Masterpact™ MP circuit breaker table of contents

Masterpact™ MP circuit breaker introduction, advantages

standard compliance

■ UL489 : Masterpact™ MP 08 to MP 30 circuit breakers and their accessories are listed under UL file E63335, E113554 and E113555

■ international standards : Masterpact™ has been designed to meet all the major standards including :

❑ IEC 157-1
❑ british BS 47-52
❑ french NF C63-120
❑ german VDE 660
❑ australian AS 1930

■ marine applications :

❑ homologated by Bureau Veritas
❑ approved by Det Norske Veritas and Germanische Lloyd's
❑ listed by Lloyd's Register of shipping
❑ American Bureau of shipping application.

other performances

The UL 489 standard assures that the circuit breaker has sufficient characteristics to be used in normal conditions.
However, Masterpact™ exceeds without additional costs the standard 1,500 operations required in endurance. The heavy duty mechanism and the contact design provide a mechanical endurance of 10,000 operations without maintenance.

interrupting ratings

type 3-pole	ampere rating (A)	interrupting ratings RMS Sym. Amps 240V	480V	600V	short time rating (A) (0.5 sec)
standard interrupting rating					
MP 08H1	800	50,000	50,000	50,000	50,000
MP 12H1	1200	65,000	65,000	65,000	65,000
MP 16H1	1600	65,000	65,000	65,000	65,000
MP 20H1	2000	65,000	65,000	65,000	65,000
MP 25H1	2500	65,000	65,000	65,000	65,000
MP 30H1	3000	65,000	65,000	65,000	65,000
MP 40H1	4000	100,000	100,000	100,000	100,000
MP 50H1	5000	100,000	100,000	100,000	100,000
MP 63H1	6300	100,000	100,000	100,000	100,000
high interrupting rating					
MP 08H2	800	100,000	100,000	65,000	65,000
MP 12H2	1200	100,000	100,000	65,000	65,000
MP 16H2	1600	100,000	100,000	65,000	65,000
MP 20H2	2000	100,000	100,000	65,000	65,000
MP 25H2	2500	100,000	100,000	65,000	65,000
MP 30H2	3000	100,000	100,000	65,000	65,000
MP 40H2	4000	150,000	150,000	100,000	100,000
MP 50H2	5000	150,000	150,000	100,000	100,000
MP 63H2	6300	150,000	150,000	100,000	100,000

tropicalisation

The standard moisture and fungus protection ensure normal operation under extreme ambiant conditions.
Masterpact™ breakers comply with T2 tropicalisation (IEC standard 62 30) ; relative humidity 95% and 113°F (45°C) and 80% at 131°F (55°C) (hot - humid climate).
Salt spray resistance as per IEC 68 2 11.

ratings

type	ampere rating (A)	sensor ratings (A)
MP 08	800	250-400-600-800
MP 12	1200	800-1000-1200
MP 16	1600	1200-1600
MP 20	2000	1600-2000
MP 25	2500	2000-2500
MP 30	3000	2500-3000
MP 40	4000	2500-3000-4000
MP 50	5000	4000-5000
MP 63	6300	5000-6300

single design up to 6300A

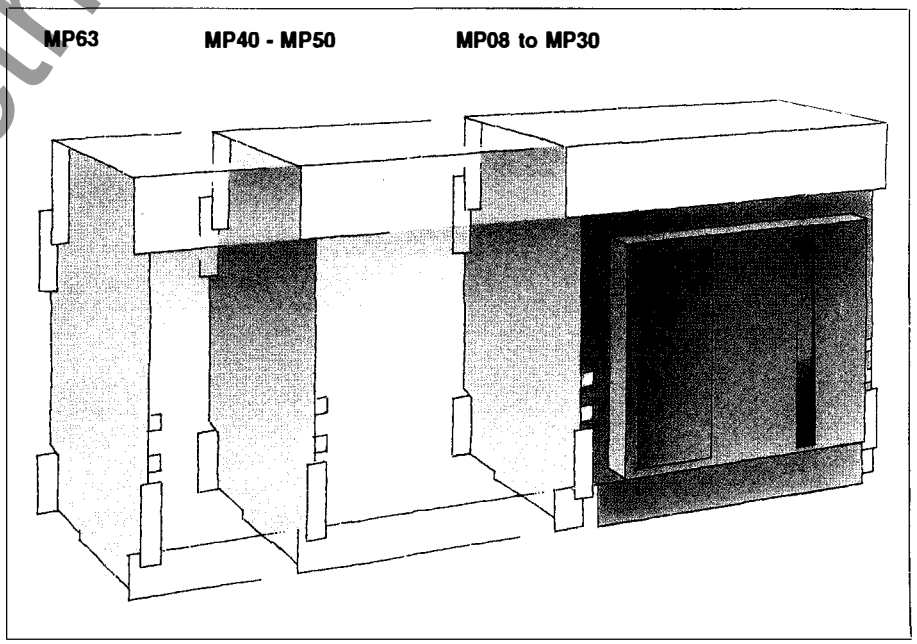
All frame sizes have been designed with the same technology featuring a single depth and door cutout, common control units and accessories.

high short time current rating: up to 100kA for 1 sec.

The exceptional short time rating of 65,000A in a 3000A frame and 100,000A in a 4000A frame and above allows Masterpact™ to be fully selective up to its interrupting rating.

100% rated

Masterpact™ circuit breakers are designed for continuous operation at 100% of their current rating as permitted by the NEC. (UL listing applies up to 3000A)

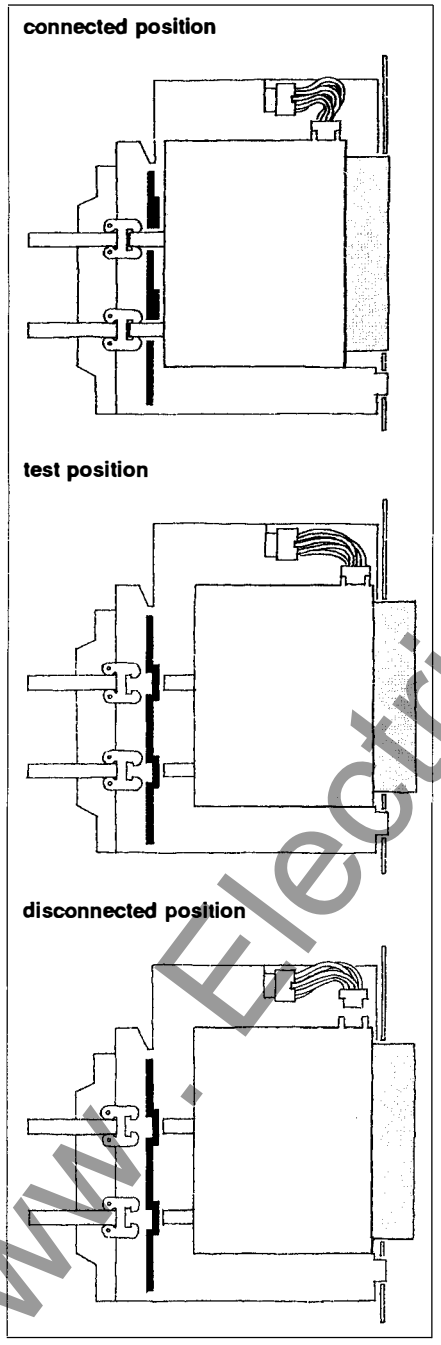


Masterpact™ MP circuit breaker advantages

drawout breaker design

■ The drawout assembly mechanism allows the breaker to be racked in 4 positions (connected, test, disconnected and withdrawn).

■ The closing and opening push buttons, the racking handle and racking mechanism are accessible through the front door cutout. Disconnecting the breaker will be therefore possible without opening the door and accessing live parts. Safety shutters can be provided for protection from live parts when the breaker is removed.



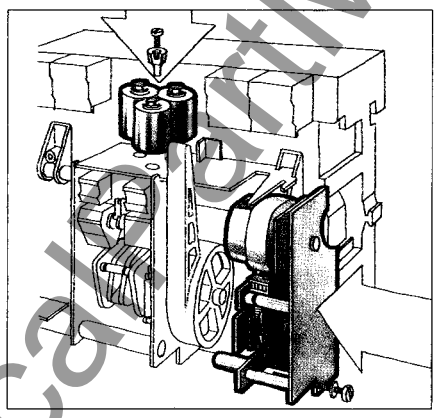
true 2-step stored energy mechanism

The closing time is less than 5 cycles. Masterpact™ circuit breaker is operated via a stored energy mechanism which can be manually or motor charged. Closing and opening operations can be initiated either from the local pushbuttons on the circuit breaker front face, or by remote control. O-C-O cycle is possible without recharging.

field installable accessories

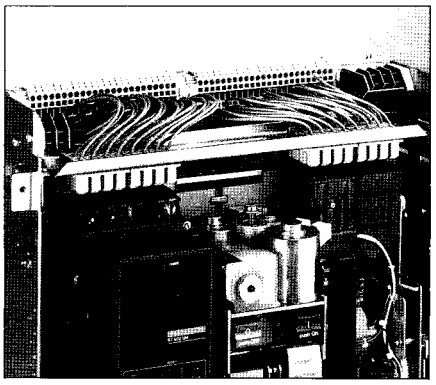
■ As the installation develops and changes Masterpact™ can develop and change with it. Most accessories are field installable without loosing the listing mark, without any adjustment and with only the aid of a screwdriver.

■ The uniform design of the line allows these accessories to be common for the whole line.



front connection of secondary circuits

All accessory terminals are located on a connecting block which is accessible from the front even with the breaker in the test or disconnected position. This is particularly useful for field inspection and modification.



designed for no maintenance...

Masterpact™ circuit breaker has fewer parts (by a factor of at least 5) than conventional lines while performing the same functions. This leads to greatly enhanced reliability and reduction in maintenance.

Under normal operating conditions, given by standards and controlled by tests, Masterpact™ does not require maintenance.

...but exceeds the standard provided an easy and reduced maintenance

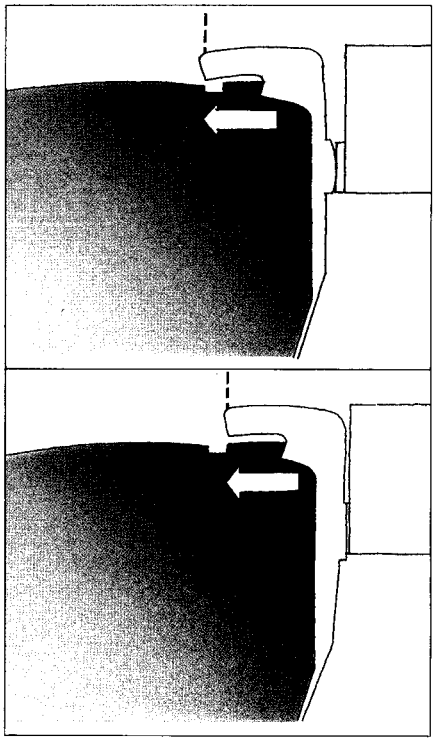
It is easy to remove the arc-chutes and visually inspect the contacts and wear indicator. The operation counter (option of the spring charging motor) can also indicate on the moment where the inspection should be done and possibly the maintenance.

After operating conditions exceeding those given by standards, it is possible to extend the Masterpact™ life accordingly proceeding to a reduced maintenance :

- replacement of arc chutes and spring charging motor by the user
- replacement of main contacts by our after sale service man.

This operation can take place on site.

note: see page 37 for additional information



Masterpact™ MP circuit breaker advantages

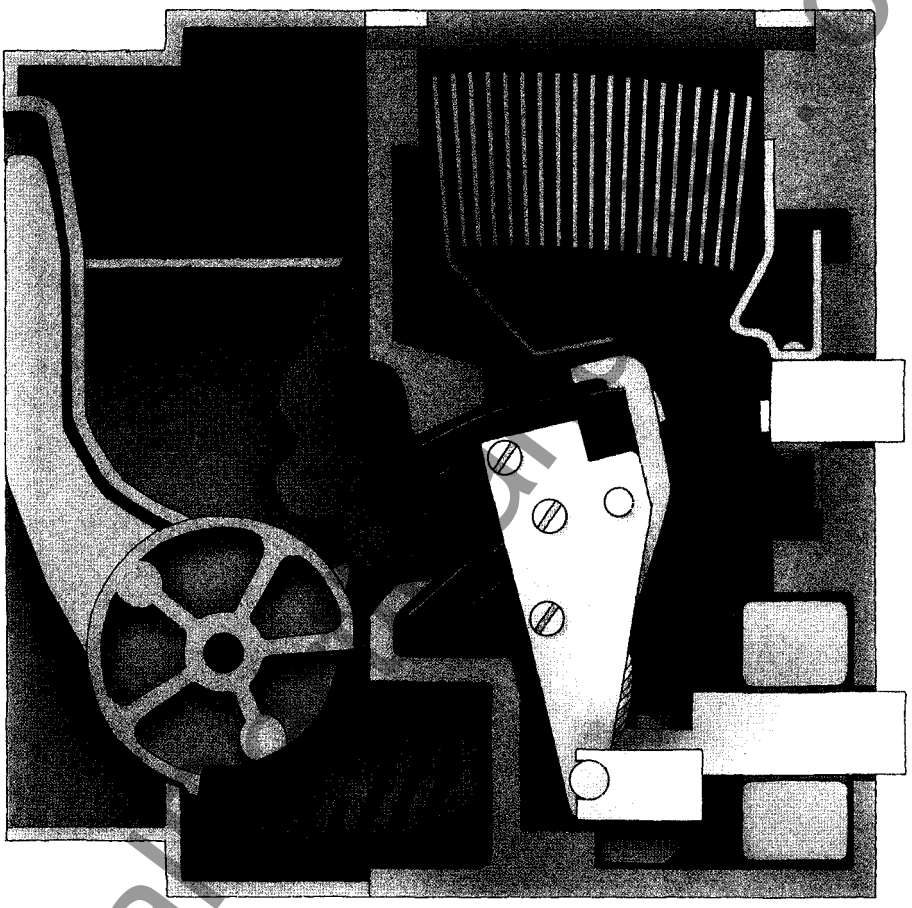
improved safety

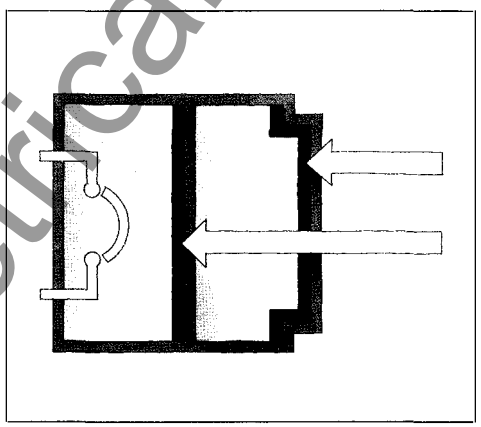
■ **segregated compartment**
Once the front cover has been removed, leaving access to the auxiliary compartment the main contacts remain fully isolated. Furthermore, interphase partitioning allows full insulation between each pole even if the front cover has been removed.

■ **isolation function by positive indication of contact status**
The mechanical indicator is truly representative of all three main contacts status.

■ **reinforced insulation**
Two insulation barriers separate the front of the circuit breaker from main circuits.

■ **disconnecting thru door**
The racking handle and racking mechanism are accessible through the front door cutout. Disconnecting the breaker will be therefore possible without opening the door and giving access to live parts.





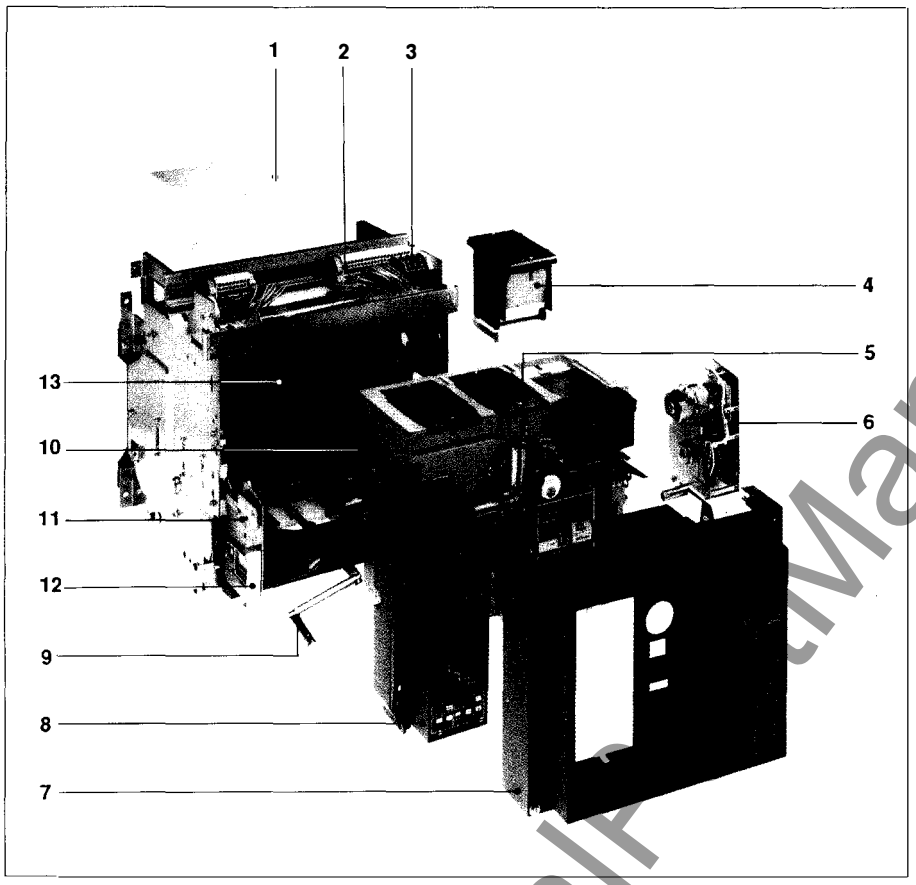
solid state protection and control

Masterpact™ is equipped with solid state control units which provide all the traditional protection of the universal power breaker (long time, short time, instantaneous and ground fault) plus other built-in functions :

		ST 208D	ST 308S	ST 318S	ST 408S①	ST 418S①
basic function						
long time	pickup	adjustable	adjustable	adjustable	adjustable	adjustable
	delay	fixed	fixed	fixed	adjustable	adjustable
short time	pickup		adjustable	adjustable	adjustable	adjustable
	delay		adjustable	adjustable	adjustable	adjustable
instantaneous		adjustable	fixed	without	fixed	without
test receptacle		■	■	■	■	■
additional functions						
ground fault			■	■	■	■
load monitoring			■	■	■	■
fault indicators			■	■	■	■
built-in ammeter		■	■	■	■	■

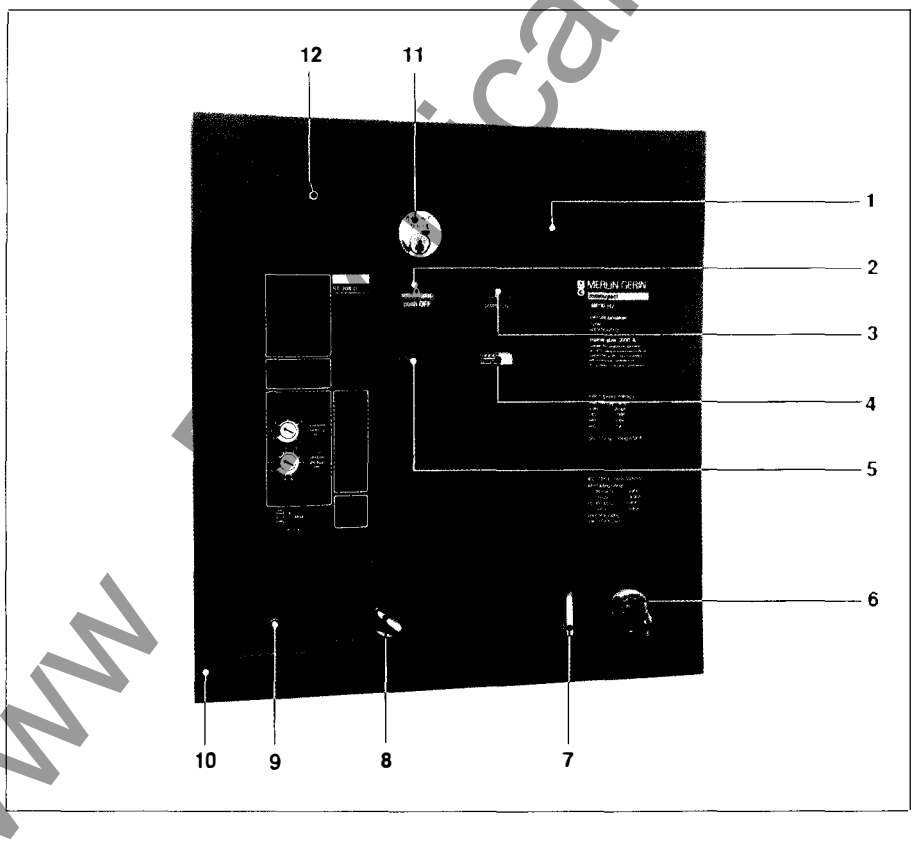
① not available on MP 63 type.

Masterpact™ MP circuit breaker description



description

1 control terminal covers
2 accessories and control unit front connecting block
3 position carriage switches
4 arc chute
5 opening coils
6 spring charging motor
7 front cover
8 control unit
9 racking crank
10 handling handgrip
11 retractable rails
12 pull-out handgrip
13 safety shutters



front vew

1 charging handle
2 manual opening push-button
3 manual closing push-button
4 stored energy mechanism status indicator (charged or discharged)
5 main contact position indicator (ON or OFF)
6 disconnected position locking (Kirk key lock)
7 disconnected position padlocking
8 drawout position indicator showing that the circuit breaker is in the connected, test or disconnected position
9 racking crank housing
10 door escutcheon
11 fault indicator and reset button
12 open position locking (Kirk key lock)

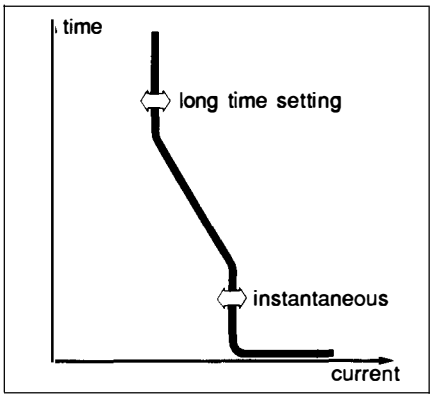
Masterpact™ MP circuit breaker control units

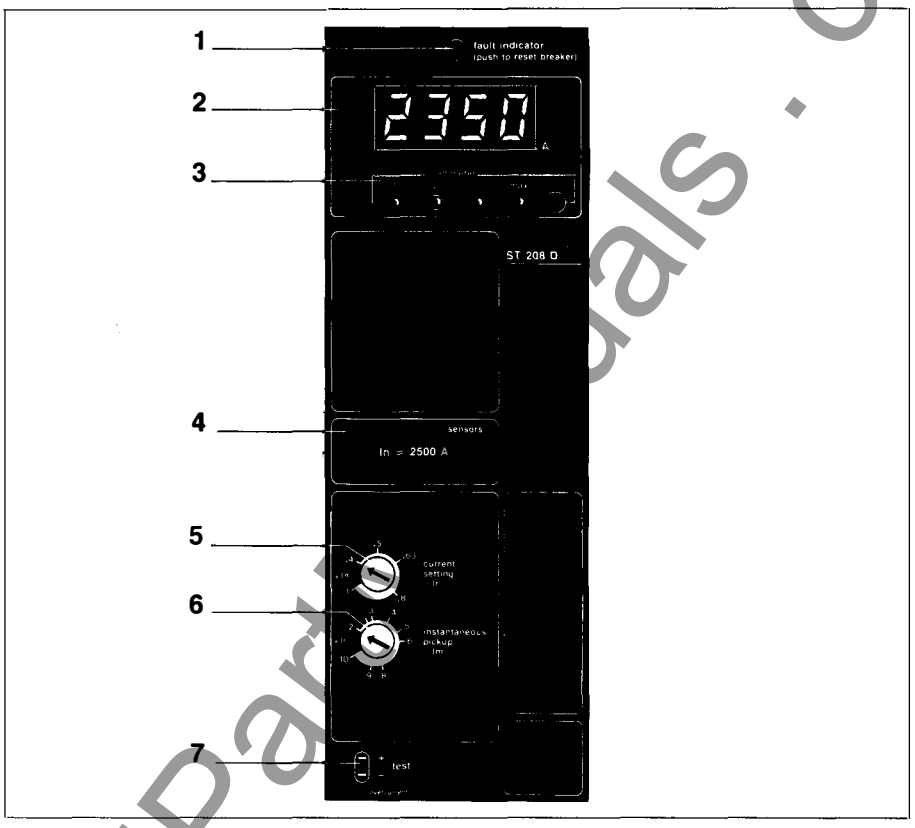
ST 208D
for general application

1 mechanical pop-out type fault indicator and reset button
- indicates that a fault trip has occurred
- prevents reclosure of the circuit breaker after fault until reset

2 ammeter (LED digital display)
3 ammeter selector used to :
- read phase currents (1, 2, 3)
- read the phase with the highest load current (max)

4 sensors rating
5 long time current setting
6 instantaneous pickup
7 test receptacle





overcurrent protection

long time	current setting	0.4 to 1 x sensor rating
instantaneous	pickup	2 to 10 x current setting
test receptacle	for overcurrent testing	

built-in ammeter

option I	control voltage	120 to 240V 50-60Hz
	display	phase 1, phase 2, phase 3, phase max.
	accuracy	± 1,5 %①

fault indicators

	local	by mechanical pop-out type indicator
	remote	by overcurrent trip switch-see page 15

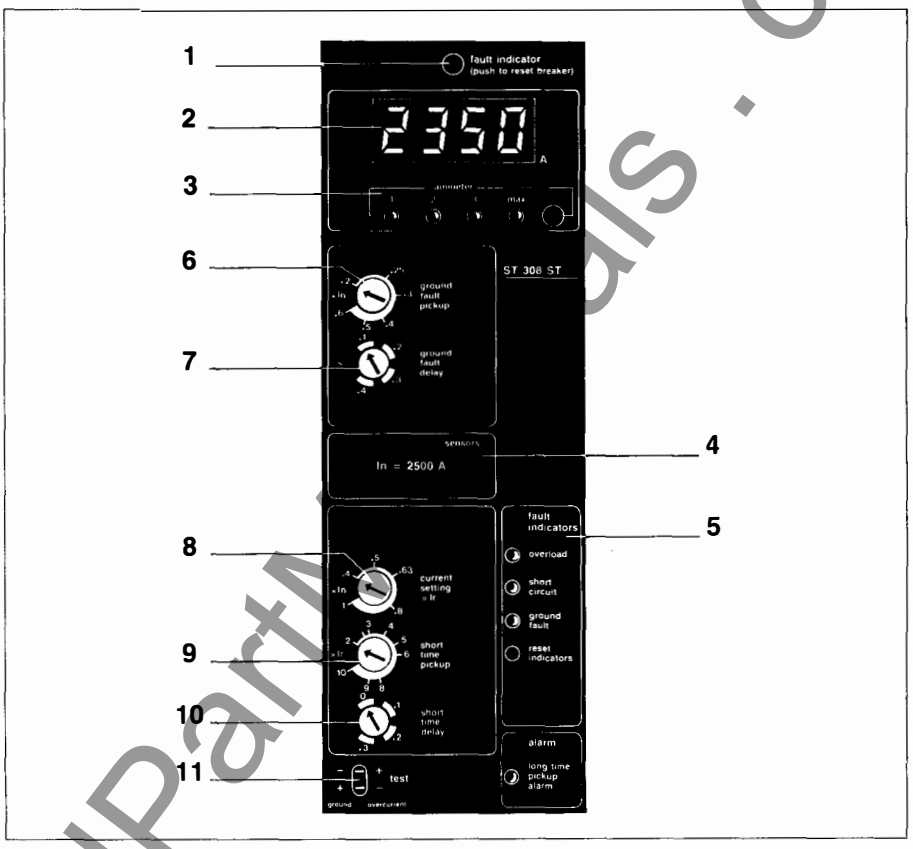
① total accuracy including current sensors: ± 4,5%

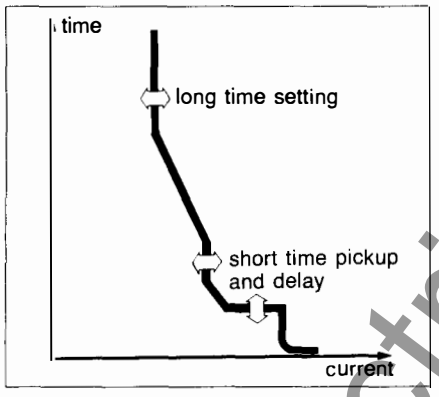
1 mechanical pop-out type fault indicator and reset button
- indicates that a fault trip has occurred
- prevents reclosure of the circuit breaker after fault until reset

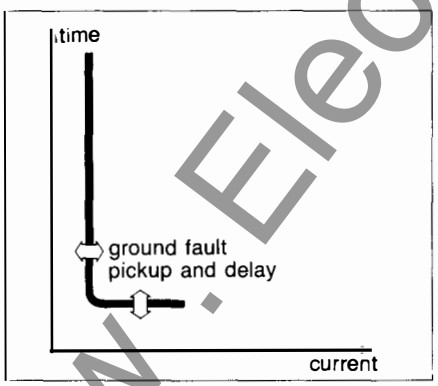
2 ammeter (LED digital display)
3 ammeter selector used to :
- read phase currents (1, 2, 3)
- read the phase with the highest load current (max)

4 sensors rating
5 local (option F) or local and remote (option J) fault indicators: they consist of built in light emitting diode :
- fault indicators differentiate the 3 causes of tripping : overload, short circuit and ground fault if any.
- alarm indicator indicates before the breaker trips that the long time pickup has been exceeded.

ground fault (option T) or load monitoring (option R) :
6 ground fault or load monitoring pickups
7 ground fault time delay or load monitoring pickup
8 long time pickup
9 short time pickup
10 short time delay
11 test receptacle







① 0.5 to 1 x sensor rating with load monitoring option
② Option T (ground fault protection) and option R (load monitoring) cannot be combined
③ Residual scheme. The maximum ground fault pick-up meets 1984 National Electrical Code paragraph 230-95(a) (not exceed 1200A)
④ Total accuracy including current sensors: ±4,5%

overcurrent protection

long time	current setting	0.4 to 1 x sensor rating ①							
short time	pickup	2 to 10 x current setting							
	delay bands	0 - 0.1 - 0.2 - 0.3							
instantaneous	ST 308S	ratings (A)	250-1600	2000	2500	3000	4000	5000	6300
pickup		standard	28	21	18	14	11	11	11
(multiple of sensor		factory set	12-14-18-21	12-14-18	12-14	12	6-8	6-8	6-8
ratings)	ST 318S	without							
test receptacle	for overcurrent and ground fault testing								

ground fault protection ②③

pickup	MP08 to MP20	0.2 to 0.6 x sensor rating
	MP25 to MP30	0.2 to 0.4 x sensor rating
	MP40 to MP63	fixed at 1200A
delay band	0.1 - 0.2 - 0.3 - 0.4	
zone selective	with option Z	

load monitoring ②

inverse time	pickup	Ic1 = 0.8 to 1 x current setting
alarm		Ic2 = 0.8 to 1 x current setting
option R	time delay	see time-current curve page 27

fault indicators

not discriminated	local	by mechanical pop-out type indicator
	remote	by overcurrent trip switch. See page 15
discriminated	local	with option F - see page 10
	local and remote	with option J - see page 10

built-in ammeter

option I	control voltage	120 to 240V 50-60Hz
	display	phase 1, phase 2, phase 3, phase max.
	accuracy	± 1,5 % ④

Masterpact™ MP circuit breaker control units

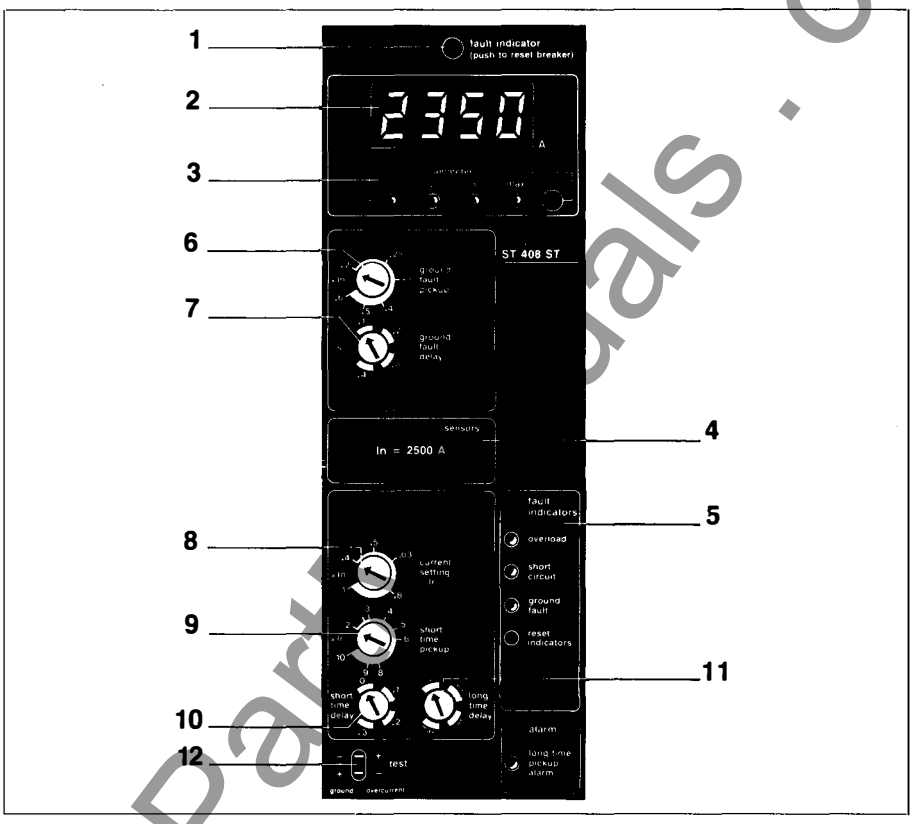
ST 408S - ST 418S
for selective application and generator protection

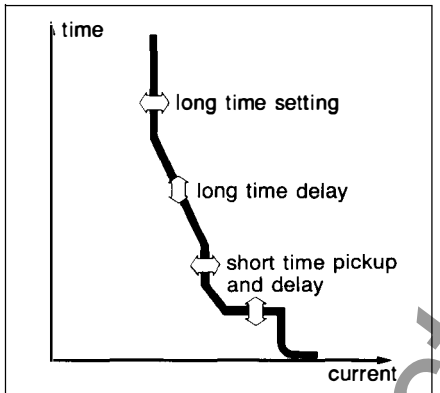
1 mechanical pop-out type fault indicator and reset button
- indicates that a fault trip has occurred
- prevents reclosure of the circuit breaker after fault until reset

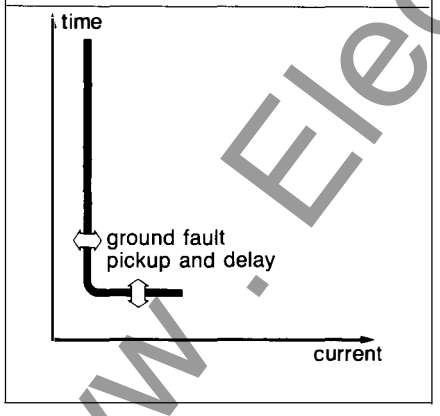
2 ammeter (LED digital display)
3 ammeter selector used to :
- read phase currents (1, 2, 3)
- read the phase with the highest load current (max)

4 sensors rating
5 local fault indicators (option F) : they consist of built-in light emitting diode :
- fault indicators differentiate the 3 causes of tripping: overload, short circuit and ground fault if any.
- alarm indicator indicates before the breaker trips that the long time pickup has been exceeded.

ground fault (option T) or load monitoring (option R) :
6 ground fault or load monitoring pickups
7 ground fault time delay or load monitoring pickup
8 long time pickup
9 short time pickup
10 short time delay
11 long time delay
12 test receptacle







overcurrent protection

long time	current setting	0.4 to 1 x sensor rating ①					
	delay bands	G - MIN. - INT. - MAX.					
short time	pickup	1.6 to 10 x current setting					
	delay bands	0 - 0.1 - 0.2 - 0.3					
instantaneous pickup (multiple of sensor ratings)	ST 408S	ratings (A)	250-1600	2000	2500	3000	4000	5000
		standard	28	21	18	14	14	14
		factory set	12-14-18-21	12-14-18	12-14	12	12	12
	ST 418S	without						
test receptacle	for overcurrent and ground fault testing							

ground fault protection ②③

pickup	MP08 to MP20	0.2 to 0.6 x sensor rating
	MP25 to MP30	0.2 to 0.4 x sensor rating
	MP40 to MP50	fixed at 1200A
delay band	0.1 - 0.2 - 0.3 - 0.4	
zone selective	with option Z	

load monitoring

inverse time alarm	pickup	Ic1 = 0.8 to 1 x current setting
		Ic2 = 0.8 to 1 x current setting
option R	time delay	see time-current curve page 27

fault indicators

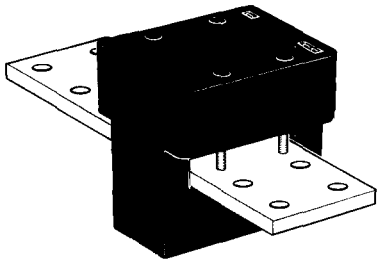
not discriminated	local	by mechanical pop-out type indicator
	remote	by overcurrent trip switch - see page 15
discriminated	local	with option F - see page 10

built-in ammeter

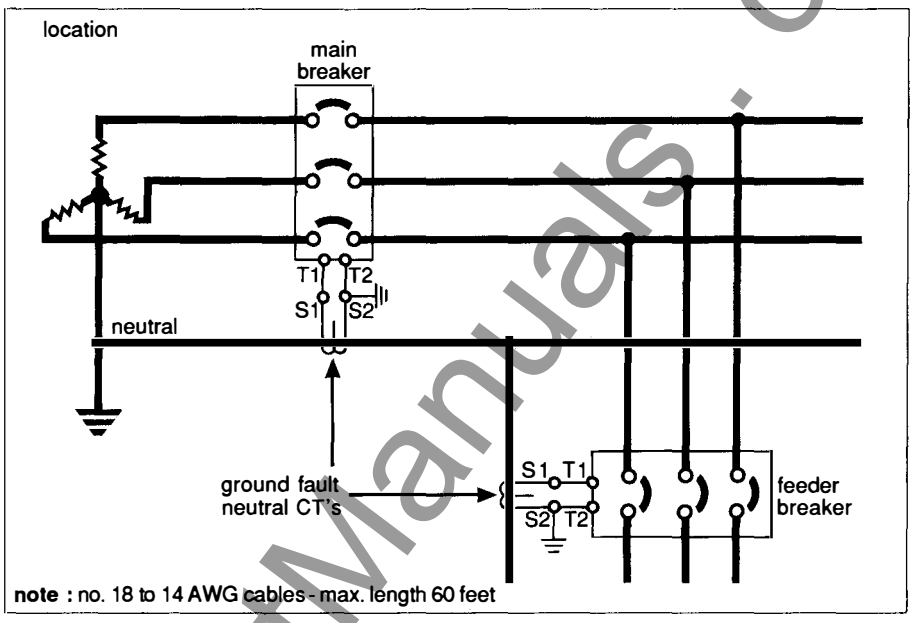
option I	control voltage	120 to 240V 50-60Hz
	display	phase 1, phase 2, phase 3, phase max.
	accuracy	± 1,5 % ④

neutral sensor

Groundfault protection may be applied on 3Ø4W or 3Ø3W circuits. On 3Ø4W an external neutral sensor must be used. This neutral current sensor shall have the same ampere rating as the breaker.



external neutral sensor



note : no. 18 to 14 AWG cables - max. length 60 feet

Zone Selective Interlocking

Option Z provides selectivity and reduces the duration of fault compared to traditional time-delayed selectivity. By interconnecting several control units, it locates the ground fault and allows the upstream circuit breaker to trip at the minimum time regardless of the time delay setting of this breaker.

ground fault 1

Circuit breaker A will clear the fault within the minimum time delay regardless of its time delay setting.

ground fault 2

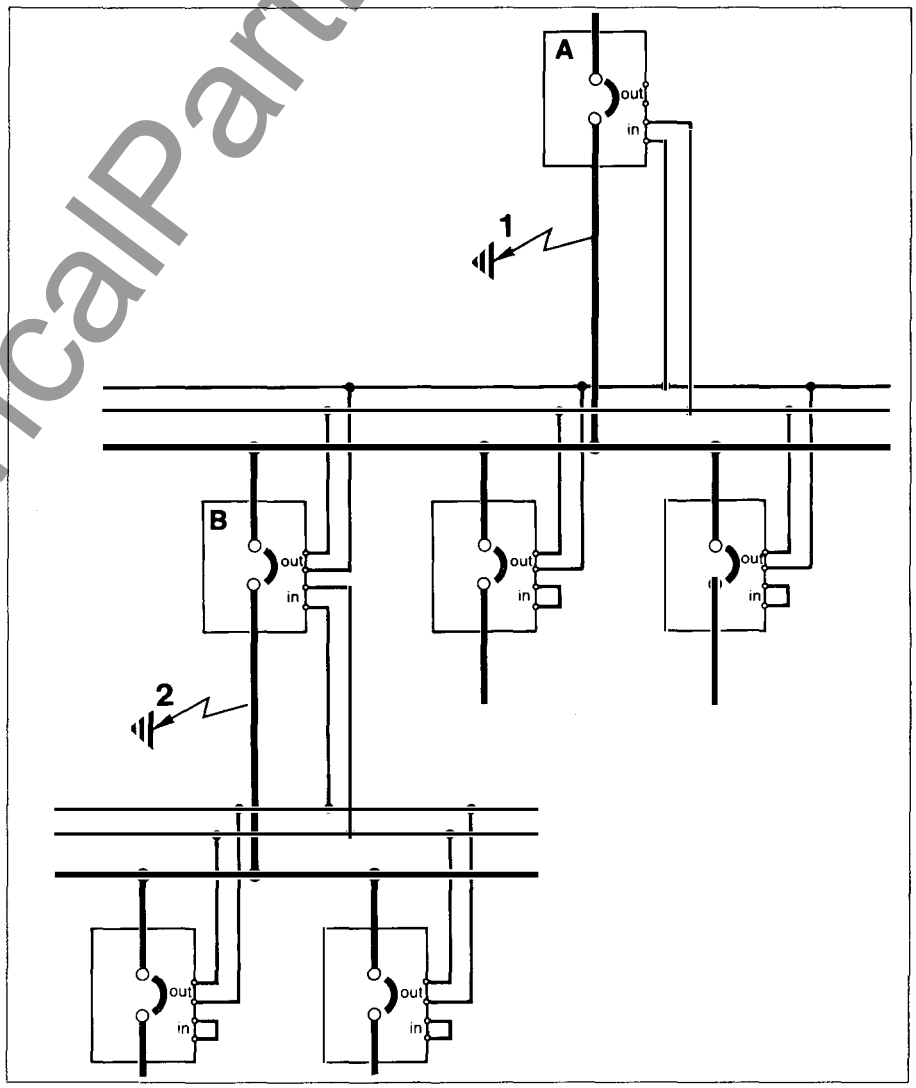
Circuit breaker B will inform the upstream circuit breaker A that it is clearing the fault and will prevent it from tripping instantaneously.

