SW770
SHOP MANUAL

SAKAI®

3498-6431A-0

Introduction

This manual provides important information to familiarize you with safe operating and maintenance procedures for your SAKAI roller. Even though you may be familiar with similar equipment you must read and understand this manual before operating or servicing this unit.

Safety is everyone's business and it is one of your primary concerns. Knowing the guidelines presented in this manual will help provide for your safety, for the safety of those around you and for the proper operation and maintenance of the machine. Improper operation is dangerous and can result in injury or death.

Sakai Heavy Industries cannot foresee all possible circumstances or varying conditions to which the operator, serviceman or machine may be exposed to that might lead to a potential hazard. Therefore, the warnings and cautions listed in this manual and those placed on the machine are not intended to be all inclusive and liability for personal injury or damage to equipment or property cannot be assumed.

All information, specifications and illustrations in this publication are based on the product information available at the time that the publication was written. The contents may change without prior notice due to modifications of the model.

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4. HYDRAULIC SYSTEMS

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SAFETY

1. GENERAL SAFETY

1-1. Understanding the Safety Symbols and Words

The words DANGER, WARNING, and CAUTION are used with the safety-alert symbol. DANGER identifies the most serious hazard. When the symbols DANGER, WARNING and CAUTION are displayed, become alert. Your safety or those around you may be involved. NOTICE is used to provide important information that is not hazard related.

⚠DANGER : Indicates an imminently hazardous situation or condition which if not avoided can result in serious personal injury or death.

⚠WARNING: Indicates a potentially hazardous situation or condition which if not avoided can result in serious personal injury or death.

⚠CAUTION : Indicates a potentially hazardous situation or condition which if not avoided may result in moderate personal injury or damage to the machine or personal property.

(NOTICE) : Indicates important information about operation or maintenance of the machine that may cause damage, breakdown, or shortened service life of the machine if you fail to observe or important point to maintain of quality in maintenance works.

★ : Indicates standard value to judge whether measured value is good or not.

Items that indicate the weight of a part or equipment and require attention in wire selection and operating posture for slinging operation.

In the assembly operation, tightening torque in locations that require particular attention.

1-2. General

- Operators and maintenance personnel must be alert to recognize and avoid potential hazards. They should also have comprehensive training, the required skills and necessary tools to perform the job safely.
- The machine was built in accordance to the latest safety standards and recognized safety rules. Nevertheless, misuse of the machine may result in risk to life and limb of the user or nearby personnel and may cause damage to the machine or other property.
- The machine must only be used for its intended purpose as described in the Operator's Manual. It must be operated by safety-conscious persons who are fully aware of the risks involved when operating the machine. Any malfunctions especially those affecting the safety of the machine must be corrected immediately.

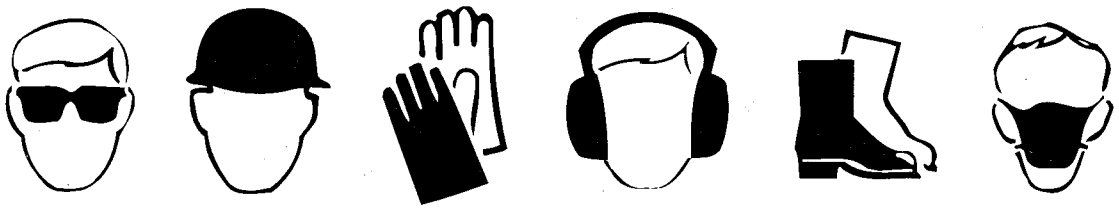
- The machine is designed specifically for the compaction of asphalt or soil road construction materials. Use of the machine for other purposes such as towing other equipment is considered contrary to the designated use. The manufacturer cannot be responsible or held liable for any damage resulting from such use. The risk for such use lies entirely with the user.
- Operating the machine within the limits of its designated use also involves compliance with the inspection and maintenance requirements contained in the Operation and Maintenance Manual.

1-3. Qualifications of Operators and Maintenance Personnel

- Work on the machine must be performed by qualified personnel only. Individual responsibilities of personnel regarding operation, maintenance, repair of the machine must be clearly stated.
- Define the operator's responsibilities; the operator should have authority to refuse instructions that are contrary to safety.
- Do not allow persons being trained to operate or perform maintenance on the machine without constant supervision by an experienced person.
- Work on the electrical system of the machine must be done only by an experienced person or under the guidance of a skilled electrician and according to electrical engineering rules and regulations.
- Work on the frame, brakes, hydraulic and steering systems must be performed by skilled personnel with special knowledge and training for such work.

1-4. Safety Practices and Policies

- Keep the manuals in the container provided on the machine. Manuals must always be available at the site where the machine is being used.
- The operator or user of the machine must be aware of all applicable or legal and mandatory regulations relevant to accident prevention and environmental protection. These regulations may also deal with handling of hazardous substances, the required proper personal safety and protective equipment and traffic or jobsite regulations.
- Machine operating instructions should also be supplemented with detailed instructions pertaining to the specific jobsite or work location.
- Always be sure the persons working on the machine have read the operating instructions and all safety precautions before beginning work. Reading safety instructions after work has already begun is too late.
- Wear close fitting garments and always tie back and secure long hair, also avoid wearing jewelry such as rings. Injury can result from loose clothing, hair or jewelry being caught up in the machinery or rotating parts.
- Use protective equipment as required by the circumstances or by law.



- Observe all safety instructions and warnings attached to the machine.
- Make sure all safety instructions and warnings on the machine are complete and perfectly legible.
- Stop the machine immediately in the event of any malfunction. Report any malfunction immediately to the supervisor or other person of authority.
- Never perform service or maintenance on the machine unless the drums or tires are adequately blocked, articulation lock bar and pin is in the locked position and the parking brake is applied.
- Never make any modifications to the machine which might affect safety without the manufacturer's approval.
- Always perform the recommended routine inspections and adjustments according to the prescribed intervals.

1-5. Pre Start Inspection

- Inspect your machine daily. Ensure that the routine maintenance and lubrication are properly performed. Repair or replace any malfunctioning, broken or missing parts before using the machine. Refer to the maintenance schedule in the Operator's Manual.
- Check that all instructions and safety stickers are in place and readable.
- Never fill the fuel tank with the engine running or while near an open flame or while smoking.
- Always clean up any spilled fuel.
- Check for any warning tags placed on the machine, do not operate the machine until all repairs have been made and warning tags have been removed by authorized personnel.
- Check the seat belt for wear or damage; inspect the belt hardware and fabric. Replace if hardware is damaged or the belt is frayed or nicked or stitching is loose. Check that mounting hardware is tight.
- Clean the steps and operating platform of dirt and foreign matter to reduce danger of slipping.
- Know how to shut-down or stop the machine immediately in case of emergency.
- Know the capabilities and limitations of the machine such as speed, gradeability, steering and braking.
- Be aware of the dimensions of the machine such as height, weight especially for transporting.

1-6. Safety Instructions

- Take all necessary precautions to ensure that the machine is used only when in a safe and reliable condition.
- Avoid any operational mode that might compromise safety.
- Operate the machine only if all protective and safety devices are in place and fully functional.
- Always use the hand rails and steps to get on and off your machine maintaining 3-point contact (using both hands).

1-7. Starting

- Start the machine only from the driver's seat and always wear the seat belt.
- Watch that the warning lights and indicators during start-up and shutdown are working in accordance with operating instructions.
- Watch that no one is in danger before starting and when moving the machine.
- Check that braking, steering, signals and lights are fully functional before starting work or traveling with the machine.

1-8. Operating

- Always make sure that there are no obstructions or persons in your line of travel before starting the compactor in motion.
- Never climb on and off the machine while it is in motion.
- Always remain seated with the seat belt fastened when traveling, compacting or loading or unloading the machine.
- Use caution and be very observant when operating in close quarters and congested areas.
- Obey all traffic regulations when working on public roads and make sure machine is compatible with these regulations.
- Never carry passengers.
- Know and use the hand signals for particular jobs and who has the responsibility for signaling.
- Do not work close to edges or in the vicinity of overhanging banks or on grades that could cause the compactor to slide or roll over. Avoid any areas that may be a risk to machine stability.
- Avoid side hill travel. Always operate up and down the slope. Always keep the propulsion (travel control) lever in low speed range when climbing or descending hills or steep grades.
- Make sure there is sufficient clearance when crossing underpasses, bridges and tunnels or when passing under overhead power lines.
- Never allow anyone to stand in the articulation area of the machine when the engine is running.
- Always look in all directions before reversing the direction of travel.
- Always switch on the lighting system (if equipped) during poor visibility conditions and after dark.
- Do not attempt to control the compactor travel speed with the throttle control. Maintain engine speed at the full operating RPM.
- Do not run the engine in a closed building for an extended period of time. Exhaust fumes can kill.

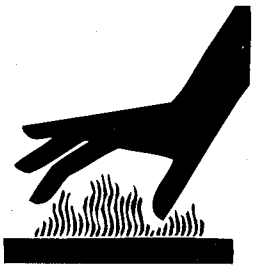
1-9. Stopping

- Always park the machine in a safe area on solid and level ground. If this is not possible, always park at a right angle to the slope and block the drums or tires.
- Do not leave the operator's platform with the engine running. Always move the travel lever to neutral position and apply the parking brake then turn the starter switch to OFF.
- Lock all lockable compartments.
- Park behind a safe barrier, use proper flags, and warning devices, especially when parking in areas of heavy traffic.

1-10. Maintenance

- In any performing any work concerning the operation, adjustment or modification of the machine or it's safety devices or any work related to maintenance, inspection or repair, always follow the start-up and shut-down procedures in the Operator's Manual and the Maintenance Manual.
- Ensure that the maintenance area is safe and secure.
- If the machine is shut down for maintenance or repair work it must be secured against inadvertent starting by removing the starter key and attaching a warning sign to the starter switch.

- The machine must be parked on stable and level ground with the drums or tires blocked to prevent inadvertent movement.
- Immediately after the engine has stopped, the exhaust system, engine, radiator coolant, engine oil, hydraulic fluid and other lubricants and components will be very hot. Fluids can be under pressure, removing the radiator cap or draining oil or changing filters can cause serious burns. Wait until the machine has cooled down.



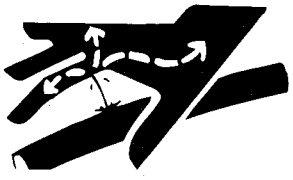
- Use care when attaching and securing lifting tackle to individual parts and large assemblies being removed or repositioned for repair purposes to avoid the risk of accident. Use lifting devices that are in perfect condition and of sufficient lifting capacity. Never stand under suspended loads.

- Always use the proper tools and workshop equipment in good condition when performing maintenance or repairs on the machine.
- Always use specially designed safety ladders and working platforms when working above floor level. Never use machine parts as a climbing aid.

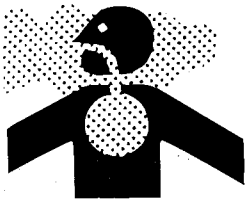
- Keep all steps, handles, handrails, platforms and ladders free from mud, dirt, grease, ice or snow.
- Clean the machine, especially threaded connections of any traces of oil or fuel before carrying out any maintenance or repairs. Never use aggressive detergents. Use lint free cleaning rags.
- Examine all fuel, lubricant and hydraulic fluid lines and connectors for leaks, loose connections chafe marks or damage after cleaning.
- Repair or replace defective parts immediately.
- Whenever possible, avoid servicing or maintenance when the engine is running unless the drums or tires are adequately blocked, the articulation lock bar is in the locked position and the parking brake is applied.
- Never fill the fuel tank with the engine running, while near an open flame or while smoking. Always clean up any spilled fuel.
- Ensure safe operation, optimum performance of the machine and its warranty by using only genuine SAKAI replacement parts.

- Use only the specified fluids and lubricants. Substitute only products known to be equivalent from reputable manufacturers.
- Disconnect the battery cables when working on the electrical system or when welding on the compactor.

- Be sure the battery area is well ventilated (clear of fumes) should it be necessary to connect a jumper cable or battery charger. Fumes can ignite from a spark and may explode.
- Be sure battery charger is OFF when making connections if charging is required.
- Use only original fuses with the specified rating. Switch off the machine immediately if trouble occurs in the electrical system.
- Work on the electrical system may only be carried out by a qualified electrician or by a specially trained person according to electrical engineering principles.
- Inspect the electrical equipment of the machine at regular intervals. Defects such as loose connections or burnt or scorched wires must be repaired or replaced immediately.
- Do not weld, flame cut or perform grinding on the machine unless expressly authorized, as there may be a risk of fire or explosion. Disconnect the battery when welding on the machine.
- Clean the machine and its surrounding from dust or other flammable substances and make sure the area is adequately ventilated before beginning welding, flame cutting or grinding operations.
- Inspect hydraulic hoses at regular intervals and immediately replace if they show signs of chafing, cracking, brittleness, deformation, blistering, fitting separation, leakage, corrosion or other damage which may affect their function or strength.
- Do not work on hydraulic system while the engine is running and the system is under pressure. The hydraulic system remains pressurized even after the engine has stopped.
- Do not disconnect hydraulic hoses or fittings until the pressure has been properly relieved.
- Wait until the systems and fluid have cooled down before disconnecting.
- Never use your hands to check for leaks when inspecting a hydraulic system. Use a piece of cardboard and always wear gloves and safety glasses.



- Get immediate medical attention if fluid has been injected under your skin. Fluid penetration from a pin hole leak can cause severe injury or death.
- Ensure that hydraulic lines and hoses are routed and fitted properly. Ensure that no connections are interchanged. All fittings, lengths and specifications of hoses must comply with the technical requirements.
- Observe all product safety regulations when handling fuel, oils, grease, engine coolant and other chemical substances. Be careful especially when these items are hot as there is a risk of burning or scalding.
- Operate internal combustion engines and fuel operated heating systems only in adequately ventilated premises. Before starting the engine in an enclosed area, make sure there is sufficient ventilation.



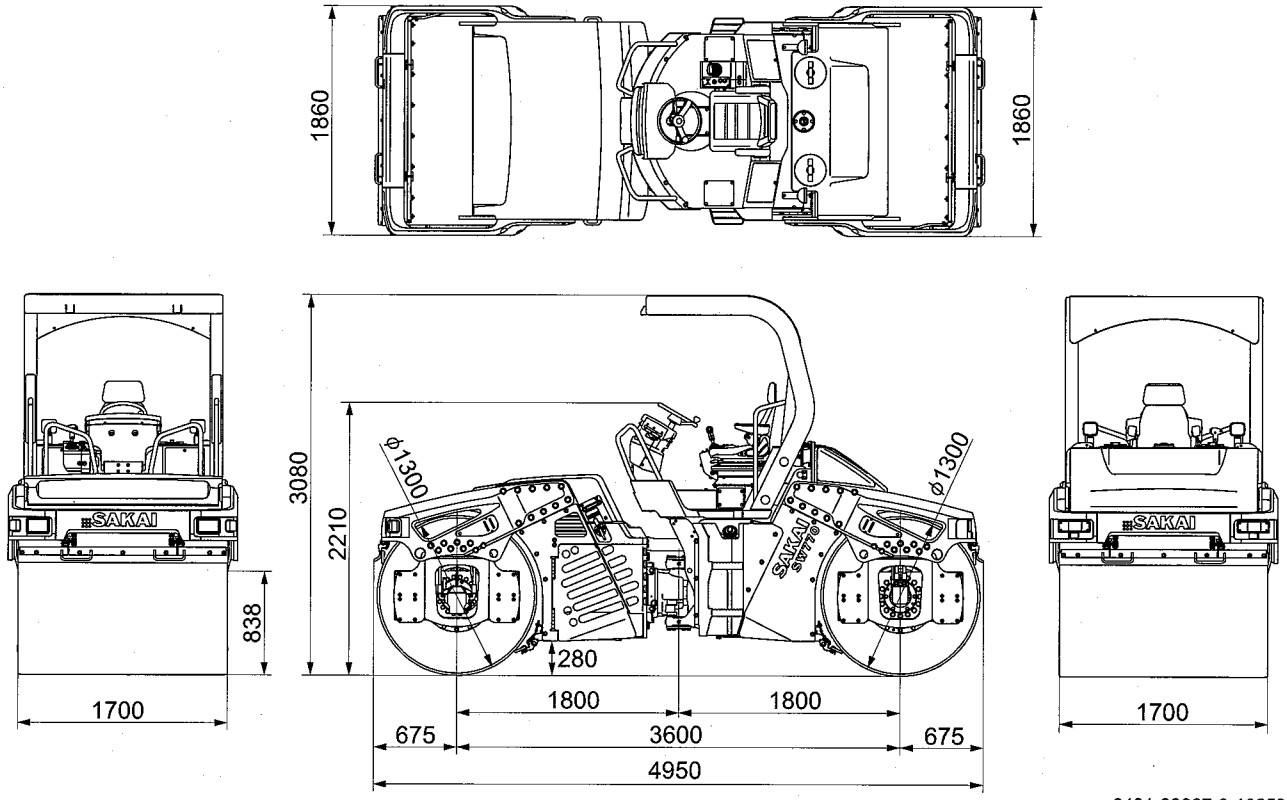
1-11. Transporting the Machine

- Use only suitable and approved trailers and haul vehicles and lifting equipment of sufficient capacity.
- Entrust to experienced personnel the fastening and lifting of loads and instructing of crane operators.
- Only experienced persons familiar with the operation of the machine may load and unload the machine.
- Use ramps or a loading dock when loading or unloading the machine. Ramps must be the proper strength, low angle and the proper height and width.
- Block the drums or tires (front and rear) of the hauling vehicle when loading and unloading the compactor. Ensure that the haul vehicle is on level ground and approach the loading ramps squarely to make sure that the compactor does not slide off the edge of the ramp.
- Keep the deck clear of mud, oil, ice or snow or other materials that can make the deck slippery.
- Position the compactor on the trailer or transport vehicle centered from side to side, and apply the brake. Shut off the engine and lock all lockable compartments.
- Block the drums or tires and lock the articulation lock bar. Chain the machine down properly using the appropriate tackle.
- Know the overall height of the compactor and hauling vehicle. Observe height and weight regulations and be sure you can pass safely at overhead obstructions.
- Obey all traffic regulations and be sure that the proper clearance flags, lights and warning signs including “Slow Moving Vehicle” emblem are displayed when traveling on public roads.
- Know the approximate stopping distance at any given speed.
- Drive Safely. Never turn corners at excessive speeds.

SPECIFICATIONS

1. SPECIFICATION DATA

1-1. SW770

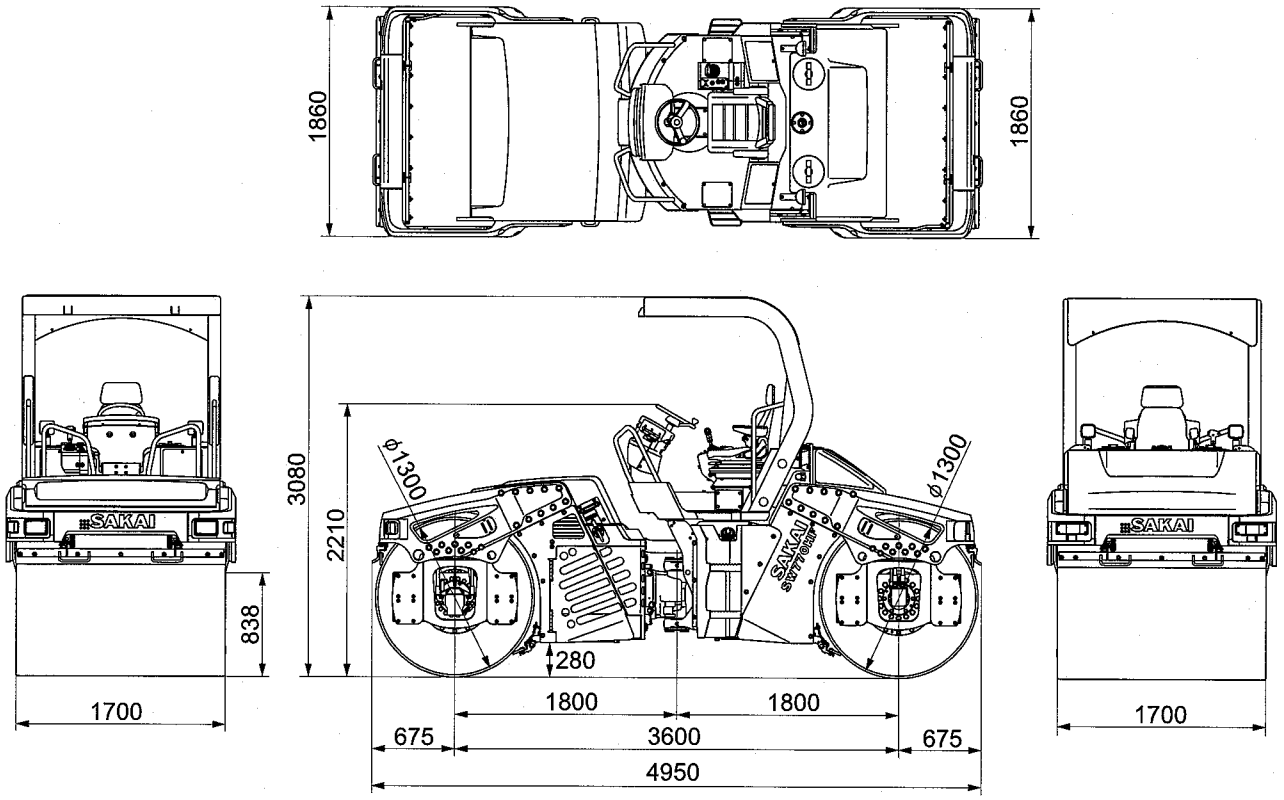


0431-99007-0-10253-B

Model			SW770
Weight	Operating weight		10,800 kg (23,810 lbs.)
	Front axle		5,200 kg (11,465 lbs.)
	Rear axle		5,600 kg (12,345 lbs.)
Dimensions	Overall length		4,950 mm (195 in.)
	Overall width		1,860 mm (73 in.)
	Overall height	Steering wheel	2,210 mm (87 in.)
		ROPS	3,080 mm (121 in.)
	Wheelbase		3,600 mm (142 in.)
	Compaction width		1,700 mm (67 in.)
	Minimum height above ground		280 mm (11 in.)
	Curb clearance		838 mm (32.5 in.)
Speed (Forward & Reverse)	Low		0 to 6 km/h (0 to 3.7 mile/h)
	High		0 to 12 km/h (0 to 7.5 mile/h)
Vibration performance	Frequency	Low amplitude	50 Hz
		High amplitude	50 Hz
	Centrifugal force	Low amplitude	68 kN (15,285 lbs.)
		High amplitude	132 kN (29,675 lbs.)
	Amplitude	Low amplitude	0.33 mm (0.013 in.)
		High amplitude	0.65 mm (0.026 in.)
Minimum turning radius			6.3 m (249 in.)
Gradability			28 % (16 °)

Engine	Name			ISUZU 4JJ1XDIA Diesel Engine (EPA Tier 3) with turbocharger
	Model			4-cycle, water-cooled, 4-cylinder in-line, overhead camshaft, vertical in-line, direct injection type, with turbocharger
	Bore × Stroke			95.4 mm × 104.9 mm (3.756 in. × 4.130 in.)
	Displacement			2.999 L (183 cu.in)
	Performance (SAE NET)	Rated speed		2,200 min^{-1}
		Rated output		92 kW (123 HP)
		Max. torque		420 N·m (310 lbf·ft) at 1,800 min^{-1}
		Fuel consumption		206 g/kW·h (0.339 lb/HP·h) at rated speed with silencer and air cleaner, without cooling fan
	Fuel injection system			Full electronic control
	Fuel injection pump			Common rail HP3 type
	Lubrication system			Full forced pressure feed type
	Oil filter			Full flow paper element
	Oil cooler			Pressurized water forced circulation type
	Air cleaner			Dry type
	Cooling system			Centrifugal pump forced feeding system (pressure type)
	Cooling fan			Inhaling type
	Electrical system	Alternator		24 V 50 A
		Starter		24 V 4.0 kW
		Battery		12 V 80 Ah × 2 pcs. (24 V)
	Dry weight			320 kg (705 lbs.)
Power line	Transmission	Type		Hydrostatic transmission
		Speeds		2 speed shifts
	Reverser			Switching the direction of flow delivered from the variable pump
	Final drive			Planetary gear
Vibrating system	Transmission			Hydrostatic transmission
	Vibrator			Eccentric shaft type
Braking device	Service brake			Hydrostatic and mechanical, multi-wet disc type
	Parking brake			Mechanical, multi-wet disc type
Steering system	Steering control type			Hydraulic type (Articulated type)
	Steering control angle			± 36.7°
	Oscillation angle			± 6.5°
Drums	Use	Front drum		Vibrate and drive × 1
		Rear drum		Vibrate and drive × 1
	Dimension	Front drum	width × diameter	1,700 mm × 1,300 mm (67 in. × 51 in.)
		Rear drum	width × diameter	1,700 mm × 1,300 mm (67 in. × 51 in.)
	Suspension system	Front		Rubber damper type
		Rear		Rubber damper type
Water spray system				Pressurized type
Others	Instruments & lights			1 set

1-2. SW770HF

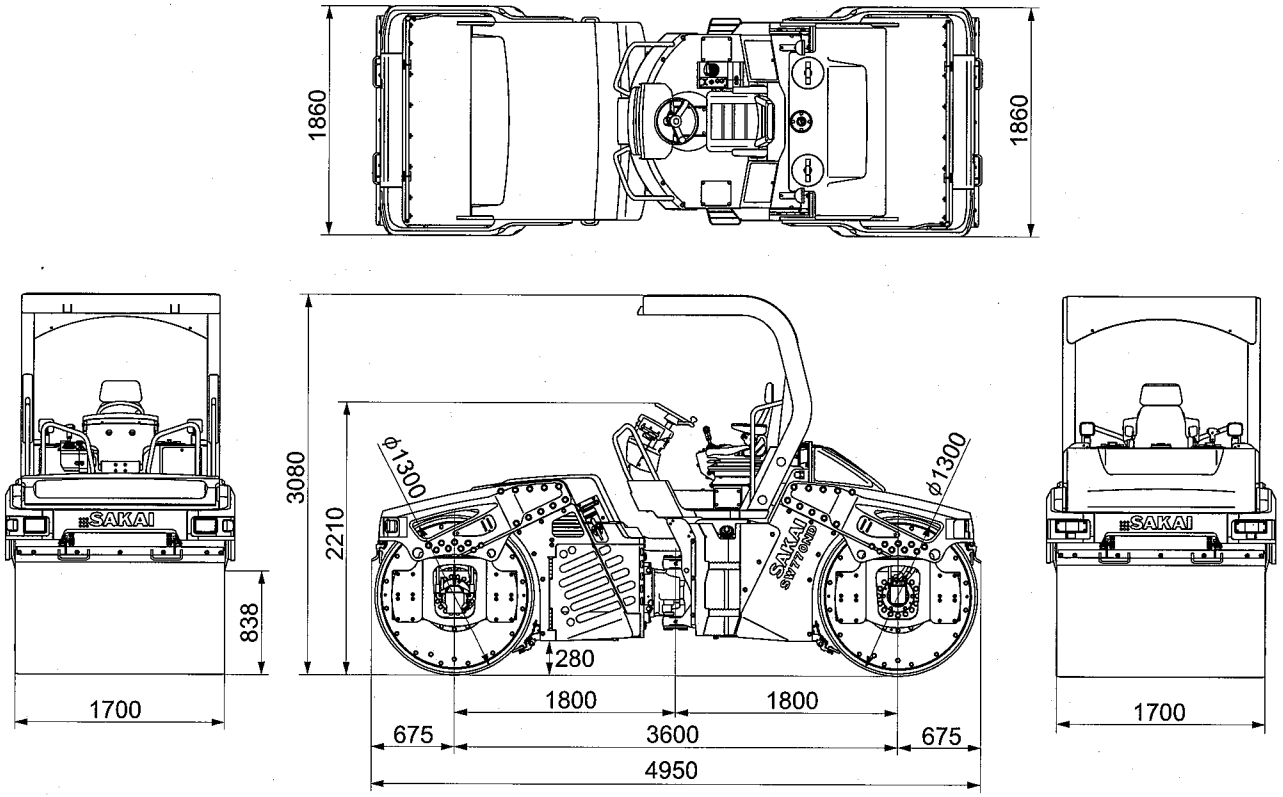


0431-99004-0-10230-B

Model				SW770HF	
Weight	Operating weight			10,800 kg	(23,810 lbs.)
	Front axle			5,200 kg	(11,465 lbs.)
	Rear axle			5,600 kg	(12,345 lbs.)
Dimensions	Overall length			4,950 mm	(195 in.)
	Overall width			1,860 mm	(73 in.)
	Overall height	Steering wheel		2,210 mm	(87 in.)
		ROPS		3,080 mm	(121 in.)
	Wheelbase			3,600 mm	(142 in.)
	Compaction width			1,700 mm	(67 in.)
	Minimum height above ground			280 mm	(11 in.)
	Curb clearance			838 mm	(32.5 in.)
Speed (Forward & Reverse)	Low			0 to 6 km/h	(0 to 3.7 mile/h)
	High			0 to 14 km/h	(0 to 8.7 mile/h)
Vibration performance	Frequency	Low amplitude	1	42 Hz	
			2	50 Hz	
			3	67 Hz	
		High amplitude	1	42 Hz	
			2	50 Hz	
	Centrifugal force	Low amplitude	1	47 kN	(10,565 lbs.)
			2	68 kN	(15,285 lbs.)
			3	120 kN	(26,975 lbs.)
		High amplitude	1	92 kN	(20,680 lbs.)
			2	132 kN	(29,675 lbs.)
	Amplitude	Low amplitude		0.33 mm	(0.013 in.)
		High amplitude		0.65 mm	(0.026 in.)
Minimum turning radius				6.3 m	(249 in.)
Gradability				38 %	(21 °)

Engine	Name			ISUZU 4JJ1XDIA Diesel Engine (EPA Tier 3) with turbocharger
	Model			4-cycle, water-cooled, 4-cylinder in-line, overhead camshaft, vertical in-line, direct injection type, with turbocharger
	Bore × Stroke			95.4 mm × 104.9 mm (3.756 in. × 4.130 in.)
	Displacement			2.999 L (183 cu.in)
	Performance (SAE NET)	Rated speed		2,200 min^{-1}
		Rated output		92 kW (123 HP)
		Max. torque		420 N·m (310 lbf·ft)
				at 1,800 min^{-1}
		Fuel consumption		206 g/kW·h (0.339 lb/HP·h)
				at rated speed with silencer and air cleaner, without cooling fan
	Fuel injection system			Full electronic control
	Fuel injection pump			Common rail HP3 type
	Lubrication system			Full forced pressure feed type
	Oil filter			Full flow paper element
	Oil cooler			Pressurized water forced circulation type
	Air cleaner			Dry type
	Cooling system			Centrifugal pump forced feeding system (pressure type)
	Cooling fan			Inhaling type
	Electrical system	Alternator		24 V 50 A
		Starter		24 V 4.0 kW
		Battery		12 V 80 Ah × 2 pcs. (24 V)
	Dry weight			320 kg (705 lbs.)
Power line	Transmission	Type		Hydrostatic transmission
		Speeds		2 speed shifts
	Reverser			Switching the direction of flow delivered from the variable pump
	Final drive			Planetary gear
Vibrating system	Transmission			Hydrostatic transmission
	Vibrator			Eccentric shaft type
Braking device	Service brake			Hydrostatic and mechanical, multi-wet disc type
	Parking brake			Mechanical, multi-wet disc type
Steering system	Steering control type			Hydraulic type (Articulated type)
	Steering control angle			± 36.7°
	Oscillation angle			± 6.5°
Drums	Use	Front drum		Vibrate and drive × 1
		Rear drum		Vibrate and drive × 1
	Dimension	Front drum	width × diameter	1,700 mm × 1,300 mm (67 in. × 51 in.)
		Rear drum	width × diameter	1,700 mm × 1,300 mm (67 in. × 51 in.)
	Suspension system	Front		Rubber damper type
		Rear		Rubber damper type
Water spray system				Pressurized type
Others	Instruments & lights			1 set

1-3. SW770ND



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Model			SW770ND	
Weight	Operating weight		11,320 kg	(24,955 lbs.)
	Front axle		5,460 kg	(12,035 lbs.)
	Rear axle		5,860 kg	(12,920 lbs.)
Dimensions	Overall length		4,950 mm	(195 in.)
	Overall width		1,860 mm	(73 in.)
	Overall height	Steering wheel	2,210 mm	(87 in.)
		ROPS	3,080 mm	(121 in.)
	Wheelbase		3,600 mm	(142 in.)
	Compaction width		1,700 mm	(67 in.)
	Minimum height above ground		280 mm	(11 in.)
	Curb clearance		838 mm	(32.5 in.)
Speed (Forward & Reverse)	Low		0 to 6 km/h	(0 to 3.7 mile/h)
	High		0 to 14 km/h	(0 to 8.7 mile/h)
Vibration performance	Frequency	Normal	50 Hz	
		Horizontal	50 Hz	
	Centrifugal force	Normal	138 kN	(31,025 lbs.)
		Horizontal	163 kN	(36,645 lbs.)
	Amplitude	Normal	0.60 mm	(0.024 in.)
		Horizontal	0.70 mm	(0.028 in.)
Minimum turning radius			6.3 m	(249 in.)
Gradability			32 %	(18 °)

Engine	Name			ISUZU 4JJ1XDIA Diesel Engine (EPA Tier 3) with turbocharger
	Model			4-cycle, water-cooled, 4-cylinder in-line, overhead camshaft, vertical in-line, direct injection type, with turbocharger
	Bore × Stroke			95.4 mm × 104.9 mm (3.756 in. × 4.130 in.)
	Displacement			2.999 L (183 cu.in)
	Performance (SAE NET)	Rated speed		2,200 min^{-1}
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				at 1,800 min^{-1}
		Fuel consumption		206 g/kW·h (0.339 lb/HP·h)
				at rated speed with silencer and air cleaner, without cooling fan
	Fuel injection system			Full electronic control
	Fuel injection pump			Common rail HP3 type
	Lubrication system			Full forced pressure feed type
	Oil filter			Full flow paper element
	Oil cooler			Pressurized water forced circulation type
	Air cleaner			Dry type
	Cooling system			Centrifugal pump forced feeding system (pressure type)
	Cooling fan			Inhaling type
	Electrical system	Alternator		24 V 50 A
		Starter		24 V 4.0 kW
		Battery		12 V 80 Ah × 2 pcs. (24 V)
	Dry weight			320 kg (705 lbs.)
Power line	Transmission	Type		Hydrostatic transmission
		Speeds		2 speed shifts
	Reverser			Switching the direction of flow delivered from the variable pump
	Final drive			Planetary gear
Vibrating system	Transmission			Hydrostatic transmission
	Vibrator			Twin eccentric shaft type
Braking device	Service brake			Hydrostatic and mechanical, multi-wet disc type
	Parking brake			Mechanical, multi-wet disc type
Steering system	Steering control type			Hydraulic type (Articulated type)
	Steering control angle			± 36.7°
	Oscillation angle			± 6.5°
Drums	Use	Front drum		Vibrate and drive × 1
		Rear drum		Vibrate and drive × 1
	Dimension	Front drum	width × diameter	1,700 mm × 1,300 mm (67 in. × 51 in.)
		Rear drum	width × diameter	1,700 mm × 1,300 mm (67 in. × 51 in.)
	Suspension system	Front		Rubber damper type
		Rear		Rubber damper type
Water spray system				Pressurized type
Others	Instruments & lights			1 set

2. TABLE OF STANDARD VALUES

2-1. Engine

Item		Standard value	Remarks
Engine model		ISUZU 4JJ1XDIA Diesel Engine (EPA Tier 3) with turbocharger	
Rated output		92/2,200 kW/ min^{-1} (123/2,200 HP/min^{-1})	
Max. no-load rotational speed		2,475 ± 25 min^{-1}	
Min. no-load rotational speed		900 ± 20 min^{-1}	
Cylinder head tightening torque	1st tightening	70 N·m (52 lbf·ft)	
	2nd tightening	70 N·m (52 lbf·ft)	
	3rd tightening	Tighten additional 60°	
Intake manifold tightening torque		25 N·m (18 lbf·ft)	
Exhaust manifold tightening torque		52 N·m (38 lbf·ft)	
Fan belt tension		10 to 15 mm (0.39 to 0.59 in.)	Pressed by 98N (22 lbf) at midpoint between pulleys center distance
Valve clearance (intake)		0.15 mm (0.006 in.)	When cold
Valve clearance (exhaust)		0.15 mm (0.006 in.)	When cold
Compression pressure		3.0 MPa (435 psi)	200 min^{-1}
Fuel consumption rate		206 g/kW·h (0.34 lb/HP·h)	When engine is at rated output

2-2. Propulsion

Item		Standard value		Remarks
		SW770	SW770HF, SW770ND	
Travel speed (Forward/reverse)	Low	0 to 6 km/h (0 to 3.7 mile/h)		
	High	0 to 12 km/h (0 to 7.5 mile/h)	0 to 14 km/h (0 to 8.7 mile/h)	

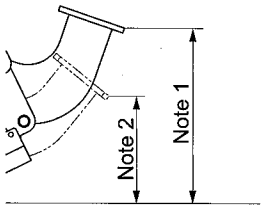
2-3. Hydraulic Systems

Item			Standard value			Remarks
			SW770	SW770HF	SW770ND	
Propulsion	High pressure relief valve pressure setting		33.0 MPa (4,785 psi)	43.0 MPa (6,235 psi)		Differential pressure
	Cut off valve pressure setting		30.0 MPa (4,350 psi)	40.0 MPa (5,800 psi)		
	Charge relief valve pressure setting		2.4 MPa (348 psi)	2.5 MPa (363 psi)		
	Case pressure	Pump	0.4 MPa (58.0 psi)			or less
		Motor	0.3 MPa (43.5 psi)			or less
	Brake release pressure		1.6 MPa (232 psi)			
	Motor drainage		5.5 L/min (1.5 gal./min)	6.4 L/min (1.7 gal./min)		
Vibration	High pressure relief valve pressure setting		34.5 MPa (5,003 psi)	35.0 MPa (5,075 psi)		Differential pressure
	Cut off valve pressure setting		32.5 MPa (4,713 psi)	32.0 MPa (4,640 psi)		
	Case pressure	Pump	0.4 MPa (58.0 psi)			or less
		Motor	0.2 MPa (29.0 psi)		0.4 MPa (58.0 psi)	or less
	Motor drainage		7.1 L/min (1.9 gal./min)	9.4 L/min (2.5 gal./min)	11.0 L/min (2.9 gal./min)	
Steering oil pressure			17.5 ± 1.0 MPa (2,538 ± 145 psi)			(orbitroll relief pressure + charge relief pressure)

2-4. Steering

Item	Standard value	Remarks
Play in steering wheel	5 to 10 mm (0.2 to 0.4 in.)	Steering wheel circumference
	0.5 mm (0.02 in.) or less	Steering column shaft direction

2-5. Brakes

Item	Standard value	Remarks
Clearance between brake pedal and floorboard (as released)	154 mm (6.1 in.) Note 1: See dimensions	
Clearance between brake pedal and floorboard (when pressed down)	94 mm (3.7 in.) Note 2: See dimensions	

2-6. Capacities

Item	Standard value		Remarks
	SW770, SW770HF	SW770ND	
Engine oil pan	14 L (3.7 gal.)		
Fuel tank	193 L (51 gal.)		
Coolant	15 L (4.0 gal.)		
Gear box	2.0 L × 2 (0.5 gal. × 2)		
Hydraulic oil tank	50.3 L (13 gal.)		
Vibrator case	20 L × 2 (5.3 gal. × 2)	45 L × 2 (12 gal. × 2)	
Water spray tank	1,000 L (264 gal.)		

3. FUEL AND LUBRICANTS SPECIFICATION

3-1. Rating

Lubricant	Service classification	Ambient temperature and applicable viscosity rating			Applicable Standards
		-15 to 30°C (5 to 86°F) Cold	0 to 40°C (32 to 104°F) Moderate	15 to 55°C (59 to 131°F) Tropical	
Engine oil	API grade CD	SAE10W-30	SAE30	SAE40	MIL-L-2104D
Gear oil	API grade GL4	SAE80W-90	SAE90	SAE140	MIL-L-2105
Hydraulic oil	Wear resistant	ISO-VG32 Over VI 140	ISO-VG46 Over VI 140	ISO-VG68 Over VI 110	ISO-3448
Grease	Lithium type extreme pressure				NLGI-2
Fuel	Ambient temperature -15 to -10°C (5 to 14°F)		Ambient temperature -10 to -55°C (14 to -67°F)		
	Diesel fuel ASTM · D975 NO.1-D S15 or S500		Diesel fuel ASTM · D975 NO.2-D S15 or S500		

3-2. Recommended Lubricants

Lubricant / Oil company	Engine oil API CD	Gear oil API GL 4	Hydraulic oil VG 45	Grease (NLGI-2)
CALTEX	RPM DELO 300 oil	Universal Thuban 90	Rando Oil HD 46	Martifack EP 2
BP	BP Vanellus C3-30	BP Gear Oil EP 90	BP Energol HLP 46	BP Energrease LS-EP 2
ESSO	Esso Lube D3-30	Esso Gear Oil GP 90	Nuto H 46	Beacon EP 2
MOBIL	Mobile Delvac 1330	Mobil Pegasus Gear oil 90	Mobile DTE Oil 25	Mobil Lux EP 25
SHELL	Shell Rotella CT Oil 30	Shell Spirax 90 EP	Shell Tellus Oil T46	Shell Alvania EP Grease 2

4. TIGHTENING TORQUE CHART

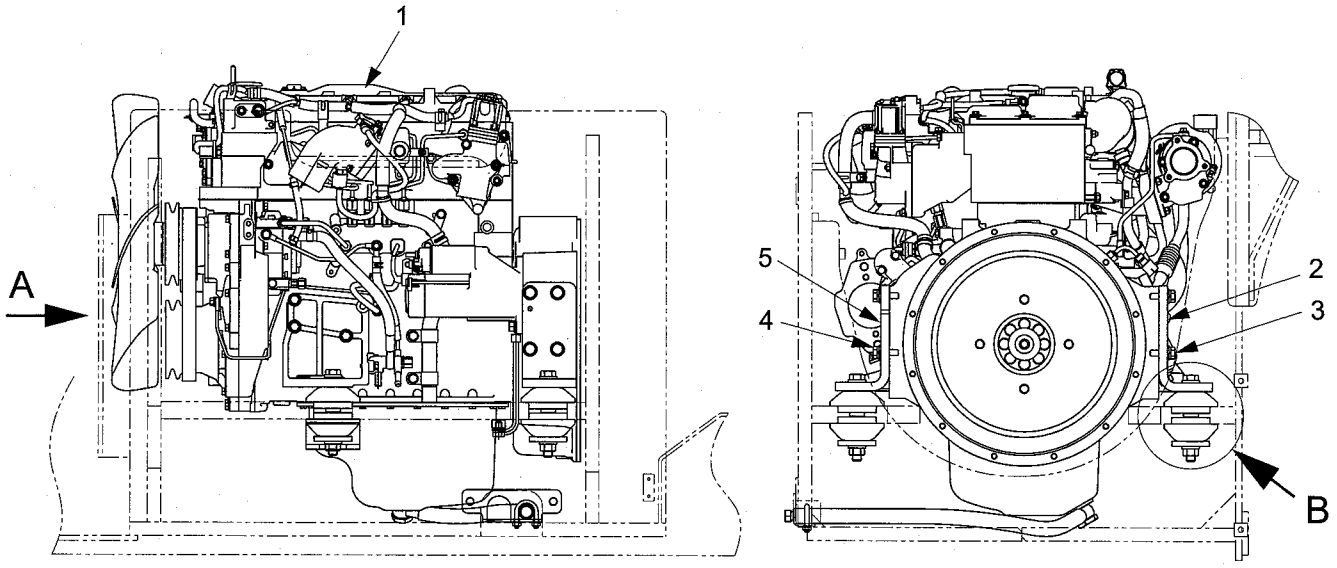
N·m	(lbf·ft)

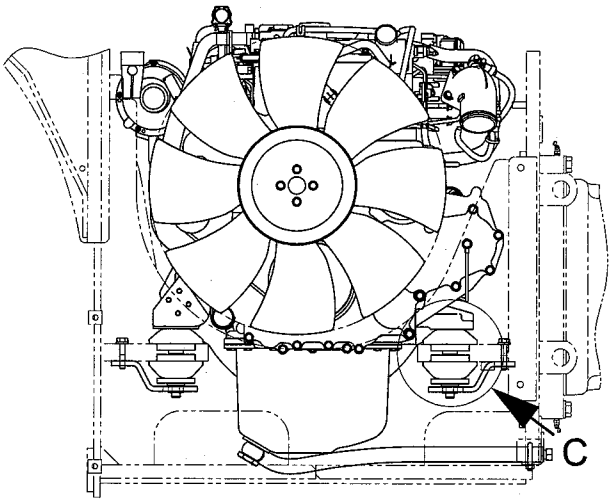
	Nominal Dia.	Pitch	Strength Classification							
			6.8		8.8		10.9		12.9	
Metric coarse screw	5	0.8	4.9	(3.6)	5.9	(4.4)	7.8	(5.8)	7.8	(5.8)
	6	1.0	7.8	(5.8)	9.8	(7.2)	13	(9.6)	13	(9.6)
	8	1.25	17	(13)	23	(17)	31	(23)	31	(23)
	10	1.5	39	(29)	49	(36)	59	(44)	59	(44)
	12	1.75	69	(51)	78	(58)	108	(80)	108	(80)
	14	2.0	98	(72)	127	(94)	167	(123)	167	(123)
	16	2.0	157	(116)	196	(145)	265	(195)	265	(195)
	18	2.5	196	(145)	245	(181)	343	(253)	343	(253)
	20	2.5	294	(217)	392	(289)	539	(398)	539	(398)
	22	2.5	441	(325)	539	(398)	686	(506)	686	(506)
	24	3.0	539	(398)	637	(470)	883	(651)	883	(651)
	27	3.0	785	(579)	981	(724)	1324	(977)	1324	(977)
	30	3.5	1079	(796)	1324	(977)	1765	(1302)	1765	(1302)
Metric fine screw	10	1.25	39	(29)	49	(36)	69	(51)	69	(51)
	12	1.25	69	(51)	88	(65)	118	(87)	118	(87)
	14	1.5	108	(80)	137	(101)	186	(137)	186	(137)
	16	1.5	167	(123)	206	(152)	284	(209)	284	(209)
	18	1.5	245	(181)	294	(217)	392	(289)	392	(289)
	20	1.5	343	(253)	441	(325)	588	(434)	588	(434)
	22	1.5	490	(361)	588	(434)	785	(579)	785	(579)
	24	2.0	588	(434)	735	(542)	981	(724)	981	(724)
	27	2.0	834	(615)	1030	(760)	1422	(1049)	1422	(1049)
	30	2.0	1177	(868)	1422	(1049)	1961	(1446)	1961	(1446)

ENGINE AND CONTROLS

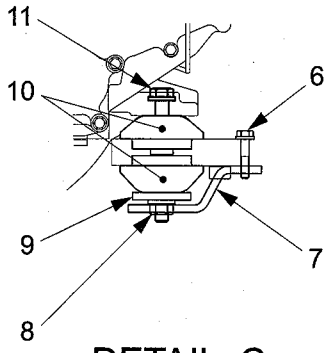
1. ENGINE

1-1. Engine Mount

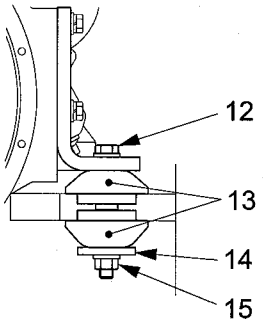




VIEW A



DETAIL C



DETAIL B

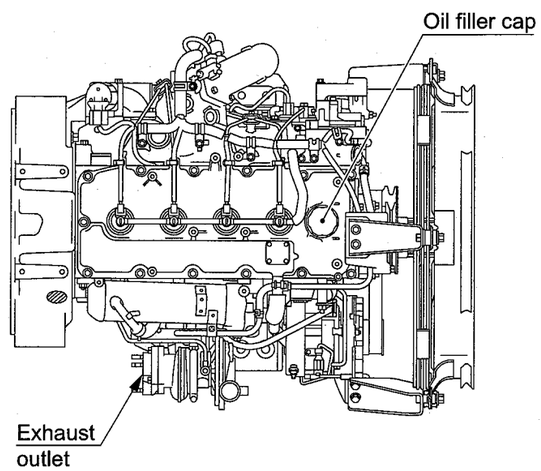
0431-01803-0-11056-0

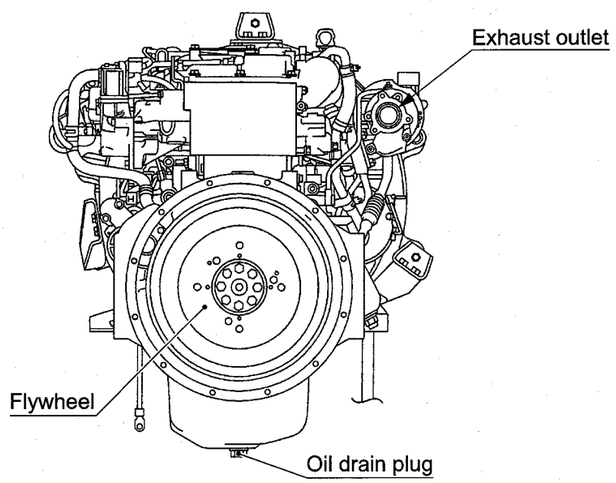
(1) Engine
(2) Bracket
(3) Bolt : M12×40
(4) Bolt : M12×40
(5) Bracket
(6) Bolt : M10×50
(7) Stopper
(8) Nut : M16
(9) Plate
(10) Damper
(11) Bolt : M16×150
(12) Bolt : M16×150
(13) Damper
(14) Plate
(15) Nut : M16

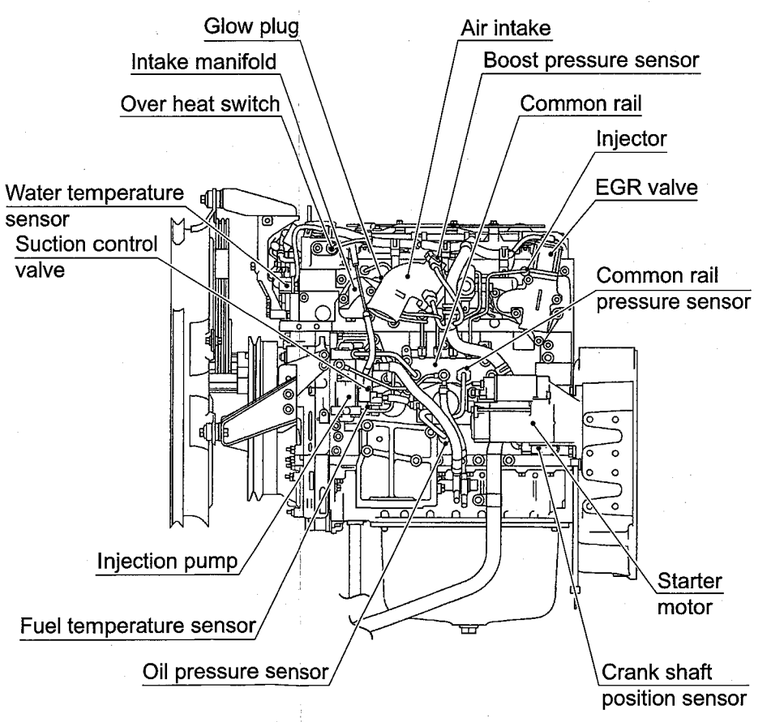
N·m

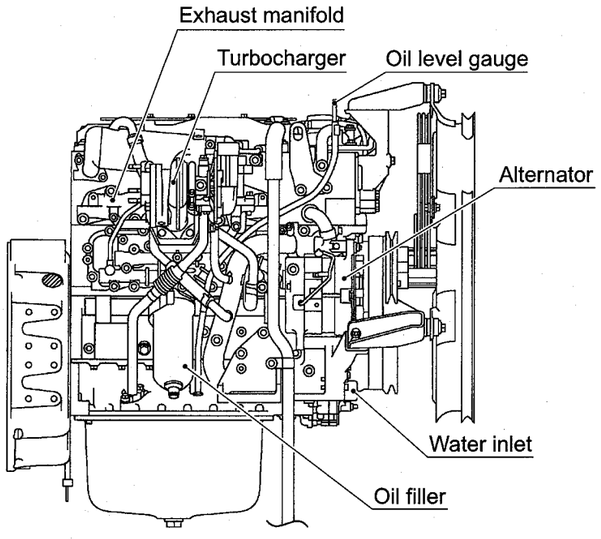
(3) Bolt M12×40 : 108 N·m (80 lbf·ft)
(4) Bolt M12×40 : 108 N·m (80 lbf·ft)
(6) Bolt M10×50 : 59 N·m (44 lbf·ft)
(8) Nut M16 : 265 N·m (195 lbf·ft)
(15) Nut M16 : 265 N·m (195 lbf·ft)

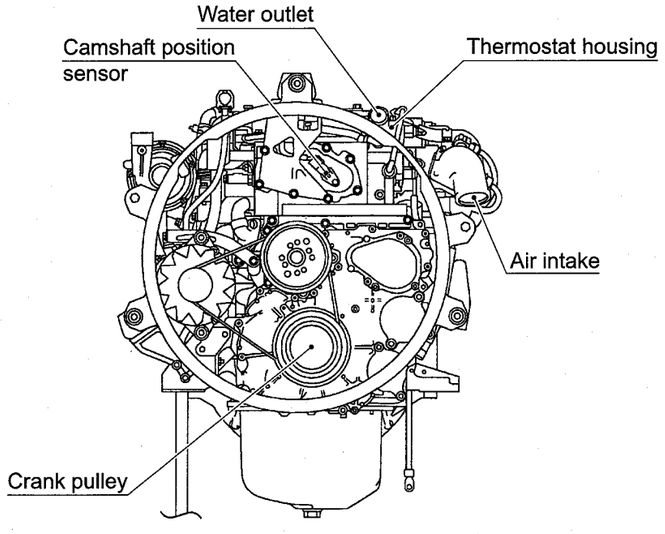
1-2. Engine Exterior









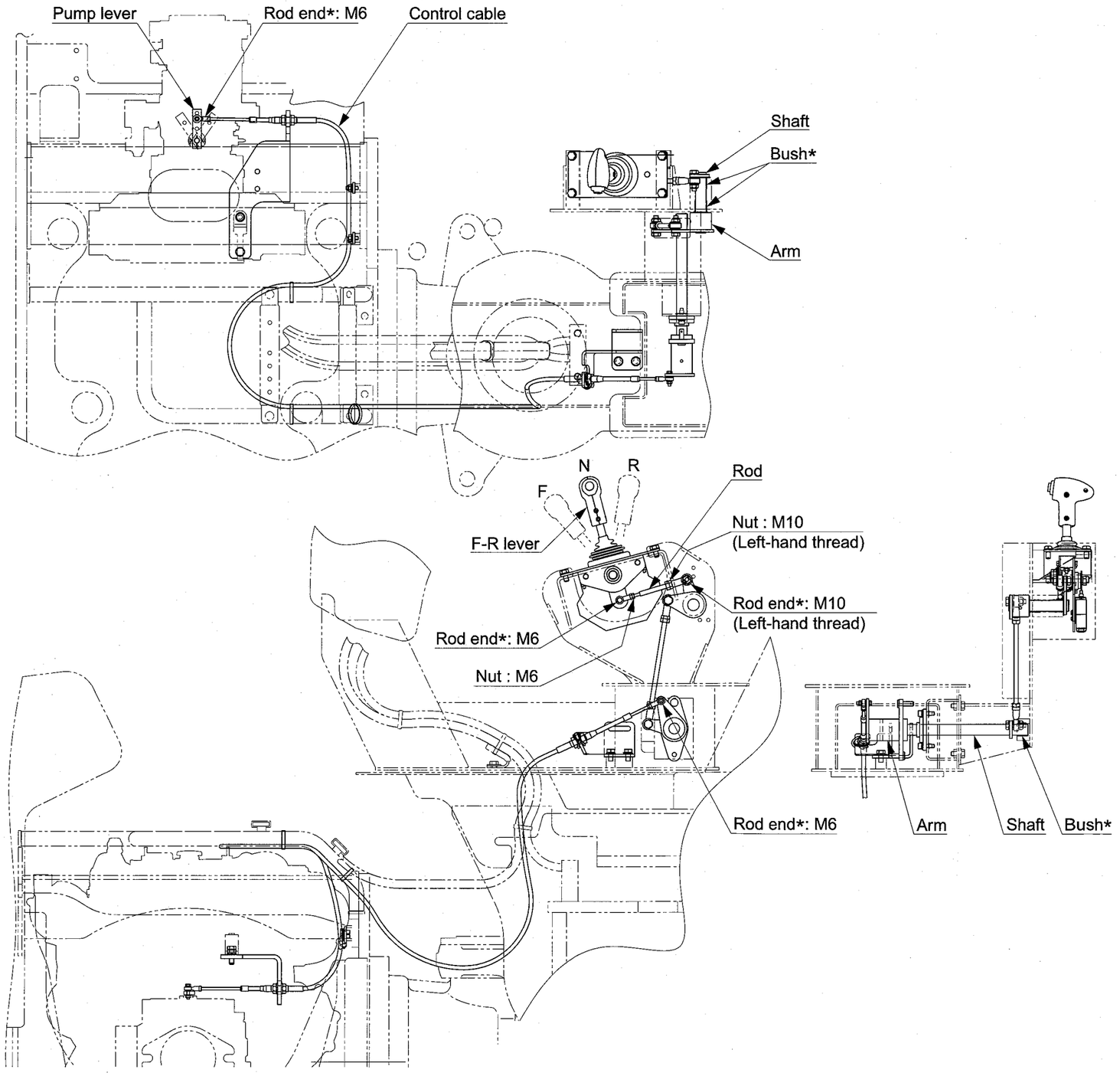


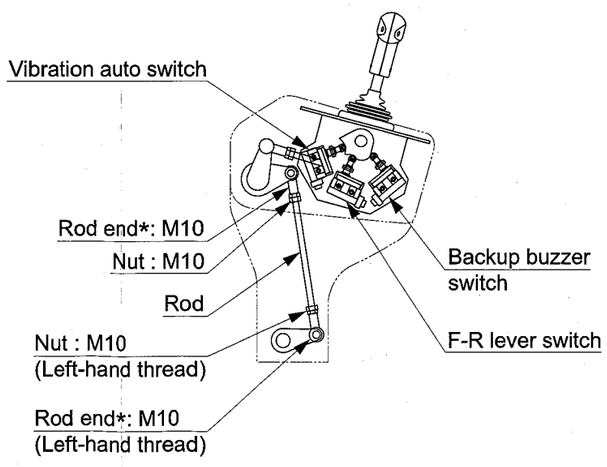
• The actual equipment may differ from that shown above.

SW770-03001

2. CONTROL SYSTEM

2-1. Forward-reverse Control

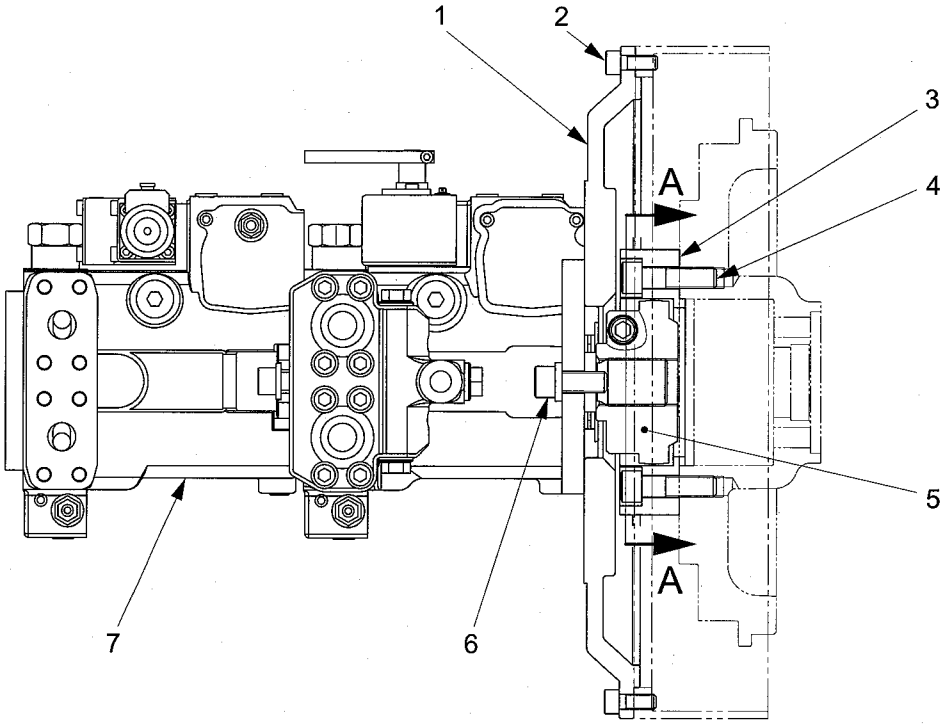


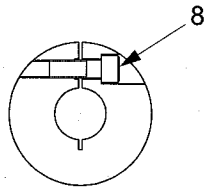


*: Apply grease

3. PUMP MOUNT

3-1. Pump Mount (SW770)





SECTION A-A

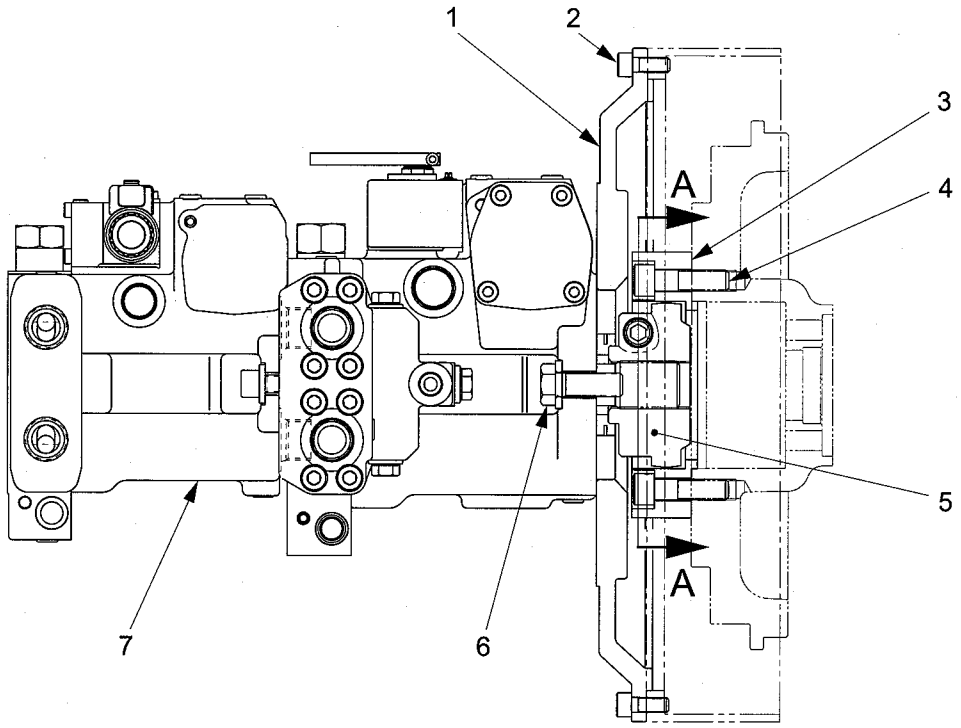
0431-36804-0-10093-A

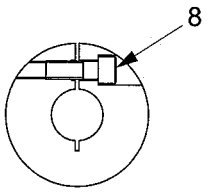
(1) Housing
(2) Bolt : M10×25
(3) Flange
(4) Bolt : M14×50
(5) Hub
(6) Bolt : M14×35
(7) Pump
(8) Bolt : M12×35

N·m

(2)	Bolt	M10×25	: 59 N·m	(44 lbf·ft)
(4)	Bolt	M14×50	: 190 N·m	(140 lbf·ft)
(6)	Bolt	M14×35	: 167 N·m	(123 lbf·ft)
(8)	Bolt	M12×35	: 86 N·m	(63 lbf·ft)

3-2. Pump Mount (SW770HF, SW770ND)





SECTION A-A

0431-36801-0-10031-A

(1) Housing
(2) Bolt : M10×25
(3) Flange
(4) Bolt : M14×50
(5) Hub
(6) Bolt : M16×45
(7) Pump
(8) Bolt : M12×35

N·m

(2)	Bolt	M10×25	:	59 N·m (	44 lbf·ft)
(4)	Bolt	M14×50	:	190 N·m (	140 lbf·ft)
(6)	Bolt	M16×45	:	265 N·m (	195 lbf·ft)
(8)	Bolt	M12×35	:	86 N·m (	63 lbf·ft)

3-3. Installation of Pump

- When the pump has been removed from the engine for repair or replacement, reinstall it in accordance with the following procedure.

① Apply adequate amount of lithium-based grease to pump (7) and hub (5) splines.
② Set hub (5) on pump (7).

★ Push hub (5) until run against shaft of pump (7).

③ Secure hub (5) with bolt (8).

(8) Bolt M12×35 : 86 N·m (63 lbf·ft)

④ Secure flange (3) to engine flywheel with three bolts (4).

(4) Bolt M14×50 : 190 N·m (140 lbf·ft)

⑤ Secure housing (1) to engine flywheel housing with twelve bolts (2).

(2) Bolt M10×25 : 59 N·m (44 lbf·ft)

⑥ Engage hub (5) with flange (3).
⑦ Secure pump (7) to housing (1) with two bolts (6) and washers.

SW770
(6) Bolt M14×35 : 167 N·m (123 lbf·ft)
SW770HF, SW770ND
(6) Bolt M16×45 : 265 N·m (195 lbf·ft)

(NOTICE)

- **Bolts (2) and (4) are treated with thread-locking fluid. Use new thread-locking fluid treated bolts for installation.**

HYDRAULIC SYSTEMS

1. SYSTEM CIRCUIT DIAGRAM

1-1. Graphic Symbols for Hydraulic Circuits

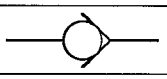
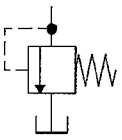
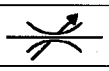
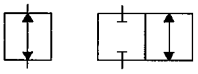
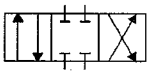
Basic Symbols

DESCRIPTION	SYMBOL
Lines:	
Main working	
Pilot control	
Drain or bleed	
Lines, joining	
Not connected	
Component outline	
Arrow indicates direction of flow.	
Line with fixed restriction (orifice).	
Test port, pressure measurement.	
Temperature measurement gauge	
Pressure measurement gauge	
Reservoir (vented)	
Filter or strainer	
Heat exchanger, lines indicate flow of coolant.	
Quick disconnect: Connected with mechanically opened checks. Disconnected.	
Sloping arrow through a symbol at 45° indicates that a component can be adjusted or varied.	

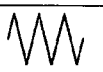
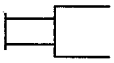
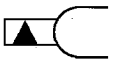
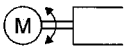
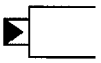
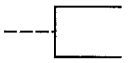
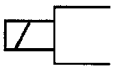
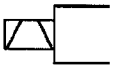
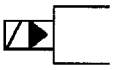
Pump, Motors and Cylinders

DESCRIPTION	SYMBOL
Hydraulic pumps: Fixed displacement Unidirectional Bidirectional Variable displacement Unidirectional Bidirectional Variable displacement pressure compensated Unidirectional	
Hydraulic Motor: Unidirectional Bidirectional	
Double acting hydraulic cylinder Differential cylinder	
Electric motor	M

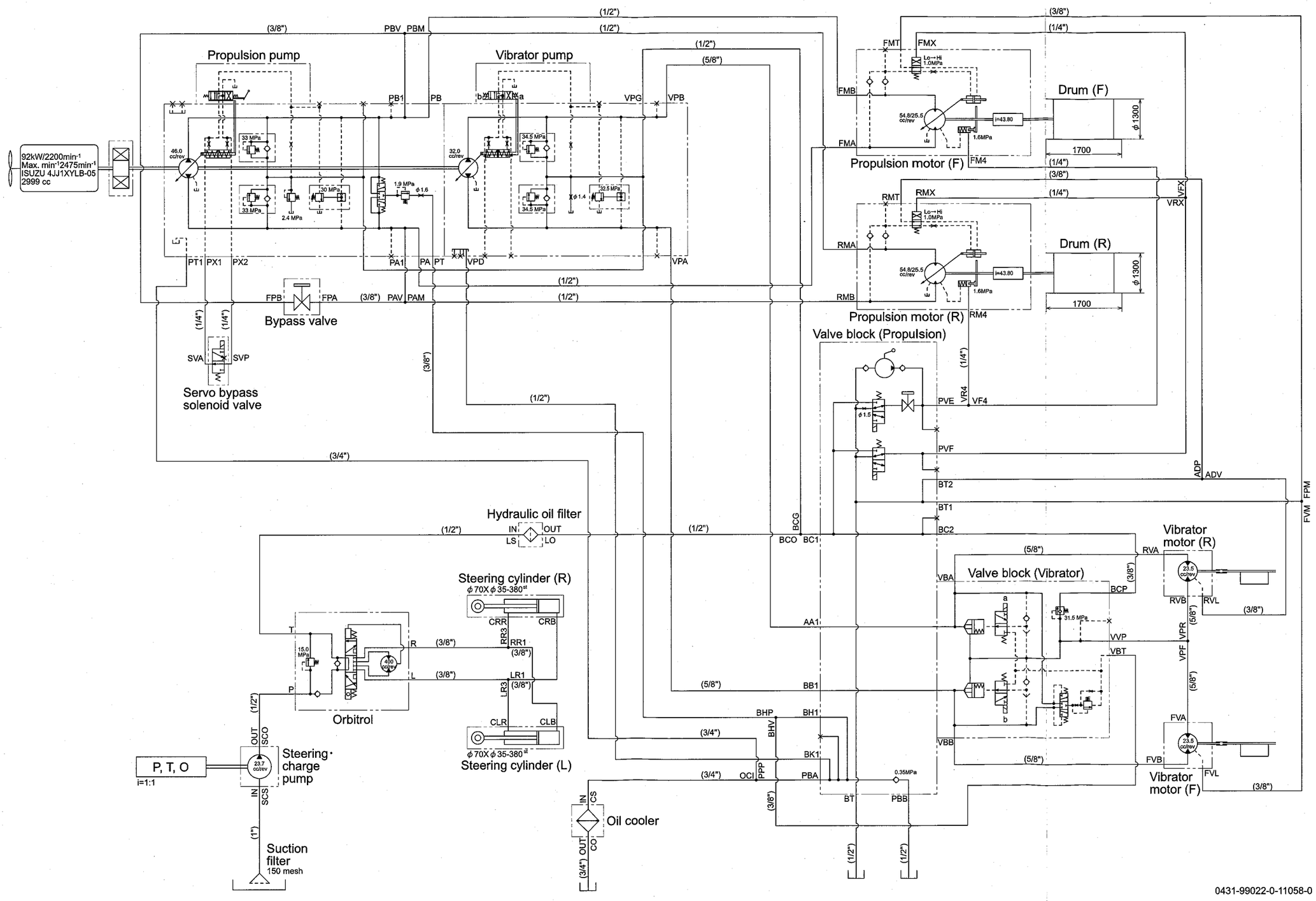
Valves

DESCRIPTION	SYMBOL
Check valve	
Manual shut off (On-Off)	
Pressure relief	
Flow control, adjustable	
Valve symbols: The basic valve symbol one or more squares with lines representing flow paths and flow conditions between ports.	
Multiple squares indicate a valve with as many distinct positions there are squares providing various flow path options for the fluid. The multiple square moves to represent how flow paths change when the valving element is shifted within the component.	
Valves with infinite positioning between certain limits are symbolized with lines parallel to the squares.	

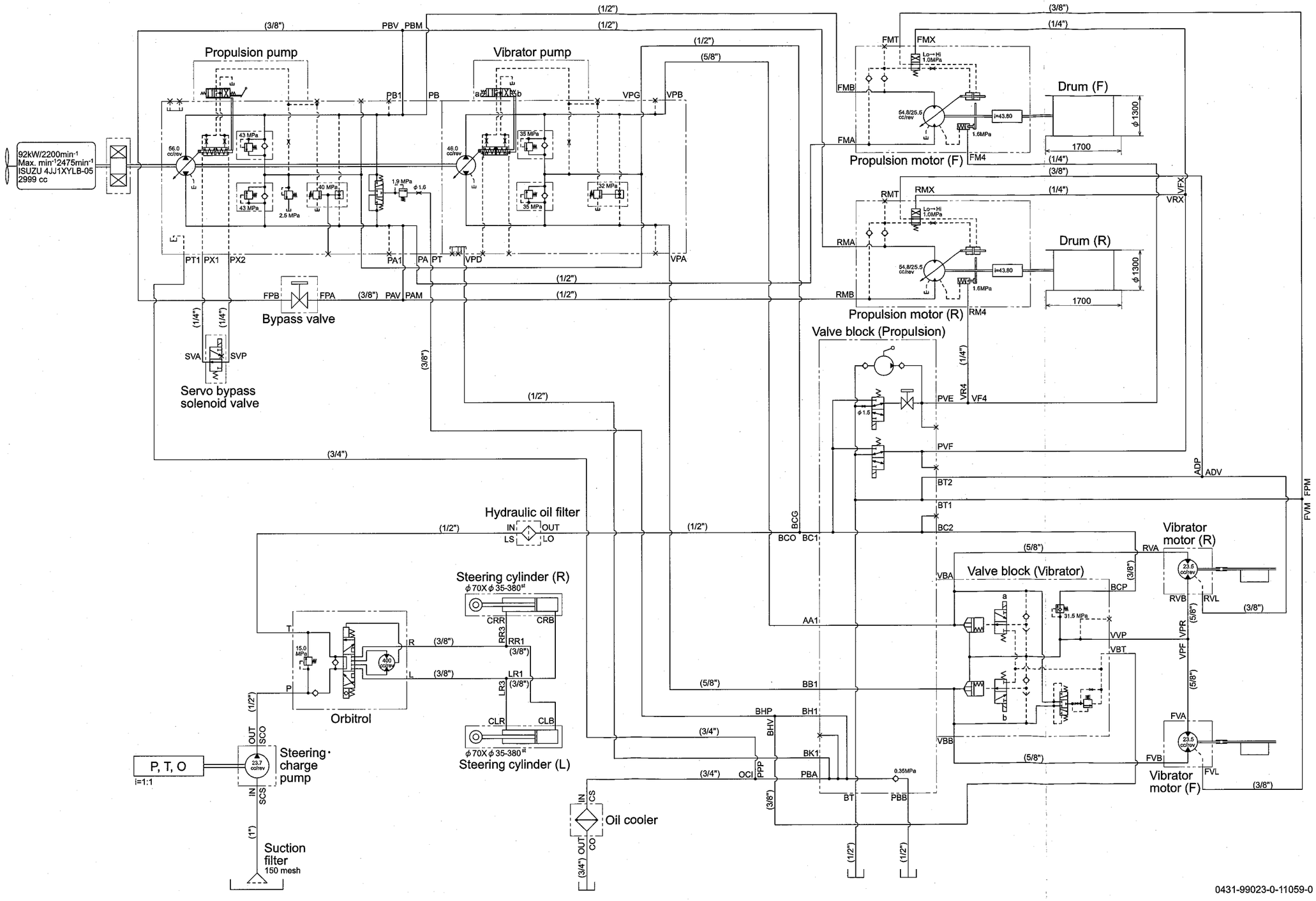
Methods of Operation

DESCRIPTION	SYMBOL
Spring	
Manual	
Pressure compensated	
Reversing motor	
Pilot pressure: Internal supply	
Remote supply	
Solenoid: Single winding	
Two windings operating in opposite directions.	
Pilot directional valve is actuated by the solenoid.	

1-2. Hydraulic Circuit Diagram (SW770)

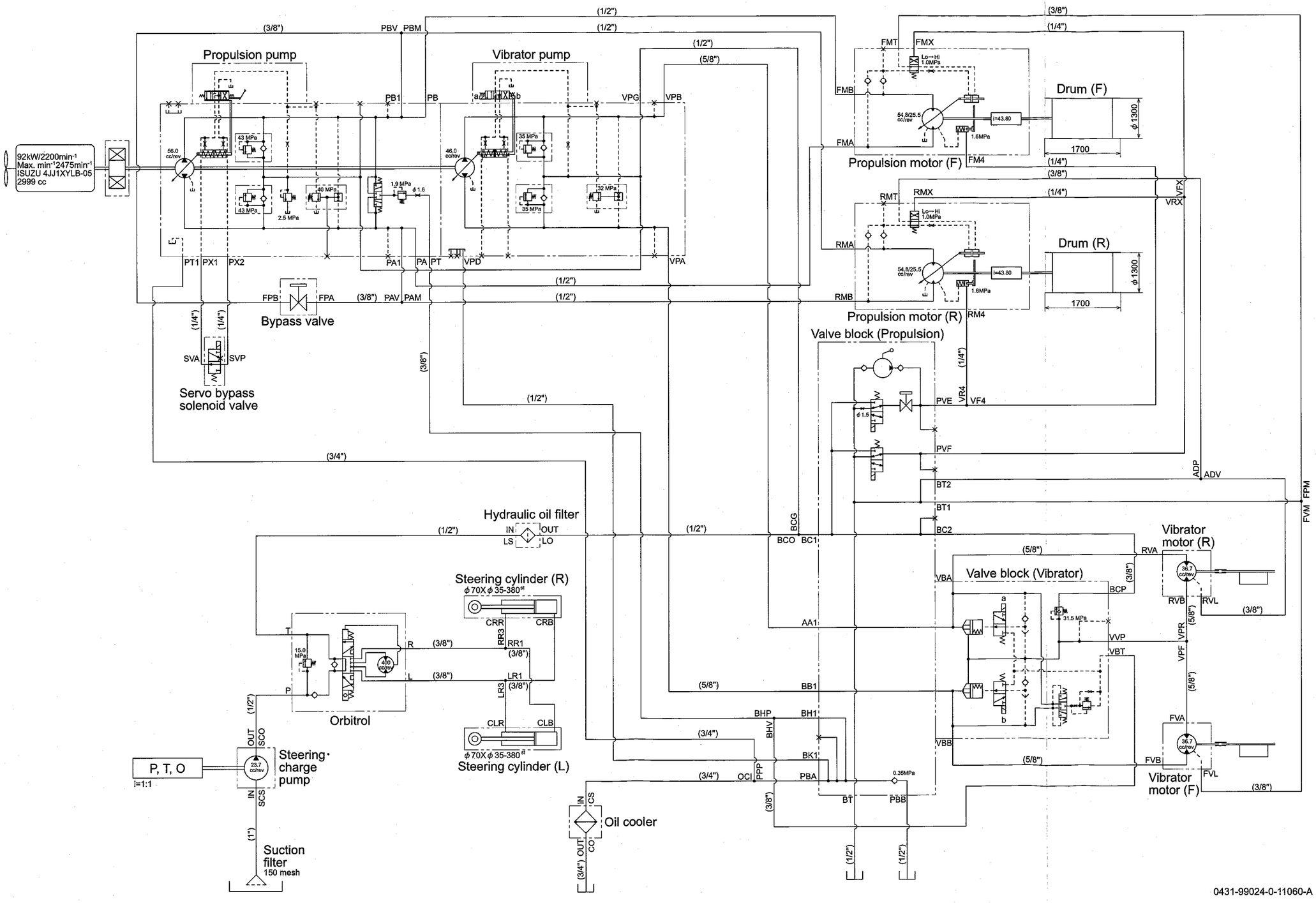


1-3. Hydraulic Circuit Diagram (SW770HF)



0431-99023-0-11059-0

1-4. Hydraulic Circuit Diagram (SW770ND)

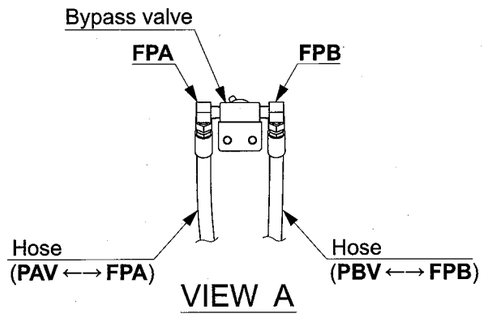


0431-99024-0-11060-A

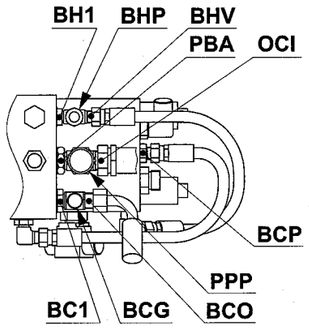
2. PROPULSION HYDRAULIC SYSTEM

2-1. Propulsion Hydraulic Piping

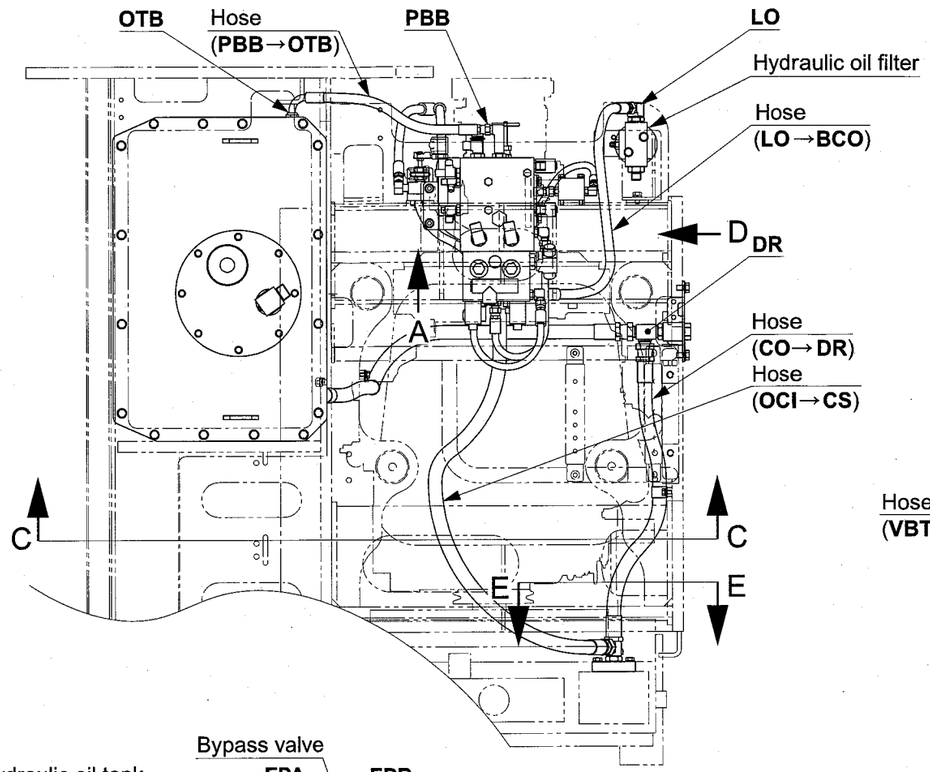
2-1-1. Propulsion hydraulic piping (1)

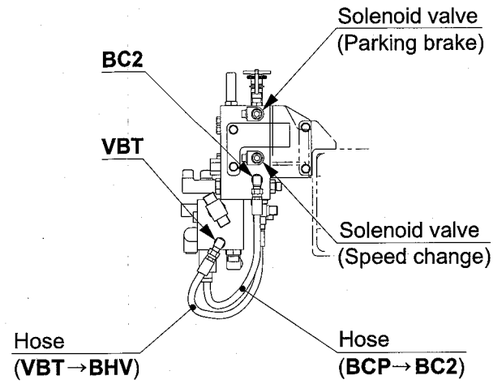


VIEW A

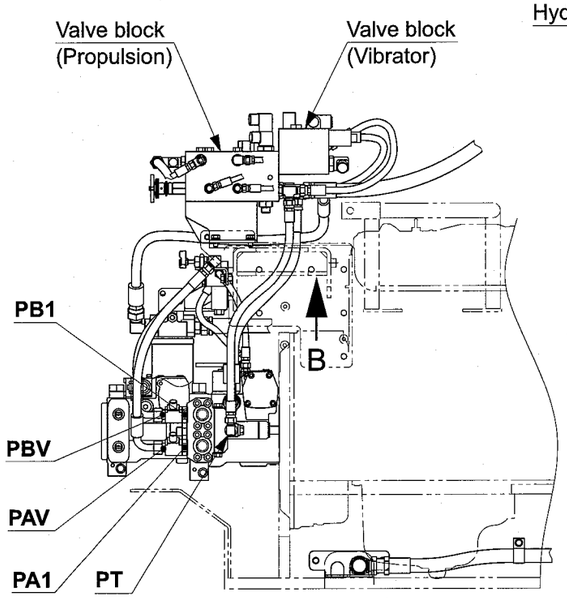


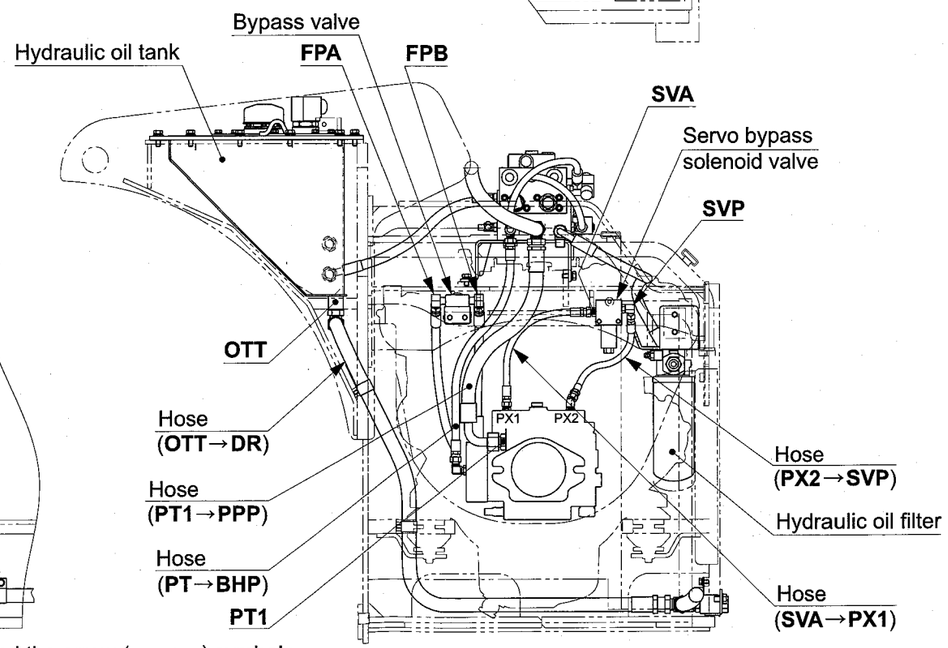
VIEW B



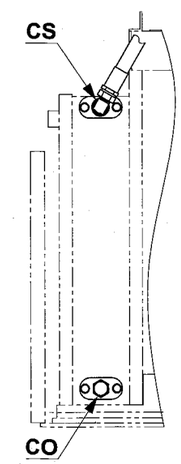


VIEW D





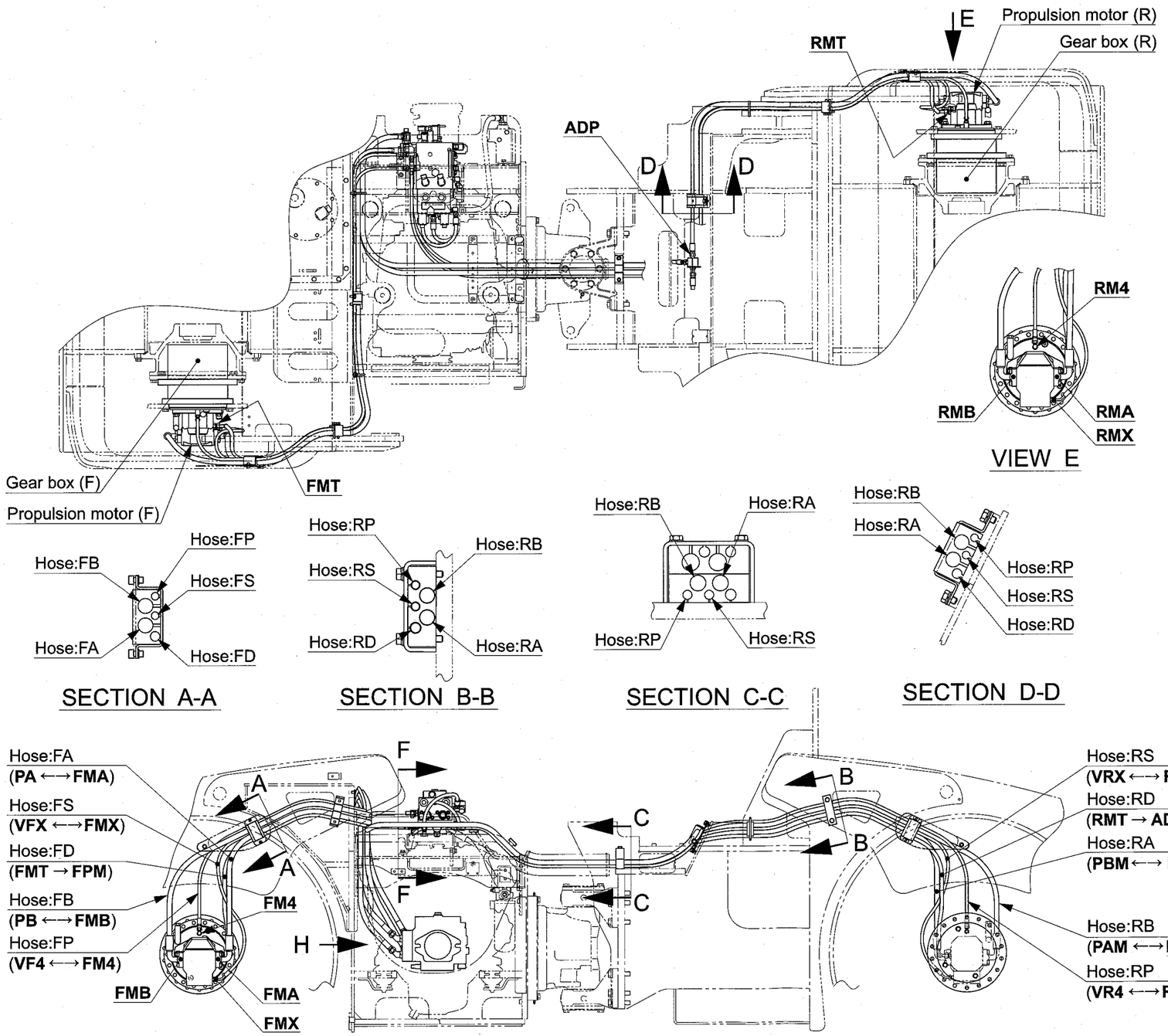
SECTION C-C



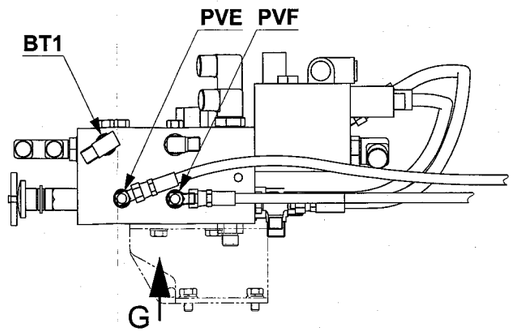
SECTION E-E

• The letters and figures (such as LO and BCO) show each port and the arrow (⟷;→) symbols show the hose connection and the direction of the flow of the oil.

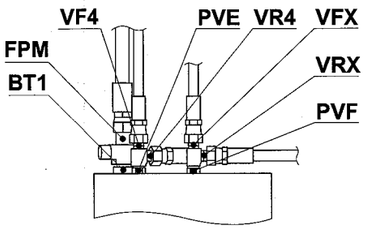
2-1-2. Propulsion hydraulic piping (2)



VIEW E



VIEW F-F



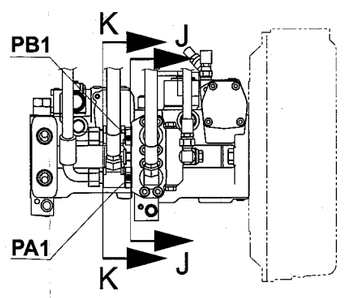
VIEW G

SECTION A-A

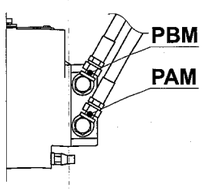
SECTION B-B

SECTION C-C

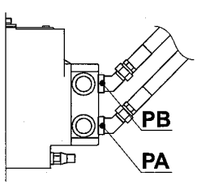
SECTION D-D



VIEW H



SECTION K-K



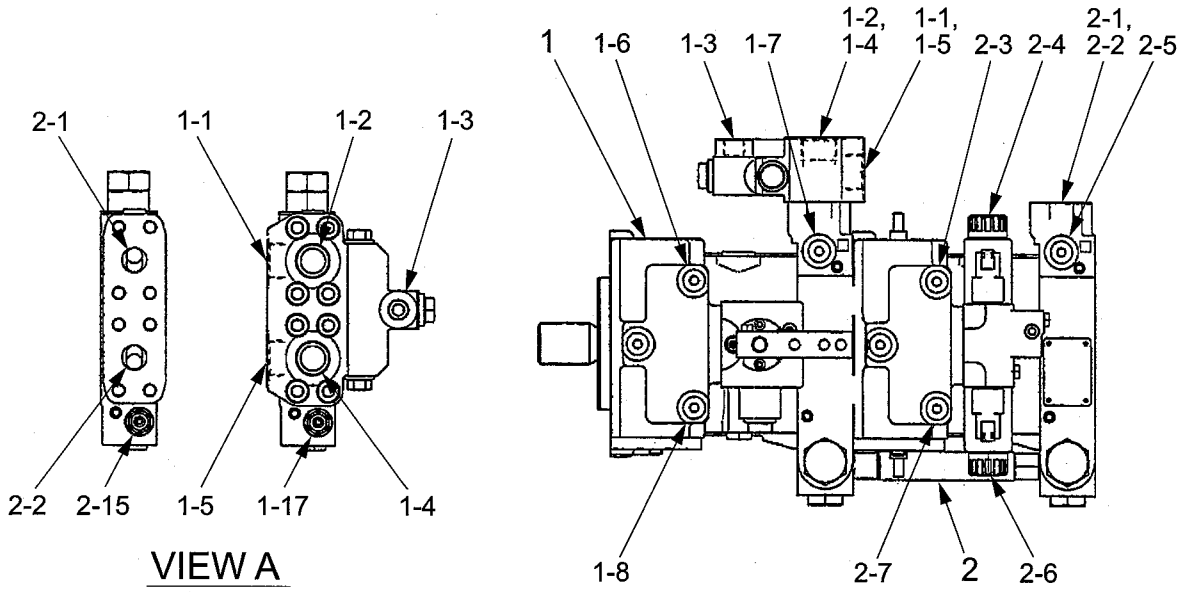
SECTION J-J

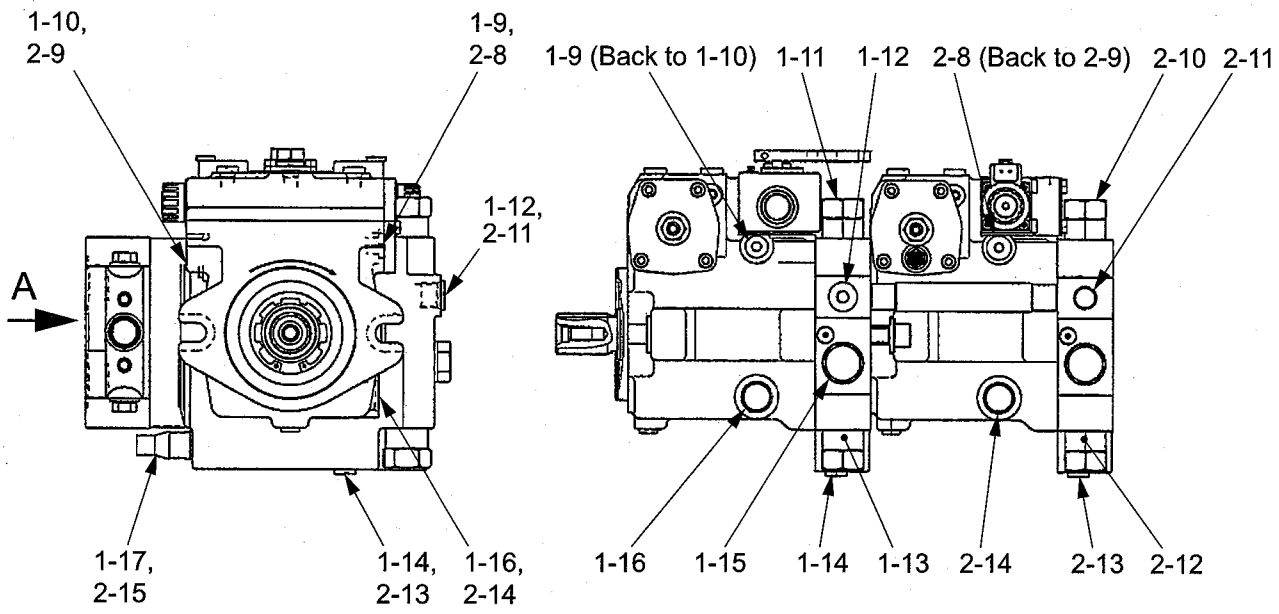
• The letters and figures (such as PB and FMB) show each port and the arrow (⟷;→) symbols show the hose connection and the direction of the flow of the oil.

