

Relays & Solenoids



DC solenoids are relays used for remote switching of electrical currents from 20A to 600A. Littelfuse offers a variety of DC solenoids and relays, such as solid state relays, plug-in relays, compact relays among others.

Solenoids or Relays?

The terms solenoid and relay are interchangeable and refer to a type of remote switch. In the automotive context, solenoid refers to the metal can device. A relay refers to all other such devices including the small micro relays referenced later in this section. The word solenoid actually refers to the helical windings that create the magnetic force which pulls the plunger in the core. Littelfuse manufactures a very broad range of remote switches.



Intermittent or Continuous?

Relays are rated for Intermittent Duty or Continuous Duty. Intermittent duty relays are rated with maximum On times and minimum Off times, which is a workable situation in many applications. Exceed those specs and you run the risk of burning out the coil windings. You cannot use an Intermittent Duty relay for continuous service, but you can use a Continuous Duty relay for intermittent service – although you would be purchasing a relay that is in excess of your needs.

Bistable & Latching?

When it comes to solenoids or relays, both bi-stable and latching refer to the same function. A bi-stable state is one in which a moving contact is at rest in two configurations, either the On or Off position. This is achieved by a mechanical or magnetic latching mechanism which maintains contact in the ON or OFF position while device is not energized. A more well-known example of the mechanical style is the mechanism of a retractable ballpoint pen, where the user pushes to move the ballpoint out of the housing, and pushes again to retract the ballpoint. The point remains in either of two stable states until the user presses the actuator.

In standard solenoids or relays, a control current has to be maintained in order to keep the plunger in the On position; in a bi-stable relay, control current is only applied when changing between the two states of Off and On. This provides many advantages – no current is used in the On or Off states, and bi-stable relays generate less heat.



Bi-Stable Latching Relays



HD Series • 300A General Purpose Bi-Stable Relays

- Very low current draw to maintain closed circuit
- Remotely-operated 300A disconnect for high-amperage circuits
- Small control wires: eliminates the cost and weight of routing large copper cables
- Bi-stable (latched) operation draws no current in On or Off: eliminates a continuous demand on batteries.
- LED output wire enables remote indication of relay status – Open or Closed.
- Silver alloy contacts assure the lowest voltage drop / resistance and extends cycling life of the device.
- Stainless steel hardware and tin-plated copper contacts maximize resistance in harsh environments.

Download additional technical information at: littelfuse.com/HD-Relay

PART NUMBERS			VOLTAGE	AMPERAGE	INGRESS	NOTES
BULK	BOXED	RETAIL				
880086	–	–	12V DC	300A	IP66/IP69k	–
880088	–	–	24V DC	300A	IP66/IP69k	–



HD Time Delay Series • 250A Bi-Stable Relay

The Heavy Duty Time Delay Bi-Stable Relay is able to disconnect the battery from the electrical system of vehicles in 12V and 24V, with voltage self-recognition.

- It includes immediate switch ON, controlled switch OFF with programmable delay time and service state managing (service switch OFF and switch ON).
- This Heavy Duty Time Delay Bi-Stable Relay has a non-volatile memory, low battery alert system and is thermal protected.

Download additional technical information at: littelfuse.com/HDTimeDelay

PART NUMBERS	VOLTAGE	AMPERAGE	VOLTAGE RANGE	INGRESS	NOTES
08070900	12/24V DC	250A	8.5V to 32V @ 23°C	IP67	Light Line Current Rating: 1.3A continuous (6.5A protected)

SD Series • 300-600A Bi-Stable Relay

An all-vehicle battery disconnect, designed to support remote power switching applications. Great for high continuous current passage, large engine starting needs and high ambient temperatures.