As a safety feature, the breaker A will trip at the end of its time delay setting if the fault is not cleared during this time.

note :

- circuit breaker terminals are delivered with "in" terminals jumpered. Remove the jumber when interlocking with a downstream breaker.
- Masterpact circuit breaker with control units ST308S - ST318S - ST408S and ST418S with option Z and W may be also interlocked with Compact CK type molded case circuit breakers with ZSI ground fault option.
- no. 18 to 14 AWG cables, twisted in pairs (approx. one turn per 4").

Max. length 60 feet. Do not ground.



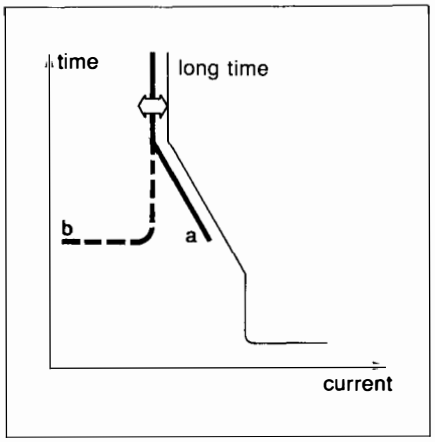
load monitoring (option R)

The option R provides 2 independent static contacts which operate when the current exceeds adjustable pickup limits (two independent limits Ic1 and Ic2 adjustable from 0.8 to 1 x the long time setting.

- when the current exceeds the limit Ic1 (or Ic2) the contact R1-R2 (or R3-R4) closes, following an inverse time characteristic **a**
- when the current drops below the limit Ic1 (or Ic2) the contact R1-R2 (or R3-R4) opens with constant time delay (3 seconds) **b**

These contacts can be used for load shedding, alarms, indications, etc...

voltage	240V AC max
outputs	0.5 A triac



fault and alarm indicators (option F and J)

In addition to the mechanical fault indicator, long time, short time/instantaneous and ground fault trips are indicated separately.
Fault indications differentiate the 3 causes of tripping : overload, short circuit and ground fault if any.
Option F provides LED's indicators located on the front face of the control unit.
Option J provides LED's indicators and opto-decoupled outputs (terminals 612-622-632)
Alarm indication (option F only) indicates before the breaker trips that the long time pickup has been exceeded.

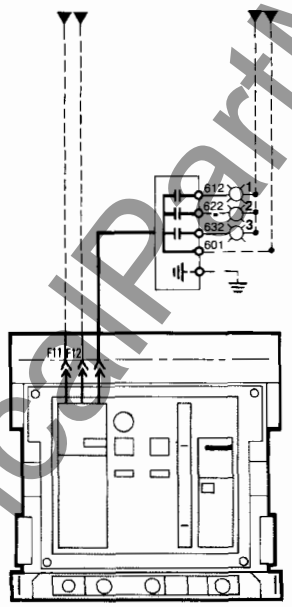
A separate control source is required. Fault indications are maintened as long as the control voltage is provided. When the control voltage is considered as unreliable, auxiliary power module (AD) and battery pack module (BAT) may be added to preserve memory.

input voltage	
option F	24 to 240V AC or DC
option J	24 to 48V DC
outputs	
option J	1A - triac - 240V AC max.

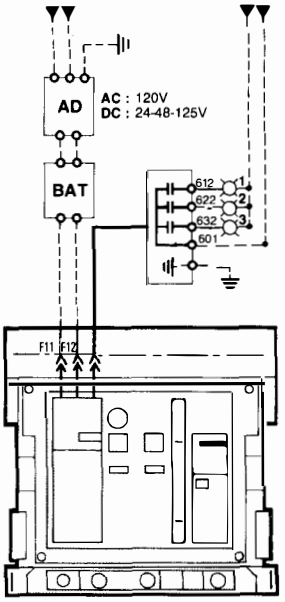
Input voltages available for the module (AD):
DC : 24 - 48 - 125V
consumption : 10W
60Hz : 120V
consumption : 10VA

Safeguard period of the battery pack module (BAT) :
approximately 12 hours.

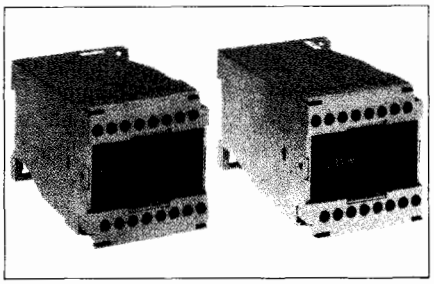
configuration with reliable control voltage



configuration with interuptible control voltage

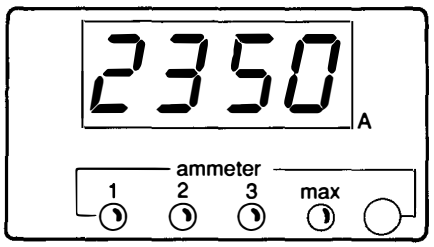


1: overload
2: short circuit
3: ground fault



Masterpact™ MP circuit breaker control units

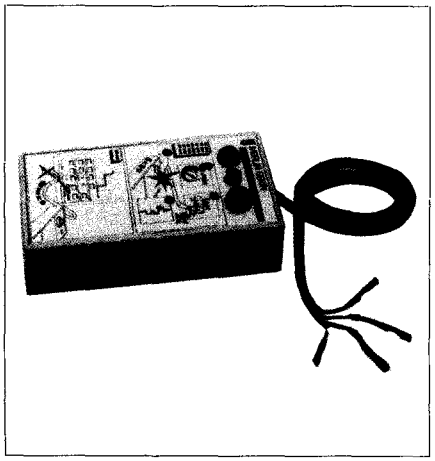
built-in ammeter
mini test kit
portable test kit



built-in ammeter

This built-in ammeter avoids installation of current transformers, ammeter and selector switches.

- current measurements using internal CT's
- current measurements may be selected by a push-button : phase 1, 2 or 3 or the maximum current in any phase. Lights indicate the phase selected
- current indication are done on numerical display. The LED type display and the 1/2 " high figures allows easy reading regardless of lighting conditions
- this ammeter must be supplied by a 120 to 240V control voltage



test kits

Every control trip unit is equipped with a test receptacle that can be used with a test kit. This particular design allows a safe and simple testing.
Tests performed by test kits are only functional tests designed to electrically test the operating integrity of the control unit, the flux transfer device and the mechanical operation of the breaker. Tests are not designed to calibrate the breaker.
Calibration can best be done at the factory.

test procedure

mini test kit

Overcurrent protection test procedure

1 operate on "OFF load" conditions
2 record the short time or instantaneous pickup setting and set the control unit to the minimum setting.
3 close the circuit breaker.
4 connect the two + and - test leads into trip unit test receptacle, observing the "+ - overcurr" markings.
5 press the test kit push button, the circuit breaker will trip.
6 return to initial setting.

Batteries
The mini test kit requires five 9 Volt batteries. Alkaline batteries are recommended.
dimensions : 5 1/2 x 3 x 1 1/2

portable test kit

Warning
Touching test plug pins may cause electrical shock when power cord is plugged and power switch should never be in the ON position unless test plug is connected.

■ **prior testing :**
1 operate in "OFF load" conditions.
2 set control voltage selector located at the back of test kit to proper voltage.
3 switch for control power has to be in the OFF position.
4 remove the transparent trip unit cover and connect test leads according to + -
5 plug in the power cord.
6 turn control power switch ON. The "power on" lamp should light. If not, check the source, then the test kit fuse (1 A fuse).
7 close breaker.

■ **long time** :
- test leads shall be connected according to "+ - overcurrent" indications (on control unit).
- set current selector K of test kit at trip unit long time setting.
- move Ir switch. The breaker will trip (see max. tripping time in table below).

caution: when breaker trips release the test switch immediately.
Under no circumstances, should this switch be in the "ON" position for more than 120 % of the expected maximum tripping time.

■ **short time or instantaneous** :
- tests leads shall be connected according to "+ - overcurrent" indications (on control unit).
- move Im switch for one second max. to trip breaker.

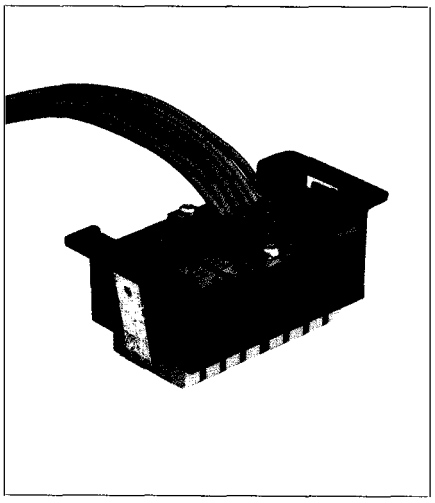
■ **ground fault** (residual scheme) :
caution : test leads shall be connected according to "+ - ground" indications (on control unit).
Move Ih switch for one second max. to trip breaker.

control unit	long time delay setting	maximum tripping time
ST 208D - ST 308S - ST 318S		150 sec.
ST 408S - ST 418S	G	20 sec.
	MIN	40 sec.
	INT	180 sec.
	MAX	500 sec.

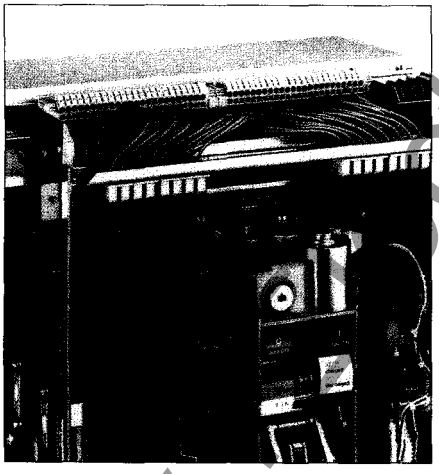
secondary disconnects

Electrical accessories are listed for field installation per UL file E113554.
They are provided with their terminals. They are gathered and accessible on secondary disconnecting blocks located above the circuit breaker.

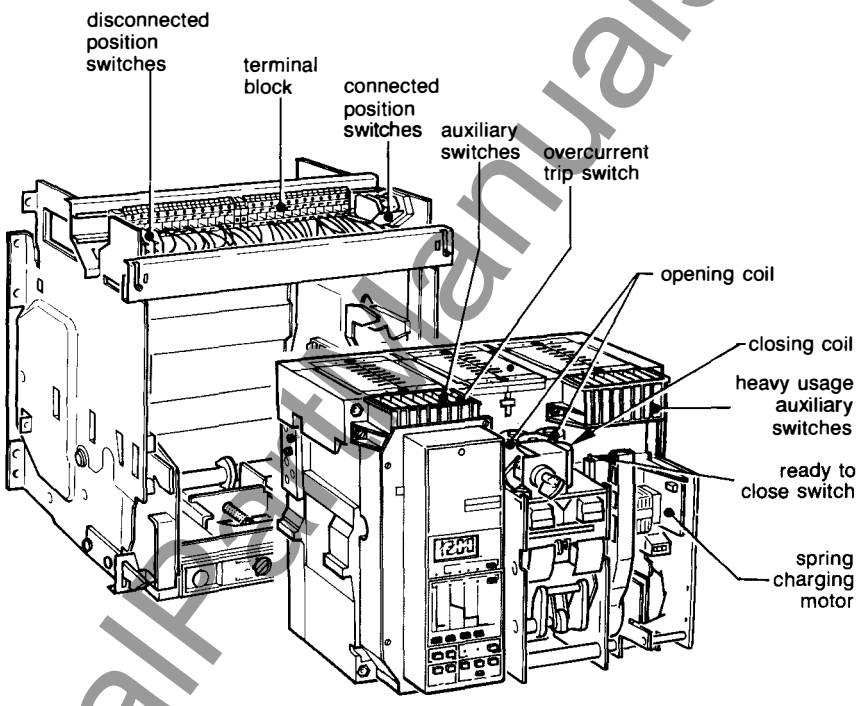
■ **fixed mounted :**
By one or two connecting plugs (provided).



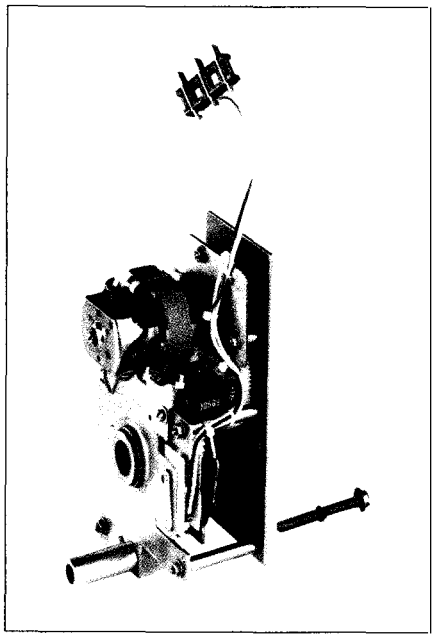
■ **drawout mounted**
To a terminal block **a** located in the front of the stationary assembly making the connections easy.
This terminal block is then wired to another connection block **b** that operates automatically to isolate the internal accessories when the breaker is in the disconnected position.



location

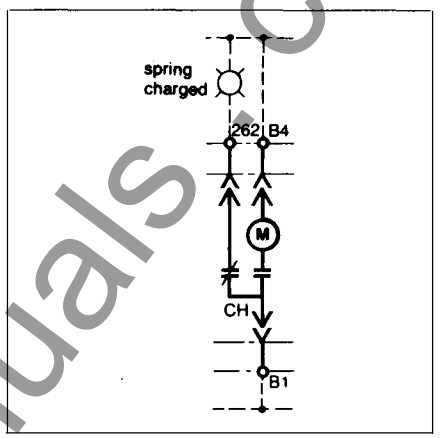


connection : accessory terminals are of screwless type and may be connected by standard copper wires 18 to 14 AWG.
cable strip length : 3/8" approximate.



Masterpact™ circuit breaker is equipped with true two step stored energy mechanism which insures fast opening and closing operations and complete sequence open-close-open without recharging mechanism.
Masterpact™ always has manual actuators : charging handle, push to open and push to close buttons. In addition, remote operation is possible with field installable accessories:
- the spring charging motor (MCH)
- a closing release (XF)
- an undervoltage trip device (MN) or shunt trip (MX) for opening.

The manual operating mechanism can still be used in an emergency. The addition of the electrical operating mechanism does not alter circuit breaker dimensions.



control voltage (V)	60Hz	120-240
	DC	24-48-125
consumption	AC	180VA
	DC	180W
inrush current	2 to 3 x In for 0.1 s	
charging time	3 to 4 sec.	

spring charging motor (MCH)

Added to the manual operating mechanism, a motor charges automatically the stored energy mechanism (when the breaker closes) making possible O-C-O cycles without recharging. Opening and closing operations are instantaneous.

operation counter (CDM)

With gear motor option only. The operation counter is read from the front and gives the total number of breaker operating cycles.

"spring charged" switch

Type b switch, it is closed when spring is charged.
It is delivered as standard with the spring charging motor and has a common terminal with it .

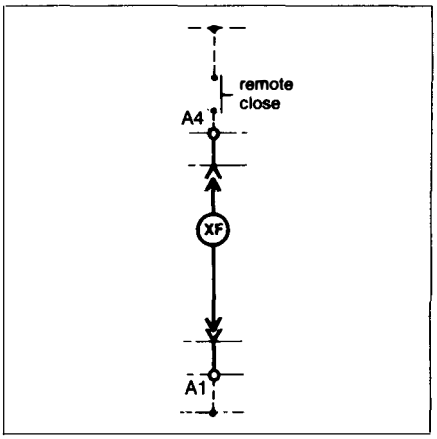
max. current (A)		
60Hz	240V	10
DC	125V	0.5
	250V	0.25

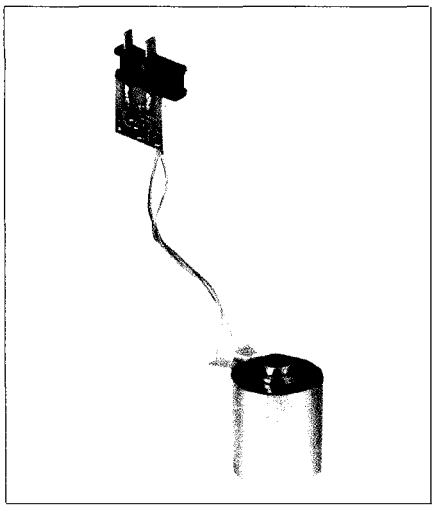
closing coil (XF)

This device releases the breaker closing mechanism when the spring is charged.
The closing coil is rated for continuous duty.
The closing release is supplied on request and can be fitted even on manual operating mechanism.

breaker closing time	less than 80 ms	
operating voltage range	0.85 to 1.1 x rated voltage	
control voltage (V)		
	60Hz	120-240
	DC	24-48-125
consumption (inrush and sealed) :		
	60Hz	15W
	DC	20 VA

Anti-pumping function:
In case of permanently energized closing coil (XF), the breaker remains in the open position after it has been opened, either by manual or electrical operation. The breaker can be re-closed only if closing coil is momentarily de-energized.
note: this anti-pumping function can be disabled by series connecting a "ready to close" switch (PF).



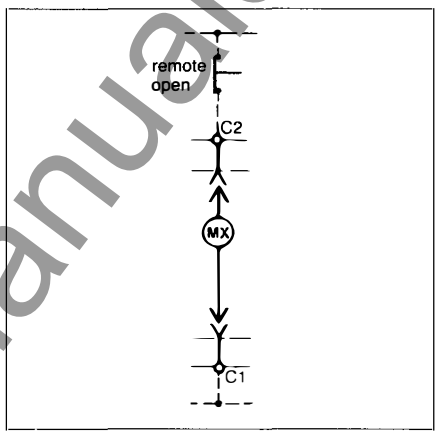


Three types of voltage release can be used for remote opening of Masterpact circuit breakers :
- shunt trip (MX)
- instantaneous undervoltage trip device (MN)
- time delayed undervoltage trip device (MNR)

Release combinations
Each Masterpact circuit breaker can be equipped with :
- 1 shunt trip (MX) + 1 undervoltage trip device (MN or MNR)
- or 2 shunt trips (MX)

shunt trip (MX)

The release is rated for continuous duty and operates with control voltages between 85 and 110%.
However, when series connected with an "a" auxiliary switch, the shunt trip can be operated with 55% or more of its rated voltage and can be used for ground fault protection when combined with a Class 1 Ground Fault Sensing Element.
Field installable.



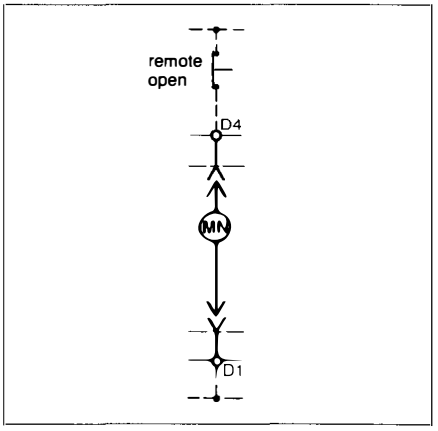
operating time	70 ms	
control voltage (V)		
	60Hz	120-240-480-600
	DC	24-48-48-125
consumption		
	AC	20VA
	DC	15W

instantaneous undervoltage trip device (MN)

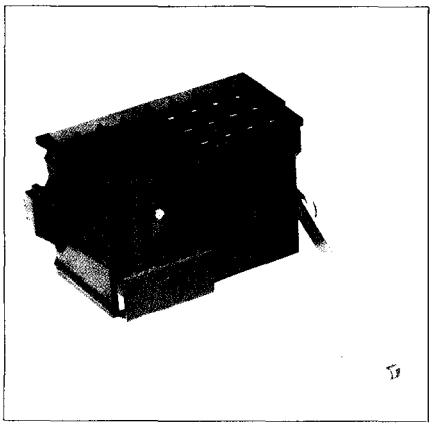
This release instantaneously opens the breaker when its supply voltage drops below a value between 35% and 70% of its rated voltage.
If the release is not energized, the breaker cannot be closed (either manually of electrically). Any attempt to close will have no effect on the main contacts.
Closing is possible when the release voltage reaches 85% of its rated value.
Field installable.

time delayed undervoltage trip device (MNR)

To prevent the breaker from tripping in the event of transient voltage drops, this release has a built-in adjustable time delay.
If required, this time delay can be overridden by connecting an external switch on an additional circuit (wired by the user).
Field installable.

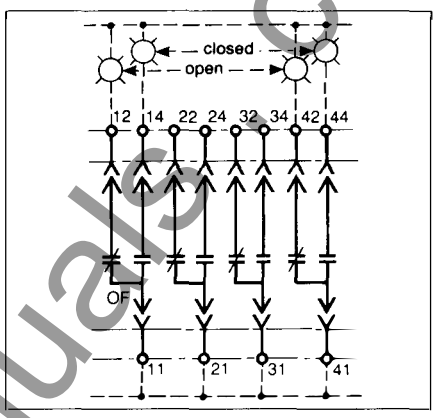


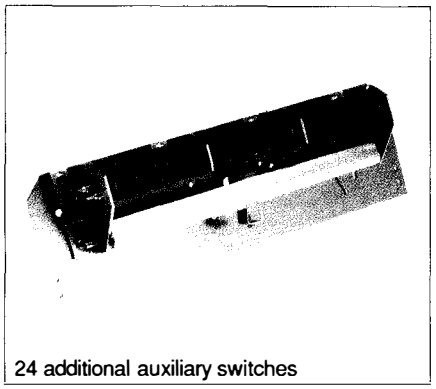
		MN	**MNR**
operating time (ms)		0,090	0.5-0.9-1.5-3
control voltage (V)			
	60Hz	120	120
		240	
		480	480
		600	
	DC	24	
		48	
		125	
consumption (inrush and sealed) :			
	AC	20VA	20VA
	DC	15W	15W



heavy usage auxiliary switches (OF)

4 SPDT switches double break construction. They are directly operated by the main contacts and insure a large insulation distance in open position. They are therefore particularly adapted for insulation of auxiliary circuits or reliable interlockings.
"a" contacts are open when the breaker is open and closed when the breaker is closed.
"b" switches are closed when the breaker is open and open when the breaker is closed.
See page 17 for operating diagrams.
Field installable.





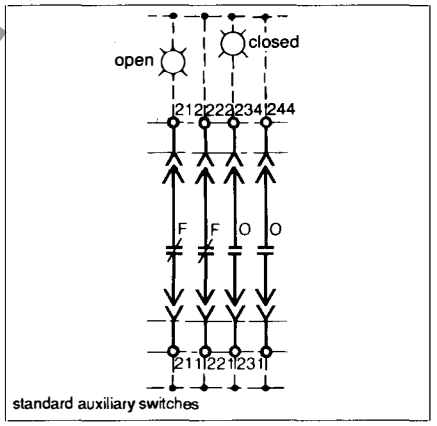
24 additional auxiliary switches

standard auxiliary switches (O and F)

2a + 2b switches available as standard.
"a" contacts are open when the breaker is open and closed when the breaker is closed.
"b" switches are closed when the breaker is open and open when the breaker is closed.
See page 17 for operating diagrams.

24 additional auxiliary switches (OFSUP)

an external plate holds a set of 24 SPDT switches. They are operated by the means of a cable. Not UL listed.

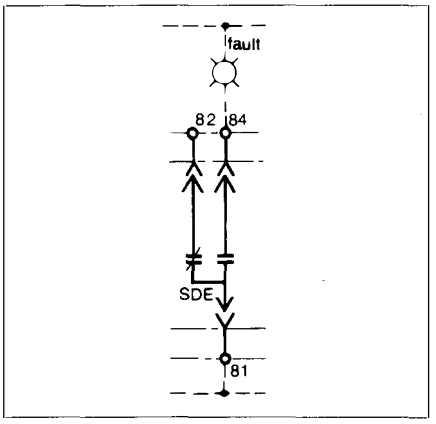


standard auxiliary switches

overcurrent trip switch (SDE)

delivered as standard with control unit.

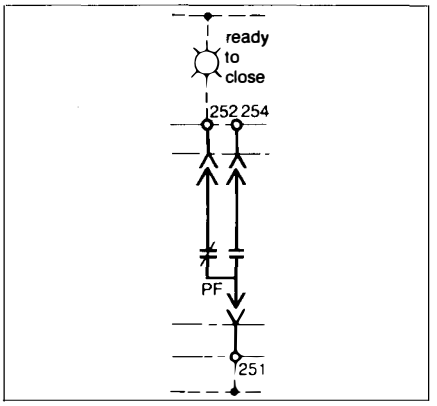
In addition to the fault trip indicator/reset button, one SPDT switch provides alarm/lockout information. This SPDT switch is operated only when the breaker is tripped by the control unit.
When the breaker is reset, the "a" switch (alarm) is open and the "b" switch (lockout) is closed).

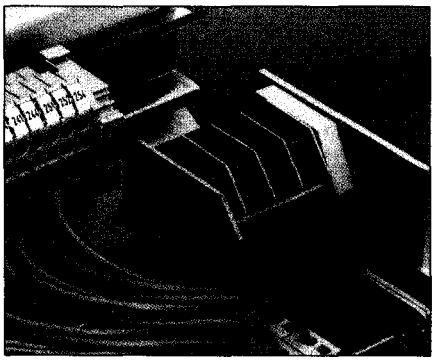


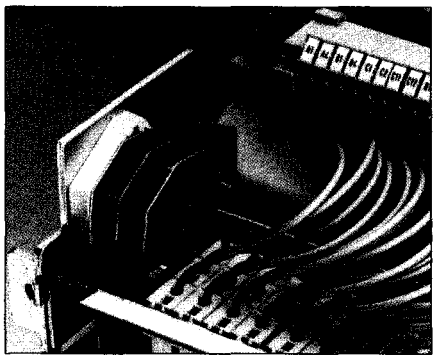
"ready to close" switch (PF)

This SPDT switch indicates that the breaker is ready to close and that the following conditions are simultaneously effective :
- the breaker is open,
- the stored energy mechanism is charged,
- the control unit is reset,
- the breaker opening pushbutton is neither locked nor padlocked,
- the breaker is in the fully connected position.

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







connected position switches (CE)

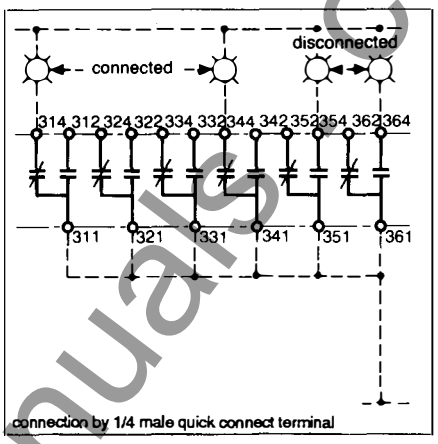
A block of 4 SPDT switches is operated close to the connected position.
Field installable.

disconnected position switches (CD)

A block of 2 SPDT switches is operated close to the fully disconnected position.
Field installable.

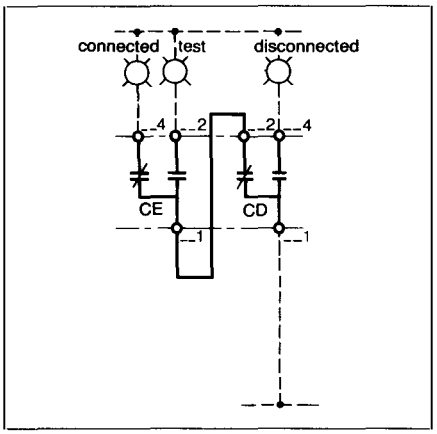
note:

- these switches also enable the linking of the normally closed auxiliary contacts (N/C) of the circuit breaker in open position when they are used in automatisms which do not have to be interfered by the circuit breaker drawout.
- see page 17 for operating diagrams



test position indication

By series connection of CD and CE contacts the test position may be discriminated.

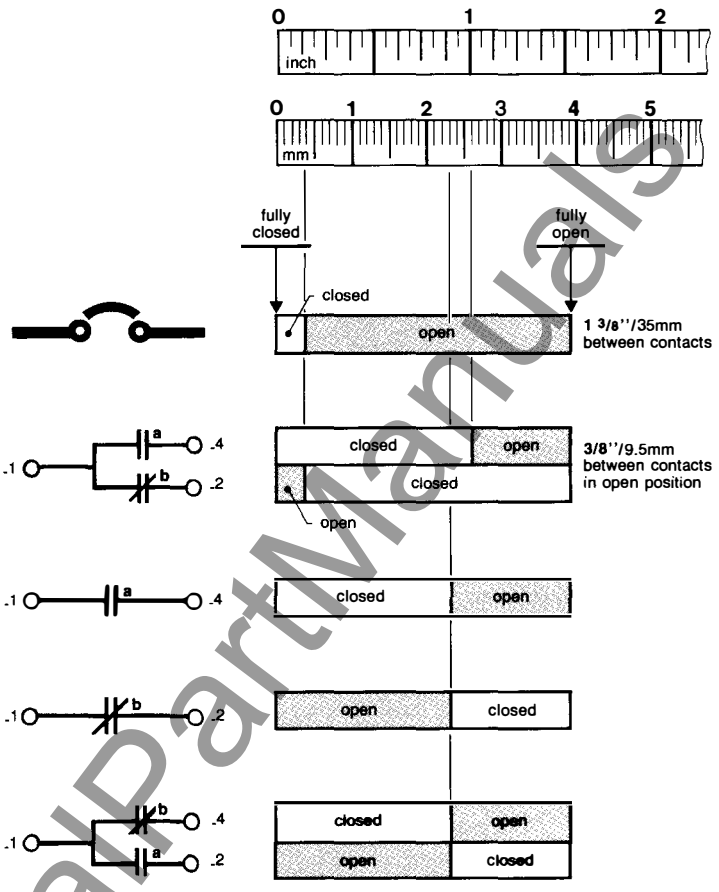


current ratings (A)

voltage (V)		auxiliary switch heavy usage	auxiliary switch standard	auxiliary switch 24 additional	overcurrent trip switch	ready to close switch	position switch connected	position switch disconnected
60Hz	240	10	10	10	10	10	10	10
	480	10	6	6			6	6
	600	6	3	3			3	3
DC	125	3	0.5	0.5			0.5	0.5
	250	3	0.25	0.25			0.25	0.25

Masterpact™ MP circuit breaker accessories

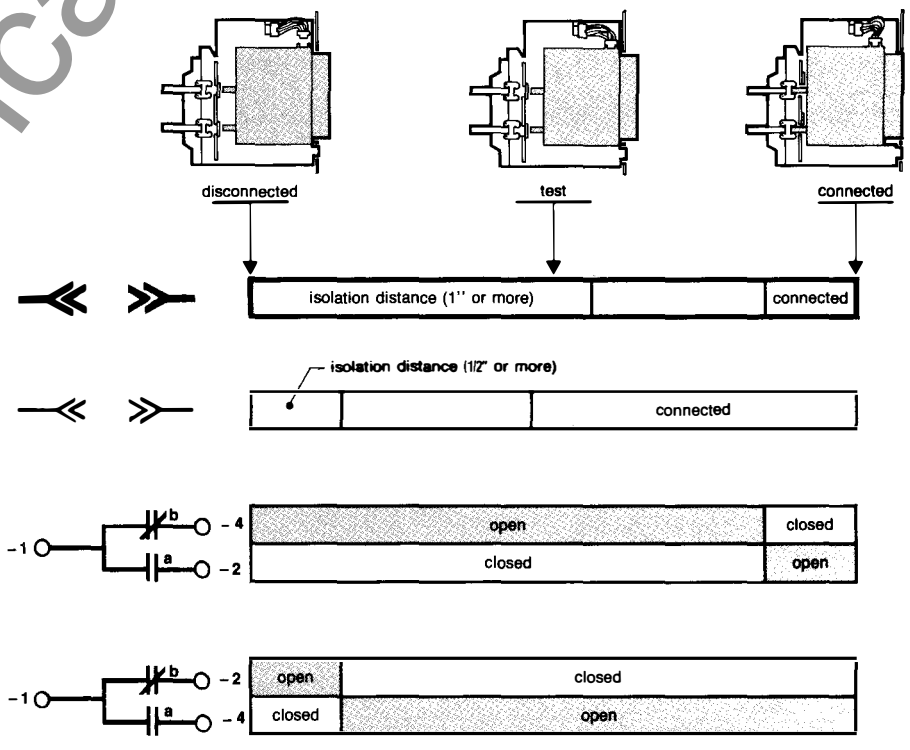
auxiliary switches



- **main contact position**
- **heavy usage (OF)**
- **standard (O)**
- **standard (F)**
- **24 additional (OFSUP)**

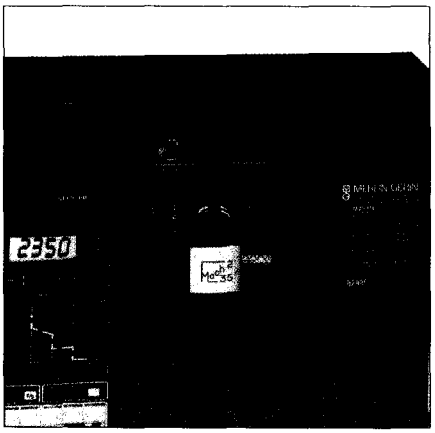
note: contacts are shown with the breaker in the open position

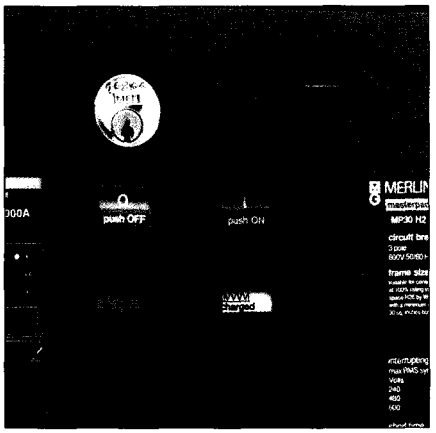
connected and disconnected position switches



- **main disconnect position**
- **secondary disconnect position**
- **connected position switches (CE)**
- **disconnected position switches (CD)**

note: position switches are shown with the breaker in the connected position



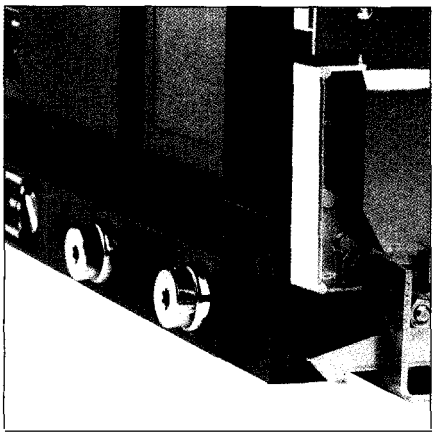


pushbutton locking device (VBP)

This device prevents local manual operation of the circuit breaker by covering the opening and/or closing push buttons. This locking device can be locked by a padlock or a sealing lead.

"open" position lock (VSKA)

A Kirk key lock that locks the breaker in the open position by holding the pushbutton in its depressed position.
The Kirk key lock is provided.
Factory mounted.



door interlock (VPEC)

This lock prevents the compartment door from being opened when the breaker is in the 'connected' position. If the breaker is put into the 'connected' position with the door open, the latter can be closed without disconnecting the breaker.
note : for more safety, this interlock may be used with racking interlock (VPOC) below.

racking interlock (VPOC)

This lock prevents racking in the breaker when the door is open.
(Insertion of the breaker racking crank is not possible when the compartment door is open)

disconnected position locking

The breaker can be locked in the 'disconnected' position by the means of 1 to 3 padlocks (padlocks not provided) or 1 Kirk key lock (option VSKC - Kirk key lock is provided -Factory mounted).
Mounted on the stationary assembly and accessible with the cubicle door locked
note :
- keylock is of the captive key type, free when locked.
- on special order, locking may be possible on disconnected - test and connected positions (VSKEC).

mechanical interlocks

■ disconnecting when breaker closed
During any disconnecting attempt when the breaker is closed, an interlocking device ensures the tripping of the breaker before the real separation of the main disconnects. The breaker remains, however, operable in the other positions : test, disconnected and withdrawn.

■ breaker closing when incompletely connected
The same above interlocking device avoids the closing of the breaker if the connecting operation is not completely achieved.

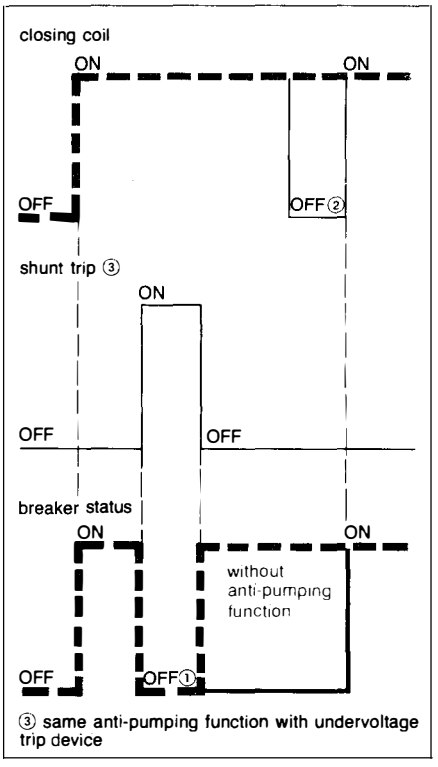
■ connecting when door opened
VPEC and VPOC options prevent the compartment door from being opened when the breaker is in the "connected position" and from connecting the breaker when the door is open.

electrical interlocks

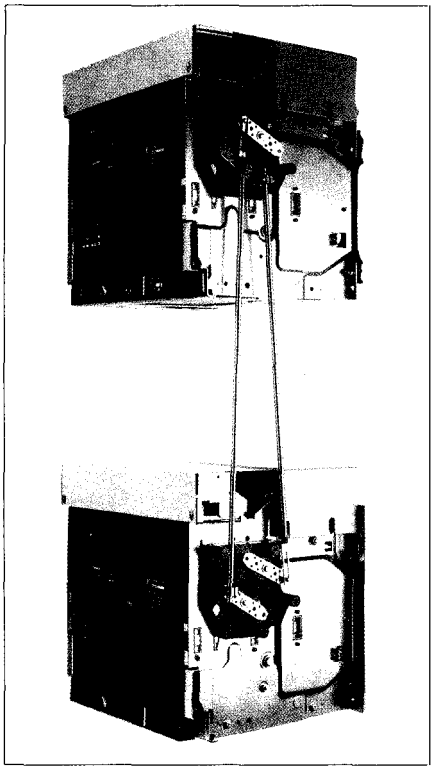
■ priority of opening orders (standard)
Opening coils (undervoltage trip devices - shunt trip) and opening push button have priority over the closing coils and closing push button.

■ mechanical pop-out type indicator (standard)
Under overcurrent or ground fault conditions, the trip indicator located in the control unit will pop out. Reclosing of the breaker is impossible until this trip indicator is reset.
This standard function can be disabled on request

■ anti-pumping function (standard)
In case of permanently energization of the closing coil (XF), the breaker remains in the open position ① after it has been opened, either by manual or electrical operation. The breaker can be closed only if closing coil is momentarily denergized ②
note : this anti-pumping function can be disabled by series connecting a "ready to close" switch (PF) with the closing coil (XF).



③ same anti-pumping function with undervoltage trip device



Two or three Masterpact™ can be mechanically interlocked by means of rods or cables.
This accessory is mountable on the right side of the breaker.
This adaptation can be made on site without modifying the breaker.

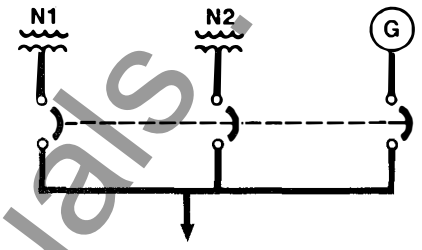
mechanical interlock between 2 or 3 stacked breakers

This interlocking is obtained by the adjunction of :
- one adaptation block
- one or two adjustable and unadjustable rods.
- maximum distance between the 2 fixing surfaces of the devices : 35" (890 mm)

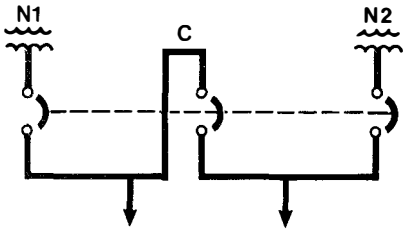
mechanical interlocks between 2 side by side breakers

This interlocking is obtained by the adjunction of :
- one adaptation block
- one set of adjustable cables with a maximum length of 78" (2 meters).

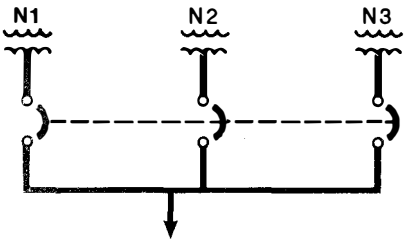
Possible mounting arrangements between 3 stacked breakers



1 use, power supplied by :
- either 2 transformers N1 and N2 which are connected in parallel
- or one stand-by source G



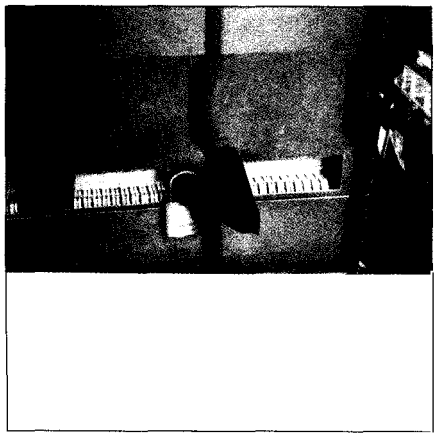
2 uses independently powered supply by 2 transformers N1 and N2, stand-by through a circuit breaker or a connection tie switch, forbidding the connection in parallel of the 2 current transformers.



1 uses power supplied by 1 group of transformers N1, N2 or N3 or of generators, forbidding any connection in parallel.

