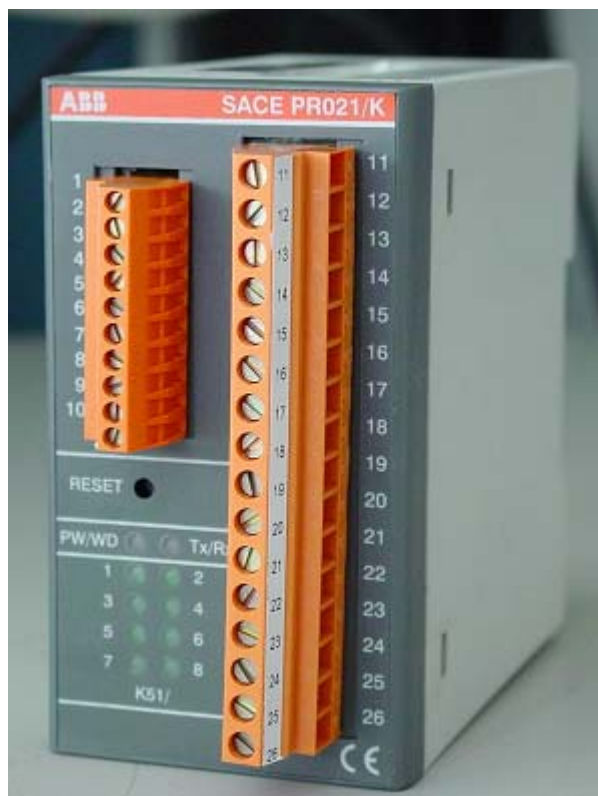


SACE PR021/K SIGNALLING UNIT



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1. General information

1.1. Foreword

Carefully read the whole of this document before installation and start-up of the PR021/K unit.

The PR021/K unit, connected to the Isomax, Emax and Tmax series protection units, allows signalling of various events which may occur during normal operation of the connected protection unit.

In these events, the PR021/K unit operates the internal relays fitted with power contacts (par. 2.5).

The PR021/K unit also features (only in combination with the protection relays fitted to the Emax series) the 'Load control' function. For further information on the 'Load control' function, as well as the settings necessary to use this protection, consult the user manual for the protection relays PR112, PR113, PR122 and PR123.

For correct use and operation of protection units interfaced with the PR021/K unit, the following documents must be consulted:

- Kit sheet of PR212/P protection unit (doc. no. RH0062)
- Kit sheet of PR212MP protection unit (doc. no. RH0063)
- Kit sheet of PR222MP protection unit (doc. no. 1SDH000436R0506)
- User manual for PR112/P protection unit (doc. no. RH0288 for IEC version or RH0109 for UL version)
- User manual for PR113/P protection unit (doc. no. RH0288 for IEC version or RH0109 for UL version)
- User manual for PR222DS protection unit (doc. no. 1SDH000436R0502 for IEC version or 1SDH000549R0001 for UL version)
- User manual for PR223EF protection unit (doc. no. 1SDH000538R0001 for IEC version)
- User manual for PR121/P protection unit (doc. no. 1SDH000460R0001 for IEC version or 1SDH000532R002 for UL version)
- User manual for PR122/P protection unit (doc. no. 1SDH000460R0001 for IEC version or 1SDH000532R002 for UL version)
- User manual for PR123/P protection unit (doc. no. 1SDH000460R0001 for IEC version or 1SDH000532R002 for UL version)
- User manual for PR331/P protection unit (doc. no. 1SDH000587R0001 for IEC version or ?????????????????????? for UL version)
- User manual for PR332/P protection unit (doc. no. 1SDH000587R0001 for IEC version or ?????????????????????? for UL version)
- User manual for PR333/P protection unit (doc. no. 1SDH000587R0001 for IEC version or ?????????????????????? for UL version)
- ABB SACE Isomax technical catalogue
- ABB SACE Emax technical catalogue

1.2. Applicable scenarios

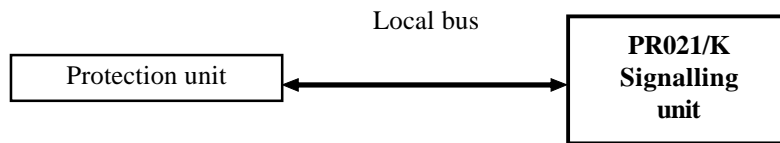
The following block diagrams show the applicable scenarios and the relationship between:

- Protection units (Isomax, Emax or Tmax series)**
- PR021/K unit
- Communication units (Isomax, Emax or Tmax series)**

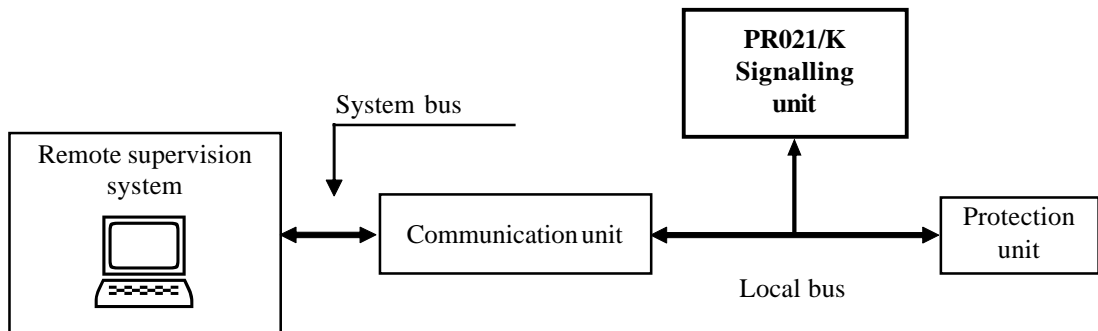
**: for Emax and Tmax series, the protection unit contains an internal communication unit (when required).

Connections between various units, depending on the scenario (Master or Slave mode) are shown as a guiding reference only, therefore wiring must be carried out according to official ABB SACE documentation.

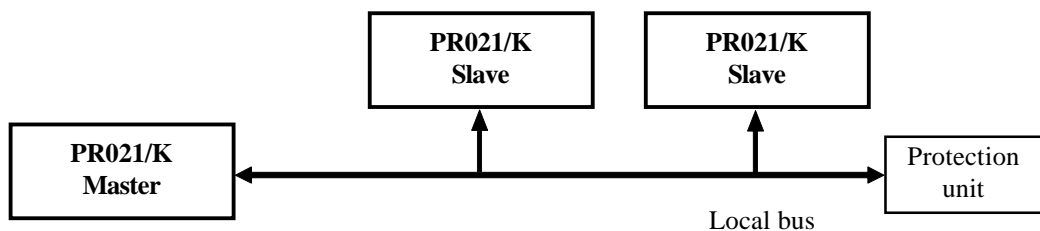
“Master Mode” scenario:



“Slave Mode” scenario:



Mixed “Master+Slave” scenario:



2. Technical specifications

2.1. Electrical characteristics

Active operation: Maximum 5s after power on
MTBF (MIL-HDBK-217E) expected: 15 years at 45°C

2.1.1. Auxiliary power supply

As the Vaux must be isolated from earth, it is necessary to use 'galvanically separate converters' conforming to IEC 60950 (UL1950) or equivalent Std. [which guarantee a common mode current or leakage current (see IEC 478/1, CEI 22/3) not greater than 3.5mA], IEC 60364-41 and CEI 64-8.

2.2. Mechanical characteristics

Casing: Polyamide plastic (no metal parts)
Protection grade: IP20
Dimensions: 95 x 53 x 112mm (h x l x d)
Weight: 330g (including 2 front connectors)

2.3. Environmental conditions

Operating environmental temperature: -5°C ... +70°C
Storage temperature: -40°C ... +90°C
Relative humidity: 5 ... 90% (without condensation)
Atmospheric pressure: 1bar, 0...2000m

2.4. Communication Bus

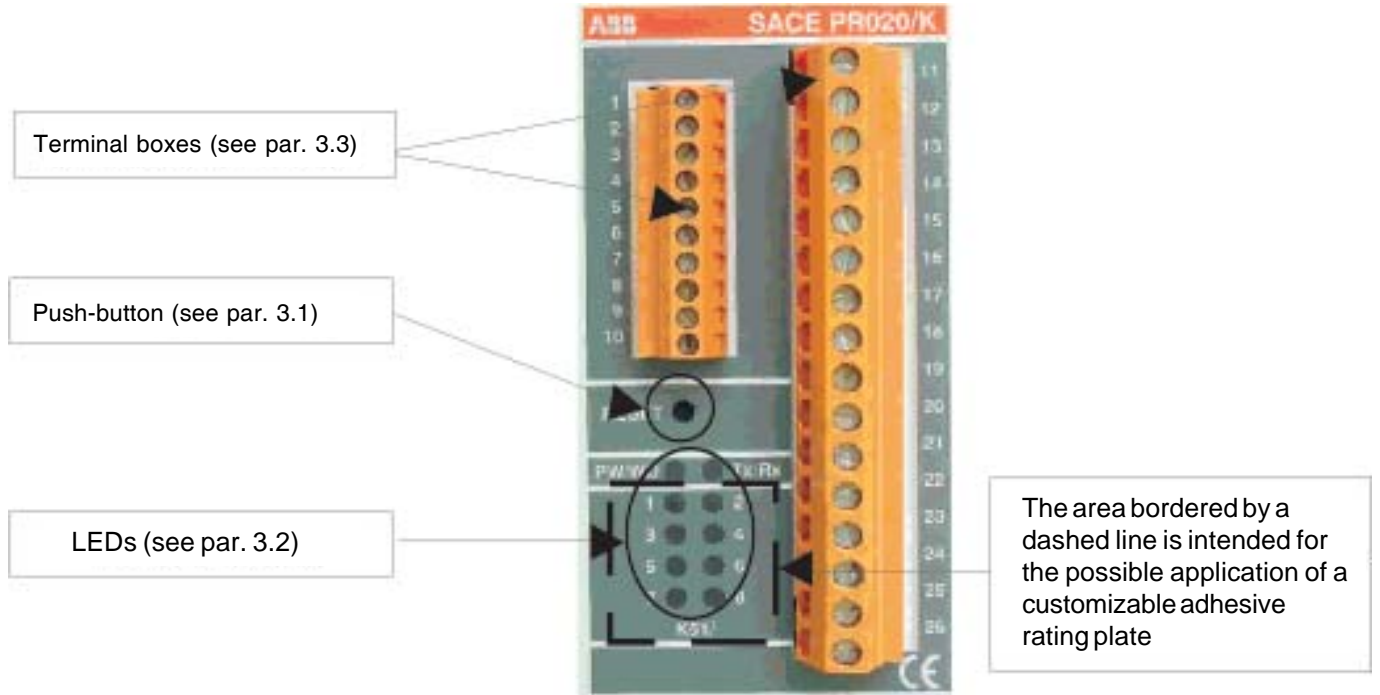
Exclusive ABB SACE communication bus (local bus)

2.5. Internal relay characteristics

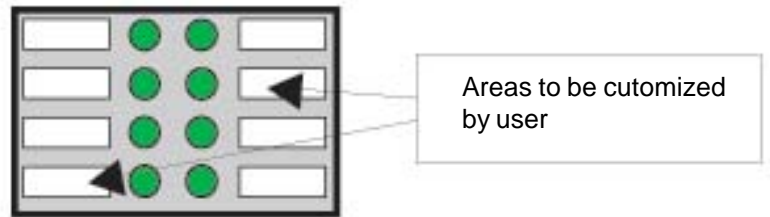
Type: Monostable STDP
Maximum switching capacity: 100W / 1250VA (resistive load)
Maximum switching voltage: 130VDC / 250VAC
Maximum switching current: 5A
Breaking power (UL/CSA) @ 30VDC (resistive load): 3.3A
Breaking power (UL/CSA) @ 250VAC (resistive load): 5A
Contact/coil isolation: 2000V eff (1 min. @ 50Hz)

3. User interface

One push-button, ten LEDs and two terminal boxes are provided on unit's front panel.



Should the user wish to customize the LEDs, the customizable adhesive rating plate may be used (RE0433/001), supplied together with the SACE PR021/K unit.



3.1. Using the push-buttons

- Reset:
Press to reset the PR021/K hardware.

3.2. Optical signals

Description of events signalled by the LEDs K51/1...K51/8

PR021/K Operating conditions			
Description of LEDs	LED state		
	Off	On	Flashing
K51/1 (green)	Contact K51/1 open	Contact K51/1 closed	--
K51/2 (green)	Contact K51/2 open	Contact K51/2 closed	--
K51/3 (green)	Contact K51/3 open	Contact K51/3 closed	--
K51/4 (green)	Contact K51/4 open	Contact K51/4 closed	--
K51/5 (green)	Contact K51/5 open	Contact K51/5 closed	--
K51/6 (green)	Contact K51/6 open	Contact K51/6 closed	--
K51/7 (green)	Contact K51/7 open	Contact K51/7 closed	--
K51/8 (green)	Contact K51/8 open	Contact K51/8 closed	--

Description of events signalled by the LEDs PW/WD and TX/RX

PR021/K Operating conditions		
Description of LEDs		Meaning
PW/WD	TX/RX	
GREEN	OFF	If PR021/K is Slave then there is no communication
GREEN	ON	Not contemplated
GREEN	4 flashes (*)	Bus KO
GREEN	3 flashes (*)	Failure to identify the protection unit
GREEN	2 flashes (*)	Indicates that the Dip-switch K51 Dis/En is in the ON position
GREEN	1 flash (*)	Indicates that the Dip-switch TEST Dis/En is in the ON position
GREEN	BLINK	Operating mode
RED	XX	WD hardware error
R/V 2Hz	OFF	Programming Mode
R/V 2Hz	ON	Programming successfully completed
R/V 2Hz	2Hz flashing	Programming failed
OFF	OFF	Unit off
OFF	ON	Not contemplated

Caption:

XX = don't care

BLINK = Flashing synchronized with activity of the local bus (the LED is on for 1 ms for each message received or transmitted)

R/V 2Hz = intermittent red/green lighting at 2Hz.

