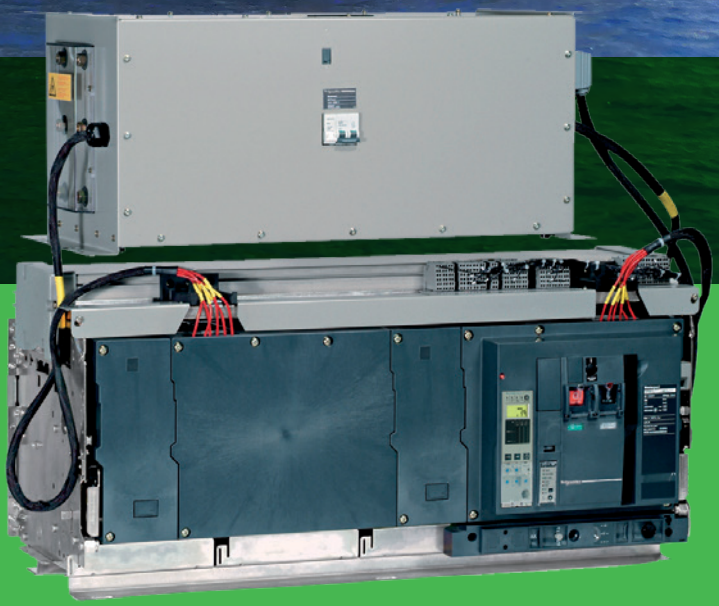
Masterpact UR

Catalogue 2019
Ultra Rapid circuit breakers
(5000-6000 A)



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Product

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Available at the click of a button, these instructions provide:

- Recyclability rates for Schneider Electric products.
- Guidance to mitigate personnel hazards during the dismantling of products and before recycling operations.
- Parts identification for recycling or for selective treatment, to mitigate environmental hazards/ incompatibility with standard recycling processes.

General contents

Masterpact UR

A

B

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E

F

Application

To reduce the electrodynamic forces and thermal stresses in switchboards

The Masterpact UR is a low voltage power breaker (based on the Thomson effect technology) with an ultra rapid opening system on very high short-circuit level. Its breaking performance makes it possible to limit the short-circuit current and prospective energy, and consequently protect the electrical installation against the electrodynamic and thermal effects of short-circuit.

Presentation

Masterpact UR is an ultra rapid opening breaker for AC networks (50/60 Hz) from 240 V to 690 V, covering the ratings up to 6000 A.

Ultra rapid breaker

As installed power increases, electrical distribution has to shift from a LV design to a MV design. Indeed, a high short-circuit level can be a threat to the installation if not protected by high performance protection breakers.
Built from our highly reliable standard air circuit-breaker, Masterpact UR has been developed to allow much higher installed power with a LV design.

Performances

- fault detection < 0.3 ms
- opening order < 1 ms
- arc extinguishing 5 ms to 8 ms max.

Advantages

- cost effective solutions
- no MV needed, so easier maintenance
- simpler solution, allowing reduced time to market.

Data

- from 5000 A to 6000 A up to 690 V
- Icu 150 kA / 440 V, 100 kA / 690 V.

Application

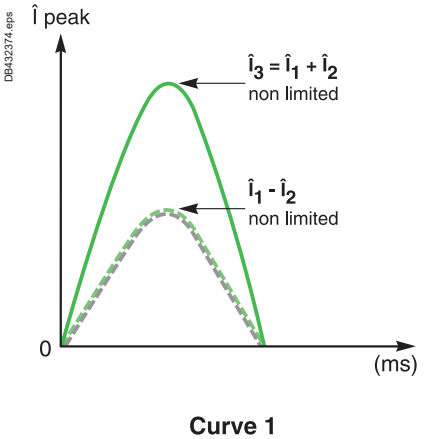
Masterpact UR is particularly adapted to the following applications:

- busbars coupling onboard merchant vessels, off shore platform
- loop networks (in industry), where the current and energy are important because of the installed power (several transformers or generators in parallel).

Example of limitation offered by Masterpact UR in decoupling busbars in case of short circuit

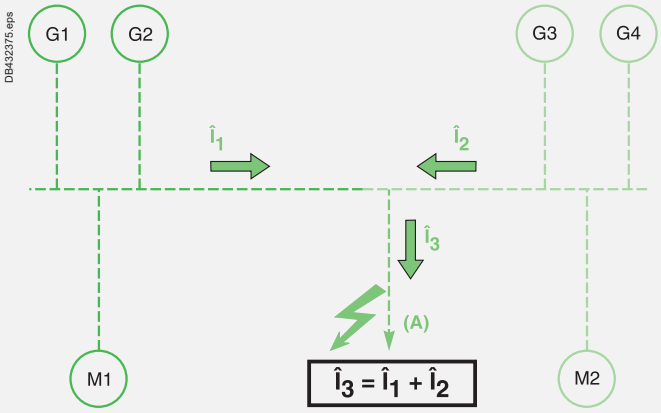
Case 1 no coupler

When a short-circuit occurs downstream in the installation (A) and there is no coupler, the short-circuit level will be the total sum of all the generated power (illustrated by **curve 1**).



Curve 1

Figure 1: diagram of the network.



Application

To reduce the electrodynamic forces and thermal stresses in switchboards

Case 2: Masterpact UR as a coupler.

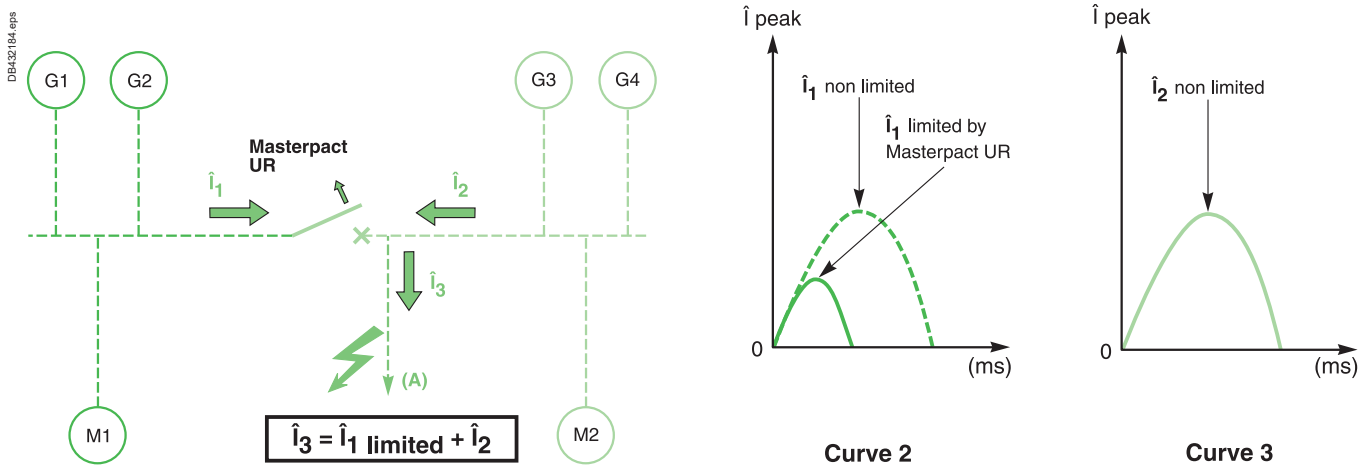
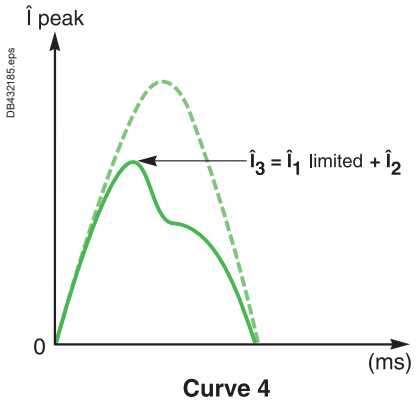


Figure 2: diagram of the network.



By inserting a bus coupler - Masterpact UR - to separate the sources under fault conditions, the short circuit at (A) will consist in:

- a limited short circuit coming from generator G1 and G2 interrupted by the Masterpact UR (see **curve 2**)
- a non limited short circuit from generators G3 and G4 (see **curve 3**).
- the resulting short circuit level is illustrated by **curve 4.**

The consequence of the strong limitation of the short circuit current and the prospective energy allows the design of a LV network instead of a MV design. This also prevents the network from being totally shutdown (black out) in case of short cuircuit in the main switchboard.

Example of limitation by Masterpact UR for 690 V - 60 Hz network (IEC 947-2)

Source 2	Source 1													
	50		55		60		65		70		75		80	
50	169	207	183	229	193	240	203	251	213	262	224	273	234	284
55	176	229	189	240	199	251	210	262	220	273	230	284	240	295
60	178	240	191	251	201	262	211	273	220	284	230	295	240	306
65	181	251	194	262	204	273	214	284	223	295	233	306	242	317
70	185	262	198	273	207	284	217	295	226	306	236	317	246	327
75	189	273	201	284	211	295	220	306	230	317	240	327	249	338
80	192	284	205	295	214	306	224	317	233	327	243	338	252	349
85	196	295	208	306	218	317	227	327	237	338	246	349	256	360
90	199	306	212	317	221	327	231	338	240	349	249	360	259	371
95	204	317	216	327	225	338	235	349	244	360	253	371	263	382
100	209	327	221	338	230	349	239	360	249	371	258	382	268	393
110	218	349	230	360	239	371	248	382	258	393	267	404	276	415

Limited

No limited

xxx Example

Example

We can see that if the unlimited short circuit from the source 1 is **60 rms** and the limited short circuit from source 2 is **80 kA rms,** without the Masterpact UR the resulting short circuit level still be **306 kÂ** and with Masterpact UR it is only **214 kÂ**. Please, contact your local Schneider Electric subsidary for your specific short circuit limitation study of your electrical installation.

Standards / Description

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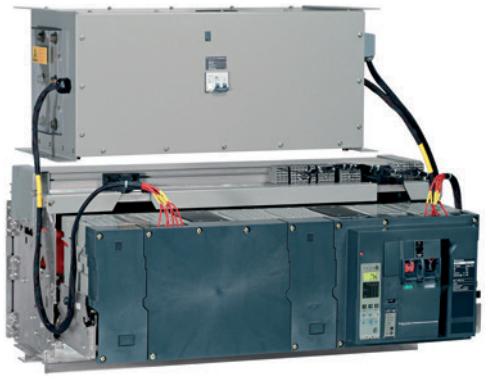

Masterpact UR is composed of Masterpact case fitted with two supplementary modules:
- "UR control" module dedicated for detecting high short-circuits. This module is built-in the Masterpact UR breaker
- "UR power" module for energy storage trigger monitoring and control units supply. This module is placed near the breaker and connected to the pole thrusters by cables.

Standards

Masterpact UR is tested according to the IEC 60947-2 standard.
Masterpact UR 50-60 equiped with Micrologic A type has been tested according to IACS recommendations and is certified by the following Marine organisations:
- Lloyd's Register
- Bureau Veritas.

Masterpact UR is composed of two subassemblies:
- an electromechanical one for breaking
- an electronic one for power energy ("UR power" module).

The electromechanical one, adapted from a Masterpact NW breaker case, and its chassis comprises:
- the chassis
- the fixed and moving contacts
- the arc chambers
- the individual thruster mechanism: Thomson Effect Coil (T.E.C)
- the individual current sensors
- the pole operation mechanism
- the auxiliaries and accessories (identical to the Masterpact NW standard device).

The Micrologic control unit (A, P or H type) and the "UR control" module are fitted on the case, they are dedicated for detecting short circuits.

The "UR power" module comprises:
- the power capacitors (for energy storage)
- the charging and discharging system monitored by the "UR control" module
- the communication system with PC.

The "UR power" module is connected to the thrusters and to the "UR control" module by cables.

Masterpact UR exists in 3P version

	Dimensions (mm)		
	W	H	D
Three-pole device			
5000 A / 6000 A	1016	479	394.5
"UR power" module			
5000 A / 6000 A	778	344.5	379

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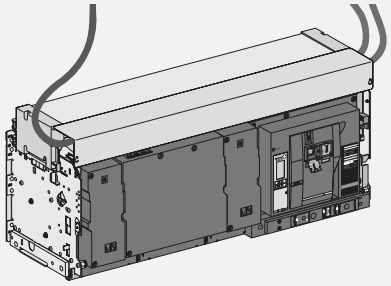

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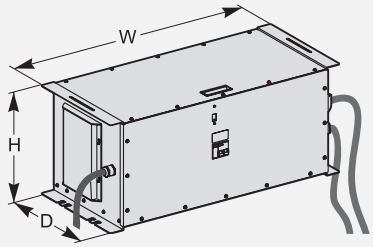

Thomson effect coils

Principle of operation

Each thruster consists in a fixed primary coil, against which a solid disk forming the secondary coil is pressed on. The operating energy is electrostatically stored in capacitors.
When the capacitors energy is released instantaneously in the primary coil, by the ordering of a thyristor, it results from it a high induced current in the disc and an immediate repulsion from this one under the effect of the electrodynamic forces between primary and secondary.

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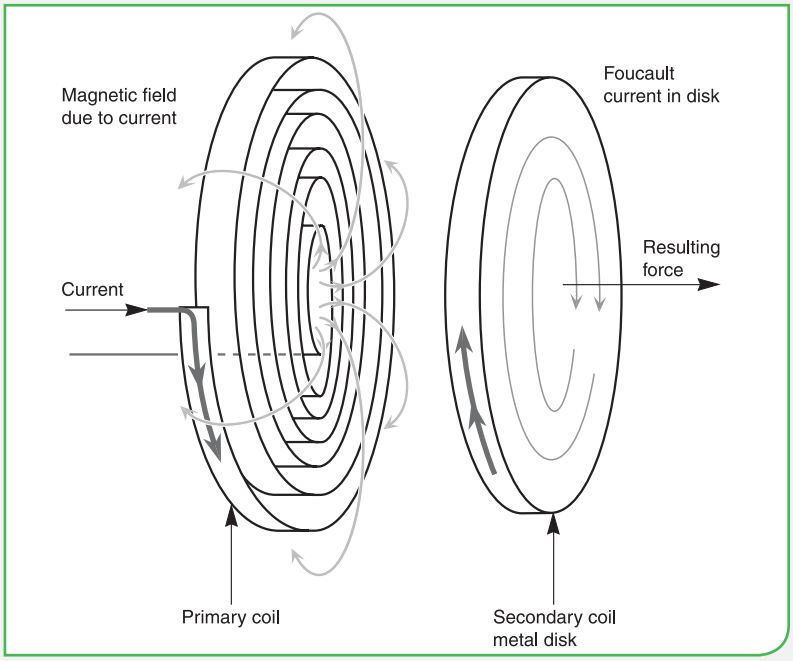

The disc by striking the moving contacts provokes their ultra-fast opening.
At the appearance of the electric arc, the short-circuit current is limited.

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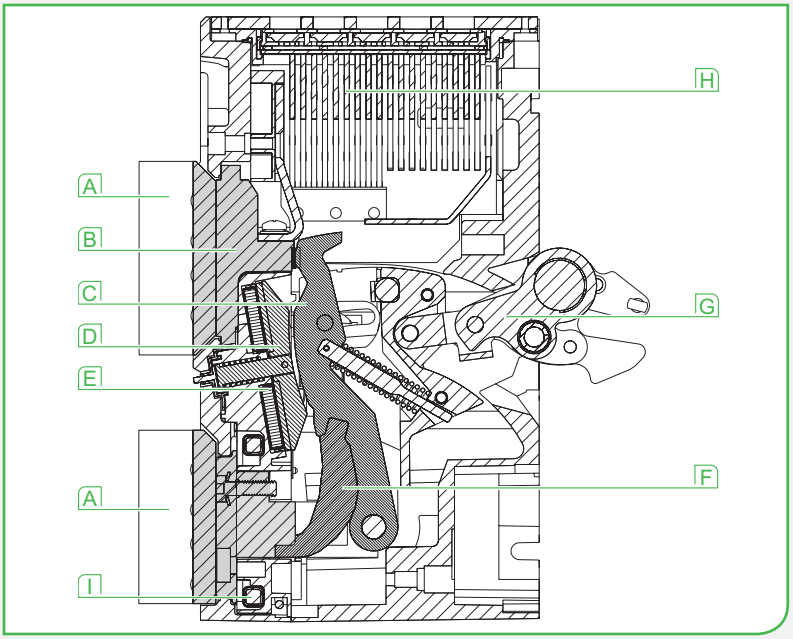


A Drawout terminals.
B Fixed contact.
C Moving contact.
D Thomson thruster (secondary coil).
E Primary coil.
F Braid.
G Pole shaft.
H Arc chamber.
I Air CTs

Thomson effect coils

Masterpact UR, installed in a circuit, permanently senses the current of the installation. This sensing is done by air CTs (Rogowsky type) integrated in the Masterpact UR.

On operation

Masterpact UR opening and closing sequence is achieved by the standard energy mechanism. The breaker can be locally or remotely opened and closed.

On overload or low short-circuit

In case of an overload or a low short-circuit, the Ir or Isd thresholds of the Micrologic control unit are activated and the trip order is given via the Mitop coil (MITOP) to the opening mechanism. The total breaking time is approximatively 80 ms.

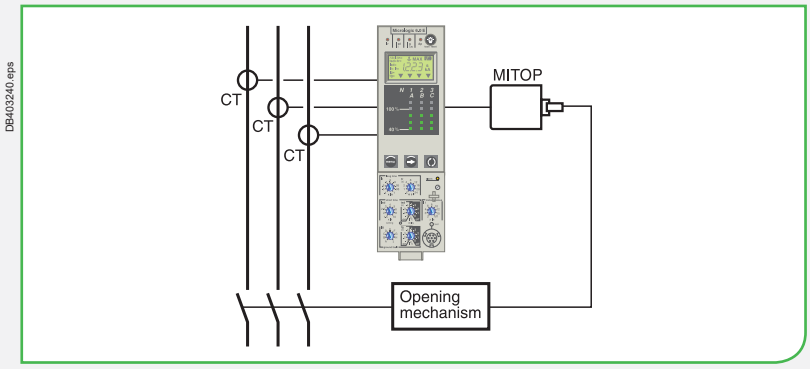
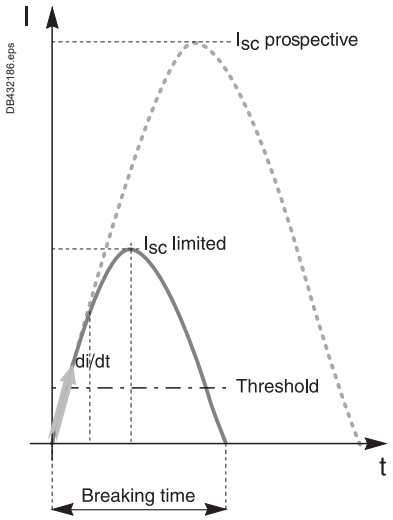


Diagram Opening mechanism.



On high short-circuit

- in case of a high short-circuit, the “UR control” module directly linked to the air current transformer, analyses the slope (di/dt) and its amplitude in a very short time (< 240 µs)
- in case of overtaking the two thresholds, the “UR control” gives a simultaneous order to the thyristors and the MITOP:
  - the thyristors release the capacitor electrostatic energy in the Thomson Effect Coils provoking the immediate repulsion of the contacts (< 1 ms). The total breaking time is lower than 8 ms
  - the MITOP confirms the opening.

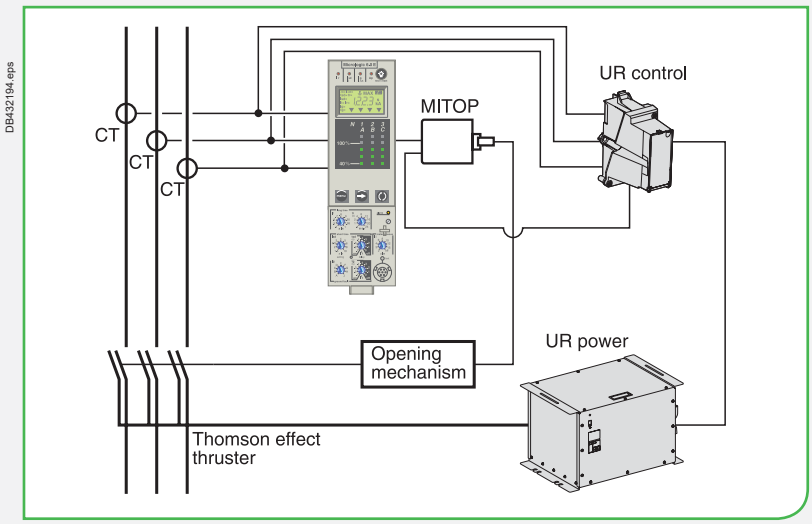


Diagram Opening mechanism - “UR power”- Thomson effect thruster.

Masterpact UR 50-60 3 poles withdrawable version

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Masterpact UR 50-60 front view.

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Masterpact UR 50-60 rear view.

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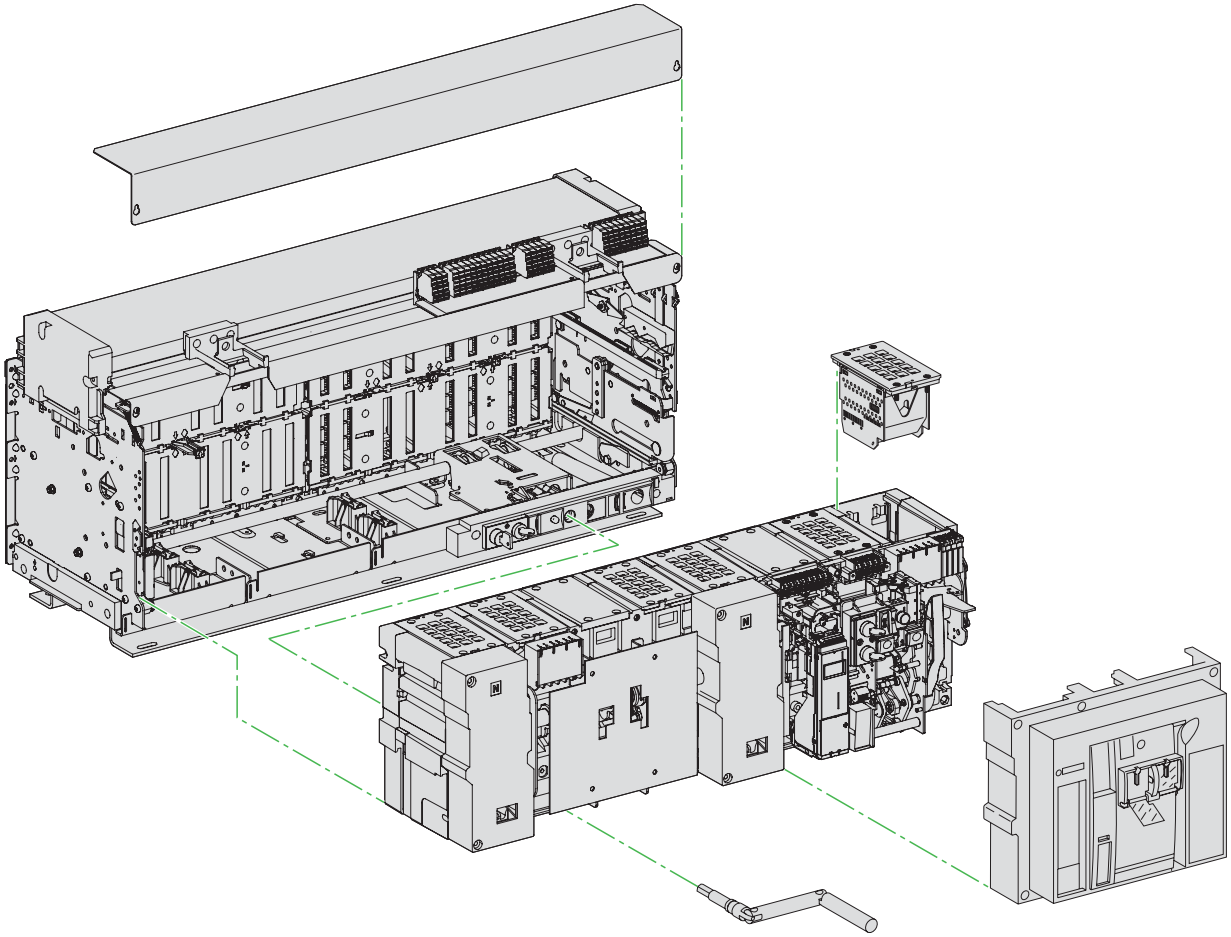

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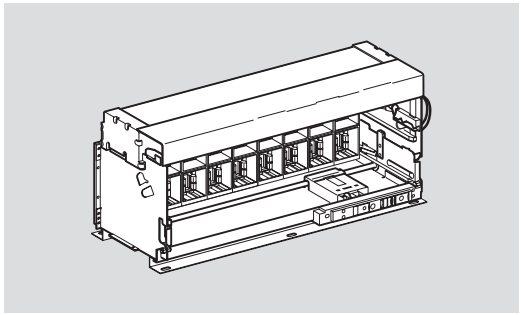

Chassis

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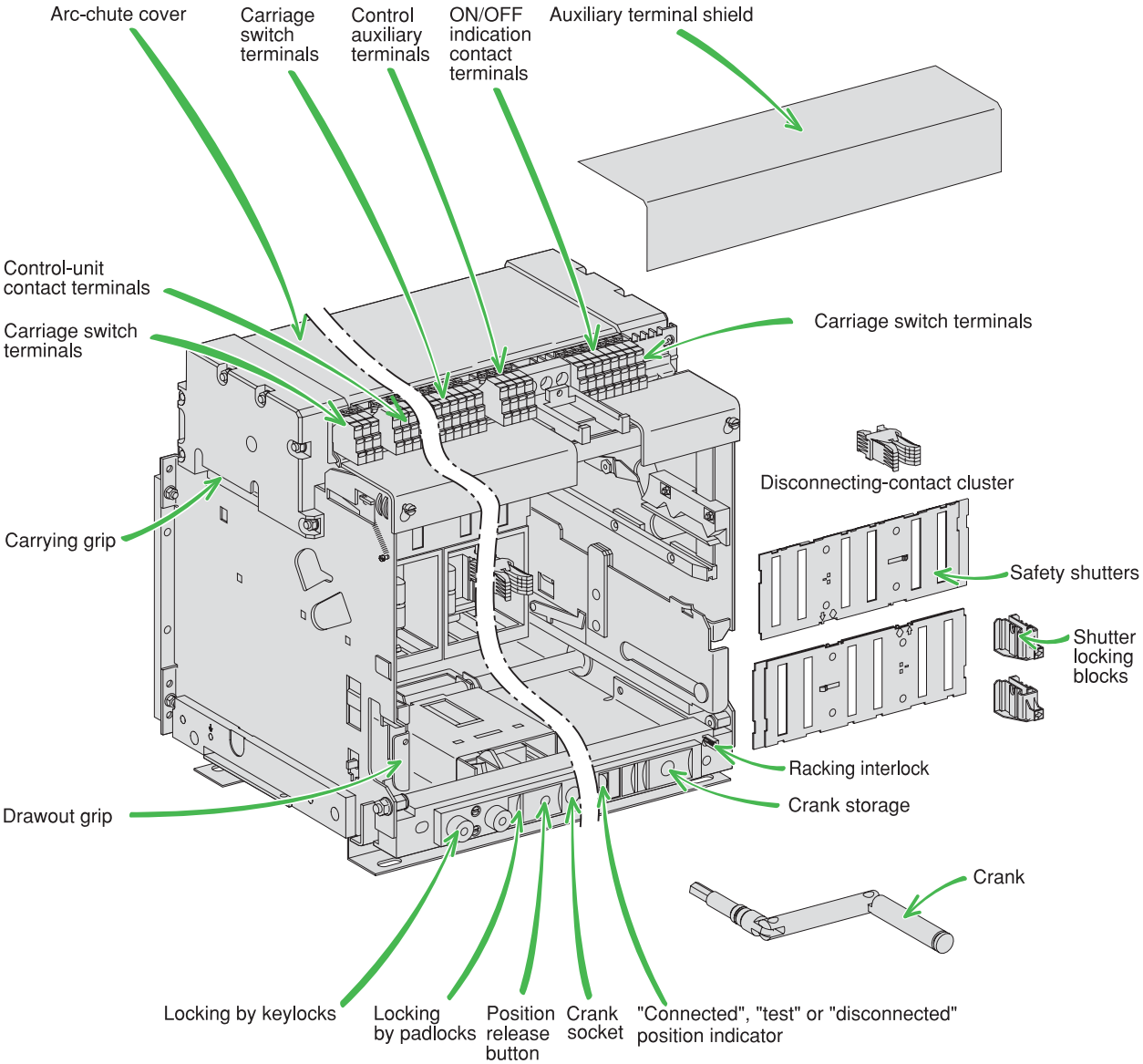

Circuit breaker

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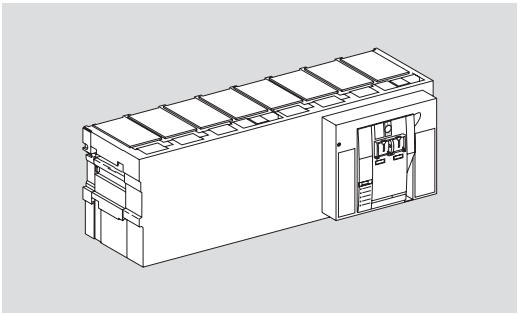

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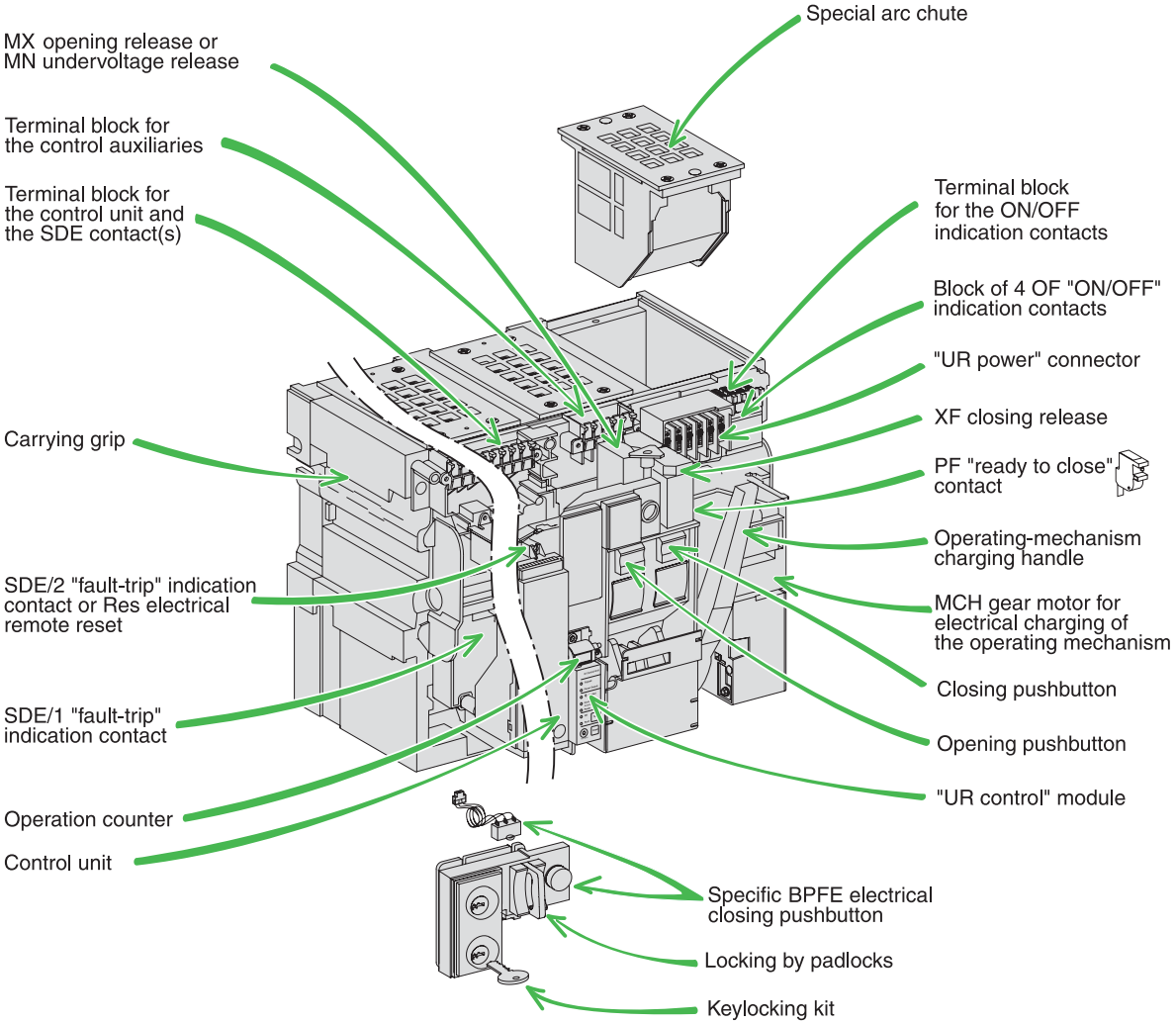

