



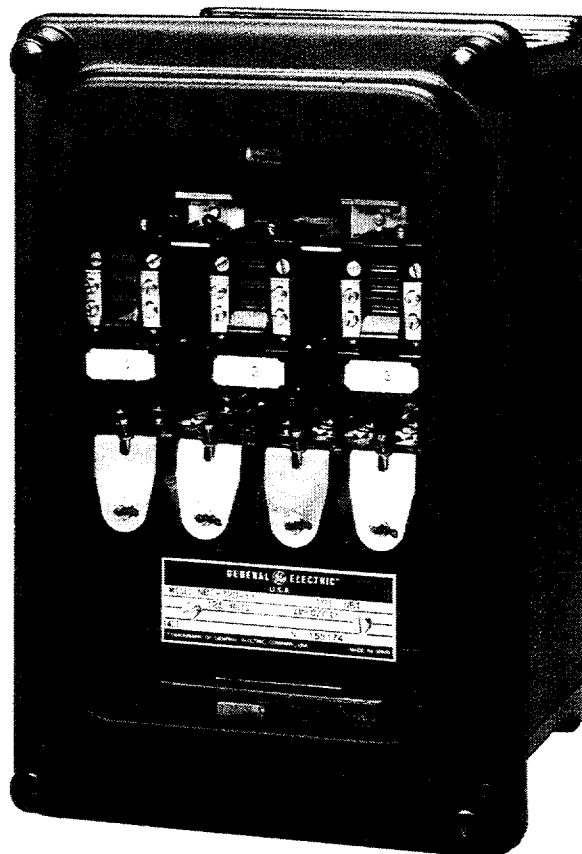
INSTRUCTIONS

GEK - 90573

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# BREAKER TRIP CIRCUIT SUPERVISION RELAY

## NBT



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**GENERAL**  **ELECTRIC**  
U. S. A.



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## 1. Figure list

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## 2. Application

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The type NBT relays have been designed to supervise the voltage level and opened circuit in the trip circuit of a breaker.

One NBT relay performs the supervision regardless of whether the circuit is opened or closed. Should the voltage supply drop or the trip circuit be opened, the output relay C is activated closing two contacts and opening a third one. These contacts can be used for alarm signaling, and blocking of the breaker closing circuit.

When the position of a breaker is changed, either trip or reclosing, the relay will not operate since it is provided with a 300 ms timer at rated voltage to allow time for switching of the breaker's auxiliary contacts 52a and 52b.

## 3. Construction

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The NBT relays are drawout type and have auxiliary relays (designated A, B, and C in the diagrams). These are low power relays to minimize the power consumption and heating since they are permanently energized, except when in operation. Although they are low power type relays, the contacts can carry high currents as indicated in **Table 1**.

## 4. Models

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### Relay type NBT12E

This relay is used for a breaker with one trip coil. Under normal conditions, relay A is permanently energized through 52a or 52b and the trip coil.

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$R_a$  and  $R'_a$  limit the current value below the minimum required to energize the tripping coil even in case of a short circuit in the auxiliary relay coil.

Should the voltage drop or there is an opened circuit, (for example, due to a wiring failure in the trip circuit) relay A as well as relay C would drop out, closing two contacts and opening a third one.

Both the trip circuits and signaling circuits may be powered by a single battery or by two separate batteries.

### Relay type NBT12F

This relay is identical to Model NBT12E with the addition of a signaling board located within the relay.

### Relay type NBT32E

This relay is used for a breaker with three trip coils (one per phase). This model has three signaling boards on the same relay to identify the defective phase.

MAXIMUM VOLTAGE		MAXIMUM CURRENT		BREAK RATING		
VDC	VAC	For 1s (A)	Continuous (A)	V < 300 VAC (W)	V < 40 VDC (W)	V < 60 VDC (W)
440	380	30	4	400	400	150

**Table 1.** Contact characteristics

RATED VOLTAGE VDC	NUMBER OF TRIP COILS TO BE SUPERVISED	MODEL	MINIMUM OPERATING VOLTAGE VDC	MAXIMUM CONTINUOUS VOLTAGE VDC	NUMBER OF SIGNALING BOARDS
125	1 1 3	NBT12E NBT12F NBT32E	90	140	--- 1 3

NUMBER OF OUTPUT CONTACTS	TOTAL BURDEN W/ PHASE	CASE SIZE	APPROXIMATE WEIGHT lb (kg)
2 NC and 1 NO	1.5	S-1 S-1 S-3	11 (5) 11 (5) 13 (6)

**Table 2.** Model selection guide

## 5. Technical specifications

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- Total time from failure of supervised circuit to trip of output relay C: 250-400 ms
- Power supply limits: 90 - 140 VDC
- Maximum ripple: 20%
- Measuring units (Connection diagram relays A and B)
  - Coil resistance:  $12 \text{ k}\Omega \pm 15\%$
  - Serial resistors ( $R_a, R'_a, R_b, R'_b$ ):  $2.5 \text{ k}\Omega \pm 10\%$
  - Operating current: 2.7 - 4 mA
  - Drop out current: 0.5 - 1.3 mA
  - Operating time: 25 - 45 ms
  - Drop out time: 125 - 200 ms
  - Measuring circuit current at 125 VDC: 7.3 - 9.7 mA
- Output unit (Connection diagram relay C).
  - Coil resistance:  $12 \text{ k}\Omega \pm 15\%$
  - Serial resistor (RC):  $1 \text{ k}\Omega \pm 10\%$
  - Operating current: 3.5 - 4.3 mA
  - Drop out current: 0.4 - 1 mA
  - Operating time: 45 - 65 ms
  - Drop out time: 125 - 200 ms
  - Measuring circuit current at 125 VDC: 8 - 10.8 mA
- Signaling units (Connection diagram relay S for models 32E and 12F)
  - Power consumption at 125 VDC: 11.6 - 14.2 mA



These units have a time delay of approximately 250 ms to avoid false signaling at the time of relay connection.