(*) Each flash is equivalent to relevant LED lighting for 200 ms, with a repetition period of 2s. The following priorities are introduced to handle cases in which more than one signal is active:

Signal	Priority
Bus KO	high priority
Missing identification	
K51 Dis/En	
Test Dis/En	low priority

- The LED test, consisting of all LEDs lighting up in sequence, takes place when the PR021/K unit is switched on; the LED status is subsequently linked to normal unit operation.
- Any LED lighting state which does not conform with the above conditions, probably indicates a malfunction of the SACE PR021/K unit.
- The indications given in the above table are with Vaux installed.
- For further details of possible malfunction conditions, see par. 6.

3.3. Terminal boxes

Connections 1...26 inputs and outputs of PR021/K unit (see pars. 5.1 and 5.2).

4. Special functions

4.1. Reset

The PR021/K unit can be reset by pressing the 'Reset' push-button on the front panel of the unit (see par. 3.1). This type of reset restarts the Sw of the PR021/K unit (the data stored in the RAM are erased).

4.2. Reset signals

"Reset signals" causes the internal relays (K51/1...8) to be returned to their rest condition (contact open).

If the "AUTOMATIC RESET" function is not selected, to reset the signals, proceed as follows:

- carry out a reset (see par. 4.1), if the applicable scenario is "PR021/K in Master mode" (see par. 1.2)
- send a "Trip Reset" command from the remote supervision system
- carry out a reset (see par. 4.1), if the applicable scenario is "PR021/K in Slave mode" (see par. 1.2), on the Emax series protection unit (PR112 or PR113).

If the "AUTOMATIC RESET" function is selected, to reset the signals simply carry out a trip reset on the protection unit and the signals on the PR021/K unit will also be reset automatically.

4.3. Self-test function

To carry out the self-test, dip-switch no. 1 must be set to ON (see par. 5.3) then the reset push-button is pressed. The self-test switches all 8 internal relays of the unit in sequence, and activates the related indicator LED K51/1...K51/8 (see par. 3.2).

The Tx/Rx LED lights on each switching, and once the self-test is finished, it will flash according to the indications listed in par. 3.2.

The self-test takes approx. 10s, thereafter the SACE PR021/K unit automatically returns to normal operation.

N.B. If dip-switch no. 1 is ON, the Self-test function is also activated when the PR021/K unit is powered on.

4.4. Stand-by function

To select the Stand-by mode, dip-switch no. 8 must be set to ON (see par. 5.3) then the reset push-button is pressed; in this operating mode, the internal relays of the unit will not be switched (but the related indicator LEDs K51/1...K51/8 will still light).

While operating in Stand-by mode, the Tx/Rx LED will flash according to the instructions listed in par. 3.2.

This function is used when the protection unit is being tested (for example with PR010/T unit) and switching of the relays of the PR021/K unit is not desired.

N.B. If dip-switch no. 8 is ON, the Stand-by function is also activated when the PR021/K unit is powered on.

4.5. Operating Mode

Depending on the setting of the dip switches and the protection unit connected, one of three operating modes may be selected. The Signals section of each protection unit includes signal tables for each of the operating modes. A description of the operating modes is given below.

4.5.1. Normal mode

4.5.1.1. Normal mode with AUTOMATIC RESET disabled

To disable Automatic Reset, dip-switch no. 10 will be set to MAN (see par. 5.3), thereafter press the reset push-button or switch PR021/K off and on.

In this operating mode each contact is associated with an event that causes the contact to close; with some contacts, the associated event can be selected from two events by setting a dip switch (dip switch nos. 2, 3, 4).

When the protection release trips, the status of the contacts is “frozen” (any change in status of the protection is not reflected in a change in status of the contacts). In this status, only the “protection release TRIP alarm” contact and the contact that represents the protection that caused the trip, will be closed. For example, if protection S (selective short-circuit) trips, the “protection release TRIP alarm” contact and the “Protection S trip (selective short-circuit)” contact will be closed.

You can exit from the “frozen” status by resetting the signals (see par. 4.2).

4.5.1.2. Normal mode with AUTOMATIC RESET enabled

To select the Automatic Reset function, dip-switch no. 10 will be set to AUT (see par. 5.3), thereafter press the reset push-button or switch PR021/K off and on.

In this operating mode, the signals are the same as in Normal mode (see par. 4.5.1.1), the only difference being that, to exit from “frozen” status following a TRIP, the trip can be directly reset on the protection unit (see user manual of the protection unit used).

4.5.2. Latch mode

To select the Latch function, dip-switch no. 11 must be set to ON (see par. 5.3) and the reset button then be pressed or the PR021/K unit be switched off and on

In this mode, the signals associated with each individual contact, once activated, are maintained (self-retaining of contacts) until the signals have been reset (see par. 4.2).

N.B. When Latch mode is activated, the automatic reset function is automatically disabled irrespective of the setting of dip-switch no. 10.

4.5.3. User mode

To select the User function, dip-switch no. 5 must be set to B (see par. 5.3) and the reset button then be pressed or the PR021/K unit be switched off and on

In this mode, all contacts from K51/1 to K51/8 - excluding contact K51/5 - are solely associated with the function selected on the protection unit (refer to user manual of the protection unit used); contact K51/5 is always associated with the “Communication problems on local bus (KO bus)” indication.

N.B. When User mode is activated, the automatic reset and Latch mode functions are automatically disabled irrespective of the setting of dip-switches no. 10 and no. 11

5. Installation and setup

5.1. Installation instructions

Mount on standard 35mm guide (DIN EN50022 type TS 35 x 15mm).

For the removable front connectors use cables with conductors having a cross-section from:

- 0.5 to 1.5mm² (AWG 22...14) for connections to terminals 1...10;
- 0.5 to 2.5mm² (AWG 22...12) for connections to terminals 11...26 (maximum current for each terminal is 5A continuous rating, and 10A for a maximum of 2 seconds).

An earth terminal is provided on a front connector, to connect the electronic circuit to the installation earth.

Dielectric strength tests must not be carried out on the inputs and outputs of the PR021/K unit.

Although the PR021/K unit can be installed in the circuit-breaker compartment, it is good practice to install the unit in the instrument compartment on the switchboard.

5.2. Connections

Carefully study the relevant wiring diagrams for wiring the terminals.

For the dedicated inputs and outputs, wiring other than that described in the official ABB SACE wiring diagrams, is not allowed.

5.3. Dip-switch settings

After correctly wiring all front connections, it is necessary to set the dip-switches on the top of the PR021/K unit. The criteria for wiring the front connections and for dip-switch setting, depend upon the type of protection unit connected to the PR021/K unit; the following paragraphs detail the possible configurations.

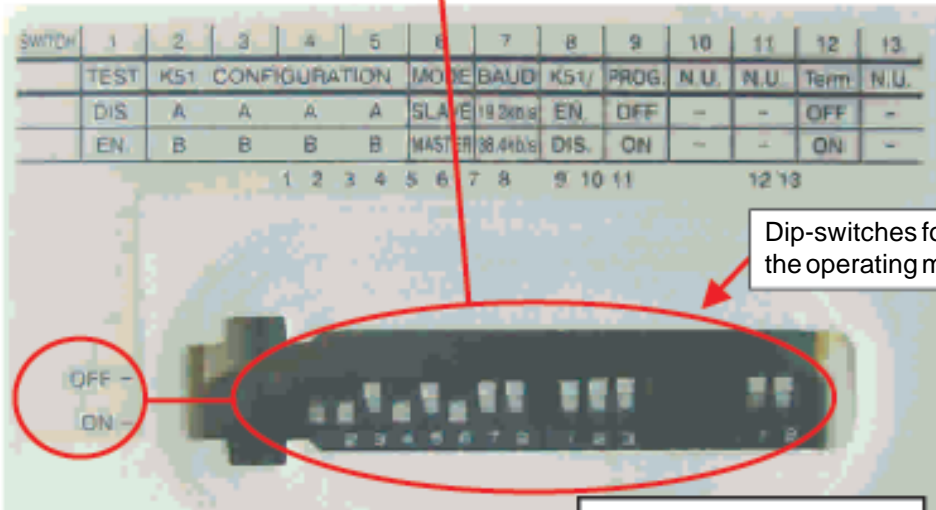
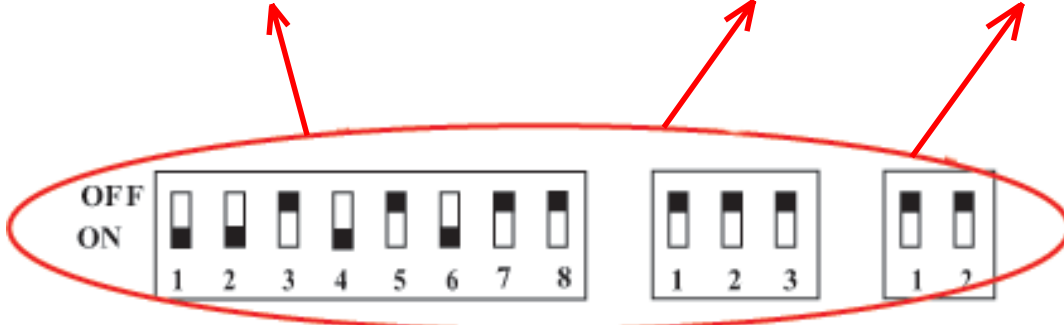
N.B.: dip-switch reading is carried out at “power on” or after a hardware reset (pressing front “Reset” button) and is active after start-up.

Dip-sw no.	Dip-sw name	Settable values	Notes
1	TEST	DIS. = self-test disabled EN. = self-test enabled	The "Self-test" function switches all 8 internal relays in sequence. The Tx LED lights on each switching, and will flash once the self-test is finished according to the indications listed in par. 3.2. For normal operating mode, set this dip-switch to OFF.
2	K51 Configuration	A= type A signal B= type B signal	Depending on the type of protection unit to which the PR021/K unit is connected, the signal of the event associated with switching of some contacts (K51) may be chosen from two alternatives (A or B). N.B. For some protection units, an alternative which can be selected using the dip-switches is not provided. In this case the event associated with each contact is unique (defined by ABB SACE), and is independent of the position of the dip-switch (OFF or ON).
3			
4			
5			
6	MODE	SLAVE = Slave mode MASTER = Master mode	Setting to Master mode is necessary when the PR021/K unit is combined with a protection unit without a communication unit (see "scenario PR021/K in Master mode" and mixed "Master+Slave" scenario, par. 1.2). Setting to Slave mode is necessary when the PR021/K unit is connected to a protection unit and a master communication unit (see "scenario PR021/K in Slave mode" and mixed "Master+Slave" scenario, par. 1.2).
7	BAUD	19.2kbit/s = baud rate 19200bit/s 38.4kbit/s = baud rate 38400bit/s	Setting of the transmission speed must be equal to that of the connected protection unit.
8	K51/	EN.= Normal mode DIS.= Stand-by mode	Normal operating mode ensures that the K51 contacts switch when the conditions which normally cause switching exist (normal operating) and the related indicator LED lights. Stand-by mode ensures that the K51 contacts do not switch under any circumstances, even under conditions which would normally cause switching (the indicator LEDs K51/1...K51/8 will still light). If set to ON (Stand-by) the unit is not able to carry out a self-test (performs the self-test by activating the LEDs only). For normal operating mode, set this dip-switch to OFF.
9	PROG.	OFF = Operating mode ON = Programming mode	<u>For ABB SACE use only.</u> For normal operating mode, set this dip-switch to OFF.
10	RESET	MAN = manual reset AUTO = automatic reset	This dip-switch is used to select the reset mode. Manual reset: in the case of a trip, the signals are "frozen" until a reset is carried out (see par. 4.2) Automatic reset: the signals of a trip are reset automatically when the trip on the protection unit is reset. In this case, to reset the signals of the PR021/K unit, the trip signals on the protection unit must be reset.
11	LATCH	OFF = latch OFF ON = latch ON	If Latch is enabled, the signals of each individual relay are maintained (self-retained) and can only be reset by a reset command (see par. 4.2).
12	Term.	OFF = Termination switched off ON = Termination switched on	Turn (ON) to terminate the local bus with a 120Ω resistance The choice depends on the actual position of the PR021/K unit on the backbone of the communication system.
13	N.U.	OFF = - - ON = - -	Not used. For normal operating mode, set this dip-switch to OFF.

5.3.1. Example of dip-switch setting

Example of dip-switch setting for connecting the PR021/K unit.

Dip-sw description	No.
TEST: EN	1
K51 Configuration: B	2
K51 Configuration: A	3
K51 Configuration: B	4
K51 Configuration: A	5
MODE: MASTER	6
BAUD: 19.2kb/s	7
K51/: EN.	8
PROG.: OFF	9
RESET: MAN	10
LATCH: OFF	11
Term.: OFF	12
N.U.: OFF	13



PR021/K top view

SWITCH	1	2	3	4	5	6	7	8	9	10	11	12	13
TEST	DIS	EN.	A	A	A	A	SLAVE	19.2kb/s	EN.	OFF	-	-	OFF
			B	B	B	B	MASTER	38.4kb/s	DIS.	ON	-	-	ON

5.3.2. Default settings

The PR021/K unit is supplied by ABB SACE with the following parameters pre-set:

Dip-sw no.	Dip-switch description	Dip-switch position	Value set
1	TEST	OFF	DIS.
2	K51 CONFIGURATION		Mode A
3			
4			
5			
6			
7	BAUD		19.2kbit/s
8	K51/		EN.
9	PROG.		OFF
10	RESET		MAN
11	LATCH		OFF
12	Term.		OFF
13	N.U.		--

5.3.3. Serial Number

The Serial Number label is positioned on the left side, at the top.

