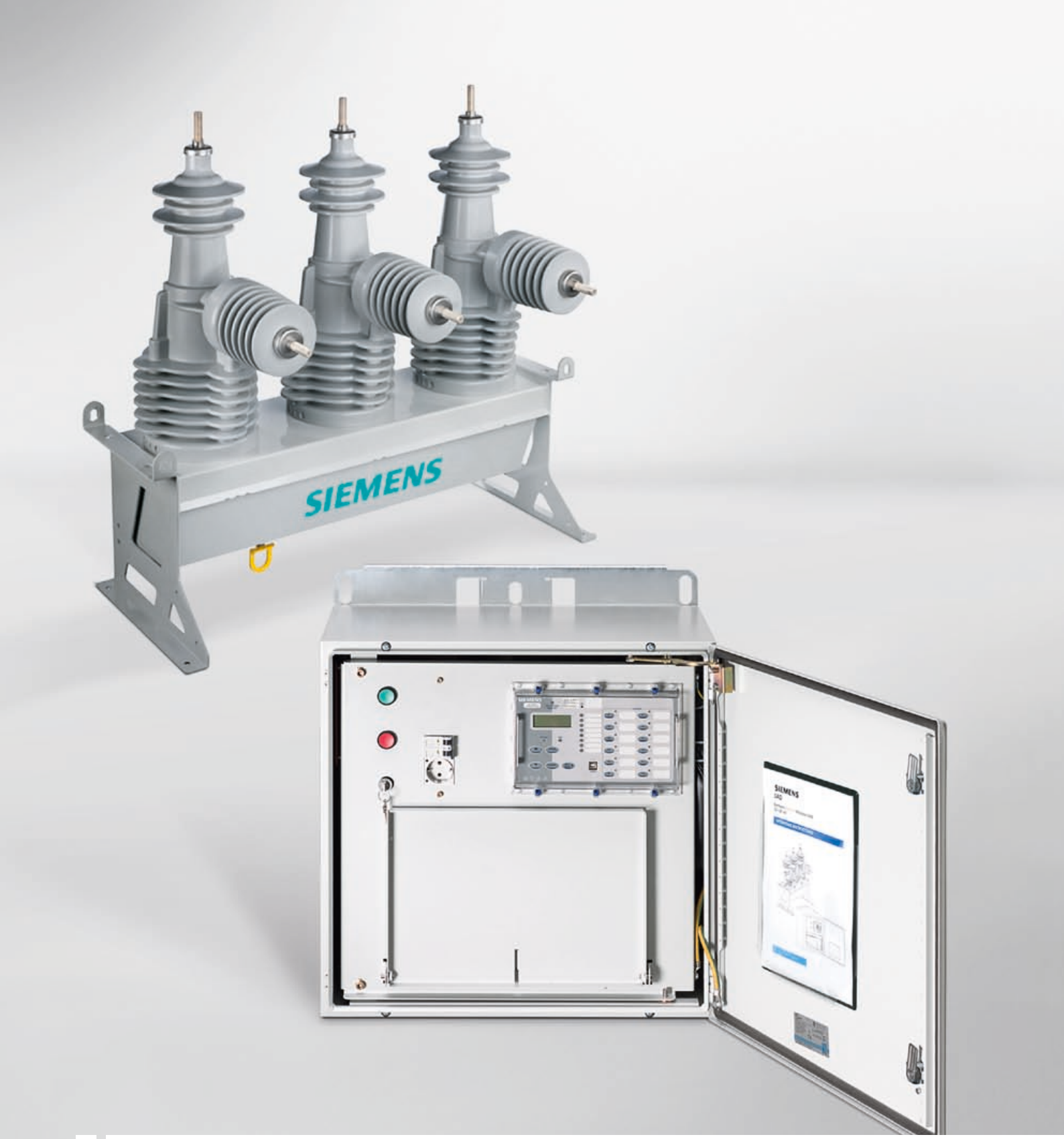

Siemens Vacuum Recloser 3AD

Medium-Voltage Equipment
Selection and Ordering Data

Catalog HG 11.42 · 2011

Answers for energy.

SIEMENS

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Siemens Vacuum Recloser 3AD

Medium-Voltage Equipment
Catalog HG 11.42 · 2011

Invalid: Catalog HG 11.42 · 2008

ISO 9001
ISO 14001
DNV
Certified Company

OHSAS 18001
DNV
Certified Company

The products and systems described in this catalog are manufactured and sold according to a certified management system (acc. to ISO 9001, ISO 14001 and BS OHSAS 18001).
DNV Certificate No.: 92113-2011-AHSO-GER-TGA and Certificate No.: 87028-2010-AHSO-GER-TGA.

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Vacuum recloser with control cubicle and controller

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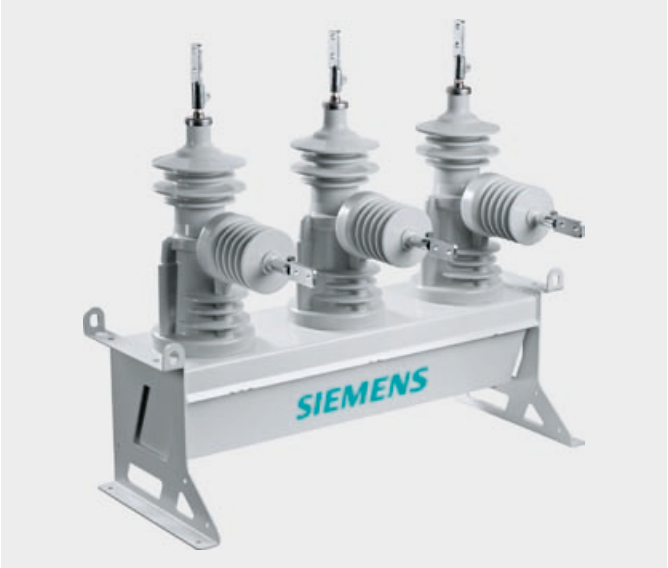
Siemens vacuum recloser 3AD

3AD vacuum reclosers combine the latest technology in vacuum switching and electronic control. They are based on decades of experience in circuit-breaker design, protection relay development and network planning. Siemens reclosers meet all the requirements for outdoor use in accordance with the recloser standards IEEE C37.60 and IEC 62271-111.

The recloser consists of two main components: The switch unit and the controller as protection and control unit. It is located inside the control cubicle, which also contains the electronics and auxiliary circuits.

Three-phase switch unit up to 27 kV



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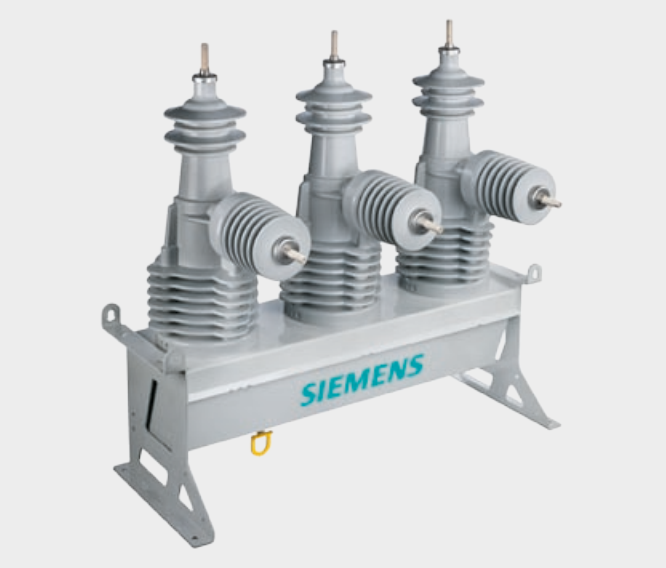
Three-phase switch unit 38 kV



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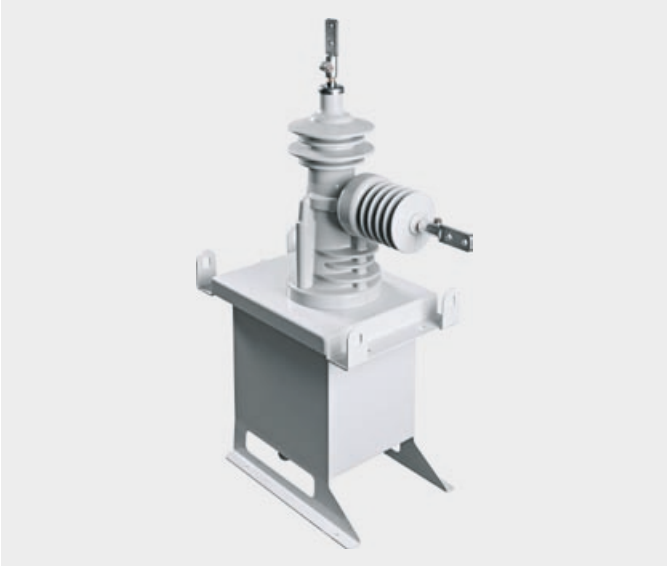
Single-phase switch unit (available on request)



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The switch unit is the primary part of the recloser. It is located on top of the pole to switch the overhead line. Alternatively, it can be mounted on a frame inside a substation. It is designed to permanently withstand weather, dust and animals.

Controller and cubicle

R-HG11-318.tif

As the brain of the recloser, the controller is located in the control cubicle at the bottom of the pole. The picture is showing additional features.

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Recloser principle

Reclosers are used in overhead lines and in substations. Like circuit-breakers they are capable of switching normal and fault currents. They are equipped with sensors and controller being the protection and control device. In case of a temporary line fault, they can trip and reclose up to four times, thus avoiding longer network interruptions.