-Hi-pot test

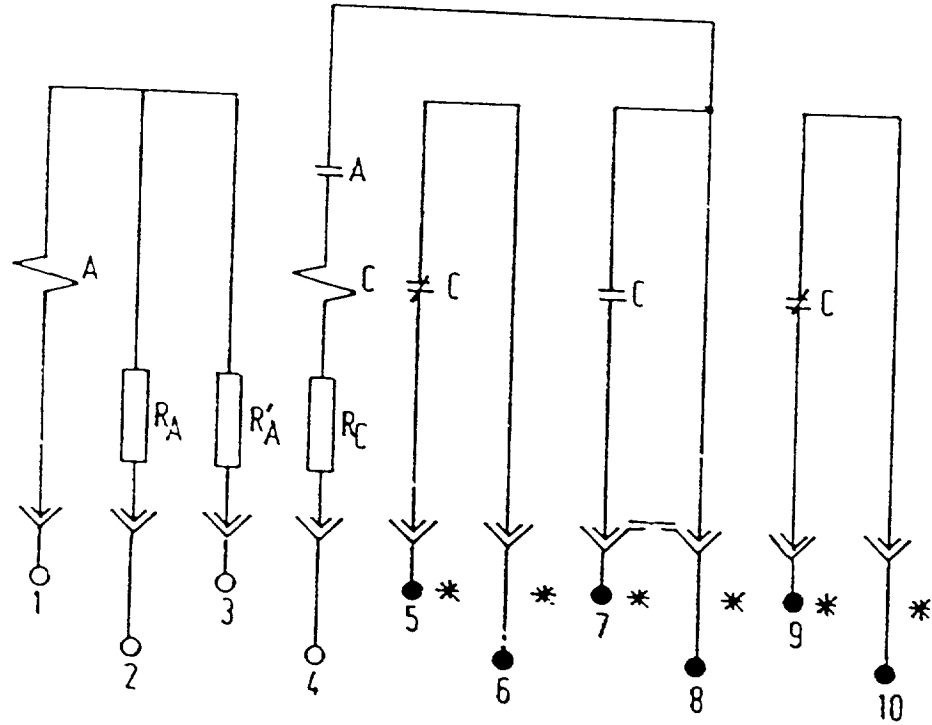
Between each terminal and the chassis:

2000 VAC during 1 minute at industrial frequency.

Between independent circuits:

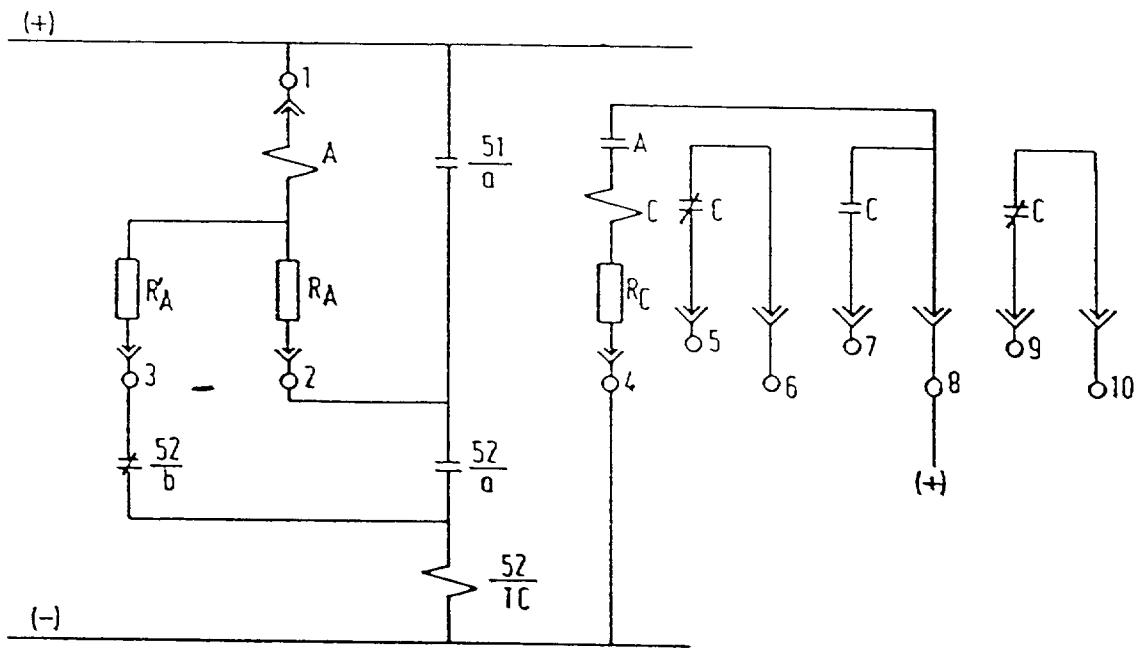
2000 VAC during 1 minute at industrial frequency.

