

RefleX Protection and Control

RefleX - 1502

Overcurrent protection
Earth Fault current protection
Phase unbalance protection
Communication (IEC 60 870-5-103)



3-stage OC, 2-stage EF current
and phase-unbalance
Model 1502

RefleX Overcurrent, EF current and Phase Unbalance Protection

Menu (setting group #1)

<p>In-service display</p>	<p>(See separate description of the sub-menu)</p>	<p>In-service display Press 'enter' to toggle displays</p>
<p>Trip records</p>	<p>(See separate description of the sub-menu 'Trip Records')</p>	<p>Press 'enter' to display recorded data After selecting a record use 'arrow up' or 'arrow down' to display additional information. Leave monitor by pressing 'Esc'.</p>
<p>Low current #1 I> 160/4A t> 1.5s Def.t CT 200/5A In5A</p>	<p>_____</p> <p>_____</p> <p>_____</p>	<p>Low phase current Setting group # Primary/secondary current set value Delay Characteristic Primary/secondary CT Rated phase current</p>
<p>Med. current #1 I>> 800/20A t>> 0.5s Def.t CT 200/5A In5A</p>	<p>_____</p> <p>_____</p> <p>_____</p>	<p>Medium phase current Setting group # Primary/secondary current set value Delay Characteristic Primary/secondary CT Rated phase current</p>
<p>High current #1 I>>> 1200/30A t>>> 0.05s Def.t CT 200/5A In5A</p>	<p>_____</p> <p>_____</p> <p>_____</p>	<p>High phase current Setting group # Primary/secondary current set value Delay Characteristic Primary/secondary CT Rated phase current</p>
<p>Ph unbalance #1 I2 0.4*I1 t2 3s Trip Off</p>	<p>_____</p> <p>_____</p> <p>_____</p>	<p>Phase unbalance Setting group # Neg. seq. starting ratio (I1: pos. seq. current) Delay (definite time) Trip On / Off</p>
<p>EF low curr #1 Io> 80/0.8A ko> 0.7 VI CT 100/1A In 1A</p>	<p>_____</p> <p>_____</p> <p>_____</p>	<p>Low EF current Setting group # Primary/secondary current set value Delay Characteristic Primary/secondary CT Rated EF current</p>
<p>EF high curr #1 Io>> 120/1.20A ko>> 0.7 VI CT 100/1A In 1A</p>	<p>_____</p> <p>_____</p> <p>_____</p>	<p>High EF current Setting group # Primary/secondary current set value Delay Characteristic Primary/secondary CT Rated EF current</p>
<p>Comm. IEC ON Config. Ring Address 1 Meas. value 1.2</p>	<p>_____</p> <p>_____</p> <p>_____</p>	<p>Communication Comm. On/Off Configuration Relay address Value of measurand</p>
<p>YMD 2002-08-27 HMS 13:52:36 Password **** Freq. 50Hz</p>	<p>_____</p> <p>_____</p> <p>_____</p>	<p>Year - month - day 24 hour clock Four-digit password Factory default: 1111 Rated power system frequency</p>

RefleX Overcurrent, EF current and Phase Unbalance Protection

Menu (setting group #2)

In-service display 	(See separate description of the sub-menu)	In-service display Press 'enter' to toggle displays
Trip records 	(See separate description of the sub-menu 'Trip Records')	Press 'enter' to display recorded data After selecting a record use 'arrow up' or 'arrow down' to display additional information. Leave monitor by pressing 'Esc'.
Low current #2 I> 160/4A t> 1.5s Def.t CT 200/5A In5A	_____ _____ _____	Low phase current Setting group # Primary/secondary current set value Delay Characteristic Primary/secondary CT Rated phase current
Med. current #2 I>> 800/20A t>> 0.5s Def.t CT 200/5A In5A	_____ _____ _____	Medium phase current Setting group # Primary/secondary current set value Delay Characteristic Primary/secondary CT Rated phase current
High current #2 I>>> 1200/30A t>>> 0.05s Def.t CT 200/5A In5A	_____ _____ _____	High phase current Setting group # Primary/secondary current set value Delay Characteristic Primary/secondary CT Rated phase current
Ph unbalance #2 I2 0.4*I1 t2 3s Trip Off	_____ _____ _____	Phase unbalance Setting group # Neg. seq. starting ratio (I1: pos. seq. current) Delay (definite time) Trip On / Off
EF low curr #2 Io> 80/0.8A ko> 0.7 VI CT 100/1A In 1A	_____ _____ _____	Low EF current Setting group # Primary/secondary current set value Delay Characteristic Primary/secondary CT Rated EF current
EF high curr #2 Io> 80/0.8A ko> 0.7 VI CT 100/1A In 1A	_____ _____ _____	High EF current Setting group # Primary/secondary current set value Delay Characteristic Primary/secondary CT Rated EF current
Comm. IEC ON Config. Ring Address 1 Meas. value 1.2	_____ _____ _____	Communication Comm. On/Off Configuration Relay address Value of measurand
YMD 2002-08-27 HMS 13:52:36 Password **** Freq. 50Hz	_____ _____ _____	Year - month - day 24 hour clock Four-digit password Factory default: 1111 Rated power system frequency

RefleX Overcurrent, EF current and Phase Unbalance Protection

In-service displays

By commissioning of the relay the in-service display will show the primary phase currents.

