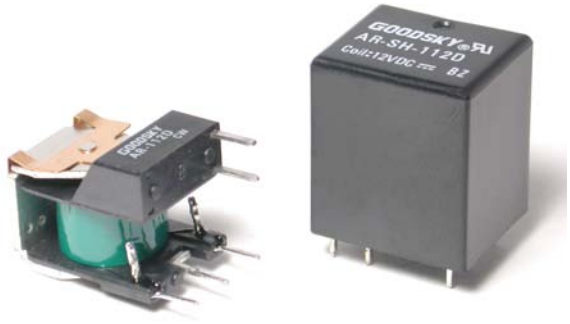


Main Feature

1. Single contact and double contacts type offer switching capacity by 15A in small size for exclusive automobile control relay switching box use.
2. Standard and European Specification are available to comply with various electrical specification requirements.
3. Simple magnetic circuit to meet mass production for low cost offer. Standard type is open type without dust cover. If dust cover is required, suitable cased relay can be prepared.
4. Bubble Test conforming to JIS standard will be conducted on the SX type of Relay for checking the Relay sealing.
5. Operating ambient temperature range covers from -30ºC to 80ºC at no current on Relay's contacts.

Contact Rating

Load Type	AR (DM)	AR (D)
Rated Load (Resistive)	3A 120VAC	3A 120VAC
	10A 12VDC	10A 12VDC
Rated Carrying Current	10A	10A
Max. Allowable Voltage	AC 120V	AC 120V
	DC 28V	DC 28V
Max. Allowable Current	10A	10A
Max. Allowable Power Force	360VA	360VA
	120W	120W
Min. Switching Load	DC 5V, 10mA	DC 5V, 10mA
Contact Material	Ag Alloy	Ag Alloy
Contact Form	SPST	SPDT

Application

Car Control Switching Box (Alarm System, Automatic Door Locking System….), Car Flashers…. etc.

Performance (at Initial Value)

- Contact Resistance ..... 100mΩMax.@1A,6VDC
- Operate Time..... 10 mSec. Max.
- Release Time ..... 10 mSec. Max.
- Dielectric Strength:
  Between Coil & Contact ..... 1,000VAC at 50/60 Hz for one minute.
  Between Contacts ..... 500VAC at 50/60 Hz for one minute.
- Surge Strength ..... 2,000V (between coil & contact 1x40 μ Sec.)
- Insulation Resistance ..... 100 MegaΩ Min. at 500VDC.
- Max. On/Off Switching :
  Electrical..... 20 Cycles per Minute.
  Mechanical..... 300 Cycles per Minute.
- Temperature Range ..... -25～80°C
- Humidity Range .....45～85% RH.
- Coil Temperature Rise .....60°C Max.
- Vibration:
  Endurance.....10 to 55 Hz dual amplitude width 1.5mm.
  Error Operation .....10 to 55 Hz dual amplitude width 1.5mm.
- Shock:
  Endurance .....1000 m/S^2.
  Error Operation .....100 m/S^2.
- Life Expectancy :
  Mechanical .....10^7 Operations at No load condition.
  Electrical .....10^5 Operations at Rated Resistive Load.
- Weight.....About 10 g.

Safety Standard & Its File Number

- UL & C-UL.....E141060

Coil Specification (at 20 °C)

Coil Sensitivity	Nominal Voltage (VDC)	Nominal Current (mA)	Coil Resistance (Ω±10%)	Power Consumption (W)	Pull-In Voltage (VDC)	Drop-Out Voltage (VDC)	Maximum Allowable Voltage (VDC)
AR (Standard)	6	150	40	Abt. 0.93	80% Maximum	5% Minimum	150% (for short time carrying current)
	9	93	97				
	12	77	155				
	15	59	255				
	18	47	380				
	24	36	660				
AR (European)	06	214	28	Abt. 1.1	60% Maximum	5% Minimum	160% (for short time carrying current)
	12	92	130				
	24	46	520				

Ordering Information

AR - SS - 1 12 D M 1

Specification: **Nil**: Standard; **1**: European

Contact Form: **Nil**: One Form C; **M**: One Form A; **B**: One Form B

Coil Type: **D**: DC Coil

Coil Voltage: **06**: 6V, **09**: 9V, **12**: 12V, **15**: 15V, **18**: 18V, **24**: 24V

Number of Pole: **1**: One Pole

Type of Sealing: **Nil**：RT 0 Unclosed Relays; **SS**: RT Ⅱ Flux Proofed Relays; **SH**: RT Ⅲ Wash Tight Relays

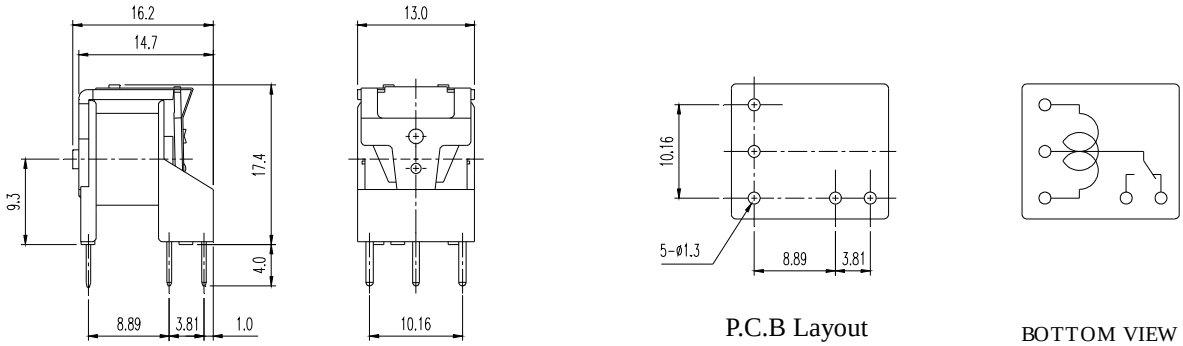
Type: **AR**

Classification

Model	AR					
Coil Sensitivity	Standard			European		
Contact Form	1C	1A	1B	1C	1A	1B
Open Type	AR-1□□D	AR-1□□DM	AR-1□□DB	AR-1□□D1	AR-1□□DM1	AR-1□□DB1
Flow Solder Type	AR-SS-1□□D	AR-SS-1□□DM	AR-SS-1□□DB	AR-SS-1□□D1	AR-SS-1□□DM1	AR-SS-1□□DB1
Plastic Sealed Type	AR-SH-1□□D	AR-SH-1□□DM	AR-SH-1□□DB	AR-SH-1□□D1	AR-SH-1□□DM1	AR-SH-1□□DB1

Dimension (≦ 5mm± 0.2mm, > 5mm ± 0.3mm, the tolerance of PCB thru hole: +0.1mm)

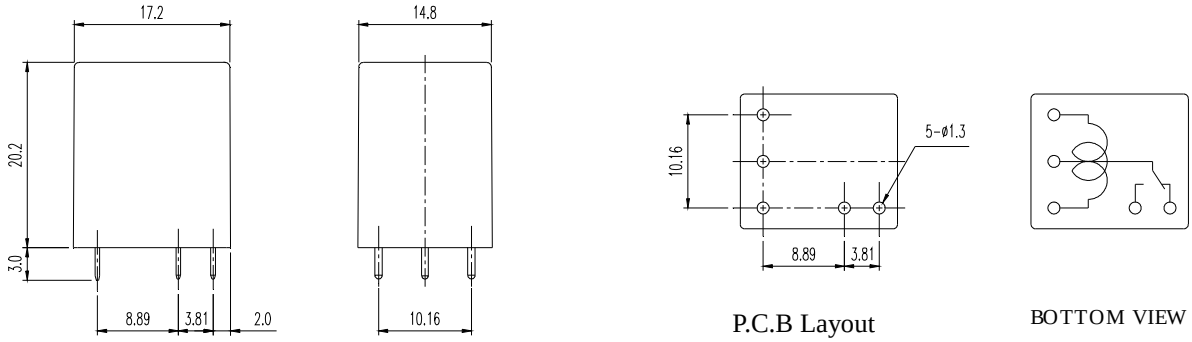
AR



P.C.B Layout

BOTTOM VIEW

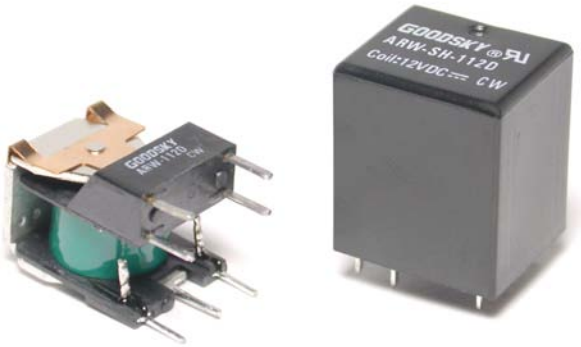
AR-SS/SH



P.C.B Layout

BOTTOM VIEW

ARW



Main Feature

1. Single contact and double contacts type offer switching capacity by 15A in small size for exclusive automobile control relay switching box use.
2. Standard and European Specification are available to comply with various electrical specification requirements.
3. Simple magnetic circuit to meet mass production for low cost offer. Standard type is open type without dust cover. If dust cover is required, suitable cased relay can be prepared.
4. Bubble Test conforming to JIS standard will be conducted on the SX type of Relay for checking the Relay sealing.
5. Operating ambient temperature range covers from -25ºC to 80ºC at no current on Relay's contacts.

