

OptiMat A Air circuit breakers for currents from 630 to 6300 A



Air circuit breakers of OptiMat A series are assigned for conducting current in a normal mode, protection and infrequent operating of electric circuits with rated current from 630 to 6300 A. Owing to their design, they easily handle high capacities. The devices are equipped with numerous types of protection that allow to provide selectivity requirements in the protected network. Various locking equipment is intended to prevent unqualified actions and protection of the operating and maintenance personnel.

Designation

a b c d

OptiMat A-630-S2-3P-85-D-MR8.0-B-C2200-M2-P01-S1-03

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|-----------|--|--|--|--|---|--|
| 1 | Range of product | OptiMat | | | | |
| 2 | Design | A – air circuit breakers | | | | |
| 3 | Rated current I_n, A | 630; 800; 1000; 1250; 1600; 2000; 2500; 3200; 4000; 5000; 6300 | | | | |
| 4 | Dimension (standard size) | S1 – First overall dimension (width up to 280 mm., In from 630 to 1600 A) | S2 – Second overall dimension (width up to 370 mm., In from 630 to 2000 A) | S4 – Fourth overall dimension (width up to 430 mm., In from 2500 to 4000 A) | S5 – Fifth overall dimension (width up to 820 mm., In 5000 A) | S6 – Sixth overall dimension (width up to 950 mm., In 6300 A) |
| 5 | Number of the circuit breaker poles | 3P – Three-pole | | 4P – Four-pole | | |
| 6 | Maximum breaking capacity, kA at $U_n = 400$ V | 50; 85; 100; 120 | | | | |
| 7 | Version by installation method | F – Fixed design ¹⁾ | | D – Withdrawable (draw – out) design | | |
| 8 | Type of a microprocessor-based release | MR0 – Microprocessor-based release is unavailable | MR5.0 – LSIG protections, current measurement (for S1, S5, S6) | MR7.0 – LSIG protections (for S2, S4) | MR8.0 – LSIG protections. With Modbus communication function and current measurement (for S2, S4) | MR8.1 – LSIG protections. With Modbus communication function and current measurement. Menu in Russian (for S2, S4) |
| 9 | Types of wiring | B – Rear (back) connection type (horizontal or vertical) ²⁾ | F – Front connection type (for S2, S4 for currents 630 to 2500 A) | C – Combined connection type (upper – front, lower – back (rear)), (for S2, S4 for currents 630 to 2500 A) | | |
| 10 | Type of control coils | Cabcd – control coil unit designation | | | | |
| | | a – Closing coil: – 0 – not installed; – 2 – installed; 230 V AC/220 V DC; – 3 – installed 24 V DC | b – Independent trip device: – 0 – not installed; – 2 – installed; 230 V AC/220 V DC; – 3 – installed 24 V DC | c – Secondary independent trip device: – 0 – not installed; – 2 – installed; 230 V AC / 220 V DC; – 3 – installed 24 V DC | d – Undervoltage release: – 0 – not installed; – 2 – installed; 230 V AC / 220 V DC | |
| 11 | Type of a motor drive | M0 – Motor drive is not available | | M2 – Motor drive 230 V AC / 220 V DC | | |
| 12 | Type of protection systems | P00 – protection systems are not available | P01 – insulating shutters are installed | P02 – built-in power button lock is installed | P03 – insulating shutters and a built-in power button lock are installed | |
| 13 | Type of auxiliary signaling contacts | S0 – Signaling contacts are not installed | | S1 – Signaling contacts 6a+6b (for S2, S4, S5, S6) | S2 – Signaling contacts 6c (for S1) | |
| 14 | Type of additional signaling systems | 00 – Signaling systems are not established; 01 – The switch position indication in the basket is established; 02 – The signaling contact of the switch availability for closing the main contacts is established; 03 – The mechanical cycle counter is set; 04 – Indication of the switch position in the basket and signaling contact of the switch availability for closing the main contacts are established; 05 – Indication of the position of the switch in the basket and the mechanical cycle counter are set; 06 – The signaling contact of the switch availability for closing the main contacts and the mechanical cycle counter are established; 07 – The position of the switch in the basket is set, the signaling contact of the switch availability for closing the main contacts and the mechanical cycle counter are established. | | | | |

¹⁾ Fixed version is available in all dimensions, except S5, S6.

²⁾ For fixed and withdrawable 2000A circuit breakers, only a rear vertical, a front and a combined mounting types are available. For 4000 A fixed and withdrawable circuit breaker versions, only a rear vertical busbar connection type is available. For the 5000 and 6300 A circuit breakers, only a rear horizontal busbar connection type is available.

Batch effectiveness

The presence in the overall design of S2, S4, S5, S6 of twelve (6a + 6b) galvanically isolated contacts allows for the implementation of a large number of signaling circuits.

The block with screw clamps in overall design of S1, S5, S6 allows for quick installation of control circuits, without using additional crimps and soldering connections.

Conductive elements are made of pure electrical copper, which allows to obtain high conductivity, efficiency, as well as durable operation.

The availability of various interlocks (blocking the status of the switch in the chassis, blocking the closing, isolating shutters, etc.) ensure the safety of the maintenance personnel.

Compact dimensions of the circuit breakers of the S1 overall design make it possible to complete standard boards with larger amount of equipment, or, alternatively, use boards of a smaller size.

The possibility of changing the position of the terminals from horizontal to vertical in the overall design of S1, S2, S4 that enables the client to use the switches in the circuits with both vertical application of busbars, as well as horizontal.

Application of special alloys based on silver for creation of a contact group, enabled to achieve high wear resistance and provide for over ten thousand cycles of electrical switching.

Data transfer support via Modbus protocol in the releases MR8.0 and MR8.1 allows for the application of the dispatch system.

Modular design provides simple and quick mounting.

Warranty 5 years. Each unit undergoes multi-stage quality control from assembling to the finished commodity warehouse.



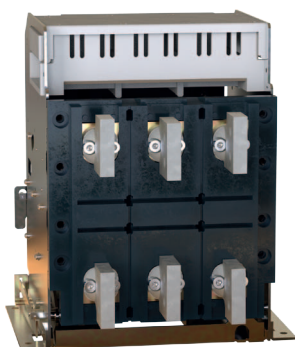
Various delivery and main output mounting options



**Rear horizontal busbar
S1 connection type**



**Front busbar S2 connection
type**



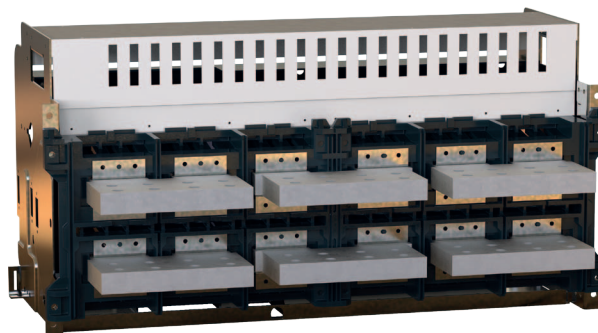
**Rear vertical busbar
S1 connection type**



**Rear vertical busbar S4
connection type**



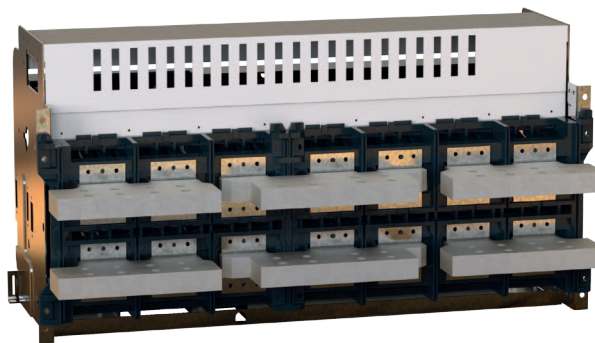
**Rear horizontal busbar
S4 connection type**



**Rear horizontal busbar
S5 connection type**







**Rear combined busbar
S4 connection type**



**Rear horizontal busbar
S6 connection type**

Note: For detailed delivery options of connection types, see the technical specifications chart.

Selection guide

| Automatic circuit breakers of OptiMat A series | | | | | | | | | | | | | | | | |
|--|---|------------------------|-----------|---|-----------|---------------|-----------|---|---------------|---------------|---|------|------|------|------|------|
| Type | OptiMat A-S1 | | | OptiMat A-S2 | | | | OptiMat A-S4 | | | OptiMat A-S5,S6 | | | | | |
| Appearance |  | | |  | | | |  | | |  | | | | | |
| Standards of compliance | GOST 50030.2 | | | | | | | | | | | | | | | |
| Number of poles | 3 | | | 3/4 | | | | | | | 3 | | | | | |
| Electrical properties | | | | | | | | | | | | | | | | |
| Rated current In, A | 630 | 800 | 1000 | 1250 | 1600 | 630 | 800 | 1000 | 1250 | 1600 | 2000 | 2500 | 3200 | 4000 | 5000 | 6300 |
| Rated frequency, Hz | 50 | | | 50,60 | | | | | | | 50 | | | | | |
| Application category | B | | | | | | | | | | | | | | | |
| Type of current | AC AC | | | | | | | | | | | | | | | |
| Rated operational voltage Ue, V | | | | 690 | | | | | | | 400 | | | | | |
| Auxiliary (free) contacts | 6c | | | | | | | 6a+6b | | | | | | | | |
| Manual | | | | | | | | Available | | | | | | | | |
| Electrical | | | | | | | | Available | | | Available | | | | | |
| Motor drive | Available | | | Available / Non-available | | | | | | | Available | | | | | |
| Ultimate breaking capacity of AC Icu (kA) | 50 | | | 65 | | | | 85 | | | 120 | | | | | |
| Release type | Electronic | | | No release / Electronic | | | | | | | Electronic | | | | | |
| Release version | MR5.0 | | | MR7.0 / MR8.0 / MR8.1 | | | | | | | MR5.0 | | | | | |
| Mounting properties | | | | | | | | | | | | | | | | |
| Fixed design | Rear connection type | vertical output type | | | | | Available | | | Non-available | | | | | | |
| | | horizontal output type | Available | | | Non-available | Available | | Non-available | | | | | | | |
| | Front connection type | Non-available | | | Available | | | Non-available | | | | | | | | |
| | Combined | Non-available | | | Available | | | Non-available | | | | | | | | |
| Withdrawable design | Rear connection type | vertical output type | | | | | Available | | | Non-available | | | | | | |
| | | horizontal output type | Available | | | Non-available | Available | | Non-available | Available | | | | | | |
| | Front connection type | Non-available | | | Available | | | Non-available | | | | | | | | |
| | Combined | Non-available | | | Available | | | Non-available | | | | | | | | |
| Performance characteristics | | | | | | | | | | | | | | | | |
| Degree of protection (IP) | IP20 | | | | | | | | | | | | | | | |
| Environment and location category | U3 (T3) | | | | | | | | | | | | | | | |
| Application category by selectivity | Selective | | | Non-selective / Selective | | | | | | | Selective | | | | | |
| Extra features | | | | | | | | | | | | | | | | |
| Indication of the switch position in the chassis | Non-available | | | Available / Non-available | | | | | | | Non-available | | | | | |
| Undervoltage release ¹⁾ | Non-available | | | Available / Non-available | | | | | | | Non-available | | | | | |
| Second independent trip device ¹⁾ | Non-available | | | Available / Non-available | | | | | | | Non-available | | | | | |
| Indication contact of the switch availability to close the main contacts ²⁾ | Non-available | | | Available / Non-available | | | | | | | Non-available | | | | | |
| Internal installation lock | Non-available | | | Available / Non-available | | | | | | | Non-available | | | | | |
| Protective shutters | | | | Available / Non-available | | | | | | | Available | | | | | |

¹⁾ Feature mutually exclusive positions in the circuit breakers of the overall design S2, S4 (installed in one cell);

²⁾ Feature mutually exclusive position in the circuit breakers of the overall design S2, S4 with a minimum release or second shunt release in the versions of the switch with MR8.0 and MR8.1 (connected to the terminal block into one U1 and U2 connectors).

Technical specifications

| Series of circuit breakers | | | OptiMat A-S1 | | | | |
|---|---|-------------------|--------------------|-------------|------|------|------|
| General characteristics | | | | | | | |
| Rated operational voltage Ue, V | | | 690 | | | | |
| Rated insulation voltage Ui, V | | | 690 | | | | |
| Rated impulse withstand voltage Uimp, kV | | | 8 | | | | |
| Application category | | | B | | | | |
| Suitability for isolation | | | available | | | | |
| Number of poles | | | 3 | | | | |
| Control | | | | | | | |
| Manual | | Operation buttons | + | | | | |
| Electrical | | Motor drive | + | | | | |
| Version | | | 630 | 800 | 1000 | 1250 | 1600 |
| Fixed | Rear | vertical | + | + | + | + | + |
| | | horizontal | + | + | + | + | + |
| | Front | vertical | - | - | - | - | - |
| | | horizontal | - | - | - | - | - |
| Withdrawable | Rear | vertical | + | + | + | + | + |
| | | horizontal | + | + | + | + | + |
| | Front | vertical | - | - | - | - | - |
| | | horizontal | - | - | - | - | - |
| Rated and limiting parameters of the main circuit of switches | | | | | | | |
| Rated current In, A | | | 630 | 800 | 1000 | 1250 | 1600 |
| Rated frequency, Hz | | | 50 | | | | |
| Rated ultimate breaking capacity (Icu), kA | Ue 400 V | | 50 | | | | |
| | Ue 690 V | | 25 | | | | |
| Rated service capacity (Ics), kA | Ue 400 V | | 40 | | | | |
| | Ue 690 V | | 20 | | | | |
| Short-time withstand current (Icw) within 1s, kA | Ue 400 V | | 40 | | | | |
| | Ue 690 V | | 20 | | | | |
| Rated short-circuit making capacity | Ue 400 V | | - | | | | |
| | Ue 690 V | | - | | | | |
| General wear resistance, cycles | with maintenance | | - | | | | |
| | without maintenance | | 15000 | | | | |
| Electrical life, cycles | with maintenance | | - | | | | |
| | without maintenance | | 5000 | | | | |
| Trip time | Break-time (opening), ms | | 50±10 | | | | |
| | Make-time (closing), ms | | 50±10 | | | | |
| Protection, indication and measurement devices | | | | | | | |
| Microprocessor-based release | | | MR5.0 | | | | |
| Overload protection | | | + | | | | |
| Short-circuit protection | with time-delay | | + | | | | |
| | non-time-delay | | + | | | | |
| Earth fault protection | | | + | | | | |
| Changed current indication | | | + | | | | |
| Device status indication | | | - | | | | |
| Auxiliary devices (control and signaling systems) ¹⁾ | | | | | | | |
| Auxiliary contacts | | | 6c | | | | |
| Voltage trip devices | independent trip device | | 230V AC / 220 V DC | | | | |
| | closing coil | | 230V AC / 220 V DC | | | | |
| | undervoltage release ²⁾ | | - | | | | |
| | Secondary independent trip device ²⁾ | | - | | | | |
| Indication of the switch position in the basket (chassis) | | | - | | | | |
| Signaling contact of the switch availability for closing the main contacts | | | - | | | | |
| Additional devices (locking, protection, indication systems) ¹⁾ | | | | | | | |
| Internal lock | | | - | | | | |
| Protective shutters | | | -/+ | | | | |
| Insulation (interpole) barriers | | | + | | | | |
| Mechanical cycle counter | | | + | | | | |
| Mechanical interlocking ³⁾ | | | - | | | | |
| Overall dimensions and weight | | | | | | | |
| Overall dimensions WxHxD, mm | Fixed with front connection type | | 3P | - | | | |
| | Withdrawable with front connection type | | 3P | - | | | |
| | Fixed with rear (back) connection type | | 3P | 370×340×490 | | | |
| | Withdrawable with rear (back) connection type | | 3P | 450×360×530 | | | |
| Weight, kg | Fixed with front connection type | | 3P | - | | | |
| | Withdrawable with front connection type | | 3P | - | | | |
| | Fixed with rear (back) connection type | | 3P | 33 | | | |
| | Withdrawable with rear (back) connection type | | 3P | 53 | | | |





¹⁾ For a detailed description of accessories, see page 206.

²⁾ Are mutually exclusive positions in overall dimensions of S2, S4 versions.

³⁾ Mechanical interlock is installed only on withdrawable version of the switch.

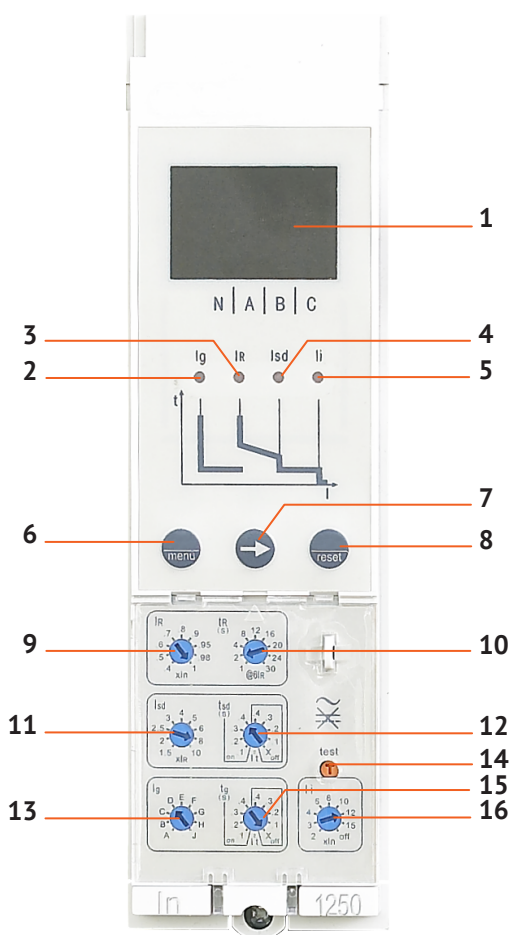
| OptiMat A-S2 | | | | | | | | | | | | OptiMat A-S4 | | | | OptiMat A-S5, S6 | | | | | | |
|--------------|-----|------|------|------|------|------|------|------|------|------|---|----------------------------|-----|------|------|--------------------|------|--------------|------|------|------|------|
| 690 | | | | | | | | | | | | | | | | 400 | | | | | | |
| | | | | | | | | | | | | 1000 | | | | | | | | | | |
| 12 | | | | | | | | | | | | | | | | 12 | | | | | | |
| | | | | | | | | | | | | B | | | | | | | | | | |
| | | | | | | | | | | | | available | | | | | | | | | | |
| 3,4 | | | | | | | | | | | | | | | | 3 | | | | | | |
| | | | | | | | | | | | | + | | | | | | | | | | |
| | | | | | | | | | | | | + | | | | | | | | | | |
| 630 | 800 | 1000 | 1250 | 1600 | 2000 | 2500 | 3200 | 4000 | 5000 | 6300 | | 630 | 800 | 1000 | 1250 | 1600 | 2000 | 2500 | 3200 | 4000 | 5000 | 6300 |
| + | + | + | + | + | + | + | + | + | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| + | + | + | + | + | - | + | + | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| + | + | + | + | + | + | + | + | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| + | + | + | + | + | + | + | + | + | + | - | - | - | - | - | - | - | - | - | - | - | - | - |
| + | + | + | + | + | - | + | + | - | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| + | + | + | + | + | + | + | + | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| + | + | + | + | + | + | + | + | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 630 | 800 | 1000 | 1250 | 1600 | 2000 | 2500 | 3200 | 4000 | 5000 | 6300 | | 630 | 800 | 1000 | 1250 | 1600 | 2000 | 2500 | 3200 | 4000 | 5000 | 6300 |
| 50,60 | | | | | | | | | | | | | | | | 50 | | | | | | |
| 85 | | | | | | | | | | | | 100 | | | | 120 | | | | | | |
| 65 | | | | | | | | | | | | 85 | | | | - | | | | | | |
| 85 | | | | | | | | | | | | 100 | | | | 100 | | | | | | |
| 65 | | | | | | | | | | | | 85 | | | | - | | | | | | |
| 50 | | | | | | | | | | | | 85 | | | | 100 | | | | | | |
| - | | | | | | | | | | | | - | | | | - | | | | | | |
| 143 | | | | | | | | | | | | 220 | | | | - | | | | | | |
| 187 | | | | | | | | | | | | 220 | | | | - | | | | | | |
| 50000 | | | | | | | | | | | | | | | | - | | | | | | |
| 30000 | | | | | | | | | | | | | | | | 5000 | | | | | | |
| 20000 | | | | | | | | | | | | | | | | - | | | | | | |
| 10000 | | | | | | | | | | | | | | | | 500 | | | | | | |
| 40 | | | | | | | | | | | | | | | | 50±10 | | | | | | |
| 80 | | | | | | | | | | | | | | | | 50±10 | | | | | | |
| | | | | | | | | | | | | MR7.0 / MR8.0 / MR8.1 | | | | MR5.0 | | | | | | |
| | | | | | | | | | | | | +/+ | | | | + | | | | | | |
| | | | | | | | | | | | | +/+ | | | | + | | | | | | |
| | | | | | | | | | | | | +/+ | | | | + | | | | | | |
| | | | | | | | | | | | | +/+ | | | | + | | | | | | |
| | | | | | | | | | | | | -/+ | | | | + | | | | | | |
| | | | | | | | | | | | | +/+ | | | | - | | | | | | |
| | | | | | | | | | | | | 6a+6b | | | | 6a+6b | | | | | | |
| | | | | | | | | | | | | 230 V AC/220V DC / 24 V DC | | | | 230V AC / 220 V DC | | | | | | |
| | | | | | | | | | | | | 230 V AC/220V DC / 24 V DC | | | | 230V AC / 220 V DC | | | | | | |
| | | | | | | | | | | | | 230 V AC/220V DC | | | | - | | | | | | |
| | | | | | | | | | | | | 230 V AC/220V DC / 24 V DC | | | | - | | | | | | |
| | | | | | | | | | | | | -/+ | | | | - | | | | | | |
| | | | | | | | | | | | | -/+ | | | | - | | | | | | |
| | | | | | | | | | | | | -/+ | | | | - | | | | | | |
| | | | | | | | | | | | | -/+ | | | | -/+ | | | | | | |
| | | | | | | | | | | | | + | | | | + | | | | | | |
| | | | | | | | | | | | | -/+ | | | | + | | | | | | |
| | | | | | | | | | | | | -/+ | | | | - | | | | | | |
| | | | | | | | | | | | | 361x462x332 | | | | 421x482x332 | | - | | | | |
| | | | | | | | | | | | | 353x499x431 | | | | 413x512x433 | | - | | | | |
| | | | | | | | | | | | | 361x310x335 | | | | 421x310x335 | | 421x335x391 | | | | |
| | | | | | | | | | | | | 353x432x435 | | | | 413x432x435 | | 413x432x492 | | | | |
| | | | | | | | | | | | | | | | | 970×600×660 | | 1070×600×660 | | | | |
| 52 | 52 | 52 | 54 | 54 | 55 | 65 | 76 | - | - | - | - | 52 | 52 | 52 | 54 | 54 | 55 | 65 | 76 | - | - | - |
| 75 | 75 | 75 | 78 | 78 | 79 | 92 | 107 | - | - | - | - | 75 | 75 | 75 | 78 | 78 | 79 | 92 | 107 | - | - | - |
| 41 | 41 | 41 | 43 | 43 | 45 | 48 | 59 | 65 | - | - | - | 41 | 41 | 41 | 43 | 43 | 45 | 48 | 59 | 65 | - | - |
| 65 | 65 | 65 | 68 | 68 | 70 | 75 | 90 | 98 | 240 | 260 | - | 65 | 65 | 65 | 68 | 68 | 70 | 75 | 90 | 98 | 240 | 260 |

Microprocessor-based releases

| Types of microprocessor-based releases | | | | |
|--|--|---|---|--|
| | MR5.0 | MR7.0 | MR8.0 | MR8.1 |
| Appearance |  |  |  |  |
| Current protection | 1) From overload 2) From short circuit with time delay 3) From short circuit non-time-delay / instantaneous | 1) From overload 2) From short circuit with time delay 3) From short circuit non-time-delay / instantaneous | | |
| Measurement | current | no current | | current |
| Power supply | External power supply: – 230 V AC | Powered by current sensors * installed in the protected network (at least 20% of rated current) External power supply: – AC/DC 110/220V – DC 48V | Powered by current sensors * installed in the protected network (at least 20% of rated current) External power supply is required for data exchange: – AC/DC 110/220V – DC 48V | |
| LED operation indicators | Alarm signaling indications of the earth fault protection functions / alarm indication of the overload protection functions / alarm indication of the short-circuit protection functions with a short response delay / alarm indication of the short-circuit protection functions. | warning about overload | | Overload indication / Indication of overload and short-circuit operation / shutdown indication without time delay / indication of currents in phases |
| Control buttons | Reset, menu, rightwards. | Not available | Reset, menu, rightwards, rightwards, input, self-test | Input, reset, leftwards, rightwards, return, self-test |
| Registration of protective operations | 1 last trip (current, time) | Not available | 10 last records (reason, current, phase, time) | 300 last records (reason, current, phase, time) |
| Data transfer protocol | Not available | Not available | | Modbus / RS-485 |

* Power supply from current sensors is a backup power system. When using power only from current sensors, the release does not provide protection when switched on short-circuit, since it takes 3 seconds to load, and for normal information display and release operation, it is necessary that the current of the power circuits will be at least 20% of the rated current of the circuit breaker. For functional operation, and full protection of electrical networks, according to the stated characteristics, it is recommended to power the release from an external source.

