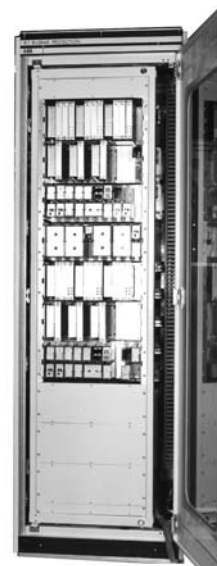




(SE 94 540)



(SE 90 06 40)

## Features

- Permits easy, flexible and rapid installation, service and expansion of both simple and complex systems
- Combines plug-in apparatus and other components to form complete systems for protection and control
- Fulfills the highest requirements in power plants, substations and industrial installations

## Application

The parts are of particular value for users of the COMBIFLEX system that wish to assemble or modify protection relays on their own. They can also be used to design and build protection functions and relays that are not available as standard. The parts and plug-in units can easily be combined into functional

units of own design or according to specification. Due to the unique connection technique very reliable connection points are obtained.

The parts are also useful for the assembly and wiring of cubicles as well as for extension, modification or service of existing equipment.

## Design

The COMBIFLEX mounting systems consist mainly of plug-in and firmly mounted electrical units that are interconnected with socket leads, specially designed for the system. The parts for assembly, installation and connection are hereby adapted to assure the best economy and quality for the user of the system.

The basis for the mounting systems, which are modular systems, are equipment frames with an overall width of 19" and varying

height. The height module U ( $1U = 44,45 \text{ mm} = 1,75''$ ) and width modules C ( $1C = 7 \text{ mm}$ ) and TE ( $1TE = 5,08 \text{ mm}$ ) are used.

The installation parts cover use in 19" rack mounting systems or with flush mounting and cut-outs. Also wall mounting and front terminals are available.

The parts also cover the connection details and tools required as well as prefabricated multicore wires, rapid connectors, branch and cross connectors.

## Technical data

### Data pertaining to connection details

Clearance and creepage distances, live part to live part = 4 mm

Clearance and creepage distances, live part to exposed conductive part = 6 mm

Current carrying capacity continuous for 10 A pin/socket = 10 A at max. +70°C

Current carrying capacity continuous for 20 A pin/socket = 20 A at max. +70°C

Current carrying capacity during 1 s for 10 A pin/socket = 150 A at max. +70°C

Current carrying capacity during 1 s for 20 A pin/socket = 500 A at max. +70°C\*

Contact resistance pin to socket = < 5 mΩ

\* Valid for RTXP and RTXK

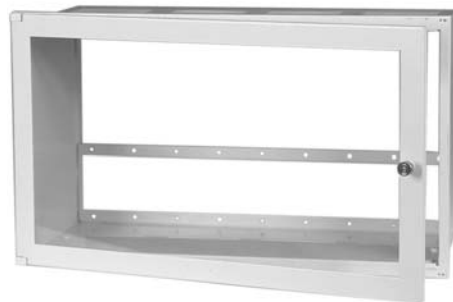
### Data pertaining to socket leads

Conductor area mm <sup>2</sup>	0,5	0,75	1,0-1,5	2,5
Rated voltage, V	400	400	750	750
Test voltage at 50 Hz for 15 min, V	1500	1500	2500	2500
Rated current, A	7	10	10	20
Max continuous operating temp., °C	70	70	70	70
Tensile strength socket-lead, N/mm <sup>2</sup>	≥ 150	≥ 150	≥ 150	≥ 150

## Ordering

### RHGS Cases for 19" Cubicle mounting or surface mounting

This type of case can be used for all common way of mounting. The RHGS cases are available in three different sizes, which can be combined with mounting accessories to get maximum flexibility. The cases can also be combined together with the terminals in the 500-series.



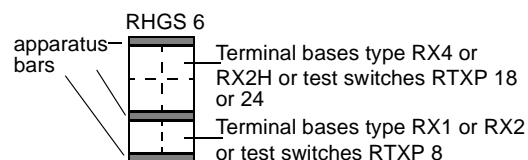
(SE970103)

The case, a metal box with open rear side, has a flange working as a stop when the case is inserted into a front panel opening. The case is provided with a support frame. Apparatuses which shall be mounted have to be provided with apparatus bars. The colour of the case is beige.

A spacer frame for semi-flush mounting is available. The case can be provided with a door.

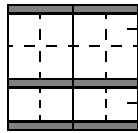
Together with the terminals from the RE 500 series described in 1MRK 514 003-BEN, the cases can be mounted in a 19" frame in a cubicle (different sizes can be mounted together side by side to utilize the width of the frame in the cubicle), semi-flush mounted, flush mounted or surface mounted.

Type	Size	No. of relay seats	Ordering No. without door	Ordering No. with door with transparent window
RHGS 30	6U 19"	30	1MRK 000 315-A	1MRK 000 315-D
RHGS 12	6U x 1/2	12	1MRK 000 315-B	1MRK 000 315-E
RHGS 6	6U x 1/4	6	1MRK 000 315-C	1MRK 000 315-F



The apparatus bars are used for the mounting of COMBIFLEX terminal bases and are screwed directly on the supporting frame using ST 3,5 tapping screws

RHGS 12

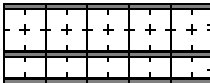


Terminal bases type RX4 or RX2H or test switches RTXP 18 or 24  
Terminal bases type RX1 or RX2 or test switches RTXP 8

Case	Size	Ordering No.
RHGS 6	12C	2175 323-1
RHGS 12	24C	2175 323-2
RHGS 30	60C	2175 323-5

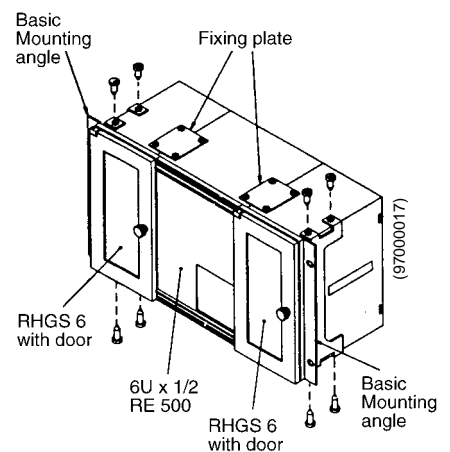
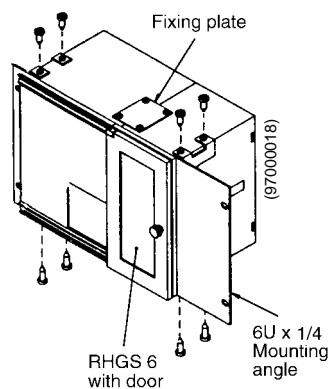
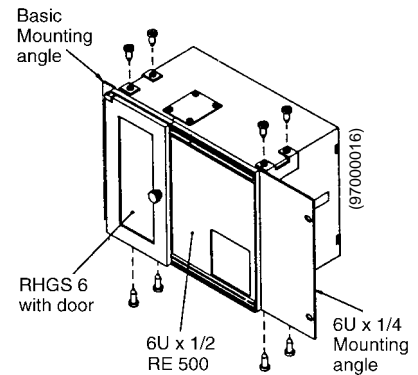
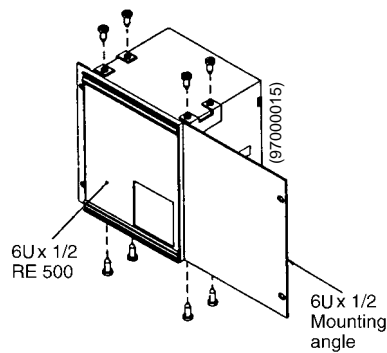
Terminal bases are ordered separately.

RHGS 30

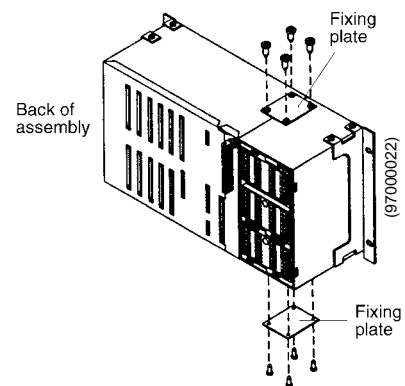
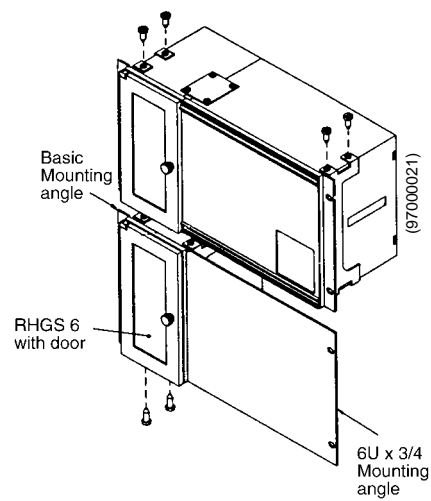
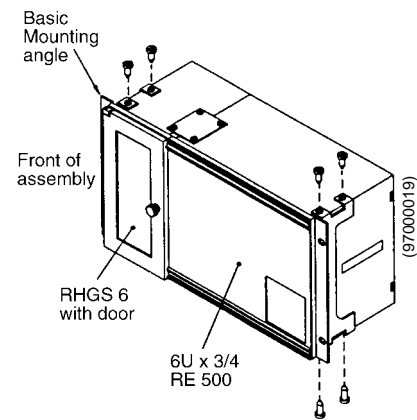
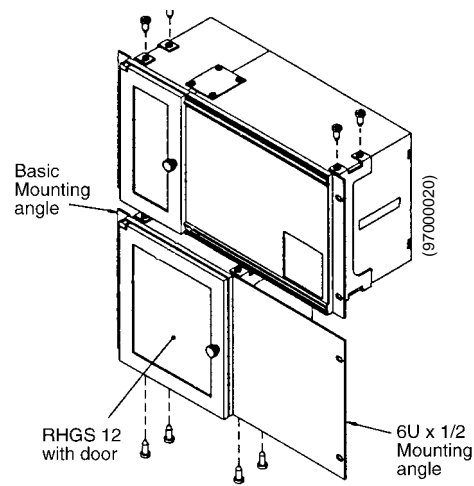


