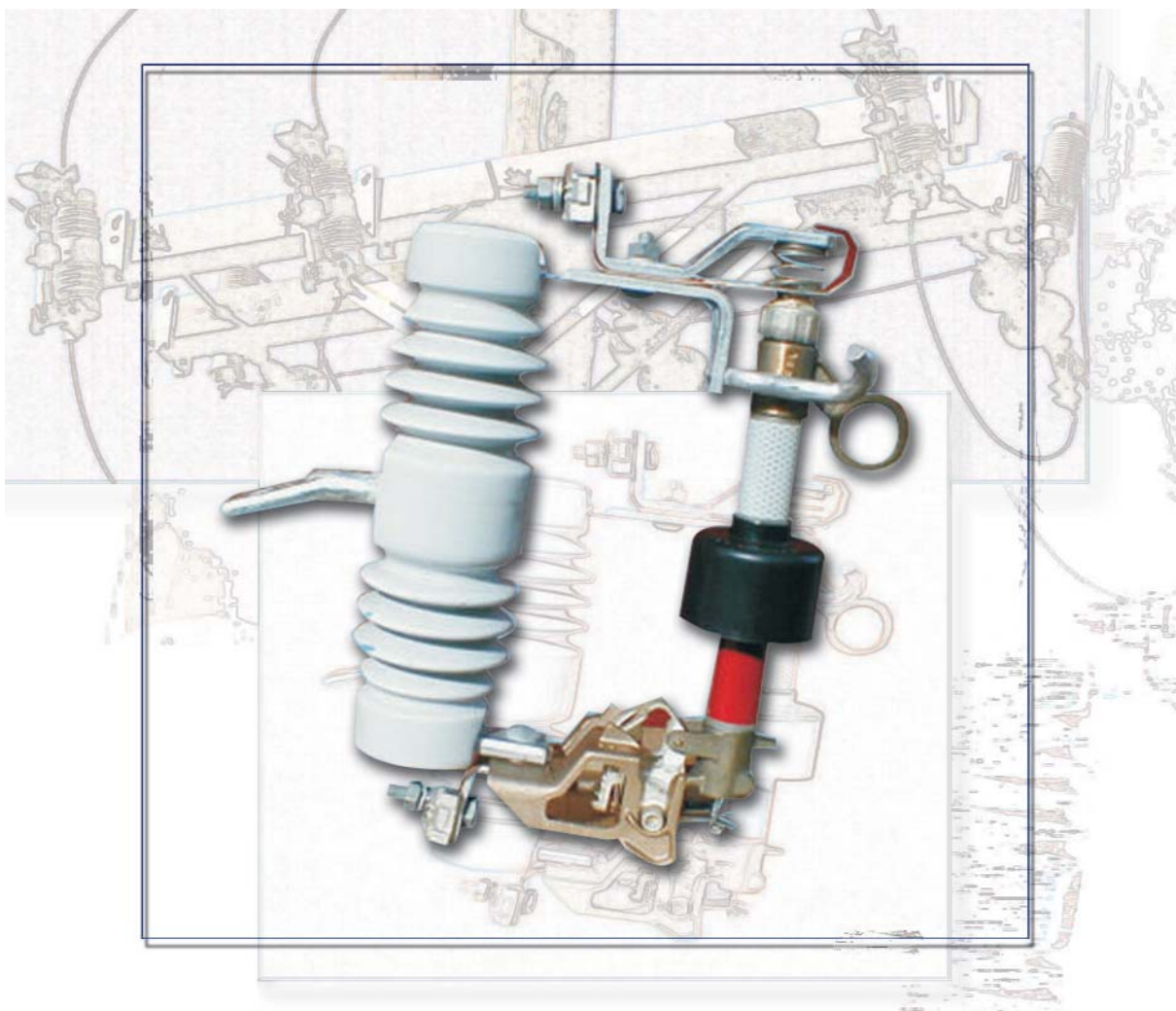




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Electronic Auto Sectionalizer

An exclusivity by : **P.T. ENERTELINDO KENCANA**

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ASMRMS

ASMRMS Manually Resettable Electronic Auto Sectionaliser*

*patented product

ASMRMS Application

Based on the structure and operating principle of the traditional ASMRM electronic sectionaliser, the new ASMRMS manually resettable electronic auto sectionaliser, incorporates state of the art technology in well-known performing equipment subject to ongoing improvement and with a long track-record in the market.

