



# MAINTENANCE INSTRUCTION

M.I. 6825  
\*Rev. A

## TRANSITION RELAY SETTINGS

Efficient Locomotive Performance depends to a great extent on the proper operation of the automatic transition equipment. To assure the most satisfactory results, the settings outlined in the bulletin should be carefully made to the various relays designated.

	Pickup	Dropout
<b>I. PASSENGER LOCOMOTIVES</b>		
<b>A. 2000 HP WITH D4 MAIN GENERATORS</b>		
Voltage Relay (VI)	980 - 990 volts	700 - 710 volts
Time Delay Relay (VT)	1/3 - 1/2 sec. delay	
<b>B. 2000 AND 2250 HP WITH D15 MAIN GENERATORS</b>		
Voltage Relay (VI or FTR)	910 $\pm$ 10 volts	600 + 20 - 10 volts
Time Delay Relay (VT) Used With VI Relay	1/3 - 1/2 sec. delay	
<b>C. 2400 HP E9 LOCOMOTIVES WITH D15 MAIN GENERATORS</b>		
FTR (FSD-ab and TR-gh Open)	900 - 910 volts	585 - 640 volts (inherent)
(FSD-ab closed)		500 - 520 volts
(P2-cd or P3-cd closed and TRI-gh or TR2-gh closed)		500 - 520 volts
FSD		10 - 12 sec. delay
FS Contactor Coil Current (Adjust 500 Ohm Resistor With GR Energized)	.180 - .190 amp. @ 74 volts	
<b>D. 2400 HP E9 LOCOMOTIVES WITH D15 MAIN GENERATORS AND E-I TYPE TRANSITION</b>		
PTR Relay (Terminal J-K) coil current PTR-ab interlock open (Adjust 15,000 ohm resistor)	98 MA @ 1000 volts	
PTR Relay (Terminal J-K) coil current PTR-ab interlock closed (Adjust 20,000 ohm resistor)	99 MA @ 630 volts	
Final Settings		

NOTE: Final transition relay settings should fall between limits shown on Fig. 1.

\* THIS BULLETIN SUPERSEDES ALL PREVIOUS ISSUES OF M.I. 6825.

	Pickup	Dropout
<b>II. SWITCHER LOCOMOTIVE</b>		
<b>A. 600 HP WITH D4 MAIN GENERATOR AND AUTOMATIC TRANSITION</b>		
Voltage Relay (VI)	920 - 930 volts	655 - 665 volts
<b>B. 600 HP WITH D15 MAIN GENERATOR AND AUTOMATIC TRANSITION</b>		
Voltage Relay (VI or FTR)	800 $\pm$ 10 volts	540 $\pm$ 20 volts
<b>C. 600 HP WITH D15 MAIN GENERATOR, AUTOMATIC TRANSITION AND TRANSITION OVERLOAD CONTROL</b>		
Voltage Relay (FTR)	940 $\pm$ 10 volts	630 $\pm$ 20 volts
TOC	40 $\pm$ 2 volts	30 $\pm$ 2 volts
<b>D. 800 HP WITH D15 MAIN GENERATOR</b>		
Voltage Relay (FTR)	850 $\pm$ 10 volts	570 $\pm$ 20 volts
<b>E. 800 HP WITH D15 MAIN GENERATOR AND TRANSITION OVERLOAD CONTROL</b>		
Voltage Relay (FTR)	940 $\pm$ 10 volts	630 $\pm$ 20 volts
*Current Limiting Relay (CLR)	1500 - 1550 amps.	1385 - 1435 amps.
TOC Relay	40 $\pm$ 2 volts	30 $\pm$ 2 volts
<b>F. 900 HP WITH D15 MAIN GENERATOR</b>		
Voltage Relay (FTR)	940 $\pm$ 10 volts	630 $\pm$ 20 volts (inherent)
**FTR (PR-ab and P2-ab closed)		500 - 525 volts
Current Limiting Relay (CLR)	1500 - 1550 amps.	1385 - 1435 amps.
<b>G. 1000 HP WITH D4 MAIN GENERATOR</b>		
Voltage Relay (VI)	980 - 990 volts	700 - 710 volts
*Current Limiting Relay (CLR)	1500 - 1550 amps.	1385 - 1435 amps.
Time Delay Relay (VT)	1/3 - 1/2 sec. delay	
<b>H. 1000 AND 1200 HP WITH D15 MAIN GENERATOR</b>		
Voltage Relay (VI or FTR)	940 $\pm$ 10 volts	630 $\pm$ 20 volts (inherent)
**FTR (PR-ab and P2-ab closed)		500 - 525 volts
*Current Limiting Relay (CLR) (8004528 and 8059221)	1500 - 1550 amps.	1385 - 1435 amps.
Time Delay Relay (VT) Used With VI Relay	1/3 - 1/2 sec. delay	

\* If used, used for indication only.

