

# RefleX Protection and Control

**RefleX - 1506**

**3 phase overcurrent protection  
3 phase overvoltage protection  
3 phase undervoltage protection  
IEC 60 870-5-103 F/O Interface**



3-stage OC  
2-stage OV/UV  
Model 1506

# Three Stage Overcurrent and 2 stage Over/Under Voltage Protection

## Menu (setting group #1)

OC, OV, UV IL1 124A IL2 120A IL3 123A	(See separate description of sub-menu 'In-service displays')	In-service display Press 'enter' to toggle displays Primary current I2 Primary current I3
Trip records	(See separate description of 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 #1 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 #1 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 #1 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
U> #1 U> 14000/70.0V t> 1.50s VT 22000/110V	_____ _____ _____	U> voltage                Setting group # Primary/secondary overvoltage set value Trip delay Primary/secondary VT.
U>> #1 U>> 15200/76.0V t>> 0.500s VT 22000/110V	_____ _____ _____	U>> voltage              Setting group # Primary/secondary overvoltage set value Trip delay Primary/secondary VT.
t<0.050s #1 U< 10000/50.0V Limit 3000/15.0V VT 22000/110V	_____ _____ _____	Trip delay                Setting group # Primary/secondary undervoltage set value Lower limit for undervoltage detection Primary/secondary VT.
t<<0.050s #1 U<< 9000/45.0V Limit 3000/15.0V VT 22000/110V	_____ _____ _____	Trip delay                Setting group# Primary/secondary undervoltage set value Lower limit for undervoltage detection Primary/secondary VT.
Comm. IEC ON Config. Ring Address 1 Meas. Value 1.2	_____ _____ _____	Configuration            Comm. On/Off Relay address Value of measurand
YMD 2002-05-29 HMS 13:52:36 Password **** Freq. 50Hz	_____ _____ _____	Year - month - day 24 hour clock Four-digit password      Factory default: 1111 Rated power system frequency

\*) If the VT is delta connected on the secondary or primary side, or if the relay is delta connected, please note that phase to earth measurement is not applicable.

# Three Stage Overcurrent and 2 stage Over/Under Voltage Protection

## Menu (setting group #2)

OC, OV, UV IL1 124A IL2 120A IL3 123A	(See separate description of sub-menu 'In-service displays')	In-service display Press 'enter' to toggle displays Primary current I2 Primary current I3
Trip records	(See separate description of 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> 160/5A 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>> 800/25A 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>>> 1200/35A 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
U> #2 U> 14000/60.0V t> 1.50s VT 22000/110V	_____ _____ _____	U> voltage Setting group # Primary/secondary overvoltage set value Trip delay Primary/secondary VT.
U>> #2 U>> 15200/77.0V t>> 0.500s VT 22000/110V	_____ _____ _____	U>> voltage Setting group # Primary/secondary overvoltage set value Trip delay Primary/secondary VT.
t<0.050s #2 U< 10000/50.0V Limit 3000/15.0V VT 22000/110V	_____ _____ _____	Trip delay Setting group # Primary/secondary undervoltage set value Lower limit for undervoltage detection Primary/secondary VT.
t<<0.100s #2 U<< 9000/45.0V Limit 3000/15.0V VT 22000/110V	_____ _____ _____	Trip delay Setting group# Primary/secondary undervoltage set value Lower limit for undervoltage detection Primary/secondary VT.
Comm. IEC ON Config. Ring Address 1 Meas. Value 1.2	_____ _____ _____	Configuration Comm. On/Off Relay address Value of measurand
YMD 2002-05-29 HMS 13:52:36 Password **** Freq. 50Hz	_____ _____ _____	Year - month - day 24 hour clock Four-digit password Factory default: 1111 Rated power system frequency

\*) If the VT is delta connected on the secondary or primary side, or if the relay is delta connected, please note that phase to earth measurement is not applicable.

# Three Stage Overcurrent and 2 stage Over/Under Voltage 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, OV, UV
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, OV, UV
U1N      22.1kV
U2N      22.1kV
U3N      22.1kV
```

Alternativ in-service display  
Primary Voltage L1 to Earth  
Primary Voltage L2 to Earth  
Primary Voltage L3 to Earth

## 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>>>*
```

Trip 333  
\* indicates type of current-trip

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

Trip 333  
Primary phase current  
Primary phase current  
Primary phase current

```
Trip 333
U>      U>>*
U<      U<<
```

