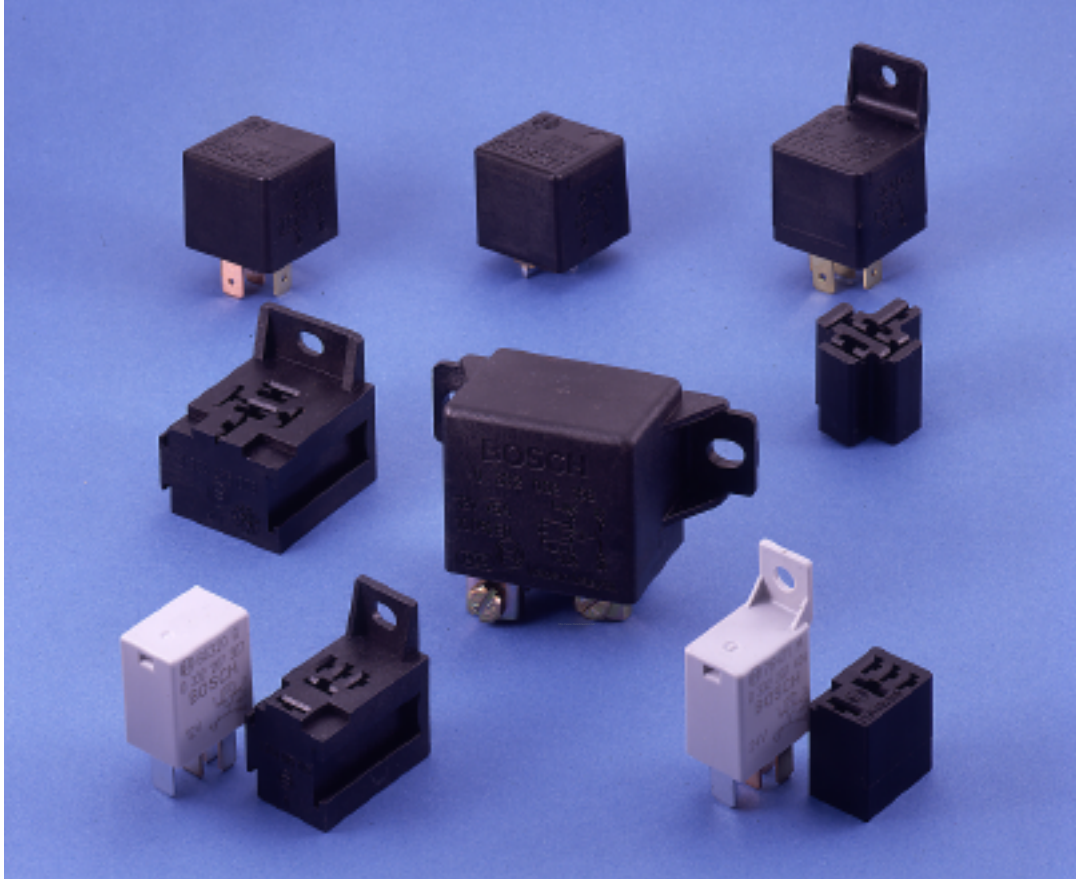


BOSCH



CHIEF ENTERPRISES INC.
Master International Distributor

Relays

- High Capacity 50 Amp Mini Relays
- Standard Mini Relays
- Micro Relays
- Power Relays
- Connector Modules



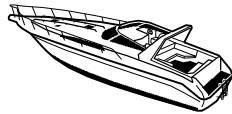
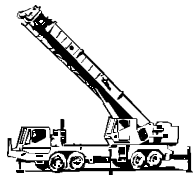
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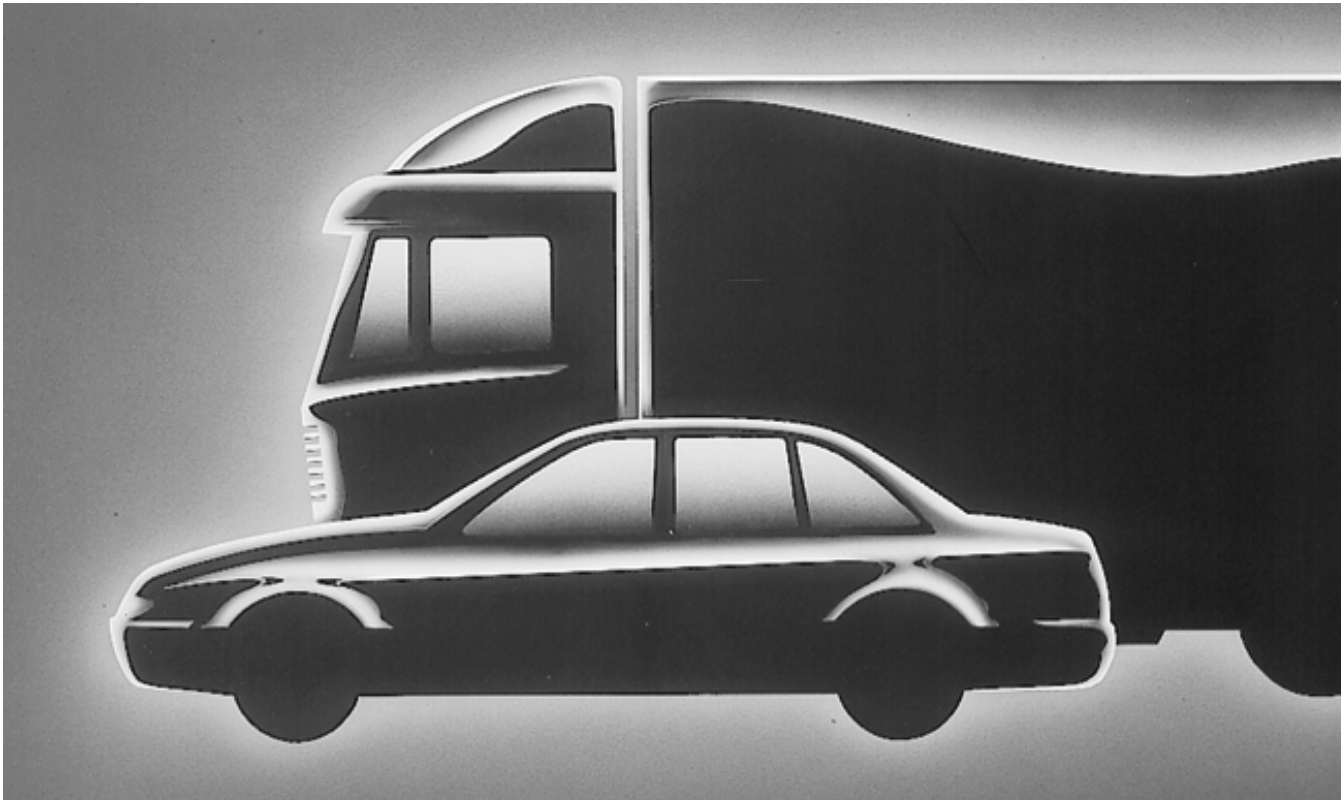
Application Notes

Applications

Relay Applications

Bosch relays were originally designed for use in automotive applications. The great range of different versions are used in the most varied applications.

