Electromechanical Relays 78 Series Selection Guide




Electromechanical Relays 78 Series				
Specification	***781 Series***	***782 Series***	***783 Series***	***784 Series***
Coil Voltages	120VAC, 240VAC, 12VAC, 12VDC, 24VAC, 24VDC	120VAC, 240VAC, 12VAC, 12VDC, 24VAC, 24VDC	120VAC, 240VAC, 12VAC, 12VDC, 24VAC, 24VDC	120VAC, 240VAC, 12VAC, 12VDC, 24VAC, 24VDC
Configuration	SPDT	DPDT	3PDT	4PDT
Contact Rating	15A	15A	15A	15A
Base Socket	5 pin spade terminal	8 pin spade terminal	11 pin spade terminal	14 pin spade terminal
Agency Approvals	UL Recognized (E191059), CE, IEC Std 947-4-1 and 947-5-1, CSA 244610	UL Recognized (E191059), CE, IEC Std 947-4-1 and 947-5-1, CSA 244610	UL Recognized (E191059), CE, IEC Std 947-4-1 and 947-5-1, CSA 244610	UL Recognized (E191059), CE, CSA 244610

Overview

These ice cube style relays are power relays designed for applications demanding high power control in various factory machines and control panels. They are ideal for electrical control panels requiring stable and reliable relays.

Features

- Small package design
- Silver alloy gold flashed contact
- High open contact dielectric strength (up to 2500V rms)
- High reliability and long life
- High vibration and shock resistance
- LED indicator on all models, so you can easily see if the relay is working properly without using a voltmeter
- Flag indicator shows relay status in manual or powered condition
- A pushbutton allows manual operation of the relay without the need for power to the coil
- Lock-Down door, when activated, holds pushbutton and contacts in the "operate" position, allowing circuits to be analyzed.
- SPDT, DPDT, 3PDT and 4PDT models
- Finger grip cover allows easier removal of relays from sockets than conventional relays
- I.D. tag/write labels for identifying relays in multi-relay circuits

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Electromechanical Relays 78 Series							
Part Number	*Price*	*Drawing Link*	*Coil Voltage*	*Configuration*	*Relay Socket Part Number*	*Price*	*Drawing Link*
781-1C-12D	$5.25	PDF	12VDC	SPDT	***781-1C-SKT***	$4.50	PDF
781-1C-12A	$5.25	PDF	12VAC				
781-1C-24D	$5.00	PDF	24VDC				
781-1C-24A	$5.25	PDF	24VAC				
781-1C-120A	$5.25	PDF	120VAC				
781-1C-240A	$6.25	PDF	240VAC				
782-2C-12D	$6.50	PDF	12VDC	DPDT	***782-2C-SKT***	$4.50	PDF
782-2C-12A	$6.50	PDF	12VAC				
782-2C-24D	$6.50	PDF	24VDC				
782-2C-24A	$6.75	N/A	24VAC				
782-2C-120A	$6.75	N/A	120VAC				
782-2C-240A	$7.50	N/A	240VAC				
783-3C-12D	$6.75	PDF	12VDC	3PDT	***783-3C-SKT***	$5.00	PDF
783-3C-12A	$9.00	PDF	12VAC				
783-3C-24D	$9.50	N/A	24VDC				
783-3C-24A	$9.50	N/A	24VAC				
783-3C-120A	$9.50	N/A	120VAC				
783-3C-240A	$9.50	N/A	240VAC				
784-4C-12D	$8.50	PDF	12VDC	4PDT	***784-4C-SKT-1***	$5.25	PDF
784-4C-12A	$11.00	PDF	12VAC				
784-4C-24D	$8.75	PDF	24VDC				
784-4C-24A	$8.75	N/A	24VAC				
784-4C-120A	$8.75	N/A	120VAC				
784-4C-240A	$8.75	N/A	240VAC				

NOTE: Not recommended for low current switching. Find contacts' Minimum Switching Requirement on following page.
For low current switching, please see the QM4N1 and QM4X1 series.

