

COMBIFLEX

Connection and installation components

COMBIFLEX

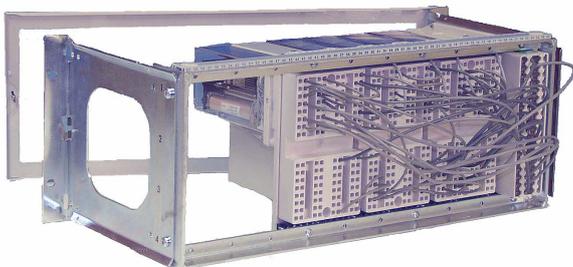
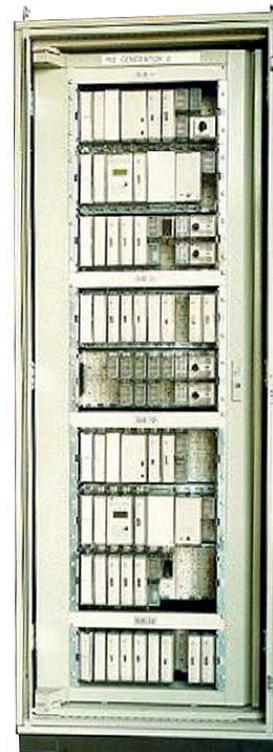
Features

Easy, flexible and rapid installation, service and expansion of both simple and complex systems
Combine plug-in apparatus and other components to form complete systems for protection and control
Fulfill 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.

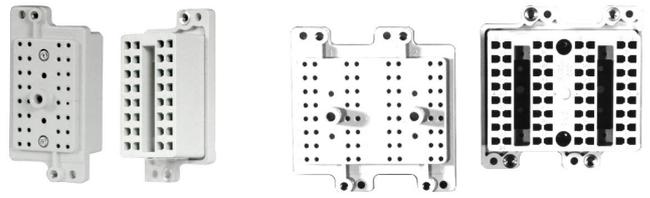
The basis for the mounting systems, which are modular systems, are equipment frames with an overall width of 19" and varying height. The height module U (1U= 44,45 mm= 1,75") and width modules C (1C=7mm) and TE (1TE=5,08 mm) are used.

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.

Product overview

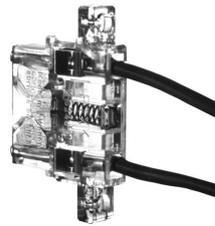
RX Terminal bases, sockets and leads.
For more information see page 5.



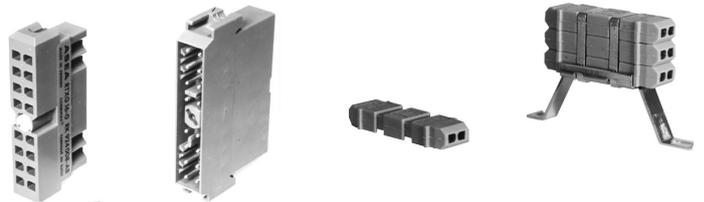
Tools for connection and installation.
For more information see page 7.



RTXI and RTXK current connectors.
For more information see page 9.



RTXG, RTX, RTXCB Connectors. For more information see page 10 and page 12.



DIN-rail adapter. For more information see page 14.



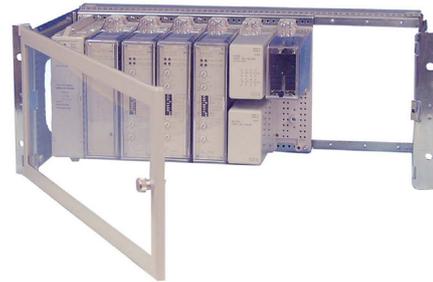
RXZ Panel bases for surface mounting.

- For 2 or 4 seat COMBIFLEX relays
- For more information see page 15.



RHGT is a 19" rack system for mounting in cubicles.

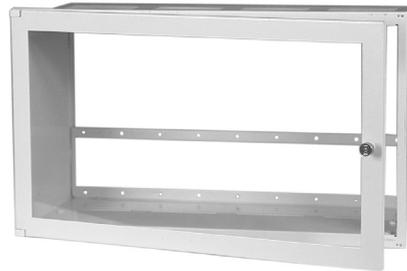
- With or without door
- For more information see page 16.



RHGS is a 19" case system for cubicle or surface mounting.

- Case size 1/4, 1/2 and 1/1 (full) 19" rack
- 6U high self standing and accessory to 500-, 650- or 670-series protection and control terminals.

For more information see page 21.



RHGP is a case system for panel (flush) mounting.

- Variants for 1, 2, 2H, 4 and 8 COMBIFLEX relay seats
- Variant covering cut-outs according to Hitachi Energy's earlier 900-series
- With or without front cover

For more information see page 25.



RHGX is a case system for panel (flush) mounting.

- Case size 12C, 24C, 36C and 60C with 4U height
- Case size 60C and 8U height
- Flush and semiflush mounting
- Front door

For more information see page 28.



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



Ordering

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 RTKX and RTXI 20A current connectors.

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

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 RXZ 21 and RXZ 41.

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 $10,5 \pm 0,5$ mm. They are as standard silver plated and gold on request. They are delivered in plastic bags with fixed quantities acc. to table below.

Rated current, A	Suitable for conductor area, mm ²	Max. outer diameter of the insulation of lead, mm	Package pcs	Ordering No.	Weight, g/package
10	0,25-1,5	3,7	100	1MRK 002 136-A	50
10	0,25-1,5	3,7	1000	1MRK 002 136-B	500
10	0,25-1,5	3,7	5000	1MRK 002 136-C	2500
20	1,5-2,5	4,2	100	1MRK 002 136-D	90
20	1,5-2,5	4,2	1000	1MRK 002 136-E	900
20	1,5-2,5	4,2	5000	1MRK 002 136-F	4500

Ordering

Leads on rolls

Leads having a tinned multistranded copper conductor with gray insulation (specify no of metres, but multiples of rolls lengths).

Area, mm ²	Roll length, m	Ordering No.
1,0	100	9ADA102-7
1,5	100	9ADA102-10
2,5	100	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.