Masterpact™ MP circuit breaker accessories

safety shutters
fouling plate
interphase barrier
transparent cover



safety shutters

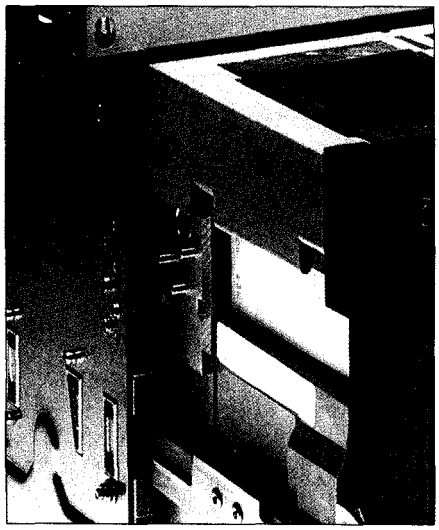
Comprising two independant parts, line and load side, the safety shutters automatically block access to the main disconnects when the breaker is in the disconnected, test or full withdrawn position.

shutters lock (VVC)

A mobile and lockable slide (padlock not supplied) is used to :

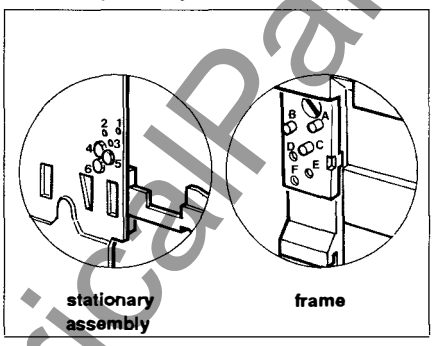
- lock the line or load shutters in the closed position
- hold the line or load shutters in the open position.

A support is provided at the back of the stationary assembly to hold the slide when not in use.
Factory mounted.



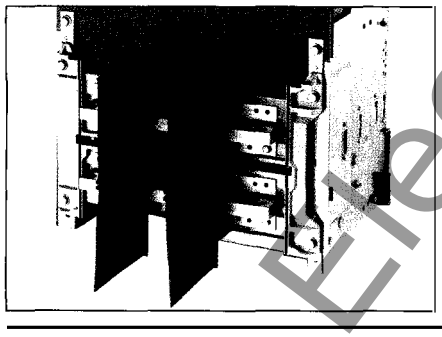
rejection feature

Installed as option on drawout mounting type breakers, rejection feature allows or not to connect or to disconnect a frame within a stationary assembly having similar features.
They are made of 2 parts (one for the frame and one for the stationary assembly) and allows the possibility of 20 combinations .



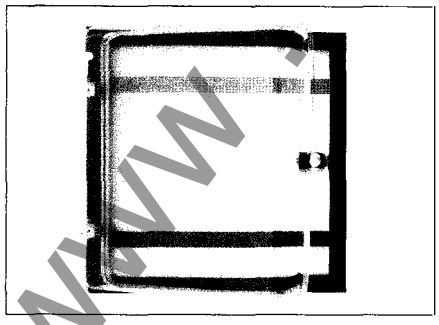
Possible arrangements :

frame	stationary assembly	frame	stationary assembly
A-B-C	4-5-6	B-C-D	1-5-6
A-B-D	3-5-6	B-C-E	1-4-6
A-B-E	3-4-6	B-C-F	1-4-5
A-B-F	3-4-5	B-D-E	1-3-6
A-C-D	2-5-6	B-D-F	1-3-5
A-C-E	2-4-6	B-E-F	1-3-4
A-C-F	2-4-5	C-D-E	1-2-6
A-D-E	2-3-6	C-D-F	1-2-5
A-D-F	2-3-5	C-E-F	1-2-4
A-E-F	2-3-4	D-E-F	1-2-3



interphase barrier

Mounted between terminals of the stationary assembly, it prevents arc prolongation to the breaker in the event of a line side fault and isolates the breaker connections in insulated busbar installations.

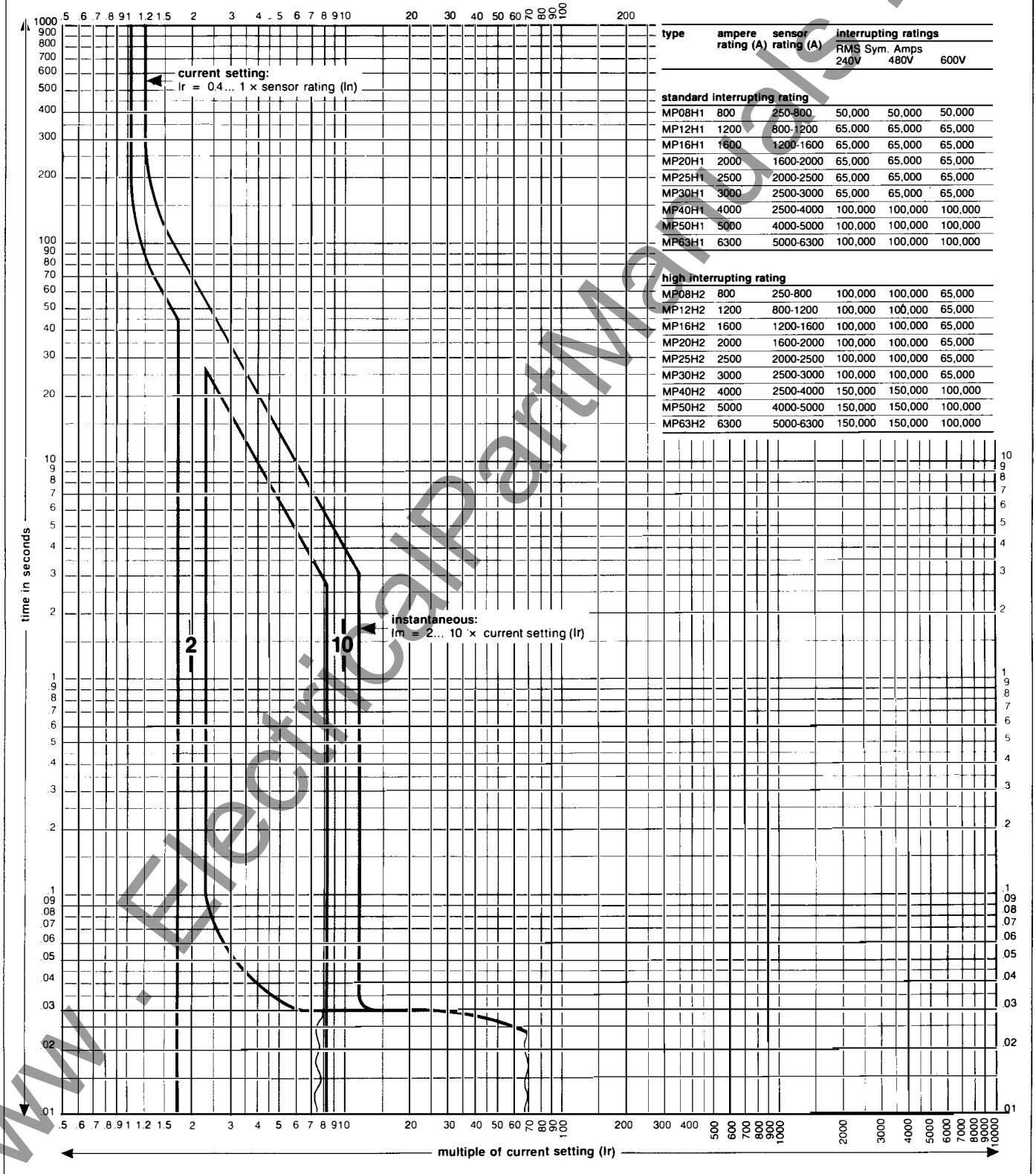


transparent cover

Hinged-mounted and locked with a milled head, this cover is designed to be installed on the door escutcheon. It provides a higher degree of protection and is suitable for fixed or drawout mounted breakers.

Masterpact™ MP circuit breaker time current curves

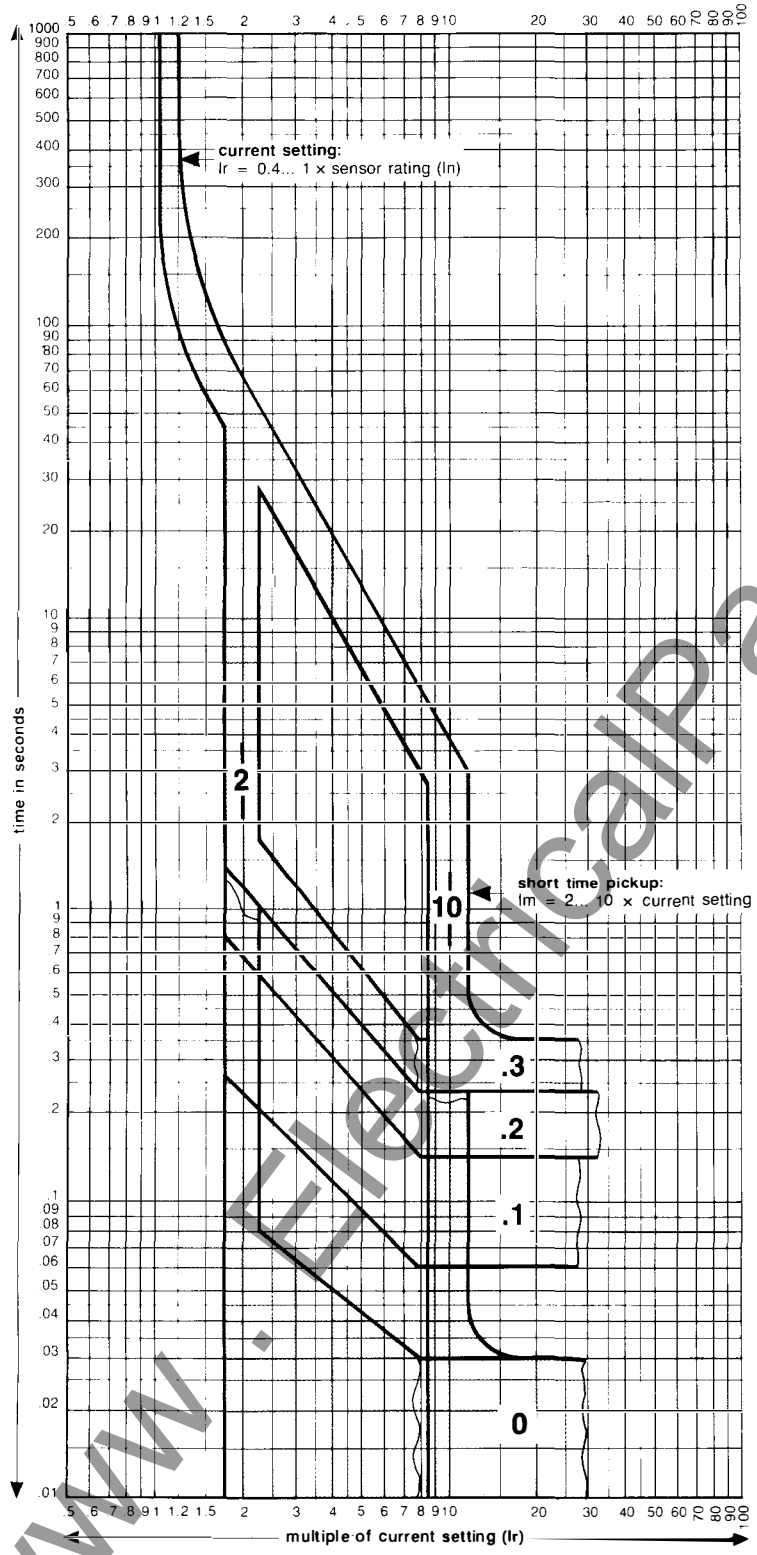
overcurrent protection ST208D

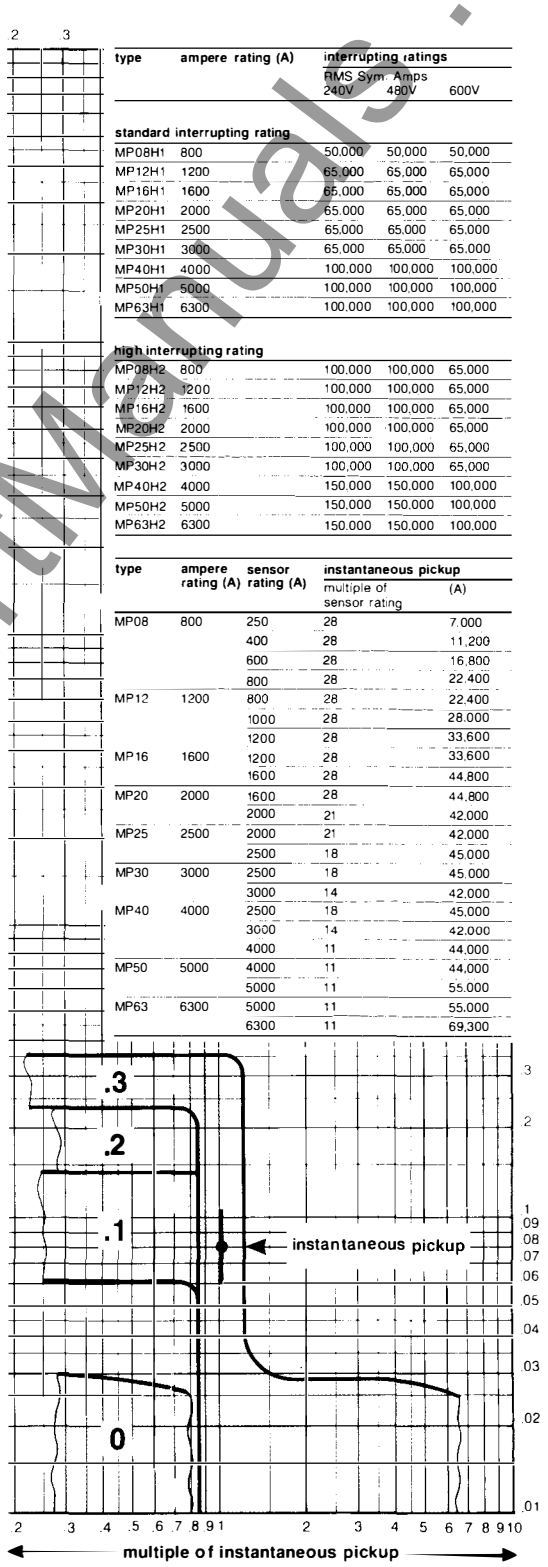


type	ampere rating (A)	sensor rating (A)	interrupting ratings RMS Sym. Amps 240V	480V	600V
standard interrupting rating					
MP08H1	800	250-800	50,000	50,000	50,000
MP12H1	1200	800-1200	65,000	65,000	65,000
MP16H1	1600	1200-1600	65,000	65,000	65,000
MP20H1	2000	1600-2000	65,000	65,000	65,000
MP25H1	2500	2000-2500	65,000	65,000	65,000
MP30H1	3000	2500-3000	65,000	65,000	65,000
MP40H1	4000	2500-4000	100,000	100,000	100,000
MP50H1	5000	4000-5000	100,000	100,000	100,000
MP63H1	6300	5000-6300	100,000	100,000	100,000
high interrupting rating					
MP08H2	800	250-800	100,000	100,000	65,000
MP12H2	1200	800-1200	100,000	100,000	65,000
MP16H2	1600	1200-1600	100,000	100,000	65,000
MP20H2	2000	1600-2000	100,000	100,000	65,000
MP25H2	2500	2000-2500	100,000	100,000	65,000
MP30H2	3000	2500-3000	100,000	100,000	65,000
MP40H2	4000	2500-4000	150,000	150,000	100,000
MP50H2	5000	4000-5000	150,000	150,000	100,000
MP63H2	6300	5000-6300	150,000	150,000	100,000

Masterpact™ MP circuit breaker time current curves

overcurrent protection ST 308S - ST 308ST



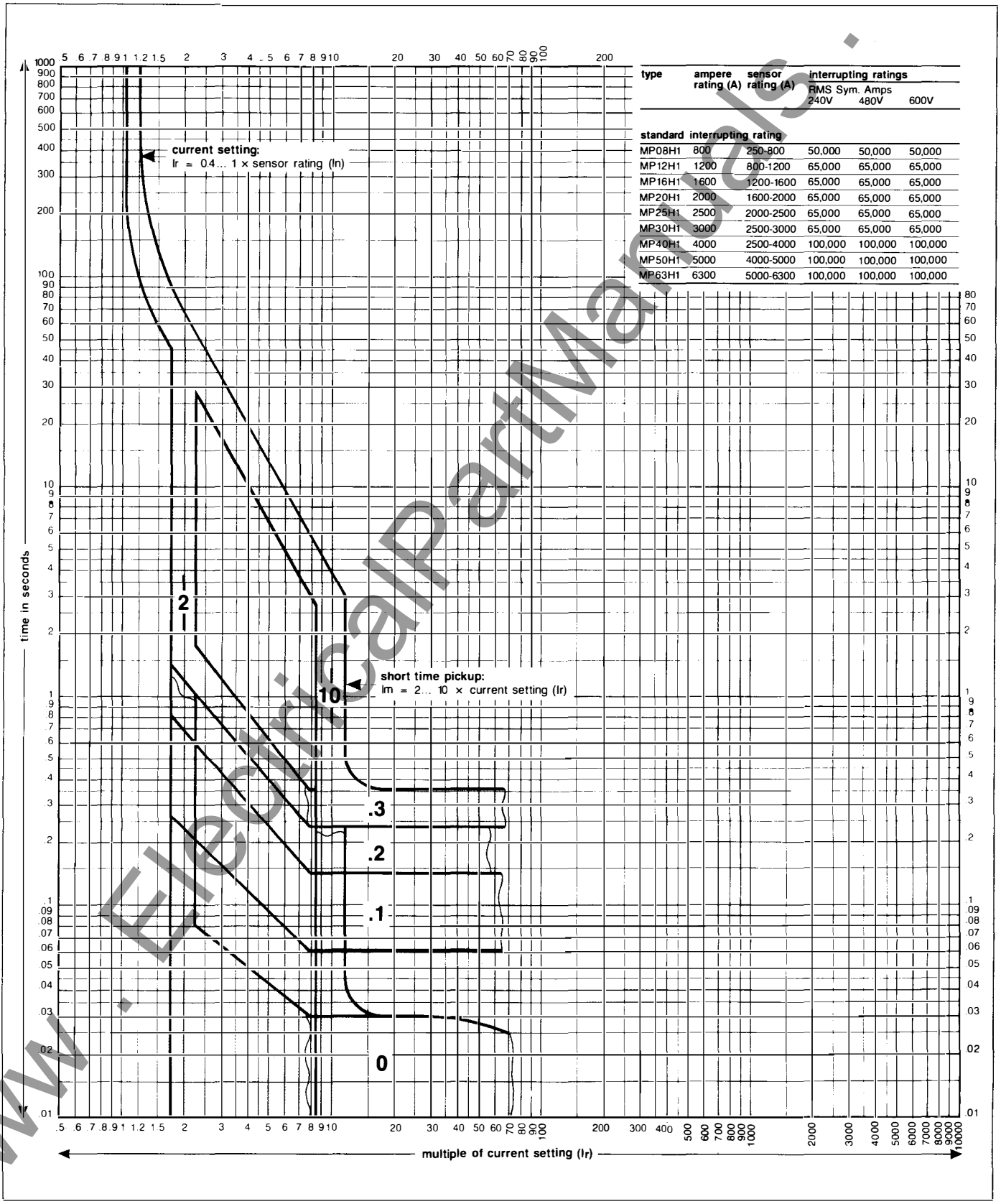


type	ampere rating (A)	interrupting ratings RMS Sym. Amps 240V	480V	600V
standard interrupting rating				
MP08H1	800	50,000	50,000	50,000
MP12H1	1200	65,000	65,000	65,000
MP16H1	1600	65,000	65,000	65,000
MP20H1	2000	65,000	65,000	65,000
MP25H1	2500	65,000	65,000	65,000
MP30H1	3000	65,000	65,000	65,000
MP40H1	4000	100,000	100,000	100,000
MP50H1	5000	100,000	100,000	100,000
MP63H1	6300	100,000	100,000	100,000
high interrupting rating				
MP08H2	800	100,000	100,000	65,000
MP12H2	1200	100,000	100,000	65,000
MP16H2	1600	100,000	100,000	65,000
MP20H2	2000	100,000	100,000	65,000
MP25H2	2500	100,000	100,000	65,000
MP30H2	3000	100,000	100,000	65,000
MP40H2	4000	150,000	150,000	100,000
MP50H2	5000	150,000	150,000	100,000
MP63H2	6300	150,000	150,000	100,000

type	ampere rating (A)	sensor rating (A)	instantaneous pickup multiple of sensor rating	(A)
MP08	800	250	28	7,000
		400	28	11,200
		600	28	16,800
		800	28	22,400
MP12	1200	800	28	22,400
		1000	28	28,000
		1200	28	33,600
MP16	1600	1200	28	33,600
		1600	28	44,800
MP20	2000	1600	28	44,800
		2000	21	42,000
MP25	2500	2000	21	42,000
		2500	18	45,000
MP30	3000	2500	18	45,000
		3000	14	42,000
MP40	4000	2500	18	45,000
		3000	14	42,000
		4000	11	44,000
MP50	5000	4000	11	44,000
		5000	11	55,000
MP63	6300	5000	11	55,000
		6300	11	69,300

Masterpact™ MP circuit breaker time current curves

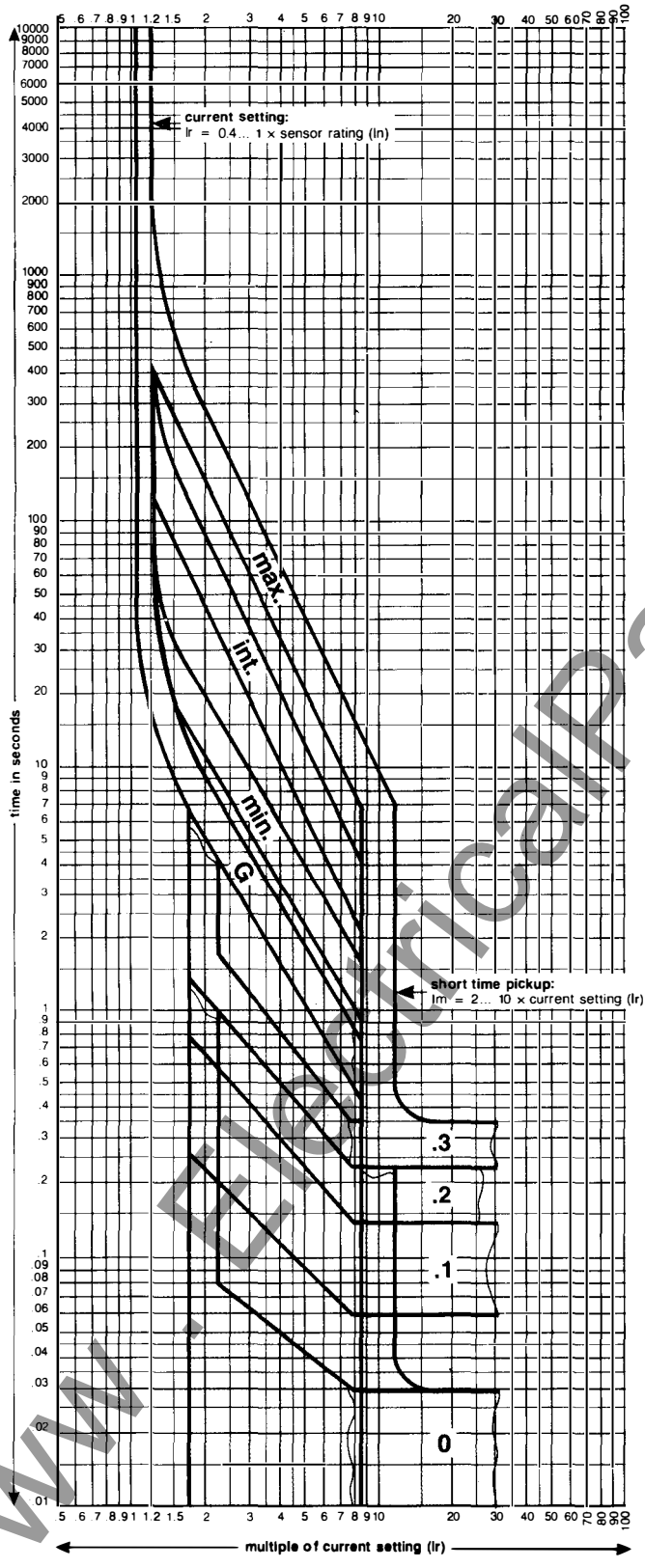
overcurrent protection ST 318S - ST 318ST

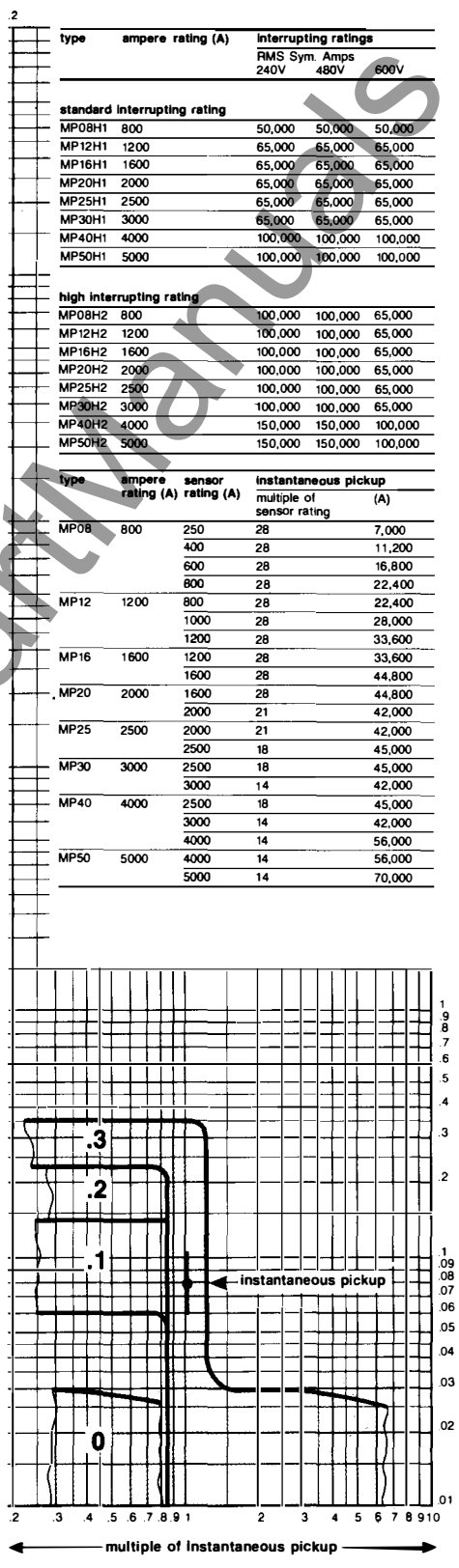


type	ampere rating (A)	sensor rating (A)	interrupting ratings RMS Sym. Amps 240V	480V	600V
standard interrupting rating					
MP08H1	800	250-800	50,000	50,000	50,000
MP12H1	1200	800-1200	65,000	65,000	65,000
MP16H1	1600	1200-1600	65,000	65,000	65,000
MP20H1	2000	1600-2000	65,000	65,000	65,000
MP25H1	2500	2000-2500	65,000	65,000	65,000
MP30H1	3000	2500-3000	65,000	65,000	65,000
MP40H1	4000	2500-4000	100,000	100,000	100,000
MP50H1	5000	4000-5000	100,000	100,000	100,000
MP63H1	6300	5000-6300	100,000	100,000	100,000

Masterpact™ MP circuit breaker time current curves

overcurrent protection ST 408S - ST 408ST



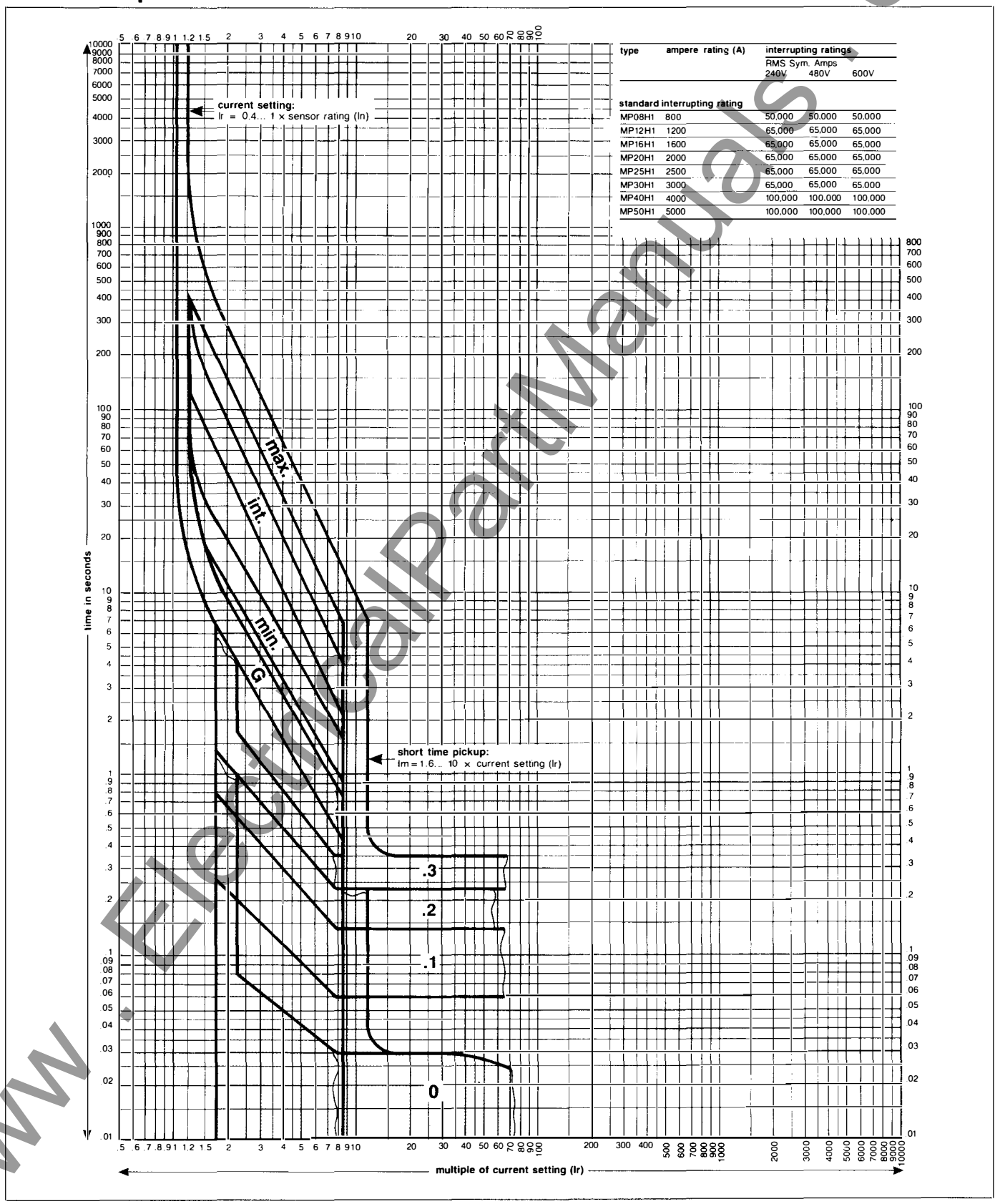


type	ampere rating (A)	interrupting ratings RMS Sym. Amps 240V	480V	600V
standard interrupting rating				
MP08H1	800	50,000	50,000	50,000
MP12H1	1200	65,000	65,000	65,000
MP16H1	1600	65,000	65,000	65,000
MP20H1	2000	65,000	65,000	65,000
MP25H1	2500	65,000	65,000	65,000
MP30H1	3000	65,000	65,000	65,000
MP40H1	4000	100,000	100,000	100,000
MP50H1	5000	100,000	100,000	100,000
high interrupting rating				
MP08H2	800	100,000	100,000	65,000
MP12H2	1200	100,000	100,000	65,000
MP16H2	1600	100,000	100,000	65,000
MP20H2	2000	100,000	100,000	65,000
MP25H2	2500	100,000	100,000	65,000
MP30H2	3000	100,000	100,000	65,000
MP40H2	4000	150,000	150,000	100,000
MP50H2	5000	150,000	150,000	100,000

type	ampere rating (A)	sensor rating (A)	instantaneous pickup multiple of sensor rating	(A)
MP08	800	250	28	7,000
		400	28	11,200
		600	28	16,800
		800	28	22,400
MP12	1200	800	28	22,400
		1000	28	28,000
		1200	28	33,600
MP16	1600	1200	28	33,600
		1600	28	44,800
MP20	2000	1600	28	44,800
		2000	21	42,000
MP25	2500	2000	21	42,000
		2500	18	45,000
MP30	3000	2500	18	45,000
		3000	14	42,000
MP40	4000	2500	18	45,000
		3000	14	42,000
		4000	14	56,000
MP50	5000	4000	14	56,000
		5000	14	70,000

Masterpact™ MP circuit breaker time current curves

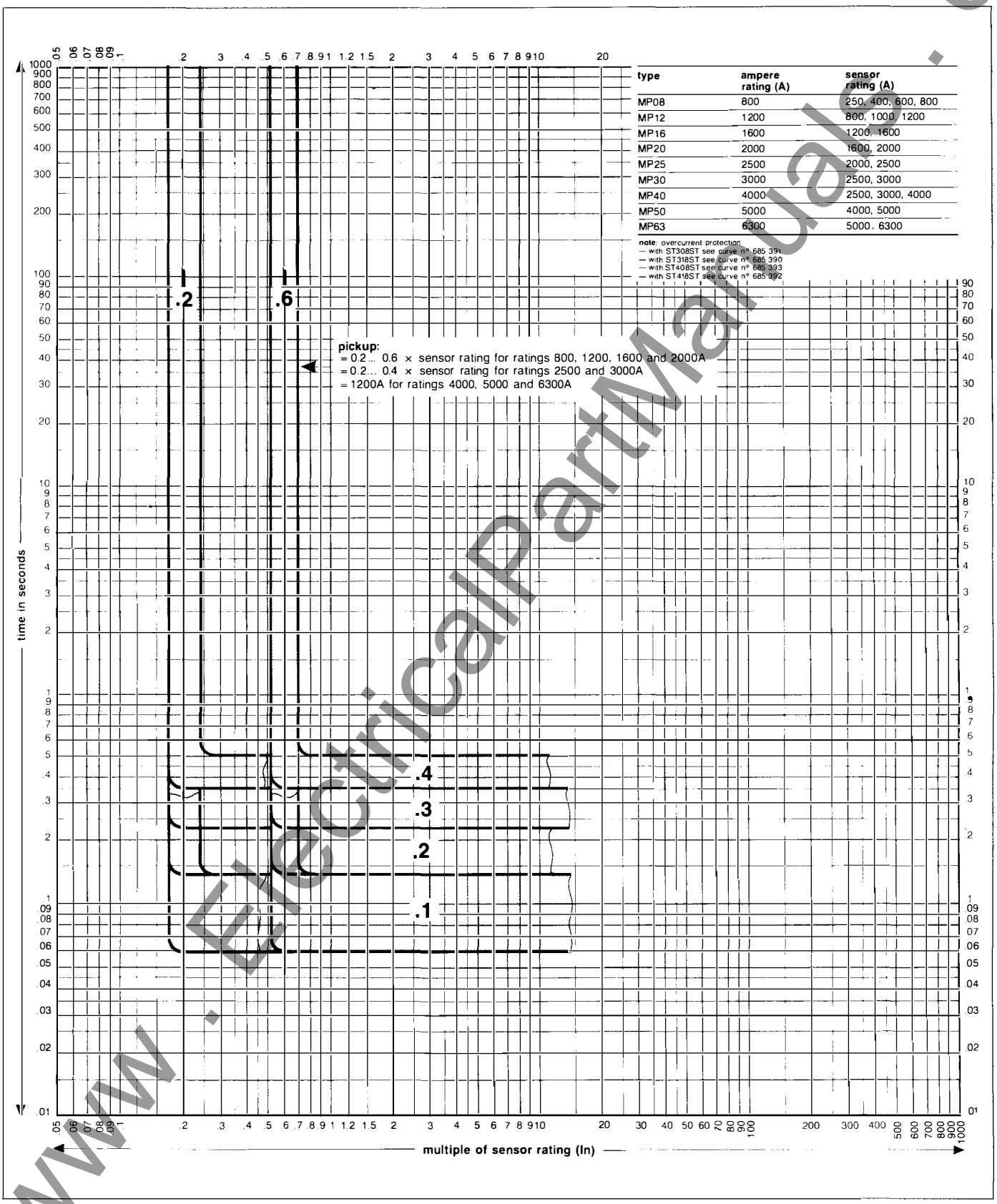
overcurrent protection ST 418S - ST 418ST



type	ampere rating (A)	interrupting ratings RMS Sym. Amps 240V	480V	600V
standard interrupting rating				
MP08H1	800	50,000	50,000	50,000
MP12H1	1200	65,000	65,000	65,000
MP16H1	1600	65,000	65,000	65,000
MP20H1	2000	65,000	65,000	65,000
MP25H1	2500	65,000	65,000	65,000
MP30H1	3000	65,000	65,000	65,000
MP40H1	4000	100,000	100,000	100,000
MP50H1	5000	100,000	100,000	100,000

Masterpact™ MP circuit breaker time current curves

ground fault protection ST 308ST - ST 318ST - ST 408ST - ST 418ST

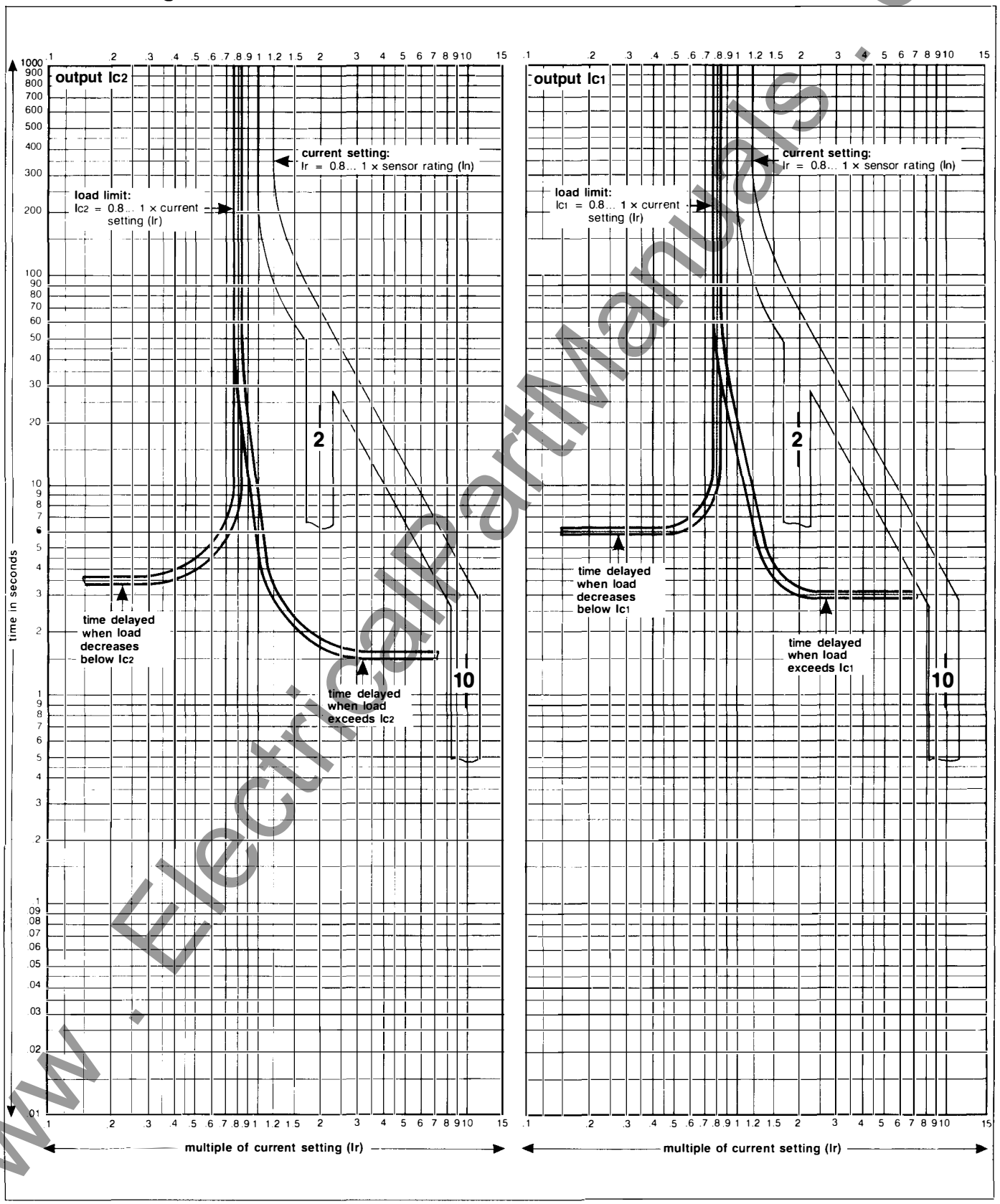


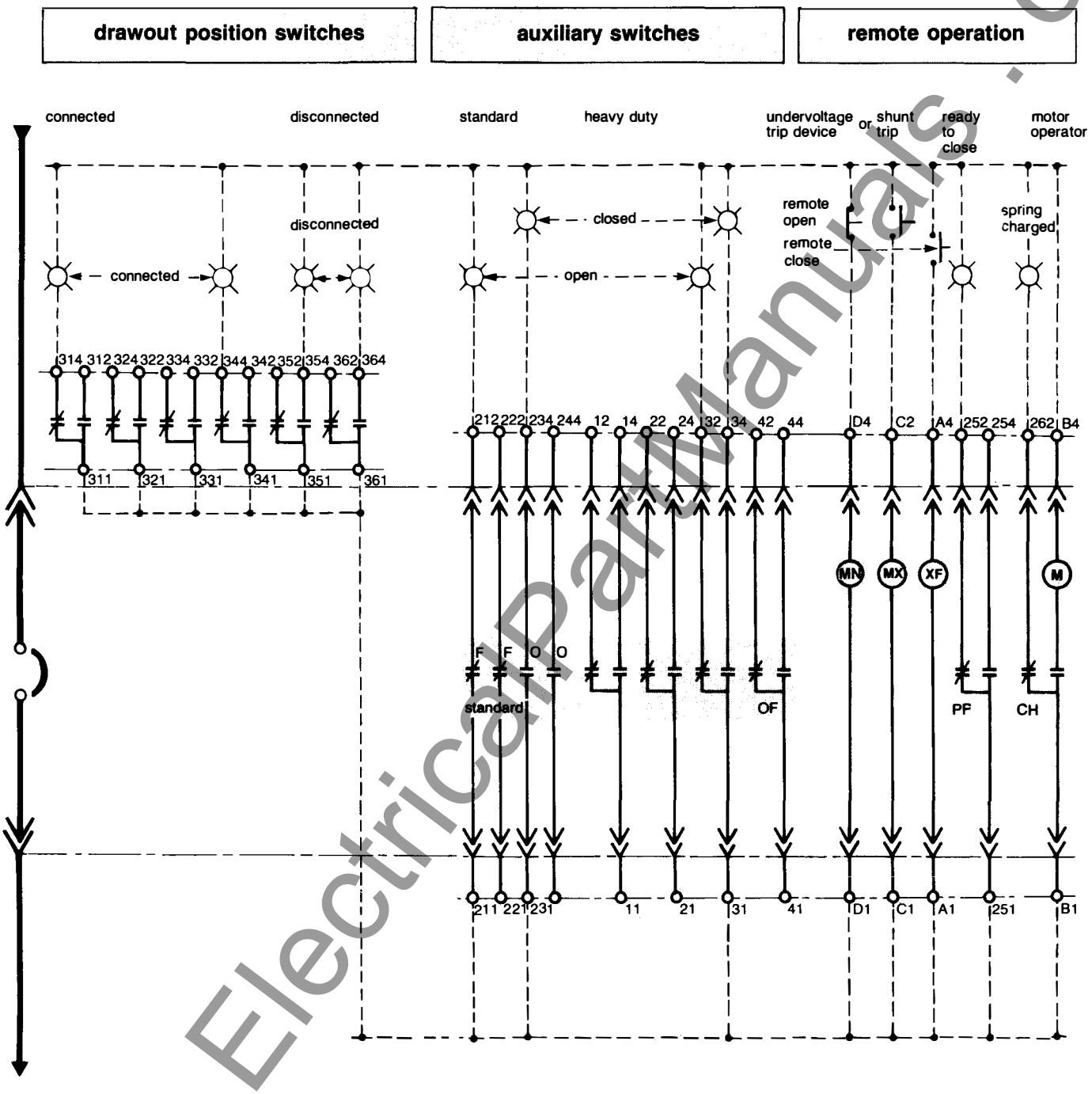
type	ampere rating (A)	sensor rating (A)
MP08	800	250, 400, 600, 800
MP12	1200	800, 1000, 1200
MP16	1600	1200, 1600
MP20	2000	1600, 2000
MP25	2500	2000, 2500
MP30	3000	2500, 3000
MP40	4000	2500, 3000, 4000
MP50	5000	4000, 5000
MP63	6300	5000, 6300

note: overcurrent protection
— with ST308ST see curve n° 685 391
— with ST318ST see curve n° 685 390
— with ST408ST see curve n° 685 393
— with ST418ST see curve n° 685 392

Masterpact™ MP circuit breaker time current curves

load monitoring ST 308SR - ST 318SR - ST 408SR - ST 418SR

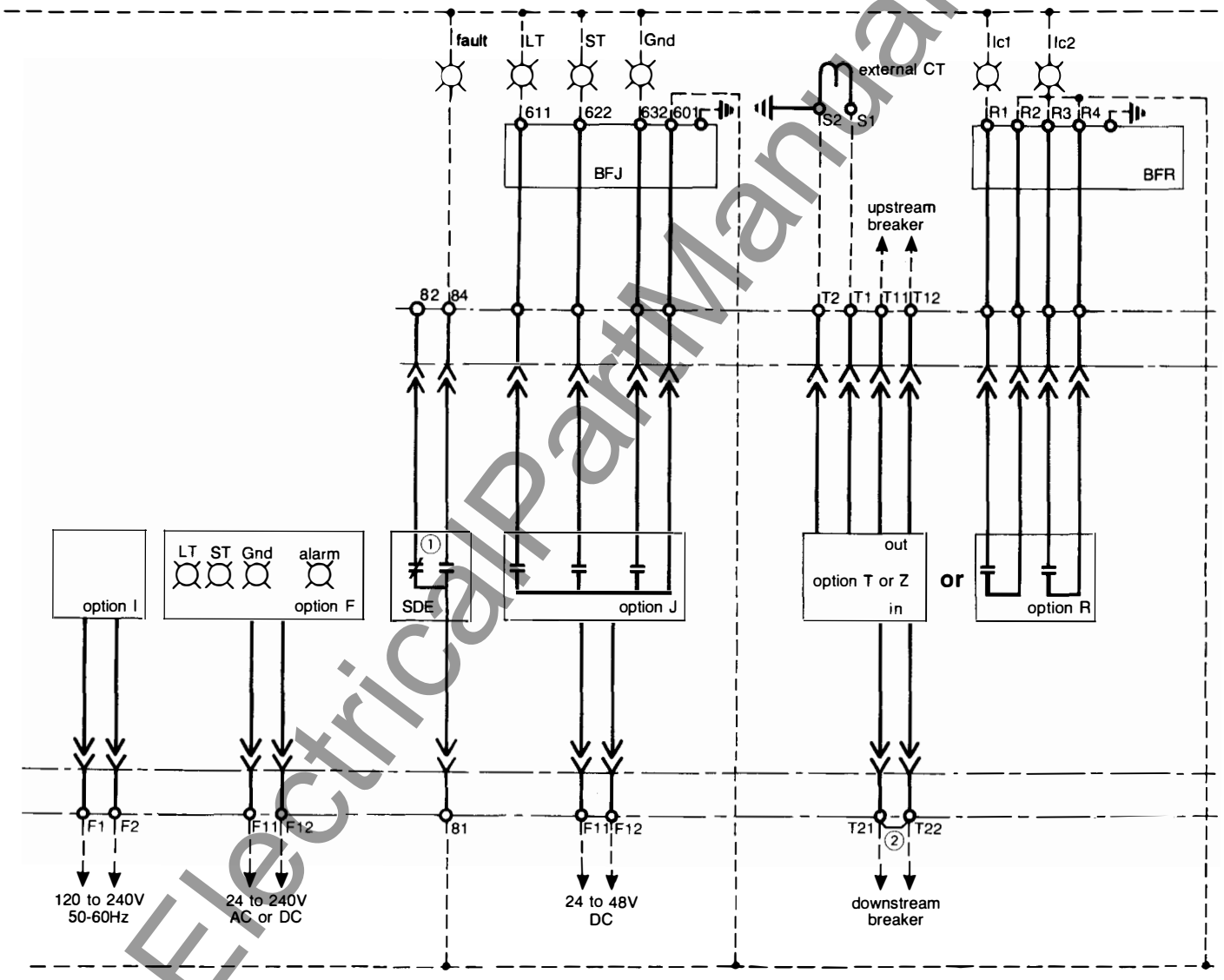




Masterpact™ MP circuit breaker wiring diagrams

wiring diagrams for breakers only equipped with options I, F, J, T and R

ammeter	local fault indications	remote fault indications	ground fault protection or load monitoring



① terminal 84 not available with option J (remote fault indicators)

② Zone Selective Interlocking with a downstream circuit breaker. Remove the jumper.