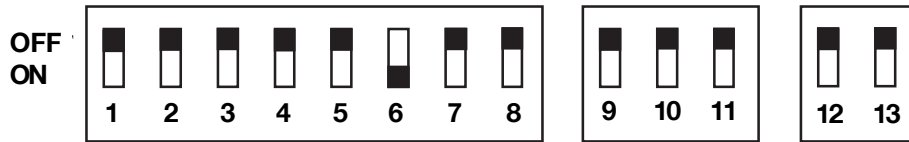
5.4. SACE PR021/K with SACE PR112 unit (version "with key")

5.4.1. Dip-switch settings

To use the PR021/K unit with the PR112/P protection unit, the dip-switches must be set as follows:

Dip-sw no.	Dip-sw name	Setting	Notes
1	TEST	DIS.	Self-test enabled
		EN.	Self-test disabled
2	K51 Configuration	A/B	Select A or B to choose the functions of the relays (see par. 5.5.2)
3		A/B	
4		A/B	
5		A	Not used, set A
6	MODE	SLAVE	<ul style="list-style-type: none"> "Slave" scenario Slave unit in mixed "Master+Slave" scenario
		MASTER	<ul style="list-style-type: none"> "Master" scenario Master unit in mixed "Master+Slave" scenario
7	BAUD	19.2kbit/s	Set 19.2 kbit/s
8	K51/	EN.	Operating mode
		DIS.	Stand-by mode enabled
9	PROG.	OFF	Set this dip-switch to OFF
10	RESET	MAN	Manual Reset mode
		AUT	Automatic Reset mode
11	LATCH	OFF	Normal mode
		ON	Latch mode
12	Term.	OFF	See par. 5.3
13	N.U.	OFF	Not used

Example of dip-switch settings for the PR021/K unit to be connected to the SACE PR112/P release



In the example, the PR021/K has been set as follows:

- Self-test function disabled
- K51 configuration = A-A-A-A
- Master mode
- Baud rate = 19.2Kb/s
- Stand-by function not active
- Manual Reset mode
- Latch mode disabled
- Local bus not terminated

5.4.2. Signals

The signals (K51/1...K51/8) for the SACE PR112 protection release may be divided into 2 modes: Normal and Latch. A description of the signals in these modes is given below.

5.4.1.1. Normal mode (see par. 4.5.1)

Dip-switch no. 11 to be set to its OFF position.

Electric contact	Event that caused closing of the relay
K51/1	L protection alarm or trip (overload)
K51/2	S protection alarm or trip (selective short-circuit)
K51/3	I protection trip (instantaneous short-circuit)
K51/4	G protection alarm or trip (earth fault)
K51/5	Communication problems on the local bus (bus KO)
K51/6	Internal overtemperature alarm or trip
K51/7	Protection release TRIP alarm
K51/8	L function prealarm (overload)

Note 1: Following a TRIP, the status of the signals is frozen signalling the trip (K51/7) and the protection that caused it.

Note 2: If dip switch no. 10 (RESET) is set to its "MAN" position, the signals may be reset as described in par. 4.2.

Note 3: If dip switch no. 10 (RESET) is set to its "AUT" position, the signals are reset automatically when the trip on the protection unit is reset (see par. 4.2).

5.4.1.2. Latch mode (see par. 4.5.2)

Dip-switch no. 11 to be set to its ON position.

Electric contact	Event that caused closing of the relay	Selection of dip-switches no. 2, 3, 4
K51/1	A = L protection alarm (overload)	dip no. 2 = A
	B = L protection trip (overload)	dip no. 2 = B
K51/2	A = S protection alarm (selective short-circuit)	dip no. 3 = A
	B = S protection trip (selective short-circuit)	dip no. 3 = B
K51/3	I protection trip (instantaneous short-circuit)	---
K51/4	A = G protection alarm (earth fault)	dip no. 4 = A
	B = G protection trip (earth fault)	dip no. 4 = B
K51/5	Communication problems on the local bus (bus KO)	
K51/6	Internal overtemperature alarm	---
K51/7	Protection release TRIP alarm	---
K51/8	L function prealarm (overload)	---

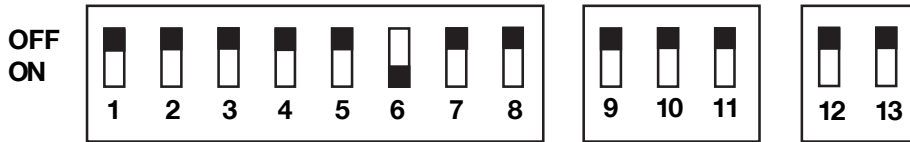
5.5. SACE PR021/K with SACE PR112 unit (version "without key")

5.5.1. Dip-switch settings

To use the PR021/K unit with the PR112/P protection unit, the dip-switches must be set as follows:

Dip-sw no.	Dip-sw name	Setting	Notes
1	TEST	DIS.	Self-test enabled
		EN.	Self-test disabled
2	K51 Configuration	A/B	Select A or B to choose the functions of the relays (see par. 5.4.2)
3		A/B	
4		A/B	
5		A	Not used, set A
6	MODE	SLAVE	<ul style="list-style-type: none"> "Slave" scenario Slave unit in mixed "Master+Slave" scenario
		MASTER	<ul style="list-style-type: none"> "Master" scenario Master unit in mixed "Master+Slave" scenario
7	BAUD	19.2kbit/s	Set 19.2 kbit/s
8	K51/	EN.	Operating mode
		DIS.	Stand-by mode enabled
9	PROG.	OFF	Set this dip-switch to OFF
10	RESET	MAN	Manual Reset mode
		AUT	Automatic Reset mode
11	LATCH	OFF	Normal mode
		ON	Latch mode
12	Term.	OFF	See par. 5.3
13	N.U.	OFF	Not used

Example of dip-switch settings for the PR021/K unit to be connected to the SACE PR112/P release



In the example, the PR021/K has been set as follows:

- Self-test function disabled
- K51 configuration = A-A-A-A
- Master mode
- Baud rate = 19.2Kb/s
- Stand-by function not active
- Manual Reset mode
- Latch mode disabled
- Local bus not terminated

5.5.2. Signals

The signals (K51/1...K51/8) for the SACE PR112 protection release may be divided into 2 modes: Normal and Latch. A description of the signals in these modes is given below.

5.5.2.1. Normal mode (see par. 4.5.1)

Dip-switch no. 11 to be set to its OFF position.

Electric contact	Event that caused closing of the relay	Selection of dip-switches no. 2, 3, 4
K51/1	L protection alarm or trip (overload)	---
K51/2	S protection alarm or trip (selective short-circuit)	---
K51/3	I protection trip (instantaneous short-circuit)	---
K51/4	A = G protection alarm or trip (earth fault)	dip no. 2 = A
	B = L function prealarm (overload)	dip no. 2 = B
K51/5	Communication problems on the local bus (bus KO)	dip no. 3 = A
	Internal overtemperature alarm or trip	dip no. 3 = B
K51/6	LC1 load control (Note 2)	---
K51/7	Protection release TRIP alarm	---
K51/8	LC2 load control (Note 2)	---

Note 1: Following a TRIP, the status of the signals is frozen signalling the trip (K51/7) and the protection that caused it.

Note 2: The signals bearing this marking are not frozen as indicated in Note 1.

Note 3: If dip switch no. 10 (RESET) is set to its "MAN" position, the signals may be reset as described in par. 4.2.

Note 4: If dip switch no. 10 (RESET) is set to its "AUT" position, the signals are reset automatically when the trip on the protection unit is reset (see par. 4.2).

Note 5: If a trip is caused by a protection function not included in the set of signals (for example, a trip for "protection G" has occurred but the K51/4 relay was set for the "Function L prealarm" signal), only the K51/7 relay (the protection release TRIP alarm) will be switched.

5.5.2.2. Latch mode (see par. 4.5.2)

Dip-switch no. 11 to be set to its ON position.

Electric contact	Event that caused closing of the relay	Selection of dip-switches no. 2, 3, 4
K51/1	A = L protection alarm (overload)	dip no. 4 = A
	B = L protection trip (overload)	dip no. 4 = B
K51/2	S protection alarm (selective short-circuit)	---
K51/3	I protection trip (instantaneous short-circuit)	---
K51/4	A = G protection alarm (earth fault)	dip no. 2 = A
	B = L function prealarm (overload)	dip no. 2 = B
K51/5	A = Communication problems on the local bus (bus KO)	dip no. 3 = A
	B = Internal overtemperature alarm	dip no. 3 = B
K51/6	LC1 load control	---
K51/7	Protection release TRIP alarm	---
K51/8	LC2 load control	---

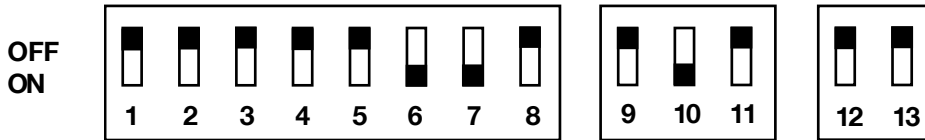
5.6. SACE PR021/K with SACE PR113 unit

5.6.1. Dip-switch settings

To use the PR021/K unit with the PR113/P protection unit, the dip-switches must be set as follows:

Dip-sw no.	Dip-sw name	Setting	Notes
1	TEST	DIS.	Self-test enabled
		EN.	Self-test disabled
2	K51 Configuration	A/B	Select A or B to choose the functions of the relays (see par. 5.6.2)
3		A/B	
4		A/B	
5		A/B	
6	MODE	SLAVE	<ul style="list-style-type: none"> "Slave" scenario Slave unit in mixed "Master+Slave" scenario
		MASTER	<ul style="list-style-type: none"> "Master" scenario Master unit in mixed "Master+Slave" scenario
7	BAUD	38.4kb/s	Set 38.4 kbit/s
8	K51/	EN.	Operating mode
		DIS.	Stand-by mode enabled
9	PROG.	OFF	Set this dip-switch to OFF
10	RESET	MAN	Manual Reset mode
		AUT	Automatic Reset mode
11	LATCH	OFF	Normal mode
		ON	Latch mode
12	Term.	OFF	See par. 5.3
13	N.U.	OFF	Not used

Example of dip-switch settings for the PR021/K unit to be connected to the SACE PR113/P release



In the example, the PR021/K has been set as follows:

- Self-test function disabled
- K51 configuration = A-A-A-A
- Master mode
- Baud rate = 38.4Kb/s
- Stand-by function not active
- Automatic Reset mode
- Latch mode disabled
- Local bus not terminated

5.6.2. Signals

The signals (K51/1...K51/8) for the SACE PR113 protection release may be divided into 3 modes: Normal, Latch and User. A description of the signals in these modes is given below.

5.6.2.1. Normal mode (see par. 4.5.1)

The dip-switches are to be set as follows: Dip-switch no. 5 = A, Dip-switch no. 11 = OFF.

Electric contact	Event that caused closing of the relay	Selection of dip-switches no. 2, 3, 4
K51/1	A = L protection alarm or trip (overload)	dip no. 2 = A
	B = L function prealarm (overload)	dip no. 2 = B
K51/2	S protection alarm or trip (selective short-circuit)	---
K51/3	I protection trip (instantaneous short-circuit)	---
K51/4	A = G protection alarm or trip (earth fault)	dip no. 3 = A
	B = Minimum voltage coil (MT) energized	dip no. 3 = B
K51/5	A = Communication problems on the local bus (bus KO)	dip no. 4 = A
	B = Overtemperature alarm or trip	dip no. 4 = B
K51/6	LC1 load control (Note 2)	---
K51/7	Protection release TRIP alarm	---
K51/8	LC2 load control (Note 2)	---

Note 1: Following a TRIP, the status of the signals is frozen signalling the trip (K51/7) and the protection that caused it.

Note 2: The signals bearing this marking are not frozen as indicated in Note 1, but follow the status indicated by the protection irrespective of the protection trip.

Note 3: If dip switch no. 10 (RESET) is set to its "MAN" position, the signals may be reset as described in par. 4.2.

Note 4: If dip switch no. 10 (RESET) is set to its "AUT" position, the signals are reset automatically when the trip on the protection unit is reset (see par. 4.2).

Note 5: If a trip is caused by a protection function not included in the set of signals (for example, a trip for "protection G" has occurred but the K51/4 relay was set for the "minimum voltage (MT) coil energized" signal), only the K51/7 relay (the protection release TRIP alarm) will be switched.

5.6.2.2. *Latch mode (see par. 4.5.2)*

The dip-switches are to be set as follows: Dip-switch no. 5 = A, Dip-switch no. 11 = ON.

Electric contact	Event that caused closing of the relay	Selection of dip-switches no. 2, 3, 4
K51/1	A = L protection alarm (overload)	dip no. 2 = A
	B = L function prealarm (overload)	dip no. 2 = B
K51/2	S protection alarm (selective short-circuit)	---
K51/3	I protection trip (instantaneous short-circuit)	---
K51/4	A = G protection alarm (earth fault)	dip no. 3 = A
	B = Minimum voltage coil (MT) energized	dip no. 3 = B
K51/5	A = Communication problems on the local bus (bus KO)	dip no. 4 = A
	B = Overtemperature prealarm	dip no. 4 = B
K51/6	LC1 load control	---
K51/7	Protection release TRIP alarm	---
K51/8	LC2 load control	---

5.6.2.3. *User mode (see par. 4.5.3)*

The dip-switches are to be set as follows: Dip-switch no. 5 = B, Dip-switch no. 11 = ignored.

Electric contact	Event that caused closing of the relay
K51/1	Configured by user on the PR113 unit
K51/2	Configured by user on the PR113 unit
K51/3	Configured by user on the PR113 unit
K51/4	Configured by user on the PR113 unit
K51/5	Communication problems on the local bus (bus KO)
K51/6	Configured by user on the PR113 unit
K51/7	Configured by user on the PR113 unit
K51/8	Configured by user on the PR113 unit

All contacts (K51/1...K51/8) are associated exclusively with the function selected on the PR113 unit by the user, except the K51/5 contact, which indicates the "Communication problems on the local bus (bus KO)" function.

5.6.3. Connection of 3 SACE PR021/K units with SACE PR113/P

Up to a maximum of three SACE PR021/K units can be connected to the PR113/P unit (see par. 5.14.4).

The only condition is that one PR021/K unit is to be configured as Master, while the other(s) is/are configured as Slave(s).

This allows activating up to (7 + 8 + 3 =) 18 contacts without potential (K51/1, K51/2,...), plus 6 replicated contacts (see Emax user manual).