Leads with a terminal socket on each end

Length of insulated part mm	Terminal socket combination: 10 A-10 A		Terminal socket combination: 10 A-20 A 20 A-20 A	
	Conductor area, mm ² 1,0	1,5	1,5	2,5
	Ordering No.			
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
580	SK 791 019-N	SK 791 007-N	SK 791 013-N	SK 791 015-N



(SE93328a.jpg)

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

Length of insulated part	Terminal socket size 10 A	Terminal socket size 20 A
	Conductor area, mm ²	
	1,5	2,5
680	SK 791 009-R	SK 791 017-R
1780	SK 791 009-Z	SK 791 017-Z
2980	SK 791 009-AD	SK 791 017-AD



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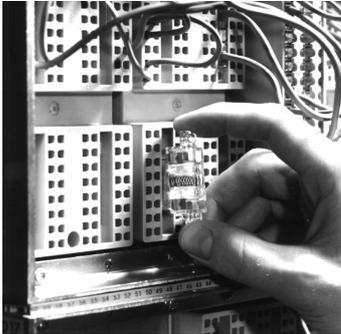
COMBIFLEX tools

Tool set	No. incl. in the tool set	Ordering No.	Weight/ item		
Set of tools consisting of the number of tools, test items and spare parts mentioned below. Supplied in a tool box (size 47x24x20 cm)	See below	RK 924 020-AA	6,3 kg		(xx0400080.jpg)
Extractor RTXD (set of 10 pcs) for withdrawing 10 A and 20 A socket leads	1	1MRK 002 138-A	3 g		(SE73954.eps)
Phillips type screwdriver For screws No. 1	1	6883 1111-137	60 g		(SE91814.eps)
For screws No. 2	1	6883 1111-138	110 g		
Screw driver torx T10	1	1MRK 000 436-3	50 g		
Screw driver torx T15	1	1MRK 000 436-7	50 g		
Screw driver torx T20	1	1MRK 000 436-4	70 g		
Screw driver torx T25	1	1MRK 000 436-5	70 g		
Screw driver torx T30	1	1MRK 000 436-6	110 g		
Stripping tool For stripping and cutting of leads with conductor area of 0,25-2,5 mm ² . The length of the stripped part will be 10,5 ± 0,5 mm	1	RK 924 034-AA	260 g		(SE76821.eps)
Crimping tool for 10 and 20 A contact terminal sockets and pins onto leads. 10 A, conductor area, 0,5-1,5 mm ² (0,25 mm ² through field adjustment) 20 A, conductor area, 1,5-2,5 mm ²	1	1MRK 001 593-1	680 g		(SE970900.eps)
Test-plug handle RTXH 18	1	RK 926 011-BC	500 g		
Test-plug handle RTXH 24	1	RK 926 016-AA	950 g		
Trip-block plug RTX B	5	RK 926 005-AC	10 g		
Ammeter test plug RTX M	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 ²					
black	5	2639 0605-1	110 g		
red	5	2639 0605-2	110 g		
10 A test leads Length 2,5 m with a 4 mm banana pin on the end and a 10 A terminal pin on the other. Conductor area 1,0 mm ² .					
black	2	2639 0180-B	110 g		
red	2	2639 0181-B	110 g		(SE820289.eps)

COMBIFLEX tools

Tool set	No. incl. in the tool set	Ordering No.	Weight/ item		
Contact sockets, silver plated (set of 100 pcs)					(SE95037a.jpg)
10 A, conductor area 0,25-1,5 mm ²	1	1MRK 002 136-A	50 g		
20 A, conductor area 1,5-2,5 mm ²	1	1MRK 002 136-D	90 g		(SE95037b.jpg)
Contact pins, silver plated (set of 100 pcs)					(SE95037c.jpg)
10 A, conductor area 0,25-1,5 mm ²	1	1MRK 002 136-G	60 g		
20 A, conductor area 1,5-2,5 mm ²	1	1MRK 002 136-H	120 g		(SE95037d.jpg)
Plastic plugs for blanking off the holes in the front of plastic covers of plug-in apparatus. Hole in diameter 6,1 mm	100	2188 152-1			
Other useful tools		Ordering No.			
Electric press for crimping contact sockets and pins onto leads for 10 A and 20 A.		1MRK 002 011-A			(xx04000088.jpg)

RTXI, RTXK current connectors



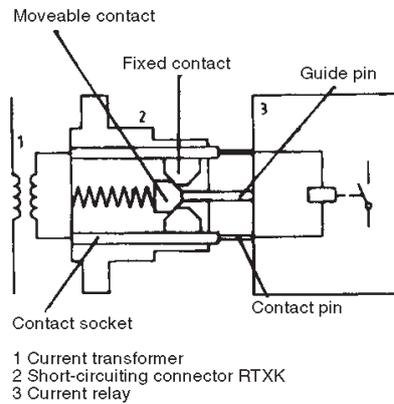
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These 20 A current connectors fit into the terminal base component pocket and adapt the terminal base for current connections.

The RTXK transparent plastic short-circuiting connector contains two fixed contacts with 20 A terminals and one movable springloaded 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.

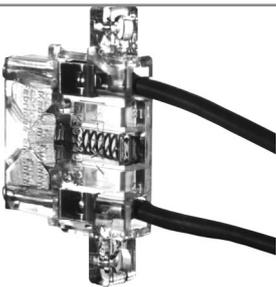
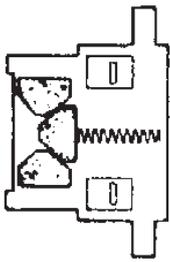
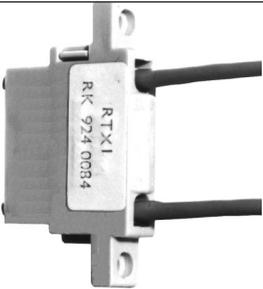
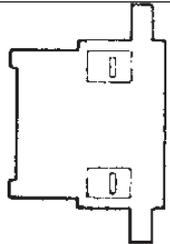
As the relay is withdrawn from the terminal base, the current circuit is short-circuited before the relay is disconnected (see Fig. 1). It is mainly used in ac circuits for short-circuiting a CT secondary circuit when the relay is removed from the terminal base.

The RTXI beige 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 with-drawn from the terminal base, the current circuit is opened. It is mainly used in dc shunt circuits.



