

July, 1991  
Supersedes DB 41-765, pages 1-8,  
dated May, 1987  
Mailed to: E, D, C/41-100A

Device Number: 37, 50, 76

## Types SC, SC-1 Instantaneous Adjustable Current Relays

### Application

The Types SC, SC-1 current relays are suitable for any application where an instantaneous plunger relay of high accuracy is required. These relays are utilized for protective service, and for auxiliary service where some of their features are desired.

The Type SC line of relays is adjustable over a wide range of current. Each relay is provided with a mechanical operation indicator and a calibrated scale to indicate the pick-up setting.

The high drop-out to pick-up ratio (85-98%) of the Type SC relays make them particularly suitable for use as fault detectors to supervise main protective relays.

The Type SC-1 has a lower ratio of drop-out to pick-up. This lower ratio makes possible a plunger pull characteristic which permits operation of a latching device.

These relays must not be used in critical applications where they may be picked-up for prolonged periods of time.

### Additional Applications

**Instantaneous motor protection:** To prevent high current damage, where time-delay relays would not operate fast enough.

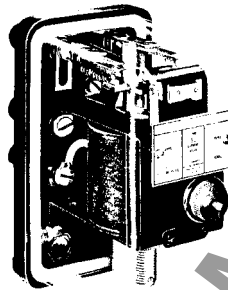
**High-speed non-directional tripping:** Where economically justified on the end of outlying feeder lines.

**Ground protection:** Types SC and SC-1 can be used on dc to 60 Hz service without coil changeover.

### Device Numbers

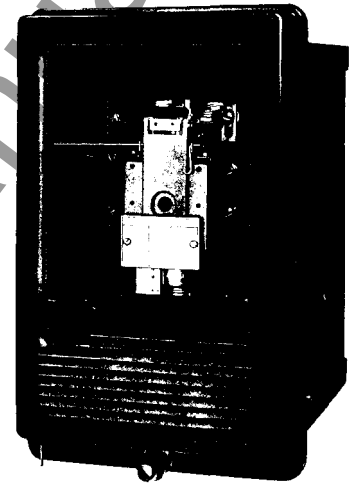
	SC, SC-1
Undercurrent	37
Ac Overcurrent	50
Dc Overcurrent	76

Small Glass Projection Case



Type SC  
In Rear-connected Small Glass Case

Flexitest<sup>®</sup> Case



Type SC-1

### Construction

These relays consist of a wound operating coil, a magnetic shunt for adjustable pick-up or drop-out (determined by relay type), a stationary core, and a moving plunger.

### Types Available

Relay	Operation	Service		Reset	
		Pick-up	Drop-out	Self	Hand
SC	Current	X	X	X	
SC-1	Current	X	X	X	①

● Plunger rises with enough force to latch itself in place and deflect the contacts sufficiently to prevent contact re-opening when the relay is de-energized.

### Adjustment

The Types SC, SC-1 may be set for a specific value of pick-up by adjusting the magnetic shunt (item 9) to the desired value indicated on the calibrated scale. The relay may be set by test for desired drop-out values.

Types SC and SC-1 relays have a normal current adjustment range of 4 to 1.

For use on extremely wide current ranges, Types SC and SC-1 relays with 4-100 amps range of adjustment are supplied with tapped

coils. Taps are brought out to a tap block which has a connector plate marked with the minimum pick-up value of each tap. The relay shunt is adjustable over pick-up setting ranges listed below. On these relays, the adjustable scale plate is supplied blank so that the user can mark the individual relay settings desired.

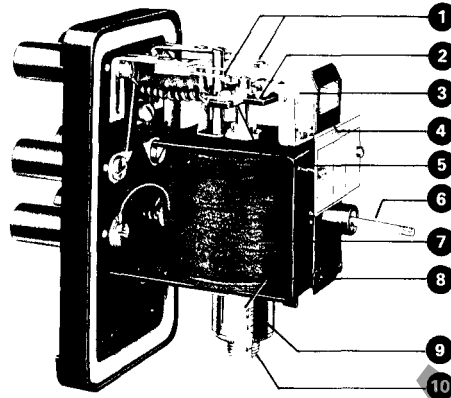
### Pick-Up Adjustment Range for 4-100 Amp SC and SC-1 Relays

Tap Setting	Pick-Up Range
4 amps	4-16 amps
10 amps	10-40 amps
30 amps	30-100 amps