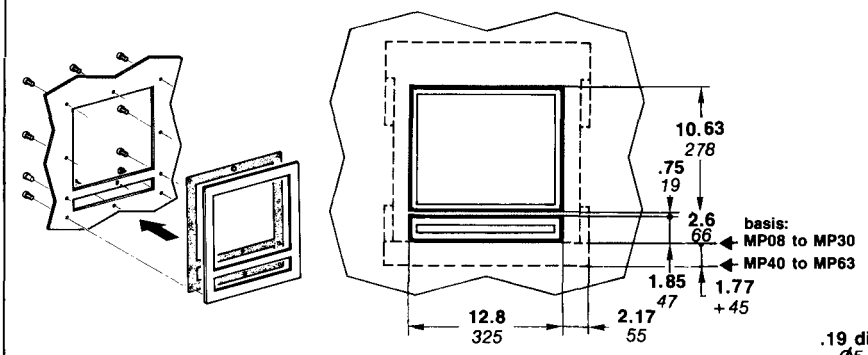
Masterpact™ MP circuit breaker dimensions

inch / *mm*

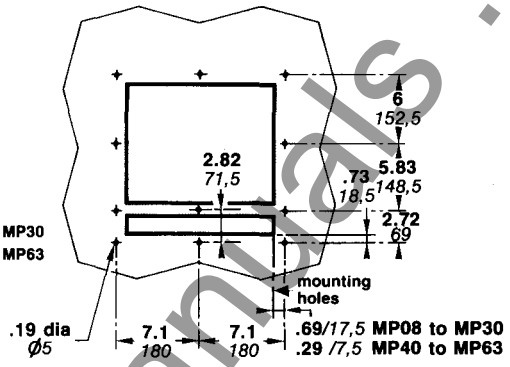
door escutcheon,
door interlock,
rear cutout,
external neutral sensor

door escutcheon (drawout mounting)

door cutout

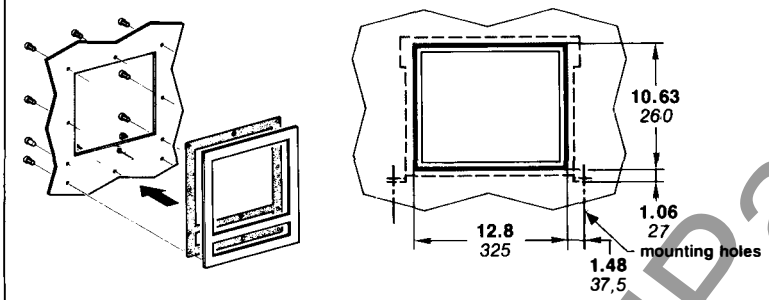


drilling of the door

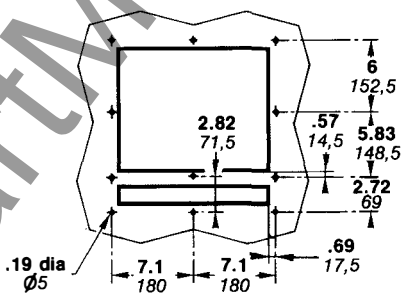


door escutcheon (fixed mounting)

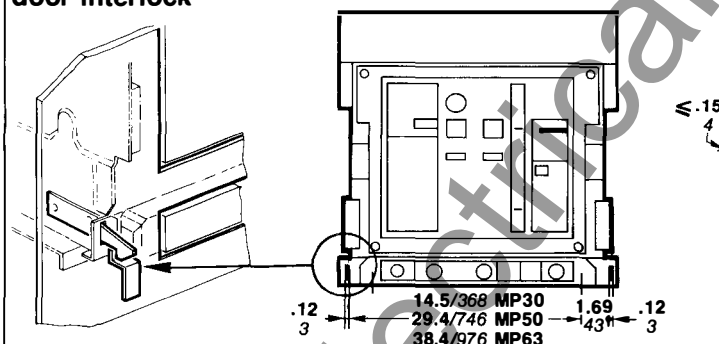
door cutout



drilling of the door

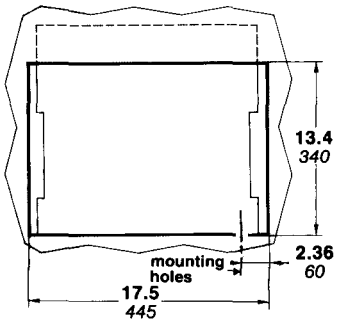


door interlock



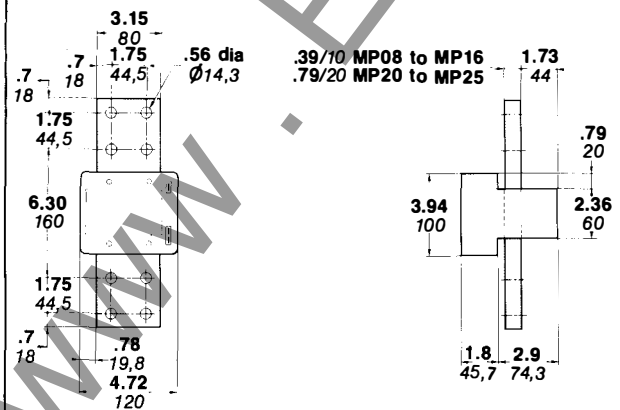
note: the door interlock can either be mounted on the right side or the left side of the breaker

rear cutout

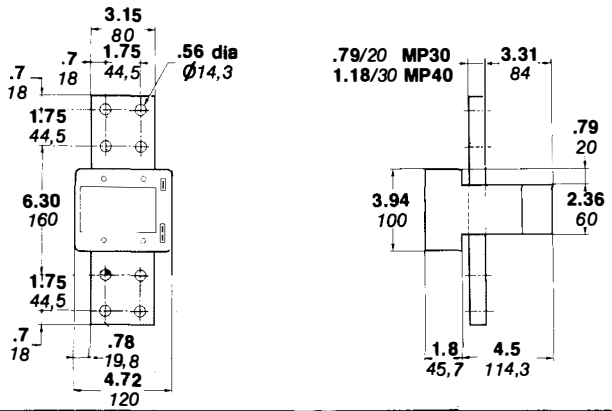


external neutral sensor

MP08-MP12-MP16-MP20-MP25



MP30-MP40



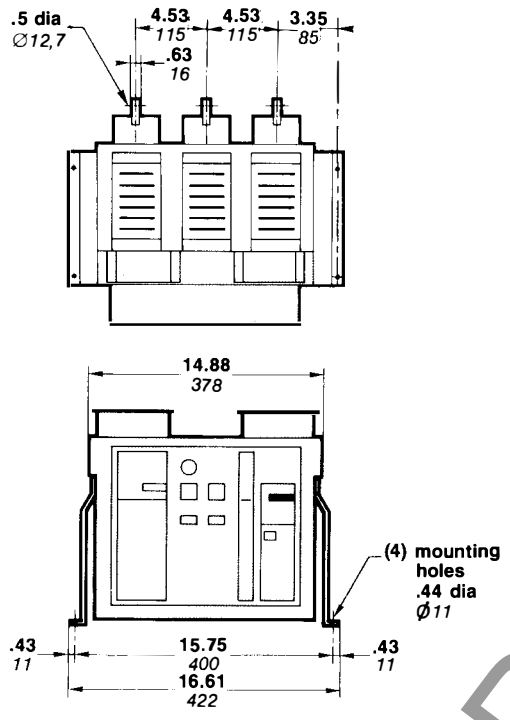
Masterpact™ MP circuit breaker dimensions

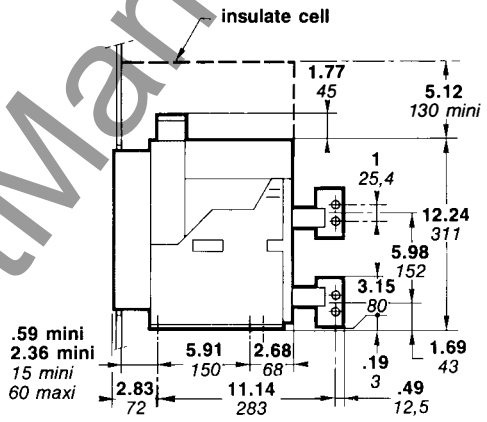
MP 08 - MP 12 - MP 16

inch / *mm*

fixed mounting

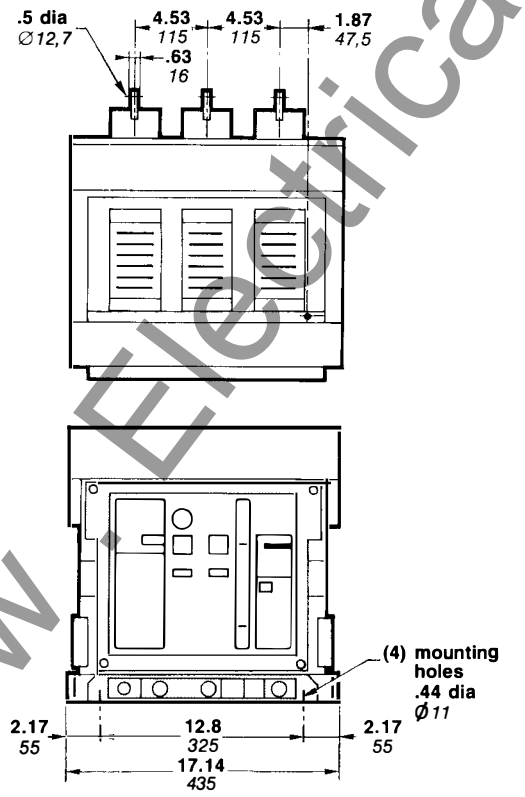
note: suitable for continuous operation at 100% rating in a minimum cubicle space H17½ by W21 by D16 inches.
Ventilation is not required.

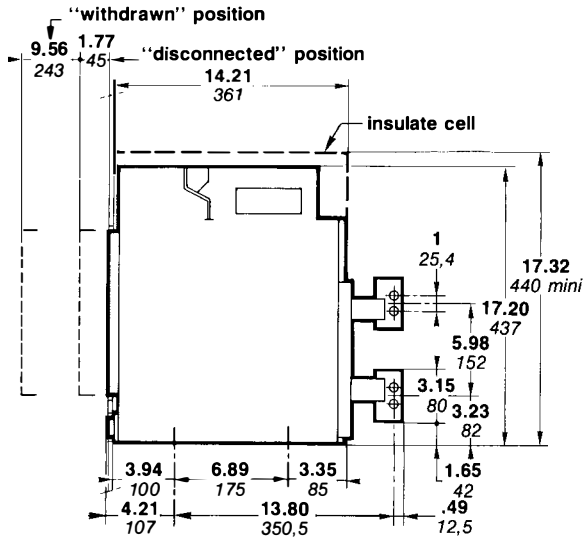




drawout mounting

note: suitable for continuous operation at 100% rating in a minimum cubicle space H17½ by W21 by D16 inches.
Ventilation is not required.



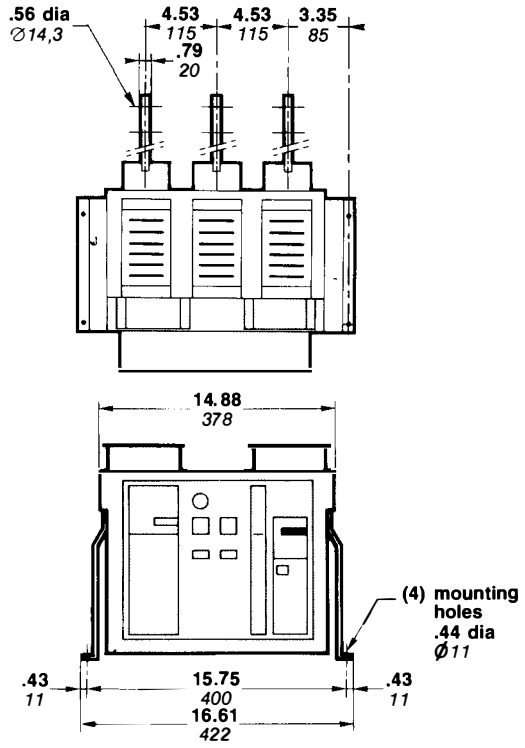


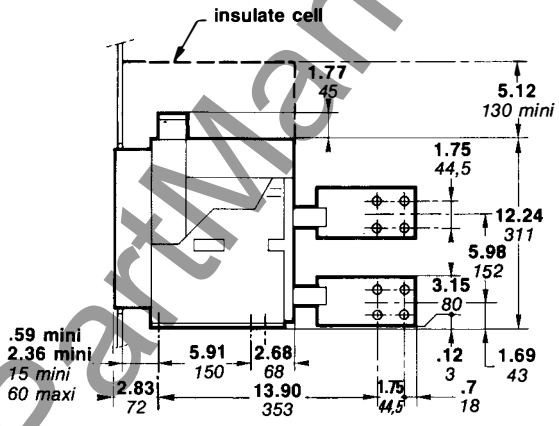
Masterpact™ MP circuit breaker dimensions

MP 20

inch / *mm*

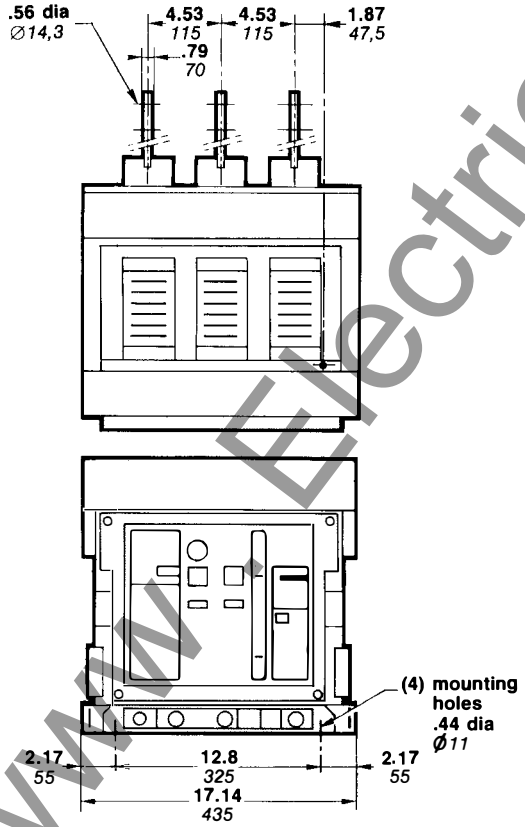
fixed mounting

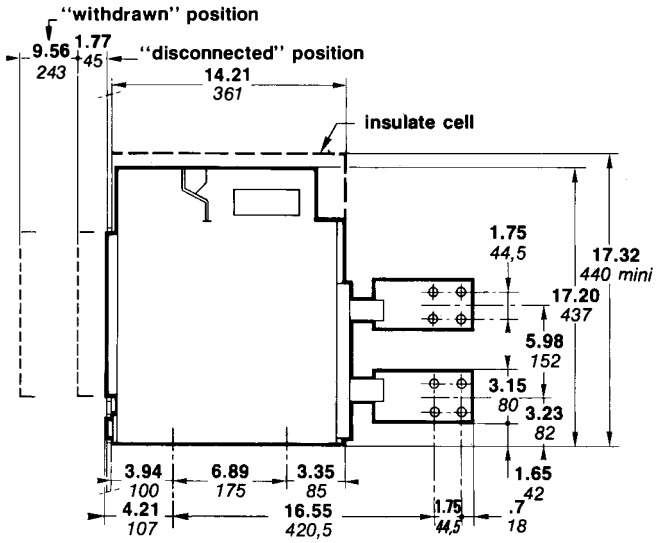




note: suitable for continuous operation at 100% rating in a minimum cubicle space H17½ by W21 by D16 inches.
Ventilation is not required.

drawout mounting





note: suitable for continuous operation at 100% rating in a minimum cubicle space H17½ by W21 by D16 inches.
Ventilation is not required.

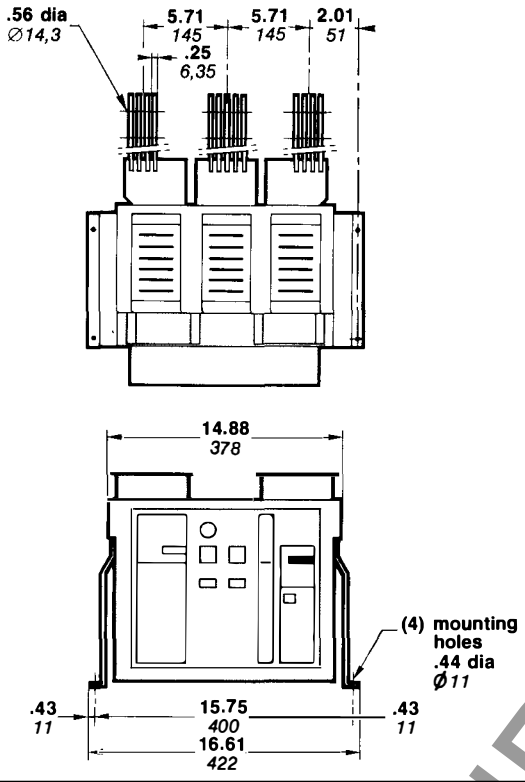
Masterpact™ MP circuit breaker dimensions

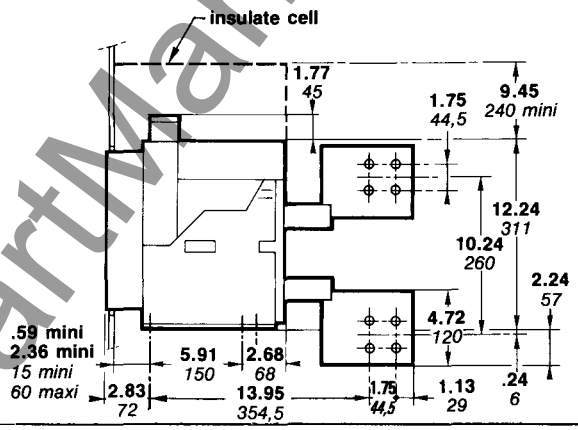
MP 25 - MP 30

inch / *mm*

fixed mounting

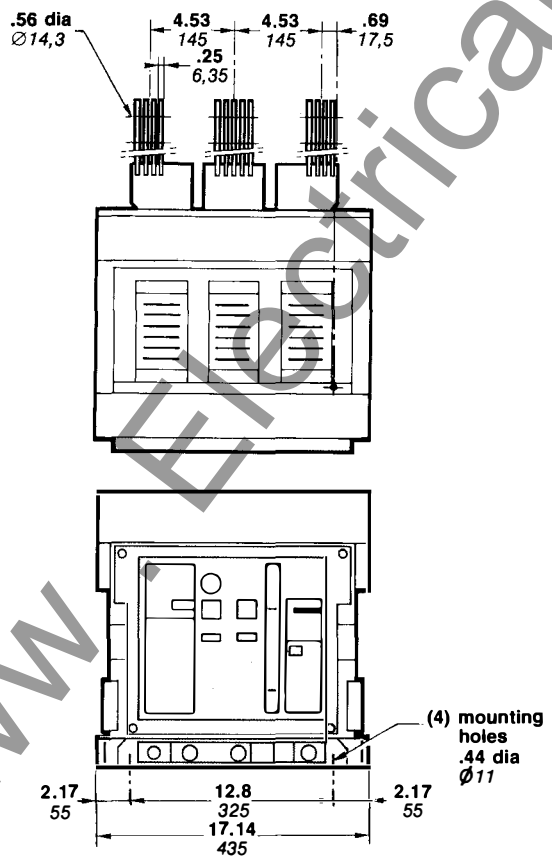
note: suitable for continuous operation at 100% rating in a minimum cubicle space H26 by W21 by D16 inches with a ventilation of 30 sq. inches both at top and bottom.

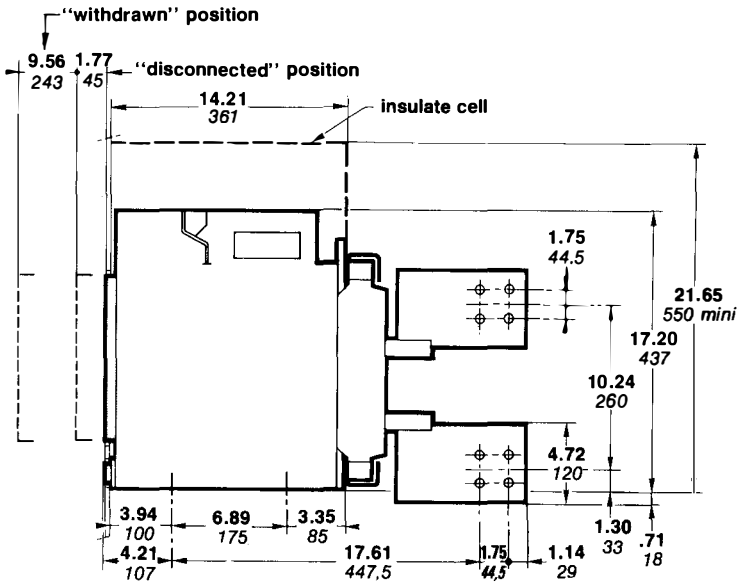




drawout mounting

note: suitable for continuous operation at 100% rating in a minimum cubicle space H26 by W21 by D16 inches with a ventilation of 30 sq. inches both at top and bottom.



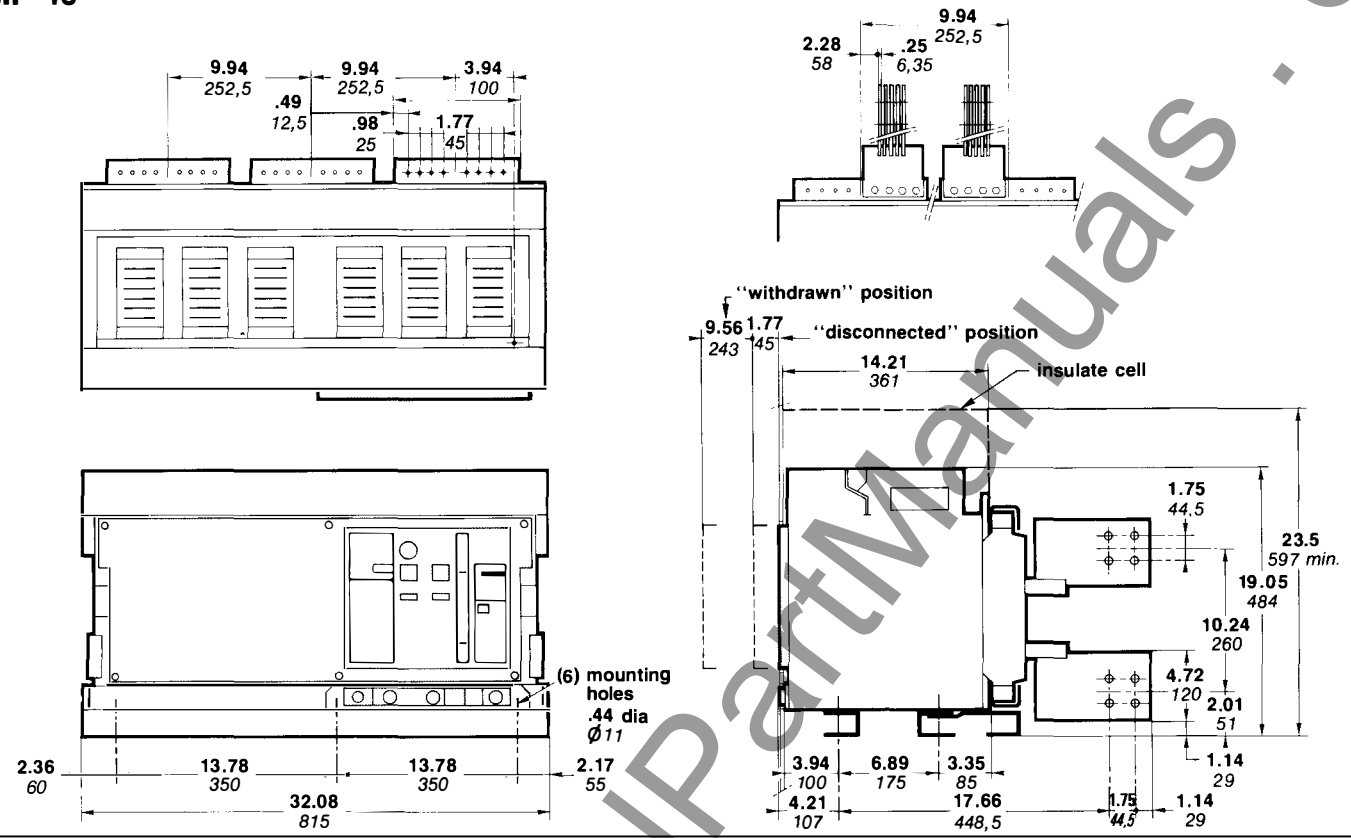


Masterpact™ MP circuit breaker dimensions

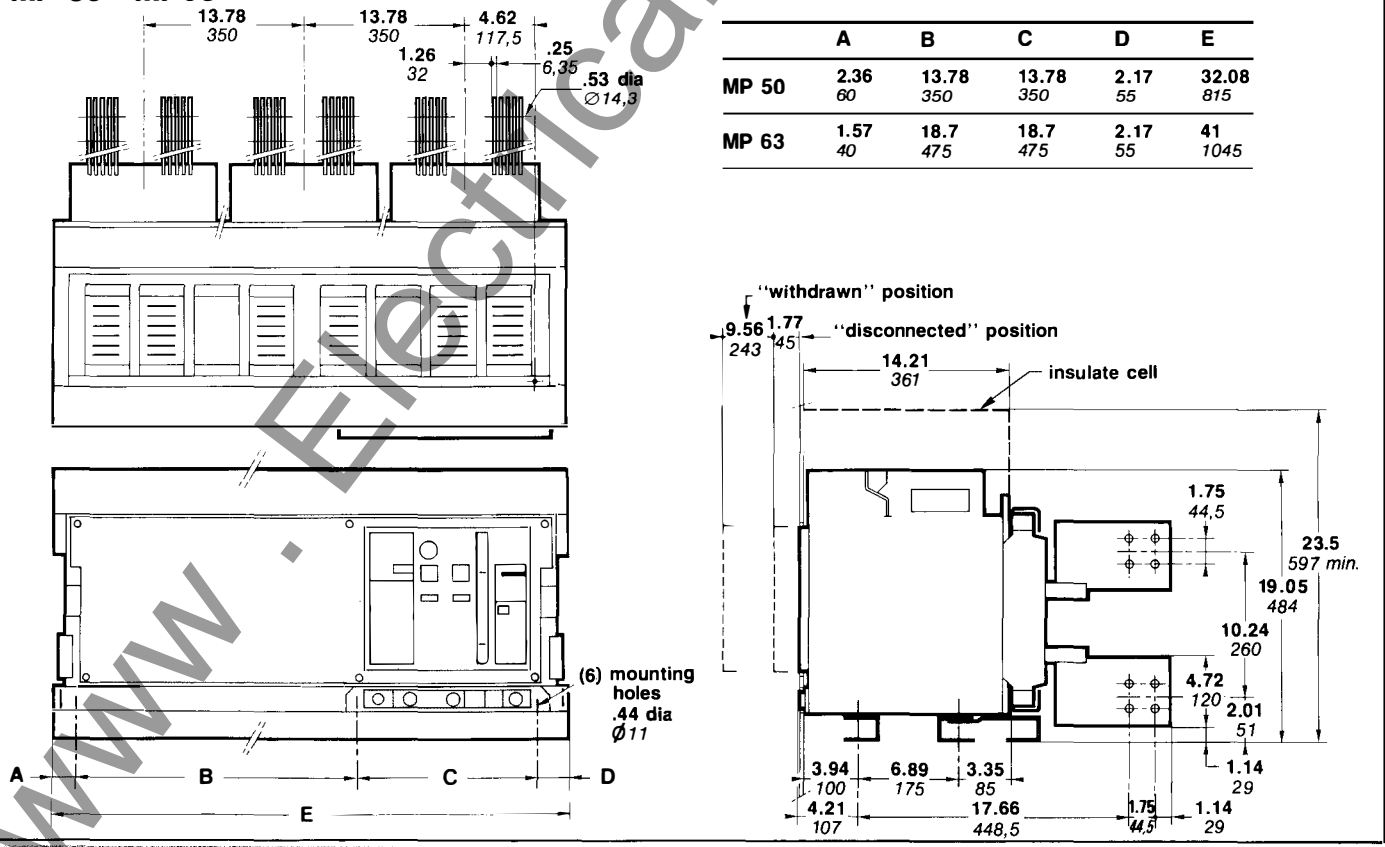
inch / *mm*

MP 40 - MP 50 - MP 63 drawout mounting

MP 40

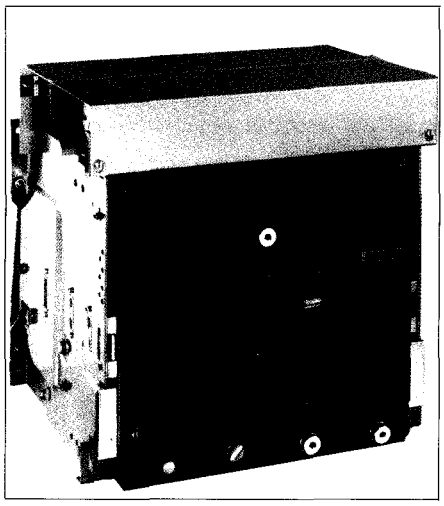


MP 50 - MP63



	A	B	C	D	E
MP 50	2.36 *60*	13.78 *350*	13.78 *350*	2.17 *55*	32.08 *815*
MP 63	1.57 *40*	18.7 *475*	18.7 *475*	2.17 *55*	41 *1045*

Masterpact™ MP switch



construction

Masterpact™ switch is designed identically to MP circuit breaker, except that it is not equipped with a control unit.

Caution :
switch does not provide overcurrent protection.
Switch can be protected by a Masterpact™ circuit breaker.

ratings ①

type 3-pole	ampere rating (A)	short time rating (RMS Sym. Amps) 600V AC max.	short circuit withstand when protected by Masterpact™ circuit breaker (A) max. frame (A)	600V AC max.
MP 08NA	800	50,000	800	50.000
MP 12NA	1200	50,000	1200	50.000
MP 16NA	1600	50,000	1600	50.000
MP 20NA	2000	50,000	2000	50.000
MP 25NA	2500	50,000	2500	50.000
MP 30NA	3000	50,000	3000	50.000
MP 40NA②	4000	85,000	4000	85.000
MP 50NA②	5000	85,000	5000	85.000
MP 63NA②	6300	85,000	6300	85.000

accessories - dimensions - connections

Switch accessories, dimensions and connection are identical to those of the corresponding circuit breaker. Overcurrent trip switch is not available with switch version.

① control unit not required
② not UL listed

recommended inspection intervals

Masterpact™ circuit breakers are designed to be maintenance-free (see page 37). However, all equipment with moving parts requires periodic inspection to ensure optimum performance and reliability. We recommend that the circuit breakers be routinely inspected six months after installation, followed by an annual inspection. Intervals can vary depending on your particular use and experience.

inspection of terminals

Connections of circuit breaker :

- terminals may be inspected. If there is discoloration due to overheating, the joint should be dissassembled and the surface cleaned before reinstallation.

It is essential that electrical connections are made carefully in order to prevent overheating.

- Check for terminal tightness.

inspection of main contacts

The arc chutes are easily removable to allow access to the main contacts and to the wear indicator. It consists of a groove located within the contacts support (see p.3). When the breaker is closed, this groove is entirely covered up by the moving contacts.

In the end, the wear of the contacts will make the groove appear.

The contacts will have to be changed when the groove is fully visible.

cleaning

Remove the dust and dirt that may have accumulated on the circuit breaker surface and terminals.

mechanical checks

For long periods circuit breakers may not be required to operate on overload or short-circuit conditions. Therefore it is essential to operate the breaker periodically.

insulation resistance tests

When breakers are subjected to severe operating conditions, an insulation resistance test may be performed as indicated in NEMA standard publication no AB2-1984.

An insulation resistance test is used to determine the quality of the insulation between phases and phase to ground. The resistance test is made at a DC voltage higher than the rated voltage, to determine the actual resistance of the insulation. The most common method employs a "megger" type instrument. A 1000-volt instrument will provide a more reliable test because it is capable of detecting tracking on insulated surfaces. Resistance values below 1 megohm should be investigated.

The insulation test shall be made :

- between line and load terminals of individual poles with the circuit breaker contacts open.
- between adjacent poles and from poles to the metallic supporting structure with the circuit breaker contacts closed. This test may be made with the circuit breaker in place after the line and load conductors have been removed, or with the circuit breaker bolted to a metallic base which simulates the in-service mounting.

electrical tests

These tests require equipment for pole resistance measurement, overcurrent and instantaneous tripping, in accordance with NEMA standard publication no AB 2. They are not within the scope of normal field operation.

Important

All tests shall be made on circuit breakers which have been de-energized, and disconnected so as to prevent accidental contact with live parts.

Caution

Since circuit breakers contain factory-sealed and calibrated elements, it is essential that the seal not be broken and the circuit breaker not be tampered with.

In the case of malfunction, the breaker shall be replaced at the Merlin Gerin factory, or by an authorized representative.

importance notice :
all the endurances given are based on normal operating conditions and conventional tests:
- closing and opening operations at rated current,
- power factor : 0.75 - 0.80.
As actual conditions differ, use these values only as inspection guidelines and check periodically contacts wear.

