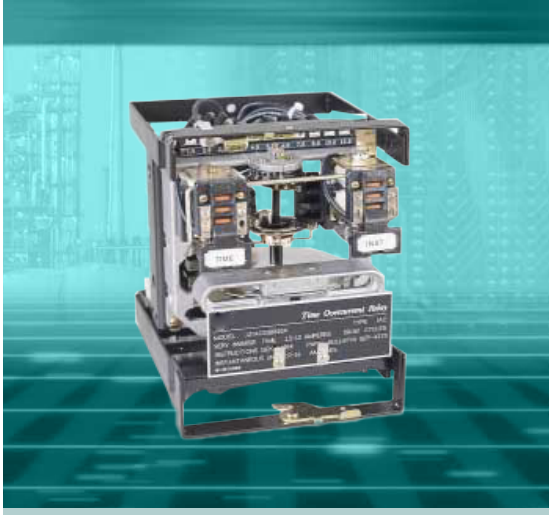
Grid Solutions

IAC

Time-overcurrent protection of AC circuits and apparatus.



Introduction

The listing of IAC Models, on pages 310 through 314 is organized by time/current characteristics into fourteen tables.

To find a known model number:

1. See WHERE TO FIND IAC MODELS on this page to determine correct table and page.
2. Turn to that table for sequential listing of models.

To find a model number for a known application:

1. See APPLICATION, to determine time/current characteristics and/or specific application desired.
2. See WHERE TO FIND IAC MODELS to determine correct table and page.
3. Use the rating and comment columns of that table to determine Model Number with desired features.

Description

IAC relays are used in the protection of industrial and utility power systems against either phase or ground overcurrent. They are single phase (although some models contain more than one unit), non-directional, current sensitive, ac devices. The basic operating mechanism (the time unit) produces one of several available operating characteristics. The operating time is inversely related to operating current which permits close coordination with other protective devices. It consists of a magnetic core operating coil, an induction disc, damping magnet, and a mechanical target. The IAC relay may also include one or more hinged armature instantaneous overcurrent units, with integral target.

The IAC relay is mounted in a drawout case, permitting front access to the relay for testing and maintenance. Testing can be accomplished, without removing the relay, by using XLA test plugs.

MODELS OF THESE DESIGNS	TIME/CURRENT CHARACTERISTICS	60 Hz	50 Hz
IAC 51, 52, 60	Inverse Time	Table 1	Table 8
IAC 53, 54, 80	Very Inverse Time	Table 2	Table 9
IAC 77, 78, 90	Extremely Inverse Time	Table 3	Table 10
IAC 55, 56, 68, 85, 95	Inverse, Short Time	Table 4	Table 11
IAC 57	Inverse, Medium Time	Table 5	Table 12
IAC 66	Inverse, Long Time	Table 6	Table 13
IAC 59	Inverse, Over- and Undercurrent	Table 7	Table 14

Where to find IAC models

Features and Benefits

- 6 inverse time/current operating curves
- Target seal-in units available
- Instantaneous units available
- Drawout case

Applications

- Feeder, AC machines & transformers
- Applications where operating time is inverse to operating current

Protection and Control

- Ground and f time O/C and U/C
- Overload motor protection
- Instantaneous overcurrent (optional)

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Applications

IAC relays are used for protection of feeders, transmission lines, alternating current machines, transformers, and for numerous other applications where a relay is required whose operating time is inversely related to operating current.

Available Inverse Time/Current Characteristics

Six inverse time/current operating characteristics are available for the time unit of the IAC (see Figure 1).

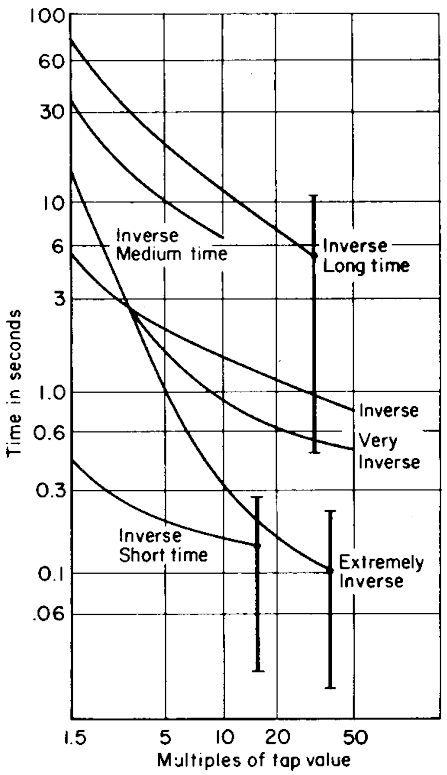

Fig. 1. Typical operating characteristics of 60 Hz IAC relays. The No. 5 time-dial setting is shown for each curve, and the range of time adjustment from 0.5 to 10 time-dial settings is shown for the extremely inverse, the inverse short time, and the inverse long time relays.

The three standard time characteristics are as follows:

Inverse Time relays (see Table 1) are generally applied where the short-circuit current magnitude is dependent largely upon the system generating capacity at the time of the fault.

Very Inverse Time relays (see Table 2) are best applied on systems where the magnitude of the short circuit current flowing through any given relay is dependent mainly upon the relative location of the fault with respect to the relay and only slightly or not at all upon the system generating capacity.