MR5.0 type



All required types of protection

OVERLOAD PROTECTION:

- with long-time delay.

PROTECTION AGAINST SHORT CIRCUIT:

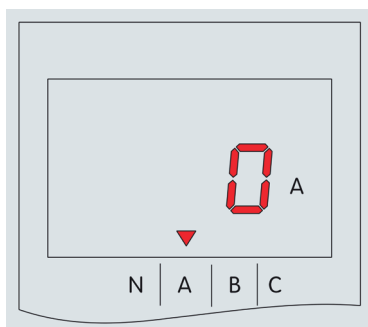
- instantaneous with independent time delay;
- additional protection function I_{2t} on / off (for protection with short-time delay).

PROTECTION AGAINST GROUND SHORT CIRCUIT:

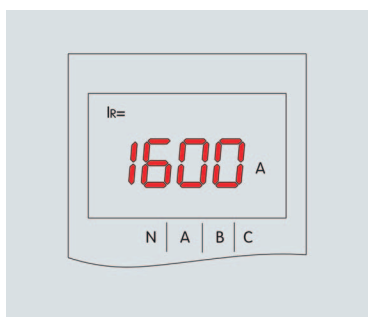
- additional protection function I²t on / off

- 1 LED display
- 2 I alarm signaling indicator of earth fault protection functions;
- 3 IR alarm signaling indicator overload protection functions;
- 4 Isd alarm signaling indicator of short-circuit protection functions with short response time;
- 5 Ii indicator of the alarm signaling functions of protection against short circuit;
- 6 "MENU" button to access different submenus;
- 7 "→" button to move through the menu;
- 8 "RESET" parameter setting button;
- 9 "IR" adjustment of the current setting value for overload protection;
- 10 "tR" setting of the overload protection delay;
- 11 "Isd" adjustment of the current setting value for protection against short circuit;
- 12 "tsd" setting for a short delay;
- 13 "Ig" setting of the value of the ground fault current setting;
- 14 "test" testing of instantaneous short circuit protection;
- 15 "tg" setting of the response delay of the earth fault protection;
- 16 "Ii" adjustment of the current setting value for instantaneous short circuit protection.

MR5.0 Liquid Crystal Display



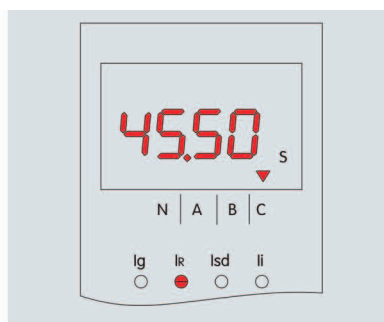
To move to the request status with parameters, you need to press the "menu" button once, being on the main screen of the release.



To move to the query which parameter is set for protection against overcurrent, you need to press the "→" button.

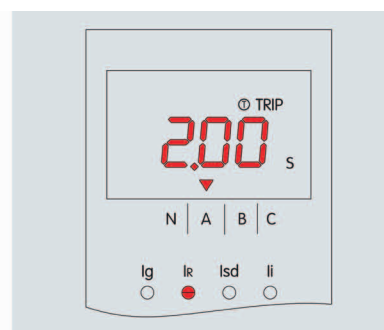
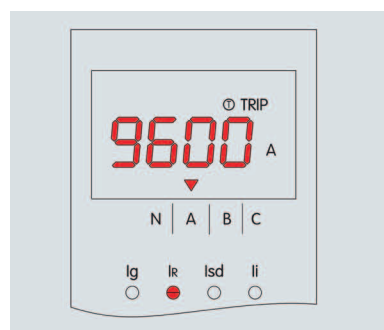


a) operating (trip) current



b) response time

Press the "menu" button twice to move to the response request status (displays information about the last response).



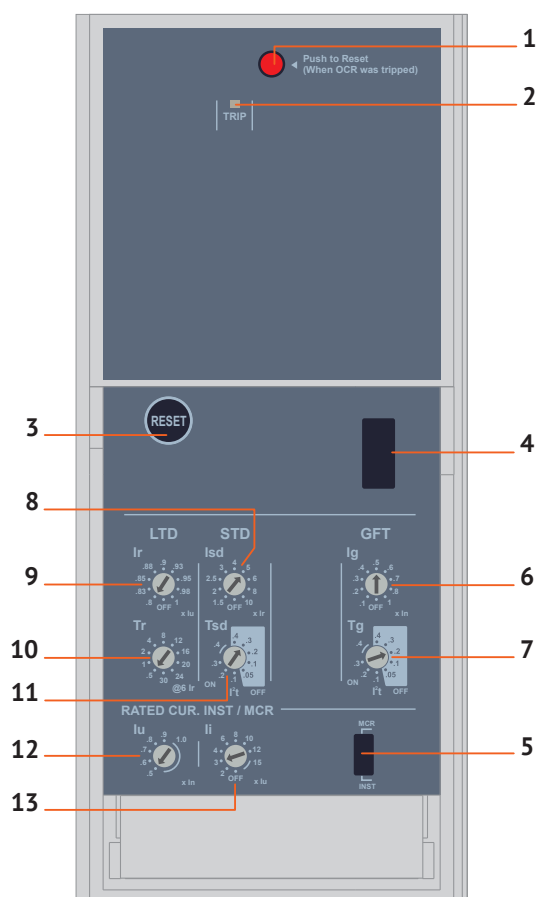
To move to the response simulation status at 6IR, press the "test" button. After actuation, you can see the following data.

To return to the default interface from any status, press the "RESET" button.

Protection settings for microprocessor-based trip unit MR5.0

| Parameter name | Parameter value | Accuracy |
|--|--|----------|
| Setpoint of operating (service) current (I_R) in multiples of the switch rated current | 0,4; 0,5; 0,6; 0,7; 0,8; 0,9; 0,95; 0,98; 1 | 10% |
| Setpoints by the response time at current 6_{IR} , s | 1; 2; 4; 8; 12; 16; 20; 24; 30 | 15% |
| Setpoints by the response current in the zone of short circuit I_{sd} in multiples of the operating (service) current (I_{sd} / I_U) | 1,5; 2; 2,5; 3; 4; 5; 6; 8; 10 | 15% |
| Setpoints by the response time in the zone of short circuit, s | 0,1; 0,2; 0,3; 0,4; X (I^t off) 0,1; 0,2; 0,3; 0,4 (I^t on) | 15% |
| Instantaneous current setpoints (I_1), A | 2; 3; 4; 6; 8; 10; 12; 15; off | 15% |
| Trip current setpoints at single-phase short circuit to earth in multiples of the rated current (I_g), A | A; B; C; D; E; F; G; H; J* | 10% |
| Response time settings at the single-phase short circuit to earth (T_g), s | 0,1; 0,2; 0,3; 0,4; X (I^t off) 0,1; 0,2; 0,3; 0,4 (I^t on) | 15% |

MR7.0 type



All required types of protection

OVERLOAD PROTECTION:

- with long-time delay.

PROTECTION AGAINST SHORT CIRCUIT:

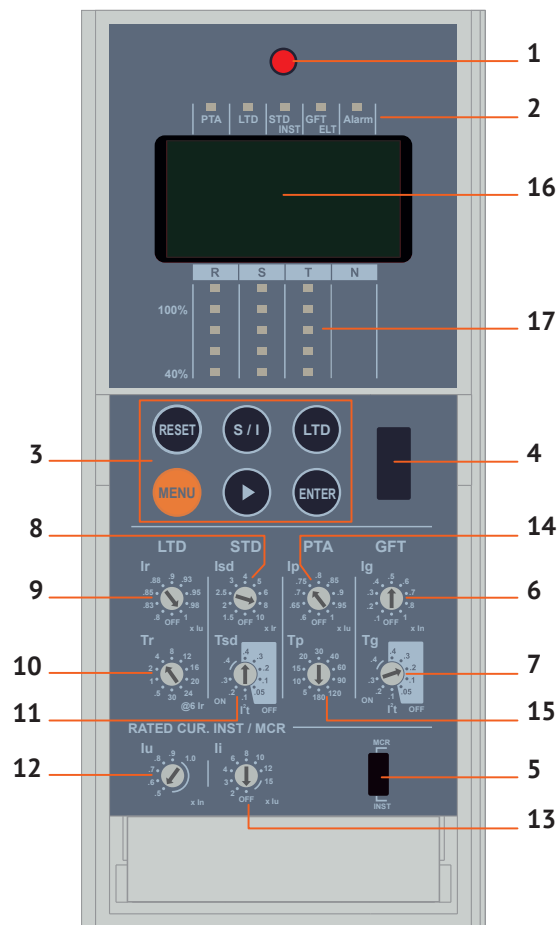
- instantaneous with independent time delay;
- additional protection function I^2t on / off (for protection with short-time delay).

PROTECTION AGAINST GROUND SHORT CIRCUIT:

- additional protection function I^2t on / off

- 1 Return button after fault tripping
- 2 Indication of tripping:
PTI – overload. LED flickers when the current reaches the value $1.13 I_R$
- 3 Reset button
- 4 Testing device jack
- 5 Selection of I^2t protection characteristic (set by the manufacturer)
- 6 The I_g switch sets the tripping current at single-phase short circuit to earth in multiples to the rated current (from 0.1 to $1.0 I_n$)
- 7 T_g switch sets independent or inverse-time delay in the event of single-phase short circuit to earth (from 0.05 to 0.4 s)
- 8 The I_{sd} switch is used to set the tripping current in the zone of short circuit in multiples to the operating current (from 1.5 to $10 I_R$)
- 9, 12 I_r and I_u switches set the operating current of the switch in multiples to the rated current from 0.4 to $1.0 I_n$ ($I_R = I_r \times I_u$)
- 10 The T_r switch is used to set the time delay in the zone of overload (from 0.5 to 30 s with a load of $6 I_R$)
- 11 With the T_{sd} switch, a short-time delay is set in the zone of short circuit (from 0.05 to 0.4 s)
- 13 I_i switch sets the reflex tripping current in the zone of short circuit in multiples to the rated current (from 2 to $15 I_n$).

MR8.0 type



All required types of protection

OVERLOAD PROTECTION:

- with long-time delay.

PROTECTION AGAINST SHORT CIRCUIT:

- instantaneous with independent time delay;
- additional protection function I^2t on / off (for protection with short-time delay).

PROTECTION AGAINST GROUND SHORT CIRCUIT:

- additional protection function I^2t on / off.

OVERLOAD SIGNALING.

PROTECTIVE ACTUATION RECORDING:

- record of the last 10 events (the cause of actuation, the value of the operating current, a phase and actuation time).

DATA EXCHANGE INTERFACE:

Modbus/RS485.

1 Return button after fault tripping

2 Actuation indication:

PTA – alarm indication in the event of overload

LTD – overload protection

STD / INST – short circuit tripping

GFT / ELT – tripping by short circuit to ground

Alarm – microprocessor trip operation

3 Button to navigate the menu and self-test operation

4 Testing device jack

5 Selection of I^2t protection characteristic (set by the manufacturer)

6 The I_g switch sets the tripping current at single-phase short circuit to earth in multiples to the rated current (from 0.1 to 1.0 I_n)

7 T_g switch sets independent or inverse-time delay in the event of single-phase short circuit to earth (from 0.05 to 0.4 s)

8 The I_{sd} switch is used to set the tripping current in the zone of short circuit in multiples to the operating current (from 1.5 to 10 I_R)

9, 12 I_r and I_u switches set the operating current of the switch in multiples to the rated current from 0.4 to 1.0 I_n ($I_R = I_r \times I_u$)

10 The T_r switch is used to set the time delay in the zone of overload (from 0.5 to 30 s with a load of 6 I_R)

11 With the T_{sd} switch, a short-time delay is set in the zone of short circuit (from 0.05 to 0.4 s)

13 I_i switch sets the reflex tripping current in the zone of short circuit in multiples to the rated current (from 2 to 15 I_n)

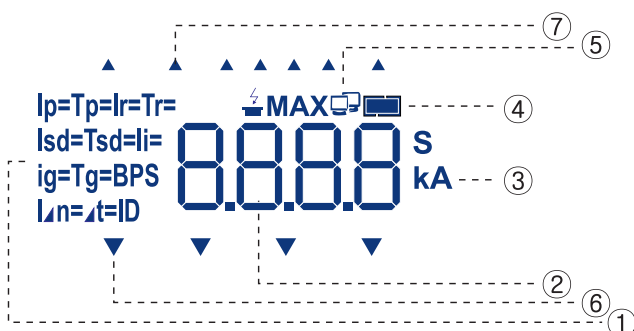
14 The I_p switch sets the overload alarm making current in multiples to the I_u current

15 The T_p switch sets the make time for the overload alarm from the moment when it occurs

16 Liquid crystal display

17 LED three-phase current indication scales










MR8.0 Liquid Crystal Display



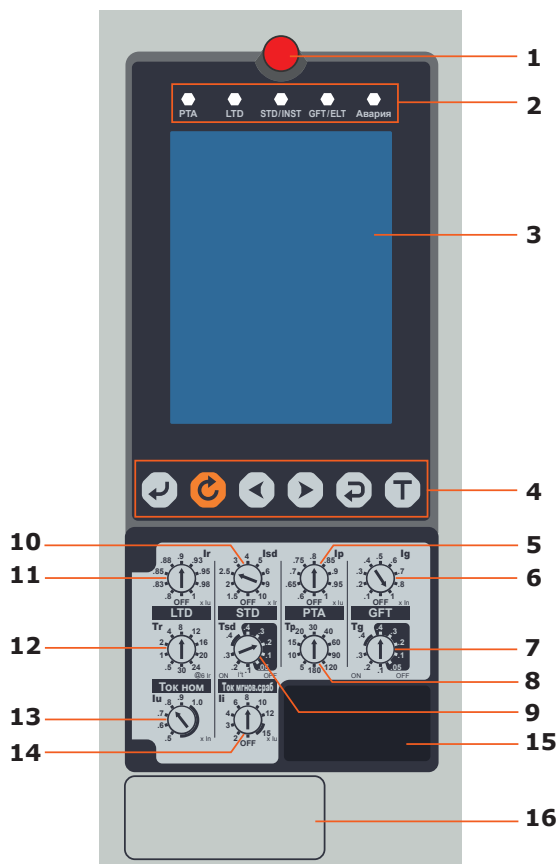
1. Displays current and time settings. Displays setting values and events.
2. Display numbers or symbols. Displays current, time and simple symbols.
3. Displays units, time and current values.
4. Battery charge control. A 3.6V battery is installed in a microprocessor-based release (lithium). Indication of battery status. Flicker with a frequency of 0.5 s means that the battery is low, replacement is necessary.
5. Indication of connection speed, address and screen settings.
6. Displays the measured current, phase and load level.
7. Displays information about alarms and commutations.

It is displayed for 1 s after supplying power to the microprocessor release, and then returns to the measurement screen.

| Image | Button | Description |
|-------|--------|---|
| | | <ol style="list-style-type: none"> 1. On the screen, current in R / S / T / N phases is displayed within 3-second intervals. 2. The current of each phase is displayed. (▶) The form moves from left → to right. 3. LED bar graph shows the load level of each phase by 40 ~ 110%. |
| | ▶ | <ol style="list-style-type: none"> 1. Pressing the button (▶) is used to move to the next step. <ul style="list-style-type: none"> • Measurement screen: moving to the next phase current reading. • Adjustment of settings: View the description of the next setting. • Viewing time: year, month → day, hour → minute, seconds. 2. When pressed for about 3 ~ 4 seconds on the measurement screen, the current of the displayed phase can be measured. (Press and hold for a short time, then release). |
| | MENU | Used to check parameter values, view the alarm / event log, time and communication parameters. |
| | S/I | <ol style="list-style-type: none"> 1. Used for protection with short-time delay response / instant protection, SELF-TESTING. 2. Priority of the shutdown without time delay. 3. Instant shutdown in the event when time delay is not set for protection with a short-time delay / instantaneous protection. |
| | LTD | <ol style="list-style-type: none"> 1. Used for protection with long time delay, SELF TEST. 2. Unavailable if long-time delay is not set. |
| | ENTER | <ol style="list-style-type: none"> 1. Used to view the description of the event / fault and change the date / time. 2. After proceeding to the description, you must check or change the use of the MENU button, press the ENTER button to move to the next step. |
| | RESET | <ol style="list-style-type: none"> 1. Return to the initial state after actuation, resetting event and alarm reports. 2. The set of displayed LCD elements and the actuation information shown by the LEDs will be turned on for about 0.5 seconds. 3. When displaying disconnection data using power from the backup battery, the LED indication will be turned off. |

| | | Screen indication | Button | Description |
|------|---------|---|----------------|--|
| LTD | current | $I_r =$  | M ▶ | <ol style="list-style-type: none"> Being in the "Measurements" menu, press the Menu (M) button once to move to the "Settings" menu. The first screen displays the current setting for protection with long-time delay, press the tab button to view the values of other settings. Top of the screen: "$I_r =$" is displayed. |
| | time | $T_r =$  | M ▶x1 times | <ol style="list-style-type: none"> Press the tab button once in the settings preview menu to check the time setting for protection with long-time delay. Top of the screen: "$T_r =$" is displayed. |
| STD | current | $I_{sd} =$  | M ▶x2 times | <ol style="list-style-type: none"> Press the tab button 2 times in the settings preview menu to check the current setting for protection with short-time delay. Top of the screen: "$I_{sd} =$" is displayed. |
| | time | $T_{sd} =$  | M ▶x3 times | <ol style="list-style-type: none"> Press the tab button 3 times in the settings preview menu to check the time setting for protection with short-time delay. If the inverse response delay of I2t was chosen, then the displayed value will be greater than the specified value by 1 in the last digit. Example: With I2t on, the delay set 0.400 s. is displayed as 0.401 s. Top of the screen: "$T_{sd} =$" is displayed. |
| INST | current | $I_i =$  | M ▶x4 times | <ol style="list-style-type: none"> Press the tab button 4 times in the settings preview menu to check the current setting for instantaneous protection. Top of the screen: "$I_i =$" is displayed. |
| PTA | current | $I_p =$  | M ▶x5 times | <ol style="list-style-type: none"> Press the tab button 5 times in the settings preview menu to check the current setting for overload alarm (PTA). Top of the screen: "$I_p =$" is displayed. |
| | time | $T_p =$  | M ▶x6 times | <ol style="list-style-type: none"> Press the tab button 6 times in the settings preview menu to check the time setting for overload alarm (PTA). Top of the screen: "$T_p =$" is displayed. |
| GFT | current | $I_g =$  | M ▶x7 times | <ol style="list-style-type: none"> Press the tab button 7 times in the settings preview menu to check the current setting for earth fault protection. Top of the screen: "$I_g =$" is displayed. |
| | time | $T_g =$  | M ▶x8 times | <ol style="list-style-type: none"> Press the tab button 8 times in the settings preview menu to check the time setting for earth fault protection. If an inverse response delay I2t was selected, then the displayed value will be greater than the specified value by 1 in the last digit. Example: With I2t on, the set delay 0.400 s. is displayed as 0.401 s. Top of the screen: "$T_g =$" is displayed. |

MR8.1 type



- 1 Reset button
- 2 Alarm indications
- 3 LCD display
- 4 Control buttons and adjustment block
- 5 Adjustment of the current setting for overload indication
- 6 Adjustment of the current setting for earth fault
- 7 Adjustment of the time setting for earth fault
- 8 Adjustment of the time setting for overload indication
- 9 Adjustment of the time setting for single phase short circuit
- 10 Adjustment of the current setting for single phase short circuit
- 11 Adjustment of the current setting for overload
- 12 Adjustment of the time setting for overload
- 13 Adjustment of the operating current setting in multiples of nominal
- 14 Adjustment of the instantaneous current setting (no time delay)
- 15 Multifunctional connector
- 16 Battery cell

All required types of protection

OVERLOAD PROTECTION:

- with long-time delay.

PROTECTION AGAINST SHORT CIRCUIT:

- instantaneous with independent time delay;
- additional protection function I2t on / off (for protection with short – time delay).

PROTECTION AGAINST GROUND SHORT CIRCUIT:

- additional protection function I2t on / off.

OVERLOAD SIGNALING.

PROTECTIVE ACTUATION RECORDING:

- record of the last 300 events (the cause of actuation, the value of the operating current, a phase and actuation time).







CONTACT PROGRAMMING FUNCTION.

RUSSIAN LANGUAGE MENU

DATA EXCHANGE INTERFACE:

Modbus RTU/RS485.

LCD – display MR8.1

| Button | Designation | Description |
|---|-------------------------------|--|
|  | Input, menu selection (ENTER) | - Used to select the menu; - Used to save changed settings. |
|  | Error reset (RESET) | - Used to update the screen; - Used to update the error indication; - When the trip information is displayed using the backup battery, by pressing the RESET button, the main screen can be turned off |
|  | Move left (LEFT) | - Used to navigate the menu or change parameters and select values. |
|  | Move right (RIGHT) | - Used to navigate the menu or change parameters and select values. |
|  | Reset (RESET) | - Used to navigate through the main menu; - Moves to the "Save" screen if there are changes on the settings display. |
|  | Testing (TEST) | - Run the test using the specified test condition; |

The microprocessor-based trip unit MR8.1 includes the following main menus:

- Measurements

In this tab, you can see the current values of current and current readings in each phase.

- System

In this tab, you can change rated current, rated frequency, system settings, system time, password, language, assignment of digital outputs and self-test settings.

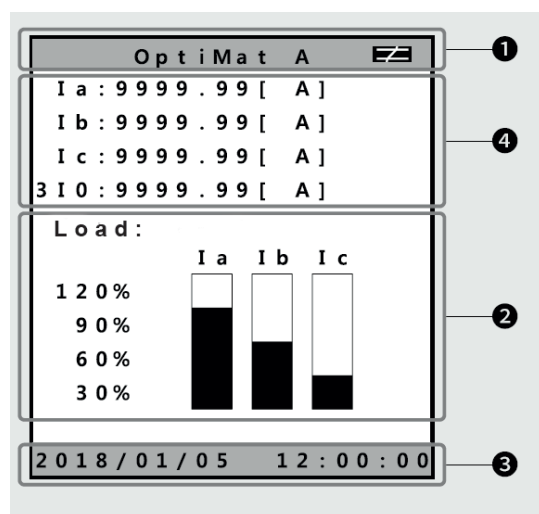
- Settings

In this tab, you can change the settings.

- Data log

In this tab, you can see information about the operations and faults.

The main screen displays the following information:



- 1 Display of the status of the internal battery and the menu titles.
- 2 Display of the load indication of each phase.
- 3 Display of the date and time.
- 4 Display of the exact current value in each phase.

