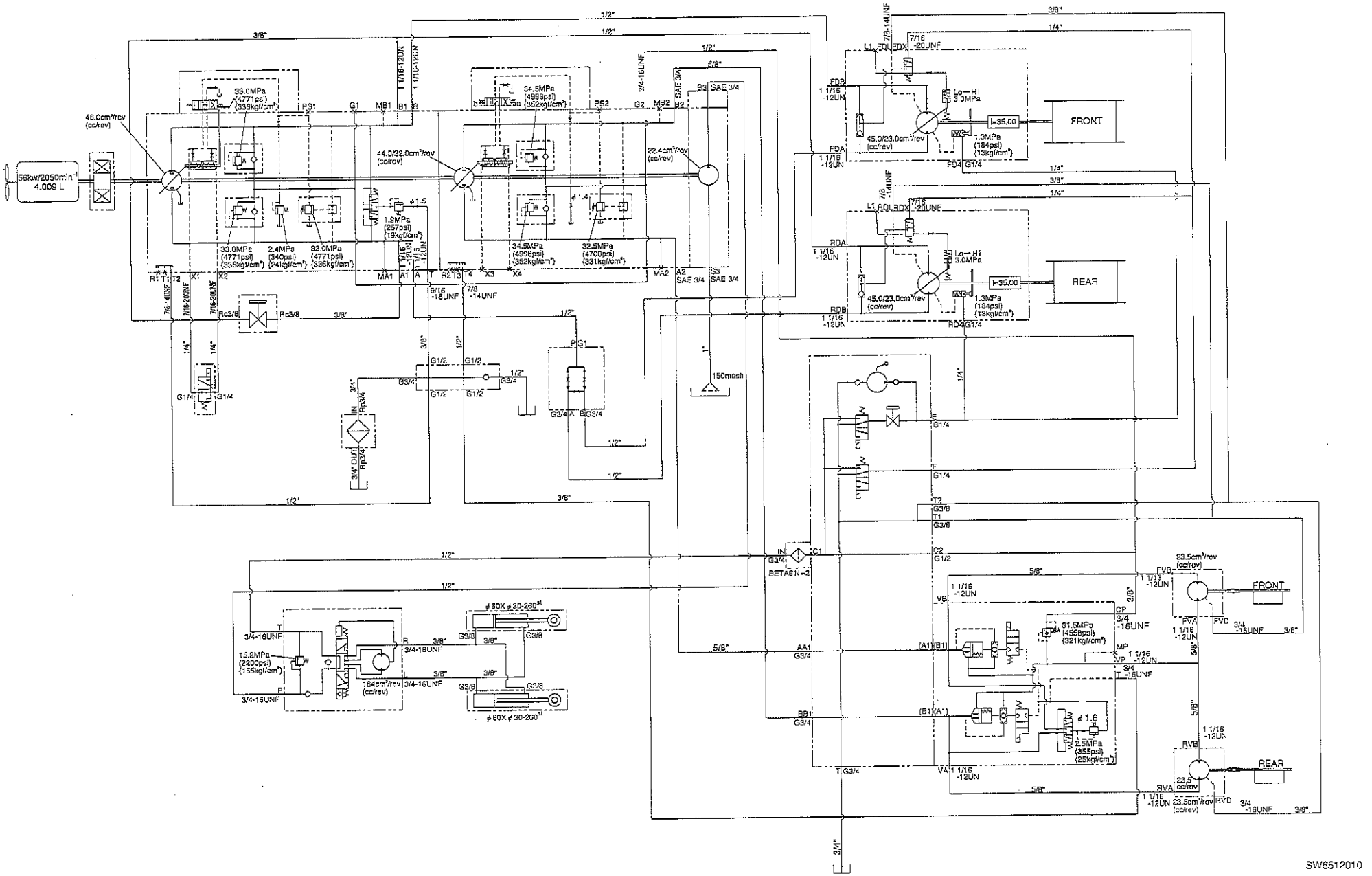
SW651 Series

SHOP MANUAL

SAKAI®

2-1-4. Hydraulic circuit (SW651B)



2-2-10. Description and operation of propulsion system

♦ See the hydraulic circuit on pages 2-020 to 2-021.

Description of propulsion system

Made up of propulsion pump (3), front propulsion motor (10), front drum (12), rear propulsion motor (11), rear drum (13) high/low speed switching solenoid valve (16) and brake release solenoid valve (17).

