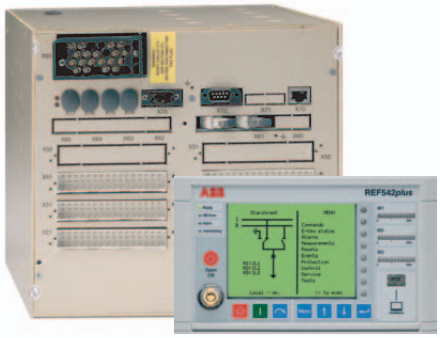
# Feeder Terminal REF 542plus



Compact protection, control, measurement and supervision terminal

Dedicated solution for air or gas insulated MV switchgear systems

Targeted for feeder, transformer and motor protection

HMI concept based on integrated WEB server technology

Support for a wide range of communication protocols

## REF 542plus

is a compact protection, control, measurement and supervision terminal for the power distribution system. Distinguishing features of the terminal are its flexibility and configurability. The same unit can be used as a feeder, transformer or motor protection and control terminal, or as a control terminal alone. The REF 542plus terminal features a wide range of protection and management functions readily available to satisfy your application's need for protection and control.

**One product with many possibilities**

The REF 542plus feeder terminal offers all the essential functionality in one single package. The protection functionality required for a given application can be provided in standardized configuration solutions. When necessary, the standardized terminals can be further tuned to meet specific requirements. The terminal's integrated condition monitoring system enables introduction of preventive maintenance to promote your long-term asset management strategy. The measurement and control functions provide valuable power quality data as well as power system control and management. In addition, the built-in frequency relay functionality makes the terminal suited for load shedding applications.

The functionality of the REF 542plus protection and control terminal makes it the optimum solution for any air or gas insulated switchgear for MV distribution system.

**Protection that your network deserves**

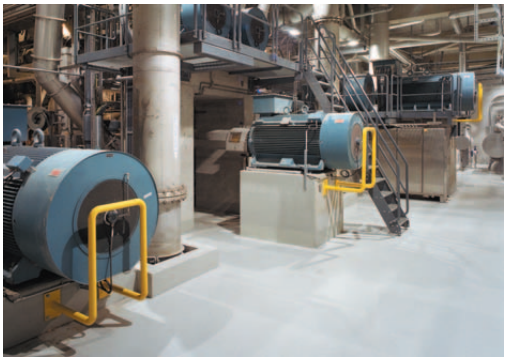
The REF 542plus incorporates a multi-zone distance protection scheme with integrated impedance based fault location to be used for the protection of meshed distribution network. Any power system fault can be detected within the shortest possible time, usually in less than two periods, and so the faulty network part can be isolated within 70 to 100 ms, depending on the speed of the circuit breaker used. The built-in fault locator provides the accurate information to enable rapid fault location and proper corrective measures. Consequently, the power system outage times can be kept at a minimum. Further, if the multi-shot auto-reclosure function is applied, most of the transient system faults on overhead lines can be cleared automatically.

**Web server functionality**
REF 542plus comprises embedded web server functionality for monitoring and control purposes via the Ethernet port on the main module. By using a PC provided with a web browser, the user gains access to the substation unit using web technology. All information on the HMI and the switchgear overview will be displayed. After the required authorization control of switching devices and switching to change to other parameter set can be performed.

**Sophisticated local HMI**
REF 542plus is equipped with a sophisticated local human machine interface to provide extensive local communication between the operator and the terminal. The large display area is divided into two windows for the display of alpha-numerical data such as settings, measured and recorded value, alarms, etc. and graphics like single line diagrams of the switchgear lay-out.

The HMI features full support for Unicode characters. The bilingual HMI allows the user to toggle between two languages. One of the languages is always English, the second one is user definable.

**Lifecycle Services**
By using a dedicated software infrastructure to automatically collect, store and retrieve relevant product data, such as hardware module compositions, software version information and the like, ABB can manage the whole product life-cycle of your REF542 plus terminals, from the order to the disposal of the product. On request, the firmware of the REF 542plus terminals returns information for detection of hardware and firmware changes . Due to the collected history record ABB can be provide accurate technical support as well as service and repair.