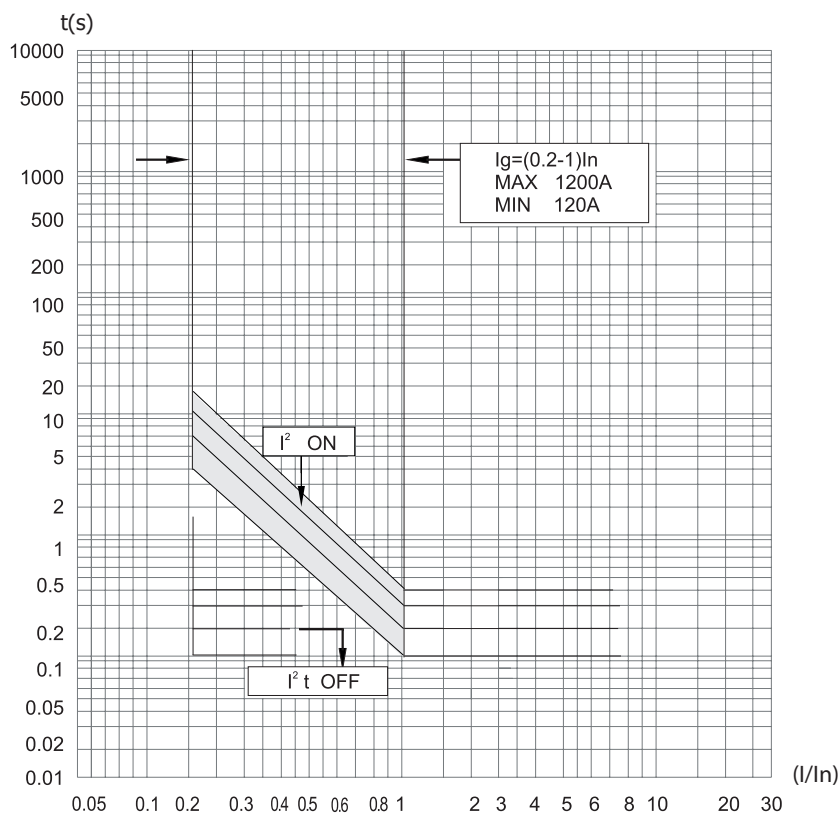
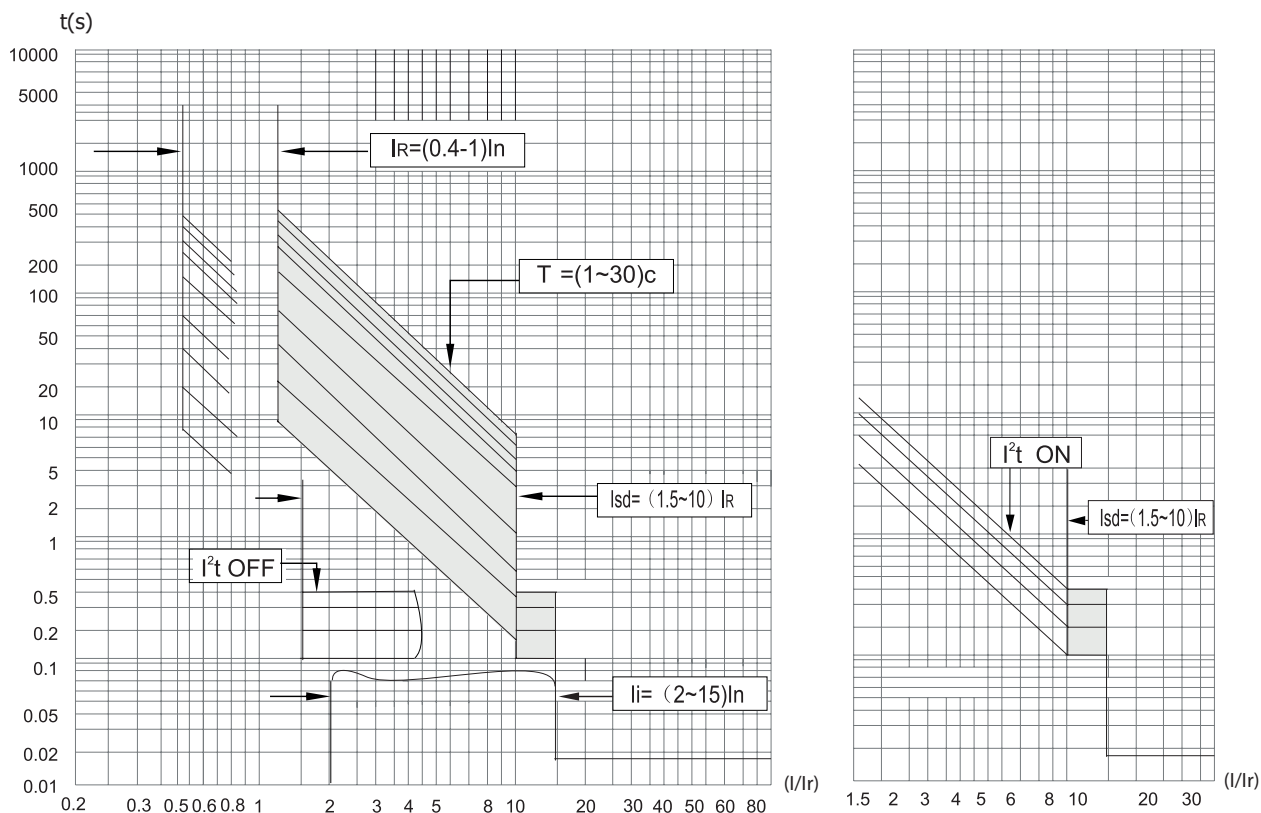
Protection settings for microprocessor-based releases MR7.0, MR8.0, MR8.1

| Parameter name | Parameter value | Accuracy |
|---|---|----------|
| Setpoint of operating current (IR) in multiples of the rated current of the switch (I_R / I_n) $I_R = I_r \times I_u$ | $I_r = 0,8; 0,83; 0,85; 0,88; 0,9; 0,93; 0,95; 0,98; 1,0$ $I_u = 0,5; 0,6; 0,7; 0,8; 0,9; 1$ | |
| Settings by the response time at a current of 6 IR, s (T_r) | 0,5; 1; 2; 4; 8; 12; 16; 20; 24; 30 | +15% |
| Settings by the trip current in the zone of short circuit Isd in multiples of the operating current (I_{sd} / I_R) | 1,5; 2; 2,5; 3; 4; 5; 6; 8; 10 | +15% |
| Settings by the response time in the zone of short circuit, s (T_{sd}) | 0,05; 0,1; 0,2; 0,3; 0,4 (I^2t off) 0,1; 0,2; 0,3; 0,4 (I^2t on) | +0,03 s |
| Settings by the instantaneous tripping current (I), A (T_i not more than 0.05 s) | 2; 4; 6; 8; 10; 12; 15 | +15% |
| Overload alarm current settings (I_p / I_u) | 0,6; 0,65; 0,7; 0,75; 0,8; 0,85; 0,9; 0,95; 1,0 | +15% |
| Settings by the time of the alarm signaling actuation (T_p), s | 5; 10; 15; 20; 30; 40; 60; 90; 120; 180 | +15% |
| Tripping current settings at single-phase earth fault in multiples to the rated current (I_g / I_n) | 0,1; 0,2; 0,3; 0,4; 0,5; 0,6; 0,7; 0,8; 1 | +20% |
| Settings by the response time at single-phase short circuit to earth (T_g), s | 0,05; 0,1; 0,2; 0,3; 0,4 (I^2t off) 0,1; 0,2; 0,3; 0,4 (I^2t on) | +0,03 s |

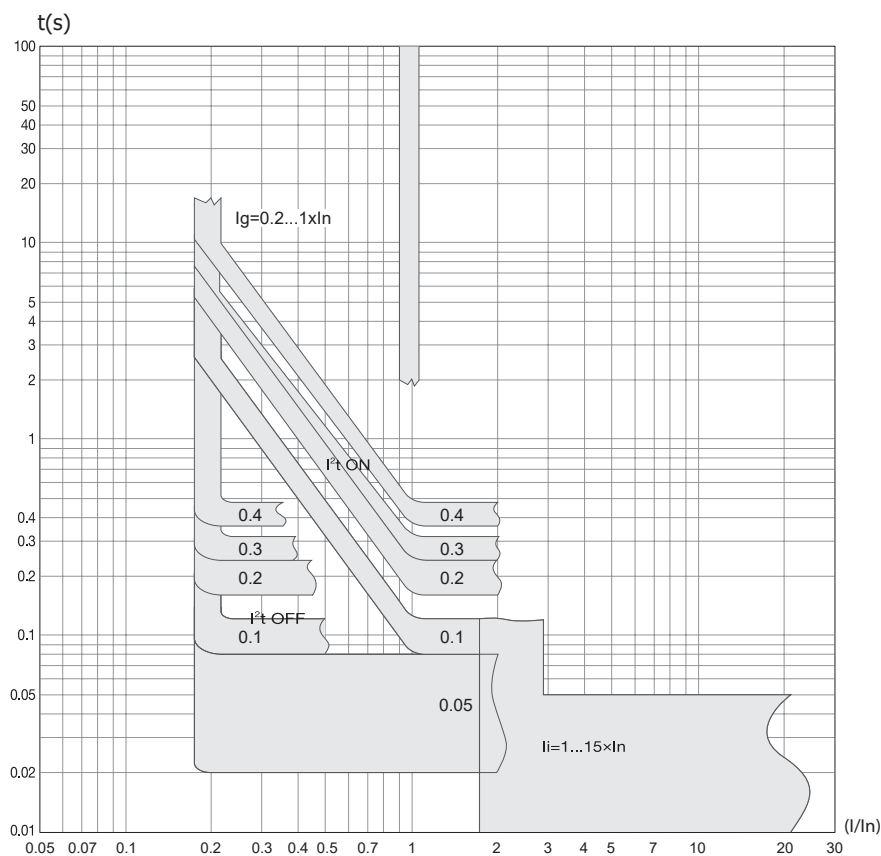
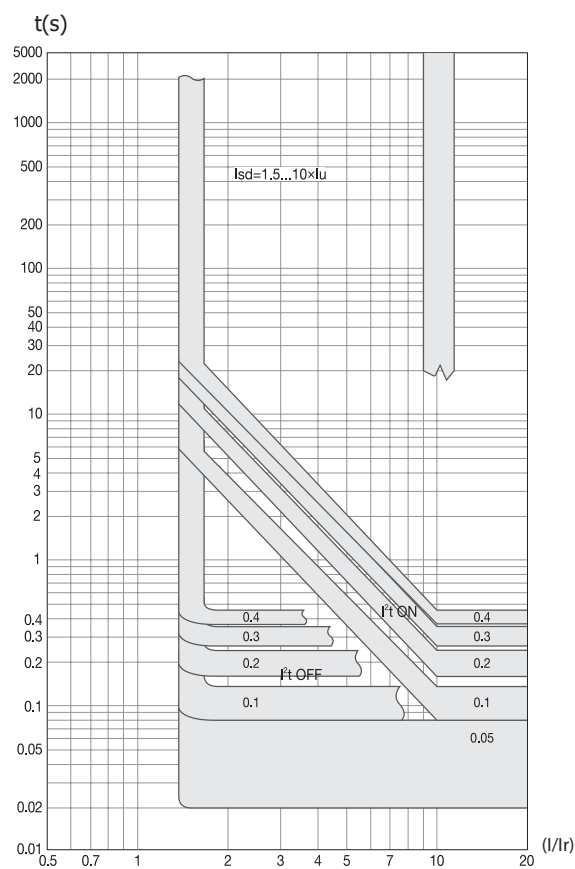
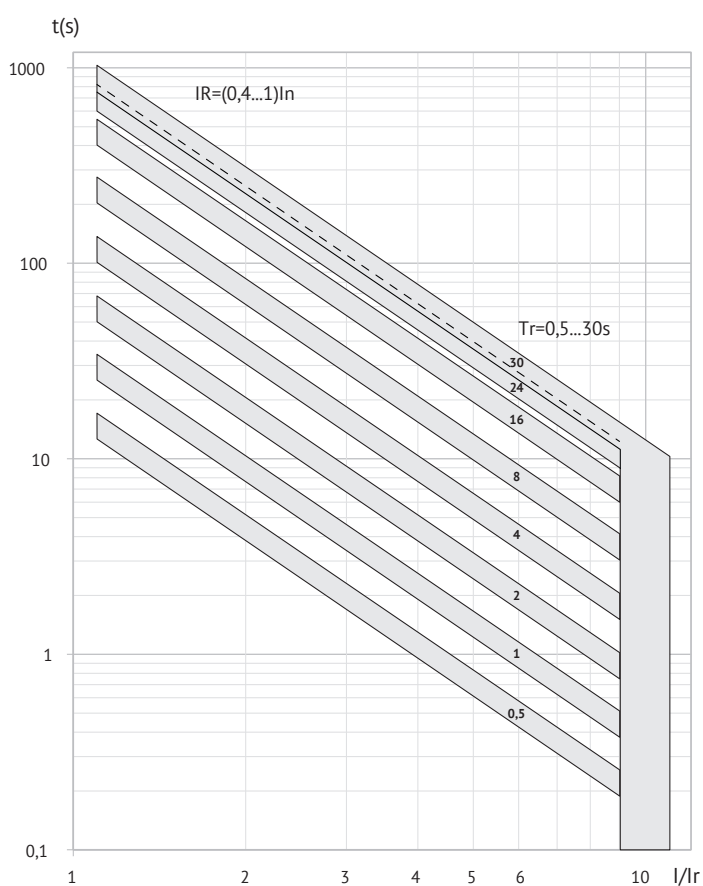
Information transmitted by the microprocessor-based release MR8.0, MR8.1

| Supported protocol | | Modbus RTU |
|--|--|------------|
| Physical level | | RS485 |
| Maximum data transfer rate | | 19200 bps |
| Maximum number of devices in parallel operation | | 100 |
| Settings information | | |
| Ir | Operating current of the switch (set by the switches Ir and Iu in multiples of the rated current from 0.4 In to 1.0In ($I_R = I_r \cdot I_u$)) | |
| Tr | Protective characteristic depending on the response time in the overload zone (from 0.5 to 30 s with a load of 6IR) | |
| Isd | Tripping current in the short circuit zone (from 1.5IR to 10IR) | |
| Tsd | Short-time delay in the zone of short circuit (from 0.05 to 0.4 s) | |
| Ii | Instantaneous operating current in the zone of short circuit in multiples of the rated current (from 2In to 15In) | |
| Ip | Overload alarm switching current in multiples of current Iu | |
| Tp | Overload alarm actuation time since the moment of its occurrence | |
| Ig | Tripping current at single-phase short-circuit to earth in multiples of the rated current (from 0.1In to 1.0In) | |
| Tg | Short-time delay at single-phase short circuit to earth (0.05 to 0.4 s) | |
| Data on circuit breaker actuation | | |
| Current in phases in the event of the switch actuation | | |
| Tripping current in the event of single-phase short circuit to earth | | |
| Year, month, date, time (minutes and seconds) of the circuit breaker actuation | | |
| Cause of the circuit breaker actuation and the phase with the maximum current value when the circuit breaker trips | | |
| Maximum current in one of the phases when the circuit breaker trips | | |
| Measured parameters | | |
| Measured current value in phases | | |

Time – current characteristics of switches with a microprocessor-based release MR5.0



Time - current characteristics of switches with a microprocessor-based release MR7.0, MR8.0, MR8.1



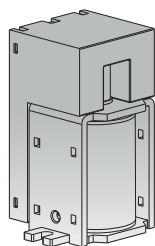
Mounting accessories OptiMat A of overall designs S2, S4

Independent trip device

The specified independent trip device is designed to remotely disconnect the circuit breaker. The independent trip device causes the circuit breaker to open in all operating conditions, when the supply voltage remains within the range from 0,75Ue to 1,1Ue. Unified for all types of OptiMat A switches. It is installed under the front panel of the circuit breaker in its own cell.

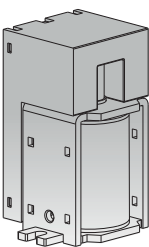
Secondary independent trip device

The secondary independent trip device is intended for a remote disconnection of the circuit breaker and features a backup system of the shunt release. Technical specifications correspond to the characteristics of the shunt release. Is installed if additional requirements are placed on the system reliability, which include an air circuit breaker. It is a mutually exclusive position with an undervoltage release.



| Title | Independent trip device OptiMat A-230AC/DC-UHL3 (TC3) | Independent trip device OptiMat A-110AC/DC-UHL3 (TC3) | Independent trip device OptiMat A-24DC-UHL3 (TC3) |
|-----------------------------|---|---|---|
| Reference | 217987 | 217986 | 272026 |
| Operating voltage, V | 230 AC/DC | 110 AC/DC | 24 DC |
| Range of operating voltages | (0,75-1,1) Ue | | |
| Power consumption, VA, W | 200 | | |
| Operation mode | Short-time (impulse) | | |
| Break – time, ms | not more than 50 | | |

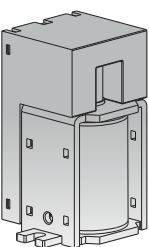
Closing coil



The closing coil is designed to remotely actuate the circuit breaker. Unified for all types of OptiMat A switches. It is installed under the front panel of the circuit breaker in its own cell.

| Title | Closing coil OptiMat A-230AC/DC-UHL3 (TC3) | Closing coil OptiMat A-110AC/DC-UHL3 (TC3) | Closing coil OptiMat A-24DC-UHL3 (TC3) |
|-----------------------------|--|--|--|
| Reference | 217989 | 217988 | 272020 |
| Operating voltage, V | 230 AC/DC | 110 AC/DC | 24 DC |
| Range of operating voltages | (0,75-1,1) Ue | | |
| Power consumption, VA, W | 200 | | |
| Operation mode | Short-time (impulse) | | |
| Break – time, ms | not more than 50 | | |

Undervoltage release

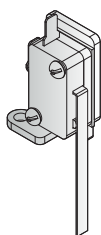


The undervoltage release is designed to disconnect the circuit breaker when the voltage drops below the established norms. If there is no supply voltage at the undervoltage release, automatic or manual closing is impossible. The undervoltage release causes the circuit breaker trip under any operating conditions when the supply voltage decreases within the range from 0,75 to 1,1 Ue. Closing of the circuit breaker becomes possible when applying to the undervoltage release from 0,75 to 1,1 Ue. The device is unified for all types of OptiMat A switches. It is installed under the front panel of the circuit breaker in its own cell.

The position is mutually exclusive with the secondary independent trip device.

| Title | Undervoltage release OptiMat A-230AC/DC-UHL3 (TC3) |
|-----------------------------|--|
| Reference | 217994 |
| Operating voltage, V | 230 AC/DC |
| Range of operating voltages | (0,75-1,1) Ue |
| Power consumption, VA | 200 |
| Operation mode | Short-time (impulse) |
| Break – time, ms | not more than 50 |

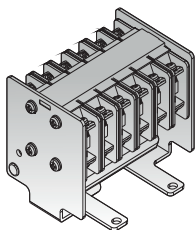
— Signaling contact of the switch availability for closing the main contacts



Signaling contact of the switch availability for closing the main contacts is intended to inform on the status of the spring (it is wound / not wound), turning on the automatic switch. It is installed under the front panel of the circuit breaker in its own cell.

| Title | Signaling contact of the switch availability for closing the main contacts of OptiMat A630-4000-UHL3(TC3) | |
|-------------------------|---|----------------|
| | Voltage, V | Active load, A |
| Alternating current, VA | 250 | 8 |
| | 125 | 16 |
| Direct current, W | 250 | 0,3 |
| | 125 | 0,6 |

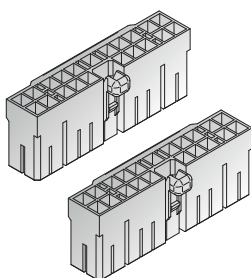
— Auxiliary contacts



Auxiliary contacts are used to signal the status of the switch. The devices are unified for all types of OptiMat A switches. Installed under the front panel of the circuit breaker in their own cell. Included in standard configuration.

| Title | Inductive load | |
|-------------------------|----------------|-----|
| Alternating current | 250 V | 5 A |
| Direct current | 30 V | 3 A |
| Number of used contacts | 6a+6b | |

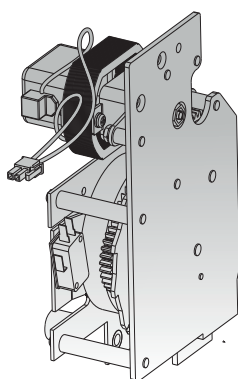
— Set of connectors for control circuits



A set of connectors for control circuits is designed for electrical connection of the air circuit breaker systems with the main control body. It is mounted to external electrical wiring and is connected to the circuit breaker. Included in standard configuration of the circuit breakers of withdrawable (draw-out) version.

| Title | | OptiMat A-UHL3 (TC3) set of connectors for control circuits |
|-------------------|------------------------|--|
| Reference | | 234555 |
| Delivery quantity | Plastic terminal block | 2 |
| | Female contact | 15 |

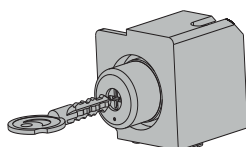
— Motor drive



The motor drive is designed for arming the closing spring of the circuit breaker. In the event of power supply absence to the motor drive, the arming of the closing spring is performed manually. The device is unified for all types of OptiMat A switches. It is installed under the front panel of the circuit breaker in its own cell.

| Title | Motor drive OptiMat A630-4000-230AC / DC-UHL3 (TC3) |
|---------------------------------|---|
| Reference | 235993 |
| Operating voltage, V | 230 AC/DC |
| Maximum current consumption, A | 0,5 |
| Motor rotational speed, rpm | 16000-19000 |
| Maximum starting current | 5In |
| Arming time, s | not more than 5 |
| Insulation strength | 2 kV within 1 min |
| Operating temperature range, °C | -25...+60 |
| Operating frequency | no more than 2 times / min |
| Mechanical life | 20,000 cycles |

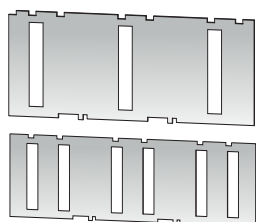
— Startup lock



The built-in startup lock is designed to lock actuation (locks the circuit breaker in the disconnected state). It is impossible to unlock the switch without the corresponding key. The device is unified for all types of OptiMat A switches. It is installed under the front panel of the circuit breaker in its own cell.

| Title | OptiMat A built-in lock |
|--------------------------------|----------------------------|
| Reference | 217999 |
| Number of keys in the set, pcs | 1 |

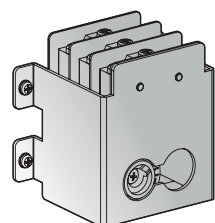
Insulating shutters



Insulating shutters are designed to prevent access to plug-in contacts when the circuit breaker is in the "draw-out" or "test" position (IP20 protection level). Installed in the chassis (basket) of the circuit breaker.

| Dimension of circuit breaker | Title | Reference |
|------------------------------|---|-----------|
| Dimension I up to 2000 A | Insulating shutters OptiMat A630-2000-UHL3 (TC3) | 242118 |
| Dimension II up to 4000 A | Insulating shutters OptiMat A2500-4000-UHL3 (TC3) | 242119 |

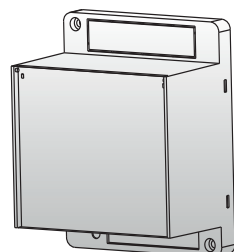
Indication of the circuit breaker position in the chassis (basket)



The position indication determines the state of the circuit breaker: DRAW-IN / TEST / DRAW-OUT. Installed on the basket (chassis) to the left or right of the CIRCUIT BREAKER.

| Title | | | |
|--|-----|-------------|----------------|
| Indication of the circuit breaker position in the chassis (basket) OptiMat A-UHL3 (TC3) | | | |
| Reference | | 267249 | |
| Voltage, V | | Active load | Inductive load |
| Alternating current, VA | 250 | 5 | 2,5 |
| | 125 | 10 | 10 |
| Direct current, W | 250 | 3 | 1,5 |
| | 125 | 10 | 10 |

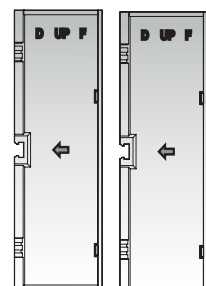
Response delay controller of the undervoltage release



The controller is designed to prevent tripping of the undervoltage release in case of short-time failures or voltage drops at the power supply. The undervoltage release is required for connection as part of a circuit breaker. Mounted on a DIN rail or on the side of the switch.

| Title | |
|---|------------------|
| Response delay controller of the undervoltage release OptiMat A-UHL3 (TC3) | |
| Reference | |
| 236607 | |
| Delay time, s | 0,5; 1,0; 1,5; 3 |

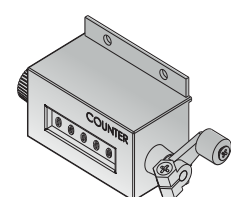
Interpole barriers



Interpole barriers are designed to prevent the occurrence of interphase short circuit. The devices are unified for all types of OptiMat A circuit breakers. They are installed in the corresponding grooves between the main terminals of the switch. Included in standard configuration.