# BREAKER TRIP CIRCUIT SUPERVISION RELAY



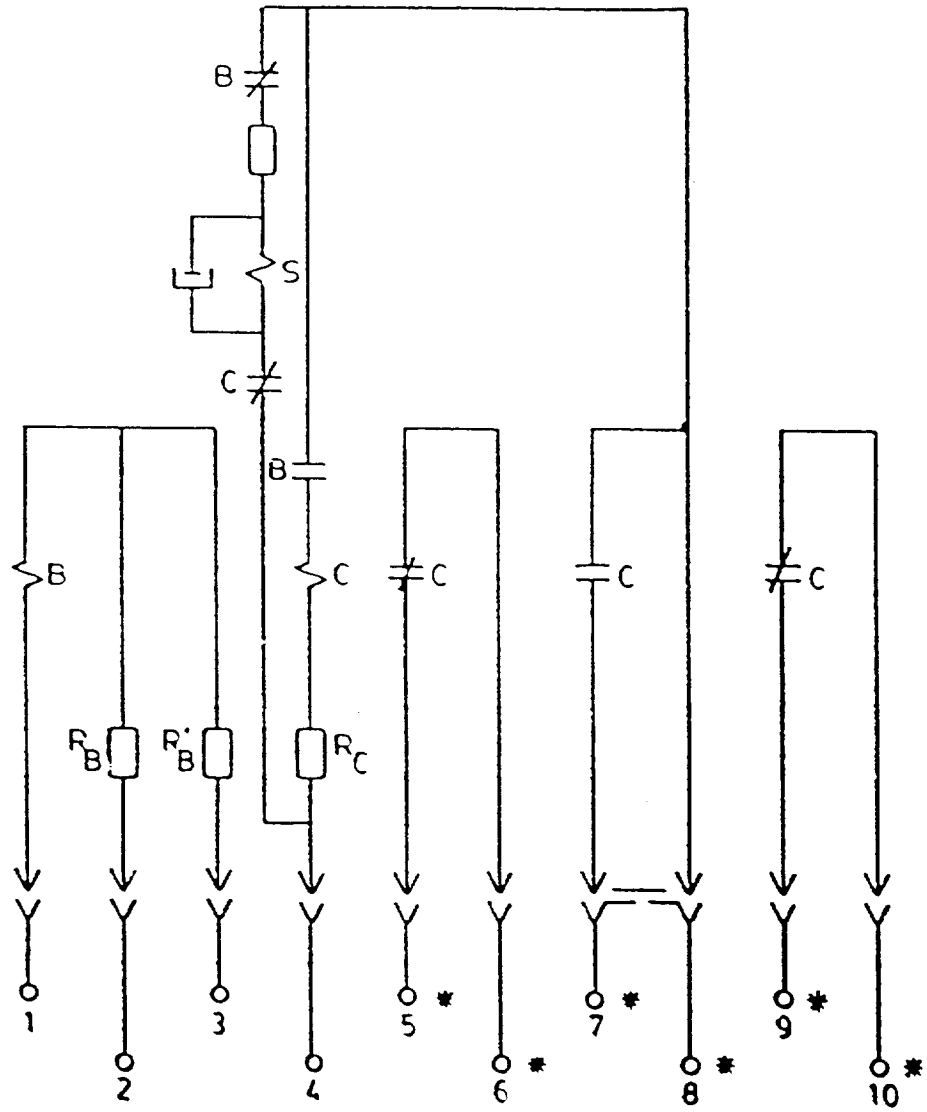
RELAY FRONT VIEW
S-1 CASE
* SHORT FINGERS