As outdoor devices they are pole or structure-mounted and exposed to environment and weather. Extensive testing beyond the recloser standard has proven the suitability for application in various climates to ensure long service life.

Recloser cycle

In case of a network fault, the recloser opens and recloses several times. In case of temporary faults, the automatic reclosing significantly reduces the outage times.

While the trip settings for each operation can be set individually the optimal recloser cycle is:

- The first two interruptions of a fault are set to instantaneous protection, so that downstream fuses in the system do not operate. After a few cycles it recloses back on.
- The subsequent interruptions have a delayed protection setting. Thus, downstream fuses on network spurs have the chance to operate and isolate the affected network section, restoring normal operation in the main feeder.

The controller for the 3AD recloser is based on the ARGUS-M protection relay family. It allows full flexibility for the user to set up to five trips and four recloses, each of them with individual protection settings for phase, earth and high-impedance faults.

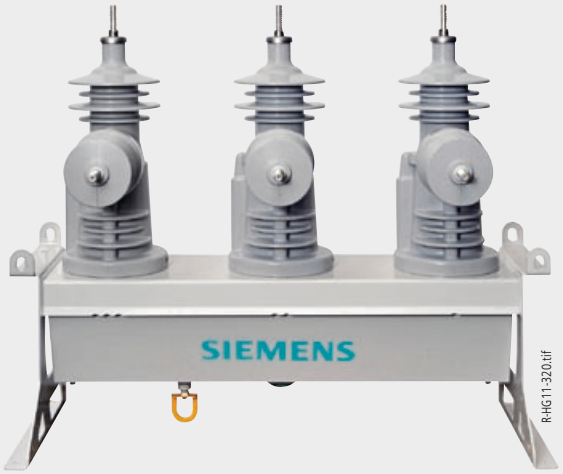
Design of the switch unit

Vacuum interrupter

Our vacuum reclosers rely on a well-established technology Siemens has developed and introduced into series production some 30 years ago: the Siemens vacuum interrupter. It offers high performance and reliability and is being continuously improved.

Pole assemblies

Each vacuum interrupter is embedded in a solid-insulated pole made of weather-proof cycloaliphatic epoxy-resin. This enables a small design as well as resistance against environmental effects. The vacuum interrupter is vertically mounted inside the pole, providing a long service life. Each recloser is equipped with an integrated current transformer. For directional protection or metering purposes, a resistive voltage sensor can also be incorporated in the pole. The accuracy achieved in this way is much higher than that of capacitive dividers.



Switch unit – front view

Switch unit – rear view

38 kV pole design

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Mechanical lockout

Lockout handle – pushed in
(operational position)

Lockout handle – pulled
(open position)

Operating mechanism

Magnetic actuator

The recloser is operated by a magnetic actuator enabling the recloser cycle, i.e. the high number of switching operations within a short period of time. The actuator is a bi-stable system, locked in the end positions by permanent magnets. If not in operation, the magnet coils do not consume any power.

The operating mechanism housing is made of galvanized mild steel with a special coating for outdoor applications. Optionally, a stainless-steel housing is available. Apart from the complete kinematics, it also accommodates the position indicator and a mechanical operations counter.

The recloser is installed on the pole by means of a pole mounting frame. Alternatively, the recloser can be mounted directly on a frame in substations.

A three-phase controller has gang-operated poles on a common actuator housing.

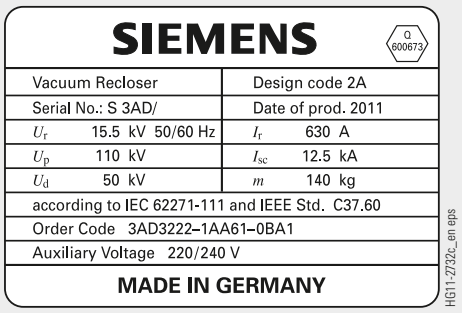
A single-phase recloser follows the same constructional principle, but it is designed according to the forces required for the operation of only one pole.

Mechanical lockout

The recloser can be tripped manually. If the handle is pulled, the recloser opens and is simultaneously locked out electrically and mechanically. The handle stays extended, thus indicating the interlocked state.

To close the recloser again, the handle must first be pushed back to the operation position in order to release the lockout. Then the recloser can be closed electrically via the controller.

Data on the nameplate



Note:

For any request regarding spare parts, subsequent deliveries, etc. the following details are necessary:
– Type designation
– Serial No.
– Year of manufacture

1

Controller

The controller is based on the ARGUS-M 7SR224 directional overcurrent protection relay family. These relays provide protection, control, monitoring, instrumentation and metering with integrated input and output logic, data logging & fault reports.

Communication access to relay functionality is via a front USB port for local PC connection or a rear electrical RS485 port for remote connection. Additional rear port options including RS232 and optical ports are available.

The controller is mounted in the control cubicle. Along with the controller, this cubicle also contains the auxiliary power supply with batteries for uninterruptible power supply, electronic boards, fuses, and a general-purpose outlet to power a laptop.

The controller contains a large number of protection functions (elements) which can be selected or deselected through the menu driven display or a laptop. These elements can be customized to the utilities' needs by parameters (settings) as described below.

User interface

- 20-character x 4-line backlit LCD
- 5 menu navigation keys
- 3 fixed LEDs
- 12 freely programmable function keys each with tri-color LED
- 8 or 16 programmable LEDs. Each LED is tri-colored (red, green or yellow) allowing for clear indication of the associated function state.

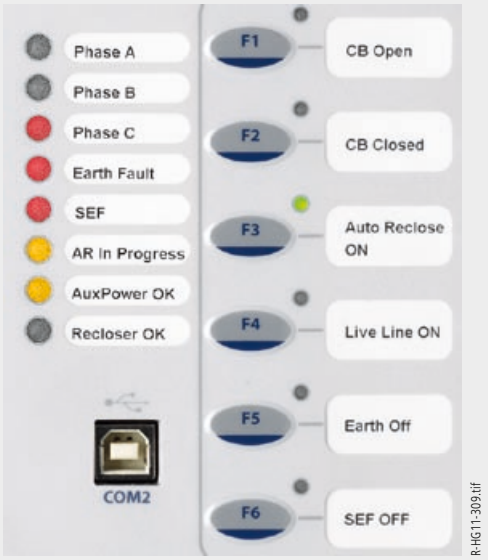
Controller option

For substation application a controller is available on request based on the SIPROTEC 7SJ family, which provides communication via IEC 61850.

Cubicle

The cubicle includes the complete electronics, the protection relay and the UPS system of the recloser. Additional components and features can be selected via order number (MLFB).

ARGUS-M controller



Tri-color LEDs and pushbuttons of the controller

Cubicle

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Protection functions
(in order of ANSI numbering)

25 Synchronizing

Synchronizing is used with three-pole manual closing and autoreclose operations to ensure that voltages are within safe limits before allowing the close operation to proceed. The ARGUS-M controller provides settings for voltages, phase and frequency difference for check synchronizing as well as system synchronizing and close on zero phase difference for automatic selection following detection of a split system. Automatic synchronizing bypass is also available to allow closure to energize a dead feeder or busbar.

27/59 Under / overvoltage

Four elements which can be set independently as under or overvoltage. Each element has settings for pickup level and Definite Time Lag (DTL) delays, operates if voltage 'exceeds' setting for duration of delay. Typically applied in load shedding schemes.

37 Undercurrent

Two elements with settings for pickup level and Definite Time Lag (DTL) delays. Each operates if current falls below its setting for duration of its delay.

46BC Broken conductor

Each element has settings for pickup level and DTL delay. With the circuit-breaker closed, if the NPS/PPS current ratio is above setting this could be due to a broken conductor.

46NPS Negative phase-sequence overcurrent

Two elements, one DTL and one IDMT, with user settings for pickup levels and delays. NPS current elements can be used to detect unbalances on the system. The negative phase sequence component of current is derived from the three phase currents. It is a measure of the quantity of unbalanced current on the system.

47NPS Negative phase-sequence overvoltage

Two DTL elements with independent user settings for NPS overvoltage pickup level and delays. NPS voltage elements can be used to detect unbalances on the system. The negative phase sequence component of voltage is derived from the three phase voltages. It is a measure of the quantity of unbalanced voltage on the system.

49 Thermal overload

The thermal algorithm calculates the thermal state of each pole from the measured currents and can be applied to lines, cables and transformers; operates if the user set thermal overload is exceeded. Capacity alarm operates if a user set percentage of overload is reached.

50BF Circuit-breaker fail

The circuit-breaker fail function may be triggered from an internal trip signal or from a binary input. All measured currents can be monitored following a trip signal and an output is issued if any current is still detected after a specified time interval. This can be used to re-trip the CB or to back-trip an upstream CB. A second back-trip time delay is provided to enable another stage to be utilized if required.

59N Neutral overvoltage

Two elements, one DTL and one IDMTL, have user settings for pickup level and delays. These will operate if the neutral voltage exceeds the setting for duration of delay. Neutral overvoltage can be used to detect earth faults in high impedance earthed or isolated systems.

67/50 Phase-fault elements

Provide Directional Instantaneous or Definite Time (DTL) overcurrent protection, with independent settings for pickup current and time delay. Four elements are provided.
Elements can be inrush-inhibited

67/51 Phase-fault elements

Provide Directional Inverse Definite Time overcurrent protection, TCC/DTL with independent settings for pickup current, TCC and minimum/follower time delay.
Four elements are provided.

The user can select the TCC from standard IEC/ANSI or legacy characteristics e.g. 101 (A) etc. Reset TCC can be user set to either DTL or shaped, to integrate grading with electromechanical or other protection devices.