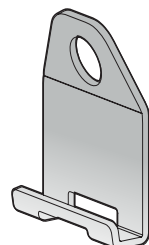
| Title | Interpole barriers OptiMat A630-4000-UHL3(TC3)-2 pcs |
|-------------------------------|--|
| Reference | 269618 |
| Number of barriers in the set | 2 |

Mechanical cycle counter



The mechanical cycle counter is designed to indicate the number of on / off cycles. Unified for all types of OptiMat A switches. It is installed under the front panel of the circuit breaker in its own cell. Included in standard configuration.

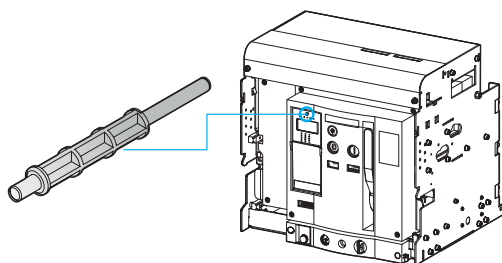
Lifting lugs



Lifting lugs are designed to facilitate lifting and moving a circuit breaker. Unified for all types of OptiMat A switches.

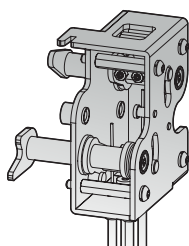
| Title | Lifting lugs OptiMat A-UHL3(TC3)-2pcs |
|-----------|---------------------------------------|
| Reference | 240745 |

Retracting mechanism of the microprocessor-based release



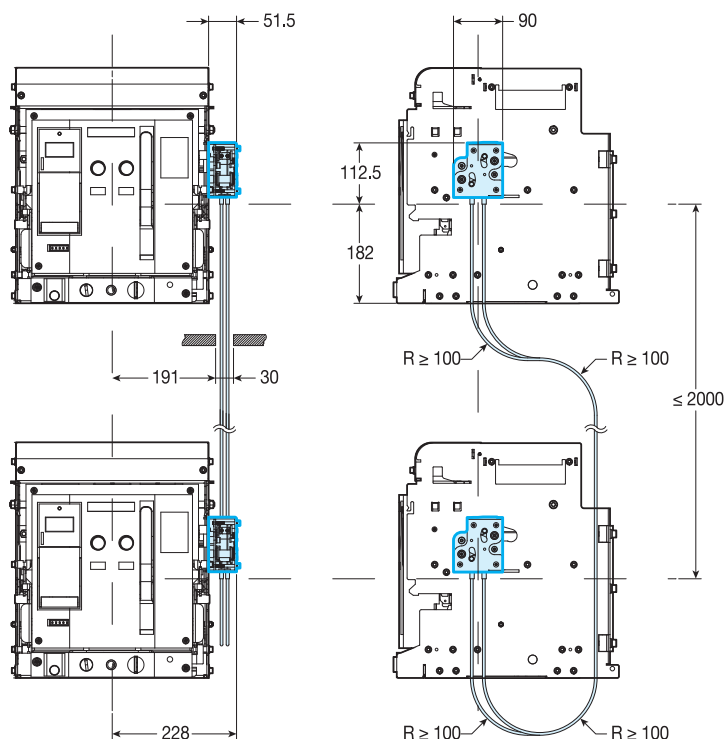
The module in the base of the microprocessor-based release is equipped with a manual retraction (return) button after actuation from the microprocessor trip unit. After the automatic circuit breaker is actuated, the button moves forward. To turn on the circuit breaker, it is necessary to press the button. Unified for OptiMat A switches of all types. It is installed under the front panel of the circuit breaker in its own cell. Included in standard configuration.

Mechanical interlocking

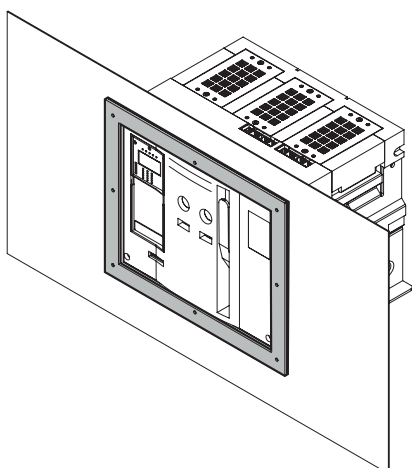


Mechanical interlocking is designed for reciprocal interlocking of the on / off operations of two or three automatic circuit breakers.

| Title | Reference |
|---|-----------|
| Mechanical interlock kit for 2 OptiMat A630-4000-UHL3 (TC3) | 242120 |
| Mechanical interlock kit for 3 OptiMat A630-4000-UHL3 (TC3) | 248580 |



Front panel frame



The frame of the front panel is designed to protect against contact with the sharp edge of the cutout. In addition, it protects the extending front part of the switch. Is mounted on the front panel of the switchgear.

| Title | Reference |
|---|-----------|
| Front panel frame of the fixed OptiMat A 630-2000A-UHL3 (TC3) | 246228 |
| Front panel frame of the fixed OptiMat A 2500-4000A-UHL3 (TC3) | 246232 |
| Front panel frame of the withdrawable OptiMat A 630-2000A-UHL3 (TC3) | 246233 |
| Front panel frame of the withdrawable OptiMat A 2500-4000A-UHL3 (TC3) | 249399 |

Mounting accessories of OptiMat A series of overall dimensions S1, S5, S6

Closing coil and independent trip device

The closing coil is designed to actuate the switch remotely, and the independent trip device is designed to disconnect the switch remotely. They are designed for operation in AC and DC circuits.

| | |
|------------------------------|---------------------|
| Operating voltage U_e , V | 230AC/220DC |
| Operating voltage range, V | $(0,7 \sim 1,1)U_e$ |
| Power consumption V / A or W | 200 |
| Break-time | 50 ± 10 ms |

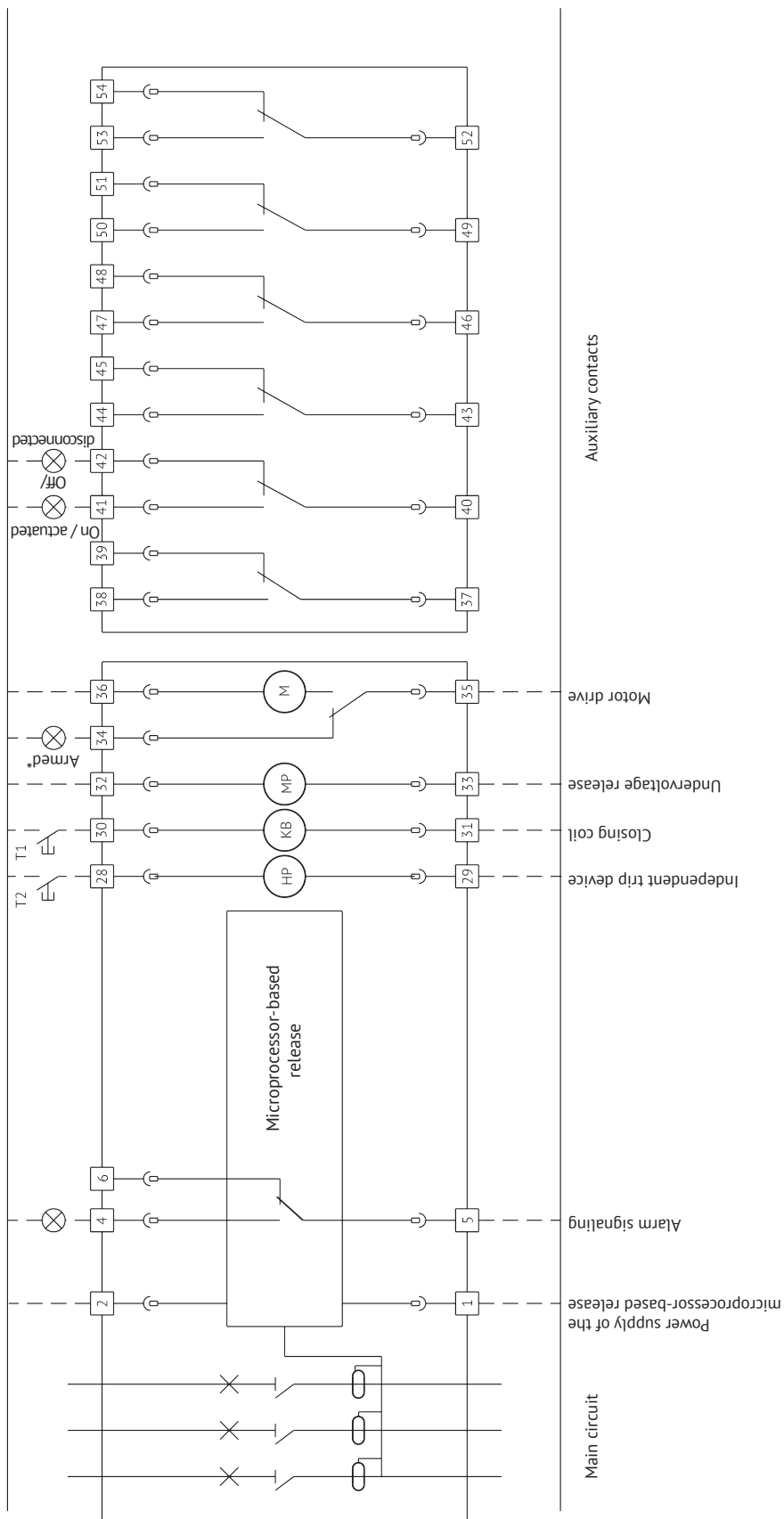
Motor drive

The motor drive is designed for remote arming of the switch mechanism, pre-compression of the actuating spring, i.e. preparation of the switch to close. The nominal operation mode of the motor drive is short-term. The motor drive is designed for operation in an AC or DC circuit.

| | |
|------------------------------|-------------------------------|
| Operating voltage U_e , V | 230AC/220DC |
| Operating voltage range, V | $(0,85 \sim 1,1)U_e$ |
| Power consumption V / A or W | 150 |
| Arming (retraction) time, s | <8 |
| Frequency of arming | up to three cycles per minute |

Wiring diagrams of OptiMat A

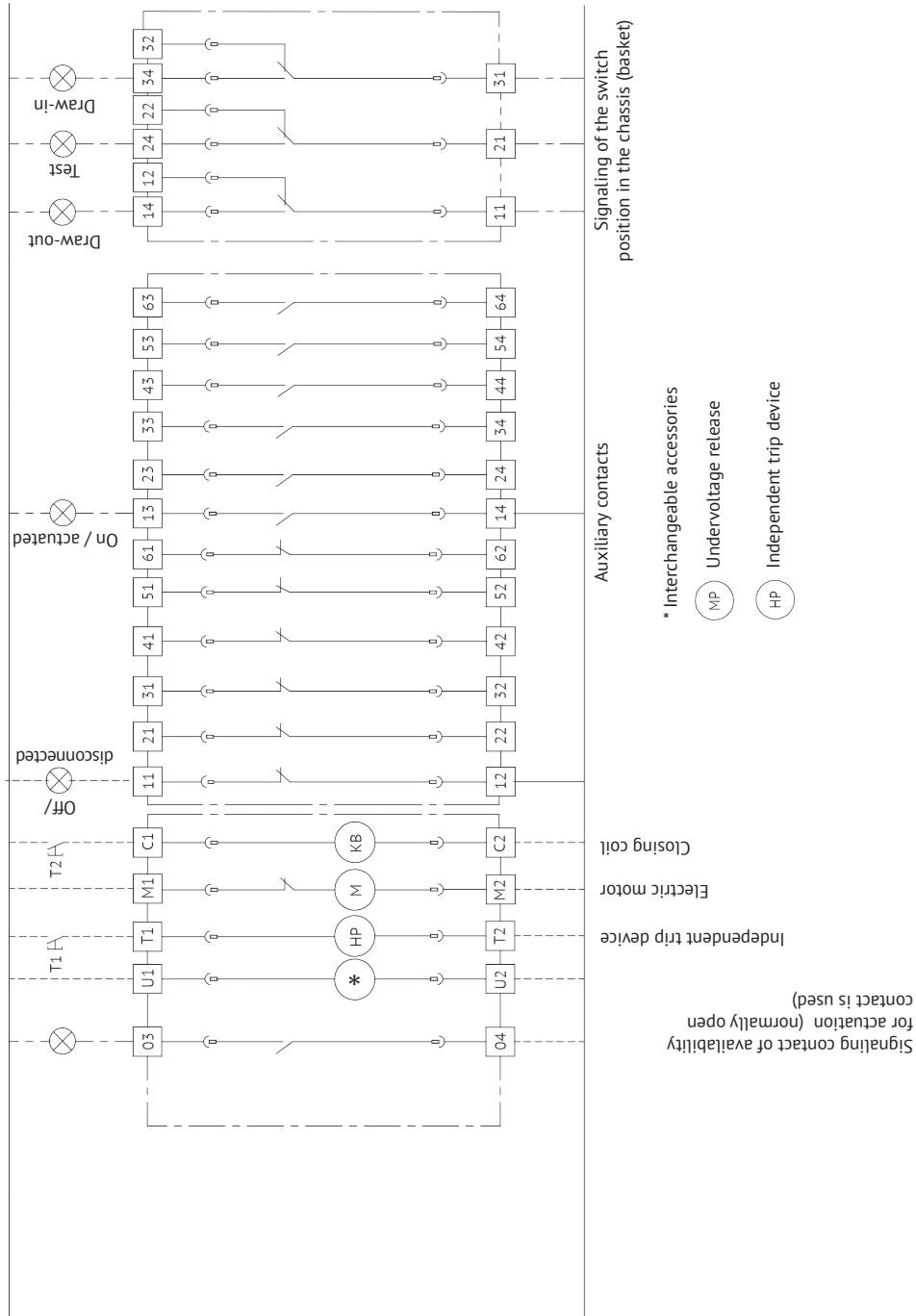
Wiring diagram of the circuit breaker with a semiconductor release MR5.0 type of S1 overall dimension



"Output" 34" (armed) is not galvanically isolated with output "36"

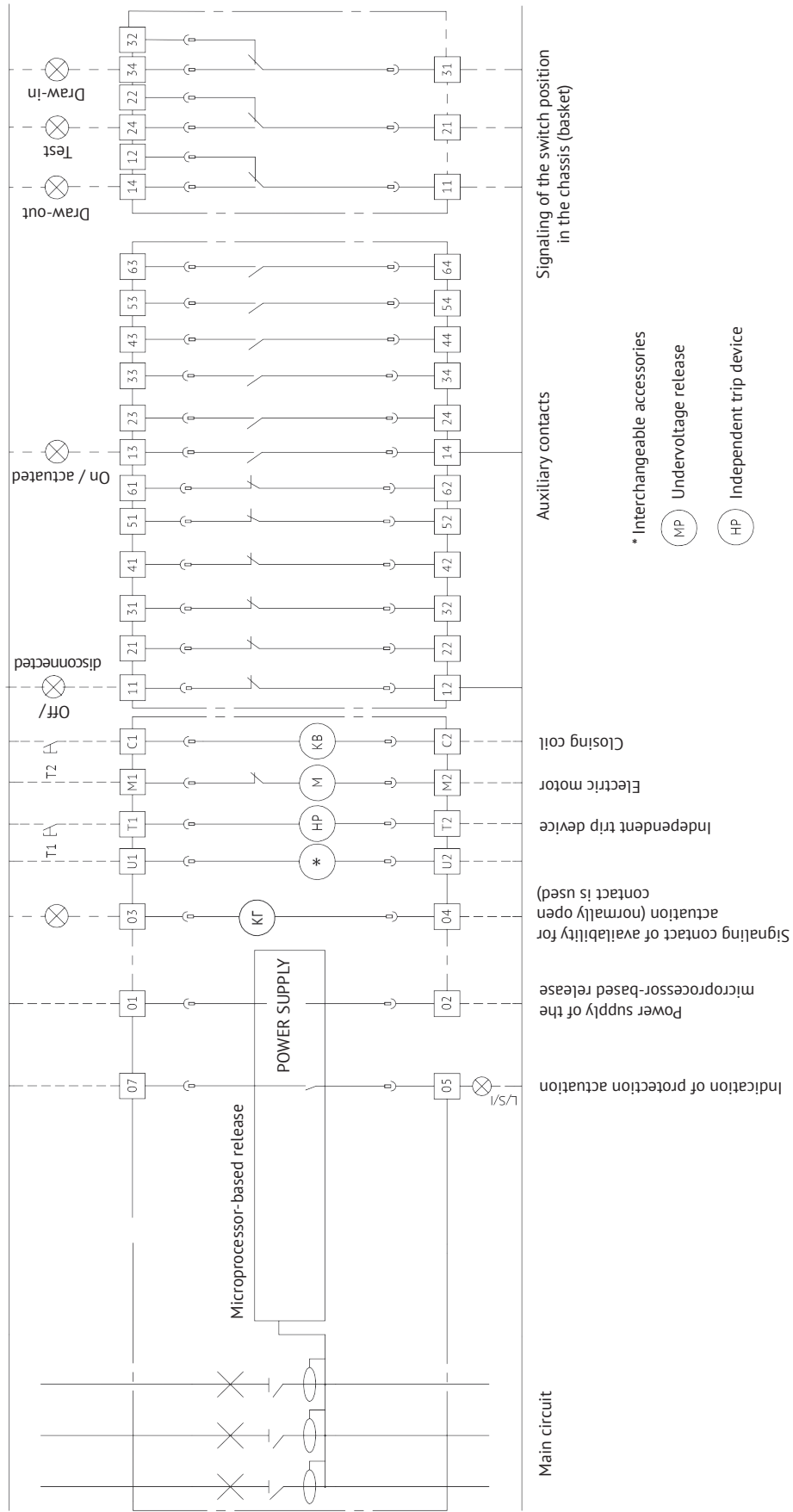
Dashed lines indicate connections made by a consumer.

Wiring diagram of the circuit breaker without a semiconductor release type of S2, S4 overall dimensions



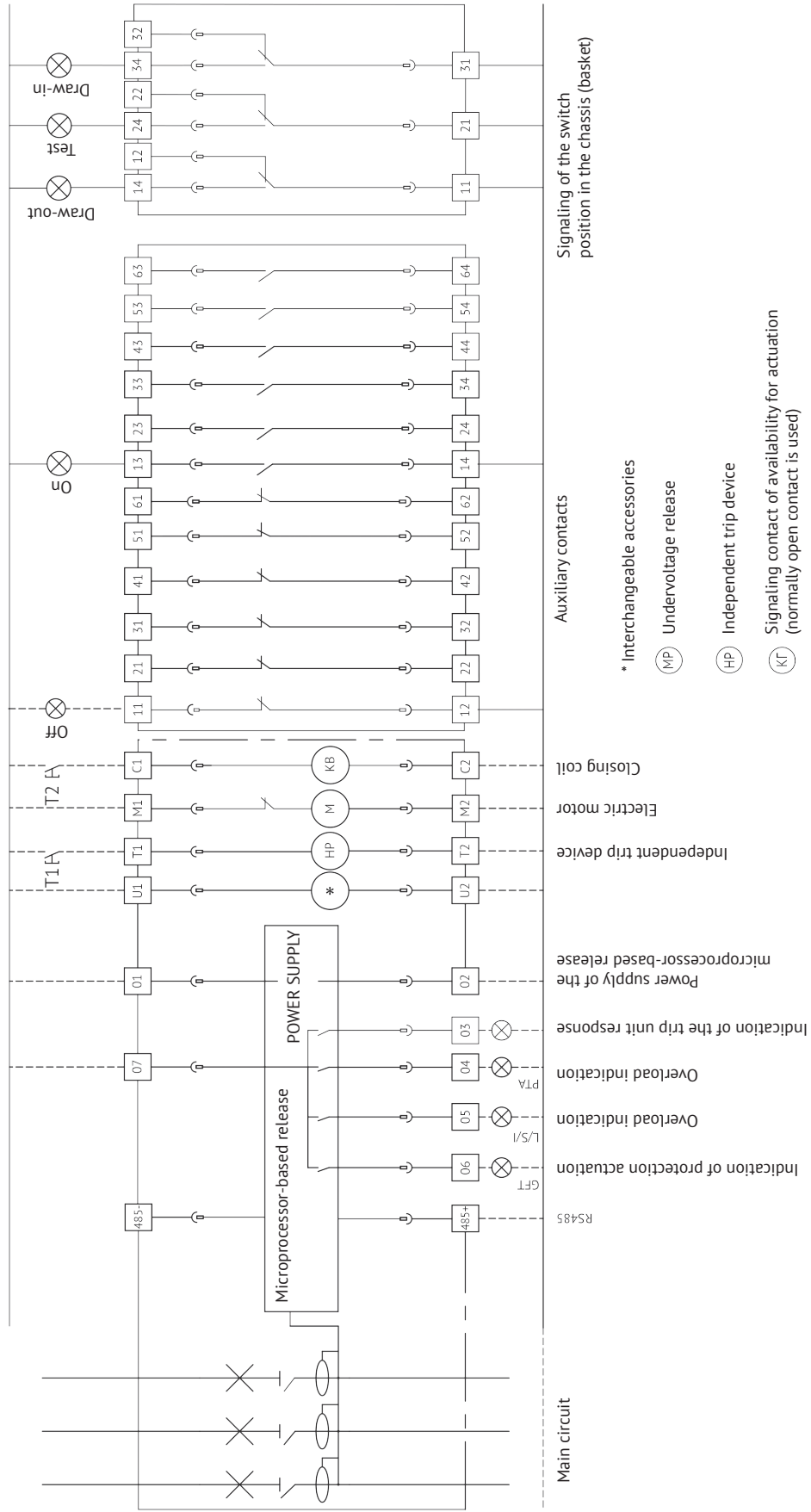
Dashed lines indicate connections made by a consumer.

Wiring diagram of the circuit breaker with a semiconductor release type MR7.0 of S2, S4 overall dimensions

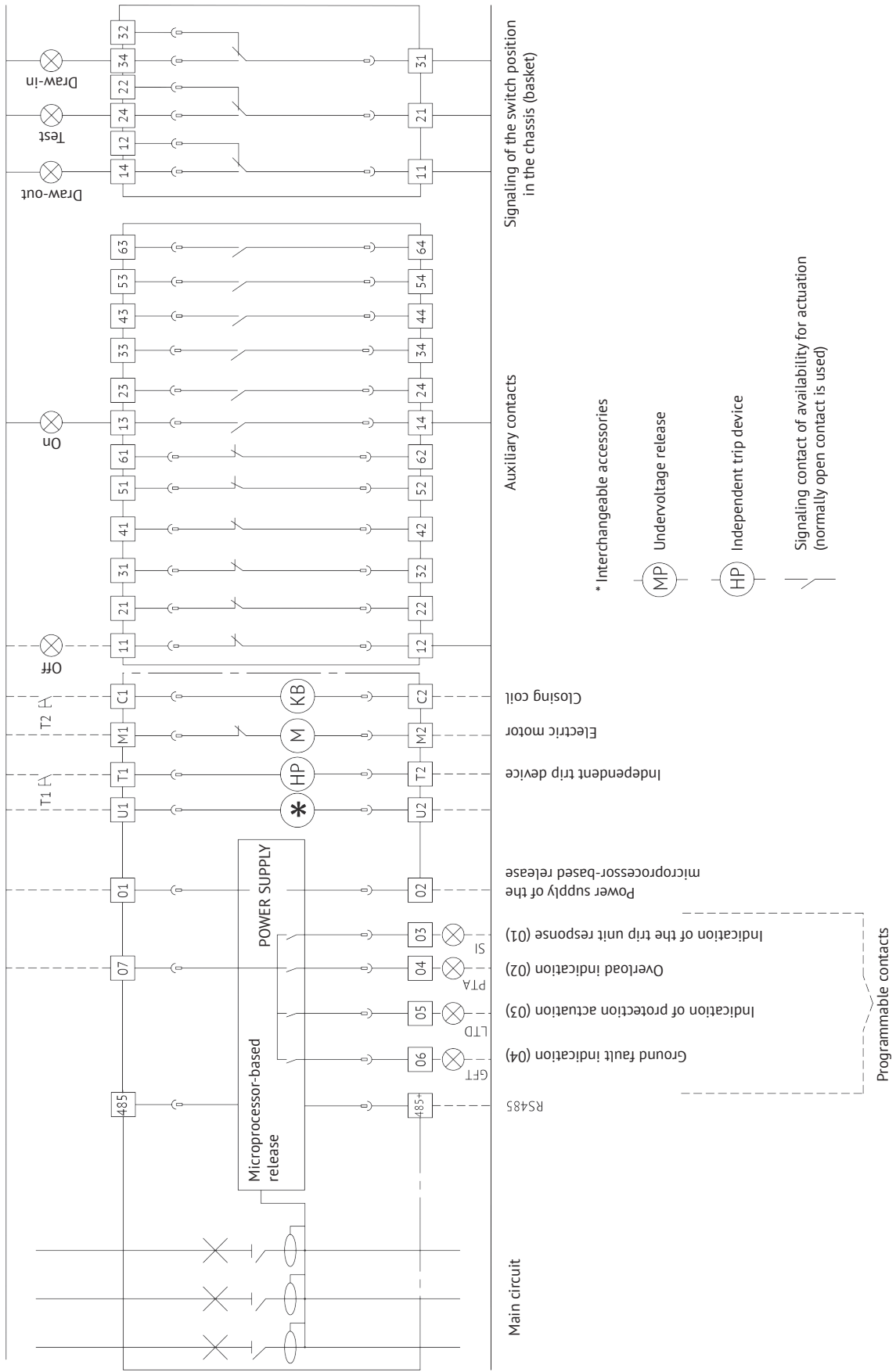


Dashed lines indicate connections made by a consumer.