1. NBT12E relay internal connections.



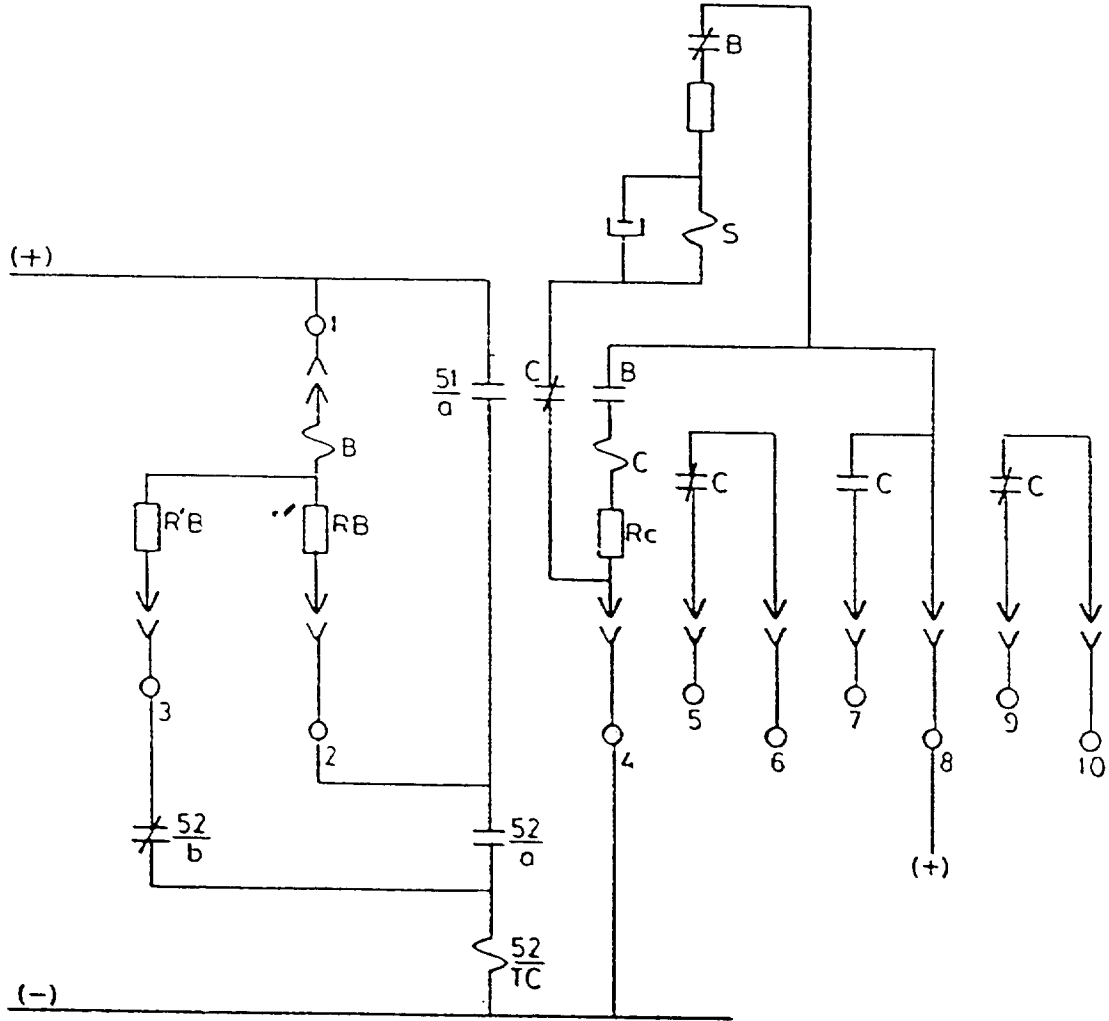
2. NBT12E relay external connections.

BREAKER TRIP CIRCUIT SUPERVISION RELAY



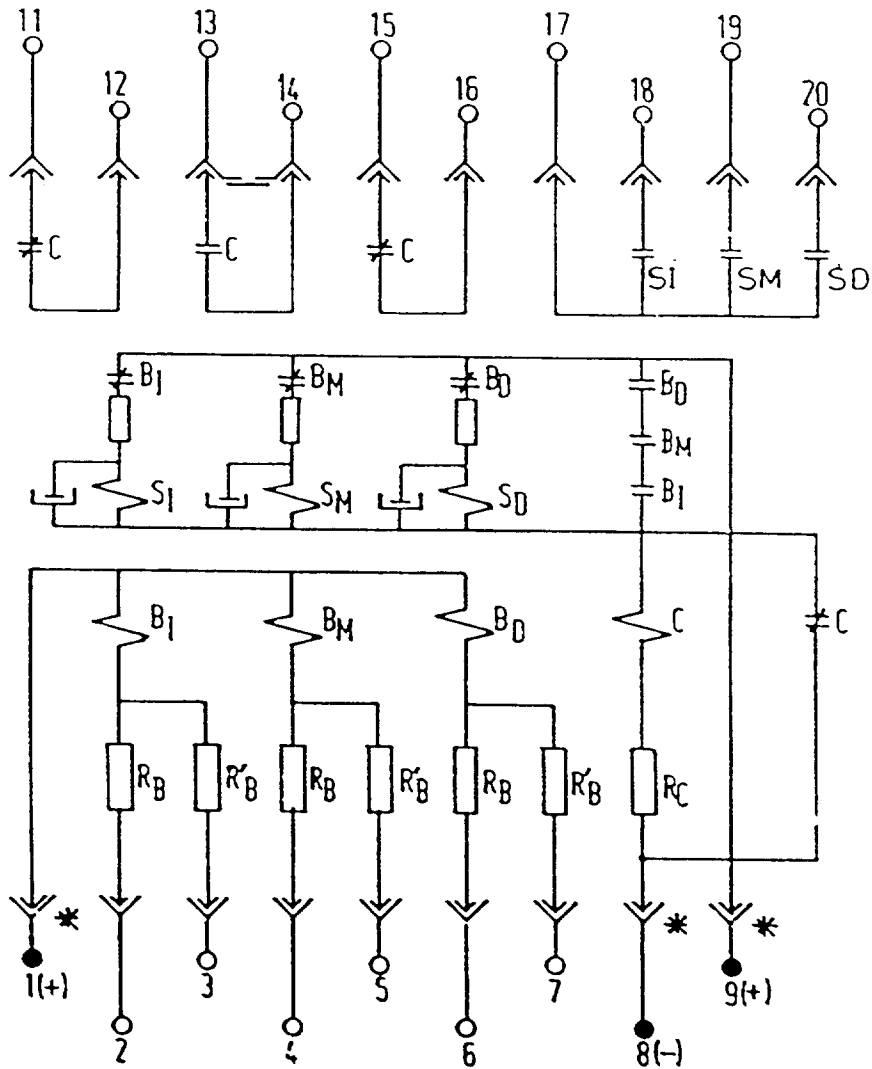
RELAY FRONT VIEW
S-1 CASE
* SHORT FINGERS