(96000298.tif)

Figure 1: Connection when mounting the shortcircuiting connector RTXK

	Type	Ordering No.	Weight, g
 <p>(SE91864.eps)</p>   <p>(96000299.tif)</p>	RTXK	5371 050-A	12
 <p>(SE91862.eps)</p>   <p>(96000300.tif)</p>	RTXI	5371 050-B	4,5

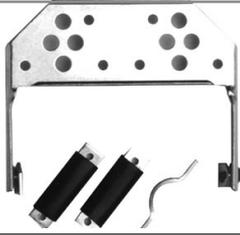
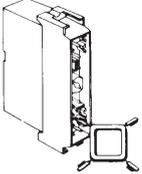
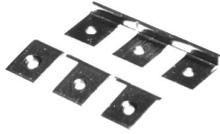
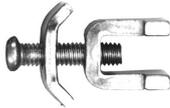
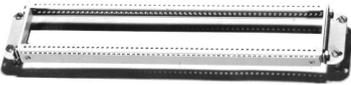
RTXG 10 A pin/socket connector

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		Dimension	Ordering No.	Weight, g	
			Single (Blue)	Double (Gray)				
Socket connectors								
 RTXG 8-0 RTXG 8-1 RTXG 16-0 RTXG 16-1	(SE93994.eps)	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		
Pin connectors								
 RTXG 8-0 RTXG 8-1 RTXG 16-0 RTXG 16-1	(SE93997.eps)	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
 (SE782720.eps)	<p>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.</p>	8-0, 16-0	RK 924 025-AA	32
 (SE782723.eps)	<p>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.</p>	8-0, 16-0	RK 924 025-AC	25
 (SE94001.eps)	<p>3. Cable holder for socket connector With clamp for cable diameter 10-20 mm Without clamp (Clamp listed below)</p>	802, 1602 804, 1604 806, 1606	RK 924 025-BA RK 924 025-CA	43 37
	<p>4. Clamp for cable holder RK 924 025-CA For cable diameter 10-20 mm For cable diameter 20-32 mm</p>		RK 924 025-EA RK 924 025-DA	6 15
 (96000301.tif)	<p>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.</p>	8-1, 16-1	RK 924 028-AA	25
 (SE93998.eps)	<p>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.</p>	8-0, 16-0	RK 924 026-AA	7
 (SE93999.eps)	<p>7. Attachment bars for pin connectors. For attachment of five pin connectors in 2U apparatus frame. Set of two bars.</p>	8-1, 16-1	RK 924 030-AA	14
 (SE95043.eps)	<p>8. Attachment for pin connectors. For assembly of two pin connectors one above the other in a 4U apparatus frame.</p>	8-1, 16-1	RK 924 029-AA	5
 (SE82533.eps)	<p>9. 2U apparatus frame 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 requirements 3U.</p>		5284 1350-D	1000

RTXC and RTXCB Branch and cross connector

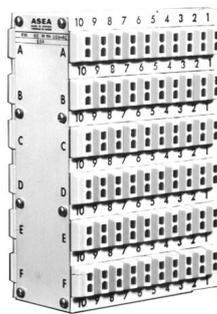


RTXC 1



RTXC 1.3

(SE940734.eps)



RTXC 1

(SE94528.eps)



RTXCB

(RTXCB.jpg)

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

One branch connector RTXC 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. RTXC 20 has 2 x 10 branch connector units; RTXC 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.

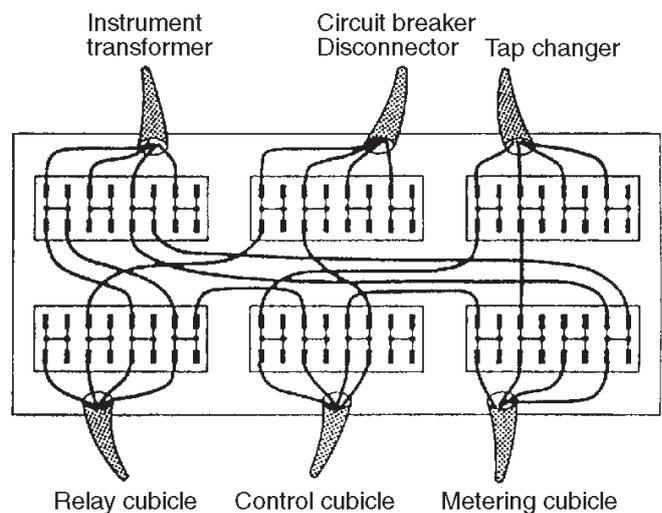


Figure 2: Principle diagram showing the use of RTXC cross connectors

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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
RTXCB	1 x 2	RK 924 050-AA	–	10	–

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 comprise of 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.

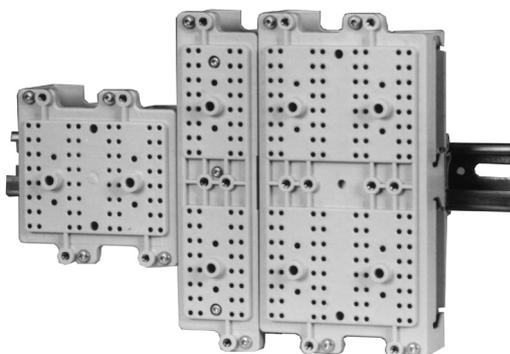
The adapters can be mounted onto vertical or horizontal DIN-rails by rotating the clamp-fit holders 90°.

Terminal bases 2U and 4U mounted on bars.



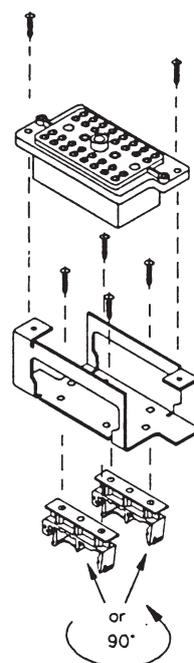
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Relays size 2U mounted on bases for terminal bars.



(se950242.eps)

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



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(xx04000077.jpg)



(xx04000078.jpg)

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 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.

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 RXZ 21 has one place for a RX 2 terminal base and the RXZ 41 has one place for a RX 4 terminal base. The complete panel base RXZ 21 also includes one terminal block with 16 terminals, wired according to buyer's specification.

The complete RXZ 41 has two terminal blocks each with 16 terminals also wired according to specification. When multistranded

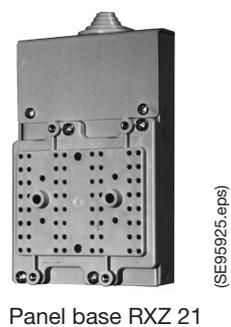
leads are used connection can be made directly to the terminal base; thus variants without terminal blocks are chosen.

