

RELAYS



MARKET AND CUSTOM
SOLUTIONS FOR VEHICLE
POWER RELAYS



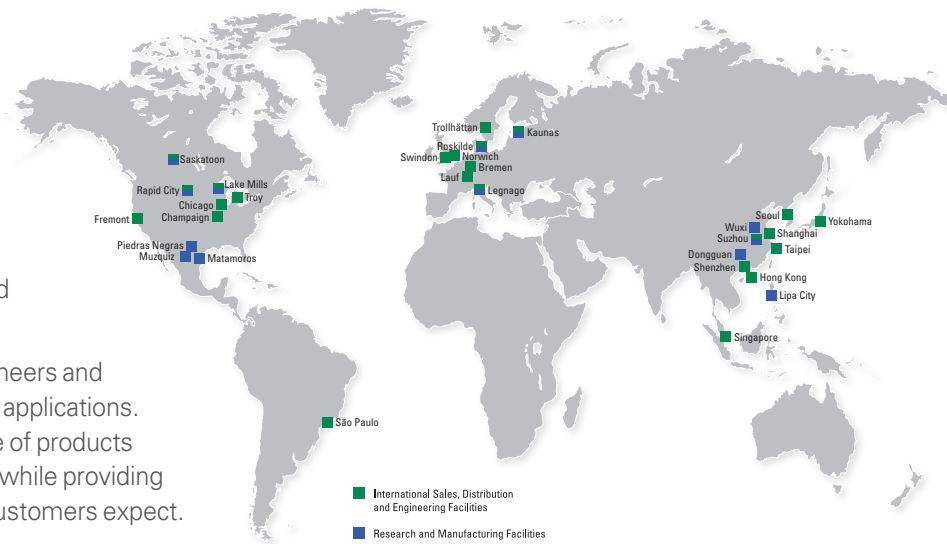
Expertise Applied | Answers Delivered



Local Resources for a **GLOBAL** Market

Littelfuse products help protect, control and distribute vehicle electrical power in OEM and aftermarket applications for industries such as heavy-duty truck, construction and agriculture. We offer a broad and reliable selection of fuses, fuse blocks, power distribution modules, high-current switches, relays and solenoids to fit your requirements.

For decades, we have helped OEMs, engineers and end-users select the right product for their applications. Today, Littelfuse offers the broadest range of products for protection, sensing, and control needs while providing exceptional service and support that our customers expect.



Our Market Focus **INDUSTRIES** and Applications



Truck & Bus

- On-Highway
- Severe Duty
- Transit Buses
- Vocational



Construction

- Loaders
- Skid Steers
- Excavators
- Cranes



Agriculture

- Tractors
- Harvesters
- Lawn Turf
- Loaders



Material Handling

- Fork Lifts
- Telehandlers
- Aerial Work Platform
- Pallet Jacks



Municipality

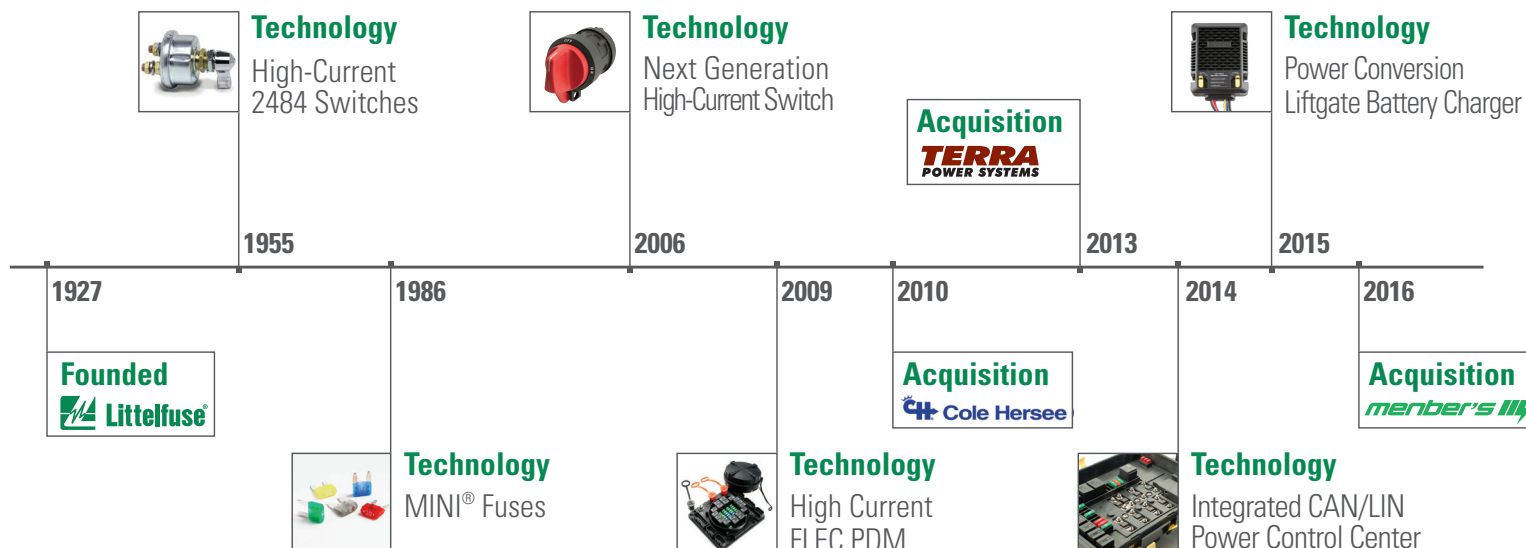
- Emergency
- Waste Trucks
- Fire & Rescue
- Utility



Marine & Recreational

- Boats & Marine
- Golf Carts
- Recreation Vehicles
- ATV & Snowmobiles

Over 90 Years of Electrical Power Expertise



Why Choose Littelfuse

Littelfuse is the global leader in circuit protection solutions with the broadest spectrum of electrical power technologies. Our Commercial Vehicle Products portfolio provides a total solution to protect, control and distribute vehicle electrical power.

