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Automotive and Industrial Applications



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Order no.: 1 987 721 074

Relays | Lifting Magnets

The Bosch Range for Industrial Applications

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Relays Lifting Magnets



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Limitless possible applications for **Bosch relays**



Bosch relays are primarily designed for automotive applications. From wiper and blower motors to central locking to the gasoline pump – relays are used almost everywhere in a vehicle.

Apart from these purely automotive applications, Bosch relays are also ideal for switching any 12 or 24 Volt components. They can be used to perform almost any drive task – in mobile devices or stationary applications, for example where electric motors are operated.

Be inspired by the huge variety of possible applications and contact us with your idea and your product. Together we can put things in motion. **With relays from Bosch.**

Bosch relays are used in

- ▶ Automatic sliding doors
- ▶ Electric wheelchairs
- ▶ Electrical systems on boats
- ▶ Electric lawnmowers
- ▶ Bicycle driving gear
- ▶ Materials handling (e.g. conveyor belts, rabbit systems)
- ▶ Garage door drives
- ▶ Chargers
- ▶ Emergency power equipment
- ▶ Agricultural machinery
- ▶ Furniture adjustment
- ▶ Cleaning equipment
- ▶ Robot controllers
- ▶ Vending machines, and much much more ...

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Explanation of characteristic quantities



Overview

Relay applications

This catalog contains the technical specifications that a design engineer needs to select the appropriate relay to meet his requirements. Bosch d.c. relays were originally designed for automotive applications. For all other applications, particularly those with differing requirements, loads or ambient conditions, we recommend prior technical consultation.

Bosch d.c. relays can withstand extreme conditions. They meet the following requirements:

- ▶ High-power switching
- ▶ Function over a wide temperature range
- ▶ Excellent vibration and impact resistance
- ▶ Long service life and good climatic resistance

Bosch d.c. relays are used for switching electrical equipment that has a high power or is sensitive to voltage losses. Relays relieve the burden on control switches and provide low voltage drops with economical wire cross-sections. In addition, relays make it easy to set up interlock circuits.

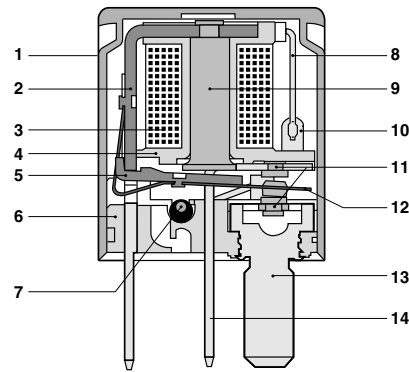
Mini and micro relays are ideal for use where space is at a premium.

Multifunction connectors allow easy assembly and extremely low fault rates on pre-tested wiring harnesses – particularly for OEMs. The same applies to servicing. The following mini and micro relay designs are available:

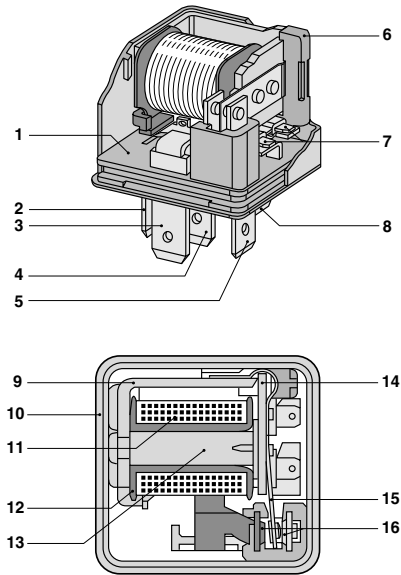
- ▶ Relays without mounting bracket, easy to plug into screw-on combination receptacle housings
- ▶ Relays with mounting bracket for connection to five-pole receptacle housing

Power relays allow a rated switching current of more than 50 A. They are suitable for switching motors, starters and other devices.

Micro relay: 1 Housing 2 Solenoid bracket and terminal 3 Coil 4 Bobbin 5 Armature 6 Base plate 7 Damping resistor or diode 8 Connecting wire 9 Core 10 Terminal 1/2 11 Contact 12 Spring 13 Terminal 4 14 Terminal 5



Mini relay: 1 Base plate 2 Terminal 86 3 Terminal 87 4 Terminal 87a 5 Terminal 85 6 Clamping piece 7 Coil connecting bracket 8 Terminal 30 9 Solenoid bracket 10 Housing 11 Coil 12 Bobbin 13 Core 14 Armature 15 Spring 16 Contact





Characteristic quantities and terms

Terms (where standardized, based on DIN 41215)

Various characteristic quantities and their values allow an appropriate relay to be selected to perform a specific task. Each relay type must meet specific requirements at the specified characteristic values during its service life.

Response voltage is the minimum excitation voltage that causes a relay to respond, taking into account the ambient temperature and self-heating.

Response time is the time from closure of the feed circuit until the first closure of a make contact or the first opening of a break contact.

Operating voltage is the value of the excitation voltage, at which the relay has the characteristic data required for operation.

Excitation voltage is the electrical voltage that permits the electric current that flows through the excitation winding and causes excitation. Connection is via terminals 1 and 2 and terminals 85 and 86.

Rated value is the value of a variable (e.g. voltage, current, resistance) for which a relay, its parts and its properties are designed or after which they are named.

Correction factor

Characteristic data on the excitation side relate to an ambient temperature of +20°C. If the ambient temperature is different, the winding resistance and the response and release voltages can be converted using a correction factor K:

$$K = [1 + \alpha(t_u - 20^\circ\text{C})]$$

t_u = Actual ambient or coil temperature

α = 0.004 K⁻¹ (Average temperature coefficient for copper)

Bounce time is the time from the first to the last closure of a relay contact when the relay is shifting to a different position.

Release voltage is the value of the maximum excitation voltage that causes a relay to release, taking into account the ambient temperature and self-heating.

Release time (release delay) is the time from the opening of the feed circuit until the first opening of a make contact or the first closure of a break contact.

Switching voltage is the voltage that is present between the contacts with an open circuit, when the transient effects have subsided.

Voltage drop is the voltage at the relay connections for a closed relay contact, measured at a defined current.

Total resistance of the feed circuit is the electrical resistance between the connecting terminals 1 and 2 and terminals 85 and 86.

Protection types and operating modes



Protection types and operating modes

Switching operations

Response is an operation in which a relay moves from its idle position to its operating position.

Opening is an operation that breaks the electrical contact.

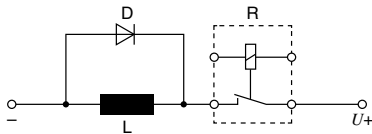
Release is an operation in which a relay moves from its operating position to its idle position.

Operating cycle is one response and release of a relay.

Number of operations is the number of operating cycles.

Closing is an operation that results in contact making.

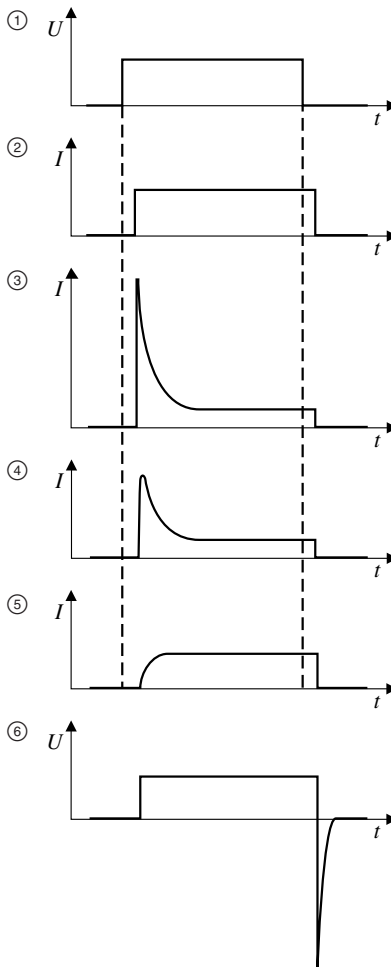
For inductive loads and motors, a protective circuit is often required, which can be implemented with a freewheeling diode parallel to the load (see circuit diagram).



L Inductive load **D** Freewheeling diode
U Supply voltage **R** Relay

Typical load curves

- ① Excitation voltage for relay coil
- ② Current curve with resistance load
- ③ Current curve with lamp load
- ④ Current curve with motor load
- ⑤ Current curve with inductive load
- ⑥ Voltage curve with inductive load



Service life

Mechanical service life specifies the number of operating cycles with current-free relay contacts for which the relay remains operational.

Contact service life specifies the number of operating cycles with electrical contact load for which the relay remains operational.

Switching contacts

Make contact is a relay contact that is open when a relay is in idle position and closes when the relay moves to the operating position.

Break contact is a relay contact that is closed when a relay is in idle position and opens when the relay moves to the operating position.

Double changeover contact (transfer contact) is a set of contacts with three electrically isolated connections, consisting of a make contact and a break contact. When the switching position changes, the previously closed contact opens first and the previously open contact then closes.



Protection types and operating modes

Protection types

Protection types under DIN 40 050 are identified by a code, which is made up of the standard letters IP (Internal Protection) followed by two figures for the degree of protection.

The first figure specifies the degree of protection in terms of contact and foreign-body protection, while the second figure represents the degree of protection against harmful penetration of water. If the protection type of part of a piece of equipment

(e.g. connecting terminals) differs from the protection type of the main part, the code for the differing part must be specified separately; the lower protection type is always stated first.

Example: Terminals IP 20 – Housing IP 5K4.

Protection types (DIN 40050, sheet 9)

Overview of IP code components				
First figure	Protection against contact by persons	Protection against penetration of solid foreign bodies	Second figure	Protection against penetration of water
0	Not protected	Not protected	0	Not protected
1	With back of hand	Object $\varnothing \geq 50$ mm	1	Vertical drops
2	With finger	Object $\varnothing \geq 12,5$ mm	2	Drops (15° gradient)
3	With tools	Object $\varnothing \geq 2,5$ mm	3	Water spray
4	With thin wire	Object $\varnothing \geq 1$ mm	4	Splash water
5K	With thin wire	Dust protected	4K	As above with increased pressure
6K	With thin wire	Dust-proof	5	Water jet
			6	Strong water jet
			6K	As above with increased pressure
			7	Short-term immersion
			8	Permanent immersion
			9K	High-pressure cleaning/steam cleaning

Application

Bosch relays are primarily designed for automotive applications. The various versions are used for a wide variety of applications, for example

- ▶ Wiper motor
- ▶ Fan motor
- ▶ Starter
- ▶ Coolant water fan
- ▶ Heated rear window
- ▶ Stop lamps
- ▶ Electric window lifter
- ▶ Central locking
- ▶ Electric seat adjustment
- ▶ Electric seat heating
- ▶ Electric outside mirror
- ▶ Gasoline pump
- ▶ Horn
- ▶ Headlamps
- ▶ Safety systems and many more.

Apart from these purely automotive applications, Bosch relays are also ideal for switching any 12 or 24 Volt components. This is the case in a large number of mobile devices and in stationary applications, for example where electric motors are operated. They can be used to perform a wide variety of drive tasks.

For example, Bosch relays are used in

- ▶ Automatic sliding doors
- ▶ Equipment for the disabled
- ▶ Electrical systems on boats
- ▶ Electric lawnmowers
- ▶ Bicycle driving gear
- ▶ Materials handling (e.g. conveyor belts rabbit systems)
- ▶ Garage-door drives
- ▶ Battery chargers
- ▶ Emergency power equipment
- ▶ Agricultural machinery
- ▶ Furniture adjustment
- ▶ Cleaning equipment
- ▶ Robot controls
- ▶ Switch cabinets
- ▶ Toys
- ▶ Vending machines and many more.

Relays

Micro relays

Characteristic quantities

Rated voltage (load and excitation circuit)	12 V	24 V
Operating voltage	8...16 V	17...27 V
Ambient temperature	-40...+100 °C	-40...+100 °C
Response voltage (at 20 °C)	≤ 8 V	≤ 17 V
Release voltage (at 20 °C)	≥ 1,5 V	≥ 3 V
Response time	≤ 10 ms	≤ 10 ms
Release time	≤ 15 ms	≤ 15 ms
Contact material	Silver tin oxide ¹⁾	Silver tin oxide
Voltage drop at NO contact in as-new condition	≤ 50 mV at 10 A	≤ 40 mV at 5 A
Voltage drop at NO contact after specified switching time	≤ 100 mV at 10 A	≤ 75 mV at 5 A
Voltage drop at NC contact in as-new condition	≤ 50 mV at 10 A	≤ 40 mV at 5 A
Voltage drop at NC contact after specified switching time	≤ 200 mV at 10 A	≤ 150 mV at 5 A
Degree of protection for housing and terminals, general (refer to Page 5)	IP 20	IP 20
Degree of protection for receptacle housing with connector installation position at bottom (refer to Page 5)	IP 5K4	IP 5K4

¹⁾ Hard silver for changeover relay, order number 0 332 207 304.

Relays

Micro relays

Make relay 12 V

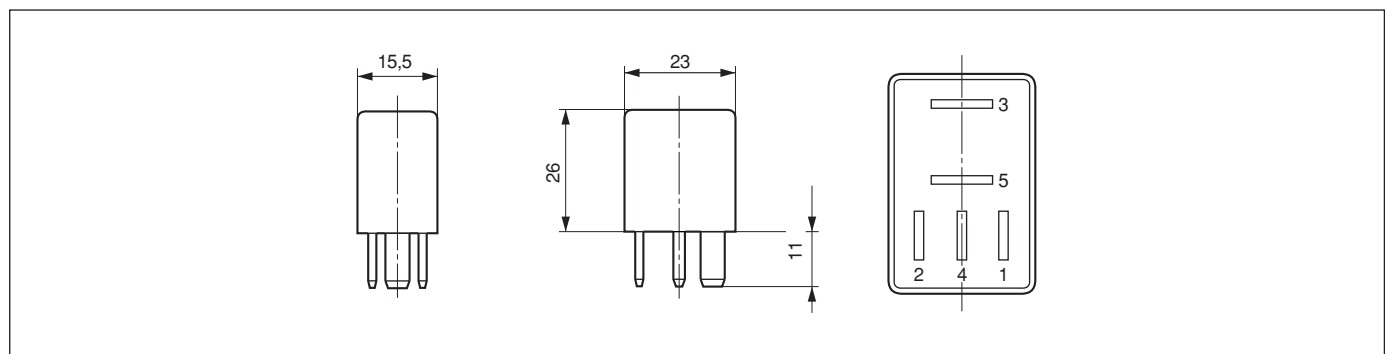
0 332 011 007

Technical data

Resistance load ¹⁾ - Make contact	A/thousand	30/≥100	22/≥200
Motor load ²⁾ - NO contact	A/A/Thousand	65/17/≥200	
Lamp load ¹⁾ - NO contact	A/Thousand	17/≥150	10/≥200
Exciter circuit total resistance	Ω		75±6

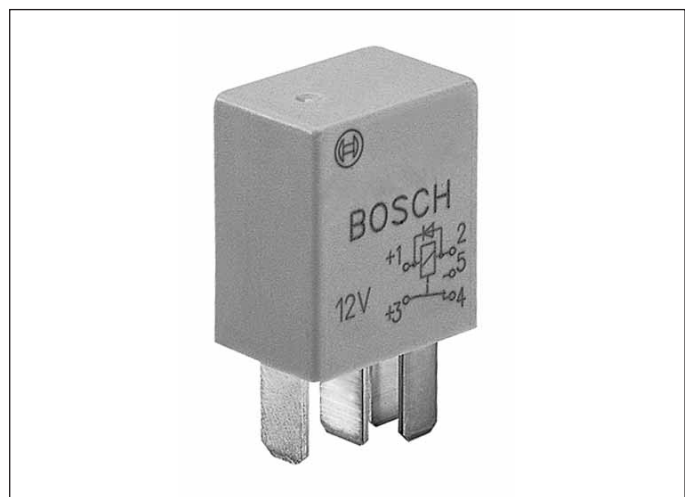
¹⁾ Switching current/no. of operations ²⁾ Making/continuous current/no. of operations

Dimensional drawing



Blade terminal size to DIN 46 244, similar to ISO 8092: Terminal 1 and 2 (4): 4.8 x 0.8 mm; Terminal 3 and 5: 6.3 x 0.8 mm

Figure



Connection and circuit diagram

Comparison of terminal designations		
Micro relay	Mini relay	Polarity
1	86	+
2	85	-
3	30	+
4	87a	
5	87	

Relays

Micro relays

Make relay 12 V

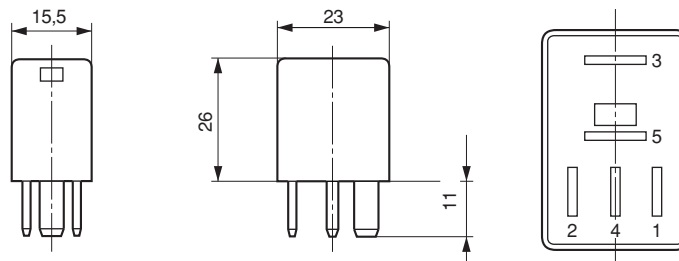
0 332 017 300

Technical data

Resistance load ¹⁾ - Make contact	A/thousand	20/≥300
Motor load ²⁾ - NO contact	A/A/Thousand	30/15/≥200
Lamp load ¹⁾ - NO contact	A/Thousand	20/≥150
Exciter circuit total resistance	Ω	78±6

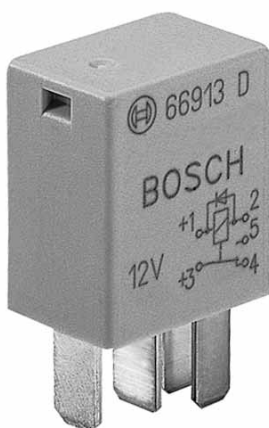
¹⁾ Switching current/no. of operations ²⁾ Making/continuous current/no. of operations

Dimensional drawing

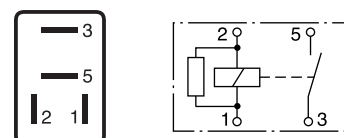


Blade terminal size to DIN 46 244, similar to ISO 8092: Terminal 1 and 2 (4): 4.8 x 0.8 mm; Terminal 3 and 5: 6.3 x 0.8 mm

Figure



Connection and circuit diagram



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Micro relay	Mini relay	Polarity
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Relays

Micro relays

Make relay 12 V

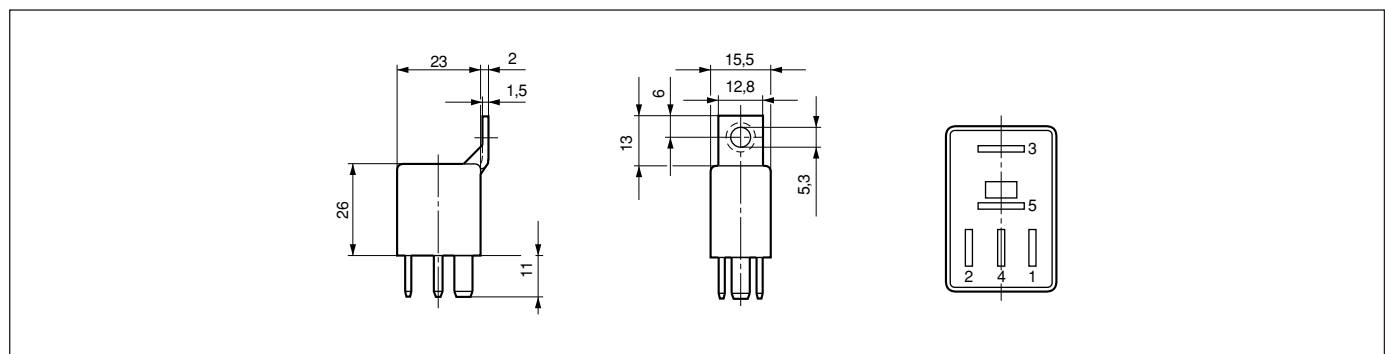
0 332 017 302

Technical data

Resistance load ¹⁾ - Make contact	A/thousand	20/≥300
Motor load ²⁾ - NO contact	A/A/Thousand	30/15/≥200
Lamp load ¹⁾ - NO contact	A/Thousand	20/≥150
Exciter circuit total resistance	Ω	78±6

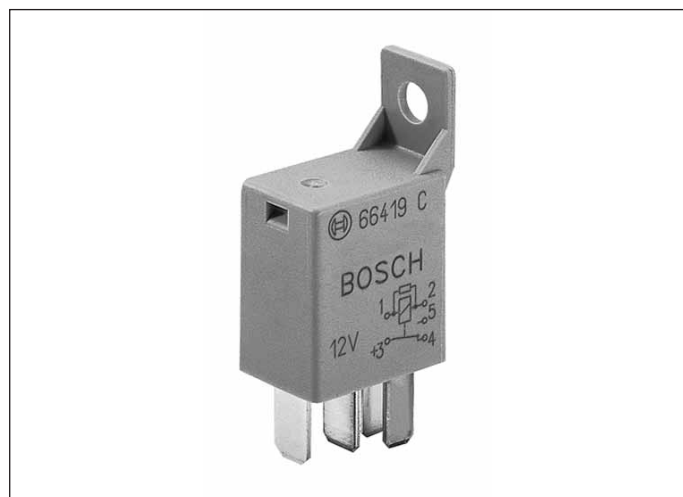
¹⁾ Switching current/no. of operations ²⁾ Making/continuous current/no. of operations

Dimensional drawing



Blade terminal size to DIN 46 244, similar to ISO 8092: Terminal 1 and 2 (4): 4.8 x 0.8 mm; Terminal 3 and 5: 6.3 x 0.8 mm

Figure



Connection and circuit diagram

The diagram shows the terminal layout with terminals 1, 2, 3, 4, and 5. Terminal 1 is the common terminal, 2 is the normally closed (NC) terminal, 3 is the normally open (NO) terminal, 4 is the coil terminal, and 5 is the other coil terminal. The circuit diagram shows the internal connections between these terminals.

Comparison of terminal designations		
Micro relay	Mini relay	Polarity
1	86	+
2	85	-
3	30	+
4	87a	
5	87	

Relays

Micro relays

Changeover relay 12V

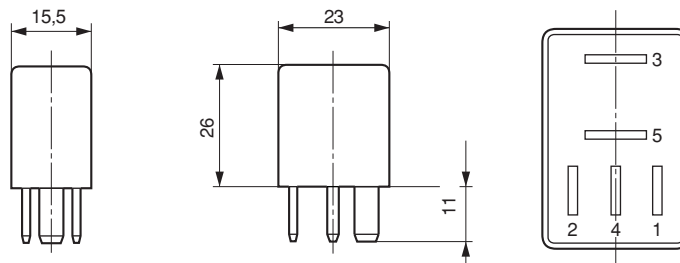
0 332 201 107

Technical data

Resistive load ¹⁾ - NO contact	A/Thousand	30/≥100	22/≥200
Resistive load ¹⁾ - NC contact	A/Thousand	10/≥100	5/≥200
Motor load ²⁾ - NO contact	A/A/Thousand	65/17/≥200	30/7/≥200
Lamp load ¹⁾ - NO contact	A/Thousand	17/≥150	10/≥200
Lamp load ¹⁾ - NC contact	A/Thousand	10/≥150	3,5/≥200
Exciter circuit total resistance	Ω		75±6

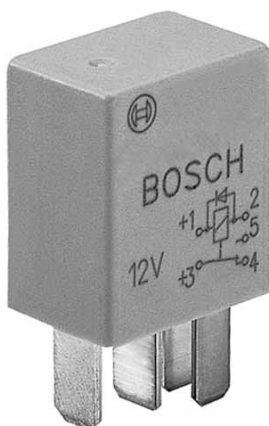
¹⁾ Switching current/no. of operations ²⁾ Making/continuous current/no. of operations

Dimensional drawing

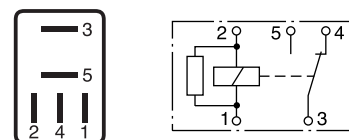


Blade terminal size to DIN 46 244, similar to ISO 8092: Terminal 1 and 2 (4): 4.8 x 0.8 mm; Terminal 3 and 5: 6.3 x 0.8 mm

Figure



Connection and circuit diagram



Comparison of terminal designations

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1	86	+
2	85	-
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Relays

Micro relays

Changeover relay 12V

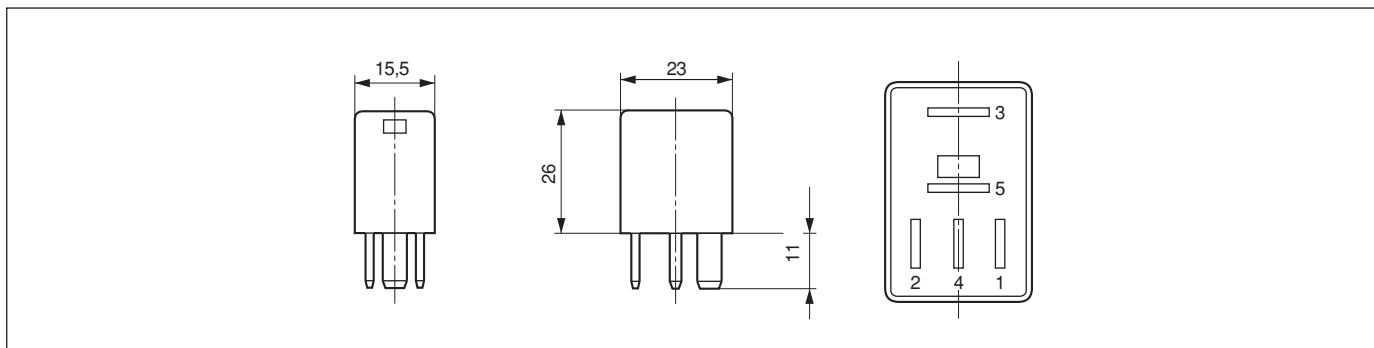
0 332 207 304

Technical data

Resistive load ¹⁾ - NO contact	A/Thousand	20/≥100	16/≥200	10/≥500
Resistive load ¹⁾ - NC contact	A/Thousand	10/≥125	5/≥250	
Motor load ²⁾ - NO contact	A/A/Thousand	35/20/≥100		
Exciter circuit total resistance	Ω			88±6

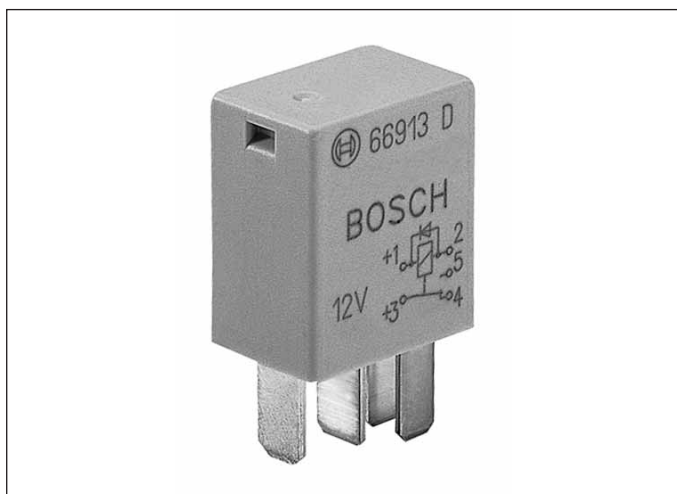
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Dimensional drawing

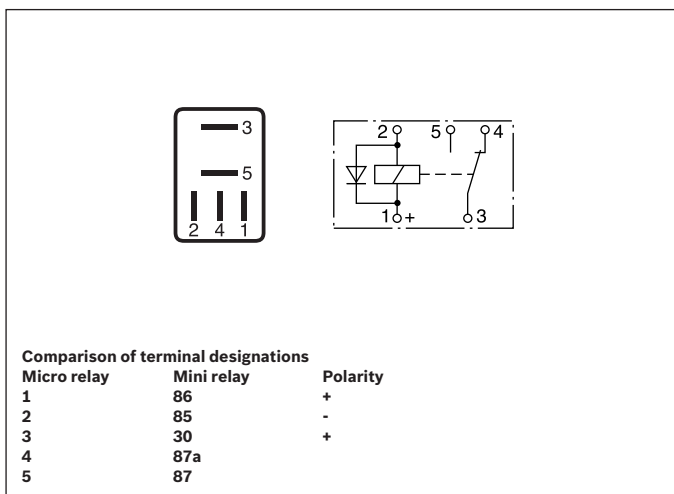


Blade terminal size to DIN 46 244, similar to ISO 8092: Terminal 1 and 2 (4): 4.8 x 0.8 mm; Terminal 3 and 5: 6.3 x 0.8 mm

Figure



Connection and circuit diagram



Relays

Micro relays

Changeover relay 12V

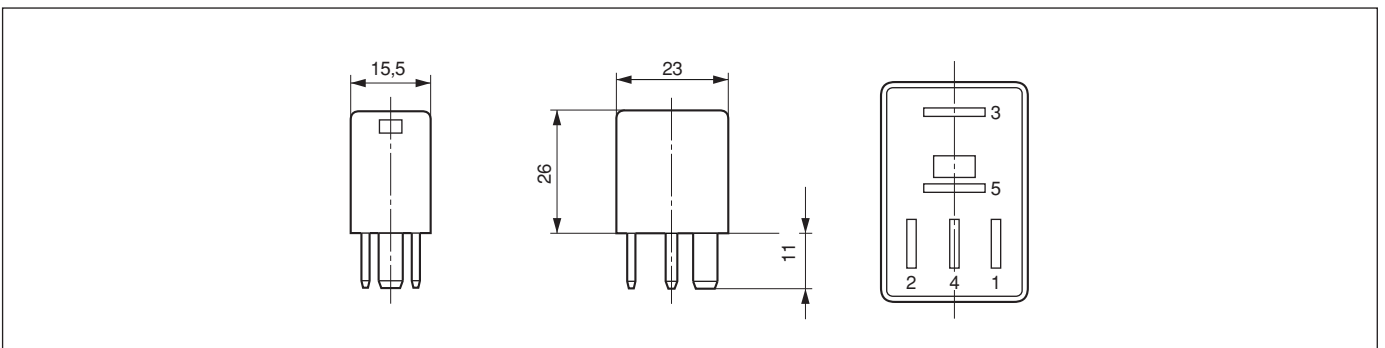
0 332 207 307

Technical data

Resistive load ¹⁾ - NO contact	A/Thousand	20/≥300
Resistive load ¹⁾ - NC contact	A/Thousand	10/≥150
Motor load ²⁾ - NO contact	A/A/Thousand	30/15/≥200
Lamp load ¹⁾ - NO contact	A/Thousand	20/≥150
Lamp load ¹⁾ - NC contact	A/Thousand	10/≥75
Exciter circuit total resistance	Ω	78±6

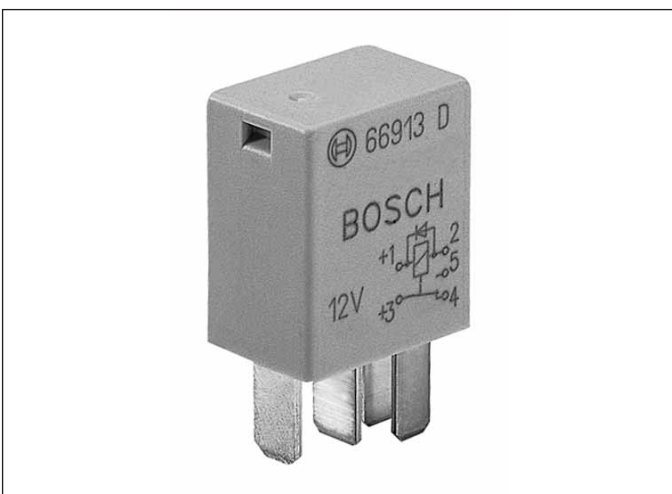
¹⁾ Switching current/no. of operations ²⁾ Making/continuous current/no. of operations

Dimensional drawing


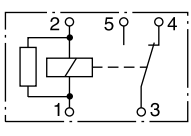


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Relays

Micro relays

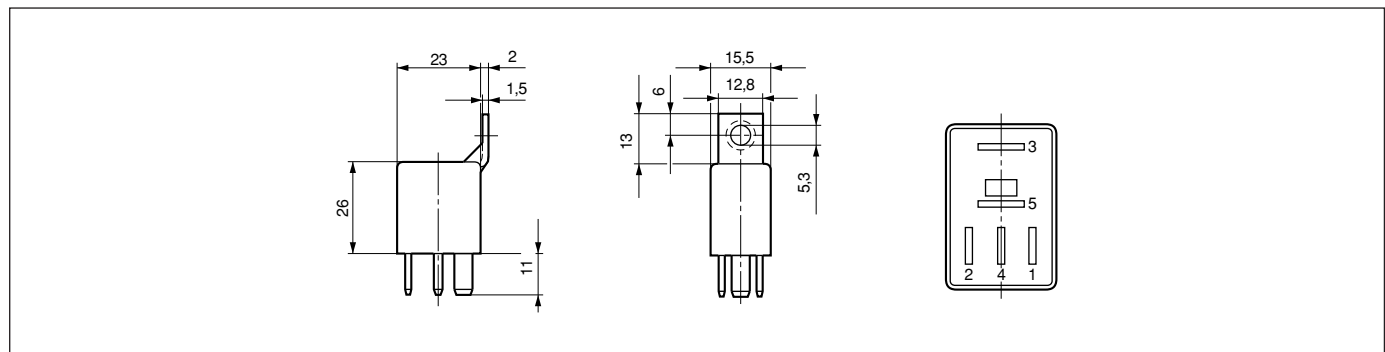
Changeover relay 12 V

0 332 207 310

Technical data		
Resistive load ¹⁾ - NO contact	A/Thousand	20/≥300
Resistive load ¹⁾ - NC contact	A/Thousand	10/≥150
Motor load ²⁾ - NO contact	A/A/Thousand	30/15/≥200
Lamp load ¹⁾ - NO contact	A/Thousand	20/≥150
Lamp load ¹⁾ - NC contact	A/Thousand	10/≥75
Exciter circuit total resistance	Ω	78±6

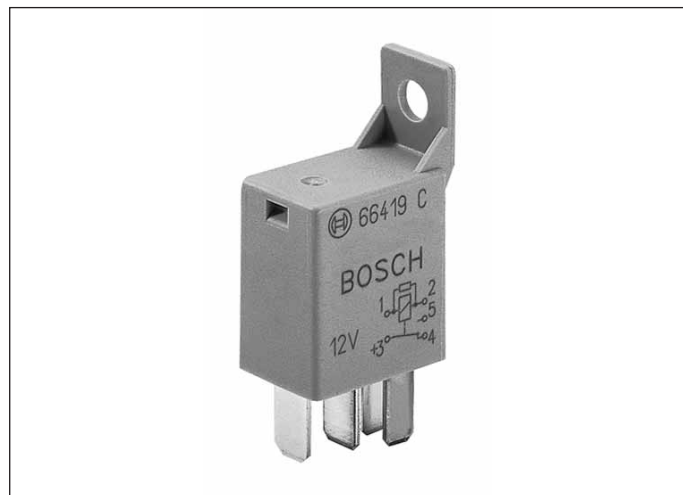
¹⁾ Switching current/no. of operations ²⁾ Making/continuous current/no. of operations

Dimensional drawing



Blade terminal size to DIN 46 244, similar to ISO 8092: Terminal 1 and 2 (4): 4.8 x 0.8 mm; Terminal 3 and 5: 6.3 x 0.8 mm

Figure Connection and circuit diagram



The terminal diagram shows terminals 1, 2, 3, 4, and 5. The circuit diagram shows a coil connected to terminals 1 and 2, and a changeover contact with terminals 3, 4, and 5.

Comparison of terminal designations		
Micro relay	Mini relay	Polarity
1	86	+
2	85	-
3	30	+
4	87a	
5	87	

Relays

Micro relays

Changeover relay 24V

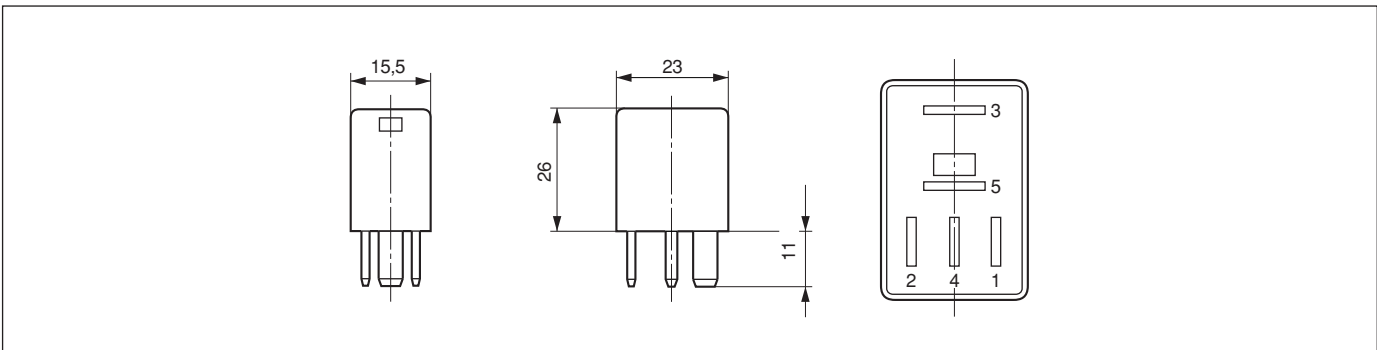
0 332 207 402

Technical data

Resistive load ¹⁾ - NO contact	A/Thousand	10/≥250
Resistive load ¹⁾ - NC contact	A/Thousand	5/≥250
Exciter circuit total resistance	Ω	410±20

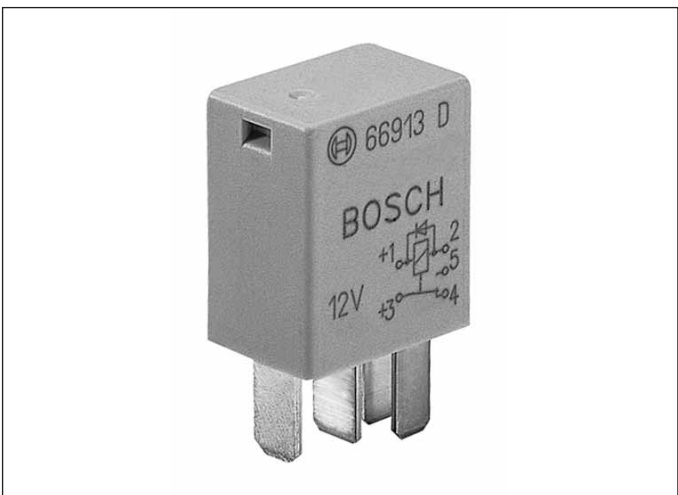
¹⁾ Switching current/no. of operations ²⁾ Making/continuous current/no. of operations

Dimensional drawing



Blade terminal size to DIN 46 244, similar to ISO 8092: Terminal 1 and 2 (4): 4.8 x 0.8 mm; Terminal 3 and 5: 6.3 x 0.8 mm

Figure



Connection and circuit diagram

Micro relay	Mini relay	Polarity
1	86	+
2	85	-
3	30	+
4	87a	
5	87	

Relays

Micro relays

Changeover relay 24 V

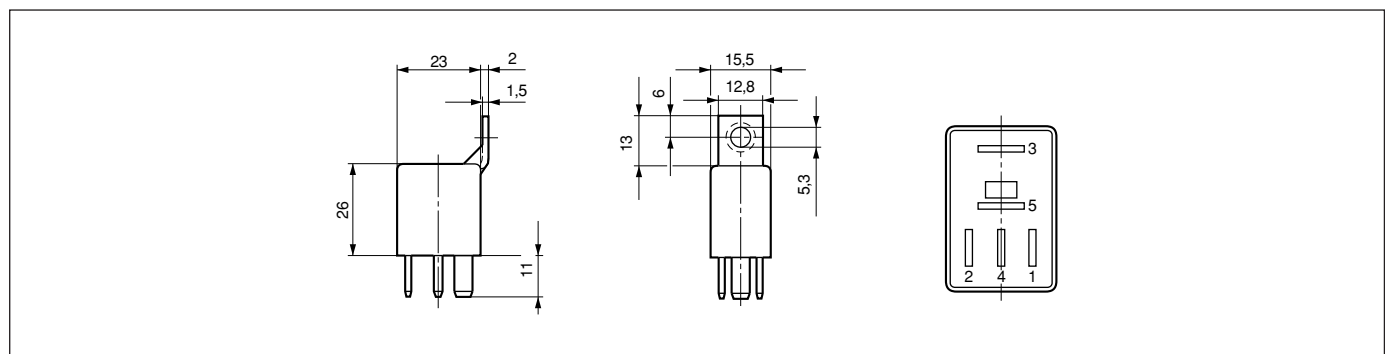
0 332 207 404

Technical data

Resistive load ¹⁾ - NO contact	A/Thousand	10/≥250
Resistive load ¹⁾ - NC contact	A/Thousand	5/≥250
Exciter circuit total resistance	Ω	335±20

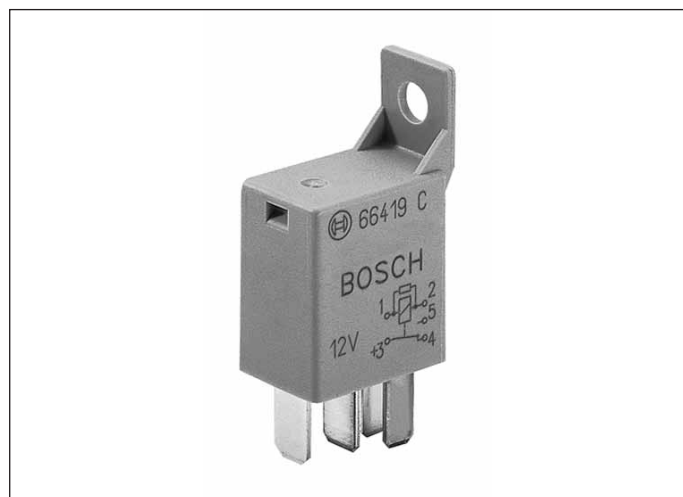
¹⁾ Switching current/no. of operations ²⁾ Making/continuous current/no. of operations

Dimensional drawing



Blade terminal size to DIN 46 244, similar to ISO 8092: Terminal 1 and 2 (4): 4.8 x 0.8 mm; Terminal 3 and 5: 6.3 x 0.8 mm

Figure



Connection and circuit diagram

The diagram shows the terminal layout (terminals 1, 2, 3, 4, 5) and a circuit diagram. The circuit diagram shows a coil connected between terminals 1 and 2, and a changeover contact with terminals 3, 4, and 5.

Micro relay	Mini relay	Polarity
1	86	+
2	85	-
3	30	+
4	87a	
5	87	

Relays

Mini relays

Characteristic quantities

Rated voltage (excitation and switching voltage)	12 V	24 V
Operating voltage	8...16 V	16...32 V
Ambient temperature	-40...+100 °C	-40...+85 °C
Response voltage (at 20 °C)	≤ 8 V	≤ 16 V
Release voltage (at 20 °C)	1,2...5,0 ¹⁾ V	2,4...10,0 V
NO contact - voltage drop ²⁾ - in as-new condition	≤ 50 mV	≤ 50 mV
NO contact - voltage drop ²⁾ - after specified switching operations	≤ 80 mV	≤ 100 mV
NC contact - voltage drop ²⁾ - in as-new condition	≤ 175 mV	
NC contact - voltage drop ²⁾ - after specified switching operations	≤ 250 mV	
Changeover contact - voltage drop ²⁾ - NO contact in as-new condition	≤ 50 mV ³⁾	≤ 50 mV
Changeover contact - voltage drop ²⁾ - NO contact after specified switching operations	≤ 80 mV ⁴⁾	≤ 100 mV
Changeover contact - voltage drop ²⁾ - NC contact in as-new condition	≤ 70 mV ³⁾	≤ 50 mV
Changeover contact - voltage drop ²⁾ - NC contact after specified switching operations	≤ 120 mV ⁴⁾	≤ 150 mV
Resistive, motor, lamp load - test voltage	13,5 V ⁵⁾	27 V ⁶⁾

¹⁾ 0.5 - 5.0 V for 0 332 109 011 ²⁾ in load circuit at 10 A ³⁾ ≤ 30 mV for 0 332 209 158 ⁴⁾ ≤ 60 mV for 0 332 209 158 ⁵⁾ The numbers of operations have been determined at a test voltage of 13.5 V. For hard silver contact material at test temperature of 23 ±5 °C, for silver tin dioxide at +85 °C. ⁶⁾ The numbers of operations have been determined at a test voltage of 27 V. Temperature change program 48h +85 °C, 24h +20 °C, 24h +40 °C.

Relays

Mini relays

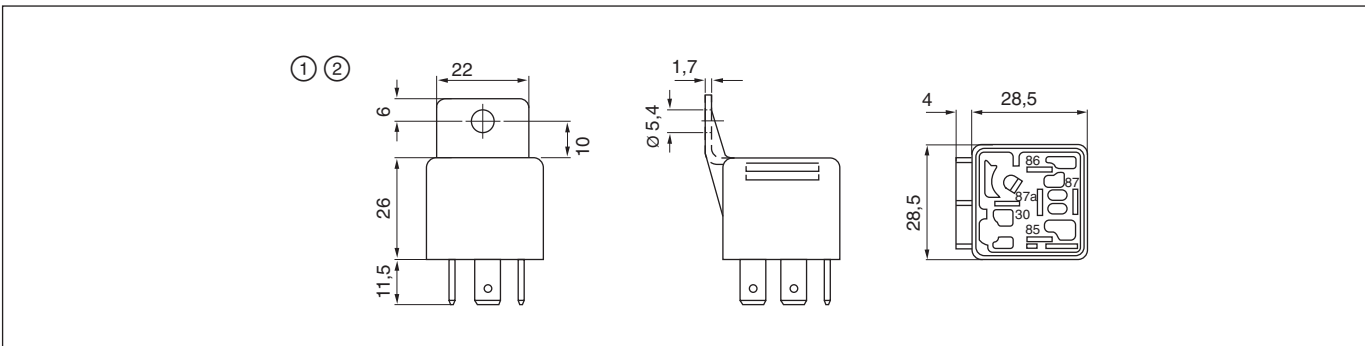
Normally open relay 12 V

0 332 019 103

Technical data				
Resistive load ¹⁾ - NO contact	A/Thousand	50/≥75	40/≥125	30/≥250
Motor load ²⁾ - NO contact	A/A/Thousand	90/40/≥75	75/30/≥125	50/20/≥250
Lamp load ¹⁾ - NO contact	A/Thousand	30/≥75	20/≥125	10/≥250
Contact material				silver tin oxide
Overall resistance of excitation circuit ⁴⁾	Ω			75±5
Response time	ms			≤ 10
Release time	ms			≤ 10
Degree of protection Terminals ³⁾				IP 20
Degree of protection Housing				IP 5K4
Illustration / Dimension drawing				1

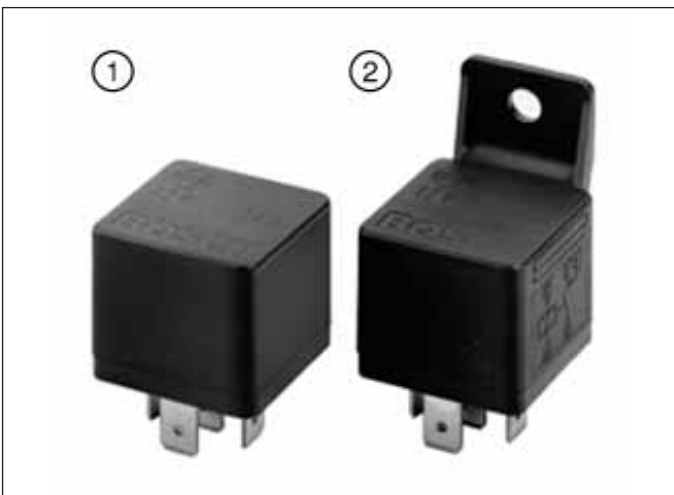
¹⁾ Switching current/no. of operations ²⁾ Making/continuous current/no. of operations ³⁾ When a socket housing is used and when installed with blade terminals pointing downwards. In a different installation position, the housing degree of protection is IP 20. ⁴⁾ at +20 °C

Dimensional drawing

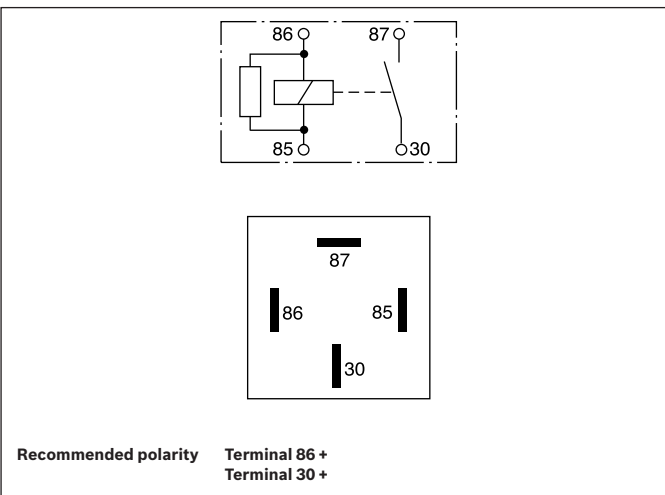


Blade terminal size: 6.3 x 0.8 mm to DIN 46 244 (similar to ISO 8092)

Figure



Connection and circuit diagram



Relays

Mini relays

Normally open relay 12 V

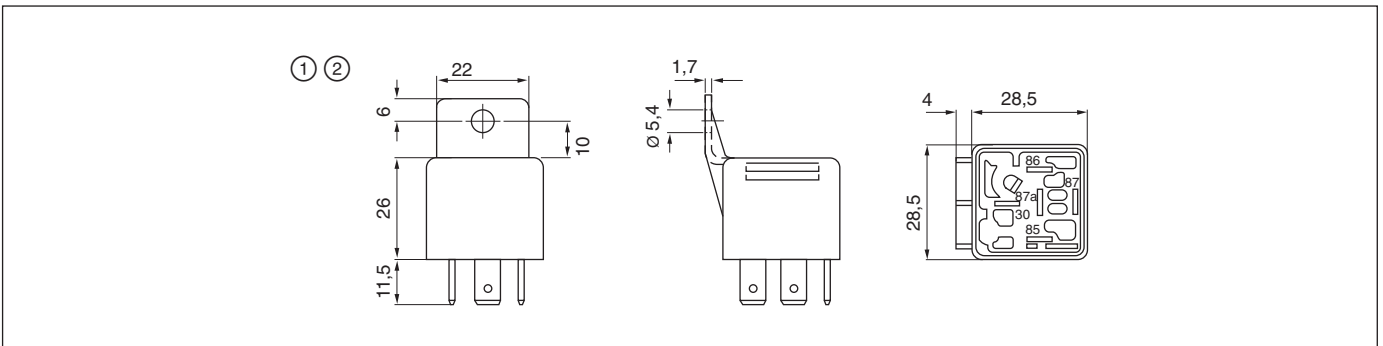
0 332 019 109

Technical data

Resistive load ¹⁾ - NO contact	A/Thousand	50/≥50	40/≥75	30/≥100
Motor load ²⁾ - NO contact	A/A/Thousand	72/16/≥50		
Lamp load ¹⁾ - NO contact	A/Thousand	30/≥75	20/≥125	10/≥250
Contact material				silver tin oxide
Overall resistance of excitation circuit ⁴⁾	Ω			85±5
Response time	ms			≤ 10
Release time	ms			≤ 15
Degree of protection Terminals ³⁾				IP 20
Degree of protection Housing				IP 34
Illustration / Dimension drawing				1

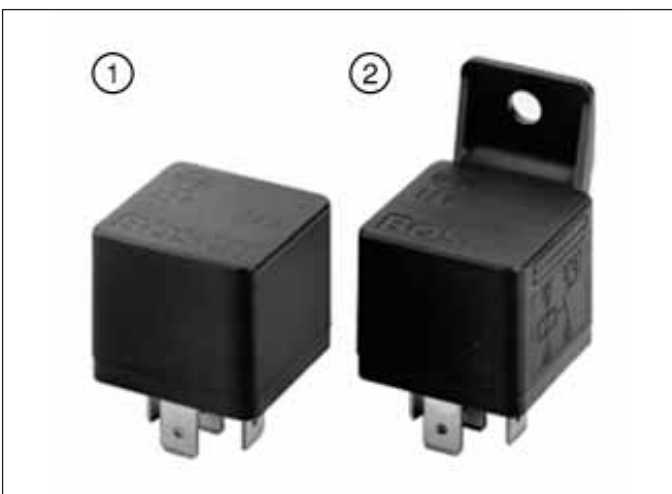
¹⁾ Switching current/no. of operations ²⁾ Making/continuous current/no. of operations ³⁾ When a socket housing is used and when installed with blade terminals pointing downwards. In a different installation position, the housing degree of protection is IP 20. ⁴⁾ at +20 °C

Dimensional drawing

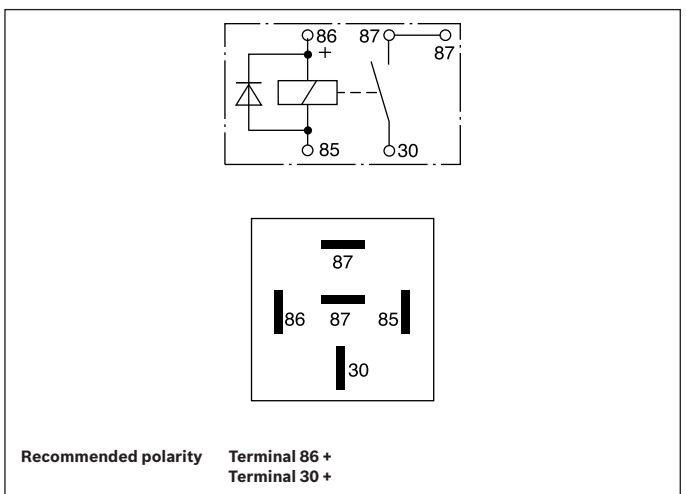


Blade terminal size: 6.3 x 0.8 mm to DIN 46 244 (similar to ISO 8092)

Figure



Connection and circuit diagram



Relays

Mini relays

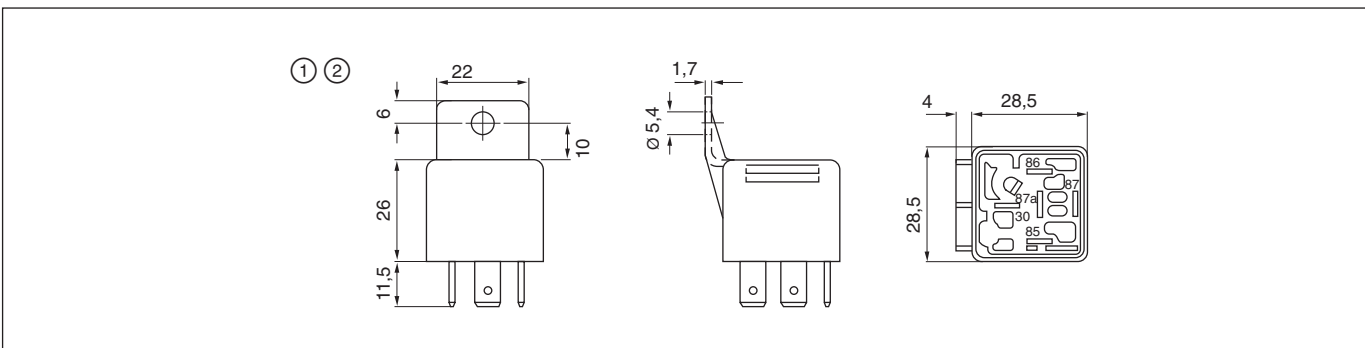
Normally open relay 12 V

0 332 019 110

Technical data				
Resistive load ¹⁾ - NO contact	A/Thousand	50/≥75	40/≥125	30/≥250
Motor load ²⁾ - NO contact	A/A/Thousand	90/40/≥75	75/30/≥125	50/20/≥250
Lamp load ¹⁾ - NO contact	A/Thousand	30/≥75	20/≥125	10/≥250
Contact material				silver tin oxide
Overall resistance of excitation circuit ⁴⁾	Ω			75±5
Response time	ms			≤ 10
Release time	ms			≤ 10
Degree of protection Terminals ³⁾				IP 20
Degree of protection Housing				IP 5K4
Illustration / Dimension drawing				2

