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.

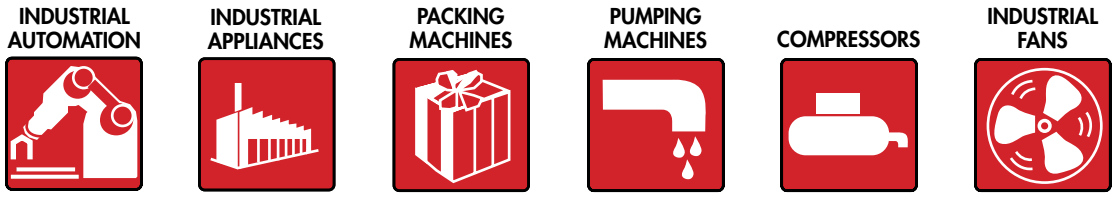
The Model 712 Series Alternating Relay is designed for duplex pumping systems where it is desirable to equalize pump run time. The solid state alternating circuit drives an internal electromechanical relay. A continuous power source and control switch is required.

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:



Advantages of the 712 Alternating Relay

The Complete System Solution!

Highest Grade Electronic Components
RoHS Compliant.

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 are required.

The control switch (float, pressure or other isolated contact) is connected between the L1 terminal and the control terminal. 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 Load 1 or Load 2 will lock the relay in position, preventing alternation.

UL Listed when 712 Relay and Octal Socket are Combined
UL Approved for Field Replacement.

- **Offers a "one stop solution" for your pump management system.**
- **Several configurations available to meet your individual needs.**
- **Switching capabilities up to 12 amps.**
- **Two LED status indicators; indicate status of the separate loads independently.**
- **Dual Voltage Coils eliminate the need to specify AC or DC (AC only for 240 volts).**
- **Only 36 mm's wide; does not take up any additional room on the DIN rail.**
- **Color and appearance designed for high visibility in all environments.**
- **Engineering availability allows for customized control system solutions.**