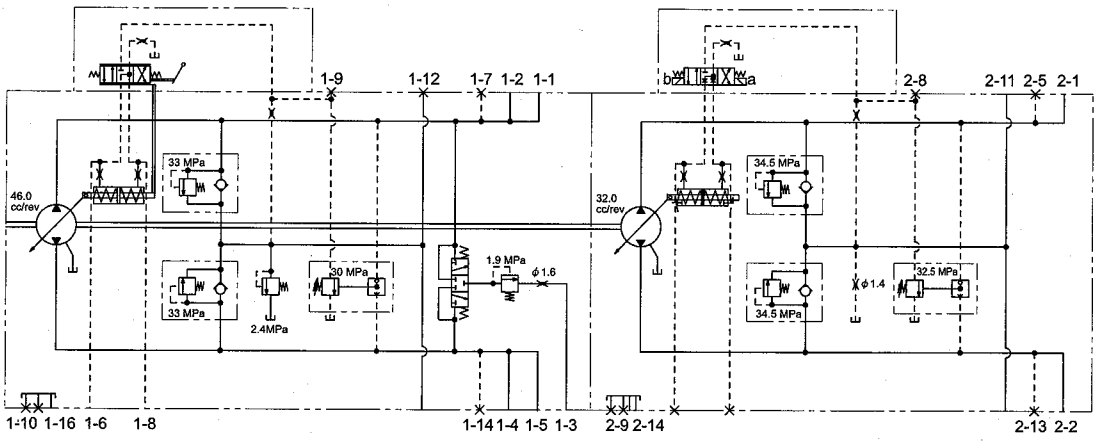
0431-36807-0-10362-E

2-2. Hydraulic Component Specifications

2-2-1. Hydraulic pump ASSY (propulsion + vibrator) (SW770)







Pump circuit diagram

SW770-04001

(1) Propulsion pump

(1-1)	Port B (Forward)	**[PB1]**	:	1 1/16-12UN
(1-2)	Port B1 (Forward)	**[PB]**	:	1 1/16-12UN
(1-3)	Drain port	**[PT]**	:	9/16-18UNF
(1-4)	Port A1 (Reverse)	**[PA]**	:	1 1/16-12UN
(1-5)	Port A (Reverse)	**[PA1]**	:	1 1/16-12UN
(1-6)	Servo pressure gauge port	**[PX1]**	:	7/16-20UNF
(1-7)	High pressure gauge port (For port B)		:	7/16-20UNF
(1-8)	Servo pressure gauge port	**[PX2]**	:	7/16-20UNF
(1-9)	Control pressure port		:	9/16-18UNF
(1-10)	Drain port or Filler port	**[PT1]**	:	7/ 8-14UNF
(1-11)	High pressure relief valve (For port B)			
(1-12)	Charge pressure gauge port		:	3/ 4-16UNF
(1-13)	High pressure relief valve (For port A)			
(1-14)	High pressure gauge port (For port A)		:	7/16-20UNF
(1-15)	Charge relief valve			
(1-16)	Drain port		:	7/ 8-14UNF
(1-17)	Cut off valve			

Specifications

• Displacement	: 46 cm^3/rev	(2.8	cu.in./rev)
• High pressure relief valve pressure setting	: 33.0 MPa	(4,785	psi)
• Charge relief valve pressure setting	: 2.4 MPa	(348	psi)
• Cut off valve pressure setting	: 30.0 MPa	(4,350	psi)

(2) Vibrator pump

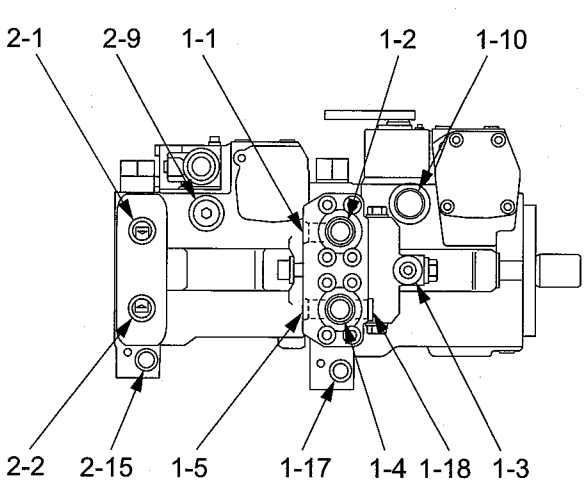
(2-1)	Port B2 (Low amplitude)	**[VPB]**	:	SAE 3/4"
(2-2)	Port A2 (High amplitude)	**[VPA]**	:	SAE 3/4"
(2-3)	Servo pressure gauge port		:	7/16-20UNF
(2-4)	Solenoid valve a (High amplitude)			
(2-5)	High pressure gauge port (For port B2)		:	7/16-20UNF
(2-6)	Solenoid valve b (Low amplitude)			
(2-7)	Servo pressure gauge port		:	7/16-20UNF
(2-8)	Control pressure port		:	9/16-18UNF
(2-9)	Drain port or Filler port		:	7/ 8-14UNF
(2-10)	High pressure relief valve (For port B2)			
(2-11)	Charge pressure gauge port	**[VPG]**	:	3/ 4-16UNF
(2-12)	High pressure relief valve (For port A2)			
(2-13)	High pressure gauge port (For port A2)		:	7/16-20UNF
(2-14)	Drain port	**[VPD]**	:	7/ 8-14UNF
(2-15)	Cut off valve			

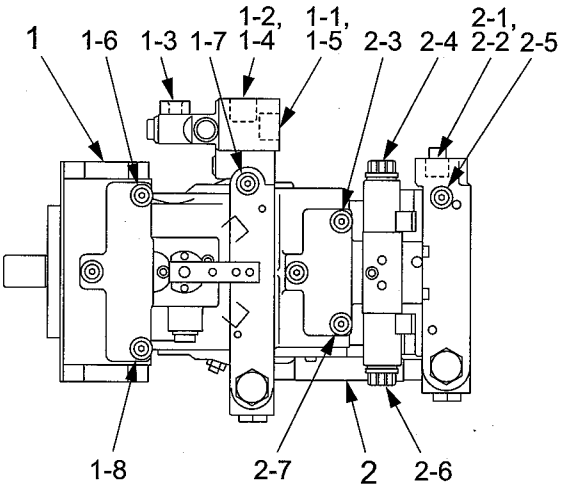
Specifications

• Displacement	: 32 cm^3/rev	(2.0	cu.in./rev)
• High pressure relief valve pressure setting	: 34.5 MPa	(5,003	psi)
• Cut off valve pressure setting	: 32.5 MPa	(4,713	psi)

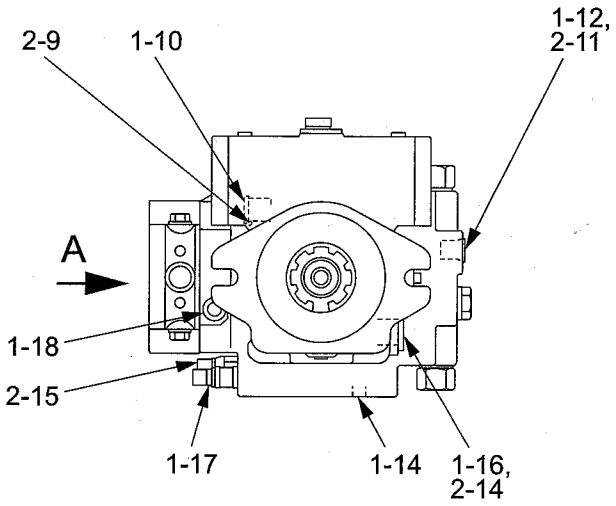
• Allowable pump case pressure	: 0.4 MPa	(58.0	psi) or less
• Pump ASSY weight	: 54 kg	(119	lbs.)

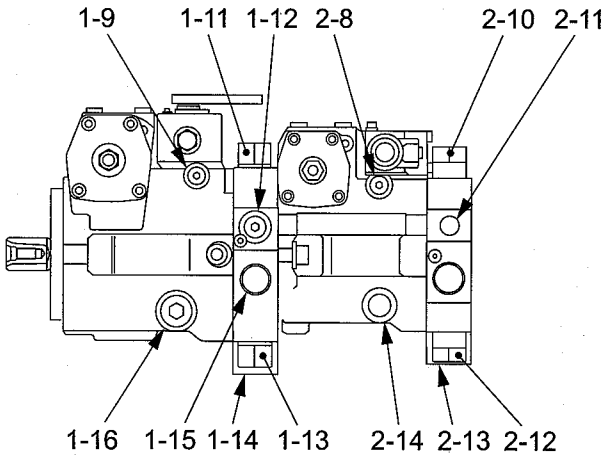
2-2-2. Hydraulic pump ASSY (propulsion + vibrator) (SW770HF, SW770ND)

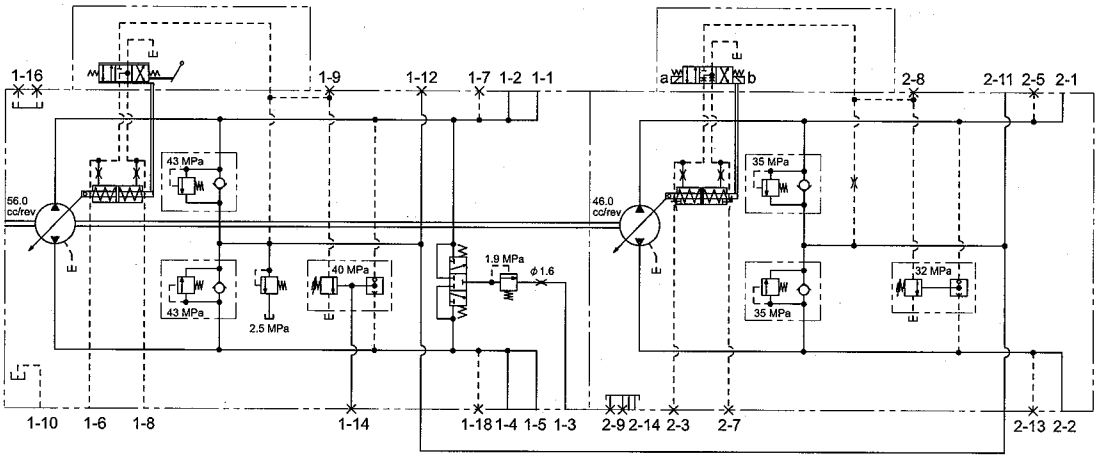




VIEW A







Pump circuit diagram

SW770HF-04001

(1) Propulsion pump

(1-1)	Port B1 (Forward)	**[PB1]**	: 1 1/16-12UN
(1-2)	Port B (Forward)	**[PB]**	: 1 1/16-12UN
(1-3)	Drain port	**[PT]**	: 9/16-18UNF
(1-4)	Port A (Reverse)	**[PA]**	: 1 1/16-12UN
(1-5)	Port A1 (Reverse)	**[PA1]**	: 1 1/16-12UN
(1-6)	Servo pressure gauge port	**[PX1]**	: 7/16-20UNF
(1-7)	High pressure gauge port (For port B)		: 7/16-20UNF
(1-8)	Servo pressure gauge port	**[PX2]**	: 7/16-20UNF
(1-9)	Control pressure port		: 9/16-18UNF
(1-10)	Drain port	**[PT1]**	: 1 1/16-12UN
(1-11)	High pressure relief valve (For port B)		
(1-12)	Charge pressure gauge port		: 3/ 4-16UNF
(1-13)	High pressure relief valve (For port A)		
(1-14)	High pressure gauge port		: 7/16-20UNF
(1-15)	Charge relief valve		
(1-16)	Drain port		: 1 1/16-12UN
(1-17)	Cut off valve		
(1-18)	High pressure gauge port (For port A)		: 7/16-20UNF

Specifications

- Displacement : 56 cm^3/rev (3.4 cu.in./rev)
- High pressure relief valve pressure setting : 43.0 MPa (6,235 psi)
- Charge relief valve pressure setting : 2.5 MPa (363 psi)
- Cut off valve pressure setting : 40.0 MPa (5,800 psi)

(2) Vibrator pump

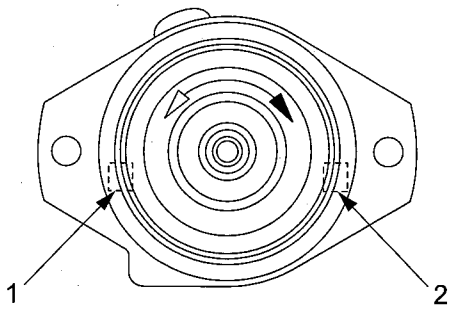
(2-1)	Port B (Low amplitude/Normal)	**[VPB]**	: 1 1/16-12UN
(2-2)	Port A (High amplitude/Horizontal)	**[VPA]**	: 1 1/16-12UN
(2-3)	Servo pressure gauge port		: 7/16-20UNF
(2-4)	Solenoid valve a (Low amplitude/Normal)		
(2-5)	High pressure gauge port (For port B)		: 7/16-20UNF
(2-6)	Solenoid valve b (High amplitude/Horizontal)		
(2-7)	Servo pressure gauge port		: 7/16-20UNF
(2-8)	Control pressure port		: 9/16-18UNF
(2-9)	Drain port		: 7/ 8-14UNF
(2-10)	High pressure relief valve (For port B)		
(2-11)	Charge pressure gauge port	**[VPG]**	: 3/ 4-16UNF
(2-12)	High pressure relief valve (For port A)		
(2-13)	High pressure gauge port (For port A)		: 7/16-20UNF
(2-14)	Drain port	**[VPD]**	: 7/ 8-14UNF
(2-15)	Cut off valve		

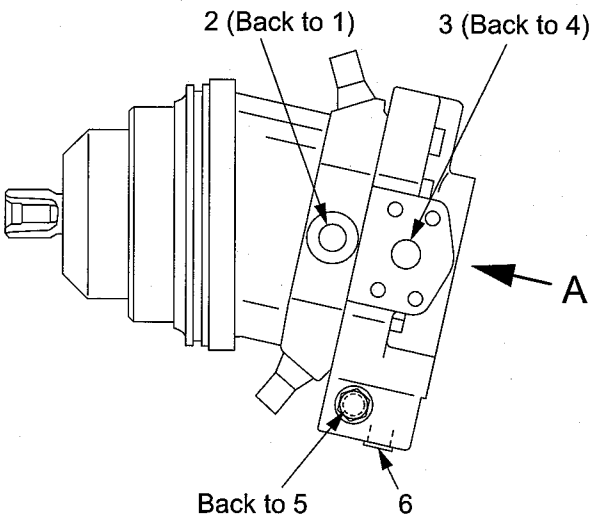
Specifications

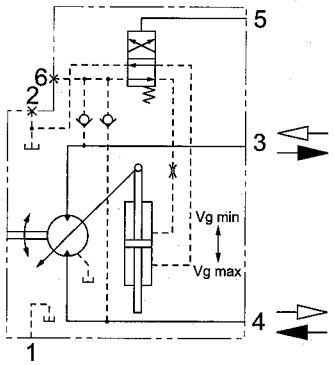
- Displacement : 46 cm^3/rev (2.8 cu.in./rev)
- High pressure relief valve pressure setting : 35.0 MPa (5,075 psi)
- Cut off valve pressure setting : 32.0 MPa (4,640 psi)

- Allowable pump case pressure : 0.4 MPa (58.0 psi) or less
- Pump ASSY weight : 65 kg (143 lbs.)

2-2-3. Propulsion hydraulic motor

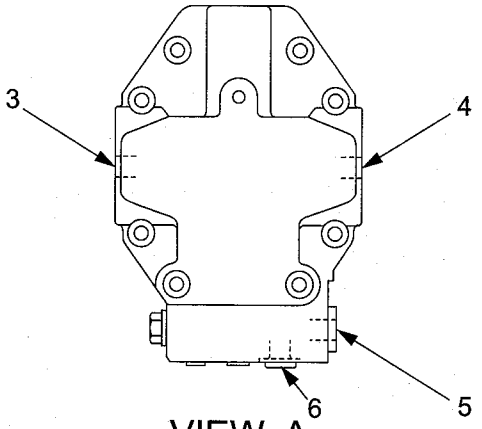






Motor circuit diagram

4 → 3 Clockwise rotation
3 → 4 Counterclockwise rotation



VIEW A

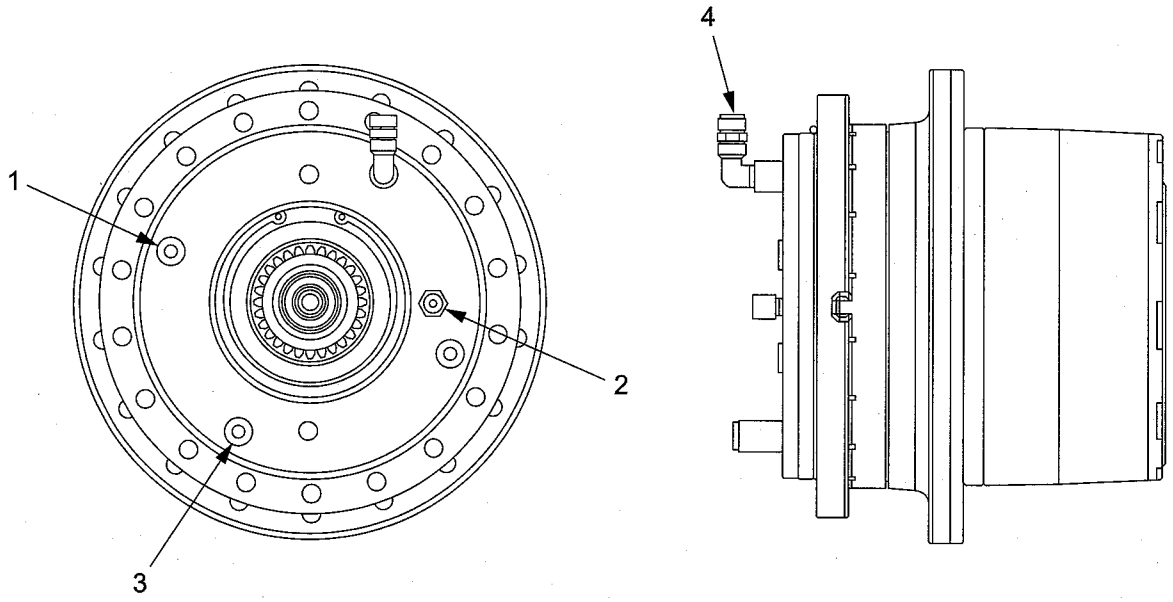
SW770-04002

(1) Drain port	**[FMT] [RMT]** : M18×1.5	(4) Port A	**[FMA] [RMA]** : SAE 3/4"
(2) Drain port	: M18×1.5	(5) Pilot pressure port	**[FMX] [RMX]** : M14×1.5
(3) Port B	**[FMB] [RMB]** : SAE 3/4"	(6) High pressure gauge port	: M14×1.5

Specifications

- Displacement (max.) : 54.8 cm^3/rev (3.3 cu.in./rev)
  (min.) : 25.5 cm^3/rev (1.6 cu.in./rev)
- Maximum working pressure : 40.0 MPa (5,800 psi)
- Speed change pressure : 1.0 MPa (145 psi)
- Allowable motor case pressure : 0.3 MPa (43.5 psi) or less
- Weight : 26 kg (57 lbs.)

2-2-4. Gear box



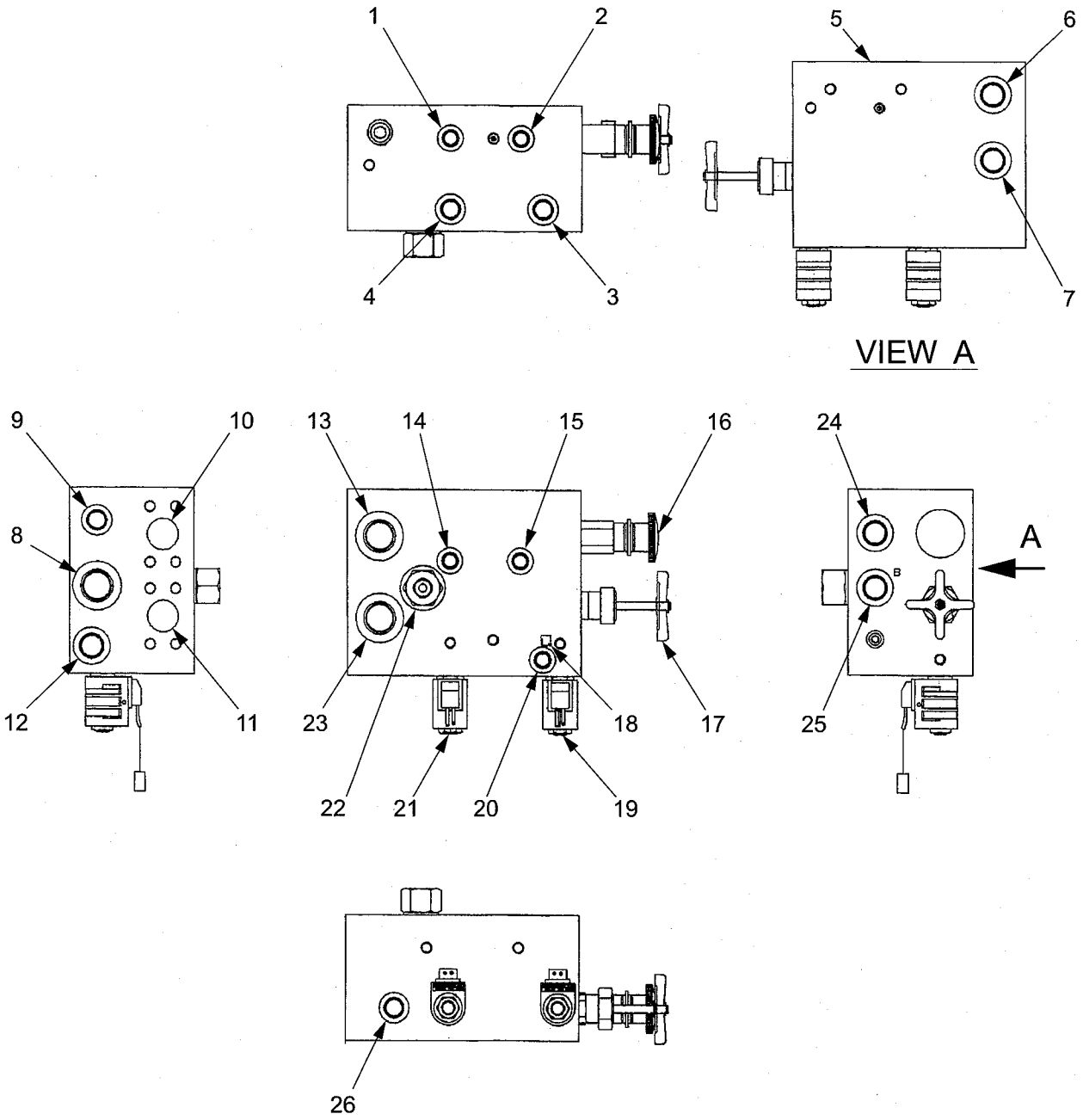
SW770-04003

(1)	Oil level plug		: M18×1.5
(2)	Brake port	**[FM4] [RM4]**	: 9/16-18UNF
(3)	Oil drain plug		: G3/8
(4)	Breather and oil filling plug		: G3/8

Specifications

- Brake release pressure : 1.6 MPa (232 psi)
- Reduction ratio : 1/43.8
- Oil quantity : 2 L (0.5 gal.)
- Weight : 100 kg (220 lbs.)

2-2-5. Valve block



Hydraulic diagram

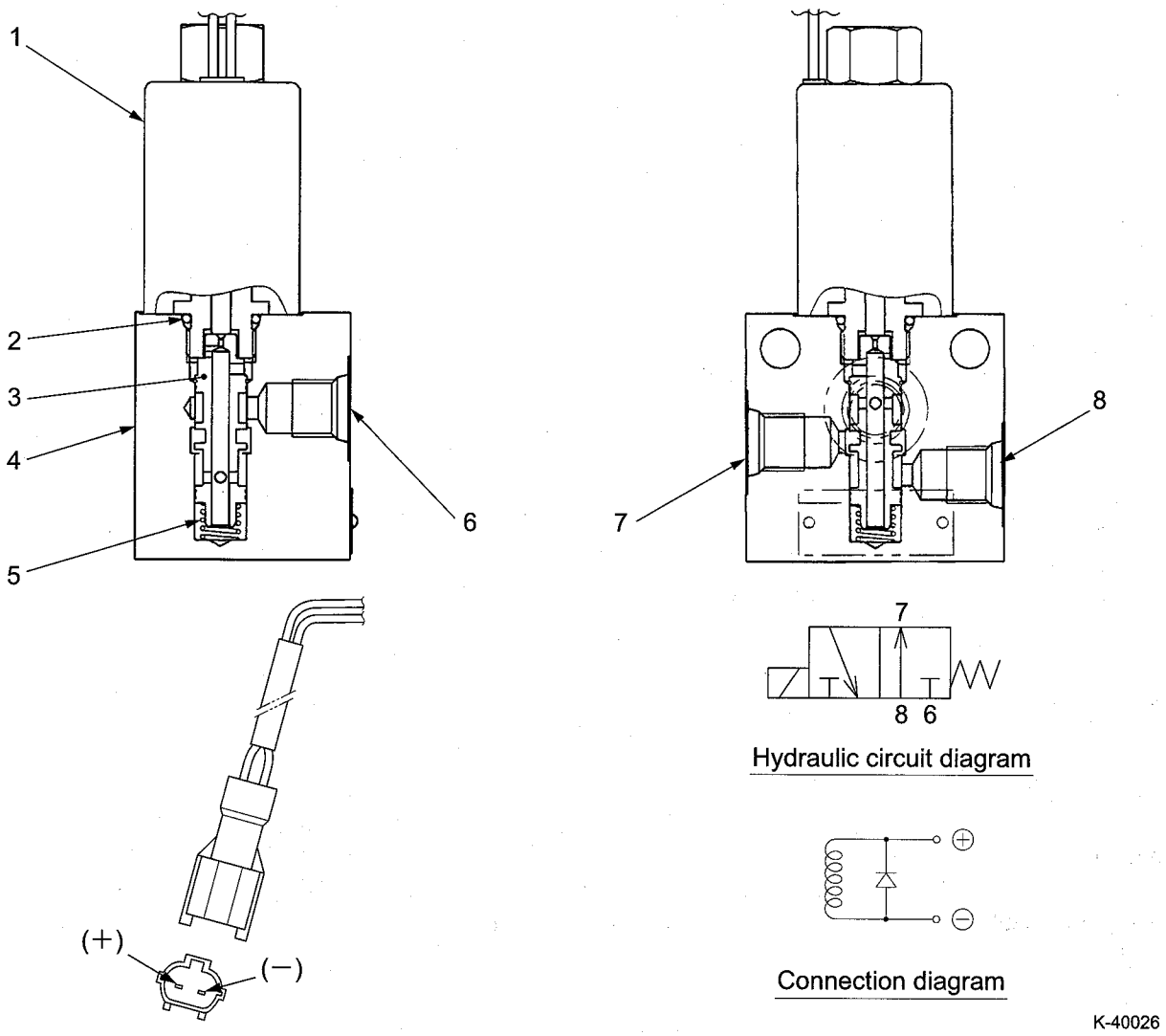
SW652-1-04004

(1)	Port F	**[PVF]**	: G1/4
(2)	Port E	**[PVE]**	: G1/4
(3)	Port T1	**[BT1]**	: G3/8
(4)	Port T2	**[BT2]**	: G3/8
(5)	Block		
(6)	Port J1		: G1/2
(7)	Port K1	**[BK1]**	: G1/2
(8)	Port A	**[PBA]**	: G3/4
(9)	Port H1	**[BH1]**	: G3/8
(10)	Port B1		: ϕ19
(11)	Port A1		: ϕ19
(12)	Port C1	**[BC1]**	: G1/2
(13)	Port BB1	**[BB1]**	: G3/4
(14)	Port L		: G1/4
(15)	Port M		: G1/4
(16)	Hand pump		
(17)	Stop valve		
(18)	Orifice plug		: ϕ1.5
(19)	Solenoid valve (Parking brake)		
(20)	Port N		: G1/4
(21)	Solenoid valve (Speed change)		
(22)	Check valve		
(23)	Port AA1	**[AA1]**	: G3/4
(24)	Port T	**[BT]**	: G1/2
(25)	Port B	**[PBB]**	: G1/2
(26)	Port C2	**[BC2]**	: G3/8

Specifications

• Maximum working pressure	: 25 MPa	(3,625 psi	)	(6 to 9, 24, 25)
	: 35 MPa	(5,075 psi	)	(1 to 4, 10 to 15, 20, 23, 26)
• Maximum flow	: 50 L/min	(13.2 gal./min	)	(6 to 9, 24, 25)
	: 10 L/min	(2.6 gal./min	)	(1 to 4, 10 to 15, 20, 23, 26)
• Hand pump displacement	: 5.7 mL/stroke	(0.0015 gal./stroke	)	
• Weight	: 13 kg	(29 lbs.	)	

2-2-6. Servo bypass solenoid valve



(1) Solenoid
(2) O-ring (1B P14)
(3) Spool (K)
(4) Body
(5) Spring
(6) Port T : G1/4
(7) Port A **[SVA]** : G1/4
(8) Port P **[SVP]** : G1/4

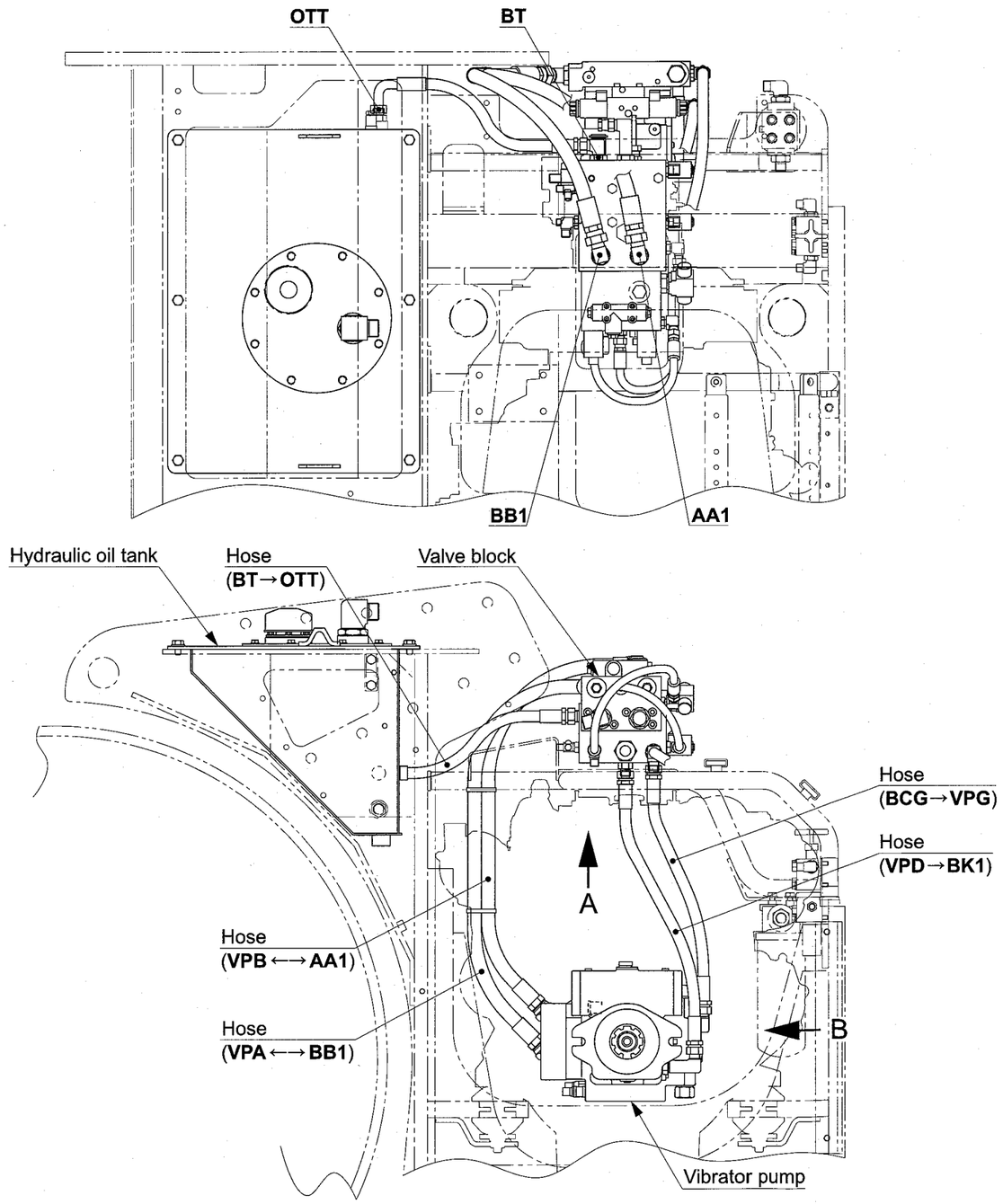
Specifications

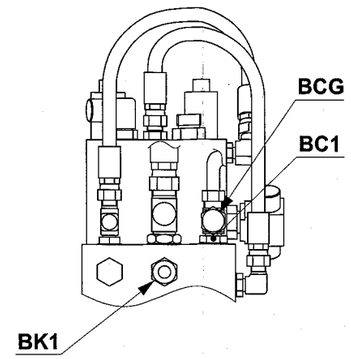
• Rated pressure	: 4.9 MPa	(	710 psi	)	(7, 8)
	: 0.5 MPa	(	72.5 psi	)	(6)
• Rated flow	: 30 L/min	(	7.9 gal./min	)	
• Weight	: 1.5 kg	(	3.3 lbs.	)	

3. VIBRATOR HYDRAULIC SYSTEM

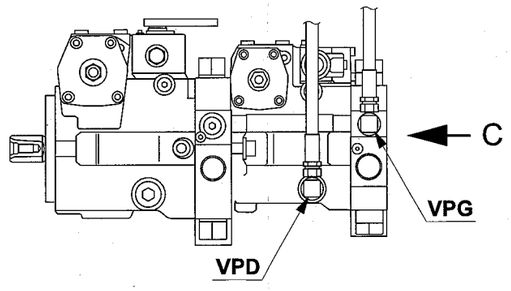
3-1. Vibrator Hydraulic Piping

3-1-1. Vibrator hydraulic piping (1)

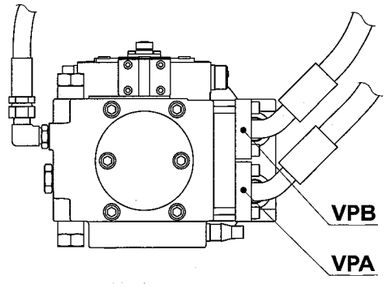




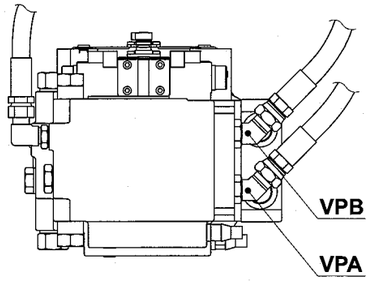
VIEW A



VIEW B



VIEW C
(SW770)

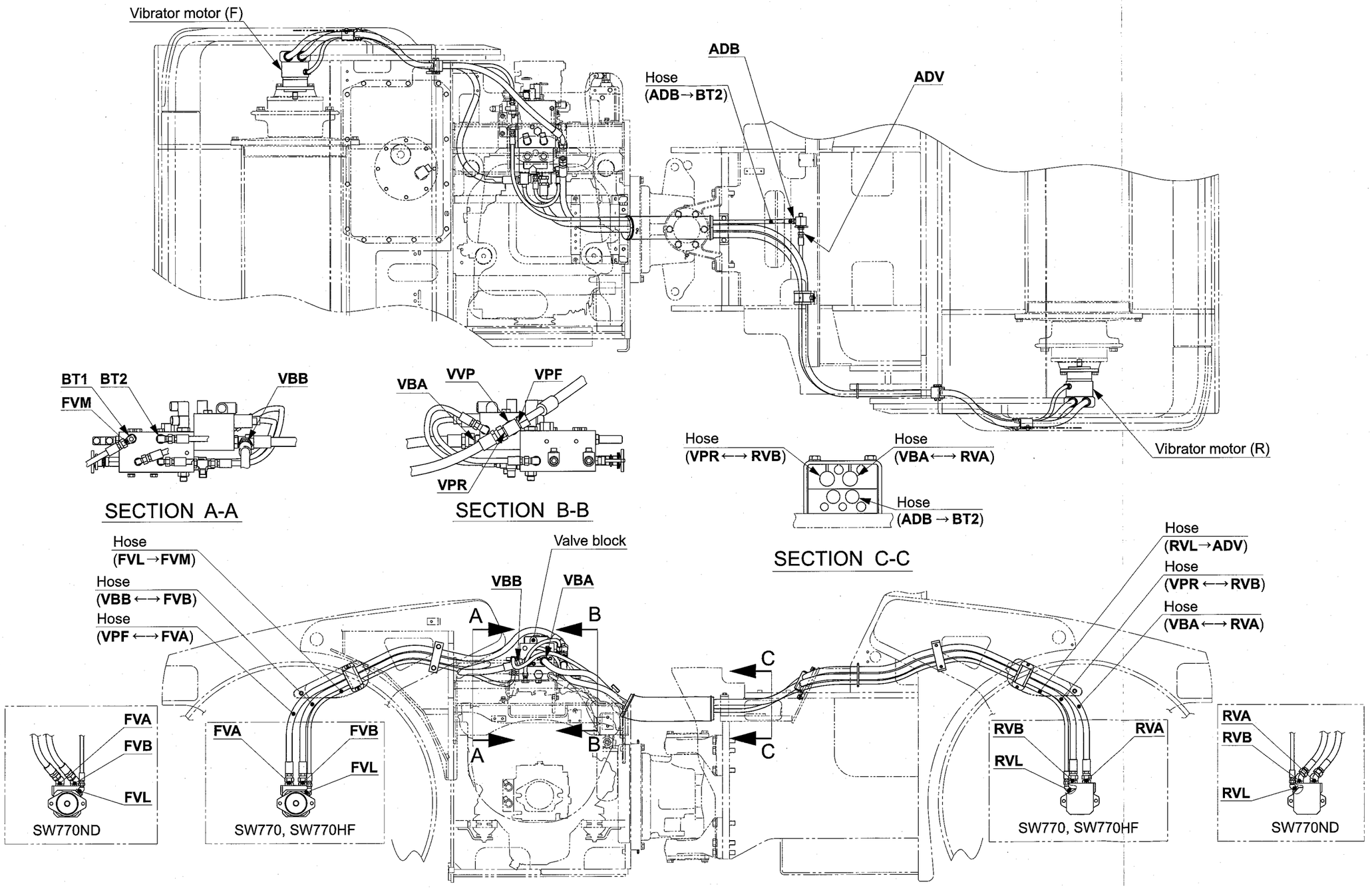


VIEW C
(SW770HF, SW770ND)

• The letters and figures (such as VPB and AA1) show each port and the arrow (←→;→) symbols show the hose connection and the direction of the flow of the oil.

0431-49801-0-10081-C
0431-49804-0-10426-0

3-1-2. Vibrator hydraulic piping (2)

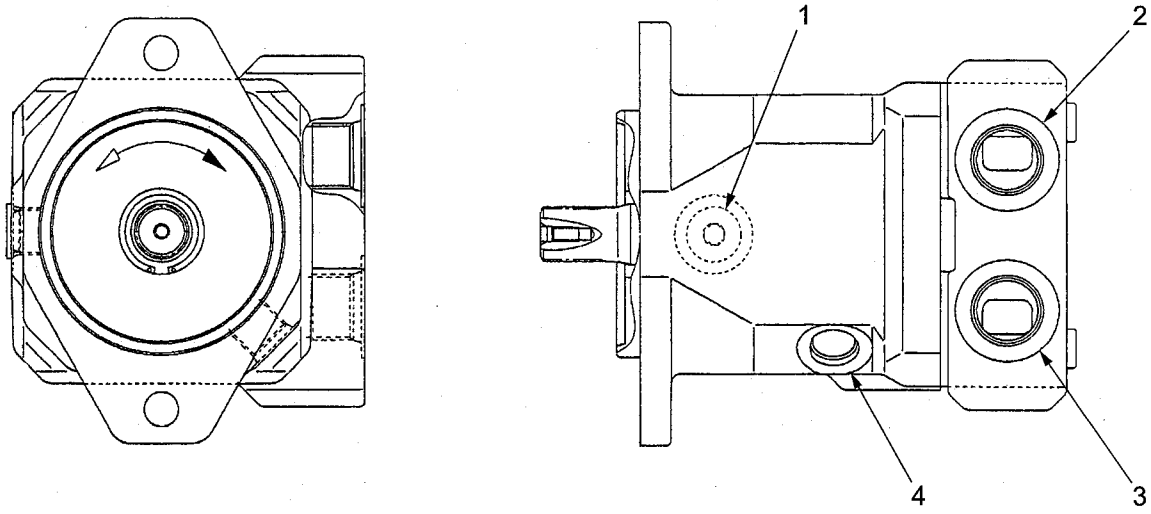


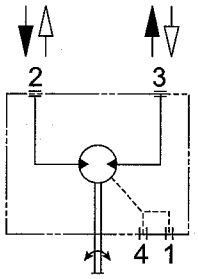
• The letters and figures (such as VPF and FVA) show each port and the arrow (←→;→) symbols show the hose connection and the direction of the flow of the oil.

0431-49803-0-10363-E
0431-49810-0-10891-A

3-2. Hydraulic Component Specifications

3-2-1. Vibrator hydraulic motor





Hydraulic circuit diagram

Flow of oil
- 2→3 Clockwise rotation
- 3→2 Counterclockwise rotation

SW652-1-04005

SW770, SW770HF

(1) Drain port : 3/ 4-16UNF
(2) Port A **[FVA, RVA]** : 1 1/16-12UN
(3) Port B **[FVB, RVB]** : 1 1/16-12UN
(4) Drain port **[FVL, RVL]** : 3/ 4-16UNF

Specifications

• Displacement	: 23.5 cm^3/rev	(1.43 cu.in./rev)	
• Working pressure	: 28 MPa	(4,060 psi)	
• Allowable motor case pressure	: 0.2 MPa	(29.0 psi)	or less
• Weight	: 12 kg	(26 lbs.)	

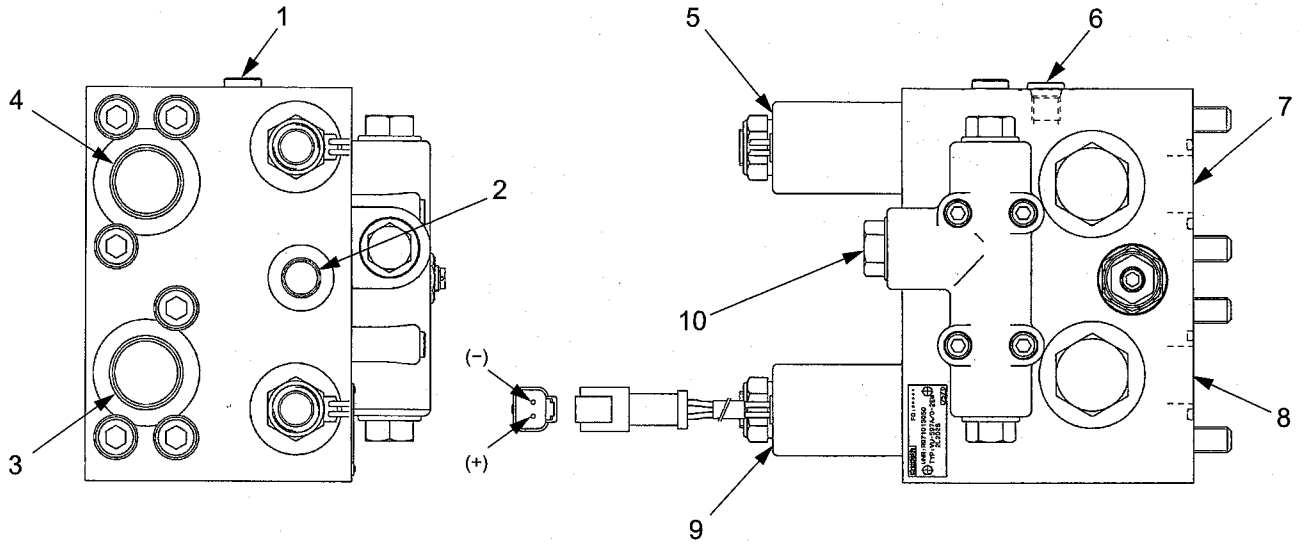
SW770ND

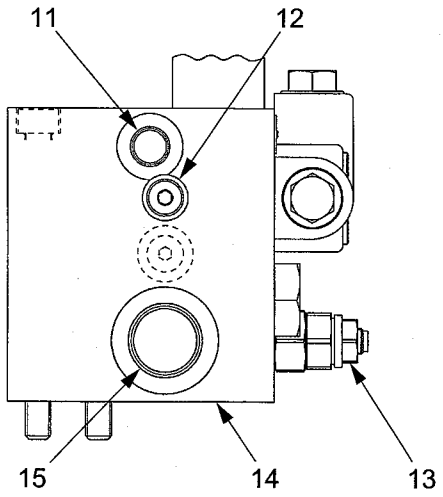
(1) Drain port : 7/ 8-14UNF
(2) Port A **[FVA, RVA]** : 1 1/16-12UN
(3) Port B **[FVB, RVB]** : 1 1/16-12UN
(4) Drain port **[FVL, RVL]** : 7/ 8-14UNF

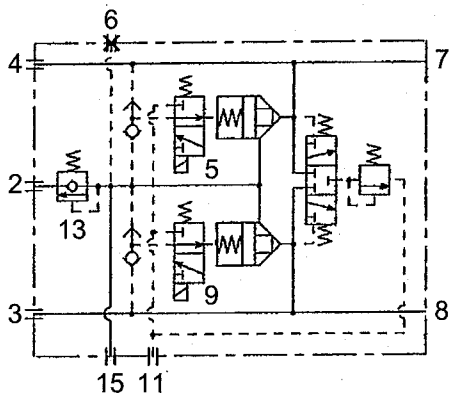
Specifications

• Displacement	: 36.7 cm^3/rev	(2.24 cu.in./rev)	
• Working pressure	: 28 MPa	(4,060 psi)	
• Allowable motor case pressure	: 0.4 MPa	(58.0 psi)	or less
• Weight	: 17 kg	(37 lbs.)	

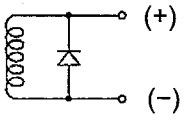
3-2-2. Valve block







Hydraulic circuit diagram



Connection diagram

SW770-04004

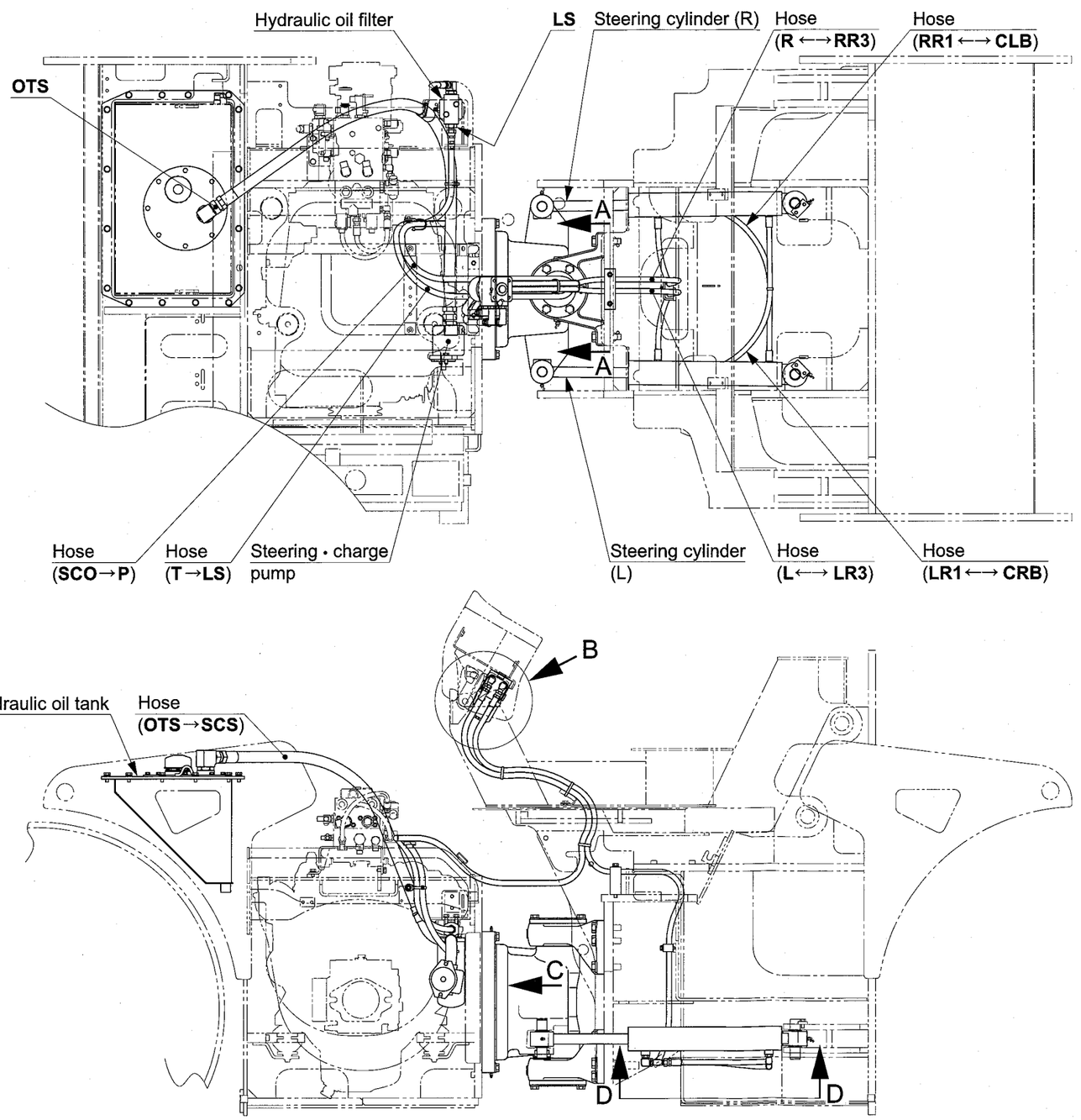
(1) Check valve
(2) Port CP **[BCP]** : 9/16-18UNF
(3) Port A **[VBA]** : 1 1/16-12UN
(4) Port B **[VBB]** : 1 1/16-12UN
(5) Solenoid valve b
(6) Port MP : 7/16-20UNF
(7) Port B1
(8) Port A1
(9) Solenoid valve a
(10) Flushing valve
(11) Port T **[VBT]** : 9/16-18UNF
(12) Check valve
(13) Relief valve (R1)
(14) Body
(15) Port P **[VVP]** : 1 1/16-12UN

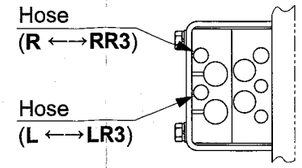
Specifications

• Rated pressure	:	35 MPa	(5,075 psi	)	(2 to 4, 6, 15)
	:	0.5 MPa	(72.5 psi	)	(11)
• Relief valve pressure setting	:	31.5 MPa	(4,568 psi	)	(13)
• Rated flow	:	100 L/min	(26.4 gal./min	)	
• Weight	:	16 kg	(35 lbs.	)	

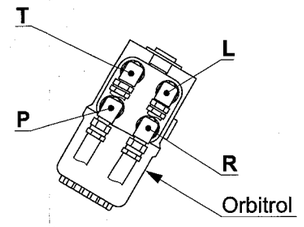
4. STEERING SYSTEM

4-1. Steering Hydraulic Piping

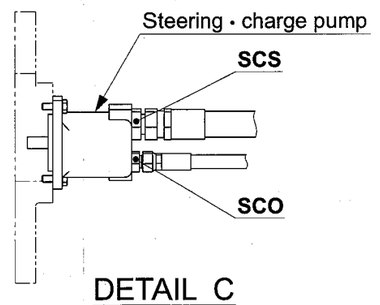




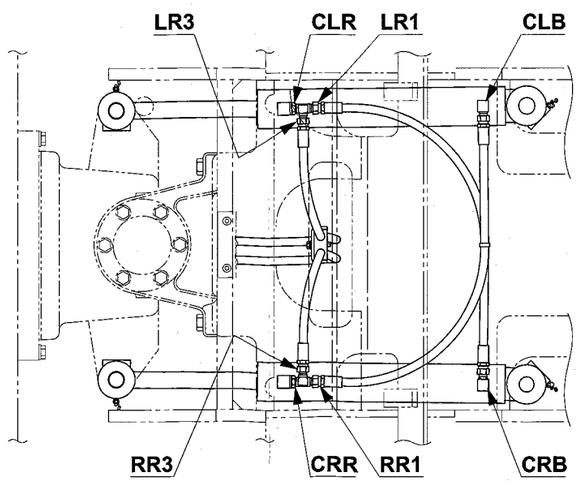
SECTION A-A



DETAIL B



DETAIL C

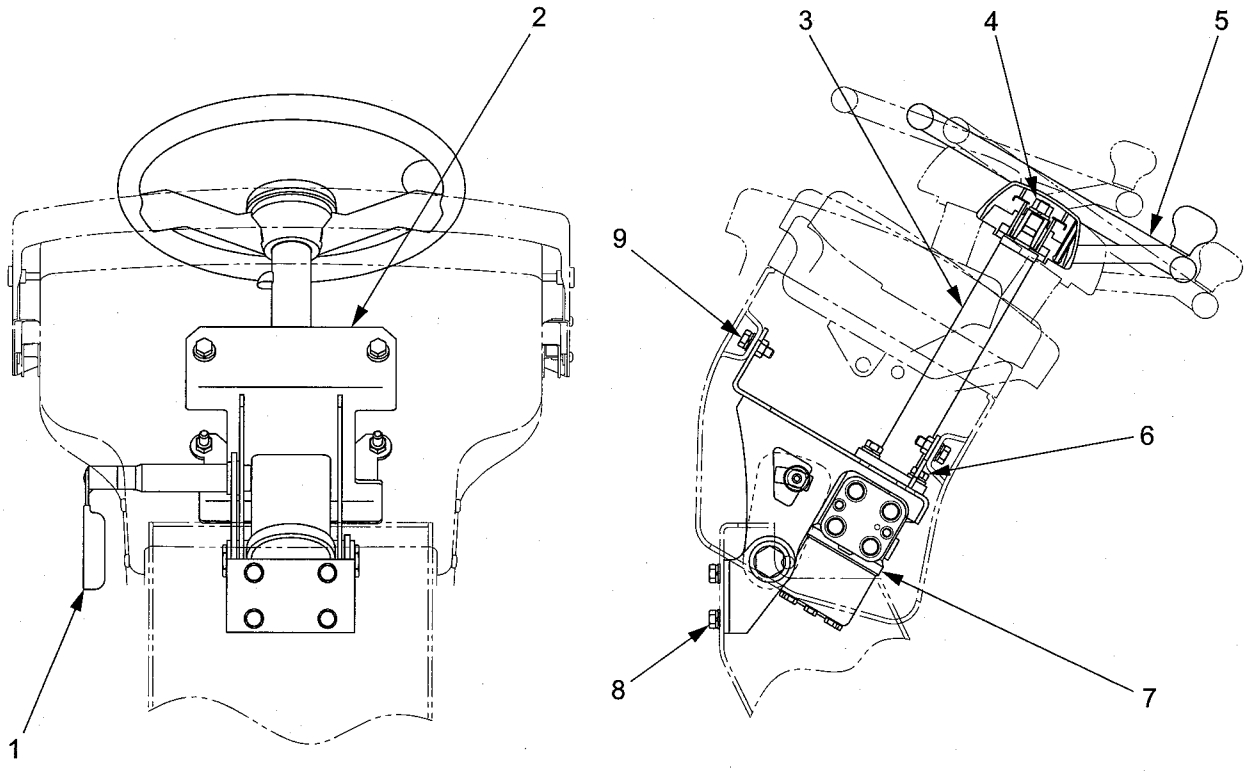


VIEW D-D

0431-32803-0-10078-B

· The letters and figures (such as OTS and SCS) show each port and the arrow (⟷;→) symbols show the hose connection and the direction of the flow of the oil.

4-2. Steering Wheel



0431-32801-0-10036-A

(1) Tilt lock handle
(2) Tilt ASSY
(3) Column shaft
(4) Nut : M12 P=1.25
(5) Steering wheel
(6) Bolt : M10×35
(7) Orbitrol
(8) Bolt : M10×25
(9) Bolt : M10×25

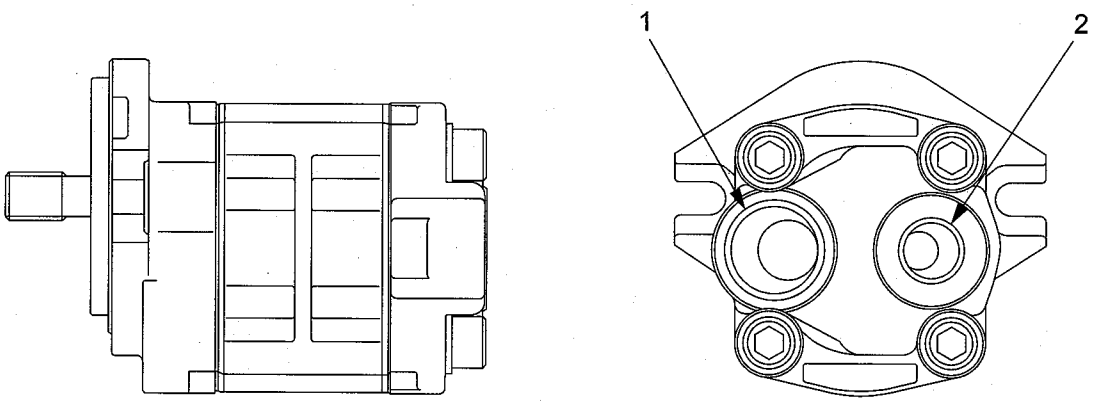
N·m

(4) Nut M12 P=1.25	:	64 N·m	(47 lbf·ft)
(6) Bolt M10×35	:	49 N·m	(36 lbf·ft)
(8) Bolt M10×25	:	49 N·m	(36 lbf·ft)
(9) Bolt M10×25	:	49 N·m	(36 lbf·ft)

• Steering wheel ASSY weight : 18 kg (40 lbs.)

4-3. Hydraulic Component Specifications

4-3-1. Steering • charge pump

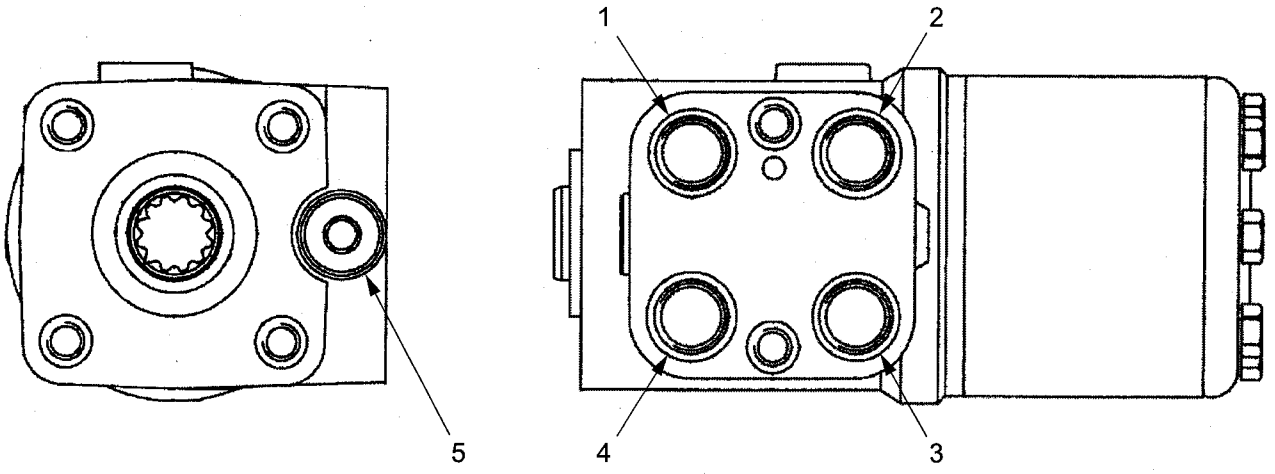


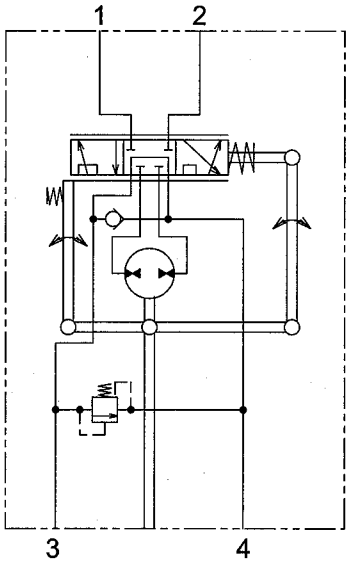
SW770-04005

(1) Inlet port **[SCS]** : G1
(2) Outlet port **[SCO]** : G1/2

Specifications
- Displacement : 23.7 cm^3/rev (1.4 cu.in./rev)
- Weight : 3.7 kg (8.2 lbs.)

4-3-2. Orbitrol





Hydraulic circuit diagram

SV510-III-04010

(1) Port L **[L]** : 3/4-16UNF
(2) Port R **[R]** : 3/4-16UNF
(3) Port P **[P]** : 3/4-16UNF
(4) Port T **[T]** : 3/4-16UNF
(5) Relief valve

Specifications

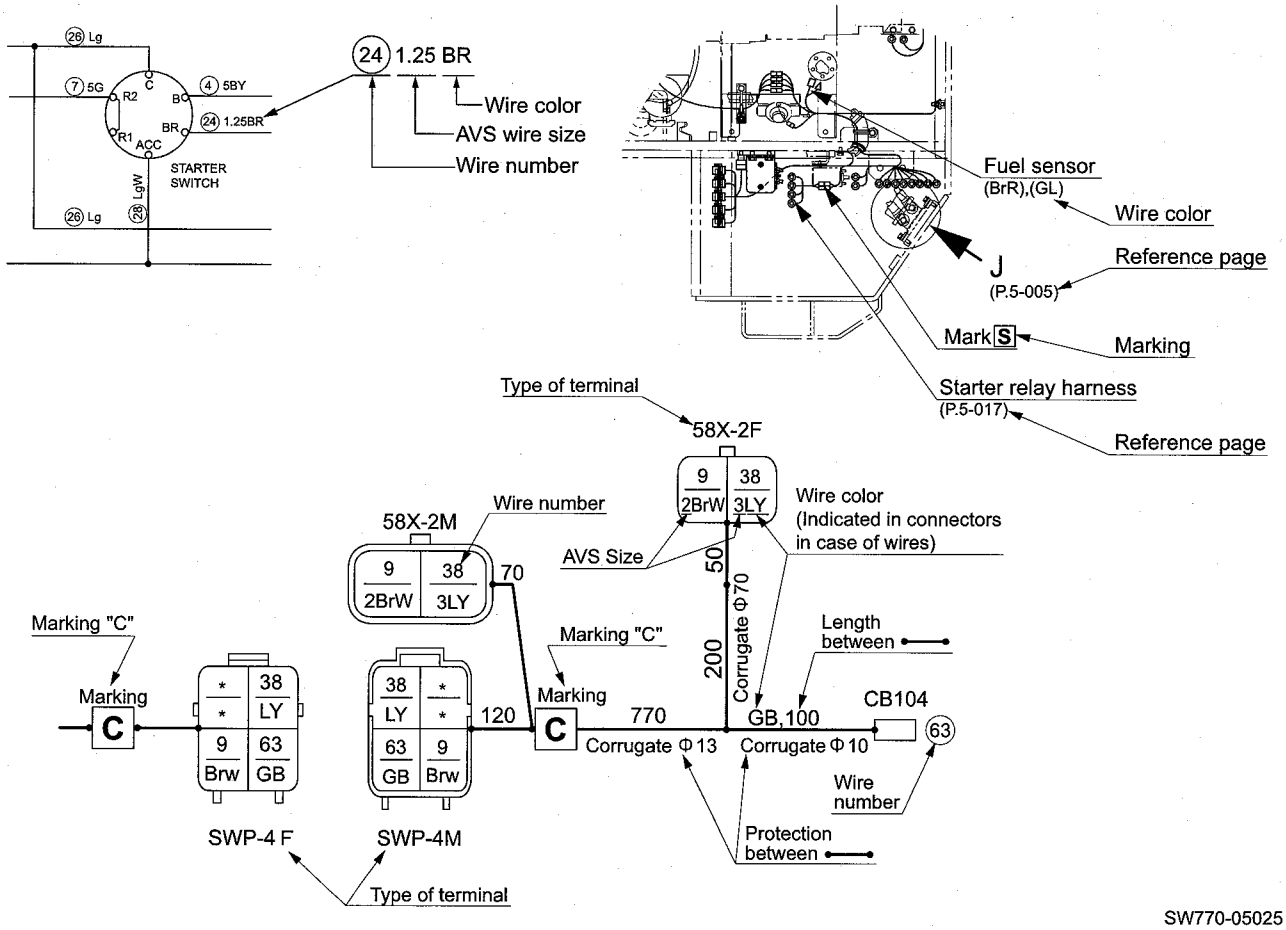
- Displacement : 400 cm^3/rev (24.4 cu.in./rev)
- Relief valve pressure setting : 15.0 MPa (2,175 psi)
- Weight : 7 kg (15 lbs.)

ELECTRICAL SYSTEM

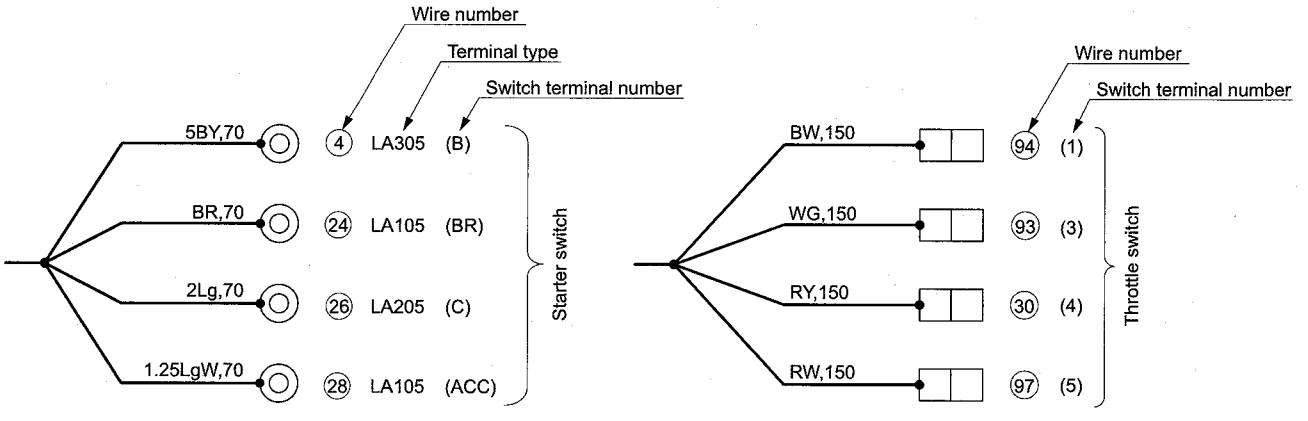
1. PRECAUTIONS FOR WORK

1-1. Wire Numbers, Wire Sizes, Wire Colors and Connectors Shown in Electrical Circuit Diagram, Wiring Harness Layout and Wiring Harnesses

- Codes used in electrical circuit diagrams give the following information.
- The wire size is AVS 0.85 unless otherwise specified.



- The pin or socket layout of mating connectors are symmetrical, either vertically or horizontally. When the connector halves are connected, the pin and socket that have the same number are connected.
- When connector has mark (i.e. C), connect with connector of certainly same mark.

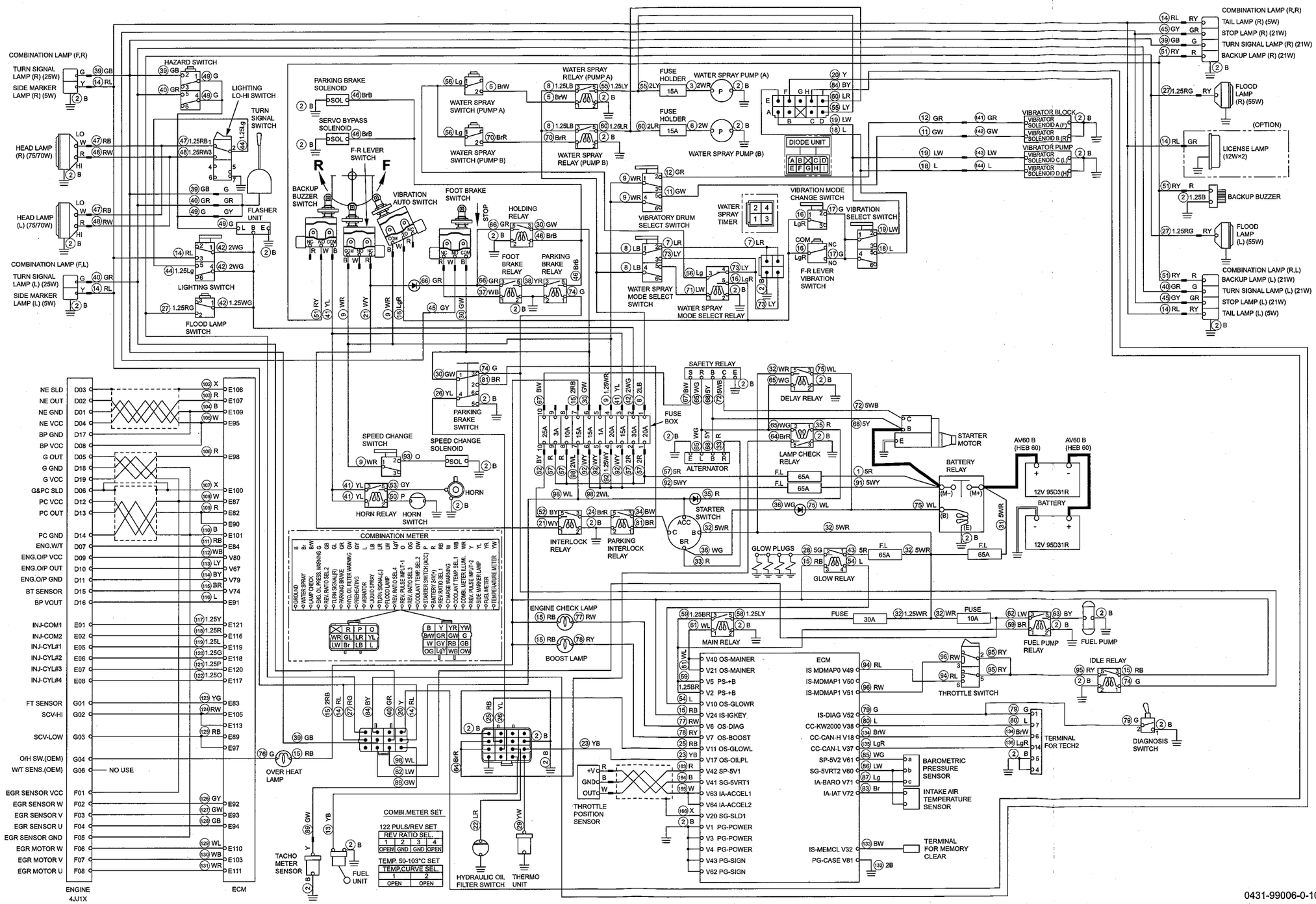


- Wire color code chart

B	Black	BW	Black/ White stripe	BY	Black/ Yellow stripe	BR	Black/ Red stripe	BG	Black/ Green stripe	BL	Black/ Blue stripe			O	Orange	YO	Yellow/ Orange stripe
W	White	WR	White/ Red stripe	WB	White/ Black stripe	WL	White/ Blue stripe	WY	White/ Yellow stripe	WG	White/ Green stripe					LO	Blue/ Orange stripe
R	Red	RW	Red/ White stripe	RB	Red/ Black stripe	RY	Red/ Yellow stripe	RG	Red/ Green stripe	RL	Red/ Blue stripe					GO	Green/ Orange stripe
G	Green	GW	Green/ White stripe	GR	Green/ Red stripe	GY	Green/ Yellow stripe	GB	Green/ Black stripe	GL	Green/ Blue stripe			Gy	Gray	GyR	Gray/ Red stripe
Y	Yellow	YR	Yellow/ Red stripe	YB	Yellow/ Black stripe	YG	Yellow/ Green stripe	YL	Yellow/ Blue stripe	YW	Yellow/ White stripe					GyL	Gray/ Blue stripe
Br	Brown	BrW	Brown/ White stripe	BrR	Brown/ Red stripe	BrY	Brown/ Yellow stripe	BrB	Brown/ Black stripe	BrG	Brown/ Green stripe	BrL	Brown/ Blue stripe	Sb	Sky blue		
L	Blue	LW	Blue/ White stripe	LR	Blue/ Red stripe	LY	Blue/ Yellow stripe	LB	Blue/ Black stripe	LG	Blue/ Green stripe			P	Pink	PB	Pink/ Black stripe
Lg	Light green	LgR	Light green/ Red stripe	LgY	Light green/ Yellow stripe	LgB	Light green/ Black stripe	LgW	Light green/ White stripe	LgL	Light green/ Blue stripe			Pu	Purple		

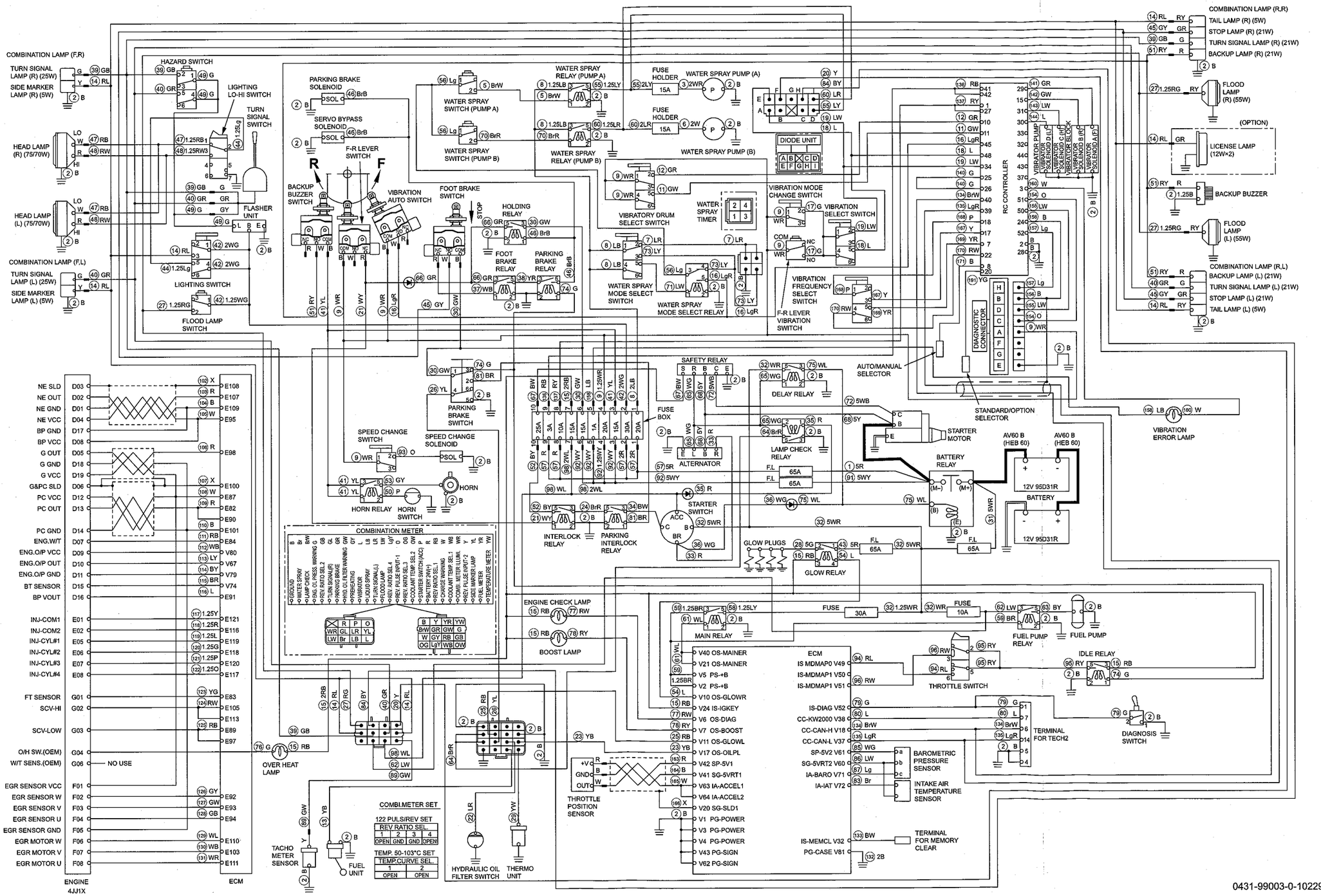
2. SYSTEM CIRCUIT DIAGRAM

2-1. Electrical Circuit Diagram (SW770)



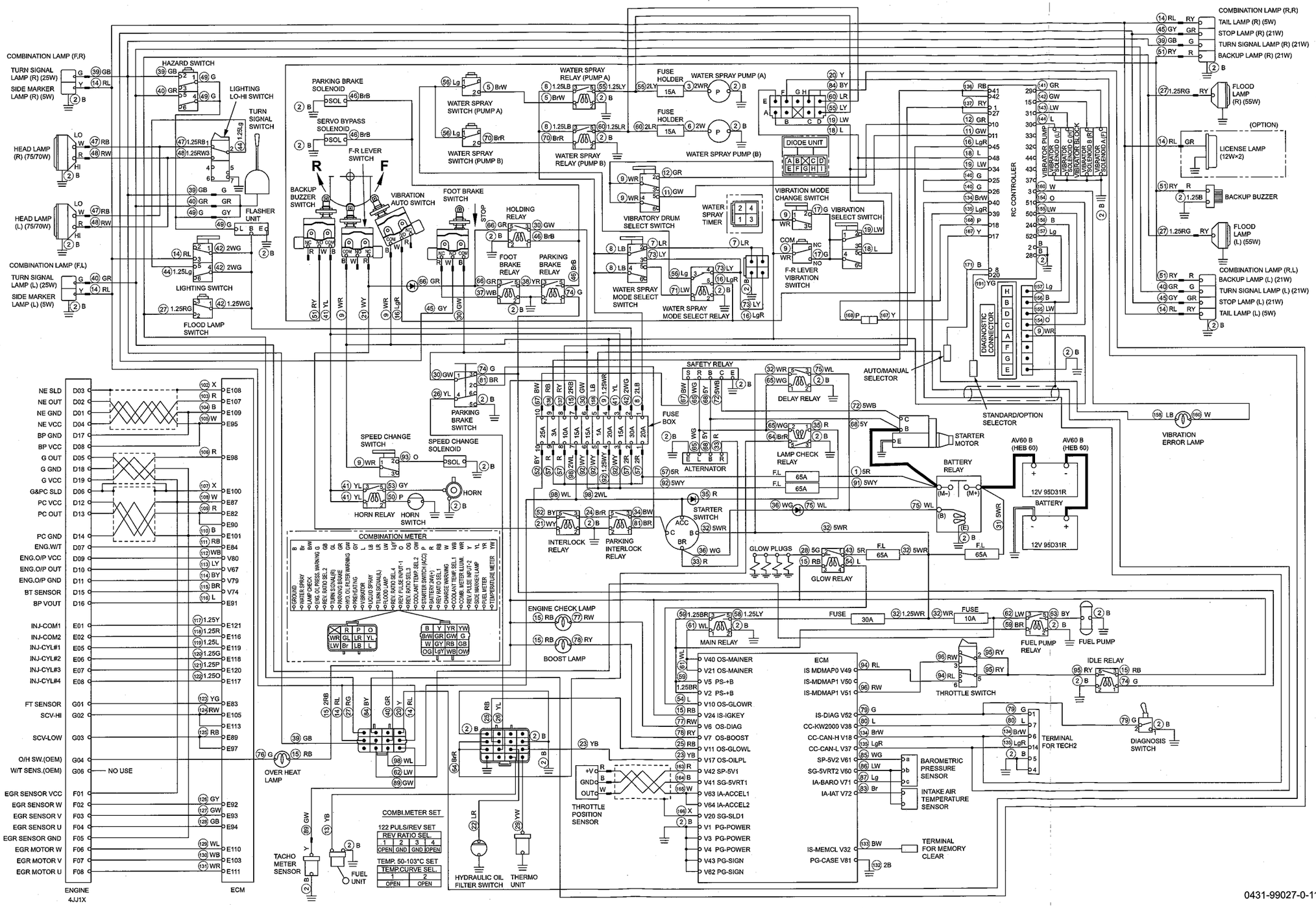
0431-99006-0-10250-C

2-2. Electrical Circuit Diagram (SW770HF)



0431-99003-0-10229-B

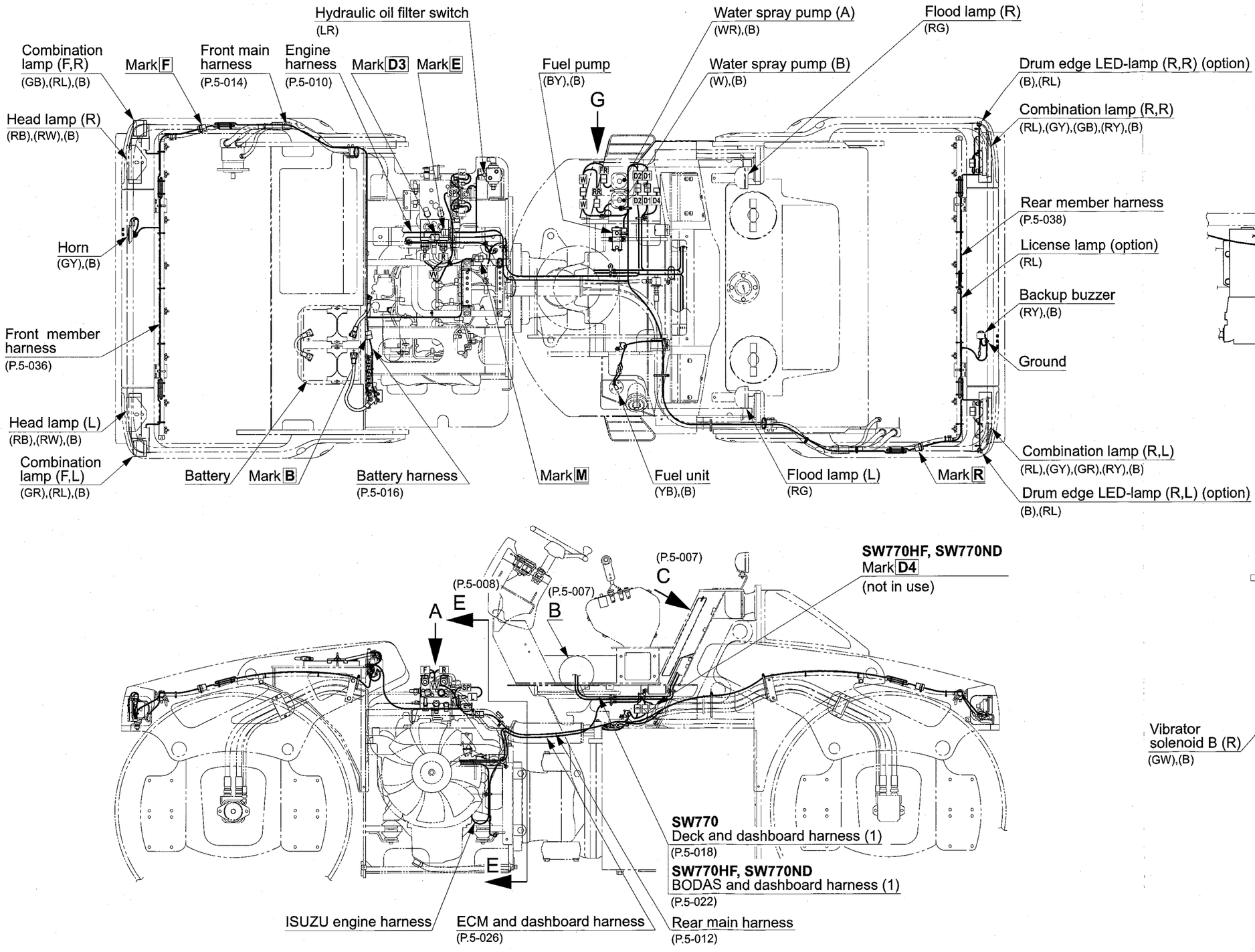
2-3. Electrical Circuit Diagram (SW770ND)



0431-99027-0-11121-A

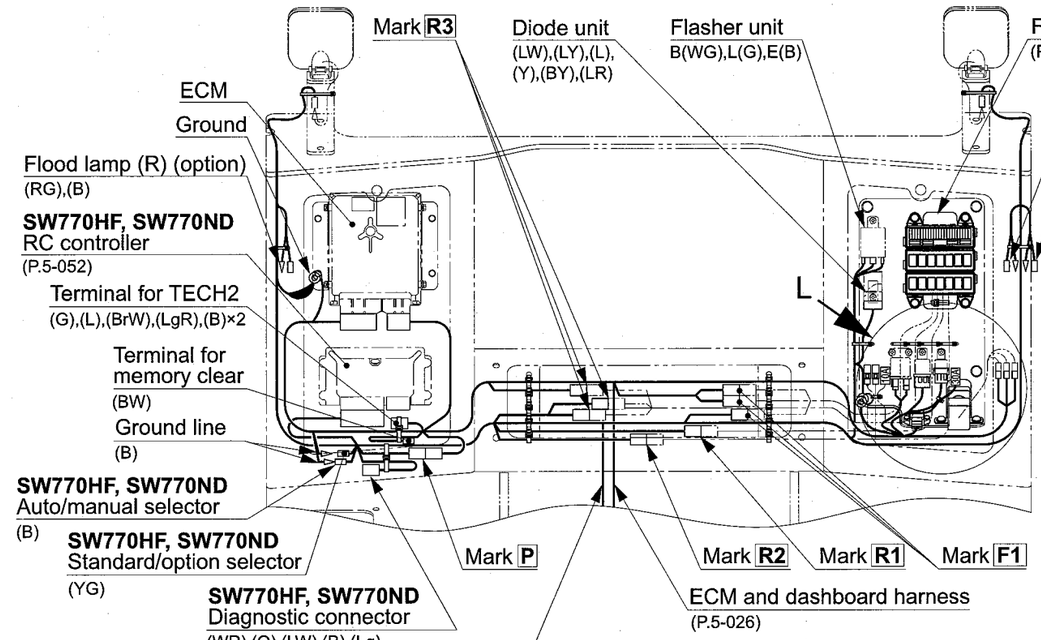
3. WIRING HARNESS LAYOUT

3-1. Wiring Harness Layout (1)

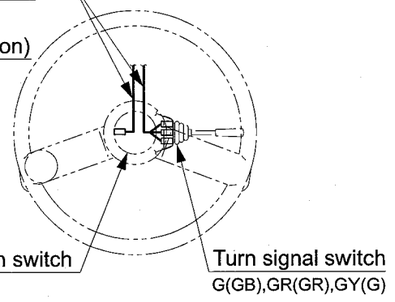


0431-09815-0-10754-B
0431-09816-0-10843-B

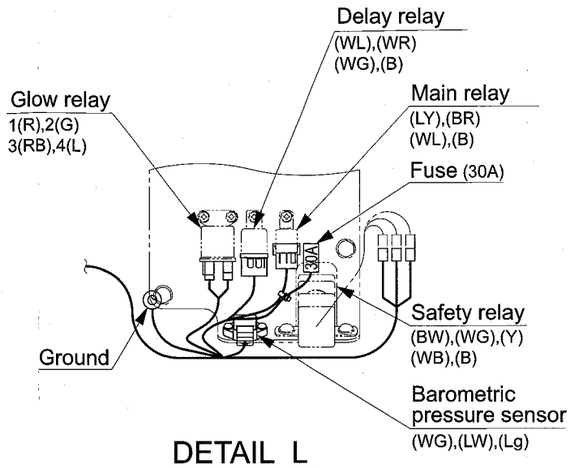
3-2. Wiring Harness Layout (2)



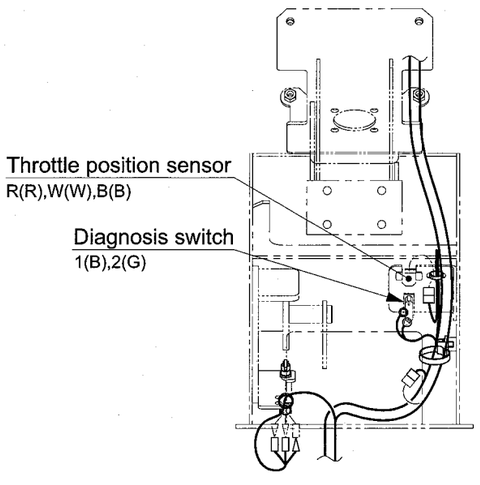
VIEW C



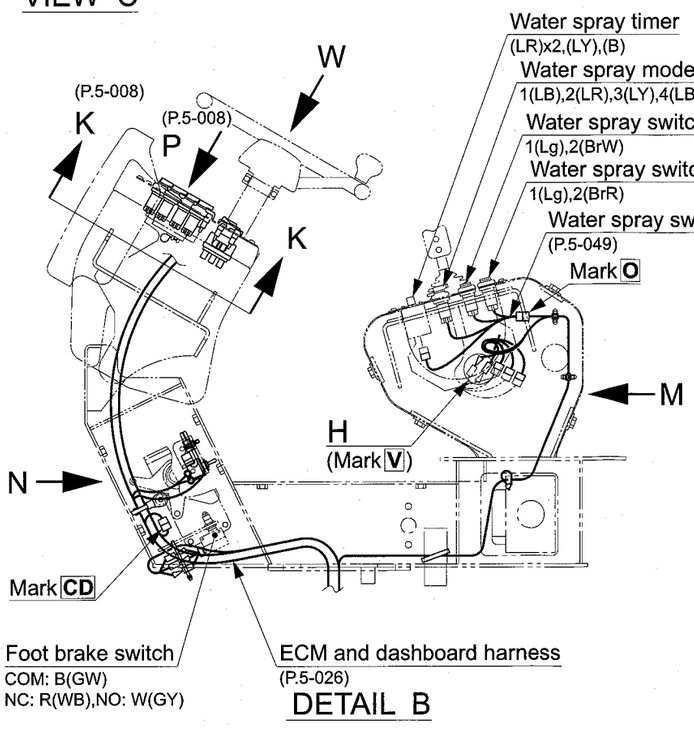
VIEW W



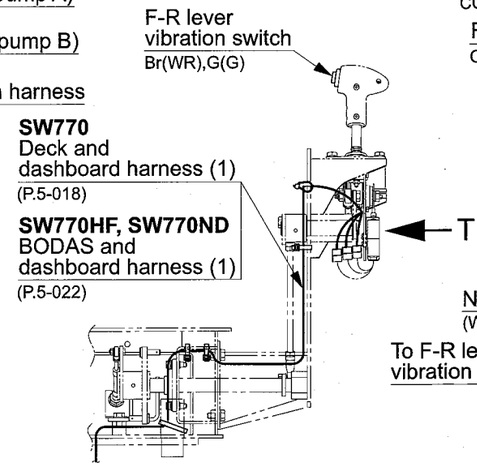
DETAIL L



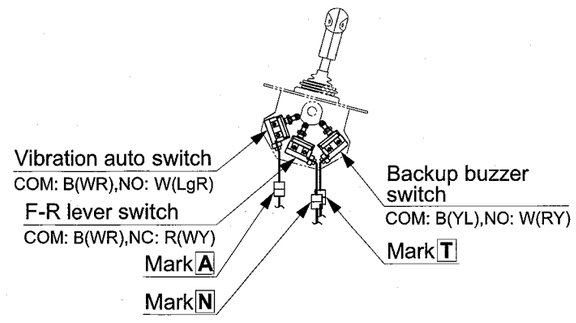
VIEW N



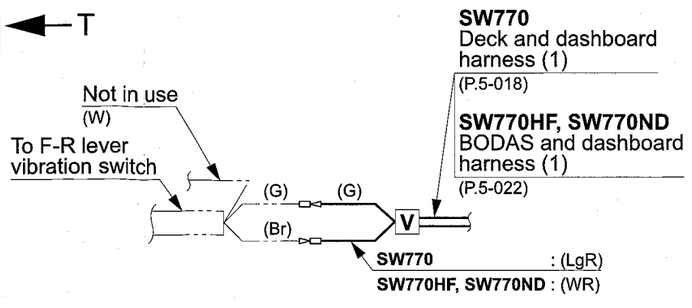
DETAIL B



VIEW M



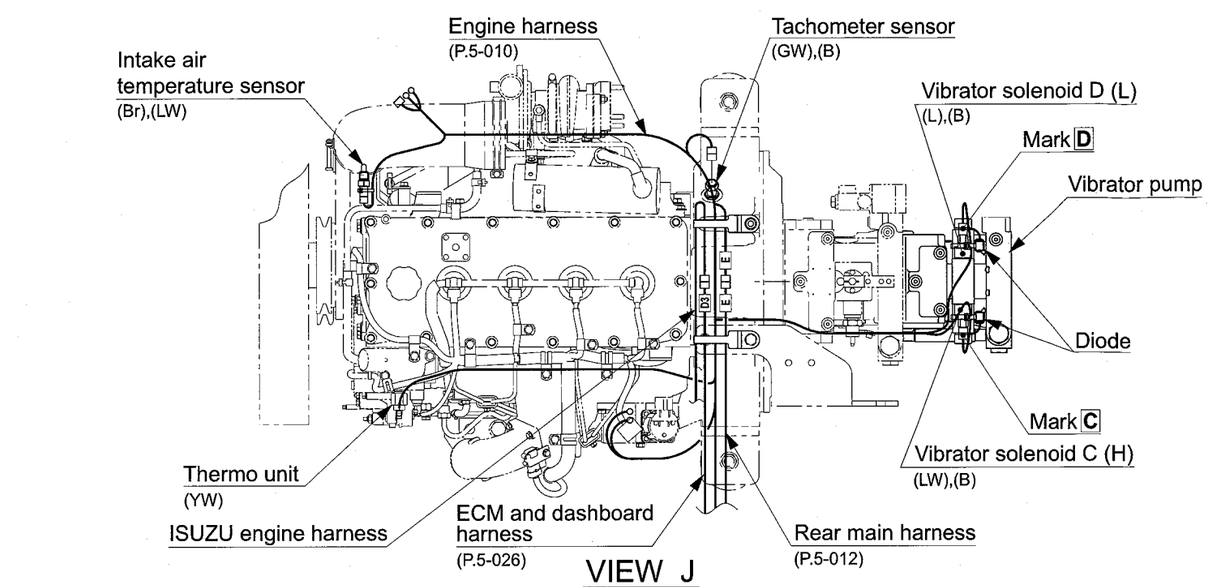
VIEW T

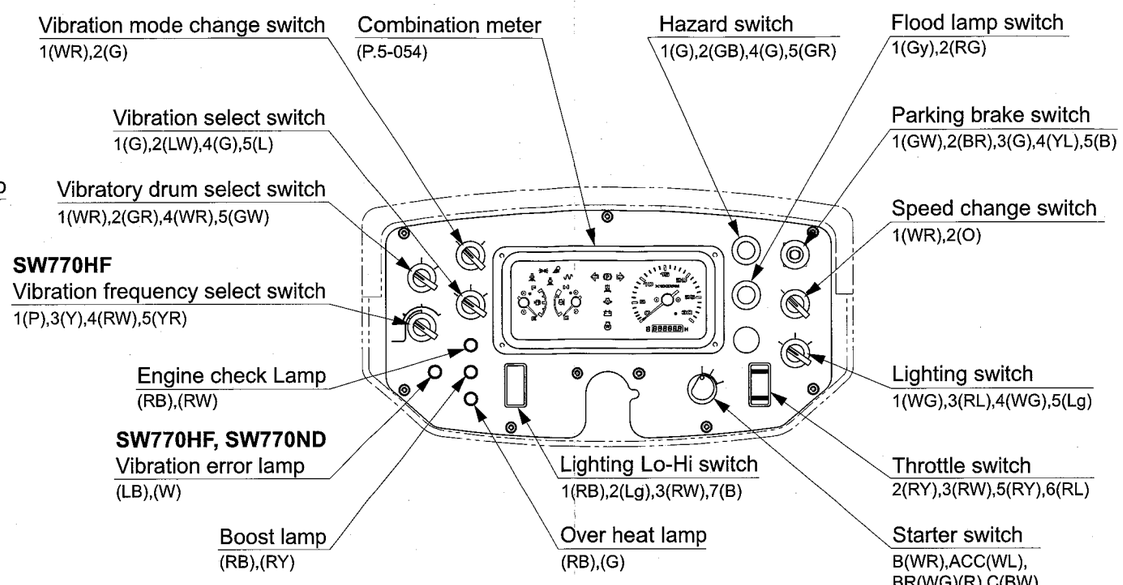


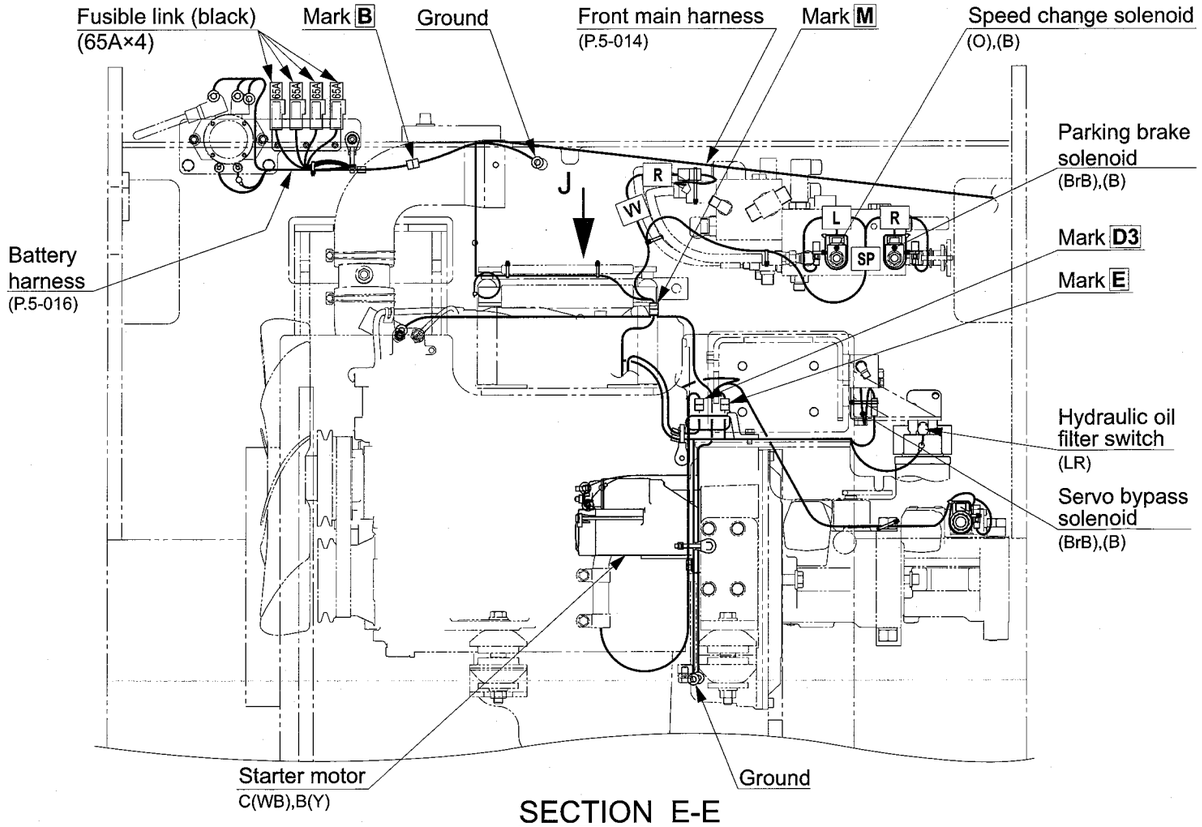
DETAIL H

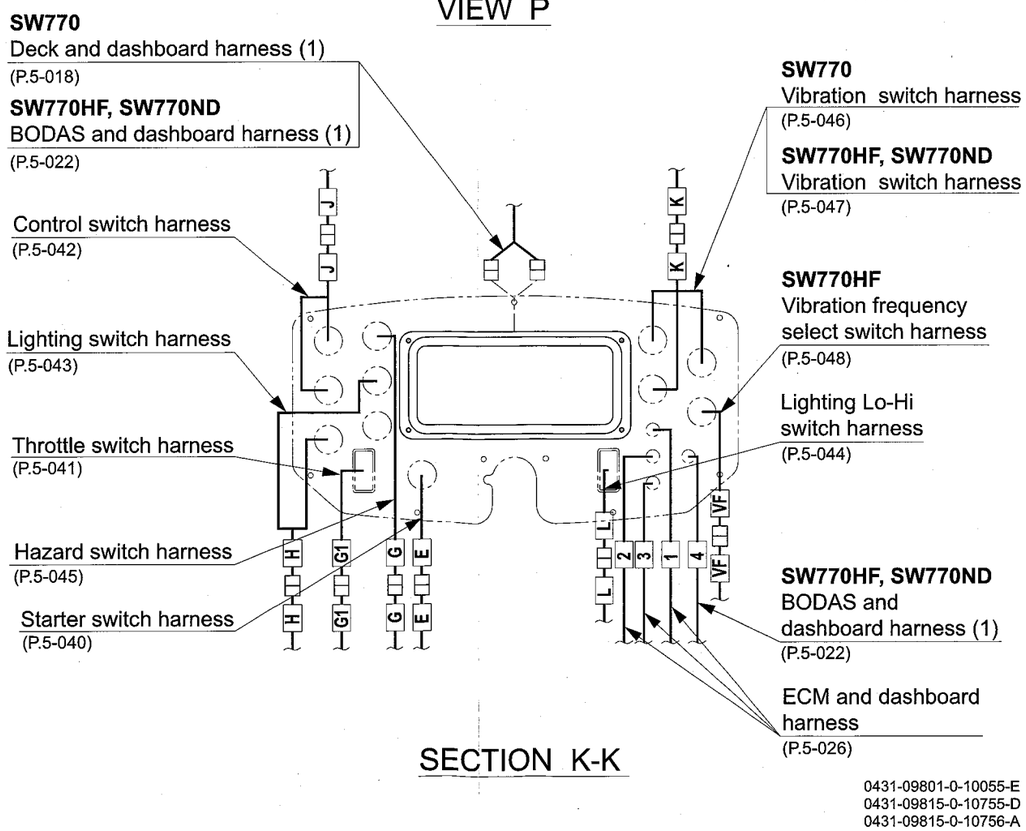
0431-09815-0-10755-D
0431-09816-0-10844-C

3-3. Wiring Harness Layout (3)



