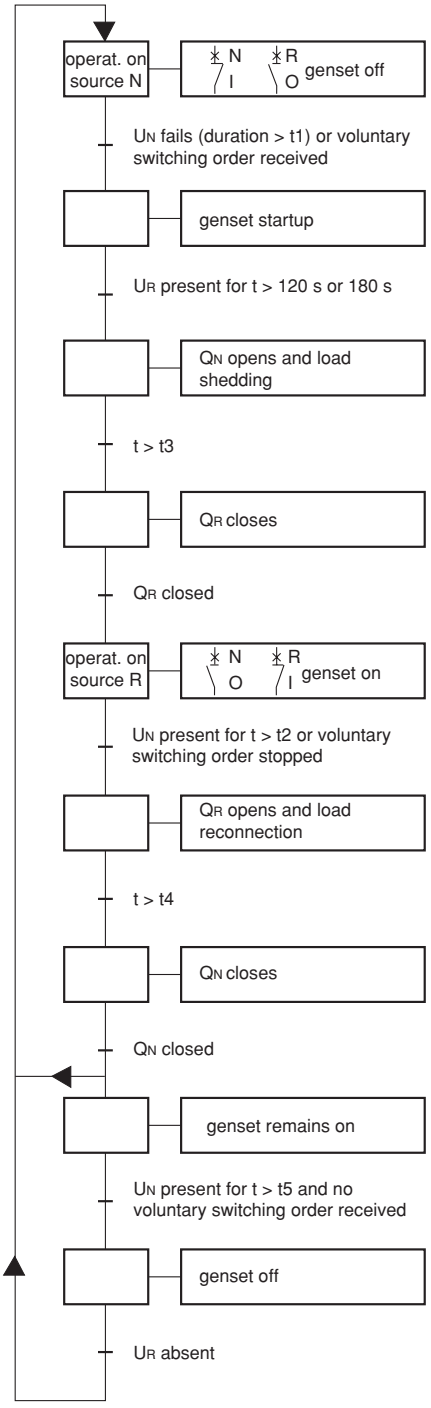


It is not necessary to set controller UA to “stop” position before operating circuit breakers QN or QR manually.

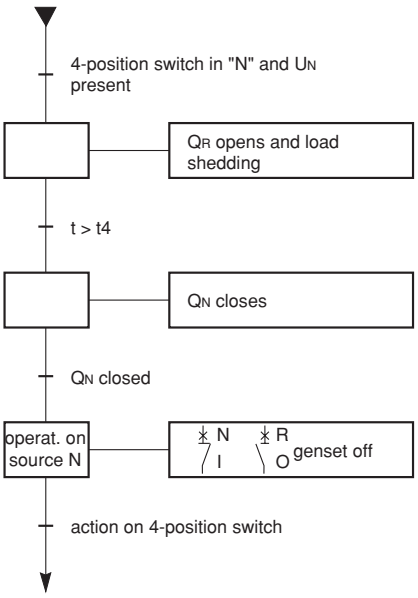
The circuit breakers will return to their initial state when the controller is reset to “auto”.

note: source N = mains
source R = standby

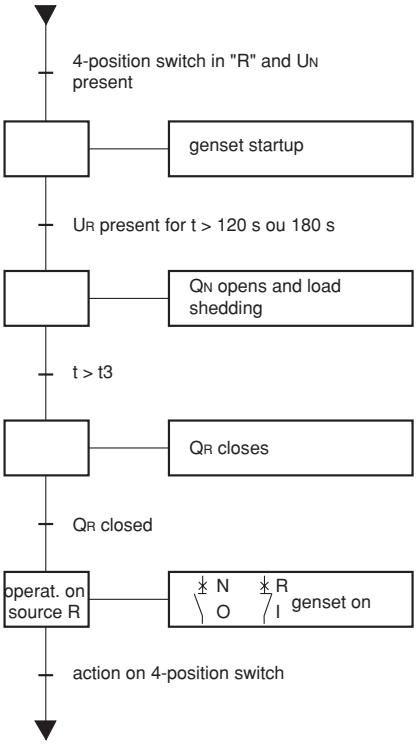
■ **4-position switch in "auto" position (automatic operation)**



■ **4-position switch in "N" position (forced operation on "mains" source)**



■ **4-position switch in "R" position (forced operation on "standby" source)**



Section 6

LV air circuit breakers and switch-disconnectors

Masterpact 80 to 6300 Amp

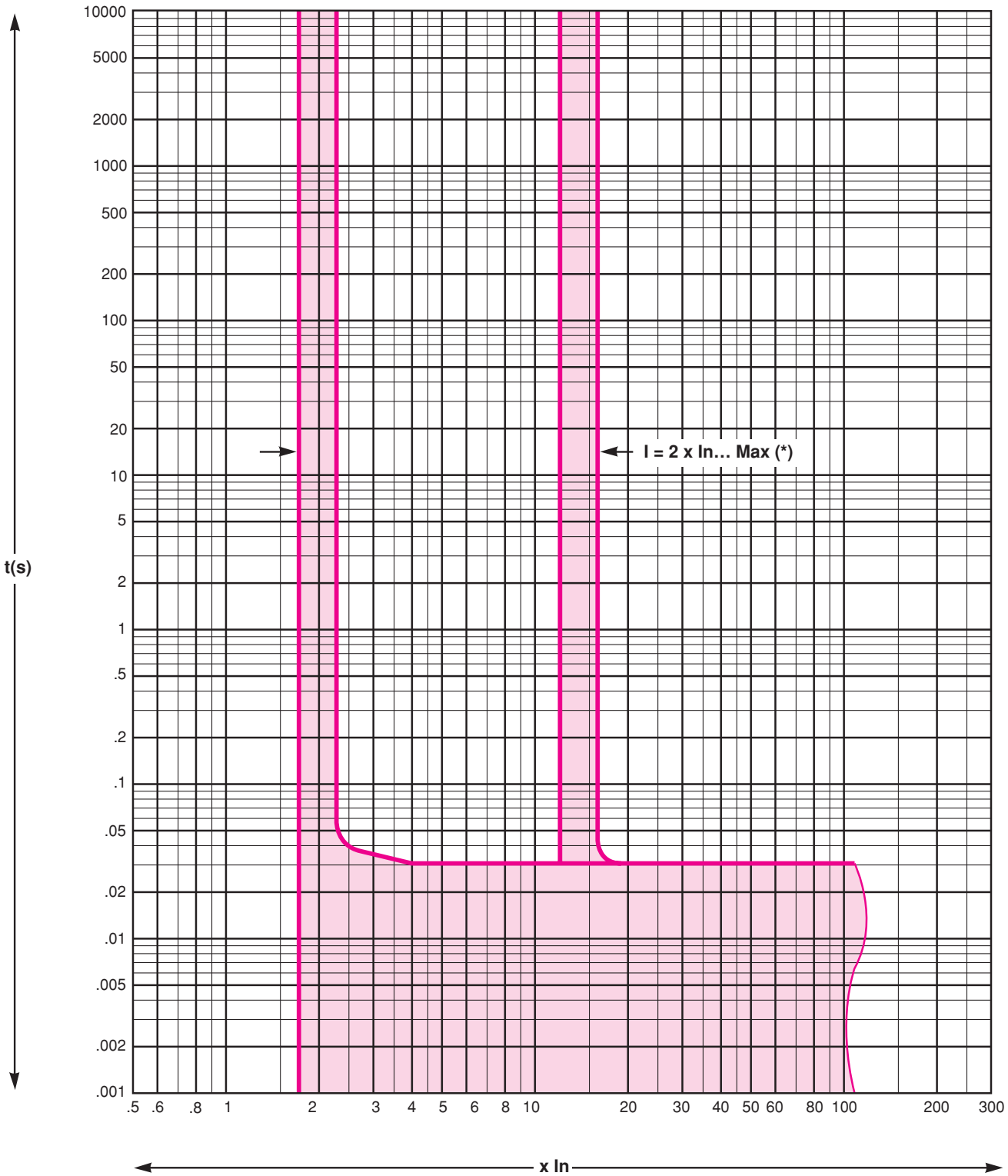
Complementary technical information

All Merlin Gerin tripping characteristics are also available in our ‘protect’ software package.

6

Tripping curves (AC range)

STR 18 M

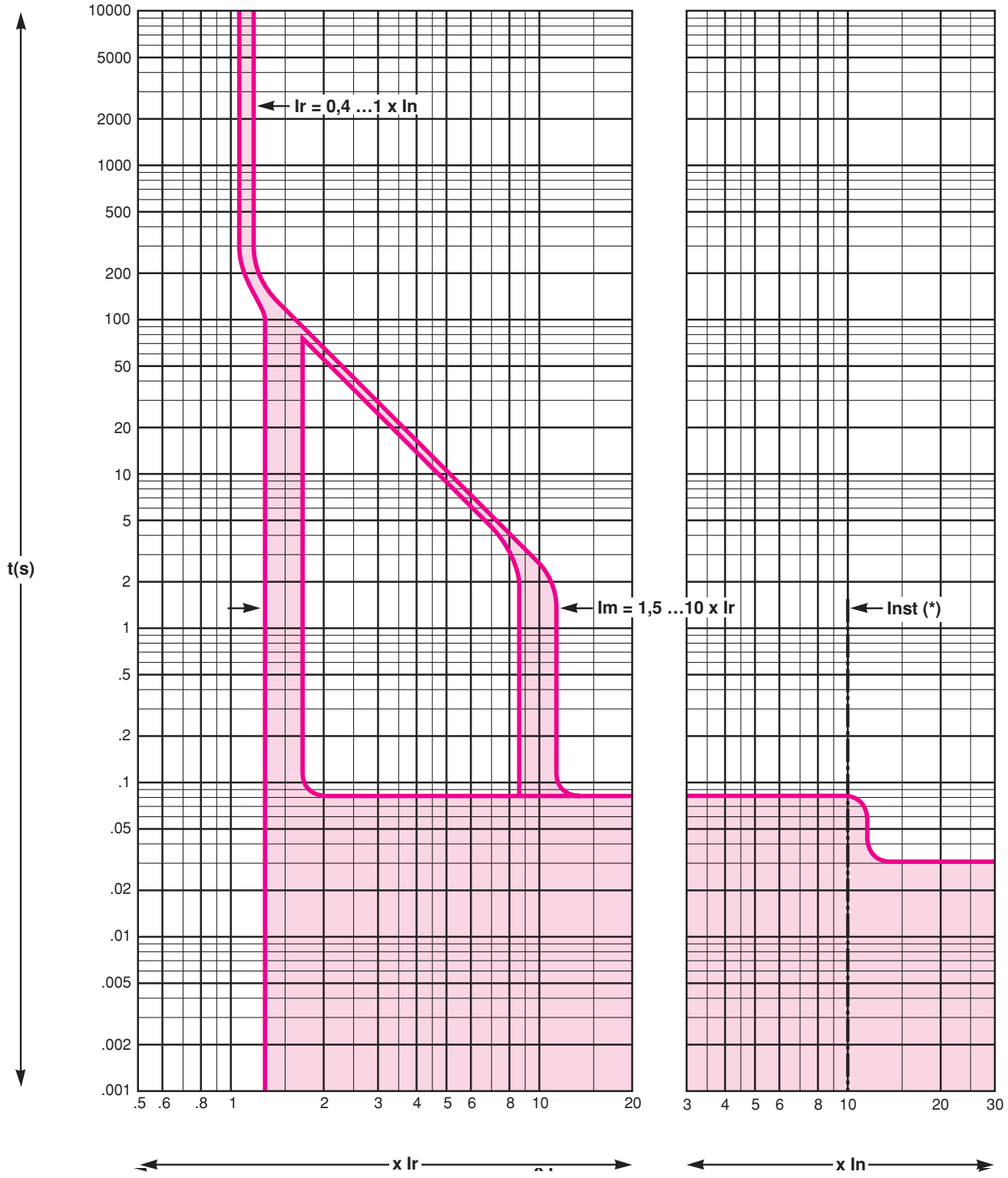


(*)Max

In (A)	630	800/1000	1200/1600	2000	2500	3000/3200	4000/5000/6300
Max = In x ...	28	28	24	20	14	12	10

Tripping curves (AC range)

STR 28 D

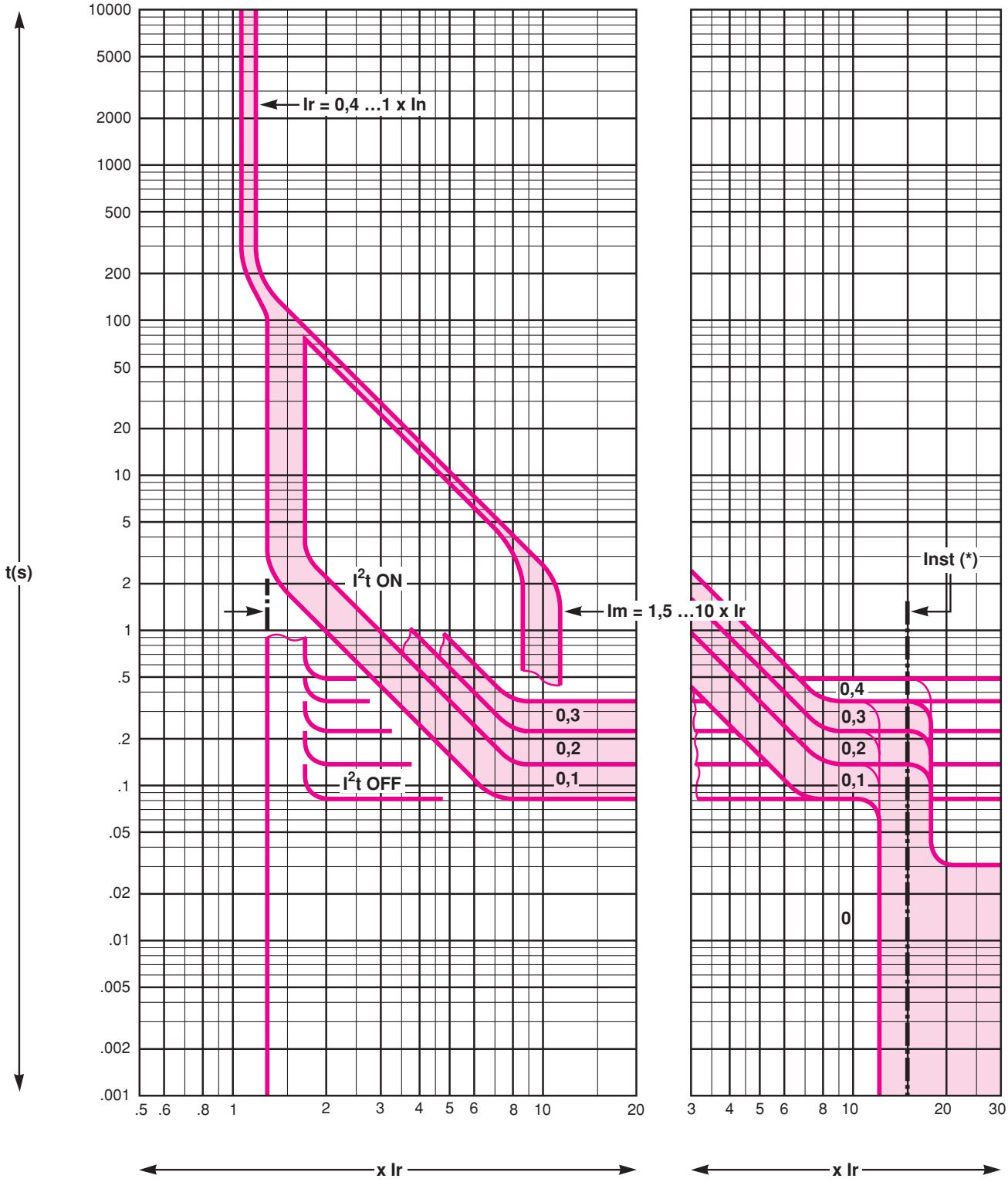


(*)Max

In (A)	630	800/1000	1200/1600	2000	2500	3000/3200	4000/5000/6300
Max = In x ...	28	28	24	20	14	12	10

Tripping curves (AC range) (cont.)

STR 38 S

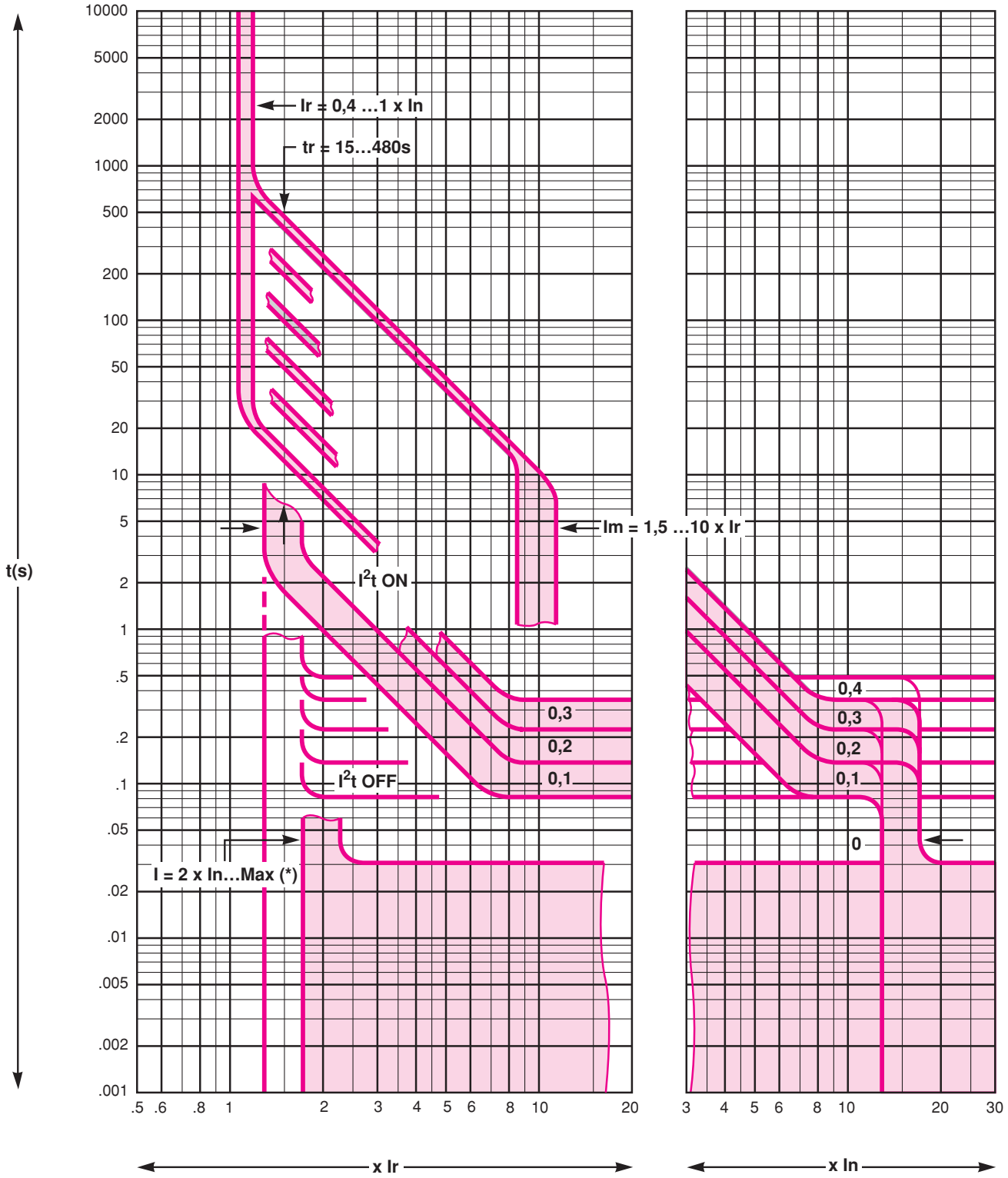


(*)Inst

In (A)	630	800/1000	1200/1600	2000	2500	3000/3200	4000/5000/6300
I = In x ... (N-H)	28	28	24	20	14	12	10
I = In x ... (L)	14	10	8	6	6	-	-

Tripping curves (AC range) (cont.)

STR 58 U

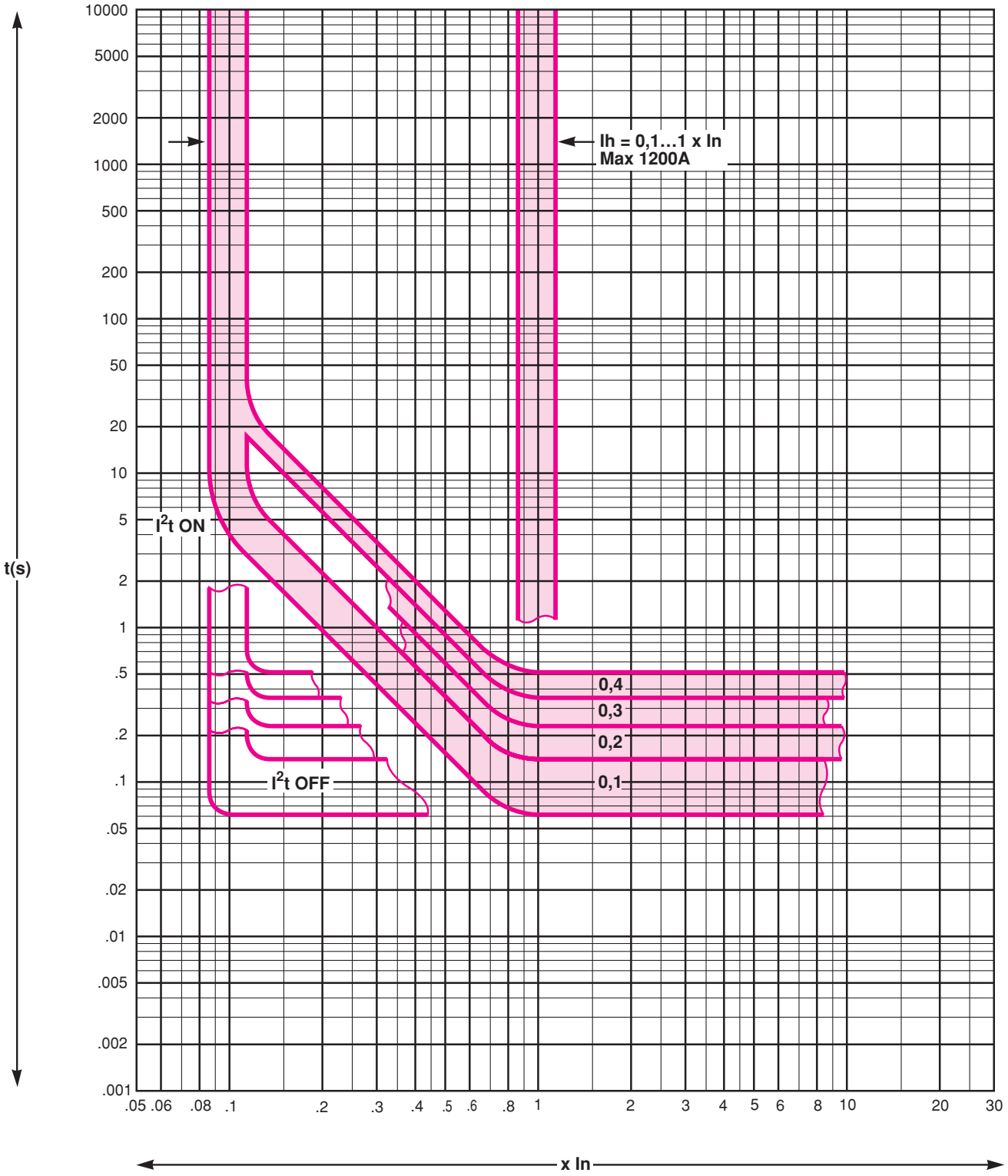


(*)Max

In (A)	630	800/1000	1200/1600	2000	2500	3000/3200	4000/5000/6300
Max = In x ... (N-H)	28	28	24	20	14	12	10
Max = In x ... (L)	14	10	8	6	6	-	-

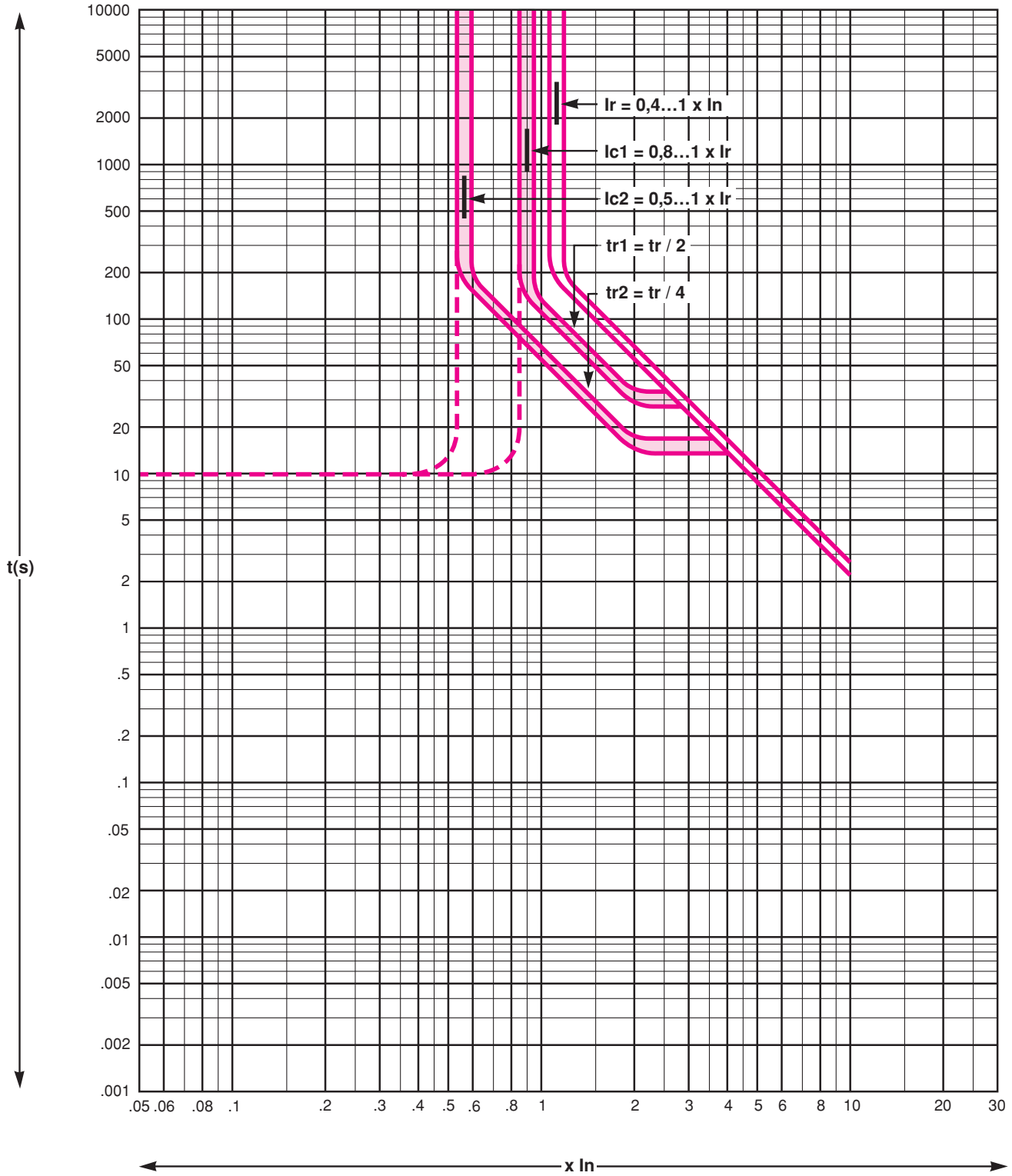
Tripping curves (AC range) (cont.)

STR 38 S/STR 58 U: earth fault protection



In: CT rating
Ih: earth fault protection pick-up (delay: th)

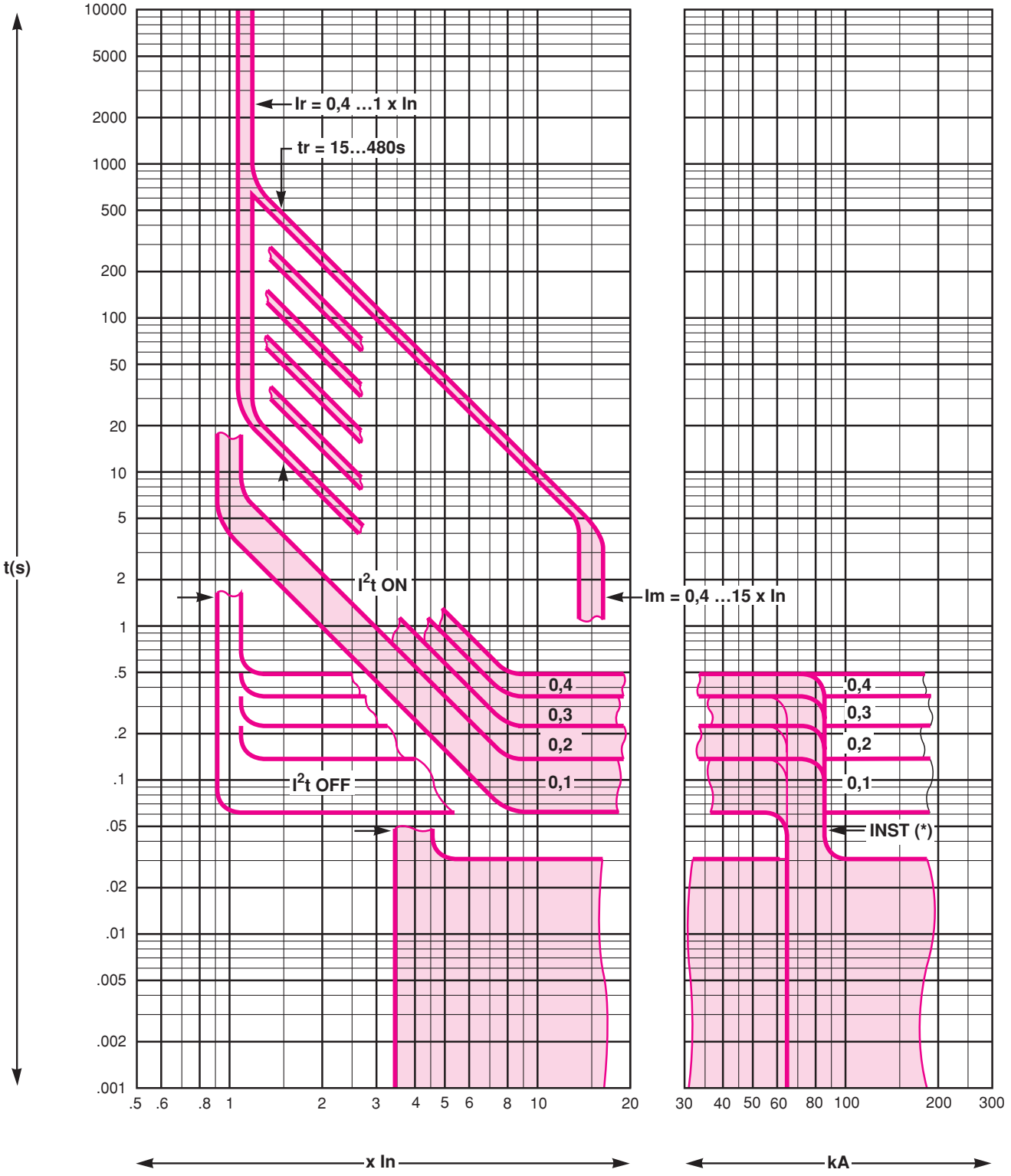
STR 38 S/STR 58 U: load monitoring



Ir: LT protection current setting (delay: tr)
Ic1: load-shedding pick-up 1 (delay: tr1)
Ic2: load-shedding pick-up 2 (delay: tr2)

Tripping curves (AC range) (cont.)