Front

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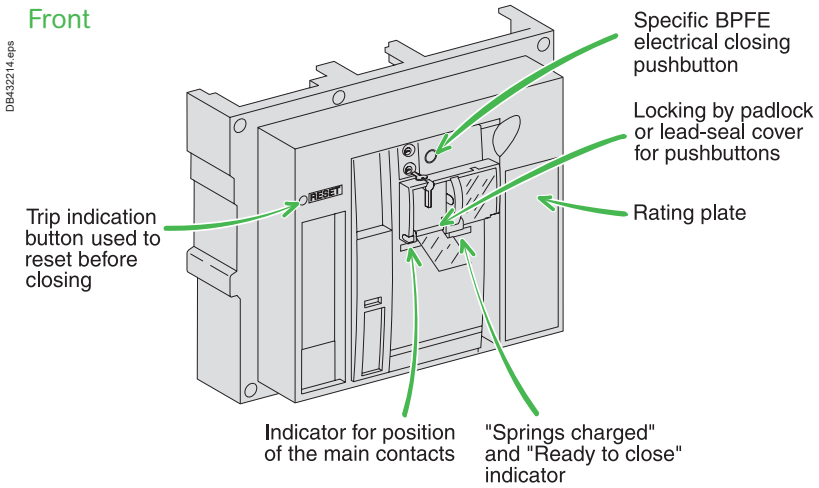
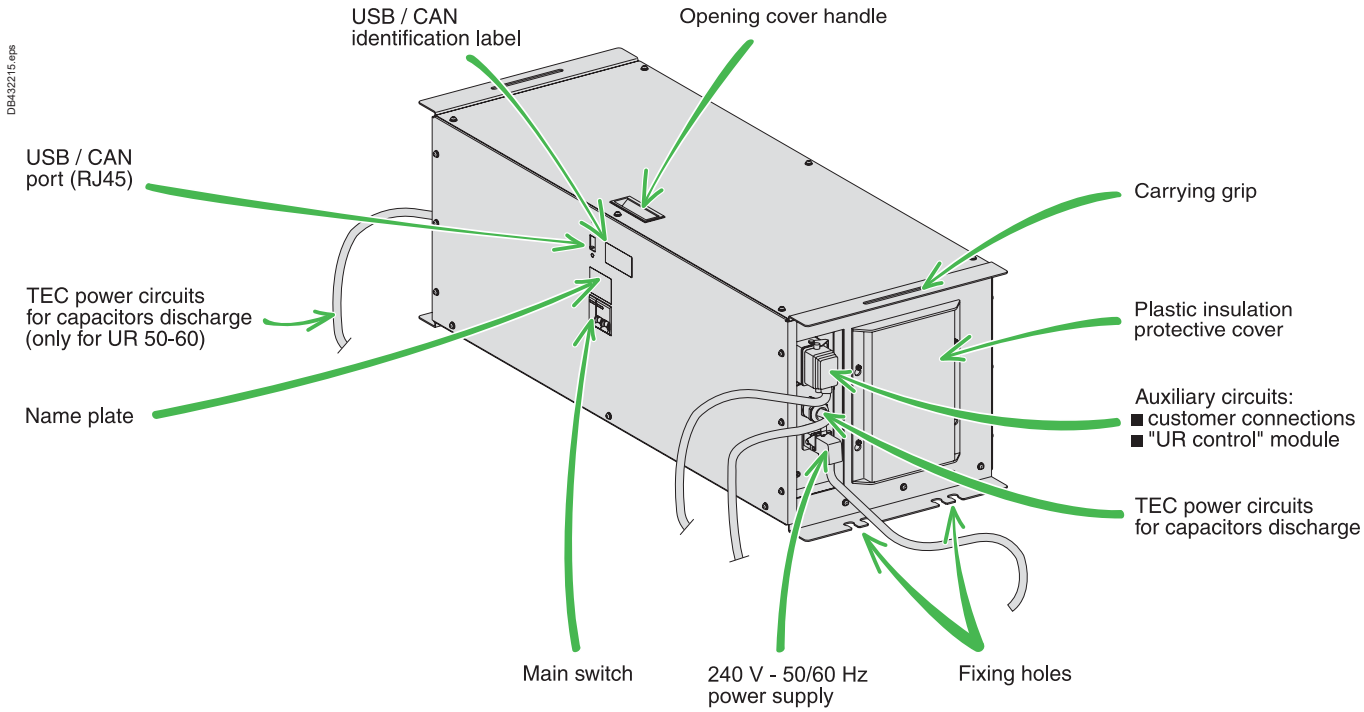
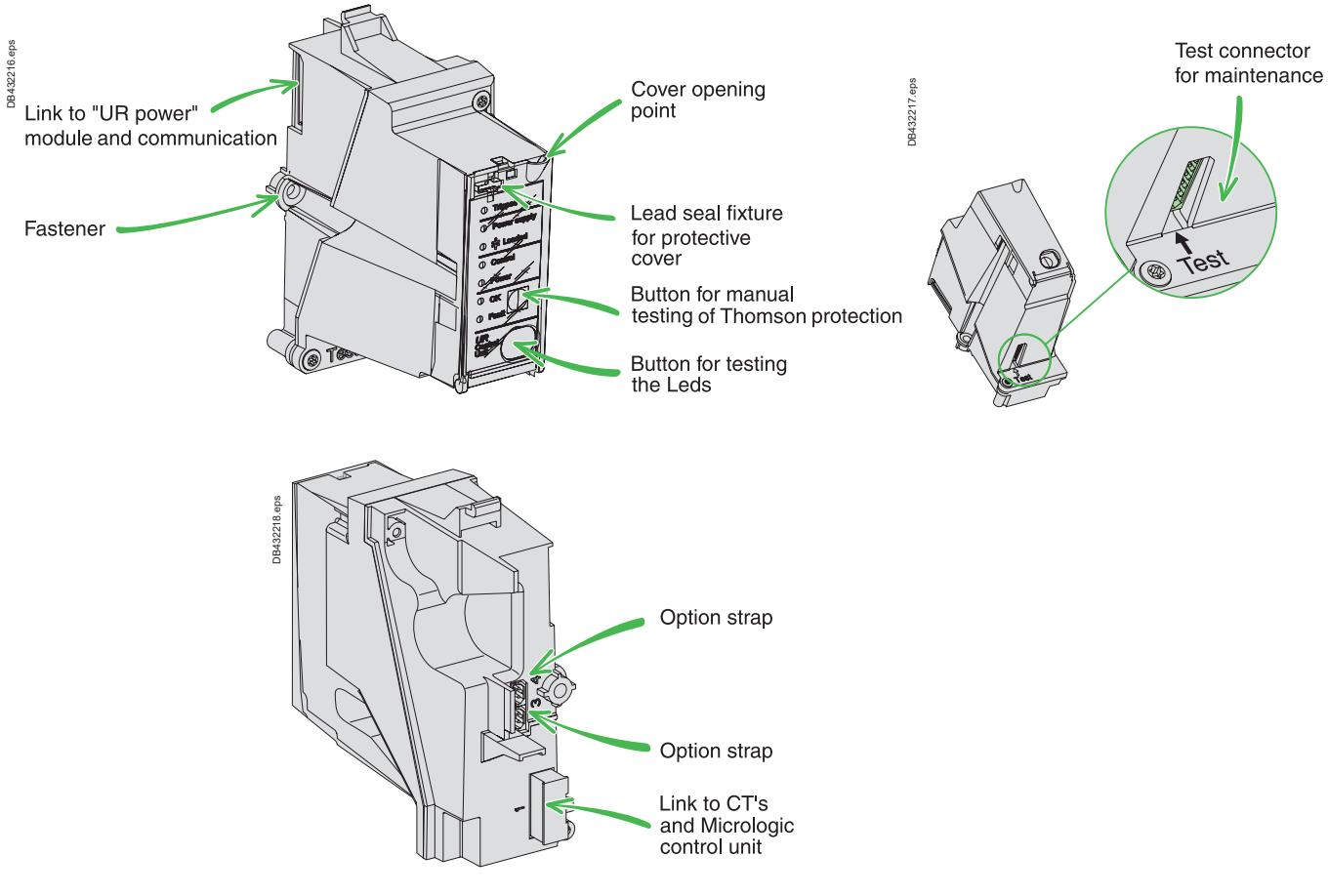


“UR power” module and “UR control” module

“UR power” 50-60



“UR control” module



Functions and characteristics

Other chapters

A

UR50 - UR60 circuit breakers
Drawout 3-pole devices

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Common characteristics			
Number of poles			3
Rated insulation voltage (V)		**Ui**	1000
Impulse withstand voltage (kV)	Breaker (cat. IV)	**Uimp**	12
	“UR power” (cat. III)	**Uimp**	4
	Auxiliary circuits (cat. III)	**Uimp**	8
Rated operational voltage (V AC 50/60 Hz)		**Ue**	690
Suitability for isolation		IEC 60947-2	
Degree of pollution		IEC 60664-1	3

Sensor selection		
Rating (A)	**5000**	**6000**
Ir thresold setting (A)	2000 to 5000	2400 to 6000

Circuit breaker characteristics as per IEC 60947-2			UR50	UR60
Rated current (A)		at 45 °C	5000	6000
Type of circuit breaker			**L**	**L**
Ultimate breaking capacity (kA rms) V AC 50/60 Hz	**Icu**	220/415/440 V	150	150
		690 V	100	100
Rated service breaking capacity (kA rms)	**Ics**	% Icu	100 %	100 %
Utilisation category			A	A
Rated short-time withstand current 1 s (kA rms) [0% + 20%] AC 50/60 Hz		690 V	20	20
Integrated instantaneous protection		[kA peak ±10 %] [kA rms]	46 32	46 32
Rated making capacity (kA peak) V AC 50/60 Hz	**Icm**	220/415/440 V 690 V	330 220	330 220
Break time (ms) between fault detection and arc extinction (standard protection)			80	80
Break time (ms) between fault detection and arc extinction (Thomson thruster)			< 8	< 8
Closing time (ms)			< 80	< 80

Mechanical and electrical durability as per IEC 60947-2 at In				UR50	UR60
C/O cycles	Mechanical	Without maintenance		2500	2500
Rated current			**In (A)**	**5000**	**6000**
C/O cycles	Electrical	Without maintenance	440 V	500	500
			690 V	500	500
Maximum number of trips by Thomson effect (without current)				100	100

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Masterpact UR is equipped with two control units:
- one Micrologic control unit (Fig. 1) for protection against overloads, low short-circuits and insulation faults
- a specific control unit “UR control” module for protection against high short-circuits (Fig. 2).

This module is associated to the “UR power” module for the tripping by Thomson effect.

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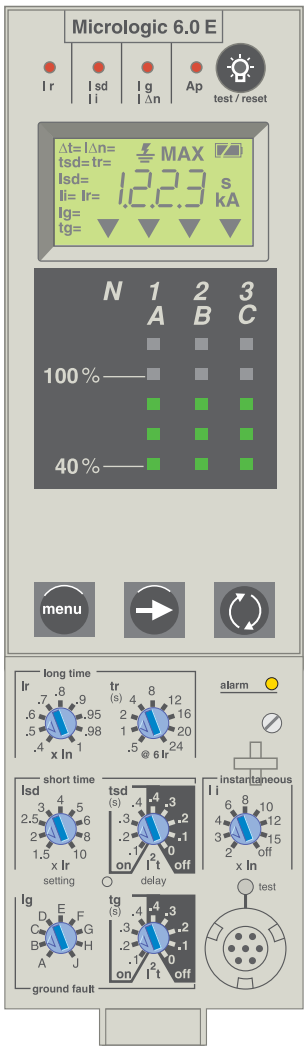

Fig. 1.

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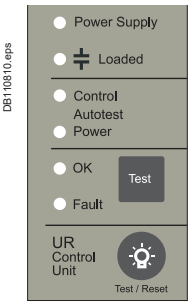

Fig. 2.

A

Micrologic control units
Overview of functions

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

A

Dependability

Integration of protection functions in an ASIC electronic component used in all Micrologic control units guarantees a high degree of reliability and immunity to conducted or radiated disturbances.
On Micrologic A, E, P and H control units, advanced functions are managed by an independent microprocessor.

Accessories

Certain functions require the addition of Micrologic control unit accessories, described on page A-21.
The rules governing the various possible combinations can be found in the documentation accessible via the Products and services menu of the www.schneider-electric.com web site.

Micrologic name codes

2.0 E
X Y Z

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

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

Z: type of measurement
- A for “ammeter”
- E for “energy”
- P for “power meter”
- H for “harmonic meter”.

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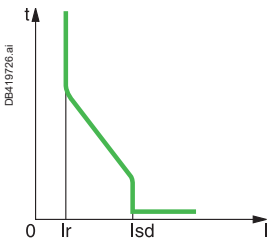
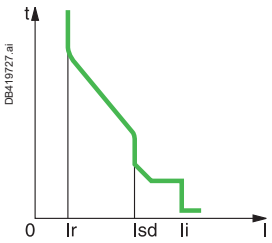
Current protection

Micrologic 2: basic protection



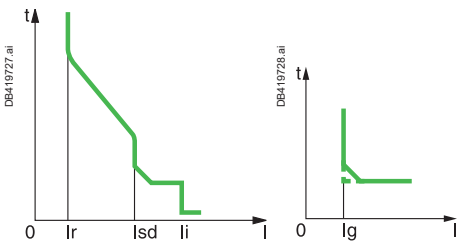
Protection:
long time
+ instantaneous

Micrologic 5: selective protection



Protection:
long time
+ short time
+ instantaneous

Micrologic 6: selective + earth-fault protection



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

A

Measurements and programmable protection

A: ammeter

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

E: Energy

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

P: A + power meter + programmable protection

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

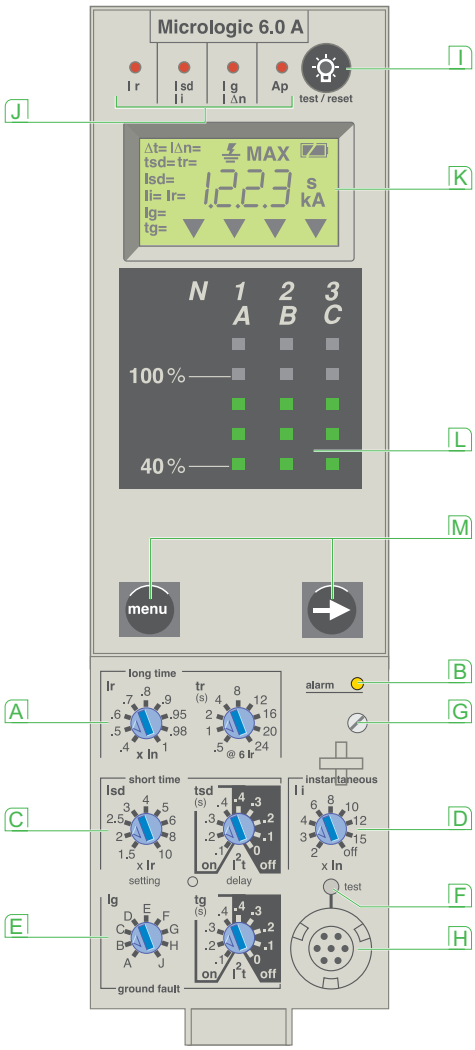
H: P + harmonics

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

2.0 A  DB127404.eps	**2.0 E**  DB127405.eps		
5.0 A  DB127406.eps	**5.0 E**  DB127407.eps	**5.0 P**  DB101122.eps	**5.0 H**  DB101122.eps
6.0 A  DB101123.eps	**6.0 E**  DB127408.eps	**6.0 P**  DB101124.eps	**6.0 H**  DB101124.eps

Micrologic control units
Micrologic A “ammeter”

Micrologic A control units protect power circuits.
They also offer measurements, display, communication and current maximeters. Version 6 provides earth-fault protection, Micrologic A complies to IACS recommendation and trust be used when Marine certification is requested.



A Long-time threshold and tripping delay
B Overload alarm (LED) at 1.125 Ir
C Short-time pick-up and tripping delay
D Instantaneous pick-up
E Earth-fault pick-up and tripping delay
F Earth-fault test button
G Long-time rating plug screw
H Test connector
I Lamp test, reset and battery test
J Indication of tripping cause
K Digital display
L Three-phase bargraph and ammeter
M Navigation buttons

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

“Ammeter” measurements

Micrologic A control units measure the true rms value of currents.
They provide continuous current measurements from 0.2 to 1.2 In and are accurate to within 1.5 % (including the sensors).
A digital LCD screen continuously displays the most heavily loaded phase (Imax) or displays the I_1, I_2, I_3, I_N, I_g, $I_{\Delta n}$, stored-current (maximeter) and setting values by successively pressing the navigation button.
The optional external power supply makes it possible to display currents < 20 % In. Below 0.1 In, measurements are not significant. Between 0.1 and 0.2 In, accuracy changes linearly from 4 % to 1.5 %.

Communication option

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

Protection settings

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

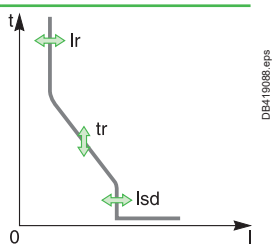
Overload protection
True rms long-time protection.
Thermal memory: thermal image before and after tripping.
Setting accuracy may be enhanced by limiting the setting range using a different long-time rating plug.
The long-time rating plug “OFF” enables to cancel the overload protection.

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

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

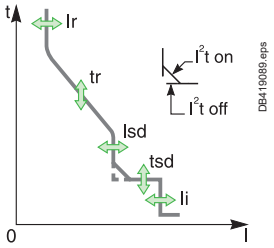
Protection — Micrologic 2.0 A

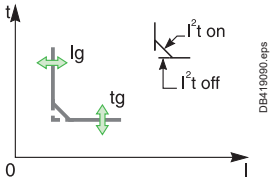
Long time											
Current setting (A)	**Ir** = In x …		0.4	0.5	0.6	0.7	0.8	0.9	0.95	0.98	1
Tripping between 1.05 and 1.20 x Ir			Other ranges or disable by changing long-time rating plug								
Time setting		**tr (s)**	0.5	1	2	4	8	12	16	20	24
Time delay (s)	Accuracy: 0 to -30 %	1.5 x Ir	12.5	25	50	100	200	300	400	500	600
	Accuracy: 0 to -20 %	6 x Ir	0.7[1]	1	2	4	8	12	16	20	24
	Accuracy: 0 to -20 %	7.2 x Ir	0.7[2]	0.69	1.38	2.7	5.5	8.3	11	13.8	16.6
Thermal memory			20 minutes before and after tripping								
[1] 0 to -40 % - [2] 0 to -60 %											
Instantaneous											
Pick-up (A)	**Isd** = Ir x …		1.5	2	2.5	3	4	5	6	8	10
Accuracy: ±10 %											
Time delay			Max resettable time: 20 ms Max break time: 80 ms								



Protection — Micrologic 5.0/6.0 A

Long time			**Micrologic 5.0 / 6.0 A**								
Current setting (A)	**Ir** = In x …		0.4	0.5	0.6	0.7	0.8	0.9	0.95	0.98	1
Tripping between 1.05 and 1.20 x Ir			Other ranges or disable by changing long-time rating plug								
Time setting		**tr (s)**	0.5	1	2	4	8	12	16	20	24
Time delay (s)	Accuracy: 0 to -30 %	1.5 x Ir	12.5	25	50	100	200	300	400	500	600
	Accuracy: 0 to -20 %	6 x Ir	0.7[1]	1	2	4	8	12	16	20	24
	Accuracy: 0 to -20 %	7.2 x Ir	0.7[2]	0.69	1.38	2.7	5.5	8.3	11	13.8	16.6
Thermal memory			20 minutes before and after tripping								
[1] 0 to -40 % - [2] 0 to -60 %											
Short time											
Pick-up (A)	**Isd** = Ir x …		1.5	2	2.5	3	4	5	6	8	10
Accuracy: ±10 %											
Time setting t_{sd} (s)	Settings	I^2t Off	0	0.1	0.2	0.3	0.4				
		I^2t On	-	0.1	0.2	0.3	0.4				
Time delay (ms) at 10 x Ir	**tsd** (max resettable time)		20	80	140	230	350				
(I^2t Off or I^2t On)	**tsd** (max break time)		80	140	200	320	500				
Instantaneous											
Pick-up (A)	**Ii** = In x …		2	3	4	6	8	10	12	15	off
Accuracy: ±10 %											
Time delay			Max resettable time: 20 ms Max break time: 50 ms								
Earth fault			**Micrologic 6.0 A**								
Pick-up (A)	**Ig** = In x …		A	B	C	D	E	F	G	H	J
Accuracy: ±10 %	In ⩽ 400 A		0.3	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1
	400 A < In < 1250 A		0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1
	In ⩾ 1250 A		500	640	720	800	880	960	1040	1120	1200
Time setting t_g (s)	Settings	I^2t Off	0	0.1	0.2	0.3	0.4				
		I^2t On	-	0.1	0.2	0.3	0.4				
Time delay (ms) at In or 1200 A (I^2t Off or I^2t On)	**tg** (max resettable time)		20	80	140	230	350				
	tg (max break time)		80	140	200	320	500				





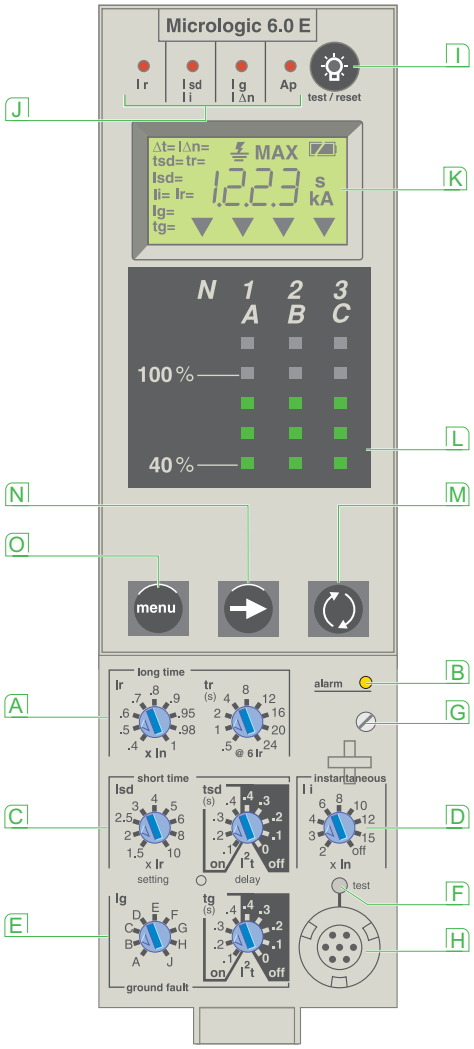
Ammeter — Micrologic 2.0/5.0/6.0 A

Type of measurements		**Range**	**Accuracy**
Instantaneous currents	I1, I2, I3, IN	0.2 x In to 1.2 x In	± 1.5 %
	Ig (6.0 A)	0.2 x In to In	± 10 %
Current maximeters of	I1, I2, I3, IN	0.2 x In to 1.2 x In	± 1.5 %

Note: all current-based protection functions require no auxiliary source.
The test / reset button resets maximeters, clears the tripping indication and tests the battery.

Micrologic control units
Micrologic E "energy"

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



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A long-time threshold and tripping delay
B overload alarm (LED) at 1,125 Ir
C short-time pick-up and tripping delay
D instantaneous pick-up
E earth-leakage or earth-fault pick-up and tripping delay
F earth-leakage or earth-fault test button
G long-time rating plug screw
H test connector
I lamp test, reset and battery test
J indication of tripping cause
K digital display
L three-phase bargraph and ammeter
M navigation button "quick View" (only with Micrologic E)
N navigation button to view menu contents
O navigation button to change menu

[1] Display on FDM121 only.

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

"Energy meter" measurements

In addition to the ammeter measurements of Micrologic A
Micrologic E control units measure and display:
- current demand
- voltages: phase to phase, phase to neutral, average [1] and unbalanced [1]
- instantaneous power: P, Q, S
- power factor: PF
- power demand: P demand
- energy: Ep, Eq [1], Es [1].

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

Communication option

In conjunction with the COM communication option, the control unit transmits the following:
- settings
- all "ammeter" and "energy" measurements
- enable connection to FDM121
- tripping causes
- maximeter / minimeter readings.

Protection

Protection thresholds and delays are set using the adjustment dials.

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

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

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

Overload alarm

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

M2C programmable contacts

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

Fault indications

LEDs indicate the type of fault:
- overload (long-time protection Ir)
- short-circuit (short-time Isd or instantaneous Ii protection)
- earth fault (Ig)
- internal fault (Ap).

Trip history
The trip history displays the list of the last 10 trips. For each trip, the following indications are recorded and displayed:
- the tripping cause: Ir, Isd, Ii, Ig or Auto-protection (Ap) trips
- the date and time of the trip (requires communication option).

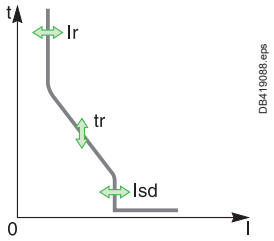
Battery power
The fault indication LEDs remain on until the test/reset button is pressed. Under normal operating conditions, the battery supplying the LEDs has a service life of approximately 10 years.

Test

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

Protection — Micrologic 2.0 E

Long time											
Current setting (A)			0.4	0.5	0.6	0.7	0.8	0.9	0.95	0.98	1
Tripping between 1.05 and 1.20 x Ir			Other ranges or disable by changing long-time rating plug								
Time setting		**tr (s)**	0.5	1	2	4	8	12	16	20	24
Time delay (s)	Accuracy: 0 to -30 %	1.5 x Ir	12.5	25	50	100	200	300	400	500	600
	Accuracy: 0 to -20 %	6 x Ir	0.7[1]	1	2	4	8	12	16	20	24
	Accuracy: 0 to -20 %	7.2 x Ir	0.7[2]	0.69	1.38	2.7	5.5	8.3	11	13.8	16.6
Thermal memory			20 minutes before and after tripping								
[1] 0 to -40 % - [2] 0 to -60 %											
Instantaneous											
Pick-up (A)	**Isd** = Ir x …		1.5	2	2.5	3	4	5	6	8	10
Accuracy: ±10 %											
Time delay			Max resettable time: 20 ms Max break time: 80 ms								



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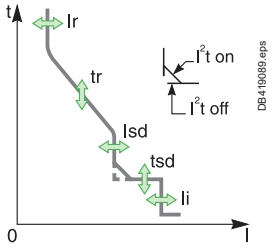
A

Protection — Micrologic 5.0/6.0 E

Long time			**Micrologic 5.0 / 6.0 E**								
Current setting (A)	**Ir** = In x …		0.4	0.5	0.6	0.7	0.8	0.9	0.95	0.98	1
Tripping between 1.05 and 1.20 x Ir			Other ranges or disable by changing long-time rating plug								
Time setting		**tr (s)**	0.5	1	2	4	8	12	16	20	24
Time delay (s)	Accuracy: 0 to -30 %	1.5 x Ir	12.5	25	50	100	200	300	400	500	600
	Accuracy: 0 to -20 %	6 x Ir	0.7[1]	1	2	4	8	12	16	20	24
	Accuracy: 0 to -20 %	7.2 x Ir	0.7[2]	0.69	1.38	2.7	5.5	8.3	11	13.8	16.6
Thermal memory			20 minutes before and after tripping								
[1] 0 to -40 % - [2] 0 to -60 %											
Short time											
Pick-up (A)	**Isd** = Ir x …		1.5	2	2.5	3	4	5	6	8	10
Accuracy: ±10 %											
Time setting t_{sd} (s)	Settings	I^2t Off	0	0.1	0.2	0.3	0.4				
		I^2t On	-	0.1	0.2	0.3	0.4				
Time delay (ms) at 10 x Ir	**tsd** (max resettable time)		20	80	140	230	350				
(I^2t Off or I^2t On)	**tsd** (max break time)		80	140	200	320	500				
Instantaneous											
Pick-up (A)	**Ii** = In x …		2	3	4	6	8	10	12	15	off
Accuracy: ±10 %											
Time delay			Max resettable time: 20 ms Max break time: 50 ms								
Earth fault			**Micrologic 6.0 E**								
Pick-up (A)	**Ig** = In x …		A	B	C	D	E	F	G	H	J
Accuracy: ±10 %	In ⩽ 400 A		0.3	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1
	400 A < In < 1250 A		0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1
	In ⩾ 1250 A		500	640	720	800	880	960	1040	1120	1200
Time setting t_g (s)	Settings	I^2t Off	0	0.1	0.2	0.3	0.4				
		I^2t On	-	0.1	0.2	0.3	0.4				
Time delay (ms)	**tg** (max resettable time)		20	80	140	230	350				
at In or 1200 A (I^2t Off or I^2t On)	**tg** (max break time)		80	140	200	320	500				



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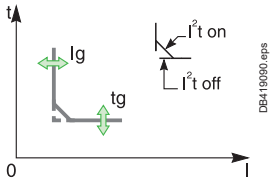

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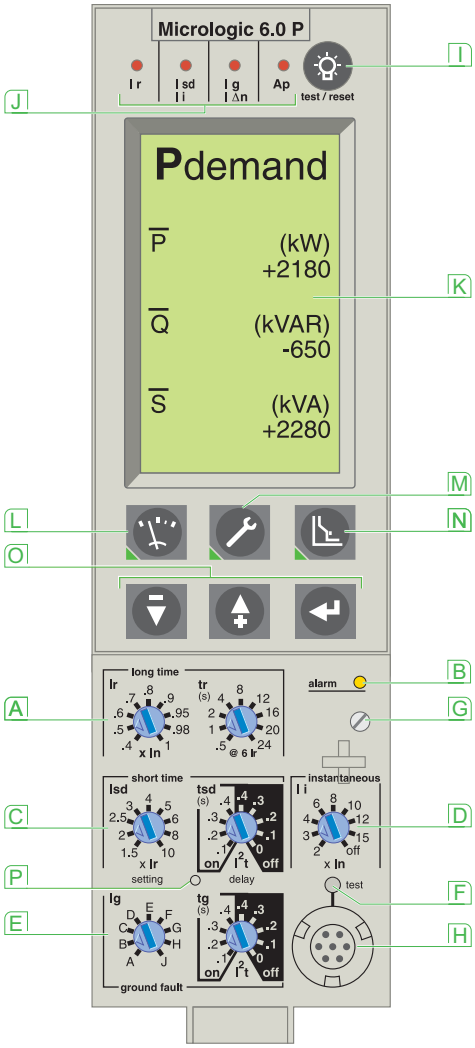
Energy — Micrologic 2.0/5.0/6.0 E

Type of measurements		**Range**	**Accuracy**
Instantaneous currents	I_1, I_2, I_3, I_N	0.2 x In to 1.2 x In	± 1.5 %
	I_g (6.0 E)	0.05 x In to In	± 10 %
Current maximeters of	I_1, I_2, I_3, I_N	0.2 x In to 1.2 x In	± 1.5 %
Demand currents of I_1, I_2, I_3, I_g		0.2 x In to 1.2 x In	± 1.5 %
Voltages	V12, V23, V31, V1N, V2N, V3N	100 to 690 V	± 0.5 %
Active power	P	30 to 2000 kW	± 2 %
Power factor	PF	0 to 1	± 2 %
Demand power	P demand	30 to 2000 kW	± 2 %
Active energy	Ep	-10^{10} GWh to 10^{10} GWh	± 2 %

Note: all current-based protection functions require no auxiliary source.
The test / reset button resets maximeters, clears the tripping indication and tests the battery.

Micrologic control units
Micrologic P “power”

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



A Long-time current setting and tripping delay.
B Overload signal (LED).
C Short-time pick-up and tripping delay.
D Instantaneous pick-up.
E Earth-fault pick-up and tripping delay.
F Earth-fault test button.
G Long-time rating plug screw.
H Test connector.
I Lamp + battery test and indications reset.
J Indication of tripping cause.
K High-resolution screen.
L Measurement display.
M Maintenance indicators.
N Protection settings.
O Navigation buttons.
P Hole for settings lockout pin on cover.

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

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

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

IDMTL (Inverse Definite Minimum Time lag) setting
Coordination with fuse-type or medium-voltage protection systems is optimised by adjusting the slope of the overload-protection curve. This setting also ensures better operation of this protection function with certain loads.

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

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

Measurements
The Micrologic P control unit calculates in real time all the electrical values (V, A, W, VAR, VA, Wh, VARh, VAh, Hz), power factors and crest factors.
The Micrologic P control unit also calculates demand current and demand power over an adjustable time period. Each measurement is associated with a minimeter and a maximeter.
In the event of tripping on a fault, the interrupted current is stored. The optional external power supply makes it possible to display the value with the circuit breaker open or not supplied.

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

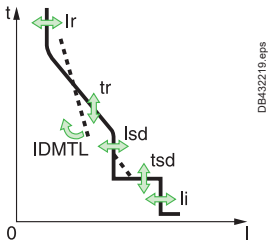
M2C programmable contacts
The M2C (two contacts) auxiliary contacts may be used to signal threshold overruns or status changes. They can be programmed using the keypad on the Micrologic P control unit or remotely using the COM option (BCM ULP).