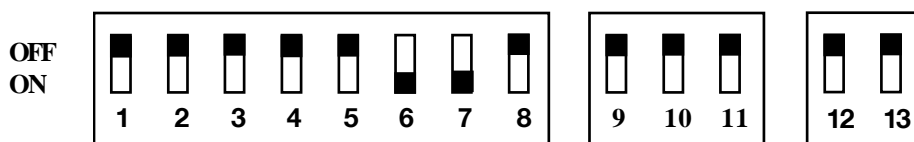
5.7. SACE PR021/K with SACE PR212/P unit

5.7.1. Dip-switch settings

To use the PR021/K unit with the PR212/P protection unit, the dip-switches must be set as follows:

Dip-sw no.	Dip-sw name	Setting	Notes
1	TEST	DIS.	Self-test enabled
		EN.	Self-test disabled
2	K51 Configuration	A/B	Select A or B to choose the functions of the relays (see par. 5.7.2)
3		A/B	
4		A/B	
5		A	Not used, set A
6	MODE	SLAVE	<ul style="list-style-type: none"> "Slave" scenario Slave unit in mixed "Master+Slave" scenario
		MASTER	<ul style="list-style-type: none"> "Master" scenario Master unit in mixed "Master+Slave" scenario
7	BAUD	38.4kb/s	Set 38.4 kbit/s
8	K51/	EN.	Operating mode
		DIS.	Stand-by mode enabled
9	PROG.	OFF	Set this dip-switch to OFF
10	RESET	MAN	Manual Reset mode
		AUT	Automatic Reset mode
11	LATCH	OFF	Normal mode
		ON	Latch mode
12	Term.	OFF	See par. 5.3
13	N.U.	OFF	Not used

Example of dip-switch settings for the PR021/K unit to be connected to the SACE PR212/P release



In the example, the PR021/K has been set as follows:

- Self-test function disabled
- K51 configuration = A-A-A-A
- Master mode
- Baud rate = 38.4Kb/s
- Stand-by function not active
- Manual Reset mode
- Latch mode disabled
- Local bus not terminated

5.7.2. Signals

The signals (K51/1...K51/8) for the SACE PR212 protection release may be divided into 2 modes: Normal and Latch. A description of the signals in these modes is given below.

5.7.2.1. Normal mode (see par. 4.5.1)

Dip-switch no. 11 to be set to its OFF position.

Electric contact	Event that caused closing of the relay
K51/1	L protection alarm or trip (overload)
K51/2	S protection alarm or trip (selective short-circuit)
K51/3	I protection trip (instantaneous short-circuit)
K51/4	G protection alarm or trip (earth fault)
K51/5	Communication problems on the local bus (bus KO)
K51/6	Protection release TRIP alarm
K51/7	Protection release TRIP alarm
K51/8	L function prealarm (overload)

Note 1: Following a TRIP, the status of the signals is frozen signalling the trip (K51/7) and the protection that caused it.

Note 2: If dip switch no. 10 (RESET) is set to its "MAN" position, the signals may be reset as described in par. 4.2.

Note 3: If dip switch no. 10 (RESET) is set to its "AUT" position, the signals are reset automatically when the trip on the protection unit is reset (see par. 4.2).

5.7.2.2. Latch mode (see par. 4.5.2)

Dip-switch no. 11 to be set to its ON position.

Electric contact	Event that caused closing of the relay	Selection of dip-switches no. 2, 3, 4
K51/1	A = L protection alarm (overload)	dip no. 2 = A
	B = L protection trip (overload)	dip no. 2 = B
K51/2	A = S protection alarm (selective short-circuit)	dip no. 3 = A
	B = S protection trip (selective short-circuit)	dip no. 3 = B
K51/3	I protection trip (instantaneous short-circuit)	---
K51/4	A = G protection alarm (earth fault)	dip no. 4 = A
	B = G protection trip (earth fault)	dip no. 4 = B
K51/5	Communication problems on the local bus (bus KO)	---
K51/6	Protection release TRIP alarm	---
K51/7	Protection release TRIP alarm	---
K51/8	L function prealarm (overload)	---

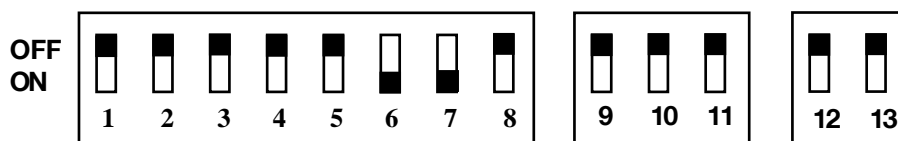
5.8. SACE PR021/K with SACE PR212MP-PR222MP units

5.8.1. Dip-switch settings

To use the PR021/K unit with the PR212MP protection unit, the dip-switches must be set as follows:

Dip-sw no.	Dip-sw name	Setting	Notes
1	TEST	DIS.	Self-test enabled
		EN.	Self-test disabled
2	K51 Configuration	A/B	Select A or B to choose the functions of the relays (see par. 5.8.2)
3		A/B	
4		A/B	
5		A	Not used, set A
6	MODE	MASTER	Set Master
7	BAUD	38.4kb/s	Set 38.4 kbit/s
8	K51/	EN.	Operating mode
		DIS.	Stand-by mode enabled
9	PROG.	OFF	Set this dip-switch to OFF
10	RESET	MAN	Manual Reset mode
		AUT	Automatic Reset mode
11	LATCH	OFF	Normal mode
		ON	Latch mode
12	Term.	OFF	See par. 5.3
13	N.U.	OFF	Not used

Example of dip-switch settings for the PR021/K unit to be connected to the SACE PR212MP release



In the example, the PR021/K has been set as follows:

- Self-test function disabled
- K51 configuration = A-A-A-A
- Master mode
- Baud rate = 38.4Kb/s
- Stand-by function not active
- Manual Reset mode
- Latch mode disabled
- Local bus not terminated

5.8.2. Signals

The signals (K51/1...K51/8) for the SACE PR212MP protection release may be divided into 2 modes: Normal and Latch. A description of the signals in these modes is given below.

5.8.2.1. Normal mode (see par. 4.5.1)

Dip-switch no. 11 to be set to its OFF position.

Electric contact	Event that caused closing of the relay	Selection of dip-switches no. 2, 3, 4
K51/1	L protection alarm or trip (overload)	---
K51/2	R protection alarm or trip (locked rotor)	---
K51/3	I protection trip (instantaneous short-circuit)	---
K51/4	A = U protection alarm or trip (phase loss)	dip no. 2 = A
	B = CW alarm or trip (contacts worn)	dip no. 2 = B
K51/5	Communication problems on the local bus (bus KO)	---
K51/6	A = PTC alarm or trip (motor overtemperature)	dip no. 3 = A
	B = G.P. generic input status (activated if G.P. = 1)	dip no. 3 = B
K51/7	Protection release TRIP alarm	---
K51/8	A = L Function prealarm (overload)	dip no. 4 = A
	B = Backup protection alarm (Note 5)	dip no. 4 = B

Note 1: Following a TRIP, the status of the signals is frozen signalling the trip (K51/7) and the protection that caused it.

Note 2: If dip switch no. 10 (RESET) is set to its "MAN" position, the signals may be reset as described in par. 4.2.

Note 3: If dip switch no. 10 (RESET) is set to its "AUT" position, the signals are reset automatically when the trip on the protection unit is reset (see par. 4.2).

Note 4: If a trip is caused by a protection function not included in the set of signals (for example, a trip for "protection U" has occurred but the K51/4 relay was set for the "CW alarm or trip" signal), only the K51/7 relay (the protection release TRIP alarm) will be switched.

Note 5: Backup protection signalling does not undergo freezing as per Note 1.

5.8.2.2. Latch mode (see par. 4.5.2)

Dip-switch no. 11 to be set to its ON position.

Electric contact	Event that caused closing of the relay	Selection of dip-switches no. 2, 3, 4
K51/1	L protection alarm (overload)	---
K51/2	R protection alarm (locked rotor)	---
K51/3	I protection trip (instantaneous short-circuit)	---
K51/4	A = U protection alarm (phase loss)	dip no. 2 = A
	B = CW alarm (contacts worn)	dip no. 2 = B
K51/5	Communication problems on the local bus (bus KO)	---
K51/6	A = PTC alarm or trip (motor overtemperature)	dip no. 3 = A
	B = G.P. generic input status (activated if G.P. = 1)	dip no. 3 = B
K51/7	Protection release TRIP alarm	---
K51/8	A = L Function prealarm (overload)	dip no. 4 = A
	B = Backup protection alarm	dip no. 4 = B

5.9. SACE PR021/K with SACE PR222DS unit

To work with the PR021/K unit, the communication baud rate of the PR222DS must be set to 19200 bit/s.

5.9.1. Dip-switch settings

To use the PR021/K unit with the PR222DS protection unit, the dip-switches must be set as follows:

Dip-sw no.	Dip-sw name	Setting	Notes
1	TEST	DIS.	Self-test enabled
		EN.	Self-test disabled
2	K51 Configuration	A/B	Select A or B to choose the functions of the relays (see par. 5.9.2)
3		A/B	
4		A/B	
5		A	Not used, set A
6	MODE	MASTER	With PR222DS, the only scenario available is the Master scenario.
7	BAUD	19.2kb/s	Set 19.2 kbit/s
8	K51/	EN.	Operating mode
		DIS.	Stand-by mode enabled
9	PROG.	OFF	Set this dip-switch to OFF
10	RESET	MAN	Manual Reset mode
		AUT	Automatic Reset mode
11	LATCH	OFF	Normal mode
		ON	Latch mode
12	Term.	OFF	See par. 5.3
13	N.U.	OFF	Not used

Example of dip-switch settings for the PR021/K unit to be connected to the SACE PR222DS release



In the example, the PR021/K has been set as follows:

- Self-test function disabled
- K51 configuration = A-A-A-A
- Master mode
- Baud rate = 19.2Kb/s
- Stand-by function not active
- Manual Reset mode
- Latch mode disabled
- Local bus not terminated

5.9.2. Signals

The signals (K51/1...K51/8) for the SACE PR222DS protection release may be divided into 2 modes: Normal and Latch. A description of the signals in these modes is given below.

5.9.2.1. Normal mode (see par. 4.5.1)

Dip-switch no. 11 to be set to its OFF position.

Electric contact	Event that caused closing of the relay
K51/1	L protection alarm or trip (overload)
K51/2	S protection alarm or trip (selective short-circuit)
K51/3	I protection trip (instantaneous short-circuit)
K51/4	G protection alarm or trip (earth fault)
K51/5	Communication problems on the local bus (bus KO)
K51/6	Protection release TRIP alarm
K51/7	Protection release TRIP alarm
K51/8	L function prealarm (overload)

Note 1: Following a TRIP, the status of the signals is frozen signalling the trip (K51/7) and the protection that caused it.

Note 2: If dip switch no. 10 (RESET) is set to its "MAN" position, the signals may be reset as described in par. 4.2.

Note 3: If dip switch no. 10 (RESET) is set to its "AUT" position, the signals are reset automatically when the trip on the protection unit is reset (see par. 4.2).

Note 4: Use of the PR010/T test unit interrupts communication with the PR021/K unit, which will signal a communication error on the local bus by closing the K51/5 contact.

5.9.2.2. Latch mode (see par. 4.5.2)

Dip-switch no. 11 to be set to its ON position.

Electric contact	Event that caused closing of the relay	Selection of dip-switches no. 2, 3, 4
K51/1	A = L protection alarm (overload)	dip no. 2 = A
	B = L protection trip (overload)	dip no. 2 = B
K51/2	A = S protection alarm (selective short-circuit)	dip no. 3 = A
	B = S protection trip (selective short-circuit)	dip no. 3 = B
K51/3	I protection trip (instantaneous short-circuit)	---
K51/4	A = G protection alarm (earth fault)	dip no. 4 = A
	B = G protection trip (earth fault)	dip no. 4 = B
K51/5	Communication problems on the local bus (bus KO)	---
K51/6	Protection release TRIP alarm	---
K51/7	Protection release TRIP alarm	---
K51/8	L function prealarm (overload)	---

5.10. SACE PR021/K with SACE PR223EF unit

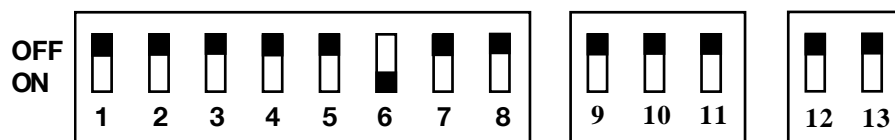
To work with the PR021/K unit, the communication baud rate of the PR223EF unit must be set to 19200 bit/s.

5.10.1. Dip-switch settings

To use the PR021/K unit with the PR223EF protection unit, the dip-switches must be set as follows:

Dip-sw no.	Dip-sw name	Setting	Notes
1	TEST	DIS.	Self-test enabled
		EN.	Self-test disabled
2	K51 Configuration	A/B	Select A or B to choose the functions of the relays (see par. 5.10.2)
3		A/B	
4		A/B	
5		A/B	
6	MODE	MASTER	With PR223EF, the only scenario available is the Master scenario.
7	BAUD	19.2kb/s	Set 19.2 kbit/s
8	K51/	EN.	Operating mode
		DIS.	Stand-by mode enabled
9	PROG.	OFF	Set this dip-switch to OFF
10	RESET	MAN	Manual Reset mode
		AUT	Automatic Reset mode
11	LATCH	OFF	Normal mode
		ON	Latch mode
12	Term.	OFF	See par. 5.3
13	N.U.	OFF	Not used

Example of dip-switch settings for the PR021/K unit to be connected to the SACE PR223EF release



In the example, the PR021/K has been set as follows:

- Self-test function disabled
- K51 configuration = A-A-A-A
- Master mode
- Baud rate = 19.2Kb/s
- Stand-by function not active
- Manual Reset mode
- Latch mode disabled
- Local bus not terminated

5.10.2. Signals

The signals (K51/1...K51/8) for the SACE PR223EF protection release may be divided into 3 modes: Normal, Latch and User. A description of the signals in these modes is given below.

5.10.2.1. Normal mode (see par. 4.5.1)

The dip-switches are to be set as follows: Dip-switch no. 5 = A, Dip-switch no. 11 = OFF.

Electric contact	Event that caused closing of the relay	Selection of dip-switches no. 2, 3, 4
K51/1	L protection alarm or trip (overload)	---
K51/2	S protection alarm or trip (selective short-circuit)	---
K51/3	I or EF protection trip (instantaneous short-circuit)	---
K51/4	G protection alarm or trip (earth fault)	---
K51/5	Communication problems on the local bus (bus KO)	---
K51/6	Backup protection alarm (Note 2)	---
K51/7	Protection release TRIP alarm	---
K51/8	A = L Function prealarm (overload)	dip no. 4 = A
	B = Interlock alarm	dip no. 4 = B

Note 1: Following a TRIP, the status of the signals is frozen signalling the trip (K51/7) and the protection that caused it.

Note 2: The signals bearing this marking are not frozen as indicated in Note 1.

Note 3: If dip switch no. 10 (RESET) is set to its "MAN" position, the signals may be reset as described in par. 4.2.