Earth-fault / Sensitive earth-fault

The earth-fault current is measured directly via a dedicated current analog input. This input is used for both earth-fault and sensitive earth-fault elements.

67/50G Earth-fault

Provide Directional Instantaneous or Definite Time (DTL) earth-fault protection, with independent settings for pickup current and time delay. Four elements are provided.
Elements can be inrush-inhibited.

67/51G Earth-fault

Provide Directional Inverse Definite Time earth-fault protection, TCC/DTL with independent settings for pickup current, TCC and minimum/follower time delay.
Four elements are provided.

The user can select the TCC from standard IEC/ANSI or legacy characteristics e.g. 101 (A) etc. Reset TCC can be user set to either DTL or shaped, to integrate grading with electromechanical or other protection devices.

67/50SEF Sensitive earth-fault

Provide Directional Instantaneous or Definite Time (DTL) earth-fault protection, with independent settings for pickup current and time delay. Four elements are provided. Elements can be inrush-inhibited.

67/51SEF Sensitive earth-fault

Provide Directional Instantaneous or Definite Time (DTL) earth-fault protection, with independent settings for pickup current and time delay. Four elements are provided. Elements can be inrush-inhibited.

The user can select the TCC from standard IEC/ANSI or legacy characteristics e.g. 101 (A) etc. Reset TCC can be user set to either DTL or shaped, to integrate grading with electromechanical or other protection devices.

67 Directional control

Phase-fault, earth-fault and sensitive earth-fault elements can be directionalized. Each element can be user set to forward, reverse, or non-directional.

Where multiple elements are provided two could be set for forward and two for reverse, thus providing bi-directional tri-state protection is a single device.

Phase-fault elements are polarized from the calculated quadrature voltage, i.e. Ia~Vbc, Ib~Vca & Ic~Vab.

Earth-fault/SEF elements are polarized from internally calculated zero sequence voltage, i.e. Io~Vo.

51c Cold load

When a circuit-breaker is closed onto a 'cold' load, i.e. one that has not been powered for a prolonged period, this can impose a higher than normal load-current demand on the system which could exceed 'normal settings'. These conditions can exist for an extended period and must not be interpreted as a fault. To allow optimum setting levels to be applied for normal operation, cold load causes the 67/51 elements to change to 67/51c settings, i.e. setting/TCC/time multiplier/follower delay times, for a limited period. Cold load resets and returns to 'normal settings' when either the circuit-breaker has been closed for a user set period, or if the current has fallen to below a set level for a set time and it is safe to return.

51V Voltage dependent overcurrent

Element has settings for Undervoltage pickup level and operates if voltage falls below setting. On pickup this element applies the set 51V multiplier to the pickup setting of the 67/51 phase-fault elements.

60CTS CT supervision

The CT supervision considers the presence of negative phase-sequence current, without an equivalent level of negative phase-sequence voltage, for a user set time as a CT failure. Element has user operate and delay settings.

60VTS VT supervision

The VT supervision uses a combination of negative phase-sequence voltage and negative phase-sequence current to detect a VT fuse failure. This condition may be alarmed or used to inhibit voltage dependent functions. Element has user operate and delay settings.

64H Restricted earth-fault scheme

The measured earth-fault input may be used in a 64H high-impedance, restricted earth-fault scheme. The required external series stabilizing resistor and shunt non-linear varistor can be supplied.

74TC Trip-circuit supervision

Up to three trip circuits can be monitored using binary inputs connected in H4/H5/H6 or H7 schemes. Trip-circuit failure raises an HMI alarm and output(s).

79 Auto-reclose

The controller provides independent phase-fault, earth-fault and sensitive earth-fault sequences. They can be set for up to 4 shots, i.e. 5 trips + 4 reclose attempts to lockout. These sequences can be user set to any configuration of instantaneous (fast TCC) or delayed TCC protection, with independent reclose (Dead) times.

As the user defines which elements are instantaneous, the combination of TCC1 plus 50 high-set elements & TCC2 plus 50 high-set elements, provides the user with full flexibility. It enables the optimization of the protection characteristics, which will be applied at each point in the protection sequence. Limits can be set by the user on the number of delayed trips to lockout or high-set trips to lockout.

The external protection auto-reclose sequence allows auto-reclose to be provided for a separate high-speed protection device with options for blocking external trips to allow overcurrent grading to take place.

Single / triple auto-reclose

Additional optional functionality is available to provide tripping, auto-reclose and control of three single-pole reclosers located together and controlled by a single ARGUS-M controller device. The facility to operate each of the three phases independently for systems where single-phase loads are connected is common in some countries. The ARGUS-M provides flexible schemes which are used to provide single and three-pole trip and reclose operations depending on the fault type detected.

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Loss of voltage LOV automation

Additional optional functionality is available to provide control of Normally Open Points (NOP) and other reclosers in the distribution network to provide an automation sequence of load restoration following a persistent fault. The sequence is started by the loss of voltage detection, for an extended period of time, following a complete but unsuccessful autoreclose sequence, which has caused lockout of a recloser at any point in the network.

81 Under / overfrequency

Each of the 4 elements has settings for pickup level, drop-off level and Definite Time Lag (DTL) delays. This function operates if frequency 'exceeds' setting for duration of delay. Typically applied in load shedding schemes.

81HBL2 Second harmonic block

Where second harmonic current is detected, i.e. during transformer energization the user selected elements can be blocked.

27 Sag / 59 Swell

Power system utilities use SARFI (System Average RMS Variation Frequency Index), indices of voltage sag and swell, which express the magnitude and duration of sag and swell variations occurring on their systems. These indices are based on the 'ride-through' capability of the customer's plant and are usually expressed in terms of the number of a specific class (index) of r.m.s. variation per customer per specified period.

These elements provide the raw data in the form of counters that display the total count of each type of index value. Sags have a greater impact on plant performance than swells. Disturbances are classified according to their magnitude and duration, the limits can be user set for SIARFI (System Instantaneous Average RMS Variation Frequency Index), SMARFI (System Momentary Average RMS Variation Frequency Index) & STARFI (System Temporary Average RMS Variation Frequency Index). Breaks above 60 s duration are interruptions. Counters for each are provided per pole.

Lockout (ANSI 86)

All binary output statuses can be memorized. The LED reset key is used to reset the lockout state. The lockout state is also stored in the event of supply voltage failure. Reclosure can only occur after the lockout state is reset.

Optional protection functions

The optional protection functions are depending on specific types of controller and may not be available in combination. For a detailed overview of options please refer to the order overview (MLFB).

- Single/triple-pole autoreclose
- Fault locator
- Loop automation
- Synchronizing.

Communication interface and modem options

- Front USB port
- Rear RS485 port
- Bluetooth modem
- Quadband GPRS/GSM-modem
- Rear RS232 port
- IRIG-B ports
- Rear fiber optic ports
- RJ45 (optional feature).

Communication protocol options

- IEC 60870-5-103
- MODBUS RTU
- DNP 3.0
- IEC 60870-5-101/-104 (optional).

Monitoring functions

- Fault data mode – displays date and time, type of fault and currents and voltages for each of the last 10 faults
- Favourite (default) meters – User selectable from:
  - Currents – primary, secondary, xIn, earth/SEF, sequence components and 2nd harmonic
  - Voltages – primary, secondary, xVn, Ph-Ph and Ph-n, sequence components, calculated earth voltage, neutral voltage displacement (Vx) voltage
  - Frequency
  - Power – MW, MVar, MVA, power factor
  - Energy – export and import – MWh, MVarh
  - Direction – load flow indication
  - Thermal capacity – %
  - Autoreclose – status and shot number
- CB maintenance:
  - 2 independent trip counters
  - Frequent operations counter
  - Lockout handle operations counter
  - I^2t summation for contact wear
- General alarms
- Battery condition monitoring and automatic cyclical test
- Power quality – 27 sag and 59 swell (per pole counters for SIARFIx, SMARFIx, STARFIx and interruption events)
- Binary input status indication
- Binary output status indication
- Virtual internal status indication
- Communications meters
- Miscellaneous meters, date, time, waveform, fault, event and data log record counters
- Demand monitoring.

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Data acquisition via communication interface

Sequence of event records

Up to 5000 events are stored and time tagged to 1 ms resolution.

Fault records

The last 10 fault records are displayed on the relay fascia and are also available through the communication interface, with time and date of trip, measured quantities and type of fault.

Waveform recorder

The waveform recorder stores analog data for all poles and the states of protection functions, binary inputs, LEDs and binary outputs with user settable pre and post trigger data. A record can be triggered from protection function, binary input or via data communications. 10 records of 1 second duration are stored.

Demand monitoring

A rolling record of demand over the last 24 h is stored. The demand is averaged over a user selectable period of time. A rolling record of such demand averages is stored and provides the demand history. A typical application is to record 15 min. averages for the last 7 days.

Real time clock

The time and date can be set and are maintained while the relay is de-energized by a back-up storage capacitor. The time can be synchronized from a binary input pulse or the data communication channel.

Data log

The average values of voltage, current and real and reactive power are recorded at a user selectable interval and stored to provide data in the form of a data log which can be downloaded for further analysis. A typical application is to record 15 min. intervals over the last 7 days.