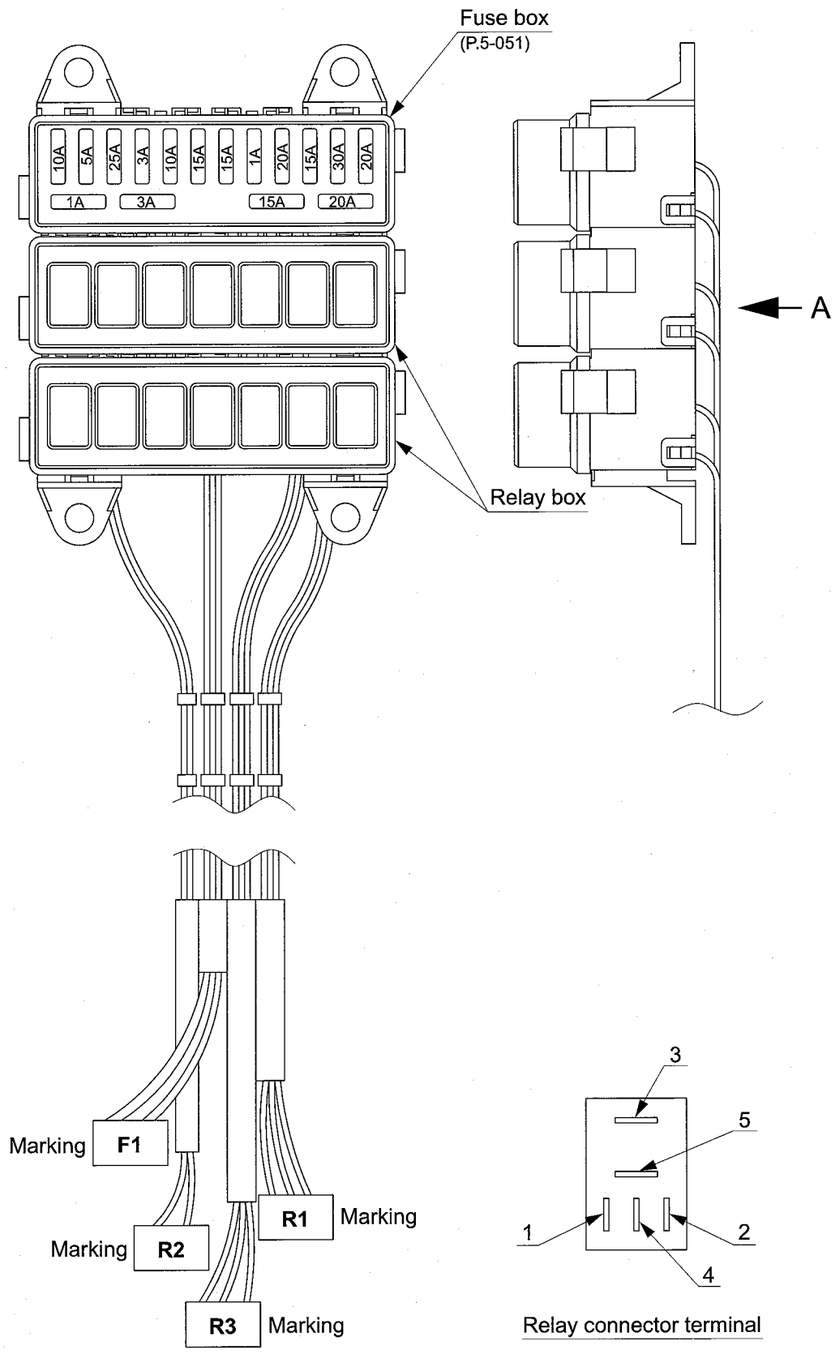




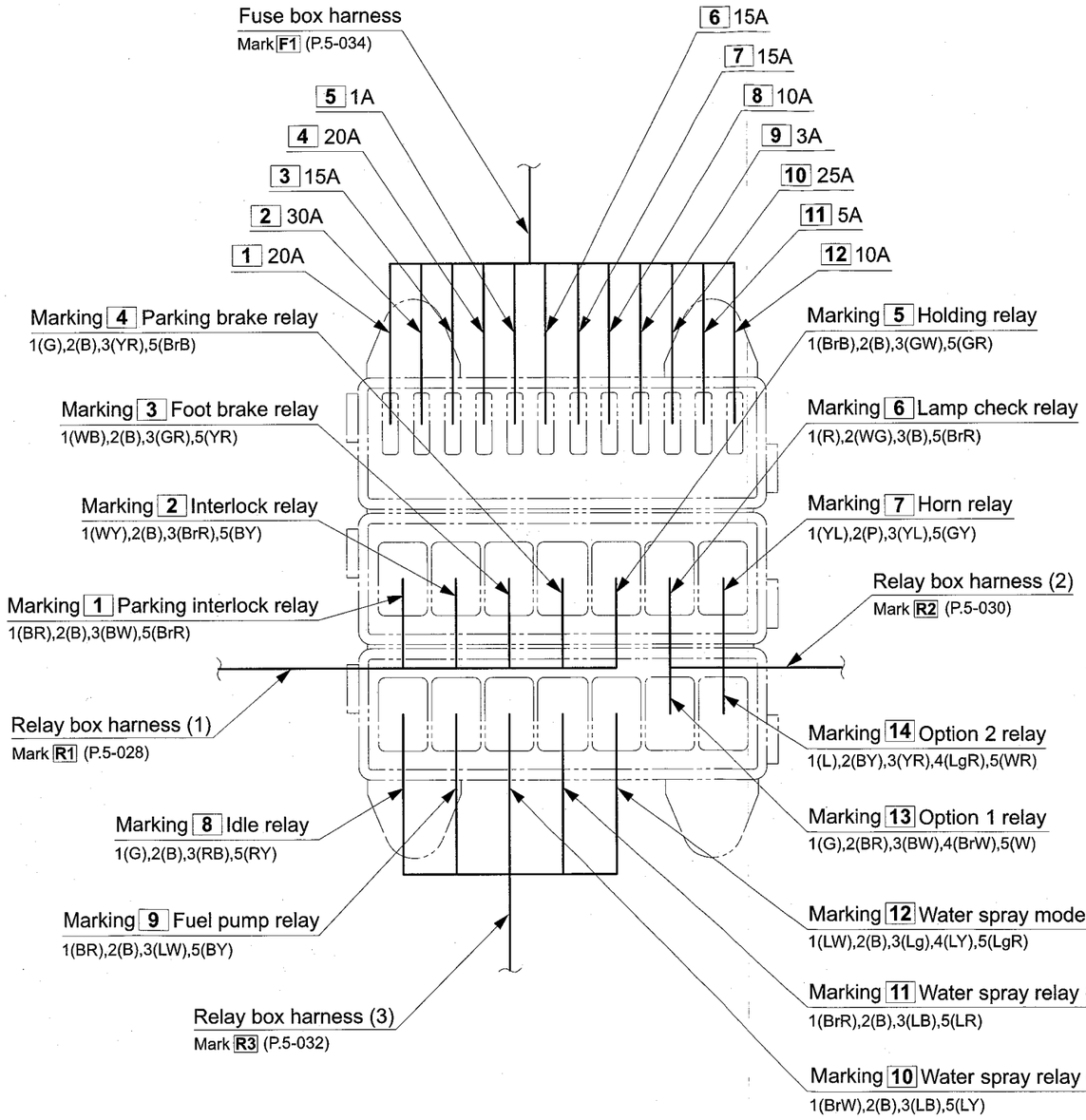


0431-09801-0-10055-E
0431-09815-0-10755-D
0431-09815-0-10756-A

3-4. Fuse Box and Relay Box



Relay connector terminal

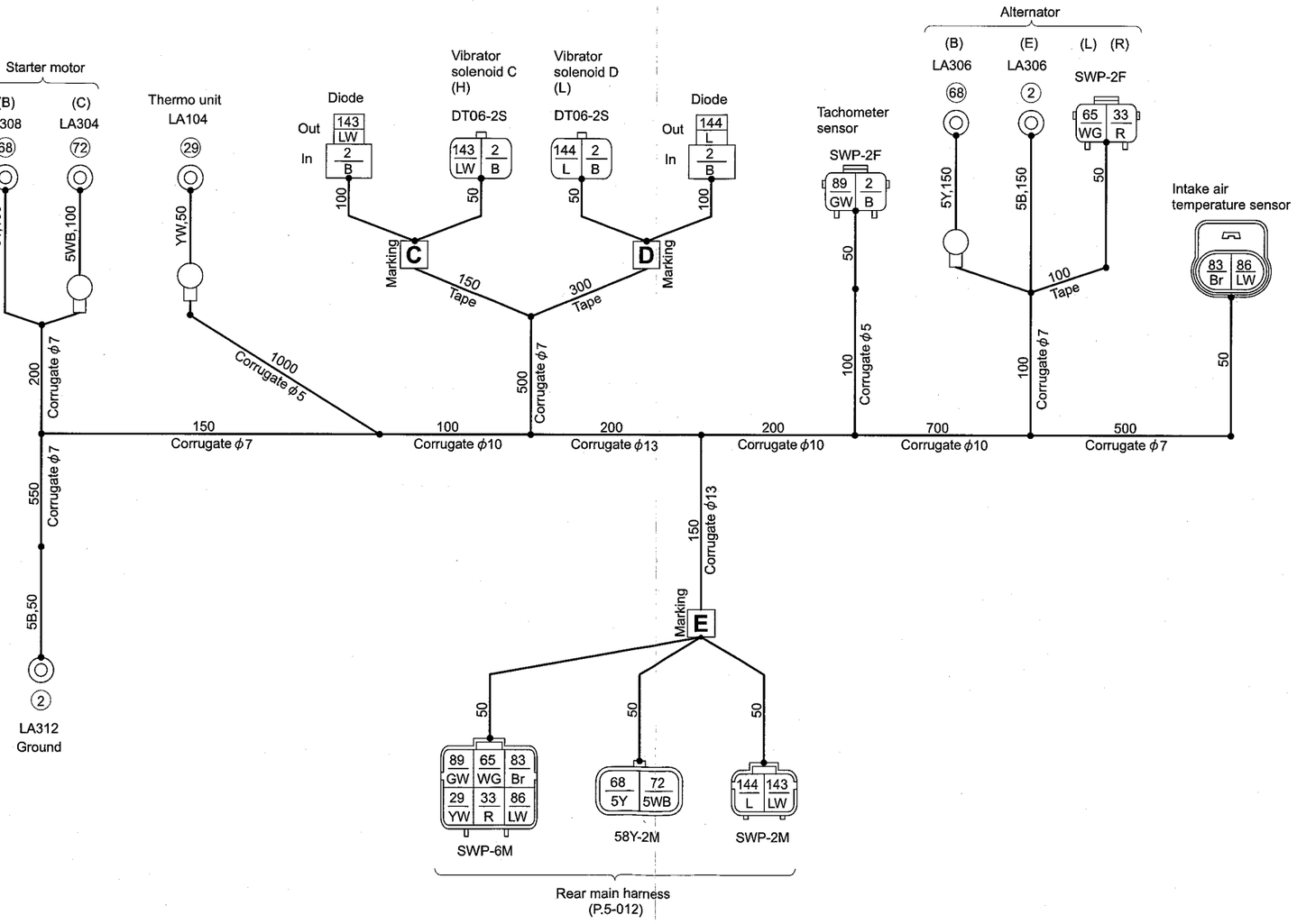


VIEW A

0431-09003-1-10841-A

4. WIRING HARNESSES

4-1. Engine Harness

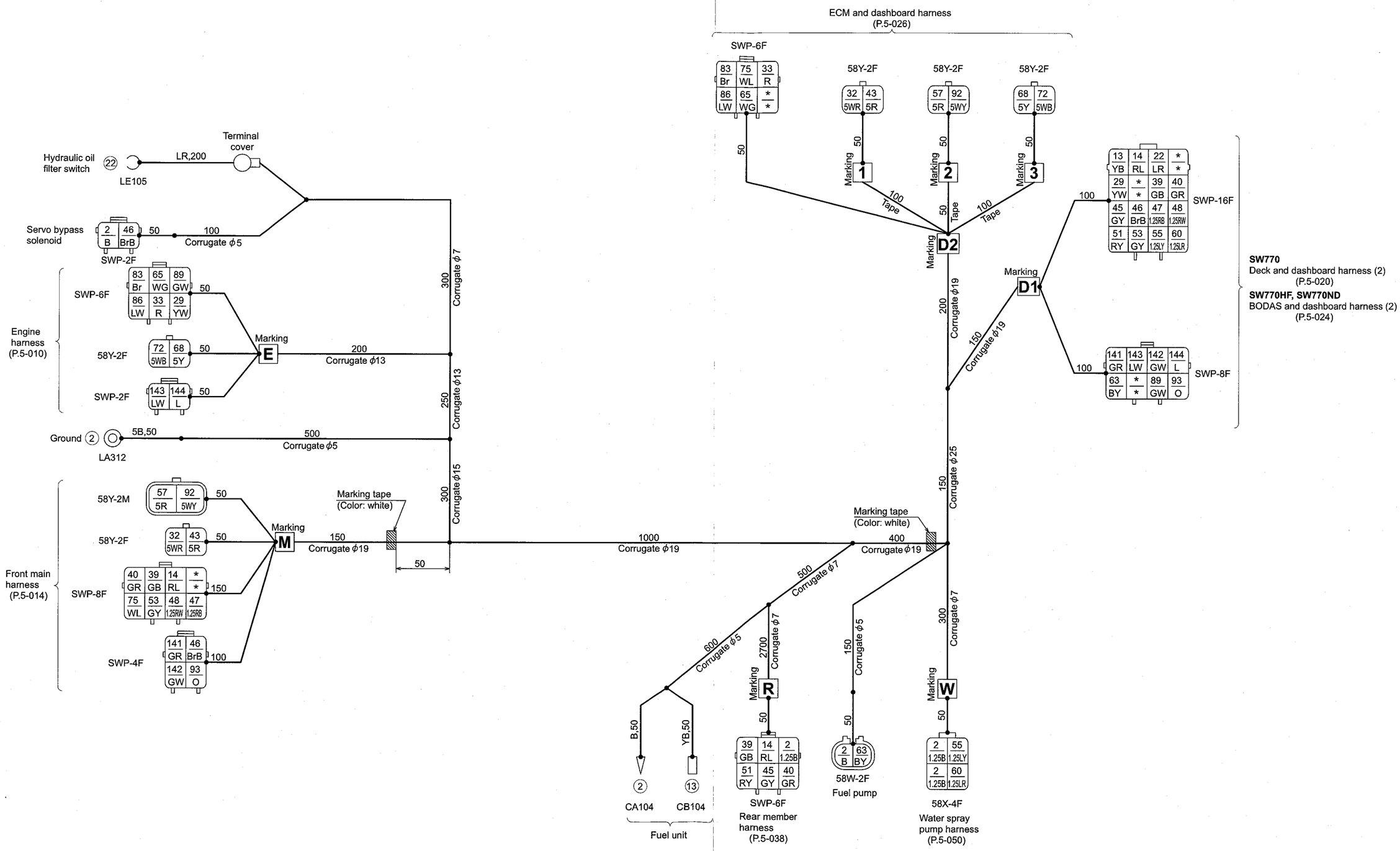


SW770-05001

NO.	SIZE, COLOR	CONTACT POINTS	CONNECTION
②	B, 5B	7	C × 2, D × 2, Alternator-(E), Ground, Tachometer sensor
㉙	YW	2	E, Thermo unit
㉝	R	2	E, Alternator-(R)
㊺	WG	2	E, Alternator-(L)
㊽	5Y	3	E, Alternator-(B), Starter motor-(B)
㉒	5WB	2	E, Starter motor-(C)

NO.	SIZE, COLOR	CONTACT POINTS	CONNECTION
㉓	Br	2	E, Intake air temperature sensor
㊻	LW	2	E, Intake air temperature sensor
㊾	GW	2	E, Tachometer sensor
⑭③	LW	3	C × 2, E
⑭④	L	3	D × 2, E

4-2. Rear Main Harness

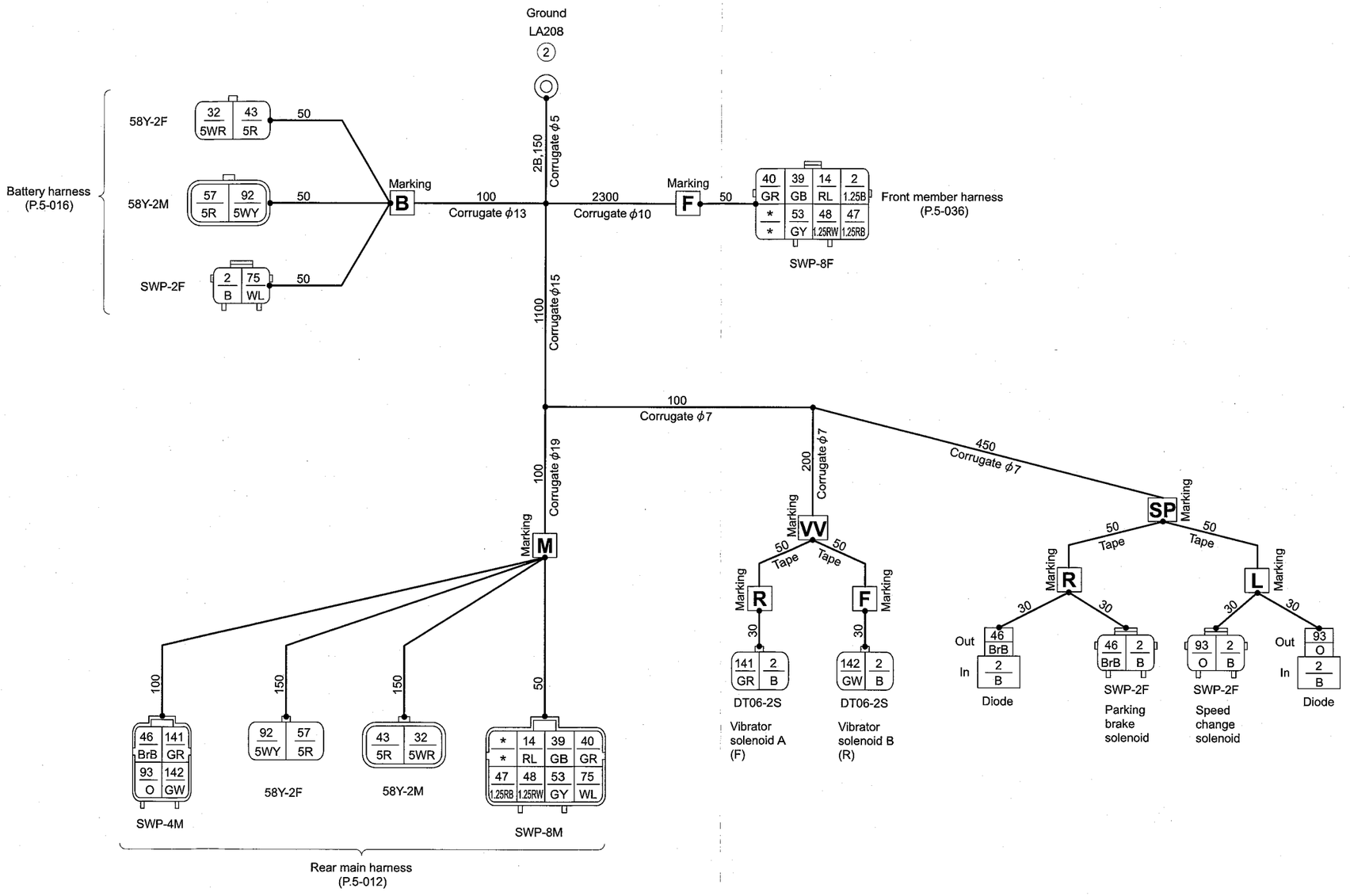


SW770-05002

NO.	SIZE, COLOR	CONTACT POINTS	CONNECTION
②	B, 1,25B, 5B	7	R, W × 2, Fuel pump, Fuel unit, Ground, Servo bypass solenoid
⑬	YB	2	D1 (16F), Fuel unit
⑭	RL	3	D1 (16F), M (8F), R
㉒	LR	2	D1 (16F), Hydraulic oil filter switch
㉙	YW	2	D1 (16F), E
㉜	5WR	2	D2-1, M (2F)
㉝	R	2	D2, E
㊴	GB	3	D1 (16F), M (8F), R
㊵	GR	3	D1 (16F), M (8F), R
㊸	5R	2	D2-1, M (2F)
㊺	GY	2	D1 (16F), R
㊻	BrB	3	D1 (16F), M (4F), Servo bypass solenoid
㊼	1.25RB	2	D1 (16F), M (8F)
㊽	1.25RW	2	D1 (16F), M (8F)
㊶	RY	2	D1 (16F), R
㊸	GY	2	D1 (16F), M (8F)
㊺	1.25LY	2	D1 (16F), W

NO.	SIZE, COLOR	CONTACT POINTS	CONNECTION
㊼	5R	2	D2-2, M (2M)
㊿	1.25LR	2	D1 (16F), W
㊸	BY	2	D1 (8F), Fuel pump
㊺	WG	2	D2, E
㊽	5Y	2	D2-3, E
㊷	5WB	2	D2-3, E
㊺	WL	2	D2, M (8F)
㊸	Br	2	D2, E
㊻	LW	2	D2, E
㊾	GW	2	D1 (8F), E
㊷	5WY	2	D2-2, M (2M)
㊸	O	2	D1 (8F), M (4F)
㊶	GR	2	D1 (8F), M (4F)
㊷	GW	2	D1 (8F), M (4F)
㊸	LW	2	D1 (8F), E
㊹	L	2	D1 (8F), E

4-3. Front Main Harness

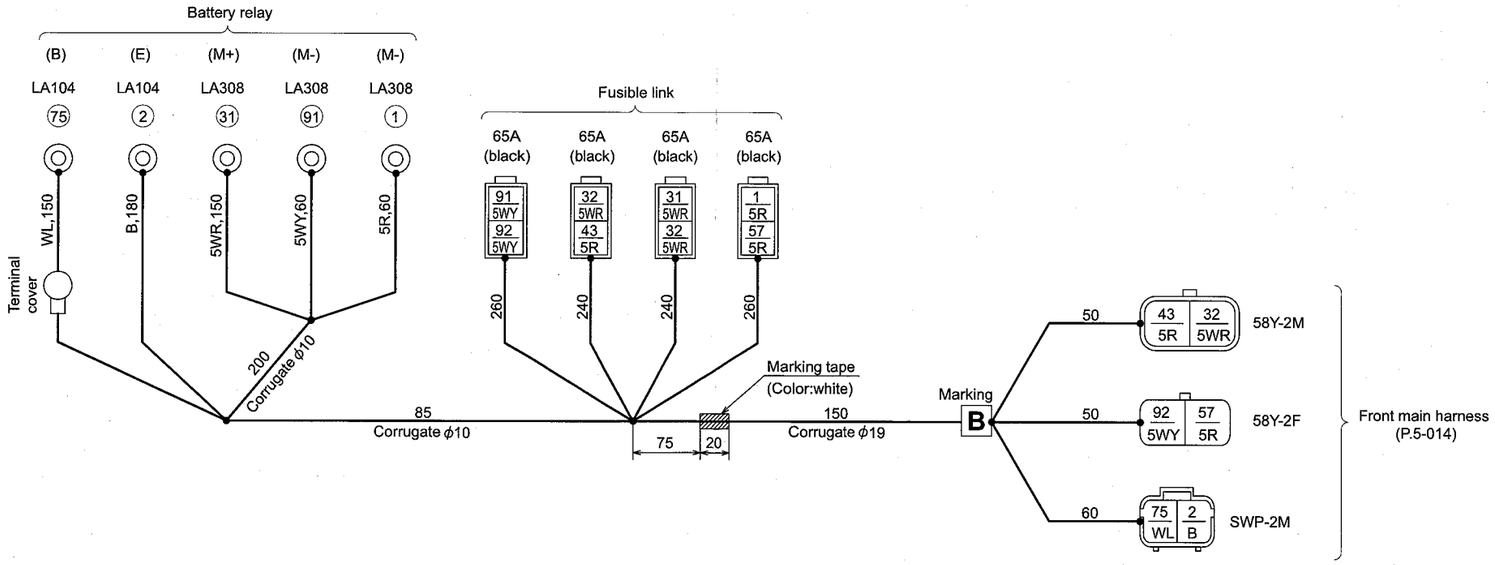


SW770-05003

NO.	SIZE, COLOR	CONTACT POINTS	CONNECTION
②	B, 1.25B, 2B	9	B, F, SP-L × 2, SP-R × 2, VV-F, VV-R, Ground
⑭	RL	2	F, M (8M)
㉜	5WR	2	B, M (2M)
㊴	GB	2	F, M (8M)
㊵	GR	2	F, M (8M)
㊸	5R	2	B, M (2M)
㊻	BrB	3	M (4M), SP-R × 2
㊼	1.25RB	2	F, M (8M)

NO.	SIZE, COLOR	CONTACT POINTS	CONNECTION
㊽	1.25RW	2	F, M (8M)
㊸	GY	2	F, M (8M)
㊼	5R	2	B, M (2F)
㊺	WL	2	B, M (8M)
㊷	5WY	2	B, M (2F)
㊸	O	3	M (4M), SP-L × 2
㊶	GR	2	M (4M), VV-R
㊷	GW	2	M (4M), VV-F

4-4. Battery Harness



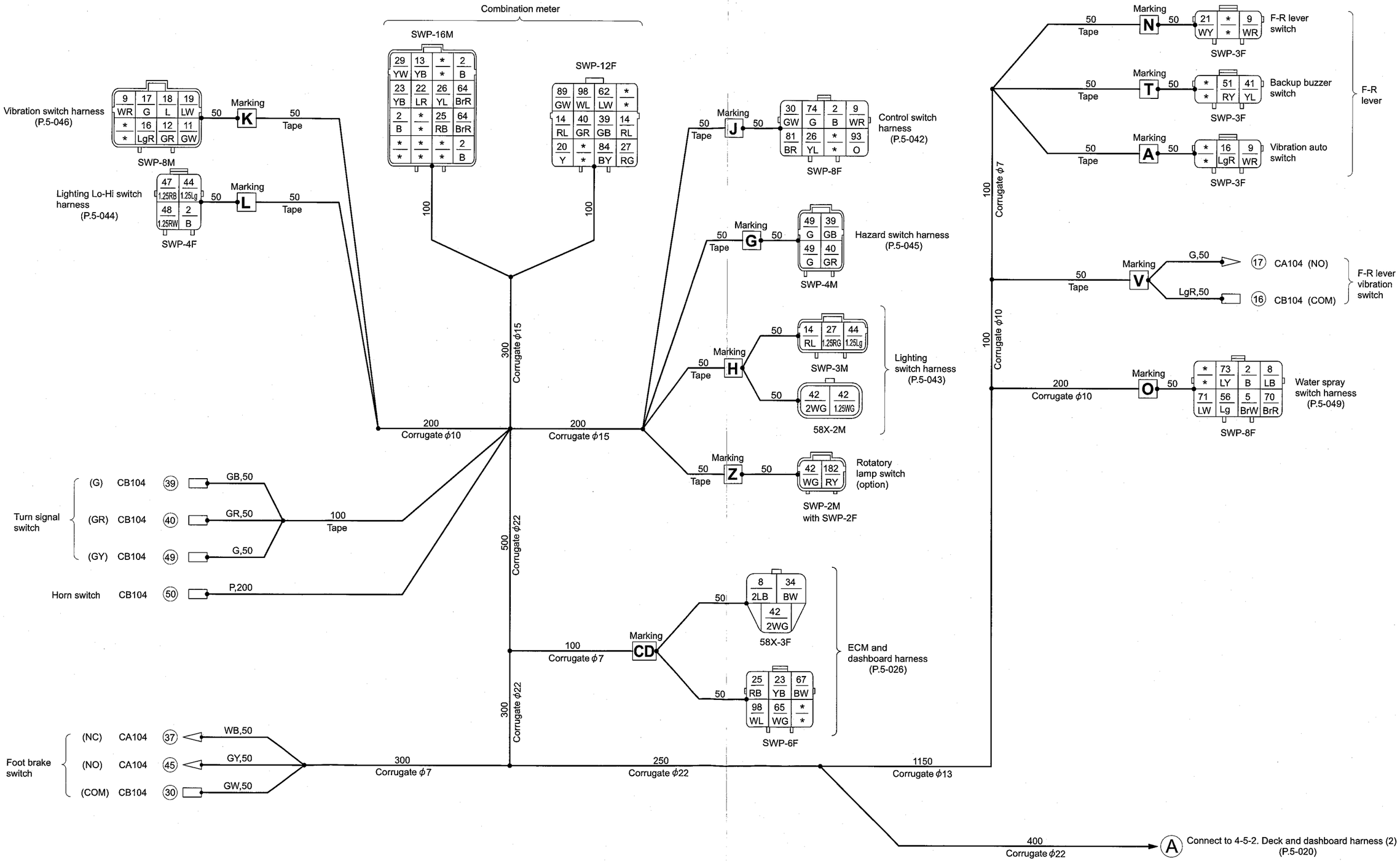
SW770-05004

NO.	SIZE, COLOR	CONTACT POINTS	CONNECTION
①	5R	2	Battery relay-(M−), Fusible link 65A
②	B	2	[B], Battery relay-(E)
㉛	5WR	2	Battery relay-(M+), Fusible link 65A
㉜	5WR	3	[B], Fusible link 65A × 2
㊸	5R	2	[B], Fusible link 65A

NO.	SIZE, COLOR	CONTACT POINTS	CONNECTION
㊼	5R	2	[B], Fusible link 65A
㊺	WL	2	[B], Battery relay-(B)
㊶	5WY	2	Battery relay-(M−), Fusible link 65A
㊷	5WY	2	[B], Fusible link 65A

4-5. Deck and Dashboard Harness (SW770)

4-5-1. Deck and dashboard harness (1)

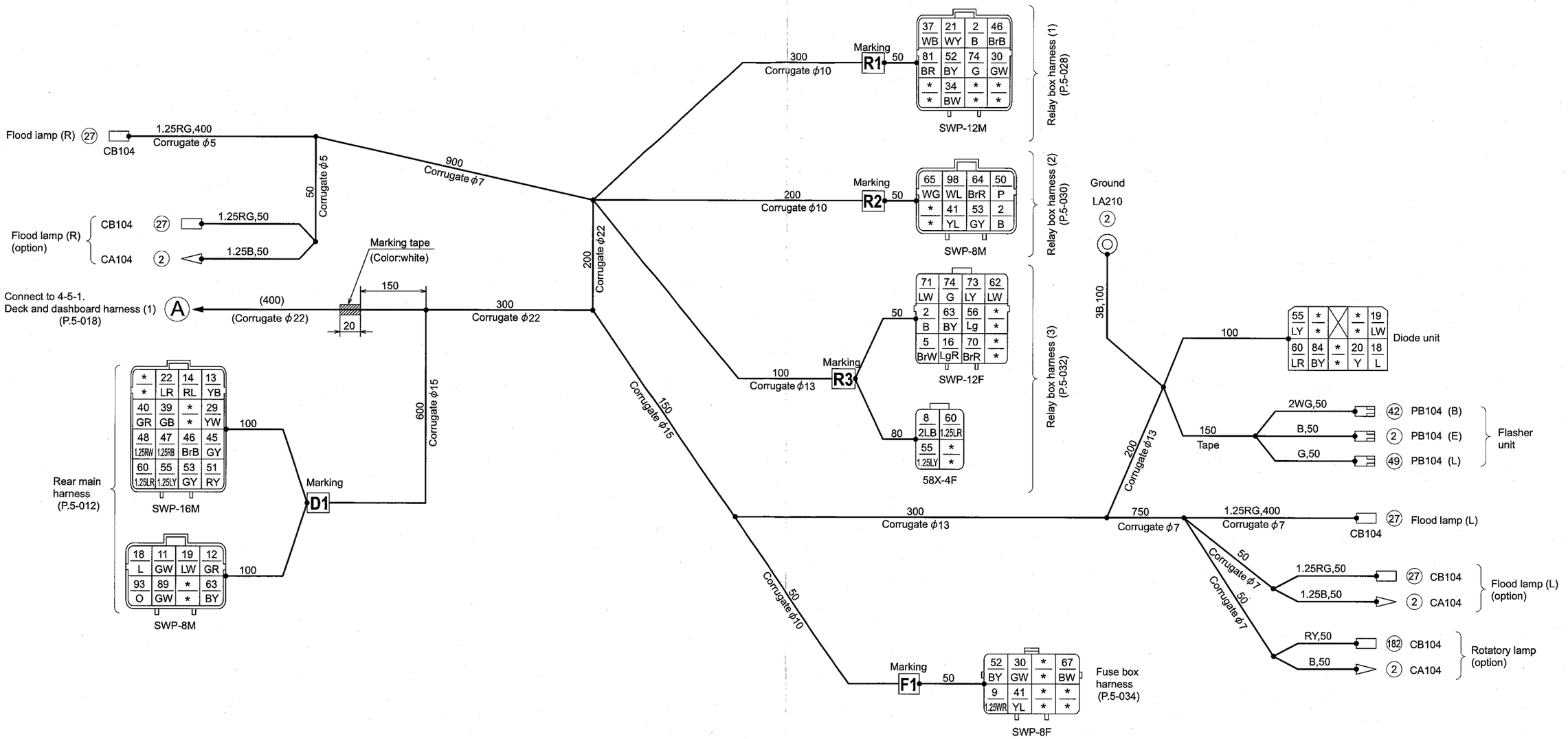


SW770-05005

NO.	SIZE, COLOR	CONTACT POINTS	CONNECTION	
			Deck and dashboard harness (1)	Deck and dashboard harness (2)
②	B, 1.25B, 3B	14	J, L, O, Combi. meter (16M) × 3	R1, R2, R3 (12F), Flasher unit, Ground, Flood lamp (option) (L), (R), Rotatory lamp (option)
⑤	BrW	2	O	R3 (12F)
⑧	LB, 2LB	3	CD, O	R3 (4F)
⑨	WR, 1.25WR	5	A, J, K, N	F1
⑪	GW	2	K	D1 (8M)
⑫	GR	2	K	D1 (8M)
⑬	YB	2	Combi. meter (16M)	D1 (16M)
⑭	RL	4	H, Combi. meter (12F) × 2	D1 (16M)
⑯	LgR	4	A, K, V	R3 (12F)
⑰	G	2	K, V	
⑱	L	3	K	D1 (8M), Diode unit
⑲	LW	3	K	D1 (8M), Diode unit
⑳	Y	2	Combi. meter (12F)	Diode unit
㉑	WY	2	N	R1
㉒	LR	2	Combi. meter (16M)	D1 (16M)
㉓	YB	2	CD, Combi. meter (16M)	
㉕	RB	2	CD, Combi. meter (16M)	
㉖	YL	2	J, Combi. meter (16M)	
㉗	RG, 1.25RG	6	H, Combi. meter (12F)	Flood lamp (L), (R), Flood lamp (option) (L), (R)
㉙	YW	2	Combi. meter (16M)	D1 (16M)
㉚	GW	4	J, Foot brake switch	F1, R1
㉞	BW	2	CD	R1
㊲	WB	2	Foot brake switch	R1
㊴	GB	4	G, Combi. meter (12F), Turn signal switch	D1 (16M)
㊵	GR	4	G, Combi. meter (12F), Turn signal switch	D1 (16M)
㊶	YL	3	T	F1, R2

NO.	SIZE, COLOR	CONTACT POINTS	CONNECTION	
			Deck and dashboard harness (1)	Deck and dashboard harness (2)
㊷	WG, 1.25WG, 2WG	5	CD, H × 2, Z	Flasher unit
㊹	1.25Lg	2	H, L	
㊺	GY	2	Foot brake switch	D1 (16M)
㊻	BrB	2		D1 (16M), R1
㊼	1.25RB	2	L	D1 (16M)
㊽	1.25RW	2	L	D1 (16M)
㊾	G	4	G × 2, Turn signal switch	Flasher unit
㊿	P	2	Horn switch	R2
(51)	RY	2	T	D1 (16M)
(52)	BY	2		F1, R1
(53)	GY	2		D1 (16M), R2
(55)	LY, 1.25LY	3		D1 (16M), R3 (4F), Diode unit
(56)	Lg	2	O	R3 (12F)
(60)	LR, 1.25LR	3		D1 (16M), R3 (4F), Diode unit
(62)	LW	2	Combi. meter (12F)	R3 (12F)
(63)	BY	2		D1 (8M), R3 (12F)
(64)	BrR	3	Combi. meter (16M) × 2	R2
(65)	WG	2	CD	R2
(67)	BW	2	CD	F1
(70)	BrR	2	O	R3 (12F)
(71)	LW	2	O	R3 (12F)
(73)	LY	2	O	R3 (12F)
(74)	G	3	J	R1, R3 (12F)
(81)	BR	2	J	R1
(84)	BY	2	Combi. meter (12F)	Diode unit
(89)	GW	2	Combi. meter (12F)	D1 (8M)
(93)	O	2	J	D1 (8M)
(98)	WL	3	CD, Combi. meter (12F)	R2
(182)	RY	2	Z	Rotatory lamp (option)

4-5-2. Deck and dashboard harness (2)



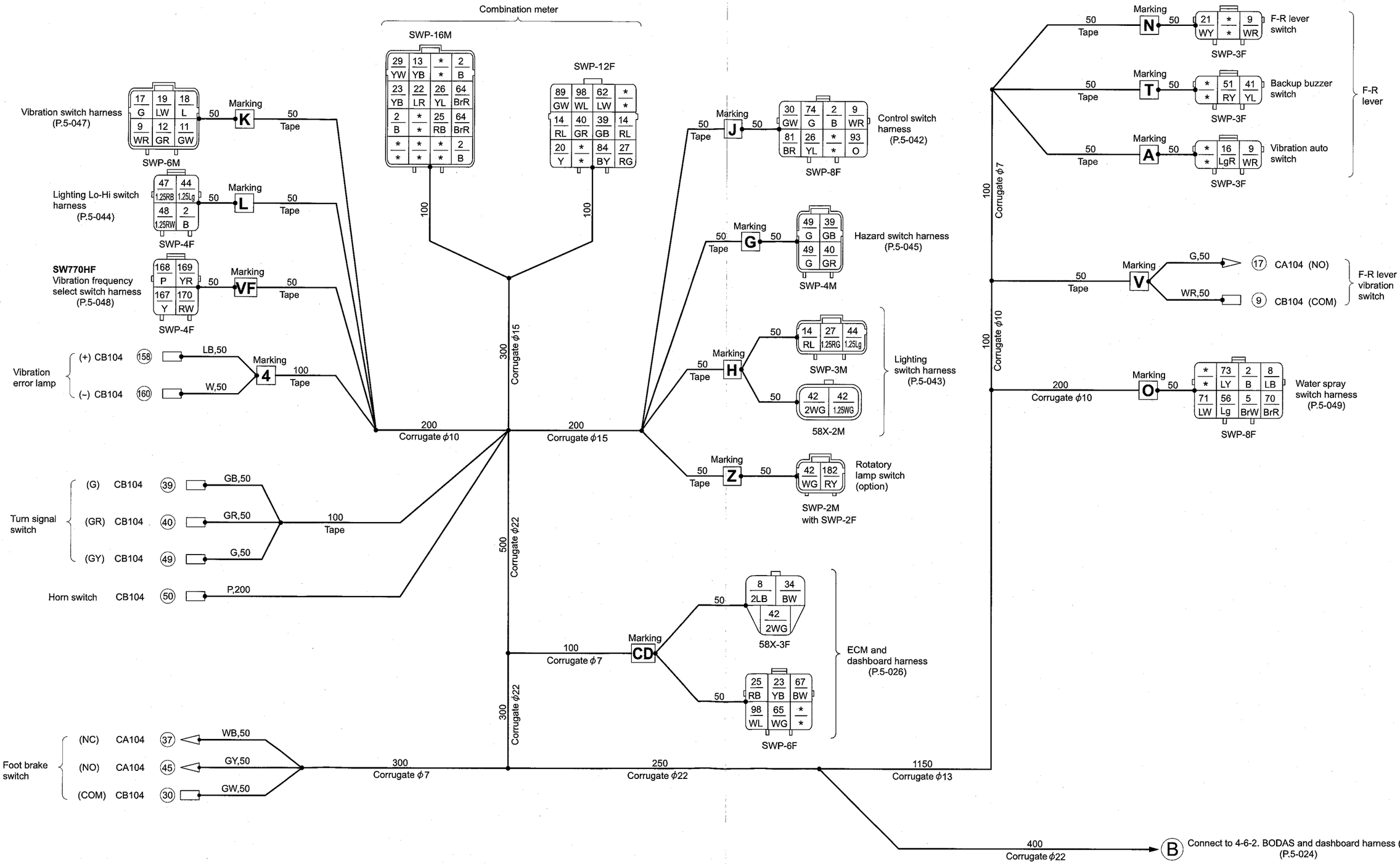
SW770-05006

NO.	SIZE, COLOR	CONTACT POINTS	CONNECTION	
			Deck and dashboard harness (1)	Deck and dashboard harness (2)
②	B, 1.25B, 3B	14	J, L, O, Combi. meter (16M) × 3	R1, R2, R3 (12F), Flasher unit, Ground, Flood lamp (option) (L), (R), Rotatory lamp (option)
⑤	BrW	2	O	R3 (12F)
⑧	LB, 2LB	3	CD, O	R3 (4F)
⑨	WR, 1.25WR	5	A, J, K, N	F1
⑪	GW	2	K	D1 (8M)
⑫	GR	2	K	D1 (8M)
⑬	YB	2	Combi. meter (16M)	D1 (16M)
⑭	RL	4	H, Combi. meter (12F) × 2	D1 (16M)
⑯	LgR	4	A, K, V	R3 (12F)
⑰	G	2	K, V	
⑱	L	3	K	D1 (8M), Diode unit
⑲	LW	3	K	D1 (8M), Diode unit
⑳	Y	2	Combi. meter (12F)	Diode unit
㉑	WY	2	N	R1
㉒	LR	2	Combi. meter (16M)	D1 (16M)
㉓	YB	2	CD, Combi. meter (16M)	
㉕	RB	2	CD, Combi. meter (16M)	
㉖	YL	2	J, Combi. meter (16M)	
㉗	RG, 1.25RG	6	H, Combi. meter (12F)	Flood lamp (L), (R), Flood lamp (option) (L), (R)
㉙	YW	2	Combi. meter (16M)	D1 (16M)
㉚	GW	4	J, Foot brake switch	F1, R1
㉞	BW	2	CD	R1
㉗	WB	2	Foot brake switch	R1
㊴	GB	4	G, Combi. meter (12F), Turn signal switch	D1 (16M)
㊵	GR	4	G, Combi. meter (12F), Turn signal switch	D1 (16M)
㊶	YL	3	T	F1, R2

NO.	SIZE, COLOR	CONTACT POINTS	CONNECTION	
			Deck and dashboard harness (1)	Deck and dashboard harness (2)
㊷	WG, 1.25WG, 2WG	5	CD, H × 2, Z	Flasher unit
㊹	1.25Lg	2	H, L	
㊺	GY	2	Foot brake switch	D1 (16M)
㊻	BrB	2		D1 (16M), R1
㊼	1.25RB	2	L	D1 (16M)
㊽	1.25RW	2	L	D1 (16M)
㊾	G	4	G × 2, Turn signal switch	Flasher unit
㊿	P	2	Horn switch	R2
(51)	RY	2	T	D1 (16M)
(52)	BY	2		F1, R1
(53)	GY	2		D1 (16M), R2
(55)	LY, 1.25LY	3		D1 (16M), R3 (4F), Diode unit
(56)	Lg	2	O	R3 (12F)
(60)	LR, 1.25LR	3		D1 (16M), R3 (4F), Diode unit
(62)	LW	2	Combi. meter (12F)	R3 (12F)
(63)	BY	2		D1 (8M), R3 (12F)
(64)	BrR	3	Combi. meter (16M) × 2	R2
(65)	WG	2	CD	R2
(67)	BW	2	CD	F1
(70)	BrR	2	O	R3 (12F)
(71)	LW	2	O	R3 (12F)
(73)	LY	2	O	R3 (12F)
(74)	G	3	J	R1, R3 (12F)
(81)	BR	2	J	R1
(84)	BY	2	Combi. meter (12F)	Diode unit
(89)	GW	2	Combi. meter (12F)	D1 (8M)
(93)	O	2	J	D1 (8M)
(98)	WL	3	CD, Combi. meter (12F)	R2
(182)	RY	2	Z	Rotatory lamp (option)

4-6. BODAS and Dashboard Harness (SW770HF, SW770ND)

4-6-1. BODAS and dashboard harness (1)

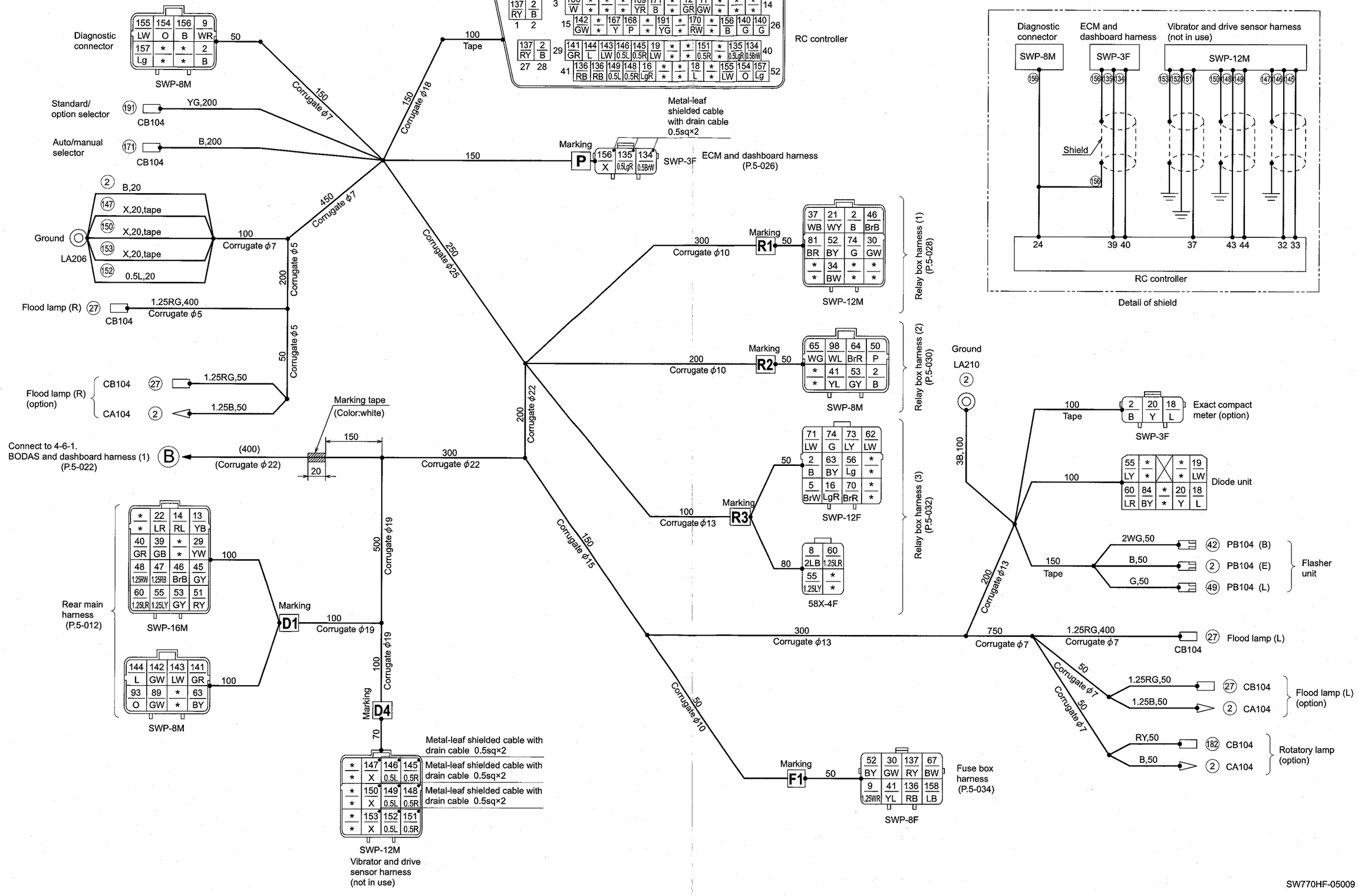


SW770HF-05008

NO.	SIZE, COLOR	CONTACT POINTS	CONNECTION	
			BODAS and dashboard harness (1)	BODAS and dashboard harness (2)
②	B, 1.25B, 3B	19	J, L, O, Combi. meter (16M) × 3	R1, R2, R3 (12F), Diagnostic connector, Flasher unit, Ground×2, RC controller-(2), (28), Exact compact meter (option), Flood lamp (option) (L), (R), Rotatory lamp (option)
⑤	BrW	2	O	R3 (12F)
⑧	LB, 2LB	3	CD, O	R3 (4F)
⑨	WR, 1.25WR	7	A, J, K, N, V	F1, Diagnostic connector
⑪	GW	2	K	RC controller-(11)
⑫	GR	2	K	RC controller-(10)
⑬	YB	2	Combi. meter (16M)	D1 (16M)
⑭	RL	4	H, Combi. meter (12F) × 2	D1 (16M)
⑯	LgR	3	A	R3 (12F), RC controller-(45)
⑰	G	2	K, V	
⑱	L	4	K	Diode unit, RC controller-(48), Exact compact meter (option)
⑲	LW	3	K	Diode unit, RC controller-(34)
⑳	Y	3	Combi. meter (12F)	Diode unit, Exact compact meter (option)
㉑	WY	2	N	R1
㉒	LR	2	Combi. meter (16M)	D1 (16M)
㉓	YB	2	CD, Combi. meter (16M)	
㉕	RB	2	CD, Combi. meter (16M)	
㉖	YL	2	J, Combi. meter (16M)	
㉗	RG, 1.25RG	6	H, Combi. meter (12F)	Flood lamp (L), (R), Flood lamp (option) (L), (R)
㉙	YW	2	Combi. meter (16M)	D1 (16M)
㉚	GW	4	J, Foot brake switch	F1, R1
㉞	BW	2	CD	R1
㉗	WB	2	Foot brake switch	R1
㉙	GB	4	G, Combi. meter (12F), Turn signal switch	D1 (16M)
㊵	GR	4	G, Combi. meter (12F), Turn signal switch	D1 (16M)
㊶	YL	3	T	F1, R2
㊷	WG, 1.25WG, 2WG	5	CD, H × 2, Z	Flasher unit
㊹	1.25Lg	2	H, L	
㊺	GY	2	Foot brake switch	D1 (16M)
㊻	BrB	2		D1 (16M), R1
㊼	1.25RB	2	L	D1 (16M)
㊽	1.25RW	2	L	D1 (16M)
㊾	G	4	G × 2, Turn signal switch	Flasher unit
㊿	P	2	Horn switch	R2
(51)	RY	2	T	D1 (16M)
(52)	BY	2		F1, R1
(53)	GY	2		D1 (16M), R2
(55)	LY, 1.25LY	3		D1 (16M), R3 (4F), Diode unit
(56)	Lg	2	O	R3 (12F)
(60)	LR, 1.25LR	3		D1 (16M), R3 (4F), Diode unit

NO.	SIZE, COLOR	CONTACT POINTS	CONNECTION	
			BODAS and dashboard harness (1)	BODAS and dashboard harness (2)
(62)	LW	2	Combi. meter (12F)	R3 (12F)
(63)	BY	2		D1 (8M), R3 (12F)
(64)	BrR	3	Combi. meter (16M) × 2	R2
(65)	WG	2	CD	R2
(67)	BW	2	CD	F1
(70)	BrR	2	O	R3 (12F)
(71)	LW	2	O	R3 (12F)
(73)	LY	2	O	R3 (12F)
(74)	G	3	J	R1, R3 (12F)
(81)	BR	2	J	R1
(84)	BY	2	Combi. meter (12F)	Diode unit
(89)	GW	2	Combi. meter (12F)	D1 (8M)
(93)	O	2	J	D1 (8M)
(98)	WL	3	CD, Combi. meter (12F)	R2
(134)	0.5BrW	2		P, RC controller-(40)
(135)	0.5LgR	2		P, RC controller-(39)
(136)	RB	3		F1, RC controller-(41), (42)
(137)	RY	3		F1, RC controller-(1), (27)
(140)	G	2		RC controller-(25), (26)
(141)	GR	2		D1 (8M), RC controller-(29)
(142)	GW	2		D1 (8M), RC controller-(15)
(143)	LW	2		D1 (8M), RC controller-(31)
(144)	L	2		D1 (8M), RC controller-(30)
(145)	0.5R	2		RC controller-(33), D4 (not in use)
(146)	0.5L	2		RC controller-(32), D4 (not in use)
(147)	X	2		Ground, D4 (not in use)
(148)	0.5R	2		RC controller-(44), D4 (not in use)
(149)	0.5L	2		RC controller-(43), D4 (not in use)
(150)	X	2		Ground, D4 (not in use)
(151)	0.5R	2		RC controller-(37), D4 (not in use)
(152)	0.5L	2		Ground, D4 (not in use)
(153)	X	2		Ground, D4 (not in use)
(154)	O	2		Diagnostic connector, RC controller-(51)
(155)	LW	2		Diagnostic connector, RC controller-(50)
(156)	B, X	3		P, Diagnostic connector, RC controller-(24)
(157)	Lg	2		Diagnostic connector, RC controller-(52)
(158)	LB	2	4	F1
(160)	W	2	4	RC controller-(3)
(167)	Y	2	VF	RC controller-(17)
(168)	P	2	VF	RC controller-(18)
(169)	YR	2	VF	RC controller-(7)
(170)	RW	2	VF	RC controller-(22)
(171)	B	2		Auto/manual selector, RC controller-(8)
(182)	RY	2	Z	Rotatory lamp (option)
(191)	YG	2		RC controller-(20), Standard/option selector

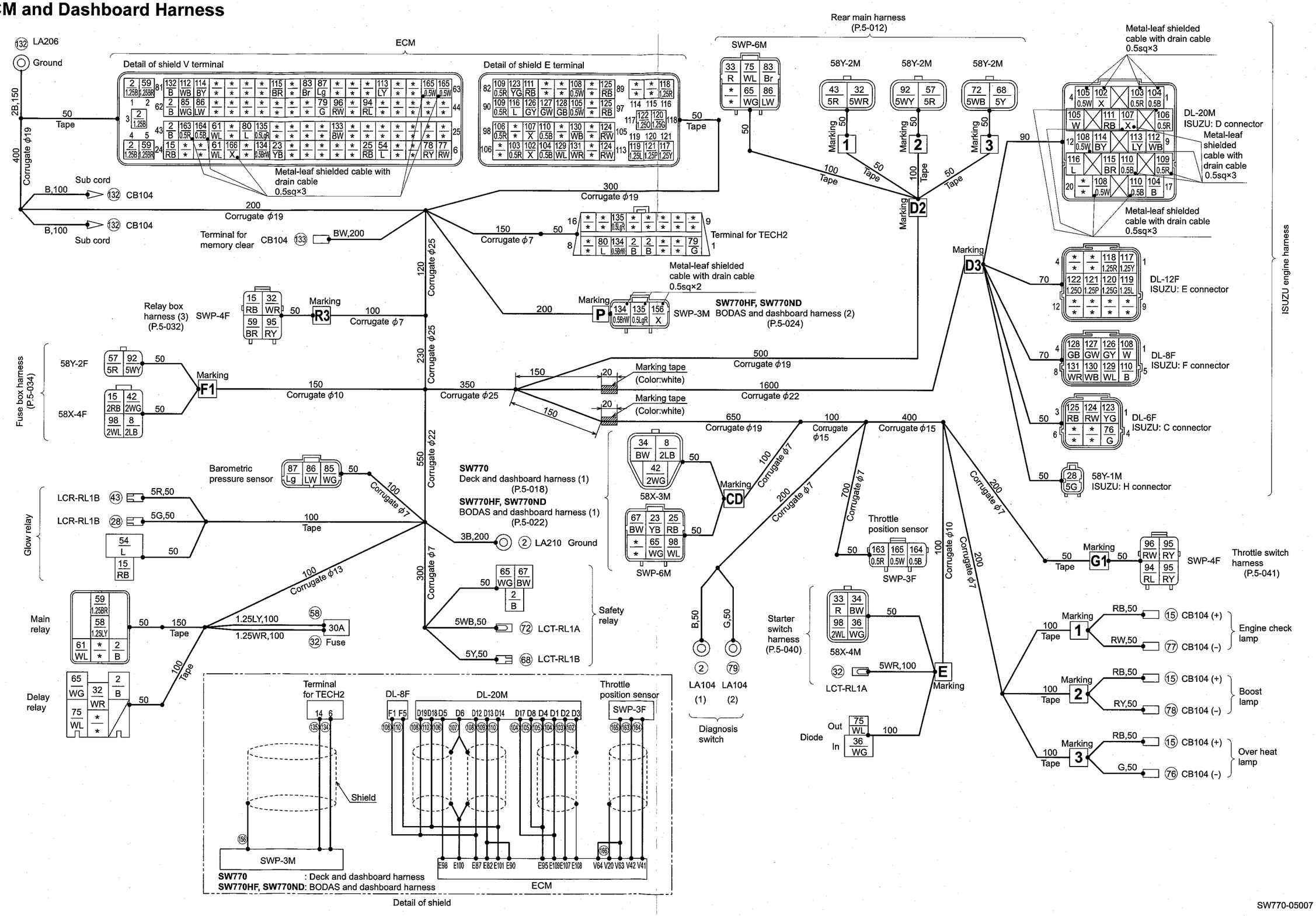
4-6-2. BODAS and dashboard harness (2)



NO.	SIZE, COLOR	CONTACT POINTS	CONNECTION	
			BODAS and dashboard harness (1)	BODAS and dashboard harness (2)
②	B, 1.25B, 3B	19	J, L, O, Combi. meter (16M) × 3	R1, R2, R3 (12F), Diagnostic connector, Flasher unit, Ground×2, RC controller-(2), (28), Exact compact meter (option), Flood lamp (option) (L), (R), Rotatory lamp (option)
⑤	BrW	2	O	R3 (12F)
⑧	LB, 2LB	3	CD, O	R3 (4F)
⑨	WR, 1.25WR	7	A, J, K, N, V	F1, Diagnostic connector
⑪	GW	2	K	RC controller-(11)
⑫	GR	2	K	RC controller-(10)
⑬	YB	2	Combi. meter (16M)	D1 (16M)
⑭	RL	4	H, Combi. meter (12F) × 2	D1 (16M)
⑯	LgR	3	A	R3 (12F), RC controller-(45)
⑰	G	2	K, V	
⑱	L	4	K	Diode unit, RC controller-(48), Exact compact meter (option)
⑲	LW	3	K	Diode unit, RC controller-(34)
⑳	Y	3	Combi. meter (12F)	Diode unit, Exact compact meter (option)
㉑	WY	2	N	R1
㉒	LR	2	Combi. meter (16M)	D1 (16M)
㉓	YB	2	CD, Combi. meter (16M)	
㉕	RB	2	CD, Combi. meter (16M)	
㉖	YL	2	J, Combi. meter (16M)	
㉗	RG, 1.25RG	6	H, Combi. meter (12F)	Flood lamp (L), (R), Flood lamp (option) (L), (R)
㉙	YW	2	Combi. meter (16M)	D1 (16M)
㉚	GW	4	J, Foot brake switch	F1, R1
㉞	BW	2	CD	R1
㉗	WB	2	Foot brake switch	R1
㉙	GB	4	G, Combi. meter (12F), Turn signal switch	D1 (16M)
㊵	GR	4	G, Combi. meter (12F), Turn signal switch	D1 (16M)
㊶	YL	3	T	F1, R2
㊷	WG, 1.25WG, 2WG	5	CD, H × 2, Z	Flasher unit
㊹	1.25Lg	2	H, L	
㊺	GY	2	Foot brake switch	D1 (16M)
㊻	BrB	2		D1 (16M), R1
㊼	1.25RB	2	L	D1 (16M)
㊽	1.25RW	2	L	D1 (16M)
㊾	G	4	G × 2, Turn signal switch	Flasher unit
㊿	P	2	Horn switch	R2
(51)	RY	2	T	D1 (16M)
(52)	BY	2		F1, R1
(53)	GY	2		D1 (16M), R2
(55)	LY, 1.25LY	3		D1 (16M), R3 (4F), Diode unit
(56)	Lg	2	O	R3 (12F)
(60)	LR, 1.25LR	3		D1 (16M), R3 (4F), Diode unit

NO.	SIZE, COLOR	CONTACT POINTS	CONNECTION	
			BODAS and dashboard harness (1)	BODAS and dashboard harness (2)
(62)	LW	2	Combi. meter (12F)	R3 (12F)
(63)	BY	2		D1 (8M), R3 (12F)
(64)	BrR	3	Combi. meter (16M) × 2	R2
(65)	WG	2	CD	R2
(67)	BW	2	CD	F1
(70)	BrR	2	O	R3 (12F)
(71)	LW	2	O	R3 (12F)
(73)	LY	2	O	R3 (12F)
(74)	G	3	J	R1, R3 (12F)
(81)	BR	2	J	R1
(84)	BY	2	Combi. meter (12F)	Diode unit
(89)	GW	2	Combi. meter (12F)	D1 (8M)
(93)	O	2	J	D1 (8M)
(98)	WL	3	CD, Combi. meter (12F)	R2
(134)	0.5BrW	2		P, RC controller-(40)
(135)	0.5LgR	2		P, RC controller-(39)
(136)	RB	3		F1, RC controller-(41), (42)
(137)	RY	3		F1, RC controller-(1), (27)
(140)	G	2		RC controller-(25), (26)
(141)	GR	2		D1 (8M), RC controller-(29)
(142)	GW	2		D1 (8M), RC controller-(15)
(143)	LW	2		D1 (8M), RC controller-(31)
(144)	L	2		D1 (8M), RC controller-(30)
(145)	0.5R	2		RC controller-(33), D4 (not in use)
(146)	0.5L	2		RC controller-(32), D4 (not in use)
(147)	X	2		Ground, D4 (not in use)
(148)	0.5R	2		RC controller-(44), D4 (not in use)
(149)	0.5L	2		RC controller-(43), D4 (not in use)
(150)	X	2		Ground, D4 (not in use)
(151)	0.5R	2		RC controller-(37), D4 (not in use)
(152)	0.5L	2		Ground, D4 (not in use)
(153)	X	2		Ground, D4 (not in use)
(154)	O	2		Diagnostic connector, RC controller-(51)
(155)	LW	2		Diagnostic connector, RC controller-(50)
(156)	B, X	3		P, Diagnostic connector, RC controller-(24)
(157)	Lg	2		Diagnostic connector, RC controller-(52)
(158)	LB	2	4	F1
(160)	W	2	4	RC controller-(3)
(167)	Y	2	VF	RC controller-(17)
(168)	P	2	VF	RC controller-(18)
(169)	YR	2	VF	RC controller-(7)
(170)	RW	2	VF	RC controller-(22)
(171)	B	2		Auto/manual selector, RC controller-(8)
(182)	RY	2	Z	Rotatory lamp (option)
(191)	YG	2		RC controller-(20), Standard/option selector

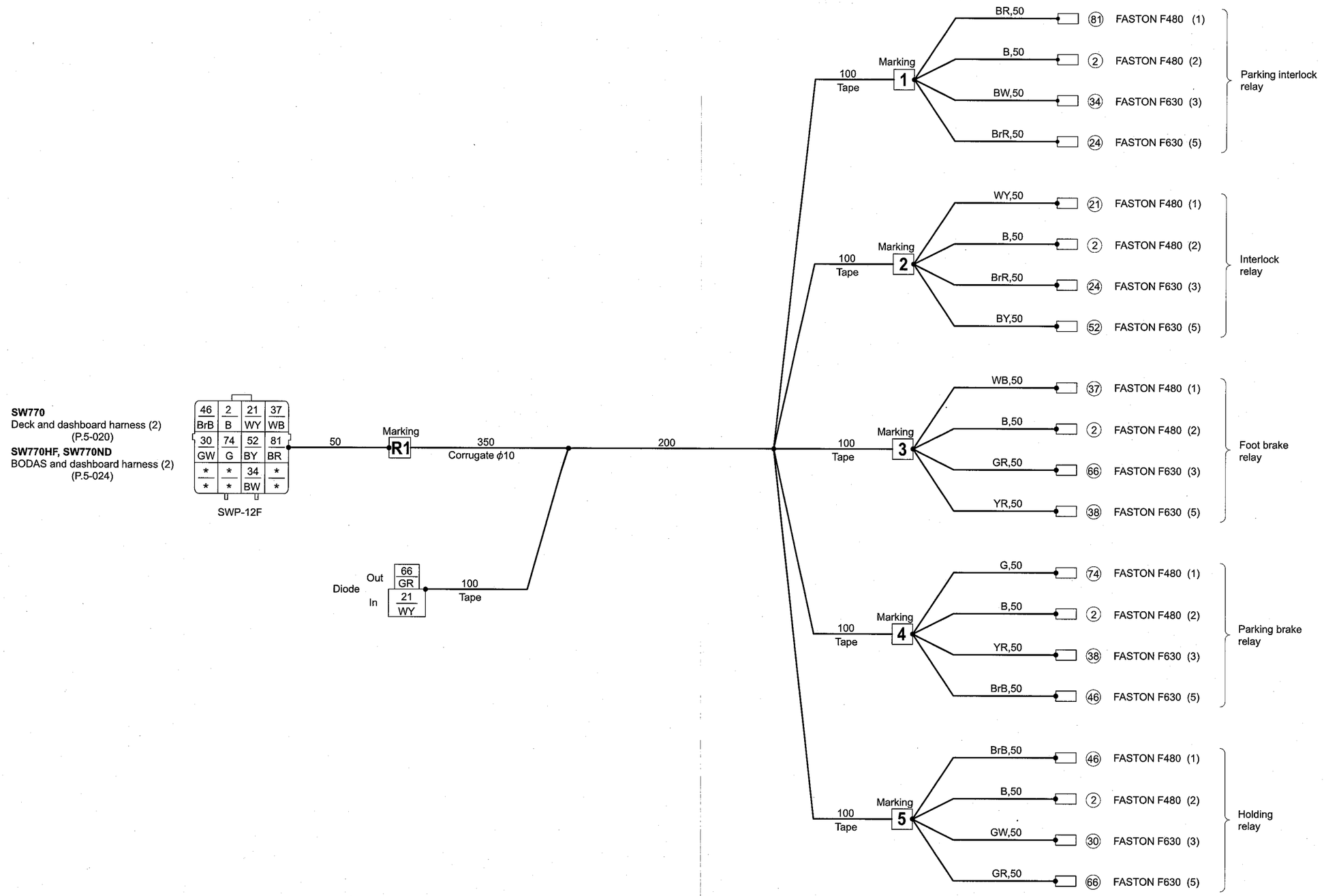
4-7. ECM and Dashboard Harness



NO.	SIZE, COLOR	CONTACT POINTS	CONNECTION
②	B, 1.25B, 3B	12	Delay relay, Diagnosis switch, ECM-(1), (3), (4), (43), (62), Ground, Main relay, Safety relay, Terminal for TECH2-(4), (5)
⑧	2LB	2	CD, F1
⑮	RB, 2RB	7	1, 2, 3, F1, R3, ECM-(24), Glow relay
㉓	YB	2	CD, ECM-(17)
㉕	RB	2	CD, ECM-(11)
㉘	5G	2	D3 (1M), Glow relay
㉜	WR, 1.25WR, 5WR	5	D2-1, E, R3, Delay relay, Fuse (30A)
㉝	R	2	D2, E
㉞	BW	2	CD, E
㊱	WG	2	E × 2
㊷	2WG	2	CD, F1
㊸	5R	2	D2-1, Glow relay
㊹	L	2	ECM-(10), Glow relay
㊼	5R	2	D2-2, F1
㊽	1.25LY	2	Fuse (30A), Main relay
㊾	BR, 1.25BR	4	R3, ECM-(2), (5), Main relay
㊶	WL	3	ECM-(21), (40), Main relay
㊺	WG	4	CD, D2, Delay relay, Safety relay
㊼	BW	2	CD, Safety relay
㊽	5Y	2	D2-3, Safety relay
㊲	5WB	2	D2-3, Safety relay
㊵	WL	3	D2, E, Delay relay
㊶	G	2	3, D3 (6F)
㊼	RW	2	1, ECM-(6)
㊽	RY	2	2, ECM-(7)
㊾	G	3	Diagnosis switch, ECM-(52), Terminal for TECH2-(1)
㊿	L	2	ECM-(38), Terminal for TECH2-(7)
㊸	Br	2	D2, ECM-(72)
㊺	WG	2	Barometric pressure sensor, ECM-(61)
㊻	LW	3	D2, Barometric pressure sensor, ECM-(60)
㊼	Lg	2	Barometric pressure sensor, ECM-(71)
㊷	5WY	2	D2-2, F1
㊹	RL	2	G1, ECM-(49)
㊺	RY	3	G1 × 2, R3
㊻	RW	2	G1, ECM-(51)
㊽	WL, 2WL	3	CD, E, F1
㉒	X	2	D3 (20M), ECM-(108)

NO.	SIZE, COLOR	CONTACT POINTS	CONNECTION
㉓	0.5R	2	D3 (20M), ECM-(107)
㉔	0.5B, B	3	D3 (20M) × 2, ECM-(109)
㉕	0.5W, W	3	D3 (20M) × 2, ECM-(95)
㉖	0.5R	2	D3 (20M), ECM-(98)
㉗	X	2	D3 (20M), ECM-(100)
㉘	0.5W, W	4	D3 (8F), (20M) × 2, ECM-(87)
㉙	0.5R	3	D3 (20M), ECM-(82), (90)
㉚	0.5B, B	4	D3 (8F), (20M) × 2, ECM-(101)
㉛	RB	2	D3 (20M), ECM-(84)
㉜	WB	2	D3 (20M), ECM-(80)
㉝	LY	2	D3 (20M), ECM-(67)
㉞	BY	2	D3 (20M), ECM-(79)
㉟	BR	2	D3 (20M), ECM-(74)
㊱	L	2	D3 (20M), ECM-(91)
㊲	1.25Y	2	D3 (12F), ECM-(121)
㊳	1.25R	2	D3 (12F), ECM-(116)
㊴	1.25L	2	D3 (12F), ECM-(119)
㊵	1.25G	2	D3 (12F), ECM-(118)
㊶	1.25P	2	D3 (12F), ECM-(120)
㊷	1.25O	2	D3 (12F), ECM-(117)
㊸	YG	2	D3 (6F), ECM-(83)
㊹	RW	3	D3 (6F), ECM-(105), (113)
㊺	RB	3	D3 (6F), ECM-(89), (97)
㊻	GY	2	D3 (8F), ECM-(92)
㊼	GW	2	D3 (8F), ECM-(93)
㊽	GB	2	D3 (8F), ECM-(94)
㊾	WL	2	D3 (8F), ECM-(110)
㊿	WB	2	D3 (8F), ECM-(103)
㊶	WR	2	D3 (8F), ECM-(111)
㊷	B, 2B	4	ECM-(81), Ground, Sub cord × 2
㊸	BW	2	ECM-(32), Terminal for memory clear
㊹	0.5BrW	3	P, ECM-(18), Terminal for TECH2-(6)
㊺	0.5LgR	3	P, ECM-(37), Terminal for TECH2-(14)
㊻	X	1	P
㊸	0.5R	2	ECM-(42), Throttle position sensor
㊹	0.5B	2	ECM-(41), Throttle position sensor
㊺	0.5W	3	ECM-(63), (64), Throttle position sensor
㊻	X	1	ECM-(20)

4-8. Relay Box Harness (1)

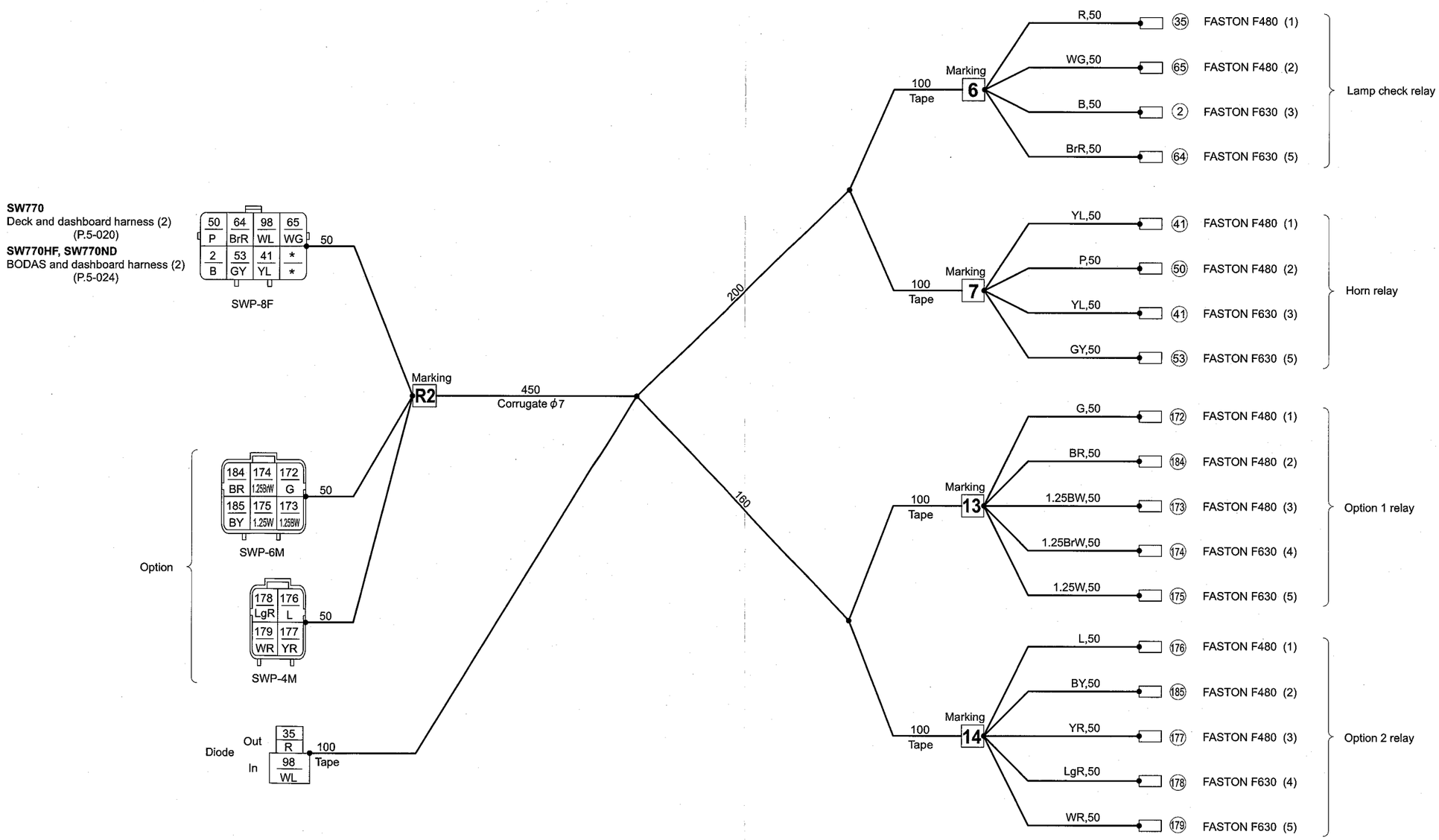


SW770-05008

NO.	SIZE, COLOR	CONTACT POINTS	CONNECTION
②	B	6	1-(2), 2-(2), 3-(2), 4-(2), 5-(2), R1
㉑	WY	3	2-(1), R1, Diode
㉔	BrR	2	1-(5), 2-(3)
㉚	GW	2	5-(3), R1
㉞	BW	2	1-(3), R1
㊲	WB	2	3-(1), R1

NO.	SIZE, COLOR	CONTACT POINTS	CONNECTION
㊳	YR	2	3-(5), 4-(3)
㊻	BrB	3	4-(5), 5-(1), R1
㊷	BY	2	2-(5), R1
㊻	GR	3	3-(3), 5-(5), Diode
㉞	G	2	4-(1), R1
㊶	BR	2	1-(1), R1

4-9. Relay Box Harness (2)

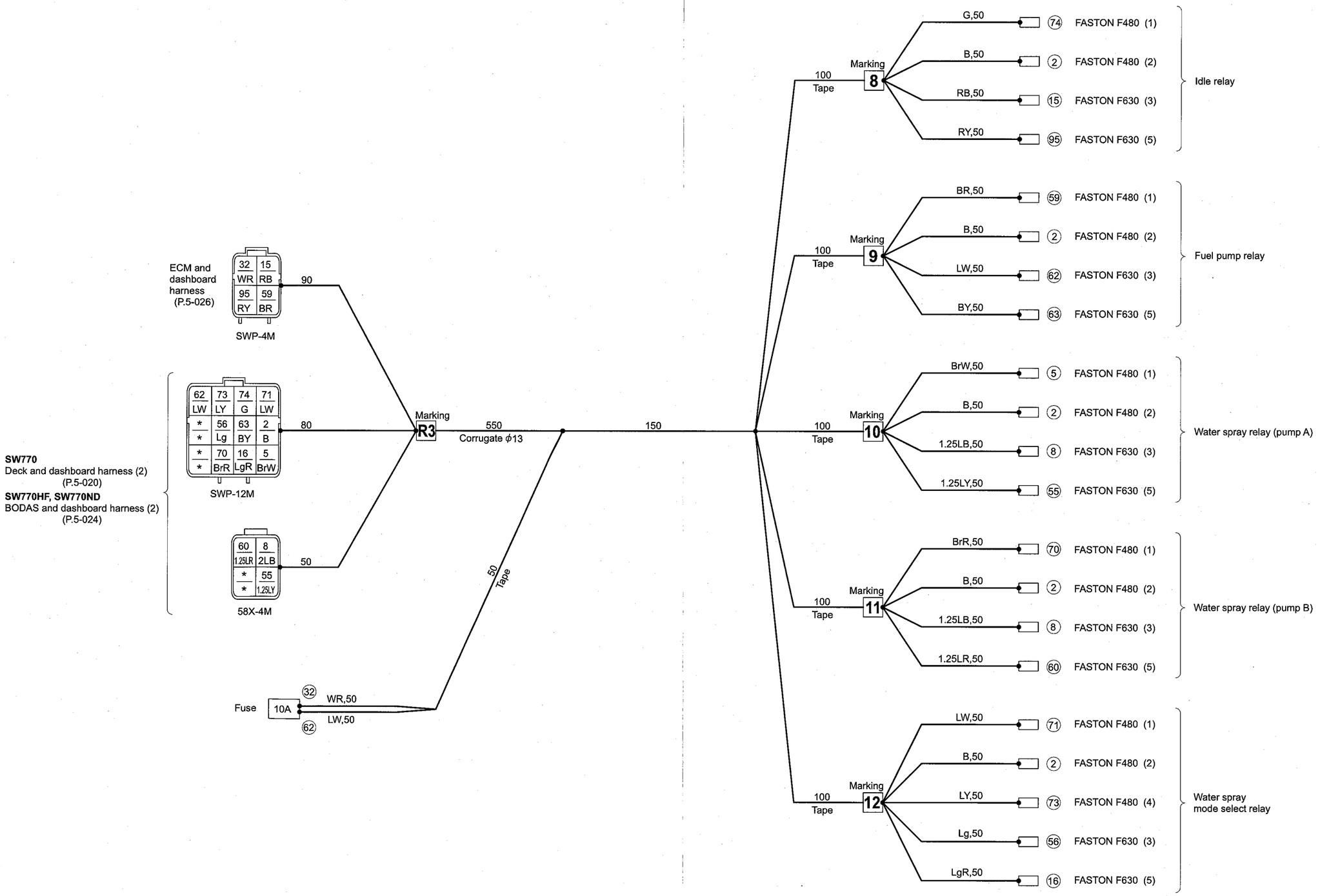


SW770-05009

NO.	SIZE, COLOR	CONTACT POINTS	CONNECTION
②	B	2	6-(3), R2 (8F)
㉟	R	2	6-(1), Diode
㊶	YL	3	7-(1), (3), R2 (8F)
㊿	P	2	7-(2), R2 (8F)
㊸	GY	2	7-(5), R2 (8F)
㊹	BrR	2	6-(5), R2 (8F)
㊺	WG	2	6-(2), R2 (8F)
㊽	WL	2	R2 (8F), Diode
⑫	G	2	13-(1), R2 (6M)

NO.	SIZE, COLOR	CONTACT POINTS	CONNECTION
⑬	1.25BW	2	13-(3), R2 (6M)
⑭	1.25BrW	2	13-(4), R2 (6M)
⑮	1.25W	2	13-(5), R2 (6M)
⑯	L	2	14-(1), R2 (4M)
⑰	YR	2	14-(3), R2 (4M)
⑱	LgR	2	14-(4), R2 (4M)
⑲	WR	2	14-(5), R2 (4M)
⑭	BR	2	13-(2), R2 (6M)
⑮	BY	2	14-(2), R2 (6M)

4-10. Relay Box Harness (3)

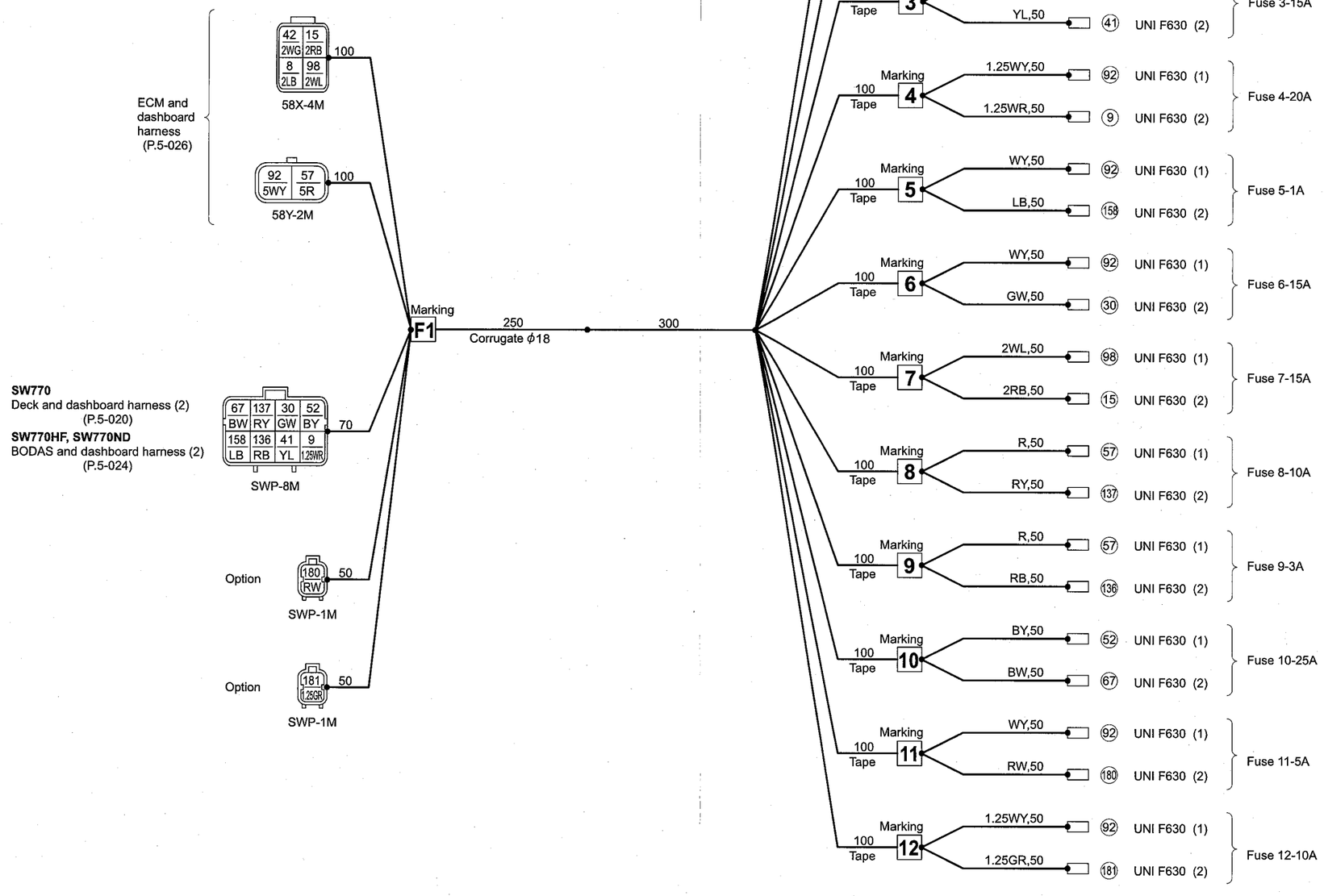


SW770-05010

NO.	SIZE, COLOR	CONTACT POINTS	CONNECTION
②	B	6	8-(2), 9-(2), 10-(2), 11-(2), 12-(2), R3 (12M)
⑤	BrW	2	10-(1), R3 (12M)
⑧	1.25LB, 2LB	3	10-(3), 11-(3), R3 (4M)
⑮	RB	2	8-(3), R3 (4M)
⑯	LgR	2	12-(5), R3 (12M)
㉜	WR	2	R3 (4M), Fuse (10A)
㊺	1.25LY	2	10-(5), R3 (4M)
㊻	Lg	2	12-(3), R3 (12M)
㊾	BR	2	9-(1), R3 (4M)

NO.	SIZE, COLOR	CONTACT POINTS	CONNECTION
⑥⓪	1.25LR	2	11-(5), R3 (4M)
⑥②	LW	3	9-(3), R3 (12M), Fuse (10A)
⑥③	BY	2	9-(5), R3 (12M)
⑦⓪	BrR	2	11-(1), R3 (12M)
⑦①	LW	2	12-(1), R3 (12M)
⑦③	LY	2	12-(4), R3 (12M)
⑦④	G	2	8-(1), R3 (12M)
⑨⑤	RY	2	8-(5), R3 (4M)

4-11. Fuse Box Harness

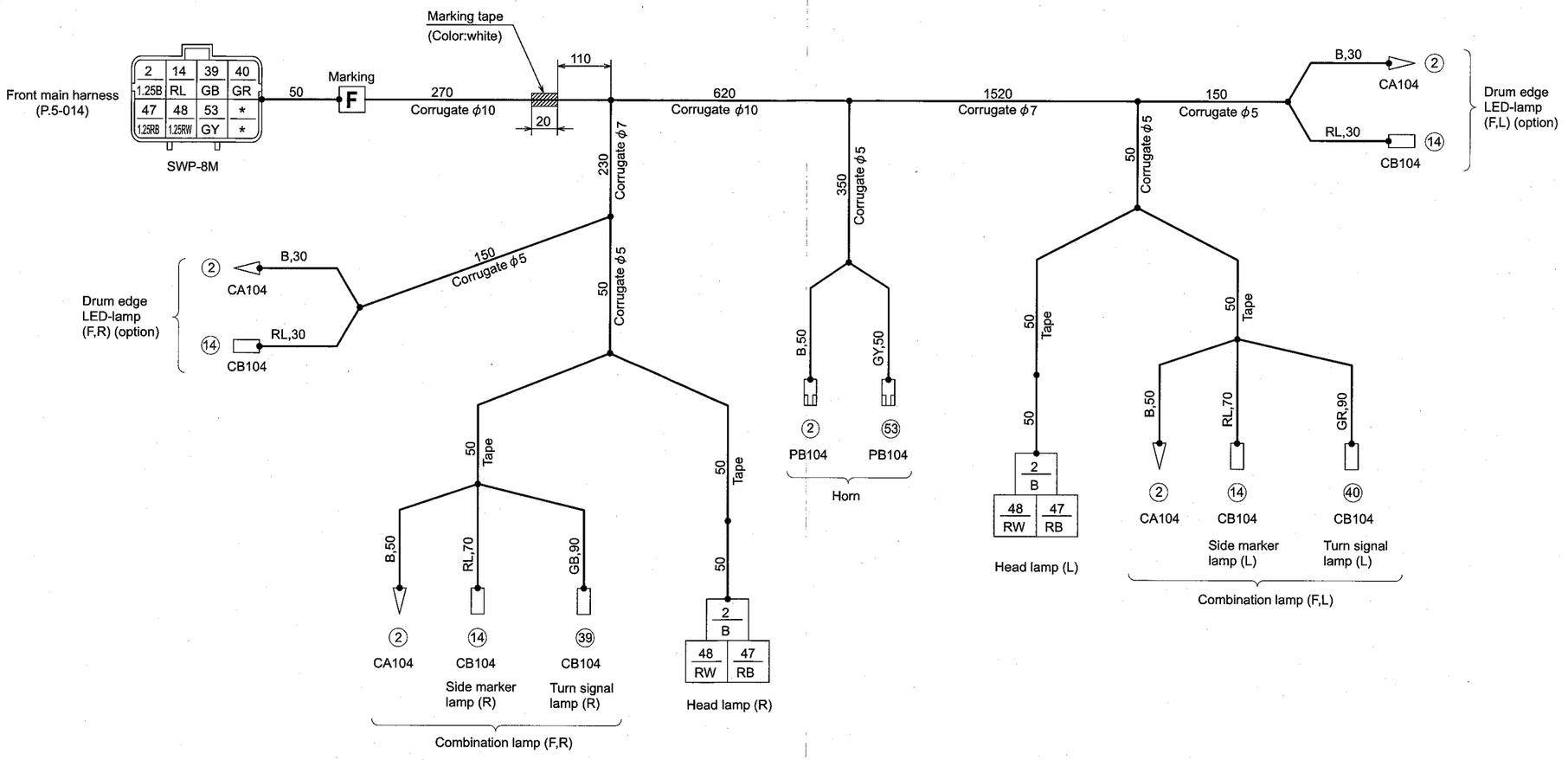


SW770-05011

NO.	SIZE, COLOR	CONTACT POINTS	CONNECTION
⑧	2LB	2	1-(2), F1 (4M)
⑨	1.25WR	2	4-(2), F1 (8M)
⑮	2RB	2	7-(2), F1 (4M)
㉚	GW	2	6-(2), F1 (8M)
㊶	YL	2	3-(2), F1 (8M)
㊷	2WG	2	2-(2), F1 (4M)
㊷	BY	2	10-(1), F1 (8M)
㊼	R, 2R, 5R	5	1-(1), 2-(1), 8-(1), 9-(1), F1 (2M)

NO.	SIZE, COLOR	CONTACT POINTS	CONNECTION
㊼	BW	2	10-(2), F1 (8M)
㉜	WY, 1.25WY, 5WY	7	3-(1), 4-(1), 5-(1), 6-(1), 11-(1), 12-(1), F1 (2M)
㊽	2WL	2	7-(1), F1 (4M)
㊱	RB	2	9-(2), F1 (8M)
㊲	RY	2	8-(2), F1 (8M)
㊽	LB	2	5-(2), F1 (8M)
㊿	RW	2	11-(2), F1 (1M)
㊶	1.25GR	2	12-(2), F1 (1M)

4-12. Front Member Harness

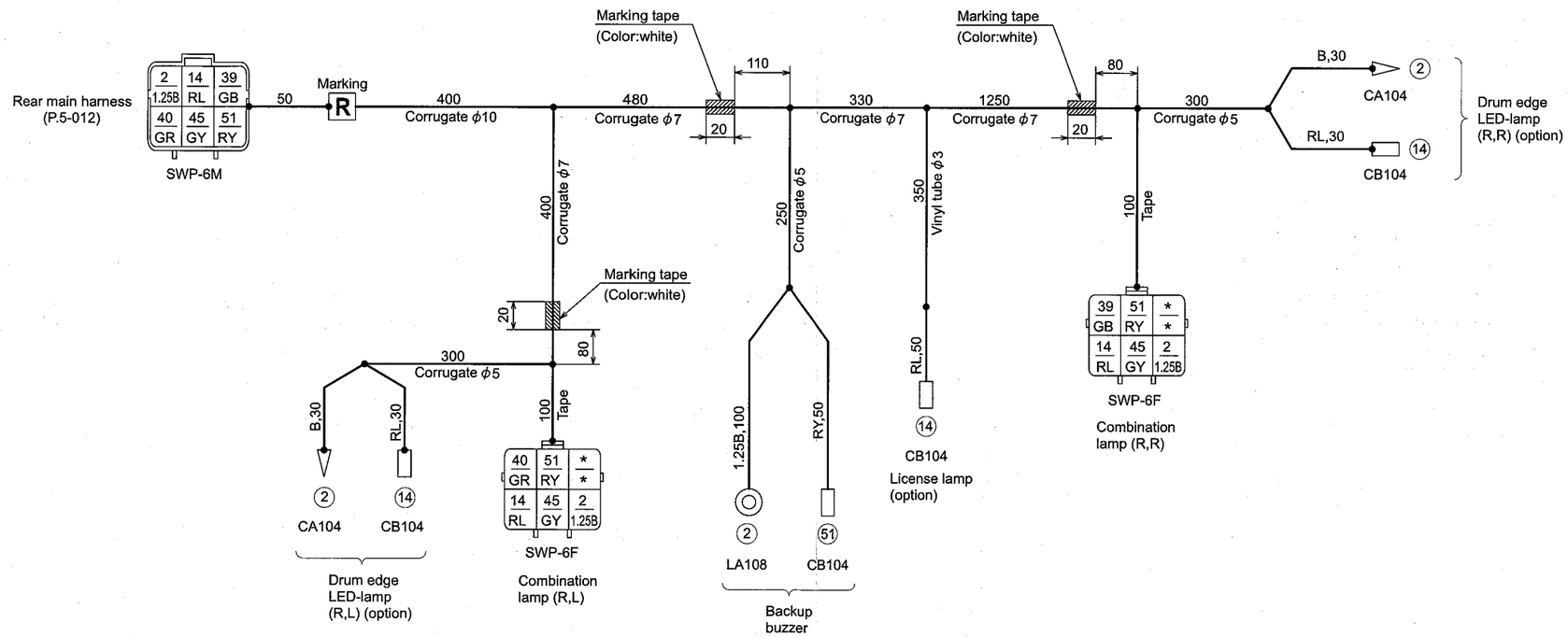


SW770-05012

NO.	SIZE, COLOR	CONTACT POINTS	CONNECTION
②	B, 1.25B	8	F, Combination lamp (F,L), (F,R), Head lamp (L), (R), Horn, Drum edge LED-light (option) (F,L), (F,R)
⑭	RL	5	F, Combination lamp (F,L), (F,R), Drum edge LED-light (option) (F,L), (F,R)
㊴	GB	2	F, Combination lamp (F,R)

NO.	SIZE, COLOR	CONTACT POINTS	CONNECTION
㊵	GR	2	F, Combination lamp (F,L)
㊼	RB, 1.25RB	3	F, Head lamp (L), (R)
㊽	RW, 1.25RW	3	F, Head lamp (L), (R)
㊸	GY	2	F, Horn

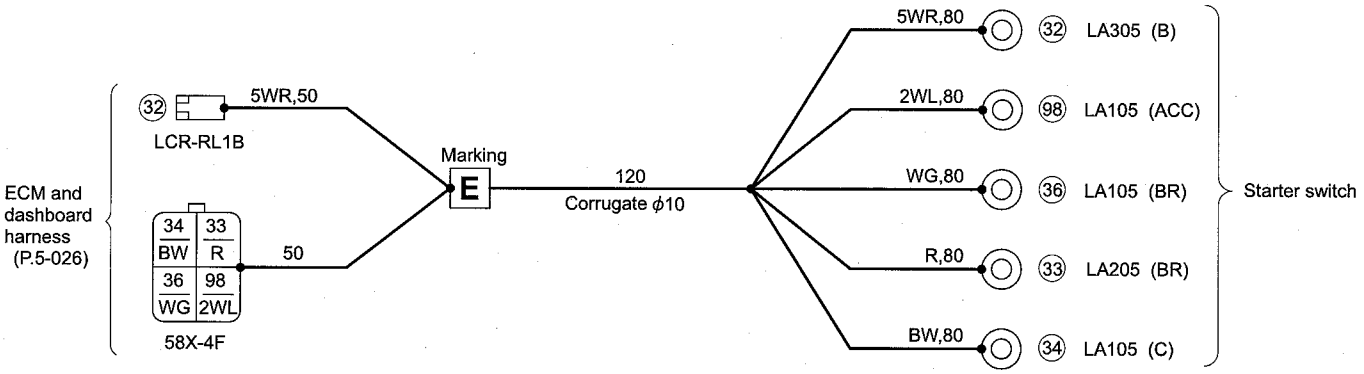
4-13. Rear Member Harness



SW770-05013

NO.	SIZE, COLOR	CONTACT POINTS	CONNECTION
②	B, 1.25B	6	R, Backup buzzer, Combination lamp (R,L), (R,R), Drum edge LED-light (option) (R,L), (R,R)
⑭	RL	6	R, Combination lamp (R,L), (R,R), Drum edge LED-light (option) (R,L), (R,R), License lamp (option)
㊴	GB	2	R, Combination lamp (R,R)
㊵	GR	2	R, Combination lamp (R,L)
㊺	GY	3	R, Combination lamp (R,L), (R,R)
㊶	RY	4	R, Backup buzzer, Combination lamp (R,L), (R,R)

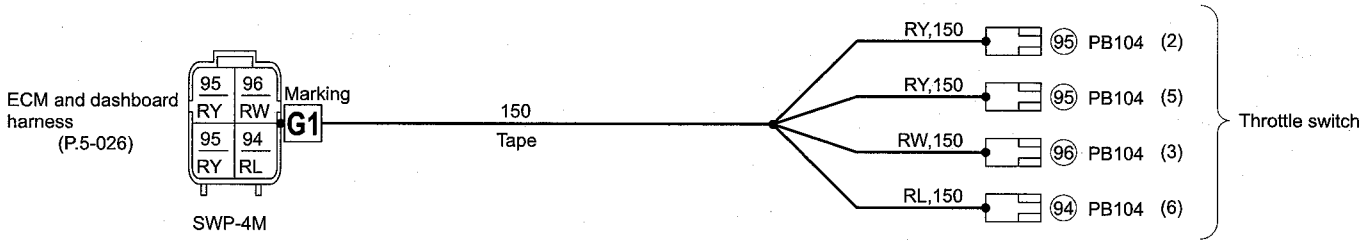
4-14. Starter Switch Harness



SW770-05014

NO.	SIZE, COLOR	CONTACT POINTS	CONNECTION
㉜	5WR	2	E, Starter switch-(B)
㉝	R	2	E, Starter switch-(BR)
㉞	BW	2	E, Starter switch-(C)
㊱	WG	2	E, Starter switch-(BR)
㊽	2WL	2	E, Starter switch-(ACC)

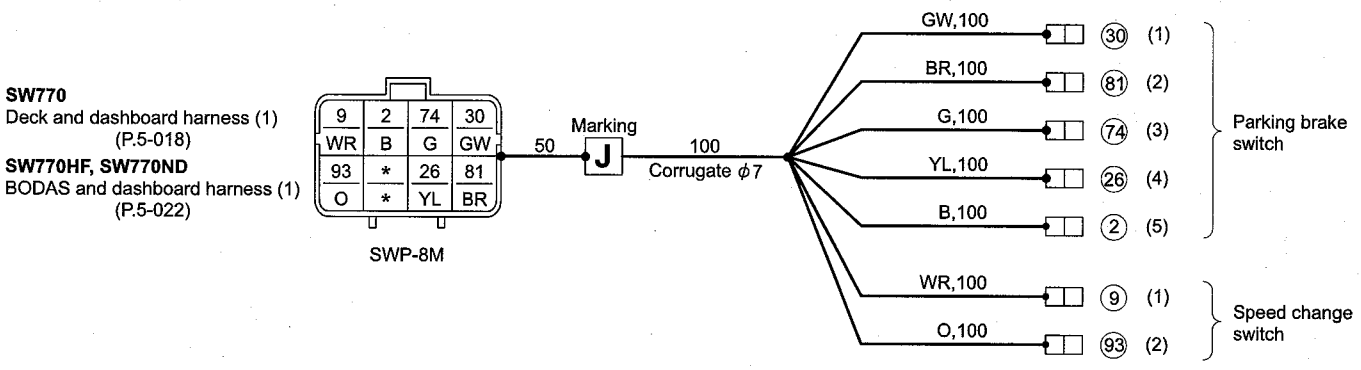
4-15. Throttle Switch Harness



SW770-05015

NO.	SIZE, COLOR	CONTACT POINTS	CONNECTION
⑭	RL	2	G1, Throttle switch-(6)
⑮	RY	4	G1 × 2, Throttle switch-(2), (5)
⑯	RW	2	G1, Throttle switch-(3)

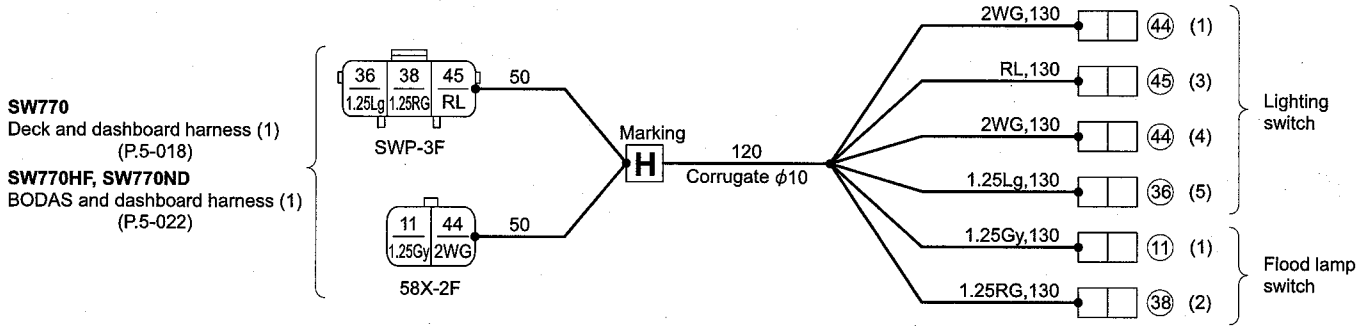
4-16. Control Switch Harness



SW770-05016

NO.	SIZE, COLOR	CONTACT POINTS	CONNECTION
②	B	2	J, Parking brake switch-(5)
⑨	WR	2	J, Speed change switch-(1)
㉖	YL	2	J, Parking brake switch-(4)
㉚	GW	2	J, Parking brake switch-(1)
㉞	G	2	J, Parking brake switch-(3)
㉛	BR	2	J, Parking brake switch-(2)
㉝	O	2	J, Speed change switch-(2)