Panel frames for surface mounting

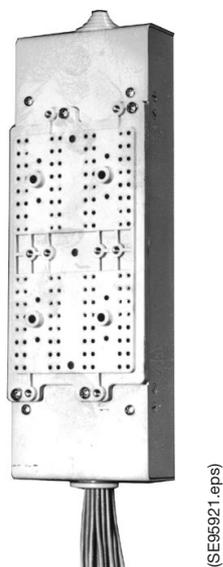
The panel frame provides front connection and surface mounting for protection relay assemblies, else intended for rack or case mounting.

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.



Panel base RXZ 21



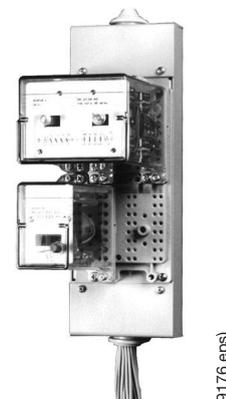
Panel base RXZ 41



Support case



Support case



Panel base RXZ 41, equipped

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

Optional items for RXZ Bases		Maximum quantity	
Article no.	Description	RK928008-AC	RK928009-AC
5371 050-A	RTXK	2	4
5371 050-B	RTXI	2	4
2663 045-1	Terminal block	-	2
2639 530-AM	Lead, 10 A, L=110	16	32 ¹⁾
SK791 017-B	Lead, 20 A, L=100	4	8 ¹⁾
SK791 019-B	Lead, 10 A, L=100	4	8 ³⁾
2639 530-AN	Lead, 10 A, L=190	-	16 ²⁾
SK791 017-D	Lead, 20 A, L=180	-	4 ²⁾
SK791 019-D	Lead, 10 A, L=180	-	16 ³⁾

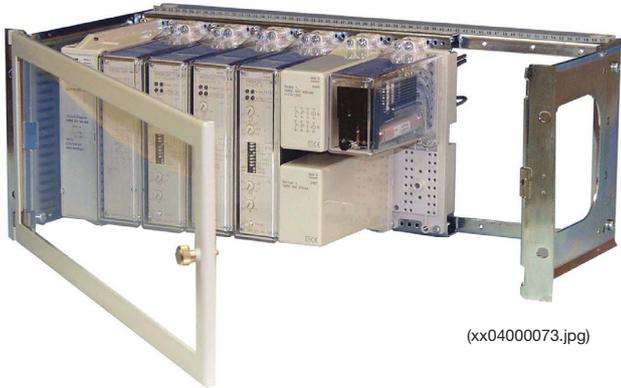
¹⁾ For connecting RX4 Base to Terminal Block

²⁾ If 1 PC of Terminal Block has been ordered, these leads should be used to connect relay place 1 and 2 to the lower terminal block or relay place 3 and 4 to the upper terminal block

³⁾ For internal connection between the relay places

RHGT 19" equipment frame

These types of equipment frame is used for cubicle mounting or panel mounting of plugin units in the COMBIFLEX range.



(xx04000073.jpg)

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.

Frames, end panels and brackets are zinc plated, doors are powder coated light beige or gray.

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.

The frame is available in size: 4U (7"x19") for mounting 20 module seats.

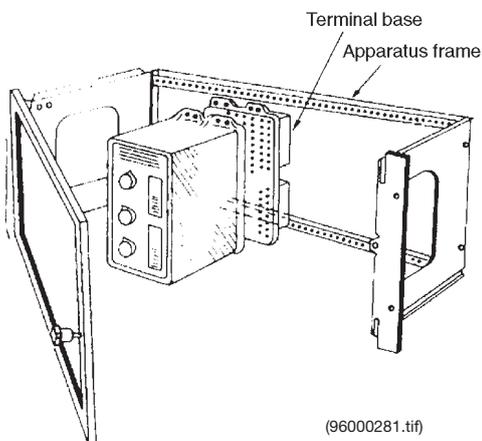
The equipment frame has a mounting bar (combined apparatus and support bar) for mounting of assemblies and terminal bases side-by-side if a 10 mm (apparatus bar thickness) difference of front level is acceptable.

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.

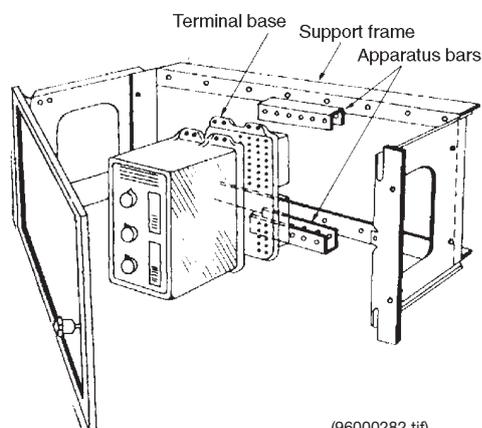
Equipment frames with end panels have an optional front door, with a transparent window. The door, hinged on the left, is 4U high.



(xx04000082.jpg)



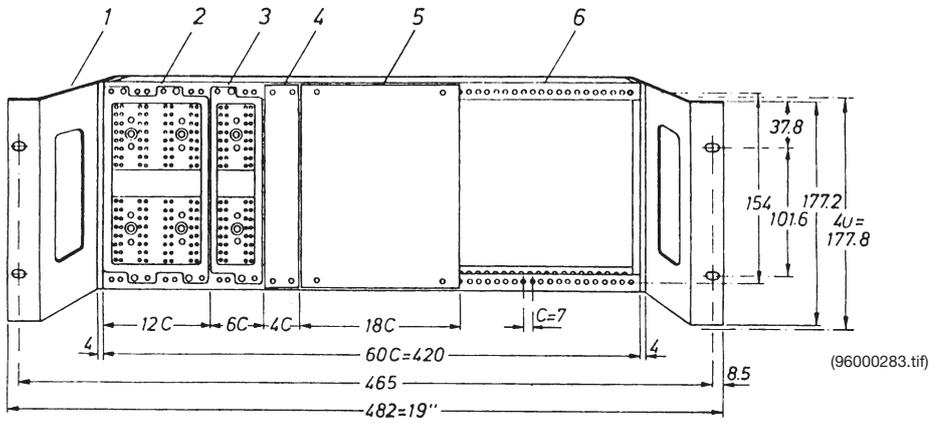
(96000281.tif)



(96000282.tif)

Figure 3: Mounting without apparatus bars

Figure 4: Mounting with apparatus bars



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 mounting bar

Figure 5: Dimensions



(xx04000083.jpg)

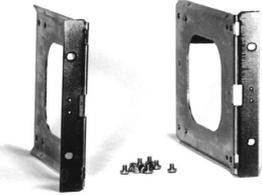
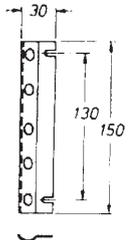


(xx04000084.jpg)

Delivered as a set of necessary material, unassembled.