- | | | |
|--|---|--|
| <input type="checkbox"/> Wiper motors | <input type="checkbox"/> Fan motors | <input type="checkbox"/> Starting motors |
| <input type="checkbox"/> Cooling fans | <input type="checkbox"/> Rear defrosters | <input type="checkbox"/> Brake lamps |
| <input type="checkbox"/> Headlamps | <input type="checkbox"/> Electric seat adjustment | <input type="checkbox"/> Electric seat heating |
| <input type="checkbox"/> Electric window mirrors | <input type="checkbox"/> Fuel pumps | <input type="checkbox"/> Horn |
| <input type="checkbox"/> Central locking | <input type="checkbox"/> Security systems | <input type="checkbox"/> Many other uses |



In addition to these purely automotive applications, Bosch relays are ideal for switching 12V or 24V components. This is true for both mobile and stationary applications, where for example, electric motors are actuated. With these relays, a multiplicity of drive assignments can be implemented.

Bosch relays are employed in

- | | | |
|--|---|--|
| <input type="checkbox"/> Automatic sliding doors | <input type="checkbox"/> Devices for the disabled | <input type="checkbox"/> Boat electric devices |
| <input type="checkbox"/> Electric lawn mowers | <input type="checkbox"/> Material handling technology | <input type="checkbox"/> Garage door drives |
| <input type="checkbox"/> Control cabinets | <input type="checkbox"/> Vending machines | <input type="checkbox"/> Battery chargers |
| <input type="checkbox"/> Emergency generators | <input type="checkbox"/> Agricultural equipment | <input type="checkbox"/> Furniture adjustments |
| <input type="checkbox"/> Cleaning devices | <input type="checkbox"/> Robot controls | <input type="checkbox"/> Toys |

Applications

The Application Process

Consideration of the following questions will aid in the selection of the proper relay to suit your application.

1. **Type of load?** (Resistive, Motor, Lamp, Inductive)
2. **Size of load?** What is the number of Amps being switched ON, carried during steady state performance, and being switched OFF?
3. **Time–Current curve?** For a motor or lamp load, what are the magnitude and duration of the inrush peak current during turn ON?
4. **Multi-tasking?** Will one relay part number “A” switch a lamp for example in one circuit, and a second relay part number “A” switch a resistive load in another circuit?
5. **Duty cycle?** What is the expected ON (running) time for your load, and the expected OFF (resting) time?
6. **Temperature conditions?** What are the minimum and maximum storage and operating temperatures the relay will experience?
7. **Relay life?** How many switching cycles are required?
8. **Coil suppression?** Will a resistor or diode in parallel to the coil be required to suppress a negative drop out voltage spike when the coil is de-energized? (This protects other devices in your circuit.)
9. **Method of mounting?** Will the relay be plugged into a power distribution center, or be mounted via a bracket?
10. **Are other devices required?** Will you require mounting connector modules and their related terminals?

Contact Chief Enterprises, Inc. for help in optimizing your relay application.

Recommended wire sizes for all relays

Metric Size mm ²	SAE Wire Size Gauge	Permissible Continuous Current (approximate values)	
		Amps, at 25°C	Amps, at 50°C
0.5	20	12	8.0
0.8	18	16	10.6
1.0	16	20	13.3
2.0	14	30	19.6
3.0	12	34	22.6
5.0	10	51	34.0
8.0	8	68	45.0
13.0	6	91	60.5
19.0	4	121	80.0

These values are to be used only as a guide.

Operating voltage temperature correction factors for all relays

For ambient temperature (°C)	-40	-20	0	+23	+40	+60	+80	+100
Multiply table value by	0.75	0.83	0.91	1.00	1.07	1.15	1.23	1.31

Cycle life values for all relays are based on actual endurance tests performed by Bosch on a continuing basis. The cycle life expectancy may differ in your application. The values listed are reflective of customer requirements, and should only be used as a guide.

Explanatory Notes on Parameters

Overview

Relay applications

This catalog contains the technical information which a design engineer requires in order to select a relay for his particular requirements. Bosch DC relays were originally designed for automotive applications. We recommend prior technical clarification for all other applications, especially where requirements, loading or ambient conditions differ from those applying to automotive applications.

Bosch DC relays are able to withstand exposure to extreme conditions and must comply with the following requirements: They must

- switch high powers
- function efficiently and reliably in a broad temperature range
- be extremely resistant to vibration
- have a long service life, and
- be highly climate-proof.

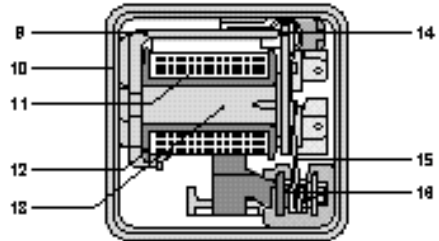
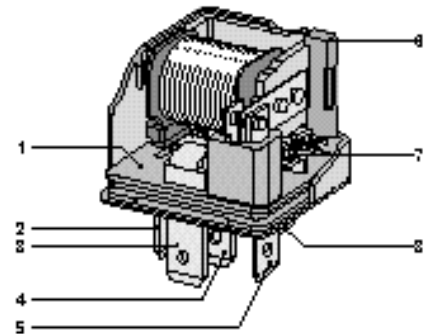
Bosch DC relays are used to switch electrical devices featuring high power levels or which are sensitive to voltage loss. Relays relieve the load on control switches and make for small voltage drops with economical conductor cross-sections. And relays make simple interlock circuits possible.

Mini-relays and micro-relays are ideal for use where the available space is restricted. Multiple connectors, together with pre-tested wiring harnesses, ensure simple assembly and the lowest possible error rate. This applies in particular to OEM, but also to customer service. The following versions of mini-relays and micro-relays are available:

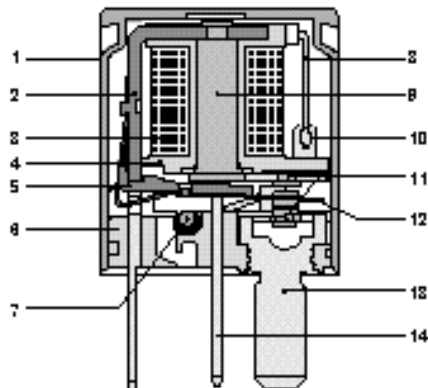
- Relays without mounting bracket. Easily plugged into buttable socket housings for screwing to mounting surface.
- Relays with mounting bracket. Connected using a 5-pole socket housing.
- Relays with solder terminals for soldering into PC boards.