\*\* Only on locomotives equipped with 60 ohm shunt field discharge resistor.

	Pickup	Dropout
<b>III. 1500 HP - F3, F7, FP7, GP7 AND SD7</b>		
<b>A. 1500 HP F3 WITH D12 MAIN GENERATOR AND TYPE "A" AUTOMATIC TRANSITION</b>		
Voltage Relay (FTR old model)	950 $\pm$ 10 volts	660 + 20 - 10 volts
Voltage Relay (FTR 8147352)	950 $\pm$ 10 volts	630 + 20 - 10 volts
In Transition #4 for 30 sec.		580 $\pm$ 10 volts
Weston BTR Relay (Parallel)	2300 + 25 - 0 amps. (Field Operation)	110 - 230 amps. lower than pickup value. (Field setting)
Weston BTR Relay (Series Shunt)	1580 $\pm$ 30 amps. (Field Operation)	80 - 160 amps. lower than pickup value. (Field Setting)
Time Delay Relay (TD)	3-4 sec. delay @ 74 volts	
Time Delay Relay (TDB)	25-30 sec. delay @ 64 - 74 volts	
Polar Relay (KP)	6 - 7 volts @ 64 volts	
<b>B. 1500 HP F3, F7, FP7, BL2 WITH D12 MAIN GENERATORS AND TYPE "B" AUTOMATIC TRANSITION</b>		
Voltage Relay (FTR old model)	950 $\pm$ 10 volts	660 + 20 - 10 volts
Voltage Relay (FTR 8147352)	950 $\pm$ 10 volts	630 + 20 - 10 volts
In Transition #4 for 30 sec.		580 $\pm$ 10 volts
BTP Relay (8123440)	2300 + 25 - 0 amps. (Field Operation)	400 amps. lower than pickup to above 50% of pickup value (with or without bucking coil)
BTS Relay (8123439)	1580 + 30 - 20 amps.	180 - 230 amps. lower than pickup value without bucking coil. 250 - 330 amps. lower than pickup value with bucking coil.
Time Delay Relay (VT)	1/3 - 1/2 sec. delay	
Time Delay Relay (TD)	3-4 sec. delay @ 64 volts	
Time Delay Relay (TDB)	2-3 sec. delay @ 74 volts 25-30 sec. delay @ 64 - 74 volts	
<b>C. 1500 HP F7, FP7 WITH D12 MAIN GENERATOR AND 3-RELAY TYPE AUTOMATIC TRANSITION</b>		
Voltage Relay (FTP)	930 + 10 - 0 volts	620 + 20 - 10 volts (inherent)
Voltage Relay (FTM)	910 + 10 - 0 volts	690 + 20 - 10 volts (inherent)
Recalibrated		600 + 20 - 10 volts
NOTE: Setting for voltage relay (FTM) when unit is equipped with traction motor cutout switches located in water cooler cabinet.		
With MG set	930 + 10 - 0 volts	
Main generator voltage	910 + 10 - 0 volts	

