

JVM16-63 Miniature Circuit Breaker

Standard: IEC 60898  CB   CE  RoHS



Construction and feature

- The state-of-art design
- Elegant appearance; cover and handle in arc shape make comfortable operation.
- Contact position indicating window
- Transparent cover designed to carry label.
- Handle central-staying function for circuit fault indicating
- In case of overload, to protected circuit, MCB handle trips and stays at central position, which enables a quick solution to the faulty line. The handle cannot stay in such position when operated manually.
- High short-circuit capacity
- High short-circuit capacity 10KA for whole range and 15kA capacity for current rating up to 40A thanks to the powerful electric arc extinguishing system.
- Long electrical endurance up to 6000 cycles thanks to quick making mechanism.
- Handle padlock device
- MCB handle can be locked either at "ON" position or at "OFF" position to prevent unwanted operation of the product.
- Screw terminal lock device
- The lock device prevents unwanted or casual dismounting of connected terminals.

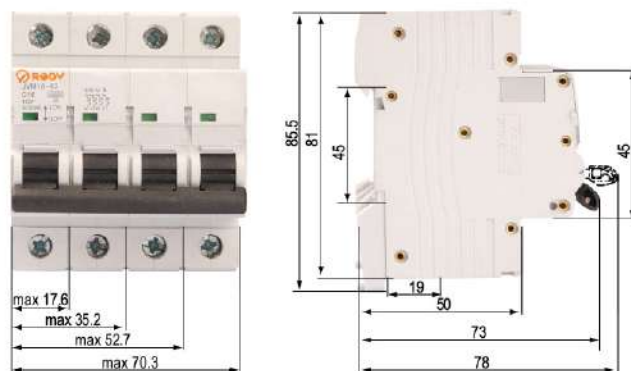
Technical data

- Pole No.: 1, 1P+N, 2, 3, 3P+N, 4
- Rated voltage: AC 230/400V
- Rated current (A): 1, 2, 3, 4, 6, 10, 13, 16, 20, 25, 32, 40, 50, 63
- Tripping curve: B, C, D
- High short-circuit breaking capacity (Icn): 10kA
- Rated service short-circuit breaking capacity(Ics): 7.5kA
- Rated frequency: 50/60Hz
- Energy limiting class: 3
- Rated impulse withstand voltage: 6.2kV
- Electro-mechanical endurance: 20000
- Contact position indication
- Connection terminal:
 - Screw terminal
 - Pillar terminal with clamp
- Connection capacity: Rigid conductor up to 25mm²
- Terminal Connection Height: 19mm
- Fastening torque: 2.0Nm
- Installation:
 - On symmetrical DIN rail 35mm
 - Panel mounting

Accessories

- F3 Auxiliary contact
- S3 Shunt tripper
- JVRX16 Auxiliary
- SD3 Alarm Switch
- U3+O3 Over-Voltage/ Under-Voltage Tripper

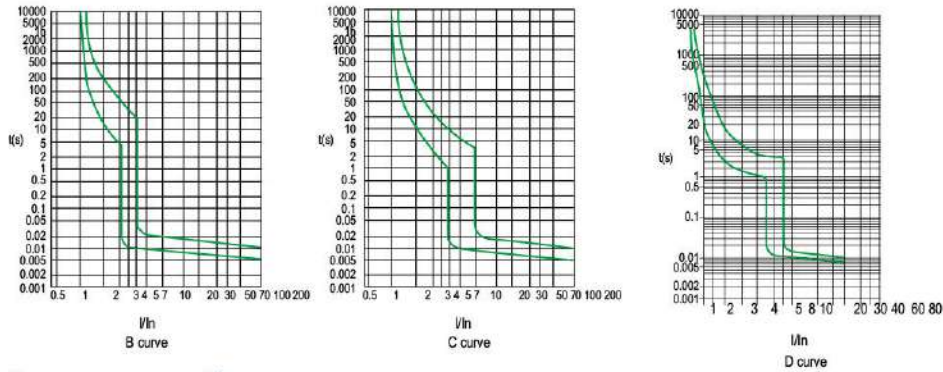
Overall & installation dimensions



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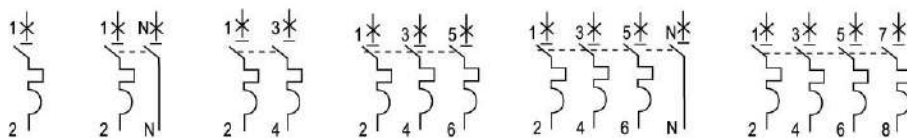
Characteristic curve



