USE OF NO. 35 TYPE TEST SET AS A VARIABLE RESISTANCE

1. GENERAL

1.01 This section describes the procedure for obtaining a given value of resistance in the No. 35C or No. 35D test set for use when a resistance is specified for test purposes.

1.02 This section is reissued to add the use of the 35D test set, which can be used for higher resistance values than the 35C test set.

1.03 The data covered herein is applicable in those cases where, as for example in testing J type relays, a given value of resistance is to be inserted in the circuit. By using these procedures the necessity of providing a number of individual resistances for this purpose is obviated. The procedures are, however, not applicable in those cases where a resistance held to limits closer than ± 5% is required.

1.04 The principle involved in setting up a specific resistance value in the rheostat of the test set is based on Ohms' Law, and depends upon the measurement of voltage and current. That is, resistance equals the voltage divided by the current. Tables 1 and 2 give resistance values which may be set up by this method.

2. APPARATUS

2.01 No. 35C or No. 35D test set.

2.02 1 P2P cord equipped with 1 No. 109 or No. 309 plug with black shell and 1 No. 110 or No. 310 plug with black shell (2P10B) or 1 W2W cord equipped with 1 No. 110 or No. 310 plug, 1 No. 360B tool and 1 No. 360C tool (2W17A).

2.03 2 KS-6278 connecting clips (when W2W cord is used).

2.04 When using method covered in 3.02 (a) 1 W2W cord equipped with 1 No. 110 or No. 310 plug, 1 No. 360B tool and 1 No. 360C tool (2W17A) with a 5000 ohm ±1% resistance (such as a No. 63DN resistance) connected to the terminals.

2.05 When using method covered in 3.02 (b) 1 W2W cord equipped with 1 No. 110 or No. 310 plug, 1 No. 360B tool and 1 No. 360C tool (2W17A).

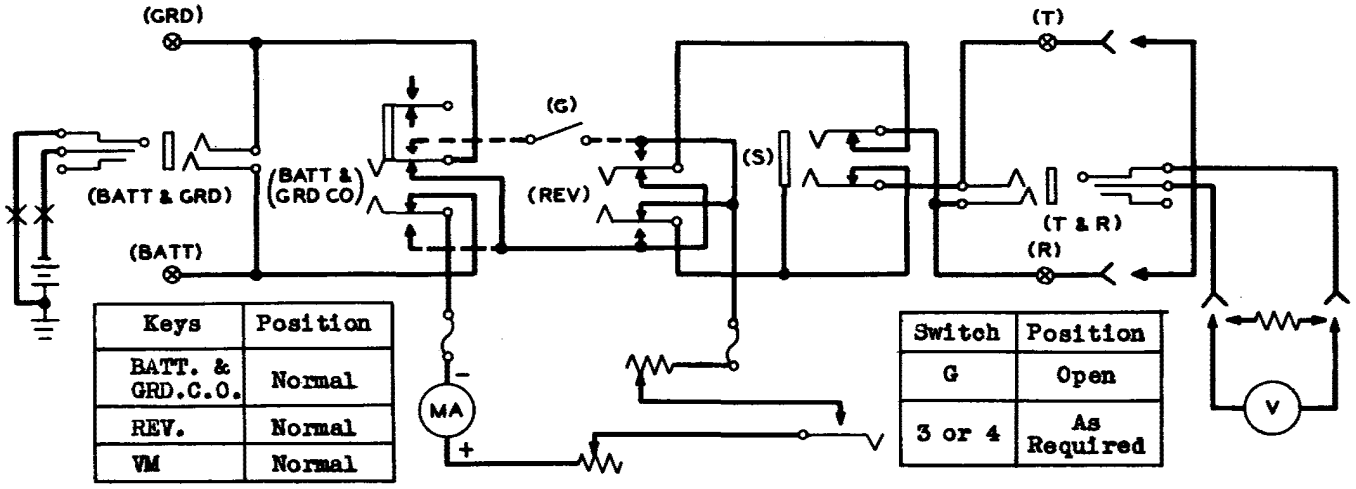
2.06 2 No. 364 tools.