Contact Rating

Load Type	ARW (DM)	ARW (DB)	ARW (D)
Rated Load (Resistive)	5A 120VAC	5A 120VAC	5A 120VAC
	15A 12VDC	15A 12VDC	15A 12VDC
Rated Carrying Current	15A	15A	15A
Max. Allowable Voltage	AC 120V	AC 120V	AC 120V
	DC 28V	DC 28V	DC 28V
Max. Allowable Current	15A	15A	15A
Max. Allowable Power Force	600VA	600VA	600VA
	180W	180W	180W
Contact Material	Ag Alloy	Ag Alloy	Ag Alloy
Contact Form	SPST	SPST	SPDT

Application

Car Control Switching Box (Alarm System, Automatic Door Locking System….), Car Flashers…. Etc

Performance (at Initial Value)

- Contact Resistance ..... 100 mΩ Max.@1A,6VDC
- Operate Time..... 10 mSec. Max.
- Release Time ..... 10 mSec. Max.
- Dielectric Strength:
  Between Coil & Contact ..... 1,000VAC at 50/60 Hz for one minute.
  Between Contacts ..... 500VAC at 50/60 Hz for one minute.
- Surge Strength ..... 2,000V (between coil & contact 1.2x50μSec.)
- Insulation Resistance ..... 100 MegaΩ Min. at 500VDC.
- Max. On/Off Switching :
  Electrical..... 20 Cycles per Minute.
  Mechanical ..... 300Cycles per Minute.
- Temperature Range ..... -25～80°C
- Humidity Range ..... 45～85% RH.
- Coil Temperature Rise ..... 60°C Max.
- Vibration:
  Endurance..... 10 to 55 Hz dual amplitude width 1.5mm.
  Error Operation ..... 10 to 55 Hz dual amplitude width 1.5mm.
- Shock:
  Endurance ..... 1,000 m/S^2.
  Error Operation ..... 100 m/S^2.
- Life Expectancy :
  Mechanical ..... 10^7 Operations at No load condition.
  Electrical ..... 10^5 Operations at Rated Resistive Load.
- Weight..... About 10 g.

Safety Standard & Its File Number

- UL & C-UL..... E141060

Coil Specification (at 20 °C)

Coil Sensitivity	Nominal Voltage (VDC)	Nominal Current (mA)	Coil Resistance (Ω±10%)	Power Consumption (W)	Pull-In Voltage (VDC)	Drop-Out Voltage (VDC)	Maximum Allowable Voltage (VDC)
ARW (Standard)	6	150	40	Abt. 0.93	80% Maximum	5% Minimum	150% (for short time carrying current)
	9	93	97				
	12	77	155				
	15	59	255				
	18	47	380				
	24	36	660				
ARW (European)	6	214	28	Abt. 1.1	60% Maximum	5% Minimum	160% (for short time carrying current)
	12	92	130				
	24	46	520				

Ordering Information

ARW - SS - 1 12 D M 1

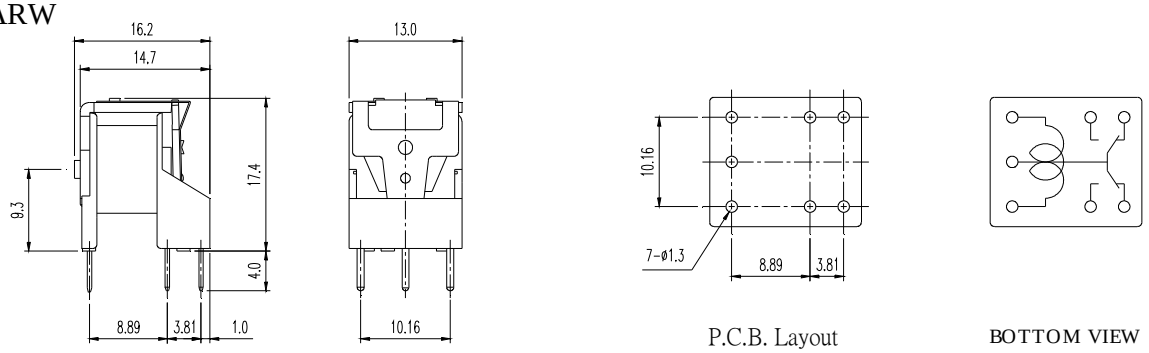
Specification: **Nil**: Standard; **1**: European
Contact Form: **Nil**: One Form C; **M**: One Form A; **B**: One Form B
Coil Type: **D**: DC Coil
Coil Voltage: **06**: 6V, **09**: 9V, **12**: 12V, **15**: 15V, **18**: 18V, **24**: 24V
Number of Pole: **1**: One Pole
Type of Sealing: **Nil**：RT 0 Unclosed Relays; **SS**: RT Ⅱ Flux Proofed Relays; **SH**: RT Ⅲ Wash Tight Relays
Type: **ARW**

Classification

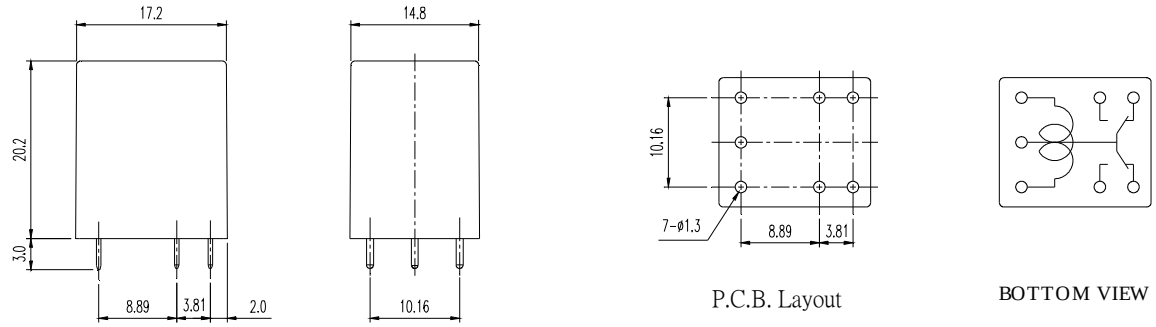
Model	ARW					
Coil Sensitivity	Standard			European		
Contact Form	1C	1A	1B	1C	1A	1B
Open Type	ARW-1□□D	ARW-1□□DM	ARW-1□□DB	ARW-1□□D1	ARW-1□□DM1	ARW-1□□DB1
Flow Solder Type	ARW-SS-1□□D	ARW-SS-1□□DM	ARW-SS-1□□DB	ARW-SS-1□□D1	ARW-SS-1□□DM1	ARW-SS-1□□DB1
Plastic Sealed Type	ARW-SH-1□□D	ARW-SH-1□□DM	ARW-SH-1□□DB	ARW-SH-1□□D1	ARW-SH-1□□DM1	ARW-SH-1□□DB1

Dimension (≦ 5mm± 0.2mm, > 5mm ± 0.3mm, the tolerance of PCB thru hole: +0.1mm)

ARW



ARW-SS/SH



CAR

Main Feature

1. European and American footprints available offer different market selections.
2. Customer can choose different construction version according to various manufacturing process from Open Type (without dust cover), Flux Solder type which can protect the Relays from dust, and Epoxy Resin Sealed type for PCB washing procedure.
3. Special contact FE130 material is applied which creates the maximum 30~40 Amp rated current.

Contact Rating

Load Type	CAR (DM)	CAR (DB)	CAR (D)
Rated Load (Resistive)	NO: 40A 12VDC	NC: 40A 12VDC	NO: 40A 12VDC NC: 30A 12VDC
Rated Carrying Current	NO: 40A	NC: 40A	NO: 40A NC: 30A
Max. Allowable Voltage	DC 60V	DC 60V	DC 60V
Max. Allowable Current	40A	40A	NO:40A NC:30A
Max. Allowable Power Force	480W	480W	NO: 480W NC: 360W
Contact Material	Ag Alloy	Ag Alloy	Ag Alloy
Contact Form	SPST	SPST	SPDT

Load Type	CAR (LM)	CAR (LB)	CAR (L)
Rated Load (Resistive)	30A 12VDC	30A 12VDC	30A 12VDC
Rated Carrying Current	30A	30A	30A
Max. Allowable Voltage	DC 60V	DC 60V	DC 60V
Max. Allowable Current	30A	30A	30A
Max. Allowable Power Force	360W	360W	360W
Contact Material	Ag Alloy	Ag Alloy	Ag Alloy
Contact Form	SPST	SPST	SPDT

Application

Car Control Switching Box (Car Alarm, Center door lock system, Blinkers, …etc.)

Performance (at Initial Value)

- Contact Resistance ..... 100mΩ Max.@1A,6VDC
- Operate Time..... 10 mSec. Max.
- Release Time ..... 10 mSec. Max.
- Insulation Resistance ..... 100 MegaΩ Min. at 500VDC.
- Dielectric Strength:
  Between Coil & Contact……1,200VAC at 50 Hz for one minute
  Between Contacts .....750VAC at 50 Hz for one minute
- Max. On/Off Switching:
  Electrical..... 20 Ops per Minute.
  Mechanical ..... 300 Ops per Minute.
- Humidity Range..... 95% at 20°C.
- Temperature Range..... -40～85°C
- Life Expectancy :
  Mechanical ..... 10^7 Operations at No Load condition.
  Electrical..... 10^5 Operations at Rated Resistive Load.
- Contact Material ..... Ag Alloy.
- Weight ..... About 20.2 g.