Software

Reydisp Evolution

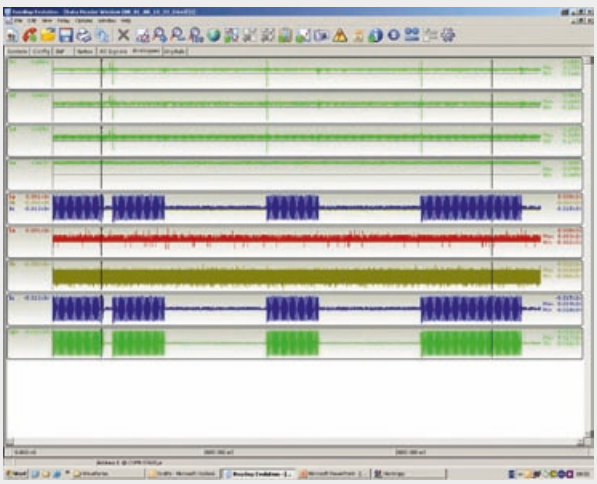
For communication with the relay via a PC (personal computer) a user-friendly software package, Reydisp Evolution, is available to allow transfer of relay settings, waveform records, event records, fault data records, instruments/meters and control functions. Reydisp Evolution is compatible with IEC 60870-5-103.

- Further information
- Software free of charge
- Download link

For further information, product news and software download please visit: www.energy.siemens.com

Programmable logic

The user can map binary inputs (the number of binary inputs and outputs depends on the controller type. For detailed information please see the scope of delivery description) and protection operated outputs to function inhibits, logic inputs, LEDs and/or binary outputs. The user can also enter up to 16 equations defining scheme logic using standard functions e.g. timers and/or gates, inverters and counters. Each protection element output can be used for alarm and indication and/or tripping.



Typical Reydisp Evolution screenshot

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Special functions and applications

Application on long rural lines and their specific characteristics

Long rural feeders have a high line impedance due to their length, which results in low-fault levels in case of network failure. This makes it diffcult to distinguish faults from overload situations with a similar current level. The 51V Voltage dependent overcurrent function ensures tripping in fault situations only.

On the other side hand, overload situations are common for long rural feeders. They vary in current and length so that it is diffucult to set a trip level: if the level is chosen too low it will often trip. If the level is high it might damage overhead lines or other equipment when the situation lasts too long. The real issue during overload is the thermal stress on lines and transformers. This can be optimized by using 49 Thermal overload in reclosers which calculates the integral heating of line. This allows the maximum utilization without unnecessary tripping.

Load shedding in case the demand deviates from the supply and outages shall be prevented

Siemens reclosers allow smart load shedding schemes. Whenever the network becomes weak, i.e. the demand is higher than the available supply, the voltage and frequency in the network will start to drop. A fast reaction within seconds is required to switch off certain parts of the line in order to reduce the load, keeping the main part network running and stable in total. The decision about dropping parts of the feeder will be made on 81 Under/overfrequency. They have certain settings for which frequency or voltage the network section shall be dropped.

Zero voltage closing for capacitor banks (single-triple recloser)

Capacitor banks are used in substations to compensate for voltage fluctuations. They have to be switched frequently and during voltage zero in order to eliminate stress on the equipment. A special zero voltage closing (ZVC) control in combination with single-triple recloser provides this function.

Broken conductor detection with focus on safety

Broken lines do always inherit the risk of someone getting hurt by touching a wire sitting isolated on the ground. A broken wire can be detected by comparing negative and positive phase sequences in the feeder. Whenever there is a NPS above a certain level it indicates broken wire, regardless of the location upstream or downstream.

Ring core CT supplement for accurate SEF protection in compensated networks

In compensated networks the current level in case of earth faults is very low. Ring core CTs are used in switchgear on cable feeders to determine the earth-fault current accurately. 3AD reclosers can be equipped with a ring core CT even when connected to overhead lines. A fourth current input stage at the controller is used to accurately measure sensitive earth-fault currents down to 0.1 A primary current. This is independant of the phase currents and provides a very accurate protection.

Standards

The recloser conforms to the following standards:

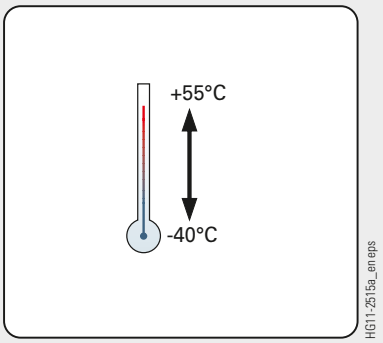
- IEC 62271-111 and IEEE C37.60
- IEC 60255
- IEC 62271-1

Ambient conditions

The recloser is designed for the normal operating conditions defined in IEC 62271-111/IEEE C37.60. This comprises an ambient temperature from –40 °C to +55 °C plus solar radiation.

The Siemens vacuum recloser is designed for environments with extremely high pollution according to the IEC Level 4.

The 3AD design successfully passed the environmental test in KIPTS*.



Altitude correction factor

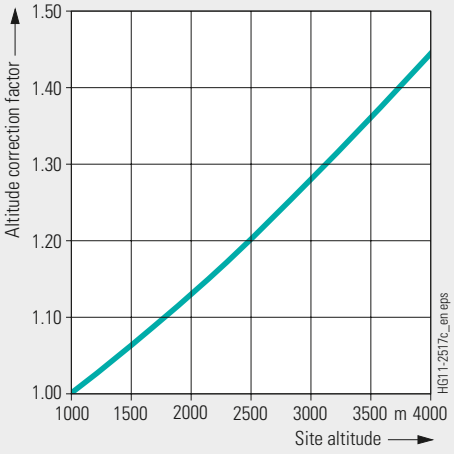
The dielectric strength of air insulation decreases with increasing altitude due to low air density. The rated lightning impulse withstand voltage values specified in the chapter "Technical Data" apply to a site altitude of 1000 m above sea level. For an altitude above 1000 m, the insulation level must be corrected according to the drawing as per IEC 62271-1.

The characteristic shown applies to the rated short-duration power-frequency withstand voltage and the rated lightning impulse withstand voltage.

To select the devices, the following applies:

$U \geq U_0 \times K_a$

U Rated withstand voltage under standard reference atmosphere
U_0 Rated withstand voltage requested for the place of installation
K_a Altitude correction factor according to the opposite diagram



Example

For a requested rated lightning impulse withstand voltage of 75 kV at an altitude of 2500 m, an insulation level of 90 kV under standard reference atmosphere is required as a minimum:

90 kV ≥ 75 kV x 1.2

Number of operating cycles

The switch unit of the 3AD vacuum recloser is maintenance-free for 10,000 operating cycles.

According to the standard IEC 62271-111/IEEE C37.60, the recloser has been type tested for 116 short-circuit breaking operations. The actual number of short-circuit breaking operations at maximum current can be up to 300 operations.

*) Koeberg Insulator Pollution Test Station (KIPTS), environmental testing facility run by ESKOM Electric Utility, South Africa

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Product range overview

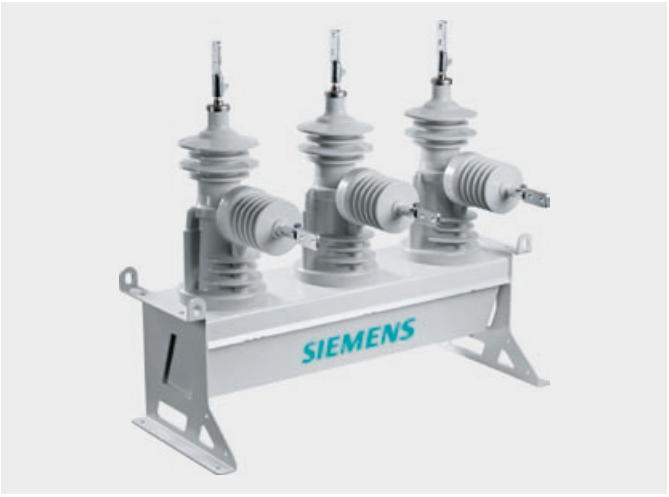
Rated voltage	Rated short-circuit breaking current	Rated lightning impulse withstand voltage	Rated normal current			
kV	kA	kV	200 A	400 A	630 A	800 A
12	12.5	75	■	■	■	■
15.5	12.5	110	■	■	■	■
	16	110			■	■
27	12.5	125	■	■	■	■
	12.5	150	■	■	■	■
	16	150			■	■
38	12.5	170			■	■
	16	170			■	■

Scope of delivery

	Standard equipment	Optionally available	Remarks
Switch unit			
Operating mechanism	Electrical operating mechanism (magnetic actuator)		
Operating mechanism housing	Mild steel with outdoor protection coating, IP 55	Stainless steel	
Switching medium	Vacuum interrupters		
Insulation	Solid insulation – Cycloaliphatic epoxy resin		
Power supply	Auxiliary power input 110–240 V AC or DC		Auxiliary transformer for supply from HV line optionally available
Position indicator	OPEN: green/CLOSED: red	Customer-specific color or inscription	
Operations counter	Mechanical operations counter in the switch unit; electronical trip counters in the controller		
Interlocking	Electrical; mechanical lockout		
Configuration	Pole mounting frame and 6 m control cable	Other cable lengths and/or substation frame	
Sensors	Integrated current transformers	Additional integrated voltage sensors	
Connection	Threaded stud 3/4"-10UNC-2B	Terminal connectors 2-hole-Nema-Pad Cable connectors	
Control cubicle			
Socket outlet	American/Brazilian Standard for AC, voltage as per auxiliary power input	Country-specific design	
Programmable LEDs	8 user-definable LEDs	16 LEDs	
Controller size	E10 (= 10" wide)	E12 (= 12" wide)	
Number of inputs/outputs for customer use	4 x BI, 7 x BO	Additional BI/BO	BI: E10 case: 4, 14, 24 E12 case: 24, 34 BO: E10 case: 7, 15, 7 E12 case: 15, 23
Operator panel	5 navigation keys, 12 function keys, 2 pushbuttons	Customer-specific pushbuttons or rotary CLOSE/OPEN switches	
Controller interfaces	USB (front), RS485 (rear)	RS232, fiber optic, IRIG-B (rear), key switch for local and remote	
Protection and monitoring functions	27/59 Under / overvoltage, 27 Sag / 59 Swell, 37 Undercurrent, 46BC Broken conductor / phase unbalance, 46NPS Negative phase-sequence overcurrent, 47NPS Negative phase-sequence overvoltage, 49 Thermal overload, 50BF Circuit-breaker fail, 51V Voltage dependent overcurrent, 59N Neutral voltage displacement, 60CTS CT supervision, 60VTS VT supervision, 67/50 Directional instantaneous phase fault overcurrent, 67/50G Directional instantaneous earth fault, 67/51 Directional time delayed phase fault overcurrent, 67/51G Directional time delayed earth fault, 67/50SEF Directional instantaneous sensitive earth fault, 67/51SEF Directional time delayed sensitive earth fault, 74TC Trip-circuit supervision, 74TC Circuit-breaker close fail, 79 Auto-reclose, 81 Under / overfrequency, 81HBL2 Inrush restraint, 86 Lockout, Battery and capacitor test, Cold load pickup, Programmable logic	Loop automation, Single/triple pole autoreclose, Fault Locator (on request), 25 Synchronising	
Enclosure	Mild steel with outdoor protection coating IP 65	Stainless steel	
LV terminal blocks and wiring	Wired for operation	CT-test disconnector terminal blocks	
Temperature range	–30 °C to +55 °C	–40 °C to +50 °C	