Single Source for Vehicle Electrical Products

Littelfuse offers an extensive commercial vehicle product line and if an off-the-shelf product does not fit your needs we can work with you to develop a customized solution that fits your application.

Product Development and Testing Expertise

Our global team of engineers design innovative solutions, provide customer support and perform product testing to ensure you have the best solution that meets all requirements and regulations.

Global Support Team

Littelfuse has a world-wide team of specialist prepared to support your application needs from conceptual development to continuous quality assurance for the lifetime of your program.

Littelfuse.com/Relays



Selecting a Relay

The important criteria you need to know when selecting a relay product for your application.



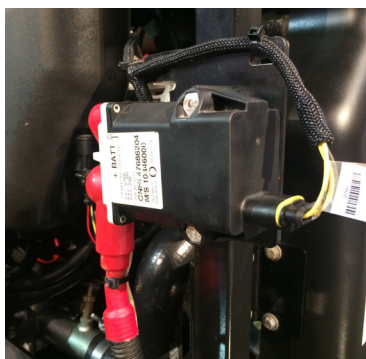
Why Should You Use a Relay?

The main job of a relay is to enable remote switching within an electrical system. A relay allows switching of a high current circuit by a low current signal.

This allows the relay to be placed close to the power source, or load to be switched, so that expensive high current cabling is minimized, while still giving easy access to the operator to turn the relay on or off.

Application Considerations

What is your application? Knowing your application will be key to selecting the right solution.



Load Type

Is it going to be switching a load on and off frequently so it needs high switching cycle life? Or will it be used to turn on a load and keep it on for a long time, and it needs to be very efficient with minimal losses? It is important to understand how the relay will be used.

Load Ratings Requirements

What is the application voltage? What are the continuous and peak currents? What kind and size of wire will be used to connect the power terminals? Understanding your application electrical load requirements will help with your relay selection

Mounting Locations

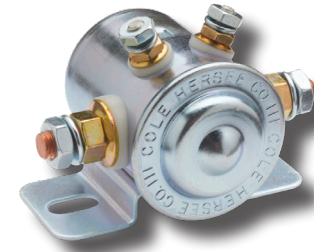
Where will the unit be mounted? Will it be protected in an enclosure like a charging station or 5G base station or exposed to the elements in an engine bay or on a frame rail? Identifying the required mounting location is important as it will affect the selection of the relay for maximum life.

Circuit Protection

Do I need to consider circuit protection with the relay? How will I integrate them so I have an efficient installation? Protecting a relay's main power wires that run to secondary power distribution is a frequently overlooked aspect of high current relay applications.

Electrical Considerations

It is important to understand the specific application electrical requirements before selecting the most appropriate relay. Electrical considerations like voltage, amperage, coil type, high current terminals, smart connectivity, and others help drive relay selection to best match the application



Voltage

The voltage of a relay has two separate voltage ratings. One rating for the coil and one rating for the main contacts. In many cases, they are the same but also can be very different. In High Voltage relays, they tend to be very different, with relay contacts rated at 1000V to handle the high voltage required whilst being operated by coils of 12V-96V.



Amperage

There are several different current ratings that need to be considered when picking a relay.

Continuous Carry Current - The current that the relay can carry essentially forever without the temperature rising above a set value.

Inrush Current or Starting Current - A short duration current value that is the maximum the switch can withstand without raising the temperature over that same value (10-60 secs). Examples include starting event, incandescent light in-rush, Inductive load start up, etc. It is very important to match the in-rush current rating of the relay to the application, especially in applications with inductive or capacitive loads.



Coil Types:

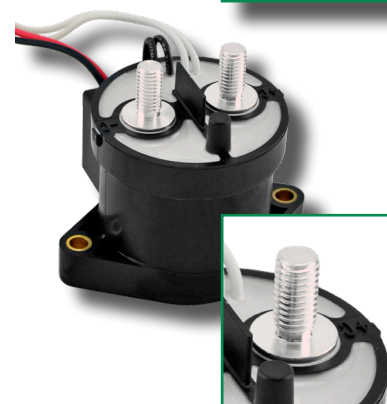
Monostable relays (also sometimes referred to as normally open) turn on when the coil is ON and turn OFF when the coil is OFF. They have one position (usually OFF) that they return to when the coil is turned OFF. This type of relay is usually designed to control a specific load that is turned ON and OFF as needed in the vehicle.

Bi-stable (or latching relays) are relays that are designed to stay in either the ON or OFF positions with no power applied. Once they receive an activation signal to change state from OFF to ON (or ON to OFF) they do not consume any power.



Coil Terminals

These smaller terminals connect the solenoid coil of the relay to the control input. In sealed relays, frequently these are in a sealed connector.



High Current Terminals

In high current relays, the most common style of main terminals are studs or screws. These usually range from M6 to M12, with the size usually corresponding to the relay rating (larger studs for larger currents). Tin or Silver plated terminals help prevent bad contact by limiting corrosion. It is beneficial to always try to use stainless steel hardware as this eliminates the issue of galvanic corrosion



Smart Connectivity

Relays can incorporate many smart features to control the switching. Examples include delay timers, voltage sensors, or bussed connection via CAN or LIN communications.