Extremely Inverse Time relays (see Table 3) are intended for applications, such as on utility distribution feeders, where sufficient time delay must be provided to allow a re-energized circuit to pick up without unnecessary tripping during the inrush period, and at the same time coordinate properly with power fuses and fuse cutouts.

Three additional time characteristics are available as follows:

Inverse Short Time relays (see Table 4) are used on equipment where tripping must be relatively fast but should not approach the operating time of an instantaneous unit. Protection of power rectifiers is an example of such an application.

Inverse Medium Time relays (see Table 5) are used as generator or transformer neutral relays or as backup protection for feeder ground faults. Also, the inverse medium time relay may be used where a slower relay is required to obtain coordination.

Inverse Long Time relays (see Table 6) are designed for applications requiring long time delay. The major area of usefulness is in the protection of motors against overloads under conditions where the customary thermal devices are not applicable.

Instantaneous Unit

Instantaneous units are used to provide tripping with no intentional time delay for currents exceeding a predetermined value. Typically, if the fault current magnitude under maximum generating conditions triples as a fault is moved toward the relay location from the far end of the line, then an instantaneous unit is desirable.

High dropout instantaneous units are available and are used together with other devices to obtain time-delay tripping. One application is motor protection, where the high dropout unit supervises the time unit for tripping during starting and overload conditions. For special feeder applications, the high dropout unit can supervise the time unit to prevent the overtravel from causing undesired tripping and to permit shorter coordination margins.

Specific Applications

Motor Protection Relays provide overcurrent protection for starting, overload, and fault conditions. The IAC66K relay has an inverse long time characteristic (as described above), which approximates the motor thermal limit, and two instantaneous overcurrent units. The first instantaneous unit is set above the maximum motor starting current and protects for fault conditions only. The second, a special high dropout unit, is customarily used for supervising the time overcurrent unit to permit tripping for stall and heavy overload conditions. Operation of only the time unit indicates a light or moderate overload condition and can be used as an alarm. The IAC66M relay is similar except that the high dropout instantaneous unit is used in conjunction with a 0.1 sec time delay telephone relay which blocks operating during initial inrush conditions, allowing the unit to be set more sensitively.

Load Center Protection The IAC66T relay, which has a static timer unit used with a high dropout instantaneous unit, is designed to protect medium voltage circuits supplying low voltage load centers. This relay coordinates width the short time and long time overcurrent trip characteristics of 600 V air circuit breakers.

Over - And Undercurrent Relays (see Table 7) are used where an indication of the variation of a current between maximum and minimum limits is required. These relays do not have a time dial. The time characteristics are determined by the contact settings.

Torque Controlled Relays have wound shading coils connected to terminal studs. Operation of the time-overcurrent unit thus depends on the closing of an external contact across those terminals. The overcurrent relay can be supervised by some external device, such as a directional relay.

Features

Time-Overcurrent

Time-overcurrent units are available in several ranges to meet current pickup settings of from 0.1 to 16 A. Sensitivity is determined by discrete tap-plug settings, and a time dial provides a continuously adjustable time delay over the entire range. IAC model numbers which end in “8__A”,

such as IAC51B801A, provide an extended range of settings with a ratio of maximum setting to minimum setting of 8:1. Most other IAC relays have a ratio of 4:1. The available tap settings are listed below for the common time overcurrent units:

AVAILABLE SETTINGS

Time overcurrent units with 8:1 range of settings:

- 0.5-4.0 A unit: 0.5, 0.6, 0.7, 0.8, 1, 1.2, 1.5, 2, 2.5, 3, and 4 A taps
- 1.5-12 A unit: 1.5, 2, 2.5, 3, 4, 5, 6, 7, 8, 10, and 12 A taps
- 2-16 A unit: 2, 2.5, 3, 4, 5, 6, 7, 8, 10, 12 and 16 A taps

Other common IAC time overcurrent units:

- 0.5-2.0 A: 0.5, 0.6, 0.8, 1, 1.2, 1.5 and 2 A
- 0.6-1.8 A: 0.6, 0.8, 1.0, 1.2, 1.4, 1.6 and 1.8 A
- 1.5-4.5 A: 1.5, 2.0, 2.5, 3.0, 3.5, 4.0, and 4.5 A
- 1.5-6.0 A: 1.5, 2, 2.5, 3, 4, 5, and 6 A
- 2.5- 5.0 A: 2.5, 2.8, 3.1, 3.5, 4, 4.5 and 5 A
- 2.5-7.5 A: 2.5, 3.0, 3.5, 4.0, 5.0, 6.0, and 7.5 A
- 4.0-8.0 A: 4, 4.5, 5, 5.6, 6, 6.3, 7.1 and 8 A
- 4.0-12.0 A: 4, 5, 6, 7, 8, 10 and 12 A
- 4.0-16.0* A: 4, 5, 6, 8 10, 12 and 16 A