2.07 Weston Model No. 280 voltmeter with ranges of 3-60-150 volts (or equivalent voltmeter).

3. PROCEDURE FOR SETTING RESISTANCE ON TEST SET

3.01 Connect direct battery and ground to the test set BATT & GRD jack with a P2P cord. Where a battery and ground supply jack is not available, use a W2W cord and connect the white (tip) conductor to ground and connect the black (ring) conductor to the working side of a fuse, to the battery terminal of the frame connecting block or to other source of direct battery. The battery should be within the limits shown in table 1 or 2. Set the BATT & GRD CO and REV keys in their normal positions and open the G switch.

3.02 Measure the battery voltage to the nearest half volt by one of the fol-



Keys	Position
BATT. & GRD.C.O.	Normal
REV.	Normal
VM	Normal

Switch	Position
G	Open
3 or 4	As Required

Fig. 1 - Illustrating Connections to No. 35C or No. 35D Test Set

3.02 (Continued)

lowing methods. Method (a) or (b) should be followed when a No. 35C test set is used and method (c) should be followed when a No. 35D test set is used.

(a) Connect the 5000 ohm resistance to the T & R jack with a W2W cord (See Fig. 1). Operate the short circuiting switch of either the No. 1 or No. 2 telegraph key, shift the sliders of the associated rheostat to the extreme left so as to have no resistance in the rheostat and operate the 15 MIL-AMPS key. The reading on the 0-75 scale is the battery voltage. Disconnect the 5000 ohm resistance and proceed in accordance with 3.03.

(b) Connect the voltmeter to the T & R jack with a W2W cord (See Fig. 1). Operate the short-circuiting switch of either the No. 1 or No. 2 telegraph key and shift the associated sliders of the rheostat to the extreme left so as to have no resistance in the rheostat. Read the battery voltage. Disconnect the voltmeter and proceed in accordance with 3.03.

(c) Operate the short-circuiting switch of either the No. 1 or No. 2 telegraph key and shift the associated sliders of the rheostat to the extreme left so as to have no resistance in the rheostat. Operate the VM key and operate the VOLTS key to the 75 position (See Fig. 2). Read the battery voltage. Restore the VM and VOLTS keys to normal and proceed in accordance with 3.03.

3.03 Immediately after measuring the voltage, shift all the sliders of the rheostat to the extreme right so as to introduce some resistance in the circuit. Short circuit the T & R binding posts of the test set. (See Fig. 1).

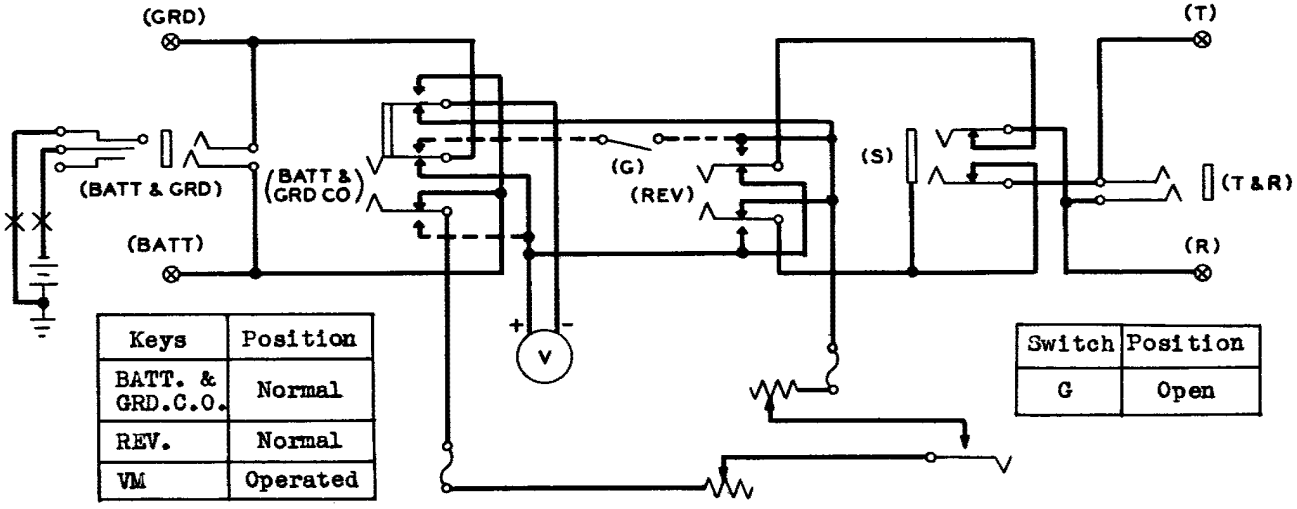
3.04 Refer to the tables for the required resistance and the corresponding meter reading for the battery voltage determined as above. When a No. 35C test set is used, resistances up to 15000 ohms can be determined with a battery of 21.5 to 28 volts and resistances up to 30000 ohms can be determined with a battery of 46 to 50 volts. When a No. 35D test set is used, resistances above these values can be determined. When the higher resistances are required, open the short circuiting switch associated with the No. 1 or No. 2 telegraph key, operate the short circuiting switch associated with the No. 3 or No. 4 telegraph key and operate the knife switches associated with this key to indicate a resistance less than but within 25000 ohms of the value required. Operate the specified MIL-AMPS key. Shift the sliders of the rheostat associated with the short-circuited telegraph key to obtain the meter reading as read on the 0-750 scale.