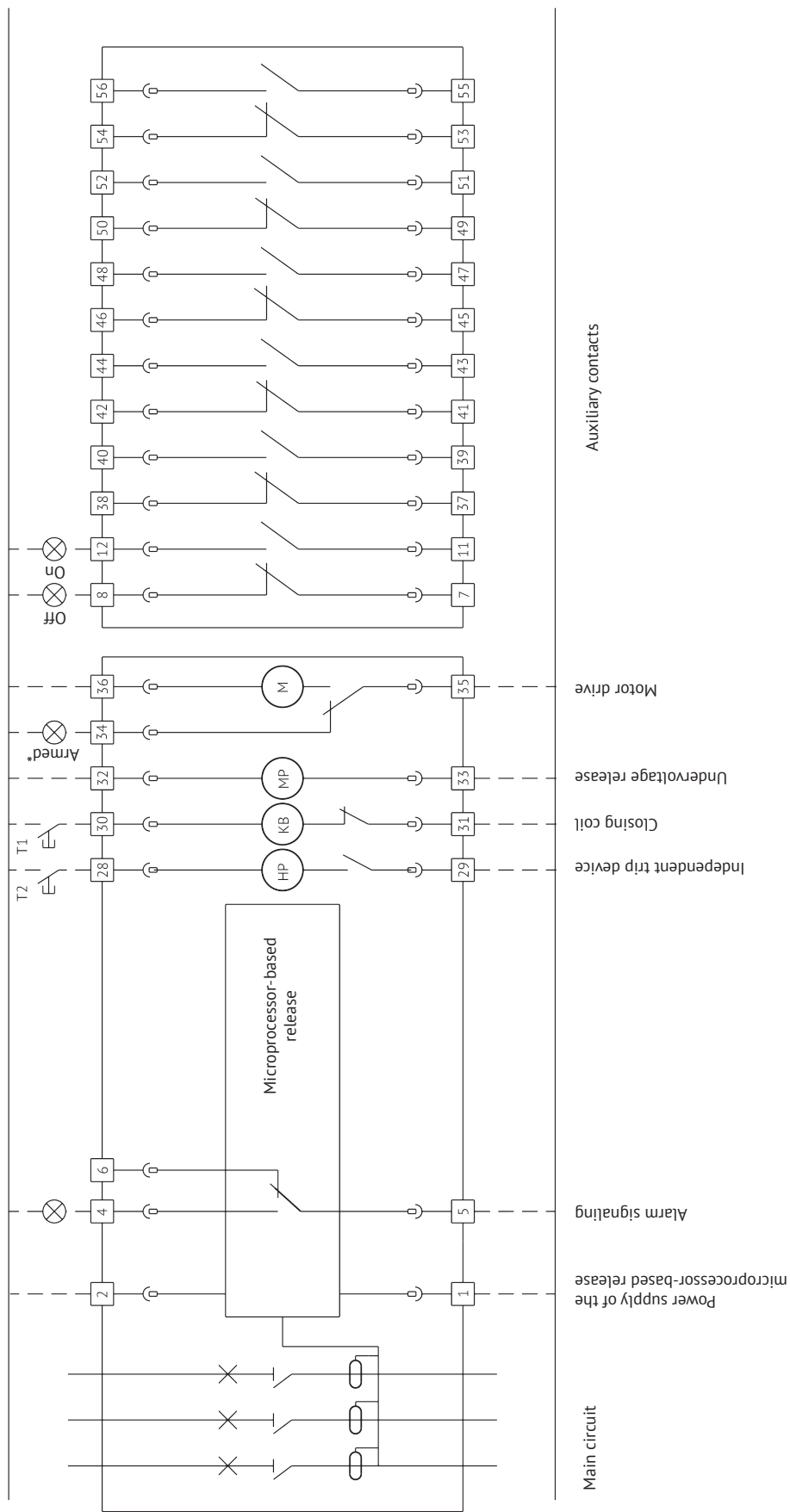
Wiring diagram of the circuit breaker with a semiconductor release type MR8.0 of S2, S4 overall dimensions



Wiring diagram of the circuit breaker with a semiconductor release type MR8.1 of S2, S4 overall dimensions



Wiring diagram of the circuit breaker with a semiconductor release type MR5.0 S5, S6 overall dimensions



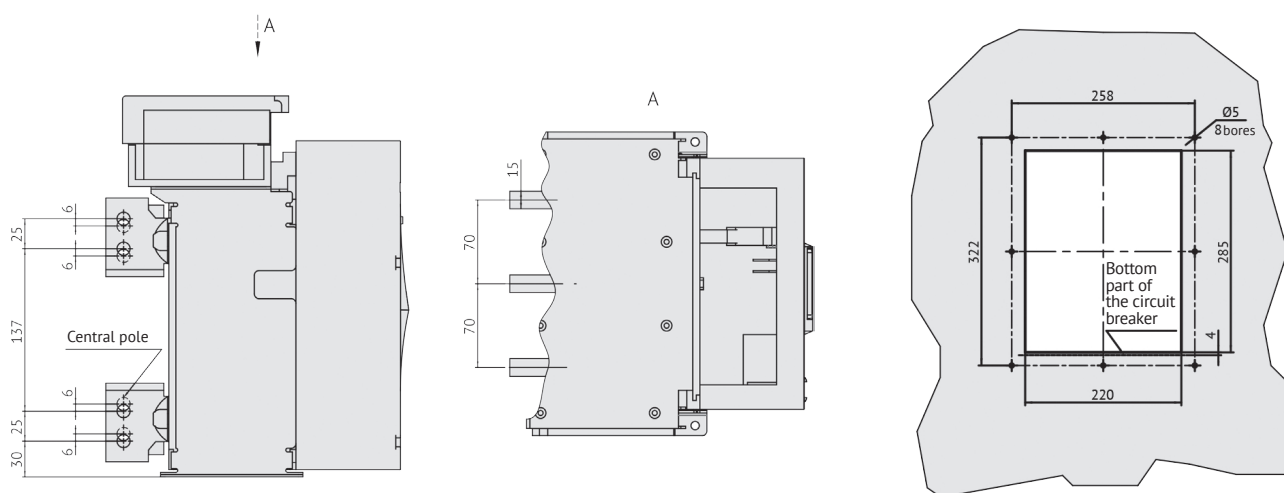
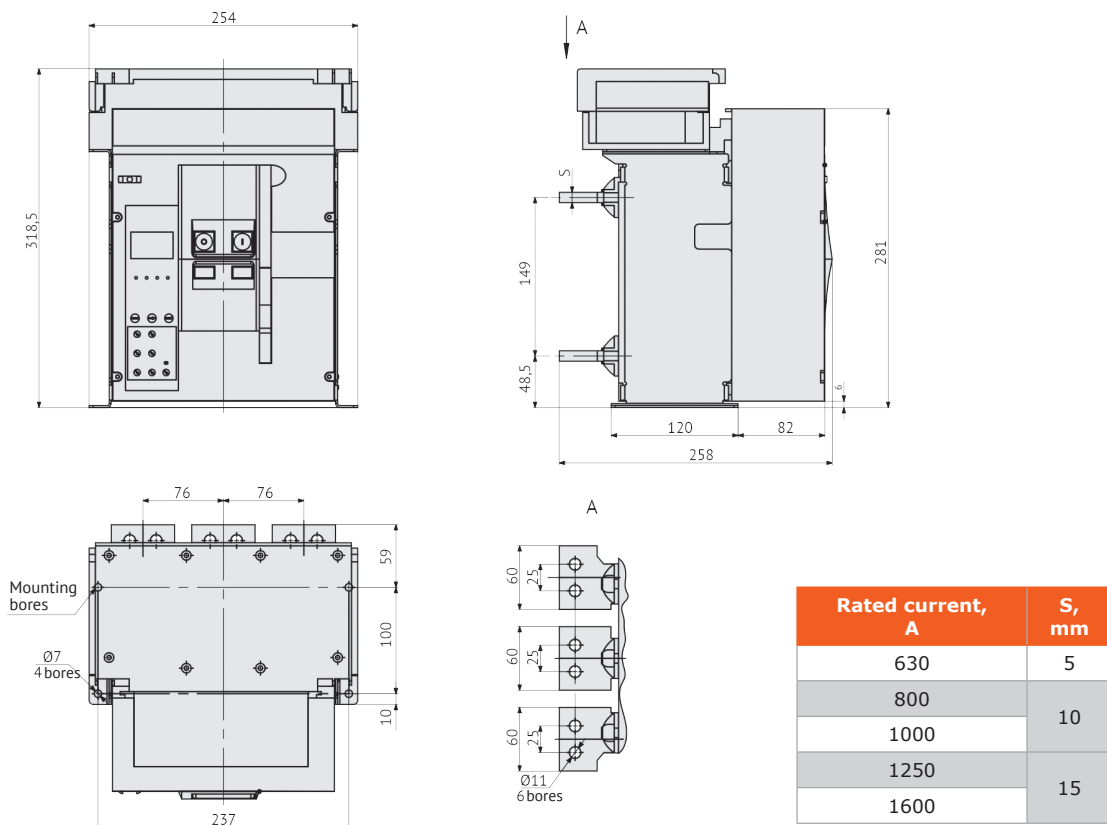
Dashed lines indicate connections made by a consumer.

Dashed lines indicate connections made by a consumer.

Overall, mounting and connection dimensions (mm)

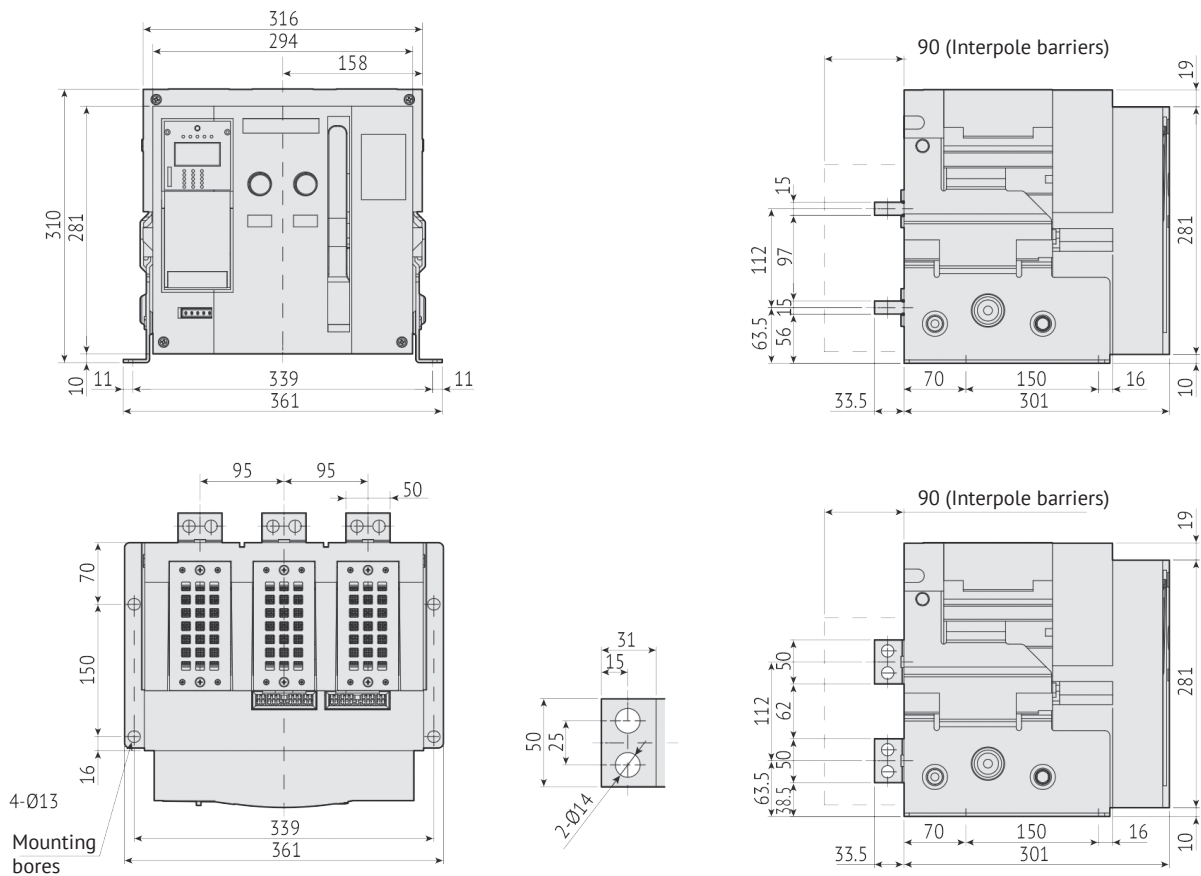
Drawings of S1 dimension fixed circuit breakers

OptiMat A circuit breakers of S1 dimension, fixed version with rear busbar connection option from 630 to 1600 A

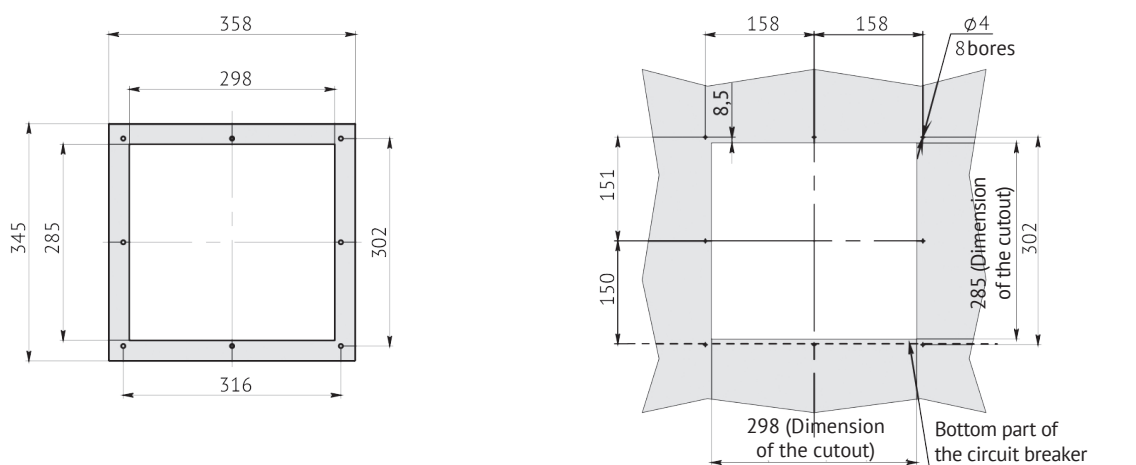


Drawings of S2 dimension fixed circuit breakers

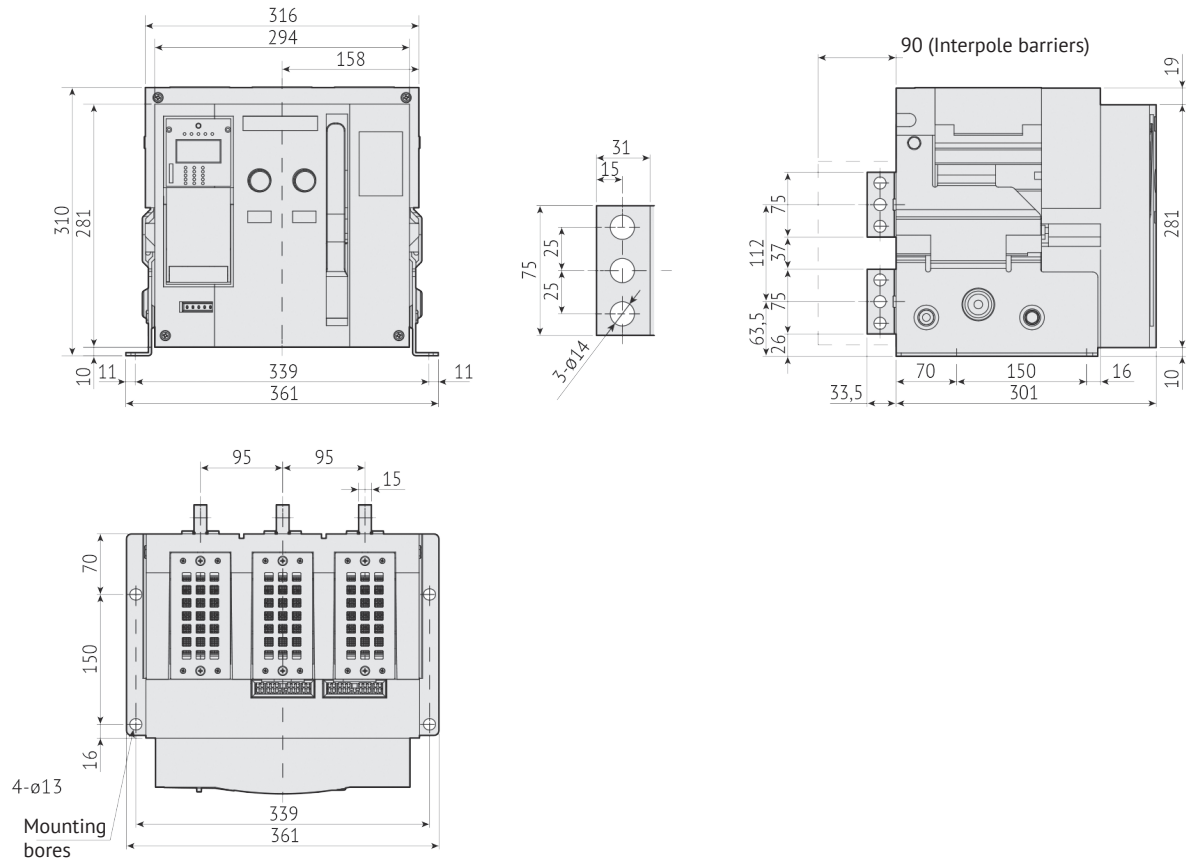
OptiMat A circuit breakers of S2 dimension, fixed version with rear busbar connection option from 630 to 1600 A



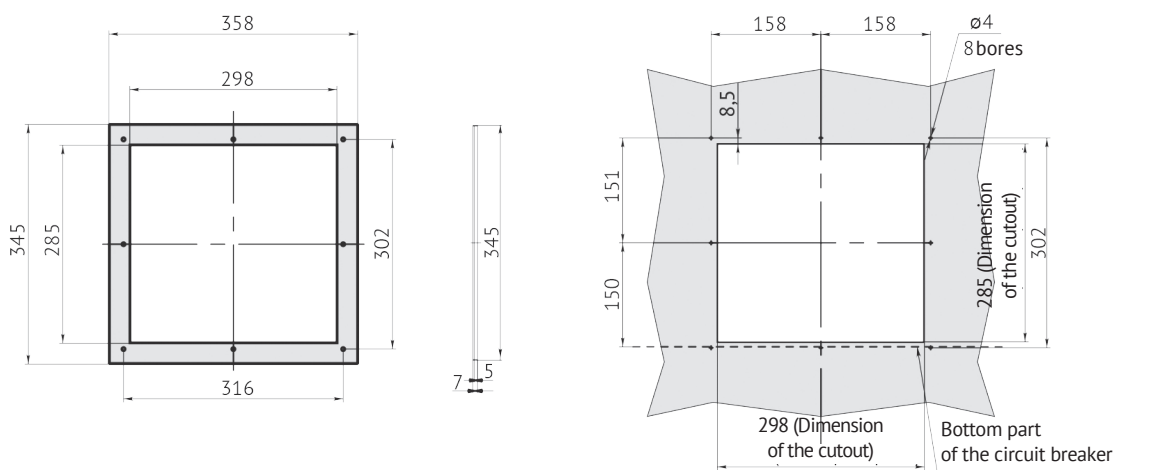
Front panel frame



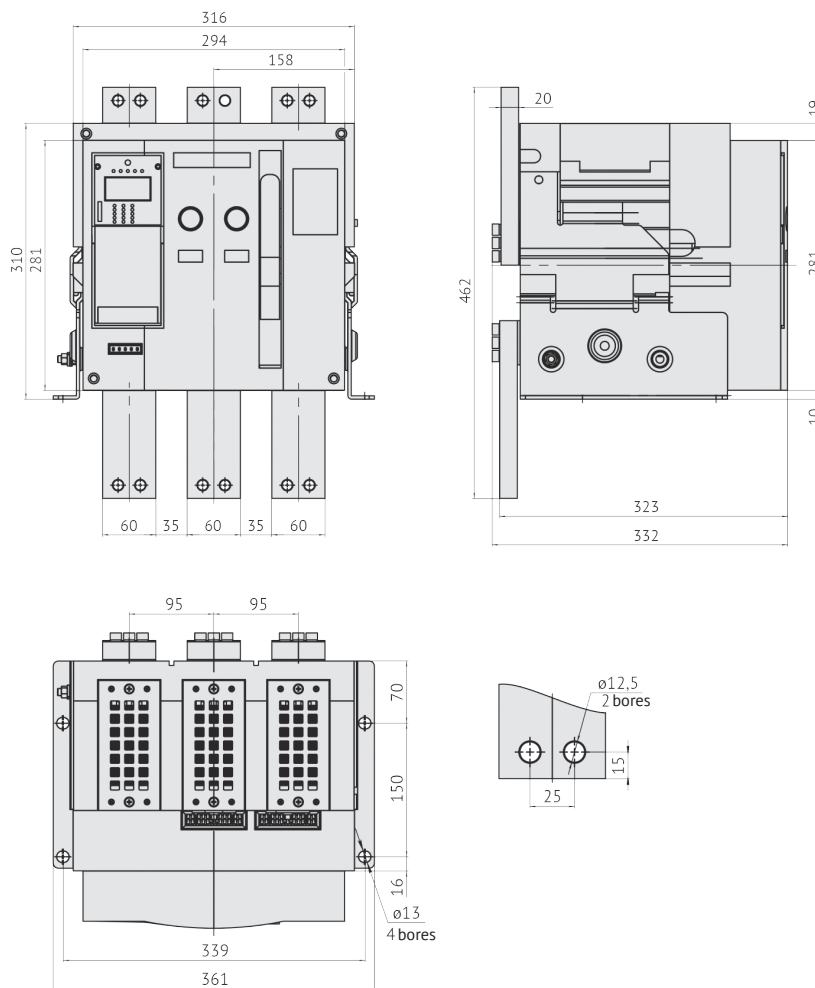
OptiMat A circuit breakers of S2 dimension, fixed version with rear busbar connection option for 2000 A