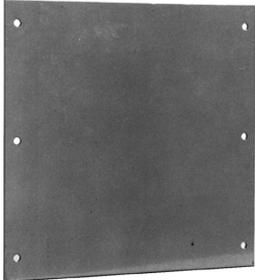
Set of equipment frame details	Size	Ordering No.	Weight, kg
Without door	4U 19"	1MRK 000 137-PA	2,0
With door, beige	4U 19"	1MRK 000 137-RA	2,6

Accessories and individual parts for equipment frames

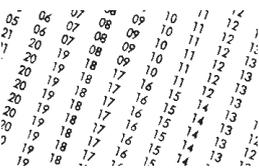
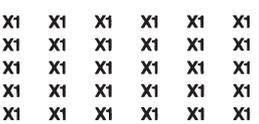
		For all RHGT equipment frames	Size	Ordering No.	Weight, Kg
	(SE96405.eps)	Strengthening plate To be fitted to top and bottom of equipment frame. Two required per frame. Extra space 1U between racks is a necessity.	60 C	1MRK 000 588-2	0,6
	(SE96413.eps)	End panels To be fitted to apparatus frame to make up an equipment frame for flush-mounting. Two required per equipment frame.	4U	2176 138-6	0,2
	(SE96414a.eps) (SE96414b.eps)	Mounting brackets To be fitted to apparatus frame or support frame to make up an equipment frame for flush-mounting. Two required per equipment frame. To get a folding support frame, one 2174 195-1 and one 2174195-10 is provided.	4U 8U	2174 195-1 2174 195-10	0,2 0,2
	(SE96415.eps)	Door with transparent window, beige. To be mounted on left end panel of equipment frame. Door with transparent window, gray To be mounted on left end panel of equipment frame. Hinge (two are needed for each door) Lock	4U 60C 4U 60C	5284 1342-Y 1TSA340015R0025 2184 0512-1 2167 247-3	0,6
	(SE75433.eps)	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
	(96000284.tif)	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
		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

Apparatus bars, plates and frames

		Modular width	Ordering No.	Weight, Kg
 <p>(SE82532.eps)</p>	Apparatus bars	60C	2175 323-5	0,27
	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.).	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

		To be mounted on apparatus bars/apparatus frame:		
 <p>(SE82536.eps)</p>	4U apparatus plates, zinc plated	60C	2172 467-15	1,14
	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.	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

Markings

	To be affixed to	Description	Marking	No. of identical markings	Ordering No.
 <p>(96000303.tif)</p>	Apparatus bar	C-module divisions, white with black text	01-18	100	-
			19-36	100	-
			37-60	50	-
		Set of markings as per above			1MRK 002 137-A
 <p>(96000304.tif)</p>	Marking bar in equipment frame or case	C-module divisions, white with black text	02-24, 24-02	100	-
			25-48, 48-25	100	-
			49-60, 60-49	10	-
	Connectors and other separately mounted devices	Labels 12 x 6 mm, yellow with black text	X1	45	-
		Set of markings as per above			1MRK 002 137-B

Accessories and individual parts for equipment frames

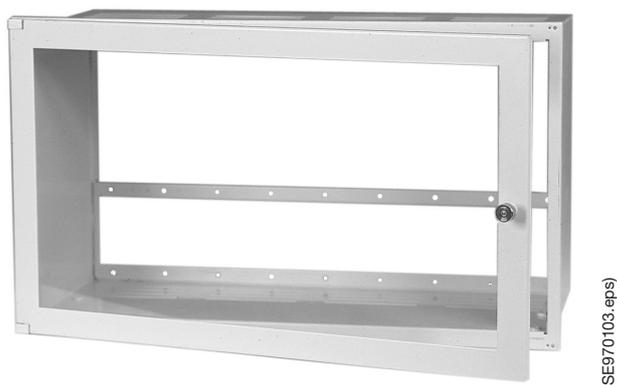
	Size	Ordering No.	Weight, Kg
 <p>(xx04000076.jpg)</p>	<p>For building RHGT equipment frames with combined apparatus and support bar (variant A)</p>		
	<p>Mounting bar (2 required) To mount terminal bases and apparatus plates on, as well as assemblies or apparatus bars.</p>	1MRK 000 316-23	0,3
General accessories			
 <p>(xx04000075.jpg)</p>	<p>Mounting Kit For the mounting of RTXP 24 in 4U cases</p>	1MRK 000 020-BT	0,1
 <p>(xx04000074.jpg)</p>	<p>Mounting Bracket For the mounting of RTXP 8 in 4U cases</p>	1MRK 000 316-19	0,1

RHGS Cases for 19" Cubicle mounting or surface mounting

This type of case can be used for all common ways 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-, 650- and 670-series.

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 or gray.

A spacer frame for semi-flush mounting is available.



(SE970103.eps)

Case colour beige

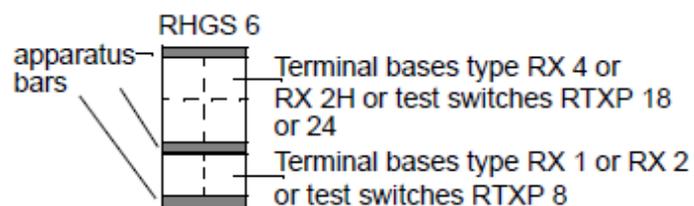
Type	Size	No. of relay seats	Ordering No. without door	Ordering No. with door with transparent window
RHGS 30	6U 19"	30	1MRK 000 315-A	1MRK 000 315-D
RHGS 12	6U x 1/2	12	1MRK 000 315-B	1MRK 000 315-E
RHGS 6	6U x 1/4	6	1MRK 000 315-C	1MRK 000 315-F

Case colour gray

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-BC	1MRK 000 315-BB
RHGS 12	6U x 1/2	12	1MRK 000 315-BK	1MRK 000 315-BH
RHGS 6	6U x 1/4	6	1MRK 000 315-AH	1MRK 000 315-AG

Apparatus bars are required for mounting of COMBIFLEX terminal bases.