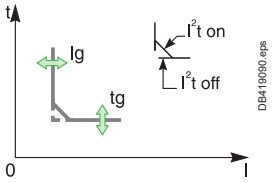
Communication option (COM)
The communication option may be used to:
- remotely read and set parameters for the protection functions
- transmit all the calculated indicators and measurements
- signal the causes of tripping and alarms
- consult the history files and the maintenance-indicator register.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

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

Protection — Micrologic 5.0/6.0 P

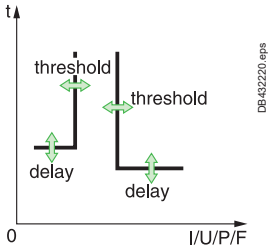
Long time (rms)			**Micrologic 5.0 / 6.0 P**								
Current setting (A)	**Ir** = In x …		0.4	0.5	0.6	0.7	0.8	0.9	0.95	0.98	1
Tripping between 1.05 and 1.20 x Ir			Other ranges or disable by changing long-time rating plug								
Time setting		**tr (s)**	0.5	1	2	4	8	12	16	20	24
Time delay (s)	Accuracy: 0 to -30 %	1.5 x Ir	12.5	25	50	100	200	300	400	500	600
	Accuracy: 0 to -20 %	6 x Ir	0.7[1]	1	2	4	8	12	16	20	24
	Accuracy: 0 to -20 %	7.2 x Ir	0.7[2]	0.69	1.38	2.7	5.5	8.3	11	13.8	16.6
IDMTL setting	Curve slope		SIT	VIT	EIT	HVFuse	DT				
Thermal memory			20 minutes before and after tripping								
Short time (rms)											
Pick-up (A) Accuracy: ±10 %	**Isd** = Ir x …		1.5	2	2.5	3	4	5	6	8	10
Time setting t_{sd} (s)	Settings	I^2t Off	0	0.1	0.2	0.3	0.4				
		I^2t On	-	0.1	0.2	0.3	0.4				
Time delay (ms) at 10 Ir	**tsd** (max resettable time)		20	80	140	230	350				
(I^2t Off or I^2t On)	**tsd** (max break time)		80	140	200	320	500				
Instantaneous											
Pick-up (A) Accuracy: ±10 %	**Ii** = In x …		2	3	4	6	8	10	12	15	off
Time delay			Max resettable time: 20 ms Max break time: 50 ms								
Earth fault			**Micrologic 6.0 P**								
Pick-up (A)	**Ig** = In x …		A	B	C	D	E	F	G	H	J
Accuracy: ±10 %	In ⩽ 400 A		0.3	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1
	400 A < In < 1250 A		0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1
	In ⩾ 1250 A		500	640	720	800	880	960	1040	1120	1200
Time setting t_g (s)	Settings	I^2t Off	0	0.1	0.2	0.3	0.4				
		I^2t On	-	0.1	0.2	0.3	0.4				
Time delay (ms) at In or 1200 A (I^2t Off or I^2t On)	**tg** (max resettable time)		20	80	140	230	350				
	tg (max break time)		80	140	200	320	500				





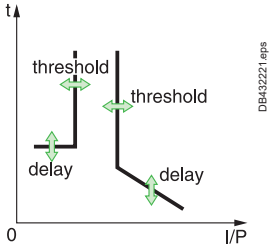
Alarm and other protections — Micrologic 5.0/6.0 P

Current		**Threshold**	**Delay**
Current unbalance	**Iunbalance**	0.05 to 0.6 Iaverage	1 to 40 s
Max. demand current	**Imax demand** : I1, I2, I3, IN,	0.2 In to In	15 to 1500 s
Earth fault alarm			
	I⏚	10 to 100 % In[3]	1 to 10 s
Voltage			
Voltage unbalance	**Uunbalance**	2 to 30 % x Uaverage	1 to 40 s
Minimum voltage	**Umin**	100 to Umax between phases	1.2 to 10 s
Maximum voltage [4]	**Umax**	Umin to 1200 between phases	1.2 to 10 s
Power			
Reverse power	**rP**	5 to 500 kW	0.2 to 20 s
Frequency			
Minimum frequency	**Fmin**	45 to Fmax	1.2 to 5 s
Maximum frequency	**Fmax**	Fmin to 440 Hz	1.2 to 5 s
Phase sequence			
Sequence (alarm)	**ΔØ**	Ø1/2/3 or Ø1/3/2	0.3 s



Load shedding and reconnection — Micrologic 5.0/6.0 P

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

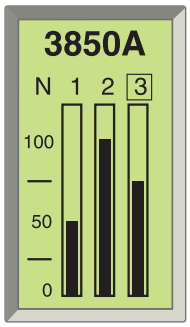


[3] In ⩽ 400 A 30 %
400 A < In < 1250 A 20 %
In ⩾ 1250 A 10 %
[4] For 690 V applications, a step-down transformer must be used if the voltage exceeds the nominal value of 690 V by more than 10 %.

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

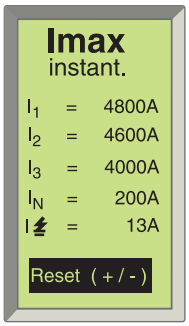
Micrologic control units
Micrologic P "power"

DB101133.eps



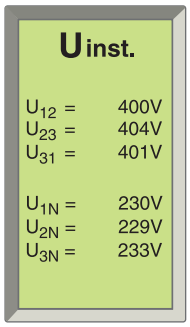
Default display.

DB101134.eps



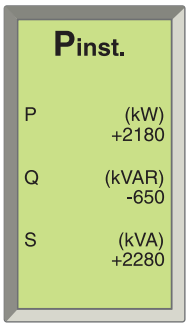
Display of a maximum current

DB101135.eps



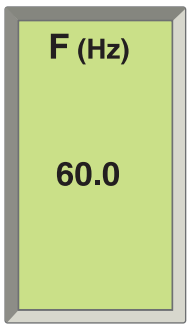
Display of a voltage.

DB117042.eps



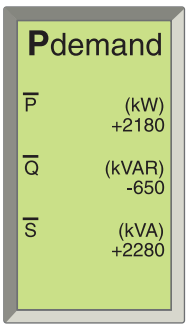
Display of a power.

DB101137.eps



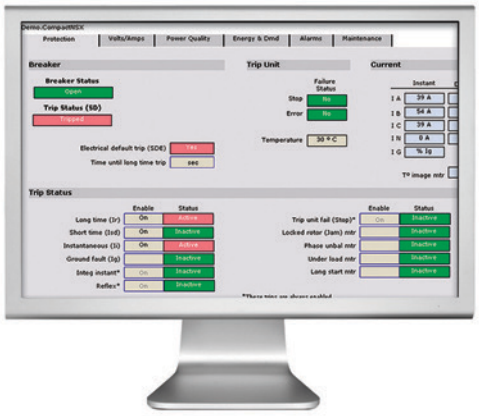
Display of a frequency.

DB101138.eps



Display of a demand power.

PB104850.eps



Ion software.

Measurements

The Micrologic P control unit calculates in real time all the electrical values (V, A, W, VAR, VA, Wh, VARh, VAh, Hz), power factors and cosφ factors.
The Micrologic P control unit also calculates demand current and demand power over an adjustable time period. Each measurement is associated with a minimeter and a maximeter.
In the event of tripping on a fault, the interrupted current is stored. The optional external power supply makes it possible to display the value with the circuit breaker open or not supplied.

Instantaneous values
The value displayed on the screen is refreshed every second.
Minimum and maximum values of measurements are stored in memory (minimeters and maximeters).

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

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

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

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

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

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

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

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

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

Histories and maintenance indicators .....

The last ten trips and alarms are recorded in two separate history files that may be displayed on the screen:
- tripping history:
  - type of fault
  - date and time
  - values measured at the time of tripping (interrupted current, etc.)
- alarm history:
  - type of alarm
  - date and time
  - values measured at the time of the alarm.

All the other events are recorded in a third history file which is only accessible through the communication network.
- Event log history (only accessible through the communication network)
  - modifications to settings and parameters
  - counter resets
  - system faults:
  - fallback position
  - thermal self-protection
  - loss of time
  - overrun of wear indicators
  - test-kit connections
  - etc.

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

Maintenance indicators with COM option (BCM ULP)

A number of maintenance indicators may be called up on the screen to better plan for device maintenance:
- contact wear
- operation counter:
  - cumulative total
  - total since last reset.

Additional maintenance indicators are also available through the COM network, and can be used as an aid in troubleshooting:
- highest current measured
- number of test-kit connections
- number of trips in operating mode and in test mode.

Additional technical characteristics

Safety

Measurement functions are independent of the protection functions.
The high-accuracy measurement module operates independently of the protection module.

Simplicity and multi-language

Navigation from one display to another is intuitive. The six buttons on the keypad provide access to the menus and easy selection of values. When the setting cover is closed, the keypad may no longer be used to access the protection settings, but still provides access to the displays for measurements, histories, indicators, etc. Micrologic is also multi-language, including the following languages: English, Spanish, Portuguese, Russian, Chinese, French, German...

Intelligent measurement

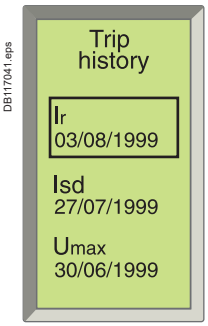
Measurement-calculation mode:
- energies are calculated on the basis of the instantaneous power values, in two manners:
  - the traditional mode where only positive (consumed) energies are considered
  - the signed mode where the positive (consumed) and negative (supplied) energies are considered separately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

Always powered

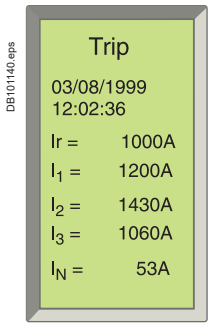
All current-based protection functions require no auxiliary source. Voltage-based protection functions are connected to AC power via a voltage measurement input built into the circuit breaker.

Stored information

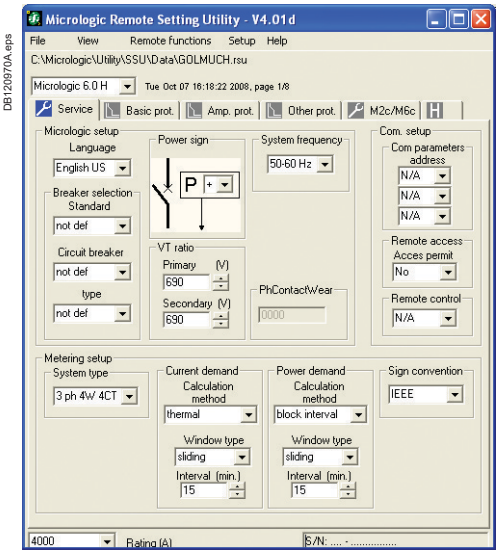
The fine setting adjustments, the last 100 events and the maintenance register remain in the control-unit memory even when power is lost.



Display of a tripping history.



Display after tripping.



RSU configuration screen for a Micrologic.

Micrologic control units
Micrologic H “harmonics”

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

In addition to the Micrologic P functions, the Micrologic H control unit offers:
- in-depth analysis of power quality including calculation of harmonics and the fundamentals
- diagnostics aid and event analysis through waveform capture
- enhanced alarm programming to analyse and track down a disturbance on the AC power system.

Measurements

The Micrologic H control unit offers all the measurements carried out by Micrologic P, with in addition:
- phase by phase measurements of:
  - power, energy
  - power factors
- calculation of:
  - current and voltage total harmonic distortion (THD)
  - current, voltage and power fundamentals
  - current and voltage harmonics up to the 31st order.

Instantaneous values displayed on the screen

Currents					
I rms	A	1	2	3	N
	A	E-fault		E-leakage	
I max rms	A	1	2	3	N
	A	E-fault		E-leakage	
Voltages					
U rms	V	12	23	31	
V rms	V	1N	2N	3N	
U average rms	V	(U12 + U23 + U31) / 3			
U unbalance	%				
Power, energy					
P active, Q reactive, S apparent	W, Var, VA	Totals	1	2	3
E active, E reactive, E apparent	Wh, VARh, VAh	Totals consumed - supplied			
		Totals consumed			
		Totals supplied			
Power factor	PF	Total	1	2	3
Frequencies					
F	Hz				
Power-quality indicators					
Total fundamentals		U I P Q S			
THD	%	U I			
U and Iharmonics	Amplitude	3 5 7 9 11 13			

Harmonics 3, 5, 7, 9, 11 and 13, monitored by electrical utilities, are displayed on the screen.

Demand measurements

Similar to the Micrologic P control unit, the demand values are calculated over a fixed or sliding time window that may be set from 5 to 60 minutes.

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

Maximeters

Only the current maximeters may be displayed on the screen.

Histories and maintenance indicators

These functions are identical to those of the Micrologic P.

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

A

With the communication option

Additional measurements, maximeters and minimeters
Certain measured or calculated values are only accessible with the COM communication option:
- I peak / $\sqrt{2}$ ($I_1 + I_2 + I_3$)/3, $I_{unbalance}$
- load level in % Ir
- power factor (total and per phase)
- voltage and current THD
- K factors of currents and average K factor
- crest factors of currents and voltages
- all the fundamentals per phase
- fundamental current and voltage phase displacement
- distortion power and distortion factor phase by phase
- amplitude and displacement of current and voltage harmonics 3 to 31.

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

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

Pre-defined analogue alarms (1 to 53)
Each alarm can be compared to user-set high and low thresholds. Overrun of a threshold generates an alarm. An alarm or combinations of alarms can be linked to programmable action such as selective recording of measurements in a log, waveform capture, etc.

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

Additional technical characteristics

Safety
Measurement functions are independent of the protection functions.
The high-accuracy measurement module operates independently of the protection module.

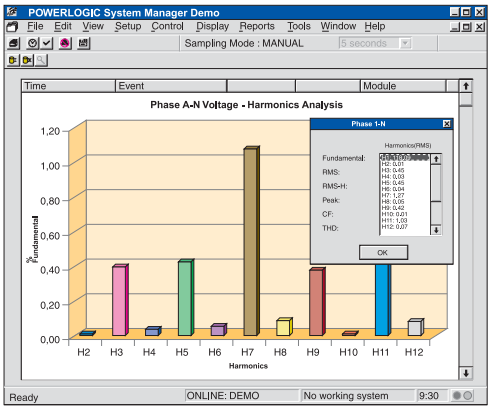
Simplicity and multi-language
Navigation from one display to another is intuitive. The six buttons on the keypad provide access to the menus and easy selection of values. When the setting cover is closed, the keypad may no longer be used to access the protection settings, but still provides access to the displays for measurements, histories, indicators, etc. Micrologic is also multi-language, including the following languages: English, Spanish, Portuguese, Russian, Chinese, French, German;;;

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

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

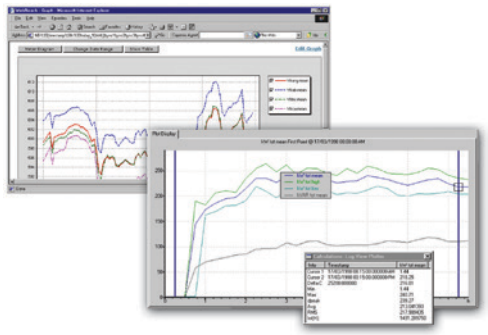
Stored information
The fine setting adjustments, the last 100 events and the maintenance register remain in the control-unit memory even when power is lost.

DB101521.eps

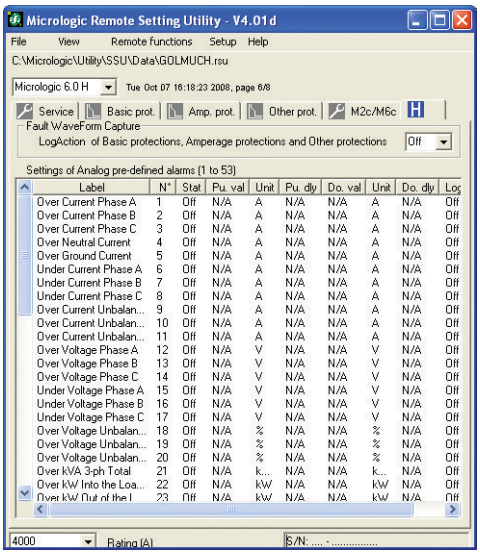


Display of harmonics up to 21th order.

DB120971A.eps



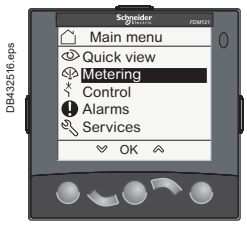
DB120969A.eps



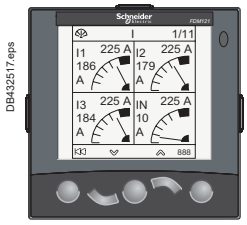
Log.

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

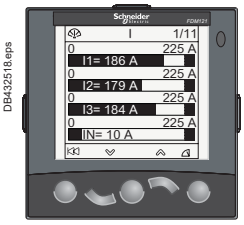
In addition to protection functions, Micrologic A/E/P/H control units offer all the functions of Power Meter products as well as operating-assistance for the circuit breaker.



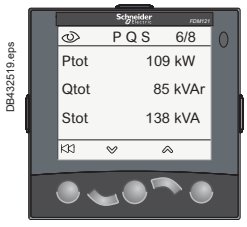
FDM121 display: navigation.



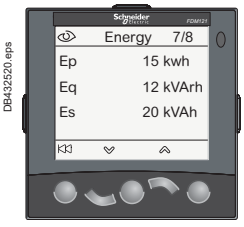
Current.



Voltage.



Power.



Consumption.

Examples of measurement screens on the FDM121 display unit.

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

Display

FDM121 display unit
The FDM121 switchboard display unit can be connected to a Micrologic COM option (BCM ULP) using a breaker ULP cord to display all measurements on a screen. The result is a veritable 96 x 96 mm Power Meter.
In addition to the information displayed on the Micrologic LCD, the FDM121 screen shows demand, power quality and maximeter/minimeter values along with histories and maintenance indicators.
The FMD121 display unit requires a 24 V DC power supply. The COM option (BCM ULP) unit is supplied by the same power supply via the breaker ULP cord connecting it to the FDM121.

Measurements

Instantaneous rms measurements
The Micrologic continuously display the RMS value of the highest current of the three phases and neutral (Imax). The navigation buttons can be used to scroll through the main measurements.
In the event of a fault trip, the trip cause is displayed.
The Micrologic A measures phase, neutral, ground fault currents.
The Micrologic E offers voltage, power, Power Factor, measurements in addition to the measurements provided by Micrologic A.
The Micrologic P/H offer frequency, cos.φ in addition to the measurements provided by Micrologic E.

Maximeters / minimeters
Every instantaneous measurement provided by Micrologic A or E can be associated with a maximeter/minimeter. The maximeters for the highest current of the 3 phases and neutral, the demand current and power can be reset via the FDM121 display unit or the communication system.

Energy metering
The Micrologic E/P/H also measures the energy consumed since the last reset of the meter. The active energy meter can be reset via Micrologic keypad or the FDM121 display unit or the communication system.

Demand and maximum demand values
Micrologic E/P/H also calculates demand current and power values.
These calculations can be made using a block or sliding interval that can be set from 5 to 60 minutes in steps of 1 minute. The window can be synchronised with a signal sent via the communication system. Whatever the calculation method, the calculated values can be recovered on a PC via Modbus communication.
Ordinary spreadsheet software can be used to provide trend curves and forecasts based on this data. They will provide a basis for load shedding and reconnection operations used to adjust consumption to the subscribed power.

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

Power Meter functions

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

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

[1] Available via the communication system only.
[2] Available for Micrologic P/H only.

Additional technical characteristics

Measurement accuracy
Accuracies are those of the entire measurement system, including the sensors:
- current: class 1 as per IEC 61557-12
- voltage: 0.5 %
- power and energy: Class 2 as per IEC 61557-12
- frequency: 0.1 %.

Operating-assistance functions
Micrologic A/E/P/H control unit with COM option (BCM ULP)

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

Maintenance indicators
Micrologic control unit have indicators for, among others, the number of operating cycles, contact wear P/H, load profile and operating times (operating hours counter) of the Masterpact circuit breaker.
It is possible to assign an alarm to the operating cycle counter to plan maintenance. The various indicators can be used together with the trip histories to analyse the level of stresses the device has been subjected to.

Management of installed devices
Each circuit breaker equipped with a COM option (BCM ULP) can be identified via the communication system:
- serial number
- firmware version
- hardware version
- device name assigned by the user.

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

Micrologic A/E/P/H operating assistance functions			Type		Display	
			A/E	**P/H**	**Micrologic LCD**	**FDM121 display**
Operating assistance						
Trip history						
Trips	Cause of tripping	Ir, Isd, Ii, Ig, IΔn	- **/E**	**P/H**	◉	◉
Maintenance indicators						
Counter	Mechanical cycles	Assignable to an alarm	**A/E**	**P/H**	-	◉
	Electrical cycles	Assignable to an alarm	**A/E**	**P/H**	-	◉
	Hours	Total operating time (hours) [1]	**A/E**	**P/H**	-	-
Indicator	Contact wear	%	- / -	**P/H**	-	◉
Load profile	Hours at different load levels	**%** of hours in four current ranges: 0-49 % In, 50-79 % In, 80-89 % In and ≥ 90 % In	A **/E**	**P/H**	-	◉

[1] Also available via the communication system.

Additional technical characteristics

Contact wear
Each time Masterpact opens, the Micrologic P/H trip unit measures the interrupted current and increments the contact-wear indicator as a function of the interrupted current, according to test results stored in memory. Breaking under normal load conditions results in a very slight increment. The indicator value may be read on the FDM121 display. It provides an estimation of contact wear calculated on the basis of the cumulative forces affecting the circuit breaker. When the indicator reaches 100 %, it is advised to inspect the circuit breaker to ensure the availability of the protected equipment.

Circuit breaker load profile
Micrologic A/E/P/H calculates the load profile of the circuit breaker protecting a load circuit. The profile indicates the percentage of the total operating time at four current levels (% of breaker In):
- 0 to 49 % In
- 50 to 79 % In
- 80 to 89 % In
- u 90 % In.

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

Switchboard-display functions
Micrologic A/E/P/H control unit with COM option (BCM ULP)

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

FDM121 switchboard display

The FDM121 switchboard display unit can be connected to a Micrologic COM option (BCM ULP). It uses the sensors and processing capacity of the Micrologic control unit. It is easy to use and requires no special software or settings. It is immediately operational when connected to the COM option (BCM ULP) by a breaker ULP cord.
The FDM121 is a large display, but requires very little depth. The anti-glare graphic screen is backlit for very easy reading even under poor ambient lighting and at sharp angles.

Display of Micrologic measurements and trips

The FDM121 is intended to display Micrologic A/E/P/H measurements, trips and operating information. It cannot be used to modify the protection settings.
Measurements may be easily accessed via a menu.
Trips are automatically displayed.
- A pop-up window displays the time-stamped description of the trip and the orange LED flashes

Status indications

When the circuit breaker is equipped with the COM option (BCM ULP) (including its set of sensors) the FDM121 display can also be used to view circuit breaker status conditions:
- O/F: ON/OFF
- SDE: Fault-trip indication (overload, short-circuit, ground fault).
- PF: ready to close
- CH: charged (spring loaded).

Remote control

When the circuit breaker is equipped with the COM option (BCM ULP) (including its kit for connection to XF and MX1 communication voltage releases), the FDM121 display can also be used to control (open/close) the circuit breaker. Two operating mode are available.
- local mode : open/close commands are enabled from FDM121 while disable from communication network
- remote mode : open/close commands are disabled from FDM121 while, enabled from communication network.

Main characteristics

- 96 x 96 x 30 mm screen requiring 10 mm behind the door (or 20 mm when the 24 volt power supply connector is used).
- White backlighting.
- Wide viewing angle: vertical ±60°, horizontal ±30°.
- High resolution: excellent reading of graphic symbols.
- Alarm LED: flashing orange for alarm pick-up, steady orange after operator reset if alarm condition persists.
- Operating temperature range -10 °C to +55 °C.
- CE / UL / CSA marking (pending).
- 24 V DC power supply, with tolerances 24 V -20 % (19.2 V) to 24 V +10 % (26.4 V).

When the FDM121 is connected to the communication network, the 24 V DC can be supplied by the communication system wiring system (see paragraph "Connection").
- Consumption 40 mA.

Mounting

The FDM121 is easily installed in a switchboard.
- Standard door cut-out 92 x 92 mm.
- Attached using clips.

To avoid a cut-out in the door, an accessory is available for surface mounting by drilling only two 22 mm diameter holes.
The FDM121 degree of protection is IP54 in front. IP54 is maintained after switchboard mounting by using the supplied gasket during installation.

Connection

The FDM121 is equipped with:
- a 24 V DC terminal block:
  - plug-in type with 2 wire inputs per point for easy daisy-chaining
  - power supply range of 24 V DC -20 % (19.2 V) to 24 V DC +10 % (26.4 V).

A 24 V DC type auxiliary power supply must be connected to a single point on the ULP system. The FDM121 display unit has a 2-point screw connector on the rear panel of the module for this purpose. The ULP module to which the auxiliary power supply is connected distributes the supply via the ULP cable to all the ULP modules connected to the system and therefore also to Micrologic.
- two RJ45 jacks.

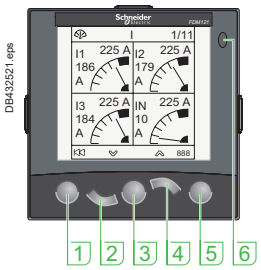
The Micrologic connects to the internal communication terminal block on the Masterpact via the breaker ULP cord. Connection to one of the RJ45 connectors on the FDM121 automatically establishes communication between the Micrologic and the FDM121 and supplies power to the Micrologic measurement functions.
When the second connector is not used, it must be fitted with a line terminator.

FDM121 display.

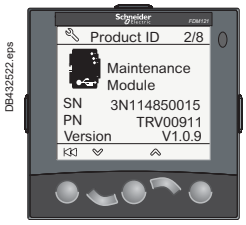
Surface mount accessory.

Connection with FDM121 display unit.

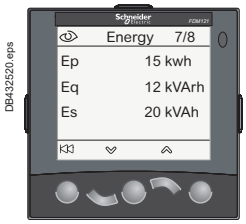
Switchboard-display functions
Micrologic A/E/P/H control unit with COM option (BCM ULP)



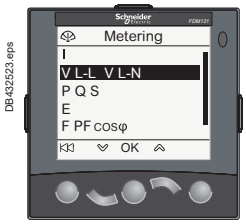
A escape
B down
C ok
D up
E context
F alarm LED



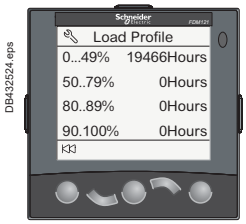
Product identification.



Metering: meter.



Metering: sub-menu.



Services.

The Micrologic connects to the internal communication terminal block on the Masterpact via the breaker ULP cord. Connection to one of the RJ45 connectors on the FDM121 automatically establishes communication between the Micrologic and the FDM121 and supplies power to the Micrologic measurement functions.
When the second connector is not used, it must be fitted with a line terminator.

Navigation

Five buttons are used for intuitive and fast navigation.
The “Context” button may be used to select the type of display (digital, bargraph, analogue).
The user can select the display language (Chinese, English, French, German, Italian, Portuguese, Spanish, etc.).

Screens

Main menu

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

Quick view Alarms Metering Services Control

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

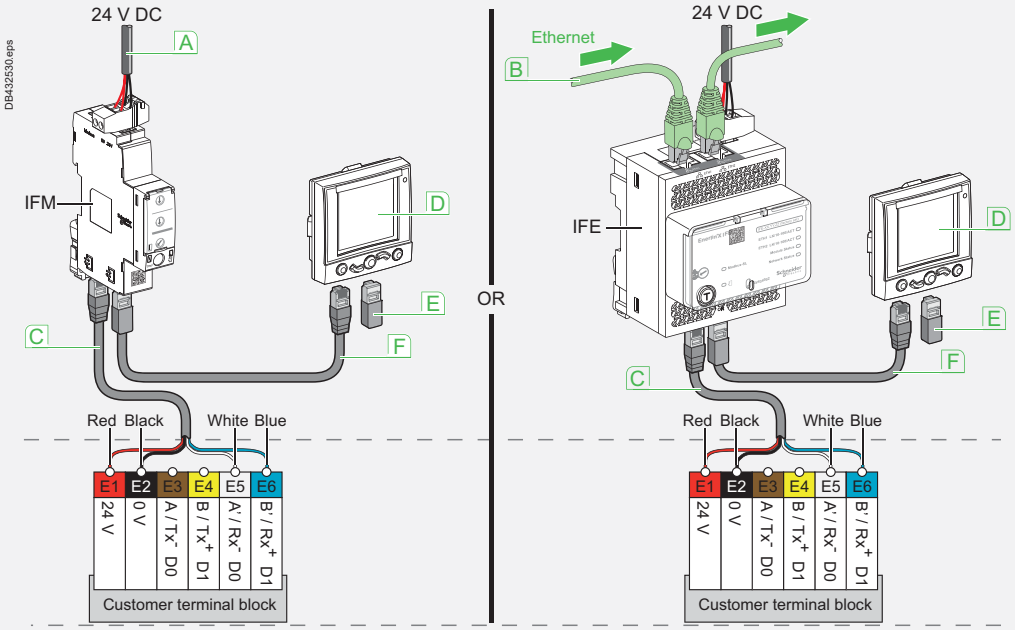
Fast access to essential information

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

Access to detailed information

- "Metering" can be used to display the measurement data (I, U-V, f, P, Q, S, E, THD, PF) with the corresponding min/max values.
- Alarms displays active alarms and the alarm history.
- Services provides access to the operation counters, energy and maximeter reset
- function, maintenance indicators, identification of modules connected to the internal bus and FDM121 internal settings (language, contrast, etc.).

Communication components and FDM121 connections



A Modbus network
B Ethernet network
C Breaker ULP cord
D FDM121 display
E ULP termination
F ULP cable

Connections

- Compact NS is connected to the ULP devices (FDM121 display, IFM, IFE or I/O application module) unit via the breaker ULP cord.
  - cord available in three lengths: 0.35 m, 1.3 m and 3 m.
  - lengths up to 10 m possible using extensions.

Long-time rating plug

Four interchangeable plugs may be used to limit the long-time threshold setting range for higher accuracy.
The time delay settings indicated on the plugs are for an overload of 6 Ir (for further details, see the characteristics on pages (see page A-7) and (see page A-11).
As standard, control units are equipped with the 0.4 with to 1 plug.

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

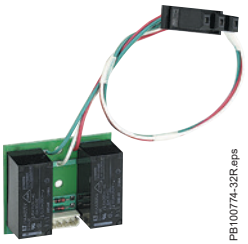
Important: long-time rating plugs must always be removed before carrying out insulation or dielectric withstand tests.

M2C programmable contacts

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

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

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



M2C.

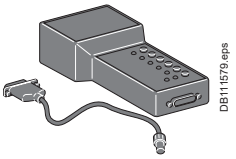
Lead-seal cover.

Spare parts

Lead-seal covers
A lead-seal cover controls access to the adjustment dials.
When the cover is closed:
- it is impossible to modify settings using the keypad unless the settings lockout pin on the cover is removed
- the test connector remains accessible
- the test button for the earth-fault and earth-leakage protection function remains accessible.

Characteristics
- transparent cover for basic Micrologic and Micrologic A, E control units
- non-transparent cover for Micrologic P and H control units.

Spare battery
A battery supplies power to the LEDs identifying the tripping causes. Battery service life is approximately ten years.
A test button on the front of the control unit is used to check the battery condition.
The battery may be replaced on site when discharged.



Test equipments

Hand-held test kit (HHTK)
The hand-held mini test kit may be used to:
- check operation of the control unit and the tripping and pole-opening system by sending a signal simulating a short-circuit
- supply power to the control units for settings via the keypad when the circuit-breaker is open (Micrologic P and H control units).

Power source: standard LR6-AA battery.

Full function test kit (FFTK)
The test kit can be used alone or with a supporting personal computer.
The test kit without PC may be used to check:
- the mechanical operation of the circuit breaker
- the electrical continuity of the connection between the circuit breaker and the control unit
- operation of the control unit:
  - display of settings
  - automatic and manual tests on protection functions
  - inhibition of the earth-fault protection
  - inhibition of the thermal memory.

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

Portable test kit.

LV454444.eps

External 24 V DC power supply module (AD)

External 24 V DC power-supply module (AD)

The external power-supply module makes it possible:
- to use the display even if the circuit breaker is open or not supplied (for the exact conditions of use, see the “electrical diagrams” part of this catalogue)
- to display fault currents after tripping
- to modify settings when the circuit breaker is open (OFF position).

An external 24 V DC power supply is required for installation with communication, whatever the type of trip unit.
This module is not designed to power on 24 V DC voltage releases and electric motor mechanism.
This module powers both the control unit and the M2C programmable contacts.
We recommend using the AD power supply due to its low stray primary secondary capacitance. Good operation of the Micrologic trip unit in noisy environment is not guaranteed with other power supplies.
If the COM option is used, a second dedicated power supply shall be used.

Characteristics
- Power supply AC-to-DC or DC-to-DC
- Output voltage: 24 V DC ±5%.
- Output current: 1 A.
- DIN rail or platine Fixing with Acti9 form factor
- Conducted emissions power line: class B per EN 61000-6-3.

24 V DC Universal Phaseo™ ABL8 power supplies

The Universal Phaseo ABL8 RPS 24050 and ABL8 RPS 24030 power supplies can be connected phase-to-neutral or phase-to-phase.
They deliver a voltage that is precise to 3 %, whatever the load and whatever the value of the AC supply, within the ranges 85 to 132 V AC and 170 to 550 V AC.
The Universal Phaseo ABL8 powers:
- circuit breaker communication module and interface.

Characteristics
- Power supply AC-to-DC.
- Network frequency: 50/60 Hz (±5 %).
- Output voltage: 24 V DC ±3%.
- Output current: 3 or 5 A.
- DIN rail or platine Fixing.
- Conducted emissions power line: class B per EN 61000-6-3.

To assist cooling there must be sufficient clearance around the Universal range Phaseo power supplies:
- 50 mm above and below
- 10 mm on the side.

		ABL8RPS●●●●	Module AD
Over Voltage Category		Cat I per VDE 0106-1	Cat IV per IEC 62477-1 (AC model) Cat III per IEC 62477-1 (DC model) Cat III per UL 61010-1
Degree of pollution as per IEC 60664-1		2	3
Input supply voltage AC		100…120 V AC and 200…500 V AC	110/130 or 200/240 V AC
Input supply voltage DC		N/A	24/30 or 48/60 or 100/125 V DC
Dielectric	Input/Output	4 kV rms -1 mn.	3 kV rms - 1 mn. (110/130 V AC and 200/240 V AC model)
			3 kV rms - 1 mn. (110/125 V DC model)
			2 kV rms - 1 mn. (24/30 V DC and 48/60 V DC model)
	Input/Ground	3.5 kV rms -1 mn.	3 kV rms - 1 mn.
	Ouput /Ground	0,5 kV rms - 1 mn.	1.5 kV rms - 1 mn.
Temperature		■ 50 °C ■ 60 °C with 80 % of the rated current maximum	70°C
Output current		3 A (ABL8RPS24030) 5 A (ABL8RPS24050)	1 A
Inrush current for 2 ms		< 30 A	< 20 A
Ripple		200 mV peak-peak	200 mV peak-peak
Output voltage limits		24 to 28.8 V DC	22.8 to 25.2 V DC
Protection degree		IP20	IP4x front face / IP2x terminals / IP3x other

Note: For the applications requiring an over voltage category higher than 2, a surge arrester shall be associated to ABL8 RPS power supplies. The iQuick20prd type 2 surge arrester is recommended.

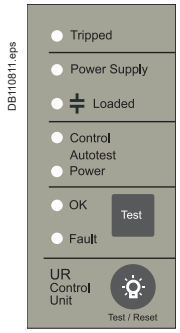
ABL8 RPS power supply

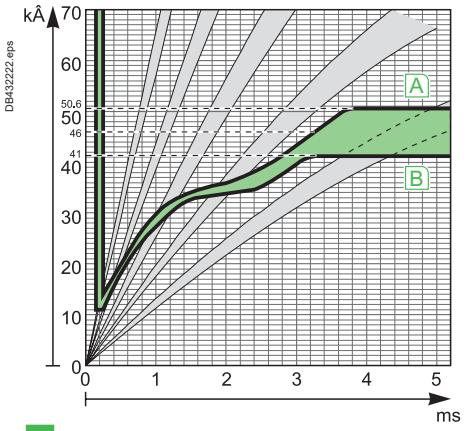
PF106349SE_ABL8RPS24050.eps

A

Protection by Thomson effect
"UR control" module

The "UR control" module directly connected to the air CT device allows an early detection of high short-circuit.