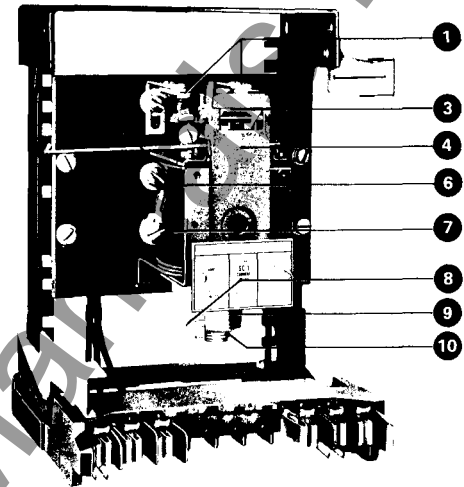
- ① Two independent, reversible, stationary contacts
- ② Moving contact arm with two contacts
- ③ Operation indicator, reversible to indicate up or down strokes
- ④ Target latch
- ⑤ Plunger
- ⑥ Target reset
- ⑦ Coil
- ⑧ Calibrated scale
- ⑨ Adjustable magnetic shunt
- ⑩ Core Screw

**Small Glass Projection Case**

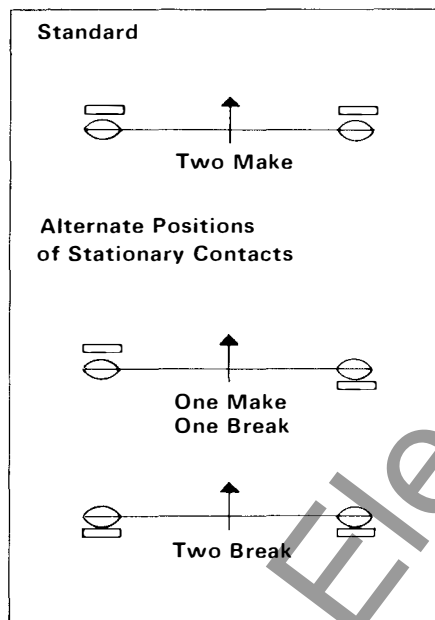
Rear Connected



**Flexitest Universal Case**



**Contact Arrangement**



**Drop-Out to Pick-up Ratio**

Relays can be set for specific values of either pick-up or drop-out. For example, if a relay is adjusted for any pick-up value, the corresponding drop-out ratio will fall well within the limits given in the table below. This ratio will vary

with different types of relays, as shown, or may change somewhat at different settings, but remains substantially constant at any one setting. Drop-out to pick-up ratio is closely repetitive at the same setting independent of the number of operations or temperature increase.

**Current relays: SC and SC-1**

Types	Hertz ●	Drop-Out to Pick-Up Ratios		Range of Pick-Up Adjustment Amps	Maximum Amperes Continuous	One-Second Rating in Amperes	Burden <sup>②</sup> 5 Amp at 60 Hertz	
		Ac	Dc				Watts	Volt-Amperes
SC	Dc or 25 to 60	85-98%	65-80%	5-2	1.5	70	99	225
				1-4	3	140	28	65
				2-8	6	280	6.9	19
				4-16	12	460	1.5	5
				10-40	25	460	.24	.7
				20-80	40 <sup>④</sup>	460	.07	.16
				40-160	40 <sup>④</sup>	460	.03	.05
4-100 ●	10-15-20	460	1.7-6-18	5-1-2				
SC-1	Dc or 25 to 60	35-60%	25-40%	5-2	1.5	70	100	210
				1-4	3	140	24	60
				2-8	6	280	6	16
				4-16	12	460	1.5	5
				10-40	25	460	.25	.65
				20-80	40 <sup>④</sup>	460	.07	.16
				40-160	40 <sup>④</sup>	460	.03	.05
4-100 <sup>⑤</sup>	10-15-20	460	1.7-6-18	5-1-2				

① Standard current relays are calibrated on 60 Hertz. This calibration is correct for 25 hertz and Dc applications, within 10% to 15%.  
 ② Values of watts and volt-amperes in the tables are average for various plunger and shunt positions

④ Relays in Flexitest case have a maximum continuous current rating of 30 amperes  
 ⑤ Coil has taps on which minimum pickups are 10 and 30 amperes.