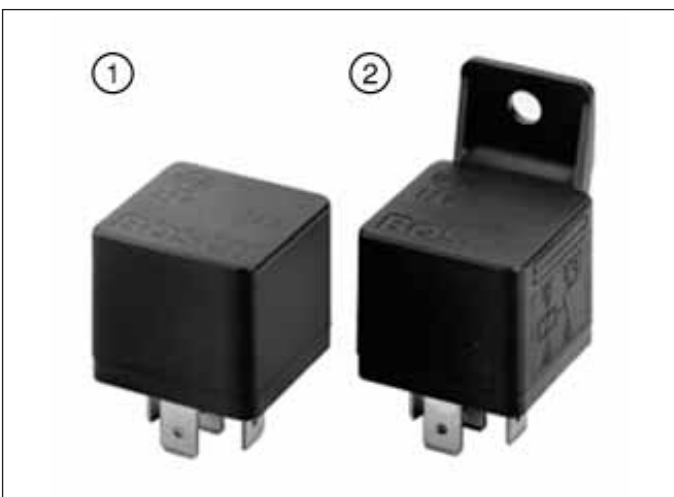
¹⁾ Switching current/no. of operations ²⁾ Making/continuous current/no. of operations ³⁾ When a socket housing is used and when installed with blade terminals pointing downwards. In a different installation position, the housing degree of protection is IP 20. ⁴⁾ at +20 °C

Dimensional drawing

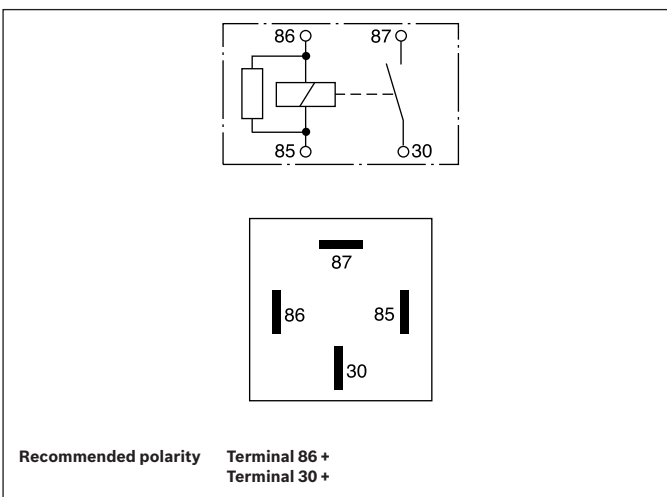


Blade terminal size: 6.3 x 0.8 mm to DIN 46 244 (similar to ISO 8092)

Figure



Connection and circuit diagram



Relays

Mini relays

Normally open relay 12 V

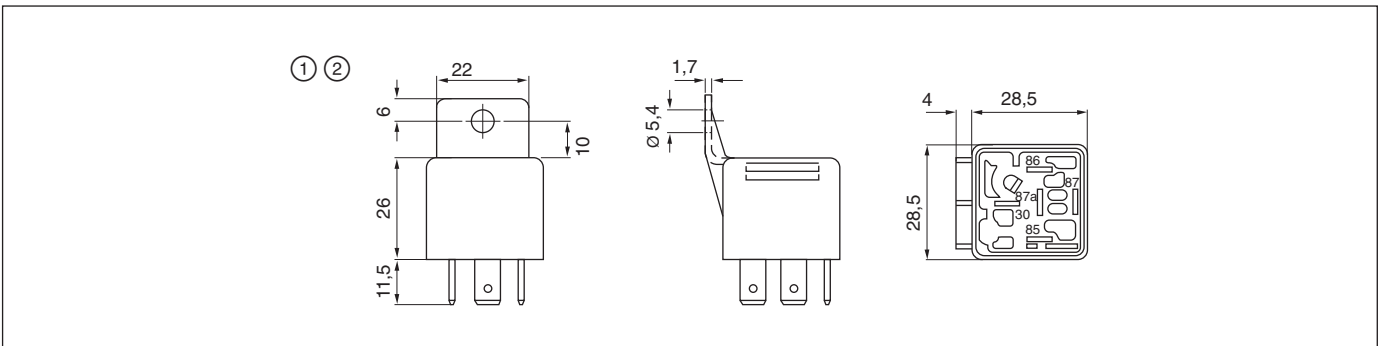
0 332 019 150

Technical data

Resistive load ¹⁾ - NO contact	A/Thousand	30/≥250	20/≥300	10/≥500
Motor load ²⁾ - NO contact	A/A/Thousand	50/25/≥100		
Lamp load ¹⁾ - NO contact	A/Thousand	30/≥100	20/≥200	10/≥500
Inductive load ¹⁾ - NO contact	A/Thousand			24/≥100
Contact material				hard silver
Overall resistance of excitation circuit ⁴⁾	Ω			85±5
Response time	ms			≤ 10
Release time	ms			≤ 10
Degree of protection Terminals ³⁾				IP 20
Degree of protection Housing				IP 34
Illustration / Dimension drawing				2

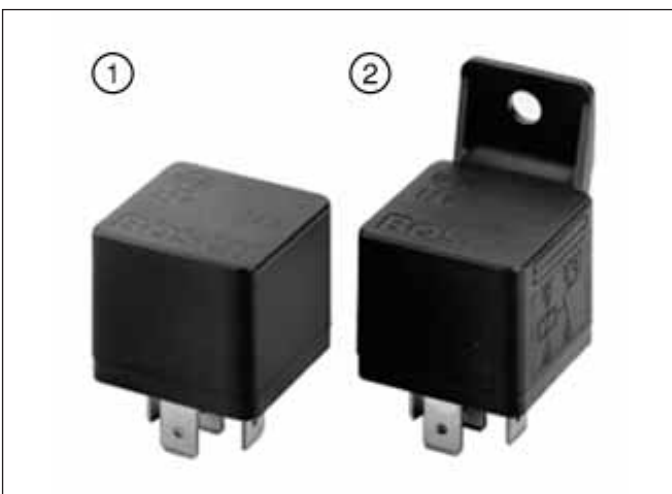
¹⁾ Switching current/no. of operations ²⁾ Making/continuous current/no. of operations ³⁾ When a socket housing is used and when installed with blade terminals pointing downwards. In a different installation position, the housing degree of protection is IP 20. ⁴⁾ at +20 °C

Dimensional drawing

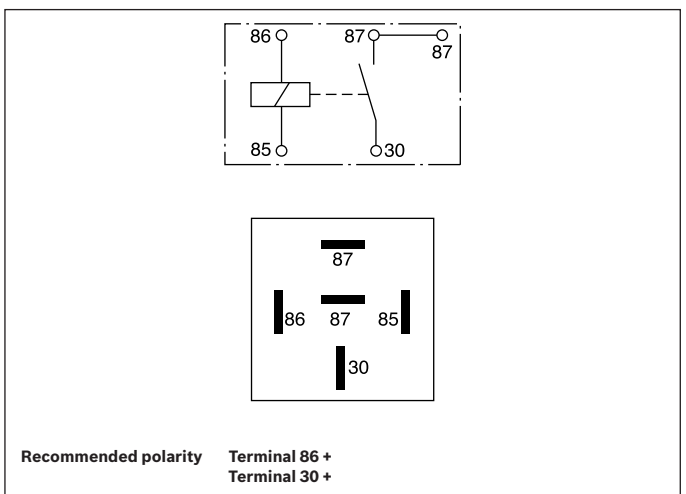


Blade terminal size: 6.3 x 0.8 mm to DIN 46 244 (similar to ISO 8092)

Figure



Connection and circuit diagram



Relays

Mini relays

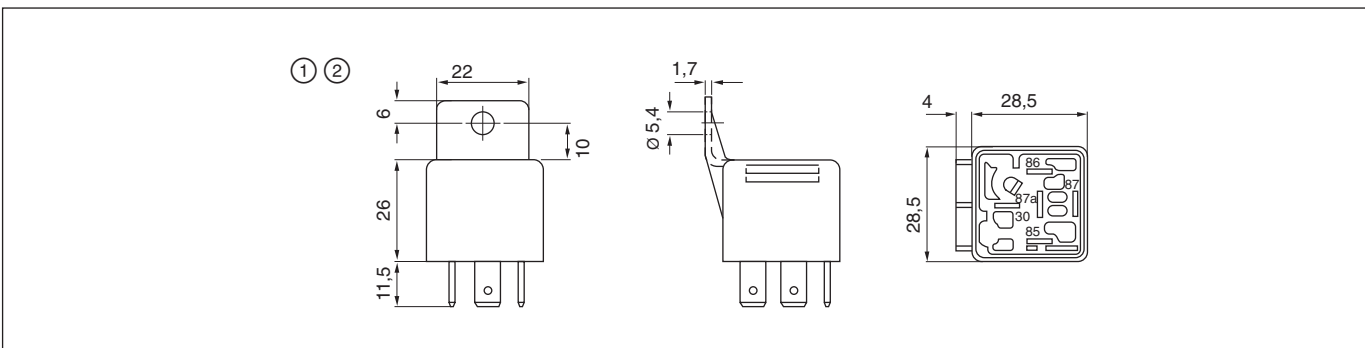
Normally open relay 12 V

0 332 019 151

Technical data				
Resistive load ¹⁾ - NO contact	A/Thousand	30/≥250	20/≥300	10/≥500
Motor load ²⁾ - NO contact	A/A/Thousand	50/25/≥100		
Lamp load ¹⁾ - NO contact	A/Thousand	30/≥100	20/≥200	10/≥500
Inductive load ¹⁾ - NO contact	A/Thousand			24/≥100
Contact material				hard silver
Overall resistance of excitation circuit ⁴⁾	Ω			85±5
Response time	ms			≤ 10
Release time	ms			≤ 10
Degree of protection Terminals ³⁾				IP 20
Degree of protection Housing				IP 34
Illustration / Dimension drawing				1

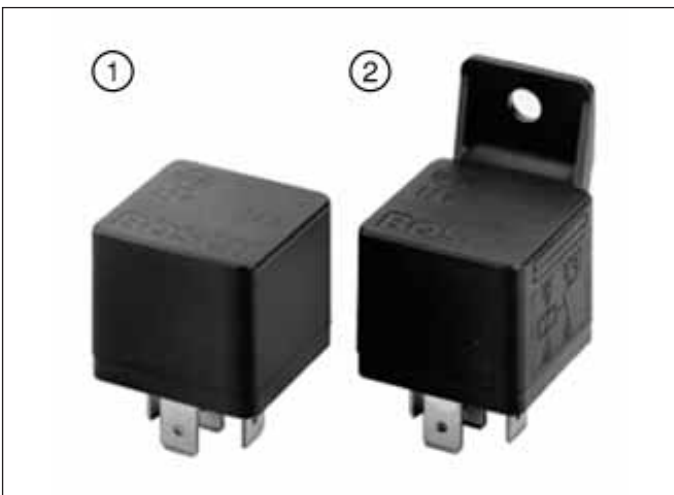
¹⁾ Switching current/no. of operations ²⁾ Making/continuous current/no. of operations ³⁾ When a socket housing is used and when installed with blade terminals pointing downwards. In a different installation position, the housing degree of protection is IP 20. ⁴⁾ at +20 °C

Dimensional drawing

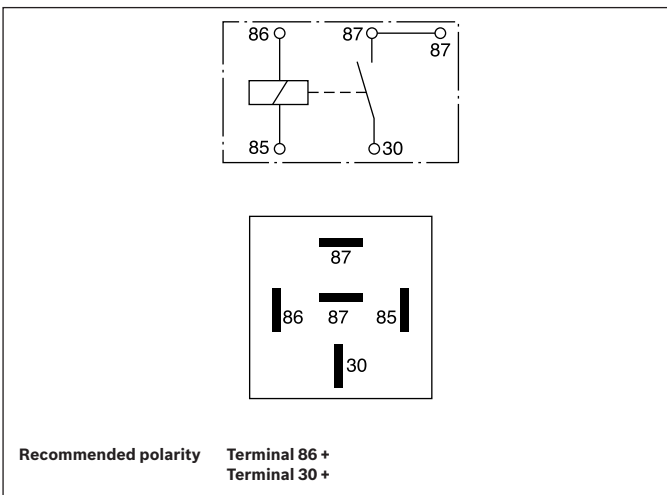


Blade terminal size: 6.3 x 0.8 mm to DIN 46 244 (similar to ISO 8092)

Figure



Connection and circuit diagram



Relays

Mini relays

Normally open relay 12 V

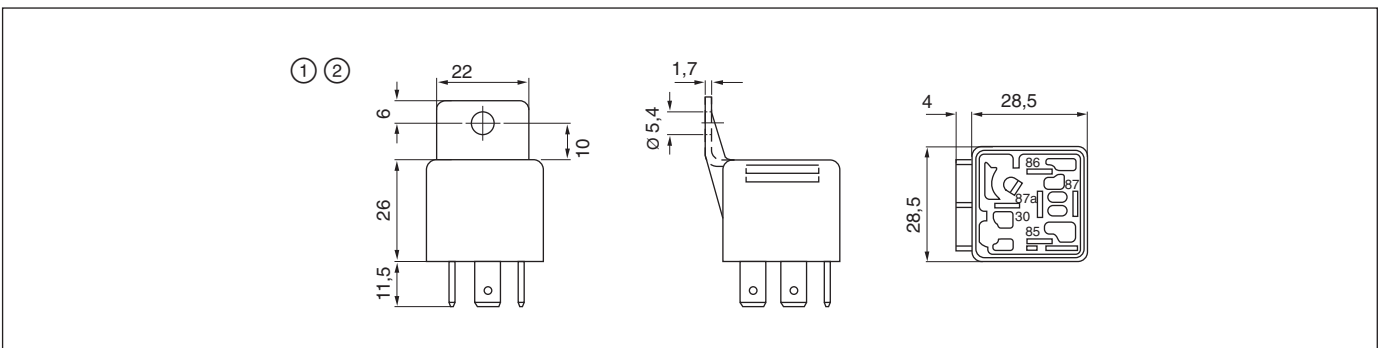
0 332 019 155

Technical data

Resistive load ¹⁾ - NO contact	A/Thousand	30/≥100	20/≥200	10/≥350
Motor load ²⁾ - NO contact	A/A/Thousand	40/20/≥100		
Lamp load ¹⁾ - NO contact	A/Thousand	20/≥100	10/≥350	
Inductive load ¹⁾ - NO contact	A/Thousand			15/≥50
Contact material				hard silver
Overall resistance of excitation circuit ⁴⁾	Ω			85±5
Response time	ms			≤ 10
Release time	ms			≤ 15
Degree of protection Terminals ³⁾				IP 20
Degree of protection Housing				IP 34
Illustration / Dimension drawing				2

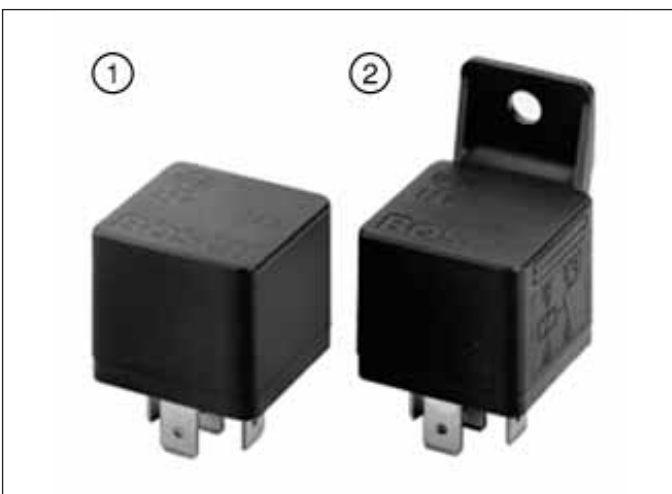
¹⁾ Switching current/no. of operations ²⁾ Making/continuous current/no. of operations ³⁾ When a socket housing is used and when installed with blade terminals pointing downwards. In a different installation position, the housing degree of protection is IP 20. ⁴⁾ at +20 °C

Dimensional drawing

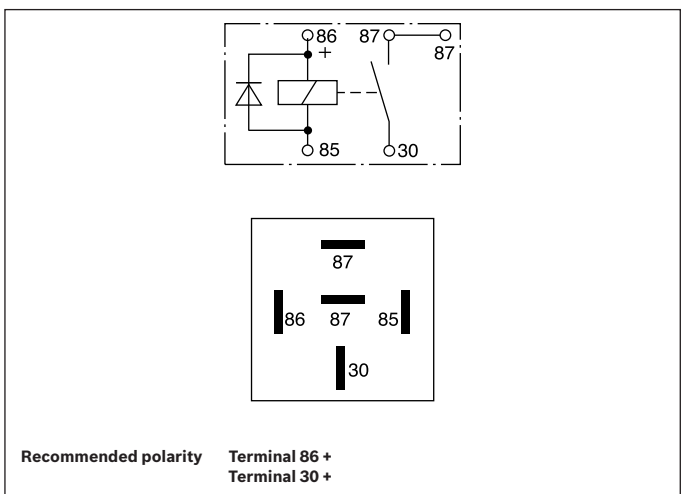


Blade terminal size: 6.3 x 0.8 mm to DIN 46 244 (similar to ISO 8092)

Figure



Connection and circuit diagram



Relays

Mini relays

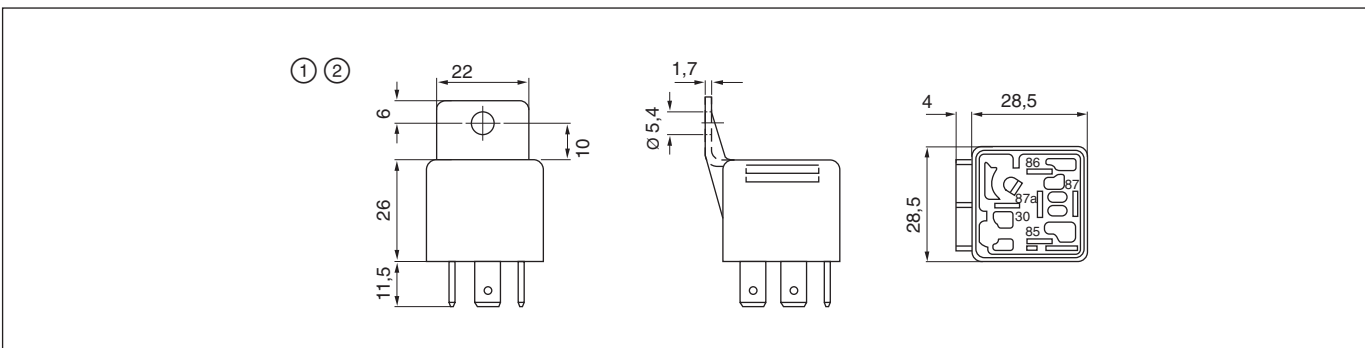
Normally open relay 24 V

0 332 019 203

Technical data		
Resistive load ¹⁾ - NO contact	A/Thousand	20/≥250
Motor load ²⁾ - NO contact	A/A/Thousand	40/16/≥250
Lamp load ¹⁾ - NO contact	A/Thousand	16/≥250
Contact material	Ω	silver tin oxide
Overall resistance of excitation circuit ⁴⁾	Ω	255±15
Response time	ms	≤ 15
Release time	ms	≤ 15
Degree of protection Terminals ³⁾		IP 20
Degree of protection Housing		IP 5K4
Illustration / Dimension drawing		2

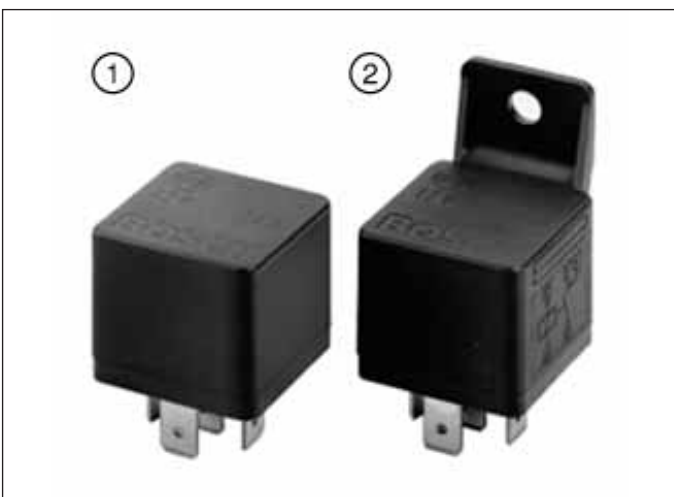
¹⁾ Switching current/no. of operations ²⁾ Making/continuous current/no. of operations ³⁾ When a socket housing is used and when installed with blade terminals pointing downwards. In a different installation position, the housing degree of protection is IP 20. ⁴⁾ at +20 °C

Dimensional drawing

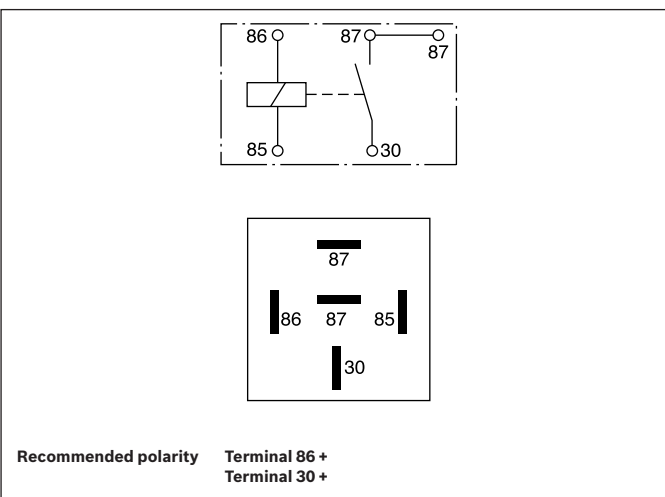


Blade terminal size: 6.3 x 0.8 mm to DIN 46 244 (similar to ISO 8092)

Figure



Connection and circuit diagram



Relays

Mini relays

Normally open relay 24 V

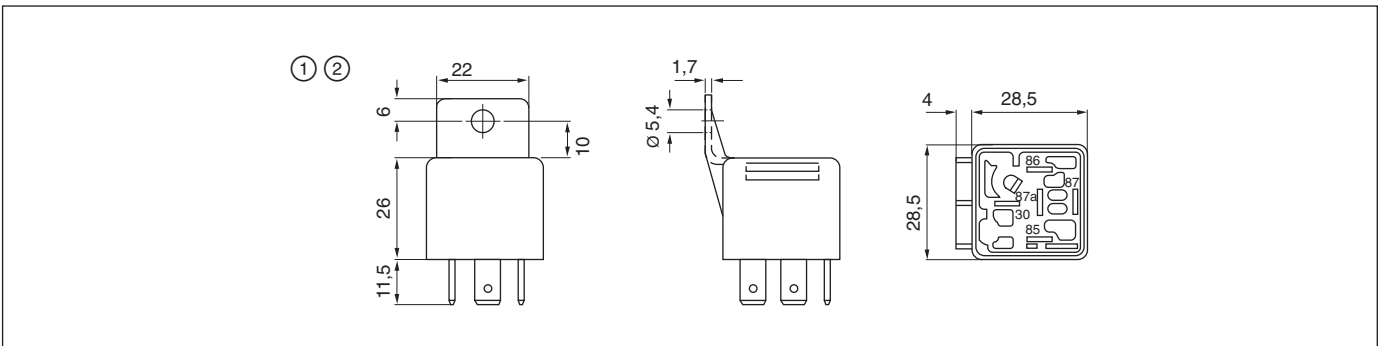
0 332 019 204

Technical data

Resistive load ¹⁾ - NO contact	A/Thousand	20/≥250
Motor load ²⁾ - NO contact	A/A/Thousand	40/16/≥250
Lamp load ¹⁾ - NO contact	A/Thousand	16/≥250
Contact material	Ω	silver tin oxide
Overall resistance of excitation circuit ⁴⁾	Ω	216±15
Response time	ms	≤ 15
Release time	ms	≤ 15
Degree of protection Terminals ³⁾		IP 20
Degree of protection Housing		IP 5K4
Illustration / Dimension drawing		1

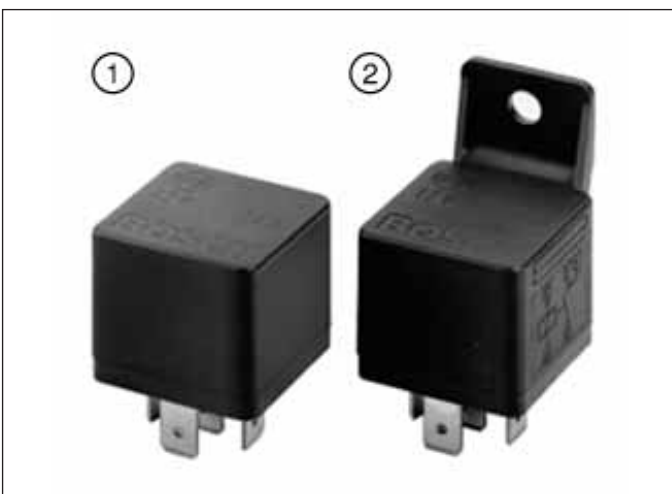
¹⁾ Switching current/no. of operations ²⁾ Making/continuous current/no. of operations ³⁾ When a socket housing is used and when installed with blade terminals pointing downwards. In a different installation position, the housing degree of protection is IP 20. ⁴⁾ at +20 °C

Dimensional drawing

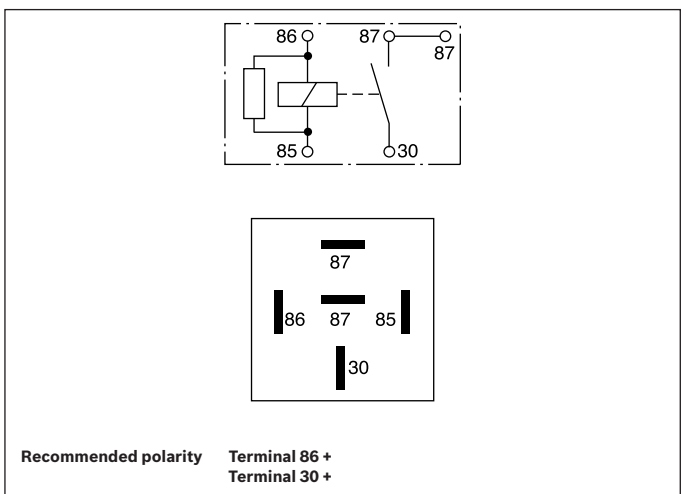


Blade terminal size: 6.3 x 0.8 mm to DIN 46 244 (similar to ISO 8092)

Figure



Connection and circuit diagram



Relays

Mini relays

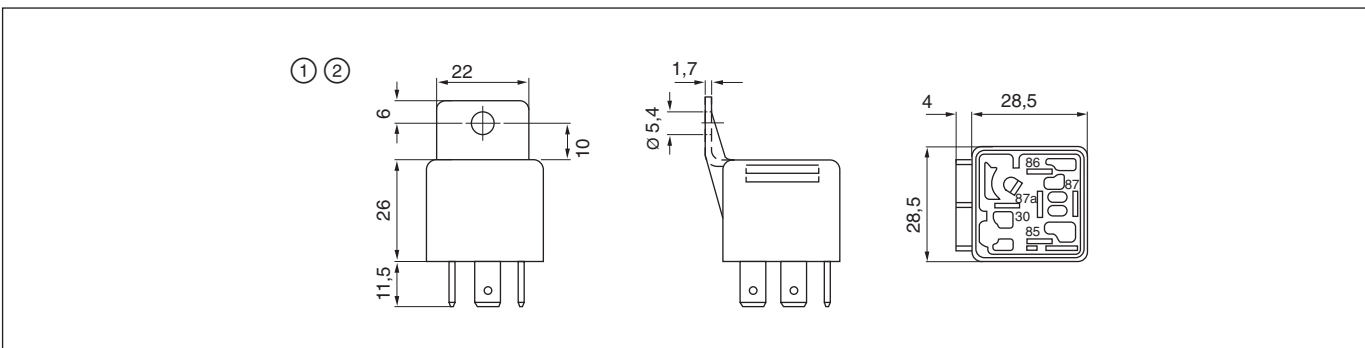
Normally open relay 24 V

0 332 019 213

Technical data		
Resistive load ¹⁾ - NO contact	A/Thousand	20/≥250
Motor load ²⁾ - NO contact	A/A/Thousand	40/16/≥250
Lamp load ¹⁾ - NO contact	A/Thousand	16/≥250
Contact material	Ω	silver tin oxide
Overall resistance of excitation circuit ⁴⁾	Ω	255±15
Response time	ms	≤ 15
Release time	ms	≤ 15
Degree of protection Terminals ³⁾		IP 20
Degree of protection Housing		IP 5K4
Illustration / Dimension drawing		1

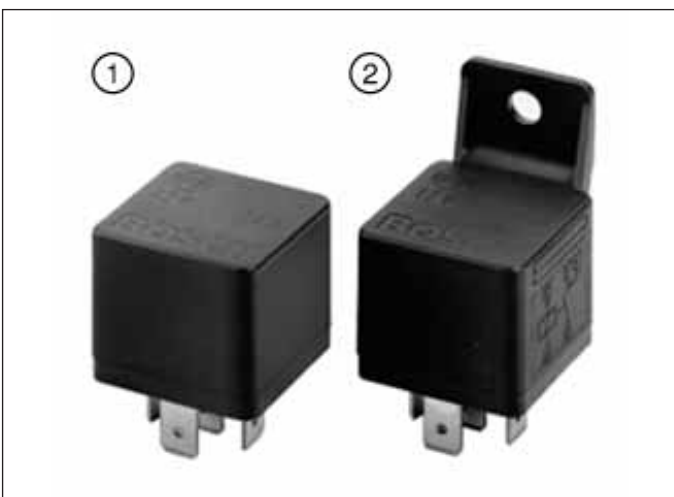
¹⁾ Switching current/no. of operations ²⁾ Making/continuous current/no. of operations ³⁾ When a socket housing is used and when installed with blade terminals pointing downwards. In a different installation position, the housing degree of protection is IP 20. ⁴⁾ at +20 °C

Dimensional drawing

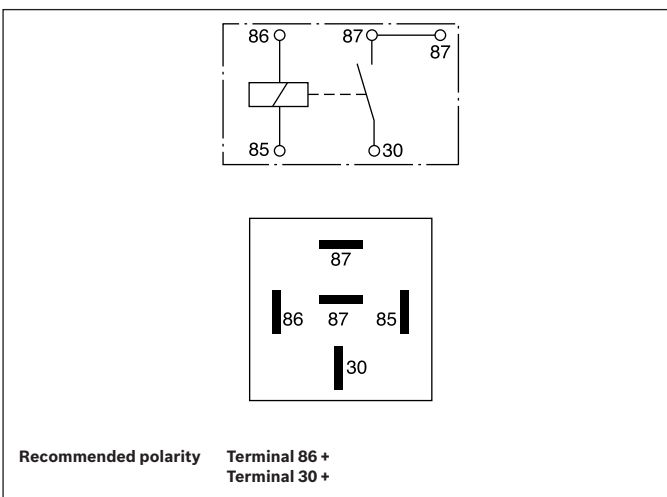


Blade terminal size: 6.3 x 0.8 mm to DIN 46 244 (similar to ISO 8092)

Figure



Connection and circuit diagram



Relays

Mini relays

Normally closed relay 12 V

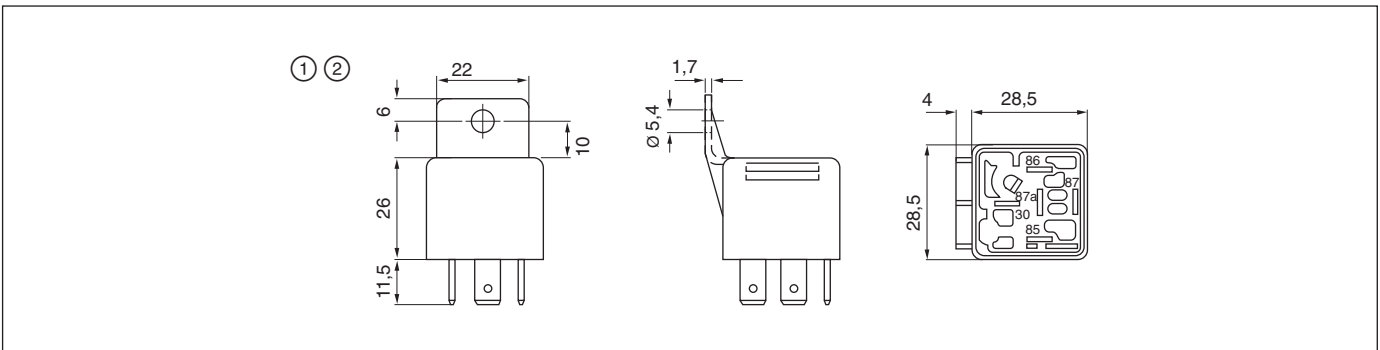
0 332 109 011

Technical data

Resistive load ¹⁾ - NO contact	A/Thousand	10/≥100	20/≥50
Motor load ²⁾ - NC contact	A/A/Thousand		100/18/≥200
Lamp load ¹⁾ - NC contact	A/Thousand		12/100
Contact material			silver tin oxide
Overall resistance of excitation circuit ⁴⁾	Ω		75±5
Response time	ms		≤ 10
Release time	ms		≤ 10
Degree of protection Terminals ³⁾			IP 20
Degree of protection Housing			IP 34
Illustration / Dimension drawing			1

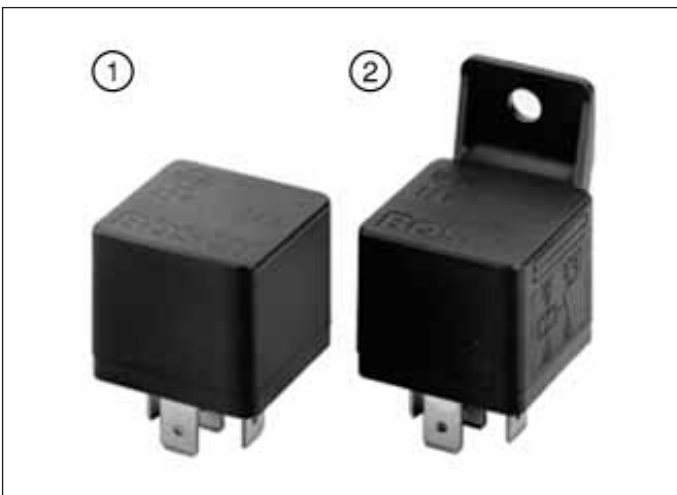
¹⁾ Switching current/no. of operations ²⁾ Making/continuous current/no. of operations ³⁾ When a socket housing is used and when installed with blade terminals pointing downwards. In a different installation position, the housing degree of protection is IP 20. ⁴⁾ at +20 °C

Dimensional drawing

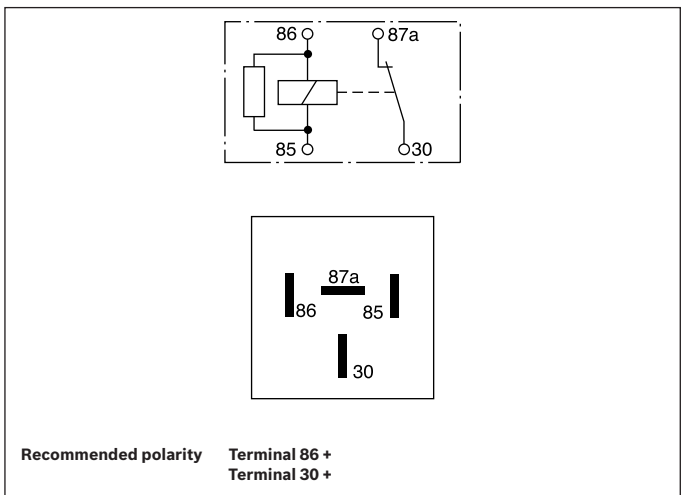


Blade terminal size: 6.3 x 0.8 mm to DIN 46 244 (similar to ISO 8092)

Figure



Connection and circuit diagram



Relays

Mini relays

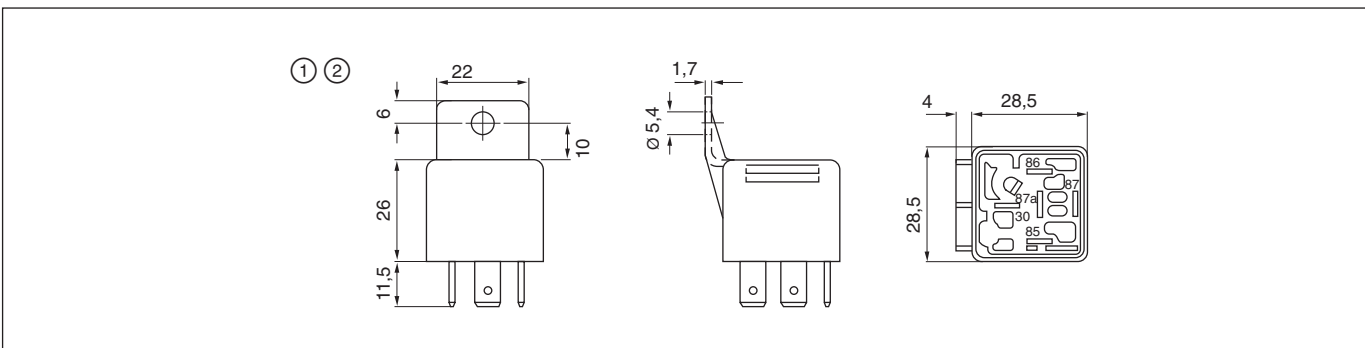
Changeover relay 12 V

0 332 209 135

Technical data				
Resistive load ¹⁾ - NO contact	A/Thousand	50/≥50	40/≥75	30/≥100
Resistive load ¹⁾ - NC contact	A/Thousand	20/≥50		
Motor load ²⁾ - NO contact	A/A/Thousand	90/40/≥75	75/30/≥150	50/20/≥300
Lamp load ¹⁾ - NO contact	A/Thousand	30/≥75	20/≥150	10/≥300
Lamp load ¹⁾ - NC contact	A/Thousand	5/≥150		
Contact material				silver tin oxide
Overall resistance of excitation circuit ⁴⁾	Ω			85±5
Response time	ms			≤ 10
Release time	ms			≤ 15
Degree of protection Terminals ³⁾				IP 20
Degree of protection Housing				IP 5K4
Illustration / Dimension drawing				1

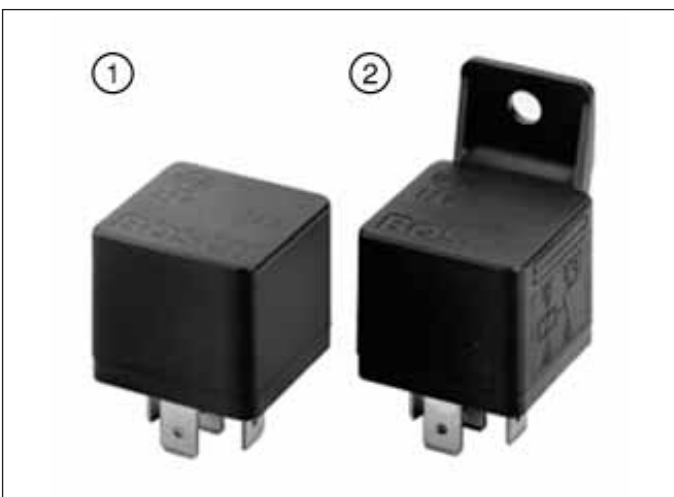
¹⁾ Switching current/no. of operations ²⁾ Making/continuous current/no. of operations ³⁾ When a socket housing is used and when installed with blade terminals pointing downwards. In a different installation position, the housing degree of protection is IP 20. ⁴⁾ at +20 °C

Dimensional drawing

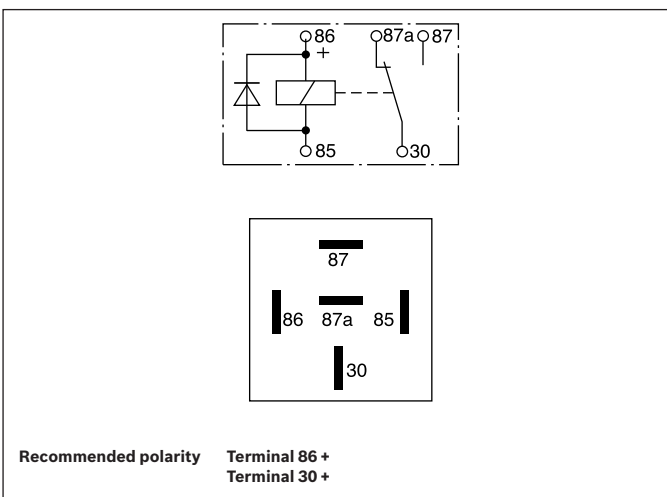


Blade terminal size: 6.3 x 0.8 mm to DIN 46 244 (similar to ISO 8092)

Figure



Connection and circuit diagram



Relays

Mini relays

Changeover relay 12 V

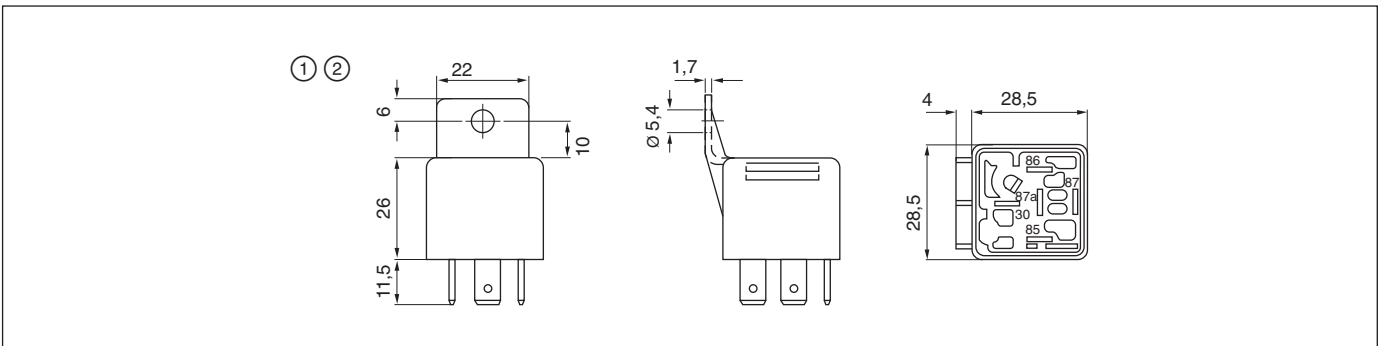
0 332 209 137

Technical data

Resistive load ¹⁾ - NO contact	A/Thousand	50/≥75	40/≥150	30/≥300
Resistive load ¹⁾ - NC contact	A/Thousand	20/≥100	15/≥150	10/≥300
Motor load ²⁾ - NO contact	A/A/Thousand	90/40/≥75	75/30/≥150	50/20/≥300
Motor load ²⁾ - NC contact	A/A/Thousand	35/15/≥50	25/10/≥150	15/5/≥300
Lamp load ¹⁾ - NO contact	A/Thousand	30/≥75	20/≥150	10/≥300
Lamp load ¹⁾ - NC contact	A/Thousand	5/≥300		
Contact material				silver tin oxide
Overall resistance of excitation circuit ⁴⁾	Ω			75±5
Response time	ms			≤ 10
Release time	ms			≤ 10
Degree of protection Terminals ³⁾				IP 20
Degree of protection Housing				IP 5K4
Illustration / Dimension drawing				1

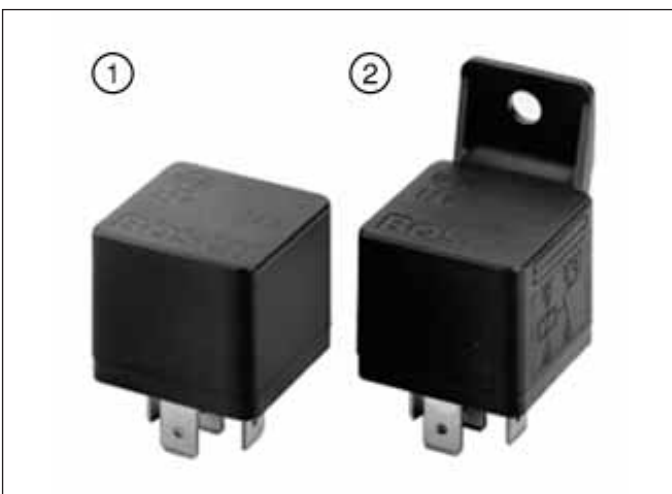
¹⁾ Switching current/no. of operations ²⁾ Making/continuous current/no. of operations ³⁾ When a socket housing is used and when installed with blade terminals pointing downwards. In a different installation position, the housing degree of protection is IP 20. ⁴⁾ at +20 °C

Dimensional drawing

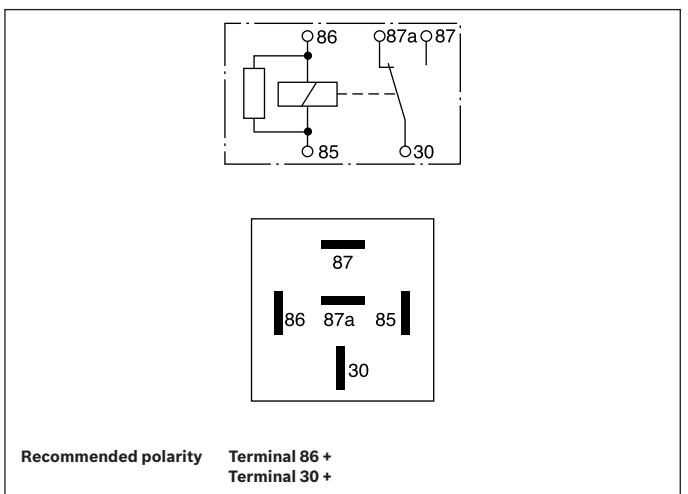


Blade terminal size: 6.3 x 0.8 mm to DIN 46 244 (similar to ISO 8092)

Figure



Connection and circuit diagram



Relays

Mini relays

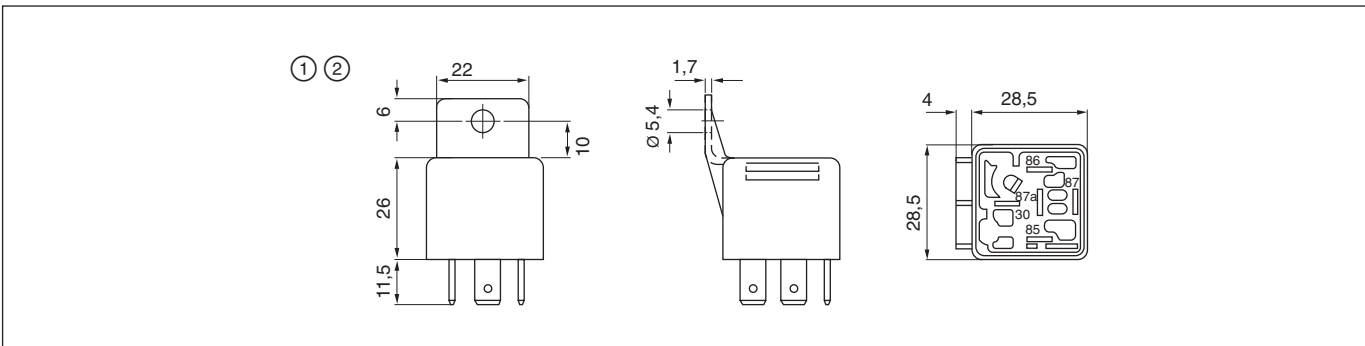
Changeover relay 12 V

0 332 209 138

Technical data				
Resistive load ¹⁾ - NO contact	A/Thousand	50/≥75	40/≥150	30/≥300
Resistive load ¹⁾ - NC contact	A/Thousand	20/≥100	15/≥150	10/≥300
Motor load ²⁾ - NO contact	A/A/Thousand	90/40/≥75	75/30/≥150	50/20/≥300
Motor load ²⁾ - NC contact	A/A/Thousand	35/15/≥50	25/10/≥150	15/5/≥300
Lamp load ¹⁾ - NO contact	A/Thousand	30/≥75	20/≥150	10/≥300
Lamp load ¹⁾ - NC contact	A/Thousand	5/≥300		
Contact material				silver tin oxide
Overall resistance of excitation circuit ⁴⁾	Ω			75±5
Response time	ms			≤ 10
Release time	ms			≤ 10
Degree of protection Terminals ³⁾				IP 20
Degree of protection Housing				IP 5K4
Illustration / Dimension drawing				2

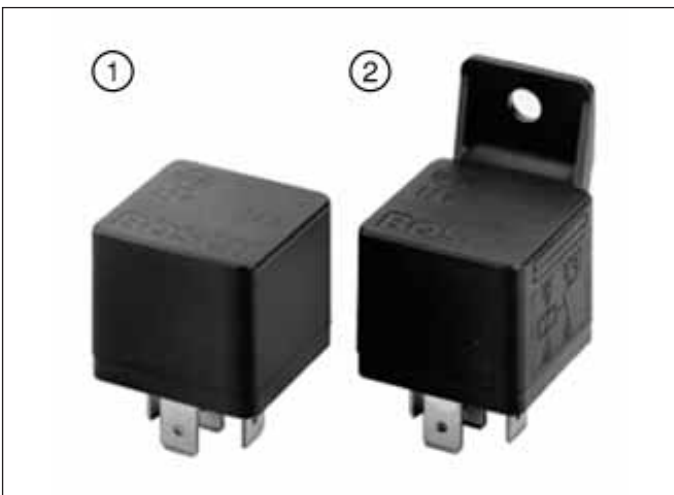
¹⁾ Switching current/no. of operations ²⁾ Making/continuous current/no. of operations ³⁾ When a socket housing is used and when installed with blade terminals pointing downwards. In a different installation position, the housing degree of protection is IP 20. ⁴⁾ at +20 °C

Dimensional drawing

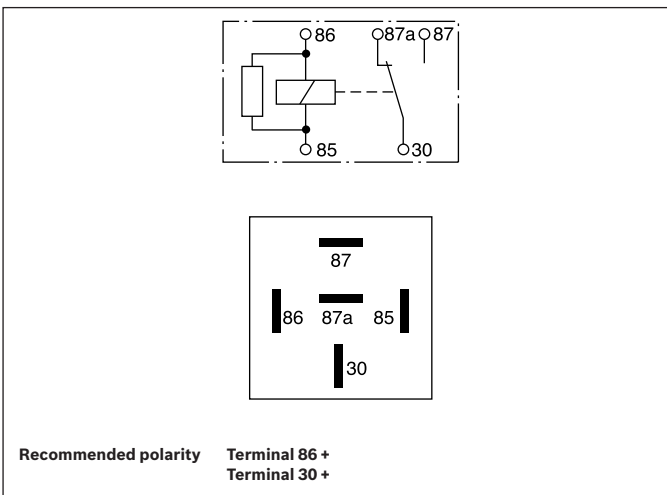


Blade terminal size: 6.3 x 0.8 mm to DIN 46 244 (similar to ISO 8092)

Figure



Connection and circuit diagram



Relays

Mini relays

Changeover relay 12 V

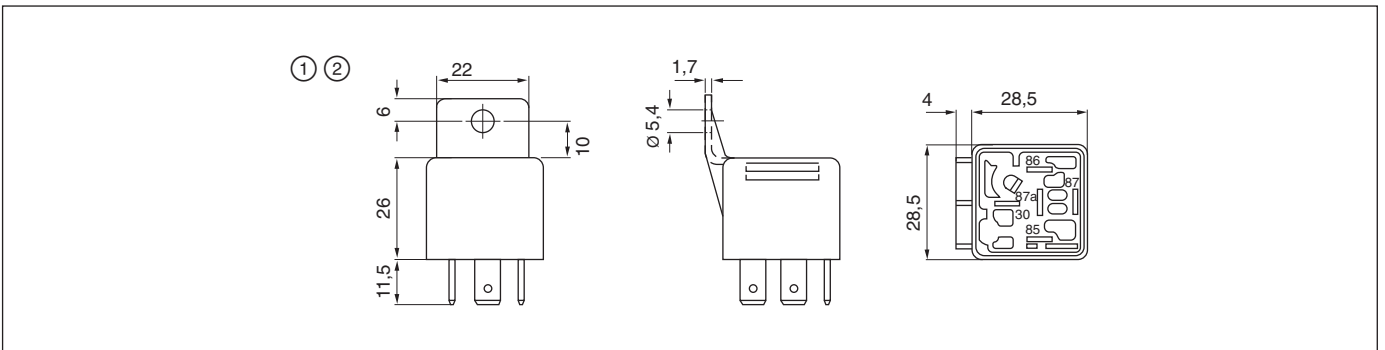
0 332 209 150

Technical data

Resistive load ¹⁾ - NO contact	A/Thousand	30/≥250	20/≥300	10/≥500
Resistive load ¹⁾ - NC contact	A/Thousand	5/≥250		
Motor load ²⁾ - NO contact	A/A/Thousand	50/25/≥100		
Lamp load ¹⁾ - NO contact	A/Thousand	30/≥100	20/≥200	10/≥500
Lamp load ¹⁾ - NC contact	A/Thousand	10/≥100	5/≥150	
Inductive load ¹⁾ - NO contact	A/Thousand			15/≥100
Inductive load ¹⁾ - NC contact	A/Thousand			15/≥100
Contact material				hard silver
Overall resistance of excitation circuit ⁴⁾	Ω			85±5
Response time	ms			≤ 10
Release time	ms			≤ 10
Degree of protection Terminals ³⁾				IP 20
Degree of protection Housing				IP 34
Illustration / Dimension drawing				2

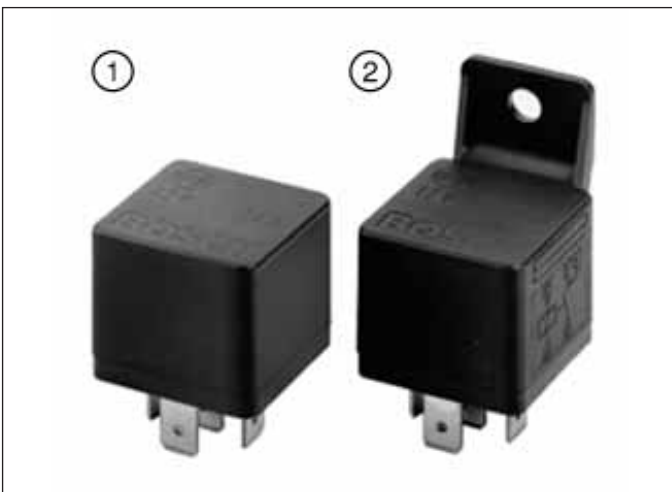
¹⁾ Switching current/no. of operations ²⁾ Making/continuous current/no. of operations ³⁾ When a socket housing is used and when installed with blade terminals pointing downwards. In a different installation position, the housing degree of protection is IP 20. ⁴⁾ at +20 °C