Power relays can switch a nominal current of 50 A and more, and are suitable for switching motors, starting motors and other devices.

Mini-relay 1 Baseplate, 2 Term. 86, 3 Term. 87, 4 Term. 87a, 5 Term. 85, 6 Clamping piece, 7 Coil connection bracket, 8 Term. 30, 9 Magnet bracket, 10 Cap, 11 Coil, 12 Bobbin, 13 Core, 14 Armature, 15 Spring, 16 Contact.



Micro-relay 1 Cap, 2 Magnet bracket and term. 3, 3 Coil, 4 Bobbin, 5 Armature, 6 Baseplate, 7 Damping resistor or diode, 8 Connecting wire, 9 Core, 10 Term. 1/2, 11 Contact, 12 Spring, 13 Term. 4, 14 Term. 5.



Operating Modes

Switching operations

Response is the operation by which a relay is switched from its normal position to its operated position.

Opening is an operation which results in the electrical contact being opened.

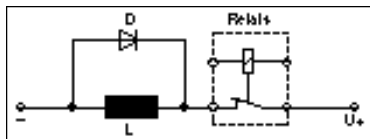
Release (dropout) is the operation by which a relay is switched from its operated position to its normal position.

A **switching cycle** comprises the single response and release of a relay.

The **number of switching operations** comprises the total number of switching cycles.

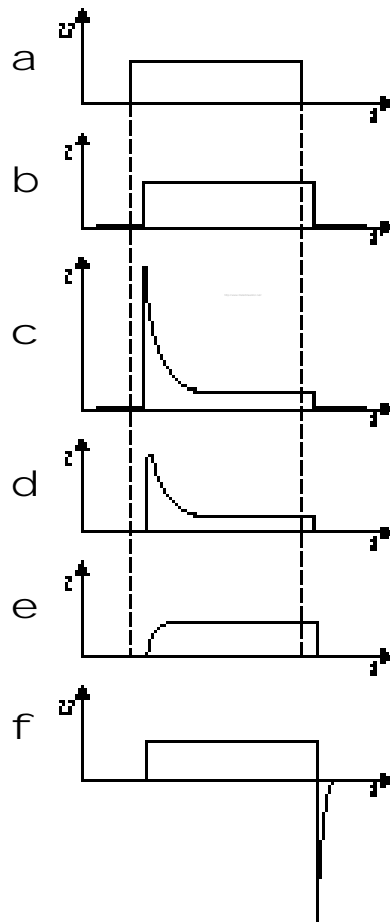
Closing is an operation which results in contact closure.

With inductive loads and motors, a suppressor circuit, which can be set up parallel to the load with a free-wheeling diode, is required (see circuit).



L Inductive Load, D Free-wheeling diode, U Supply voltage

Typical load characteristics
 1 Excitation voltage for relay coil
 2 Current characteristic for resistive load
 3 Current characteristic for lamp load
 4 Current characteristic for motor load
 5 Current characteristic for inductive load
 6 Voltage characteristic for inductive load



Service life

The **mechanical service life** is defined as the number of switching cycles, without electrical loading of the contacts, during which the relay remains operational.

The **contact service life** is defined as the number of switching cycles, with electrical loading of the contacts, during which the relay remains operational.

Switching contacts

The **NO (Normally Open) contact** is a relay contact which is open in the relay's normal position and closes as the relay changes to its operated position.

The **NC (Normally Closed) contact** is a relay contact which is closed in the relay's normal position and opens as the relay changes to its operated position.

The **changeover contact** is a contact assembly with three electrically isolated connections consisting of an NO contact, an NC contact, and a common contact spring. When the switch position changes, the closed contacts open first, followed by the closing of the other contacts (which up to that point were open).

High Capacity 50 Amp Mini Relays

All are dust proof; all 12V relays have a resistor in parallel to the coil to limit EMI

PART NUMBER	DESCRIPTION and Details # 4 terminal relay	Illustration and Dimensions, Drawing	Terminal diagram; Circuit Diag.	VOLTAGE Operating Voltage Nominal – Max.	CONTACT MATERIAL T 87	MAXIMUM N.O. RESISTIVE LOAD Amps – Life Cycles	OTHER LOADS: See Group # in LOAD TABLE
0 332 019 103	SPST, resistor, #	a	A 3 S 7	12V – 15V	STO	50A – 150,000	1
0 332 019 110	SPST, resistor, bracket, #	b	A 3 S 7	12V – 15V	STO	50A – 150,000	1
0 332 209 137	SPDT, resistor	a	A 2 S 5	12V – 15V	STO	50A – 150,000	2
0 332 209 138	SPDT, resistor, bracket	b	A 2 S 5	12V – 15V	STO	50A – 150,000	2
0 332 019 203	SPST, bracket	b	A 1 S 1	24V – 30V	STO	20A – 250,000	3
0 332 209 203	SPDT, bracket	b	A 2 S 4	24V – 30V	STO	20A – 250,000	4
0 332 209 204	SPDT, diode P	a	A 2 S 6	24V – 30V	STO	20A – 250,000	4
0 332 209 211	SPDT	a	A 2 S 4	24V – 30V	STO	20A – 250,000	4

PART NUMBER	PULL-IN VOLTAGE	DROP-OUT VOLTAGE	RESISTANCE		Nominal Operating Current
			No resistor, or with diode	With resistor	
0 332 019 103	8.0 V	1.2 – 5.0 V		75 ± 5 ohm	160 mA
0 332 019 110	8.0 V	1.2 – 5.0 V		75 ± 5 ohm	160 mA
0 332 209 137	8.0 V	1.2 – 5.0 V		75 ± 5 ohm	160 mA
0 332 209 138	8.0 V	1.2 – 5.0 V		75 ± 5 ohm	160 mA
0 332 019 203	16.0 V	2.4 – 10.0 V	255 ± 15 ohm		95 mA
0 332 209 203	16.0 V	2.4 – 10.0 V	255 ± 15 ohm		95 mA
0 332 209 204	16.0 V	2.4 – 10.0 V	255 ± 15 ohm		95 mA
0 332 209 211	16.0 V	2.4 – 10.0 V	255 ± 15 ohm		95 mA