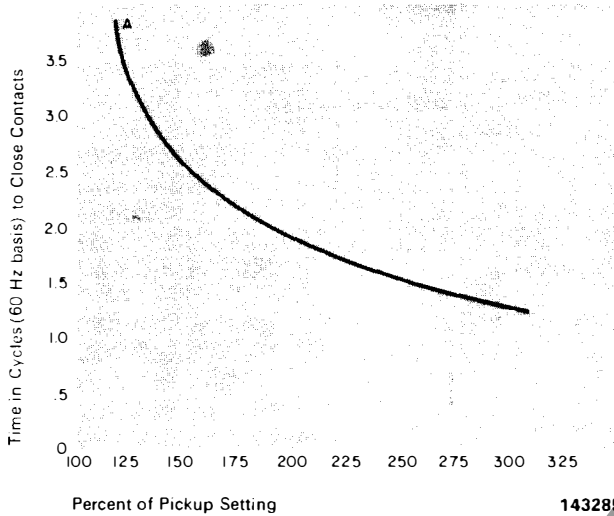
### Additional Burden Data: SC and SC-1

Relay	Burden	At Minimum Pick-Up			At Multiples of Minimum Pick-Up (60 Hertz)			At Maximum Pick-Up
		60 Hertz	25	Dc	3	10	20	
SC	Watts	1.0	0.65	0.57	..	..	..	Multiply Minimum Values By 16
	Volt-amps	3.4	1.4	....	31	240	770	
SC-1	Watts	1.3	0.7	0.57	..	..	..	Values By 16
	Volt-amps	3.5	1.3	....	31	240	770	

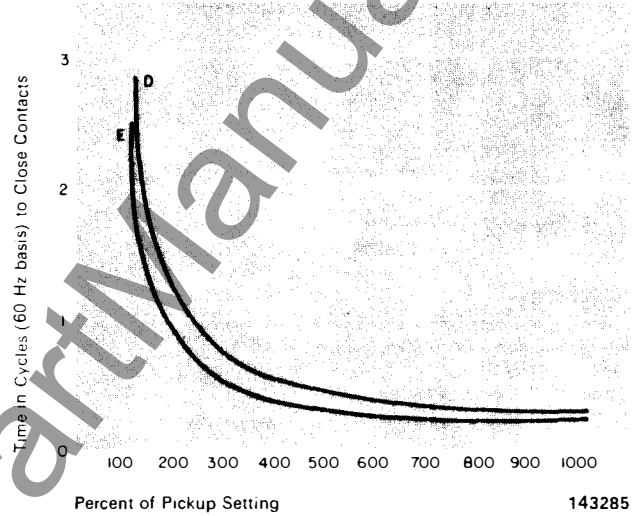
### Contact Rating: Amps

Control Circuit Volts	Hertz	Contacts Will:		
		Close	Open	Carry
120	60	30	5	5
125	Dc	30	1	5

### Time Curves



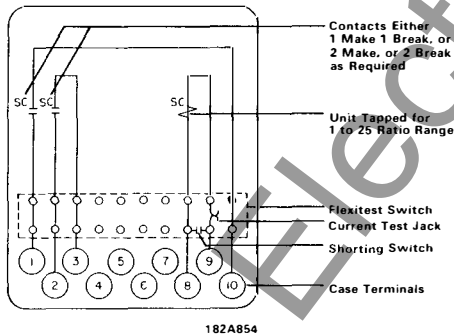
**Fig. 1**  
A—SC, SC-1 on Dc  
Maximum or Minimum Setting



**Fig. 2**  
B—SC, SC-1 on 60 Hz  
Minimum Setting  
C—SC, SC-1 on 60 Hz  
Maximum Setting

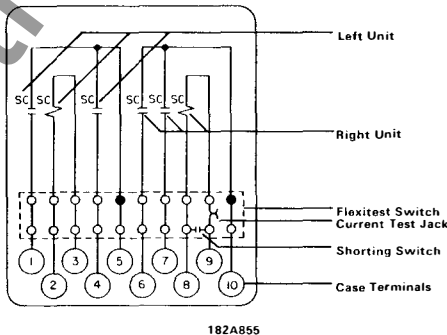
### Internal Wiring Diagrams, Flexitest Case Types SC, SC-1 Current Operated