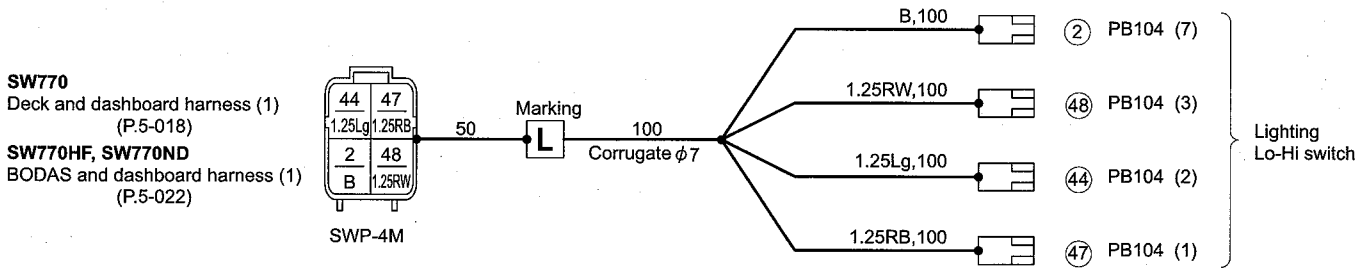
4-17. Lighting Switch Harness



SW770-05017

NO.	SIZE, COLOR	CONTACT POINTS	CONNECTION
⑪	1.25Gy	2	H, Flood lamp switch-(1)
㊱	1.25Lg	2	H, Lighting switch-(5)
㊳	1.25RG	2	H, Flood lamp switch-(2)
㊹	2WG	3	H, Lighting switch-(1), (4)
㊺	RL	2	H, Lighting switch-(3)

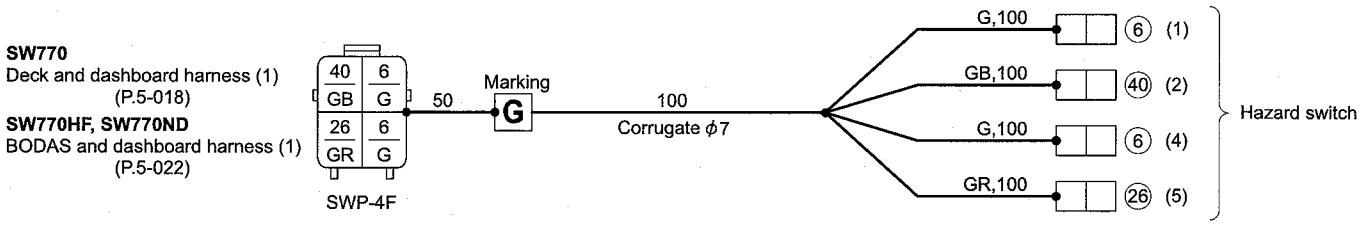
4-18. Lighting Lo-Hi Switch Harness



SW770-05018

NO.	SIZE, COLOR	CONTACT POINTS	CONNECTION
②	B	2	L, Lighting Lo-Hi switch-(7)
㊹	1.25Lg	2	L, Lighting Lo-Hi switch-(2)
㊼	1.25RB	2	L, Lighting Lo-Hi switch-(1)
㊽	1.25RW	2	L, Lighting Lo-Hi switch-(3)

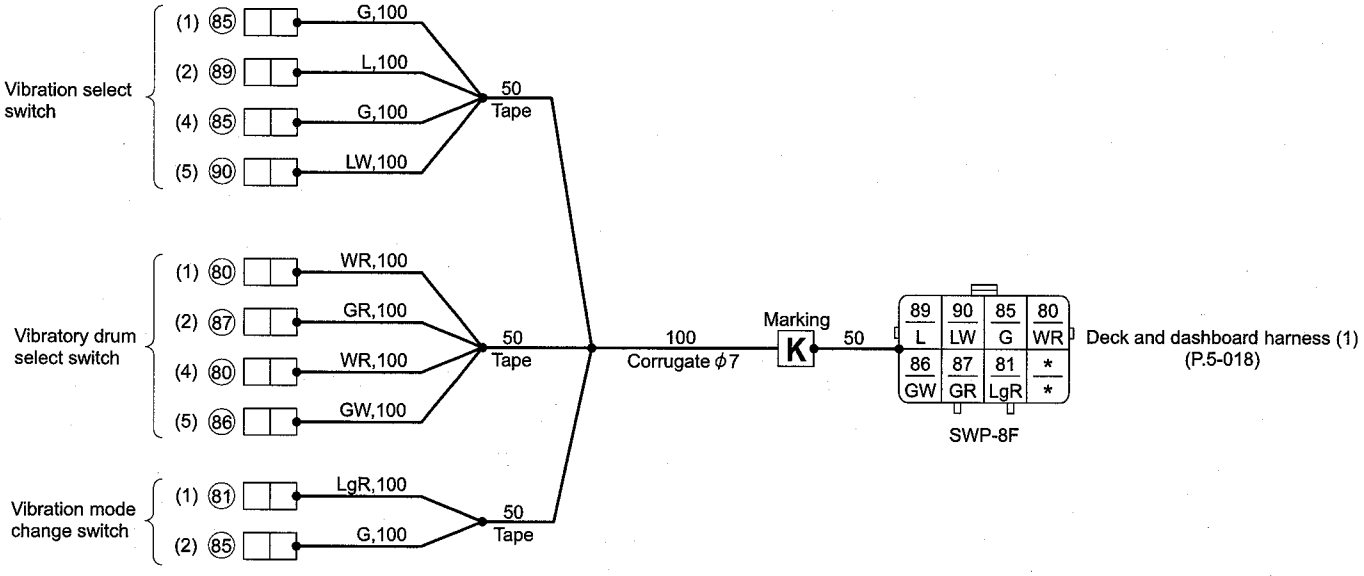
4-19. Hazard Switch Harness



SW770-05019

NO.	SIZE, COLOR	CONTACT POINTS	CONNECTION
⑥	G	4	G × 2, Hazard switch-(1), (4)
㉖	GR	2	G, Hazard switch-(5)
㊵	GB	2	G, Hazard switch-(2)

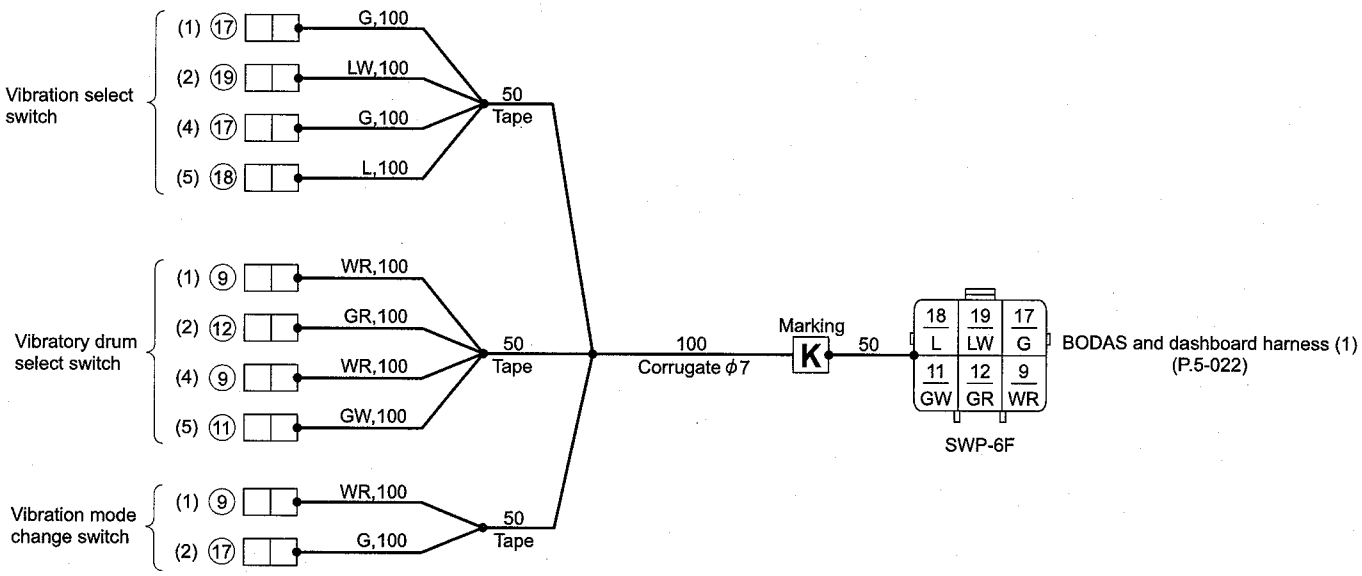
4-20. Vibration Switch Harness (SW770)



SW770-05020

NO.	SIZE, COLOR	CONTACT POINTS	CONNECTION
⑧⓪	WR	3	K, Vibratory drum select switch-(1), (4)
⑧①	LgR	2	K, Vibration mode change switch-(1)
⑧⑤	G	4	K, Vibration mode change switch-(2), Vibration select switch-(1), (4)
⑧⑥	GW	2	K, Vibratory drum select switch-(5)
⑧⑦	GR	2	K, Vibratory drum select switch-(2)
⑧⑨	L	2	K, Vibration select switch-(2)
⑨⓪	LW	2	K, Vibration select switch-(5)

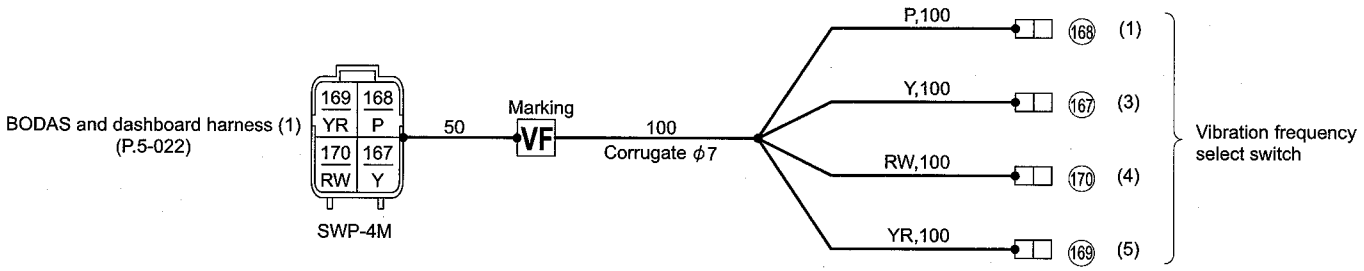
4-21. Vibration Switch Harness (SW770HF, SW770ND)



SW770HF-05024

NO.	SIZE, COLOR	CONTACT POINTS	CONNECTION
⑨	WR	4	K, Vibration mode change switch-(1), Vibratory drum select switch-(1), (4)
⑪	GW	2	K, Vibratory drum select switch-(5)
⑫	GR	2	K, Vibratory drum select switch-(2)
⑰	G	4	K, Vibration mode change switch-(2), Vibration select switch-(1), (4)
⑱	L	2	K, Vibration select switch-(5)
⑲	LW	2	K, Vibration select switch-(2)

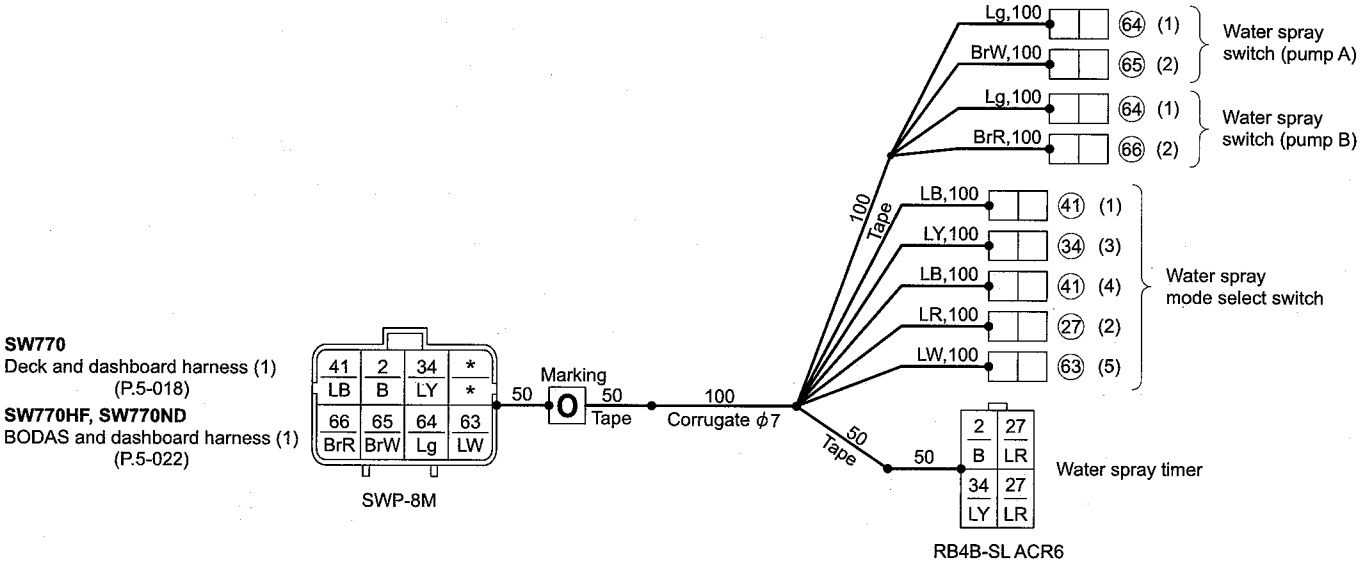
4-22. Vibration Frequency Select Switch Harness (SW770HF)



SW770HF-05025

NO.	SIZE, COLOR	CONTACT POINTS	CONNECTION
(167)	Y	2	VF, Vibration frequency select switch-(3)
(168)	P	2	VF, Vibration frequency select switch-(1)
(169)	YR	2	VF, Vibration frequency select switch-(5)
(170)	RW	2	VF, Vibration frequency select switch-(4)

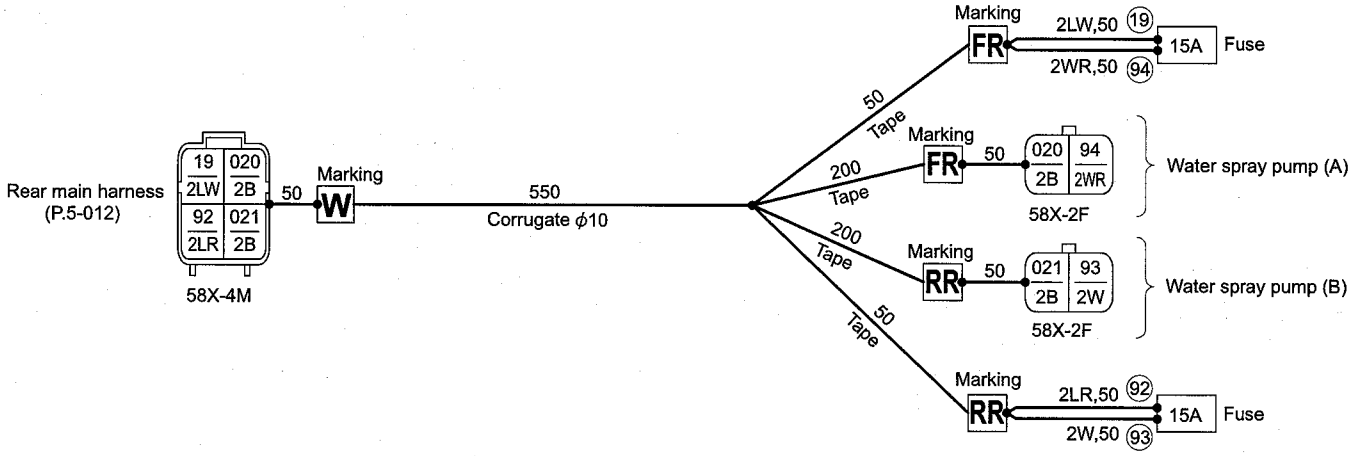
4-23. Water Spray Switch Harness



SW770-05021

NO.	SIZE, COLOR	CONTACT POINTS	CONNECTION
②	B	2	O, Water spray timer
㉗	LR	3	Water spray mode select switch-(2), Water spray timer × 2
㉞	LY	3	O, Water spray mode select switch-(3), Water spray timer
㊶	LB	3	O, Water spray mode select switch-(1), (4)
⑥③	LW	2	O, Water spray mode select switch-(5)
⑥④	Lg	3	O, Water spray switch (pump A)-(1), (pump B)-(1)
⑥⑤	BrW	2	O, Water spray switch (pump A)-(2)
⑥⑥	BrR	2	O, Water spray switch (pump B)-(2)

4-24. Water Spray Pump Harness

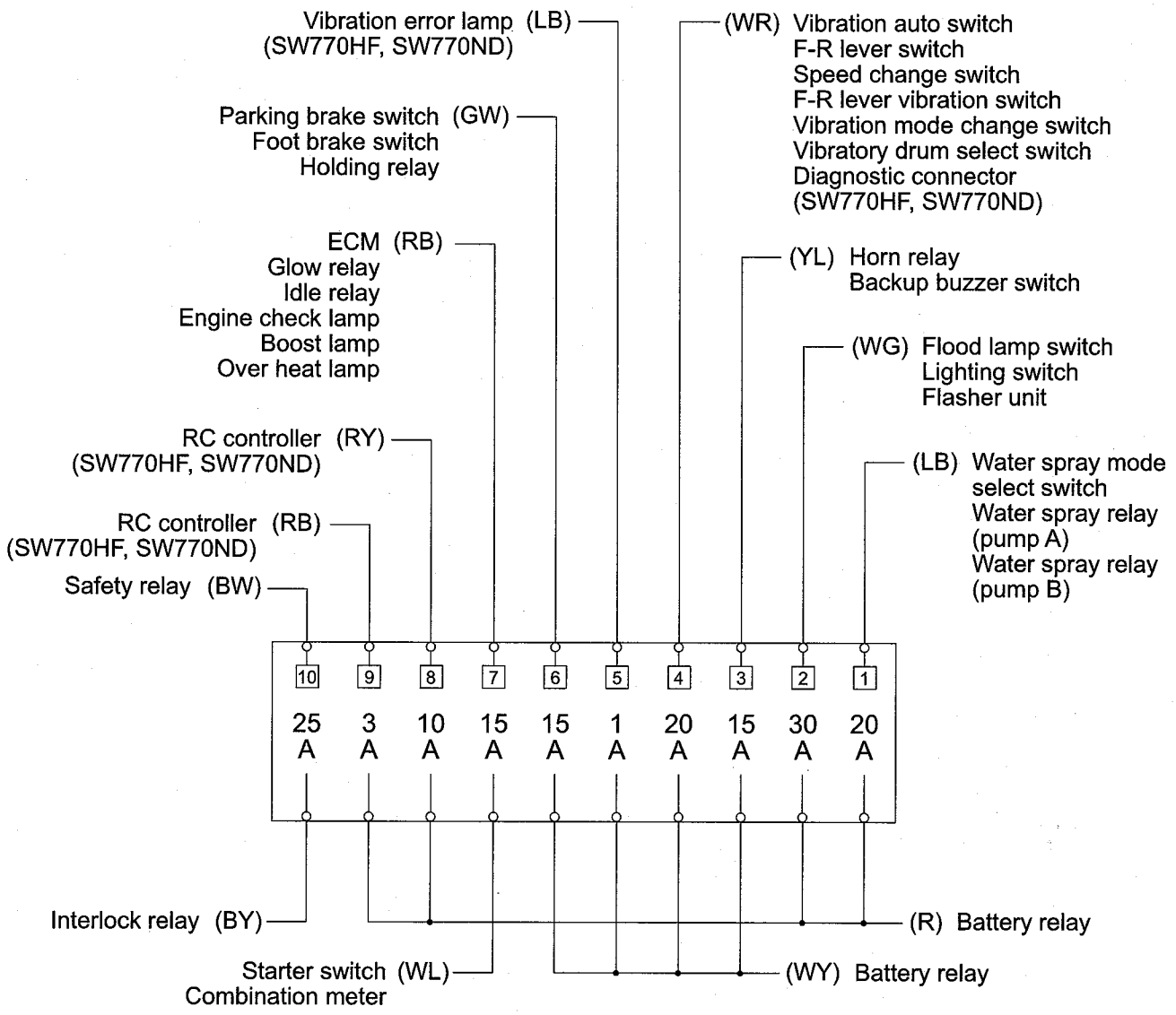


SW770-05022

NO.	SIZE, COLOR	CONTACT POINTS	CONNECTION
⑲	2LW	2	W, FR-Fuse (15A)
⑨②	2LR	2	W, RR-Fuse (15A)
⑨③	2W	2	RR-Water spray pump (B), RR-Fuse (15A)
⑨④	2WR	2	FR-Water spray pump (A), FR-Fuse (15A)
⑫⓪	2B	2	W, FR-Water spray pump (A)
⑫①	2B	2	W, RR-Water spray pump (B)

5. ELECTRICAL COMPONENT SPECIFICATIONS

5-1. Fuse Box

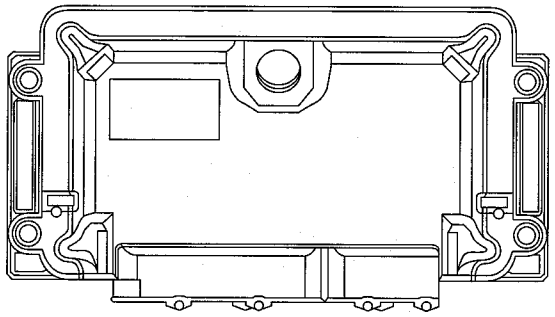


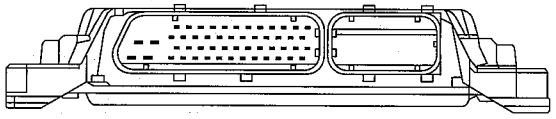
SW770-05023

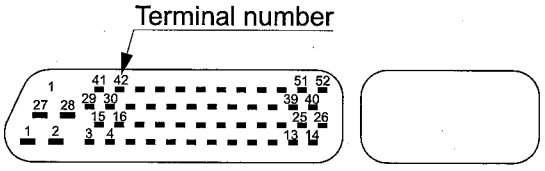
Harness color codes

R	: Red	WG	: White/Green stripe
BW	: Black/White stripe	RB	: Red/Black stripe
BY	: Black/Yellow stripe	RY	: Red/Yellow stripe
WR	: White/Red stripe	GW	: Green/White stripe
WL	: White/Blue stripe	YL	: Yellow/Blue stripe
WY	: White/Yellow stripe	LB	: Blue/Black stripe

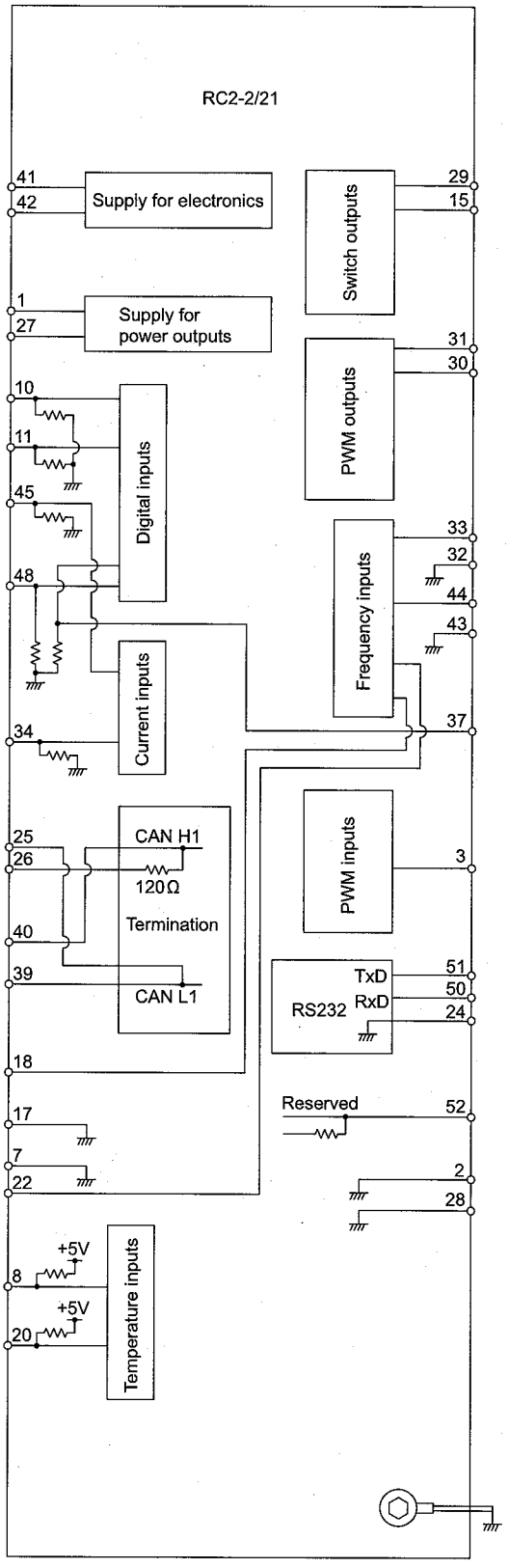
5-2. RC Controller (RC2-2/21) (SW770HF, SW770ND)







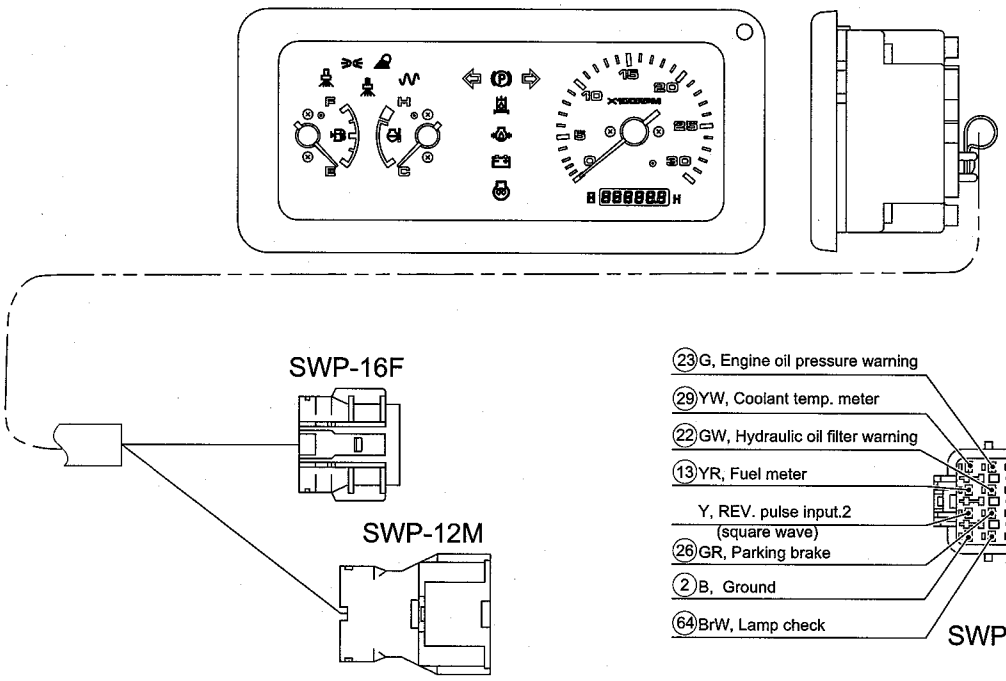
SW770HF-05031

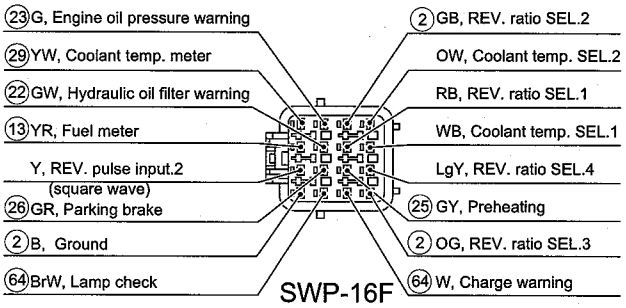


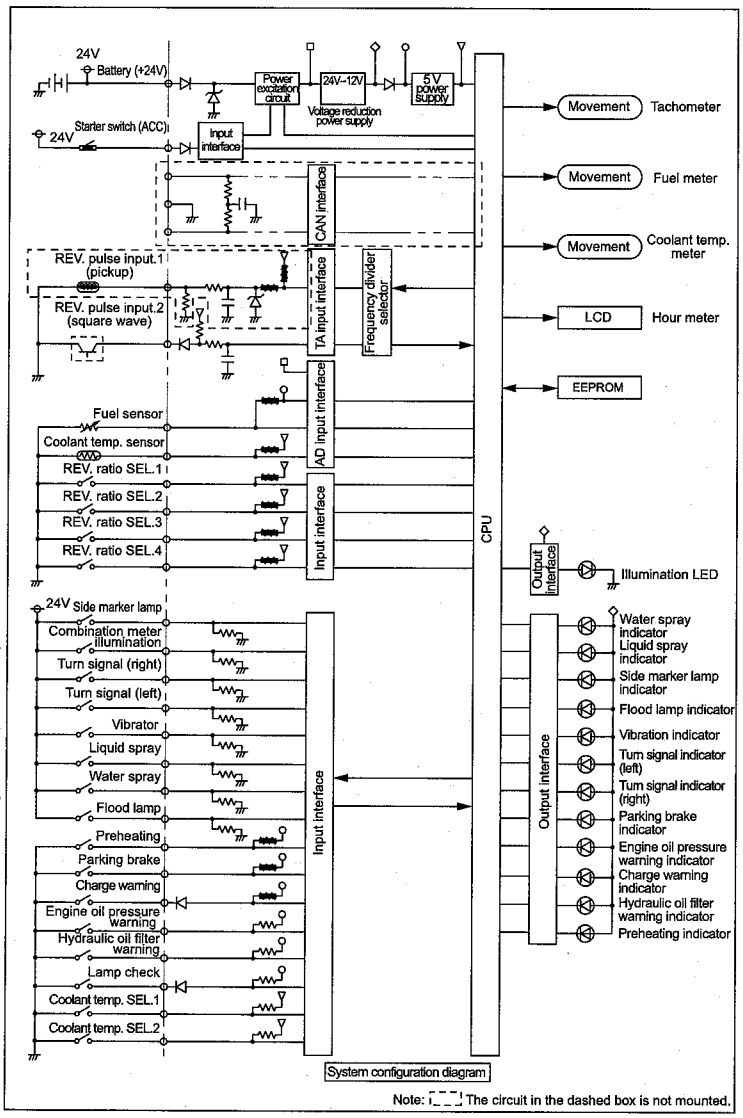
SW770HF-05030

Pin No.	Terminal name
1	Supply for power outputs
2	GND
3	Vibration error lamp
7	Vibration frequency select switch for 4000 rpm
8	Auto/manual selector
10	Vibratory drum select switch for front side
11	Vibratory drum select switch for rear side
15	Vibrator solenoid B (R)
17	Vibration frequency select switch for 3000 rpm
18	Vibration frequency select switch
20	Standard/option selector
22	Vibration frequency select switch
24	GND
25	Termination
26	Termination
27	Supply for power outputs
28	GND
29	Vibrator solenoid A (F)
30	Vibrator pump SOL (D) (Low)
31	Vibrator pump SOL (C) (High)
32	GND
33	Front side vibrator speed sensor
34	Vibration select switch for low amplitude
37	Traveling detection sensor
39	CAN L1
40	CAN H1
41	Supply for electronics
42	Supply for electronics
43	GND
44	Rear side vibrator speed sensor
45	Vibration auto switch
48	Vibration select switch for high amplitude
50	Diagnostic connector for RS232, RxD
51	Diagnostic connector for RS232, TxD
52	Diagnostic connector for reserved port

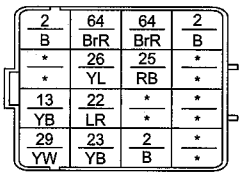
5-3. Combination Meter



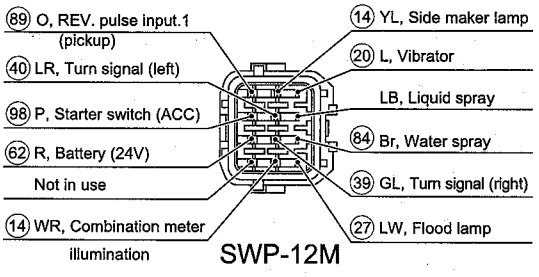




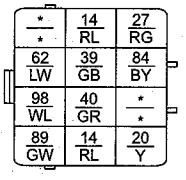
Harness side



SWP-16M



Harness side



SWP-12F

SW770-05024

VIBRATORY DRUM

1. PRECAUTIONS FOR DISASSEMBLY AND REASSEMBLY

• When removing, installing, disassembling or reassembling the unit, observe the general precautions described below.

1) Precautions for removal work
- Coolant that contains antifreeze should be treated as a chemical, and must not be drained carelessly on the ground.
- To prevent dust from getting into disconnected hoses and tubes, cover them with a plug or similar means.
- When draining oil, use a receptacle with sufficient capacity to receive it.
- Before proceeding with the work, look for matchmarks that show the installation location. For reassembly, place matchmarks in the required locations to prevent errors. Then remove.
- When disconnecting wiring connectors, hold the connector components so that unreasonable force is not applied to the wires.
- Label wires and hoses to ensure correct installation location.
- Confirm the number and thickness of shims prior to storage.
- When lifting parts, use lifting equipment of sufficient capacity.
- When separating parts by using pull bolts, tighten the bolts alternately.
- Before removing a unit, clean its surrounding area. Then after removal, cover it to prevent dust and other substances from getting in.
- Before removing piping for hydraulic oil or coolant, or removing related parts, satisfactorily release internal pressure.

2) Precautions for installation work
- Tighten bolts and nuts (sleeve nuts) to the specified torque (screw tightening torque table).
- When installing hoses, do not twist them or allow them to interfere with other parts.
- Replace gaskets, O-rings, split cotter pins, and lock plates with new parts.
- Properly bend split cotter pins and lock plates.
- When applying an adhesive, first clean and remove oil/grease from the surfaces properly. Then apply two or three drops to the threaded areas.
- When applying a liquid gasket, first clean and remove oil/grease from the application surface properly, and confirm that the surface is free of dust and damage. Then apply the product evenly.
- Clean parts well. Repair scratches, dents, burrs, rust, etc.
- Apply gear oil to rotating and sliding components.
- Apply grease to the surfaces of press-fit parts.
- After installing snap rings, confirm that they are properly seated in the grooves.
- Connect wiring connectors securely after cleaning off adhering oil, dust and water.
- Use lifting bolts that are not fatigued or deformed. Screw them in fully.
- When tightening a split flange, tighten screws alternately to prevent uneven tightening.
- Before installing hydraulic parts, confirm that they are free of damage and dust, etc.

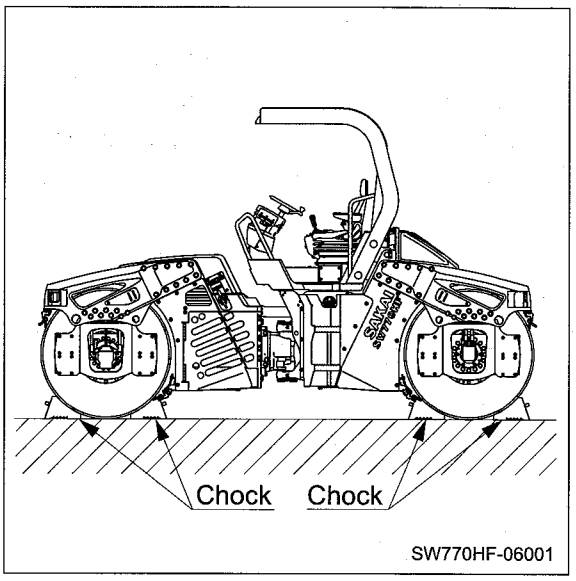
3) Precautions when work is completed

- If coolant has been drained, securely retighten the drain cock and fill with coolant (mixing in long-life coolant) to the specified level. Start the engine and allow the coolant to circulate through the piping. Then add coolant again to the specified level.
- If hydraulic equipment has been removed and reinstalled, fill with hydraulic oil to the specified level. Start the engine and allow the oil to circulate through the piping. Then add oil again to the specified level.

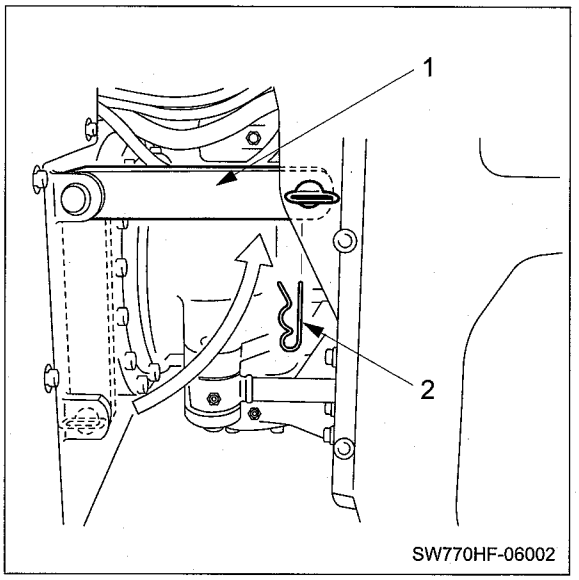
2. VIBRATORY DRUM

2-1. Removal and Installation of Vibratory Drum

- Hold vibratory drum with chocks.



- Lock front and rear frames with steering lock bar (1) and then set spring pin (2) to steering lock bar (1).

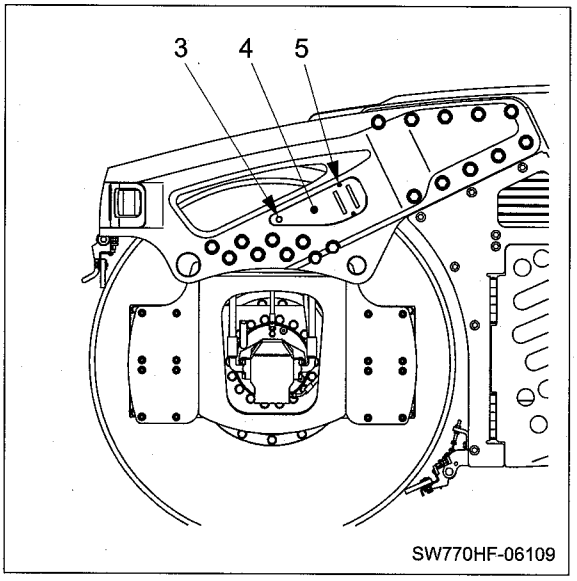


2-1-1. Removal of front vibratory drum

⚠WARNING

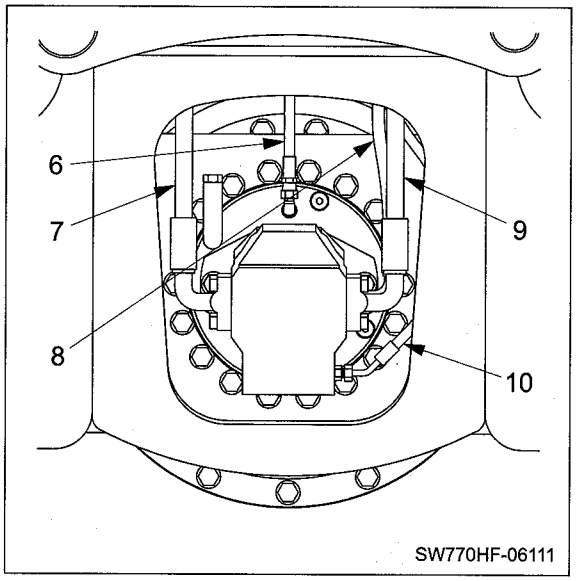
The hydraulic oil in the machine is hot and compressed immediately after the machine is stopped. Disconnecting the hydraulic hoses in this condition can cause burns. Wait for the hydraulic oil to cool down before starting the work.

1) Propulsion motor piping
   - Remove bolts (5).
   - Remove bolt (3).
   - Remove cover (4).

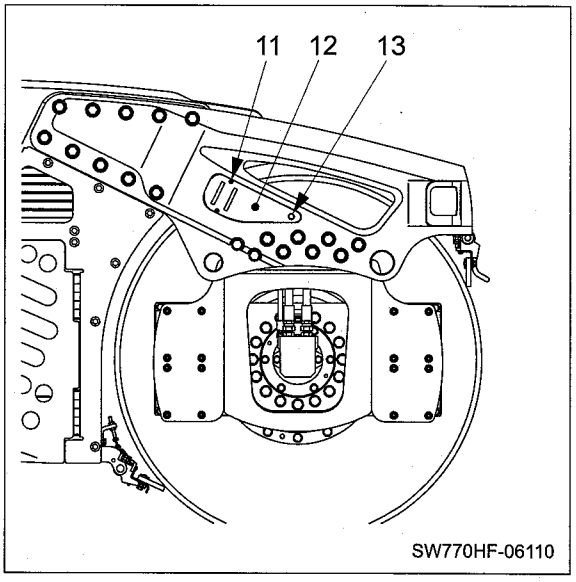


2) Disconnect hydraulic hoses (6), (7), (8), (9) and (10) connecting to propulsion motor.

   (NOTICE)
   - **Plug both ends of the disconnected hoses or implement other actions to prevent entry of foreign matter.**

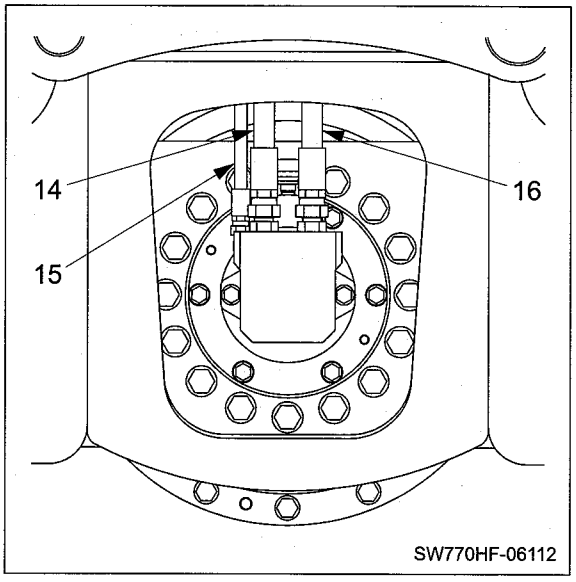


3) Vibrator motor piping
   - Remove bolts (11).
   - Remove bolt (13).
   - Remove cover (12).



4) Disconnect hydraulic hoses (14), (15) and (16) connecting to vibrator motor.

(NOTICE)
- **Plug both ends of the disconnected hoses or implement other actions to prevent entry of foreign matter.**



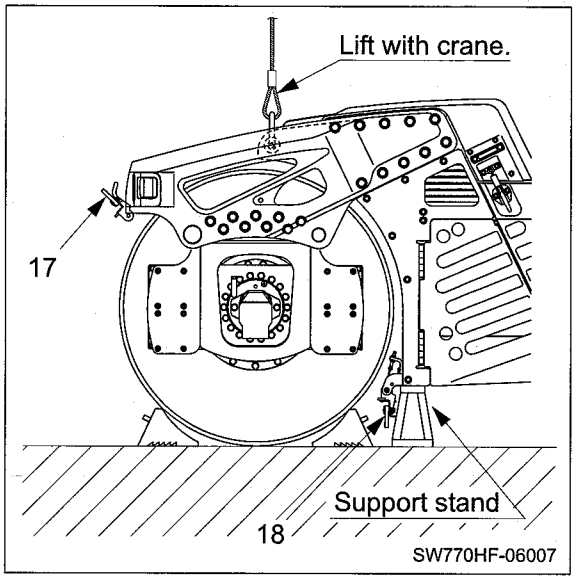
⚠DANGER

When lifting the machine body, use an appropriate hoist of sufficient strength. Confirm that the surrounding area is safe, and work in a natural, unstrained posture. Also, to firmly secure the machine body, use a support stand of sufficient strength.

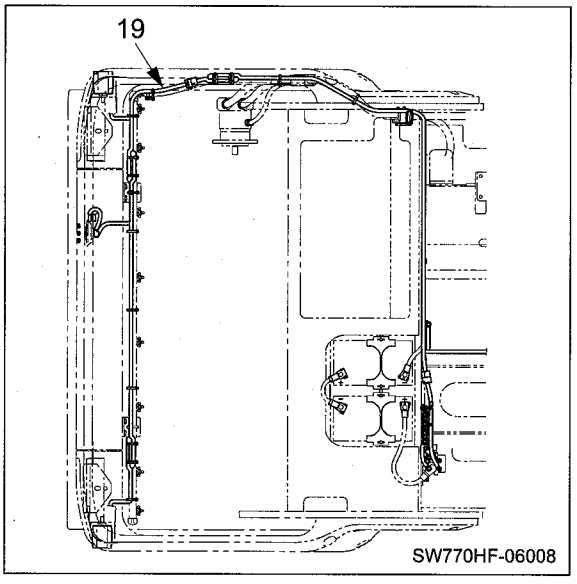
5) Supporting front frame
- Lift frame with a crane.
- Place support stands under frame when vibratory drum is slightly off ground to support machine body.

  5 kg Front axle weight
  SW770 : 5,200 kg (11,465 lbs.)
  SW770HF : 5,200 kg (11,465 lbs.)
  SW770ND : 5,460 kg (12,035 lbs.)

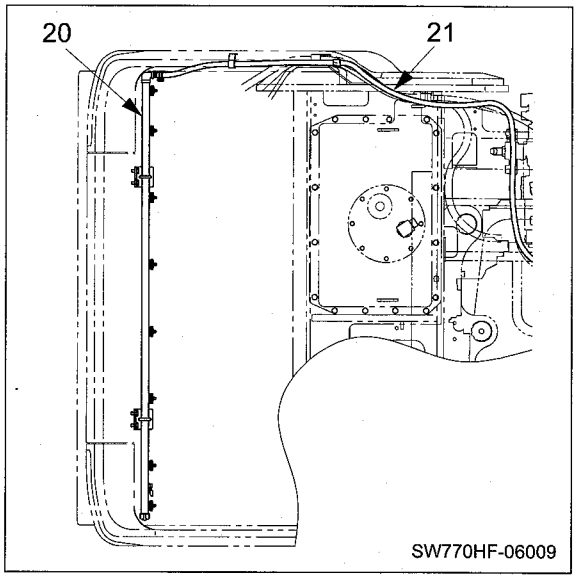
- Flip up scraper blades (17) and (18).



6) Remove electrical harness (19).

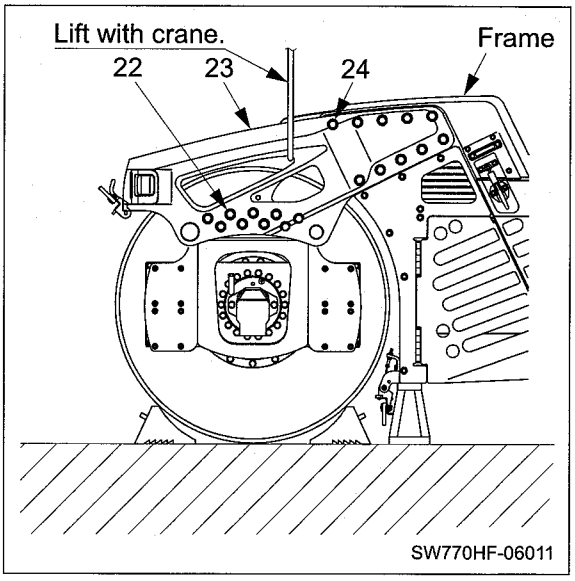


7) Remove water spray hose (21) from water spray pipe (20).



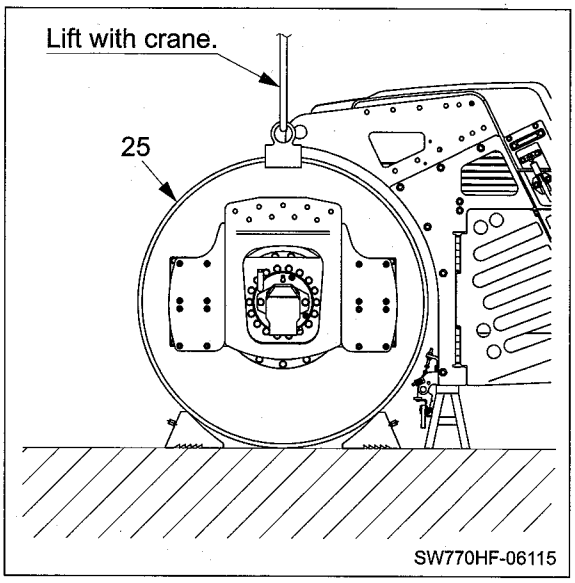
8) Remove bolts (22) and (24) (left and right sides).
   - Remove plates (left and right sides) and member (23) from frame.

   Lifting parts : 500 kg (1,102 lbs.)

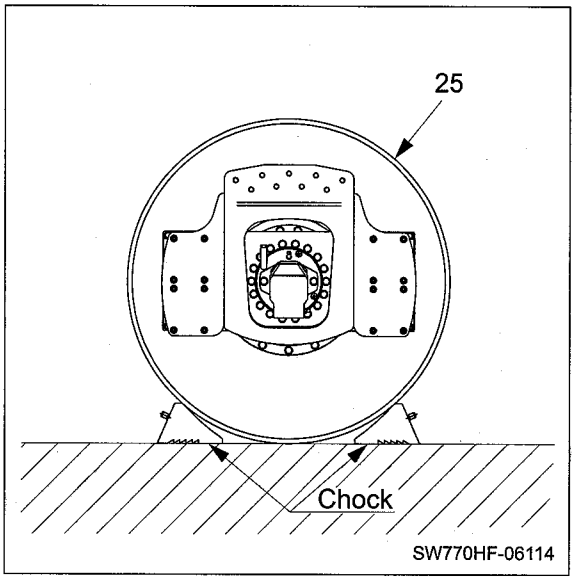


9) Lift vibratory drum ASSY (25) with crane.

kg (25) Vibratory drum ASSY
SW770 : 2,505 kg (5,523 lbs.)
SW770HF : 2,505 kg (5,523 lbs.)
SW770ND : 2,800 kg (6,173 lbs.)



10) Place chocks at front and rear of removed vibratory drum ASSY (25) to prevent vibratory drum ASSY from moving.



2-1-2. Removal of rear vibratory drum

- Removal of rear vibratory drum is same procedures as removal of front vibratory drum.

kg Rear axle weight
SW770 : 5,600 kg (12,345 lbs.)
SW770HF : 5,600 kg (12,345 lbs.)
SW770ND : 5,860 kg (12,920 lbs.)

2-1-3. Installation of vibratory drum

1) Install vibratory drum in reverse order in which it was removed.
   - Tightening torque for bolts where particular care is required when installing vibratory drum.

(22) Bolts M20 x 60 : 539 N·m (398 lbf·ft)
(24) Bolts M20 x 60 : 539 N·m (398 lbf·ft)

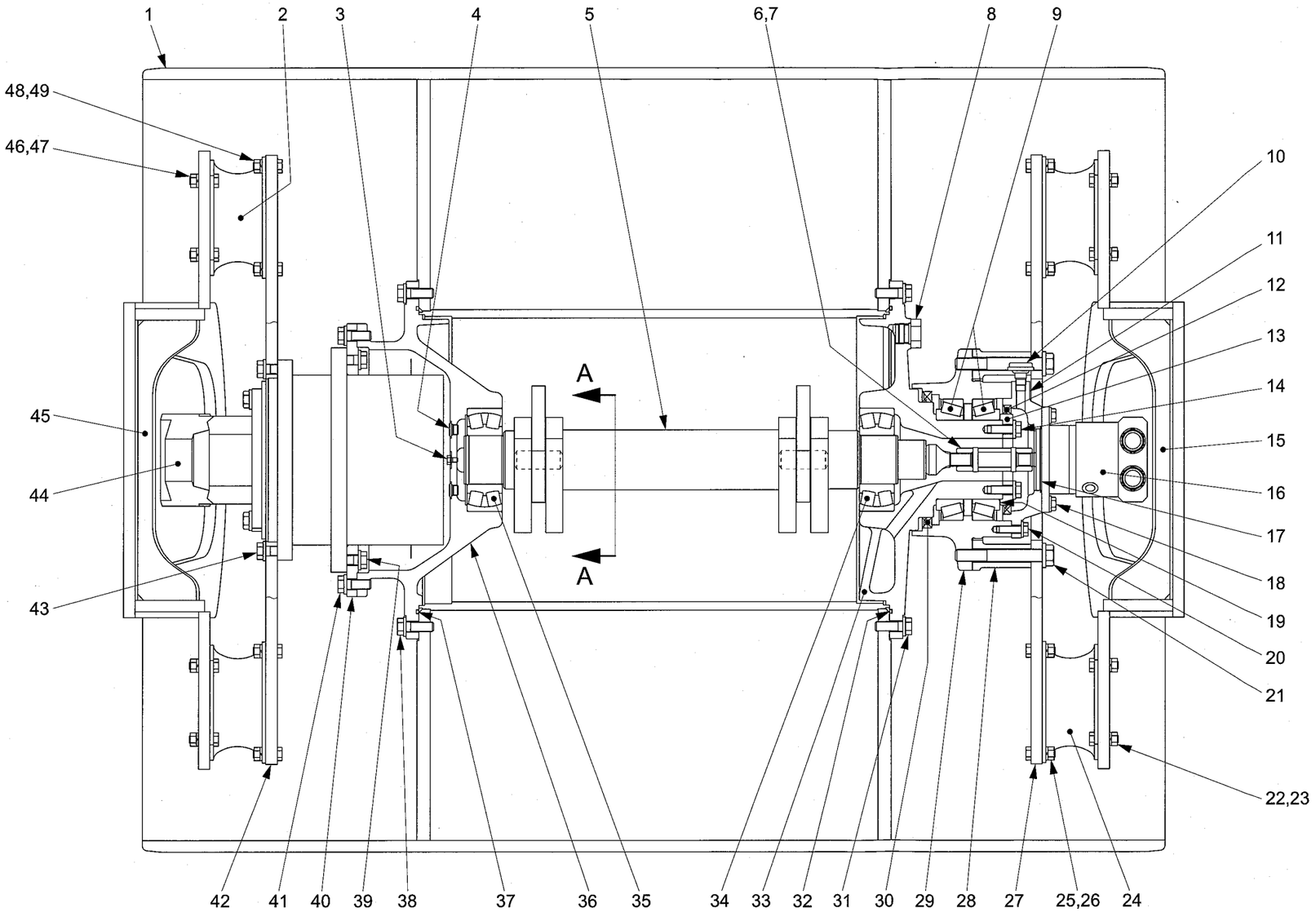
2) Upon installing vibratory drum, pay particular attention to items mentioned below.
   - Fill hydraulic oil tank to specified level to make up for any oil leakage.
   - Start engine and circulate oil through piping. Then check oil level again, ensuring that oil is at specified level.

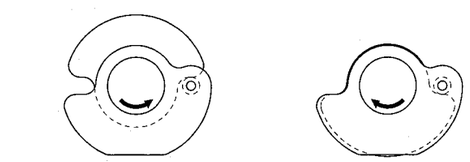
(NOTICE)

- **If the engine is run at high speed or the cylinder is operated to full stroke when the engine is started for the first time after the work is completed, the piston packing or other items may be damaged by air entering into the cylinder.**

3. VIBRATORY DRUM ASSY

3-1. Vibratory Drum ASSY (SW770, SW770HF)

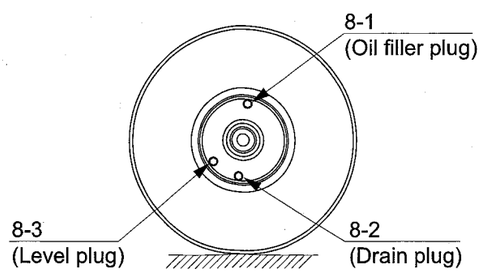




Vibrator mode: Low
Counterclockwise rotation

Vibrator mode: High
Clockwise rotation

SECTION A-A



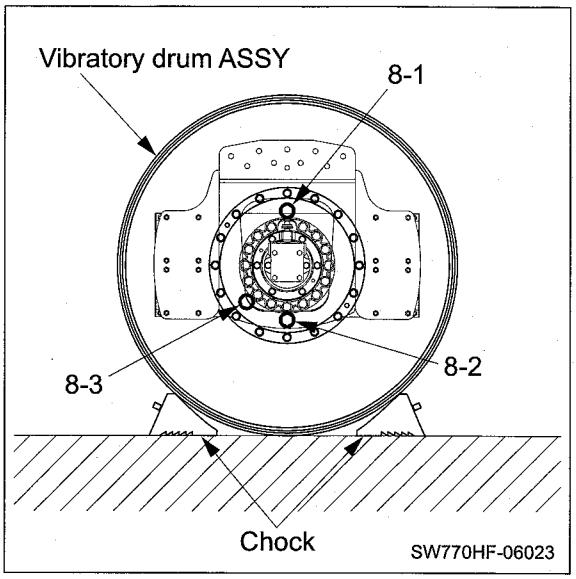
Vibrator motor side

0431-43801-0-10013-C

(1) Drum
(2) Damper
(3) Bolt : M8×16
(4) Plug
(5) Eccentric shaft
(6) Sleeve
(7) Spring pin
(8) Plug
(9) Roller bearing
(10) Breather
(11) Cover
(12) Oil seal
(13) Cover
(14) Bolt : M14×40
(15) Bracket
(16) Vibrator motor
(17) O-ring
(18) Bolt : M12×40
(19) Shim
(20) Bolt : M12×40
(21) Bolt : M20×150
(22) Bolt : M12×40
(23) Nut : M12
(24) Damper
(25) Bolt : M12×40
(26) Nut : M12
(27) Disc
(28) Bracket
(29) Housing
(30) Oil seal
(31) Bolt : M16×50
(32) O-ring
(33) Axle shaft
(34) Vibrator bearing
(35) Vibrator bearing
(36) Housing
(37) O-ring
(38) Bolt : M16×50
(39) Bolt : M16×50
(40) Ring
(41) Bolt : M16×45
(42) Disc
(43) Bolt : M16×45
(44) Propulsion motor
(45) Bracket
(46) Bolt : M12×40
(47) Nut : M12
(48) Bolt : M12×40
(49) Nut : M12

3-2. Disassembly and Reassembly of Vibratory Drum (SW770, SW770HF)

- Lead line numbers shown in the illustrations for the following vibratory drum disassembly and reassembly procedures are constant with part numbers of vibratory drum ASSY shown on page 6-010.

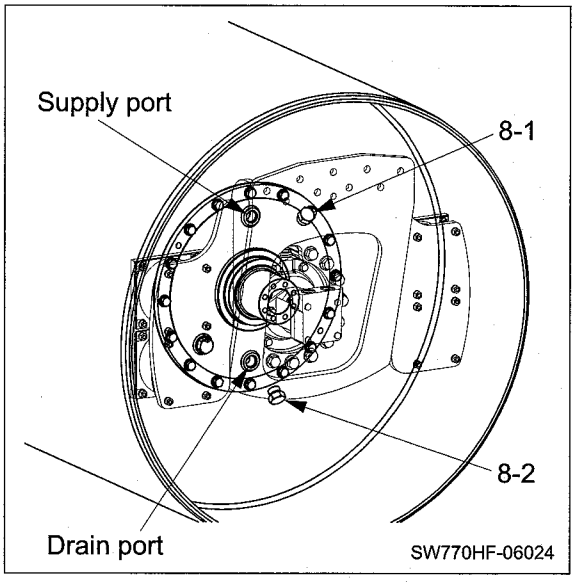


3-2-1. Disassembly of vibratory drum

1) Lay vibratory drum ASSY with plugs (8-1), (8-2) and (8-3) positioned as shown on the right.
   - Hold with chocks.

   Vibratory drum ASSY : 2,505 kg (5,523 lbs.)

2) Remove plugs (8-1) and (8-2).
   - Drain gear oil.
     - Quantity of gear oil : 20 L (5.3 gal.)
   - Install plugs (8-1) and (8-2).

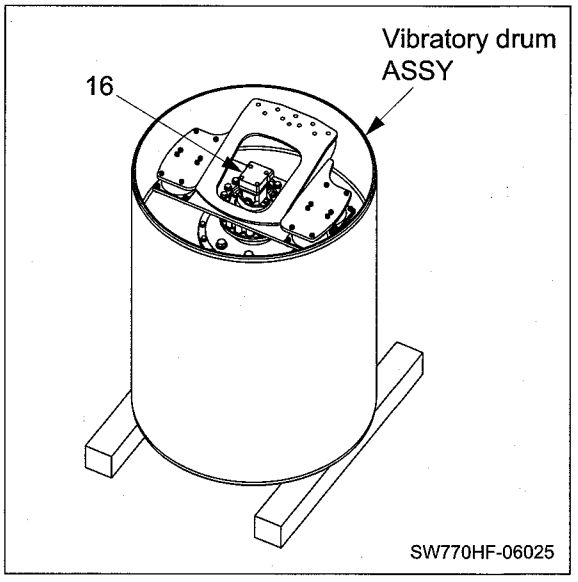


⚠WARNING

- **When standing the drum, use wooden blocks of sufficient strength to securely support the drum.**
- **Carry out the work in an unstrained posture using a work stool or the like.**

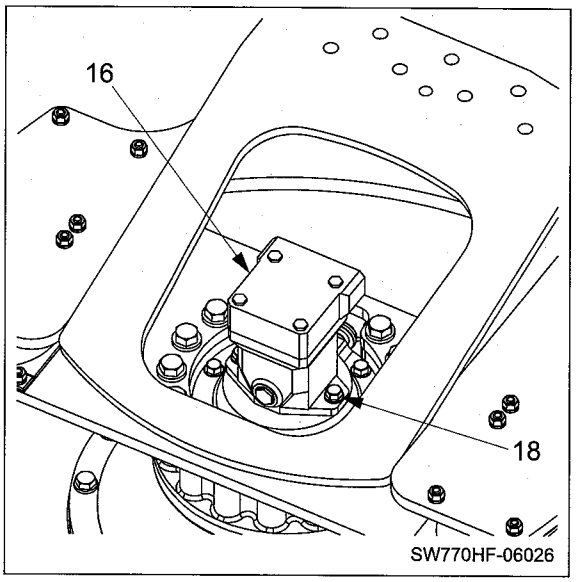
3) Stand vibratory drum ASSY with its vibrator motor (16) side facing up.

   Vibratory drum ASSY : 2,485 kg (5,478 lbs.)

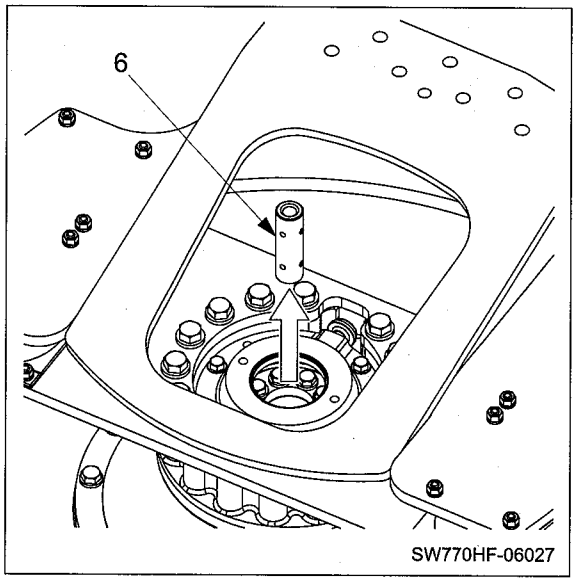


4) Remove bolts (18).
   - Remove vibrator motor (16).

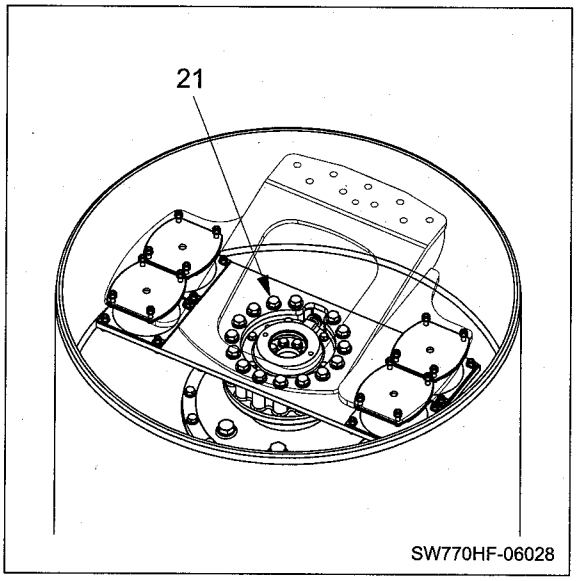
   (16) Vibrator motor : 15 kg (33 lbs.)



5) Remove sleeve (6).

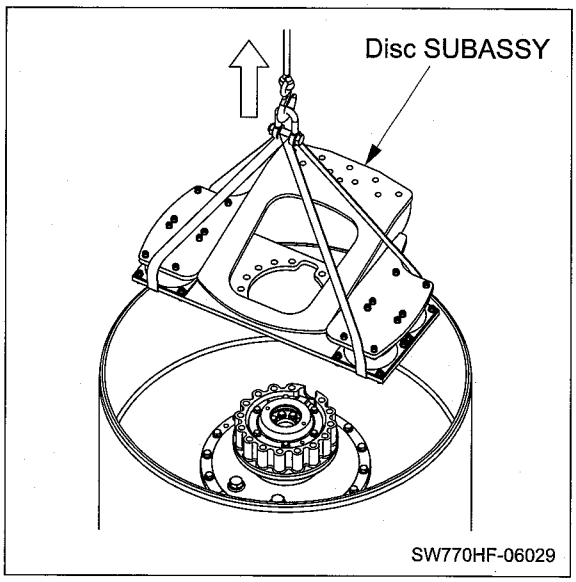


6) Remove bolts (21).



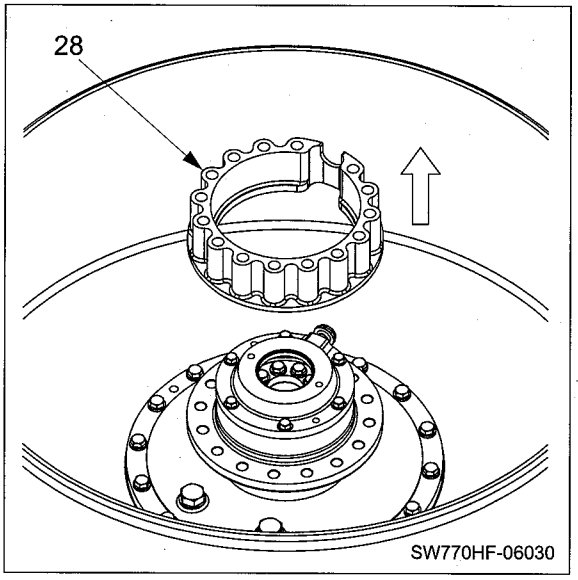
7) Remove disc SUBASSY.

Disc SUBASSY : 155 kg (342 lbs.)

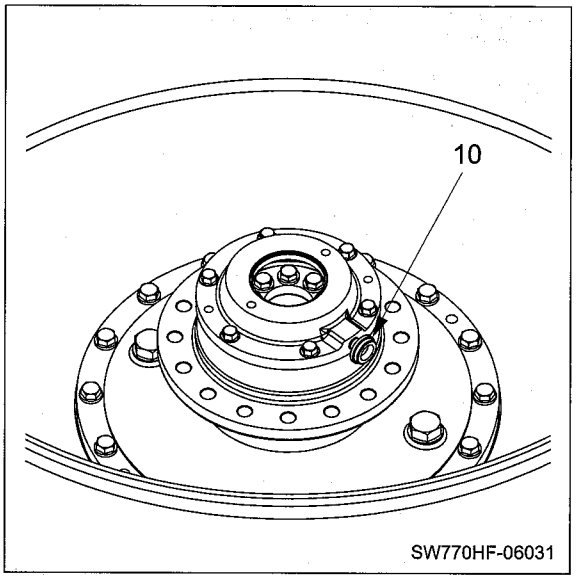


8) Remove bracket (28).

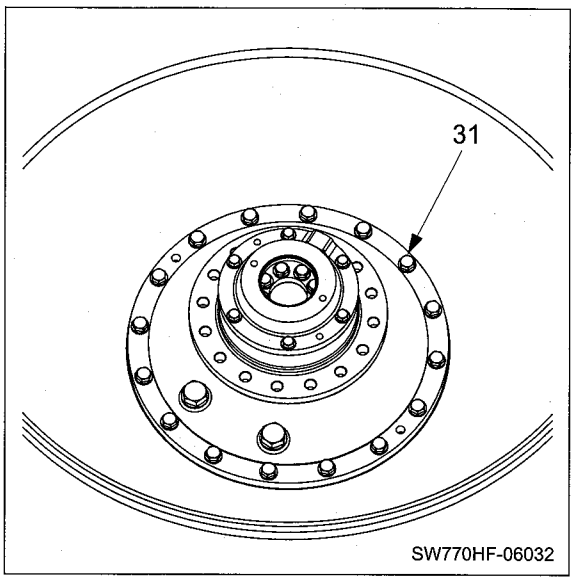
(28) Bracket : 20 kg (44 lbs.)



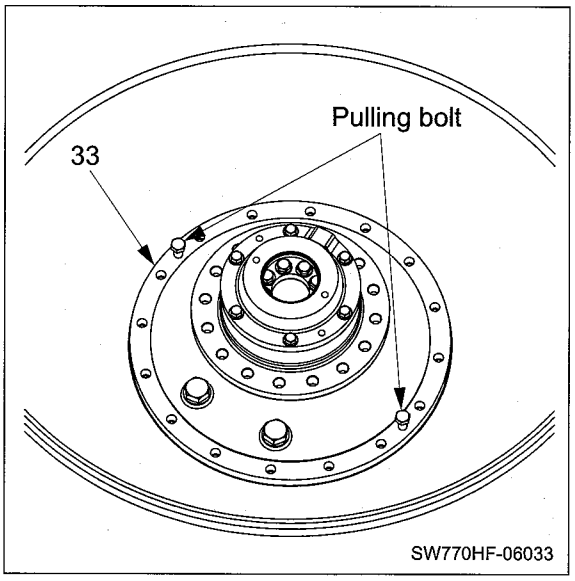
9) Remove breather (10).



10) Remove bolts (31).



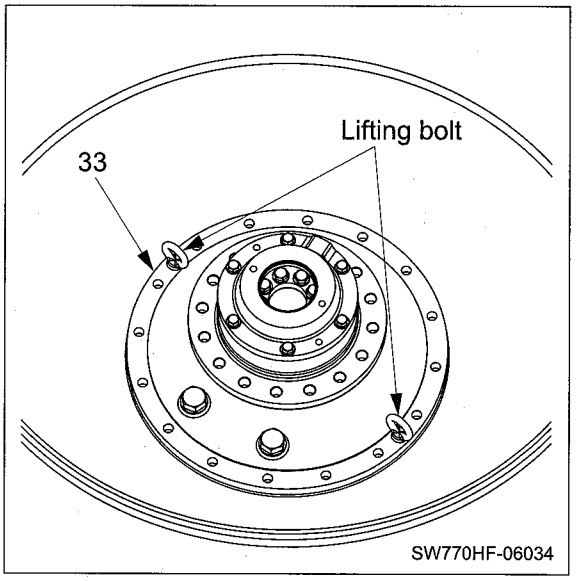
11) Lift axle shaft (33) using two pulling bolts (M16×50).



⚠WARNING

When installing lifting bolts, screw in the threads fully before using.

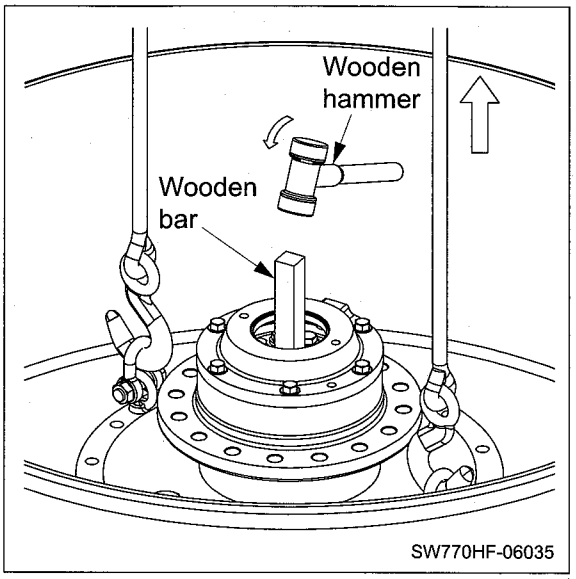
12) Install lifting bolts (M16) to axle shaft (33).



13) Lift axle shaft SUBASSY.

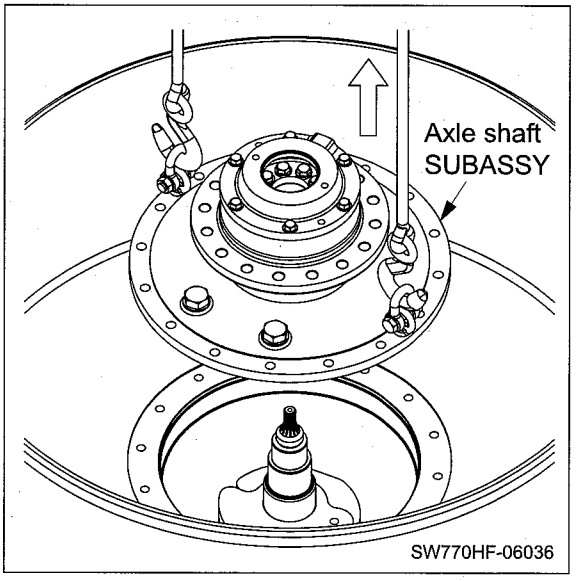
(NOTICE)

- **In order not to lift eccentric shaft together with axle shaft SUBASSY, tap on the shaft end with a wooden hammer via a wooden bar during lifting.**

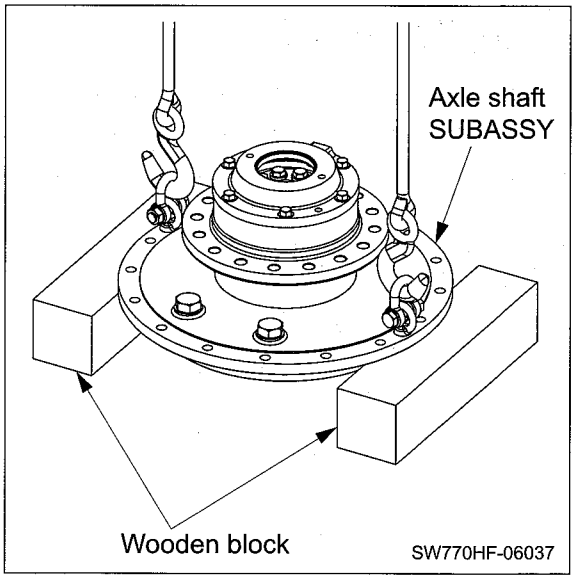


14) Remove axle shaft SUBASSY.

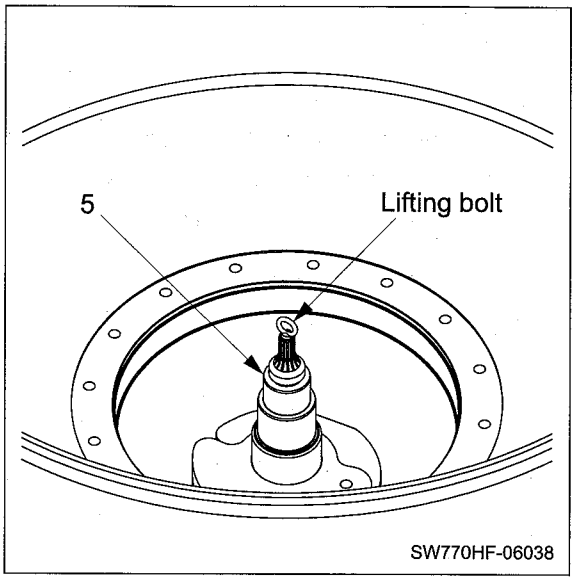
Axle shaft SUBASSY : 150 kg (331 lbs.)



15) Put axle shaft SUBASSY on wooden blocks.
(To step (28))



16) Install a lifting bolt (M8) to end of eccentric shaft (5).

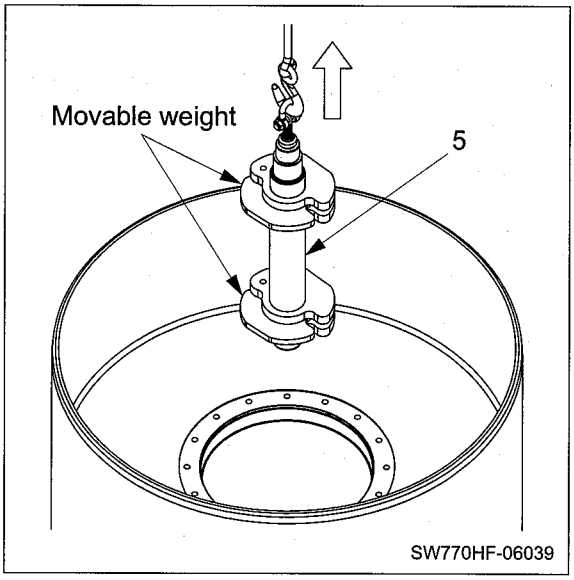


17) Remove eccentric shaft (5).

kg (5) Eccentric shaft : 80 kg (176 lbs.)

(NOTICE)

- **Put the movable weight at its outmost position.**

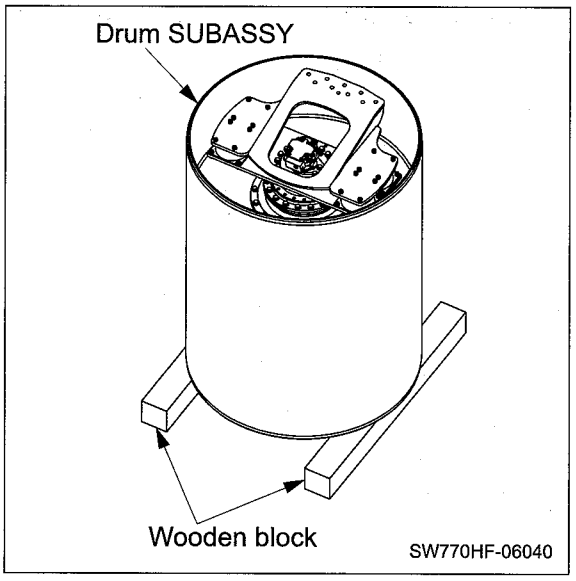


⚠WARNING

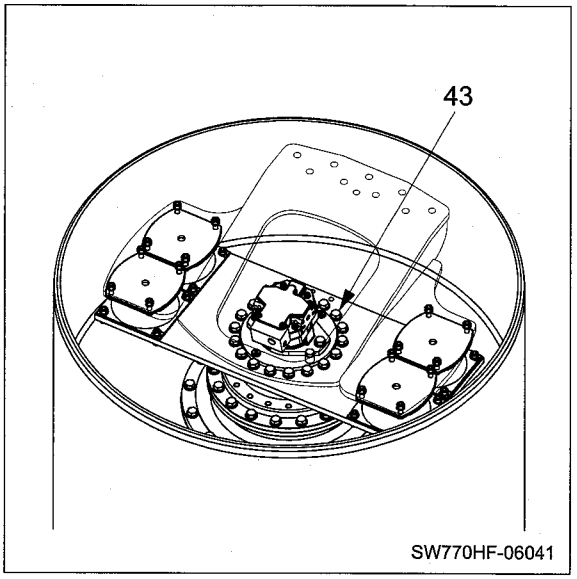
Be careful because reversing the drum involves risk. Confirm that the surrounding area is safe, and work in a natural, unstrained posture.

18) Reverse drum SUBASSY.

kg Drum SUBASSY : 2,055 kg (4,530 lbs.)

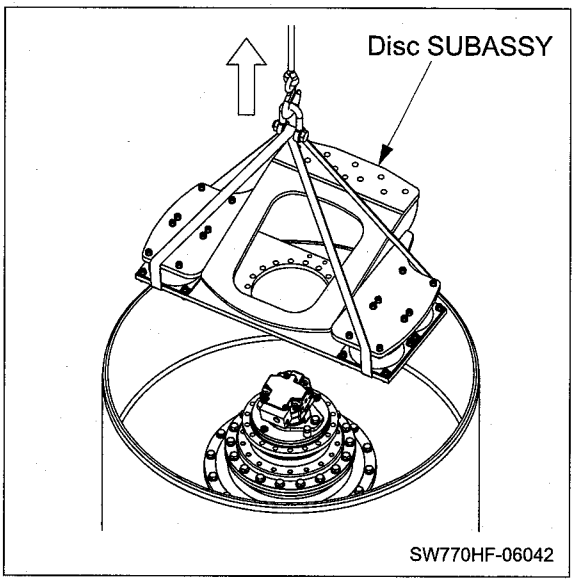


19) Remove bolts (43).



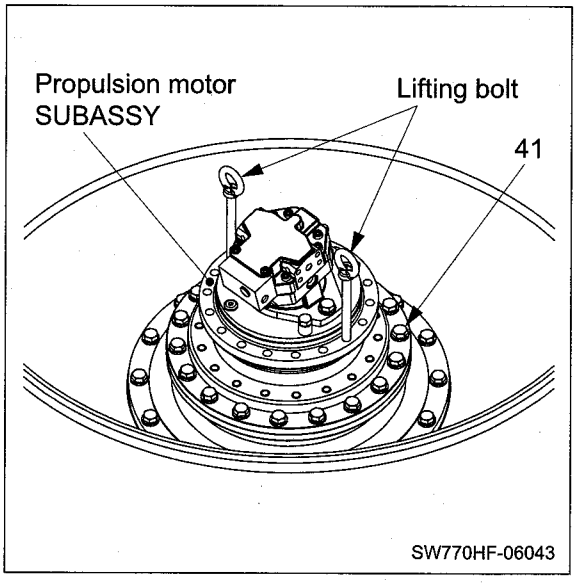
20) Remove disc SUBASSY.

Disc SUBASSY : 155 kg (342 lbs.)



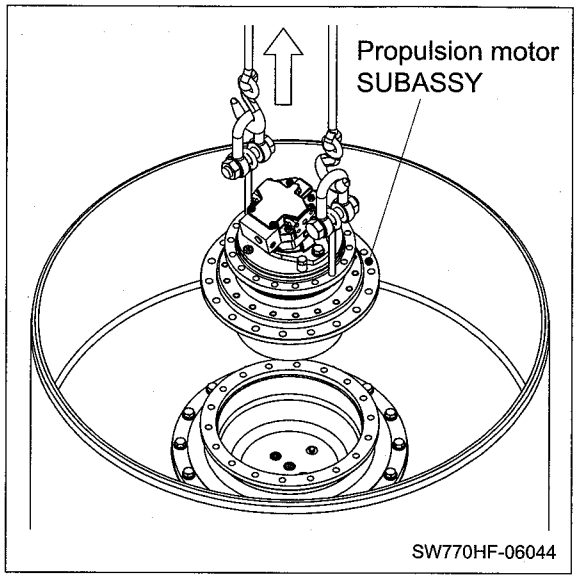
21) Install lifting bolts (M16) to propulsion motor SUBASSY.

- Remove bolts (41).



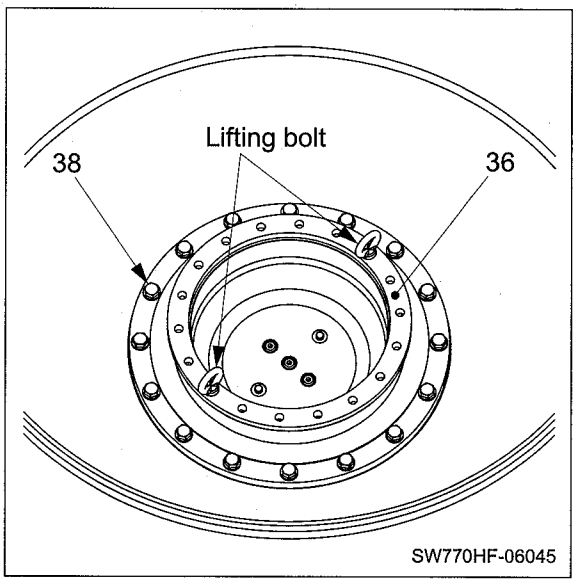
22) Remove propulsion motor SUBASSY.

Propulsion motor SUBASSY : 155 kg (342 lbs.)



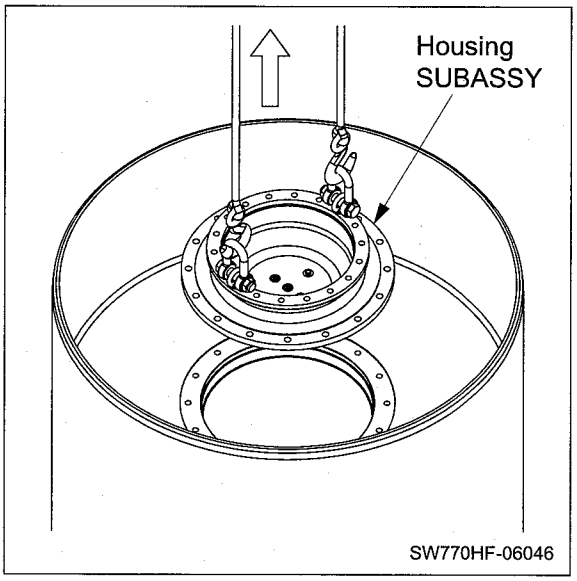
23) Install lifting bolts (M16) to housing (36).

- Remove bolts (38).

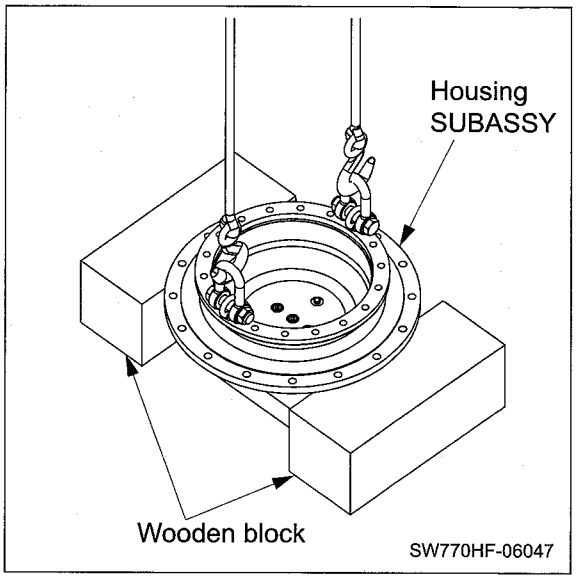


24) Remove housing SUBASSY.

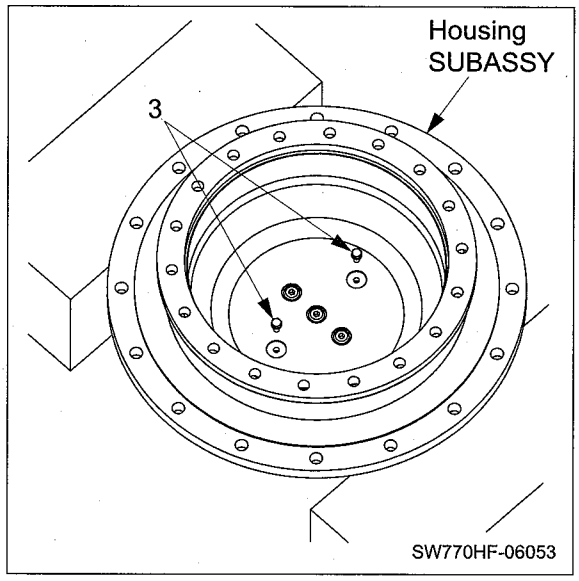
Housing SUBASSY : 100 kg (220 lbs.)



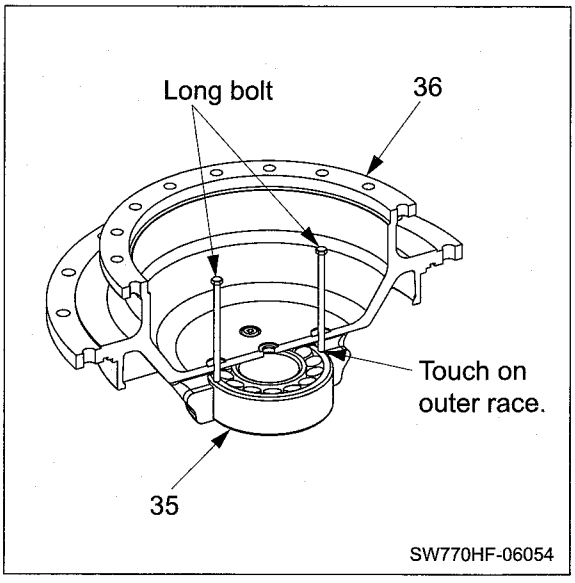
25) Put housing SUBASSY on wooden blocks.



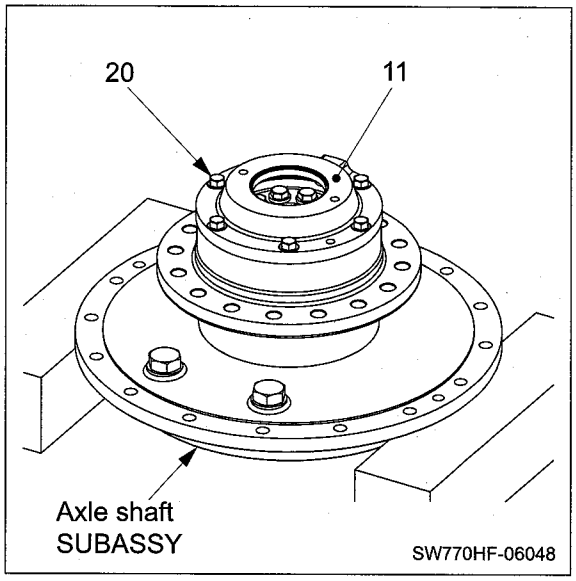
26) Remove bolts (3).



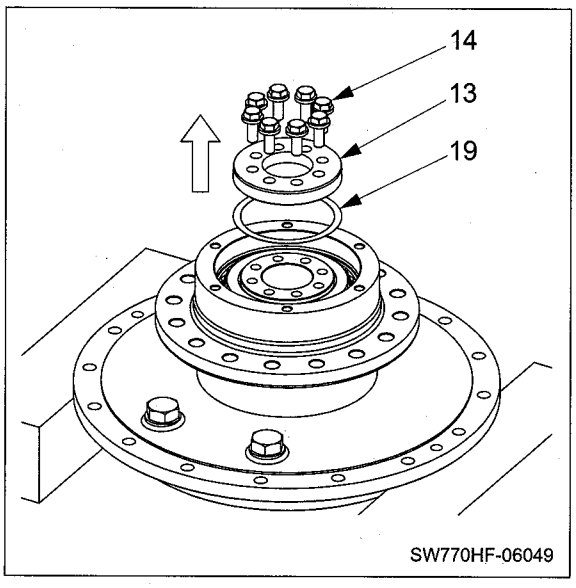
27) Set two long bolts to bolt holes and long bolts are screwed in little by little by turns.
- Remove vibrator bearing (35) from housing (36).



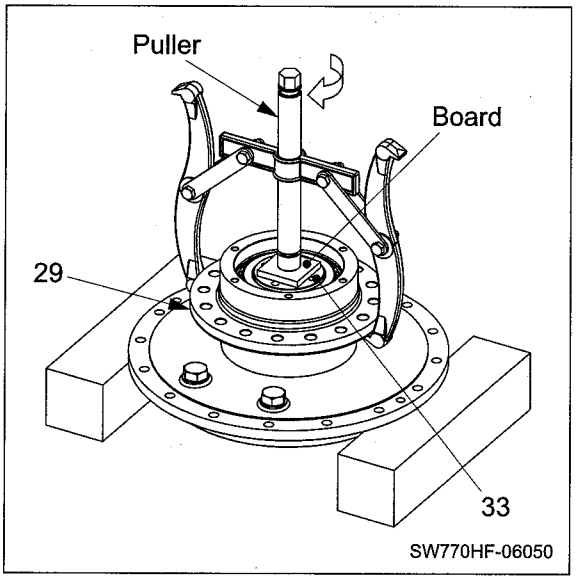
28) Disassembly of axle shaft SUBASSY
(From step (15))
- Remove bolts (20).
- Remove cover (11).



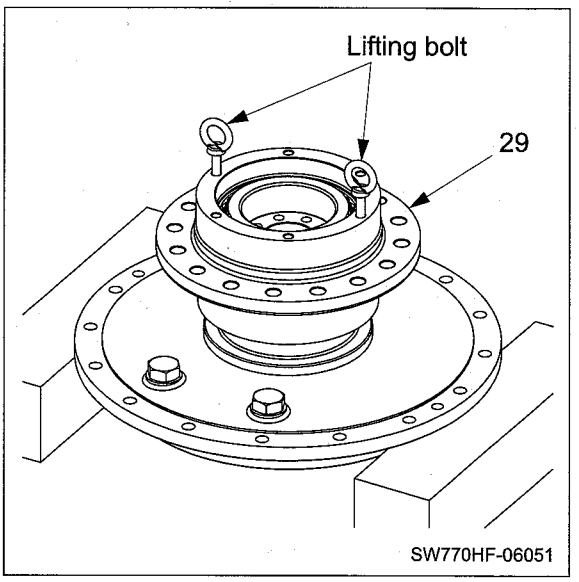
29) Remove bolts (14).
- Remove cover (13).
- Remove shim (19).



30) Put a piece of board on end of axle shaft (33).
- Set a puller on housing (29).
- Remove housing SUBASSY with roller bearing from axle shaft SUBASSY.

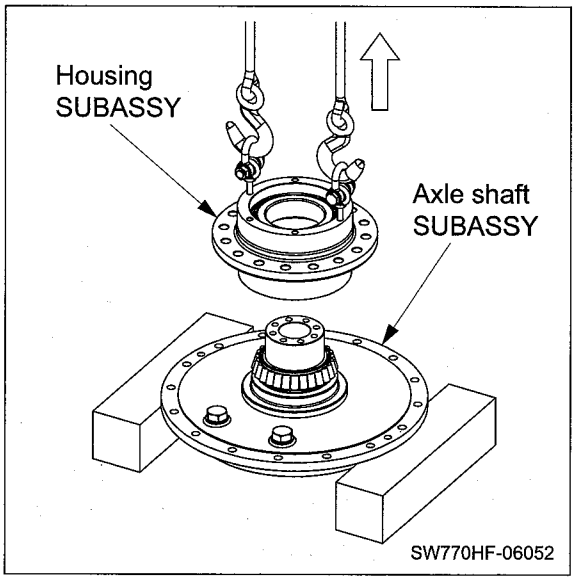


31) Install lifting bolts (M12) to housing (29).



32) Remove housing SUBASSY from axle shaft SUBASSY.

Housing SUBASSY : 45 kg (99 lbs.)



3-2-2. Reassembly of vibratory drum

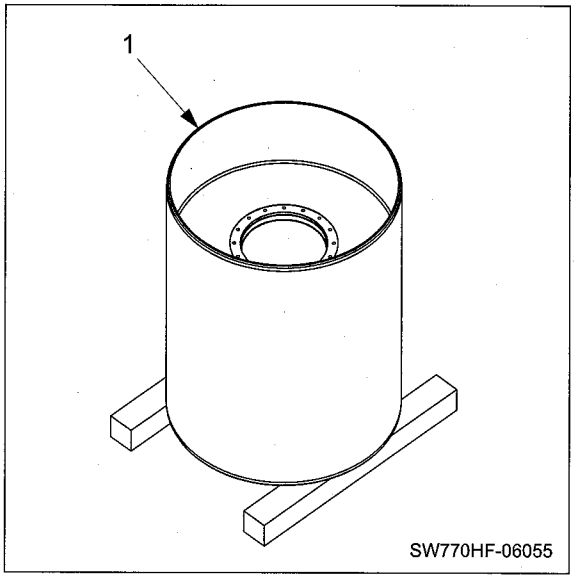
- Before reassembling, clean disassembled parts well and check that there is no abnormality.

⚠WARNING

- **When standing the drum, use wooden blocks of sufficient strength to securely support the drum.**
- **Carry out the work in an unstrained posture using a work stool or the like.**

1) Stand drum (1).

(1) Drum : 1,640 kg (3,616 lbs.)



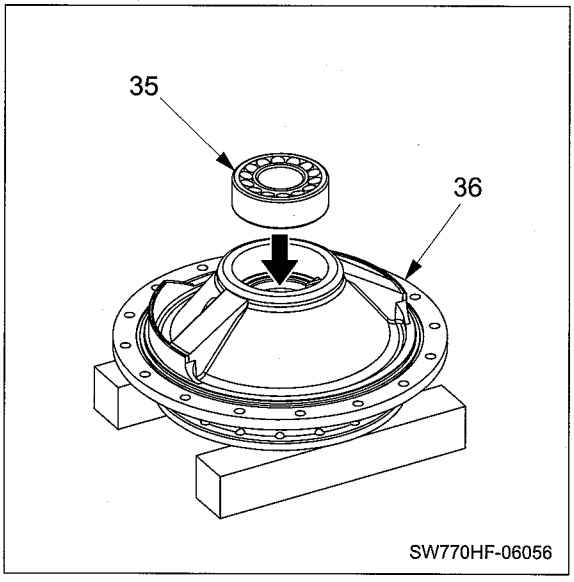
2) Reassembly of housing SUBASSY

2-1) Apply a coat of gear oil to housing (36) at where bearing will be press-fitted.

- Drive in vibrator bearing (35).

(NOTICE)

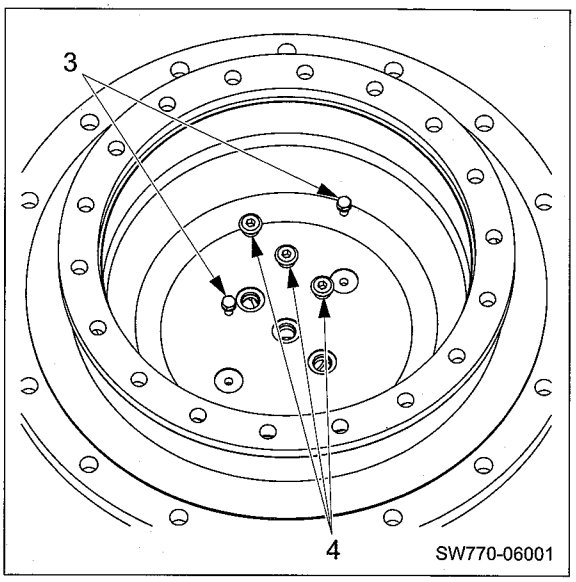
- **Take care not to damage the bearing when installing it.**



2-2) Reverse housing SUBASSY.

Housing SUBASSY : 100 kg (220 lbs.)

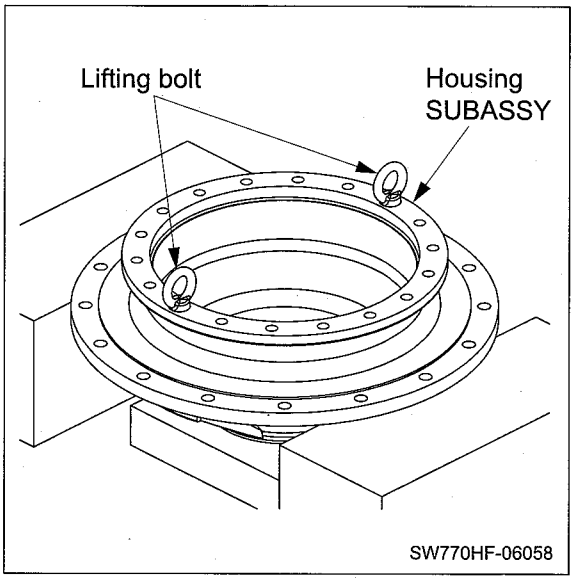
- Install plugs (4) to housing SUBASSY.
- Install bolts (3) to housing SUBASSY.



⚠WARNING

When installing lifting bolts, screw in the threads fully before using.

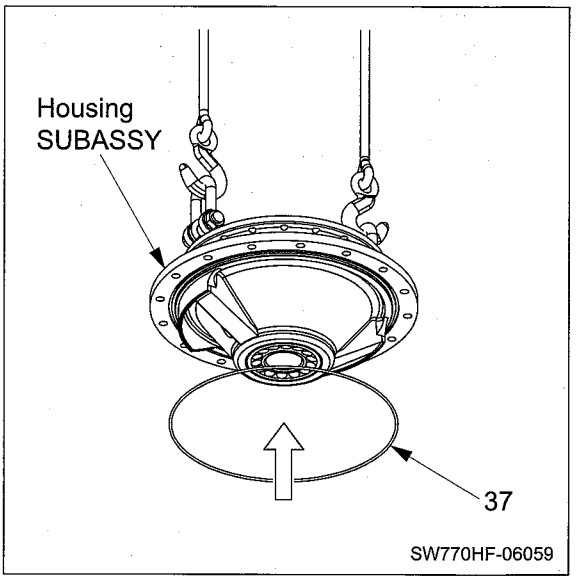
3) Install lifting bolts (M16) to housing SUBASSY.



4) Lift housing SUBASSY.

- Apply grease to O-ring (37).
- Install O-ring (37) to housing SUBASSY.

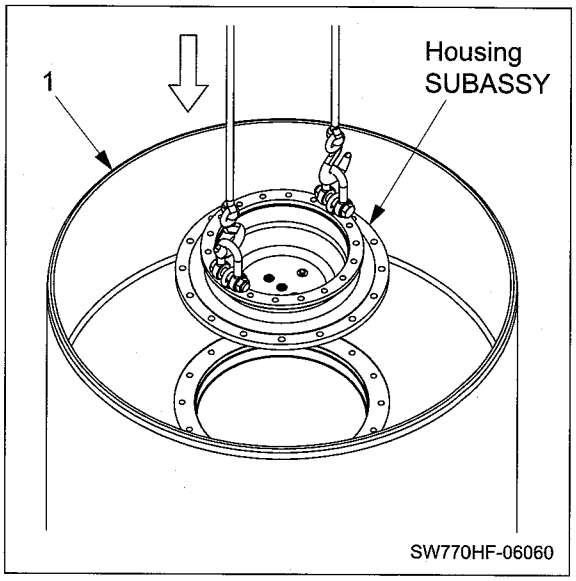
Housing SUBASSY : 100 kg (220 lbs.)



