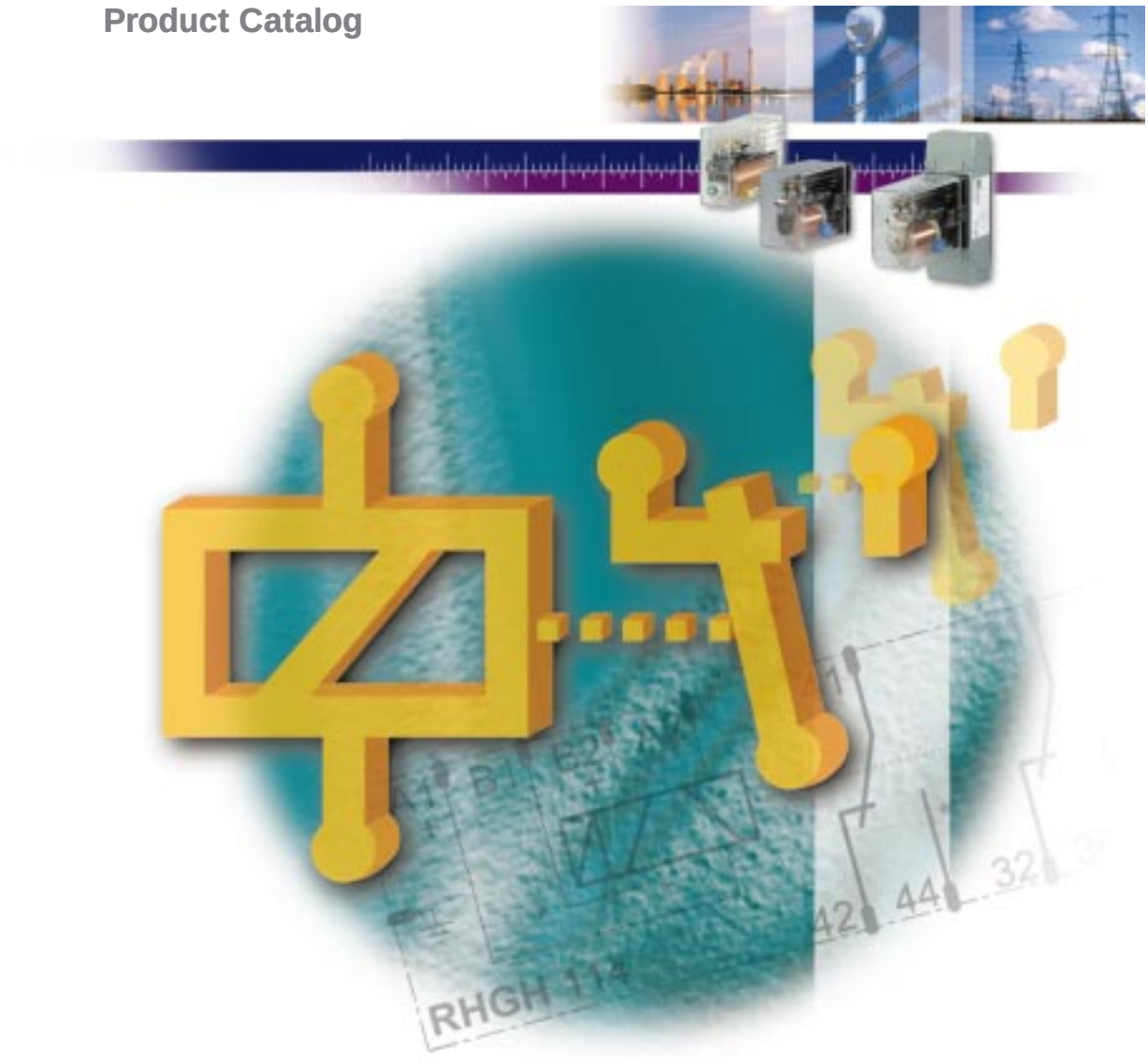
Relays

Product Catalog



Relays

Catalog 86 EN

Relays

Overview

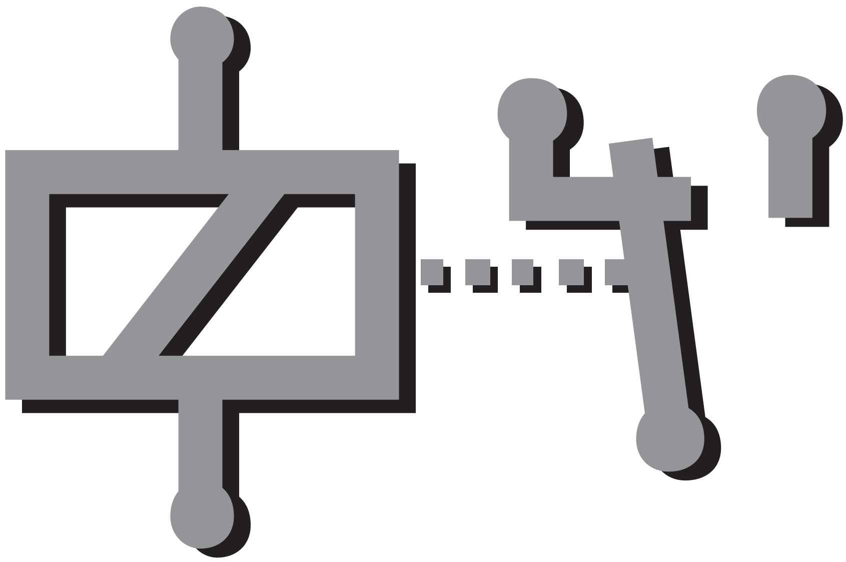
All-or-nothing relays and latching relays

Signaling Relays and Repeaters

All-or-nothing relays

Overview
and selection table

10/86-1.00 EN



CE Identification
The products in this Catalog comply with the relevant EC Directives and bear the CE identification mark on the product, the packaging or both. Exceptions are possible for products that are being phased out as indicated in the Catalog and that are applied in existing installations only.

DQS Certificate
The products in this Catalog are manufactured by ABB, an EN ISO 9001 certified company

Scope of Delivery
All-or-nothing relays
Latching relays
Signaling relays
Repeaters

ZERTIFIKAT

Die
DQS Deutsche Gesellschaft zur Zertifizierung von Managementsystemen mbH
bescheinigt hiermit, dass das Unternehmen

ABB Automation Products GmbH
Industriestraße 28
D-65760 Eschborn

mit den im Anhang gelisteten Unternehmenseinheiten

für den Geltungsbereich

Entwicklung, Herstellung und Vertrieb
von Produkten und Dienstleistungen für die
Mess-, Steuer-, Antriebs-, Analysen- und Automatisierungstechnik

ein
Qualitätsmanagementsystem
eingeführt hat und anwendet.

Durch ein Audit, dokumentiert in einem Bericht, wurde der Nachweis erbracht, dass dieses Qualitätsmanagementsystem die Forderungen der folgenden Norm erfüllt:

DIN EN ISO 9001
Ausgabe August 1994

Dieses Zertifikat ist gültig bis	2003-08-29
Zertifikat-Registrier-Nr.:	70213-01
Frankfurt am Main, Berlin	2000-08-30

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Definitions

Our relays are designed, manufactured and tested in compliance with the relevant VDE regulations and EN standards.

Standards and Directives (examples)

- IEC 61810-1: 1998
  EN 61810-1, VDE 0435 Part 201 (April 1999),
  Electromechanical non-specified time all-or-nothing relays
  Part 1: General requirements
- IEC 61810-5: 1998
  EN 61810-5, VDE 0435 Part 140 (April 1999),
  Electromechanical non-specified time all-or-nothing relays
  Part 5: Insulation coordination
- IEC 60255-23: 1994
  EN 60255-23, VDE 0435 Part 120 (March 1997),
  Electrical relays –Part 23: Contact performance
- EN 116000-3: 1996
  Electromechanical all-or-nothing relays
  Part 3: Test and measurement procedures
- IEC 60721-3-3: 1994 and /A2: 1996
  EN 60721-3-3 (September 1995) and /A2 (July 1997)
  Classification of environmental conditions
  Part 3: Stationary use at weatherprotected locations
- IEC 60529: 1989 (2nd edition)
  VDE 0470 Part 1, (November 1992); EN 60529: 1991
  Degrees of protection provided by enclosures (IP code)
- 73/23/EEC –Low-voltage directive

Important

⚠ Covers for the purpose of shock protection must be applied by the user unless already in place. Where stranded conductors are used for threaded terminals, wire end ferrules must be employed.

Operating range of the energizing quantity

The function of an all-or-nothing relay must be assured within a tolerance band above and below the rated value. These tolerance bands are:
Class 1 devices: 80 % to 110 % of the rated value
Class 2 devices: 85 % to 110 % of the rated value

The products in this Catalog are rated class 1. In addition to the rated values, we state the possible operating range (V_{min}...V_{max}). All rated values are possible that fall (with their range of 0.8 ×...1.1 ×) into the possible operating range.

⚠ Caution: The maximum permissible voltage as determined by the coordination of insulation must be taken into account!

The relays must operate from the lowest value onwards but may operate earlier. The release must take place at the latest when the value falls to 5 % (for DC current/voltage) or 15 % (for AC current/voltage) of the rated value.

Relevant for this are the specified operate value Θ_{OP} of the system and the specified release value Θ_{RL} of the system. These values limit the operating range. A further limit is given by the maximum permissible heating. The coil resistance is stated as nominal value at 20 °C (with the permissible tolerance). If heating to above 20 °C, the coil resistance is increased by 0.38 %/K; if cooling to below 20 °C, the coil resistance is increased by 0.38 %/K.

For an energizing quantity 'current' this means: The permissible operating range is constant for the entire temperature range.

For an energizing quantity 'voltage' this means: For higher coil temperatures, a higher voltage is needed to reach or exceed the operate sensitivity. For lower coil temperatures, a lower voltage is needed to reach or fall below the release value.

Compared with the preferential temperature range of -5...40 °C the following holds for temperatures outside this range: If extending from, for example, -5 °C...-25 °C, the maximum permissible voltage decreases since at lower temperatures the voltage only reaches or falls below the release value at lower voltages.

If extending from, for example, 40 °C...70 °C, the minimum permissible voltage increases since at higher temperatures the voltage only reaches or exceeds the operate value at higher voltages. At the same time, the maximum permissible voltage decreases since at higher temperatures the maximum permissible power loss (and thus the maximum permissible voltage) are lower.

Mechanical service life and switching capacity of the contacts

The mechanical service life is the number of the switching operations that will be safely reached for non-energized contacts. The mechanical service life of the contacts under load depends considerably on the electrical stress and is stated for the number of switching operations possible without detrimental wear under permissible stress. By connecting 2 contacts in series, the breaking capacity is increased by a factor 2.5 applied to the stated value.

Contact materials

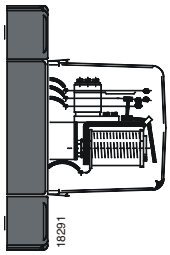
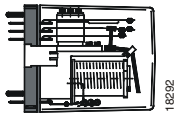
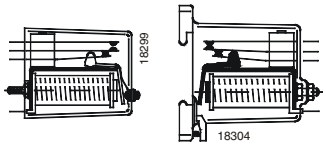
Silver is the standard material for relay contacts due to its high electrical conductivity. It is less suitable for sulphurous atmospheres. (Our devices are gold-bloomed for storage stability.)
Recommended application range: for current > 50 mA,
for voltage > 1 V,
for power > 1 W.

Silver-palladium is less sensitive to sulphurous atmospheres than silver. It has better erosion resistance than silver but a higher contact resistance. (Our devices are gold-bloomed for storage stability.)
Recommended application range: for current > 50 mA,
for voltage > 1 V,
for power > 0.5 W.

Silver-cadmium oxide is distinguished by a high erosion resistance and low welding tendency. It is therefore particularly suitable for high making currents and peak currents. (Our devices are passivated.)
Recommended application range: for current > 500 mA,
for voltage > 12 V,
for power > 10 W.

Gold is used for switching low currents and low voltages at low loads.
Recommended application range: for current > 1 mA < 0,2 A,
for voltage > 1 mV < 24 V,
for power < 5 W.

All-or-nothing relays
Overview and selection table

Data Sheet		10/86-2.20 EN				10/86-2.36 EN	
Type		All-or-nothing relay RH 110	Latching relay[1] RHH 110	All-or-nothing relay RHG 110	Latching relay[1] RHGH 110	All-or-nothing relay RH 1000	All-or-nothing relay RHM1000
View scale							
Case		Wall-mounting case		Plug-in case		Plug-in case	Wall-mounting/ top-hat rail case
Installation	Relay	bolt		plug		bolt, plug	bolt, snap
	Socket	–		bolt, snap		bolt, snap	–
Connection	Relay	bolt		plug		plug, solder	plug, solder
	Flush-mounting socket	–		solder		crimp, solder	–
	Surface-mounting socket	–		bolt		bolt	–
Mechanical service life		50 x 10^6 switching operations		50 x 10^6 switching operations		20 x 10^6 switching operations	
Permissible switching frequency		200 switching operations/minute		200 switching operations/minute		200 switching operations/minute	
Coil circuit (reference values)							
Power consumption		1.8...2.6 W	2.8...4.1 W	1.8...2.6 W	2.8...4.1 W	1.7...2.2 W	1.7...2.2 W
Voltage coil		5...250 V DC 12...250 V AC	5...250 V DC –	5...250 V DC 12...250 V AC	5...250 V DC –	5...250 V DC 12...250 V AC	5...250 V DC 12...250 V AC
Contact circuit							
Components		3 or 4 changeover contacts		3 or 4 changeover contacts		3 or 4 changeover contacts	
Switching voltage		500 V AC/600 V DC		500 V AC/600 V DC		400 V AC/450 V DC	
Making current		≤ 10 A AC/DC		≤ 10 A AC/DC		≤ 10 A AC/DC	
Continuous current		≤ 6 A AC/DC		≤ 6 A AC/DC		≤ 6 A AC/DC	
CE classification							
Overvoltage category		III		III		III	
Pollution degree		3		3		3	
Rated impulse voltage		4 kV		4 kV		4 kV	
Nominal contact voltage e.g. for switching in TN and TT systems		250 V AC/DC 230/400 V		250 V AC/DC 230/400 V		250 V AC/DC 230/400 V	

[1] Magnetic latching after operating until the reverse operating winding is triggered

All-or-nothing relays
Overview and selection table

10/86-1.00 EN

Data Sheet		10/86-2.43 EN	10/86-6.20 EN		10/86-7.44 EN
Type		All-or-nothing relay RH 1713	Signaling relay RA 32		Repeater AM 0
Ansichten					
Case		Wall-mounting case	Surface- or flush-mounting case		Flush-mounting case
Installation	Relay	bolt	bolt	plug	bolt,
	Socket	–	–	bolt	
Connection	Relay	bolt	bolt	plug	bolt
	Flush-mounting socket	–	–	bolt	–
	Surface-mounting socket	–	–	bolt	–
Mechanical service life		20 x 10^6 switching operations	5 x 10^5 switching operations		2 x 10^6 display changes
Permissible switching frequency		200 switching operations/minute	200 switching operations/hour		–
Coil circuit (reference values)					
Power consumption		0.8 W	2.4...3.3 W		1.2...2.0 W
Voltage coil		22.5 V DC –	5...250 V DC 12...250 V AC		5...250 V DC 12...250 V AC
Contact circuit					
Components		3 changeover contacts	2 contacts (function selectable)		–
Switching voltage		380 V AC/450 V DC	400 V AC/450 V DC		–
Making current		≤ 10 A AC/DC	≤ 10 A AC/DC		–
Continuous current		≤ 6 A AC/DC	≤ 6 A AC/DC		–
CE classification					
Overvoltage category[1)]		[1)] Insulation group and reference voltage as per VDE 0110/11.72 Group C: 250 V AC/300 V DC Group B: 380 V AC/450 V DC	III		III
Pollution degree[1)]			3		2
Rated impulse voltage[1)]			4 kV		–
Nominal contact voltage[1)] e.g. for switching in TN and TT systems			250 V AC/DC 230/400 V		– –

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Technische Änderungen vorbehalten.
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All-or-nothing relay RH(G) 110
Latching relay RH(G)H 110

in wall-mounting case and plug-in case

10/86-2.20 EN

- **Robust power relay**
  Type RH...113: 3 changeover contacts
  Type RH...114: 4 changeover contacts
- **Choice of contact material**
  Silver, gold-bloomed (standard material)
  Silver-palladium
  Silver-cadmium oxide
  Gold
- **Wall-mounting case**
  Type RH...(H): relay for wall-mounting,
  IP 50 degree of device protection, threaded terminals,
  can be mounted close to each other
- **Plug-in Case**
  Type RHG...: relay for plug-in cases,
  IP 60 degree of device protection,
  Accessories for RHG...:
  Flush-mounting case with soldered connection,
  surface-mounting case for wall-mounting,
  threaded terminals,
  surface-mounting case for top-hat-rail mounting,
  threaded terminals
- **All-or-nothing relay RH(G). . .**
  DC voltage operation or
  AC voltage operation ($16^2/_3$ to 200 Hz).
  For f > 200 Hz: operate value rising
  release value falling
- **Latching relay RH(G)H. . .**
  Relay with magnetic latching (remanence relay)
  DC voltage or DC current operation
  During or after excitation of the trigger coil, the system remains in operate condition until the shut-off coil is excited.
  If both coils are excited, the trigger coil dominates.

CE

Technical notes

All-or-nothing relay
An applied energizing quantity (current or voltage) within the guaranteed range produces a magnetic field which in turn causes the relay to operate. The operate function is ensured from the lowest guaranteed value onwards (but may also occur for lower values). The relay remains in operate condition while the energizing quantity is within the guaranteed range.

The assured release takes place from 5 % (DC) or 15 % (AC) of the highest reference value within the permitted range of the energizing quantity (but may also occur for higher values).

Latching relay
The energizing quantity (current or voltage) within the guaranteed range applied to the trigger coil produces a magnetic field which in turn causes the relay to operate.

The operate function is ensured from the lowest guaranteed value onwards (but may also occur for lower values). The relay remains in operate condition if the energizing quantity drops out.

The assured release takes place when the energizing quantity (current or voltage) within the guaranteed range is applied to the shut-off coil. If both energizing quantities are applied, the trigger coil dominates. For thermal reasons, the two coils may not be loaded continuously together.

Wall-mounting case
The relay is built into a case for mounting onto a surface (wall, metal plate, panel). Connection is via terminals integrated into the case.

Plug-in case
The relay plugs into a matching socket.

Coil for DC current /DC voltage only
(Coil without auxiliary circuit)
The energizing quantity is applied directly to the coil. There is no auxiliary circuit as protection from transient overvoltages or for the limitation of overvoltages on switch-off. The relay itself is resistent towards transient overvoltages within the guaranteed range.

Coil for DC or AC voltage
(Coil with auxiliary circuit)
The energizing quantity is applied to the coil via a bridge rectifier. The coil circuit is thereby polarity-independent and reverse-polarity-protected at the point of connection. The bridge rectifier simultaneously takes on the function of a free-wheeling diode without polarity dependence. The input circuit is additionally protected by a voltage-dependent resistor (VDR).