R-HG11-331.eps

Control cubicle



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Switch unit

R-HG11-326.eps

Pole mounting frame (different designs available)

Contents Page

2

Order number structure

The vacuum reclosers consist of a primary part as well as of a controller or secondary part. The relevant data make up the 16-digit order number. The primary part covers the main electrical data of the circuit-breaker poles. The controller and secondary part covers all auxiliary devices and the controller, which are necessary for operating and controlling the recloser.

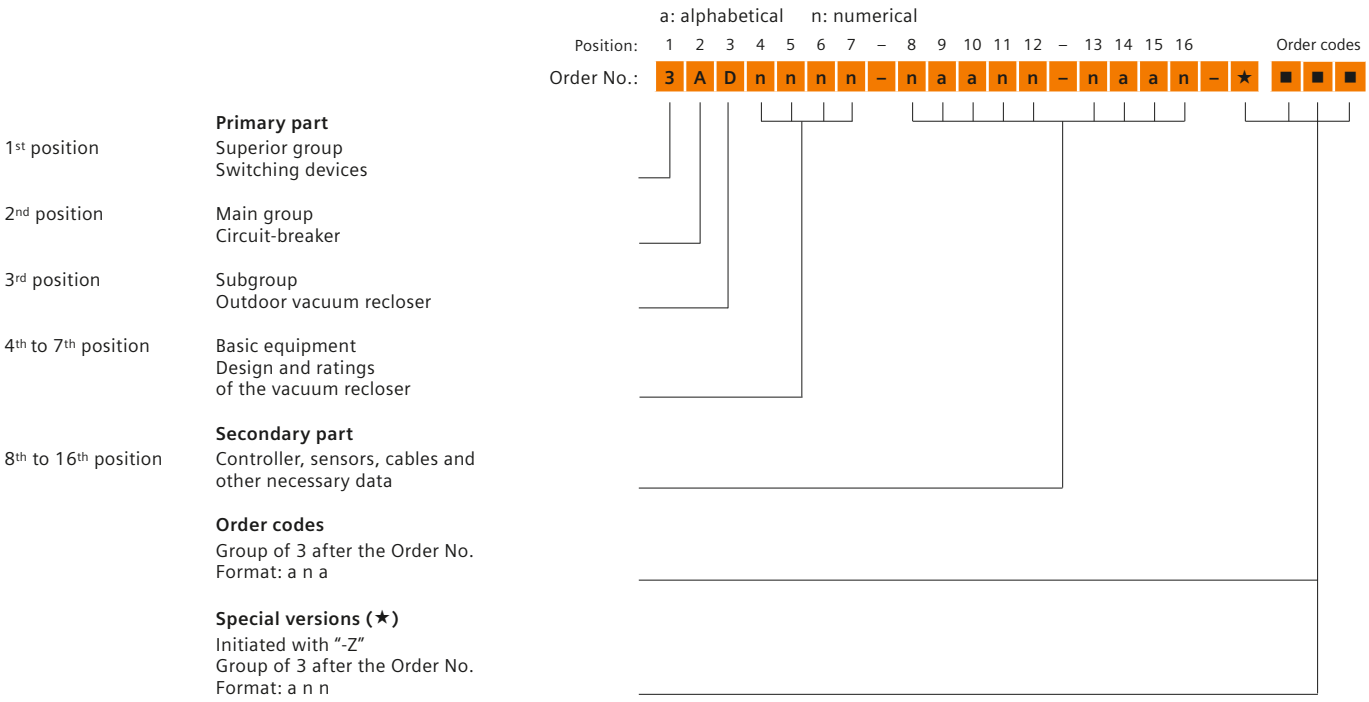
Order codes

Individual equipment versions, marked with **9** or **Z** in the 8th to 16th position, are explained more in detail by a 3-digit order code. Several order codes can be added to the order number in succession and in any sequence.

Special versions

In case of special versions, "**-Z**" is added to the order number and a descriptive order code follows. If several special versions are required, the suffix "**-Z**" is listed only once. If a requested special version is not in the catalog and can therefore not be ordered via order code, it has to be identified with **Y 9 9** after consultation. The agreement hereto is made between your responsible sales partner and the order processing department in our Switchgear Factory in Berlin.

2



Configuration example

In order to simplify the selection of the correct order number for the requested recloser type, you will find a configuration example on each page of the chapter "Product Selection". For the selection of the auxiliary voltages, the fixing options, the controller, etc. always the last example of the primary part was taken over and continued, so that at the end of the equipment selection (page 24) a completely configured recloser results as an example.

On the foldout page we offer a configuring aid. Here you can fill in the order number you have determined for your recloser.

Example for Order No.:	3	A	D	3	2	3	2	–	■	■	■	■	■	–	■	■	■	■						
Order codes:																								

Product Selection
Selection of primary ratings

12 kV
50/60 Hz

Position:	1	2	3	4	5	6	7	–	8	9	10	11	12	–	13	14	15	16		Order codes
Order No.:	3	A	D	■	■	■	■	–	■	■	■	■	■	–	■	■	■	■	–	★	■ ■ ■

Rated voltage U_r kV	Rated lightning impulse withstand voltage U_p kV	Rated short-duration power-frequency withstand voltage U_d kV	Rated short-circuit breaking current I_{sc} kA	Rated normal current I_r A	Type Three-phase																			
																				See page 21	See page 21	See page 21	See page 22	See page 22	See page 22	See page 23	See page 23	See page 23	See page 24	
12	75	42	12.5	**200**	■	3	A	D	3	1	2	6																		
				400	■	3	A	D	3	1	2	1																		
				630	■	3	A	D	3	1	2	2																		
				800	■	3	A	D	3	1	2	3																		

15.5 kV
50/60 Hz

U_r kV	U_p kV	U_d kV	I_{sc} kA	I_r A																										
15.5	110	50	12.5	**200**	■	3	A	D	3	2	2	6																		
				400	■	3	A	D	3	2	2	1																		
				630	■	3	A	D	3	2	2	2																		
				800	■	3	A	D	3	2	2	3																		
			16	**630**	■	3	A	D	3	2	3	2																		
				800	■	3	A	D	3	2	3	3																		

Configuration example

Siemens vacuum recloser 3AD — 3 A D

Rated voltage U_r = **15.5 kV**

Rated lightning impulse withstand voltage U_p = **110 kV**

Rated short-duration power-frequency withstand voltage U_d = **50 kV**

Rated short-circuit breaking current I_{sc} = **16 kA**

Rated normal current I_r = **630 A**

Type: Three-phase — 3 2 3 2

Example for Order No.:	3	A	D	3	2	3	2	–	■	■	■	■	■	–	■	■	■	■												
Order codes:																														

2

Product Selection

Selection of primary ratings



27 kV

50/60 Hz

Position:	1	2	3	4	5	6	7	–	8	9	10	11	12	–	13	14	15	16		Order codes		
Order No.:	3	A	D	■	■	■	■	–	■	■	■	■	■	–	■	■	■	■	–	★	■	■	■

Rated voltage U_r kV	Rated lightning impulse withstand voltage U_p kV	Rated short-duration power-frequency withstand voltage dry U_d kV	Rated short-circuit breaking current I_{sc} kA	Rated normal current I_r A	Type Three-phase																				
									See page 21	See page 21	See page 21	See page 22	See page 22		See page 22	See page 23	See page 23	See page 23		See page 24			
27	125	60	12.5	**200**	■	3	A	D	3	3	2	6													
				400	■	3	A	D	3	3	2	1													
				630	■	3	A	D	3	3	2	2													
				800	■	3	A	D	3	3	2	3													
	150 [1]	70 [1]	12.5	**200**	■	3	A	D	3	4	2	6											T	7	0
				400	■	3	A	D	3	4	2	1											T	7	0
				630	■	3	A	D	3	4	2	2											T	7	0
				800	■	3	A	D	3	4	2	3											T	7	0
	150	70	16	**630**	■	3	A	D	3	4	3	2													
				800	■	3	A	D	3	4	3	3													

38 kV

50/60 Hz

U_r kV	U_p kV	U_d kV	I_{sc} kA	I_r A																					
38	170	70	12.5	**630**	■	3	A	D	3	5	2	2													
				800	■	3	A	D	3	5	2	3													
			16	**630**	■	3	A	D	3	5	3	2													
				800	■	3	A	D	3	5	3	3													