3. NBT12F relay internal connections.



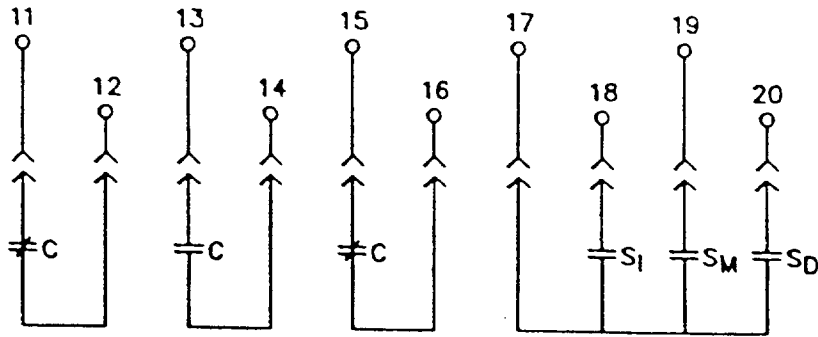
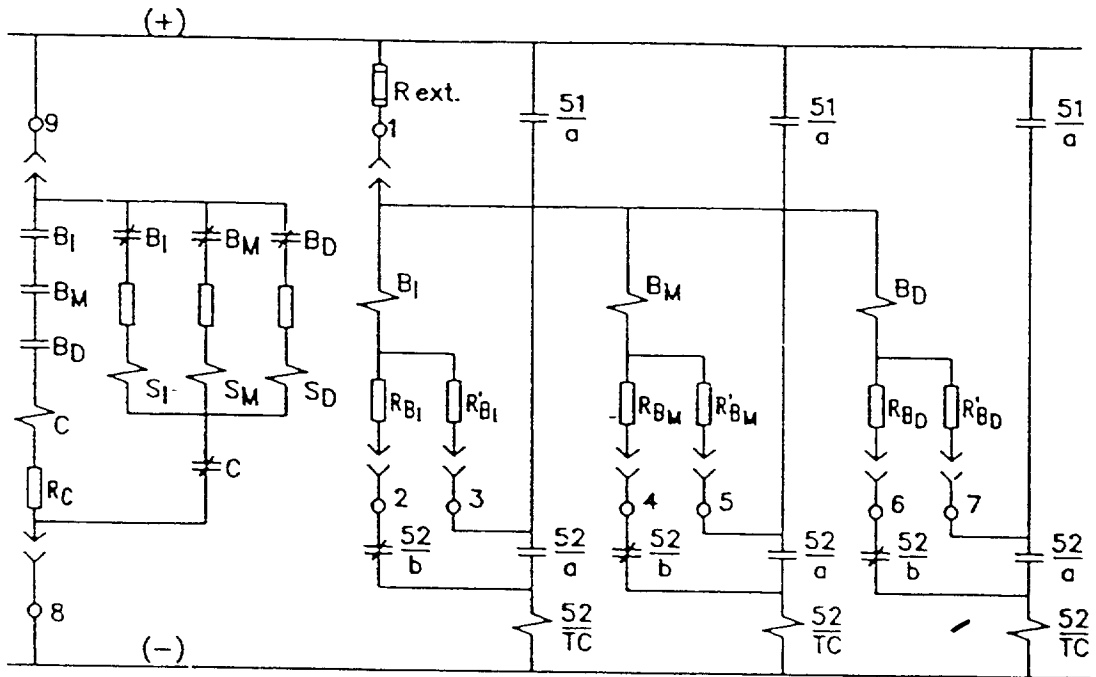
4. NBT12F relay external connections.

BREAKER TRIP CIRCUIT SUPERVISION RELAY



RELAY FRONT VIEW
S-2 CASE
* SHORT FINGERS

5. NBT32E relay internal connections.

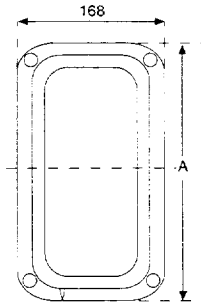


6. NBT32E relay external connections.

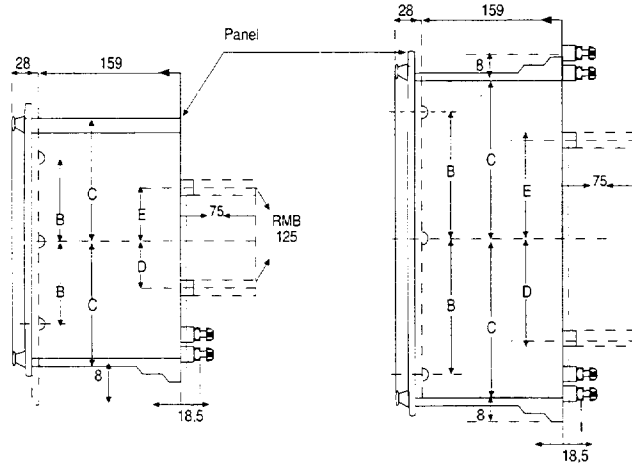
# BREAKER TRIP CIRCUIT SUPERVISION RELAY