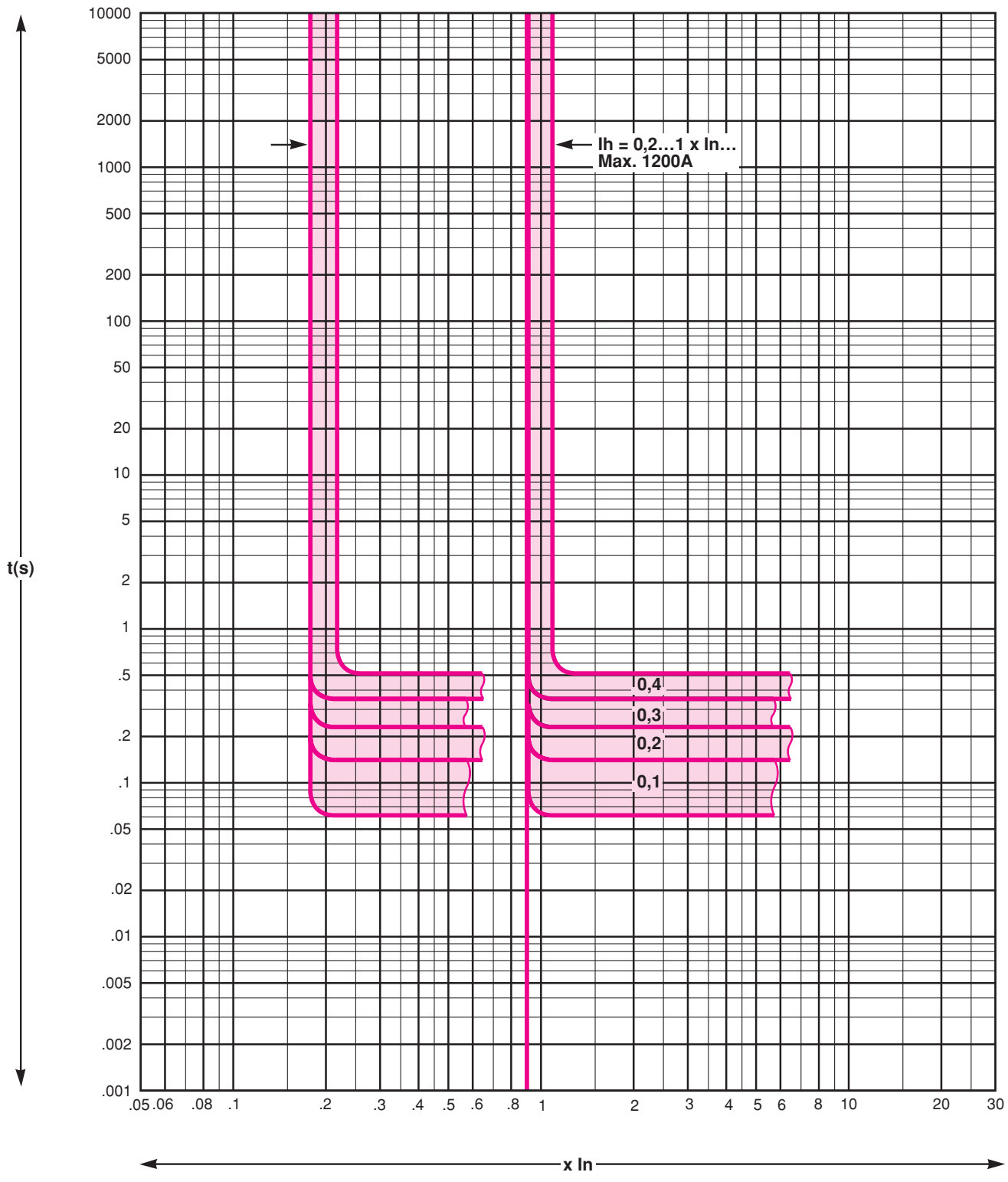
STR 68 U



(*)INST

In (A)	800	1000	1250	1600	2000	2500	3200	4000	5000	6000
type H2: INST =	1.6 kA ... 50 kA				In ... 65 kA		In ... 75 kA			
type H1: INST =	In or 1.6 kA ... 50 kA									
type L1: INST =	1.6 kA ... 11 kA			In ... 15 kA						

STR 68 U: earth fault protection

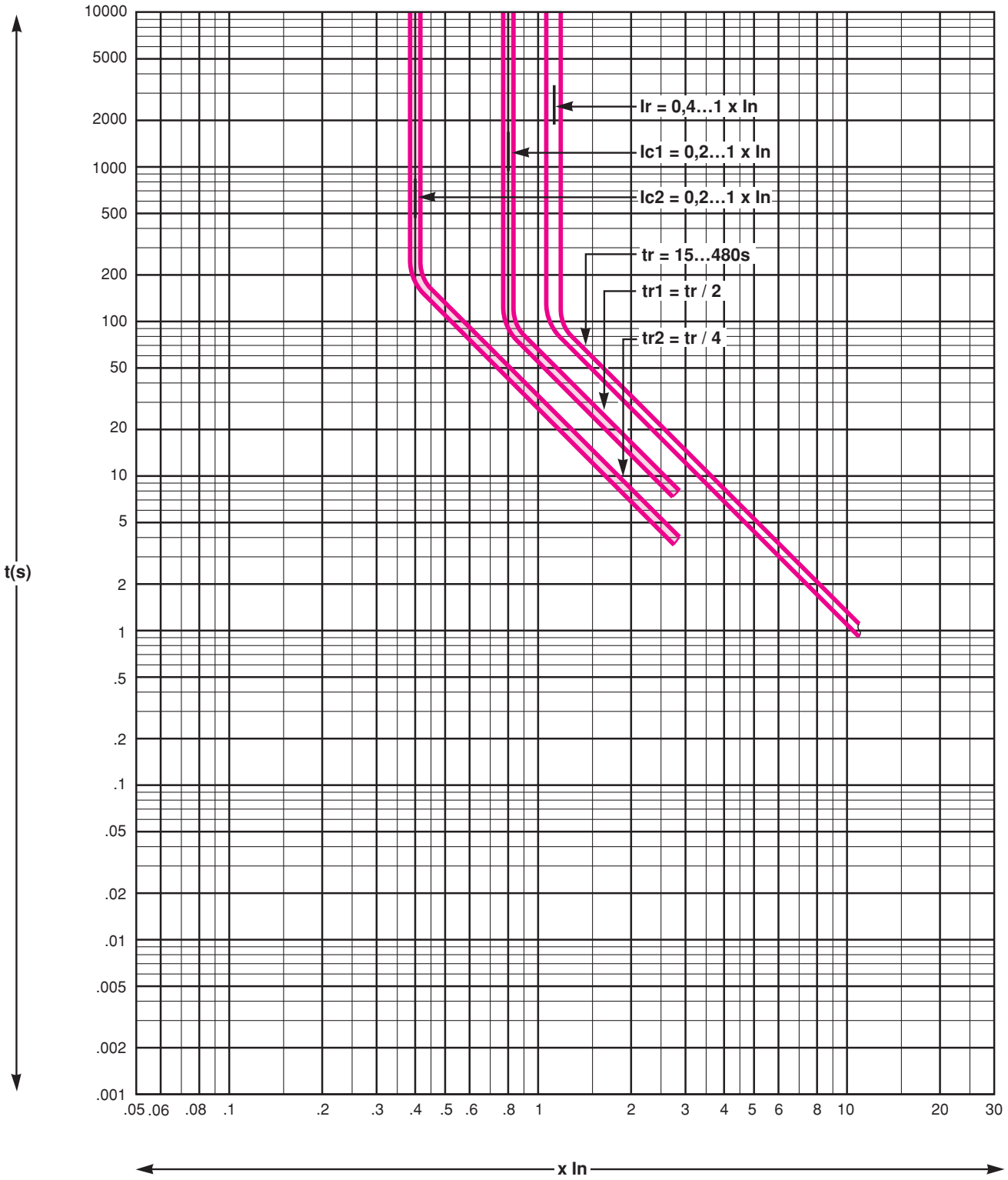


In: CT rating
Ir: LT protection current setting (delay: tr)
Im: ST protection pick-up (delay: tm)
INST: instantaneous protection pick-up

Ih: earth fault protection pick-up (delay: th)
(0, 0.1, ...: time delay settings)

Tripping curves (AC range) (cont.)

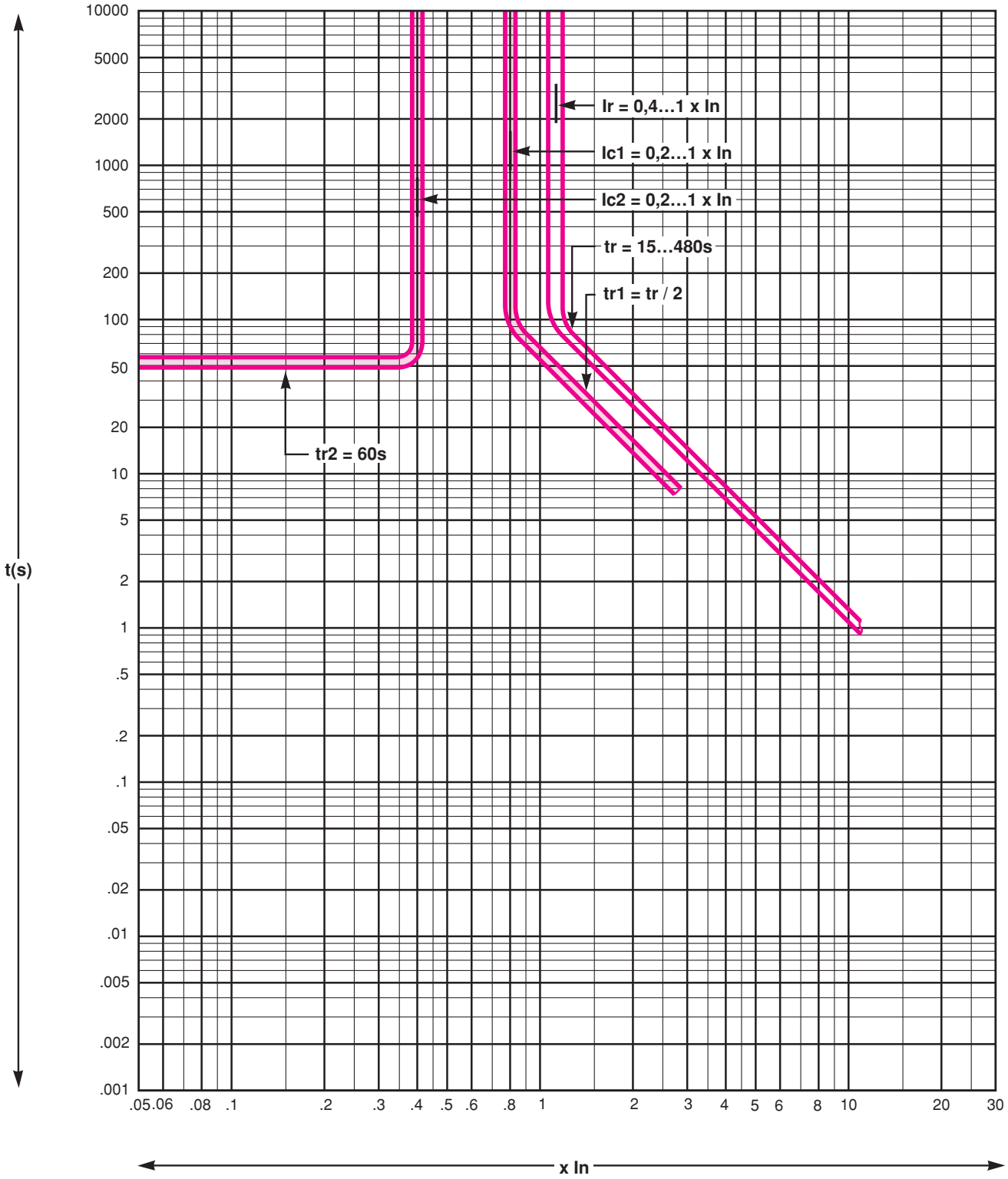
STR 68 U: load monitoring with 2 load limits



In: CT rating
Ir: LT protection current setting (delay: tr)

Ic1: one load-shedding pick-up (delay: tr1)
Ic2: another load-shedding pick-up (delay: tr2)

STR 68: load monitoring with 1 load-shedding and 1 load-reconnection pick-up



Ic1: load-shedding pick-up (delay: tr1)
Ic2: load-reconnection pick-up 2 (delay: tr2)

Effect of ambient temperature (AC range)

Ambient temperature

The electrical and mechanical characteristics are specified for an ambient temperature between –5 and +60 °C.

Masterpact circuit breakers operate from –10 to +70 °C.

First closing minimum temperature: –30 °C.

In addition, Masterpact circuit breakers comply with IEC standards 68.2.1 and 68.2.2: exceptional storage temperature from: –50 to +100 °C.

The table below indicates the maximum current rating, for each type of connection terminal, as a function of the ambient temperature around the circuit breaker and the busbars.

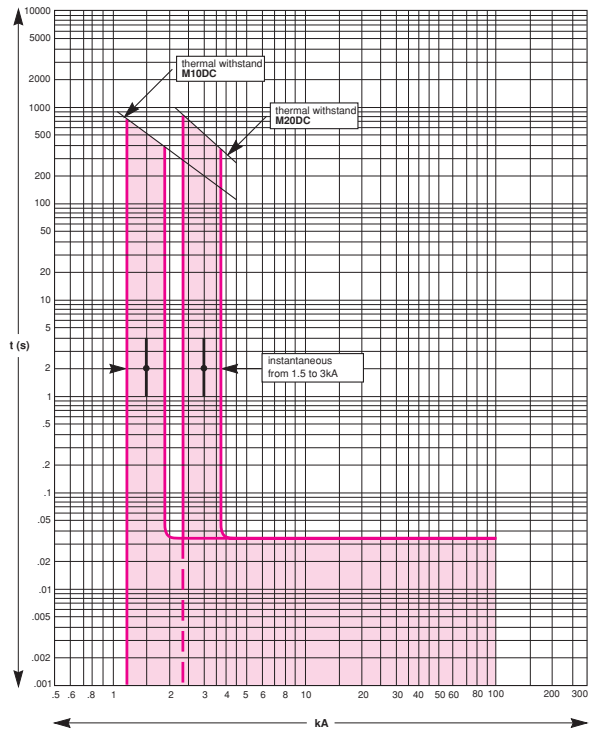
Current rating (A) as a function ambient temperature (°C)

Masterpact			**M08N/H/L**	**M10N/H/L**	**M12N**	**M12H**	**M12L**	**M16N/H**	**M16L**	**M20N/H**	**M20L**	**M25N/H**	**M25L**	**M32H**	**M40H**	**M50H**	**M63H**
Version	connection	T °C															
Drawout	front or rear horizontal	40	800	1 000	1 250	1 250	1 250	1 600	1 600	2 000	2 000	2 500	2 500	3 150	3 800	5 000	6 000
		45	800	1 000	1 250	1 250	1 250	1 600	1 600	2 000	2 000	2 500	2 350	3 080	3 650	4 750	5 700
		50	800	1 000	1 250	1 250	1 250	1 600	1 600	2 000	2 000	2 430	2 250	3 000	3 500	4 500	5 400
		55	800	1 000	1 250	1 250	1 250	1 600	1 600	2 000	2 000	2 350	2 150	2 900	3 300	4 250	5 100
		60	800	1 000	1 200	1 250	1 250	1 550	1 500	1 900	1 900	2 250	2 000	2 800	3 100	4 000	4 800
	rear vertical	40	800	1 000	1 250	1 250	1 250	1 600	1 600	2 000	2 000	2 500	2 500	3 200	4 000	5 000	6 300
		45	800	1 000	1 250	1 250	1 250	1 600	1 600	2 000	2 000	2 500	2 500	3 200	3 800	5 000	6 000
		50	800	1 000	1 250	1 250	1 250	1 600	1 600	2 000	2 000	2 500	2 500	3 100	3 600	5 000	5 700
		55	800	1 000	1 250	1 250	1 250	1 600	1 600	2 000	2 000	2 500	2 350	3 000	3 400	5 000	5 400
		60	800	1 000	1 250	1 250	1 250	1 550	1 600	1 900	1 900	2 400	2 200	2 900	3 200	4 700	5 100
Fixed	front or rear horizontal	40	800	1 000	1 250	1 250	1 250	1 600	1 600	2 000	2 000	2 500	2 500	3 200	4 000	5 000	–
		45	800	1 000	1 250	1 250	1 250	1 600	1 600	2 000	2 000	2 500	2 500	3 200	4 000	5 000	–
		50	800	1 000	1 250	1 250	1 250	1 600	1 600	2 000	2 000	2 500	2 500	3 200	4 000	5 000	–
		55	800	1 000	1 250	1 250	1 250	1 600	1 600	2 000	2 000	2 500	2 500	3 200	3 900	5 000	–
		60	800	1 000	1 250	1 250	1 250	1 600	1 600	2 000	2 000	2 500	2 300	3 100	3 800	5 000	–
	rear vertical	40	800	1 000	1 250	1 250	1 250	1 600	1 600	2 000	2 000	2 500	2 500	3 200	4 000	5 000	–
		45	800	1 000	1 250	1 250	1 250	1 600	1 600	2 000	2 000	2 500	2 500	3 200	4 000	5 000	–
		50	800	1 000	1 250	1 250	1 250	1 600	1 600	2 000	2 000	2 500	2 500	3 200	4 000	5 000	–
		55	800	1 000	1 250	1 250	1 250	1 600	1 600	2 000	2 000	2 500	2 500	3 200	4 000	5 000	–
		60	800	1 000	1 250	1 250	1 250	1 600	1 600	2 000	2 000	2 500	2 500	3 100	3 900	5 000	–
Power dissipation and resistance between inputs/outputs																	
Power(1)	drawout		160	250	360	230	360	390	460	365	500	520	780	803	1 250	1 150	1 200
Dissipated (W)	fixed		66	103	150	100	150	170	220	180	250	260	390	500	780	700	–
Input/output(2)	drawout		53	53	53	32	50	32	31	18	23	17	23	15	15	9	9
Resistance (μΩ)	fixed		33	33	33	16	36	16	12	9	10	8	10	10	10	8	–

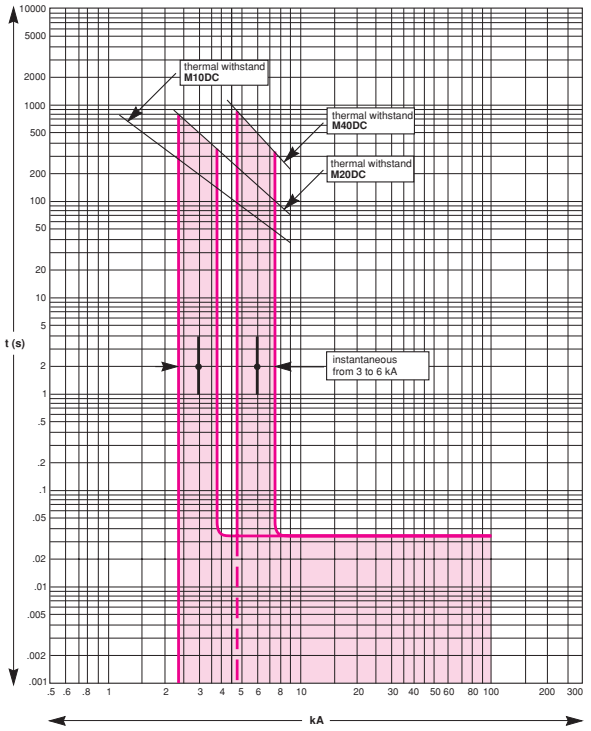
(1) Values measured at In, 50/60 Hz for a 3-pole or 4-pole breaker.
(2) Values measured per pole.

DINA trip units

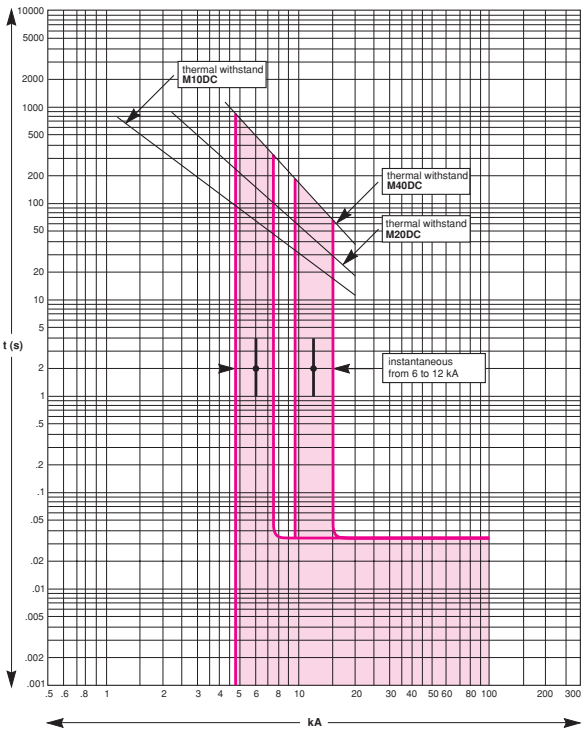
Adjustable from 1.5 to 3 kA



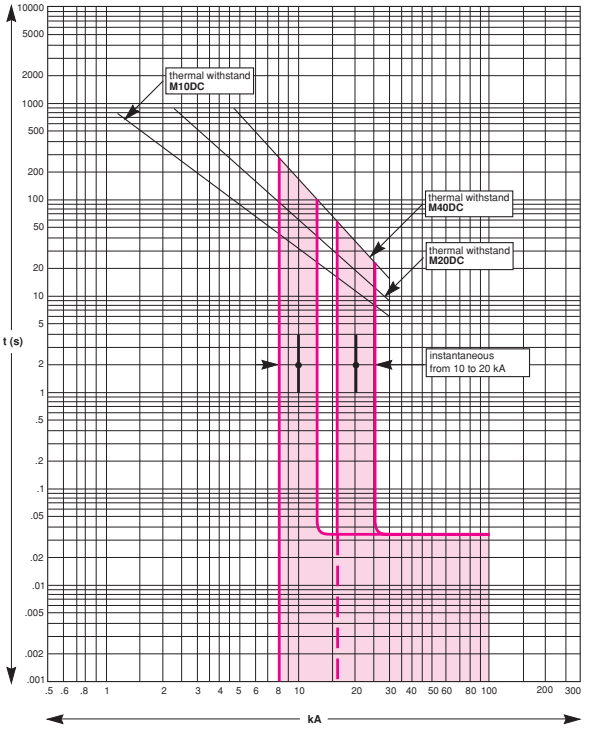
Adjustable from 3 to 6 kA



Adjustable from 6 to 12 kA

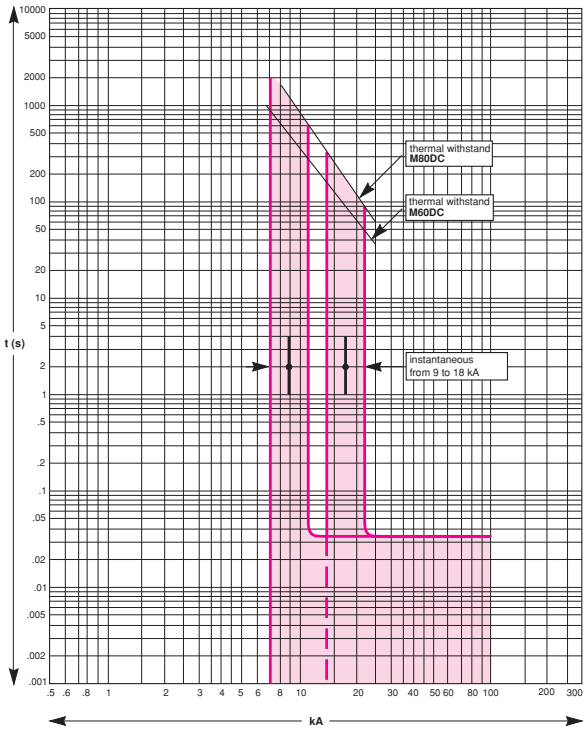


Adjustable from 10 to 20 kA

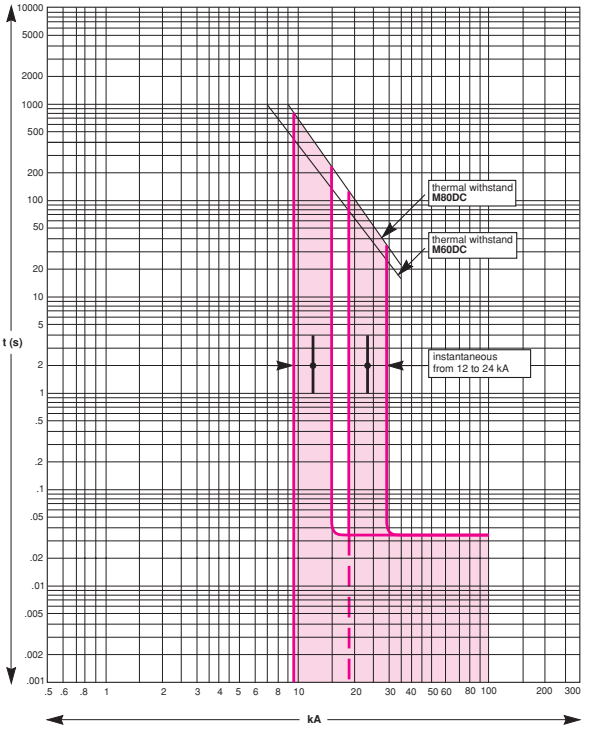


Tripping curves (DC range)

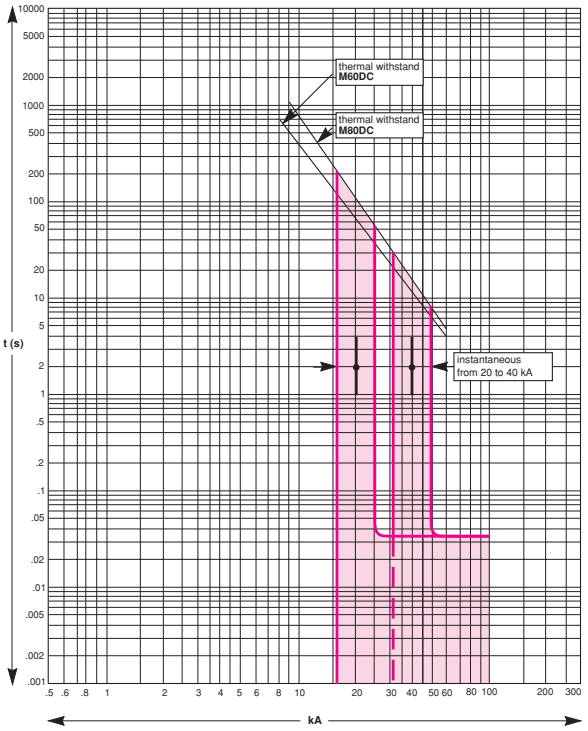
Adjustable from 9 to 18 kA



Adjustable from 12 to 24 kA



Adjustable from 20 to 40 kA



Effect of ambient temperature (DC range)

The tables below indicate derating values for Masterpact DC circuit breakers depending on the ambient temperature around the device.

Fixed circuit breaker: maximum operational current (A)

Masterpact Type		M10DC D, E, F, H, J	M20DC D, E, F, H, J	M40DC D	M40DC E, F	M40DC H	M40DC J
amb. temp. (°C)	40	1000	2000	4000	4000	3600	3500
	45	1000	2000	4000	3860	3450	3360
	50	1000	2000	3900	3750	3280	3200
	55	1000	2000	3780	3630	3110	3040
	60	1000	2000	3660	3520	2940	2860
	65	1000	2000	3530	3400	2760	2690

Drawout circuit breaker: maximum operational current (A)

Masterpact Type		M10DC D, E, F, H, J	M20DC D, E, F, H, J	M40DC D	M40DC E, F	M40DC H	M40DC J	M60DC G	M80DC G
amb. temp. (°C)	40	1000	2000	4000	4000	3600	3500	6000	8000
	45	1000	2000	4000	3860	3450	3360	6000	8000
	50	1000	2000	3900	3750	3280	3200	6000	8000
	55	1000	2000	3780	3630	3110	3040	6000	8000
	60	1000	2000	3660	3520	2940	2860	6000	8000
	65	1000	2000	3530	3400	2760	2690	6000	8000

Section 7

LV air circuit breakers and switch-disconnectors

Masterpact 80 to 6300 Amp

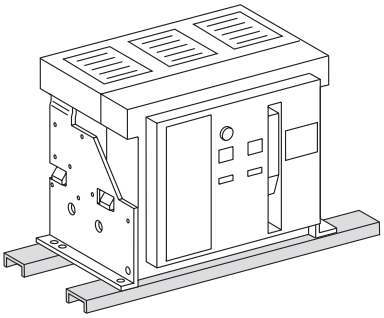
Installation and connection details

General

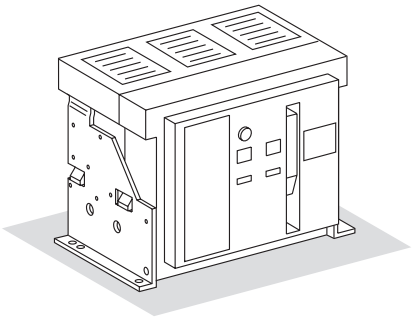
Installation

Masterpact circuit breakers must be installed in the vertical position on a base plate or on rails.

Fixed circuit breaker (M08 to M50)



Installation on rails

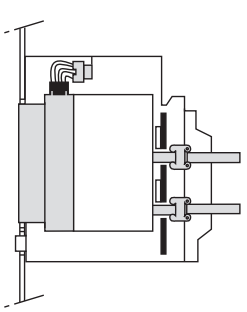


Installation on a metal base plate

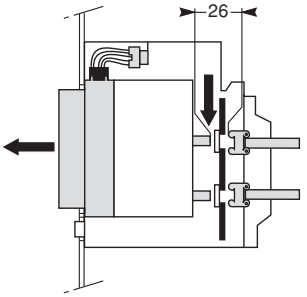
Drawout circuit breaker (M08 to M63)

The drawout version makes it possible to:

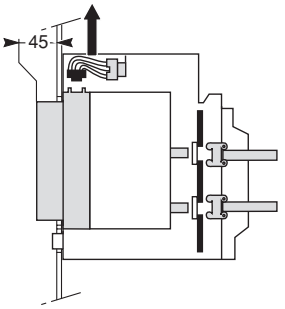
- Rapidly remove and/or replace the circuit breaker without having to disconnect the main busbar connections.
- Install spare outgoing ways in a switchboard that will then be suitable to receive the necessary circuit breakers at a later date without modification.



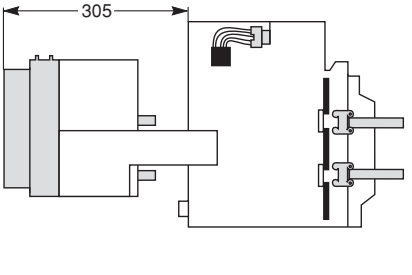
"Connected" position



"Test" position
ample clearance between contacts



"Disconnected" position
easy withdrawal, short travel



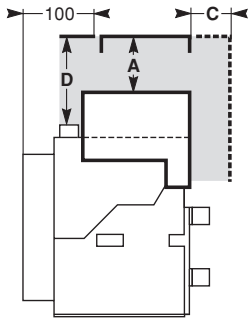
"Withdrawn" position
compact dimensions

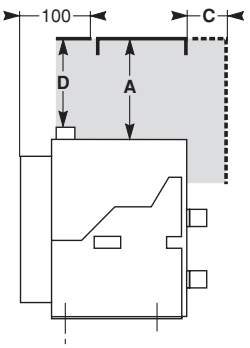
Safety clearance (AC range)

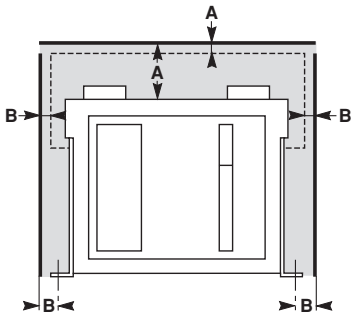
Certain distances must be maintained between a circuit breaker and other elements such as earthed metal, busbars and other circuit breakers. Taken together, these distances form the safety clearance for the circuit breaker. The diagrams and the table below indicate the required distances when installing Masterpact circuit breakers.

These distances are the results of tests carried out in accordance with standard IEC 947-2 and are in part determined by the ultimate breaking capacities.

