



T91 series

SMALL, LOW COST
30 AMP PC BOARD OR
PANEL MOUNT RELAY

File E22575

File LR15734

FEATURES

- Up to 30 amp switching in SPST and 20 amp in SPDT arrangements.
- Choice of dust cover or immersion cleanable^(note 6), plastic sealed case.
- Meets UL 873 and UL 508 spacing - 1/8" through air, 1/4" over surface.
- Load connections made via 1/4" quick connect terminals.
- Safety wells accept insulated female quick connect terminals.
- UL Class F insulation system standard.

CONTACT DATA @ 25°C

Arrangements: 1 Form A (SPST-NO), 1 Form B (SPST-NC) and 1 Form C (SPDT).

Material: Code 1 - Silver; Code 2 - Silver-cadmium oxide.

Mechanical Life: AC Coil: 1 million operations, typical.

DC Coil: 10 million operations, typical.

TYPICAL ELECTRICAL LOAD & LIFE

Operations	Contact Load	Type of Load	Contact Form
Silver-Cadmium Oxide Contacts - DC Coil			
100,000	30A @ 240VAC	UL General Purpose	Form A
100,000	20A @ 240VAC	Resistive Heater	Form A
100,000	20A/10A @ 240VAC	UL General Purpose	NO/NC Form C
100,000	20A/10A @ 28VDC	Resistive	NO/NC Form C
Silver-Cadmium Oxide Contacts - AC Coil			
100,000	20A/15A @ 240VAC	Resistive	NO/NC Form C
100,000	15A/7.5A @ 28VDC	Resistive	NO/NC Form C
Silver Contacts - DC Coil			
100,000	10A/5A @ 240VAC or 28VDC	Resistive	NO/NC Form C

Minimum Contact Load: Silver: 500mA @ 5VDC or 12VAC.

Silver-Cadmium Oxide: 1A @ 5VDC or 12VAC.

Initial Contact Resistance: 75 milliohms, max., @ 500mA, 12VDC.

INITIAL DIELECTRIC STRENGTH

Between Open Contacts: 1,500V rms.

Between Contacts and Coil: DC Coil: 2,500V rms; AC Coil: 1,500V rms.

INITIAL INSULATION RESISTANCE

Between Mutually Insulated Elements: 10⁹ ohms, min., @ 500VDC, 25°C and 50% R.H.

COIL DATA @ 25°C

Voltage: 5 to 110VDC and 12 to 240VAC.

Nominal Coil Power: DC Coil: 0.9W, approx.; AC Coil: 2VA, approx.

Maximum Coil Temperature^(note 3): Class F: 140°C.

Duty Cycle: Continuous.

COIL DATA

DC COILS			AC COILS		
Nominal Voltage	DC Resistance ± 10% (Ohms)	Nominal Current (mA)	Nominal Voltage	DC Resistance ± 10% (Ohms)	Nominal Current (mA)
5	27	185	12	26	167
6	40	150	24	106	83
9	97	93	48	432	42
12	155	77	120	2,950	17
15	256	59	240	13,110	8.3
18	380	47			
24	660	36			
48	2,560	19			
110	10,330	11			

OPERATE DATA @ 25°C

Must Operate Voltage: AC Coil: 85% of nominal voltage or less.

DC Coil: 75% of nominal voltage or less.

Must Release Voltage: 10% of nominal voltage or more.

Operate Time (Including Bounce): DC Coil: 15 ms, max.

AC Coil: 20 ms, max.

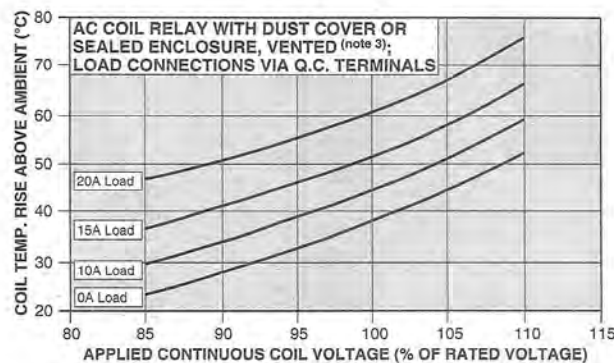
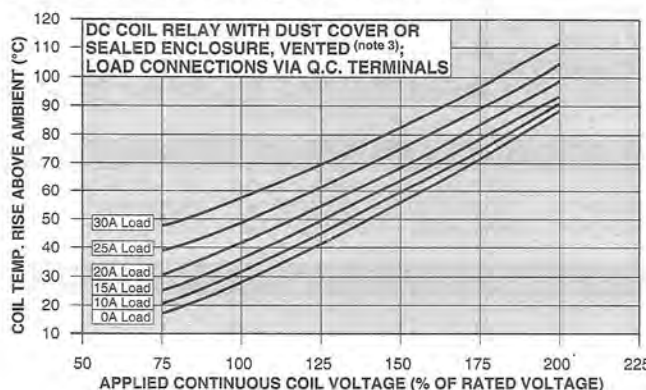
Release Time (Including Bounce): DC Coil: 10 ms, max.