For example, to set the test set for 4000 ohms resistance when the voltage reading is 25.5 volts, note from table 2 that the required meter reading is 320. Then operate the 15 MIL-AMPS key and set the rheostat so that the meter deflects to 320 as read on the 0-750 scale.

3.05 Operate the BATT & GRD CO key and remove the short circuit from the T & R binding posts. Take care not to disturb the setting of the rheostat sliders. The test set resistance may now be connected to an external circuit by means of a W2W cord plugged into the T & R jack.

Caution: If the apparatus under test is connected to ringing current, take care not to touch the metal portions of the rheostat while using the test set.

3.06 In case a value of resistance not shown in the table is required, use the value in the table which is nearest the required resistance.



Keys	Position
BATT. & GRD.C.O.	Normal
REV.	Normal
VM	Operated

Switch	Position
G	Open

Fig. 2 - Illustrating Connections to No. 35D Test Set for Voltage Measurement

Table 1 - Resistance Values for Voltage Range of 46 to 50 Volts

Ohms Resistance			Meter Reading on 0-750 Scale								
			46.0 Volts	46.5 Volts	47.0 Volts	47.5 Volts	48.0 Volts	48.5 Volts	49.0 Volts	49.5 Volts	50.0 Volts
800*	4000†	20000#	575	580	590	595	600	605	610	620	625
820*	4100†	20500#	560	565	575	580	585	590	600	605	610
840*	4200†	21000#	550	555	560	565	570	575	585	590	595
860*	4300†	21500#	535	540	545	555	560	565	570	575	580
880*	4400†	22000#	520	530	535	540	545	550	555	565	570
900*	4500†	22500#	510	515	520	525	535	540	545	550	555
920*	4600†	23000#	500	505	510	515	520	525	530	540	545
940*	4700†	23500#	490	495	500	505	510	515	520	525	530
960*	4800†	24000#	480	485	490	495	500	505	510	515	520
980*	4900†	24500#	470	475	480	485	490	495	500	505	510
1000*	5000†	25000#	460	465	470	475	480	485	490	495	500
1025*	5125†	25625#	450	455	460	465	470	475	480	480	485
1050*	5250†	26250#	440	445	445	450	455	460	465	470	475
1075*	5375†	26875#	425	430	435	440	445	450	455	460	465
1100*	5500†	27500#	420	420	425	430	435	440	445	450	455
1125*	5625†	28125#	410	415	420	420	425	430	435	440	445
1150*	5750†	28750#	400	405	410	415	415	420	425	430	435
1175*	5875†	29375#	390	395	400	405	410	415	415	420	425
1200*	6000†	30000#	385	390	390	395	400	405	410	410	415
1225*	6125†	30625#	375	380	385	385	390	395	400	405	410
1250*	6250†	31250#	370	370	375	380	385	390	390	395	400
1275*	6375†	31875#	360	365	370	370	375	380	385	390	390
1300*	6500†	32500#	355	360	360	365	370	375	375	380	385
1340*	6700†	33500#	345	345	350	355	360	360	365	370	370
1380*	6900†	34500#	335	335	340	345	350	350	355	360	360
1420*	7100†	35500#	325	325	330	335	340	340	345	350	350
1460*	7300†	36500#	315	320	320	325	330	330	335	340	340
