The Engineering Society For Advancing Mobility Land Sea Air and Space®
INTERNATIONAL
400 Commonwealth Drive, Warrendale, PA 15096-0001

SURFACE VEHICLE RECOMMENDED PRACTICE

Submitted for recognition as an American National Standard

SAE J1493 | REV. OCT91

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Superseding J1493 DEC86

(R) SHIELDING OF STARTER SYSTEM ENERGIZATION

1. Scope—This SAE Standard specifies the requirements to prevent inadvertent and to discourage deliberate electrical connection at the starter motor solenoid or starter relay which may result in the starter pinion engaging the ring gear.

This document applies to off-road, self-propelled work machines, as identified in SAE J1116, which have the potential of powered movement as a direct result of the starter pinion engaging the ring gear.

2. References

2.1 Applicable Documents—The following publications form a part of this specification to the extent specified herein. The latest issue of SAE publications shall apply.

2.1.1 SAE PUBLICATIONS—Available from SAE, 400 Commonwealth Drive, Warrendale, PA 15096-0001.

SAE J1116—Categories of Off-Road Self-Propelled Work Machines

2.2 Definitions

2.2.1 STARTER MOTOR SOLENOID—The control actuator, integral with the starter motor, which energizes the starter motor and/or extends the pinion to engage the ring gear.

2.2.2 STARTER RELAY—The solenoid operated switch which controls the application of power to the starter motor or the starter motor solenoid.

2.2.3 COIL TERMINAL—The connecting point used to energize the coil of either the starter relay or the starter motor solenoid, terminal (1) and (4) in Figure 1.

2.2.4 BATTERY TERMINAL—The connecting point used to supply battery power to either the starter relay or the starter motor solenoid, terminal (2) and (5) in Figure 1.

2.2.5 SOLENOID TERMINAL—The terminal on the starter relay which connects to the coil terminal on the starter motor solenoid, terminal (3) in Figure 1.

2.2.6 MOTOR TERMINAL—The terminal on the starter motor solenoid which connects to the starter motor to supply power to the motor. This includes the terminal on the solenoid and motor and any uninsulated conductor between the terminals. Terminal (6) in Figure 1.

NOTE—The word "Terminal," as used in the document, shall include the uninsulated portion of the cable or terminal which is connected to the starter motor solenoid or starter relay.

3. Requirements

3.1 Shielding shall be provided on the starter motor solenoid and on the starter relay (if used) to discourage deliberate electrical contact between the specified terminals when any common electrically conductive tools, such as pliers, are used on the starter motor solenoid or starter relay with all shields installed