AC Coil: 15 ms, max.

§ At or From Nominal Coil Voltage

TYPICAL COIL TEMPERATURE RISE

Data below are average values and should be verified in application. Tests were conducted within a 2' (.6 m) cube (still air) with relay mounted to a 30A, single side P.C. board^(note 5); at nominal coil power @ 25°C; with normally open contact loaded; and with 4' (1.22 m) long, #10 AWG load wires.



ENVIRONMENTAL DATA

Storage Temperature Range: -40°C to 130°C.

Operating Temperature Range^(note 1): DC Coil: -55°C to +85°C.

AC Coil: -55°C to +80°C.

Vibration, Operational: 0.065" (1.65 mm) max. excursions from 10-55 Hz. with no contact opening >100µs.

Shock, Operational: 10 g for 11 ms with no contact opening >100µs.

Shock, Mechanical: 100 g.

MECHANICAL DATA

Termination: Printed circuit and quick connect terminals^(note 4).

Enclosures (all have 94V-O flammability rating):

T91P: Unsealed, plastic dust cover.

T91S: Immersion cleanable, tape sealed plastic case^(note 2).

Weight: 1.2 oz. (33 g) approximately.

NOTES

- 1.) Operating ambient temperature must consider "Must Operate Voltage Change Over Temperature," Contact Temperature Rise, Coil Temperature Rise (If coil is not allowed to cool) and Maximum Coil Temperature. Specification ambient considers 20A load with coil cooled to ambient.
- 2.) Sealed relay terminals should not be bent.
- 3.) Vent tape should be removed after cleaning process for optimum life of sealed relays.
- 4.) Maximum soldering temperature is 500°F for 4 seconds.
- 5.) Class F coils are UL systems approved for maximum coil temperature of 140°C, by change of resistance method.
- 6.) See application note 13C265 for proper relay mounting, termination, cleaning and PC board conductor width. Coil rise test performed with 30A PC board to maintain 20°C maximum rise @ 30A.

ORDERING INFORMATION

Typical Part Number>

T91 S 5 D 2 2 -12

1. BASIC SERIES:

T91 = Low cost, printed circuit board/panel power relay.

2. ENCLOSURE:

P = Unsealed, plastic dust cover. S = Immersion cleanable, tape sealed plastic case.

3. CONTACT ARRANGEMENT:

1 = 1 Form A (SPST-NO). 2 = 1 Form B (SPST-NC). 5 = 1 Form C (SPDT).

4. COIL INPUT:

A = AC Voltage D = DC Voltage

5. MOUNTING & TERMINATION:

2 = Printed circuit board mounting; PC terminals for coil & contacts, and .250" (6.35 mm) quick connects for contacts.
5 = Flanged mounting; .187" (4.75 mm) quick connects for coil and .250" (6.35 mm) quick connects for contacts.

6. CONTACT MATERIAL:

1 = Silver. 2 = Silver-cadmium oxide.

7. COIL VOLTAGE:

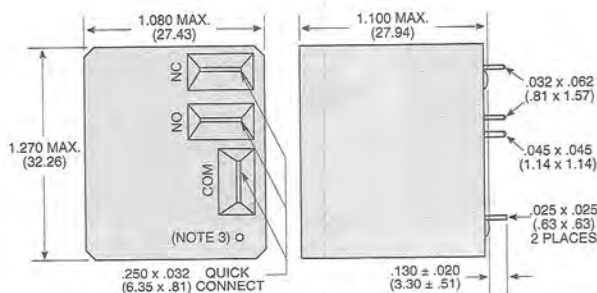
5 = 5VDC 6 = 6VDC 9 = 9VDC 12 = 12VDC/VAC 15 = 15VDC 18 = 18VDC
24 = 24VDC/VAC 48 = 48VDC/VAC 110 = 110VDC 120 = 120VAC 240 = 240VAC

STOCK ITEMS - The following items are normally maintained in stock for immediate delivery.

