

SERVICE INFORMATION LETTER

SIL648

Contains Useful Information Pertaining To Your Aircraft Ignition System

FAA APPROVED

SUBJECT: OPTIONAL CONVERSION TO "SHOWER-OF-SPARKS" IGNITION

REASON FOR LETTER: To provide installation data regarding "Shower-Of Sparks" ignition systems.

EQUIPMENT AFFECTED:


MAGNETO TYPE NUMBER	MAGNETO PART NUMBER	MAGNETO TYPE NUMBER	MAGNETO PART NUMBER
S4LN-21	10-51360-26	S6RN-25	10-79020-19
S4LN-21	10-51360-37	S6RSC-25	10-500556-1
S4LN-21	10-51360-45	S6LSC-25	10-500556-3
S4LN-21	10-51360-54	S4LN-1227	10-349365-3
S4LN-21	10-51360-55	S4LN-1227	10-349365-9
S4LN-21	10-51360-58	S6RN-1225	10-349350-4
S4LSC-21	10-500514-1	S6RN-1225	10-349350-5
S4LSC-21	10-500514-2	S6LN-1225	10-349350-6
S6LN-21	10-51365-39	S6LN-1225	10-349350-7
S6LN-21	10-51365-47	S6LN-1227	10-349370-4
S6LN-21	10-51360-57	D6LN-2031	10-385126-105
S6LSC-21	10-500516-2	D6LN-2031	10-385126-107
S6LSC-21	10-500516-4	D6LN-3000	10-685126-105
S6LN-25	10-79020-6	D6LN-3000	10-685126-107
S6RN-25	10-79020-10	D6LN-3000	10-685126-108
S6LN-25	10-79020-16	D6LN-3000	10-785126-105
S6LN-25	10-79020-18	D6LN-3000	10-785126-107

COMPLIANCE: At user's discretion.

GENERAL INFORMATION:

Since the 1940's, the vast majority of four and six cylinder aircraft engines have been manufactured to include one of two systems to assist magneto ignition during engine start: either the impulse coupling or the "Shower-of-Sparks" booster technology.

An impulse coupling is a mechanical device attached to the drive shaft of the magneto. Impulse couplings contain moving parts which are subject to wear. In order to avoid periodic inspections for impulse coupling wear, operators may convert their ignition equipment from impulse coupling to Shower-of-Sparks.

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A typical Shower-of-Sparks ignition system includes a special ignition switching arrangement, a "boosted" left mounted magneto fitted with a retard breaker, a "non-boosted" right mounted magneto which is grounded during starting, and a starting vibrator.

The function of the special ignition switching arrangement is to ground the right mounted magneto during the start cycle, to energize the starter relay and the starting vibrator, and to direct the starting vibrator output voltage to both the main and retard breakers in the left mounted magneto for boosted starting.

Many engine applications can be converted from impulse coupled to Shower-of-Sparks starting. See Table 1 for a complete listing of eligible engines. All engines listed in Table 1 may be converted by removing the impulse coupled magneto(s) and replacing them with Shower-of Sparks magnetos as detailed in Table 1. Follow Detailed Instructions, paragraph A for complete installation instructions. In a few cases, impulse coupled magnetos themselves may be converted to Shower-of-Sparks configurations. See Detailed Instructions, paragraph B, for conversion instructions, then install reconfigured magnetos in accordance with paragraph A.

DETAILED INSTRUCTIONS

A. "Shower-of-Sparks" Conversion


1. Remove impulse coupled magneto(s). If possible, magneto(s) may be converted to Shower-of-Sparks configuration in accordance with paragraph B. Install Shower-of-Sparks replacement magneto(s) and associated mounting and drive parts in accordance with applicable engine parts list (see NOTE, below). Adjust magneto-to-engine timing in accordance with engine manufacturer's instructions. See Table 1 for application data.