Note 4: If dip switch no. 10 (RESET) is set to its "AUT" position, the signals are reset automatically when the trip on the protection unit is reset (see par. 4.2).

Note 5: Use of the PR010/T test unit interrupts communication with the PR021/K unit, which will signal a communication error on the local bus by closing the K51/5 contact.

5.10.2.2. Latch mode (see par. 4.5.2)

The dip-switches are to be set as follows: Dip-switch no. 5 = A, Dip-switch no. 11 = ON.

Electric contact	Event that caused closing of the relay	Selection of dip-switches no. 2, 3, 4
K51/1	A = L protection alarm (overload)	dip no. 2 = A
	B = L protection trip (overload)	dip no. 2 = B
K51/2	A = S protection alarm (selective short-circuit)	dip no. 3 = A
	B = S protection trip (selective short-circuit)	dip no. 3 = B
K51/3	I protection trip (instantaneous short-circuit)	---
K51/4	G protection alarm (earth fault)	---
K51/5	Communication problems on the local bus (bus KO)	---
K51/6	Backup protection alarm	---
K51/7	Protection release TRIP alarm	---
K51/8	A = L Function prealarm (overload)	dip no. 4 = A
	B = Interlock alarm	dip no. 4 = B

5.10.2.3. User mode (see par. 4.5.3)

The dip-switches are to be set as follows: Dip-switch no. 5 = B, Dip-switch no. 11 = ignored.

Electric contact	Event that caused closing of the relay
K51/1	Configured by user on the PR223EF unit
K51/2	Configured by user on the PR223EF unit
K51/3	Configured by user on the PR223EF unit
K51/4	Configured by user on the PR223EF unit
K51/5	Communication problems on the local bus (bus KO)
K51/6	Configured by user on the PR223EF unit
K51/7	Configured by user on the PR223EF unit
K51/8	Configured by user on the PR223EF unit

All contacts (K51/1...K51/8) are associated exclusively with the function selected on the PR223EF unit by the user, except the K51/5 contact, which indicates the "Communication problems on the local bus (bus KO)" function.

5.11. SACE PR021/K with SACE PR121/P unit

5.11.1. Dip-switch settings

To use the PR021/K unit with the PR121/P protection unit, the dip-switches must be set as follows:

Dip-sw no.	Dip-sw name	Setting	Notes
1	TEST	DIS.	Self-test enabled
		EN.	Self-test disabled
2	K51 Configuration	A/B	Select A or B to choose the functions of the relays (see par. 5.11.2)
3		A/B	
4		A/B	
5		A/B	
6	MODE	SLAVE	<ul style="list-style-type: none"> "Slave" scenario Slave unit in mixed "Master+Slave" scenario
		MASTER	<ul style="list-style-type: none"> "Master" scenario Master unit in mixed "Master+Slave" scenario
7	BAUD	19.2kb/s	Set 19.2 kbit/s
8	K51/	EN.	Operating mode
		DIS.	Stand-by mode enabled
9	PROG.	OFF	Set this dip-switch to OFF
10	RESET	MAN	Manual Reset mode
		AUT	Automatic Reset mode
11	LATCH	OFF	Normal mode
		ON	Latch mode
12	Term.	OFF	See par. 5.3
13	N.U.	OFF	Not used

Example of dip-switch settings for the PR021/K unit to be connected to the SACE PR121/P release



In the example, the PR021/K has been set as follows:

- Self-test function disabled
- K51 configuration = A-A-A-A
- Master mode
- Baud rate = 19.2Kb/s
- Stand-by function not active
- Manual Reset mode
- Latch mode disabled
- Local bus not terminated

5.11.2. Signals

The signals (K51/1...K51/8) for the SACE PR121/P protection release may be divided into 3 modes: Normal, Latch and User. A description of the signals in these modes is given below.

5.11.2.1. Normal mode (see par. 4.5.1)

The dip-switches are to be set as follows: Dip-switch no. 5 = A, Dip-switch no. 11 = OFF.

Electric contact	Event that caused closing of the relay	Selection of dip-switches no. 2, 3, 4
K51/1	L protection alarm or trip (overload)	---
K51/2	S protection alarm or trip (selective short-circuit)	---
K51/3	I protection trip (instantaneous short-circuit)	---
K51/4	G protection alarm or trip (earth fault)	---
K51/5	Communication problems on the local bus (bus KO)	---
K51/6	L function prealarm (overload)	---
K51/7	Protection release TRIP alarm	---
K51/8	A = Backup protection alarm (Note 2)	dip no. 4 = A
	B = Hardware alarm	dip no. 4 = B

Note 1: Following a TRIP, the status of the signals is frozen signalling the trip (K51/7) and the protection that caused it.

Note 2: The signals bearing this marking are not frozen as indicated in Note 1.

Note 3: If dip switch no. 10 (RESET) is set to its "MAN" position, the signals may be reset as described in par. 4.2.

Note 4: If dip switch no. 10 (RESET) is set to its "AUT" position, the signals are reset automatically when the trip on the protection unit is reset (see par. 4.2).

5.11.2.2. *Latch mode (see par. 4.5.2)*

The dip-switches are to be set as follows: Dip-switch no. 5 = A, Dip-switch no. 11 = ON.

Electric contact	Event that caused closing of the relay	Selection of dip-switches no. 2, 3, 4
K51/1	A = L protection alarm (overload)	dip no. 2 = A
	B = L protection trip (overload)	dip no. 2 = B
K51/2	A = S protection alarm (selective short-circuit)	dip no. 3 = A
	B = S protection trip (selective short-circuit)	dip no. 3 = B
K51/3	I protection trip (instantaneous short-circuit)	---
K51/4	G protection alarm (earth fault)	---
K51/5	Communication problems on the local bus (bus KO)	---
K51/6	L function prealarm (overload)	---
K51/7	Protection release TRIP alarm	---
K51/8	A = Backup protection alarm	dip no. 4 = A
	B = Hardware alarm	dip no. 4 = B

5.11.2.3. *User mode (see par. 4.5.3)*

The dip-switches are to be set as follows: Dip-switch no. 5 = B, Dip-switch no. 11 = ignored.

Electric contact	Event that caused closing of the relay
K51/1	Configured by user on the PR121/P unit
K51/2	Configured by user on the PR121/P unit
K51/3	Configured by user on the PR121/P unit
K51/4	Configured by user on the PR121/P unit
K51/5	Communication problems on the local bus (bus KO)
K51/6	Configured by user on the PR121/P unit
K51/7	Configured by user on the PR121/P unit
K51/8	Configured by user on the PR121/P unit

All contacts (K51/1...K51/8) are associated exclusively with the function selected on the PR121/P unit by the user, except the K51/5 contact, which indicates the "Communication problems on the local bus (bus KO)" function.

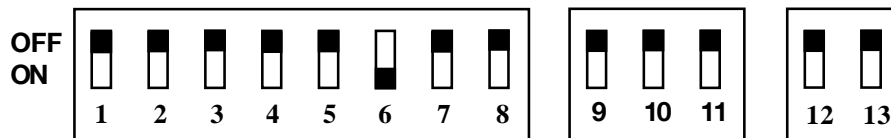
5.12. SACE PR021/K with SACE PR122/P unit

5.12.1. Dip-switch settings

To use the PR021/K unit with the PR122/P protection unit, the dip-switches must be set as follows:

Dip-sw no.	Dip-sw name	Setting	Notes
1	TEST	DIS.	Self-test enabled
		EN.	Self-test disabled
2	K51 Configuration	A/B	Select A or B to choose the functions of the relays (see par. 5.12.2)
3		A/B	
4		A/B	
5		A/B	
6	MODE	SLAVE	<ul style="list-style-type: none"> "Slave" scenario Slave unit in mixed "Master+Slave" scenario
		MASTER	<ul style="list-style-type: none"> "Master" scenario Master unit in mixed "Master+Slave" scenario
7	BAUD	19.2kb/s	Set 19.2 kbit/s
8	K51/	EN.	Operating mode
		DIS.	Stand-by mode enabled
9	PROG.	OFF	Set this dip-switch to OFF
10	RESET	MAN	Manual Reset mode
		AUT	Automatic Reset mode
11	LATCH	OFF	Normal mode
		ON	Latch mode
12	Term.	OFF	See par. 5.3
13	N.U.	OFF	Not used

Example of dip-switch settings for the PR021/K unit to be connected to the SACE PR122/P release



In the example, the PR021/K has been set as follows:

- Self-test function disabled
- K51 configuration = A-A-A-A
- Master mode
- Baud rate = 19.2Kb/s
- Stand-by function not active
- Manual Reset mode
- Latch mode disabled
- Local bus not terminated

5.12.2. Signals

The signals (K51/1...K51/8) for the SACE PR122/P protection release may be divided into 3 modes: Normal, Latch and User. A description of the signals in these modes is given below.

5.12.2.1. Normal mode (see par. 4.5.1)

The dip-switches are to be set as follows: Dip-switch no. 5 = A, Dip-switch no. 11 = OFF.

Electric contact	Event that caused closing of the relay	Selection of dip-switches no. 2, 3, 4
K51/1	L protection alarm or trip (overload)	---
K51/2	S protection alarm or trip (selective short-circuit)	---
K51/3	I protection trip (instantaneous short-circuit)	---
K51/4	A = G protection alarm or trip (earth fault)	dip no. 2 = A
	B = LC1 load control (Note 2)	dip no. 2 = B
K51/5	Communication problems on the local bus (bus KO)	---
K51/6	A = L Function prealarm (overload)	dip no. 3 = A
	B = LC2 load control (Note 2)	dip no. 3 = B
K51/7	Protection release TRIP alarm	---
K51/8	A = Backup protection alarm (Note 2)	dip no. 4 = A
	B = Hardware alarm	dip no. 4 = B

Note 1: Following a TRIP, the status of the signals is frozen signalling the trip (K51/7) and the protection that caused it.

Note 2: The signals bearing this marking are not frozen as indicated in Note 1.

Note 3: If dip switch no. 10 (RESET) is set to its "MAN" position, the signals may be reset as described in par. 4.2.

Note 4: If dip switch no. 10 (RESET) is set to its "AUT" position, the signals are reset automatically when the trip on the protection unit is reset (see par. 4.2).

Note 5: If a trip is caused by a protection function not included in the set of signals (for example, a trip for "protection G" has occurred but the K51/4 relay was set for the "LC1 load control" signal), only the K51/7 relay (the protection release TRIP alarm) will be switched.

5.12.2.2. Latch mode (see par. 4.5.2)

The dip-switches are to be set as follows: Dip-switch no. 5 = A, Dip-switch no. 11 = ON.

Electric contact	Event that caused closing of the relay	Selection of dip-switches no. 2, 3, 4
K51/1	L protection alarm (overload)	---
K51/2	S protection alarm (selective short-circuit)	---
K51/3	I protection trip (instantaneous short-circuit)	---
K51/4	A = G protection alarm (earth fault)	dip no. 2 = A
	B = LC1 load control	dip no. 2 = B
K51/5	Communication problems on the local bus (bus KO)	---
K51/6	A = L Function prealarm (overload)	dip no. 3 = A
	B = LC2 load control	dip no. 3 = B
K51/7	Protection release TRIP alarm	---
K51/8	A = Backup protection alarm	dip no. 4 = A
	B = Hardware alarm	dip no. 4 = B

5.12.2.3. *User mode (see par. 4.5.3)*

The dip-switches are to be set as follows: Dip-switch no. 5 = B, Dip-switch no. 11 = ignored.

Electric contact	Event that caused closing of the relay
K51/1	Configured by user on the PR122/P unit
K51/2	Configured by user on the PR122/P unit
K51/3	Configured by user on the PR122/P unit
K51/4	Configured by user on the PR122/P unit
K51/5	Communication problems on the local bus (bus KO)
K51/6	Configured by user on the PR122/P unit
K51/7	Configured by user on the PR122/P unit
K51/8	Configured by user on the PR122/P unit

All contacts (K51/1...K51/8) are associated exclusively with the function selected on the PR122/P unit by the user, except the K51/5 contact, which indicates the "Communication problems on the local bus (bus KO)" function.

5.13. SACE PR021/K with SACE PR123/P unit

5.13.1. *Dip-switch settings*

To use the PR021/K unit with the PR123/P protection unit, the dip-switches must be set as follows:

Dip-sw no.	Dip-sw name	Setting	Notes
1	TEST	DIS.	Self-test enabled
		EN.	Self-test disabled
2	K51 Configuration	A/B	Select A or B to choose the functions of the relays (see par. 5.13.2)
3		A/B	
4		A/B	
5		A/B	
6	MODE	SLAVE	<ul style="list-style-type: none"> "Slave" scenario Slave unit in mixed "Master+Slave" scenario
		MASTER	<ul style="list-style-type: none"> "Master" scenario Master unit in mixed "Master+Slave" scenario
7	BAUD	19.2kb/s	Set 19.2 kbit/s
8	K51/	EN.	Operating mode
		DIS.	Stand-by mode enabled
9	PROG.	OFF	Set this dip-switch to OFF
10	RESET	MAN	Manual Reset mode
		AUT	Automatic Reset mode
11	LATCH	OFF	Normal mode
		ON	Latch mode
12	Term.	OFF	See par. 5.3
13	N.U.	OFF	Not used

Example of dip-switch settings for the PR021/K unit to be connected to the SACE PR123/P release



In the example, the PR021/K has been set as follows:

- Self-test function disabled
- K51 configuration = A-A-A-A
- Master mode
- Baud rate = 19.2Kb/s
- Stand-by function not active
- Manual Reset mode
- Latch mode disabled
- Local bus not terminated

5.13.2. Signals

The signals (K51/1...K51/8) for the SACE PR123/P protection release may be divided into 3 modes: Normal, Latch and User. A description of the signals in these modes is given below.

5.13.2.1. Normal mode (see par. 4.5.1)

The dip-switches are to be set as follows: Dip-switch no. 5 = A, Dip-switch no. 11 = OFF.

