

## Self-Propelled Sweepers and Scrubbers Dual Position Driving Controls and Displays

1. **Scope**—This SAE standard applies to self-propelled driver operated sweepers and scrubbers as defined in SAE J2130.
- 1.1 **Purpose**—The purpose of this document is to establish the basic requirements associated with controls and displays for dual position driving controls as depicted in a typical installation shown in Figure 1. The control layout illustrated being of a conventional installation as associated with a normal on-road vehicle having a steering wheel to steer the machine and foot pedals to control the speed and braking functions. The document elaborates the requirements for an originally built machine with two driving positions but also where a proprietary commercial truck chassis is converted from a single driving position, it also advises recommendations in design, construction and safety related elements.

In the case where National Regulations pertain to the design and performance of driving control systems as depicted, then these regulations take precedent over the recommendations in this document.

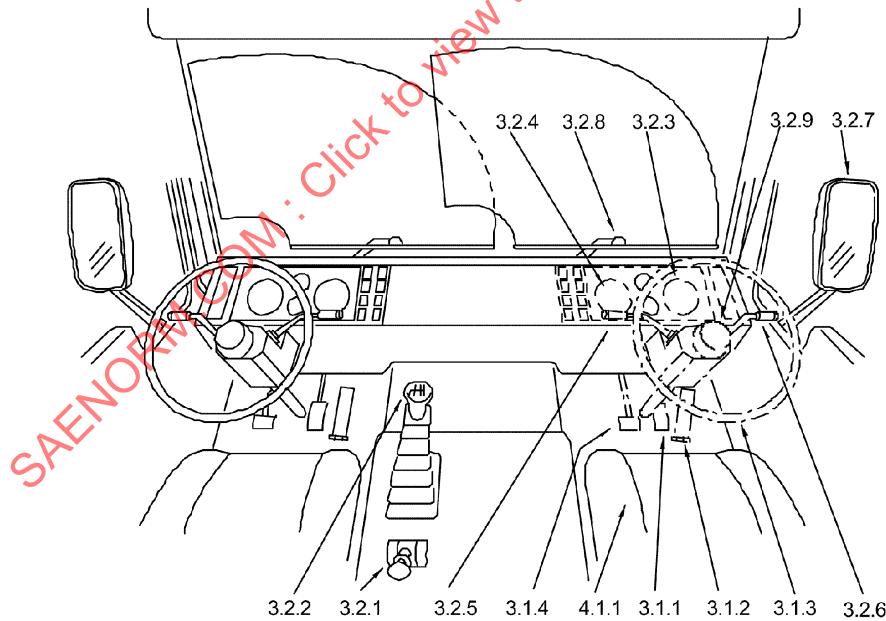


FIGURE 1—TYPICAL LAYOUT OF SYSTEM

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## 2. *References*

**2.1 Applicable Publications**—The following standards form a part of the specification to the extent specified herein. Unless otherwise indicated, the latest revision of the publications shall apply.

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

SAE J287—Driver hand Control Reach

SAE J680—Location and Operation of Instruments and Controls in Motor Truck Cabs

SAE J898—Control Locations for Off-Road Work Machines

SAE J1050—Describing and Measuring the Driver's Field of View

SAE J1517—Driver Selected Seat Position

SAE J2130—Self-Propelled Sweepers

**2.2 Related Publication**—The following publication is provided for information purposes only and is not a required part of this specification.

2.2.1 SAE PUBLICATION—Available from SAE, 400 Commonwealth Drive, Warrendale, PA 15096-0001.

SAE J1521—Truck Driver Shift-Knee Position for Clutch and Accelerator

## 3. *Definitions*

**3.1 Primary Controls**—Are the controls principally used to operate, control and drive the machine safely, these include:

3.1.1 **SERVICE BRAKE**—A system to arrest, hold and bring the machine to a stop. Actuation is by a foot pedal control located in the normal position for an automotive application. The service brake may be pneumatic, hydraulic or hydrostatically operated or a combination of systems.

3.1.2 **ACCELERATOR**—A system to regulate the engine speed and/or the machine's ground speed by means of a foot pedal located in the normal position for an automotive application.

3.1.3 **STEERING SYSTEM**—A system that controls the direction of the machine by means of a steering wheel and associated linkage, with or without power assistance.

3.1.4 **CLUTCH**—A system for disconnecting the engine from the drivetrain by means of a foot pedal located in the normal position for an automotive application.