NOTE...For many Lycoming installations, some additional engine parts, such as gears, standoffs, drive plates, studs and clamps may be necessary for conversion. Consult engine parts list. Also for many Lycoming installations, only the left magneto was originally equipped with an impulse coupling. Therefore, these engines can be converted to Shower-of-Sparks without affecting the right magneto in any way.

2. Using suitable mounting hardware and acceptable standard shop practice, install starting vibrator unit on airframe. Refer to Table 4 for a list of typical installation materials. Vibrator unit is to be mounted in a location which will provide minimum wire lengths, freedom from excessive heat or exposure to the elements, freedom from interference with other parts of the aircraft, and accessibility for inspection. Vibrator unit part number selection is based on electrical system voltage and magneto type. See Table 2 for vibrator applications. Complete the Shower-of-Sparks wiring using standard 18 gage (or larger) aircraft wire as necessary. See Figure 1 or Figure 2 for typical wiring diagrams.

WARNING

Only aircraft grade materials must be used. Selection of materials, installation positioning, routing of wires, and installation workmanship must be performed in accordance with all applicable Federal Aviation Regulations, including but not limited to: Section 23.1301, 23.1309, 23.1351, 23.1357, 23.1365, 23.1367 and 43.13.

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3. Complete an FAA Form 337 with all pertinent information regarding conversion, referencing this Service Information Letter and detailing specific parts added and deleted as well as specific new wiring configuration.

B. Magneto Conversion

Certain impulse coupled magnetos may be economically converted to magneto specifications with retard breaker (boosted) or with no start assist mechanism (non-boosted). Such magnetos are listed in Table 3. Following the latest revision of the appropriate service manual and parts catalog (included in TCM Ignition Systems Master Service Manual, Form X40000):

1. Remove impulse coupling and replace with P/N 10-163003 drive plate and associated attaching parts.
2. Stop pins in S-20 Series magnetos being converted may be left in place. Stop pins in S-1200 Series magnetos being converted **MUST** be left in place, unless flange is replaced with P/N 10-349392-1 flange with sealed stop pin holes. If converting to non-boosted magneto, proceed to step 4.
3. When converting to boosted (with retard breaker) magnetos, mark and adjust distributor gear as specified for boosted magnetos, then install and adjust retard breaker. Install retard lead and associated parts.
 - a. For S6LN-25 and S6RN-25 magnetos, remove and discard cap nut P/N 10-163177 and disk P/N 10-163384 from retard terminal.
 - b. For all other magnetos, remove magneto cover from magneto housing and drill hole .290 inch diameter through cover at retard countersink position. Remove all debris and burrs from cover prior to assembly of retard stud terminal and associated parts.
4. Assemble new data plate onto magneto to indicate new magneto part number and type number. Data plate P/N 10-400012 is to be used for S-200 Series magnetos. Data plate P/N 10-400009 is to be used for S-1200 Series magnetos.

PARTS REQUIRED:

As determined by application.

MAN HOURS REQUIRED:

Approximately 2 hours per engine.

WEIGHT CHANGE:

As determined by application.

WARRANTY CONSIDERATION:

None. Compliance with this Service Information Letter is optional. New or Rebuilt parts installed in accordance with this Service Information Letter are covered under the terms and conditions of the standard TCM Ignition Systems Warranty Policy.