- Small control wires: eliminates the cost and weight of routing large copper cables to an accessible switch
- Dedicated 24-hour output, thermally protected, for tachograph or other keep-alive functions.
- Supports multiple Off switch control applications.
- Ignition protected to SAE J1171 and ISO 8846 for installation in battery box or with hazardous loads.
- Auxiliary relay contacts (normally open & normally closed) for Alternator Field Disconnect (AFD) or for additional vehicle system control

Download additional technical information at: littelfuse.com/SD-Relay

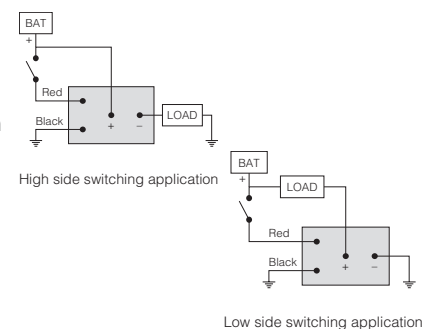


PART NUMBERS			VOLTAGE	AMPERAGE	CIRCUITRY	INGRESS	NOTES
BULK	BOXED	RETAIL					
880107	880107S	–	12V DC	300A	Dual Pole	IP66/IP69k	4/0 input/output cables

48785 • 85A Electronic Relay/Switch

Fully solid-state with no moving parts to wear out that is completely sealed, ignition protected and designed to withstand vibration for harsh environments. Relays can be used in both high side and low side switching application and are suitable for high inrush demand circuits.

- Resistance: .005 Ω
- Control Current: .02A max
- Temperature Range: -40°C to +85°C
- On-Off Cycles: 20 million



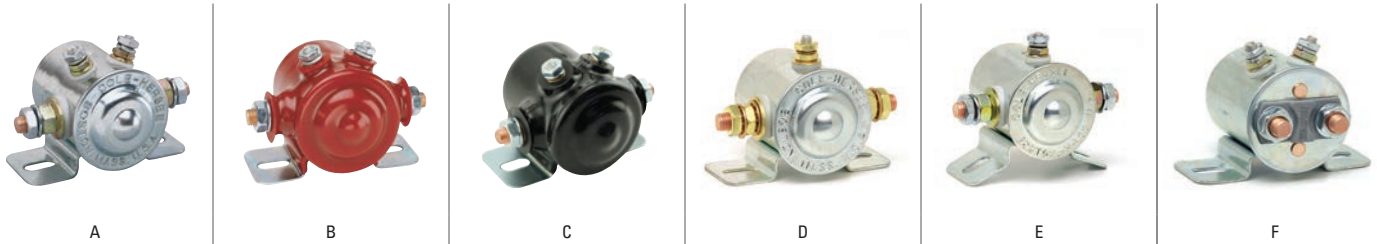
PART NUMBERS			VOLTAGE	AMPERAGE		INGRESS	DIMENSIONS
BULK	BOXED	RETAIL		CONTINUOUS	INTERMITTENT		
48785	48785-BX	–	9-31V DC	85A	175A	IP67	3.0 x 5.0 x 2.9 in

Standard High Current Relays

6-36V DC • 35-200A • Continuous Duty Solenoids

- Hex nuts and lock washers are included
- Steel housing mounting holes: 5/16 x 19/32," 2 13/64" on centers (7.9 x 15.1, 56.0mm)
- Plated steel housing available with optional PVC coating available to protect critical components from environmental hazards

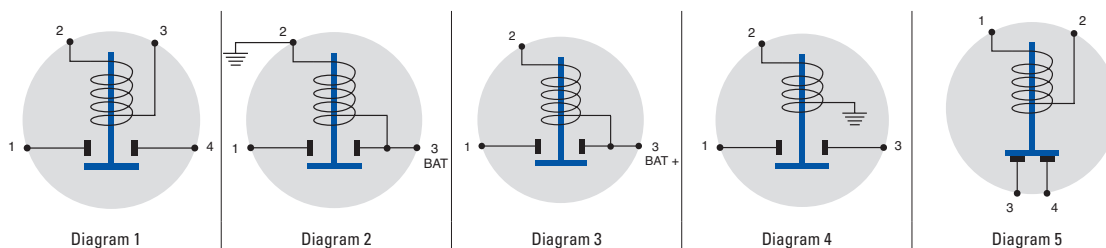
Datasheet, wiring diagram, and additional pack sizes: littelfuse.com/ContinuousDutySPST