LOAD and LIFE CYCLE TEST DATA for HIGH CAPACITY MINI RELAYS

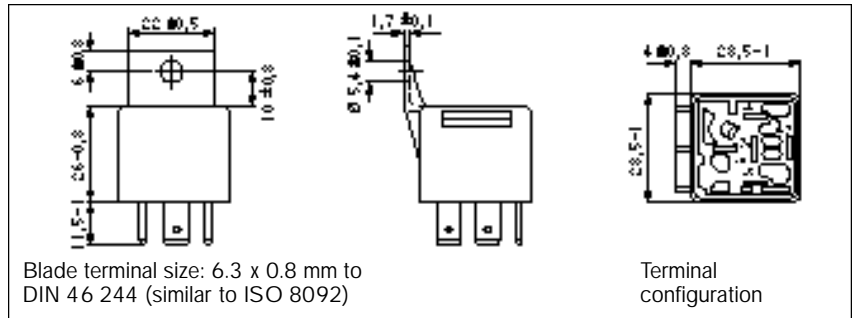
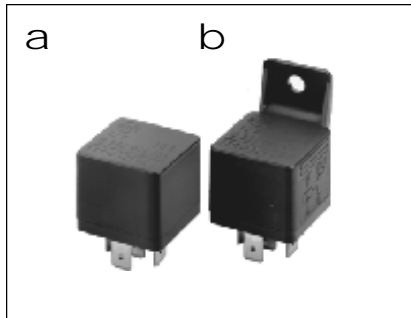
Contact testing conditions	Test Temp.	Relay Type	Load	Switching cycle
For STO (Silver Tin Oxide) contacts: Life cycles tested at 85°C, 13.5V (27V for 24V relays)	85°C	High capacity	Lamp Resistive Motor	1 Sec ON, 9 Sec OFF 2 Sec ON, 2 Sec OFF 5 Sec ON, 5 Sec OFF

HIGH CAPACITY MINI RELAY LOAD TABLE

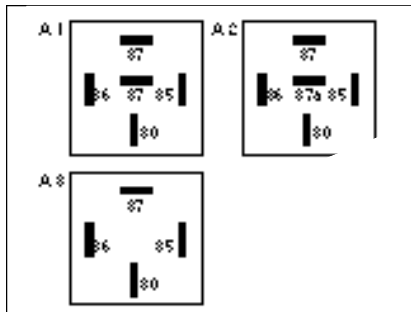
LOAD GROUP	VOLTAGE	CONTACT POSITION	RESISTIVE LOAD		MOTOR LOAD		LAMP LOAD		INDUCTIVE LOAD	
			Continuous	Life Cycles	In rush/ Continuous	Life Cycles	Continuous	Life Cycles	Continuous/ Inductivity	Life Cycles
1	12V	NO	50A 40A 30A	150,000 250,000 500,000	90/40A 75/30A 50/20A	150,000 250,000 300,000	30A 20A 10A	150,000 250,000 500,000	N/A	N/A
2	12V	NO	50A 40A 30A	150,000 250,000 500,000	90/40A 75/30A 50/20A	150,000 250,000 300,000	30A 20A 10A	150,000 250,000 500,000	N/A	N/A
		NC	20A 15A 10A	100,000 150,000 300,000	35/15A 25/10A 15/5A	75,000 150,000 300,000	15A 10A 5A	50,000 50,000 600,000	N/A	N/A
3	24V	NO	20A	250,000	40/16A	250,000	16A	250,000	16A/4mH	100,000
4	24V	NO	20A	250,000	40/16A	250,000	16A	250,000	N/A	N/A
		NC	10A	250,000	N/A	N/A	5A	150,000	N/A	N/A

OPERATING CHARACTERISTICS		MECHANICAL CHARACTERISTICS		ENVIRONMENTAL CHARACTERISTICS	
Response Time	10 mS	Random Vibration Test	10 Hz ... 1000Hz for 4 h	Operating Temperature	-40°C to +85°C
Response Time, with Diode	15 mS	Sine Wave Vibration Test	10 Hz ... 200Hz, 2.5 G's for 4 h	Humidity Test	95% for 7 days
Contact Voltage Drop - New, at 10A (12 V, at 10 A)	50 mV	Drop Test – All sides	1 meter	Salt Spray Test–All sides	144 hours
- After life test (24 V, at 10 A)	80 mV	Terminal Retention Force	> 110 N	Dust Test	8 hours
- After life test	100 mV	Cover Retention Force	> 220 N		
Mechanical Life	> 1,000,000	Cover Crush Force	> 220 N		
Coil Inductance	250 mH				

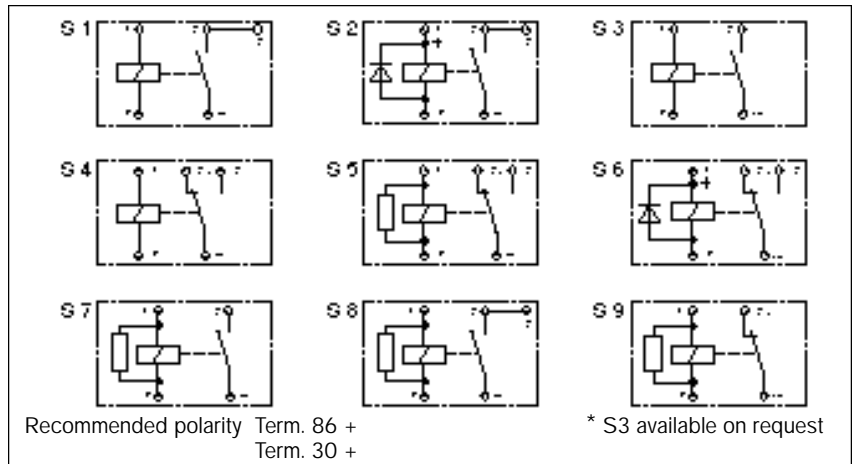
Illustrations and Dimension Drawings



Terminal Diagrams



Circuit Diagrams



Standard Mini Relays

PART NUMBER	DESCRIPTION and Details ## double 87 terminal	Illustration and Dimensions, Drawing	Terminal Diagram; Circuit Diag.	VOLTAGE Nominal – Max. Operating Voltage	CONTACT MATERIAL T 87	MAXIMUM N.O. RESISTIVE LOAD Amps – Life cycles	OTHER LOADS: See Group # in LOAD TABLE
0 332 019 150	SPST, bracket, ##	a	A 1 S 1	12V – 15V	Hard Silver	40A – 200,000	6
0 332 019 151	SPST, ##	a	A 1 S 1	12V – 15V	Hard Silver	40A – 200,000	6
0 332 019 155	SPST, diode, bracket, ##	b	A 1 S 2	12V – 15V	Hard Silver	40A – 200,000	5
0 332 209 150	SPDT, bracket	b	A 2 S 4	12V – 15V	Hard Silver	40A – 200,000	7
0 332 209 151	SPDT	a	A 2 S 4	12V – 15V	Hard Silver	40A – 200,000	7
0 332 209 159	SPDT, resistor	a	A 2 S 5	12V – 15V	Hard Silver	40A – 200,000	7
0 332 209 161	SPDT, resistor, bracket	b	A 2 S 5	12V – 15V	Hard Silver	40A – 200,000	7
0 332 209 167	SPDT, resistor P	a	A 2 S 5	12V – 15V	Silver Nickel	30A – 250,000	8
0 332 209 168	SPDT P	a	A 2 S 4	12V – 15V	Hard Silver	30A – 250,000	8