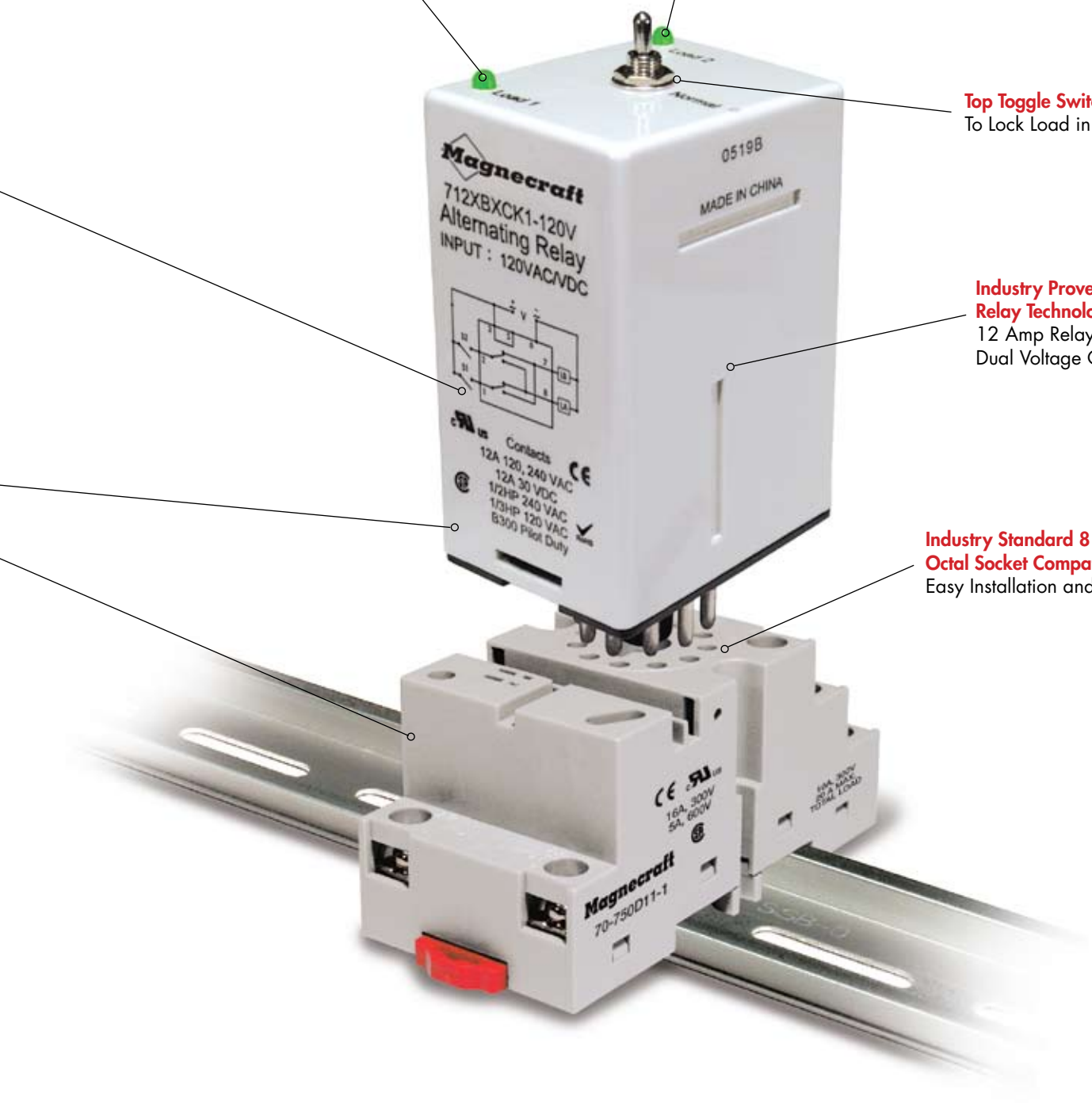
See Section 3 p.14-16

16-711C1
FLANGE ADAPTER

16-711C4
DIN RAIL ADAPTER

Load 1 Indicator
Indicates when Load 1 is Active.

Load 2 Indicator
Indicates when Load 2 is Active.



Top Toggle Switch
To Lock Load in Position.

Industry Proven Power Relay Technology
12 Amp Relay with
Dual Voltage Capability.

Industry Standard 8 or 11 Pin Octal Socket Compatible
Easy Installation and Replacement.

SECTION 7

712 Alternating Relay/DPDT, 12 Amp Rating

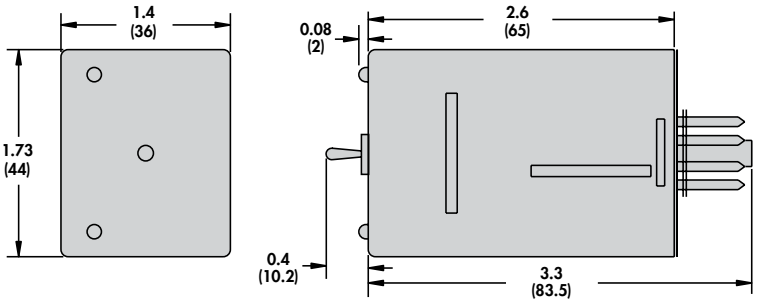
UL Listed When Used With Magnecraft Sockets.

UL Recognized File No. E43641

712 Relay with the 70-750DL8-1 Socket

General Specifications (UL 508)

Contact Characteristics			Units	712XAXC	712XBXC	712XBXCK	712XBXCK1
Number and type of Contacts				SPDT	DPDT CROSS WIRED	DPDT, PIN 9 - NO PIN 11 - NC	DPDT, PIN 9 - NC PIN 11 - NO
Contact materials				Silver Alloy			
Thermal (Carrying) Current			A	12			
Maximum Switching Voltage			V	300			
Current rating		~	Resistive	12A @ 240V 50/60Hz			
Switching voltage		⎓	Resistive	12A @ 30V			
		~	HP	1/3 @ 120 VAC			
		~	HP	1/2 @ 240 VAC			
			Pilot Duty	B300			
Minimum Switching Requirement			mA	100 @ 5 VDC (.5W)			
Coil Characteristics							
Voltage Range		~ ⎓	V	12, 24, 120			
		~	V	240			
Operating Range	% of Nominal	~	V	80% to 110%			
		⎓	V	80% to 110%			
Average consumption		~	V	1.8			
		⎓	W	1.8			
Drop-out voltage threshold		~	V	15%			
		⎓	VDC	10%			
Timing Characteristics							
Time Delay - Fixed			s	0.5			
Reset Time			ms	100			
Alternating Action	Maximum			Release of Control Switch			
Performance Characteristics							
Electrical Life (UL 508)	Operations @		(Resistive)	100,000			
Mechanical Life	Rated Current			10,000,000			
Rated insulation voltage	Unpowered Between coil	~	V(rms)	1500			
Dielectric strength	and contact	~	V(rms)	500			
rms voltage	Between poles Between contacts	~	V(rms)	1500			
Environment							
Product certifications				UR, CSA, CE			
Ambient air temperature	Standard version		°C	-30…+70			
around the device	Storage		°C	-20…+60			
Degree of protection	Operation			IP 40			
Weight			grams	120			