Terminal bases type RX4 or RX2H or test switches RTXP 18 or 24  
Terminal bases type RX1 or RX2 or test switches RTXP 8

The RHGS cases and the RE 500 series of terminals can be mounted in 19" swing door panels, flush on panels, and semiflush using a spacer frame. Examples on mounting in a 19" swing door panel are shown below

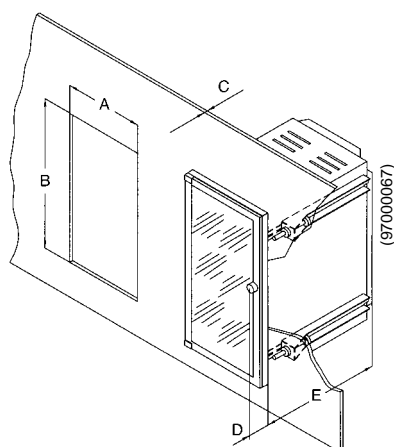


## Ordering (cont'd)

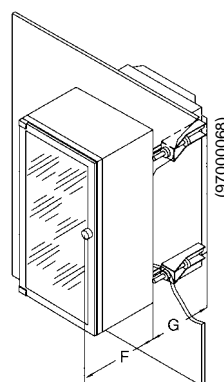


Examples on flush mounting in a panel, semiflush mounting and wall mounting are shown below

## Flush mounting



## Semi-flush mounting



Case size	Cut-out dimensions	
	A ± 1	B ± 1
RHGS 6	97,8	259,3
RHGS 12	210,1	
RHGS 30	434,7	

(mm)

C = 4-10 mm

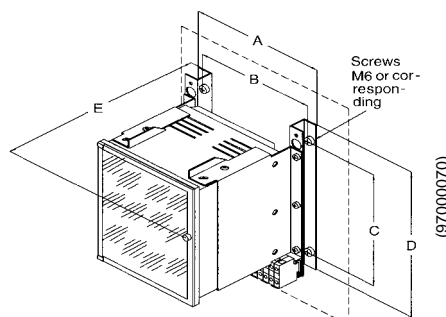
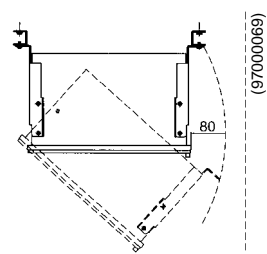
D = 32,5 mm (excl. knob 16,5 mm)

E = 190 mm without protective cover,  
234 mm with protective cover

F = 125 mm (excl. knob 109 mm)

G = 100,2 mm without protective cover,  
144,2 mm with protective cover

## Wall mounting



Case size	A	B	C	D
RHGS 6	179,7	154,8	272,8	390
RHGS 12	292	267,1		
RHGS 30	516	491,1		

(mm)

E = 255 mm

## Table 1: Accessories for RHGS

The following accessories are available for different installations:

Description	For case size	Ordering No.
Protection for rear area: consisting of a steel sheet with a slot for cable entrance at the bottom part, fixing screws and assembly instruction.	RHGS 30 RHGS 12 RHGS 6	1MRK 000 020-AA 1MRK 000 020-AC 1MRK 000 020-AE
Mounting kit 19" installation: consisting of two mounting angles, fixing screws and assembly instruction.	RHGS 30 RHGS 12 + RHGS 6 RHGS 12 RHGS 6	1MRK 000 020-CA 1MRK 000 020-BA 1MRK 000 020-BB 1MRK 000 020-BE
Mounting kit for wall-mounting: consisting of two mounting angles, two mounting bars, fixing screws and assembly instruction.	All sizes	1MRK 000 020-DA
Mounting kit for semi-flush mounting: consisting of the same parts as for flush installation and a distance frame.	RHGS 30 RHGS 12 RHGS 6	1MRK 000 020-AK 1MRK 000 020-AM 1MRK 000 020-AP

## Ordering (cont'd)

**Table 1: Accessories for RHGS**

The following accessories are available for different installations:

Mounting kit for flush installation: consisting of four fastener, sealing strip, fixing screws and assembly instruction.	All sizes	1MRK 000 020-Y
Mounting kit for side-by-side installation: consisting of two fixing plates, fixing screws and assembly drawing.	All sizes	1MRK 000 020-Z

Note: All kits are complete including screws.

### Ordering example:

Example:

Mounting kit for 19" installation of RHGS 30 = 1MRK 000 020-CA

Mounting kit for 19" installation of RHGS 12 = 1MRK 000 020-BB

For side-by-side installation of two cases, two mounting kits must be ordered

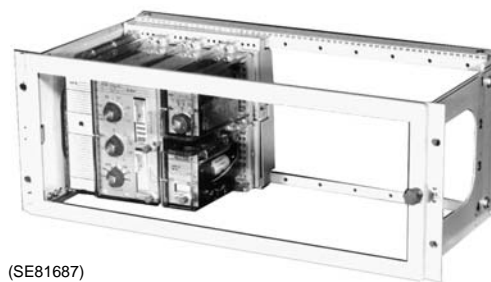
Example:

Mounting kit for 19" installation, cases RHGS 12 + RHGS 6 = 1MRK 000 020-BA + 1MRK 000 020-Z

Mounting kits for 19" installation, cases RHGS 12 + RHGS 12 = 1MRK 000 020-BB + 1MRK 000 020-Z

### 19" equipment frames

These types of equipment frames are used for cubicle mounting or panel mounting of plug-in units in the COMBIFLEX range.



(SE81687)

The frames are available in 3 sizes:

- 4U (7" x 19")
- 8U (14" x 19")
- 12U (21" x 19")

for mounting 20, 40 and 60 module seats respectively.

### Following variants are available:

- with apparatus frame and with end panels or mounting brackets. For direct mounting of terminal bases and plates.
- with support frame and with end panels or mounting brackets. For mounting of apparatus groups assembled on apparatus bars; e.g. relay assemblies.

Equipment frames with end panels are used for flush-mounting or in cubicles with a hinged frame. Equipment frames with mounting brackets are intended to be mounted in the rear of cubicles.

Equipment frames with end panels have an optional front door, with a transparent window. The door, hinged on the left, is 4U high. The window is of flame-retarding carbonate plastic. At the top of the apparatus frame or support frame there is a marking strip on which the C-modules are numbered from 01 to 60.

The overall width of the equipment frame is equivalent to 19" and the inside space for apparatus is 60C = 420 mm. The height is given in U units equal to 44,45 mm/1,75 inches, therefore 4U = 7 inches, 8U = 14 inches and 12U = 21 inches.

Frames, end panels and brackets are zinc plated; doors are enamelled light beige.

A strengthening plate is available for equipment frames which may be subject to severe vibrations. When mounting such equipment frames in a cubicle there must be at least 1U distance between the frames.