Electromechanical Relays 78 Series Specifications

Electromechanical Relays 78 Series Specifications												
Part Numbers	781-1C-12D	781-1C-12A	781-1C-24D	781-1C-24A	781-1C-120A	781-1C-240A	782-2C-12D	782-2C-12A	782-2C-24D	782-2C-24A	782-2C-120A	782-2C-240A
General Specifications												
***Service Life: Mechanical / Electrical Operations**	Mechanical: 10,000,000 operations not powered											
	Electrical: 100,000 operations @ rated resistive load											
***Operating Temperature**	-40 to 55°C [-40 to 131°F]											
***Response Time**	20ms											
***Vibration Resistance**	± 1mm [10-35 Hz] and 3gn [35-50Hz]											
***Shock Resistance**	15gn											
***Weight**	26g [0.92 oz]						36g [1.27 oz]					
***Environmental Protection**	IP40											
***NEMA B300 Pilot Duty Rated**	Yes											
****Agency Approvals and Standards**	UL Recognized File E191059, CE, CSA											
Coil Specifications												
***Standard**	Mechanical flag indicator, LED Indicator, lockable push to test button											
***Coil Input Voltage**	12VDC	12VAC	24VDC	24VAC	120VAC	240VAC	12VDC	12VAC	24VDC	24VAC	120VAC	240VAC
***Coil Resistance**	115Ω	44Ω	450Ω	177Ω	4.43kΩ	17.72kΩ	177Ω	44Ω	640Ω	177Ω	4.43 kΩ	17.72 kΩ
***Power Consumption**	1.4 W DC, 1.9 W AC @ 50/60 Hz						1.15 W DC, 1.4 W AC @ 50/60 Hz					
***Dropout Voltage (% of nominal voltage or more)**	10%	15%	10%	15%			10%	15%	10%	15%		
***Pull-in Voltage (% of nominal voltage or less)**	85%	85%	85%	85%			80%	85%	80%	85%		
***Max. Voltage (Max. continuous voltage)**	110% of the rated coil voltage											
Contact Specifications												
***Contact Type**	SPDT						DPDT					
***Contact Material**	Silver alloy, gold flashed											
***Minimum Switching Requirement**	10mA @ 17VDC											
***Max. Contact Rating**	Refer to Contact Ratings charts.											
***Dielectric Strength Between Contacts**	Between coil contact: 2000V rms; Between poles 2000V rms; Between contacts 1500V rms											

***Note: These devices are rated for 1,000 cycles when used in a motor application. (Per Table 45.1, UL 508).**
****Note: UL listed when used with sockets 781-1C-SKT, 782-2C-SKT, 783-3C-SKT, or 784-4C-SKT-1. Current limited to rating of relay or socket, whichever is less.**

NEMA Mechanical Switching Ratings and Test Values for AC Control Circuit Contacts											
Contact Rating Designation	**Thermal Continuous Test Current (A)**	**Maximum AC Current, 50/60Hz (A)**								**Voltamperes**	
		120 Volts		**240 Volts**		**480 Volts**		**600 Volts**			
		Make	**Break**	**Make**	**Break**	**Make**	**Break**	**Make**	**Break**	**Make**	**Break**
B300	5	30	3.00	15	1.50	---	---	---	---	3600	360

This chart is provided as a guideline only, and the ratings and values are not guaranteed to be accurate. It is the users' responsibility to properly size their control circuit devices. The chart values are from NEMA Standard ICS 5-2000, Table 1-4-1.

Contact Ratings 781 Series (current)				
Resistive				***Motor Load**
Voltage	**Nominal**	**UL**	**CSA**	**UL**
28VDC	15A	15A	12A	---
120VAC	15A	15A	15A	1/2Hp
277VAC	15A	12A	12A	1Hp

Contact Ratings 782 Series (current)				
Resistive				***Motor Load**
Voltage	**Nominal**	**UL**	**CSA**	**UL**
28VDC	15A	15A	12A	---
120VAC	15A	15A	15A	1/2Hp
277VAC	15A	12A	12A	1Hp

Electromechanical Relays 78 Series Specifications

Electromechanical Relay 78 Series Specifications													
Part Numbers	***783-3C-12D***	***783-3C-12A***	***783-3C-24D***	***783-3C-24A***	***783-3C-120A***	***783-3C-240A***	***784-4C-12D***	***784-4C-12A***	***784-4C-24D***	***784-4C-24A***	***784-4C-120A***	***784-4C-240A***
General Specifications													
****Service Life: Mechanical / Electrical Operations***	Mechanical: 10,000,000 operations not powered												
	Electrical: 100,000 operations @ rated resistive load												
Operating Temperature	-40 to 55°C [-40 to 131°F]												
Response Time	20ms												
Vibration Resistance	± 1mm [10-35 Hz] and 3gn [35-100 Hz]												
Shock Resistance	15gn												
Weight	60g [2.12 oz]						80g [2.82 oz]						
Environmental Protection	IP40												
NEMA B300 Pilot Duty Rated	Yes												
*****Agency Approvals and Standards***	UL Recognized File E191059, CE, CSA												
Coil Specifications													
Standard	Mechanical flag indicator, LED Indicator, lockable push to test button												
Coil Input Voltage	12VDC	12VAC	24VDC	24VAC	120VAC	240VAC	12VDC	12VAC	24VDC	24VAC	120VAC	240VAC	
Coil Resistance	80Ω	30Ω	320Ω	110Ω	2.88 kΩ	11.3 kΩ	76Ω	20Ω	303Ω	80Ω	2.1 kΩ	8kΩ	
Power Consumption	1.85 W DC, 2.05 W AC @ 50/60 Hz						1.5 W DC, 1.5 W AC @ 50/60 Hz						
Dropout Voltage (% of nominal voltage or more)	10%	15%	10%	15%			10%	15%	10%	15%			
Pull-in Voltage (% of nominal voltage or less)	80%	85%	80%	85%			80%	85%	80%	85%			
Max. Voltage (Max. continuous voltage)	110% of the rated coil voltage												
Contact Specifications													
Contact Type	3PDT						4PDT						
Contact Material	Silver alloy, gold flashed												
Minimum Switching Requirement	10mA @ 17VDC												
Max. Contact Rating	Refer to Contact Ratings charts.												
Dielectric Strength Between Contacts	Between coil and contacts: 2000V rms; Between poles: 2000V rms; Between contacts: 1500V rms												