Dimensional drawing

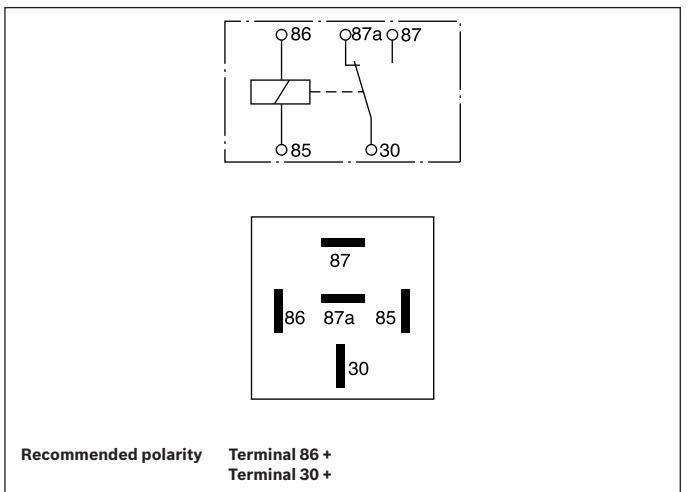


Blade terminal size: 6.3 x 0.8 mm to DIN 46 244 (similar to ISO 8092)

Figure



Connection and circuit diagram



Relays

Mini relays

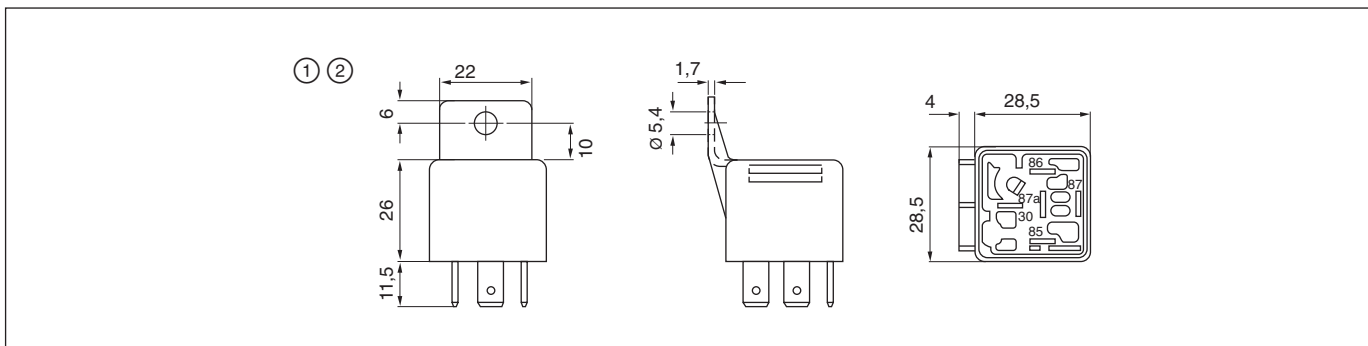
Changeover relay 12 V

0 332 209 151

Technical data				
Resistive load ¹⁾ - NO contact	A/Thousand	30/≥250	20/≥300	10/≥500
Resistive load ¹⁾ - NC contact	A/Thousand	20/≥250	10/≥250	5/≥250
Motor load ²⁾ - NO contact	A/A/Thousand	50/25/≥100		
Lamp load ¹⁾ - NO contact	A/Thousand	30/≥100	20/≥200	10/≥500
Lamp load ¹⁾ - NC contact	A/Thousand	10/≥100	5/≥150	
Inductive load ¹⁾ - NO contact	A/Thousand			15/≥100
Inductive load ¹⁾ - NC contact	A/Thousand			15/≥100
Contact material				hard silver
Overall resistance of excitation circuit ⁴⁾	Ω			85±5
Response time	ms			≤ 10
Release time	ms			≤ 10
Degree of protection Terminals ³⁾				IP 20
Degree of protection Housing				IP 34
Illustration / Dimension drawing				1

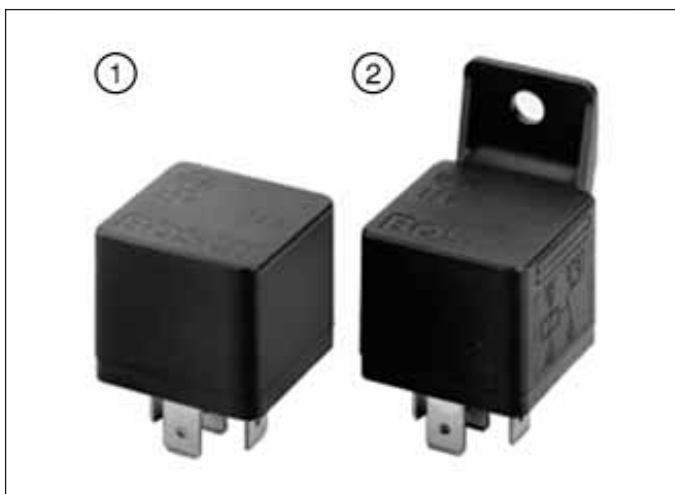
¹⁾ Switching current/no. of operations ²⁾ Making/continuous current/no. of operations ³⁾ When a socket housing is used and when installed with blade terminals pointing downwards. In a different installation position, the housing degree of protection is IP 20. ⁴⁾ at +20 °C

Dimensional drawing

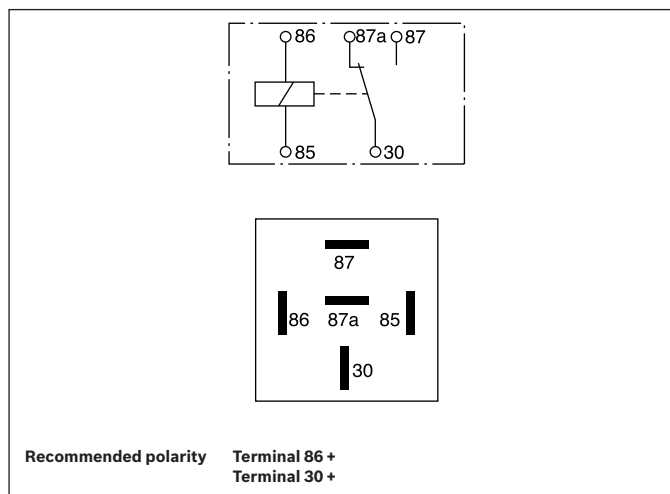


Blade terminal size: 6.3 x 0.8 mm to DIN 46 244 (similar to ISO 8092)

Figure



Connection and circuit diagram



Relays

Mini relays

Changeover relay 12 V

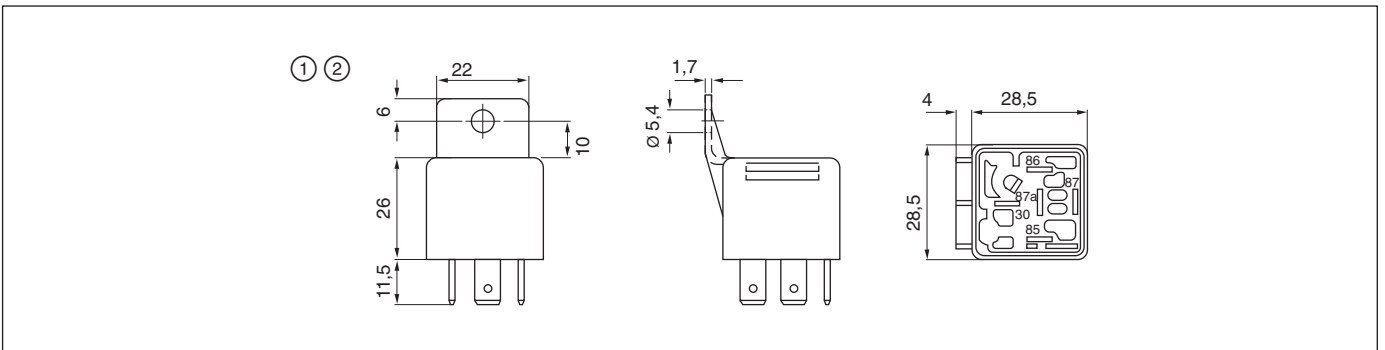
0 332 209 152

Technical data

Resistive load ¹⁾ - NO contact	A/Thousand	30/≥250	20/≥300	10/≥500
Resistive load ¹⁾ - NC contact	A/Thousand	20/≥250	10/≥250	5/≥250
Motor load ²⁾ - NO contact	A/A/Thousand	50/25/≥100		
Lamp load ¹⁾ - NO contact	A/Thousand	30/≥100	20/≥200	10/≥500
Lamp load ¹⁾ - NC contact	A/Thousand	10/≥100	5/≥150	
Inductive load ¹⁾ - NO contact	A/Thousand			15/≥100
Inductive load ¹⁾ - NC contact	A/Thousand			15/≥100
Contact material				hard silver
Overall resistance of excitation circuit ⁴⁾	Ω			85±5
Response time	ms			≤ 10
Release time	ms			≤ 15
Degree of protection Terminals ³⁾				IP 20
Degree of protection Housing				IP 34
Illustration / Dimension drawing				1

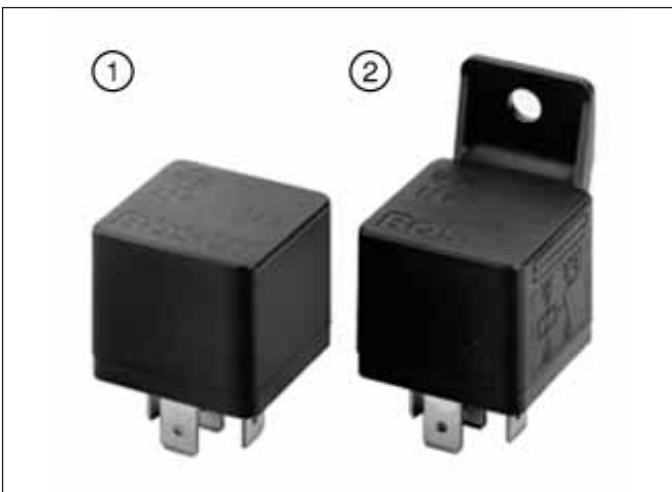
¹⁾ Switching current/no. of operations ²⁾ Making/continuous current/no. of operations ³⁾ When a socket housing is used and when installed with blade terminals pointing downwards. In a different installation position, the housing degree of protection is IP 20. ⁴⁾ at +20 °C

Dimensional drawing

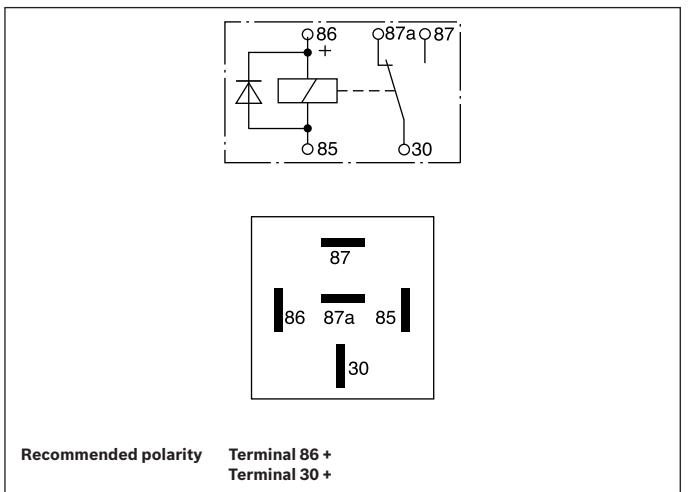


Blade terminal size: 6.3 x 0.8 mm to DIN 46 244 (similar to ISO 8092)

Figure



Connection and circuit diagram



Relays

Mini relays

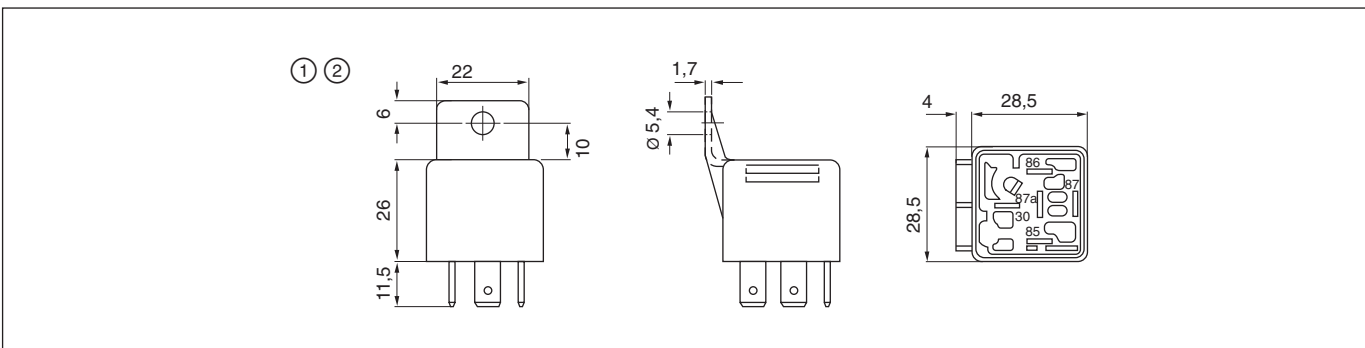
Changeover relay 12 V

0 332 209 158

Technical data				
Resistive load ¹⁾ - NO contact	A/Thousand	30/≥150	20/≥500	10/≥750
Resistive load ¹⁾ - NC contact	A/Thousand	20/≥150	10/≥250	5/≥500
Motor load ²⁾ - NO contact	A/A/Thousand	40/20/≥100		
Lamp load ¹⁾ - NO contact	A/Thousand	30/≥150	20/≥250	10/≥750
Lamp load ¹⁾ - NC contact	A/Thousand	10/≥150	5/≥250	
Inductive load ¹⁾ - NO contact	A/Thousand			15/≥100
Inductive load ¹⁾ - NC contact	A/Thousand			15/≥100
Contact material				hard silver
Overall resistance of excitation circuit ⁴⁾	Ω			85±5
Response time	ms			≤ 10
Release time	ms			≤ 15
Degree of protection Terminals ³⁾				IP 20
Degree of protection Housing				IP 34
Illustration / Dimension drawing				2

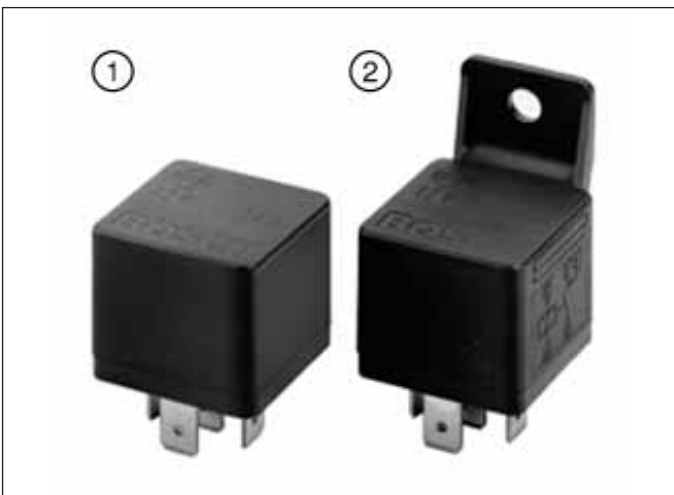
¹⁾ Switching current/no. of operations ²⁾ Making/continuous current/no. of operations ³⁾ When a socket housing is used and when installed with blade terminals pointing downwards. In a different installation position, the housing degree of protection is IP 20. ⁴⁾ at +20 °C

Dimensional drawing

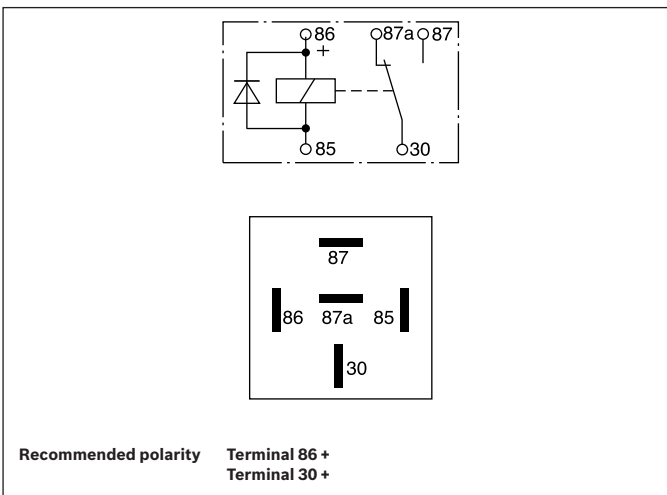


Blade terminal size: 6.3 x 0.8 mm to DIN 46 244 (similar to ISO 8092)

Figure



Connection and circuit diagram



Relays

Mini relays

Changeover relay 12 V

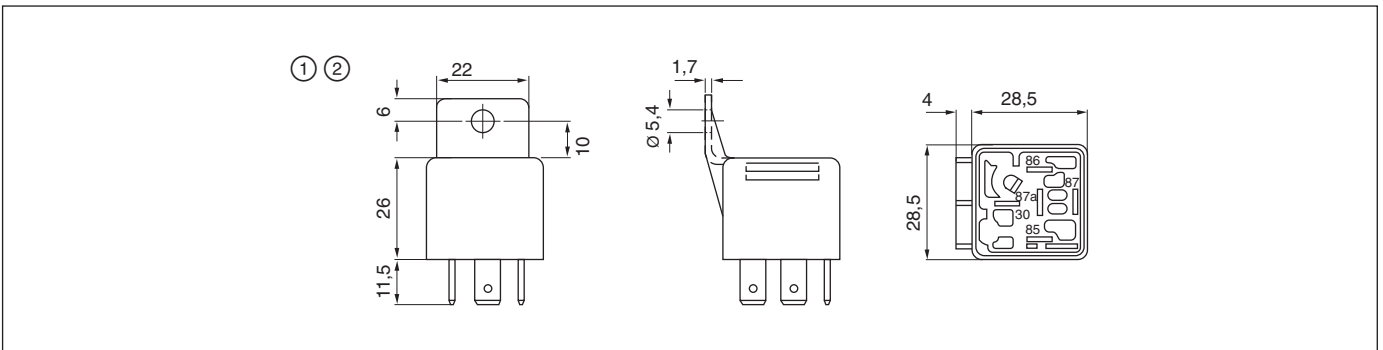
0 332 209 159

Technical data

Resistive load ¹⁾ - NO contact	A/Thousand	30/≥250	20/≥300	10/≥500
Resistive load ¹⁾ - NC contact	A/Thousand	20/≥250	10/≥250	5/≥250
Motor load ²⁾ - NO contact	A/A/Thousand	50/25/≥100		
Lamp load ¹⁾ - NO contact	A/Thousand	30/≥100	20/≥200	10/≥500
Lamp load ¹⁾ - NC contact	A/Thousand	10/≥100	5/≥150	
Inductive load ¹⁾ - NO contact	A/Thousand			15/≥100
Inductive load ¹⁾ - NC contact	A/Thousand			15/≥100
Contact material				hard silver
Overall resistance of excitation circuit ⁴⁾	Ω			75±5
Response time	ms			≤ 10
Release time	ms			≤ 10
Degree of protection Terminals ³⁾				IP 20
Degree of protection Housing				IP 34
Illustration / Dimension drawing				1

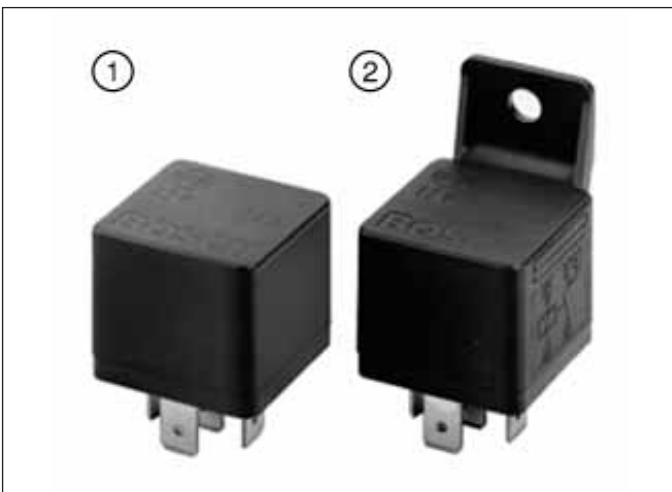
¹⁾ Switching current/no. of operations ²⁾ Making/continuous current/no. of operations ³⁾ When a socket housing is used and when installed with blade terminals pointing downwards. In a different installation position, the housing degree of protection is IP 20. ⁴⁾ at +20 °C

Dimensional drawing

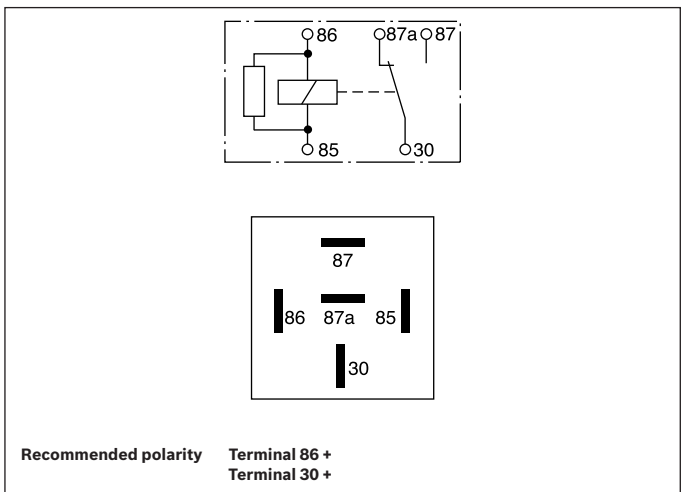


Blade terminal size: 6.3 x 0.8 mm to DIN 46 244 (similar to ISO 8092)

Figure



Connection and circuit diagram



Relays

Mini relays

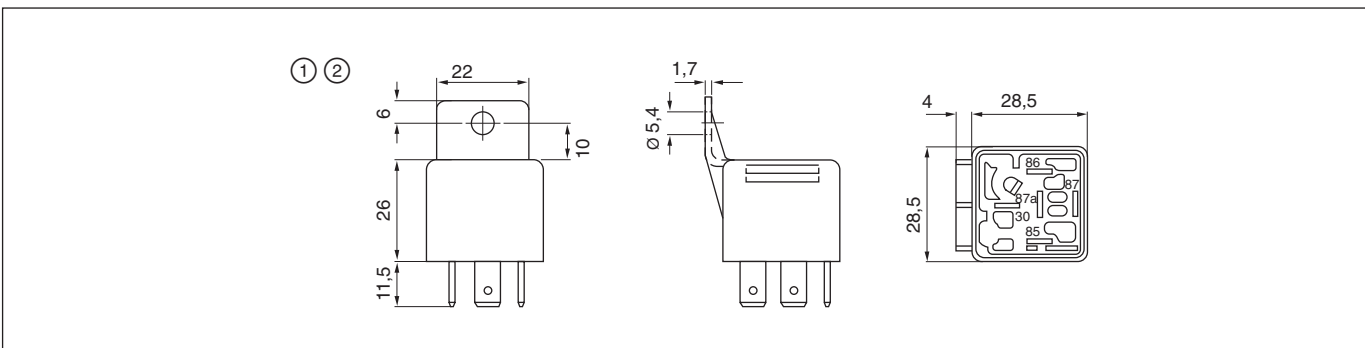
Changeover relay 24 V

0 332 209 203

Technical data		
Resistive load ¹⁾ - NO contact	A/Thousand	20/≥250
Resistive load ¹⁾ - NC contact	A/Thousand	10/≥250
Motor load ²⁾ - NO contact	A/A/Thousand	40/16/≥250
Lamp load ¹⁾ - NO contact	A/Thousand	16/≥250
Lamp load ¹⁾ - NC contact	A/Thousand	8/≥50 5/≥150
Contact material		silver tin oxide
Overall resistance of excitation circuit ⁴⁾	Ω	255±15
Response time	ms	≤ 15
Release time	ms	≤ 15
Degree of protection Terminals ³⁾		IP 20
Degree of protection Housing		IP 5K4
Illustration / Dimension drawing		2

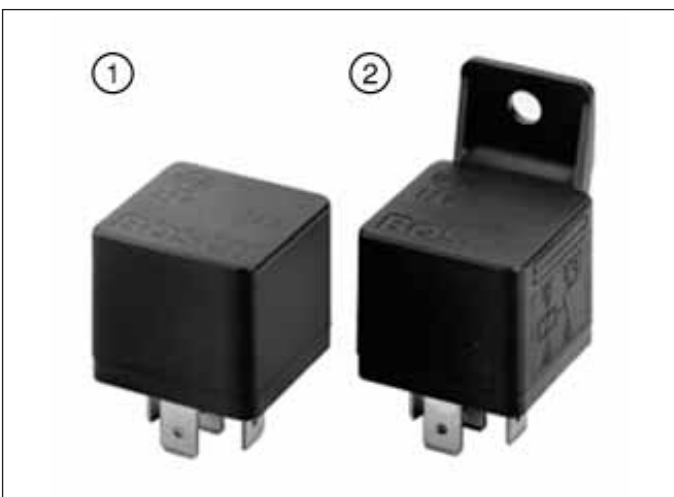
¹⁾ Switching current/no. of operations ²⁾ Making/continuous current/no. of operations ³⁾ When a socket housing is used and when installed with blade terminals pointing downwards. In a different installation position, the housing degree of protection is IP 20. ⁴⁾ at +20 °C

Dimensional drawing

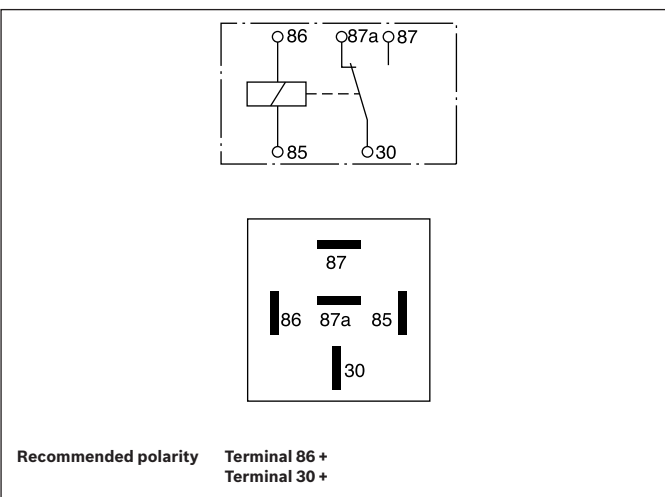


Blade terminal size: 6.3 x 0.8 mm to DIN 46 244 (similar to ISO 8092)

Figure



Connection and circuit diagram



Relays

Mini relays

Changeover relay 24 V

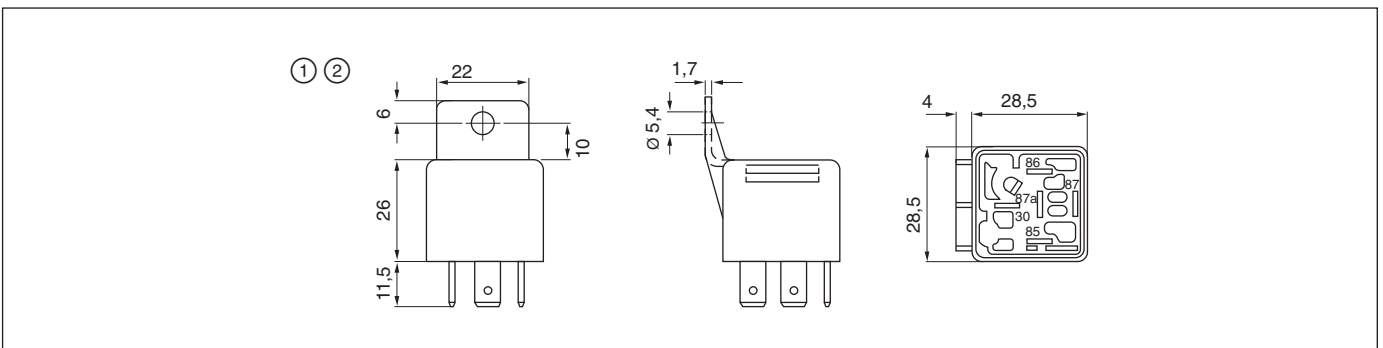
0 332 209 204

Technical data

Resistive load ¹⁾ - NO contact	A/Thousand	20/≥250
Resistive load ¹⁾ - NC contact	A/Thousand	10/≥250
Motor load ²⁾ - NO contact	A/A/Thousand	40/16/≥250
Lamp load ¹⁾ - NO contact	A/Thousand	16/≥250
Lamp load ¹⁾ - NC contact	A/Thousand	8/≥50 5/≥150
Contact material		silver tin oxide
Overall resistance of excitation circuit ⁴⁾	Ω	255±15
Response time	ms	≤ 15
Release time	ms	≤ 25
Degree of protection Terminals ³⁾		IP 20
Degree of protection Housing		IP 5K4
Illustration / Dimension drawing		1

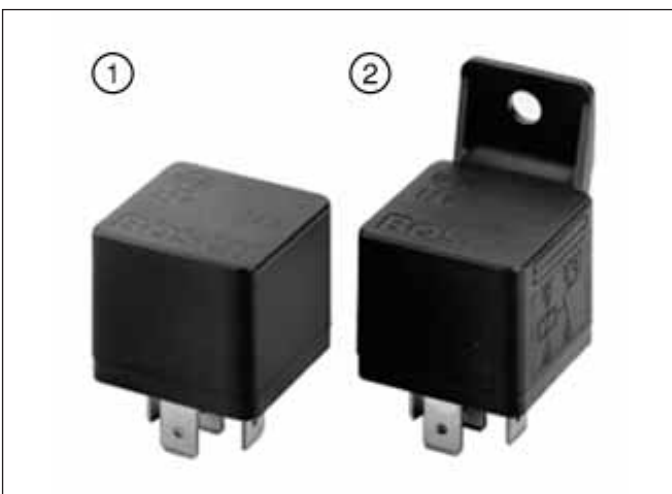
¹⁾ Switching current/no. of operations ²⁾ Making/continuous current/no. of operations ³⁾ When a socket housing is used and when installed with blade terminals pointing downwards. In a different installation position, the housing degree of protection is IP 20. ⁴⁾ at +20 °C

Dimensional drawing

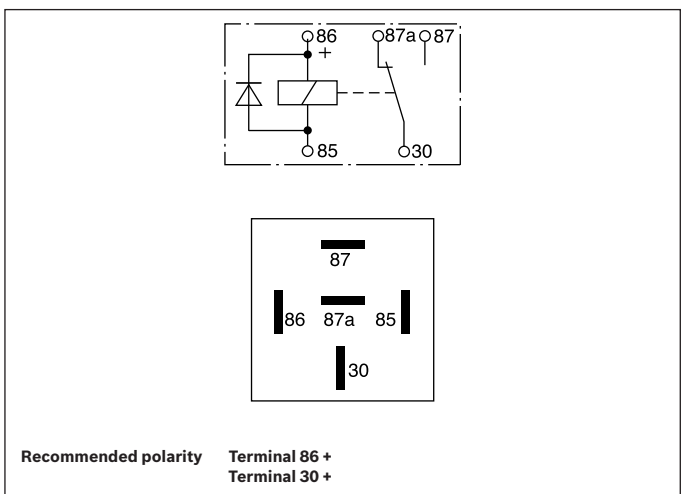


Blade terminal size: 6.3 x 0.8 mm to DIN 46 244 (similar to ISO 8092)

Figure



Connection and circuit diagram



Relays

Mini relays

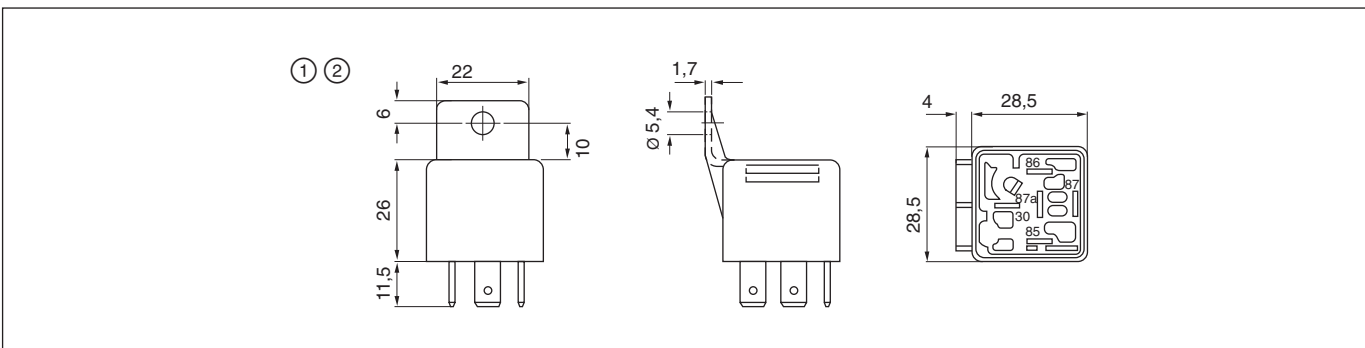
Changeover relay 24 V

0 332 209 206

Technical data		
Resistive load ¹⁾ - NO contact	A/Thousand	20/≥250
Resistive load ¹⁾ - NC contact	A/Thousand	10/≥250
Motor load ²⁾ - NO contact	A/A/Thousand	40/16/≥250
Lamp load ¹⁾ - NO contact	A/Thousand	16/≥250
Lamp load ¹⁾ - NC contact	A/Thousand	8/≥50 5/≥150
Contact material		silver tin oxide
Overall resistance of excitation circuit ⁴⁾	Ω	216±15
Response time	ms	≤ 15
Release time	ms	≤ 15
Degree of protection Terminals ³⁾		IP 20
Degree of protection Housing		IP 5K4
Illustration / Dimension drawing		1

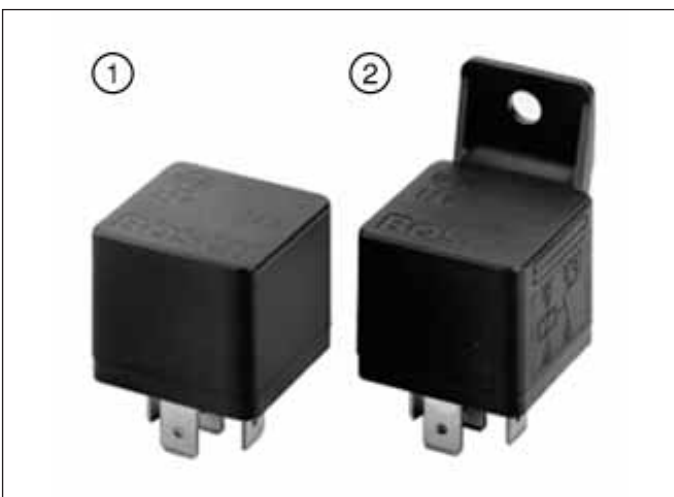
¹⁾ Switching current/no. of operations ²⁾ Making/continuous current/no. of operations ³⁾ When a socket housing is used and when installed with blade terminals pointing downwards. In a different installation position, the housing degree of protection is IP 20. ⁴⁾ at +20 °C

Dimensional drawing

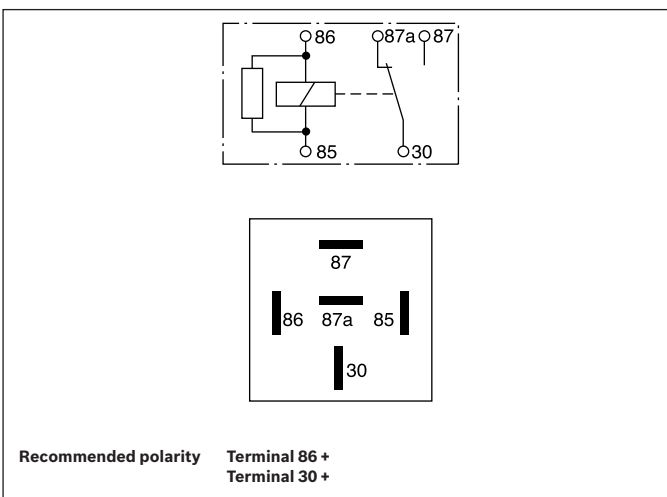


Blade terminal size: 6.3 x 0.8 mm to DIN 46 244 (similar to ISO 8092)

Figure



Connection and circuit diagram



Relays

Mini relays

Changeover relay 24 V

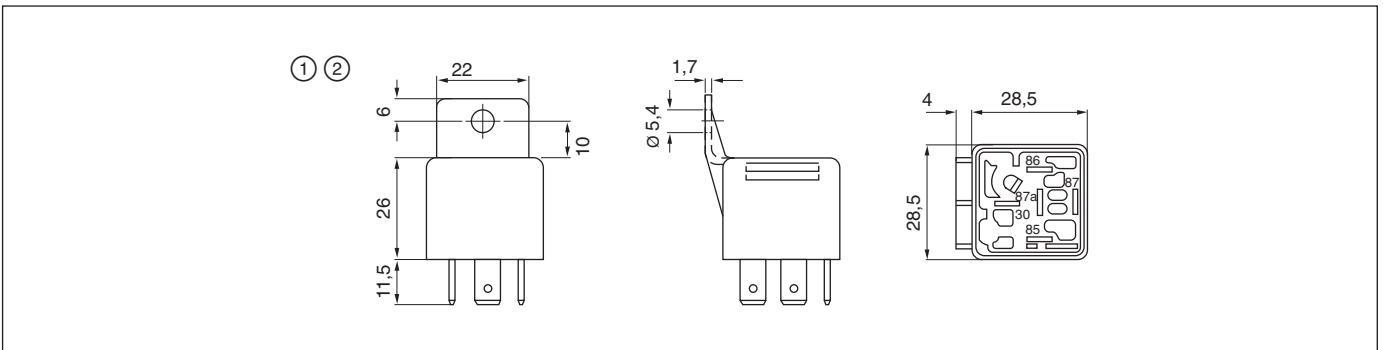
0 332 209 207

Technical data

Resistive load ¹⁾ - NO contact	A/Thousand	20/≥250
Resistive load ¹⁾ - NC contact	A/Thousand	10/≥250
Motor load ²⁾ - NO contact	A/A/Thousand	40/16/≥250
Lamp load ¹⁾ - NO contact	A/Thousand	16/≥250
Lamp load ¹⁾ - NC contact	A/Thousand	8/≥50 5/≥150
Contact material		silver tin oxide
Overall resistance of excitation circuit ⁴⁾	Ω	216±15
Response time	ms	≤ 15
Release time	ms	≤ 15
Degree of protection Terminals ³⁾		IP 20
Degree of protection Housing		IP 5K4
Illustration / Dimension drawing		2

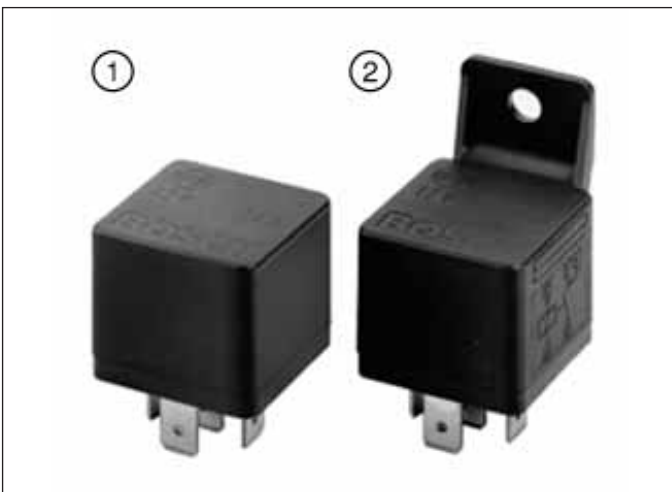
¹⁾ Switching current/no. of operations ²⁾ Making/continuous current/no. of operations ³⁾ When a socket housing is used and when installed with blade terminals pointing downwards. In a different installation position, the housing degree of protection is IP 20. ⁴⁾ at +20 °C

Dimensional drawing

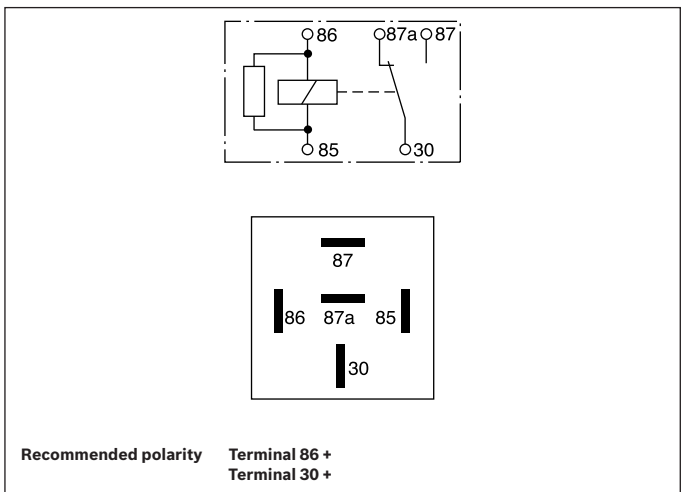


Blade terminal size: 6.3 x 0.8 mm to DIN 46 244 (similar to ISO 8092)

Figure



Connection and circuit diagram



Relays

Mini relays

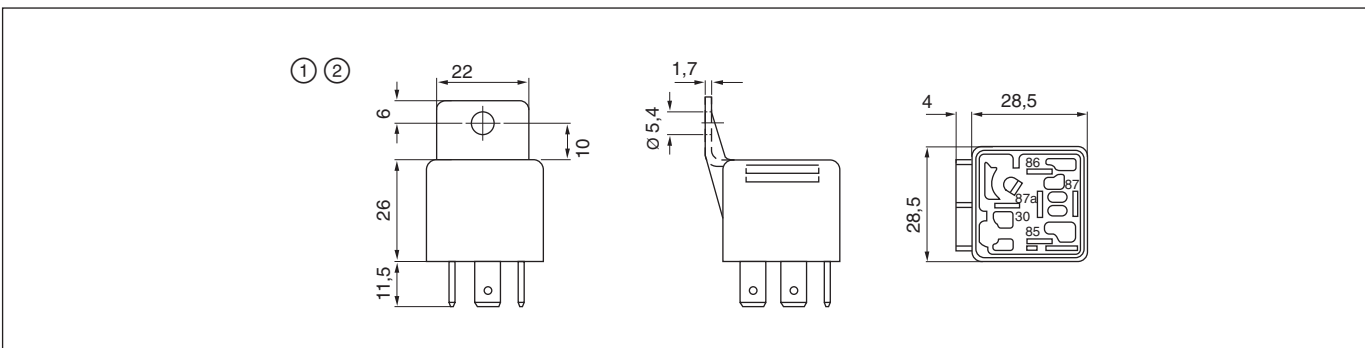
Changeover relay 24 V

0 332 209 211

Technical data		
Resistive load ¹⁾ - NO contact	A/Thousand	20/≥250
Resistive load ¹⁾ - NC contact	A/Thousand	10/≥250
Motor load ²⁾ - NO contact	A/A/Thousand	40/16/≥250
Lamp load ¹⁾ - NO contact	A/Thousand	16/≥250
Lamp load ¹⁾ - NC contact	A/Thousand	8/≥50 5/≥150
Contact material		silver tin oxide
Overall resistance of excitation circuit ⁴⁾	Ω	255±15
Response time	ms	≤ 15
Release time	ms	≤ 15
Degree of protection Terminals ³⁾		IP 20
Degree of protection Housing		IP 5K4
Illustration / Dimension drawing		1

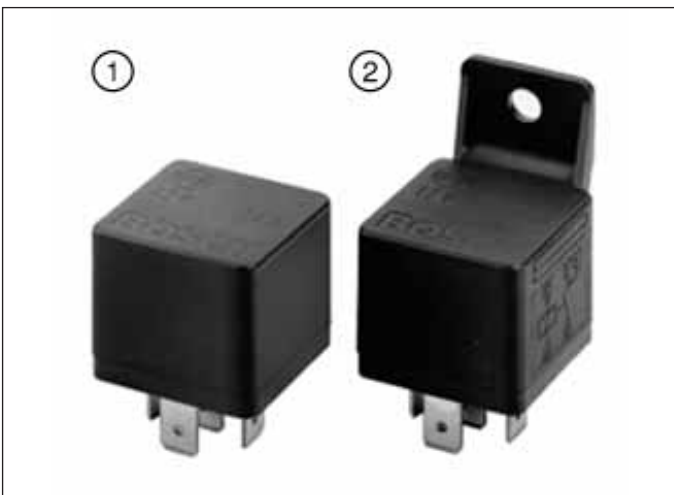
¹⁾ Switching current/no. of operations ²⁾ Making/continuous current/no. of operations ³⁾ When a socket housing is used and when installed with blade terminals pointing downwards. In a different installation position, the housing degree of protection is IP 20. ⁴⁾ at +20 °C

Dimensional drawing

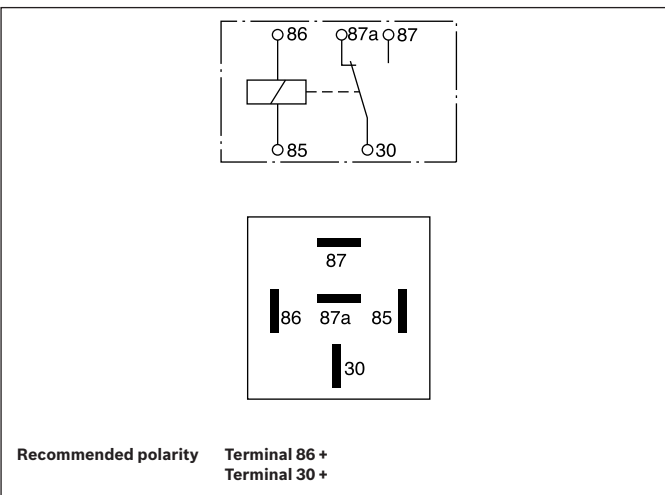


Blade terminal size: 6.3 x 0.8 mm to DIN 46 244 (similar to ISO 8092)

Figure



Connection and circuit diagram



Accessories

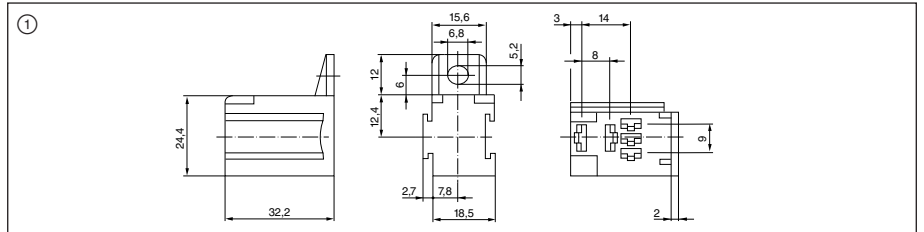


Receptacle housing for micro relay

① Receptacle housing with mounting bracket

Single and multiple mounting possible, screw-on, 5-pole; Receptacles 6.3 mm or 4.8 mm with snap-in pin to engage in housing.

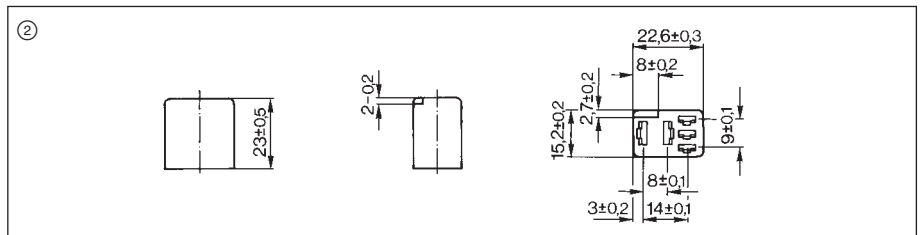
5 units **3 334 485 045**



② Receptacle housing without mounting bracket

5-pole; Receptacles 6.3 mm or 4.8 mm with snap-in pin to engage in housing.

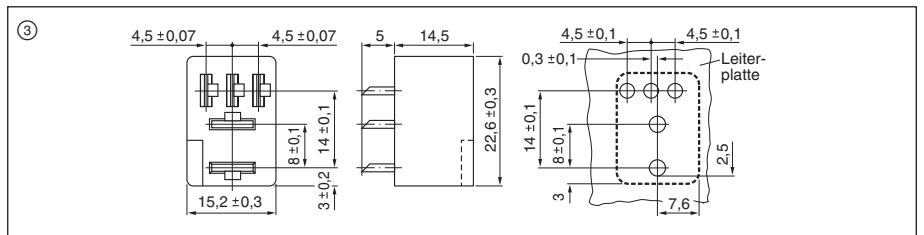
5 units **3 334 485 046**



③ Receptacle housing for soldering into printed-circuit boards

A solder-in receptacle housing allows micro relays to be connected to printed-circuit boards using blade terminals. The resulting interchangeability allows quick and cost-effective servicing.

5 units **3 334 485 049**

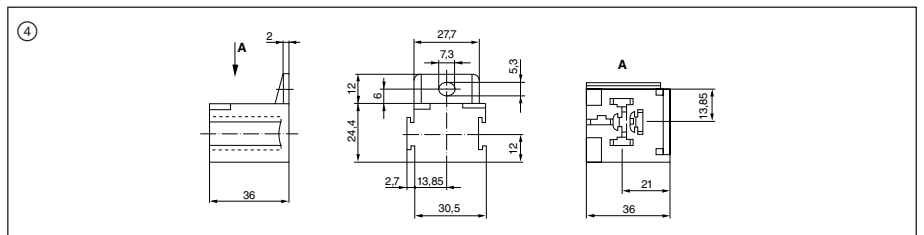


Receptacle housing for mini relay

④ Receptacle housing with mounting bracket

Single and multiple mounting possible, screw-on, 5-pole; Receptacles 6.3 mm with snap-in pin to engage in housing.

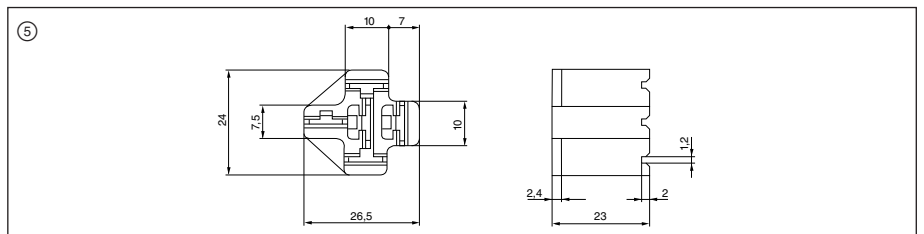
5 units **3 334 485 008**



⑤ Receptacle housing without mounting bracket

5-pole; Receptacles 6.3 mm with snap-in pin to engage in housing.

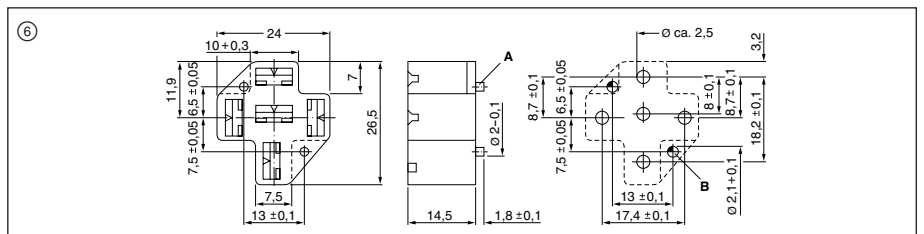
5 units **3 334 485 007**



⑥ Receptacle housing for soldering into printed-circuit boards

A solder-in receptacle housing allows mini relays to be connected to printed-circuit boards using blade terminals. The resulting interchangeability allows quick and cost-effective servicing. Receptacles in housing.

1 unit **3 334 485 041**



- A Two fixing pins
- B Holes for fixing pins



Assembly parts

⑦ Plastic removal clip

For removing micro relays from the receptacle housing.

1 unit **3 331 329 049**

⑧ Bronze receptacles

with snap-in pin to engage in receptacle housing.

Connector size 4.8 x 0.8 mm for micro relays

(similar to DIN 46 340) Tin-plated surface, attachable conductor cross-section 1...2.5 mm².

25 units **1 904 492 016**

Connector size 6.3 x 0.8 mm for micro and mini relays

(DIN 46340) Tin-plated surface, attachable conductor cross-section 1...2.5 mm².

25 units **1 901 355 895**

⑨ Brass receptacles

with insulating sleeve (DIN 46245)

Connector size 6.3 x 0.8 mm for power relays type 1 and type 2

Tin-plated surface, attachable conductor cross-section 0.5...1 mm².

Identification color: Red
100 units **1 901 355 880**

Attachable conductor cross-section 1...2.5 mm².

Identification color: Blue
100 units **1 901 355 881**

Connector size 9.5 x 1.2 mm for type 1 power relays

Tin-plated surface, attachable conductor cross-section 4...6 mm².

Identification color: Yellow
50 units **8 781 355 811**

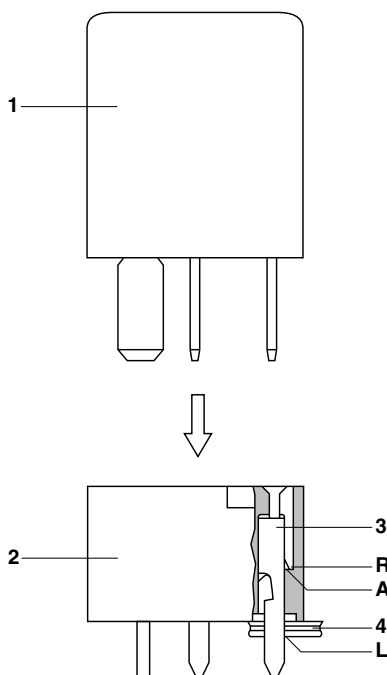


Additional accessories such as connectors, protective sleeves, pressing tools, leads etc. can be found in the “Accessories” catalog 1 987 721 074.

Recommended assembly:

The receptacle housing should be soldered onto the circuit board with the relay connected as this means that the receptacles are automatically centered and there is no load on the circuit board when connecting the relay. If the relay is connected after soldering in the receptacle housing, it is essential to ensure that the snap-in pin for the receptacle is in contact with the receptacle housing stop to relieve the strain on the soldering point.