Today, thanks to the new technology introduced in the ASMRMS, the actuating current and counts of any single equipment can be set to different configurations of the network as many times as necessary, allowing correct coordination between the Recloser and the actuating current. The use of the electronic auto

sectionaliser in branches instead of cut-outs permits better coordination in the event of permanent or temporary faults, decreasing operating costs and the number of current cut-outs. In fact, fuses do not work in coordination with reclosers either in the event of temporary or permanent faults. In both cases the

fuse actuates, unlike the auto sectionaliser that counts operations. And as it does not depend on any time-current curve and therefore has perfect coordination. It should be recalled that fuses do not usually have the "ideal" capacity and they also suffer aging, which impairs its coordination.

Description and general operating principle

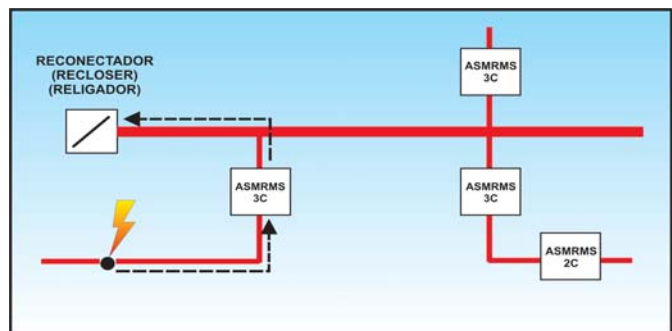
The equipment consists of a cut-out base, as the one used for cut-outs or drop-out fuses. The sectionaliser is manufactured of a copper tube that houses an electronic circuit fed by toroidal coils. They sense the current on the network. The electronic circuit analyses the medium-voltage network fault current, counting the opening operations run by the headend recloser on the circuit (upstream), and sets the mechanical opening of the sectionaliser if the fault current is permanent. The electronic circuit is also capable of performing a spectral analysis of the current waveform so as to discriminate between a

transformer inrush current and a fault current, therefore preventing medium-voltage line sectioning and the subsequent unnecessary power cut-out to customers. The equipment re-setting module is found under upper contact cap. By accessing this module and through a given sequence of combinations described in the mounting and calibration instructions, the operator can configure and re-configure the sectionaliser actuating current and number of counts so as to obtain the proper combination for protection of the system. Fitted with an upstream recloser, the electronic auto sectionaliser installed on a service connection (downstream) counts the

operations and, when reaching the preset counting (1 to 4) usually 1 less opening operations of recloser), releases the mechanical device and opens the circuit; while the system is with

no load because of the opening of the recloser.

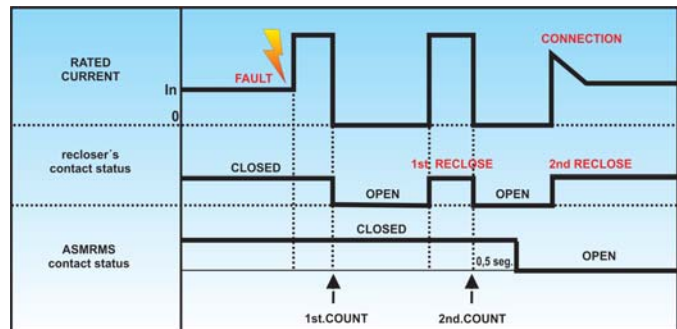
The circuit is restored by reassembling the mechanical device.



Operating under temporary fault conditions

In overhead lines, temporary fault events account for 80-90% of faults, and are cleared by means of a headend recloser or reclosure switch. If a fault event occurs, the headend equipment actuates (the ASMRMS sectionaliser counts 1 opening), and then successfully recloses (the temporary fault is cleared), so that both the

headend equipment and the ASMRMS sectionaliser are connected and the circuit is in operation. After 30 seconds, the ASMRMS electronic sectionaliser resets the count. If fuses are employed, these normally operate concurrently with the headend recloser, therefore causing an unnecessary interruption of the circuit.