Power consumption

Rated Current Range (InA)	Max consumption/pole (W)
$I_n \leq 10$	3
$10 < I_n \leq 16$	3.5
$16 < I_n \leq 25$	4.5
$25 < I_n \leq 32$	6
$32 < I_n \leq 40$	7.5
$40 < I_n \leq 50$	9
$50 < I_n \leq 63$	13

Wiring diagram



Overload current protection characteristics

Test Procedure	Type	Test Current	Initial State	Tripping or Non-tripping Time Limit	Expected Result	Remark
A	B, C, D	$1.13I_n$	cold	$t \leq 1h$	no tripping	
B	B, C, D	$1.45I_n$	after test a	$t \leq 1h$	tripping	Current in the 5s in the increase of stability
C	B, C, D	$2.55I_n$	cold	$1s < t < 60s (I_n \leq 32A)$ $1s < t < 120s (I_n > 32A)$	tripping	
D	B	$3I_n$	cold	$t \geq 0.1s$	no tripping	Turn on the auxiliary switch to close the current
	C	$5I_n$				
	D	$10I_n$				
E	B	$5I_n$	cold	$t \geq 0.1s$	tripping	Turn on the auxiliary switch to close the current
	C	$10I_n$				
	D	$20I_n$				

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Technical data

- Number of poles: 1, 2, 3, 4, 1+N, 3+N
- Nominal currents I_n (A):
 - 1, 2, 3, 4, 6, 8, 10, 13, 16, 20, 25, 32, 40, 50, 63
- Characteristics:
 - B The short-circuit release is to be set up to 3 I_n through 5 I_n . It serves especially for protection of circuits with such devices which do not cause any current surges (lights or socket circuits etc.)
 - C The short-circuit release is to be set up to 5 I_n through 10 I_n . It serves especially for protection of circuits with such devices which cause some current surges (groups of bulbs, motors etc.)
 - D The short-circuit release is to be set up to 10 I_n through 20 I_n . It serves especially for protection of circuits with devices which cause high current surges (transformers, double-pole motors, motors with heavy start etc.)
- Nominal voltage:
 - 1P (single-pole) ~230/400V 50/60Hz
 - 3P (three-pole) ~400V 50/60Hz
- Rupturing capacity:
 - EN60898-10000A (nominal short-circuit and operational rupturing capacity)
- Protection:
 - IP40 for a sole MCB with its design, it protects against a hazardous finger or instrument touch as well as against very small foreign objects; it is without any protection against water leakage (water protection is to be solved with design of the switchboard casing)
- Ambient temperature:
 - -5°C to +40°C pursuant to EN60898
- Gauging temperature:
 - +30°C pursuant to EN60898
- Max. pre-inserted fuse:
 - 100AgG (>10kA)
- Mechanical lifetime:
 - ≥20.000 cycles
- Electrical lifetime:
 - ≥8.000 cycles
- Fastening:
 - By means of an unique snap mechanism (with arrestment in final positions) the carrying DIN strip EN 50022, width 35mm, or even onto the flat surface by means of screws.
- Removal from the DIN strip:
 - By means of an unique auxiliary snap mechanism, the MCB's can be removed even from a row of devices mutually interconnected by a forked or reed rack strip without necessity to dismantle the whole interconnecting strip.
- Input terminals:
 - Clip terminals (with barrier layer), snap-locked against the worse input of a conductor
 - The input and output can be interchanged
 - They enable more conductors as well as interconnecting strips to be connected
- Connect ability of conductors (Maximum cross-sections):
 - 35mm² solid conductor
 - 25mm² stranded conductor
- Terminal protection: IP20
- Tightening moment for terminals
 - 2 Nm (combined slotted-head screw)
- Manufacture standard
 - EN60898, same to IEC 60898
- Selectivity class: 3
- Colored levers:
 - For better distinction among circuits in the switchboards, we supply also miniature circuit breaker with distinction of nominal currents by means of colored levers corresponding to the colors of turn fuses
 - 0.2A-1.6A (Black)
 - 2A (Pink)
 - 4A (Brown)
 - 6A (Green)
 - 8A (Light green)
 - 10A (Red)
 - 13A (Pure white)
 - 16A (Grey)
 - 20A (Blue)
 - 25A (Yellow)
 - 32A (Purple)
 - 40A (Black)
 - 50A (White)
 - 63A (Copper-colored)
- Can be delivered also with only black levers
 - 1-63A (Black)