- 1 Relay with blade terminal
- 2 Receptacle housing
- 3 Receptacle
- 4 Circuit board
- A Stop
- L Soldering point
- R Snap-in pin



Relays

Power relays

Characteristic quantities

Rated voltage (switching and excitation circuit)	12 V (type 1)	24 V (type 1)	12 V (type 2)	24 V (type 2)	12 V (type 3)
Operating voltage	8...14,5 V	16...27 V	15 V	30 V	8...16 V
Ambient temperature	-40...+100 °C	-40...+100 °C	-40...+65 °C ¹⁾	-40...+65 °C ¹⁾	-40...+100 °C
Voltage drop at measurement current in as-new condition	≤ 200 mV/50 A	≤ 150 mV/20 A	≤ 100 mV ²⁾ /75 A	≤ 100 mV/75 A	≤ 100 mV/100 A
Voltage drop after specified switching operations	≤ 225 mV/50 A		≤ 200 mV ³⁾ /75 A	≤ 200 mV/75 A	
Housing/terminal degree of protection (refer to Page 5)	IP 20 ⁴⁾ /IP 20	IP 20 ⁴⁾ /IP 20	IP 54 /IP 00	IP 54 /IP 00	IP 67 /IP 20

¹⁾ +100 °C for short-term operation with 25% operating time relative to 2 minutes. ²⁾ ≤ 50 mV/75 A for double contact relay 0 332 002 150. ³⁾ ≤ 100 mV/75 A for double contact relay 0 332 002 150. ⁴⁾ Housing protection type IP 5K4 when using a receptacle housing with installation position at lower connector.

Notes

- Compact design.
- High degree of corrosion protection due to use of glass-fiber-reinforced polyamide for baseplate and cap.
- High degree of protection against splash water thanks to drip rim between cap and baseplate.
- Leakage-current barriers in baseplate.

- Designed-in ventilation by means of “labyrinth”.
- Option of “heavy duty” version with tungsten leading contact.

Automotive applications:

- Load-reducing relay for switches.
- Operating relay for starting motors.
- Switch-on relay for hydraulic assemblies, slowers and heaters

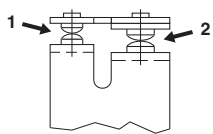
for the passenger compartment, engine-cooling fans.

- Pre-heating device for diesel starting systems.
- Motor relay for antilock braking system (ABS).
- Battery cutoff relay.

Accessories

see page 40

Method of operation of leading contact



1. Closure of leading contact
Coil energized; current flows in leading contact for a fraction of a second.

2. Closure of main contact
Coil energized; current flows in main contact. The characteristics of the tungsten leading contact make it ideal for the considerable loads resulting from the separation arc when contacts are opening (inductive loads). The main

contact ensures efficient current flow with minimum voltage losses. The tungsten leading contact (late-opening when the contacts open) ensures that the main contacts are not subject to separation arcs.

Relays

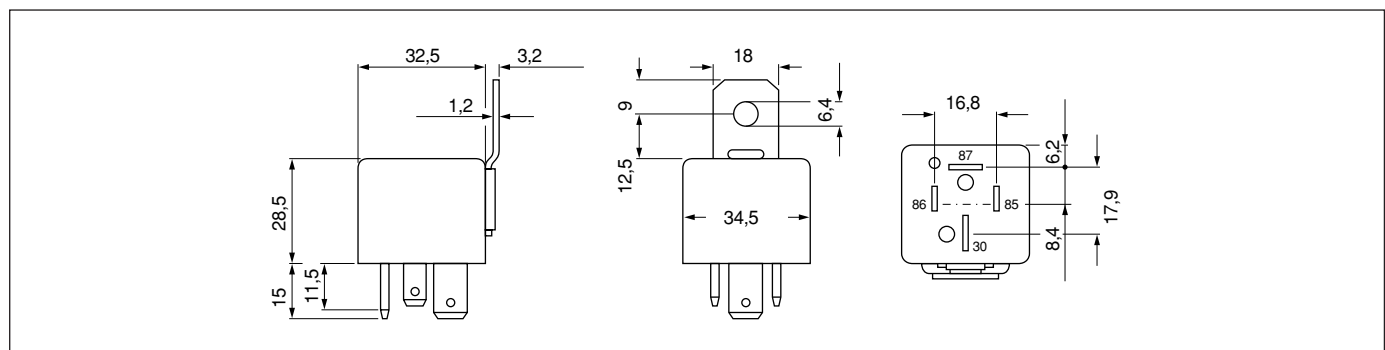
Power relays

Make relay 12 V type 1

0 332 002 192

Technical data			
Resistive load	Switching current/no. of operations	A/Thousand	50 / ≥ 100
Resistive load	Short-time load ≤ 1 s	A	120
Motor load	Making curr./cont.curr./no. of operations	A/A/Thousand	86/55 / ≥ 130
Response/release voltage		V/V	$\leq 6,0/1,0...5,0$
Response/release time		ms/ms	$\leq 10 / \leq 10$
Contact type			single
Bracket			plugged in
Overall resistance		Ω	45 ± 5

Dimensional drawing

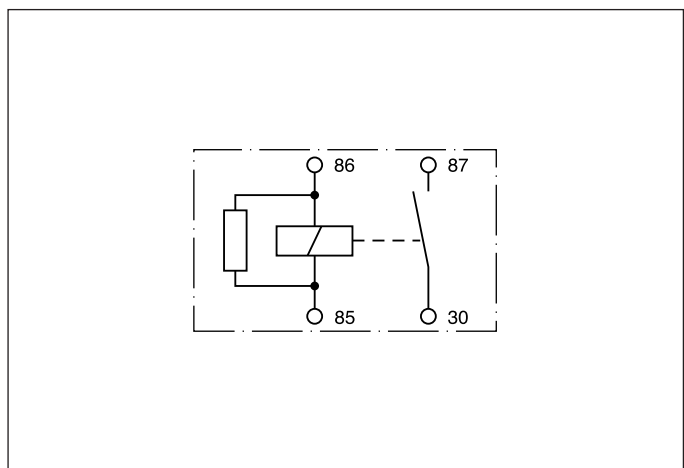


Blade terminal connections: Excitation side terminals 85 and 86: 6.3 x 0.8 mm; Contact side terminals 30 and 87: 9.5 x 1.2 mm

Figure



Connection and circuit diagram



Polarity: Terminal 86 and terminal 30 to +

Relays

Power relays

Make relay 24 V type 1

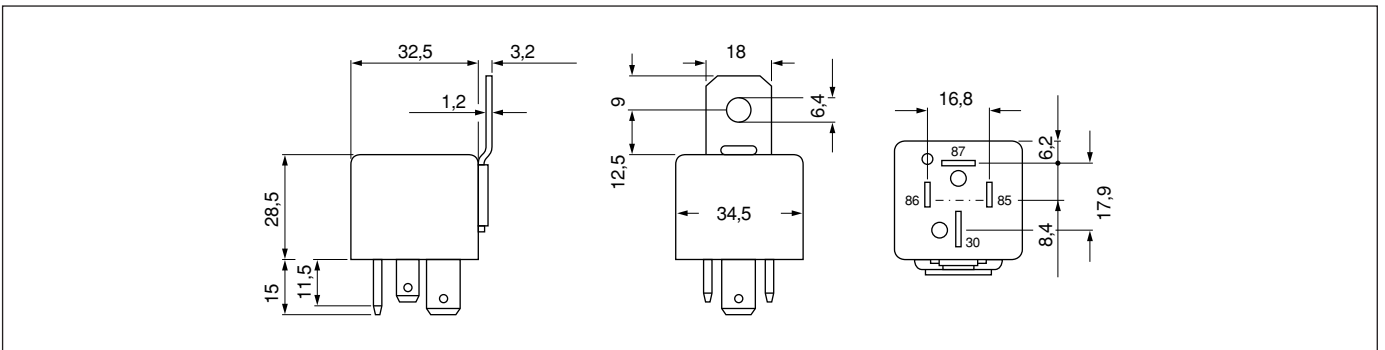
0 332 002 270

Technical data

Resistive load	Switching current/no. of operations	A/Thousand	30 / \geq 50
Resistive load	Short-time load \leq 1 s	A	70
Motor load	Making curr./cont.curr./no. of operations	A/A/Thousand	70/20 / \geq 120
Response/release voltage		V/V	\leq 16,0/3,0...8,0
Response/release time		ms/ms	\leq 15 / \leq 15
Contact type			leading contact
Bracket			none ¹⁾
Overall resistance		Ω	200 \pm 10

¹⁾ Bracket can be obtained under part number 3 331 335 063.

Dimensional drawing

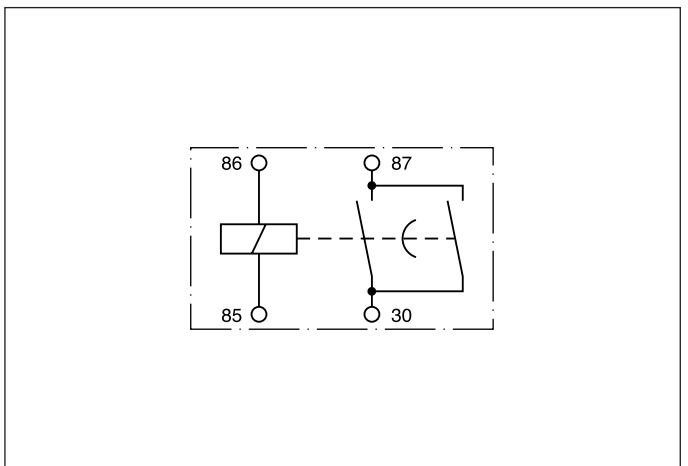


Blade terminal connections: Excitation side terminals 85 and 86: 6.3 x 0.8 mm; Contact side terminals 30 and 87: 9.5 x 1.2 mm

Figure



Connection and circuit diagram



Polarity: Terminal 86 and terminal 30 to +

Relays

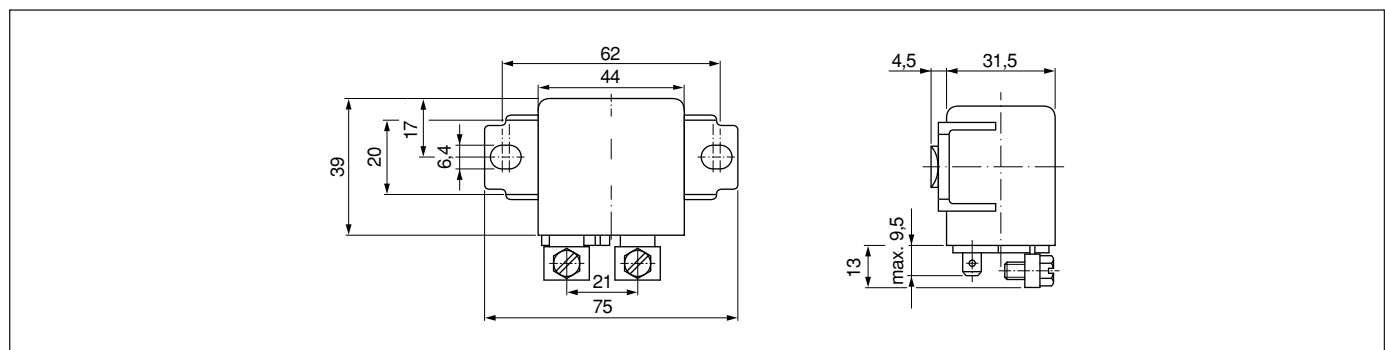
Power relays

Make relay 12 V type 2

0 332 002 150

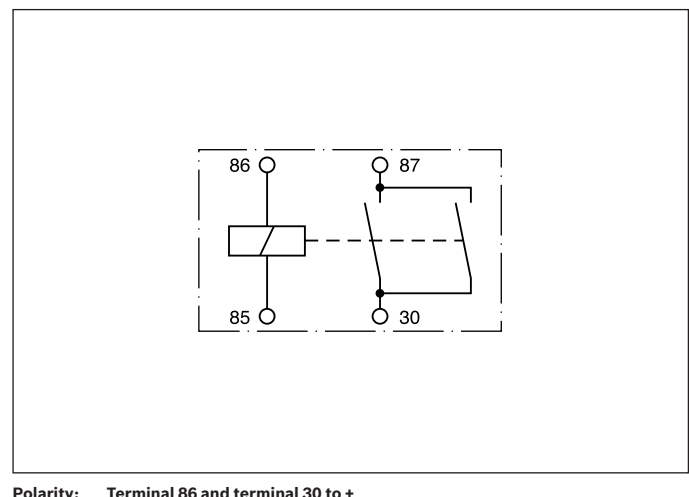
Technical data			
Resistive load	Switching current/no. of operations	A/Thousand	75 / \geq 125
Resistive load	Short-time load \leq 1 s	A	400
Response/release voltage		V/V	\leq 8,0/1,5...4,0
Response/release time		ms/ms	\leq 10 / \leq 15
Contact type			twin
Bracket			fixed
Overall resistance		Ω	46 \pm 5

Dimensional drawing



Accessories: Double receptacle housing for excitation side (terminals 85 and 86). Order using Tyco (AMP) number 180 907 from: Tyco (AMP) Deutschland GmbH, Amperestraße 7-11, D-63225 Langen, Tel. 0 61 03/70 90.

Figure Connection and circuit diagram



Polarity: Terminal 86 and terminal 30 to +

Relays

Power relays

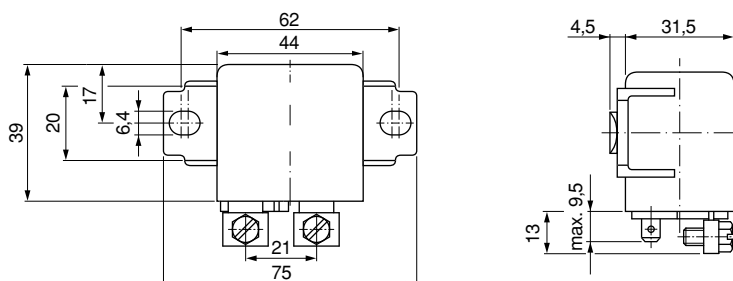
Make relay 12 V type 2

0 332 002 156

Technical data

Resistive load	Switching current/no. of operations	A/Thousand	75 / ≥ 100
Resistive load	Short-time load ≤ 1 s	A	250
Response/release voltage		V/V	$\leq 8,5/1,0 \dots 4,0$
Response/release time		ms/ms	$\leq 10 / \leq 15$
Contact type			single
Bracket			fixed
Overall resistance		Ω	46 ± 5

Dimensional drawing

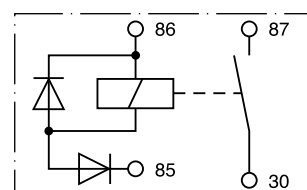


Accessories: Double receptacle housing for excitation side (terminals 85 and 86). Order using Tyco (AMP) number 180 907 from: Tyco (AMP) Deutschland GmbH, Amperestraße 7-11, D-63225 Langen, Tel. 0 61 03/70 90.

Figure



Connection and circuit diagram



Polarity: Terminal 86 and terminal 30 to +

Relays

Power relays

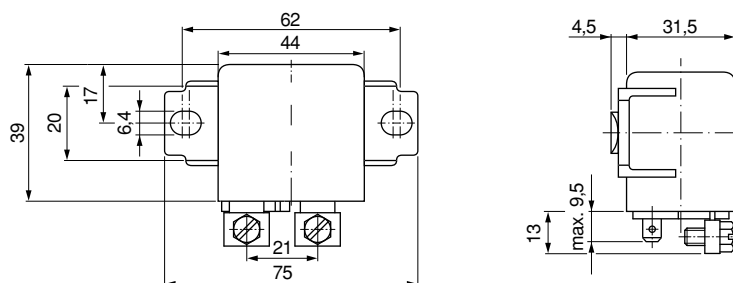
Make relay 12 V type 2

0 332 002 161

Technical data

Resistive load	Switching current/no. of operations	A/Thousand	75 / \geq 125
Resistive load	Short-time load \leq 1 s	A	400
Response/release voltage		V/V	\leq 5,5/0,5...4,0
Response/release time		ms/ms	\leq 10 / \leq 10
Contact type			single
Bracket			fixed
Overall resistance		Ω	20 \pm 3

Dimensional drawing

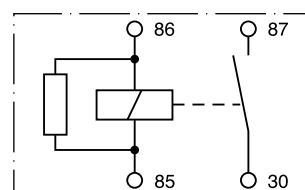


Accessories: Double receptacle housing for excitation side (terminals 85 and 86). Order using Tyco (AMP) number 180 907 from: Tyco (AMP) Deutschland GmbH, Amperestraße 7-11, D-63225 Langen, Tel. 0 61 03/70 90.

Figure



Connection and circuit diagram



Polarity: Terminal 86 and terminal 30 to +

Relays

Power relays

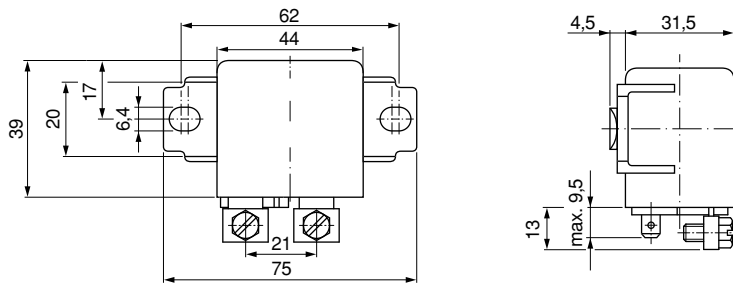
Make relay 24 V type 2

0 332 002 250

Technical data

Resistive load	Switching current/no. of operations	A/Thousand	50 / \geq 100
Resistive load	Short-time load \leq 1 s	A	200
Response/release voltage		V/V	\leq 18,0/1,0...8,0
Response/release time		ms/ms	\leq 10 / \leq 10
Contact type			leading contact
Bracket			fixed
Overall resistance		Ω	130 \pm 10

Dimensional drawing

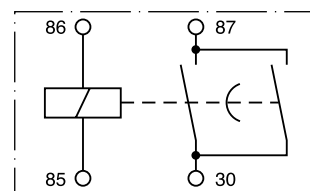


Accessories: Double receptacle housing for excitation side (terminals 85 and 86). Order using Tyco (AMP) number 180 907 from: Tyco (AMP) Deutschland GmbH, Amperestraße 7-11, D-63225 Langen, Tel. 0 61 03/70 90.

Figure



Connection and circuit diagrams



Polarity: Terminal 86 and terminal 30 to +

Relays

Power relays

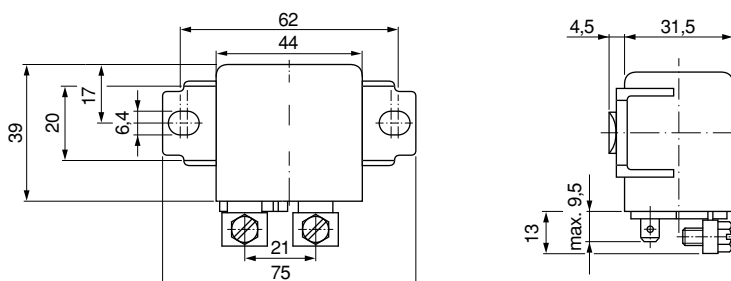
Make relay 24 V type 2

0 332 002 256

Technical data

Resistive load	Switching current/no. of operations	A/Thousand	50 / ≥ 50
Resistive load	Short-time load ≤ 1 s	A	150
Response/release voltage		V/V	≤ 17,0/4,0...8,0
Response/release time		ms/ms	≤ 10 / ≤ 15
Contact type			single
Bracket			fixed
Overall resistance		Ω	130 ± 10

Dimensional drawing

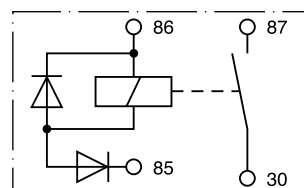


Accessories: Double receptacle housing for excitation side (terminals 85 and 86). Order using Tyco (AMP) number 180 907 from: Tyco (AMP) Deutschland GmbH, Amperestraße 7-11, D-63225 Langen, Tel. 0 61 03/70 90.

Figure



Connection and circuit diagrams



Polarity: Terminal 86 and terminal 30 to +

Relays

Power relays

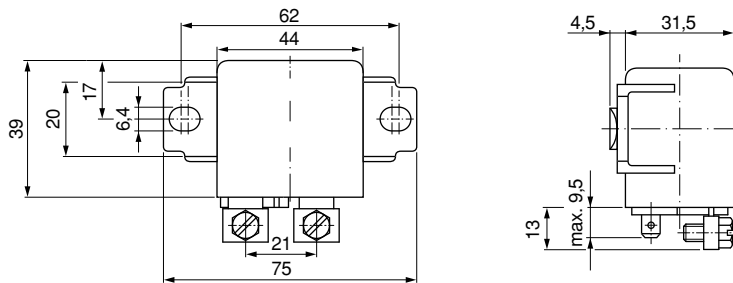
Make relay 24 V type 2

0 332 002 257

Technical data

Resistive load	Switching current/no. of operations	A/Thousand	50 / ≥ 50
Response/release voltage		V/V	$\leq 18,0/1,0...8,0$
Response/release time		ms/ms	$\leq 10 / \leq 10$
Contact type			single
Bracket			fixed
Overall resistance		Ω	130 ± 10

Dimensional drawing

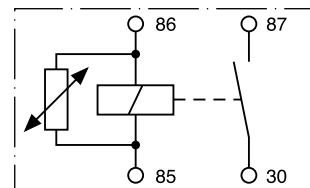


Accessories: Double receptacle housing for excitation side (terminals 85 and 86). Order using Tyco (AMP) number 180 907 from: Tyco (AMP) Deutschland GmbH, Amperestraße 7-11, D-63225 Langen, Tel. 0 61 03/70 90.

Figure



Connection and circuit diagrams



Polarity: Terminal 86 and terminal 30 to +

Relays

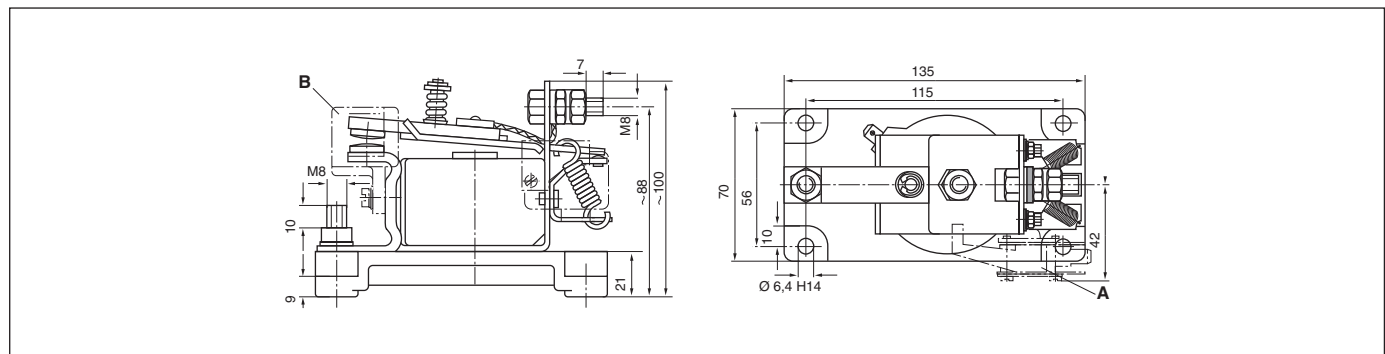
Power relays

Make relay 12 V type 3

0 332 002 351

Technical data			
Resistive load	Switching current/no. of operations	A/Thousand	75 / ≥ 200
Resistive load	Short-time load ≤ 1 s	A	500
Response/release voltage		V/V	$\leq 8,0/1,5...4,0$
Response/release time		ms/ms	$\leq 10 / \leq 10$
Contact type			twin
Bracket			fixed
Overall resistance		Ω	46 ± 5

Dimensional drawing

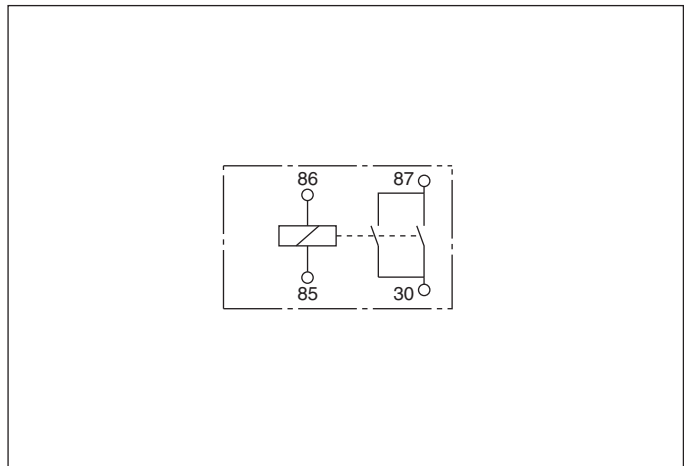


Accessories: Tyco (AMP) Supersal connector; Connector housing no. 282080-1; Contact no. 183025-1 (x2); Single wire seal no. 828920-1 for 1.5mm² cable (x2)

Figure



Connection and circuit diagram



Relays

Power relays

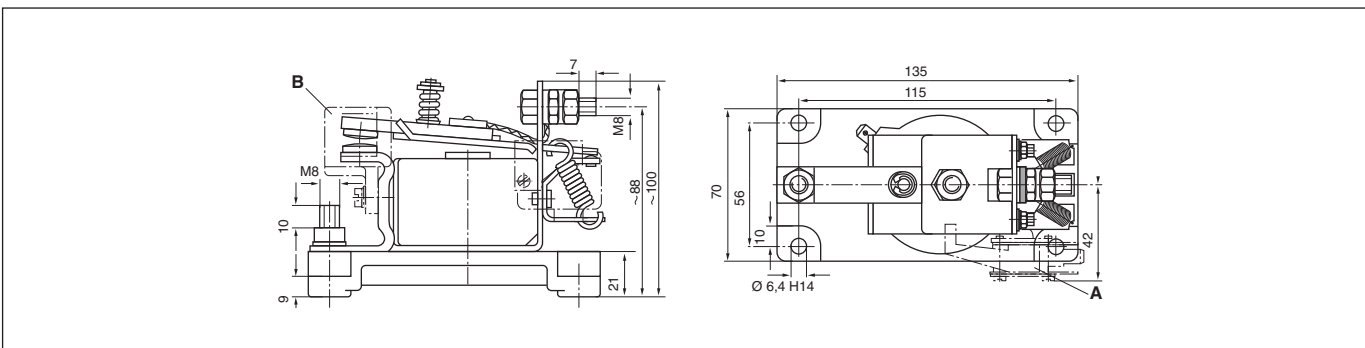
Make relay 12 V type 3

0 332 002 352

Technical data

Resistive load	Switching current/no. of operations	A/Thousand	75 / \geq 200
Resistive load	Short-time load \leq 1 s	A	500
Response/release voltage		V/V	\leq 8,0/1,5...4,0
Response/release time		ms/ms	\leq 10 / \leq 10
Contact type			twin
Bracket			fixed
Overall resistance		Ω	42 \pm 5

Dimensional drawing

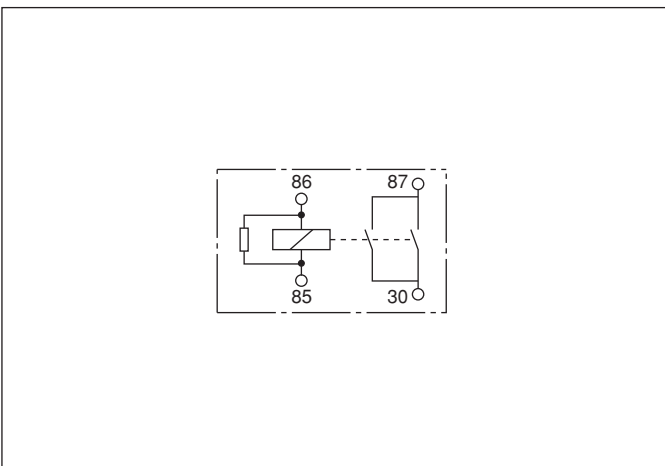


Accessories: Tyco (AMP) Supersal connector; Connector housing no. 282080-1; Contact no. 183025-1 (x2); Single wire seal no. 828920-1 for 1.5mm² cable (x2)

Figure



Connection and circuit diagram



Relays

Power relays Series 200,201

Characteristic quantities

Designation	230A cutout blade relay
Rated voltage ¹⁾	24 V,36 V,48 V,80 V
Design	Open
Mode of operation	Continuous operation up to 1h
Version	Optionally available with auxiliary relay and blow magnet
Voltage limits (permissible)	0.7 x rated voltage to rated voltage
Switching times at rated voltage	Response time ≤ 50 ms; Release time ≤ 30 ms
Useage category	Starting, switch off during operation DC4-VDE 0660
Creepage distances and air gaps	based on insulation group C-VDE 0110
Coil power	32 W
Coil connection	Blade terminal 0,8 x 6,3 mm
Main-current contacts	Make contact - series 0 333 200...; Changeover contact - series 0 333 201 ...
Operating-current rated value	375 A
Sustained thermal current	230 A
Contact material	Silver cadmium oxide (AgCdO) sintered
Stud	M 8; Permissible tightening torque 6...8 Nm
Auxiliary contact	Changeover contact
Auxiliary-contact sustained current	2.5 A with inductive load, 6A with ohmic load
Auxiliary-contact connection	Blade terminal 0,8 x 6,3 mm
Blow-out magnet	optionally only for 36 V, 48 V, 80 V.
Degree of protection (refer to Page 5)	IP 00
Operating-temperature range	-40...+100 °C
Note 1	For industrial trucks, hydraulic systems etc.
Note 2	Observe polarity of main current connections. Connect to fixed contact.

¹⁾ Excitation and switching voltage.

Relays

Power relays Series 200,201

Normally open relay 24 V

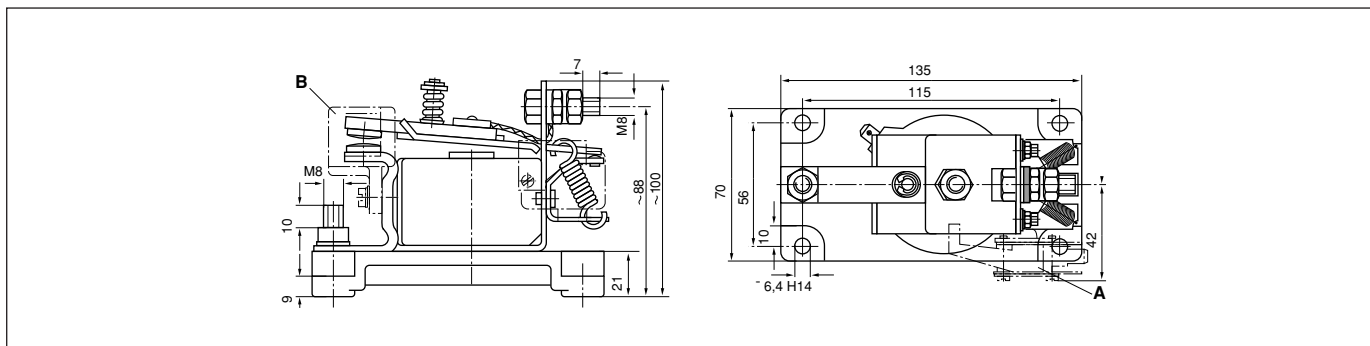
0 333 200 010

Technical data

Nominal voltage ¹⁾		V	24
Nominal value of excitation current		A	1,3
Switching current	Contin. Duty	A	230
Switching current	Load current 1 s	A	1500
Service life of contact	Mechanical	Thousand	1250
Service life of contact	Electrical	Thousand	250
Interrupting current with inductive load		A	375
Dimensions	L x W x H	mm	135 x 70 x 100
Weight		kg	1,2

¹⁾ Excitation and switching voltage.

Dimensional drawing

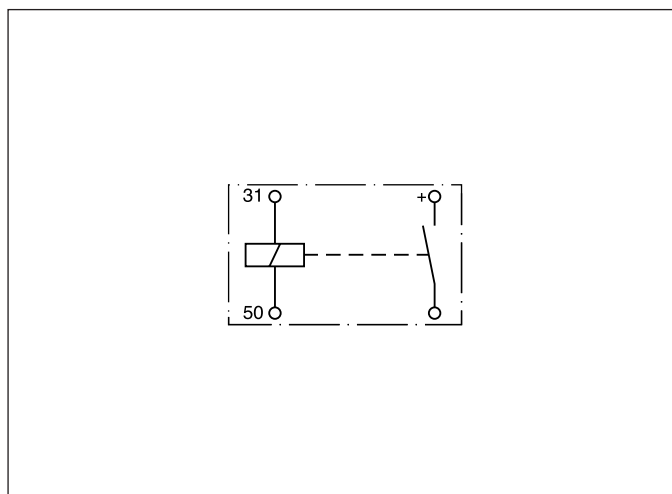


A Design with auxiliary relay
 B Blow magnet

Figure



Connection and circuit diagram



Relays

Power relays Series 200,201

Normally open relay 24 V

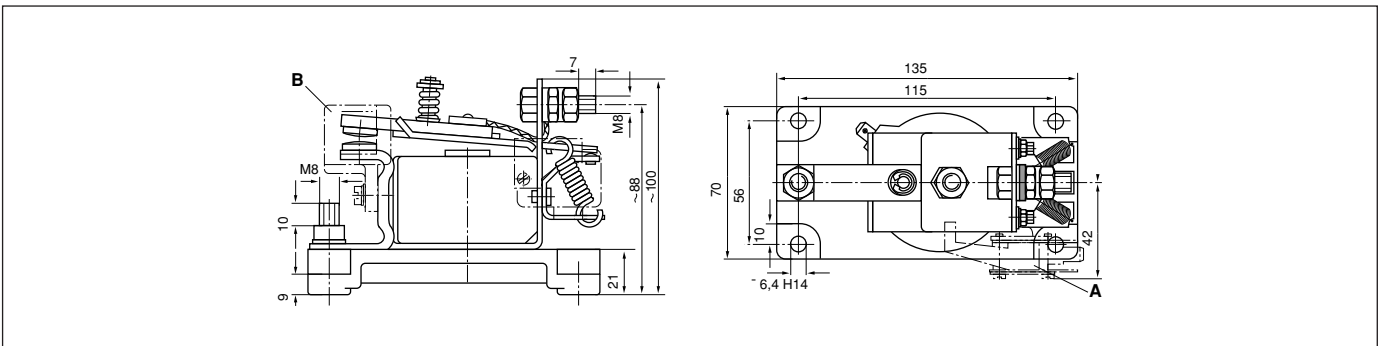
0 333 200 012

Technical data

Nominal voltage ¹⁾	V	24	
Nominal value of excitation current	A	1,3	
Switching current	Contin. Duty	A	230
Switching current	Load current 1 s	A	1500
Service life of contact	Mechanical	Thousand	1250
Service life of contact	Electrical	Thousand	250
Interrupting current with inductive load	A	375	
Dimensions	L x W x H	mm	135 x 70 x 100
Weight	kg	1,2	

Installation position: long edge of baseplate vertical, max. inclination 10°. ¹⁾ Excitation and switching voltage.

Dimensional drawing

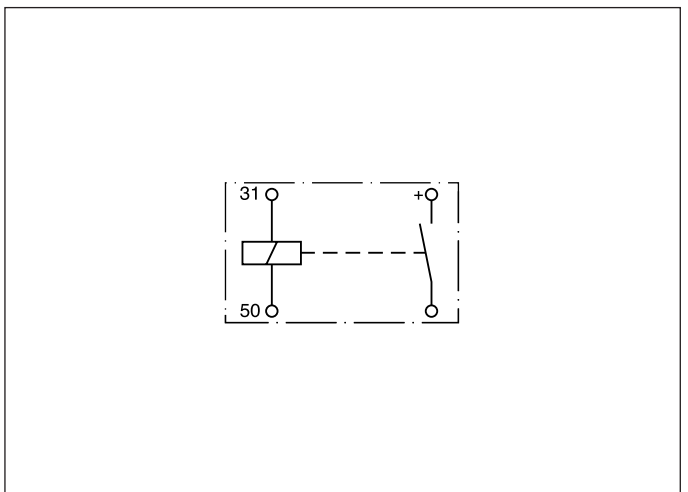


- A Design with auxiliary relay
- B Blow magnet

Figure



Connection and circuit diagram



Relays

Power relays Series 200,201

Normally open relay 80 V

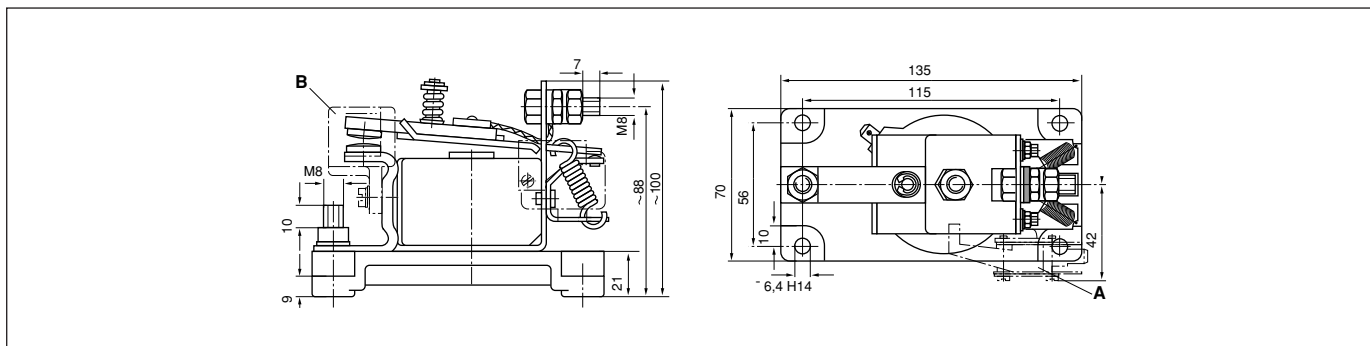
0 333 200 013

Technical data

Nominal voltage ¹⁾		V	80
Nominal value of excitation current		A	0,4
Switching current	Contin. Duty	A	230
Switching current	Load current 1 s	A	1500
Service life of contact	Mechanical	Thousand	1250
Service life of contact	Electrical	Thousand	250
Interrupting current with inductive load		A	375
Dimensions	L x W x H	mm	135 x 70 x 100
Weight		kg	1,2

With blowout magnet. ¹⁾ Excitation and switching voltage.

Dimensional drawing

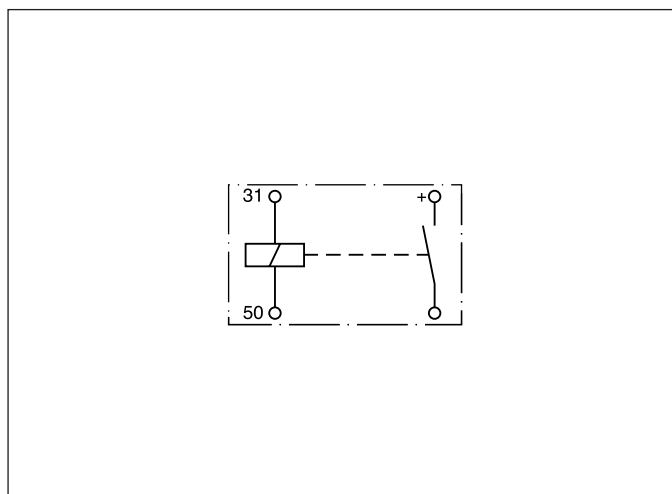


- A Design with auxiliary relay
B Blow magnet

Figure



Connection and circuit diagram



Relays

Power relays Series 200,201

Normally open relay with auxiliary relay 24 V

0 333 200 011

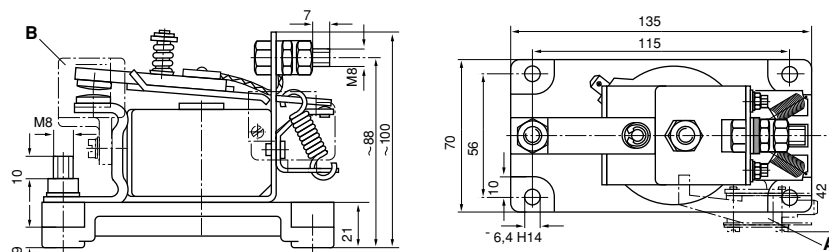
Technical data

Nominal voltage ¹⁾		V	24
Nominal value of excitation current		A	1,3
Switching current	Contin. Duty	A	230
Switching current	Load current 1 s	A	1500
Service life of contact	Mechanical	Thousand	1250
Service life of contact	Electrical	Thousand	250
Interrupting current with inductive load		A	375
Dimensions	L x W x H	mm	135 x 70 x 100
Weight		kg	1,2

With additional auxiliary relay (changeover contact), e.g. for indicator lamps, max. 6 A (resistive load); 2.5 A (inductive load); contact P switches from 1 to 2.

¹⁾ Excitation and switching voltage.

Dimensional drawing

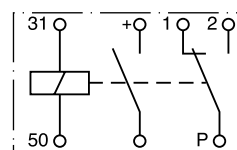


A Design with auxiliary relay
B Blow magnet

Figure



Connection and circuit diagram



Relays

Power relays Series 200,201

Changeover relay 24 V

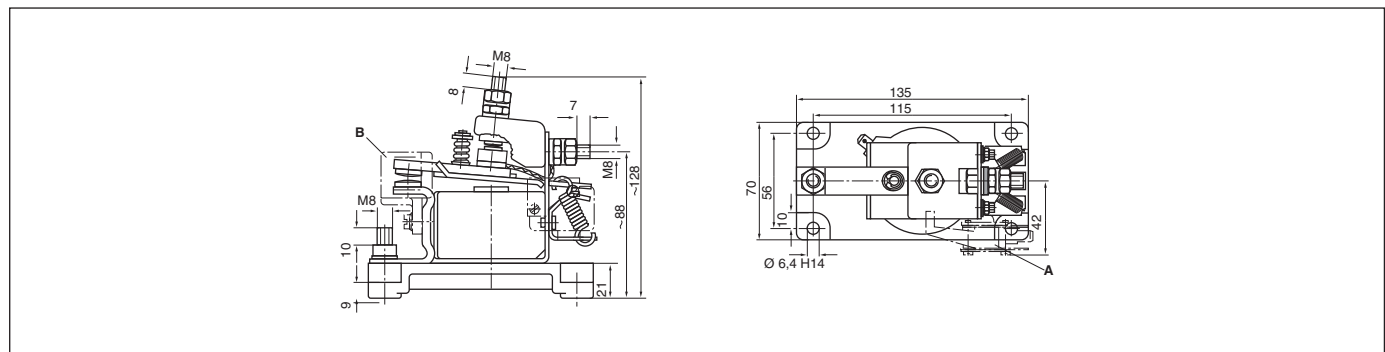
0 333 201 010

Technical data

Nominal voltage ¹⁾		V	24
Nominal value of excitation current		A	1,3
Switching current	Contin. Duty	A	230
Switching current	Load current 1 s	A	1500
Service life of contact	Mechanical	Thousand	1250
Service life of contact	Electrical	Thousand	100
Interrupting current with inductive load		A	375
Dimensions	L x W x H	mm	135 x 70 x 128
Weight		kg	1,3

¹⁾ Excitation and switching voltage.

Dimensional drawing

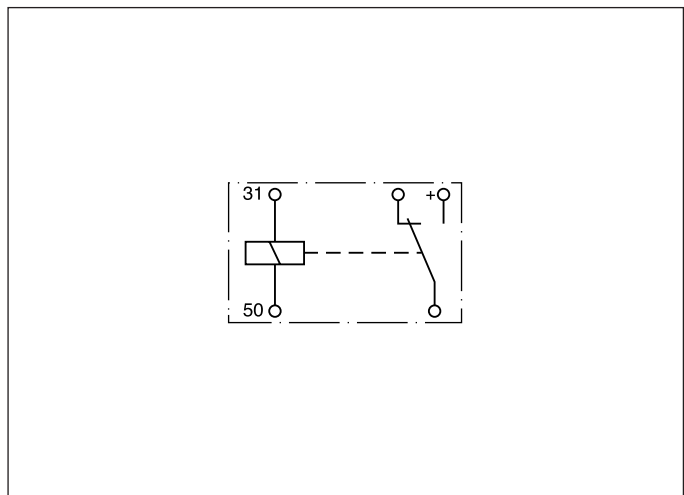


A Design with auxiliary relay
 B Blow magnet

Figure



Connection and circuit diagram



Relays

Power relays Series 200,201

Changeover relay 80 V

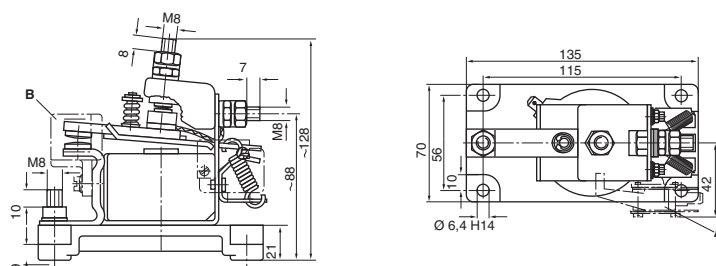
0 333 201 012

Technical data

Nominal voltage ¹⁾		V	80
Nominal value of excitation current		A	0,4
Switching current	Contin. Duty	A	230
Switching current	Load current 1 s	A	1500
Service life of contact	Mechanical	Thousand	1250
Service life of contact	Electrical	Thousand	100
Interrupting current with inductive load		A	375
Dimensions	L x W x H	mm	135 x 70 x 128
Weight		kg	1,3

 With blowout magnet. ¹
¹ Excitation and switching voltage.

Dimensional drawing

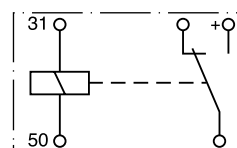


A Design with auxiliary relay
 B Blow magnet

Figure



Connection and circuit diagram



Relays

Power relays Series 200,201

Changeover relay with auxiliary relay 24 V

0 333 201 011

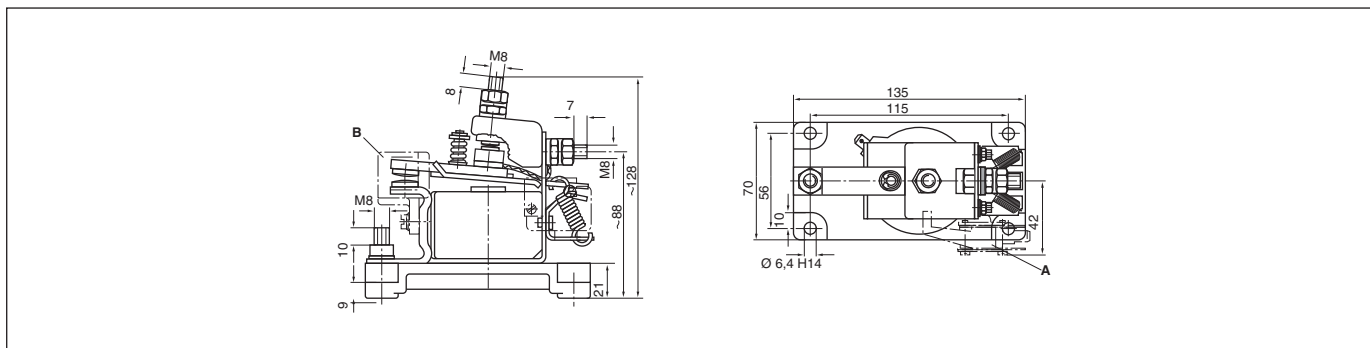
Technical data

Nominal voltage ¹⁾		V	24
Nominal value of excitation current		A	1,3
Switching current	Contin. Duty	A	230
Switching current	Load current 1 s	A	1500
Service life of contact	Mechanical	Thousand	1250
Service life of contact	Electrical	Thousand	100
Interrupting current with inductive load		A	375
Dimensions	L x W x H	mm	135 x 70 x 128
Weight		kg	1,3

With additional auxiliary relay (changeover contact), e.g. for indicator lamps, max. 6 A (resistive load); 2.5 A (inductive load); contact P switches from 1 to 2.

¹⁾ Excitation and switching voltage.

Dimensional drawing



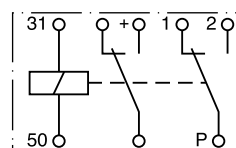
A Design with auxiliary relay

B Blow magnet

Figure



Connection and circuit diagrams



Relays

Power relays Series 200,201

Changeover relay with auxiliary relay 80 V

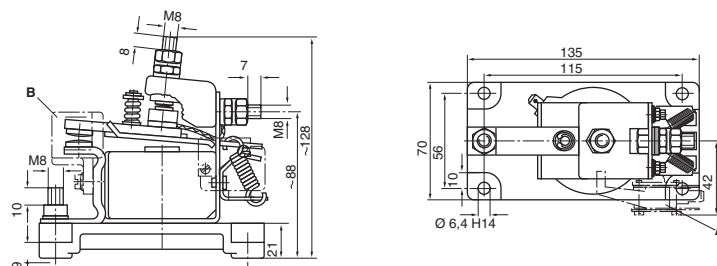
0 333 201 013

Technical data

Nominal voltage ¹⁾		V	80
Nominal value of excitation current		A	0,4
Switching current	Contin. Duty	A	230
Switching current	Load current 1 s	A	1500
Service life of contact	Mechanical	Thousand	1250
Service life of contact	Electrical	Thousand	100
Interrupting current with inductive load		A	375
Dimensions	L x W x H	mm	135 x 70 x 128
Weight		kg	1,3

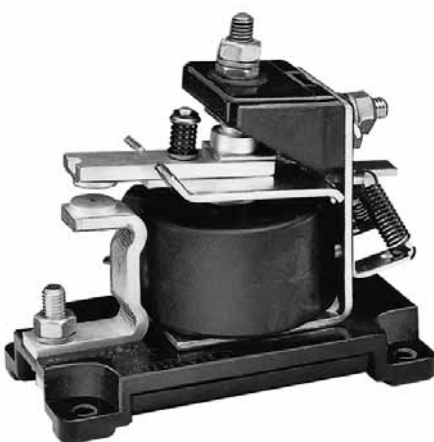
With additional auxiliary relay (changeover contact), e.g. for indicator lamps, max. 6 A (resistive load); 2.5 A (inductive load); contact P switches from 1 to 2.
¹⁾ Excitation and switching voltage.

Dimensional drawing

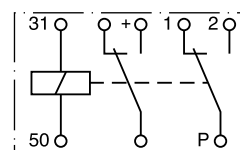


A Design with auxiliary relay
 B Blow magnet

Figure



Connection and circuit diagrams



Relays

Power relays Series 006

Characteristic quantities

Designation	80A solenoid plunger relay
Rated voltage ¹⁾	6 V,12 V,24 V
Design	Closed
Mode of operation	Continuous operation up to 1h
Voltage limits (permissible)	0.75 x rated voltage, after 1h continuous operation up to rated voltage
Switching times at rated voltage	Response time ≤ 50 ms; Release time ≤ 30 ms
Useage category	Starting, switch off during operation DC4-VDE 0660
Creepage distances and air gaps	based on insulation group C-VDE 0110
Coil power	13 W
Coil connection	Terminal screws, for conductor diameter 3 mm
Main current contacts	Make contact, break contact
Contact material	Copper
Stud	M 8; Permissible tightening torque 10...15 Nm
Degree of protection (refer to Page 5)	Terminals IP 00 ; Housing IP 54
Operating-temperature range	-40...+100 °C
Note	For continuous operation, ensure adequate ventilation (cooling).

¹⁾ Excitation and switching voltage.

Relays

Power relays Series 006

Make relay 12 V

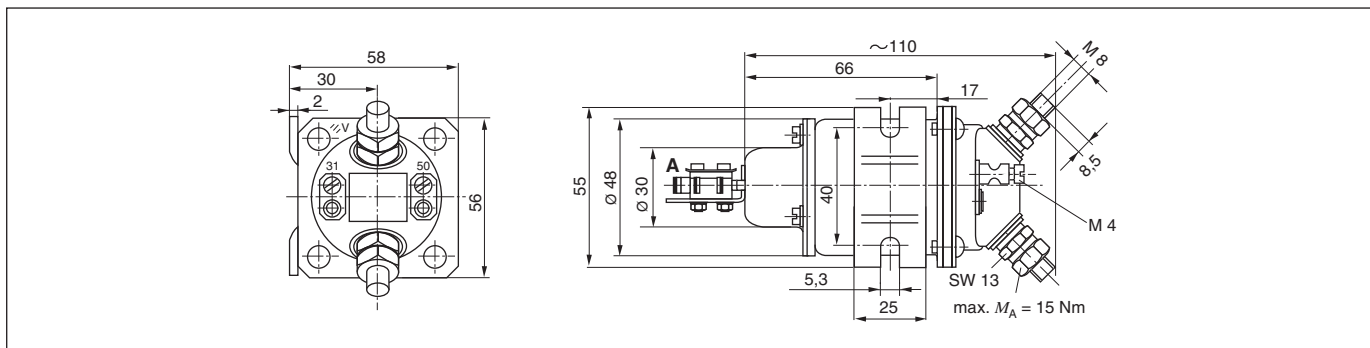
0 333 006 004

Technical data

Nominal voltage ¹⁾		V	12
Nominal value of excitation current		A	1,1
Nominal load current	Contin. duty	A	80
Nominal load current	Load current up to 1 s	A	800
Service life of contact	Mechanical	Thousand	500
Service life of contact	Electrical	Thousand	100
Interrupting current with inductive load		A	80
Dimensions	L x W x H	mm	110 x 55 x 60
Weight		kg	0,78

¹⁾ Excitation and switching voltage.

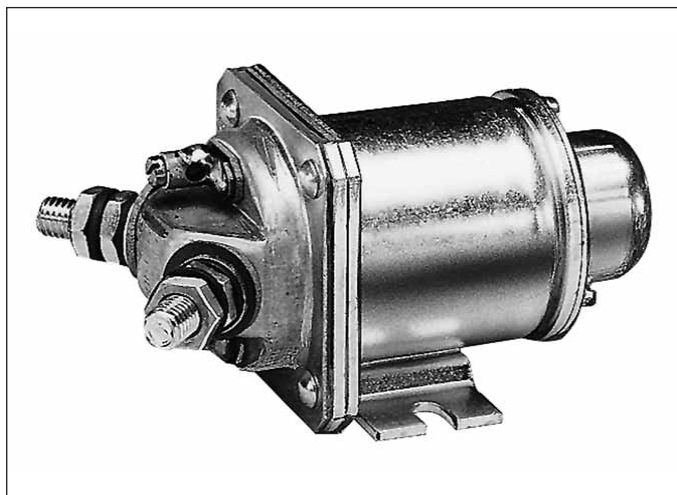
Dimensional drawing



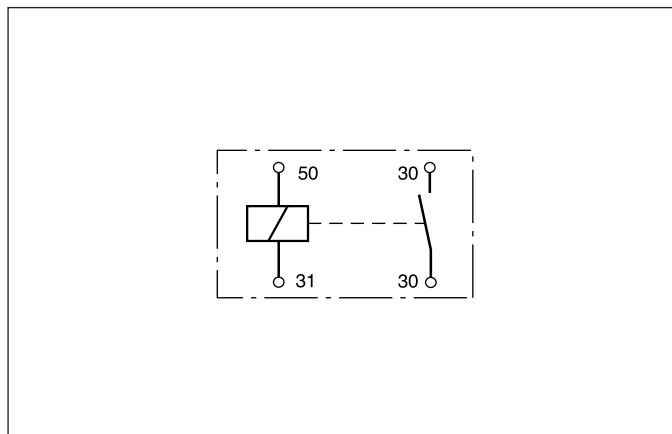
A Auxiliary relay only with 0 333 006 015. Loose parts enclosed with 0 333 006 006.