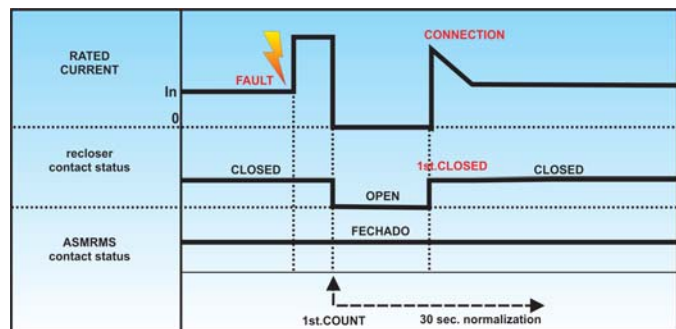


Operating under permanent fault conditions

Between 10 and 20% of the remaining fault events in overhead lines are of a permanent type. In this case the continuous reclosing operations won't clear the fault. But as the ASMRMS counts the opening operations and, upon reaching the set count, opens the line under fault condition, thus permitting a successful reclosure of the recloser and the continuity of the supply upstream from the ASMRMS electronic sectionaliser.

capacitor that supplies the operating power must be charged. The power used to charge the capacitor is provided by the current circulating through the line during and immediately prior to the fault event.

If fuses are used, there is often no coordination between the fuse curve and the slow recloser curve, so that an unnecessary current supply interruption occurs all over the circuit, upstream and downstream from the sectionaliser.



In order to obtain proper performance, the equipment



Technical Specifications

Rated voltage	15, 27, 27/33 and 33 KV
Rated frequency	50 or 60 Hz
Actuating current range	Resettable between 6 and 220 A
Number of opening counts	Resettable between 1 and 4 counts
Dead line detection	<200 mA
Dead line verification time	80 m sec
Total opening time	0.5 sec
Memory resetting time	30 sec
Insulation level	95, 125, 150 and 170 KV/BIL
Duration current 1 sec	4 symmetric KA
Current (peak value)	10 KA

Operating highlights

- Immune to temperature variations between -25 and 65°C
- Immune to connection current overload of transformer (inrush current) because of its specially designed electronic circuit
- Low dead line threshold detection value. This value has been set below 200 mA in order to increase operating safety so that it may only be in operation when the medium-voltage line has been sectioned by the upstream recloser
- Exchangeable and adjustable to any type of standard simple vent cut-out base
- Immune to electromagnetic induction fields through a shielded design for electrical and electronic circuits (Faraday cage)
- Adaptability to any current or

- future line protection type needs.
- **Easier inventory management!**... One single type of equipment deals with all types of possible configurations.
- No power sources required. The supply is obtained through same system
- Reliable opening action
- Easy and fast installation assured
- Selectivity.
- Avoids unnecessary interruptions. The ASMRMS is an effective, simple and economical solution to obtain operating selectivity both with temporary and permanent fault events.
- Service optimisation achieved through cost reduction in terms of non-delivered supply due to faults in the recloser-fuse system caused by temporary fault events.

Ordering information

ASMRMS(KV) - B50

(KV): Indicate rated voltage (15, 27, 27/33 or 33 KV)

B: If a fuseholder base is required, add suffix letter "B" to the selected model.

50 o 60: Indicate system frequency, 50 or 60 Hz

Example:

ASMRMS15-B50 50 Hz, resettable electronic auto sectionaliser with fuseholder base

ASMRMS proper selection and setting

In order to ensure perfect coordination of the electronic auto sectionaliser and the headend reclosers, the following requirements must be met:

1) The actuating current of the ASMRMS electronic sectionaliser must be set below the actuating current of the recloser (both for phase fault and ground fault events)

2) The actuating current of the ASMRMS electronic sectionaliser

must be set between the short-circuit current and the circuit rated current

3) The 30-second memory reset time of the ASMRMS sectionaliser must be longer than the interval between the recloser operations so that the ASMRMS may recall the counting recorded.

4) The 0.5-second total opening time of the ASMRMS sectionaliser must be shorter than the reclosing interval of the recloser.

5) The lifetime and proper operation of the ASMRMS electronic sectionaliser depends on a correct setting of the equipment and on a correct watertight closure of the setting module. This operation must be performed only by trained staff with adequate tools who should follow the recommendations included in the mounting and calibration instructions provided with the equipment.

Table of Models

Model	Rated voltage	Insulation level *	Actuating current	Number of counts	Packaging		
					No. per box	Weight (kg)	Box size (mm)
ASMRMS 15	15	95	Resettable between 6 and 220 A	Resettable between 1 and 4 counts	1	8,50	110x400x420
ASMRMS 27	27	125				9,95	110x400x520
ASMRMS 27/33	27/33	150				12,50	130x400x520
ASMRMS 33	33	170				15,20	160x400x635

- if a base is required, add suffix letter "B" to the selected model
- indicate 50 or 60 according to the system frequency 50 or 60 Hz
- * valid for equipments with base

ASMRMS-T

ASMRMS-T Manually Resettable 3-Phase Opening Electronic Auto Sectionalizer*



* Patented product

ASMRMS-T Application

Based on the same operating principle as the ASMRMS single-phase electronic auto sectionalizer, the ASMRMS-T manually resettable 3-phase opening electronic auto sectionalizer has been developed. This

equipment is a highly useful alternative to clear faults on branch lines as 3-phase rather than single-phase openings are recommended for these types of lines.