Fixed circuit breaker



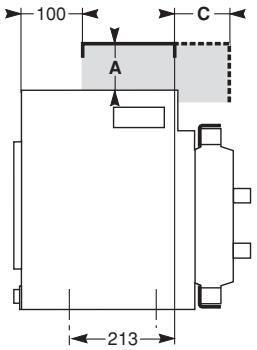


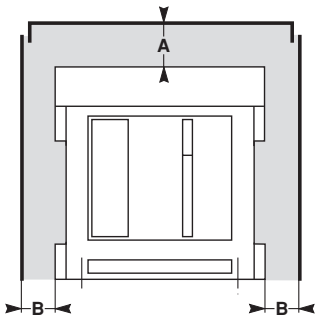


Masterpact M08 to M50

Type of connection	to insulated barrier				to metal parts				To live bars			
	A	B	C	D (2)	A	B	C	D (2)	A	B	C	D (2)
Front connection without cover (1)	360	30	0	0	360	70	–	0	1085	420	–	0
Rear connection without cover	150	30	20	0	250	70	95	0	1085	420	495	0
Rear connection with cover	0	0	20	0	0	0	95	–	145	105	125	0

Drawout circuit breaker





Masterpact M08 to M63

Type of connection	To insulated barrier			To metal parts			To live bars		
	A	B	C	A	B	C	A	B	C
Front connection without cover (1)	300	15	0	300	50	–	1000	400	–
Rear connection without cover	150	15	45	150	50	45	1000	400	445
Rear connection with cover	0	0	45	0	0	45	60	85	75

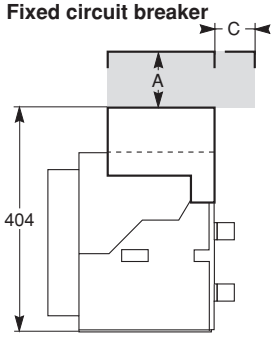
(1) Shield compulsary with front connections.
(2) D is the clearance required for connection of auxiliaries.
D = 0 for fixed circuit breakers (required clearance included in the height of the connection plugs).
D = 0 for drawout circuit breakers as well.

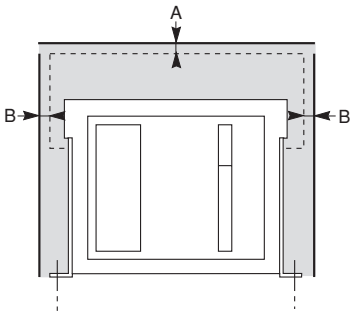
Note: For the fixed circuit breakers, a clearance of 130 mm is required on top for removal of the arc chutes.

Safety clearance (DC range)

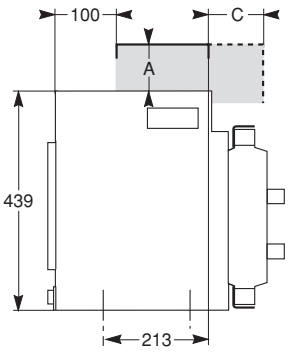
Certain distances must be maintained between a circuit breaker and other elements such as earthed metal, busbars and other circuit breakers. Taken together, these distances form the safety clearance for the circuit breaker. The diagrams and the table below indicate the required distances when installing Masterpact DC circuit breakers. These distances are the results of tests carried out in accordance with standard
IEC 947-2 and are in part determined by the ultimate breaking capacities.

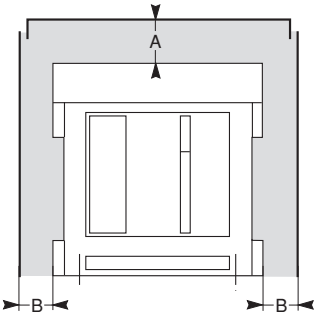
Fixed circuit breaker





Drawout circuit breaker



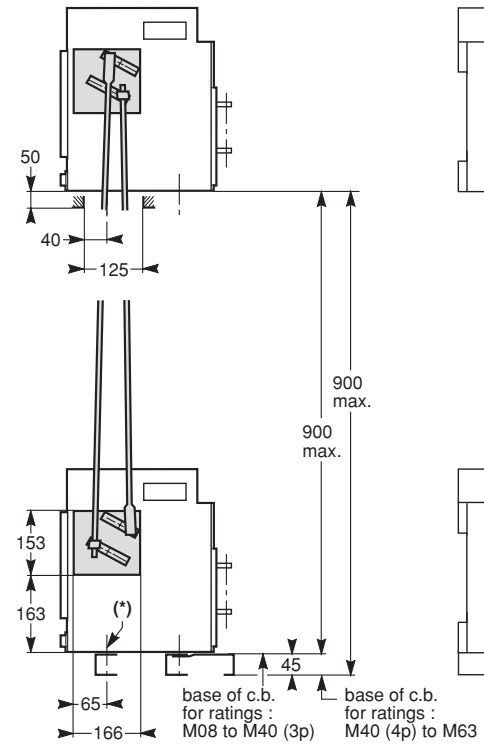


Version	distance (mm)	To insulated barrier A	B	C	To metal parts A	B	C
Fixed		0	0	20	0	0	95
Drawout		0	0	45	0	0	45

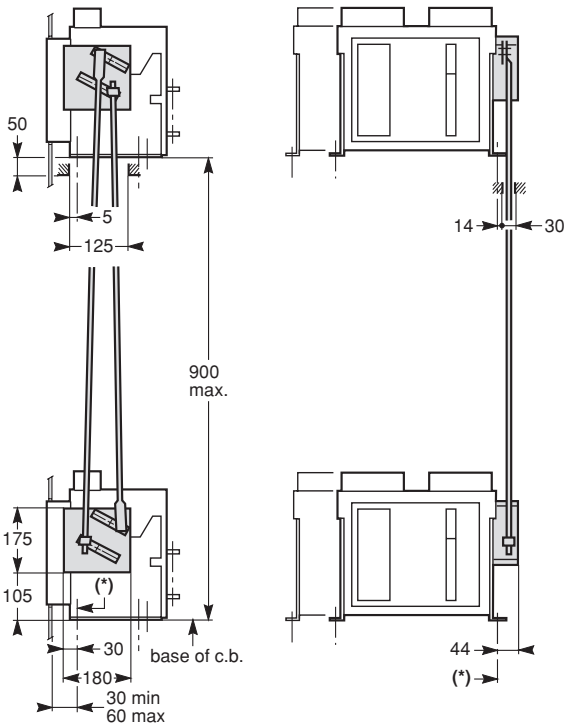
Source-changeover system

Interlocking by connecting rods for 2 stack-mounted breakers

drawout pattern, 3 or 4 poles

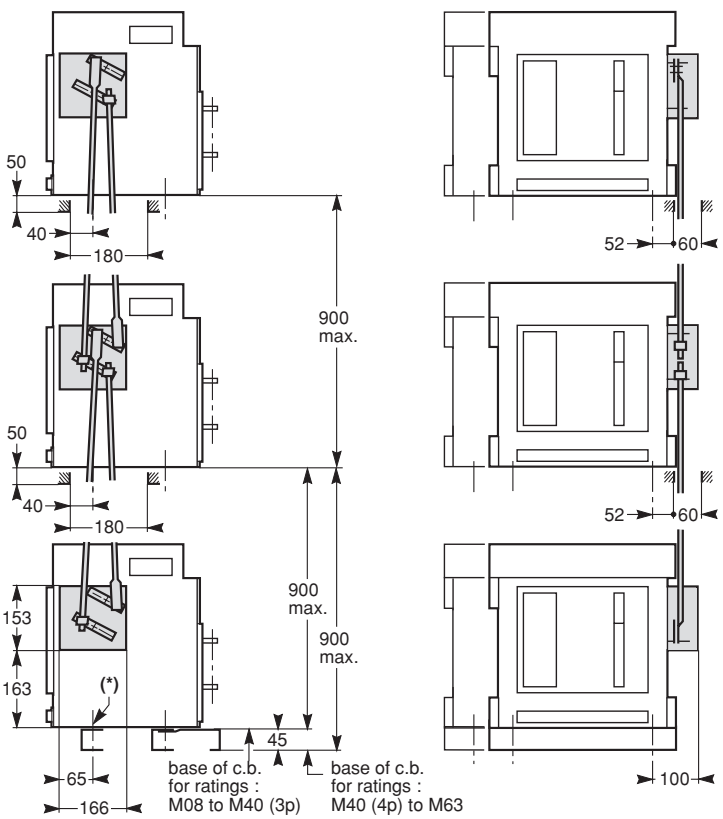


Fixed pattern, 3 or 4 poles

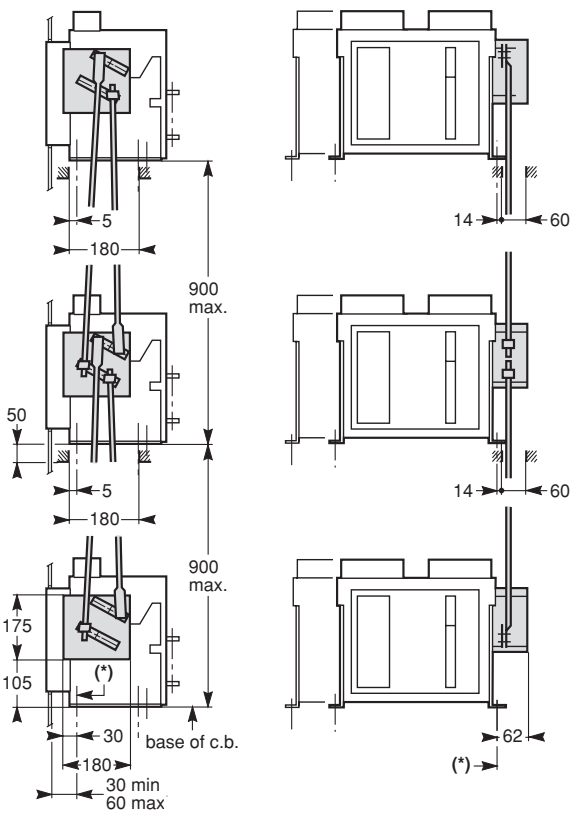


Interlocking by connecting rods for 3 stack-mounted breakers

drawout pattern, 3 or 4 poles



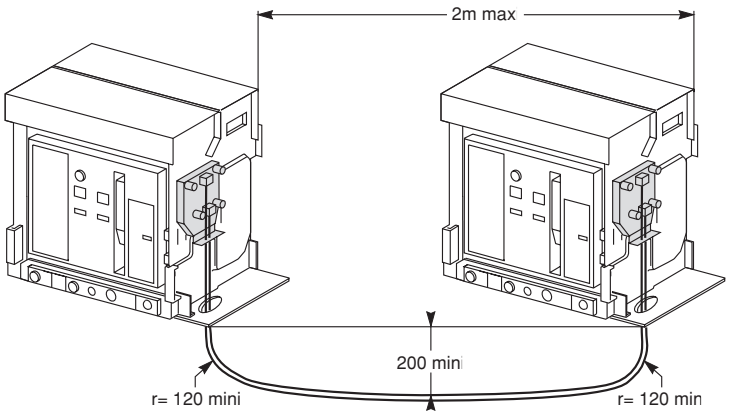
Fixed pattern, 3 or 4 poles



Manual and automatic source changeover systems

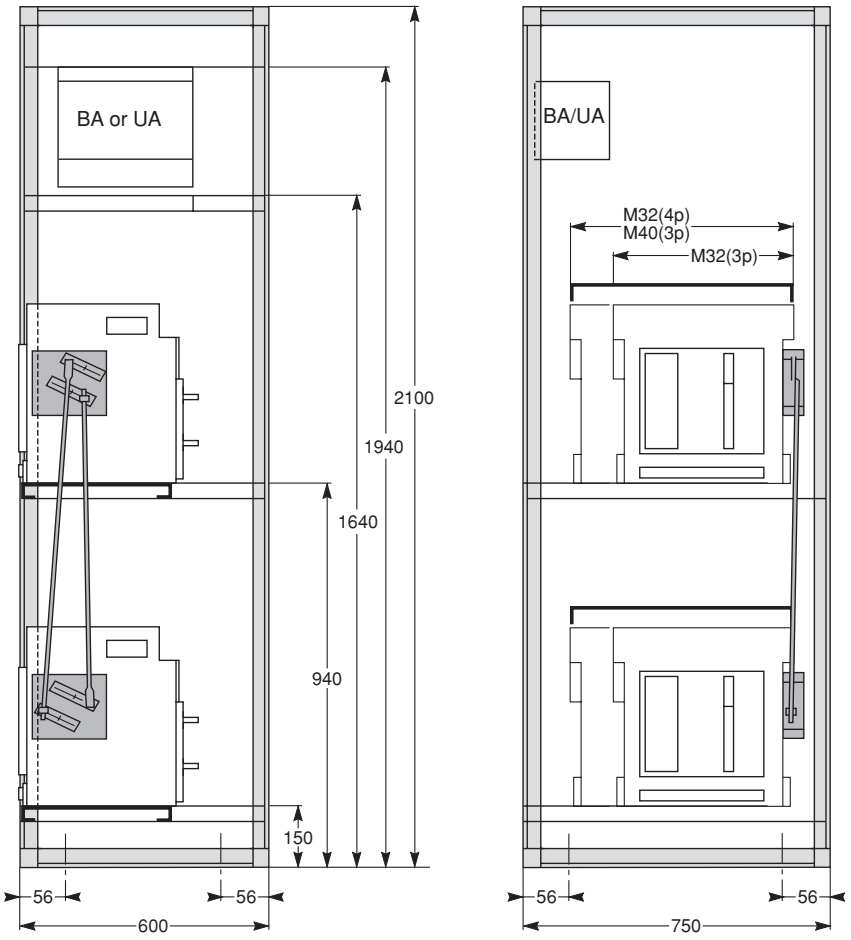
Manual source changeover system

Interlocking by cables for 2 side-by-side breakers
fixed or drawout patterns 3 or 4 poles



Automatic source changeover system

Mounted on frame



(*) Datum

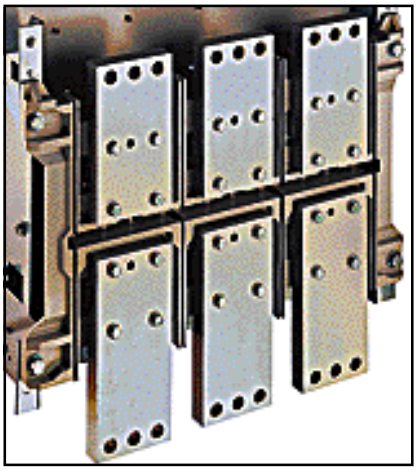
General

Four types of connection are possible:

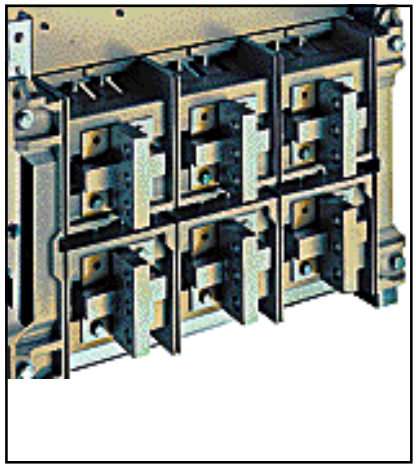
- Rear horizontal;
- Rear vertical;
- Front;
- Mixed.

The terminals are sized to allow circuit breaker connection with bars up to a thickness of 20 mm (except for the M40, M50 and M63).

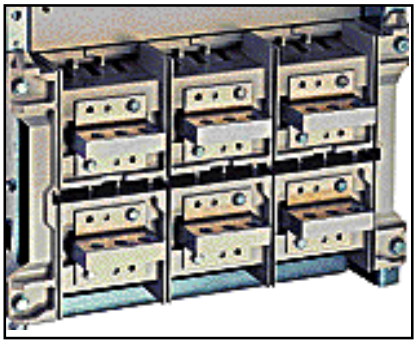
Conductor materials
The terminals of Masterpact circuit breakers can be used to connect bare copper, tinned copper or tinned aluminium conductors without any special surface treatment.



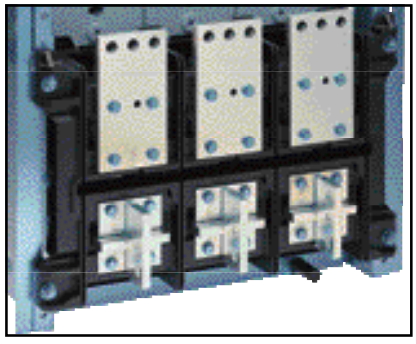
Front connection



Rear vertical connection



Rear horizontal connection



Mixed connection.
Upper terminals: front connection.
Bottom terminals: vertical connection.

Electrodynamic forces

- The first set of busbar supports must be located at a certain distance from the circuit breaker connection point;
- This maximum distance must be respected to withstand the electrodynamic forces that are applied between the bars during a short-circuit.

Maximum distance between circuit breaker connection point and the first set of busbar supports for various short-circuit currents

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

General

Connection selection table

Note:

The indicated values come from tests and theoretical calculations made for the parameters given below. These tables are intended to serve as a general guide for connection design and not to replace experience acquired for a certain type of connection or the need for subsequent tests.

Parameters used in establishing the tables

- Maximum admissible bar temperature: 100 °C;
- Temperature in the switchboard around the circuit breaker and its connections: T_a;
- Copper busbars.

Example

Data:

- Drawout circuit breaker;
- Flat busbars;
- Temperature: T_a = 50 °C;
- Operating current: 1800 A.

Solution:

For T_a = 50 °C; table 2 indicates an M20 circuit breaker connected either with three 80 x 5 mm bars or two 63 x 10 mm bars.

Drawout circuit breakers

drawout circuit breakers, edgewise bars

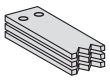
Maximum current	T_a = 40 °C			T_a = 50 °C			T_a = 60°C		
	Masterpact	Number of bars		Masterpact	Number of bars		Masterpact	Number of bars	
		5 thick bars	10 thick bars		5 thick bars	10 thick bars		5 thick bars	10 thick bars
800	**M08**	2b.50 x 5	1b.50 x 10	**M08**	2b.50 x 5	1b.50 x 10	**M08**	2b.50 x 5	1b.50 x 10
1000	**M10**	2b.50 x 5	1b.50 x 10	**M10**	2b.50 x 5	1b.50 x 10	**M10**	2b.63 x 5	1b.63 x 10
1250	**M12**	2b.63 x 5	1b.63 x 10	**M12**	2b.63 x 5	1b.63 x 10	**M12**	3b.50 x 5	2b.50 x 10
1400	**M16**	2b.63 x 5	1b.63 x 10	**M16**	2b.63 x 5	1b.63 x 10	**M16**	3b.50 x 5	2b.50 x 10
1600	**M16**	2b.80 x 5	1b.80 x 10	**M16**	2b.80 x 5	1b.80 x 10	**M20**	3b.63 x 5	2b.50 x 10
1800	**M20**	2b.80 x 5	1b.80 x 10	**M20**	2b.80 x 5	2b.50 x 10	**M20**	3b.80 x 5	2b.63 x 10
2000	**M20**	2b.100 x 5	2b.63 x 10	**M20**	2b.100 x 5	2b.63 x 10	**M25**	3b.100 x 5	2b.80 x 10
2200	**M25**	2b.100 x 5	2b.63 x 10	**M25**	2b.100 x 5	2b.63 x 10	**M25**	3b.100 x 5	2b.80 x 10
2500	**M25**	4b.80 x 5	2b.80 x 10	**M25**	4b.80 x 5	2b.80 x 10	**M32**	4b.100 x 5	3b.80 x 10
2800	**M32**	4b.100 x 5	2b.100 x 10	**M32**	4b.100 x 5	2b.100 x 10	**M32**	4b.100 x 5	3b.80 x 10
3000	**M32**	5b.100 x 5	3b.80 x 10	**M32**	6b.100 x 5	3b.100 x 10	**M40**		3b.100 x 10
3200	**M32**	6b.100 x 5	3b.100 x 10	**M40**		3b.100 x 10	**M40**		4b.100 x 10
3600	**M40**		4b.100 x 10	**M40**		4b.100 x 10	**M50**		4b.100 x 10
4000	**M40**		4b.100 x 10	**M50**		4b.100 x 10	**M50**		5b.100 x 10
4700	**M50**		5b.100 x 10	**M50**		5b.100 x 10	**M50**		5b.100 x 10
5000	**M50**		5b.100 x 10	**M50**		5b.100 x 10	**M63**		6b.100 x 10
5100	**M63**		5b.100 x 10	**M63**		6b.100 x 10	**M63**		6b.100 x 10
5700	**M63**		6b.100 x 10	**M63**		6b.100 x 10			
6300	**M63**		6b.100 x 10						

Fixed circuit breakers

Fixed circuit breakers, edgewise bars

Maximum current	T_a = 40 °C			T_a = 50 °C			T_a = 60°C		
	Masterpact	Number of bars		Masterpact	Number of bars		Masterpact	Number of bars	
		5 thick bars	10 thick bars		5 thick bars	10 thick bars		5 thick bars	10 thick bars
800	**M08**	2b.50 x 5	1b.50 x 10	**M08**	2b.50 x 5	1b.50 x 10	**M08**	2b.50 x 5	1b.50 x 10
1000	**M10**	2b.50 x 5	1b.50 x 10	**M10**	2b.50 x 5	1b.50 x 10	**M10**	2b.63 x 5	1b.63 x 10
1250	**M12**	2b.63 x 5	1b.63 x 10	**M12**	2b.63 x 5	1b.63 x 10	**M12**	3b.50 x 5	2b.50 x 10
1400	**M16**	2b.63 x 5	1b.63 x 10	**M16**	2b.63 x 5	1b.63 x 10	**M16**	3b.50 x 5	2b.50 x 10
1600	**M16**	2b.80 x 5	1b.80 x 10	**M16**	2b.80 x 5	1b.80 x 10	**M16**	3b.63 x 5	2b.50 x 10
1800	**M20**	2b.80 x 5	1b.80 x 10	**M20**	2b.80 x 5	2b.50 x 10	**M20**	3b.80 x 5	2b.63 x 10
2000	**M20**	2b.100 x 5	2b.63 x 10	**M20**	2b.100 x 5	2b.63 x 10	**M20**	3b.100 x 5	2b.80 x 10
2200	**M25**	2b.100 x 5	2b.63 x 10	**M25**	2b.100 x 5	2b.63 x 10	**M25**	3b.100 x 5	2b.80 x 10
2500	**M25**	4b.80 x 5	2b.80 x 10	**M25**	4b.80 x 5	2b.80 x 10	**M25**	4b.100 x 5	3b.80 x 10
2800	**M32**	4b.100 x 5	2b.100 x 10	**M32**	4b.100 x 5	2b.100 x 10	**M32**	4b.100 x 5	3b.80 x 10
3000	**M32**	5b.100 x 5	3b.80 x 10	**M32**	6b.100 x 5	3b.100 x 10	**M32**		4b.80 x 10
3200	**M32**	6b.100 x 5	3b.100 x 10	**M32**	6b.100 x 5	3b.100 x 10	**M40**		4b.100 x 10
3600	**M40**		4b.100 x 10	**M40**		4b.100 x 10	**M40**		4b.100 x 10
4000	**M40**		4b.100 x 10	**M40**		4b.100 x 10	**M50**		5b.100 x 10
4500	**M50**		5b.100 x 10	**M50**		5b.100 x 10	**M50**		5b.100 x 10
5000	**M50**		5b.100 x 10	**M50**		5b.100 x 10	**M50**		6b.100 x 10

Drawout circuit breakers

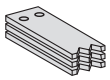


Drawout circuit breakers, flat bars

Maximum current	T_a = 40 °C			T_a = 50 °C			T_a = 60°C		
	Masterpact	Number of bars		Masterpact	Number of bars		Masterpact	Number of bars	
		5 thick bars	10 thick bars		5 thick bars	10 thick bars		5 thick bars	10 thick bars
800	**M08**	2b.50 x 5	1b.50 x 10	**M08**	2b.50 x 5	1b.50 x 10	**M08**	2b.50 x 5	2b.50 x 10
1000	**M10**	3b.50 x 5	1b.63 x 10	**M10**	3b.50 x 5	2b.50 x 10	**M10**	3b.63 x 5	2b.50 x 10
1250	**M12**	3b.50 x 5	2b.50 x 10	**M12**	3b.50 x 5	2b.50 x 10	**M12 (1)**	3b.63 x 5	2b.50 x 10
1250	**M12**	2b.80 x 5	2b.50 x 10	**M12**	2b.80 x 5	2b.50 x 10	**M16**	3b.63 x 5	2b.50 x 10
1400	**M16**	3b.50 x 5	2b.50 x 10	**M16**	2b.80 x 5	2b.50 x 10	**M16**	3b.80 x 5	2b.63 x 10
1600	**M16**	3b.63 x 5	2b.50 x 10	**M16**	3b.80 x 5	2b.63 x 10	**M20**	3b.80 x 5	3b.50 x 10
1800	**M20**	3b.80 x 5	2b.63 x 10	**M20**	3b.80 x 5	2b.63 x 10	**M20**	3b.100 x 5	2b.80 x 10
2000	**M20**	3b.100 x 5	2b.80 x 10	**M20**	3b.100 x 5	2b.80 x 10	**M25**	3b.100 x 5	3b.63 x 10
2200	**M25**	3b.100 x 5	2b.80 x 10	**M25**	3b.100 x 5	2b.80 x 10	**M25 (2)**	4b.80 x 5	2b.100 x 10
2500	**M25**	4b.100 x 5	2b.100 x 10	**M32**	4b.100 x 5	2b.100 x 10	**M32**	4b.100 x 5	3b.80 x 10
2800	**M32**	4b.100 x 5	3b.80 x 10	**M32**	4b.100 x 5	3b.80 x 10	**M32**	5b.100 x 5	3b.100 x 10
3000	**M32**	5b.100 x 5	3b.80 x 10	**M32**	6b.100 x 5	3b.100 x 10	**M40**	8b.100 x 5	3b.100 x 10
3100/3150	**M32**	6b.100 x 5	3b.100 x 10	**M40**	8b.100 x 5	3b.100 x 10	**M40**	10b.100 x 5	4b.100 x 10
3500	**M40**	8b.100 x 5	4b.100 x 10	**M40**	8b.100 x 5	4b.100 x 10	**M50**	10b.100 x 5	5b.100 x 10
3800	**M40**	8b.100 x 5	4b.100 x 10	**M50**	10b.100 x 5	5b.100 x 10	**M50**	10b.100 x 5	5b.100 x 10
4000	**M50**	10b.100 x 5	5b.100 x 10	**M50**	10b.100 x 5	5b.100 x 10	**M50**	10b.125 x 5	5b.100 x 10
4500	**M50**	10b.100 x 5	5b.100 x 10	**M50**	10b.100 x 5	5b.100 x 10	**M63**	10b.125 x 5	6b.100 x 10
4800	**M50**	10b.100 x 5	5b.100 x 10	**M63**	10b.125 x 5	6b.100 x 10	**M63**	10b.125 x 5	6b.100 x 10
5000	**M50**	10b.100 x 5	5b.100 x 10	**M63**	10b.125 x 5	6b.100 x 10			
5400	**M63**	10b.125 x 5	6b.100 x 10	**M63**	10b.125 x 5	6b.100 x 10			
6000	**M63**	10b.125 x 5	6b.100 x 10						

(1) Except for M12N.
(2) Except for M25L.

Fixed circuit breakers



Fixed circuit breakers, flat bars

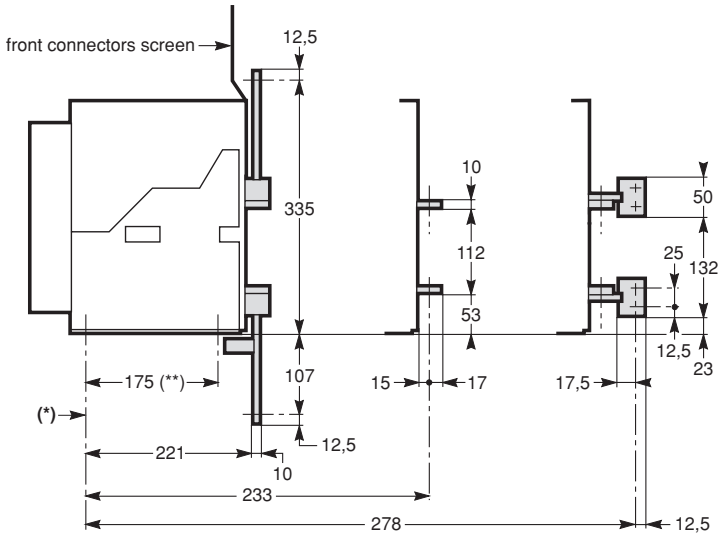
Maximum current	T_a = 40 °C			T_a = 50 °C			T_a = 60°C		
	Masterpact	Number of bars		Masterpact	Number of bars		Masterpact	Number of bars	
		5 thick bars	10 thick bars		5 thick bars	10 thick bars		5 thick bars	10 thick bars
800	**M08**	2b.50 x 5	1b.50 x 10	**M08**	2b.50 x 5	1b.50 x 10	**M08**	2b.50 x 5	2b.50 x 10
1000	**M10**	3b.50 x 5	1b.63 x 10	**M10**	3b.50 x 5	2b.50 x 10	**M10**	3b.63 x 5	2b.50 x 10
1250	**M12**	3b.50 x 5	2b.40 x 10	**M12**	3b.50 x 5	2b.40 x 10	**M12**	3b.63 x 5	2b.50 x 10
1250	**M12**	2b.80 x 5	2b.40 x 10	**M12**	2b.80 x 5	2b.40 x 10			
1400	**M16**	3b.50 x 5	2b.40 x 10	**M16**	2b.80 x 5	2b.50 x 10	**M16**	3b.80 x 5	2b.63 x 10
1600	**M16**	3b.63 x 5	2b.50 x 10	**M16**	3b.80 x 5	2b.63 x 10	**M16**	3b.80x 5	3b.50 x 10
1800	**M20**	3b.80 x 5	2b.63 x 10	**M20**	3b.80 x 5	2b.63 x 10	**M20**	3b.100 x 5	2b.80 x 10
2000	**M20**	3b.100 x 5	2b.80 x 10	**M20**	3b.100 x 5	2b.80 x 10	**M20**	3b.100 x 5	3b.63 x 10
2200	**M25**	3b.100 x 5	2b.80 x 10	**M25**	3b.100 x 5	2b.80 x 10	**M25**	4b.80 x 5	2b.100 x 10
2500	**M25**	4b.100 x 5	2b.100 x 10	**M25**	4b.100 x 5	2b.100 x 10	**M25**	4b.100 x 5	3b.80 x 10
2800	**M32**	4b.100 x 5	3b.80 x 10	**M32**	4b.100 x 5	3b.80 x 10	**M32**	5b.100 x 5	3b.100 x 10
3000	**M32**	5b.100 x 5	3b.80 x 10	**M32**	6b.100 x 5	3b.100 x 10	**M32**	8b.100 x 5	4b.80 x 10
3200	**M32**	6b.100 x 5	3b.100 x 10	**M32**	8b.100 x 5	3b.100 x 10	**M40**		4b.100 x 10
3800	**M40**		4b.100 x 10	**M40**		5b.100 x 10	**M40**		5b.100 x 10
4000	**M40**		5b.100 x 10	**M40**		5b.100 x 10	**M50**		5b.100 x 10
4500	**M50**		5b.100 x 10	**M50**		5b.100 x 10	**M50**		5b.100 x 10
5000	**M50**		5b.100 x 10	**M50**		5b.100 x 10			

Fixed and drawout circuit breakers (AC range)
M08H,L/M10H,L/M12H,L/M16,H,L

Fixed circuit breaker

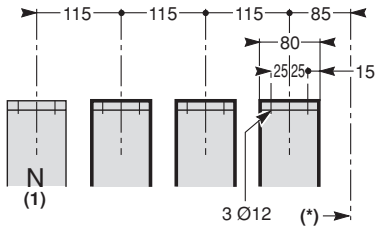
Front connection

Rear connection
horizontal terminals vertical terminals

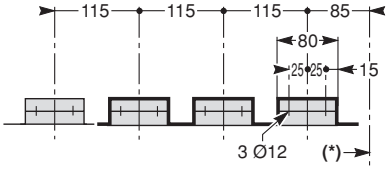


(*) Datum.
(**) Hole for securing front connection support bracket.
(1) On request, neutral on the right.

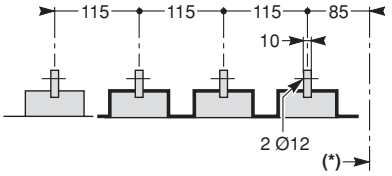
Front connection



Rear connection
Horizontal terminals



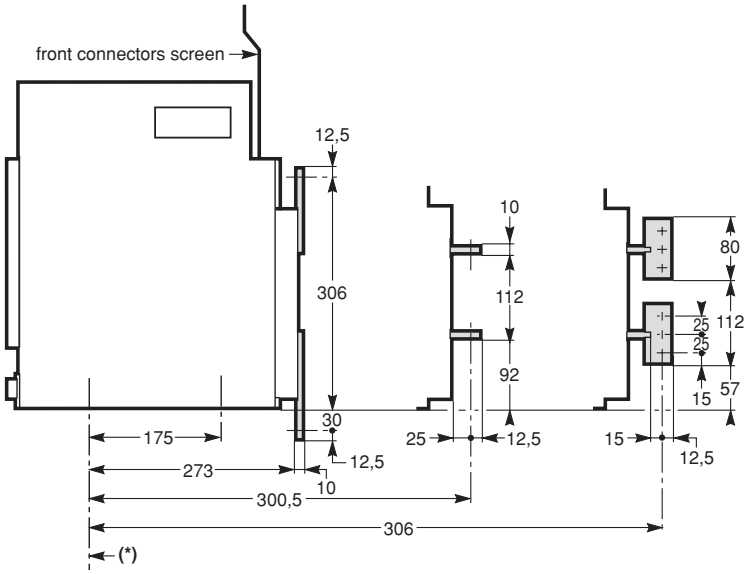
Vertical terminals



Drawout circuit breaker

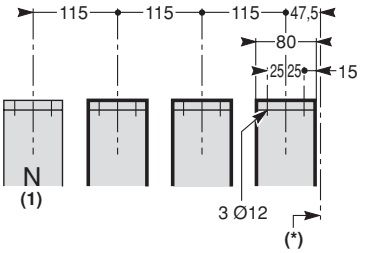
Front connection

Rear connection
Horizontal terminals vertical terminals

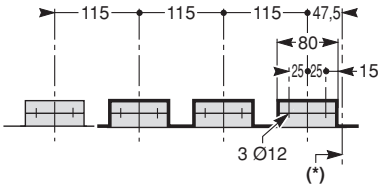


(*) Datum.
(1) On request, neutral on the right.