P = Plated Terminals

PART NUMBER	PULL-IN VOLTAGE	DROP-OUT VOLTAGE	RESISTANCE		Nominal Operating Current
			No resistor, or with diode	With resistor	
0 332 019 150	8.0 V	1.0 – 5.0 V	85 ± 5 ohm		140 mA
0 332 019 151	8.0 V	1.0 – 5.0 V	85 ± 5 ohm		140 mA
0 332 019 155	8.0 V	1.0 – 5.0 V	85 ± 5 ohm		140 mA
0 332 209 150	8.0 V	1.0 – 5.0 V	85 ± 5 ohm		140 mA
0 332 209 151	8.0 V	1.0 – 5.0 V	85 ± 5 ohm		140 mA
0 332 209 159	8.0 V	1.0 – 5.0 V		75 ± 5 ohm	160 mA
0 332 209 161	8.0 V	1.0 – 5.0 V		75 ± 5 ohm	160 mA
0 332 209 167	8.0 V	1.2 – 5.5 V		75 ± 5 ohm	160 mA
0 332 209 168	7.0 V	0.5 – 4.0 V	65 ± 5 ohm		184 mA

LOAD and LIFE CYCLE TEST DATA for STANDARD MINI RELAYS

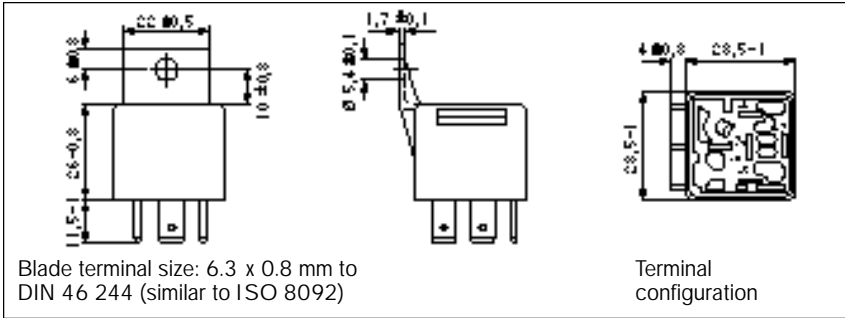
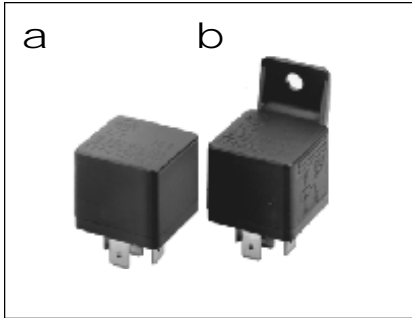
Contact testing conditions	Test Temp.	Relay Type	Load	Switching cycle
For STO (Silver Tin Oxide) contacts: Life cycles tested at 23°C, 13.5V For Hard Silver (AgCU2Ni) contacts: Life cycles tested at 23°C, 13.5V For Silver Nickel (AgNi20) contacts: Life cycles tested at 23°C, 13.5V	23°C	Standard	Lamp Resistive Motor	2 Sec ON, 2 Sec OFF 2 Sec ON, 2 Sec OFF 2 Sec ON, 2 Sec OFF

STANDARD MINI RELAY LOAD TABLE

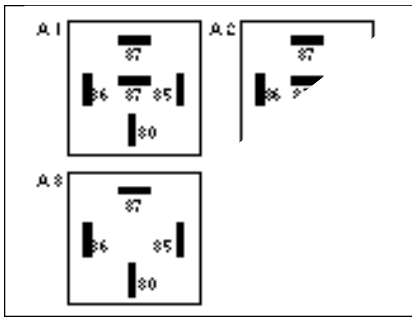
LOAD GROUP	VOLTAGE	CONTACT POSITION	RESISTIVE LOAD		MOTOR LOAD		LAMP LOAD		INDUCTIVE LOAD	
			Continuous	Life Cycles	In rush/ Continuous	Life Cycles	Continuous	Life Cycles	Continuous/ Inductivity	Life Cycles
5	12V	NO	40A	200,000	50/25A	100,000	30A	100,000	15A/8mH	50,000
			30A	300,000			20A	200,000		
			10A	500,000			10A	500,000		
6	12V	NO	40A	200,000	50/25A	100,000	30A	100,000	24A/2mH	100,000
			30A	300,000			20A	200,000		
			10A	500,000			10A	500,000		
7	12V	NO	40A	200,000	50/25A	100,000	30A	100,000	24A/8mH	100,000
			30A	300,000			20A	200,000		
			10A	500,000			10A	500,000		
		NC	20A	250,000	N/A	N/A	10A	100,000	15A/8mH	100,000
8	12V	NO	30A	250,000	75/30A	100,000	30A	100,000	24A/8mH	100,000
			20A	300,000			20A	200,000		
			10A	500,000			10A	500,000		
		NC	20A	250,000	N/A	N/A	10A	100,000	15A/8mH	100,000

OPERATING CHARACTERISTICS	MECHANICAL CHARACTERISTICS	ENVIRONMENTAL CHARACTERISTICS
Response Time	10 mS	Operating Temperature –40°C to +85°C Humidity Test 95% for 7 days Salt Spray Test–All sides 144 hours Dust Test 8 hours
Response Time, with Diode	15 mS	
Contact Voltage Drop - New, at 10A	50 mV	
(12 V, at 10 A) - After life test	80 mV	
(24 V, at 10 A) - After life test	100 mV	
Mechanical Life	> 1,000,000	
Coil Inductance	250 mH	
	Random Vibration Test 10 Hz ...1000Hz for 4 h Sine Wave Vibration Test 10 Hz ...200Hz, 2.5 G's for 4 h Drop Test – All sides 1 meter Terminal Retention Force > 110 N Cover Retention Force > 220 N Cover Crush Force > 220 N	