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PART NUMBERS			VOLTAGE	AMPS	INSULATED / GROUNDED	CIRCUITRY	FORM / CONTACTS	CONTACT	TERMINALS		PVC COATED	UL LISTED	IMAGE	DIAGRAM	NOTES
BULK	BOXED	RETAIL							LARGE	SMALL					
24080	24080-BX	-	36	85	Insulated	SPST	NO	Copper					A	1	
24063	24063-BX	-		85	Insulated	SPST	NO	Copper					A	1	
24063-08	24063-08-BX	-		85	Insulated	SPST	NO	Copper			•	•	B	1	
24214	24214-BX	-	24	200	Insulated	SPST	NO	Silver					A	1	
-	24107-BX	-		85	Insulated	SPST	NO	Copper					D	2	
24124	24124-BX	-		85	Grounded	SPST	NO	Copper					D	4	
24115	24115-BX	-		85	Insulated	SPST	NO	Copper					D	3	
24059	24059-BX	-		85	Insulated	SPST	NO	Copper					A	1	
24059-15	-	-		85	Insulated	SPST	NO	Silver					A	1	
24059-08	24059-08-BX	24059-08-BP		65	Insulated	SPST	NO	Copper	Copper 5/16"-24	Steel 10-32"		•	A	1	Intermittent rating: 750A Make, 100A Break 10 sec on, 30 min off
24117	24117-BX	-		85	Insulated	SPST	NO	Copper			•		B	1	
24117-01	24117-01-BX	24117-01-BP	12	65	Insulated	SPST	NO	Copper			•	•	B	1	Intermittent rating: 750A Make, 100A Break 10 sec on, 30 min off
24213	24213-BX	-		200	Insulated	SPST	NO	Silver					A	1	
24213-01	-	-		200	Insulated	SPST	NO	Silver					A	1	Potted Coil - IP66
24213-03	-	-		200	Insulated	SPST	NO	Silver			•		C	1	Black Coating
24106	24106-BX	-		85	Grounded	SPST	NO	Copper					D	4	
24106-07	24106-BX	-		85	Grounded	SPST	NO	Copper					C	4	P/N, Date Code, Voltage ink stamped on surface
24082	24082-BX	-		85	Grounded	SPST	NO	Copper					E	4	Curved Bracket
-	24420-BX	-		35	Insulated	SPST	NC	Copper					F	5	
24097	24097-BX	-	6	85	Grounded	SPST	NO	Copper					A	1	