**3.2 Secondary Controls, Displays, and Systems**—Are controls and systems that are operated or observed intermittently in order to conduct specific functions during the control of the machine, these include:

3.2.1 **PARKING BRAKE**—A system to prevent the machine from moving when unattended.

3.2.2 **GEAR SHIFT**—A system to engage or disengage a train of gears or other propulsion transmission

3.2.3 **SPEEDOMETER**—A device to visually indicate the machine's ground speed.

3.2.4 **DISPLAYS AND SYMBOLS**

a. Displays: a system for indicating the operational status of the machine's vehicular functions and systems.

b. Symbols: a method of identifying a control device and its function.

- 3.2.5 **LIGHTING CONTROL**—Control system for the operation of all mandatory lamps.
- 3.2.6 **TURN INDICATOR**—A device to control an external visual indicator to show the driver's intention to turn.
- 3.2.7 **REARVIEW MIRRORS**—System to enable the operator to observe rearwards.
- 3.2.8 **WIPER SYSTEM**—Mechanism for cleaning the windscreens of rain, snow, mist, etc.
- 3.2.9 **HORN**—Audible warning device operated by the driver to warn of presence to others in hearing range.

### **3.3 Components**

- 3.3.1 **LOCKING FASTENER**—Screw fasteners and similar components that embody a torque prevailing friction element used to join, attach and secure machine components.
- 3.3.2 **CABLES**—Flexible mechanical linkages contained in a routing conduit.
- 3.3.3 **BRAKE CONTROL VALVES**—Components used to regulate the braking forces in a braking system.
- 3.3.4 **MIRRORS**—Components displaying a reflected mirrored visual image.

## **4. Technical Requirements**

### **4.1 Control Layout, Construction, and Safety Requirements**

- 4.1.1 Driver seating position and foot pedal arrangements shall observe the requirements of - SAE J1517, SAE J898.
- 4.1.2 Driver hand control reach shall observe the requirements of – SAE J287, SAE J898.
- 4.1.3 Location of all controls and displays shall observe the requirements of – SAE J898, SAE J680.
- 4.1.4 Location of mirrors shall observe the requirements of SAE J1050.

### **4.2 Control System Functionality**

- 4.2.1 All primary controls, shall be duplicated for both driving positions and function at all times, although in the case of duplicated power steering systems and electronic accelerator pedals, it is permissible to disable the redundant driving position.
- 4.2.2 All secondary controls and displays, may be of an un-duplicated format. But, where the requirements of 4.1 are breached, requiring an unnatural driving posture to operate a control or observe a display, then the system shall be duplicated for both left and right hand driving positions.

### **4.2.3 SLAVE AND MECHANICAL SYSTEMS**

- 4.2.3.1 The steering system shall utilize one chassis frame-mounted steering gear controlled by two interconnected mechanical systems that provide steering control from either driving position.
- 4.2.3.2 The braking system shall utilize one master cylinder or brake control valve with a mechanical linkage for the second driving position acting on the master control.
- 4.2.3.3 The accelerator system shall utilize one master control device with a mechanical linkage for the second driving position acting on the master control.

4.2.3.4 The clutch system shall utilize one master control device with a mechanical linkage for the second driving position acting on the master control.

4.2.4 DUPLICATED SYSTEM

4.2.4.1 The steering system shall utilize two chassis frame-mounted steering gears (manual steering/power steering) mechanically connected through the steering linkage with steering control from either driving position. Hydraulic power assistance may be supplied through a directional control valve.

4.2.4.2 The braking system shall utilize two master cylinders or brake control valves controlled from either driving position.

4.2.4.3 The accelerator system shall utilize two throttle cables/actuators controlled from either driving position.

4.2.4.4 The clutch system shall utilize two separate clutch linkages/master cylinders controlled from either driving position.

**5. General Requirements**

**5.1 Fasteners and Components**

5.1.1 Locking fasteners used in primary controls shall be discarded and replaced if removal is necessary during a vehicle conversion.

5.1.2 The use of original equipment components or their equivalents for the duplicated driving controls is recommended where a vehicle is converted from a single driving position in order to replicate the operation and control characteristics of the original controls.

5.1.3 Fluid power systems used in duplicated power steering systems shall be of a fail-safe design.

**5.2 Instruction Decals**

5.2.1 An instruction decal shall indicate in the case of a converted proprietary commercial truck chassis, the original single driving position.

5.2.2 Instruction decals, etc., shall indicate additional selection controls, switches, etc.

**5.3 Rearview Mirrors**—Any combination of rearview mirror image systems is acceptable but shall meet the requirements of SAE J1050 when operating the machine from either driving position.

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