Under normal operating conditions of use, given by UL 489 or ANSI standards (see table 4) and controled by tests, Masterpact™ do not require maintenance. However, Masterpact™ exceeds without maintenance and additional costs the endurances required by standards.
See table 1.
It is nevertheless possible to exceed these values by an easy maintenance :
■ on site by end user. this maintenance consists of changing arc chutes and some visual inspections. See table 2.
■ on site by our after sales service. This maintenance consists of changing contacts, arc chute and some other parts. See table 3.
example
MP 25 at 480V : requires no maintenance below 10,000 cycles (mechanical) or 1,000 cycles (electricalat 480V).
Endurance may be increased by simple maintenance (changing arc chutes and some visual inspections) every 1,000 operations, and on site by our after sales service every 3,000 electrical operations and at 10,000 mechanical operations.

table 1 - endurance without maintenance

Masterpact™	MP 08	MP 12	MP 16	MP 20	MP 25	MP 30	MP40	MP 50	MP 63
mechanical	10,000	10,000	10,000	10,000	10,000	10,000	5,000	5,000	5,000
electrical									
480V	3,000	2,000	1,500	1,200	1,000	800	700	600	600
600V	2,500	1,600	1,200	1,000	800	600	600	500	500

table 2 - endurance with end user maintenance

electrical (480 or 600V)									
480V	9,000	6,000	4,500	3,600	3,000	2,400	2,100	1,800	1,800
600V	7,500	4,800	3,600	3,000	2,400	1,800	1,800	1,500	1,500

table 3 - endurance with after sales service maintenance

electrical									
480V	15,000	15,000	15,000	15,000	15,000	15,000	10,000	10,000	10,000

table 4 - standards

frame size	800	1200	1600	2000	2500	3000	4000	5000	6300
UL489									
mechanical	3,500	2,000	2,000	2,000	2,000	1,500	1,500	1,500	1,500
electrical	500	500	500	500	500	400	400	400	400
ANSI									
mechanical	12,500	NS	4,000	4,000	NS	1,500	1,500	NS	NS
electrical	2,800	NS	800	800	NS	400	400	NS	NS

Masterpact™ MP circuit breaker appendix

molded case circuit breaker

In addition to UL 489, Masterpact™ circuit breakers comply with IEC 157-1 standard as per table below:

A 4-pole version complements the product line. For further information, please contact your Merlin Gerin representative.

type 3-pole	ampere rating (A)	interrupting ratings UL489 RMS Sym. Amps 240V	480V	600V	IEC 157-1 415V P1	415V P2	660V P1	660V P2
standard interrupting rating								
MP 08H1	800	50,000	50,000	50,000	50,000	50,000	50,000	50,000
MP 12H1	1200	65,000	65,000	65,000	65,000	65,000	65,000	65,000
MP 16H1	1600	65,000	65,000	65,000	65,000	65,000	65,000	65,000
MP 20H1	2000	65,000	65,000	65,000	65,000	65,000	65,000	65,000
MP 25H1	2500	65,000	65,000	65,000	65,000	65,000	65,000	65,000
MP 30H1	3000	65,000	65,000	65,000	65,000	65,000	65,000	65,000
MP 40H1	4000	100,000	100,000	100,000	100,000	100,000	75,000	75,000
MP 50H1	5000	100,000	100,000	100,000	100,000	100,000	75,000	75,000
MP 63H1	6300	100,000	100,000	100,000	100,000	100,000	75,000	75,000
high interrupting rating								
MP 08H2	800	100,000	100,000	65,000	100,000	80,000	85,000	65,000
MP 12H2	1200	100,000	100,000	65,000	100,000	80,000	85,000	65,000
MP 16H2	1600	100,000	100,000	65,000	100,000	80,000	85,000	65,000
MP 20H2	2000	100,000	100,000	65,000	100,000	80,000	85,000	65,000
MP 25H2	2500	100,000	100,000	65,000	100,000	80,000	85,000	65,000
MP 30H2	3000	100,000	100,000	65,000	100,000	80,000	85,000	65,000
MP 40H2	4000	150,000	150,000	100,000	150,000	120,000	85,000	85,000
MP 50H2	5000	150,000	150,000	100,000	150,000	120,000	85,000	85,000
MP 63H2	6300	150,000	150,000	100,000	150,000	120,000	85,000	85,000

auxiliary and position switches (IEC 157-1 ratings)

voltage (V)		auxiliary switch OF	O	OFSUP	overcurrent trip switch	ready to close switch	position switch CE	CD
50/60Hz	110	15						
	240	10	10	10	10	10	10	10
	380	10	6	6	5	5	6	6
	480	10	6	6			6	6
	600	6	3	3			3	3
DC	48	5	3	3	3	3	3	3
	125	3	0.5	0.5	0.3	0.3	0.5	0.5
	250	3	0.25	0.25	0.15	0.15	0.25	0.25
	500	0.5						

OF: heavy duty - **O**: standard - **OFSUP**: 24 additional - **CE**: connected - **CD**: disconnected

spring charging motor

rated voltage (V)			
UL 489 listed		IEC 157-1	
60Hz	120	50/60Hz	100-127
	240		200-240
DC	24	DC	24-30
	48		48-60
	125		100-125

closing coil

rated voltage (V)			
UL 489 listed		IEC 157-1	
60Hz	120	50/60Hz	110-127
	240		220-250
DC	24	DC	24
	48		48
	125		125

shunt trip

rated voltage (V)			
UL 489 listed		IEC 157-1	
60Hz	120	50/60Hz	110-127
	240		220-250
	480		440-480
	600		600
DC	24	DC	24
	48		48
	125		125

undervoltage trip

rated voltage (V)			
UL 489 listed		IEC 157-1	
60Hz	120	50/60Hz	110-127
	240		220-250
	480		440-480
	600		600
DC	24	DC	24
	48		48
	125		125

Masterpact® circuit breaker table of contents

Masterpact® circuit breaker introduction

interrupting ratings

UL489/NEMA AB1 type	rating (A)	480V	600V	short time
standard interrupting rating				
MP08 H1	800	65kA	65kA	50kA
MP12 H1	1200	65kA	65kA	50kA
MP16 H1	1600	65kA	65kA	50kA
MP20 H1	2000	75kA	75kA	75kA
MP25 H1	2500	75kA	75kA	75kA
MP30 H1	3000	75kA	75kA	75kA
MP40 H1	4000	100kA	100kA	100kA
MP50 H1	5000	100kA	100kA	100kA
MP63 H1	6300 ①	100kA	100kA	100kA
high interrupting rating				
MP08 H2	800	100kA	65kA	50kA
MP12 H2	1200	100kA	65kA	50kA
MP16 H2	1600	100kA	65kA	50kA
MP20 H2	2000	100kA	75kA	75kA
MP25 H2	2500	100kA	75kA	75kA
MP30 H2	3000	100kA	75kA	75kA
MP40 H2	4000	125kA	100kA	100kA
MP50 H2	5000	125kA	100kA	100kA
MP63 H2	6300 ①	150kA	100kA	100kA

① not UL listed

UL1066/ANSI C37-13/NEMA SG3 ② type	rating (A)	480V	600V	short time
special interrupting rating				
MC08 N1	800	50kA	50kA	42kA
MC16 N1	1600	50kA	50kA	50kA
standard interrupting rating				
MC08 H1	800	65kA	65kA	50kA
MC16 H1	1600	65kA	65kA	50kA
MC20 H1	2000	65kA	65kA	65kA
MC32 H1	3200	65kA	65kA	65kA
MC40 H1	4000	100kA	100kA	100kA
MC50 H1	5000	100kA	100kA	100kA

② drawout only

ratings

type	ampere rating (A)	sensor ratings (A)
08	800	250-400-600-800
12	1200	800-1000-1200
16	1600	1200-1600
20	2000	1600-2000
25	2500	2000-2500
30	3000	2500-3000
32	3200	2500-3200
40	4000	2500-3000-4000
50	5000	4000-5000
63	6300	5000-6300

tropicalization

The standard moisture and fungus protection ensure normal operation under extreme ambient conditions. Masterpact® circuit breakers comply with T2 tropicalization (IEC standard 68-2-30); relative humidity 95% at 113°F (45°C) and 80% at 131°F (55°C) (hot, humid climate). Salt spray resistance as per IEC 68-2-11.

standard compliance

- UL489: MP08 to MP50 circuit breakers and their accessories are listed under UL files E63335, E103955 and E113555
- UL1066/ANSI: MC08 to MC50 circuit breakers are UL Listed according to UL1066 (ANSI C37-13) under file E161835
- international standards: the Masterpact® circuit breaker has been designed to meet all the major standards including:
  - IEC 947-2 and related standards such as VDE, BS, etc.
  - JEC, JIS
- marine applications:
  - homologated by Bureau Veritas
  - approved by Det Norske Veritas and Germanische Lloyd's
  - listed by Lloyd's Register of Shipping
  - American Bureau of Shipping application
  - UL marine

other performances

The UL 489 and UL1066 (ANSI C37-13) standard performance assure that the circuit breaker has sufficient characteristics to be used in normal conditions. However, the circuit breaker exceeds, without additional costs, the UL standard 1,500 operations required in endurance. The heavy duty mechanism and the contact design provide a mechanical endurance of 10,000 operations (approx.) without maintenance (see page 38).

single design up to 6300A

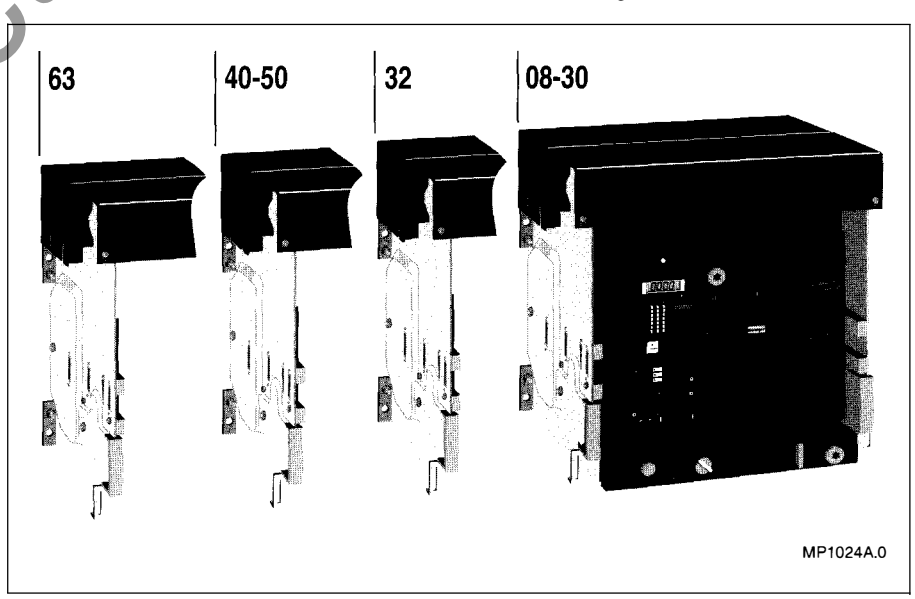
All frame sizes have been designed with the same technology featuring identical depth and door cutouts, and common control units and accessories.

high short-time current rating: up to 100kA for 1 sec.

The exceptional short-time rating of 75,000A in a 3000A frame and 100,000A in a 4000A frame and above allows the circuit breakers to be fully selective up to their interrupting ratings.

100% rated

The circuit breakers are designed for continuous operation at 100% of their current rating.

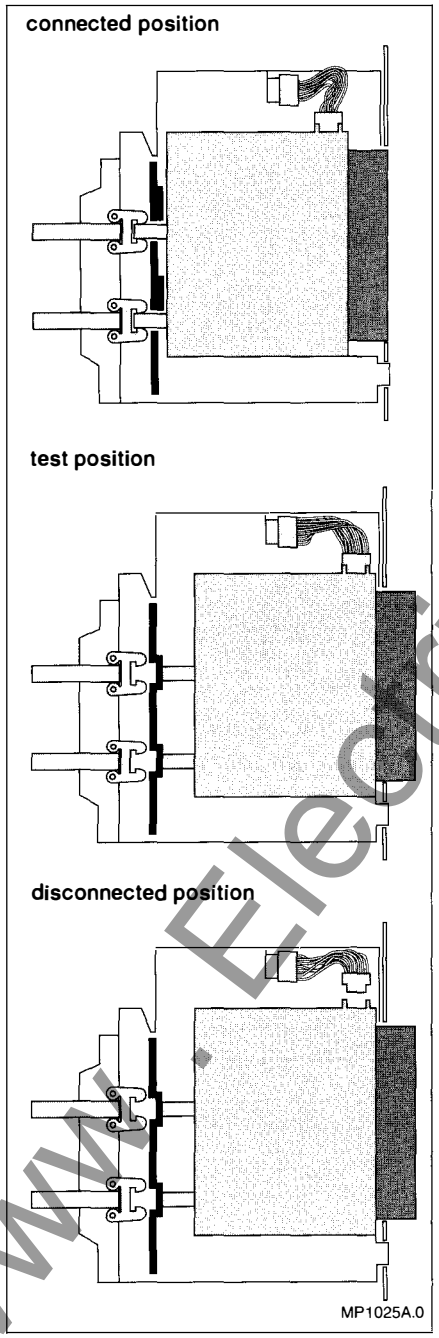


MP1024A.0

Masterpact® circuit breaker advantages

drawout circuit breaker design

■ the drawout assembly mechanism allows the circuit breaker to be racked in 4 positions (connected, test, disconnected and withdrawn).
■ the closing and opening push buttons, the racking handle and racking mechanism are accessible through the front door cutout. Disconnecting the circuit breaker will be therefore possible without opening the door and accessing live parts. Safety shutters can be provided for protection from live parts when the circuit breaker is removed.

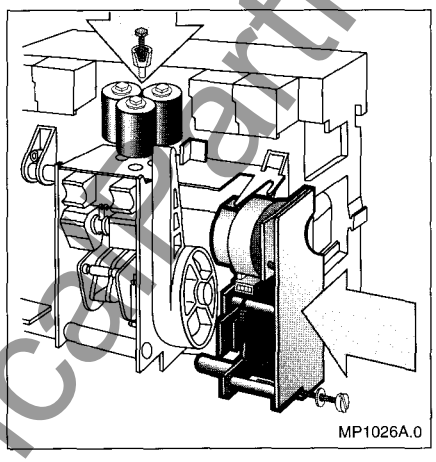


true 2-step stored energy mechanism

The closing time is less than 5 cycles.
The circuit breaker is operated via a stored energy mechanism which can be manually or motor charged. Closing and opening operations can be initiated either from the local push buttons on the circuit breaker front face, or by remote control.
O-C-O cycle is possible without recharging.

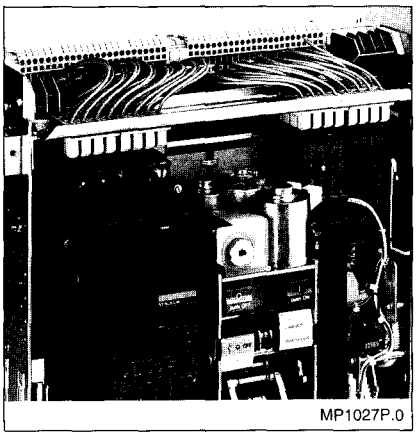
field-installable accessories

■ as the installation develops and changes the circuit breaker can develop and change with it. Most accessories are field-installable, without losing the UL Listing mark, without any adjustment and with only the aid of a screwdriver.
■ the uniform design of the circuit breaker line allows these accessories to be common for the whole line.



front connection of secondary circuits

All accessory terminals are located on a connecting block which is accessible from the front even with the circuit breaker in the test or disconnected position. This is particularly useful for field inspection and modification.

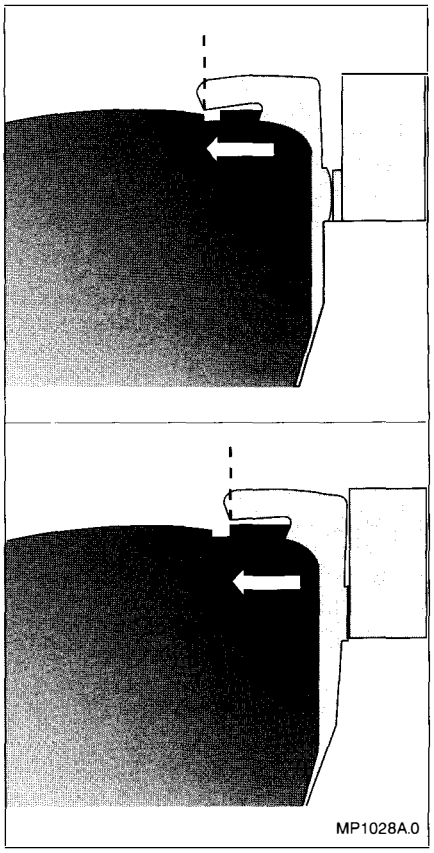


designed for no maintenance...

The circuit breaker has fewer parts (by a factor of at least 5) than conventional circuit breakers while performing the same functions. This leads to greatly enhanced reliability and reduction in maintenance.
Under normal operating conditions, given by standards and controlled by tests, the circuit breaker does not require maintenance.

...but exceeds the standard with an easy and reduced maintenance

It is easy to remove the arc chutes and visually inspect the contacts and wear indicator. The operation counter (spring charging motor option) can also indicate when inspections and possible maintenance should be done.
After operating conditions exceeding those given by standards, it is possible to extend the circuit breaker life by:
■ replacement of arc chutes and spring charging motor by the user.
■ replacement of main contacts by an after sale service team.
Note: see page 37 for additional information.



Masterpact® circuit breaker advantages

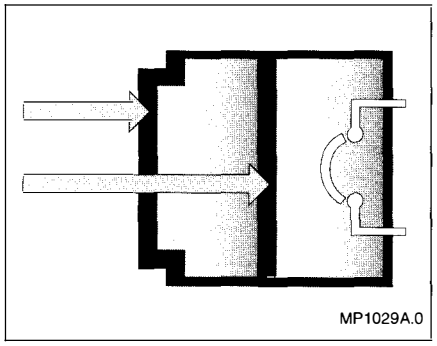
improved features

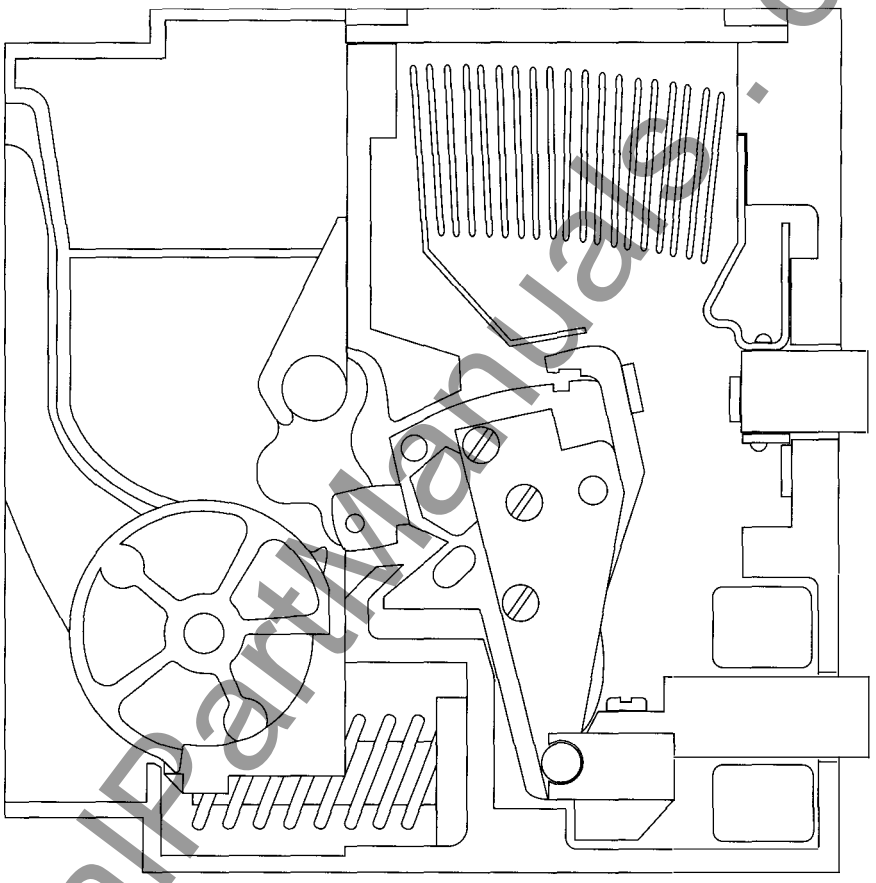
■ **segregated compartment**
Once the front cover has been removed, giving access to the auxiliary compartment, the main contacts remain fully isolated. Furthermore, interphase partitioning allows full insulation between each pole even if the front cover has been removed.

■ **isolation function by positive indication of contact status**
The mechanical indicator is truly representative of the status of all three main contacts.

■ **reinforced insulation**
Two insulation barriers separate the front of the circuit breaker from main circuits.

■ **disconnecting through door**
The racking handle and racking mechanism are accessible through the front door cutout. Disconnecting the circuit breaker will therefore be possible without opening the door and giving access to live parts.


MP1029A.0


MP1030A.0

state of the art protection and control

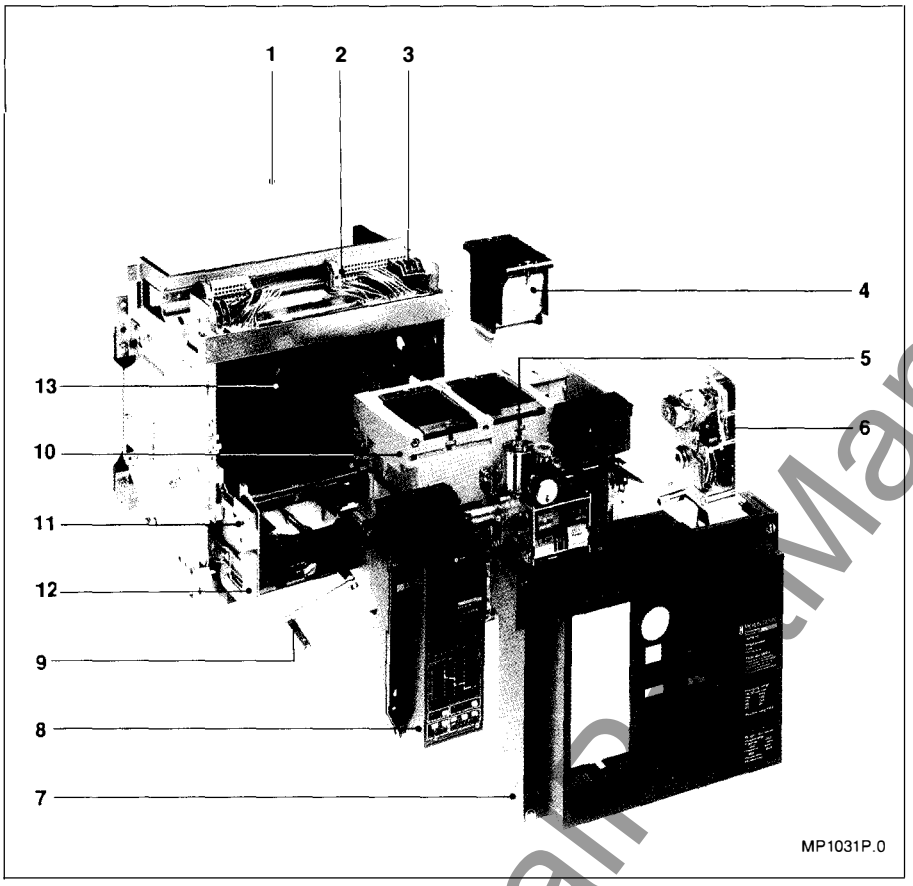
The circuit breaker can be equipped with a microprocessor-based, electronic control unit which provides all the traditional protection of the universal power circuit breaker (long-time, short-time, instantaneous and ground-fault) ③ plus other built-in functions:

■ rms sensing (standard)
■ alarm switch (standard)
■ overcurrent trip switch (standard)
■ interchangeable rating plugs (standard)
■ thermal memory and I^2t ramp (standard on STR 38-58 control unit)
■ defeatable instantaneous (standard on STR 38-58 control unit)
■ zone-selective interlocking for ground fault and short time (option)
■ current and load meter (option)
■ load monitoring outputs (option)
■ fault indicators (option)
■ communication ability (option)

control units		STR 28D	STR 38S	STR 58U
basic features				
long-time ①	setting	adjustable	adjustable	adjustable
	delay	fixed	fixed	adjustable
short-time	pickup		adjustable	adjustable
	delay		adjustable	adjustable
instantaneous		adjustable	fixed ②	adjustable ②
test receptacle		standard	standard	standard
additional features				
ground-fault protection ③			■	■
built-in ammeter		■	■	■
fault indicators			■	■
segregated alarm switch				■
zone-selective interlocking				■
load monitoring				■
communication outputs				■

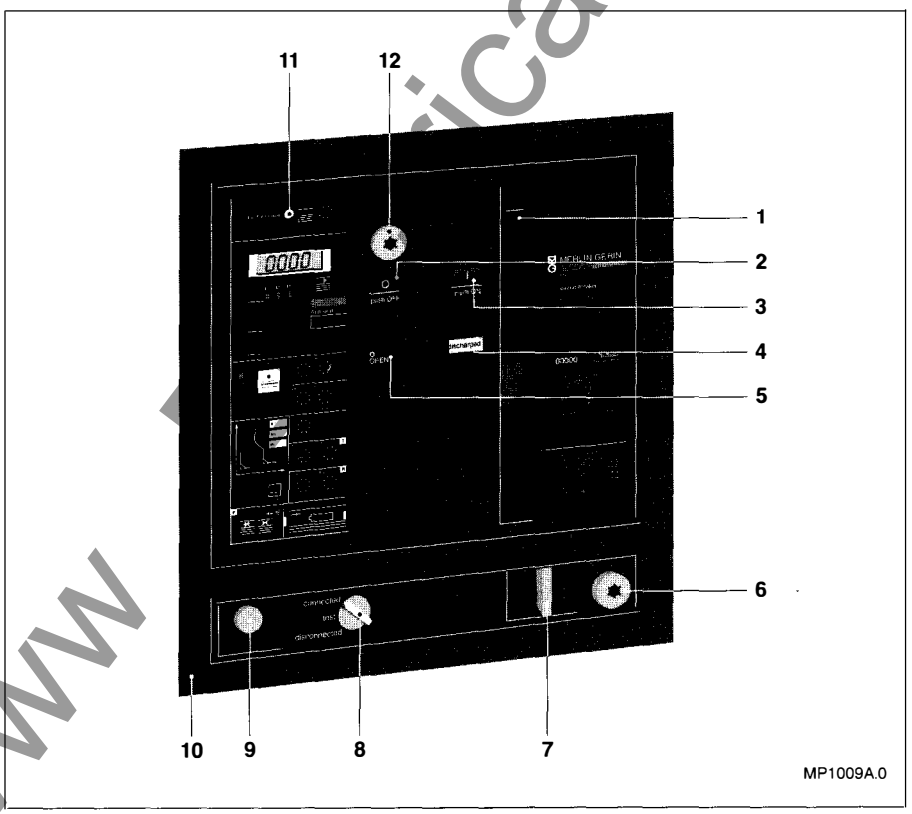
① long-time pickup at 1.1 current setting
② defeatable on N1 and H1 types
③ two types: residual sensing (T) or residual source ground return (W)

Masterpact® circuit breaker description



description

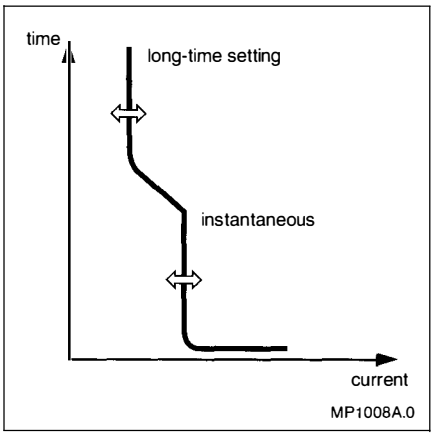
1 control terminal covers
2 accessories and control unit front connecting block
3 position carriage switches
4 arc chute
5 opening coils
6 spring charging motor
7 front cover
8 control unit
9 racking crank
10 handling handgrip
11 retractable rails
12 pull-out handgrip
13 safety shutters

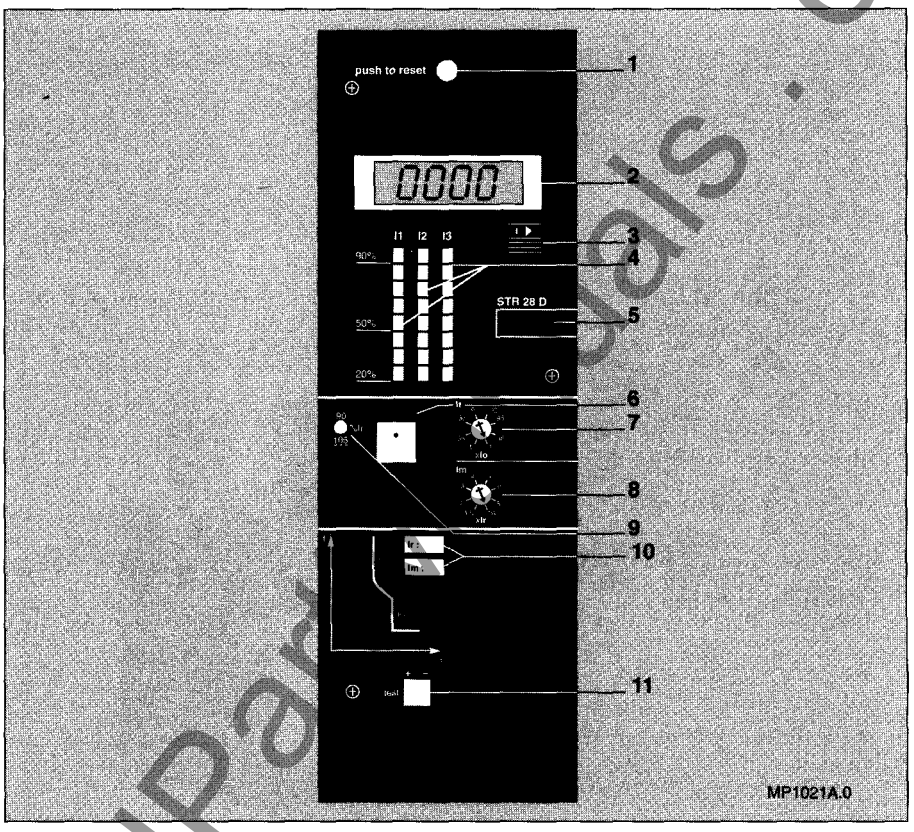


front view

1 charging handle
2 manual opening push button
3 manual closing push button
4 stored energy mechanism status indicator (charged or discharged)
5 main contact position indicator (open or closed)
6 disconnected position locking (key interlock)
7 disconnected position padlocking
8 drawout position indicator showing that the circuit breaker is in the connected, test or disconnected position
9 racking crank housing
10 door escutcheon
11 fault indicator and reset button
12 open position locking (key interlock)

1 mechanical pop-out type fault indicator and reset button
■ indicates that a fault trip has occurred
■ prevents reclosure of the circuit breaker after fault until reset
2 ammeter (LCD digital display)
3 ammeter selector used to read:
■ phase currents (1, 2, 3, N)
■ or the phase with the highest load current (max.)
4 load indication
(bar graph - % of current setting)
5 sensor rating
6 rating plug
7 long-time current setting
8 instantaneous pickup
9 local and remote pre-trip alarm:
■ LED on at 90% of current setting
■ LED flashing on overload ①
■ remote indication by static contact
10 available spaces for setting identification
11 test receptacle

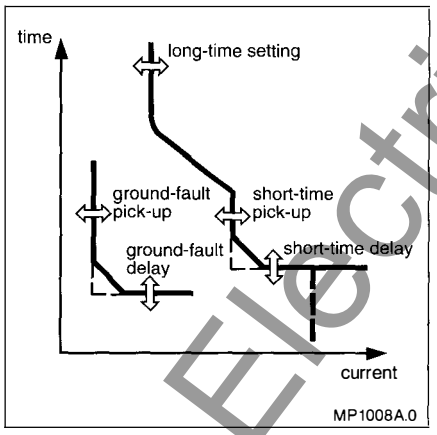




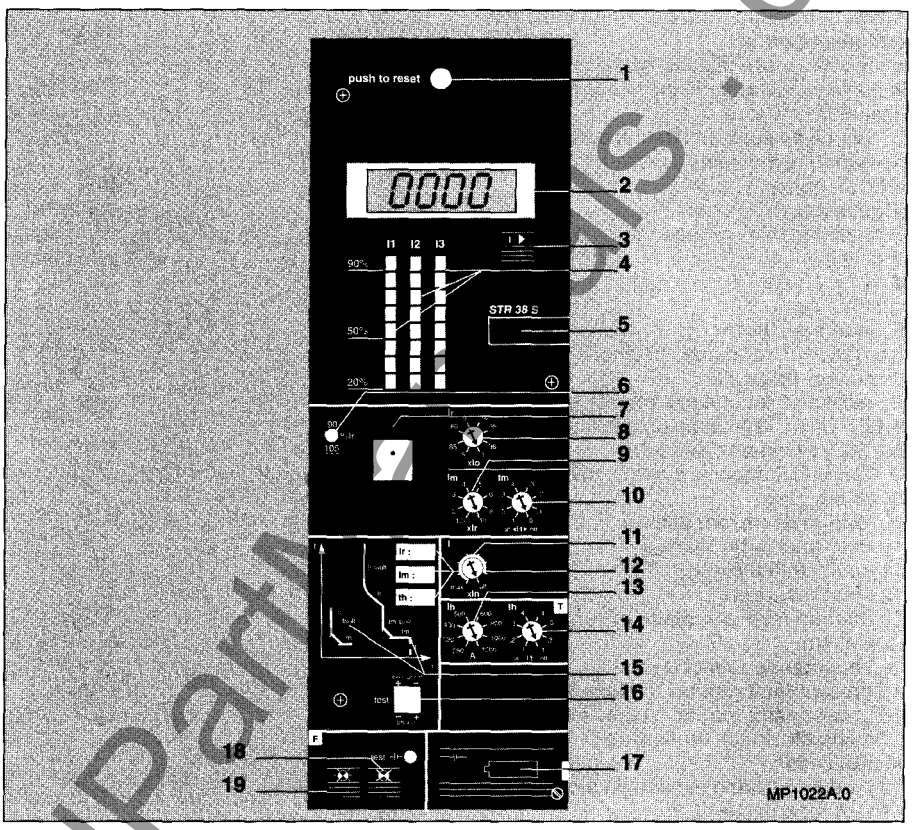
overcurrent protection - rms sensing		
rating plug	current sensor	plug rating
	250A	250-200-150-125A
	400A	400-300-250-200A
	600A	600-500-400-300A
	800A	800-600-500-400A
	1200A	1200-1000-800-600A
	1600A	1600-1200-1000-800A
	2000A	2000-1600-1200-1000A
	2500A	2500-2000-1600-1200A
	3000A	3000-2500-2000-1600A
	3200A	3200-3000-2500-2000-1600A
	4000A	4000-3200-3000-2500-2000A
	5000A	5000-4000-3200-3000-2500A
	6300A	6300-6000-5000-4000-3200-3000A
long-time	current setting	0.8 to 1 x rating plug (pick up at 1.1 x setting)
	max. delay	fixed: 7.5s at 6 x current setting
instantaneous	pickup	1.5 to 10 x current setting
built-in ammeter (optional)		
option I	values displayed	phase 1, 2, 3, max., neutral current
	accuracy	± 1.5 % ②
	bar graph indicat.	phase 1, 2, 3 - 10% steps
	control power	not required ③
fault or alarm indicators		
not discriminated	local	by pop-out type indicator and LED pre-trip alarm
	remote	by overcurrent trip and pre-trip alarm switches. See p. 11

● according to time current curves: between 105% and 120% of current setting
② total accuracy including current sensors: ± 4.5%
③ control power not required for loads greater than 20% of current sensors. Required for load less than 20% of current sensors if maximum demand memory requested. (see diagram p. 29)

1 mechanical pop-out type fault indicator and reset button
■ indicates that a fault trip has occurred
■ prevents reclosure of the circuit breaker after fault until reset
2 ammeter (LCD digital display)
3 ammeter selector used to read:
■ phase currents (1, 2, 3, N, ground)
■ or the phase with the highest load current (max.)
4 load indication
(bar graph - % of current setting)
5 sensor rating
6 local and remote pre-trip alarm:
■ LED on at 90% of current setting
■ LED flashing on overload ①
■ remote indication by static contact
7 rating plug
8 long-time current setting
9 short-time pick-up
10 short-time delay
11 instantaneous ON/OFF selector
12 available space for setting identification
13 ground-fault (option T) pick-up
14 ground-fault (option T) time delay
15 local (option F) fault indicators:
consisting of built-in light emitting diodes: fault indicators differentiate the three causes of tripping: overload, short circuit and ground fault, if any
16 test receptacle
17 fault indicator saving battery (option PIL)
18 fault indicator reset or battery test button
19 fault indicator re-activating button (option PIL) ②

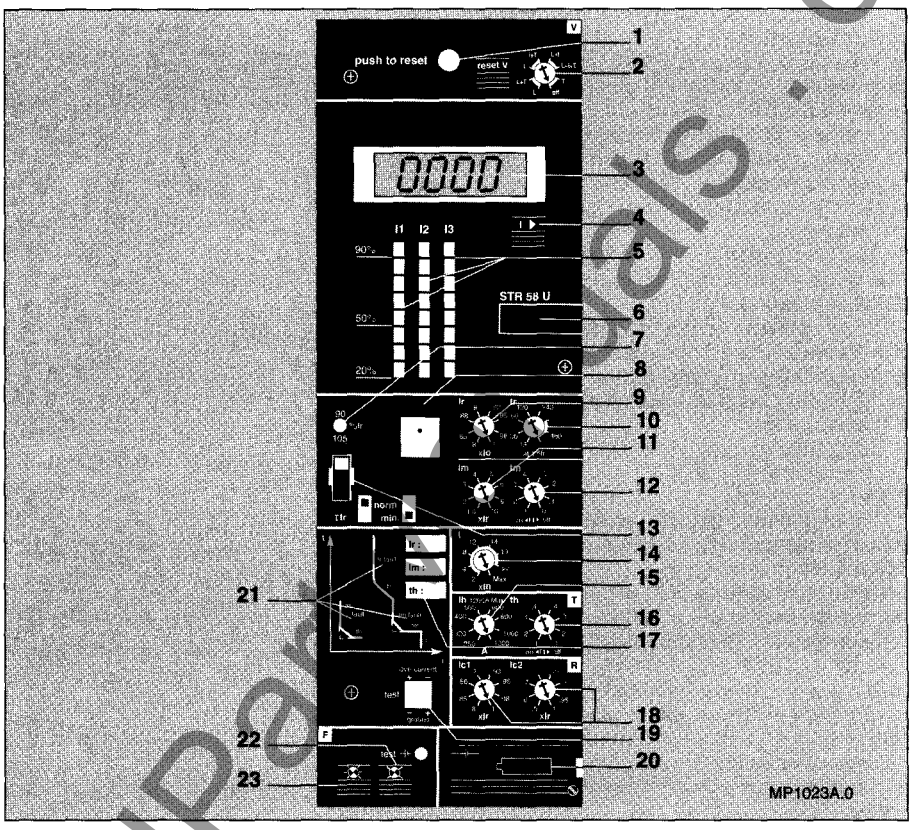


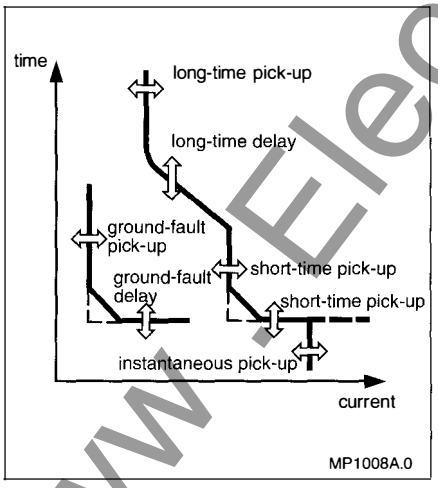
● according to time current curves: 105% to 120% of current setting
② with PIL option, fault indicator lights (15) will only light up when this button is pushed in
③ see values on pp. 24 to 26
④ residual scheme. The maximum ground-fault pickup meets 1991 National Electrical Code paragraph 230-95 (a) (not exceeding 1200A) Source Ground Return scheme on request
⑤ 0.1 minimum pickup only with external power
⑥ total accuracy including current sensors: ± 4.5%
⑦ control power not required for loads greater than 20% of current sensors. Required for loads less than 20% of current sensors if maximum demand memory requested. (see diagram p. 29)



overcurrent protection - rms sensing		
rating plug	4 to 6 rating plugs available per sensor rating: see STR 28D p. 6	
long-time	current setting	0.8 to 1 x rating plug (pick up at 1.1 x setting)
	delay	fixed: 7.5 s at 6 x current setting
	thermal memory	as standard
short-time	pickup	1.5 to 10 x current setting
	delay bands	0 - 0.1 - 0.2 - 0.3 - 0.4 with I^2t OFF
		0.1 - 0.2 - 0.3 with I^2t ON
instantaneous	pickup	high-set fixed type ③ - defeatable on N1 and H1 types
ground-fault protection (option T or W) ④		
pickup	0.1 x current sensor to 1200A ⑤	
delay band	0.1 - 0.2 - 0.3 - 0.4 with I^2t ramp ON/OFF switch	
fault indicators		
not discriminated	local	by mechanical pop-out type indicator and LED pre-trip alarm
	remote	by overcurrent trip and pre-trip alarm switches. See p. 11
discriminated	local	with option F - see p. 11
built-in ammeter		
option I	values display	phase 1, 2, 3, max., neutral and ground current
	accuracy	± 1.5 % ⑥
	bar graph indication	phases 1, 2, 3 - 10% steps
	control power	not required ●

1 mechanical pop-out type fault indicator and reset button
■ indicates that a fault trip has occurred
■ prevents reclosure of the circuit breaker after fault until reset
2 switch selector for the type of fault to be remotely indicated and reset flat push button (option V, p. 11)
3 ammeter (LCD digital display)
4 ammeter selector used to read:
■ phase currents (1, 2, 3, N, ground)
■ or the phase with the highest load current (max.)
5 load indication
(bar graph - % or current setting)
6 sensor rating
7 local and remote pre-trip alarm:
■ LED on at 90% of current setting
■ LED flashing on overload ①
■ remote indication by static contact
8 rating plug
9 long-time current setting
10 long-time delay setting
11 short-time pick-up
12 short-time delay
13 thermal memory min./max. selector
(see p. 40)
14 instantaneous pickup
15 ground-fault (option T) pickup
16 ground-fault (option T) time delay
17 available space for setting identification
18 load monitoring (option R) pickups
19 test receptacle
20 fault indicator saving battery (option PIL)
21 local (option F) fault indicators:
consist of built-in light emitting diodes which differentiate the three causes of tripping: overload, short circuit and ground fault, if any
22 fault indicator reset or battery test button
23 fault indicator re-activating button (option PIL) ②





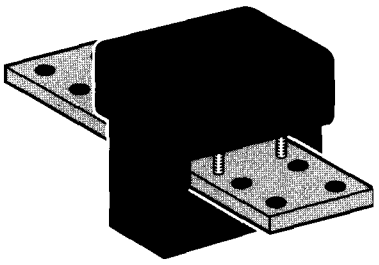
① according to time current curves: 105% to 120% of current setting
② with PIL option, fault indicator lights (21) will only light up when this button is pushed in

overcurrent protection - rms sensing		
rating plug	4 to 6 rating plugs available per sensor rating: see STR 28D control unit	
long-time	current setting	0.8 to 1 x rating plug (pick up at 1.1 x current setting)
	delay bands	0.94 - 1.88 - 3.75 - 7.50 - 15 - 30s at 6 x current setting
	thermal memory as standard with min./max. selector	
short-time	pickup	1.5 to 10 x current setting
	delay bands	0 - 0.1 - 0.2 - 0.3 - 0.4 with I^2t OFF
		0.1 - 0.2 - 0.3 with I^2t ON
	zone-selective interlocking with option Z - see p. 10	
instantaneous	pickup	adjustable from 2 to max. value, ① defeatable on N1 and H1 types
ground-fault protection (option T or W) ②		
pickup	0.1 x current sensor to 1200A ③	
delay band	0.1 - 0.2 - 0.3 - 0.4 with I^2t ramp ON/OFF switch	
	zone-selective interlocking with option Z - see p. 10	
fault indicators		
not discriminated	local	by mechanical pop-out type indicator and LED pre-trip alarm
	remote	by overcurrent trip and pre-trip alarm switches. See p. 11
discriminated	local	with option F - see p. 11
	remote	with option V - see p. 11
built-in ammeter (option I)		
option I	values display	phase 1, 2, 3, max., neutral and ground current
	accuracy	± 1.5 % ④
	bar graph indication phase 1, 2, 3 - 10% steps	
	control power	not required ⑤
load monitoring (option R)		
inverse time alarm	pickups	Ic1 = 0.8 to 1 x current setting
		Ic2 = 0.5 to 1 x current setting
	time delay	see curve p. 27
outputs for communication through Dialpact system (option C)		
transmitted values	entire settings of the trip unit	
	circuit breaker status: open, tripped, closed	
	alarms: overload, type of fault, internal watchdog ⑥	

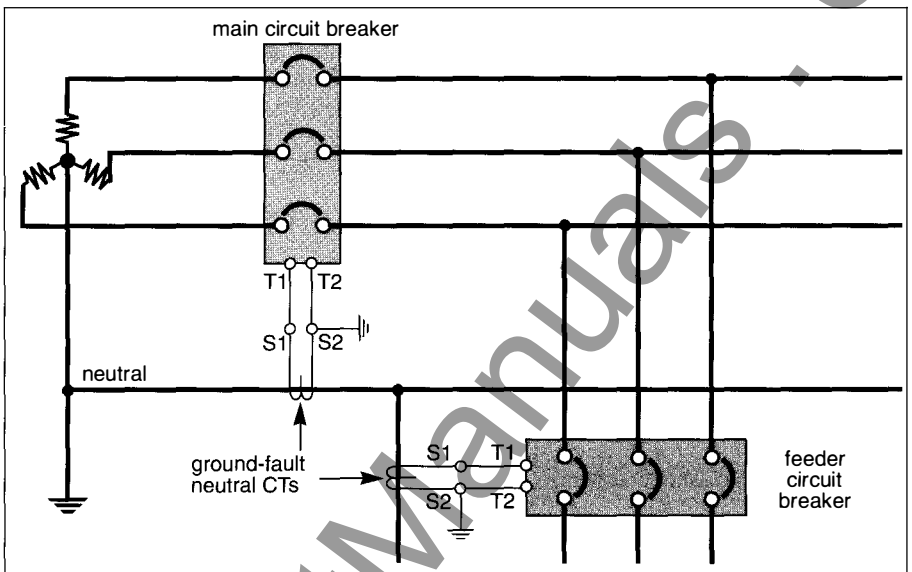
① see values on pp. 24 to 26
② residual scheme. The maximum ground-fault pickup meets 1993 National Electrical Code paragraph 230-95 (a) (not exceeding 1200A) Source Ground Return scheme on request
③ 0.1 minimum pickup only with external power
④ total accuracy including current sensors: ± 4.5%
⑤ control power not required for loads greater than 20% of current sensors. Required for load less than 20% of current sensors if maximum demand memory requested. (See diagram p. 29)
⑥ internal watchdog: control unit internal temperature and microprocessor proper operation monitoring

neutral sensor

Ground-fault protection may be applied on 3Ø4W or 3Ø3W circuits. On 3Ø4W circuits an external neutral sensor must be used. This neutral current sensor must have the same ampere rating as the circuit breaker.



external neutral sensor MP1001A.0



Note: #18 to #14 AWG cables - max. length 60 ft./18.3 m MP1002A.0

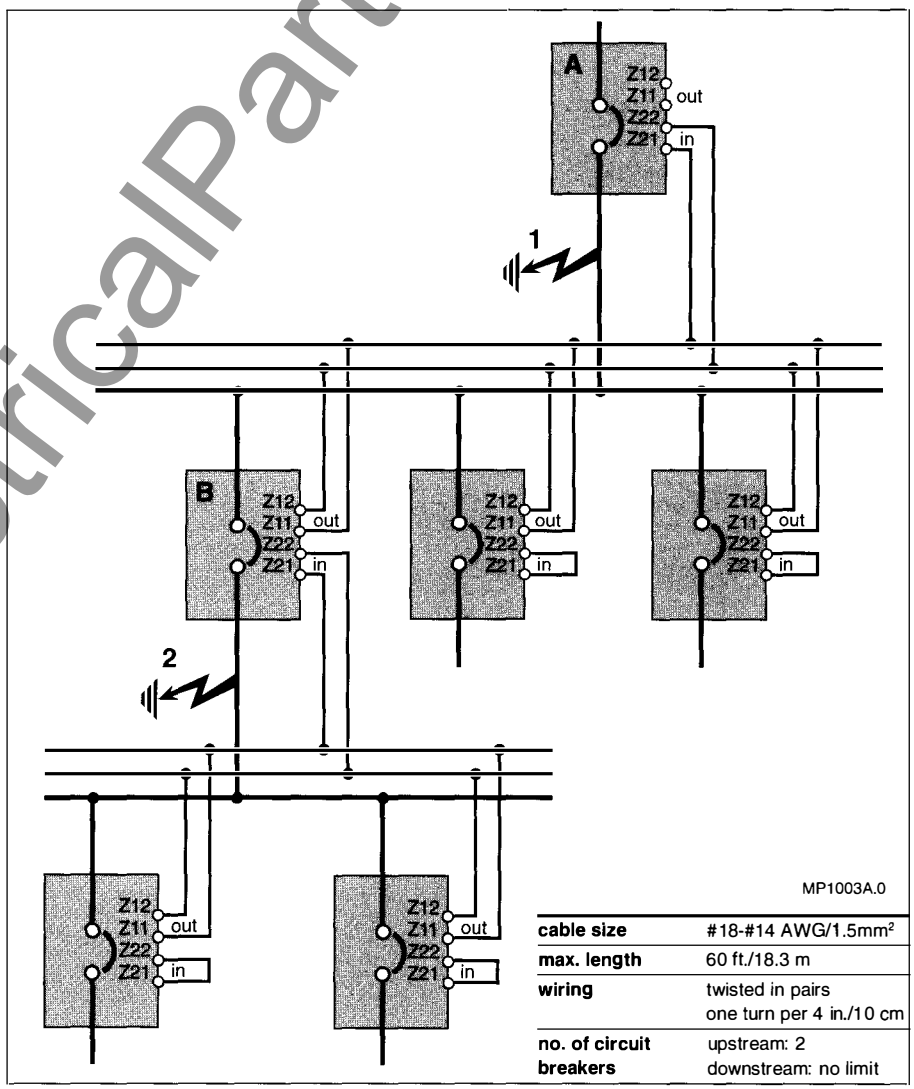
Zone-selective Interlocking (ZSI)

Option Z on the STR 58U trip unit provides selective interlocking on short time or ground fault.
A pilot wire links several trip units in the distribution network, as shown in the opposite figure.
In the event of a fault, the trip unit will obey the pre-set delay only if receiving a signal from the downstream unit. If not receiving a signal, the tripping will be instantaneous. Therefore, the fault is cleared instantaneously by the nearest circuit breaker:
the thermal stresses (I^2t) in the network are minimized, without any effect on the correct time delay coordination in the installation.

fault 1
Circuit breaker A will clear the fault instantaneously, regardless of its time delay setting.

fault 2
Circuit breaker B will inform upstream circuit breaker A that it is clearing the fault and will prevent it from tripping instantaneously.
Circuit breaker A will trip at the end of its time delay setting if the fault is not cleared during this time.