SECTION 7

Standard Part Numbers

BOLD-FACED PART NUMBERS ARE NORMALLY STOCKED

Part Numbers	Input Voltage	Timing Range	Contact Configuration	Rated Load Current
8 Pin Octal Base, SPDT				
712XAXC-12V	12 VAC/VDC	0.5s Fixed	SPDT	12 Amps
712XAXC-24V	24 VAC/VDC	0.5s Fixed	SPDT	12 Amps
712XAXC-120V	120 VAC/VDC	0.5s Fixed	SPDT	12 Amps
712XAXC-240A	240 VAC	0.5s Fixed	SPDT	12 Amps
8 Pin Octal Base, DPDT (CROSS WIRED)				
712XBXC-12V	12 VAC/VDC	0.5s Fixed	DPDT	12 Amps
712XBXC-24V	24 VAC/VDC	0.5s Fixed	DPDT	12 Amps
712XBXC-120V	120 VAC/VDC	0.5s Fixed	DPDT	12 Amps
712XBXC-240A	240 VAC	0.5s Fixed	DPDT	12 Amps
11 Pin Octal Base, DPDT (PIN 11 NC)				
712XBXCK-12V	12 VAC/VDC	0.5s Fixed	DPDT	12 Amps
712XBXCK-24V	24 VAC/VDC	0.5s Fixed	DPDT	12 Amps
712XBXCK-120V	120 VAC/VDC	0.5s Fixed	DPDT	12 Amps
712XBXCK-240A	240 VAC	0.5s Fixed	DPDT	12 Amps
11 Pin Octal Base, DPDT (PIN 11 NO)				
712XBXCK1-12V	12 VAC/VDC	0.5s Fixed	DPDT	12 Amps
712XBXCK1-24V	24 VAC/VDC	0.5s Fixed	DPDT	12 Amps
712XBXCK1-120V	120 VAC/VDC	0.5s Fixed	DPDT	12 Amps
712XBXCK1-240A	240 VAC	0.5s Fixed	DPDT	12 Amps

Part Number Builder

Series	Contact Configuration	Pin Orientation	–	Input Voltage
712	XAX = SPDT	C = 8 OCTAL	–	12V = 12 VAC/VDC
	XBX = DPDT	CK = 11 PIN OCTAL (PIN 11 NC)		24V = 24 VAC/VDC
		CK1 = 11 PIN OCTAL (PIN 11 NO)		120V = 120 VAC/VDC
				240V = 240 VAC

Other mating sockets see Section 2: 70-750DL11-1, 70-750E8-1, 70-750E11-1, 70-464-1, 70-465-1, 70-169-1, 70-170-1

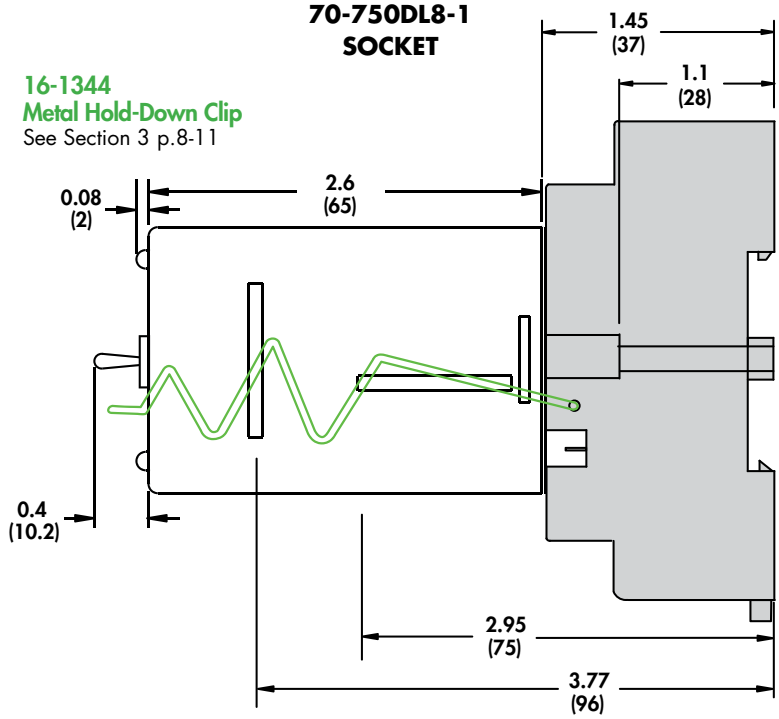
Relay Adapters

16-711C4
Section 3, p.14-16

16-711C1
Section 3, p.14-16

70-750DL8-1 SOCKET

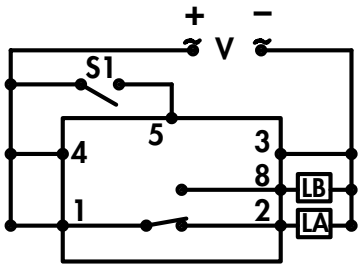
16-1344
Metal Hold-Down Clip
See Section 3 p.8-11



Theory of Operation

Wiring Diagram:
712XAXC

8 Pin Octal, with an SPDT Contact Configuration.



A.