Safety Standard & Its File Number

- NIL.

Coil Specification (at 20 °C)

Coil Sensitivity	Nominal Voltage (VDC)	Nominal Current (mA)	Coil Resistance (Ω±10%)	Power Consumption (W)	Pull-In Voltage (VDC)	Drop-Out Voltage (VDC)	Maximum Allowable Voltage (VDC)
CAR-D/DM/DB (Europe)	6	315.7	19	Abt.1.89	70% Maximum	5% Minimum	160%
	12	133.3	90	Abt.1.59			
	24	66.2	362				
	36	44	816				
	48	33	1450				
CAR-L/LM/LB (Europe)	6	100	60	Abt.0.6	75% Maximum	10% Minimum	160%
	12	50	240				
	24	25	960				
	36	16.7	2160				
	48	12.5	3840				
CAR-D/DM/DB (U.S.A.)	6	315.7	19	Abt.1.89	70% Maximum	5% Minimum	160%
	12	133.3	90	Abt.1.59			
	24	66.2	362				
	36	44	816				
	48	33	1450				
CAR-L/LM/LB (U.S.A.)	6	100	60	Abt.0.6	75% Maximum	10% Minimum	160%
	12	50	240				
	24	25	960				
	36	16.7	2160				
	48	12.5	3840				

Further coils for motor vehicle applications on request.

The operating voltage limits Umin and Umax depend on temperature in accordance with the following formula:

Umin tu = K_I x Umin 20°C and Umax tu =Ku x Umax 20°C

tu = ambient temperature

Umix tu = minimum voltage at ambient temperature tu

Umax tu = maximum voltage at ambient temperature tu

K_I and Ku = factors

tu	-40°C	-30°C	-20°C	-10°C	0°C	10°C	20°C	30°C	40°C	50°C	60°C	70°C	80°C	85°C
KI	0.764	0.804	0.843	0.882	0.921	0.961	1.000	1.039	1.079	1.118	1.157	1.197	1.236	1.255
Ku	1.081	1.069	1.056	1.043	1.029	1.014	1.000	0.985	0.969	0.953	0.935	0.917	0.897	0.887

Ordering Information

CAR - SS - 1 12 D M E

Terminal Size:	**E**: Europe Version **U**: U.S.A. Version
Contact Form:	**Nil**: One Form C **M**: One Form A **B**: One Form B
Coil Type:	**D**: Standard DC Coil **L**: High Sensitivity DC Coil
Coil Voltage:	**06**:6V, **12**:12V, **24**:24V, **36**:36V, **48**:48V
Number of Pole:	**1**: One Pole
Type of Sealing:	**Nil**：RT 0 Unclosed Relays **SS**: RT Ⅱ Flux Proofed Relays **SH**: RT Ⅲ Wash Tight Relays
Type:	**CAR**

Classification

Model	**CAR**		
Terminal Size	**Europe Version**		
Coil Sensitivity	**Standard DC Coil**		
Contact Form	1C	1A	1B
Unclosed Relay	CAR-1□□DE	CAR-1□□DME	CAR-1□□DBE
Flux Proofed Relay	CAR-SS-1□□DE	CAR-SS-1□□DME	CAR-SS-1□□DBE
Wash Tight Relay	CAR-SH-1□□DE	CAR-SH-1□□DME	CAR-SH-1□□DBE

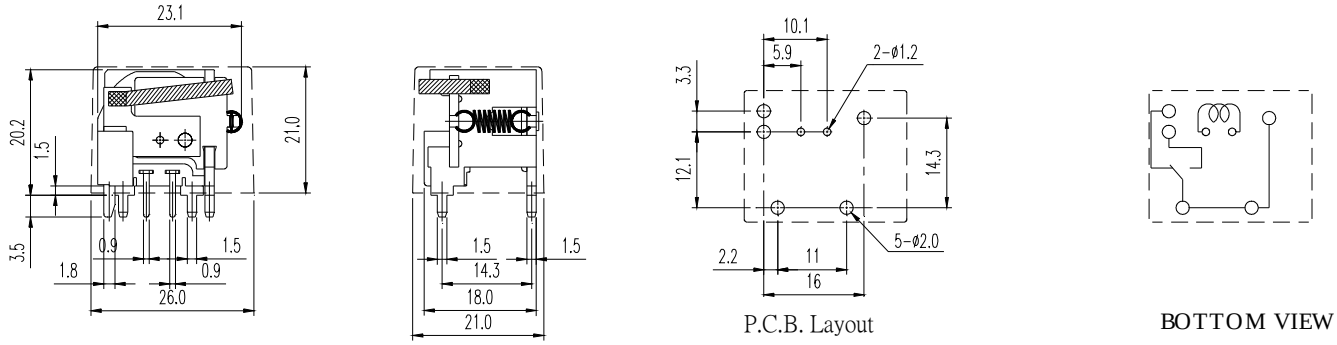
Model	**CAR**		
Terminal Size	**Europe Version**		
Coil Sensitivity	**High Standard DC Coil**		
Contact Form	1C	1A	1B
Unclosed Relay	CAR-1□□LE	CAR-1□□LME	CAR-1□□LBE
Flux Proofed Relay	CAR-SS-1□□LE	CAR-SS-1□□LME	CAR-SS-1□□LBE
Wash Tight Relay	CAR-SH-1□□LE	CAR-SH-1□□LME	CAR-SH-1□□LBE

Model	**CAR**		
Terminal Size	**U.S.A. Version**		
Coil Sensitivity	**Standard DC Coil**		
Contact Form	1C	1A	1B
Unclosed Relay	CAR-1□□DU	CAR-1□□DMU	CAR-1□□DBU
Flux Proofed Relay	CAR-SS-1□□DU	CAR-SS-1□□DMU	CAR-SS-1□□DBU
Wash Tight Relay	CAR-SH-1□□DU	CAR-SH-1□□DMU	CAR-SH-1□□DBU

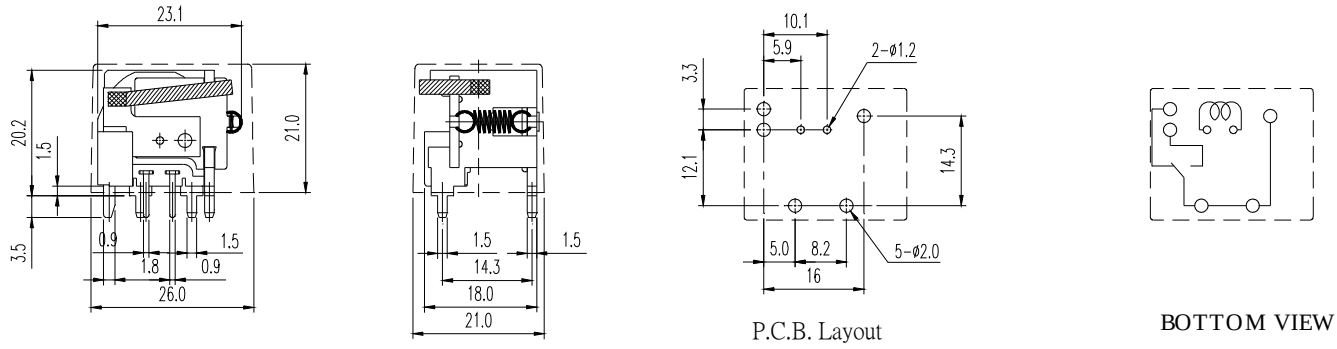
Model	**CAR**		
Terminal Size	**U.S.A. Version**		
Coil Sensitivity	**High Standard DC Coil**		
Contact Form	1C	1A	1B
Unclosed Relay	CAR-1□□LU	CAR-1□□LMU	CAR-1□□LBU
Flux Proofed Relay	CAR-SS-1□□LU	CAR-SS-1□□LMU	CAR-SS-1□□LBU
Wash Tight Relay	CAR-SH-1□□LU	CAR-SH-1□□LMU	CAR-SH-1□□LBU

Dimension

EUROPE



U.S.A.



GIN

Main Feature

1. 25Amp motor lock load.
2. Small size with high rating.
3. Single or dual version available.
4. Standard type contact form SPDT and SPST are available for customers' selection
5. High performance PCB Relay.

Contact Rating

Load Type	GIN (DM)	GIN (D)
Rated Load (Resistive)	25A 16VDC	25A 16VDC
Rated Carrying Current	25A	25A
Max. Allowable Voltage	DC 16V	DC 16V
Max. Allowable Current	30A	30A
Min. Switching Load	1A 6VDC	1A 6VDC
Contact Material	Ag Alloy	Ag Alloy
Contact Form	SPST / DPST	SPDT / DPDT

Application

Power Windows, Seat adjustment, Power Doors, Sunroof, Wiper Control.