Main advantages

Beside the advantages listed for the ASMRMS single-phase equipment, the 3-phase opening electronic sectionalizer includes the following features:

- Installation on existing structures. No changes, additional structures or improvements of poles are required. Installation is even possible on the existing

bases of fuse cut-outs

- No mechanical or electric connections between phases are required
- Low-range coded radio signal that prevents interference with other equipment
- Internal setting adaptability to any type of line configuration is always achieved

Operating principle

The set consists of 3 single-phase sectionalizer linked together by a coded radio signal. It operates only after counting the total number of counts set, at the fault phase(s), and once it has checked that the circuit current equals zero (dead line detection <200 mA), i.e., that the headend recloser has at that instant opened the three phases; the opening operation without any load may be ensured by leaving the three-phase branch line disconnected from the main line. In order to achieve this, it is essential that the headend recloser should also be set for a three-phase opening.

As the ASMRMS-T sectionalizers are not linked together by any mechanical means or by electrical conductors but by a coded radio signal, each set of three is perfectly identified and has its own coded signal (for instance A, B, C, D or E). Therefore, if a sectionalizer in a set of three is to be replaced, the new sectionalizer must have a coded signal (A, B, C, D or E), as the number of counts and the actuating current of any piece of equipment can be modified and adjusted so that the sectionalizers in the set may have the same setting parameters.

It should be noted that as the signal range is of approx. 4 m. there is no possibility of interference between the equipment of different branch connections.

However, it is convenient to check whether nearby sets have different coding signals against the equipment identification provided by the manufacturer. To this end, the equipment is generally supplied with 5 standard coded signals. Therefore, if a 3-phase opening equipment is installed on the lines, the signal code of existing equipment must be indicated or else the new equipment must be located

at a distance of more than 10 m. from the other set.

In the case of this sectionalizer like in the ASMRMS-T single-phase opening models, the current for the equipment operation is supplied by same circuit. Also, as the transmitter-receiver of each equipment must be energised in order to achieve proper operation, the current should not be lower than 5 A during 1 minute prior to the opening requested in order to receive the signal and achieve the 3-phase opening of the set.

Ordering information

ASMRMS-T (KV) - B50

(KV): Provide rated voltage needed (15, 27, 27/33 or 33 KV)

B: : If a cut-out base is required, add suffix letter "B" to the selected model.

50 6 60: Indicate if equipment is for 50 or 60 Hz circuits. If a spare phase is required to complete a set of three, indicate signal code needed.

Example:

3 ASMRMS-T15-B50 set of three 15KV, 50 Hz, resettable electronic auto sectionalizers with cut-out base

ASMRMS-T proper selection and setting

In order to ensure perfect coordination of the 3-phase opening electronic auto sectionalizer and the headend reclosers or reclosure switches, the following requirements are added to those specified for single-phase equipment:

a. The "prior instant" current required in the 3 phases for signal reception and 3-phase opening must not be lower than 5 A (during 1 minute); otherwise the opening will only occur at the fault phase.

b. At all times the setting must be the same with regard to the num-

ber of counts and the trigger current between phases.

c. The headend recloser must be programmed for a 3-phase opening

at least in the operation corresponding to the trigger count number set in the ASMRMS-T 3-phase opening auto sectionalizer.



Table of models

Model	Rated voltage	Insulation level *	Actuating current	Number of counts	Embalaje		
					No. per box	Weight (kg)	Box size (mm)
ASMRMS-T 15	15	95	Resettable between 6 and 220 A	Resettable between 1 and 4 counts	1 set of three	26,70	110x200x1260
ASMRMS-T 27	27	125				31,00	110x1200x1560
ASMRMS-T 27/33	27/33	150				38,70	130x1200x1560
ASMRMS-T 33	33	170				47,00	160x1200x1905

- if a cut out base is required, add suffix letter "B" to the selected model
- indicate 50 or 60 according to the mains frequency, 50 or 60 Hz
- indicate if signal code is required (signal codes available - A, B, C, D or E)
- * valid on equipments with base

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