	Pickup	Dropout
BTP Relay (AC)	2300 + 25 - 0 amps. (Field Operation)	400 amps. below pick-up to above 50% of pickup value.
BTP Relay (US&S)	2300 + 25 - 0 amps. (Field Operation)	Above 83% of pickup value.
<b>D. 1500 HP GP7 WITH D12 MAIN GENERATOR AND AUTOMATIC TRANSITION</b>		
BTR Relay (8123440)	2500 + 50 - 0 amps. (Field Operation)	Above 50% of pickup value.
BTR Relay (US&S)	2500 + 50 - 0 amps. (Field Operation)	Above 83% of pickup value.
Time Delay Relay (VT)	3/4 - 1 sec. delay	
Load Regulator Switch (LRS)	LRC at approximately 4 o'clock position	LRC at 12 o'clock position
Transition Switch (FTS)	Picks up at approximately 8 o'clock position	
<b>E. 1500 HP SD7 WITH D12 MAIN GENERATOR AND AUTOMATIC TRANSITION</b>		
Voltage Relay (FTS)	930 + 10 - 0 volts	610 - 655 volts (VT closed)
Voltage Relay (FTR)	930 + 10 - 0 volts	585 - 640 volts
NOTE: FTR dropout with FS1 closed will be 15-25 volts lower than FTS dropout with the "ab" interlock of the VT relay closed.		
Current Relay (BTR)	2100 + 50 - 0 amps. (Field Operation)	Above 83% of pickup value.
Time Delay Relay (VT)	2 - 3 sec. delay	
Time Delay Relay (TDO)	2 - 2-1/2 sec. delay	
Time Delay Relay (TDS)		6 - 8 sec. delay
<b>IV. 1750 HP WITH AUTOMATIC TRANSITION - F9, FP9, FL9, GP9 AND SD9</b>		
<b>A. F9 AND GP9 WITH D12 MAIN GENERATOR</b>		
FSR (FSD-cd closed)	960 - 970 volts (1 to 2 & 3 to 4)	620 - 690 volts (inherent)(4 to 3)
FSR (FSD-cd open)		720 - 730 volts (2 to 1)
FSR (TR-gh and P1-cd closed)		500 - 525 volts (2 to 3)
FTR (FSD-ab closed)	960 - 970 volts (2 to 3)	
FTR (FSD-ab open)	1000 - 1010 volts	620 - 690 volts (inherent)
BTR	2250 ± 25 amps.	83% of pickup (min.)
BTR (TDB-ab closed)	2400 - 2500 amps.	83% of pickup (min.)
TDB		1 - 1-1/2 minute delay
TDS		6 - 8 sec. delay
FSD	10 - 12 sec. delay	

	Pickup	Dropout
FS Contactor coil current (adjust 500 ohm resistor with GR energized)		
CH Contactor 8200785	.150 - .160 amp. @ 74 volts	
AC Contactor 8211365	.340 - .350 amp. @ 74 volts	
 <b>B. SD9 WITH D12 MAIN GENERATOR</b>		
FTR	960 + 10 - 0 volts	
FTR (TDO-gh or FS1-ef closed)		610 - 620 volts
FTR (TDR-ab closed)		560 - 580 volts
FTS (FSD-ab closed)	960 + 10 - 0 volts	
FTS (FS2-ef closed)		610 - 620 volts
BTR	2250 ± 25 amps.	83% of pickup (min.)
BTR (calibrating coil energized with MCO)	1800 - 1850 amps.	83% of pickup (min.)
FSD or VT	2 - 3 sec. delay	
TDO		2 - 2.5 sec. delay
TDR		2 - 2.5 sec. delay
TDS		6 - 8 sec. delay
FS Contactor coil current (adjust 500 ohm resistor with GR energized)		
CH Contactor 8205701	.150 - .160 amp. @ 74 volts	
AC Contactor 8211365	.340 - .350 amp. @ 74 volts	

**C. GP9, F9, FL9 LOCOMOTIVE WITH  
D12 MAIN GENERATOR AND  
E-I TYPE TRANSITION**

Initial Settings

FSR Relay (Terminal M-L) coil current (adjust 500 ohm resistor)	224 MA @ 74 volts
FSR Relay (Terminal J-K) coil current FSR-ef interlock open (adjust 10,000 ohm resistor)	110 MA @ 1000 volts
FSR Relay (Terminal J-K) coil current FSR-ef interlock closed and P4-gh interlock open (adjust 20,000 ohm resistor slider)	125 MA @ 730 volts
FSR Relay (Terminal J-K) coil current FSR-ef interlock and P4-gh interlock closed (adjust 20,000 ohm resistor slider connected to P4-gh interlock)	137 MA @ 650 volts
PTR Relay (Terminal J-M) coil current PTR-ef interlock open and BF-ef and FS-ab interlocks open (adjust 15,000 ohm resistor)	95 MA @ 1000 volts

	Pickup	Dropout
PTR Relay (Terminal J-M) coil current PTR-ef interlock closed and BF-ef and FS-ab interlocks open (adjust 7,500 ohm resistor)	128 MA @ 580 volts	
*COLR Relay (Terminal J-K) coil current (adjust resistor in series with coil)	79 MA @ 74 volts	

## Final Settings

NOTE: Final Transition Relay settings should fall between limits shown on Fig. 2.

FS Contactor coil current (adjust 500 ohm resistor with GR energized)	
AC Contactor 8211365	.340 - .350 amp. @ 74 volts
CH Contactor 8225437	.150 - .160 amp. @ 74 volts

*COLR (adjust resistor in series with COLR Relay (Terminal J-K) coil)	2250 ± 25 amps.
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## V. MRS WITH D12 MAIN GENERATOR

Voltage Relay (FTM)	940 ± 10 volts	590 ± 10 volts
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## VI. 201A LOCOMOTIVE

A. 600 HP WITH G.E. MAIN GENERATOR  
AND AUTOMATIC TRANSITION

Voltage Relay	650 ± 5 volts	450 ± 5 volts
Current Limiting Relay (CLR)	1400 amps. ± 2%	900 amps.