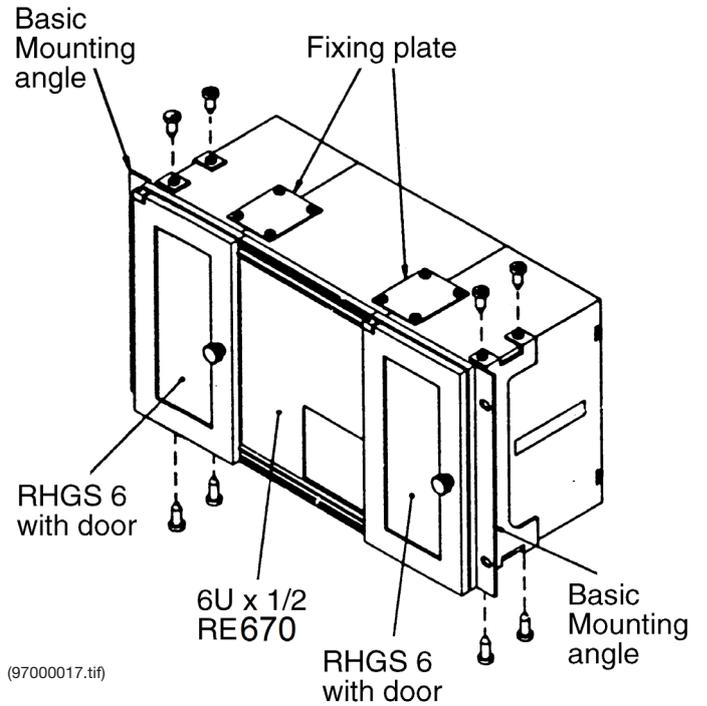
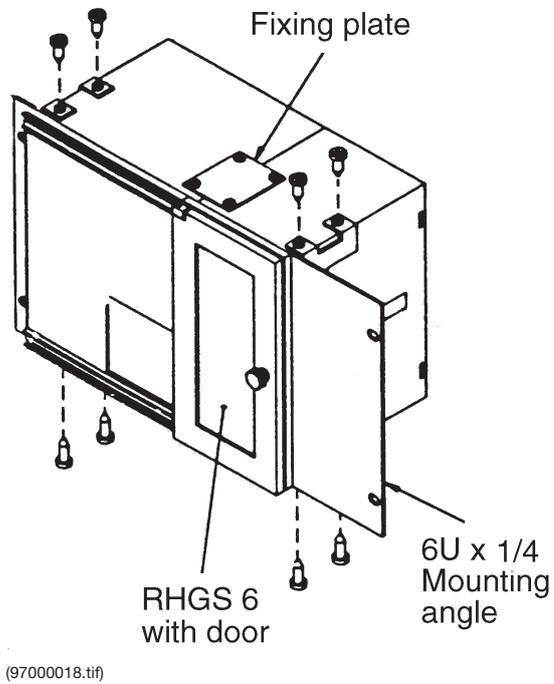
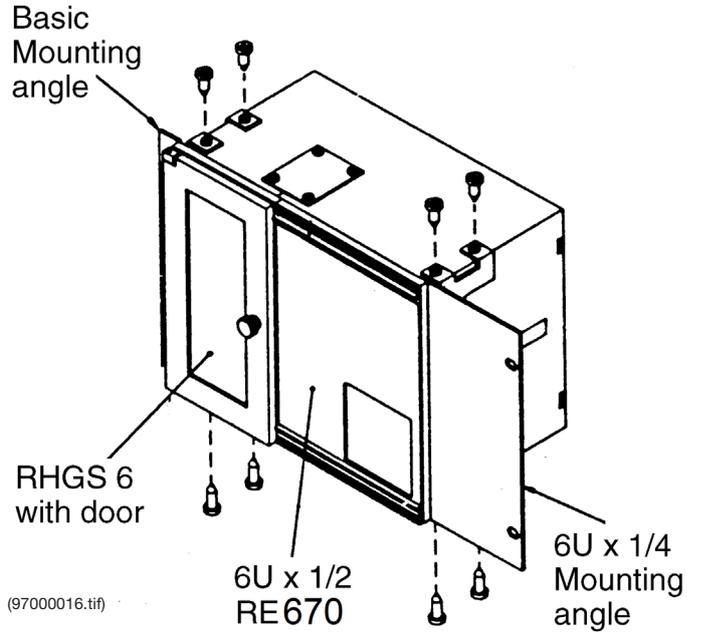
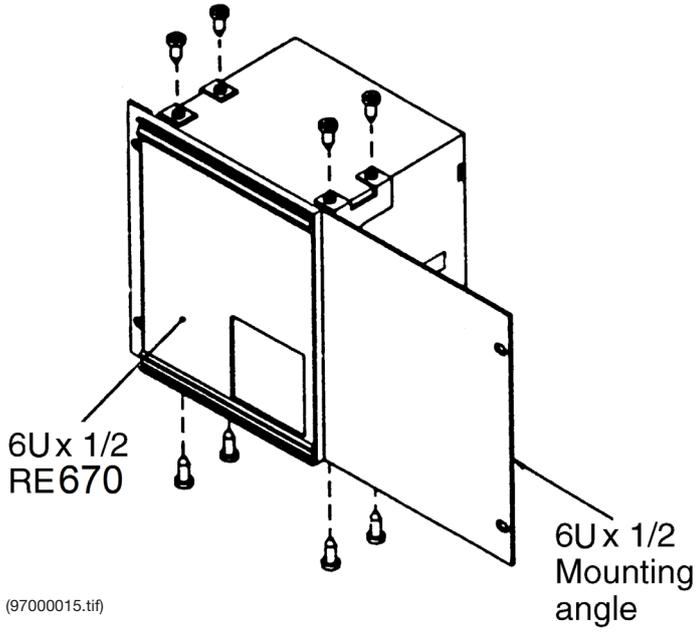
The apparatus bars are fixed directly on the supporting frame using ST 3,5 tapping screws.