Basic function of propulsion pump and propulsion motor

• Propulsion pump

A piston pump is used which allows adjusting the travel speed by varying inclination of the swash plate to change the piston stroke, and switching forward-reverse travel by reversing the discharge port with the control of servo valve.

• Propulsion motor

A piston motor is used which allows switching high/low speed travel by varying displacement volume of the motor (or varying piston stroke).

Operation (It is assumed that the machine is traveling forward.)

★ Parking brake has been released.

♦ Assemblies such as pump assembly and motor assembly are indicated by numbers such as (1) and (2), while component parts in the assemblies are shown by small letters such as (a) and (b).

• Both front and rear motors are hydraulically connected in parallel.

• When forward-reverse lever (F-R lever) is shifted to "Forward", forward-reverse valve of the pump functions to allow the servo piston (b) to tilt the swash plate of the pump in the "forward" travel direction.

• This allows the oil to discharge from the propulsion pump to forward travel circuit (port A) and the oil is discharged and divided at the pump outlet to enter in the "forward travel port" of propulsion motor.

★ Port B is assigned for front motor and port B is for rear motor.

• The divided oil fed into the forward travel ports of the motor drives the motor, flows out of the port on opposite side, and merges at the inlet of the pump returning to suction port of the pump.

NOTE: Because the propulsion circuit is a closed loop circuit (HST), the "discharge port" differs from forward to reverse travel.

Release of parking brake

• When the brake release solenoid valve (17) is energized, the valve actuates allowing the oil in the charge circuit to discharge out of the valve to flow into the brake release port of the propulsion motor.

• The oil entered in the motor moves the brake piston to release the brake.

On normal vibration

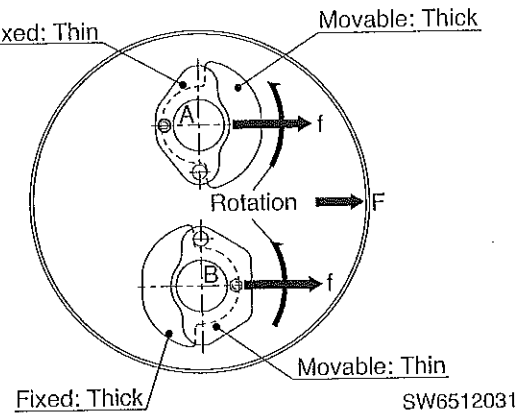
When the shaft rotates counter-clockwise viewed from the vibrator motor:

- Operation of [① through ④] in the figure on the right will be carried out at a single revolution of the shaft.
- Although the movable weight (2) shifts to the opposite side of the fixed weight (1) and mass of the fixed weight decreases, total mass increases as 2 sets of vibratory shaft rotate in the same direction by which vibratory force is generated in all circumference.

★ **Vibration is generated in all circumference by repetition of operation [① through ④] illustrated in the figure.**

Fixed: Fixed weight
Movable: Movable weight
Thick: Thicker side of weight
Thin: Thinner side of weight

①



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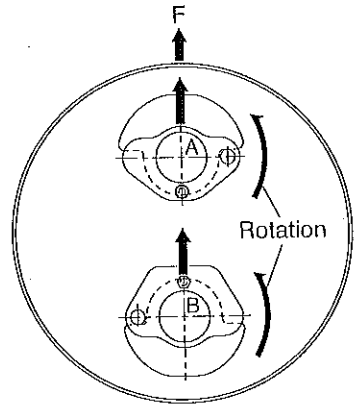
②



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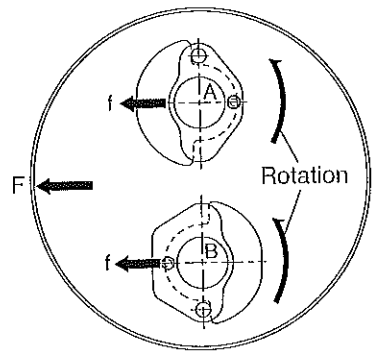
③



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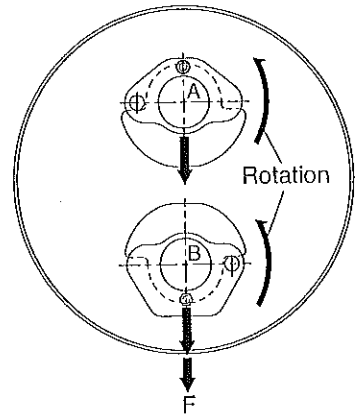
④