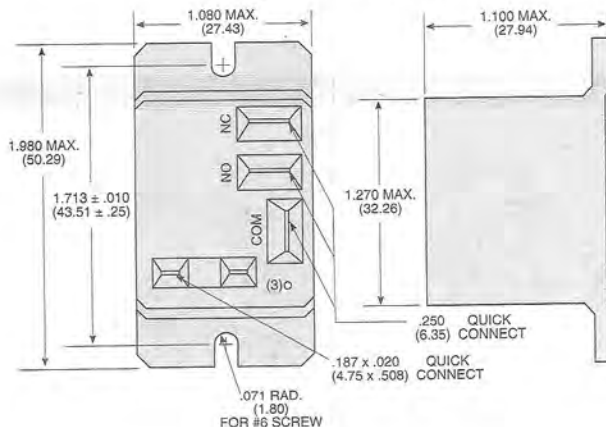
T91P1A52-24	T91P5A52-120	T91P5D52-12	T91S1A22-240	T91S2D22-24	T91S5D21-12	T91S5D52-12
T91P1A52-120	T91P5A52-240	T91P5D52-24	T91S1D22-5	T91S5A22-12	T91S5D21-24	T91S5D52-24
T91P1A52-240	T91P5D21-12	T91P5D52-48	T91S1D22-12	T91S5A22-24	T91S5D22-5	
T91P1D22-5	T91P5D21-24	T91P5D52-110	T91S1D22-24	T91S5A22-120	T91S5D22-12	
T91P1D22-12	T91P5D22-5	T91S1A22-12	T91S1D22-48	T91S5A22-240	T91S5D22-24	
T91P1D22-24	T91P5D22-12	T91S1A22-24	T91S1D22-110	T91S5A52-120	T91S5D22-48	
T91P5A52-24	T91P5D22-24	T91S1A22-120	T91S2D22-12	T91S5D21-5	T91S5D22-110	

OUTLINE DIMENSIONS

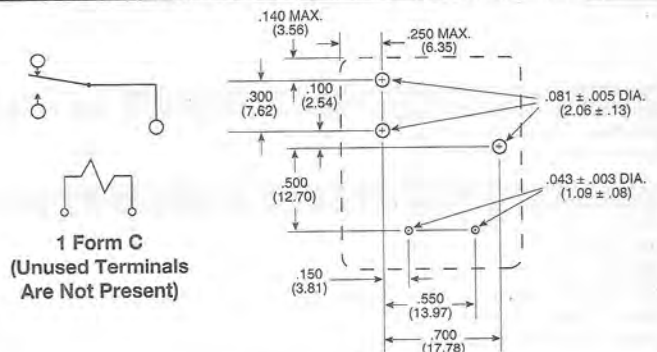
Mounting & Termination Style 2



Mounting & Termination Style 5



WIRING DIAGRAM & PC BOARD LAYOUT (Bottom Views)



UL 508/873 & CSA CONTACT RATINGS

Voltage	Load Type	N.O. Contact	N.C. Contact
Silver Contacts - AC and DC Coils			
240VAC	General Purpose	10A	5A
28VDC	Resistive	10A	5A
Silver-Cadmium Oxide Contacts - DC Coils			
240VAC	General Purpose†	30A	15A
240VAC	UL Resistive†	30A	15A
125VAC	Motor	1 HP	1/4 HP
120VAC	LRA/FLA†	98A/22A	-
240VAC	Motor	2 HP	1/2 HP
240VAC	LRA/FLA**†	80A/30A	30A/10A
240VAC	Tungsten*	TV-5	TV-3
240VAC	Pilot Duty	470VA	275VA
277VAC	Ballast	10A	3A
28VDC	Resistive	20A	10A
Silver-Cadmium Oxide Contacts - AC Coils			
240VAC	Resistive	20A	15A**
120VAC	Motor	1/2 HP	1/6 HP
240VAC	Motor	1 1/2 HP	1/3 HP
240VAC	LRA/FLA**	50A/11A	20A/10A**
240VAC	Tungsten*	TV-3	TV-3
28VDC	Resistive	15A	7.5A**

* Rated 25,000 operations.

** Higher UL & CSA ratings available.

† For Form C application, derate current to 67%.