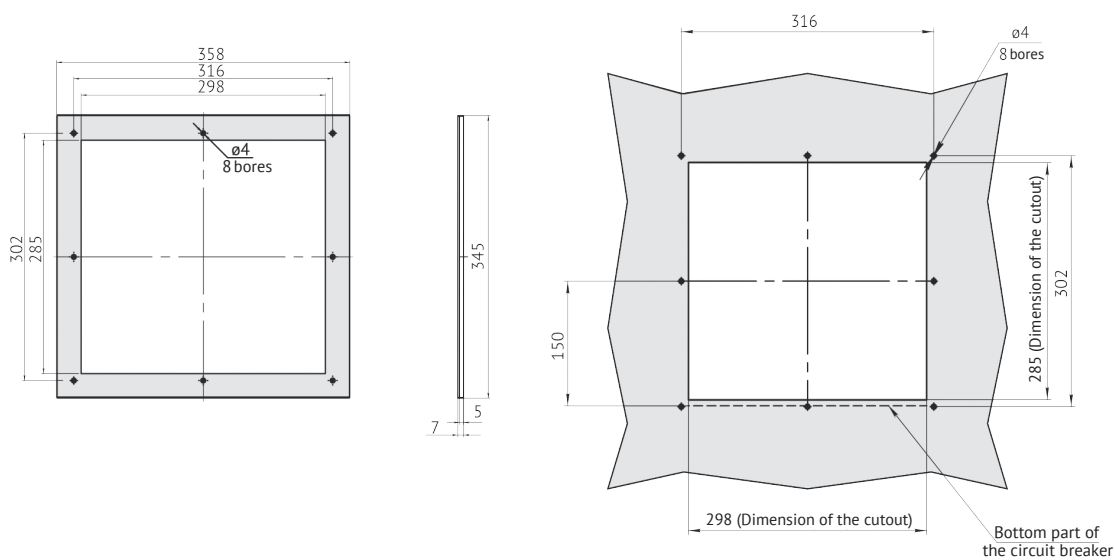
Front panel frame



OptiMat A circuit breakers of S2 dimension, fixed version with front busbar connection option from 630 to 2000 A

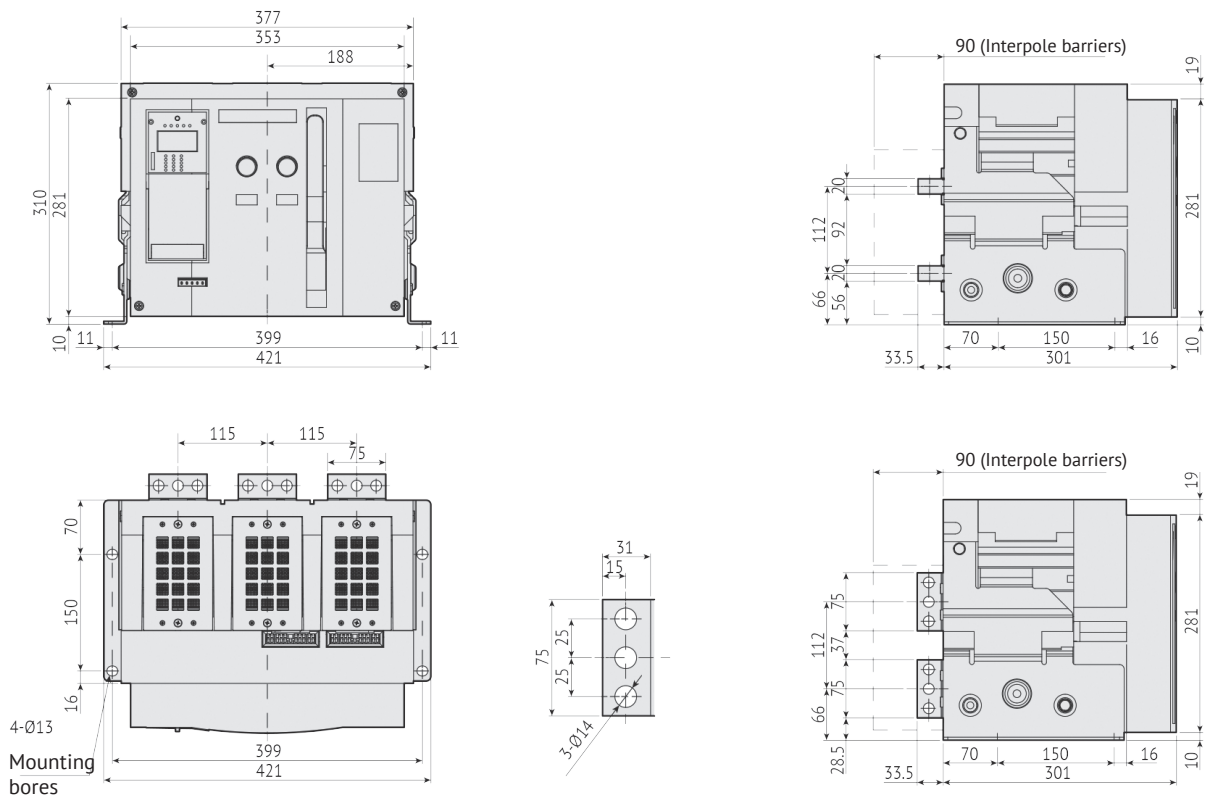


Front panel frame

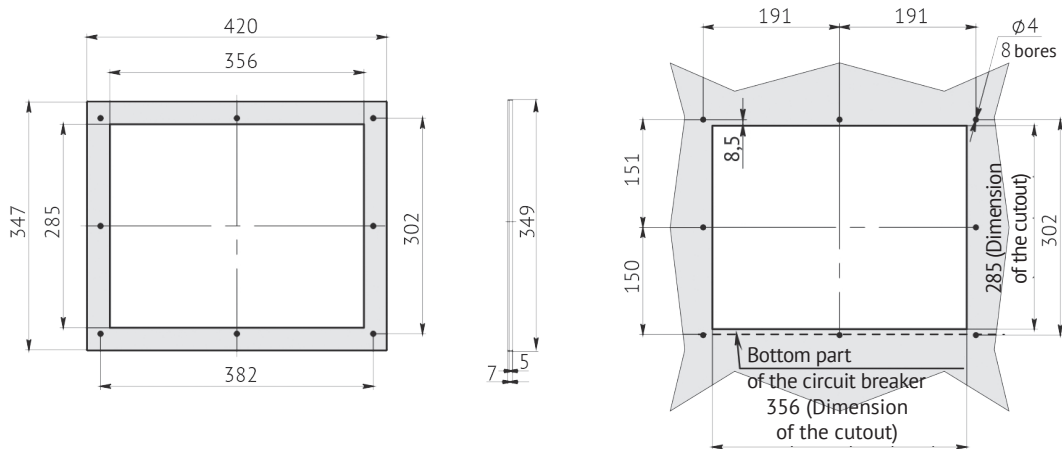


Drawings of S4 dimension fixed circuit breakers

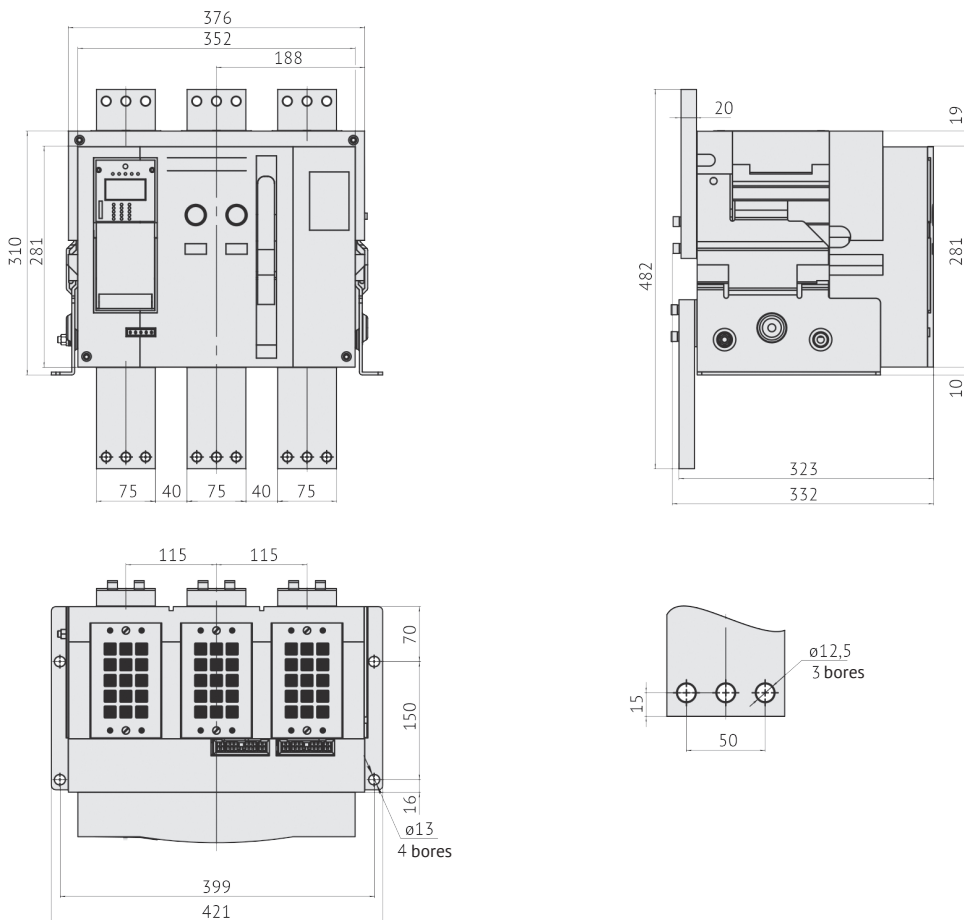
OptiMat A circuit breakers of S4 dimension, fixed version with rear busbar connection option from 2500 to 3200 A



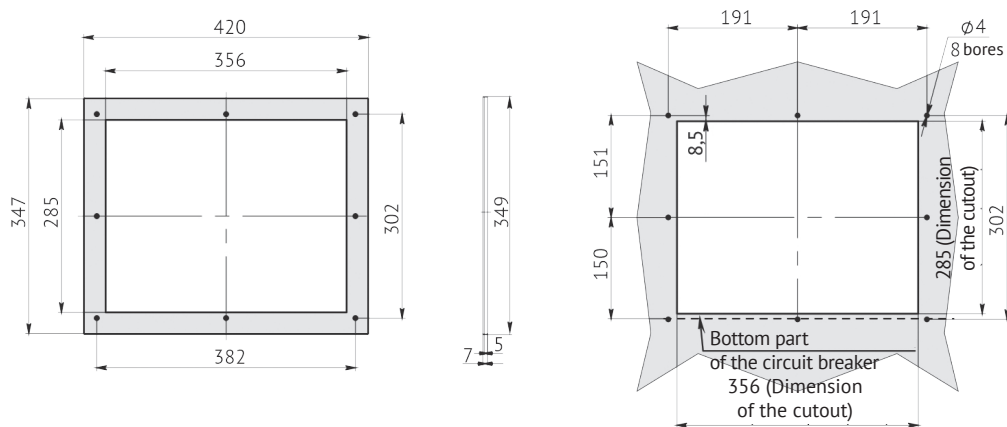
Front panel frame



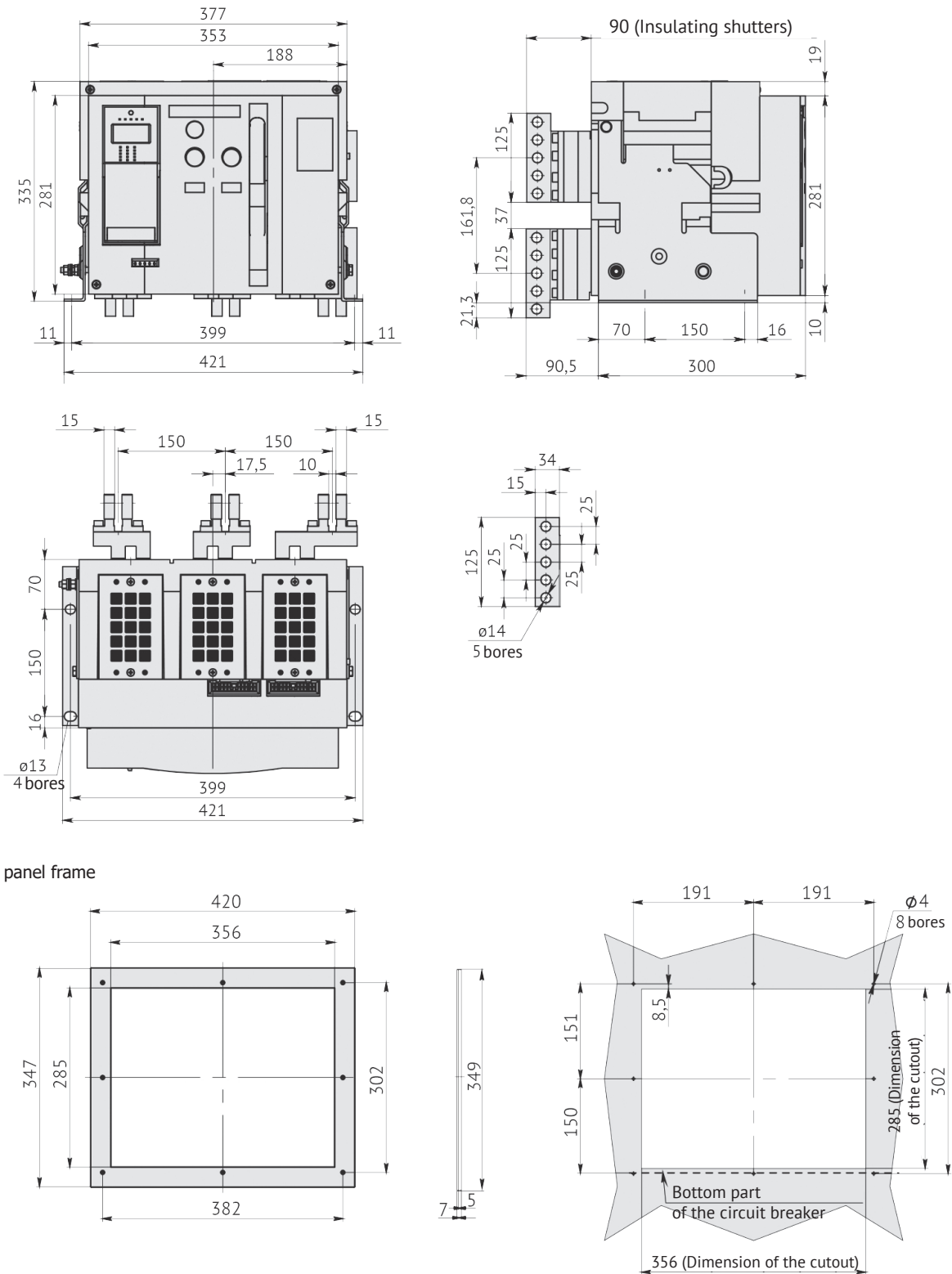
OptiMat A circuit breakers of S4 dimension, fixed version with front busbar connection option for 2500A



Front panel frame

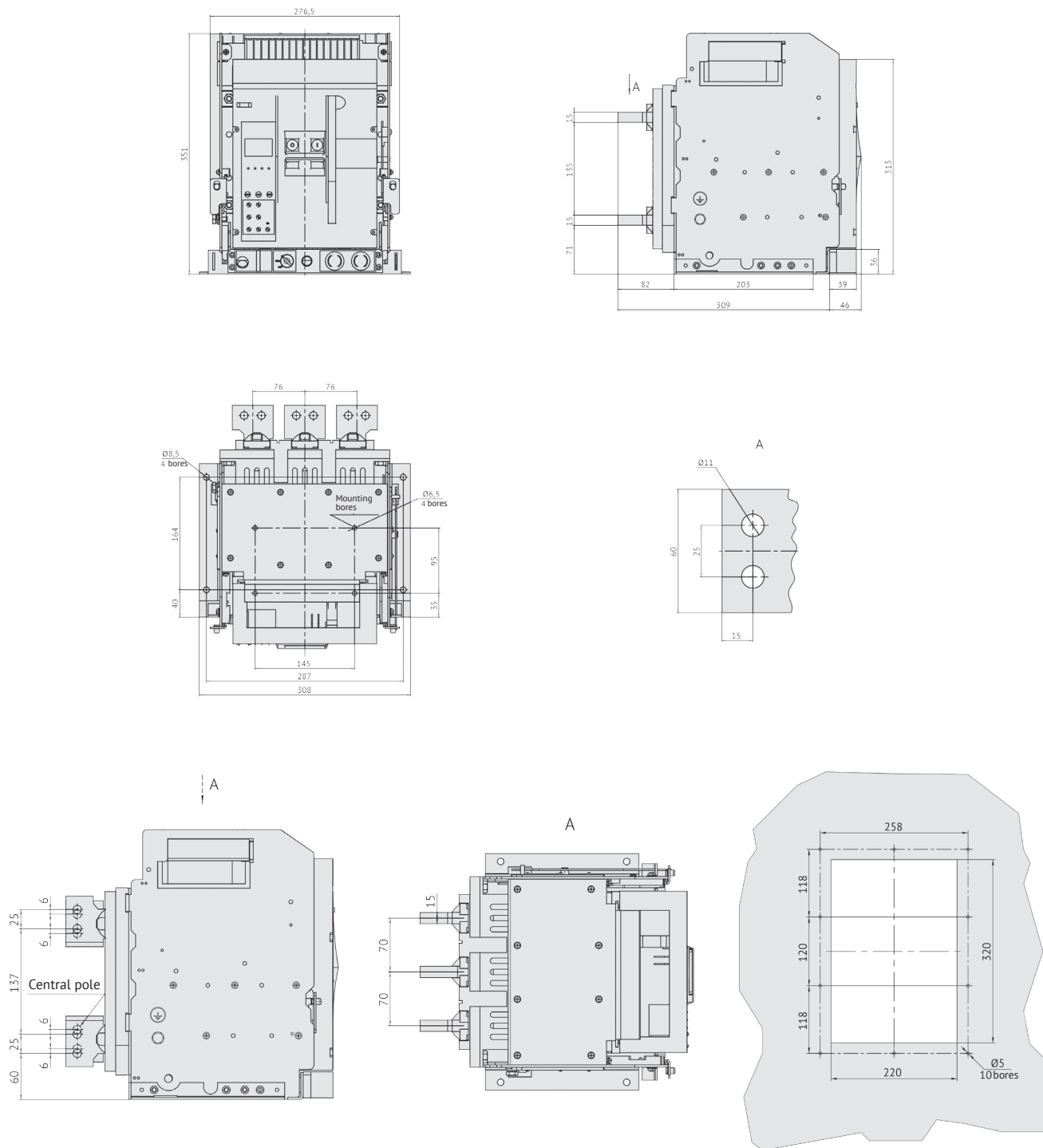


OptiMat A circuit breakers of S4 dimension, fixed version with rear busbar connection option for 400A



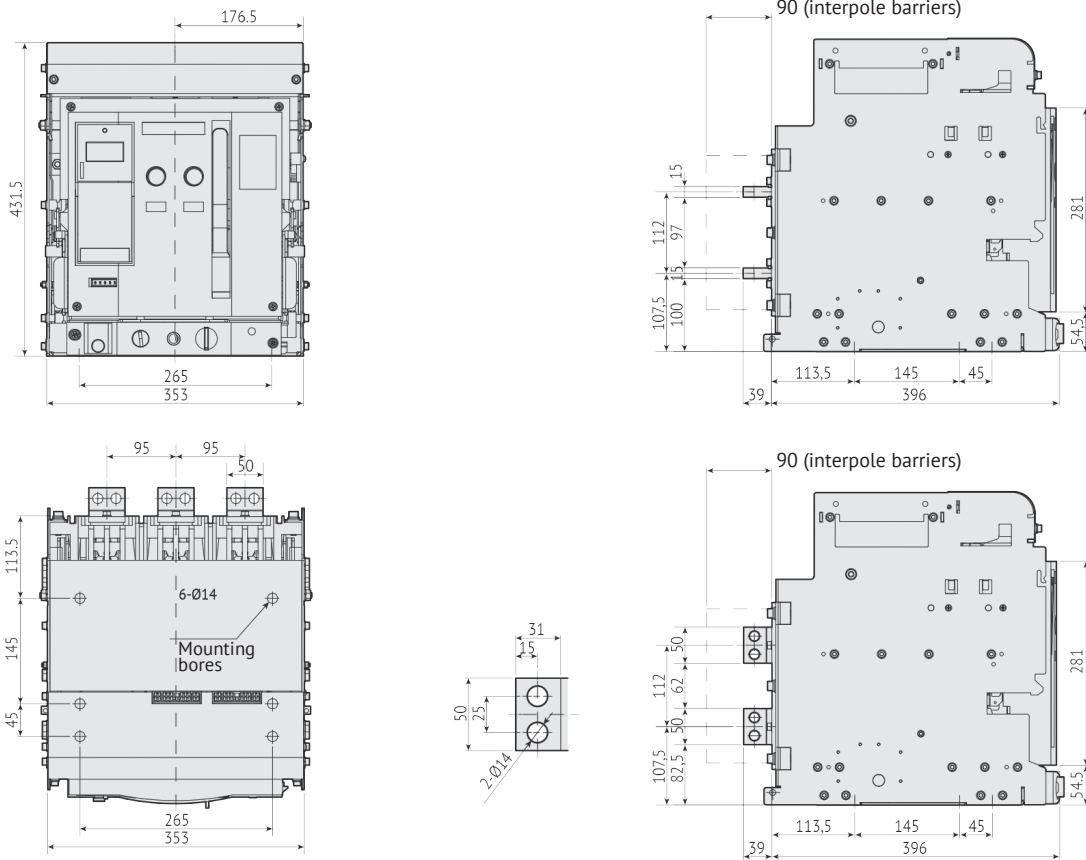
Drawings of S1 dimension retractable (withdrawable) circuit breakers

OptiMat A circuit breakers of S1 dimension, retractable (withdrawable) version with rear busbar connection option from 630 to 1600A

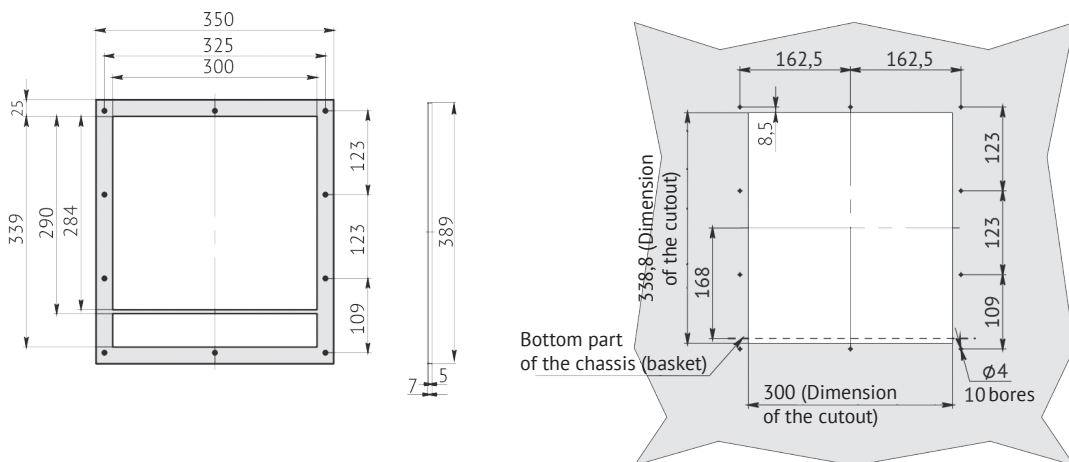


Drawings of S2 dimension retractable (withdrawable) circuit breakers

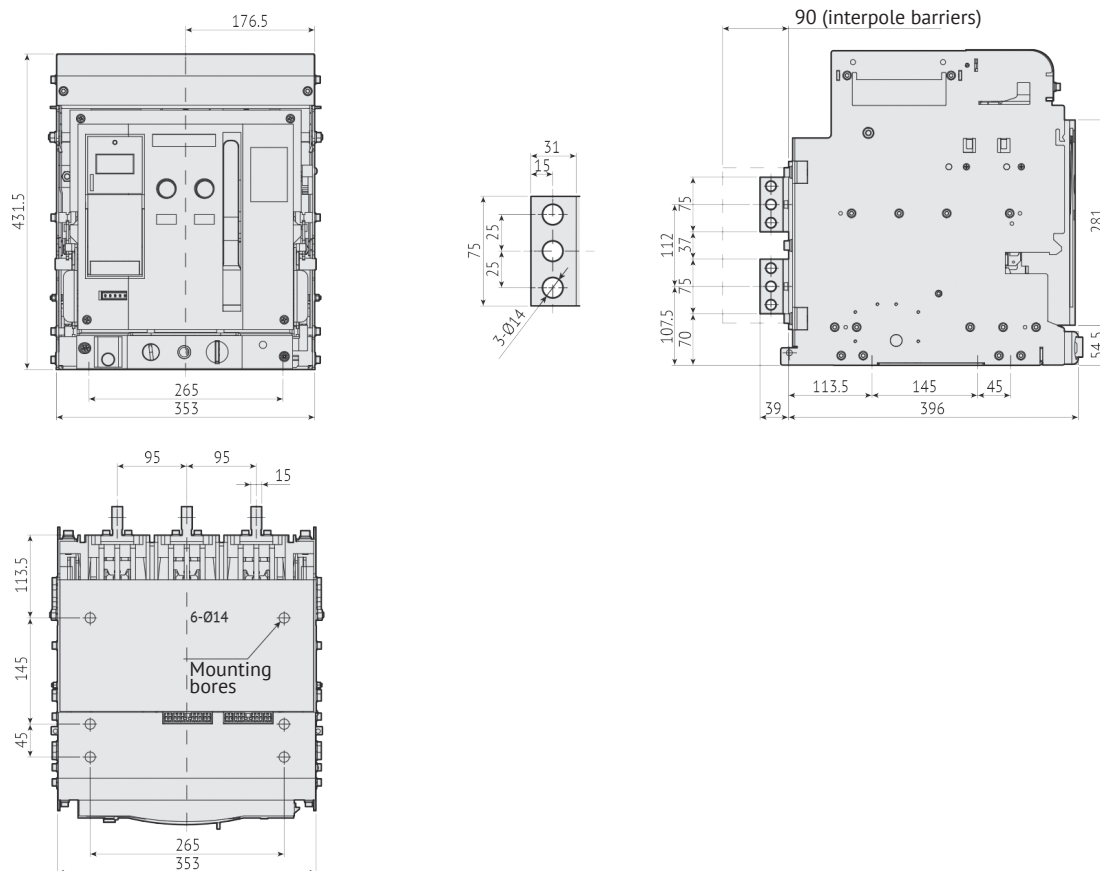
OptiMat A circuit breakers of S2 dimension, retractable (withdrawable) version with rear busbar connection option from 630 to 1600A