Contact material
Our standard contact material is silver that is gold-bloomed for protection during storage. Other contact materials are offered for selection. Please see the guide sheet for details.

Coil with simple winding
For all-or-nothing relays, a coil with simple winding is the standard design. One energizing quantity only may be applied.

Coil with double winding
For all-or-nothing relays with double winding, triggering by two independent energizing quantities is possible. For latching relays, the design with a double winding is standard with the first winding as trigger coil and the second as shut-off coil.

Coil in R-circuit
This special design serves to reduce the continuous power loss after the relay has operated. The energizing quantity is initially applied directly to the coil. After the relay has operated, the energizing quantity is applied to a built-in series resistor instead.

Trigger pulse prolongation (from 4 ms to 100 ms)
This special design ensures that the relay will operate for at least 100 ms even if the energizing quantity is applied for a short period only ($\geq$ 4 ms). The release time of the relay is increased by approximately 100 ms.

Coil with simple winding and free-wheeling diode
The coil is additionally fitted with a free-wheeling diode (+ on A1) for voltage limitation when the coil is switched off. There is no reverse-polarity protection. Reverse polarity will destroy the free-wheeling diode!

Flush-mounting socket for soldered connection
A relay mounted in a plug-in case is plugged into this socket and held firmly by a built-in catch spring. The flush-mounting socket is mounted with two bolts into a carrier. This socket is equipped with soldering connections.

Surface-mounting socket with threaded terminals
A relay mounted in a plug-in case is plugged into this socket and held firmly by a built-in catch spring. The surface-mounting socket is mounted with two bolts. It is equipped with threaded terminals.

Surface-mounting socket with threaded terminals and snap fixing for a top-hat rail
Identical to the surface-mounting socket with threaded terminals except that it is not bolt-mounted but snap-fixed onto a top-hat rail. The arrow on the snap fixing should point down during installation.

Snap fixing for a top-hat rail
Snap fixing for a top-hat rail on a mounting plate, suitable for a surface-mounting socket with threaded terminals. It is used preferentially for the retrofitting of such sockets..

Technical data (Please note the general hints in the Data Sheet 86-1.00 EN)

General data	**RH 110 and RHH 110** (Relay in wall-mounting case)	**RHG 110 and RHGH 110** (Relay in plug-in case)
Degree of protection		
Relay (without connection area)	IP 50	IP 60
Relay (terminals with covering)	IP 20	–
Flush-mounting socket	–	IP 00
Surface-mounting socket with covering	–	IP 20
Installation		
Relay	bolt	plug
Flush-mounting socket	–	bolt
Surface-mounting socket	–	bolt, snap
Weight		
Relay	approx. 450 g	approx. 260 g
Flush-mounting socket	–	approx. 110 g
Surface-mounting socket	–	approx. 120 g
Surface-mounting socket with snap fixing	–	approx. 200 g
Electrical connections (see also “circuit diagrams“)		
Relay	Threaded terminals max. 6 mm^2 (wire, solid) max. 6 mm^2 (wire, flexible, use wire end ferrules)	Plugs (round pins)
Flush-mounting socket (ensure shock protection dur. install.)	–	Soldering pins
Surface-mounting socket	–	Threaded terminals max. 6 mm^2 (wire, solid) max. 6 mm^2 (wire, flexible, use wire end ferrules)
Mounting orientation	arbitrary	arbitrary
Mechanical service life	50 x 10^6 switching operations	50 x 10^6 switching operations
Permissible switching frequency	200 switching operations/min.	200 switching operations/min.
Climate class	3K3 max. 85 % relative humidity max. 25 g/m^3 abs. humidity	3K3 max. 85 % relative humidity max. 25 g/m^3 abs. humidity
Permissible temperature ranges	RH 110 / RHH 110	RHG 110 / RHGH 110
Transport and storage temperatures	-45...+100 °C / -45...+100 °C	-45...+100 °C / -45...+100 °C
Ambient temperature	-25...+ 70 °C / - 5...+ 40 °C	-25...+ 70 °C / - 5...+ 40 °C
Maximum surface temperature (with all maximum permissible values for ambient temperature, coil voltage, contact rating)	+80 °C / +50 °C	+80 °C / +50 °C

Coil circuit

Nominal voltage	Nominal range	Resistance R_{coil} (±10 % at 20 °C)	$R_{ser.}$	Nominal consumption	max. permissible operating range $V_{min.}$ to $V_{max.}$ at ambient temperature -25 °C...+40 °C	-5 °C...+40 °C	-25 °C...+70 °C
RH 110 and RHG 110 (all-or-nothing relay, specified operate value 230 AW)							
Coil for DC voltage only							
24 V	19.2... 26.4 V	300 Ω	–	1.92 W	15.1... 41.0 V	15.1... 44.8 V	16.6... 33.2 V
42/48 V	33.6... 52.8 V	1000 Ω	–	2.30 W	27.4... 74.6 V	27.5... 81.5 V	30.3... 60.7 V
60 V	48.0... 66.0 V	2000 Ω	–	1.80 W	40.5...109.4 V	40.5...117.8 V	44.5... 85.9 V
100/110/130 V	80.0...143.0 V	5600 Ω	–	2.16 W	68.0...183.8 V	68.0...197.1 V	78.8...143.7 V
220/250 V	176.0...275.0 V	20500 Ω	–	2.36 W	135.9...365.8 V	135.9...377.2 V	149.5...275.0 V
others per order from 5...250 V							
Coil for DC and AC voltage (DC/AC, f = $16^2/_3$...200 Hz)							
24 V	19.2... 26.4 V	300 Ω	–	1.92 W	17.5... 43.4 V	17.5... 46.8 V	19.0... 34.5 V
42/48 V	33.6... 52.8 V	1000 Ω	–	1.76 W	29.9... 77.0 V	29.9... 83.9 V	32.6... 61.9 V
60 V	48.0... 66.0 V	2000 Ω	–	1.80 W	42.9...111.8 V	42.9...119.8 V	46.9... 87.1 V
100/110/130 V	80.0...143.0 V	5600 Ω	–	2.16 W	70.4...186.2 V	70.4...198.4 V	77.2...144.9 V
220/230/250 V	176.0...275.0 V	20500 Ω	–	2.58 W	138.3...368.2 V	138.3...378.4 V	151.9...276.1 V
others per order from 12...250 V							

Technical data (Please note the general hints in the Data Sheet 86-1.00 EN)

Coil circuit (continue)

Nominal voltage	Nominal range	Resistance R_{coil} (±10 % at 20 °C)	$R_{ser.}$	Nominal consumption	max. permissible operating range $V_{min.}$ to $V_{max.}$ at ambient temperature -5 °C...+40 °C
RHH 110 and RHGH 110 (latching relays, specified operate value 353 AW, specified release value 178 AW)					
Coil for DC voltage only					
24 V	19.2... 26.4 V	Op 185 Ω	–	3.1 W	19... 28 V
		Re 50 Ω	120 Ω	3.4 W	19... 28 V
48 V	34.8... 52.8 V	Op 820 Ω	–	2.8 W	37... 56 V
		Re 210 Ω	470 Ω	3.4 W	37... 56 V
60 V	48.0... 66.0 V	Op 1150 Ω	–	3.1 W	48... 72 V
		Re 350 Ω	820 Ω	3.1 W	48... 72 V
110 V	88.0...121.0 V	Op 3800 Ω	–	3.2 W	83...124 V
		Re 1020 Ω	2500 Ω	3.4 W	83...124 V
220 V	176.0...242.0 V	Op13000 Ω	–	3.7 W	164...245 V
		Re 3650 Ω	8200 Ω	4.1 W	164...245 V
others per order from 5...250 V					

⚠ The insulation between coil circuit and contact circuit complies with the specifications for basic insulation.

Contact circuit

Comp. fitted	RH(G)(H) 113 3 changeover cont.	RH(G)(H) 114 4 changeover contacts

Switching times for DC voltage operation (at reference value)

	without free-wh. diode		with free-wheeling diode	
	make contact	break contact	make contact	break contact
Operate time	< 25 ms	< 25 ms	< 25 ms	< 25 ms
Release time	< 20 ms	< 25 ms	< 60 ms	< 60 ms

Switching times for AC voltage operation (at reference value)

			with free-wheeling diode	
			make cont.	break cont.
Operate time	–	–	< 30 ms	< 25 ms
Release time	–	–	< 80 ms	< 80 ms

Contacts	Contact material	Contact diameter
Standard	silver, gold-bloomed	3.5 mm
choices	silver-palladium	3.5 mm
	silver-cadmium oxide	3.5 mm
	gold	2.5 mm

Limit values

(Please note restrictions on contact materials and rated voltage.)

Clearance/creepage dist.:	Clearance	Creepage distance
Open contact	≥ 0.9 mm	≥ 4.0 mm
Between contact sets	≥ 3.0 mm	≥ 4.0 mm
Contact/coil	≥ 3.0 mm	≥ 4.0 mm
Contact/mass	≥ 3.0 mm	≥ 4.0 mm
Coil/mass	≥ 3.0 mm	≥ 4.0 mm

Switching voltage	500 V AC/600 V DC
Making current	10 A AC/DC
Continuous current	6 A AC/DC

Breaking capacity	Current	Power
230 V AC cosφ = 0.4...1	6 A	1380 VA
220 V DC L/R = 0 ms	0.4 A	88 W
110 V DC L/R = 0 ms	0.7 A	77 W
60 V DC L/R = 0 ms	2 A	120 W
220 V DC L/R = 40 ms	0.2 A	44 W
110 V DC L/R = 40 ms	0.35 A	38 W
60 V DC L/R = 40 ms	1 A	60 W
(see also diagrams 1 and 2)		

Electrical service life > 10^4 switching operations

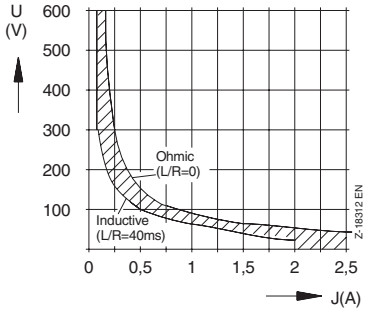


Diagram 1: Breaking capacity for DC current

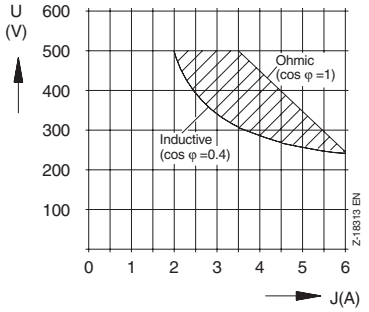


Diagram 2: Breaking capacity for AC current

CE classification

Overvoltage category
III

Pollution degree
3

Rated impulse voltage
4 kV

Nominal voltage
250 V AC/DC

E.g. for switching in TN and TT systems
230/400 V

For special designs, the technical data may differ.

Circuit diagrams

Relay in wall-mounting case RH(H) 110

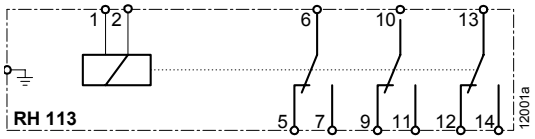


Diagram 1
All-or-nothing relay RH 113 for DC
with simple winding without auxiliary circuit

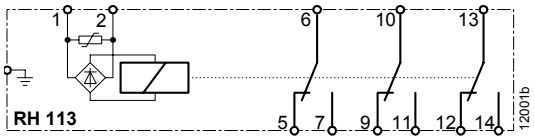


Diagram 2
All-or-nothing relay RH 113 for DC/AC
with simple winding, bridge rectifier and protective circuitry

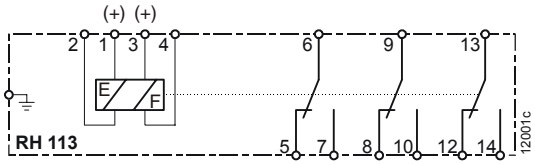


Diagram 3
All-or-nothing relay RH 113 for DC
with double winding without auxiliary circuit

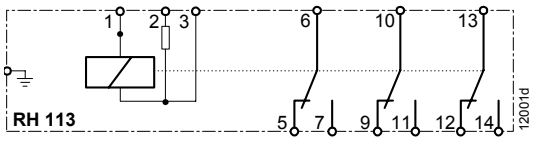


Diagram 4
All-or-nothing relay RH 113 for DC
with simple winding and series resistance for R-circuit

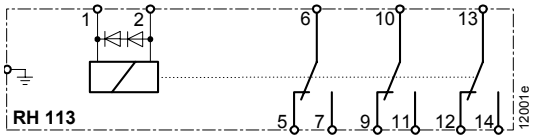


Diagram 5
All-or-nothing relay RH 113 for DC
with simple winding and free-wheeling diodes

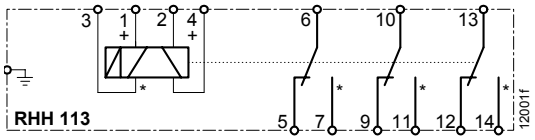


Diagram 6
Latching relay RHH 113 for DC
with double winding without auxiliary circuit

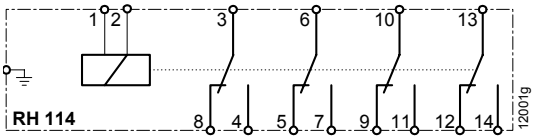


Diagram 7
All-or-nothing relay RH 114 for DC
with simple winding without auxiliary circuit

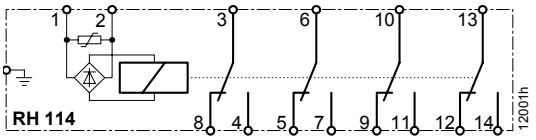


Diagram 8
All-or-nothing relay RH 114 for DC/AC
with simple winding, bridge rectifier and protective circuitry

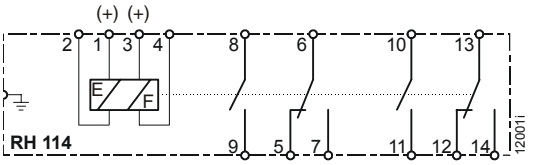


Diagram 9
All-or-nothing relay RH 114 for DC
with double winding without auxiliary circuit

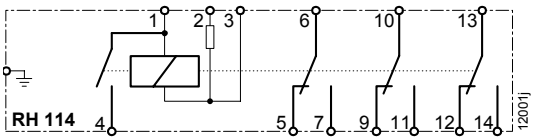


Diagram 10
All-or-nothing relay RH 114 for DC
with simple winding and series resistance for R-circuit

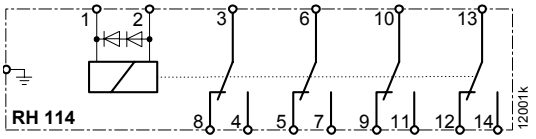


Diagram 11
All-or-nothing relay RH 114 for DC
with simple winding and free-wheeling diodes

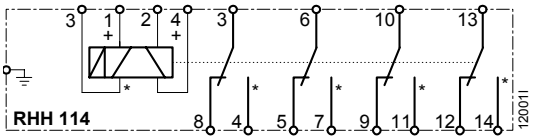


Diagram 12
Latching relay RHH 114 for DC
with double winding without auxiliary circuit

Circuit diagrams

Relay in plug-in case RHG(H) 110

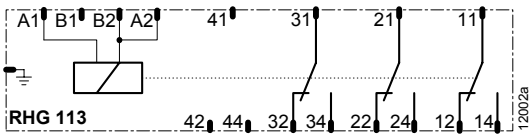


Diagram 13
All-or-nothing relay RHG 113 for DC
with simple winding without auxiliary circuit

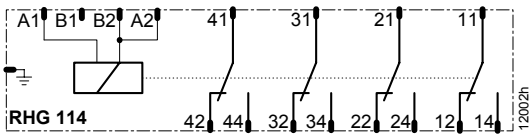


Diagram 20
All-or-nothing relay RHG 114 for DC
with simple winding without auxiliary circuit

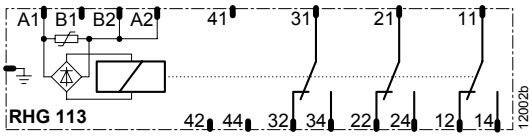


Diagram 14
All-or-nothing relay RHG 113 for DC/AC
with simple winding, bridge rectifier and protective circuitry

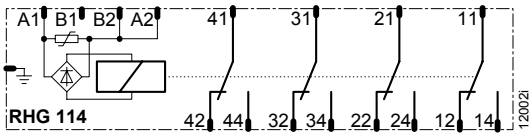


Diagram 21
All-or-nothing relay RHG 114 for DC/AC
with simple winding, bridge rectifier and protective circuitry

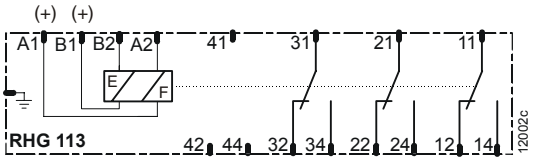


Diagram 15
All-or-nothing relay RHG 113 for DC
with double winding without auxiliary circuit

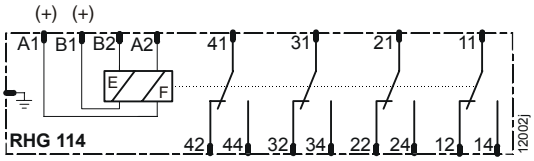


Diagram 22
All-or-nothing relay RHG 114 for DC
with double winding without auxiliary circuit

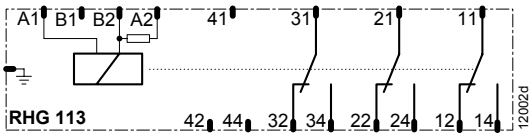


Diagram 16
All-or-nothing relay RHG113 for DC
with simple winding and series resistor for R-circuit

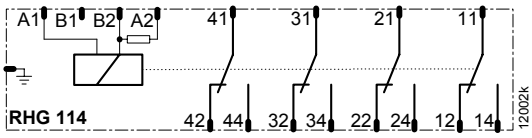


Diagram 23
All-or-nothing relay RHG 114 for DC
with simple winding and series resistor for R-circuit

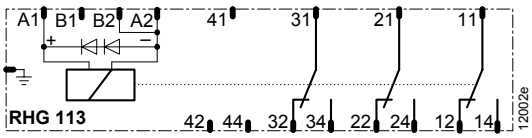


Diagram 17
All-or-nothing relay RHG 113 for DC
with simple winding and free-wheeling diodes

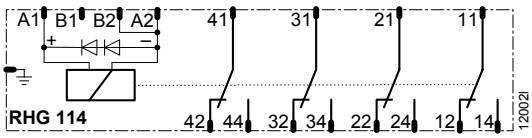


Diagram 24
All-or-nothing relay RHG 114 for DC
with simple winding and free-wheeling diodes

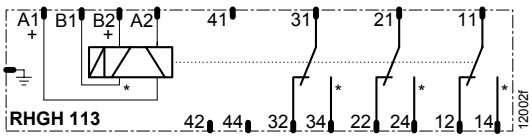


Diagram 18
Latching relay RHGH 113 for DC
with double winding without auxiliary circuit