Press 'enter' to switch between the different in-service displays

Chosen in-service display will automatically be default in-service display

In-service display

OC, EF, Ph-Unb	
IL1	124A
IL2	120A
IL3	123A

In service display
Primary current in phase 1
Primary current in phase 2
Primary current in phase 3

OC, EF, Ph-Unb	
Io	0.1A

Alternative in-service display
Primary EF-current

OC, EF, Ph-Unb	
I1	100A
I2	0.1*I1

Alternative in-service display
Positive sequence value of the primary load current
Negative sequence value of the currents

RefleX Overcurrent, EF current and Phase Unbalance Protection

Trip records

After a relay trip the display showing date and time of the trip automatically appears.

Each trip is automatically assigned a separate serial number.

All displays show recordings subsequent to relay tripping. The last five recordings are always stored.

By using arrow up/arrow down the user may access all relevant information in the displays below.

Only trip records (displays) with active information is stored and/or displayed after a trip.

Trip records

This display is part of the main menu
After selecting a record use 'arrow up' or 'arrow down' to display additional information.
Leave trip records by pressing 'Esc'.

```
Trip 333
2002-12-24
12:13:14.123
Delay 0.05s
```

Header (in this case looking at trip no. 333)
Date of 'trip 333'
Time of 'trip 333'
Delay of 'trip 333'

```
Trip 333
I>  I>>  I>>>*
Io> Io>> I2
```

Trip indication (trip 333)
* indicates type of trip

```
Trip 333
IL1      1400A
IL2      1390A
IL3      1400A
```

Trip 333
Primary phase current
Primary phase current
Primary phase current

```
Trip 333
Io              0A
```

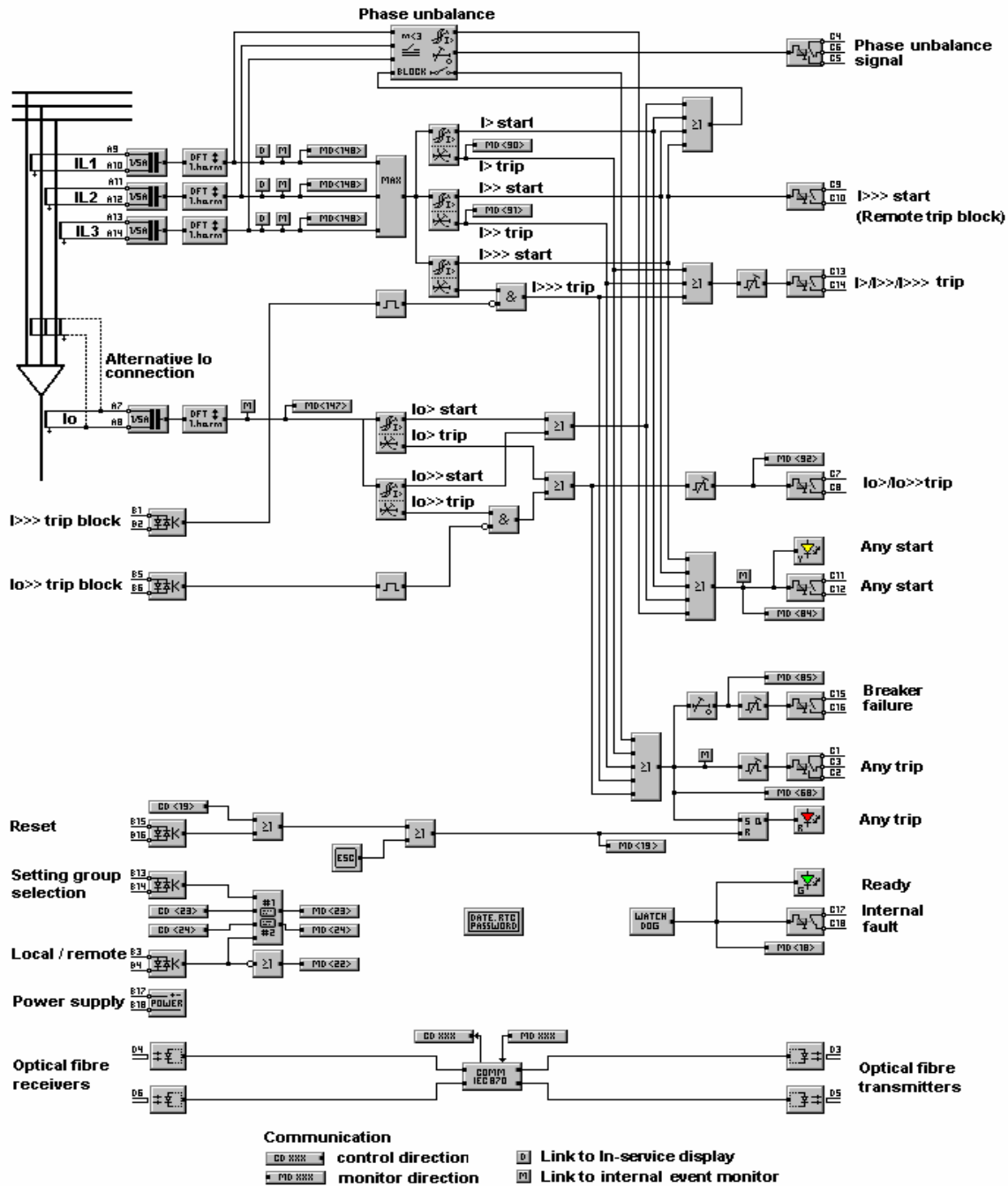
Trip 333
Primary Earth fault current

```
Trip 333
I1      100A
I2      0*I1
```