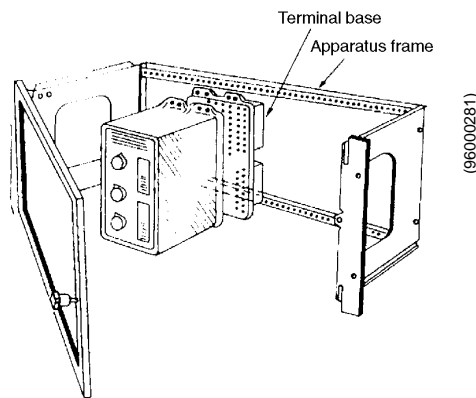


Fig. 1 Equipment frame with apparatus frame and door with window

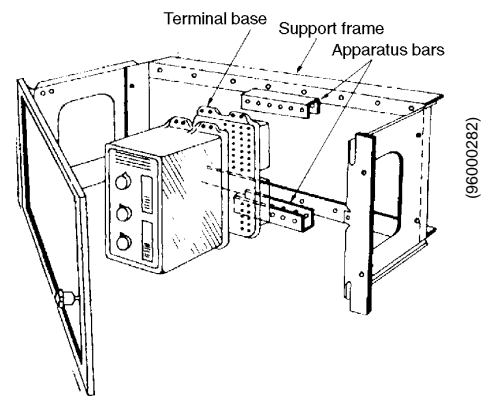
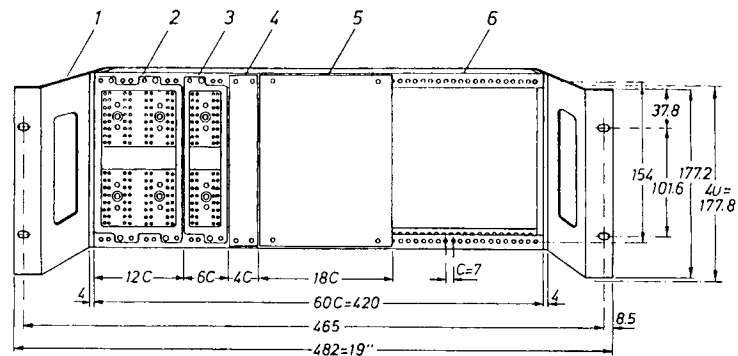


Fig. 2 Equipment frame with support frame and door with window



- 1 End panel
- 2 Terminal base RX 4
- 3 Terminal base RX 2H
- 4 4U x 4C apparatus plate
- 5 4U x 18C apparatus plate
- 6 4U x 60C apparatus plate

Fig. 3 Equipment frame with apparatus frame and end panels

Ordering (cont'd)

4U 19"



(SE96399)

8U 19"



(SE96400)

12U 19"



(SE96401)

**Set of equipment frame details  
(equipment frames with end  
panels assembled)**

	Size	Ordering No.	Ordering No. (unassembled)	Weight, kg
With apparatus frame:				
Without door	4U 19"	1MRK 000 137-AA	5284 1935-A	2,2
Without doors	8U 19"	1MRK 000 137-BA	5284 1935-B	4,2
Without doors	12U 19"	1MRK 000 137-CA	5284 1935-C	6,2
Door with transparent window	4U 19"	1MRK 000 137-DA	5284 1935-D	2,8
Doors with transparent window	8U 19"	1MRK 000 137-EA	5284 1935-E	5,4
Doors with transparent window	12U 19"	1MRK 000 137-FA	5284 1935-F	8,0
With support frame:				
Without door	4U 19"	1MRK 000 137-GA	5284 1935-G	2,4
Without doors	8U 19"	1MRK 000 137-HA	5284 1935-H	4,7
Without doors	12U 19"	1MRK 000 137-JA	5284 1935-J	7,0
Door with transparent window	4U 19"	1MRK 000 137-KA	5284 1935-K	3,0
Doors with transparent window	8U 19"	1MRK 000 137-LA	5284 1935-L	5,9
Doors with transparent window	12U 19"	1MRK 000 137-MA	5284 1935-M	8,8

**Accessories and individual parts for  
equipment frames**

	Size	Ordering No.	Weight, Kg
<p>(SE96405)</p>			
<b>Strengthening plate</b> To be fitted to top and bottom of equipment frame. Two required per frame. Extra space 1U between racks is a necessity.	60 C	1MRK 000 588-2	0,6
<p>(SE96409)</p>			
<b>Apparatus frame</b> To mount terminal bases and apparatus plates on. Made up of two U-shaped bars joined with side bars.	4U 60C	5284 1340-A	0,8





## Support frame

To carry apparatus groups assembled on apparatus bars.  
Made up of two L-section bars fitted together with side bars.

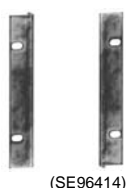
4U 60C	5284 1340-C	1,2
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## End panels

To be fitted to apparatus frame or support frame to make up an equipment frame for flush-mounting. Two frames can be mounted on size 8U brackets and three frames on size 12U end panels. Two required per equipment frame.

4U	2176 138-6	0,2
8U	2176 138-7	0,5
12U	2176 138-8	0,7

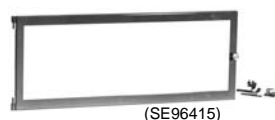


## Mounting brackets

To be fitted to apparatus frame or support frame to make up an equipment frame for flush-mounting. Two frames can be mounted on size 8U brackets and three frames on size 12 brackets. Two required per equipment frame. To get a folding support frame, one 2174 195-1 and one 2174195-10 is provided.

4U	2174 195-1	0,2
8U	2174 195-2	0,5
12U	2174 195-3	0,7
4U	2174 195-10	0,2

## Accessories and individual parts for equipment frames



## Door with transparent window, light beige.

To be mounted on left end panel of equipment frame.  
Hinge (two is needed for each door)  
Lock

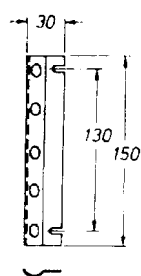
Size	Ordering No.	Weight, Kg
4U 60C	5284 1342-Y	0,6
	2184 0512-1	
	2167 247-3	



## Marking bar (marking 01-60)

To be fixed on top of upper bar of apparatus frame or support frame.  
Incl. two fixing plugs.

60C	5284 1509-A	0,1
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## Lead holder

To enable lead bundles to be tied at the rear of the equipment frame.  
For vertical mounting on rear edge of end panel.

2166 352-3	0,1
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## Set of screws

Set containing all screws needed to mount any of the 4U equipment frames.  
A 8U frame needs two sets and a 12U frame needs three sets.

5284 1935-N	0,1
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## 19" equipment frame type RL

This type of equipment frame is used at cubicle mounting or panel mounting of functional units assembled in 6U cassettes according to the so called Eurostandard IEC 297 (DIN 41 494).

The equipment frame is available in one size with the height 6U and the inside space for functional units 84 TE. (The overall width= 19".)

The side plates of the frame are used to attach the frame to the hinged frame of the cubicle. Cover plates without ventilation holes are mounted at the top and bottom of the frame.

## Ordering (cont'd)

Four card rails per cassette must be mounted inside the equipment frame before the cassette is inserted in the frame.

### Ordering:

Equipment frame 6U RK 932 001-AA

### Accessories:

6U 14TE

6U 21TE

6U 28TE

6U 42TE

### Ordering No.

RK 932 009-AA

RK 932 009-AB

RK 932 009-AC

RK 932 009-AD

### Card rail

To be mounted inside the equipment frame to guide and support the cassette. Four required per cassette.

### Ordering No.

RK 932 003-A

(Set of four card rails including fixing material)

### Type RHGX cases for flush- or semi-flush panel mounting

The type RHGX cases are available in five sizes. The case, a metal box open at the back, has a flange (with a rubber sealing strip) at the front which acts as a stop when the case is inserted into a front panel opening. At the front of the case there is a door with window and a rubber seal.

The back of the case is fitted with a support frame; relays installed in the case must be mounted on apparatus bars which in turn are screwed to the support frame from the rear.

#### RHGX 8



(SE81702)

#### RHGX 20



(SE96420)

Terminal bases and apparatus plates smaller than 12C must first be mounted on apparatus bars before they are screwed to the support frame. The case is open at the back, but the back can be fitted with a blanking plate or a connector mounting frame with blanking plate. If the blanking plate only is used, it comes up against the rear face of the support frame, and holes must be made to allow leads to enter the case.

The connector mounting frame with blanking plate creates enough space behind the support frame to accommodate plug-in connectors of type RTXG or terminal blocks with incoming and outgoing terminals on either side of a panel. Mounting holes must be cut in the panel for this purpose. A spacer frame with a rubber seal is available for semi-flush mounting. This arrangement requires less mounting depth. The cases are painted light beige. The case includes; support frame, door with window and seal, clamps, seal against front panel.

Permissible power losses for 15 °C temperature increase in RHGX cases.

Case type	°C/W	W
RHGX 4	2,5	6
RHGX 8	1,8	8
RHGX 12	1,4	11
RHGX 20	0,9	17
RHGX 40	0,65	23

Type	Size	Ordering No.	Weight, kg
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RHGX 40	8U 60C	RK 927 017-AB	6,3
RHGX 20	4U 60C	RK 927 004-AB	4,7
RHGX 12	4U 36C	RK 927 003-AB	3,5
RHGX 8	4U 24C	RK 927 002-AB	3,0
RHGX 4	4U 12C	RK 927 001-AB	2,5

### Accessories for RHGX

The accessories are supplied unassembled.  
Screws are included.



(SE96421)

#### Blanking plate:

Mounted at rear side of the case.  
Supplied with mounting holes but otherwise undrilled.  
Cannot be used when test switch is included.

RHGX 40	8U 60C	RK 927 019-AB	1,26
RHGX 20	4U 60C	RK 927 012-AB	0,96
RHGX 12	4U 36C	RK 927 011-AB	0,60
RHGX 8	4U 24C	RK 927 010-AB	0,43
RHGX 4	4U 12C	RK 927 009-AB	0,24



(SE96422)

#### Connector-mounting frame with blanking plate:

To be fixed to back of case when more space is required between frame and blanking plate. With bent-over edges to protect terminals and connectors. Supplied with mounting holes, but otherwise undrilled.

