RefleX² Protection and Control

RefleX² - 204

Overcurrent protection
Directional earth fault protection
Phase unbalance protection
Communication (IEC 60 870-5-103)

2-stage OC, 2-stage dir.EF
and phase-unbalance
Model 204

Jacobsen Elektro

Menu (setting group #1)

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 #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 and 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 and rated phase current
Ph unbalance #1 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
DEF Uo/angle #1 Uo 30V Trip ON Iø direction 90° Iø sector 120°		Dir. EF voltage / ang Setting group # Secondary voltage set value Trip ON/OFF Tripping sector direction for Io with Uo reference Tripping sector opening angle
DEF current #1 Io> 80/0.8A tø> 1.5s CT 100/1A In1A		Dir. earth fault low c Setting group # Primary/secondary current set value Delay (after Io>>, Uo and angle 'operation') Primary/secondary C Rated EF current
DEF current #1 Io>> 90/0.9A tø>> 1.0s CT 100/1A In1A		Dir. earth fault high ‹ Setting group # Primary/secondary current set value Delay (after Io>>, Uo and angle 'operation') Primary/secondary C Rated EF current
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

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 and 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 and 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
DEF Uo/angle #2 Uo 30V Trip ON Iø direction 90° Iø sector 120°		Dir. EF voltage / ang Setting group # Secondary voltage set value Trip ON/OFF Tripping sector direction for Io with Uo reference Tripping sector opening angle
DEF current #2 Io> 80/0.8A tø> 1.5s CT 100/1A In1A		Dir. earth fault low c Setting group # Primary/secondary current set value Delay (after Io>>, Uo and angle 'operation') Primary/secondary C Rated EF current
DEF current #2 Io>> 90/0.9A tø>> 1.0s CT 100/1A In1A		Dir. earth fault high Setting group # Primary/secondary current set value Delay (after Io>>, Uo and angle 'operation') Primary/secondary C Rated EF current
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

In-service displays

By commisioning 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,DEF,Ph-Unb	In service display
IL1 124A	Primary current in phase 1
IL2 120A	Primary current in phase 2
IL3 123A	Primary current in phase 3

OC,DEF,Ph-Unb	Alternativ in-service display
Io 0.1A	Primary EF-current
Uo 5V	Secondary EF-voltage
EF Angle 86°	EF angle

OC,DEF,Ph-Unb	Alternativ in-service display
I1 100A	Pos. seq. of the primary load current
I2 0.1*I1	I2 = Negative sequence factor * I1

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>>*
 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