#### Single Unit in FT-21 Case



**Fig. 3**

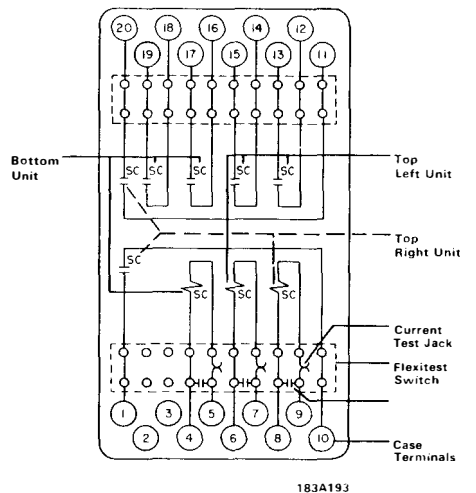
#### Two Unit in FT-21 Case



**Fig. 4**

Note: Contacts either make or break as required

#### Three Unit in FT-32 Case



**Fig. 5**

Note: Contacts either make or break as required

**Internal Wiring Diagrams, Small Glass Projection Case**

**SC, SC-1 Relays  
Rear Connected**

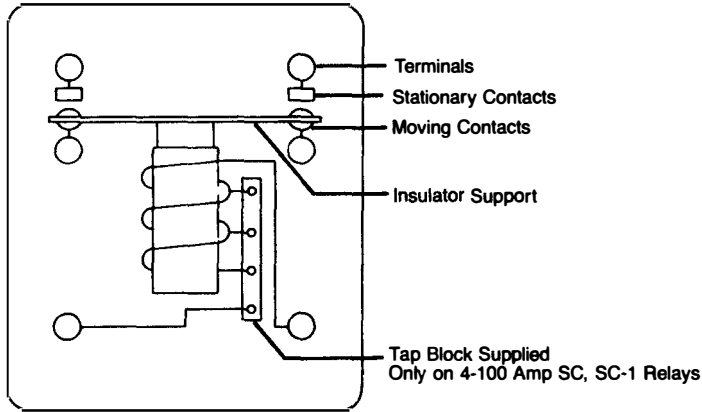


Fig. 15 871766

**Front Connected**

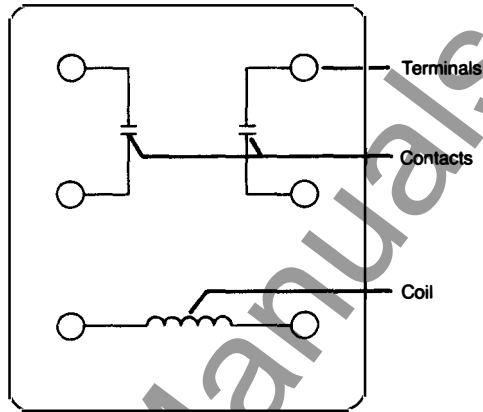


Fig. 16 184A942

**Case Dimensions**

Flexitest case types: see Descriptive Bulletin 41-076.  
Other case types: see Descriptive Bulletin 41-080.

**Carton Dimensions and Weights**

Case Type	No. of Units	Weight, LB		Domestic Shipping Carton, in.
		Net	Shipping	
Small Glas	1	2	6	9½ x 10½ x 11
Flexitest: FT-21	1	10	13	9 x 12 x 13
	2	12	15	
FT-32	3	15	19	13 x 13 x 21
	4	18	22	

**Further Information**

List Prices: PL 41-020  
Technical Data: TD 41-025  
Instructions: IL 41-766.1  
Other Protective Relays:  
Application Selector Guide, TD 41-016



July, 1991  
Supersedes TD 41-020, Types SC, SC-1 on  
pages 138-139, dated November, 1987  
Mailed to: E, D, C/41-100A

# Types SC, SC-1 Instantaneous Adjustable Current Relays

## Instantaneous, Current Operated, Dc or 25-60 Hertz Mechanical Operation Indicator (Device Number: 37, 50, 76) Two Normally Open Contacts Flexitest Case Type

Type	Adjustable Range: Amps	Dropout Ratio		Relay Data							
		Ac	Dc	Self-Reset	Style Number	Case Size					
<b>One Unit Per Case</b>											
SC	0.5-2	85-98%	65-80%	182A854	1876 046 <sup>Ⓢ</sup>	FT-21					
	1-4				1876 047						
	2-8				1876 048 <sup>Ⓢ</sup>						
	4-16				1876 049						
	10-40				1876 050						
	20-80				1876 051						
	40-160				1876 052						
	4-100 (taps)				1876 053						
	<b>Two Units Per Case<sup>Ⓢ</sup></b>										
	SC				0.5-2		85-98%	65-80%	182A855	1876 054	FT-21
1-4		1876 055									
2-8		1876 056									
4-16		1876 057									
10-40		1876 058									
20-80		1876 059									
40-160		1876 060									
4-100 (taps)		1876 061									
<b>Three Units Per Case<sup>Ⓢ</sup></b>											
SC		0.5-2	85-98%	65-80%	183A193	1878 393				FT-32	
	1-4	1878 394									
	2-8	1878 395 <sup>Ⓢ</sup>									
	4-16	1878 396									
	10-40	1878 397									
	20-80	1878 398									
	40-160	1878 399									
	4-100 (taps)	1878 400									