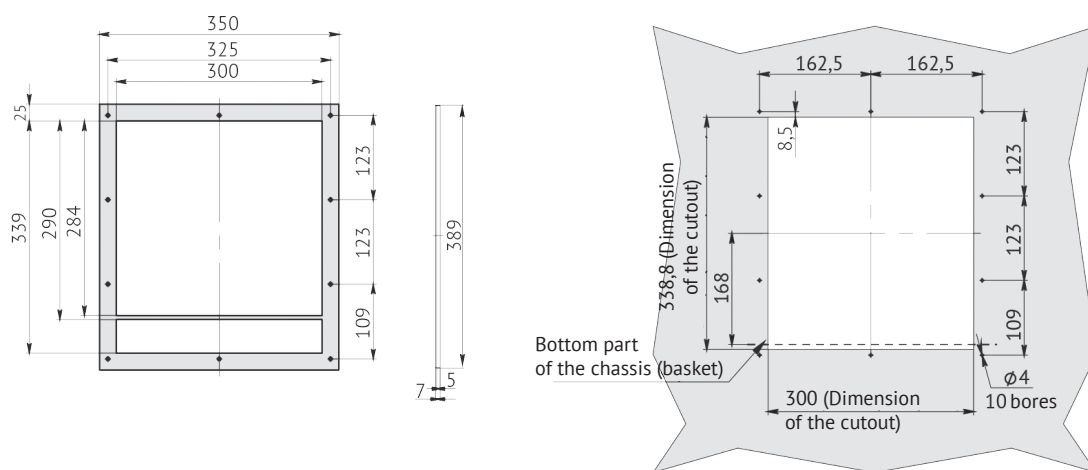
Front panel frame



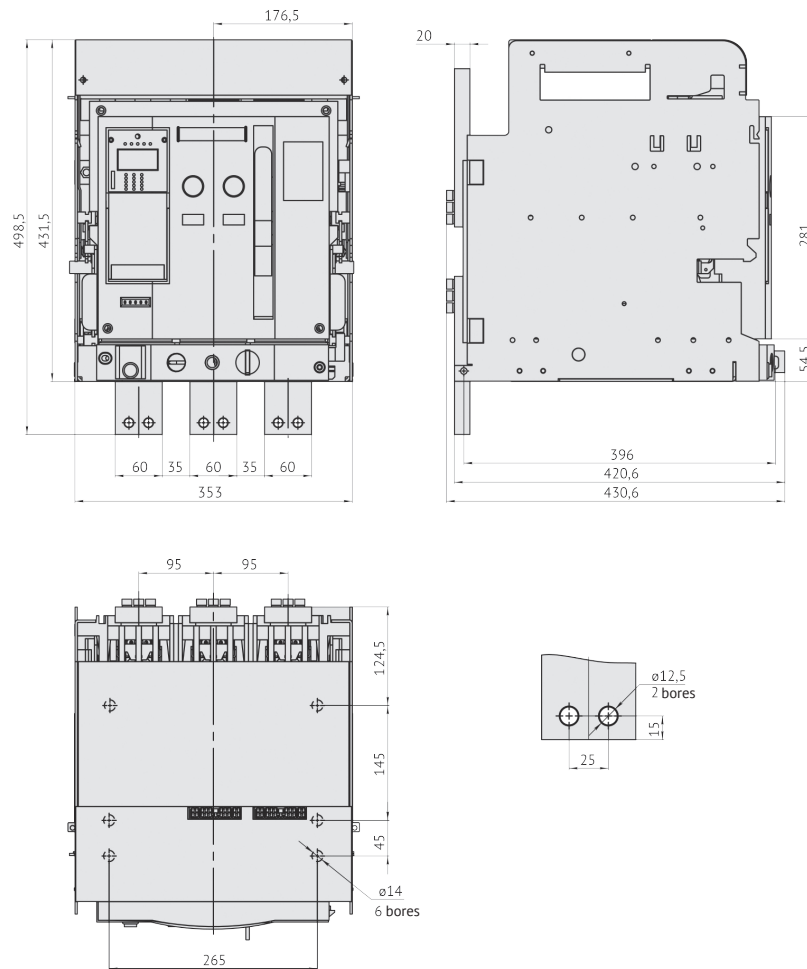
OptiMat A circuit breakers of S2 dimension, retractable (withdrawable) version with rear busbar connection option for 2000A



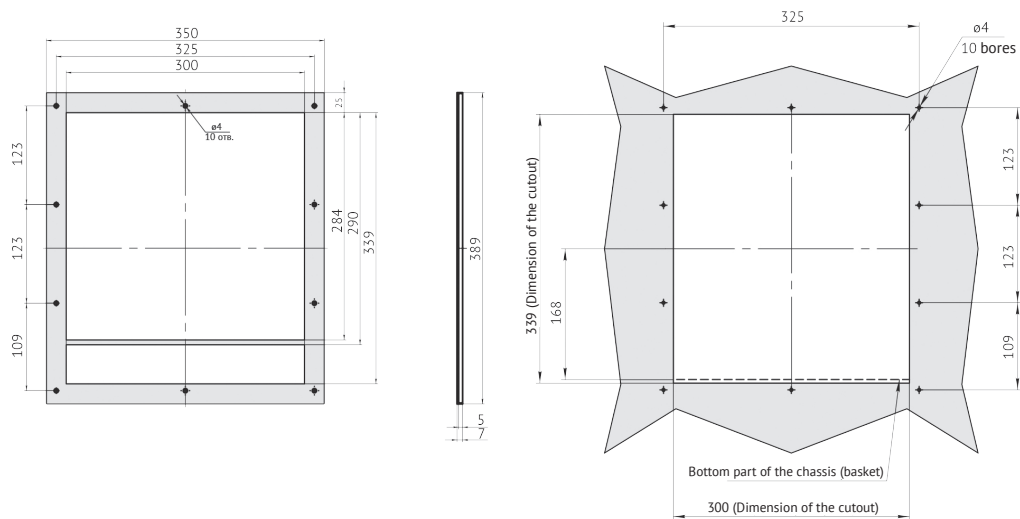
Front panel frame



OptiMat A circuit breakers of S2 dimension, retractable (withdrawable) version with front busbar connection option from 630 to 2000A

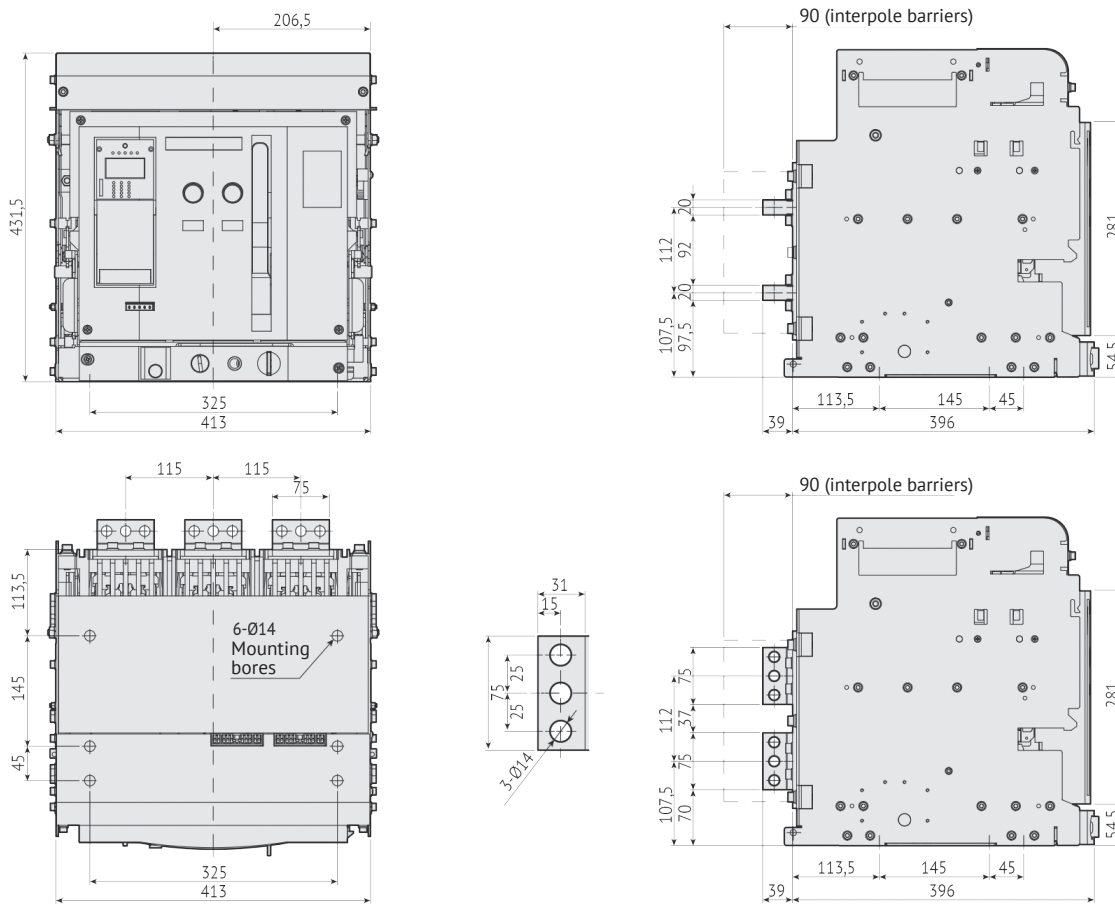


Front panel frame

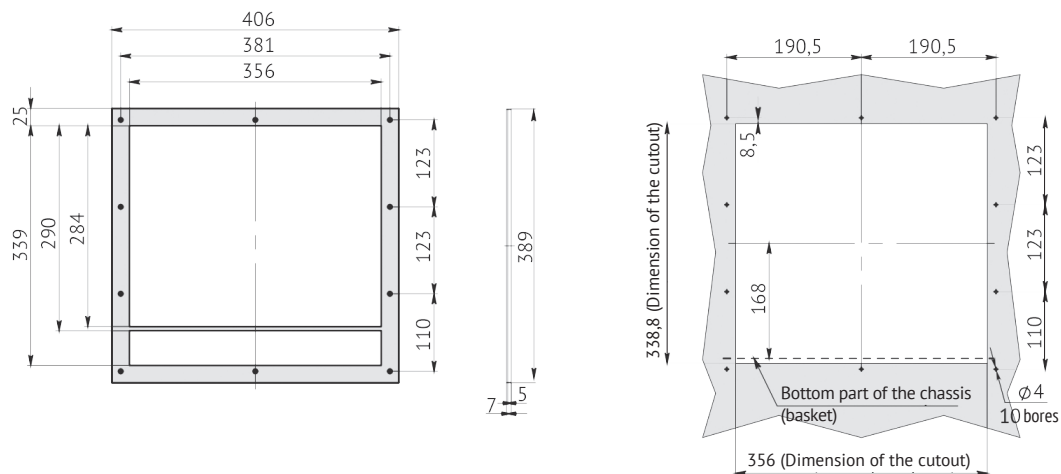


Drawings of S4 dimension retractable (withdrawable) circuit breakers

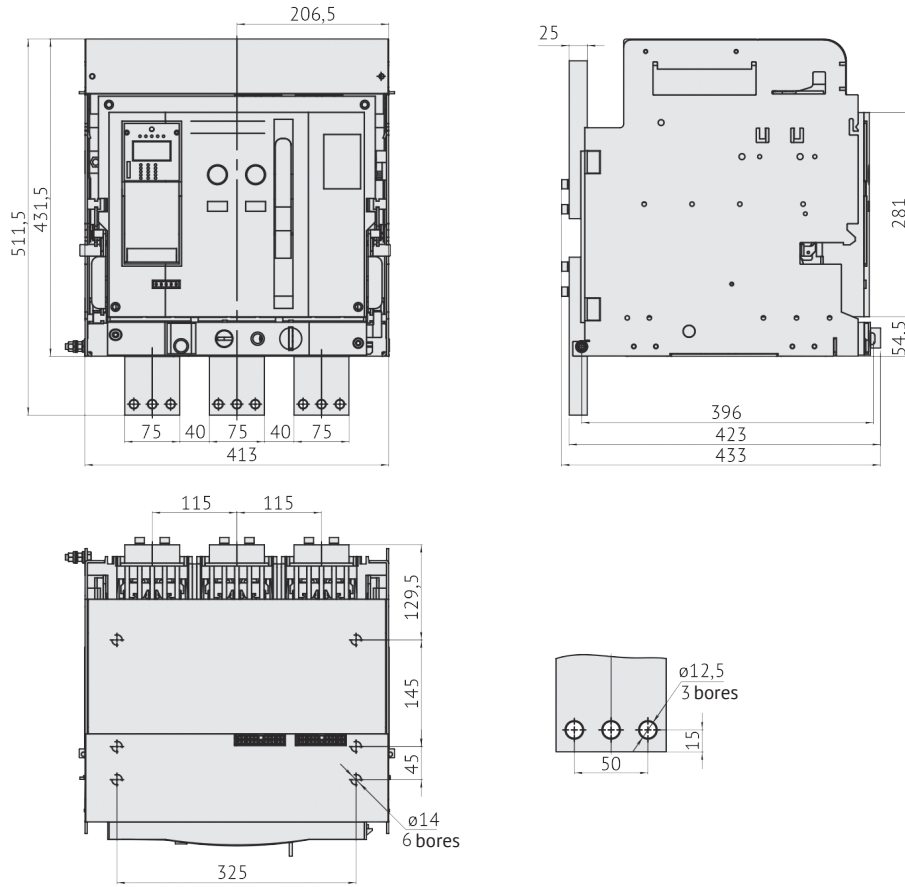
OptiMat A circuit breakers of S4 dimension, retractable (withdrawable) version with rear busbar connection option from 2500 to 3200A



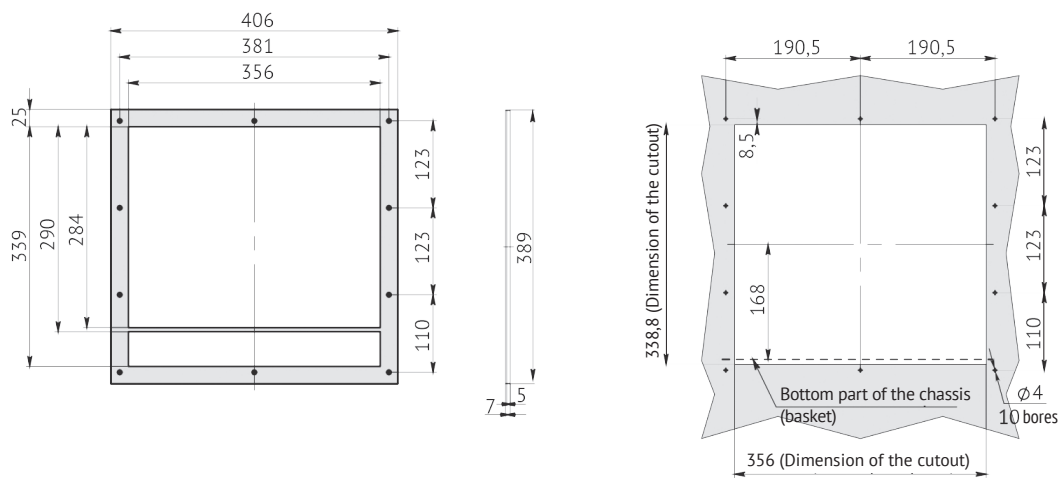
Front panel frame



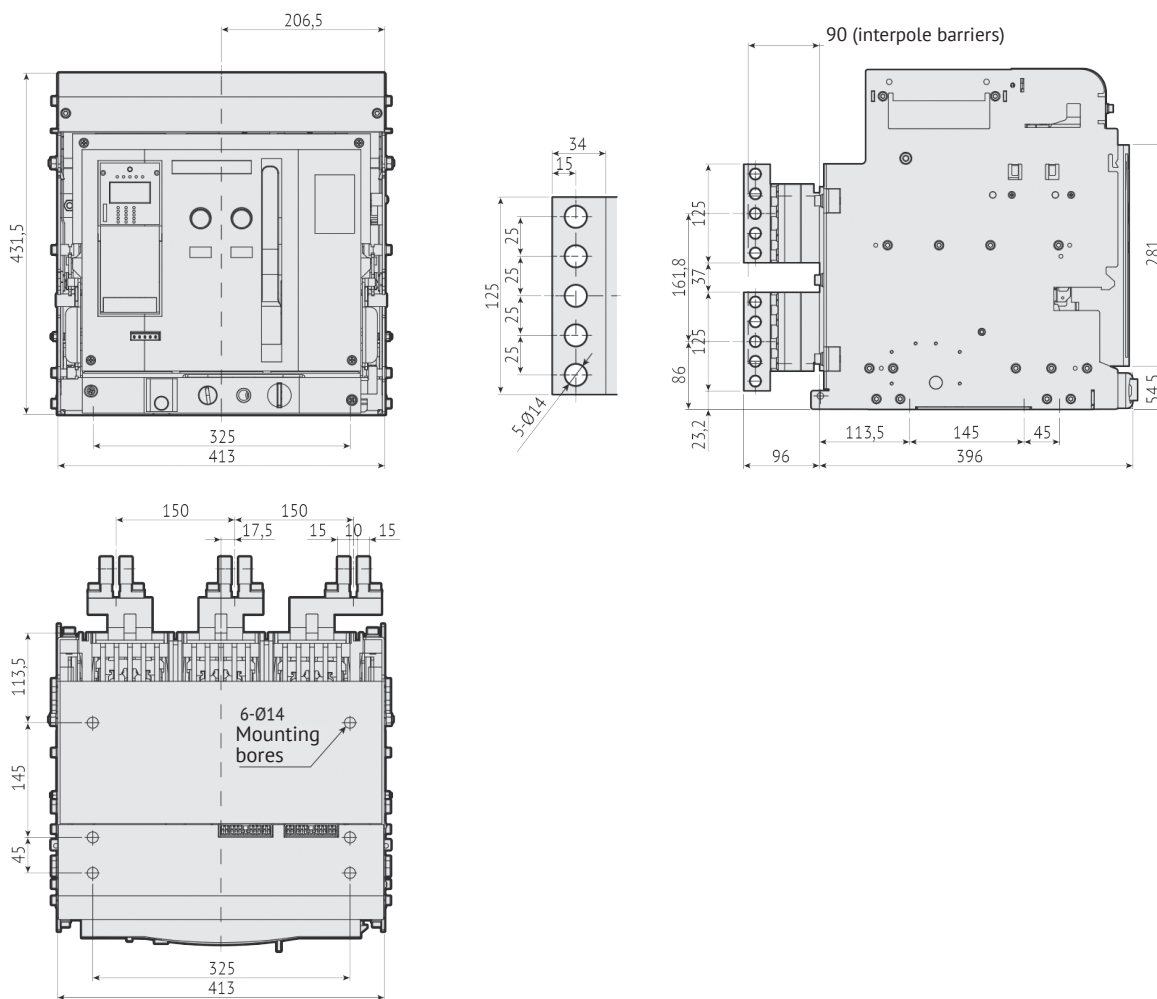
OptiMat A circuit breakers of S4 dimension, retractable (withdrawable) version with front busbar connection option for 2500A



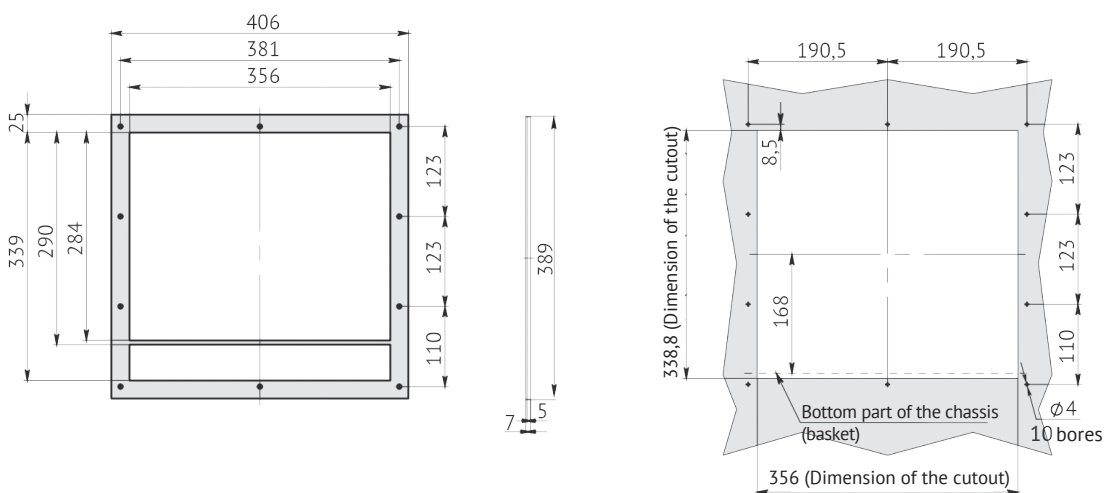
Front panel frame



OptiMat A circuit breakers of S4 dimension, retractable (withdrawable) version with rear busbar connection option for 4000A