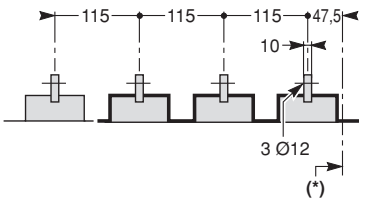
Front connection



Rear connection
horizontal terminals



Vertical terminals

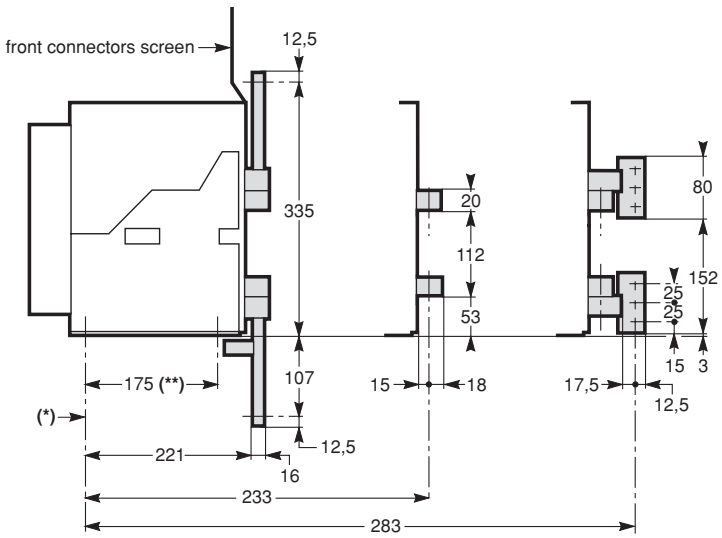


Fixed and drawout circuit breakers (AC range)
M20,H/M25,H

Fixed circuit breaker

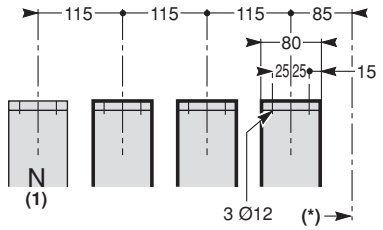
Front connection

Rear connection
Horizontal terminals vertical terminals

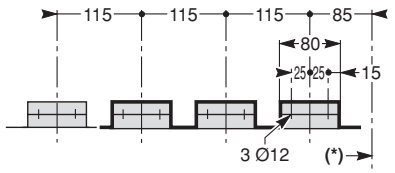


(*) Datum.
(**) Hole for securing front connection support bracket.
(1) On request, neutral on the right.

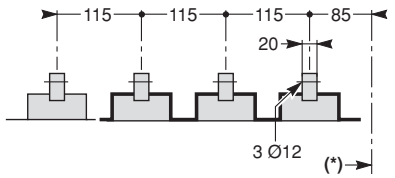
Front connection



Rear connection
Horizontal terminals



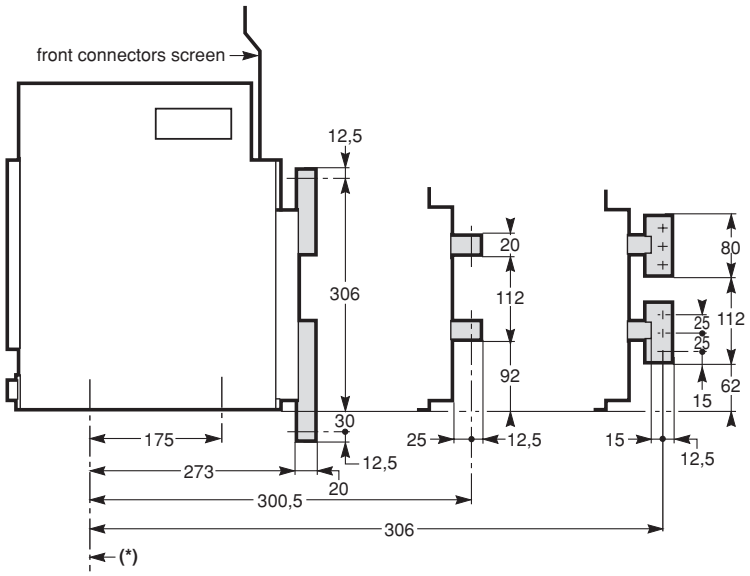
Vertical terminals



Drawout circuit breaker

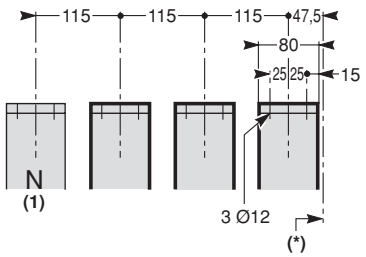
Front connection

Rear connection
horizontal terminals vertical terminals

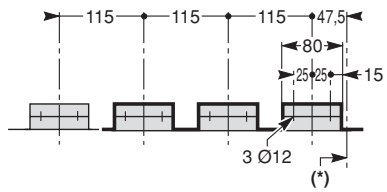


(*) Datum.
(1) On request, neutral on the right.

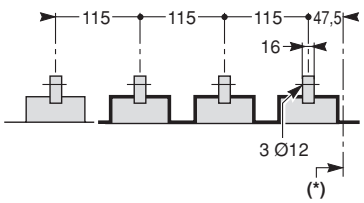
Front connection



Rear connection
Horizontal terminals



Vertical terminals



Masterpact: Connection details

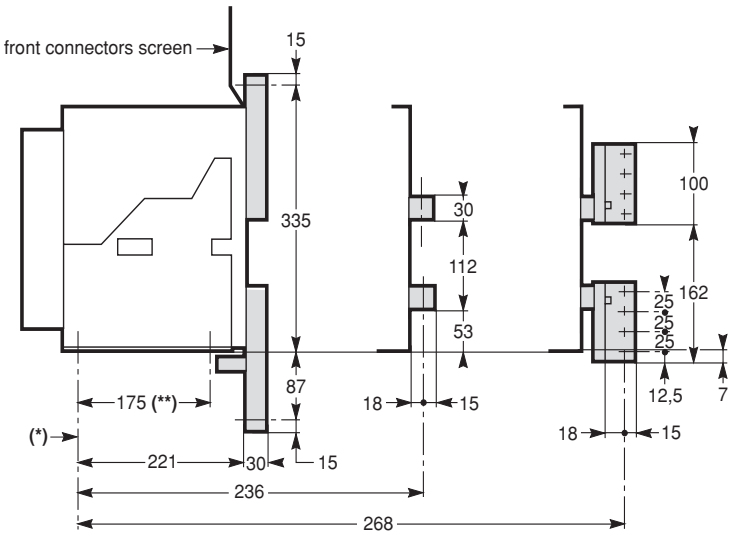
Fixed and drawout circuit breakers (AC range) M20L/M25L/M32H

Fixed circuit breaker

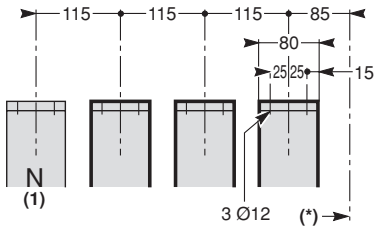
Front connection

Rear connection

Horizontal terminals Vertical terminals

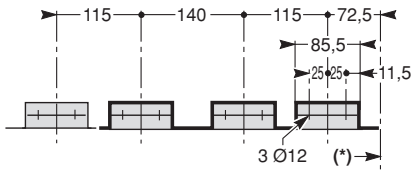


Front connection

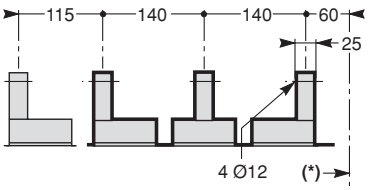


Rear connection

Horizontal terminals



Vertical terminals

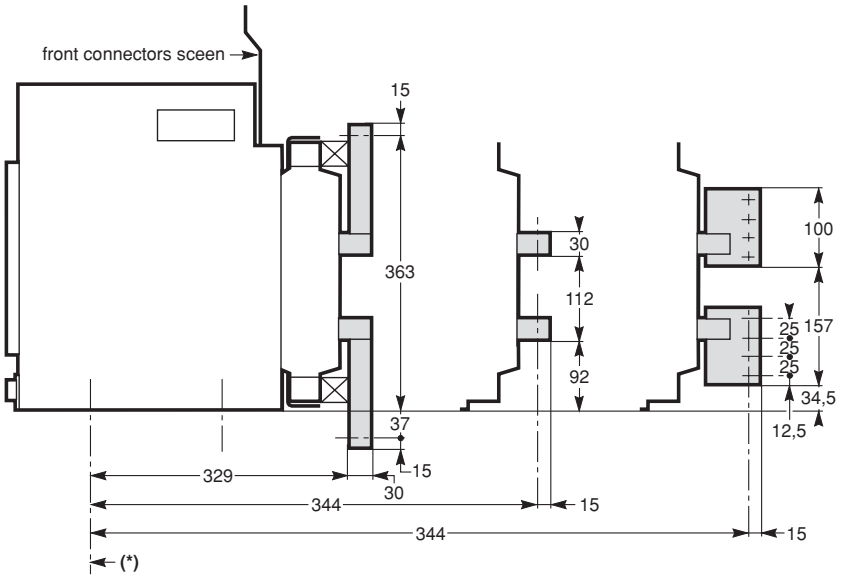


Drawout circuit breaker

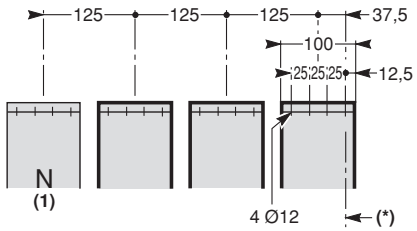
Front connection

Rear connection

Horizontal terminals Vertical terminals

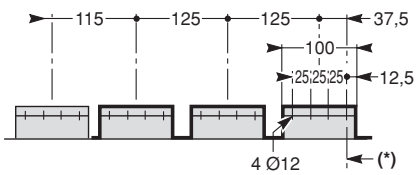


Front connection

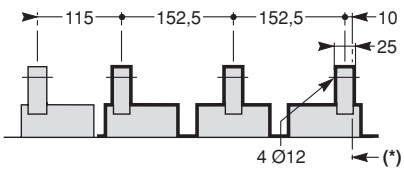


Rear connection

Horizontal terminals



Vertical terminals



(*) Datum.

(**) Hole for securing front connection support bracket.

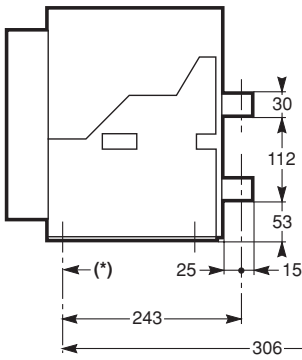
(1) On request, neutral on the right.

Fixed and drawout circuit breaker (AC range)
M40

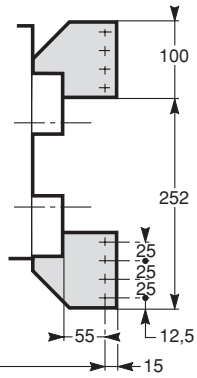
Fixed circuit breaker

Rear connection 3 or 4 poles

Horizontal terminals



Vertical terminals

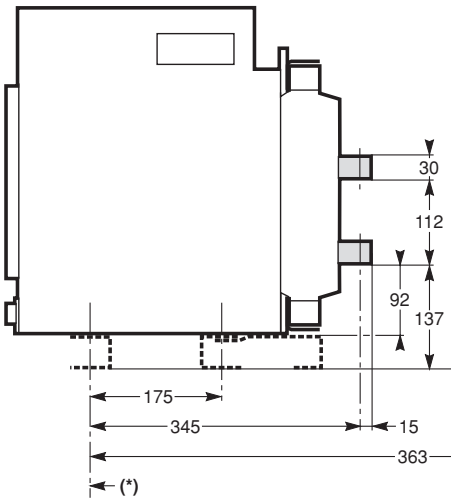


(*) Datum.

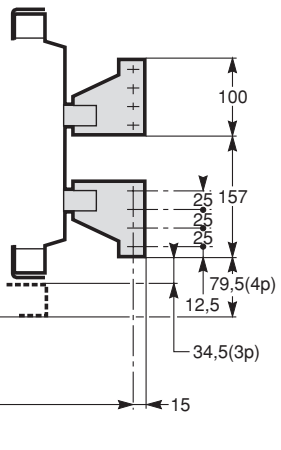
Drawout circuit breaker

Rear connection 3 or 4 poles

Horizontal terminals



Vertical terminals



Continued on following page

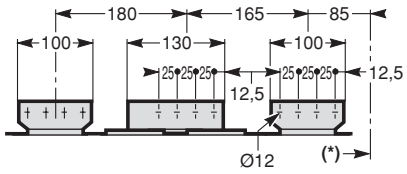
(*) Datum.

Fixed and drawout circuit breaker (AC range)
M40 (cont.)

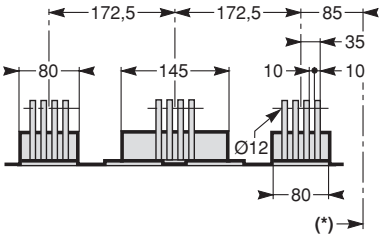
Fixed circuit breaker

Rear connection 3 poles

Horizontal terminals

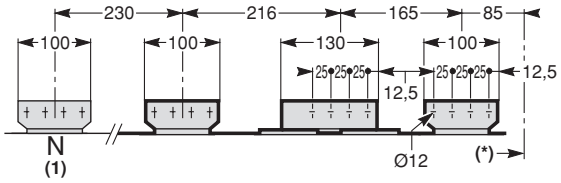


Vertical terminals

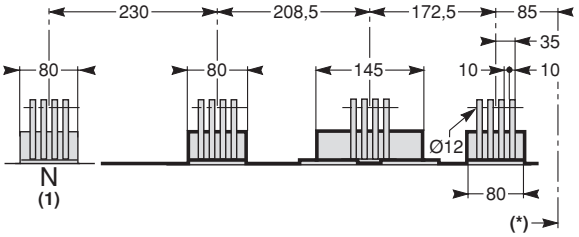


Rear connection 4 poles

Horizontal terminals



Vertical terminals



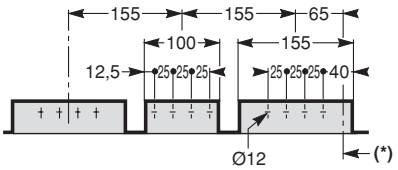
(*) Datum.

(1) On request, neutral on the right.

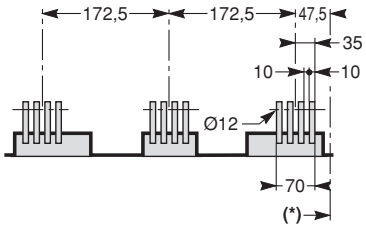
Drawout circuit breaker

Rear connection 3 poles

Horizontal terminals

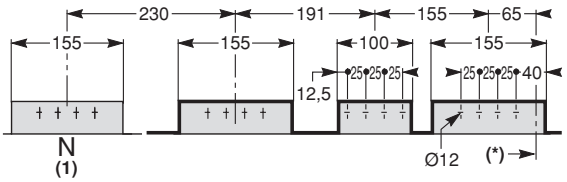


Vertical terminals

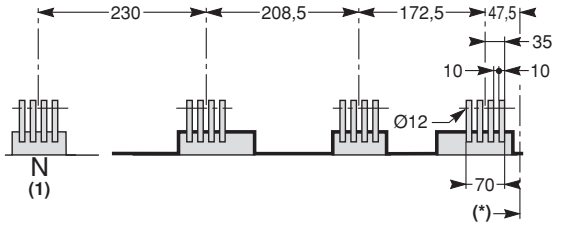


Rear connection 4 poles

Horizontal terminals



Vertical terminals



(*) Datum.

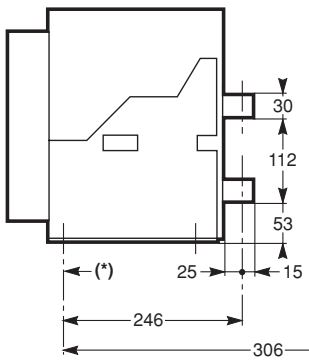
(1) On request, neutral on the right.

Fixed and drawout circuit breaker (AC range) M50 to M63

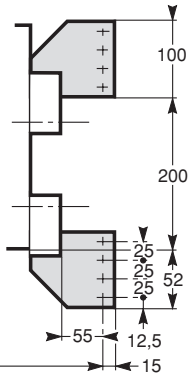
Fixed circuit breaker M50

Rear connection 3 poles

Horizontal terminals



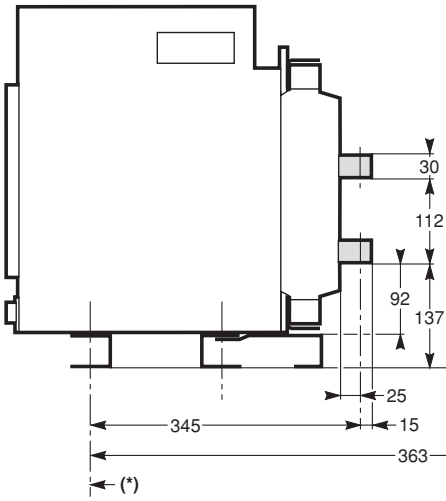
Vertical terminals



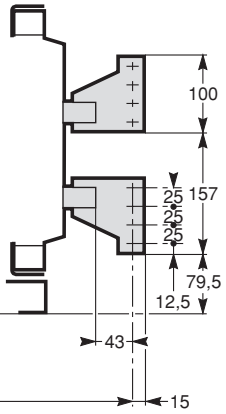
Drawout circuit breaker M50

Rear connection 3 or 4 poles

Horizontal terminals



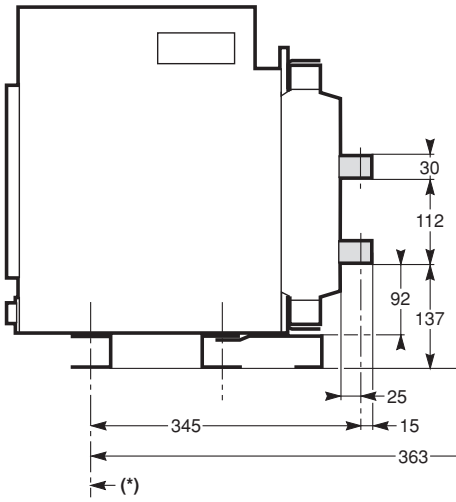
Vertical terminals



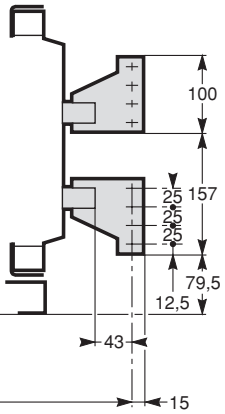
Drawout circuit breaker M63

Rear connection 3 or 4 poles

Horizontal terminals



Vertical terminals



(*) Datum.

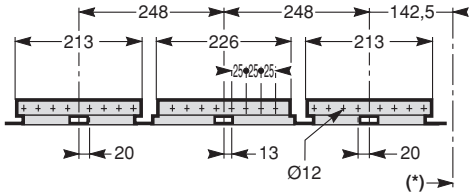
Continued on following page

Fixed and drawout circuit breaker (AC range) M50 to M63 (cont.)

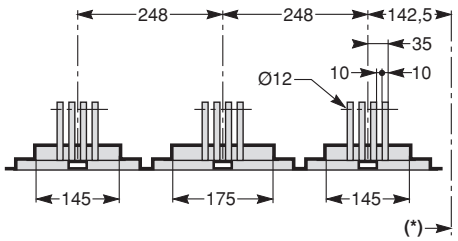
Fixed circuit breaker M50

Rear connection 3 poles

Horizontal terminals



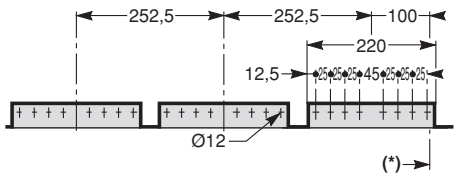
Vertical terminals



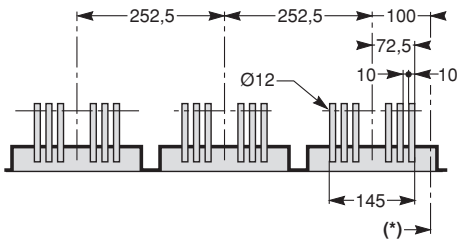
Drawout circuit breaker M50

Rear connection 3 poles

Horizontal terminals

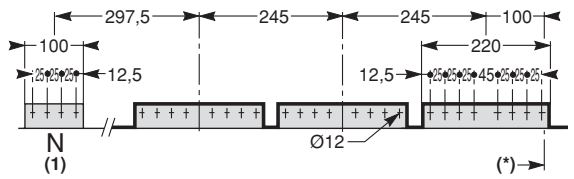


Vertical terminals

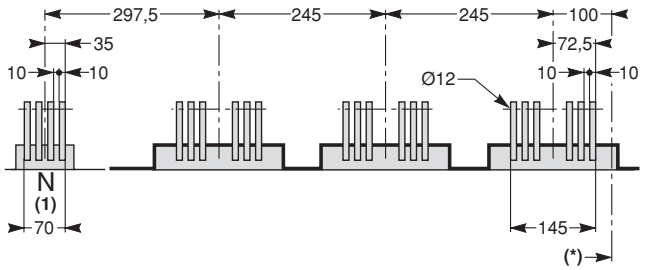


Rear connection 4 poles

Horizontal terminals



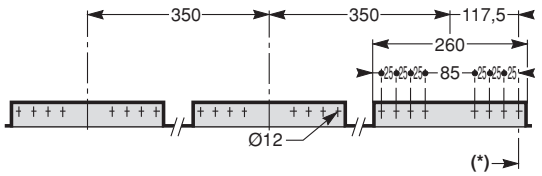
Vertical terminals



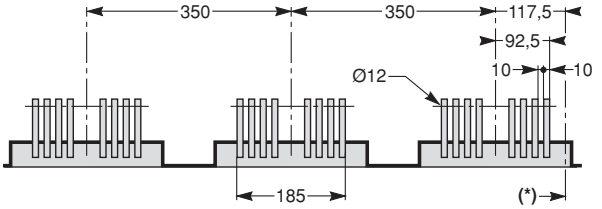
Drawout circuit breaker M63

Rear connection 3 poles

Horizontal terminals

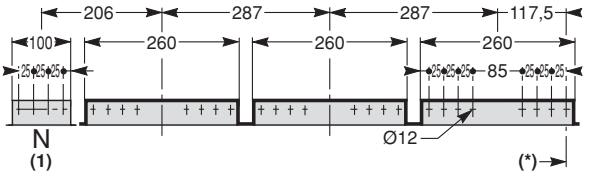


Vertical terminals

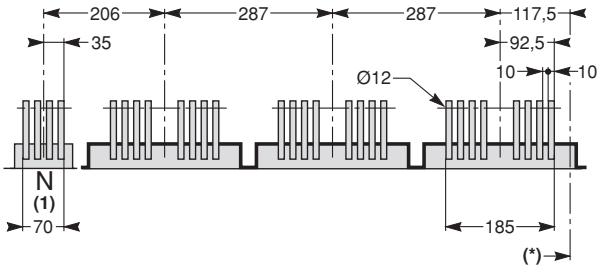


Rear connection 4 poles

Horizontal terminals



Vertical terminals



(*) Datum.

(1) On request, neutral on the right.

Types of DC distribution systems (DC range)

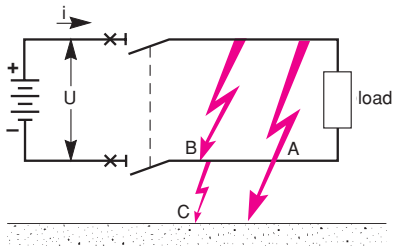
selection of a DC circuit breaker

Selection of a DC circuit breaker depends on the following criteria:

- The type of DC distribution system, which determines the required version;
- The rated current, which determines the circuit-breaker rating;
- The rated voltage, which determines the number of in-series poles required for breaking;
- The maximum short-circuit current at the point of installation, which determines the breaking capacity of the circuit breaker.

There are three types of DC distribution systems. Selection of an operational voltage with one of the three types of distribution systems determines the number of poles required for breaking.

Distribution system n° 1: isolated



The source is isolated from earth

Fault B
Isc maximum.
The 2 polarities of the breaker are involved in clearing the fault.

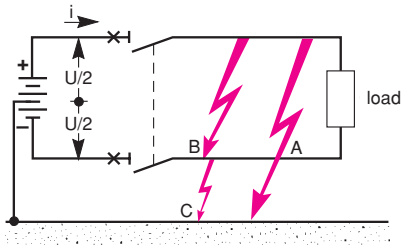
Fault A or C
No consequence.

Simultaneous faults A and C
Isc < Isc max.
(due to earth-loop impedance).
The 2 polarities of the breaker are involved in clearing the fault.

Most unfavourable fault

Fault B
Isc maximum.
Distribute the poles between the two polarities.

Distribution system n° 2: earthed middle point



The middle point of the source is earthed

Fault B
Isc maximum (at U).
The 2 polarities of the breaker are involved in clearing the fault.

Fault A or C
Isc < Isc maximum at U/2.
The positive or negative polarity of the breaker is involved in clearing the fault.

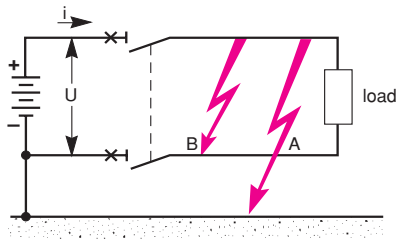
Simultaneous faults A and C
Isc < Isc max.
(due to earth-loop impedance).
The 2 polarities of the breaker are involved in clearing the fault.

Most unfavourable fault

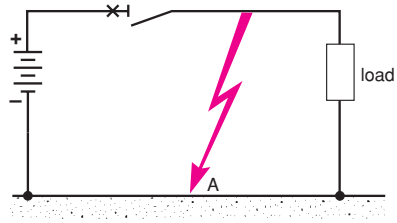
Fault A or C
Each polarity (positive or negative) can be concerned by the fault at U/2.

Distribution system n° 3: earthed negative polarity

1st alternative



2nd alternative



The negative polarity of the source is earthed

Fault A
Isc maximum.
The positive polarity of the breaker is involved in clearing the fault

Fault B
Isc maximum.
The 2 polarities of the breaker are involved in clearing the fault.

Most unfavourable fault

Fault A
Isc maximum on single polarity.
All the poles must be connected in series on the positive polarity.
In this case, an extra pole provided on the negative polarity has only an isolating function.

The source and the load are earthed

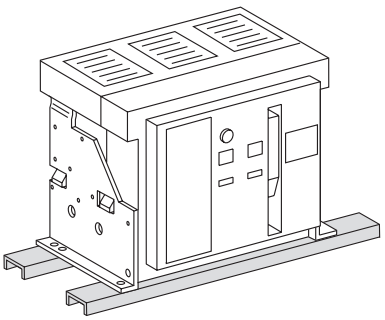
One type of fault (A):
all the poles must be associated in series on the positive polarity.

General (DC range)

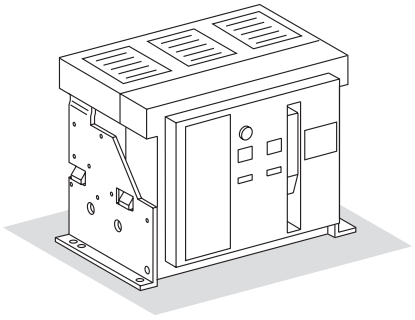
Installation

Masterpact circuit breakers must be installed in the vertical position on a base plate or on rails.

Fixed circuit breaker (M10DC to M40DC)



Installation on rails



Installation on a metal base plate

Drawout circuit breaker (M10DC to M80DC)

The drawout version makes it possible to:
- Rapidly remove and/or replace the circuit breaker without having to deal with connections;
- Install stand-by outgoers in a switchboard that will receive the necessary circuit breakers at a future.

Connection

Two types of connection are possible:
- Rear horizontal;
- Rear vertical.

The connection terminals are very big and may be connected to bars up to 20 mm thick (except the M60 and M80DC).

Different materials
The main circuit terminals on Masterpact circuit breakers may be connected to either bare copper, tinned copper or tinned aluminium conductors. No particular preparation is required.

Connection selection table

Type of circuit breaker	M10DC		M20DC		M40DC		M60DC	M80DC
Pole type	D, E, F	H or J	D, E, F	H or J	D, E, F	H or J	G	G
Type of connection								
vertical	■	■	■	■	■	■	■	■
horizontal	■	■	■	■				
Recommended sectional areas (mm)								
vertical connection	1b. 100x5		2b. 100x5		3b. 100x10		5b.100x10	6b. 100x10
horizontal connection	2b. 100x5 (1)		3b. 100x5 (1)		-		-	-

Electrodynamic stresses

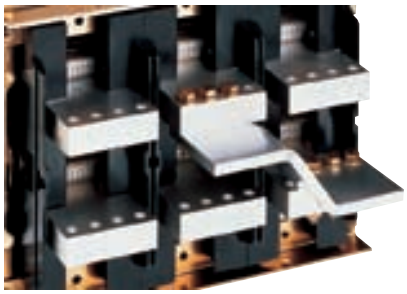
- The first busbar support or spacer shall be situated at a maximum distance from the connection point of the breaker (see table below).
- This distance must be maintained to allow the electrodynamic stresses between phases to be withstood in the event of a short-circuit.

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

Isc (kA eff.)	30	50	65	80	100	150
distance (mm)	350	300	250	150	150	150

(1) Fixed circuit breaker: 80 mm bar only.

Terminal configuration (DC range)



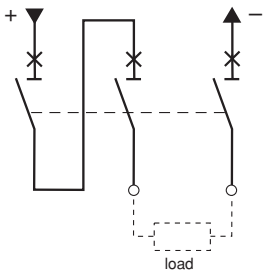
Selection of pole-connection types depends on the type of distribution system and the operational voltage.
The Masterpact DC range offers six different pole-connection types, namely D, E, F, G, H and J.
The selected type must be mentioned on the order form.

