

Motor and Generator Terminals REM 543/545



- Protects your investments
- Extensive protection for motors and generators
- Proven performance in challenging environments
- Easy to use user HMI interface
- Easy to configure for your applications
- Flexible connectivity and IEC 61850 support



The REM 543/545 terminals

are ideal for protection and control of your electric motors and power generators, offering ease of use and reliable, proven performance. With their wide range of communications and connectivity support, they can easily be integrated into your process or plant automation and supervision system.

For the complete protection of your valuable machines

The REM 543/545 terminals provide complete protection for rotating machines. The terminals are intended for large asynchronous and synchronous motors and for small and medium-sized power generators. The motor and generator terminals have been successfully employed in challenging environments, such as mines, mills, marine and off-shore, and in demanding applications including base-load and peak-power generating sets, pumps, fans and crushers.

The motor and generator terminals REM 543/545 have been certificated for marine and off-shore use by Det Norske Veritas (DNV), and have obtained type approval by Registro Italiano Navale (RINA), Lloyd's Register of Shipping and Germanischer Lloyd, as well as UL recognition by Underwrites Laboratories Inc.

One product – many possibilities

The REM 543/545 units provide you with integrated terminal technology including

protection, measuring, supervision, control and condition monitoring functions in the most cost-effective way. In one powerful package these terminals offer you all the functionality needed for managing all start-up, operation and disturbance situations of power generators and large motors. The terminals come in two software versions. The M version is used for asynchronous motors while the more advanced G version is packed with the most sophisticated functionality for power generators and large synchronous motors.

Easy adaptation

The terminals' user-friendly graphical configuration tools permit you to create your own application-specific configurations and MIMICs. Process status is shown on a dynamic graphical display. Detailed information on, for instance, measurements, events and application-specific alarms, are easily at hand on the display views.

Thanks to their comprehensive communication protocols, including widely

used industrial protocols such as Modbus and Profibus, the terminals can easily be integrated into various control systems.

Diverse and adaptable I/Os

The machine terminal measures three-phase currents and voltages via conventional current and voltage transformers. If preferred, the three-phase currents can be measured via highly linear current sensors of type Rogowski coils. Correspondingly, the three-phase voltages can be measured via sensors of type voltage dividers. Further, the terminals can be fitted with an optional I/O module featuring eight general use RTD/analog signal inputs and four analog mA outputs. The inputs can be used for measuring the winding, bearing or cooling air temperatures of the machine as well as the ambient temperature. The freely assignable analog mA outputs can be used to transfer measured or calculated

values to additional panel meters, co-operating automation systems, PLCs or the like.

Sophisticated local HMI

The relay is provided with a sophisticated local Human-Machine Interface to facilitate extensive local communication between the operator and the terminal. The backlit, graphic liquid crystal display has a resolution of 128 x 160 pixels. The large display surface is divided into two windows for display of alpha-numerical data, such as settings, measured and recorded values, alarms, etc as well as graphics like single-line diagrams of the switchgear lay-out. The informative display, the local control push-buttons and indicators give the operator full control of the terminal during start-up, operation and disturbance situations of the protected machine.

* RTD – Resistive thermal device

** PLC – Programmable logic controller



Innovative technology

REM 543/545 motor and generator terminals are part of ABB's substation automation concept and the RE500 series. Innovative solutions like IEC 61850 support and the simultaneous dual port communication offering flexible connectivity cater for all your communications needs and help to cover future demands.

Their common configuration, setting and monitoring tools offer you yet another benefit: you only need to learn how to use one of our products, because all of our RE500 series protection relays and monitoring and control terminals use the same technology.