Application Environment Considerations

It is important to match the environmental requirements to the application. Where is the relay to be mounted on the vehicle? Will it be in the battery box, under the hood, in the cab or out placed on the frame rail? Each has their own unique challenges.



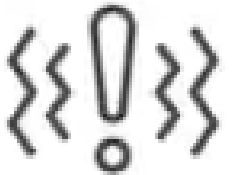
Ingress Protection (IP)

Rating that describes the level of liquids and solids protection the switch has. Generally, the higher the number in either digit that follows the IP, the better the ingress protection. Ingress of contaminants can lead to corrosion. Road salt corrosion is becoming an increasingly common problem. In the event corrosion leads to a short-circuit resulting in a fire, a battery switch can be activated to prevent further damage to the vehicle or injury to occupants. On an unattended vehicle, chaffed or damaged wires can short-circuit causing a thermal event that can destroy the equipment, vehicles around it, or the building where it is parked.



Shock & Vibration

Relay specifications are often tied to international agency standards such as SAE or ISO. This ensures that the relay was tested to specifications that are appropriate for use on a vehicle. Industrial relays, even ones with good quality, are not designed for use on vehicles.



Temperature

Different locations on the vehicle will put different thermal loading on the relay. Most automotive relays are rated from -40°C to 85°C for operation and some go as high as 125°C. Picking a relay that has appropriate temperature ratings for your application is very important.



SOLID STATE (SSR) vs. ELECTROMECHANICAL (EM) Relays

Solid state relays very different than electromechanical relays as there is no mechanical make or break of the electrical flow to create an arc. SSRs control the flow of electricity by enabling or disabling electron flow through the semi-conductor. This means that an SSR does not arc when opening or closing the circuit. However, most SSRs are monodirectional devices so they cannot control current in the reverse direction. SSRs are also typically are more expensive than similarly rated electromechanical relays.



KEY TERMS AND DEFINITIONS

Amp/Amperage – The strength of an electric current in Amperes (the basic unit of electrical current in the International System of Units).

Bi-Stable – The relay contacts remain in their present switch position when the excitation current is switched off.

Busbar – In electric power distribution, a busbar (also bus bar) is a metallic strip or bar, typically housed inside switchgear, panel boards, and busway enclosures for local power distribution.

Circuit – The path over which an electrical charge flows.

Connectorized – Products that have an existing, integrally molded, female or male market available connector.

Continuous Rating – The rating meant to indicate what the device can handle forever with no interruption. It is usually measured as the amperage that a device can handle for one hour without exceeding the maximum allowed temperature rise at the terminals.

Harsh Environments – Shock or vibration ratings in addition to IP or Ingress Protection ratings a product can be rated to.

High Current – Nominal current range above 60A, 32 VDC

Inrush Rating – The short duration rating of the switch. This rating is meant to reflect the ability of the switch to withstand a short term, high current event like starting. A large diesel engine starting in cold weather can draw close to 2000A for about 30 seconds.

IP Rating – IP Rating - Formally known as an International Protection rating, but often referred to as Ingress Protection, this rating determines the resistance of a device to environmental contaminants

Low Current – Nominal current range below 60A, 32 VDC

Mechanically Latched – When a relays uses a locking mechanisms to hold contacts in the last position until they receive electrical stimuli to change.

Magnetically Latched – When a relay requires one pulse of coil power to move contacts into one state, and then requires another pulse that is redirected to move the contacts back to the other state. The magnet will be held in the closed position by the permanent magenet until the second pulse.

PCBA – (Printed Circuit Board Assembly) is the board obtained after all printing solder paste on the PCB and then mounting various components like resistors, ICs (Integrated Circuits), capacitors and any other components like transformers depending on the application and desired characteristics of the board.

Short Circuit – An abnormal low resistance path between two polarities, or polar opposite, circuits. It can be accompanied by overheating, an explosion, or fire. A short-circuit is also likely to cause damage to components or equipment in that circuit.

Terminals – A reusable interface creating a point where external circuits can be connected. Terminals can be connected at the end of a wire and consist of either connectors or fasteners.