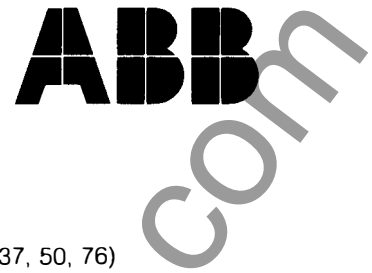
## Small Glass Projection Case Type

Type	Adjustable Range: Amps	Dropout Ratio	Small Glass Projection Case					
			Self-Reset		Rear Connected		Front Connected	
			Ac	Dc	Internal Schematic	Style Number	Internal Schematic	Style Number
<b>One Unit Per Case</b>								
SC	0.25-1	85-98%	65-80%	871766	1962 591	18 4A9 42	.....	
	0.5-2				1096 937		292B400A10	
	1-4				1096 938		292B400A11 <sup>Ⓢ</sup>	
	2-8				1096 939 <sup>Ⓢ</sup>		292B400A12 <sup>Ⓢ</sup>	
	4-16				1096 940 <sup>Ⓢ</sup>		292B400A13	
	10-40				1096 941		292B400A14	
	20-80				1096 942		292B400A15	
	40-160				1100 866		292B400A16	
	4-100 (taps)				1094 830		.....	

<sup>Ⓢ</sup> Denotes item available from stock.  
<sup>Ⓢ</sup> Denotes item is "Qwik Ship" style. Qwik Ship is being phased in during 1990/1991. Check for availability.

<sup>Ⓢ</sup> Relays can be supplied with different ratings on each unit. Choose from standard ratings listed. Use standard price.

Order similar to style number of relay with rating desired for first unit and then specify other rating.



**Instantaneous, Current Operated, Dc or 25-60 Hertz Mechanical Operation Indicator** (Device Number: 37, 50, 76)  
Two Normally Open Contacts  
**Flexitest Case Type**

Type	Adjustable Range: Amps	Dropout Ratio		Relay Data												
		Ac	Dc	Self-Reset			Hand Reset									
				Internal Schematic	Style Number	Case Size	Internal Schematic	Style Number	Case Size							
<b>One Unit Per Case</b>																
SC-1	0.5-2	35-60%	25-40%	182A854	1876 062	FT-21	182A854	1876 078	FT-21							
	1-4				1876 063			1876 079								
	2-8				1876 064			1876 080								
	4-16				1876 065			1876 081								
	10-40				1876 066			1876 082								
	20-80				1876 067			1876 083								
	40-160				1876 068			1876 084								
	4-100 (taps)				1876 069			1876 085								
	<b>Two Units Per Case<sup>②</sup></b>															
	SC-1				0.5-2			35-60%		25-40%	182A855	1876 070	FT-21	132A855	1876 086	FT-21
1-4		1876 071	1876 087													
2-8		1876 072	1876 088													
4-16		1876 073	1876 089													
10-40		1876 074	1876 090													
20-80		1876 075	1876 091													
40-160		1876 076	1876 092													
4-100		1876 077	1876 093													
<b>Three Units Per Case<sup>②</sup></b>																
SC-1		0.5-2	35-60%	25-40%	183A193	1878 401	FT-32		183A193			1878 409			FT-32	
	1-4	1878 402				1878 410										
	2-8	1878 403				1878 411										
	4-16	1878 404				1878 412										
	10-40	1878 405				1878 413										
	20-80	1878 406				1878 414										
	40-160	1878 407				1878 415										
	4-100 (taps)	1878 408				1878 416										

**Small Glass Projection Type**

Type	Adjustable Range: Amps	Dropout Ratio		Small Glass Projection Case										
		Ac	Dc	Internal Schematic	Self-Reset Style Number	Hand Reset Style Number								
<b>Rear Connected (One Unit Per Case)</b>														
SC-1	0.5-2	35-60%	25-40%	871766	1096 943	94D335	1096 949							
	1-4				1096 944		1096 950							
	2-8				1096 945		1096 951							
	4-16				1096 946		1096 952							
	10-40				1096 947		1906 953							
	20-80				1096 948		1096 954							
	40-160				1100 867		1100 868							
	4-100 (taps)													
	<b>Front Connected (One Unit Per Case)</b>													
	SC-1				0.5-2		35-60%	25-40%	184A942	292B403A09	292B403A18	292B403A21		
1-4		292B403A10	292B403A22											
2-8		292B403A11	292B403A23											
4-16		292B403A12	292B403A24											
10-40		292B403A13	292B403A25											
20-80		292B403A14	292B403A26											
40-160		292B403A15	292B403A27											
4-100 (taps)		292B403A18	292B403A35											

① Denotes item available from stock.  
② Relays can be supplied with different ratings on each unit. Choose from standard ratings listed. Use standard price.

Order similar to style number of relay with rating desired for first unit and then specify other rating.

Printed in U.S.A.

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