SW Width across flats

Figure



Connection and circuit diagram



Relays

Power relays Series 006

Make relay 24 V

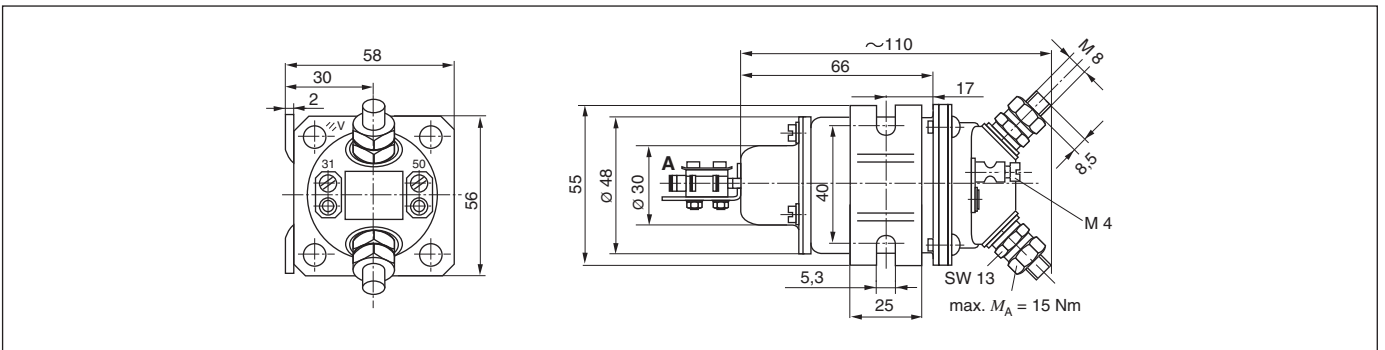
0 333 006 006

Technical data

Nominal voltage ¹⁾		V	24
Nominal value of excitation current		A	0,6
Nominal load current	Contin. duty	A	80
Nominal load current	Load current up to 1 s	A	800
Service life of contact	Mechanical	Thousand	500
Service life of contact	Electrical	Thousand	100
Interrupting current with inductive load		A	80
Dimensions	L x W x H	mm	110 x 55 x 60
Weight		kg	0,77

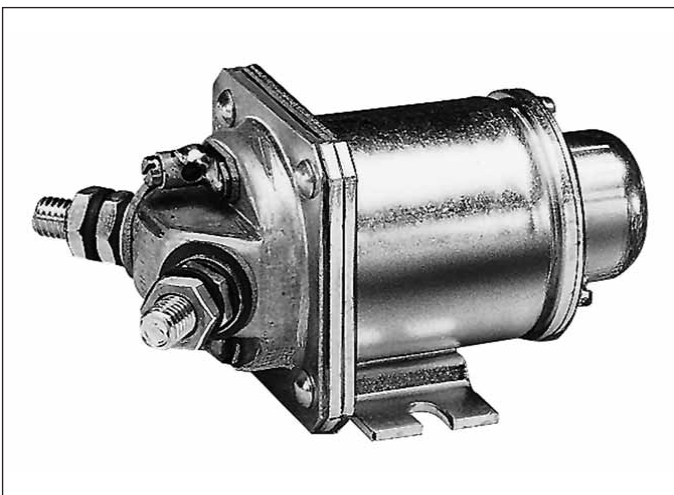
¹⁾ Excitation and switching voltage.

Dimensional drawing

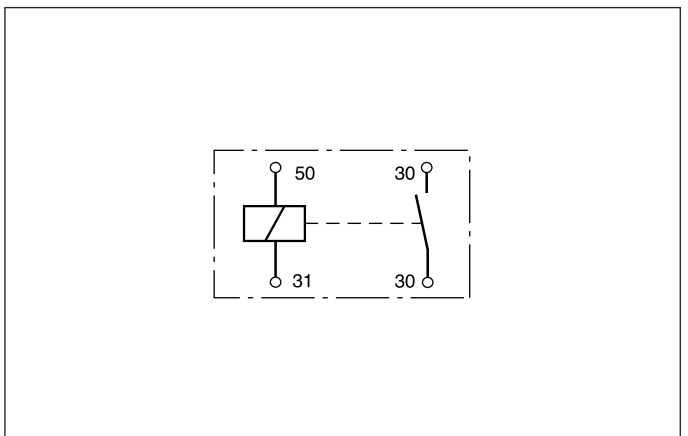


A Auxiliary relay only with 0 333 006 015. Loose parts enclosed with 0 333 006 006.
 SW Width across flats

Figure



Connection and circuit diagram



Relays

Power relays Series 006

Normally open relay 24 V

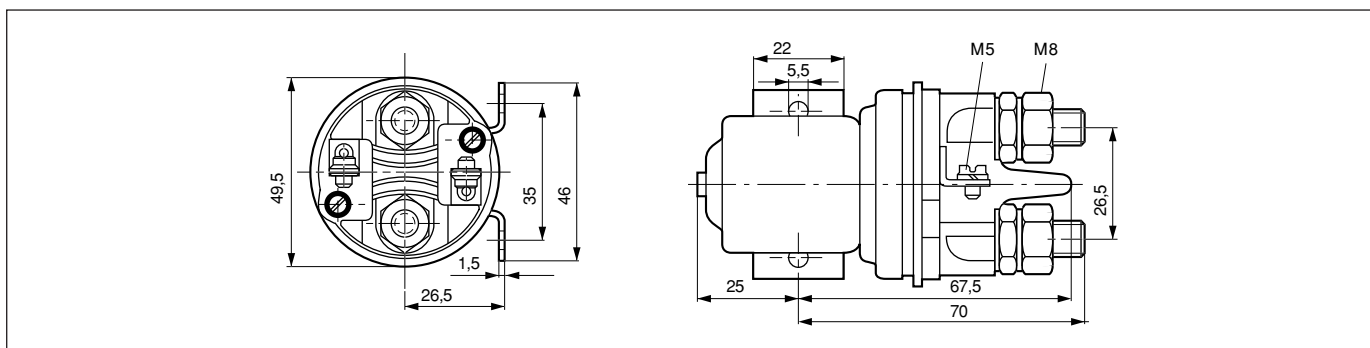
0 333 006 010

Technical data

Nominal voltage ¹⁾		V	24
Nominal value of excitation current		A	6/0,25 ²⁾
Nominal load current	Contin. duty	A	200
Nominal load current	Load current up to 1 s	A	800
Service life of contact	Mechanical	Thousand	500
Service life of contact	Electrical	Thousand	100
Dimensions	L x W x H	mm	95 x 50 x 52
Weight		kg	0,27

¹⁾ Excitation and switching voltage. ²⁾ Pull-in current 6 A, continuous current 0.25 A.

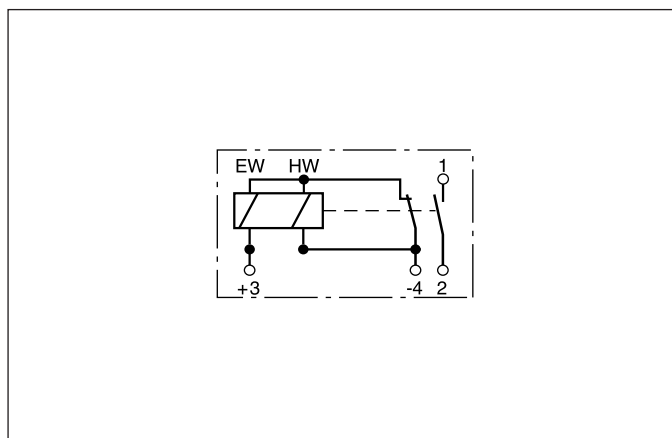
Dimensional drawing



Figure



Connection and circuit diagram



EW Excitation winding HW Holding winding

Relays

Power relays Series 006

Normally open relay 24 V

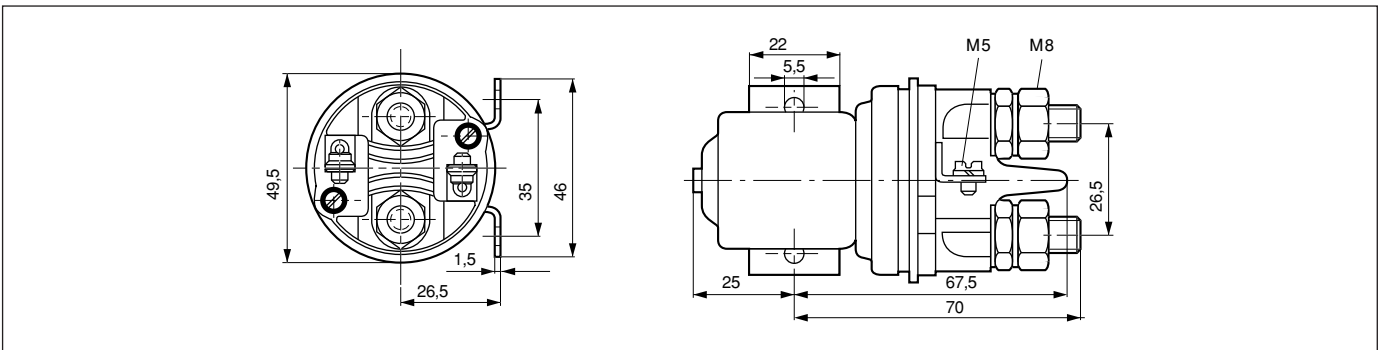
0 333 006 017

Technical data

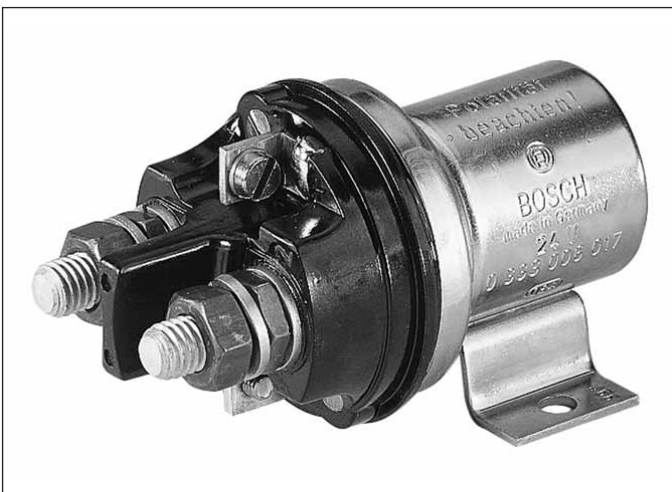
Nominal voltage ¹⁾		V	24
Nominal value of excitation current		A	6/0,25 ²⁾
Nominal load current	Contin. duty	A	100
Nominal load current	Load current up to 1 s	A	500
Service life of contact	Mechanical	Thousand	500
Service life of contact	Electrical	Thousand	100
Dimensions	L x W x H	mm	95 x 50 x 52
Weight		kg	0,27

Response time ≤ 14 ms, release time ≤ 58 ms. ¹⁾ Excitation and switching voltage. ²⁾ Pull-in current 6 A, continuous current 0.25 A.

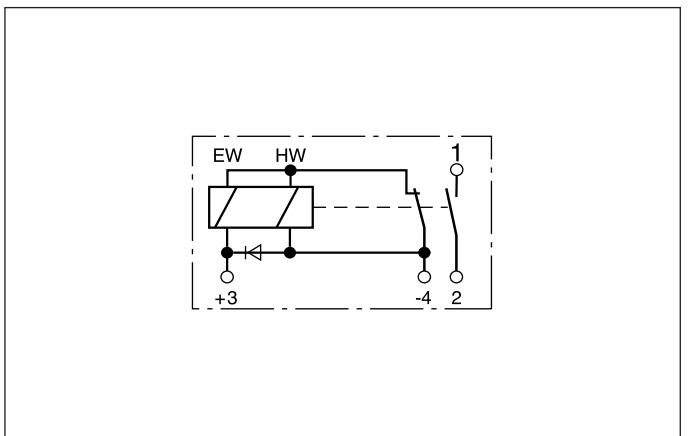
Dimensional drawing



Figure



Connection and circuit diagram



EW Excitation winding HW Holding winding

Relays

Power relays Series 006

Make relay with auxiliary relay 12 V

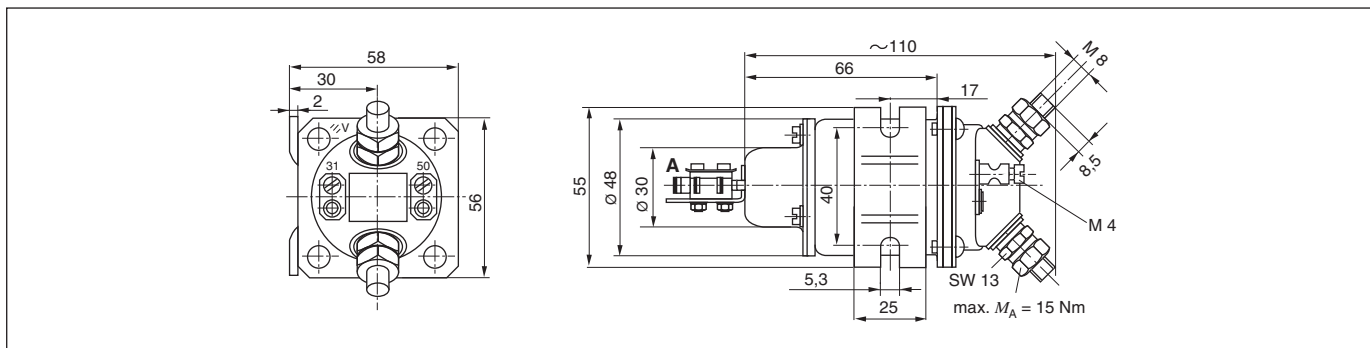
0 333 006 015

Technical data

Nominal voltage ¹⁾		V	12
Nominal value of excitation current		A	1,5
Nominal load current	Contin. duty	A	80
Nominal load current	Load current up to 1 s	A	800
Service life of contact	Mechanical	Thousand	500
Service life of contact	Electrical	Thousand	100
Interrupting current with inductive load		A	80
Dimensions	L x W x H	mm	140 x 55 x 56
Weight		kg	0,77

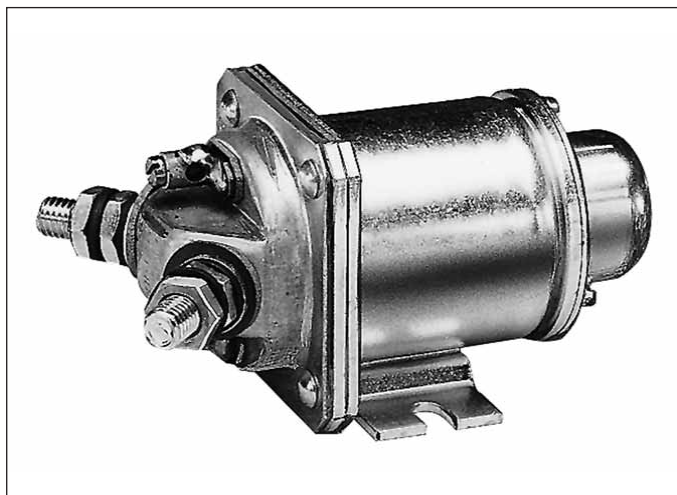
Degree of protection for housing: IP 33 (see page 5). With additional auxiliary relay (changeover contact), e.g. for indicator lamps, max. 6 A (resistive load); 2.5 A (inductive load); contact P switches from 1 to 2. Method of functioning: When switching on, auxiliary contact switches before main contact; When switching off, main contact breaks before auxiliary contact switches. ¹⁾ Excitation and switching voltage.

Dimensional drawing

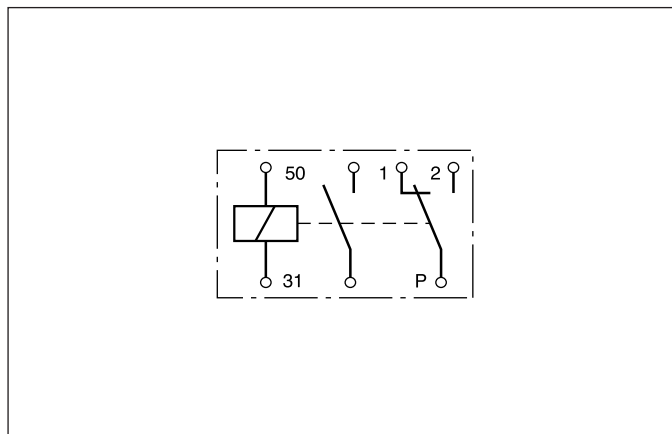


A Auxiliary relay only with 0 333 006 015. Loose parts enclosed with 0 333 006 006.
SW Width across flats

Figure



Connection and circuit diagram



Relays

Power relays Series 006

Break relay 24 V

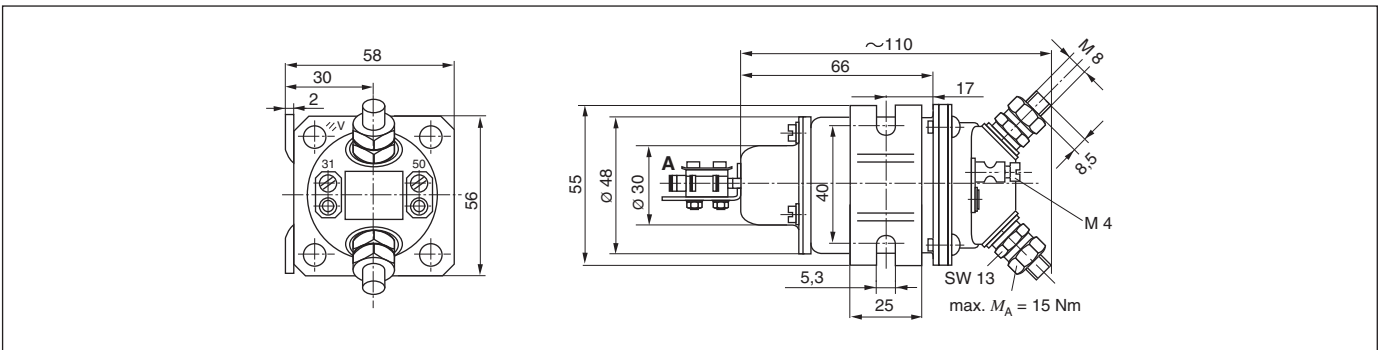
0 333 006 008

Technical data

Nominal voltage ¹⁾		V	24
Nominal value of excitation current		A	0,9
Nominal load current	Contin. duty	A	100
Nominal load current	Load current up to 1 s	A	500
Service life of contact	Mechanical	Thousand	500
Service life of contact	Electrical	Thousand	100
Interrupting current with inductive load		A	100
Dimensions	L x W x H	mm	110 x 55 x 60
Weight		kg	0,8

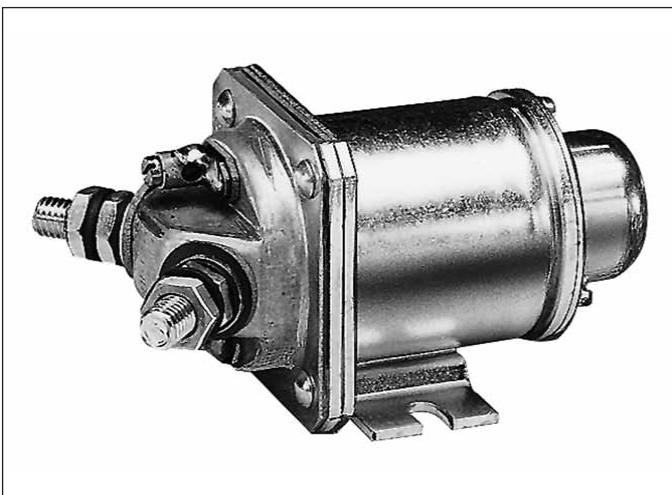
¹⁾ Excitation and switching voltage.

Dimensional drawing

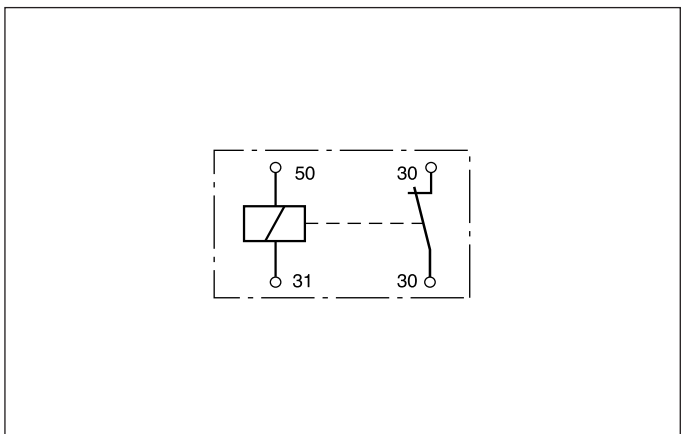


A Auxiliary relay only with 0 333 006 015. Loose parts enclosed with 0 333 006 006.
 SW Width across flats

Figure



Connection and circuit diagram



Relays

Power relays Series 007

Characteristic quantities

Rated voltage ¹⁾	24 V
Designation	150 A solenoid plunger relay
Design	Open
Mode of operation	Continuous operation up to 1h
Voltage limits (permissible)	0.7 x rated voltage to rated voltage
Switching times at rated voltage	Response time ≤ 30 ms; Release time ≤ 30 ms
Useage category	Starting, switch off during operation DC4-VDE 0660
Creepage distances and air gaps	based on insulation group C-VDE 0110
Coil power	20 W
Coil connection	Blade terminal 0,8 x 6,3 mm
Main-current contacts	2 make contacts (2-pole double break or 1-pole quadruple break)
Contact material	Silver cadmium oxide (AgCdO) sintered
Terminal bars	Hole -∅ 6.4 mm for steel screws M6
Degree of protection (refer to Page 5)	IP 00
Operating-temperature range	-40...+100 °C

¹⁾ Excitation and switching voltage.

Relays

Power relays Series 007

Normally open relay

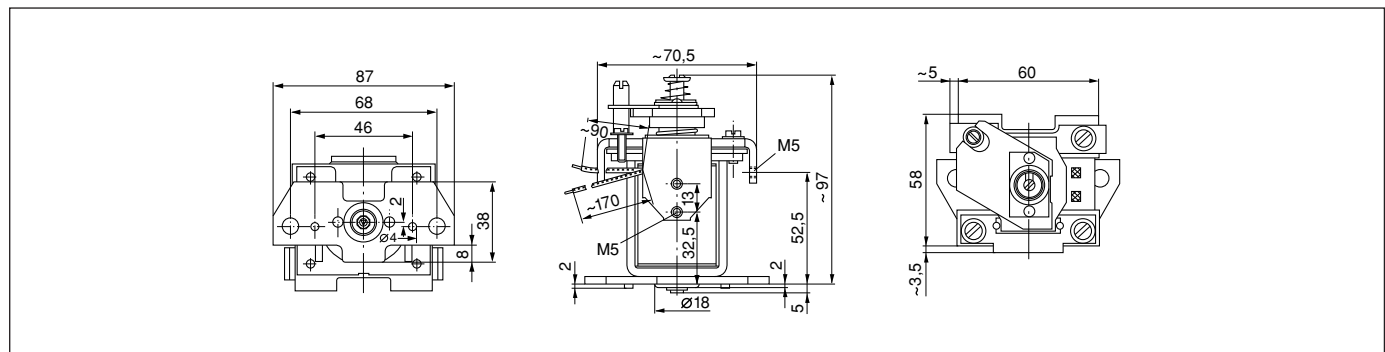
0 333 007 002

Technical data

Relay function			NO contact single
Nominal value of excitation current		A	2,3
Nominal load current	Load current 1s	A	250 ¹⁾
Service life of contact	Mechanical	Thousand	100
Dimensions	L x W x H	mm	87 x 62 x 102
Weight		kg	0,8

Contact material: copper. ¹⁾ For max. 3 minutes.

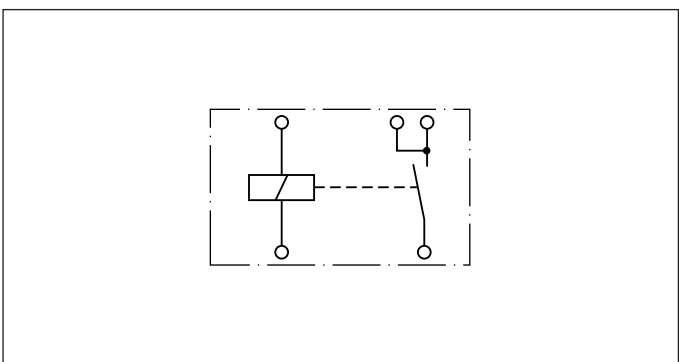
Dimensional drawing



Figure



Connection and circuit diagram



The excitation and holding windings are connected in parallel before the response and ensure a rapid and reliable response due to the resulting high make current (maximum approx. 13 A). After the relay responds, the excitation winding circuit is interrupted and the relay is held in its operating position by the holding winding with a current of approx. 1 A.

Relays

Power relays Series 007

Normally open relay

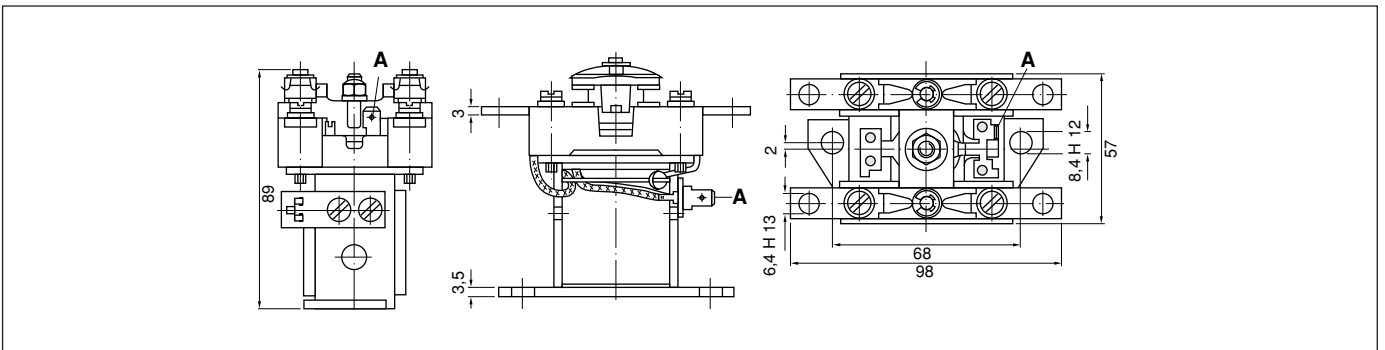
0 333 007 004

Technical data

Relay function			NO contact double
Nominal value of excitation current		A	1 ¹⁾
Nominal load current	Contin. duty	A	2 x 150
Nominal load current	Load current 1s	A	2 x 1000
Service life of contact	Mechanical	Thousand	> 300
Service life of contact	Electrical	Thousand	> 150
Interrupting current with inductive load		A	375
Dimensions	L x W x H	mm	98 x 57 x 89
Weight		kg	0,8

Installation position: long edge of baseplate vertical, max. inclination 10°. ¹⁾ A maximum peak current of 13 A occurs at the pull-in moment.

Dimensional drawing

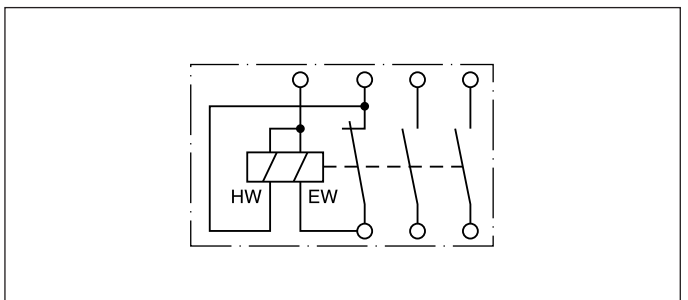


A Blade terminal 6.3 x 0.8 DIN 46 244

Figure



Connection and circuit diagram



HW Holding winding
EW Excitation winding

The excitation and holding windings are connected in parallel before the response and ensure a rapid and reliable response due to the resulting high make current (maximum approx. 13 A).

After the relay responds, the excitation winding circuit is interrupted and the relay is held in its operating position by the holding winding with a current of approx. 1 A.

Relays

Power relays Series 009

Characteristic quantities

Designation	150 A solenoid plunger relay
Design	Closed
Mode of operation	Continuous operation up to 1h
Voltage types ¹⁾	12 V, 24 V
Voltage limits (permissible)	0.75 x rated voltage to rated voltage
Switching times at rated voltage	Response time ≤ 50 ms; Release time ≤ 40 ms
Useage category	Starting, switch off during operation DC4-VDE 0660
Creepage distances and air gaps	based on insulation group C-VDE 0110
Coil power	20 W
Coil connection	Blade terminal 0.8 x 6.3 mm, cable lug M4
Main-current contacts	Make contact (double break)
Contact material	Silver nickel alloy (AgNi)
Terminal bars	M 8; Permissible tightening torque 5.5 Nm.
Degree of protection (refer to Page 5)	Terminals: IP 00 ; Housing IP 54
Operating-temperature range	-40...+100 °C
Note	For continuous operation, ensure adequate ventilation (cooling).

¹⁾ Excitation and switching voltage.

Relays

Power relays Series 009

Normally open relay 12 V

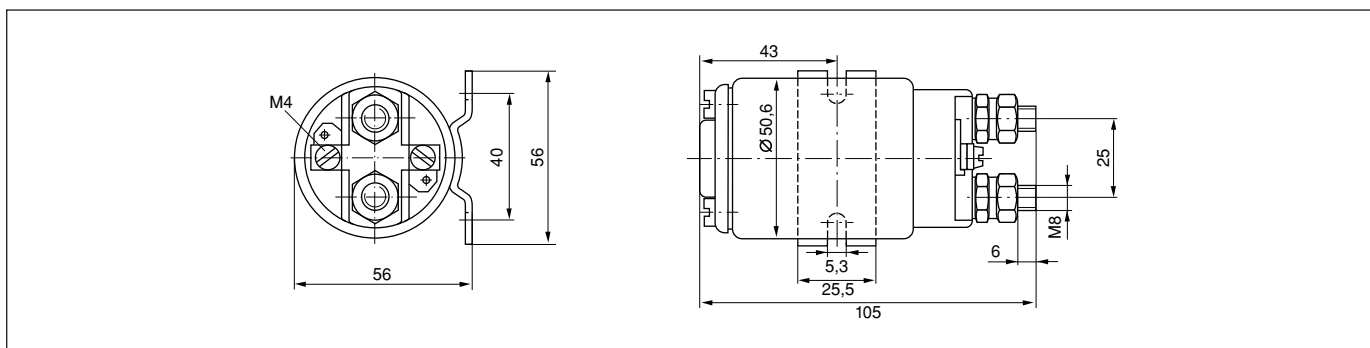
0 333 009 004

Technical data

Nominal excitation current		A	1,5
Nominal load current	Contin. duty	A	150
Nominal load current	Load current 5 s	A	800
Service life of contact	Mechanical	Thousand	2000
Service life of contact	Electrical	Thousand	200
Interrupting current with inductive load		A	150
Dimensions	L x W x H	mm	105 x 56 x 56
Weight		kg	0,75

Excitation and switching voltage.

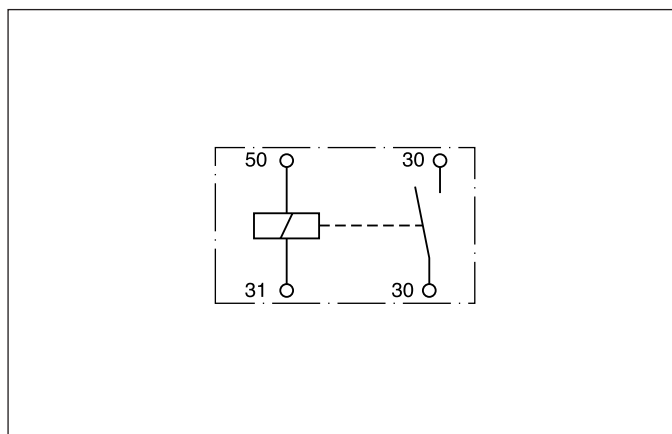
Dimensional drawing



Figure



Connection and circuit diagram



Relays

Power relays Series 009

Normally open relay 12 V

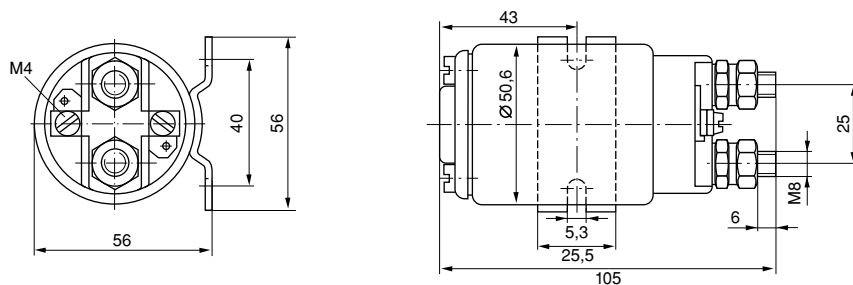
0 333 009 010

Technical data

Nominal excitation current		A	1,5
Nominal load current	Contin. duty	A	150
Nominal load current	Load current 5 s	A	800
Service life of contact	Mechanical	Thousand	2000
Service life of contact	Electrical	Thousand	200
Interrupting current with inductive load		A	150
Dimensions	L x W x H	mm	104 x 56 x 57
Weight		kg	0,75

Excitation and switching voltage. With electric lead.

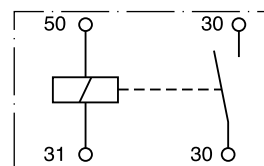
Dimensional drawing



Figure



Connection and circuit diagram



Relays

Power relays Series 009

Normally open relay 24 V

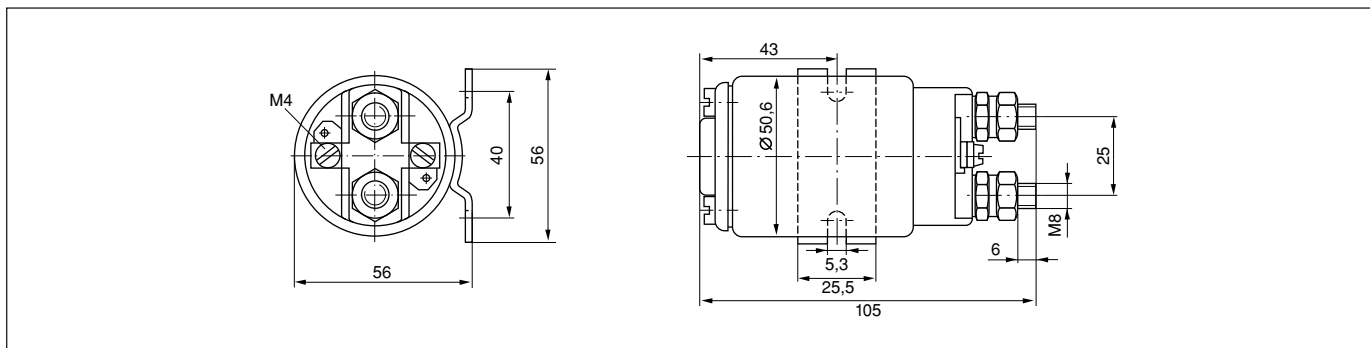
0 333 009 002

Technical data

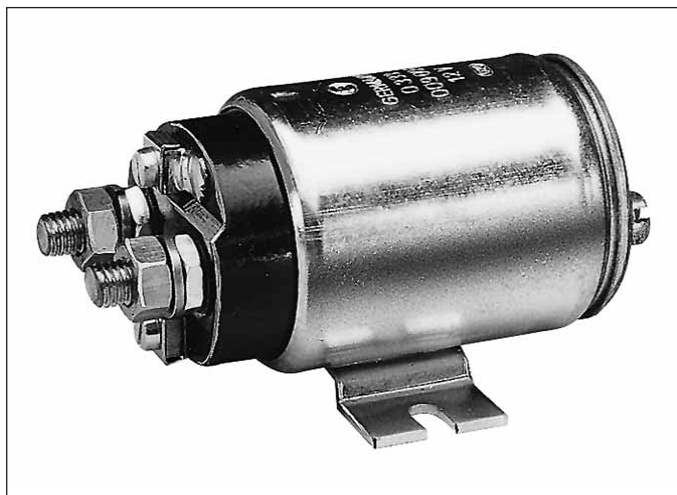
Nominal excitation current		A	0,83
Nominal load current	Contin. duty	A	150
Nominal load current	Load current 5 s	A	800
Service life of contact	Mechanical	Thousand	2000
Service life of contact	Electrical	Thousand	200
Interrupting current with inductive load		A	150
Dimensions	L x W x H	mm	104 x 56 x 57
Weight		kg	0,75

Excitation and switching voltage.

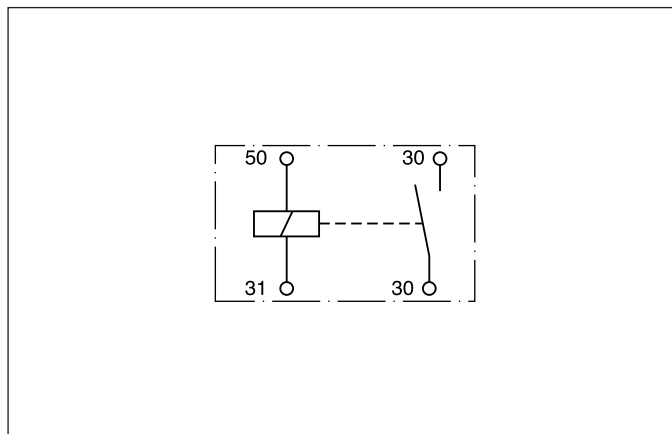
Dimensional drawing



Figure



Connection and circuit diagram



Relays

Power relays Series 009

Normally open relay 24 V

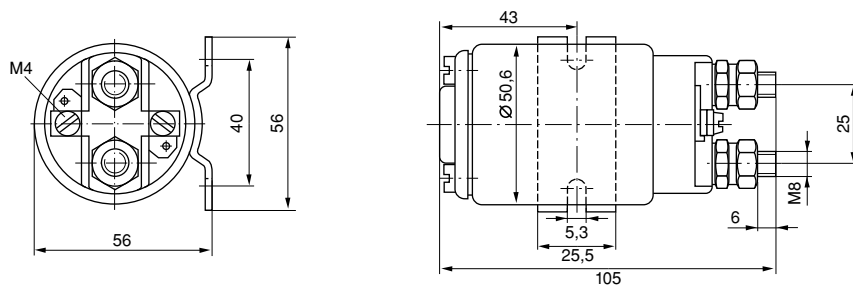
0 333 009 005

Technical data

Nominal excitation current		A	0,83
Nominal load current	Contin. duty	A	150
Nominal load current	Load current 5 s	A	800
Service life of contact	Mechanical	Thousand	2000
Service life of contact	Electrical	Thousand	200
Interrupting current with inductive load		A	150
Dimensions	L x W x H	mm	104 x 56 x 57
Weight		kg	0,75

Excitation and switching voltage.

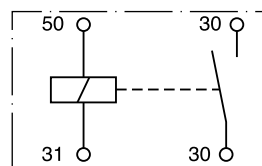
Dimensional drawing



Figure



Connection and circuit diagram



Relays

Power relays Series 009

Normally open relay 24 V

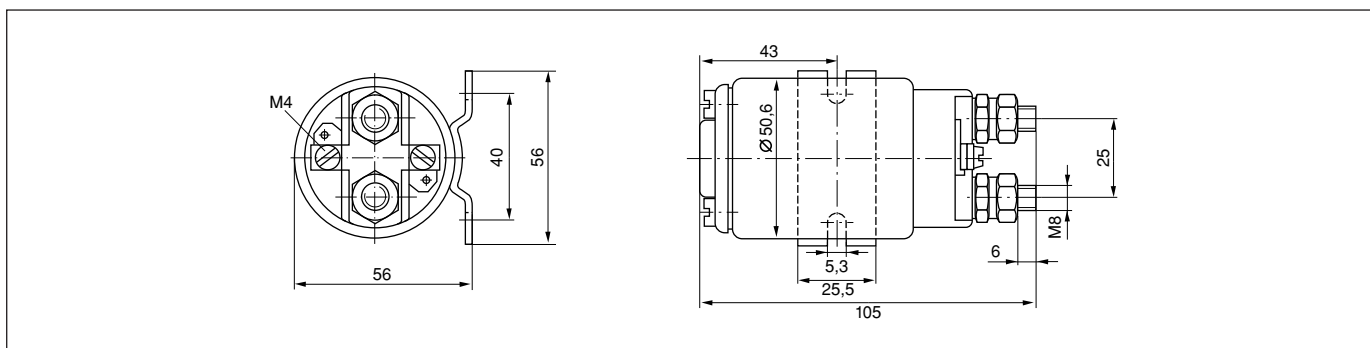
0 333 009 009

Technical data

Nominal excitation current		A	0,83
Nominal load current	Contin. duty	A	150
Nominal load current	Load current 5 s	A	800
Service life of contact	Mechanical	Thousand	2000
Service life of contact	Electrical	Thousand	200
Interrupting current with inductive load		A	150
Dimensions	L x W x H	mm	104 x 56 x 56
Weight		kg	0,75

Excitation and switching voltage. With electric lead.

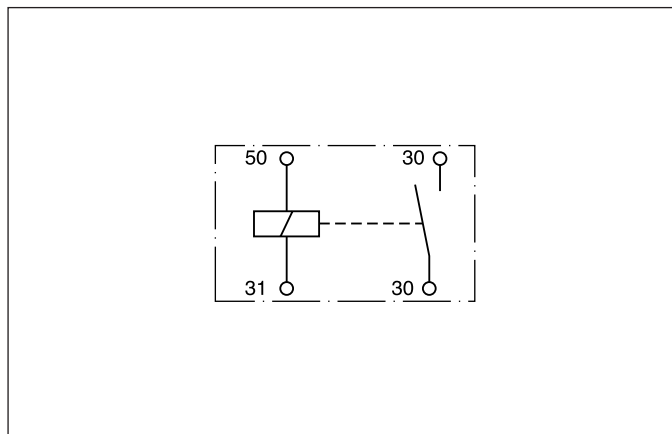
Dimensional drawing



Figure



Connection and circuit diagram



Relays

Power relays Series 009

Normally open relay 24 V

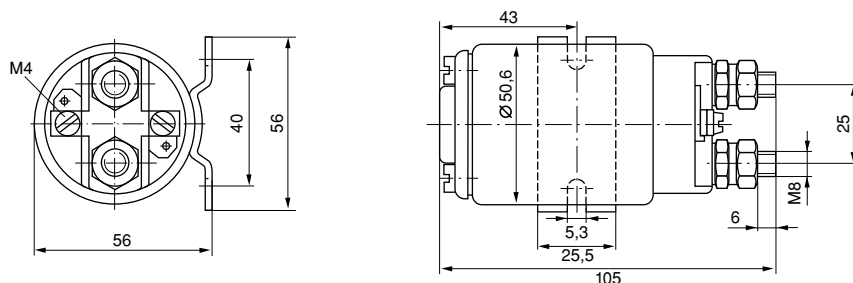
0 333 009 011

Technical data

Nominal excitation current		A	0,83
Nominal load current	Contin. duty	A	150
Nominal load current	Load current 5 s	A	800
Service life of contact	Mechanical	Thousand	2000
Service life of contact	Electrical	Thousand	200
Interrupting current with inductive load		A	150
Dimensions	L x W x H	mm	106 x 56 x 57
Weight		kg	0,75

Excitation and switching voltage.

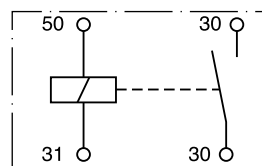
Dimensional drawing



Figure



Connection and circuit diagram



Relays

Power relays Series 009

Normally open relay 24 V

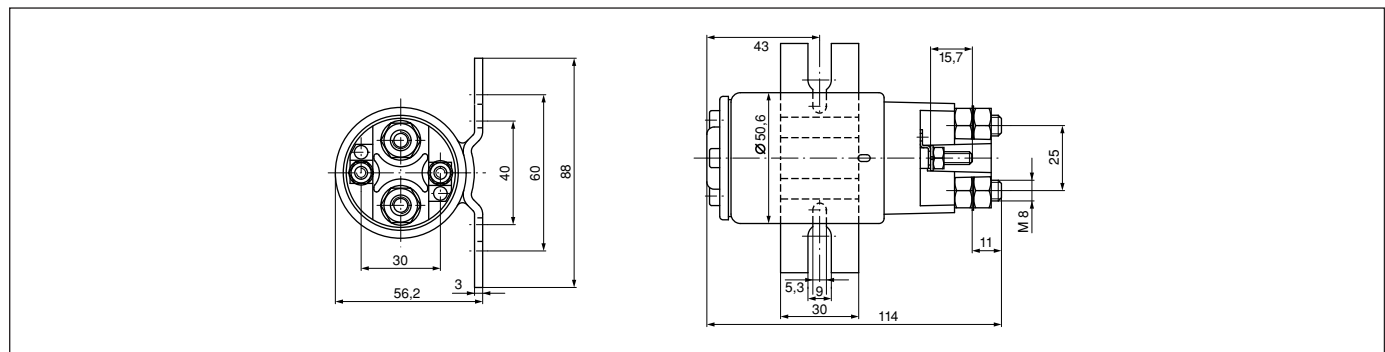
0 333 009 017

Technical data

Nominal excitation current		A	1,2
Nominal load current	Load current 5 s	A	800
Service life of contact	Mechanical	Thousand	2000
Service life of contact	Electrical	Thousand	200
Interrupting current with inductive load		A	150
Dimensions	L x W x H	mm	114 x 56 x 88
Weight		kg	0,80

Excitation and switching voltage. Degree of protection for housing: IP 33 (see page 5).

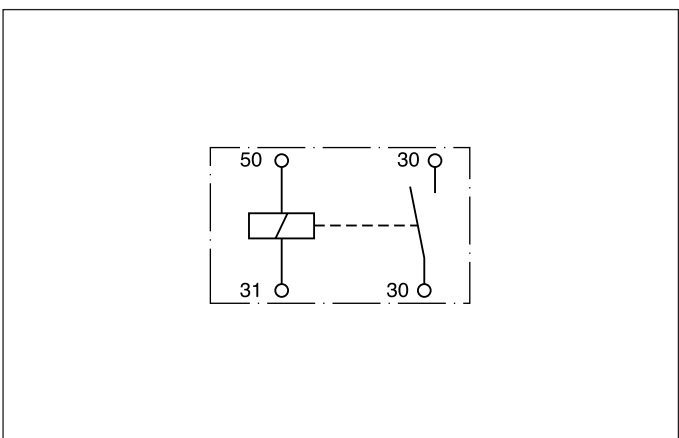
Dimensional drawing



Figure



Connection and circuit diagram



Relays

Micro relays A

Characteristic quantities

Rated voltage	U_N	12 V
Test voltage	U_P	1000 V _{-rms}
Upper limit temperature	ϑ_{\max}	155 °C
Thermal resistance	R_{ϑ}	40 K/W
Ambient temperature	ϑ_{amb}	-40...+125 °C
Max. switching frequency	$f_{S\max}$	20 Hz
Release time (typ.)	t_r	2,0 ms
Graphical symbol		See connection diagram

Relays

Micro relays A

Make relay

BOSCH
Part number Tyco
Mitsubishi-Part number

0 986 332 010
V23074-A1001-X007
MB 953 382

Technical data for contact side

Contact material		AgSnO ₂
Minimum recommended current	$I_{Smin} (U_s = 13,5 V)$	1 A
Max. switching current ²⁾ - Make	I_{Smax} on ³⁾ / off	120 A / 30 A
Limiting continuous current - Make	I_{SN} at 23 °C / 85 °C	25 A / 15 A
Voltage drop - Make	10 A contact current	≈ 20 mV
Increase in coil temperature (typ.)	10 A contact current	15 K
Mechanical endurance (without load)		> 1 x 10 ⁶ cycles
Electrical endurance at lamp load ⁴⁾		> 2 x 10 ⁵ cycles

²⁾ The values apply to a resistive or inductive load with suitable spark suppression. ³⁾ This current may flow for a maximum of 3 s for a make/break ratio of 1:10.

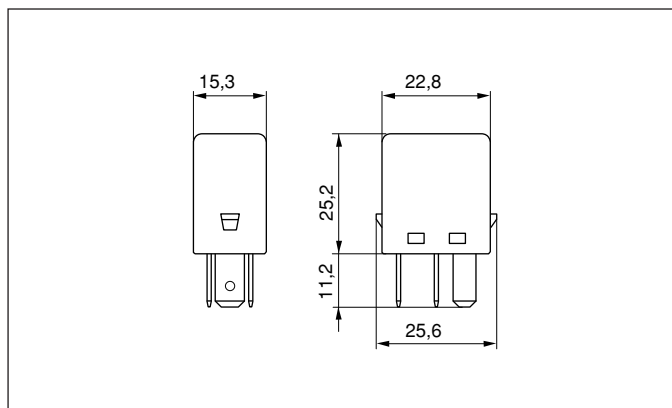
⁴⁾ 120 A/20 A or inductive load 0.44 mH, 45 A/20 A (make/break)

Technical data for energizing side

Operate voltage ¹⁾	U_{12op}	≤ 7,2 V
Release voltage ¹⁾	U_{12r}	≥ 1,6 V
Coil resistance ¹⁾	R_{Cu}	123 Ω±0 Ω
Parallel resistor	R_P	680 Ω
Total resistance	R_{12}	104 Ω±10 Ω
Nom. power consumption	P_N	1,5 W
Operate time (typ.)	t_{OP}	5,0 ms

¹⁾ At 23 °C coil temperature.

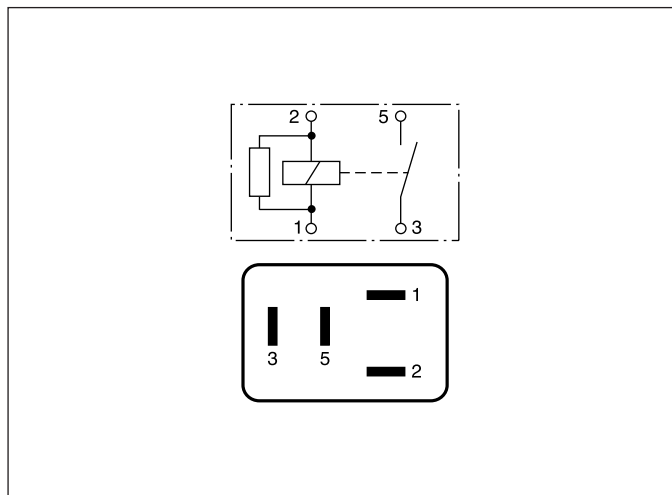
Dimensional drawing



Figure



Connection diagram



Relays

Micro relays A

Normally open relay

BOSCH
Part number Tyco
Ford-Part number

0 986 332 052
V23074-B1701-X020
07320414

Technical data for contact side

Contact material		AgSnO ₂
Minimum recommended current	$I_{Smin} (U_s = 13,5 V)$	1 A
Max. switching current ²⁾ - Normal load	$I_{Smin} (U_s = 13,5 V)$	90 A
Max. switching current - Lamp load	$I_{Smin} (U_s = 13,5 V)$	120 A
Limiting continuous current ³⁾ - Normal load	$I_{SN} \text{ at } 23 \text{ }^\circ\text{C} / 85 \text{ }^\circ\text{C}$	20 A / 15 A
Limiting continuous current - Lamp load	$I_{SN} \text{ at } 23 \text{ }^\circ\text{C} / 85 \text{ }^\circ\text{C}$	12 A / 9 A
Voltage drop - Normal load	10 A contact current	≈ 40 mV
Voltage drop - Lamp load	10 A contact current	≈ 40 mV
Increase in coil temperature (typ.)	10 A contact current	15 K
Mechanical endurance (without load)		> 1 x 10 ⁶ cycles
Electrical endurance at lamp load ³⁾	$I_S = 120 A$	> 1 x 10 ⁵ cycles
Electrical endurance with resistive load ³⁾	$I_S = 20 A$	> 2 x 10 ⁵ cycles
Electrical endurance motor load (on/continuous) ³⁾	$I_S = 40/20 A$	> 2 x 10 ⁵ cycles

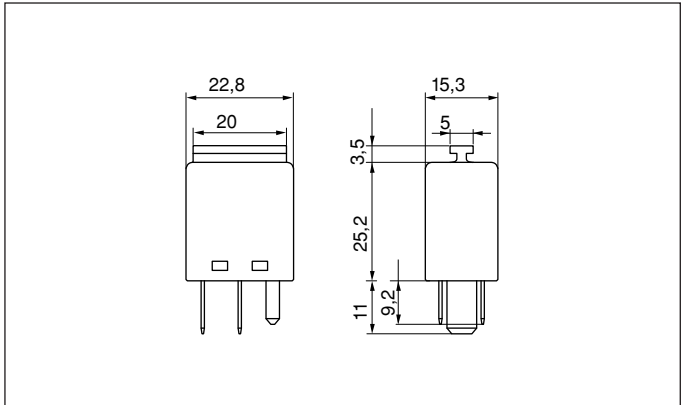
²⁾ The values apply to a resistive or inductive load with suitable spark suppression. ³⁾ $U_s = 13,5 V$; max. 2 s on / 2 s off.

Technical data for energizing side

Operate voltage ¹⁾	U_{12op}	≤ 7,2 V
Release voltage ¹⁾	U_{12r}	≥ 1,6 V
Coil resistance ¹⁾	R_{Cu}	144 Ω ± 12 Ω
Parallel resistor	R_P	1000 Ω
Total resistance	R_{12}	126 Ω ± 9,4 Ω
Nom. power consumption	P_N	1,5 W
Operate time (typ.)	t_{OP}	5,0 ms

¹⁾ At 23 °C coil temperature.

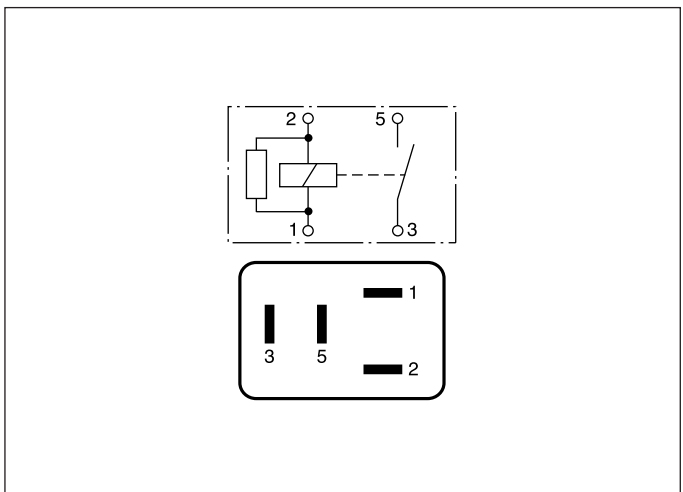
Dimensional drawing



Figure



Connection diagram



Relays

Micro relays A

Normally closed relay

BOSCH
Part number Tyco
Ford-Part number

0 986 332 051
V23074-B1201-X021
07320415

Technical data for contact side

Contact material		Ag
Minimum recommended current	I_{Smin} (bei $U_s = 13,5 V$)	1 A
Max. switching current ²⁾ - Break	I_{Smax} on ³⁾ / off	40 A / 15 A
Limiting continuous current - Break	I_{SN} at 23 °C / 85 °C	15 A / 10 A
Voltage drop - Break	10 A contact current	≈ 20 mV
Increase in coil temperature (typ.)	10 A contact current	15 K
Mechanical endurance (without load)		> 1 x 10 ⁶ cycles
Electrical endurance with resistive load	10 A resistive load	> 1 x 10 ⁵ cycles

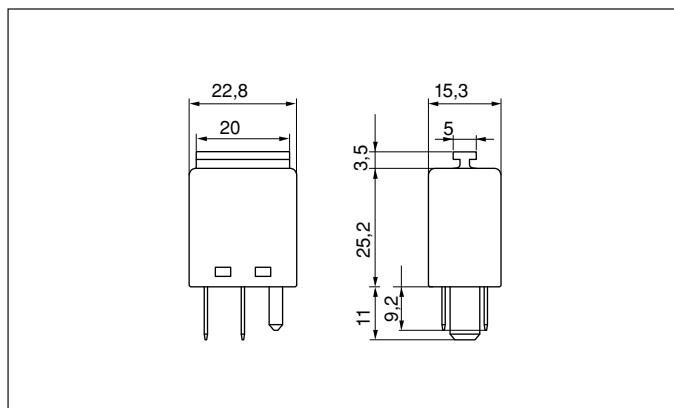
²⁾ The values apply to a resistive or inductive load with suitable spark suppression. ³⁾ This current may flow for a maximum of 3 s for a make/break ratio of 1:10.