** Some 4-16 A units also have 7 A tap.*

IAC Relays With 8:1 Range Units

TIME OVERCURRENT UNIT

TAP SETTING	IAC51 AND 52		IAC53 AND 54		IAC77 AND 78	
	TAPS 0.5-4.0 (A)	TAPS 2-16 (A)	TAPS 0.5-4.0 (A)	TAPS 1.5-12 (A)	TAPS 0.5-4.0 (A)	TAPS 1.5-12 (A)
CONTINUOUS-CURRENT RATING						
0.5 0.6 0.7 0.8 1.0 1.2	1.6 1.8 2.0 2.1 2.3 2.7		4.0 4.5 5.0 5.5 6.0 7.0		3.5 3.7 4.0 4.5 5.0 5.5	
1.5 2.0 2.5 3.0 4.0 5.0	3.0 3.5 4.0 4.5 5.0	8 9 10 12 14	7.5 9.0 10.0 11.0 12.0	10.0 11.5 13.0 14.5 17.0 19.0	6.0 7.0 8.0 9.0 10.0	9.5 10 11.5 12.5 14.0 15.5
6.0 7.0 8.0 10.0 12.0 16.0		15 16 17.5 20 20 20		20.0 20.0 20.0 20.0 20.0		17.0 18.0 19.0 20.0 20.0
ONE SEC RATING						
All	70 A	260 A	140 A	260 A	125 A	260 A

INSTANTANEOUS UNIT

INSTANTANEOUS UNIT RANGE	CONNECTION OF INSTANTANEOUS UNIT — HIGH OR LOW RANGE		CONTINUOUS RATING (A)	ONE SEC RATING (A)
0.5-4.0	Low High	0.5-2.0 1.0-4.0	0.75 1.5	25 50
2-16	Low High	2-8 4-16	3.0 6.0	130 260
10-80	Low High	10-40 20-80	15.0 25.0	400 600
20-160	Low High	20-80 40-160	25.0 25.0	600 600

Low range refers to coils connected in series. High range refers to coils connected in parallel.

IAC Relays With 4:1 Range Units

TIME-OVERCURRENT UNIT

TIME UNIT RANGE	ONE SEC RATING (A)	CONTINUOUS RATING ①② (A)
4-16 A		
IAC51, 52, 53, 54, 77, 78	260	10
1.5-6 A		
IAC51, 52	215	5
IAC53, 54	260	5
IAC77, 78	200	6
0.5-2 A		
IAC51, 52	70	1.5
IAC53, 54	130	1.5
IAC77, 79	65	3

① The continuous rating of the coil circuit applies to all Time Unit taps up to, and including, the value of the rating. For taps above this value, the rating is the same as the tap value.

② Continuous ratings of relays having instantaneous units is the value shown or 1.5 times the minimum setting of the instantaneous units, whichever is the lower of the two values.

Instantaneous Overcurrent

Instantaneous overcurrent units are available in several ranges to meet current settings between 1.0 and 160 A. The instantaneous unit in IAC relays with model numbers ending in "8__A" has a maximum setting to minimum setting ratio of 8:1. It uses two separate windings which can be connected either in series (for low range) or in parallel (for high range) with pickup continuously adjustable over each range. The instantaneous unit used in most other IAC relays uses a single winding with a ratio of maximum to minimum setting of 4:1, with continuously adjustable pickup. These instantaneous units drop out at 40 percent or more of setting at minimum setting and 50 percent at maximum setting. High dropout units are also available which drop out at 80 percent or more of setting at minimum setting and 90 percent at maximum setting.

Except as noted in the tables, the TOC unit operating coil is connected in series with the instantaneous unit operating coil if both are present, and each is set independently.

Target and Seal-in

Target and seal-in units, which are included with all time units except as noted in the tables of relay models, are dual rated. 0.2 and 2.0 A taps are standard; contact factory for form numbers of other ratings available. The seal-in unit picks up to bypass the contacts of the time unit during trip circuit energization. The 2 A tap is generally used, except where the relay contacts are used to energize auxiliary relays or other low-current devices.

Contacts

Each unit, time or instantaneous, has one or two output contacts (if two contacts per unit, those contacts will have one side common). Contacts of a relay with more than one unit are generally not electrically separate except as noted in the tables. An exception is the high-dropout instantaneous unit, whose contacts are electrically separate from other contacts in the relay.

The current closing rating of the contacts is 30 A for voltage not exceeding 250 V. The current carrying rating of the relay is limited by the tap being used on the target and seal-in units as indicated in the following table:

	DUAL RATED			
	0.2/2.0 A		0.6/2.0 A	
	0.2	2.0	0.6	2.0
Carry 30 A for (sec)	0.05	2.2	0.5	3.5
Carry 10 A for (sec)	0.45	20.0	5.0	30
Carry continuously (A)	0.37	2.3	1.2	2.6
Min. Operating (A)	0.2	2.0	0.6	2.0
Min. Drop-out (A)	0.05	0.5	0.15	0.5
DC resistance (Ohms)	8.3	0.24	0.78	0.18
DC resistive Interrupting rating (A)	2.5 A @ 125 VDC			

Ratings of Target Seal-In Units, High Seismic (Hi-G)

If the total tripping current exceeds 30 A, an auxiliary relay must be used in conjunction with IAC relays.

After tripping occurs, the tripping circuit of these relays must be opened by an "a" auxiliary switch on the circuit breaker or by other external automatic means, because the circuit is sealed closed while tripping current is flowing. The contacts will open in 6 cycles (1/10 sec) with normal adjustment of "wipe", permitting use of the relay in instantaneous reclosing schemes.

Operating Coil Ratings

Note that relays with both time overcurrent and instantaneous units are limited to the lesser of the respective current ratings, since the operating coils are connected in series.