RHGX 40	8U 60C	RK 927 020-AB	2,21
RHGX 20	4U 60C	RK 927 016-AB	1,65
RHGX 12	4U 36C	RK 927 015-AB	1,10
RHGX 8	4U 24C	RK 927 014-AB	0,85
RHGX 4	4U 12C	RK 927 013-AB	0,60



(SE96423)

#### Spacer frame:

To be fitted around the case in front of the mounting panel for semi-flush mounting. Supplied with seal.

RHGX 40	8U 60C	RK 927 018-AB	1,3
RHGX 20	4U 60C	RK 927 008-AB	0,8
RHGX 12	4U 36C	RK 927 007-AB	0,6
RHGX 8	4U 24C	RK 927 006-AB	0,5
RHGX 4	4U 12C	RK 927 005-AB	0,4

### Type RXZ 21/41

#### Panel bases for surface mounting

The front-connected panel base, RXZ 21/41, provided with two or four modular mounting seats, is used in applications where surface mounting is preferred. It consists of a terminal base, a terminal block (optional) and a metal support case.

The RXZ21 has one place for a RX2 terminal base and the RXZ41 has one place for a RX4 terminal base. The complete panel base

RXZ21 also includes one terminal block with 16 terminals, wired according to buyer's specification.

The complete RXZ41 has two terminal blocks each with 16 terminals also wired according to specification. When multi-stranded leads are used connection can be made directly to the terminal base; thus variants without terminal blocks are chosen.

## Ordering (cont'd)

### Panel frames for surface mounting

The panel frame provides front connection and surface mounting for protection relay assemblies, else intended for rack or case mounting.

The panel frame is made of two end panels joined together with intermediate profiles on which the protection relay is fitted. Terminal blocks are delivered separately without wiring.



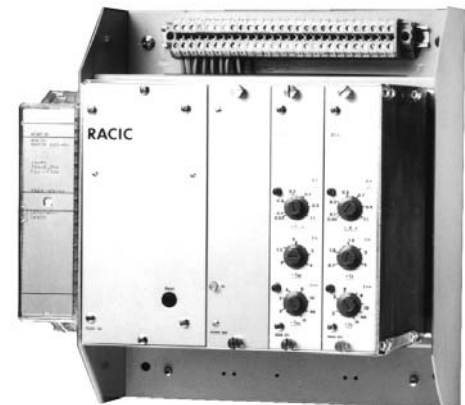
(SE95925)

Panel base RXZ 21



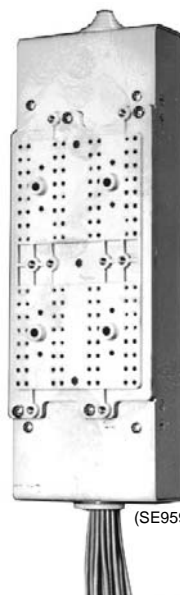
(SE95926)

Support case



(SE840203)

Panel frame



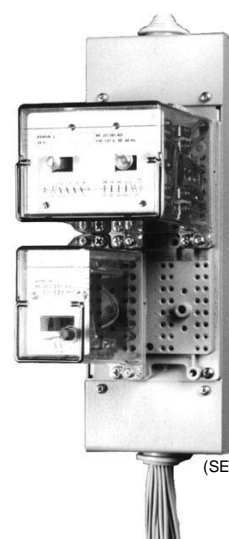
(SE95921)

Panel base RXZ 41



(SE95922)

Support case



(SE99176)

Panel base RXZ 41, equipped

Panel base	Ordering No.	Weight, kg
RXZ 21 with terminal base and terminal block	RK 928 008-AC	0,7
RXZ 21 with terminal base without terminal block	RK 928 008-AB	0,5
Support case for RXZ 21	RK 928 008-AA	0,4
RXZ 41 with terminal base and terminal block	RK 928 009-AC	1,3
RXZ 41 with terminal base without terminal block	RK 928 009-AB	0,9
Support case for RXZ 41	RK 928 009-AA	0,7

Panel frames Module-width		
60C	RK 935 004-AE	2,1
42C	RK 935 004-AD	1,7
36C	RK 935 004-AC	1,6
30C	RK 935 004-AB	1,4
24C	RK 935 004-AA	1,3

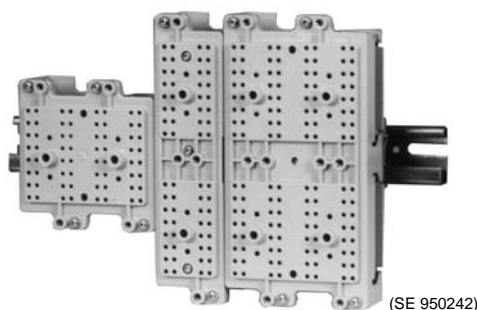
Accessories for panel frames	Ordering No.
Terminal block with 12 screw terminals for 24C panel case (marked 1-12)	5231 601-C
Terminal block with 14 screw terminals for 30C panel case (marked 1-14)	5231 601-B
Terminal block with 27 screw terminals for 36C, 42C and 60C panel case (marked 1-27)	5231 601-A
(marked 28-54)	5231 601-D

## Adapter for DIN-rail screw terminal bars or for direct surface mounting

An adapter for DIN-rail screw terminal bars is needed to mount COMBIFLEX-relays inside the relay cubicle directly onto the screw terminal bars.

The bases for terminal bars comprises one RX terminal base, available in four sizes, plus a mounting arrangement consisting of one steel adapter mounting bracket, two, three or four plastic clamp-fit holders and screws. Connections are normally made directly to the terminal bases via COMBIFLEX-connections.

The adapters can be mounted onto vertical or horizontal DIN-rails by rotating the clamp-fit holders 90°.



Terminal bases 2U and 4U mounted on bars.



Relays size 2U mounted on bases for terminal bars.



Relays with size 4U mounted on bases for terminal bars.

## Ordering (cont'd)

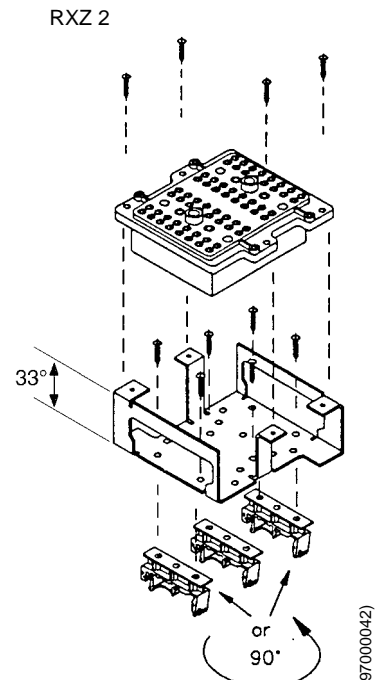
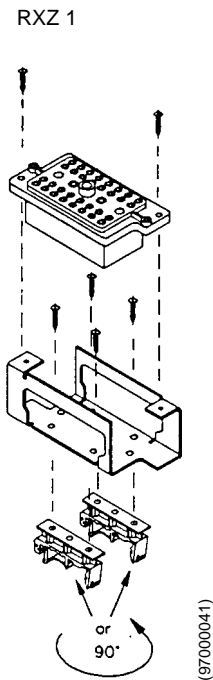
Type	Size	No. of seats	Ordering No.
RXZ 1	2U6C	1	1MRK 000 893-A
RXZ 2H	4U6C	2	1MRK 000 893-B
RXZ 2	2U12C	2	1MRK 000 893-C
RXZ 4	4U12C	4	1MRK 000 893-D

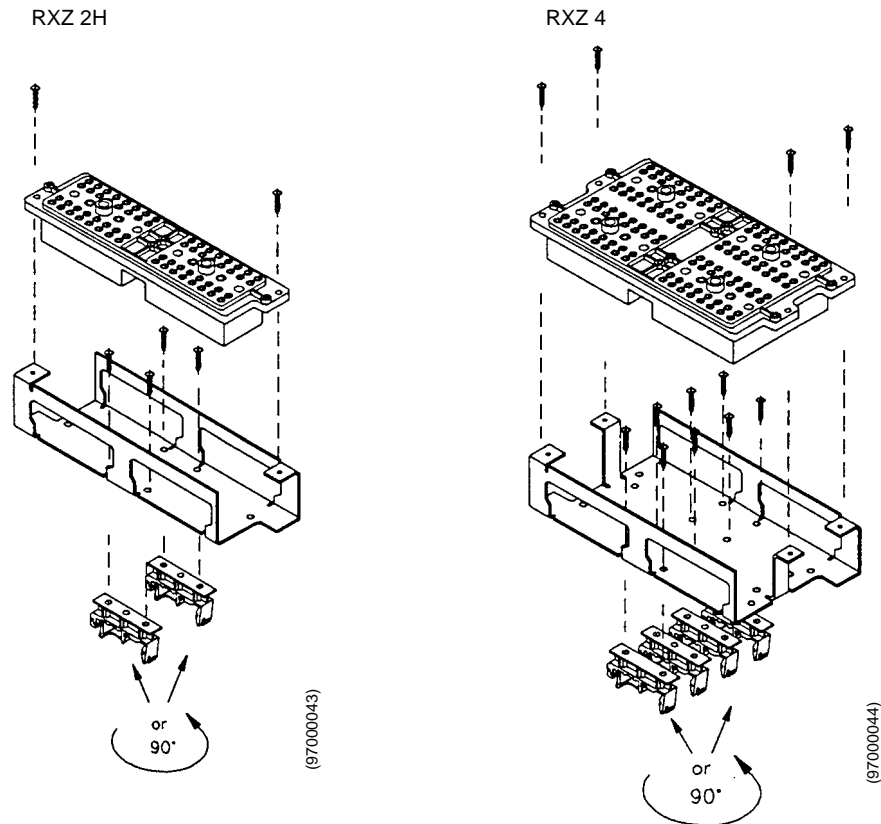
The bases for terminal bars can be completed with terminals for screw-connections on request.