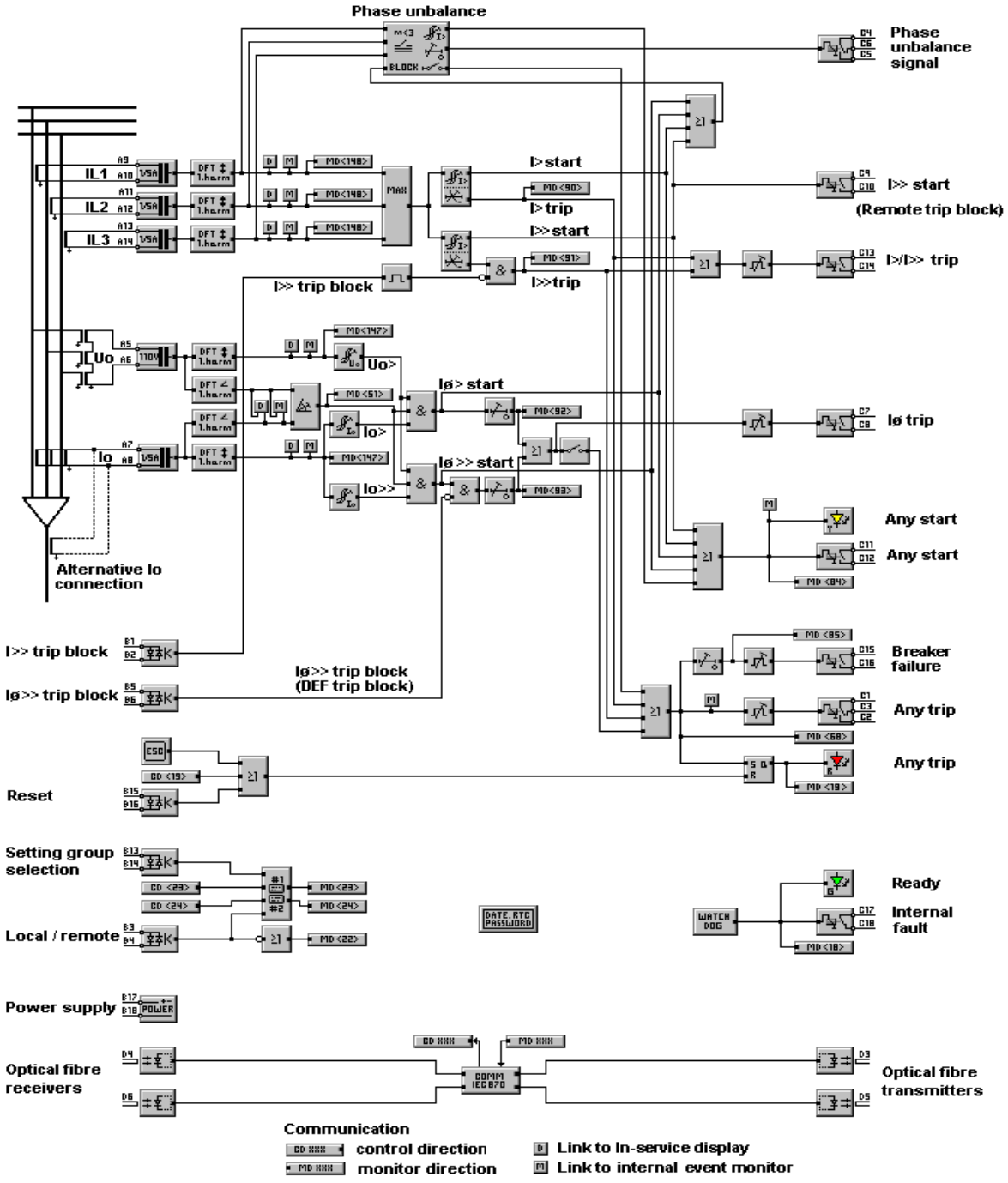
```
Trip 333
 Io           0A
 Uo           0V
 EF Angle     0°
```

Trip 333
Primary Earth fault current
Earth fault voltage
Earth fault angle

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

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

Logic diagram



File: 204_PRD_304_UK.bmp

Technical data

Overcurrent protection

Measurement		Three phases
Current settings 1A rated input.	I>, I>>	0.200 - 75.0 A and block
Current settings 5A rated input.	I>, I>>	1.00 - 375 A and block
Time characteristics		NI, VI, EI, LTI and fasttid
Time multipliers for inverse time characteristics	k>,k>>	0.10 - 1.20 and block
Definite time settings	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 phase currents
*) I2 = the negative sequence value of the phase currents

Directional Earth Fault protection

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
Timer - definite time	tø> , tø>>	0.01 - 30.0 s and block
Directional reference. Voltage setting	Uo	1.00 - 170 V
Directional reference. Measuring direction	Direction	0 - 360°
Directional reference. Operational sector	Sector	0 - 360°
Resetting ratio (current and voltage)		>0.97
Harmonic measurement (current and voltage)		1st harmonic

Breaker failure protection

Trip transfer delay (fixed value)	0.2 s

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
Pulse-extension circuit at blocking inputs	50 ms pulse
Rated frequency	50 / 60 Hz

Technical data

Communication (IEC 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
Earth fault protection is directed forward i.e. line	160	51		
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