5) Lower housing SUBASSY on mounting surface of drum (1).

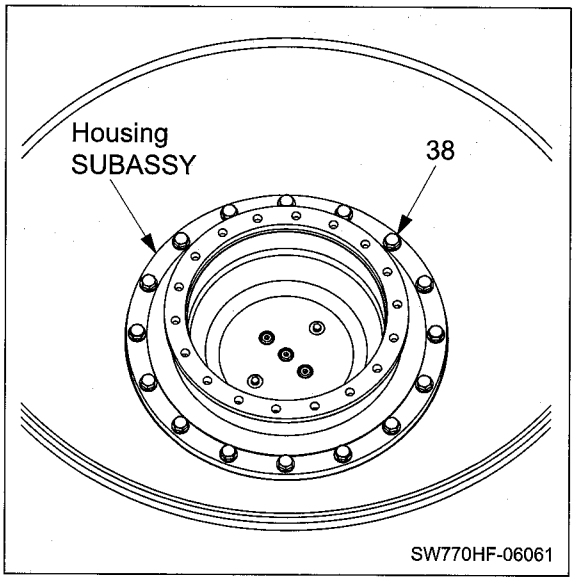
(NOTICE)

- **Take care not to let O-ring to protrude from its groove.**



6) Secure housing SUBASSY with sixteen bolts (38) and washers.

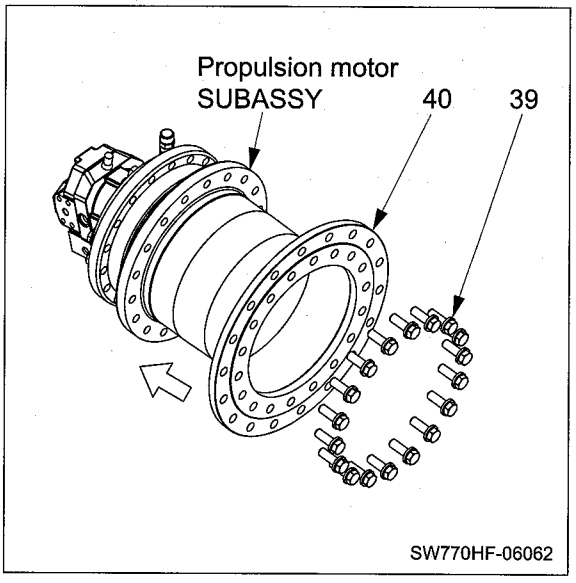
N•m (38) Bolts M16×50 : 265 N·m (195 lbf·ft)



7) Reassembly of propulsion motor SUBASSY.

- Secure ring (40) to propulsion motor SUBASSY with eighteen bolts (39) and washers.

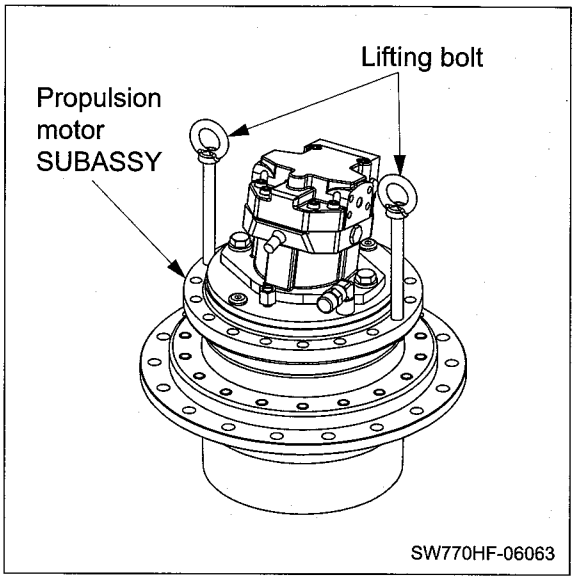
N•m (39) Bolts M16×50 : 265 N·m (195 lbf·ft)



8) Stand propulsion motor SUBASSY.

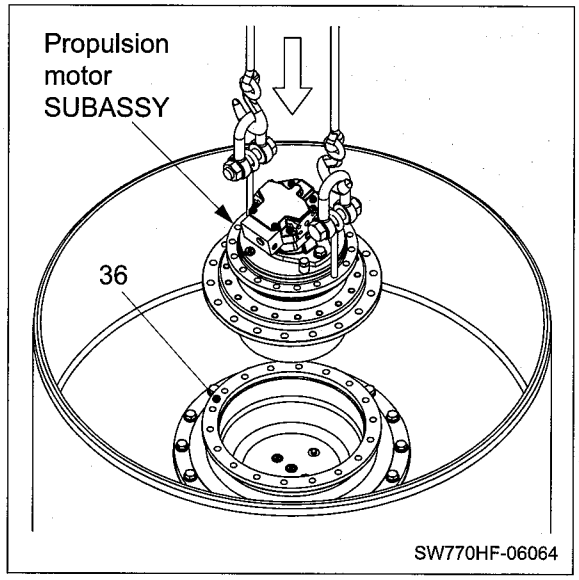
Propulsion motor SUBASSY : 155 kg (342 lbs.)

- Install lifting bolts (M16) to propulsion motor SUBASSY.



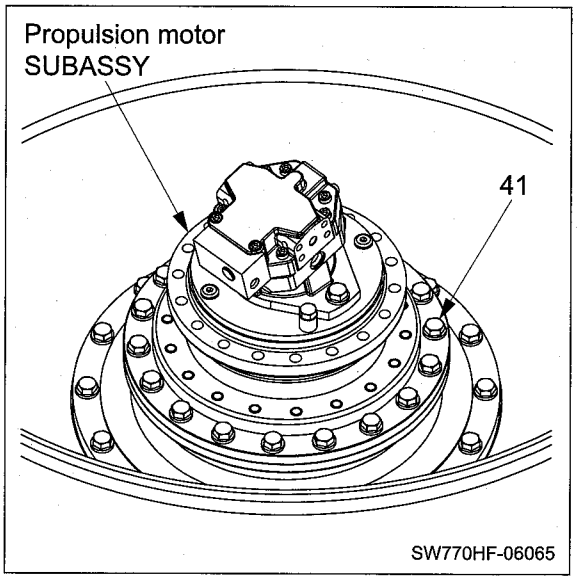
9) Lower propulsion motor SUBASSY on mounting surface of housing (36).

Propulsion motor SUBASSY : 155 kg (342 lbs.)



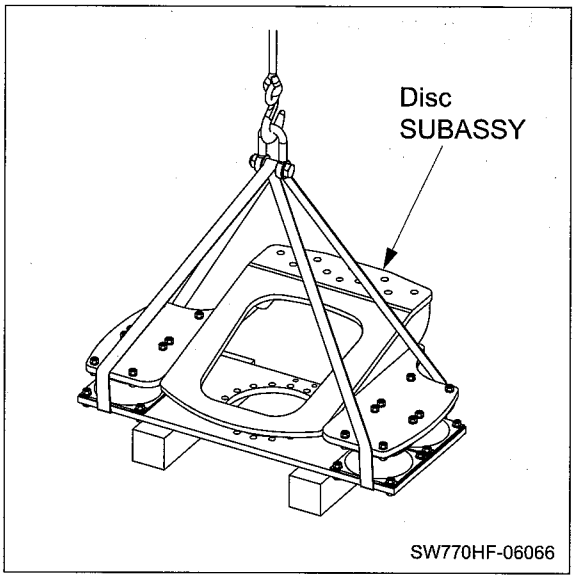
10) Secure propulsion motor SUBASSY with eighteen bolts (41) and washers.

N·m (41) Bolts M16×45 : 265 N·m (195 lbf·ft)

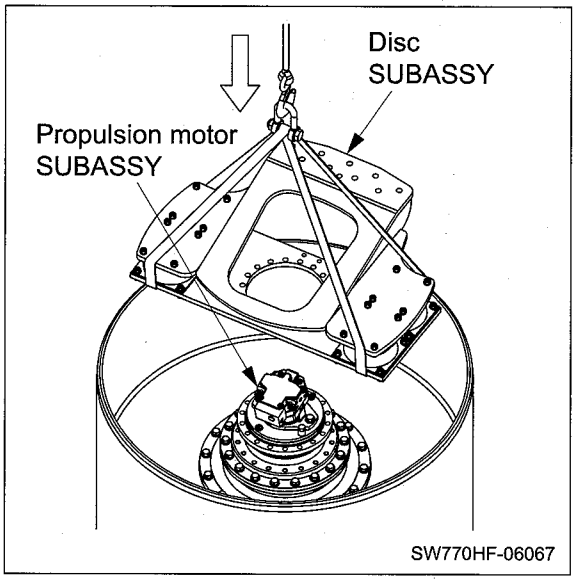


11) Lift disc SUBASSY.

Disc SUBASSY : 155 kg (342 lbs.)

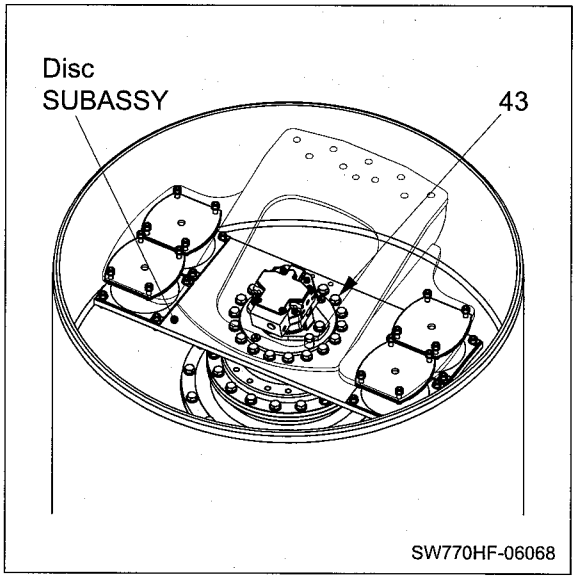


12) Lower disc SUBASSY on mounting surface of propulsion motor SUBASSY.



13) Secure disc SUBASSY with eighteen bolts (43) and washers.

(43) Bolts M16×45 : 265 N·m (195 lbf·ft)

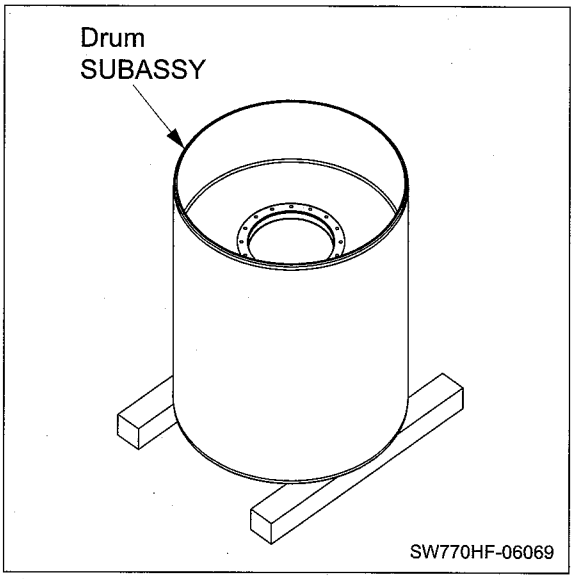


⚠WARNING

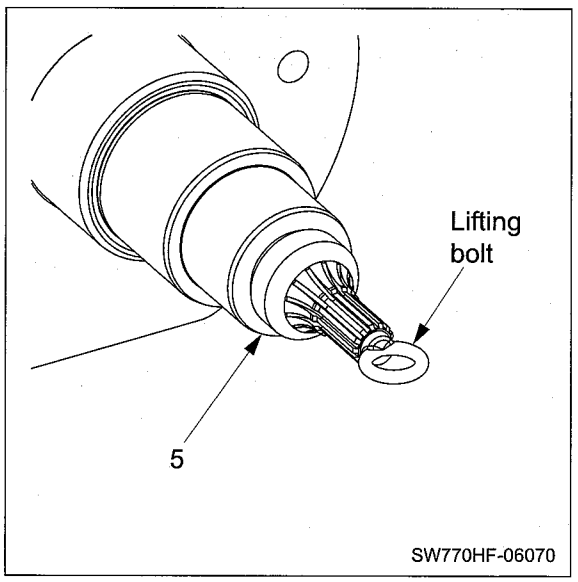
Be careful because reversing the drum involves risk. Confirm that the surrounding area is safe, and work in a natural, unstrained posture.

14) Reverse drum SUBASSY.

ℑkg Drum SUBASSY : 2,055 kg (4,530 lbs.)



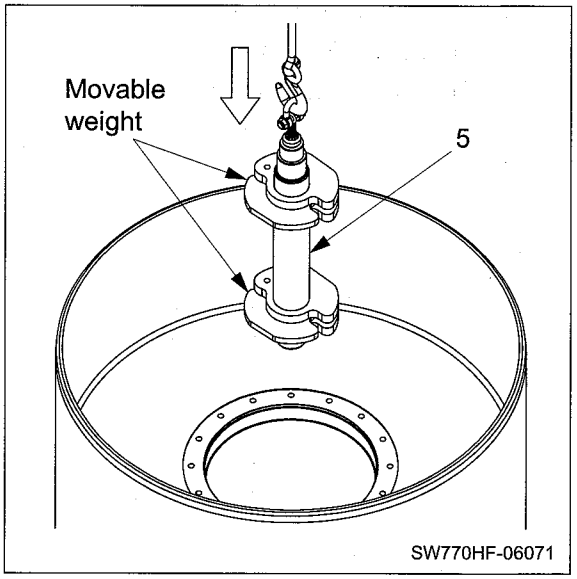
15) Install a lifting bolt (M8) to end of eccentric shaft (5).



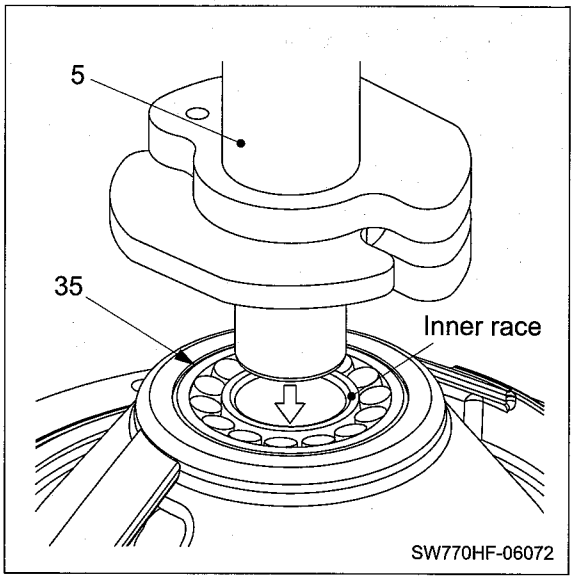
16) Apply a coat of gear oil to eccentric shaft SUBASSY at where bearing will be installed.
- Lower eccentric shaft (5).

ℑkg (5) Eccentric shaft : 80 kg (176 lbs.)

(NOTICE)
- **Put the movable weight at its outmost position.**

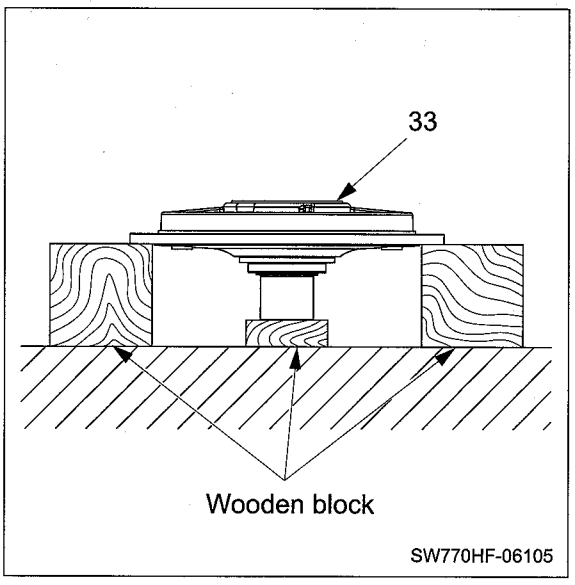


17) Insert eccentric shaft (5) into vibrator bearing (35) while taking care not to tilt vibrator bearing inner race.



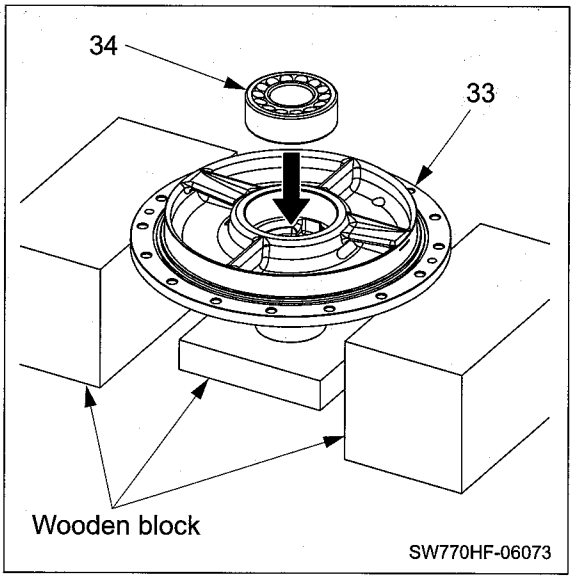
18) Reassembly of axle shaft SUBASSY

18-1) Fix axle shaft (33) with wooden blocks.



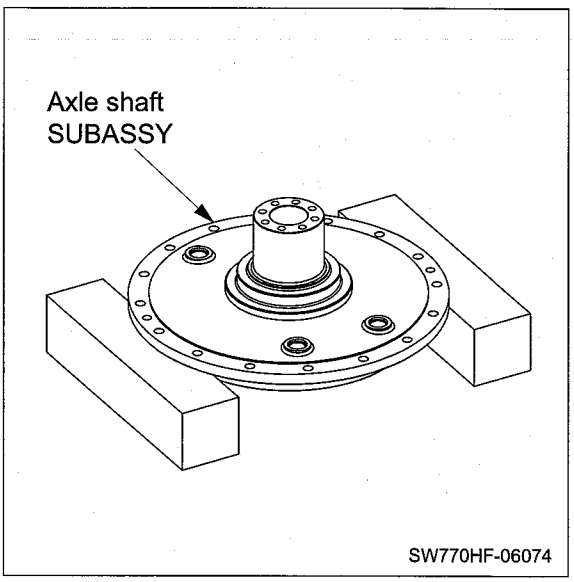
18-2) Apply a coat of gear oil to axle shaft (33) at where bearing will be press-fitted.

- Drive in vibrator bearing (34).



18-3) Reverse axle shaft SUBASSY.

Axle shaft SUBASSY : 90 kg (198 lbs.)

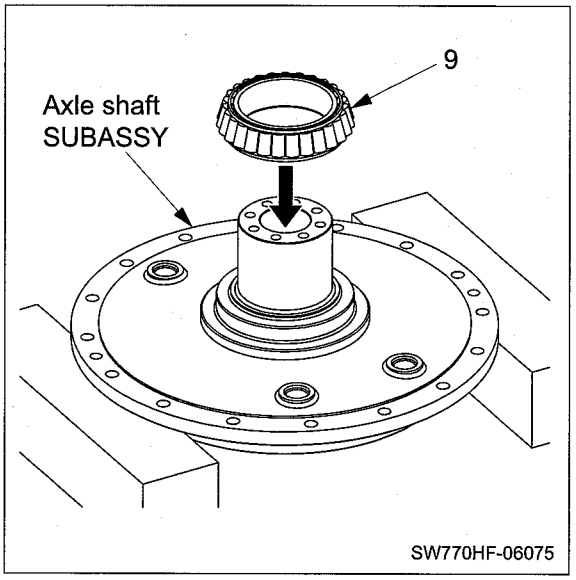


⚠WARNING

Wear heat resistant gloves when handling heated parts to avoid burns.

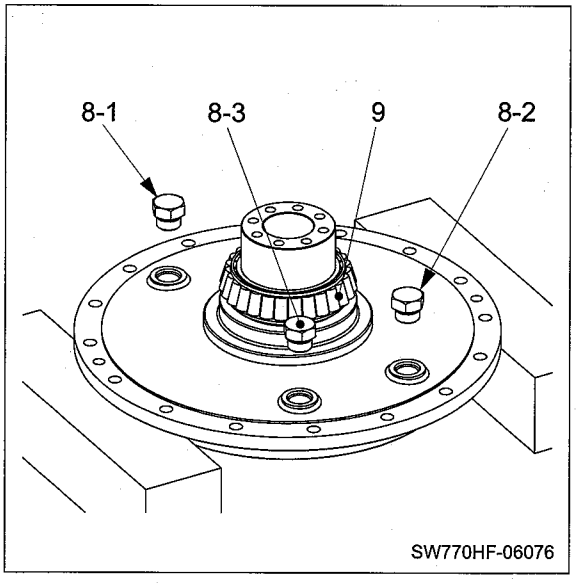
18-4) Heat up roller bearing (9) inner race by using a ring heater or the like.

- Apply a coat of gear oil to axle shaft SUBASSY at where bearing inner will be press-fitted.
- Drive in heated roller bearing (9) inner race.

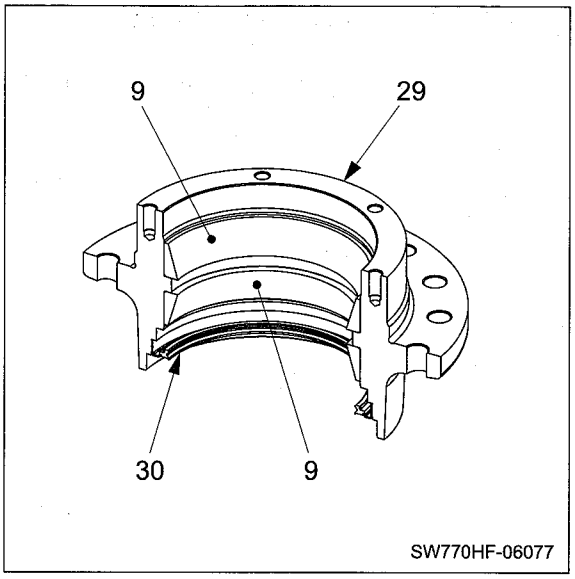


18-5) Apply grease to O-rings for plugs (8-1), (8-2) and (8-3).

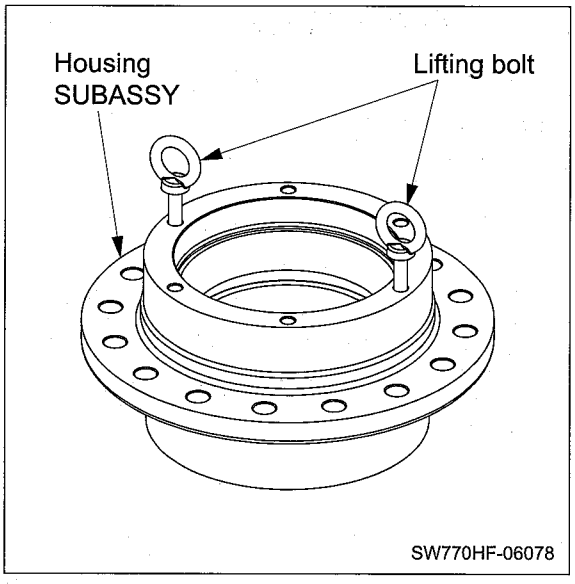
- Install plugs (8-1), (8-2) and (8-3).
- Apply sufficient amount of lithium-based grease to rollers of roller bearing (9) inner race.



18-6) Apply a coat of gear oil to housing (29) at where bearing outer races will be press-fitted.
- Drive roller bearings (9) outer races into housing (29).
- Apply liquid packing to periphery of oil seal (30).
- Drive in oil seal (30).
- Apply grease to lip of oil seal (30).

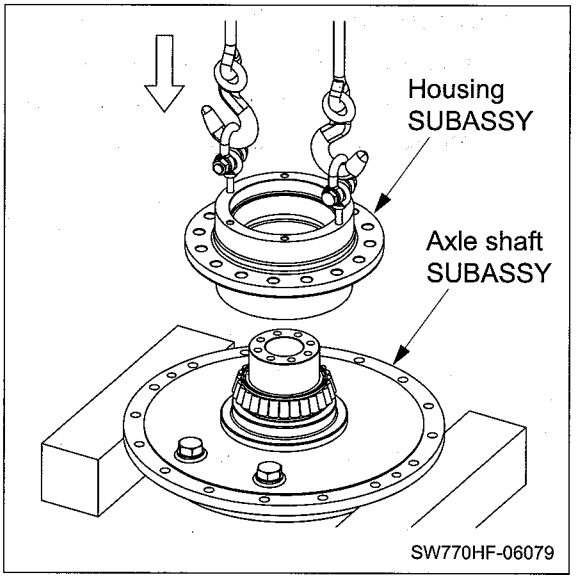


18-7) Install lifting bolts (M12) to housing SUBASSY.

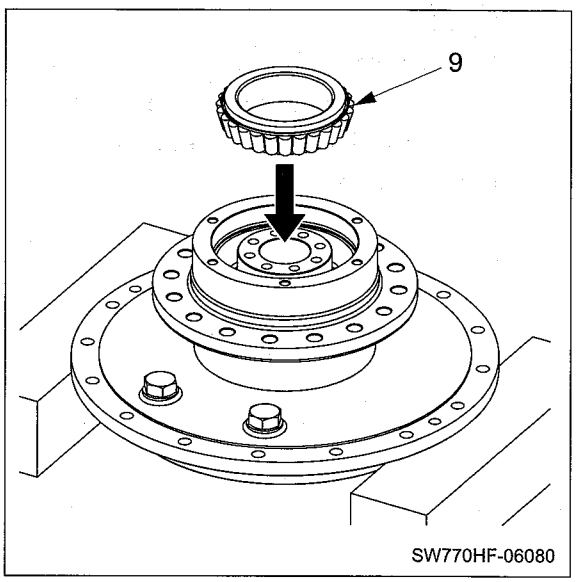


18-8) Install housing SUBASSY to axle shaft SUBASSY.

Housing SUBASSY : 40 kg (88 lbs.)

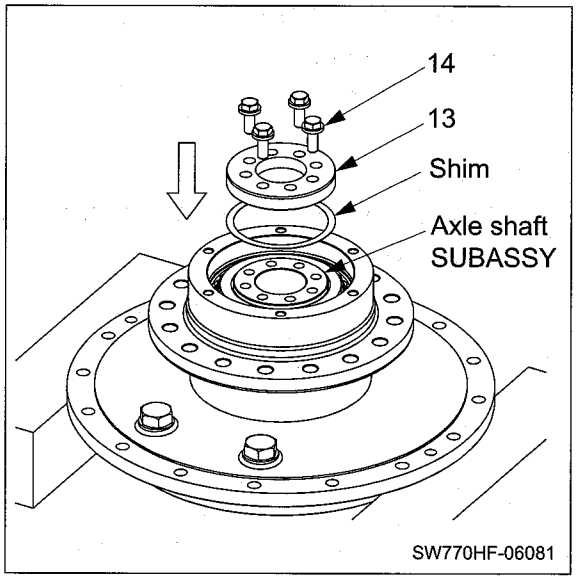


18-9) Apply sufficient amount of lithium-based grease to rollers of roller bearing (9) inner race.
- Drive in roller bearing (9) inner race until rollers come in contact with outer race.



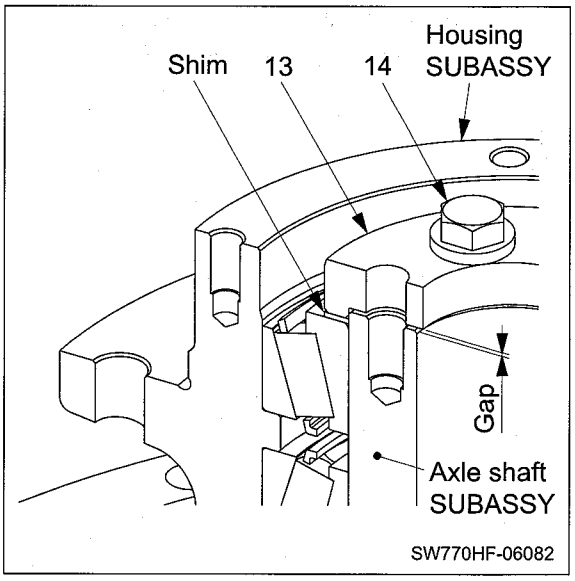
18-10) Preload adjustment of roller bearing

① Install a shim of about 1 mm (0.04 in.) and secure cover (13) to axle shaft SUBASSY with four bolts (14) and washers.



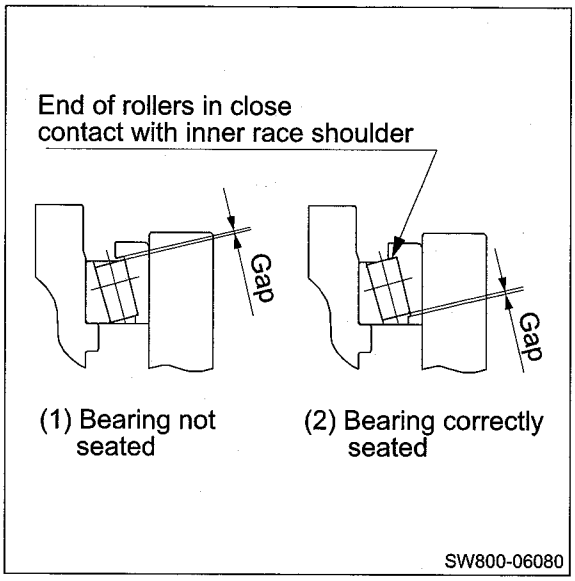
② A gap will remain between end of axle shaft SUBASSY and inside of cover (13).
- Tighten bolts (14) to a torque of 108 N·m (80 lbf·ft).
- Give housing SUBASSY two to three turns.
- Tighten bolts (14) to a torque of 108 N·m (80 lbf·ft) again.
- Repeat this work several times until tightening torque of bolts no longer fluctuates.

(NOTICE)
- **Tighten the bolts (14) alternately in diagonal directions.**



(NOTICE)

- **It is necessary to rotate the bearing to lift the rollers while pressing in the inner race. Otherwise the bearing will not seat no matter how forcibly the inner race is pressed.**

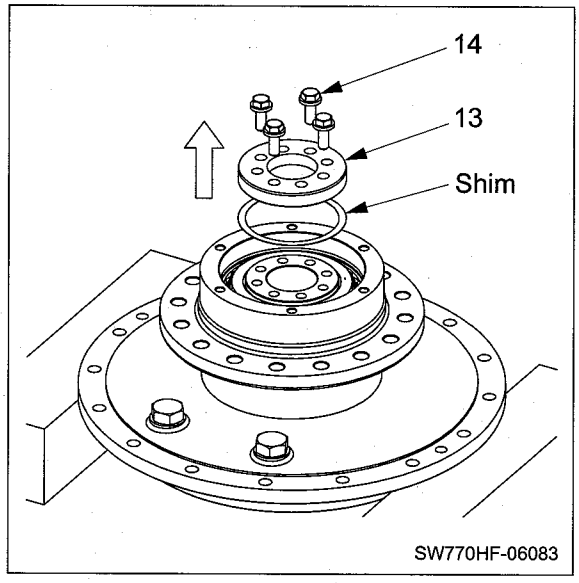


③ Remove bolts (14).

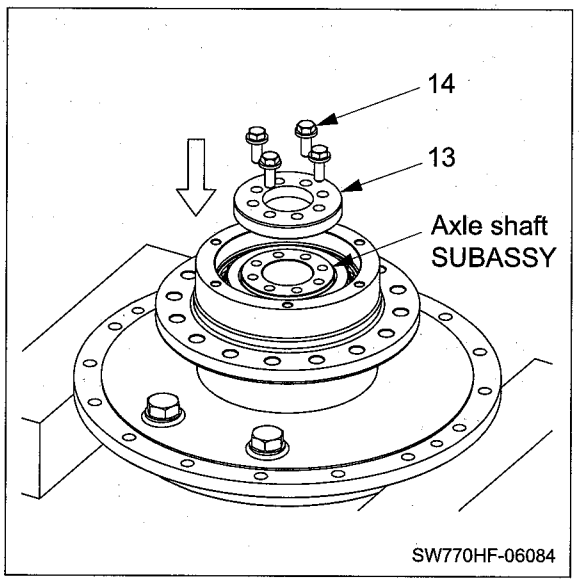
- Remove cover (13).
- Remove shim.

(NOTICE)

- **Do not turn the housing SUBASSY after the cover (13) is removed.**

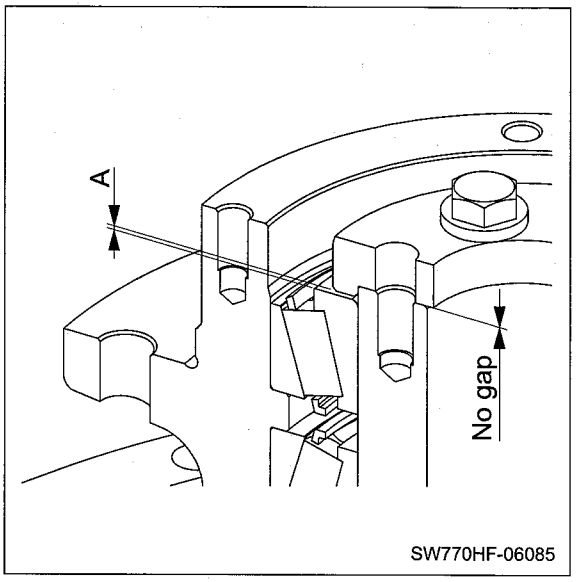


④ Without inserting shim, install cover (13) to axle shaft SUBASSY with four bolts (14) and washers.

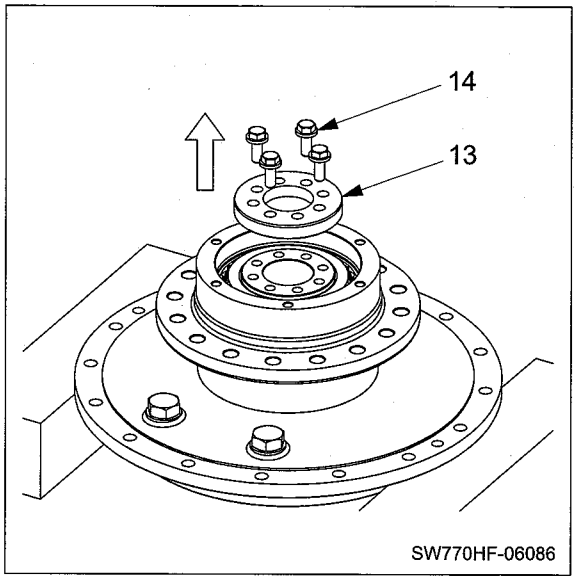


⑤ Using a thickness gauge, measure clearance "A".

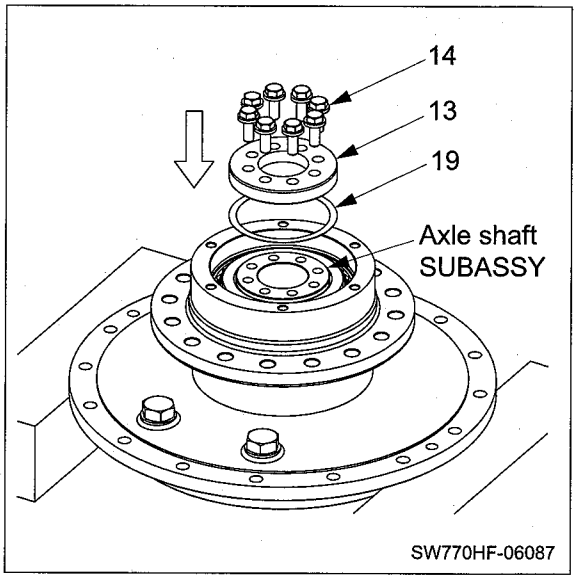
★ **Preload adjusting shim thickness** **= A + 0.1 mm (0.004 in.)**



⑥ Remove bolts (14).
- Remove cover (13).

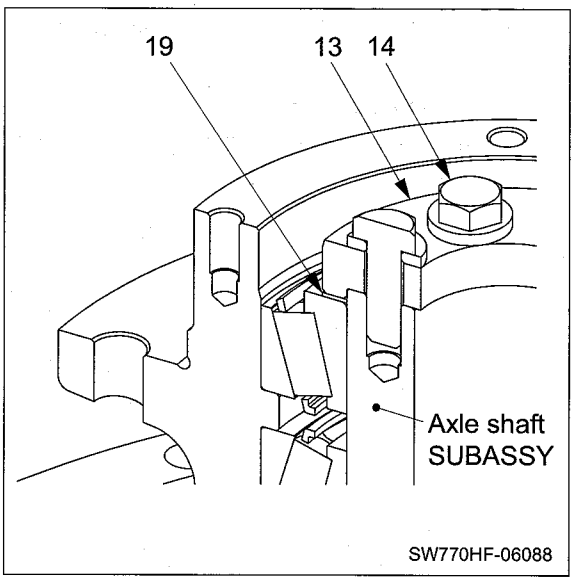


⑦ Install shim (19) of preload adjusting shim thickness = "A + 0.1 mm (0.004 in.)".
Install cover (13) to axle shaft SUBASSY with eight bolts (14) and washers.



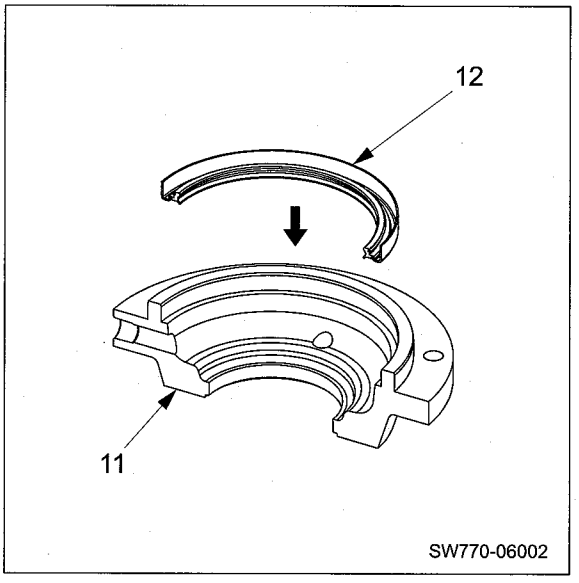
⑧ Secure shim (19) and cover (13) to axle shaft SUBASSY with eight bolts (14) and washers.

N·m (14) Bolts M14×40 : 167 N·m (123 lbf·ft)



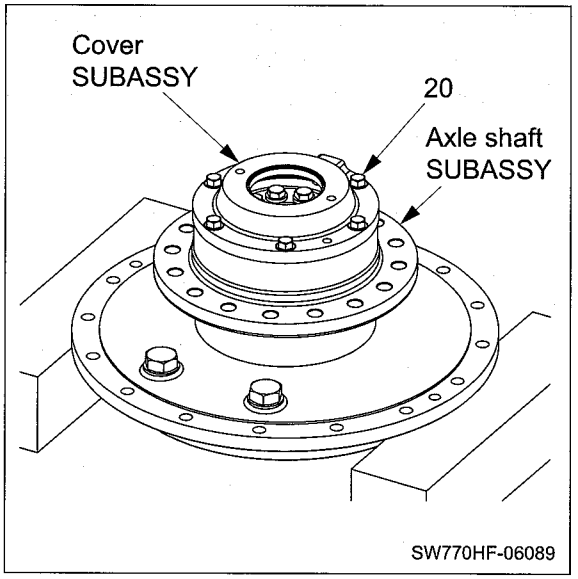
18-11) Install oil seal (12) on cover (11).

- Apply a thin coat of grease to lip of oil seal (12).
- Apply liquid packing to mounting surface.



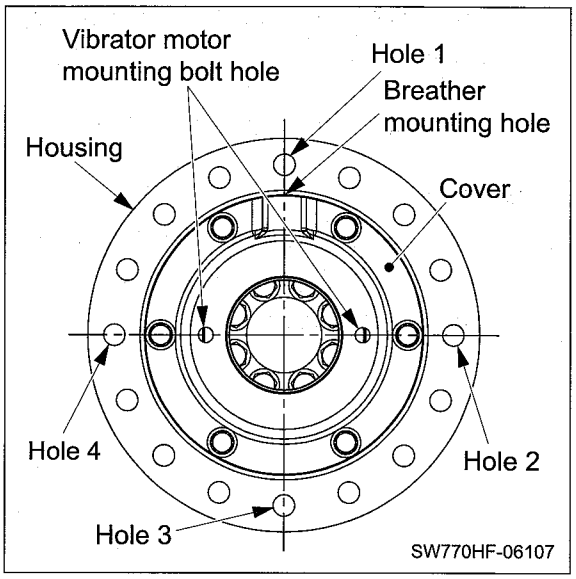
18-12) Secure cover SUBASSY to axle shaft SUBASSY with six bolts (20) and washers.

N·m (20) Bolts M12×40 : 108 N·m (80 lbf·ft)

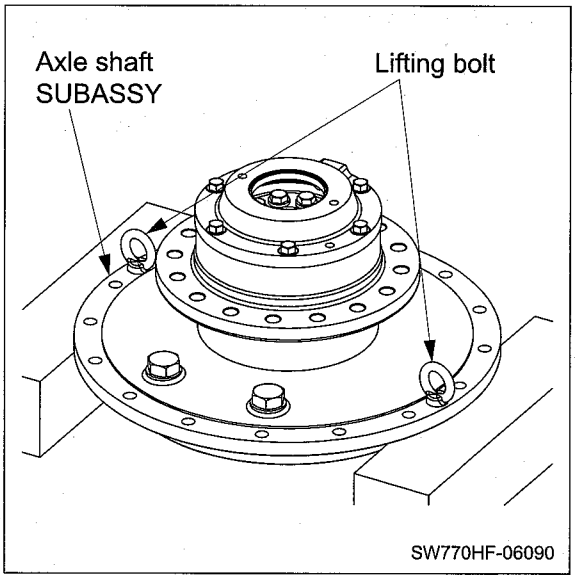


(NOTICE)

- **The four holes in housing, breather mounting hole in cover, and vibrator motor mounting bolt holes must be arranged as shown on the right.**

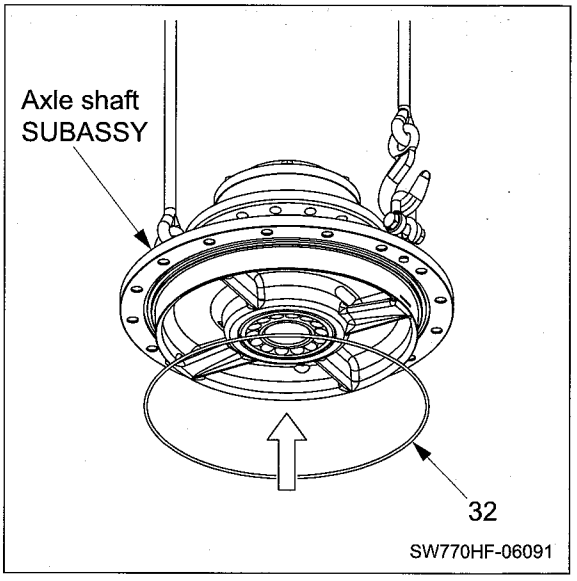


19) Install lifting bolts (M16) to axle shaft SUBASSY.



20) Lift axle shaft SUBASSY.

- Apply grease to O-ring (32).
- Install O-ring (32) to axle shaft SUBASSY.

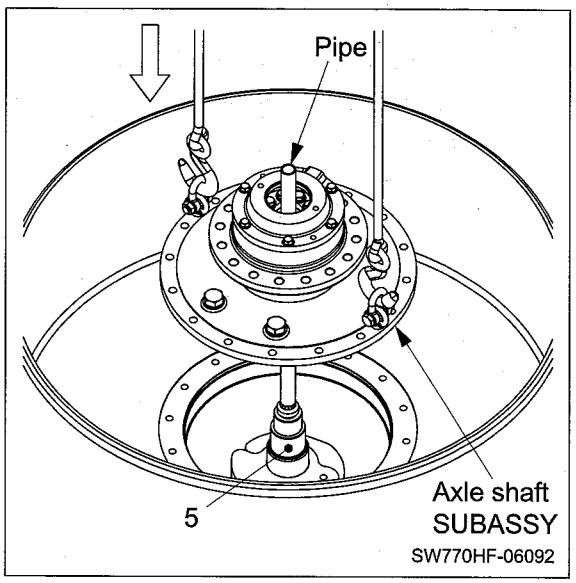


21) Lower axle shaft SUBASSY on mounting surface of drum SUBASSY slowly.

Axle shaft SUBASSY : 150 kg (331 lbs.)

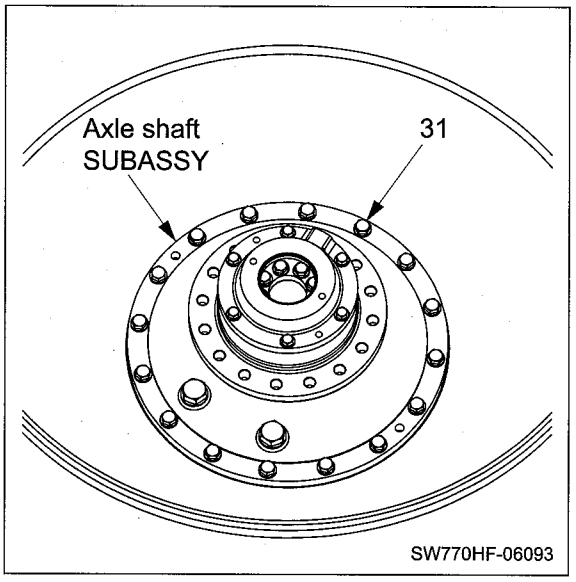
(NOTICE)

- **Support the eccentric shaft (5) with a pipe or the like, to prevent tilting of the vibrator bearing inner race during installation.**

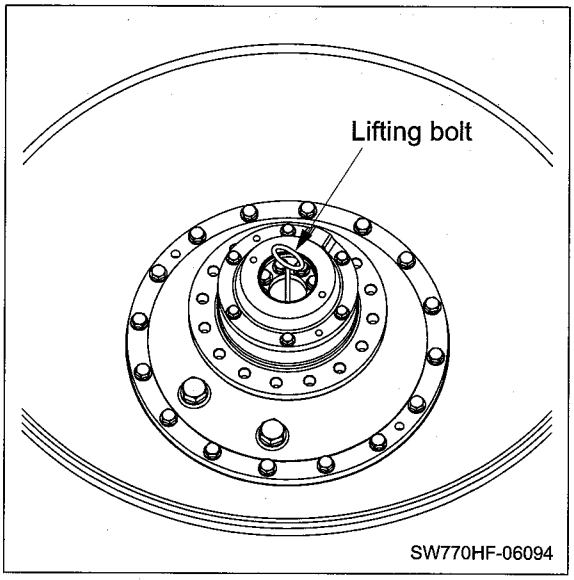


22) Secure axle shaft SUBASSY with sixteen bolts (31) and washers.

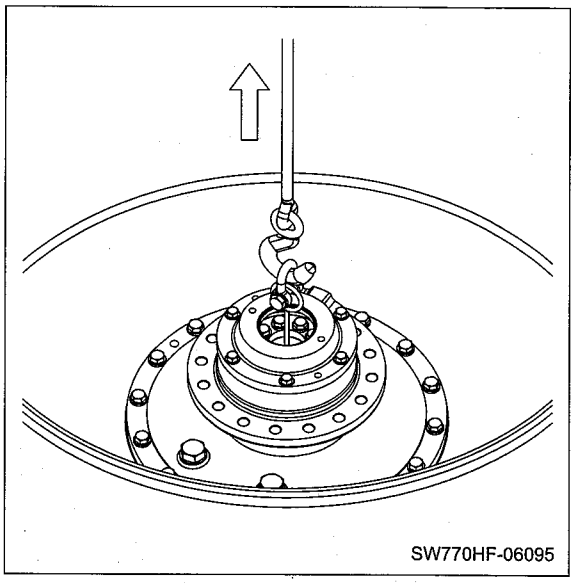
(31) Bolts M16×50 : 265 N·m (195 lbf·ft)



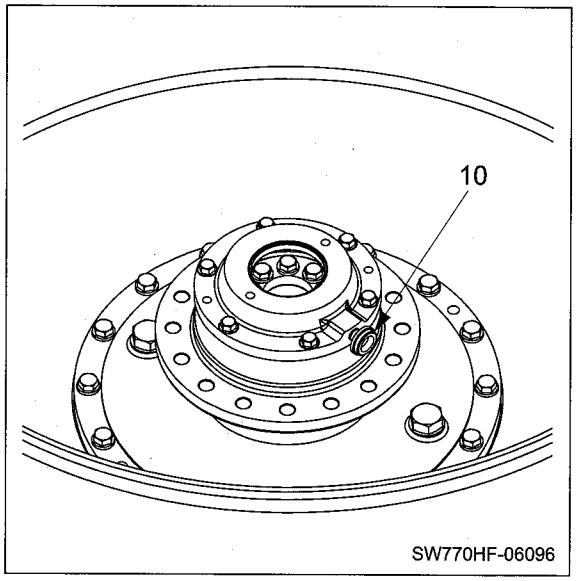
23) Install a lifting bolt (M8) to end of eccentric shaft.



24) Slowly lift eccentric shaft with a crane and check that there is an axial play of 2 to 3 mm (0.08 to 0.12 in.).

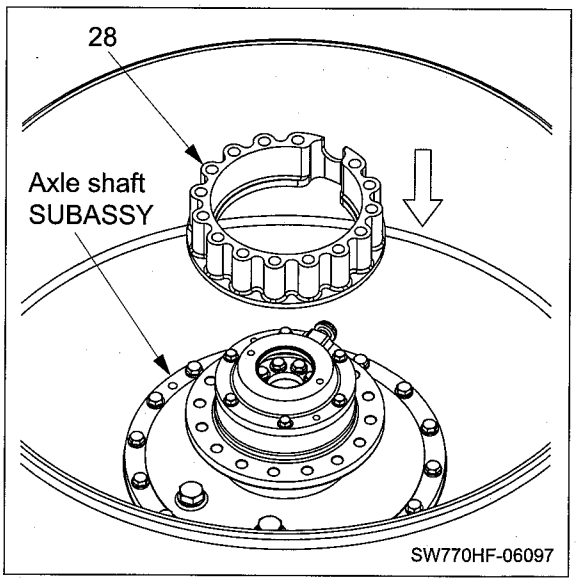


25) Wind seal tape around threaded portion of breather (10).
- Install breather (10).



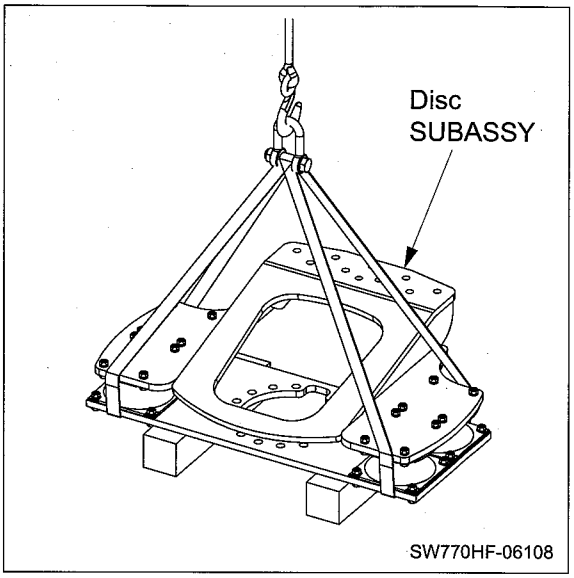
26) Put bracket (28) on axle shaft SUBASSY.

(28) Bracket : 20 kg (44 lbs.)

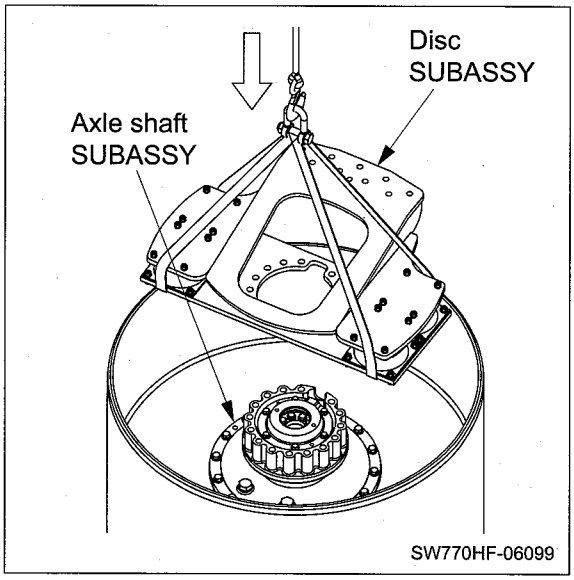


27) Lift disc SUBASSY.

Disc SUBASSY : 155 kg (342 lbs.)

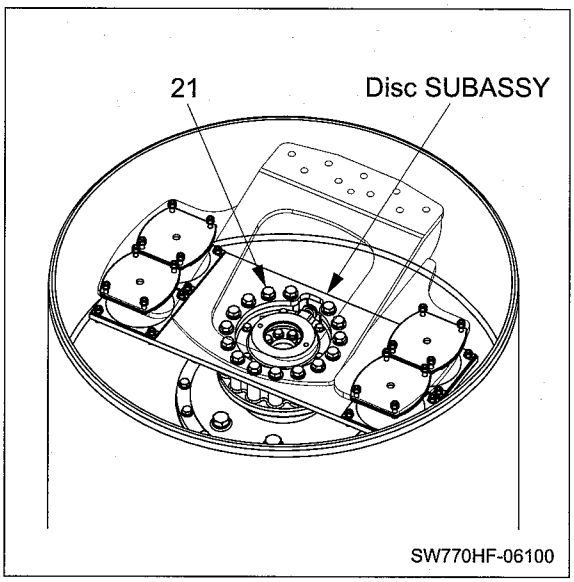


28) Lower disc SUBASSY on mounting surface of axle shaft SUBASSY.

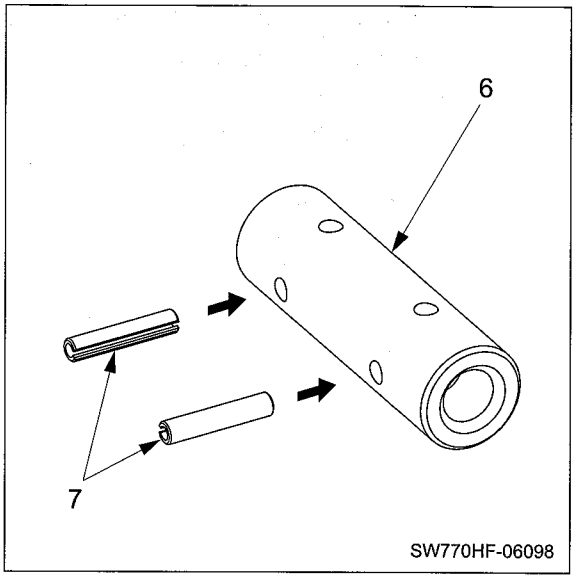


29) Secure disc SUBASSY with fifteen bolts (21) and washers.

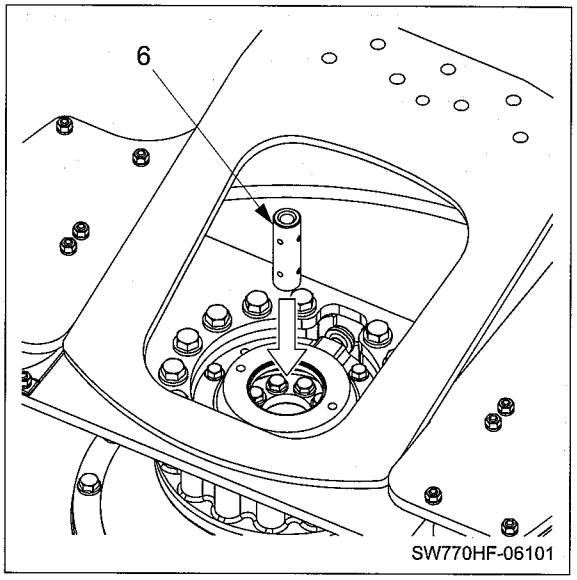
(21) Bolts M20×150 : 539 N·m (398 lbf·ft)



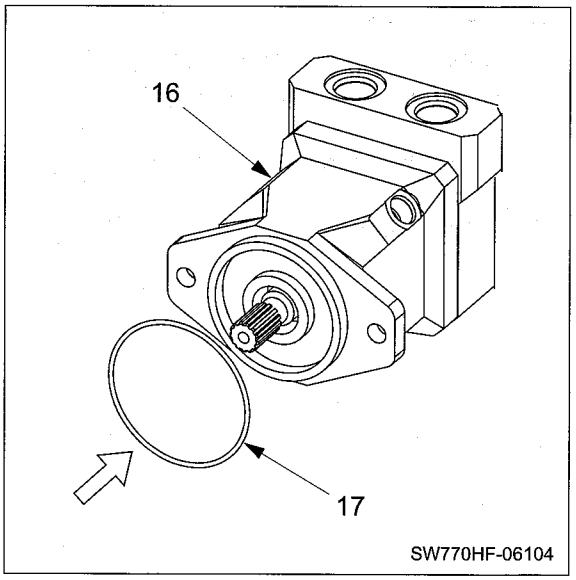
30) Drive two spring pins (7) into sleeve (6).



31) Apply molybdenum-based grease to splined portion of sleeve (6).
- Fit sleeve (6) to splined portion on eccentric shaft.



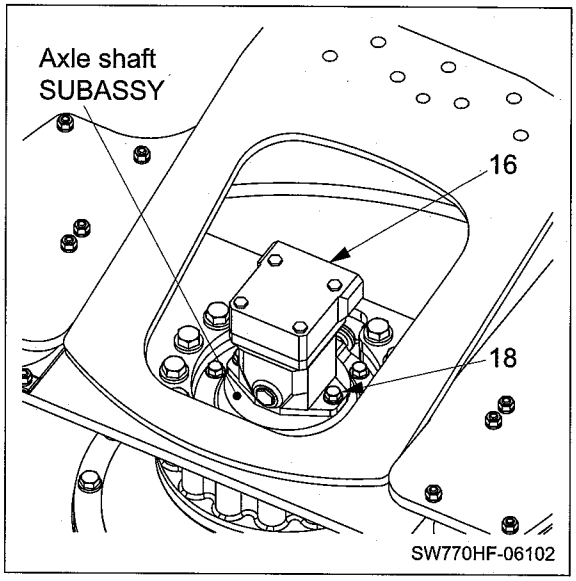
32) Apply grease to O-ring (17).
- Install O-ring (17) to vibrator motor (16).



33) Secure vibrator motor (16) to axle shaft SUBASSY with two bolts (18) and washers.

(16) Vibrator motor :15 kg (33 lbs.)

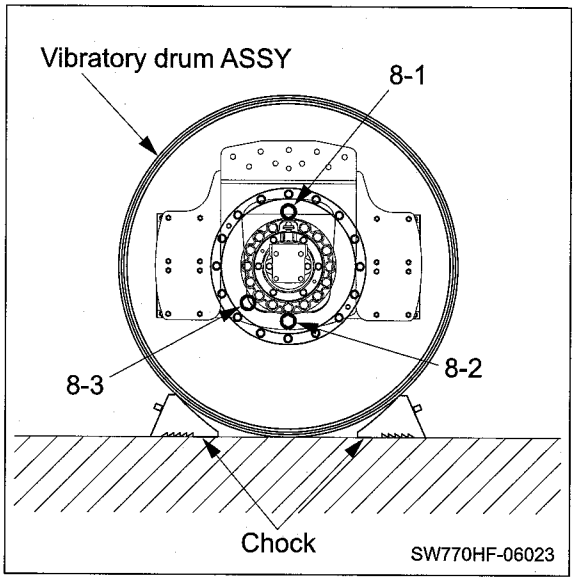
(18) Bolts M12×40 : 108 N·m (80 lbf·ft)



34) Lay vibratory drum ASSY with plugs (8-1), (8-2) and (8-3) positioned as shown right.

- Hold with chocks.

Vibratory drum ASSY : 2,485 kg (5,478 lbs.)

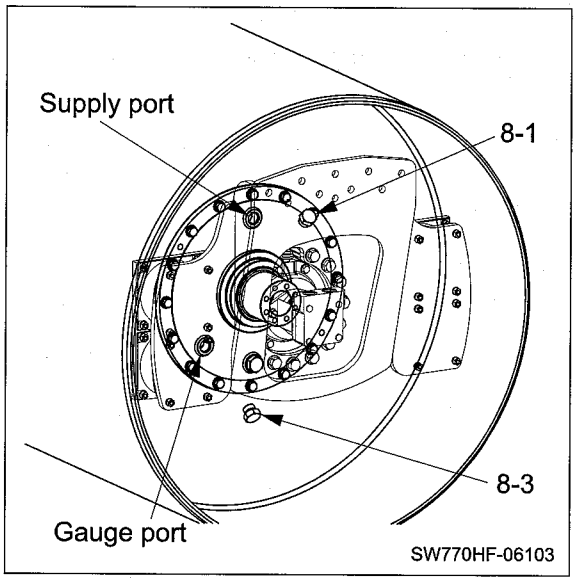


35) Remove plugs (8-1) and (8-3).

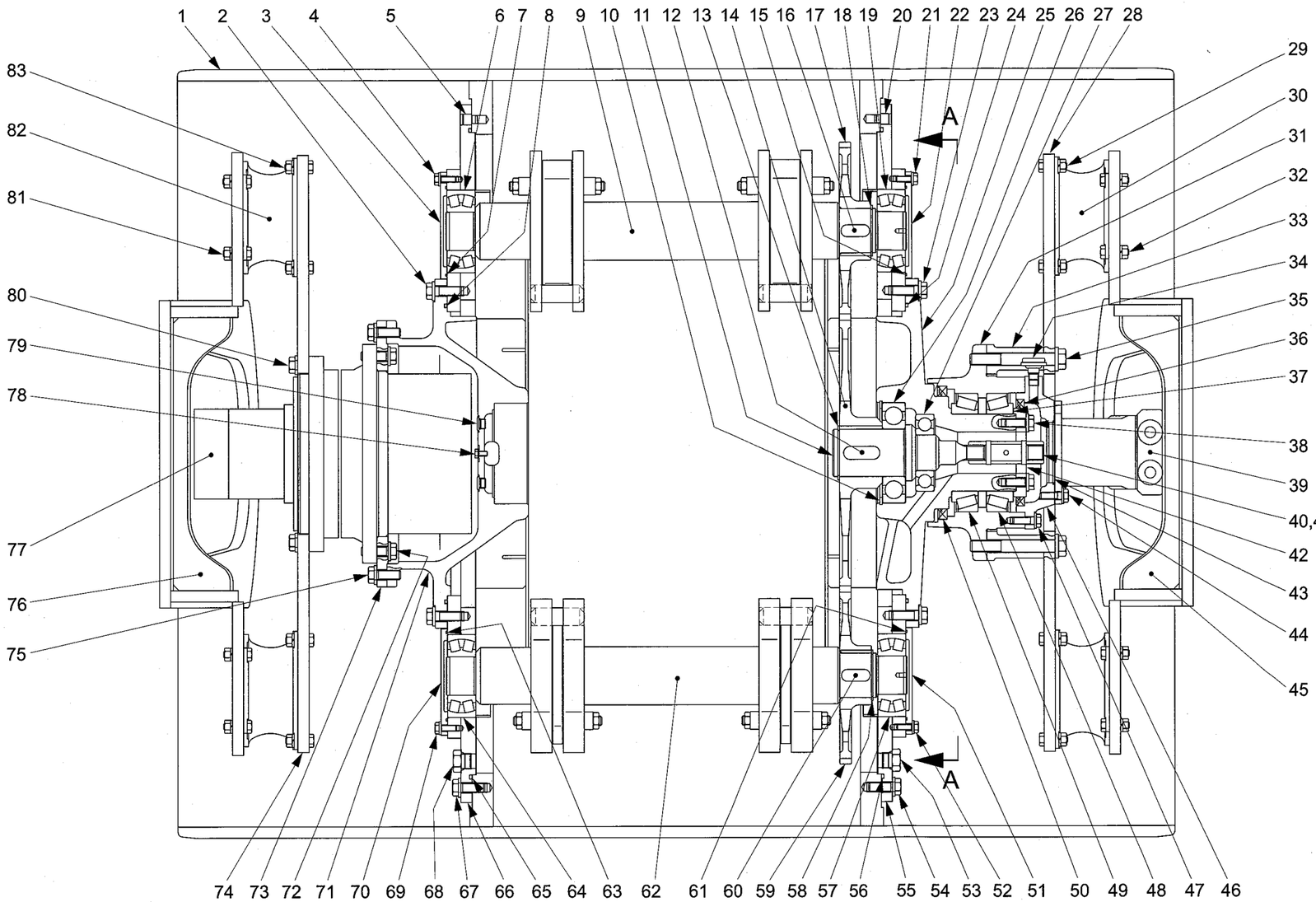
- Supply gear oil from oil supply port.
- Check that oil drips from gauge port.

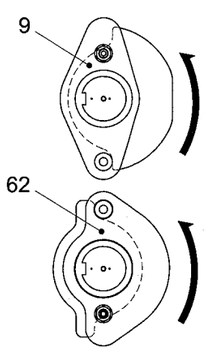
  • Quantity of gear oil : 20 L (5.3 gal.)

- Install plugs (8-1) and (8-3).

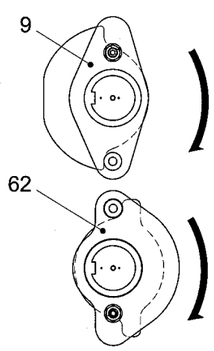


3-3. Vibratory Drum ASSY (SW770ND)



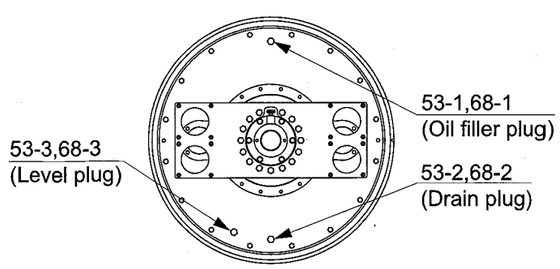


Vibration mode: Normal
Counterclockwise rotation



Vibration mode: Horizontal
Clockwise rotation

SECTION A-A



Vibrator motor side

0431-43802-0-10254-E

(1) Drum
(2) Bolt : M16×50
(3) Cover
(4) Bolt : M10×30
(5) Pin
(6) Vibrator bearing
(7) O-ring
(8) O-ring
(9) Eccentric shaft A
(10) Retaining ring
(11) Shaft
(12) Sunk key
(13) Retaining ring
(14) Gear
(15) O-ring
(16) Sunk key
(17) Gear
(18) Retaining ring
(19) Vibrator bearing
(20) Pin
(21) Bolt : M10×30
(22) Cover
(23) Bolt : M16×50
(24) O-ring
(25) Axle shaft
(26) Ball bearing
(27) Ball bearing
(28) Disc
(29) Bolt : M12×40
(30) Damper
(31) Housing
(32) Bolt : M12×40
(33) Bracket
(34) Breather
(35) Bolt : M20×150
(36) Oil seal
(37) Shim
(38) Bolt : M14×40
(39) Vibrator motor
(40) Sleeve
(41) Spring pin
(42) Cover
(43) O-ring
(44) Bolt : M12×40
(45) Bracket
(46) Cover
(47) Bolt : M12×40
(48) Roller bearing
(49) Roller bearing
(50) Oil seal
(51) Cover
(52) Bolt : M10×30
(53) Plug
(54) Bolt : M16×45
(55) Housing
(56) O-ring
(57) Vibrator bearing
(58) Retaining ring
(59) Gear
(60) Sunk key
(61) O-ring
(62) Eccentric shaft B
(63) O-ring
(64) Vibrator bearing
(65) O-ring
(66) Housing
(67) Bolt : M16×45
(68) Plug
(69) Bolt : M10×30
(70) Cover
(71) Housing
(72) Bolt : M16×50
(73) Ring
(74) Disc
(75) Bolt : M16×45
(76) Bracket
(77) Propulsion motor
(78) Bolt : M 8×16
(79) Plug
(80) Bolt : M16×45
(81) Bolt : M12×40
(82) Damper
(83) Bolt : M12×40

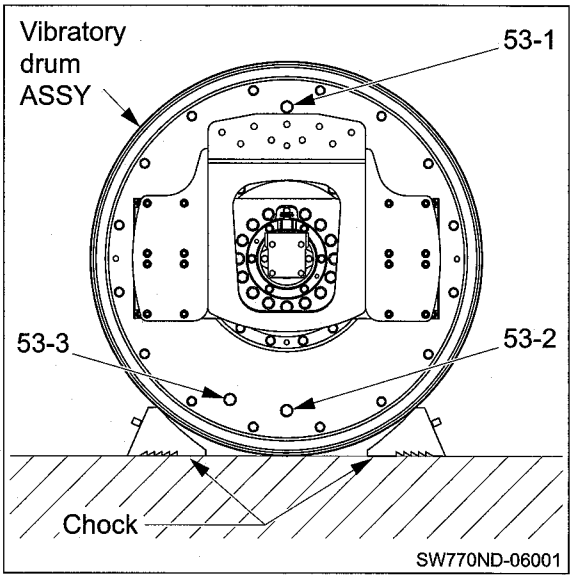
3-4. Disassembly and Reassembly of Vibratory Drum (SW770ND)

- Lead line numbers shown in illustrations for the following vibratory drum disassembly and reassembly procedures are constant with part numbers of vibratory drum ASSY shown on page 6-041.

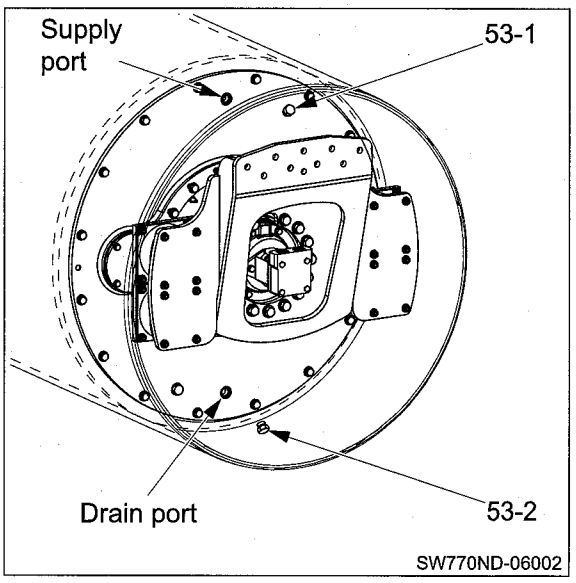
3-4-1. Disassembly of vibratory drum

1) Lay vibratory drum ASSY with plugs (53-1), (53-2), and (53-3) positioned as shown on the right.
   - Hold with chocks.

   Vibratory drum ASSY : 2,800 kg (6,173 lbs.)



2) Remove plugs (53-1) and (53-2).
   - Drain gear oil.
     - Quantity of gear oil : 45 L (11.9 gal.)
   - Install plugs (53-1) and (53-2).

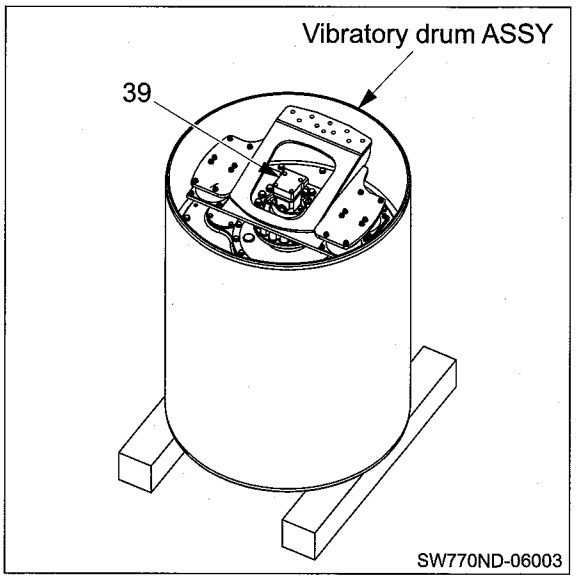


⚠WARNING

- **When standing the vibratory drum, use wooden blocks of sufficient strength to securely support the vibratory drum.**
- **Carry out the work in an unstrained posture using a work stool or the like.**

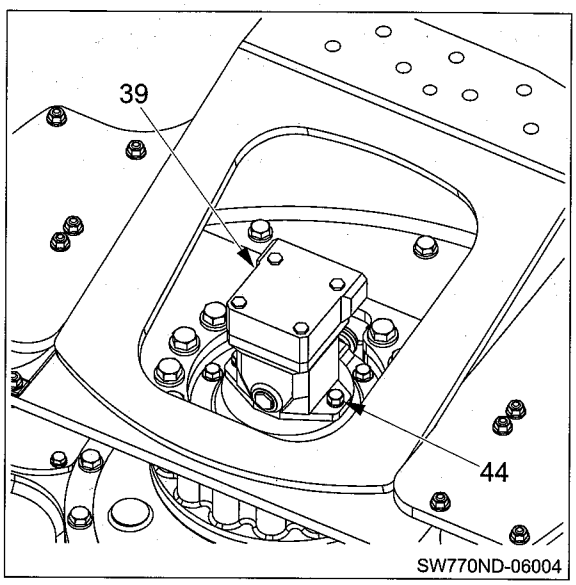
3) Stand vibratory drum ASSY with its vibrator motor (39) side facing up.

   Vibratory drum ASSY : 2,755 kg (6,074 lbs.)

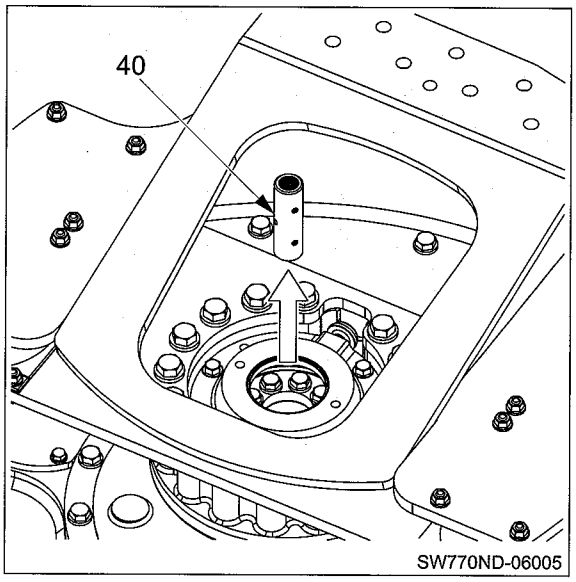


4) Remove bolts (44).
- Remove vibrator motor (39).

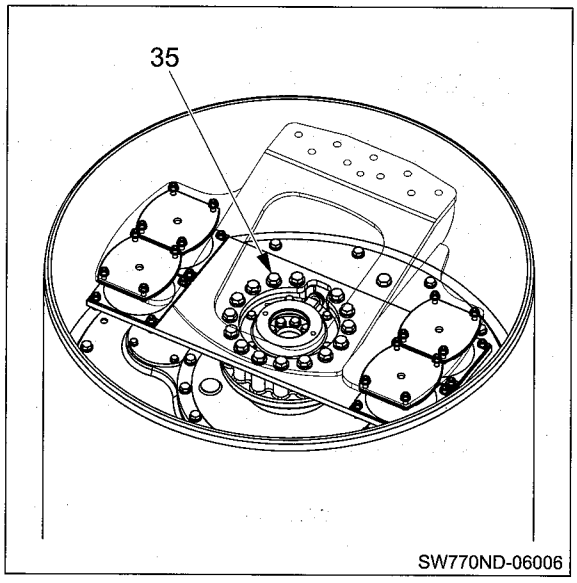
(39) Vibrator motor : 20 kg (44 lbs.)



5) Remove sleeve (40).

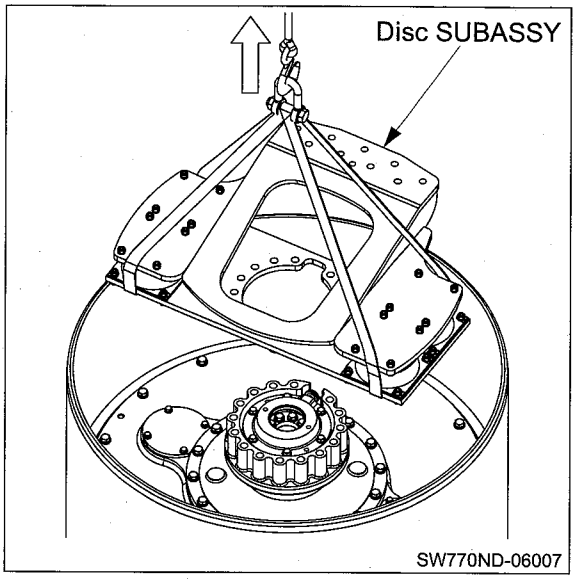


6) Remove bolts (35).



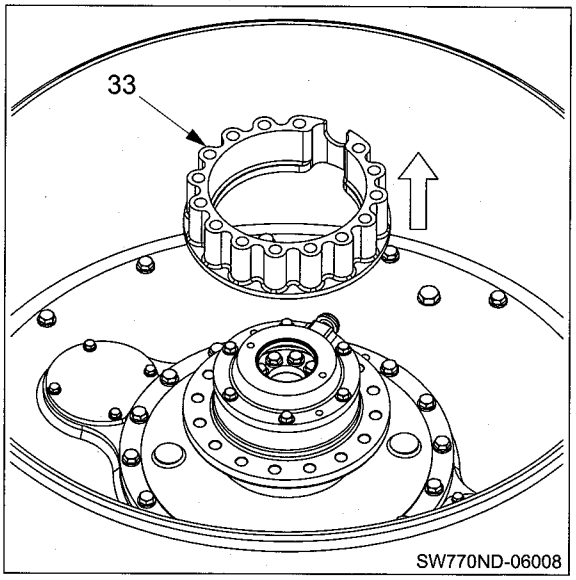
7) Remove disc SUBASSY.

Disc SUBASSY : 155 kg (342 lbs.)

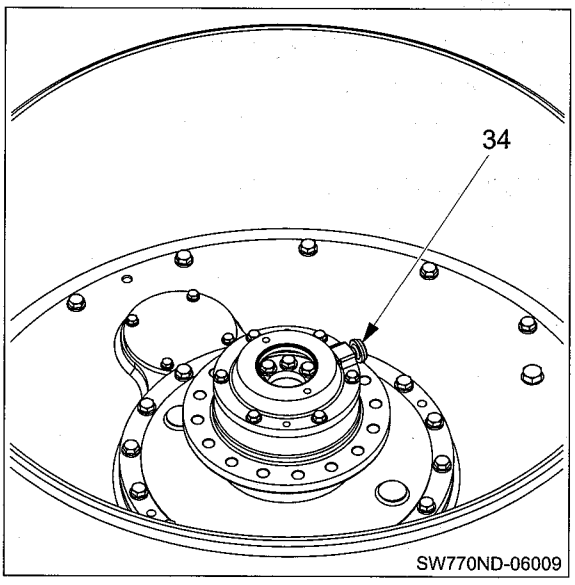


8) Remove bracket (33).

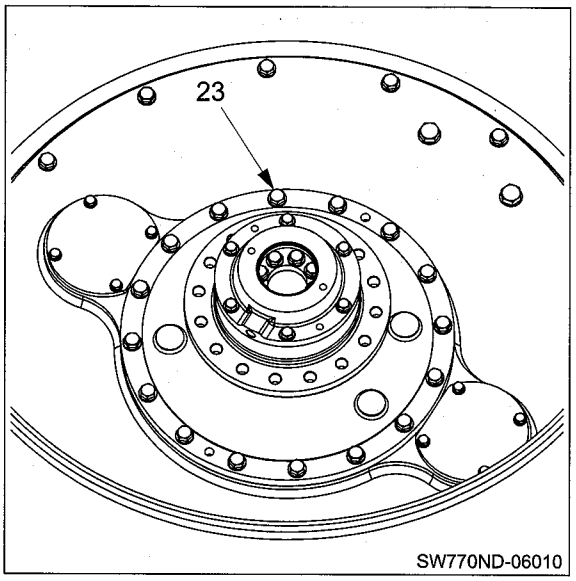
(33) Bracket : 20 kg (44 lbs.)



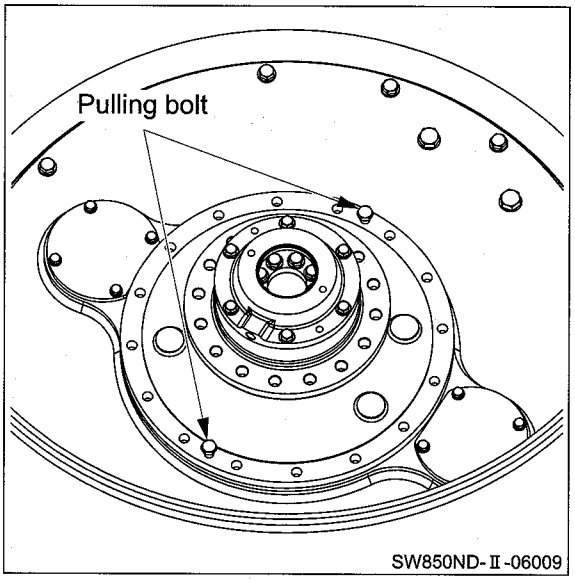
9) Remove breather (34).



10) Remove bolts (23).



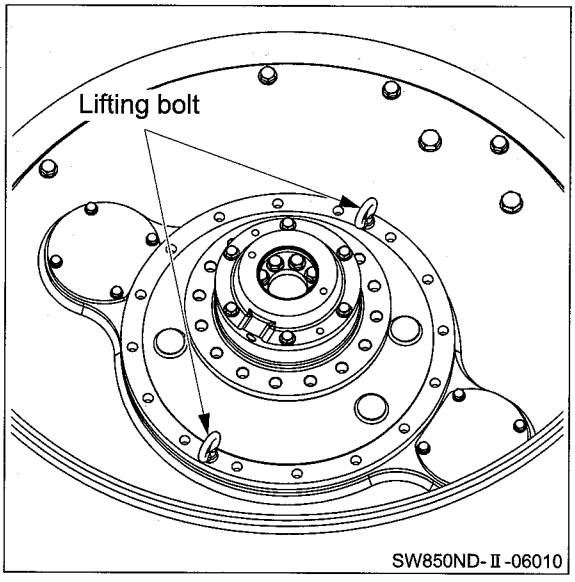
11) Lift axle shaft SUBASSY using two pulling bolts (M16×50).



⚠WARNING

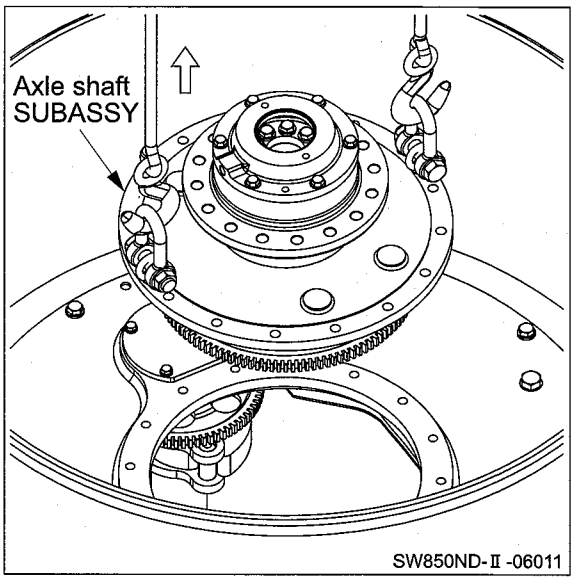
When attaching lifting bolts, screw in the threads fully before using.

12) Install lifting bolts (M16).

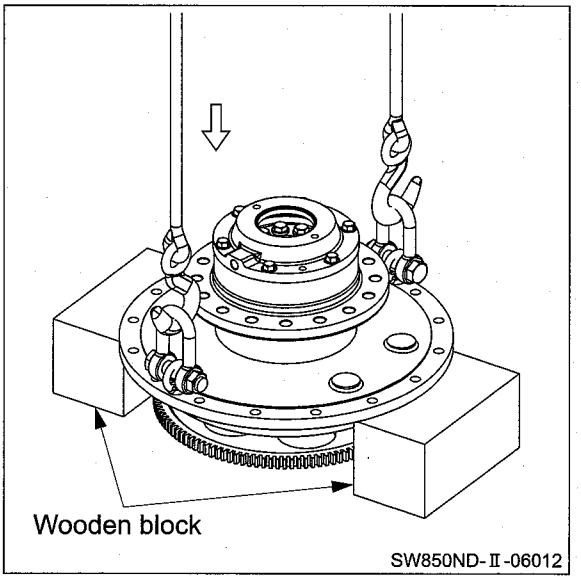


13) Remove axle shaft SUBASSY.

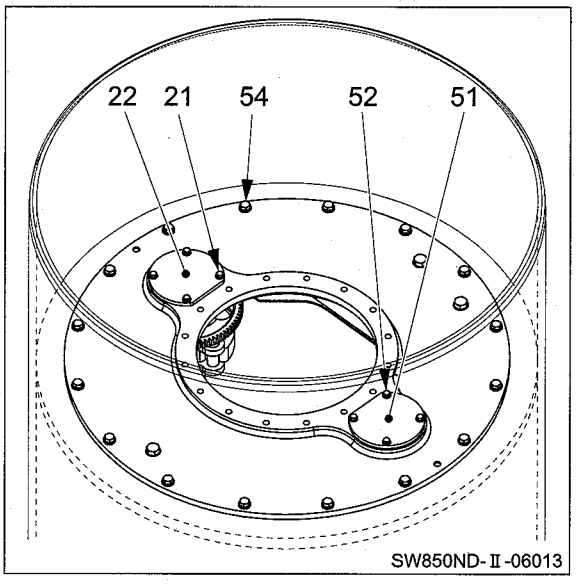
Axle shaft SUBASSY : 185 kg (408 lbs.)



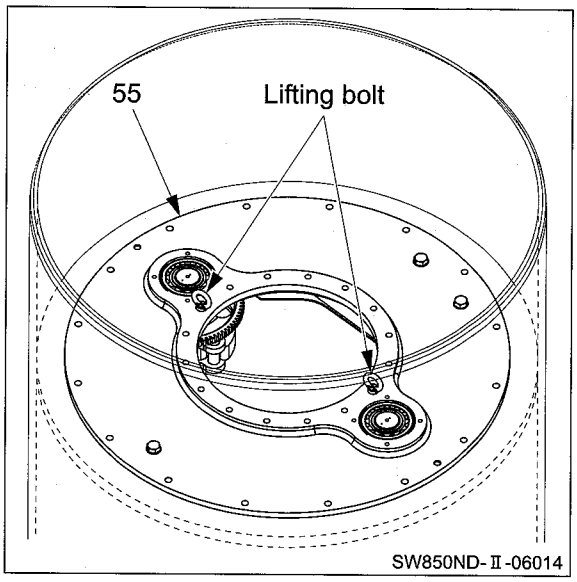
14) Put axle shaft SUBASSY on wooden blocks.
(To step (29))



15) Remove bolts (21) and (52).
- Remove covers (22) and (51).
- Remove bolts (54).



16) Install lifting bolts (M16) to housing (55).

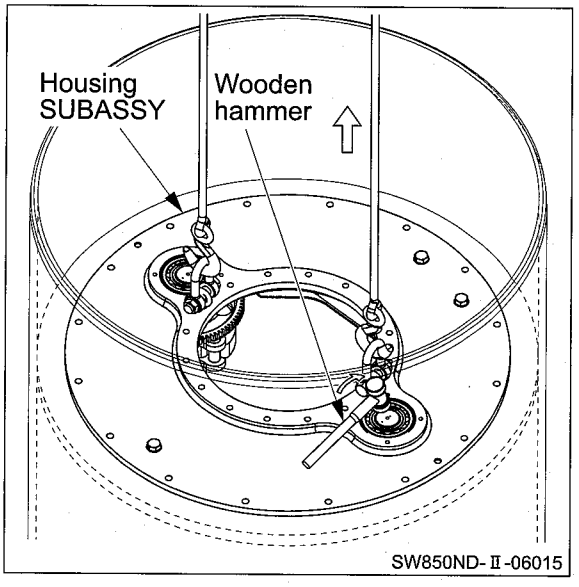


17) Remove housing SUBASSY.

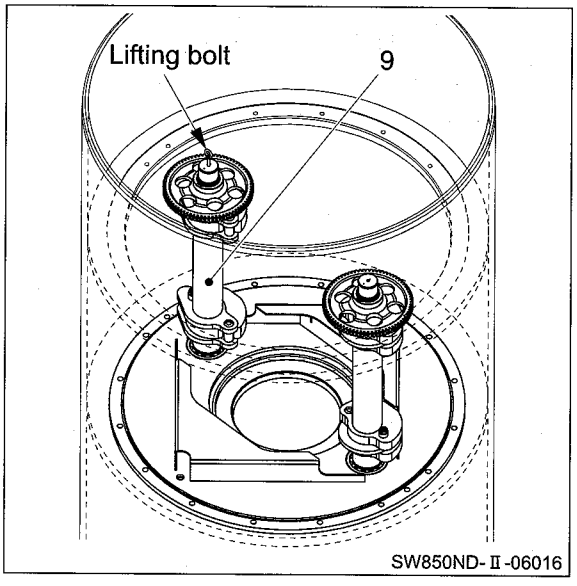
kg Housing SUBASSY : 225 kg (496 lbs.)

(NOTICE)

- **In order not to lift eccentric shaft together with housing SUBASSY, tap on the eccentric shaft ends alternately with a wooden hammer during lifting.**



18) Install a lifting bolt (M8) to eccentric shaft A (9).



⚠WARNING

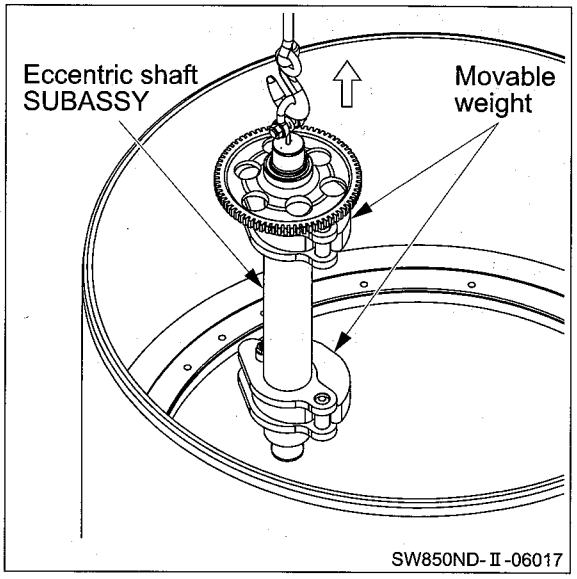
Take care not to get your fingers caught in movable weights.

19) Remove eccentric shaft SUBASSY.

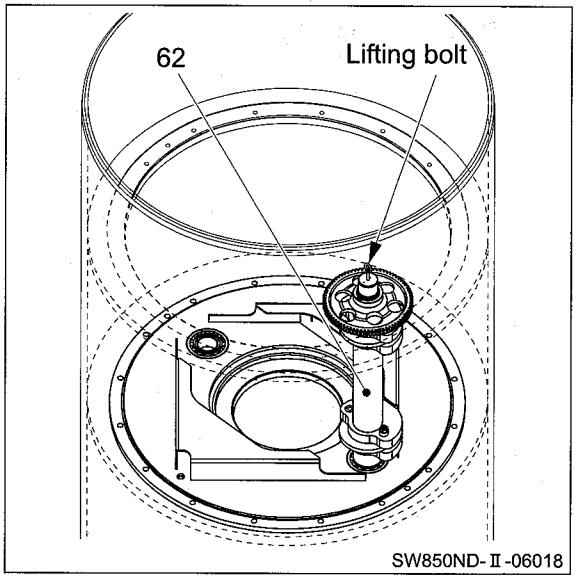
Eccentric shaft SUBASSY : 85 kg (187 lbs.)

(NOTICE)

- **Put the movable weight at its outmost position.**



20) Install a lifting bolt (M8) to eccentric shaft B (62).

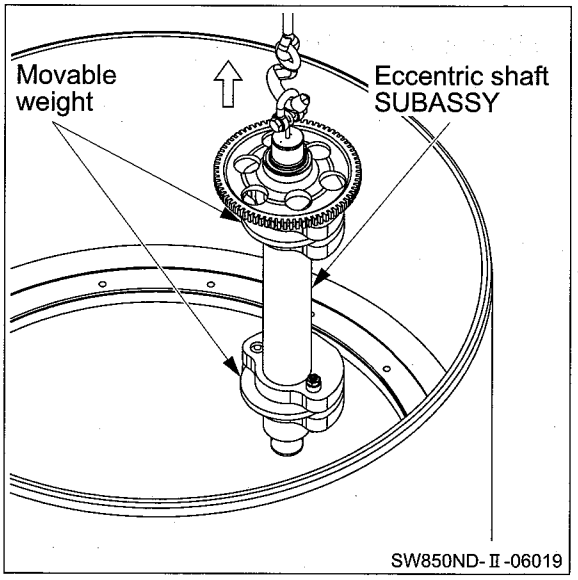


21) Remove eccentric shaft SUBASSY.

Eccentric shaft SUBASSY : 90 kg (198 lbs.)

(NOTICE)

- **Put the movable weight at its outmost position.**

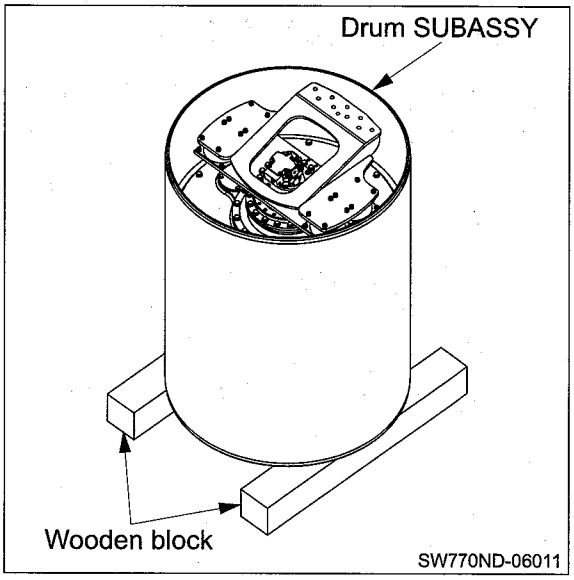


⚠WARNING

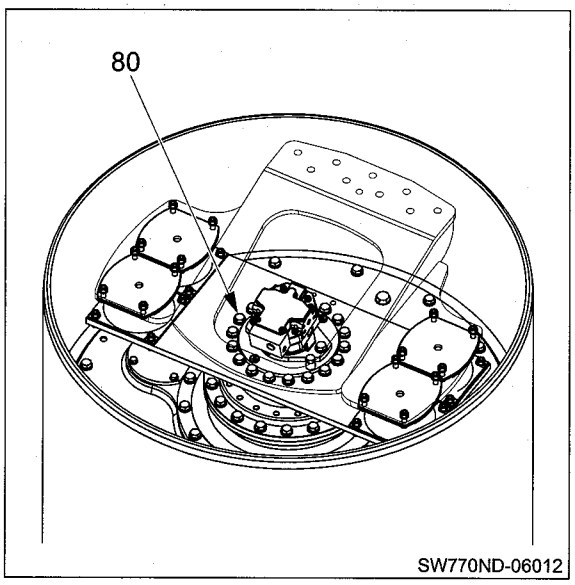
Be careful because reversing the drum involves risk. Confirm that the surrounding area is safe, and work in a natural, unstrained posture.

22) Reverse drum SUBASSY.

Drum SUBASSY : 1,965 kg (4,332 lbs.)

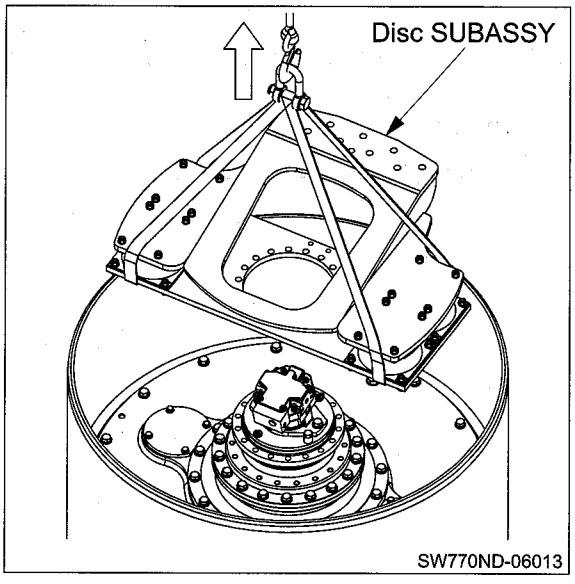


23) Remove bolts (80).

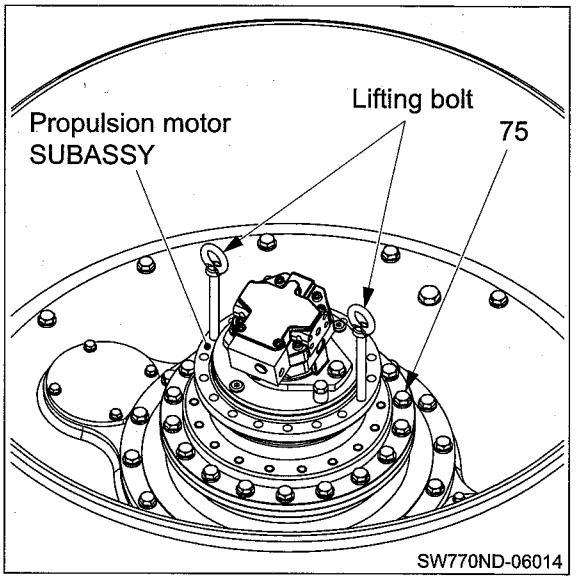


24) Remove disc SUBASSY.

Disc SUBASSY : 155 kg (342 lbs.)

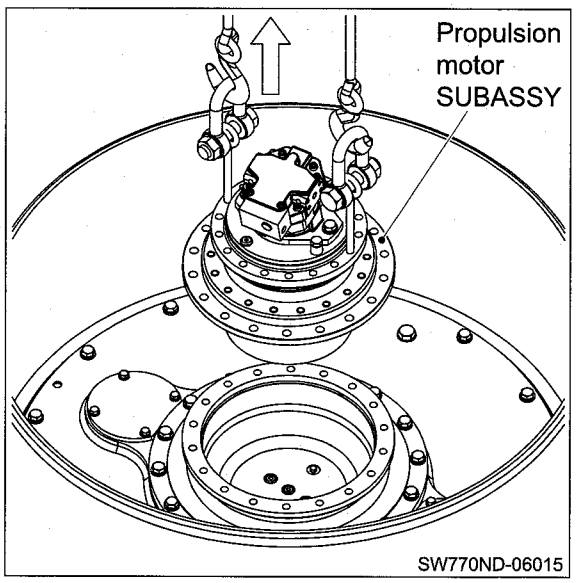


25) Install lifting bolts (M16) to propulsion motor SUBASSY.
- Remove bolts (75).

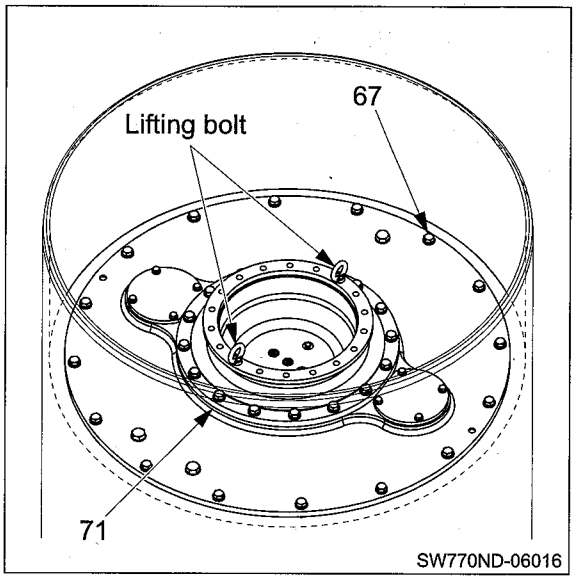


26) Remove propulsion motor SUBASSY.

Propulsion motor SUBASSY : 155 kg (342 lbs.)

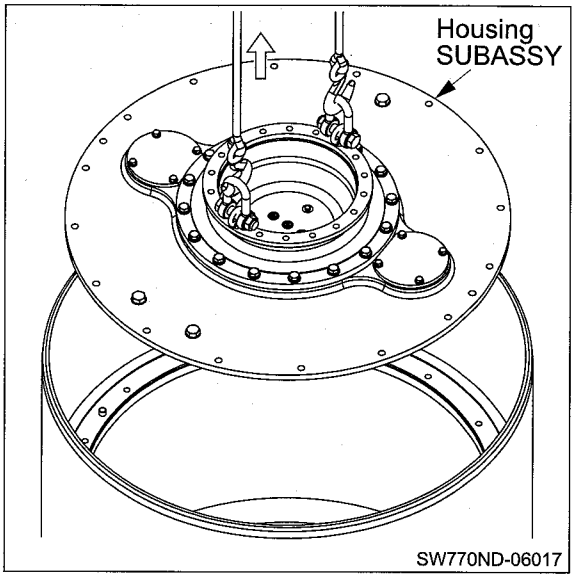


27) Install lifting bolts (M16) to housing (71).
- Remove bolts (67).