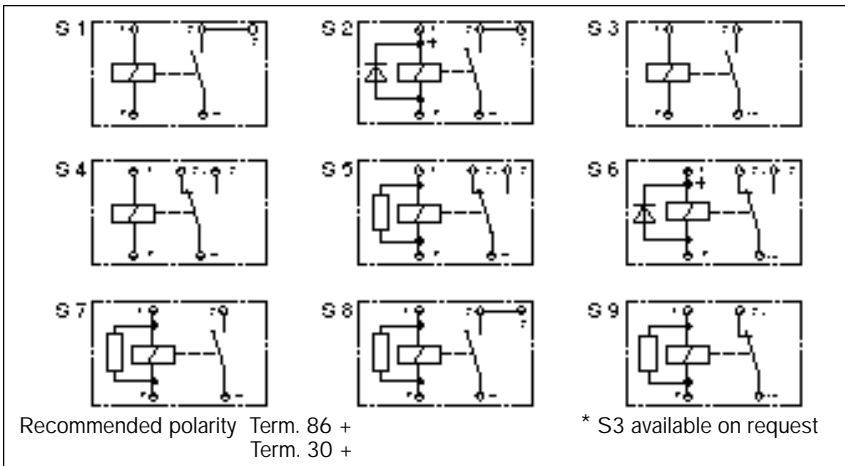
Illustrations and Dimension Drawings



Terminal Diagrams



Circuit Diagrams



Micro Relays

PART NUMBER	DESCRIPTION and Details P = Plated Terminals	Illustration and Dimensions, Drawing	Terminal diagram; Circuit Diag.	VOLTAGE Operating Voltage Nominal – Max.	CONTACT MATERIAL T 87	MAXIMUM N.O. RESISTIVE LOAD Amps – Life Cycles	OTHER LOADS: See Group # in LOAD TABLE
0 332 017 300	SPST, resistor P	a	A 1 S 1	12V – 16V	STO	20A – 300,000	9
0 332 017 302	SPST, resistor, bracket P	b	A 1 S 1	12V – 16V	STO	20A – 300,000	9
0 332 207 307	SPDT, resistor P	a	A 2 S 2	12V – 16V	STO	20A – 300,000	11
0 332 207 310	SPDT, resistor, bracket P	b	A 2 S 2	12V – 16V	STO	20A – 300,000	11
0 332 207 402	SPDT, diode P	a	A 2 S 3	24V – 30V	STO	10A – 250,000	12
0 332 207 404	SPDT, resistor, bracket	b	A 2 S 2	24V – 30V	STO	10A – 250,000	12

P = Plated Terminals

PART NUMBER	PULL-IN VOLTAGE	DROP-OUT VOLTAGE	RESISTANCE		Nominal Operating Current
			No resistor, or with diode	With resistor	
0 332 017 300	8.0 V	1.5 V		78 ± 6 ohm	154 mA
0 332 017 302	8.0 V	1.5 V		78 ± 6 ohm	154 mA
0 332 207 307	8.0 V	1.5 V		78 ± 6 ohm	154 mA
0 332 207 310	8.0 V	1.5 V		78 ± 6 ohm	154 mA
0 332 207 402	17.0 V	3.0 V	410 ± 20 ohm		60 mA
0 332 207 404	17.0 V	3.0 V		335 ± 20 ohm	72 mA

LOAD and LIFE CYCLE TEST DATA for MICRO RELAYS

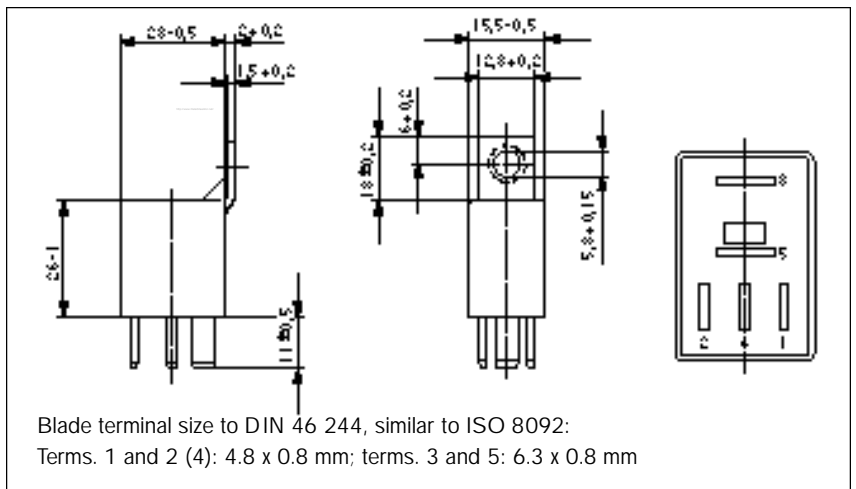
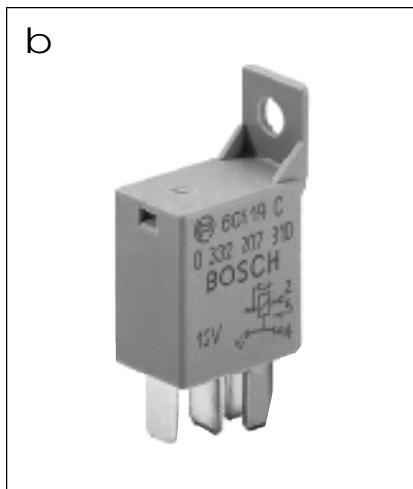
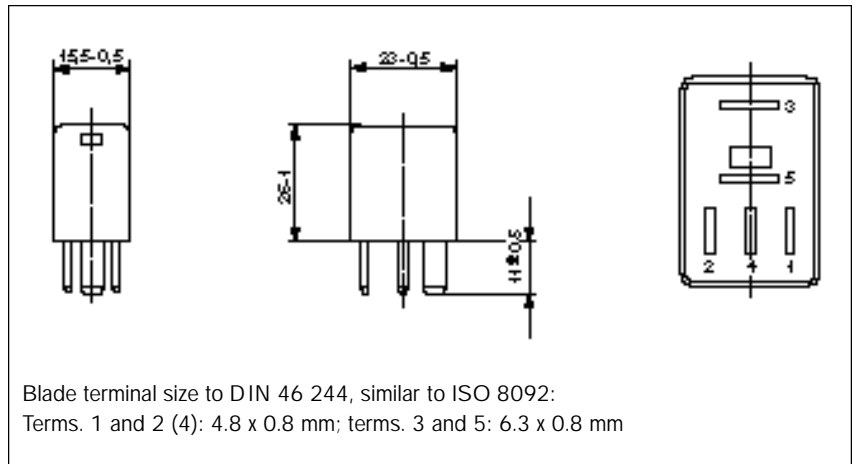
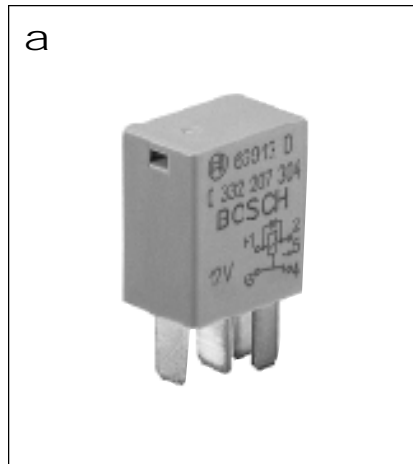
Contact testing conditions	Load	Switching cycle
For STO (Silver Tin Oxide) contacts: Life cycles tested at 85°C, 12V; 23°C for 24V	Resistive Motor Lamp	2 Sec ON, 2 Sec OFF
For Hard Silver (AgCU2Ni) contacts: Life cycles tested at 23°C, 12V		5 Sec ON, 5 Sec OFF
		1 Sec ON, 9 Sec OFF