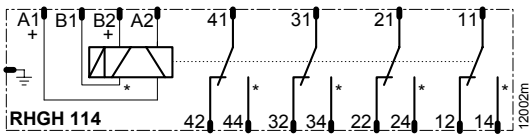


Diagram 25
Latching relay RHGH 114 for DC
with double winding without auxiliary circuit

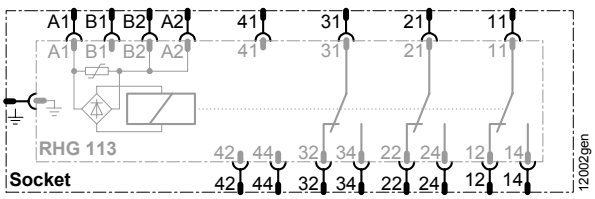


Diagram 19
Flush- or surface-mounting socket
with RHG 113 plugged in (grey)

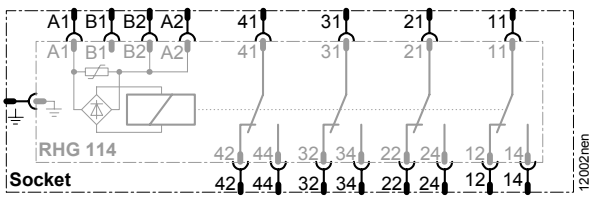
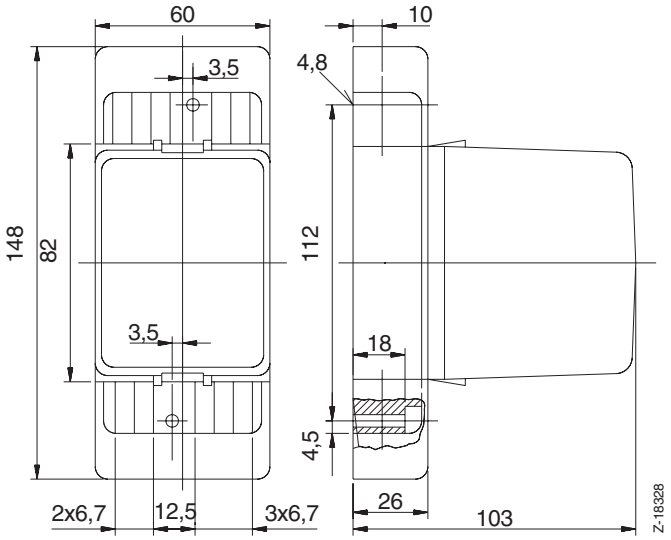
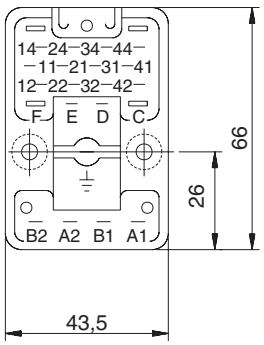


Diagram 26
Flush- or surface-mounting socket
with RHG 114 plugged in (grey)

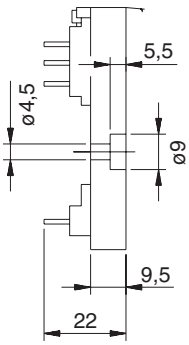
Dimensional drawings (dimensions in mm)



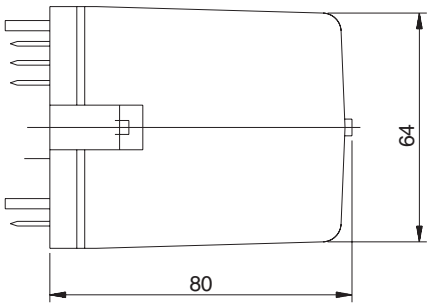
Drawing 1
Relay in wall-mounting case RH(H) 110



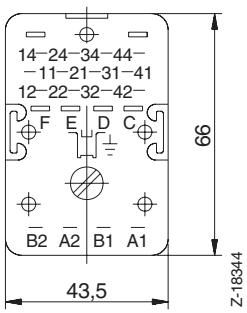
Drawing 2
Flush-mounting socket
Rear view



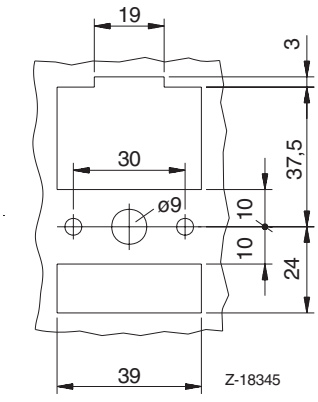
Side view



Drawing 3
Relay in plug-in case RHG(H) 110
Side view

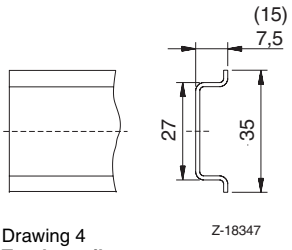


Rear view

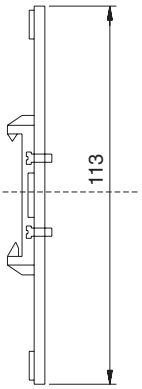


Panel cutout for flush-mounting socket

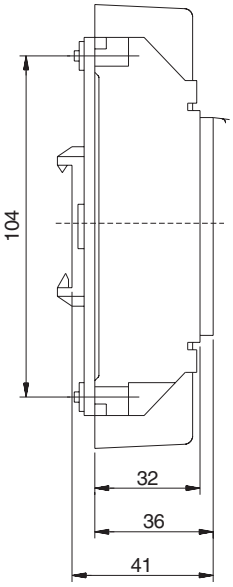
Dimensional drawings (dimensions in mm)



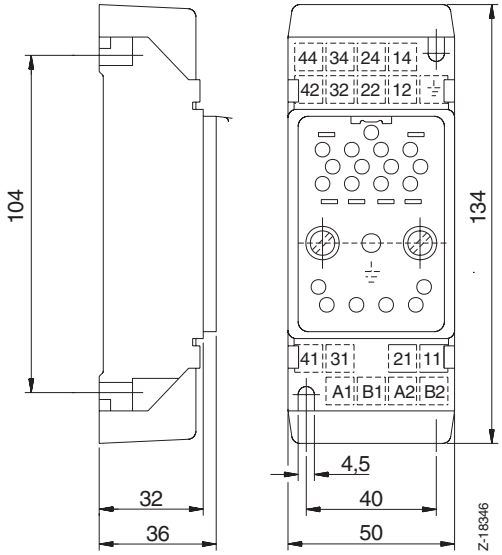
Drawing 4
Top-hat rail
EN 50022-35 x 7.5



Drawing 5
Snap fixing
for top-hat rail
EN 50022 for
the retrofitting of
surface-mounting
sockets



Drawing 6
Surface-mounting socket for RHG(H) 110 with snap fixing
for top-hat rail EN 50022



Drawing 7
Surface-mounting socket for RHG(H) 110

Ordering information for all available designs

Design			Catalog No. V8621									Code	Circ. diagr.	Dim. draw.
											1			
All-or-nothing relay in wall-mounting case				6										1
RH 113	3 changeover contacts					3							1...5	
RH 114	4 changeover contacts		[2]			4							7...11	
All-or-nothing relay in plug-in case				7										3
RHG 113	3 changeover contacts					3							13...17	
RHG 114	4 changeover contacts					4							20...24	
Latching relay in wall-mounting case				6										1
RHH 113	3 changeover contacts	Double winding				7				0	2		6	
RHH 114	2 ch.over, 2 make cont.	Double winding				8				0	2		12	
Latching relay in plug-in case				7										3
RHGH 113	3 changeover contacts	Double winding				7				0	2		18	
RHGH 114	4 changeover contacts	Double winding				8				0	2		25	
Contact material														
RH(G)(H) 113	Silver, gold-bloomed	Ø 3,5 mm					1	0						
	Silver-palladium	Ø 3,5 mm					2	0						
	Silver-cadmium oxide	Ø 3,5 mm					4	0						
	Gold	Ø 2,5 mm					5	0						
RH(G)(H) 114	Silver, gold-bloomed	Ø 3,5 mm					0	1						
	Silver-palladium	Ø 3,5 mm					0	2						
	Silver-cadmium oxide	Ø 3,5 mm					0	4						
	Gold	Ø 2,5 mm					0	5						
Nominal voltage														
All-or-nothing	24	V DC							2	0				
relay (without	42/<u>48</u>	V DC							3	0				
auxiliary circuit)	60	V DC							4	0				
	100/<u>110</u>/130	V DC							5	0				
	<u>220</u>/250	V DC							7	0				
	..... .	V DC	[1] [5]						9	0		501		
All-or-nothing	24	V DC/AC							0	2				
relay only	<u>42</u>/48	V DC/AC							0	3				
(with bridge	60	V DC/AC							0	4				
cetifier and	100/<u>110</u>/130	V DC/AC							0	5				
protective	220/<u>230</u>/250	V DC/AC							0	8				
circuitry)	..... .	V DC/AC	[1] [5]						0	9		501		
Other features (for all-or-nothing relays only)														
Simple winding											1			
Double winding										0	2			
R-circuit for RH(G) 113										0	3			
R-circuit for RH(G) 114			[3]							0	3			
Trigger puls prolongation for RH 113 (from 4 to 100 ms)										0	5			
Simple winding with free-wheeling diode (+ on A1)										0	6			

[1] Customer-specific within the realm feasibility as per Catalog 86.
State nominal voltage / nominal current of the coil.
Possible nominal voltages: 5 to 250 V DC and 12 to 250 V AC

[2] RH 114 in wall-mounting case with double winding: 2 changeover contacts and 2 make contacts.

[3] RH 114 in wall-mounting case in R-circuit: 2 changeover contacts, 1 make contact and 1 further make contact in one-side connection to the coil circuit.

[5] Technical data may change compared to the standard design as per Catalog specifications.

Standard designs of all-or-nothing relays RH(G) 110				
Design	Nominal voltage	Catalog No.	Circ. diagr.	Dim. draw.
All-or-nothing relay RH 113	24 V DC	V86216A-3102011	1	1
in wall-mounting case,	42/48 V DC	V86216A-3103011	1	1
3 changeover contacts,	60 V DC	V86216A-3104011	1	1
contact material	100/110/130 V DC	V86216A-3105011	1	1
silver, gold-bloomed,	220/250 V DC	V86216A-3107011	1	1
simple winding	24 V DC/AC	V86216A-3100211	2	1
	42/48 V DC/AC	V86216A-3100311	2	1
	60 V DC/AC	V86216A-3100411	2	1
	100/110/130 V DC/AC	V86216A-3100511	2	1
	220/230/250 V DC/AC	V86216A-3100811	2	1
All-or-nothing relay RH 114	24 V DC	V86216A-4012011	7	1
in wall-mounting case,	42/48 V DC	V86216A-4013011	7	1
4 changeover contacts,	60 V DC	V86216A-4014011	7	1
contact material	100/110/130 V DC	V86216A-4015011	7	1
silver, gold-bloomed,	220/250 V DC	V86216A-4017011	7	1
simple winding	24 V DC/AC	V86216A-4010211	8	1
	42/48 V DC/AC	V86216A-4010311	8	1
	60 V DC/AC	V86216A-4010411	8	1
	100/110/130 V DC/AC	V86216A-4010511	8	1
	220/230/250 V DC/AC	V86216A-4010811	8	1
All-or-nothing relay RHG 113	24 V DC	V86217A-3102011	13	3
in plug-in-case,	42/48 V DC	V86217A-3103011	13	3
3 changeover contacts,	60 V DC	V86217A-3104011	13	3
contact material	100/110/130 V DC	V86217A-3105011	13	3
silver, gold-bloomed,	220/250 V DC	V86217A-3107011	13	3
simple winding	24 V DC/AC	V86217A-3100211	14	3
	42/48 V DC/AC	V86217A-3100311	14	3
	60 V DC/AC	V86217A-3100411	14	3
	100/110/130 V DC/AC	V86217A-3100511	14	3
	220/230/250 V DC/AC	V86217A-3100811	14	3
All-or-nothing relay RHG 114	24 V DC	V86217A-4012011	20	3
in plug-in-case,	42/48 V DC	V86217A-4013011	20	3
4 changeover contacts,	60 V DC	V86217A-4014011	20	3
contact material	100/110/130 V DC	V86217A-4015011	20	3
silver, gold-bloomed,	220/250 V DC	V86217A-4017011	20	3
simple winding	24 V DC/AC	V86217A-4010211	21	3
	42/48 V DC/AC	V86217A-4010311	21	3
	60 V DC/AC	V86217A-4010411	21	3
	100/110/130 V DC/AC	V86217A-4010511	21	3
	220/230/250 V DC/AC	V86217A-4010811	21	3

Standard designs of latching relays RH(G)H 110				
Design	Nominal voltage	Catalog No.	Circ. diagr.	Dim. draw.
Latching relay RHH 113	24 V DC	V86216A-7102021	6	1
in wall-mounting case,	48 V DC	V86216A-7103021	6	1
3 changeover contacts,	60 V DC	V86216A-7104021	6	1
contact material	110 V DC	V86216A-7105021	6	1
silver, gold-bloomed,	220 V DC	V86216A-7107021	6	1
double winding				
Latching relay RHH 114	24 V DC	V86216A-8012021	12	1
in wall-mounting case,	48 V DC	V86216A-8013021	12	1
2 changeover, 2 make contacts	60 V DC	V86216A-8014021	12	1
contact material	110 V DC	V86216A-8015021	12	1
silver, gold-bloomed,	220 V DC	V86216A-8017021	12	1
double winding				
Latching relay RHGH 113	24 V DC	V86217A-7102021	18	3
in plug-in case,	48 V DC	V86217A-7103021	18	3
3 changeover contacts,	60 V DC	V86217A-7104021	18	3
contact material	110 V DC	V86217A-7105021	18	3
silver, gold-bloomed,	220 V DC	V86217A-7107021	18	3
double winding				
Latching relay RHGH 114	24 V DC	V86217A-8012021	25	3
in plug-in case,	48 V DC	V86217A-8013021	25	3
4 changeover contacts,	60 V DC	V86217A-8014021	25	3
contact material	110 V DC	V86217A-8015021	25	3
silver, gold-bloomed,	220 V DC	V86217A-8017021	25	3
double winding				

Accessories for all-or-nothing relays and latching relays RH(G)(H) 110			
Description	Catalog No.		
Flush-mounting case for soldered connection	V86210A-2400000	19, 26	2
Surface-mounting case with threaded terminal ends	V86210A-4040000	19, 26	7
Surface-mounting case with threaded terminal ends and snap-on fixing for top-hat rail	V86210A-6090000	19, 26	6
Snap-on fixing for top-hat rail (for retrofitting to surface-mounting case)	V86211A-0900000		5
Top-hat rail EN 50022-35x7,5 (2000 mm long)	V86299A-1100000		4

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Technische Änderungen vorbehalten.
Printed in the Fed. Rep. of Germany
10/86-2.20 EN 04.01

All-or-nothing relay RH(M) 1000

in plug-in case and case for top-hat rail or wall-mounting

10/86-2.36 EN

- **Compact robust power relay**
  Type RH(M) 1003: 3 changeover contacts
  Type RH(M) 1004: 4 changeover contacts
- **Choice of contact material**
  Silver, gold-bloomed (standard material)
  Silver-palladium
  Silver-cadmium oxide
  Gold
- **All-or-nothing relay in plug-in case RH 1000**
  for direct connection (2.8 mm tab connector or soldering)
  or plug into
  flush-mounting socket for PCB-mounting
  flush-mounting socket for soldering
  flush-mounting socket for crimping
  surface-mounting socket for wall-mounting with threaded terminals
  surface-mounting socket for top-hat-rail-mounting with threaded terminals
- **All-or-nothing relay for top-hat rail mounting RHM 1000**
  for direct connection (2.8 mm tab connector or soldering)
- **DC voltage operation**
  (also available for DC current operation) or
- **AC voltage operation (40 to 70 Hz)**
  At f > 70 Hz: operate value rising
  release value falling
- **With jog/latch button as standard**
  for manual operation and for position indication
- **LED Indicator in the coil circuit (optional)**

CE

Technical notes

All-or-nothing relay
An applied energizing quantity (current or voltage) within the guaranteed range produces a magnetic field which in turn causes the relay to operate. The operate function is ensured from the lowest guaranteed value onwards (but may also occur for lower values). The relay remains in operate condition while the energizing quantity is within the guaranteed range.

The assured release takes place from 5 % (DC) or 15 % (AC) of the highest reference value within the permitted range of the energizing quantity (but may also occur for higher values).

All-or-nothing relay RH 1000
This relay plugs into a matching socket. It can also be mounted directly.

All-or-nothing relay RHM 1000
This relay is snap-fastened onto a top-hat rail or mounted directly onto a mounting plane using two bolts.

Coil for DC voltage only
(Coil without auxiliary circuit)
The energizing quantity is applied directly to the coil. There is no auxiliary circuit as protection from transient overvoltages or for the limitation of overvoltages on switch-off. The relay itself is resistent towards transient overvoltages within the guaranteed range. Connection to A1 and A2.

Coil with simple winding and free-wheeling diode
The coil is additionally fitted with a free-wheeling diode for voltage limitation when the coil is switched off. Connect + to A1 or A2 as per order. There is no reverse-polarity protection. Reverse polarity will destroy the free-wheeling diode! Connection to A1 and A2.

Coil with simple winding, reverse-polarity protection, LED indicator and free-wheeling diode (+ on A1)
The coil is additionally fitted with a diode as reverse-polarity protection and an LED indicator for coil current indication. The free-wheeling diode limits the voltage as the coil is switched off. Caution: external connection to A1 and B1; A2 is internally assigned and must not be connected externally!

Coil with simple winding
For all-or-nothing relays, a coil with simple winding is the standard design. One energizing quantity only may be applied.

Coil with tap
In addition to both ends of the coil, a coil point in between is connected to a pin (for example for coil current monitoring for interruption).

Coil with double winding
For all-or-nothing relays with double winding, triggering by two independent energizing quantities is possible. Both coils have a common connection point at one end.

Coil for DC or AC voltage
(Coil with auxiliary circuit)
The energizing quantity is applied to the coil via a diode (+ on A1). The coil circuit is thereby reverse-polarity-protected. A free-wheeling diode is connected in parallel to the coil. The relay is additionally protected by protective circuitry. For AC voltage, the coil is loaded by the energizing quantity during part of the cycle only. During the other part of the cycle, the magnetic system is buffered by the free-wheeling diode. For AC operation, the r.m.s. value needs to be double the value for DC voltage operation. Connection to A1 and A2; B1 is internally assigned and must not be connected externally!

Coil for DC or AC voltage and LED Indicator
(Coil with auxiliary circuit)
Design as for the coils for DC or AC voltage (coil with auxiliary circuit) with additional LED for operation indication. Connection to A1 and A2; B1 is internally assigned and must not be connected externally!

Contact material
Our standard contact material is silver that is gold-bloomed for protection during storage. Other contact materials are offered for selection. Please see the Guide Sheet for details.

Mounting bracket
Used for individual mounting of one RH1000 on a mounting plane. Available in packs of 25.

Retaining clip
Each socket is supplied with a retaining clip that will hold an RH1000 firmly inside the socket. Retaining clips are available separately in packs of 25.