A Threshold max. integrated instantaneous protection.

B Threshold min. integrated instantaneous protection.

Fig. 1

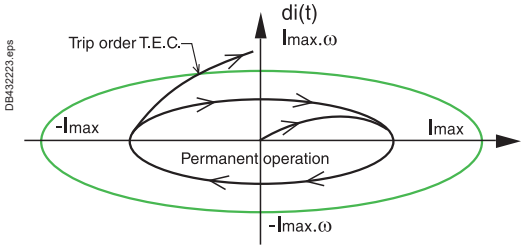


Fig. 2

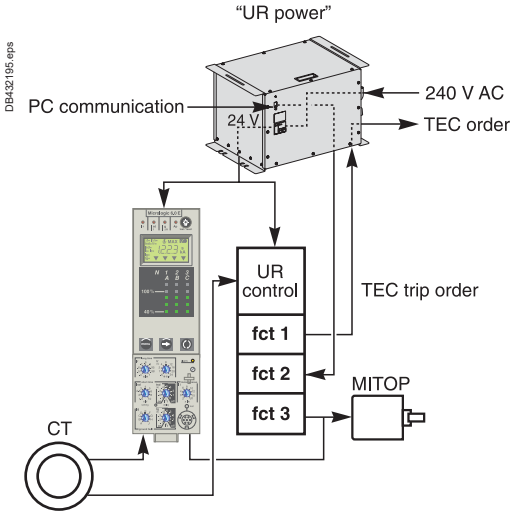


Fig. 3

Detection Principle

This detection is based on the current derivative which gives the I_{max} value of the sinusoidal error signal with a quarter leading time.
This period is given by the phase shift of $\pi/2$ of the derivative.
A permanent sinusoidal signal can be written under the following formula:
$i(t) = I_{max}.\sin(\omega.t + \varphi)$.
its derivative is:
$di/dt = I_{max}.\omega.\cos(\omega.t + \varphi) = I_{max}.\omega.\sin(\omega.t + \varphi + \pi/2)$.
The combination of information given by the signal and its derivative allows the short-circuit to be detected in a very short time depending on the prospective short-circuit current. (Fig. 1)
(i.e. for a prospective current of 150 kA, the time detection is less than 240 µs, the contacts separation occurs within 700 µs making it 10 times faster than a traditional device).
Note: refer to tripping curves in the chapter Additional characteristics.

Protection operation

■ on operation:
The curves $i(t) = I_{max}.\sin(\omega.t + \varphi)$ and $di(t) = I_{max}.\omega.\cos(\omega.t + \varphi)$ verify the ellipse centred equation in 0:

$$\frac{i^2(t)}{A^2} + \frac{di^2(t)}{B^2} = 1, \text{ with } A = I_{max} \text{ and } B = I_{max}.\omega.$$

The signal turns in loop in the ellipse (Fig. 2), of which the circumference represents the tripping threshold.
While the CT entry signal does not exit from the ellipse, there is no threshold excess and the protection is not activated.

■ on short-circuit:
In case of high short circuit, if the control unit detects at the same time, a di/dt threshold excess and an î (kA) value, the "UR control" gives simultaneously a tripping order to the "UR power" module and to the MITOP.

"UR control" module is protected against nuisance tripping that could result from motor stating current, inrush current and transient phenomenon.

■ protection threshold :

Depending on the prospective short-circuit level, and the current limitation to be reached, two "UR Control" modules are available [1]:

"UR Control" with high threshold, mainly for network ⩽ 440 V and Isc > 50 kA

"UR Control" with low threshold, mainly for network ⩽ 690 V and Isc ⩽ 50 kA
(ask for date of availability).

[1] This limitation and choice of the threshold are given with the study provided by Schneider-Electric.

"UR control" functions

The "UR control" module has three main functions (Fig. 3):
■ function 1: analyse the current signal and trigger the thyristors to discharge the capacitors in the T.E.C.
■ function 2: establish communication from a PC with "UR power" and "UR control" with the "Masterpact UR utility"
■ function 3: activate the MITOP to confirm the opening manoeuvre of the mechanism.

Protection by Thomson effect
"UR Power" module

The "UR power" module pilots by the "UR control". It is connected to the thruster "Thomson effect coil" via cables.

The "UR power" module ensures the following functions:

- piloting of Thomson effect coils
- recording of maintenance data
- operation tests.

Piloting of Thomson effect coils

The electronic system of the "UR power" module allows to:

- store capacitor energy A
- monitor and regulate the capacitors charge B
- pilot TEC discharge by means of thyristor triggers C
- balance and measure capacitors voltage D
- monitor and manage its operation E
- control Masterpact UR auxiliary contacts CE-OF of and the "UR power" module input contacts (inhibition) and output contacts F (SDUR-PFUR)
- control the power supply level of the system G.

Recording of maintenance data

The event and maintenance logs are stored in "UR power" module:

- the event log contains:
  - system internal errors
  - trips
  - status modifications, etc.
- the maintenance log contains:
  - manual auto-tests results
  - tripping tests results
  - intervention reports.

Note: these logs are accessible on PC only via the "Masterpact UR utility" software. Consult the chapter "Communication" for detailed information.

Operation tests:

The operation tests ensure the Thomson effect protection is always operational during the different operating phases.

- manual tripping test by Thomson effect coils.

This test is performed either directly by pressing the pushbutton located on the "UR control" module front face or by PC with the "Masterpact UR utility" software configured in maintenance mode.
The test by button discharges the energy capacitors in the Thomson coils provoking the repulsion of the contacts and the device opening by the Mitop.
The result of the trip is displayed by "test" LED located on the "UR control" module (green LED: test OK, red LED: test failed)

Note: the test by PC using Masterpact UR utility provokes only the repulsion of the contacts by Thomson effect without causing a complete opening.

- test of "UR control" tripping curve (di/dt).

This test checks the good operation of the Thomson effect tripping circuit.
The test requires a test instrument (Low Frequency Generator). The test simulates the injection of a high current through the test plug located on the "UR control" module. This test can be programmed to cause or not the tripping of the breaker.

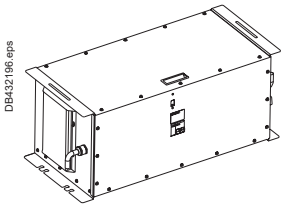
- auto-tests:

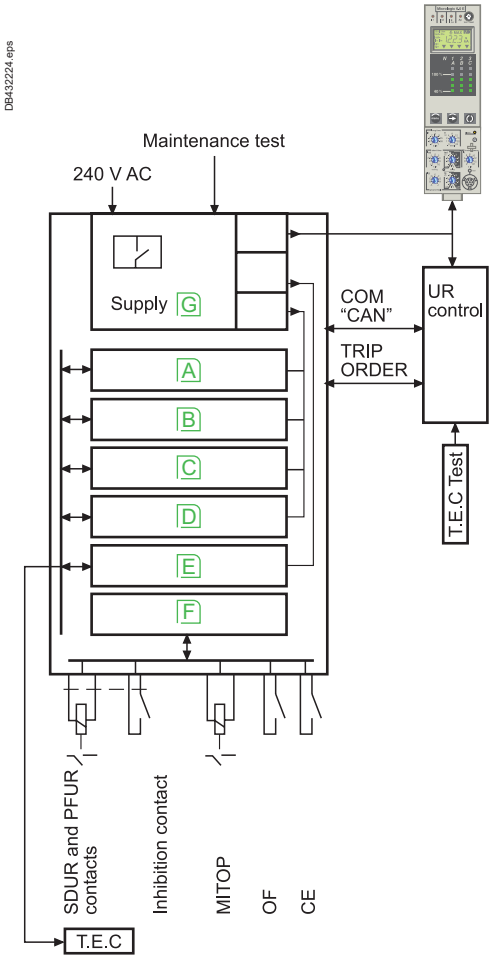
The auto-tests are launched every time "UR power" is energized and at regular intervals. The auto-tests results are displayed by flashing LED on the front face of the "UR control" module.
The auto-tests can be manually launched from a PC with the "Masterpact UR utility" software.
Manual auto-tests results may be recorded in the maintenance log and consulted via the "Masterpact UR utility" software configured in maintenance mode only.

- if the "tripping on system internal errors" option is configured, and if an error is detected:
  - on "UR power" energizing: the circuit breaker can't be closed
  - on operation: the breaker trips.

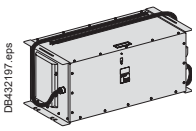
Technical characteristics				
UR power supply	at energizing	after 30 sec.	on operation	during capacitor autotest sequence
240 V	10 A	1 A	400 mA	800 mA 30 sec.

Note: it is recommend to supply the "UR power" module throught a low voltage/low voltage transformer or UPS.





Protection by Thomson effect
Accessories and test instruments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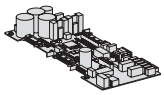
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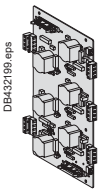
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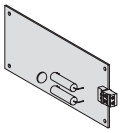
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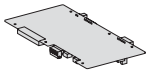
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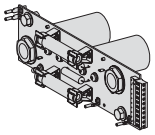
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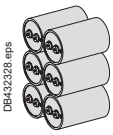
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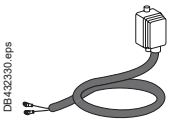
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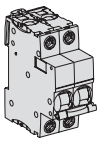
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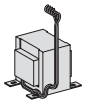
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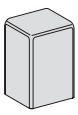
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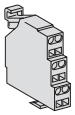
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Spare parts

“UR power” module
Complete set with discharge cable and without auxiliary cable.

Interface board
This board monitors the “UR power” module and the communication system between “UR control”, the “UR power” modules and a PC.

Impulse transformer board
This board controls the thyristors, the T.E.C and measures the voltage.

Filter board
This board ensures the protection against voltage surge (surge arrester).

Regulation board
This board regulates the charge of capacitors.

Capacitors - Thyristors board
This board is used for holding capacitors, resistances and thyristors and connecting them together.

Capacitors (set of 6)

Capacitor discharge cable
2 for “UR power” 50/60.-

Auxiliary circuit wire set
Interconnect “UR power” and chassis auxiliary circuit.

iC60
This MCB’s protects and switches ON/OFF “UR power” module.

Set of screws for “UR power” boards

Lithium battery
This battery located on the Interface board is used to save the events and maintenance log. It must be changed every 10 years.

Transformer
■ this transformer generates the 300 V for the capacitor charge and the 36 V DC for the power supply

Charging / discharging relay
■ this relay allows the charge of the capacitors when the “UR power” module is energised and its discharge when the power is OFF.

User connection terminal
These terminals, mounted on the chassis, allow the user to connect auxiliary supplies to the “UR power” module.

“UR control” Module
■ it includes the board, its case and the cover
■ lead sealing kit:
□ this transparent cover, once fitted, prohibits any tripping operation by the test button situated on the front face. It, however, allows the user to test the LED’s

Accessories and intruments for tests

Masterpact UR utility software
This software establishes communication - via a USB / CAN converter - with “UR power” and “UR control” modules and allows the user to configure them. (refer to chapter communication “UR control” and “UR power” modules).


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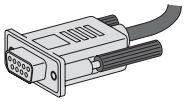
“UR power” module / IXXAT converter cable
This cable allows the user to connect the converter (Sub D9) to the “UR power” module (RJ45).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Test cable
This cable makes it possible to connect a Low Frequency generator to the “UR control” module and to test the protection by Thomson effect.


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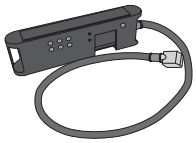
Maintenance cable for pairing
This tool will supply all auxiliary circuits during the prairing maintenance operation. To be used only by Schneider Electric Services Technicien.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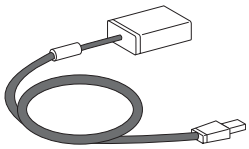
Low frequency generator (not provided)
This Low frequency generator is needed to simulate a fault current by secondary injection to check the tripping circuit of the Thomson protection.

Oscilloscope (not provided)
The oscilloscope is needed to measure the opening time of the contacts during a tripping test by Thomson effect.

USB / Can Converter (not provided)
Only the IXXAT converter (Compact) can be used to interface a PC and the “UR control” module.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“Pole” repulsion measuring tool
This tool measures the repulsion distance of the contacts depending on the energy released during the manual Thomson effect trip test.

“Contact thurster”Gap measuring tool
This tool consists of a “Vernier Gange” and a specific support to measure the “contact thurster” gap.

Contact wear measuring tool
This tool fits into the arc chamber and allow the measurement of the contact wear.

TEC selector switch
This tool allows one to select the Thomson coil to be triggered when performing the pairing test. It is installed between the interface board and TI board.

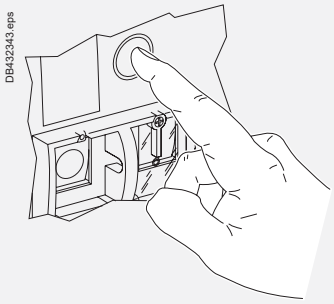
Operation
Electrical closing

Masterpact UR closing operation is only electrically possible locally or remotely.
The remote closing can be carried out by a point to point link or by the communication bus.

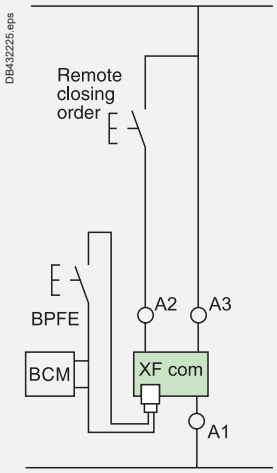
A

Local closing

The local closing is carried out manually by the electrical closing pushbutton (BPFE) situated on the front panel of the breaker.



- the transparent screen blocks the mechanical closing button
- the BPFE is connected to the XF “communicating” coil and the breaker communication module (BCM), if present.



The closing is subject to the “ready to close” contacts conditions (see page A-29).
Note: as soon as the control voltage A1-A3 is applied to the XF coil, it is necessary to wait 1.5 second before sending an order.

Remote “point to point” closing

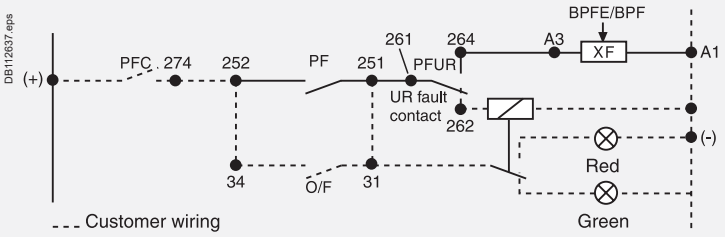
The remote closing is carried out by a pushbutton activating the XF “ communicating” coil.
The closing is subject to the “ready to close” contacts conditions.

Remote closing using the communication bus

This control order requires the communication module (BCM) to function.
The closing is subject to the “ready to close” contacts conditions (see page A-29).

“Ready to close” function

The device closing is subject to three conditions represented by the three contacts in series.



- the PFC - “Customer ready to close” contact - corresponds to either a customer’s operating condition or network one. This contact is optional
- the PF “ready to close” contact indicates that all the following are valid:
  - the circuit breaker is in the OFF position
  - the spring mechanism is charged
  - a maintained opening order is not present:
    - MX energised
    - fault trip
    - remote tripping (MN not supplied)
    - device not completely racked in
    - device locked in OFF position
- the PFUR - “UR power” and “UR control” ready to close contact - indicates that capacitors are fully loaded and the “UR power” and “UR control” modules are energized. The “PFUR” contact is operated by the “UR power” module.

PFUR operation

- on energizing “UR power” and “UR control” modules (240 V AC), the capacitors are being charged and simultaneously auto-tests are launched.
At the end of the sequence, the PFUR contact closes allowing the XF coil to be energized
- on operation, if following an auto-test, a system internal errors is detected, the “PFUR” changeover contact drops. It is possible to have a remote indication of this error by external cabling (to be wired by user).
Moreover, if the user has chosen the “tripping option on system internal errors”, the breaker trips by means of the MITOP. The device closing is only possible after the resetting of the mechanism and the clearing of the fault.

When the PFC, PF and PFUR contacts are closed, Masterpact UR can be closed.

Closing is possible:

- locally by the BPFE situated on the circuit breaker front face
- remotely either by the BPF and the XF communicating coil or by PC using the communication networks.

Characteristics (PF device)			PF contact
Maximum number			1
Minimum Load			100 mA/24 V
Breaking capacity (A) p.f.: 0.3 AC12/DC12	V AC	240/380	5
		480	5
		690	3
	V DC	24/48	3
		125	0.3
		250	0.15
Characteristics			**PF UR**
Minimum Load			10 mA/5 V
Breaking capacity (A)	V AC	250	10
		400	5
	V DC	30	8
		150	0.3
		300	0.15

PF contacts “ready to close”.

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A

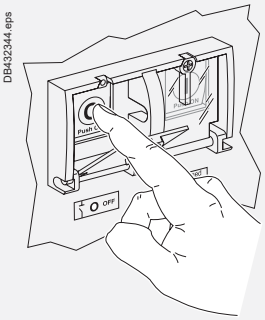
Operation
Opening

The opening of the Masterpact UR is electrically or manually possible, locally and remotely.
Remote opening can be carried out either by the point to point wiring system, or by the communication bus.

A

Local opening

The local opening is carried out manually by the mechanical pushbutton (BPO) situated on the front panel of the breaker.



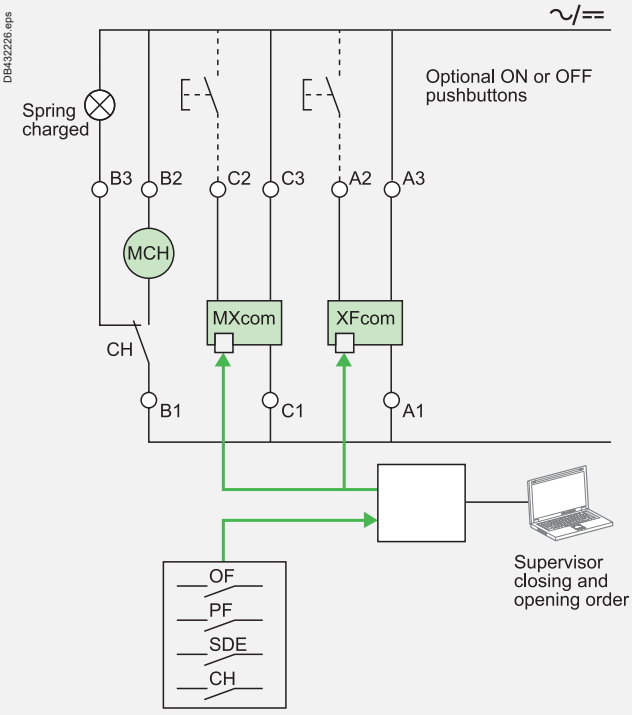
This action can be forbidden by blocking the BPO by the transparent screen.

Remote “point to point” opening

The remote opening is carried out by the pushbutton activating the MX opening coil.

Remote opening through a communication bus

The operation requires the “communicating” MX coil and the “communication module” (BCM).



Note: MX communicating releases are of the impulse type only and cannot be used to lock a circuit breaker in OFF position.
For locking in OFF position, use the remote tripping function (MX or MN).
When MX communicating releases is used, the third wire (C3) must be connected even if the communication module is not installed. When the control voltage (C3-C1 or A3-A1) is applied to the MX or XF releases, it is necessary to wait 1.5 seconds before issuing an order.

A

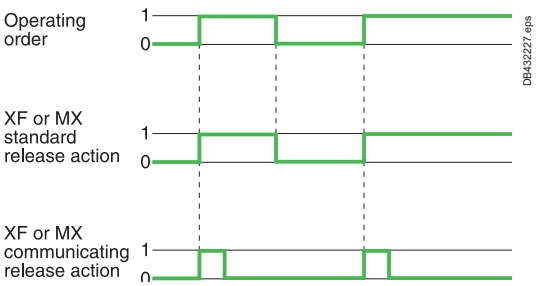
Voltage releases (XF and MX)

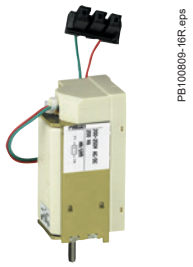
Their supply can be maintained or automatically disconnected.

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

Characteristics		XF	MX
Power supply	V AC 50/60 Hz	24 - 48 - 100/130 - 200/250 - 277 - 380/480	
	V DC	12 - 24/30 - 48/60 - 100/130 - 200/250	
Operating threshold		0.85 to 1.1 Un	0.7 to 1.1 Un
Consumption (VA or W)		Hold: 4.5 Pick-up: 200 (200 ms)	Hold: 4.5 Pick-up: 200 (200 ms)
Circuit-breaker response time at Un		70 ms ±10 (NW ⩽ 3200A) 80 ms ±10 (NW > 3200A)	50 ms ±10

Note: an opening order always takes priority over a closing order.
If opening and closing orders occur simultaneously, the mechanism discharges without any movement of the main contacts. The circuit breaker remains in the open position (OFF).
In the event of maintained opening and closing orders, the standard mechanism provides an anti-pumping function by blocking the main contacts in open position.
Anti-pumping function. After fault tripping or intentional opening using the manual or electrical controls, the closing order must first be discontinued, then reactivated to close the circuit breaker. When the automatic reset after fault trip (RAR) option is installed, to avoid pumping following a fault trip, the automatic control system must take into account the information supplied by the circuit breaker before issuing a new closing order or blocking the circuit breaker in the open position (information on the type of fault, e.g. overload, short-time fault, earth fault, short-circuit, etc.).





XF and MX voltage releases

Operation
Remote tripping by MN or MX

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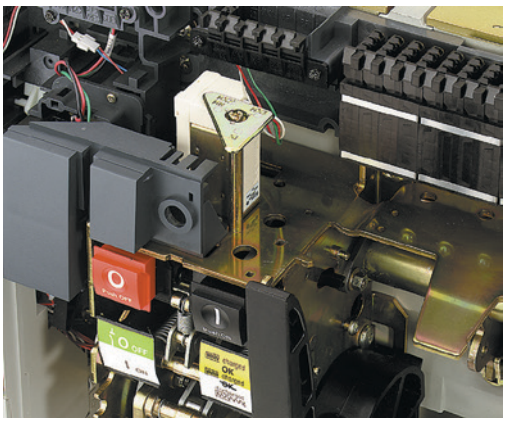

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MX or MN voltage release.

This function opens the circuit breaker via an electrical order. It is made up of:
- a shunt release (MX)
- or an undervoltage release (MN)
- or a delayed undervoltage release (MNR: MN + delay unit).

The MN release cannot be operated by the communication bus.
The delay unit, installed outside the circuit breaker, may be disabled by an emergency OFF button to obtain instantaneous opening of the circuit breaker.

Wiring diagram for the remote-tripping function

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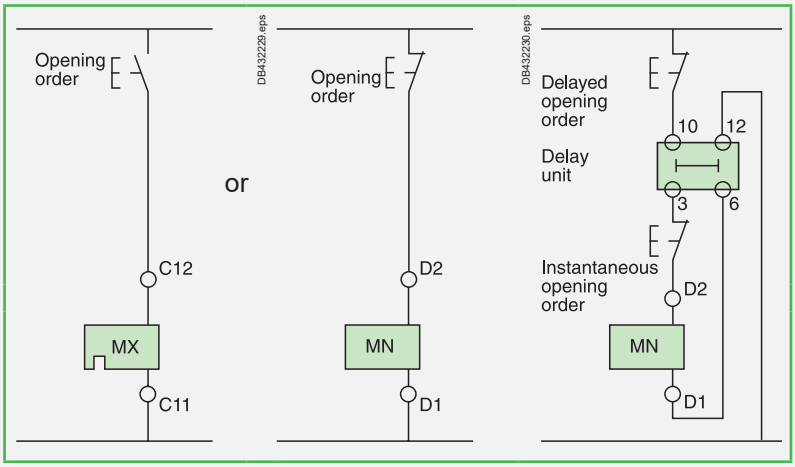


Instantaneous voltage releases (MN)

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

Characteristics			
Power supply	V AC 50/60 Hz V DC	24 - 48 - 100/130 - 200/250 - 380/480 24/30 - 48/60 - 100/130 - 200/250	
Operating threshold	Opening Closing	0.35 to 0.7 Un 0.85 Un	
Consumption (VA or W)		Pick-up: 200 (200 ms)	Hold: 4.5
MN consumption with delay unit (VA or W)		Pick-up: 200 (200 ms)	Hold: 9
Circuit-breaker response time at Un		40 ms ±5 for UR	

MN delay units

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

Characteristics			
Power supply	Non-adjustable	100/130 - 200/250	
V AC 50-60 Hz /DC	Adjustable	48/60 - 100/130 - 200/250 - 380/480	
Operating threshold	Opening	0.35 to 0.7 Un	
	Closing	0.85 Un	
Time delay consumption only	Pick-up: 200 (200 ms)		Hold: 4.5
Circuit-breaker response time at Un	Non-adjustable	0.25 s	
	Adjustable	0.5 s - 0.9 s - 1.5 s - 3 s	

Masterpact UR is equipped as standard with an electric motor.

Electric motor (MCH)

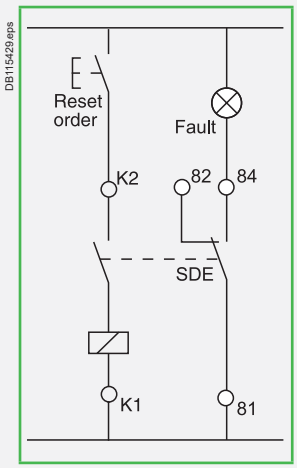
The electric motor automatically charges and recharges the spring mechanism when the circuit breaker is closed. Instantaneous reclosing of the breaker is thus possible following opening. The spring-mechanism charging handle is used only as a backup if auxiliary power is absent.
The electric motor (MCH) is equipped as standard with a limit switch contact (CH) that signals the “charged” position of the mechanism (springs charged).

Characteristics		
Power supply	V AC 50/60 Hz	48/60 - 100/130 - 200/240 - 277- 380/415 - 400/440 - 480
	V DC	24/30 - 48/60 - 100/125 - 200/250
Operating threshold		0.85 to 1.1 Un
Consumption (VA or W)		180
Motor overcurrent		2 to 3 In for 0.1 s
Charging time		maximum 4 s for UR
Operating frequency		maximum 3 cycles per minute
CH contact		10 A at 240 V

Electric motor (MCH)

Remote reset after fault trip

Electrical reset after fault trip (Res)
Following tripping, this function resets the “fault trip” indication contacts (SDE) and the mechanical indicator and enables circuit breaker closing.
Power supply: 130 V AC and 240 V AC.



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

Note: after tripping, it is compulsory to reset the breakewr mechanism to clear the fault indication (SDE contact) and to allow the PF contact to return to its normal position. This supplies the circuit and gives the status of the PFUR contact (see page A-29).

“UR power” and “UR control”
Customer options

Option “Tripping on system internal errors”

This option is configured during the manufacturing stage at the request of the customer. It requires the removal of a strap on the “UR control” module and the firmware programming of the “UR control” and “UR power” modules via the “Masterpact UR utility” software.
Once the option is configured, the tripping of the device occurs when the following internal errors are detected:

1 loss of power supply (20 V DC) to the MITOP
2 loss of power supply (24 V DC) to “UR control” module
3 loss of power circuit continuity
4 low capacitor charge

When the option is configured, the breaker reacts as follows:

■ on energizing
□ during the auto-test sequence, if an error 1 to 4 is detected, the device cannot be closed

Note: the device cannot be closed if the ambient temperature nearly the "UR Power" is less than 15°C.

■ on operation
□ the defects 1 and 2 will trip the device instantaneously
□ the defects 3 and 4 will trip the device at the end of the cycle (every 20’ for defect 3 and 24 h for defect 4).

Note: the “tripping option on internal error” is inhibited if the “inhibition” option is configured and manually activated (see option "inhibition" page A-35).

The internal errors are systematically:

■ displayed on the front face of the “UR control” module by a flashing LED
■ recorded and time-stamped in the event log of the “UR control” module.

They can be consulted on PC using “Micrologic UR utility”.
It is possible to have a remote indication of this error by an external cabling (to be wired by user (see page A-29)).

A

Option “Inhibition”

Application
The “inhibition” function may be temporarily switched ON for delicate navigational manoeuvres such as entering in a port or passing through a canal (i.e.: Panama, Suez).
This option is configured during the manufacturing stage at the request of the customer. It requires the removal of a strap on the “UR control” module and the firmware programming of the “UR control” and “UR power” modules via the “Masterpact UR utility” software.
The “inhibition” function, once activated by the user by means of a switch, (Fig. 1) prevents the breaker tripping on any electrical fault (overload, short circuit, ground fault) detected either by the Micrologic control unit or the “UR control” module.
It is recommended to remotely signal that the tripping function is temporarily inhibited by means of a double auxiliary contact (Fig. 1).
This action must also be recorded in the Ship Alarm System.
Any switching operation of this function, ON and OFF, is recorded and time-stamped in the “UR power” event log and can be viewed on a PC using the “Masterpact UR utility”.

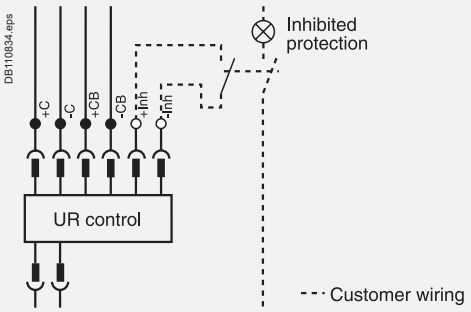


Fig. 1

The inhibition function does not prevent the breaker to be manually opened locally by pushbutton (BPO) or remotely by the MX or MN releases or the communication bus.

Priority when the 2 options are programmed and the inhibition function is activated

When the “inhibition” and the “trip on system internal errors” functions are activated, the inhibition has priority. Consequently, no trip on system internal errors can occur during the lapse of time when it is activited.

Communication
COM option in Masterpact UR

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

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BCM ULP.

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I/O application module.

For Masterpact UR, the common communication option is made up of:
- a BCM ULP module, installed behind the Micrologic control unit and supplied with its set of sensors (OF, SDE, PF and CH micro switches) its kit for connection to XF and MX communicating voltage releases and its COM terminal block (inputs E1 to E6). This module is independent of the control unit. It receives and transmits information on the communication network. An infra-red link transmits data between the control unit and the communication module.
Consumption: 30 mA, 24 V.
- IFM, this module required for connection to the network, contains the Modbus address (1 to 99) declared by the user via the two dials in front. It automatically adapts (baud rate, parity) to the Modbus network in which it is installed.

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

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

For communicating remote control, option with XF and MX communicating voltage releases must be added:
The XF and MX communicating voltage releases are equipped for connection to the "device" communication module.
The remote-tripping function (MN) are independent of the communication option. They are not equipped for connection to the "device" communication module.

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Four functional levels
The Masterpact can be integrated into a Modbus communication environment. There are four possible functional levels that can be combined.

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

Communication Modbus bus

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

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

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

The manager addresses are automatically derived from the circuit breaker address @xx entered via the Micrologic control unit (the default address is 47).

Number of devices
The maximum number of devices that may be connected to the Modbus bus depends on the type of device (Compact with Modbus COM, PM700, PM800, Sepam, Vigilohm, Compact NSX, etc.), the baud rate (19200 is recommended), the volume of data exchanged and the desired response time. The RS 485 physical layer offers up to 32 connection points on the bus (1 master, 31 slaves).
A fixed device requires only one connection point (communication module on the device). A drawout device uses two connection points (communication modules on the device and on the chassis).
The number must never exceed 31 fixed devices or 15 drawout devices.

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

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

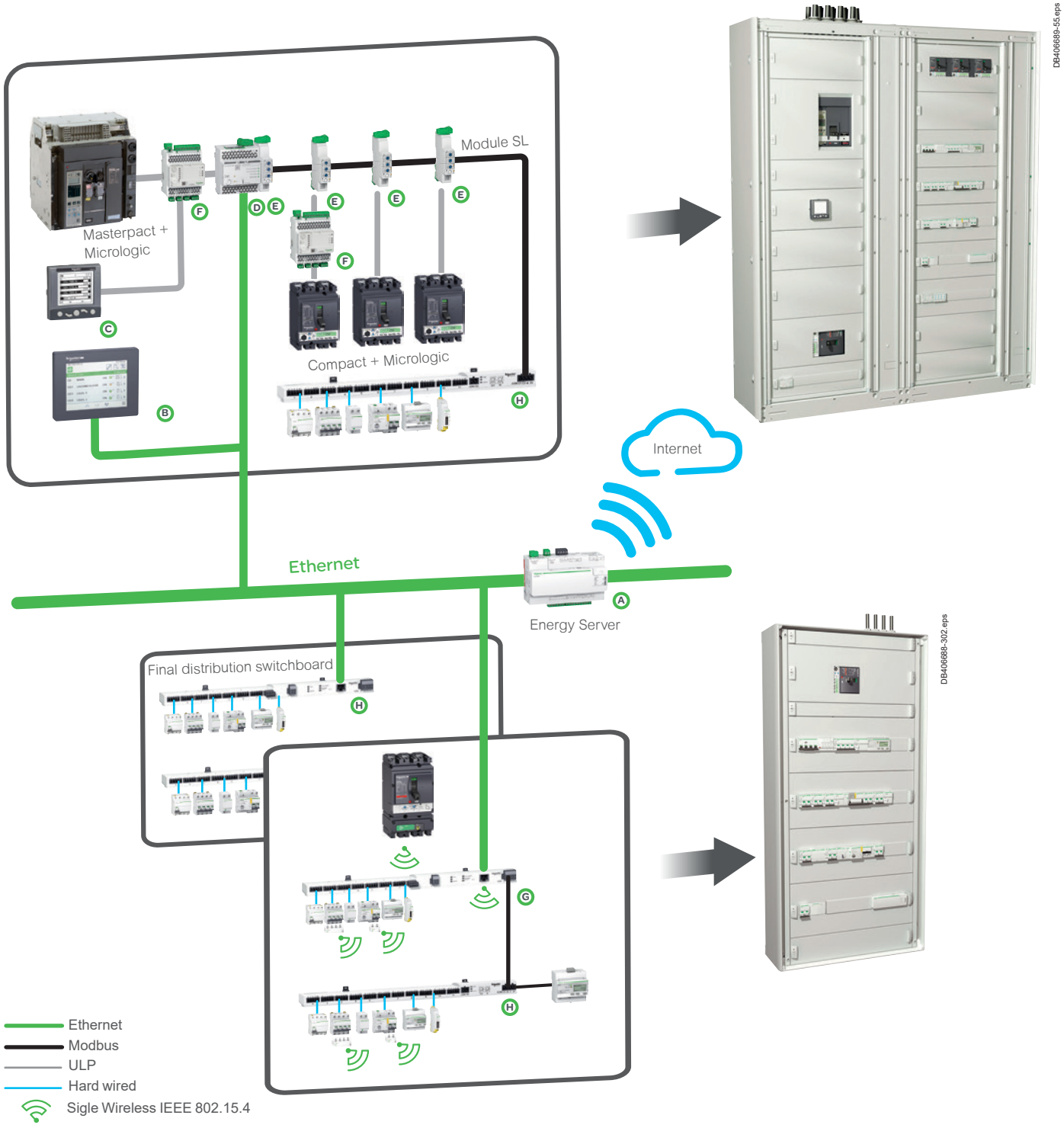
A: Micrologic with ammeter
E: Micrologic "Energy"
P: Micrologic "Power"
H: Micrologic "Harmonics"
Note: see the description of the Micrologic control units for further details on protection and alarms, measurements, waveform capture, histories, logs and maintenance indicators.