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TABLE 1

SHOWER-OF-SPARKS CONVERSION INFORMATION MAGNETO TO ENGINE APPLICATION CHART

ENGINES ORIGINALLY EQUIPPED WITH IMPULSE COUPLED MAGNETO(S)	POSITION ON ENGINE	ORIGINAL IMPULSE COUPLED		REPLACE WITH SHOWER-OF-SPARKS	
		MAGNETO P/N	MAGNETO TYPE	MAGNETO P/N	MAGNETO TYPE
TELEDYNE CONTINENTAL *C-85-12, 14, 15 *C-90-12, 14, 16F O-200-A, B, C O-240-A, D IO-240-A *Includes all F, J, H, B & P suffix variants.	Left	10-51360-26 or 10-51360-37 or 10-500514-1	S4LN-21 S4LN-21 S4LSC-21	10-163005-3 or 10-600614-3	S4LN-200 S4LSC-200
	Right	10-51360-26 or 10-51360-37 or 10-500514-1	S4LN-21 S4LN-21 S4LSC-21	10-163045-1 or 10-600644-4	S4LN-204 S4LSC-204
O-300-A, B, C, D, E	Left	10-51365-39 or 10-500516-4	S6LN-21 S6LSC-21	10-163010-11 10-600616-6	S6LN-200 S6LSC-200
	Right	10-51365-39 or 10-500516-4	S6LN-21 S6LSC-21	10-163050-2 10-600646-3	S6LN-204 S6LSC-204
IO-360-A, B, C, CB, D, DB, E, ES, G, GB, H, HB, J, JB, K, KB TSIO-360-A, AB, B, C, CB, D, DB, E, EB, GB, H, HB, JB, KB	Left	10-79020-6 or 10-79020-16 or 10-79020-18 or 10-500556-3	S6LN-25 S6LN-25 S6LN-25 S6LSC-25	10-163020-4 or 10-600606-3	S6LN-201 S6LSC-201
	Right	10-79020-6 or 10-79020-16 or 10-79020-18 or 10-500556-3	S6LN-25 S6LN-25 S6LN-25 S6LSC-25	10-163060-2 or 10-600656-3	S6LN-205 S6LSC-205
LTSIO-360-E, EB, KB IO-470-A, C, D, E, F, G, H, P, R, T, VO *O-470-A, B, E, G, H, J, K, L, M, N, P, R, U TSIO-470-B, C, D IO-520-A, BA, BB, D, E, F, K TSIO-520-A IO-550-F, G *Includes all C1 suffix variants.	Left	10-79020-10 or 10-79020-19 or 10-500556-1	S6RN-25 S6LN-25 S6RSC-25	10-163020-3 or 10-600606-1	S6RN-201 S6RSC-201
	Right	10-79020-10 or 10-79020-19 10-500556-1	S6RN-25 S6RN-25 S6RSC-25	10-163060-1 10-600656-1	S6RN-205 S6RSC-205
IO-470-F, J, K, L, N, S O-470-R, S, U IO-520-A, BA, BB, C, CB, D, F, J, L TSIO-520-A, AE, AF, C, CE, D, DB, G, H, M, P, R, T, UB IO-550-B, C, D, E, L TSIO-L-550-B	Left	10-349350-4	S6RN-1225	10-349220-5	S6RN-1201
	Right	10-349350-5	S6RN-1225	10-349260-6	S6RN-1205
LTSIO-520-AE	Left	10-349350-6	S6LN-1225	10-349220-4	S6LN-1201
	Right	10-349350-7	S6LN-1225	10-349260-7	S6LN-1205

TABLE 1

**SHOWER-OF-SPARKS CONVERSION INFORMATION
MAGNETO TO ENGINE APPLICATION CHART**

(continued)