Performance (at Initial Value)

- Contact Resistance ..... 100 mΩ Max. @1A,6VDC
- Operate Time ..... 10mSec. Max.
- Release Time ..... 10mSec. Max.
- Dielectric Strength:
  Between Coil & Contact ..... 500VAC at 50/60 Hz for one minute.
  Between Contacts ..... 500VAC at 50/60 Hz for one minute.
- Insulation Resistance ..... 100MΩ Min. at 500VDC.
- Max. On/Off Switching:
  Electrical..... 6 Cycles per Minute.
  Mechanical..... 300 Cycles per Minute.
- Temperature Range ..... -40~105 °C.
- Humidity Range..... 45~80% RH.
- Coil Temperature Rise ..... 50 °C Max.
- Vibration:
  Endurance..... 10 to 55 Hz dual amplitude width 1.5 mm
  Error Operation ..... 10 to 55 Hz dual amplitude width 1.5mm.
- Shock:
  Endurance ..... 1,000 m/S^2.
  Error Operation..... 100 m/S^2.
- Life Expectancy:
  Electrical ..... 10^5 Operations at Rated Resistive Load.
  Mechanical..... 10^6 Operations at No load condition.
- Weight ..... About 4 g.

Safety Standard & Its File Number

- NIL.

Coil Specification (at 20 °C)

Coil Sensitivity	Nominal Voltage(VDC)	Nominal Current (mA)	Coil Resistance (W±10%)	Power Consumption (W±10%)	Pull-In Voltage (VDC)	Drop-Out Voltage (VDC)	Maximum Allowable Voltage (VDC)
GIN	9	70.8	127	Abt. 0.64	60%	5%	130%
	12	53.3	225				
	24	26.7	900				
	48	16.7	2880	Abt. 0.8			

Ordering Information

GIN -SS- 1 12 D M

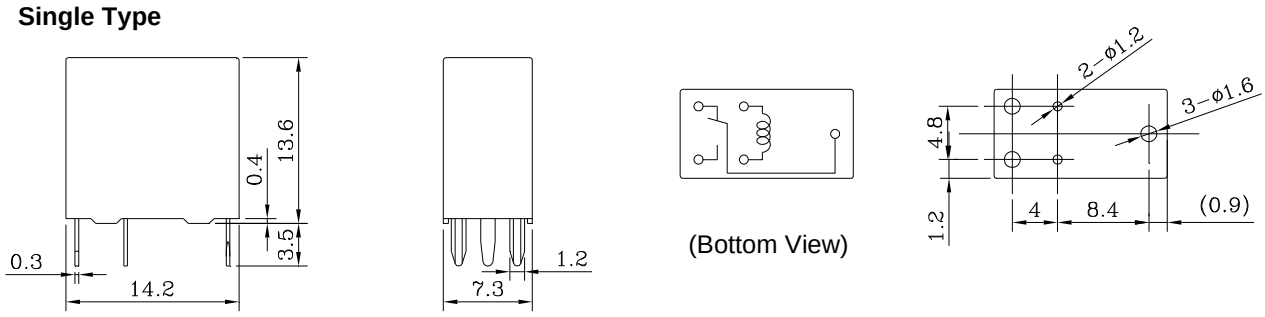
Contact Form:	**NIL:** Form C **M:** Form A
Coil Type:	**D:** Standard DC Coil
Coil Voltage:	**09:** 9V, **12:** 12V, **24:** 24V, **48:** 48V
Number of Pole:	**1:** Single Relay **2:** Dual Relay
Type of Sealing:	**SS:** RT Ⅱ Flux Proofed Relays **SH:** RT Ⅲ Wash Tight Relays
TYPE:	**GIN**

Classification

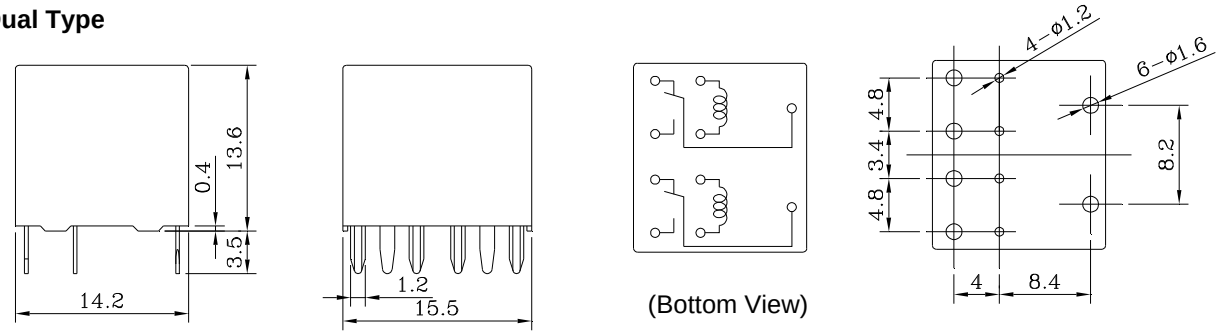
Model	GIN			
Single or Dual Relay	**Single Relay**		**Dual Relay**	
Contact Form	1C	1A	2C	2A
Flux Proofed Relays	GIN-SS-1□□D	GIN- SS -1□□DM	GIN- SS -2□□D	GIN- SS -2□□DM
Wash Tight Relays	GIN- SH -1□□D	GIN- SH -1□□DM	GIN- SH -2□□D	GIN- SH -2□□DM

Dimension (≦ 5mm± 0.2mm, > 5mm ± 0.3mm, the tolerance of PCB thru hole: +0.1mm)

Single Type



Dual Type



Main Feature

1. 40A switching use relay at ambient temperature of 80°C.
2. Compatible fasten terminal arrangement with this kind of power relay.
3. Simple magnetic circuit to meet mass production for low cost offer.
4. Standard type contact form SPDT and DPST are available for customer's selection.
5. Operating ambient temperature range covers from -30°C to 80°C.

Contact Rating

Load Type	GRL (DM/DB)	GRL (D)	GRL-2P (DM)
Rated Load (Resistive)	N.O.: 40A 12VDC	N.O.: 40A 12VDC	40A(20A×2) 12VDC
	N.C.: 30A 12VDC	N.C.: 30A 12VDC	
Rated Carrying Current	40A	40A	40A(20A×2)
Max. Allowable Voltage	30VDC	30VDC	30VDC
Max. Allowable Current	40A	40A	40A(20A×2)
Max. Allowable Power Force	480W	480W	240W
Contact Material	Ag Alloy	Ag Alloy	Ag Alloy
Contact Form	SPST	SPDT	DPST

Application

For direct connection with Cell Motors, Transmission etc. and Anti-Locking Brake System.

Performance (at Initial Value)

- Contact Resistance ..... 100 mΩ Max.@1A,6VDC
- Operate Time..... 10 mSec. Max.
- Release Time ..... 10 mSec. Max.
- Dielectric Strength:
  Between Coil & Contact ..... 1,000VAC at 50/60 Hz for one minute.
  Between Contacts ..... 500VAC at 50/60 Hz for one minute.
- Insulation Resistance ..... 100 MegaΩ Min. at 500VDC.
- Max. On/Off Switching:
  Electrical..... 6 Cycles per Minute.
  Mechanical ..... 300 Cycles per Minute.
- Temperature Range..... -30～85°C
- Humidity Range..... 45～80% RH.
- Coil Temperature Rise..... 60°C Max.
- Vibration :
  Endurance.....10 to 55 Hz dual amplitude width 2 mm.
  Error Operation .....10 to 55 Hz dual amplitude width 2 mm.
- Shock :
  Endurance .....1,000 m/S^2 .
  Error Operation .....50 m/S^2 .
- Life Expectancy :
  Mechanical .....10^7 Operations at No Load condition.
  Electrical .....10^5 Operations at Rated Resistive Load.
- Weight.....About 36.5 g.

Accessories & Sockets

- UC3003.....See Page 180
- CS3770.....See Page 180
- UC3001.....See Page 180

Safety Standard & Its File Number

- NIL.

Coil Specification (at 20°C)

Coil Sensitivity	Nominal Voltage (VDC)	Nominal Current (mA)	Coil Resistance (Ω±10%)	Power Consumption (W)	Pull-In Voltage (VDC)	Drop-Out Voltage (VDC)	Maximum Allowable Voltage (VDC)
GRL	12	150	80	Abt. 1.8	75% Maximum	5% Minimum	150% but for short time carrying current
	24	75	320				

Ordering Information

GRL - S - 1 12 D M H R1

Options:
Nil: Standard
R1: Coil parallel with 1/2W Resistor
680Ω for Coil Voltage 12VDC
2700Ω for Coil Voltage 24VDC
D1: Coil parallel with diode & the Positive pole "+" on #85 Terminal
D2: Coil parallel with diode & the Negative pole "-" on #85 Terminal

Bracket:
Nil: No Bracket Standard
H: Dust Cover with Metal Bracket
F: Plastic Bracket Cover

Contact Form:
Nil: One Form C
M: One Form A
B: One Form B

Coil Type: **D**: Standard DC Coil

Coil Voltage: **12**: 12V, **24**: 24V

Number of Pole:
1: One Pole
2: Two Poles (Form A only)

Type of Sealing: **S** : RT Ⅰ Dust Protected Relays

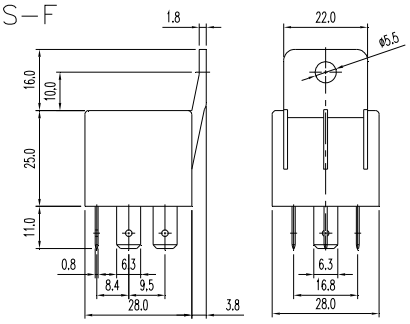
Type: **GRL**

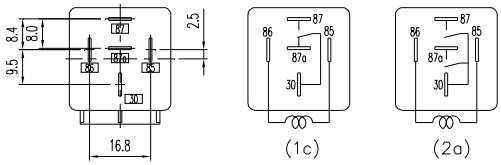
Classification

Model	GRL			
Number of Pole	1 Pole			2 Poles
Contact Form	1C	1A	1B	2A
No Bracket Standard	GRL-S-1□□D	GRL-S-1□□DM	GRL-S-1□□DB	GRL-S-2□□DM
Dust Cover Metal Bracket	GRL-S-1□□DH	GRL-S-1□□DMH	GRL-S-1□□DBH	GRL-S-2□□DMH
Plastic Bracket Cover	GRL-S-1□□DF	GRL-S-1□□DMF	GRL-S-1□□DBF	GRL-S-2□□DMF
Coil Additional Parts	Please add your choice Coil Parallel "R1" ," D1" ," D2" at the back of all above-mentioned part number .			