***Note: These devices are rated for 1,000 cycles when used in a motor application. (Per Table 45.1, UL 508).**
****Note: UL listed when used with sockets 781-1C-SKT, 782-2C-SKT, 783-3C-SKT, or 784-4C-SKT-1. Current limited to rating of relay or socket, whichever is less.**

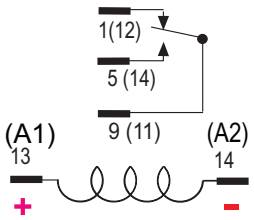
Contact Ratings 783 Series (current)				
Resistive				****Motor Load***
Voltage	***Nominal***	***UL***	***CSA***	***UL***
28VDC	15A	15A	15A @ 28VDC 30A max total	–
120VAC	15A	–	15A	1/2 hp
277VAC	15A	15A	15A @ 150VAC 30A max total	1hp 2hp max total

Contact Ratings 784 Series (current)				
Resistive				****Motor Load***
Voltage	***Nominal***	***UL***	***CSA***	***UL***
28VDC	15A	15A	15A @ 28VDC 30A max total	–
120VAC	15A	–	15A	1/2Hp
277VAC	15A	15A	15A @ 150VAC 30A max total	1hp 2hp max total

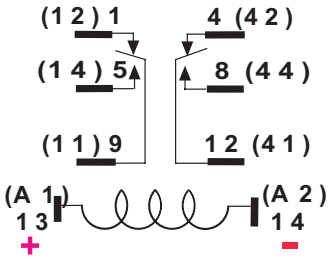
Wiring Diagrams 78 Series

Wiring Diagrams (viewed from pin end)

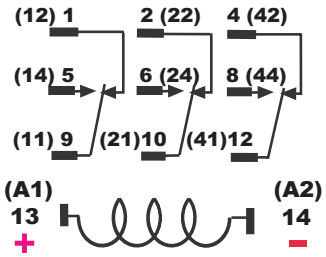
781-1C-XXX



782-2C-XXX



783-3C-XXX



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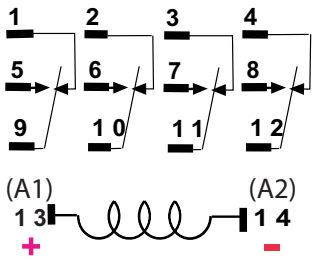
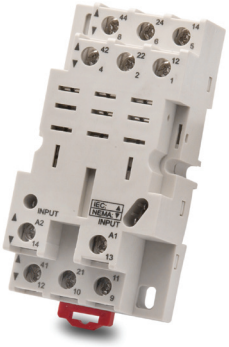


*Note: ALTERNATE NEMA OR IEC ( ) NUMBERS, VIEWED FROM PIN SIDE

Relay Sockets 78 Series

781-1C-SKT

782-2C-SKT



783-3C-SKT

784-4C-SKT-1

Relay Sockets 78 Series				
Part Number	***Price***	***Description***	***Drawing Link***	***Agency Approval***
781-1C-SKT	$4.50	AutomationDirect relay socket, 35mm DIN rail or panel mount. For use with 781 series cube relays.	PDF	UL Recognized file number: E225080
782-2C-SKT	$4.50	AutomationDirect relay socket, 35mm DIN rail or panel mount. For use with 782 and AD-70S2 series cube relays.	PDF	
783-3C-SKT	$5.00	AutomationDirect relay socket, 35mm DIN rail or panel mount. For use with 783 series cube relays.	PDF	
784-4C-SKT-1	$5.25	AutomationDirect relay socket, 35mm DIN rail or panel mount. For use with 784 series cube relays.	PDF	