Sockets
Sockets are available for RH1003 and RH1004. Each flush-mounting socket is supplied with a retaining clip.

- Flush-mounting socket for PCB-mounting:
  Flush-mounting socket with soldering pins (0.5 mm x 1 mm) for mounting in printed circuit boards.
- Flush-mounting socket for soldered connection:
  Flush-mounting socket with soldering tag.
- Flush-mounting socket for crimping:
  Flush-mounting socket with crimp contacts.
- Surface-mounting socket with threaded terminals:
  Surface-mounting sockets are available for RH1003 (one standard design for all RH1003 versions) and for RH1004 (premium type and special designs). They are mounted with two bolts on a mounting plane.
- Surface-mounting socket with threaded terminals and snap fixing for top-hat rail: Identical to the surface-mounting socket with threaded terminals except that it is not bolt-mounted but snap-fixed onto a top-hat rail. The arrow on the snap fixing should point down during installation.

Spare cover caps for surface-mounting sockets
As replacement for damaged or lost cover caps. Available in sets of 2.

Snap fixing for a top-hat rail
Snap fixing for a top-hat rail on a mounting plate, suitable for a surface-mounting socket with threaded terminals. It is used preferentially for the retrofitting of such sockets.

Technical data (Please note the general hints in the Data Sheet 86-1.00 EN)

General data	**RH 1000** (Relay in plug-in case)	**RHM 1000** (Relay for top-hat rail and wall-mounting)
Degree of protection		
Relay (without connection area)	IP 40	IP 40
Relay (terminals with covering)	IP 00	IP 00
Flush-mounting socket	IP 00	–
Surface-mounting socket with covering	IP 20	–
Installation		
Relay	bolt	bolt, snap
Flush-mounting socket	bolt	–
Surface-mounting socket	bolt, snap	–
Weight		
Relay	approx. 150 g	approx.150 g
Flush-mounting socket	approx. 35 g	–
Surface-mounting socket	approx. 100 g	–
Surface-mounting socket with snap fixing	approx. 170 g	–
Electrical connections (see also “circuit diagrams“) Caution: For direct connection of the RH(M) 1000 please take into account the basic insulation between contact circuits and operating circuit!		
Relay (ensure shock protection during installation)	plugging: max. 0.75 mm^2 flexible with tab connector 2.8 x 0.8 mm soldering: max. 0.75 mm^2 solid	plugging: max. 0.75 mm^2 flexible with tab connector 2.8 x 0.8 mm soldering: max. 0.75 mm^2 solid
Flush-mounting socket (ensure shock protection dur. install.) for PCB-mounting for soldering for crimping	soldering pin 1 x 0.5 mm max. 0.75 mm^2 solid max. 0.75 mm^2 flexible	–
Surface-mounting socket	threaded terminals max. 2.5 mm^2 solid max. 2.5 mm^2 flexible (use wire end ferrules!)	–
Mounting orientation	arbitrary	arbitrary
Mechanical service life	20 x 10^6 switching operations	20 x 10^6 switching operations
Permissible switching frequency	200 switching operations/min.	200 switching operations/min.
Climate class	3K3 max. 85 % relative humidity max. 25 g/m^3 abs. humidity	3K3 max. 85 % relative humidity max. 25 g/m^3 abs. humidity
Permissible temperature ranges for coils	DC / DC/AC	DC / DC/AC
Transport and storage temperatures	-45...+100 °C / -45...+100 °C	-45...+100 °C / -45...+100 °C
Ambient temperature	-25...+ 70 °C / -25...+ 65 °C	-25...+ 70 °C / -25...+ 65 °C
Maximum surface temperature (with all maximum permissible values for ambient temperature, coil voltage, contact rating)	+85 °C / +80 °C	+85 °C / +80 °C

Technical data (Please note the general hints in the Data Sheet 86-1.00 EN)

Coil circuit

Nominal voltage	Nominal range	Resistance R_{coil} (±10 % at 20 °C)	$R_{ser.}$	Nominal consumption	max. permissible operating range $V_{min.}$ to $V_{max.}$ at ambient temperature		
RH 1000 and RHM 1000 (specified operate value 260 AW)							
Coil for DC voltage only					-25 °C...+40 °C	-5 °C...+40 °C	-25 °C...+70 °C
12 V DC	9.6... 13.2 V	78 Ω	–	1.85 W	7.9... 15.1 V	7.9... 16.4 V	8.6... 15.1 V
24 V DC	19.2... 26.4 V	270 Ω	–	2.13 W	14.2... 27.3 V	14.2... 29.8 V	15.6... 27..3 V
48 V DC	38.4... 52.8 V	1200 Ω	–	1.92 W	31.7... 60.6 V	31.7... 66.2 V	34.9... 60.6 V
60 V DC	48.0... 66.0 V	2150 Ω	–	1.67 W	40.4... 77.6 V	40.4... 84.7 V	44.4... 77.6 V
110/125 V DC	88.0...137.5 V	7700 Ω	–	1.57 W	80.1...153.2 V	80.1...167.2 V	88.1...153.2 V
220/250 V DC	176.0...242.0 V	26000 Ω	–	1.86 W	154.7...294.3 V	154.7...321.3 V	170.2...294.3 V
others per order from 5...250 V							
RH 1000 and RHM 1000 (specified operate value 260 AW)							
Coil for DC/AC voltage (f = 40...70 Hz)					-25 °C...+40 °C	-5 °C...+40 °C	-25 °C...+65 °C
Without LED indicator							
12 V DC/ 24 V AC	9.6... 13.2 V 19.2... 26.4 V	78 Ω	–	1.85 W	9.1... 16.3 V 16.9... 31.3 V	9.1... 17.7 V 16.9... 34.1 V	9.6... 14.6 V 18.2... 27.9 V
24 V DC/ 42/48 V AC	19.2... 26.4 V 33.6... 52.8 V	270 Ω	–	2.13 W	15.4... 28.5 V 29.6... 55.5 V	15.4... 31.0 V 29.6... 60.7 V	16.6... 26.6 V 31.9... 52.8 V
48 V DC/ 100 V AC	38.4... 52.8 V 80.0...121.0 V	1200 Ω	–	1.92 W	32.9... 61.8 V 64.6...122.4 V	32.9... 67.4 V 64.6...133.5 V	35.5... 55.3 V 69.9...110.0 V
60 V DC 115/130 V AC	48.0... 66.0 V 92.0...143.0 V	2150 Ω	–	1.67 W	41.6... 78.8 V 81.9...156.3 V	41.6... 85.9 V 81.9...170.5 V	44.9... 73.8 V 88.0...146.5 V
110/125 V DC/ 220/230/250 V AC	88.0...137.5 V 176.0...275.0 V	7700 Ω	–	1.57 W	81.3...154.4 V 161.4...307.6 V	81.3...168.4 V 161.4...335.7 V	88.0...139.2 V 174.8...277.2 V
220 V DC	176.0...242.0 V	26000 Ω	–	1.86 W	155.9...295.5 V	155.9...322.5 V	168.8...255.3 V
others per order from 12...250 V							
With LED indicator							
12 V DC/ 24 V AC	9.6... 13.2 V 19.2... 26.4 V	78 Ω	–	1.85 W	9.1... 16.3 V 16.9... 31.3 V	9.1... 17.7 V 16.9... 34.1 V	9.6... 14.6 V 18.2... 27.9 V
24 V DC/ 42/48 V AC	19.2... 26.4 V 33.6... 52.8 V	270 Ω	–	2.13 W	15.4... 28.5 V 29.6... 55.5 V	15.4... 31.0 V 29.6... 60.7 V	16.6... 26.6 V 31.9... 52.8 V
48 V DC/ 100 V AC	38.4... 52.8 V 80.0...121.0 V	1200 Ω	–	1.92 W	34.9... 63.8 V 66.6...124.4 V	34.9... 69.4 V 66.6...135.5 V	37.5... 56.3 V 71.9...110.0 V
60 V DC 115/130 V AC	48.0... 66.0 V 92.0...143.0 V	2150 Ω	–	1.67 W	43.6... 80.8 V 83.9...153.8 V	43.6... 87.9 V 83.9...172.5 V	46.9... 74.9 V 88.0...146.5 V
110/125 V DC/ 220/230/250 V AC	88.0...137.5 V 176.0...275.0 V	7700 Ω	–	1.57 W	83.3...156.4 V 163.4...309.6 V	83.3...170.4 V 163.4...337.7 V	88.0...140.2 V 176.0...277.2 V
220 V DC	176.0...242.0 V	26000 Ω	–	1.86 W	157.9...297.5 V	157.9...324.5 V	170.8...256.3 V
others per order from 12...250 V							

⚠ The insulation between coil circuit and contact circuit complies with the specifications for basic insulation.

Technical data (Please note the general hints in the Data Sheet 86-1.00 EN)

Contact circuit

Comp. fitted	RH(M) 1003 3 changeover cont.	RH(M) 1004 4 changeover contacts

Switching times for DC voltage operation (at reference value)

	w/o free-wh. diode		with free-wheeling diode	
	make contact	break contact	make contact	break contact
Operate time	< 30 ms	< 30 ms	< 30 ms	< 30 ms
Release time	< 30 ms	< 30 ms	< 40 ms	< 40 ms

Switching times for AC voltage operation (at reference value)

			with free-wheeling diode	
			make contact	break contact
Operate time	–	–	< 30 ms	< 30 ms
Release time	–	–	< 55 ms	< 60 ms

Contacts	Contact material	Contact diameter
Standard	silver, gold-bloomed	3.5 mm
choices	silver-palladium	3.5 mm
	silver-cadmium oxide	3.5 mm
	gold	2.5 mm

Limit values

(Please note restrictions on contact materials and rated voltage)

Clearance/creepage dist.:	Clearance	Creepage distance
Open contact	≥ 0.9 mm	≥ 4.0 mm
Between contact sets	≥ 3.0 mm	≥ 4.0 mm
Contact/coil	≥ 3.0 mm	≥ 4.0 mm
Contact/mass	≥ 3.0 mm	≥ 4.0 mm
Coil/mass	≥ 3.0 mm	≥ 4.0 mm

Switching voltage	400 V AC/450 V DC
Making current	10 A AC/DC
Continuous current	6 A AC/DC

Breaking capacity	Current	Power
230 V AC cosφ = 0.4...1	6 A	1380 VA
220 V DC L/R = 0 ms	0.4 A	88 W
110 V DC L/R = 0 ms	0.7 A	77 W
60 V DC L/R = 0 ms	2 A	120 W
220 V DC L/R = 40 ms	0.2 A	44 W
110 V DC L/R = 40 ms	0.35 A	38 W
60 V DC L/R = 40 ms	1 A	60 W
(see also diagrams 1 and 2)		

Electrical service life > 10^4 switching operations

CE classification

Overvoltage category
III

Pollution degree
3

Rated impulse voltage
4 kV

Nominal voltage
250 V AC/DC

E.g. for switching in TN and TT systems
230/400 V

For special designs, the technical data may differ.

Explosion protection[1)]

Explosion protection with PTB certificate
(special feature for RH1003 and RH1004 only)

Intra-plant ID 49 Ex 86-5
Design ID PTB-Nr. III B/E - 26627 U

Protection type
Ex i G5

Coil circuit
1 to 220 V DC,
1 to 220 V AC

Contact circuit
to 220 V DC,
to 0.2 A at L/R ≤ 200 ms
to 220 V AC,
to 6 A at cos φ ≥ 0.7

The sum of the voltages at the coil circuit and the contact circuit must not exceed 250 V. The relay provides electrical isolation of circuits that are intrinsically safe from circuits that are not.

Either the contact circuit or the coil circuit can be designed to protection type “intrinsically safe” Ex i G5. Due to the design of the device, the coil circuit is separated reliably from the contact circuit.

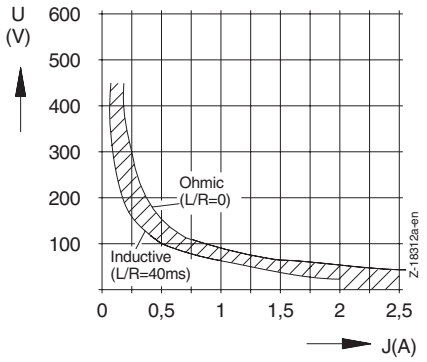


Diagram 1: Breaking capacity for DC current

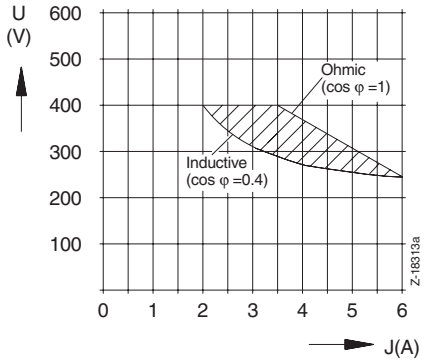


Diagram 2: Breaking capacity for AC current

[1)] This version will be phased out at the end of 2001!

Circuit diagrams

All-or-nothing relay RH(M) 1003

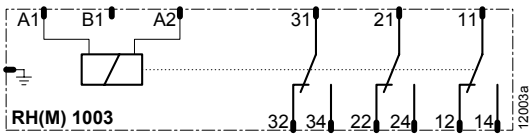


Diagram 1
All-or-nothing relay RH(M) 1003 for DC
with simple winding without auxiliary circuit

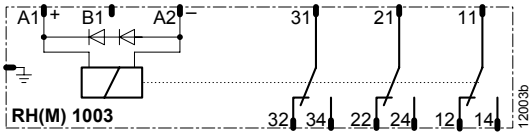


Diagram 2
All-or-nothing relay RH(M) 1003 for DC
with simple winding and free-wheeling diodes, + on A1

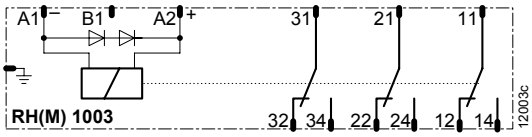


Diagram 3
All-or-nothing relay RH(M) 1003 for DC
with simple winding and free-wheeling diodes, + on A2

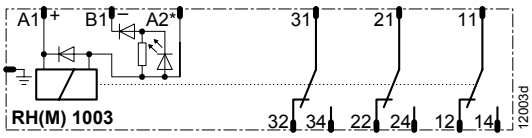


Diagram 4
All-or-nothing relay RH(M) 1003 for DC
with simple winding, reverse-polarity protection, free-wheeling diode and LED indicator. * External connection to A2 not permissible!

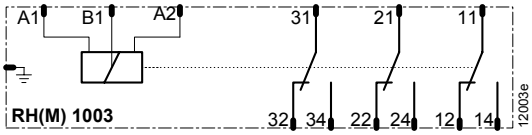


Diagram 5
All-or-nothing relay RH(M) 1003 for DC
simple winding with tap

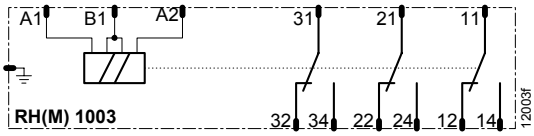


Diagram 6
All-or-nothing relay RH(M) 1003 for DC
with double winding without auxiliary circuit

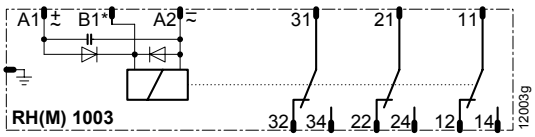


Diagram 7
All-or-nothing relay RH(M) 1003 for DC/AC
* External connection to B1 not permissible!

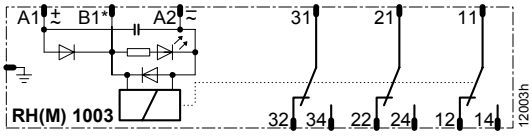


Diagram 8
All-or-nothing relay RH(M) 1003 for nominal voltage ≤ 24 V DC, 42/48 V AC
with LED indicator
* External connection to B1 not permissible!
!

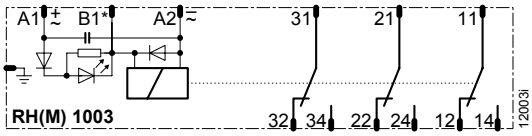


Diagram 9
All-or-nothing relay RH(M) 1003 for nominal voltage ≥ 48 V DC, 100 V AC
with LED indicator
* External connection to B1 not permissible!

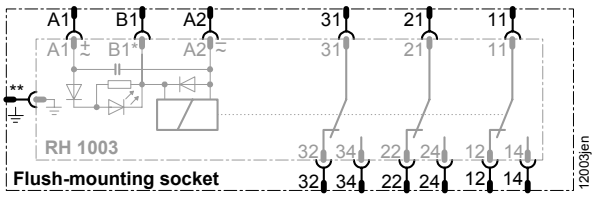


Diagram 10
Flush-mounting socket for RH 1003
with relay plugged in as example (grey)
** Grounding connection obviated with flush-mounting socket for PCB

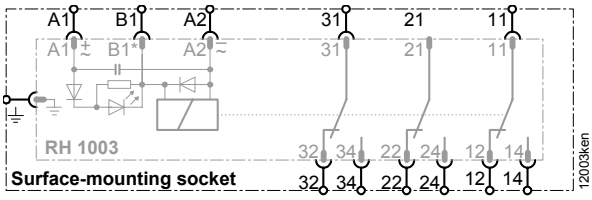


Diagram 11
Surface-mounting socket for RH 1003
with relay plugged in as example (grey)

Circuit diagrams

All-or-nothing relay RH(M) 1004

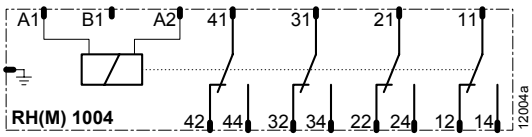


Diagram 12
All-or-nothing relay RH(M) 1004 for DC
with simple winding without auxiliary circuit

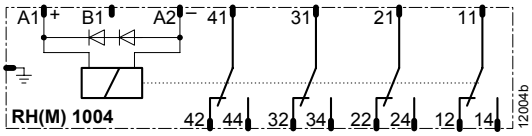


Diagram 13
All-or-nothing relay RH(M) 1004 for DC
with simple winding and free-wheeling diodes, + on A1

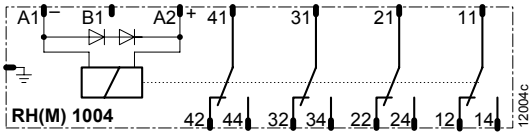


Diagram 14
All-or-nothing relay RH(M) 1004 for DC
with simple winding and free-wheeling diodes, + on A2

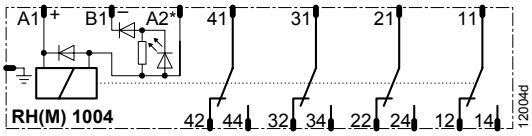


Diagram 15
All-or-nothing relay RH(M) 1004 for DC
with simple winding, reverse-polarity protection, free-wheeling diode and LED indicator * External connection to A2 not permissible!