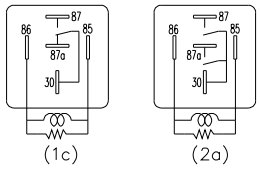
Dimension (≦ 5mm± 0.2mm, > 5mm ± 0.3mm, the tolerance of PCB thru hole: +0.1mm)

GRL-S-F

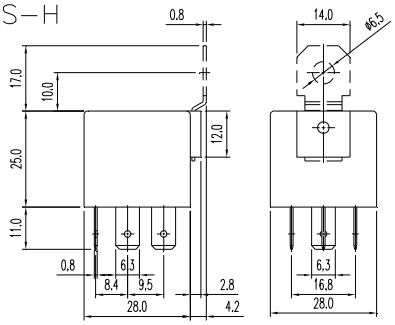




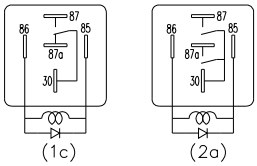
"R1" Type



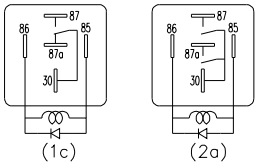
GRL-S
GRL-S-H

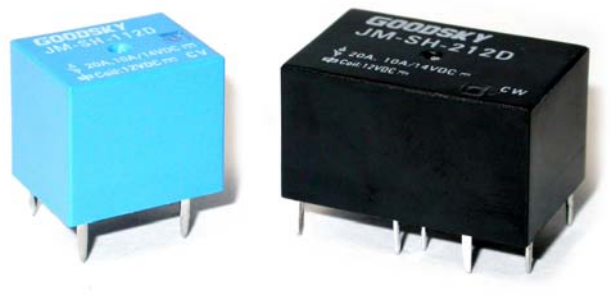


"D1" Type



"D2" Type





Main Feature

1. Smaller size compared to RW series, but with 25A of inrush current.
2. Application for automotive electrical systems.
3. JM-2P is consisted of 2 pieces of JM-1P and capsulated by one cover and the locations of terminals are distributed for easy pattern design on N.O. and N.C. contact terminal.
4. Plastic sealed type is available.

Contact Rating

Load Type	JM-1P (DM/LM)	JM-1P (D/L)	JM-2P (DM/LM)	JM-2P (D/L)
Rated Load (Resistive)	10A 14VDC	10A 14VDC	10A 14VDC	10A 14VDC
Rated Load (Motor) at 0.5s ON, 9.5s OFF	20A 14VDC	20A 14VDC	20A 14VDC	20A 14VDC
Rated Carrying Current	10A	10A	10A	10A
Max. Allowable Voltage	60VDC	60VDC	60VDC	60VDC
Max. Allowable Current	25A	25A	25A	25A
Max. Allowable Power Force	280W	280W	280W	280W
Contact Material	Ag Alloy	Ag Alloy	Ag Alloy	Ag Alloy
Contact Form	SPST	SPDT	DPST	DPDT

Application

Car Control Switching Box (Alarm System, Automatic Door Locking System….), Car Flashers… etc.

Performance (at Initial Value)

- Contact Resistance ..... 100 mΩ Max.@1A,6VDC
- Operate Time..... 10 mSec. Max.
- Release Time ..... 10 mSec. Max.
- Dielectric Strength :
  Between Coil & Contact ..... 500VAC at 50/60 Hz For one minute.
  Between Contacts ..... 500VAC at 50/60 Hz for one minute.
- Surge Strength ..... 1,500V (between coil & contact 1.2x50μSec.)
- Insulation Resistance ..... 100 MegaΩ Min. at 500VDC
- Max. On/Off Switching :
  Electrical..... 6 Cycles per Minute.
  Mechanical ..... 300 Cycles per Minute.
- Temperature Range..... -40～85°C
- Humidity Range .....45～85% RH.
- Coil Temperature Rise .....70°C Max.
- Vibration :
  Endurance.....10 to 55 Hz dual amplitude width 1.5mm.
  Error Operation .....10 to 55 Hz dual amplitude width 1.5mm.
- Shock :
  Endurance .....1,000 m/S^2.
  Error Operation .....100 m/S^2.
- Life Expectancy :
  Mechanical .....10^7 Operations at No load condition.
  Electrical .....10^5 Operations at Rated Resistive Load.
- Weight.....About 5.2 g for 1P.
  About 10.2 g for 2P.

Safety Standard & Its File Number

- NIL.

Coil Specification (at 20 °C)

Coil Sensitivity	Nominal Voltage (VDC)	Nominal Current (mA)	Coil Resistance (Ω±10%)	Power Consumption (W)	Pull-In Voltage (VDC)	Drop-Out Voltage (VDC)	Maximum Allowable Voltage (VDC)
JM-D	6	133	45	Abt. 0.8	60% Maximum	5% Minimum	150% but for short time carrying current
	9	90	100				
	10	74	135				
	12	66.7	180				
	24	33.3	720				
JM-L	6	100	60	Abt. 0.6			
	9	66.7	135				
	10	55.6	180				
	12	50	240				

Ordering Information

JM - SS - 1 12 D M

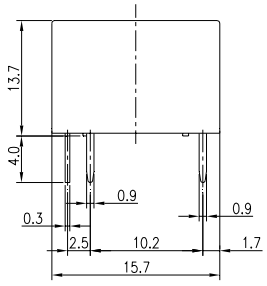
Contact Form:	**Nil**: One Form C **M**: One Form A **B**: One Form B
Coil Type:	**D**: Standard DC Coil **L**: High Sensitivity DC Coil
Coil Voltage:	**06**: 6V, **09**: 9V, **10**: 10V, **12**: 12V, **24:**24V
Number of Pole:	**1**: One Pole **2**: Two Poles
Type of Sealing:	**SS**: RT Ⅱ flux proofed relays **SH**: RT Ⅲ wash tight relays
Type:	**JM**

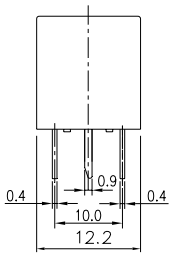
Classification

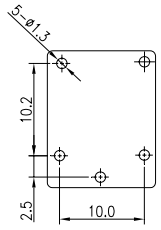
Model	JM											
Coil Sensitivity	Standard DC Coil						High Sensitivity DC Coil					
Number of Pole	1 Pole			2 Poles			1 Pole			2 Poles		
Contact Form	1C	1A	1B	2C	2A	2B	1C	1A	1B	2C	2A	2B
Flux Proofed Relay	1C : JM-SS-1□□D			2C : JM-SS-2□□D			1C : JM-SS-1□□L			2C : JM-SS-2□□L		
	1A : JM-SS-1□□DM			2A : JM-SS-2□□DM			1A : JM-SS-1□□LM			2A : JM-SS-2□□LM		
	1B : JM-SS-1□□DB			2B : JM-SS-2□□DB			1B : JM-SS-1□□LB			2B : JM-SS-2□□LB		
Wash Tight Relay	1C : JM-SH-1□□D			2C : JM-SH-2□□D			1C : JM-SH-1□□L			2C : JM-SH-2□□L		
	1A : JM-SH-1□□DM			2A : JM-SH-2□□DM			1A : JM-SH-1□□LM			2A : JM-SH-2□□LM		
	1B : JM-SH-1□□DB			2B : JM-SH-2□□DB			1B : JM-SH-1□□LB			2B : JM-SH-2□□LB		

Dimension (≦ 5mm± 0.2mm, > 5mm ± 0.3mm, the tolerance of PCB thru hole: +0.1mm)