You can download the connectivity package from www.abb.com/substationautomation



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Technical Data

REM 543/545

Protection functions	ANSI number
• 3I>, 3I>>, 3I>>>	50/51
3-phase non-directional overcurrent protection, 3 stages	
• 3I>->, 3I>>->, 3I>>>->	67
3-phase directional overcurrent protection, 3 stages	
• I(U)>, I(U)>>	51V
Voltage-dependent overcurrent protection, 2 stages	
• Z<, Z<<	21
3-phase underimpedance protection, 2 stages	
• I ₀ >, I ₀ >>, I ₀ >>>	50N/51G
3-phase non-directional earth-fault protection, 3 stages	
• I ₀ >->, I ₀ >>->, I ₀ >>>->	67N
3-phase directional earth-fault protection, 3 stages	
• U ₀ >, U ₀ >>, U ₀ >>>	59N
Residual overvoltage protection, 3 stages	
• P>->/ Q>->, P>>->/ Q>>->, P>>>->/ Q>>>->	32O
3-phase directional overvoltage protection, 3 stages	
• P<<->, P<<<->, P<<<<->	32R/32L
3-phase underpower/low forward power or reverse power protection, 3 stages	
• X<, X<<	40
Underexcitation protection, 2 stages	
• 3J	49M/49G/49T
3-phase thermal overload protection for motors, generators or transformers	
• I ₂ >, I ₂ >>	46
Negative-phase-sequence protection, 2 stages	
• 3U>, 3U>>	59
3-phase overvoltage protection, 2 stages	
• 3U<, 3U<<	27
3-phase undervoltage protection, 2 stages	
• U1<, U2>, U1>	27/47/59
3-phase sequence voltage protection, 2 stages	
• f<, f>, df/dt	81U/81O
Under- or overfrequency incl. rate of change, 5 stages	
• 3ΔI>	87G
3-phase stabilized differential protection for generators	
• 3ΔI>	87G/87M
High-impedance or flux-balanced based differential protection for generators and motors	
• ΔI ₀	87N
High-impedance based restricted earth-fault protection	
• 3I _{2f} >	68
3-phase transformer inrush and motor start-up detector	
• 3I _{s2t} >, n<	48/14/66
Start-up supervision for motors	
• 3I<, 3I<<	37
3-phase non-directional undercurrent protection, 2 stages	
• 3I↶, 3I↷	46R
Phase reversal protection	
• U/f>, U/f>>	24
Overexcitation protection, 2 stages	
• Synchro/voltage check	25
• Fuse failure supervision	60
• CBFP Circuit breaker failure protection	62 BF

Control

- Circuit breaker with indication, 2 instances
- Direct open for CBs via HMI
- Disconnecter with indication, 5 instances
- 3-state disconnecter with indication, 2 instances
- Object status indication, 8 instances
- On/off switch, 4 instances
- Control position selector (remote/local/logic)
- 8 Alarm LEDs with 3 colors and free text

Measurement functions

- 3I 3-phase current
- I₀, U₀ Neutral current, residual voltage
- 3U 3-phase voltage
- E/P/Q/pf 3-phase energy/power/power factor
- f System frequency
- Transient disturbance recorder

Inputs/outputs

- 15 or 25 freely assignable digital inputs
- 5 or 11 power outputs for trip/close control; 2 of them with trip circuit supervision
- 2 NO and 5 NO/NC signal outputs
- 8 RTD/mA inputs, e.g. Pt100, Ni120, Cu10 and 4 isolated analog outputs 0/4-20 mA

Energizing inputs

- Conventional CT/VT inputs or current/voltage sensors
- Several variants available, max 9 CT/VT inputs
- Up to 8 current transformers for 1A and 5A connection
- 1 current transformer for 0.2A and 1A connection
- Up to 4 voltage transformers for 100V-120V connection
- 9 inputs for current or voltage sensors

Communication & Connectivity

- SPA, LON®, MODBUS® RTU/ASCII⁽¹⁾, PROFIBUS DP⁽²⁾, IEC 61850⁽³⁾

- 1) Requires the use of RS-232 to RS-485 converter module RER 133
 - 2) With interface adapter SPA-ZC 302
 - 3) With interface adapter SPA-ZC 400
- Connectivity package

Condition monitoring

- Trip circuit supervision (TCS)
- Breaker wear
- Breaker traveltime
- Breaker operations counter
- Breaker inactive time
- Spring charging control
- Gas pressure
- Supervision of energizing inputs
- Scheduled maintenance
- Battery supervision
- Machine run time