SW6512034

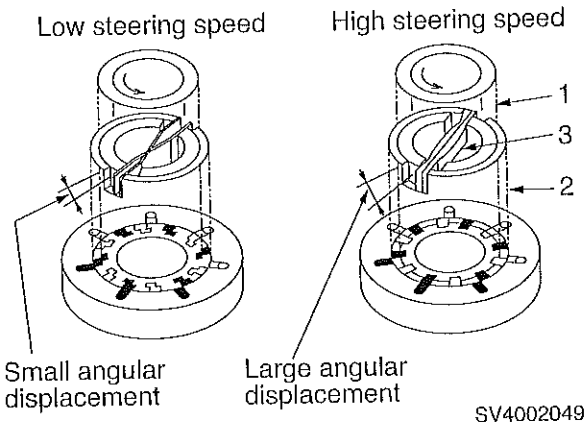
Steering wheel rotating speed and flow control

* In the steering mechanism, flow rate of oil into the steering cylinders depends on the rotating speed of the steering wheel.

- The steering valve (Orbitrol) controls oil flow by varying the angular displacement.
  While the steering wheel is being rotated, sleeve (2) chases the rotation of spool (1) to close the oil ports.
- With increasing speed of the steering wheel rotation, the angular displacement between the spool and sleeve increases. Flow increases.

Pump flow and force to operate the steering wheel

- With sufficient pump flow, force required to operate the steering wheel is equal to sliding resistance of selleve (2) and rotor. The steering wheel is very light to rotate.
- If the pump flow is insufficeint, the angular displacement between the spool and sleeve is at maximum. In spite of wide opening of oil ports, flow from the pump to the rotor is small. The rotor rotates slowly.
- This makes spool rotating speed greater than rotor speed to provide maximum angular displacement. The spool rotates the rotor via the cross pin and drive shaft. At this time, the rotor acts as a hydraulic pump. The steering wheel is heavy to rotate.



1. Spool
2. Sleeve
3. Centering spring

INSPECTION & ADJUSTMENT

2-8. Adjustment of F-R lever/speed shift lever linkage

★When the F-R lever linkage has been renewed (or reconnected) or if the F-R lever fails to move smoothly, adjust as described below:

1. Adjustment

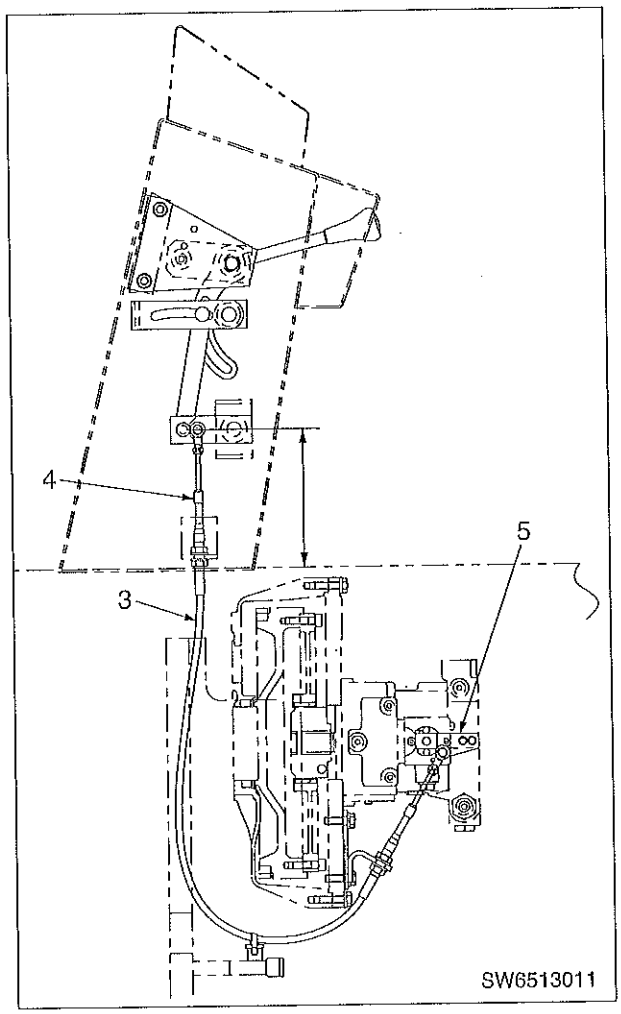
★Hydraulic oil temperature:
50±5°C (122±41°F)