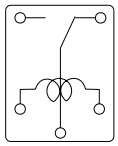
JM-SS/SH-1





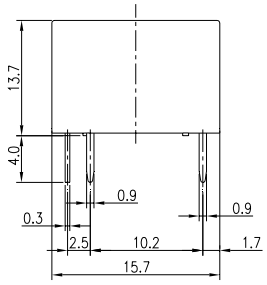


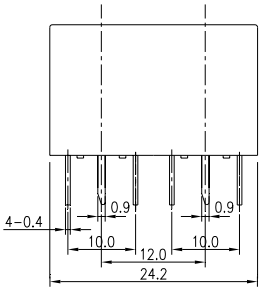
P.C.B. Layout

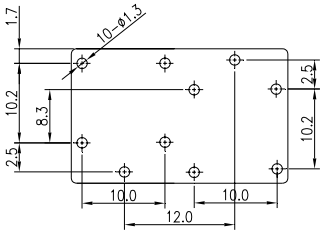


Bottom View

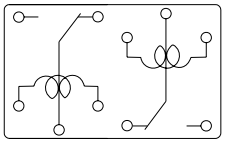
JM-SS/SH-2



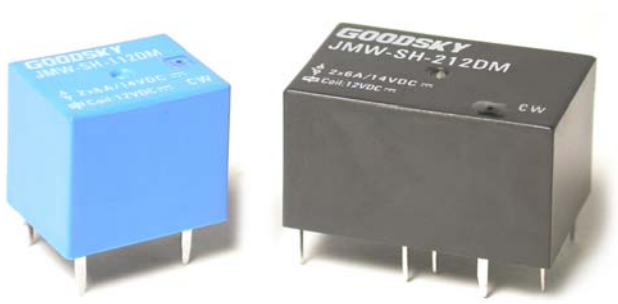




P.C.B. Layout



Bottom View



Main Feature

1. Smaller size compared to RW series , but with 2×6A of rated carrying current and double contact type.
2. Application for automotive electrical systems.
3. JMW-2P is consisted of 2 pieces of JMW-1P and capsulated by one cover and the locations of terminals are distributed for easy pattern design on N.O. contact terminal.
4. Simple magnetic circuit to meet mass production for low cost offer.
5. Plastic sealed type is available.

Contact Rating

Load Type	JMW-1P (DM/LM)	JMW-2P (DM/LM)
Rated Load (Resistive)	2x6A 14VDC	2x6A 14VDC
Rated Carrying Current	2×6A	2×6A
Max. Allowable Voltage	60VDC	60VDC
Max. Allowable Current	12A	12A
Max. Allowable Power Force	150W	150W
Contact Material	Ag Alloy	Ag Alloy
Contact Form	SPST	DPST

Application

Car Control Switching Box (Alarm System, Automatic Door Locking System….), Car Flashers… etc.

Performance (at Initial Value)

- Contact Resistance ..... 100 mΩ Max.@1A,6VDC
- Operate Time..... 10 mSec. Max.
- Release Time ..... 10 mSec. Max.
- Dielectric Strength :
  Between Coil & Contact ..... 500VAC at 50/60 Hz for one minute.
  Between Contacts ..... 500VAC at 50/60 Hz for one minute.
- Surge Strength ..... 1,500V (between coil & contact 1.2x50μSec.)
- Insulation Resistance ..... 100 MegaΩ Min. at 500VDC
- Max. On/Off Switching :
  Electrical……. 4 Cycles per Minute. (at 1s ON, 14s OFF)
  Mechanical ..... 300 Cycles per Minute.
- Temperature Range..... -40～85°C
- Humidity Range .....45～85% RH.
- Coil Temperature Rise .....70°C Max.
- Vibration :
  Endurance.....10 to 55 Hz dual amplitude width 1.5mm.
  Error Operation .....10 to 55 Hz dual amplitude width 1.5mm.
- Shock :
  Endurance .....1,000 m/S^2 .
  Error Operation .....100 m/S^2 .
- Life Expectancy :
  Mechanical .....10^7 Operations at No load condition.
  Electrical .....10^5 Operations at Rated Resistive Load.
- Weight.....About 5.2 g for 1P.
  About 10.2 g for 2P.

Safety Standard & Its File Number

- NIL.

Coil Specification (at 20 °C)

Coil Sensitivity	Nominal Voltage (VDC)	Nominal Current (mA)	Coil Resistance (Ω±10%)	Power Consumption (W)	Pull-In Voltage (VDC)	Drop-Out Voltage (VDC)	Maximum Allowable Voltage (VDC)
JMW-DM	6	133	45	Abt. 0.8	60% Maximum	5% Minimum	150% but for short time carrying current
	9	90	100				
	10	74	135				
	12	66.7	180				
	24	33.3	720				
JMW-LM	6	100	60	Abt. 0.6			
	9	66.7	135				
	10	55.6	180				
	12	50	240				

Ordering Information

JMW - SS - 1 12 D M

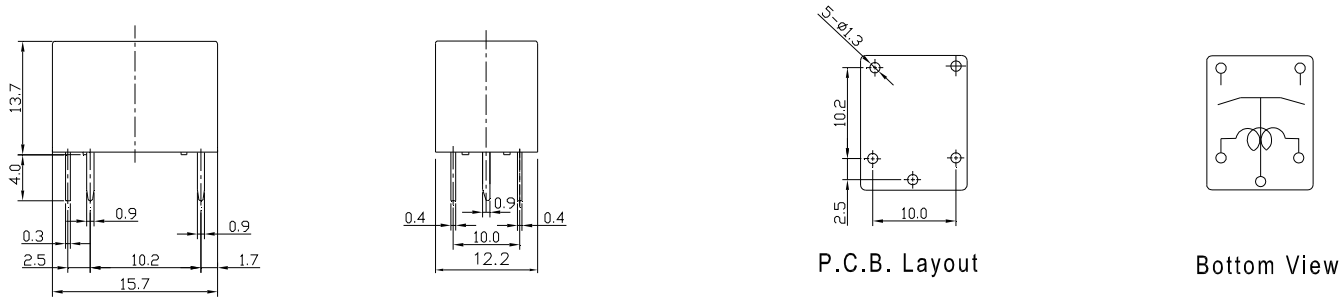
Contact Form:	**M**: One Form A
Coil Type:	**D**: Standard DC Coil **L**: High Sensitivity DC Coil
Coil Voltage:	**06**: 6V, **09**: 9V, **10**: 10V, **12**: 12V, **24**:24V
Number of Pole:	**1**: One Pole **2**: Two Poles
Type of Sealing:	**SS**: RT Ⅱ Flux Proofed Relays **SH**: RT Ⅲ Wash Tight Relays
Type:	**JMW**

Classification

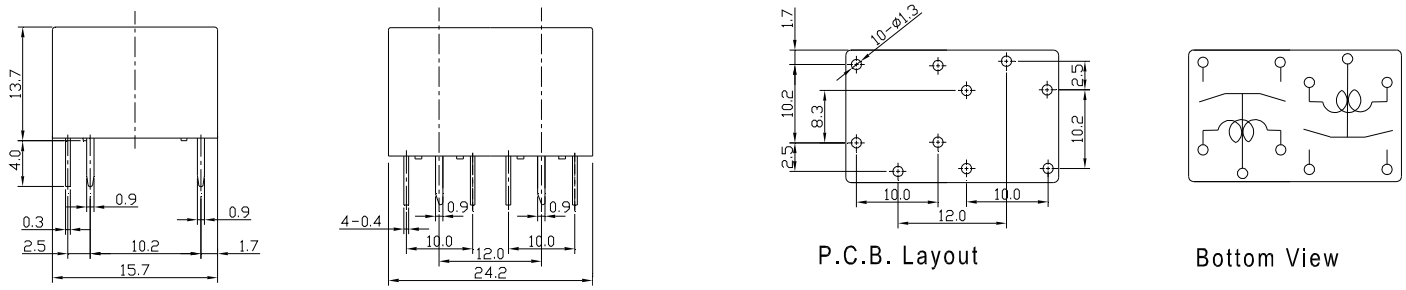
Model	JMW			
Coil Sensitivity	Standard DC Coil		High Sensitivity DC Coil	
Number of Pole	1 Pole	2 Poles	1 Pole	2 Poles
Flux Proofed Relay	JMW-SS-1□□DM	JMW-SS-2□□DM	JMW-SS-1□□LM	JMW-SS-2□□LM
Wash Tight Relay	JMW-SH-1□□DM	JMW-SH-2□□DM	JMW-SH-1□□LM	JMW-SH-2□□LM

Dimension (≦ 5mm± 0.2mm, > 5mm ± 0.3mm, the tolerance of PCB thru hole: +0.1mm)

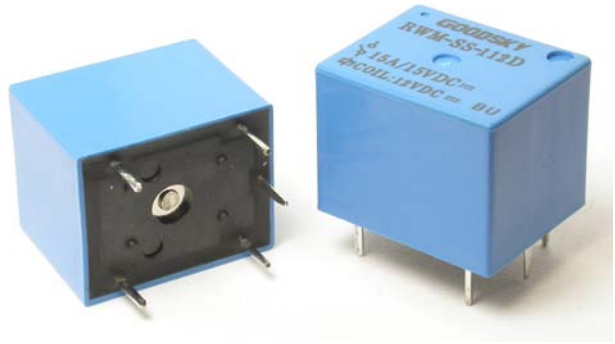
JMW-1



JMW-2



RWM



Main Feature

1. The employment of suitable plastic and metal material is applied suitable to high temperature and various chemical solutions.
2. Complete protective construction is designed from dust and soldering flux. Flow solder type is available for dust and soldering flux prevention. Plastic sealed type is also available for simple washing procedure.
3. The employment of suitable metal material and design is suitable for DC application.

