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

Magnecraft
Your Contact for Industrial Relays

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.

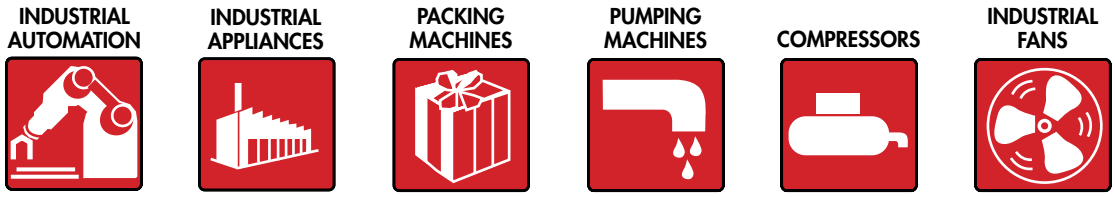
The Model 712 Series Alternating Relay is designed for duplex pumping systems where it is desirable to equalize pump run time. The solid state alternating circuit drives an internal electromechanical relay. A continuous power source and control switch is required.

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.

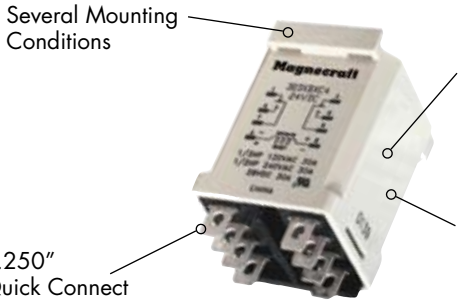
Setting the top toggle switch to the "center position" alternates the load; while setting the switch to "Load 1" or "Load 2" will lock the relay in the respected position, preventing alternation.

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:



303 Magnetic Latching Power Relay/DPDT, DPST & SPDT, 30 Amp Rating



The Class 303 relay has been designed for 30 Amp loads by using 0.250" quick connect terminals and other proven materials used by Magnecraft power relays. Contact gaps are 2 millimeters wide to meet most standards for creepage and clearance. Its magnetic latching mechanism keeps the contact in the last set position until commanded to change by means of a separate redirected signal. The optional magnetic blowout allows for high voltage DC switching applications.

General Specifications (UL 508)

Contact Characteristics			Units	303
Number and type of Contacts				DPDT, DPST (NO), SPDT (DM-DB)
Contact materials				Silver Alloy
Thermal (Carrying) Current			A	30
Maximum Switching Voltage			V	600
Switching Current @ Voltage		~	General Purpose	30A @ 300V 50/60Hz
		~	Resistive	30A @ 28V
		⎓	HP	1 @ 120 VAC
			HP	2 @ 208 VAC to 600 VAC
Current rating with magnetic blowout - Code 69			A	10 @ 150 VDC (SPDT) 5 @ 150 VDC (DPDT, DPST)
Minimum Switching Requirement			mA	100 @ 5 VDC (.5W)
Coil Characteristics				
Voltage Range		~	V	12....240
		⎓	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)	6,000
Mechanical Life	Unpowered			100,000
Operating time (response time)			ms	30
Rated insulation voltage	Between coil and contact	~	V(rms)	4000
Dielectric strength	Between poles	~	V(rms)	1000
rms voltage	Between contacts	~	V(rms)	2200
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	170

SECTION 7

SIDE FLANGE - CODE C1

TOP FLANGE - CODE C3

DIN MOUNT - CODE C4

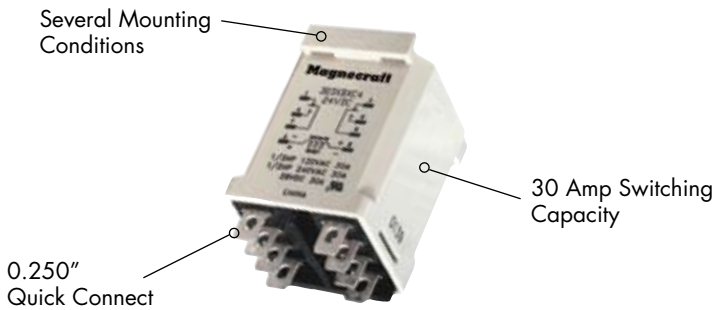
Standard Part Numbers

BOLD-FACED PART NUMBERS ARE NORMALLY STOCKED

Nominal Voltage	Coil Resistance Coil A/B	Part Number DPDT (Side Flange)	Part Number SPDT DM-DB (Side Flange)
AC Operated			
12 VAC 50/60 HZ	30/30 Ohms	303XBXC1-12A	303XHXC1-12A
24 VAC 50/60 HZ	180/180 Ohms	303XBXC1-24A	303XHXC1-24A
120 VAC 50/60 HZ	3,800/3,800 Ohms	**303XBXC1-120A**	303XHXC1-120A
240 VAC 50/60 HZ	16,000/16,000 Ohms	303XBXC1-240A	303XHXC1-240A
DC Operated			
12 VDC	85/85 Ohms	303XBXC1-12D	303XHXC1-12D
24 VDC	340/340 Ohms	**303XBXC1-24D**	303XHXC1-24D
48 VDC	1,360/1,360 Ohms	303XBXC1-48D	303XHXC1-48D
110-125 VDC	9,000/9,000 Ohms	303XBXC1-110/125D	303XHXC1-110/125D

Part Number Builder

303	XBX		C1		–	240A
Series	**Contact Configuration**	**Option**	**Cover Options**	**Coil Options**		**Coil Voltage**
303	DPDT = XBX	DC Switching	Side Flange = C1	Single Coil = No Code		VAC = 12 - 240A
	DPST (NO) = BXX	Option, Magnetic	Top Flange = C3	Dual Coil = D		VDC = 12 - 125D
	SPDT (NC - NO, DB - DM) = XHX	Blowout = 69	DIN Mount = C4			