(RHGS 6.tif)

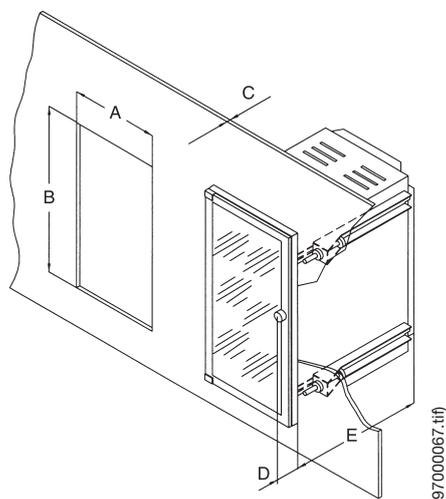
Mounting examples

Below 19" adaption of a 6U x 1/2 box (RHGS 12, 670-series)

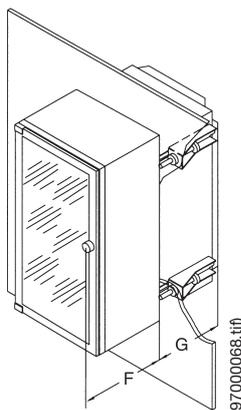


Examples on flush mounting in a panel, semiflush mounting and wall mounting are shown below.

Flush mounting



Semi-flush mounting

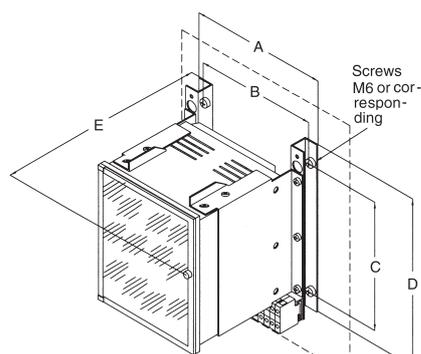
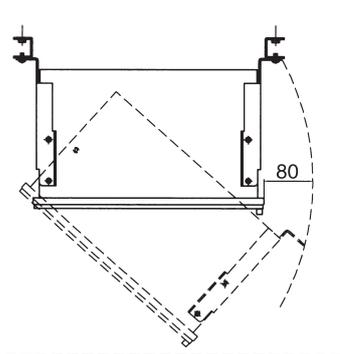


Case size	Cut-out dimensions	
	A ± 1	B ± 1
RHGS 6	97,8	
RHGS 12	210,1	254,3
RHGS 30	434,7	

(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		
RHGS 12	292	267,1	272,8	390
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	Beige Ordering No.	Gray 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	1MRK002 420-AA 1MRK002 420-AC 1MRK002 420-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	1MRK002 420-CA 1MRK002 420-BA 1MRK002 420-BB 1MRK002 420-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	1MRK002 420-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	- - -

Mounting examples

Table 1: Accessories for RHGS

The following accessories are available for different installations:

Description	For case size	Beige Ordering No.	Gray Ordering No.
Mounting kit for flush installation: consisting of four fastener, sealing strip, fixing screws and assembly instruction.	All sizes	1MRK 000 020-Y	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	1MRK 002 420-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

RHGP Panel mounting cases



(xx04000079.jpg)

RHGP 1, RHGP 2, RHGP 2H and RHGP 4 are used to mount a single or few relays on a terminal base in panel cut-out.

RHGP 4B cut-out dimension is adapted for mounting in the same cut-out space as the earlier 900-series, size 1 relay.

RHGP 8 is used to mount a relay assembly of size 4U 24C on apparatus bars or a number of relays directly on terminal bases RX 4/RX 2H, in a panel cut-out.

RHGP can also be used to mount test switches in RTXP 8, RTXP 18 and RTXP 24 in a panel cut-out. Terminal bases are then not required. An extra mounting kits is required for RTXP 24 (see RHGT accessories). RTXP 8 can be mounted in RHGP 1 and RHGP 2.

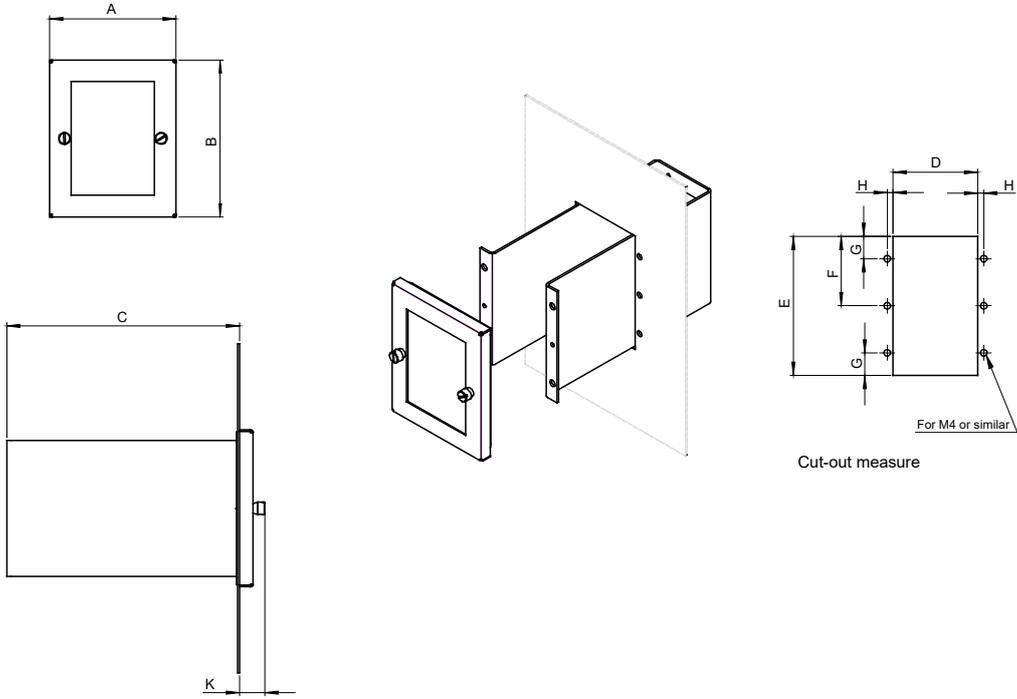


(xx00000629.tif)

RHGP cases are light beige (Hitachi Energy standard, color code NCS 1704-I15R), made of steel sheets. RHGP 4B and RHGP 8 are fully enfolded.

