# 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	ecognized (E191059), CE, Std 947-4-1 and 947-5-1, IEC Std 947-4-1 and 947-5-1,		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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		Electron	nechanical Re	elays 78 Serie	S		
Part Number	Price	Drawing Link	Coil Voltage	Configuration	Relay Socket Part Number	Price	Drawing Link
<u>781-1C-12D</u>	\$5.25	<u>PDF</u>	12VDC				
<u>781-1C-12A</u>	\$5.25	PDF	12VAC				
<u>781-1C-24D</u>	\$5.00	PDF	24VDC	- SPDT	781-1C-SKT	\$4.50	PDF
<u>781-1C-24A</u>	\$5.25	PDF	24VAC	J SFD1	<u>787-70-381</u>	φ4.50	
<u>781-1C-120A</u>	\$5.25	PDF	120VAC	_			
<u>781-1C-240A</u>	\$6.25	PDF	240VAC				
<u>782-2C-12D</u>	\$6.50	PDF	12VDC				
782-2C-12A	\$6.50	PDF	12VAC		<u>782-2C-SKT</u>		
<u>782-2C-24D</u>	\$6.50	PDF	24VDC				555
782-2C-24A	\$6.75	N/A	24VAC	- DPDT		\$4.50	<u>PDF</u>
782-2C-120A	\$6.75	N/A	120VAC				
782-2C-240A	\$7.50	N/A	240VAC				
783-3C-12D	\$6.75	PDF	12VDC				
<u>783-3C-12A</u>	\$9.00	PDF	12VAC				
<u>783-3C-24D</u>	\$9.50	N/A	24VDC	- 3PDT	783-3C-SKT	\$5.00	PDF
<u>783-3C-24A</u>	\$9.50	N/A	24VAC	SPDT	<u>703-30-511</u>	φο.00	
<u>783-3C-120A</u>	\$9.50	N/A	120VAC				
<u>783-3C-240A</u>	\$9.50	N/A	240VAC				
<u>784-4C-12D</u>	\$8.50	PDF	12VDC				
<u>784-4C-12A</u>	\$11.00	PDF	12VAC				
<u>784-4C-24D</u>	\$8.75	PDF	24VDC	4007	704 40 OKT 4	¢5.05	DDE
784-4C-24A	\$8.75	N/A	24VAC	4PDT	<u>784-4C-SKT-1</u>	\$5.25	<u>PDF</u>
<u>784-4C-120A</u>	\$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.

# 1-800-633-0405 **Electromechanical Relays 78 Series Specifications**

Electrom	echan	ical R	elays	78 S	eries S	Specifi	catio	18				
Part Numbers	781-1C-12D	781-1C-12A	781-1C-24D	781-1C-24A	781-1C-120A	<u>781-1C-240A</u>	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						10,000,000 000 operati		· ·				
Operating Temperature					-4	0 to 55°C [-	40 to 131	°F]				
Response Time						201	ns					
Vibration Resistance					±1mm	[10-35 Hz]	and 3gn [	35-50Hz]				
Shock Resistance						15	gn					
Weight			26g [(	).92 oz]					36g	[1.27 oz]		
Environmental Protection						IP4	40					
NEMA B300 Pilot Duty Rated						Ye						
**Agency Approvals and Standards					UL Reco	gnized File	E191059	, CE, CS	A			
Coil Specifications												
Standard			Me	chanical	flag indicat	or, LED Ind	icator, loc	kable pus	sh to test I	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 V	N AC @ 5	50/60 Hz			1.15	W DC, 1.4	WAC @	) 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 rat	ed coil vo	ltage				
Contact Specifications												
Contact Type			SF	PDT					[	OPDT		
Contact Material	Silver alloy, gold flashed											
Minimum Switching Requirement	10mA@ 17VDC											
Max. Contact Rating	Refer to Contact Ratings charts.											
Dielectric Strength Between Contacts		Betw	een coil c	ontact: 20	000V rms; I	Between po	les 2000	/ rms; Be	etween co	ntacts 15	00V 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.

NEM	NEMA Mechanical Switching Ratings and Test Values for AC Control Circuit Contacts										
			Maximum AC Current, 50/60Hz (A)							Voltamperes	
Contact Rating Designation	Thermal Continuous Test Current (A)	120 Volts 240 Volts		480 Volts		600 Volts					
Doorgination		Make	Break	Make	Break	Make	Break	Make	Break	Make Break	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)									
	*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								
Voltage	Nominal	UL	CSA	UL					
28VDC	15A	15A	12A						
120VAC	15A	15A	15A	1/2Hp					
277VAC	15A	12A	12A	1Hp					

# 1-800-633-0405 **Electromechanical Relays 78 Series Specifications**

Electromed	hanio	cal R	elay 1	78 Se	ries S	pecifi	cation	S				
Part Numbers	<u>783-3C-12D</u>	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						10,000,000 000 operat	· ·	I				
Operating Temperature					-4	0 to 55°C	[-40 to 13	1°F]				
Response Time						20	ms				-	
Vibration Resistance	± 1mm [10-35 Hz] and 3gn [35-100 Hz]											
Shock Resistance				-		15	ign					
Weight			60g [	2.12 oz]					80g [2	2.82 oz]		
Environmental Protection							40					
NEMA B300 Pilot Duty Rated			-	-			es					
**Agency Approvals and Standards					UL Reco	gnized File	E19105	9, CE, CS	SA			
Coil Specifications												
Standard						or, LED Inc				button		
Coil Input Voltage	12VDC	12VAC				240VAC	12VDC			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 V	V AC @ 9	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 ra	ted coil vo	oltage				
Contact Specifications												
Contact Type	3PDT 4PDT											
Contact Material	Silver alloy, gold flashed											
Minimum Switching Requirement						10mA @	) 17VDC					
Max. Contact Rating					Refe	r to Contac	t Ratings	charts.				
Dielectric Strength Between Contacts		Between	coil and o	contacts:	2000V rms	s; Between	poles: 20	00V rms	Between	contacts	: 1500V rm	ıs