Note:
■ circuit breaker terminals are delivered with "in" terminals jumpered. Remove the jumper when interlocking with a downstream circuit breaker.
■ the Masterpact circuit breaker may also be interlocked with Compact CK type molded case circuit breakers with ZSI option.
■ do not ground.



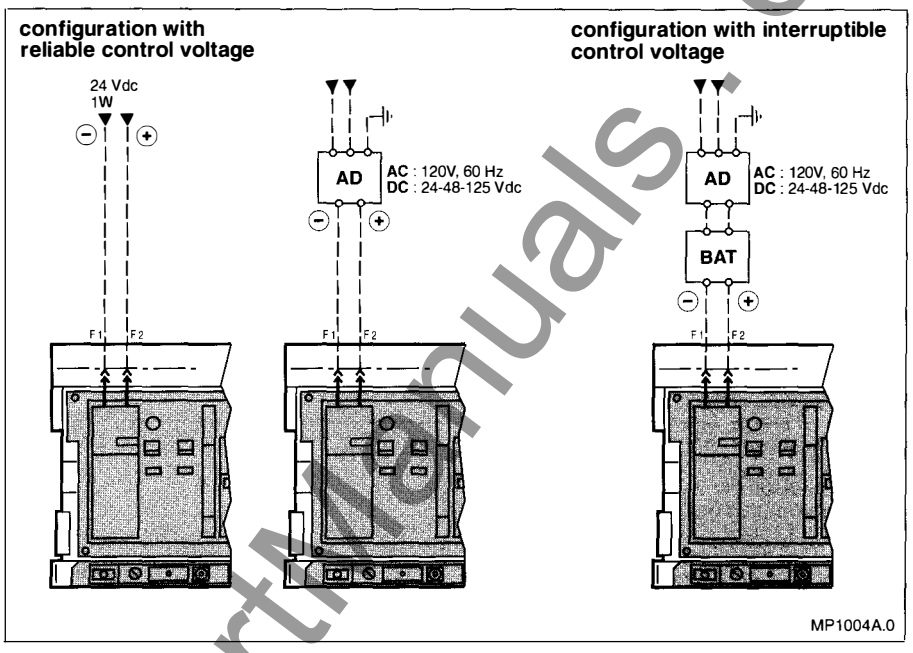
MP1003A.0

cable size	#18-#14 AWG/1.5mm²
max. length	60 ft./18.3 m
wiring	twisted in pairs one turn per 4 in./10 cm
no. of circuit breakers	upstream: 2 downstream: no limit

fault indicator (option F)

In addition to the mechanical fault indicator, this indicator differentiates the three causes of tripping: overload, short circuit or ground fault if any.
Three light-emitting diodes indicate separately long-time, short-time/ instantaneous and ground-fault trip.
A flat push button allows resetting of the indicator after tripping.
A separate power supply is required to maintain the indication after tripping of the circuit breaker. Two different possibilities are offered:

- connecting a reliable 24 Vdc control voltage on F1-F2. Auxiliary power module (AD) is used for other voltages. When the control source is considered as unreliable, a battery pack (BAT) is to be added to an AD power module.
- from a built-in battery module. When no external control source is available, a built-in battery module may be ordered (option PIL). This module integrates battery testing and indicator re-activating buttons.



alarm indicator pre-trip alarm switch

Delivered as standard with control unit.
The alarm indicator is a fixed, front face light-emitting diode which operates as follows:

- fixed when the current exceeds 90% of the current setting
- flashing on overload: according to time current curves, 105% to 120% of current setting.

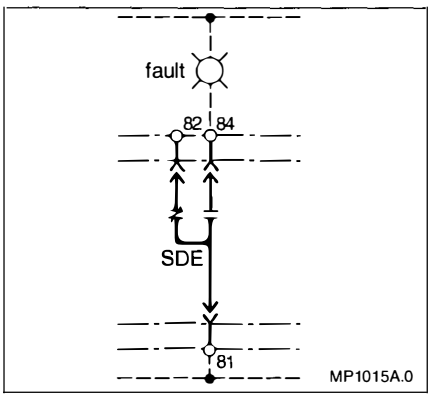
The pre-trip alarm switch is a static contact which closes when in the overload zone, up to the tripping of the circuit breaker.
This contact can be used for ultimate load shedding, alarm before tripping, etc.

output char.	0.1A/240 Vac (optical triac)
power supply	not required

overcurrent trip switch (SDE)

Delivered as standard with control unit.
In addition to the fault trip indicator/reset button, one SPDT switch provides alarm/ lockout information. This SPDT switch is operated only when the circuit breaker is tripped by the control unit.
When the circuit breaker is reset, the "a" switch (alarm) is open and the "b" switch (lockout) is closed.

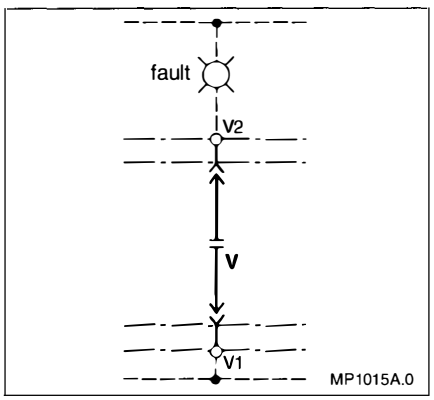
output char.	SPDT 10A/240 Vac
power supply	not required



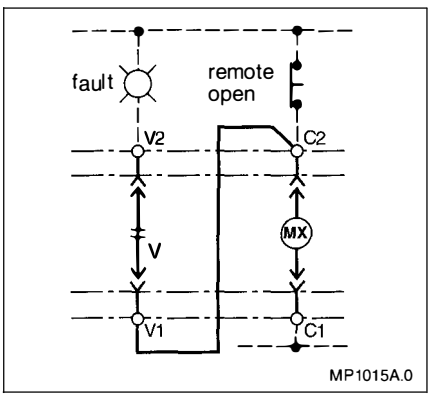
segregated trip switch (option V)

This switch works exactly as the standard overcurrent trip switch (SDE) except that a commutator on the front face is used to choose the type of fault which will operate the contact: overload, short-circuit, ground-fault, or any combination of these types.
This option can be used in addition to the SDE switch for remote signalization of particular types of faults.
A flat push button allows resetting of the indicator after tripping.

output char.	5A/240 Vac
power supply	required



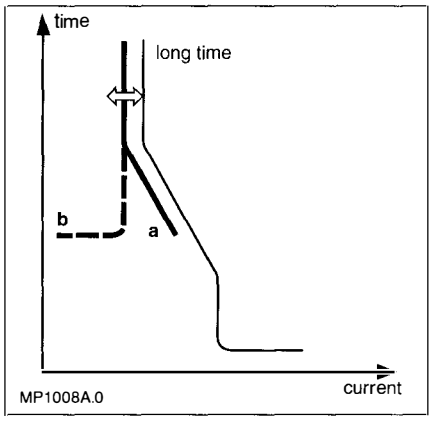
Wired in parallel with the remote opening button which operates the shunt trip, the option V contact provides an electrical interlock which prevents the circuit breaker from being reclosed after the pre-selected type of faults: for example the circuit breaker will be able to be remotely reclosed after overload, but not after short circuit.



load monitoring (option R)

The option R provides two independent static contacts which operate when the current exceeds adjustable pickup limits.
■ when the current exceeds the limit Ic1 (or Ic2) the contact C-R1 (or C-R2) closes, following an inverse time characteristic **a.**
■ when the current drops below the limit Ic1 (or Ic2) the contact C-R1 (or C-R2) opens with constant time delay (10 seconds) **b**.
These contacts can be used for load shedding, alarms, indications, etc.

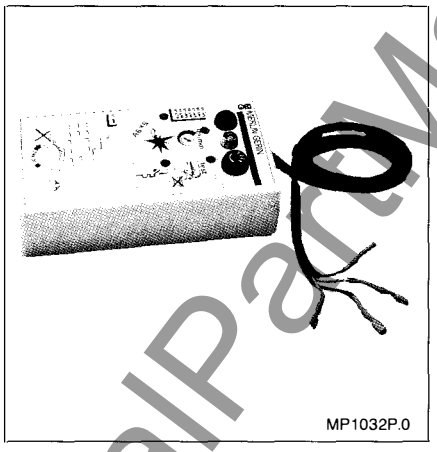
voltage	240 Vac max.
outputs	0.1 A triac

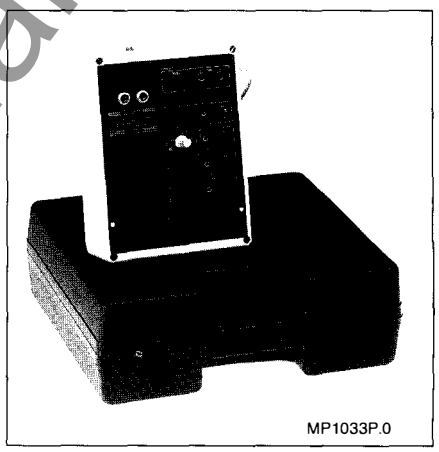


test kits

Every control trip unit is equipped with a test receptacle that can be used with a test kit.

Tests performed by test kits are only functional tests designed to electrically test the operating integrity of the control unit, the flux transfer device and the mechanical operation of the circuit breaker. Tests are not designed to calibrate the circuit breaker. Calibration can best be done at the factory.





mini test kit test procedure

Overcurrent protection test procedure
1 operate on "OFF load" conditions.
2 record the short-time or instantaneous pickup setting and set the control unit to the minimum setting.
3 close the circuit breaker.
4 connect the two + and – test leads into trip unit test receptacle, observing the "+ – overcurr" markings.
5 press the test kit push button, the circuit breaker will trip.
6 return to initial setting.

Batteries
The mini test kit requires five 9-volt batteries. Alkaline batteries are recommended.
Dimensions: 5-1/2 x 3 x 1-1/2 in. (140 x 76 x 38 mm)

■ **prior to testing:**
1 operate in "OFF load" conditions.
2 set control voltage selector located at the back of test kit to proper voltage.
3 switch for control power must be OFF.
4 connect test leads according to "+ – overcurrent" marking.
5 plug in the power cord.
6 turn control power switch ON.
The "power on" lamp should light. If not, check the source, then the test kit fuse (1A fuse).
7 close circuit breaker.

■ **long time:**
connect test leads according to "+ – overcurrent" indications (on control unit).
set current selector K of test kit at control unit long-time setting.
push Ir switch. The circuit breaker will trip (see max. tripping time in table below).

⚠ CAUTION

Hazard of Equipment Damage
When circuit breaker trips, release the test switch immediately. Under no circumstances should this switch be in the ON position for more than 120% of the expected maximum tripping time.
Failure to follow this precaution can result in equipment damage.

■ **short time or instantaneous:**
Connect test leads according to the control unit "+ – overcurrent" indications.
push Im switch for one second max. to trip circuit breaker.

■ **ground fault** (residual scheme):

⚠ CAUTION

Hazard of Equipment Damage
Connect test leads according to the control unit "+ – ground" indications.
Failure to follow this precaution can result in equipment damage.

Push Ih switch for one second max. to trip circuit breaker.

portable test kit test procedure

⚠ DANGER

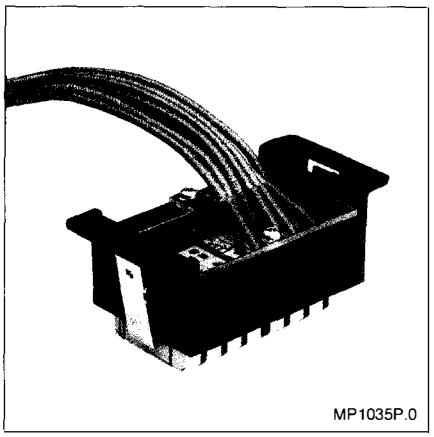
HAZARD OF ELECTRICAL SHOCK, BURN OR EXPLOSION.
Do not touch test plug pins when power cord is plugged in and power switch is ON. The power switch should never be in the ON position unless test plug is connected.
Failure to do so will cause death, personal injury or electrical shock.

control unit	long-time delay setting	maximum tripping time
STR 28D - STR 38S	NA	75 sec.
STR 58U	15 sec.	8 sec.
	30 sec.	18 sec.
	60 sec.	35 sec.
	120 sec.	70 sec.
	240 sec.	180 sec.
	480 sec.	300 sec.

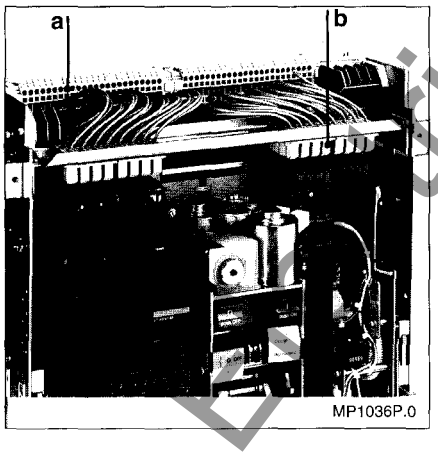
secondary disconnects

Electrical accessories are UL Listed for field installation per UL file E113554.
They are provided with terminals. They are located on secondary disconnecting blocks above the circuit breaker.

■ **fixed-mounted:**
By one or two connecting plugs (provided).

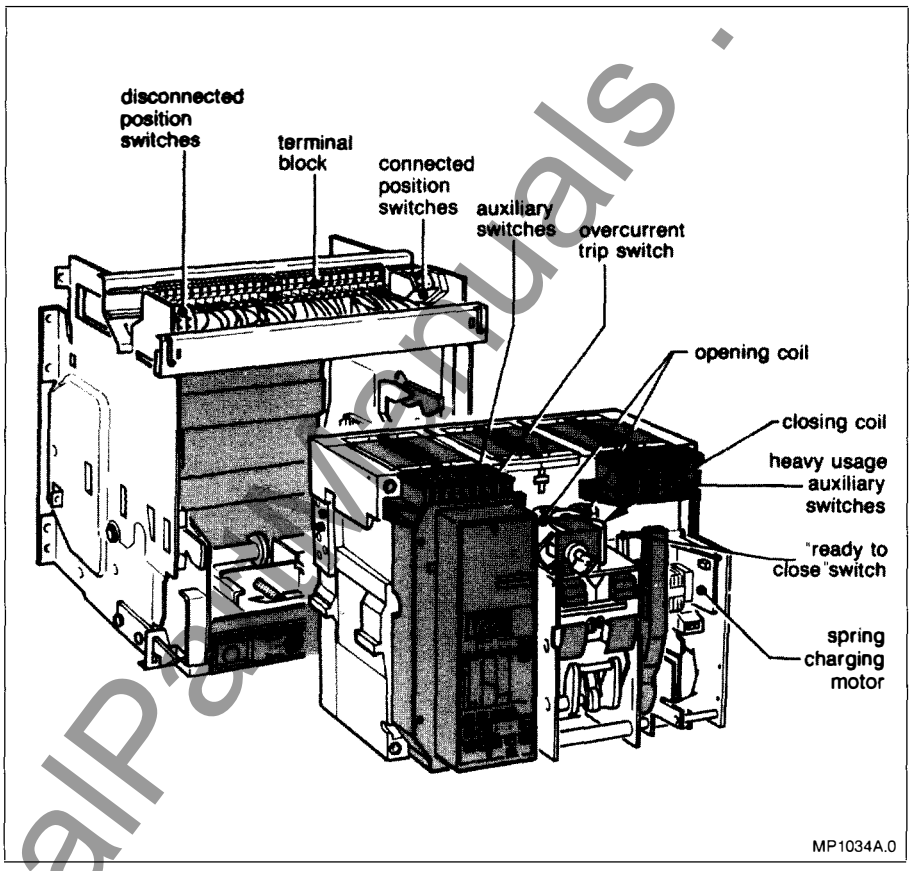

MP1035P.0

■ **drawout-mounted:**
To a terminal block **a** located in the front of the stationary assembly making the connections easy.
This terminal block is then wired to another connection block **b** that operates automatically to isolate the internal accessories when the circuit breaker is in the disconnected position.



MP1036P.0

location



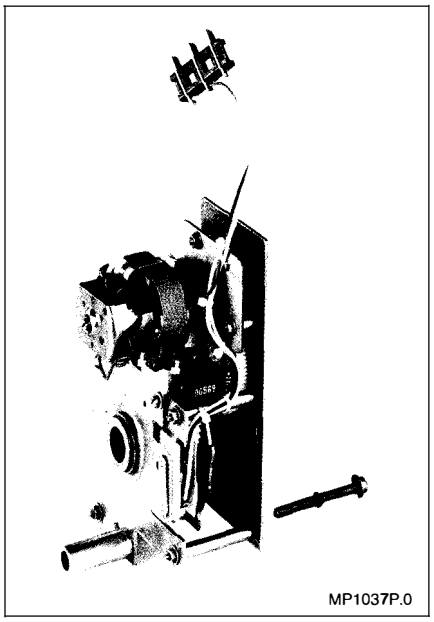
MP1034A.0

connection:
Accessory terminals are of screwless type (maintenance-free) and may be connected by standard copper wires #18 to #14 AWG.
Cable strip length: 3/8 in. (10 mm)

additional connections (BS):
Single connection only is allowed in the terminal block.
Multiple connections have to be made by adding extra terminals in the block located on the stationary assembly.
BS option consists of five additional terminals.

Masterpact® circuit breaker accessories

spring charging motor closing coil


MP1037P.0

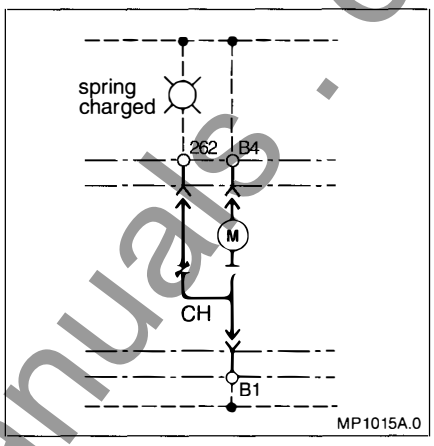
The Masterpact circuit breaker is equipped with a true two-step stored energy mechanism which insures fast opening and closing operations and complete open-close-open sequence without recharging the mechanism. The Masterpact circuit breaker has manual actuators: charging handle, push-to-open and push-to-close buttons. In addition, remote operation is possible with field-installable accessories:

- spring charging motor (MCH)
- closing release (XF)
- undervoltage trip device (MN) or shunt trip (MX) for opening

The manual operating mechanism can still be used in an emergency. The addition of the electrical operating mechanism does not alter circuit breaker dimensions.

spring charging motor (MCH)

The spring charging motor automatically charges the stored energy mechanism (when the circuit breaker closes) making O-C-O cycles possible without recharging. Opening and closing operations are instantaneous.



MP1015A.0

control voltage (V)	60 Hz	120-240
	DC	24-48-125
consumption	AC	180 VA
	DC	180 W
inrush current	2 to 3 x In for 0.1 sec.	
charging time	3 to 4 sec.	

operation counter (CDM)

With gear motor option only. The operation counter is read from the front and gives the total number of circuit breaker operating cycles.

"spring-charged" switch

This type "b" switch is closed when the spring is charged. It comes standard with the spring charging motor and is provided with a common terminal.

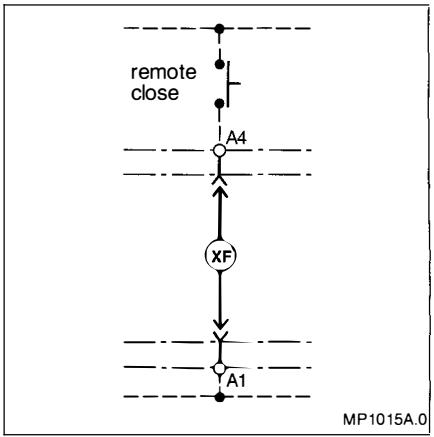
max. current (A)		
60 Hz	240V	10
DC	125V	0.5
	250V	0.25

closing coil (XF)

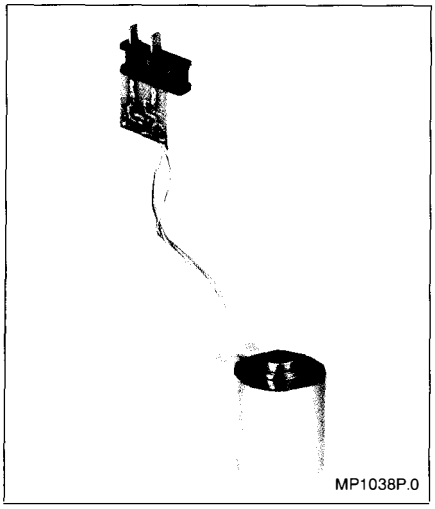
This device releases the circuit breaker closing mechanism when the spring is charged.
The closing coil is rated for continuous duty.
The closing release is supplied on request and can be fitted even on a manual operating mechanism.

Anti-pumping function:
When the permanently energized closing coil (XF) is installed, the circuit breaker remains in the open position after it has been opened, either by manual or electrical operation. The circuit breaker can be reclosed only if the closing coil is momentarily de-energized.
Note: this anti-pumping function can be disabled by series connecting a "ready to close" switch (PF).

breaker closing time	less than 80 ms	
operating voltage range	0.85 to 1.1 x rated voltage	
control voltage (V)		
	60 Hz	120-240
	DC	24-48-125
consumption (inrush and sealed)		
	60 Hz	20 VA
	DC	15 W



MP1015A.0

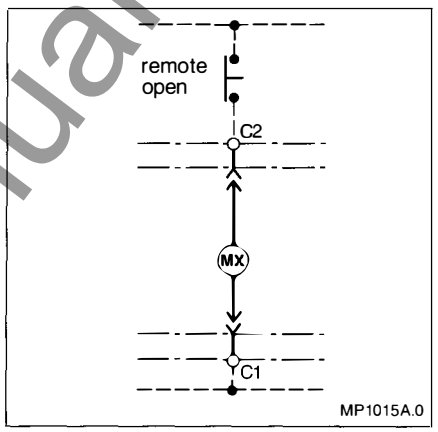


Three types of voltage releases can be used for remote opening of the circuit breakers:
- shunt trip (MX)
- instantaneous undervoltage trip device (MN)
- time-delayed undervoltage trip device (MNR)

Release combinations
Each Masterpact circuit breaker can be equipped with:
- 1 shunt trip (MX) + 1 undervoltage trip device (MN or MNR)
- or 2 shunt trips (MX)

shunt trip (MX)

This release is rated for continuous duty and operates with control voltages between 85 and 110% of its rating.
However, when series connected with an "a" auxiliary switch, the shunt trip can be operated with 55% or more of its rated voltage and can be used for ground-fault protection when combined with a Class 1 ground-fault sensing element.
The shunt trip is field-installable.



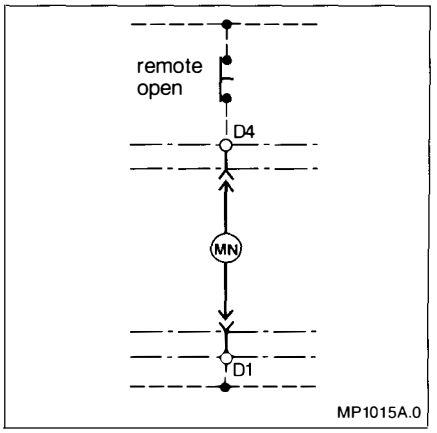
operating time	40 ms	
control voltage (V)		
	60 Hz	120-240-480
	DC	24-48-125-250
consumption (inrush and sealed)		
	AC	20 VA
	DC	15 W

instantaneous undervoltage trip device (MN)

This release instantaneously opens the circuit breaker when supply voltage drops below a value between 35% and 70% of rated voltage.
If the release is not energized, the circuit breaker cannot be closed (either manually or electrically). Any attempt to close it will have no effect on the main contacts.
Closing is possible when the release voltage reaches 85% of its rated value. The instantaneous undervoltage trip device is field-installable.

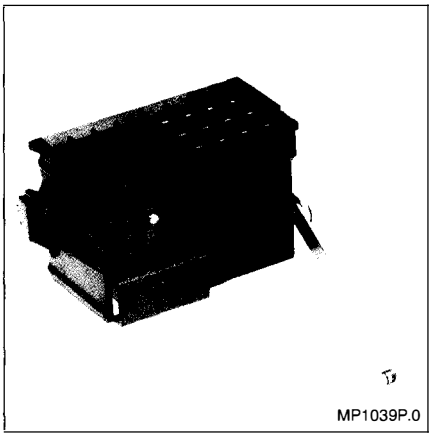
time-delayed undervoltage trip device (MNR)①

To prevent the circuit breaker from tripping in the event of transient voltage drops, this release has a built-in adjustable time delay.
If required, this time delay can be overridden by connecting an external switch on an additional circuit (wired by the user). The undervoltage trip device is field-installable.



		MN	MNR
operating time (s)		0.09	0.5-0.9-1.5-3
control voltage (V)			
	60Hz	120	120
		240	
		480	480
	DC	24	
		48	
		125	
		250	
consumption (inrush and sealed)			
	AC	20 VA	20 VA
	DC	15 W	15 W

① not UL listed

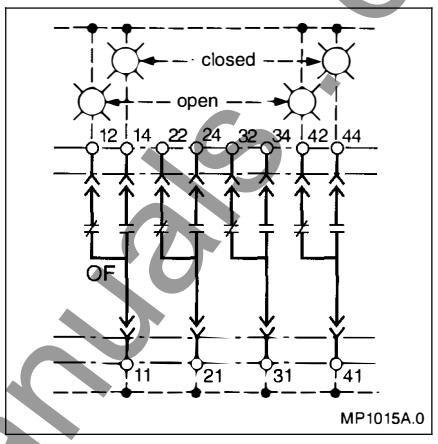


MP1039P.0

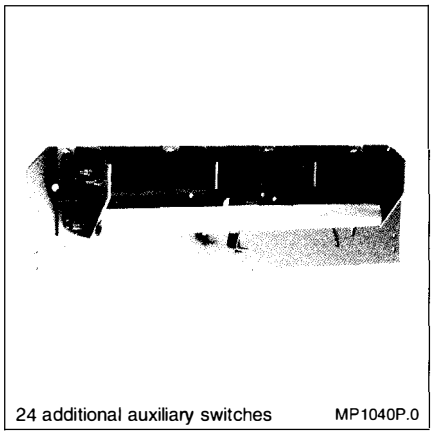
heavy usage auxiliary switches (OF)

4 SPDT switches with double break construction. They are directly operated by the main contacts and insure a large insulation distance in open position. They are therefore particularly suitable for insulation of auxiliary circuits or reliable interlockings.
- "a" contacts are open when the circuit breaker is open and closed when the circuit breaker is closed.
- "b" switches are closed when the circuit breaker is open and open when the circuit breaker is closed.

See page 18 for operating diagrams.
Auxiliary switches are field-installable.



MP1015A.0



24 additional auxiliary switches MP1040P.0

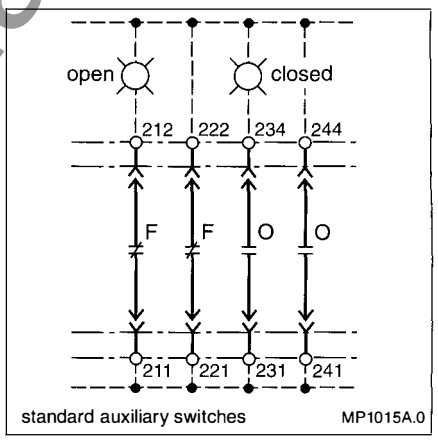
standard auxiliary switches (O and F)

2a + 2b switches available as standard.
- "a" contacts are open when the circuit breaker is open and closed when the circuit breaker is closed.
- "b" switches are closed when the circuit breaker is open and open when the circuit breaker is closed.

See page 18 for operating diagrams.

24 additional auxiliary switches (OFSUP)

An external plate holds a set of 24 SPDT switches. They are operated by the means of a cable. Only available for drawout circuit breakers.

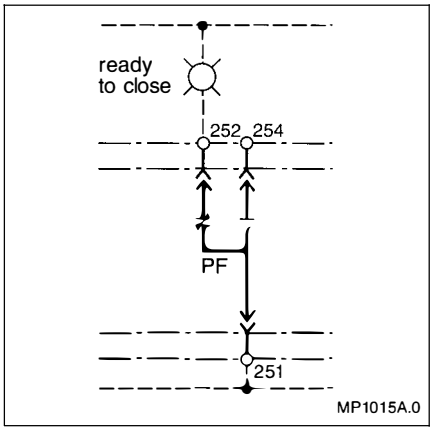


standard auxiliary switches MP1015A.0

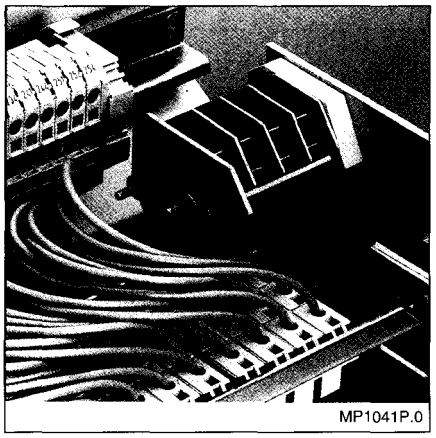
"ready to close" switch (PF)

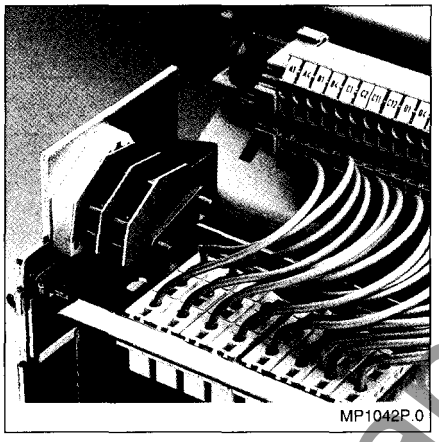
This SPDT switch indicates that the circuit breaker is ready to close and that the following conditions exist:
- the circuit breaker is open
- the stored energy mechanism is charged
- the control unit is reset
- the circuit breaker opening push button is neither locked nor padlocked
- the circuit breaker is in the fully connected or test position

The switch is field-installable.



MP1015A.0


MP1041P.0


MP1042P.0

connected position switches (CE)

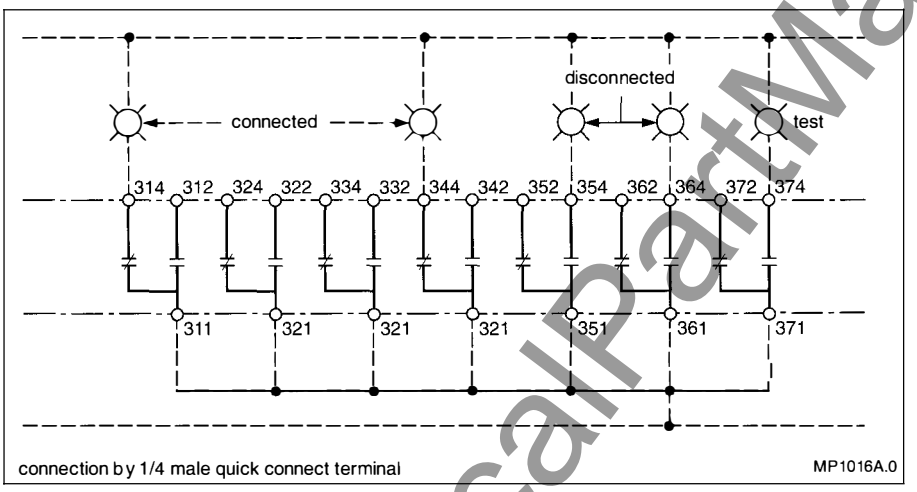
A block of four SPDT switches operated close to the connected position. The switch block is field-installable.

disconnected position switches (CD)

A block of two SPDT switches operated close to the fully-disconnected position. The block is field-installable.
See page 18 for operating diagrams.

test position switch (CT)

One SPDT switch is operated only in the test position.
The switch is field-installable.



connection by 1/4 male quick connect terminal
MP1016A.0

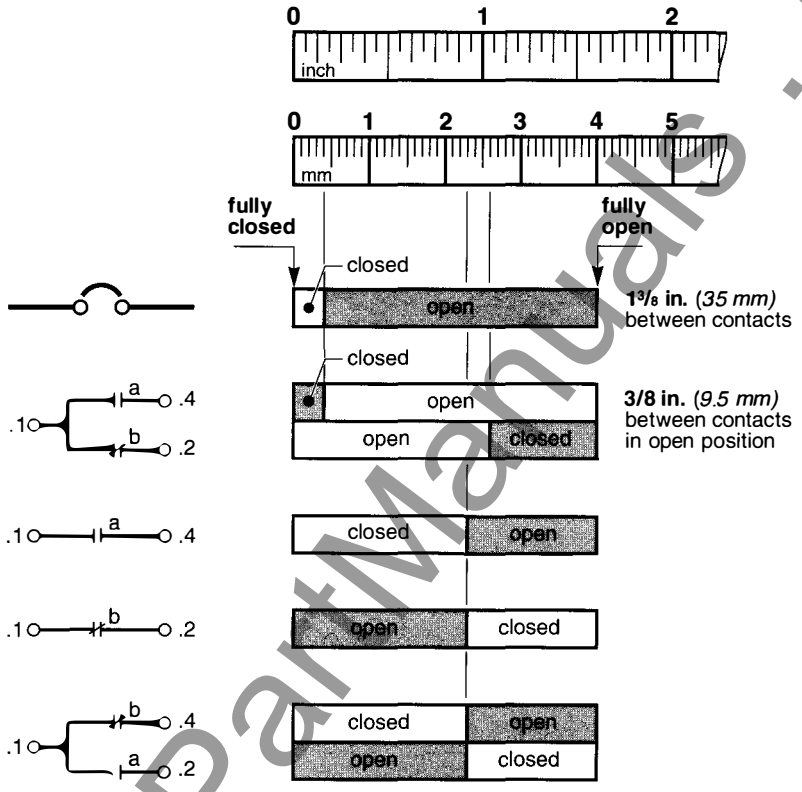
current ratings (A)

voltage (V)		auxiliary switch heavy usage	standard	24 additional	ready to close switch	position switch connected	disconnected	test
60 Hz	240	10	15	15	12	15	15	15
	480	10①	6	6		6	6	6
	600	6	3	3		3	3	3
DC	125	3	0.5	0.5		0.5	0.5	0.5
	250	3	0.25	0.25		0.25	0.25	0.25

see p. 39 for IEC ratings
① 8A for MC08

Masterpact® circuit breaker accessories

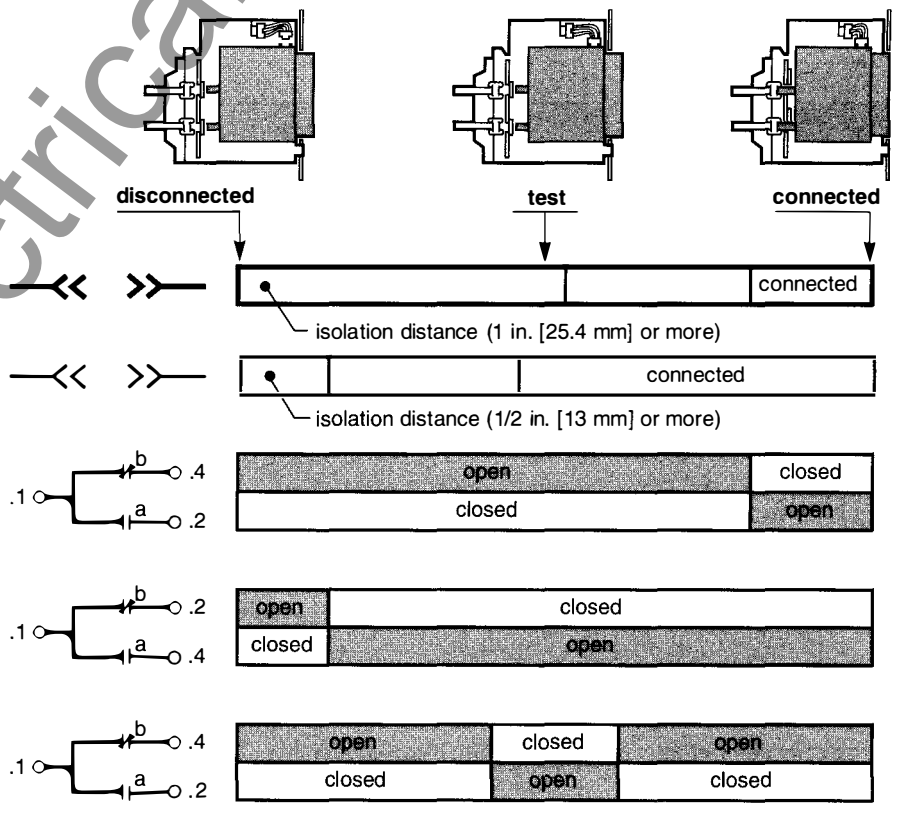
auxiliary switches



note: contacts are shown with the circuit breaker in the open position

MP1005A.0

position switches



note: position switches are shown with the circuit breaker in the connected position

MP1006A.0


MP1043P.0

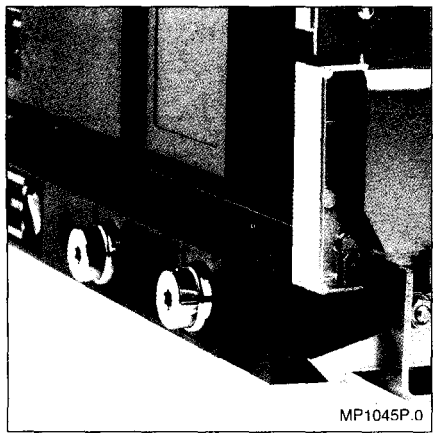
MP1044P.0

push button locking device (VBP)

This device prevents local manual operation of the circuit breaker by covering the opening and/or closing the push buttons. This locking device can be locked by a padlock or a sealing lead.

open position lock (VSKA)

A key interlock that locks the circuit breaker in the open position by holding the push button in its depressed position.
The key interlock is provided.