Common Applications



AGRICULTURE

- Tractors
- Harvestors



CONSTRUCTION

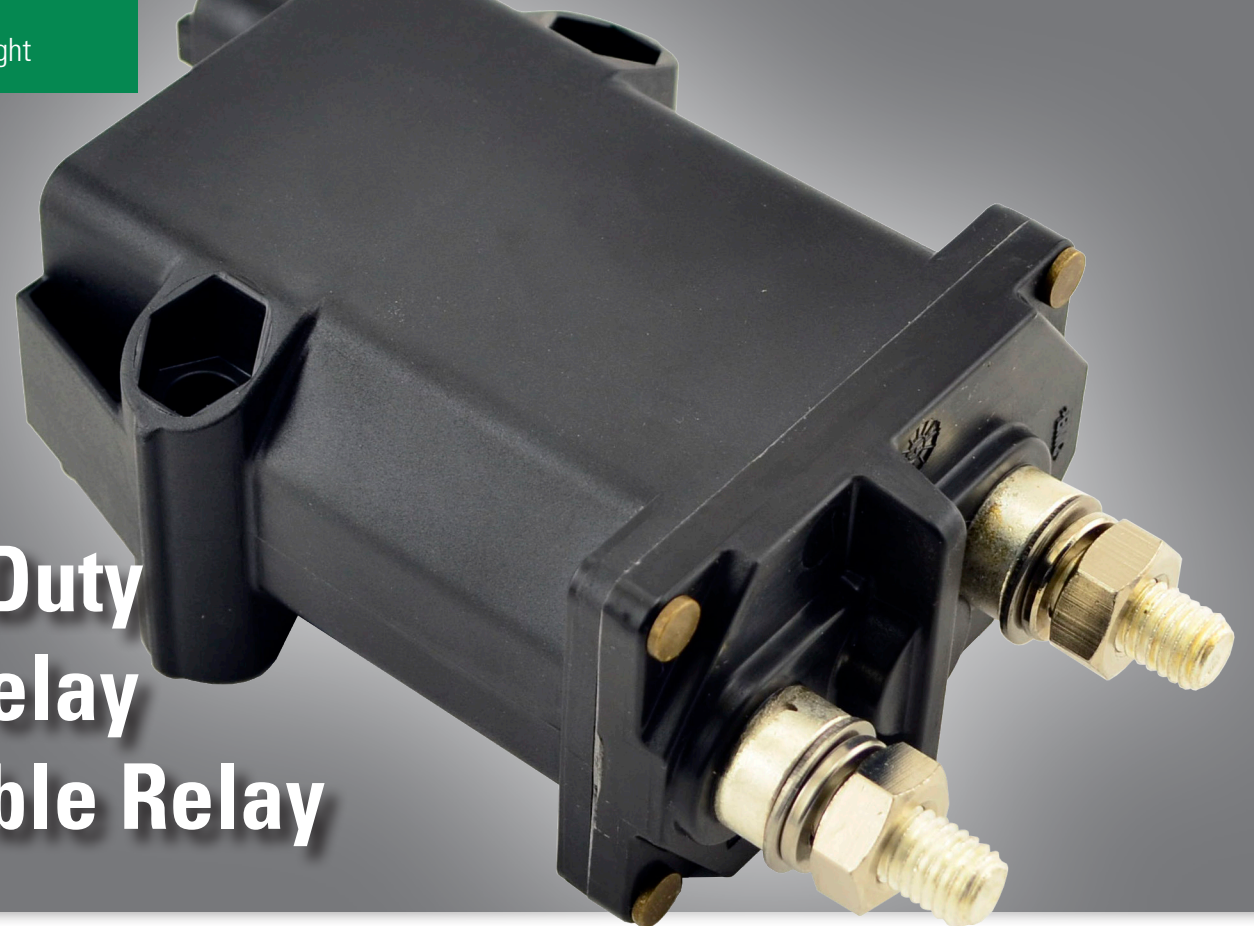
- Excavators
- Loaders



MATERIAL HANDLING

- Fork Lifts
- Telehandlers
- Pallet Jacks

Heavy Duty Time Delay Bi-Stable Relay

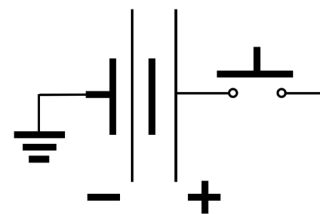


Products Designed for Your Industry Leading Equipment



High Current Performance

250A continuous current rating, 2000A for 5 sec. intermittent rating, 12V/24V so there is no need to stock two relays.



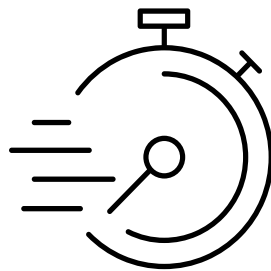
Reliability and Safety

Disconnects battery from the vehicle electrical system, Prevents battery drain, Prevents thermal events in accidents.



Sealed Relay

IP67/IP69K waterproof sealed.



Programmable Time Delay

User programmable time delay cut off from 1 second to 1 hour via toggle switch and LED blinking. Benefits: Selective Catalytic Reduction (SCR) is common in heavy duty diesel engine vehicles (emissions control technology system that injects a Diesel Exhaust Fluid (DEF) which helps reduce emissions, Programmable Time Delay allows the DEF to get pumped out of the engine (exhaust manifold) area, back into a tank to prevent corrosion before the relay disconnects main power from the battery, Allows any remote control devices to be charged, Lets vehicle electronic units store data and make after-run procedures.



Remote Control

Remote operation via built-in TE Superseal 1.5 Series 4-pin connector, Thermally protected to prevent overheating of the coil.

Bi-Stable Relay

Bi-stable relay has two states, mechanically latches in the ON or OFF state, Monostable relay does not latch rather reverts back to initial state, Beneficial in battery disconnect applications as consumes no power in ON or OFF states and less waste heat vs monostable.



DCNEV250 Series High Voltage DC Contactor Relays

Highly Reliable System with Stable Contact Resistance in Harsh Environments

High current and high voltage DC contactor relays for electric vehicle applications such as battery isolation, DC power control, circuit protection, and other switch controls. DC Contactors can also be used in charging stations, uninterruptible power supplies, and other electronic control systems. Contactors are available with polarized and non-polarized contacts to best suit the electrical systems application.