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Advantages of ROGY MCB --- JVM16-63 for Users

- Guaranteed short-circuit resistance
- It is guaranteed not only the short-circuit resistance of 6kA and 10kA in the whole range up to 63A but this JVM16 series has the short-circuit resistance of up to 15kA even up to the values!
- A high-speed switch-off
- An extraordinary high rate of switch-off upon short-circuits; an unperturbed fulfillment of all power terms and following selectivity No.3. All those phenomena together ensure a very sensitive protection of persons, electrical devices and wiring.
- Central position of defect indication (to be developed)
- The release mechanism enables a central indication position which informs the user that the MCB has not been switched-off manually but by a thermal or short-circuit protection (the lever is moved just to the half-way of its motion). In case of manual switch-off, the MCB is always moved to its final low position. Therefore you can know very quickly if there is a defect at the circuit, or if the circuit has been switched-off by an operator.
- Simultaneous switching at multi-module types
A worldwide unique, recently patented system of triggering mechanism, which ensures a safe, more accurate and almost simultaneous switching of all the contacts at multi-module (pole) MCB's; it has been reached a three-times longer switching distance than that reached by the best competitors world-wide.
- Instantaneous switching of contacts, independent on the rate of lever motion
- A worldwide unique, recently patented principle of the instantaneous switching where the forces are transmitted only into the middle of segments—therefore no crossing occurs (no world manufacturer has developed that solution yet!). This solution has a big influence on extension of both mechanical and electrical lifetimes in connection with number of switching cycles. The function of instantaneous switching has been solved only by one manufacturer worldwide until now.
- This unique principle of instantaneous switching of contacts is based on the following facts: even when the MCB lever is stretched very slowly, during the first stage the contacts inside the MCB only come near to each other to a distance which cannot create the condition for electric arc. In this moment the “coming-near” is interrupted, even if the lever continues to be stretched (switched-on). In this moment the second stage begins. The pre-stressing only inside the instantaneous mechanism when the contacts does not come near to each other more, but the lever is moved. Upon the pre-stressing, stated in advance, the third stage begins to be a heavy high-speed switching of internal contacts. This switching is, however, fully independent on the rate of contact lever motion. The above principle offers the following advantages.
 - a) The contacts can never be burnt even not with a very slow MCB lever motion (stretching); sometimes

the terms, “short-circuiting” or so-called “burning-out” of contacts are used. It is thus impossible to destroy the MCB in that way.

b) By a heavy high-speed switching of contacts, a perfect touch is secured even at very low values of nominal current such touch excludes any wrong power transfer.

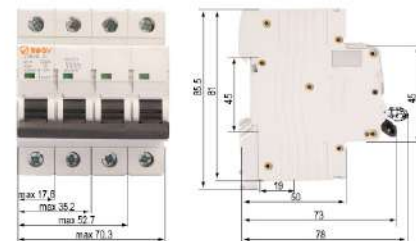
c) Burning of contacts is reduced to a minimum level.

d) The total MCB's lifetime is extended.

- Extraordinary short dimensions

□ As to the available information, because of their extraordinary short dimensions (especially the width of only 81mm), our JVM16 MCB's are classified as among the smallest MCB's over the world in the category of short-circuit resistance up to 10kA. In the category of 15kA, we have the shortest dimensions worldwide (see the dimensioned chart).

Thus there is more space for conducting and connecting the conductors in the installation section, which is covered at a switchboard. This property can be appreciated especially when using these MCB's at small apartment switchboards.