Electric contact	Event that caused closing of the relay	Selection of dip-switches no. 2, 3, 4
K51/1	L protection alarm or trip (overload)	---
K51/2	S protection alarm or trip (selective short-circuit)	---
K51/3	I protection trip (instantaneous short-circuit)	---
K51/4	A = G protection alarm or trip (earth fault)	dip no. 2 = A
	B = LC1 load control (Note 2)	dip no. 2 = B
K51/5	Communication problems on the local bus (bus KO)	---
K51/6	A = L Function prealarm (overload)	dip no. 3 = A
	B = LC2 load control (Note 2)	dip no. 3 = B
K51/7	Protection release TRIP alarm	---
K51/8	A = Backup protection alarm (Note 2)	dip no. 4 = A
	B = Hardware alarm	dip no. 4 = B

Note 1: Following a TRIP, the status of the signals is frozen signalling the trip (K51/7) and the protection that caused it.

Note 2: The signals bearing this marking are not frozen as indicated in Note 1.

Note 3: If dip switch no. 10 (RESET) is set to its "MAN" position, the signals may be reset as described in par. 4.2.

Note 4: If dip switch no. 10 (RESET) is set to its "AUT" position, the signals are reset automatically when the trip on the protection unit is reset (see par. 4.2).

Note 5: If a trip is caused by a protection function not included in the set of signals (for example, a trip for "protection G" has occurred but the K51/4 relay was set for the "LC1 load control" signal), only the K51/7 relay (the protection release TRIP alarm) will be switched.

5.13.2.2. Latch mode (see par. 4.5.2)

The dip-switches are to be set as follows: Dip-switch no. 5 = A, Dip-switch no. 11 = ON.

Electric contact	Event that caused closing of the relay	Selection of dip-switches no. 2, 3, 4
K51/1	L protection alarm (overload)	---
K51/2	S protection alarm (selective short-circuit)	---
K51/3	I protection trip (instantaneous short-circuit)	---
K51/4	A = G protection alarm (earth fault)	dip no. 2 = A
	B = LC1 load control	dip no. 2 = B
K51/5	Communication problems on the local bus (bus KO)	---
K51/6	A = L Function prealarm (overload)	dip no. 3 = A
	B = LC2 load control	dip no. 3 = B
K51/7	Protection release TRIP alarm	---
K51/8	A = Backup protection alarm	dip no. 4 = A
	B = Hardware alarm	dip no. 4 = B

5.13.2.3. User mode (see par. 4.5.3)

The dip-switches are to be set as follows: Dip-switch no. 5 = B, Dip-switch no. 11 = ignored.

Electric contact	Event that caused closing of the relay
K51/1	Configured by user on the PR123/P unit
K51/2	Configured by user on the PR123/P unit
K51/3	Configured by user on the PR123/P unit
K51/4	Configured by user on the PR123/P unit
K51/5	Communication problems on the local bus (bus KO)
K51/6	Configured by user on the PR123/P unit
K51/7	Configured by user on the PR123/P unit
K51/8	Configured by user on the PR123/P unit

All contacts (K51/1...K51/8) are associated exclusively with the function selected on the PR123/P unit by the user, except the K51/5 contact, which indicates the "Communication problems on the local bus (bus KO)" function.

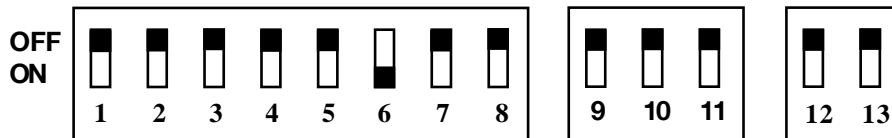
5.14. SACE PR021/K with SACE PR331/P unit

5.14.1. Dip-switch settings

To use the PR021/K unit with the PR331/P protection unit, the dip-switches must be set as follows:

Dip-sw no.	Dip-sw name	Setting	Notes
1	TEST	DIS.	Self-test enabled
		EN.	Self-test disabled
2	K51 Configuration	A/B	Select A or B to choose the functions of the relays (see par. 5.14.2)
3		A/B	
4		A/B	
5		A/B	
6	MODE	SLAVE	<ul style="list-style-type: none"> "Slave" scenario Slave unit in mixed "Master+Slave" scenario
		MASTER	<ul style="list-style-type: none"> "Master" scenario Master unit in mixed "Master+Slave" scenario
7	BAUD	19.2kb/s	Set 19.2 kbit/s
8	K51/	EN.	Operating mode
		DIS.	Stand-by mode enabled
9	PROG.	OFF	Set this dip-switch to OFF
10	RESET	MAN	Manual Reset mode
		AUT	Automatic Reset mode
11	LATCH	OFF	Normal mode
		ON	Latch mode
12	Term.	OFF	See par. 5.3
13	N.U.	OFF	Not used

Example of dip-switch settings for the PR021/K unit to be connected to the SACE PR331/P release



In the example, the PR021/K has been set as follows:

- Self-test function disabled
- K51 configuration = A-A-A-A
- Master mode
- Baud rate = 19.2Kb/s
- Stand-by function not active
- Manual Reset mode
- Latch mode disabled
- Local bus not terminated

5.14.2. Signals

The signals (K51/1...K51/8) for the SACE PR331/P protection release may be divided into 3 modes: Normal, Latch and User. A description of the signals in these modes is given below.

5.14.2.1. Normal mode (see par. 4.5.1)

The dip-switches are to be set as follows: Dip-switch no. 5 = A, Dip-switch no. 11 = OFF.

Electric contact	Event that caused closing of the relay	Selection of dip-switches no. 2, 3, 4
K51/1	L protection alarm or trip (overload)	---
K51/2	S protection alarm or trip (selective short-circuit)	---
K51/3	I protection trip (instantaneous short-circuit)	---
K51/4	G protection alarm or trip (earth fault)	---
K51/5	Communication problems on the local bus (bus KO)	---
K51/6	L function prealarm (overload)	---
K51/7	Protection release TRIP alarm	---
K51/8	A = Backup protection alarm (Note 2)	dip no. 4 = A
	B = Hardware alarm	dip no. 4 = B

Note 1: Following a TRIP, the status of the signals is frozen signalling the trip (K51/7) and the protection that caused it.

Note 2: The signals bearing this marking are not frozen as indicated in Note 1.

Note 3: If dip switch no. 10 (RESET) is set to its "MAN" position, the signals may be reset as described in par. 4.2.

Note 4: If dip switch no. 10 (RESET) is set to its "AUT" position, the signals are reset automatically when the trip on the protection unit is reset (see par. 4.2).

5.14.2.2. Latch mode (see par. 4.5.2)

The dip-switches are to be set as follows: Dip-switch no. 5 = A, Dip-switch no. 11 = ON.

Electric contact	Event that caused closing of the relay	Selection of dip-switches no. 2, 3, 4
K51/1	A = L protection alarm (overload)	dip no. 2 = A
	B = L protection trip (overload)	dip no. 2 = B
K51/2	A = S protection alarm (selective short-circuit)	dip no. 3 = A
	B = S protection trip (selective short-circuit)	dip no. 3 = B
K51/3	I protection trip (instantaneous short-circuit)	---
K51/4	G protection alarm (earth fault)	---
K51/5	Communication problems on the local bus (bus KO)	---
K51/6	L function prealarm (overload)	---
K51/7	Protection release TRIP alarm	---
K51/8	A = Backup protection alarm	dip no. 4 = A
	B = Hardware alarm	dip no. 4 = B

5.14.2.3. *User mode (see par. 4.5.3)*

The dip-switches are to be set as follows: Dip-switch no. 5 = B, Dip-switch no. 11 = ignored.

Electric contact	Event that caused closing of the relay
K51/1	Configured by user on the PR331/P unit
K51/2	Configured by user on the PR331/P unit
K51/3	Configured by user on the PR331/P unit
K51/4	Configured by user on the PR331/P unit
K51/5	Communication problems on the local bus (bus KO)
K51/6	Configured by user on the PR331/P unit
K51/7	Configured by user on the PR331/P unit
K51/8	Configured by user on the PR331/P unit

All contacts (K51/1...K51/8) are associated exclusively with the function selected on the PR331/P unit by the user, except the K51/5 contact, which indicates the "Communication problems on the local bus (bus KO)" function.

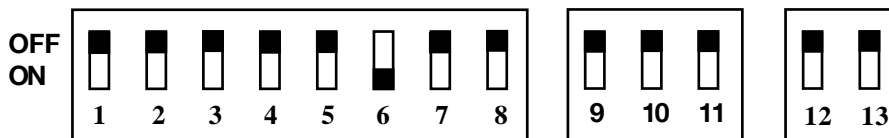
5.15. SACE PR021/K with SACE PR332/P unit

5.15.1. Dip-switch settings

To use the PR021/K unit with the PR332/P protection unit, the dip-switches must be set as follows:

Dip-sw no.	Dip-sw name	Setting	Notes
1	TEST	DIS.	Self-test enabled
		EN.	Self-test disabled
2	K51 Configuration	A/B	Select A or B to choose the functions of the relays (see par. 5.15.2)
3		A/B	
4		A/B	
5		A/B	
6	MODE	SLAVE	<ul style="list-style-type: none"> "Slave" scenario Slave unit in mixed "Master+Slave" scenario
		MASTER	<ul style="list-style-type: none"> "Master" scenario Master unit in mixed "Master+Slave" scenario
7	BAUD	19.2kb/s	Set 19.2 kbit/s
8	K51/	EN.	Operating mode
		DIS.	Stand-by mode enabled
9	PROG.	OFF	Set this dip-switch to OFF
10	RESET	MAN	Manual Reset mode
		AUT	Automatic Reset mode
11	LATCH	OFF	Normal mode
		ON	Latch mode
12	Term.	OFF	See par. 5.3
13	N.U.	OFF	Not used

Example of dip-switch settings for the PR021/K unit to be connected to the SACE PR332/P release



In the example, the PR021/K has been set as follows:

- Self-test function disabled
- K51 configuration = A-A-A-A
- Master mode
- Baud rate = 19.2Kb/s
- Stand-by function not active
- Manual Reset mode
- Latch mode disabled
- Local bus not terminated

5.15.2. Signals

The signals (K51/1...K51/8) for the SACE PR332/P protection release may be divided into 3 modes: Normal, Latch and User. A description of the signals in these modes is given below.

5.15.2.1. Normal mode (see par. 4.5.1)

The dip-switches are to be set as follows: Dip-switch no. 5 = A, Dip-switch no. 11 = OFF.

Electric contact	Event that caused closing of the relay	Selection of dip-switches no. 2, 3, 4
K51/1	L protection alarm or trip (overload)	---
K51/2	S protection alarm or trip (selective short-circuit)	---
K51/3	I protection trip (instantaneous short-circuit)	---
K51/4	A = G protection alarm or trip (earth fault)	dip no. 2 = A
	B = LC1 load control (Note 2)	dip no. 2 = B
K51/5	Communication problems on the local bus (bus KO)	---
K51/6	A = L Function prealarm (overload)	dip no. 3 = A
	B = LC2 load control (Note 2)	dip no. 3 = B
K51/7	Protection release TRIP alarm	---
K51/8	A = Backup protection alarm (Note 2)	dip no. 4 = A
	B = Hardware alarm	dip no. 4 = B

Note 1: Following a TRIP, the status of the signals is frozen signalling the trip (K51/7) and the protection that caused it.

Note 2: The signals bearing this marking are not frozen as indicated in Note 1.

Note 3: If dip switch no. 10 (RESET) is set to its "MAN" position, the signals may be reset as described in par. 4.2.

Note 4: If dip switch no. 10 (RESET) is set to its "AUT" position, the signals are reset automatically when the trip on the protection unit is reset (see par. 4.2).

Note 5: If a trip is caused by a protection function not included in the set of signals (for example, a trip for "protection G" has occurred but the K51/4 relay was set for the "LC1 load control" signal), only the K51/7 relay (the protection release TRIP alarm) will be switched.

5.15.2.2. Latch mode (see par. 4.5.2)

The dip-switches are to be set as follows: Dip-switch no. 5 = A, Dip-switch no. 11 = ON.

Electric contact	Event that caused closing of the relay	Selection of dip-switches no. 2, 3, 4
K51/1	L protection alarm (overload)	---
K51/2	S protection alarm (selective short-circuit)	---
K51/3	I protection trip (instantaneous short-circuit)	---
K51/4	A = G protection alarm (earth fault)	dip no. 2 = A
	B = LC1 load control	dip no. 2 = B
K51/5	Communication problems on the local bus (bus KO)	---
K51/6	A = L Function prealarm (overload)	dip no. 3 = A
	B = LC2 load control	dip no. 3 = B
K51/7	Protection release TRIP alarm	---
K51/8	A = Backup protection alarm	dip no. 4 = A
	B = Hardware alarm	dip no. 4 = B

5.15.2.3. *User mode (see par. 4.5.3)*

The dip-switches are to be set as follows: Dip-switch no. 5 = B, Dip-switch no. 11 = ignored.

Electric contact	Event that caused closing of the relay
K51/1	Configured by user on the PR332/P unit
K51/2	Configured by user on the PR332/P unit
K51/3	Configured by user on the PR332/P unit
K51/4	Configured by user on the PR332/P unit
K51/5	Communication problems on the local bus (bus KO)
K51/6	Configured by user on the PR332/P unit
K51/7	Configured by user on the PR332/P unit
K51/8	Configured by user on the PR332/P unit

All contacts (K51/1...K51/8) are associated exclusively with the function selected on the PR332/P unit by the user, except the K51/5 contact, which indicates the "Communication problems on the local bus (bus KO)" function.

5.16. SACE PR021/K with SACE PR333/P unit

5.16.1. Dip-switch settings

To use the PR021/K unit with the PR333/P protection unit, the dip-switches must be set as follows:

Dip-sw no.	Dip-sw name	Setting	Notes
1	TEST	DIS.	Self-test enabled
		EN.	Self-test disabled
2	K51 Configuration	A/B	Select A or B to choose the functions of the relays (see par. 5.16.2)
3		A/B	
4		A/B	
5		A/B	
6	MODE	SLAVE	<ul style="list-style-type: none"> "Slave" scenario Slave unit in mixed "Master+Slave" scenario
		MASTER	<ul style="list-style-type: none"> "Master" scenario Master unit in mixed "Master+Slave" scenario
7	BAUD	19.2kb/s	Set 19.2 kbit/s
8	K51/	EN.	Operating mode
		DIS.	Stand-by mode enabled
9	PROG.	OFF	Set this dip-switch to OFF
10	RESET	MAN	Manual Reset mode
		AUT	Automatic Reset mode
11	LATCH	OFF	Normal mode
		ON	Latch mode
12	Term.	OFF	See par. 5.3
13	N.U.	OFF	Not used

Example of dip-switch settings for the PR021/K unit to be connected to the SACE PR333/P release



In the example, the PR021/K has been set as follows:

- Self-test function disabled
- K51 configuration = A-A-A-A
- Master mode
- Baud rate = 19.2Kb/s
- Stand-by function not active
- Manual Reset mode
- Latch mode disabled
- Local bus not terminated

5.16.2. Signals

The signals (K51/1...K51/8) for the SACE PR333/P protection release may be divided into 3 modes: Normal, Latch and User. A description of the signals in these modes is given below.