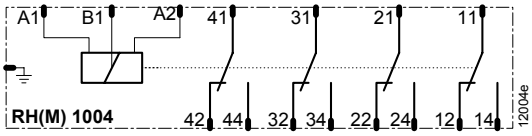


Diagram 16
All-or-nothing relay RH(M) 1004 for DC
simple winding with tap

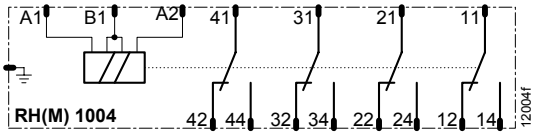


Diagram 17
All-or-nothing relay RH(M) 1004 for DC
with double winding without auxiliary circuit

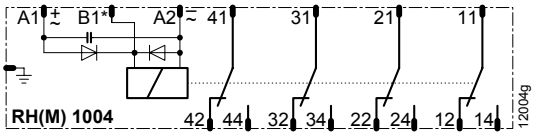


Diagram 18
All-or-nothing relay RH(M) 1004 for DC/AC
* External connection to B1 not permissible!

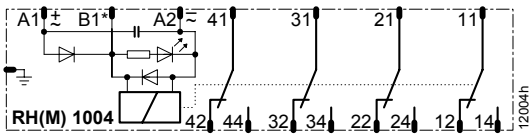


Diagram 19
All-or-nothing relay RH(M) 1004 for nominal voltage ≤ 24 V DC, 42/48 V AC
with LED indicator
* External connection to B1 not permissible!

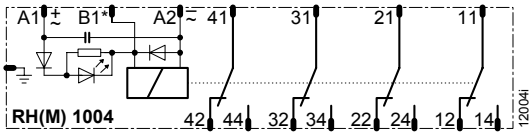


Diagram 20
All-or-nothing relay RH(M) 1004 for nominal voltage ≥ 48 V DC, 100 V AC
with LED indicator
* External connection to B1 not permissible!

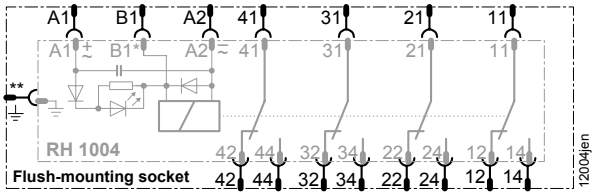


Diagram 21
Flush-mounting socket for RH 1004
with relay plugged in as example (grey)
** No grounding connection for flush-mounting socket for PCB's

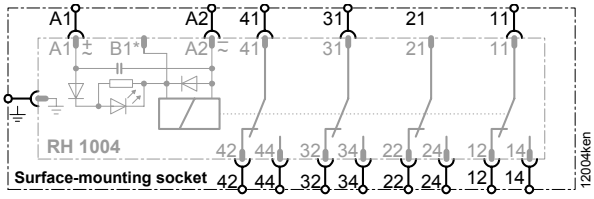


Diagram 22
Surface-mounting socket (standard version) for RH 1004
with relay plugged in as example (grey)

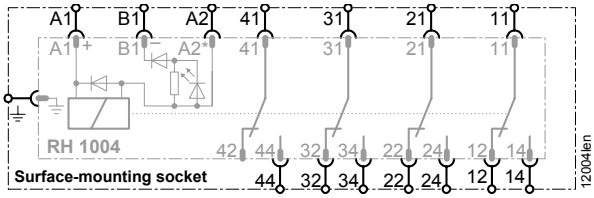


Diagram 23
Surface-mounting socket (B1 on terminal 42) for RH 1004
with relay plugged in as example (grey)

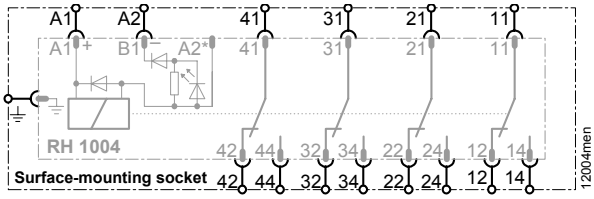
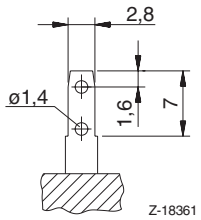
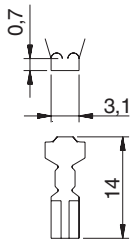


Diagram 24
Surface-mounting socket (B1 on terminal A2) for RH 1004
with relay plugged in as example (grey)

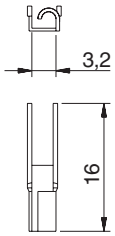
Dimensional drawings (dimensions in mm)



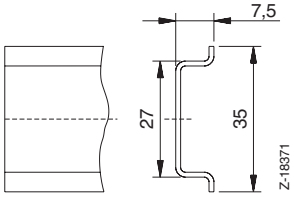
Drawing 1
Solder/plug pin
on RH(M) 1000



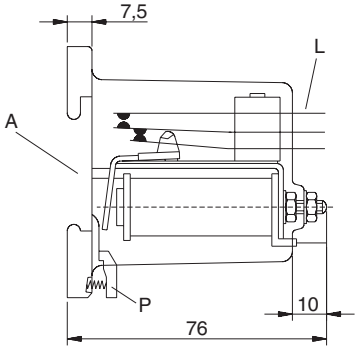
Drawing 2
Plug-in sleeve
for RH(M) 1000



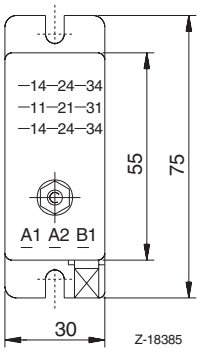
Drawing 3
Plug distributor
for RH(M) 1000



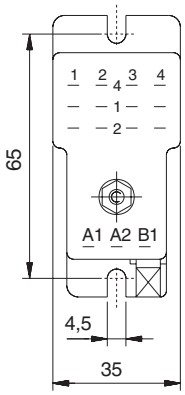
Drawing 4
Top-hat rail



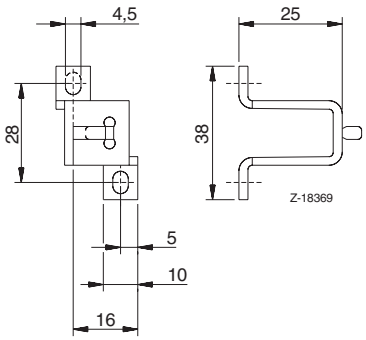
Drawing 5
RHM 1000 (side view)



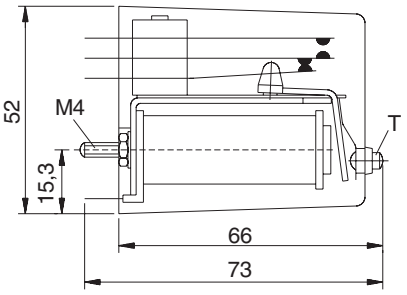
Rear view
RHM 1003



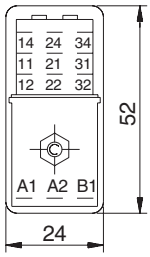
Rear view
RHM 1004



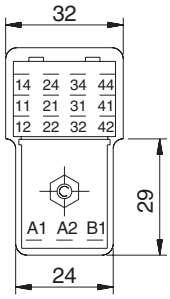
Drawing 7
Mounting bracket



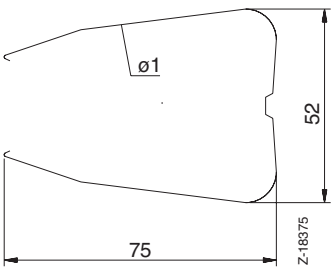
Drawing 8
RH 1000 (side view)



Rear view
RH 1003

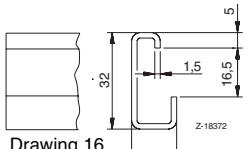


Rear view
RH 1004

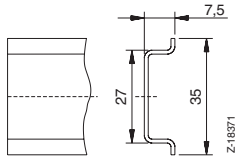


Drawing 9
Retainer clip for flush- and surface mounting sockets

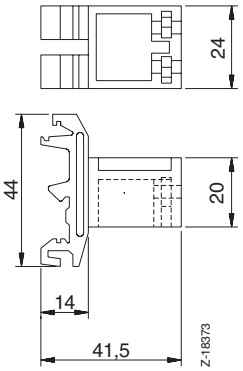
Dimensional drawings (dimensions in mm)



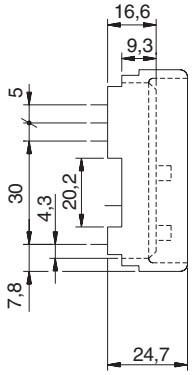
Drawing 16
G-rail



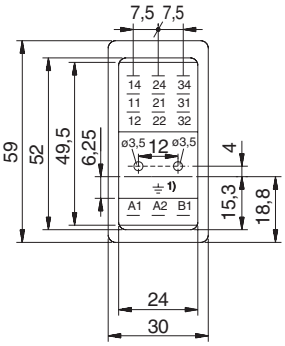
Drawing 4
Top-hat rail



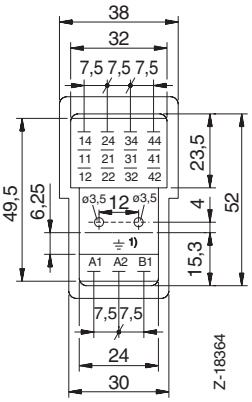
Drawing 14
Adapter for flush-mounting socket
for mounting on top-hat rail or G-rail



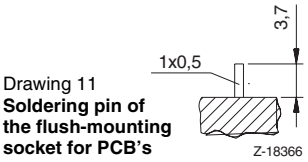
Drawing 15
Flush-mounting socket (side view)



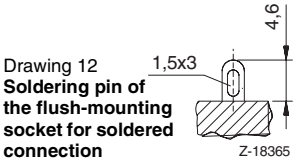
Rear view of
flush-mounting socket
for RH 1003



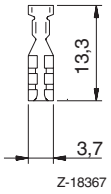
Rear view of
flush-mounting socket
for RH 1004



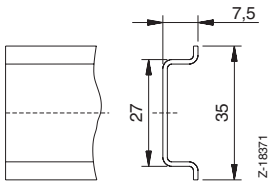
Drawing 11
Soldering pin of the flush-mounting socket for PCB's



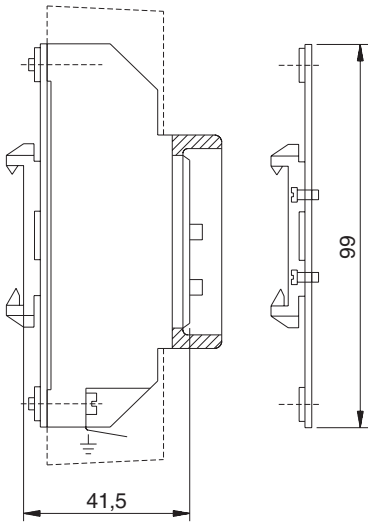
Drawing 12
Soldering pin of the flush-mounting socket for soldered connection



Drawing 13
Clip contact for crimping

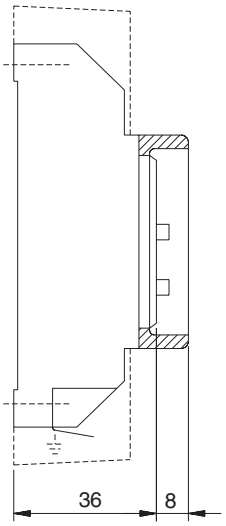


Drawing 4
Top-hat rail

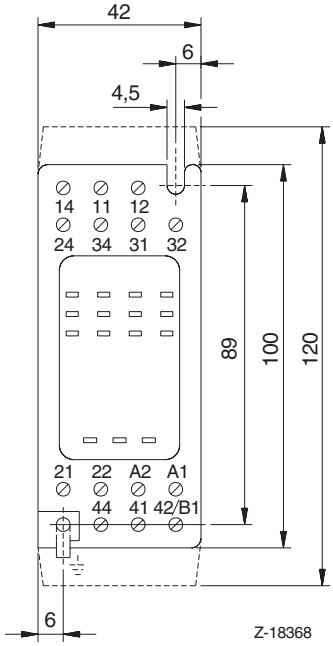


Drawing 18
Surface-mounting socket with snap fixing
for top-hat rails
(side view)

Drawing 19
Snap fixing
for top-hat rails
(side view)



Drawing 20
Surface-mounting socket
(side view)



Frontal view of the
surface-mounting socket

Ordering information for all available designs

Design			Catalog No. V86236A-							Code	Circ. diagr.	Dim. draw.
All-or-nothing relay in plug-in case												8
RH 1003	3 changeover contacts		1						0		1...9	
RH 1004	4 changeover contacts		2					0			12...20	
All-or-nothing relay, top-hat-rail- or wall-mounting												5
RHM 1003	3 changeover contacts		3				0		0		1...9	
RHM 1004	4 changeover contacts		4				0	0			12...20	
Nominal coil voltage (DC)												
Simple winding	12 V DC			1	0							
	24 V DC			2	0							
	48 V DC			3	0							
	60 V DC			4	0							
	110/125 V DC			5	0							
	220/250 V DC			6	0							
	..... . V DC	1) 5)		7	0					501		
Auxiliary circuit	without				0	0					1, 12	
	with free-wheeling diode (+ on A1)	2)			0	2					2, 13	
	with rev.polar.prot., free-wh.diode and LED (+ on A1)	2) 3) 4) 5)			0	3					4, 15	
	with free-wheeling diode (+ on A2)	2)			0	4					3, 14	
Winding with tap	..... . V DC	1) 3) 5)		8	0	0				501	5,16	
Double winding	..... . V DC	1) 3) 5)		9	0	0				501	6, 17	
Nominal coil voltage (DC, AC)												
with reverse polarity protection, free-wheeling diode and protective circuit												
Simple winding	12 V DC	24 V AC		1	2							
	24 V DC	42/48 V AC		2	3							
	48 V DC	100 V AC		3	4							
	60 V DC	110/130 V AC		4	5							
	110/125 V DC	220/230/250 V AC		5	6							
	220 V DC			6	7							
	..... . V DC	..... . V AC	1) 5)	7	7					501		
Auxiliary circuit	without					1					7, 18	
	with LED indicator					6					8, 9, 12, 20	
Jog/latch button												
With jog/latch button (standard design)							0					
Without jog/latch button							1					
Without jog/latch button, with PTB certificate		5) 7)					2					
Contact material												
RH(M) 1003	Silver, gold-bloomed	Ø 3,5 mm						1	0			
	Silver-cadmium oxide	Ø 3,5 mm						2	0			
	Silver-palladium	Ø 3,5 mm						3	0			
	Gold	Ø 2,5 mm						4	0			
RH(M) 1004	Silver, gold-bloomed	Ø 3,5 mm						0	1			
	Silver-cadmium oxide	Ø 3,5 mm						0	2			
	Silver-palladium	Ø 3,5 mm						0	3			
	Gold	Ø 2,5 mm						0	4			

[1] Customer-specific within the realm of technical feasibility as per Catalog 86!
State nominal voltage / nominal current of the coil.
Possible nominal voltages: 5 to 250 V DC und 12 to 250 V AC

[2] Use only in existing installations. For new installations, use DC/AC version!

[3] Ancillary surface mounting: See footnote 3).

[4] Ancillary surface mounting: See footnote 4).

[5] Technical data may change compared to the standard design as per Catalog specifications.

[6] External connect. Not permitted due to intrnal assignment!

[7] This version will be phased out at the end of 2001!

Standard designs all-or-nothing relays RH(M) 1000					
Design	Nominal voltage		Catalog No.	Circ. diagr.	Dim. draw.
All-or-nothing relay RH 1003	12 V DC		V86236A-1100010	1	8
in plug-in case,	24 V DC		V86236A-1200010	1	8
3 changeover contacts,	48 V DC		V86236A-1300010	1	8
contact material	60 V DC		V86236A-1400010	1	8
silver, gold-bloomed	110/125 V DC		V86236A-1500010	1	8
simple winding	220/250 V DC		V86236A-1600010	1	8
	12 V DC	24 V AC	V86236A-1121010	7	8
	24 V DC	42/48 V AC	V86236A-1231010	7	8
	48 V DC	100 V AC	V86236A-1341010	7	8
	60 V DC	110/130 V AC	V86236A-1451010	7	8
	110/125 V DC	220/250 V AC	V86236A-1561010	7	8
	220 V DC		V86236A-1671010	7	8
All-or-nothing relay RH 1004	12 V DC		V86236A-2100001	12	8
in plug-in case,	24 V DC		V86236A-2200001	12	8
4 changeover contacts,	48 V DC		V86236A-2300001	12	8
contact material	60 V DC		V86236A-2400001	12	8
silver, gold-bloomed	110/125 V DC		V86236A-2500001	12	8
simple winding	220/250 V DC		V86236A-2600001	12	8
simple winding	12 V DC	24 V AC	V86236A-2121001	18	8
	24 V DC	42/48 V AC	V86236A-2231001	18	8
	48 V DC	100 V AC	V86236A-2341001	18	8
	60 V DC	110/130 V AC	V86236A-2451001	18	8
	110/125 V DC	220/250 V AC	V86236A-2561001	18	8
	220 V DC		V86236A-2671001	18	8
All-or-nothing relay RHM 1003	12 V DC		V86236A-3100010	1	5
top-hat-rail- or	24 V DC		V86236A-3200010	1	5
Wall-mounting	48 V DC		V86236A-3300010	1	5
3 Changeover contacts,	60 V DC		V86236A-3400010	1	5
contact material	110/125 V DC		V86236A-3500010	1	5
silver, gold-bloomed,	220/250 V DC		V86236A-3600010	1	5
simple winding	12 V DC	24 V AC	V86236A-3121010	7	5
	24 V DC	42/48 V AC	V86236A-3231010	7	5
	48 V DC	100 V AC	V86236A-3341010	7	5
	60 V DC	110/130 V AC	V86236A-3451010	7	5
	110/125 V DC	220/250 V AC	V86236A-3561010	7	5
	220 V DC		V86236A-3671010	7	5
All-or-nothing relay RHM 1004	12 V DC		V86236A-4100001	12	5
top-hat-rail- or	24 V DC		V86236A-4200001	12	5
wall-mounting	48 V DC		V86236A-4300001	12	5
4 changeover contacts,	60 V DC		V86236A-4400001	12	5
contact material	110/125 V DC		V86236A-4500001	12	5
silver, gold-bloomed,	220/250 V DC		V86236A-4600001	12	5
simple winding	12 V DC	24 V AC	V86236A-4121001	18	5
	24 V DC	42/48 V AC	V86236A-4231001	18	5
	48 V DC	100 V AC	V86236A-4341001	18	5
	60 V DC	110/130 V AC	V86236A-4451001	18	5
	110/125 V DC	220/250 V AC	V86236A-4561001	18	5
	220 V DC		V86236A-4671001	18	5

All-or-nothing relay RH(M) 1000
in plug-in case and case for top-hat rail or wall-mounting

10/86-2.36 EN

Special designs RH(M) 1000						
Design	Nominal voltage		Catalog No.	Code	Circ. diagr.	Dim. draw.
RH 1003 for GEAMATIC	24 V DC	[5]	V86236A-1800120	510	[6]	8
RHM 1003 for GEAMATIC	24 V DC	[5]	V86236A-3800020	510	[6]	5
RH 1004 for Protronic P	24 V DC	[5]	V86236A-2702002	511	12	8
RHM 1004 for Protronic P	24 V DC	[5]	V86236A-4702002	511	12	5

Accessories for all-or-nothing relays RH 1000					
Design			Catalog No.	Circ. diagr.	Dim. draw.
Angle bracket (25 per pack)			V86211A-0305000		7
Retaining clip for plug-in case (25 per pack)			V86211A-0404000		9
Flush-mounting case (with retaining clip)					
for RH 1003	for PCBs		V86210A-1500000	10	15
(all designs)	for soldered connections		V86210A-2500000	10	15
	for crimping		V86210A-3500000	10	15
for RH 1004	for PCBs		V86210A-1600000	21	15
(all designs)	for soldered connections		V86210A-2600000	21	15
	for crimping		V86210A-3600000	21	15
Adapter for mounting flush-mounting case on top-hat rails or G-type rails			V86211A-7000000		14
Surface-mounting case with threaded terminal ends (with retaining clip)					
für RH 1003	all designs		V86210A-4050000	11	20
für RH 1004	standard design		V86210A-4060000	22	20
für RH 1004	B1 on terminal 42	[3]	V86210A-5060000	23	20
für RH 1004	B1 on terminal A2	[4]	V86210A-8060000	24	20
Surface-mounting case with threaded terminal ends and snap-on fixing for top-hat rail (with retaining clip)					
für RH1003	all designs		V86210A-6050000	11	18
für RH1004	standard design		V86210A-6060000	22	18
für RH1004	B1 on terminal 42	[3]	V86210A-7060000	23	18
für RH1004	B1 on terminal A2	[4]	V86210A-9060000	24	18
Spare caps for surface-mounting case (2 per pack)			V86211A-8800000		
Snap-on fixing for top-hat rail (for retrofitting to surface-mounting cases)			V86211A-9800000		19
Top-hat rail EN 50022-35x7.5 (2000 mm long)			V86299A-1100000		4

Accessories for all-or-nothing relays RHM 1000			
Description	Catalog No.		Dim. draw.
Top-hat rail EN 50022-35 x 7.5 (2000 mm long)	V86299A-1100000		4

[3] Important: The 4th changeover contact is connected to the terminal as make contact only

[4] Relay coil connection B1 is taken to terminal A2

[5] Technical data may change compared to the standard design as per Catalog specifications

[6] Coil begin: A1 / coil end: B1 / center tapning point: A2

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10/86-2.36 EN 04.01

All-or-nothing relay RH 1713

Coupling relay between controller electronics and actuator

10/86-2.43 EN

- **Power relay in surface-mounting case with 3 changeover contacts**
- **High switching capacity of the contacts**
- **Low power consumption**
- **Threaded terminals below**
- **DC voltage operation**
- **Approved as coupling relay for applications in reactor safety systems**

The production of the RH 1713 all-or-nothing relay has been phased out at the end of 1998.

