

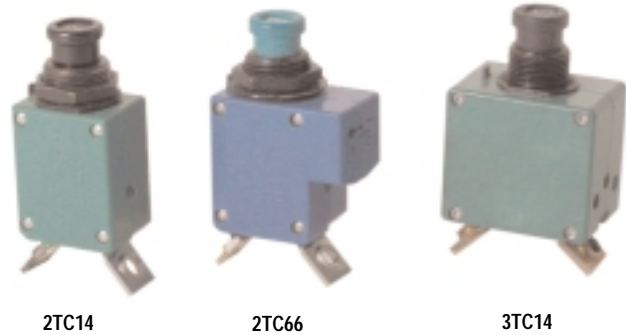


# Single Phase TC Series Circuit Breakers

## Miniature Ambient Compensated

### Features

- **Miniature size**
- **Light weight**
- **Trip free**
- **Mil-qualification**
- **Current rating 1-35 amperes**
- **Coordinated ratings**
- **High vibration resistance**
- **High interrupt capacity**



### Overview

Klixon® single-phase TC devices are the smallest, lightest aircraft circuit breakers available today. They represent “state-of-the-art” protection for today’s aerospace power systems. Their light weight and small size make them especially well suited for aircraft, avionics and electronic systems.

The Klixon trademark has set the standard for aerospace circuit breakers. Despite the small size, the TC series offers the endurance and reliability required by exacting military specifications, and are available in standard current ratings from 1 – 35 amperes.

### Coordination

The 2, 3, 6 and 9TC breaker ratings are coordinated so any rating will trip before another circuit breaker, twice its rating, in the event of a fault of up to 6000 amps let-thru current. This results in improved overall equipment performance, since only the smallest faulted circuit is interrupted, while larger circuits remain operational (see pages 6 and 7 for 6/9TC details).

### Ambient Temperature Compensation

Ambient compensated circuit breakers permit system designers to specify smaller gauge wire where the circuit breaker and wiring are exposed to different ambient temperatures. They are especially suited for applications where the ambient temperature exceeds the 160°F maximum of non-ambient compensated thermal circuit breakers. The TC series may be applied where operating temperatures are as high as 250°F (121°C), with no derating of the circuit breaker. This eliminates the need for cooling air and allows substantial weight, space and cost savings.

### Options\*

- Longer push buttons
- High vibration
- Random vibration
- Metric mounting thread
- Metric terminal thread
- Dust boot†
- Auxiliary switch - male and female contacts available
- Terminal barriers
- Plug-in terminals

### Trip Free

The complete line of TC series circuit breakers is trip free. The circuit breaker cannot be maintained closed during an overload even with the actuator button held closed.

### High Short Circuit Capacity

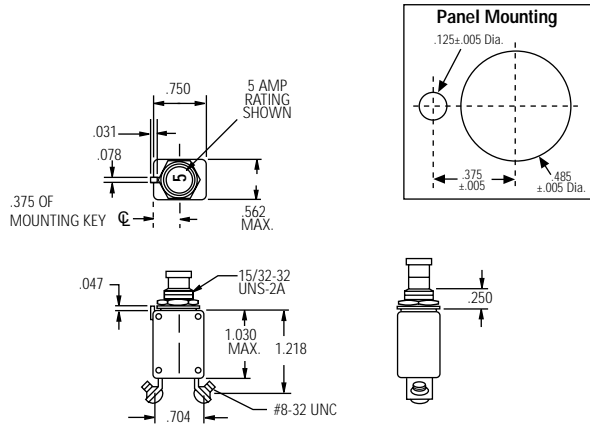
For its miniature size, the 2/3TC series offers unusually high current interrupting capacity. Overloads up to 6000 amps at 28 VDC or 2000-3500 amps at 120 VAC, 400 Hz can be safely interrupted without affecting calibration or operating performance in the standard 2/3TC series.

