

RefleX Protection and Control

RefleX - 2001

**Distance to fault locator
Integrated impedance starter**



Distance-to-fault locator
with impedance starter
Model 2001

Distance to Fault Locator with integrated Impedance Starting.

Description

The RefleX distance to fault location algorithm is based on 3 phase measurements of currents and voltages in one end of a transmission line. Starting is achieved by an internal impedance starting function.

Measurements

The voltages and currents are sampled and stored in a cyclic data buffer 16 cycles in length. When a fault occurs, the starting signal will "freeze" all recorded data for analysis. The starting signal is received from the integrated starting zone which is similar to the starting zones of the advanced impedance relays in the RefleX range. The integrated starter forms a "full scheme" measuring system.

Autorecord function

With the AUTORECORD function "ON" the fault locator will record all events that activate the starting module. The starter will then initiate the fault locator during all starts even if the circuit breaker is not tripped. To restrict recording to the cases when the circuit breaker actually trips, the trip outputs of the protective relays are connected to the TRIP inputs of the fault locator, and the AUTORECORD function is set to "OFF" in the fault locator menu. Now the fault locator will only record faults that are followed by an actual trip within the "MAX TRIP TIME". If for example the MAX TRIP TIME is set to 0.4 sec, then only faults tripped by distance relays Z1 and Z2 will be recorded. All trips beyond the 0.4 sec time will be ignored and the distances not recorded.

Record of Fault Results

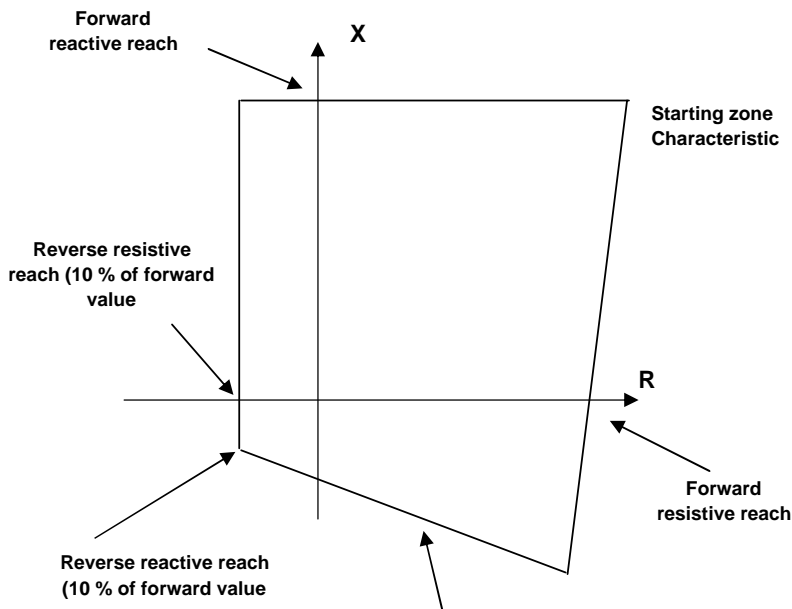
The results of the last five recorded locations are stored in the fault locator. The date and time of the faults are also recorded. The information can be recalled in the unit display at any time.