ENGINES ORIGINALLY EQUIPPED WITH IMPULSE COUPLED MAGNETO(S)	POSITION ON ENGINE	ORIGINAL IMPULSE COUPLED		REPLACE WITH SHOWER-OF-SPARKS	
		MAGNETO P/N	MAGNETO TYPE	MAGNETO P/N	MAGNETO TYPE
<p>TEXTRON LYCOMING O-235-C1, C1A, C1C@, C2A, C2C@, E1, E2A, F1, F2A, G1, G2A, H2C@, J2A, M2C, M3C, N2C@, P2C, P3C O-290-D, D2, D2A, D2B AEIO-320-E1A, E1B@, E2A, E2B@ IO-320-B1A, B1B, B1C, B2A, C1A, C1B E1A, E1B@, E2A, E2B@, F1A O-320-A1A, A1B, A2A, A2B, A2D@, A3A, A3B, B1A, B1B, B2A, B2B, B3A, B3B, C1A, C1B, C2A, C2B, C3A, C3B, D1A, D1B, D1D, D2A, D2G@, D2H@, D2J@, D3G@, E1A, E2A, E2D@, E2G@, E2H, E3D@, E3H O-340-A1A, A2A, B1A AEIO-360-B4A IO-360-B4A O-360-A1A, A1H, A2A, A2H, A3A, A4A, A4D, A4J, A4K@, A4M@, A4N@, B1A, B2A, C1A, C1E@, C1G, C2A, C2B, C2E@, D1A, D2A, F1A6@, G1A6@ VO-360-A1A</p> <p>@ Engines indicated originally equipped with Slick Magneto with 20° lag impulse coupling.</p>	<p>Left</p> <p>Right</p>	<p>10-51360-37 or 10-51360-45 or 10-500514-1</p> <p>10-51360-37 or 10-500514-1 or 10-51360-29 or 10-163045-3 or 10-600644-1 - OR - 10-51360-47 or 10-500514-201 With Optional 2-Wire Tachometer Breaker</p>	<p>S4LN-21 S4LN-21 S4LSC-21</p> <p>S4LN-21 S4LSC-21 S4LN-20 S4LN-204 S4LSC-204</p> <p>S4LN-21 S4LSC-21T</p>	<p>10-163005-2 or 10-600614-1</p> <p>10-51360-29 or 10-163045-3 or 10-600644-1</p> <p>- OR - 10-163045-6 10-600644-201 With Optional 2-Wire Tachometer Breaker</p>	<p>S4LN-200 S4LSC-200</p> <p>S4LN-20 S4LN-204 S4LSC-204</p> <p>S4LN-204 S4LSC-204T</p>
<p>O-235-C2B, E2B, F2B, G2B, J2B, K2B AEIO-320-D1B, D2B AIO-320-A1B, A2B, B1B, C1B IO-320-B1E, D1A, D1B, D1C O-320-D1C, D1F, D2C, D2F, E1C, E1F, E2C, E2F AEIO-360-A1B6, B1F AIO-360-A2B, B1B IO-360-A1B, A1B6, A2B, B1E, B1F, B2E, B2F, B2F6, C1C, C1D6, C1E6 O-360-A1F, A1F6, A1G, A1G6, A2F, A2G, A4G, C1F</p>	<p>Left</p> <p>Right</p>	<p>10-349365-3</p> <p>10-349365-3 or 10-349305-1 - OR - 10-349305-5 With Optional 1-Wire Tachometer Breaker</p>	<p>S4LN-1227</p> <p>S4LN-1227 S4LN-1209</p> <p>S4LN-1209</p>	<p>10-349285-1</p> <p>10-349305-1</p> <p>- OR - 10-349305-5 With Optional 1-Wire Tachometer Breaker</p>	<p>S4LN-1208</p> <p>S4LN-1209</p> <p>S4LN-1209</p>
<p>AIO-360-A1B, B1B AEIO-360-A1B, A1B6, A2B IO-360-A1B, A1B6, A1D6, A2B, C1C, C1C6, C1D6, C1E6, C1F</p>	<p>Left</p> <p>Right</p>	<p>10-349365-9</p> <p>10-349365-9 or 10-349305-1 - OR - 10-349305-5 With Optional 1-Wire Tachometer Breaker</p>	<p>S4LN-1227</p> <p>S4LN-1227 S4LN-1209</p> <p>S4LN-1209</p>	<p>10-349285-7</p> <p>10-349305-1</p> <p>- OR - 10-349305-5 With Optional 1-Wire Tachometer Breaker</p>	<p>S4LN-1208</p> <p>S4LN-1209</p> <p>S4LN-1209</p>

TABLE 1

SHOWER-OF-SPARKS CONVERSION INFORMATION MAGNETO TO ENGINE APPLICATION CHART

(continued)