5.16.2.1. Normal mode (see par. 4.5.1)

The dip-switches are to be set as follows: Dip-switch no. 5 = A, Dip-switch no. 11 = OFF.

Electric contact	Event that caused closing of the relay	Selection of dip-switches no. 2, 3, 4
K51/1	L protection alarm or trip (overload)	---
K51/2	S protection alarm or trip (selective short-circuit)	---
K51/3	I protection trip (instantaneous short-circuit)	---
K51/4	A = G protection alarm or trip (earth fault)	dip no. 2 = A
	B = LC1 load control (Note 2)	dip no. 2 = B
K51/5	Communication problems on the local bus (bus KO)	---
K51/6	A = L Function prealarm (overload)	dip no. 3 = A
	B = LC2 load control (Note 2)	dip no. 3 = B
K51/7	Protection release TRIP alarm	---
K51/8	A = Backup protection alarm (Note 2)	dip no. 4 = A
	B = Hardware alarm	dip no. 4 = B

Note 1: Following a TRIP, the status of the signals is frozen signalling the trip (K51/7) and the protection that caused it.

Note 2: The signals bearing this marking are not frozen as indicated in Note 1.

Note 3: If dip switch no. 10 (RESET) is set to its "MAN" position, the signals may be reset as described in par. 4.2.

Note 4: If dip switch no. 10 (RESET) is set to its "AUT" position, the signals are reset automatically when the trip on the protection unit is reset (see par. 4.2).

Note 5: If a trip is caused by a protection function not included in the set of signals (for example, a trip for "protection G" has occurred but the K51/4 relay was set for the "LC1 load control" signal), only the K51/7 relay (the protection release TRIP alarm) will be switched.

5.16.2.2. *Latch mode (see par. 4.5.2)*

The dip-switches are to be set as follows: Dip-switch no. 5 = A, Dip-switch no. 11 = ON.

Electric contact	Event that caused closing of the relay	Selection of dip-switches no. 2, 3, 4
K51/1	L protection alarm or trip (overload)	---
K51/2	S protection alarm or trip (selective short-circuit)	---
K51/3	I protection trip (instantaneous short-circuit)	---
K51/4	A = G protection alarm or trip (earth fault)	dip no. 2 = A
	B = LC1 load control	dip no. 2 = B
K51/5	Communication problems on the local bus (bus KO)	---
K51/6	A = L Function prealarm (overload)	dip no. 3 = A
	B = LC2 load control	dip no. 3 = B
K51/7	Protection release TRIP alarm	---
K51/8	A = Backup protection alarm	dip no. 4 = A
	B = Hardware alarm	dip no. 4 = B

5.16.2.3. *User mode (see par. 4.5.3)*

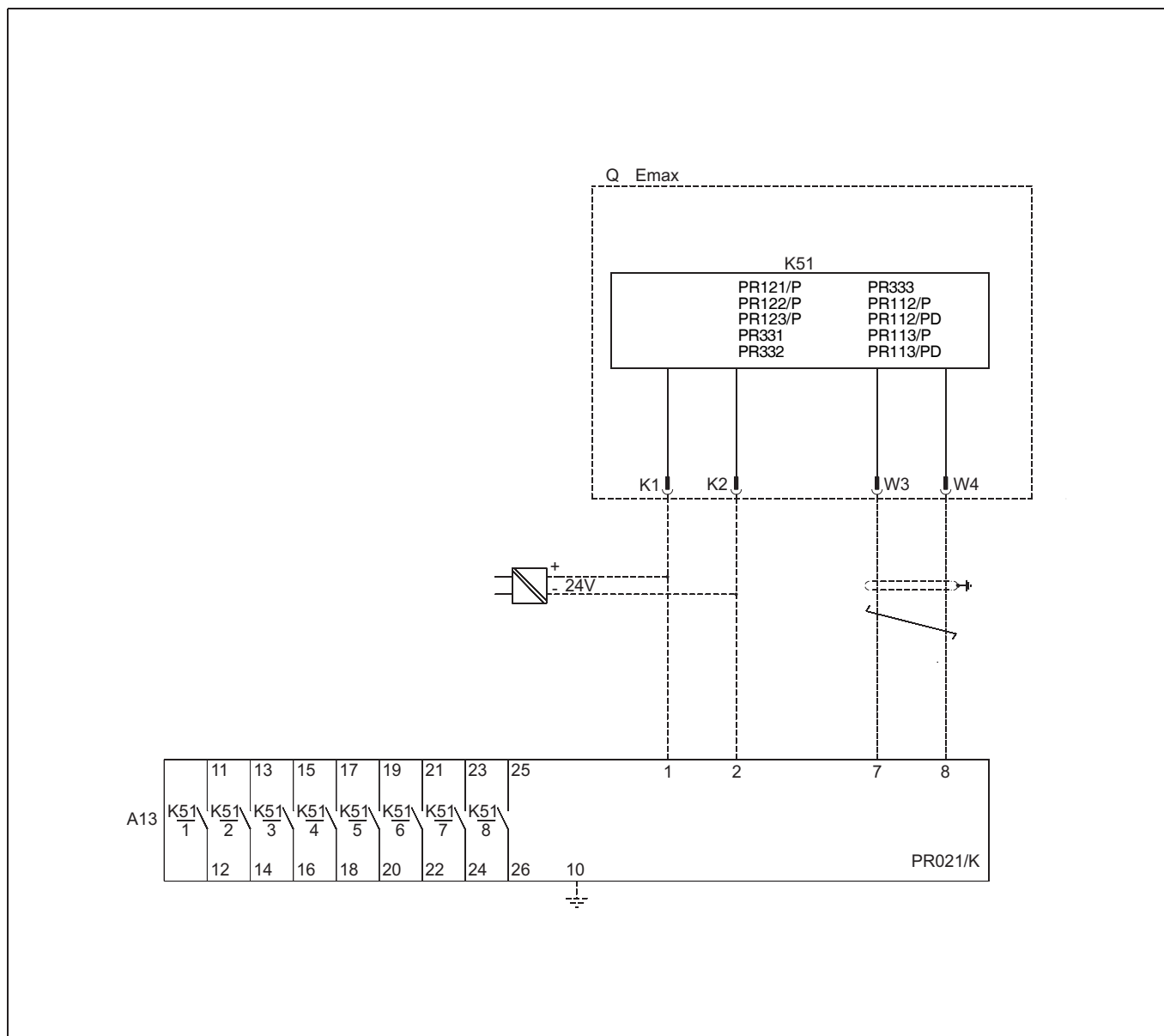
The dip-switches are to be set as follows: Dip-switch no. 5 = B, Dip-switch no. 11 = ignored.

Electric contact	Event that caused closing of the relay
K51/1	Configured by user on the PR333/P unit
K51/2	Configured by user on the PR333/P unit
K51/3	Configured by user on the PR333/P unit
K51/4	Configured by user on the PR333/P unit
K51/5	Communication problems on the local bus (bus KO)
K51/6	Configured by user on the PR333/P unit
K51/7	Configured by user on the PR333/P unit
K51/8	Configured by user on the PR333/P unit

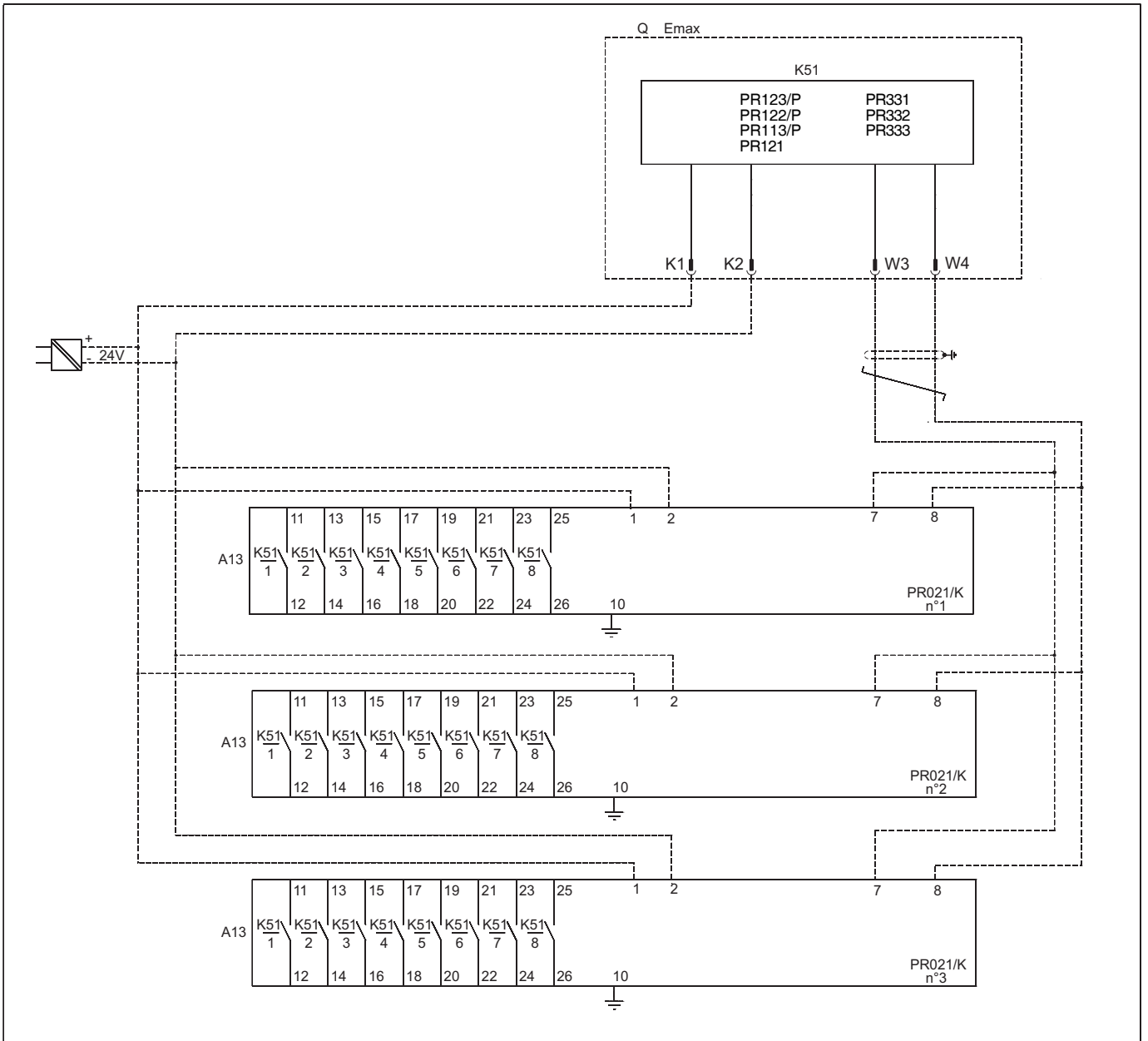
All contacts (K51/1...K51/8) are associated exclusively with the function selected on the PR333/P unit by the user, except the K51/5 contact, which indicates the "Communication problems on the local bus (bus KO)" function.

5.17. Wiring diagrams

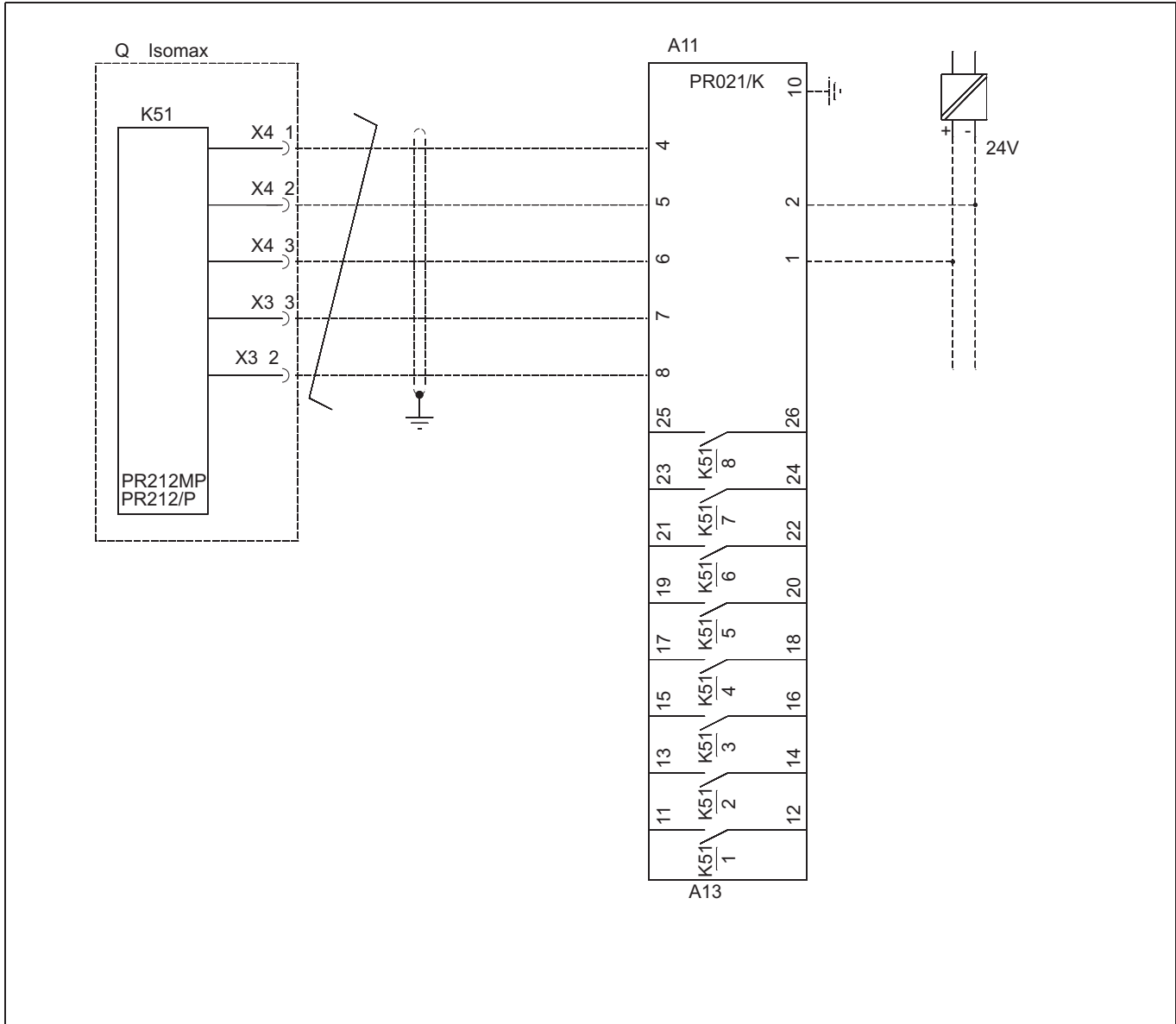
5.17.1. PR112-PR113-PR121-PR122-PR123-PR331-PR332-PR333 + PR021/K