### Qualifications

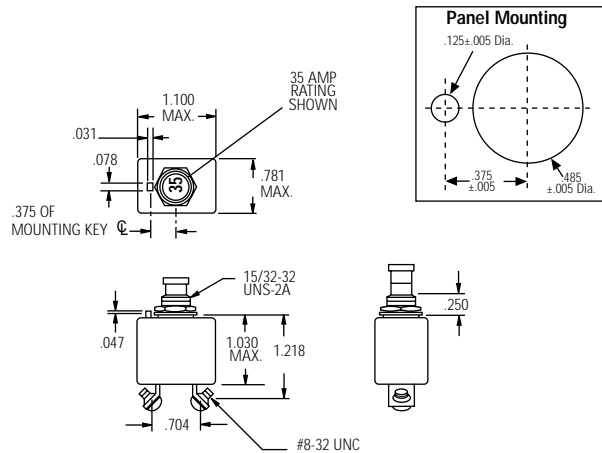
MS3320 - 2TC2  
MS3320L - 2TC27  
MS3320V - 2TC63  
MS14105 - 3TC2  
MS14105L - 3TC27  
European standards  
SAE standards  
All U.S. aircraft OEM's  
Most European aircraft OEM's

\* Contact factory for details  
† Part Number 14500-1 Fits 15/32 Bushing  
Part Number 14500-5 Fits 7/16 Bushing

### 2TC14



### 3TC14



### Calibration: 1-25 amps

TEMP °C	MIN ULT TRIP	MAX ULT TRIP	TRIP TIME - SECONDS		
			200%	500%	1000%
+25	115%	138%	4-16	.4-1.6	.10-.40
-54	115%	165%	7-35	.6-3.0	.15-.70
+121	85%	145%	2-13	.25-1.0	.06-.25

### Calibration: 15-35 amps

TEMP °C	MIN ULT TRIP	MAX ULT TRIP	TRIP TIME - SECONDS		
			200%	500%	1000%
+25	115%	138%	4-20	.40-1.7	.10-.40
-54	115%	165%	6-35	.55-3.0	.15-.70
+121	85%	145%	2-15	.25-1.0	.06-.25

Vibration\*..... 10 G's minimum, 50 - 500 Hz  
 Mechanical Shock..... 50 G's  
 Acceleration..... 10 G's  
 Weight..... 2TC14 - 24 gm max.  
 3TC14 - 36 gm max.

### Interrupt Current

1-20 amps: 6000 amps at 28 VDC  
 25 amps: 1625 amps at 28 VDC  
 1-15 amps: 2500 amps at 120 VAC, 400 Hz  
 20 amps: 2000 amps at 120 VAC, 400 Hz  
 25 amps: 1800 amps at 120 VAC, 400 Hz

### Endurance

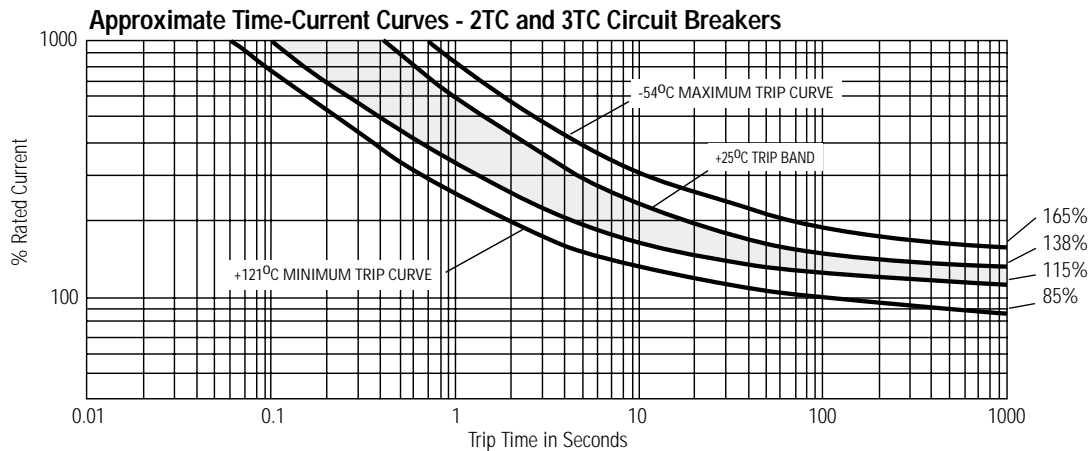
2500 cycles 120 VAC, 400 Hz Inductive  
 5000 cycles 120 VAC, 400 Hz Resistive  
 2500 cycles 30 VDC Inductive  
 5000 cycles 30 VDC Resistive  
 10,000 cycles Mechanical, no load

\* Other vibration levels available. Contact factory for details.