Enerlin'X digital system
Overview

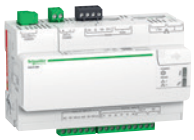
Enerlin'X communication system provides access to status, electrical values and devices control using Ethernet and Modbus SL communication protocols.

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

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



Enerlin'X digital devices and displays

		Name	Function	Port (to device)	Port (to server)	Inputs	Outputs	Cial. Ref.
A		Com'X 210	Energy data logger + Ethernet Gateway	Ethernet Modbus Master, Zigbee (to wireless meters)	Ethernet cable + WiFi	64 devices: 6 binary 2 analog 32 Modbus devices + other Ethernet devices (Modbus TCP)	-	**EBX210**
		Com'X 510 24 V DC + PoE	Energy server + Ethernet Gateway				-	**EBX510**
B		FDM128	Ethernet LCD colour touch screen	-	Ethernet		-	**LV434128**
C		FDM121	LCD display for circuit breaker	ULP	-	1 circuit breaker	-	**TRV00121**
D		IFE Switchboard server	Switchboard server	Modbus Master & ULP	Ethernet	20 circuit breakers	-	**LV434002**
		IFE interface	Ethernet interface for circuit breakers	ULP	Ethernet	1 circuit breaker	-	**LV434001**
E		IFM	Modbus interface for circuit breaker	ULP	Modbus Slave	1 circuit breaker	-	**LV434000**
F		I/O	Input/Output application module for circuit breaker	ULP	ULP	6 binary 1 analog (PT100 sensor)	3	**LV434063**
G		Acti 9 Smartlink SI B Ethernet wireless	Ethernet server for I/O and Modbus slave devices	Modbus Master & Wireless to PowerTag	Ethernet	14 binary 2 analog	7	**A9XMZA08**
H		Acti 9 Smartlink Modbus slave	Modbus interface with Input/Output functions	-	Modbus Slave	22 binary	11	**A9XMSB11**

Ethernet Gateway or Interface: routes an internal traffic (ULP or other protocole) to the Internet, the outgoing messages are coded with Modbus TCPIP protocol.

Server (Switchboard, Energy): routes the internal traffic to the Internet. Other complementary functions such as data logging and storage. Provides devices status and energy trends on internal web pages...

Masterpact communication
RSU and RCU utilities

Two utilities, RSU and RCU, are available to assist in starting up a communicating installation.
They can be downloaded from the Schneider Electric internet site and include a "Live update" function that enables immediate updating.

A

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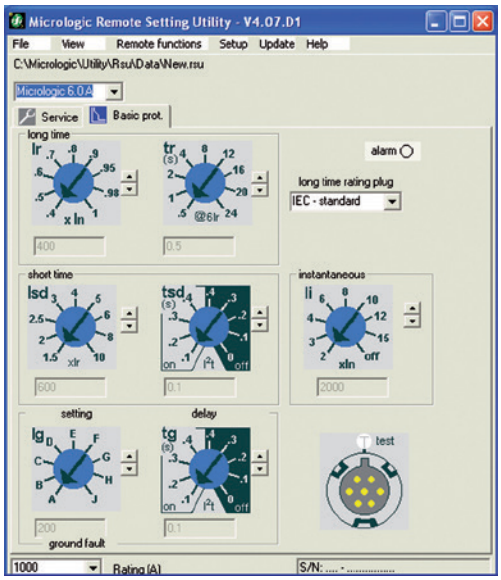

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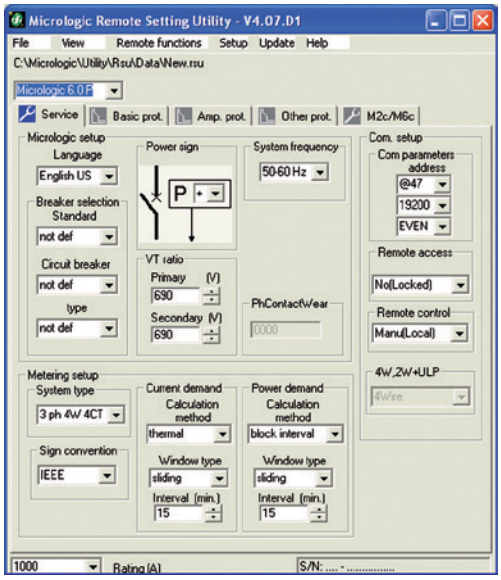

RSU: Micrologic Remote Setting Utility.

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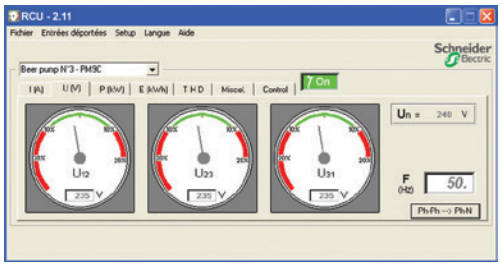

RCU: Remote Control Utility for communication tests.

RSU (Remote Setting Utility)

This utility is used to set the protection functions and alarms for each Masterpact and Compact NSX device.
After connection to the network and entry of the circuit-breaker Modbus address, the software automatically detects the type of trip unit installed.
There are two possible operating modes.

Off-line with the software disconnected from the communication network

For each selected circuit breaker, the user can do the following.

Determine the protection settings
The settings are carried out on a screen that shows the front of the trip unit. The Micrologic setting dials, keypad and screen are simulated for easy use of all Micrologic setting functions.

Save and duplicate the protection settings
Each configuration created can be saved for subsequent device programming. It can also be duplicated and used as the basis for programming another circuit breaker.

On-line with the software connected to the network

Similarly, for each selected circuit breaker, the user can do the following.

Display the current settings
The software displays the trip unit and provides access to all settings.

View the corresponding protection curves
A graphic curve module in the software displays the protection curve corresponding to the settings. It is possible to lay a second curve over the first for selectivity studies.

Modify settings in a secure manner
- There are different levels of security:
  - password: by default, it is the same for all devices, but can be differentiated for each device
  - locking of the Modbus interface module which must be unlocked before the corresponding device can be set remotely
  - maximum settings limited by the positions of the two dials on the trip unit. These dials, set by the user, determine the maximum settings that can be made via the communication system.
- Settings are modified by:
  - either direct, on-line setting of the protection settings on the screen
  - or by loading the settings prepared in off-line mode. This is possible only if the positions of the dials allow the new settings.

All manual settings made subsequently on the device have priority.

Program alarms
- Up to 12 alarms can be linked to measurements or events.
- two alarms are predefined and activated automatically:
  - Micrologic 5: overload (Ir)
  - Micrologic 6: overload (Ir) and ground fault (Ig)
- thresholds, priorities and time delays can be set for 10 other alarms. They may be selected from a list of 91 alarms

Set the outputs of the SDx relays
This is required when the user wants to change the standard configuration and assign different signals to the 2 outputs of the SDx relay.

RCU (Remote Control Utility)

The RCU utility can be used to test communication for all the devices connected to the Modbus network. It is designed for use with Masterpact, Compact NSX, Advantys OTB and Power Meter devices. It offers a number of functions.

Mini supervisor
- Display of I, U, f, P, E and THD measurements for each device, via navigation.
- Display of ON/OFF status.

Open and close commands for each device
A common or individual password must first be entered.

When all functions have been tested, this utility is replaced by the supervision software selected for the installation.

Schneider Electric electrical installation supervision, management and expert system software integrates Masterpact, Compact and Compact NSX identification modules.

Types of software

Masterpact, Compact and Compact NSX communication functions are designed to interface with software dedicated to electrical installations:
- switchboard supervision
- electrical installation supervision
- power system management: electrical engineering expert systems
- process control
- SCADA (Supervisory Control & Data Acquisition), EMS (Enterprise Management System) or BMS (Building Management System) type software.

Schneider Electric solutions

Electrical switchboard supervision via EGX300 Web servers

A simple solution for customers who want to consult the main electrical parameters of switchboard devices without dedicated software.
Up to 16 switchboard devices are connected via Modbus interfaces to an EGX300 Ethernet gateway integrating the functions of a web page server. The embedded Web pages can be easily configured with just a few mouse clicks. The information they provide is updated in real time.
The Web pages can be consulted using a standard Web browser on a PC connected via Ethernet to the company Intranet or remotely via a modem. Automatic notification of alarms and threshold overruns is possible via e-mail or SMS (Short Message Service).

Electrical installation supervision via iRIO RTU

The iRIO RTU(remote terminal unit) can be used as Ethernet coupler for the PowerLogic System devices and for any other communicating devices operating under Modbus RS485 protocol. Data is viewable via a standard web browser.

ION-E electrical engineering expert system software

ION-E is a family of web-enabled software products for high-end power-monitoring applications. It is designed for large power systems.
ION-E offer detailed analysis of electrical events, long-duration data logging and extensive, economical report-building capabilities (e.g. consumption monitoring and tariff management).
A wide variety of screens can be displayed in real time, including more than 50 tables, analogue meters, bargraphs, alarms logs with links to display waveforms and predefined reports on energy quality and service costs.

Other software

Masterpact, Compact and Compact NSX devices can forward their measurement and operating information to special software integrating the electrical installation and other technical facilities:
- SCADA process control software: Vijeo CITECT
- BMS Building Management System software: Vista.

Please consult us.

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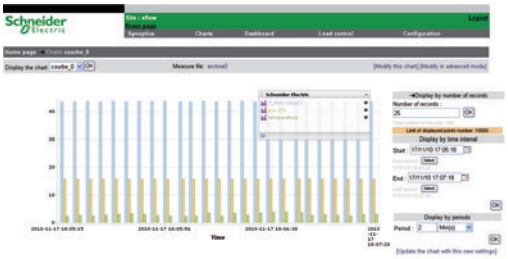
EGX300



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iRIO RTU

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ION-E

Masterpact communication
“UR control” and “UR power” modules

The CAN communication bus cannot be used for the integration ot the "UR Power" and "UR Control" modules into a permanent supervision system. The local connection should only be established for recommended checks, maintenance operations and then disconnected.

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Note: it is recommended to use the Compact converter IXXAT from Compact.

It is possible to communicate with “UR power” and “UR control” modules via the RJ 45 socket situated on the “UR power” front face.
This consultation can only done with a local connection and via a USB/CAN converter (cat.IXXAT, normal or compact case).
The “Masterpact UR utility” software installed on PC makes it possible to consult and to configure the data of the system according to two modes:

Operation mode
With this mode, the information accessible are:
- ■ identification
- □ version number and software “UR power” and “UR control” modules
- □ circuit breakers types
- □ device rating
- □ serial number “UR power” and “UR control” modules and “Masterpact UR”
- □ option configuration : fault trip, inhibition
- ■ input and “UR power” module condition status
- □ breaker position (OFF/ON)
- □ temporary activation of the control “inhibition”
- □ TEC controls condition (Tripped / Not tripped)
- □ Mitop controls condition (Tripped / Not tripped)
- ■ output condition (remote indication)
- □ tripping indication by TEC and Mitop
- □ internal fault system indication
- ■ number of TEC tripping
- □ following a fault
- □ following a manual test (maintenance).
- ■ measures
- □ Mitop supply voltage (P20 V)
- □ Micrologic Supply voltage (24 V)
- □ percentage of capacitor’s load per moving contact
- □ supply voltage of capacitor per moving contact
- □ internal temperature of “UR power” module
- ■ time-stamped event log
- □ change of status
- □ tripping TEC and Mitop
- □ loss of supply etc…

Maintenance mode
The user maintenance mode requires a name of user and a password for safety reasons.

Note: the password is given by Schneider Electric after training on the software (it can be changed by the administrator).

The maintenance mode makes it possible to visualise all the data accessible on the operation mode and to configure the following data :
- ■ system characteristics
- □ pairing of “UR power” and “UR control” modules
- □ configuration of options : “trip on internal errors system” and “inhibition”
- □ writing of the basic device type
- □ display and modification of the configurable parameters of the “UR control” and “UR power” module
- □ “UR control” and “Interface” boards.

The maintenance mode also makes it possible to launch on request autotests and operation tests.

Note: the autotests are carried out automatically on energizing and at regular intervals. The results (including those manually launched) are recorded in an event log in case of defect only. This event log can be reset.
- ■ autotests
- □ individual checks of capacitor’s load
- □ checks the continuity of the Thomson discharge circuit
- □ checks the presence 24 V
- □ checks the presence 20 V.

Note: the result of manual autotests can be recorded in the maintenance log and viewed on maintenance mode only.
- ■ operation test
- □ manual test of tripping by Thomson effet
- □ manual test of tripping by MITOP.

Note: the Result of manual tests can be recorded in the maintenance log in maintenance mode only. This maintenance log can be reset.

A

The Masterpact UR can be fitted with :
- vertical or horizontal rear connections
- mix rear connections.

	UR50	UR60
Vertical rear	◉	◉ [1]
Horizontal rear	◉	
Mixed	◉	

[1] Long rear connection.

Rear connections

Horizontal

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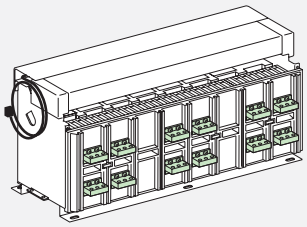

Vertical

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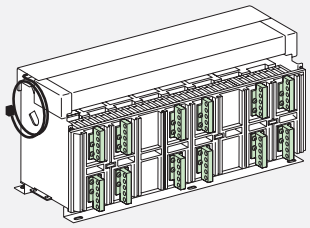

A horizontal rear connection becomes a vertical rear connection by a quarter rotation.
For the 6000 A, the device is with vertical rears only.

Mixed connections

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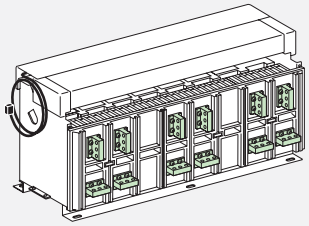
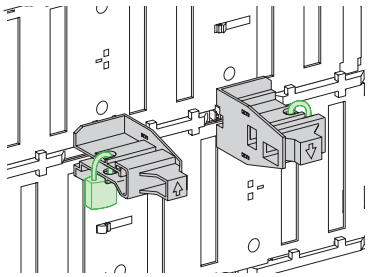


Safety shutters

Mounted on the chassis, the safety shutters automatically block access to the disconnecting contact cluster when the device is in the disconnected or test positions (degree of protection IP20) When the device is removed from its chassis, no live parts are accessible.
The shutter-locking system is made up of a moving block that can be padlocked (padlock not supplied). The block:
- prevents connection of the device
- locks the shutters in the closed position.

For Masterpact UR50/60
A support at the back of the chassis is used to store the 4 blocks when they are not used.



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Locking
On the device

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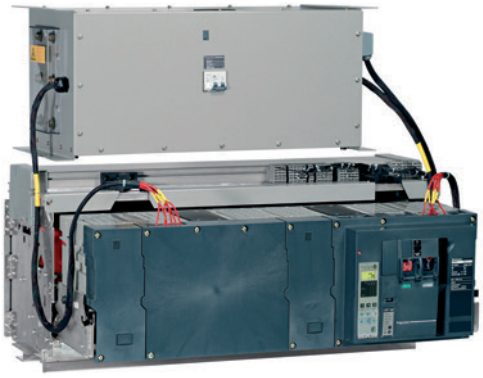

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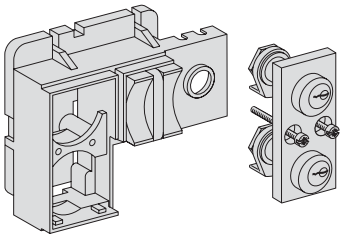

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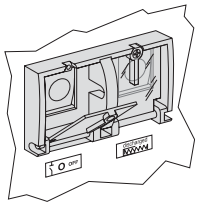

Access to pushbuttons protected by transparent cover.

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Pushbutton locking using a padlock.

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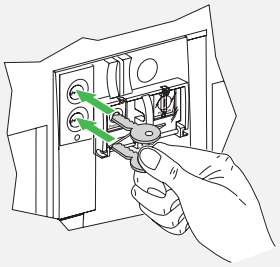
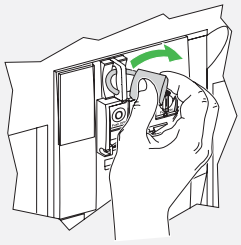




Device locking in the OFF position

The circuit breaker is locked in the OFF position by physically maintaining the opening pushbutton pressed down:
- using padlock (one to three padlocks, not supplied)
- using keylocks (one or two different keylocks, supplied).

Keys may be removed only when locking is effective (Profalux or Ronis type locks).
The keylocks are available in any of the following configurations:
- one keylock
- one keylock mounted on the device + one identical keylock supplied separately for interlocking with another device
- two different keylocks for double locking.

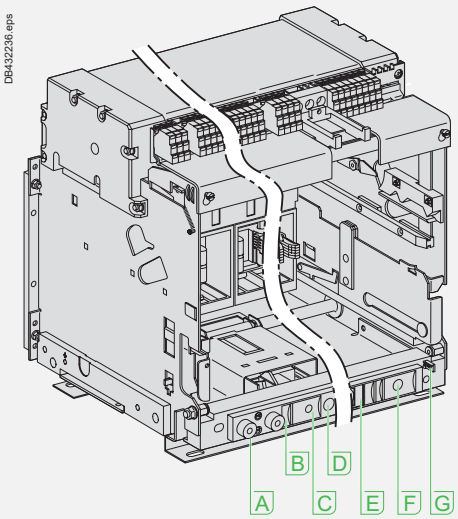
Profalux and Ronis keylocks are compatible with each other.
A locking kit make it possible the installation of one or two keylocks (Ronis, Profalux, Kirk or Castell).

Accessory-compatibility
For Masterpact UR: Three padlocks or/and two keylocks.

Pushbutton locking

The transparent cover blocks access to the pushbuttons used to open and close the device. This cover is mounted as standard on Masterpact UR. The BPF is locked and prevents the mechanical closing of the breaker.
It is possible to lock the opening button.

The pushbuttons may be locked using either:
- three padlocks (not supplied)
- lead seal
- 1 screw on the BPO side.



A Keylock locking.
B Padlock.
C Position release button.
D Crank socket.
E Position indicator.
F Crank storage.
G Racking interlock.

“Disconnected” position locking

Mounted on the chassis and accessible with the door closed, these devices lock the circuit breaker in the “disconnected” position in two manners:
- using padlocks (standard), up to three padlocks (not supplied)
- using keylocks (optional), one or two different keylocks are available.

Profalux and Ronis keylocks are available in different options:
- one keylock
- two different keylocks for double locking
- one (or two) keylocks mounted on the device + one (or two) identical keylocks supplied separately for interlocking with another device.

A locking kit (without locks) is available for installation of one or two keylocks (Ronis, Profalux, Kirk or Castell).

“Connected”, “disconnected” and “test” position locking

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

Racking interlock

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

Indication contacts

Indication contacts are available:
- in the standard version for relay applications.
- in a low-level version for control of PLCs and electronic circuits.

M2C (Micrologic E, P, H) may be programmed via the control unit keypad.

A

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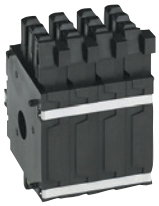

ON/OFF indication contacts (OF) (rotary type).

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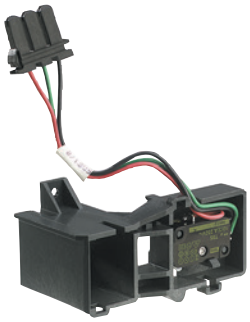

Additional “fault-trip” indication contacts (SDE).

ON/OFF indication contacts (OF)

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

OF				UR
Supplied as standard				3
Breaking capacity (A) p.f.: 0.3 AC12/DC12	Standard			Minimum load: 100 mA/24 V
		V AC	240/380	10
			480	10
			690	6
		V DC	24/48	10
			125	10
			250	3
	Low-level			Minimum load: 2 mA/15 V
		V AC	24/48	6
			240	6
			380	3
		V DC	24/48	6
			125	6
			250	3

“Fault-trip” indication contacts (SDE)

Circuit-breaker tripping due to a fault is signalled by:
- a red mechanical fault indicator (reset)
- one changeover contact (SDE).

Following tripping, the mechanical indicator must be reset before the circuit breaker may be closed.

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

“Fault-trip” indication contacts (SD UR)

Circuit-breaker tripping due to a Thomson (TEC) fault is signalled by a change over contact (SDUR).

This contact is located inside the "UR Power" module.

Note: this contact is a non Latching contact. To keep the indication, it is necessay to connect on external relay.

Characteristics			SDUR
Minimum load			10 mA/5 V
Breaking capacity (A)	V AC	250	10
		400	5
	V DC	30	8
		150	0.3
		300	0.15

“Connected”, “disconnected” and “test” position carriage switches

3 series of optional auxiliary contacts are available for the chassis:
- changeover contacts to indicate the “connected” position (CE)
- changeover contacts to indicate the “disconnected” position (CD). This position is indicated when the required clearance for isolation of the power and auxiliary circuits is reached
- changeover contacts to indicate the “test” position (CT). In this position, the power circuits are disconnected and the auxiliary circuits are connected.

In each position (CE, CD, CT) the T.E.C. discharge cables remain connected).

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

			UR
Contacts			**CE/CD/CT**
Maximum number	Standard		2 2 2
	with additional actuators		
Breaking capacity (A) p.f.: 0.3 AC12/DC12	Standard		Minimum load: 100 mA/24 V
	V AC	240	8
		380	8
		480	8
		690	6
	V DC	24/48	2.5
		125	0.8
		250	0.3
	Low-level		Minimum load: 2 mA/15 V
	V AC	24/48	5
		240	5
		380	5
	V DC	24/48	2.5
		125	0.8
		250	0.3

M2C programmable contacts

These contacts, used with the Micrologic E, P and H control units, may be programmed via the control unit keypad or via a supervisory station with the COM communication option. They require an external power supply module.
They indicate:
- the type of fault
- instantaneous or delayed threshold overruns.

They may be programmed:
- with instantaneous return to the initial state
- without return to the initial state
- with return to the initial state following a delay.

Micrologic		**Type E, P, H**
Characteristics		**M2C**
Minimum load		
Breaking capacity (A) p.f.: 0.7	V AC	240
		380
	V DC	24
		48
		125
		250

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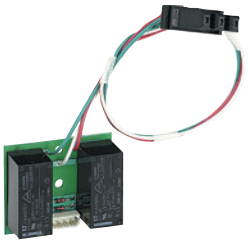
M2C: 24 V DC power supplied by control unit (consumption 100 mA).

PB100817-32R.eps

CE, CD and CT “connected/disconnected/test” position carriage switches.

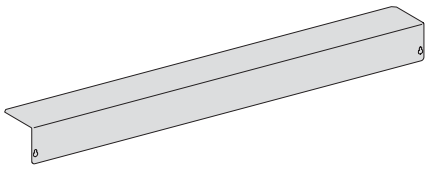


PB100778-32R.eps

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

A

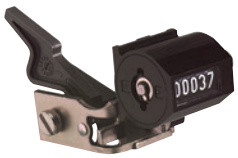
DB432349.eps



Auxiliary terminal shield (CB)

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

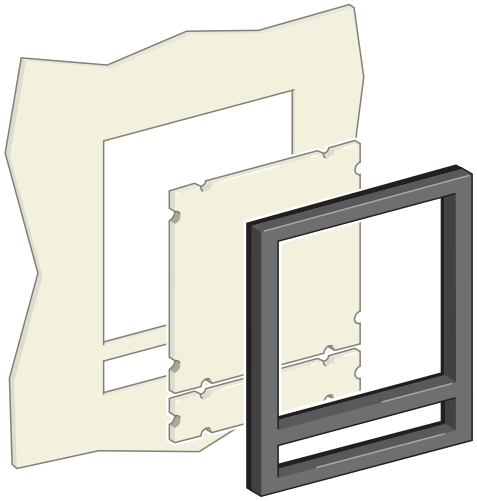
PB104382A32.eps



Operation counter (CDM)

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

DB101173.eps



Escutcheon (CDP)

Optional equipment mounted on the door of the cubicle, the escutcheon increases the degree of protection to IP40 (circuit breaker installed free standing: IP30) .
It is available in fixed and drawout versions.

Blanking plate (OP) for escutcheon

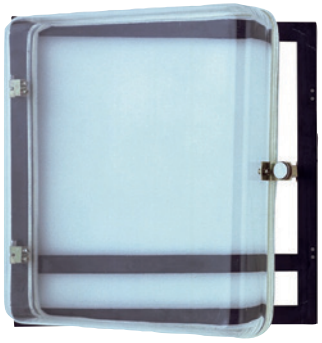
Used with the escutcheon, this option closes off the door cut-out of a cubicle not yet equipped with a device. It may be used with the escutcheon for both fixed and drawout devices.

Transparent cover (CP) for escutcheon

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

Escutcheon (CDP) with blanking plate.

PB100776-42R.eps



Transparent cover (CP) for escutcheon.

Automatic transfer switch

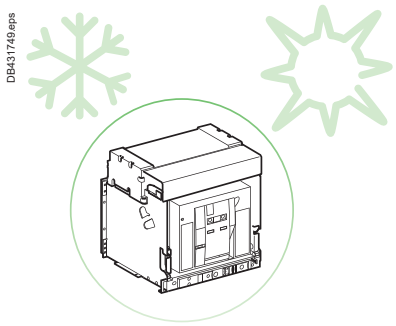
Not available (automatic transfer cannot be guarantee due to closing conditions).

Installation recommendations

B

Operating conditions

Masterpact circuit breakers have been tested for operation in industrial atmospheres. It is recommended that the equipment be cooled or heated to the proper operating temperature and kept free of excessive vibration and dust.

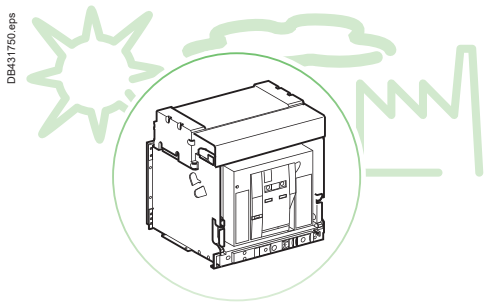


Ambient temperature [1]

Masterpact UR can operate under the following temperature conditions:
- the electrical and mechanical characteristics are guaranteed for an ambient temperature of +15 °C to +50 °C [2].

Storage conditions are as follows:
- Masterpact UR without control unit (Micrologic, “UR control”) and “UR Power” module: -40 °C to +85 °C
- control units (Micrologic, “UR control”) and “UR power” module: -25 °C to +85 °C.

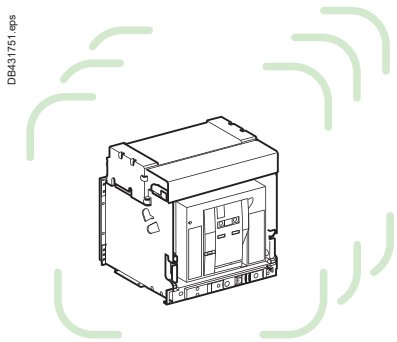
[1] Temperature measured inside the switchboard, 10 cm above the arc chute.
[2] For higher temperature, please consult us.



Extreme atmospheric conditions

Masterpact UR have successfully passed the tests defined by the following standards for extreme atmospheric conditions:
- IEC 60068-2-1: dry cold at -55 °C
- IEC 60068-2-2: dry heat at +85 °C
- IEC 60068-2-30: damp heat (temperature +55 °C, relative humidity 95 %)
- IEC 60068-2-52 level 2: salt mist.

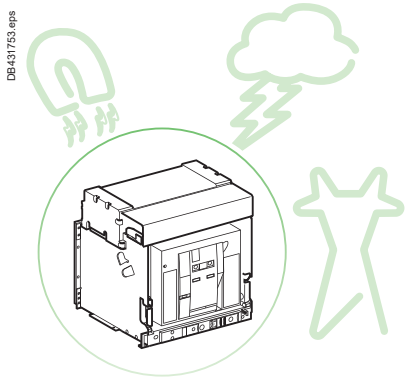
Masterpact UR can operate in the industrial environments defined by standard IEC 60947 (pollution degree up to 3).
It is nonetheless advised to check that the devices are installed in suitably cooled switchboards without excessive dust.



Vibrations

Masterpact UR are guaranteed against electromagnetic or mechanical vibrations. Tests are carried out in compliance with standard IEC 60068-2-6 for the levels required by merchant-marine inspection organisations (Veritas, Lloyd’s, etc.):
- 2 to 13.2 Hz: amplitude ±1 mm
- 13.2 to 100 Hz: constant acceleration 0.7 g.

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



Electromagnetic disturbances

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

Masterpact UR have successfully passed the electromagnetic-compatibility tests (EMC) defined by the following international standards:
- IEC 60947-2, appendix F.

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

Level II

Minor preventive-maintenance operations such as greasing and operating checks, as well as repairs by standard exchange of certain assemblies, carried out by a certified customer employee according to the manufacturer maintenance instructions.

Check	Year					Tool	Procedure number
	1	2	3	4	5 [1]		
Device							
Check the general condition of the device (escutcheon, control unit, case, chassis, connections)	■	■	■	■	■	None	device NII_1_1.pdf
Mechanism							
Open/close device manually and electrically	■	■	■	■	■	None	mechanism NII_1_1.pdf
Charge device electrically	■	■	■	■	■	None	mechanism NII_1_2.pdf
Check complete closing of device's poles	■	■	■	■	■	None	mechanism NII_1_3.pdf
Check number of device operating cycles	■	■	■	■	■	Operation counter	mechanism NII_1_4.pdf
Check the free movement of the Thomson propeller disk	■	■	■	■	■	None	mechanism NII_1_5.pdf
Breaking unit (arc chutes + contacts)							
Check the filters cleanlines and the fixing of the arc-chute chambers	■	■	■	■	■	Dynamometric crank	breaking unit NII_1_1.pdf
Control auxiliaries							
Check auxiliary wiring and insulation	■	■	■	■	■	None	auxiliaries NII_1_1.pdf
Control unit							
Trip control unit using test tool and check operation of contacts SDE1 and SDE2	■	■	■	■	■	HHTK or FFTK	control unit NII_1_1.pdf
Check earth-fault protection function (Micrologic 6.0)	■	■	■	■	■	None	control unit NII_1_2.pdf
Device locking							
Open and close keylocks installed on device	■	■	■	■	■	None	device locking NII_1_1.pdf
Open and close padlocking system installed on device	■	■	■	■	■	None	device locking NII_1_2.pdf
Chassis (optional)							
Remove device from chassis and put it back	■	■	■	■	■	None	chassis NII_1_1.pdf
Check operation of position contacts (CE, CT, CD, EF)	■	■	■	■	■	None	chassis NII_1_2.pdf
Check operation of safety shutters	■	■	■	■	■	None	chassis NII_1_3.pdf
Chassis locking							
Open and close keylocks installed on chassis	■	■	■	■	■	None	chassis locking NII_1_1.pdf
Operate padlocking system	■	■	■	■	■	None	chassis locking NII_1_2.pdf

[1] These checks will be carried out by Schneider Services in case of diagnostic the fifth year (see page B-5).

Preventive maintenance
Level II recommended every 2 years

Level III

General preventive-maintenance operations such as general adjustments, trouble-shooting and diagnosis of breakdowns, repairs by exchange of components or functional parts, minor mechanical repairs, carried out by a qualified customer technician using the tools and measurement/setting devices specified in the manufacturer maintenance instructions.