Continuous Duty Solenoid Wiring Diagrams

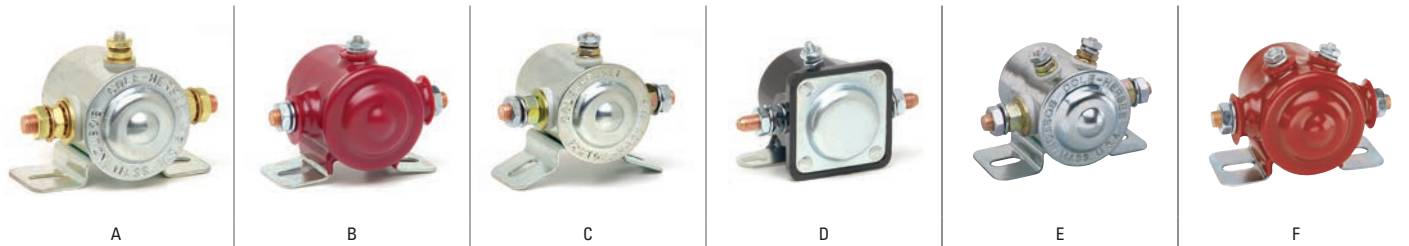


Standard High Current Relays

12V DC • Intermittent Duty Solenoids

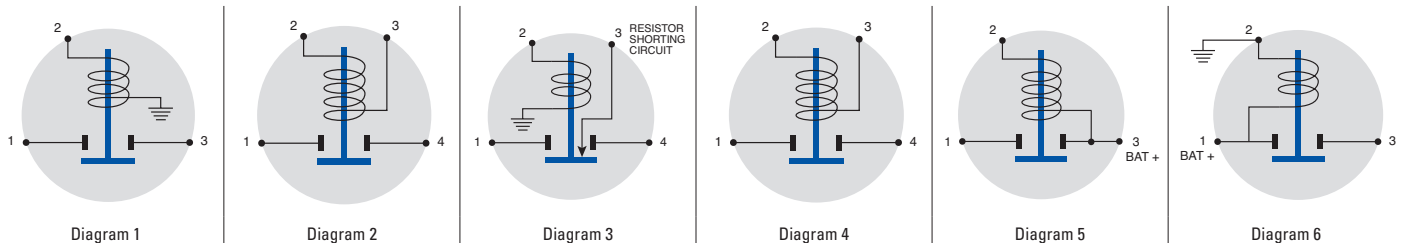
- Hex nuts and lock washers are included
- Steel housing mounting holes: 5/16 x 19/32," 2 13/64" on centers (7.9 x 15.1, 56.0mm)
- Phenolic housing mounting holes: 9/32 x 25/64," 2 7/64" on centers (7.1 x 9.9, 53.6mm)
- Solenoids available in phenolic, plated steel or PVC coated housings to protect critical components from environmental hazards
- Resistor shorting circuit solenoids (p/n 24103/24021) feature a 3 that is normally open and becomes common with 1 and 4 when the solenoid is energized. Commonly used in engine starting applications.

Datasheet, wiring diagram, and additional information: littelfuse.com/IntermittentDutySPST



PART NUMBERS			VOLTAGE	AMPS		DUTY CYCLE	INSULATED / GROUNDED	CIRCUITRY	FORM / CONTACTS	HOUSING MATERIAL	CONTACT TERMINALS	SMALL TERMINALS	IMAGE	DIAGRAM	NOTES	
BULK	BOXED	RETAIL		MAKE	BREAK											
24037	24037-BX	-	12	750A	100A	On: 10 sec Off: 20 min	Grounded	SPST	NO	Plated Steel	Copper 5/16" -24 threads	Copper 10-32	A	1		
24071	24071-BX	-	12	750A	100A	On: 10 sec Off: 20 min	Grounded						PVC Coated	B	1	
24044	24044-BX	-	12	750A	100A	On: 10 sec Off: 20 min	Grounded						Plated Steel	C	1	Curved Bracket
24022	24022-BX	-	12	750A	100A	On: 10 sec Off: 20 min	Grounded						Phenolic	D	1	
24103	24103-BX	-	12	750A	100A	On: 10 sec Off: 20 min	Grounded						Plated Steel	E	3	Resistor Shorting Circuit
24021	24021-BX	-	12	750A	100A	On: 10 sec Off: 20 min	Grounded						Phenolic	D	3	Resistor Shorting Circuit
24047	24047-BX	-	12	750A	100A	On: 10 sec Off: 20 min	Insulated						Plated Steel	E	4	
24076	24076-BX	-	12	750A	100A	On: 10 sec Off: 20 min	Insulated						PVC Coated	F	4	
24060	24060-BX	-	12	750A	100A	On: 10 sec Off: 20 min	Insulated						Plated Steel	A	5	
-	24046-BX	-	12	750A	100A	On: 10 sec Off: 20 min	Insulated						Plated Steel	A	6	
24023	24023-BX	-	12	750A	100A	On: 10 sec Off: 20 min	Insulated						Phenolic	D	2	
24008-03	-	-	24	750A	120A	On: 10 sec Off: 20 min	Insulated						Plated Steel	E	-	Components shipped unassembled
24008	24008-BX	-	24	750A	120A	On: 10 sec Off: 20 min	Insulated						Plated Steel	E	-	Special spring for stronger contact return force
-	24041-BX	-	6	750A	100A	On: 10 sec Off: 20 min	Insulated						Plated Steel	A	-	