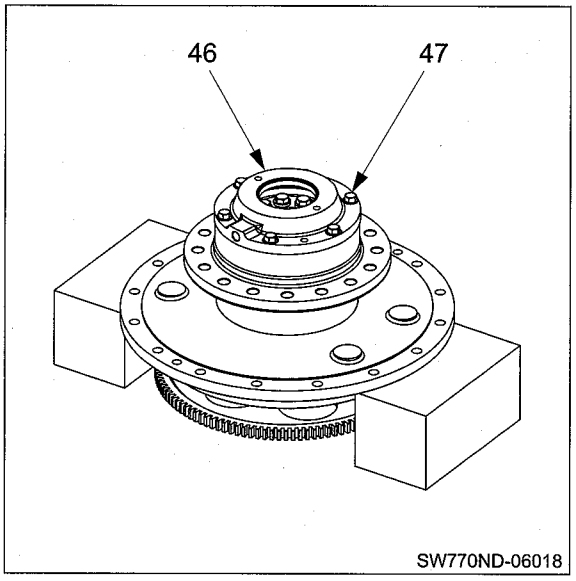


28) Remove housing SUBASSY.

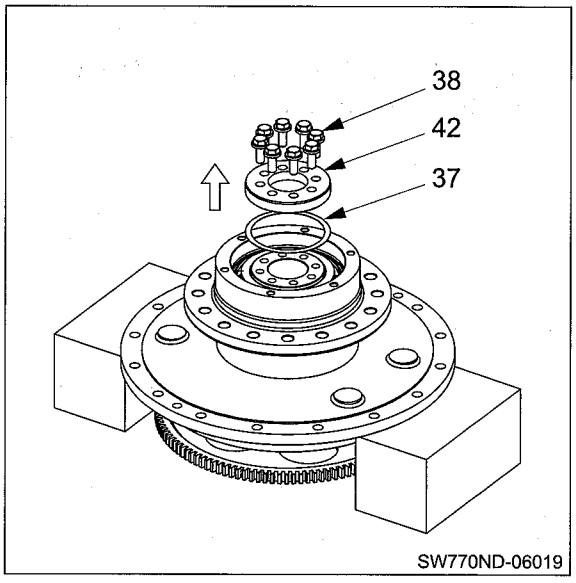
Housing SUBASSY : 320 kg (705 lbs.)



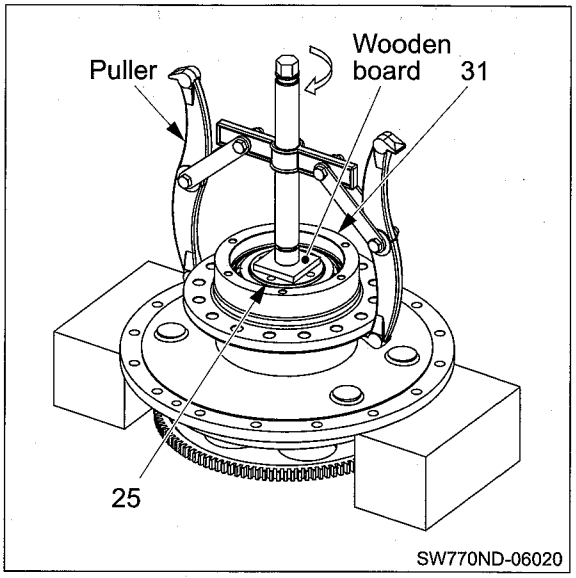
29) Disassembly of axle shaft SUBASSY
(From step (14))
- Remove bolts (47).
- Remove cover (46).



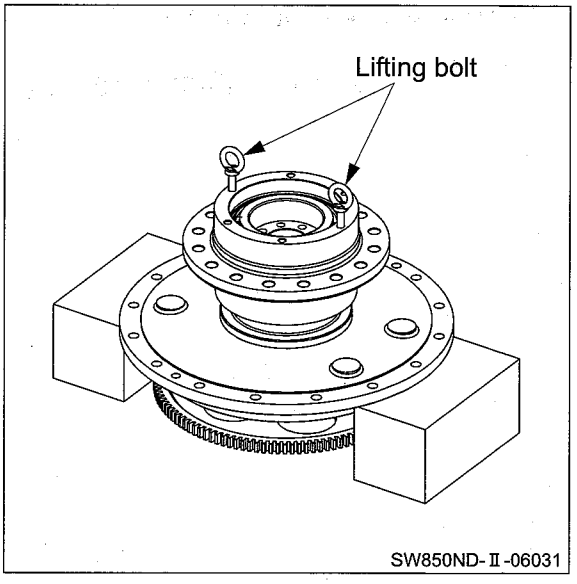
30) Remove bolts (38).
- Remove cover (42).
- Remove shim (37).



31) Put a piece of wooden board on end of axle shaft (25).
- Set a puller on housing (31).
- Remove housing SUBASSY with roller bearing from axle shaft SUBASSY.

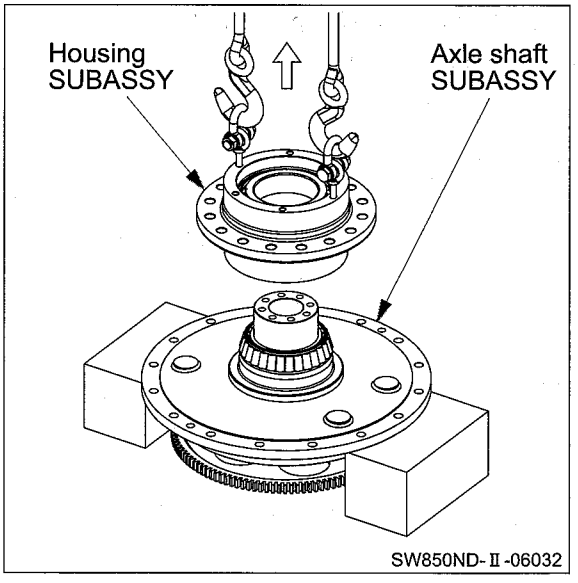


32) Install lifting bolts (M12).

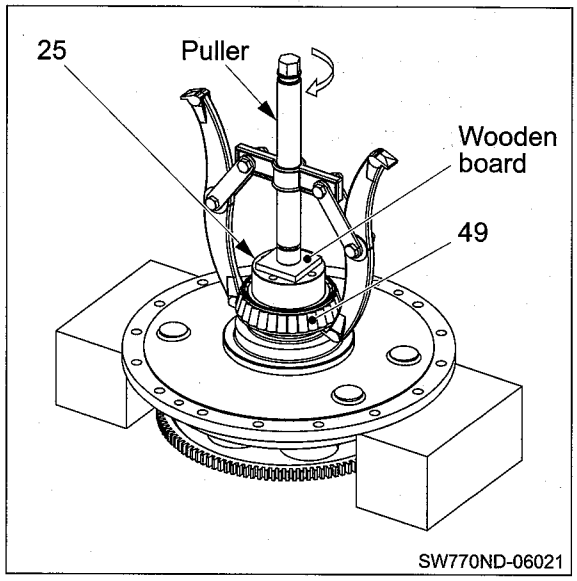


33) Remove housing SUBASSY from axle shaft SUBASSY.

Housing SUBASSY : 45 kg (99 lbs.)

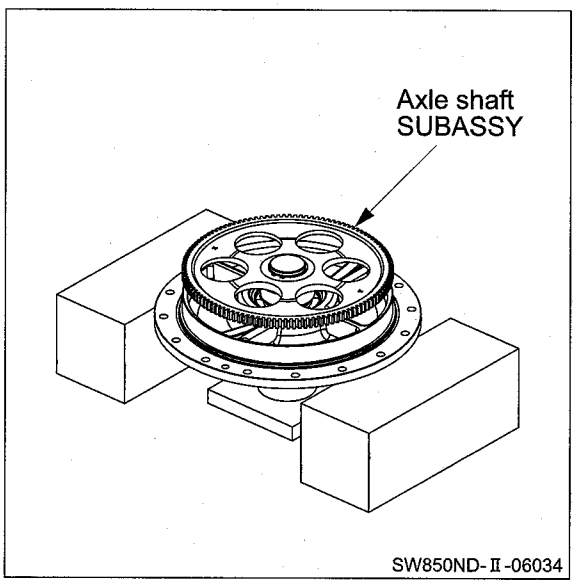


34) Put a piece of wooden board on end of axle shaft (25).
- Set a puller on roller bearing (49) inner race.
- Remove roller bearing (49) inner race from axle shaft SUBASSY.

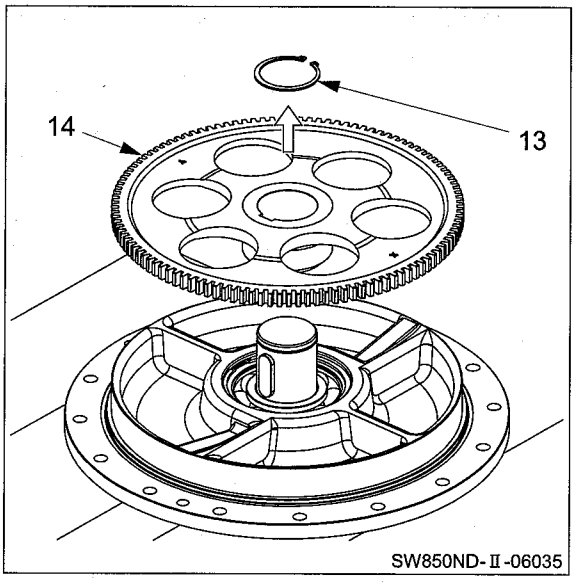


35) Reverse axle shaft SUBASSY.

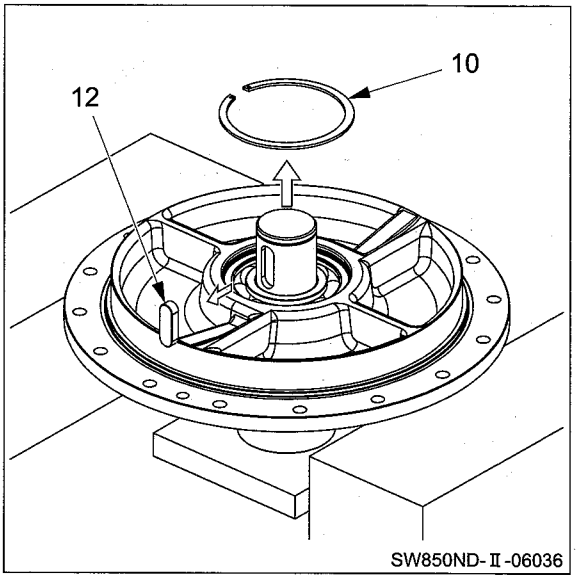
Axle shaft SUBASSY : 125 kg (276 lbs.)



36) Remove retaining ring (13).
- Remove gear (14).

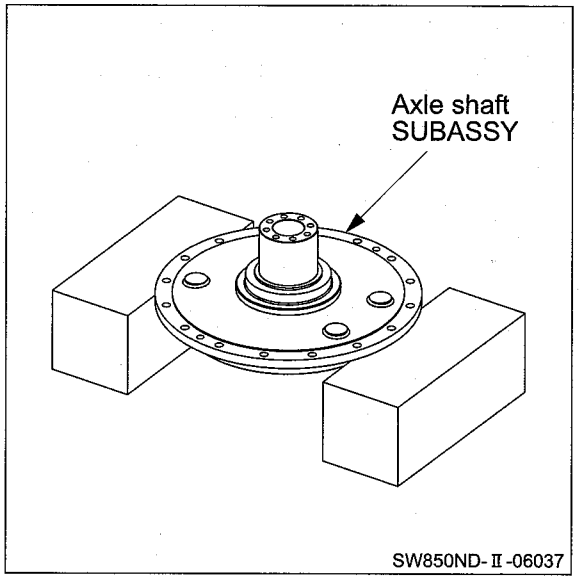


37) Remove sunk key (12).
- Remove retaining ring (10).

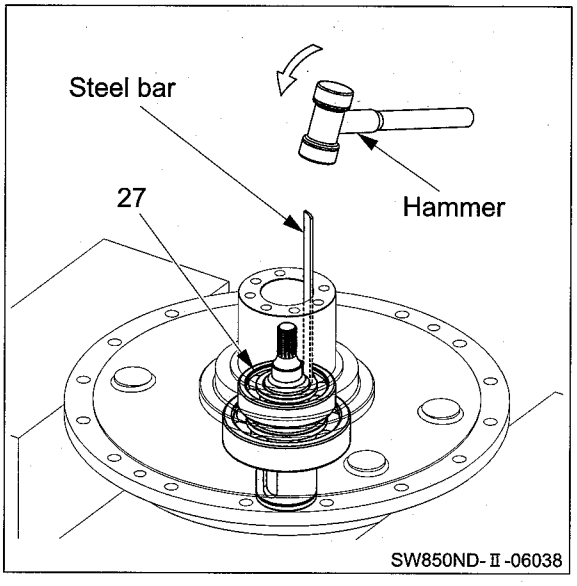


38) Reverse axle shaft SUBASSY.

Axle shaft SUBASSY : 105 kg (231 lbs.)



39) Strike on ball bearing (27) inner race by using a steel bar, and remove shaft SUBASSY.

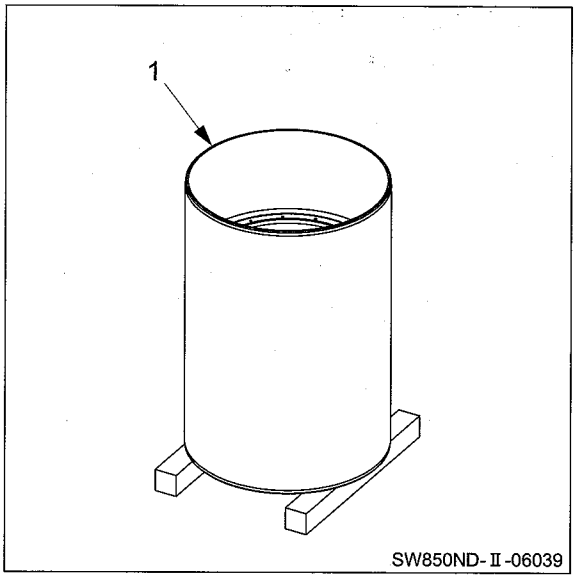


3-4-2. Reassembly of vibratory drum

- Before reassembling, clean disassembled parts well and check that there is no abnormality.

⚠WARNING

- **When standing the drum, use wooden blocks of sufficient strength to securely support the drum.**
- **Carry out the work in an unstrained posture using a work stool or the like.**



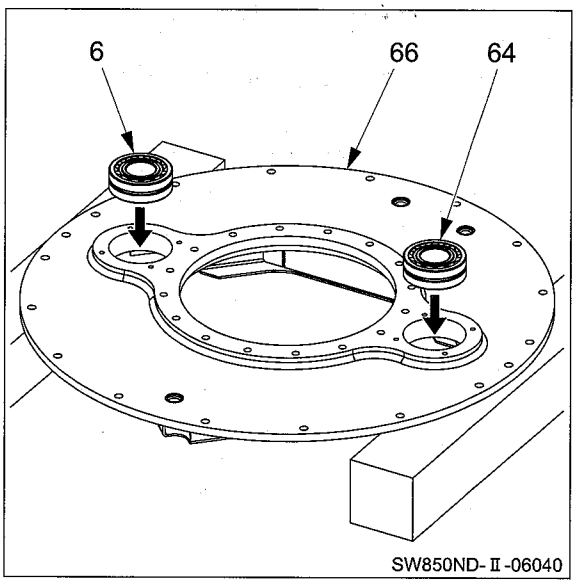
1) Lift drum (1) with a crane and put it in an upright position.

kg (1) Drum : 1,330 kg (2,932 lbs.)

2) Reassembly of housing SUBASSY

2-1) Apply a coat of gear oil to housing (66) at where bearings will be press-fitted.

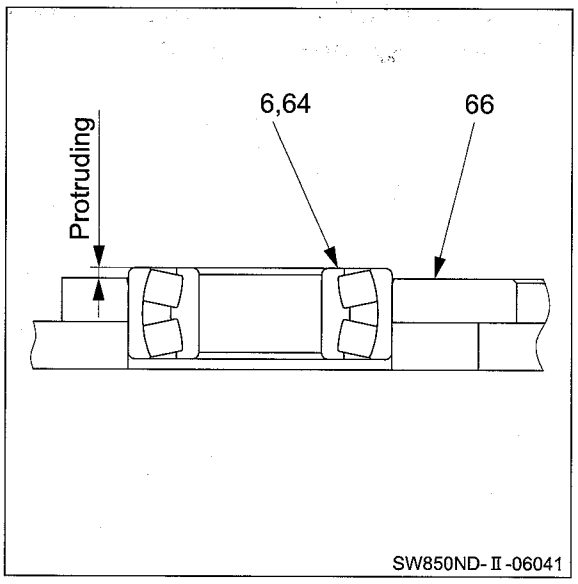
- Drive vibrator bearings (6) and (64) into housing (66).



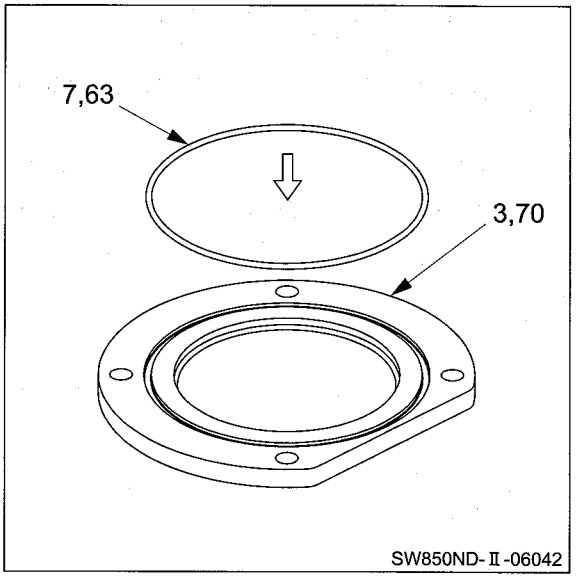
(NOTICE)

- **Take care not to damage the bearings (6) and (64) when installing them.**

2-2) Stop driving in vibrator bearings (6) and (64) when they come to a position slightly protruding from the boss surface of the housing (66) to avoid driving in too much.

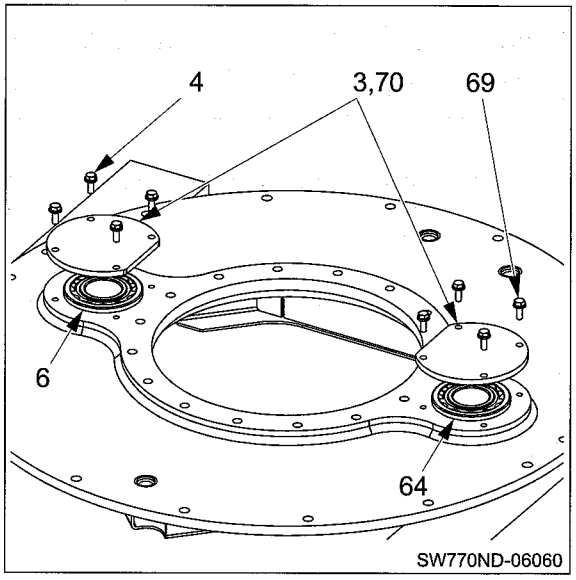


2-3) Apply grease to O-rings (7) and (63).
- Install O-rings (7) and (63) to covers (3) and (70).



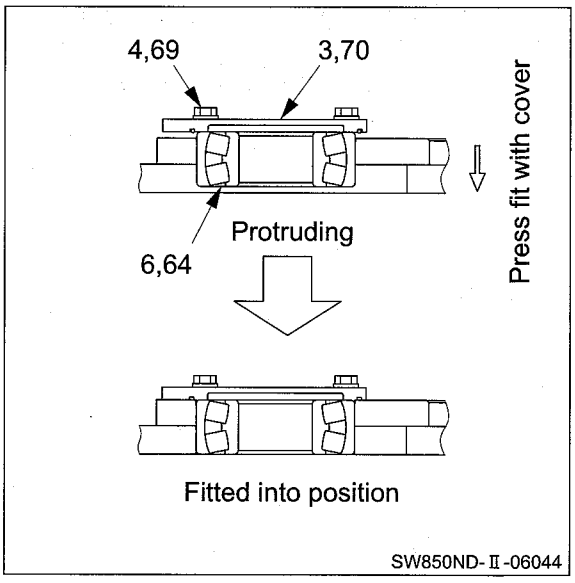
2-4) Apply a coat liquid packing to housing SUBASSY at where covers (3) and (70) will be installed.
- Place covers (3) and (70) while making sure to orient them in the correct direction.
- Install four bolts (4), four bolts (69) to press in bearings (6) and (64).

(NOTICE)
- **Take care not to let O-ring to protrude from its groove.**
- **Bolts (4) and (69) are treated with thread-locking fluid. Use new thread-locking fluid treated bolts for installation.**



2-5) Press in and secure bearings (6) and (64) with covers (3) and (70).

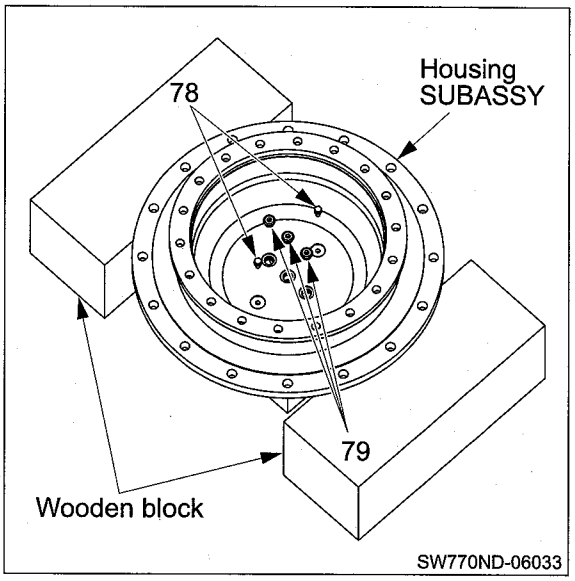
N•m (4) (69) Bolts M10×30 : 59 N·m (44 lbf·ft)



2-6) Reverse housing SUBASSY.

Housing SUBASSY : 90 kg (198 lbs.)

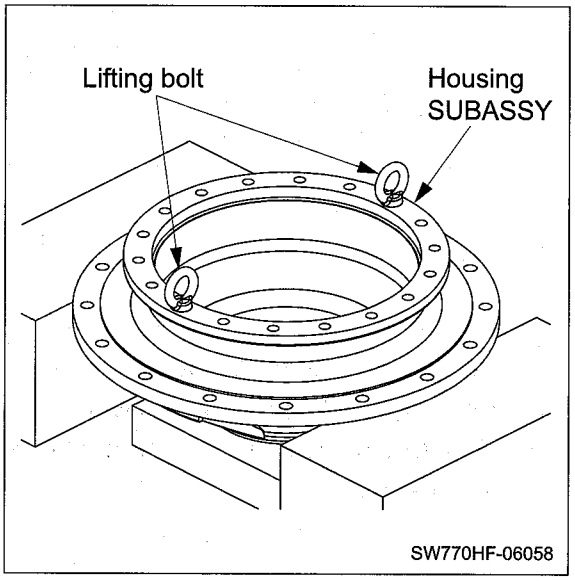
- Install plugs (79) to housing SUBASSY.
- Install bolts (78) to housing SUBASSY.



⚠WARNING

When installing lifting bolts, screw in the threads fully before using.

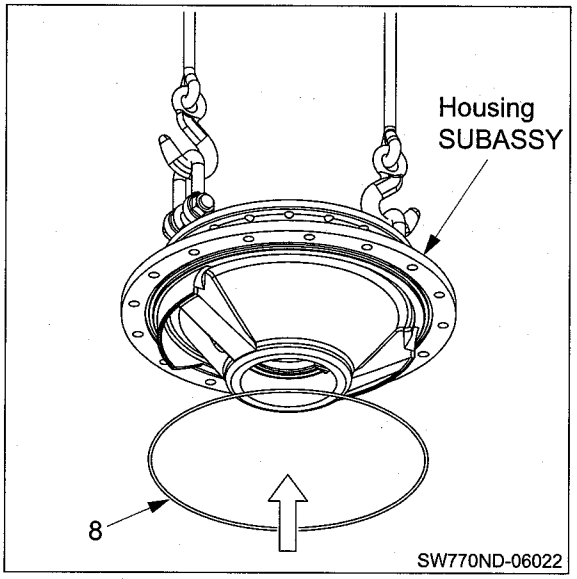
2-7) Install lifting bolts (M16) to housing SUBASSY.



2-8) Lift housing SUBASSY.

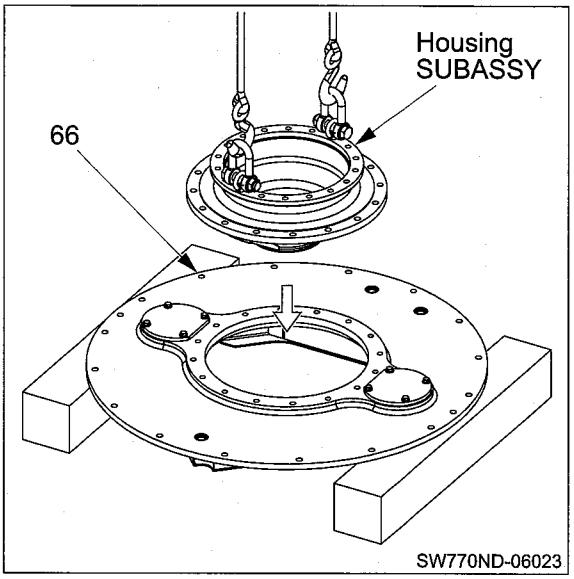
- Apply grease to O-ring (8).
- Install O-ring (8) to housing SUBASSY.

Housing SUBASSY : 90 kg (198 lbs.)



2-9) Apply a coat of liquid packing to housing (66) at where housing SUBASSY will be installed.
- Lower housing SUBASSY on mounting surface of housing.

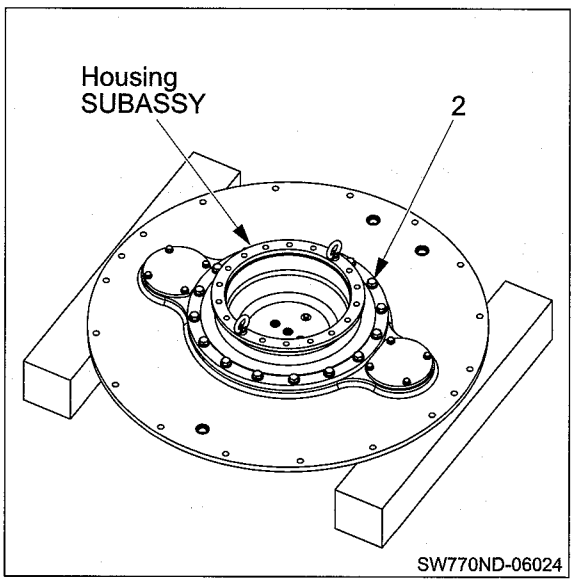
(NOTICE)
- **Take care not to let O-ring to protrude from its groove.**



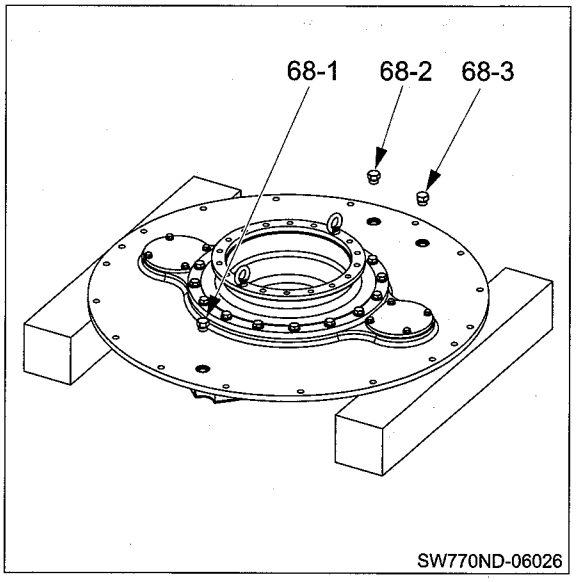
2-10) Secure housing SUBASSY with sixteen bolts (2) and washers.

N•m (2) Bolts M16×50 : 265 N·m (195 lbf·ft)

(NOTICE)
- **Bolts (2) are treated with thread-locking fluid. Use new thread-locking fluid treated bolts for installation.**

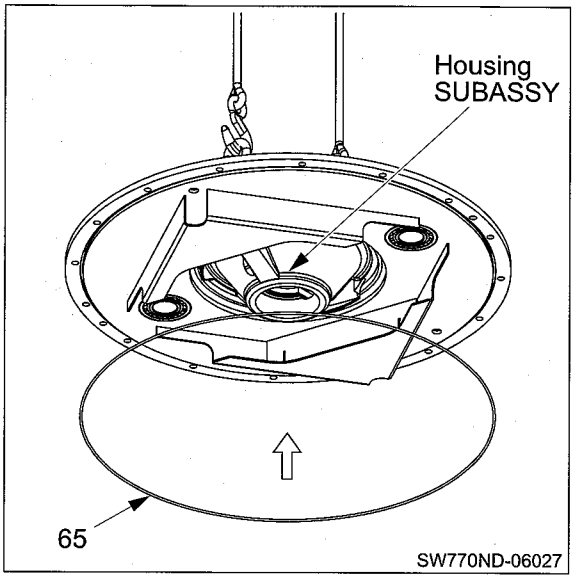


3) Apply grease to O-rings for plugs (68-1), (68-2), and (68-3).
- Install plugs (68-1), (68-2), and (68-3).



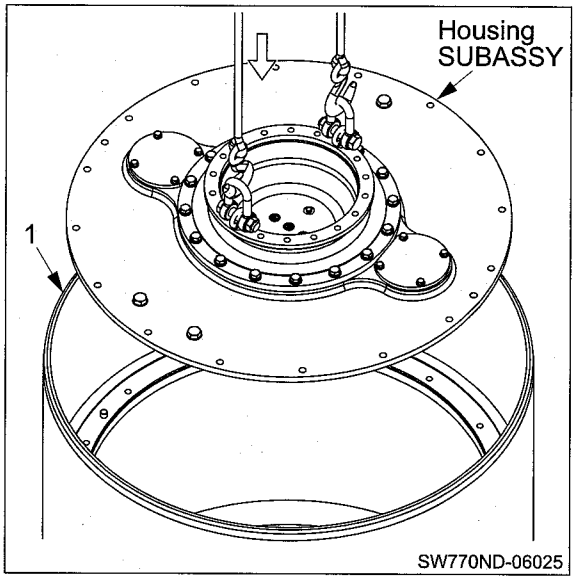
4) Lift housing SUBASSY.
   - Apply grease to O-ring (65).
   - Install O-ring (65) to housing SUBASSY.

   Housing SUBASSY : 320 kg (705 lbs.)

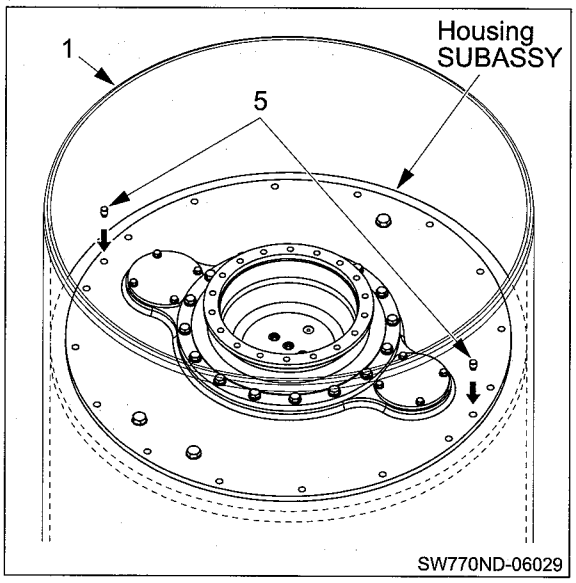


5) Lower housing SUBASSY on mounting surface of drum (1).

(NOTICE)
- **Take care not to let O-ring to protrude from its groove.**



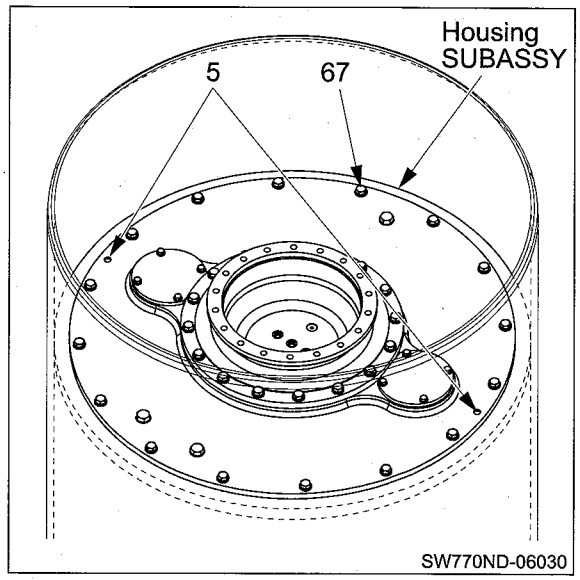
6) Drive in two locating pins (5) for housing SUBASSY and drum (1) temporarily.



7) Secure housing SUBASSY with sixteen bolts (67) and washers.

N•m (67) Bolts M16×45 : 265 N·m (195 lbf·ft)

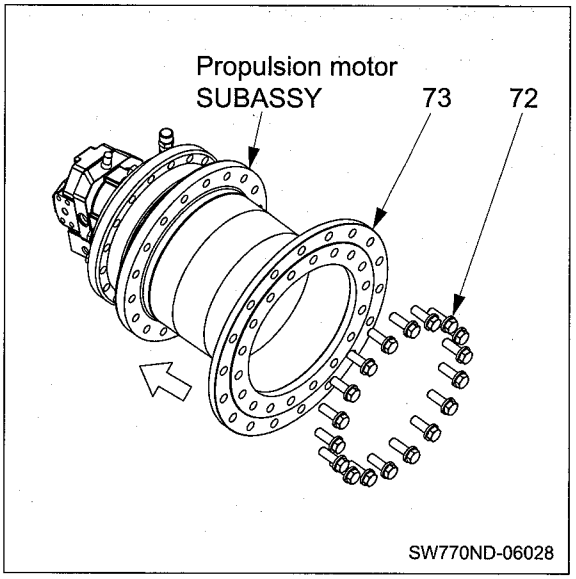
- Drive in locating pins (5) again.



8) Reassembly of propulsion motor SUBASSY.

- Secure ring (73) to propulsion motor SUBASSY with eighteen bolts (72) and washers.

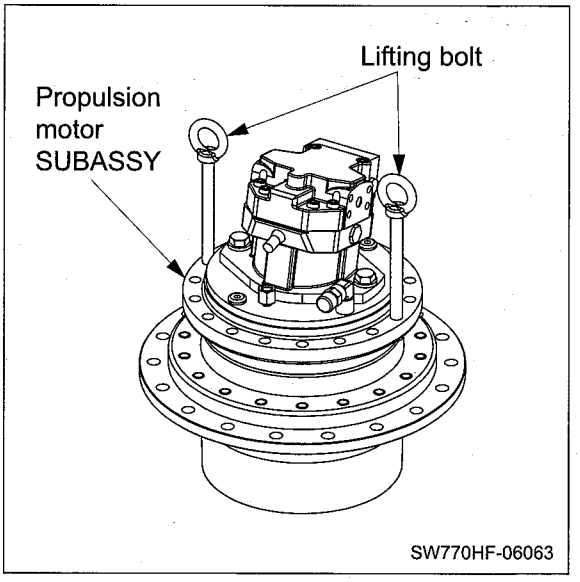
N•m (72) Bolts M16×50 : 265 N·m (195 lbf·ft)



9) Stand propulsion motor SUBASSY.

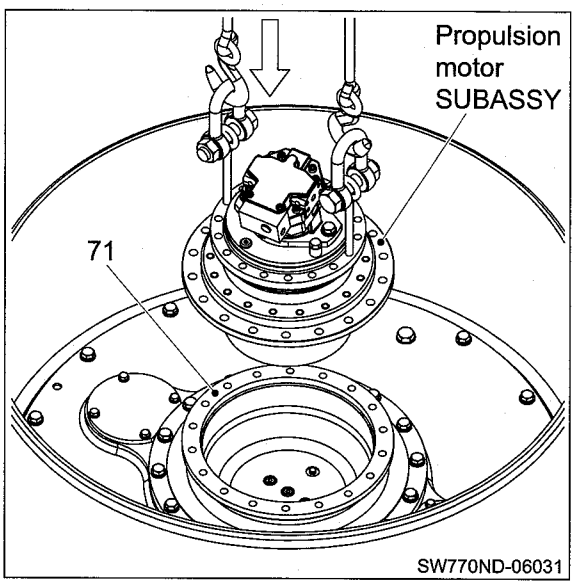
kg Propulsion motor SUBASSY : 155 kg (342 lbs.)

- Install lifting bolts (M16) to propulsion motor SUBASSY.



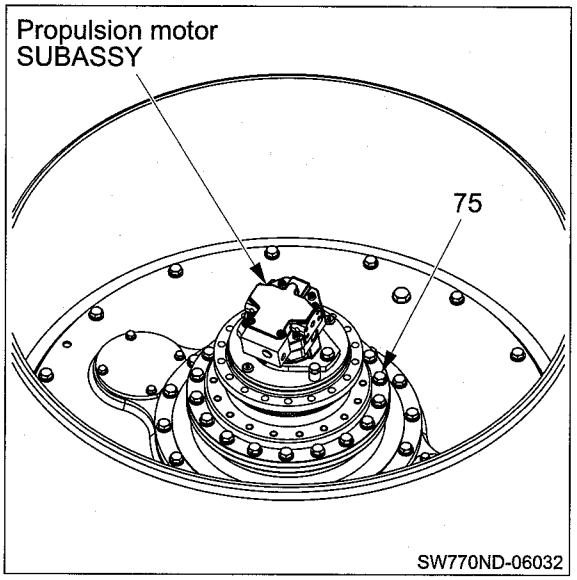
10) Lower propulsion motor SUBASSY on mounting surface of housing (71).

Propulsion motor SUBASSY : 155 kg (342 lbs.)



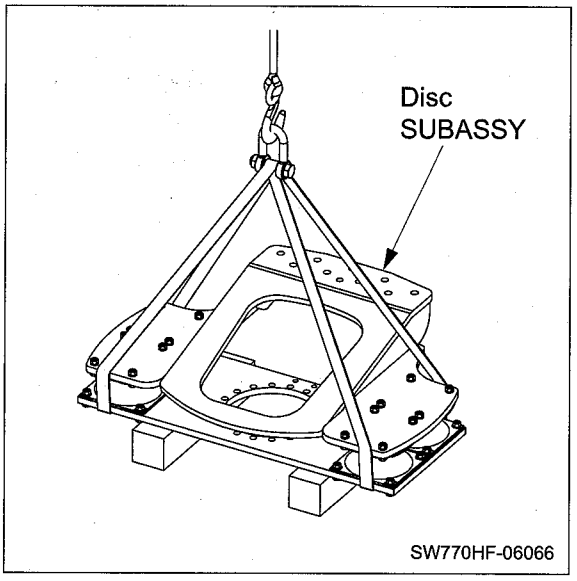
11) Secure propulsion motor SUBASSY with eighteen bolts (75) and washers.

(75) Bolts M16×45 : 265 N·m (195 lbf·ft)

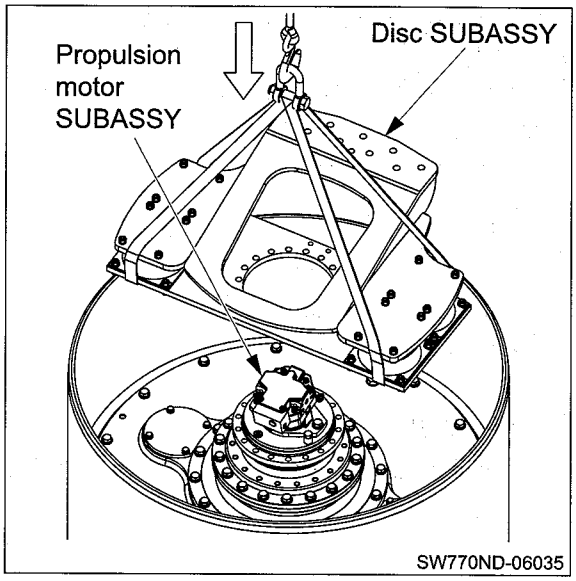


12) Lift disc SUBASSY.

Disc SUBASSY : 155 kg (342 lbs.)

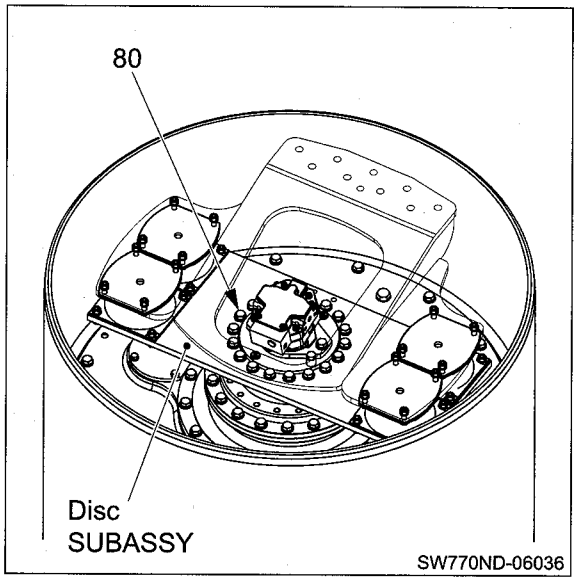


13) Lower disc SUBASSY on mounting surface of propulsion motor SUBASSY.



14) Secure disc SUBASSY with eighteen bolts (80) and washers.

N·m (80) Bolts M16×45 : 265 N·m (195 lbf·ft)

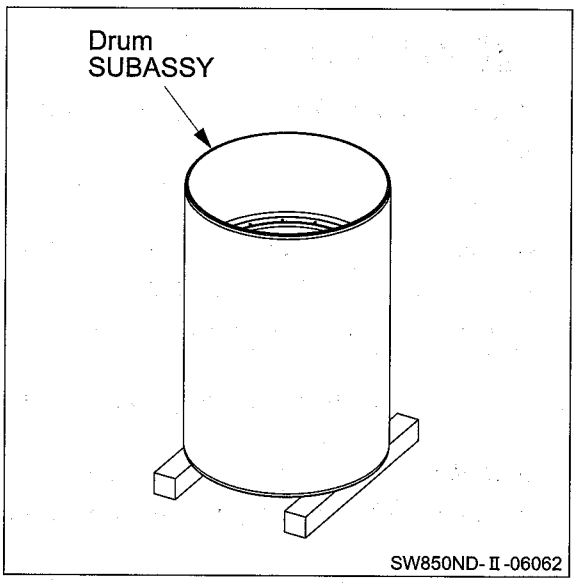


⚠WARNING

Be careful because reversing the drum involves risk. Confirm that the surrounding area is safe, and work in a natural, unstrained posture.

15) Reverse drum SUBASSY.

kg Drum SUBASSY : 1,965 kg (4,332 lbs.)

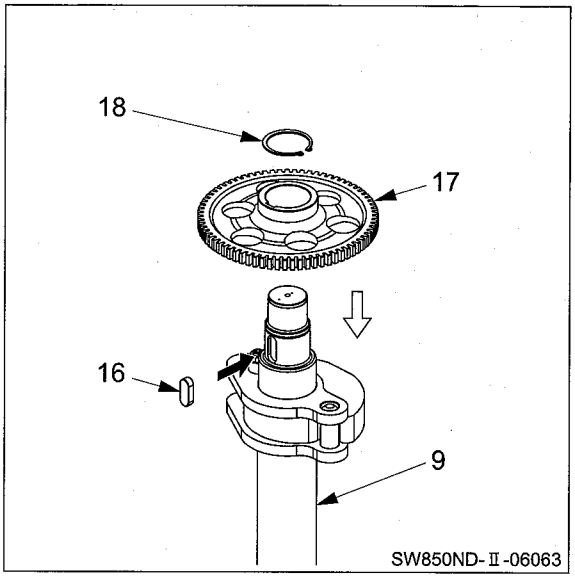


⚠WARNING

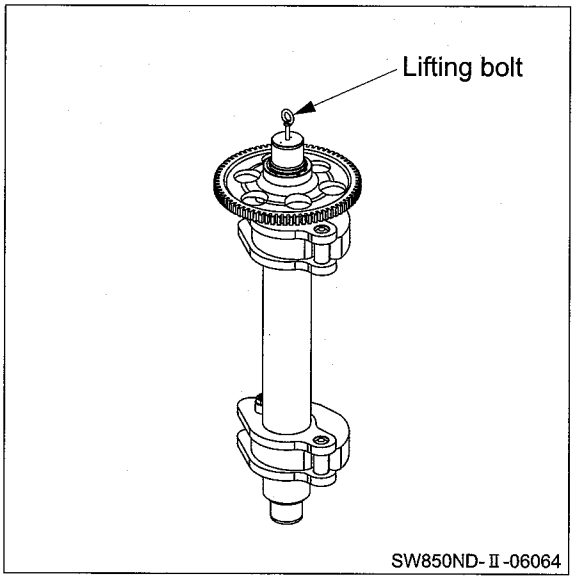
Wear heat resistant gloves when handling heated parts to avoid burns.

16) Heat up gear (17) by using a ring heater or the like.
- Drive sunk key (16) into eccentric shaft A (9).
- Install heated gear (17).
- Install retaining ring (18).

(NOTICE)
- **Make sure that the retaining ring (18) is fitted completely in its groove.**



17) Install a lifting bolt (M8).



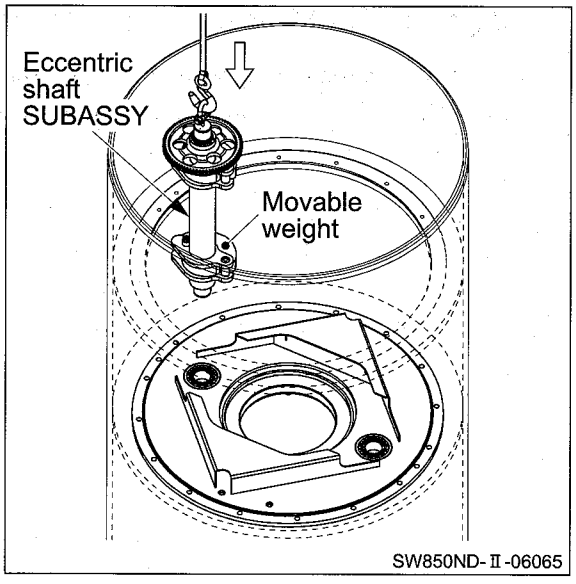
⚠WARNING

Take care not to get your fingers caught in movable weights.

18) Apply a coat of gear oil to eccentric shaft SUBASSY at where bearing will be installed.
- Install eccentric shaft SUBASSY.

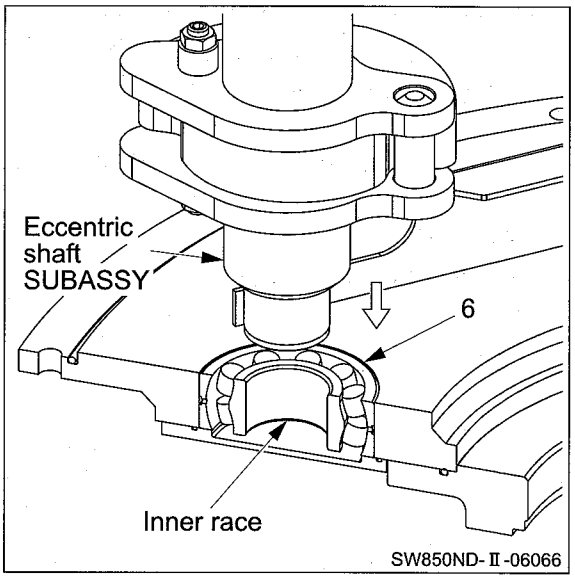
Eccentric shaft SUBASSY : 85 kg (187 lbs.)

(NOTICE)
- **Put the movable weight at its outmost position.**



(NOTICE)

- **Insert eccentric shaft SUBASSY into vibrator bearing (6) while taking care not to tilt vibrator bearing inner race.**
- **After inserting the eccentric shaft SUBASSY into the vibrator bearing (6), lay the eccentric shaft SUBASSY against the inner wall of the drum so that it will not fall down.**

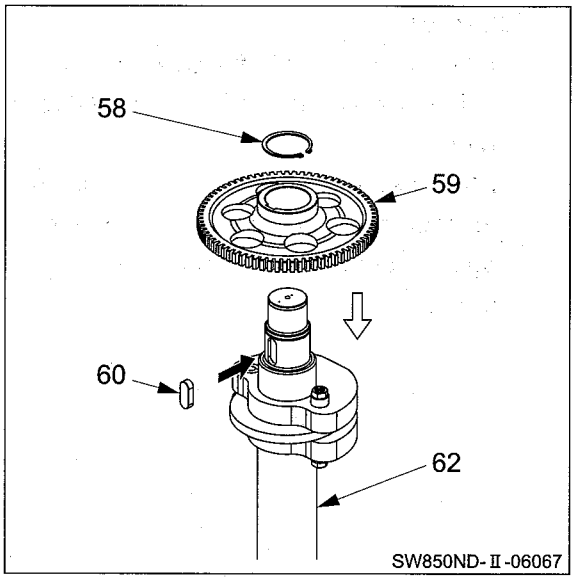


19) Heat up gear (59) by using a ring heater or the like.

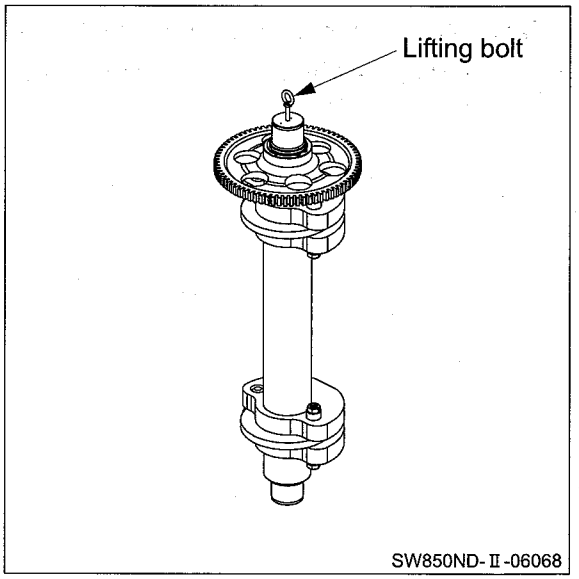
- Drive sunk key (60) into eccentric shaft B (62).
- Install heated gear (59).
- Install retaining ring (58).

(NOTICE)

- **Make sure that the retaining ring (58) is fitted completely in its groove.**



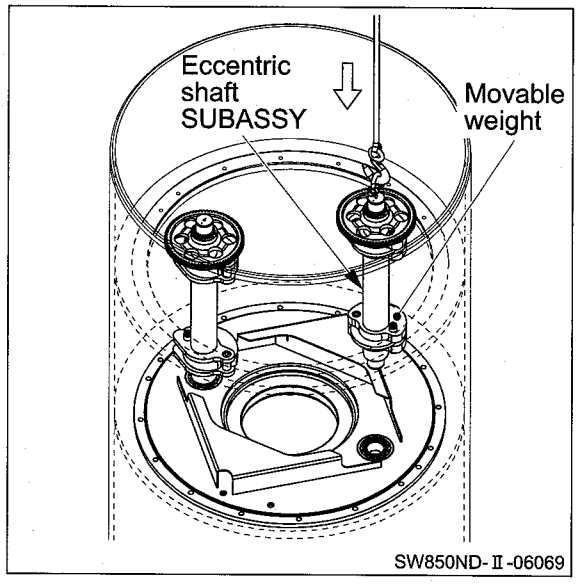
20) Install a lifting bolt (M8).



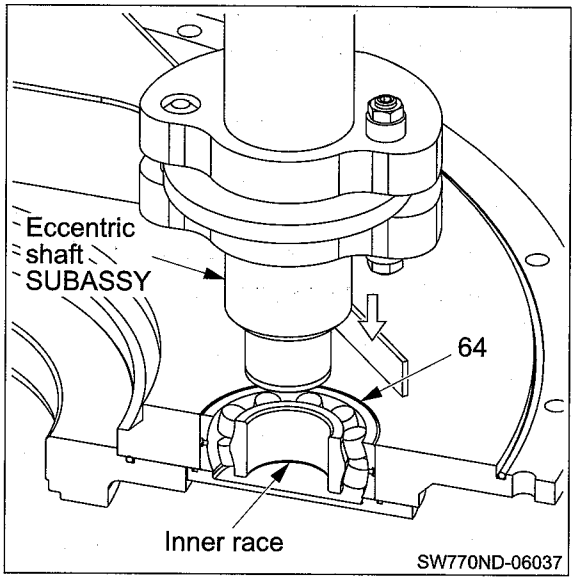
21) Apply a coat of gear oil to eccentric shaft SUBASSY at where bearing will be installed.
- Install eccentric shaft SUBASSY.

Eccentric shaft SUBASSY : 90 kg (198 lbs.)

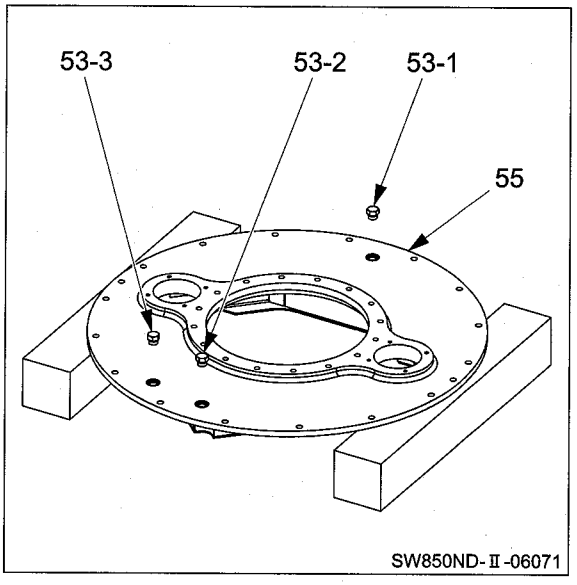
(NOTICE)
- **Put the movable weight at its outmost position.**



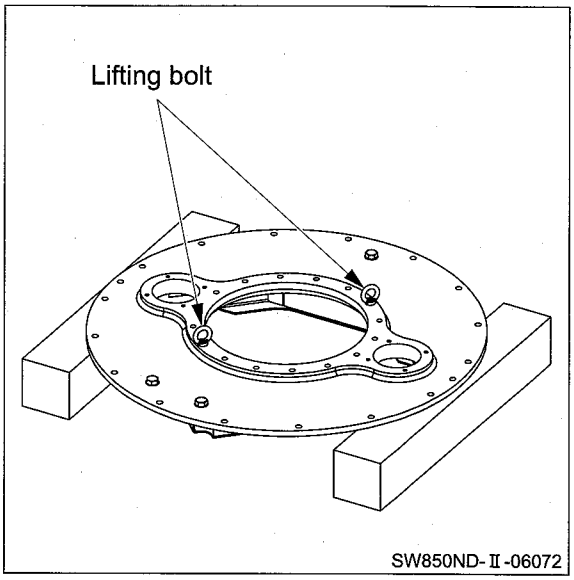
(NOTICE)
- **Insert eccentric shaft SUBASSY into vibrator bearing (64) while taking care not to tilt vibrator bearing inner race.**
- **After inserting the eccentric shaft SUBASSY into the vibrator bearing (64), lay the eccentric shaft SUBASSY against the inner wall of the drum so that it will not fall down.**



22) Apply grease to O-rings for plugs (53-1), (53-2), and (53-3).
- Install plugs (53-1), (53-2), and (53-3) to housing (55).



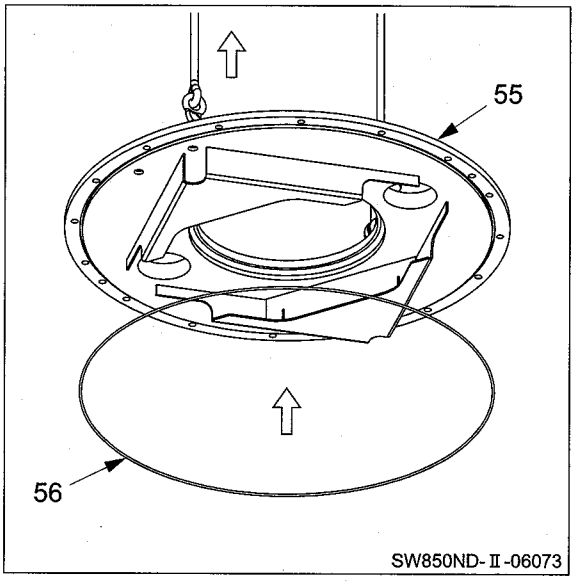
23) Install lifting bolts (M16).



24) Lift housing (55).

ℑkg (55) Housing : 215 kg (474 lbs.)

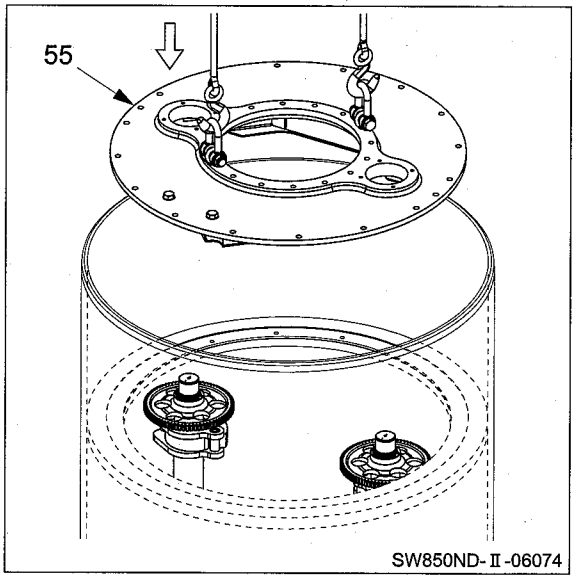
- Apply grease to O-ring (56).
- Install O-ring (56) to housing.



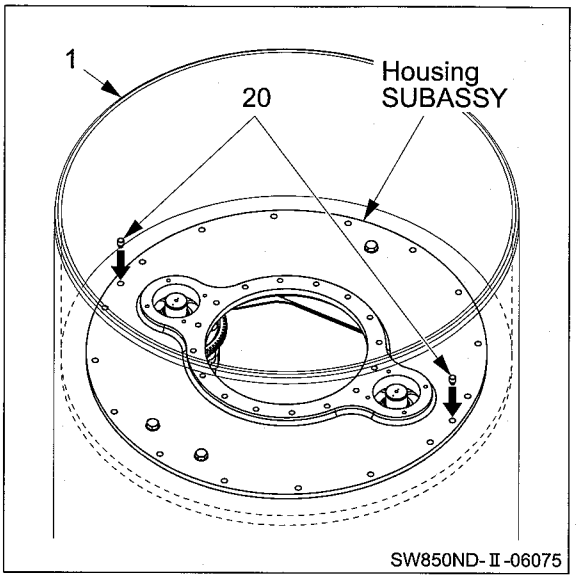
25) Lower housing (55) on mounting surface of drum.

(NOTICE)

- **Take care not to let O-ring to protrude from its groove.**



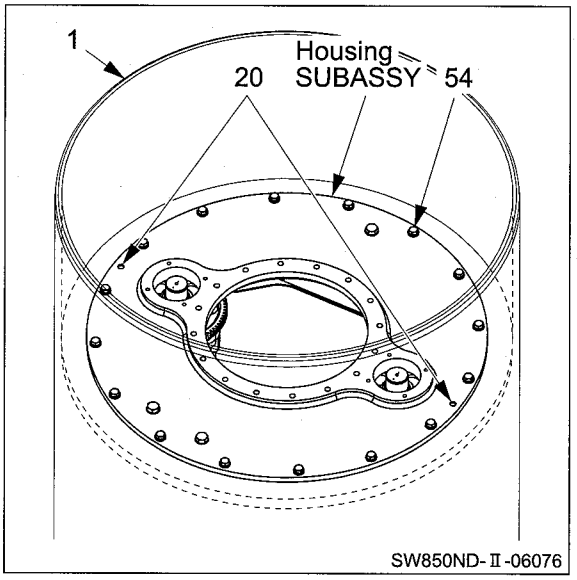
26) Drive in two locating pins (20) for housing SUBASSY and drum (1) temporarily.



27) Secure housing SUBASSY to drum (1) with sixteen bolts (54) and washers.

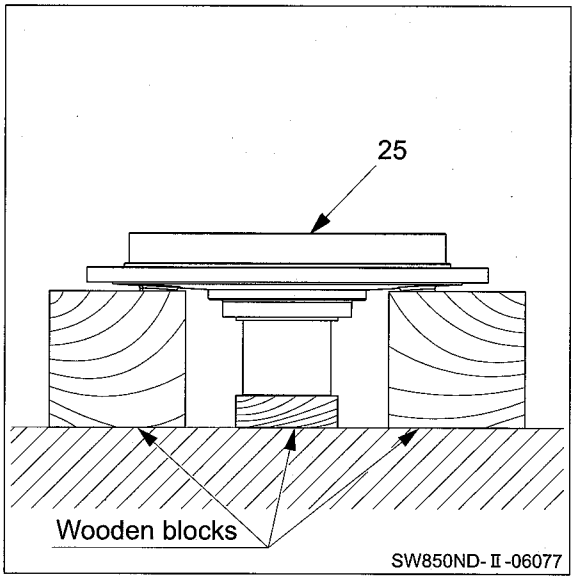
N•m (54) Bolts M16×45 : 265 N·m (195 lbf·ft)

- Drive in locating pins (20) again.

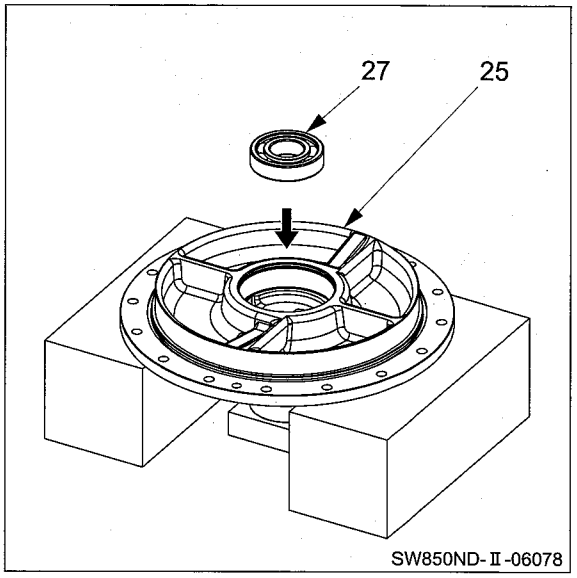


28) Reassembly of axle shaft SUBASSY

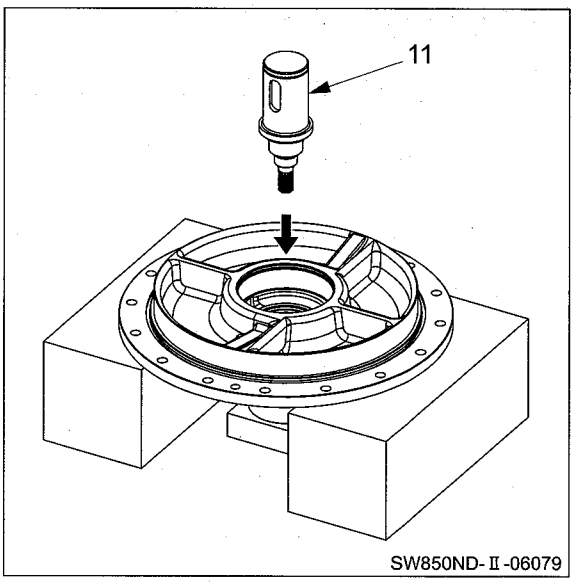
28-1) Fix axle shaft (25) with wooden blocks.



28-2) Apply a coat of gear oil to axle shaft (25) at where bearing will be press-fitted.
- Drive ball bearing (27).

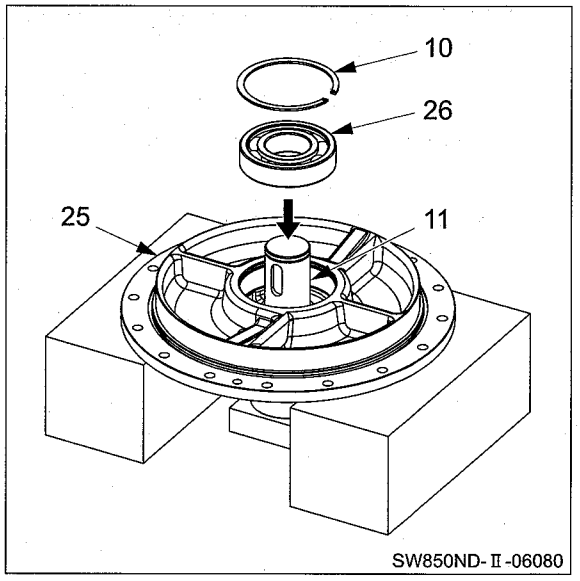


28-3) Apply a coat of gear oil to bearing mounting surface of shaft (11).
- Drive in shaft (11).



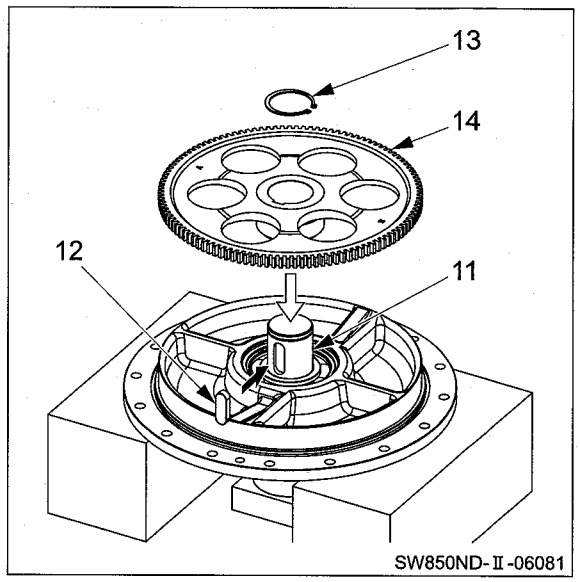
28-4) Apply a coat of gear oil to axle shaft (25) at where bearing will be press-fitted and to drive shaft (11) at where bearing will be installed.
- Drive ball bearing (26).
- Install retaining ring (10).

(NOTICE)
- **Make sure that the retaining ring (10) is fitted completely in its groove.**



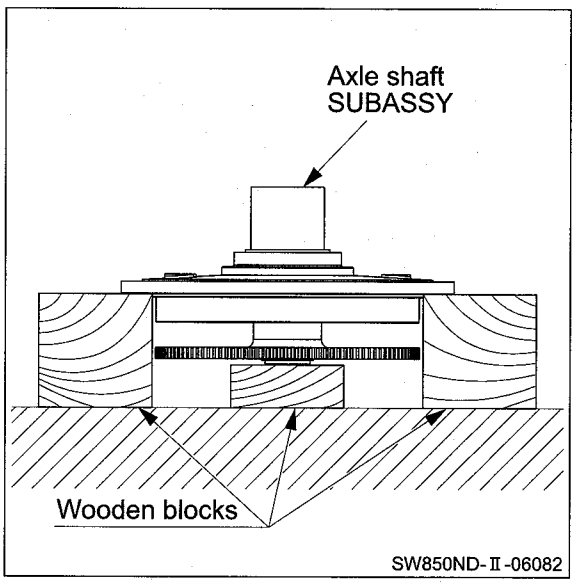
28-5) Heat up gear (14) by using a ring heater or the like.
- Drive sunk key (12) to shaft (11).
- Install heated gear (14).
- Install retaining ring (13).

(NOTICE)
- **Make sure that the retaining ring (13) is fitted completely in its groove.**

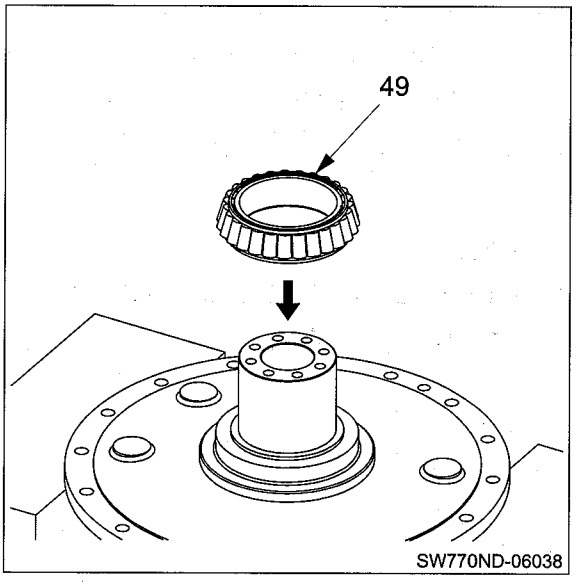


28-6) Reverse axle shaft SUBASSY.

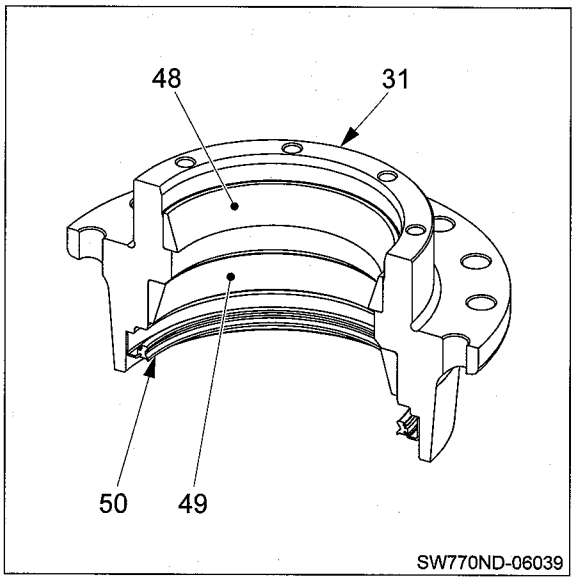
Axle shaft SUBASSY : 125 kg (276 lbs.)



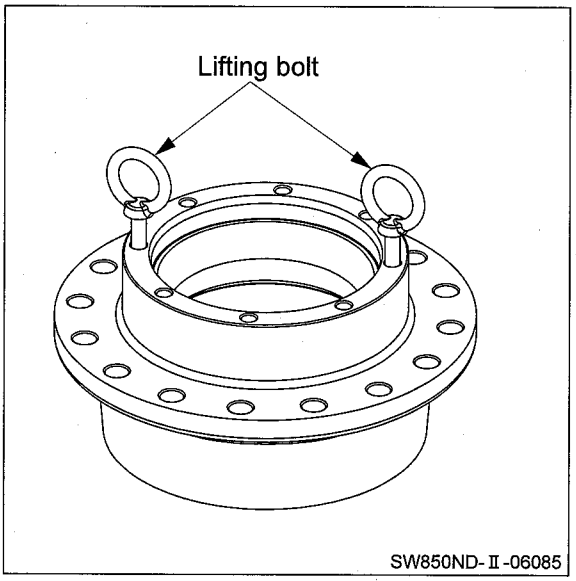
28-7) Heat up roller bearing (49) inner race by using a ring heater or the like.
- Apply a coat of gear oil to axle shaft at where bearing inner race will be press-fitted.
- Drive in heated roller bearing (49) inner race.
- Apply sufficient amount of lithium-based grease to rollers of roller bearing (49) inner race.



28-8) Apply a coat of gear oil to housing (31) at where bearing outer races will be press-fitted.
- Drive roller bearings (48) and (49) outer races into housing.
- Apply liquid packing to periphery of oil seal (50).
- Drive in oil seal (50).
- Apply grease to lip of oil seal (50).

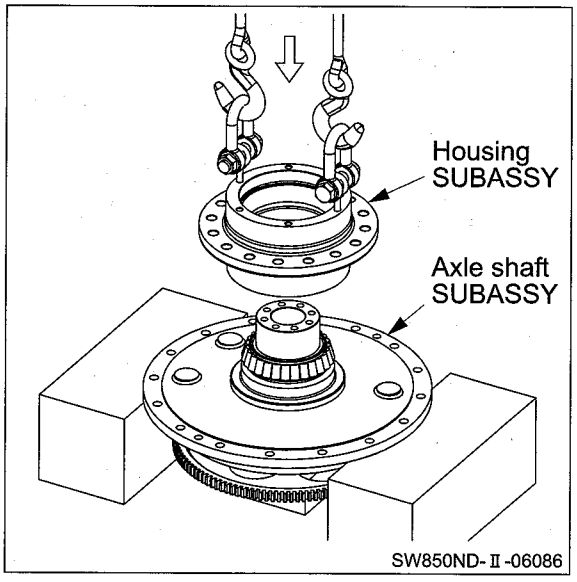


28-9) Install lifting bolts (M12).

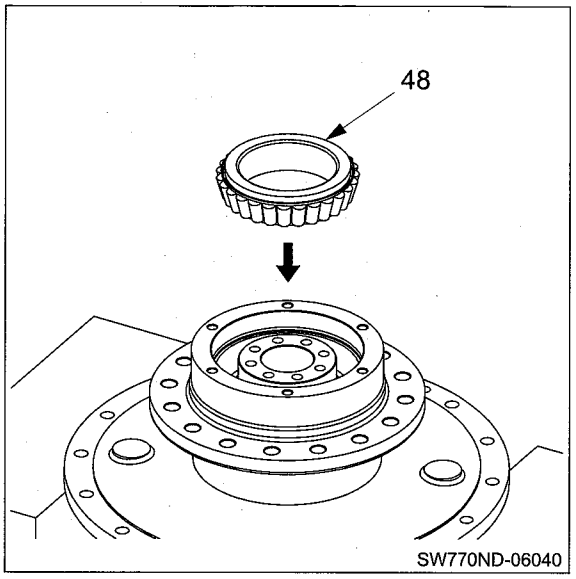


28-10) Install housing SUBASSY to axle shaft SUBASSY.

Housing SUBASSY : 40kg (88 lbs.)

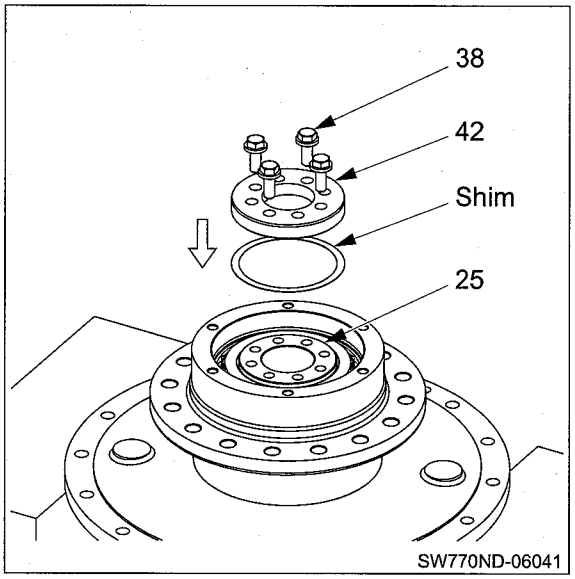


28-11) Apply sufficient amount of lithium-based grease to rollers of roller bearing (48) inner race.
- Drive in roller bearing (48) inner race until rollers come in contact with outer race.

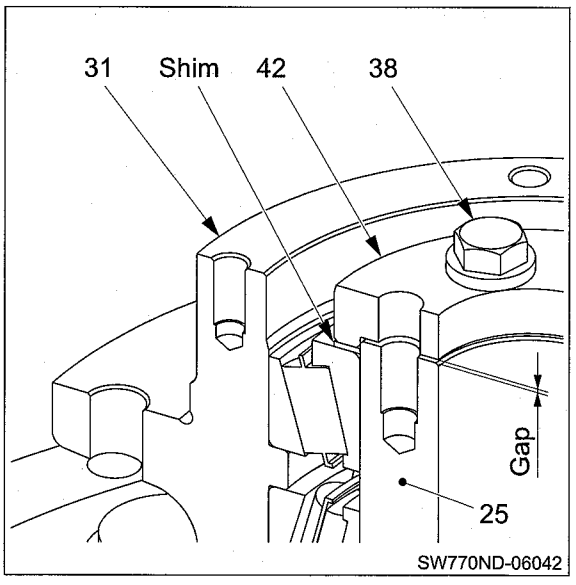


28-12) Preload adjustment of roller bearing

① Install a shim of about 1 mm (0.04 in.) and secure cover (42) to axle shaft (25) with four bolts (38) and washers.



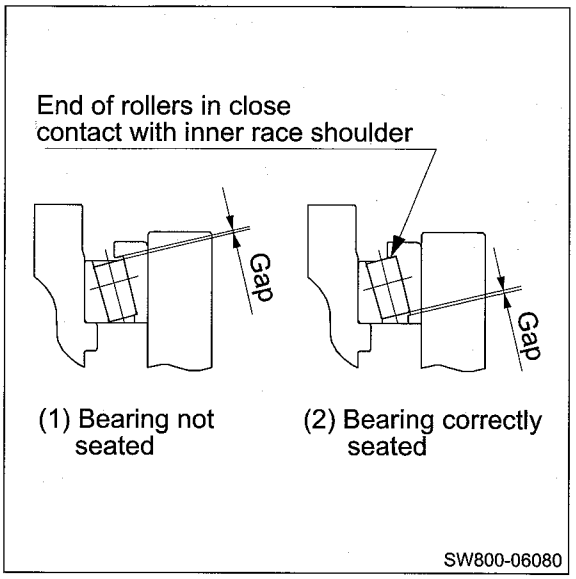
② A gap will remain between end of axle shaft (25) and inside of cover (42).
- Tighten bolts (38) to a torque of 108 N·m (80 lbf·ft).
- Give housing (31) two to three turns.
- Tighten bolts (38) to a torque of 108 N·m (80 lbf·ft) again.
- Repeat this work several times until tightening torque of bolts (38) no longer fluctuates.



(NOTICE)
- **Tighten the bolts (38) alternately in diagonal directions.**

(NOTICE)

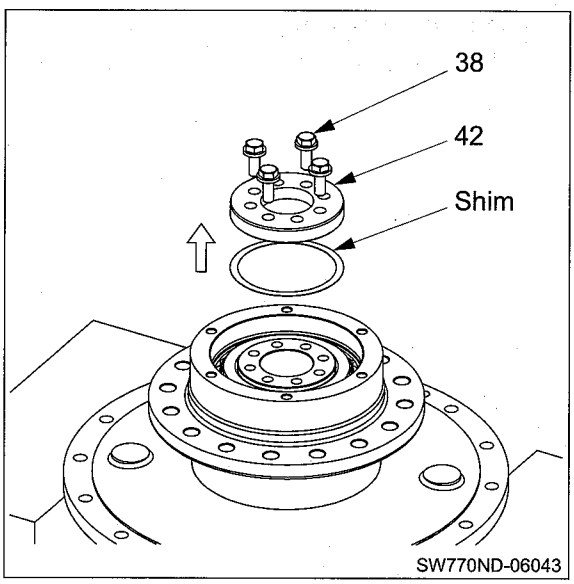
- **Push in the inner race while rotating the bearing. Otherwise, even strongly trying to push the inner race, the bearing rollers will not be pushed up and therefore bearing will not be seated.**



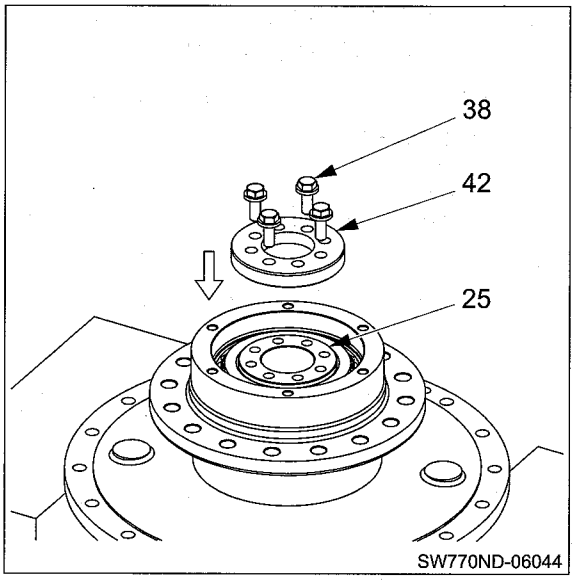
③ Remove bolts (38).
- Remove cover (42).
- Remove shim.

(NOTICE)

- **Do not turn the housing after the cover (42) is removed.**

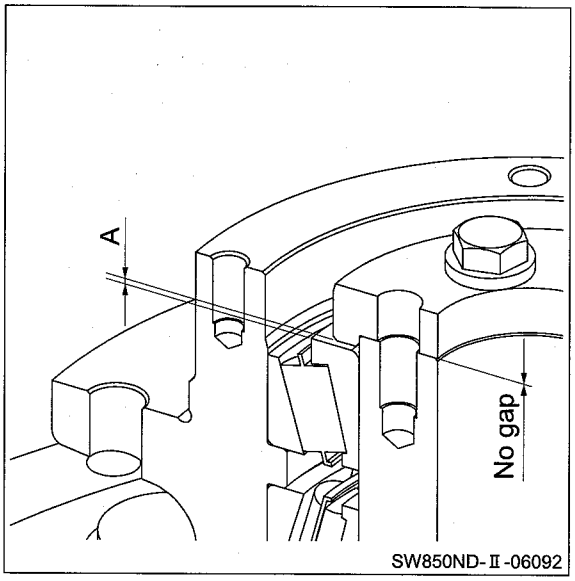


④ Without inserting shim, install cover (42) to axle shaft (25) with four bolts (38) and washers.

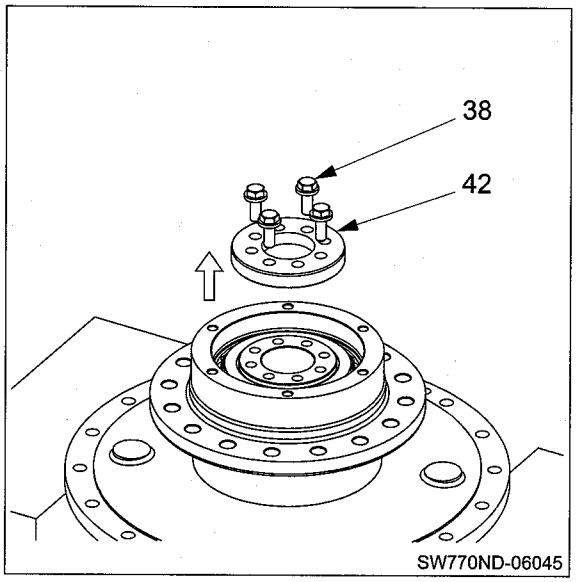


⑤ Using a thickness gauge, measure clearance "A".

★ **Preload adjusting shim thickness** **= A + 0.1 mm (0.004 in.)**

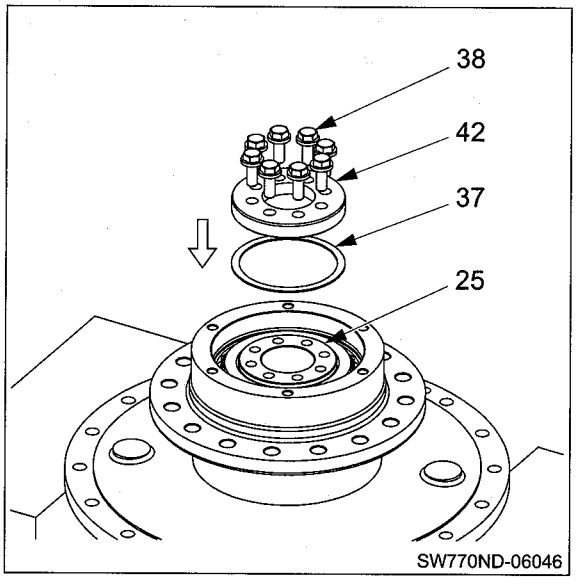


⑥ Remove bolts (38).
- Remove cover (42).

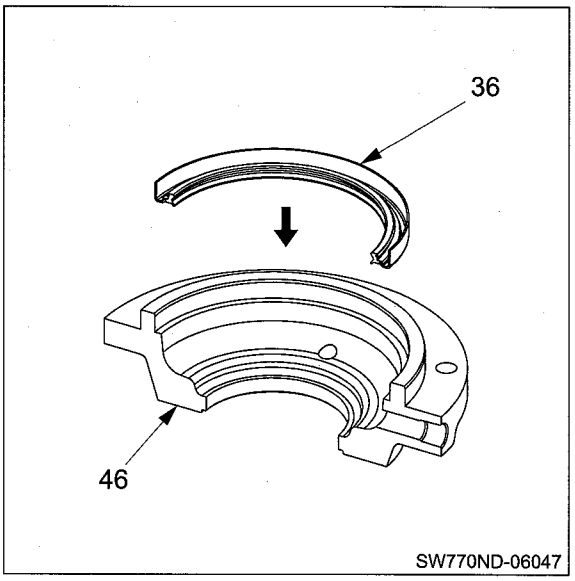


⑦ Install shim (37) of preload adjusting shim thickness = "A + 0.1 mm (0.004 in.)".
- Secure cover (42) to axle shaft (25) with eight bolts (38) and washers.

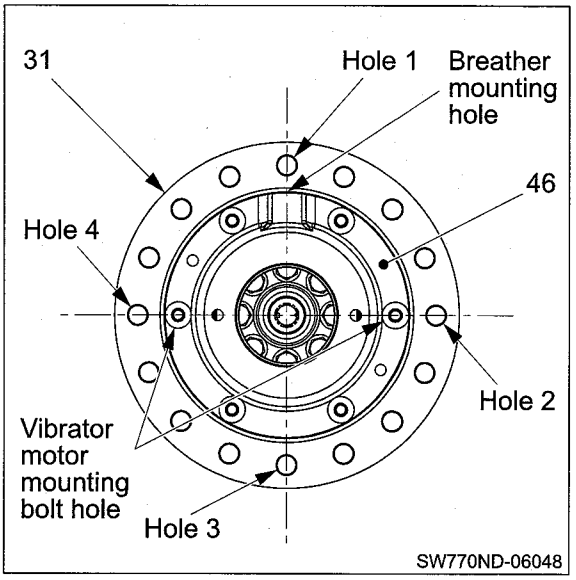
N•m (38) Bolts M14×40 : 167 N·m (123 lbf·ft)



28-13) Apply liquid packing to periphery of oil seal (36).
- Drive in oil seal (36) to cover (46).
- Apply grease to lip of oil seal (36).

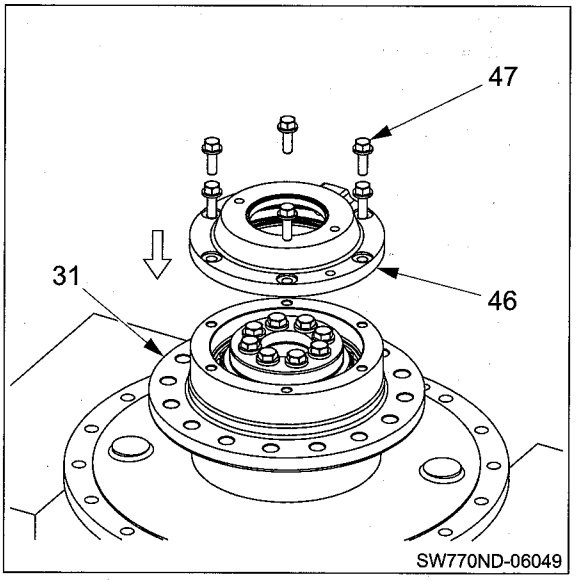


(NOTICE)
- **The four holes in housing (31), breather mounting hole in cover (46), and vibrator motor mounting bolt holes must be arranged as shown on the right.**

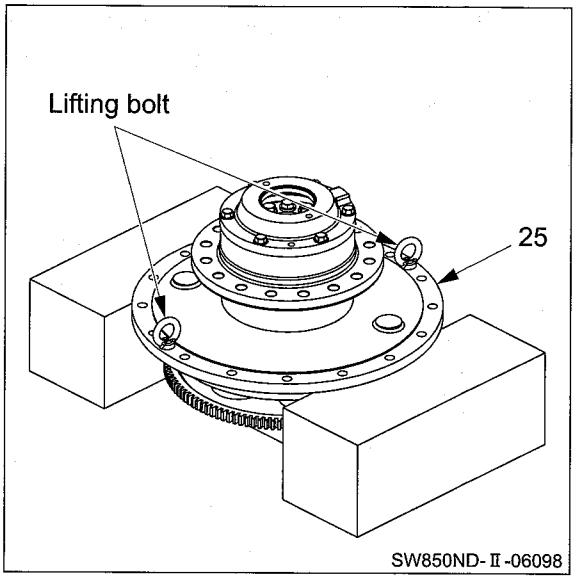


28-14) Apply a coat liquid packing to housing (31) at where cover (46) will be installed.
- Secure cover (46) to housing (31) with six bolts (47) and washers.

N•m (47) Bolts M12×40 : 108 N·m (80 lbf·ft)



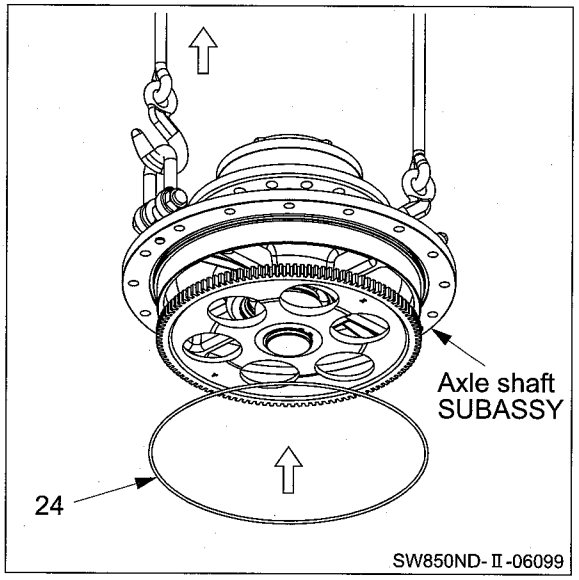
29) Install lifting bolts (M16) to axle shaft (25).



30) Lift axle shaft SUBASSY.

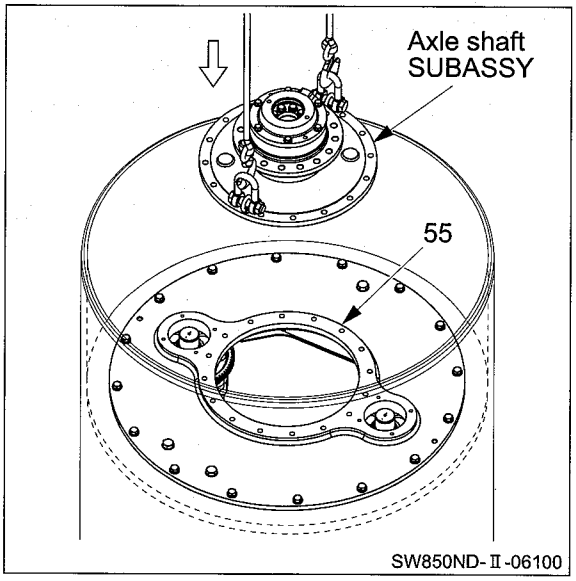
kg Axle shaft SUBASSY : 185 kg (408 lbs.)

- Apply grease to O-ring (24).
- Install O-ring (24).



31) Apply a coat of liquid packing to housing (55) at where axle shaft SUBASSY will be installed.
- Lower axle shaft SUBASSY on mounting surface of housing (55).

(NOTICE)
- **Take care not to let O-ring to protrude from its groove.**

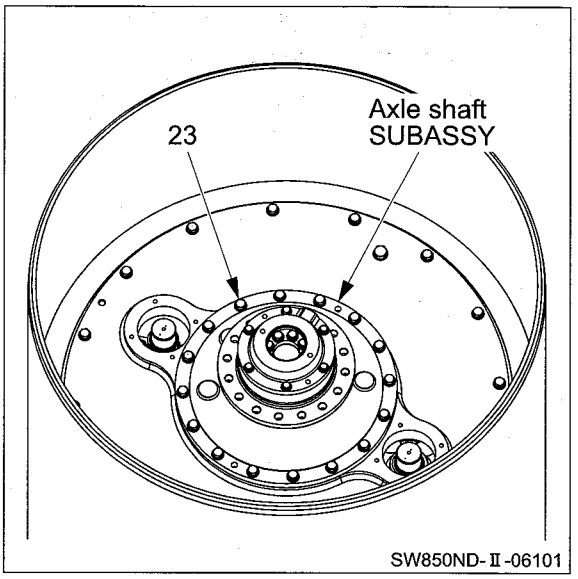


32) Secure axle shaft SUBASSY with sixteen bolts (23) and washers.

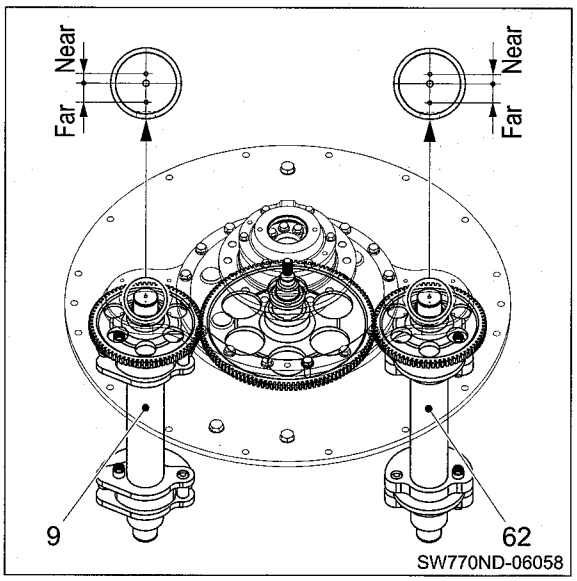
N•m (23) Bolts M16×50 : 265 N·m (195 lbf·ft)

(NOTICE)

- **Bolts (23) are treated with thread-locking fluid. Use new thread-locking fluid treated bolts for installation.**



33) Make sure that punch marks on eccentric shafts A (9) and B (62) are as shown right.

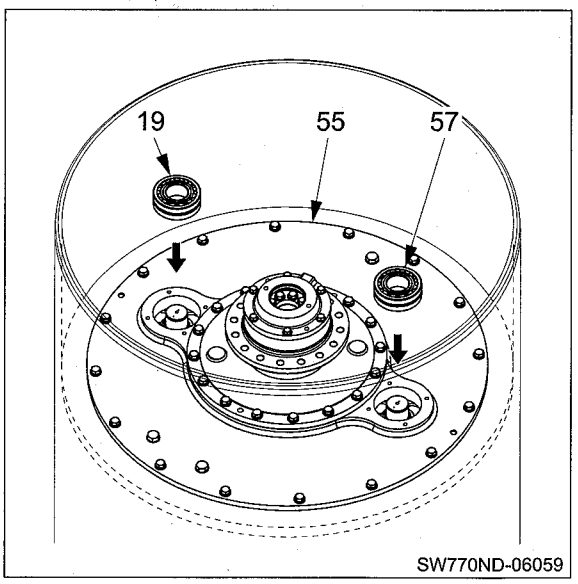


34) Apply a coat of gear oil to housing (55) at where bearings will be press-fitted and to eccentric shafts at where bearings will be installed.

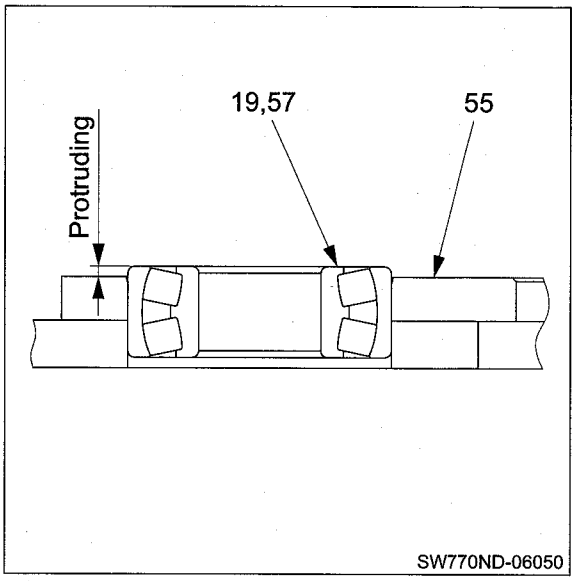
- Drive in vibrator bearings (19) and (57).

(NOTICE)

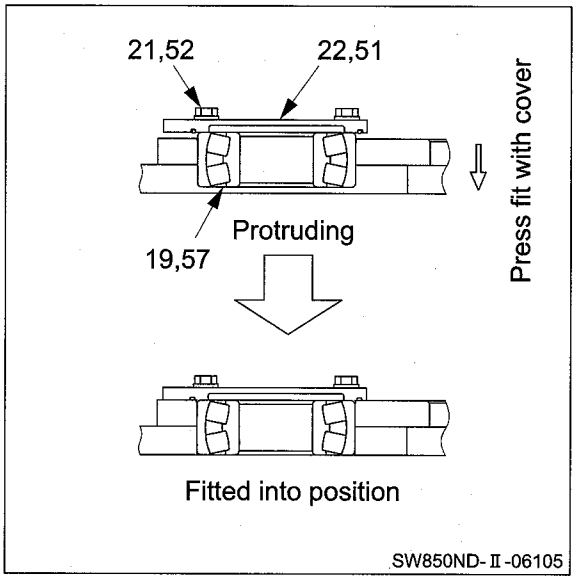
- **Take care not to damage the bearings (19) and (57) when installing them.**



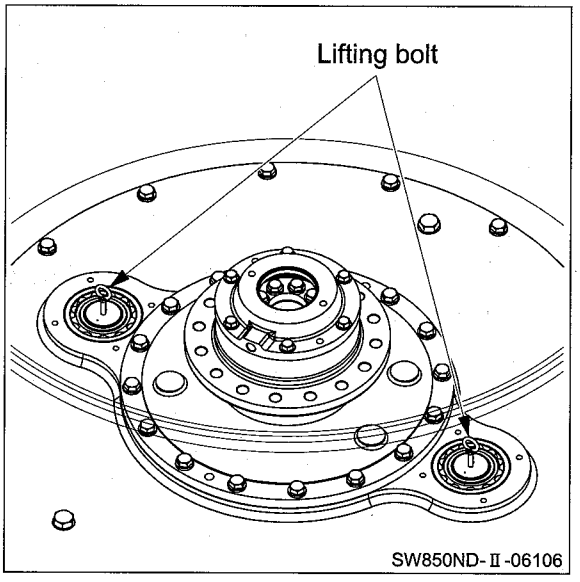
35) Stop driving in vibrator bearings (19) and (57) when they come to a position slightly protruding from the boss surface of housing (55) to avoid driving in too much.



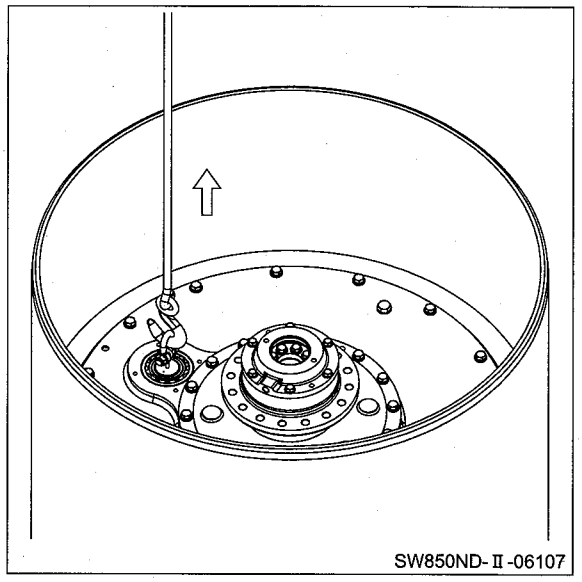
36) Press fit slightly protruding vibrator bearings (19) and (57) into place by securing covers (22) and (51) with four bolts (21), four bolts (52), and washers.
- After press fitting, remove covers (22) and (51) to make sure that vibrator bearings (19) and (57) are not protruding.



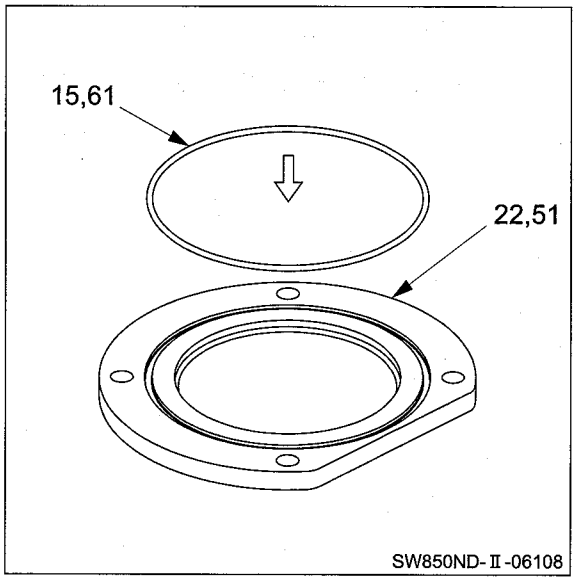
37) Install lifting bolts (M8) to end of eccentric shafts.