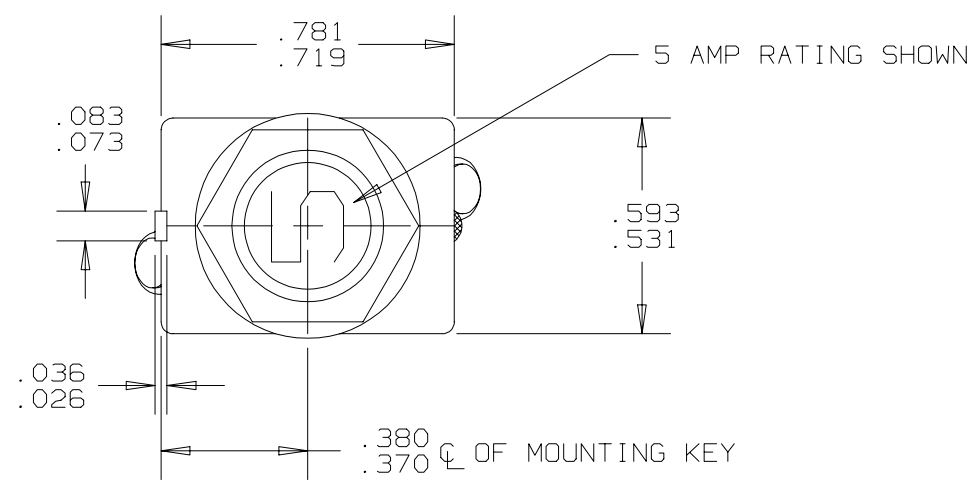
TI Number	Voltage Drop (max.)**
2TC14-1	1.10
2TC14-2	0.70
2TC14-2½	0.50
2TC14-3	0.40
2TC14-4	0.45
2TC14-5	0.35
2TC14-7½	0.30
2TC14-10	0.28
2TC14-15	0.25
2TC14-20	0.25
2TC14-25	0.20

TI Number	Voltage Drop (max.)**
3TC14-15	0.25
3TC14-20	0.25
3TC14-25	0.25
3TC14-30	0.25
3TC14-35	0.25

\*\*Max. voltage drop at nominal rated current.



REVISIONS						
ZONE	LTR	2TC63	DESCRIPTION	PROJ. 1041	DATE	APPROVED
	H	SEE ECN		ECN0017504 PAF	8-20-04	D.A.



- NOTES:
1. EPOXY SURFACES ARE NON-DIMENSIONED. ENVELOPE DRAWING DIMENSIONS DO NOT APPLY TO THESE PROJECTED EPOXY SURFACES.
  2. TERMINAL AND MOUNTING HARDWARE MAY BE PACKAGED RATHER THAN INSTALLED.
  3. COUNTRY OF ORIGIN IS SHOWN FOR ILLUSTRATION PURPOSES ONLY. COUNTRY OF ORIGIN TO BE IDENTIFIED AS REQUIRED.
  4. DATE CODE PER 10588-285.
  5. MARK IN APPROXIMATE POSITION SHOWN IN BLACK INK PER 12506-70.

PERFORMANCE CHARACTERISTICS

DETAIL PERFORMANCE PER MIL-C-5809 AND MS 3320 "V"

OVERLOAD CYCLING	100 CYCLES AT 200% RATING
VIBRATION	10 G'S CONDITION "C" 55-2000 HZ AND 15 G'S CONDITION "B" 10-2000 HZ
MECHANICAL SHOCK	50 G'S
ACCELERATION	10 G'S
SAND AND DUST	12 HOURS
CORROSION	SALT SPRAY 50 HOURS
HUMIDITY	10 DAYS
EXPLOSION PROOF	WHILE INTERRUPTING RUPTURE CURRENTS

ENDURANCE:

120 VAC	400 HZ INDUCTIVE	2500 CYCLES
30 VDC	400 HZ RESISTIVE	5000 CYCLES
	INDUCTIVE	2500 CYCLES
	RESISTIVE	5000 CYCLES
	NO LOAD	10000 CYCLES

CALIBRATION: 1 AMP THRU 25 AMP

	MIN. ULT. TRIP	MAX. ULT. TRIP	200%	500%	1000%
+25°C, +77°F	115% RATING	138% RATING	5-20 SEC.	.5-2.0 SEC.	.12-.53 SEC.
+121°C, +250°F	115% RATING	160% RATING	7-40 SEC.	.6-3.0 SEC.	.16-.8 SEC.
+121°C, +250°F	100% RATING	138% RATING	3-13 SEC.	.33-1.1 SEC.	.07-.3 SEC.