Check	Years					Tool	Procedure number
	1	2	3	4	5 [1]		
Mechanism							
Check gear-motor charging time at 0,85 Un		■		■	■	Stop-watch + external power supply	mechanism NIII_2_1.pdf
Check general condition of mechanism		■		■	■	Screwdriver	mechanism NIII_2_2.pdf
Breaking unit (arc chutes + contacts)							
Check condition UR of breaking unit		■		■	■	[2]	breaking unit NIII_3_1.pdf
Control auxiliaries							
Check operation of indication contacts (OF / PF / MCH)		■		■	■	Ωmetre	auxiliaries NIII_2_1.pdf
Check closing operation of control auxiliary XF at 0.85 Un		■		■	■	External power supply	auxiliaries NIII_2_2.pdf
Check opening operation of control auxiliary MX at 0.70 Un		■		■	■	External power supply	auxiliaries NIII_2_3.pdf
Check operation of control auxiliary MN/MNR between 0.35 and 0.7 Un		■		■	■	External power supply	auxiliaries NIII_2_4.pdf
Check delay of MNR devices at 0.35 and 0.7 Un		■		■	■	External power supply	auxiliaries NIII_2_5.pdf
Check MX tripping time		■		■	■	Tester	auxiliaries NIII_2_6.pdf
Control unit							
Check tripping curves using test tool, signallling LED (tripped, overload) Save results on PC		■		■	■	FFTK FFTK report generator software	control unit NIII_2_1.pdf
Chassis (optional)							
Dust and regrease chassis		■		■	■	Mobilith SHC100	chassis NIII_2_1.pdf
Regrease disconnecting-contact clusters (specific case of corrosive athmospheres)		■		■	■	Mobilith SHC100	chassis NIII_2_2.pdf
Power connections							
Check and tighten loose connections	Only after a visual inspection showing overheating marks					Dynamometric crank	power connections NIII_2_1.pdf
“UR power” module							
Check capacitance (and serial resistance)		■		■	■	Capacimeter	UR power NIII_2_1.pdf
Tune up and check charging voltage		■		■	■	Voltmeter	UR power NIII_2_2.pdf
Extract and analyse events log		■		■	■	Software + PC	UR power NIII_2_3.pdf
Check continuity of TEC discharge circuit		■		■	■		UR power NIII_2_4.pdf
Check accelerated ageing (only after full load operation)		■		■	■	Curve	UR power NIII_2_5.pdf
“UR control” module							
Check signalling LED		■		■	■		UR control NIII_2_1.pdf
Check continuity of circuit (CT’s to UR control)		■		■	■		UR control NIII_2_2.pdf

[1] These checks and tests will be carried out by Schneider Services in case of diagnostic the fifth year (see page B-5).
[2] Contact wear measuring tool.

Manufacturer diagnostic and replacement of components
Level IV recommended every 5 years

Level IV

All the major preventive and corrective-maintenance work ensured by the Schneider Electric after-sales support department.

Check	Years					Tool	Procedure number
	5	10	15	20	25		(=S= internal use)
Case							
Measure insulation resistance	■	■	■	■	■	Ohmmeter	device NIV_3_1.pdf
Mechanism							
Check tripping forces (crescent shaped part)	■	■	■	■	■	Tester	mechanism NIV_3_1.pdf
Measure the gap (between the Thomson propeller disk and contact finger) and the travel of the disk	■	■	■	■	■	[1]	mechanism NIV_3_2.pdf
Breaking unit (arc chutes + contacts)							
Measure resistance of input/output contact	■	■	■	■	■	Ohmmeter + injection unit	breaking unit NIV_3_1. pdf
Control auxiliaries							
Preventive replacement of control auxiliaries			■			None	
Micrologic control unit							
Save protection settings, log events (Micrologic P and H) and edit reports.	■	■	■	■	■	Magicbox + SSU software	control unit NIV_3_1.pdf
Check continuity of the tripping chain by primary injection for each phase	■	■	■	■	■	Injection unit	control unit NIV_3_2.pdf
Check DIN/DINF tripping using performer test tool	■	■	■	■	■	Performer test kit	control unit NIV_3_3.pdf
Check operation of thumbwheels	■	■	■	■	■	RSU	control unit NIV_3_4.pdf
Check the service life of control unit Preventive replacement of Micrologic	■	■	■ ■	■	■	"service life" software RSU	auxiliaries NIV_3_1.pdf
Chassis (optional)							
Clean and regrease racking screw (NW only)	■	■	■	■	■	Grease	chassis NIV_3_1.pdf
Check connection/disconnection torque						Dynamometric crank	chassis NIV_3_2.pdf
Communication module and accessories							
Test the device control, the uploading of contact status (OF, SDE, PF, CH) operation of optical link , by using the communication bus	■	■	■	■	■	Magicbox + RCU software	communication-en NIV_3_1.pdf
Test the uploading of chassis position contacts, the synchronisation of the address between BCM, the forced replication of the BCM address, by using the communication bus	■	■	■	■	■	Magicbox + RSU software	communication-en NIV_3_2.pdf
Test the writing of data into Micrologic by using the communication bus	■	■	■	■	■	Magicbox + RSU software	communication-en NIV_3_3.pdf
"UR power" module							
Preventive replacement of capacitors	■	■	■	■	■		UR power NIV_3_1.pdf
Tune up capacitors and pole deplacement	■	■	■	■	■		UR power NIV_3_2.pdf
Tighten fixing scews of capacitor discharge cables	■	■	■	■	■		UR power NIV_3_3.pdf
Preventive replacement of interface electronic card			■				UR power NIV_3_4.pdf
"UR control" module							
Perform Thomson effect trip	■	■	■	■	■		UR control NIV_3_1.pdf
Preventive replacement of "UR control"			■				UR control NIV_3_3.pdf

[1] "Contact/Thruster" gap measuring tool.

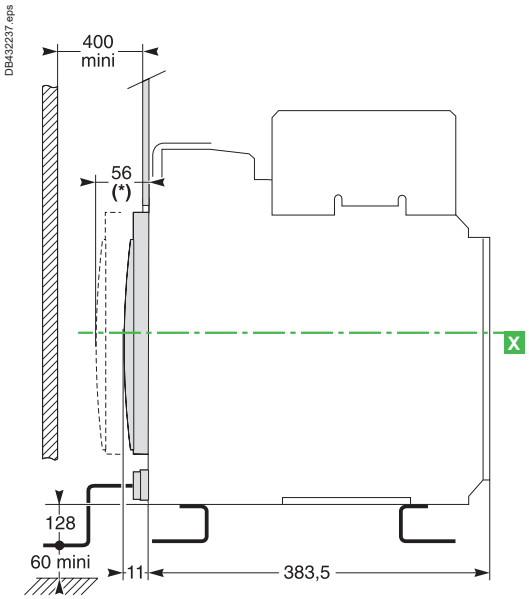
B

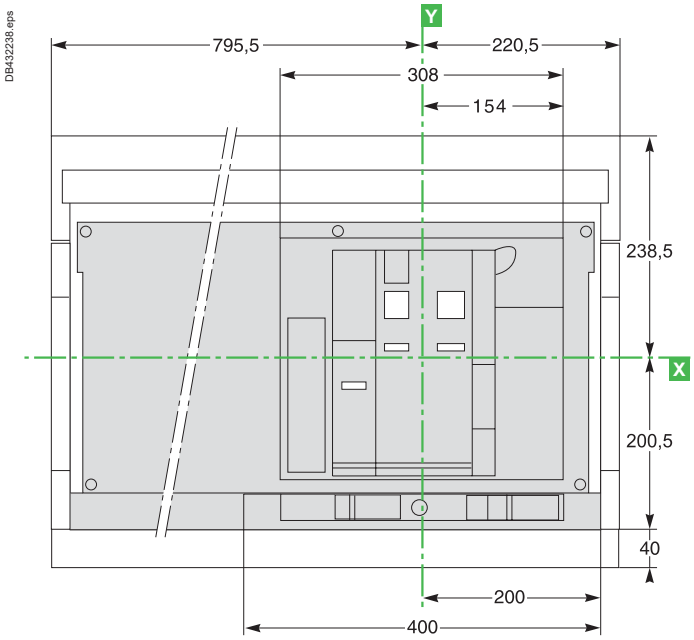
Dimensions and connections

C

UR50 - UR60 circuit breakers
Drawout 3-pole devices

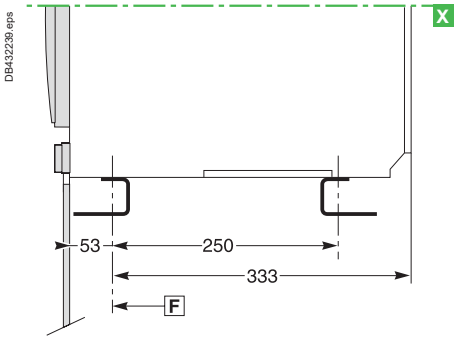
Dimensions



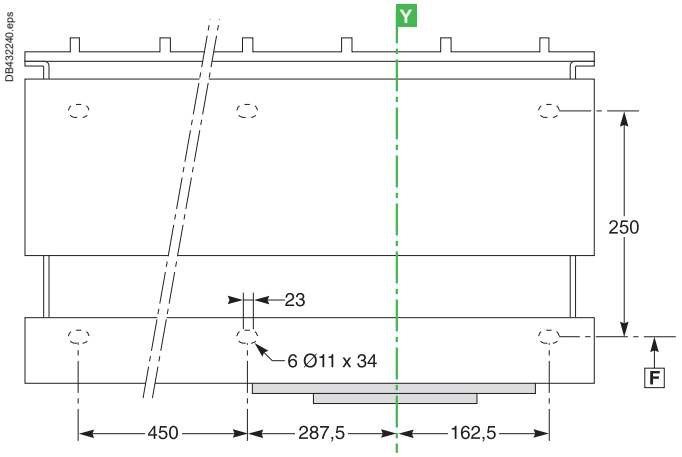


[*] Disconnected position.

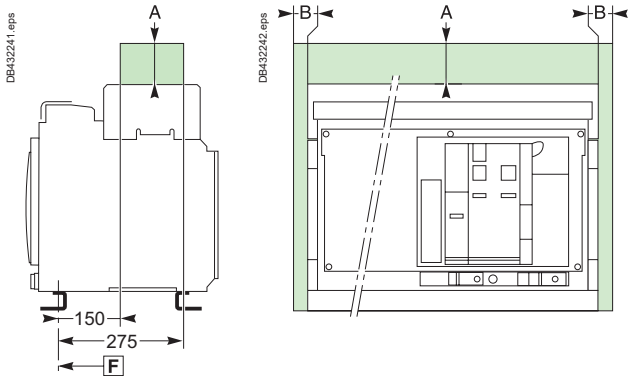
Mounting on base plate or rails



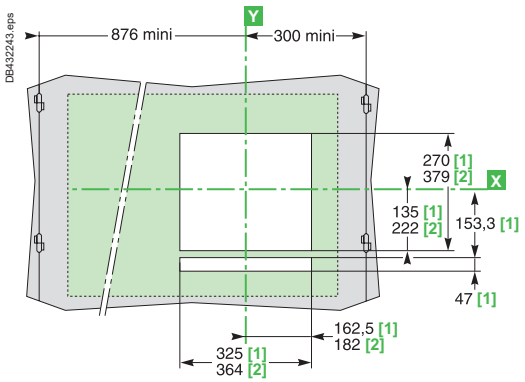
Mounting detail



Safety clearances



Door cutout

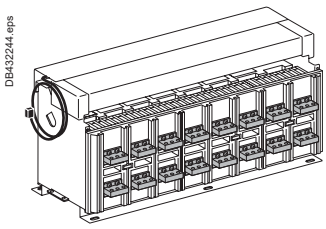


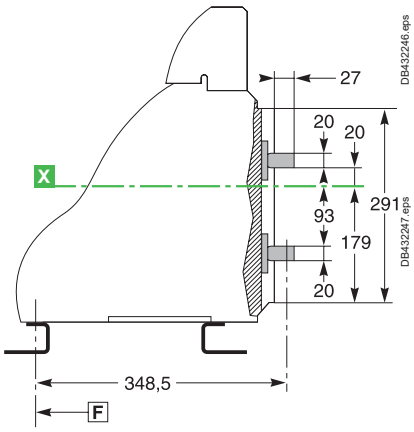
	Insulated parts	Metal parts	Energised parts
A	0	0	0
B	0	0	60

[1] Without escutcheon.
[2] With escutcheon.
Note: X and Y are the symmetry planes for a 3-pole device.
F: datum.

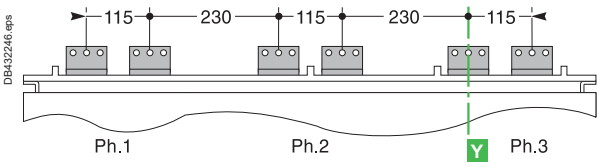
Connections

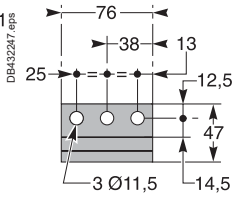
Horizontal rear connection (UR50)



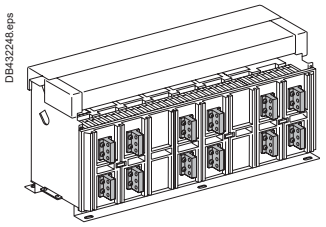


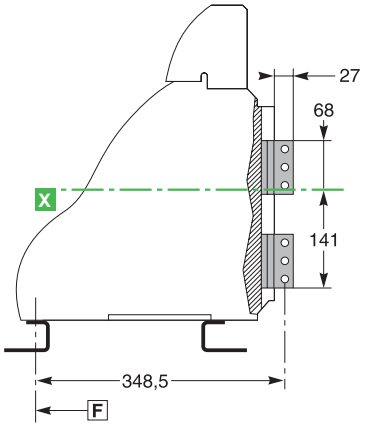
Detail



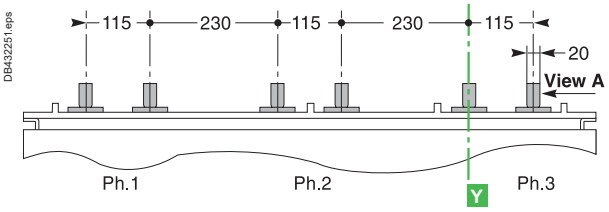


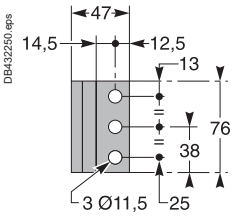
Vertical rear connection (UR50)





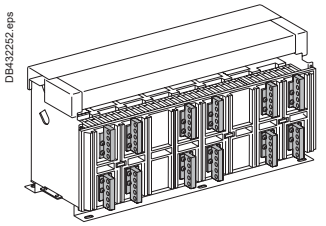
Detail

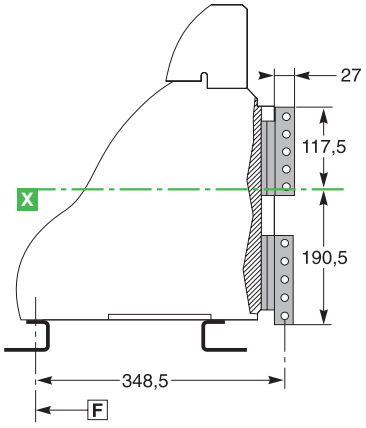




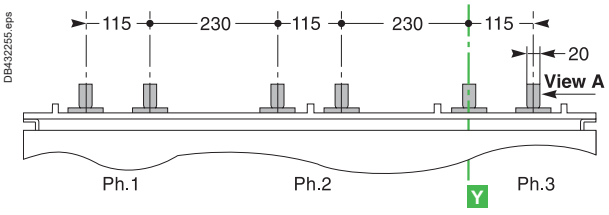
View A detail.

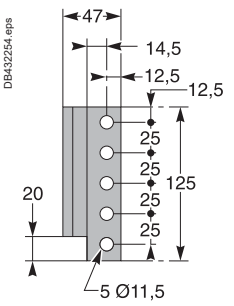
Vertical rear connection (UR60)





Detail



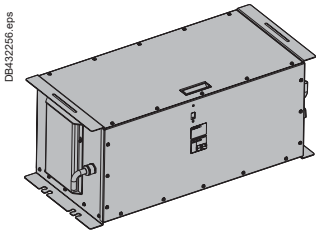


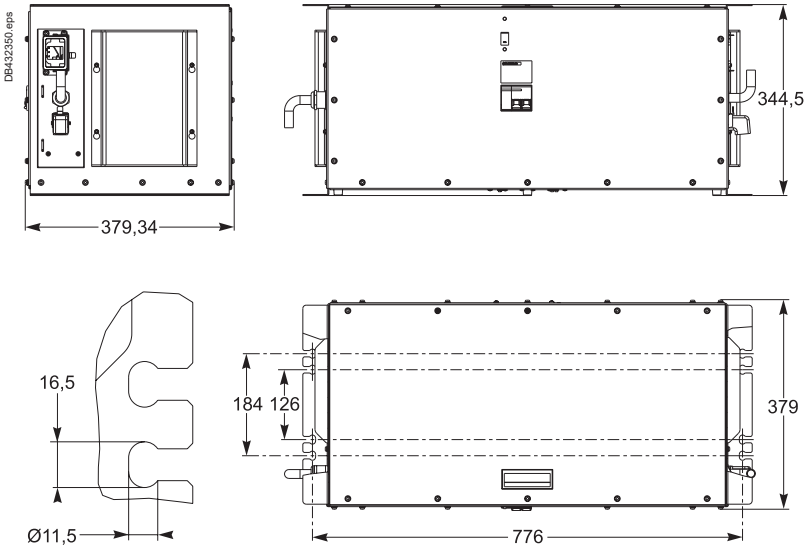
View A detail.

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

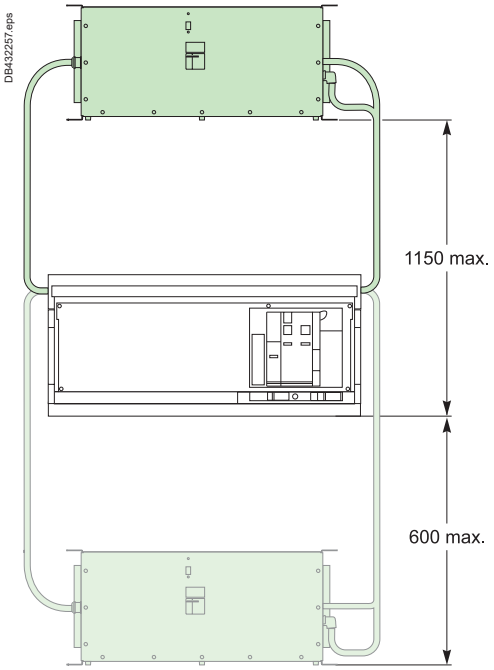
“UR power” module

UR power 50/60 device





Installation

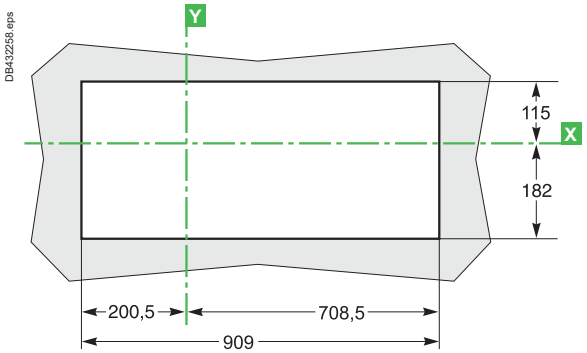


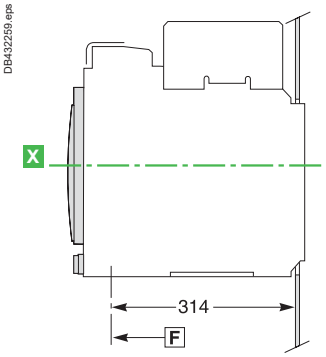
Nota: possible installation of “UR power” module on right side of circuit breaker. Please consult us.

Rear panel cutout (drawout devices)

UR50 - UR63

Rear view

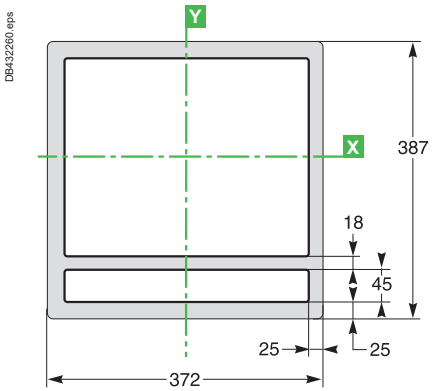




Escutcheon

Masterpact UR

Drawout device

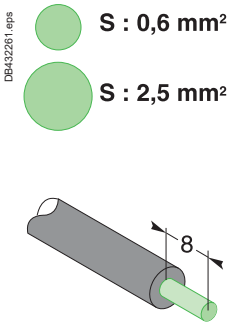


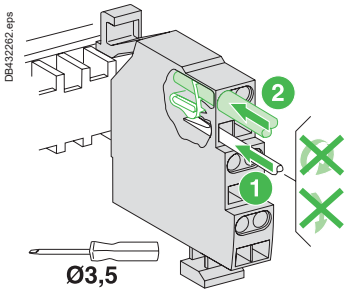
F: datum.

C

UR external modules

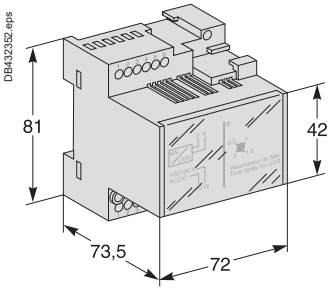
Connection of auxilary wiring to terminal block

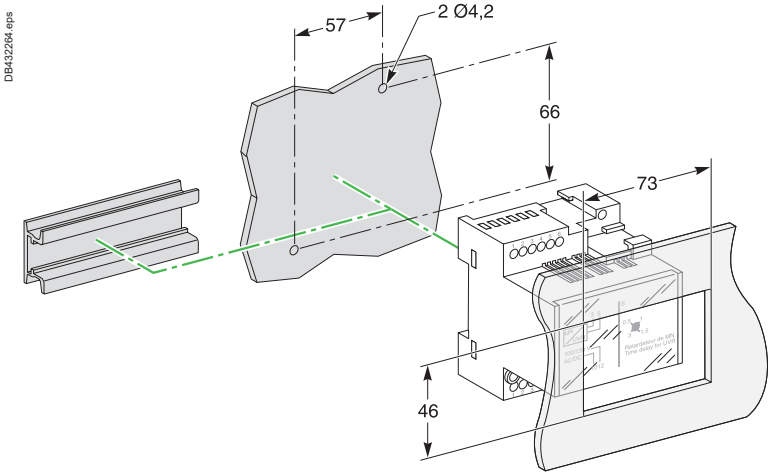




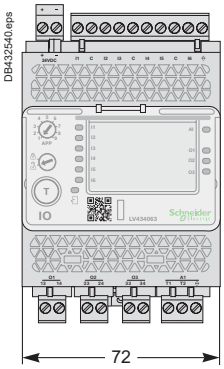
One conductor only per connection point.

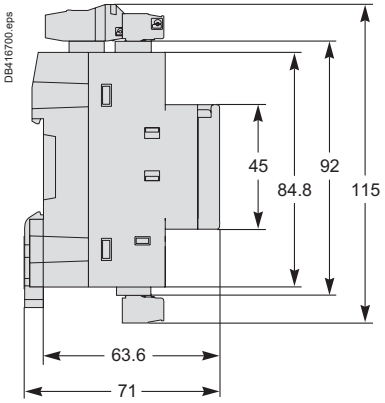
Delay unit for MN release



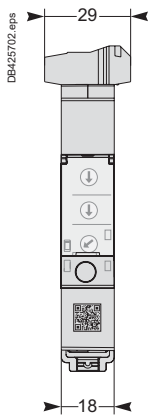


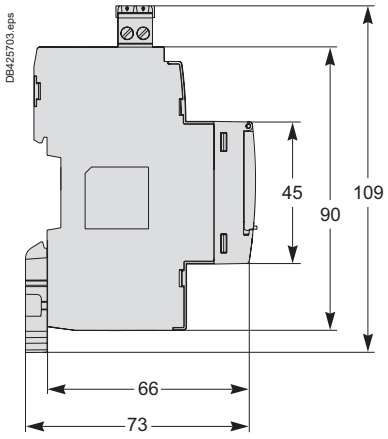
I/O (Input/Output) application module





IFM - Modbus-SL interface





C

D

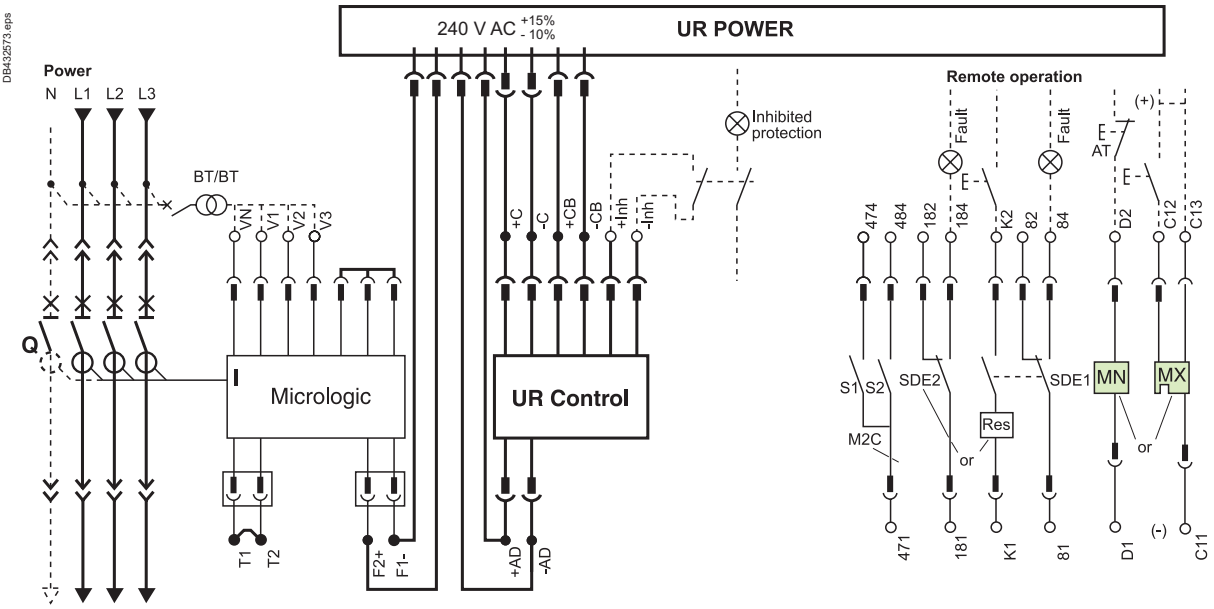
Electrical diagrams

D

Masterpact UR50 - UR60
Drawout devices

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

Power — Control unit — Remote operation



D

Control unit

Terminal block marking	Com		UC1		UC2		UC3	UC4	M2C
	E5	E6			+Inh	-Inh	F2+	V3	484
	E3	E4	+C	-C	+CB	-CB	VN	V2	474
	E1	E2	+AD	-AD	T1	T2	F1 –	V1	471

Remote operation

SDE2 / Res		SDE1	MN / MX		XF	PF	MCH
184 /	K2	84	D2 /	C12	A2	254	B2
182		82		C13	A3	252	B3
181 /	K1	81	D1 /	C11	A1	251	B1

A	E	P	H	Control unit
■	■	■	■	**Com:** E1-E6 communication
■	■		■	**UC1:** +C, -C : Output CAN +AD, -AD "UR control" 24 V DC power supply
■		■	■	**UC2**: +Inh, -Inh : Inhibition tripping on electrical defect (indication)
■		■	■	+ CB, -CB : Input Thomson tripping
■	■	■	■	T1, T2
■	■	■	■	**UC3:** F2+, F1- "Micrologic" 24 V DC power supply
		■	■	VN external neutral voltage connector (must be connected to the neutral with a 3P circuit breaker)
		■	■	**UC4**: V1, V2, V3 external voltage connector (must be connected by user)
	■	■	■	**M2C:** 2 programmable contacts (internal relay) 24 V DC supplyed by Micrologic

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

Remote operation

SDE2: fault-trip indication contact
or
Res: remote reset

SDE1: fault-trip indication contact (supplied as standard)

MN: undervoltage release
or
MX shunt release

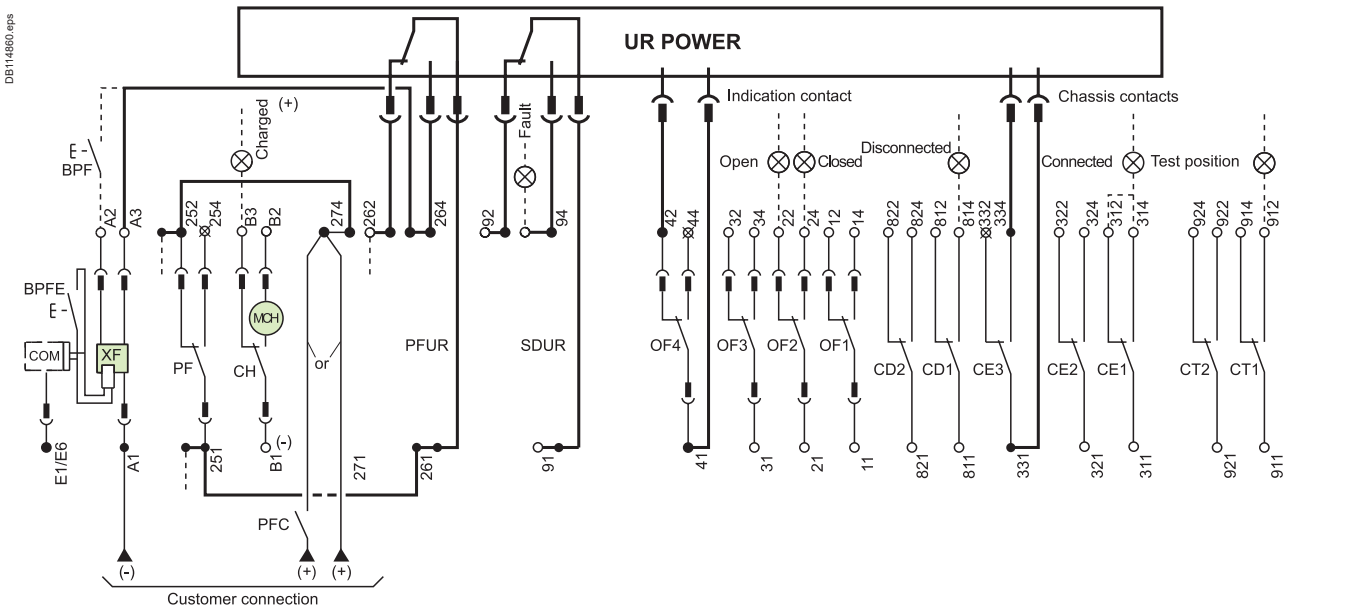
XFcom: communicating closing release in series by PF, PFC and PFUR

PF: ready-to-close contacts in series by PFC, PFUR and XF release
MCH: electric motor

Note: when communicating MX release is used, the third wire (C13) must be connected even if the communication is not installed.

Indication contacts

Chassis contacts



Indication contacts

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

IN/OUT : Connecting points

PFC	PFUR	SDUR
274	264	94
	262	92
	261	91

Chassis contacts

CD2	CD1	CE3	CE2	CE1	CT2	CT1
824	814	334	324	314	924	914
822	812	332	322	312	922	912
821	811	331	321	311	921	911

or

CE8	CE7
384	374
382	372
381	371

Indication contacts

OF4 ON/OFF indication contacts
OF3
OF2
OF1
(OF4: for “UR power” use only)

PFC: “customer” ready-to-close contact

PFUR: “UR power” and “UR control” ready-to-close contact

SDUR: “UR power” Thomson Trip Fault

Chassis contacts

CD2 **CD1** disconnected position contacts

CE3 **CE2** **CE1** connected position contacts

CE3 (for “UR power” use only)

CT2 **CT1** test position contacts

or

CE8 **CE7** connected position contacts

Key:

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

Interconnected connections (only one wire per connection point).

Prohibited to use

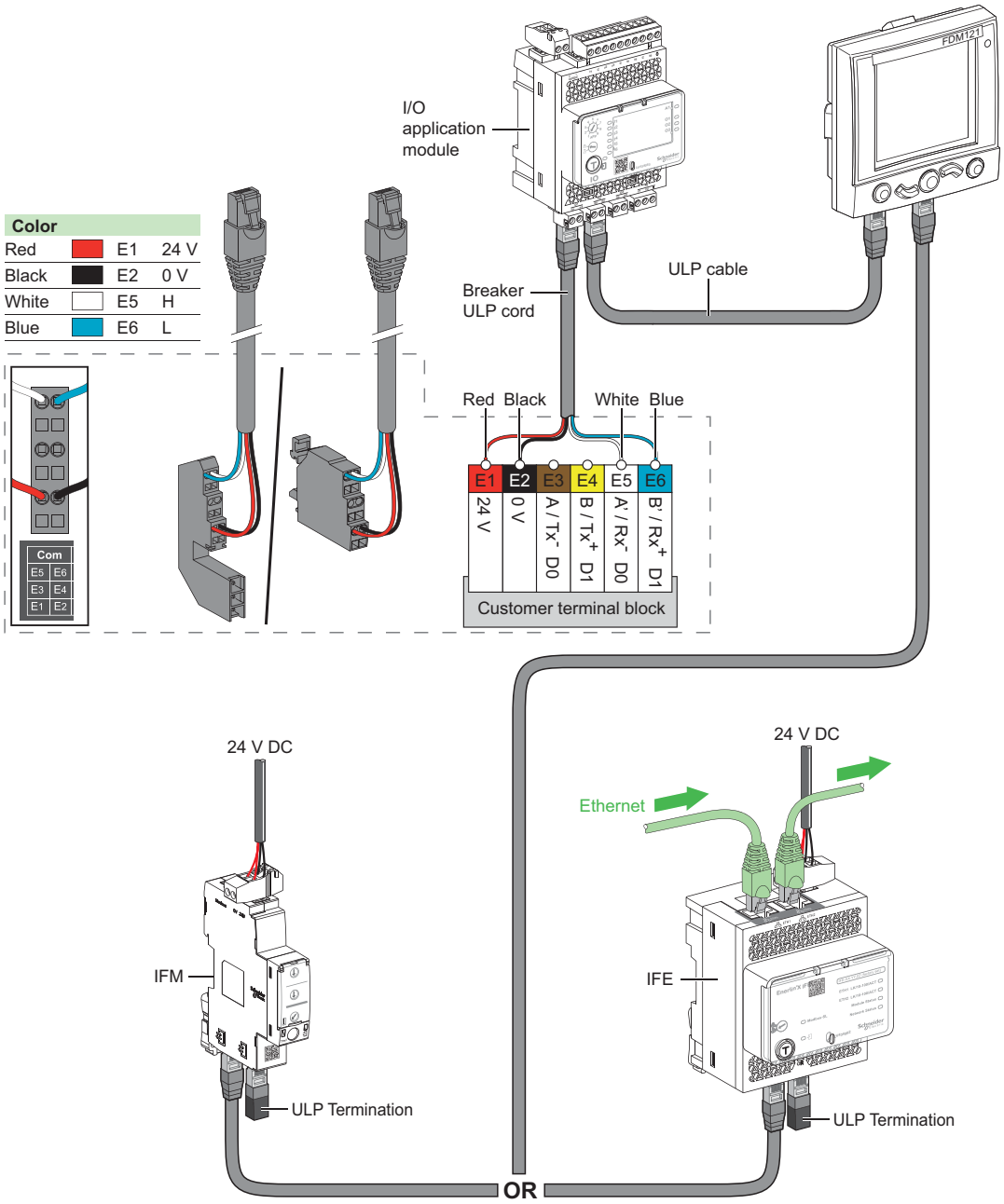
Factory wired

Note : for remote indication of PFUR status and system internal errors, follow the electrical diagram as proposed (see page D-2).