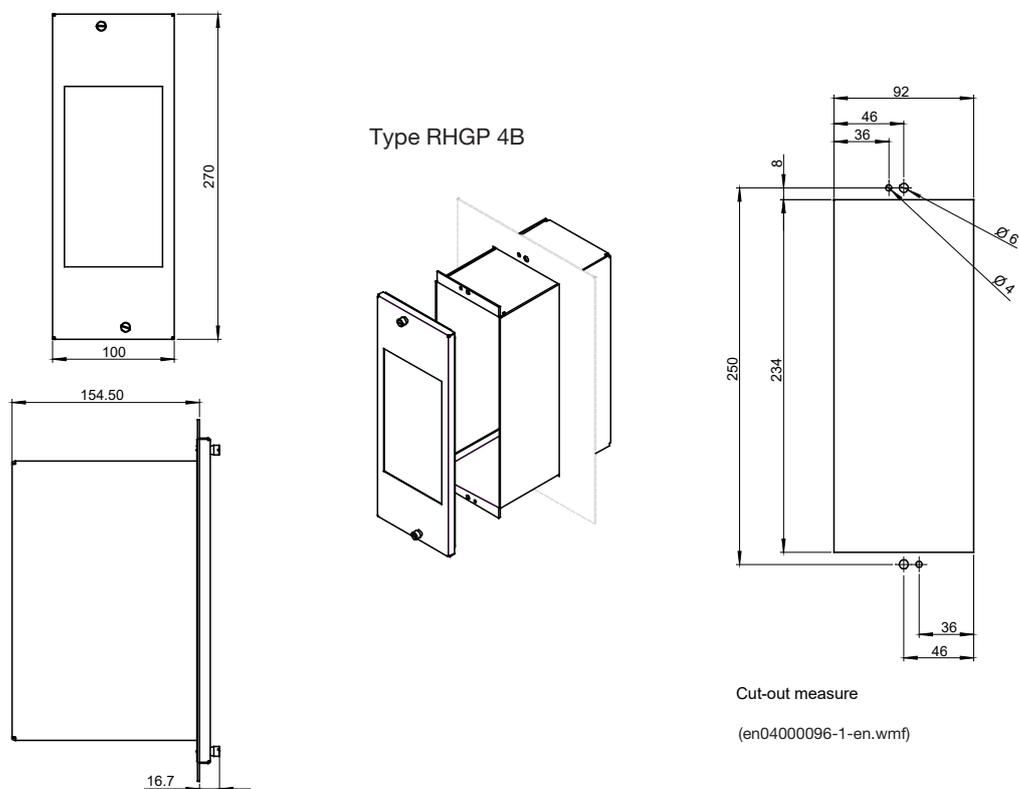
The top and the bottom parts of RHGP 1, 2, 2H and 4 are not covered in order to have better air circulation which reduces heat build up. The cases are inserted and mounted with screws in the cut-out from the front side of any panel. Terminal bases and test switches are mounted directly to the rear of the cases. The front covers are made of light beige colored sheets of steel and provided with a transparent polycarbonate plastic window. The front covers are mounted to the case with two captive screws. A gasket at the rear of the front cover protects (IP50) against dust.

Connection and installation components



Type	Measure								
	A	B	C	D	E	F	G	H	K
RHGP 1	84	105	154.5	56	93	46.5	15	4	16.7
RHGP 2	126	105	154.5	98	93	46.5	15		
RHGP 2H	84	182	154.5	56	170	85	21.5		
RHGP 4	131	182	154.5	103	170	85	21.5		
RHGP 8	210	187	175	182	175	87.5	21.5		

Connection and installation components



Description	Type	Size	Ordering No.
Case	RHGP 1	2U6C	1MRK 001 914-1
Case with front cover	RHGP 1	2U6C	1MRK 001 913-AA
Case	RHGP 2	2U12C	1MRK 001 914-4
Case with front cover	RHGP 2	2U12C	1MRK 001 913-BA
Case	RHGP 2H	4U6C	1MRK 001 914-7
Case with front cover	RHGP 2H	4U6C	1MRK 001 913-CA
Case	RHGP 4	4U12C	1MRK 001 914-10
Case with front cover	RHGP 4	4U12C	1MRK 001 913-DA
Case	RHGP 4B	4U12C*)	1MRK 001 914-16
Case with front cover	RHGP 4B	4U12C*)	1MRK 001 913-FA
Case	RHGP 8	4U24C	1MRK 001 914-13
Case with front cover	RHGP 8	4U24C	1MRK 001 913-EA

*) Adapted for the mounting in a same cut-out as the earlier 900-series relays.

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.

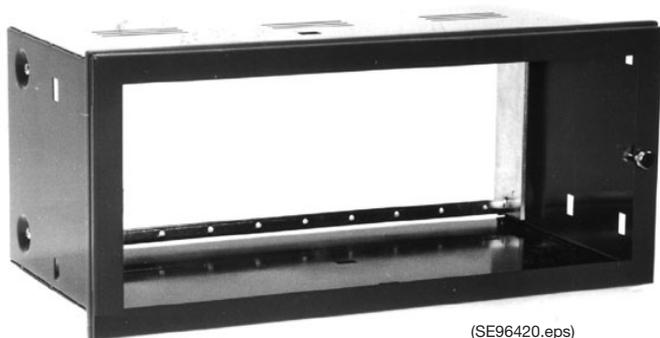
The back of the case is fitted with a support frame; relays installed in the case must be mounted on apparatus bars which in turn are screwed to the support frame from the rear.

RHGX 8



(SE81702.eps)

RHGX 20



(SE96420.eps)

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.

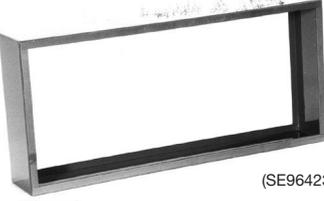
Permissible power losses for 15 °C temperature increase in RHGX cases.

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.	Wight, kg
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.

	Description	To fit case type	Size	Ordering No.	Weight, Kg
 <p>(SE96421.eps)</p>	<p>Blanking plate: Mounted at rear side of the case. Supplied with mounting holes but otherwise undrilled. Cannot be used when test switch is included.</p>	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
 <p>(SE96422.eps)</p>	<p>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.</p>	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
 <p>(SE96423.eps)</p>	<p>Spacer frame: To be fitted around the case in front of the mounting panel for semi-flush mounting. Supplied with seal.</p>	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

References

References	
Dimensions	1MRK 514 004-BEN