B. 900 HP WITH G.E. OR W. MAIN  
GENERATOR AND AUTOMATIC  
TRANSITION

Voltage Relay	730 ± 5 volts	550 ± 5 volts
Current Limiting Relay (CLR)	1850 amps. ± 2%	1200 amps.

C. 1200 HP WITH G.E. MAIN GENERATOR  
AND AUTOMATIC TRANSITION

Voltage Relay	650 ± 5 volts	450 ± 5 volts
Current Limiting Relay (CLR)	3000 amps. ± 2%	1950 amps.

## VII. EXPORT LOCOMOTIVES

A. 875 HP WITH D15 MAIN GENERATOR  
AND D19 TRACTION MOTORS

FTR	920 - 930 volts	600 - 620 volts (3 to 2)
FTR		500 - 525 volts (2 to 1)

\* COLR Relay adjustment on locomotives with motor cutouts and COLR Relay.

	Pickup	Dropout
BTR	1475 - 1525 amps.	55 ± 5% of PU
TDC		3 - 4 sec. delay
TDS		8 - 10 sec. delay
<b>B. 875 HP WITH D15 MAIN GENERATOR AND D37 TRACTION MOTORS</b>		
FTR	920 - 930 volts	500 - 525 volts
BTR	1475 - 1525 amps.	55 ± 5% of PU
TDC		3 - 4 sec. delay
TDS		8 - 10 sec. delay
<b>C. 1310 HP WITH D12 MAIN GENERATOR AND D19 TRACTION MOTORS</b>		
FSR	945 - 955 volts	570 - 580 volts
TDD		10 sec. delay
TDS		8 - 10 sec. delay
<b>D. 1310 HP WITH D12 MAIN GENERATOR AND D37 TRACTION MOTORS</b>		
FTR	950 - 970 volts	500 - 525 volts
BTR	2225 - 2275 amps.	83% of PU
TDS		8 - 10 sec. delay
<b>E. 1125 HP WITH D15 MAIN GENERATOR AND D19 TRACTION MOTORS</b>		
FSR	900 - 910 volts	67 ± 2% of PU
TDC (Self-Centering Reverser)		3 - 4 sec. delay
TD (Dynamic Brakes)		3 sec. delay