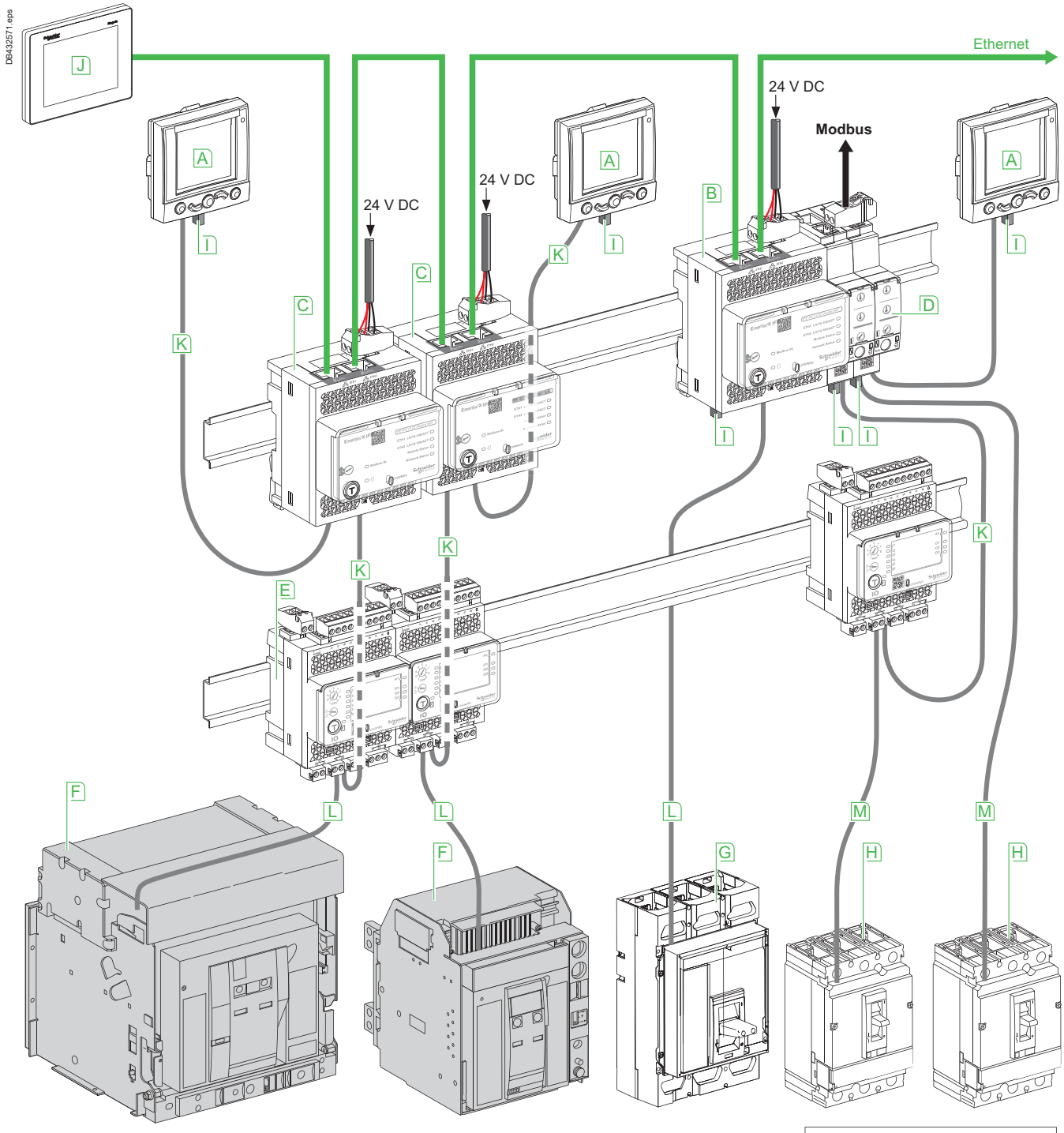
Withdrawable Masterpact UR50 - UR60

Connection to the I/O and communication interface module

DB432549.eps



Communication architecture



A FDM121 (TRV00121)
B IFE master (LV434002)
C IFE (LV434001)
D IFM (LV434000)
E I/O application module (LV434063)
F Masterpact MTZ1/MTZ2
G Compact NS630b-3200
H Compact NSX
I ULP termination (TRV00880)
J FDM128 (LV434128)
N Modbus Termination [1] (VW3A8306DRC)

[1] Modbus termination is mandatory, see ULP system user guide TRV99101.

Fixed, electrically operated Masterpact UR50 - UR60

Connection to the communication interface module

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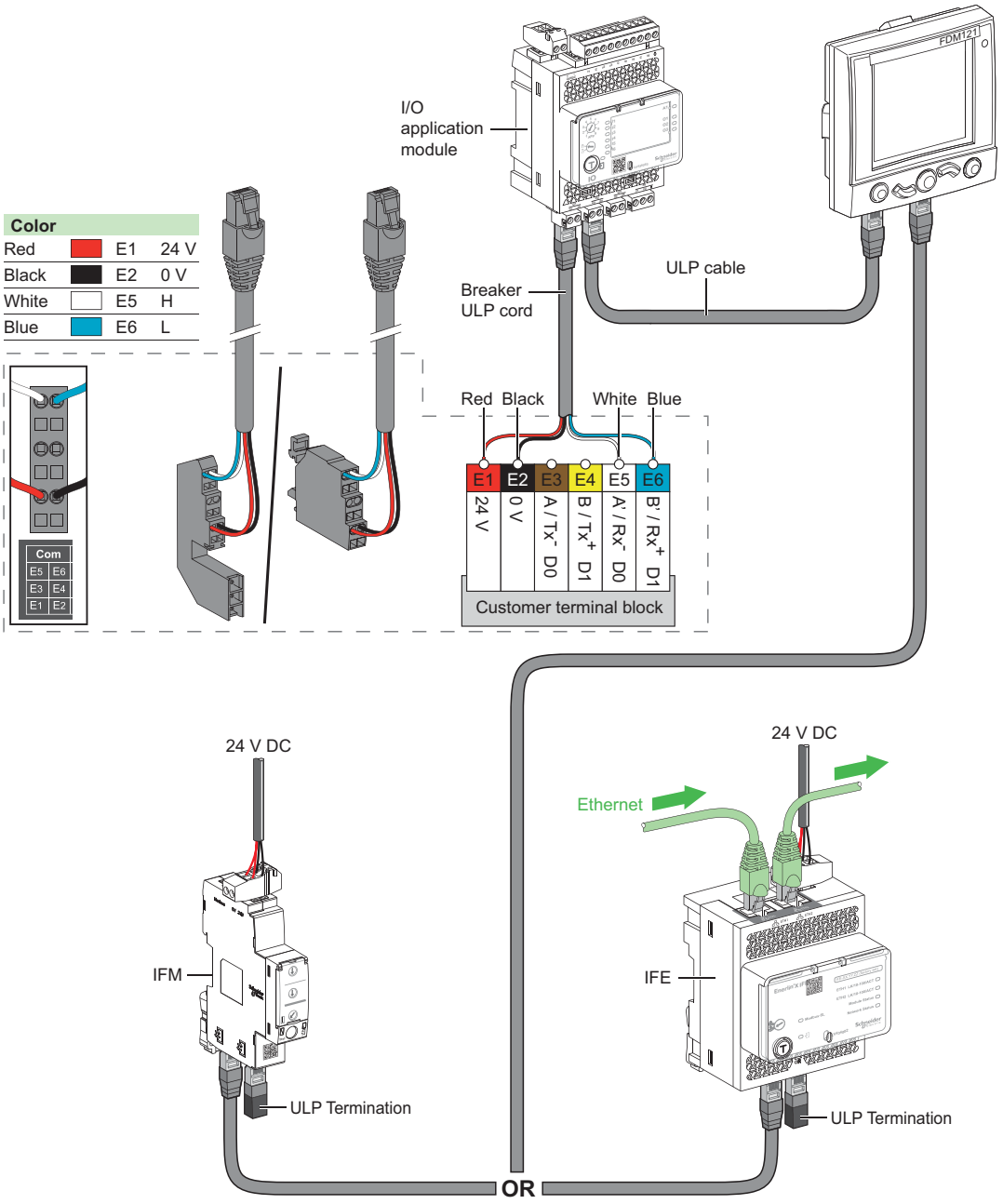
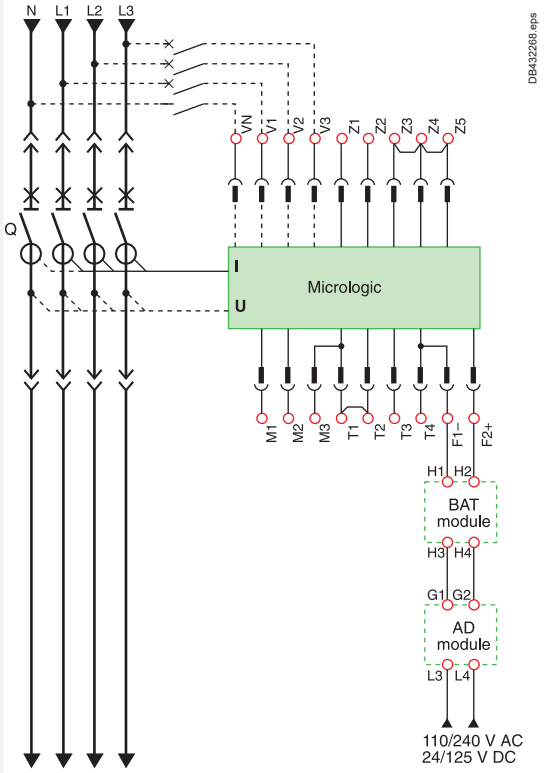


D

Masterpact UR50 - UR60
24 V DC external power supply AD module

■ With Micrologic, it is recommended to connect 24 V DC external power-supply (AD module) to the Micrologic control unit (F1- F2+) in order:
□ to keep available the display and the energy metering, even if Current < 20 % In.
□ to use the display even if the circuit breaker is open or not supplied (for the exact conditions of use, see the “electrical diagrams” part of this catalogue)
□ to display fault currents after tripping
□ to modify settings when the circuit breaker is open (OFF position).
■ The same 24 V DC external power supply can be used for the micrologic control unit and the communication devices (IFE, IFM, I/O, FDM).
■ The 24 V DC external power-supply (AD module) for the Micrologic control unit (F1- F2+) is not required for basic protections LSIG.
■ The 24 V DC external power-supply for the BCM ULP communication module (E1-E2) is required. The same 24 V DC external power supply can be used for the communication devices (IFE, IFM, I/O, FDM).
■ If the 24 V DC external power supply (AD module) is used to supply Micrologic control unit, this power supply shall be used only for supplying Micrologic control units and M2C.
■ The dedicated AD power supplies shall be used only for the Micrologic trip units. If the COM option is used, a second dedicated 24 V DC external power supply shall be used.

Note: In case of using the 24 V DC external power supply (AD module), maximum cable length between 24 V DC (G1, G2) and the control unit (F1-, F2+) must not exceed 10 meters.
The internal voltage taps are connected to the bottom side of the circuit breaker.
An external voltage taps are possible using the PTE option:
■ With this option, the internal voltage taps are disconnected and the voltage taps are connected to terminals VN, V1, V2, V3.
■ The PTE option is required for voltages less than 220 V and greater than 690 V (in which case a voltage transformer is compulsory). For three-pole devices, the system is supplied with terminal VN connected only to the control unit.
■ When the PTE option is implemented, the voltage measurement input must be protected against short-circuits.
Installed as close as possible to the busbars, this protection function is ensured by a P25M circuit breaker (1 A rating) with an auxiliary contact (cat. no. 21104 and 21117).
■ This voltage measurement input is reserved exclusively for the control unit and must not ever be used to supply other circuits outside the switchboard.
The BAT battery module, mounted in series upstream of the AD module, ensures an uninterrupted supply of power if the AD module power supply fails.



Connection

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

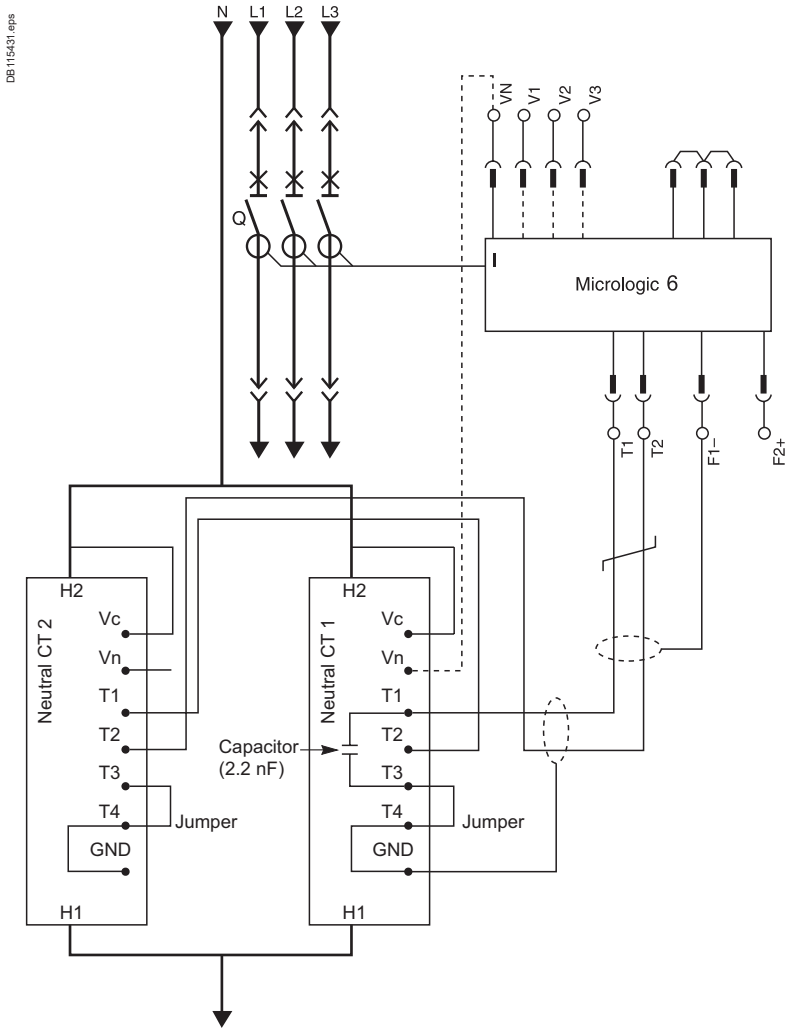
Do not ground F2+, F1-, or power supply output:
■ the positive terminal (F2+) on the trip unit must not be connected to earth ground
■ the negative terminal (F1-) on the trip unit must not be connected to earth ground
■ the output terminals (- and +) of the 24 V DC power supply must not be grounded.

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

D

Masterpact UR50 - UR60
Earth-fault and neutral protection

External sensor (CT) for residual earth-fault protection



Connection of current-transformer secondary circuit for external neutral
Masterpact equipped with a Micrologic 6 E/P/H:
- shielded cable with 1 twisted pair
- T1 twisted with T2
- shielding connected to GND and to F1-
- maximum length 4 meters
- cable cross-sectional area 0.4 to 1.5 mm^2
- recommanded cable: Belden 8723 or equivalent.

If supply is via the top, follow the shematics.
If supply is via the bottom, control wiring is identical; for the power wiring, H1 is connected to the source side, H2 to the load side.
- On the 2000/6300 current transformer signals T1 and T2 must be wired in series.

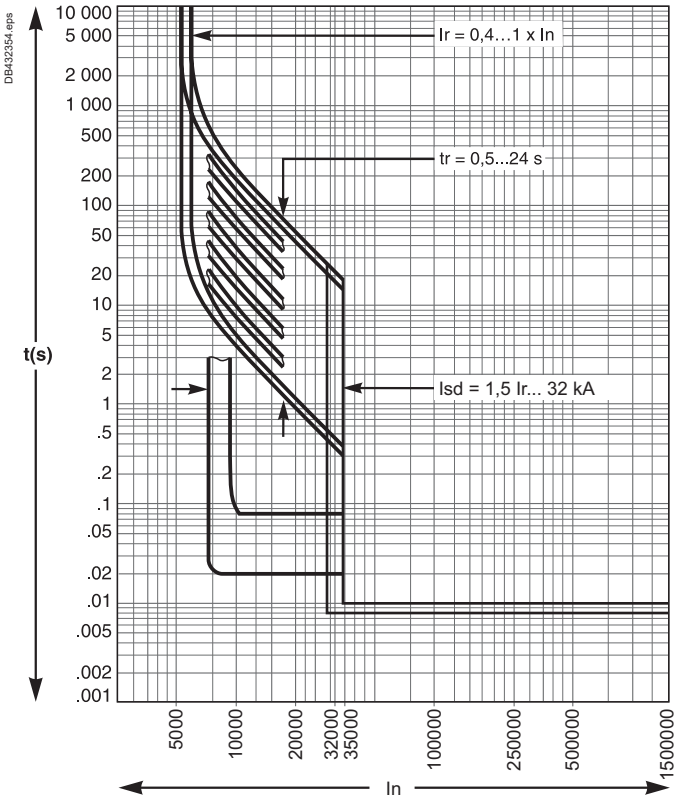
Connection for signal VN is required only for power measurements (3 Ø , 4 wires, 4 CTs).

Additional characteristics

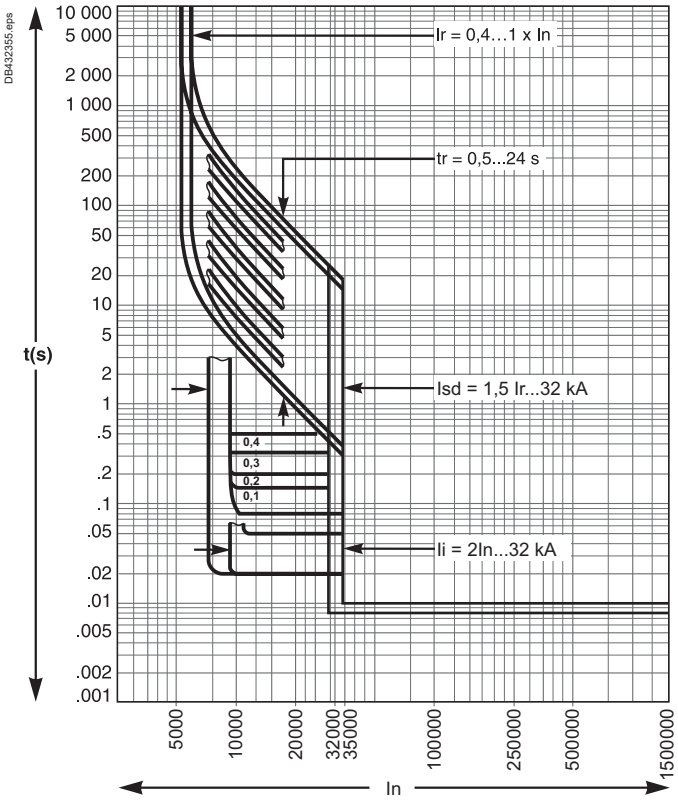
E

Tripping curves
Masterpact UR50

Micrologic 2.0 A/E

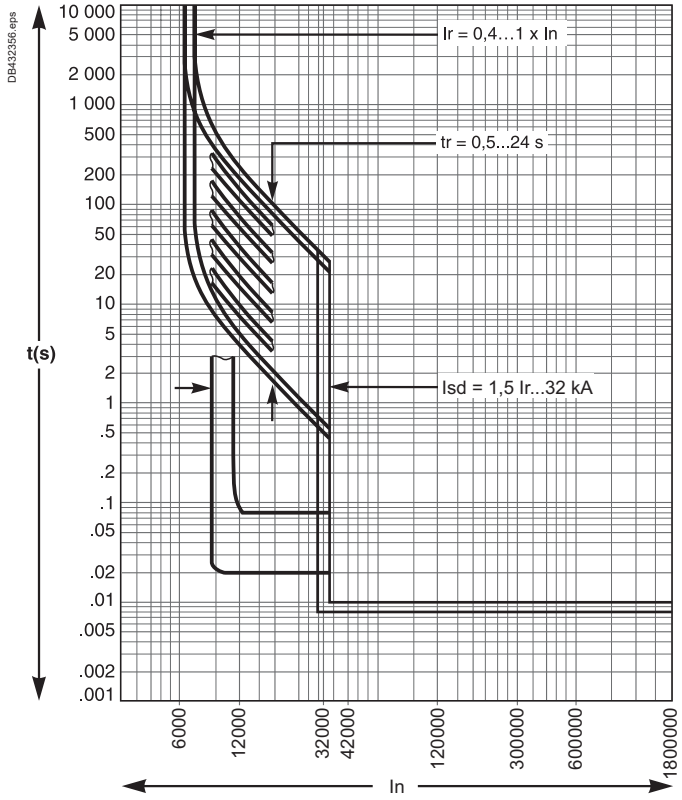


Micrologic 5.0 A/E/P/H

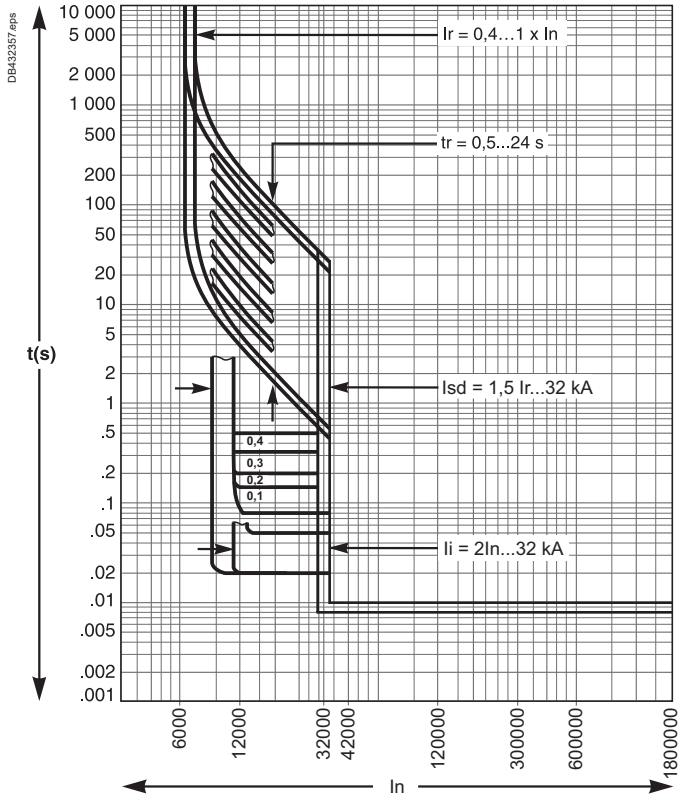


E

Micrologic 2.0 A/E



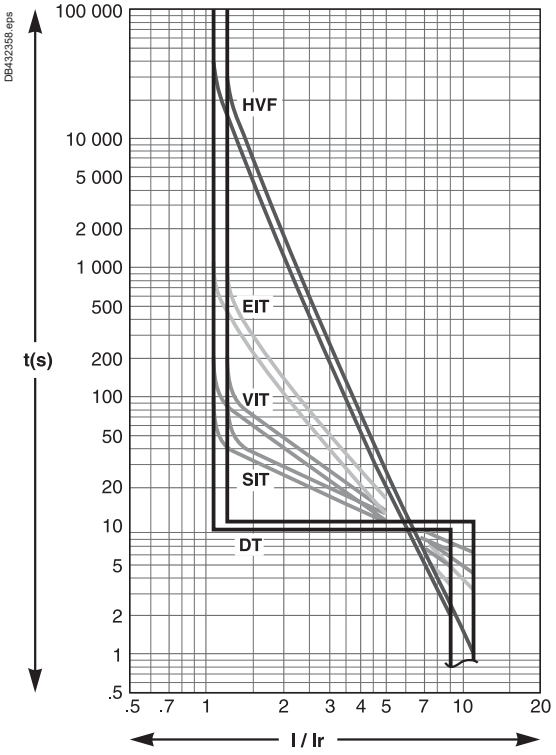
Micrologic 5.0 A/E/P/H



E

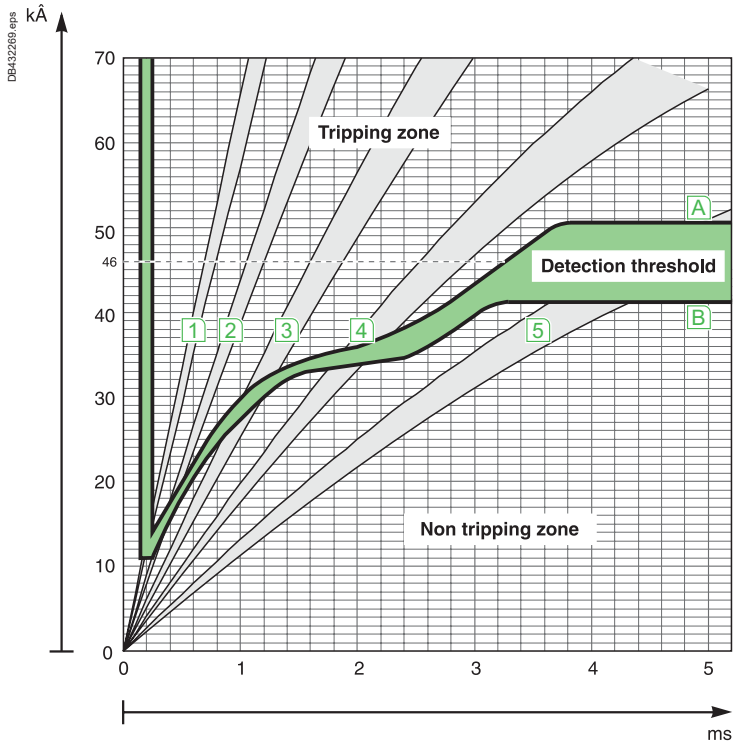
Tripping curves

IDMTL curve (Micrologic P and H)



E

Masterpact 5000 A / 6000 A



A Threshold max. integrated instantaneous protection (50.6 kÂ).
B Threshold min. integrated instantaneous protection (41 kÂ).

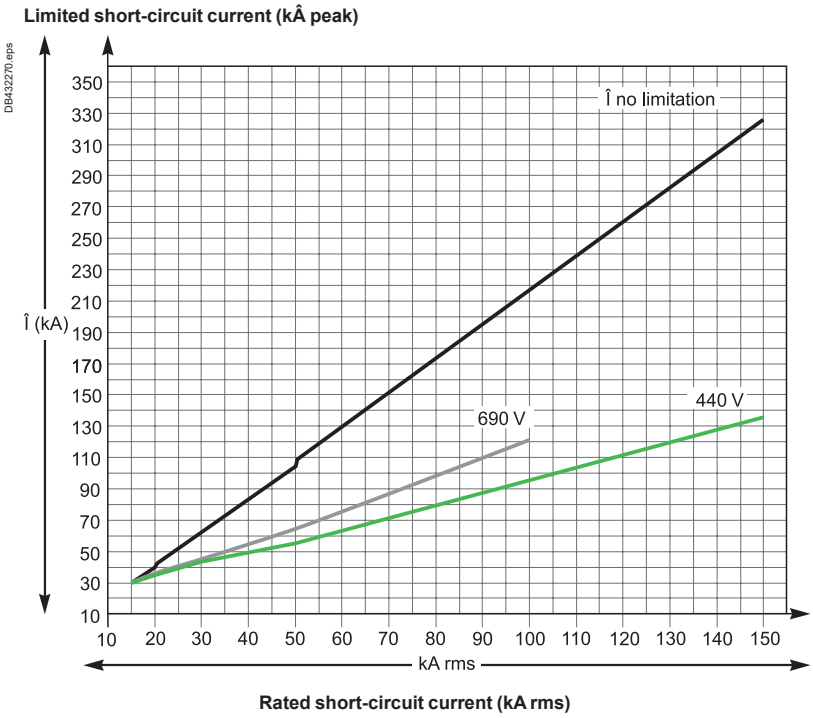
Example of several cases of appearance of 3 phases short circuits					
Curve "envelope"	**1**	**2**	**3**	**4**	**5**
50 Hz	150	100	67.5	45	30
60 Hz	125	83	56	36	25

Example:
For a prospective short-circuit current of 100 kA (50 Hz) or 83 kA (60 Hz), the UR control module will detect the default between 11 kA / 240 µs and 20 kA / 500 µs, depending on the closing angle.

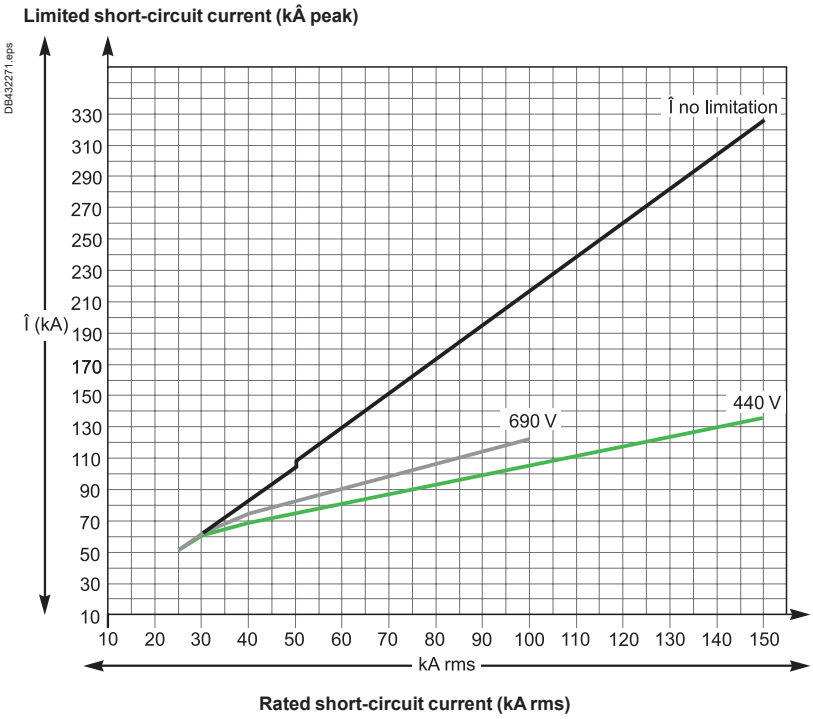
E

Limitation curves
Current limiting

Low threshold 50/60 Hz - Masterpact UR 50-60



High threshold 50/60 Hz - Masterpact UR 50-60



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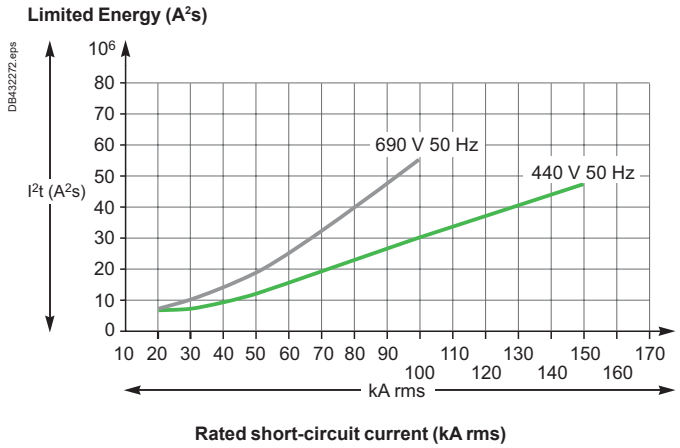
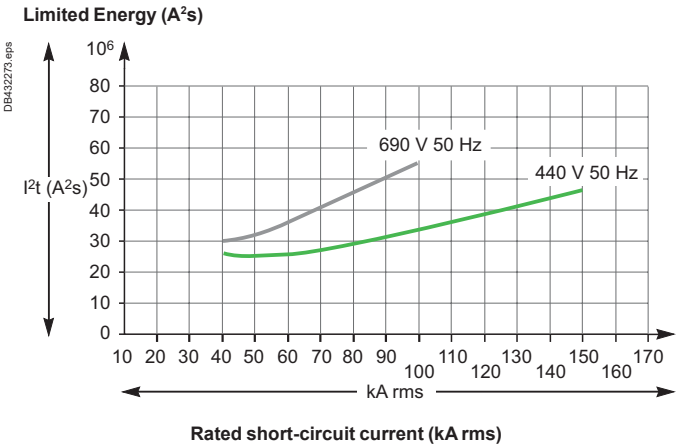
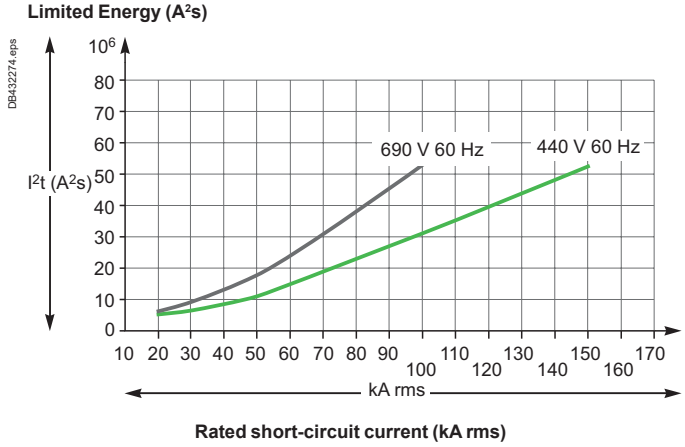
Low threshold 50 Hz - Masterpact UR 50-60



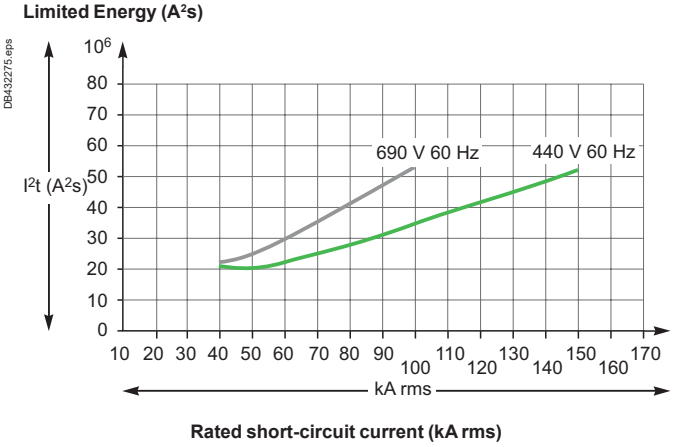
High threshold 50 Hz - Masterpact UR 50-60



Low threshold 60 Hz - Masterpact UR 50-60



High threshold 60 Hz - Masterpact UR 50-60



E

Temperature derating
Power dissipation and input / output resistance

Temperature derating

The table below indicates the maximum current rating, for each connection type, as a function of Ti around the circuit breaker and the busbars.
Circuit breakers with mixed connections have the same derating as horizontally connected breakers. For Ti greater than 50 °C, consult us.
Ti: temperature around the circuit breaker and its connection.