Intermittent Duty Solenoid Wiring Diagrams



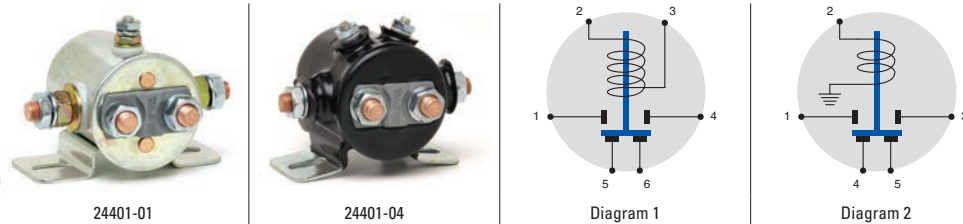
Standard High Current Relays

Continuous Duty Two Circuit Solenoids

Special applications: Forward and reverse systems in electric golf carts, garden tractors, fork lift trucks, winches, etc.

- Hex nuts and lock washers are included
- Mounting holes: 5/16 x 19/32," 2 13/64" on centers (7.9 x 15.1, 56.0mm)

Datasheet, wiring diagram, and additional information: littelfuse.com/ContinuousDutyDPST



PART NUMBERS			VOLTAGE	AMPS		COIL TYPE	CIRCUITRY	PVC COATED	CONTACTS		TERMINALS	DIAGRAM
BULK	BOXED	RETAIL		NC	NO				MATERIAL	THREADS		
24402	24402-BX	-	24	35	85	Insulated	DPST	-	Copper	5/16"-24	Steel 10-32"	1
24401	24401-BX	-	12	35	85	Insulated	DPST	-	Copper	5/16"-24	Steel 10-32"	1
24401-04	24401-04-BX	-	12	35	85	Insulated	DPST	•	Copper	5/16"-24	Steel 10-32"	1
24401-01	24401-01-BX	-	12	35	85	Grounded	DPST	-	Copper	5/16"-24	Steel 10-32"	2

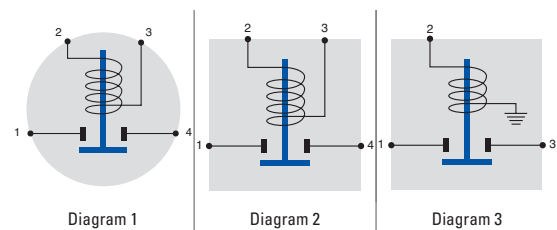
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100-225A • Heavy Service Plastic Body Solenoids

For starting small engines, including lawn tractors, golf carts and sweepers.

- Small ignition and ground terminals are 10-32 thread
- Large contact terminals are 5/16" -24 thread.