The series connections for the selected pole type are delivered with the circuit breaker. All Masterpact DC circuit breakers are thus **supplied ready for connection.**

Selection table

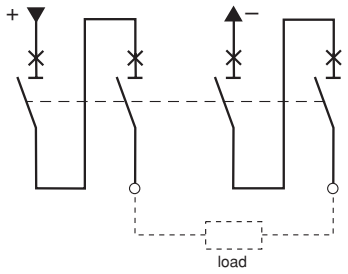
Circuit breaker identification	M10-20-40DC			M60-80DC
Rated current (A)	1000-2000-4000			6000-8000
Operational voltage (V)	250/500	750	1000	250
Distribution system n° 1: isolated	D	E	E	G
Distribution system n° 2: earthed middle point	D	E	E	G
Distribution system n° 3: earthed negative polarity				
■ Alternative n° 1	D	F	-	G
■ Alternative n° 2	H	H	J	G

Type D: 3-pole breaker

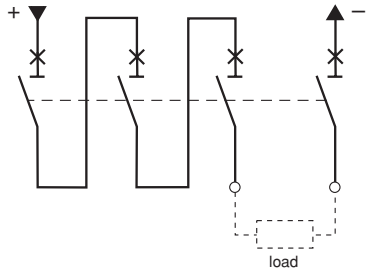


Type E: 4-pole breaker

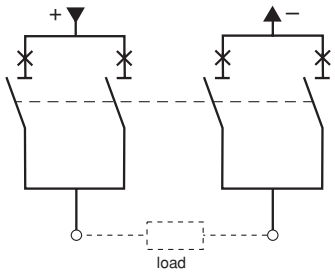
U > 750 V: mandatory supply via upper terminals



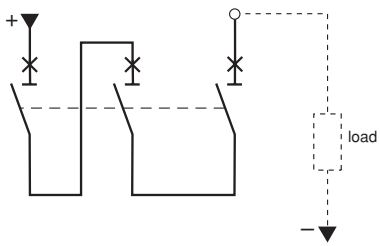
Type F: 4-pole breaker



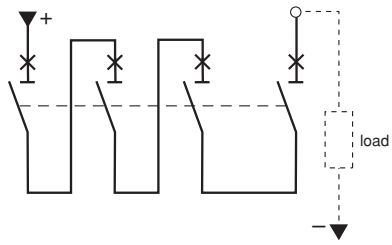
Type G: 2-pole breaker



Type H: 3-pole breaker



Version J: 4-pole breaker

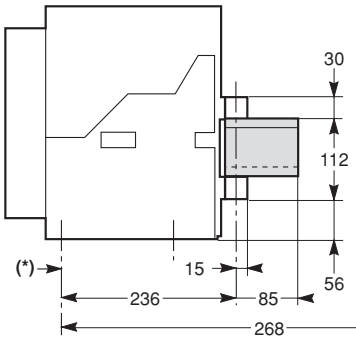


Note : front view diagrams.

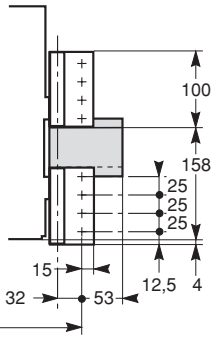
Fixed Masterpact M10/20DC (DC range)

Types D, E and F

Horizontal connection



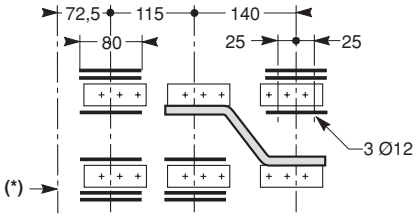
Vertical connection



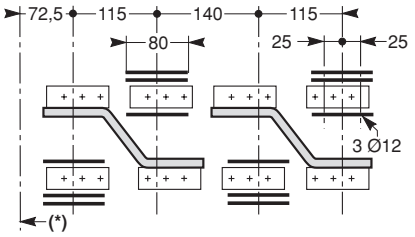
Rear view

Horizontal connection

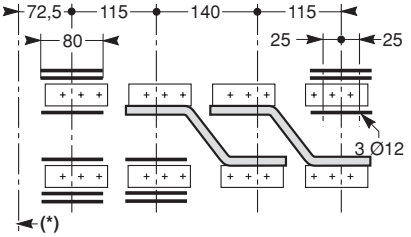
Type D



Type E

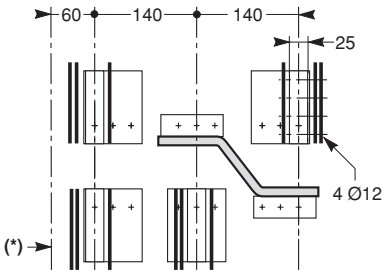


Type F

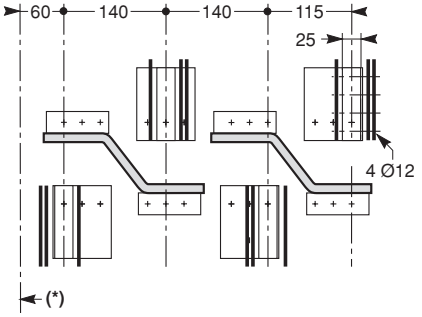


Vertical connection

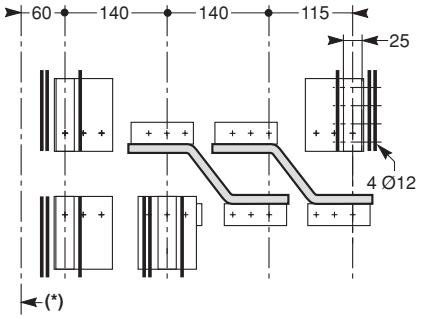
Type D



Type E



Type F

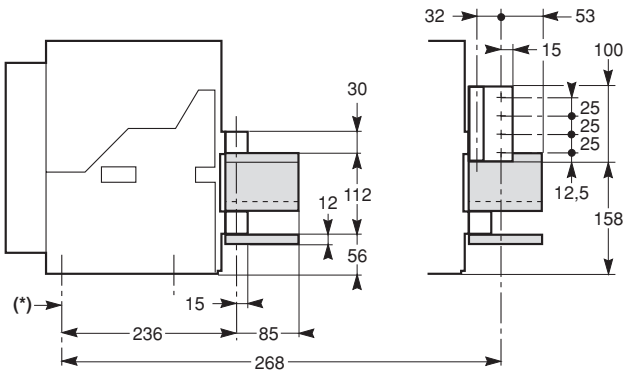


(*) Datum

Fixed Masterpact M10/20DC (DC range)

Types H and J

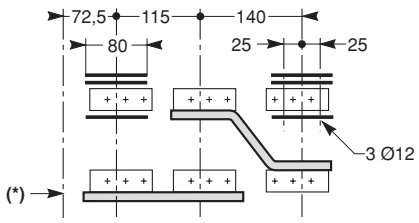
Horizontal connection **Vertical connection**



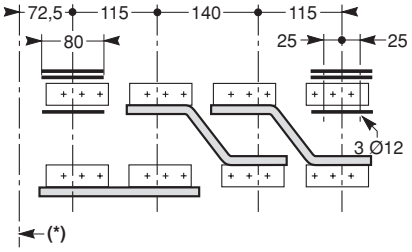
Rear view

Horizontal connection

Type H

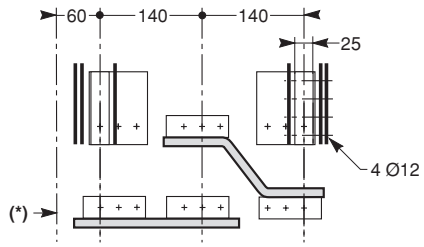


Type J

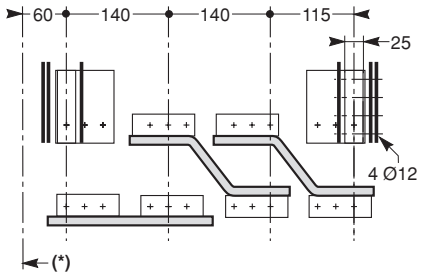


Vertical connection

Type H



Type J

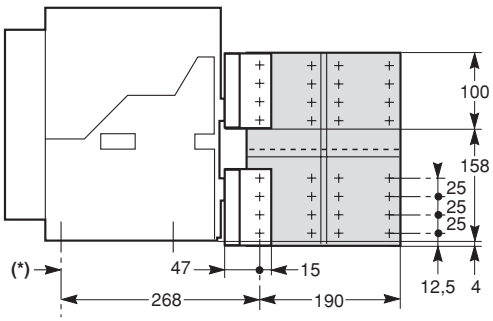


(*) Datum

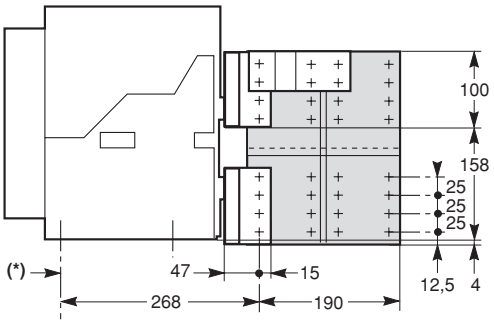
Fixed Masterpact M40DC (DC range)

Types D and F

Vertical connection



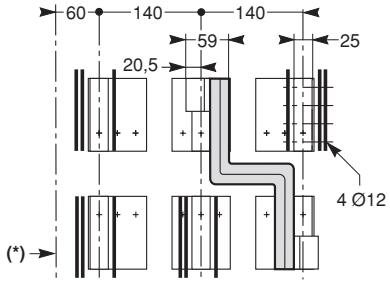
Type E



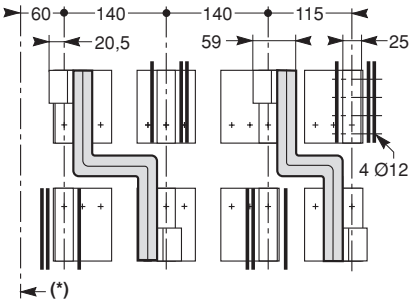
Rear view

Vertical connection

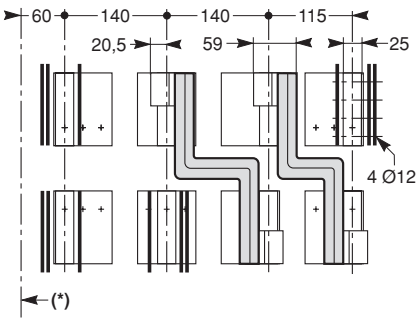
Type D



Type E

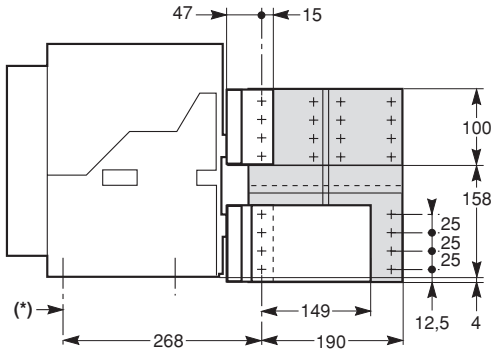


Type F



Types H and J

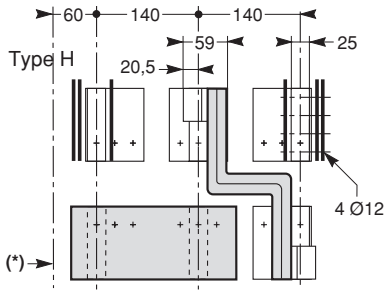
Vertical connection



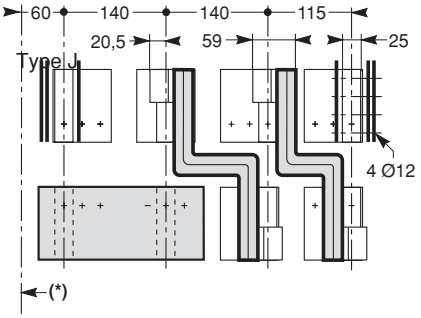
Rear view

Vertical connection

Type H



Type J

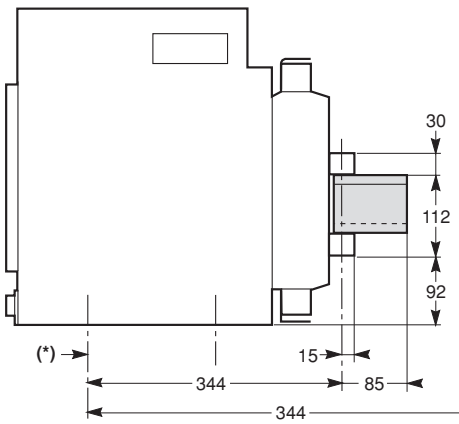


(*) Datum

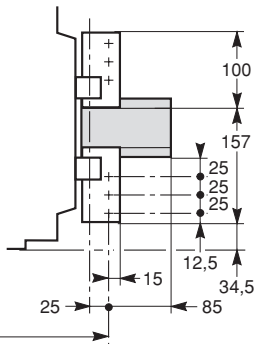
Drawout Masterpact M10/20DC (DC range)

Types D, E and F

Horizontal connection



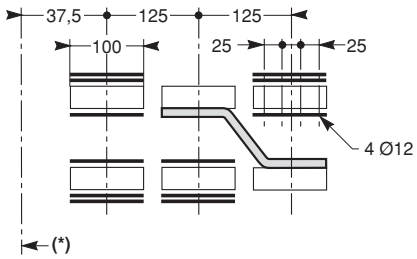
Vertical connection



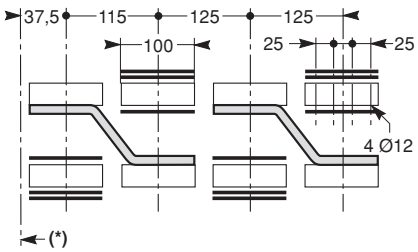
Rear view

Horizontal connection

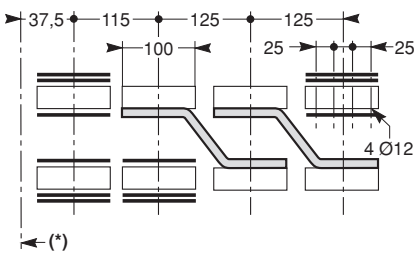
Type D



Type E

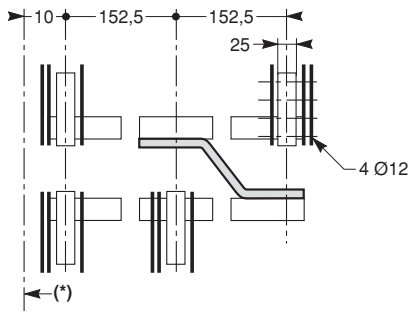


Type F

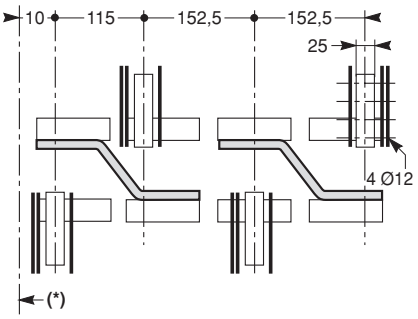


Vertical connection

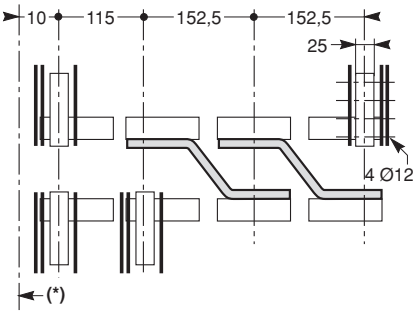
Type D



Type E



Type F

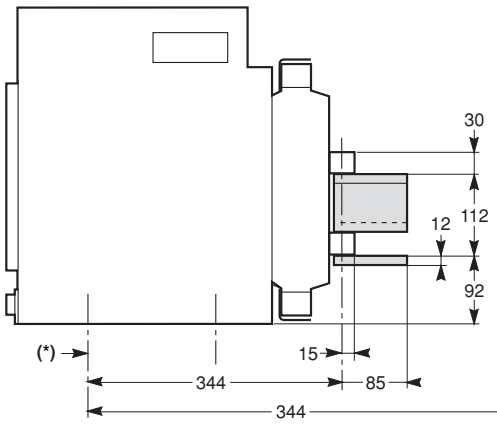


(*) Datum

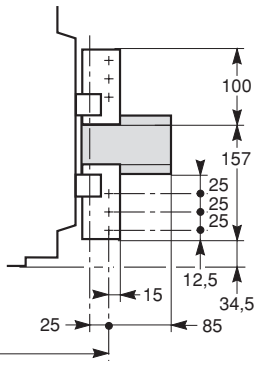
Drawout Masterpact M10/20DC (DC range)

Types H and J

Horizontal connection



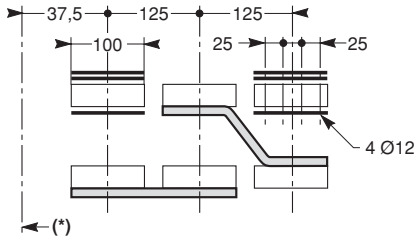
Vertical connection



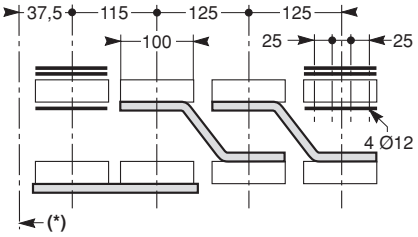
Rear view

Horizontal connection

Type H

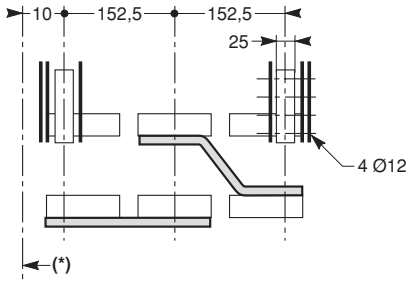


Type J

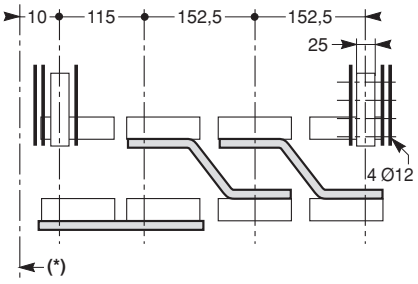


Vertical connection

Type H



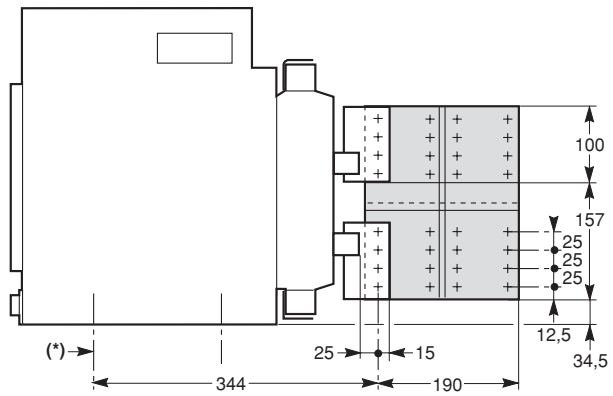
Type J



(*) Datum

Types D, E and F

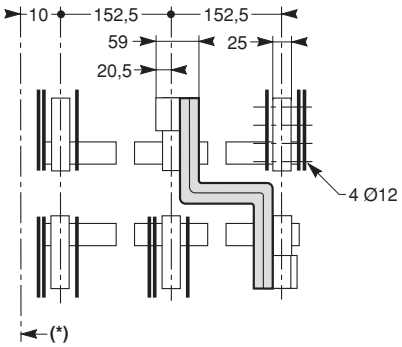
Vertical connection



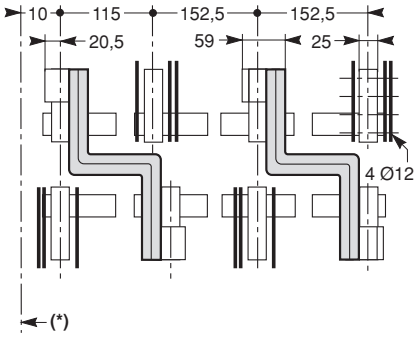
Rear view

Vertical connection

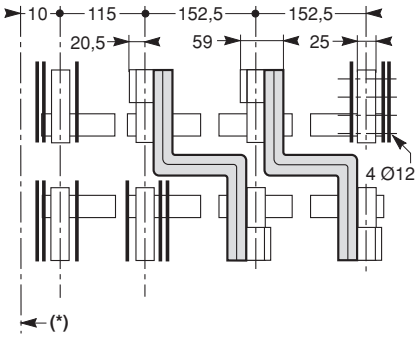
Type D



Type E



Type F

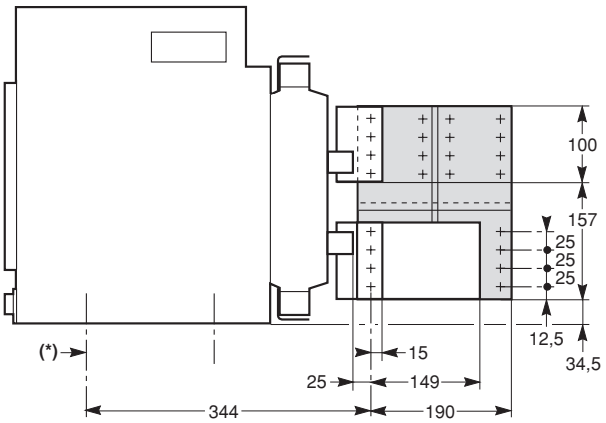


* Datum

Drawout Masterpact M40DC (DC range)

Types H and J

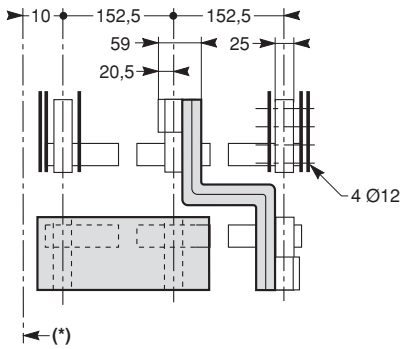
Vertical connection



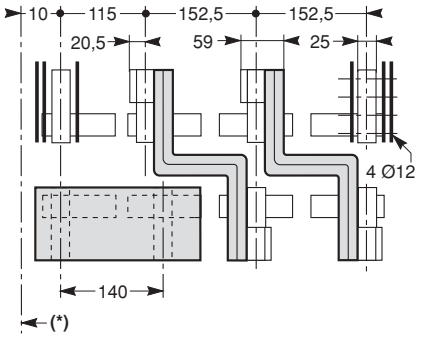
Rear view

Vertical connection

Type H



Type J

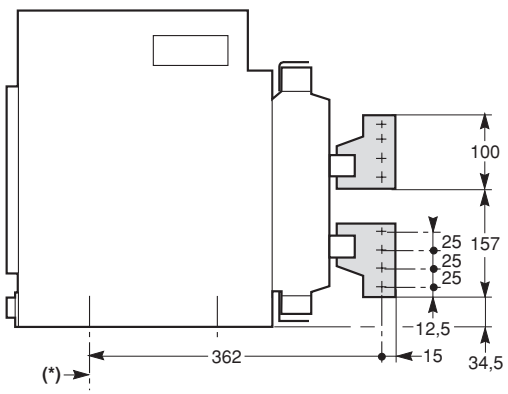


(*) Datum

Drawout Masterpact M60/80DC (DC range)

type G

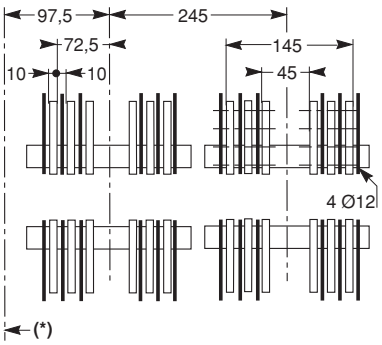
Vertical connection



Rear view

Vertical connection

Type G



(*) Datum

Section 8

LV air circuit breakers and switch-disconnectors

Masterpact 80 to 6300 Amp

Dimensions

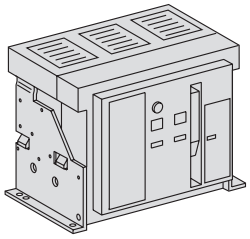
Please note that all Masterpact dimensions are available on disk suitable for CAD use (please cosult us)

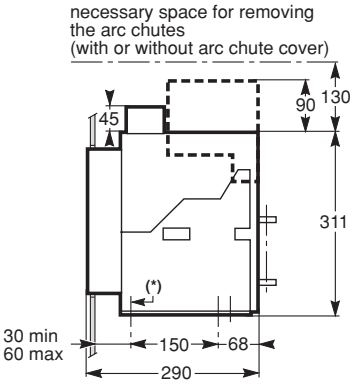
8

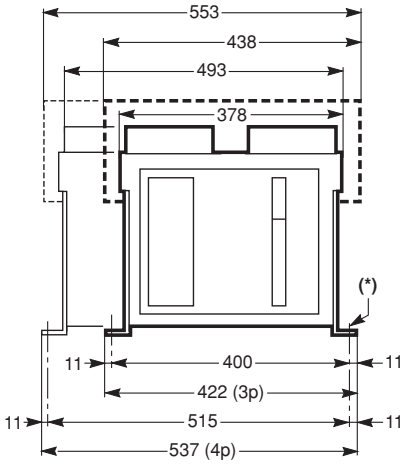
Fixed circuit breakers M08 to M32 (AC range)

Dimensions

3 or 4 poles



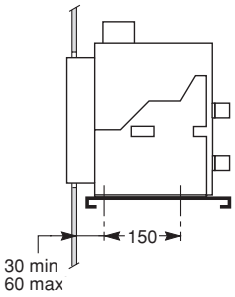




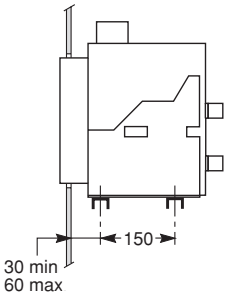
(*) Datum

Mounting

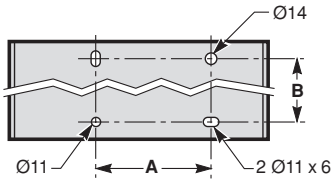
On a base plate



On rails



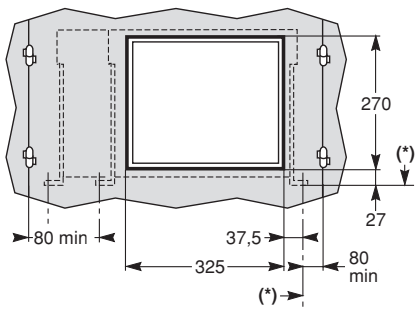
Mounting detail



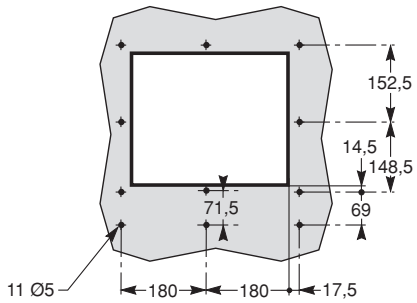
	3 poles	4 poles
A	150	150
B	400	515

Cut-outs

Front panel cut-outs



Holes for escutcheon

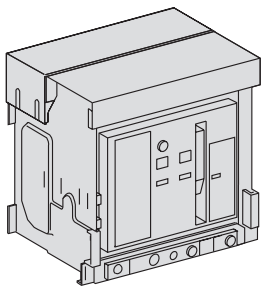


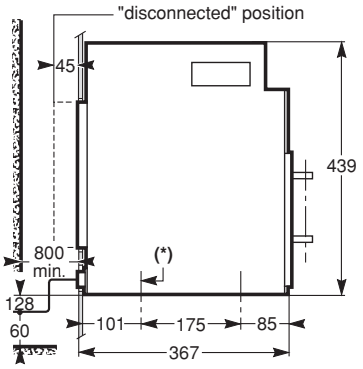
(*) Datum

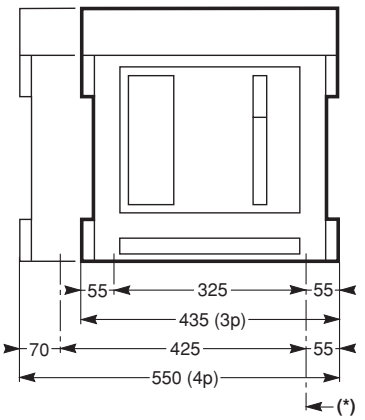
Drawout circuit breaker M08 to M32 (AC range)

Dimensions

3 or 4 poles



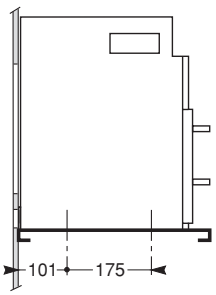




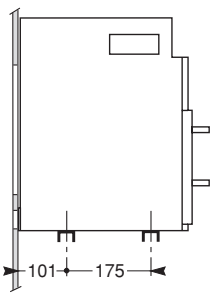
(*) Datum

Mounting

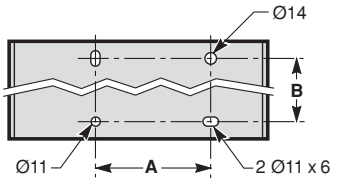
On a base plate



On rails



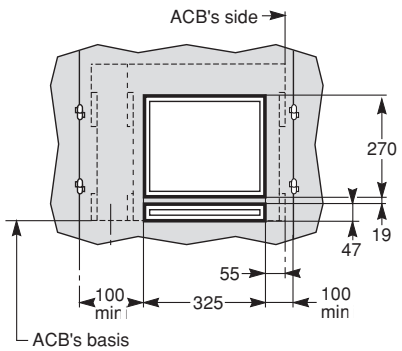
Mounting detail



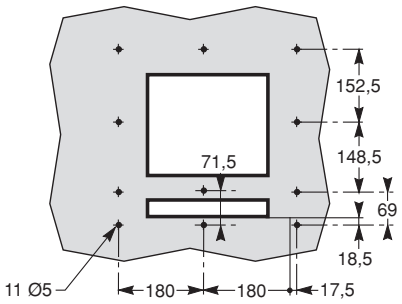
	3 poles	4 poles
A	175	175
B	325	425

Cut-outs

Front panel cut-out



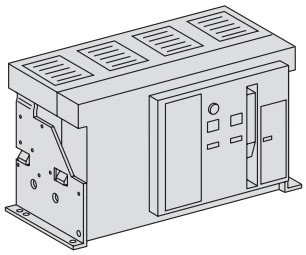
Holes for escutcheon

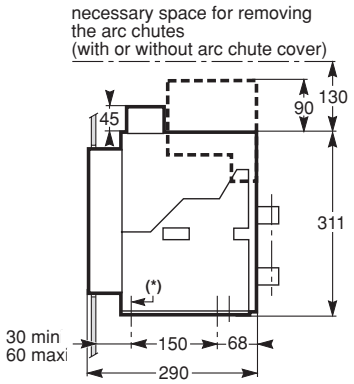


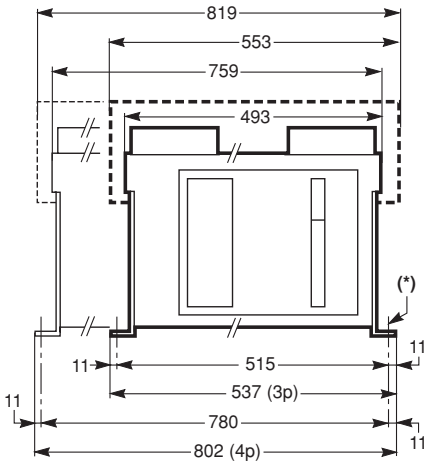
Fixed circuit breaker M40 (AC range)

Dimensions

3 or 4 poles



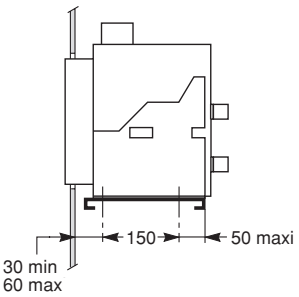




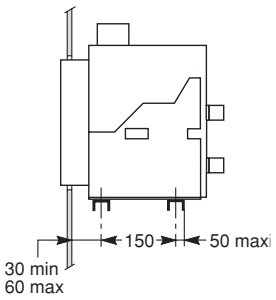
(*) Datum

Mounting

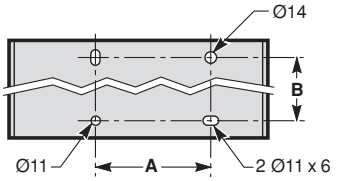
On a base plate



On rails



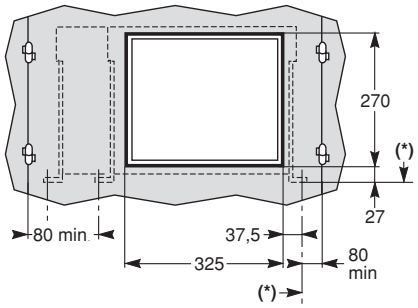
Mounting detail



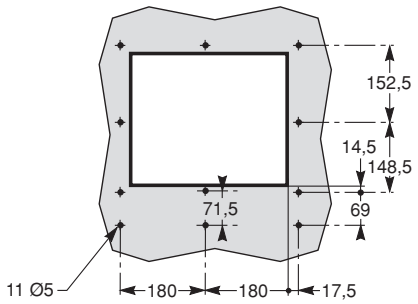
	3 poles	4 poles
A	150	150
B	515	780

cut-outs

Front panel cut-out



Holes for escutcheon

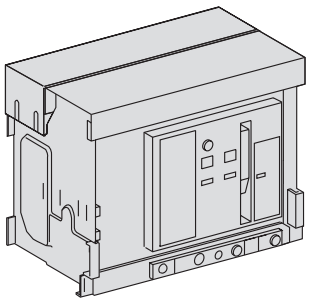


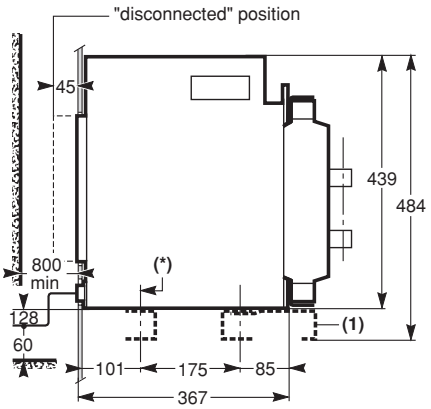
(*) Datum

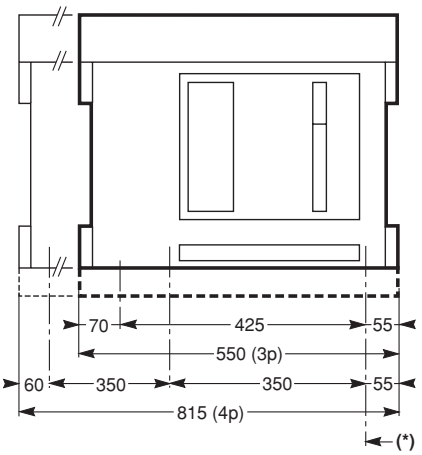
Drawout circuit breaker M40 (AC range)

Dimensions

3 or 4 poles



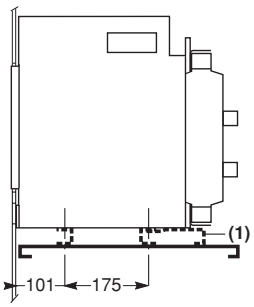




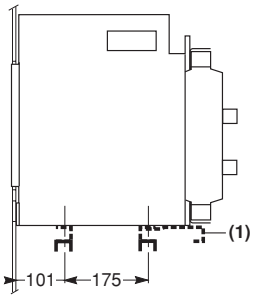
(*) Datum
(1) 4-pole version only.

