



SPECIALTY BREAKER
PHILADELPHIA, PA

SERVICE ADVICE LETTER

SUBJECT:

LATEST DESIGN CONFIGURATION:
GE TYPE AM CIRCUIT BREAKERS
AND MEDIUM VOLTAGE SWITCHGEAR

TAB: 073

No. 352.1

The purpose of this Service Advice Letter (SAL) is to provide a brief description of the significant design changes made to the following equipment:

- All 5 kv, 7.2 kv, and 15 kv type AM circuit breakers manufactured after 1962. This includes vertical lift breakers with ML-13 mechanisms and horizontal draw-out breakers with ML-13A mechanisms.
- All type M26 and M36 vertical lift switchgear and type (HDO) horizontal draw-out switchgear.

This SAL is in response to numerous requests from valued customers for information on changes, substitutions, improvements, or upgrades that have been made to the above equipment and the impact these changes could have on the maintenance, operation, and reliability of that equipment.

The attached table lists the subject matter, a brief description of the change, the approximate date the change was implemented on production equipment, ordering information, and the type equipment involved.

In some cases, a change was made because of field reported problems; and a SAL on that subject was issued which is herein listed as a reference. Complete details are given there.

In most cases, the table lists changes made for the purpose of improving operation, assembly, or maintenance of the equipment. In some cases, the change was unavoidable because some material, manufacturing process, or device was no longer available for use due to regulatory reasons.

All of the listed items can be incorporated into existing equipment in the field. This list will undoubtedly be updated with additions periodically. Those involved with the maintenance and reliability of this equipment can evaluate each subject and consider its applicability to their particular equipment.

PREPARED BY: <i>Edward J. Dugan</i> E. J. Dugan	ISSUED BY: <i>Don McDonald</i> D. McDonald	DATE: 7-7-95	SUPERSEDES New	PAGE: 1 of 8
---	--	-----------------	-------------------	-----------------

GE will assist any customer interested in determining if the original configuration of their particular equipment included these latest designs, if the serial number or equipment summary number is provided with the request for quotation, or the order. In many cases, a check of the effective date listed in the table against the date of manufacture stamped on the breaker nameplate will suffice for determining applicability.

Ordering information is given in the table that follows. The quantity required is per breaker or switchgear cubicle. It is not the intention of this SAL to state that all of the changes listed should be incorporated immediately, if they are not presently included on the equipment. Our observation, however, has been that customers value the judgment of factory experience with regard to the relative benefits and/or need for urgency of these changes. Therefore, the following recommendation index is (RI) given and the index numbers (1,2, or 3) correlate to the number given in the second column of the table.

<u>INDEX NO.</u>	<u>RECOMMENDATION</u>
1	Strongly Recommended - Incorporate at the next scheduled maintenance.
2	Highly Recommended - Incorporate during next overhaul.
3	Recommend incorporation only if experiencing problems.

The instruction book reference numbers given in the table may suffice to illustrate the parts involved or to identify the area within the equipment where the changes were made.

Specialty Breaker - Philadelphia Plant continues to manufacture renewal parts for all type AM breakers and switchgear equipment and has in stock many of the frequently used items.

GE recommends the use of new parts from the original manufacturer to maintain equipment performance and system reliability.

Commercial customers contact: GE Support Services @ 1-800-727-8443. Or FAX @ 1-800-329-8643.

Nuclear customers contact: GE Nuclear Energy @ 1-800-425-8108. Or FAX @ (408) 925-4792.

No.	R.I.	SUBJECT	REF.	DESCRIPTION	ORDERING INFORMATION	APP.
1.	1	Al-Bronze Bushings	SAL-073-318.2	Replaced the "Tuff Loc" bushings used in the ML-13 mechanism with al-bronze to improve wear characteristics. Effective 1974	Replacement Kit; 0156C9403G001 (1 ea.)	ML-13;13A mechanisms
2.	1	Al-Bronze Prop Bushings	GEF4379 Item 6	Replaced the "Tuff Loc" bushings in the Prop. These bushings were not addressed by SAL 073-318.2. These parts are now included in the bushing kit. (Reference No. 1) Effective 1990	0456A0885P207 (2 each) (Ref: Prop & Bushings 0213X0702G013)	ML-13;13A mechanisms
3.	2	Square Shaft Bushing	GEF4379 Item 47	Standardized on the superior bronze square shaft bushing and eliminated the cast iron bushing used on certain breaker mechanisms. Effective 1985	006442239P003 (2 each)	ML-13;13A mechanisms
4.	2	Driving Pawl Crank Assembly	GEF4379, Items 55	Revised driving pawl pivot pin assembly to improve reliability. Effective 1979	0257A6975G001 (1 each)	ML-13;13A mechanisms
5.	3	Stop Block	GEF4379 Items 58 & 59	a) Changed mounting holes to slots to facilitate clearance adjustments between ratchet wheel and pawls. b) Increased width to stop both holding pawls. Effective 1984 Effective 1965	0108B1960G001 (1 each)	ML-13;13A mechanisms
6.	2	Latching Pawl Hinge Pin	GEF 4379 Items 58 & 59	Redesigned hinge pin to facilitate removal for maintenance. Effective 1979	0275A7273G001 (1 each)	ML-13;13A mechanisms