- Movable terminals are equipped with a locking bar avoiding an incorrect placing of conductors
- A chart of a terminal with locking bar.
- This is a unique solution, which helps to avoid problems in case when the terminal cannot be seen during installation. This principle excludes the possibility to place the conductor under the terminal. In this way, frequent (latent) claim defects can be avoided. Such defects occurred mostly at the end user and the switchboard manufacturer has to bear additional expenses for simple removal of such defects.
- The design is based on the fact that each terminal has so-called flat locking bar in its bottom section. When tightening the screw, this bar occurs step by step at the inlet hole and closes the space under the terminal. So it avoids the conductor to be put-in under the terminal clip where it cannot be interconnected with the inlet or outlet from the MCB.
- The clip terminals have cross grooves at the bottom section—those grooves avoid the conductor to be drawn half out from the terminal because after being tightened, the conductor sinks into the grooves; in addition, the transfer surface is extended and the contact resistances are limited essentially.
- Unique extinguishing chamber

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Advantages of MCB --- M16-63 for Users

- The extinguishing chamber is of a fully new conception. Besides other essential function, at the beginning of short-circuit process it enables to use the non-warmed air inside the chamber for cooling the contacts immediately before they are disconnected.
- Very easy running of the lever when being switched-on.
- A very easy running when switching-on the lever (stretching) even in case of multi-pole models is given by an excellent and balanced design of switching mechanism.
- Unique auxiliary mechanism for fastening and removal of the MCB from the DIN strip
- Besides the normal fastening onto the DIN strip, this unique auxiliary mechanism for fastening and removal enables also an easy removal of the MCB from a row of devices mutually interconnected by forked or rack (reed) interconnecting strip without necessity to dismantle the whole interconnecting strip.
- Other advantages of this solution:
 - The mechanisms will not fall-out from the MCB' s body.
 - Arrestment in final positions.
 - No steel spring.
- Essential increase of vertical stability on the DIN strip
- The new and marked improvement of vertical stability after connection of the MCB onto the DIN strip consists in a formed plastic stop on the bottom side. After fastening the MCB onto the DIN strip, this stop takes-over the function of counter pressure in case of torsional stress of the MCB body. In contradistinction to our competitors, the pawl plays only a holding role.
- MCB' s body stiffness even at the multi-module design
- The casing design ensures a very high stiffness not only at a single-module type, but even in case of multi-module circuit breakers. The stiffness is given not only by a sophisticated placing and number of rivets but also by the design of the casing with stabilizing locks and pivot joints.
- Very high torsional-stressing resistance of terminals
- Suitable plastic guides and press in casing body, which serve for placing of movable and fixed parts of terminals together with points for rivets create a high torsional-stressing resistance of the terminals. This design excludes the possibility that the casing opens when the screws are tightened out of proportion or that the terminal crosses at the casing.
- Round aesthetical design
- The place for two-line inscription is protected by a swing sight glass with arrestment
- Each pole is equipped with an aesthetic transparent swing cover placed above the switching-off lever. Under that cover there is a paper two-line inscription label put into slots. It is also possible to write on the plastic surface. The cover has an arrestment in the upper open position.
- Colored indication of contact condition with dust-protection
- The MCB is equipped with a colored indication of contact condition, which is independent on the lever position, and it depends just on the real contact condition. In addition, this indication is protected against dust penetration into the MCB by a transparent plastic cover with enlarging effect.
- Switched-on-red I-ON
- Switched-off-green O-OFF
- Universal terminals for different interconnecting strips
- The terminals are solved as interconnecting forked or rack (reed) strips.
- Terminal modification resistant to inter-phase short-circuit in case of interconnection of multi-module designs by means of a forked strip
- At the upper part of the terminal (serving for interconnection by means of forked strip), the MCB' s body is equipped with partitions, which can be broken off. Those partitions shall avoid a possible inter-phase short-circuit in case of interconnection of multi-module types by means of multi-phase interconnecting strips.
- Tolerance and dilatation not affecting the function
- The design allows possible plays (by dilatation, shock, wearing) to be accepted without any affect on the function of movable parts, such as switching mechanism, movable contact, ejecting coil, indication etc. This unique solution improves the quality essentially but especially it warranties the reliability under different, even very extreme operational conditions.
- Press pieces from only two-side moulds
- The press pieces of all part, except for the lever, are made from two-side moulds. Because of this technology, we have reached much higher dimensional accuracy, and thus higher quality and resulting higher operational reliability.
- Unexchangeability of component
- It is secured the explicit unexchangeability of components during manufacture (avoiding the manufacture mistakes). It is another portion of our approach to quality.
- Universal single-module design enabling any combination (1P, 2P, 3P, 4P, 1P+N, 3P+N, etc)
- The conception for individual compositions consists in manufacture of only single-module miniature circuit breakers from which various combinations can be created, e.g. 1P (pole), 2P, 3P, 4P, 1P+N, (zero=switch-off), 3P+N.
- Because of this solution, we can be adapted to different requirements of our customers very quickly.
- Patent protection
- The MCB' s as well as the linking-up products are patent-protected. Because of multilateral treaties and unpleasant consequences we do not suppose that somebody will try to copy the products (as we know it in case of other products). Our goal is to avoid a possible devaluation of the products. In case of the above MCB, the world patents covers the switching-off mechanism, instantaneous release etc, the world use pattern cover the fastening mechanism onto the DIN strip etc.