## PROTECTION RELAYS

FRONT VIEW



SIDE VIEW



ALL SIZES

WITH ONE CONNECTING PLUG WITH TWO CONNECTING PLUGS

SIZE	CASE	CONNECTING PLUG	DIMENSIONS IN mm						
			A	B*	C	C'	D**	E	F***
V-1	Small	one	178	28,5	67,5	75,5	2,5	—	85
S-1		one	232	55,5	102,5	102,5	29,5	47	112
S-2	Medium	two	262	70,5	117,5	117,5	44,5	44,5	127
M-1		one	384	132	178,5	178,5	105,5	105,5	188
M-2	Large	two	414,5	147	193,5	193,5	120,5	120,5	203
L-1		one	516	197,5	244,5	244,5	171,5	171,5	254
L-2		two	516	197,5	244,5	244,5	171,5	171,5	254
v-2		Small	two	178	28,5	75,5	75,5	0	0

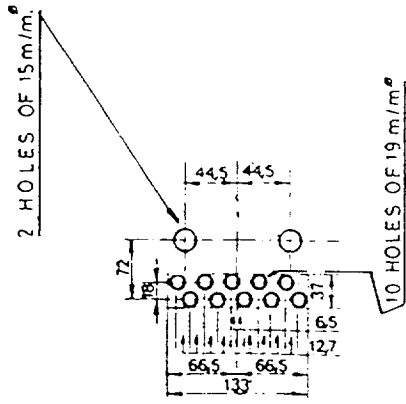
\* 4 crews for "V" and "S" sizes and 6 crews for "M" and "L" sizes.

\*\* 2 studs for "V" and "S" sizes and 4 studs for "M" and "L" sizes.

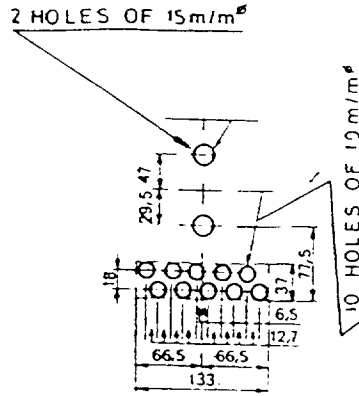
\*\*\* Maximum dimensions.

7A. Relay case dimension diagram.

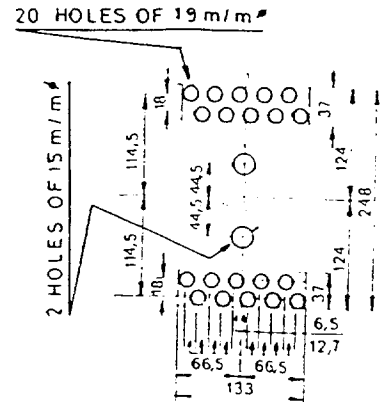




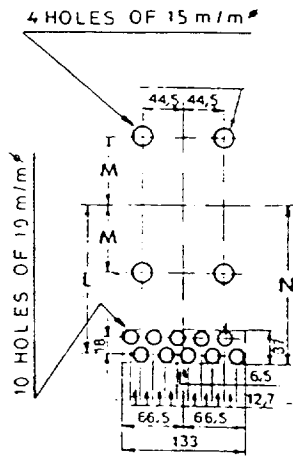
CASE V-1



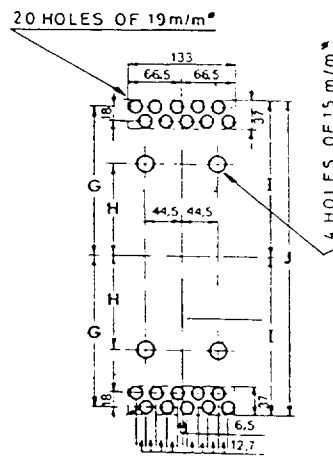
CASE S-1



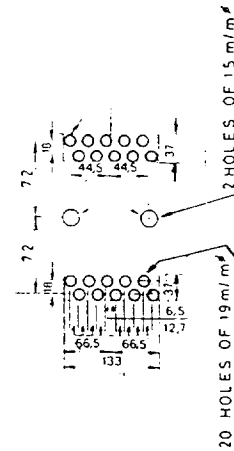
CASE S-2



CASES M-1 AND L-1



CASES M-2 AND L-2

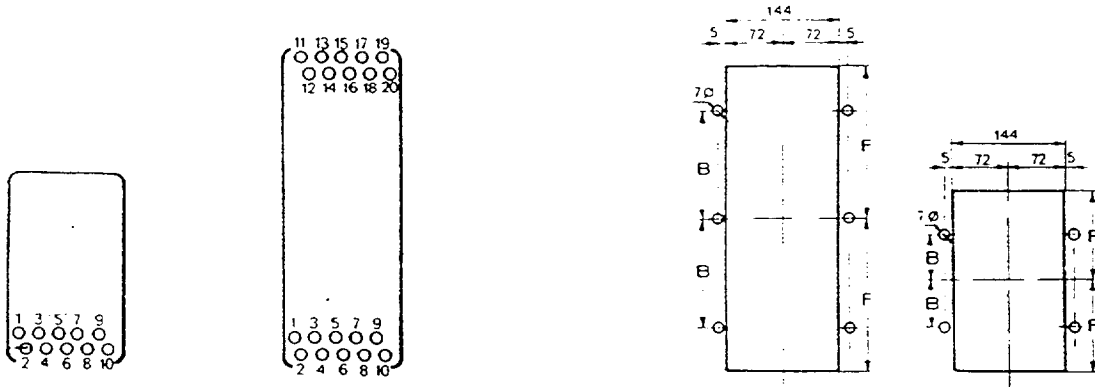


CASE V-2

SIZE	CASE	CONNECTING PLUG	DIMENSIONS IN mm						
			G	H	I	J	L	M	N
M-1	Medium	one	-	-	-	-	175,5	105	186
M-2	Medium	two	191	120,5	200,5	401	-	-	-
L-1	Large	one	-	-	-	-	241,5	171,5	251
L-2	Large	two	241,5	171,5	251	502	-	-	-

7B. Relay case dimension diagram.

