Latching, Sequence and Impulse Relays – Application Data

Energy Conservation Relays
In many applications it is important for the customer to conserve electrical energy. One approach to energy conservation in an electrical system is to use relays that do not require constant power to maintain contact closure.

"Latching relay" is a generic term that is used to describe a relay that maintains its contact position after the control power has been removed. Latching relays allow a customer to control a circuit by simply providing a single pulse to the relay control circuit. Latching relays are also desirable when the customer needs to have a relay that maintains its position during an interruption of power.

There are three main types of Latching relays. Magnetic latching, Mechanical Latching and Impulse Sequencing.

Magnetic Latching Relays
Magnetic Latching relays require one pulse of coil power to move their contacts in one direction, and another, redirected pulse to move them back. Repeated pulses from the same input have no effect. Magnetic Latching relays are useful in applications where interrupted power should not be able to transition the contacts.

Magnetic Latching relays can have either single or dual coils. On a single coil device, the relay will operate in one direction when power is applied with one polarity, and will reset when the polarity is reversed. On a dual coil device, when polarized voltage is applied to the reset coil the contacts will transition. AC controlled magnetic latch relays have single coils that employ steering diodes to differentiate between operate and reset commands.

785

755

303 Series

Mechanical Latching Relays
Mechanical latching relays use a locking mechanism to hold their contacts in their last set position until commanded to change state, usually by means of energizing a second coil. Since the relay does not rely on a magnet, the locking strength will not degrade over time or weaken during thermal cycling. The contacts will remain locked in the directed position until the opposing coil has been energized. Packaging machinery that places several units into a single container would be a good example.

385

Impulse Relays
Impulse relays are a form of latching relay that transfers the contacts with each pulse. Many impulse relays are made up of a magnetic latch relay and a solid state steering circuit that, upon application of power, determines which position the relay is in and energizes the opposite coil. The contacts transfer and hold that position when power is removed. When reenergized, the contacts transfer again and hold that position, and so on. In order to transfer the contacts, one simply provides a single unidirectional pulse. There is no need to redirect the control pulse or reverse the polarity.

Impulse relays can be used as wear equalizers. They are well suited for applications such as turning a single device on or off from one or more locations with a single momentary switch or push button at each station. For example, a conveyor could be started and/or stopped from multiple locations by means of a single button at each position.

711

712 Alternating Relay

In many industrial pumping applications, two identical pumps are used for the same job. A standby unit is available in case the first pump fails. However, a completely idle pump might deteriorate and provide no safety margin. Alternating relays prevent this by assuring that both pumps get equal run time.

The Model 712 Series Alternating Relay is designed for duplex pumping systems where it is desirable to equalize pump run time. The solid state alternating circuit drives an internal electromechanical relay. A continuous power source and control switch is required.

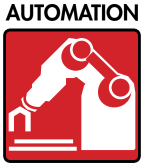
The control switch (float, pressure or other isolated contact) is connected as shown in the respective wiring diagrams. Each time the control switch is opened the output contacts will change status. Indicator lights on the case show the internal relay status.

Setting the top toggle switch to the "center position" alternates the load; while setting the switch to "Load 1" or "Load 2" will lock the relay in the respected position, preventing alternation.

The alternating relay approach isn't limited to pumping applications. The control switches could be thermostats or pressure switches, and the loads could be fans or compressors.

Applications:

INDUSTRIAL AUTOMATION

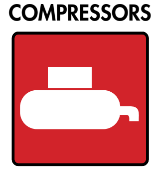


INDUSTRIAL APPLIANCES

PACKING MACHINES

PUMPING MACHINES

COMPRESSORS



INDUSTRIAL FANS

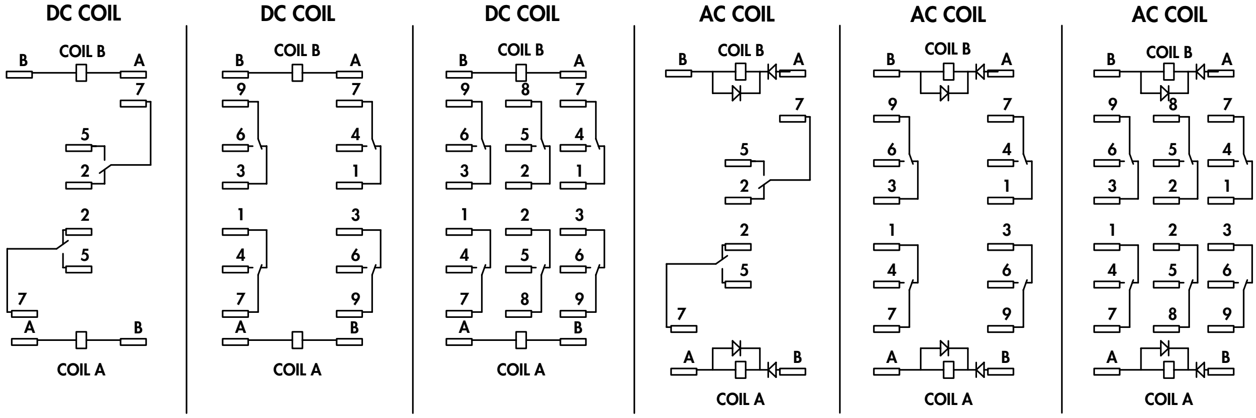
385 Mechanical Latching Relay/DPDT to 6PDT, 15 Amp Rating