Additional information: littelfuse.com/PlasticBodyRelays



24848 - L-Bracket



24624-10 - F-Bracket



24612-10 - F-Bracket



24512-10 - Bracket

PART NUMBERS			TYPE	VOLTAGE	MAX VOLTAGE	AMPS		COIL TYPE	CIRCUITRY	FORM / CONTACTS	MOUNTING BRACKET	CONTACTS	COIL TERMINALS	DIAGRAM	
BULK	BOXED	OTHER				MAKE/BREAK	INRUSH								
24848	-	-	Continuous Duty	48	48	225	600	Insulated	SPST	NO	L-Bracket	Silver 5/16"-24	10-32 studs	1	
24824-01	24824-01-BX	-		24	-	225	600	Insulated	SPST	NO	L-Bracket	Silver 5/16"-24	10-32 studs	1	
24812	24812-BX	-		12	14	225	600	Insulated	SPST	NO	L-Bracket	Copper 5/16"-24	10-32 studs	1	
24812-01	24812-01-BX	-		12	14	225	600	Insulated	SPST	NO	L-Bracket	Silver 5/16"-24	10-32 studs	1	
24624-10	24624-10-BX	-		24	27	100	400	Insulated	SPST	NO	F-Bracket	Silver 5/16"-24	10-32 studs	2	
24512-10	24512-10-BX	-		12	14	100	400	Insulated	SPST	NO	F-Bracket	Silver 5/16"-24	Blade	2	
24612	24612-BX	24610-G10-BX		12	-	225	400	Insulated	SPST	NO	L-Bracket	Silver 5/16"-24	10-32 stud	1	
24612-10	24612-10-BX	-		12	14	100	400	Grounded	SPST	NO	F-Bracket	Silver 5/16"-24	10-32 stud	3	
24612-03	24612-03-BX	-		Intermittent Duty	12	-	200	300	Insulated	SPST	NO	L-Bracket	Copper 5/16"-24	10-32 studs	2

Reversing & Latching Solenoids



70A • Forward & Reverse Relay Module

Ideal for tarp or lift applications. Also use on hoists, hatches, winches, snowplows, intake/exhaust fans, vehicle outriggers and other reversing applications. Module automatically reverses the direction of the motor when the appropriate control circuit is energized with a pulse from a control switch. Dynamic braking stops the motor when the switch returns to Off.

- Dimensions: 2.91" × 3.51" × 1.86" H (73.9 × 91.7 × 47.2mm)

Download additional technical information at: littelfuse.com/24450

PART NUMBERS			VOLTAGE	AMPERAGE		INRUSH	SEALING	CONTACTS
BULK	BOXED	RETAIL		INTERMITTENT	CONTINUOUS			
24452	24452-BX	–	12V DC	70A (On: 5 min max, Off: 3 min)	50A	150A	IP67	Silver

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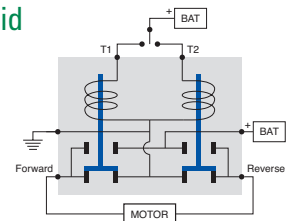


12-24V DC • 150A Motor Reversing Intermittent Duty Solenoid

A combination of two solenoids in one package to reduce cost and maximize space savings while also providing simpler wiring.

- 75A Make/Break: 5 min On, 5 min Off
- 125A Make/Break: 30 sec On, 5 min Off
- 150A Make/Break: 0.5 sec On, 5 min Off

Download additional technical information at: littelfuse.com/24450



PART NUMBERS			VOLTAGE	AMPS	COIL TYPE	CIRCUITRY	CONTACTS	TERMINALS	
BULK	BOXED	RETAIL						Two Blade Coil	5/16"-24 Large Studs
24450	24450-BX	–	12V DC (14.5 max)	75-150A	Common Ground	DPDT	Copper	Two Blade Coil	5/16"-24 Large Studs
24450-02	–	–	24V DC	75-150A	Common Ground	DPDT	Copper	Two Blade Coil	5/16"-24 Large Studs

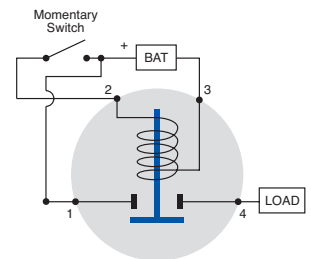


24200 • 110A Standard High Current Latching Solenoid

Requires only a momentary application of coil power to operate. Minimal heat is generated, because the coil is de-energized when the solenoid is On.

