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BELL SYSTEM PRACTICES
Teletypewriter and Data Stations

SECTION P31.152
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USE OF FUSETRONS WITH TELETYPEWRITER APPARATUS

1. GENERAL

1.01 This section lists the recommended time-delay fuse ratings for teletypewriter apparatus. These time-delay (also called time-lag) fuses are either Fusetrons (manufactured by the Bussmann Co.) or Slo-Blo fuses (manufactured by the Littelfuse Co.). It should be noted that the regular type of quick-blowing fuses are no longer generally recommended for teletypewriter apparatus. However, regular fuse values are given in parentheses in case time-delay fuses are not available. See P31.101 for fusing of rectifiers.

1.02 This section is reissued to:

(a) Remove references to motor generators
(b) Simplify the tables
(c) Add information on 28 teletypewriter apparatus
(d) Add information on the 131B2 teletypewriter subscriber set.

Because of the rearrangement of the section, marginal arrows to indicate changes are not feasible.

2. DESCRIPTION

2.01 Fusetrons or Slo-Blo fuses are thermal-type, time-delay fuses with two features, first, that they will not blow out quickly on large overloads, and second, that they will not blow out on moderate overloads for short periods. Fusetrons or Slo-Blo fuses are more satisfactory than regular fuses for motor operation because they will not blow out on the initial rush of current which motors take on starting, and yet will provide a higher degree of protection against excessive current in case of a short circuit or a stalled motor. "Fusetron" is a copyrighted trade name which the Bussmann Fuse Co. uses for a time-lag or time-delay fuse. "Slo-Blo" is the trade name for a similar type of time-delay fuse copyrighted by the Littelfuse Co. It is

recommended that the same TP number as well as the same current rating be used in making replacements, since the time-lag duration may vary considerably among differently coded time-delay fuses of the same current rating. "Fustat" is a copyrighted trade name which the Bussmann Co. employs for a Fusetron with a special narrow-thread, screw-in type base. Fustats are no longer recommended for teletypewriter equipment.

3. 14 TELETYPEWRITER

3.01 The value of Fusetron which may be used in the teletypewriter **table** when desired, depends on the type of motor used and whether a rectifier is also protected. The values used under different conditions are as follows:

Units Protected	Fusetron	(Fuse)
dc motor or ac series motor	1.0 amp	(3.0 amp)
ac series motor and rectifier	1.6 amp	(3.0 amp)
* ac synchronous motor, alone or with rectifier	3.2 amp	(6.0 amp)

4. 15 TELETYPEWRITER

4.01 The value of Fusetron used in the teletypewriter **base** or **table** depends on the motor unit used and whether a rectifier is also protected. The values used under different conditions are as follows:

Units Protected	Fusetron	(Fuse)
dc motor or ac series motor	1.25 amp	(3.0 amp)
ac series motor and rectifier	1.6 amp	(3.0 amp)
* ac synchronous motor, alone or with rectifier	3.2 amp	(6.0 amp)

5. 19 TELETYPEWRITER SETS

5.01 The value of the Fusetron used in the teletypewriter **base** depends on the motor unit used, while the value used in the teletypewriter **table** depends on the motor unit and transmitter-distributor used and whether a rectifier is also protected. The values used under different conditions are as follows:

Units Protected	Base		Table	
	Fusetron	(Fuse)	Fusetron	(Fuse)
dc motor and transmitter-distributor	1.6 amp	(3.0 amp)	2.5 amp	(6.0 amp)
ac series motor, transmitter-distributor and 0.8 amp rectifier	1.6 amp	(3.0 amp)	6.25 amp	(15.0 amp)
* synchronous motor, transmitter-distributor and 0.8 amp rectifier	3.2 amp	(6.0 amp)	8.0 amp	(15.0 amp)

* The TP136132 overload switch assembly provides a thermostatic switch to supplement or replace the standard fusing for the 15D or TP82283 synchronous motor if desired. See 5904S.

6. 28 APPARATUS

6.01 Some of the time-delay fuses listed below under **FUSETRON** are not Bussmann Fusetrons but Slo-Blo fuses, similar time-delay fuses made by the Littelfuse Company. 28 synchronous motors are also protected by a thermostatic switch on the motor unit. Under **UNIT** below is listed the unit which contains the protective fusing, not necessarily the unit protected.