PART NUMBERS	DESCRIPTION	PART NUMBERS	DESCRIPTION
BULK		BULK	
DCNEV250-M	High Voltage DC Contactor Relay Bottom Mount with Polar Load Terminals	DCNEV250-FAN	High Voltage DC Contactor Relay Bottom Mount with Auxiliary Circuit & Non-Polar Load Terminals
DCNEV250-MN	High Voltage DC Contactor Relay Bottom Mount with Non-Polar Load Terminals	DCNEV250-FB	High Voltage DC Contactor Relay Bottom Mount with Auxiliary Circuit with Polar Load Terminals
DCNEV250-MA	High Voltage DC Contactor Relay Bottom Mount with Auxiliary Circuit with Polar Load Terminals	DCNEV250-FN	High Voltage DC Contactor Relay Bottom Mount with Non-Polar Load Terminals
DCNEV250-MAN	High Voltage DC Contactor Relay Bottom Mount with Auxiliary Circuit & Non-Polar Load Terminals	DCNEV250-G	High Voltage DC Contactor Relay Bottom Mount with Polar Load Terminals
DCNEV250-MP	High Voltage DC Contactor Relay Bottom Mount with Potted PCB with Polar Load Terminals	DCNEV250-GA	High Voltage DC Contactor Relay Bottom Mount with Auxiliary Circuit with Polar Load Terminals
DCNEV250-MB	High Voltage DC Contactor Relay Bottom Mount with Auxiliary Circuit with Polar Load Terminals	DCNEV250-GAN	High Voltage DC Contactor Relay Bottom Mount with Auxiliary Circuit & Non-Polar Load Terminals
DCNEV250-F	High Voltage DC Contactor Relay Bottom Mount with Polar Load Terminals	DCNEV250-GB	High Voltage DC Contactor Relay Bottom Mount with Auxiliary Circuit with Polar Load Terminals
DCNEV250-FA	High Voltage DC Contactor Relay Bottom Mount with Auxiliary Circuit with Polar Load Terminals	DCNEV250-GN	High Voltage DC Contactor Relay Bottom Mount with Non-Polar Load Terminals

DC High Voltage Contactor Relays

Resin Design Relays

PART NUMBER SYSTEM

DCNEVT150 + **-CS** = **DCNEVT150-CS**
 Series Name PN Suffix Part Number

P = Polarized NP = Non-Polarized

30A-50A	Series Name	
	DCNSEV30	
	30A Continuous Carry	
	Nom. Coil Voltage	12V DC 24V DC
	Voltage Rating	900V DC 900V DC
	Mounting Type	Bottom Bottom
	Auxiliary Circuit	N N
	Terminals	P P
Part Number Suffix		
-B -C		

DCNLEV50																							
50A Continuous Carry																							
12V DC								24V DC								48V DC							
900V DC																							
Bottom				Side				Bottom				Side				Bottom				Side			
Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N
P	NP	P	NP	P	NP	P	NP	P	NP	P	NP	P	NP	P	NP	P	NP	P	NP	P	NP	P	NP
-BA	-BAN	-B	-BN	-BAS	-BASN	-BS	-BSN	-CA	-CAN	-C	-CN	-CAS	-CASN	-CS	-CSN	-EA	-EAN	-E	-EN	-EAS	-EASN	-ES	-ESN

100A	Series Name																							
	DCNLEV100																							
	100A Continuous Carry								100A Continuous Carry								100A Continuous Carry							
	12V DC																							
	750V DC																							
	Bottom				Side				Bottom				Side				Bottom				Side			
	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N
	P	NP	P	NP	P	NP	P	NP	P	NP	P	NP	P	NP	P	NP	P	NP	P	NP	P	NP	P	NP
Part Number Suffix																								
-BA -BAN -B -BN -BAS -BASN -BS -BSN -CA -CAN -C -CN -CAS -CASN -CS -CSN -EA -EAN -E -EN -EAS -EASN -ES -ESN																								



DCNSEV30



DCNLEV50 Bottom Mount



DCNLEV50 Side Mount



DCNLEV100 Bottom Mount



DCNLEV100 Side Mount

DC High Voltage Contactor Relays

Resin Design Relays

PART NUMBER SYSTEM

DCNEVT150 + **-CS** = **DCNEVT150-CS**

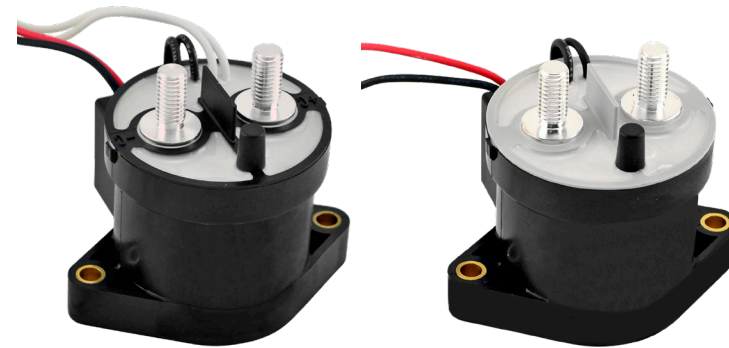
Series Name PN Suffix Part Number

P = Polarized NP = Non-Polarized

150A-250A	Series Name
	Amperage
	Nom. Coil Voltage
	Voltage Rating
	Mounting Type
	Auxiliary Circuit
	Terminals
Part Number Suffix	

DCNEV150			
150A Continuous Carry			
12V DC			
900V DC			
Bottom			
Y		N	
P	NP	P	NP
-MA	-MAN	-M	-MN

DCNEV250											
250A Continuous Carry											
12-24V DC				48-72V DC				72V DC			
900V DC				900V DC				900V DC			
Bottom				Bottom				Bottom			
Y			N			Y			N		
P	NP	P	NP	P	NP	P	NP	P	NP	P	NP
-MA	-MAN	-M	-MN	-GA	-GAN	-G	-GN	-FA	-FAN	-F	-FN
				-GB				-FB			



Ceramic Design Relays

150A-500A	Series Name
	Amperage
	Nom. Coil Voltage
	Voltage Rating
	Mounting Type
	Auxiliary Circuit
	Terminals
Part Number Suffix	