The 385 relay is a mechanically latched, electrically reset relay. It can be furnished with two, four or six sets of double throw contacts. The molded, plastic dust cover snaps onto a standard DIN rail as well as incorporating mounting slots for panel mounting. The 385 does not have a dominant coil. If both coils are energized at the same time, all of the normally open contacts close and all normally closed contacts open. If one coil, (Coil A) is de-energized, then the contacts on the opposite side (Coil B) will not transition until coil power is restored to the first coil (A).

General Specifications (UL 508)

Contact Characteristics			Units	385
Number and type of Contacts				DPDT, 4PDT, 6PDT
Contact materials				Silver Alloy
Thermal (Carrying) Current			A	15
Maximum Switching Voltage			V	600
Switching Current @ Voltage		~	Resistive	15A @ 240V 50/60Hz
		⎓	Resistive	10A @ 28V
		~	HP	1/3 @ 120 VAC
		~	HP	1/2 @ 208 VAC to 600 VAC
Minimum Switching Requirement			mA	100 @ 5 VDC (.5W)
Coil Characteristics				
Voltage Range		~	V	12....240, 50/60 Hz
		⎓	V	12....125
Operating Range	% of Nominal	~		85% to 110%
		⎓		80% to 110%
Average consumption		~	VA	2
		⎓	W	1.64
Drop-out voltage threshold		~		15%
		⎓		10%
Performance Characteristics				
Electrical Life (UL508)	Operations @ Rated Current		(Resistive)	100,000
Mechanical Life				10,000,000
Operating time (response time)	Unpowered		ms	25
Dielectric strength	Between coil and contact	~	V(rms)	2000
	Between poles	~	V(rms)	1500
	Between contacts	~	V(rms)	1500
Environment				
Product certifications	Standard version			UL
Ambient air temperature	Storage		°C	-40…+85
around the device	Operation		°C	-40…+55
Vibration resistance	Operational		g-n	3, 10 - 55 Hz
Shock resistance			g-n	10
Degree of protection				IP 40
Weight			grams	85

DPDT DC COIL | 4PDT DC COIL | 6PDT DC COIL | 4PDT AC COIL | DPDT AC COIL | 6PDT AC COIL



SECTION 7

Standard Part Numbers

BOLD-FACED PART NUMBERS ARE NORMALLY STOCKED

Nominal Voltage	Coil Resistance	Part Number DPDT	Part Number 4PDT	Part Number 6PDT
AC Operated (Single Coil)				
12 VAC 50/60 HZ	30/30 Ohms	385XBX-12A	**385XDX-12A**	385XFX-12A
24 VAC 50/60 HZ	180/180 Ohms	**385XBX-24A**	385XDX-24A	**385XFX-24A**
120 VAC 50/60 HZ	3,800/3,800 Ohms	**385XBX-120A**	**385XDX-120A**	**385XFX-120A**
240 VAC 50/60 HZ	16,000/16,000 Ohms	385XBX-240A	385XDX-240A	385XFX-240A
DC Operated				
12 VDC	85/85 Ohms	**385XBX-12D**	**385XDX-12D**	**385XFX-12D**
24 VDC	340/340 Ohms	**385XBX-24D**	**385XDX-24D**	**385XFX-24D**
48 VDC	1,360/1,360 Ohms	385XBX-48D	385XDX-48D	385XFX-48D
110-125 VDC	9,000/9,000 Ohms	385XBX-110/125D	385XDX-110/125D	385XFX-110/125D

Part Number Builder

F	385	XBX	–	240A
Temperature Class	**Series**	**Contact Configuration**		**Coil Voltage**
130° C = None	385	DPDT = XBX		VAC = 6 - 240A
155° C = F		4PDT = XDX		VDC = 6 - 125D
		6PDT = XFX