No.	R.I.	SUBJECT	REF.	DESCRIPTION	ORDERING INFORMATION	APP.
7.	1	Anti-Pump Relay, Shock Mounting	GEF4379 Item 77	Addition of "shock mount" to prevent trip free operations caused by vibration. Effective 1971	0152C5906 (1 ea.) G001 "H" bkr. G002 "C" bkr. G003 - HDO bkr.	ML-13;13A mechanisms
8.	3	Chain Drive	Addendum to GEF4379	Added chain drive coupling between charging motor and driving pawl crank assembly on high close & latch breakers (above 60 KA) to reduce load on driving pawl. Effective 1979	0257A6974G001 (1 each)	ML-13;13A mechanisms
9.	1	Prop Spring	SAL 348.1 073-348.1	Redesigned prop spring to address operational failures. Effective 1990	0275A7211P001 (1 each)	ML-13;13A mechanisms
10.	2	Second Prop Spring	SAL 351.1	Clarified the applicability of the second prop spring for all circuit breakers. Effective 1994 Second prop spring became standard on high close & latch rated breaker. Effective 1968	0172C8083G002 (0172C8083G001) (Two prop spgs.) (1 each)	ML-13;13A mechanisms
11.	3	New Prop Spring Support for Two Springs.	See Ref. No. 10	Replaces fabricated steel support with one of cast bronze. This new spring support is suited for mechanisms which require 2 prop springs and also early "a" and "b" switches. Effective 1995	0108B5546P011 (1 each)	ML-13;13A mechanisms

No.	R.I.	SUBJECT	REF.	DESCRIPTION	ORDERING INFORMATION	APP.
12.	3	Closing Spring Charging Motor	GEF4379 Ref. No. 81	Miller Falls/Ingersoll Rand spring charging motors 010569393 P1, 2, 3 no longer available. Superior, interchangeable replacement has been in production breakers since 1984. Effective 1985	0184B7360 (1 ea.) G001 48 vdc G002 125 vdc G003 230/250V	ML-13; 13A mechanisms
13.	3	Spring Discharge Assembly	GEF 4379 Ref. Figure 4	For a few years in the early 1960's, the spring discharge interlock assembly was optional. A kit is available to add the assembly to mechanisms which do not have this interlock. Effective 1965	0114C5413G001 (1 each) Installation Dwg. (0172C8104)	ML-13; 13A mechanisms
14	2	Ratchet Wheel with two blind teeth.	GEF4379 Ref. No. 52	Ratchet wheels have a stop on the back side which produces a blind tooth which allows the driving pawl to coast to a stop following a charging operation. In 1971 the stop was changed to cover 2 teeth instead of 1. Effective 1971	0105C9310G002 (1 each)	ML-13; 13A mechanisms
15.	3	Vacuum Conversion Kits	GEK89760	Asbestos bearing arc chute interrupters are no longer available. Modern vacuum interrupter conversion kits are available for GE Apparatus Service Shops to convert existing breakers. Effective 1984	Ordering Index 0275A7266 (1 each)	AM & AMH Breakers
16.	3	Position Switch	SAL073-326.1	A stronger position switch operating mechanism was developed for high seismic applications and with minor modifications to the switchgear, can replace earlier designs. Effective 1978	Ordering Index 0269A2835 (1 each)	Vertical Lift Switchgear

No.	R.I.	SUBJECT	REF.	DESCRIPTION	ORDERING INFORMATION	APP.
17.	2	Elevating Motor Switch Guard	SAL073-338.1	Small sheet metal part designed to be added to existing elevating motor reversing switches which prevents accidental switch operation. Effective 1981	0184B7254G001 (1 each)	Vertical Lift Switchgear
18.	1	Auxiliary Switch Test Position Operator	NRC IN No. 91-55	Redesigned test link to prevent damage to the circuit breaker plunger cam (GEF4379 Ref 173) while providing means to adjust the operator to assure that a gap exists between the switch operating rod and the top of the test line. Effective 1991	0184B7436G-001 (G002 for 13.8 kv) -1000 MVA (1 per Station)	Vertical Lift Switchgear w/Aux. Sw.
19.	2	Spring Discharge Guard	GEH-1802 "Operation"	Eliminates the leading cause of box barrier damage when a breaker being inserted into a cubicle inadvertently hits the spring discharge cam. Effective 1995	0172C8030G001 (1 each)	All Vertical Lift Switchgear
20.	2	Set Screws	GEF4379 Items 7, 52, 63	Changed the length of the center cam set screw and eliminated the cup point backup screw (for forged cams with double keyway only). Ordering info includes (5) set screws for the ratchet wheel the center cam, and the outer cam. Effective 1994	0184B9761G001 (1 each)	ML-13; 13A Mechanisms
21	2	Secondary Disconnect Grounding Contact	GEF4379 Figure 6 GEH1802 Figure 30A Item 68	A secondary ground contact (male on removable breaker element and female on switchgear) was added to the secondary disconnect assembly to maintain a ground connection, both in the connected position and during tests using a coupler or inspection box. Effective 1994	0172C8031G001 (1 each)	All Vertical Lift Switchgear