MICRO RELAY LOAD TABLE

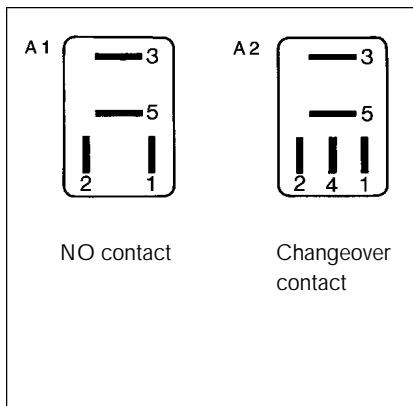
LOAD GROUP	VOLTAGE	CONTACT POSITION	RESISTIVE LOAD		MOTOR LOAD		LAMP LOAD		INDUCTIVE LOAD	
			Continuous	Life Cycles	In rush/ Continuous	Life Cycles	Continuous	Life Cycles	Continuous/ Inductivity	Life Cycles
9	12V	NO	20A	300,000	30/15A	200,000	20A	150,000	4A/4mH	300,000
10	12V	NO	20A	300,000	35/20A	100,000	N/A	N/A	N/A	N/A
		NC	10A	300,000	N/A	N/A	N/A	N/A	N/A	N/A
11	12V	NO	20A	300,000	30/15A	200,000	20A	150,000	4A/4mH	300,000
		NC	10A	150,000	N/A	N/A	10A	75,000	N/A	N/A
12	24V	NO	10A	250,000	N/A	N/A	N/A	N/A	N/A	N/A
		NC	5A	250,000	N/A	N/A	N/A	N/A	N/A	N/A

OPERATING CHARACTERISTICS		MECHANICAL CHARACTERISTICS		ENVIRONMENTAL CHARACTERISTICS	
Response Time	10 mS	Random Vibration Test	10 Hz...1000Hz for 4 h	Operating Temperature	-40°C to +100°C (12V)
Response Time, with Diode	15 mS	Sine Wave Vibration Test	10 Hz...200Hz, 2.5 G's for 3 h		-40°C to +85°C (24V)
Contact Voltage Drop - New, at 10A	50 mV	Drop Test – All sides	1 meter	Humidity Test	95% for 7 days
- After life test	200 mV	Terminal Retention Force	> 110 N	Salt Spray Test–All sides	48 hours
Mechanical Life	> 1,000,000	Cover Retention Force	> 220 N	Dust Test	8 hours
Coil Inductance	190mH (12V)	Cover Crush Force	> 220 N		
	750mH (24V)				

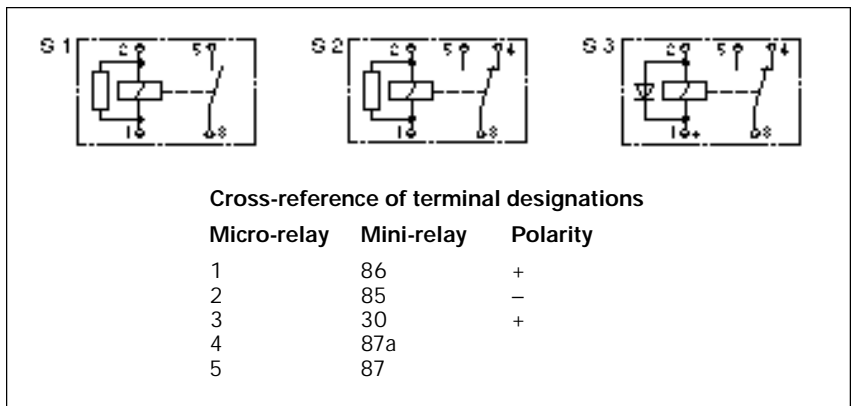
Illustrations and Dimension Drawings



Terminal Diagrams



Circuit Diagrams



Power Relays

PART NUMBER	DESCRIPTION and Details	Illustration and Dimensions, Drawing	Terminal diagram; Circuit Diag.	VOLTAGE Operating Voltage Nominal – Max.	CONTACT MATERIAL T 87	MAXIMUM N.O. RESISTIVE LOAD Amps – Life Cycles	OTHER LOADS: See Group # in LOAD TABLE
0 332 002 150	SPST, dual contact	a	S 6	12V – 16V	STO	75A – 100,000	13
0 332 002 156	SPST, with parallel and series diodes	a	S 3	12V – 15V	Silver Nickel	75A – 100,000	14
0 332 002 250	SPST, pre-contact	a	S 2	24V – 32V	Silver Nickel	50A – 100,000	15
0 332 002 256	SPST, with parallel and	a	S 3	24V – 30V	Silver Nickel	50A – 100,000	16

PART NUMBER	PULL-IN VOLTAGE	DROP-OUT VOLTAGE	RESISTANCE		Nominal Operating Current
			No resistor, or with diode	With resistor	
0 332 002 150	8.0 V	1.5 – 4.0 V	46 ± 5 ohm	N/A	290 mA
0 332 002 156	8.0 V	1.5 – 4.0 V	46 ± 5 ohm	N/A	290 mA
0 332 002 250	18.0 V	1.0 – 8.0 V	130 ± 10 ohm	N/A	200 mA
0 332 002 256	18.0 V	1.0 – 8.0 V	130 ± 10 ohm	N/A	200 mA

LOAD and LIFE CYCLE TEST DATA for POWER RELAYS

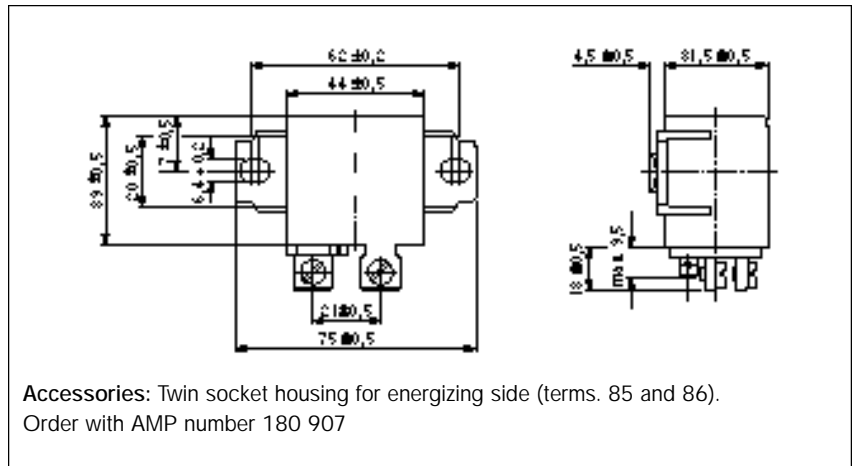
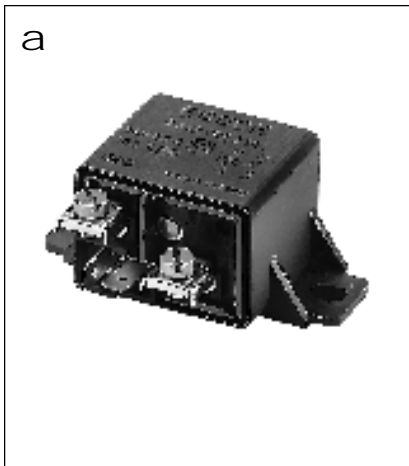
Contact testing conditions	Load	Switching cycle
For STO (Silver Tin Oxide) contacts: Life cycles tested at 23°C	Resistive Motor	2 Sec ON, 2 Sec OFF 5 Sec ON, 5 Sec OFF
For Silver Nickel (AgNi20) contacts: Life cycles tested at 23°C		