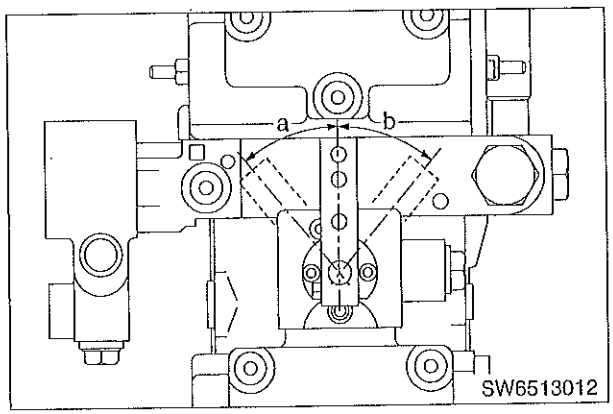
★Since the levers controlling both forward/reverse and gear change are positioned by notch balls, inspect the mounting dimensions of the cable and the stroke of the control lever on the pump.

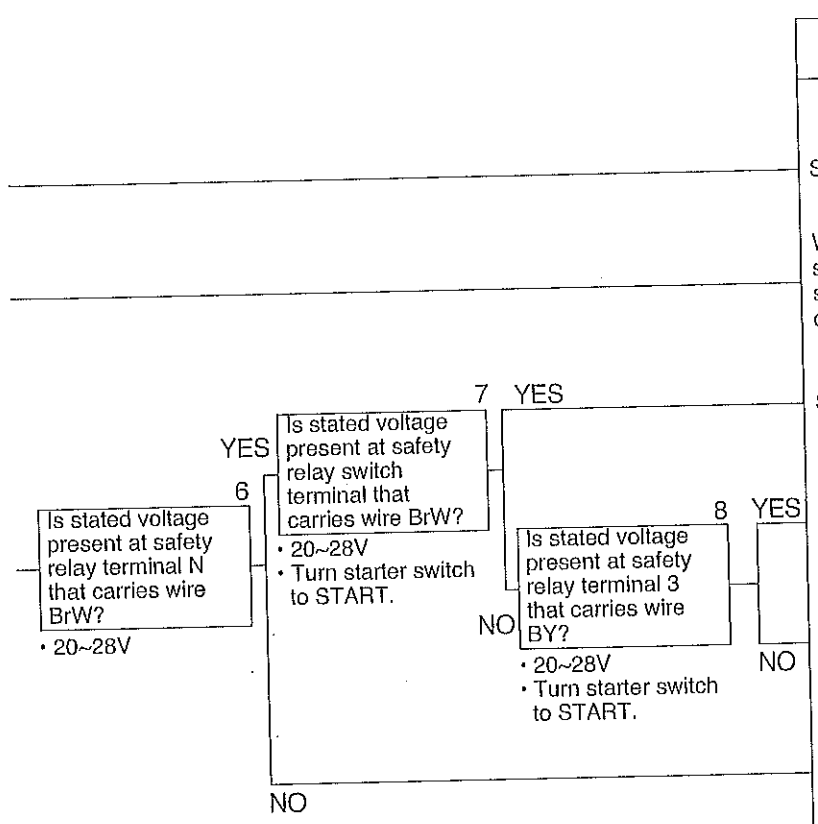
1) Fit the cable (3) to adjust mounting distance of the section (4) to be specified.
★Specified distance of section (4):
190mm (74.8in.)

2) Put the control lever (5) at its neutral position to fit the cable (3).

3) Check that the stroke of control lever (5) on the pump is as specified.
★Maximum stroke of lever (the same applies to forward and reverse):
a: 40°
b: 40°