Relay Sockets 78 Series Screw Torques and Wire Sizes		
Part Number	***Maximum Screw Torques***	***Maximum Wire Sizes***
781-1C-SKT	Terminals 13, 14: 7 in·lbs/0.8 N·m Terminals 1, 5, 9: 9 in·lbs/1.0 N·m	Terminals 13, 14: 18 to 20 AWG, solid or stranded, one or two identical wires Terminals 1, 5, 9: 12 to 20 AWG, solid or stranded, one or two identical wires
782-2C-SKT	All terminals: 9 in·lbs/1.0 N·m	All terminals: 12 to 20 AWG, solid or stranded, one or two identical wires
783-3C-SKT		
784-4C-SKT-1		

Note: Order sockets separately; holding clips are included with sockets.

Packaged M.O.V.s and Diodes

Overview

Metal Oxide Varistors (MOV) and Diode circuits are offered as convenient plug-in modules. Plugging a module into the relay socket connects the circuit in parallel with the relay coil. No additional wiring is required.

Modules fit within the maximum dimensions of the relay and socket.

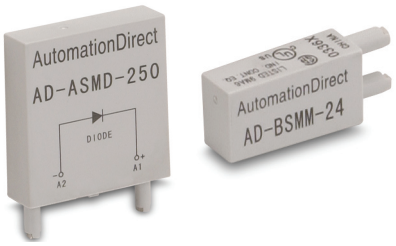
Features

- MOVs protect by shunting potentially damaging electrical spikes away from the relay coil. Ideal for AC and DC applications.
- Diodes protect external drive circuitry from inductive voltages generated when removing coil voltage.
  Ideal for DC applications.
  Polarity sensitive.

Application

Many PLC systems control one or more inductive load devices. These inductive loads (devices with a coil) generate transient voltages when they are de-energized with a relay contact. When a relay contact is closed it "bounces", which causes the coil to energize and de-energize until the "bouncing" stops. The transient voltage which is generated is much larger in amplitude than the supply voltage, especially with a DC supply voltage.

When switching a DC-supplied inductive load the full supply voltage is always present when the relay contact opens (or "bounces"). When switching an AC-supplied inductive load, if the voltage is not zero when the relay contact opens, there is energy stored in the inductor that is released when the voltage to the inductor is suddenly removed. This release of energy is what produces transient voltages.



When inductive load devices (motors, motor starters, interposing relays, solenoids, valves, etc.) are controlled with relay contacts, it is recommended that a surge suppression device be connected directly across the coil of the field device. If the inductive device has plug-type connectors, the suppression device can be installed on the terminal block of the relay output.

Metal oxide varistors (MOV) and diodes are devices which provide good surge and transient suppression of AC and DC powered coils.

Protection Devices

Part Number	Price	QTY	Description	Nominal Input Voltage	Dimensions & Package	Mating Socket
AD-ASMD-250	$11.00	5	Protection diode module for 783, 784 and 75 series relays.	6-250VDC	Figure 1	783-3C-SKT 784-4C-SKT-1 750-2C-SKT 750-3C-SKT
AD-ASMM-24	$9.25	5	MOV module for 783, 784 and 75 series relays that operate at 24VAC coil voltage.	24VAC/VDC		
AD-ASMM-120	$9.25	5	MOV module for 783, 784 and 75 series relays that operate at 120VAC coil voltage.	120VAC/VDC		
AD-ASMM-240	$9.25	5	MOV module for 783, 784 and 75 series relays that operate at 240VAC coil voltage.	240VAC/VDC		
AD-BSMD-250	$9.25	5	Protection diode module for 782 series relays.	6-250VDC	Figure 2	782-2C-SKT
AD-BSMM-24	$9.25	5	MOV module for 782 series relays that operate at 24VAC coil voltage.	24VAC/VDC		
AD-BSMM-120	$9.25	5	MOV module for 782 series relays that operate at 120VAC coil voltage.	120VAC/VDC		
AD-BSMM-240	$9.25	5	MOV module for 782 series relays that operate at 240VAC coil voltage.	240VAC/VDC		

Dimensions

inches [mm]

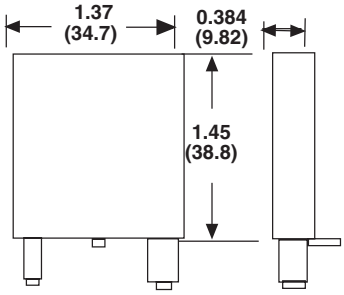


Figure 1

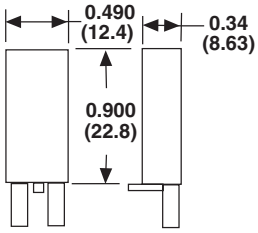


Figure 2