Unit	Fusetron	(Fuse)	TP No.
28A Electrical Service Unit	—	(10.0 amp)	TP151418
28B " " "	4.0 amp	(6.0 amp)	TP129919
28C " " "	6-1/4 amp (2)	(15.0 amp (2))	TP161136
28D " " "	None	None	
28D-1 " " "	4.0 amp	(6.0 amp)	TP129919
28E " " "	4.0 amp	(6.0 amp)	TP129919
28E-1 " " "	4.0 amp	(6.0 amp)	TP129919
28F " " "	6-1/4 amp	(15.0 amp)	TP161136
28F-1 " " "	6-1/4 amp	(15.0 amp)	TP161136
28G " " "	6-1/4 amp	(15.0 amp)	TP161136
28G-1 " " "	6-1/4 amp	(15.0 amp)	TP161136
28H " " "	6-1/4 amp	(15.0 amp)	TP161136
28J " " "	6-1/4 amp	(15.0 amp)	TP161136
28K " " "	4.0 amp	(6.0 amp)	TP129919
28A Typing Reperforator Base	4.0 amp	(6.0 amp)	TP129919
28F Teletypewriter Cabinet	4.0 amp	(6.0 amp)	TP129919
28A Stroboscopic Test Set	1.0 amp	(3.0 amp)	TP161205
28A Typing Reperforator Cabinet	10.0 amp (4)	(15.0 amp (4))	TP112141
28A-1 Typing Reperforator Cabinet	4.0 amp (6)	(6.0 amp (6))	TP129431
" " " "	—	(5.0 amp (2))	TP126296

7. TELETYPEWRITER SUBSCRIBER SETS

7.01 Teletypewriter subscriber sets in present use do not contain fuses other than those listed below:

Subscriber Set	Fusetron	(Fuse)
120C1	1.6 amp (2)	(3.0 amp (2))
120C2	1.6 amp (2)	(3.0 amp (2))
120D1	1.6 amp (2)	(3.0 amp (2))

7.02 The use of teletypewriter subscriber sets, other than the 131B2 subscriber set, does not affect the ratings of the fusing in the teletypewriter base or table. Apparatus used in conjunction with the 131B2 subscriber set should be fused as follows:

15 TTY on 15N Table

Motor	Fusetron	(Fuse)
dc	2.0 amp	(3.0 amp)
ac series	5.0 amp	(10.0 amp)
syn	5.0 amp	(10.0 amp)

15 TTY with Keyboard and Transmitter-Distributor on 19A Table

Motor	Fusetron for TTY	(Fuse for TTY)	Fusetron for Table	(Fuse for Table)
dc	1.25 amp	(3.0 amp)	6.0 amp	(10.0 amp)
ac series	1.6 amp	(3.0 amp)	15.0 amp	—
syn	3.2 amp	(6.0 amp)	15.0 amp	—

15 TTY with Perforator-Transmitter and Transmitter-Distributor on 19A Table

Motor	Fusetron for TTY	(Fuse for TTY)	Fusetron for Table	(Fuse for Table)
dc	1.6 amp	(3.0 amp)	6.0 amp	(10.0 amp)
ac series	1.6 amp	(3.0 amp)	15.0 amp	—
syn	3.2 amp	(6.0 amp)	15.0 amp	—

14 Typing Reperforator on 14B Table

Motor	Fusetron on Table	(Fuse on Table)
dc	1.0 amp	(3.0 amp)
ac series	1.6 amp	(3.0 amp)
ac syn	3.2 amp	(6.0 amp)

14 Typing Reperforator and Transmitter-Distributor on 19A Table

Motor	Fusetron for Table	(Fuse for Table)
dc	6.0 amp	(10.0 amp)
ac series	15.0 amp	—
syn	15.0 amp	—

8. 14-TYPE UNITS OPERATED SEPARATELY AND SOTUS

8.01 Since it may sometimes be desired to operate individual units of teletypewriter apparatus without associating them to form one of the coded teletypewriter sets, the recommended values of Fusetrons for use with certain units are listed below. In the table under "Protection Afforded," A indicates that if the motor stalls the Fusetron will operate so quickly that the motor will not be damaged; B indicates that if the motor stalls the Fusetron will operate after a period of time in which some damage to the motor may occur; C indicates that if the motor stalls the Fusetron may not operate in time to prevent serious damage to the motor. The Fusetron should be connected in series with the motor.

Unit	Motor	Fusetron	Protection Afforded	(Fuse)
14 type Transmitter-Distributor	DC	1.0 amp	A	(3.0 amp)
	AC Series	1.0 amp	B	(3.0 amp)
	SYN	3.2 amp	A	(6.0 amp)
14 type Reperforator (Non-Typing)	DC	1.0 amp	A	(3.0 amp)
	AC Series	1.6 amp	C	(3.0 amp)
	SYN	3.2 amp	A	(6.0 amp)
14 Typing Reperforator	DC Shunt	1.0 amp	A	(3.0 amp)
	AC Series	1.0 amp	B	(3.0 amp)
	SYN (Note 1)	3.2 amp	A	(6.0 amp)
SOTUS (Note 2)	DC Shunt	.8 amp	A	(3.0 amp)
	AC Series	1.6 amp	C	(3.0 amp)
	SYN	3.2 amp	A	(6.0 amp)

Note 1: See 5742S for fuse holder assembly used in 81-type switching centers.

Note 2: The SOTUS requires a cartridge-type Fusetron. The Bussmann catalog number consists of the amperage prefixed by FNM.

9. REFERENCE TO BELL SYSTEM PRACTICES

BSP	Section
Rectifiers for Teletypewriter Station Apparatus	P31.101