ENGINES ORIGINALLY EQUIPPED WITH IMPULSE COUPLED MAGNETO(S)	POSITION ON ENGINE	ORIGINAL IMPULSE COUPLED		REPLACE WITH SHOWER-OF-SPARKS	
		MAGNETO P/N	MAGNETO TYPE	MAGNETO P/N	MAGNETO TYPE
TEXTRON LYCOMING O-235-K2A, K2C, L2A, L2C⊕, M1, N2A, N2C⊕, P1, P2A AEIO-360-A1D, A1E IO-360-A1D, K2A ⊕ Engines indicated had option for Slick Magneto with 5° Lag Impulse Coupling.	Left	10-51360-54 or 10-51360-55 or 10-51360-58 or 10-500514-2	S4LN-21 S4LN-21 S4LN-21 S4LSC-21	10-163005-11 or 10-600614-2	S4LN-200 S4LSC-200
	Right	10-51360-29 or 10-163045-3 or 10-600644-1 - OR - 10-163045-6 10-600644-201 With Optional 2-Wire Tachometer Breaker	S4LN-20 S4LN-204 S4LSC-204 S4LN-204 S4LN-204T	10-51360-29 or 10-163045-3 or 10-600644-1 - OR - 10-163045-6 10-600644-201 With Optional 2-Wire Tachometer Breaker	S4LN-20 S4LN-204 S4LSC-204 S4LN-204 S4LN-204T
IO-540-C2C O-540-A1A, A1A5, A1B5, A1C5, A2B, A4A5, A4B5, A4C5, B1B5, B2B5, B4B5, E4B5, F1A5, F1B5, H1A5, H2A5	Left	10-51365-47 or 10-500516-2	S6LN-21 S6LSC-21	10-163010-10 10-600616-3	S6LN-200 S6LSC-200
	Right	10-51365-47 or 10-51365-46 or 10-163050-9 or 10-500516-2	S6LN-21 S6LN-20 S6LN-204 S6LSC-21	10-51365-46 or 10-163050-9 or 10-600646-1	S6LN-20 S6LN-204 S6LSC-204
AEIO-540-D4B5 HIO-540-A1A IO-540-D4B5, G1C5, G1D5, G1F5, K1A5, K1B5, K1E5, K1G5, K1H5, K1K5, L1A5, L1C5 O-540-B2C5, E4C5, G1A5, G2A5 TIO-540-E1A, H1A	Left	10-349370-4	S6LN -1227	10-349290-1	S6LN-1208
	Right	10-349310-1 - OR - 10-349310-8 With Optional 1-Wire Tachometer Breaker	S6LN-1209 S6LN-1209	10-349310-1 - OR - 10-349310-8 With Optional 1-Wire Tachometer Breaker	S6LN-1209 S6LN-1209
IO-540-C4D5D, K1A5D, T4A5D, T4B5D, V4A5D, W1A5D, W3A5D O-540-J1A5D, J1C5D, J2B5D, J2C5D, J3A5D, J3C5D, L3C5D	System Magneto Harness	10-385126-105 10-382560-11 10-384602-303	D6LN-2031	10-785146-106 10-682610-11 10-821624-6	D6LN-3200
	System Magneto Harness	10-685126-105 10-682560-11 10-684602-303	D6LN-3000		
	System Magneto Harness	10-785126-105 10-682560-11 10-821614-6	D6LN-3000		
AEIO-540-L1B5D IO-540-K1A5D, K1E5D, K1G5D, L1A5D, L1B5D TIO-540-AB1AD	System Magneto Harness	10-785126-107 10-682560-13 10-821614-6	D6LN-3000	10-785146-111 10-682610-13 10-821624-6	D6LN-3200
	System Magneto Harness	10-685126-107 10-682560-13 10-684602-303	D6LN-3000		
	System Magneto Harness	10-685126-108 10-682560-13 10-684602-304	D6LN-3000		
	System Magneto Harness	10-385126-107 10-382560-13 10-684602-303	D6LN-2021		