38) Slowly lift eccentric shaft with a crane and check that there is an axial play of 1.6 to 4 mm (0.06 to 0.16 in.).



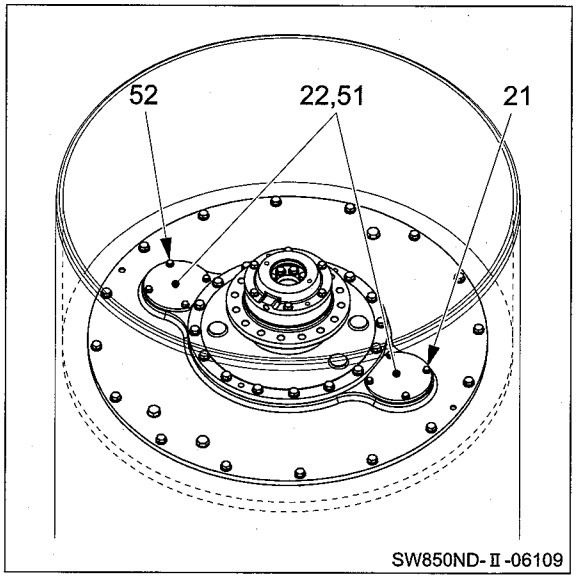
39) Apply grease to O-rings (15) and (61).
- Install O-rings (15) and (61) to covers (22) and (51).



40) Apply a coat liquid packing to housing SUBASSY at where covers (22) and (51) will be installed.
- Secure covers to four bolts (21), four bolts (52), and washers.

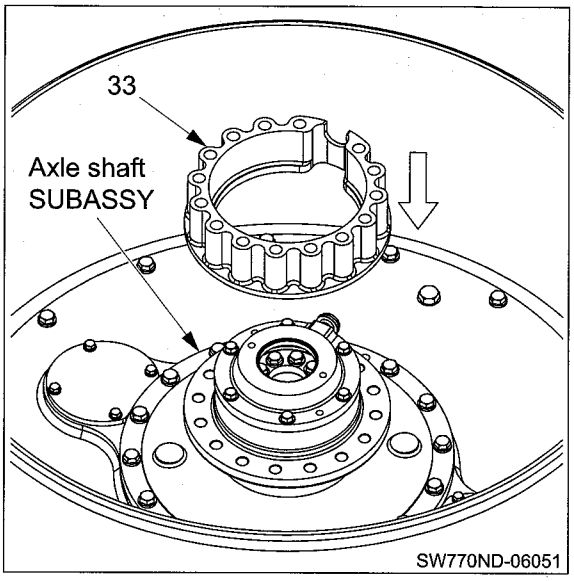
N·m (21) (52) Bolts M10×30 : 59 N·m (44 lbf·ft)

(NOTICE)
- **Take care not to let O-ring to protrude from its groove.**
- **Bolts (21) and (52) are treated with thread-locking fluid. Use new thread-locking fluid treated bolts for installation.**



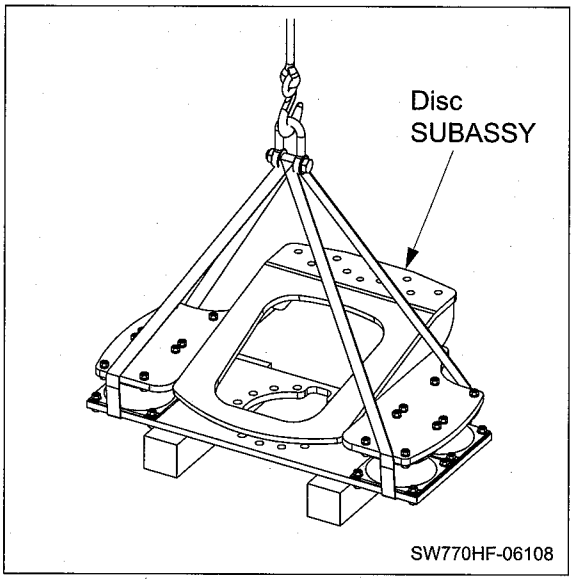
41) Put bracket (33) on axle shaft SUBASSY.

(33) Bracket : 20 kg (44 lbs.)

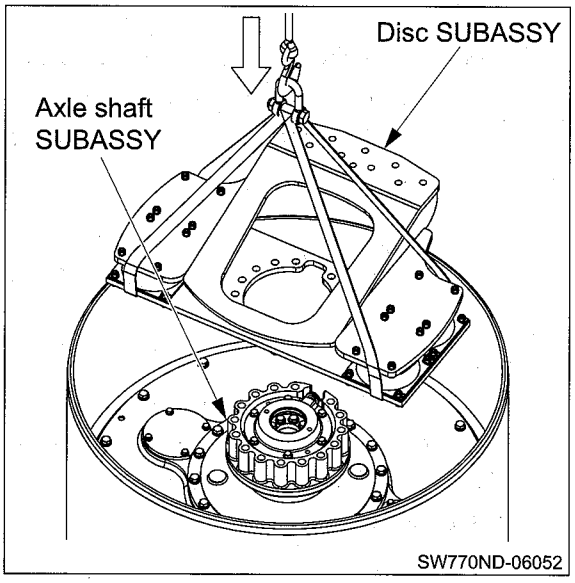


42) Lift disc SUBASSY.

Disc SUBASSY : 155 kg (342 lbs.)

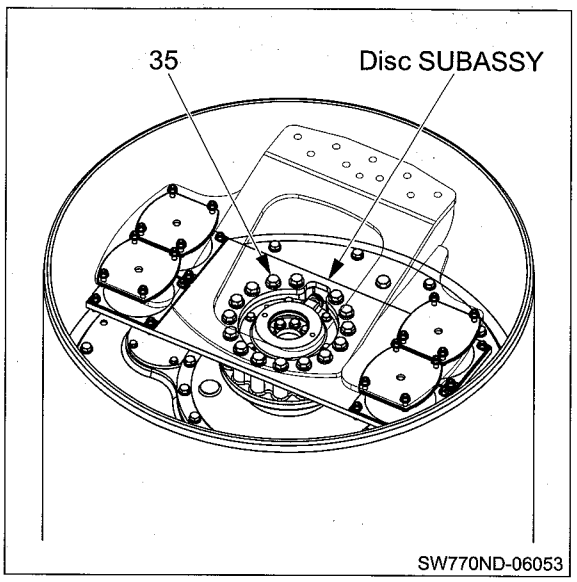


43) Lower disc SUBASSY on mounting surface of axle shaft SUBASSY.

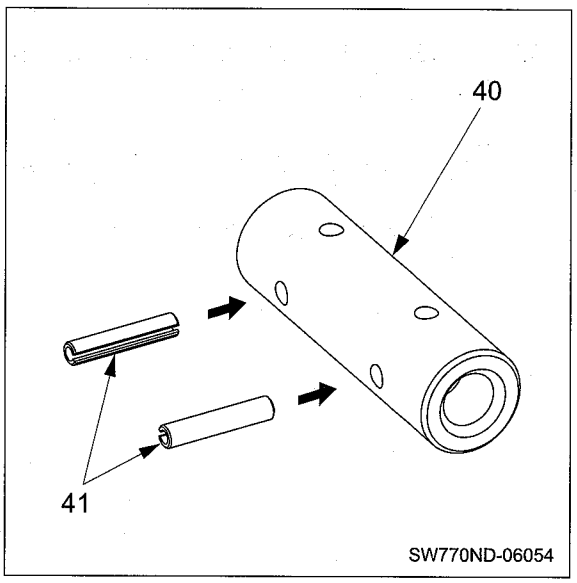


44) Secure disc SUBASSY with fifteen bolts (35) and washers.

N•m (35) Bolts M20×150 : 539 N·m (398 lbf·ft)

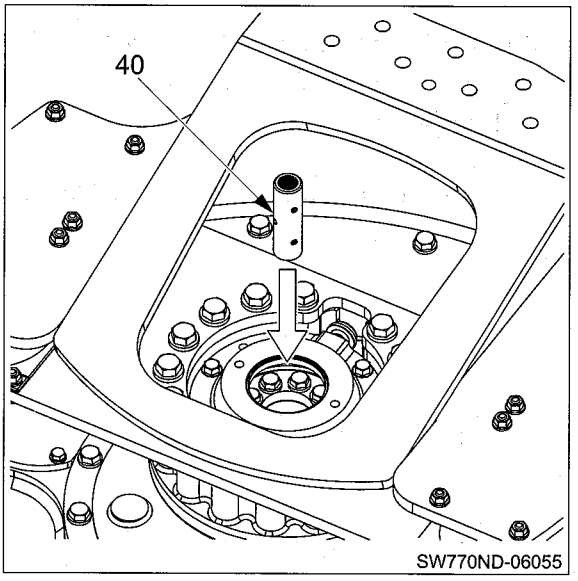


45) Drive two spring pins (41) into sleeve (40).

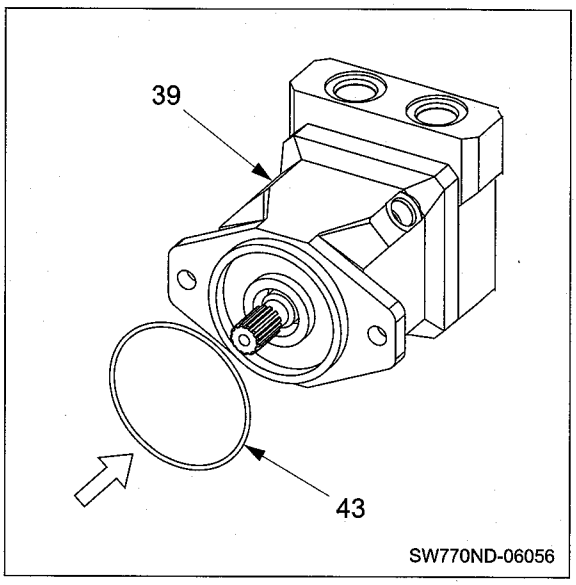


46) Apply molybdenum-based grease to splined portion of sleeve (40).

- Fit sleeve (40) to splined portion on shaft.



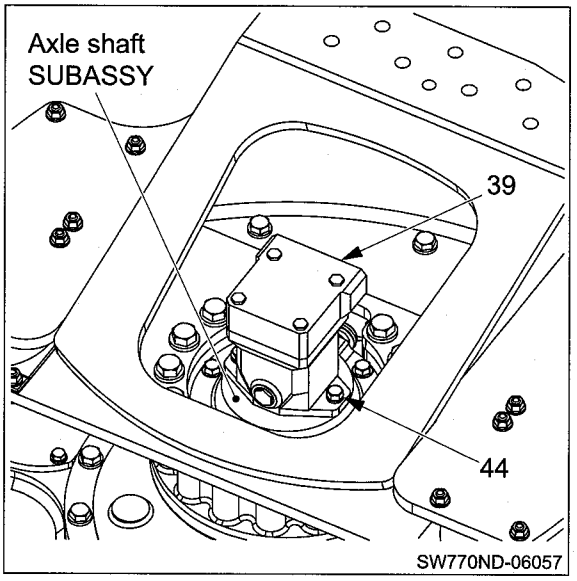
47) Apply grease to O-ring (43).
- Install O-ring (43) to vibrator motor (39).



48) Secure vibrator motor (39) to axle shaft SUBASSY with two bolts (44) and washers.

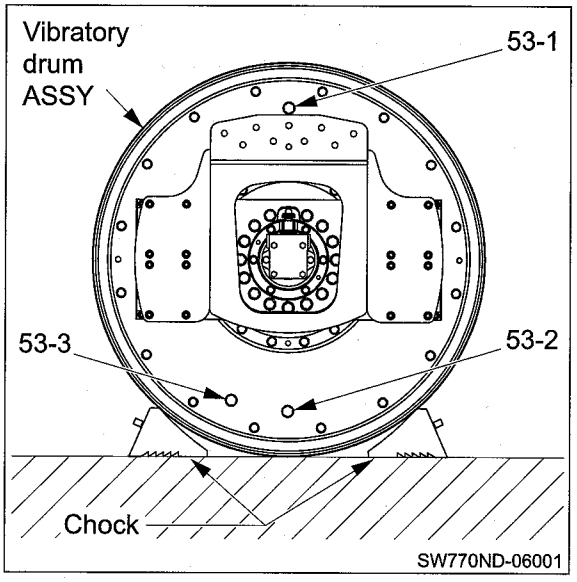
(39) Vibrator motor :20 kg (44 lbs.)

(44) Bolts M12×40 : 108 N·m (80 lbf·ft)

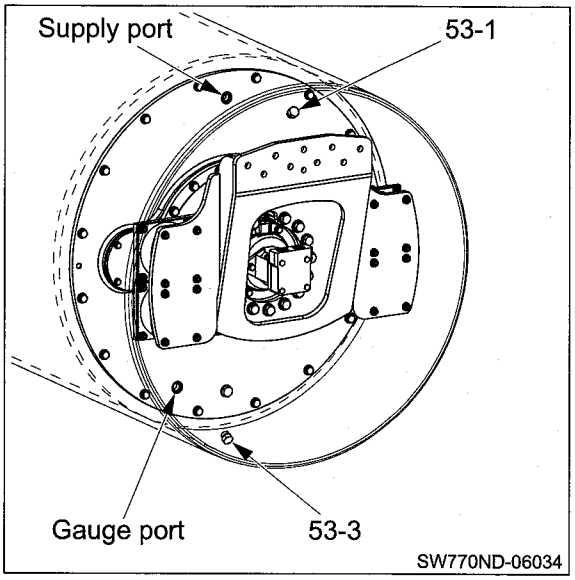


49) Lay vibratory drum ASSY with plugs (53-1), (53-2) and (53-3) positioned as shown right.
- Hold with chocks.

Vibratory drum ASSY : 2,755 kg (6,074 lbs.)

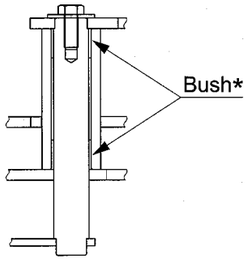


50) Remove plugs (53-1) and (53-3).
- Supply gear oil from oil supply port.
- Check that oil drips from gauge port.
  - Quantity of gear oil : 45 L (11.9 gal.)
- Install plugs (53-1) and (53-3).

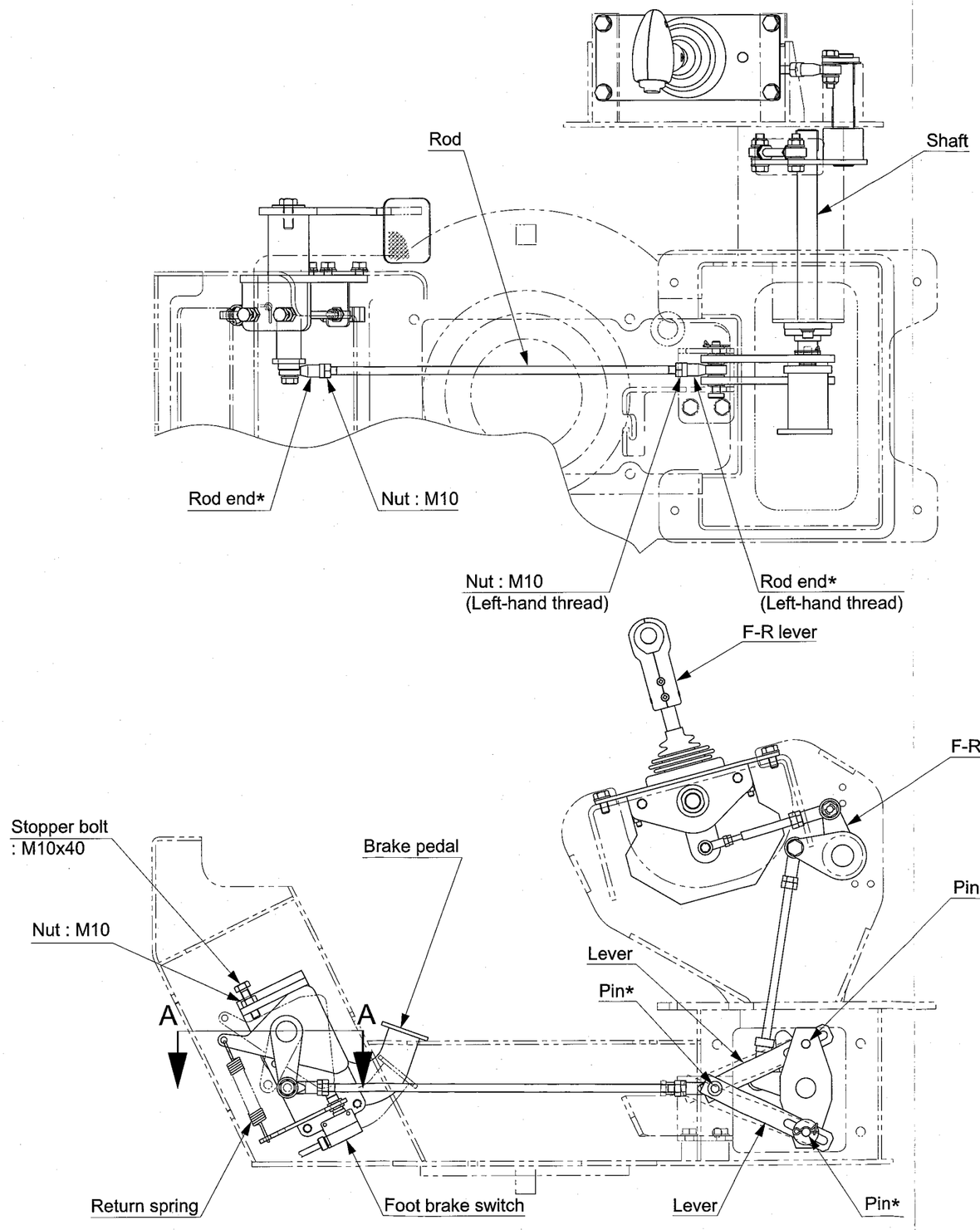


BRAKE

1. BRAKE PEDAL



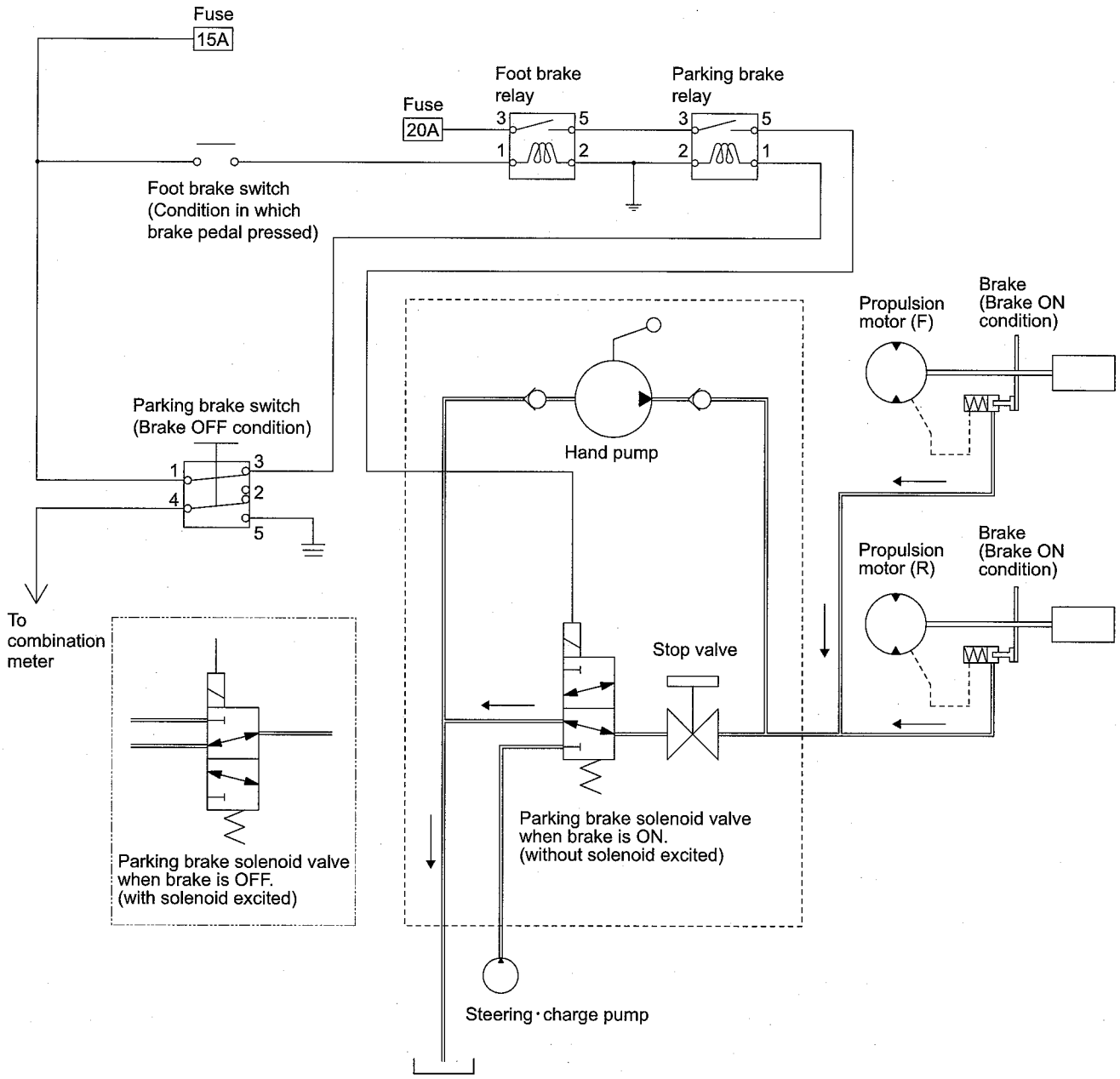
SECTION A-A



*: Apply lithium-based grease

0431-12801-0-10030-D
0431-51801-0-10088-C

2. BRAKE SYSTEM



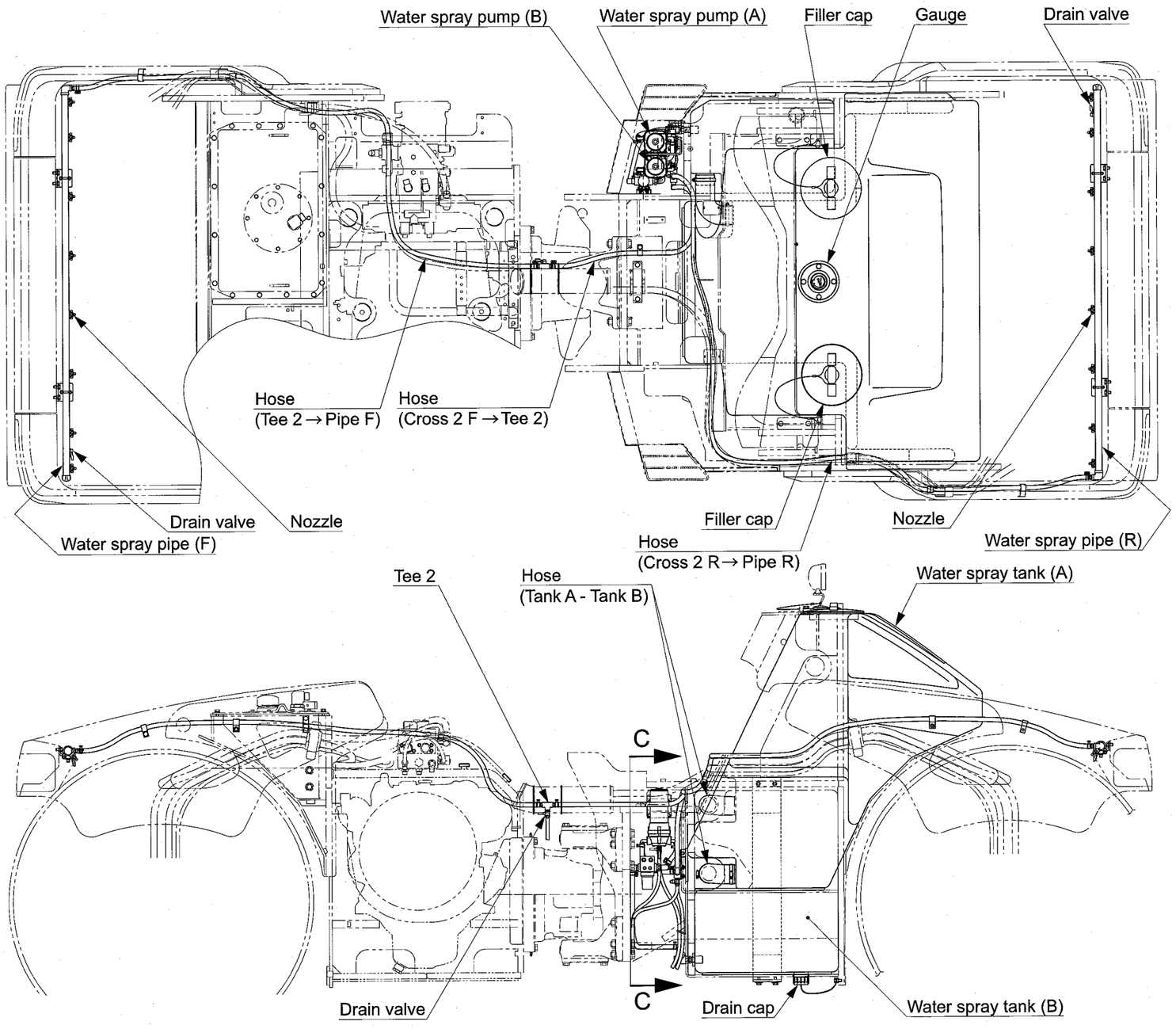
· The arrow (→) symbol shows the direction of the hydraulic oil flow.

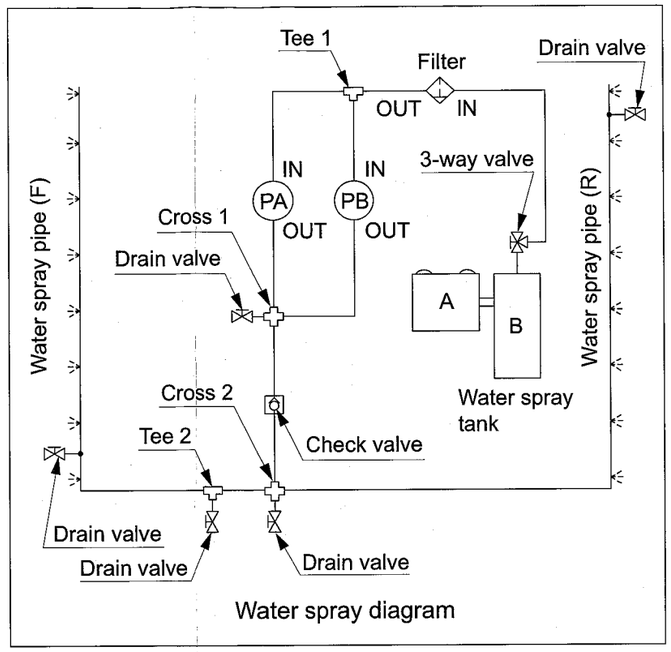
SW770-07001

WATER SPRAY SYSTEM

1. WATER SPRAY SYSTEM

1-1. Water Spray Piping (1)



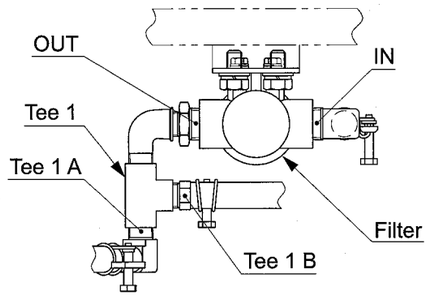


Water spray diagram

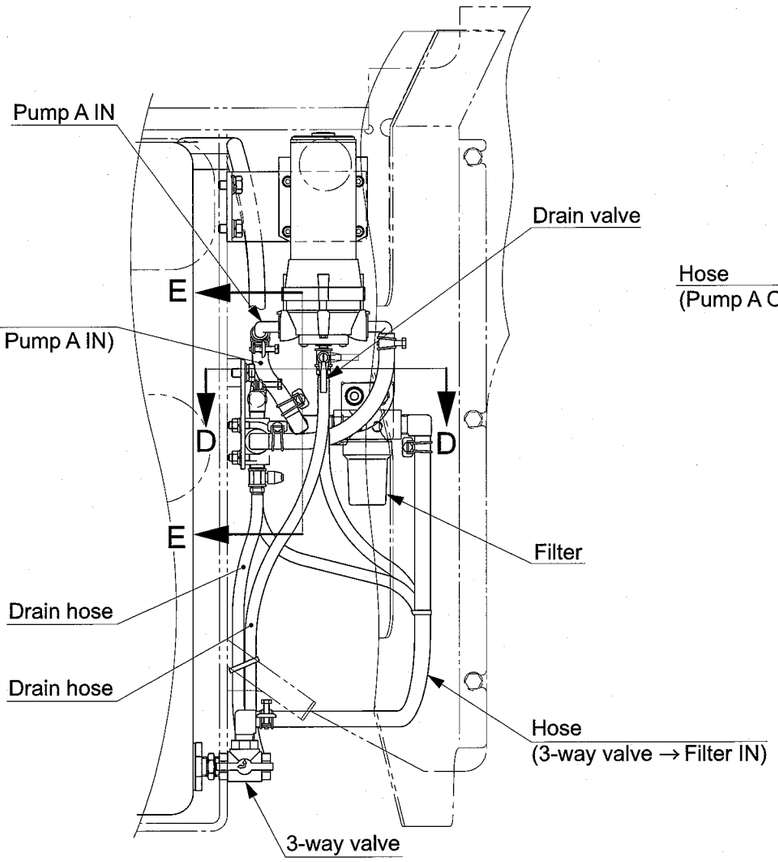
• The letters and figures (such as Cross 2 F and Tee 2) show each port and the arrow (→) symbols show the hose connection and the direction of the flow of the water.

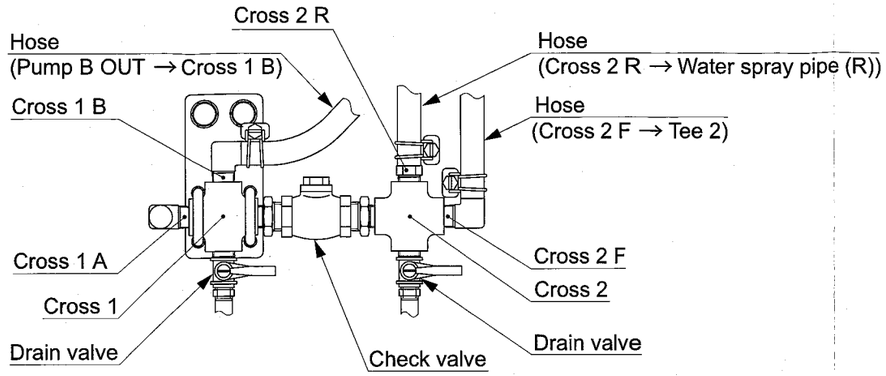
0431-75802-0-10300-E

1-2. Water Spray Piping (2)

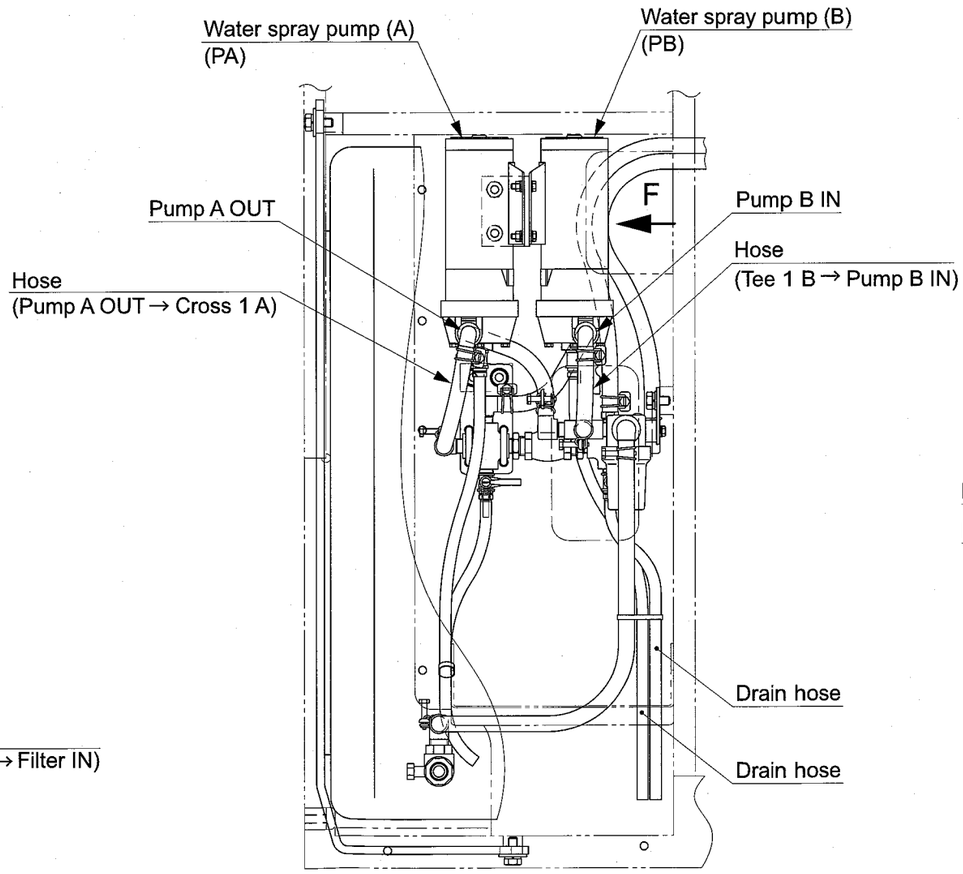


SECTION D-D

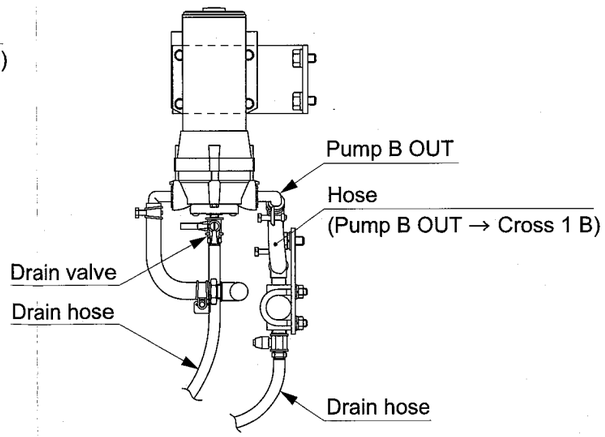




SECTION E-E



SECTION C-C



VIEW F

• The letters and figures (such as Tee 1 A and Pump A IN) show each port and the arrow (→) symbols show the hose connection and the direction of the flow of the water.

0431-75802-0-10301-B

INSPECTION AND ADJUSTMENT

1. INSPECTION AND ADJUSTMENT

1-1. Safety Precautions for Inspection and Adjustment

⚠ WARNING

Unexpected machine movement may cause a serious accident. When inspecting the machine while the engine is running, always follow the instructions below.

- Park the machine on level, flat ground.
- Apply the parking brake.
- Set chocks in front and behind each drum or tire.
- Make sure that service personnel are given the appropriate information at the appropriate time.
- Make sure that no one can enter any hazardous area.

⚠ CAUTION

Do not work on the hydraulic system while the engine is running and the system is hot and under pressure. Do not disconnect hydraulic hoses or fittings until the system has cooled and pressure has been properly relieved.

Before removing any plugs from the pressure measurement ports, always release any residual pressure from the piping and open the cap of the fluid tank to release and pressure.

⚠ WARNING

Inadvertent starting the engine may cause a serious accident.

When inspecting the engine, make sure to exchange the appropriate cues and hand signal with the person at the operator station to avoid any accidents.

⚠ CAUTION

Before inspecting inside of the engine compartment, always stop the engine.

Contact with the fan, V-belt or exhaust system parts while the engine is running may cause serious injury.

1-2. Preparation for Inspection and Adjustment

- Prepare the necessary measuring instruments. In addition, particularly when measuring pressure values, make sure to prepare the appropriate hoses, adapters and a plug removal tool for the pressure reading port.
- Make sure that the instruments to be used operate normally.
  When handling the instruments, exercise sufficient caution not to drop or apply any impact to them. Doing so may adversely affect the calibration. Another important point is to inspect the instruments regularly. An instrument that does not start from the appropriate zero point may give an inaccurate reading.

1-3. Precautions for Inspection and Adjustment

- When performing inspections and adjustments, pay special attention to safety.
- For each inspection, always take three measurements for each measurement point. If the measurements significantly differ, the measurement method may be incorrect. In such a case, take measurements once again and calculate their average.

1-4. Warm-up

- Machinery will not exhibit their true performance under the cold condition. Before taking measurements, always warm up the engine and make sure that the fluid and engine coolant are warmed to their specified normal operating temperatures.

1-5. Inspection and Adjustment of Engine Related Items

- Refer to shop manual of engine manufacturer for inspection and adjustment of engine itself.

2. MEASUREMENT AND ADJUSTMENT OF PROPULSION CIRCUIT PRESSURE (SW770)

2-1. Measurement

⚠WARNING

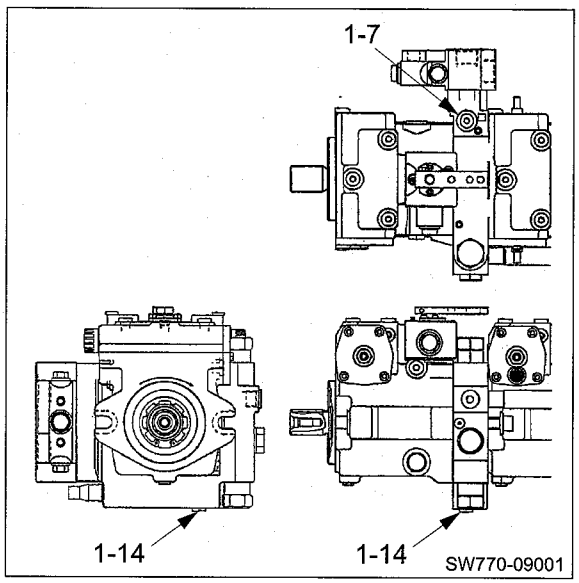
Confirm that the parking brake works properly before measurement.

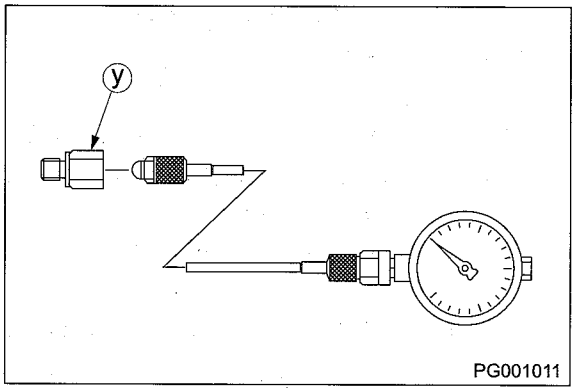
- Oil temperature during measurement : 50 ±5°C (122 ±9°F)

① Remove plugs from high pressure gauge port (1-7) and (1-14) of propulsion pump. Attach pressure gauge with adapter ⓨ.
- Adapter ⓨ : 7/16-20UNF
- High pressure gauge port (Forward) : (1-7)
- High pressure gauge port (Reverse) : (1-14)
- Pressure gauge : 0 to 50 MPa (0 to 7,250 psi)

② Set propulsion speed change switch to "🐢".
③ Start the engine and set throttle switch to "HIGH".
④ Establish a condition in which machine propulsion load becomes maximum.
(Pressure does not build up unless propulsion load is applied.)
⑤ With propulsion load at maximum, slowly move F-R lever to the side to be measured.
⑥ Read pressure indicated by pressure gauge.
⑦ After measuring, promptly return F-R lever to "N".

★ Maximum circuit pressure (cut off valve setting)
: 30.0 ±1.0 MPa (4,350 ±145 psi)

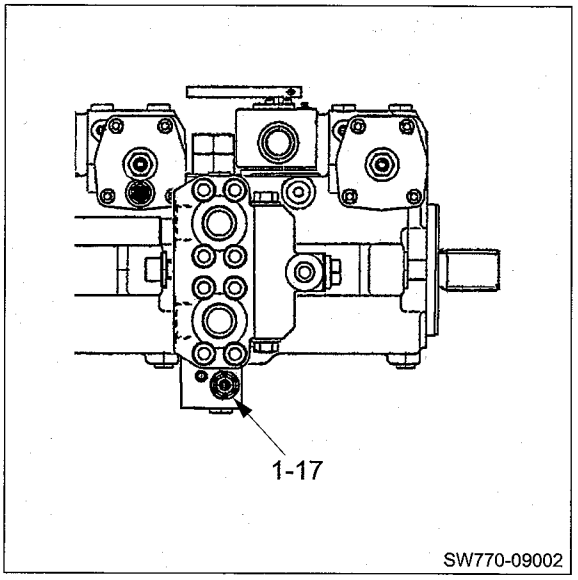




- The numbers "1-7" and "1-14" appearing in above illustrations are consistent with lead line numbers shown in illustration of propulsion pump in "2-2. Hydraulic Component Specifications" (P.4-008).

2-2. Adjustment

- If measurement results indicate the pressure deviating from maximum circuit pressure range, make an adjustment in accordance with procedure described below.



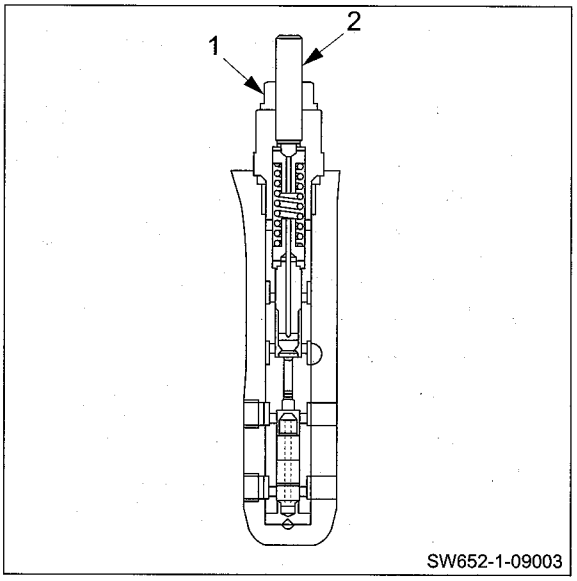
2-2-1. If pressures on both forward and reverse sides deviate from maximum circuit pressure range by same value

① Check nut (1) of cut off valve (1-17) for evidence of having loosened.

② If there is evidence of nut having loosened, adjust cut off valve so that pressure becomes within maximum circuit pressure range while watching pressure gauge.

- To adjust pressure, loosen nut and turn adjustment screw (2).

  Adjustment screw turned clockwise
  : Pressure rise
  Adjustment screw turned counterclockwise
  : Pressure drop
  Pressure change rate : 10 MPa/turn (1,450 psi/turn)



③ If there is no evidence of nut having loosened, remove cut off valve.

④ Check removed cut off valve for trapped dirt and scratches on its seat.

⑤ If trapped dirt is present, disassemble and clean cut off valve.

⑥ If a scratch is found on seat, replace cut off valve.

⑦ After adjustment, measure pressure again and check that pressure reaches maximum circuit pressure range.

N·m (1) Nut : 22 N·m (16 lbf·ft)
(1-17) Cut off valve : 35 N·m (26 lbf·ft)

(NOTICE)

- **Carefully disassemble and reassemble after taking steps to prevent foreign material from getting in.**

- The number "1-17" appearing in above illustrations is consistent with lead line numbers shown in illustration of propulsion pump in "2-2. Hydraulic Component Specifications" (P.4-008).

2-2-2. If pressure on either forward or reverse side deviates from maximum circuit pressure range

① Check high pressure relief valve (1-11) or (1-13) for evidence of having loosened.
- High pressure relief valve (Forward) : (1-11)
- High pressure relief valve (Reverse) : (1-13)

② If there is evidence of high pressure relief valve having loosened, adjust it so that pressure becomes within maximum circuit pressure range while watching pressure gauge.

③ Remove high pressure relief valve.

④ Remove lock screw (3).

⑤ Turn adjustment screw (4) to adjust pressure.

Adjustment screw turned clockwise
: Pressure rise
Adjustment screw turned counterclockwise
: Pressure drop
Pressure change rate : 4.5 MPa/turn (653 psi/turn)

⑥ If there is no evidence of high pressure relief valve having loosened, remove it.

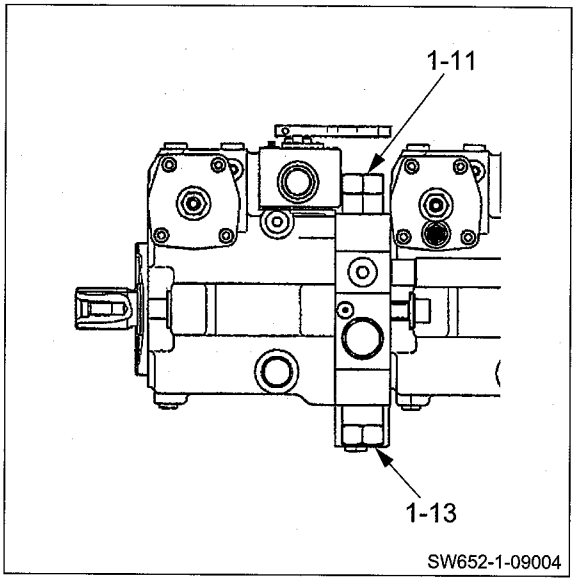
⑦ Check removed high pressure relief valve for trapped dirt and scratches on its seat.

⑧ If trapped dirt is present, disassemble and clean high pressure relief valve.

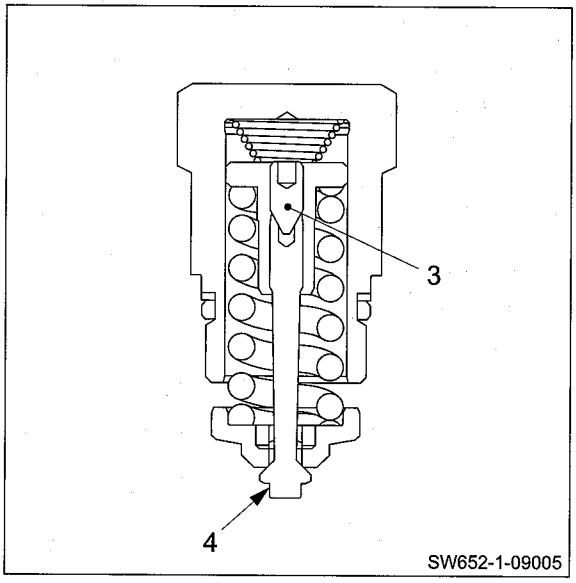
⑨ If a scratch is found on seat, replace high pressure relief valve.

⑩ After adjustment, measure pressure again and check that pressure reaches maximum circuit pressure range.

N·m (3) Lock screw : 6.5 N·m (4.8 lbf·ft)
(1-11) (1-13) High pressure relief valve
: 160 N·m (118 lbf·ft)



SW652-1-09004



SW652-1-09005

(NOTICE)
- **Carefully disassemble and reassemble after taking steps to prevent foreign material from getting in.**

- The number "1-11" and "1-13" appearing in above illustrations are consistent with lead line numbers shown in illustration of propulsion pump in "2-2. Hydraulic Component Specifications" (P.4-008).

3. MEASUREMENT AND ADJUSTMENT OF PROPULSION CIRCUIT PRESSURE (SW770HF, SW770ND)

3-1. Measurement

⚠WARNING

Confirm that the parking brake works properly before measurement.

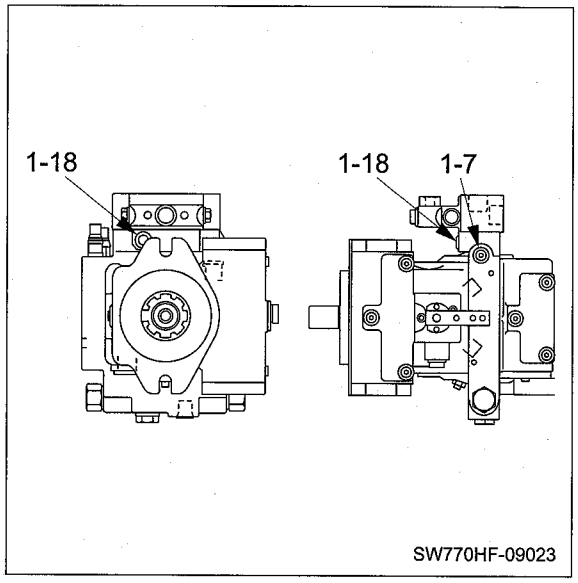
- Oil temperature during measurement : 50 ± 5°C (122 ± 9°F)

① Remove plugs from high pressure gauge port (1-7) and (1-18) of propulsion pump. Attach pressure gauge with adapter ⓨ.

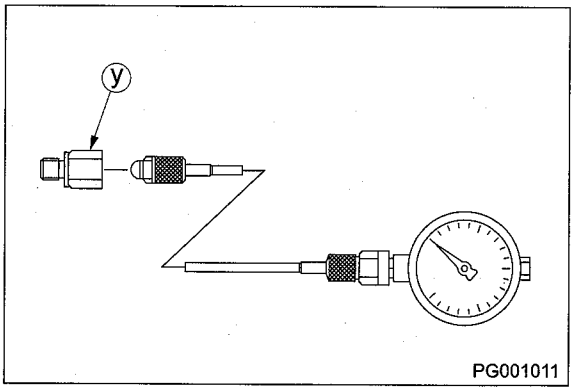
- Adapter ⓨ : 7/16-20UNF
- High pressure gauge port (Forward) : (1-7)
- High pressure gauge port (Reverse) : (1-18)
- Pressure gauge : 0 to 50 MPa (0 to 7,250 psi)

② Set propulsion speed change switch to "🐢".
③ Start the engine and set throttle switch to "HIGH".
④ Establish a condition in which machine propulsion load becomes maximum.
(Pressure does not build up unless propulsion load is applied.)
⑤ With propulsion load at maximum, slowly move F-R lever to the side to be measured.
⑥ Read pressure indicated by pressure gauge.
⑦ After measuring, promptly return F-R lever to "N".

★ Maximum circuit pressure (cut off valve setting)
: 40.0 ± 1.0 MPa (5,800 ± 145 psi)



SW770HF-09023



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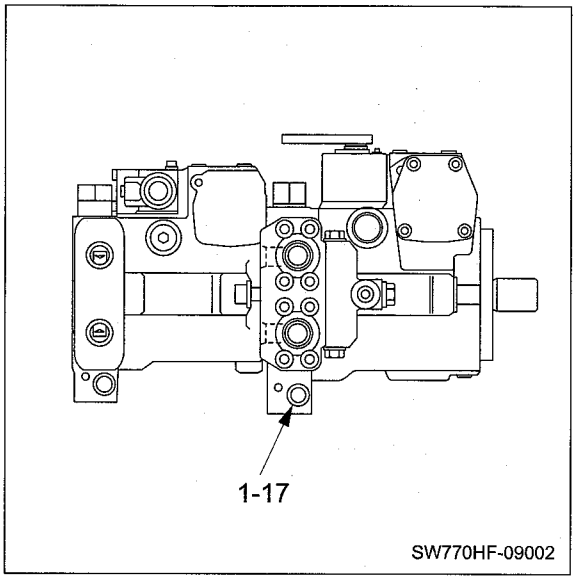
- The numbers "1-7" and "1-18" appearing in above illustrations are consistent with lead line numbers shown in illustration of propulsion pump in "2-2. Hydraulic Component Specifications" (P.4-010).

3-2. Adjustment

- If measurement results indicate the pressure deviating from maximum circuit pressure range, make an adjustment in accordance with procedure described below.



3-2-1. If pressures on both forward and reverse sides deviate from maximum circuit pressure range by same value

① Check nut (1) of cut off valve (1-17) for evidence of having loosened.

② If there is evidence of nut having loosened, adjust cut off valve so that pressure becomes within maximum circuit pressure range while watching pressure gauge.

- To adjust pressure, loosen nut and turn adjustment screw (2).

  Adjustment screw turned clockwise
  : Pressure rise
  Adjustment screw turned counterclockwise
  : Pressure drop
  Pressure change rate : 10 MPa/turn (1,450 psi/turn)

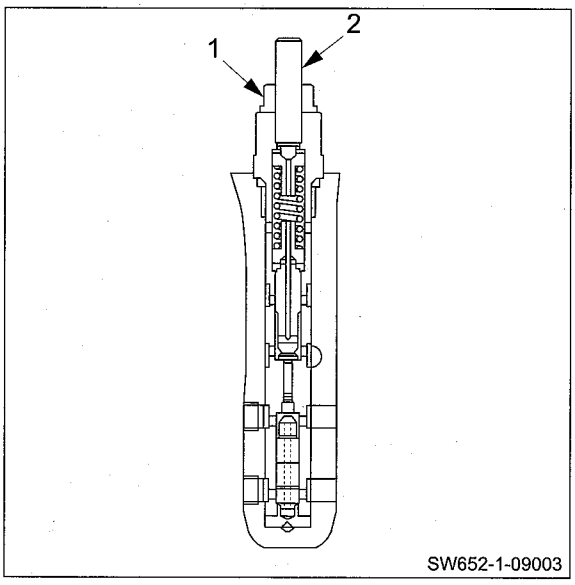
③ If there is no evidence of nut having loosened, remove cut off valve.

④ Check removed cut off valve for trapped dirt and scratches on its seat.

⑤ If trapped dirt is present, disassemble and clean cut off valve.

⑥ If a scratch is found on seat, replace cut off valve.

⑦ After adjustment, measure pressure again and check that pressure reaches maximum circuit pressure range.



N•m (1) Nut : 22 N·m (16 lbf·ft)
(1-17) Cut off valve : 35 N·m (26 lbf·ft)

(NOTICE)

- **Carefully disassemble and reassemble after taking steps to prevent foreign material from getting in.**

- The number "1-17" appearing in above illustrations is consistent with lead line numbers shown in illustration of propulsion pump in "2-2. Hydraulic Component Specifications" (P.4-010).

3-2-2. If pressure on either forward or reverse side deviates from maximum circuit pressure range

① Check high pressure relief valve (1-11) or (1-13) for evidence of having loosened.
- High pressure relief valve (Forward) : (1-11)
- High pressure relief valve (Reverse) : (1-13)

② If there is evidence of high pressure relief valve having loosened, adjust it so that pressure becomes within maximum circuit pressure range while watching pressure gauge.

③ Remove high pressure relief valve.

④ Remove lock screw (3).

⑤ Turn adjustment screw (4) to adjust pressure.

Adjustment screw turned clockwise
: Pressure rise
Adjustment screw turned counterclockwise
: Pressure drop
Pressure change rate : 4.5 MPa/turn (653 psi/turn)

⑥ If there is no evidence of high pressure relief valve having loosened, remove it.

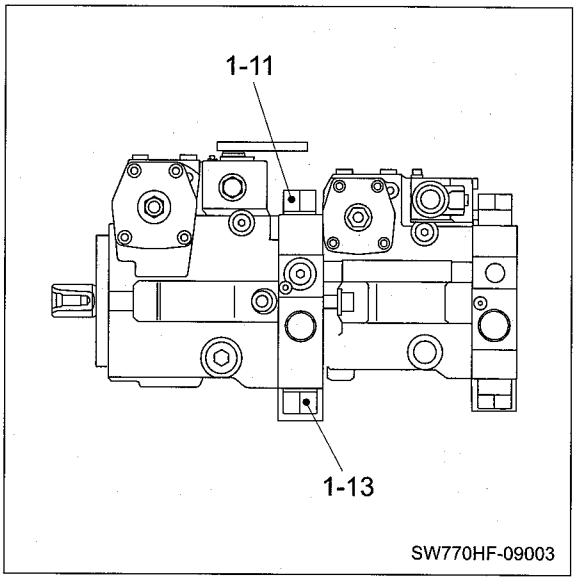
⑦ Check removed high pressure relief valve for trapped dirt and scratches on its seat.

⑧ If trapped dirt is present, disassemble and clean high pressure relief valve.

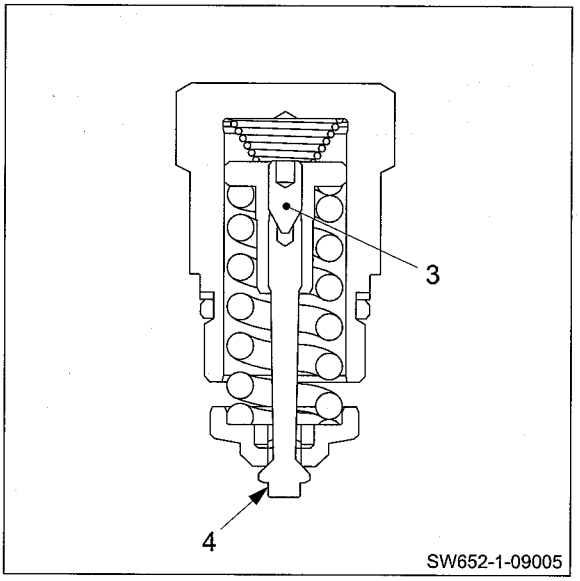
⑨ If a scratch is found on seat, replace high pressure relief valve.

⑩ After adjustment, measure pressure again and check that pressure reaches maximum circuit pressure range.

N·m (3) Lock screw : 6.5 N·m (4.8 lbf·ft)
(1-11) (1-13) High pressure relief valve : 160 N·m (118 lbf·ft)



SW770HF-09003



SW652-1-09005

(NOTICE)
- **Carefully disassemble and reassemble after taking steps to prevent foreign material from getting in.**

- The number "1-11" and "1-13" appearing in above illustrations are consistent with lead line numbers shown in illustration of propulsion pump in "2-2. Hydraulic Component Specifications" (P.4-010).

4. MEASUREMENT AND ADJUSTMENT OF PROPULSION/ VIBRATOR CHARGE CIRCUIT PRESSURE (SW770)

- Since oil in charge circuit is supplied from steering circuit, confirm that steering operation is normal before measurement.
- Ensure that neutral positions of F-R lever and hydraulic pump are aligned.

4-1. Measurement

- Oil temperature during measurement : 50 ± 5°C (122 ± 9°F)

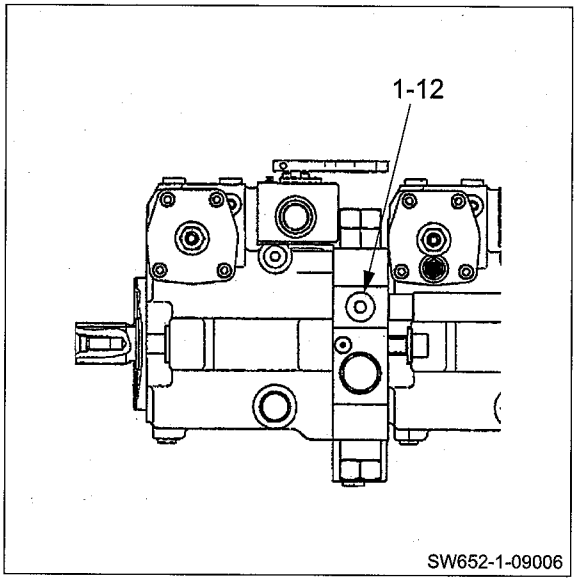
① Remove plug from charge pressure gauge port (1-12). Attach pressure gauge with adapter ⓘ.
- Adapter ⓘ : 3/4-16UNF
- Pressure gauge : 0 to 5 MPa (0 to 725 psi)

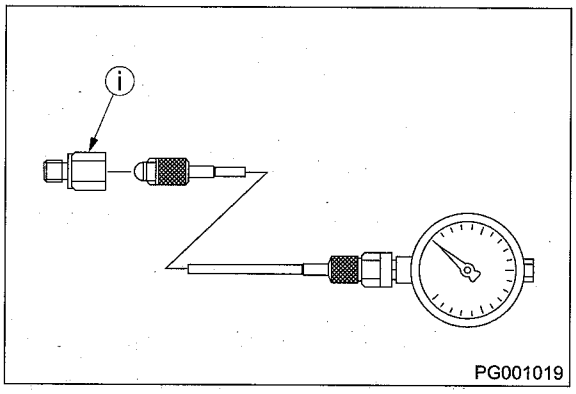
② Apply parking brake by pressing parking brake switch button.

③ Start the engine and set throttle switch to "HIGH".

④ Read pressure indicated by pressure gauge.

★ Maximum circuit pressure
(Standard charge relief valve setting)
: 2.4 ± 0.2 MPa (348 ± 29 psi)





- The number "1-12" appearing in above illustrations is consistent with lead line numbers shown in illustration of propulsion pump in "2-2. Hydraulic Component Specifications" (P.4-008).

4-2. Adjustment

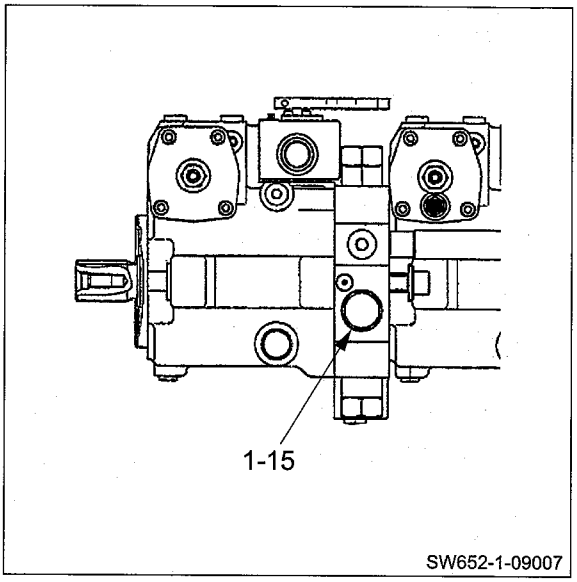
- If measurement results indicate the pressure deviating from maximum circuit pressure range, make an adjustment in accordance with procedure described below.

① Check charge relief valve (1-15) for evidence of having loosened.
② If there is evidence of charge relief valve having loosened, adjust it so that pressure becomes within standard charge relief valve pressure setting range while watching pressure gauge.
- To adjust pressure, remove charge relief valve and change thickness of shims (1).
  Pressure change rate : 0.4 MPa/mm (58 psi/mm)

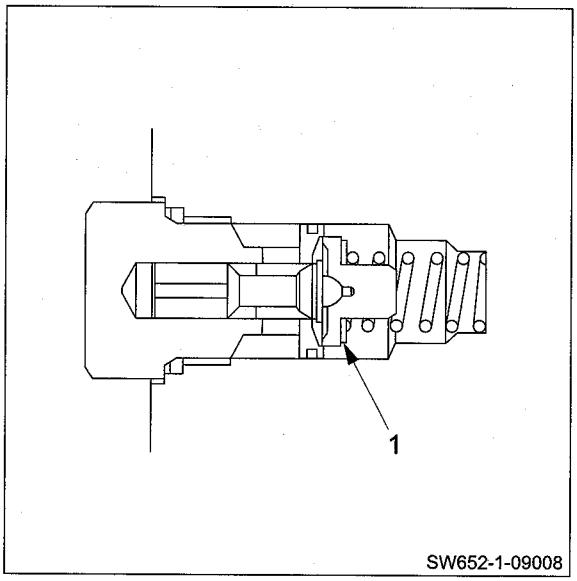
③ If there is no evidence of charge relief valve having loosened, remove it.
④ Check removed charge relief valve for trapped dirt and scratches on its seat.
⑤ If trapped dirt is present, disassemble and clean charge relief valve.
⑥ If a scratch is found on seat, replace charge relief valve.
⑦ After adjustment, measure pressure again and check that pressure reaches maximum circuit pressure range.

(1-15) Charge relief valve : 70 N·m (52 lbf·ft)

(NOTICE)
- **Carefully disassemble and reassemble after taking steps to prevent foreign material from getting in.**



SW652-1-09007



SW652-1-09008

- The number "1-15" appearing in above illustrations is consistent with lead line numbers shown in illustration of propulsion pump in "2-2. Hydraulic Component Specifications" (P.4-008).

5. MEASUREMENT AND ADJUSTMENT OF PROPULSION/ VIBRATOR CHARGE CIRCUIT PRESSURE (SW770HF, SW770ND)

- Since oil in charge circuit is supplied from steering circuit, confirm that steering operation is normal before measurement.
- Ensure that neutral positions of F-R lever and hydraulic pump are aligned.

5-1. Measurement

- Oil temperature during measurement : 50 ± 5°C (122 ± 9°F)

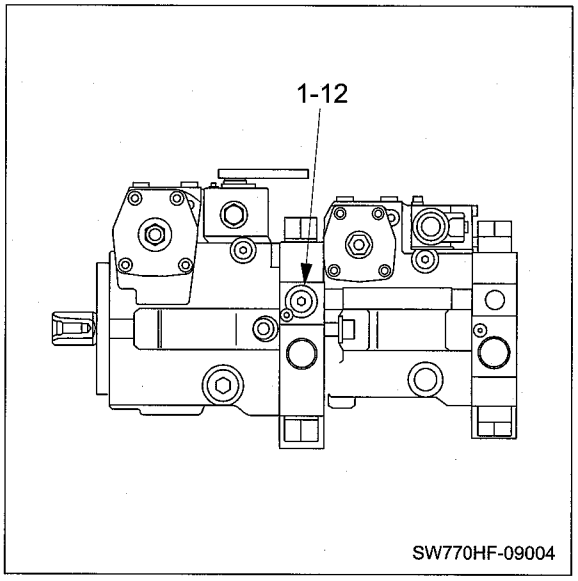
① Remove plug from charge pressure gauge port (1-12). Attach pressure gauge with adapter ⓘ .
- Adapter ⓘ : 3/4-16UNF
- Pressure gauge : 0 to 5 MPa (0 to 725 psi)

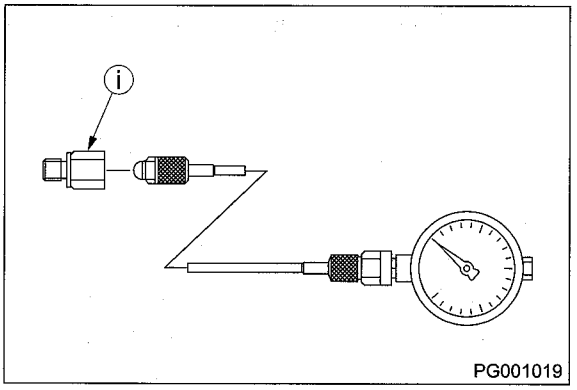
② Apply parking brake by pressing parking brake switch button.

③ Start the engine and set throttle switch to "HIGH".

④ Read pressure indicated by pressure gauge.

★ Maximum circuit pressure
(Standard charge relief valve setting)
: 2.5 ± 0.2 MPa (363 ± 29 psi)





- The number "1-12" appearing in above illustrations is consistent with lead line numbers shown in illustration of propulsion pump in "2-2. Hydraulic Component Specifications" (P.4-010).

5-2. Adjustment

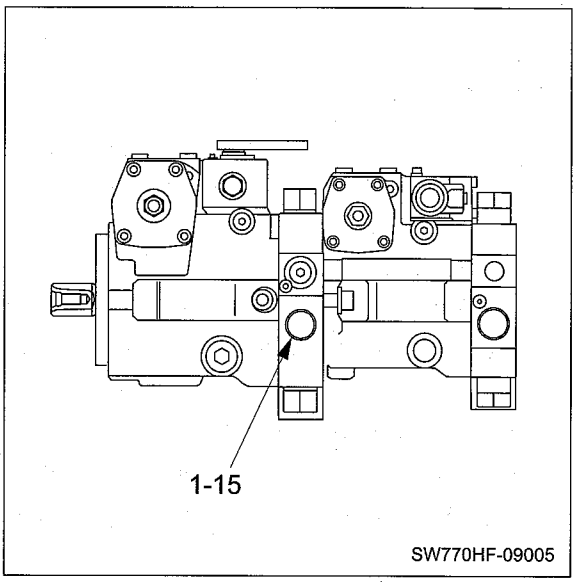
- If measurement results indicate the pressure deviating from maximum circuit pressure range, make an adjustment in accordance with procedure described below.

① Check charge relief valve (1-15) for evidence of having loosened.
② If there is evidence of charge relief valve having loosened, adjust it so that pressure becomes within standard charge relief valve pressure setting range while watching pressure gauge.
- To adjust pressure, remove charge relief valve and change thickness of shims (1).
  Pressure change rate : 0.4 MPa/mm (58 psi/mm)

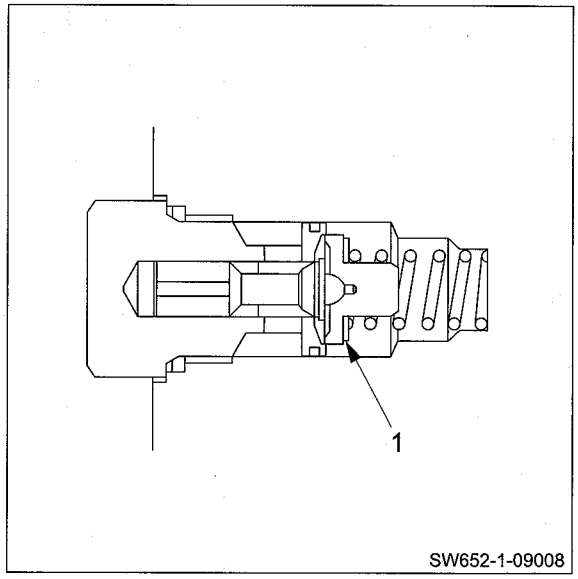
③ If there is no evidence of charge relief valve having loosened, remove it.
④ Check removed charge relief valve for trapped dirt and scratches on its seat.
⑤ If trapped dirt is present, disassemble and clean charge relief valve.
⑥ If a scratch is found on seat, replace charge relief valve.
⑦ After adjustment, measure pressure again and check that pressure reaches maximum circuit pressure range.

N•m (1-15) Charge relief valve : 70 N·m (52 lbf·ft)

(NOTICE)
- **Carefully disassemble and reassemble after taking steps to prevent foreign material from getting in.**



SW770HF-09005



SW652-1-09008

- The number "1-15" appearing in above illustrations is consistent with lead line numbers shown in illustration of propulsion pump in "2-2. Hydraulic Component Specifications" (P.4-010).

6. MEASUREMENT OF MACHINE HIGH/LOW SPEED CHANGE CIRCUIT PRESSURE

- Since oil in charge circuit is supplied from steering circuit, confirm that steering operation is normal before measurement.

6-1. Measurement

- Oil temperature during measurement : 50 ± 5°C (122 ± 9°F)

① Disconnect hose (1) from propulsion motor. Attach pressure gauge through adapter ⓜ.
- Adapter ⓜ : G1/4
- Pressure gauge : 0 to 5 MPa (0 to 725 psi)

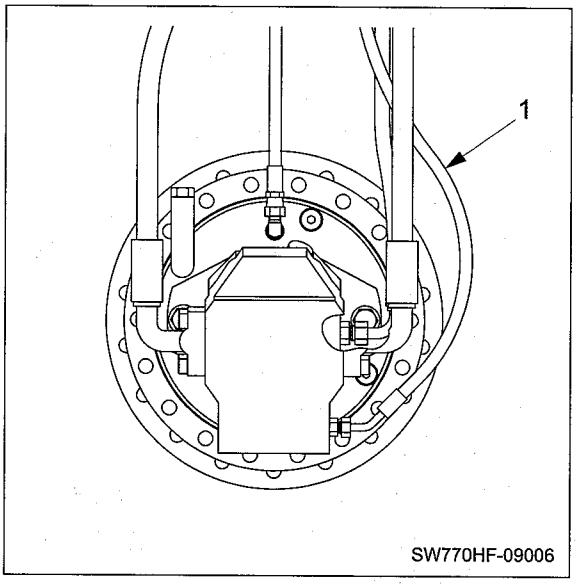
② Apply parking brake by pressing parking brake switch button.

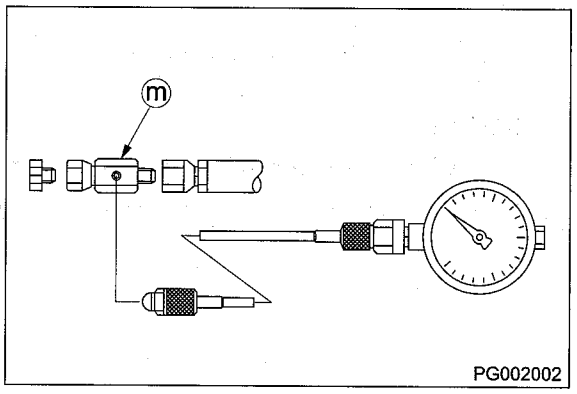
③ Set propulsion speed change switch to "🐇".

④ Start the engine and set throttle switch to "HIGH".

⑤ Read pressure indicated by pressure gauge.

★ Maximum circuit pressure
(Standard charge relief valve setting)
: 1.0 ± 0.2 MPa (145 ± 29 psi)





7. MEASUREMENT OF PROPULSION SERVO CIRCUIT PRESSURE (SW770)

7-1. Measurement

- Oil temperature during measurement : 50 ± 5°C (122 ± 9°F)

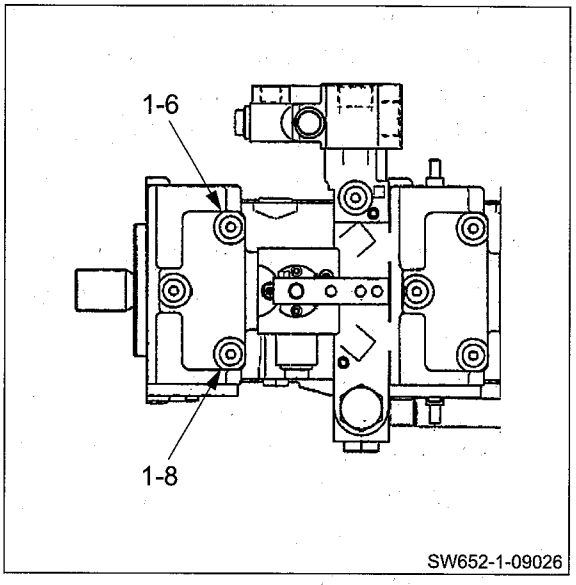
① Disconnect hoses (1) and (3) from propulsion pump (2). Attach pressure gauge through adapter ⓜ.
- Adapter ⓜ : G1/4
- Pressure gauge : 0 to 5 MPa (0 to 725 psi)

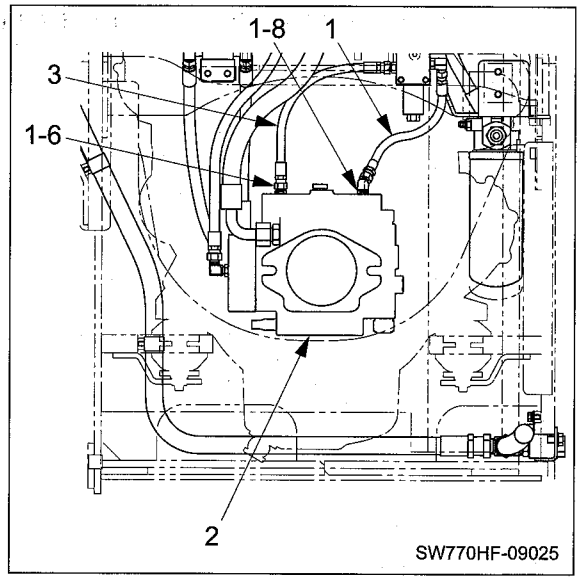
② Apply parking brake by pressing parking brake switch button.

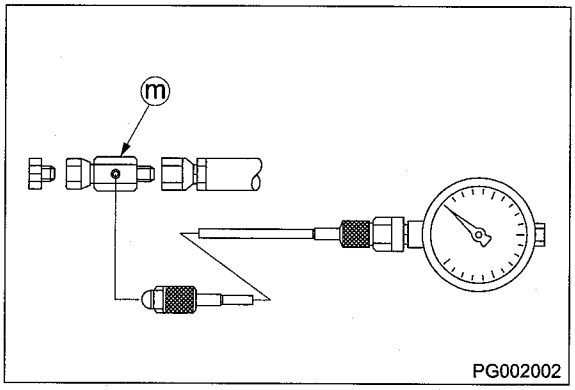
③ Start the engine and set throttle switch to "HIGH".

④ Operate F-R lever and then read pressure indicated by pressure gauge.
- With parking brake applied (ON), measured pressures of (1-6) and (1-8) are same.
- With parking brake released (OFF), measured pressures of (1-6) and (1-8) are different.

★ Maximum circuit pressure
(Standard charge relief pressure setting)
: 2.4 ± 0.2 MPa (348 ± 29 psi)







- The numbers "1-6" and "1-8" appearing in above illustrations are consistent with lead line numbers shown in illustration of propulsion pump in "2-2. hydraulic Component Specifications" (P.4-008).

8. MEASUREMENT OF PROPULSION SERVO CIRCUIT PRESSURE (SW770HF, SW770ND)

8-1. Measurement

- Oil temperature during measurement : 50 ± 5°C (122 ± 9°F)

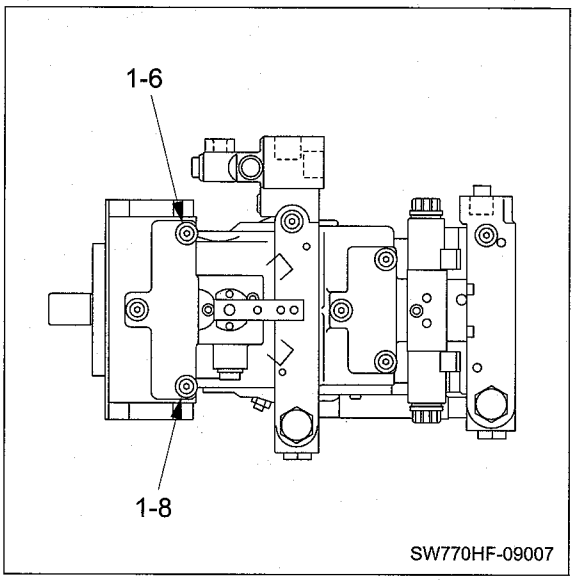
① Disconnect hoses (1) and (3) from propulsion pump (2). Attach pressure gauge through adapter ⓜ .
- Adapter ⓜ : G1/4
- Pressure gauge : 0 to 5 MPa (0 to 725 psi)

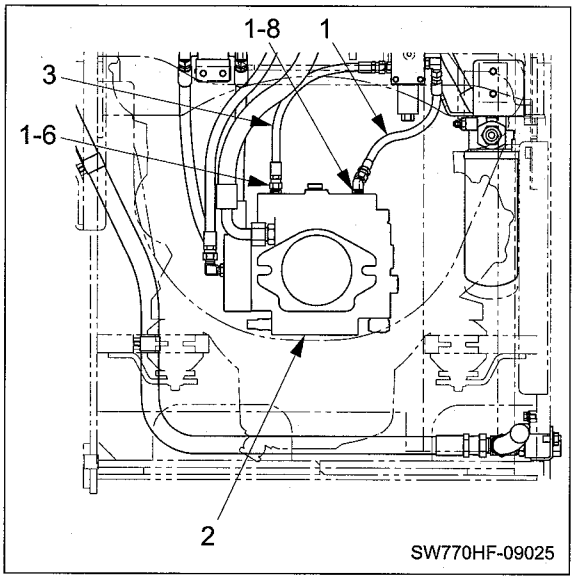
② Apply parking brake by pressing parking brake switch button.

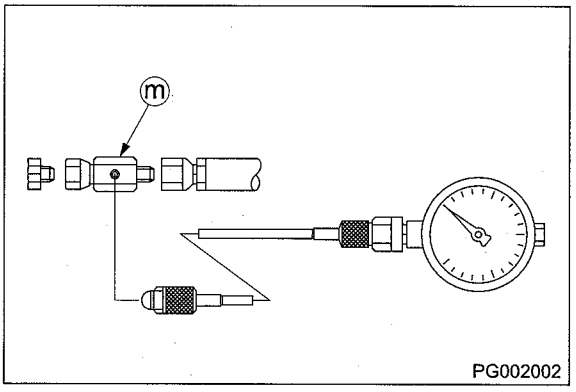
③ Start the engine and set throttle switch to "HIGH".

④ Operate F-R lever and then read pressure indicated by pressure gauge.
- With parking brake applied (ON), measured pressures of (1-6) and (1-8) are same.
- With parking brake released (OFF), measured pressures of (1-6) and (1-8) are different.

★ Maximum circuit pressure
(Standard charge relief pressure setting)
: 2.5 ± 0.2 MPa (363 ± 29 psi)







- The numbers "1-6" and "1-8" appearing in above illustrations are consistent with lead line numbers shown in illustration of propulsion pump in "2-2. hydraulic Component Specifications" (P.4-010).

9. MEASUREMENT OF PARKING BRAKE RELEASE PRESSURE

- Since oil in charge circuit is supplied from steering circuit, confirm that steering operation is normal before measurement.

9-1. Measurement

- Oil temperature during measurement : 50 ± 5°C (122 ± 9°F)

① Disconnect hose (1) from gear box. Attach pressure gauge through adapter ⓜ .
- Adapter ⓜ : G1/4
- Pressure gauge : 0 to 5 MPa (0 to 725 psi)

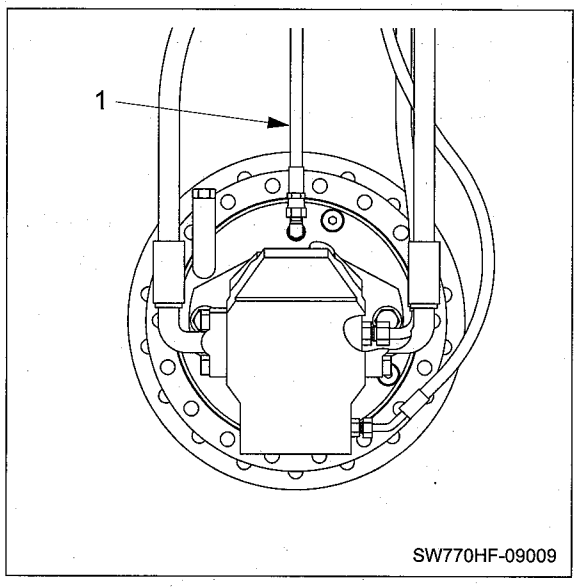
② Confirm that F-R lever is "N" properly.

③ Apply parking brake by pressing parking brake switch button.

④ Start the engine and set throttle switch to "HIGH".

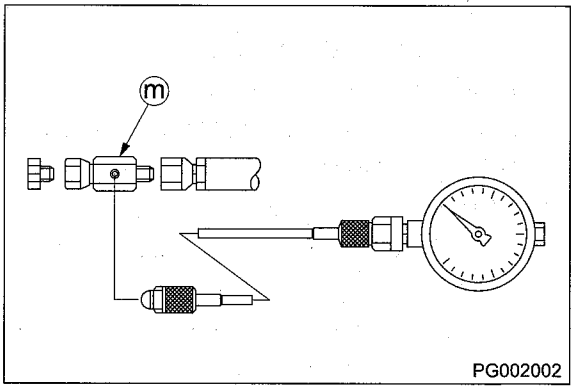
⑤ Release parking brake by pressing parking brake switch button.

⑥ Read brake release pressure indicated by pressure gauge.



★ Brake release pressure

: More than 1.6 ± 0.2 MPa (232 ± 29 psi)



10. MEASUREMENT AND ADJUSTMENT OF VIBRATOR CIRCUIT PRESSURE (SW770)

10-1. Measurement

⚠CAUTION

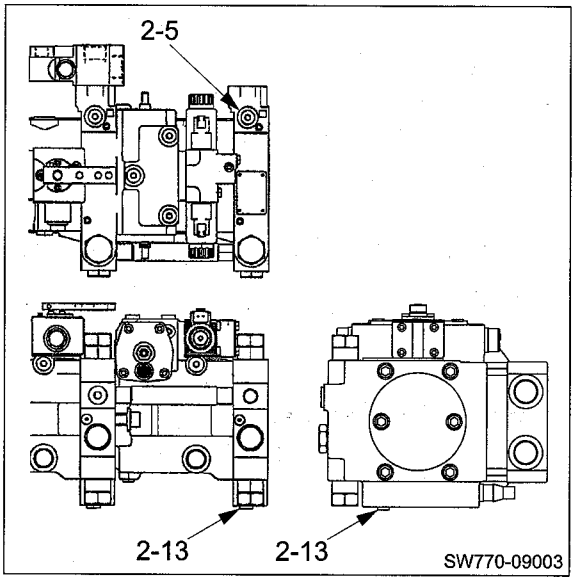
Take care not to operate the vibratory drum for a longer period of time than necessary with the machine stationary. Otherwise, the vibrator bearing could be seized.

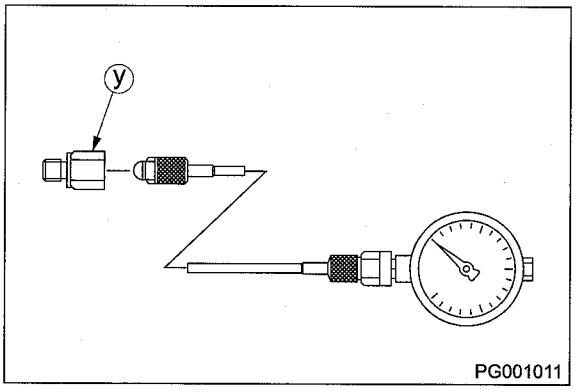
- Oil temperature during measurement : 50 ± 5°C (122 ± 9°F)

① Remove plugs from high pressure gauge port (2-5) and (2-13) of vibrator pump. Attach pressure gauge with adapter ⓨ.
- Adapter ⓨ : 7/16-20UNF
- High pressure gauge port : (2-5) (Low amplitude)
- High pressure gauge port : (2-13) (High amplitude)
- Pressure gauge : 0 to 50 MPa (0 to 7,250 psi)

② Apply parking brake by pressing parking brake switch button.
③ Set vibratory drum select switch to " ⒻⓇ ".
④ Set vibration mode change switch to " ".
⑤ Start the engine and set throttle switch to "HIGH".
⑥ Press F-R lever vibration switch ON.
⑦ Slowly move F-R lever to forward or reverse side.
⑧ Read pressure gauge for maximum value of vibrator circuit pressure.
⑨ Press F-R lever vibration switch OFF or move back F-R lever to "N" as soon as measurement is finished.

★ Maximum circuit pressure (cut off valve setting)
: 32.5 ± 1.0 MPa (4,712 ± 145 psi)

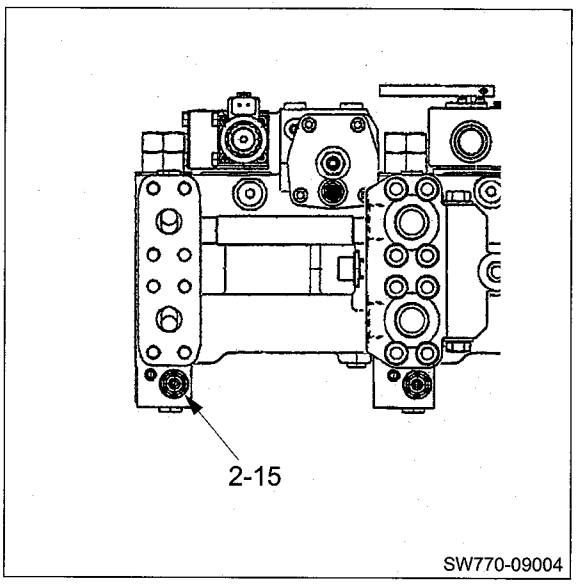




- The numbers "2-5" and "2-13" appearing in above illustrations are consistent with lead line numbers shown in illustration of vibrator pump in "2-2. Hydraulic Component Specifications" (P.4-008).

10-2. Adjustment

- If measurement results indicate the pressure deviating from maximum circuit pressure range, make an adjustment in accordance with procedure described below.



10-2-1. If pressures on both Low amplitude and High amplitude sides deviate from maximum circuit pressure range by same value

① Check nut (1) of cut off valve (2-15) for evidence of having loosened.

② If there is evidence of nut having loosened, adjust cut off valve so that pressure becomes within maximum circuit pressure range while watching pressure gauge.

- To adjust pressure, loosen nut and turn adjustment screw (2).

  Adjustment screw turned clockwise
  : Pressure rise
  Adjustment screw turned counterclockwise
  : Pressure drop
  Pressure change rate : 10 MPa/turn (1,450 psi/turn)

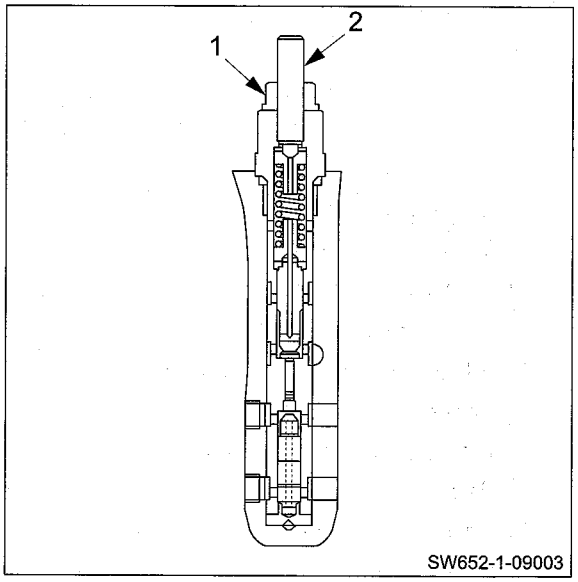
③ If there is no evidence of nut having loosened, remove cut off valve.

④ Check removed cut off valve for trapped dirt and scratches on its seat.

⑤ If trapped dirt is present, disassemble and clean cut off valve.

⑥ If a scratch is found on seat, replace cut off valve.

⑦ After adjustment, measure pressure again and check that pressure reaches maximum circuit pressure range.



N·m (1) Nut : 22 N·m (16 lbf·ft)
(2-15) Cut off valve : 35 N·m (26 lbf·ft)

(NOTICE)

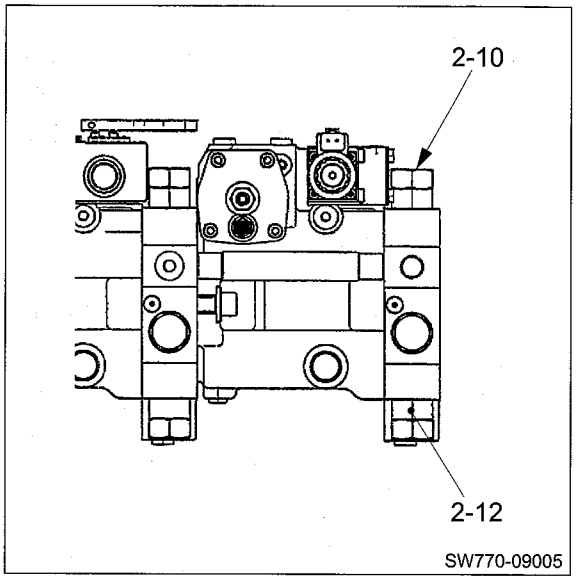
- **Carefully disassemble and reassemble after taking steps to prevent foreign material from getting in.**

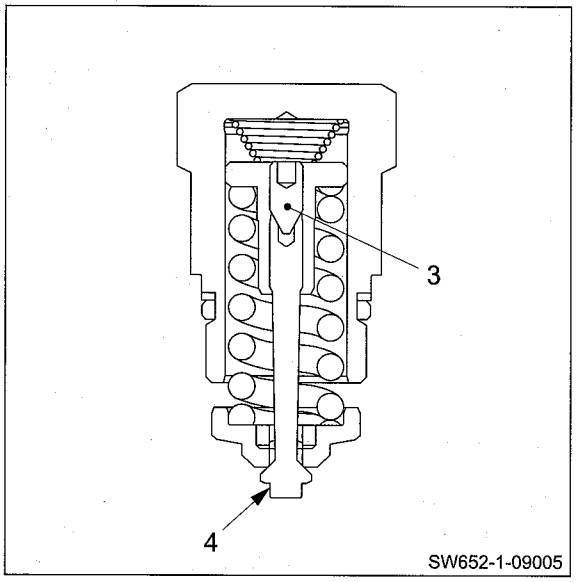
- The number "2-15" appearing in above illustrations is consistent with lead line numbers shown in illustration of propulsion pump in "2-2. Hydraulic Component Specifications" (P.4-008).

10-2-2. If pressure on either Low amplitude or High amplitude side deviates from maximum circuit pressure range

① Check high pressure relief valve (2-10) or (2-12) for evidence of having loosened.
- High pressure relief valve : (2-12) (High amplitude)
- High pressure relief valve : (2-10) (Low amplitude)

② If there is evidence of high pressure relief valve having loosened, adjust it so that pressure becomes within maximum circuit pressure range while watching pressure gauge.
③ Remove high pressure relief valve.
④ Remove lock screw (3).
⑤ Turn adjustment screw (4) to adjust pressure.
Adjustment screw turned clockwise
: Pressure rise
Adjustment screw turned counterclockwise
: Pressure drop
Pressure change rate : 4.5 MPa/turn (653 psi/turn)
⑥ If there is no evidence of high pressure relief valve having loosened, remove it.
⑦ Check removed high pressure relief valve for trapped dirt and scratches on its seat.
⑧ If trapped dirt is present, disassemble and clean high pressure relief valve.
⑨ If a scratch is found on seat, replace high pressure relief valve.
⑩ After adjustment, measure pressure again and check that pressure reaches maximum circuit pressure range.





N·m (3) Lock screw : 6.5 N·m (4.8 lbf·ft)
(2-10) (2-12) High pressure relief valve : 160 N·m (118 lbf·ft)

(NOTICE)
- **Carefully disassemble and reassemble after taking steps to prevent foreign material from getting in.**

- The numbers "2-10" and "2-12" appearing in above illustrations are consistent with lead line numbers shown in illustration of propulsion pump in "2-2. Hydraulic Component Specifications" (P.4-008).

11. MEASUREMENT AND ADJUSTMENT OF VIBRATOR CIRCUIT PRESSURE (SW770HF, SW770ND)

11-1. Measurement

⚠CAUTION

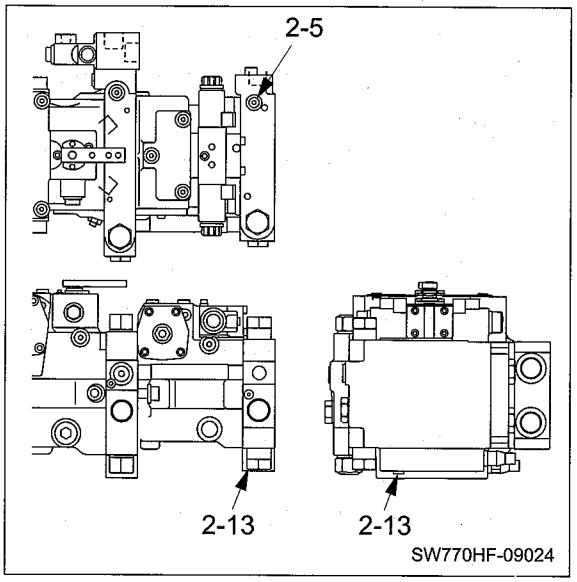
Take care not to operate the vibratory drum for a longer period of time than necessary with the machine stationary. Otherwise, the vibrator bearing could be seized.

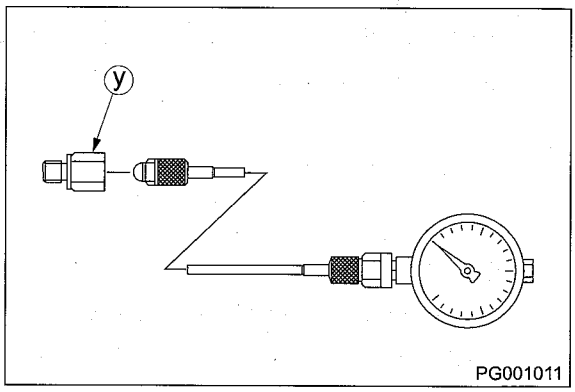
- Oil temperature during measurement : 50 ± 5°C (122 ± 9°F)

① Remove plugs from high pressure gauge port (2-5) and (2-13) of vibrator pump. Attach pressure gauge with adapter ⓨ .
- Adapter ⓨ : 7/16-20UNF
- High pressure gauge port : (2-5) (Low amplitude/Normal)
- High pressure gauge port : (2-13) (High amplitude/Horizontal)
- Pressure gauge : 0 to 50 MPa (0 to 7,250 psi)

② Apply parking brake by pressing parking brake switch button.
③ Set vibratory drum select switch to " Ⓕ Ⓡ ".
④ Set vibration mode change switch to " ".
⑤ Start the engine and set throttle switch to "HIGH".
⑥ Press F-R lever vibration switch ON.
⑦ Slowly move F-R lever to forward or reverse side.
⑧ Read pressure gauge for maximum value of vibrator circuit pressure.
⑨ Press F-R lever vibration switch OFF or move back F-R lever to "N" as soon as measurement is finished.

★ Maximum circuit pressure (cut off valve setting)
: 32 ± 1.0 MPa (4,640 ± 145 psi)

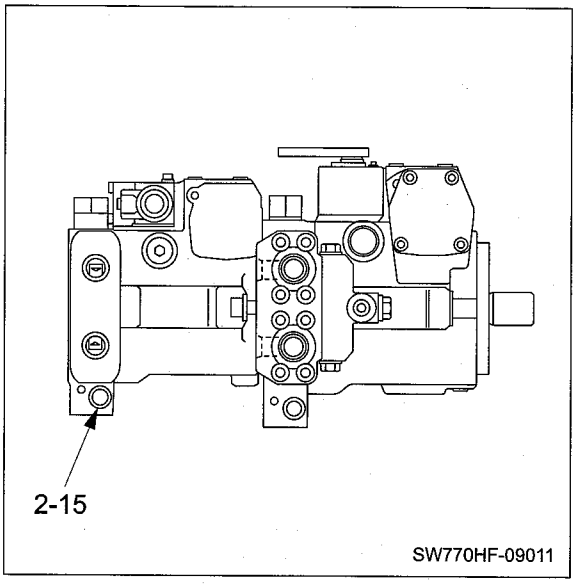




- The numbers "2-5" and "2-13" appearing in above illustrations are consistent with lead line numbers shown in illustration of vibrator pump in "2-2. Hydraulic Component Specifications" (P.4-010).

11-2. Adjustment

- If measurement results indicate the pressure deviating from maximum circuit pressure range, make an adjustment in accordance with procedure described below.



11-2-1. If pressures on both Low amplitude/Normal and High amplitude/Horizontal sides deviate from maximum circuit pressure range by same value

① Check nut (1) of cut off valve (2-15) for evidence of having loosened.

② If there is evidence of nut having loosened, adjust cut off valve so that pressure becomes within maximum circuit pressure range while watching pressure gauge.

- To adjust pressure, loosen nut and turn adjustment screw (2).

  Adjustment screw turned clockwise
  : Pressure rise
  Adjustment screw turned counterclockwise
  : Pressure drop
  Pressure change rate : 10 MPa/turn (1,450 psi/turn)

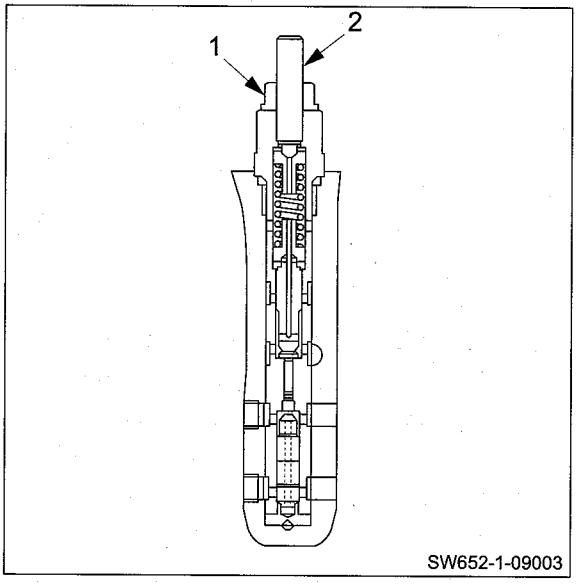
③ If there is no evidence of nut having loosened, remove cut off valve.

④ Check removed cut off valve for trapped dirt and scratches on its seat.

⑤ If trapped dirt is present, disassemble and clean cut off valve.

⑥ If a scratch is found on seat, replace cut off valve.

⑦ After adjustment, measure pressure again and check that pressure reaches maximum circuit pressure range.



N·m (1) Nut : 22 N·m (16 lbf·ft)
(2-15) Cut off valve : 35 N·m (26 lbf·ft)

(NOTICE)

- **Carefully disassemble and reassemble after taking steps to prevent foreign material from getting in.**

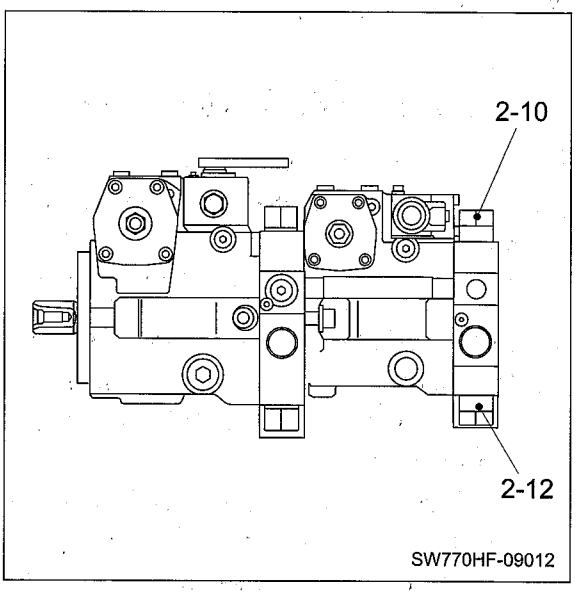
- The number "2-15" appearing in above illustrations is consistent with lead line numbers shown in illustration of propulsion pump in "2-2. Hydraulic Component Specifications" (P.4-010).