1) For external insulation, for high altitude application

Configuration example

Siemens vacuum recloser 3AD

Rated voltage U_r = **38 kV**

Rated lightning impulse withstand voltage U_p = **170 kV**

Rated short-duration power-frequency withstand voltage U_d = **70 kV**

Rated short-circuit breaking current I_{sc} = **16 kA**

Rated normal current I_r = **800 A**

Type: Three-phase

Example for Order No.:	3	A	D	3	5	3	3	–	■	■	■	■	■	–	■	■	■	■							
Order codes:																									

Product Selection
Selection of controller



	Position:	1	2	3	4	5	6	7	–	8	9	10	11	12	–	13	14	15	16		Order codes		
8th position **Recloser configuration**	Order No.:	3	A	D	■	■	■	■	–	■	■	■	■	■	–	■	■	■	■	–	★	■	■	■
Options													See page 22	See page 22		See page 22	See page 23	See page 23	See page 23		See page 24			
Recloser for pole mounting [1] incl. cubicle, controller and control cable										1														
Recloser for substation application incl. cubicle and controller										2														
Switch unit only (w/o cubicle, controller and control cable) [2]										3		Y	0	0		0	Y	Y					
Control cubicle only										4														

1) Pole mounting according to list of accessories
2) Configuration via 4th to 7th position

9th position
Current and voltage measuring

Current transformers 1 integrated CT per pole	Voltage sensors 1 integrated sensor per pole (including sensor cables)																							
■												A												
■	■											B												

10th position
Controller size

Controller size		Function keys	Number of tri-color LEDs		Number of binary inputs (partly for customer use)				Number of binary outputs (partly for customer use)															
E10	E12	12	8	16	13	23	33	43	14	22	30													
■		■	■		■				■			A												
■		■	■			■				■		B												
■		■	■				■		■			C												
	■	■		■			■				■	D												
	■	■		■				■		■		E												
	■	■		■			■				■	H												
For loop automation																								
■		■	■			■				■		F												
■		■	■		■				■			G												
Without controller (switch unit only)												Y												

Configuration example

Siemens vacuum recloser 3AD		3	A	D																				
(U_r = **27 kV**, U_p = **125 kV**, U_d = **60 kV**, I_{sc} = **12.5 kA**, I_r = **400 A**)																								
Type: Three-phase					3	3	2	1	–															
Recloser for pole mounting incl. cubicle, controller and control cable										1														
Current and voltage measuring: Current transformers, 1 integrated CT per pole											A													
Controller size: E12, 12 function keys, 16 tri-color LEDs, 33 binary inputs, 30 binary outputs												D												
Example for Order No.:		3	A	D	3	3	2	1	–	1	A	D	■	■	–	■	■	■	■			■	■	■
Order codes:																								

2

Product Selection

Selection of controller



Position:	1	2	3	4	5	6	7	–	8	9	10	11	12	–	13	14	15	16		Order codes		
Order No.:	3	A	D	■	■	■	■	–	■	■	■	■	■	–	■	■	■	■	–	★	■	■	■

11th position
Auxiliary voltage

DC voltage	AC voltage	11th position	14	15	16	17	Order codes
			See page 23	See page 23	See page 23	See page 24	
48 V		1					
110 V		3					
220 V		4					
	110/120 V	5					
	220/240 V	6					

12th position
Control and sensor cables

Options	12th position	Order codes
Without	0	
Cable length 6 m	1	
Cable length 9 m	2	
Cable with special length (to be specified in clear text)	9	Y 9 9

13th position
Communication protocols

Options	13th position
Without communication protocol (switch unit only)	0
IEC 60870-5-103, MODBUS RTU and DNP 3	2
IEC 60870-5-103 / 101, MODBUS RTU	3

Configuration example

Siemens vacuum recloser 3AD
(U_r = **27 kV**, U_p = **125 kV**, U_d = **60 kV**, I_{sc} = **12.5 kA**, I_r = **400 A**)
Type: Three-phase
Auxiliary voltage 110/120 V AC
Length of control and sensor cable 6 m
Communication protocol IEC 60870-5-103, MODBUS RTU and DNP 3

	3	A	D																				
				3	3	2	1	–	1	A	D												
												5											
													1										
														–	2								
Example for Order No.:	3	A	D	3	3	2	1	–	1	A	D	5	1	–	2	■	■	■					
Order codes:																							

Product Selection
Selection of controller



14th position
Communication interfaces

1 x USB (front)	1 x RS485 (rear)	2 x RS485 (rear)	1 x RS232 (rear)	1 x IRIG-B	2 x optical		Order codes
■	■					A	
■	■			■	■	B	
■		■		■		C	
■	■		■	■		D	
Without communication interface (switch unit only)						Y	

15th position
Function packages

Options		Order codes
Standard protection and monitoring functions	A	
Standard protection and monitoring functions for loop automation	D	
Standard protection and monitoring functions synchronizing, synchronizing check	E	
Without protection functions (switch unit only)	Y	

16th position
Languages

Languages of operating instructions and nameplate		Order codes
English (UK, IEC)	1	
English (USA, ANSI)	2	
Spanish	3	
Portuguese	4	

Configuration example

	Position: 1 2 3 4 5 6 7 – 8 9 10 11 12 – 13 14 15 16		Order codes
Siemens vacuum recloser 3AD	3 A D		
(U_r = **27 kV**, U_p = **125 kV**, U_d = **60 kV**, I_{sc} = **12.5 kA**, I_r = **400 A**)			
Type: Three-phase	3 3 2 1 – 1 A D 5 1 – 2		
Communication interfaces 1 x USB, 2 x RS485, 1 x IRIG-B		C	
Controller with standard protection and monitoring functions		A	
Language of operating instructions and nameplate: English (USA, ANSI)		2	
Example for Order No.:	3 A D 3 3 2 1 – 1 A D 5 1 – 2	C A 2	
Order codes:			

Selection of additional equipment

	Position:	1	2	3	4	5	6	7	–	8	9	10	11	12	–	13	14	15	16			Order codes		
	Order No.:	3	A	D	■	■	■	■	–	■	■	■	■	■	–	■	■	■	■	–	★	■	■	■
Switch unit options																								
Stainless steel																				–	Z	T	0	1
Position indicator with interchanged colors “green: recloser on, red: recloser off”																				–	Z	T	0	7
Terminal connectors 2-hole-Nema-Pad																				–	Z	T	8	0
Cable connectors																				–	Z	T	8	1
3 NO + 3 NC auxiliary contacts for switch unit																				–	Z	T	5	0
Cubicle options																								
Ambient temperature down to –40 °C																				–	Z	A	3	8
Stainless steel																				–	Z	T	0	1
Cubicle connectors protection cover (vandalism protection)																				–	Z	T	0	8
Door open contact and cubicle lighting																				–	Z	T	1	0
Bluetooth modem																				–	Z	T	3	0
Quadband GPRS/GSM-modem																				–	Z	T	3	1
Serial to Ethernet converter																				–	Z	T	0	3
Key-operated switch in CC, function programmable																				–	Z	T	5	1
24 V power output (max. 15 W) for additional devices																				–	Z	T	5	3
12 V power output (max. 15 W) for additional devices																				–	Z	T	5	4
Power outlet / German standard																				–	Z	T	1	1
Power outlet / British standard																				–	Z	T	1	2
Power outlet / Australian / New Zealand standard																				–	Z	T	1	3
CT-test disconnector terminal blocks																				–	Z	T	5	6
Mounting frames																								
Pole mounting frame																				–	Z	T	2	0
Pole mounting frame with provision for surge arresters																				–	Z	T	2	1
Substation frame																				–	Z	T	2	9
Substation frame with provision for surge arresters																				–	Z	T	2	8
Pole mounting frame for 1 VT / CT																				–	Z	T	2	4
Pole mounting frame for 3 VTs / CTs																				–	Z	T	2	5
Pole mounting frame kit (threaded bolt + nuts)																				–	Z	T	2	6
Special functions																								
Preparation for ring core CT supplement (for accurate SEF protection in compensated networks)																				–	Z	T	6	0
Zero voltage closing for capacitor banks (single-triple recloser, on request)																				–	Z	T	6	1

Configuration example

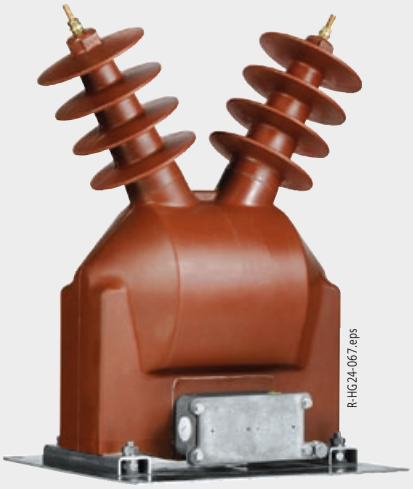
Siemens vacuum recloser 3AD	3	A	D																					
Rated voltage U_r = **27 kV**																								
Rated lightning impulse withstand voltage U_p = **125 kV**																								
Rated short-duration power-frequency withstand voltage U_d = **60 kV**																								
Rated short-circuit breaking current I_{sc} = **12.5 kA**																								
Rated normal current I_r = **400 A**																								
Type: Three-phase				3	3	2	1	–																
Recloser for pole mounting incl. control cubicle and control cable									1															
Current and voltage measuring: Current transformers, 1 CT integrated per pole										A														
Controller size: E12, 12 function keys, 16 tri-color LEDs, 33 binary inputs, 30 binary outputs											D													
Auxiliary voltage 110/120 V AC												5												
Length of control and sensor cable 6 m													1	–										
Communication protocol IEC 60870-5-103, MODBUS RTU and DNP 3															2									
Communication interfaces 1 x USB, 2 x RS485, 1 x IRIG-B																C								
Controller with standard protection and monitoring functions																	A							
Language of operating instructions and nameplate: English (USA, ANSI)																		2						
Door open contact and cubicle lighting																				–	Z	T	1	0
Stainless steel for tank and control cubicle																				–	Z	T	0	1
Example for Order No.:	3	A	D	3	3	2	1	–	1	A	D	5	1	–	2	C	A	2	–	Z				
Order codes:	T	1	0	+	T	0	1																	

Instrument transformers

Instrument transformers are a prerequisite for measuring high voltages or currents and are providing auxiliary supply. This equipment is available on request.