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Advantages of ROGY MCB --- JVM16-63 for Users

- Scaling of values and AC/DC design
- It is possible to make the values from 0.5 up to 63A (with any ampere-value, it is the scaling with only by 1A)
- They are designed mostly for alternating current but they can be used also for direct current for which the reduction of short-circuit resistance by approx. about 20% has to be taken into account (because of a higher stress of contacts).
- See-variable connection of input of output
- Input or output can be connected both onto the upper and lower terminals without impairing the function of the miniature circuit breaker in any way. Through this advantage, the mounting is easier and the distribution arrangements at the switchboards can be variable.



- It is not possible to change the characteristic by fall shock
- The design of the electromagnetic high-speed release with ejecting armature for short-circuit protection has been solved so that it has not any adjustable element. Its characteristic is given by the cross-section of the copper wire of the coil, by number of threads and spring pre-stressing in the core. This solution thus excludes that our circuit breakers could change their presented value by a fall or shock.
- High operational shock-resistance
- Thus they are suitable for application at constructional switchboards.
- The shock resistance is given by a very good bedding of the construction elements.
- A thorough-multiple outputs checking of the parameters of every MCB
- The high quality is given both by suitable materials and design, and by a thorough checkout of all the parameters at each circuit breaker.
- A triple check of the electromagnetic high-speed release with ejecting armature for short-circuit protection (if the defect occurs because of the failure or incorrect connection).
- Every piece manufactured passes through a testing stand controlled by the computer. At that stand there is verified the function of the circuit breaker on the undermost limit of the required nominal current value for given characteristics (B, C or D) by which the switch-off must not occur yet, after that, the current test of the upper limit of the nominal current value of the given characteristic follows immediately-under this current the velocity of circuit-breaker switching-off must not exceed 0.1s. This test procedure is repeated three-times!
- B at least a double check of the time-limit thermal release for overload protection (if the circuit has not been damaged but a significant overload occurred which could damage the electrical installation). The thermal release test is done two-times at least until the bi-metal is not mechanically adjusted to the

required value. Between particular tests, the circuit breaker is left to cool down!

The complete test pursuant to EN 60898-a long-term test of the thermal release at random chosen samples is performed at least once a shift.

- C at least a fivefold mechanical reliability check: This test is a part of the two aforementioned tests during which the switching-on and switching-off mechanisms are verified.
- Big cross-sections of terminals
- The cross-section 35mm² for solid conductor and the cross-section 25 mm² for stranded conductor is stated for the range up to In 63A. The geometric cross-section of the terminal however is 50 mm². You will appreciate the terminal cross-section of 35 mm² with all nominal values, when mounting any bigger cross-sections of the conductors which must be dimensioned for higher power inputs. You do not need to solve such problems by means of additional terminals on which the contact resistances could occur.
- Fixed design of terminals
- New design of the terminals (made of one piece with double overlapping through which the screw goes-the possibility to break it when mounting is fully excluded and the possibility to strip the thread is essentially limited).
- The clip terminals themselves have in their bottom part
- also the cross grooves which avoid the conductor to be taken out from the terminal because being tightened, the conductor sinks into the grooves. Simultaneously, the transmission area gets large thus the contact resistances are limited considerably.
- The screws of the clip terminals are protected against fall out from the circuit-breaker body
- The clip terminals are seated in the circuit-breaker casing so that the screws of the terminals cannot fall out from the circuit-breaker body, even if they are fully screwed out from the terminal. This advantage has been reached because the diameter of the hole at the plastic box (casing) for a screwdriver is less than the diameter of the screw head. The screw head has been modified both for cross and flat screwdrivers.
- The possibility to interconnect the miniature circuit breakers by means of interconnecting forked or reed (rack) strips
- For the JVM16 series, it is possible to use both the forked and the rack (reed) interconnecting strips. The views on application of those two types are different.
- The forked ones:
 - A advantages
Being put under the screw head, into the upper part of a double terminal, they do not take any space in the bottom part of the terminal. Because of what is written above they enable an unperturbed connection of input conductors.
 - B disadvantages
When tightening the terminal screws, the forks can distend. Thus the transmission area as well as current load rating is reduced. (Sometimes such an imperfect connection can cause the "burning-out" of the connection resulting in a full devaluation of the

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Advantages of ROGY MCB --- JVM16-63 for Users

MCB's or devices interconnected in that way). At some types of MCB's which do not have a sufficient insulation between separate terminals, the inter-phase short-circuit can occur under specific circumstances. Our JVM16 MCB's can avoid that phenomena (see the advantage 18).