POWER RELAY LOAD TABLE

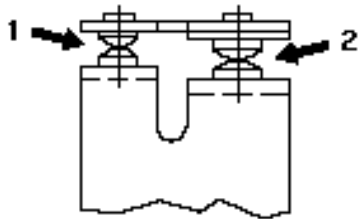
LOAD GROUP	VOLTAGE	CONTACT POSITION	RESISTIVE LOAD		MOTOR LOAD			
			Continuous	Life Cycles	In rush	Duration	Continuous	Life Cycles
13	12V	NO	75A	100,000	400A	1 Sec.	60A	40,000
14	12V	NO	75A	100,000	250A	1 Sec.	60A	40,000
15	24V	NO	50A	100,000	200A	1 Sec.	40A	40,000
16	24V	NO	50A	100,000	150A	1 Sec.	40A	40,000

OPERATING CHARACTERISTICS		MECHANICAL CHARACTERISTICS		ENVIRONMENTAL CHARACTERISTICS	
Response Time	15 mS	Random Vibration Test	10 Hz ... 1000Hz for 3 h	Operating Temperature	–40°C to +85°C
Contact Voltage Drop - New, at 10A (24 V, at 10 A)	100 mV	Sine Wave Vibration Test	10 Hz ... 100Hz, 2.5 G's for 3 h	Humidity Test	95% for 14 days
	200 mV	Drop Test – All sides	1 meter	Salt Spray Test–All sides	144 hours
Mechanical Life	> 1,000,000	Terminal Retention Force	> 110 N	Dust Test	8 hours
Coil Inductance	200 mH (12V)	Cover Retention Force	> 300 N		
	500 mH (24V)	Cover Crush Force	> 220 N		

Illustrations and Dimension Drawings



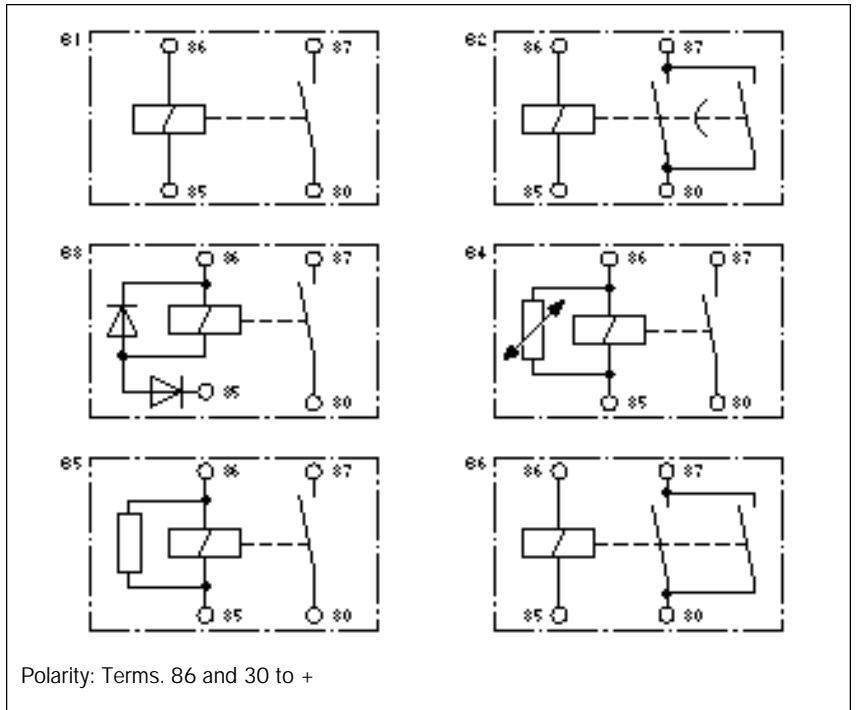
Method of operation of leading contact



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.

Circuit Diagrams

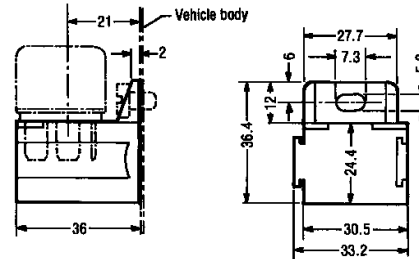


Illustrations and Dimension Drawings

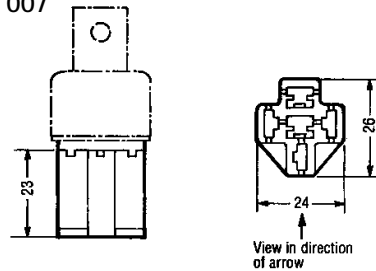
CONNECTOR MODULES FOR MINI RELAYS



Module #3 334 485 008
(Metric)¹



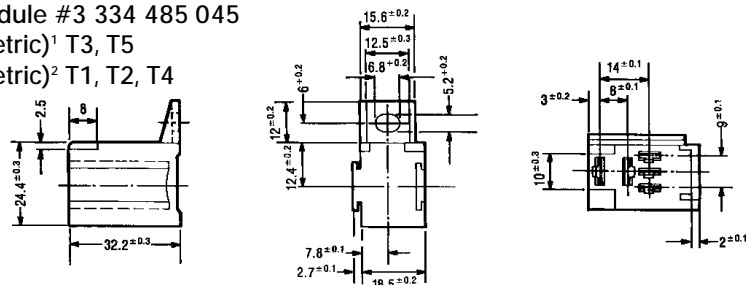
Socket #3 334 485 007
(Metric)¹



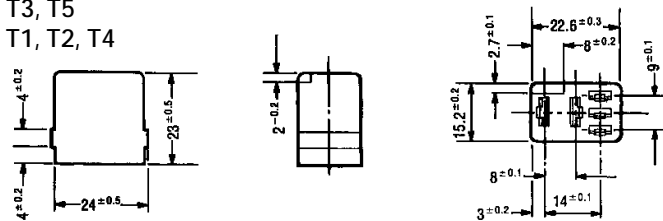
CONNECTOR MODULES FOR MICRO RELAYS



Module #3 334 485 045
(Metric)¹ T3, T5
(Metric)² T1, T2, T4



Socket #3 334 485 046
(Metric)¹ T3, T5
(Metric)² T1, T2, T4



¹ Terminals: AMP Part: 42238-2 (loose piece), or 42100-2 (strip)

² Terminals: MTS Part: 26313.201.011



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