Feeder Terminals REF 541/543/545





Supports your targets of supplying high-quality power

Enables preventive maintenance and shortened outage times

Adds value to asset management

Accurate fault location, condition monitoring

Control, operational data and monitoring all available at a glance

Flexible connectivity covers all your communications needs

IEC 61850 support and simultaneous dual port communication





Protection technology to support your goals

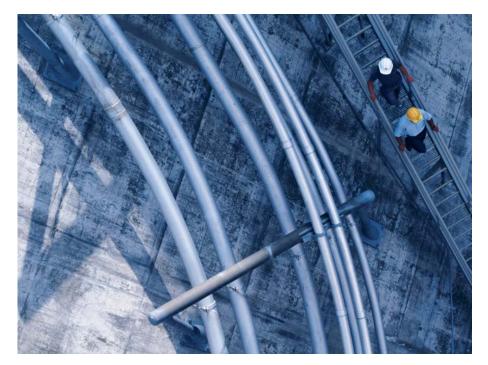
Based on proven technology, REF 541/543/545 Feeder Terminals provide you with a solution that supports both utility networks and industrial applications, including various network types and a variety of switchgear configurations. The REF feeder terminal supports your targets of supplying high-quality power and enabling efficient power system handling/management by providing suitable functions and comprehensive data exchange.

One product – lots of opportunities

REF 541/543/545 Feeder Terminals bring many benefits in a single package. For example, the impedance based fault locator for short circuits and earth faults significantly shortens outage times by reducing field work and enhancing the accuracy of network control. Condition monitoring paves the way for preventive maintenance adding value to asset management. Measurement and control functions enhance network operation and management by, for example, providing comprehensive power quality data. The comprehensive protection functionality is available in standard configuration solutions. These can also be modified to meet specific requirements thanks to the unrivalled flexibility of the terminal.

Cost-effective and comprehensive

REF 541/543/545 protection and control technology combines several functions in one unit. Control, operational data and monitoring are all available at a glance. Everything from process metrics to the condition of the power system equipment is fully covered. By integrating multiple functions into the same unit, you achieve cost effectiveness, high system reliability, safety and operability. Connectivity of REF 541/543/545 terminals to an up-level system is simplified considerably with the help of a connectivity package. Thus engineering times are reduced drastically.







Innovative technology

The REF 541/543/545 Feeder Terminal is part of ABB's substation automation concept and the ABB RE500 series. Innovative solutions like IEC 61850 support and simultaneous dual port communication meet all your system requirements. The flexible connectivity caters for all your communications needs and helps 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 REF 541/543/545

Fault indication and protection functions	ANSI numbe
• 3I>, 3I>>, 3I>>>	50/51/51B
3-phase non-directional overcurrent,	
• 3 >»→, 3 >>»→	67
3-phase directional overcurrent, 3 sta • I ₀ >, I ₀ >>, I ₀ >>>	50N/51N
Non-directional earth-fault, 3 stages	0014/0114
• I ₀ > →, I ₀ >> →, I ₀ >>> →	67N
Directional earth-fault, 3 stages	5011
• U ₀ >, U ₀ >>, U ₀ >>>	59N
Residual overvoltage, 3 stages • 3	49F
3-phase thermal overload (feeders &	
• 3U>, 3U>>	[′] 59
3-phase overvoltage, 2 stages	
• 3U<, 3U<< 3-phase undervoltage, 2 stages	27
• f <, f >, \(\Delta f \) \(\Delta t \)	81U/81O
Under- or overfrequency incl. rate of	
stages	79
• 0→1	
Auto-reclosing • SYNC	25
Syncro-check/voltage check, 2 stage	es 68
• 31 ² f>	,,,
3-phase inrush current detector	46
• <u>A</u> >	4014/400/407
Phase discontinuity • 3 1	49M/49G/49T
3-phase thermal overload protection	for devices
• ls ² t, n<	27/47/59
Start-up supervision for motors	
• U1<, U1>, U2>	0.040000
3-phase sequence voltage protection	ı, ∠ stages
ODED 61 11 1 5 11	

- CBFP Circuit breaker failure
 Capacitor bank protection
 3-phase thermal overload protection
 Current unbalance protection
 Capacitor bank control
 Power factor controller

- trunctions
 3-phase current
 Neutral current
 3-phase voltage
 Residual voltage
 3-phase power and
 energy (incl. cos \(\pi \))
 System frequency
 Transient disturbance recorder
 Measurement
 of RTD/analog inputs
 fault locator for short circuits
 and earth faults U₀
 E/P/Q/pf
- f DREC
- FLOC

Power Quality Monitoring

• THD

• PQ3_{Inf}

• PQ3Unf

• PQV3_{Sd}

PQV3_{Sd}

Current and voltage distortion measurements (1-13th harmonics)

Current waveform distortion measurement

Voltage waveform distortion measurement

Short duration voltage variation (sags and swells)

- Inputs/outputs

 Up to 34 digital inputs

 Up to 26 digital outputs
 incl. 2 outputs with trip circuit supervision

 8 RTD/analog inputs (mA, U, ohm, Pt)

 time synchronization via binary input

- Energizing inputs

 4 current transformers for 1 A and 5 A connection

 1 current transformer
 for 0.2 A and 1 A connection

 4 voltage transformers
 for 100 V-120 V connection

 9 sensor inputs for current
 or voltage measurements

- Communication & Connectivity
 Protocols: LON®, SPA, Modbus®, DNP 3.0, PROFIBUS®, IEC 61850 (*, IEC 60870-5-103 (*
 Connectivity package

Condition monitoring

- Trip circuit supervisFusefailBreaker wear
- Breaker travel time
 Breaker operational cycle counter
 Breaker inactive time
 Alarm for scheduled maintenance
- Spring charging time
 Measuring circuit supervision
 GAS pressure alarm
 Time indicator