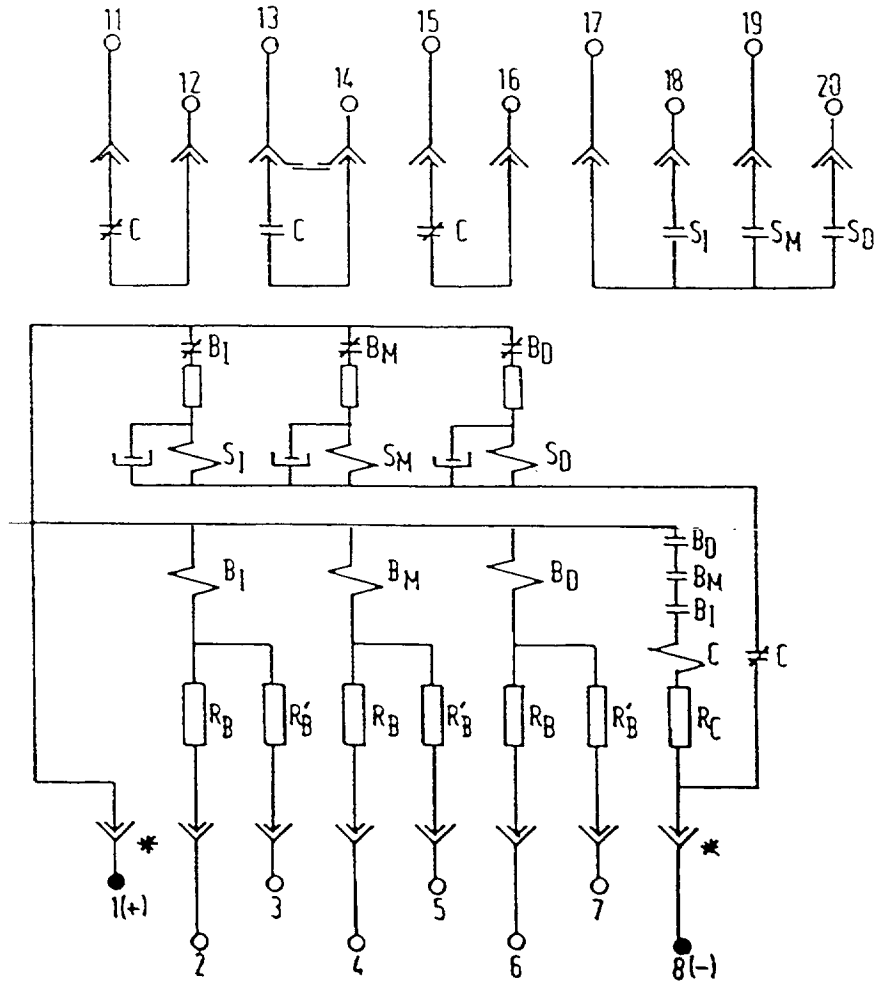
# BREAKER TRIP CIRCUIT SUPERVISION RELAY



LOCATION OF EXTERNAL STUDS  
(FRONT VIEW)