1500*	7500†	37500#	305	310	315	315	320	325	325	330	335
1540*	7700†	38500#	300	300	305	310	310	315	320	320	325
1580*	7900†	39500#	290	295	295	300	305	305	310	315	315
1620*	8100†	40500#	285	285	290	295	295	300	300	305	310
1660*	8300†	41500#	275	280	285	285	290	290	295	300	300
1700*	8500†	42500#	270	275	275	280	280	285	290	290	295
1740*	8700†	43500#	265	265	270	270	275	280	280	285	290
1780*	8900†	44500#	260	260	265	265	270	270	275	280	280
1820*	9100†	45500#	255	255	260	260	265	265	270	270	275
1850*	9250†	46250#	250	250	255	255	260	260	265	265	270
1900*	9500†	47500#	240	245	245	250	255	255	260	260	265
1950*	9750†	48750#	235	240	240	245	245	250	250	255	255
2000*	10000†	50000#	230	230	235	235	240	240	245	245	250
2050*	10250†	51250#	225	225	230	230	235	235	240	240	245
2100*	10500†	52500#	220	220	225	225	230	230	235	235	240
2150*	10750†	53750#	215	215	220	220	225	225	230	230	230
2200*	11000†	55000#	210	210	215	215	220	220	220	225	225
2250*	11250†	56250#	205	205	210	210	215	215	220	220	220
2300*	11500†	57500#	200	200	205	205	210	210	215	215	220
2350*	11750†	58750#	195	200	200	200	205	205	210	210	215
2400*	12000†	60000#	190	195	195	200	200	200	205	205	210
2450*	12250†	61250#	190	190	190	195	195	200	200	200	205
2500*	12500†	62500#	185	185	190	190	190	195	195	200	200
2550*	12750†	63750#	180	180	185	185	190	190	190	195	195
2600*	13000†	65000#	175	180	180	180	185	185	190	190	190
2650*	13250†	66250#	175	175	175	180	180	185	185	190	190
2700*	13500†	67500#	170	170	175	175	175	180	180	180	185
2800*	14000†	70000#	165	165	170	170	170	175	175	175	180
2900*	14500†	72500#	160	160	160	165	165	165	170	170	170
3000*	15000†	75000#	155	155	155	160	160	160	165	165	165
3100*	15500†	77500#	150	150	150	155	155	155	160	160	160
3200*	16000†	80000#	145	145	145	150	150	150	155	155	155
3300*	16500†	82500#	140	140	140	145	145	145	150	150	150
3400*	17000†	85000#	135	135	140	140	140	145	145	145	145
3500*	17500†	87500#	130	130	135	135	135	140	140	140	145
3600*	18000†	90000#	130	130	130	130	135	135	135	135	140
3700*	18500†	92500#	125	125	125	130	130	130	130	135	135
3800*	19000†	95000#	120	120	125	125	125	130	130	130	130
	20000†	100000#	115	115	115	120	120	120	125	125	125
	21000†	105000#	110	110	110	115	115	115	115	120	120
	22000†	110000#	105	105	105	110	110	110	110	110	115
	23000†	115000#	100	100	100	105	105	105	105	110	110
	24000†	120000#	95	95	100	100	100	100	100	105	105
	25000†	125000#	90	95	95	95	95	95	100	100	100
	26750†	133750#	90	90	90	90	90	90	90	95	95
	27500†	137500#	85	85	85	85	85	90	90	90	90
	30000†	150000#	75	80	80	80	80	80	80	85	85

* Operate the 75 MIL-AMPS key for these resistances.
† Operate the 15 MIL-AMPS key for these resistances.
# Operate the 15 and 3 MIL-AMPS keys and knife switches 3 or 4, as required, for these resistances.