V is Input Voltage
LA is Load #1
LB is Load #2
S1 is Control Switch #1

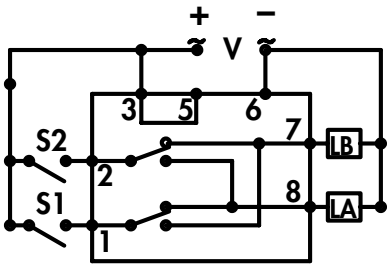
If the Top Toggle Switch is in "Alternate" position closing Switch S1 will alternate the loads between LA and LB.

If the Top Toggle Switch is in "Lock 1" position Load LA is ON and Load LB is OFF. Switch S1 is not used in this mode.

If the Top Toggle Switch is in "Lock 2" position Load LA is OFF and Load LB is ON. Switch S1 is not used in this mode.

Wiring Diagram:
712XBXC (DUPLEX)

8 Pin Octal, with a DPDT Contact Configuration. Duplex Capabilities.



B.

V is Input Voltage
LA is Load #1
LB is Load #2
S1 is Control Switch #1
S2 is Control Switch #2

If the Top Toggle Switch is in "Alternate" position closing Switch S1 will alternate the loads between LA and LB while switch S2 will only control LA.

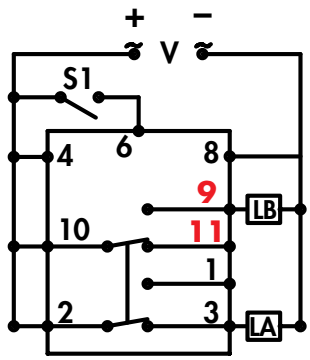
If the Top Toggle Switch is in "Lock 1" position Switch S1 will control LA while switch S2 will control LB.

If the Top Toggle Switch is in "Lock 2" position Switch S1 will control LB while switch S2 will control LA.

Duplex (Cross Wired) Functionality: This model operates the same as alternating relays except when both the control Switches S1 and S2 are closed, Load A and Load B energize simultaneously. The DPDT 8-pin, cross wired option, allows extra system load capacity through simultaneous operation of both motors when needed. Relay contacts are not isolated.

Wiring Diagram:
712XBXCK

11 Pin Octal with a DPDT Contact Configuration. Pin 9 is Normally Open and Pin 11 is Normally Closed.



C.

V is Input Voltage
LA is Load #1
LB is Load #2
S1 is Control Switch #1

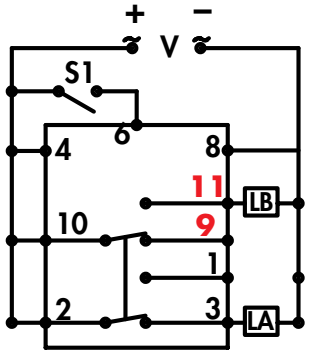
If the Top Toggle Switch is in "Alternate" position closing Switch S1 will alternate the loads between LA and LB.

If the Top Toggle Switch is in "Lock 1" position Load LA is ON and Load LB is OFF. Switch S1 is not used in this mode.

If the Top Toggle Switch is in "Lock 2" position Load LA is OFF and Load LB is ON. Switch S1 is not used in this mode.

Wiring Diagram:
712XBXCK1

11 Pin Octal with a DPDT Contact Configuration. Pin 9 is Normally Closed and Pin 11 is Normally Open.



D.

V is Input Voltage
LA is Load #1
LB is Load #2
S1 is Control Switch #1

If the Top Toggle Switch is in "Alternate" position closing Switch S1 will alternate the loads between LA and LB.

If the Top Toggle Switch is in "Lock 1" position Load LA is ON and Load LB is OFF. Switch S1 is not used in this mode.

If the Top Toggle Switch is in "Lock 2" position Load LA is OFF and Load LB is ON. Switch S1 is not used in this mode.

Note: Input voltage must be applied at all times for proper alternation. The use of a solid state control switch for S1 or S2 may not initiate alternation correctly. S1 or S2 voltage must be from the same supply as the unit's input voltage (see wiring diagrams). Loss of input voltage resets the unit; Load A becomes the lead load for the next operation.