PANEL DRILLING FOR  
SEMIFLUSH MOUNTING

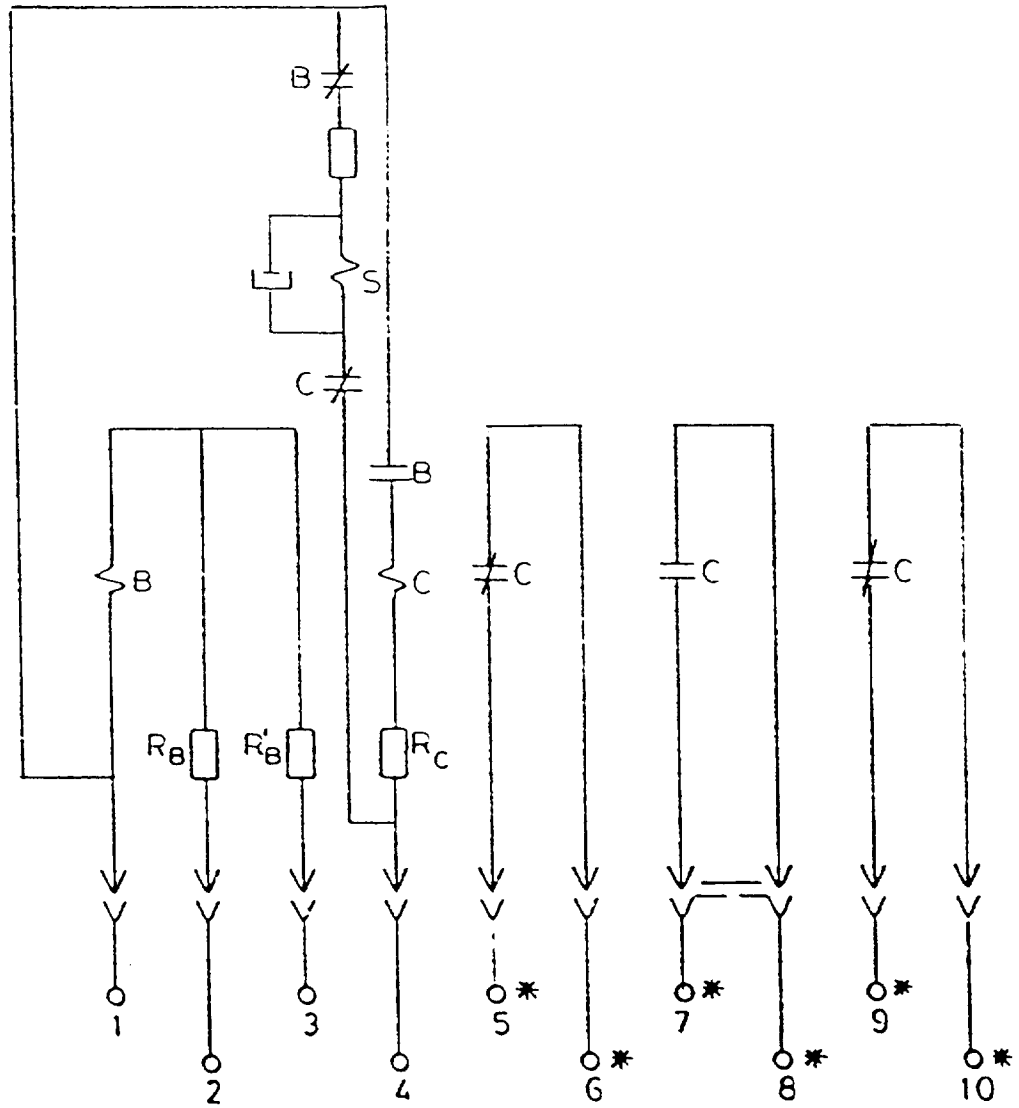
7C. Relay case dimension diagram.



RELAY FRONT VIEW
S-2 CASE
* SHORT FINGERS

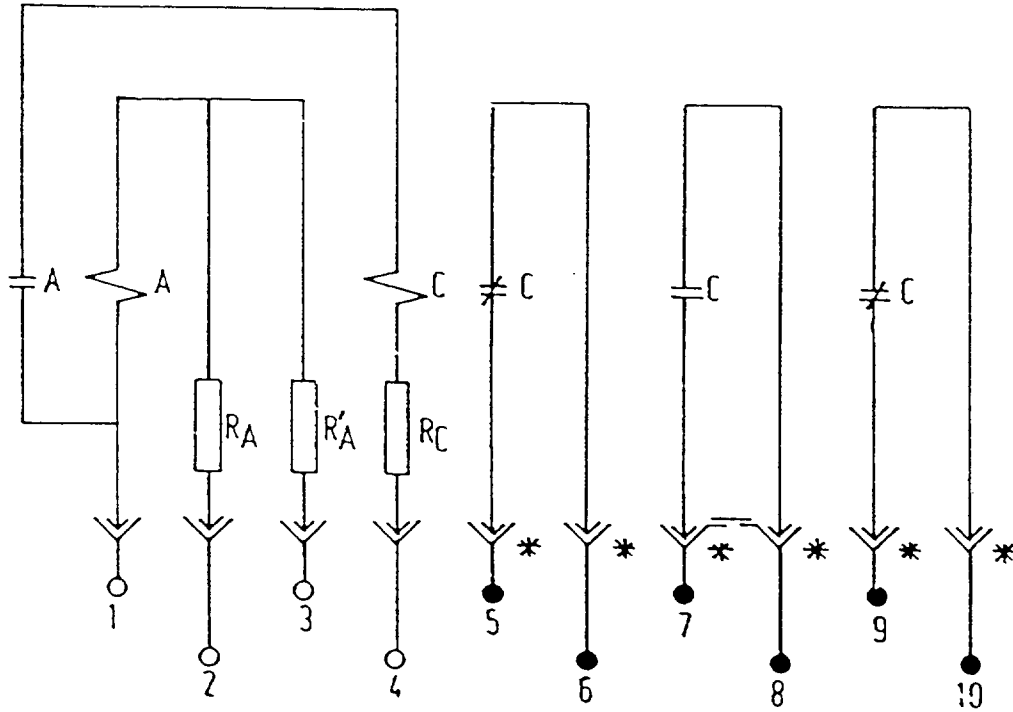
8. NBT12D relay internal connections.

BREAKER TRIP CIRCUIT SUPERVISION RELAY



<b>RELAY FRONT VIEW</b>
<b>S-1 CASE</b>
<b>* SHORT FINGERS</b>

9. NBT12G relay internal connections.



RELAY FRONT VIEW
S-1 CASE
* SHORT FINGERS

10. NBT32D relay internal connections



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***GE Power Management***

**215 Anderson Avenue  
Markham, Ontario  
Canada L6E 1B3  
Tel: (905) 294-6222  
Fax: (905) 201-2098  
[www.ge.com/indsys/pm](http://www.ge.com/indsys/pm)**