MP1045P.0

door interlock (VPEC)

This lock prevents the compartment door from being opened when the circuit breaker is in the connected position. If the circuit breaker is put into the "connected" position with the door open, the door can be closed without disconnecting the circuit breaker.
Note: for greater protection, this interlock can be used with racking interlock (VPOC) below.

racking interlock (VPOC)

This lock prevents racking in the circuit breaker when the door is open.
(Insertion of the circuit breaker racking crank is not possible when the compartment door is open.)

disconnected position locking

The circuit breaker can be locked in the disconnected position by means of 1 to 3 padlocks (padlocks not provided) or 1 key interlock (factory-mounted option VSKC).
The key interlock is on the stationary assembly and accessible with the cubicle door locked.
Note:

- key interlock is of the captive key type, free when locked.
- by special order, locking may be possible on disconnected, test and connected positions (VSKEC).

mechanical interlocks

■ **disconnecting when circuit breaker is closed**
During any disconnecting attempt when the circuit breaker is closed, an interlocking device ensures the tripping of the circuit breaker before the actual separation of the main disconnects.
The circuit breaker remains, however, operable in the other positions: test, disconnected and withdrawn.

■ **circuit breaker closing when not completely connected**
The interlocking device mentioned above prevents closing of the circuit breaker if the connecting operation is not completely achieved.

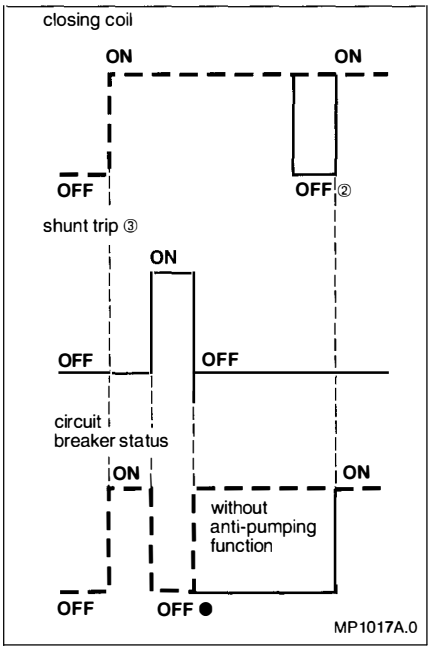
■ **connecting circuit breaker when door opened**
VPEC and VPOC options prevent the compartment door from being opened when the circuit breaker is in the connected position and from connecting the circuit breaker when the door is open.

electrical interlocks

■ **priority of opening orders (standard)**
Opening coils (undervoltage trip devices, shunt trip) and opening push button have priority over the closing coils and closing push button.

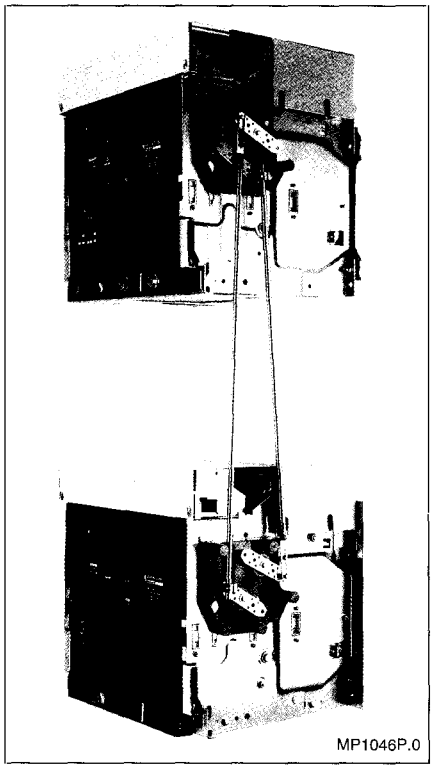
■ **mechanical pop-out type indicator (standard)**
Under overcurrent or ground-fault conditions, the trip indicator located in the control unit will pop out. Reclosing of the circuit breaker is impossible until this trip indicator is reset.
This standard function can be disabled on request.

■ **anti-pumping function (standard)**
In case of permanent energization of the closing coil (XF), the circuit breaker remains in the open position ● after it has been opened, either by manual or electrical operation. The circuit breaker can be closed only if the closing coil is momentarily de-energized. ②
Note: this anti-pumping function can be disabled by series connecting a "ready to close" (NC contact) switch (PF) with the closing coil (XF).



MP1017A.0

● same anti-pumping function with undervoltage trip device


MP1046P.0

Two or three Masterpact circuit breakers can be mechanically interlocked by means of rods or cables.
This accessory is mountable on the right side of the circuit breaker.
This adaptation can be made on-site without modifying the circuit breaker.

mechanical interlock between two or three stacked circuit breakers

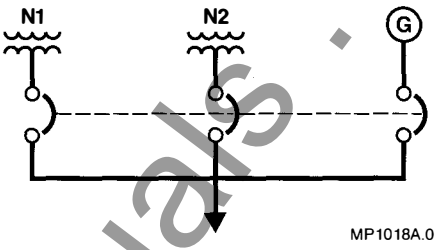
This interlocking is obtained by the joining of:
- one adaptation block
- one or two adjustable and unadjustable rods

Maximum distance between the two fixing surfaces of the devices: 35 in. (0.89 m)

mechanical interlocks between two side-by-side circuit breakers

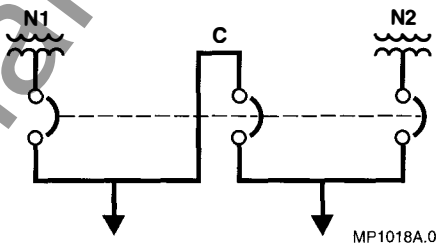
This interlocking is obtained by the joining of:
- one adaptation block
- one set of adjustable cables with a maximum length of 78 in. (2 m)

possible mounting arrangements between three stacked circuit breakers



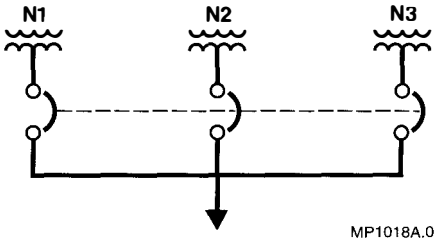
MP1018A.0

One use, power supplied by:
- either two transformers N1 and N2 which are connected in parallel
- or one standby source G



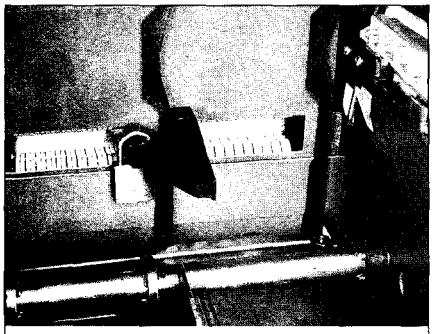
MP1018A.0

Two uses, independently powered supply by two transformers N1 and N2, standby through a circuit breaker or a connection tie switch, preventing the connection in parallel of the two current transformers



MP1018A.0

One use, power supplied by one group of transformers N1, N2 or N3 or of generators, preventing any connection in parallel


MP1047P.0

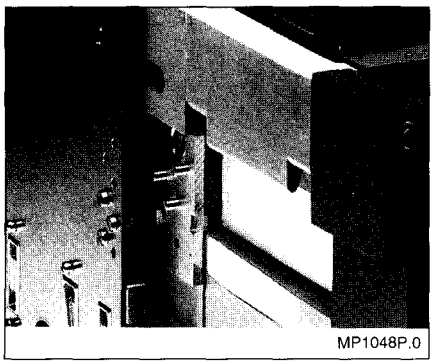
safety shutters

Comprising two independent parts, line and load side, the safety shutters automatically block access to the main disconnects when the circuit breaker is in the disconnected, test or fully withdrawn position.

shutters lock (VVC)

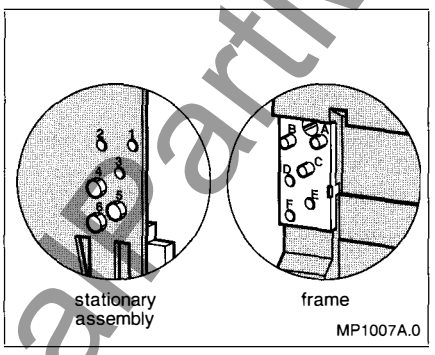
A movable and lockable slide (padlock not supplied) is used to:
- lock the line or load shutters in the closed position
- hold the line or load shutters in the open position

A support is provided at the back of the stationary assembly to hold the slide when not in use.
Factory-mounted.


MP1048P.0

rejection feature

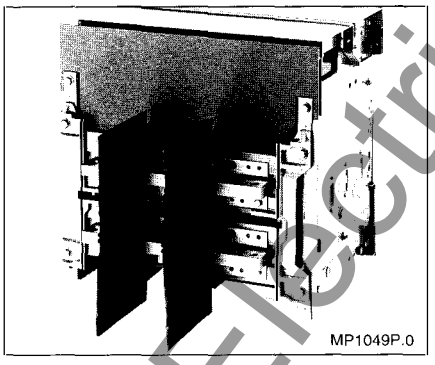
The rejection feature ensures that only the properly designated circuit breaker is matched with the selected cradle assembly. It is made of two parts (one for the frame and one for the stationary assembly), and allows 20 different combinations.



MP1007A.0

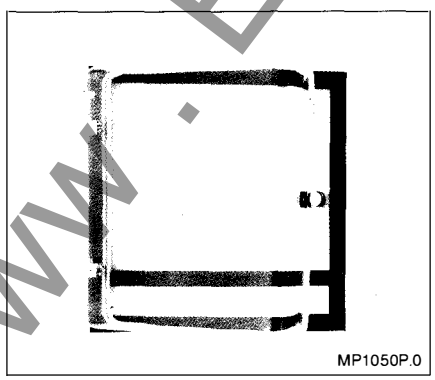
possible arrangements:

frame	stationary assembly	frame	stationary assembly
A-B-C	4-5-6	B-C-D	1-5-6
A-B-D	3-5-6	B-C-E	1-4-6
A-B-E	3-4-6	B-C-F	1-4-5
A-B-F	3-4-5	B-D-E	1-3-6
A-C-D	2-5-6	B-D-F	1-3-5
A-C-E	2-4-6	B-E-F	1-3-4
A-C-F	2-4-5	C-D-E	1-2-6
A-D-E	2-3-6	C-D-F	1-2-5
A-D-F	2-3-5	C-E-F	1-2-4
A-E-F	2-3-4	D-E-F	1-2-3


MP1049P.0

interphase barrier

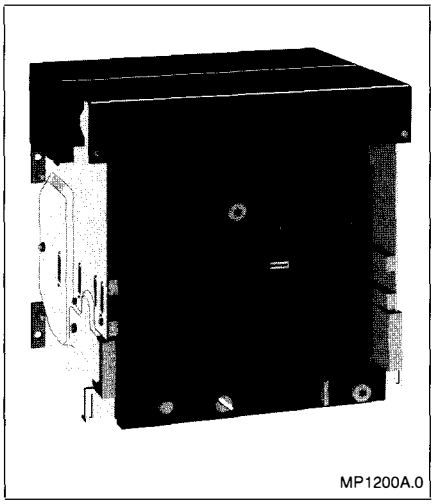
Mounted between terminals of the stationary assembly, the interphase barrier prevents arc prolongation to the circuit breaker in the event of a line side fault and isolates the circuit breaker connections in insulated bus bar installations.


MP1050P.0

transparent cover

Hinged-mounted and locked with a milled head, this cover is designed to be installed on the door escutcheon. It provides a higher degree of protection and is suitable for drawout or fixed-mounted circuit breakers.

Masterpact® switch



MP1200A.0

ratings ①

type 3-pole	ampere rating (A)	short-time rating (rms sym. amps) 600 Vac max.	short-circuit withstand when protected by a Masterpact circuit breaker (A) max. frame (A)	600 Vac max.
MP08 NA	800	50,000	800	50,000
MP12 NA	1200	50,000	1200	50,000
MP16 NA	1600	50,000	1600	50,000
MP20 NA	2000	50,000	2000	50,000
MP25 NA	2500	50,000	2500	50,000
MP30 NA	3000	50,000	3000	50,000
MP40 NA	4000	85,000	4000	85,000
MP50 NA	5000	85,000	5000	85,000
MP63 NA ②	6300	85,000	6300	85,000

construction

The Masterpact switch is designed identically to the MP circuit breaker, except that it is not equipped with a control unit and current transformers, but with an STR 08 dummy unit.

⚠ CAUTION

Hazard of equipment damage.

This switch contains no overcurrent protection. It is suitable for use at its ampere rating when protected by a Masterpact circuit breaker of the same ampere rating.

Failure to observe this precaution can cause equipment damage.

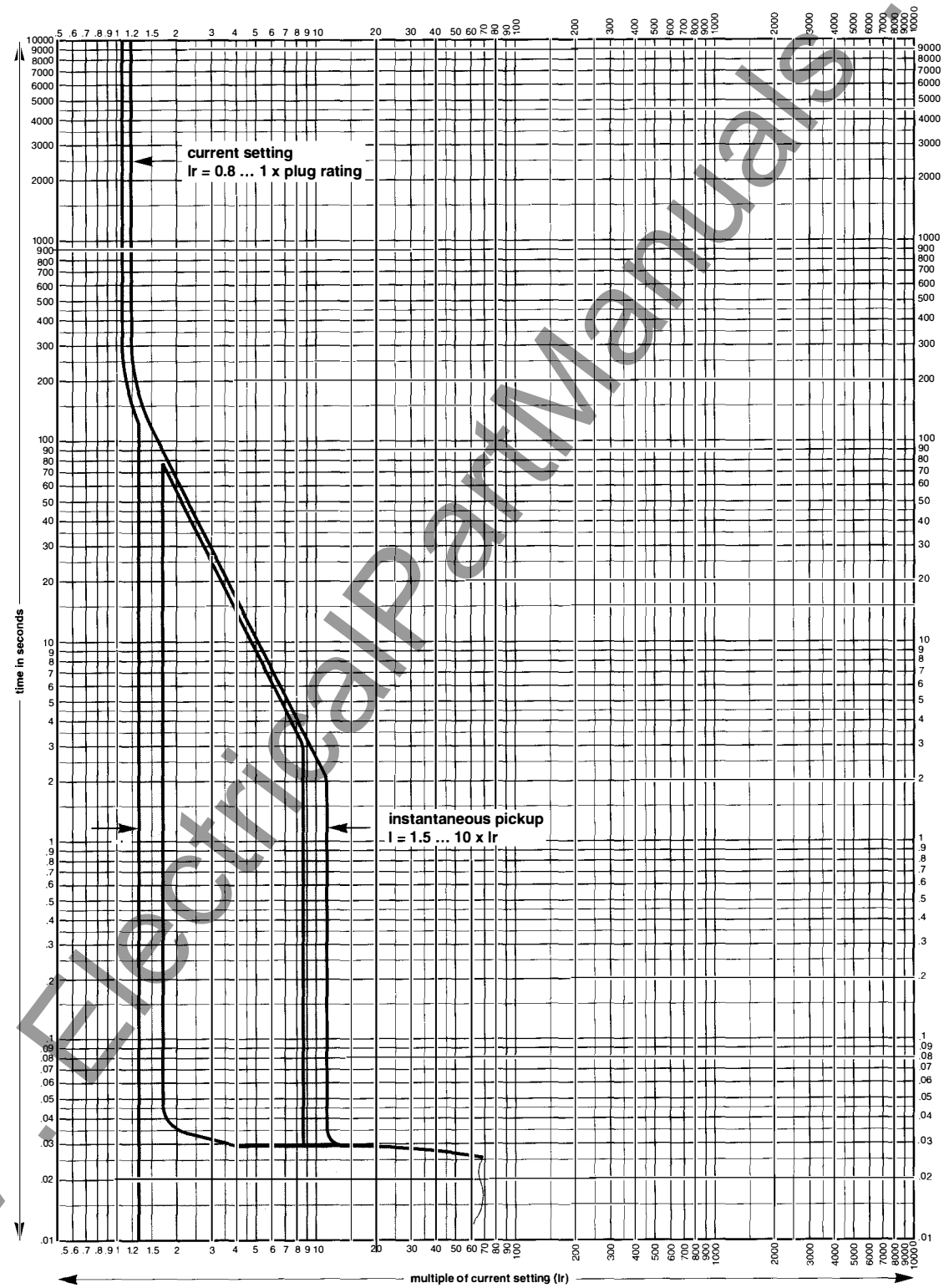
accessories, dimensions and connections

Switch accessories, dimensions and connections are identical to those of the corresponding circuit breaker. The overcurrent trip switch is not available with switch version.

① control unit not required
② not UL listed

Masterpact® circuit breaker time current curves

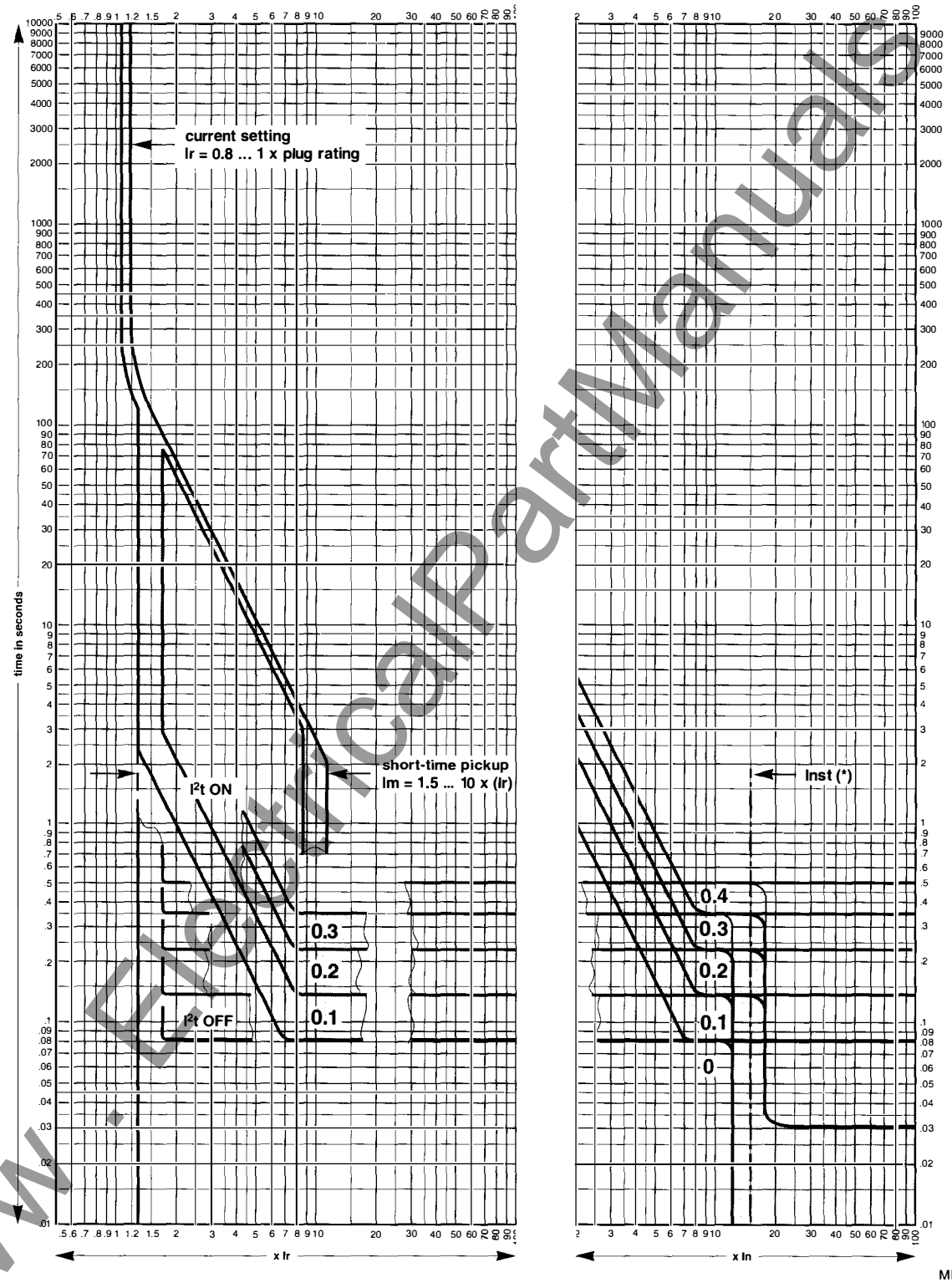
overcurrent protection STR 28D



MP1010A.0

Masterpact® circuit breaker time current curves

overcurrent protection STR 38S



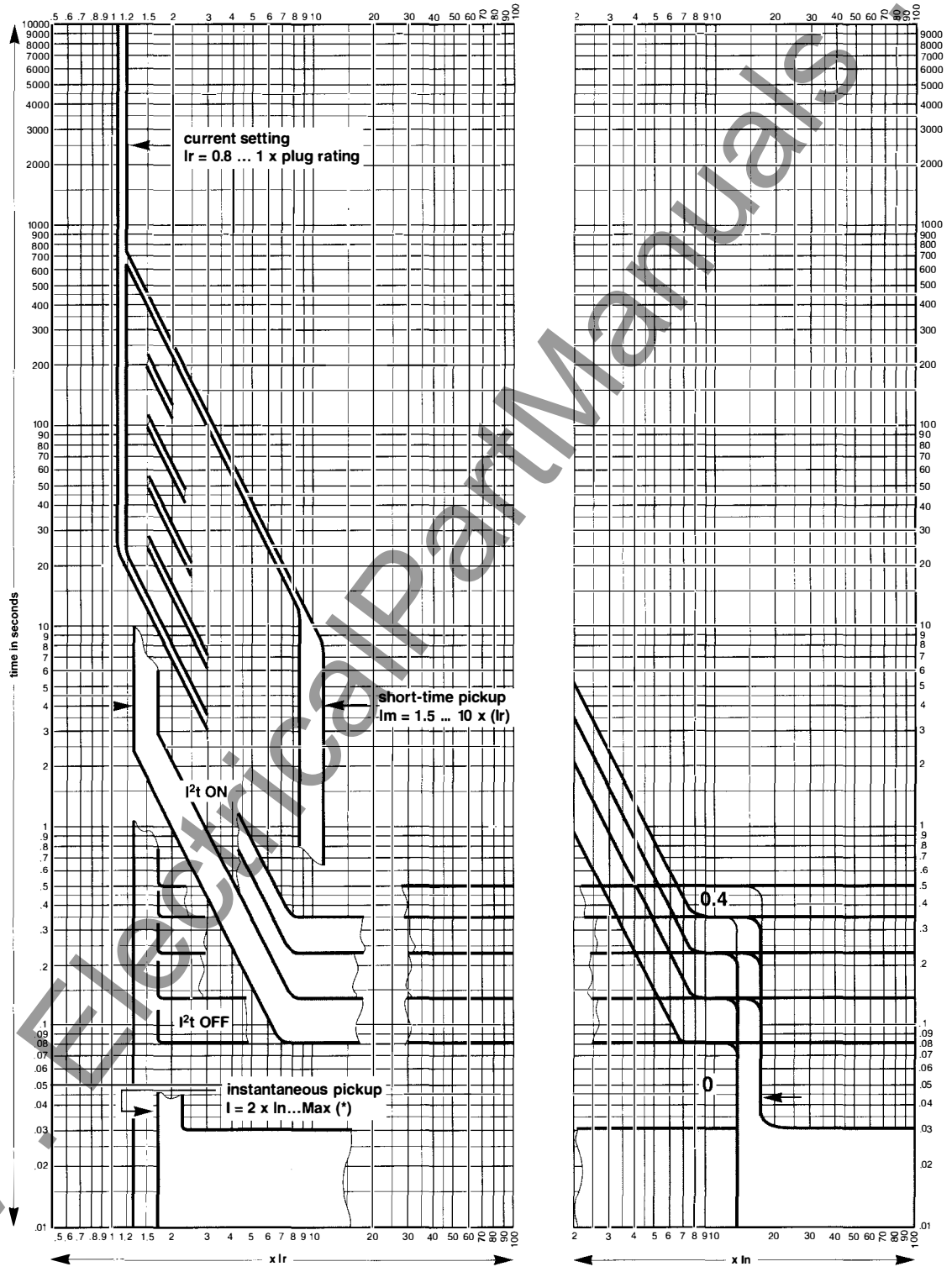
MP1011A.0

Inst (*)

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

Masterpact® circuit breaker time current curves

overcurrent protection STR 58U

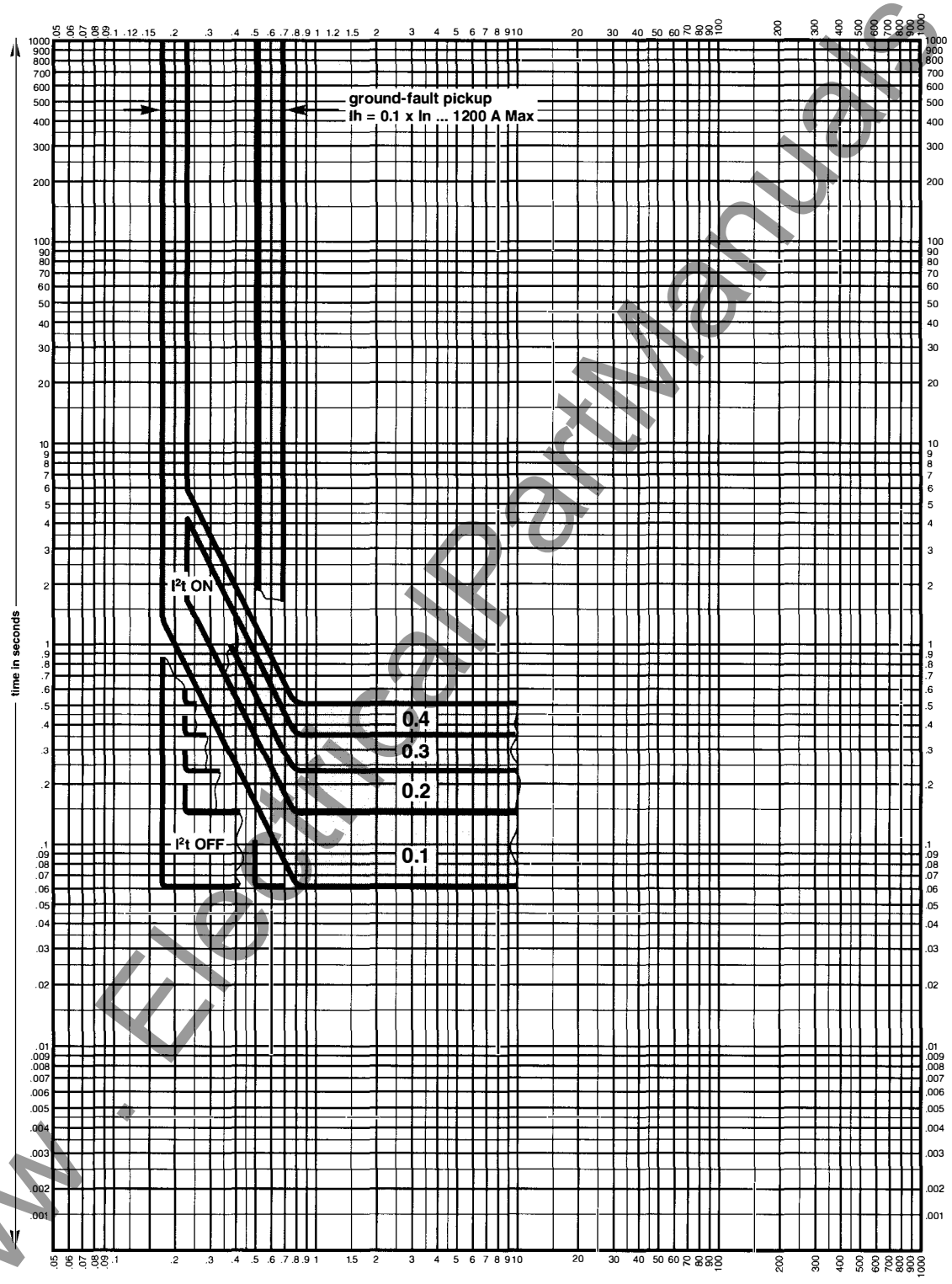


MP1012A.0

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

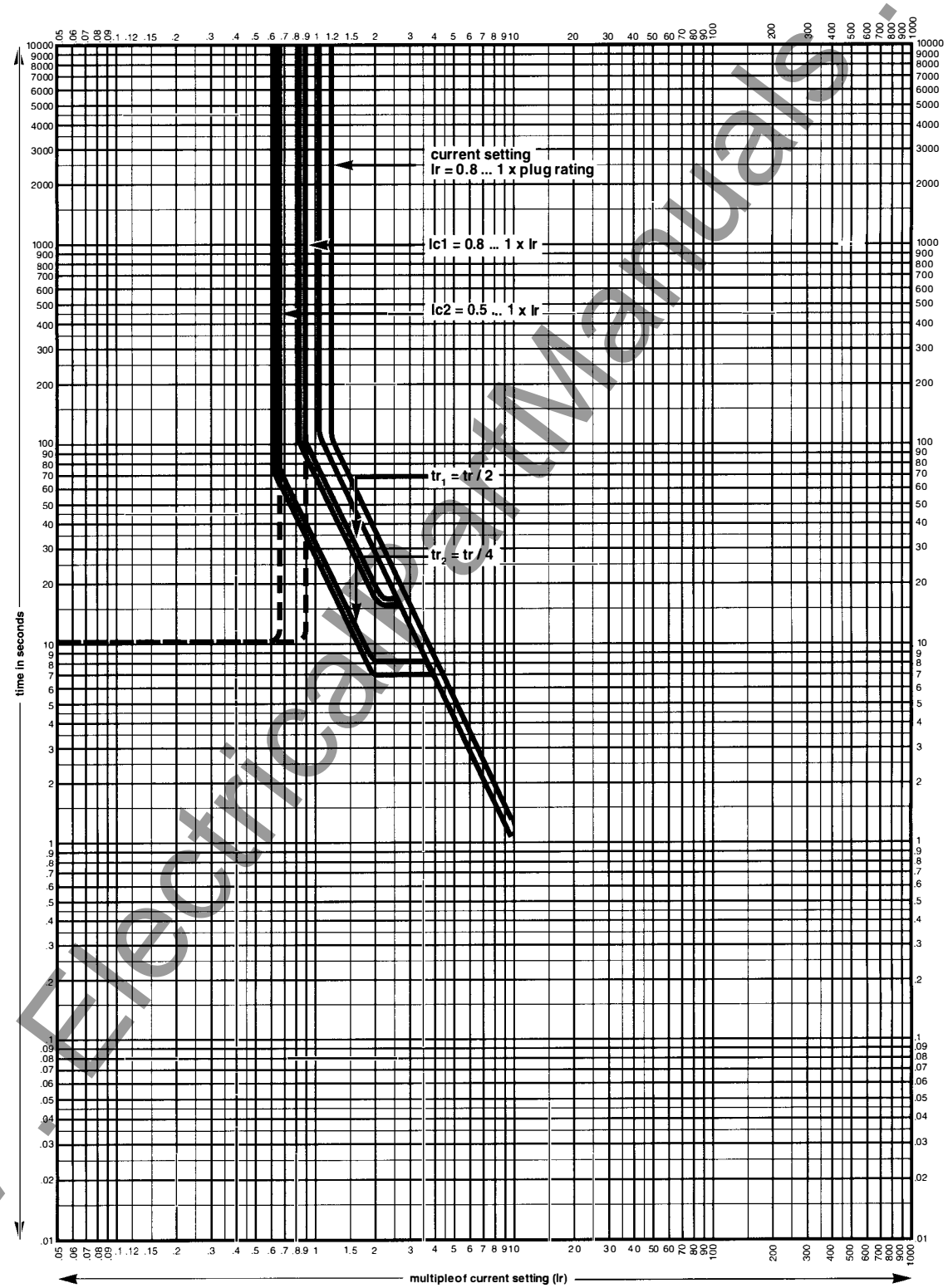
Masterpact® circuit breaker time current curves

ground-fault protection STR 38S - STR 58U



MP1013A.0

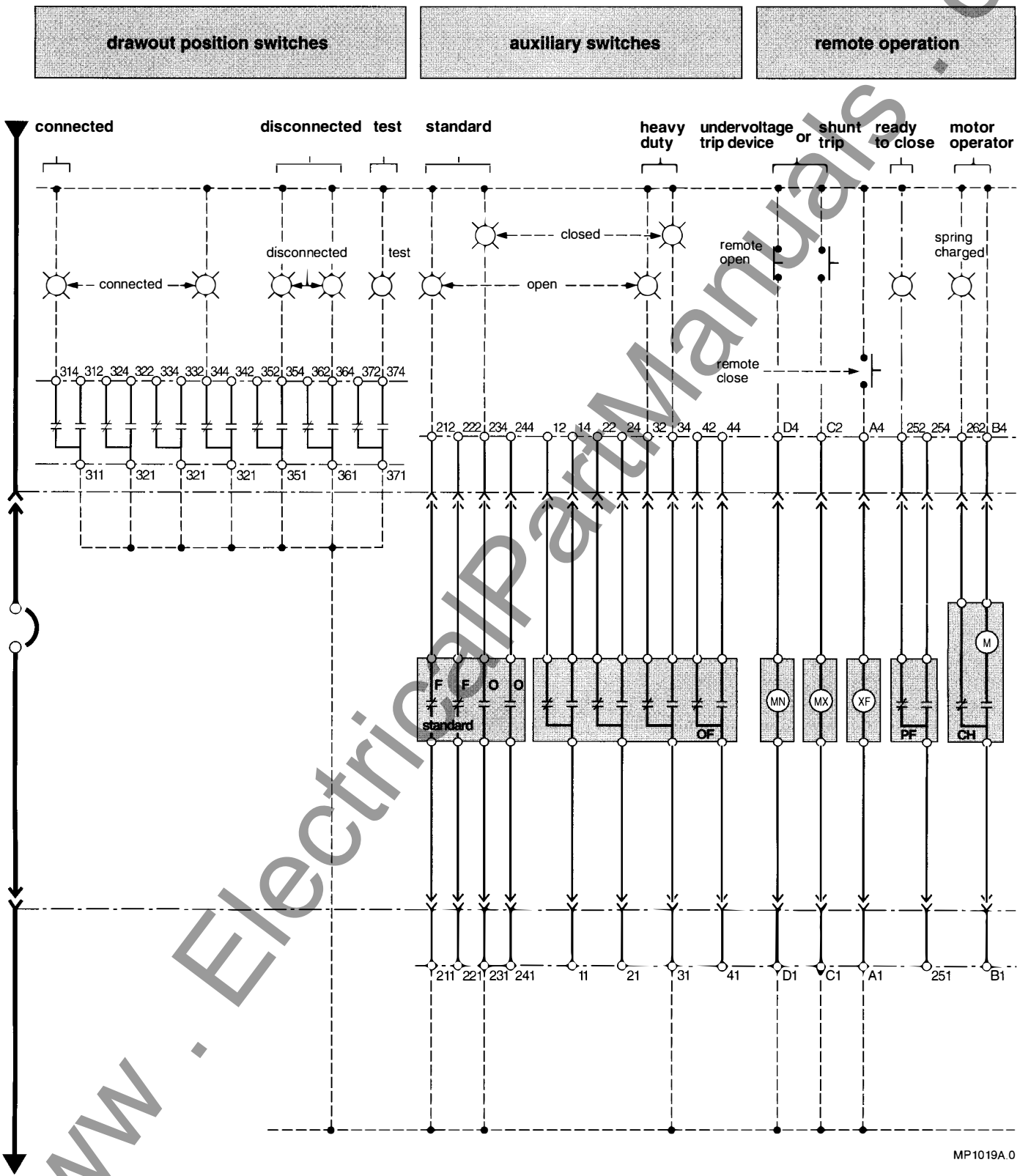
load monitoring STR 58U



MP1014A.0

Masterpact® circuit breaker wiring diagrams

diagram no. 689 889

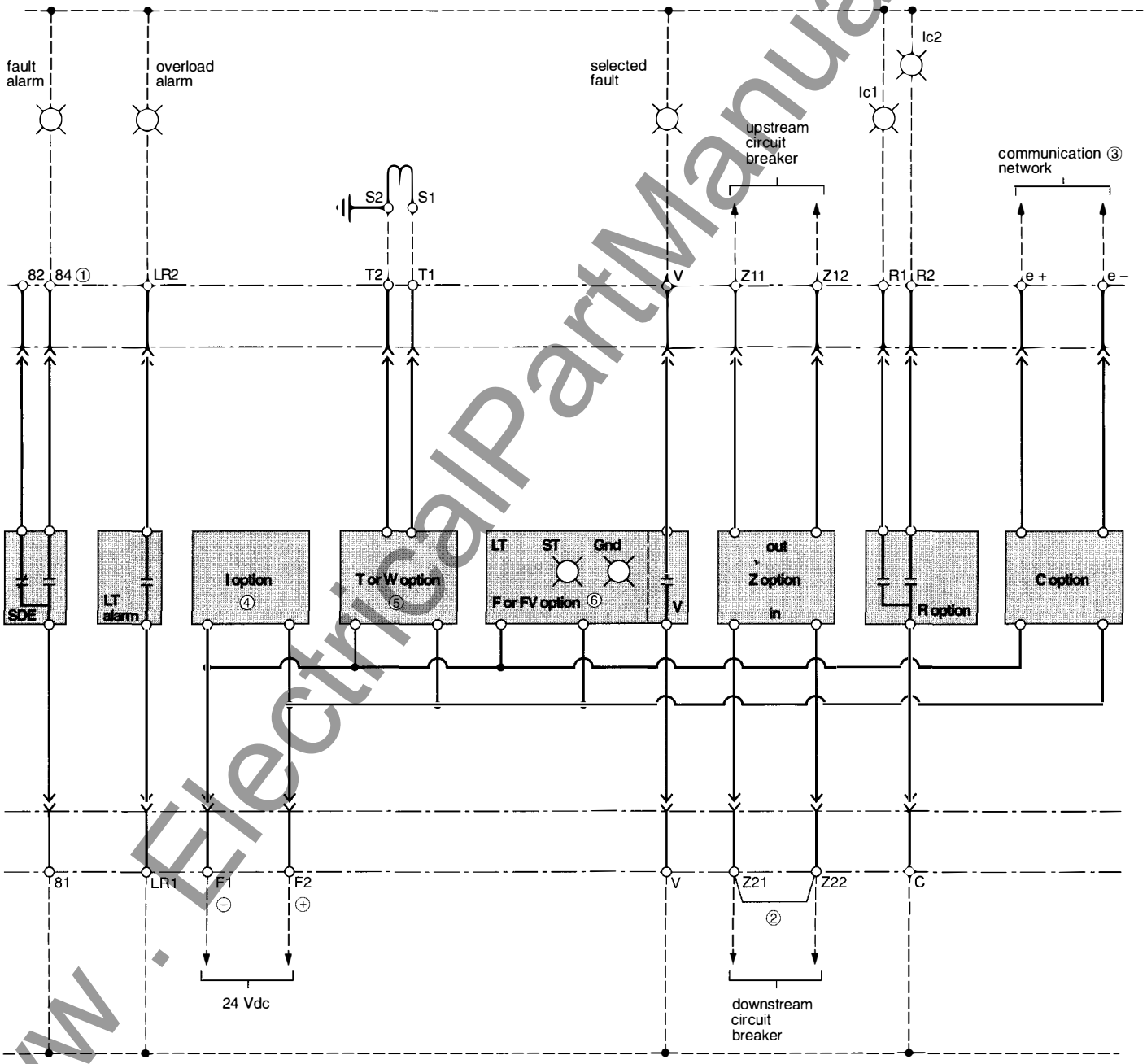


note: circuit breaker shown in connected, charged, and open position, undervoltage releases energized

Masterpact® circuit breaker wiring diagrams

diagram no. 689 889

remote fault and overload indication	ammeter	ground-fault protection	local fault indications and remote selected fault indication	zone-selective interlocking	load monitoring	data transmission



MP1020A.0

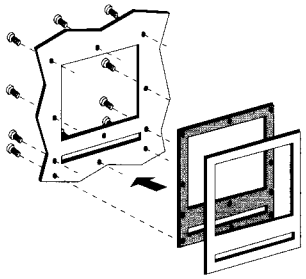
① 84 terminal not available with Z or C option
② zone-selective interlocking with downstream circuit breaker: remove the jumper
③ communication output through Dialpact module
④ use 24 Vdc supply for loads less less than 20% of current sensor rating
⑤ use 24 Vdc supply for lower setting
⑥ use 24 Vdc supply for F option if not supplied with PIL (battery) option; use 24 Vdc supply (mandatory) for FV option

Masterpact® circuit breaker dimensions

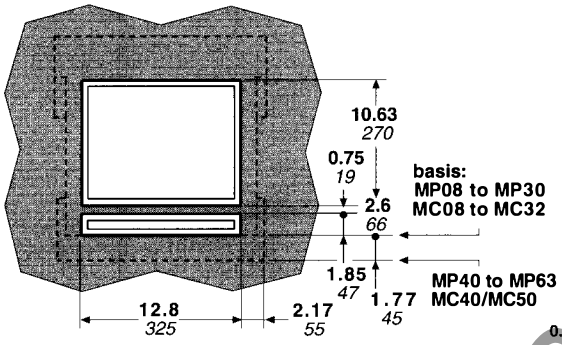
in./*mm*

door escutcheon
door interlock
rear cutout
external neutral sensor

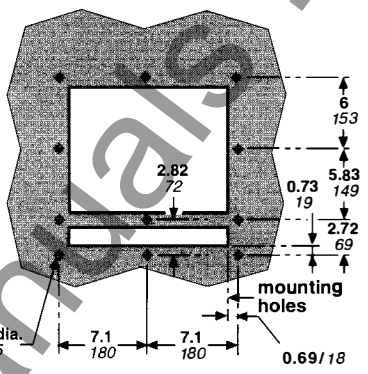
door escutcheon (drawout mounting)



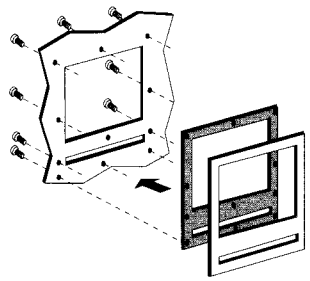
door cutout



drilling of the door

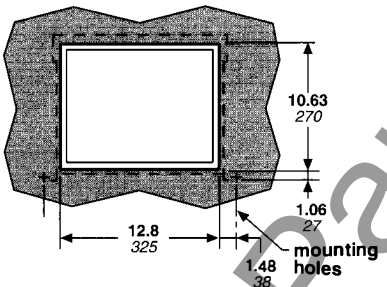


door escutcheon (fixed mounting)