Contact Rating

Load Type	RWM (DM/DB)	RWM (D)
Rated Load (Resistive)	15A 15VDC	15A 15VDC
Rated Carrying Current	15A	15A
Max. Allowable Voltage	DC 30V	DC 30V
Max. Allowable Current	15A	15A
Max. Allowable Power Force	225W	225W
Contact Material	Ag Alloy	Ag Alloy
Contact Form	SPST	SPDT

Application

Air Conditioner, Security Equipment, Power Windows

Performance (at Initial Value)

- Contact Resistance ..... 100mΩ Max. @1A,6VDC
- Operate Time..... 10mSec. Max.
- Release Time ..... 5 mSec. Max.
- Dielectric Strength:
  Between Coil & Contact ..... 1,000VAC at 50/60 Hz for one minute.
  Between Contacts ..... 500VAC at 50/60 Hz for one minute.
- Surge Strength ..... 1,000V (between coil & contact 1.2x50μSec.)
- Insulation Resistance ..... 100 Mega Ω Min. at 500VDC.
- Max. On/Off Switching :
  Electrical..... 6 Cycles per Minute.
  Mechanical ..... 300 Cycles per Minute.
- Temperature Range..... -40～85°C
- Humidity Range..... 45～85% RH.
- Coil Temperature Rise..... 55°C Max.
- Vibration:
  Endurance ..... 10 to 55 Hz dual amplitude width 1.5mm.
  Error Operation..... 10 to 55 Hz dual amplitude width 1.5mm.
- Shock :
  Endurance ..... 1,000 m/S^2.
  Error Operation..... 100 m/S^2.
- Life Expectancy :
  Mechanical ..... 10^7 Operations at No Load condition.
  Electrical ..... 10^5 Operations at Rated Resistive Load.
- Weight ..... About 9 g.

Safety Standard & Its File Number

- NIL.

Coil Specification (at 20°C)

Coil Sensitivity	Nominal Voltage (VDC)	Nominal Current (mA)	Coil Resistance (Ω±10%)	Power Consumption (W)	Pull-In Voltage (VDC)	Drop-Out Voltage (VDC)	Maximum Allowable Voltage (VDC)
RWM	9	88.9	100	Abt.0.8	80% Maximum	5% Minimum	150%
	12	66.7	180				
	24	33.3	720				

Ordering Information

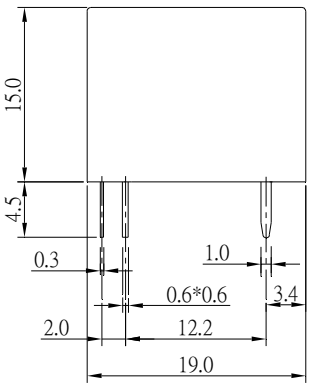
RWM - SS - 1 12 D M

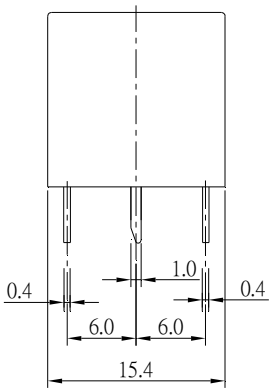
Contact Form:	**Nil**: One Form C **M**: One Form A **B**: One Form B
Coil Type:	**D**: Standard DC Coil
Coil Voltage:	**09**: 9V, **12**: 12V, **24**: 24V
Number of Pole:	**1**: One Pole
Type of Sealing:	**SS**: RT Ⅱ Flux Proofed Relays **SH**: RT Ⅲ Wash Tight Relays
Type:	**RWM**

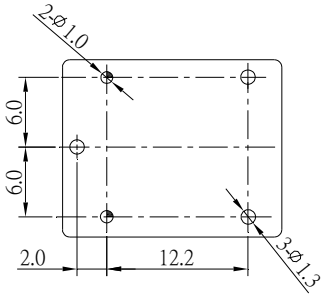
Classification

Model	RWM		
Contact Form	1C	1A	1B
Flux Proofed Relay	RWM-SS-1□□D	RWM-SS-1□□DM	RWM-SS-1□□DB
Wash Tight Relay	RWM-SH-1□□D	RWM-SH-1□□DM	RWM-SH-1□□DB

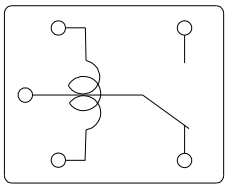
Dimension (≦ 5mm± 0.2mm, > 5mm ± 0.3mm, the tolerance of PCB thru hole: +0.1mm)



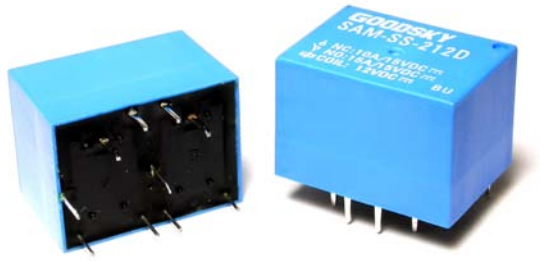




P.C.B. Layout



Bottom View



Main Feature

1. Miniature size 12.1x17.2x16.2mm on SAM-1P for smaller occupying space.
2. Easy P.C. Board design available as the location of contact terminal is separated from each contact.
3. SAM-2P is consisted of 2 pieces of SAM-1P and capsulated by one cover and the location of terminals is distributed for easy pattern design on N.O. and N.C. contact terminal.

Contact Rating

Load Type	SAM-1P (DM/DB)	SAM-1P (D)	SAM-2P (DM/DB)	SAM-2P (D)
Rated Load (Resistive)	N.O.: 10A 24VDC	N.O.: 10A 24VDC	N.O.: 15A 15VDC	N.O.: 15A 15VDC
	N.C.: 7A 24VDC	N.C.: 7A 24VDC	N.C.: 10A 15VDC	N.C.: 10A 15VDC
Rated Carrying Current	10A	10A	15A	15A
Max. Allowable Voltage	DC 30V	DC 30V	DC 30V	DC 30V
Max. Allowable Current	10A	10A	15A	15A
Max. Allowable Power Force	240W	240W	240W	240W
Contact Material	Ag Alloy	Ag Alloy	Ag Alloy	Ag Alloy
Contact Form	SPST	SPDT	DPST	DPDT

Application

Car Control Switching Box (Alarm System, Automatic Door Locking System…etc.)

Performance (at Initial Value)

- Contact Resistance ..... 100 mΩ Max.@1A,6VDC
- Operate Time..... 10 mSec. Max.
- Release Time ..... 5 mSec. Max.
- Dielectric Strength :
  Between Coil & Contact ..... 1,000VAC at 50/60 Hz for one minute.
  Between Contacts ..... 500VAC at 50/60 Hz for one minute.
- Surge Strength ..... 2000V (between coil & contact 1.2x50μSec.)
- Insulation Resistance ..... 100 MegaΩ Min. at 500VDC.
- Max. On/Off Switching :
  Electrical..... 6 Cycles per Minute.
  Mechanical ..... 300 Cycles per Minute.
- Temperature Range..... -30～80°C
- Humidity Range..... 45～85% RH.
- Coil Temperature Rise..... 60°C Max.
- Vibration:
  Endurance ..... 10 to 55 Hz dual amplitude width 1.5mm.
  Error Operation..... 10 to 55 Hz dual amplitude width 1.5mm.
- Shock:
  Endurance ..... 1,000 m/S^2.
  Error Operation..... 100 m/S^2.
- Life Expectancy :
  Mechanical ..... 10^7 Operations at No load condition.
  Electrical ..... 10^5 Operations at Rated Resistive Load.
- Weight ..... SAM-1P: 8g.
  SAM-2P: 15.2 g.

Safety Standard & Its File Number

- NIL.

Coil Specification (at 20 °C)

Coil Sensitivity	Nominal Voltage (VDC)	Nominal Current (mA)	Coil Resistance (Ω±10%)	Power Consumption (W)	Pull-In Voltage (VDC)	Drop-Out Voltage (VDC)	Maximum Allowable Voltage (VDC)
SAM-1P SAM-2P	5	91	55	Abt. 0.45	75% Maximum	5% Minimum	150% but for short time carrying current
	6	75	80				
	9	50	180				
	12	38	320				
	18	25	720				
	24	19	1,280				

Ordering Information

SAM - SS - 1 12 D M

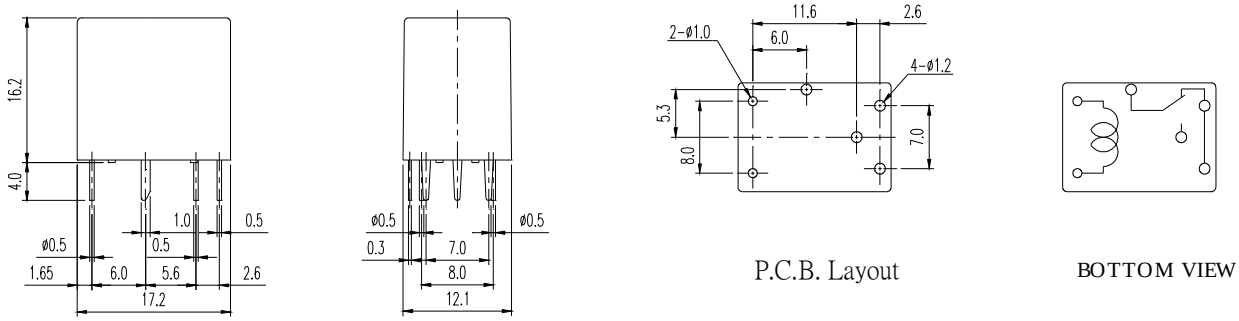
Contact Form:	**Nil**: One Form C **M**: One Form A **B**: One Form B
Coil Type:	**D**: Standard DC Coil
Coil Voltage:	**05**: 5V, **06**: 6V, **09**: 9V, **12**: 12V, **18**: 18V, **24**: 24V
Number of Pole:	**1**: One Pole **2**: Two Poles
Type of Sealing:	**SS**: RT Ⅱ Flux Proofed Relays **SH**: RT Ⅲ Wash Tight Relays
Type:	**SAM**