Mounting

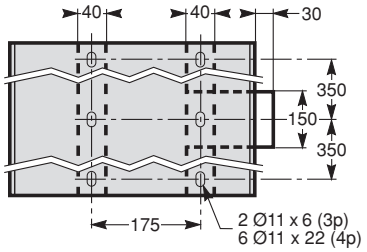
On a base plate



On rails



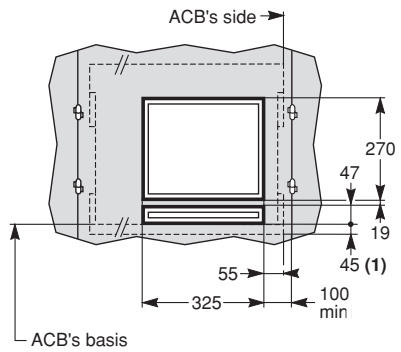
Mounting detail



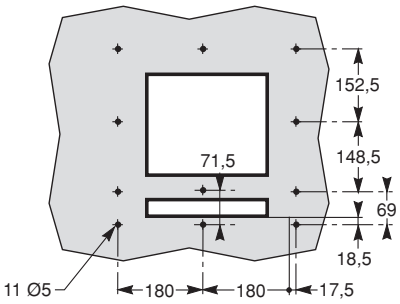
(1) 4-pole version only.

Cut-outs

Front panel cut-out



Holes for escutcheon

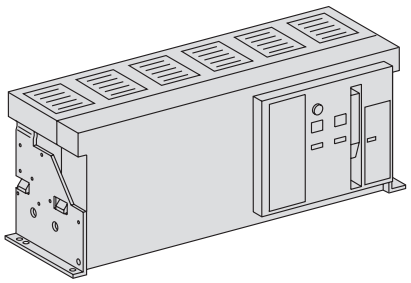


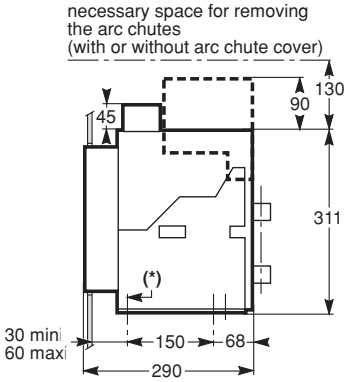
(1) 4-pole version only.

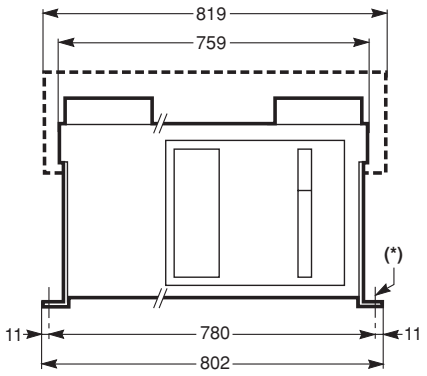
Fixed circuit breaker M50 (AC range)

Dimensions

3 poles



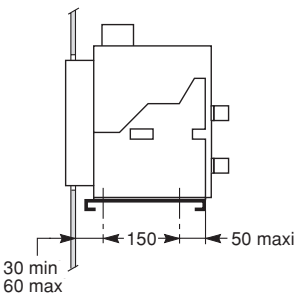




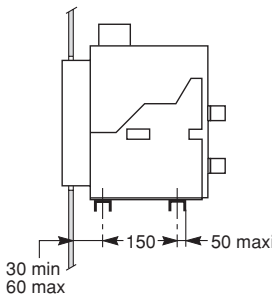
(*) Datum

Mounting

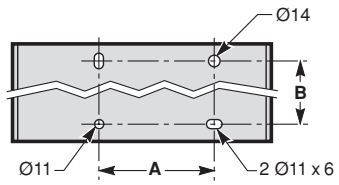
On a base plate



On rails



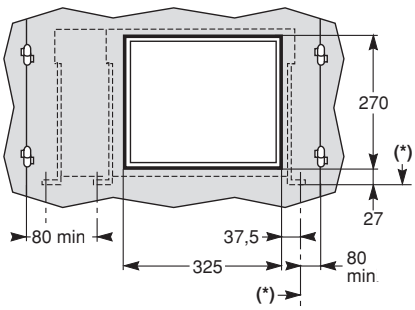
Mounting detail



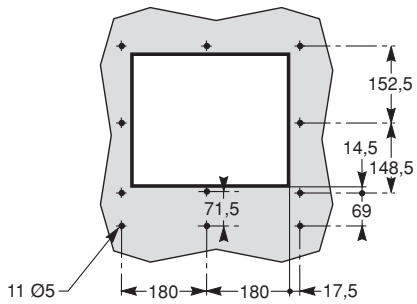
	3 poles
A	150
B	780

Cut-outs

Front panel cut-out



Holes for escutcheon

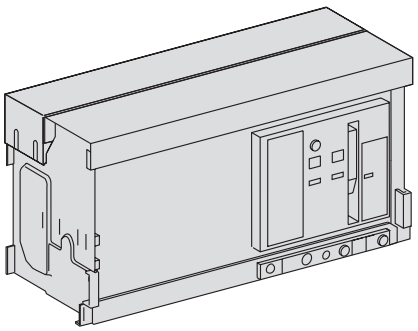


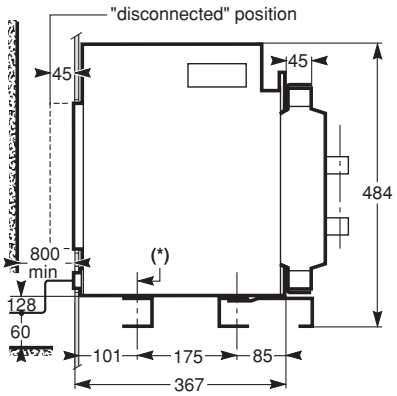
(*) Datum

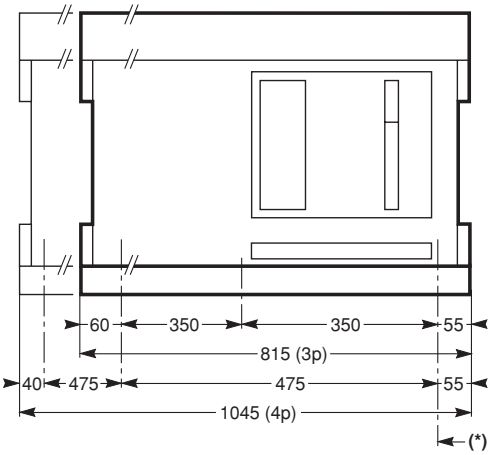
Drawout circuit breaker M50 (AC range)

Dimensions

3 or 4 poles



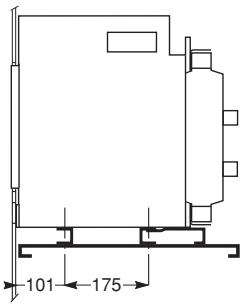




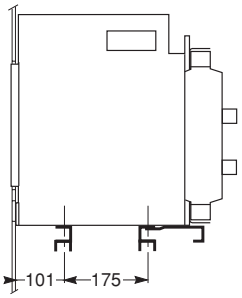
(*) Datum

Mounting

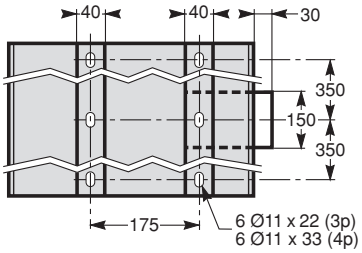
On a base plate



On rails

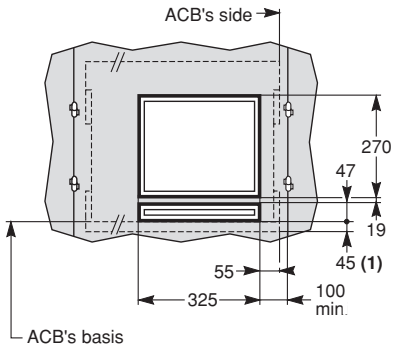


Mounting detail

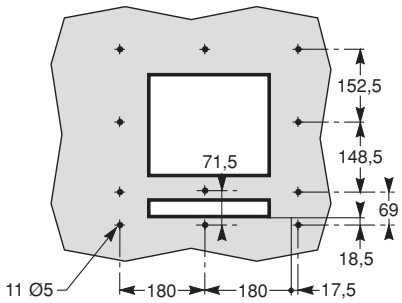


Cut-outs

Front panel cut-out



Holes for escutcheon

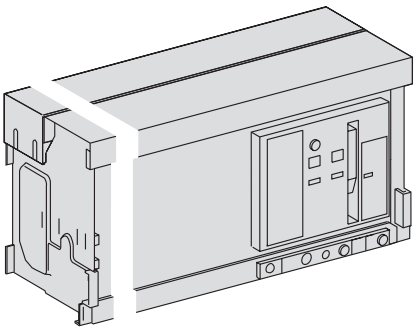


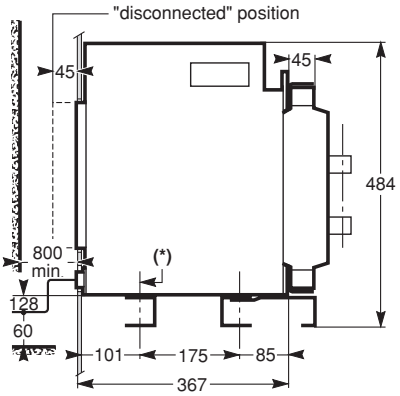
(1) 4-pole version only.

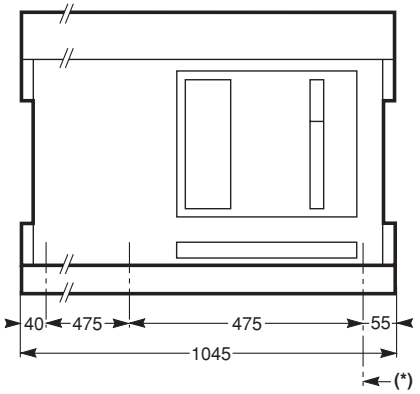
Drawout circuit breaker M63 (AC range)

Dimensions

3 poles or 4 poles



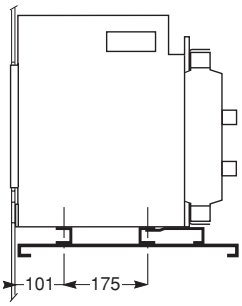




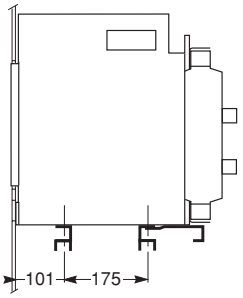
(*) Datum

Mounting

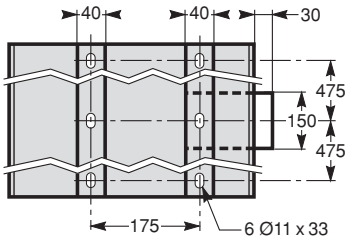
On a plate



On rails

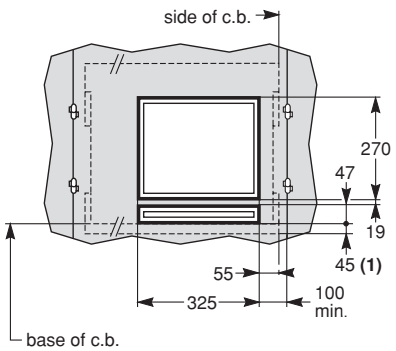


Mounting detail

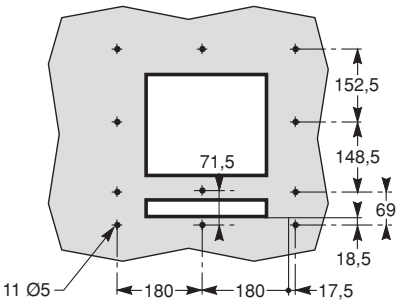


Cut-outs

Front panel cut-out



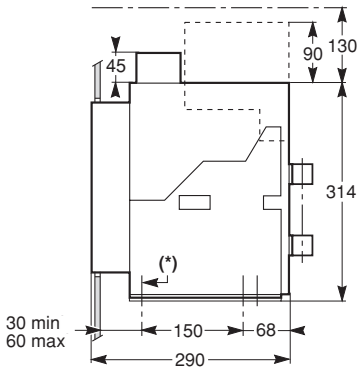
Holes for escutcheon



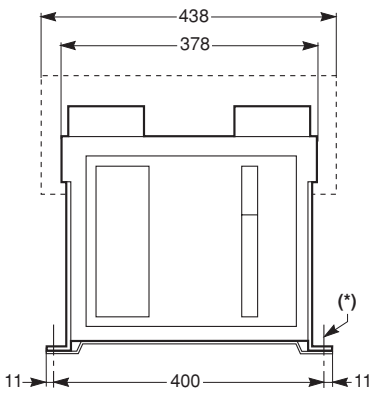
Fixed circuit breaker (DC range)

Dimensions

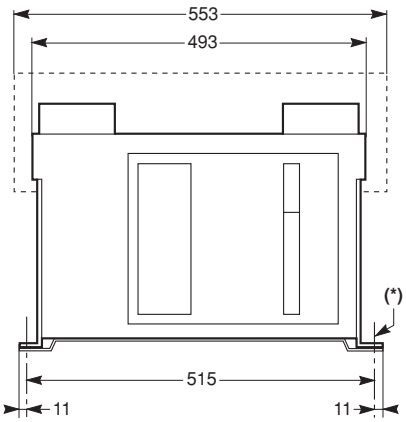
Necessary space for removing the arc chutes



Types D and H

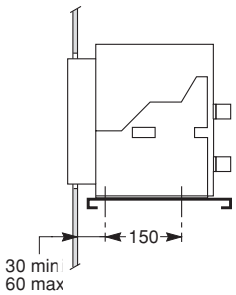


Types E, F, G and J

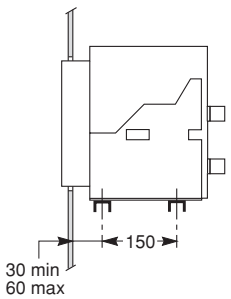


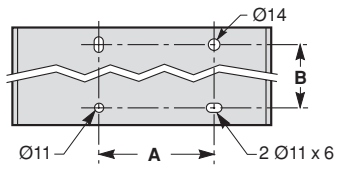
Mounting

On a base plate



On rails

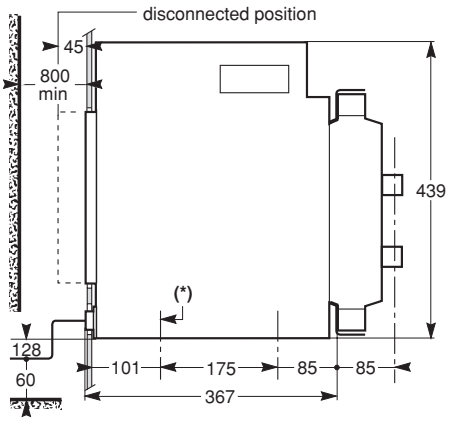




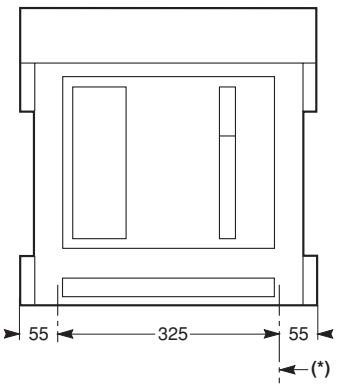
	Types E, F, and J	Types D and H
A (mm)	150	150
B (mm)	515	400

Drawout circuit breaker (DC range)

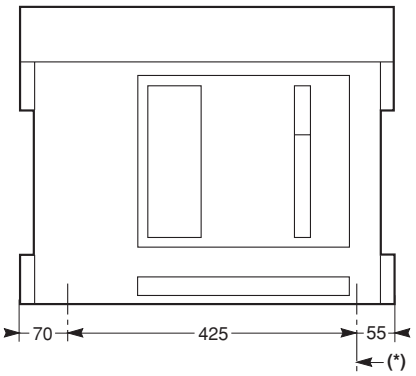
Dimensions



Types D and H

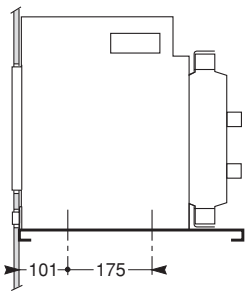


Types E, F, G and J

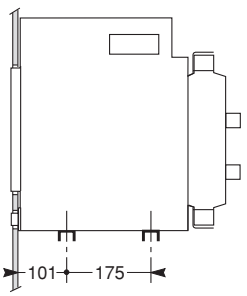


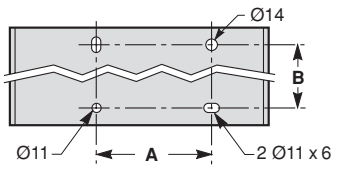
Mounting

On a base plate



On rails

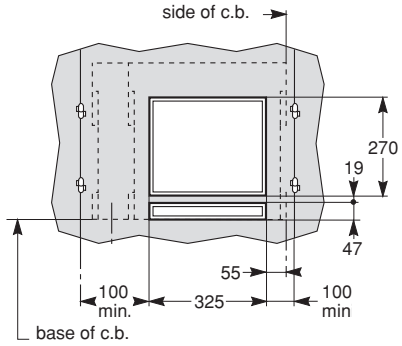




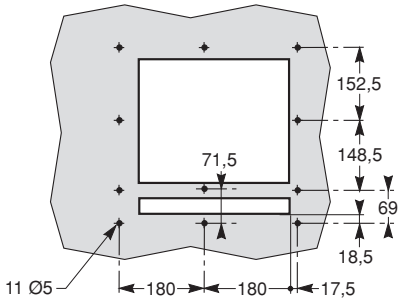
	types E, F, G and J	types D and H
A (mm)	175	175
B (mm)	425	325

Panel cut-out

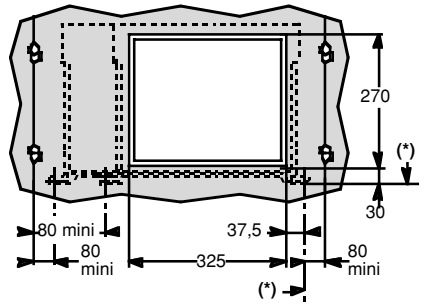
Front panel cut-out (Fixed)



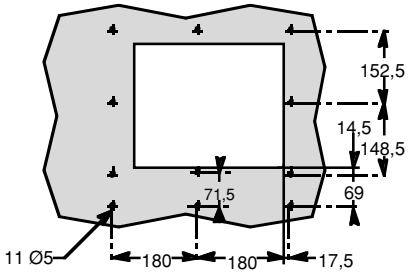
Holes for escutcheon (Fixed)



Front panel cut-out (Drawout)



Holes for escutcheon (Drawout)

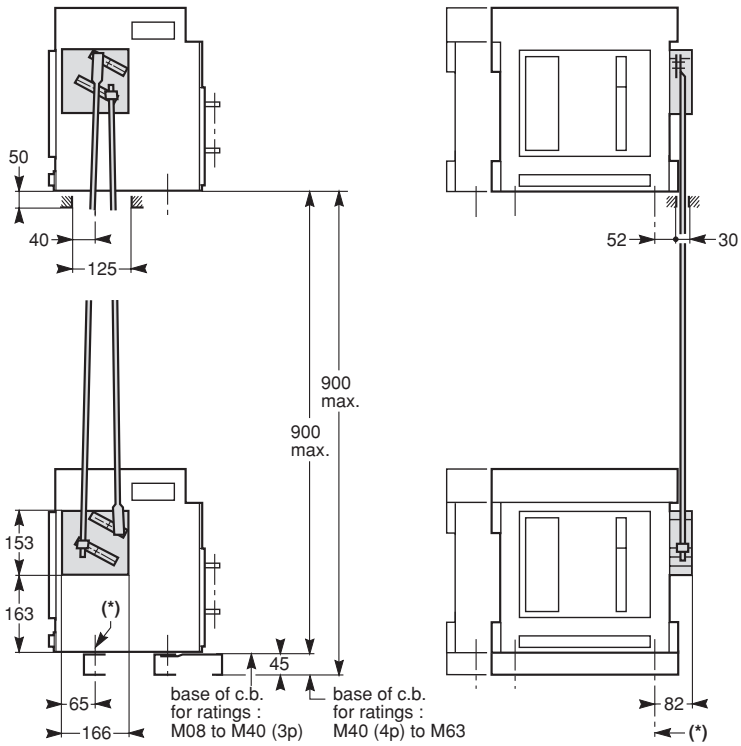


Dimensions:

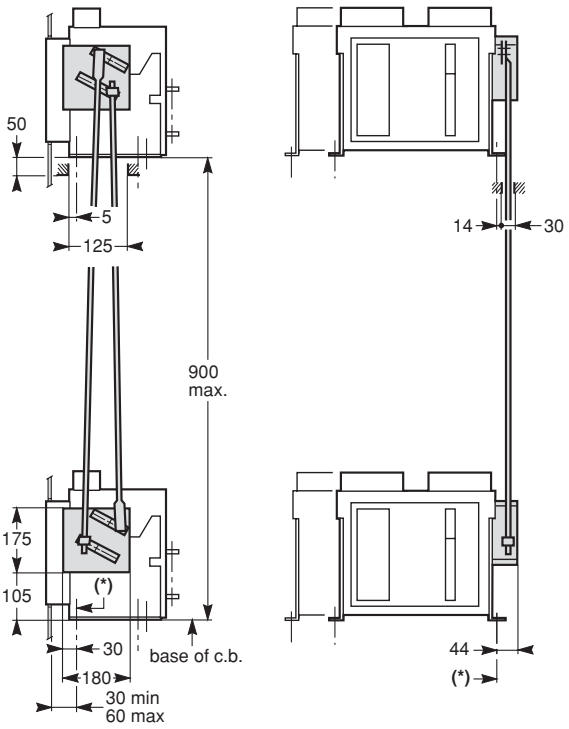
Source-changeover system Masterpact

Interlocking by connecting rods for 2 vertically mounted breakers

Drawout pattern, 3 or 4 poles

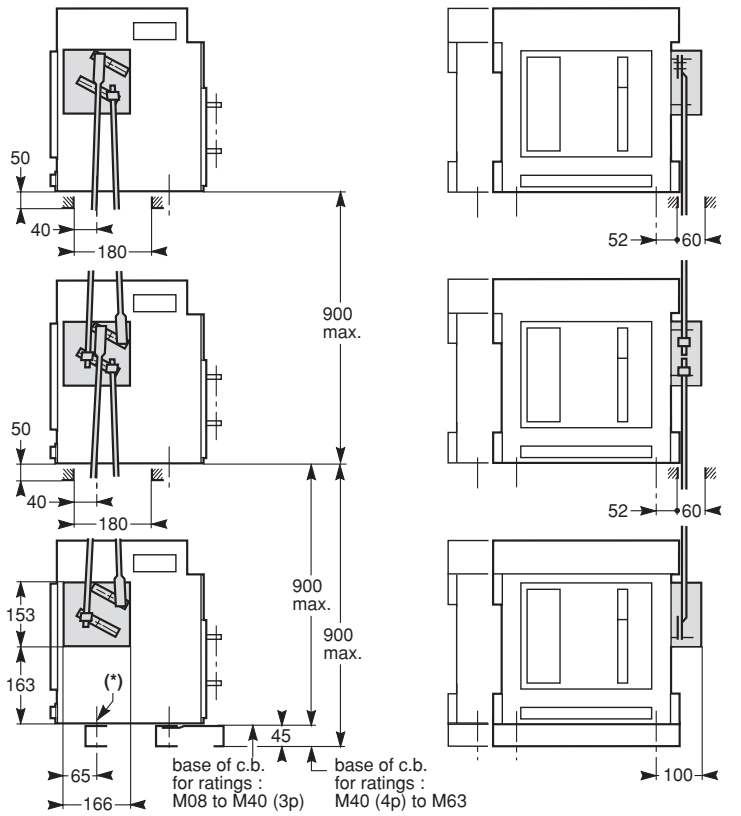


Fixed pattern, 3 or 4 poles

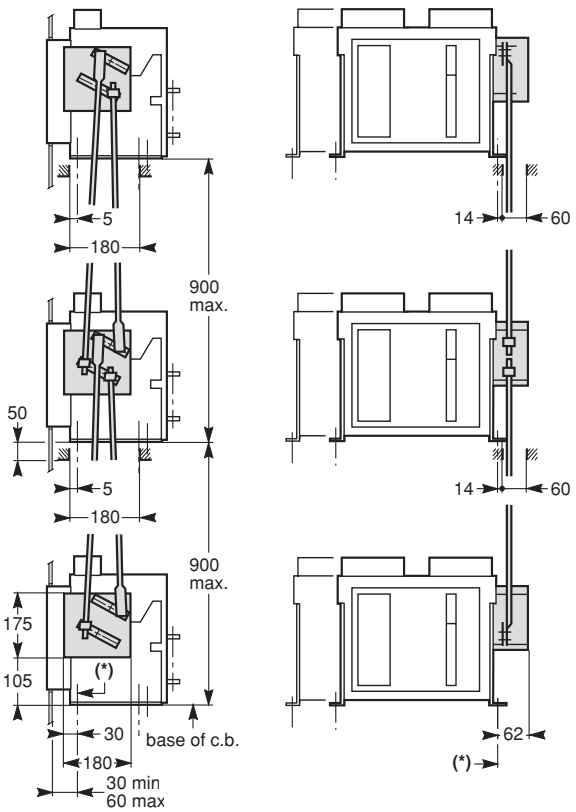


Interlocking by connecting rods for 3 stack-mounted breakers

drawout pattern, 3 or 4 poles

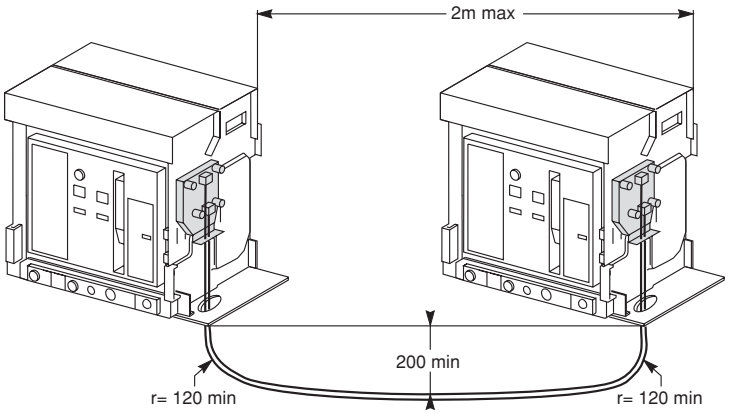


Fixed pattern, 3 or 4 poles



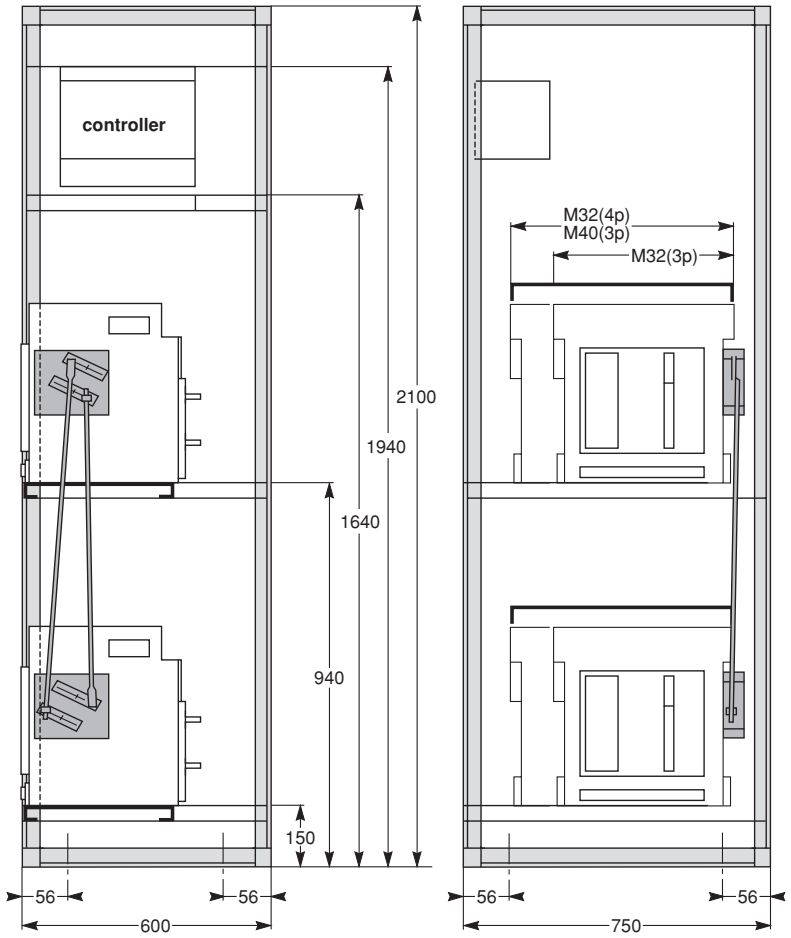
(*) Datum

Interlocking by cables for 2 side-by-side mounted breakers
fixed or drawout patterns, 3 or 4 poles

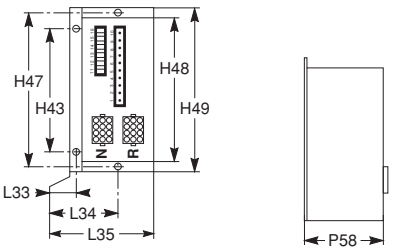


Automatic source-changeover system

Mounted on a frame

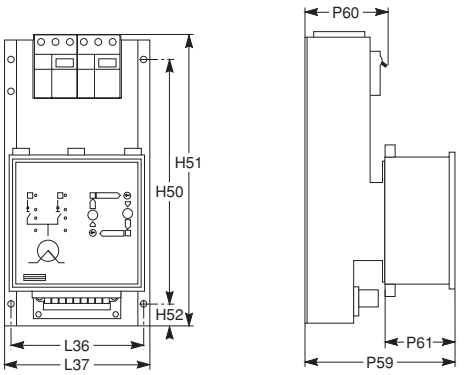


Electrical interlocking IVE (1)



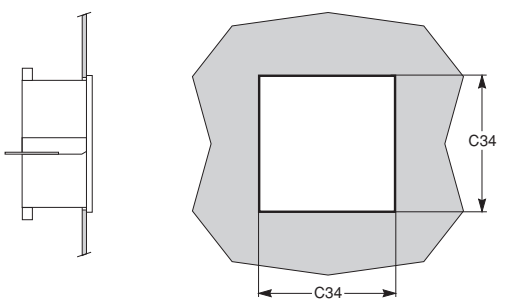
(1) with connection, add 150 mm to P58.