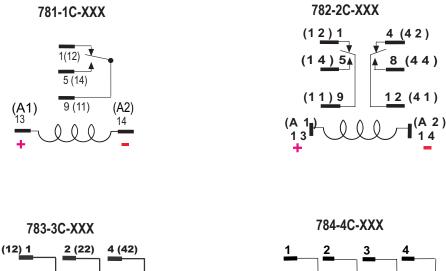
\*Note: These devices are rated for 1,000 cycles when used in a motor application. (Per Table 45.1, UL 508). \*\*Note: UL listed when used with sockets 781-1C-SKT, 782-2C-SKT, 783-3C-SKT, or 784-4C-SKT-1. Current limited to rating of relay or socket, whichever is less.

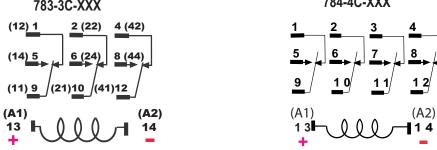
Conta	Contact Ratings 783 Series (current)										
	Resistive										
Voltage	Nominal	UL	CSA	UL							
28VDC	15A	15A	15A @ 28VDC 30A max total	-							
120VAC	15A	-	15A	1/2 hp							
277VAC	15A	15A	15A @ 150VAC 30A max total	1hp 2hp max total							

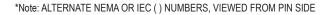
Conta	ct Ratii	4 Series	(current)			
	Res	istive		*Motor Load		
Voltage	Nominal	UL	CSA	UL		
28VDC	15A	15A	15A @ 28VDC 30A max total	-		
120VAC	15A	-	15A	1/2Hp		
277VAC	15A	15A	15A @ 150VAC 30A max total	1hp 2hp max total		

## 1-800-633-0405 Wiring Diagrams 78 Series

## Wiring Diagrams (viewed from pin end)







## 1-800-633-0405 Relay Sockets 78 Series



	Relay Sockets 78 Series										
Part Number	art Number Price Description										
<u>781-1C-SKT</u>	\$4.50	AutomationDirect relay socket, 35mm DIN rail or panel mount. For use with 781 series cube relays.	PDF								
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	UL Recognized							
<u>783-3C-SKT</u>	\$5.00	AutomationDirect relay socket, 35mm DIN rail or panel mount. For use with 783 series cube relays.	PDF	file number: E225080							
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								
<u>781-1C-SKT</u>	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								
<u>782-2C-SKT</u> <u>783-3C-SKT</u>	All terminals: 9 in·lbs/1.0 N·m	All terminals: 12 to 20 AWG, solid or stranded, one or two identical wires								
784-4C-SKT-1										

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

# 1-800-633-0405 For Packaged M.O.V.s and Diodes

## Overview

Metal Oxide Varistors (MOV) and Diode circuits are offered as convenient plugin 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.





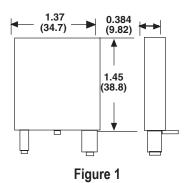
When inductive load devices (motors, motor starters, interposing relays, solenoids, valves, etc.) are controlled with relay contacts, it is recommended that a surge suppression device be connected directly across the coil of the field device. If the inductive device has plug-type connectors, the suppression 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					
<u>AD-ASMD-250</u>	\$11.00	5	Protection diode module for 783, 784 and 75 series relays.	6-250VDC							
AD-ASMM-24	\$9.25	5	MOV module for 783, 784 and 75 series relays that operate at 24VAC coil voltage.	24VAC/VDC		783-3C-SKT 784-4C-SKT-1 750-2C-SKT 750-3C-SKT					
<u>AD-ASMM-120</u>	\$9.25	5	MOV module for 783, 784 and 75 series relays that operate at 120VAC coil voltage.	120VAC/VDC	Figure 1						
<u>AD-ASMM-240</u>	\$9.25	5	MOV module for 783, 784 and 75 series relays that operate at 240VAC coil voltage.	240VAC/VDC							
<u>AD-BSMD-250</u>	\$9.25	5	Protection diode module for 782 series relays.	6-250VDC							
AD-BSMM-24	\$9.25	5	MOV module for 782 series relays that operate at 24VAC coil voltage.	24VAC/VDC							
<u>AD-BSMM-120</u>	\$9.25	5	MOV module for 782 series relays that operate at 120VAC coil voltage.	120VAC/VDC	Figure 2	<u>782-2C-SKT</u>					
<u>AD-BSMM-240</u>	\$9.25	5	MOV module for 782 series relays that operate at 240VAC coil voltage.	240VAC/VDC							

#### Dimensions

inches [mm]



0.490 (12.4) 0.900 (22.8)



