

DCA318: Turn to Turn Short Location and Repair

**TS-SSC 091-246
S. Delchamps
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This memo describes the procedure used to locate and repair the turn to turn short in coil 15M-50-1017 of magnet DCA318, which was detected during installation of the lead end clamp [1,2].

The short was originally detected while installing the lead end clamp with 15 mils of kapton on the inner surfaces of the collet insulators. The short reappeared during a second installation of the lead end clamp with 10 mils instead of 15 mils of kapton on the insulator surfaces.

The collared coil assembly was taken apart, and coil 1017 was set up for inspection. Examination with a microscope of the outside surface of the coil showed no obvious signs of damage. However, when the inner surface of the coil was examined, it was found that the 19A voltage tap wire had been crushed between the 19A turn and the 18A turn, as shown in Figure 1. This accounted for both the short between the 19A and 18A turns, and the odd behavior of the 19A voltage reported in Reference 2.

The crush occurred because the 19A voltage tap wire had not been routed in the usual manner, on the surface of the preform turn all the way onto the key surface, but rather straight out. This allowed the wire to fall into the uncemented gap between the preform and 18A turns.

The voltage tap wire was removed and replaced. The new wire was rerouted correctly (see Figure 2), and a ~1 inch long piece of 2 mil kapton was placed between the preform and 18A turns near the problem spot. Secomet adhesive was smeared on the turns where the kapton was placed.

After the repair was made, an end clamp assembly was installed on the coil using pieces of other coils. The short did not return. Full electrical measurements including voltage tap readings were taken before the end clamp was installed and with the end clamp in place. These are attached as Appendix 1 and Appendix 2. The coil will undergo impulse testing (ringing) before reinstallation in DCA318.

References

1. Discrepancy Report 327.
2. J. Strait, "Location of turn-to-turn short in DCA318", TS-SSC 91-234, December 12, 1991.

Distribution: R. Bossert, J. Carson, S. Gourlay, W. Koska, G. Pewitt,
D. Smith, J. Strait, M. Wake