Technical data for energizing side

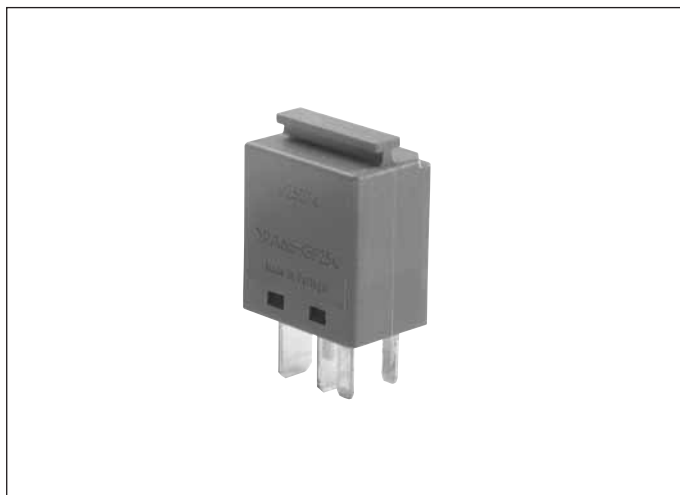
Operate voltage ¹⁾	U_{12op}	≤ 7,2 V
Release voltage ¹⁾	U_{12r}	≥ 1,6 V
Coil resistance ¹⁾	R_{Cu}	144 Ω±0 Ω
Parallel resistor	R_P	1000 Ω
Total resistance	R_{12}	126 Ω±13 Ω
Nom. power consumption	P_N	1,1 W
Operate time (typ.)	t_{OP}	5,0 ms

¹⁾ At 23 °C coil temperature.

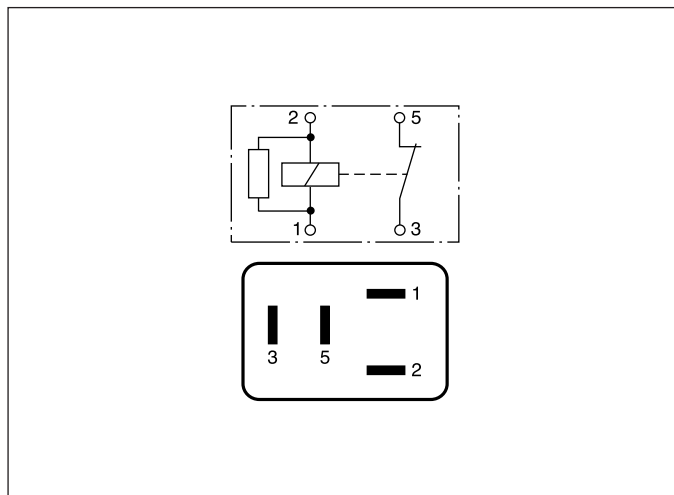
Dimensional drawing



Figure



Connection diagram



Relays

Micro relays A

Change-over relay

BOSCH
Part number Tyco
Volvo-Part number

0 986 332 020
V23074-A4001-X055
9494783-5

Technical data for contact side

Contact material		AgSnO ₂
Minimum recommended current	$I_{Smin} (U_s = 13,5 V)$	1 A
Max. switching current ²⁾ - Break	$I_{Smax} \text{ on}^3) / \text{ off}$	40 A / 15 A
Max. switching current ²⁾ - Make	$I_{Smax} \text{ on}^3) / \text{ off}$	120 A / 30 A
Limiting continuous current - Break	$I_{SN} \text{ at } 23 \text{ }^\circ\text{C} / 85 \text{ }^\circ\text{C}$	10 A / 8 A
Limiting continuous current - Make	$I_{SN} \text{ at } 23 \text{ }^\circ\text{C} / 85 \text{ }^\circ\text{C}$	25 A / 15 A
Voltage drop - Break	10 A contact current	≈ 20 mV
Voltage drop - Make	10 A contact current	≈ 20 mV
Increase in coil temperature (typ.)	10 A contact current	15 K
Mechanical endurance (without load)		> 1 x 10 ⁶ cycles
Electrical endurance at lamp load ⁴⁾		> 2 x 10 ⁵ cycles

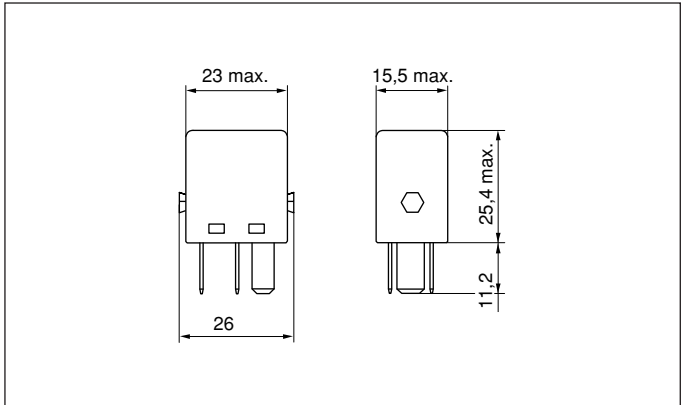
²⁾ The values apply to a resistive or inductive load with suitable spark suppression. ³⁾ This current may flow for a maximum of 3 s for a make/break ratio of 1:10. ⁴⁾ 120 A/20 A or inductive load 0.44 mH, 45 A/20 A (make/break)

Technical data for energizing side

Operate voltage ¹⁾	U_{12op}	≤ 7,2 V
Release voltage ¹⁾	U_{12r}	≥ 1,6 V
Coil resistance ¹⁾	R_{Cu}	96 Ω±9,6 Ω
Total resistance	R_{12}	96 Ω±9,6 Ω
Nom. power consumption	P_N	1,5 W
Operate time (typ.)	t_{OP}	5,0 ms

¹⁾ At 23 °C coil temperature.

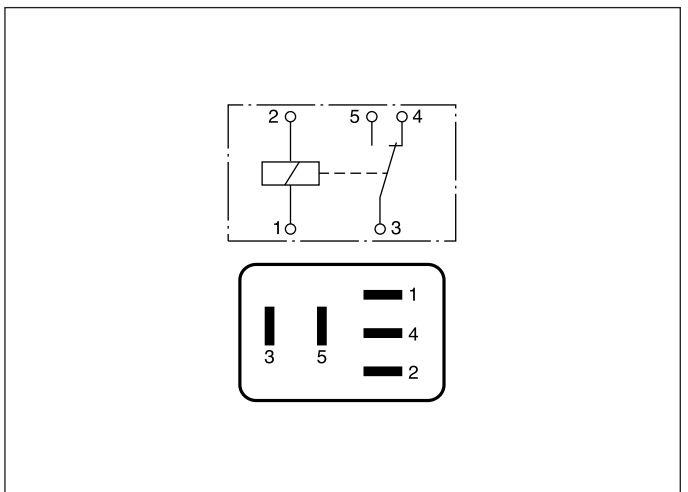
Dimensional drawing



Figure



Connection diagram



Relays

Micro relays A

Change-over relay

BOSCH
Part number Tyco
Volvo-Part number

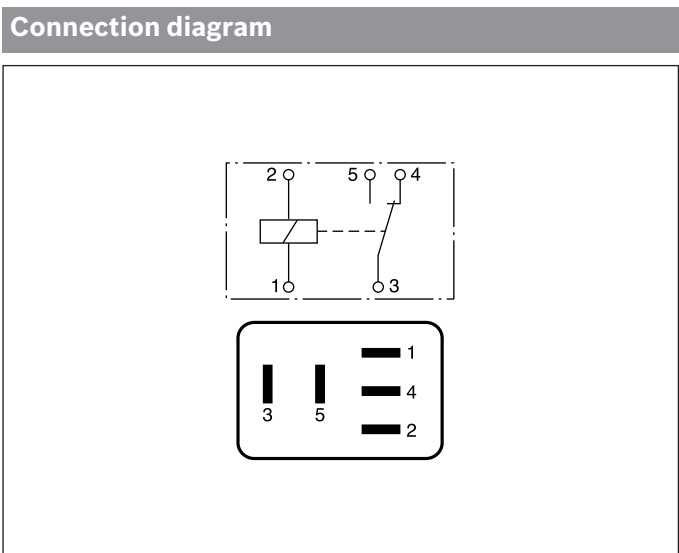
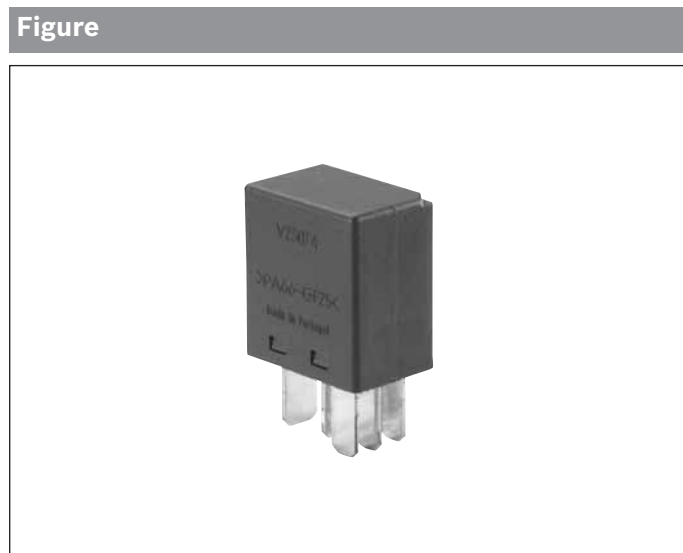
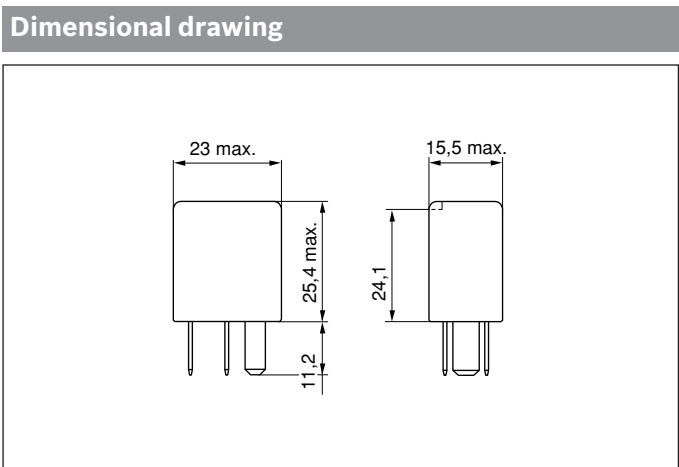
0 986 332 021
V23074-A4001-X040
9441161-8

Technical data for contact side		
Contact material		AgSnO ₂
Minimum recommended current	$I_{Smin} (U_s = 13,5 V)$	1 A
Max. switching current ²⁾ - Break	I_{Smax} on ³⁾ / off	40 A / 15 A
Max. switching current ²⁾ - Make	I_{Smax} on ³⁾ / off	120 A / 30 A
Limiting continuous current - Break	I_{SN} at 23 °C / 85 °C	10 A / 8 A
Limiting continuous current - Make	I_{SN} at 23 °C / 85 °C	25 A / 15 A
Voltage drop - Break	10 A contact current	≈ 20 mV
Voltage drop - Make	10 A contact current	≈ 20 mV
Increase in coil temperature (typ.)	10 A contact current	15 K
Mechanical endurance (without load)		> 1 x 10 ⁶ cycles
Electrical endurance ⁴⁾		> 2 x 10 ⁵ cycles

²⁾ The values apply to a resistive or inductive load with suitable spark suppression. ³⁾ This current may flow for a maximum of 3 s for a make/break ratio of 1:10.
⁴⁾ refer to Volvo specification 1282750 issue 05

Technical data for energizing side		
Operate voltage ¹⁾	U_{12op}	≤ 7,2 V
Release voltage ¹⁾	U_{12r}	≥ 1,6 V
Coil resistance ¹⁾	R_{Cu}	96 Ω±9,6 Ω
Total resistance	R_{12}	96 Ω±9,6 Ω
Nom. power consumption	P_N	1,5 W
Operate time (typ.)	t_{OP}	5,0 ms

¹⁾ At 23 °C coil temperature.



Relays

Micro relays F

Characteristic quantities

Rated voltage	U_N	12 V
Test voltage	U_P	500 V _{-eff}
Sustained thermal load	P_θ	2,6 W
Upper limit temperature	ϑ_{\max}	155 °C
Thermal resistance	R_θ	50 K/W
Ambient temperature	ϑ_{amb}	-40 °C...+85 °C
Max. switching frequency	$f_{S\max}$	20 Hz
Graphical symbol		See connection diagram

Relays

Micro relays F

Normally open relay

BOSCH
Part number Tyco
BMW-Part number

0 986 332 061
V23073-B1005-X018
61 36-1 393 412

Technical data for contact side

Contact material		Ag
Minimum recommended current	$I_{Smin} (U_s = 13,5 V)$	1 A
Max. switching current ²⁾ - Make	I_{Smax} on ³⁾ / off	90 A / 30 A
Limiting continuous current - Make	I_{SN} at 23 °C / 85 °C	20 A / 15 A
Voltage drop - Make (typ.)	10 A contact current	30 mV
Increase in coil temperature (typ.)	10 A contact current	15 K
Mechanical endurance (without load)		> 1 x 10 ⁷ cycles
Electrical endurance - on NO ⁴⁾	20 A Laststrom	> 2 x 10 ⁵ cycles

²⁾ The values apply to a resistive or inductive load with suitable spark suppression. ³⁾ This current may flow for a maximum of 3 s for a make/break ratio of 1:10.

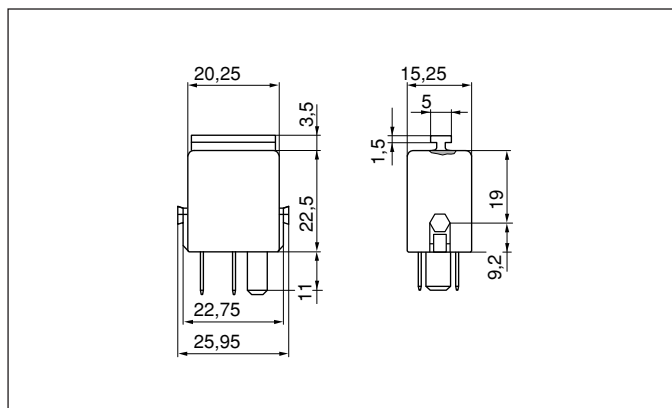
⁴⁾ $U_s = 13.5 V$ load voltage

Technical data for energizing side

Operate voltage ¹⁾	$U_{85/86op}$	≤ 7,2 V
Release voltage ¹⁾	$U_{85/86r}$	≥ 2,0 V
Coil resistance ¹⁾	R_{Cu}	123 Ω ± 0 Ω
Parallel resistor	R_P	680 Ω
Total resistance	$R_{85/86}$	104 Ω ± 10 Ω
Nom. power consumption	P_N	1,4 W
Operate time (typ.)	t_{OP}	4,0 ms
Release time (typ.)	t_r	2,0 ms

¹⁾ At 23 °C coil temperature.

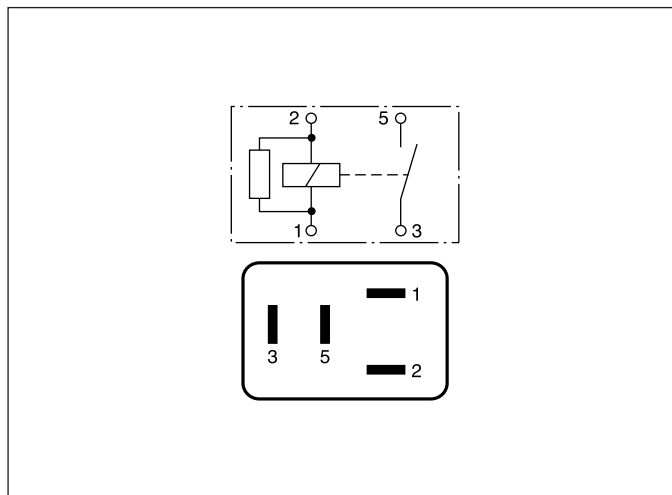
Dimensional drawing



Figure



Connection diagram



Relays

Micro relays F

Normally open relay

BOSCH
Part number Tyco
Rover-Part number

0 986 332 070
V23073-B1005-X012
YWB 10004

Technical data for contact side

Contact material		AgSnO ₂
Minimum recommended current	$I_{Smin} (U_s = 13,5 V)$	1 A
Max. switching current ²⁾ - Make	$I_{Smax} on^3) / off$	90 A / 30 A
Limiting continuous current - Make	$I_{SN} at 23 °C / 85 °C$	20 A / 15 A
Voltage drop - Make (typ.)	10 A contact current	20 mV
Increase in coil temperature (typ.)	10 A contact current	15 K
Mechanical endurance (without load)		> 1 x 10 ⁷ cycles
Electrical endurance - on NO ⁴⁾	20 A Laststrom	> 2 x 10 ⁵ cycles

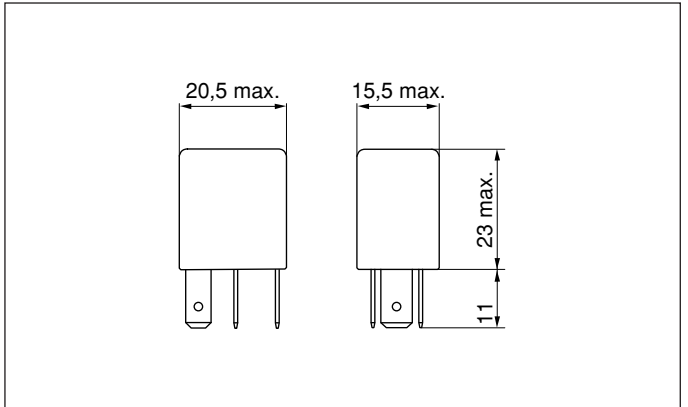
²⁾ The values apply to a resistive or inductive load with suitable spark suppression. ³⁾ This current may flow for a maximum of 3 s for a make/break ratio of 1:10.
⁴⁾ $U_s = 13.5 V$ load voltage

Technical data for energizing side

Operate voltage ¹⁾	$U_{85/86op}$	≤ 7,2 V
Release voltage ¹⁾	$U_{85/86r}$	≥ 1,3 V
Coil resistance ¹⁾	R_{Cu}	123 Ω±0 Ω
Parallel resistor	R_P	680 Ω
Total resistance	$R_{85/86}$	104 Ω±8 Ω
Nom. power consumption	P_N	1,4 W
Operate time (typ.)	t_{OP}	6,0 ms
Release time (typ.)	t_r	3,0 ms

¹⁾ At 23 °C coil temperature.

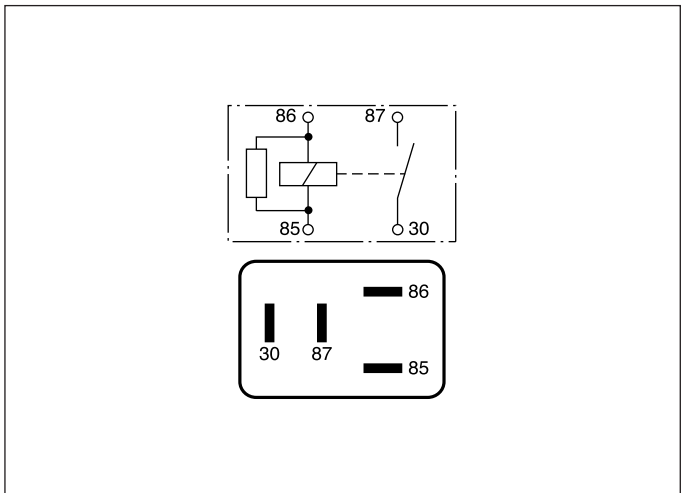
Dimensional drawing



Figure



Connection diagram



Relays

Micro relays F

Changeover relay

BOSCH
Part number Tyco
BMW-Part number

0 986 332 060
V23073-B1008-X019
61 36-4 939 415

Technical data for contact side

Contact material		Ag
Minimum recommended current	$I_{Smin} (U_s = 13,5 V)$	1 A
Max. switching current ²⁾ - Break	I_{Smax} on ³⁾ / off	20 A / 15 A
Max. switching current ²⁾ - Make	I_{Smax} on ³⁾ / off	90 A / 30 A
Limiting continuous current - Break	I_{SN} at 23 °C / 85 °C	15 A / 10 A
Limiting continuous current - Make	I_{SN} at 23 °C / 85 °C	20 A / 15 A
Voltage drop - Break (typ.)	10 A contact current	50 mV
Voltage drop - Make (typ.)	10 A contact current	30 mV
Increase in coil temperature (typ.)	10 A contact current	15 K
Mechanical endurance (without load)		> 1 x 10 ⁷ cycles
Electrical endurance - on NO ⁴⁾	20 A Laststrom	> 2 x 10 ⁵ cycles
Electrical endurance - on NC ⁴⁾	10 A Laststrom	> 1 x 10 ⁵ cycles

²⁾ The values apply to a resistive or inductive load with suitable spark suppression. ³⁾ This current may flow for a maximum of 3 s for a make/break ratio of 1:10.

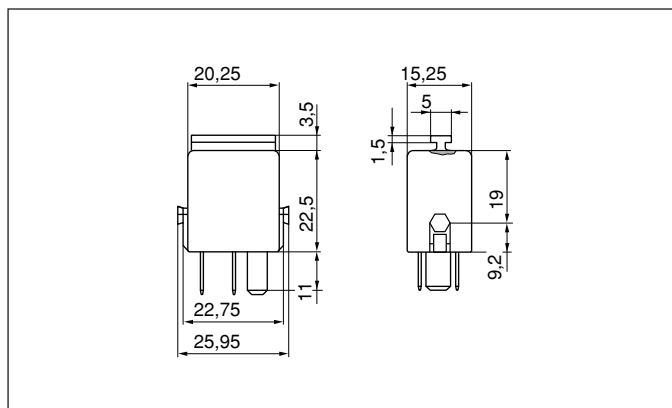
⁴⁾ $U_s = 13.5 V$ load voltage

Technical data for energizing side

Operate voltage ¹⁾	$U_{85/86op}$	≤ 7,2 V
Release voltage ¹⁾	$U_{85/86r}$	≥ 2,0 V
Coil resistance ¹⁾	R_{Cu}	97 Ω±0 Ω
Parallel resistor	R_P	680 Ω
Total resistance	$R_{85/86}$	85 Ω±8 Ω
Nom. power consumption	P_N	1,7 W
Operate time (typ.)	t_{OP}	4,0 ms
Release time (typ.)	t_r	2,0 ms

¹⁾ At 23 °C coil temperature.

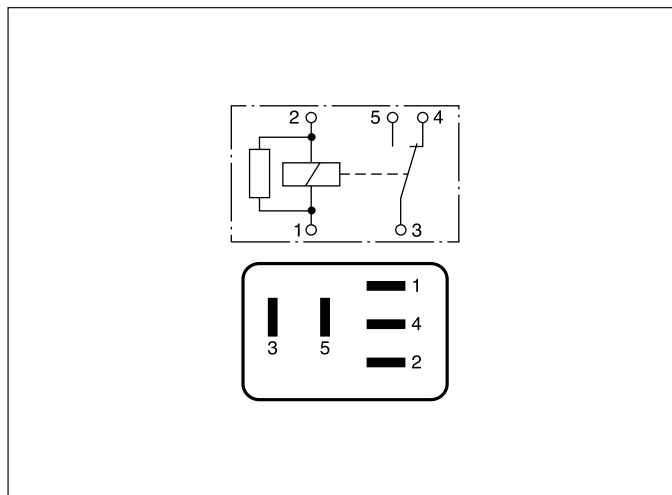
Dimensional drawing



Figure



Connection diagram



Relays

Mini relays F

Characteristic quantities

Rated voltage	U_N	12 V
Test voltage	U_P	500 V _{-eff}
Upper limit temperature	ϑ_{\max}	155 °C
Thermal resistance	R_{ϑ}	50 K/W
Ambient temperature	ϑ_{amb}	-40 °C...+85 °C
Graphical symbol		See connection diagram

Relays

Mini relays F

Make relay

BOSCH
Part number Tyco
VW-Part number

0 986 332 003
V23134-B0052-X301
6DO 951 253 A

Technical data for contact side

Contact material		AgSnO ₂
Minimum recommended current	$I_{Smin} (U_s = 13,5 V)$	1 A
Max. switching current ²⁾ - Make	I_{Smax} on ³⁾ / off	120 A / 40 A
Limiting continuous current - Make	I_{SN} bei 23 °C	40 A
Voltage drop - Make (typ.)	10 A contact current	20 mV
Increase in coil temperature (typ.)	10 A contact current	15 K
Mechanical endurance (without load)		> 1 x 10 ⁷ cycles
Electrical endurance ⁴⁾	$U_s = 13,5 V$	> 1,5 x 10 ⁵ cycles

²⁾ The values apply to a resistive or inductive load with suitable spark suppression. ³⁾ This current may flow for a maximum of 3 s for a make/break ratio of 1:1.

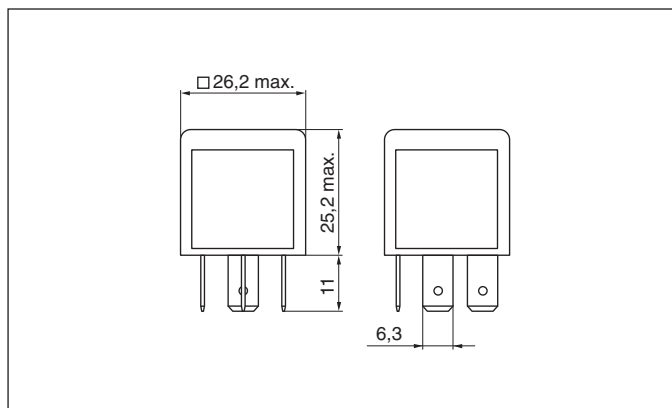
⁴⁾ for an inductive load 0.1 mH, 120 A/40 A inrush-/nominal current, ton/toff = 2 s/2 s.

Technical data for energizing side

Operate voltage ¹⁾	$U_{85/86op}$	≤ 7,3 V
Release voltage ¹⁾	$U_{85/86r}$	≥ 2,3 V
Coil resistance ¹⁾	R_{Cu}	93 Ω ± 9 Ω
Parallel resistor	R_P	560 Ω
Total resistance	$U_{85/86}$	80 Ω ± 8 Ω
Nom. power consumption	P_N	1,6 W
Operate time (typ.)	t_{OP}	7,5 ms
Release time (typ.)	t_r	3,5 ms

¹⁾ At 23 °C coil temperature.

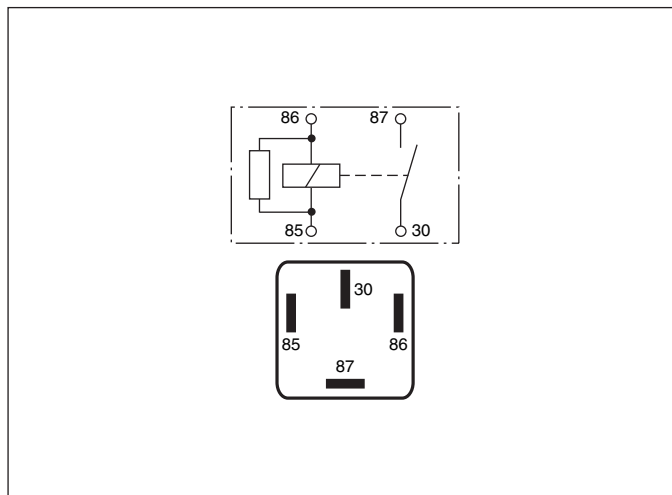
Dimensional drawing



Figure



Connection diagram



Relays

Mini relays F4

Characteristic quantities

Rated voltage	U_N	12 V
Release voltage	$U_{85/86r}$	$\geq 1,6$ V (23 °C)
Upper limit temperature	ϑ_{\max}	155 °C
Thermal resistance	R_{ϑ}	40 K/W
Ambient temperature	ϑ_{amb}	-40 °C...+85 °C
Max. switching frequency	f_{Smax}	20 Hz
Response time (typ.)	t_{OP}	7,5 ms
Graphical symbol		See connection diagram

Relays

Mini relays F4

NO relays

BOSCH
Part number Tyco
Mercedes-Benz-Part number

0 986 332 040
V23134-B0052-X336
002 542 13 19

Technical data for contact side

Contact material		Ag
Minimum recommended current	I_{Smin} ($U_s = 13,5 V$)	1 A
Max. switching current ²⁾ - Make	I_{Smax} on ³⁾ / off	120 A / 60 A
Limiting continuous current - Make	I_{SN} at 23 °C / 85 °C	60 A / 40 A
Voltage drop - Make (typ.)	10 A contact current	20 mV
Increase in coil temperature (typ.)	10 A contact current	4 K
Mechanical endurance (without load)		≈ 1 x 10 ⁷ cycles
Electrical endurance ⁴⁾	$U_s = 13,0 V$	> 2 x 10 ⁵ cycles

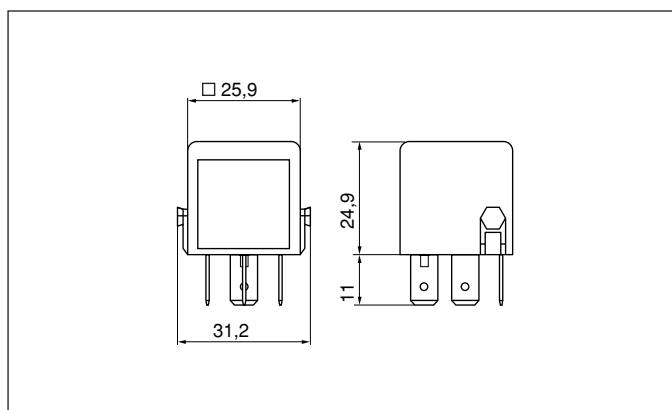
²⁾ The values apply to a resistive or inductive load with suitable spark suppression. ³⁾ This current may flow for a maximum of 3 s for a make / break ratio of 1:10.
⁴⁾ for an inductive load 500 µH, 80 A/30 A on/off current, 0,5 s/0,5 s.

Technical data for energizing side

Operate voltage ¹⁾	$U_{85/86op}$	≤ 7,4 V
Test voltage	U_P	500 V _{-eff}
Coil resistance ¹⁾	R_{Cu}	91 Ω±0 Ω
Parallel resistor	R_P	560 Ω
Total resistance	$R_{85/86}$	78,6 Ω±8 Ω
Continuous thermal load	P_{ϑ}	3,4 W
Nom. power consumption	P_N	1,6 W
Release time (typ.)	t_r	3,5 ms

¹⁾ At 23 °C coil temperature.

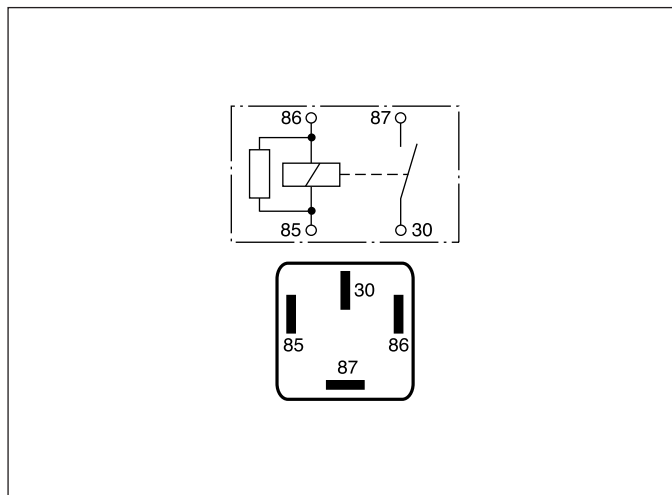
Dimensional drawing



Figure



Connection diagram



Relays

Mini relays F4

NO relays

BOSCH
Part number Tyco
Rover-Part number

0 986 332 071
V23134-B0052-X127
YWB 10012

Technical data for contact side

Contact material		Ag
Minimum recommended current	$I_{Smin} (U_s = 13,5 V)$	1 A
Max. switching current ²⁾ - Make	$I_{Smax} on^{3)} / off$	120 A / 60 A
Limiting continuous current - Make	$I_{SN} at 23 °C / 85 °C$	60 A / 40 A
Voltage drop - Make (typ.)	10 A contact current	100 mV
Increase in coil temperature (typ.)	10 A contact current	3 K
Mechanical endurance (without load)		> 1 x 10 ⁷ cycles
Electrical endurance ⁴⁾	$U_s = 13,5 V$	> 2 x 10 ⁵ cycles

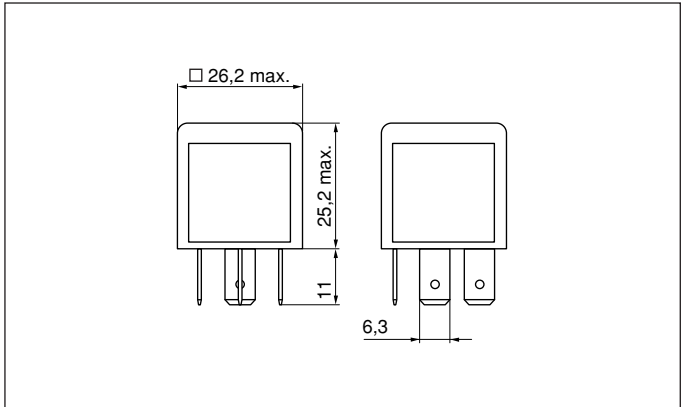
²⁾ The values apply to a resistive or inductive load with suitable spark suppression. ³⁾ This current may flow for a maximum of 3 s for a make/break ratio of 1:10.
⁴⁾ for an inductive load 500 µH, 60 A/40 A on/off current, 0.1 s/1.3 s.

Technical data for energizing side

Operate voltage ¹⁾	$U_{85/86op}$	≤ 7,2 V
Test voltage	U_P	500 V _{-rms}
Coil resistance ¹⁾	R_{Cu}	91 Ω ± 9 Ω
Parallel resistor	R_P	680 Ω
Total resistance	$R_{85/86}$	80 Ω ± 8 Ω
Continuous thermal load	P_{θ}	3,4 W
Nom. power consumption	P_N	1,8 W
Release time (typ.)	t_r	3,5 ms

¹⁾ At 23 °C coil temperature.

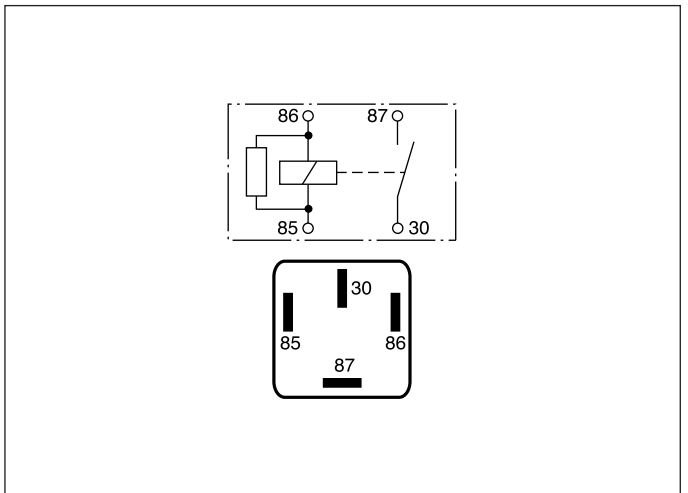
Dimensional drawing



Figure



Connection diagram



Relays

Mini relays F4

NO relays

BOSCH
Part number Tyco
Rover-Part number

0 986 332 072
V23134-B0052-X130
YWB 10027L

Technical data for contact side

Contact material		Ag
Minimum recommended current	$I_{Smin} (U_s = 13,5 V)$	1 A
Max. switching current ²⁾ - Make	I_{Smax} on ³⁾ / off	120 A / 60 A
Limiting continuous current - Make	I_{SN} at 23 °C / 85 °C	60 A / 40 A
Voltage drop - Make (typ.)	10 A contact current	100 mV
Increase in coil temperature (typ.)	10 A contact current	3 K
Mechanical endurance (without load)		> 1 x 10 ⁷ cycles
Electrical endurance ⁴⁾	$U_s = 13,5 V$	> 2 x 10 ⁵ cycles

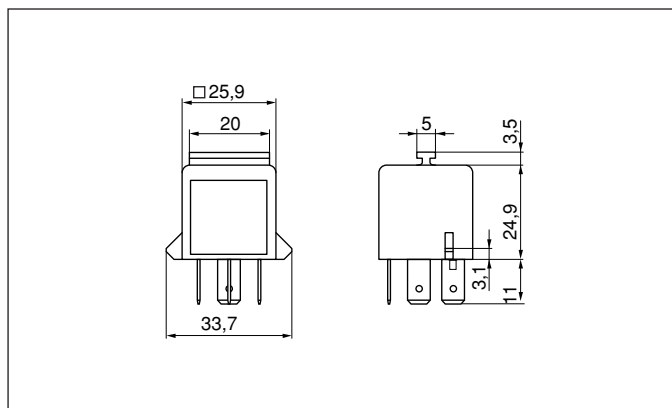
²⁾ The values apply to a resistive or inductive load with suitable spark suppression. ³⁾ This current may flow for a maximum of 3 s for a make/break ratio of 1:10.
⁴⁾ with a resistive load, 40 A inrush current, 0.1 s/1 s, $U_s = 13.5 V$ load voltage.

Technical data for energizing side

Operate voltage ¹⁾	$U_{85/86op}$	≤ 7,2 V
Test voltage	U_P	500 V _{-rms}
Coil resistance ¹⁾	R_{Cu}	91 Ω ± 9 Ω
Parallel resistor	R_P	680 Ω
Total resistance	$R_{85/86}$	80 Ω ± 8 Ω
Continuous thermal load	P_{ϑ}	3,4 W
Nom. power consumption	P_N	1,6 W
Release time (typ.)	t_r	3,5 ms

¹⁾ At 23 °C coil temperature.

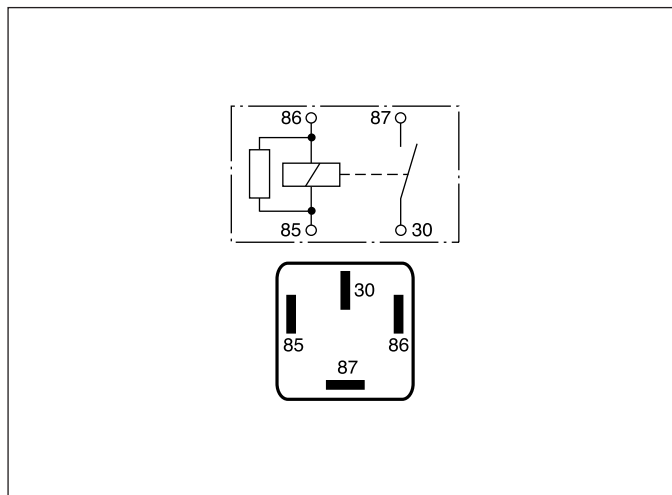
Dimensional drawing



Figure



Connection diagram



Relays

Mini relays F4

Change-over relay

BOSCH
Part number Tyco
Volvo-Part number

0 986 332 022
V23134-A0052-X345
9441160-0

Technical data for contact side

Contact material		AgSnO ₂
Minimum recommended current	$I_{Smin} (U_s = 13,5 V)$	1 A
Max. switching current ²⁾ - Break	$I_{Smax} on^3) / off$	45 A / 40 A
Max. switching current ²⁾ - Make	$I_{Smax} on^3) / off$	120 A / 60 A
Limiting continuous current - Break	$I_{SN} at 23 °C / 85 °C$	40 A / 30 A
Limiting continuous current - Make	$I_{SN} at 23 °C / 85 °C$	60 A / 40 A
Voltage drop - Break (typ.)	10 A contact current	100 mV
Voltage drop - Make (typ.)	10 A contact current	100 mV
Increase in coil temperature (typ.)	10 A contact current	3 K
Mechanical endurance (without load)		> 1 x 10 ⁷ cycles
Electrical endurance ⁴⁾		> 2 x 10 ⁵ cycles

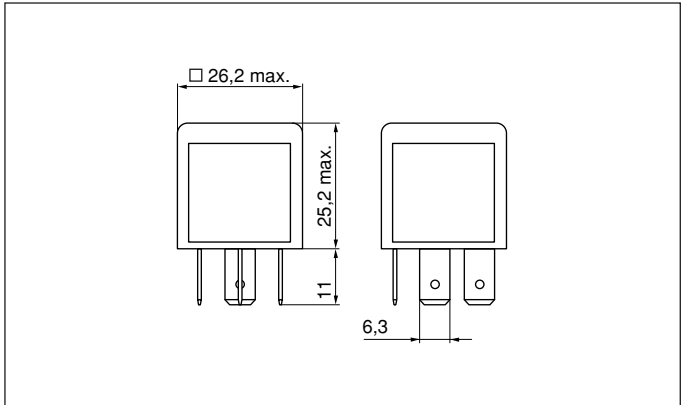
²⁾ $U_s = 13.5 V$ load voltage. ³⁾ This current may flow for a maximum of 3 s for a make/break ratio of 1:10. ⁴⁾ refer to Volvo spezifikation 1282750 issue 05

Technical data for energizing side

Operate voltage ¹⁾	$U_{85/86op}$	≤ 7,2 V
Test voltage	U_P	500 V _{-eff}
Coil resistance ¹⁾	R_{Cu}	91 Ω±9 Ω
Total resistance	$R_{85/86}$	91 Ω±9 Ω
Nom. power consumption	P_N	1,6 W
Release time (typ.)	t_r	2,0 ms

¹⁾ At 23 °C coil temperature.

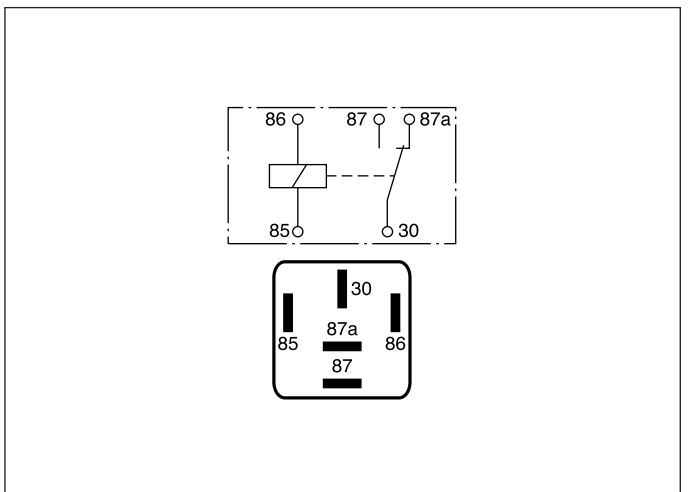
Dimensional drawing



Figure



Connection diagram



Relays

Mini relays F4

Change-over relay

BOSCH
Part number Tyco
Mercedes-Benz-Part number

0 986 332 041
V23134-A0052-X335
002 542 14 19

Technical data for contact side

Contact material		AgSnO ₂
Minimum recommended current	$I_{Smin} (U_s = 13,5 V)$	1 A
Max. switching current ²⁾ - Break	I_{Smax} on ³⁾ / off	90 A / 40 A
Max. switching current ²⁾ - Make	I_{Smax} on ³⁾ / off	200 A / 60 A
Limiting continuous current - Break	I_{SN} at 23 °C / 85 °C	40 A / 30 A
Limiting continuous current - Make	I_{SN} at 23 °C / 85 °C	40 A / 30 A
Voltage drop - Break (typ.)	10 A contact current	30 mV
Voltage drop - Make (typ.)	10 A contact current	30 mV
Increase in coil temperature (typ.)	10 A contact current	4 K
Mechanical endurance (without load)		> 1 x 10 ⁷ cycles
Electrical endurance ⁴⁾	$U_s = 13,5 V$	> 2 x 10 ⁵ cycles

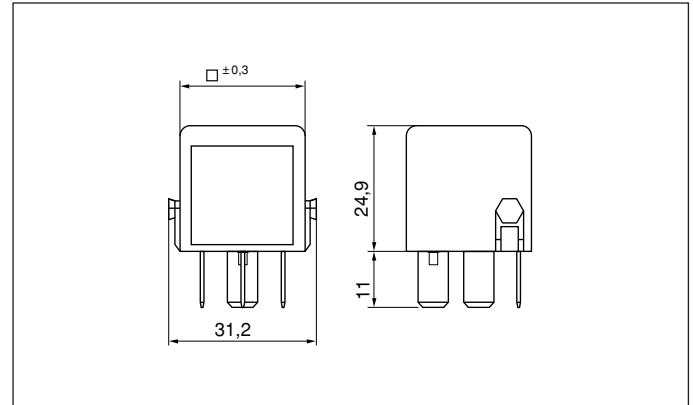
²⁾ The values apply to a resistive or inductive load with suitable spark suppression. ³⁾ This current may flow for a maximum of 3 s for a make/break ratio of 1:10.
⁴⁾ with resistive load, 80 A/30 A on/off current, 0,5 s / 1 s.

Technical data for energizing side

Operate voltage ¹⁾	$U_{85/86op}$	≤ 7,4 V
Test voltage	U_P	500 V _{-eff}
Coil resistance ¹⁾	R_{Cu}	91 Ω ± 0 Ω
Parallel resistor	R_P	560 Ω
Total resistance	$R_{85/86}$	78 Ω ± 8 Ω
Continuous thermal load	P_{ϑ}	3,4 W
Nom. power consumption	P_N	1,6 W
Release time (typ.)	t_r	3,5 ms

¹⁾ At 23 °C coil temperature.

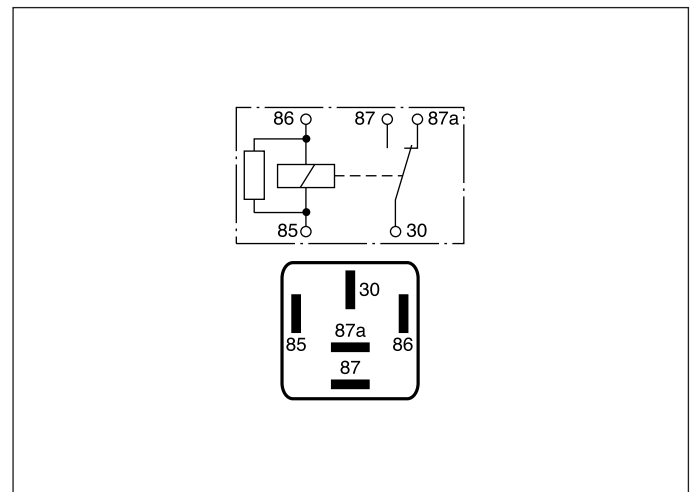
Dimensional drawing



Figure



Connection diagram



Relays

Mini relays F4

Change-over relay

BOSCH
Part number Tyco
Rover-Part number

0 986 332 073
V23134-A0052-X137
YWB 10032

Technical data for contact side

Contact material		AgNiO, 15
Minimum recommended current	$I_{Smin} (U_s = 13,5 V)$	1 A
Max. switching current ²⁾ - Break	$I_{Smax} on^3) / off$	45 A / 40 A
Max. switching current ²⁾ - Make	$I_{Smax} on^3) / off$	120 A / 60 A
Limiting continuous current - Break	$I_{SN} at 23 °C / 85 °C$	40 A / 30 A
Limiting continuous current - Make	$I_{SN} at 23 °C / 85 °C$	60 A / 40 A
Voltage drop - Break (typ.)	10 A contact current	100 mV
Voltage drop - Make (typ.)	10 A contact current	100 mV
Increase in coil temperature (typ.)	10 A contact current	3 K
Mechanical endurance (without load)		> 1 x 10 ⁷ cycles
Electrical endurance ⁴⁾	$U_s = 13,5 V$	> 2 x 10 ⁵ cycles

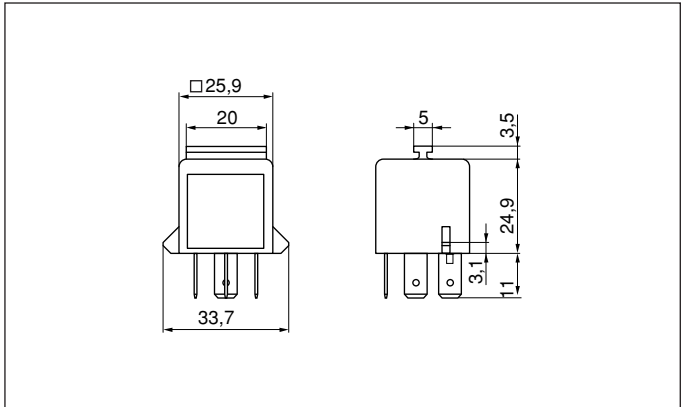
²⁾ The values apply to a resistive or inductive load with suitable spark suppression. ³⁾ This current may flow for a maximum of 3 s for a make/break ratio of 1:10.
⁴⁾ with a resistive load 40 A on make contact, 0.1 s/1 s.

Technical data for energizing side

Operate voltage ¹⁾	$U_{85/86op}$	≤ 7,2 V
Test voltage	U_P	500 V _{-eff}
Coil resistance ¹⁾	R_{Cu}	92 Ω ± 9 Ω
Parallel resistor	R_P	680 Ω
Total resistance	$R_{85/86}$	80 Ω ± 8 Ω
Continuous thermal load	P_{θ}	3,4 W
Nom. power consumption	P_N	1,6 W
Release time (typ.)	t_r	3,5 ms

¹⁾ At 23 °C coil temperature.

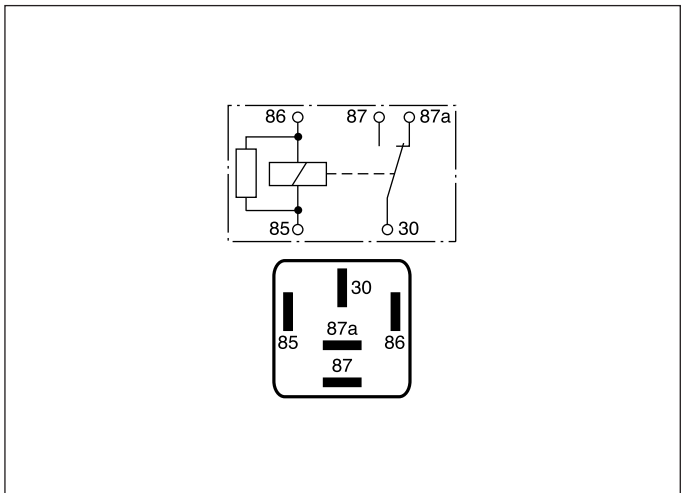
Dimensional drawing



Figure



Connection diagram



Relays

Mini relays F7

Characteristic quantities

Rated voltage	U_N	24 V
Test voltage	U_P	500 V _{-eff}
Upper limit temperature	ϑ_{\max}	155 °C
Thermal resistance	R_{ϑ}	40 K/W
Ambient temperature	ϑ_{amb}	-40 °C...+85 °C
Max. switching frequency	$f_{S\max}$	20 Hz
Response time (typ.)	t_{OP}	7,5 ms
Graphical symbol		See connection diagram

Relays

Mini relays F7

NO relays

BOSCH
Part number Tyco
VW-Part number

0 986 332 002
V23134-J0052-X300
8DO 951 253

Technical data for contact side

Contact material		AgSnO ₂
Minimum recommended current	$I_{Smin} (U_s = 13,5 V)$	1 A
Max. switching current ²⁾ - Make	I_{Smax} on ³⁾ / off	240 A / 70 A
Limiting continuous current - Make	I_{SN} at 23 °C / 85 °C	70 A / 50 A
Voltage drop - Make (typ.)	10 A contact current	10 mV
Increase in coil temperature (typ.)	10 A contact current	2 K
Mechanical endurance (without load)		> 1 x 10 ⁷ cycles
Electrical endurance ⁴⁾		> 2 x 10 ⁵ cycles

²⁾ The values apply to a resistive or inductive load with suitable spark suppression. ³⁾ This current may flow for a maximum of 3 s for a make / break ratio of 1:10.

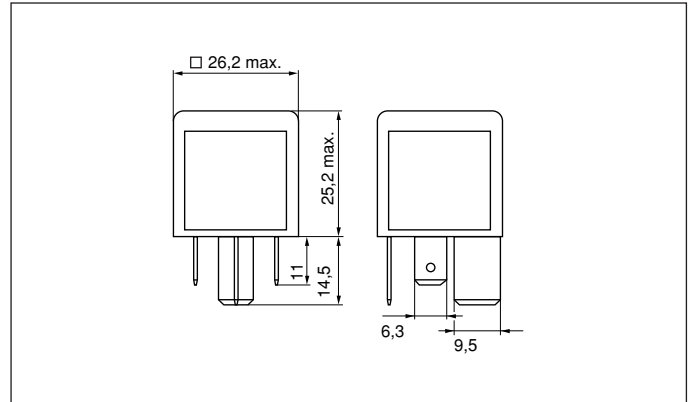
⁴⁾ For a resistive load 70 A, $U_s = 13.5 V$ load voltage

Technical data for energizing side

Operate voltage ¹⁾	$U_{85/86op}$	≤ 7,2 V
Release voltage ²⁾	$U_{85/86r}$	≥ 1,6 V
Coil resistance ¹⁾	R_{Cu}	91 Ω ± 0 Ω
Parallel resistor	R_P	560 Ω
Total resistance	$R_{85/86}$	78 Ω ± 8 Ω
Continuous thermal load	P_{ϑ}	3,3 W
Nom. power consumption	P_N	1,8 W
Release time (typ.)	t_r	5,5 ms

¹⁾ At 23 °C coil temperature.