The clamp-fit holders are attached to the steel adapter for the terminal base according to the mounting instruction over-leaf. It is important to provide the necessary wiring of the terminal base prior to assembly.

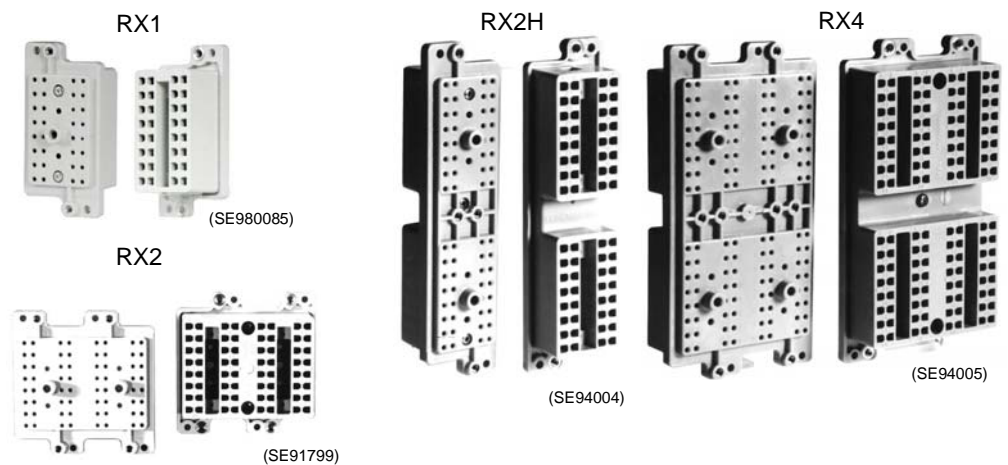
### Surface Mounting alternative

The steel adapters may be used without the plastic clamp-fit holders for direct mounting onto a steel or e.g. concrete wall surface.





## Terminal bases, sockets and leads



The terminal bases provide the mechanical mounting for modules and connectors. They have rows of dual terminal holes with built-in locking clips which permit the connection and retention of one or two external wiring socket leads to the same electrical connection point. When a module is plugged into the terminal base, the pins enter the sockets secured in the terminal base. An RTX extractor tool

is used to remove socket leads from the terminal base. Terminal bases also have component pockets for the inserting of RTX component blocks or RTXK and RTXI 20 A current connectors.

Tapping screws, type ST3.5 for mounting the terminal bases are included.

## Ordering (cont'd)

For each module seat 16 double 10 A terminals are provided.

Terminal bases can be mounted directly on panels for surface mounting with rear connection of up to 4 module mounting seats. For surface mounting with front connection, see panel bases RXZ21 and RXZ41.

For relay assemblies or other apparatus groups, terminal bases are mounted side by side on apparatus bars

Type	No. of component pockets	Modular dimensions	No. of seats	Ordering No.	Weight, g
RX 1	1	2U 6C	1	5619 622-A	70
RX 2H	2	4U 6C	2	5619 625-A	125
RX 2	2	2U 12C	2	5619 483-A	125
RX 4	4	4U 12C	4	5619 499-A	260

## Contact sockets



Contact sockets plug into terminals with locking clips; for example, terminal bases, branch connector and test switches.

They mate with the associated contact pins of a relay module, connector, test switch, etc. Contact sockets crimp to multistranded leads with the insulation stripped to length of 10,5 ± 0,5 mm. They are as standard silver plated. Orders below 100 pcs are not accepted. Gold plated sockets are available on request.

Rated current, A	Suitable for conductor area, mm <sup>2</sup>	Max. outer diameter of the insulation of lead, mm	Ordering No.	Weight, g/ item
10	0,25-1.5	3,7	2658 634-1	0,5
20	1,5-2.5	4,2	2658 636-1	0,9

## Leads

Leads having a tinned multistranded copper conductor with gray insulation can be obtained on rolls of the following lengths:

Area, mm <sup>2</sup>	Length, m	Ordering No.
1,0	450	9ADA102-7
1,5	300	9ADA102-10
2,5	250	9ADA102-13

## Socket leads

The socket leads have a multistranded copper conductor with gray insulation. The length of the stripped end (leads with socket on one end) is 10,5 mm and is intended for connection to a terminal block or cable lug. Terminal sockets are silver plated.





(SE93328a)

## Leads with a terminal socket on each end

Length of insulated part	Terminal socket combination:		Terminal socket combination:	
	10 A-10 A		10 A-20 A	20 A-20 A
	Conductor area, mm <sup>2</sup>			
	1,0	1,5	1,5	2,5
<b>mm</b>	<b>Ordering No.</b>			
100	SK 791 019-B	SK 791 007-B	SK 791 013-B	SK 791 015-B
180	SK 791 019-D	SK 791 007-D	SK 791 013-D	SK 791 015-D
280	SK 791 019-F	SK 791 007-F	SK 791 013-F	SK 791 015-F
380	SK 791 019-H	SK 791 007-H	SK 791 013-H	SK 791 015-H
480	SK 791 019-L	SK 791 007-L	SK 791 013-L	SK 791 015-L
580	SK 791 019-N	SK 791 007-N	SK 791 013-N	SK 791 015-N
680	SK 791 019-R	SK 791 007-R	SK 791 013-R	—
780	SK 791 019-S	—	SK 791 013-S	SK 791 015-S
980	SK 791 019-U	SK 791 007-U	SK 791 013-U	SK 791 015-U
1380	SK 791 019-X	SK 791 007-X	SK 791 013-X	SK 791 015-X
1780	SK 791 019-Z	SK 791 007-Z	SK 791 013-Z	SK 791 015-Z
2380	SK 791 019-AB	SK 791 007-AB	SK 791 013-AB	SK 791 015-AB
2980	SK 791 019-AD	SK 791 007-AD	—	—
<b>kg/100m</b>	1,7	2,2	2,2	3,1

## Leads with a terminal socket on one end and insulation stripped on the other

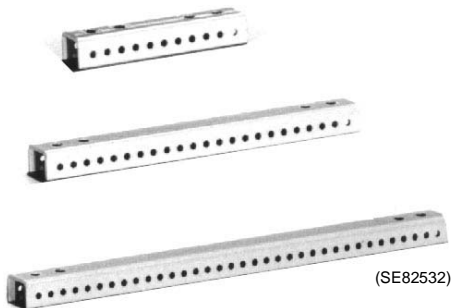


(SE93328b)

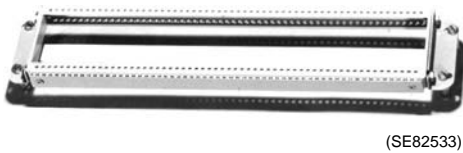
Length of insulated part	Terminal socket size		Terminal socket size
	10 A		20 A
	Conductor area, mm <sup>2</sup>		
	1,0	1,5	2,5
<b>mm</b>	<b>Ordering No.</b>		
100	SK 791 020-B	SK 791 009-B	SK 791 017-B
140	—	—	—
180	SK 791 020-D	SK 791 009-D	SK 791 017-D
280	SK 791 020-F	SK 791 009-F	SK 791 017-F
380	SK 791 020-H	SK 791 009-H	SK 791 017-H
480	SK 791 020-L	SK 791 009-L	SK 791 017-L
580	SK 791 020-N	SK 791 009-N	SK 791 017-N
680	SK 791 020-R	SK 791 009-R	SK 791 017-R
780	SK 791 020-S	SK 791 009-S	SK 791 017-S
980	SK 791 020-U	SK 791 009-U	SK 791 017-U
1380	SK 791 020-X	SK 791 009-X	SK 791 017-X
1780	SK 791 020-Z	SK 791 009-Z	SK 791 017-Z
2380	SK 791 020-AB	SK 791 009-AB	SK 791 017-AB
2980	SK 791 020-AD	SK 791 009-AD	SK 791 017-AD

Ordering (cont'd)