Surge arresters and limiters

Surge arresters and limiters protect operational equipment from overvoltages caused by lightning strikes in overhead lines and switching operations. The arresters are mounted between phase and earth. We strongly suggest to install surge arresters on both load and source side of the recloser. This equipment is available on request.



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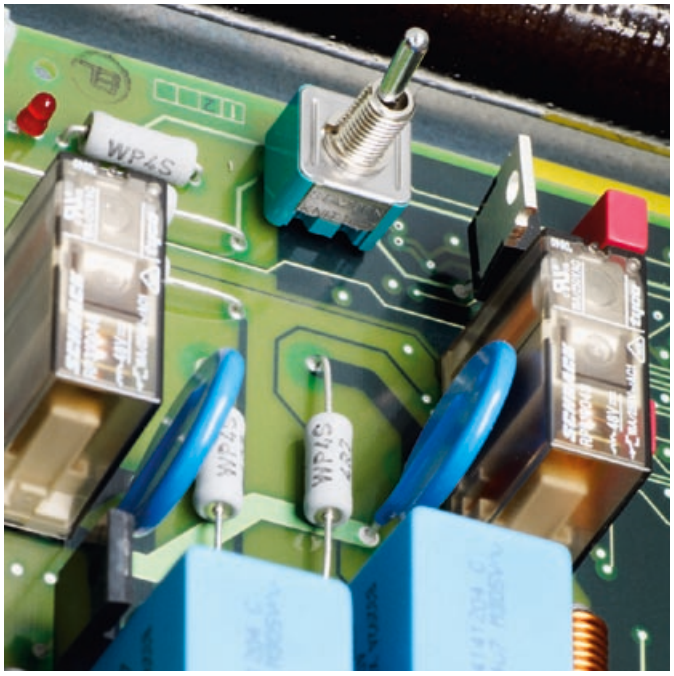

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Switch unit driver – discharge switch for the capacitor

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Controller

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12 kV 50/60 Hz Order No.	Rated normal current I_r A	Rated operating sequence: O - 0.2s - CO - 2s - CO - 2s - CO (-30s - CO) - Lockout 	Rated duration of short-circuit t_k s	Rated short-circuit breaking current I_{SC} kA	Rated short-circuit making current I_{ma} kA	Rated lightning impulse withstand voltage * U_p kV	Rated short-duration power-frequency withstand voltage * U_d kV	Impedance µΩ between connections µΩ	Creepage distance, phase-to-earth mm	Clearance, phase-to-phase mm	Minimum clearance, phase-to-earth mm	Weight kg	Line charging current A	Cable charging current A	Max. interrupting time/max.closing time ms
3AD3 126 ...	200	■	3	12.5	31.5	75	42	40	810	312	265	142	2	10	50/60
3AD3 121 ...	400	■	3	12.5	31.5	75	42	40	810	312	265	142	2	10	50/60
3AD3 122 ...	630	■	3	12.5	31.5	75	42	40	810	312	265	142	2	10	50/60
3AD3 123 ...	800	■	3	12.5	31.5	75	42	40	810	312	265	142	2	10	50/60

15.5 kV 50/60 Hz	I_r A		t_k s	I_{SC} kA	I_{ma} kA	U_p kV	U_d kV	µΩ	mm	mm	mm	kg	A	A	ms
3AD3 226 ...	200	■	3	12.5	31.5	110	50	40	810	312	265	142	2	10	50/60
3AD3 221 ...	400	■	3	12.5	31.5	110	50	40	810	312	265	142	2	10	50/60
3AD3 222 ...	630	■	3	12.5	31.5	110	50	40	810	312	265	142	2	10	50/60
3AD3 223 ...	800	■	3	12.5	31.5	110	50	40	810	312	265	142	2	10	50/60
3AD3 232 ...	630	■	3	16	40	110	50	40	810	312	265	142	2	10	50/60
3AD3 233 ...	800	■	3	16	40	110	50	40	810	312	265	142	2	10	50/60

■ Standards according to IEC 62271-100 and IEEE C37.60
* Partial-discharge free

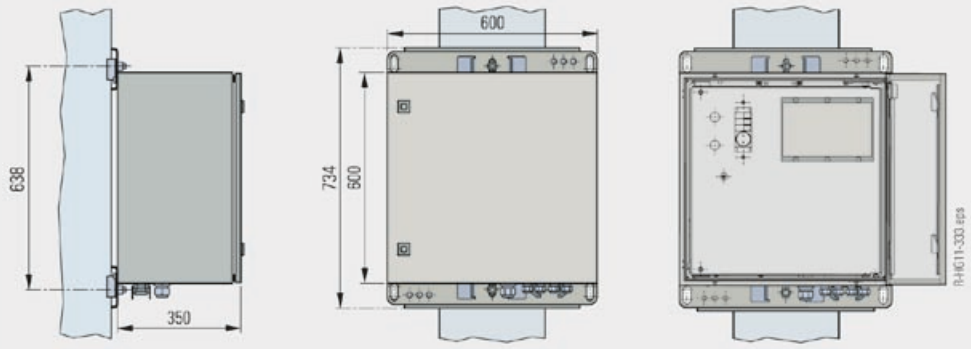
27 kV 50/60 Hz Order No.	**Rated normal current** I_r A	Rated operating sequence: O - 0.2s - CO - 2s - CO - 2s - CO (-30s - CO) - Lockout	Rated duration of short-circuit t_k s	Rated short-circuit breaking current I_{SC} kA	Rated short-circuit making current I_{ma} kA	Rated lightning impulse withstand voltage U_p kV	Rated short-duration power-frequency withstand voltage U_d kV	Impedance µΩ between connections µΩ	Creepage distance, phase-to-earth mm	Clearance, phase-to-phase mm	Minimum clearance, phase-to-earth mm	Weight kg	Line charging current A	Cable charging current A	Max. interrupting time/max.closing time ms
3AD3 326 ...	200	■	3	12.5	31.5	125	60	40	810	312	265	142	5	25	50/60
3AD3 321 ...	400	■	3	12.5	31.5	125	60	40	810	312	265	142	5	25	50/60
3AD3 322 ...	630	■	3	12.5	31.5	125	60	40	810	312	265	142	5	25	50/60
3AD3 323 ...	800	■	3	12.5	31.5	125	60	40	810	312	265	142	5	25	50/60
3AD3 426 ... Z T70	200	■	3	12.5	31.5	150 [1]	70 [1]	40	810	312	265	142	5	25	50/60
3AD3 421 ... Z T70	400	■	3	12.5	31.5	150 [1]	70 [1]	40	810	312	265	142	5	25	50/60
3AD3 422 ... Z T70	630	■	3	12.5	31.5	150 [1]	70 [1]	40	810	312	265	142	5	25	50/60
3AD3 423 ... Z T70	800	■	3	12.5	31.5	150 [1]	70 [1]	40	810	312	265	142	5	25	50/60
3AD3 432 ...	630	■	3	16	40	150	70	40	1290	312	340	142	5	25	50/60
3AD3 433 ...	800	■	3	16	40	150	70	40	1290	312	340	142	5	25	50/60

38 kV 50/60 Hz	I_r A		t_k s	I_{SC} kA	I_{ma} kA	U_p kV	U_d kV	µΩ	mm	mm	mm	kg	A	A	ms
3AD3 522 ...	630	■ [2]	3	12.5	31.5	170	70	50	1290	312	340	155	5	40	50/60
3AD3 523 ...	800	■ [2]	3	12.5	31.5	170	70	50	1290	312	340	155	5	40	50/60
3AD3 532 ...	630	■ [2]	3	16	40	170	70	50	1290	312	340	155	5	40	50/60
3AD3 533 ...	800	■ [2]	3	16	40	170	70	50	1290	312	340	155	5	40	50/60

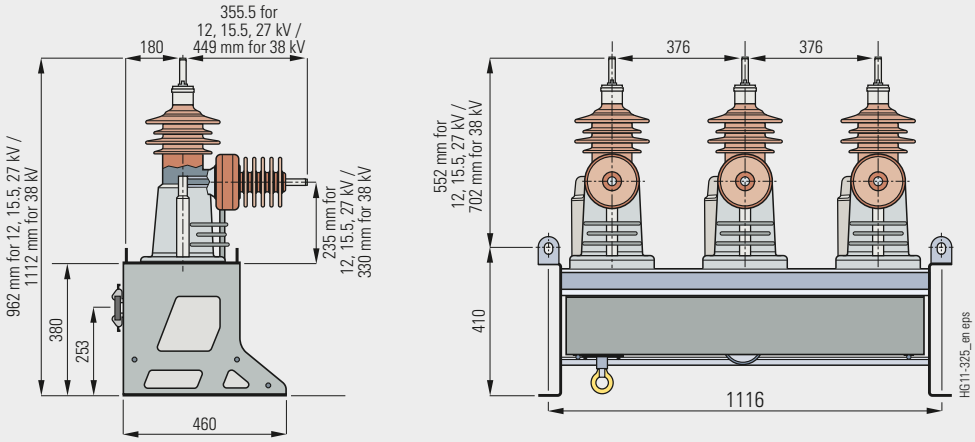
■ Standards according to IEC 62271-100 and IEEE C37.60
1) For external insulation, for high altitude application
2) Rated operating sequence: O - 0.2s - CO - 3s - CO - 3s - CO (-30s - CO) - Lockout