Supplies continue while stocks last.

All-or-nothing relay RH 1713
Coupling relay between controller electronics and actuator

10/86-2.43 EN

Technical data

General data

Design
Circular attracted-armature relay, surface-mounting case (enclosed assembly)

Degree of protection (DIN 40050)
IP 50 (threaded terminals IP 20)

Test certificate
TÜV-Arbeitsgemeinschaft Kerntechnik West T 17-0201/80

Electrical connections
Threaded terminals up to 2.5 mm^2

Mounting orientation
Arbitrary

Mechanical service life
20 x 10^6 switching operations

Permissible switching frequency
200 switching operations/min.

Insulation group and reference voltage (VDE O110/11.72)
Group C, 250 V AC/300 V DC
Group B, 380 VAC/450 V DC

Test voltage
2.5 kV, 50 Hz (VDE 0435a/9.72)

Weight
Approx. 360 g

Operating circuit

Coil type standard
Simple winding

Operate voltage
≤ 11.3 V DC at 20 °C

Specified operate value
207 AW

Release voltage
≥ 3.4 V DC

Nominal voltage
22.5 V DC

Coil resistance
630 Ω (± 10 %) at 20 °C

Nominal consumption
0.8 W at 20 °C

Operating range
15...65 V DC at 20 °C
15...45 V DC at 70 °C
16...33 V DC at 85 °C

Contact circuit

Contacts fitted
3 changeover contacts

Contact material
Silver-cadmium oxide contacts

Nominal contact voltage
380 V DC/450 V DC

Making current
10 A AC/DC

Continuous current
6 A AC/DC

Switching capacity

Perm. No. of switch. operations	Breaking capacity (switching frequency 2 Hz)
1.2 x 10^6	300 VA, 6 A AC, cosφ = 1
2.2 x 10^6	300 VA, 1.36 A AC, cosφ = 1
10^6	800 VA, 4 A AC, cosφ =1
5 x 10^6	60 VA, 220 V AC, AEG contactor LS 100
3 x 10^6	100 VA, 220 V AC, AEG contactor LS 200 switching frequency 1 Hz
2 x 10^6	150 VA, 220 V AC, AEG contactor LS 320 switching frequency 1 Hz
1.1 X 10^6	250 VA, 220 V AC, AEG contactor Gr.12

Breaking capacity

880 VA	4 A AC	220 V AC	cosφ = 0.4...1
88 W	0.4 A DC	220 V DC	L/R = 0
44 W	0.2 A DC	220 V DC	L/R = 40 ms
77 W	0.7 A DC	110 V DC	L/R = 0
38 W	0.35 A DC	110 V DC	L/R = 40 ms
120 W	2 A DC	60 V DC	L/R = 0
60 W	1 A DC	60 V DC	L/R = 40 ms

Switching times	Make contact	Break contact
Operate time	approx. 40 ms	approx. 35 ms
Release time	approx. 8 ms	approx. 10 ms

Climatic conditions

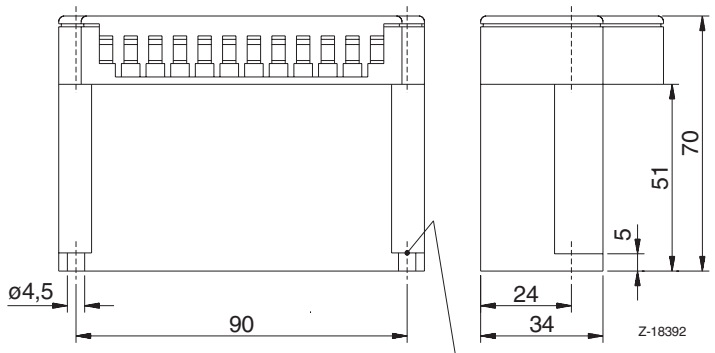
Ambient temperature
-5 °C...+ 85 °C

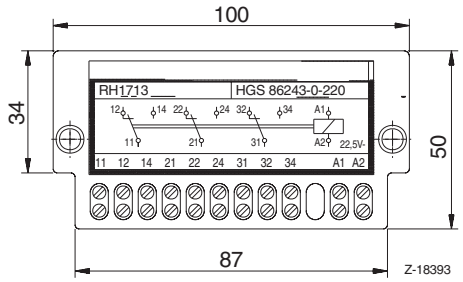
Transport and storage temperature
-25 °C...+100 °C

All-or-nothing relay RH 1713
Coupling relay between controller electronics and actuator

10/86-2.43 EN

Dimensional drawings (dimensions in mm)





Ordering information

Stock versions				
Design	Nominal voltage	Catalog No		
All-or-nothing relay RH1713 Approved for application in reactor safety systems, Closed cell wall-mounting case, 3 changeover contacts contact material silver-cadmium oxide	22,5 V D C	V86243A-2200000		

Production of the all-or-nothing relay RH1713 has been phased out at the end of 1998.
Supplies continue while stocks last.

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Printed in the Fed. Rep. of Germany
10/86-2.43 EN 04.01

Signaling relay RA 32

for surface-mounting,
flush-mounting or plug-in
version direct or in a rack

10/86-6.20 EN

- **Semi-automatic flag relay**
- **Large flag bars 40 mm × 31 mm**
  Operating position: black
  Fault: two white-, one red-hatched bar
  Acknowledged fault: three white bars
  May additionally be labeled
- **Several contact functions available for selection**
- **Several contact materials available for selection**
- **Several connection types available for selection**
- **For DC voltage operation**
  (also available for DC current operation)
  or AC voltage operation (40 to 200 Hz)
  If f > 200 Hz: operate value rising, release value falling

The RA32 is suited particularly to the display of faults that are still present after detection and manual acknowledgement.

The signaling relay has three optical state indications:

- **Operating position**
- **Fault, not acknowledged**
- **Fault acknowledged but not remedied**
- **Fault acknowledged and remedied = operating position**

The two contacts allow additional remote signals depending on the selected contact function.

CE

Technical notes

Signaling relay

Open-circuit system (standard design): An applied energizing quantity (current or voltage) within the guaranteed range produces a magnetic field which in turn causes the magnetic system to operate.

The operate function is ensured from the lowest guaranteed value onwards (but may also occur for lower values). The magnetic function remains in operate condition while the energizing quantity is within the guaranteed range.

The assured release takes place from 5 % (DC) or 15 % (AC) of the highest reference value within the permitted range of the energizing quantity (but may also occur for higher values).

Open-circuit operation: As an energizing quantity is applied and the magnetic system operates, an optical indication is issued.

Closed-circuit operation: As the energizing quantity drops out and the magnetic system no longer operates, an optical indication is issued.

The indication may be acknowledged by pressing a button. Remote signaling can be effected via 2 contacts (function can be selcted, see "Operation of flags and contacts").

Optical displays

Operating position: black
Fault, not acknowledged: two white, one red-hatched bar
Acknowledged fault (not remedied): three white bars
Fault acknowledged and remedied = operating position: black
May additionally be labeled.

Contact functions / remote signaling

See "Operation of Flags and Contacts".

Signaling relay, plug-in design

The relay plugs into a matching socket.

Signaling relay, threaded connections

The built-in signaling relay can be directly wired via threaded connections at the rear side. The signaling relay can be mounted on a mounting plane using a surface-mounting socket.

Coil for DC current /DC voltage only

(Coil without auxiliary circuit)

The energizing quantity is applied directly to the coil. There is no auxiliary circuit as protection from transient overvoltages or for the limitation of overvoltages on switch-off. The relay itself is resistent towards transient overvoltages within the guaranteed range.

Coil for DC or AC voltage

(Coil with auxiliary circuit)

The energizing quantity is applied to the coil via a bridge rectifier. The coil circuit is thereby polarity-independent and reverse-polarity-protected at the point of connection. The bridge rectifier simultaneously takes on the function of a free-wheeling diode without polarity dependence. The input circuit is additionally protected by a voltage-dependent resistor (VDR).

Contact material

Our standard contact material is silver that is gold-bloomed for protection during storage. Other contact materials are offered for selection. Please see the Data Sheet 86-1.00 EN for details.

Open-circuit operation

See "Signaling relays", "Operation of flags and contacts" and Illustration 1.

Closed-circuit operation

See "Signaling relays", "Operation of flags and contacts" and Illustration 2.

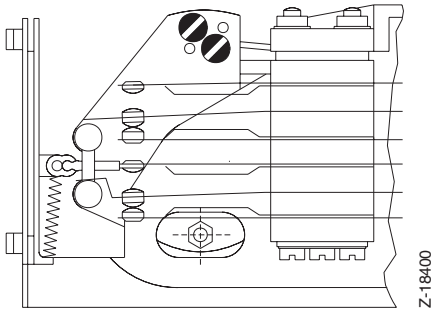


Illustration 1: Open-circuit operation, contacts in operate position

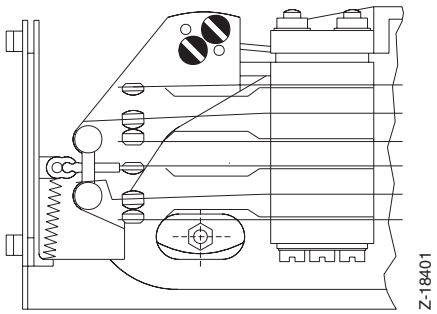


Illustration 2: Closed-circuit operation, contacts in operate position

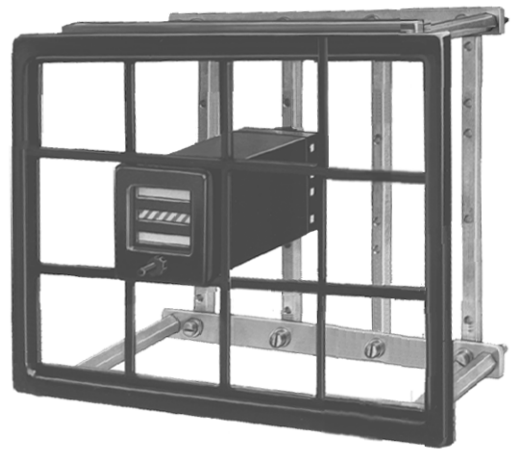
Special features

Short operate time: This special feature guarantees the operate function in open-circuit operation even for brief transients from approximately 8 ms. The energizing quantity must not persist for more than 1 s.

Without a jumper on terminals 6 and 8: No internal jumper for the contact "break-contact, non-canceling", a modified signal becomes possible.

Break contact, non-canceling instead of make contact: see "Circuit diagrams" and "Operation of flags and contacts".

Technical notes



Rack ER 034
without flush-mounting sockets, for permanent installation of the signaling relays

Rack ER 134
with built-in flush-mounting sockets

Accessories

Labeling plate:
Transparent plate set in front of the display mask of the signaling relay. Factory-labeling per order or labeling by the customer are both possible. The labeling is visible when the signals ‘Fault’ and ‘Fault acknowledged but not remedied’ are issued.

Installation spindle (set of 2):
For mounting, the signaling relays are held firmly in the mounting plane with these 2 spindles.

Flush-mounting plug-in socket:
A signaling relay can be plugged into the built-in plug-in socket.

Surface-mounting base:
Mounted on a signaling relay with threaded terminals. The signaling relay thereby turns into a wall-mounting signaling relay with threaded terminals. The surface-mounting base is installed on the mounting plane with 2 bolts.

Surface-mounting plug-in socket:
Surface-mounting socket, installed on the mounting plane with 2 bolts. Will carry a pug-in signaling relay.

Tool for plug-in relay:
Use to pull out a plugged-in signaling relay.

Rack:
One rack takes up to 12 signaling relays (3 vertical × 4 horizontal). Only a cutout plus bore holes are needed for the rack. The two pre-installed rails are mounted on the panel from the rear using the enclosed bolts. Depending on the panel thickness, the necessary number of washers is set onto the spacer bolt and the frame is then set onto the spacer bolts and bolted on. Thereafter the plastic front frame is set onto the mounting panel and the signaling relays are positioned in the compartments. Any vacant compartments are covered with dummy plates.

Rack ER 034 without flush-mounting socket for permanent installation:
The rack is not fitted with pug-in sockets. It will take signaling relays with threaded connections. The signaling relays are mounted on the carrier rails.

Rail ER134 with flush-mounting sockets for plug-in mounting:
The rack is fitted with plug-in sockets so as to take plug-in signaling relays. The signaling relays are held firmly in the sockets.

Dummy plates:
These are used to cover any vacant compartments in the racks.

Wiring bolts, wiring rail:
These are used to wire the signaling relays in different wiring levels within an installation box.

Signaling relay RA 32
for surface-mounting, flush-mounting or plug-in version direct or in a rack 10/86-6.20 EN

Technical data (Please note the general hints in the Data Sheet 86-1.00 EN)

General data

Function
Attracted-armature relay with semi-automatic flags

Degree of device protection

Relay
Front: IP 40
Rear: IP 20 (except connections)
Connection area: IP 20 (with cover)

Surface-mounting socket
IP 20 (with cover)

Surface-mounting base
IP 20 (with cover)

Flush-mounting socket
IP 00

Installation
(see “Installation and accessories“)

Weight

Relay	approx. 340 g
Surface-mounting socket	approx. 230 g
Surface-mounting base	approx. 130 g
Flush-mounting socket	approx. 120 g

Electrical connections
(see also “Circuit diagrams“)

Relay plug-in or threaded terminals
Wire, solid bolt, max. 2.5 mm^2
Wire, flexible bolt, max. 2.5 mm^2
(use wire end ferrules)

Surface-mounting socket
Wire, solid bolt, max. 2.5 mm^2
Wire, flexible bolt, max. 2.5 mm^2
(use wire end ferrules)

Surface-mounting base
Wire, solid bolt, max. 2.5 mm^2
Wire, flexible bolt, max. 2.5 mm^2
(use wire end ferrules)

Flush-mounting socket
Wire, solid bolt, max. 2.5 mm^2
Wire, flexible bolt, max. 2.5 mm^2
(use wire end ferrules)

Shock protection to be ensured through installation!

Mounting orientation
arbitrary

Mechanical service life
5×10^5 switching operations

Permissible switching frequency
200 switching operations/h

Climate class 3K3
max. 85% relative humidity
max. 25 g/m^3 abs. humidity

Transport and storage temperature
-45...100 °C

Ambient temperature
-25 ... 65 °C

Maximum surface temperature
+85 °C
(with all maximum permissible values for ambient temperature, coil voltage, contact rating)

Coil circuit

Nominal voltage	Nominal range	Resistance R_{coil} (±10 % at 20 °C)	$R_{ser.}$	Nominal consumption	max. permissible operating range $V_{min.}$ to $V_{max.}$ at ambient temperature -25 °C...+40 °C	-5 °C...+40 °C	-25 °C...+65 °C
RA 32 (specified operate value 230 AW)							
Coil for DC voltage only							
24 V	19.2... 26.4 V	210 Ω	–	2.74 W	16.2... 37.9 V	16.2... 37.9 V	17.6... 30.6 V
42/48 V	33.6... 52.8 V	700 Ω	–	3.29 W	29.4... 69.1 V	29.4... 69.1 V	32.0... 55.9 V
60 V	48.0... 66.0 V	1500 Ω	–	2.40 W	43.4...101.2 V	43.4...101.2 V	47.1... 81.8 V
100/110/130 V	80.0...143.0 V	4200 Ω	–	2.88 W	70.9...168.1 V	70.9...168.1 V	77.0...143.0 V
220/250 V	176.0...275.0 V	17200 Ω	–	2.81 W	154.9...357.4 V	154.9...357.4 V	153.5...276.9 V
others per order from 5...250 V							
Coil for DC and AC voltage (DC/AC. f = 40...200 Hz)							
24 V	19.2... 26.4 V	210 Ω	–	2.74 W	18.6... 39.1 V	18.6... 39.1 V	19.2... 31.8 V
42/48 V	33.6... 52.8 V	700 Ω	–	2.52 W	31.8... 70.4 V	31.8... 70.4 V	33.6... 57.1 V
60 V	48.0... 66.0 V	1500 Ω	–	2.40 W	45.8...102.4 V	45.8...102.4 V	48.0... 83.0 V
100/110/130 V	80.0...143.0 V	4200 Ω	–	2.88 W	73.3...170.5 V	73.3...170.5 V	79.4...143.0 V
220/230/250 V	176.0...275.0 V	17200 Ω	–	3.08 W	157.3...358.6 V	157.3...358.6 V	155.9...278.1 V
others per order from 12...250 V							

Technical data (Please note the general hints in the Data Sheet 86-1.00 EN)

Contact circuit

Components and function

RA 32	2 changeover contacts
RA 32 N	1 changeover contact, 1 make contact (non-cancelling)
RA 32 W	1 changeover contact, 1 passing contact
RA 32 NW	1 make contact (non-cancelling), 1 passing contact
RA 32 M	1 changeover contact, 1 automatic changeover contact
RA 32 MW	1 automatic changeover contact, 1 passing contact
RA 32 WA	1 automatic changeover contact, 1 automatic passing contact

Switching times

(see also “Operation of flags and contacts“)

Switching times for DC voltage operation (at reference value)

	w/o free-wheel. diode		with free-wheeling diode	
	make contact	break contact	make contact	break contact
Operate time	< 30 ms	< 30 ms	< 30 ms	< 30 ms
Release time	< 30 ms	< 30 ms	< 40 ms	< 40 ms

Switching times for AC voltage operation (at reference value)

			with free-wheeling diode	
			make contact	break contact
Operate time	–	–	< 30 ms	< 30 ms
Release time	–	–	< 70 ms	< 70 ms

Contacts	Contact material	Contact diameter
Standard	silver, gold-bloomed	3.5 mm
choices	silver-palladium	3.5 mm
	silver-cadmium oxide	3.5 mm
	gold	2.5 mm

Limit values

(Please note restrictions on contact materials and rated voltage.)