□ Rack (reed) ones:

A advantages

The rack (reed) is also the pressure (second) area of the terminal pressing onto the out-in conductor, thus it limits any possible contact resistance to the minimum.

If there are two interconnecting strips with outputs at the edge of the strips, the height seating of the terminal enables those two interconnecting strips to be put in opposite to each other and to reach double transmission load rating.

The current load capacity of such a strip with power supply away from the strip edge is 80A, with two interconnected strips located in opposite up to 160A; If the power supply is in the center of the strip, the current load rating amounts to 130A, with two interconnected strips located in opposite even up to 260A!

B disadvantages

Being put into the bottom part of the terminal, they take a part of its cross-section, thus they make the connection of input conductors more complicated.

■ Attachment onto a DIN strip with different thickness

□ The miniature circuit breakers are intended to be attached onto the DIN strip EN50 022 (width-35mm thickness 0.8-2mm). At European market, there are the DIN strips with higher dimension tolerances available. Our more variable design of the pawl has been fitted to those strips (it can correspond also with less exact performance of the DIN strips).

■ Attachment onto the DIN strip using the pawl final arrestment

□ Onto the strip DIN EN 50 022 (with-35mm, thickness 0.8-2mm)

□ The pawl arrestment in final positions facilitates both the MCB's erection onto the DIN strips, and their dismantling.

■ Possibility to attach the MCB directly onto the flat surface without the DIN strip

□ You will appreciate that advantage-a possible attachment of our MCB directly onto the flat surface without using the DIN strip-especially when repairing old switchboards. This possibility does not require any modification of the MCB. Let us explain the principle of such an attachment: you screw a flat-headed screw into the flat area at the required position. You leave that screw at a distance of approx. 5mm from the surface (not fully screwed). Onto the prepared screw you put the MCB, which has a corresponding cut in its upper part you draw out the arresting pawl

to its final "open" position in the bottom part and then you fasten the MCB by another screw to the flat surface through a hole in this pawl.

□ Colored control levers

We supply both colored levers in accordance with the nominal current values (corresponding to the marking of turn fuses) and black levers.

□ The possibility to seal the lever in the ON and OFF positions

The lever can be sealed because of openings in both guiding sidewalls of the switch-off lever. Through these openings, a sealing wire can be fed. This sealing wire passes also through a groove on the movable lever. This groove has been engraved in both positions (OFF and ON positions) and it disables the motion of the lever itself. If the lever is sealed in the ON position, the immobility does not render the function of the circuit breaker impossible, be in the event of a short-circuit or overload the circuit will be shut-down (independently on the fixed position of the lever).



■ An easy link-up of different auxiliary contacts, releases etc. from both sides of the circuit breaker

□ The link-up of plenty accessories is enabled from both sides of the MCB namely by a very simply "click-down" without any instruments. There are openings covered by self-sticking plastic plate on both sides of the MCB body. That opening is linked with a movable mechanism inside. Over an interconnecting element, the lever condition is either indicated or the switching-off mechanism is directly controlled through the other opening. These are the accessories of one of the best manufacturers in Europe, MERLIN-GERIN. Their perfect system includes inter alia low-volt coils, ejecting coils, auxiliary contacts etc. All those elements provide protection, control, regulation and remote control, remote indication of switch-on and switch-off positions of the circuit breaker, programming and measurement. By means of what has been mentioned above, those elements enable our circuit breakers to be applied in the rage of control automatization of different industrial processes. These elements can be mutually interconnected as well, thus they can form different combinations to get thorough operational information.

■ Taking into account the recent findings

and comparisons of the above main advantages we are sure that we have reached the imaginary top level of the best manufacturers of MCB's world-wide with our MCB's of the ROGY JVM16 series.