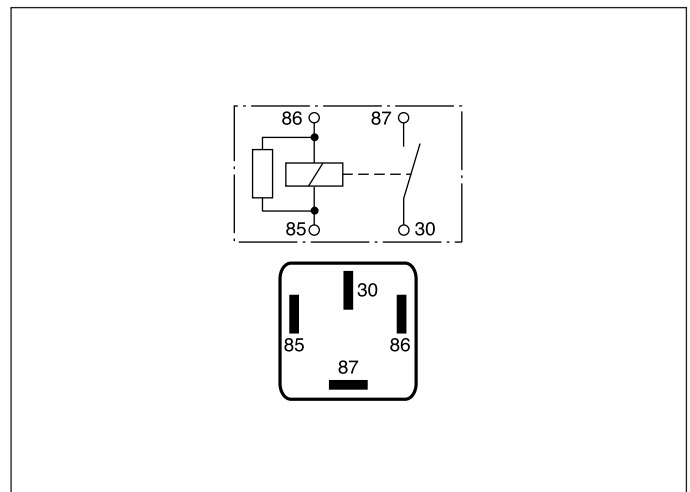
Dimensional drawing



Figure



Connection diagram



Relays

Mini relays F7

NO relays

BOSCH
Part number Tyco
Volvo-Part number

0 986 332 023
V23134-J0052-X346
9441158

Technical data for contact side

Contact material		Ag
Minimum recommended current	$I_{Smin} (U_s = 13,5 V)$	1 A
Max. switching current ²⁾ - Make	$I_{Smax} on^3) / off$	240 A / 70 A
Limiting continuous current - Make	$I_{SN} at 23 °C / 85 °C$	70 A / 50 A
Voltage drop - Make (typ.)	10 A contact current	10 mV
Increase in coil temperature (typ.)	10 A contact current	4 K
Mechanical endurance (without load)		> 1 x 10 ⁷ cycles
Electrical endurance ⁴⁾		> 2 x 10 ⁵ cycles

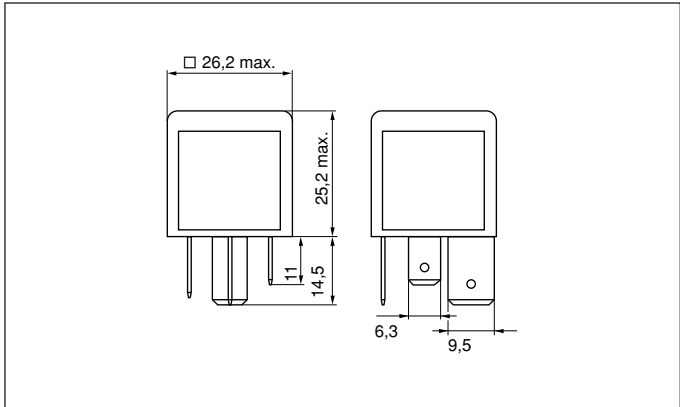
²⁾ The values apply to a resistive or inductive load with suitable spark suppression. ³⁾ This current may flow for a maximum of 3 s for a make / break ratio of 1:10.
⁴⁾ refer to Volvo specification 1282750 issue 05

Technical data for energizing side

Operate voltage ¹⁾	$U_{85/86op}$	≤ 7,4 V
Release voltage ²⁾	$U_{85/86r}$	≥ 1,6 V
Coil resistance ¹⁾	R_{Cu}	91 Ω±9 Ω
Parallel resistor	R_P	470 Ω
Total resistance	$R_{85/86}$	76 Ω±8 Ω
Nom. power consumption	P_N	1,9 W
Release time (typ.)	t_r	3,5 ms

¹⁾ At 23 °C coil temperature.

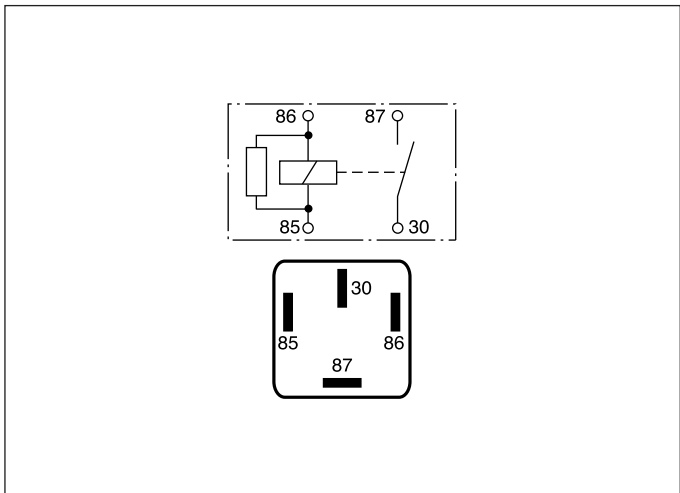
Dimensional drawing



Figure



Connection diagram



Relays

Mini relays F7

NO relays

BOSCH
Part number Tyco
Opel-Part number

0 986 332 030
V23134-K0052-X220
90 464 760

Technical data for contact side

Contact material		Ag, fine-grain
Minimum recommended current	$I_{Smin} (U_s = 13,5 V)$	1 A
Max. switching current ²⁾ - Make	I_{Smax} on ³⁾ / off	120 A / 60 A
Limiting continuous current - Make	I_{SN} at 23 °C / 85 °C	60 A / 40 A
Voltage drop - Make (typ.)	60 A contact current	60 mV
Increase in coil temperature (typ.)	10 A contact current	3 K
Mechanical endurance (without load)		> 1 x 10 ⁷ cycles
Electrical endurance ⁴⁾		> 2 x 10 ⁵ cycles

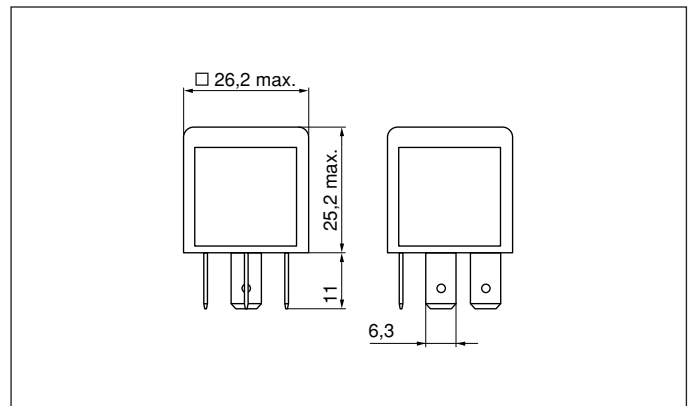
²⁾ The values apply to a resistive or inductive load with suitable spark suppression. ³⁾ This current may flow for a maximum of 3 s for a make / break ratio of 1:10.
⁴⁾ for an inductive load 500 µH 60 A/40 A, on/off current, 0.1 s/1.3 s.

Technical data for energizing side

Operate voltage ¹⁾	$U_{85/86op}$	≤ 7,4 V
Release voltage ²⁾	$U_{85/86r}$	≥ 1,9 V
Coil resistance ¹⁾	R_{Cu}	91 Ω±9 Ω
Parallel resistor	R_P	560 Ω
Total resistance	$R_{85/86}$	76 Ω±8 Ω
Nom. power consumption	P_N	1,9 W
Release time (typ.)	t_r	3,5 ms

¹⁾ At 23 °C coil temperature.

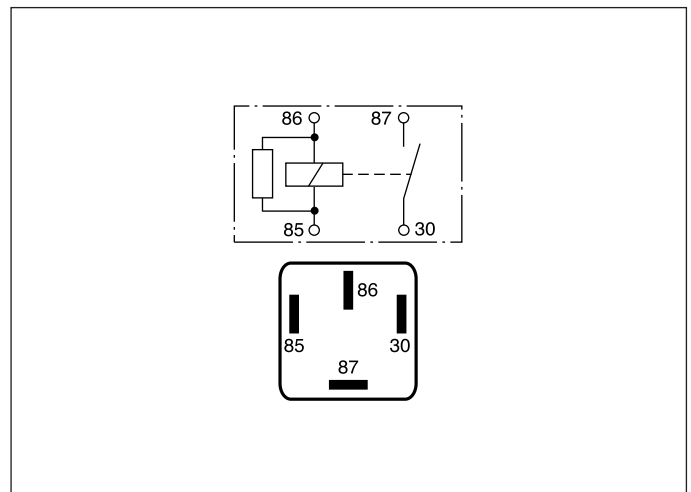
Dimensional drawing



Figure



Connection diagram



Relays

Mini relays FA4

Characteristic quantities

Rated voltage	U_N	12 V
Release voltage	U_{12r}	$\geq 2,1$ V (23 °C)
Test voltage	U_P	500 V _{-eff}
Sustained thermal load	P_θ	3,3 W
Upper limit temperature	ϑ_{\max}	155 °C
Thermal resistance	R_θ	40 K/W
Ambient temperature	ϑ_{amb}	-40 °C...+85 °C
Max. switching frequency	$f_{S\max}$	20 Hz
Release time (typ.)	t_r	5,5 ms
Graphical symbol		See connection diagram

Relays

Mini relays FA4

NO relays

BOSCH
Part number Tyco
Ford-Part number

0 986 332 050
V23136-J0004-X031
01030359

Technical data for contact side

Contact material		AgSnO ₂
Minimum recommended current	$I_{Smin} (U_s = 13,5 V)$	1 A
Max. switching current ²⁾ - Make	I_{Smax} on ³⁾ / off	240 A / 70 A
Limiting continuous current - Make	I_{SN} at 23 °C / 85 °C	70 A / 50 A
Voltage drop - Break (typ.)	10 A contact current	20 mV
Increase in coil temperature (typ.)	10 A contact current	2 K
Mechanical endurance (without load)		> 1 x 10 ⁷ cycles
Electrical endurance ⁴⁾	70 A resistive load	> 1 x 10 ⁵ cycles

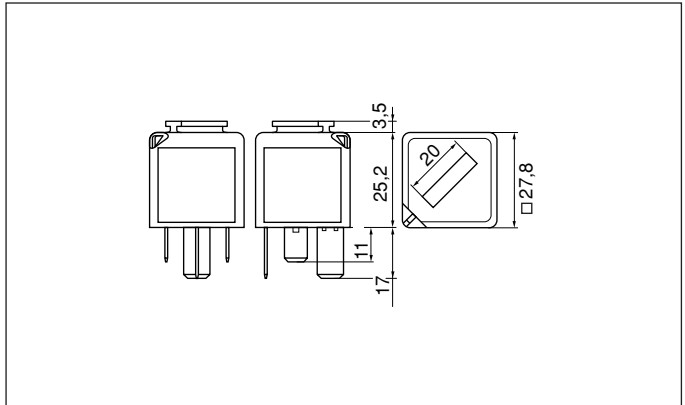
²⁾ The values apply to a resistive or inductive load with suitable spark suppression. ³⁾ This current may flow for a maximum of 3 s for a make / break ratio of 1:10.
⁴⁾ for a resistive load, 1 s/1, $U_s = 13.5 V$ load voltage.

Technical data for energizing side

Operate voltage ¹⁾	U_{12op}	≤ 7,2 V
Coil resistance	R_{Cu}	90 Ω±0 Ω
Parallel resistor	R_P	560 Ω
Total resistance	R_{12}	78 Ω±8 Ω
Nom. power consumption	P_N	1,8 W
Operate time (typ.)	t_{OP}	8,5 ms

¹⁾ At 23 °C winding temperature.

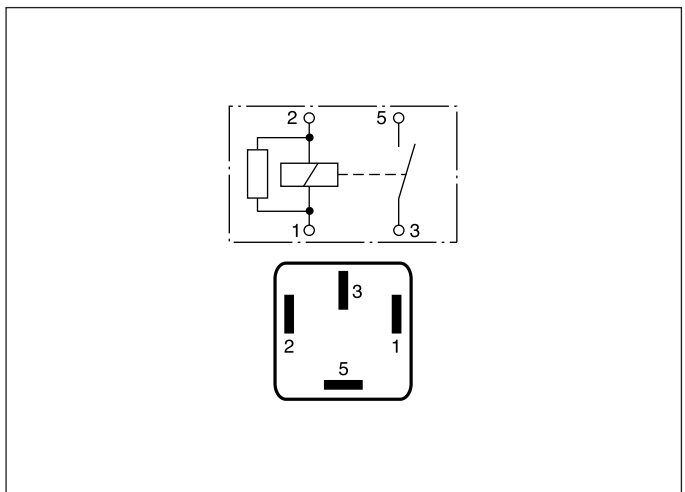
Dimensional drawing



Figure



Connection diagram



Relays

Mini relays FA4

Change-over relay

BOSCH
Part number Tyco
Ford-Part number

0 986 332 053
V23136-A0001-X032
01030360

Technical data for contact side

Contact material		Ag
Minimum recommended current	I_{Smin} ($U_s = 13,5$ V)	1 A
Max. switching current ²⁾ - Break	I_{Smax} on ³⁾ / off	45 A / 40 A
Max. switching current ²⁾ - Make	I_{Smax} on ³⁾ / off	120 A / 60 A
Limiting continuous current - Break	I_{SN} bei 20 °C / 85 °C	40 A / 30 A
Limiting continuous current - Make	I_{SN} at 23 °C / 85 °C	60 A / 40 A
Voltage drop - Break (typ.)	10 A contact current	100 mV
Voltage drop - Break (typ.)	10 A contact current	100 mV
Increase in coil temperature (typ.)	10 A contact current	3 K
Mechanical endurance (without load)		> 1 x 10 ⁷ cycles
Electrical endurance ⁴⁾	40 A resistive load	> 1 x 10 ⁵ cycles

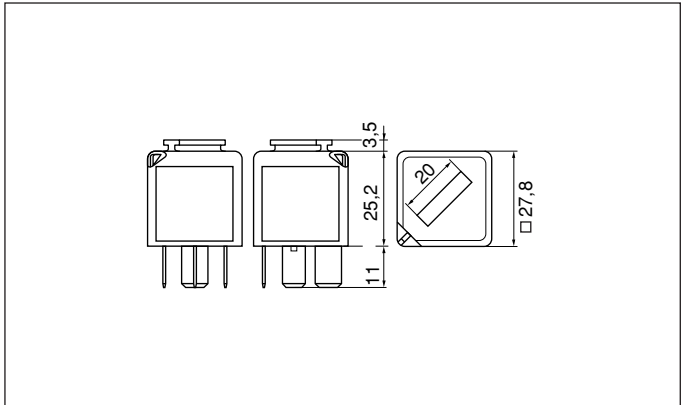
²⁾ The values apply to a resistive or inductive load with suitable spark suppression. ³⁾ This current may flow for a maximum of 3 s for a make / break ratio of 1:10.
⁴⁾ $U_s = 13.5$ V load voltage.

Technical data for energizing side

Operate voltage ¹⁾	U_{12op}	≤ 7,2 V
Coil resistance	R_{Cu}	114 Ω
Parallel resistor	R_P	680 Ω
Total resistance	R_{12}	98 Ω ± 10 Ω
Nom. power consumption	P_N	1,5 W
Operate time (typ.)	t_{OP}	8,5 ms

¹⁾ At 23 °C winding temperature.

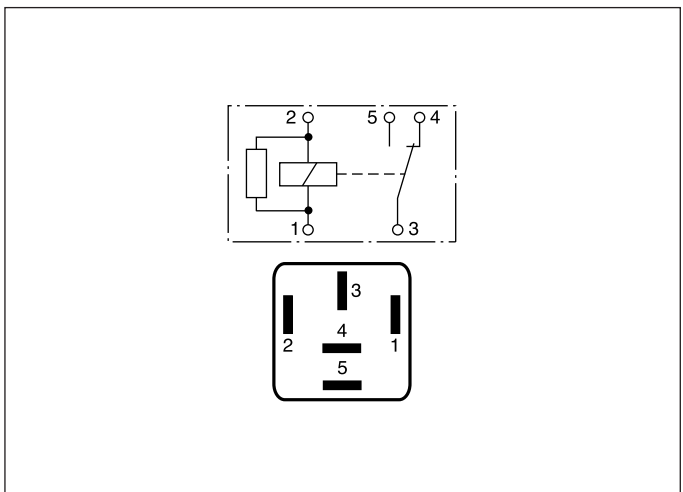
Dimensional drawing



Figure



Connection diagram



Relays

Mini relays FA7

Characteristic quantities

Rated voltage	U_N	12 V
Release voltage	U_{12r}	$\geq 1,8 \text{ V (23 } ^\circ\text{C)}$
Test voltage	U_P	500 V _{-rms}
Sustained thermal load	P_θ	3,4 W
Upper limit temperature	ϑ_{\max}	155 °C
Thermal resistance	R_θ	40 K/W
Ambient temperature	ϑ_{amb}	-40...+85 °C
Max. switching frequency	f_{Smax}	20 Hz
Release time (ms)	t_r	4,0 ms
Graphical symbol		See connection diagram

Relays

Mini relays FA7

NO relays

BOSCH
Part number Tyco
VW-Part number

0 986 332 001
V23136-J0006-X045
7MO 951 253

Technical data for contact side

Contact material		AgNiO, 15
Minimum recommended current	$I_{Smin} (U_s = 13,5 V)$	1 A
Max. switching current ²⁾ - Break	$I_{Smax} \text{ on}^3) / \text{ off}$	45 A / 40 A
Max. switching current ²⁾ - Make	$I_{Smax} \text{ on}^3) / \text{ off}$	120 A / 60 A
Limiting continuous current - Break	$I_{SN} \text{ at } 23 \text{ }^\circ\text{C} / 85 \text{ }^\circ\text{C}$	40 A / 30 A
Limiting continuous current - Make	$I_{SN} \text{ at } 23 \text{ }^\circ\text{C} / 85 \text{ }^\circ\text{C}$	40 A / 30 A
Voltage drop - Break (typ.)	10 A contact current	100 mV
Voltage drop - Make (typ.)	10 A contact current	100 mV
Increase in coil temperature (typ.)	10 A contact current	3 K
Mechanical endurance (without load)		> 1 x 10 ⁷ cycles
Electrical endurance ⁴⁾	$U_s = 13,0 V$	> 2 x 10 ⁵ cycles

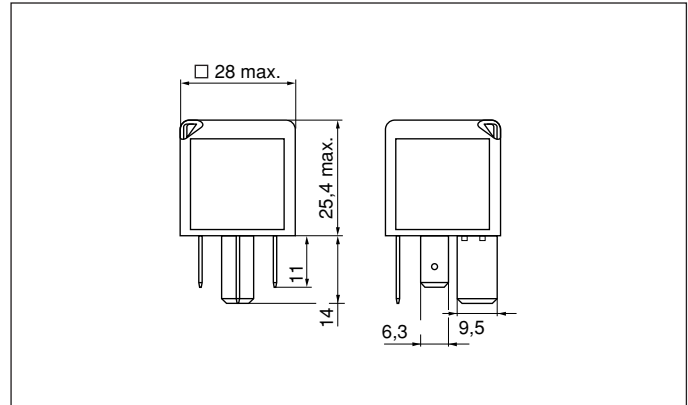
²⁾ The values apply to a resistive or inductive load with suitable spark suppression. ³⁾ This current may flow for a maximum of 3 s for a make / break ratio of 1:10.
⁴⁾ for an inductive load of 400 μH , 120 A/70 A on/off current, ton/toff = 2 s / 8 s.

Technical data for energizing side

Operate voltage ¹⁾	U_{12op}	$\leq 6,8 V$
Coil resistance	R_{Cu}	$71 \Omega \pm 5,6 \Omega$
Parallel resistor	R_P	560Ω
Total resistance	R_{12}	$63 \Omega \pm 6 \Omega$
Nom. power consumption	P_N	$2,3 W$
Operate time (typ.)	t_{OP}	$8,5 \text{ ms}$

¹⁾ At 23 °C coil temperature.

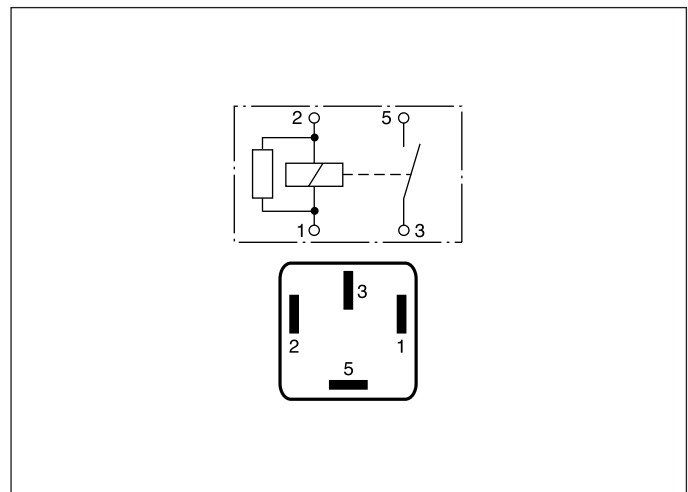
Dimensional drawing



Figure



Connection diagram



Applications

Order number	Relay type, contact type	Applications	Vehicle models
BMW			
0 986 332 060	Micro relay, changeover contact	Tailgate locking, steering-column adjustment, Turn-signal indicators, central locking, supply relays Brake-disk adjustment, turn-signal indicators, supply relays	5 Series [E34], [E39]; 7 Series [E32], [E38]; 8 Series [E31]; Z3; Z8 Motorcycles
0 986 332 061	Micro relay, make contact	Tailgate motor, heated rear window, heated wiper-parking area, fuel-tank flap Stop lamp, heated handlebars	5 Series [E34], [E39] 7 Series [E32], [E38] 8 Series [E31]; Z3; Z8 Motorcycles
Ford			
0 986 332 050	Mini relay, make contact	Fuse box, fan, ignition switch, glow plug, air-conditioning system	Cougar 98; Escort 95 [FA]; Fiesta 96 [DX]; Mondeo 93 [FD]; Mondeo 97 [GD]; PUMA [CE]; Transit 95 [EY]
0 986 332 051	Micro relay, break contact	Fuse box, high beam, full-throttle shutoff, air-conditioning system, shutoff, cruise control, low beam, daytime running lamp, general electronic modules, continuous daytime running lamp	Cougar 98; Escort 95 [FA]; Fiesta 96 [DX]; Mondeo 97 [GD]; PUMA [CE]; Transit 95 [EY]
0 986 332 052	Micro relay, make contact	Kickdown, central locking, ignition switch, fuel pump, horn, fuel supply, high beam, interior light, low beam, anti-theft system, ignition, seat heating, engine control, air-conditioning system, headlamps, cold-start device mechanism, fog lamps, diesel pre-heating, electronic modules	Cougar 98; Escort 95 [FA]; Fiesta 96 [DX]; KA 97 [AJ]; Mondeo 97 [GD]; PUMA [CE]; Transit 95 [EY]
0 986 332 053	Mini relay, change-over contact	Windshield wiper, heated rear window, fan, daytime running lamp, starter, central locking, clearance lamps, fog lamps, electronic modules, ignition switch, air-conditioning system, horn, fuel pump, heater blower	Cougar 98; Escort 95 [FA]; Fiesta 96 [DX]; IKON 99 [GF]; [CV]; Mondeo 93 [FD]; Mondeo 97 [GD]; PUMA [CE]; Transit 95 [EY]
Mercedes-Benz			
0 986 332 040	Mini relay, make contact	Locking system, terminal 15, secondary air pump, FRP ABS, fuel pumps, engine management, heated rear window, interior blower	All series
0 986 332 041	Mini relay, change-over contact	Wiper level 1 and 2, central locking, power windows, steering-column tube adjustment	All series
Mitsubishi			
0 986 332 010	Micro relay, make contact	Air-conditioning system, control relay	Carisma 7AQ Space Car
Opel			
0 986 332 030	Mini relay, make contact	Fuel pump, fuel injector	Astra-G; Corsa C; Omega B; Sintra; Vectra B; Zafira
Rover			
0 986 332 070	Micro relay, make contact	Locking system, instruments	Metro; Rover 75; Series 200, 400, 600, 800
0 986 332 071	Mini relay, make contact	Turn-signal lamp	Discovery; Metro; MGF; Mini 90; Rover 75; Series 200, 400, 600, 800
0 986 332 072	Mini relay, make contact	Air-conditioning system, blower, heated rear window	Defender; Discovery; Freelander; Metro; Range Rover; Series 200, 400; Series 600, 800 Cabrio



Order number	Relay type, contact type	Applications	Vehicle models
0 986 332 073	Mini relay, change-over contact	Seat adjuster, air-conditioning system, blower, heated rear window, ignition, power window	Defender; Discovery; Freelander; Metro; Range Rover; Series 200, 400, 800

Volvo

0 986 332 020	Micro relay, changeover contact	Rear-door childproof locks (relay in door wiring harness)	S60; S80; V70; XC90
0 986 332 021	Micro relay, changeover contact	Air-conditioning system, horn, low beam, high beam, fog lamp, stop lamp, reversing lamp, fog warning lamp, rear power window, rear central locking, rear-seat heating, rear wiper, fuel pump, supply relay (extended X)	S60; S80; V70; XC91
0 986 332 022	Mini relay, change-over contact	Windshield wiper, wash/wipe pump	S60; S80; V70; XC92
0 986 332 023	Mini relay, make contact	Supply relay (X relay and terminal 15 relay) Starter, glow plugs, engine-management supply, heated rear window	S60; S80; V70; XC93

VW

0 986 332 001	Mini relay, make contact	Supply relay, heated rear window, secondary air pump, radiator fan, glow plugs	Bora; Caddy; Golf; LT; Lupo; New Beetle; Passat; Polo; Sharan; Transporter; Jetta
0 986 332 002	Mini relay, make contact	Electric fan, bypass relay terminal 75X, glow plugs, radiator fan, PTC supplementary heater 2, secondary air pump, supply relay	Passat
0 986 332 003	Mini relay, make contact	Electric fan, bypass relay terminal 75X, electronic stability program 1 and 2, glow plugs, radiator fan, PTC supplementary heater 2, secondary air pump	Passat Transporter

Comparison

Vehicle manufacturer	Vehicle manufacturer number	Siemens number (OEM relays)	Siemens number (Bosch relays)	Tyco number (Bosch relays)	Bosch number
BMW	61 36-1 393 415	V23073-B1008-X19	V23073-B1008-X64	1-1414361-0	0 986 332 060
BMW	61 36-1 393-412	V23073-B1005-X18	V23073-B1005-X63	1-1414362-0	0 986 332 061
Ford	01030359	V23136-J4-X31	V23136-J4-X54	1-1414343-0	0 986 332 050
Ford	07320415	V23074-B1201-X21	V23074-B1201-X72	1-1414359-0	0 986 332 051
Ford	07320414	V23074-B1701-X20	V23074-B1701-X73	1-1414360-0	0 986 332 052
Ford	01030360	V23136-A1-X32	V23136-A1-X53	1-1414344-0	0 986 332 053
Mercedes-Benz	0025421319	V23134-B52-X336	V23134-B52-X449	1-1414350-0	0 986 332 040
Mercedes-Benz	0025421419	V23134-A52-X335	V23134-A52-X444	1-1414351-0	0 986 332 041
Mitsubishi	MB 953 382	V23074-A1001-X7	V23074-A1001-X69	1-1414356-0	0 986 332 010
Opel	90 464 760	V23134-K52-X220	V23134-K52-X452	1-1414349-0	0 986 332 030
Rover	YWB 10004	V23073-B1005-X012	V23073-B1005-X62	1-1414363-0	0 986 332 070
Rover	YWB 10012	V23134-B52-X127	V23134-B52-X446	1-1414352-0	0 986 332 071
Rover	YWB 10027L	V23134-B52-X130	V23134-B52-X447	1-1414353-0	0 986 332 072
Rover	YWB 10032	V23134-A52-X137	V23134-A52-X443	1-1414354-0	0 986 332 073
Volvo	9494783	V23074-A4001-X55	V23074-A4001-X71	1-1414357-0	0 986 332 020
Volvo	9441161	V23074-A4001-X40	V23074-A4001-X70	1-1414358-0	0 986 332 021
Volvo	9441160	V23134-A52-X345	V23134-A52-X445	1-1414347-0	0 986 332 022
Volvo	9441158	V23134-J52-X346	V23134-J52-X451	1-1414348-0	0 986 332 023
VW	7MO 951 253 A	V23136-J6-X45	V23136-J6-X055	1-1414342-0	0 986 332 001
VW	8DO 951 253	V23134-J52-X300	V23134-J52-X450	1-1414345-0	0 986 332 002
VW	8DO 951 253 A	V23134-B52-X301	V23134-B52-X448	1-1414346-0	0 986 332 003

Bosch number	Vehicle manufacturer	Vehicle manufacturer number	Siemens number (OEM relays)	Siemens number (Bosch relays)	Tyco number (Bosch relays)
0 986 332 001	VW	7MO 951 253 A	V23136-J6-X45	V23136-J6-X055	1-1414342-0
0 986 332 002	VW	8DO 951 253	V23134-J52-X300	V23134-J52-X450	1-1414345-0
0 986 332 003	VW	8DO 951 253 A	V23134-B52-X301	V23134-B52-X448	1-1414346-0
0 986 332 010	Mitsubishi	MB 953 382	V23074-A1001-X7	V23074-A1001-X69	1-1414356-0
0 986 332 020	Volvo	9494783	V23074-A4001-X55	V23074-A4001-X71	1-1414357-0
0 986 332 021	Volvo	9441161	V23074-A4001-X40	V23074-A4001-X70	1-1414358-0
0 986 332 022	Volvo	9441160	V23134-A52-X345	V23134-A52-X445	1-1414347-0
0 986 332 023	Volvo	9441158	V23134-J52-X346	V23134-J52-X451	1-1414348-0
0 986 332 030	Opel	90 464 760	V23134-K52-X220	V23134-K52-X452	1-1414349-0
0 986 332 040	Mercedes-Benz	0025421319	V23134-B52-X336	V23134-B52-X449	1-1414350-0
0 986 332 041	Mercedes-Benz	0025421419	V23134-A52-X335	V23134-A52-X444	1-1414351-0
0 986 332 050	Ford	01030359	V23136-J4-X31	V23136-J4-X54	1-1414343-0
0 986 332 051	Ford	07320415	V23074-B1201-X21	V23074-B1201-X72	1-1414359-0
0 986 332 052	Ford	07320414	V23074-B1701-X20	V23074-B1701-X73	1-1414360-0
0 986 332 053	Ford	01030360	V23136-A1-X32	V23136-A1-X53	1-1414344-0
0 986 332 060	BMW	61 36-1 393 415	V23073-B1008-X19	V23073-B1008-X64	1-1414361-0
0 986 332 061	BMW	61 36-1 393-412	V23073-B1005-X18	V23073-B1005-X63	1-1414362-0
0 986 332 070	Rover	YWB 10004	V23073-B1005-X012	V23073-B1005-X62	1-1414363-0
0 986 332 071	Rover	YWB 10012	V23134-B52-X127	V23134-B52-X446	1-1414352-0
0 986 332 072	Rover	YWB 10027L	V23134-B52-X130	V23134-B52-X447	1-1414353-0
0 986 332 073	Rover	YWB 10032	V23134-A52-X137	V23134-A52-X443	1-1414354-0

Siemens number (Bosch relays)	Bosch number	Vehicle manufacturer	Vehicle manufacturer number	Siemens number (OEM relays)	Tyco number (Bosch relays)
V23073-B1005-X62	0 986 332 070	Rover	YWB 10004	V23073-B1005-X012	1-1414363-0
V23073-B1005-X63	0 986 332 061	BMW	61 36-1 393-412	V23073-B1005-X18	1-1414362-0
V23073-B1008-X64	0 986 332 060	BMW	61 36-1 393 415	V23073-B1008-X19	1-1414361-0
V23074-A1001-X69	0 986 332 010	Mitsubishi	MB 953 382	V23074-A1001-X7	1-1414356-0
V23074-A4001-X70	0 986 332 021	Volvo	9441161	V23074-A4001-X40	1-1414358-0
V23074-A4001-X71	0 986 332 020	Volvo	9494783	V23074-A4001-X55	1-1414357-0
V23074-B1201-X72	0 986 332 051	Ford	07320415	V23074-B1201-X21	1-1414359-0
V23074-B1701-X73	0 986 332 052	Ford	07320414	V23074-B1701-X20	1-1414360-0
V23134-A52-X443	0 986 332 073	Rover	YWB 10032	V23134-A52-X137	1-1414354-0
V23134-A52-X444	0 986 332 041	Mercedes-Benz	0025421419	V23134-A52-X335	1-1414351-0
V23134-A52-X445	0 986 332 022	Volvo	9441160	V23134-A52-X345	1-1414347-0
V23134-B52-X446	0 986 332 071	Rover	YWB 10012	V23134-B52-X127	1-1414352-0
V23134-B52-X447	0 986 332 072	Rover	YWB 10027L	V23134-B52-X130	1-1414353-0
V23134-B52-X448	0 986 332 003	VW	8DO 951 253 A	V23134-B52-X301	1-1414346-0
V23134-B52-X449	0 986 332 040	Mercedes-Benz	0025421319	V23134-B52-X336	1-1414350-0
V23134-J52-X450	0 986 332 002	VW	8DO 951 253	V23134-J52-X300	1-1414345-0
V23134-J52-X451	0 986 332 023	Volvo	9441158	V23134-J52-X346	1-1414348-0
V23134-K52-X452	0 986 332 030	Opel	90 464 760	V23134-K52-X220	1-1414349-0
V23136-A1-X53	0 986 332 053	Ford	01030360	V23136-A1-X32	
V23136-J4-X54	0 986 332 050	Ford	01030359	V23136-J4-X31	1-1414343-0
V23136-J6-X055	0 986 332 001	VW	7MO 951 253 A	V23136-J6-X45	1-1414342-0

Tyco number (Bosch relays)	Bosch number	Siemens number (Bosch relays)	Vehicle manufacturer	Vehicle manufacturer number	Siemens number (OEM relays)
1-1414342-0	0 986 332 001	V23136-J6-X055	VW	7MO 951 253 A	V23136-J6-X45
1-1414343-0	0 986 332 050	V23136-J4-X54	Ford	01030359	V23136-J4-X31
1-1414344-0	0 986 332 053	V23136-A1-X53	Ford	01030360	V23136-A1-X32
1-1414345-0	0 986 332 002	V23134-J52-X450	VW	8DO 951 253	V23134-J52-X300
1-1414346-0	0 986 332 003	V23134-B52-X448	VW	8DO 951 253 A	V23134-B52-X301
1-1414347-0	0 986 332 022	V23134-A52-X445	Volvo	9441160	V23134-A52-X345
1-1414348-0	0 986 332 023	V23134-J52-X451	Volvo	9441158	V23134-J52-X346
1-1414349-0	0 986 332 030	V23134-K52-X452	Opel	90 464 760	V23134-K52-X220
1-1414350-0	0 986 332 040	V23134-B52-X449	Mercedes-Benz	0025421319	V23134-B52-X336
1-1414351-0	0 986 332 041	V23134-A52-X444	Mercedes-Benz	0025421419	V23134-A52-X335
1-1414352-0	0 986 332 071	V23134-B52-X446	Rover	YWB 10012	V23134-B52-X127
1-1414353-0	0 986 332 072	V23134-B52-X447	Rover	YWB 10027L	V23134-B52-X130
1-1414354-0	0 986 332 073	V23134-A52-X443	Rover	YWB 10032	V23134-A52-X137
1-1414356-0	0 986 332 010	V23074-A1001-X69	Mitsubishi	MB 953 382	V23074-A1001-X7
1-1414357-0	0 986 332 020	V23074-A4001-X71	Volvo	9494783	V23074-A4001-X55
1-1414358-0	0 986 332 021	V23074-A4001-X70	Volvo	9441161	V23074-A4001-X40
1-1414359-0	0 986 332 051	V23074-B1201-X72	Ford	07320415	V23074-B1201-X21
1-1414360-0	0 986 332 052	V23074-B1701-X73	Ford	07320414	V23074-B1701-X20
1-1414361-0	0 986 332 060	V23073-B1008-X64	BMW	61 36-1 393 415	V23073-B1008-X19
1-1414362-0	0 986 332 061	V23073-B1005-X63	BMW	61 36-1 393-412	V23073-B1005-X18
1-1414363-0	0 986 332 070	V23073-B1005-X62	Rover	YWB 10004	V23073-B1005-X012

Acoustic warning

Acoustic warning signal device in relay form

Characteristic quantities

Rated voltage (load and excitation circuit)	24 V
Permissible operating voltage	9...30 V
Frequency	3300 ± 500 Hz
Permissible ambient temperature	-30...+85 °C

Acoustic warning

Acoustic warning signal device in relay form

Warning tone generator

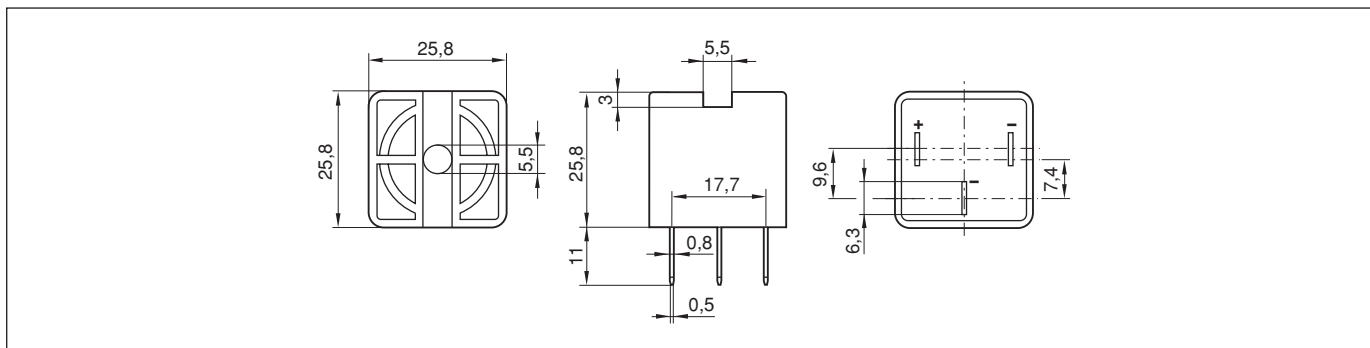
0 986 334 050

Technical data

Maximum current input	70 mA / 24 V
Sound pressure level	92 dB _A / 0,3 m
Type of tone	Pulsed tone
Weight	20 g

Receptacle housing for mini relay, see p. 40

Dimensional drawing



Figure



Acoustic warning

Acoustic warning signal device in relay form

Acoustic warning

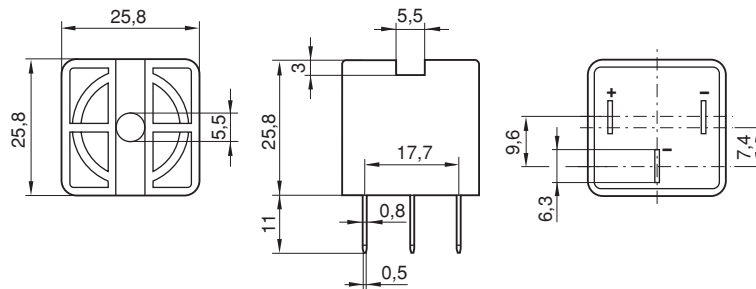
0 986 334 051

Technical data

Maximum current input	35 mA / 24 V
Sound pressure level	92 dbA / 0,3 m
Type of tone	Continuous tone
Weight	20 g

Receptacle housing for mini relay, see p. 40

Dimensional drawing



Figure



Acoustic warning

Acoustic warning signal device in relay form

Warning tone generator

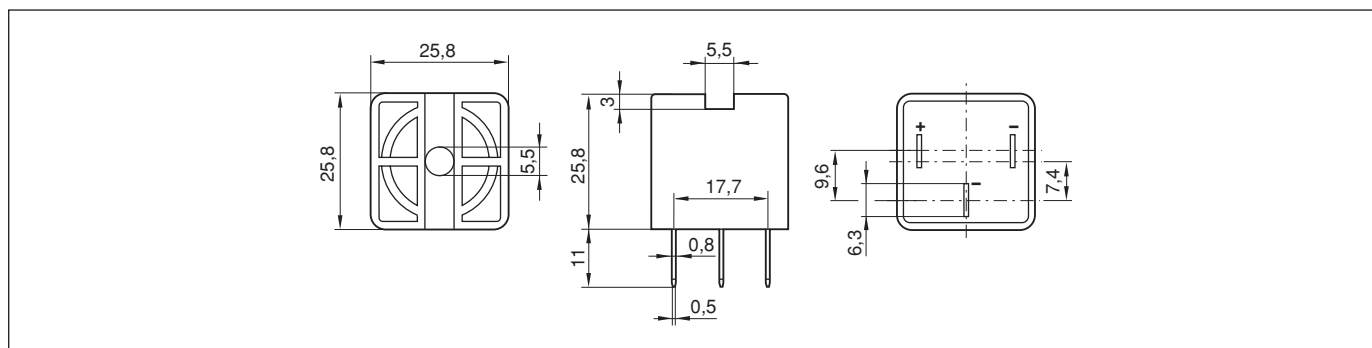
0 986 334 052

Technical data

Maximum current input	70 mA / 24 V
Sound pressure level	103 dB(A) / 0,3 m
Type of tone	Pulsed tone
Weight	20 g

Receptacle housing for mini relay, see p. 40

Dimensional drawing



Figure



Acoustic warning

Acoustic warning signal device in relay form

Warning tone generator

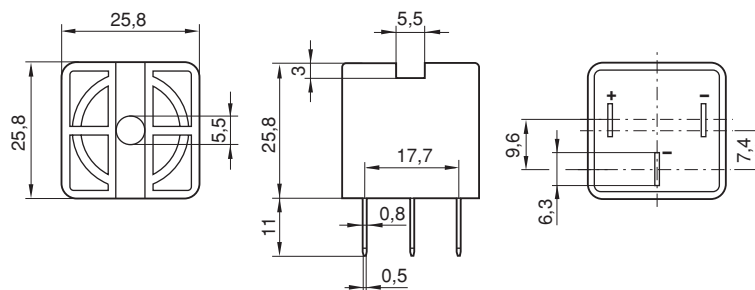
0 986 334 053

Technical data

Maximum current input	70 mA / 24 V
Sound pressure level	103 dbA / 0,3 m
Type of tone	Continuous tone
Weight	20 g

Receptacle housing for mini relay, see p. 40

Dimensional drawing



Figure



Tractive electromagnets

Tractive electromagnets

Pulling electromagnets 12 V

0 330 001 004

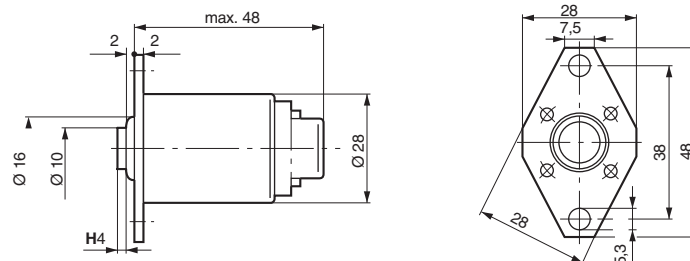
Technical data

Nominal voltage	V	12
Working stroke	mm	4
Nominal wattage ¹⁾	W	69
Operating mode ²⁾		Short-time duty
Forces Working stroke ³⁾	N	≤ 14
Forces With armature pulled in ³⁾	N	≤ 70
Forces Return spring	N	4 ± 1
Weight	kg	0,11

Besides positioning applications, tractive electromagnets may also be used in the following: Ticket stamping/punching machines, guiding, locking, triggering, metering, ventilating, pushing, clamping, riveting, blocking, etc.

¹⁾ With armature pulled in. ²⁾ Short-time duty, after 45 sec. of operation there should be a break of 4.5 min. ³⁾ At nominal voltage and winding temperature 23 ± 5 °C.

Dimensional drawing

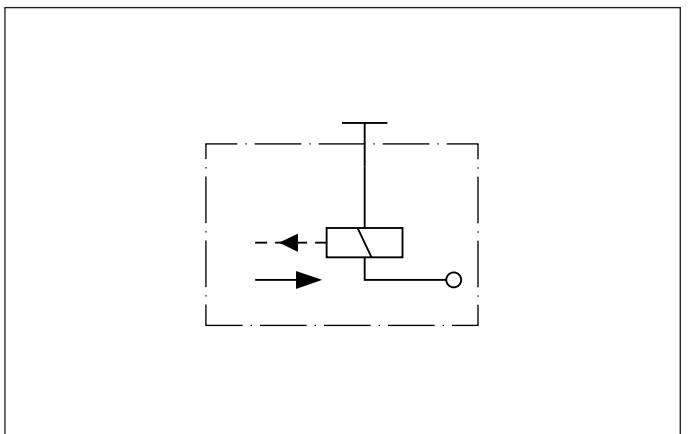


H Lift

Figure



Connection and circuit diagram



Tractive electromagnets

Tractive electromagnets

Pulling electromagnets 12 V

0 330 001 020

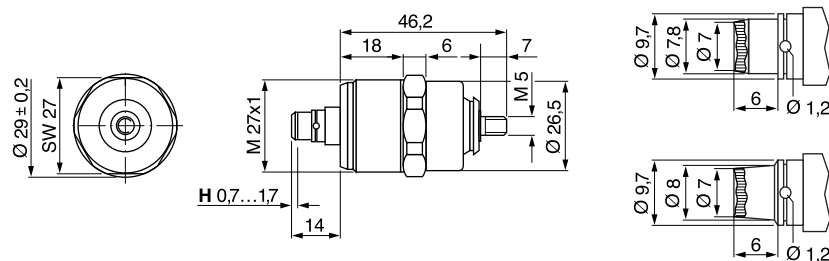
Technical data

Nominal voltage	V	12
Working stroke	mm	1,3
Nominal wattage ¹⁾	W	14
Operating mode ²⁾		Contin. duty
Forces Working stroke ³⁾	N	13
Forces With armature pulled in ³⁾	N	15
Forces Return spring	N	2,3 ± 0,5
Weight	kg	0,103

Besides positioning applications, tractive electromagnets may also be used in the following: Ticket stamping/punching machines, guiding, locking, triggering, metering, ventilating, pushing, clamping, riveting, blocking, etc.

¹⁾ With armature pulled in. ²⁾ Short-time duty, after 45 sec. of operation there should be a break of 4.5 min. ³⁾ At nominal voltage and winding temperature 23 ± 5 °C.

Dimensional drawing

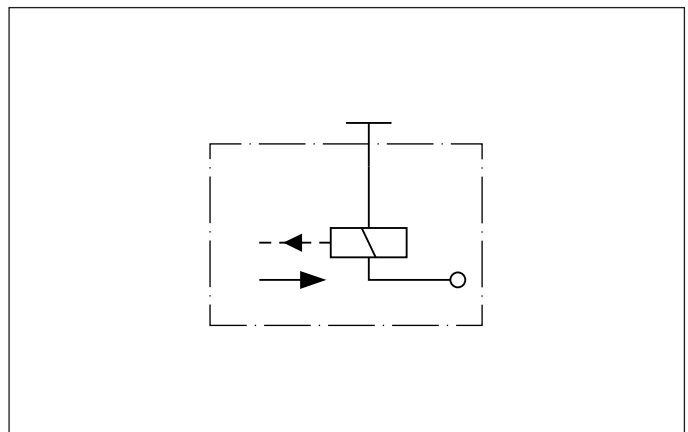


H Lift
SW Width across flats

Figure



Connection and circuit diagram



Tractive electromagnets

Tractive electromagnets

Pulling electromagnet 12 V

0 330 001 040

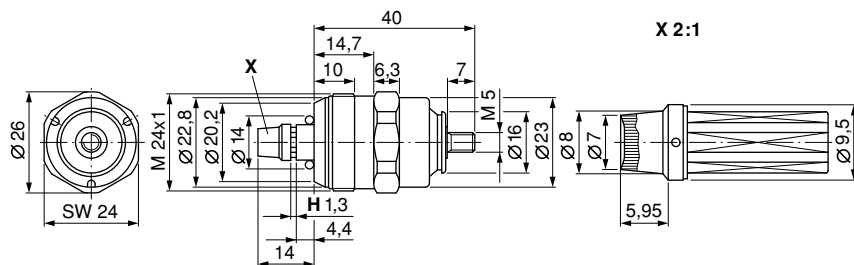
Technical data

Nominal voltage	V	12
Working stroke	mm	1,3
Nominal wattage ¹⁾	W	≤ 21
Operating mode ²⁾		Contin. duty
Forces Working stroke ³⁾	N	≥ 8
Forces With armature pulled in ³⁾	N	≥ 11
Forces Return spring	N	2,3 ± 0,5
Weight	kg	0,074

Besides positioning applications, tractive electromagnets may also be used in the following: Ticket stamping/punching machines, guiding, locking, triggering, metering, ventilating, pushing, clamping, riveting, blocking, etc.

¹⁾ With armature pulled in. ²⁾ Short-time duty, after 45 sec. of operation there should be a break of 4.5 min. ³⁾ At nominal voltage and winding temperature 23 ± 5 °C.

Dimensional drawing

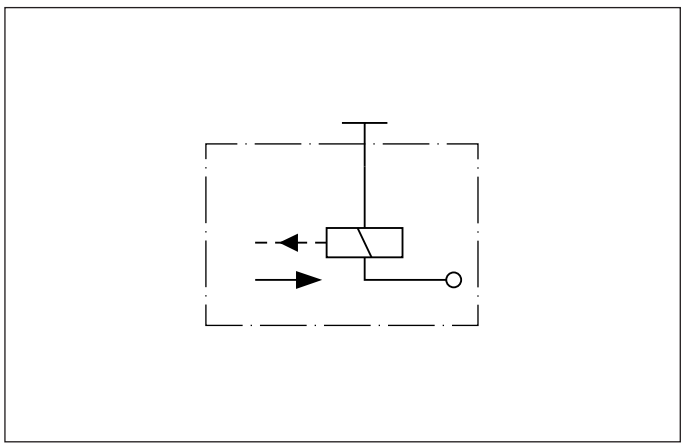


H Lift
SW Width across flats

Figure



Connection and circuit diagram



Tractive electromagnets

Tractive electromagnets

Pulling electromagnets 12 V

0 330 003 002

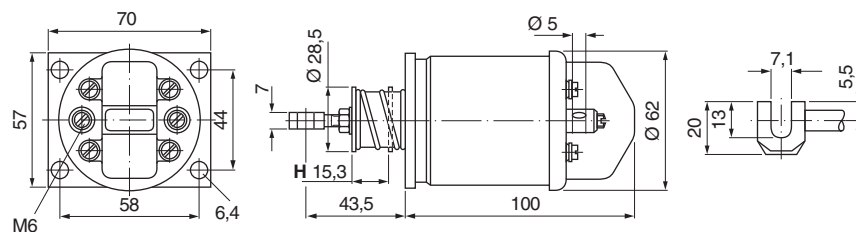
Technical data

Nominal voltage	V	12
Working stroke	mm	15,3
Nominal wattage ¹⁾	W	277
Operating mode ²⁾		Short-time duty
Forces Working stroke ³⁾	N	≤ 95
Forces With armature pulled in ³⁾	N	≤ 200
Forces Return spring	N	4,5 ± 0,5
Weight	kg	1,11

Besides positioning applications, tractive electromagnets may also be used in the following: Ticket stamping/punching machines, guiding, locking, triggering, metering, ventilating, pushing, clamping, riveting, blocking, etc.

¹⁾ With armature pulled in. ²⁾ Short-time duty, after 45 sec. of operation there should be a break of 4.5 min. ³⁾ At nominal voltage and winding temperature 23 ± 5 °C.

Dimensional drawing

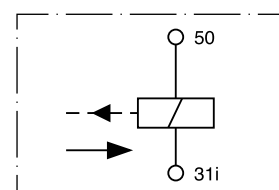


H Lift

Figure



Connection and circuit diagram



Tractive electromagnets

Tractive electromagnets

Pulling electromagnets 12 V

0 330 003 007

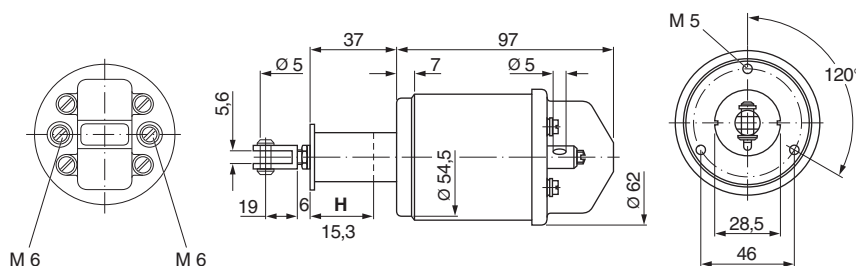
Technical data

Nominal voltage	V	12
Working stroke	mm	15,3
Nominal wattage ¹⁾	W	960/12,5 ⁴⁾
Operating mode ²⁾		Contin. duty
Forces Working stroke ³⁾	N	≤ 110
Forces With armature pulled in ³⁾	N	≤ 270
Weight	kg	1,1

Besides positioning applications, tractive electromagnets may also be used in the following: Ticket stamping/punching machines, guiding, locking, triggering, metering, ventilating, pushing, clamping, riveting, blocking, etc.

¹⁾ With armature pulled in. ²⁾ Short-time duty, after 45 sec. of operation there should be a break of 4.5 min. ³⁾ At nominal voltage and winding temperature 23 ± 5 °C. ⁴⁾ Pull-in winding/hold-in winding

Dimensional drawing

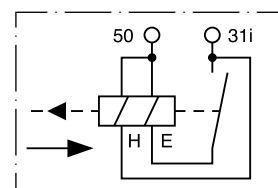


H Lift

Figure



Connection and circuit diagram



Tractive electromagnets

Tractive electromagnets

Pulling electromagnets 24 V

0 330 001 003

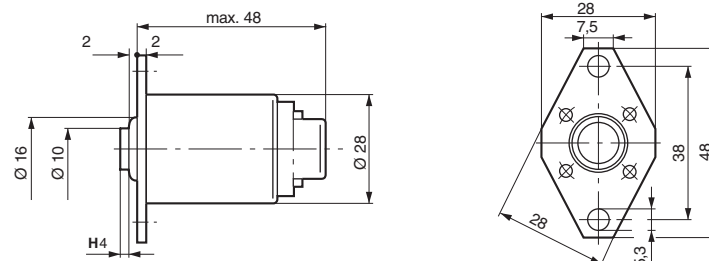
Technical data

Nominal voltage	V	24
Working stroke	mm	4
Nominal wattage ¹⁾	W	75
Operating mode ²⁾		Short-time duty
Forces Working stroke ³⁾	N	≤ 14
Forces With armature pulled in ³⁾	N	≤ 70
Forces Return spring	N	4 ± 1
Weight	kg	0,11

Besides positioning applications, tractive electromagnets may also be used in the following: Ticket stamping/punching machines, guiding, locking, triggering, metering, ventilating, pushing, clamping, riveting, blocking, etc.

¹⁾ With armature pulled in. ²⁾ Short-time duty, after 45 sec. of operation there should be a break of 4.5 min. ³⁾ At nominal voltage and winding temperature 23 ± 5 °C.