Classification

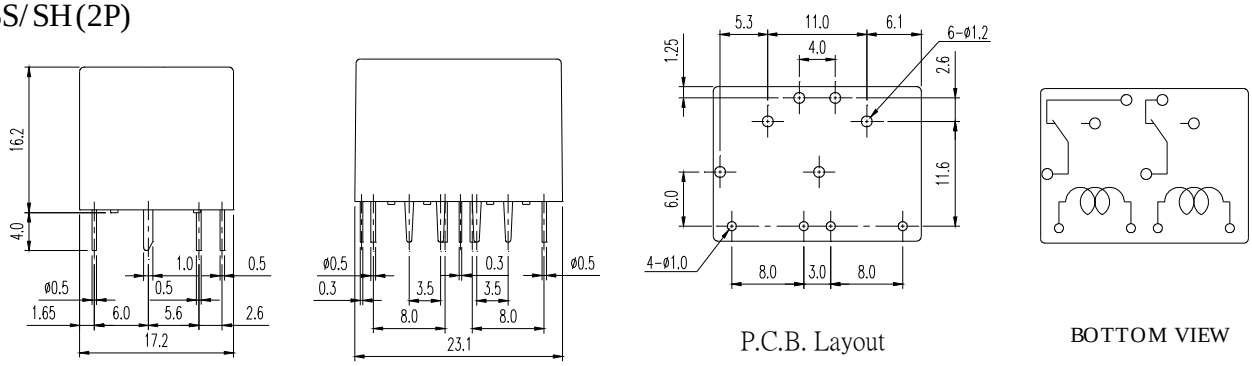
Model	SAM					
Number Of Pole	1 Pole			2 Poles		
Contact Form	1C	1A	1B	2C	2A	2B
Flow Solder Type	SAM-SS-1□□D	SAM-SS-1□□DM	SAM-SS-1□□DB	SAM-SS-2□□D	SAM-SS-2□□DM	SAM-SS-2□□DB
Plastic Sealed Type	SAM-SH-1□□D	SAM-SH-1□□DM	SAM-SH-1□□DB	SAM-SH-2□□D	SAM-SH-2□□DM	SAM-SH-2□□DB

Dimension (≦ 5mm± 0.2mm, > 5mm ± 0.3mm, the tolerance of PCB thru hole: +0.1mm)

SAM-SS/SH(1P)



SAM-SS/SH(2P)



Main Feature

1. ZEM Series Relays are designed for switching capacity by 30A to comply with industrial control system use.
2. Compatible fasten terminal arrangement with this kind of power replay
3. Simple magnetic circuit to meet mass production for low cost offer
4. Standard type contact form SPDT and SPST are available for customers' selection
5. Operating ambient temperature range covers from -40°C to 85°C.

Contact Rating

Load Type	ZEM (DM/LM)	ZEM (D/L)
Rated Load (Resistive)	30A 12VDC	NO: 30A 12VDC
	15A 24VDC	15A 24VDC
	-	NC: 20A 12VDC
	-	10A 24VDC
Rated Carrying Current	30A	30A
Max. Allowable Voltage	DC 30V	DC 30V
Max. Allowable Current	30A	30A
Max. Allowable Power Force	360W	360W
Contact Material	Ag Alloy	Ag Alloy
Contact Form	SPST	SPDT

Application

For direct connection with Cell Motors, Transmission etc. and Anti-Locking Brake System.

Performance (at Initial Value)

- Contact Resistance ..... 100 mΩ Max. @1A,6VDC
- Operate Time ..... 10mSec. Max.
- Release Time ..... 10mSec. Max.
- Dielectric Strength:
  Between Coil & Contact ..... 500VAC at 50/60 Hz for one minute.
  Between Contacts ..... 500VAC at 50/60 Hz for one minute.
- Insulation Resistance ..... 100MΩ Min. at 500VDC.
- Max. On/Off Switching:
  Electrical ..... 6 Cycles per Minute.
  Mechanical ..... 300 Cycles per Minute.
- Temperature Range ..... -40~85 °C.
- Humidity Range .....45~80% RH.
- Coil Temperature Rise .....60 °C Max.
- Vibration:
  Endurance .....10 to 55 Hz dual amplitude width 1.5 mm
  Error Operation.....10 to 55 Hz dual amplitude width 1.5mm.
- Shock:
  Endurance .....1,000 m/S^2.
  Error Operation .....100 m/S^2.
- Life Expectancy:
  Electrical.....10^5 Operations at Rated Resistive Load.
  Mechanical .....10^7 Operations at No load condition.
- Weight.....About 20 g.

Safety Standard & Its File Number

- NIL.

Coil Specification (at 20°C)

Coil Sensitivity	Nominal Voltage(VDC)	Nominal Current (mA)	Coil Resistance (Ω±10%)	Power Consumption (W±10%)	Pull-In Voltage (VDC)	Drop-Out Voltage (VDC)	Maximum Allowable Voltage (VDC)
ZEM-D	12	133	90	Abt. 1.6	8	1.2	130%
	24	67	360		16	2.4	
ZEM-L	12	100	120	Abt. 1.2	8	1.2	
	24	50	480		16	2.4	

Ordering Information

ZEM - S - 1 12 D M R

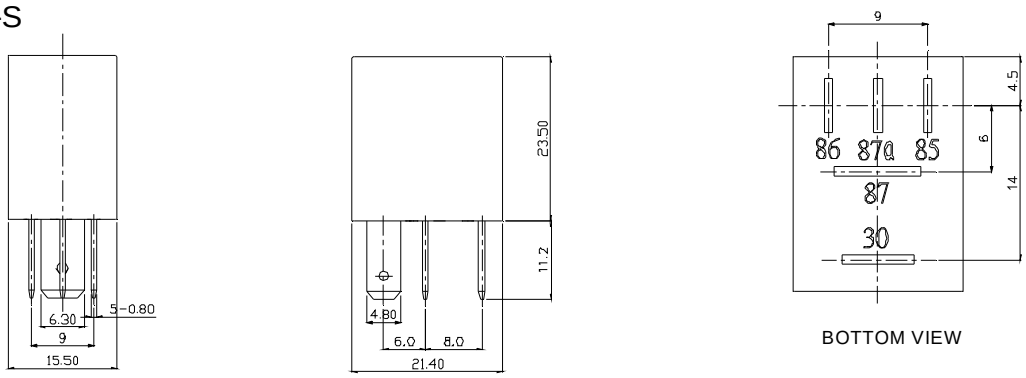
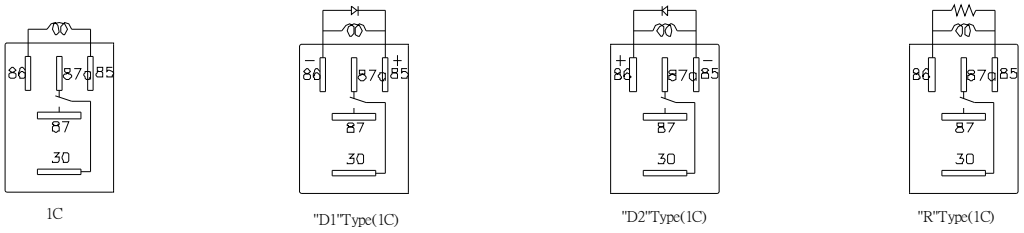
Options:	**NIL**: Standard **R**: Coil Parallel With 1/2W Resistor 680Ω for Coil Voltage 12VDC 2700Ω for Coil Voltage 24VDC **D1**: Coil Parallel with Diode & the Positive Pole "+" on #85 Terminal **D2**: Coil Parallel with Diode & the Negative Pole "-" on #85 Terminal
Contact Form:	**NIL**: One Form C **M**: One Form A
Coil Type:	**D**: Standard DC Coil **L**: High Sensitivity DC Type
Coil Voltage:	**12**: 12V, **24**: 24V
Number of Pole:	**1**: One Pole
Type of Sealing:	**S**: Hand Soldered Type
Type:	**ZEM**

Classification

Model	ZEM			
Coil Sensitivity	Standard DC Coil		High Sensitivity DC Type	
Contact Form	1C	1A	1C	1A
No Bracket Standard	ZEM-S-1□□D	ZEM -S-1□□DM	ZEM -S-1□□L	ZEM -S-1□□LM
Coil Additional Parts	Please add your choice Coil Parallel "R、D1 or D2" at the back of all above-mentioned part number			

Dimension (≦ 5mm± 0.2mm, > 5mm ± 0.3mm, the tolerance of PCB thru hole: +0.1mm)

ZEM-S



Electric diagrams