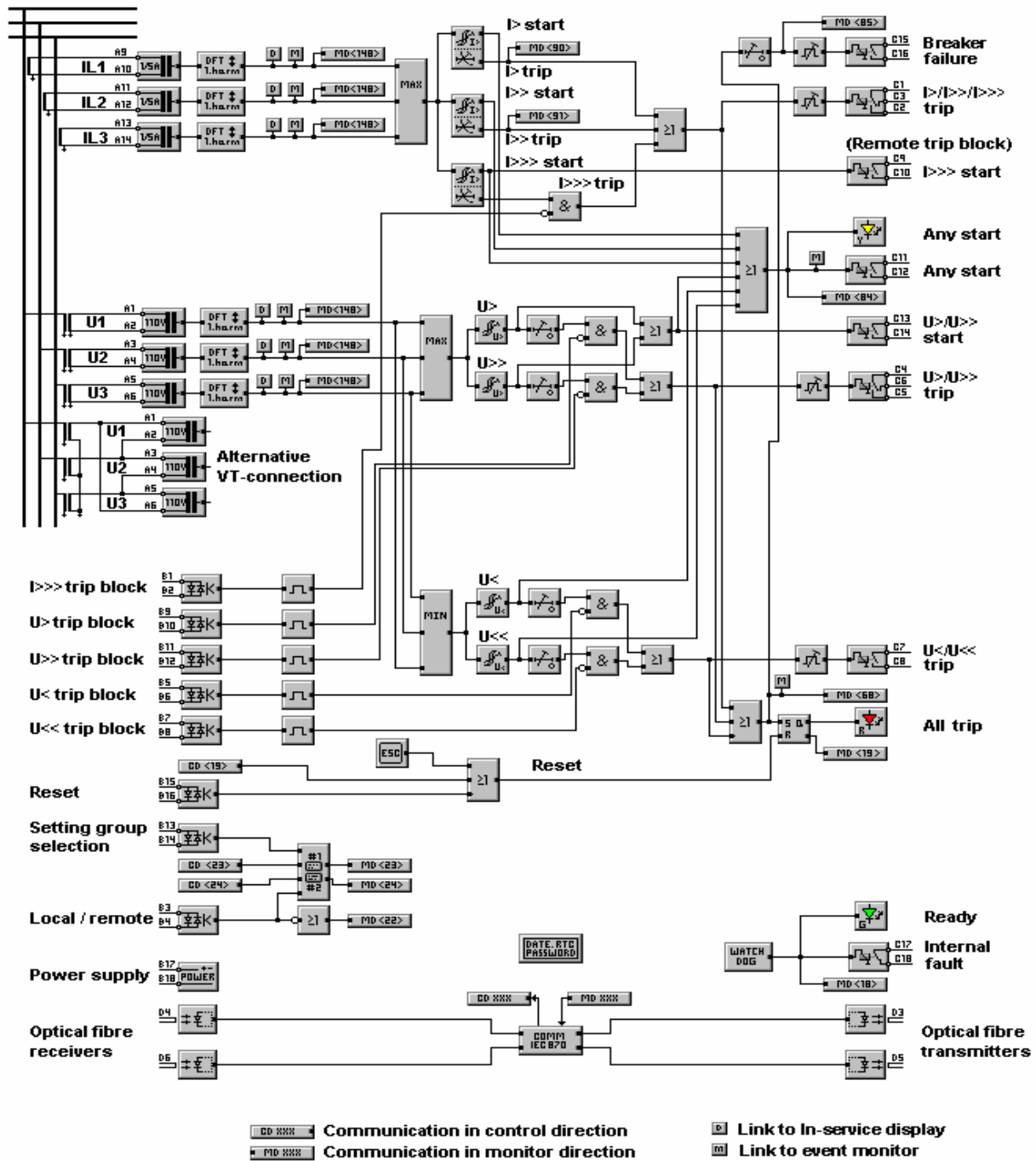
Trip 333  
\* indicates type of voltage-trip

```
Trip 333
U1      16,2kV
U2      16,2kV
U3      16,2kV
```

Trip 333  
Primary phase voltage U1  
Primary phase voltage U2  
Primary phase voltage U3

# Three Stage Overcurrent and 2 stage Over/Under Voltage Protection

## Logic diagram



Source file: 1506\_PRD\_102\_UK.bmp

# Three Stage Overcurrent and 2 stage Over/Under Voltage Protection

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## 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

### Overvoltage protection

Measurement		3 phases
Overvoltage settings	U>, U>>	1.00 - 170 V and block
Definite time settings	t>, t>>	0.01 - 999 s and block
Resetting ratio		>0.97
Harmonic measurement		1st harmonic

### Undervoltage protection

Measurement		3 phases
Undervoltage settings *)	U<, U<<	1.00 - 170 V and block
Lower limit for undervoltage detection	Limit	1.00 - 99 V and block
Definite time settings	t<, t<<	0.01 - 999 s and block
Resetting ratio		<1.03
Harmonic measurement		1st harmonic
*) The undervoltage levels have to be set higher than the lower limit for undervoltage detection		

### 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

### System data

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

# Three Stage Overcurrent and 2 stage Over/Under Voltage Protection

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## Technical data

### 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 active	160	18		x
LED-reset	160	19		-
Local parameters ON	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		
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