RUPTURE:

1 AMP	120 VAC, 400 HZ	3500 AMPS
2 AND 2 1/2 AMP	120 VAC, 400 HZ	2800 AMPS
3 THRU 15 AMP	120 VAC, 400 HZ	2500 AMPS
20 AMP	120 VAC, 400 HZ	2000 AMPS
1 THRU 20 AMP	28 VDC	6000 AMPS
25 AMP	28 VDC	1625 AMPS
25 AMP	120 VAC, 400 HZ	1800 AMPS

MAXIMUM OPERATING FORCES

PULL OUT ----- 5 LBS. MAX. (22.2 N)

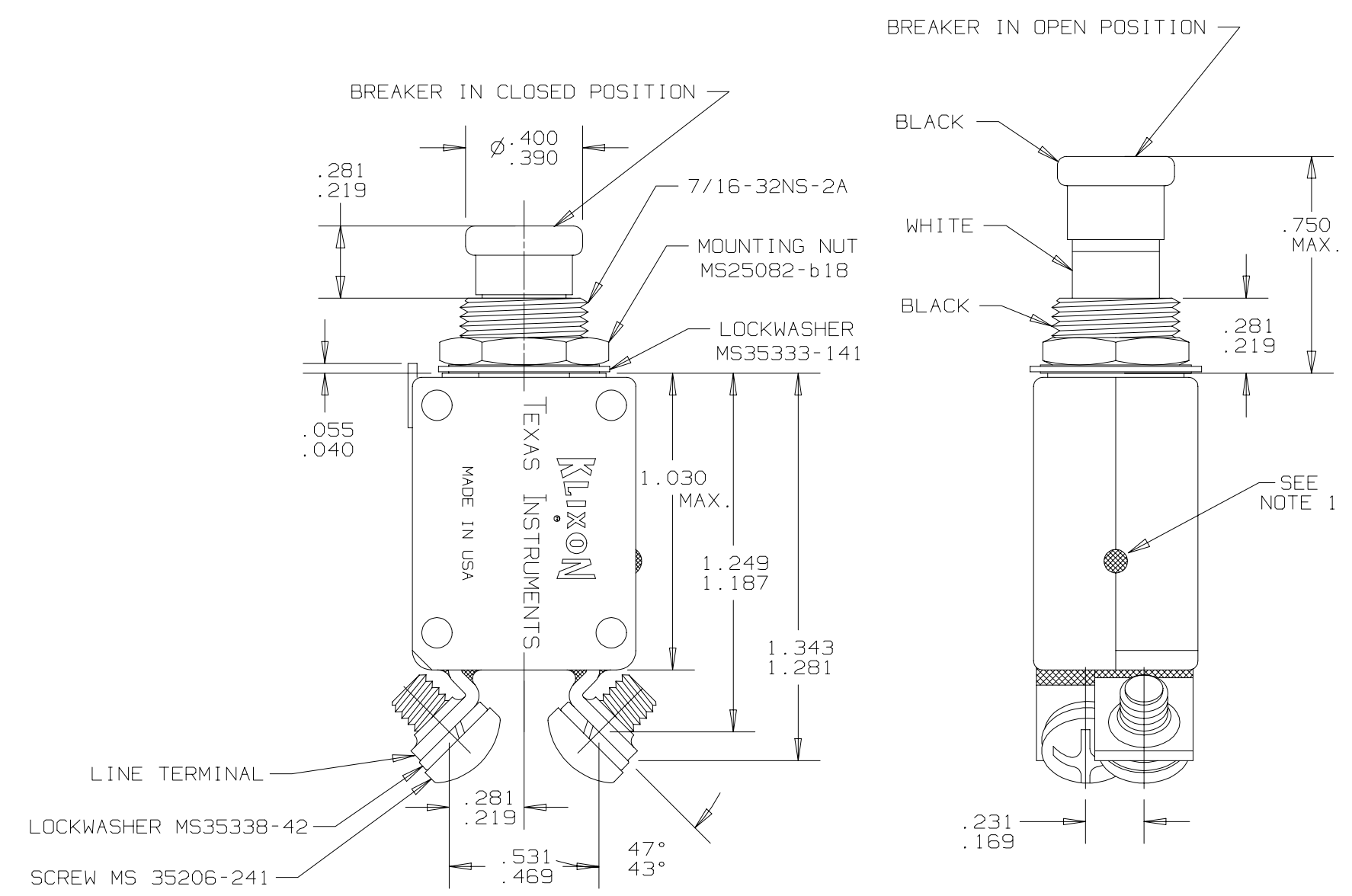
RESET ----- 5 LBS. MAX. (22.2 N)

OPERATING ALTITUDE: 70,000 FT. (21,000 M)

WEIGHT: 25.0 GRAMS MAX.