Clearance/creepage dist.:	Clearance	Creepage distance
Open contact	≥ 0.9 mm	≥ 4.0 mm
Between contact sets	≥ 3.0 mm	≥ 4.0 mm
Contact/coil	≥ 3.0 mm	≥ 4.0 mm
Contact/mass	≥ 3.0 mm	≥ 4.0 mm
Coil/mass	≥ 3.0 mm	≥ 4.0 mm

Switching voltage	400 V AC/450 V DC
Making current	10 A AC/DC
Continuous current	6 A AC/DC

Breaking capacity	Current	Power
230 V AC cosφ = 0,1...1	6 A	1380 VA
220 V DC L/R = 0 ms	0.4 A	88 W
110 V DC L/R = 0 ms	0.7 A	77 W
60 V DC L/R = 0 ms	2 A	120 W
220 V DC L/R = 40 ms	0.2 A	44 W
110 V DC L/R = 40 ms	0.35 A	38 W
60 V DC L/R = 40 ms	1 A	60 W

(see also diagrams 1 and 2)

Electrical service life> 10^4 switching operations

CE classification

Overvoltage category
III

Pollution degree
3

Rated impulse voltage
4 kV

Nominal voltage
250 V AC/DC

E.g. for switching in TN and TT systems
230/400 V

For special designs, the technical data may differ.

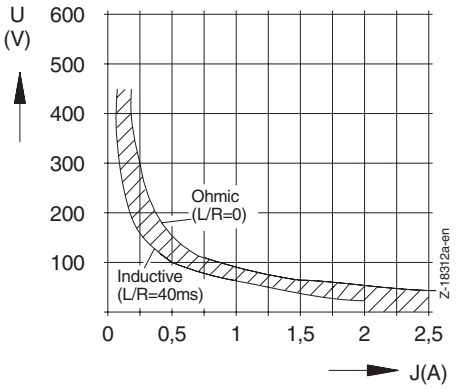


Diagram 1: DC breaking capacity

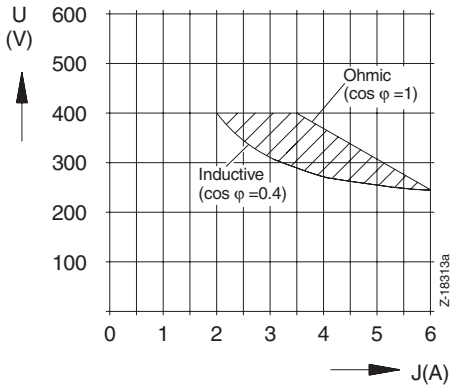


Diagram 2: AC breaking capacity

Operation of flags and contacts

	Magnetic system Setting		Flag						
	Open-circuit system	Closed-circuit system		Change-over contact	Make contact non-canceling[1] (N)	Break contact non-cancel.[2] (NU)	Automatic change-over contact[3] (W)	Passing contact[4] (W)	Automatic passing contact[5] (W)
Operating position	no current	energized							
Fault start	energized	no current							
Fault end before flag acknowledgement	no current	energized							
New fault before acknowledgement	energized	no current							
Acknowledged fault	energized	no current							
Fault end	no current	energized							

Z-18411

[1] Make contact (non-canceling) opening briefly during acknowledgement.
[2] Break contact (non-canceling) opening briefly during acknowledgement.
[3] Automatic changeover contact cannot be reset manually, it indicates the fault duration. It opens briefly during acknowledgement.
[4] The passing contact operates only during the flag transition from operating to signaling position. Contact duration > 20 ms.
[5] The passing contact operates independently of the flag position at the start of a coil energizing event. Contact pulse > 20 ms.

Circuit diagrams

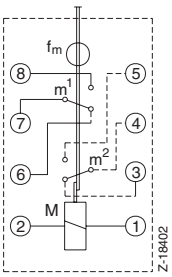


Diagram 1
RA 32

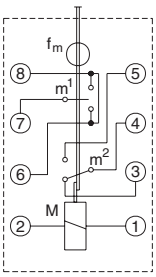


Diagram 2
RA 32 N

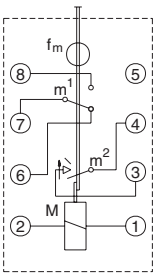


Diagram 3
RA 32 W

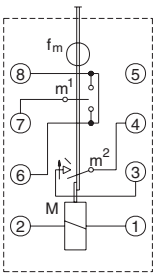


Diagram 4
RA 32 NW

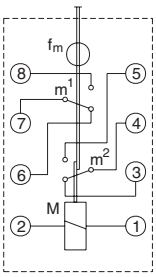


Diagram 5
RA 32 M

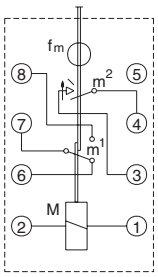


Diagram 6
RA 32 MW

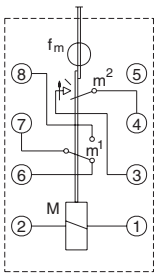


Diagram 7
RA 32 WA

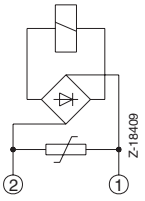


Diagram 8
Operating circuit with
auxiliary circuit for DC/AC

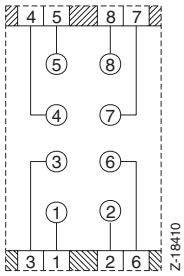
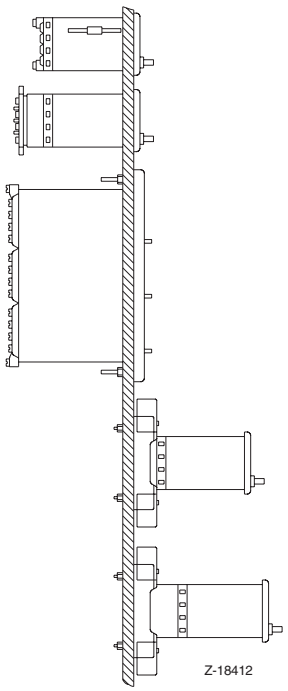


Diagram 9
Wiring of the surface-mounting base
and the surface-mounting plug-in socket
(frontal view)

Signaling relay RA 32
for surface-mounting, flush-mounting or plug-in version direct or in a rack 10/86-6.20 EN

Installation and accessories



Type of installation	Signaling relay	Accessories
Individual installation, permanent	Threaded terminals	Installation spindle
Individual installation, plug-in	Plug-in	Flush-mounting socket (tool for relay removal)
Installation of the signaling relays in the rack (3 vertical, 4 horizontal)		Rack
Signaling relay, permanent installation	Threaded terminals	ER 034
Signaling relay, plugged in	Plug-in	ER 134 (tool for relay removal)
Individual surface-mounting, permanent	Threaded terminals	Surface-mounting base
Individual surface-mounting, plugged in	Plug-in	Surface-mounting socket

Dimensional drawings of the signaling relay RA 32 (dimensions in mm)

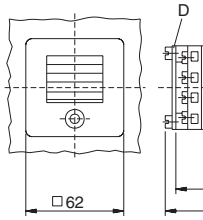
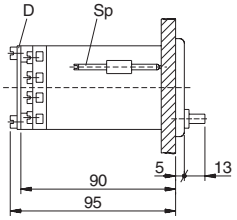
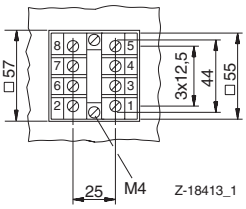


Diagram 1
RA 32 for threaded terminals



Side view
with installation spindel (Sp) and protective cover (D)



Rear view
without protective cover

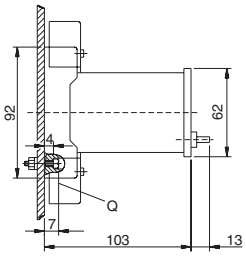
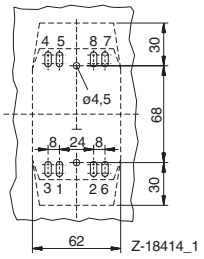


Diagram 3
RA 32 with surface mounting base



Rear view

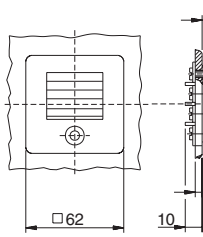
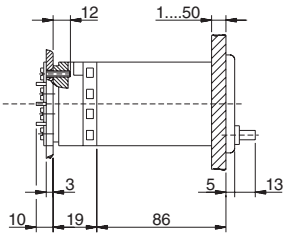
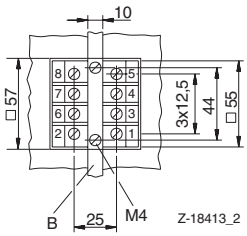


Diagram 2
RA 32 plug-in with flush-mounting socket



Side view



Rear view
B = Mounting rail

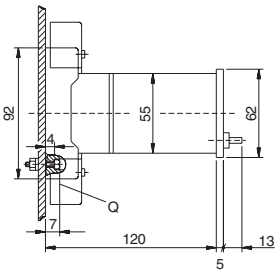
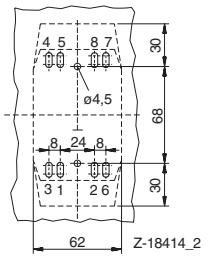
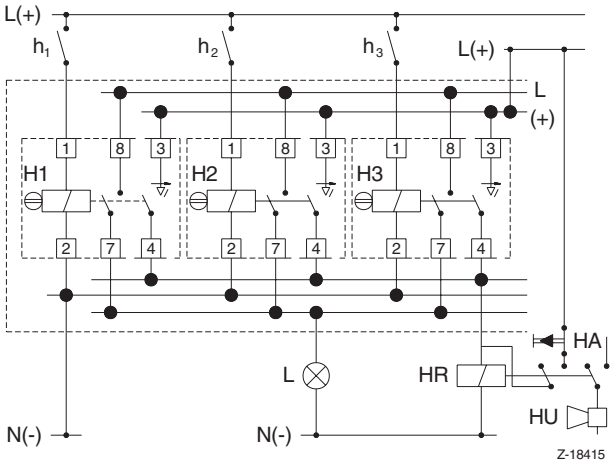


Diagram 4
RA 32 with surface-mounting socket

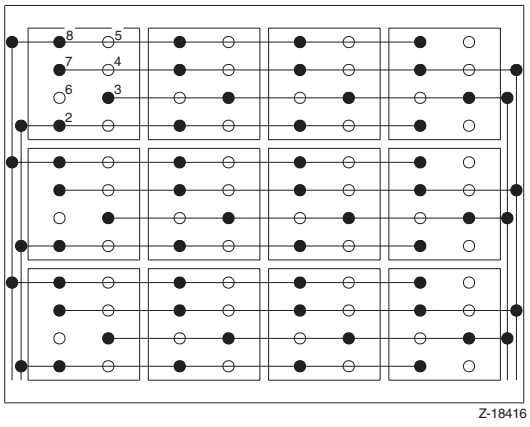


Rear view

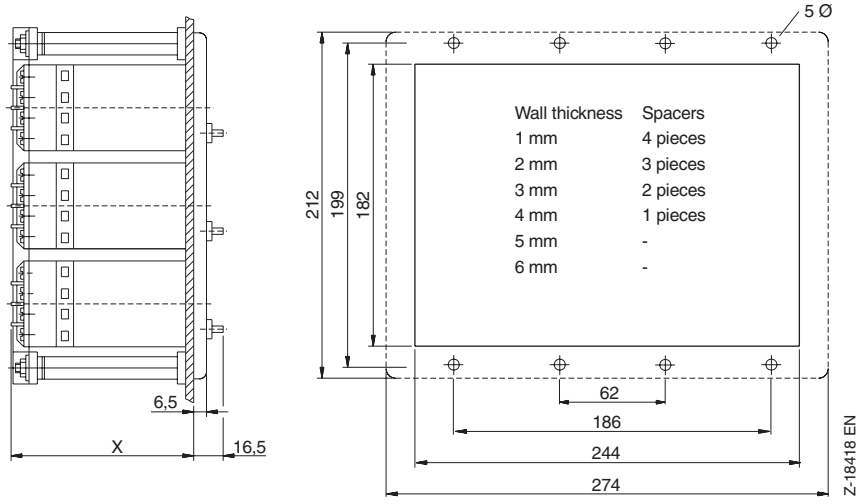
Circuit diagram and dimensional drawing of rack ER (dimensions in mm)



Circuit diagram, example
h = Fault signaling contact
L = Lamp for multiple signaling
HR = Hooter silencing relay
HA = Hooter silencing key
H = Signaling realy RA 32 W



Wiring scheme for racks ER 034 or ER 134
fitted with 12 relays RA 32 W



Rack
ER 034 (without socket)
ER 134 (with socket)
Meas. x = 99 mm without socket
113 mm with socket

Ordering information for all available designs

	Catalog No.								Code	Circ. diagr.	Dim. draw.
Design	**V86618A-**										
Signaling relay											
RA 32 2 changeover contacts		2								1	
RA 32 N 1 Changeover contact, 1 make contact (no canceling)		3								2	
RA 32 W 1 changeover contact, 1 passing contakt		4								3	
RA 32 NW 1 make contact (no canceling), 1 passing contact		5								4	
RA 32 M 1 changeover contact, 1 automatic changeover contact		6								5	
RA 32 MW 1 automatic changeover contact, 1 passing contact		7								6	
RA 32 WA 1 automatic changeover contact and passing contact each		8								7	
Contact material for RA 32, RA 32 W, RA 32 M, RA 32 MW, RA 32 WA											
Silver, gold-bloomed			4								
Silver-palladium			5								
Contact material for RA 32 N, RA 32 NW											
Silver, gold-bloomed			7								
Silver-palladium			8								
Nominal voltage											
without 24 V DC				2	0						
auxiliary circuit 42/48 V DC				3	0						
60 V DC				4	0						
100/110/130 V DC				5	0						
220/250 V DC				7	0						
...... V DC [1) 5)]				9	0				501		
with bridge 24 V AC / DC				0	2					8	
rectifier 42/48 V AC / DC				0	3					8	
and protective 60 V AC / DC				0	4					8	
circuitry 100/110/130 V AC / DC				0	5					8	
220/230/250 V AC / DC				0	7					8	
...... V AC / DC [1) 5)]				0	9				501	8	
Connection											
Threaded terminal ends						1					1
Plug-in connectors						2					2
Operating mode											
open-circuit system							3				
closed-circuit system							4				
Special features											
None								0			
Short operate time (approx. 8 ms), make-time max. 1 s [5)] (DC design only possible for RA32, RA32W, RA32N, RA32NW, RA32M)							3	2			
Without bridge between terminals 6 and 8 (possible for RA32N and RA32NW only)								3			
Break contact (no canceling) instead of make contact (possible for RA32N an RA32NW only)								4			

[1)] Customer-specific within the realm of technical feasibility as per Catalog 86!
State nominal voltage / nominal current of the coil.
Possible nominal voltages: 5 to 250 V DC und 12 to 250 V AC

[5)] Technical date may change compared to the standard design as per Catalog specifications.