Simplified Output Contact Arrangements

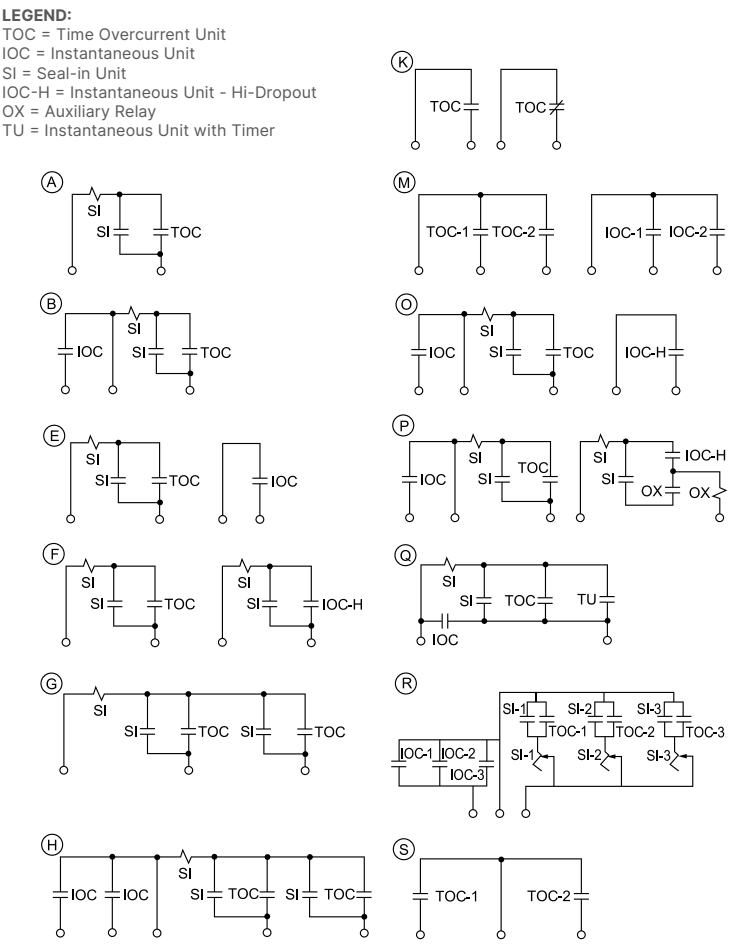

Fig. 2. As referenced in tables

Ordering

To order select the basic model and the desired features from the Selection Guide.

IAC	**	*	*	*	*	A				
IAC							IAC time-overcurrent relay			
							Time Curve		**60 Hz**	**50 Hz**
	51						Inverse, 1 NO	Refer to:	Table 1	Table 8
	52						Inverse, 2 NO	Refer to:	Table 1	Table 8
	60						Inverse, torque control	Refer to:	Table 1	Table 8
	53						Very inverse, 1 NO	Refer to:	Table 2	Table 9
	54						Very inverse, 2 NO	Refer to:	Table 2	Table 9
	80						Very inverse, torque control	Refer to:	Table 2	Table 9
	77						Extremely inverse, 1 NO	Refer to:	Table 3	Table 10
	78						Extremely inverse, 2 NO	Refer to:	Table 3	Table 10
	90						Extremely inverse, torque control	Refer to:	Table 3	Table 9
	55						Inverse, short time	Refer to:	Table 4	Table 11
	95						Inverse, short time, low burden	Refer to:	Table 4	Table 11
	57						Inverse, medium time	Refer to:	Table 5	Table 11
	66						Inverse, long time	Refer to:	Table 6	Table 12
	59						Inverse, over and undercurrent	Refer to:	Table 7	Table 14
		*					Features (see Tables 1- 14)			
			*	*	*		TOC/IOC current ranges and others (see Tables 1- 14)			

60 Hz Models

MODEL NUMBER	TIME OVER-CURRENT UNIT RANGE (A)	INSTANT. UNIT RANGE (A)	NO. OF CONTACTS PER UNIT	COMMENTS
TABLE 1. INVERSE TIME CHARACTERISTIC RELAYS				
IAC51A801A	0.5-4	----	1 N.O.	
A802A	2-16	----	See Fig. 2-A	
IAC51B801A	0.5-4	0.5-4		
B802A	2-16	0.5-4		
B803A	0.5-4	2-16		
B804A	2-16	2-16	1 N.O.	
B805A	0.5-4	10-80	See Fig. 2-B	
B806A	2-16	10-80		
B807A	0.5-4	20-160		
B808A	2-16	20-160		
				Control VDC
IAC51N7A	1.5-6	----		125
N8A	1.5-6	----		250
N13A	0.5-2	----		125
N14A	0.5-2	----		250
N16A	1.5-6	----	1 N.O.	24
N17A	1.5-6	----	See Fig. 2-A	48
N101A	4-16	----		125
N102A	4-16	----		250
N111A	4-16	----		48
				Includes auxiliary relay for bus differential protection and for checking CT secondary circuit.
IAC51V2A	1.5-6	10-30		
V3A	1.5-6	4-12		
V5A	0.5-2	2-6		
V6A	1.5-6	2-6	1 N.O.	High dropout instantaneous unit. Two target seal-in units.
V101A	4-16	10-30	See Fig. 2-F	
V104A	4-16	4-12		
V105A	4-16	20-60		
V106A	0.5-2	10-30		