DCNEVT150			
150A Continuous Carry			
12V DC		24V DC	
450V DC		450V DC	
Bottom	Side	Bottom	Side
N	N	N	N
P	P	P	P
-B	-BS	-C	-CS

DCNEVT350			
350A Continuous Carry			
12V DC		24V DC	
1800V DC		1800V DC	
Bottom		Bottom	
Y	N	Y	N
P	P	P	P
-BA	-B	-CA	-C

DCNEVT400			
400A Continuous Carry			
12V DC		24V DC	
1800V DC		1800V DC	
Bottom		Bottom	
Y	N	Y	N
P	P	P	P
-BA	-B	-CA	-C

DCNEVT500			
500A Continuous Carry			
12V DC		24V DC	
1800V DC		1800V DC	
Bottom		Bottom	
Y	N	Y	N
P	P	P	P
-BA	-B	-CA	-C



Continuous Duty SPST

Series Name	Continuous Duty SPST																	
Part Number	24080	24063	24063-08	24214	24124	24059	24059-15	24059-08	24082	24106	24106-07	24115	24117	24117-01	24213	24213-01	24213-03	24097
Amps	85A	85A	65A	200A	85A	85A	85A	65A	85A	85A	85A	85A	85A	65A	200A	200A	200A	85
Diagram	1	1	1	1	4	1	1	1	4	4	4	3	1	1	1	1	1	1
Image	A	A	B	A	D	A	A	A	E	D	D	D	B	B	A	A	C	A
Insulated/ Grounded	Insulated	Insulated	Insulated	Insulated	Grounded	Insulated	Insulated	Insulated	Grounded	Grounded	Grounded	Insulated	Insulated	Insulated	Insulated	Insulated	Insulated	Insulated
Voltage	36V DC	24V DC					12V DC											6V DC
Circuitry	SPST																	



A



B



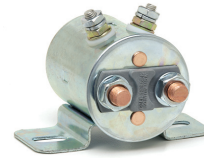
C



D



E



F

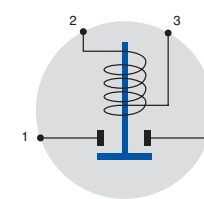


Diagram 1

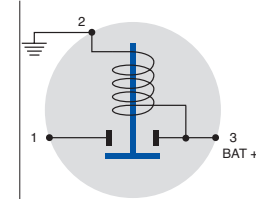


Diagram 2

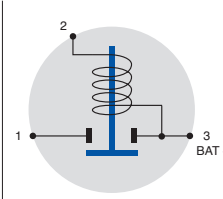


Diagram 3

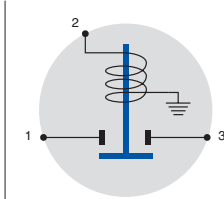


Diagram 4

Intermittent Duty SPST

Series Name	Intermittent Duty SPST								
Part Number	24037	24044	24047	24060	24071	24076	24103	24008-03	24008
Image	A	C	E	A	B	F	E	E	E
Diagram	1	1	2	4	1	2	3	2	2
Insulated/ Grounded	Grounded	Grounded	Insulated	Insulated	Grounded	Insulated	Grounded	Insulated	Insulated
Amps Make	750A	750A	750A	750A	750A	750A	750A	750A	120A
Amps Break	100A							65A	
Voltage	12V DC							24V DC	
Duty Cycle	On: 10 sec Off: 20 min								On: 10 sec Off: 30 min
Circuitry	SPST								



A



B



C



D



E



F

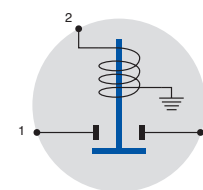


Diagram 1

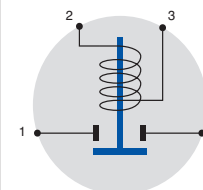


Diagram 2

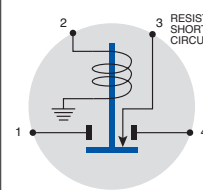


Diagram 3

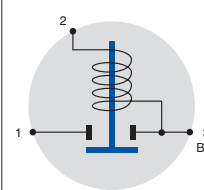


Diagram 4

Battery Master Switch Relays

Series Name
Part Number
Continuous Current
Intermittent Current
Intermittent Time
Voltage
Ingress Protection
Connector
Stability
Time Delay
Low Voltage Disconnect
Low Voltage Disconnect Threshold
Notes

08070000				
08070500	08070600	08070700	08070760	08094270
250A	250A	250A	250A	250A
1500A	1500A	1500A	1500A	1500A
On: 5 sec. Off: 10 sec.	On: 5 sec. Off: 10 sec.	On: 5 sec. Off: 10 sec.	On: 5 sec. Off: 10 sec.	On: 5 sec. Off: 10 sec.
12V/24V	12V/24V	12V/24V	12V/24V	24V
IP67, IP69K	IP67, IP69K	IP67, IP69K	IP67, IP69K	IP65
DIN 4/4 Pigtail	DIN 4/4 Pigtail	DIN 4/4 Pigtail	DIN 4/4 Pigtail	DIN 3/4 Pigtail
Bistable	Bistable	Bistable	Bistable	Bistable
0/30/300 sec.	0/30/300 sec.	–	–	–
–	–	Filtered Open 60 sec.	Filtered Open 60 sec.	–
–	–	12.1V	12.1V	–
–	–	–	Complete Kit Version of 08070700	–



08070000 Series

Series Name
Part Number
Continuous Current
Intermittent Current
Intermittent Time
Voltage
Circuitry
Ingress Protection
Connector
Stability
Retention
Time Delay
Delay Set