Standard designs				
Design	Nominal voltage	Catalog No.	Circ. diagr.	Dim. draw.
Signaling relay RA 32	24 V DC	V86618A-2420130	1	1
2 changeover contacts,	42/48 V DC	V86618A-2430130	1	1
contact material	60 V DC	V86618A-2440130	1	1
silver, gold-bloomed,	100/110/130 V DC	V86618A-2450130	1	1
threaded terminal ends,	220/250 V DC	V86618A-2470130	1	1
open-circuit system	24 V DC / AC	V86618A-2402130	1 and 8	1
	42/48 V DC / AC	V86618A-2403130	1 and 8	1
	60 V DC / AC	V86618A-2404130	1 and 8	1
	100/110/130 V DC / AC	V86618A-2405130	1 and 8	1
	220/230/250 V DC / AC	V86618A-2407130	1 and 8	1
Signaling relay RA 32 N	24 V DC	V86618A-3720130	2	1
1 changeover contact,	42/48 V DC	V86618A-3730130	2	1
1 make contact	60 V DC	V86618A-3740130	2	1
(no canceling),	100/110/130 V DC	V86618A-3750130	2	1
contact matrial	220/250 V DC	V86618A-3770130	2	1
silver, gold-bloomed,	24 V DC / AC	V86618A-3702130	2 and 8	1
threaded terminal ends,	42/48 V DC / AC	V86618A-3703130	2 and 8	1
open-circuit system	60 V DC / AC	V86618A-3704130	2 and 8	1
	100/110/130 V DC / AC	V86618A-3705130	2 and 8	1
	220/230/250 V DC / AC	V86618A-3707130	2 and 8	1
Signaling relay RA 32 W	24 V DC	V86618A-4420130	3	1
1 changeover contact,	42/48 V DC	V86618A-4430130	3	1
1 passing contact,	60 V DC	V86618A-4440130	3	1
contact material	100/110/130 V DC	V86618A-4450130	3	1
silver, gold-bloomed,	220/250 V DC	V86618A-4470130	3	1
threaded terminal ends,	24 V DC / AC	V86618A-4402130	3 and 8	1
open-circuit system	42/48 V DC / AC	V86618A-4403130	3 and 8	1
	60 V DC / AC	V86618A-4404130	3 and 8	1
	100/110/130 V DC / AC	V86618A-4405130	3 and 8	1
	220/230/250 V DC / AC	V86618A-4407130	3 and 8	1
Signaling Relay RA 32 NW	24 V DC	V86618A-5720130	4	1
1 make contact	42/48 V DC	V86618A-5730130	4	1
(no canceling),	60 V DC	V86618A-5740130	4	1
1 passing contact,	100/110/130 V DC	V86618A-5750130	4	1
contact material	220/250 V DC	V86618A-5770130	4	1
silver, gold-bloomed,	24 V DC / AC	V86618A-5702130	4 and 8	1
threaded terminal ends,	42/48 V DC / AC	V86618A-5703130	4 and 8	1
open-circuit system	60 V DC / AC	V86618A-5704130	4 and 8	1
	100/110/130 V DC / AC	V86618A-5705130	4 and 8	1
	220/230/250 V DC / AC	V86618A-5707130	4 and 8	1
Signaling relay RA 32 M	24 V DC	V86618A-6420130	5	1
1 changeover contact,	42/48 V DC	V86618A-6430130	5	1
1 automatic	60 V DC	V86618A-6440130	5	1
changeover contact,	100/110/130 V DC	V86618A-6450130	5	1
contact material	220/250 V DC	V86618A-6470130	5	1
silver, gold-bloomed,	24 V DC / AC	V86618A-6402130	5 and 8	1
threaded terminal ends,	42/48 V DC / AC	V86618A-6403130	5 and 8	1
open-circuit system	60 V DC / AC	V86618A-6404130	5 and 8	1
	100/110/130 V DC / AC	V86618A-6405130	5 and 8	1
	220/230/250 V DC / AC	V86618A-6407130	5 and 8	1

Standard designs (continued)				
Design	Nominal voltage	Catalog No.	Circ. diagr.	Dim. draw.
Signaling relay RA 32 MW	24 V DC	V86618A-7420130	6	1
1 automatic	42/48 V DC	V86618A-7430130	6	1
changeover contact,	60 V DC	V86618A-7440130	6	1
1 pasing contact,	100/110/130 V DC	V86618A-7450130	6	1
contact matrial	220/250 V DC	V86618A-7470130	6	1
silver, gold-bloomed,	24 V DC / AC	V86618A-7402130	6 and 8	1
threaded terminal ends,	42/48 V DC / AC	V86618A-7403130	6 and 8	1
open-circuit system	60 V DC / AC	V86618A-7404130	6 and 8	1
	100/110/130 V DC / AC	V86618A-7405130	6 and 8	1
	220/230/250 V DC / AC	V86618A-7407130	6 and 8	1
Signaling relay RA 32 WA	24 V DC	V86618A-8420130	7	1
1 automatic changeocer	42/48 V DC	V86618A-8430130	7	1
and passing contact each,	60 V DC	V86618A-8440130	7	1
contact material	100/110/130 V DC	V86618A-8450130	7	1
silver, gold-bloomed,	220/250 V DC	V86618A-8470130	7	1
threaded terminal ends	24 V DC / AC	V86618A-8402130	7 and 8	1
open-circuit system	42/48 V DC / AC	V86618A-8403130	7 and 8	1
	60 V DC / AC	V86618A-8404130	7 and 8	1
	100/110/130 V DC / AC	V86618A-8405130	7 and 8	1
	220/230/250 V DC / AC	V86618A-8407130	7 and 8	1

Accessories for signaling relays RA 32				
Description		Catalog No.	Circ. diagr.	Dim. draw.
Labeling plate	unlabeled	V86610A-1810000		
	1 line of labeling	V86610A-1820000		
	2 lines of labeling	V86610A-1830000		
	3 lines of labeling	V86610A-1840000		
Flush-mounting spindle (1 set)		V86610A-1200000		
Flush-mounting plug-in case		V86610A-1300000		
Surface-mounting base		V86610A-1400000	9	3
Surface-mounting plug-in case		V86610A-1500000	9	4
Key for plug-in relays		V86610A-1060000		

Signaling relay RA 32
for surface-mounting, flush-mounting or plug-in version direct or in a rack 10/86-6.20 EN

Racks ER for signaling relays RA 32			
Design	Catalog No.		Dim. draw.
Rack ER 034 without flush-mounting case, for permanent installation of 12 signaling relays: 3 x vertical, 4 x horizontal	V86611A-1200000		5
Rack ER 134 with built-in plug-in case for 12 signaling relays 3 x vertical, 4 x horizontal	V86611A-2020000		5

Accessories for racks			
Description	Catalog No.		
Blind flange complete (instead of signaling relay) for ER 034	V86610A-1051000		
Blind flange complete (instead of signaling relay) for ER 134	V86610A-1052000		
Wiring pin 15 mm	V86610A-1073000		
Wiring pin 25 mm	V86610A-1074000		
Wiring pin 35 mm	V86610A-1075000		
Wiring rail	V86610A-1080000		

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10/86-6.20 EN 04.01

Repeater AM 0

for plug-in mounting with round and square front design options

10/86-7.44 EN

- **Indication of ‘On’, ‘Off’ and ‘Fault’**
- **Front design options**
  Round AM 036 Ø 36 mm
  AM 048 Ø 48 mm
  or
  Square AM 036v 36 mm × 36 mm
  AM 048v 48 mm × 48 mm
- **Display options**
  Black bar symbol on white background (standard) or switch truck position symbol (special feature, black symbol, red dot on white background)
- **DC or AC operation**
  (50 to 70 Hz)
  Bei f > 70 Hz: operate value rising, release value falling
- **Simple assembly**
  no tools needed, simply use the enclosed locking ring
- **Repeaters are particularly suited to the position indication in mimic diagrams representing, for example, the position of switches, valves and interlocks.**

The following positions are indicated:
- **On / closed**
- **Off / open**
- **Faulty (no definite ‘on/closed’ or ‘off/open’ position)**

CE

Technical notes

Repeater

An applied energizing quantity (current or voltage) within the guaranteed range produces a magnetic field which in turn causes the repeater to operate. The operate function is ensured from the lowest guaranteed value onwards (but may also occur for lower values). The relay remains in operate condition while the energizing quantity is within the guaranteed range.

The assured release takes place from 5 % (DC) or 15 % (AC) of the highest reference value within the permitted range of the energizing quantity (but may also occur for higher values).
If the 'On' winding is loaded, the 'On' position is indicated.
If the 'Off' winding is loaded, the 'Off' position is indicated.
If there is no applied energizing quantity, the 'Fault' position is indicated.
The continuous triggering of both coils is not permissible, the indication is not defined under these conditions!

Case

The repeater is mounted in a case for installation in a mounting panel of no more than 30 mm thickness. For all designs, a standard Ø 32.5 mm hole in the mounting panel is required with an additional recess to lock the device into position (see 'Dimensional drawings'). The device can be firmly mounted without tools using the enclosed locking ring. If mounting in a wooden panel, a washer should additionally be used. The case is provided with threaded terminals for connection.

Coil for DC voltage / DC current only
(Coil without auxiliary circuit)

The energizing quantity is applied directly to the coil. There is no auxiliary circuit as protection from transient overvoltages or for the limitation of overvoltages on switch-off. The relay itself is resistent towards transient overvoltages within the guaranteed range.

Coil for DC or AC voltage
(Coil with auxiliary circuit)

The energizing quantity is applied to the coil via a bridge rectifier. The coil circuit is thereby polarity-independent and reverse-polarity-protected at the point of connection. The bridge rectifier simultaneously takes on the function of a free-wheeling diode without polarity dependence. The input circuit is additionally protected by a voltage-dependent resistor (VDR).

Display

Bar or switch truck position symbol (see 'Circuit diagrams').

Accessories

Washer: If mounting in a 'soft' mounting panel such as a wooden panel, the additional use of a washer is recommended.

General data

Degree of device protection
IP 40 (except terminals)
IP 20 (terminals with cover)

Protection class
II ⧈

Installation
with locking ring

Weight
approx. 70 g

Electrical connections (see also "Circuit diagrams")

Wire, solid	bolt, max. 1.5 mm^2
Wire, flexible	bolt, max. 1.5 mm^2 (use wire end ferrules)

Mounting orientation
arbitrary

Mechanical service life
2×10^6 indication changes

Climate class 3K3
max. 85% relative humidity
max. 25 g/m^3 abs. humidity

Transport and storage temperature
-45...100°C

Ambient temperature
-25 ... 70°C

Maximum surface temperature
+85°C
(with all maximum permissible values for ambient temperature, coil voltage, contact rating)

CE classification

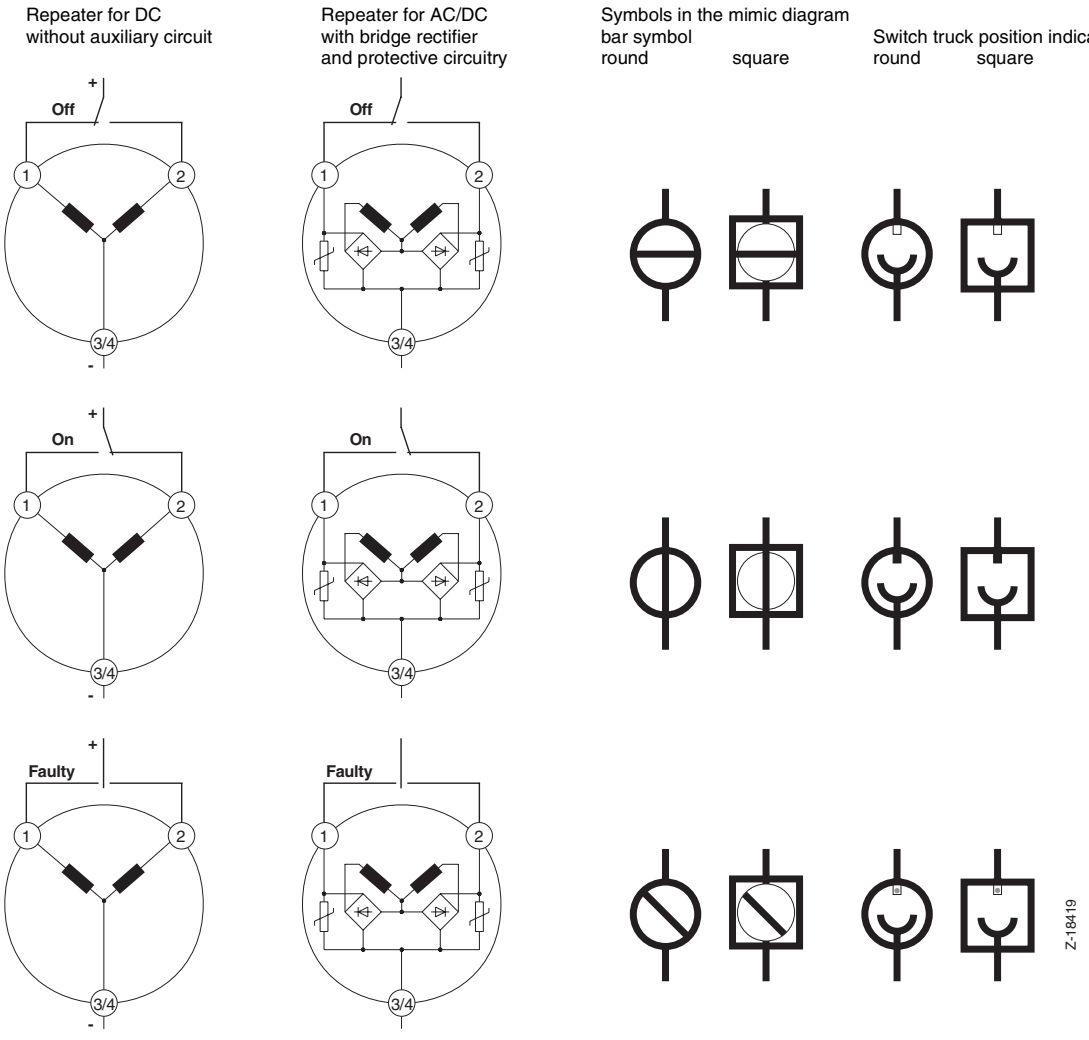
Overvoltage category
III

Pollution degree
2

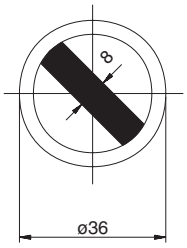
Technical data (Please note the general hints in the Data Sheet 86-1.00 EN)

Coil circuit Nominal voltage	Nominal range	Resistance R_{coil} (±10 % at 20 °C)	$R_{ser.}$	Nominal consumption	max. permissible operating range $V_{min.}$ to $V_{max.}$ at ambient temperature -25 °C...+40 °C	-5 °C...+40 °C	-25 °C...+70 °C
AM0 (specified operate value 200 AW)							
Coil for DC voltage only							
24 V	19.2... 26.4 V	420 Ω	–	1.37 W	15.1... 34.5 V	15.1... 37.6 V	16.7... 34.5 V
42/48 V	33.6... 52.8 V	1170 Ω	–	1.97 W	24.5... 56.0 V	24.5... 61.1 V	27.1... 56.0 V
60 V	48.0... 66.0 V	3140 Ω	–	1.15 W	39.3... 90.2 V	39.3... 98.5 V	43.5... 90.2 V
100/110/130 V	88.0...143.0 V	7900 Ω	–	1.53 W	64.0...164.4 V	64.0...159.8 V	70.8...146.4 V
220/250 V	176.0...275.0 V	37000 Ω	–	1.31 W	151.4...342.8 V	151.4...374.3 V	167.4...342.8 V
others per order from von 5...250 V							
Coil for DC and AC voltage (DC/AC, f = 50...70 Hz)							
24 V	19.1... 26.4 V	420 Ω	–	1.37 W	17.5... 36.9 V	17.5... 40.0 V	19.1... 36.9 V
42/48 V	33.6... 52.8 V	1170 Ω	–	1.51 W	26.9... 58.4 V	26.9... 63.5 V	29.5... 58.4 V
60 V	48.0... 66.0 V	3140 Ω	–	1.15 W	41.7... 92.6 V	41.7...100.9 V	45.9... 92.6 V
100/110/130 V	80.0...143.0 V	7900 Ω	–	1.53 W	66.4...148.8 V	66.4...162.2 V	73.2...148.8 V
220/230/250 V	176.0...275.0 V	37000 Ω	–	1.43 W	153.8...345.2 V	153.8...376.1 V	169.8...345.2 V
others per order from 12...250 V							

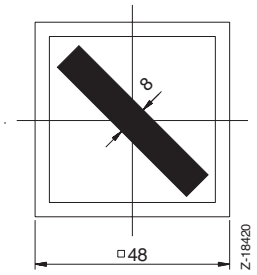
Circuit diagrams



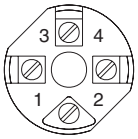
Dimensional drawings (dimensions in mm)



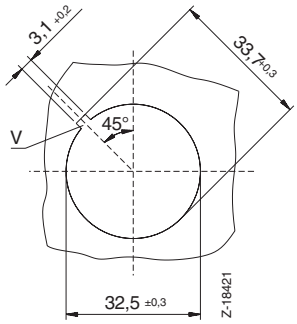
Frontal view
(non-energized)
Repeater AM 036



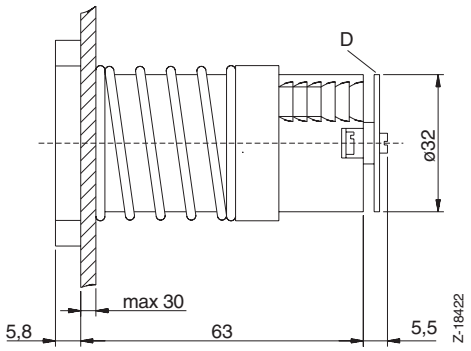
Frontal view
(non-energized)
Repeater AM 048v



Rear view
without protective cover



Frontal view
panel cutout
V = position lock



Side view
D = protective cover

Ordering information for all available designs													
		Catalog No.								Code		
Design		**V86744A-**				**0**	**0**	**1**				
Repeater												
AM 036	36 mm Ø		1									
AM 036v	36 mm × 36 mm		2									
AM 048	48 mm Ø		3									
AM 048v	48 mm × 48 mm		4									
Nominal voltage												
Without	24 V DC			2	0							
auxiliary circuit	42/48 V DC			3	0							
	60 V DC			4	0							
	100/110/130 V DC			5	0							
	220/250 V DC			7	0							
	..... . V DC	1) 5)		9	0					501		
With	24 V DC / AC			0	2							
bridge rectifier	42/48 V DC / AC			0	3							
and protective	60 V DC / AC			0	4							
circuit	100/110/130 V DC / AC			0	5							
	220/230/250 V DC / AC			0	8							
	..... . V DC / AC	1) 5)		0	9					501		
Display												
Bar symbol black (standard design)						0						
Switch truck position indicator symbol						1						

[1] Customer-specific within the realm of technical feasibility as per Catalog 86!
State nominal voltage / nominal current of the coil.
Possible nominal voltages: 5 to 250 V DC and 12 to 250 V AC

[5] Technical date may change compared to the standard design as per Catalog specifications.

Repeater AM 0
for plug-in mounting with round and square front design options

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Standard designs				
Design	Nominal voltage	Catalog No.		
Repeater AM 036	24 V DC	V86744A-1200001		
Ø 36 mm	42/48 V DC	V86744A-1300001		
with bar symbol	60 V DC	V86744A-1400001		
black	100/110/130 V DC	V86744A-1500001		
	220/250 V DC	V86744A-1700001		
	24 V DC / AC	V86744A-1020001		
	42/48 V DC / AC	V86744A-1030001		
	60 V DC / AC	V86744A-1040001		
	100/110/130 V DC / AC	V86744A-1050001		
	220/230/250 V DC / AC	V86744A-1080001		
Repeater AM 036 v	24 V DC	V86744A-2200001		
36 mm x 36 mm	42/48 V DC	V86744A-2300001		
with bar symbol	60 V DC	V86744A-2400001		
black	100/110/130 V DC	V86744A-2500001		
	220/250 V DC	V86744A-2700001		
	24 V DC / AC	V86744A-2020001		
	42/48 V DC / AC	V86744A-2030001		
	60 V DC / AC	V86744A-2040001		
	100/110/130 V DC / AC	V86744A-2050001		
	220/230/250 V DC / AC	V86744A-2080001		
Repeater AM 036 v	60 V DC	V86744A-2401001		
36 mm x 36 mm	100/110/130 V DC	V86744A-2501001		
with switch truck position indicator symbol	220/250 V DC	V86744A-2701001		
Repeater AM 048	24 V DC	V86744A-3200001		
Ø 48 mm	42/48 V DC	V86744A-3300001		
with bar symbol	60 V DC	V86744A-3400001		
black	100/110/130 V DC	V86744A-3500001		
	220/250 V DC	V86744A-3700001		
	24 V DC / AC	V86744A-3020001		
	42/48 V DC / AC	V86744A-3030001		
	60 V DC / AC	V86744A-3040001		
	100/110/130 V DC / AC	V86744A-3050001		
	220/230/250 V DC / AC	V86744A-3080001		
Repeater AM 048 v	24 V DC	V86744A-4200001		
48 mm x 48 mm	42/48 V DC	V86744A-4300001		
with bar symbol	60 V DC	V86744A-4400001		
black	100/110/130 V DC	V86744A-4500001		
	220/250 V DC	V86744A-4700001		
	24 V DC / AC	V86744A-4020001		
	42/48 V DC / AC	V86744A-4030001		
	60 V DC / AC	V86744A-4040001		
	100/110/130 V DC / AC	V86744A-4050001		
	220/230/250 V DC / AC	V86744A-4080001		

Accessories for Repeator AM 0			
Description	Catalog No.		
Washer	V86299A-2000000		

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Technische Änderungen vorbehalten.
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