MODEL NUMBER	TIME OVER-CURRENT UNIT RANGE (A)	INSTANT. UNIT RANGE (A)	NO. OF CONTACTS PER UNIT	COMMENTS
TABLE 1. INVERSE TIME CHARACTERISTIC RELAYS				
IAC52A801A	0.5-4	----	2 N.O.	
A802A	2-16	----	See Fig. 2-G	
IAC52B801A	0.5-4	0.5-4		
B802A	2-16	0.5-4		
B803A	0.5-4	2-16		
B804A	2-16	2-16	2 N.O.	
B805A	0.5-4	10-80	See Fig. 2-H	
B806A	2-16	10-80		
B807A	0.5-4	20-160		
B808A	2-16	20-160		
IAC60A12A	1.5-6	----	1 N.O.	Torque controlled time unit will operate only when an external contact (wired to shading coil) is closed.
A15A	0.5-2	----	See Fig. 2-A	
A111A	4-16	----		
IAC60B11A	1.5-6	4-16		
B13A	1.5-6	10-40		
B15A	1.5-6	2-8		
B16A	0.5-2	4-16	1 N.O.	Similar to IAC60A with instantaneous unit.
B20A	1.5-6	20-80	See Fig. 2-B	
B21A	2-8	10-40		
B112A	4-16	20-80		
B114A	4-16	10-40		
B115A	4-16	4-16		
	2 Units	2 Units		**Control VDC**
IAC60T1A	0.5-4	2-50		48/125
T2A	2-16	2-50	1 N.O.	48/125
T3A	0.5-4	2-50	See Fig. 2-M	125/250
				Has two PJC instantaneous units. No target seal-in units.

60 Hz Models

MODEL NUMBER	TIME OVER-CURRENT UNIT RANGE (A)	INSTANT. UNIT RANGE (A)	NO. OF CONTACTS PER UNIT	COMMENTS
TABLE 2. VERY INVERSE TIME CHARACTERISTIC RELAYS				
IAC53A10A	0.1-0.4	----	1 N.O. See Fig. 2-A	
A19A	0.15-0.6	----		
A801A	0.5-4.0	----		
A803A	1.5-12	----		
IAC53B32A	0.1-0.4	1-4	1 N.O. See Fig. 2-B	
B34A	0.15-0.6	10-40		
B38A	0.1-0.4	0.5-2		
B50A	0.1-0.4	4-16		
B54A	0.1-0.4	10-40		
B76A	0.1-0.4	2-8		
B78A	0.1-0.4	20-80		
B801A	0.5-4	0.5-4		
B803A	0.5-4	2-16		
B805A	0.5-4	10-80		
B807A	0.5-4	20-160		
B809A	1.5-12	0.5-4		
B810A	1.5-12	2-16		
B811A	1.5-12	10-80		
B812A	1.5-12	20-160		
IAC53M3A	1.5-6	10-30	1 N.O. See Fig. 2-F	High dropout instantaneous unit. Two target seal-in units.
M4A	0.5-2	1-3		
M5A	0.5-2	2-6		
M6A	1.5-6	4-12		
M7A	1.5-6	2-6		
M9A	0.5-2	4-12		
M10A	0.5-2	0.5-1.5		
M11A	1.5-6	0.5-1.5		
IAC53M101A	4-16	4-12	1 N.O. See Fig. 2-F	High dropout instantaneous unit. Two target seal-in units.
M102A	4-16	10-30		
M103A	4-16	20-60		
IAC53T801A	0.5-4	0.5-4	1 N.O. See Fig. 2-E	Time unit and instantaneous unit contacts are electrically separate.
T802A	0.5-4	2-16		
T803A	0.5-4	10-80		
T804A	0.5-4	20-160		
T805A	1.5-12	0.5-4		
T806A	1.5-12	2-16		
T807A	1.5-12	10-80		
T808A	1.5-12	20-160		

MODEL NUMBER	TIME OVER-CURRENT UNIT RANGE (A)	INSTANT. UNIT RANGE (A)	NO. OF CONTACTS PER UNIT	COMMENTS
TABLE 2. VERY INVERSE TIME CHARACTERISTIC RELAYS				
IAC54A10A	0.1-0.4	----	2 N.O. See Fig. 2-G	
A801A	0.5-4	----		
A803A	1.5-12	----		
IAC54B801A	0.5-4	0.5-4	2 N.O. See Fig. 2-H	
B803A	0.5-4	2-16		
B805A	0.5-4	10-80		
B807A	0.5-4	20-160		
B809A	1.5-12	0.5-4		
B810A	1.5-12	2-16		
B811A	1.5-12	10-80		
B812A	1.5-12	20-160		
B813A	0.1-0.4	4-16		
IAC80L1A	4-16	----	1 N.O. See Fig. 2-A	Torque controlled time unit will operate only when an external contact (wired to shading coil) is closed.
L2A	1.5-6	----		
L3A	0.5-2	----		
	2 Units		1 N.O. per unit See Fig. 2-S	**Control VDC**
IAC80P1A	4-16	----		125/250 — Similar to IAC80L except two units.
P2A	1.5-6	----		125/250
P3A	4-16	----		48/125
	2 Units	2 Units	1 N.O. per unit See Fig. 2-M	**Control VDC**
IAC80T1A	0.5-4	2-50		48/125 — Has two PJC instant. units. No target seal-in units.
T2A	1.5-12	2-50		48/125

Case Sizes and Approximate Weights

IAC RELAY MODEL	CASE SIZE	APPROX. WT. IN lbs (kg)	
		NET	SHIP
51N. 66T	S2	12 (5.4)	18 (8.2)
66M, 80P	M1	18 (8.2)	28 (12.7)
60T, 80T, 90T	L2	18 (8.2)	28 (12.7)
All others listed	S1	12 (5.4)	18 (8.2)