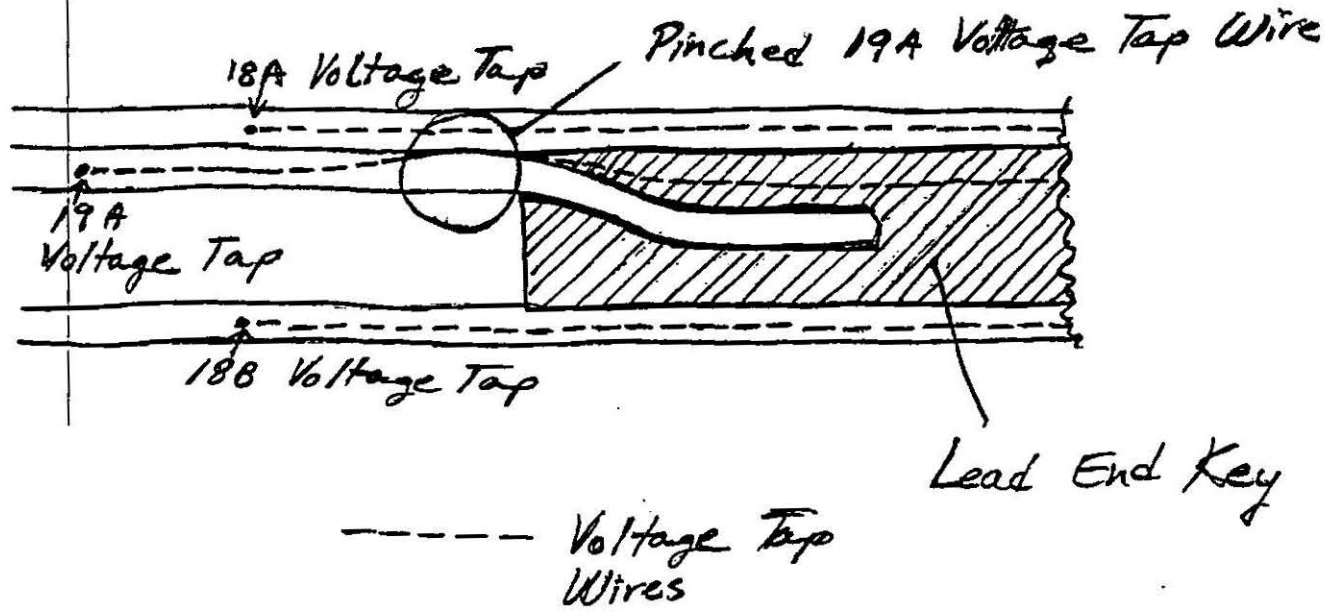


FIGURE 1

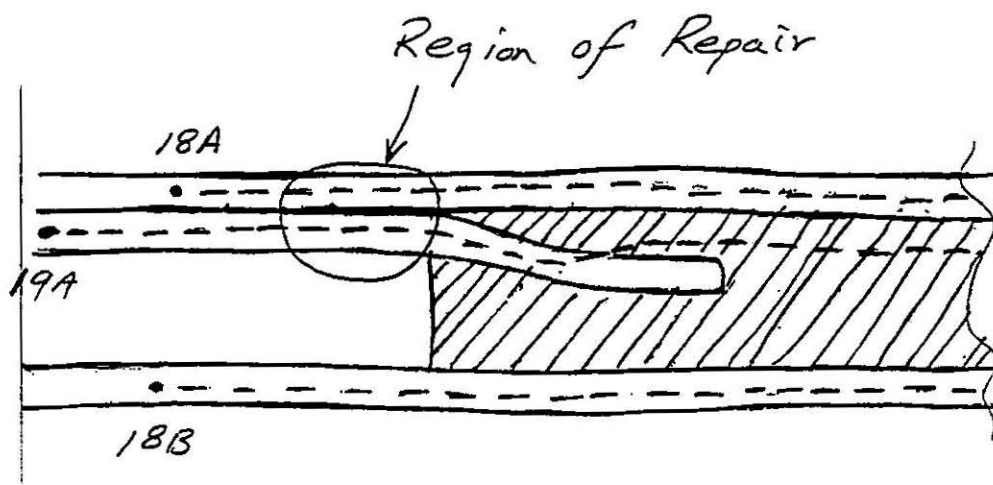


FIGURE 2

DCA 318

15M-50-1017

12/11/91

Res. 1097 mΩ
 L_s 3.031 mH
 Q 2.08

PRE END CLAMP
TEST

19B TO OA

OA TO 19B

19A	0.39	999.65
19C	25.96	973.85
19D	26.44	973.41
18B	52.09	948.00
18A	52.60	947.45
18C	78.17	921.60
18D	78.59	921.11
17B	104.33	895.79
17A	104.79	895.35
17C	130.40	869.33
17D	130.74	869.07
16B	156.56	843.57
16A	156.97	843.14
16C	182.59	817.16
16D	182.91	816.19
15B	208.77	791.25
15A	209.18	791.02
15C	234.67	765.13
15D	235.21	764.55
14B	260.97	739.16
14A	261.59	738.55
14C	286.97	712.89
14D	287.48	712.19
13B	313.32	686.74
13A	313.89	686.23

Voltage 1.00

TOTAL coil 1.001 V

Amps 1.00

TECHNICIANS

A. Wendt

S. Jackson

12/11/91

DCA 318

5M-50-1017

12/16/91

Res 1125 mΩ Post END clamp TEST
 L_S 3.01 mH CAN ON 7000 PSIG
 Q 2.02

19B TO OA

OA TO 19B

19A	26.79	999.01	ALL VOLTAGE
19C	28.19	971.55	
19D	28.67	971.09	TAP READINGS
18B	54.22	945.45	
18A	54.74	945.09	ARE IN
18C	80.29	919.47	
18D	80.70	919.16	milli Volts
17B	106.31	893.36	
17A	106.77	892.92	
17C	132.38	867.46	
17D	132.75	867.12	
16B	155.38	841.43	
16A	158.79	840.94	
16C	184.44	815.42	
16D	184.53	815.05	
15B	210.50	789.28	
15A	210.87	788.94	
15C	236.48	763.37	
15D	237.03	762.85	
14B	262.55	737.20	
14A	263.14	736.56	
14C	288.66	711.21	
14D	289.14	710.57	
13B	314.77	685.03	
13A	315.30	684.46	

VOLTAGE 1.00 TOTAL COIL 9997 V
 AMPS 1.00

TECHNICIANS

S. Lockwood / A. Wendt

DATE

12/14/91