No.	R.I.	SUBJECT	REF.	DESCRIPTION	ORDERING INFORMATION	APP.
22	2	Closing Latch Spring	GEF4379 Item 74	Tension spring (0161A4231P001) was replaced by a torsion spring (0257A6973P001) to facilitate assembly. Effective 1980	0172C8106G002 (1 each)	ML-13; 13A Mechanisms
23	3	Double Trip Coil	GEF4379 Item 46	A second, independently energized trip coil may be added in parallel to the standard coil. Changes to the control circuitry and/or auxiliary switch are required. Effective 1977	0119D9332G001 (1 each)	ML-13; 13A Mechanisms
24	1	Lubricating Oil	Lubricant Charts in AM Bkr Instr. Books	A new light synthetic oil is available for periodic maintenance. It is compatible with and should be used only on breakers lubricated with the new red grease (D6A15A) Effective 1995	0269A3691P520 (1 pint)	ML-13; 13A Mechanisms
25	2	Lubricating Grease	Lubricant Charts in AM Bkr Instr. Books	A red synthetic hydrocarbon grease (GE Spec. D6A15A1) replaced the white or amber mechanical grease (GE Spec D50H15) and the black contact grease (D50H47) for periodic maintenance and during general overhauls. Effective 1990	0183L0907 P037 (4 oz. tube)	ML-13; 13A Mechanisms
26	3	Switchgear Elev. Mechanism Pull-Out Device	GEH 1802 Fig. 30,31	The rod length was changed and a cotter pin added to prevent the pull-out device from getting into a position where it could be damaged. Effective 1995	0172C8032G001 (2 each)	M26 & M26H Vertical Lift Switchgear for 4.16-250, 350 bkrs.

No.	R.I.	SUBJECT	REF.	DESCRIPTION	ORDERING INFORMATION	APP.
27	3	Elevating Motor Clutch	GEH1802 Figure 30 Item 16	Material changed from zn/al to a more wear resistant bronze alloy on the sliding clutch (female) and the motor clutch (male). Effective 1995	006517960P013 Sliding (1 each) 0263C0133P013 Motor Clutch (1 each)	All Vertical Lift Switchgear
28	2	Shim Washers	GEF4379 Figure 1 All Views	Material changed from zinc plated steel to brass to provide a more frictionless, burr-free shim between moving links. Effective 1995	0172C8070G003 Washers only (1 each) (G004-washers, cot pins, snap rings)	ML13; 13A - mechanisms
29	3	Early "A" Early "B" Switches	GEF4379 Item 85	Early "A" or "B" contact switch provisions can be added to existing breaker mechanisms. Effective 1969	0108B5556 (1 ea.) G-001 (b) G-002 (a)	All ML13; 13A mechanisms
30	3	Switchgear Primary Disconnect Potting Compound	GEH1802 Figure 11	Black pitch (D50H49) was replaced with a modern, two-part epoxy potting compound. Effective 1994	0172C8033G001 (1 each)	All Vertical Lift Switchgear
31	2	Positive Interlock Cam Lower Vee Notch	GEH 1802 Operation SAL-073 343.1	The lower "VEE" notch in the positive interlock cam may be blocked out to eliminate an unlikely but potential hazard. Applicable to equipment which includes the spring discharge interlock.	0183B2170G002 (1 each)	All Vertical Lift Switchgear
32	3	Secondary Disconnects	GEI-88771 Figure 3 GEI-88773 Figure 5	The tools used to produce the 8 pt. black molded phenolic bases used in the movable (bkr) and stationary (swgr) secondary disconnects were destroyed and machined polyester-glass replacements are available.	0195A4055G001 Breaker 0126D9859G001 Switchgear (2 each)	4-76 HDO Breakers & Switchgear
33	3	Bus Bracing 5kv Vertical Lift Switchgear	SAL-073 344.1 GEH1802 Fig. 10	The main bus and load side bus supports on 5kv - 250 MVA and high momentary 5kv-250 MVA switchgear were changed (thk & qty) following 78000A 10 cycle short circuit withstand tests. Effective 1979	0172C5641 Main Bus Index SKEJD30383 Load Side Index	5kv M26 & M26H Vertical Lift Switchgear