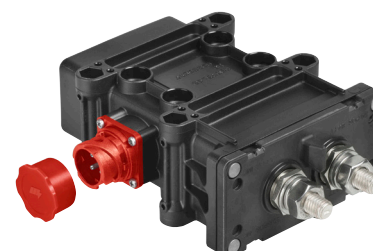
08075062					
08075063	08075064	08075100	08075160	08075161	08075164
250A	250A	250A	500A	250A	500A
2000A	2000A	2000A	2000A	2000A	2000A
On: 5 sec. Off: 10 sec.	On: 5 sec. Off: 10 sec.	On: 5 sec. Off: 10 sec.	On: 5 sec. Off: 10 sec.	On: 5 sec. Off: 10 sec.	On: 5 sec. Off: 10 sec.
24	24	24	24	24	24
SPST	SPST	SPST	SPST	SPST	SPST
IP67, IP69K	IP67, IP69K	IP67, IP69K	IP67, IP69K	IP67, IP69K	IP67, IP69K
TE SS 2/2 Pigtail	DIN 3/4 Integrated	DIN 4/4 Integrated	DIN 4/4 Integrated	DIN 6/7 Integrated	DIN 3/4 Integrated
Bistable	Bistable	Bistable	Bistable	Bistable	Bistable
Magnetic	Magnetic	Magnetic	Magnetic	Magnetic	Magnetic
–	–	3 min.	6 min.	30 sec./60 sec./3 min./6 min.	–
–	–	Fixed	Fixed	Programmable	–



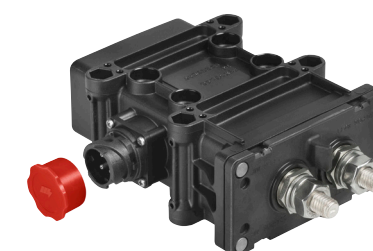
08075063



08075064



08075100



08075160



08075161

Battery Master Switch Relays

Series Name
Part Number
Continuous Current
Intermittent Current
Intermittent Time
Voltage
Circuitry
Ingress Protection
Mounting
Notes

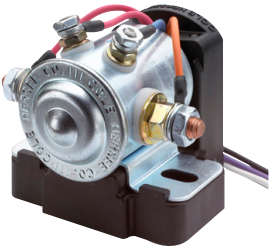
ADR Magnetic Battery Disconnect Switch	
08075300	08075360
250A	250A
2000A	2000A
2000A for 5 sec, 1000A for 30 sec.	2000A for 5 sec, 1000A for 30 sec.
12V/24V	12V/24V
SPST	
IP67, IP69K	IP67, IP69K
Surface	Surface
Complete Kit Containing: 00227073, 00900560, 00901560	Relay Only



Battery Isolators

Series Name
Part Number
Continuous Current
Voltage
Humidity
Ingress Protection
Shock
Vibration

Smart Battery Isolators			
48525	48530	880051	880055
85A	200A	300A	300A
12V		16V	32V
0 to 90% RH			
IP67	IP67	IP67/IP69K	IP67/IP69K
SAE J1455	SAE J1455	10G	10G
10-500 Hz	10-500 Hz	8G	8G



48525



880051



ISO MINI



ISO Power



ISO MICRO



Plug In Relays

Series Name
Part Number
Current
Voltage
Form
Mounting Bracket
Supression

ISO MINI										
RA-200024-DS	RA-200124-DN	RA-400112-DN	RA-400112-NN	RC-200024-DS	RC-200124-DN	RC-200124-NN	RC-400012-DS	RC-400112-DN	RC-400112-NN	RC-400112-RN
20A	20A	40A	40A	20A	20A	20A	40A	40A	40A	40A
24V DC	24V DC	12V DC	12V DC	24V DC	24V DC	24V DC	12V DC	12V DC	12V DC	12V DC
A	A	A	A	C	C	C	C	C	C	C
None	Snap-In	Snap-In	Snap-In	None	Snap-In	Snap-In	None	Snap-In	Snap-In	Snap-In
Diode	Diode	Diode	None	Diode	Diode	None	Diode	Diode	None	Resistor

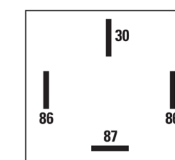
Series Name
Part Number
Current
Voltage
Form
Mounting Bracket
Supression

ISO Power Relays					
RA-700112-DN	RA-700112-NN	RA-700112-RN	RC-700112-DN	RC-700112-NN	RC-700112-RN
70A	70A	70A	70A	70A	70A
12V DC	12V DC	12V DC	12V DC	12V DC	12V DC
A	A	A	C	C	C
Snap-In	Snap-In	Snap-In	Snap-In	Snap-In	Snap-In
Diode	None	Resistor	Diode	None	Resistor

ISO MICRO					
02040080Z	02040090Z	MA-250012-NN	MA-250012-RS	MC-250012-NN	MC-250012-RN
20A	35A	25A	25A	25A	25A
12V DC	12V DC	12V DC	12V DC	12V DC	12V DC
A	C	A	A	C	C
—	—	—	—	—	—
Resistor	Resistor	None	Resistor	None	Resistor