60 Hz Models

MODEL NUMBER	TIME OVER-CURRENT UNIT RANGE (A)	INSTANT. UNIT RANGE (A)	NO. OF CONTACTS PER UNIT	COMMENTS
TABLE 3. EXTREMELY INVERSE TIME CHARACTERISTIC RELAYS				
IAC77A15A A801A A803A	0.1-0.4 0.5-4 1.5-12	---- ---- ----	1 N.O. See Fig. 2-A	
IAC77B55A B57A B60A B69A B71A B73A B801A B803A B805A B807A B809A B810A B11A B812A	0.1-0.4 0.1-0.4 0.1-0.4 0.1-0.4 0.1-0.4 0.1-0.4 0.5-4 0.5-4 0.5-4 0.5-4 1.5-12 1.5-12 1.5-12 1.5-12	4-6 0.5-2 2-8 20-80 1-4 10-40 0.5-4 2-16 10-80 20-160 0.5-4 2-16 10-80 20-160	1 N.O. See Fig. 2-B	
IAC77M3A M4A M5A	4-16 4-16 1.5-6	4-12 10-30 2-6	1 N.O. See Fig. 2-F	High dropout instantaneous unit. Two target seal-in units.
IAC78A7A A801A A803A	0.1-0.4 0.5-4 1.5-12	---- ---- ----	2 N.O. See Fig. 2-G	
IAC788801A B803A B805A B807A B809A B810A B811A B812A	0.5-4 0.5-4 0.5-4 0.5-4 1.5-12 1.5-12 1.5-12 1.5-12	0.5-4 2-16 10-80 20-160 0.5-4 2-16 10-80 20-160	2 N.O. See Fig. 2-H	
IAC90B1A B2A	1.5-6 0.5-2	10-40 4-16	1 N.O. See Fig. 2-B	Torque controlled time unit will operate only when an external contact (wired to shading coil) is close.
	2 Units	2 Units		**Control VDC**
IAC90T1A T2A	0.5-4 1.5-12	2-50 2-50	1 N.O. See Fig. 2-M	48/125 48/125 — Has two PJC instantaneous units. No target seal-in units.

MODEL NUMBER	TIME OVER-CURRENT UNIT RANGE (A)	INSTANT. UNIT RANGE (A)	NO. OF CONTACTS PER UNIT	COMMENTS
TABLE 4. INVERSE, SHORT TIME CHARACTERISTIC RELAYS				
IAC55A2A A3A A101A	1.5-6 0.5-2 4-16	---- ---- ----	1 N.O. See Fig. 2-A	
IAC55B2A B3A B9A B10A B17A B19A B20A B25A B101A	1.5-6 0.5-2 1.5-6 0.5-2 0.5-2 1.5-6 1.5-6 0.5-2 4-16	10-40 10-40 4-16 4-16 2-8 20-80 2-8 1-4 10-40	1 N.O. See Fig. 2-B	
IAC55B104A B115A B121A	4-16 4-16 4-16	20-80 4-16 40-160		
IAC55F1A F2A F3A F4A F6A F7A	4-16 1.5-6 4-16 1.5-6 0.5-2 1.5-6	4-16 4-16 0.5-2 1.5-6 0.5-2 2-8	1 N.O. See Fig. 2-B	Time unit and instantaneous unit coil leads are brought out to separate studs.
IAC95F1A	1.5-6	1.5-5	1 N.O. See Fig. 2-E	Moderately short-time characteristic. Low burden.
TABLE 5. INVERSE, MEDIUM TIME CHARACTERISTIC RELAYS				
IAC57A2A A3A A101A	1.5-6 0.5-2 4-16	---- ---- ----	1 N.O. See Fig. 2-A	
IAC57B2A B3A B10A B13A B101A B104A	1.5-6 0.5-2 1.5-6 1.5-6 4-16 4-16	10-40 10-40 20-80 4-16 10-40 20-80	1 N.O. See Fig. 2-B	

60 Hz Models

MODEL NUMBER	TIME OVER-CURRENT UNIT RANGE (A)	INSTANT. UNIT RANGE (A)	NO. OF CONTACTS PER UNIT	COMMENTS	
TABLE 6. INVERSE, LONG TIME CHARACTERISTIC RELAYS					
IAC66A51A A52A A53A	0.6-1.8 1.5-4.5 4-12	---- ---- ----	1 N.O. See Fig. 2-A		
IAC66B51A B52A B53A B54A B55A B56A B57A	0.6-1.8 1.5-4.5 4-12 0.6-1.8 1.5-4.5 4-12 4-12	2-16 2-16 2-16 10-80 10-80 10-80 20-160	1 N.O. See Fig. 2-B		
IAC66C51A C52A C53A C54A C55A C56A C57A	0.6-1.8 1.5-4.5 4-12 0.6-1.8 1.5-4.5 4-12 1.5-4.5	2-16 2-16 2-16 10-80 10-80 10-80 0.5-4	1 N.O. See Fig. 2-E	Time unit and instantaneous unit contact leads are brought our separately.	
				Hi Dropout Instantaneous	
IAC66K51A K52A K53A K55A K56A K57A K58A K59A K60A K64A K65A K67A K68A K69A K70A	0.6-1.8 0.6-1.8 0.6-1.8 1.5-4.5 1.5-4.5 1.5-4.5 1.5-4.5 1.5-4.5 1.5-4.5 4-12 4-12 4-12 4-12 4-12 4-12	2-16 2-16 10-80 2-16 2-16 10-80 10-80 10-80 20-160 2-16 10-80 10-80 10-80 10-80 20-160	1 N.O. See Fig. 2-O	1-4 10-40 2-8 2-8 10-40 2-8 4-16 10-40 4-16 10-40 2-8 4-16 10-40 20-80 4-16	Two instantaneous units, one standard and one high dropout.