Dimensional drawing

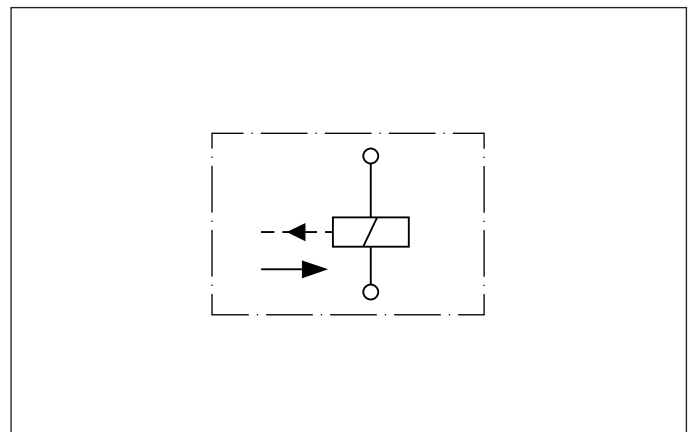


H Lift

Figure



Connection and circuit diagram



Tractive electromagnets

Tractive electromagnets

Pulling electromagnets 24 V

0 330 001 021

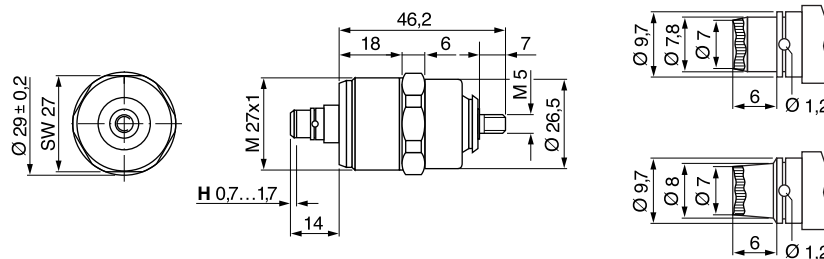
Technical data

Nominal voltage	V	24
Working stroke	mm	1,3
Nominal wattage ¹⁾	W	14
Operating mode ²⁾		Contin. duty
Forces Working stroke ³⁾	N	13
Forces With armature pulled in ³⁾	N	15
Forces Return spring	N	2,3 ± 0,5
Weight	kg	0,103

Besides positioning applications, tractive electromagnets may also be used in the following: Ticket stamping/punching machines, guiding, locking, triggering, metering, ventilating, pushing, clamping, riveting, blocking, etc.

¹⁾ With armature pulled in. ²⁾ Short-time duty, after 45 sec. of operation there should be a break of 4.5 min. ³⁾ At nominal voltage and winding temperature 23 ± 5 °C.

Dimensional drawing

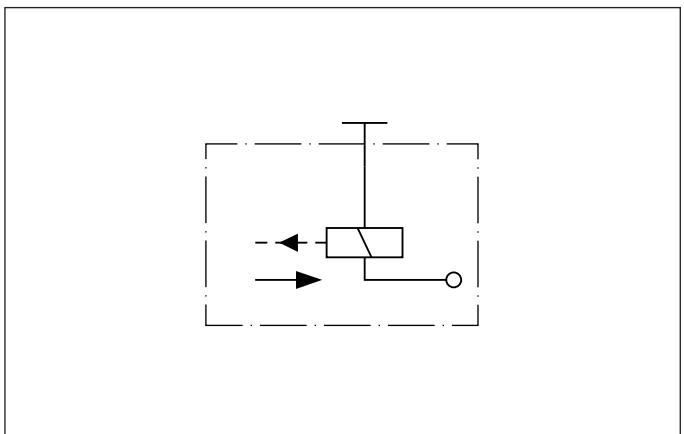


H Lift
SW Width across flats

Figure



Connection and circuit diagram



Tractive electromagnets

Tractive electromagnets

Pulling electromagnets 24 V

0 330 001 047

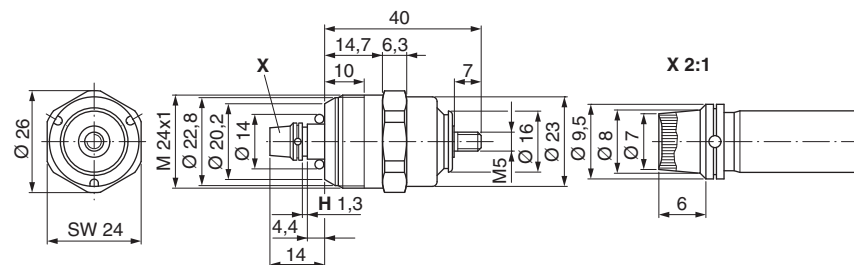
Technical data

Nominal voltage	V	24
Working stroke	mm	1,3
Nominal wattage ¹⁾	W	≤ 21
Operating mode ²⁾		Contin. duty
Forces Working stroke ³⁾	N	≤ 8
Forces With armature pulled in ³⁾	N	≤ 11
Forces Return spring	N	2,3 ± 0,5
Weight	kg	0,076

Besides positioning applications, tractive electromagnets may also be used in the following: Ticket stamping/punching machines, guiding, locking, triggering, metering, ventilating, pushing, clamping, riveting, blocking, etc.

¹⁾ With armature pulled in. ²⁾ Short-time duty, after 45 sec. of operation there should be a break of 4.5 min. ³⁾ At nominal voltage and winding temperature 23 ± 5 °C.

Dimensional drawing

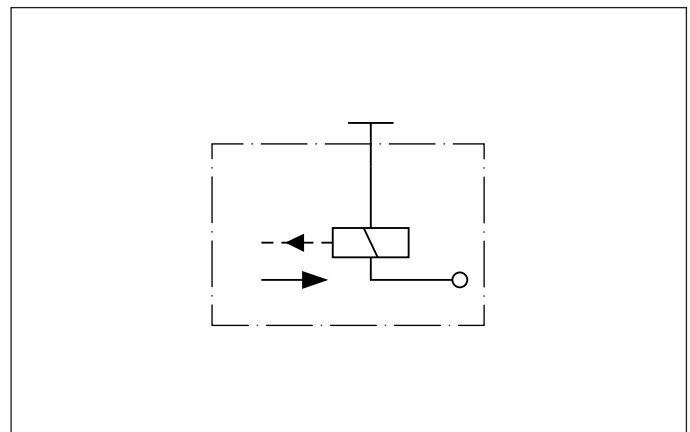


H Lift
SW Width across flats

Figure



Connection and circuit diagram



Tractive electromagnets

Tractive electromagnets

Pulling electromagnets 24 V

0 330 001 048

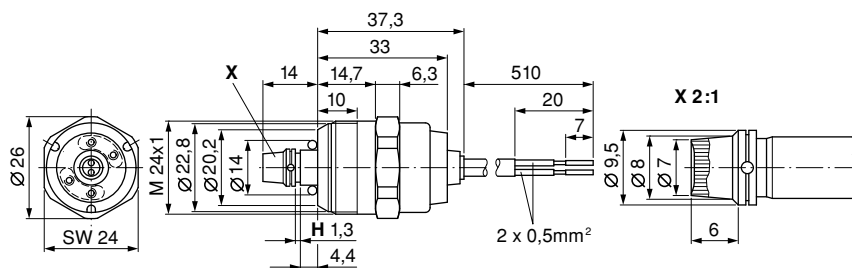
Technical data

Nominal voltage	V	24
Working stroke	mm	1,3
Nominal wattage ¹⁾	W	≤ 21
Operating mode ²⁾		Contin. duty
Forces Working stroke ³⁾	N	≤ 8
Forces With armature pulled in ³⁾	N	≤ 11
Forces Return spring	N	2,2
Weight	kg	0,094

Besides positioning applications, tractive electromagnets may also be used in the following: Ticket stamping/punching machines, guiding, locking, triggering, metering, ventilating, pushing, clamping, riveting, blocking, etc.

¹⁾ With armature pulled in. ²⁾ Short-time duty, after 45 sec. of operation there should be a break of 4.5 min. ³⁾ At nominal voltage and winding temperature 23 ± 5 °C.

Dimensional drawing

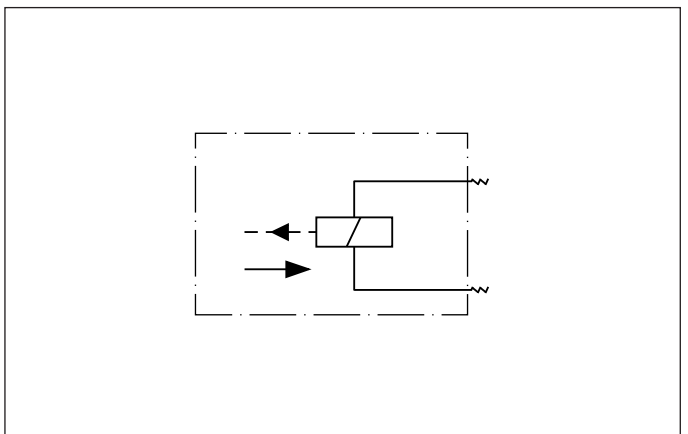


H Lift
SW Width across flats

Figure



Connection and circuit diagram



Tractive electromagnets

Tractive electromagnets

Pulling electromagnets 24 V

0 330 003 001

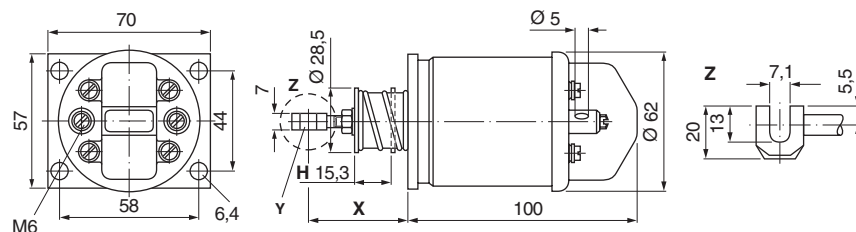
Technical data

Nominal voltage	V	24
Working stroke	mm	15,3
Nominal wattage ¹⁾	W	274
Operating mode ²⁾		Short-time duty
Forces Working stroke ³⁾	N	≤ 95
Forces With armature pulled in ³⁾	N	≤ 250
Forces Return spring	N	4,5 ± 0,5
Weight	kg	1,11

Besides positioning applications, tractive electromagnets may also be used in the following: Ticket stamping/punching machines, guiding, locking, triggering, metering, ventilating, pushing, clamping, riveting, blocking, etc.

¹⁾ With armature pulled in. ²⁾ Short-time duty, after 45 sec. of operation there should be a break of 4.5 min. ³⁾ At nominal voltage and winding temperature 23 ± 5 °C.

Dimensional drawing



H Lift

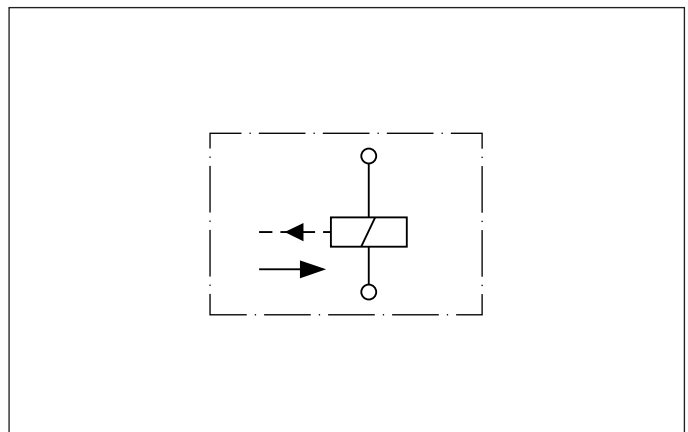
X 0 330 003 001 = 43.5 mm, 0 330 003 003 = 70 mm

Y 0 330 003 003 = U fork rotated by 90°

Figure



Connection and circuit diagram



Tractive electromagnets

Tractive electromagnets

Pulling electromagnets 24 V

0 330 003 003

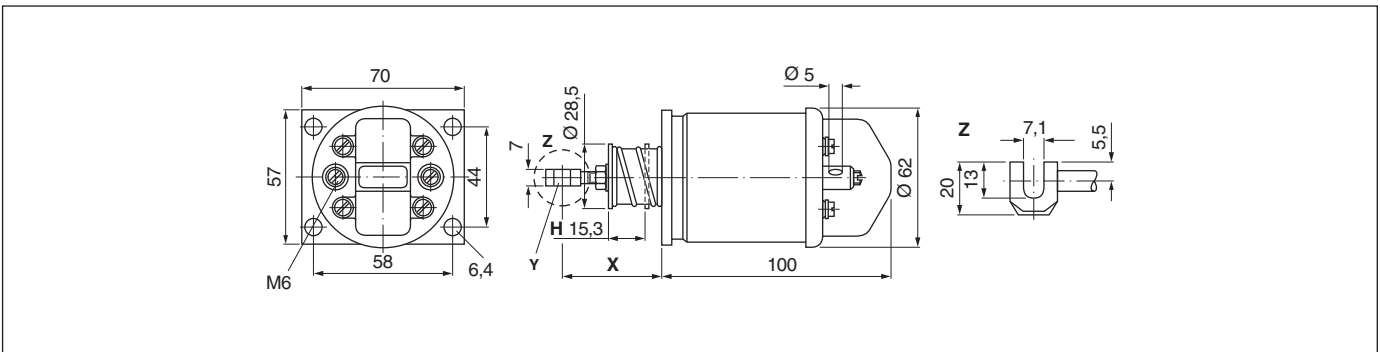
Technical data

Nominal voltage	V	24
Working stroke	mm	15,3
Nominal wattage ¹⁾	W	695/18 ⁴⁾
Operating mode ²⁾		Contin. duty
Forces Working stroke ³⁾	N	≤ 55
Forces With armature pulled in ³⁾	N	≤ 350
Forces Return spring	N	5 ± 1
Weight	kg	1,18

Besides positioning applications, tractive electromagnets may also be used in the following: Ticket stamping/punching machines, guiding, locking, triggering, metering, ventilating, pushing, clamping, riveting, blocking, etc.

¹⁾ With armature pulled in. ²⁾ Short-time duty, after 45 sec. of operation there should be a break of 4.5 min. ³⁾ At nominal voltage and winding temperature 23 ± 5 °C. ⁴⁾ Pull-in winding/hold-in winding

Dimensional drawing



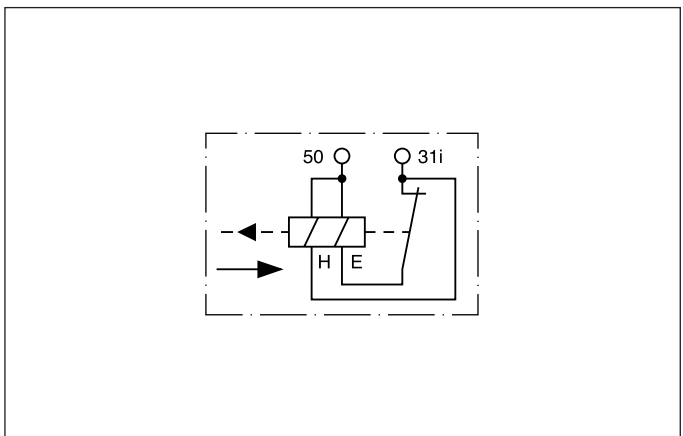
H Lift
X 0 330 003 001 = 43.5 mm, 0 330 003 003 = 70 mm

Y 0 330 003 003 = U fork rotated by 90°

Figure



Connection and circuit diagram



E Excitation winding
H Holding winding

Tractive electromagnets

Tractive electromagnets

Pulling electromagnets 24 V

0 330 004 005

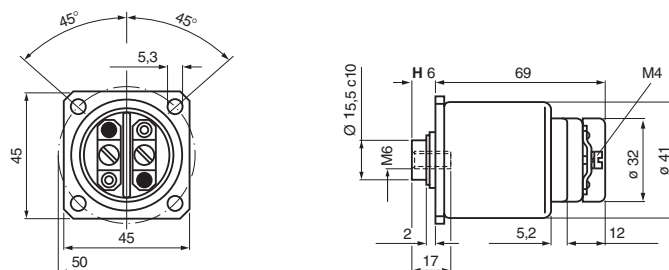
Technical data

Nominal voltage	V	24
Working stroke	mm	6
Nominal wattage ¹⁾	W	50
Operating mode ²⁾		Short-time duty
Forces Working stroke ³⁾	N	≤ 24
Forces With armature pulled in ³⁾	N	≤ 80
Forces Return spring	N	4 ± 1
Weight	kg	0,44

Besides positioning applications, tractive electromagnets may also be used in the following: Ticket stamping/punching machines, guiding, locking, triggering, metering, ventilating, pushing, clamping, riveting, blocking, etc.

¹⁾ With armature pulled in. ²⁾ Short-time duty, after 45 sec. of operation there should be a break of 4.5 min. ³⁾ At nominal voltage and winding temperature 23 ± 5 °C.

Dimensional drawing

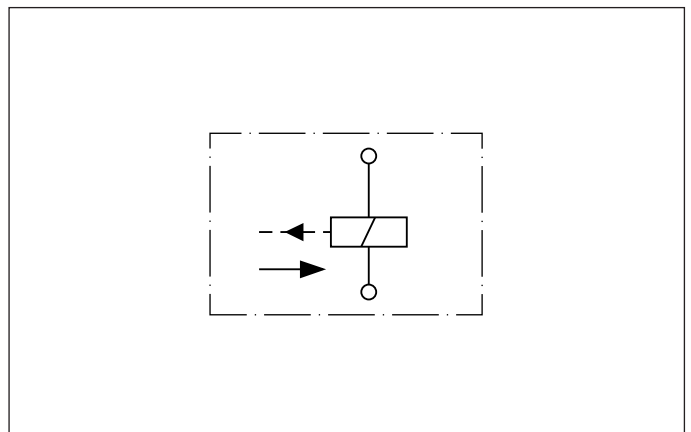


H Lift

Figure



Connection and circuit diagram



Tractive electromagnets

Tractive electromagnets

Pulling electromagnets 24 V

0 330 005 002

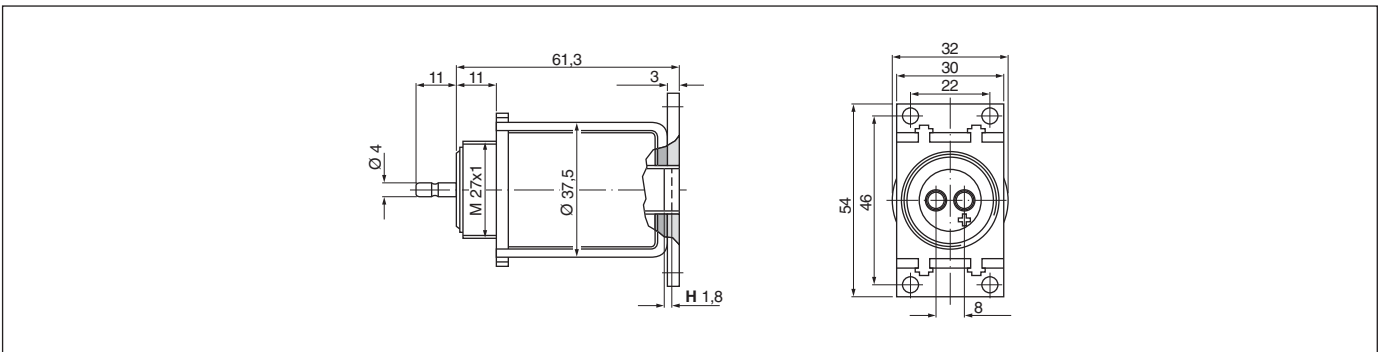
Technical data

Nominal voltage	V	24
Working stroke	mm	1,8
Nominal wattage ¹⁾	W	14
Operating mode ²⁾		Contin. duty
Forces Working stroke ³⁾	N	≤ 16
Forces With armature pulled in ³⁾	N	≤ 26
Forces Return spring	N	7,8 ± 1
Weight	kg	0,32

Besides positioning applications, tractive electromagnets may also be used in the following: Ticket stamping/punching machines, guiding, locking, triggering, metering, ventilating, pushing, clamping, riveting, blocking, etc.

¹⁾ With armature pulled in. ²⁾ Short-time duty, after 45 sec. of operation there should be a break of 4.5 min. ³⁾ At nominal voltage and winding temperature 23 ± 5 °C.

Dimensional drawing

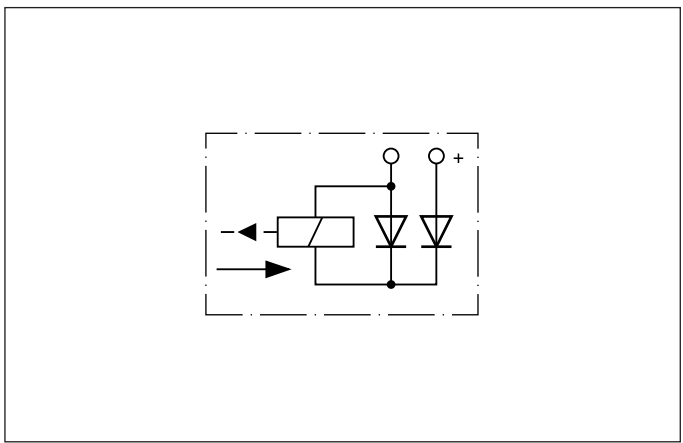


H Lift

Figure



Connection and circuit diagram



Tractive electromagnets

Tractive electromagnets

Pushing electromagnets 12 V

0 330 101 012

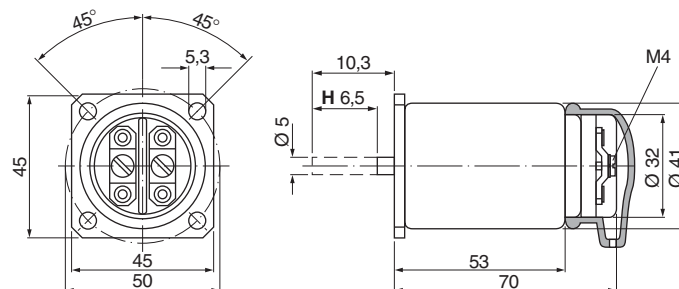
Technical data

Nominal voltage	V	12
Working stroke	mm	7
Nominal wattage ¹⁾	W	137
Operating mode ²⁾		Short-time duty
Forces Working stroke ³⁾	N	≤ 50
Forces With armature pulled in ³⁾	N	≤ 120
Weight	kg	0,4

Besides positioning applications, tractive electromagnets may also be used in the following: Ticket stamping/punching machines, guiding, locking, triggering, metering, ventilating, pushing, clamping, riveting, blocking, etc.

¹⁾ With armature pulled in. ²⁾ Short-time duty, after 45 sec. of operation there should be a break of 4.5 min. ³⁾ At nominal voltage and winding temperature 23 ±5 °C.

Dimensional drawing

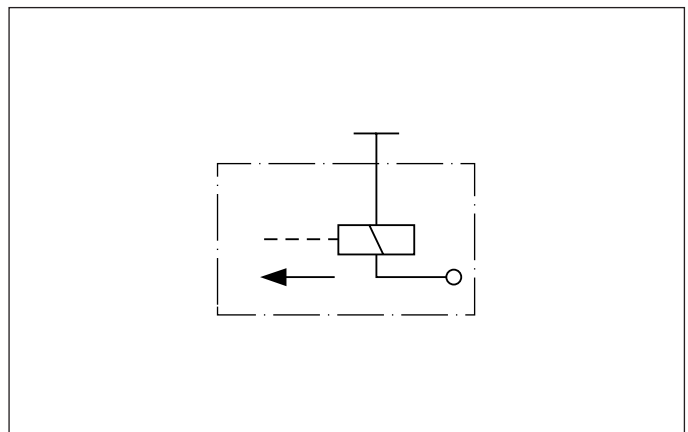


H Lift

Figure



Connection and circuit diagram



Tractive electromagnets

Tractive electromagnets

Pushing electromagnets 12 V

0 330 101 022

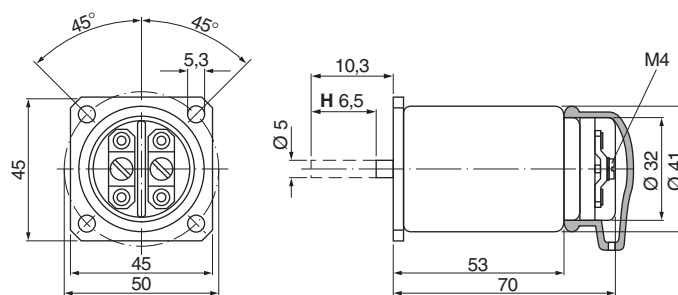
Technical data

Nominal voltage	V	12
Working stroke	mm	6,5
Nominal wattage ¹⁾	W	137
Operating mode ²⁾		Short-time duty
Forces Working stroke ³⁾	N	≤ 50
Forces With armature pulled in ³⁾	N	≤ 120
Weight	kg	0,4

Besides positioning applications, tractive electromagnets may also be used in the following: Ticket stamping/punching machines, guiding, locking, triggering, metering, ventilating, pushing, clamping, riveting, blocking, etc.

¹⁾ With armature pulled in. ²⁾ Short-time duty, after 45 sec. of operation there should be a break of 4.5 min. ³⁾ At nominal voltage and winding temperature 23 ± 5 °C.

Dimensional drawing

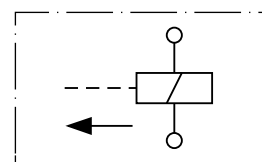


H Lift

Figure



Connection and circuit diagram



Tractive electromagnets

Tractive electromagnets

Pushing electromagnets 12 V

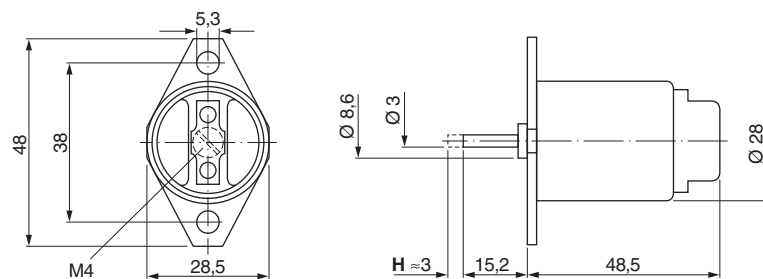
0 330 106 001

Technical data		
Nominal voltage	V	12
Working stroke	mm	3
Nominal wattage ¹⁾	W	42,5
Operating mode ²⁾		Short-time duty
Forces Working stroke ³⁾	N	≤ 12
Forces With armature pulled in ³⁾	N	≤ 60
Forces Return spring	N	0,9 ± 0,2
Weight	kg	0,14

Besides positioning applications, tractive electromagnets may also be used in the following: Ticket stamping/punching machines, guiding, locking, triggering, metering, ventilating, pushing, clamping, riveting, blocking, etc.

¹⁾ With armature pulled in. ²⁾ Short-time duty, after 45 sec. of operation there should be a break of 4.5 min. ³⁾ At nominal voltage and winding temperature 23 ± 5 °C.

Dimensional drawing

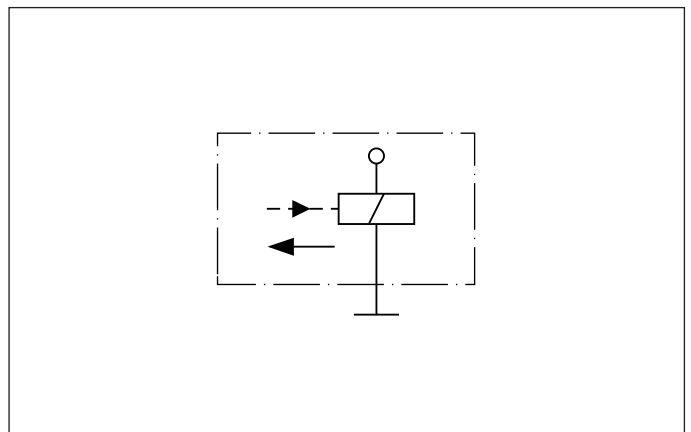


H Lift

Figure



Connection and circuit diagram



Tractive electromagnets

Tractive electromagnets

Pushing electromagnets 12 V

0 330 106 006

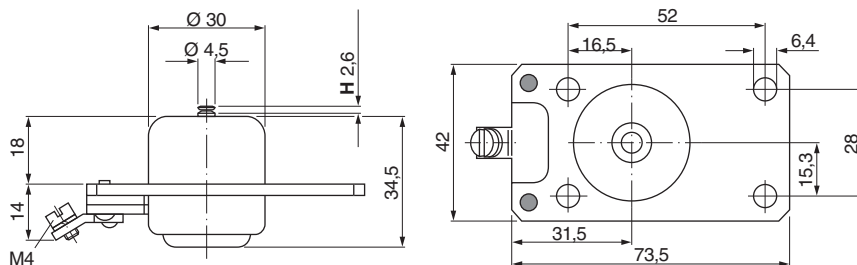
Technical data

Nominal voltage	V	12
Working stroke	mm	2,6
Nominal wattage ¹⁾	W	42,5
Operating mode ²⁾		Short-time duty
Forces Working stroke ³⁾	N	≤ 20
Forces With armature pulled in ³⁾	N	≤ 30
Weight	kg	0,19

Besides positioning applications, tractive electromagnets may also be used in the following: Ticket stamping/punching machines, guiding, locking, triggering, metering, ventilating, pushing, clamping, riveting, blocking, etc.

¹⁾ With armature pulled in. ²⁾ Short-time duty, after 45 sec. of operation there should be a break of 4.5 min. ³⁾ At nominal voltage and winding temperature 23 ± 5 °C.

Dimensional drawing

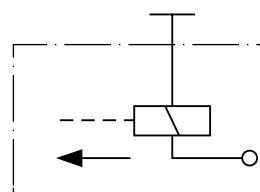


H Lift

Figure



Connection and circuit diagram



Tractive electromagnets

Tractive electromagnets

Pushing electromagnets 12 V

0 330 106 010

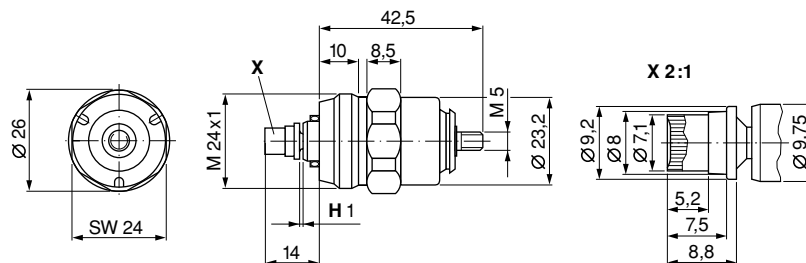
Technical data

Nominal voltage	V	12
Working stroke	mm	1
Nominal wattage ¹⁾	W	32
Operating mode ²⁾		Short-time duty
Forces Working stroke ³⁾	N	≤ 12
Forces With armature pulled in ³⁾	N	≤ 12
Weight	kg	0,088

Besides positioning applications, tractive electromagnets may also be used in the following: Ticket stamping/punching machines, guiding, locking, triggering, metering, ventilating, pushing, clamping, riveting, blocking, etc.

¹⁾ With armature pulled in. ²⁾ Short-time duty, after 45 sec. of operation there should be a break of 4.5 min. ³⁾ At nominal voltage and winding temperature 23 ±5 °C.

Dimensional drawing

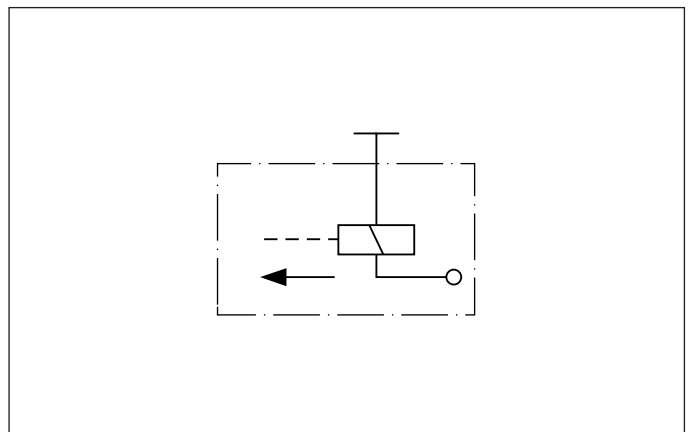


H Lift
SW Width across flats

Figure



Connection and circuit diagram



Tractive electromagnets

Tractive electromagnets

Pushing electromagnets 24 V

0 330 100 022

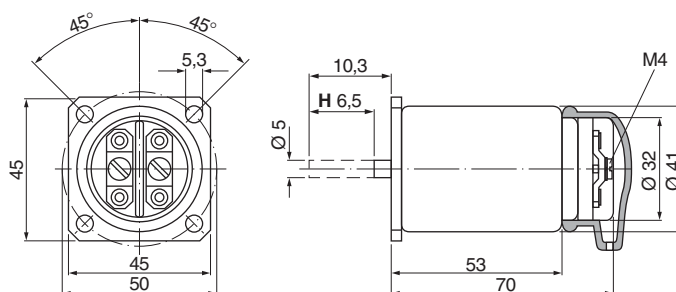
Technical data

Nominal voltage	V	24
Working stroke	mm	4,8
Nominal wattage ¹⁾	W	26,7
Operating mode ²⁾		Short-time duty
Forces Working stroke ³⁾	N	≤ 32
Forces With armature pulled in ³⁾	N	≤ 100
Weight	kg	0,6

Besides positioning applications, tractive electromagnets may also be used in the following: Ticket stamping/punching machines, guiding, locking, triggering, metering, ventilating, pushing, clamping, riveting, blocking, etc.

¹⁾ With armature pulled in. ²⁾ Short-time duty, after 45 sec. of operation there should be a break of 4.5 min. ³⁾ At nominal voltage and winding temperature 23 ± 5 °C.

Dimensional drawing

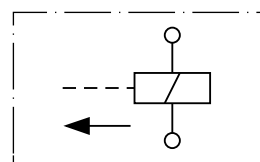


H Lift

Figure



Connection and circuit diagram



Tractive electromagnets

Tractive electromagnets

Pushing electromagnets 24 V

0 330 101 026

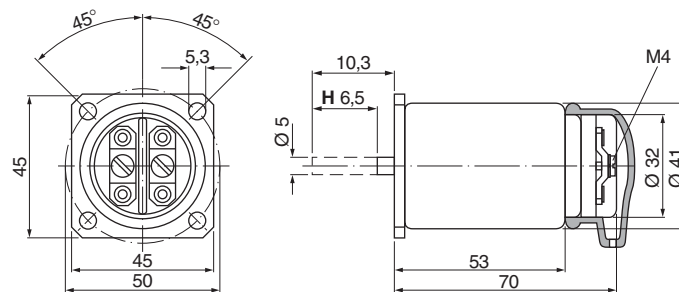
Technical data

Nominal voltage	V	24
Working stroke	mm	7
Nominal wattage ¹⁾	W	152
Operating mode ²⁾		Short-time duty
Forces Working stroke ³⁾	N	≤ 50
Forces With armature pulled in ³⁾	N	≤ 120
Weight	kg	0,4

Besides positioning applications, tractive electromagnets may also be used in the following: Ticket stamping/punching machines, guiding, locking, triggering, metering, ventilating, pushing, clamping, riveting, blocking, etc.

¹⁾ With armature pulled in. ²⁾ Short-time duty, after 45 sec. of operation there should be a break of 4.5 min. ³⁾ At nominal voltage and winding temperature 23 ±5 °C.

Dimensional drawing

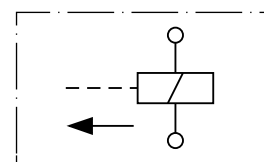


H Lift

Figure



Connection and circuit diagram



Tractive electromagnets

Tractive electromagnets

Pushing electromagnets 24 V

0 330 106 003

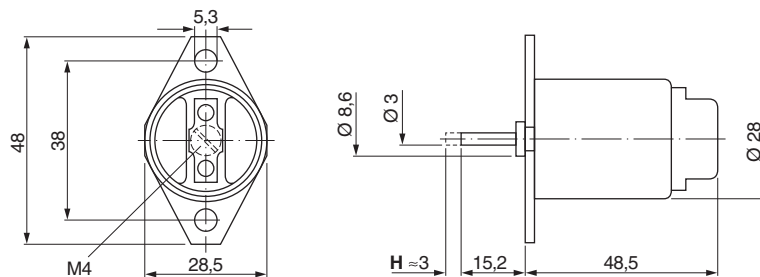
Technical data

Nominal voltage	V	24
Working stroke	mm	3
Nominal wattage ¹⁾	W	48
Operating mode ²⁾		Short-time duty
Forces Working stroke ³⁾	N	≤ 12
Forces With armature pulled in ³⁾	N	≤ 60
Forces Return spring	N	0,9 ± 0,2
Weight	kg	0,14

Besides positioning applications, tractive electromagnets may also be used in the following: Ticket stamping/punching machines, guiding, locking, triggering, metering, ventilating, pushing, clamping, riveting, blocking, etc.

¹⁾ With armature pulled in. ²⁾ Short-time duty, after 45 sec. of operation there should be a break of 4.5 min. ³⁾ At nominal voltage and winding temperature 23 ± 5 °C.

Dimensional drawing

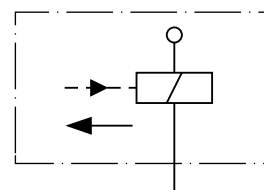


H Lift

Figure



Connection and circuit diagram



Tractive electromagnets

Tractive electromagnets

Pushing electromagnets 24 V

0 330 106 012

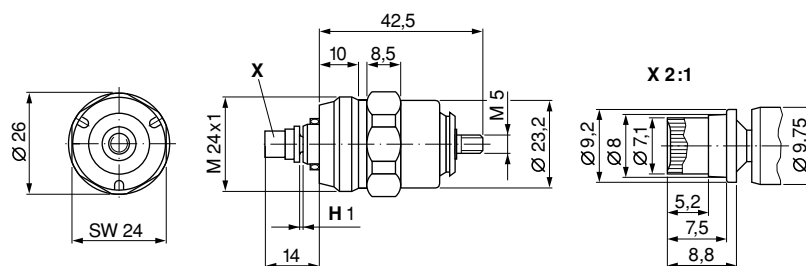
Technical data

Nominal voltage	V	24
Working stroke	mm	1
Nominal wattage ¹⁾	W	26
Operating mode ²⁾		Short-time duty
Forces Working stroke ³⁾	N	≤ 11
Forces With armature pulled in ³⁾	N	≤ 11
Weight	kg	0,088

Besides positioning applications, tractive electromagnets may also be used in the following: Ticket stamping/punching machines, guiding, locking, triggering, metering, ventilating, pushing, clamping, riveting, blocking, etc.

¹⁾ With armature pulled in. ²⁾ Short-time duty, after 45 sec. of operation there should be a break of 4.5 min. ³⁾ At nominal voltage and winding temperature 23 ±5 °C.

Dimensional drawing

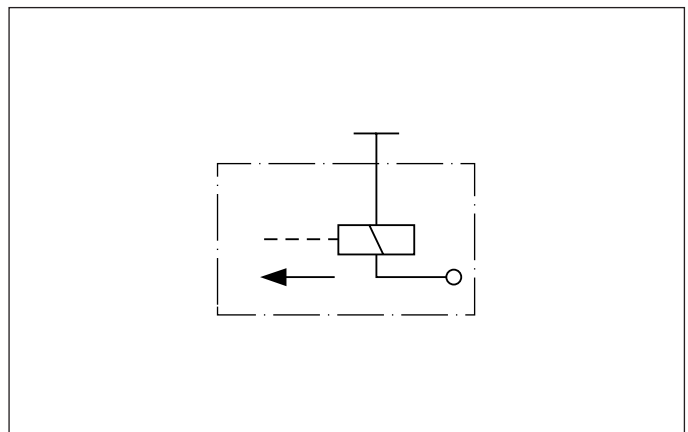


H Lift
SW Width across flats

Figure



Connection and circuit diagram



Tractive electromagnets

Tractive electromagnets

Pushing electromagnets 24 V

0 330 106 017

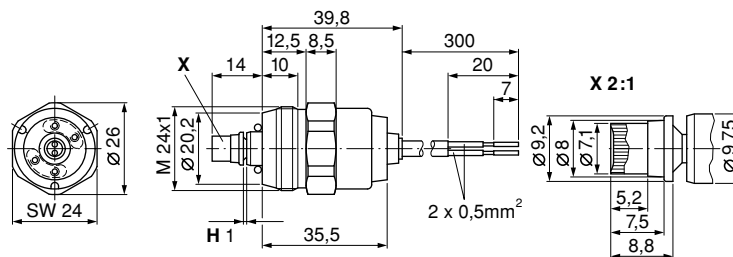
Technical data

Nominal voltage	V	24
Working stroke	mm	1
Nominal wattage ¹⁾	W	26
Operating mode ²⁾		Short-time duty
Forces Working stroke ³⁾	N	≤ 11
Forces With armature pulled in ³⁾	N	≤ 11
Weight	kg	0,094

Besides positioning applications, tractive electromagnets may also be used in the following: Ticket stamping/punching machines, guiding, locking, triggering, metering, ventilating, pushing, clamping, riveting, blocking, etc.

¹⁾ With armature pulled in. ²⁾ Short-time duty, after 45 sec. of operation there should be a break of 4.5 min. ³⁾ At nominal voltage and winding temperature 23 ± 5 °C.

Dimensional drawing

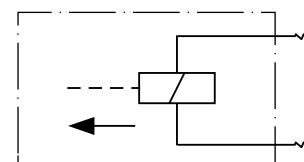


H Lift

Figure



Connection and circuit diagram



Comparison of Tyco and Robert Bosch relays

Product family	Bosch p/n	Tyco Ref2	Product family	Bosch p/n	Tyco Ref2
Spare parts	2 337 320 500	V23333-W0000-X001	Mikro2	0 332 207 302	V23274-A1601-X009
	3 331 030 003	V23333-W0000-X002		0 332 207 304	V23274-A2601-X010
	3 331 032 004	V23333-W0000-X003			V23274-A2601-Y010
	3 331 099 081	V23333-W0000-X004		0 332 207 307	V23274-A1601-X011
	3 331 099 083	V23333-W0000-X005			V23274-A1601-Y011
	3 331 236 002	V23333-W0000-X006		0 332 207 310	V23274-D1601-X012
	3 331 324 019	V23333-W0000-X007			V23274-D1601-Y012
	3 331 324 023	V23333-W0000-X008		0 332 207 312	V23274-A1901-X013
	3 331 324 041	V23333-W0000-X009		0 332 207 313	V23274-A1901-X014
	3 331 329 034	V23333-W0000-X010		0 332 207 319	V23274-A1601-X015
	3 333 440 003	V23333-W0000-X011			V23274-A1601-Y015
	3 334 210 374	V23333-W0000-X012		0 332 207 321	V23274-A1601-X016
	3 334 611 004	V23333-W0000-X013			V23274-A1601-Y016
	3 334 650 003	V23333-W0000-X014		0 332 207 322	V23274-A2601-X017
	3 337 320 053	V23333-W0000-X015		0 332 207 402	V23274-A2602-X018
Power relay	0 332 002 150	V23232-D0001-X001		V23274-A2602-Y018	
		V23232-D0001-Y001	0 332 207 404	V23274-D1602-X019	
	0 332 002 155	V23232-A0001-X002		V23274-D1602-Y019	
		V23232-A0001-Y002	0 332 207 405	V23274-A1602-X020	
	0 332 002 156	V23232-A0001-X003		V23274-A1602-Y020	
		V23232-A0001-Y003	0 332 207 406	V23274-A1602-X021	
	0 332 002 160	V23232-E0001-X004		V23274-A1602-Y021	
		V23232-E0001-Y004	0 332 207 nnn	V23274-A1602-Xnnn	
	0 332 002 161	V23232-A0001-X005			
		V23232-A0001-Y005	0 332 011 001	V23374-A1601-X001	
	0 332 002 167	V23232-D0001-X006		V23374-A1601-X002	
	0 332 002 250	V23232-E0002-X007		V23374-A1601-X003	
		V23232-E0002-Y007		V23374-A1601-Y003	
	0 332 002 255	V23232-A0002-X008	0 332 011 100	V23374-A1601-X004	
		V23232-A0002-Y008	0 332 011 nnn	V23374-A1001-X009	
	0 332 002 256	V23232-A0002-X009		V23374-A1601-X005	
		V23232-A0002-Y009	0 332 201 100	V23374-A1001-X006	
	0 332 002 257	V23232-A0002-X010		V23374-A1001-X007	
		V23232-A0002-Y010	0 332 201 102	V23374-A1001-X007	
	0 332 002 350	V23232-D0001-X011		V23374-A1601-X008	
0 332 002 351	V23232-D0001-X012		V23374-A1601-Y008		
	V23232-D0001-Y012	0 332 019 103	V23234-B0001-X001		
	V23232-D0001-Y013		V23234-B0001-Y001		
	V23232-D0001-Y013	0 332 019 105	V23234-B0001-X002		
	V23232-D0001-Y013		V23234-B0001-Y002		
Mikro2	0 332 017 300	V23274-A1601-X001		V23234-C0001-X003	
		V23274-A1601-Y001		V23234-C0001-Y003	
	0 332 017 302	V23274-D1601-X002	0 332 019 110	V23234-B1001-X004	
		V23274-D1601-Y002		V23234-B1001-Y004	
	0 332 017 305	V23274-W2601-X003	0 332 019 140	V23234-C0003-X064	
		V23274-W2601-Y003		V23234-C0003-Y064	
	0 332 017 306	V23274-W2001-X004	0 332 019 150	V23234-C1001-X005	
		V23274-W2001-Y004		V23234-C1001-Y005	
	0 332 017 307	V23274-A1001-X005	0 332 019 151	V23234-C0001-X006	
		V23274-A1001-Y005		V23234-C0001-Y006	
	0 332 017 315	V23274-A1001-X006	0 332 019 152	V23234-B0002-X007	
		V23274-A1001-Y006		V23234-B0002-Y007	
	0 332 017 401	V23274-A1602-X007	0 332 019 155	V23234-C1001-X008	
		V23274-A1602-Y007		V23234-C1001-Y008	
	0 332 017 nnn	V23274-A1602-X023	0 332 019 156	V23234-B0001-X009	
0 332 207 300	V23274-A1601-X008		V23234-B0001-Y010		
	V23274-A1601-Y008	0 332 019 157	V23234-B1001-X010		
			V23234-B1001-Y010		



Product family	Bosch p/n	Tyco Ref2
MiniB	0 332 019 162	V23234-B0001-X011
	0 332 019 166	V23234-B0002-X012 V23234-B0002-Y012
	0 332 019 167	V23234-B0001-X013
	0 332 019 168	V23234-B0002-X014
	0 332 019 180	V23234-B0002-X015
	0 332 019 190	V23234-B0002-X016
	0 332 019 203	V23234-C1004-X017 V23234-C1004-Y017
	0 332 019 204	V23234-C0004-X018 V23234-C0004-Y018
	0 332 019 205	V23234-B0004-X019 V23234-B0004-Y019
	0 332 019 213	V23234-C0004-X020 V23234-C0004-Y020
	0 332 019 214	V23234-C0004-X021 V23234-C0004-Y021
	0 332 019 451	V23234-K0001-X022 V23234-K0001-Y022
	0 332 019 452	V23234-K0002-X023
	0 332 019 453	V23234-K1001-X024 V23234-K1001-Y024
	0 332 019 454	V23234-K0005-X025 V23234-K0005-Y025
	0 332 019 456	V23234-K0005-X026 V23234-K0005-Y026
	0 332 019 457	V23234-K0001-X027 V23234-K0001-Y027
	0 332 019 801	V23234-C1001-Y005
	0 332 109 001	V23234-F0001-X028
	0 332 109 011	V23234-F0001-X029 V23234-F0001-Y029
	0 332 209 135	V23234-A0001-X030 V23234-A0001-Y030
	0 332 209 136	V23234-A0002-X031
	0 332 209 137	V23234-A0001-X032 V23234-A0001-Y032
	0 332 209 138	V23234-A1001-X033 V23234-A1001-Y033
	0 332 209 139	V23234-A0001-X034 V23234-A0001-Y034
	0 332 209 142	V23234-A0002-X035
	0 332 209 150	V23234-A1001-X036 V23234-A1001-Y036
	0 332 209 151	V23234-A0001-X037 V23234-A0001-Y037
	0 332 209 152	V23234-A0001-X038 V23234-A0001-Y038
	0 332 209 153	V23234-A0001-X039 V23234-A0001-Y039
	0 332 209 156	V23234-A0001-X040 V23234-A0001-Y040
	0 332 209 158	V23234-A1001-X041 V23234-A1001-Y041

Product family	Bosch p/n	Tyco Ref2	
MiniB	0 332 209 159	V23234-A0001-X042 V23234-A0001-Y042	
	0 332 209 161	V23234-A1001-X043	
	0 332 209 161	V23234-A1001-Y043	
	0 332 209 164	V23234-A1001-X044 V23234-A1001-Y044	
	0 332 209 167	V23234-A0001-X045 V23234-A0001-Y045	
	0 332 209 168	V23234-A0003-X046 V23234-A0003-Y046	
	0 332 209 169	V23234-A0001-X047 V23234-A0001-Y047	
	0 332 209 201	V23234-A0004-X048 V23234-A0004-Y048	
	0 332 209 202	V23234-A0004-X049 V23234-A0004-Y049	
	0 332 209 203	V23234-A1004-X050 V23234-A1004-Y050	
	0 332 209 204	V23234-A0004-X051 V23234-A0004-Y051	
	0 332 209 205	V23234-A0004-X052 V23234-A0004-Y052	
	0 332 209 206	V23234-A0004-X053 V23234-A0004-Y053	
	0 332 209 207	V23234-A1004-X054 V23234-A1004-Y054	
	0 332 209 211	V23234-A0004-X055 V23234-A0004-Y055	
	0 332 209 212	V23234-A0004-X056	
	0 332 209 214	V23234-A0004-X057	
	0 332 209 215	V23234-A0004-X058 V23234-A0004-Y058	
	0 332 209 216	V23234-A0004-X059 V23234-A0004-Y059	
	0 332 209 225	V23234-A0004-X060 V23234-A0004-Y060	
	0 332 209 nnn	V23234-A0004-X067	
	Other relays	0 331 800 003	V23333-P0000-X001
		0 332 003 025	V23333-R0000-X001
		0 332 003 028	V23333-R0000-X002
		0 332 003 029	V23333-R0000-X003
		0 332 008 001	V23333-T0000-X001
		0 332 008 002	V23333-T0000-X002
		0 332 201 006	V23333-T0000-X003
		0 332 202 001	V23333-T0000-X004
		0 332 204 153	V23333-T0000-X005
		0 332 512 007	V23333-E0000-X001
		0 332 512 009	V23333-E0000-X002
		0 332 512 010	V23333-E0000-X003
0 332 512 011		V23333-E0000-X004	
0 332 512 013		V23333-E0000-X005	
0 332 512 017		V23333-E0000-X006	
0 332 512 151		V23333-E0000-X007	
0 332 512 207		V23333-E0000-X008	

Product family	Bosch p/n	Tyco Ref2	Product family	Bosch p/n	Tyco Ref2
Other relays	0 332 515 009	V23333-S0000-X001			
	0 332 515 012	V23333-S0000-X002			
	0 332 515 019	V23333-S0000-X003			
	0 332 515 022	V23333-S0000-X004			
	0 332 515 024	V23333-S0000-X005			
	0 333 006 010	V23333-L0000-X001			
	0 333 006 017	V23333-L0000-X002			
	0 333 007 004	V23333-L0000-X009			
	0 333 007 005	V23333-L0000-X010			
	0 333 009 002	V23333-L0000-X011			
	0 333 009 004	V23333-L0000-X012			
	0 333 200 010	V23333-L0000-X003			
	0 333 200 011	V23333-L0000-X013			
	0 333 200 012	V23333-L0000-X004			
	0 333 200 013	V23333-L0000-X005			
	0 333 201 010	V23333-L0000-X006			
	0 333 201 011	V23333-L0000-X007			
	0 333 201 012	V23333-L0000-X008			
	0 333 300 003	V23333-B0000-X001			
	0 333 301 007	V23333-B0000-X002			
	0 333 301 008	V23333-B0000-X003			
	0 333 301 009	V23333-B0000-X004			
	0 333 301 010	V23333-B0000-X005			
	0 333 301 011	V23333-B0000-X006			
	0 333 301 012	V23333-B0000-X007			
	0 333 301 015	V23333-B0000-X008			
0 333 503 001	V23333-K0000-X001				
0 333 503 002	V23333-K0000-X002				
0 335 100 002	V23333-V0000-X001				
Relay frames	3 334 485 007	V23333-Z0001-A007			
	3 334 485 008	V23333-Z1001-A008			
	3 334 485 010	V23333-Z0002-A010			
	3 334 485 041	V23333-Z0002-A041			
	3 334 485 045	V23333-Z1001-B045			
	3 334 485 046	V23333-Z0001-B046			
	3 334 485 049	V23333-Z0002-B049			



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0 330 001 040	126	0 332 019 213	25	0 333 201 010	59
0 330 001 047	131	0 332 109 011	26	0 333 201 011	61
0 330 001 048	132	0 332 201 107	10	0 333 201 012	60
0 330 003 001	133	0 332 207 304	11	0 333 201 013	62
0 330 003 002	127	0 332 207 307	12	0 986 332 001	113
0 330 003 003	134	0 332 207 310	13	0 986 332 002	105
0 330 003 007	128	0 332 207 402	14	0 986 332 003	95
0 330 004 005	135	0 332 207 404	15	0 986 332 010	85
0 330 005 002	136	0 332 209 135	27	0 986 332 020	88
0 330 100 022	142	0 332 209 137	28	0 986 332 021	89
0 330 101 012	137	0 332 209 138	29	0 986 332 022	100
0 330 101 022	138	0 332 209 150	30	0 986 332 023	106
0 330 101 026	143	0 332 209 151	31	0 986 332 030	107
0 330 106 001	139	0 332 209 152	32	0 986 332 040	97
0 330 106 003	144	0 332 209 158	33	0 986 332 041	101
0 330 106 006	140	0 332 209 159	34	0 986 332 050	109
0 330 106 010	141	0 332 209 203	35	0 986 332 051	87
0 330 106 012	145	0 332 209 204	36	0 986 332 052	86
0 330 106 017	146	0 332 209 206	37	0 986 332 053	110
0 332 002 150	45	0 332 209 207	38	0 986 332 060	93
0 332 002 156	46	0 332 209 211	39	0 986 332 061	91
0 332 002 161	47	0 333 006 004	65	0 986 332 070	92
0 332 002 192	43	0 333 006 006	66	0 986 332 071	98
0 332 002 250	48	0 333 006 008	70	0 986 332 072	99
0 332 002 256	49	0 333 006 010	67	0 986 332 073	102
0 332 002 257	50	0 333 006 015	69	0 986 334 050	119
0 332 002 270	44	0 333 006 017	68	0 986 334 051	120
0 332 002 351	51	0 333 007 002	73	0 986 334 052	121
0 332 002 352	52	0 333 007 004	74	0 986 334 053	122
0 332 011 007	7	0 333 009 002	79		
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If you have any special requirements that are not covered by our range of relays, please specify this in the data sheet below. In the event of any modifications, please state the known product here.

Bosch part number:

Please use this printed data sheet as a master copy and return the completed copy.



Address (please take from adjacent list):

Sender (customer):

Your reference/dated Our dept./contact Telephone (extension) Date

Project, application:

Block diagram:

Technical data

Rated voltage	<input type="checkbox"/> 6 V	<input type="checkbox"/> 12 V	<input type="checkbox"/> 24 V
Rated current	A		
Design	<input type="checkbox"/> Make contact	<input type="checkbox"/> Changeover contact	<input type="checkbox"/> Break contact
Load type	<input type="checkbox"/> Ohmic load	<input type="checkbox"/> Inductive load	<input type="checkbox"/> Motor load <input type="checkbox"/> Lamp load
Connection	<input type="checkbox"/> Blade terminal version	<input type="checkbox"/> Screw version	<input type="checkbox"/> Solder version
Service life	switching operations		
Switching frequency	seconds on / seconds off		
Ambient temperature	Min. °C / Max. °C		
Additional requirements			
Excitation winding damping	<input type="checkbox"/> Non	<input type="checkbox"/> Resistor	<input type="checkbox"/> Diode

Installation conditions

Brief description:

Specification available Yes No

Required quantity

Single _____ units

Required delivery date _____

Specified quantity on following dates

Date					
Quantity					

Annually _____ units Monthly _____ units

I would like advice _____