3

Dimension drawings

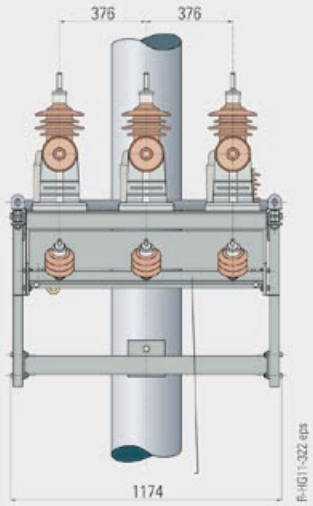


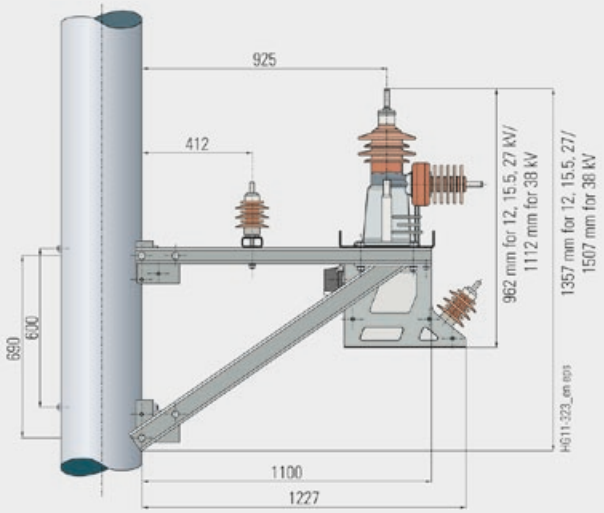
Dimensions of control cubicle

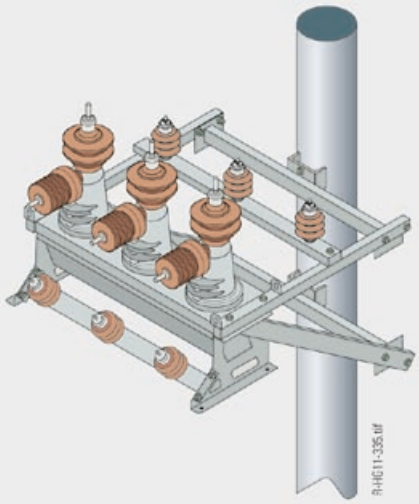


Dimensions of three-phase switch unit

Dimension drawings

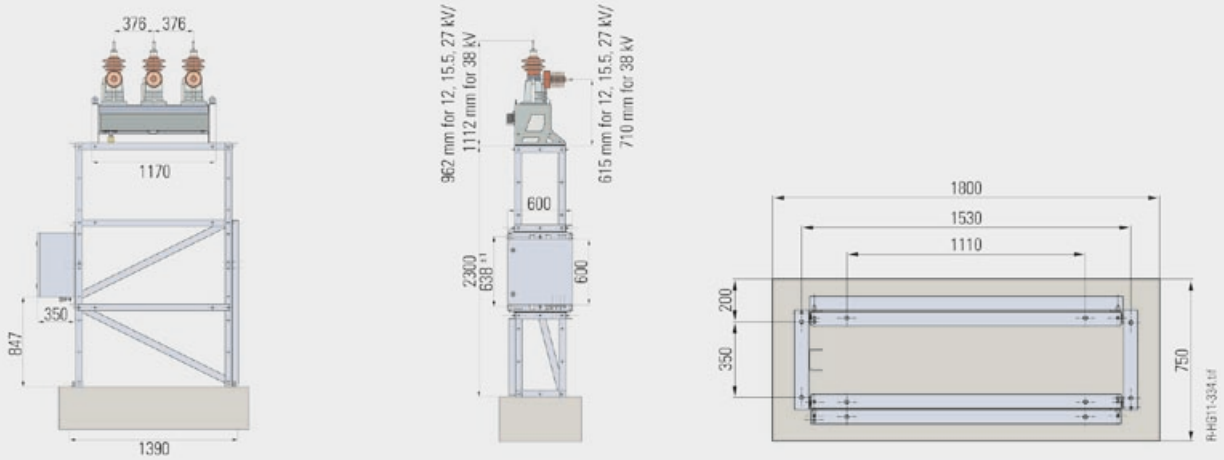






Dimensions of three-phase switch unit with pole mounting frame (standard version with surge arrester brackets)

Dimension drawings



Dimensions of three-phase switch unit with substation frame

3

R-HG11-181.eps

Brandenburg Gate, Berlin, Germany

R-HG11-180.eps

Switchgear Factory in Berlin, Germany

Contents | Page

4

Annex
Inquiry form

Please copy, fill in and return to your Siemens partner

Inquiry concerning

☐ Siemens vacuum recloser 3AD

Please

☐ Submit an offer
☐ Call us
☐ Visit us

Your address

Company

Dept.

Name

Street

Postal code / city

Country

Phone

Fax

E-mail

Siemens AG

Dept.

Name

Street

Postal code / city

Fax

Technical data

				Other values
Rated voltage	☐ 12 kV ☐ 27 kV	☐ 15.5 kV ☐ 38 kV		
Rated lightning impulse withstand voltage	☐ 75 kV ☐ 150 kV	☐ 110 kV ☐ 170 kV	☐ 125 kV	☐ ___ kV
Rated short-duration power-frequency withstand voltage (dry)	☐ 42 kV ☐ 70 kV	☐ 50 kV	☐ 60 kV	☐ ___ kV
Rated short-circuit breaking current	☐ 12.5 kA	☐ 16 kA		
Rated normal current	☐ 200 A ☐ 800 A	☐ 400 A	☐ 630 A	

Secondary equipment

For possible combinations see pages 21 to 23

Recloser configuration	☐ Recloser for pole mounting ☐ Without control cubicle	☐ Control cubicle made of stainless steel ☐ Others		☐ Application in substation
Current and voltage measuring	☐ Integrated current transformers	☐ Integrated voltage sensors		
Auxiliary voltage	☐ ___ V DC			☐ ___ V AC, ___ Hz
Control and sensor cables	☐ Without	☐ 6 m	☐ 9 m	☐ ___ m
Communication interfaces	☐ USB ☐ Optical	☐ RS485 ☐ IRIG-B		☐ RS232
Function packages additional to standard functions	☐ Synchronizing, synchronizing check	☐ Fault locator		☐ Loop automation
Languages of operating instructions and nameplate	☐ English (UK) ☐ English (USA)	☐ Spanish		☐ Portuguese

Application and other requirements

☐ Please check off ___ Please fill in

You prefer to configure your Siemens vacuum recloser 3AD on your own?

Please follow the steps for configuration and enter the order number in the configuration aid.
Alternatively you can also use your prompted online configurator under www.siemens.com/energy.

Instruction for configuration of the Siemens vacuum recloser 3AD

1st step: Definition of the primary part (see pages 19 and 20)

Please specify the following ratings:	Possible options:
Rated voltage (U_r)	U_r: 12 kV to 38 kV
Rated lightning impulse withstand voltage (U_p)	U_p: 75 kV to 170 kV
Rated short-duration power-frequency withstand voltage (U_d)	U_d: 42 kV to 70 kV
Rated short-circuit breaking current (I_{SC})	I_{SC}: 12.5 kA and 16 kA
Rated normal current (I_r)	I_r: 200 A to 800 A

These ratings define the positions 4 to 7 of the order number.

2nd step: Definition of the secondary equipment (see pages 21 to 23)

Please specify the following equipment features:	Possible options:
Recloser configuration (position 8)	Recloser incl. control cubicle and cables, recloser without control cubicle and cables, CC only
Current and voltage measuring (position 9)	Integrated current transformers, integrated voltage sensors
Controller size (position 10)	Housing size, number of function keys and tri-color LEDs, number of available binary inputs and outputs
Auxiliary voltage (position 11)	Voltages from 48 V DC to 240 V AC
Cable length of control and sensor cables (position 12)	Standard length 6 m and 9 m, special lengths possible, no cable
Communication protocols (position 13)	IEC 60870-5-103, IEC 60870-5-101 and MODBUS RTU, DNP 3.0
Communication interfaces (position 14)	USB, RS485, RS232, IRIG-B, optical
Functions of the controller (position 15)	Standard protection and monitoring functions, synchronizing, fault locator (on request), loop automation
Language of operating instructions and nameplate (position 16)	English (UK and USA), Spanish and Portuguese

These equipment features define the positions 8 to 16 of the order number.

3rd step: Do you have any further requirements concerning the equipment? (Please refer to page 24)

Should you still need more options than the possible special equipment like country-specific power sockets, weather resistance down to –40 °C, stainless-steel design, etc. please contact your responsible sales partner.

For configuration of your
Siemens vacuum recloser 3AD

1	2	3	4	5	6	7	–	8	9	10	11	12	–	13	14	15	16		
3	A	D	■	■	■	■	–	■	■	■	■	■	–	■	■	■	■	–	Z
			See page 19	to		See page 20		See page 21	See page 21	See page 21	See page 22	See page 22		See page 22	See page 23	See page 23	See page 23		See page 24
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Fax: +49 180 524 24 71
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