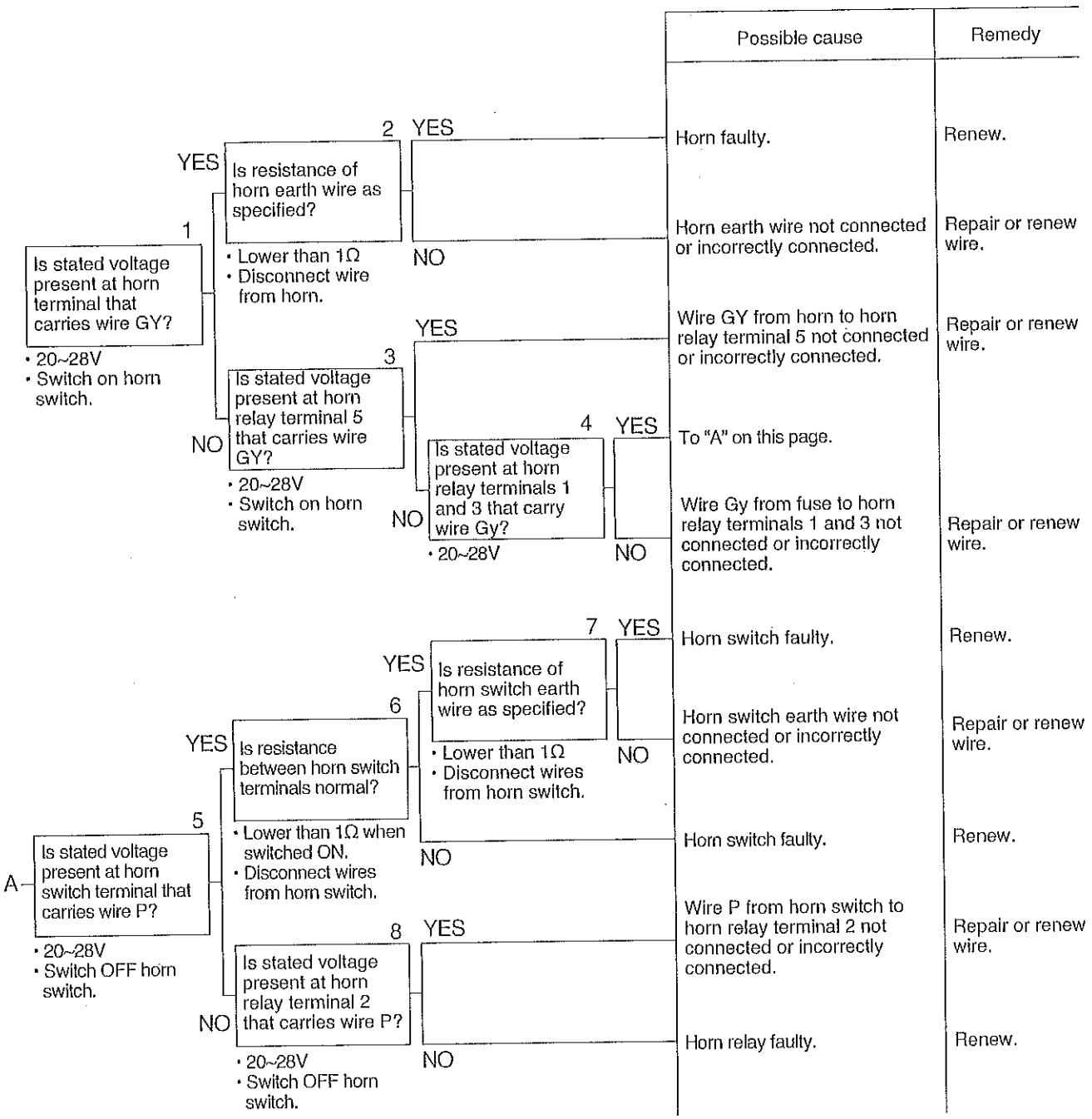


Possible cause	Remedy
Starter faulty.	Renew.
Wire harness connecting safety relay terminal C to starter terminal C is broken or poorly connected.	Repair or renew wire.
Safety relay faulty.	Renew.
Wire harness of color BY connecting safety relay switch to interlock relay terminal 3 is broken or poorly connected.	Repair or renew wire.
To "A" on page 4-204.	
Alternator faulty	Repair or renew wire.
Wire harness of color BY connecting safety relay terminal B to starter terminal B is broken or poorly connected.	Repair or renew wire.
Battery relay faulty.	Renew.
Wire harness connecting battery relay power IN terminal to battery (+) terminal is broken or poorly connected.	Repair or renew wire.
To "D" on page 2-204.	
Wire harness of color W connecting battery relay power IN terminal to starter switch terminal B is broken or poorly connected.	Repair or renew wire.
Battery capacity lowered.	Charge or renew battery.