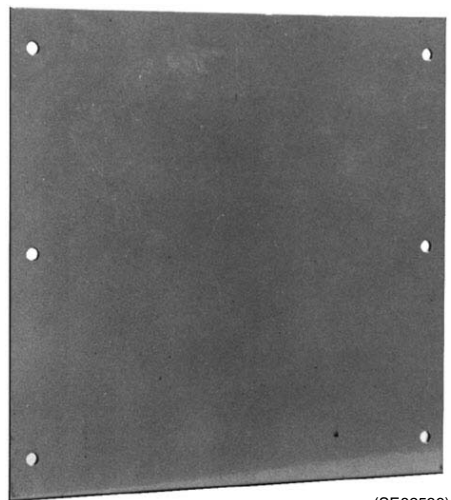
Apparatus bars, frames and plates



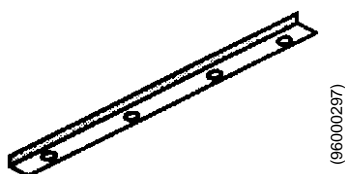
Apparatus bars	Modular width	Ordering No.	Weight kg
Used for assembling of apparatus groups: e.g. protective relays. The terminal bases of the plug-in apparatus included in the group are mounted adjacent to each other on two bars. These U-shaped bars are available in various lengths and have 3,2 mm diameter holes at a distance equivalent to one C module (7 mm) suitable for ST 3,5 tapping screw to a support frame (within case or 19" equipment frame etc.).	60C	2175 323-5	0,27
	48C	2175 323-10	0,24
	42C	2175 323-9	0,21
	36C	2175 323-3	0,16
	30C	2175 323-6	0,15
	24C	2175 323-2	0,10
	18C	2175 323-8	0,09
	12C	2175 323-1	0,05
	6C	2175 323-7	0,03



2U apparatus frame	Modular width	Ordering No.	Weight kg
With space for 1 to 30 RTXG connectors. The frame is supplied with a marking bar and can be pivoted, giving access to the pin connector wiring side. Screws are included. Height requirement 3U.	60 C	5284 1350-D	1,0

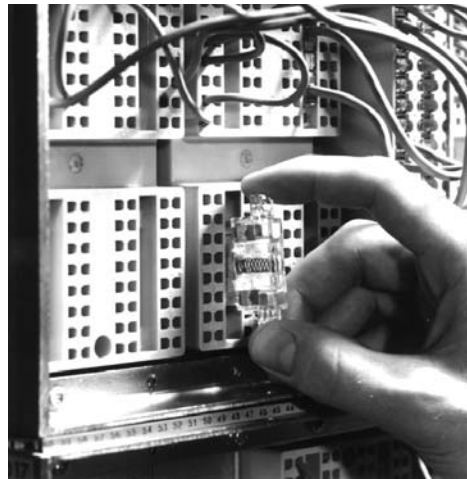


4U apparatus plates, zinc plated	Modular width	Ordering No.	Weight kg
Used to support apparatus which cannot be inserted in terminal bases. Transformers and resistors, for example, can be mounted on the plate which in turn is screwed to a supporting frame or apparatus bars/apparatus frame. The plate is also used to cover vacant space in the equipment frame.	To be mounted on 4U supporting frame:		
	42C	2172 467-19	0,80
	30C	2172 467-18	0,60
	18C	2172 467-17	0,36
	6C	2172 467-16	0,12
	To be mounted on apparatus bars/apparatus frame:		
	60C	2172 467-15	1,14
	48C	2172 467-12	0,90
	42C	2172 467-19	0,80
	36C	2172 467-9	0,68
	30C	2172 467-18	0,60
	24C	2172 467-6	0,45
	18C	2172 467-17	0,36
	12C	2172 467-3	0,2
	6C	2172 467-16	0,12



Reinforcement bar for 60C apparatus plates mounted in 19" frames. Two required per plate.	9106 518-3	0,12
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### Type RTXI, RTXK current connectors



(SE94536)

These 20 A current connectors fit into the terminal base component pocket and adapt the terminal base for current connections.

The RTXK transparent plastic short-circuiting connector contains two fixed contacts with 20 A terminals and one movable spring-loaded contact. When the current relay module is plugged into the terminal base, the module terminal pins connect the relay into the circuit before a guide pin on the module depresses the spring-loaded contact so that the current circuit is opened.

As the relay is withdrawn from the terminal base, the current circuit is short-circuited before the relay is disconnected (see Fig. 4). It is mainly used in ac circuits for short-circuiting a CT secondary circuit when the relay is removed from the terminal base.

The RTXI gray plastic shunt connector which has two 20 A terminals provides for the connection of 20 A socket leads to the base-mounted dc current modules. When the module is withdrawn from the terminal base, the current circuit is opened. It is mainly used in dc shunt circuits.

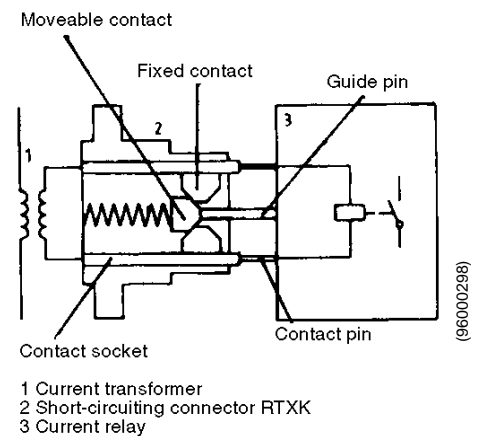
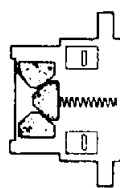


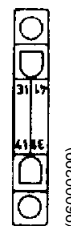
Fig. 4 Connection when mounting the short-circuiting connector RTXK



(SE91864)



Terminal markings, wiring side



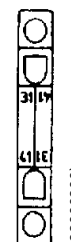
Type	Ordering No.	Weight, g
RTXK	5371 050-A	12



(SE91862)



Terminal markings, wiring side



RTXI	5371 050-B	4,5
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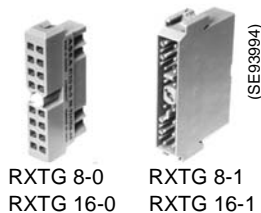
Ordering (cont'd)

**Type RTXG 10 A pin/socket connector**

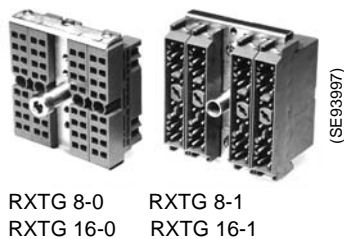
The socket connector has built-in locking clips for retaining the socket leads. The pin connector has built-in double-sided pins; one pin side contains locking clips for retaining the socket leads and the other pin side without locking clips is plugged into the socket connector. The connector consists of a single unit or is assembled in blocks of two, four or six units. The fixed portion, the pin connector, is preferably screwed to a 2U apparatus

frame which is usually located in the rear mounting plane of a relay cubicle. The socket connector (moving portion) is plugged into the pin connector and is secured with a rotary locking screw or with a metal tensioning bolt, if the connectors are assembled in blocks

RTXG is used for rapid connection and disconnection of leads and multicore cables, for example between relay cubicles or apparatus groups.



	No. of connectors	No. of terminals Single (Blue)	Double (Gray)	Dimension	Ordering No.	Weight g
<b>Socket connectors</b>						
RTXG 8-0	1	—	8	2C	RK 924 007-AB	24
RTXG 16-0	1	16	—	2C	RK 924 008-AB	24
RTXG 802	2	—	16	6C	RK 924 021-BA	150
RTXG 1602	2	32	—	6C	RK 924 022-BA	150
RTXG 804	4	—	32	10C	RK 924 021-BB	210
RTXG 1604	4	64	—	10C	RK 924 022-BB	210
RTXG 806	6	—	48	14C	RK 924 021-BC	260
RTXG 1606	6	96	—	14C	RK 924 022-BC	260



<b>Pin connectors</b>						
RTXG 8-1	1	—	8	2C	RK 924 007-AA	42
RTXG 16-1	1	16	—	2C	RK 924 008-AA	42
RTXG 812	2	—	16	6C	RK 924 021-AA	160
RTXG 1612	2	32	—	6C	RK 924 022-AA	160
RTXG 814	4	—	32	10C	RK 924 021-AB	250
RTXG 1614	4	64	—	10C	RK 924 022-AB	250
RTXG 816	6	—	48	14C	RK 924 021-AC	340
RTXG 1616	6	96	—	14C	RK 924 022-AC	340

**Accessories to RTXG**

Fixing screws are included

Suitable  
for RTXG

Ordering No.

Weight  
g



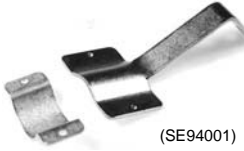
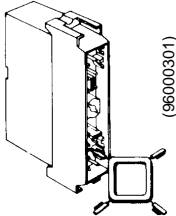
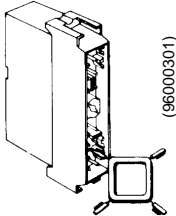
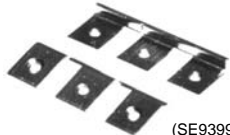


1. Cable holder for socket connector.  
With two straight and one curved clamp. The holder is to be fixed both at the top and the bottom of the socket connector. Using the straight clamp, wire bundles having a X-section of 23 x 1 to 23 x 7 mm can be attached. Using the curved clamp wire diameters between 5-10 mm can be attached.