Reset

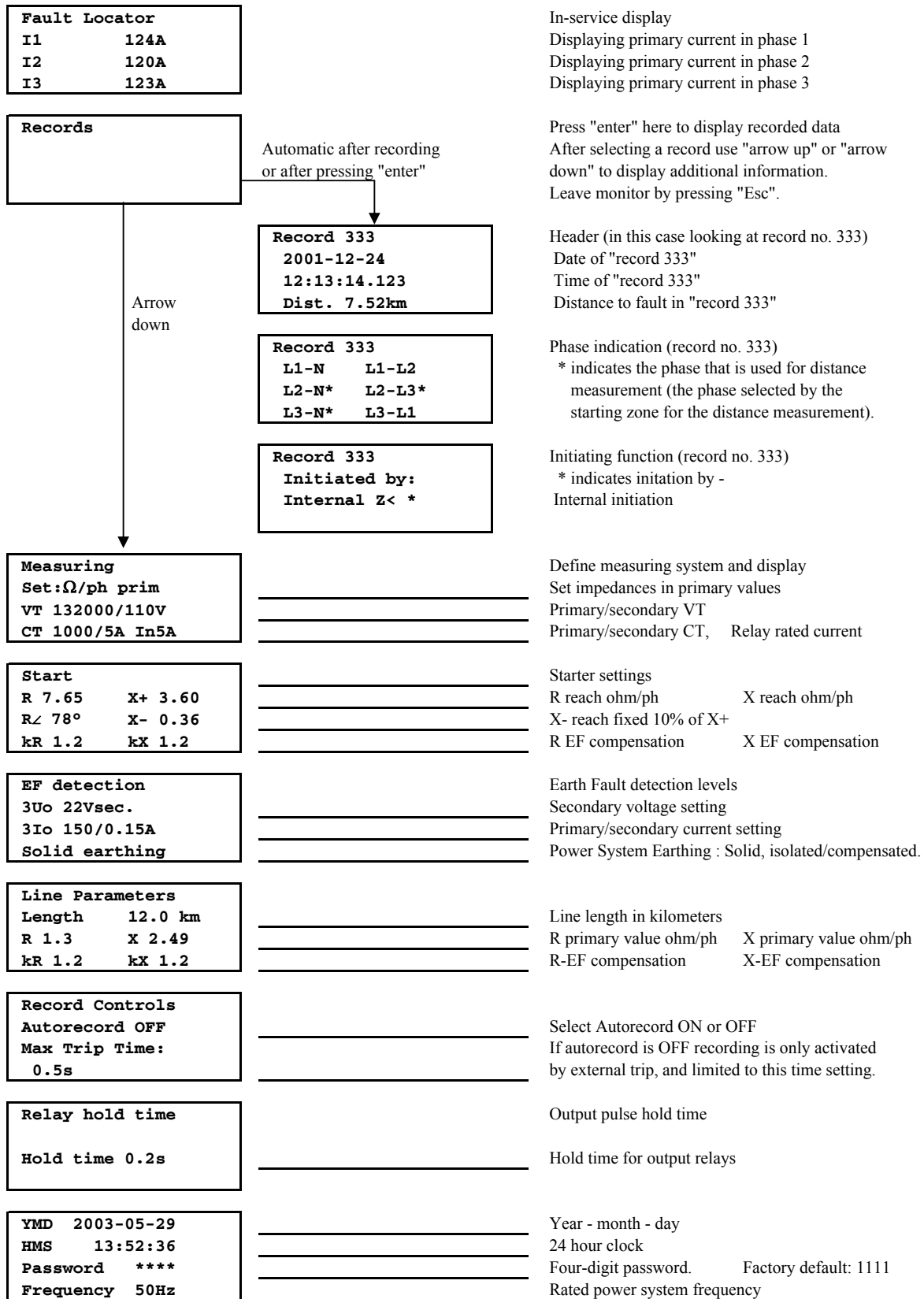
The hold time for the output relays (pulse prolongation) are menu defined. Reset can be performed either from the ESC key, or from an external signal. If the pulse timer is set to ∞ then the outputs are latched until the next operation.

Starting zone

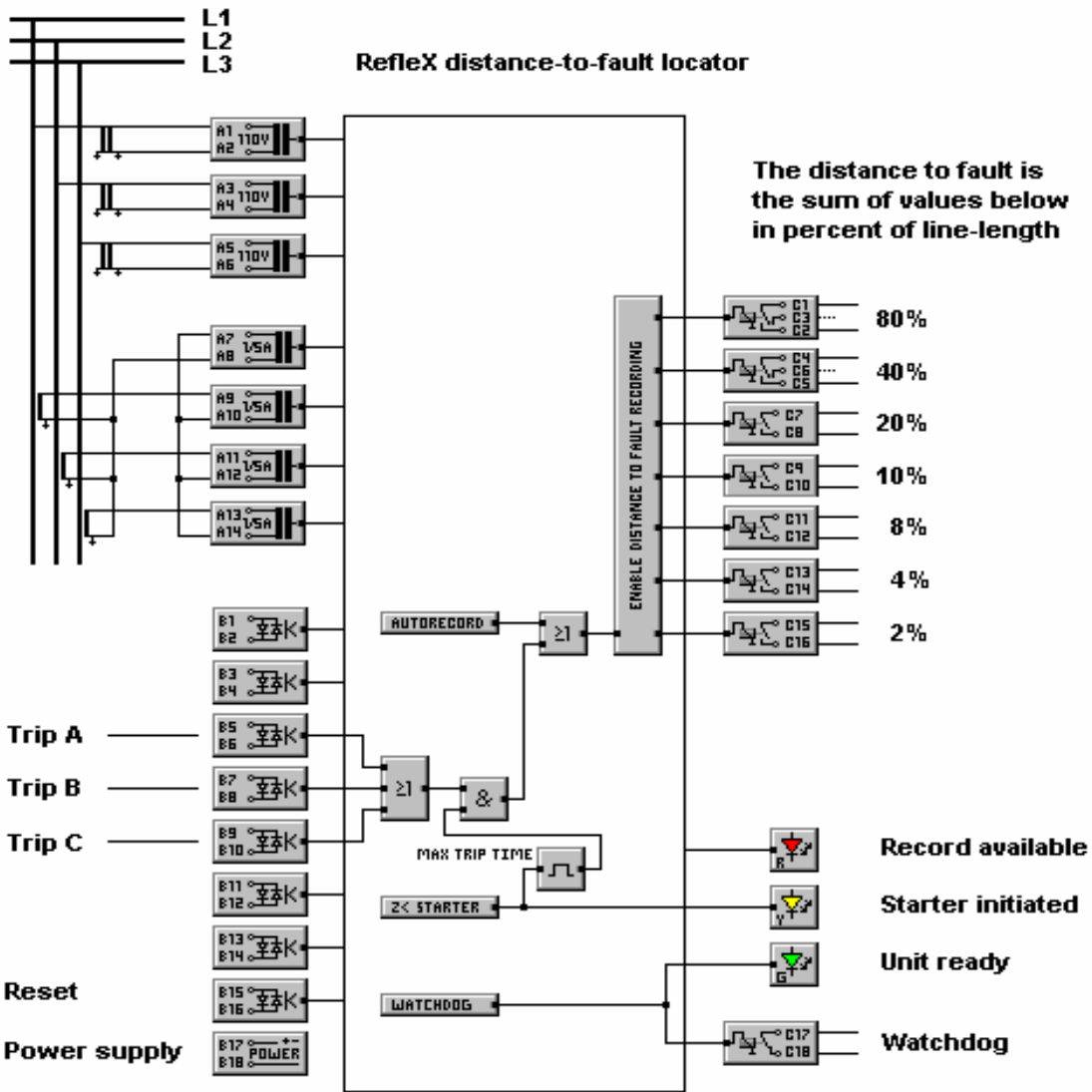
The starting zone is formed as a polygon where forward R and X reaches are menu defined. Reverse directions are fixed values set to 10% of the forward reach, and with a 30 degrees slope of the reverse reactive reach.