Version	Drawout						
Connection	Rear horizontal						
Temp. Ti	40	45	50	55	60	65	70
UR 50 L	5000	4830	4650	4470	4280	4090	3890
UR 60 L	-	-	-	-	-	-	-
Version	**Drawout**						
Connection	**Rear horizontal**						
Temp. Ti	**40**	**45**	**50**	**55**	**60**	**65**	**70**
UR 50 L	5000				4950	4730	4500
UR 60 L	6000	5780	5550	5320	4280	5080	4840

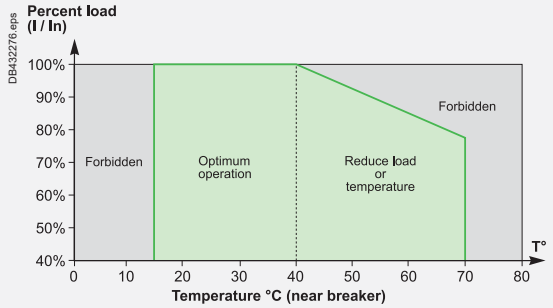
Power dissipation and input / output resistance

Total power dissipation is the value measured at In, 50/60 Hz, for 3 pole or 4 pole breaker (values above the power P = 3RI2.
The resistance between input / output is the value measured per pole (cold state).

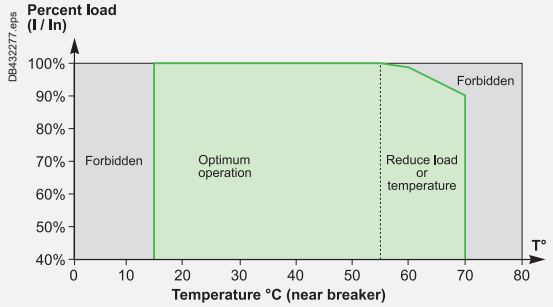
Version	Drawout	
	Power dissipation (W)	Input / output resistance (μΩ)
UR 50 L	940	5
UR 60 L	1150	5

"Thomson Effect" operation according to temperature and breaker percent load

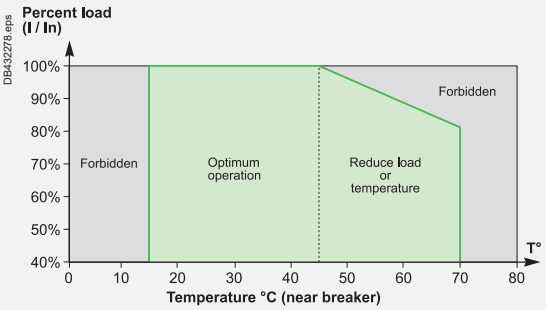
Masterpact UR 50 - Rear horizontal



Masterpact UR 50 - Rear vertical



Masterpact UR 60 - Rear vertical



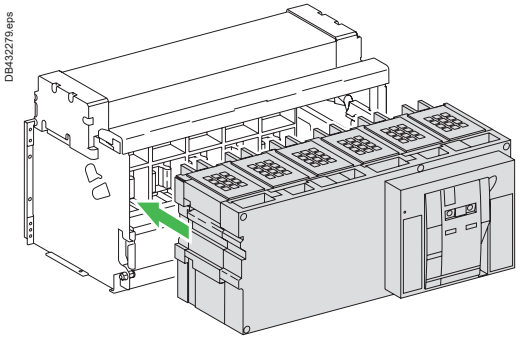
Catalogue numbers

F

Masterpact UR drawout circuit breakers
Circuit breaker, chassis and connection

A Masterpact UR drawout circuit breaker is described by 4 catalogue numbers corresponding to:
- the basic circuit breaker
- **"**UR power**"** module
- a control unit
- chassis equipped with vertical top and bottom connections.

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


DB432279.eps

Basic circuit breaker

			3P
Type			
	In (A at 45 °C)	Icu (kA for U = 220/440 V) - Ics = 100 % Icu	
UR50	5000	150	**65013**
UR60	6000	150	**65015**

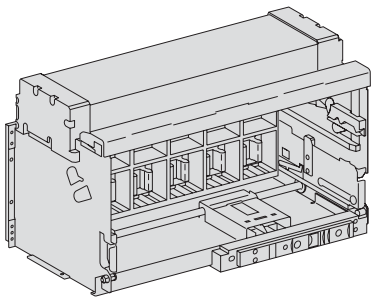
Micrologic control unit

“ammeter” A		
		3P
Micrologic 2.0 A	basic protection	**48358**
Micrologic 5.0 A	selective protection	**48360**
Micrologic 6.0 A	selective + earth-fault protection	**48361**
“energy” E		
		3P
Micrologic 2.0 E	basic protection	**48498**
Micrologic 5.0 E	selective protection	**48499**
Micrologic 6.0 E	selective + earth-fault protection	**48500**
“power meter” P		
		3P
Micrologic 5.0 P	selective protection	**48363**
Micrologic 6.0 P	selective + earth-fault protection	**48364**
“harmonic meter” H		
		3P
Micrologic 5.0 H	selective protection	**48366**
Micrologic 6.0 H	selective + earth-fault protection	**48367**

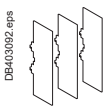
UR Power Module

		3P
UR power module	50/60	**65051**

Chassis


DB115636.eps

	3P
For type	
UR50	**65033**
UR60	**65036**
Rear connection accessories	
Interphase barries	
3P (3 parts)	**48600**


DB403092.eps

Chassis equipped as standard with **vertical top** and **bottom connections.**

Auxiliaries and accessories:
- for drawout devices: (see page F-9)

Masterpact UR drawout circuit breakers
Chassis locking and accessories

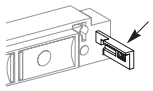
Chassis locking

"Disconnected" position locking


DB403064.eps

By padlocks		
	VCPO	Standard
By profalux keylocks		
Profalux	1 lock with 1 key + adaptation kit	**48568**
	2 locks 1 key + adaptation kit	**48569**
	2 locks 2 different keys + adaptation kit	**48570**
1 keylock Profalux (without adaptation kit):		
	identical key not identified combination	**33173**
	identical key identified 215470 combination	**33174**
	identical key identified 215471 combination	**33175**
By Ronis keylocks		
Ronis	1 lock with 1 key + adaptation kit	**48572**
	2 locks 1 key + adaptation kit	**48573**
	2 locks 2 different keys + adaptation kit	**48574**
1 keylock Ronis (without adaptation kit):		
	identical key not identified combination	**33189**
	identical key identified EL24135 combination	**33190**
	identical key identified EL24153 combination	**33191**
	identical key identified EL24315 combination	**33192**
Optional disconnected/test/connected position locking		**33779**
Adaptation kit (without keylock):		
	adaptation kit Profalux, Ronis	**48564**
	adaptation kit Castell	**48565**
	adaptation kit Kirk	**48566**

Racking interlock


DB432175.eps

1 part		**48582**

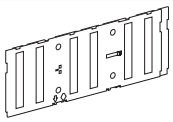
Chassis accessories

Auxiliary terminal shield (CB)


DB403066.eps

5000/6000 A	Standard

Safety shutters + locking block


DB403067.eps

5000/6000 A	Standard

Shutter locking block (for remplacement)


DB403068.eps

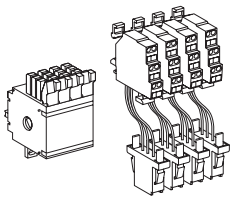
	Standard

F

Masterpact UR drawout circuit breakers
Indication contacts

ON/OFF indication contacts (OF)

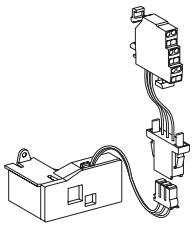
DB432179.eps



Block of 3 changeover contacts (6 A - 240 V)	1 block (standard)

"Fault trip" indication contacts (SDE)

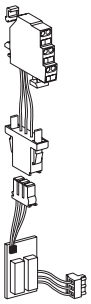
DB432180.eps



Changeover contact (5 A - 240 V)	1 (standard)
1 additional SDE (5 A - 240 V)	**48475**
or 1 additional low-level SDE	**48476**

Programmable contacts [1] (programmed via Micrologic control unit)

DB432359.eps

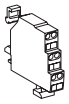


M2C

2 contacts M2C (5 A - 240 V)	**48382**

Carriage switches (connected / disconnected / test position)

DB403073.eps



Changeover contacts (8 A - 240 V)	
1 connected position contact (2 max.)	**33751**
1 test position contact (2 max.)	**33752**
1 disconnected position contact (2 max.)	**33753**
and/or low-level changeover contacts	
1 connected position contact (2 max.)	**33754**
1 test position contact (2 max.)	**33755**
1 disconnected position contact (2 max.)	**33756**
Actuator for additional carriage switches (4CE + 2CD only)	**48560**

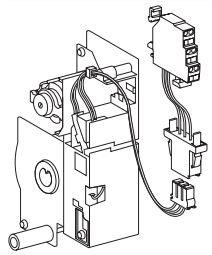
[1] For Micrologic control units P and H only.

Masterpact UR drawout circuit breakers
Remote operation

Remote ON/OFF

Gear motor

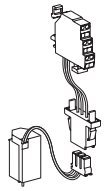
DB432361.eps



		MCH
AC 50/60 Hz	48 V	**48522**
	100/130 V	**48526**
	200/240 V	**48527**
	250/277 V	**48528**
	380/415 V	**48529**
	440/480 V	**48530**
DC	24/30 V	**48521**
	48/60 V	**48522**
	100/130 V	**48523**
	200/250 V	**48524**

Instantaneous voltage releases

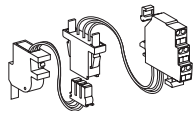
DB432362.eps



		Closing release	Opening release
Standard		**XF**	**MX not compatible with MN**
AC 50/60 Hz	12 V DC		**48490**
DC	24/30 V DC, 24 V AC		**48491**
	48/60 V DC, 48 V AC		**48492**
	100/130 V AC/DC		**48493**
	200/250 V AC/DC		**48494**
	277 V AC		**48495**
	380/480 V AC		**48496**
Cummunicating		**XF com**	**MX com not compatible with MN**
AC 50/60 Hz	12 V DC	**48448**	**48457**
DC	24/30 V DC, 24 V AC	**48449**	**48458**
	48/60 V DC, 48 V AC	**48450**	**48459**
	100/130 V AC/DC	**48451**	**48460**
	200/250 V AC/DC	**48452**	**48461**
	277 V AC	**48453**	**48462**
	380/480 V AC	**48454**	**48462**

“Ready to close” contact (1 max.)

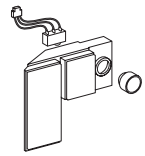
DB432363.eps



	PF
1 changeover contact (5 A - 240 V)	**48469**

Electrical closing pushbutton

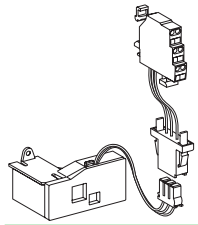
DB432182.eps



	BPFE
1 pushbutton	Standard

Remote reset after fault trip

DB432180.eps

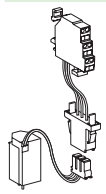


Electrical reset	**Res**
110/130 V AC	**48472**
220/240 V AC	**48473**
Automatic reset	**RAR**
Adaptation	**47346**

Remote tripping

Instantaneous voltage release

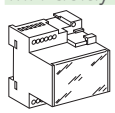
DB432362.eps



		MN not compatible with MX
AC 50/60 Hz	24/30 V DC, 24 V AC	**48501**
DC	48/60 V DC, 48 V AC	**48502**
	100/130 V AC/DC	**48503**
	200/250 V AC/DC	**48504**
	380/480 V AC	**48506**

MN delay unit

DB403080.eps



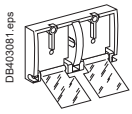
		R (non-adjustable)	Rr (adjustable)
AC 50/60 Hz	48/60 V AC/DC		**33680**
DC	100/130 V AC/DC	**33684**	**33681**
	200/250 V AC/DC	**33685**	**33682**
	380/480 V AC/DC		**33683**

F

Accessories for Masterpact UR drawout circuit breakers
Communication option

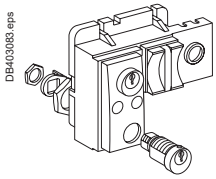
Circuit breaker locking

Pushbutton locking device



By padlocks		Standard

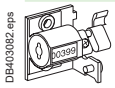
OFF position locking



By padlocks		
	VCPO	**48539**
By Profalux keylocks		
Profalux	1 lock with 1 key + adaptation kit	**48545**
	2 locks 1 key + adaptation kit	**48546**
	2 locks 2 different keys + adaptation kit	**48547**
1 keylock Profalux (without adaptation kit):	identical key not identified combination	**33173**
	identical key identified 215470 combination	**33174**
	identical key identified 215471 combination	**33175**
By Ronis keylocks		
Ronis	1 lock with 1 key + adaptation kit	**48549**
	2 locks 1 key + adaptation kit	**48550**
	2 locks 2 different keys + adaptation kit	**48551**
1 keylock Ronis (without adaptation kit):	identical key not identified combination	**33189**
	identical key identified EL24135 combination	**33190**
	identical key identified EL24153 combination	**33191**
	identical key identified EL24315 combination	**33192**
Adaptation kit (without keylock):	adaptation kit Profalux / Ronis	**48541**
	adaptation kit Kirk	**48542**
	adaptation kit Castell	**48543**

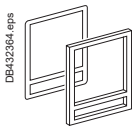
Other circuit breaker accessories

Mechanical operation counter



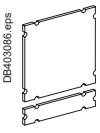
Operation counter CDM	Standard

Escutcheon and accessories



Escutcheon

Cover



Blanking plate

Escutcheon	**48603**
Transparent cover IP54	**48604**
Escutcheon blanking plate	**48605**

Communication option

COM (BCM-ULP)		**47405**
Eco COM module (BCM-ULP)		**47407**
IFE	Ethernet interface for LV breaker	**LV434001**
	Ethernet interface for LV breakers and gateway	**LV434002**
IFM Modbus-SL interface module		**LV434000**
I/O application module		**LV434063**

F

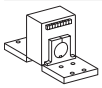
Accessories for Masterpact UR drawout circuit breakers
Communication option

Accessories for Micrologic control units

External sensors

External sensor for earth-fault protection (TCE)

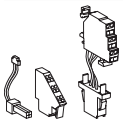
DB403087.eps



Sensor rating	5000/6000 A	**48182**

Voltage measurement input (for breakers supplied via bottom terminals)

DB432365.eps



Voltage measurement input	Drawout	Standard

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

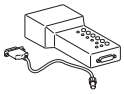
DB403089.eps

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

Test equipment

Mini test kit

DB432366.eps



Hand held test kit (HHTK)	**33594**

Portable test kit

DB403091.eps

Full function test kit (FFTK)	**33596**
Test report edition come from FFTK	**34559**
FFTK test cable 2 pin for STR trip unit	**34560**
FFTK test cable 7 pin for Micrologic trip unit	**33590**

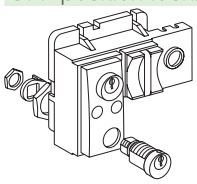
F

Masterpact UR
Circuit breaker locking and accessories

Circuit breaker locking

OFF position locking / 1 part

DB403083.eps



By padlocks / 1 part

	VCPO	**48539**

By padlocks and keylocks / 1 part

Profalux	1 lock with 1 key + adaptation kit	**48545**
	2 locks / 1 key + adaptation kit	**48546**
	2 locks 2 different keys + adaptation kit	**48547**
1 keylock Profalux (without adaptation kit):		
	identical key not identified combination	**33173**
	identical key identified 215470 combination	**33174**
	identical key identified 215471 combination	**33175**

By Ronis keylocks

Ronis	1 lock with 1 key + adaptation kit	**48549**
	2 locks / 1 keys + adaptation kit	**48550**
	2 locks 2 different keys + adaptation kit	**48551**
1 keylock Ronis (without adaptation kit):		
	identical key not identified combination	**33189**
	identical key identified EL24135 combination	**33190**
	identical key identified EL24153 combination	**33191**
	identical key identified EL24315 combination	**33192**
Adaptation kit (without keylock):		
	adaptation kit Profalux, Ronis	**48541**
	adaptation kit Kirk	**48542**
	adaptation kit Castell	**48543**
Installation manual		**47951**

Other circuit breaker accessories

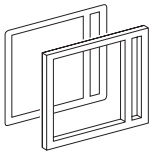
Mechanical operation counter / 1 part

DB117057.eps

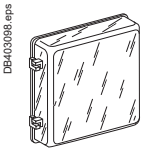
Operation counter CDM	**48535**

Escutcheon and accessories / 1 part

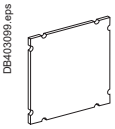
DB432177.eps



DB403098.eps



DB403099.eps

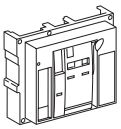


	Drawout
Escutcheon	**48603**
Transparent cover (IP 54)	**48604**
Escutcheon blanking plate	**48605**

Escutcheon. Cover. Blanking plate.

Front cover / 1 part

DB403100.eps



UR50/UR60	5000 A/6000 A	**65085**

Note: the push buttom locking device is mounted on the front cover.

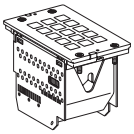
Spring charging handle / 1 part

DB403101.eps

Spring charging handle	**47940**

Arc chute for Masterpact UR / 1 part

DB432367.eps

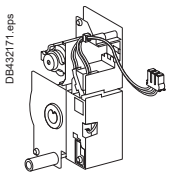


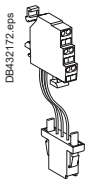
	3P
UR type	**65080**

F

Remote operation opening and closing

Gear motor

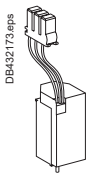


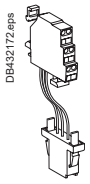


MCH (1 part)

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

Standard opening release MX

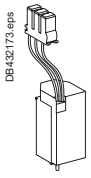


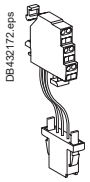


Standard coil

AC 50/60 Hz	12 V DC	**33658**
DC	24-30 V AC/DC	**33659**
	48-60 V AC/DC	**33660**
	100-130 V AC/DC	**33661**
	200-250 V AC/DC	**33662**
	277 V AC	**33663**
	380-480 V AC	**33664**
Terminal block (1 part)	For drawout circuit breaker	**47849**
Installation manual		**47951**

Communication closing release XF and opening release MX

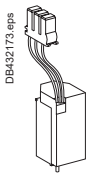


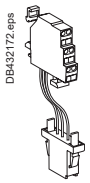


Communicating coil

AC 50/60 Hz	12 V DC	**33032**
DC	24-30 V AC/DC	**33033**
	48-60 V AC/DC	**33034**
	100-130 V AC/DC	**33035**
	200-250 V AC/DC	**33036**
	277 V AC	**33037**
	380-480 V AC	**33038**
Terminal block (1 part)	For drawout circuit breaker	**47849**
Installation manual		**47951**

Undervoltage release MN

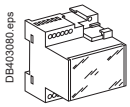




Undervoltage release

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

MN delay unit



MN delay unit (1 part)

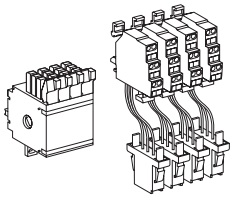
AC 50/60 Hz	48-60 V	adjustable	**33680**
DC	100-130 V	adjustable	**33681**
		non-adjustable	**33684**
	200-250 V	adjustable	**33682**
		non-adjustable	**33685**
	380-480 V	adjustable	**33683**
Installation manual			**47951**

F

Masterpact UR
Circuit breaker auxiliaries and accessories

Indications contacts for breaker

ON/OFF indication contacts (OF)

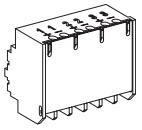


Block of 4 changeover contacts (6 A - 240 V), only 3OF available	**1 block (standard)**	**47887**
Wiring for drawout circuit breaker		**47849**
Installation manual		**47951** + **65066**

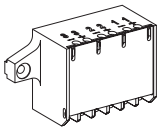
"Ready to close" contact (1 max / 1 part)

1 changeover contact (5 A - 240 V)	**47080**
Wiring for drawout circuit breaker	**47849**
Installation manual	**47951**

Connection box for capacitor cable



Right side	**65082**



Left side	**65081**

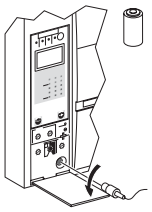
F

Replacement parts for Micrologic control units

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

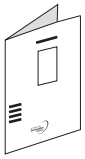
Standard	0.4 at 1 x Ir	**33542**
Low-setting option	0.4 at 0.8 x Ir	**33543**
High-setting option	0.8 at 1 x Ir	**33544**
Without long-time protection	off	**33545**
Installation manual		**33075**

Battery + cover



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

User manual (1 part)



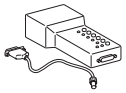
2A	French	**33079**
	English	**33080**
2E	French	**33079**
	English	**33080**
5P	French	**33082**
	English	**33083**
5H	French	**33085**
	English	**33086**

Instructions

Chassis accessories		**47952**
Circuit breaker accessories		**47951**
Installation manuel drawout circuit breaker		**65066**
User manuel Masterpact UR	French	**65086**
	English	**65067**
Modbus communication notice for manuel		**33088**
Micrologic accessories replacement guide		**33075**

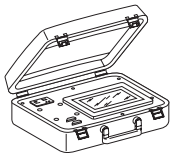
Test equipment

Mini test kit



HHTK	**33594**

Micrologic portable test kit

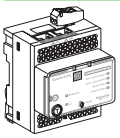


Full function test kit (FFTK)	**33595**
FFTK / HHTK test cable (7 pins) for Micrologic	**33590**
FFTK Report generator software	**34559**
User manual (included with HHTK and FFTK)	-

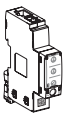
F

Communication, monitoring and control, for Masterpact UR

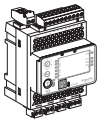
Communication option



IFE	Ethernet interface for LV breaker	**LV434001**
	Ethernet interface for LV breakers and gateway	**LV434002**



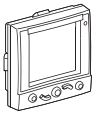
IFM Modbus-SL interface module	**LV434000**
I/O application module	**LV434063**
6 wires terminals drawout (1 part)	**47850**
6 wires terminals fixed (1 part)	**47075**



User guide IFE	**DOCA0084EN-00**
User guide I/O application module	**DOCA0055EN-00**

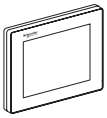
Monitoring and control

ULP display module [1]



Switchboard front display module FDM121	**TRV00121**
FDM mounting accessory (diameter 22 mm)	**TRV00128**

Ethernet display module

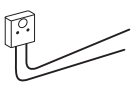


Switchboard front display module FDM128	**LV434128**

ULP wiring accessories

Breaker ULP cord L = 0.35 m	**LV434195**
Breaker ULP cord L = 1.3 m	**LV434196**
Breaker ULP cord L = 3 m	**LV434197**

10 stacking connectors for communication interface modules	**TRV00217**



2 Modbus line terminators	**VW3A8306DRC** [2]

5 RJ45 connectors female/female	**TRV00870**

10 ULP line terminators	**TRV00880**

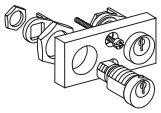
10 RJ45/RJ45 male cord L = 0.3 m	**TRV00803**
10 RJ45/RJ45 male cord L = 0.6 m	**TRV00806**
5 RJ45/RJ45 male cord L = 1 m	**TRV00810**
5 RJ45/RJ45 male cord L = 2 m	**TRV00820**
5 RJ45/RJ45 male cord L = 3 m	**TRV00830**
1 RJ45/RJ45 male cord L = 5 m	**TRV00850**

[1] For measurement display with Micrologic A, E, P and H.
[2] See Telemecanique catalogue.

F

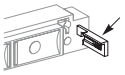
Chassis locking

"Disconnected" position locking


DB403064.eps

By padlocks		
	VCPO	**Standard**
By Profalux keylocks		
Profalux	1 lock with 1 key + adaptation kit	**48568**
	2 locks / 1 keys + adaptation kit	**48569**
	2 locks 2 different keys + adaptation kit	**48570**
1 keylock Profalux (without adaptation kit):		
	identical key not identified combination	**33173**
	identical key identified 215470 combination	**33174**
	identical key identified 215471 combination	**33175**
By Ronis keylocks		
Ronis	1 lock with 1 key + adaptation kit	**48572**
	2 locks / 1 keys + adaptation kit	**48573**
	2 locks 2 different keys + adaptation kit	**48574**
1 keylock Ronis (without adaptation kit):		
	identical key not identified combination	**33189**
	identical key identified EL24135 combination	**33190**
	identical key identified EL24153 combination	**33191**
	identical key identified EL24315 combination	**33192**
Adaptation kit (without keylock):		
	adaptation kit Profalux, Ronis	**48564**
	adaptation kit Kirk	**48565**
	adaptation kit Castell	**48566**

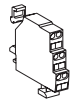
Racking interlock


DB432175.eps

5 parts	**48582**

Indications contacts for chassis

Carriage switches (connected / disconnected / test position)


DB403276.eps

Changeover contacts (8 A - 240V) (includes the actuator)	
1 connected position contact (2 max.)	**33751**
1 test position contact (3 max.)	**33752**
1 disconnected position contact (2 max.)	**33753**
and/or low-level changeover contacts (includes the actuator)	
1 connected position contact (2 max.)	**33754**
1 test position contact (3 max.)	**33755**
1 disconnected position contact (2 max.)	**33756**
1 set of actuators for additional carriage switches (4 CE - 2 CD)	**48560**

Connected disconnected list position indication contact

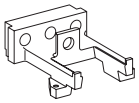
Changeover contact CE/CT/CD	6 A - 240 V	**33170**
	Low level	**33171**
Installation manual		**47952**

Auxiliary terminals for chassis alone

3 wire terminal (1 part)	**47849**
6 wire terminal	**47850**
User interconnection terminals	**65083**

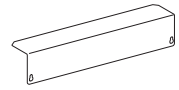
Chassis accessories

Support for auxiliary cover


DB110765.eps

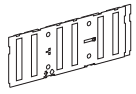
1 part	**65084**

Auxiliary terminal shield (CB), (standard)


DB403277.eps

5000/6000 A	**48598**

Safety shutters + locking block (standard)


DB403278.eps

5000/6000 A	**48724**

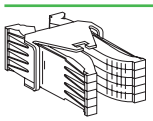
Shutter locking block (for remplacement)


DB403279.eps

2 parts for 5000/6000 A	**48591**

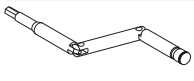
Masterpact UR
Chassis locking, accessories and connections

Clusters



Grease for disconnecting contact clusters (1 kg)	**54122**
1 disconnecting contact cluster for chassis [1]	**64906**

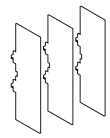
Racking handle



Racking handle	**47944**

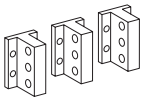
Connection accessories

Interphase barrieres / Replacement kit (3 parts)



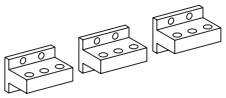
For drawout rear-connected circuit breaker	**48600**
Installation manual	**47950**

Rear connection (vertical or horizontal mounting / Replacement kit) [2]



5000 A	Vertical or horizontal	**47966**
6000 A	Vertical only	**47968**
Installation manual UR		**65066**

Vertical mounting.

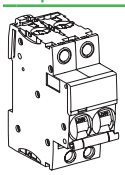
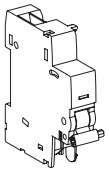
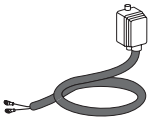


Horizontal mounting.

[1] number of clusters required for the different chassis module: 28 clusters / pôle. Total number for 3 pole breaker UR 50/60: 84.
[2] Batch of 3 connectors (for complete breaker, 4 batches must be ordered).

F

Replacement parts for "UR Power" module

 DB432370.eps	iC60 MCB	**A9F95132**
 DB432373.eps	iMX + OF for iC60	**A9A26946**
 DB432330.eps	Auxiliary circuit wire set	**65072**
 DB110773.eps	Lithium battery (idem Micrologic)	**33593**

Accessories

Communication option

IXXAT converter (to be supplied externally) [1]	-
Masterpact UR (maintenance USB key)	**65074**

Test equipment

Converter cable SubD 9 / RJ45 for IXXAT	**65042**
Cable test to connect "UR control" module	**65043**
"Contact / thruster" gap measuring tool	**65041**
Contact wear measuring tool	**65045**

[1] Consult IXXAT catalogue : http://www.ixxat.de.

F

Order form
Masterpact UR

To indicate your choice, check the applicable square boxes ☐

and enter the appropriate information in the rectangles ▭

Circuit breaker — Quantity ▭

Masterpact UR , drawout type with chassis

Rating	**A**	▭
Number of poles		**3** ☐
Brand	**Schneider Electric**	☐

Neutral on left side (standard)

Delivery :

- Chassis delivered in advance ☐
- Chassis and breaker delivered together ☐

1 Module "UR power" as standard

Module "UR Control"

Threshold : ☐

- High ☐
- Low ☐

"UR Control" options [1] ☐

- Tripping on system internal errors (actived) ☐
- Inhibition protection (actived) ☐

Micrologic control unit

Navy / Marine Certification

A - ammeter [2]	**2.0** ☐	**5.0** ☐	**6.0** ☐
E - energy [3]	**2.0** ☐	**5.0** ☐	**6.0** ☐
P - power meter [3]		**5.0** ☐	**6.0** ☐
H - harmonic meter [3]		**5.0** ☐	**6.0** ☐

LR - long-time rating plug

- Standard 0.4 to 1 Ir ☐
- Low setting 0.4 to 0.8 Ir ☐
- High setting 0.8 to 1 Ir ☐
- LR OFF ☐

PTE - external voltage connector as standard

TCE - external sensor (CT) for neutral and residual earth-fault protection ☐

Communication

COM module ☐

Device (BCM-ULP)

- with Ethernet interface ☐
- with Ethernet interface + Gateway ☐
- with Modbus interface ☐

Cradle management with I/O application module (Chassis) ☐

Eco COM module

Device (BCM-ULP)

- with Ethernet interface ☐
- with Ethernet interface + Gateway ☐
- with Modbus interface ☐

Front Display Module (FDM121) — Mounting accessories ☐

Breaker ULP Cord

- L = 0.35 m ☐
- L = 1.3 m ☐
- L = 3 m ☐

Connection

"Phase barrier" ☐

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

Indication contacts

OF - ON/OFF indication contacts

Standard	3 OF 6 A-240 V AC (10 A-240 V AC and low-level)		
SDE - "fault-trip" indication contact			
Standard	1 SDE 6 A-240 V AC		
Additional	1 SDE 6 A-240 V AC ☐	1 SDE low level	☐
Programmable contacts	2 M2C contacts ☐		
Carriage switches	Low level ☐	6 A-240 V AC	☐
CE - "connected" position	Max. 2	qty	▭
CD - "disconnected" position	Max. 2	qty	▭
CT - "test" position	Max. 2	qty	▭
AC - UR actuator for 4 CE - 2 CD - 0 CT additional carriage switches		qty	▭

Remote operation

standard	**MCH** - gear motor	**V**	▭
	communicating XF - closing voltage release	**V**	▭
	PF - "ready to close" contact 6 A-240 V AC		
	BPFE - "UR" electrical closing pushbutton		
	Res - electrical reset option	**V**	▭
optional	**MX** - opening voltage release	**V**	▭
or	**MN** - undervoltage release	**V**	▭
	R - delay unit (non-adjustable)		☐
	Rr - adjustable delay unit		☐
	RAR - automatic reset option		☐

Locking

VBP - ON/OFF pushbutton locking (by transparent cover) as standard

OFF position locking:

VCPO - by padlocks				☐
VSPO - by keylocks	Keylock kit (w/o keylock)	Profalux ☐	Ronis	☐
		Kirk ☐	Castell	☐
	1 keylock	Profalux ☐	Ronis	☐
	2 identical keylocks, 1 key	Profalux ☐	Ronis	☐
	2 keylocks, different keys (UR)	Profalux ☐	Ronis	☐

Chassis locking in "disconnected" position:

VSPD - by keylocks	Keyock kit (w/o keylock)	Profalux ☐	Ronis	☐
		Kirk ☐	Castell	☐
	1 keylock	Profalux ☐	Ronis	☐
	2 identical keylocks, 1 key	Profalux ☐	Ronis	☐
	2 keylocks, different keys	Profalux ☐	Ronis	☐
	Optional connected/disconnected/test position lock			☐
VPOC - racking interlock				☐

Accessories

standard	**VO** - safety shutters on chassis as standard	
	CDM - mechanical operation counter as standard	
	CB - auxiliary terminal shield for chassis	
optional	**CDP** - escutcheon	☐
	CP - transparent cover for escutcheon	☐
	OP - blanking plate for escutcheon	☐
Micrologic test kits	Hand held test kit (HHTK) ☐	Full function test kit (FFTK) ☐

[1] "UR Control" options are not actived as standard.
[2] to be used for all applications including Marine.
[3] to be used for all applications excepted Marine.

Life Is On | Schneider Electric

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