Trip 333
Phase unbalance (positiv sequence current)
Phase unbalance (negative sequence current)

RefleX Overcurrent, EF current and Phase Unbalance Protection

Logic diagram



Source file: 1502_PRD_120_UK.bmp

RefleX Overcurrent, EF current and Phase Unbalance Protection

Technical data

Overcurrent protection

Measurement		Three phases
Current settings 1A rated input.	I>, I>>,I>>>	0.200 - 75.0 A and block
Current settings 5A rated input.	I>, I>>,I>>>	1.00 - 375 A and block
Time characteristics		NI, VI, EI, LTI and def. time
Time multipliers k at inverse time characteristics	k>,k>>,k>>>	0.10 - 1.20 and block
Definite time settings	t>,t>>,t>>>	0.01 - 9.99 s and block
Resetting ratio		>0.97
Harmonic measurement		1st harmonic

Phase unbalance protection

Negative sequence starting ratio *)	I2	0.100 - 0.5 * I1 and block
Positive sequence measuring limit 1A rated input		0.1 A
Positive sequence measuring limit 5A rated input		0.5 A
Timer	t2	0.10 - 99.9 s and block
Resetting ratio		>0.97
Trip function		On / Off
*) I1 = the positive sequence value of the load current		
*) I2 = the negative sequence value of the currents		

Earth fault current (non-directional)

Current setting 1A rated input	Io>, Io>>	0.005 - 2.00 A and block
Current setting 5A rated input	Io>, Io>>	0.075 - 30.0 A and block
Time characteristics		NI, VI, EI, LTI and def. time
Time multipliers for inverse time characteristics	ko>, ko>>	0.10 - 1.20 and block
Definite time settings	to>, to>>	0.01 - 9.99 s and block
Resetting ratio		>0.97
Harmonic measurement		1st harmonic

Breaker failure protection

Trip transfer delay (fixed value)		0.2 s
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Selection between two setting groups

Setting group #1 is active when 'low' input voltage is applied to	Input B13-B14
Setting group #1 can also be selected by signal from comm.	<CD 23>

Setting group #2 is active when 'high' input voltage is applied to	Input B13-B14
Setting group #2 can also be selected by signal from comm.	<CD 24>

Setting group is selected by communication when 'high' input voltage is applied to	Input B3-B4
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System data

Factory default password	1111
Pulse-extension circuit on all trip outputs	0.2 s pulse
Pulse-extension circuit at blocking inputs	50 ms pulse
Rated frequency	50 / 60 Hz

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Communication (IEC 60 870-5-103 protocol)

Configuration system	Star or Ring
Address of protection equipment	1 to 254
Value of measurand (x In)	1.2 or 2.4

Optical fibre transmitters	Outputs D3,D5
Optical fibre receivers	Inputs D4,D6

Selection of standard information numbers in monitor direction (MDxxx)

	Type	Info.no	ASDU	Gi
Protection inactive (internal fault)	160	18		x
LED-reset	160	19		-
Local parametersettings	160	22		x
Characteristic 1 (selected setting group)	160	23		x
Characteristic 2 (selected setting group)	160	24		x
General trip	160	68		-
General start	160	84		x
Breaker failure	160	85		-
Trip I>	160	90		-
Trip I>>	160	91		-
Trip IN>	160	92		-
Trip IN>>	160	93		-
Measurands IN, VEN	160	147		-
Measurands IL1,2,3	160	148		-

Selection of standard information numbers in control direction (CDxxx)

LED-reset	160	19
Select setting group 1 *	160	23
Select setting group 2 *	160	24

* Only active if remote operation has been set at input B3-B4