Auxiliaries control plate ACP and controller UA/BA (2)



(2) with four-position switch, add 15 mm to P61.
The controller must be installed at 200 mm min from the circuit breaker or the busbar

Panel cut-out for controller UA/BA



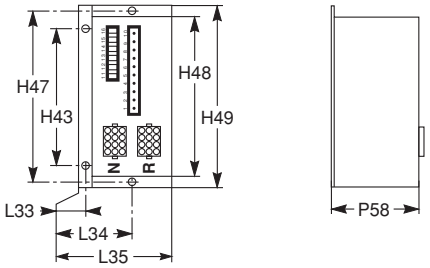
Dimensions (mm)

type	C34	H43	H47	H48	H49	H50	H51	H52	L33	L34	L35	L36	L37	P58	P59	P60	P61
	140	120	151	137	160	200	255	22	6	48	84	138	150	61,5	170	95	90

(*) Datum

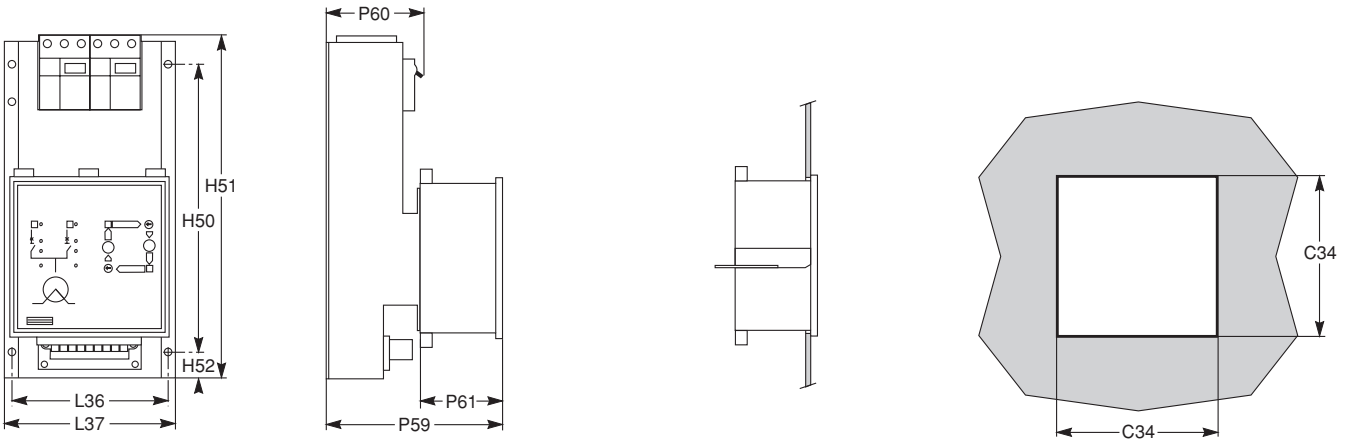
Electrical interlocking unit IVE

Dimensions



Auxiliaries control plate ACP and controller UA/BA

Door cut-out for controller UA/BA



Dimensions (mm)

Type	C34	H43	H47	H48	H49	H50	H51	H52	L33	L34	L35	L36	L37	P58	P59	P60	P61
NS100/160/250N/H/L NS400/630N/H/L C801/1001N/H/L C1251N/H C801/1251NI	140	120	151	137	160	200	255	22	6	48	84	138	150	61.5	170	95	90

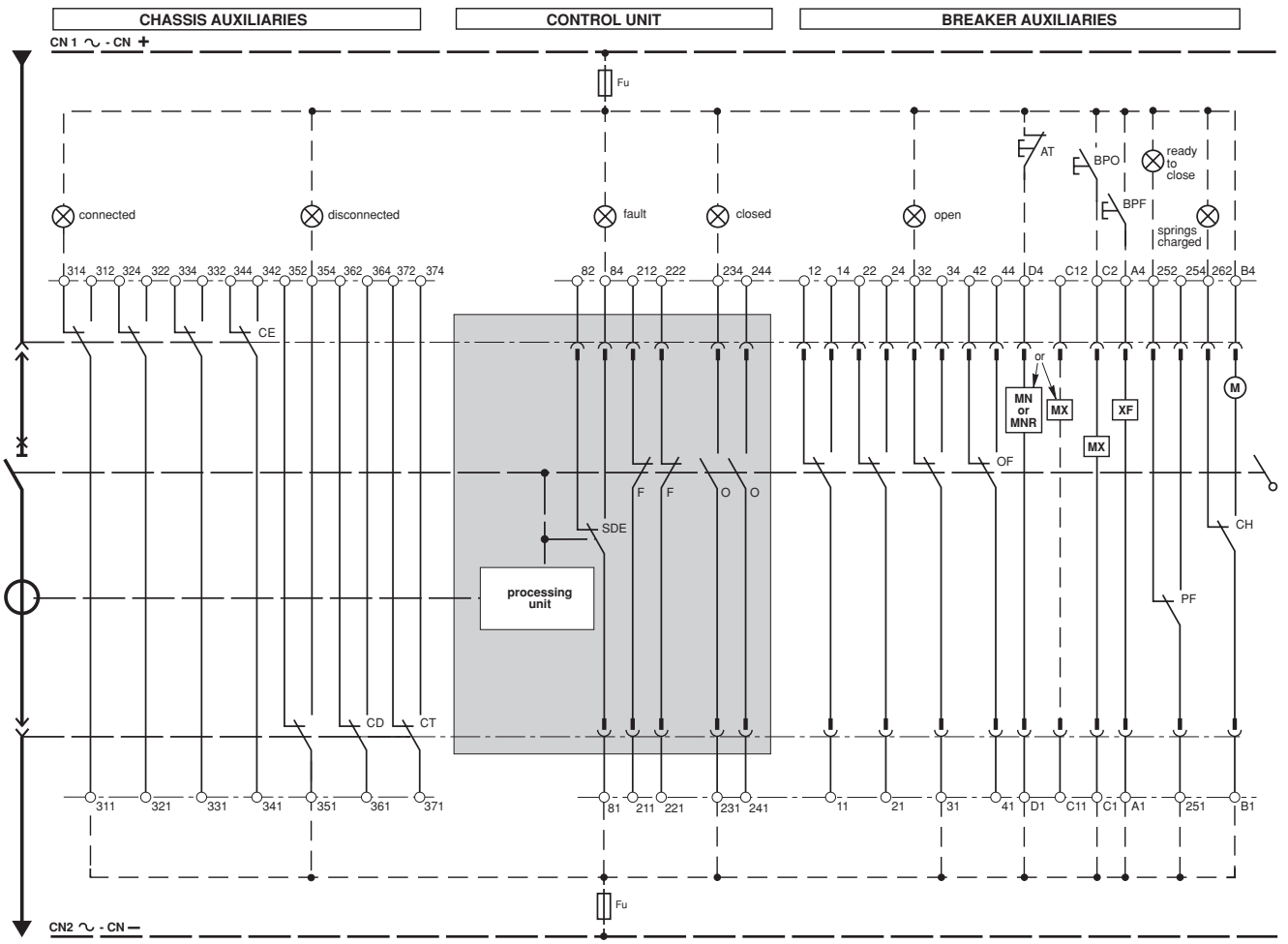
Section 9

LV air circuit breakers and switch-disconnectors

Masterpact 80 to 6300 Amp

Wiring diagrams

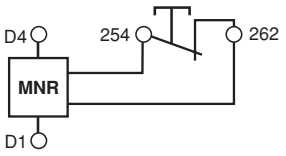
9



AT: Emergency off
BPO: "Open" pushbutton
BPF: "Close" pushbutton
CE: "Connected" position contact (10 A/240 V AC)
M: Spring charging motor (180 VA/240 V AC)
XF: Closing release (20 VA/240 V AC)
MX: Shunt release (20 VA/240 V AC)
MN: Undervoltage release (20 VA/240 V AC)
MNR: Time delayed undervoltage release (20 VA/240 AC)
OF: Auxiliary changeover contacts (10 A/240 V AC)
O: 2 auxiliary NO contacts (10 A/240 V AC)
F: 2 auxiliary NC contacts (10 A/240 V AC)
SDE: Fault trip indication contact (10 A/240 V AC)
CH: Charging motor limit switch contact
PF: "Ready to close" contact (10 A/240 V AC) (closing possible if breaker is open, not locked and operating mechanism charged)
CD: "Disconnected" position contact (10 A/240 V AC)
CT: Test posiiton contact (10 A/240 V AC)

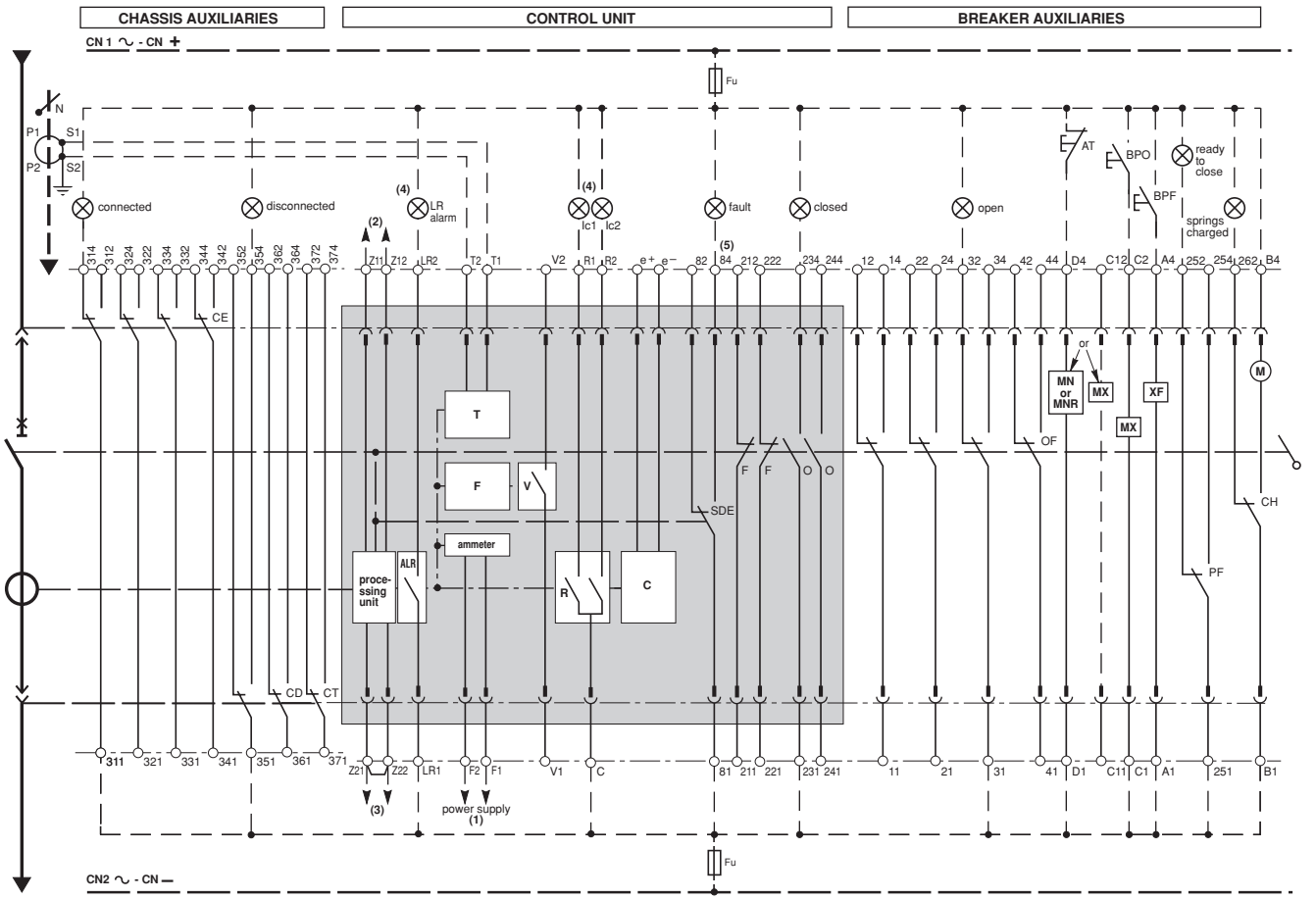
- Diagram shown with circuits deenergised, breaker open and in "connected" position, springs charged and relays in released position;
- Accessories such as pushbuttons, lamps and fuses are not supplied with the circuit breaker.

Wiring of the MNR (modified diagram). Instantaneous tripping with MNR when contact 254-262 opens.



Note: the wiring of the external contact replaces the spring charged indication and the contact PF.

STR 28 D / 38 S / 58 U
With options



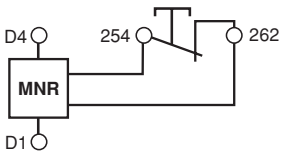
AT: Emergency off
BPO: "Open" pushbutton
BPF: "Close" pushbutton
LR: Long time trip (LT) indicating lamp
CR: Short time trip (ST) indicating lamp
T: Earth fault trip indicating lamp
CE: "Connected" position contact (10 A/240 V AC)
M: Spring charging motor (180 VA/240 V AC)
R: Load monitoring and control
XF: Closing release (20 VA/240 V AC)
T: Earth fault protection (EZ and SZ: input and output for zone selective interlocking)
MX: Shunt release (20 VA/240 V AC)
MN: Undervoltage release (20 VA/240 V AC)
MNR: Time delayed undervoltage release (20 VA/240 V AC)
OF: Auxiliary changeover contacts (10 A/240 V AC)
O: 2 auxiliary NC contacts (10 A/240 V AC)
F: 2 auxiliary NC contacts (10 A/240 V AC)
SDE: Fault trip indication contact (10 A/240 V AC)
CH: Charging motor limit switch contact
F: Fault trip local indicator
FV: Segregated fault trip indication contact (5 A/240 V AC)

PF: "Ready to close" contact (10 A/240 V AC) (closing possible if breaker is open, not locked and operating mechanism charged)
CD: "Disconnected" position contact (10 A/240 V AC)
CT: Test position contact (10 A/240 V AC)
C: Communication.

- Ic1: load shedding command according to Ic1 setting
  Ic2: load shedding command according to Ic2 setting;
- Diagram shown with circuits deenergised, breaker open and in "connected" position, springs charged and relays in released position;
- Accessories such as pushbuttons, lamps and fuses are not supplied with the circuit

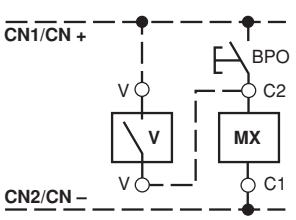
(1) Power supply terminals for I or T or F options (AD module with BAT battery module for backup power).
(2) Zone selective interlocking with line side breaker.
(3) Zone selective interlocking with load side breaker (remove jumper).
(4) DC power supply. R contacts reset request wiring of an external contact.
(5) With Z and/or C options, terminal 84 is not available.

Wiring of the MNR (modified diagram).
Instantaneous tripping with MNR when contact 254-262 opens.



Note: the wiring of the external contact replaces the spring charged indication and the contact PF.

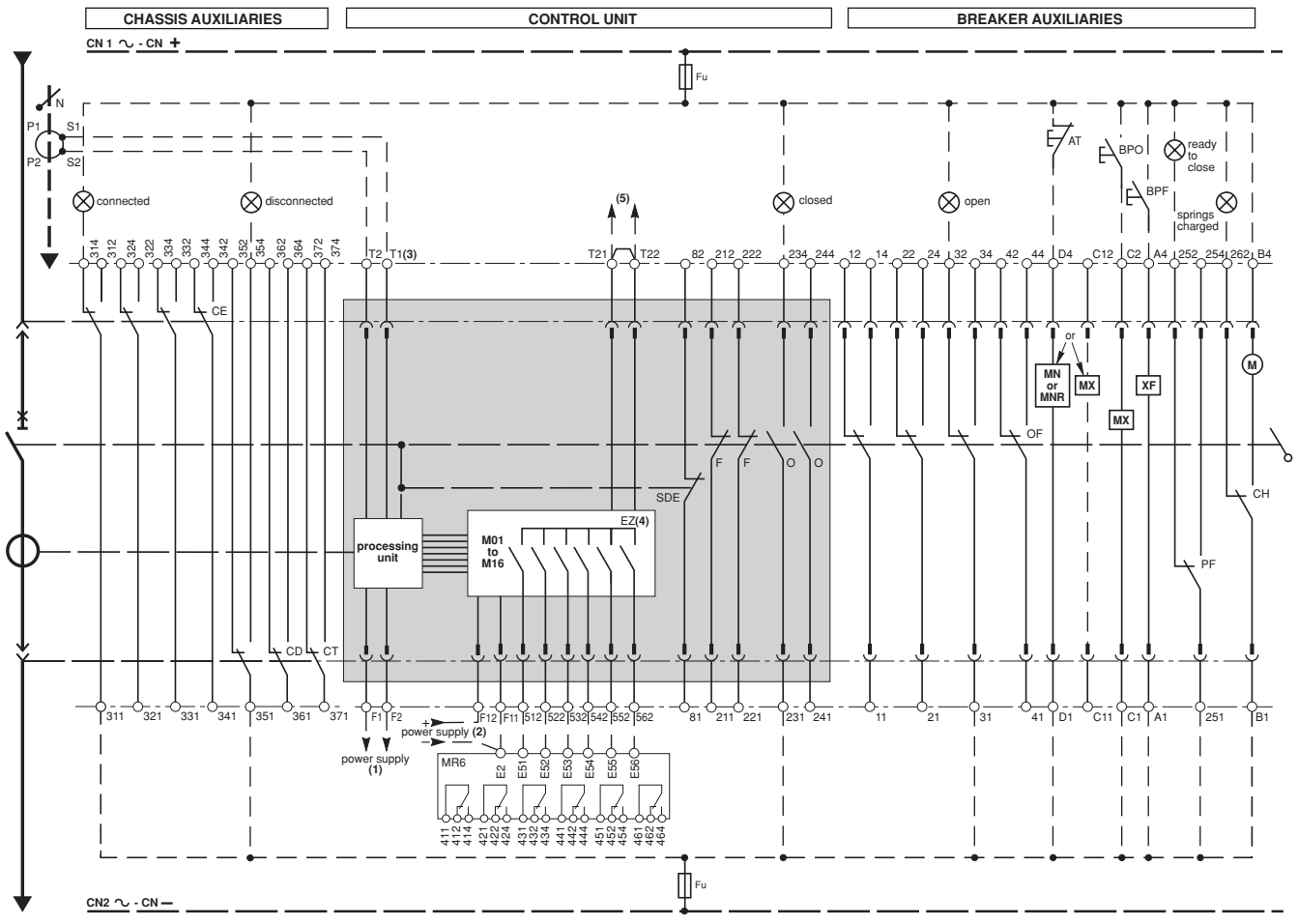
V contact wiring:
for breaker locking, depending on the selected fault.



Selective locking needs:

- External power supply (F1, F2);
- An additional terminal (BS).

STR 68 U
With options m01 to m31

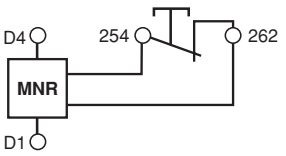


AT: Emergency off
BPO: "Open" pushbutton
BPF: "Close" pushbutton
CE: "Connected" position contact (10 A/240 V AC)
M: Spring charging motor (180 VA/240 V AC)
XF: Closing release (20 VA/240 V AC)
MX: Shunt release (20 VA/240 V AC)
MN: Undervoltage release (20 VA/240 V AC)
MNR: Time delayed undervoltage release (20 VA/240 V AC)
OF: Auxiliary changeover contacts (10 A/240 V AC)
O: 2 auxiliary NO contacts (10 A/240 V AC)
F: 2 auxiliary NC contacts (10 A/240 V AC)
SDE: Fault trip indication contact (10 A/240 V AC)
CH: Charging motor limit switch contact
M01 to M16: Indication option equipped with 6 opto-decoupled Outputs to contacts (0.2 A/24 V DC), for programming as per table on page C54 (EZ: input for earth fault protection zone selective interlocking)
PF: "ready to close" contact (10 A/240 V AC) (closing possible if breaker is open, not locked and operating mechanism charged)
MR6: Relay module with 6 changeover contacts (3 A, 24 V DC)
CD: "Disconnected" position contact (10 A/240 V AC)
CT: Test position contact (10 A/240 V AC).

- Diagram shown with circuits deenergised, breaker open and in "connected" position, springs charged and relays in released position;
- Accessories such as pushbuttons, lamps and fuses are not supplied with the circuit breaker.

(1) Power supply for control unit and modules.
(2) Power supply for option M and module MR6 by module AD.
(3) Terminals T1 and T2 must be imperatively short-circuited when the external CT is not connected.
(4) The zone selective interlocking output is provided by one output of module m01 to m32..
(5) Zone selective interlocking with load side breaker: remove the jumper.

Wiring of the MNR (modified diagram). Instantaneous tripping with MNR when contact 254-262 opens.



Note: the wiring of the external contact replaces the spring charged indication and the contact PF.

STR 68 U
With options m01 to m31

	Module	Terminal number					
		512	522	532	542	552	562
Relay outputs	**Basic version** m01	LT	ST/Inst.		AS		
	Other versions m02	LT	ST/Inst.	limit 1	limit 2	shed 1	shed 2
	m03	LT	ST/Inst.	limit 1	limit 2	shed 1	reconn. 1
	m04	LT	ST/Inst.	limit 1	AS	shed 1	shed 2
	m05	limit 2	ST/Inst.	limit 1	AS	shed 1	shed 2
	m06	LT	ST/Inst.	limit 1	AS	shed 1	reconn. 2
	m07	LT	ST/Inst.	T	limit 1	shed 1	shed 2
	m08	LT	ST/Inst.	T	AS	limit 1	Z
	m09	LT	ST/Inst.	T	AS	shed 1	shed 2
	m10	LT	ST/Inst.	T	Z	shed 1	shed 2
	m11	limit 2	ST/Inst.	T	limit 1	shed 1	shed 2
	m12	LT	ST/Inst.	T	Z	shed 1	reconn. 2
	m13	limit 1	ST/Inst.	T	AS	shed 1	shed 2
	m14	limit 1	ST/Inst.	T	Z	shed 1	shed 2
	m15	Z	ST/Inst.	T	AS	shed 1	reconn. 2
	m16	LT	ST	Inst.	AS	T	
		512	**522**	**1**	**6**	**5**	**9**
Transmission reception outputs	m17	ST/Inst.	LT				
	m18	ST/Inst.	AS				
	m19	T	ST/Inst.				
	m20	T	AS		**data transmission**		
	m21	T	Z				
	m22	Z	AS				
	m23	Z	limit 1				
	m24	Z	shed 1	e^+	e^-	s^+	s^-
	m25	T	shed 1	output	output	input	input
	m26	ST/Inst.	limit 1				
	m27	ST/Inst.	shed 1				
	m28	limit 2	limit 1				
	m29	shed 2	shed 1				
	m30	reconn. 2	shed 1				
	m31	shed 1	AS				

Protection:

LT Long time trip indication

ST/Inst. Short time or instantaneous trip indication

T Earth fault trip indication

Z Zone selective interlocking output

Load monitoring and control:

Limit 1 Indication of Ic1 setting overrun

Limit 2 Indication of Ic2 setting overrun

Shed 1 Load shedding command according to Ic1 setting (limit 1)

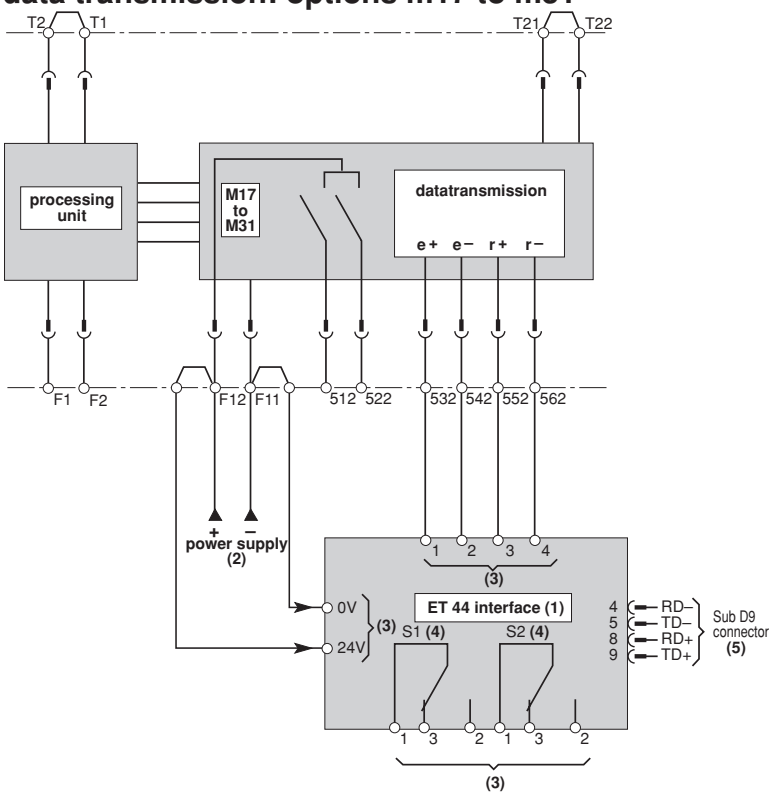
Shed 2 Load shedding command according to Ic2 setting

Reconn. 2 Load reconnection command according to Ic2 setting (limit 2)

Self-monitoring:

AS Indication of control unit fault or overtemperature.

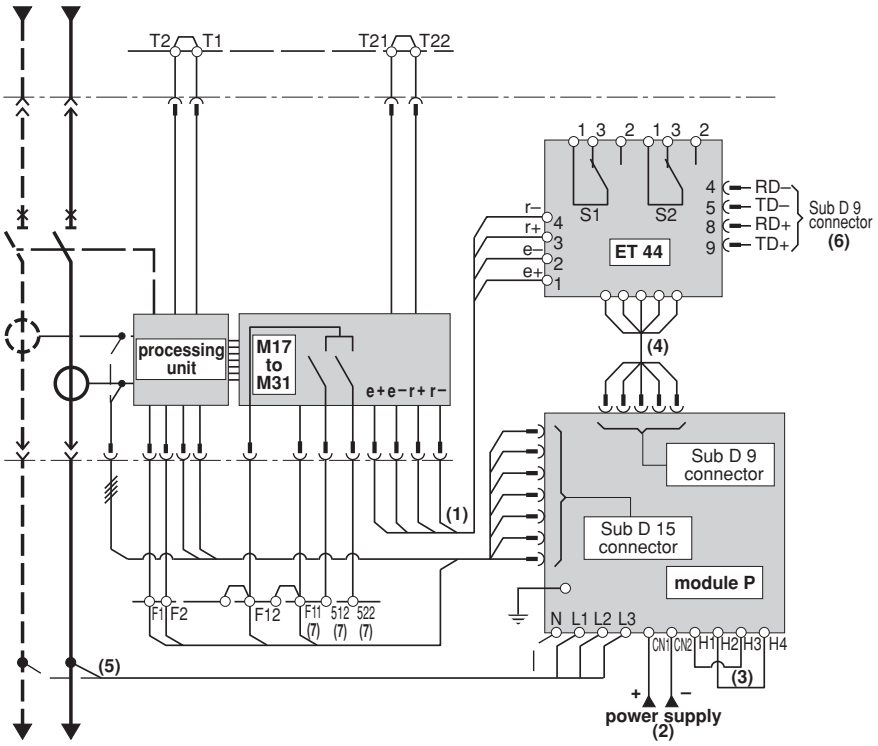
Connection modification for data transmission: options m17 to m31

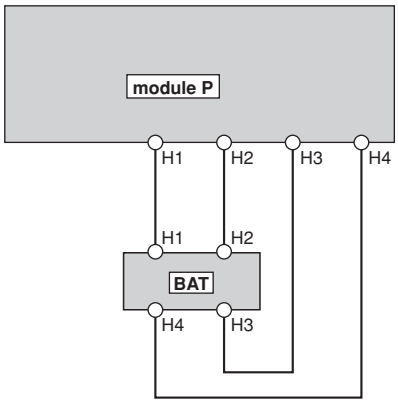


(1) Communication interface for RS485 - 9600 baud network.
(2) Power supply for m option and ET44 interface (AD module).
(3) Provided connectors.
(4) Remote controlled relay output (10 A, 220 V AC).
(5) JBUS, RS485, 9600 baud network.

STR 68 U
With options m01 to m31 (cont.)

Power supply connection





(1) Provided cable: length 1.5 m (connected to chassis).
(2) Available supply sources: 24-48 V DC, 125 V DC, 100-240 V AC.
(3) Backup power for trip unit information with BAT module (remove jumpers).
(4) Provided cable.
(5) Voltage connection (load side shown, line side also available). 3 or 4 poles available.
(6) JBUS, RS 485-9600 baud network.
(7) MR6 module wiring.

Power supply for control units and complementary functions

All the functions of the control units are self-powered by the built-in current transformers. An external power supply is required only if the circuit breaker is underloaded on a three phase system (less than 20 % of the norminal current), or loaded on one phase only.

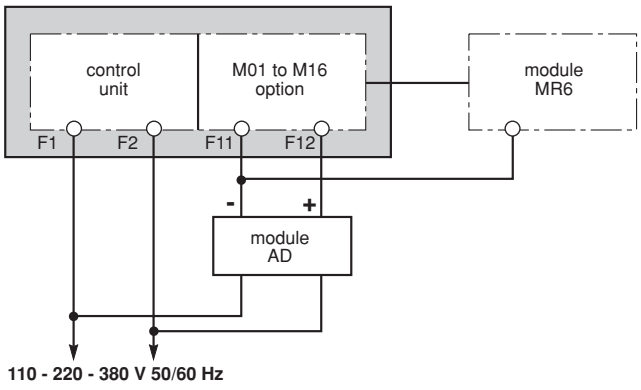
External power supply specifications:

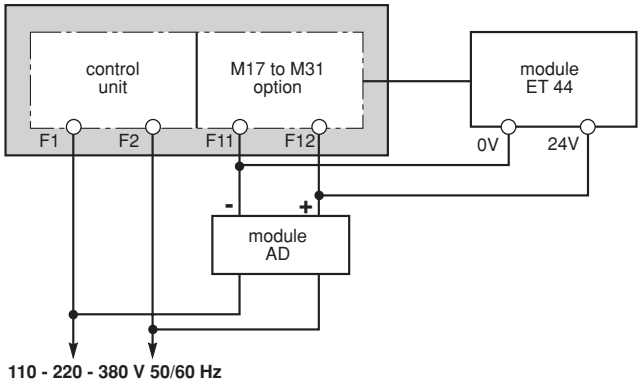
24 V DC-1 W-class 2 with a ripple factor less than 10 %.

A single external power supply (24 V DC, between terminals F1 and F2) is sufficient for all the options (see illustration below). The use of an AD power supply module is recommended.

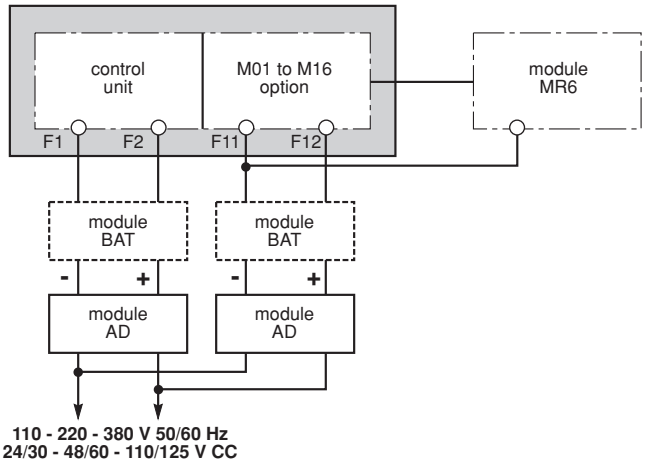
Control unit STR 68 without power module

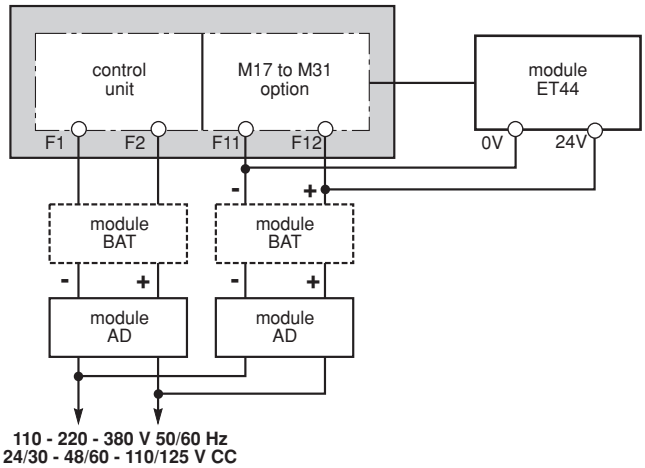
AC supply without indicators maintained after tripping





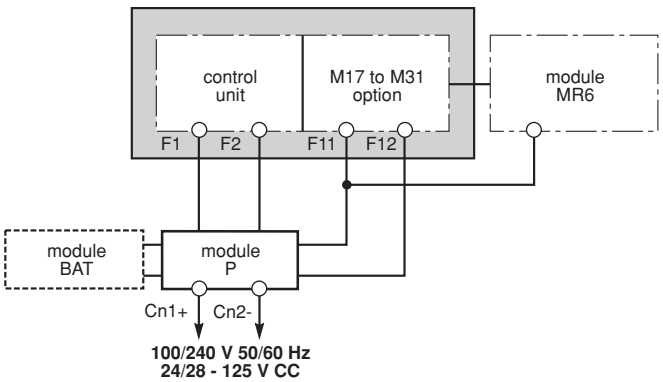
AC supply with indicators maintained after tripping
DC supply with or without indicators maintained after tripping

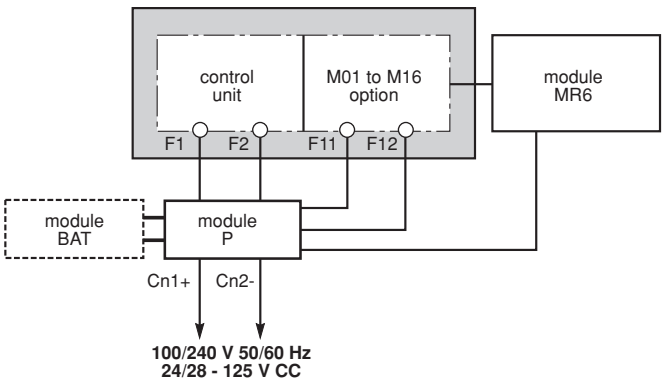




STR 68 control unit with power module

AC or DC supply with or without indicators maintained after tripping





Note: the battery module (BAT) provides back up power to the indicators on the trip unit front face to maintain indications after tripping. It can be omitted if the auxiliary supply is reliable.