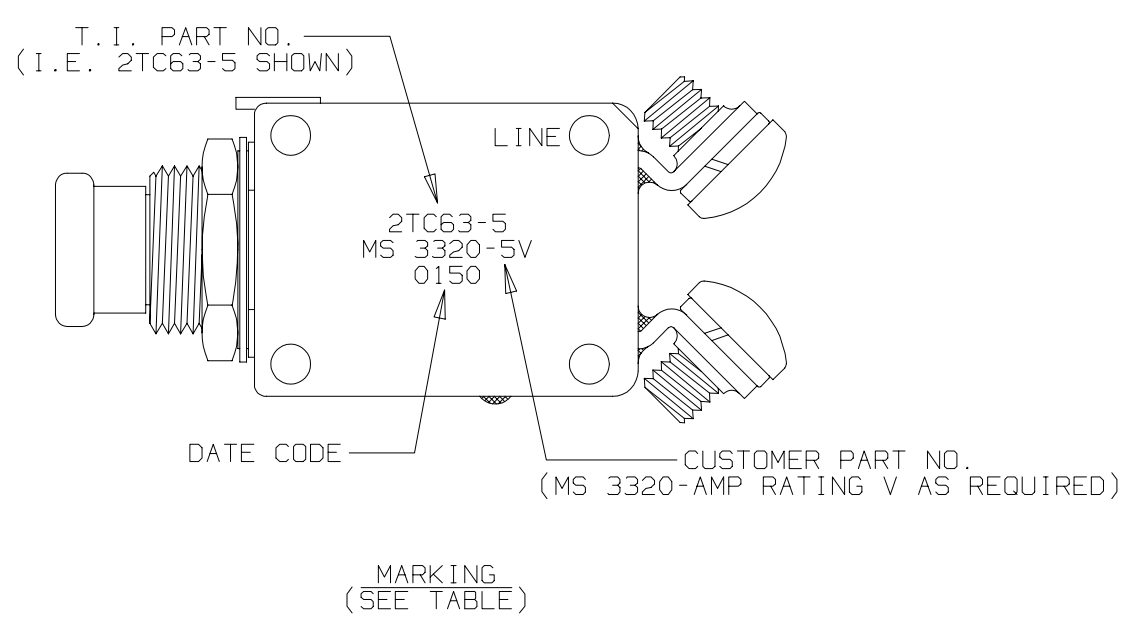
VOLTAGE DROP:

1 AMP	1.10 VOLTS MAX.
2 AMP	0.70 VOLTS MAX.
2.5 AMP	0.50 VOLTS MAX.
3 AMP	0.40 VOLTS MAX.
4 AMP	0.37 VOLTS MAX.
5 AMP	0.35 VOLTS MAX.
7.5 AMP	0.30 VOLTS MAX.
10 AMP	0.28 VOLTS MAX.
15 AMP	0.25 VOLTS MAX.
20 AMP	0.25 VOLTS MAX.
25 AMP	0.20 VOLTS MAX.



MARKING TABLE

2TC63-25	N/A
2TC63-20	MS 3320-20V
2TC63-15	MS 3320-15V
2TC63-10	MS 3320-10V
2TC63-7 1/2	MS 3320-7 1/2V
2TC63-5	MS 3320-5V
2TC63-4	MS 3320-4V
2TC63-3	MS 3320-3V
2TC63-2 1/2	MS 3320-2 1/2V
2TC63-2	MS 3320-2V
2TC63-1	-
T.I. PART NO.	MS PART NO.



THIS IS A CAD DRAWING. THE GEOMETRY IN THE ASSOCIATED CAD COMPUTER FILE IS DIMENSIONALLY ACCURATE. WHEN DRAWING IS BEING REVISED, THE GEOMETRY MUST BE UPDATED IN ALL VIEWS AND ON ALL SHEETS.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES	DRAWN TOM DAIL	DATE 10-30-89	 Texas Instruments ATTLEBORO, MASSACHUSETTS 02703  Klixon CONTROL PRODUCTS DIVISION
TOLERANCE ON FRACTIONS DECIMALS ANGLES	ENGINEER JACQUES CHAMMAS	DATE 12-4-89	
	APPROVED		TITLE PART NO. 2TC63 AMBIENT COMPENSATED, HIGH TEMP. CIRCUIT BREAKER PUSH-PULL, TRIP FREE ENVELOPE DRAWING
MATERIAL			SIZE CODE IDENT NO. C 82647
	SIGNATURES ON FILE. REFER TO ELECTRONIC CHANGE NOTICE.		2TC63
		SCALE: 4X	SHEET 1 OF 1