5.17.2. PR113/P-PR121/P-PR122/P-PR123/P-PR331/P-PR332/P-PR333/P+ 3 PR021/K units

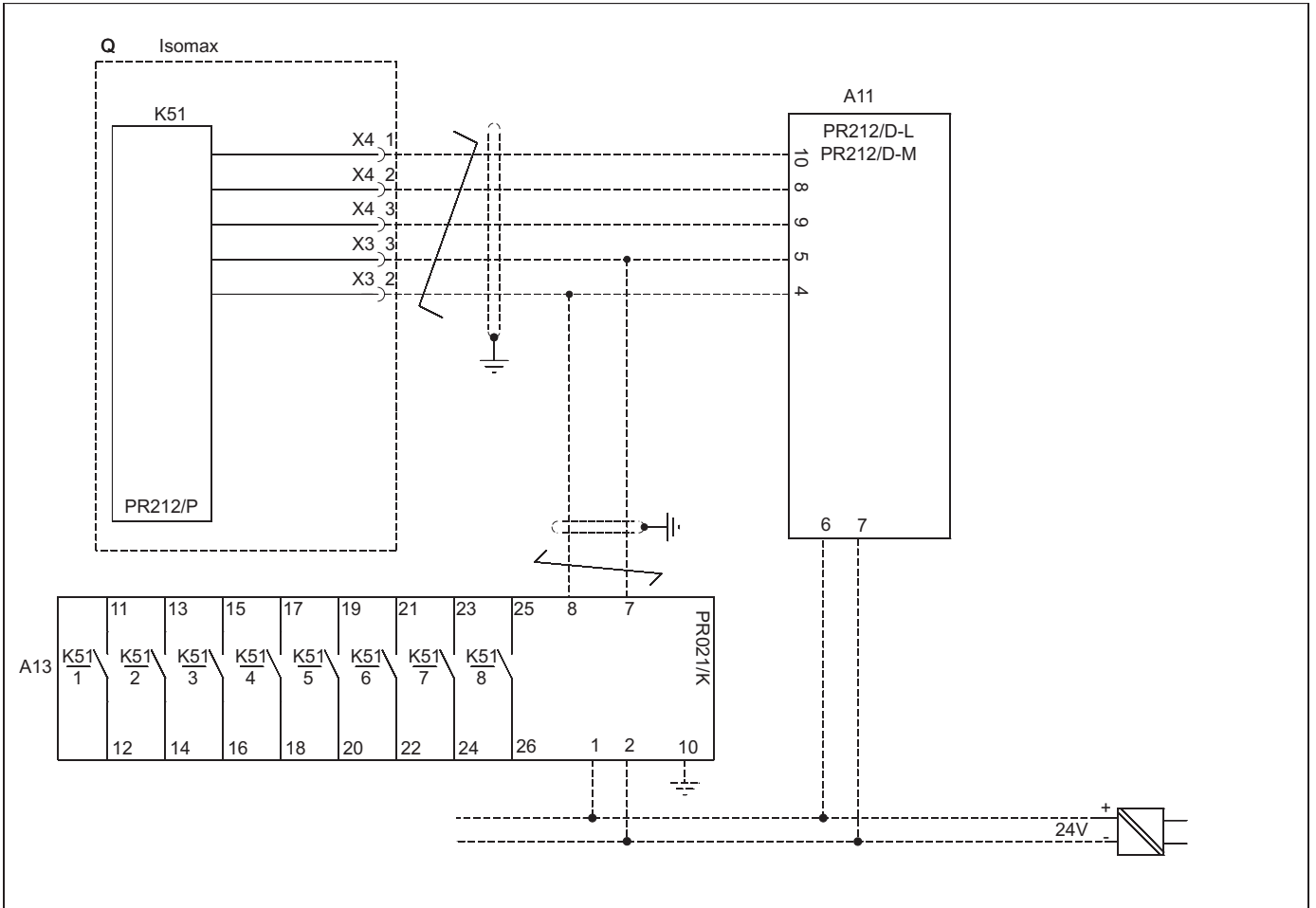


5.17.3. PR212/P or PR212MP + PR021/K

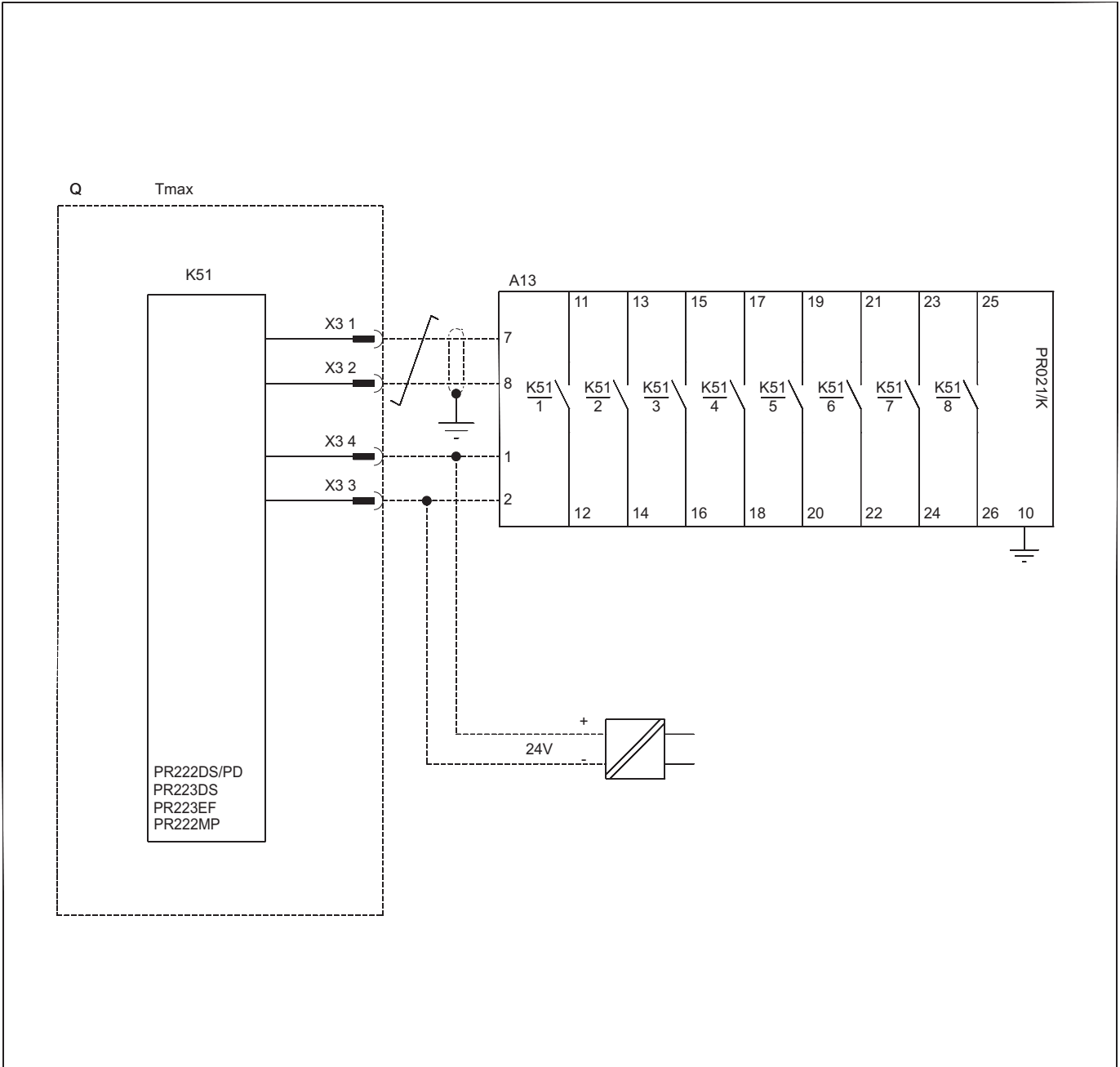


N.B. The PR212MP is only available for 3-pole circuit breakers

5.17.4. PR212/P + PR212/D-L or PR212/D-M + PR021/K




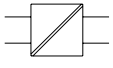





5.17.5. PR222-PR223-PR222MP + PR021/K



Wiring diagram legend

- A11** = Communication unit PR212/D-L or PR212/D-M for connection with a remote supervision system.
A13 = Signalling unit PR021/K
K51 = Protection unit PR212/P, PR212/MP, PR112/P, PR112/PD, PR113/P and PR113/PD.
K51/1...8 = Internal relays of signalling unit PR021/K
X3-X4 = Connectors for auxiliary circuits of protection unit PR212/P or PR212/MP
X = Delivery connector for auxiliary circuits of withdrawable circuit breaker
XV = Delivery terminal box for the auxiliary circuits of the fixed circuit breaker

SEGNI GRAFICI PER SCHEMI ELETTRICI (NORME IEC 617 E CEI 3-14...3-26)
 GRAPHICAL SYMBOLS FOR ELECTRICAL DIAGRAMS (617 IEC STANDARDS)

SEGNO SYMBOL	IEC REF. NUMBER	LEGENDA CAPTION
	02-15-01	-TERRA (SEGNO GENERALE) -EARTH, GROUND (GENERAL SYMBOL)
	02-17-06 + 02-17-07	-CONVERTITORE SEPARATO GALVANICAMENTE -CONVERTER WITH GALVANIC SEPARATOR
	03-01-07 + 03-01-09	-CONDUTTORI IN CAVO SCHERMATO (ESEMPIO: DUE CONDUTTORI) -CONDUCTORS IN A SCREENED CABLE, TWO CONDUCTORS SHOWN
	03-02-02	-TERMINALE O MORSETTO -TERMINAL
	03-02-01	-CONNESSIONE DI CONDUTTORI -CONNECTION OF CONDUCTORS
	03-03-05	-PRESA E SPINA (FEMMINA E MASCHIO) -PLUG AND SOCKET (MALE AND FEMALE)
	07-02-01	-CONTATTO DI CHIUSURA -MAKE CONTACT

6. Troubleshooting

The following table details a range of typical operational situations, useful to understand and solve presumed faults and malfunctions.

N.B.:

- Before consulting the following table, check the LEDs on the front panel of the PR021/K unit for several seconds (wait until the end of the start up phase if the unit has just been switched on).
- FN indicates normal operation.

No.	Situation	Possible causes	Suggestions
1	Relays do not switch, even under the conditions required for switching (for example, an overload with L protection function).	1. The PR021/K unit is in "Stand-by" operating mode.	1. Set the dip-sw "K51/" to "EN.", then press the "Reset" push-button on the front panel of the PR021/K unit.
		2. The unit has not been reset	2. Reset.
2	The unit does not update signals.	1. The unit has not been reset	1. Press the reset push-button on the front panel of the unit.
		2. Local bus communication is interrupted (see par. 3.2).	2. Check connections.
3	The signals cannot be reset after a protection release trip, despite pressing the reset push-button.	The connected protection unit is a PR112 or PR113, and availability of the PR021/K unit has not been set up.	<ul style="list-style-type: none"> • Set the PR021/K unit to On in the menu of the protection unit. • Press the RESET push-button on the front panel of the PR112 or PR113 unit. • Send a "Trip Reset " command from the remote supervision system.
4	"Tx/Rx" flashing and/or relay K51/5 switching (bus KO) discontinued.	<ol style="list-style-type: none"> 1. Bus conflict (2 masters). 2. Detective connection. 	<ol style="list-style-type: none"> 1. Set the "MODE" dip-sw to "SLAVE". 2. Check connections.
5	The "Tx/Rx" LED flashes once or more (from 1 to 4 times) with a duration of 200ms and a repetition period of 2s (see par. 3.2).	<ol style="list-style-type: none"> 1. Unit with "Self-test" function enabled. 2. PR021/K unit in Stand-by mode. 3. Connected protection unit not recognized. 4. Communication problems (bus KO). 	<ol style="list-style-type: none"> 1. FN. 2. FN. 3. Remove Vaux from PR021/K unit and from the protection unit, then re-power the two units simultaneously. 4. Check connections, communication rate setting ("BAUD" dip-switch) and mode ("MODE" dip-switch).
6	The "Tx/Rx" LED is off.	<ol style="list-style-type: none"> 1. Wiring error. 2. Aux voltage failure. 3. PR021/K in programming mode. 	<ol style="list-style-type: none"> 1. Check connections. 2. Restore supply voltage. 3. Check the "PROG." dip-switch.
7	The "PW/WD" LED is steadily lit red.	Irregular situation.	Contact ABB SACE.
8	The "PW/WD" LED is flashing red.	PR021/K in programming mode.	Check the "PROG." dip-switch.

6.1. In case of fault

If the suggestions provided in the table do not solve the problems, and/or if the PR021/K unit is presumed to be faulty, malfunctioning or has generated unexpected commands, we recommend that the instructions below are strictly complied with:

- Prepare a brief description of the problem (when did it occur? how many times? can the event be reproduced? how? etc.). Note type of load connected to the signalling unit (lamps, signalling relays, remote switches, contactors, sirens, etc.), serial number of the unit, etc. (see par. 5.3.2).
- Send all information gathered, complete with the application circuit diagram, to the nearest ABB SACE technical support.

The more complete and accurate the information supplied to ABB technical support, the easier it will be to analyze the problem encountered, thus permitting the client to receive prompt and accurate service.