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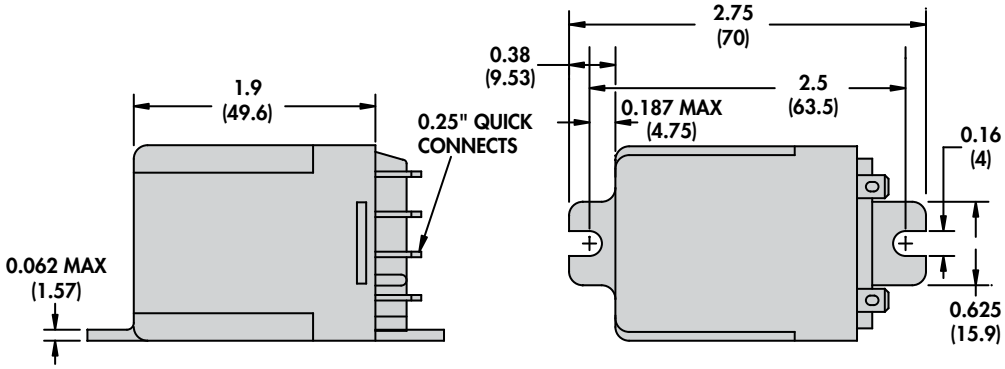
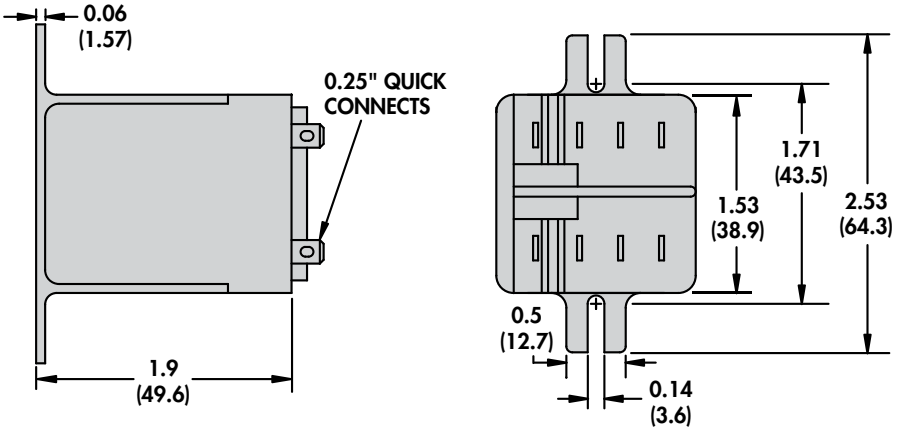
SIDE FLANGE - CODE C1



TOP FLANGE - CODE C3

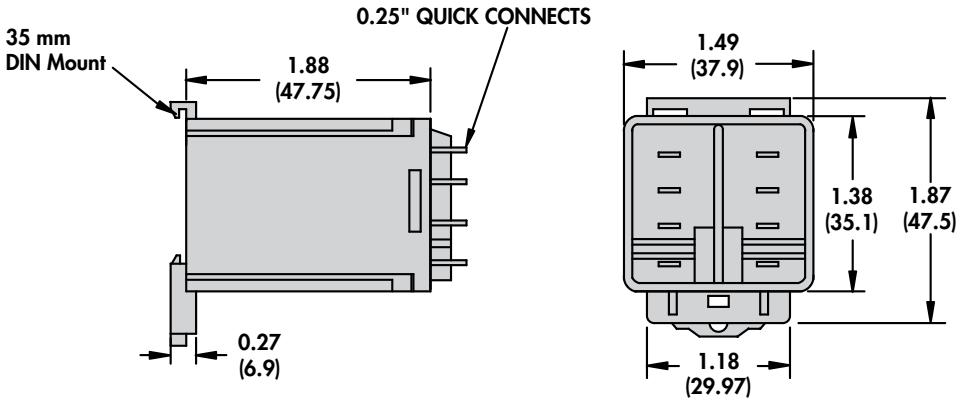


SIDE FLANGE - CODE C1

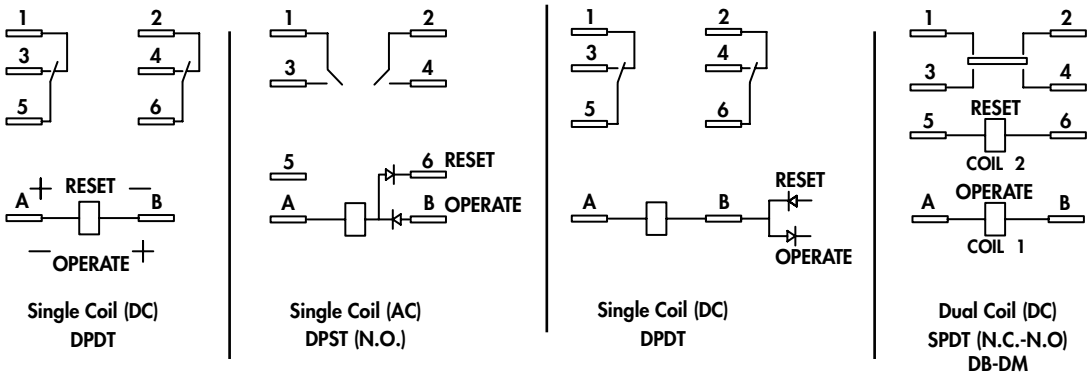
TOP FLANGE - CODE C3

DIN MOUNT - CODE C4

DIN MOUNT - CODE C4



WIRING DIAGRAMS



SECTION 7