Distance to Fault Locator with integrated Impedance Starting.



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File: 2001_PRD_110.bmp

The yellow LED (Starter initiated) is on only as long as the starter is activated.
 The red LED (Record available) is latched on after the successful recording of a distance to a fault.

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Integrated impedance starter

Measuring scheme		Full-scheme impedance measurement
Measuring elements		Six independent elements
Minimum operating current		0.1 * In
Resetting ratio		1.03
Measuring limit - voltage		3V
Measuring limit - current		0.1A (In 1A)
Measuring limit - current		0.5A (In 5A)
Forward resistive reach	R	0.50 - 300 ohm/phase secondary (In 1A)
Forward resistive reach	R	0.10 - 60.0 ohm/phase secondary (In 5A)
Resistive directional blinder angle	R \angle	45° - 85°
Reverse reach		Fixed 10 % of forward reach
Forward reactive reach	X	0.50 - 300 ohm/phase secondary (In 1A)
Forward reactive reach	X	0.10 - 60.0 ohm/phase secondary (In 5A)
Reverse reach		Fixed 10 % of forward reach
Resistive EF compensation factor	kR	0.10 - 2.50 (remember to cover arc resistance)
Reactive EF compensation factor	kX	0.10 - 2.50

Earth Fault detection

Current setting	3Io	0.10-0.99 and 1.0 A secondary (In 1A)
Current setting	3Io	0.50-5.00 A secondary (In 5A)
Voltage setting	3Uo	3.00-50.0 V secondary
Resetting ratio		>0.97
System earthing		Solid or isolated/coil compensated
Priority in isolated network		Solid earthed, Isolated L3>L2>L1, Isolated L2>L3>L1 (acyclic), Isolated Zmin or Off

Line impedance settings

Resistive reach	R	0.00 - 300 ohm/phase secondary (In 1A)
Resistive reach	R	0.00 - 60.0 ohm/phase secondary (In 5A)
Reactive reach	X	0.50 - 300 ohm/phase secondary (In 1A)
Reactive reach	X	0.10 - 60.0 ohm/phase secondary (In 5A)
Resistive EF compensation factor	kR	0.10 - 2.50
Reactive EF compensation factor	kX	0.10 - 2.50

Autorecord Controls

Autorecord activate	Autorecord	ON / OFF
Max Trip Time (fault recorder activation time)		0.10 - 9.99 s

Line length

This setting only applies if readout is defined in kilometres		0.1 - 1000 km (max 4 digit setting resolution)
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Other features

Impedance setting in relay menu		All in primary values ohms/ph
Rated power system frequency		50 and 60 Hz
Pulse hold time for output relays		0.1 - 9.99 s and ∞
Indication of reverse faults		
Measuring to 150% of the line parameter setting		

Password

Factory default password		1111
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