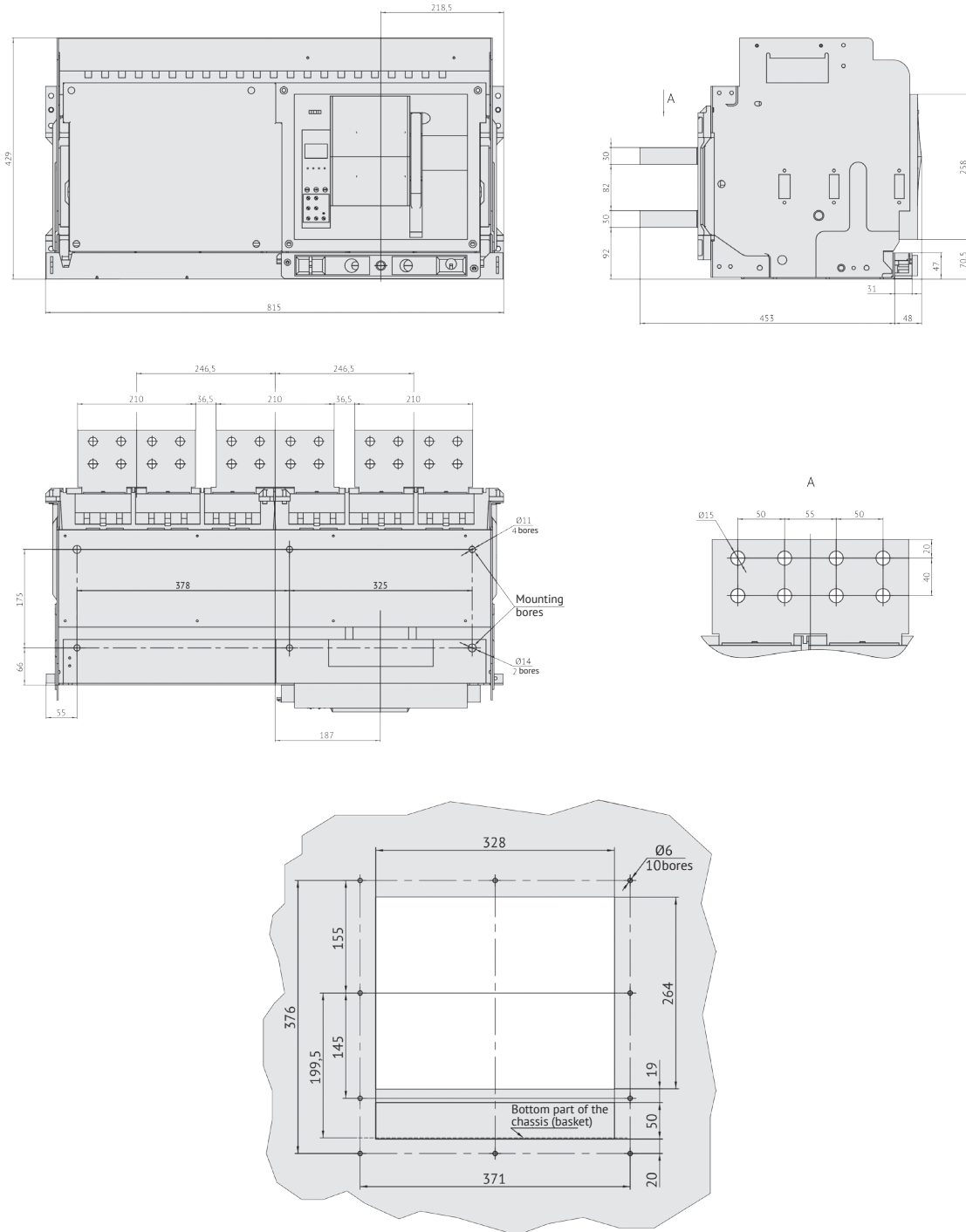


Front panel frame



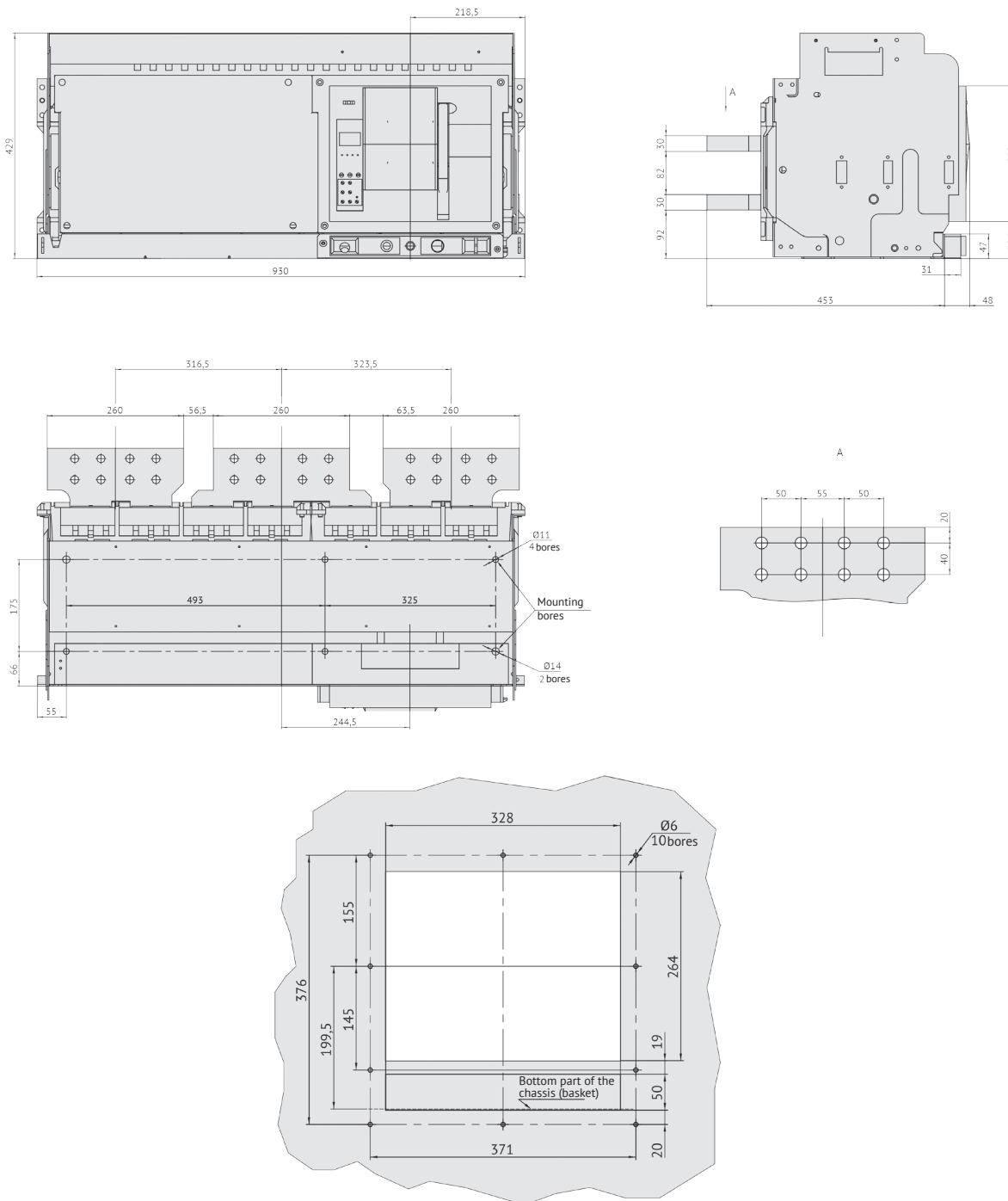
Drawings of S5 dimension retractable (withdrawable) circuit breakers

OptiMat A circuit breakers of S5 dimension, retractable (withdrawable) version with rear busbar connection option for 5000A



Drawings of S6 dimension of retractable (withdrawable) circuit breakers

OptiMat A circuit breakers of S6 dimension, retractable (withdrawable) version, with rear busbar connection option for 6300A



Connecting power cables

When connecting power cables, consider the weight of the cable and its mechanical pressure on the output of the circuit breaker:

- Extended outputs must be insulated, and the cable must be fixed to a solid surface (Fig. 1).
- When connecting several cables, it is necessary to fasten them together and secure on the frame of a fixed structure (Fig. 2).

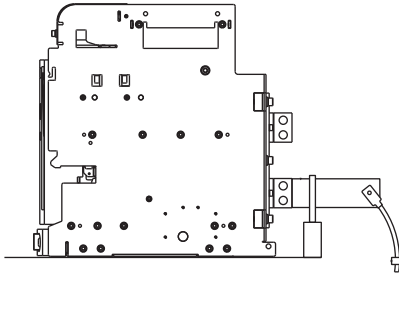


Fig. 1

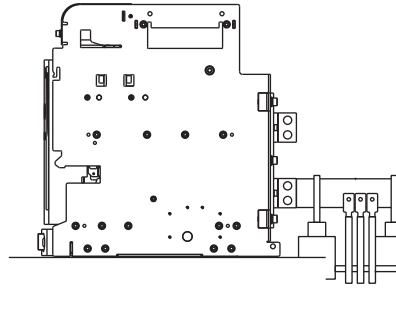


Fig. 2

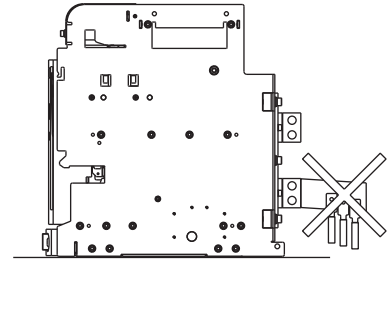


Fig. 3

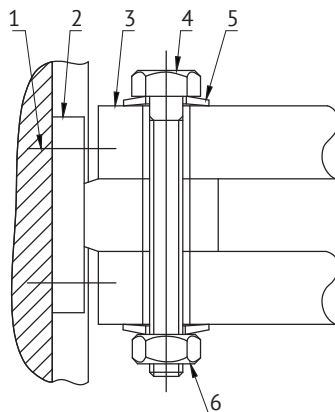
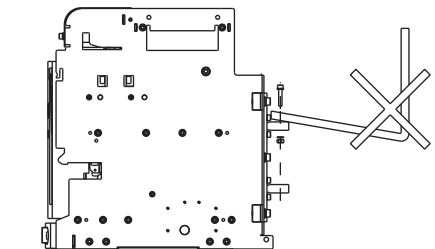
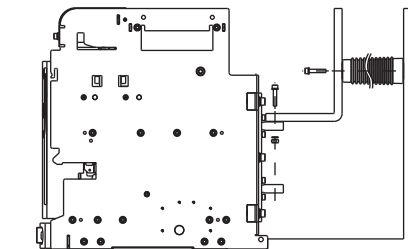
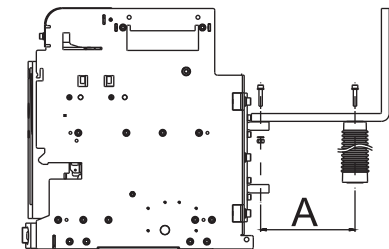
Busbar connection

When mounting the busbars, the mounting bores should be positioned so that they coincide with the holes on the terminals of the circuit breaker and do not create breaking pressure when bolted.

To prevent deflection of the busbars and increased mechanical stress on the breaker outputs, it is necessary to fix the busbars with supporting insulators.

To ensure the resistance of the busbars to the electrodynamic effects of current, the distance A should be no more than:

| For short circuit design current, kA | Distance A, mm |
|--------------------------------------|----------------|
| 30 | 350 |
| 50 | 300 |
| 65 | 250 |
| 80-100 | 150 |



- 1 – fastening screw to the device;
- 2 – switch connector;
- 3 – busbars;
- 4 – bolt;
- 5 – disk washers;
- 6 – nut.

Figure G.5 – Connection of the busbars to the device

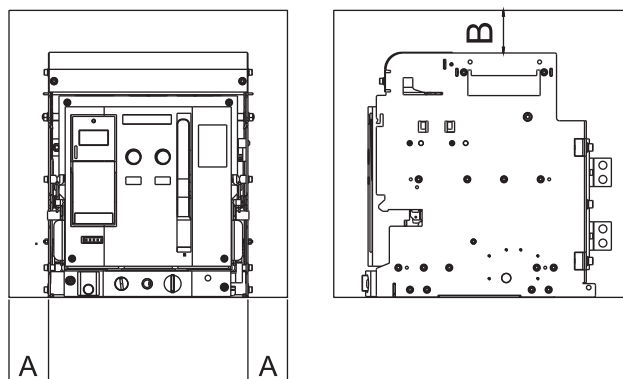
Busbar sizing

| Overall dimension | Rated current, A | Copper busbars | | Aluminium busbars | | Fasteners | Tightening torque, Nm | |
|-------------------|------------------|----------------|--------------------------------|-------------------|--------------------------------|----------------------------------|-------------------------|-----------------------|
| | | Number, pcs | Cross section, mm ² | Number, pcs | Cross section, mm ² | | Spring washer GOST 6402 | Disk spring GOST 3057 |
| S1 | 630 | 2 | 5x40 | 2 | 8x50 | Bolt M10-6gx50.88.016 GOST 7798 | 37,5 | 50 |
| | 800 | | 5x50 | | 10x50 | | | |
| | 1000 | | 5x60 | | 10x60 | | | |
| | 1250 | | 6x60 | | | | | |
| | 1600 | | 10x60 | | 4 | | | |
| S2 | 630 | 2 | 5x40 | 2 | 8x50 | Bolt M12-6gx65.88.016 GOST 7798 | 37,5 | 50 |
| | 800 | | 5x50 | | 10x50 | | | |
| | 1000 | | 5x60 | | 10x60 | | | |
| | 1250 | | 5x80 | | | | | |
| | 1600 | | 5x100 | | 4 | | | |
| | 2000 | 10x60 | | | | | | |
| S4 | 2500 | 4 | 5x100 | 5 | 10x80 | Bolt M12-6gx75.88.016 GOST 7798 | | |
| | 3200 | 2 | 10x100 | - | - | Bolt M12-6gx120.88.016 GOST 7798 | | |
| | | 4000 | 3 | 10x125 | - | | - | |
| | | 4 | 10x100 | - | - | | | |
| S5 | 5000 | 7 | 10x100 | - | - | | | |
| S6 | 6300 | 8 | 10x100 | - | - | | | |

Recommendations for switchgear mounting

The table shows the minimum allowable distance between the automatic air circuit breaker and the metal parts of the switchgear.

| Switch version | A, mm | B, mm |
|----------------|-------|-------|
| Fixed | 70 | 150 |
| Withdrawable | 70 | 0 |

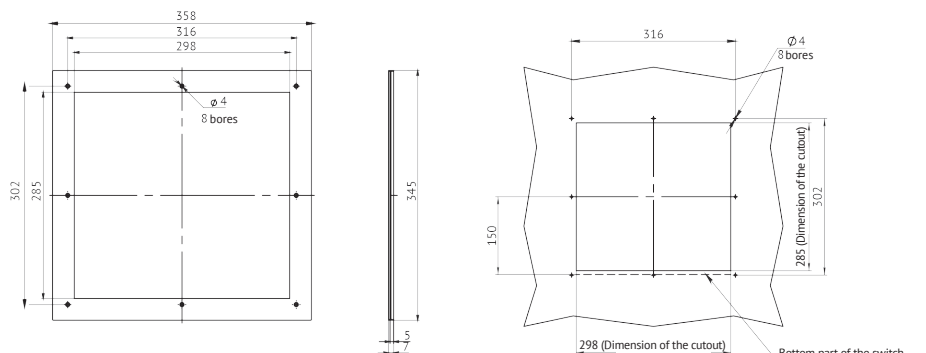


Mounting of the switch in the panel board with the installation of the frame of the air circuit breaker for switches of S2, S4 overall dimensions

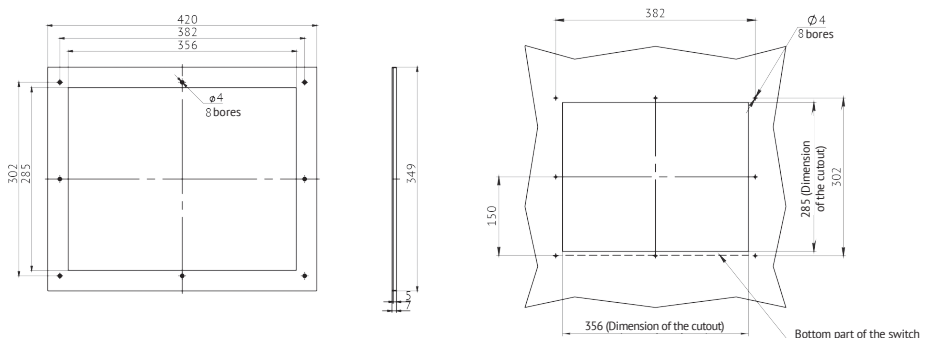
The frame of the air circuit breaker OptiMat A is designed to provide access to the operated units of the circuit breaker and the information displayed in the windows on the state of the mechanisms of the switch when the door of the electrical cabinet is closed. To ensure proper installation and further operation, it is necessary to mount the circuit breaker and its frame according to the instructions given in the figures below.

Overall and mounting dimensions of the frame of the OptiMat A circuit breaker of a retractable (withdrawable) and fixed versions of S2, S4 dimensions

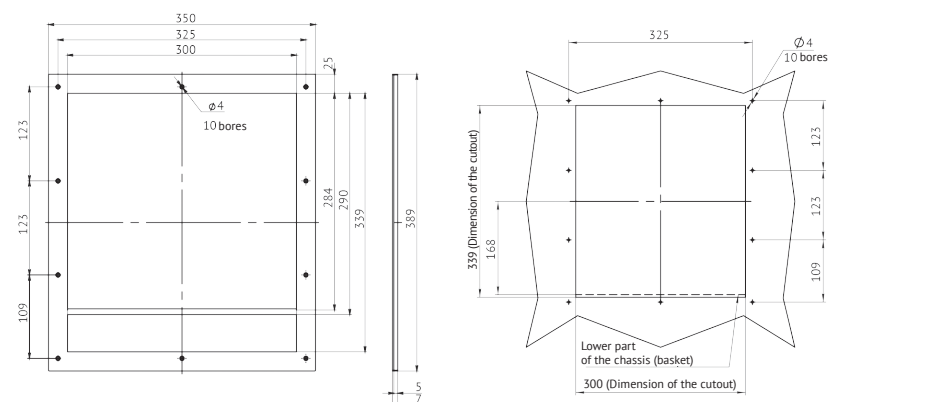
Front panel frame of a fixed OptiMat A of overall size S2 for currents from 630 to 2000 A



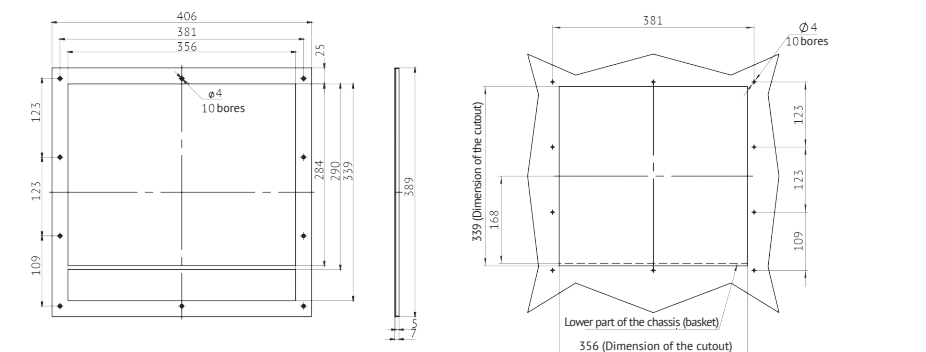
Front panel frame of a fixed OptiMat A of overall size S4 for currents from 2500 to 4000 A



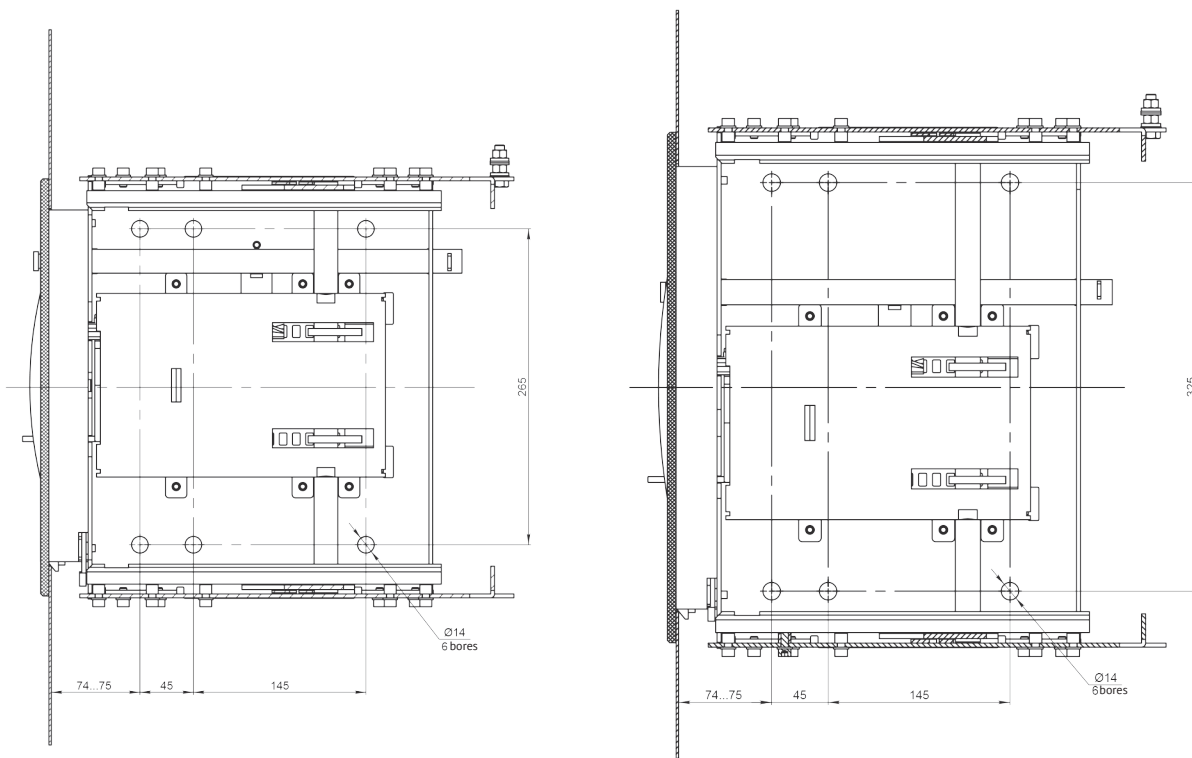
Front panel frame of a retractable OptiMat A of overall size S2 for currents from 630 to 2000 A



Front panel frame of a retractable OptiMat A of overall size S4 for currents from 2500 to 4000 A



Installation dimensions of the chassis (basket) of dimensions S2 and S4, relative to the front panel of the cell

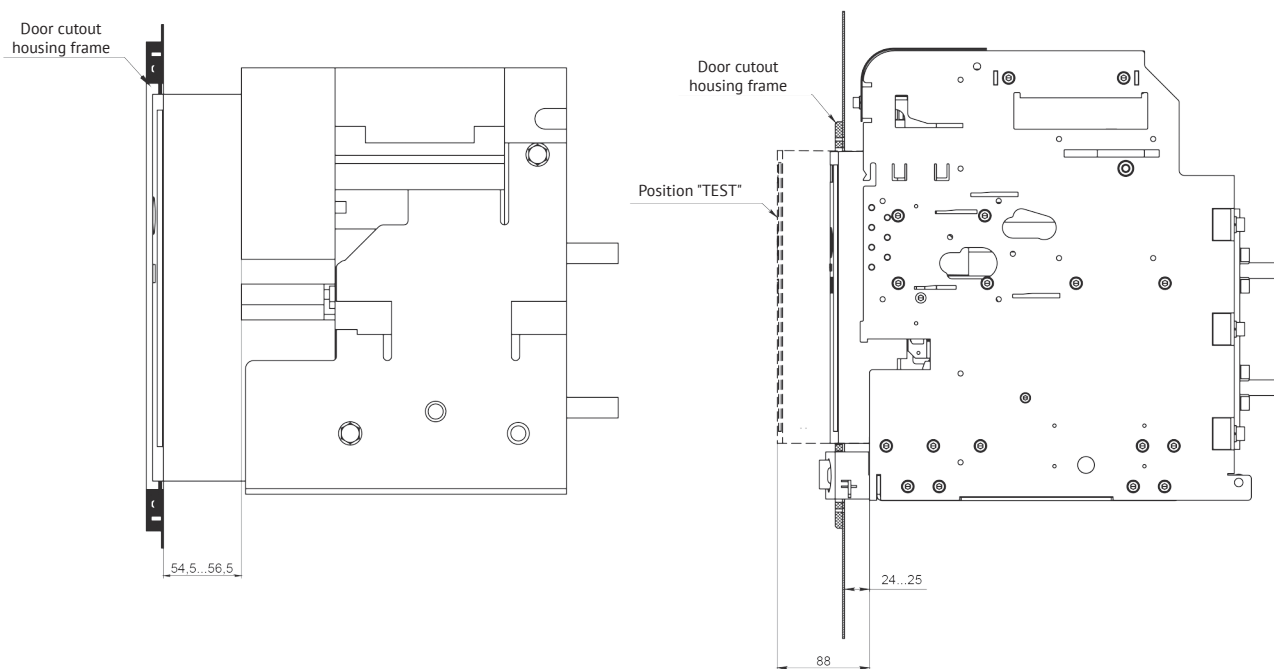


The installed switch and its frame enable to operate the circuit breaker in the "Draw-in" position, as well as to transfer it and operate in the "Test" position.

Moving out the switch to the "Draw-out" position with the cabinet door closed is not provided by the design and is prohibited due to technical reasons.

The following figures are provided with correctly installed automatic circuit breakers, of fixed and withdrawable versions, relative to the front panel of the cell.

Side view of OptiMat A circuit breaker, fixed and withdrawable versions of S2 and S4 overall dimensions after mounting into a cell with installation of a frame



A properly mounted switch and its frame enable to open the enclosure doors when the switch is in the position "Draw-in" and "Test".