8-0, 16-0 RK 924 025-AA 32

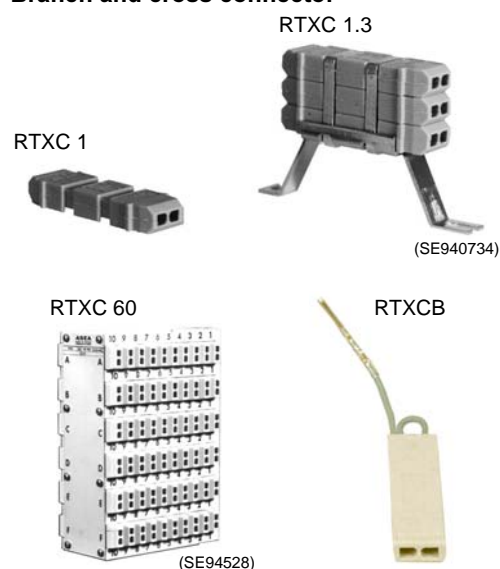


2. Cable holder without clamp  
The holder is to be fixed at the bottom of the socket connector. A bundle of wires with diameter 3-12 mm can be fixed with cable strap 2166 2055-3

8-0, 16-0 RK 924 025-AC 25

Accessories to RTXG Fixing screws are included		Suitable for RTXG	Ordering No.	Weight g
 (SE94001)	3. Cable holder for socket connector With clamp for cable diameter 10-20 mm	802, 1602	RK 924 025-BA	43
	Without clamp (Clamp listed below)	804, 1604 806, 1606	RK 924 025-CA	37
 (96000301)	4. Clamp for cable holder RK 924 025-CA For cable diameter 10-20 mm		RK 924 025-EA	6
	For cable diameter 20-32 mm		RK 924 025-DA	15
 (96000301)	5. Keying pins for pin connector Prevents the socket connector from being inserted in the incorrect pin connector. Set of ten rings each with four key pins and instruction for six reliable key combinations	8-1, 16-1	RK 924 028-AA	25
 (SE93998)	6. Mounting bars for socket connectors. For assembly of three socket connectors. When two connectors are assembled, the surplus part is removed. Set of two bars.	8-0, 16-0	RK 924 026-AA	7
 (SE93999)	7. Attachment bars for pin connectors. For attachment of five pin connectors in 2U apparatus frame. Set of two bars.	8-1, 16-1	RK 924 030-AA	14
 (SE95043)	8. Attachment for pin connectors. For assembly of two pin connectors one above the other in a 4U apparatus frame.	8-1, 16-1	RK 924 029-AA	5

## Type RTX, RTXCB and RTXQ Branch and cross connector



Branch connectors multiply the number of connections that can be made to a single terminal on the relay base.

One branch connector RTX 1 has locking clips and two double contact pins built in a plastic housing. This housing is available in

clear plastic (20 A) or gray plastic (10 A). The pins use a bus to provide one electrical point. One branch connector can accommodate one incoming and three outgoing socket leads. Two branch connectors can accommodate one incoming and five outgoing, etc.

Separate branch connectors can be suspended between two or more leads. Blocks of two, three or five branch connectors clamped together are supplied with holders and tapping screws, type ST 3.5, for apparatus bar mounting. The distance between such blocks must be sufficient to permit the use of extractor RTXD when removing socket leads from the terminals.

Branch connector RTXCB has locking clips in one side and a cable with contact pins built in a plastic housing. The free end of the cable has a contact socket (10A).

The branch connector can accommodate two incoming socket leads (10A) and one outgoing through the cable.

Branch connector RTXQ has locking clips and contact pins built in a plastic housing. The branch connector can accommodate three incoming socket leads (10A) and one outgoing through a contact socket (10A).

Cross connectors consist of 20, 40, 60, 80 or 100 branch connector units mounted on a front plate. RTX 20 has 2 x 10 branch connector units; RTX 40 has 4 x 10 branch connector units, etc.

Cross connectors with up to 100 separate branch connector units are terminal blocks for making external connections or for connections between cubicles.

The cross connectors are to be fastened on mounting bars with two end supports.

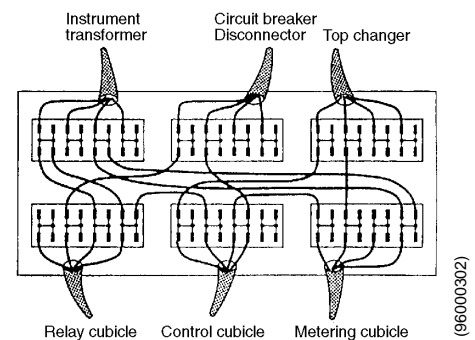


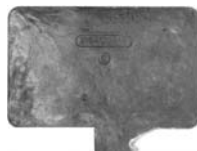
Fig. 5 Principle diagram showing the use of RTX cross connectors

Type	Max. No. of leads	Ordering No. 10 A Gray	20 A Transparent	Weight g	Suitable mounting bar of length mm
RTXC 1	1 x 4	RK 924 004-AA	RK 924 004-BA	10	—
RTXC 1.2	2 x 4	RK 924 002-AA	RK 924 002-BA	40	—
RTXC 1.3	3 x 4	RK 924 002-AB	RK 924 002-BB	50	—
RTXC 1.5	5 x 4	RK 924 002-AC	RK 924 002-BC	75	—
RTXC 20	20 x 4	RK 924 006-AE	RK 924 006-BE	310	150
RTXC 40	40 x 4	RK 924 006-AD	RK 924 006-BD	625	210
RTXC 60	60 x 4	RK 924 006-AC	RK 924 006-BC	935	265
RTXC 80	80 x 4	RK 924 006-AB	RK 924 006-BB	1225	295
RTXC 100	100 x 4	RK 924 006-AA	RK 924 006-BA	1530	350
RTXQ	1 x 3	RK 929 006-AA	—	10	—

Type	Max. No. of leads	Ordering No. 10 A Beige	Weight g
RTXCB	1 x 2	RK 924 050-AA	10



(SE70125)



(SE820528)

Accessories to RTX 20, 40, 60, 80, 100

Description	Suitable for RTX	Length of bar mm	Ordering No.	Weight g
Mounting bar	20	150	2175 0011-5	120
	40	210	2175 0011-7	170
	60	265	2175 0011-10	210
	80	295	2175 0011-11	240
	100	350	2175 0011-14	280
	20-100	2000 (undrilled)	1376 1910-3	3160
End support	20-100	—	2166 0582-2	7

### RTXR and RTXRB multi pole connectors

Pin connectors RTX are intended for PC board mounting. They are available in versions having up to 42 pins for soldering connections to the PC board. One version having 28 pins is also available for contact crimping. The pins are parallel or bent at a 90° angle towards the PC board. Some versions have a pin for making early contact upon insertion. This pin is longer than the rest.

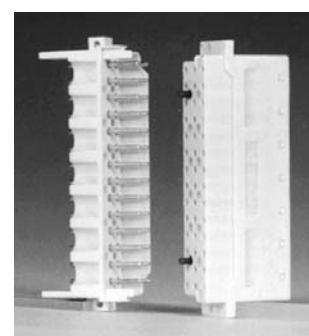
Socket connectors RTX are intended for equipment frame mounting or similar. It has 42 positions for connecting 10 A sockets for crimped connection.

Pin connectors RTXRB are intended for PC board mounting or e.g. transformer sheet metal or similar. It has 8 terminals for connecting 20 A crimped contacts. There are versions intended for all the various versions of socket connectors.

Socket connectors RTXRB are intended for equipment frame mounting or similar. It has 8 terminals for connecting 20 A crimped sockets. There are versions having up to four short circuiting devices. The device contains a con-

tact that connects two sockets when the pin connector and the socket connector are separated. A short circuiting device is used in circuits connected to current transformer secondary circuits, which must always keep the current loop closed. The device is provided with a locking device that may be used to keep the two parts together, i.e. the pin and the socket connectors.

The RTXRB devices are designed so that a pin connector inserted into the wrong version of a socket connector will not open circuits that should be closed and so that short circuiting contacts will close before the contact is opened via pins and sockets upon separation of the connectors.