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**TABLE 2 – STARTING VIBRATOR
APPLICATIONS**

Vibrator Part Number	Description	Use With Ignition System
10-176487-121	12VDC, 2.5A	S-200 Series
10-357487-241	24VDC, 2.5A	S-200 Series
10-176487-122	12VDC, 2.0A	S-1200 Series
10-357487-242	24VDC, 2.0A	S-1200 Series
10-382775-12	12VDC, 2.0A	D-3200 Series
10-382808-24	24VDC, 2.0A	D-3200 Series

**TABLE 3
CONVERSION OF IMPULSE COUPLED
MAGNETOS TO SHOWER-OF-SPARKS CONFIGURATIONS**


Impulse Coupled Magneto P/N (Type Number)	May be Converted to Boosted Magneto P/N (Type Number) Left Mount	May be Converted to Non-Boosted Magneto P/N (Type Number) Right Mount
10-79020-18 (S6LN-25)	10-163020-4 (S6LN-201)	10-163060-2 (S6LN-205)
10-79020-19 (S6RN-25)	10-163020-3 (S6RN-201)	10-163060-1 (S6RN-205)
10-500556-1 (S6RSC-25)	10-600606-1 (S6RSC-201)	10-600656-1 (S6RSC-205)
10-500556-3 (S6LSC-25)	10-600606-3 (S6LSC-201)	10-600656-3 (S6LSC-205)
10-349350-4 (S6RN-1225)	10-349220-5 (S6RN-1201)	-----
10-349350-5 (S6RN-1225)	-----	10-349260-6 (S6RN-1205)
10-349350-6 (S6LN-1225)	10-349220-4 (S6LN-1201)	-----
10-349350-7 (S6LN-1225)	-----	10-349260-7 (S6LN-1205)

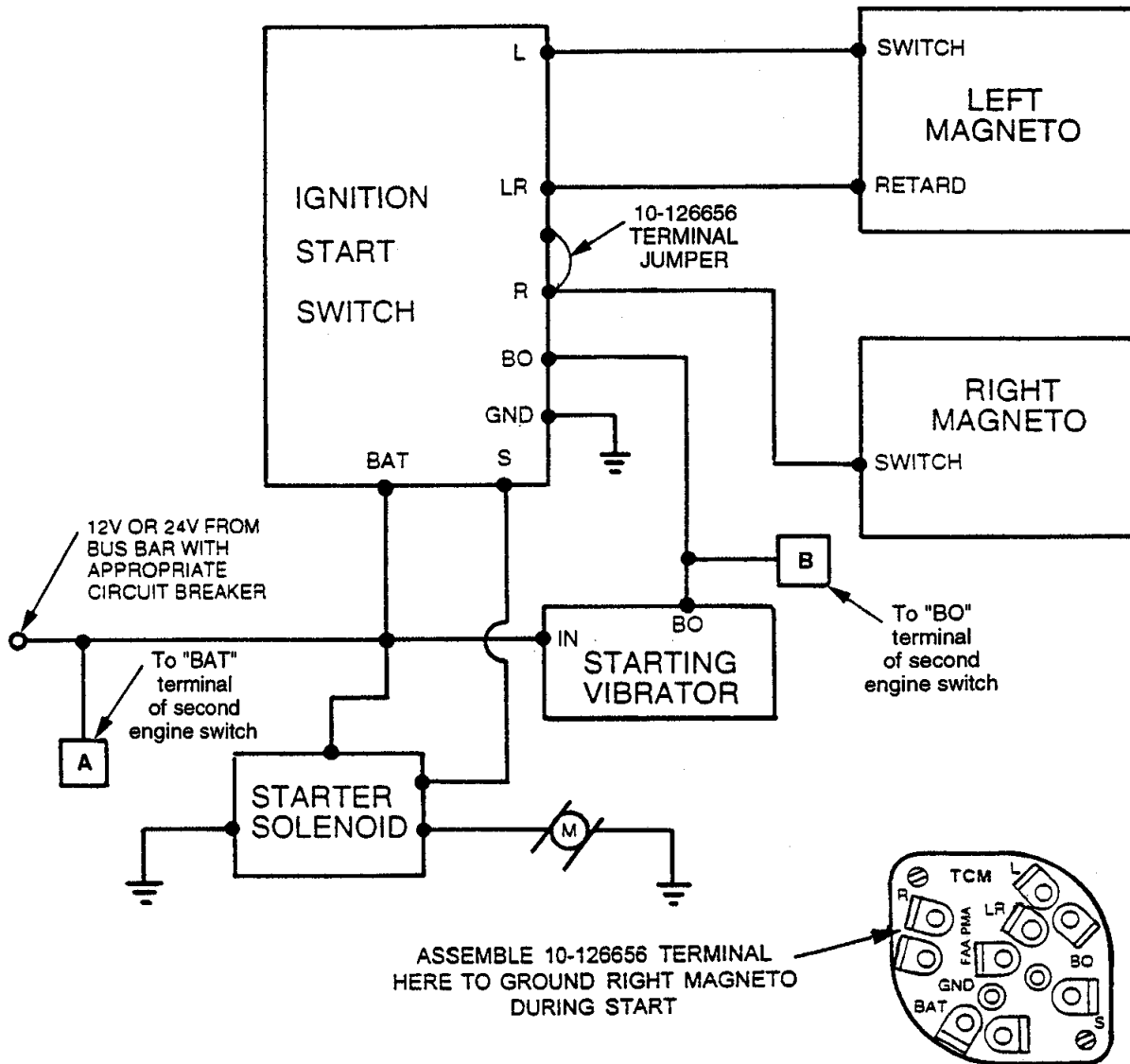
TABLE 4
TYPICAL INSTALLATION
MATERIALS LIST