MODEL NUMBER	TIME OVER-CURRENT UNIT RANGE (A)	INSTANT. UNIT RANGE (A)	NO. OF CONTACTS PER UNIT	COMMENTS		
TABLE 6. INVERSE, LONG TIME CHARACTERISTIC RELAYS						
				Hi Dropout Instant-taneous	**Control VDC**	
IAC66M51A M52A M53A M54A M55A M56A M57A M58A M59A M60A M61A M62A	1.5-4.5 1.5-4.5 1.5-4.5 1.5-4.5 1.5-4.5 1.5-4.5 4-12 4-12 4-12 4-12 4-12 4-12	2-16 10-80 10-80 10-80 10-80 20-160 2-16 10-80 10-80 10-80 10-80 20-160	1 N.O. See Fig. 2-P	4-16 2-8 7-28 10-40 20-80 20-80 4-16 2-8 7-28 10-40 20-80 20-80	48/ 125/ 250	Two instan-taneous units; one standard, one high dropout. Two seal-in units. Aux. tele- phone relay for 0.1 sec time delay pickup of high dropout unit.
IAC66T51A T52A T53A T54A T55A T56A T57A	1.5-4.5 1.5-4.5 2.5-7.5 2.5-7.5 4-12 4-12 4-12	10-80 20-160 10-80 10-80 10-80 10-80 20-160	See Fig. 2-Q	7-28 4-16 7-28 10-40 10-40 4-16 10-40	48/ 110-125/ 220-250	Two instanta-neous units; one standard, one high drop- out. Static time delay on high dropout unit adjustable from 0.05-3.0 sec, except for IAC66S2A which has 0.03-1 sec range.
TABLE 7. INVERSE TIME, OVER- AND UNDERCURRENT RELAYS						
IAC59C1A C2A C103A	0.5-2 1.5-6 4-16	--- --- ---	1 N.O. & 1 N.C. See Fig. 2-K	No target seal-in unit.		

50 Hz Models

MODEL NUMBER	TIME OVER-CURRENT UNIT RANGE (A)	INSTANT. UNIT RANGE (A)	NO. OF CONTACTS PER UNIT	COMMENTS
TABLE 8. INVERSE TIME CHARACTERISTIC RELAYS				
IAC51A804A A805A	0.5-4 2-16	---- ----	1 N.O. See Fig. 2-A	
IAC51B821A B822A B823A B824A B825A B826A B827A B828A	0.5-4 2-16 0.5-4 2-16 0.5-4 2-16 0.5-4 2-16	0.5-4 0.5-4 2-16 2-16 10-80 10-80 20-160 20-160	1 N.O. See Fig. 2-B	
IAC51N9A N10A N18A N103A N104A N119A	1.5-6 1.5-6 0.5-2 4-16 4-16 4-16	---- ---- ---- ---- ---- ----	1 N.O. See Fig. 2-A	**Control VDC** 125 250 125 125 250 48 Includes auxiliary relay for bus differential protection and for checking CT secondary circuit.
IAC51V102A	4-6	10-30	1 N.O. See Fig. 2-F	High dropout instantaneous unit. Two target seal-in units.
IAC52A804A A805A	0.5-4 2-16	---- ----	2 N.O. See Fig. 2-G	
IAC52B821A B822A B823A B824A B825A B826A B827A B828A	0.5-4 2-16 0.5-4 2-16 0.5-4 2-16 0.5-4 2-16	0.5-4 0.5-4 2-16 2-16 10-80 10-80 20-160 20-160	2 N.O. See Fig. 2-H	
IAC60A14A A16A A113A	0.5-2 1.5-6 4-16	---- ---- ----	1 N.O. See Fig. 2-A	Torque controlled time unit will operate only when an external contact (wired to shading coil) is closed.
IAC60B117A B118A B119A	4-16 4-16 4-16	10-40 4-16 20-80	1 N.O. See Fig. 2-B	Similar to IAC60A with instantaneous unit.

MODEL NUMBER	TIME OVER-CURRENT UNIT RANGE (A)	INSTANT. UNIT RANGE (A)	NO. OF CONTACTS PER UNIT	COMMENTS
TABLE 9. VERY INVERSE TIME CHARACTERISTIC RELAYS				
IAC53A801A 803A	0.5-4 1.5-12	---- ----	1 N.O. See Fig. 2-A	
IAC53B61A B801A B803A B805A B807A B809A B810A B811A B812A	0.1-0.4 0.5-4 0.5-4 0.5-4 0.5-4 1.5-12 1.5-12 1.5-12 1.5-12	4-16 0.5-4 2-16 10-80 20-160 0.5-4 2-16 10-80 20-160	1 N.O. See Fig. 2-B	
IAC53T801A T802A T803A T804A T805A T806A T807A T808A	0.5-4 0.5-4 0.5-4 0.5-4 1.5-12 1.5-12 1.5-12 1.5-12	0.5-4 2-16 10-80 20-160 0.5-4 2-16 10-80 20-160	1 N.O. See Fig. 2-E	Time unit and instantaneous unit contacts are electrically separate.
IAC54A801A A803A	0.5-4 1.2-12	---- ----	2 N.O. See Fig. 2-G	
IAC54B801A B803A B805A B807A B809A B810A B811A B812A B813A	0.5-4 0.5-4 0.5-4 0.5-4 1.5-12 1.5-12 1.5-12 1.5-12 0.1-0.4	0.5-4 2-16 10-80 20-160 0.5-4 2-16 10-80 20-160 4-16	2 N.O. See Fig. 2-H	
IAC80L4A	4-16	4-16	1 N.O. See Fig. 2-A	Torque controlled time unit will operate only when an external contact (wired to shading coil) is closed.