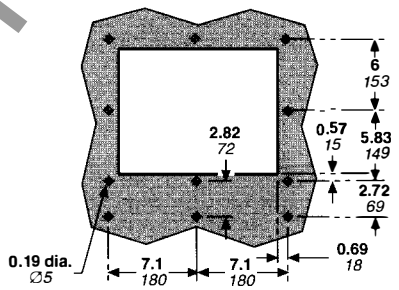


refer to shop drawings for verification

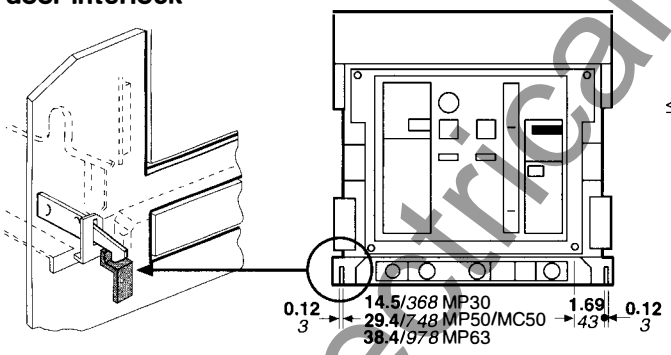
door cutout

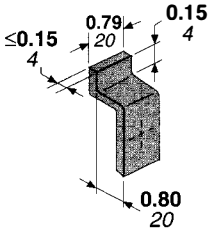


drilling of the door



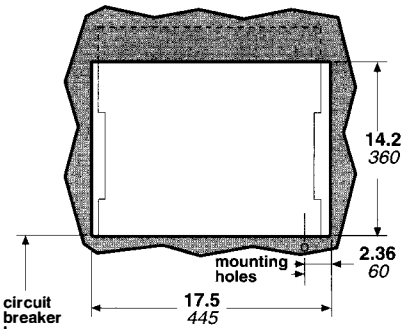
door interlock





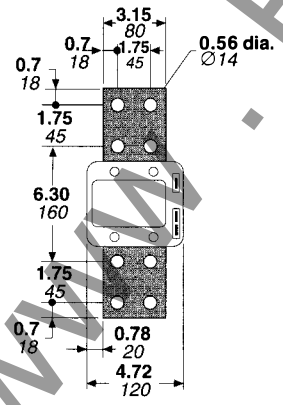
note: the door interlock can either be mounted on the right side or the left side of the circuit breaker

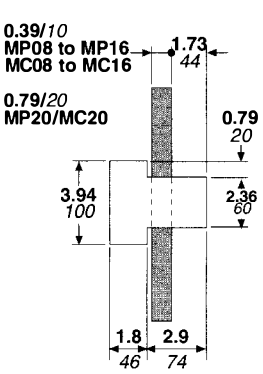
rear cutout



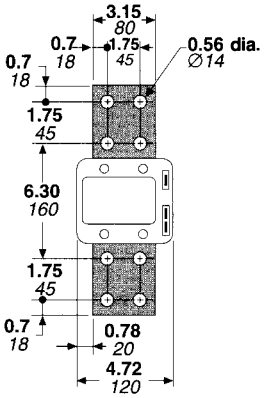
external neutral sensor

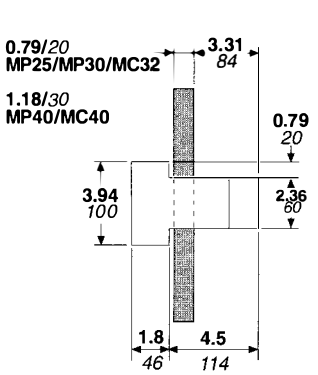
MP08 to MP20, MC08 to MC20





MP25/MP30/MP40, MC32/MC40



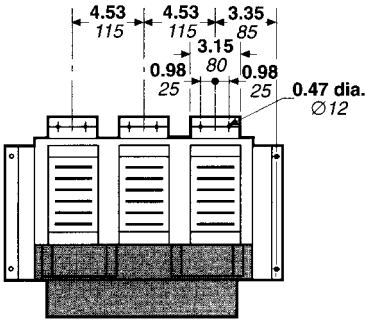


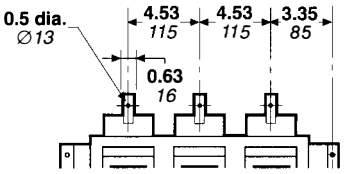
Masterpact® circuit breaker dimensions

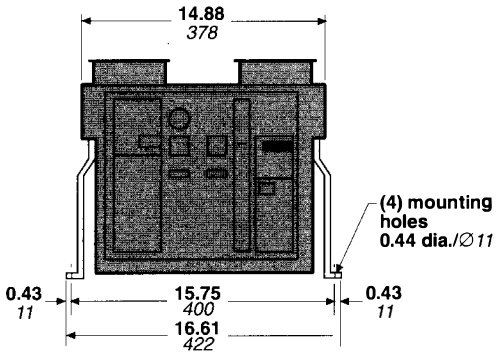
in./*mm*

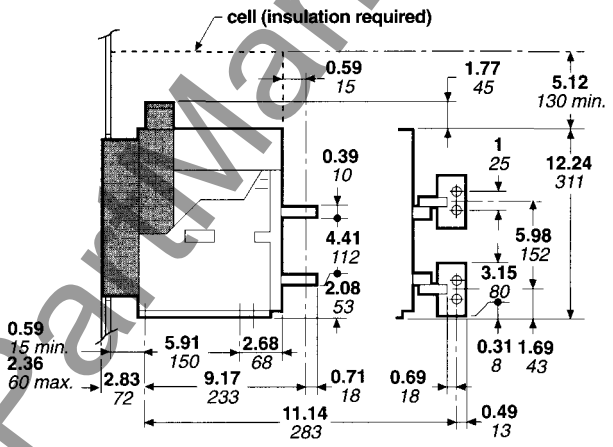
MP08 - MP12 - MP16
MC08 - MC16

fixed mounting (MP only)





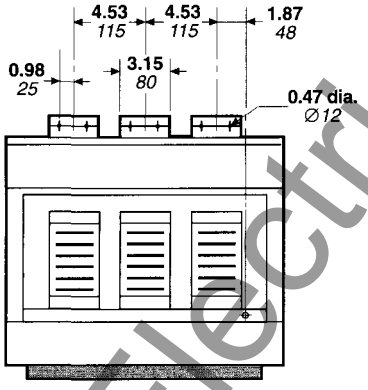


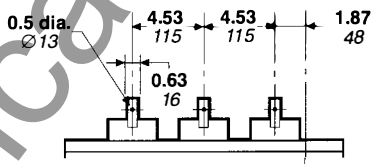


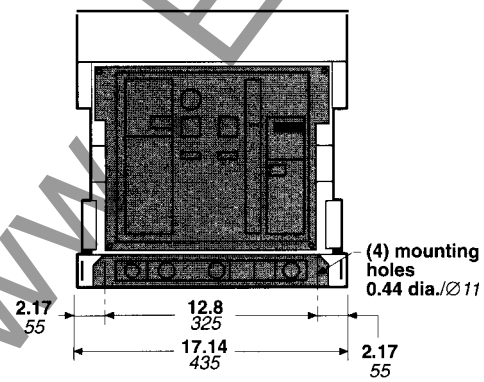
note: vertical terminals are optional for MP08 - MP12

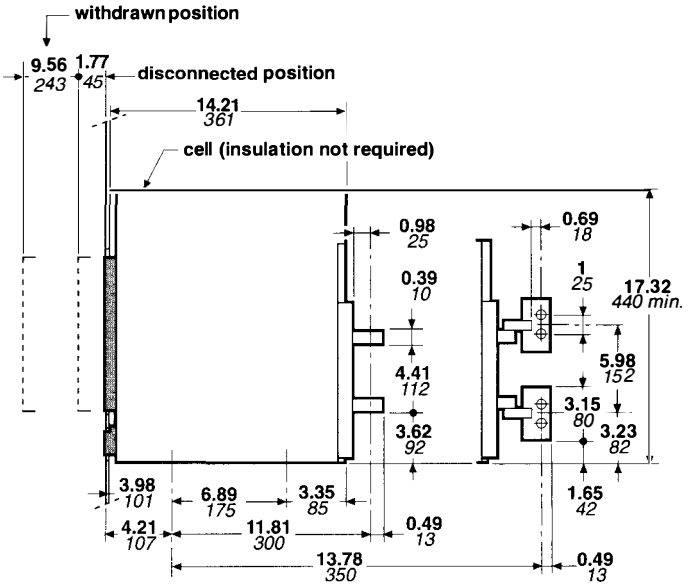
Note: suitable for continuous operation at 100% rating in a minimum cubicle space 17.5 in. (445 mm) h. by 21 in. (533 mm) w. by 16 in. (406 mm) d. Ventilation is not required.
Refer to shop drawings for verification.

drawout mounting









note: vertical terminals are optional for MP08 - MP12 - MC08

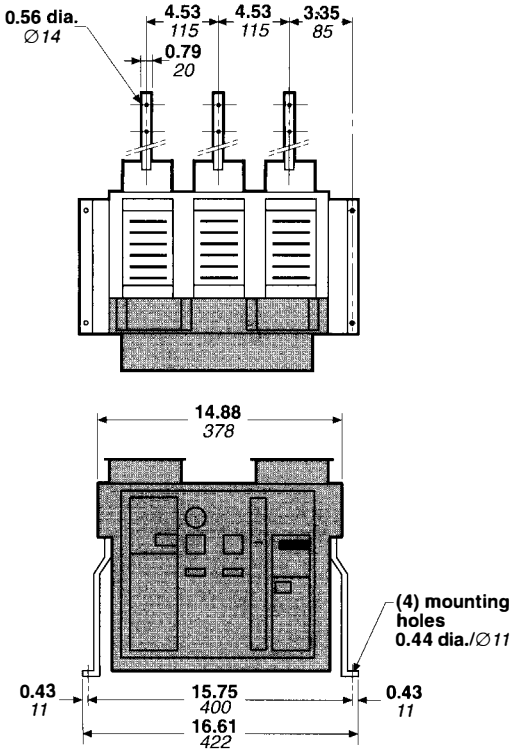
Note: suitable for continuous operation at 100% rating in a minimum cubicle space 17.5 in. (445 mm) h. by 21 in. (533 mm) w. by 16 in. (406 mm) d. Ventilation is not required.
Refer to shop drawings for verification.

Masterpact® circuit breaker dimensions

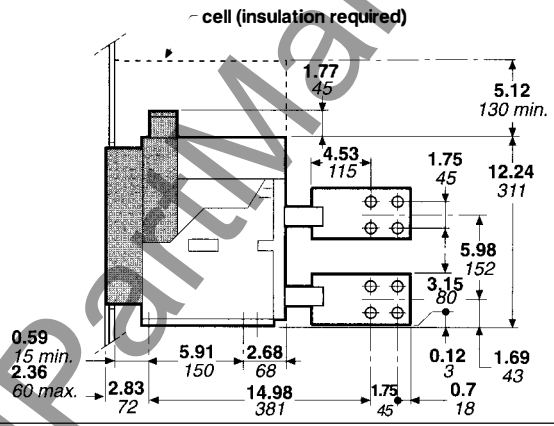
in./*mm*

MP20 - MC20

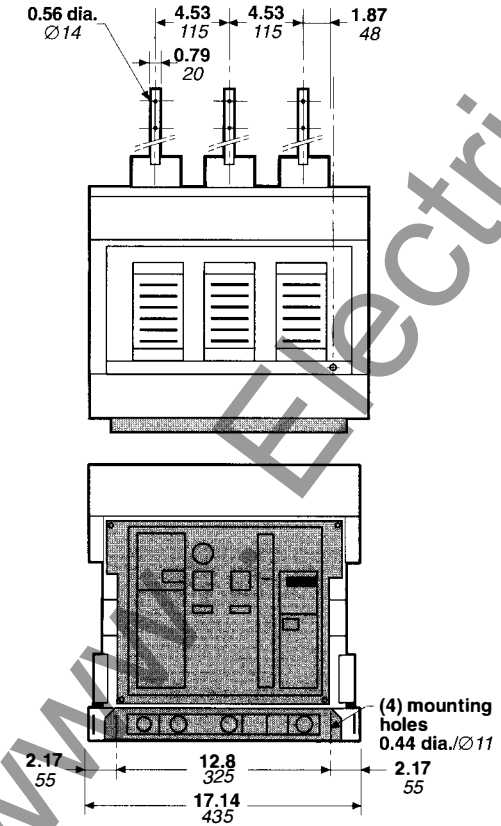
fixed mounting (MP only)



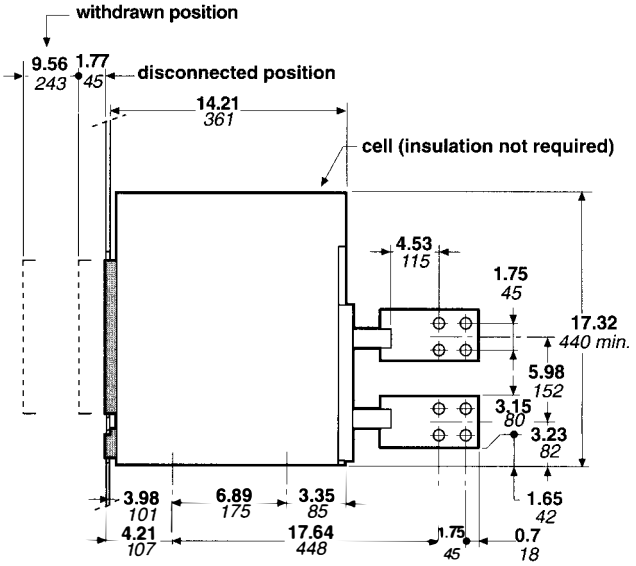
Note: suitable for continuous operation at 100% rating in a minimum cubicle space 17.5 (445 mm) h. by 21 in. (533 mm) w. by 16 in. (406 mm) d. Ventilation is not required.
Refer to shop drawings for verification.



drawout mounting



Note: suitable for continuous operation at 100% rating in a minimum cubicle space 17.5 (445 mm) h. by 21 in. (533 mm) w. by 16 in. (406 mm) d. Ventilation is not required.
Refer to shop drawings for verification.

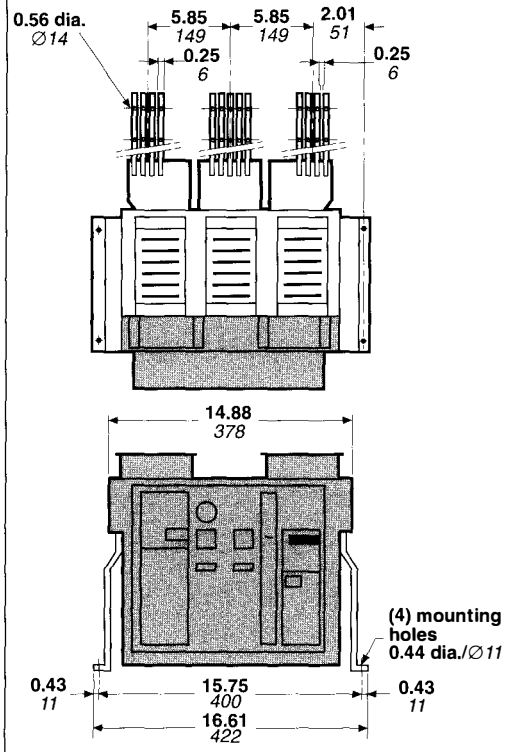


Masterpact® circuit breaker dimensions

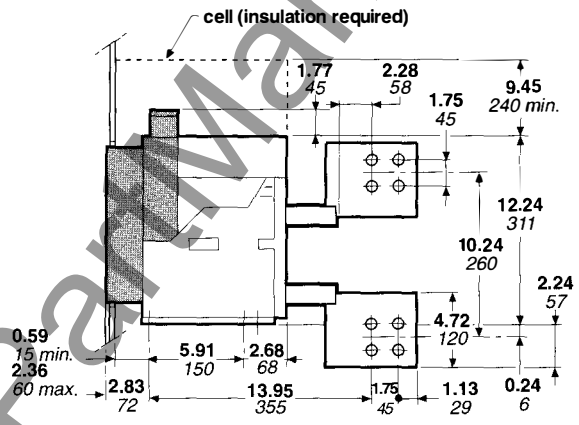
MP25 - MP30

in./*mm*

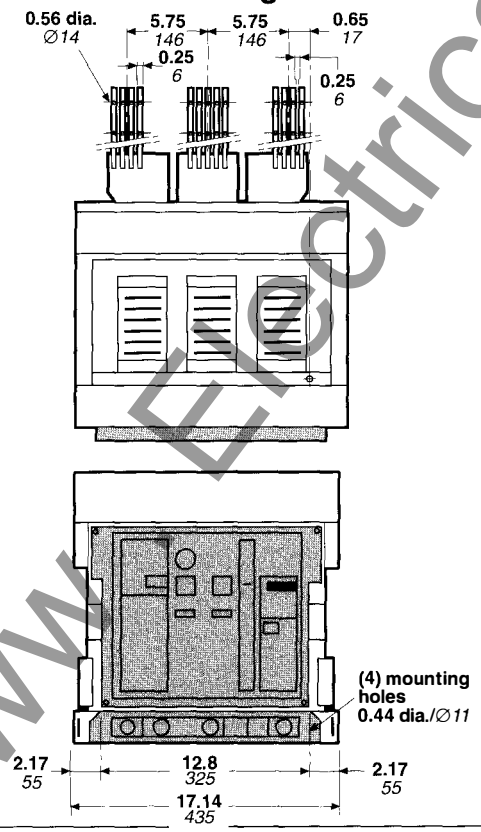
fixed mounting (MP only)



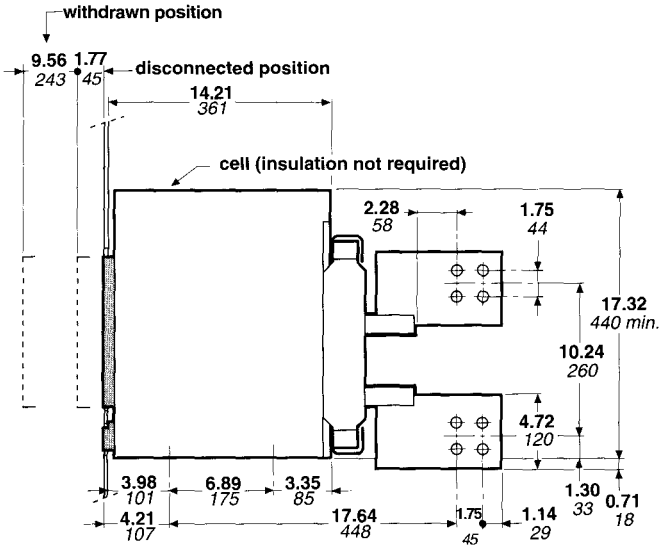
Note: suitable for continuous operation at 100% rating in a minimum cubicle space 26 in. (660 mm) h. by 21 in. (533 mm) w. by 16 in. (406 mm) d. with a ventilation of 30 sq. in. (0.02 sq. m) both at top and bottom.
Refer to shop drawings for verification.



drawout mounting



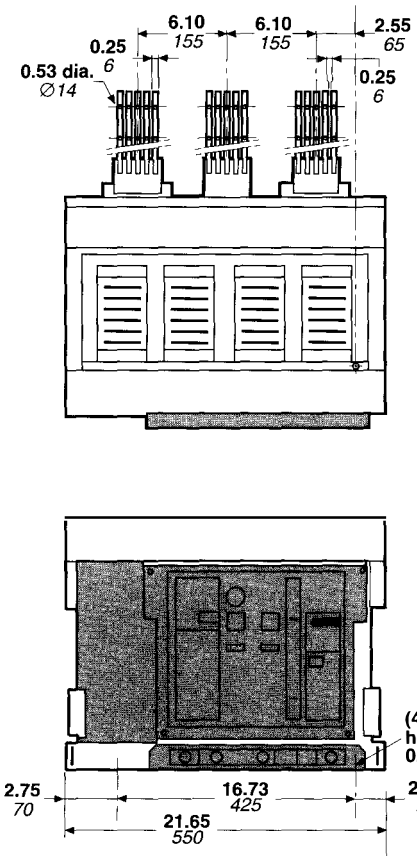
Note: suitable for continuous operation at 100% rating in a minimum cubicle space 26 in. (660 mm) h. by 21 in. (533 mm) w. by 16 in. (406 mm) d. with a ventilation of 30 sq. in. (0.02 sq. m) both at top and bottom.
Refer to shop drawings for any verification.

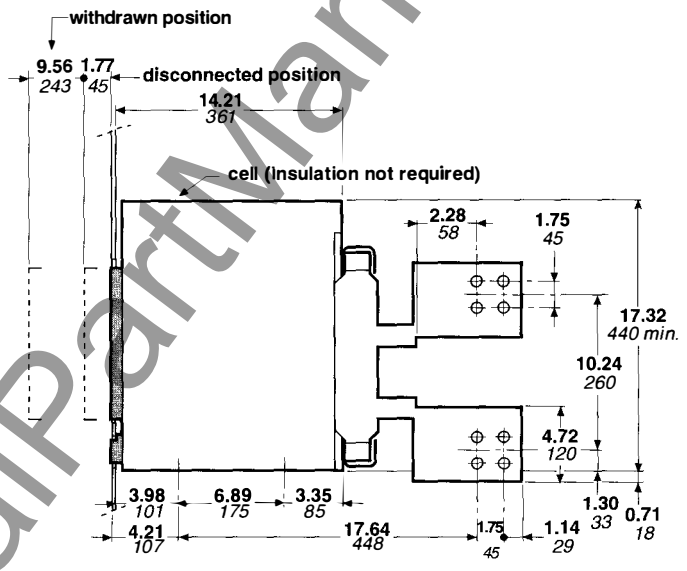


Masterpact® circuit breaker dimensions

in./*mm*

drawout mounting





Note: suitable for continuous operation at 100% rating in a minimum cubicle space 22 in. (559 mm) by 25 in. (635 mm) w. by 16 in. (406 mm) d. with a ventilation of 30 sq. in. (0.02 sq. m) at bottom. **Refer to shop drawings for verification.**

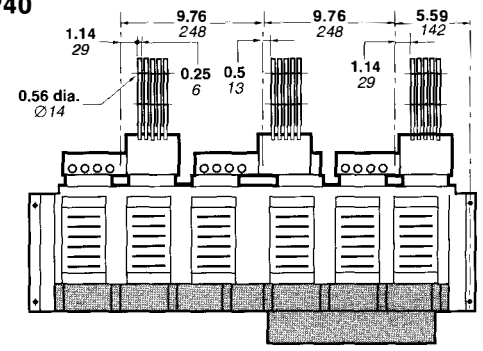
Masterpact® circuit breaker dimensions

in./*mm*

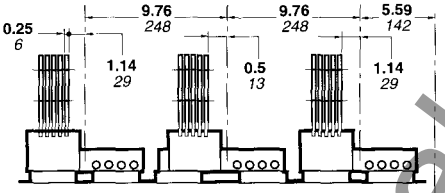
MP40 - MP50
MC40 - MC50

fixed mounting (MP only)

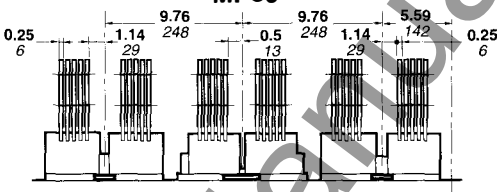
MP40



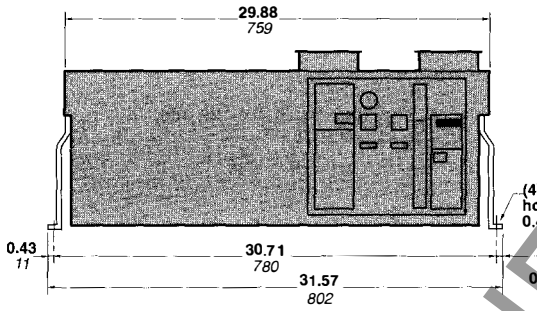
MP40

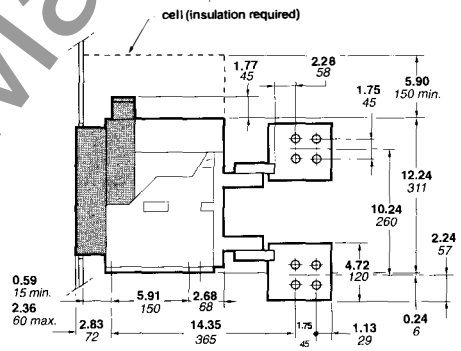


MP50



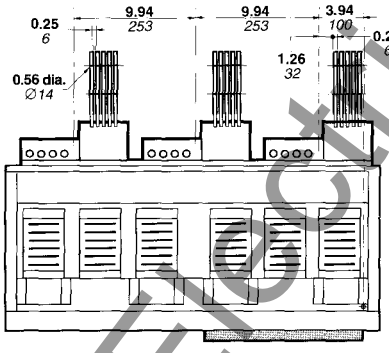
Note: suitable for continuous operation at 100% rating in a minimum cubicle space 26 in. (660 mm) h. by 34.25 in. (870 mm) w. by 16 in. (406 mm) d. with a ventilation of 30 sq. in. (0.02 sq. m) at bottom. **Refer to shop drawings for verification.**



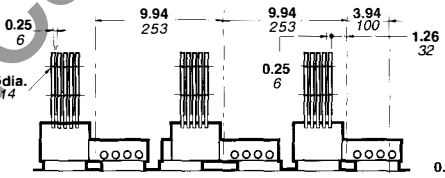


drawout mounting

MP40/MC40

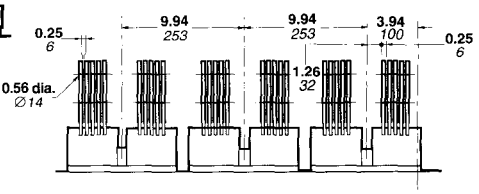


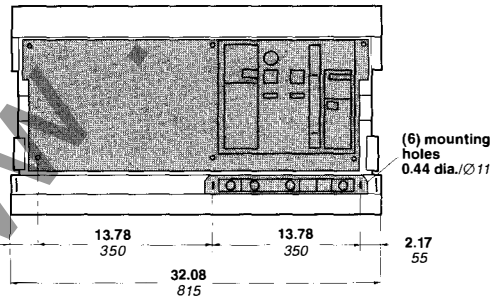
MP40/MC40

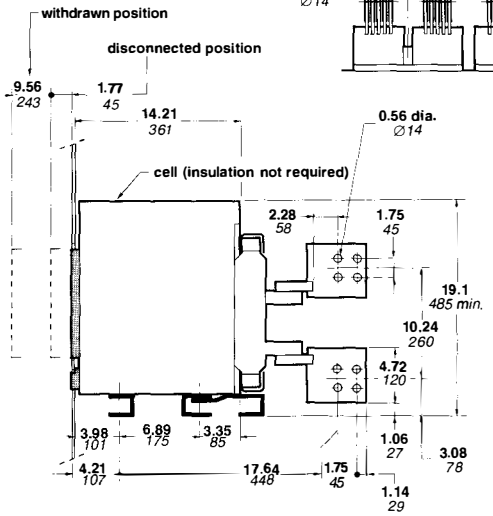


Note: suitable for continuous operation at 100% rating in a minimum cubicle space 26 in. (660 mm) h. by 34.25 in. (870 mm) w. by 16 in. (406 mm) d. with a ventilation of 30 sq. in. (0.02 sq. m) at bottom. **Refer to shop drawings for verification.**

MP50/MC50







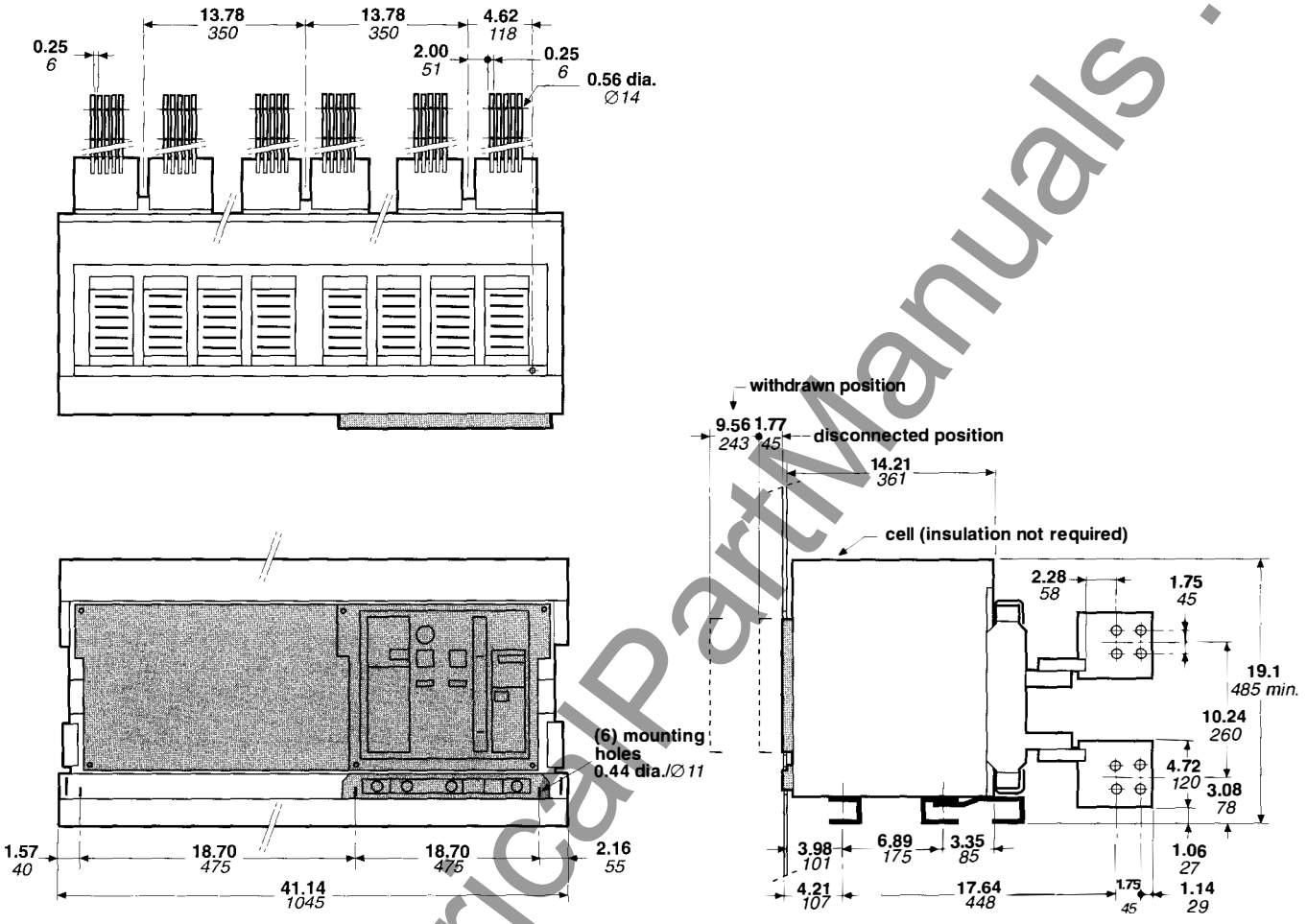
Masterpact® circuit breaker dimensions

in./*mm*

MP63

drawout mounting

Refer to shop drawings for verification.



⚠ DANGER

HAZARD OF ELECTRICAL SHOCK, BURN OR EXPLOSION

Turn OFF all power supplying the equipment before installing or removing circuit breaker.

Failure to observe these precautions will cause death, personal injury or electrical shock.

recommended inspection intervals

Masterpact® circuit breakers are designed to be maintenance-free (see page 38). However, all equipment with moving parts requires periodic inspection to ensure optimum performance and reliability. We recommend that the circuit breakers be routinely inspected six months after installation, followed by an annual inspection. Intervals can vary depending on your particular use and experience.

inspection of terminals

Connections of circuit breaker:

- inspect terminals. If there is discoloration due to overheating, the joint should be dissassembled and the surface cleaned before reinstallation.

It is essential that electrical connections are made carefully in order to prevent overheating.

- check for terminal tightness.

inspection of main contacts

The arc chutes are easily removable to allow access to the main contacts and to the wear indicator. The wear indicator consists of a groove located within the contacts support (see page 3). When the circuit breaker is closed, this groove is entirely covered up by the moving contacts.

Over time, the wear of the contacts will make the groove appear.

The contacts will have to be changed when the groove is fully visible.

inspection of clusters

Placed in the cradle, and not on the moving portion, the clusters are protected against damage due to handling during servicing. Totally maintenance-free, they have to be replaced only after overheating due to a defective connection or after a major fault. Inspection is advised when checking the terminal connections.

cleaning

Remove the dust and dirt that may have accumulated on the circuit breaker surface and terminals.

mechanical checks

For long periods circuit breakers may not be required to operate on overload or short-circuit conditions. Therefore it is essential to operate the circuit breaker periodically to avoid mechanical gumming.

insulation resistance tests

When circuit breakers are subjected to severe operating conditions, an insulation resistance test may be performed as indicated in NEMA standard publication No. AB4-1991.

An insulation resistance test is used to determine the quality of the insulation between phases and phase-to-ground. The resistance test is made at a dc voltage higher than the rated voltage to determine the actual resistance of the insulation. The most common method employs a "megger" type instrument. A 1000-volt instrument will provide a more reliable test because it is capable of detecting tracking on insulated surfaces. Resistance values below 1 megohm should be investigated.

The insulation test shall be made:

- between line and load terminals of individual poles with the circuit breaker contacts open.
- between adjacent poles and from poles to the metallic supporting structure with the circuit breaker contacts closed. This test may be made with the circuit breaker in place after the line and load conductors have been removed, or with the circuit breaker bolted to a metallic base which simulates the in-service mounting.

electrical tests

These tests require equipment for pole resistance measurement and for overcurrent and instantaneous tripping in accordance with NEMA standard publication No. AB4. They are not within the scope of normal field operation.

⚠ CAUTION

HAZARD OF EQUIPMENT DAMAGE

Since circuit breakers contain factory-sealed and calibrated elements. Do not break seal. In case of malfunction, repairs must be made at a Merlin Gerin factory or by an authorized representative.

Failure to observe this precaution may cause equipment damage.

Important notice:
all endurances given are based on normal operating conditions and conventional tests:
- **closing and opening operations at rated current,**
- **power factor: 0.75 - 0.80.**

As actual conditions differ, use these values only as inspection guidelines and periodically check contact wear.

Under normal operating conditions of use, given by UL 489 or ANSI standards (see table 3) and controlled by tests, Masterpact circuit breakers do not require maintenance. However, these circuit breakers exceed, without maintenance and additional costs, the endurances required by standards.
See tables 1 and 3.
Service maintenance by a Merlin Gerin representative will extend the endurance according to table 2. This service can be performed on site and consists in changing contacts, arc chutes and some other parts.
Example:
MP16 at 480V: requires no maintenance before 10,000 cycles (mechanical or electrical).
Endurance may be increased after servicing at 10,000 operations.

table 1 - endurance without maintenance

Masterpact® MP or MC	08	12	16	20	25	30 - 32	40	50	63
mechanical	12,500	10,000	10,000	10,000	10,000	10,000	5,000	5,000	5,000
electrical									
480V	10,000	10,000	10,000	9,000	8,000	4,000	3,000	3,000	2,000
600V	10,000	10,000	10,000	7,000	6,000	2,600	2,500	2,500	1,500

table 2 - endurance with service maintenance

electrical (480V) or mechanical									
	20,000	20,000	20,000	15,000	15,000	15,000	10,000	10,000	10,000

table 3 - endurance required by standards

frame size	800	1200	1600	2000	2500	3000	4000	5000	6300
UL489									
mechanical	3,500	2,000	2,000	2,000	2,000	1,500	1,500	1,500	1,500
electrical	500	500	500	500	500	400	400	400	400
ANSI									
mechanical	12,500	NS	4,000	4,000	NS	1,500	1,500	NS	NS
electrical	2,800	NS	800	800	NS	400	400	NS	NS

molded case circuit breaker

In addition to UL 489 and ANSI C37-13 Masterpact circuit breakers comply with IEC 947-2 standard as per the table below:

A 4-pole version complements the product line. For further information, please contact a sales representative.

type 3-pole	ampere rating (A)	interrupting ratings UL489			IEC 947-2			
		rms sym. amps 480V	600V	short time	440V Icu	Ics	690V Icu	Ics
standard interrupting rating								
MP08 H1	800	65kA	65kA	50kA	65kA	65kA	65kA	65kA
MP12 H1	1200	65kA	65kA	50kA	65kA	65kA	65kA	65kA
MP16 H1	1600	65kA	65kA	50kA	65kA	65kA	65kA	65kA
MP20 H1	2000	75kA	75kA	75kA	75kA	75kA	75kA	75kA
MP25 H1	2500	75kA	75kA	75kA	75kA	75kA	75kA	75kA
MP30 H1	3000	75kA	75kA	75kA	75kA	75kA	75kA	75kA
MP40 H1	4000	100kA	100kA	100kA	100kA	100kA	85kA	85kA
MP50 H1	5000	100kA	100kA	100kA	100kA	100kA	85kA	85kA
MP63 H1	6300 ①	100kA	100kA	100kA	100kA	100kA	85kA	85kA
high interrupting rating								
MP08 H2	800	100kA	65kA	50kA	100kA	100kA	85kA	85kA
MP12 H2	1200	100kA	65kA	50kA	100kA	100kA	85kA	85kA
MP16 H2	1600	100kA	65kA	50kA	100kA	100kA	85kA	85kA
MP20 H2	2000	100kA	75kA	75kA	100kA	100kA	85kA	85kA
MP25 H2	2500	100kA	75kA	75kA	100kA	100kA	85kA	85kA
MP30 H2	3000	100kA	75kA	75kA	100kA	100kA	85kA	85kA
MP40 H2	4000	125kA	100kA	100kA	150kA	125kA	85kA	85kA
MP50 H2	5000	125kA	100kA	100kA	150kA	125kA	85kA	85kA
MP63 H2	6300 ①	150kA	100kA	100kA	150kA	125kA	85kA	85kA

① not UL listed

auxiliary and position switches

voltage (V)		auxiliary switch OF	O	OFSUP	overcurrent trip switch	ready to close switch	position switches CE / CD / CT
50/60 Hz	110	15					
	240	10	10	10	10	10	10
	380	10	6	6	5	5	6
	480	10	6	6			6
	600	6	3	3			3
DC	48	5	3	3	3	3	3
	125	3	0.5	0.5	0.3	0.3	0.5
	250	3	0.25	0.25	0.15	0.15	0.25
	500	0.5					

OF: heavy duty **O**: standard **OFSUP**: 24 additional **CE**: connected **CD**: disconnected **CT**: test

spring charging motor

rated voltage (V)			
UL 489 Listed		IEC 947-2	
60 Hz	120	50/60 Hz	100-127
	240		200-240
DC	24	DC	24-30
	48		48-60
	125		100-125

closing coil

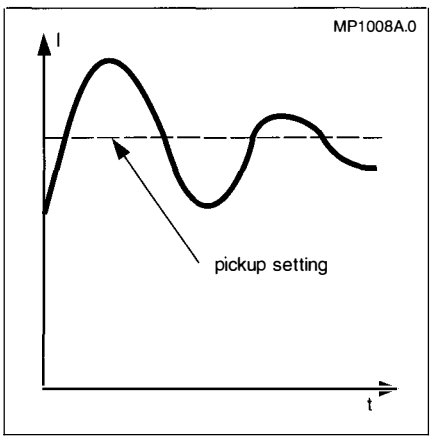
rated voltage (V)			
UL 489 Listed		IEC 947-2	
60 Hz	120	50/60 Hz	110-127
	240		220-250
DC	24	DC	24
	48		48
	125		125
	250		250

shunt trip

rated voltage (V)			
UL 489 Listed		IEC 947-2	
60 Hz	120	50/60 Hz	110-127
	240		220-250
	480		440-480
DC	24	DC	24
	48		48
	125		125
	250		250

undervoltage trip

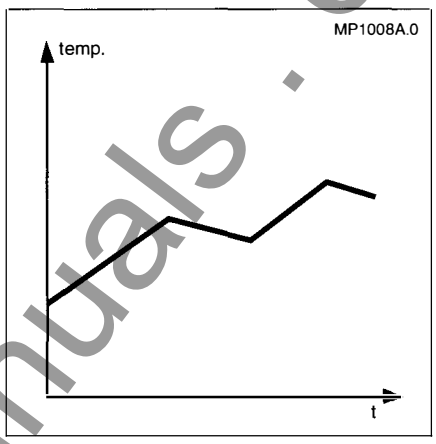
rated voltage (V)			
UL 489 Listed		IEC 947-2	
60 Hz	120	50/60 Hz	110-127
	240		220-250
	480		440-480
DC	24	DC	24
	48		48
	125		125
	250		250

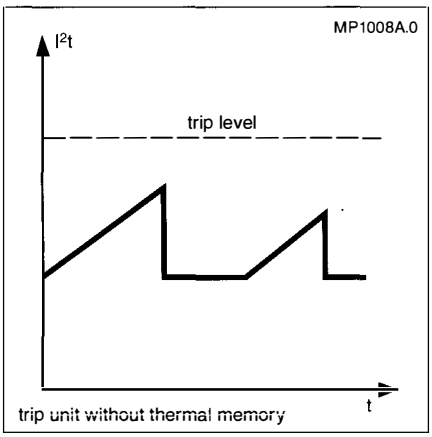


purpose

The thermal memory function allows an optimization of cables or bus bar protection in case of low amplitude repetitive faults. Such faults can be due to repetitive motor startings, fluctuating load or subsequent reclosing after a fault.

Traditional electronic protection has no effect when facing such repetitive faults because the duration of each overload above the pickup setting is too short to achieve effective tripping.
Nevertheless, each overload involves a temperature rise in the installation, the cumulative effect of which could lead to overheating of the system.

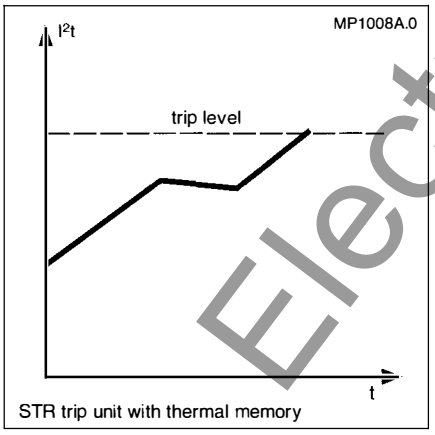




trip unit without thermal memory

principle

The thermal memory function remembers and integrates the thermal heating caused by each pickup setting overrun. Before tripping, the integrated heating value will reduce the associated time delay and therefore, the reaction of the trip unit will be closer to the real heating of the power network system. After tripping, the memory will also reduce the time delay when reclosing the circuit breaker on fault.



STR trip unit with thermal memory

STR trip units

The STR 38S and STR 58U trip units incorporate the thermal memory as standard:
- before tripping on long-time and ground-fault protection (if provided)
- after tripping on long-time protection only, adjustable min./max. position for the STR 58U trip unit is standard

The trip unit measures the internal temperature rise of the circuit breaker by thermal resistors. The cooling time constant of the memory is not fixed, but depends on the over-temperature condition.

⚠ WARNING

HAZARD OF EQUIPMENT DAMAGE

"min" position must be used only for emergency, when reclosing on fault is absolutely necessary.

Failure to observe this precaution can cause death, severe personal injury or equipment damage.