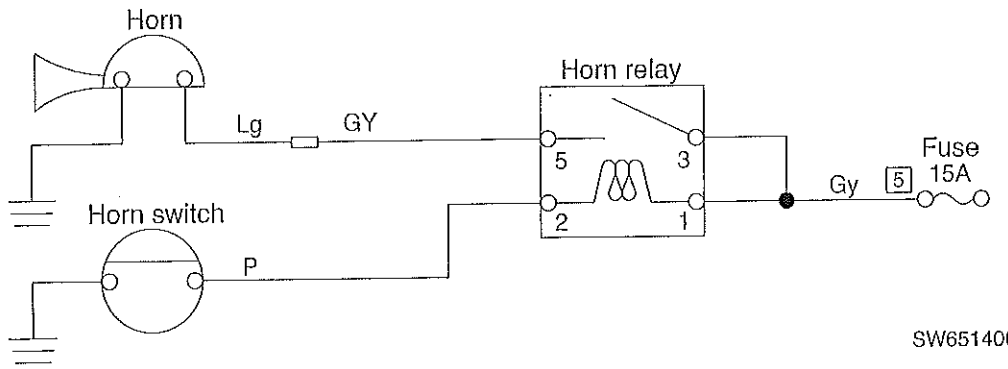
E-06 Horn does not sound

★First, check that fuse is not blown.

★The voltage measurement should be taken with the starter switch ON.



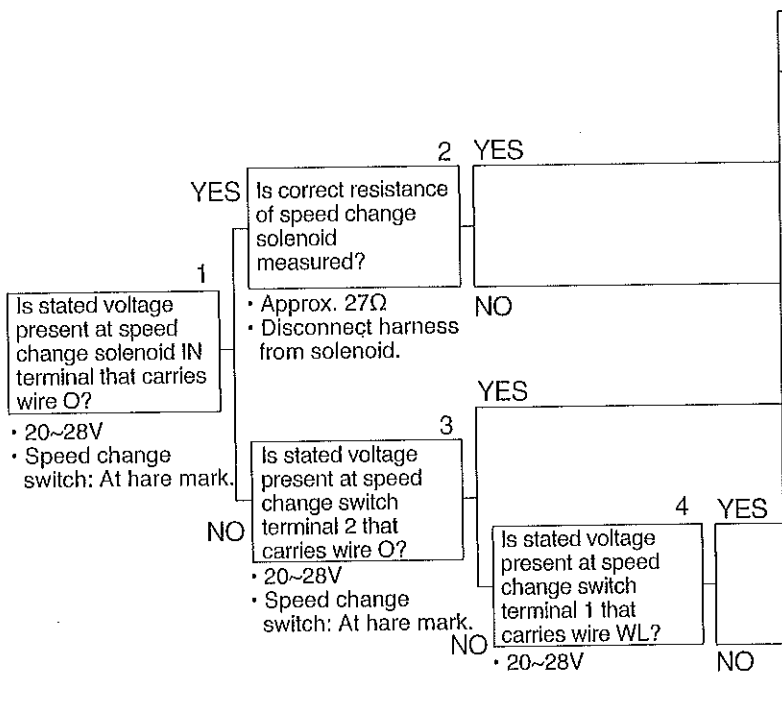
Electric wiring diagram for mode E-06



E-10 High/low speed fails to be switched

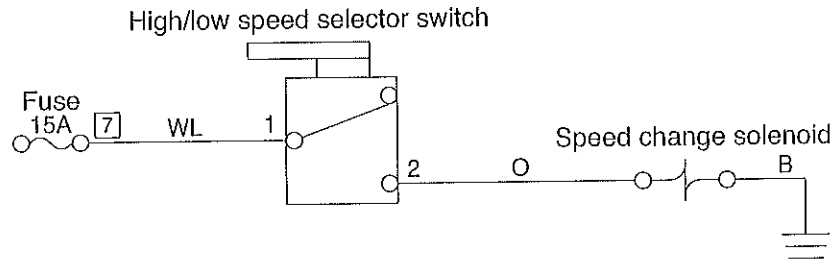
★First, ensure that the fuse is not damaged.

★Measure the voltage with the starter switch ON.