(SE970187)

Table 2: Technical data for RTX and RTXRB

	RTX	RTXRB
No. of contacts	Max. 42	8
Overload capacity	Continuously 1 s	20 A 500 A
Permissible ambient temp	-25° to +70°C	-25° to + 70°C
Contact resistance	< 5 mΩ	< 5 mΩ
Air gap	1)	4 mm
Creep distance	1)	4 mm

**Table 2: Technical data for RTXR and RTXRB**

Max. system voltage ac dc	1) 1)	500 V 600 V
Test voltage	1)	2500 V, 50 Hz, 1 min
Contact surface	Silver	Silver
Plug in and out force 10-pole 15-pole 23-pole 28-pole 42-pole 8-pole	< 38 N < 54 N < 88 N < 100 N < 160 N –	– – – – – < 100 N
Electrical connection	Pin for PC board soldering <sup>2)</sup>	Terminal for crimping pin
Male contact device	Terminal for crimping socket	Terminal for crimping socket
Material (housing)	Polyester	Polycarbonate
Flammability	UL 94 V 0	UL 94 V 2

<sup>1)</sup> Data demands on type of contact device (placement of pins) and the PC board pattern

<sup>2)</sup> RTXR 42-4 has also terminals for pins to be crimped

**Table 3: RTXR and RTXRB**

Pin device	Ordering No. pin device	Straight pins	Extended pins	Angled pins	Ordering No. corresponding socket device
RTXR 10-1	RK 924 043-AM	No	No	Yes	RK 924 043-AA RK 924 043-AF
RTXR 15-1	RK 924 043-AL	No	Yes on position B14	Yes	RK 924 043-AA RK 924 043-AF
RTXR 23-1	RK 924 043-AK	No	Yes on position D14	Yes	RK 924 043-AA RK 924 043-AF
RTXR 28-1	RK 924 043-AC	No	No	Yes	RK 924 043-AA RK 924 043-AF
RTXR 28-1	RK 924 043-AN	No	Yes on position B14	Yes	RK 924 043-AA RK 924 043-AF
RTXR 28-3	RK 924 043-AE	Yes	No	No	RK 924 043-AA RK 924 043-AF
RTXR 42-1	RK 924 043-AG	No	Yes on position D14	Yes	RK 924 043-AA
RTXR 42-1	RK 924 043-AB	No	Yes on position D14	Yes	RK 924 043-AA RK 924 043-AF
RTXR 42-3	RK 924 043-AD	Yes	Yes on position D14	No	RK 924 043-AA RK 924 043-AF
RTXR 42-3	RK 924 043-AH	Yes	Yes on position D14	No	RK 924 043-AA
RTXR 42-4	RK 924 049-AA	No	No	Yes, 14 *)	RK 924 043-AA RK 924 043-AF

\*) to be soldered to PC boards in row Z, in addition there are positions for crimped pins in row B and D.



## Pin device RTXRB 8-1

## Socket device RTXRB 8 - 0 with 1 - 4 short circuiting device

Type	Ordering No.	Type	Ordering No.	Terminal post designations short circuited = sc			
				131-141	231-241	331-341	431-441
RTXRB 8-1	RK 924 048-BA	RTXRB 8-0	RK 924 048-AA	sc	sc	sc	sc
RTXRB 8-11	RK 924 048-BB	RTXRB 8-01	RK 924 048-AB	sc	sc	sc	—
RTXRB 8-12	RK 924 048-BC	RTXRB 8-02	RK 924 048-AC	sc	sc	—	—
RTXRB 8-13	RK 924 048-BD	RTXRB 8-03	RK 924 048-AD	sc	—	—	—
RTXRB 8-14	RK 924 048-BE	RTXRB 8-04	RK 924 048-AE	—	—	—	—

### Accessories for RTXR and RTXRB

Socket and pin contact to be crimped on to timed multi conductor wire.

10 A sockets and pins are crimped onto wires having a maximum of 3.7 mm outer dimension of insulation and a conductor area of 0,25-1,5 mm<sup>2</sup>.

20 A sockets and pins are crimped onto wires having a maximum of 34.2 mm outer dimension of insulation and a conductor area of 1,5-2,5 mm<sup>2</sup>.

Cable holder RK 924 005-AA.

10 A and 20 A sockets and pins	Ordering No.	Matching connection device
10 A socket	2658 634-1	Socket connector RTXR
10 A pin	2658 766-1	Pin connector RTXR 42 - 4
10 A pin contact (extended pins)	2658 766-2	Pin connector RTXR 42 - 4
20 A socket	2658 636-1	Socket connector RTXRB
20 A pin	2658 638-1	Pin connector RTXRB

## COMBIFLEX tools

Tool set	No. incl. in the tool set	Ordering No.	Weight/ item
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(SE91811)

Set of tools consisting of the number of tools, test items and spare parts mentioned below.  
Supplied in a tool box of size 420x280x180 mm

See below RK 924 020-AA 8,5 kg



(SE73954)

Extractor RTXD  
for withdrawing 10 A and 20 A socket leads




10 6896 057-1 3 g



(SE91814)

Phillips type screwdriver  
For screws No. 1  
For screws No. 2  
Screw driver torx T10  
Screw driver torx T20  
Screw driver torx T25  
Screw driver torx T30

1 6883 1111-137 60 g  
1 6883 1111-138 110 g  
1 1MRK 000 436-3  
1 1MRK 000 436-4  
1 1MRK 000 436-5  
1 1MRK 000 436-6

	Tool set	No. incl. in the tool set	Ordering No.	Weight/ item
 (SE76821)	Stripping tool For stripping and cutting of leads with conductor area of 0,25-2,5 mm <sup>2</sup> . The length of the stripped part will be 10,5 ± 0,5 mm	1	RK 924 034-AA	260 g
 (SE970900)	Crimping tool for 10 and 20 A contact terminal sockets and pins onto leads. 10 A, conductor area, 0,5-1,5 mm <sup>2</sup> (0,25 mm <sup>2</sup> through field adjustment) 20 A, conductor area, 1,5-2,5 mm <sup>2</sup>	1	1MRK 001 593-1	680 g
 (SE820289)	Test-plug handle RTXH 18	1	RK 926 011-AC	500 g
	Test-plug handle RTXH 24	1	RK 926 016-AA	950 g
	Trip-block plug RTXB	5	RK 926 005-AC	10 g
	Ammeter test plug RTXAM	1	RK 926 006-AB	300 g
	20 A test leads Length 2,5 m with 4 mm banana type pins at each end and a conductor area of 2,5 mm <sup>2</sup> black	5	2639 0605-1	110 g
	red	5	2639 0605-2	110 g
	10 A test leads Set of one red and one black lead each with a 4 mm banana pin on the end and a 10 A terminal pin on the other. Length 2,5 m. Conductor area 1,0 mm <sup>2</sup>	2	RK 926 001-AB	100 g
	Tool set	No. incl. in the tool set	Ordering No.	Weight/ item



(SE95037)

Contact sockets, silver plated

10 A, conductor area 0,25-1,5 mm<sup>2</sup>

100

2658 634-1

0,5 g

20 A, conductor area 1,5-2,5 mm<sup>2</sup>

100

2658 636-1

0,9 g

Contact pins, silver plated

10 A, conductor area 0,25-1,5 mm<sup>2</sup>

100

2658 637-1

0,6 g

20 A, conductor area 1,5-2,5 mm<sup>2</sup>

20

2658 638-1

1,2 g

Plastic plugs for blanking off the holes in the front of plastic covers of plug-in apparatus.

100

2188 152-1

0,2 g

Hole in diameter 6,1 mm



(SE782769)

Pneumatic press for crimping contact sockets and pins onto leads for 10 A and 20 A can be ordered after inquiry.

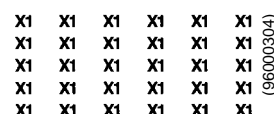
## Marking strips and labels (self-adhesive)

Marking strips and labels used for identification are to be affixed to marking bar, connector RTXG, branch connector RTXC, apparatus frame, plug-in apparatus and test switch, as below.

Instructions for marking are supplied with the marking strips and labels.



(96000303)



(96000304)

Description	To be affixed to	Marking	No. of identical markings	Ordering No.
Sheet with 2 x 10 marking strips with C-module divisions, white with black text	Marking bar in equipment frame or case	02-12, 12-02,	10	2949 0809-A
		02-24, 24-02,	10	2949 0809-B
		25-48, 48-25,	10	2949 0809-C
		49-60, 60-49	10	2949 0809-D
Sheet with 1 x 10 marking strips with C-module divisions, white with black text	Apparatus bar	01-18	10	2949 0808-1
		19-36	10	2949 0808-2
		37-60	10	2949 0808-3
Sheet with 45 Labels 12 x 6 mm yellow with black text.	All RTXG and RTXC1-RTXC1,5 and apparatus frames	X1	45	2949 0645-1
		X2	45	2949 0645-2
		X3, X4	27, 18	2949 0645-3
		X5-X9	9	2949 0645-4
		X10-X14, X15-X19	5, 4	2949 0645-5
		X20-X24, X25-X29	5, 4	2949 0645-6
		X30-X34, X35-X49	3, 2	2949 0645-7
		X50-X94	1	2949 0645-8

Description	To be affixed to	Marking	Ordering No.
Sheet with 45 Labels 12 x 6 mm yellow without text		Can be written on	2940 1697-3
Label 22,5 x 6,5 mm gray without text	Plug-in apparatus	Can be written on	2940 1691-2
Label 47,5 x 33,5 mm gray without text	Test switch RTXP 18	Can be written on	2940 1815-1
Tape showing U-modules within an equipment frame	Equipment frame end plate	1, 2, 3, 4 1, 2, 3, 4 . . . 8 1, 2, 3, 4 . . . 12	1MRK 000 074-7 1MRK 000 074-8 1MRK 000 074-9
Marking label for equipment frame type RL	Equipment frame type RL	01-83 83-01	2949 1702-9 2949 1702-10

## References

Dimensions	1MRK 514 004-BEN
Series RE 500	
Mechanical design and mounting accessories	1MRK 514 003-BEN

## Manufacturer

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