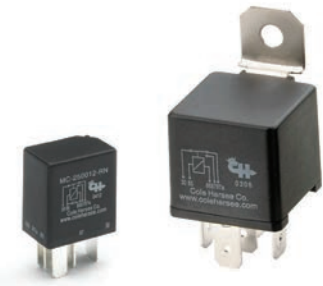
- Continuous Duty Style (Rated at 110A carry only)

Download additional technical information at: littelfuse.com/24200



PART NUMBERS			VOLTAGE	AMPS	COIL TYPE	CIRCUITRY	FORM / CONTACTS	HOUSING MATERIAL	CONTACTS	TERMINALS
BULK	BOXED	RETAIL								
24200	24200-BX	–	12V DC	110A	Insulated	SPST	NO	Plated Steel	Copper 5/16"-24	Steel 10-32"

Plug-In Relays



Heavy Duty High Power and Micro Plug-In Relays

General purpose relays fit many vehicles and applications. Typical applications include: lighting, starting, horn, heating and cooling.

Standard ISO terminal footprint for Form A, Form C and Form 2A. Relays are available sealed and unsealed (unsealed 40 & 70A relays are supplied with snap-in brackets.)

Datasheet, wiring diagram, and additional information: littelfuse.com/Plug-In-Relays

Specifications

- Pull-in voltage: 78V maximum at 12V DC, 15.6 V at 24V DC
- Release voltage: 1.2 V minimum at 12V DC, 2.4 V at 24V DC
- Temperature range: -40°C to 85°C
- Operational life: Electrical to 100,000 cycles.
Mechanical to 10,000,000 cycles
- Contact Material: Silver alloy
- Dielectric strength: 500 V rms between coil and contact
- Insulation resistance: 100 MΩ minimum (500V DC)
- Relays are rated based on a steady state resistive load. De-rate according to the type of load.
 - Motor load: Inrush can be 5 to 10 x steady state current.
 - Solenoid load: Inrush can be 10 to 20 x steady state current.
 - Incandescent lamp load: Inrush can be 10 to 15 x steady state current.
- Available with PCB terminals, contact Littelfuse for details.

Heavy Duty Relays • 40A at 12V DC

- Contact rating (Resistive load) at 20°C:
 - 12V DC: Normally Open 40A, Normally Closed 30A
 - 24V DC: Normally Open 20A, Normally Closed 15A
- Contact arrangement: Available as Form A (SPST), Form C (SPDT) and Form 2A (SPST, 2 terminals)
- Vibration resistance: 10-40Hz double amplitude 1.5mm

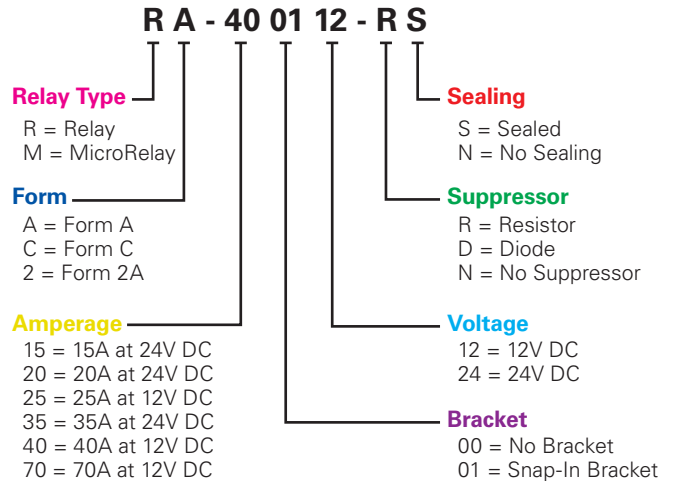
High Power Relays • 70A at 12V DC

- Contact rating (Resistive load) at 20°C:
 - 12V DC: Normally Open 70A, Normally Closed 60A
 - 24V DC: Normally Open 35A, Normally Closed 30A
- Contact arrangement: Available as Form A (SPST) and Form C (SPDT)
- Vibration resistance: 10-40Hz double amplitude 1.5m