Manual source changeover

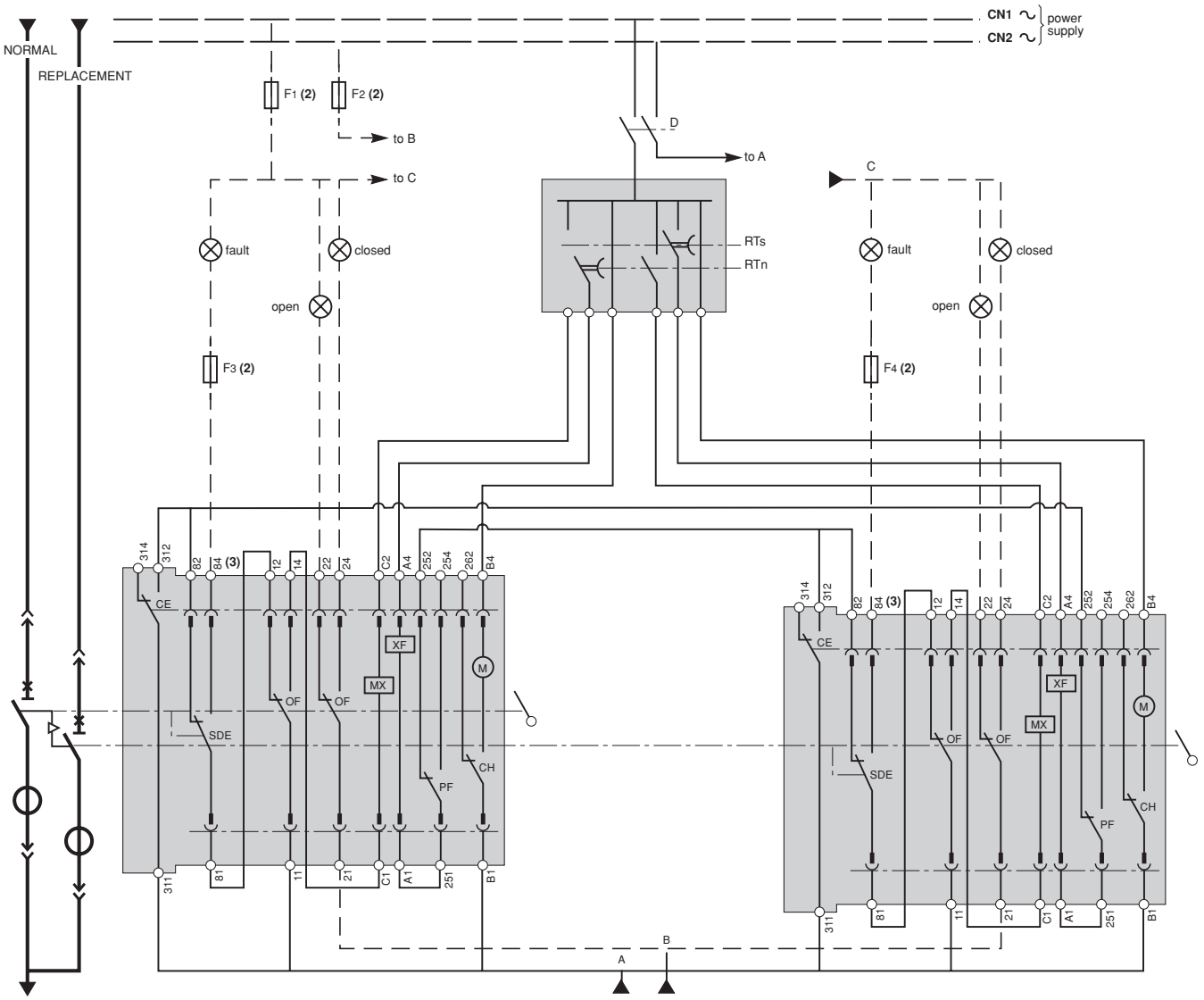
Connection

Version represented:
With lockout after a fault. If lockout after a fault is not required, contact PF of the "normal" breaker must be connected directly in series with contact OF of the "replacement" breaker and vice versa, without passing through the contact SDE.

The indication circuitry, shown in broken lines below, is optional. The accessories such as voltage relays, indicator lights and fuses are not included with the circuit

possible states			
Normal	0	1	0
Replacement	0	0	1

"NORMAL" BREAKER AUXILIARIES | WIRING DIAGRAM PRINCIPLE OF THE AUTOMATISM | "REPLACEMENT" BREAKER AUXILIARIES



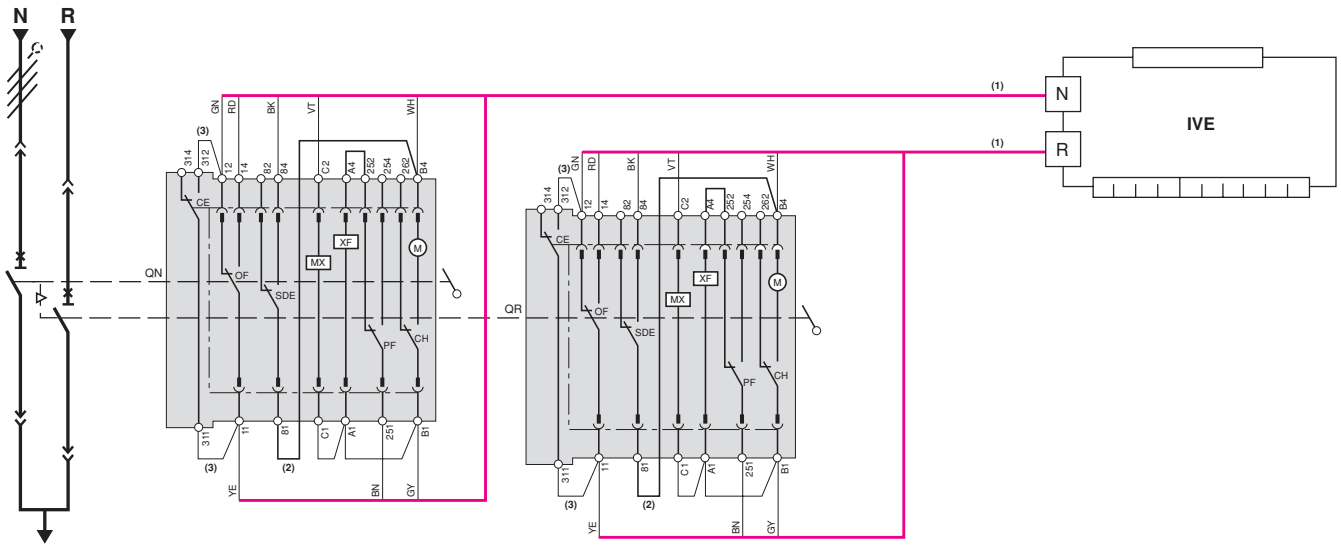
D: P25M circuit breaker (2 x 10 A)
F1, F2, F3, F4: protection fuses
RTs: Voltage relay for "replacement" source
RTn: Voltage relay for "normal" source
CE: "Connected" position contact
M: Spring charging motor
XF: Closing release
MX: Shunt release
OF: Auxiliary changeover contact
SDE: Overcurrent trip indication contact
CH: "Springs charged" contact
PF: "Ready to close" contact

■ Diagram shown with circuits de-energised, breaker open and in "connected" position, springs charged and relays in released position.

Note: the fuses allow clearing of all faults occurring on the indications circuitry without interruption of the source changeover system.

Source-changeover system with 2 circuit breakers without automatic control Masterpact

Possible states			
“Mains”	0	1	0
“Standby”	0	0	1



QN: Masterpact on «Mains» source

QR: Masterpact on «Standby» source

IVE: Electrical interlocking and terminal block unit

M: Motor mechanism

XF: Closing release

MX: Shunt release

CE: Connected position switch

OF: Auxiliary changeover switch

SDE: Overcurrent fault-trip indication switch

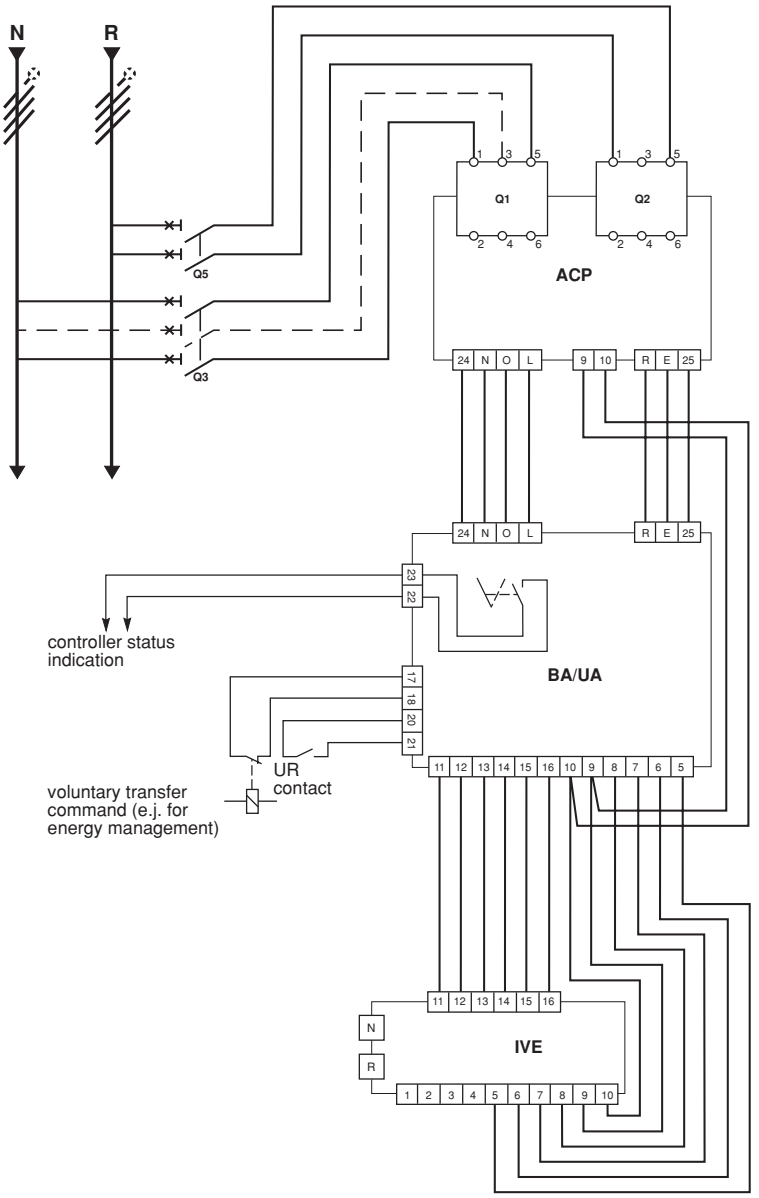
CH: «Springs charged» switch

PF: «Ready to close» contact (closing only possible if device is open, unlocked and operating mechanism charged).

■ Diagram shown with circuits de-energised, breakers open and in «connected» position, springs charged and relays in released position.

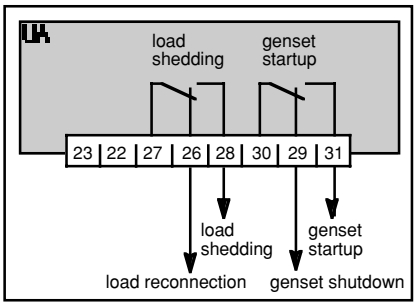
(1) Factory wiring, cannot be modified.

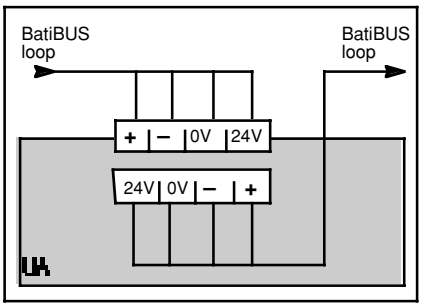
Source-changeover system with controller for Compact and Masterpact circuit breakers



Controller UA

Load shedding and genset management





Q1 : Circuit breaker supplying and protecting the automatic control circuits for the “Mains” source

Q2 : Circuit breaker supplying and protecting the automatic control circuits for the “Standby” source

Q3 : Protection circuit breaker

Q5 : Protection circuit breaker

ACP : Auxiliaries control plate

BA/UA : Controller

IVE : Electrical interlocking and terminal block unit

■ Diagram shown with circuits de-energised, all devices open and relays in the released position.

Tests on “Mains” and “Standby” voltages

BA:

■ Single-phase check for UN and UR:

☐ Tested across terminals 1 and 5 of circuit breakers Q1 and Q2.

UA:

■ Three-phase check for UN:

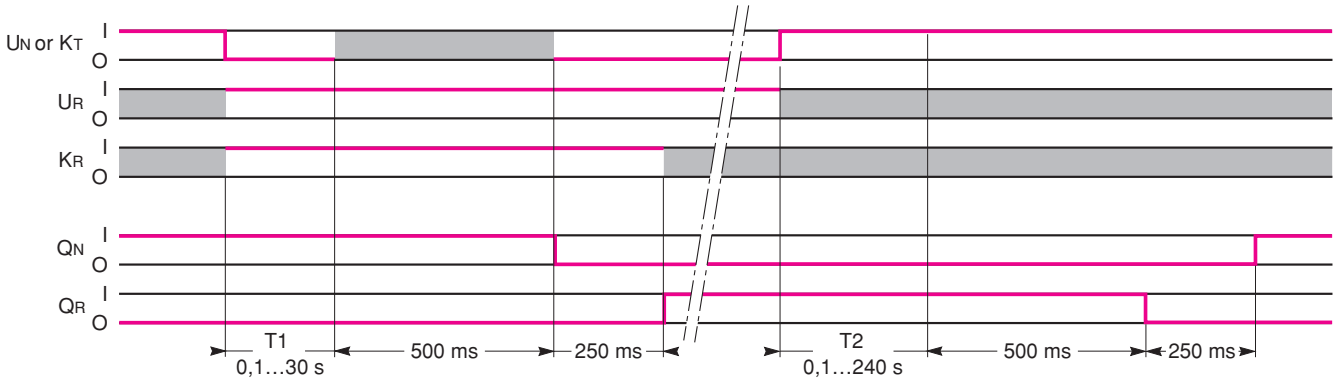
☐ Tested across terminals 1, 3 and 5 of circuit breaker Q1,

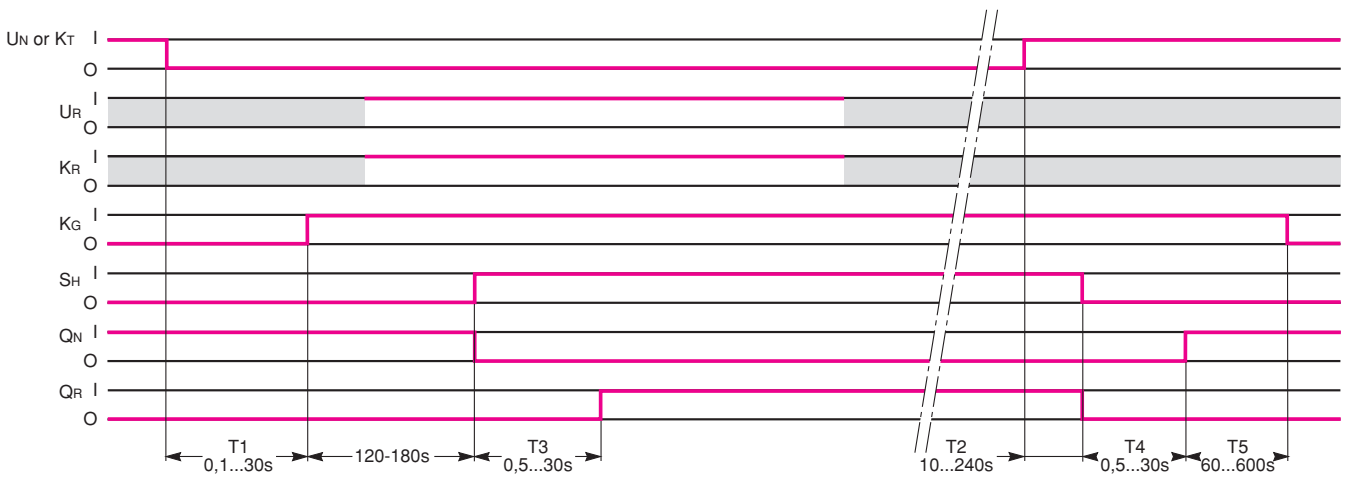
☐ Selection switch A of controller set to 1;

■ Single-phase check for UN :

☐ Tested across terminals 1 and 5 of circuit breaker Q1,

☐ Selection switch A of controller set to 0.





Inputs

UN : Mains-source voltage

UR : Stanby-source voltage

KT : Forced operation on standby-source control signal

KR : Additional check before transfer.

Outputs

KG : Engine-generator set control signal

SH : Load-shedding control signal

QN : Mains-source circuit breaker

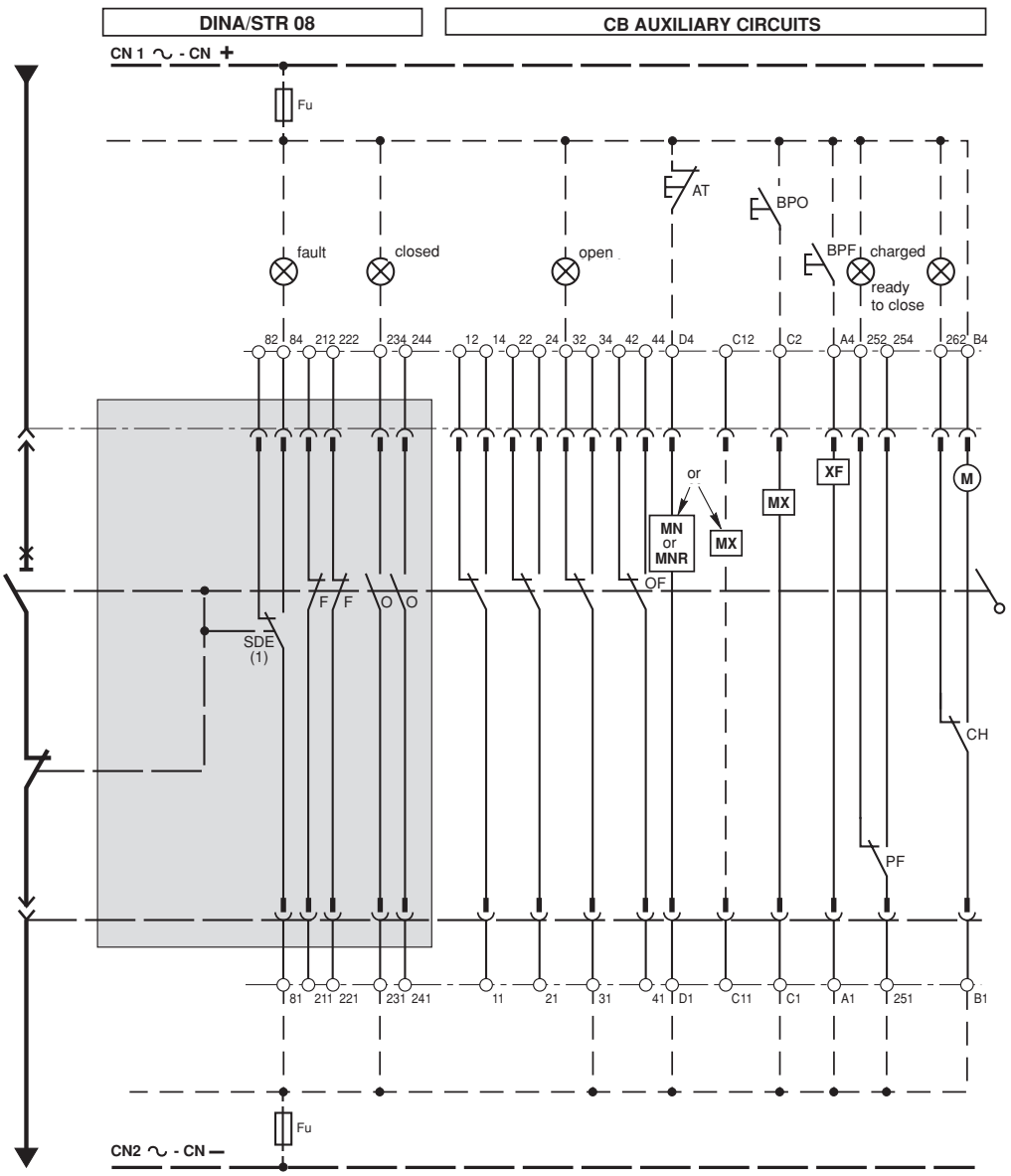
QR : Standby-source circuit breaker.

If UR is not in I state when the transfer order (KT or UN) is given, transfer is not carried out.

If KR is not in I state when the transfer order (KT or UN) is given, transfer takes place only once KR has changed to I state.

Legend

- O position: circuit open
- I position: circuit closed
- : no effect O or I.

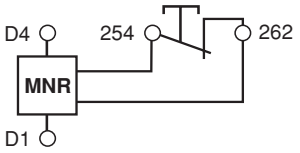


Symbols
Fu: 2 A protection fuse
AT: Emergency off
BPO: Opening pushbutton
BPF: Closing pushbutton
M: Charging motor (180 W)
XF: Closing release (15 W)
MX: Shunt release (15 W)
MN: Undervoltage release (15 W)
MNR: Time-delayed undervoltage release (15 W) (2)
OF: Changeover auxiliary switches
O: Normally open auxiliary switches
F: Normally closed auxiliary switches
SDE: Fault-trip indication contact
CH: "Spring charged" contact
PF: "Ready to close" contact

Accessories such as pushbuttons, fuses, etc. are not supplied with the circuit breaker. The diagram is shown without the supply voltage present, all devices open, connected and charged, relays in the de-energised position and the MN or MNR supplied with power.

(1) Only for the DINA trip unit.
(2) The MNR requires AC current.

MNR wiring for instantaneous tripping



Use terminals 262 («spring charged» indication) and 254 (PF make switch).

Section 10

LV air circuit breakers and switch-disconnectors

Masterpact 80 to 6300 Amp

Order form

10

Masterpact
Detailed order form (AC range)

For faster order processing, please use the following order form.
For each section, tick the box or indicate the value corresponding to your choice.

1 - Circuit breaker

Quantity				
Rating (08... 63)				
Type	N, H, L, ES (earthing switch)			
	or 1000 V AC type			
Number of poles				
Sensor rating			IN	
			TCE	
Version	fixed		F	
	complete drawout		D	
	drawout - moving portion only		A	
	fixed portion only		C	
Connection	top	horizontal	P	standard
		vertical	C	
		front	A	
	bottom	horizontal	P	standard
		vertical	C	
		front	A	
Neutral protection			NONE	
		full	N	
		reduced	N/2	
Neutral on right-hand				
Environment	special conditions			

2 - Control unit

Unprotected A.C.B				
STR 18M	instantaneous protection		STR 18M	
STR 28D	distribution protection		STR 28D	
	ammeter		I	
	overrun alarm contact		ALR	
STR 38S	selective protection		STR 38S	
	ammeter		I	
	overrun alarm contact		ALR	
	earth fault protection	"residual"	T	
		"source ground return"	W	
	fault indicator		F	
	power supply with battery		PIL	
STR 58U	universal protection		STR 58U	
	ammeter		I	
	overrun alarm contact		ALR	
	earth fault protection	"residual"	T	
		"source ground return"	W	
	fault indicator		F	
	power supply with battery		PIL	
	zone selective interlocking		Z	
	charge monitoring		R	
	segregated alarm switch (fault indicator F included)		FV	
	communication		C	
	long time protection inhibition		PLROFF	
STR 68U	universal protection		STR 68U	
	power supply voltage			V
	service continuity		YES	NO
	module type		M	
	power measurement		P	V
	earth fault protection	"residual"	T	
		"source ground return"	W	
control unit accessories	relay module		MR6	
	interface module		ET44	
	power supply module		AD	
	safeguard battery module		BAT	
	sealable cover		PBD	
	automatic reset		RAR	

Note : this order form does not take into account possible incompatibilities

Masterpact
Detailed order form (AC range)

3 - Electrical auxiliaries

Manual operating mechanism (only)			
Electrical operating mechanism	geared motor	MCH	V
	operations counter	CDM	
	closing release voltage release specify below	XF	V
Voltage release	shunt release	MX	V
	undervoltage release	MN	V
	time delayed undervoltage	MNR	V
	with instant wiring	MNRI	V
Auxiliary switch	2O+2C+SDE		standard
	4 changeovers	OF	
	24 additional changeover	OFSUP	
	ready to close	PF	
	4 connected position switches	CE	
	2 disconnected position switches	CD	
	1 test position switch	CT	
Auxiliary connection accessories	additionnal terminal block	BS	

5 - Manual and automatic source changeover

Separate components	fixed/mixed		complete drawout	
Mechanical interlocking	VM2FT		VM2CT	
	VM2FC		VM2CC	
	VM33FT		VM33CT	
	VM32FT		VM32CT	
	VM31FT		VM31CT	
Automatic changeover controller	AIS240C60H		AIS380C	
Diagram number				

Complete assemblies	fixed/mixed	complete drawout
2 alone breakers		
2 breakers with controller		
Diagram number		
Controller voltage		
Breaker position	bottom	top
Standby		
3 alone breakers		
Diagram number		

Mechanical interlocking	VM33FT		VM33CT	
	VM32FT		VM32CT	
	VM31FT		VM31CT	
Breaker position : top/medium/bottom	specify their characteristics with order			

4 - Mechanical and installation accessories

Pushbutton locking device			VBP	
"Off" position lock				
	VSPA1		VSPA2	
	VSPRAC		VSRA1	
	VSRA2		VSCA	
	VSKA			
Disconnected position locking				
	VSPC1		VSPC2	
	VSRC2		VSPRCC	
	VSRC1		VSCC	
	2VSRC1		2VSPC1	
	VSKC			
Connected - test - disconnected position locking				
	VSEPC		2VSEPC	
	VSERC		2VSERC	
	VSECC		VSEKC	
	VEC			

Installation accessories	righthand door lock	VPECD	
	lefthand door lock	VPECG	
	racking interlock in open position door	VPOC	
	withdrawal/spring charged interlock	VEAA	
	safety shutters	VO	
	shutter lock (1 or 2)	VVC	
	arc chute cover	CC	
	terminal shield	CB	
	inter phase barriers	EIP	
	partitioning fixture	AC	
	door frame	CDP	
	door frame with transparent cover	CCP	
	breaker mismatch protection	VDC	

Note : this order form does not take into account possible incompatibilities

Masterpact
Order form (DC range)

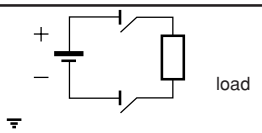
For faster order processing, please use the following order from.
For each section, tick the box for indicate the value corresponding to your choice.

1 - Circuit breaker

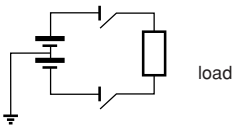
Quantity				
Rating	1000 A		M10DC	
	2000 A		M20DC	
	4000 A		M40DC	
	6000 A		M60DC	
	8000 A		M80DC	
Maximum voltage	500 V	up to 4000 A	500 V	
	750 V	up to 4000 A	750 V	
	1000 V	up to 4000 A	1000 V	
	250 V	6000-8000 A	250 V	
Type	(for distribution system selection, see diagrams opposite)			
	up to 4000 A			
	all systems (n° 1-2-3/1st alt.)	3 poles 500 V max.	D	
	isolated network (n° 1)	4 poles 1000 V max.	E	
	earthed middle point (n° 2)	4 poles 1000 V max.	E	
	earthed negative polarity (n° 3/2nd alt.)	3 poles 750 V max.	H	
	earthed negative polarity (n° 3/1st alt.)	4 poles 750 V max.	F	
	earthed negative polarity (n° 3/2nd alt.)	4 poles 1000 V max.	J	
	6000 A - 8000 A			
	all systems (n° 1-2-3)	2 poles 250 V max.	G	
Version	fixed	up to 4000 A	F	
	drawout		D	
	drawout without chassis		A	
	chassis only		C	
Connection	top	horizontal (up to 2000 A)	P	
		vertical	C	
	bottom	horizontal (up to 2000 A)	P	
		vertical	C	
Environment	for grease protection		PROTGF	

Diagrams

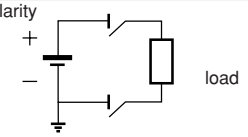
network n° 1 isolated network



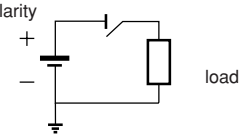
network n° 2 earthed middle point



network n° 3 (1st alternative) earthed negative polarity



network n° 3 (2nd alternative) earthed negative polarity



Note : this order form does not take into account possible incompatibilities

Masterpact
Order form (DC range)

2 - Protection

Type	without switch		STR 08I	
	or instantaneous DINA for M10-M20-M40	1500 A - 3000 A	1.5/3 K	
		3000 A - 6000 A	03/06 K	
		6 kA - 12 kA	06/12 K	
		10 kA - 20 kA	10/20 K	
	or instantaneous DINA for M60-M80	9 kA - 18 kA	9/18 K	
		12 kA - 24 kA	12/24 K	
		20 kA - 40 kA	20/40 K	
Assessories	sealable cover		PBC	

3 - Electrical auxiliaries

Manual operating mechanism only			
Electrical operating mechanism	gear-motor	MCH	V
	operations counter	CDM	
	closing release	XF	V
Voltage releases	shunt release	MX	V
	instantaneous undervoltage	MN	V
	time delayed undervoltage	MNR	V
	with instant wiring	MNRI	V
Auxiliary switches	4 changeover contacts	OF	
	automatic reset	RAR	
	ready to close	PF	
Accessory for auxiliary connections	disconnectable plug (1 or 2) compulsory	DP	standard

4 - Mechanical and installation accessories

Pushbutton locking device		VBP	
"Off" position locking device		VSPA1	
		VSPA2	
		VSPRAC	
		VSRA1	
		VSRA2	
"Disconnected" position locking device		VSPC1	
		VSPC2	
		2VSPC1	
		VSPRCC	
		VSRC1	
		VSRC2	
		2VSRC1	
"Disconnected/connected/test" position locking device		VSEPC	
		2VSEPC	
		VSERC	
		2VSERC	
		VEC	
Installation accessories	right-hand door interlock	VPECD	
	left-hand door interlock	VPECG	
	racking interlock	VPOC	
	withdrawal/spring charged interlock	VEAA	
	safety shutters (standard)	VO	standard
	shutter lock (1 or 2)	VCC	
	arc-chute cover (standard)	CC	standard
	door frame	CDP	
	transparent cover	CCP	
	circuit breaker mismatch protection	VDC	

Note : this order form does not take into account possible incompatibilities