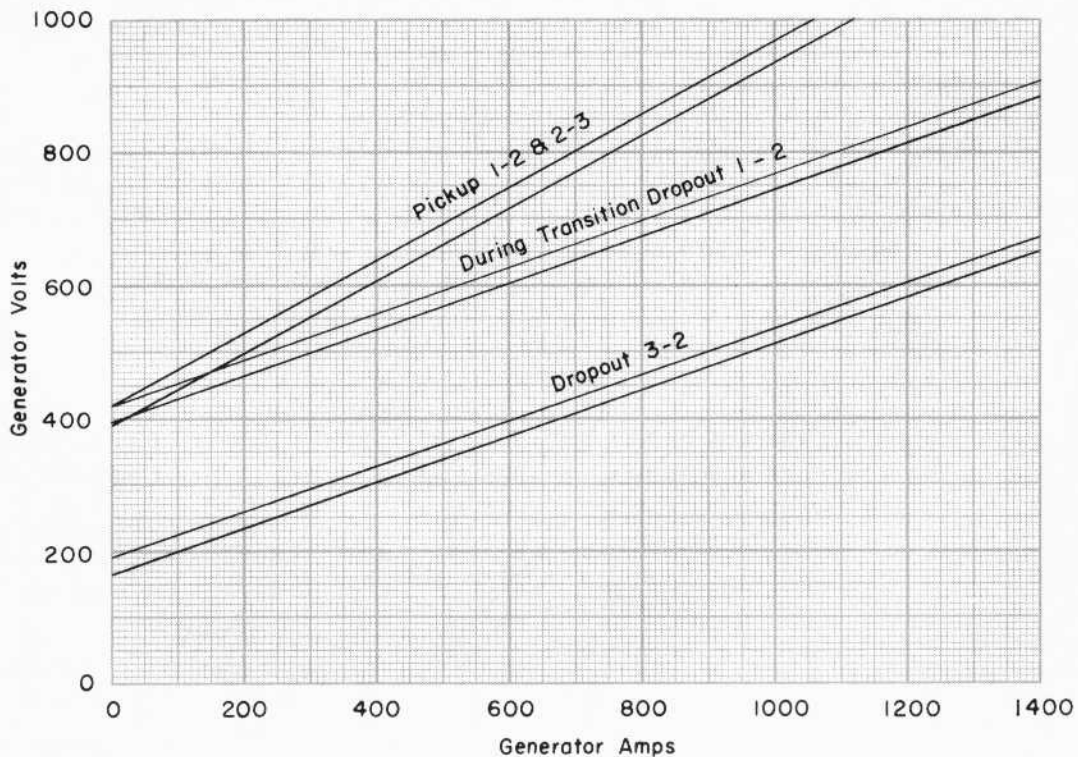


Fig. 1 - Transition Relay Settings  
E9 Locomotive Without 2-1 Backward Transition

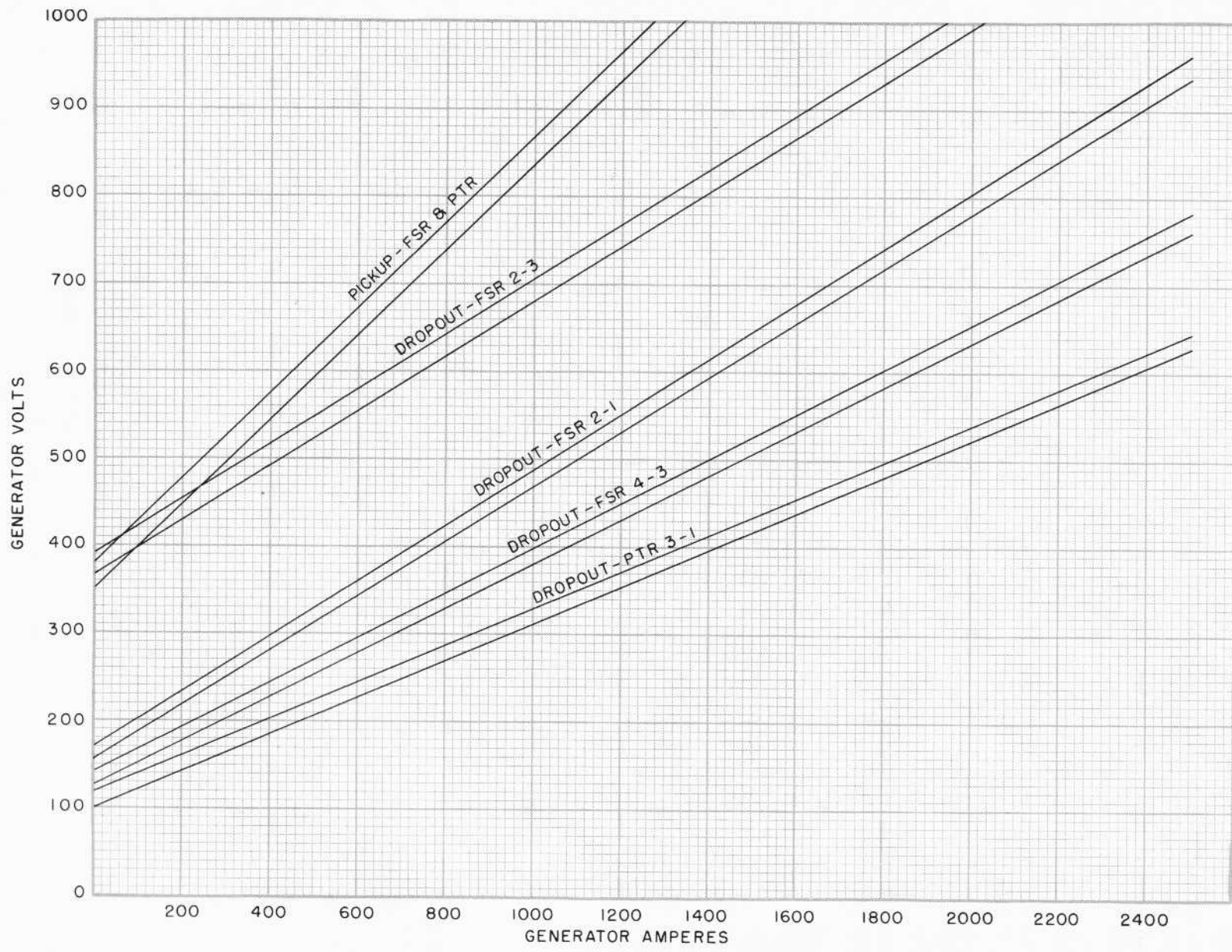


Fig. 2 - F9, FL9 And GP9 Locomotive Transition Relay Settings - Relay 8235326