Micro Relays • 25A at 12V DC

- Contact rating (Resistive load) at 20°C:
 - 12V DC: Normally Open 25A, Normally Closed 20A
- Contact arrangement: Available as Form A (SPST), and Form C (SPDT).
- Vibration resistance: 10-40Hz double amplitude 1.27mm

Part Numbering System



Relay Part Numbers

PART NUMBERS		VOLTAGE	AMPS	RELAY TYPE	FORM	BRACKET	SUPPRESSOR TYPE	SEALED
BULK	BOXED							
R2-400112-RN	-	12	40	Relay	2	SPST	•	Resistor
RA-200024-DS	-	24	20	Relay	A	SPST		Diode
RA-400012-DS	-	12	40	Relay	A	SPST		Diode
RA-400112-DN	RA-400112-DN-BX	12	40	Relay	A	SPST	•	Diode
RA-400112-NN	RA-400112-NN-BX	12	40	Relay	A	SPST	•	None
RA-400112-RN	RA-400112-RN-BX	12	40	Relay	A	SPST	•	Resistor
RA-700112-RN	RA-700112-RN-BX	12	70	Relay	A	SPST	•	Resistor
RA-700112-DN	RA-700112-DN-BX	12	70	Relay	A	SPST	•	Diode
RA-700112-NN	RA-700112-NN-BX	12	70	Relay	A	SPST	•	None
RC-200024-DS	-	24	20	Relay	C	SPDT		Diode
RC-200124-DN	RC-200124-DN-BX	24	20	Relay	C	SPDT	•	Diode
RC-200124-NN	RC-200124-NN-BX	24	20	Relay	C	SPDT	•	None
RC-200124-RN	RC-200124-RN-BX	24	20	Relay	C	SPDT	•	Resistor
RC-400012-DS	RC-400012-DS-BX	12	40	Relay	C	SPDT		Diode
RC-400112-DN	RC-400112-DN-BX	12	40	Relay	C	SPDT	•	Diode
RC-400112-NN	RC-400112-NN-BX	12	40	Relay	C	SPDT	•	None
RC-400112-RN	RC-400112-RN-BX	12	40	Relay	C	SPDT	•	Resistor
RC-700112-DN	RC-700112-DN-BX	12	70	Relay	C	SPDT	•	Diode
RC-700112-NN	RC-700112-NN-BX	12	70	Relay	C	SPDT	•	None
RC-700112-RN	RC-700112-RN-BX	12	70	Relay	C	SPDT	•	Resistor
MC-250012-DN	-	12	25	Micro	C	SPDT		Diode
MC-250012-NN	-	12	25	Micro	C	SPDT		None
MC-250012-RN	-	12	25	Micro	C	SPDT		Resistor

Modular Relay Sockets • Bi-Stable Relay

Accepts Littelfuse brand relays and standard ISO relays.



- Modular – sockets dovetail together
- Accepts standard quick-connect terminals
- Easy mount bracket
- Constructed of rugged glass-filled polyamide
- Temperature range: -40°C to 85°C

PART NUMBERS			RELAY TYPE		FORM	NOTES
BULK	BOXED	RETAIL CLAMSHELL	AMPERAGE	TERMINAL WIDTH		
99025	99025-BX	–	70A	.375"	A	Use with Tyco (AMP) terminals 280756 or 280755 (consult terminal manufacturers for full specs)
99026	99026-BX	–	40A	.250"	A or C	Use with Tyco (AMP) terminals 42281 or Ark-Les 3000H112A series (consult terminal manufacturers for full specs)

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Plug-In Relay & MicroRelay Schematics and Terminal Layout

General purpose relays fit many vehicles and applications.

FORM	RELAY SCHEMATICS	RELAY TERMINAL LAYOUTS (40A .250" terminals – 70A .375" terminals)	MICRORELAY TERMINAL LAYOUTS
Form A			
Form C			
Form 2			– Not Available –