50 Hz Models

MODEL NUMBER	TIME OVER-CURRENT UNIT RANGE (A)	INSTANT. UNIT RANGE (A)	NO. OF CONTACTS PER UNIT	COMMENTS
TABLE 10. EXTREMELY INVERSE TIME CHARACTERISTIC RELAYS				
IAC77A804A A805A	0.5-4 1.5-12	---- ----	1 N.O. See Fig. 2-A	
IAC77B58A B821A B822A B823A B824A B825A B826A B827A B828A	0.02-0.08 0.5-4 1.5-12 0.5-4 1.5-12 0.5-4 1.5-12 0.5-4 1.5-12	0.04-0.16 0.5-4 0.5-4 2-16 2-16 10-80 10-80 20-160 20-160	1 N.O. See Fig. 2-B	
	3 Units	3 Units		
IAC77S823A S826A	0.5-4 1.5-12	2-16 10-80	1 N.O. See Fig. 2-R	
IAC78A804A A805A	0.5-4 1.5-12	---- ----	2 N.O. See Fig. 2-G	
IAC78B821A B822A B823A B824A B825A B826A B827A B828A	0.5-4 1.5-12 0.5-4 1.5-12 0.5-4 1.5-12 0.5-4 1.5-12	0.5-4 0.5-4 2-16 2-16 10-80 10-80 20-160 20-160	2 N.O. See Fig. 2-H	
TABLE 11. INVERSE, SHORT TIME CHARACTERISTIC RELAYS				
IAC55A5A A6A A104A	1.5-6 0.5-2 4-16	---- ---- ----	1 N.O. See Fig. 2-A	
IAC55B6A B7A B14A B22A B105A B108A B122A	1.5-6 0.5-2 0.5-2 0.5-2 4-16 4-16 4-16	10-40 10-40 4-16 2-8 10-40 20-80 4-16	1 N.O. See Fig. 2-B	
IAC55F5A	4-16	4-16	1 N.O. See Fig. 2-B	Time unit and instantaneous unit coil leads are brought out to separate studs.
IAC95F2A	1.5-6	1.5-5	1 N.O. See Fig. 2-E	Moderately short-time characteristic. Low burden.

MODEL NUMBER	TIME OVER-CURRENT UNIT RANGE (A)	INSTANT. UNIT RANGE (A)	NO. OF CONTACTS PER UNIT	COMMENTS
TABLE 12. INVERSE, MEDIUM TIME CHARACTERISTIC RELAYS				
IAC57A6A A8A A104A	0.5-2 1.5-6 4-16	---- ---- ----	1 N.O. See Fig. 2-A	
IAC57B6A B7A B11A B105A B108A	1.5-6 0.5-2 1.5-6 4-16 4-16	10-40 10-40 20-80 10-40 20-80	1 N.O. See Fig. 2-B	
TABLE 13. INVERSE, LONG-TIME CHARACTERISTIC RELAYS				
IAC66A54A A55A A56A	0.6-1.8 1.5-4.5 4-12	---- ---- ----	1 N.O. See Fig. 2-A	
IAC66B58A B59A B60A	0.6-1.8 1.5-4.5 4-12	2-16 10-80 10-80	1 N.O. See Fig. 2-B	
IAC66C58A C59A C60A	0.6-1.8 1.5-4.5 4-12	2-16 10-80 10-80	1 N.O. See Fig. 2-E	Time unit and instantaneous unit coil leads are brought out to separate studs.
				Hi-Dropout Instantaneous
IAC66K54A K61A K62A K63A K71A K72A	0.6-1.8 1.5-4.5 1.5-4.5 1.5-4.5 4-12 4-12	10-80 10-80 10-80 20-160 10-80 20-160	1 N.O. See Fig. 2-O	2-8 2-8 4-16 4-16 4-16 4-16 — Two instantaneous units: one standard and one high dropout.
DC Control Voltage 48/125/250				**Hi-Dropout Instantaneous**
IAC66M63A M64A M65A M67A	1.5-4.5 1.5-4.5 4-12 4-12	10-80 20-160 10-80 20-160	1 N.O. See Fig. 2-P	20-80 20-80 20-80 20-80 — Two instantaneous units: one standard and one high dropout. Two seal-in units. Aux. Telephone relay for 0.1 sec time delay pickup of high dropout.
TABLE 14. INVERSE TIME OVER- AND UNDERCURRENT RELAYS				
IAC59C4A C5A C106A	0.5-2 1.5-6 4-16	---- ---- ----	1 N.O. & 1 N.C. See Fig. 2-E	No target seal-in unit.

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