Table 2 - Resistance Values for Voltage Range of 21.5 to 28 Volts

Ohms Resistance			Meter Reading on 0-750 Scale													
			21.5 Volts	22.0 Volts	22.5 Volts	23.0 Volts	23.5 Volts	24.0 Volts	24.5 Volts	25.0 Volts	25.5 Volts	26.0 Volts	26.5 Volts	27.0 Volts	27.5 Volts	28.0 Volts
400*	2000†	10000#	540	550	565	575	590	600	615	625	640	650	665	675	690	700
410*	2050†	10250#	525	535	550	560	575	585	600	610	620	635	645	660	670	685
420*	2100†	10500#	510	525	535	550	560	570	585	595	605	620	630	645	655	665
430*	2150†	10750#	500	510	525	535	545	560	570	580	595	605	615	630	640	650
440*	2200†	11000#	490	500	510	525	535	545	555	570	580	590	600	615	625	635
450*	2250†	11250#	480	490	500	510	520	535	545	555	565	580	590	600	610	620
460*	2300†	11500#	470	480	490	500	510	520	535	545	555	565	575	585	595	610
470*	2350†	11750#	460	470	480	490	500	510	520	530	545	555	565	575	585	595
480*	2400†	12000#	450	460	470	480	490	500	510	520	530	540	550	565	570	585
490*	2450†	12250#	440	450	460	470	480	490	500	510	520	530	540	550	560	570
500*	2500†	12500#	430	440	450	460	470	480	490	500	510	520	530	540	550	560
520*	2600†	13000#	415	425	435	445	450	460	470	480	490	500	510	520	530	540
540*	2700†	13500#	400	410	415	425	435	445	455	565	470	580	590	500	510	520
550*	2750†	13750#	390	400	410	420	425	435	445	455	465	470	480	490	500	510
560*	2800†	14000#	385	395	400	410	420	430	440	450	455	465	475	480	490	500
580*	2900†	14500#	370	380	390	395	405	415	420	430	440	450	455	465	475	485
600*	3000†	15000#	360	365	375	385	390	400	405	415	420	430	440	450	455	465
620*	3100†	15500#	345	355	365	370	380	390	395	405	410	420	425	435	445	450
640*	3200†	16000#	335	345	350	360	365	375	385	390	395	405	415	420	430	440
660*	3300†	16500#	325	335	340	350	355	365	370	380	385	395	400	410	415	425
680*	3400†	17000#	315	325	330	340	345	355	360	370	375	380	390	395	405	410
700*	3500†	17500#	305	315	320	330	335	345	350	355	365	370	380	385	390	400
720*	3600†	18000#	300	305	310	320	325	335	340	345	355	360	370	375	380	390
740*	3700†	18500#	290	295	305	310	315	325	330	335	345	350	360	365	370	380
760*	3800†	19000#	285	290	295	300	310	315	320	330	335	340	350	355	360	370
780*	3900†	19500#	275	280	290	295	300	310	315	320	330	335	340	345	350	360
800*	4000†	20000#	270	275	280	290	295	300	305	310	320	325	330	335	345	350
820*	4100†	20500#	260	270	275	280	285	290	300	305	310	320	325	330	335	340
840*	4200†	21000#	255	260	270	275	280	285	290	300	305	310	315	320	325	335
860*	4300†	21500#	250	255	260	270	275	280	285	290	295	300	310	315	320	325
880*	4400†	22000#	245	250	255	260	270	275	280	285	290	295	300	305	315	320
900*	4500†	22500#	240	245	250	255	260	265	270	280	285	290	295	300	305	310
920*	4600†	23000#	235	240	245	250	255	260	265	270	275	280	290	295	300	305
940*	4700†	23500#	230	235	240	245	250	255	260	265	270	275	280	290	295	300