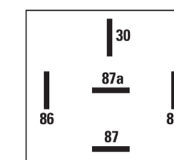
Series Name
Part Number
Form
Mounting

Plug In Relay Sockets	
99025	99026
A	A & C
Intregated	

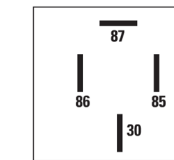


Form A

ISO MINI

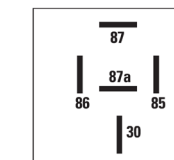


Form C

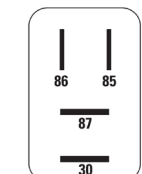


Form A

ISO Power

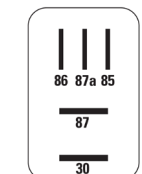


Form C



Form A

ISO MICRO



Form C

Solid State Relays

Series Name	Standard Solid State Relay
Part Number	48785
Continuous Current	85A
Inrush Current	85A
Voltage	12-24V
Ingress Protection	IP67
Control Current	20mA
Housing	Plated Steel
Stud Terminals	Two Copper 5/16-18 Studs
Contacts	Copper



48785

Specialty Relays

Series Name	HD Normally Open Relays	
Part Number	880159	880160
Continuous Current	300A (4/0 Input/Output Cable)	300A (4/0 Input/Output Cable)
Inrush Current	1500A x 10 Sec.	1500A x 10 Sec.
Voltage	9-16V	18-32V
Ingress Protection	IP67 IP69K	IP67 IP69K
Control Current	7A	7A
Connector	Deutsch 6 Pos DTM	Deutsch 6 Pos DTM
Stud Terminals	Two Tin-Plated Copper 3/8-16 Studs	Two Tin-Plated Copper 3/8-16 Studs
Vibration	8G	8G
Humidity	0-95% RH	0-95% RH
Ignition Protection	ISO 8846 and SAE J1171	ISO 8846 and SAE J1171



880159



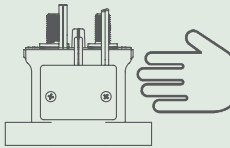
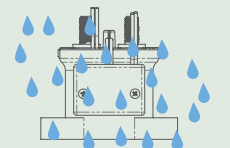
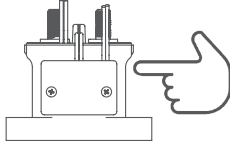
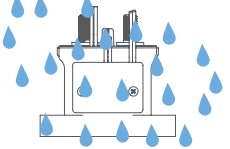
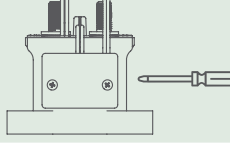
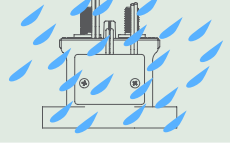
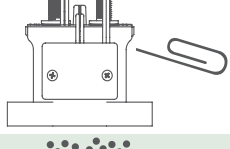
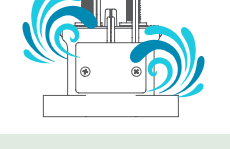
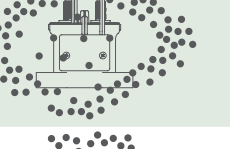
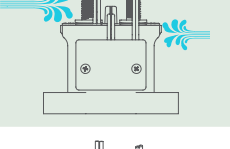
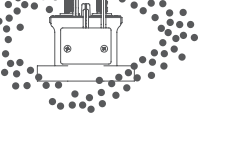
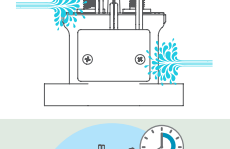
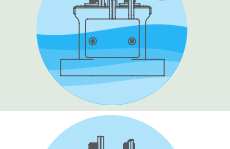
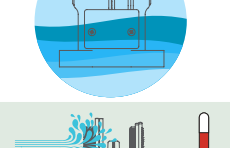

880160

Ingress Protection Explained

Harsh Environments and Ingress Protection Ratings

Environmental factors play a huge role in a product's ability to do its job and survive the lifetime of the equipment. Ingress Protection, or IP, indicates the degree of protection of a relay. IP ratings are a measure of how resistant a part is to environmental contaminants such as debris, dust, and water. IP rating selections should be based on where the relay will be mounted and what type of environment the equipment will be used in.

The numbers following IP represent levels of sealing and can range from no sealing (IP00) to protection against dust and continuous immersion in water (IP68). The table below provides a description of the protection at each level.

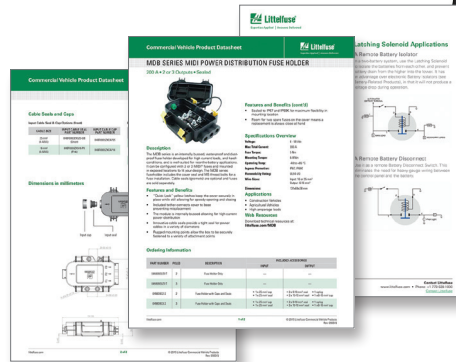
1st Digit - SOLID Degree of protection against solid objects		2nd Digit - LIQUID Degree of protection against water	
	1 Protected against a solid object greater than 50mm		1 Protected against vertically falling water drops
	2 Protected against a solid object greater than 12.5mm		2 Protected against vertical water drops when enclosure tilted up to 15 degree angle
	3 Protected against a solid object greater than 2.5mm		3 Protected against spraying water from up to a 60 degree angle
	4 Protected against a solid object greater than 1.0mm		4 Protected against splashing water
	5 Dust Protected. Prevents ingress of dust sufficient to cause harm		5 Protected against water jets
	6 Dust tight. No ingress of dust.		6 Protected against powerful water jets
Example IP67			7 Protected against the effects of temporary immersion in water between 15cm and 1m for 30 minutes
			8 Protected against the effects of continuous immersion in water under conditions agreed between manufacturer and user
			9K Protected against close-range high pressure, high temperature spray downs

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