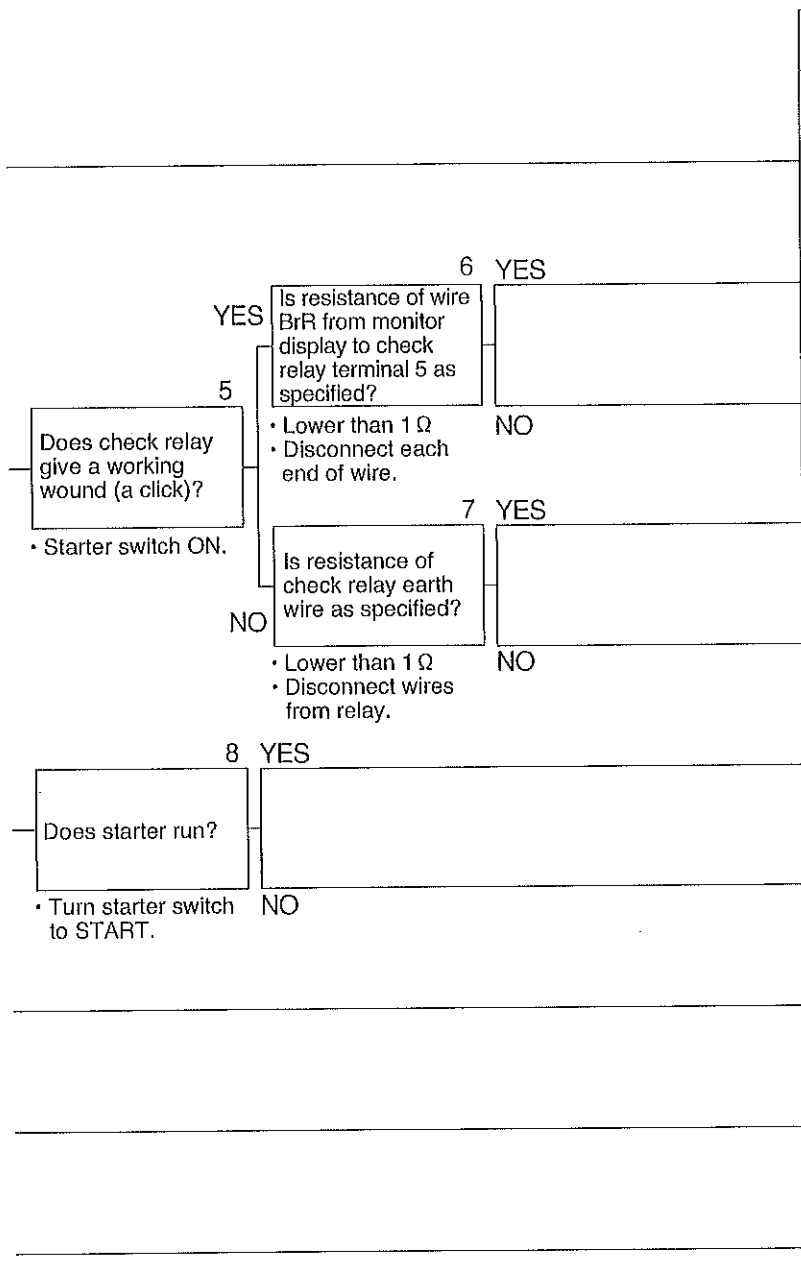


Possible cause	Remedy
Speed change solenoid valve is faulty or grounding harness is broken or poorly connected.	• See H03 • Repair or renew wire.
Speed change solenoid failure.	Renew.
Wire harness of color O connecting speed change switch terminal 2 to speed change solenoid is broken or poorly connected.	Repair or renew wire.
Speed change switch failure.	Renew.
Wire harness of color WL connecting fuse to speed change switch terminal 1 is broken or poorly connected.	Repair or renew wire.

Electric wiring diagram for mode E-10



SW6514009



Possible cause	Remedy
Lamp bulb damaged.	Renew.
Monitor display faulty.	Renew monitor display.
Wire BrR from check relay terminal 3 to monitor display not connected or incorrectly connected.	Repair or renew wire.
Check relay faulty.	Renew.
Check relay earth wire not connected or incorrectly connected.	Repair or renew wire.
Wire RB from fuse to monitor display not connected or incorrectly connected.	Repair or renew wire.
Fuse is burnt out.	Renew.
Wire Lg from check relay terminal 1 to alternator terminal L not connected or incorrectly connected.	Repair or renew wire.
Wire R from starter switch terminal ACC to check relay terminal 2 not connected or incorrectly connected.	Repair or renew wire.
Starter switch faulty (between terminals A and ACC).	Renew.