960*	4800†	24000#	225	230	235	240	245	250	255	260	265	270	275	280	285	290
980*	4900†	24500#	220	225	230	235	240	245	250	255	260	265	270	275	280	285
1000*	5000†	25000#	215	220	225	230	235	240	245	250	255	260	265	270	275	280
1020*	5100†	25500#	210	215	220	225	230	235	240	245	250	255	260	265	270	275
1040*	5200†	26000#	205	210	215	220	225	230	235	240	245	250	255	260	265	270
1060*	5300†	26500#	205	210	210	215	220	225	230	235	240	245	250	255	260	265
1080*	5400†	27000#	200	205	210	215	215	220	225	230	235	240	245	250	255	260
1100*	5500†	27500#	195	200	205	210	215	220	220	225	230	235	240	245	250	255
1130*	5650†	28250#	190	195	200	205	210	210	215	220	225	230	235	240	245	250
1160*	5800†	29000#	185	190	195	200	200	205	210	215	220	225	230	230	235	240
1200*	6000†	30000#	180	185	185	190	195	200	205	210	210	215	220	225	230	235
1240*	6200†	31000#	175	175	180	185	190	195	200	200	205	210	215	220	220	225
1280*	6400†	32000#	170	170	175	180	185	185	190	195	200	205	205	210	215	220
1320*	6600†	33000#	165	165	170	175	180	180	185	190	195	195	200	205	210	210
1360*	6800†	34000#	160	160	165	170	175	175	180	185	190	190	195	200	200	205
1400*	7000†	35000#	155	155	160	165	165	170	175	180	180	185	190	195	195	200
1450*	7250†	36250#	150	150	155	160	160	165	170	170	175	180	185	185	190	195
1500*	7500†	37500#	145	145	150	155	155	160	165	165	170	175	175	180	185	185
1550*	7750†	38750#	140	140	145	150	150	155	160	160	165	170	170	175	180	180
1600*	8000†	40000#	135	140	145	145	145	150	155	155	160	160	165	170	170	175
1650*	8250†	41250#	130	135	135	140	140	145	150	150	155	160	165	165	170	170
1700*	8500†	42500#	125	130	135	135	140	140	145	145	150	155	155	160	160	165
1750*	8750†	43750#	125	125	130	130	135	135	140	145	145	150	150	155	155	160
1800*	9000†	45000#	120	120	125	130	130	135	135	140	140	145	145	150	155	155
1850*	9250†	46250#	115	120	120	125	125	130	135	135	140	140	145	145	150	150
1900*	9500†	47500#	115	115	120	120	125	125	130	130	135	135	140	140	145	145
	10000†	50000#	105	110	115	115	120	120	125	125	130	130	135	135	140	140
	10500†	52500#	100	105	105	110	110	115	115	120	120	125	125	130	130	135
	11000†	55000#	100	100	100	105	105	110	110	115	115	120	120	125	125	125
	11500†	57500#	95	95	100	100	100	105	105	110	110	115	115	115	120	120
	12000†	60000#	90	90	95	95	100	100	100	105	105	110	110	110	115	115
	12500†	62500#	85	90	90	90	95	95	100	100	100	105	105	110	110	110
	13000†	65000#	85	85	85	90	90	90	95	95	95	100	100	105	105	110
	13500†	67500#	80	80	85	85	85	90	90	95	95	95	100	100	100	105
	14000†	70000#	75	80	80	80	85	85	85	90	90	95	95	95	100	100
	14500†	72500#	75	75	80	80	80	80	85	85	90	90	90	95	95	95
	15000†	75000#	70	75	75	75	80	80	80	85	85	85	90	90	90	95

* Operate the 75 MIL-AMPS key for these resistances.
† Operate the 15 MIL-AMPS key for these resistances.
# Operate the 15 and 3 MIL-AMPS keys and knife switches 3 or 4, as required, for these resistances.