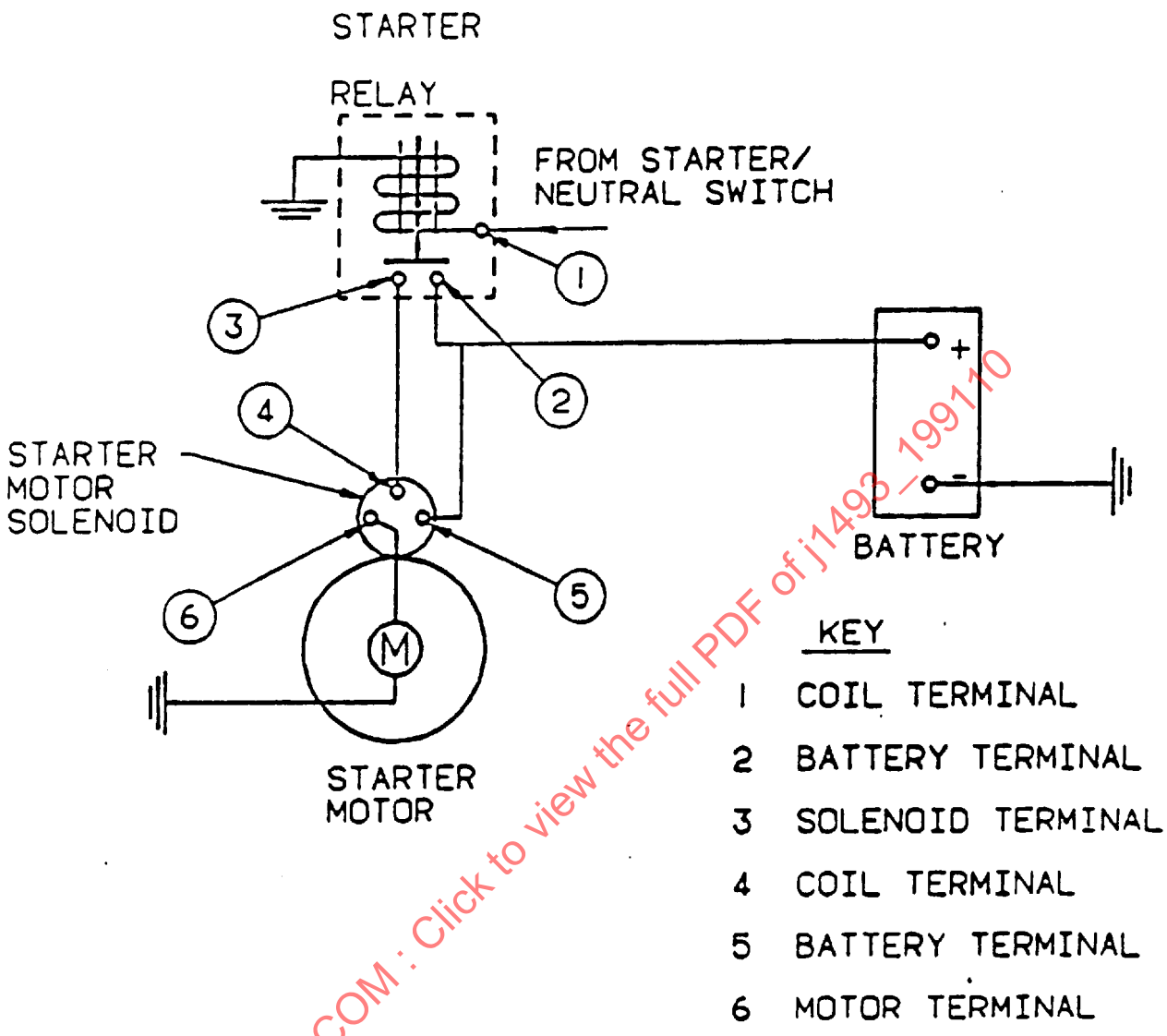

FIGURE 1—TYPICAL CRANKING CIRCUIT

and wiring attached. If the shield is removable, it shall be attached in such a fashion that the use of hand tools is required to gain access to the terminals.

This shielding shall:

3.1.1 Prevent electrical connection from the battery terminal (5) to the coil terminal (4) and/or to the motor terminal (6) on the starter motor solenoid.

NOTE—Shielding between terminal (5) and (6) is optional if this connection cannot, by itself, result in pinion engagement.

3.1.2 Prevent electrical connection from the battery terminal (2) to the coil terminal (1) and/or to the starter motor solenoid terminal (3) on the starter relay.

3.2 With the shield removed, a fixed barrier shall be provided on the starter motor solenoid and starter relay (if used) to prevent electrical contact between the specified terminals, with wiring attached, when a flat rigid conductor is used.

This barrier shall:

3.2.2 Prevent inadvertent electrical connection on the starter motor solenoid between the battery terminal (5) and the coil terminal (4) or between the battery terminal (5) and the motor terminal (6).

NOTE—A fixed barrier between terminal (5) and (6) is optional if this connection cannot, by itself, result in pinion engagement.

3.2.3 Prevent inadvertent electrical connection on the starter relay between the battery terminal (2) and the coil terminal (1) or between the battery terminal (2) and the starter motor solenoid terminal (3).

3.3 Other means of preventing engagement of the starter pinion and the ring gear are acceptable as alternatives to any barrier and/or shielding stated in this document.

4. Notes

4.1 Marginal Indicia—The (R) is for the convenience of the user in locating areas where technical revisions have been made to the previous issue of the report. If the symbol is next to the report title, it indicates a complete revision of the report.

PREPARED BY THE SAE OFF-ROAD MACHINERY TECHNICAL COMMITTEE
SC5—ELECTRICAL EQUIPMENT

Rationale—SAE J1493 has been rewritten to allow alternate means of potentially furnishing the same or greater level of protection. Additionally, the scope has been revised to agree with the latest requirements of SAE.

The word "discourage" has been added to the scope to better describe the intent of the document.

Relationship of SAE Standard to ISO Standard—Not applicable.

Application—This SAE Standard specifies the requirements to prevent inadvertent and to discourage deliberate electrical connection at the starter motor solenoid or starter relay which may result in the starter pinion engaging the ring gear.

This document applies to off-road, self-propelled work machines, as identified in SAE J1116, which have the potential of powered movement as a direct result of the starter pinion engaging the ring gear.

Reference Section

SAE J1116—Categories of Off-Road Self-Propelled Work Machines

Committee Composition

Developed by the SAE Off-Road Machinery Technical Committee SC5—Electrical Equipment

B. M. Nichols, Deere & Company, Dubuque, IA—Chairman

M. E. Johnson, AMP Inc., Harrisburg, PA—Vice Chairman

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