## Innovative technology

REF 542plus feeder terminal is part of the ABB substation automation concept and the RE500 product series. The innovative solutions and the simultaneous multi-port communication with flexible connectivity will cater for your current and future communication needs. For example, the new IEC 61850, which is already certified by KEMA, and MODBUS TCP together with the embedded web server communication can be performed simultaneously. The configuration of the communication will be generated automatically by means of a common configuration tool.

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



## Technical Data REF 542plus

| Protection Function | IEC | ANSI | Basic Low | Basic | Multi Low | Multi | Differential | Distance |
|---|---|---|---|---|---|---|---|---|
| Power factor controller | | 55 | • | • | • | • | • | • |
| Inrush stabilization | | | • | • | • | • | • | • |
| Overcurrent directional high | $3I>>\rightarrow, 3I>\rightarrow$ | 67 | | • | • | • | • | • |
| Overcurrent instantaneous | $3I>>>, 3I>>, 3I>$ | 50/51 | • | • | • | • | • | • |
| Overcurrent IDMT | | 51 | • | • | • | • | • | • |
| Earth fault overcurrent | $I_N>>, I_N>$ | 51N | • | • | • | • | • | • |
| Earth fault directional high | $I_N>>\rightarrow, I_N>\rightarrow$ | 67N | | • | • | • | • | • |
| Earth fault directional sensitive | $I_N>\rightarrow$ | 67NS | | • | • | • | • | • |
| Earth fault IDMT | | 51N | • | • | • | • | • | • |
| Overvoltage | $U>>>, U>>, U>$ | 59 | | | • | • | • | • |
| Undervoltage | $U<<, U<$ | 27 | | | • | • | | • |
| Residual overvoltage high | $U_N>>, U_N>$ | 59N | | • | • | • | • | • |
| Thermal overload | | 49 | | | | • | • | • |
| Motor start (adiabatic characteristic) | | 51 | | | | • | • | • |
| Locked rotor | | 51LR | | | | • | • | • |
| Number of starts | | 66 | | | | • | • | • |
| Distance protection | Z< | 21 | | | | | | • |
| Differential protection | $3\Delta I>, \Delta I_N>$ | 87T/G/N | | | | | • | |
| Unbalance load | $I_2>$ | 46 | | | | • | • | • |
| Directional power | P>→ | 32 | | | | • | | • |
| Low load | P<, I< | 37 | | | | • | • | • |
| Synchronism check | SYNC | 25 | • | • | • | • | | • |
| Switching resonance | | | | | | • | | • |
| High harmonics | | | | | | • | | • |
| Frequency protection | f<, f>, df/dt<, df/dt> | 81U/O | | | | • | | • |
| Autoreclosure | 0 → I | 79 | • | • | • | • | | • |

**Control:**
- Circuit breaker with indication, 1 instance
- Direct open for CB via HMI
- Disconnector and/or earthing switch with indication (max. 7 instances)
- 3 state disconnector with indication (max. 2 instances)
- Control position selector (Remote/Local/Operation/Set)
- 8 alarm LEDs with 3 colors and free text (max. 4 pages)

**Measurement functions:**
- 3 phase currents, neutral current
- 3 phase-to-phase voltages, 3 phase-to-neutral voltages, residual voltage
- Apparent power, active power, reactive power
- Frequency, voltage distortion (1-20th harmonics)

**Inputs/outputs**
- Up to 42 binary inputs
- Up to 18 power outputs, 6 signal outputs and 1 watchdog output or up to 21 static power outputs, 6 static signal outputs and 1 watchdog output
- Up to 6 analog inputs for 4 to 20 mA or up to 4 isolated analog output for 0/4 to 20 mA

**Energizing inputs**
Conventional CT/VT inputs or current/voltage sensors, several variants available, max. 8 CT/VT inputs:
- Up to 8 current transformers for 1 A and 5 A connection
- 1 current transformer for 0.2 A
- Up to 8 voltage transformers for 100 V - 125 V
- 8 inputs for current or voltage sensors

**Communication and connectivity**
Multi port communication is possible using the embedded web server functionality and Internet Explorer with Adobe SVG viewer 3.0

- MODBUS TCP, SPA, ABB LON per LAG 1.4, IEC 60870-5-103 and MODBUS RTU, IEC 61850
- Connectivity package

**Condition monitoring**
- Trip circuit supervision (TCS)
- Breaker wear
- Spring charging control
- Gas pressure
- Energizing circuit supervision
- Battery supervision
- Operation hours
- Disturbance recorder

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