Description	Part Number	Quantity, 1 Engine	Quantity, 2 Engines	Vendor
Magneto	See Table 1	1	2	TCM
Vibrator	See Table 2	1	1	TCM
Terminal, Jumper	10-126656	1	2	TCM
Screw, Switch	10-126648	3	6	TCM
Cable Tie	10-620013	15	25	TCM
#10 Eyelet	10-400039	4	8	TCM
#10 Nut	10-13799	3	4	TCM
#10 Screw	10-35937-10	2	2	TCM
#10 Washer	10-78655	4	4	TCM
Wire, 18 Gage	Aircraft Grade	25 ft.	50 ft.	Local Purchase
Boot	MS25171-1S	1	2	Local Purchase
Gasket, Magneto	62224	1	2	LYCOMING
	535324	2	-	TCM
	534750	2	4	TCM
Retard Terminal Kit *	10-157209	1	2	TCM
Switch Terminal Kit **	10-157209	2	4	TCM

Notes: * For use with D6LN-3200 type magnetos or old style S-200 Series (P/N 10-163XXX-X Series) magnetos only.


** For use with old style S-200 Series (P/N 10-163XXX-X Series) magnetos only, if not previously installed.

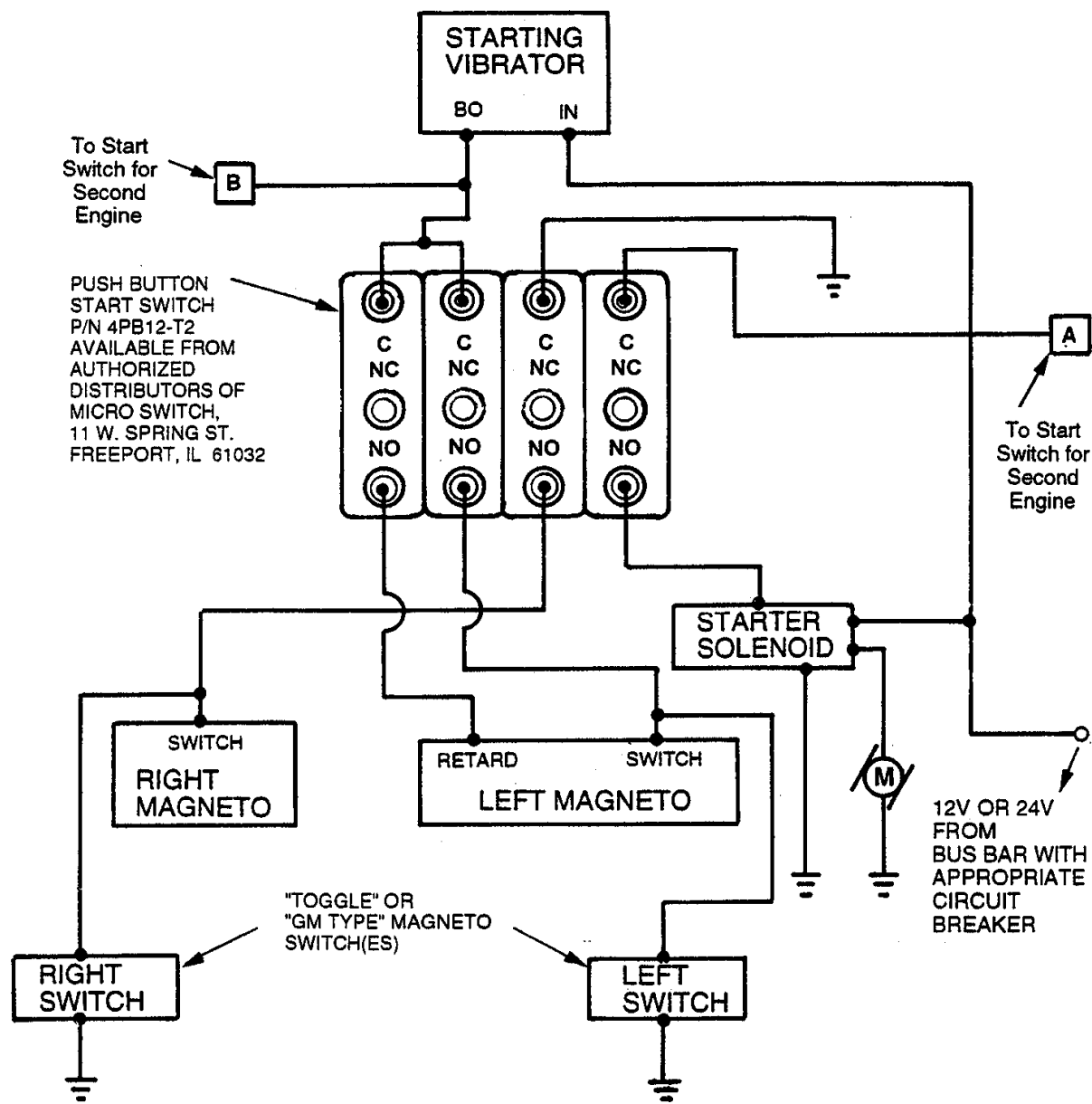
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A & **B** For twin engine installations, starting vibrator may be shared by interconnecting ignition/start circuits at points shown.


FIGURE 1: WIRING DIAGRAM – SHOWER-OF-SPARKS IGNITION SYSTEM WITH TWIST-TO-START OR PUSH-TO-START MAGNETO SWITCH

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A & **B** For twin engine installations, starting vibrator may be shared by interconnecting ignition/start circuits at points shown.

FIGURE 2: WIRING DIAGRAM – SHOWER-OF-SPARKS IGNITION SYSTEM WITH INDIVIDUAL TOGGLE MAGNETO SWITCHES OR “GM TYPE” MAGNETO SWITCH

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