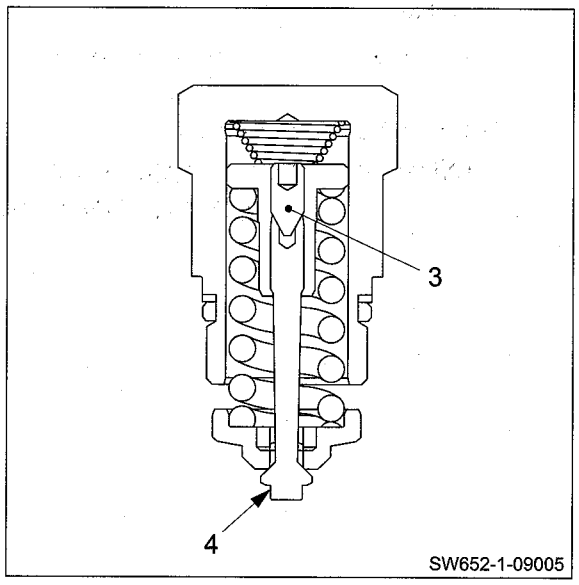
11-2-2. If pressure on either Low amplitude/Normal or High amplitude/Horizontal side deviates from maximum circuit pressure range

① Check high pressure relief valve (2-10) or (2-12) for evidence of having loosened.
- High pressure relief valve : (2-12) (High amplitude/Horizontal)
- High pressure relief valve : (2-10) (Low amplitude/Normal)

② If there is evidence of high pressure relief valve having loosened, adjust it so that pressure becomes within maximum circuit pressure range while watching pressure gauge.
③ Remove high pressure relief valve.
④ Remove lock screw (3).
⑤ Turn adjustment screw (4) to adjust pressure.
Adjustment screw turned clockwise : Pressure rise
Adjustment screw turned counterclockwise : Pressure drop
Pressure change rate : 4.5 MPa/turn (653 psi/turn)
⑥ If there is no evidence of high pressure relief valve having loosened, remove it.
⑦ Check removed high pressure relief valve for trapped dirt and scratches on its seat.
⑧ If trapped dirt is present, disassemble and clean high pressure relief valve.
⑨ If a scratch is found on seat, replace high pressure relief valve.
⑩ After adjustment, measure pressure again and check that pressure reaches maximum circuit pressure range.

N·m (3) Lock screw : 6.5 N·m (4.8 lbf·ft)
(2-10) (2-12) High pressure relief valve : 160 N·m (118 lbf·ft)





(NOTICE)
- **Carefully disassemble and reassemble after taking steps to prevent foreign material from getting in.**

- The numbers "2-10" and "2-12" appearing in above illustrations are consistent with lead line numbers shown in illustration of propulsion pump in "2-2. Hydraulic Component Specifications" (P.4-010).

12. MEASUREMENT AND INSPECTION OF STEERING CIRCUIT PRESSURE

12-1. Measurement

⚠WARNING

Make sure that there is no person around the articulated portion of the machine before operating the steering wheel.

- Oil temperature during measurement : 50 ± 5°C (122 ± 9°F)

① Disconnect hose (1) or (2) from steering cylinder. Attach pressure gauge through the adapter ⓝ .
- Adapter ⓝ : G3/8
- Pressure gauge : 0 to 25 MPa (0 to 3,625 psi)

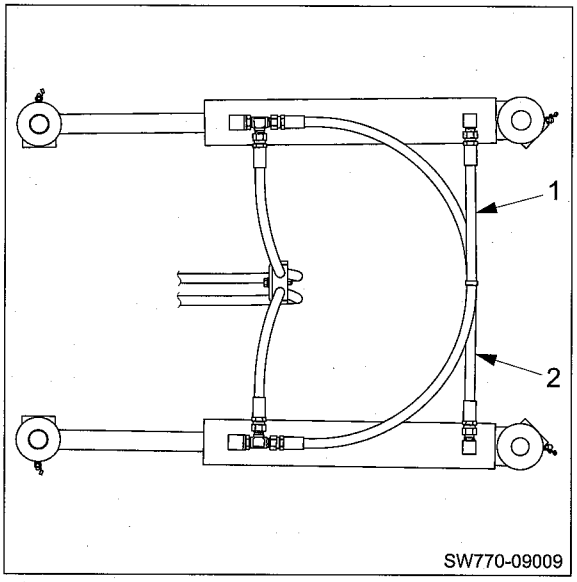
② Confirm that F-R lever is "N" properly.

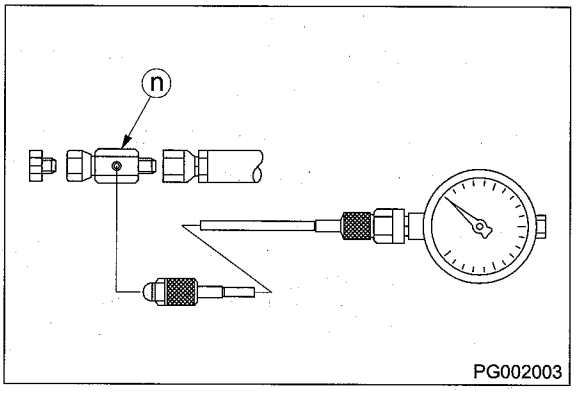
③ Start the engine and set throttle switch to "HIGH".

④ Turn steering wheel to operate relief valve.

⑤ Read pressure indicated by pressure gauge.

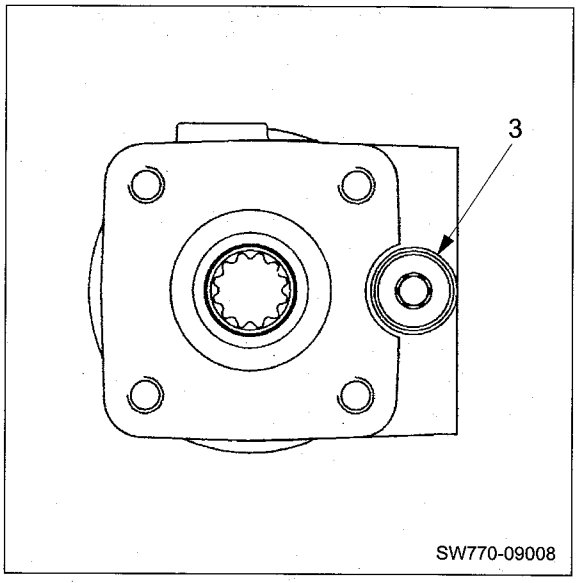
★ Maximum circuit pressure
(orbitrol relief pressure + charge relief pressure)
: 17.5 ± 1.0 MPa (2,538 ± 145 psi)





12-2. Inspection

- If measurement results indicate the pressure deviating from maximum circuit pressure range, make an adjustment in accordance with procedure described below.



① Remove relief valve (3) from orbitrol.
② Check removed relief valve for trapped dirt, scratches on its seat and other abnormalities.
③ If trapped dirt is present, disassemble and clean relief valve.
④ If a scratch or any other abnormality is found on seat, replace relief valve.
⑤ After inspection, measure pressure again and check that pressure reaches maximum circuit pressure range.

(NOTICE)

- **Carefully disassemble and reassemble after taking steps to prevent foreign material from getting in.**

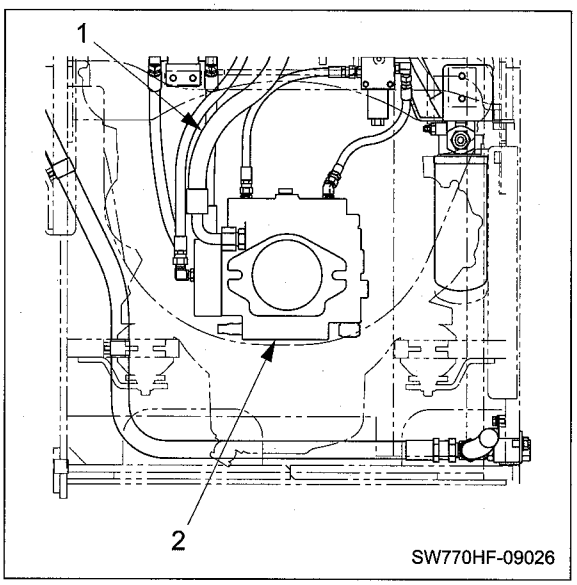
13. MEASUREMENT OF HYDRAULIC PUMP CASE PRESSURE (SW770)

13-1. Measurement of Propulsion Pump Case Pressure

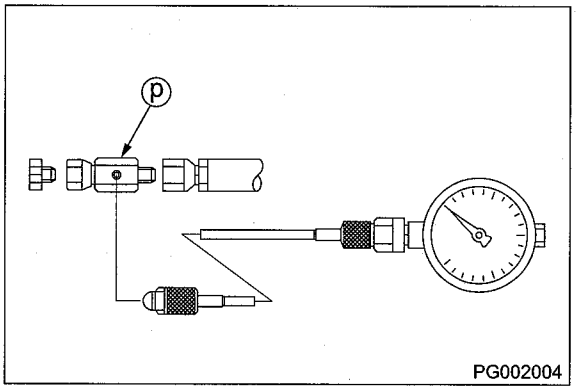
- Oil temperature during measurement : 50 ± 5°C (122 ± 9°F)

① Disconnect hose (1) from propulsion pump (2). Attach pressure gauge through adapter Ⓟ.
- Adapter Ⓟ : G1/2
- Pressure gauge : 0 to 5 MPa (0 to 725 psi)

② Set propulsion speed change switch to "🐢".
③ Start the engine and set throttle switch to "HIGH".
④ Establish a condition in which machine propulsion load becomes maximum.
(Pressure does not build up unless propulsion load is applied.)
⑤ With propulsion load at maximum, measure pressure when speed change switch is "🐢" and "🐇" and F-R lever is "N", "F", and "R", respectively.



★ Allowable pump case pressure
: 0.4 MPa (58.0 psi) or less



13-2. Measurement of Vibrator Pump Case Pressure

- Oil temperature during measurement : 50 ± 5°C (122 ± 9°F)

① Disconnect hose (1) from vibrator pump (2). Attach pressure gauge through adapter Ⓟ.
- Adapter Ⓟ : G1/2
- Pressure gauge : 0 to 5 MPa (0 to 725 psi)

② Apply parking brake by pressing parking brake switch button.

③ Set vibratory drum selector switch to " Ⓕ Ⓡ ".

④ Set vibration mode change switch to " ".

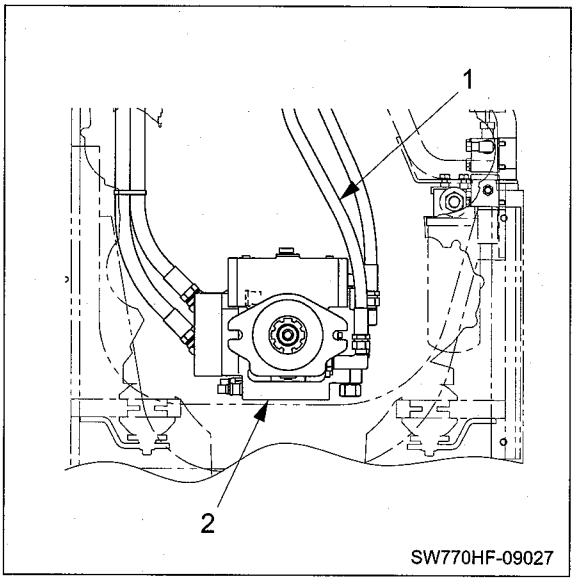
⑤ Start the engine and set throttle switch to "HIGH".

⑥ Press F-R lever vibration switch ON.

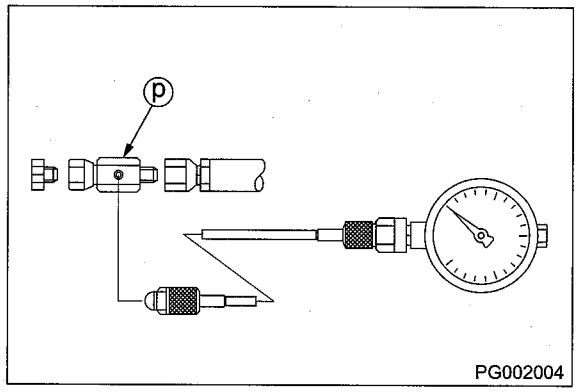
⑦ Slowly move F-R lever to forward or reverse side.

⑧ Measure pressure when vibration switch is in "⋀⋀" and "⋀⋀", respectively.

⑨ Press F-R lever vibration switch OFF or move back F-R lever to "N" as soon as measurement is finished.



SW770HF-09027



PG002004

★ Allowable pump case pressure
: 0.4 MPa (58.0 psi) or less

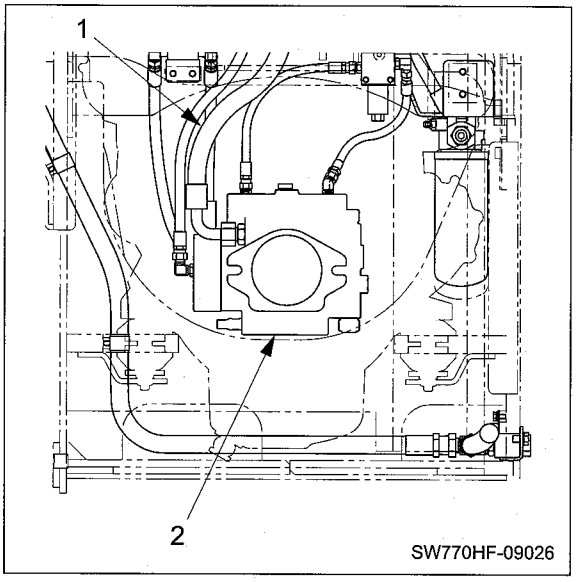
14. MEASUREMENT OF HYDRAULIC PUMP CASE PRESSURE (SW770HF, SW770ND)

14-1. Measurement of Propulsion Pump Case Pressure

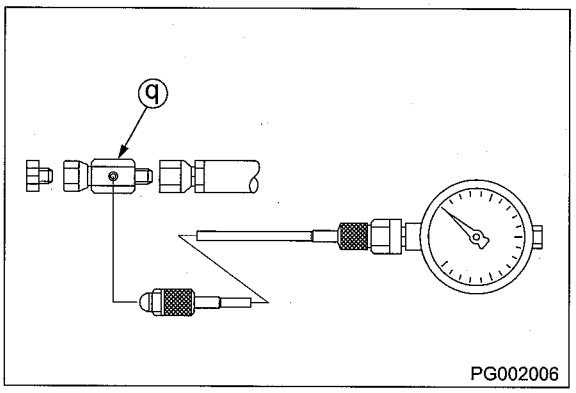
- Oil temperature during measurement : 50 ±5°C (122 ±9°F)

① Disconnect hose (1) from propulsion pump (2). Attach pressure gauge through adapter ⑨ .
- Adapter ⑨ : G3/4
- Pressure gauge : 0 to 5 MPa (0 to 725 psi)

② Set propulsion speed change switch to "🐢".
③ Start the engine and set throttle switch to "HIGH".
④ Establish a condition in which machine propulsion load becomes maximum.
(Pressure does not build up unless propulsion load is applied.)
⑤ With propulsion load at maximum, measure pressure when speed change switch is "🐢" and "🐇" and F-R lever is "N", "F", and "R", respectively.



★ Allowable pump case pressure
: 0.4 MPa (58.0 psi) or less



14-2. Measurement of Vibrator Pump Case Pressure

- Oil temperature during measurement : 50 ± 5°C (122 ± 9°F)

① Disconnect hose (1) from vibrator pump (2). Attach pressure gauge through adapter Ⓟ.
- Adapter Ⓟ : G1/2
- Pressure gauge : 0 to 5 MPa (0 to 725 psi)

② Apply parking brake by pressing parking brake switch button.

③ Set vibratory drum selector switch to " Ⓕ Ⓡ ".

④ Set vibration mode change switch to " ".

⑤ Start the engine and set throttle switch to "HIGH".

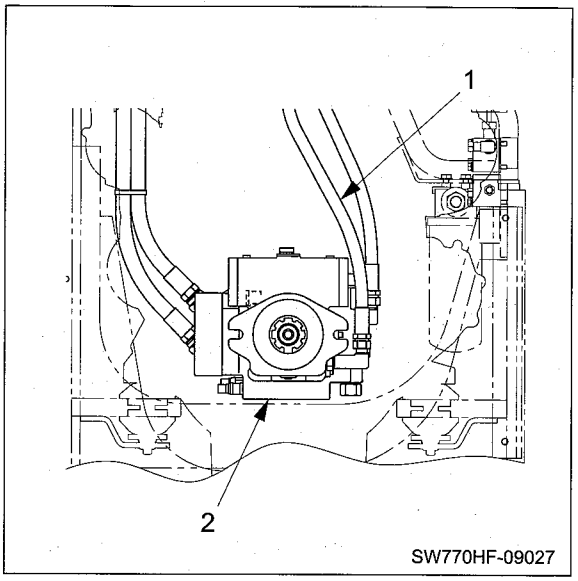
⑥ Press F-R lever vibration switch ON.

⑦ Slowly move F-R lever to forward or reverse side.

⑧ Measure pressure when vibration switch is in "⋀⋀" / " " and "⋀⋀" / " ", respectively.

⑨ Press F-R lever vibration switch OFF or move back F-R lever to "N" as soon as measurement is finished.

★ Allowable pump case pressure
: 0.4 MPa (58.0 psi) or less



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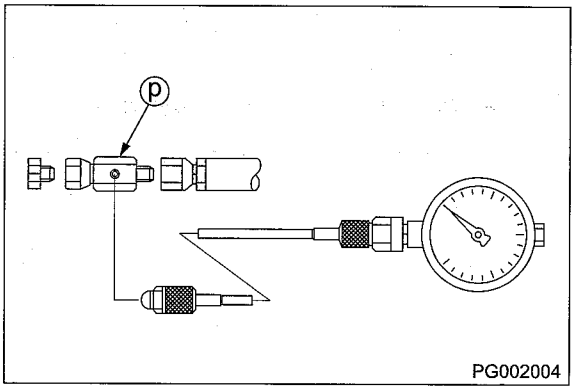


PG002004

15. MEASUREMENT OF PROPULSION MOTOR CASE PRESSURE

15-1. Measurement

- Oil temperature during measurement : 50 ±5°C (122 ±9°F)

① Disconnect hose (1) from propulsion motor (2). Attach pressure gauge through adapter ⓝ.
- Adapter ⓝ : G3/8
- Pressure gauge : 0 to 5 MPa (0 to 725 psi)

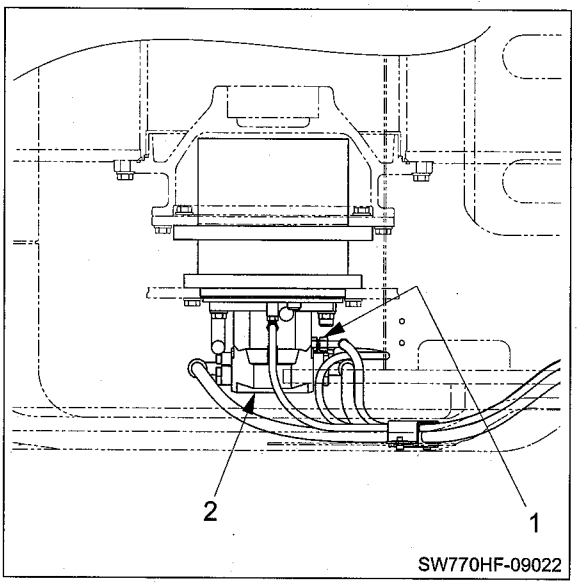
② Set propulsion speed change switch to "🐢".

③ Start the engine and set throttle switch to "HIGH".

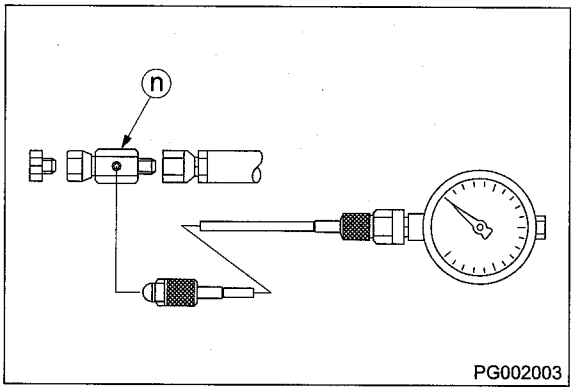
④ Establish a condition in which machine propulsion load becomes maximum.
(Pressure does not build up unless propulsion load is applied.)

⑤ With propulsion load at maximum, measure pressure when speed change switch is "🐢" and "🐇" and F-R lever "N", "F", and "R", respectively.

★ Allowable motor case pressure
: 0.3 MPa (43.5 psi) or less



SW770HF-09022



PG002003

16. MEASUREMENT OF VIBRATOR MOTOR CASE PRESSURE (SW770, SW770HF)

16-1. Measurement

- Oil temperature during measurement : 50 ±5°C (122 ±9°F)

① Remove plug from drain port (1). Attach pressure gauge with adapter ⓘ .
- Adapter ⓘ : 3/4-16UNF
- Pressure gauge : 0 to 5 MPa (0 to 725 psi)

② Apply parking brake by pressing parking brake switch button.

③ Set vibratory drum select switch to " Ⓕ Ⓡ ".

④ Set vibration mode change switch to " ".

⑤ Start the engine and set throttle switch to "HIGH".

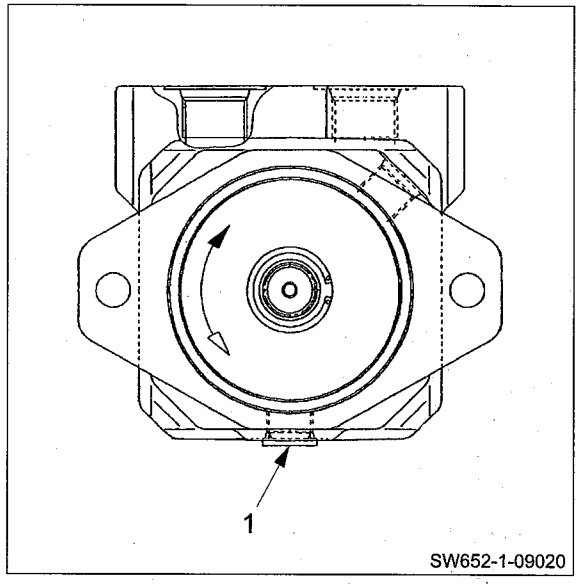
⑥ Press F-R lever vibration switch ON.

⑦ Slowly move F-R lever to forward or reverse side.

⑧ Measure pressure when vibration select switch is "∿∿" and "∿∿" respectively.

⑨ Press F-R lever vibration switch OFF or move back F-R lever to "N" as soon as measurement is finished.

★ Allowable motor case pressure
: 0.2 MPa (29.0 psi) or less



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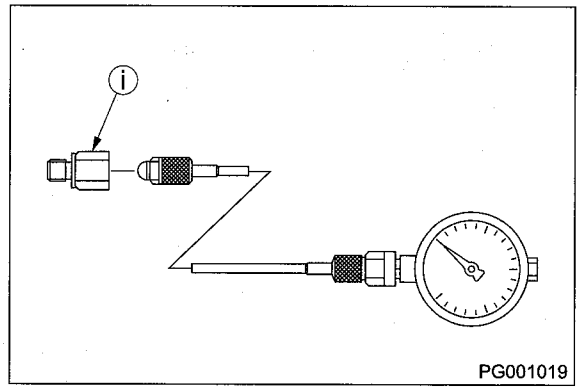


PG001019

17. MEASUREMENT OF VIBRATOR MOTOR CASE PRESSURE (SW770ND)

17-1. Measurement

- Oil temperature during measurement : 50 ± 5°C (122 ± 9°F)

① Remove plug from drain port (1). Attach pressure gauge with adapter ⓙ.
- Adapter ⓙ : 7/8-14UNF
- Pressure gauge : 0 to 5 MPa (0 to 725 psi)

② Apply parking brake by pressing parking brake switch button.

③ Set vibratory drum select switch to " Ⓕ Ⓡ ".

④ Set vibration mode change switch to " ".

⑤ Start the engine and set throttle switch to "HIGH".

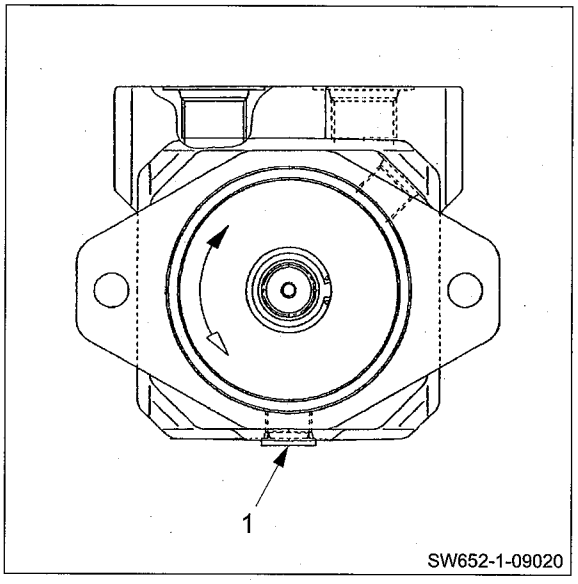
⑥ Press F-R lever vibration switch ON.

⑦ Slowly move F-R lever to forward or reverse side.

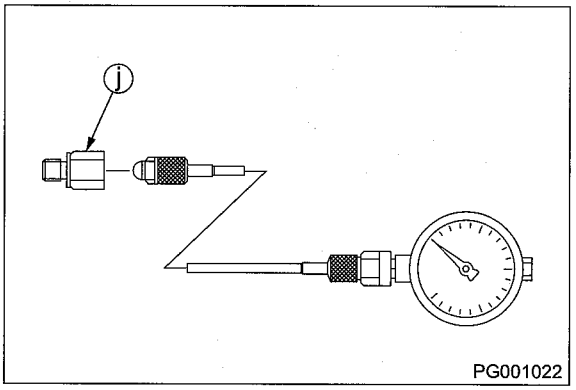
⑧ Measure pressure when vibration select switch is " " and " " respectively.

⑨ Press F-R lever vibration switch OFF or move back F-R lever to "N" as soon as measurement is finished.

★ Allowable motor case pressure
: 0.4 MPa (58.0 psi) or less



SW652-1-09020



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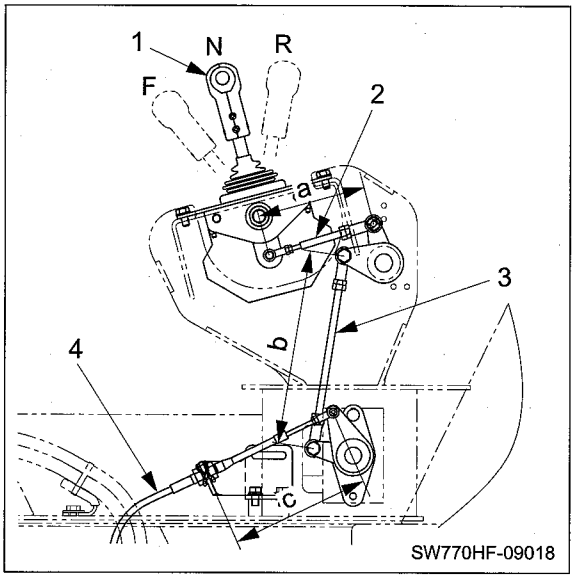
18. ADJUSTMENT OF F-R LEVER LINKAGE

18-1. Adjustment

- In cases such as propulsion hydraulic pump is replaced, control cable is replaced, or F-R lever or pump lever does not move smoothly, make an adjustment in accordance with procedure described below.
- "N", maximum "F", and maximum "R" positions of F-R lever (1) are positioned by notches.

① Set F-R lever (1) in "N".
② Install rods (2) and (3), then adjust them to specified length and fix them with a locking nut.
③ Attach control cable (4).

★ Specified dimension a: 161 mm (6.34 in.)
b: 288.5 mm (11.36 in.)
c: 207 mm (8.15 in.)

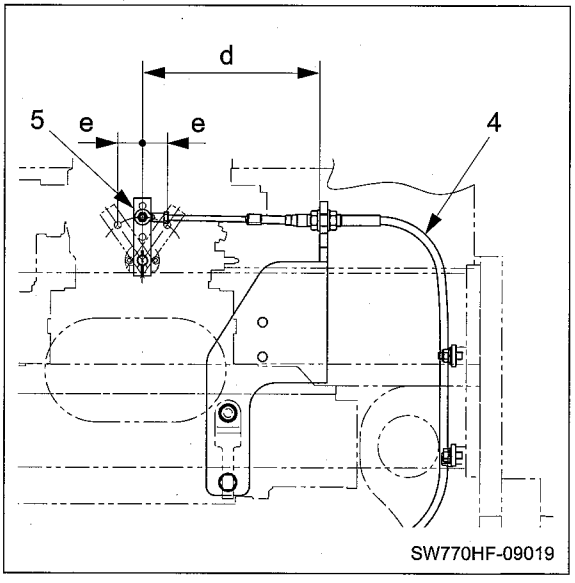


④ Attach control cable (4) to propulsion hydraulic pump lever (5).

★ Specified dimension d: 206 mm (8.11 in.)

⑤ Confirm strokes of propulsion hydraulic pump lever (5) .

★ Specified dimension e: 29 mm (1.14 in.)



TROUBLESHOOTING

1. TROUBLESHOOTING

1-1. Safety Precautions for Troubleshooting

⚠ WARNING

Unexpected machine movement may cause a serious accident. When inspecting the machine while the engine is running, always follow the instructions below.

- **Park the machine on level, flat ground.**
- **Apply the parking brake.**
- **Set chocks in front and behind each drum or tire.**
- **Make sure that service personnel are given the appropriate information at the appropriate time.**
- **Make sure that no one can enter any hazardous area.**

⚠ CAUTION

Do not work on the hydraulic system while the engine is running and the system is hot and under pressure. Do not disconnect hydraulic hoses or fittings until the system has cooled and pressure has been properly relieved.

Before removing any plugs from the pressure measurement ports, always release any residual pressure from the piping and open the cap of the fluid tank to release and pressure.

⚠ WARNING

Inadvertent starting the engine may cause a serious accident.

When inspecting the engine, make sure to exchange the appropriate cues and hand signal with the person at the operator station to avoid any accidents.

⚠ CAUTION

Before inspecting inside of the engine compartment, always stop the engine.

Contact with the fan, V-belt or exhaust system parts while the engine is running may cause serious injury.

1-2. Important Information for Troubleshooting

Before conducting troubleshooting, it is important to carefully read the operation manual and workshop manual and understand the electric circuits for each component as well as the structure and function of each system. Sufficient knowledge of the systems will enable you to identify a possible cause much faster. A fault or problem may seem to be related to many different factors. To identify the true cause, some experience is needed. To perform the appropriate troubleshooting, it is important to learn not only the normal operations of the systems but also the possible symptoms that may occur when an abnormal condition is present.

This chapter explains the possible causes and remedies for likely incidents taken from past experience.

1-3. Before Starting

The information in this section is provided to assist the troubleshooter in understanding the systems and quickly determine the causes when operating abnormalities occur.

The following steps are recommended:

1. If not familiar with the machine, study the Operator's Manual and this Shop Manual.
2. Check with the operator for full details of the trouble, ask questions.
3. Verify the trouble by warming up the machine and operating it. Check the problem yourself.
4. Identify the problem with either a mechanical, hydraulic or electrical system source.
5. Isolate the problem to a particular component or circuit.
6. Eliminate the simplest or easiest to check possibilities first to prevent unnecessary disassembly of components.
7. Following repair or replacement of any parts, perform operational tests to verify that the problem has been eliminated and the performance of all the systems is normal.

2. ELECTRICAL SYSTEM TROUBLESHOOTING

2-1. When Performing Electrical System Fault Diagnosis

⚠ WARNING

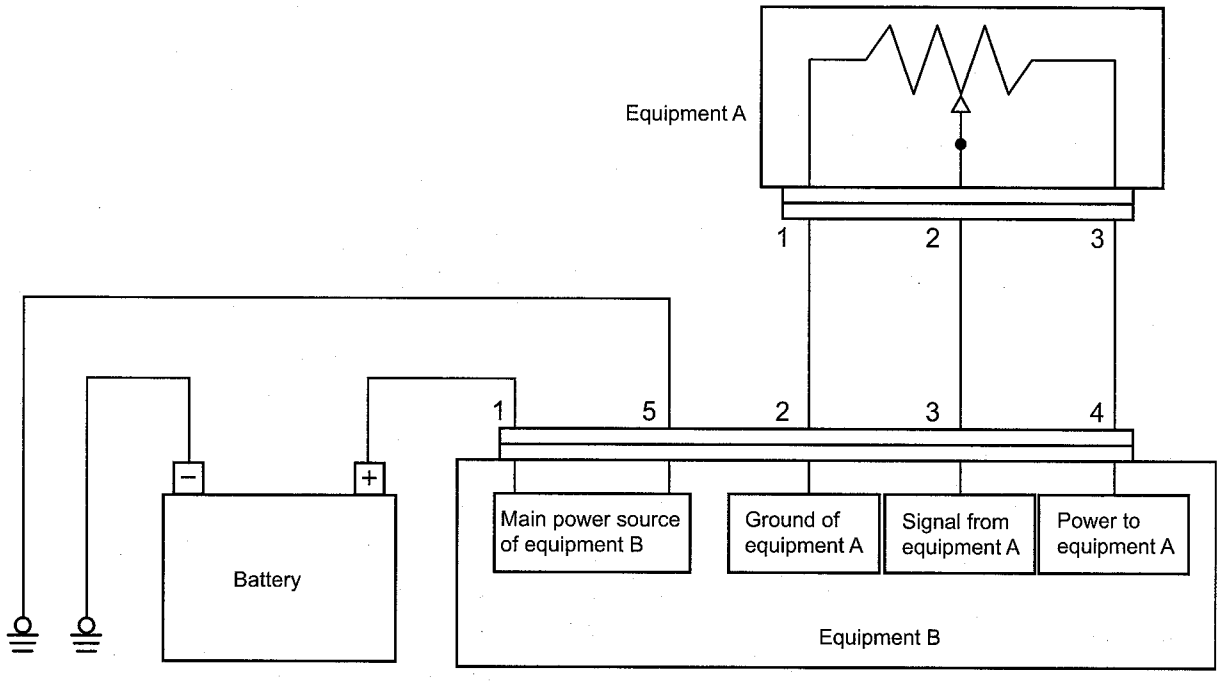
Be very careful because equipment can return to normal during an inspection and suddenly operate properly when a failure occurs due to a faulty contact or other such cause.

2-1-1. Precautions to take during electrical circuit fault diagnosis

- When disconnecting or connecting a connector, be sure to turn the power supply OFF. (Electronic control parts such as the engine control unit, in particular, could be damaged internally.)
- Since connectors are not numbered, be sure to affix alignment marks so that you can restore them to their original condition.
- Before making a diagnosis, check related connectors for faulty connections. (Check by disconnecting and reconnecting related connectors several times.)
- Before proceeding to the next step, be sure to return the disconnected connectors to their original condition.
- When diagnosing a circuit (measuring the voltage, resistance, continuity and current), move related wiring and connectors several times, and check whether the tester's numerical values change. (If values change, faulty contact in the circuit is possible.)
- Do not ground the circuit of the control unit or apply voltage to it unless otherwise specified.
- For information of wire number, wire size, and wire color used in the sample circuit diagrams, refer to "1-1. Wire Numbers, Wire Sizes, Wire Colors and Connectors Shown in Electrical Circuit Diagram, Wiring Harness Layout and Wiring Harnesses" (P.5-001).

2-1-2. Inspection procedures using a tester

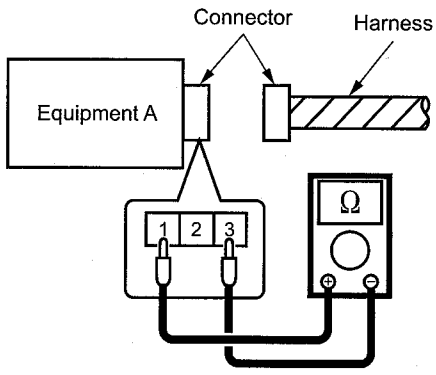
Some of the various inspection procedures are presented here for reference, using a sample circuit below.

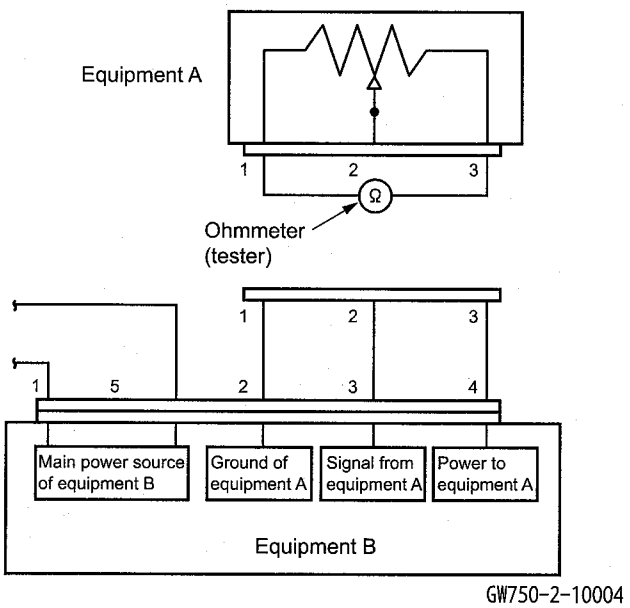


GW750-2-10003

1) Measuring resistance using tester

1-1) Measuring resistance of equipment A (measuring resistance between terminals 1 and 3)





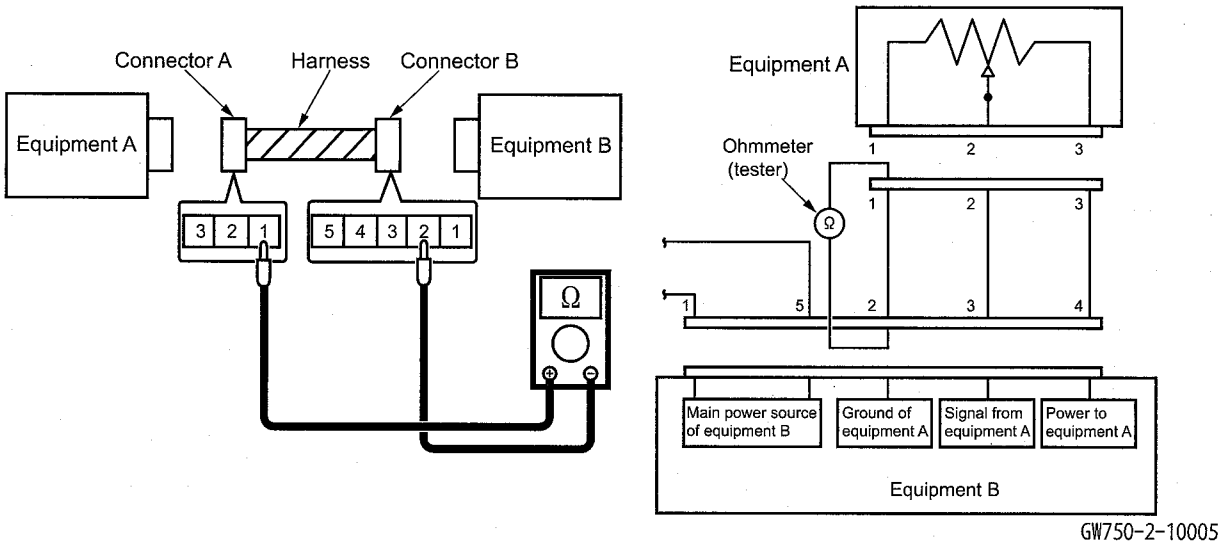
GW750-2-10004

Inspection procedure

① Disconnect the connector of equipment A.

② Connect the test probe (+) to connector terminal 1 of equipment A and the test probe (-) to connector terminal 3 of equipment A and measure the resistance. At this time, reversing the connector terminals between the probes (+) and (-) does not make any difference in the measurement.

1-2) Measuring resistance of harness (measuring resistance between terminal 1 of equipment A and terminal 2 of equipment B)



GW750-2-10005

Inspection procedure

① Disconnect the connectors of equipment A and equipment B.

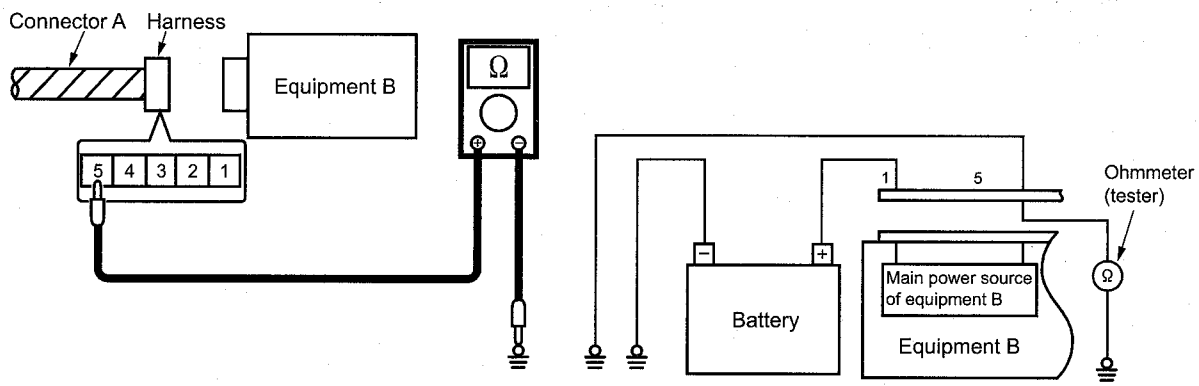
② Connect the test probe (+) to connector terminal 1 of equipment A and the test probe (-) to connector terminal 2 of equipment B and measure the resistance. At this time, reversing the connector terminals between the probes (+) and (-) does not make any difference in the measurement.

Criteria for harness defects

When there is no abnormality in the harness: Less than 10 Ω (measured value)

If there is any abnormality in the harness such as broken wire: 10 Ω or higher (measured value)

1-3) Measuring resistance of grounding wire (measuring resistance between terminal 5 of equipment B and ground)



GW750-2-10006

Inspection procedure

① Disconnect the connector of equipment B.

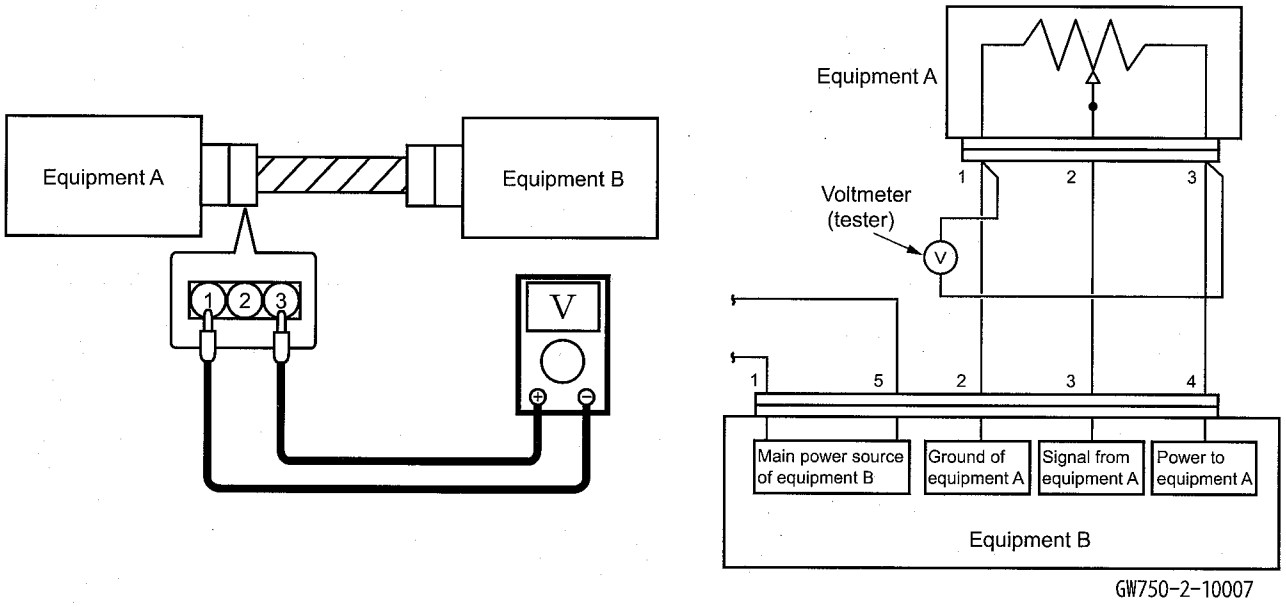
② Connect the test probe (+) to connector terminal 5 of equipment B and the test probe (-) to a machine ground point (the bolt fastening the ground terminal or an unpainted portion on the body) and measure the resistance. At this time, reversing the connector terminals between the probes (+) and (-) does not make any difference in the measurement.

(NOTICE)

- **When measuring the resistance, connect the test probes to both ends of the portion to be measured. Make also sure that no voltage is applied to the portion to be measured.**
- **When measuring the internal resistance of equipment, be sure first to disconnect all harnesses from the equipment.**
- **When measuring the resistance of a harness, disconnect the equipment connected to both ends of the harness.**

2) Measuring voltage and current flowing using tester

2-1) Measuring voltage of equipment A (measuring voltage between terminals 1 and 3)

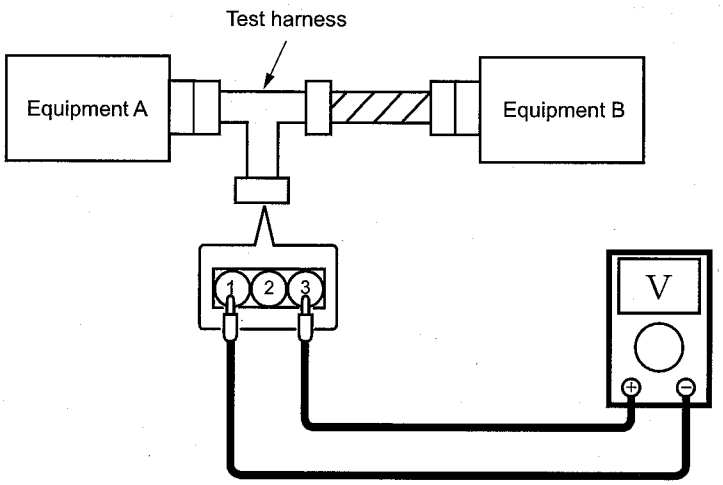


Inspection procedure

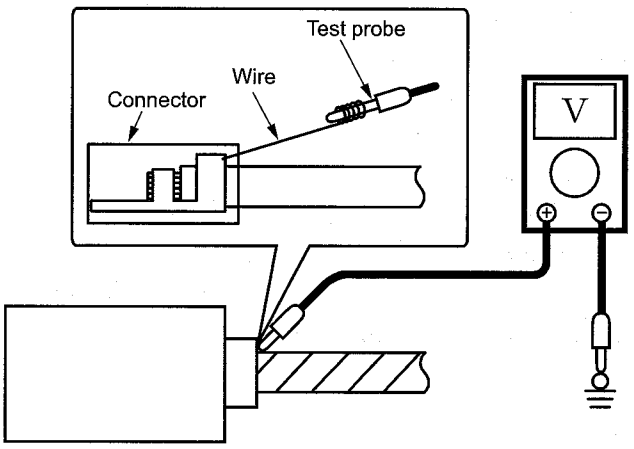
① Connect the connectors of equipment A and that of equipment B.

② Connect the test probe (+) to connector terminal 3 of equipment A and the test probe (-) to connector terminal 1 of equipment A and measure the voltage. Note that reversing the connector terminals between the probes (+) and (-) changes the result of the measurement. Be sure to connect the probe (+) to the power source side and the probe (-) to the ground side.

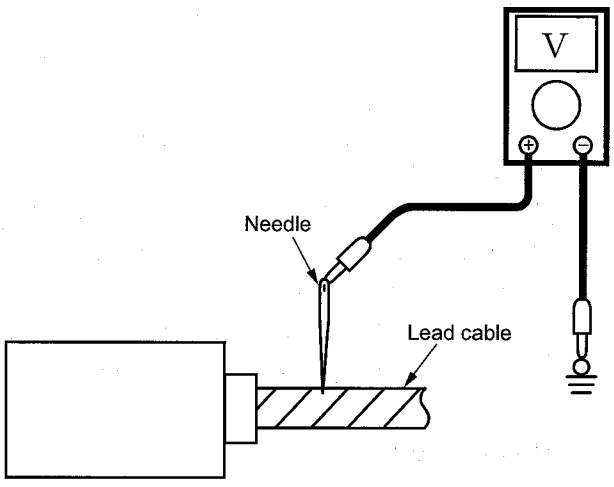
• Measurement using a test harness



• Measurement from the backside of connector



• Measurement on a lead cable



GW750-2-10002

Measurement method

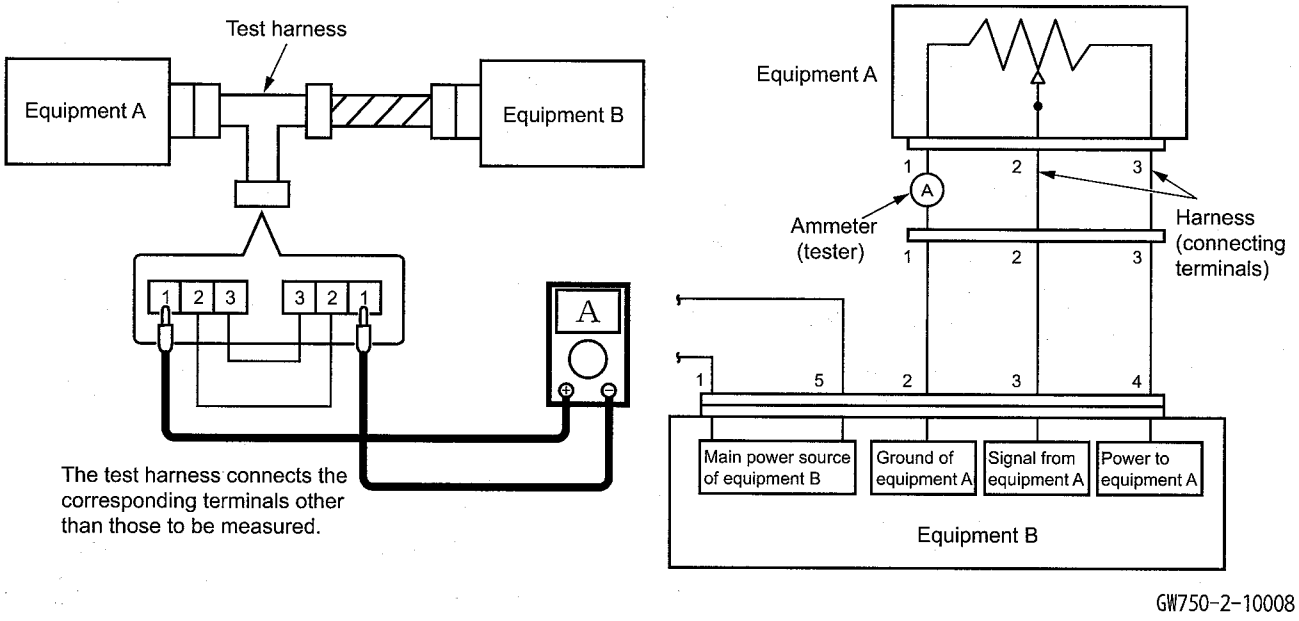
For measurement of voltage, connect the tester probes in parallel to the portion to be measured. Because the voltage can be measured only when the connector is connected in position, contact the tester probes to the terminals without disconnecting the connector. The following methods are available:

- Measurement using a test harness
  Prepare the test harness for the measurement.
- Measurement from the backside of connector
  Insert a wire from the backside of the connector.
- Measurement on a lead cable
  Remove the bundling tape from the harness to separate each cable, and stick the needle into the relevant cable.

(NOTICE)

- **Except for preparing the test harness, proper protection must be made after the measurement to prevent corrosion in the connector terminals or harnesses.**

2-2) Measuring current flowing from equipment B to equipment A
(measuring current between terminal 2 of equipment B and terminal 1 of equipment A)



Inspection procedure

① Disconnect the connector of equipment A and connect the test harness.

② Connect the test probe (+) to connector terminal 1 (harness side) of equipment A and the test probe (-) to connector terminal 1 (equipment side) of equipment A and measure the current. Note that reversing the connector terminals between the probes (+) and (-) changes the result of the measurement. Be sure to connect the probe (+) to the power source side and the probe (-) to the ground side.

Measurement method

When measuring the current, connect the tester in series to the portion to be measured. Because the current cannot be measured when the connector is connected in position, disconnect the connector to allow the test probe to connect between the terminals.

2-1-3. Inspection of electrical system

Operate the applicable switches and turn the relays ON and OFF. Ultimately, if the solenoid valve operates (makes a sound) and the pump runs, the electrical system is OK.
If there is a failure (fault), narrow the range of the inspection to the six broad steps described below.

1) Ground inspection
- Check for disconnected or loose ground. If rust or corrosion is present (which can cause faulty contact), remove the rust.

2) Fuse inspection

2-1) Check for blown fuses, disconnections and corrosion. (A fatigue open circuit cannot be identified visually. Use a tester for checking.)

2-2) If a fuse is blown

Check whether a pump or valve (that is supposed to be protected by a blown fuse) burned, and whether there is a burning odor.

Especially if the pump and valve are not burned, check the harness for signs of burning. If it is burned, replace it.

If a fuse is blown and a relay along the pathway has failed, replace it. And if there is a timer, replace the timer, too. If a switch visually appears to be unsatisfactory (burned, melted, etc.) even though it operates, replace it.

- Simply replacing a fuse may not eliminate the true cause of a problem, and over current may flow again. Also, if over current secondarily causes an electrical path to fail (such as a wiring meltdown inside a solenoid valve), current will not flow. Thus, a fuse may not be blown out, but it also will not operate. If you do not know the location of burning or of an odor, investigate as described follows.

2-3) How to find cause of failure when fuse blown is reproduced

① Turn the starter switch OFF, and remove the connector from the load (valve, pump).
② Referring to the circuit diagram, remove electrical parts that are connected to the circuit, such as relays, timers and diodes.
③ Turn the starter switch ON, and see whether the conditions can be reproduced (fuse is blown).
④ If a fuse is blown, a part such as a relay may have caused a short between the previous harness and ground (vehicle body). (Replace the harness.) If the conditions are not reproduced, check for signs of burning (odor) on the removed electrical parts.
⑤ If there is no problem, turn the starter switch OFF and reattach the parts.
⑥ Turn the starter switch ON and try again.
⑦ If a fuse is blown with this action, the problem was caused by a short between the harness and ground (vehicle body) that followed the attached electrical part. (Replace the harness.)
⑧ If the conditions are not reproduced, turn the starter switch OFF, and connect the loads (valve and pump) one at a time. Turn the starter switch ON and try again to see whether the fuse blown is reproduced.
⑨ If the fuse blown is reproduced, whatever was added at that time (including a harness added electrically) will be the cause of the failure.

- Even if the fuse is not blown and the valve or pump is not burned, the valve or pump may be damaged electrically and may not operate. There may simply be a disconnection in the interior or an abnormal heat-up.
- Even if the fuse is not blown, abnormal heat-up (hot enough to cause burns if touched) may occur if a relay, timer, diode or other semiconductor fails.

3) Connector inspection
- Is a connector disconnected or loose?
- Check that pins are not snapped or corroded.
- If faulty contact is suspected

  Turn the starter switch OFF. Then disconnect and check the connectors (including relay and switch sockets).

  If the terminal has no luster, faulty contact due to oxidation can be suspected. Therefore, polish the terminal by inserting and removing the connector (relay, switch) repeatedly at least five times. (Luster will return.)

4) Relay inspection (Check ON/OFF operation by sound.)
- Conduct without running the engine. (If you run the engine, you cannot hear the sound of operation.)

  Sound heard : A relay failure occurred.

  No sound heard : Using a tester, check the harness.

  Sound heard : A relay failure occurred.

  Still no sound : Using a tester, check the harness.

  Continuity : Turn the starter switch OFF temporarily, disconnect the relay and check for continuity between the harness-side grounding terminal (color: black) and vehicle body ground. (If there is none, replace the harness.)

  Voltage : With the relay disconnected, turn the starter switch ON and turn the operating switch ON. 24 V (or 12 V) (between vehicle body ground) should not reach the relay coil input terminal. Confirm this. Identify the location (section) to which 24 V (or 12 V) reaches. Then replace the harness or take other action.

5) Solenoid valve inspection (Check ON/OFF operation by sound.)
- Conduct without running the engine. (If you run the engine, you cannot hear the sound of operation.)

  Sound heard : The electrical system is normal.

  No sound heard : Check with a tester.

  Continuity : ① Turn the starter switch OFF temporarily, disconnect the connector and check for continuity between the harness-side grounding terminal (color: black) and vehicle body ground. (If there is none, replace the harness.)

  : ② Is the solenoid valve coil burnt?

  (Turn the starter switch OFF, disconnect the connector and check the resistance between the solenoid valve terminals.)

  Voltage : With the connector disconnected, turn the starter switch ON and check whether 24 V (or 12 V) exists between the harness-side connector and vehicle body ground.

  If YES : Replace the valve.

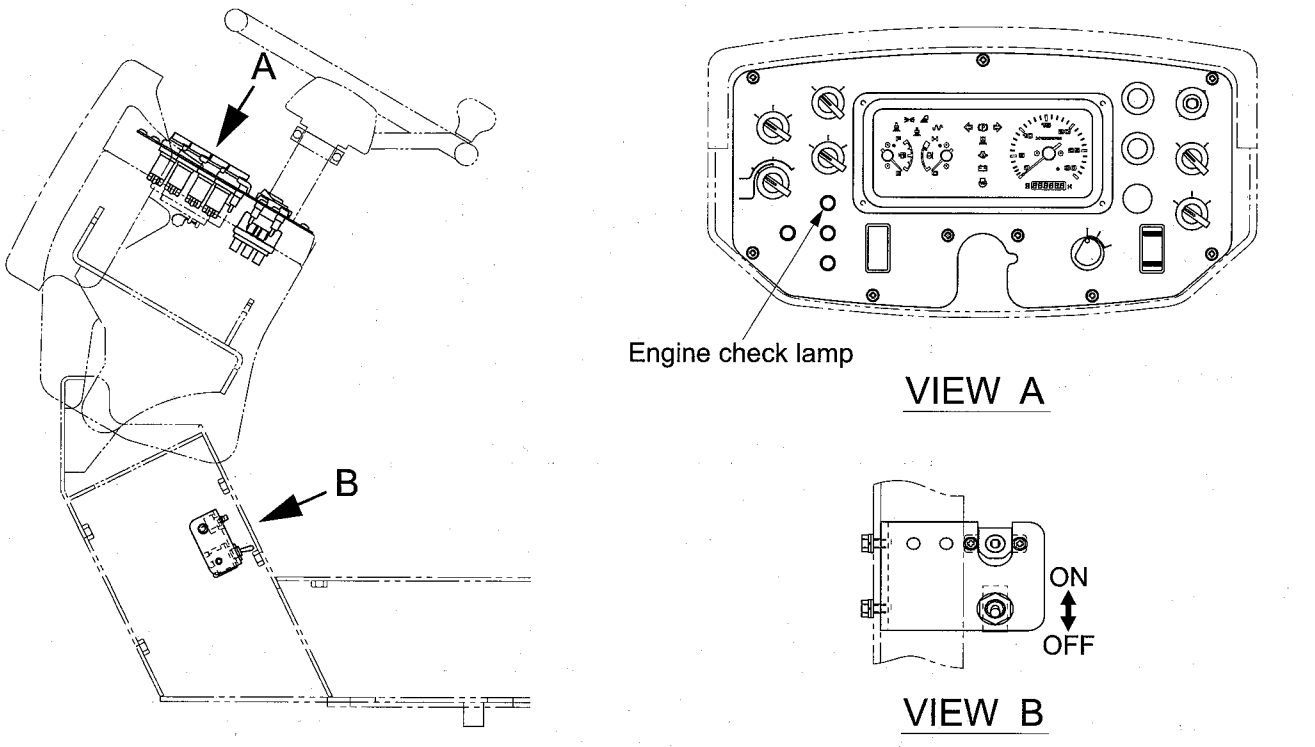
  If NO : Investigate and identify the location (section) to which 24 V (or 12 V) reaches. Then replace the harness or take other action.

6) Harness check
- If an incomplete disconnection inside the harness is suspected, wiggle (move) the harness during the relay inspection and solenoid valve inspection to see whether the relay (valve) operates incorrectly.
- Check for burned areas of the harness.
- Turn the starter switch OFF, disconnect the connector and check the continuity, referring to the circuit diagram and wiring coloring.

2-2. Engine Diagnosis Trouble Code

2-2-1. Description of diagnostic trouble code (DTC)

- The engine control module (ECM) diagnoses most of the wirings and components on turning the starter switch "ON". When detecting problems, it records them as the codes in the ECM memory, and may carry out the fuel-safe action depending on the fault. If the fault has a possibility to trouble the engine operation, the engine check lamp connected to the ECM output lights, and the trouble code is transmitted via CAN.
- If faults are detected during the diagnosis, the engine check lamp lights and it keeps lighting even when the faults are recovered, until the starter switch is turned "OFF". After then, when the starter switch is turned "ON", the ECM diagnoses the circuit again, and if no fault is detected, the engine check lamp does not light. However, the engine check lamp lights in some cases because some diagnosis is carried out after starting the engine.
- When the fault is detected during the diagnosis, the prescribed fuel-safe action starts for the safety and protection of the engine. Once the fuel-safe action starts, it continues even if the faults are recovered, till the starter switch is turned "OFF". After then, when the starter switch is turned "ON", the ECM diagnoses the circuit again, and if no fault is detected, the normal operation starts. However, because some diagnosis is carried out after starting the engine, if faults are detected that time, the fuel-safe action starts again.



SW770-10010

1) Reading procedures of DTC (Diagnostic Trouble Code) displayed by the engine check lamp
   - The present and past diagnostic trouble codes (DTC) recorded in the engine control module (ECM) can be displayed as blink of the engine check lamp by turning the diagnosis switch "ON".
     ① Turn "ON" the starter switch and check that the engine check lamp lights (bulb check).
     ② Turn the starter switch "ON", while keeping the engine stop.
     ③ Turn "ON" the diagnosis switch.
     ④ Count the number of blinking times of the engine check lamp.
     ⑤ Judge the content of the diagnostic trouble code (DTC) according to the DTC table (List of the fault diagnosis codes).

2) The display when no DTC has been recorded:
- The code "1" that indicates to start displaying the codes is displayed repeatedly with 2.4 seconds interval.

3) The display when the DTCs have been recorded:
- The recorded codes are displayed three times with 2.4 seconds intervals. When two or more codes have been recorded, they are displayed three times in the order of smaller numbers. After all the codes are displayed, they are displayed again from the smaller numbers. This display continues while the diagnosis switch is "ON".

Sample of indication of engine check lamp

(Examples) In case of code "23"

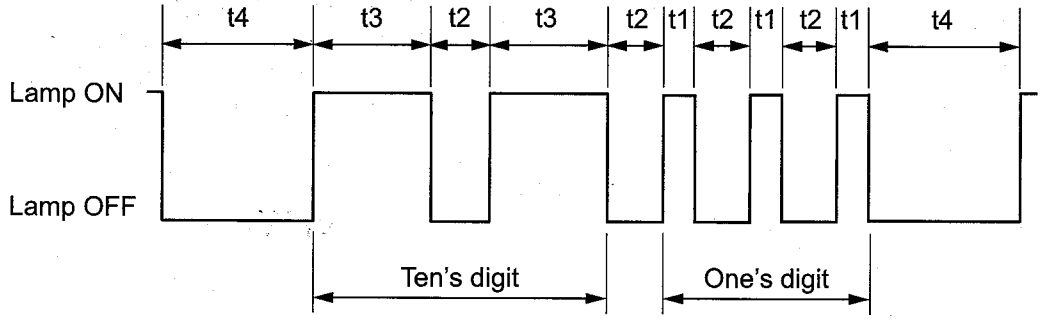
The lamp lights for approx. 1.2 seconds (long term) which repeats twice, and then lights for approx. 0.3 second (short term) which repeats three times.

In case of code "413"

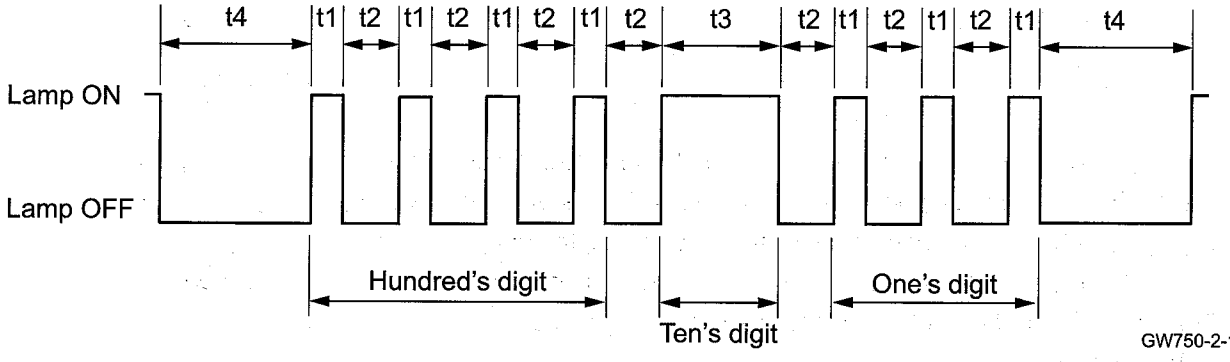
The short term lighting for approx. 0.3 second repeats four times, then the long term lighting for approx. 1.2 seconds once, and then short term lighting for approx. 0.3 second repeats three times.

t1 = approx. 0.3 second
t2 = approx. 0.6 second
t3 = approx. 1.2 seconds
t4 = approx. 2.4 seconds

In case of code "23"



In case of code "413"



GW750-2-10010

2-2-2. Table of the diagnostic trouble code (DTC)

Flash code (Blink of the engine check lamp)	DTC	Description	Symptom
14	P0340	Cam sensor abnormal (No signal)	• The performance does not change during the engine running • Impossible to restart after the engine stall
	P0341	Cam sensor abnormal (Abnormal signal)	• The performance does not change during the engine running • Impossible to restart after the engine stall
15	P0335	Crank sensor abnormal (No signal)	• Possibility of lowering output, white smoke, and large vibration • Possibility of engine stall (Possible to restart if the cam sensor is normal)
	P0336	Crank sensor abnormal (Abnormal signal)	• Possibility of lowering output, white smoke, and large vibration • Possibility of engine stall (Possible to restart if the cam sensor is normal)
16	P1345	Phase misalignment of the cam sensor	• The performance does not change during the engine running • Impossible to restart after the engine stall
22	P0112	Intake air temperature sensor abnormal (Low voltage abnormality)	Nothing special
	P0113	Intake air temperature sensor abnormal (High voltage abnormality)	Nothing special
23	P0117	Water temperature sensor abnormal (Low voltage abnormality)	• Normal temperature: Possibility of generating black smoke at start, and engine combustion sound becoming high • During warming low temperature outside air: Possibility of rough idling, stall, or generating white smoke
	P0118	Water temperature sensor abnormal (High voltage abnormality)	• Normal temperature: Possibility of generating black smoke at start, and engine combustion sound becoming high • During warming low temperature outside air: Possibility of rough idling, stall, or generating white smoke
24	P1271	Abnormal comparison of Accelerator sensors 1 and 2	• System-1 abnormal: No backup • System-2 abnormal: The accelerator opening is limited to 0 %.
	P1277	Accelerator sensor-1 abnormal (Low voltage abnormality)	• System-1 abnormal: No backup • System-2 abnormal: The accelerator opening is limited to 0 %.
	P1278	Accelerator sensor-1 abnormal (High voltage abnormality)	• System-1 abnormal: No backup • System-2 abnormal: The accelerator opening is limited to 0 %.
	P1282	Accelerator sensor-2 abnormal (Low voltage abnormality)	• System-1 abnormal: No backup • System-2 abnormal: The accelerator opening is limited to 0 %.
	P1283	Accelerator sensor-2 abnormal (High voltage abnormality)	• System-1 abnormal: No backup • System-2 abnormal: The accelerator opening is limited to 0 %.

Flash code (Blink of the engine check lamp)	DTC	Description	Symptom
32	P0237	Boost pressure sensor abnormal (Low voltage abnormality)	Generating black smoke
	P0238	Boost pressure sensor abnormal (High voltage abnormality)	Generating black smoke
34	P0611	Charge circuit abnormal (Bank-1)	Possibility of large engine vibration, rough idling, lowering output, defective blowing, or engine stall
	P0612	Charge circuit abnormal (Bank-2)	Possibility of large engine vibration, rough idling, lowering output, defective blowing, or engine stall
36	P1630	A/D converter abnormal	Lowering output, generating black smoke
44	P0487	EGR position abnormal (Brushless specification)	The exhaust gas is affected
45	P0488	EGR valve control abnormal	The exhaust gas is affected
51	P0606	CPU abnormal	Lowering output, Impossible to start
52	P0606	CPU-watching IC abnormal	Lowering output
53	P0601	ROM abnormal	Engine stop
54	P0603	EEPROM abnormal	Operation is not affected
55	P1631	Abnormal voltage on 5 V power source 1	The accelerator opening is limited to 0%.
	P1632	Abnormal voltage on 5 V power source 2	• For backup of 2000 m (6562 ft) equivalent • Generating black smoke in high altitude
	P1633	Abnormal voltage on 5 V power source 3	• Normal temperature: Possibility of generating black smoke at start, and engine combustion sound becoming high • During warming low temperature outside air: Possibility of rough idling, stall, or generating white smoke
	P1634	Abnormal voltage on 5 V power source 4	Generating black smoke
	P1635	Abnormal voltage on 5 V power source 5	Possibility of lowering output, engine stall, and affection on exhaust gas
66	P0380	Glow relay abnormal	Operation is not affected
71	P0107	Atmospheric pressure sensor abnormal (Low voltage abnormality)	• For backup of 2000 m (6562 ft) equivalent • Generating black smoke in high altitude
	P0108	Atmospheric pressure sensor abnormal (High voltage abnormality)	• For backup of 2000 m (6562 ft) equivalent • Generating black smoke in high altitude
77	P0650	Engine check lamp abnormal	Operation is not affected
118	P0088	Common rail pressure abnormal (First step)	Possibility of large engine vibration, rough idling, lowering output, defective blowing up, generating black smoke, or excessive output
		Common rail pressure abnormal (Second step)	
151	P0089	Common rail pressure abnormal (Excessive sending pressure of pump)	Possibility of large engine vibration, rough idling, lowering output, defective blowing up, generating black smoke, or excessive output
158	P1261	Driving system of injection nozzle common 1 abnormal	Possibility of large engine vibration, rough idling, lowering output, defective blowing up, and engine stall

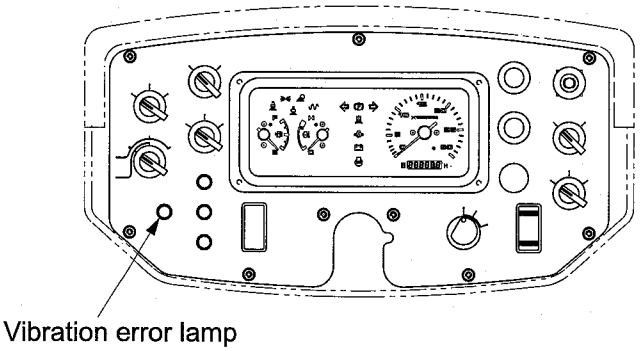
Flash code (Blink of the engine check lamp)	DTC	Description	Symptom
159	P1262	Driving system of injection nozzle common 2 abnormal	Possibility of large engine vibration, rough idling, lowering output, defective blowing up, and engine stall
211	P0182	Fuel temperature sensor abnormal (Low voltage abnormality)	Nothing special
	P0183	Fuel temperature sensor abnormal (High voltage abnormality)	Nothing special
225	P1095	Pressure limiter open	Lowering output
227	P0087	No sending pressure of pump (Fuel leakage)	Possibility of large engine vibration, rough idling, lowering output, defective blowing up, generating black smoke, or excessive output
	P1093	No sending pressure of pump (Fuel leakage)	Possibility of large engine vibration, rough idling, lowering output, defective blowing up, generating black smoke, or excessive output
245	P0192	Common rail pressure sensor abnormal (Low voltage abnormality)	• Possibility of engine stall • Lowering output
	P0193	Common rail pressure sensor abnormal (High voltage abnormality)	• Possibility of engine stall • Lowering output
247	P0090	Open circuit in SVC driving system, +B short-circuited, or grounding fault	• Possibility of stall or blowing up depending on the open/short-circuit condition • Generating black smoke, excessive output
271	P0201	Open circuit in injection nozzle #1 driving system	Large engine vibration, rough idling, lowering output, and defective blowing up
272	P0202	Open circuit in injection nozzle #2 driving system	Large engine vibration, rough idling, lowering output, and defective blowing up
273	P0203	Open circuit in injection nozzle #3 driving system	Large engine vibration, rough idling, lowering output, and defective blowing up
274	P0204	Open circuit in injection nozzle #4 driving system	Large engine vibration, rough idling, lowering output, and defective blowing up
294	P0522	Engine oil pressure sensor abnormal (Low voltage abnormality)	Operation is not affected
	P0523	Engine oil pressure sensor abnormal (High voltage abnormality)	Operation is not affected
295	P1112	Boost temperature sensor abnormal (Low voltage abnormality)	Operation is not affected
	P1113	Boost temperature sensor abnormal (High voltage abnormality)	Operation is not affected
416	P1625	Main relay system abnormal (Will not turn on)	Engine cannot be started, and vehicle power supply cannot be turned off.
542	P1173	Overheat	Lowering output, and defective blowing up
543	P0219	Overrun	Lowering output (Injection quantity restriction is canceled when engine speed is decreased.)

(NOTICE)

- **For the detail troubleshooting relating to the engine, refer to the "Troubleshooting Manual" of the engine manufacturer.**

2-3. Vibration Error Lamp (SW770HF, SW770ND)

When vibration error lamp is turn ON, it is possible that abnormalities have occurred in following items.



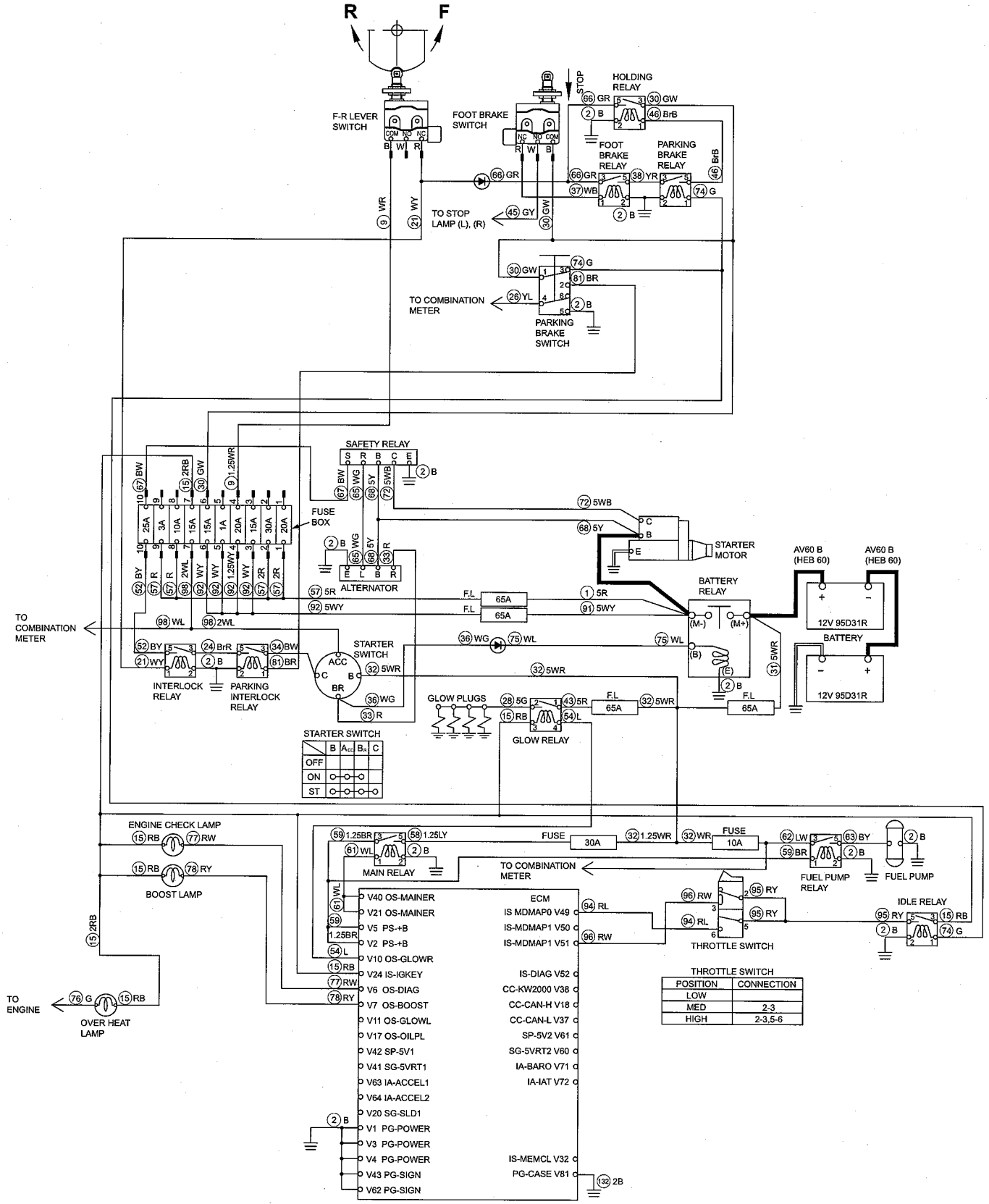
SW770-10011

No.	Error	Cause
0	Pump Sol.a	Detected error of vibrator pump SOL.C (H)
1	Pump Sol.b	Detected error of vibrator pump SOL.D (L)
2	Front SW SOL.	Detected error of vibrator solenoid A (F)
3	Rear SW SOL.	Detected error of vibrator solenoid B (R)
4	FR SW Both ON	Turned ON simultaneously of front and rear vibratory drum select switch
5	F. Vib. Rpm	Input front side vibrator speed sensor > 4900 rpm (Not use)
6	R. Vib. Rpm	Input rear side vibrator speed sensor > 4900 rpm (Not use)
7	Travel Sensor	Error judgment of traveling detection sensor
8	F. Vib. Sensor	*1 Error judgment of front side vibrator speed sensor
9	R. Vib. Sensor	*1 Error judgment of rear side vibrator speed sensor
10	CAN Receiver	When CAN engine speed data is not able to receive in more than CAN Recv Err [ms], judge CAN communication error.
11	LH SW Both ON	Turned ON simultaneously of vibration select switch 1 and 2
12	Select SW Both ON	No error judgment
13	ECU Temp.	Controller case temperature > 85°C

- When detected error, turn ON lamp except for No. 13 error. When error condition is canceled, lamp is turn OFF.
- *1: Standard/option selector = when standard position, no error detection.
- This equipment is BODAS controller RC, standard mode specification and machine traveling by input vibration auto switch.

If the problem cannot be remedied, contact to SAKAI authorized dealer or SAKAI service department.

Fig.: 2-4-1



THROTTLE SWITCH	
POSITION	CONNECTION
LOW	
MED	2-3
HIGH	2-3,5-6

SW770-10001

2-4. Engine

Check following items before troubleshooting.

- No blown fuses and power is applied up to fuses.
- Check any ground circuit which belongs to components to be checked.
- Engine check lamp is not lighting nor blinking.
- Boost lamp is not lighting.
- Over heat lamp is not lighting.
- There is no trouble on the engine itself.
  - Refer to the troubleshooting manual of the engine manufacturer for the cases that the engine check lamp is lighting or blinking, the boost temperature lamp or over heat lamp lights while the engine is still cool, or, any troubles on the engine itself (Such as start failure of engine due to the trouble on fuel supply system, unstable rotation of the engine, excessive white smoke/black smoke, or abnormal engine combustion sound).

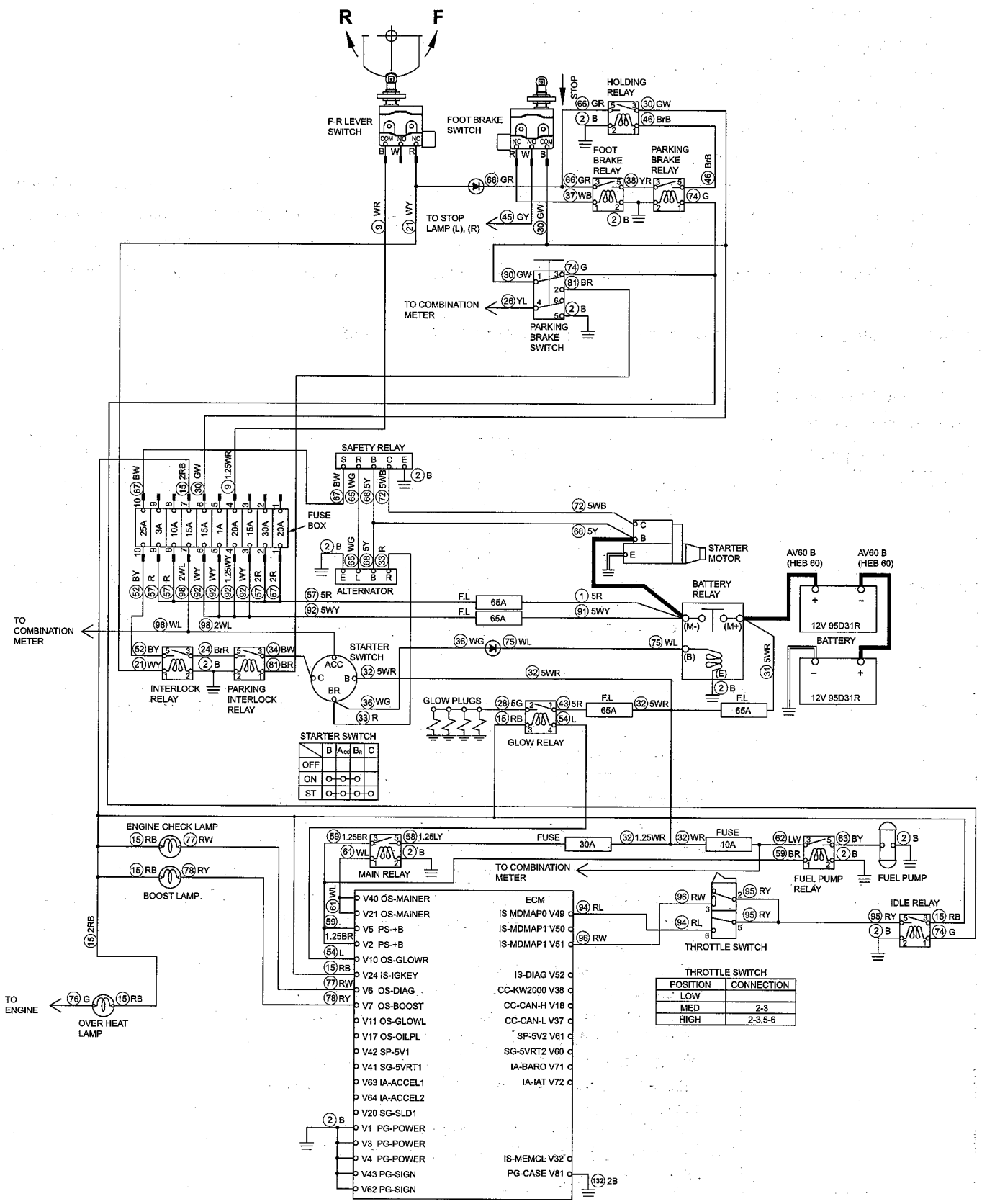
2-4-1. Engine will not start (Starter motor does not run) 1/3

- F-R lever must be "N".
- Parking brake switch must be applied.

Reference Fig.: 2-4-1

Check point	Check/Cause	Action
1. Battery	• Measure battery voltage or specific gravity. Standard voltage : 24 V or more Standard gravity : 1.26 or more • If value is below standard, battery capacity is insufficient.	Charge or replace battery.
2. Starter Switch	• Check continuity between O-O according to starter switch connection table. Switch is OK if there is continuity between connection O-O. • If there is no continuity, starter switch is faulty.	Replace starter switch.
3. Starter Motor	(1) When starter switch is ON, measure voltage between starter motor terminal B and chassis ground. Standard voltage : 24 V or more (2) When starter switch is START, measure voltage between starter motor terminal C and chassis ground. Standard voltage : 24 V or more • If above items (1) and (2) are OK and starter motor does not run, starter motor is faulty.	Replace starter motor.
4. Safety Relay	(1) When starter switch is START, measure voltage between safety relay terminal S inlet wire BW and chassis ground. Standard voltage : 24 V or more (2) When starter switch is ON, measure voltage between safety relay terminal B inlet wire Y and chassis ground. Standard voltage : 24 V or more (3) When starter switch is START, measure voltage between safety relay terminal C outlet wire WB and chassis ground. Standard voltage : 24 V or more • If above items (1) and (2) are OK and item (3) is NG, safety relay is faulty.	Replace safety relay.

Fig.: 2-4-1



SW770-10001

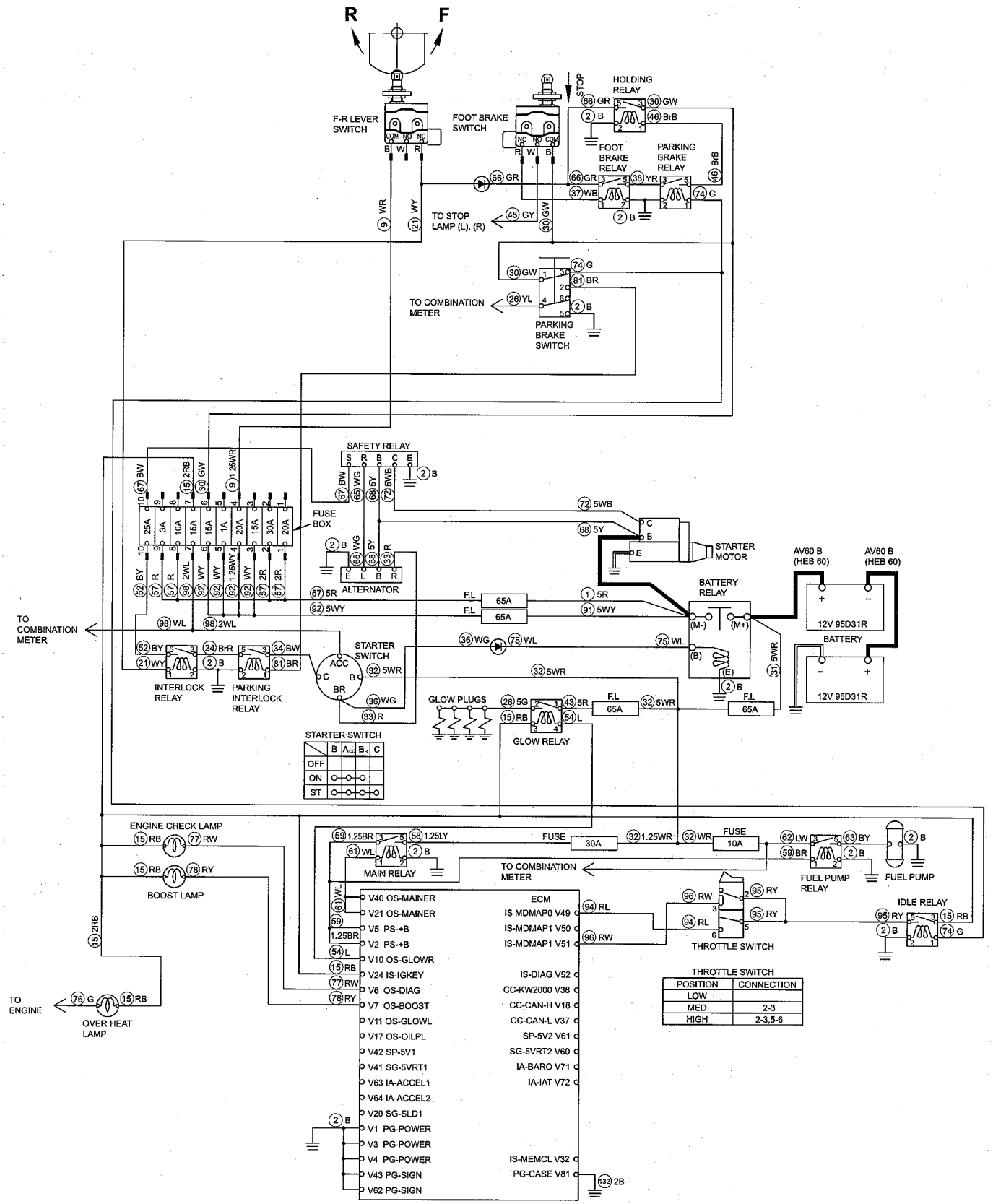
2-4-1. Engine will not start (Starter motor does not run) 2/3

- F-R lever must be "N".
- Parking brake switch must be applied.

Reference Fig.: 2-4-1

Check point	Check/Cause	Action
5. Battery Relay	(1) When starter switch is OFF, measure voltage between battery relay primary terminal M (+) and chassis ground. Standard voltage : 24 V or more (2) When starter switch is ON, measure voltage between battery relay coil terminal B inlet wire WL and coil ground terminal E. Standard voltage : 24 V or more (3) When starter switch is ON, measure voltage between battery relay secondary terminal M (-) and chassis ground. Standard voltage : 24 V or more • If above items (1) and (2) are OK and item (3) is NG, battery relay is faulty.	Replace battery relay.
6. F-R Lever Switch	(1) When starter switch is ON, measure voltage between F-R lever switch terminal COM inlet wire WR and chassis ground. Standard voltage : 24 V or more (2) When starter switch is ON, measure voltage between F-R lever switch terminal NC outlet wire WY and chassis ground. Standard voltage : 24 V or more • If above item (1) is OK and item (2) is NG, F-R lever switch is faulty.	Replace F-R lever switch.
7. Parking Brake Switch	(1) When starter switch is ON, measure voltage between parking brake switch terminal 1 inlet wire GW and chassis ground. Standard voltage : 24 V or more (2) When starter switch is ON, measure voltage between parking brake switch terminal 2 outlet wire BR and chassis ground. Standard voltage : 24 V or more • If above item (1) is OK and item (2) is NG, parking brake switch is faulty.	Replace parking brake switch.
8. Interlock Relay	(1) When starter switch is ON, measure voltage between interlock relay terminal 1 inlet wire WY and chassis ground. Standard voltage : 24 V or more (2) When starter switch is START, measure voltage between interlock relay terminal 3 inlet wire BrR and chassis ground. Standard voltage : 24 V or more (3) When starter switch is START, measure voltage between interlock relay terminal 5 outlet wire BY and chassis ground. Standard voltage : 24 V or more • If above items (1) and (2) are OK and item (3) is NG, interlock relay is faulty.	Replace interlock relay.

Fig.: 2-4-1



SW770-10001

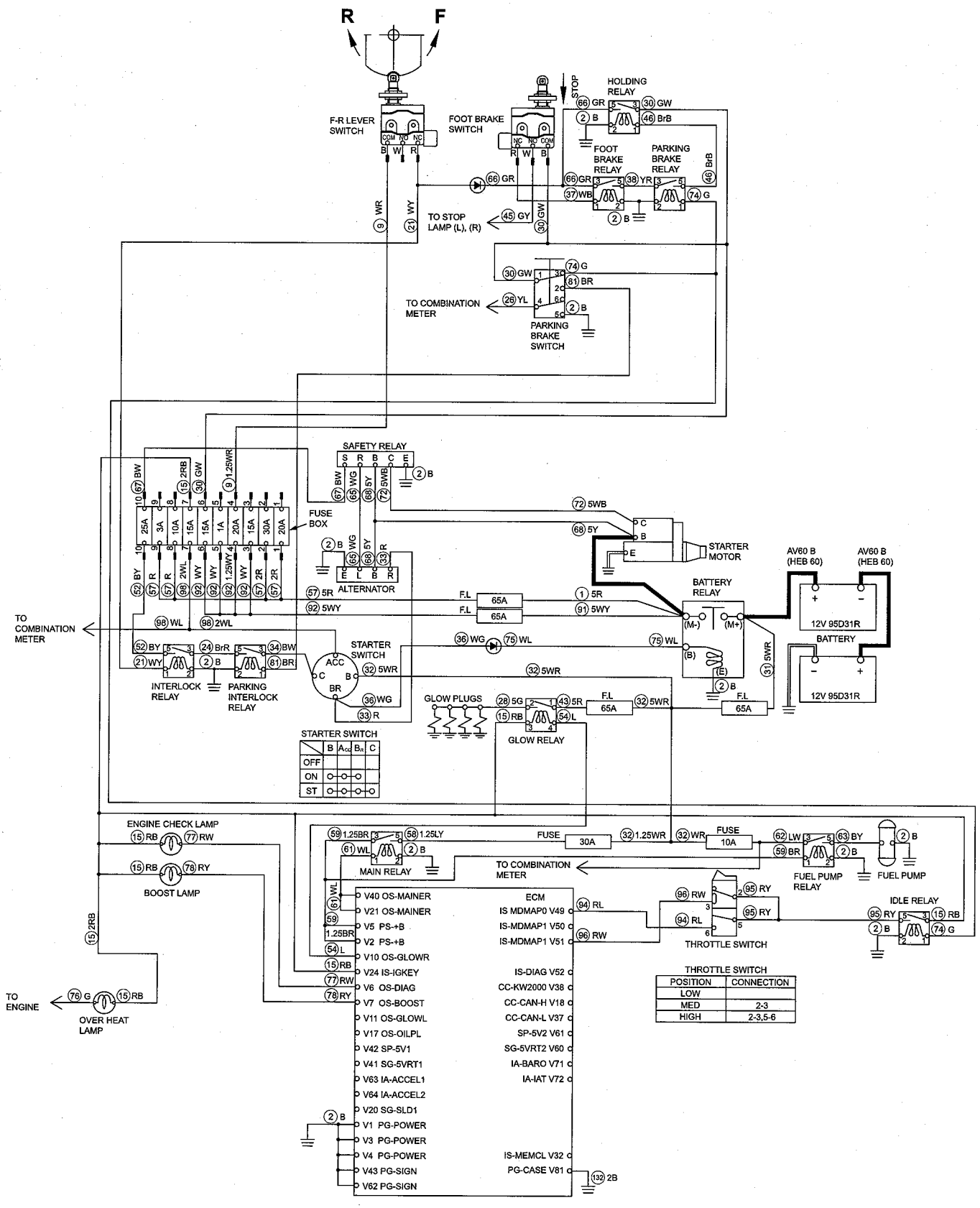
2-4-1. Engine will not start (Starter motor does not run) 3/3

- F-R lever must be "N".
- Parking brake switch must be applied.

Reference Fig.: 2-4-1

Check point	Check/Cause	Action
9. Parking Interlock Relay	(1) When starter switch is ON, measure voltage between parking interlock relay terminal 1 inlet wire BR and chassis ground. Standard voltage : 24 V or more (2) When starter switch is START, measure voltage between parking interlock relay terminal 3 inlet wire BW and chassis ground. Standard voltage : 24 V or more (3) When starter switch is START, measure voltage between parking interlock relay terminal 5 outlet wire BrR and chassis ground. Standard voltage : 24 V or more • If above items (1) and (2) are OK and item (3) is NG, parking interlock relay is faulty.	Replace parking interlock relay.
10. Harness Connecting Between Terminals	• Measure resistance of harness connecting between terminals. Standard resistance : 10 Ω or less • If resistance is abnormal, harness is faulty.	Repair or replace harness.

Fig.: 2-4-1



THROTTLE SWITCH	
POSITION	CONNECTION
LOW	
MED	2-3
HIGH	2-3,5-6

STARTER SWITCH	B	ACC	BR	C
OFF				
ON	o			o
ST	o	o		o

SW770-10001

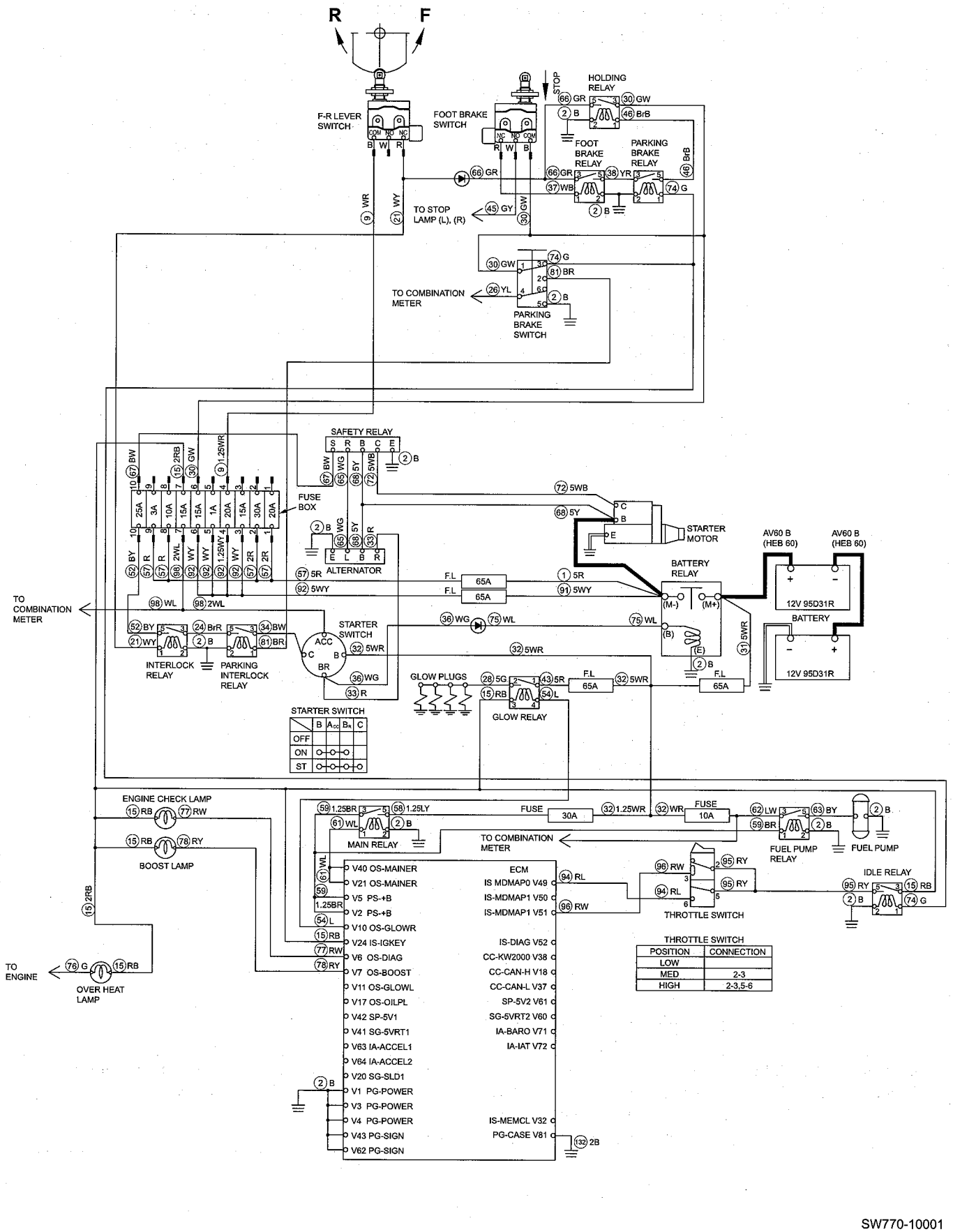
2-4-2. Engine will not start (But starter motor runs)

- **In case of engine will not start while starter motor runs, generally trouble is caused by that fuel is not supplied, supply amount of fuel is extremely low, or selection of fuel is not appropriate.**
- Check that fuel is supplied to inlet of fuel pump.

Reference Fig.: 2-4-1

Check point	Check/Cause	Action
1. Fuel Pump	• When starter switch is ON, measure voltage between fuel pump terminal inlet wire BY and chassis ground. Standard voltage : 24 V or more • If above item is OK and fuel pump does not operate, fuel pump is faulty.	Repair or replace fuel pump.
2. Fuel Pump Relay	(1) When starter switch is ON, measure voltage between fuel pump relay terminal 1 inlet wire BR and chassis ground. Standard voltage : 24 V or more (2) Measure voltage between fuel pump relay terminal 3 inlet wire LW and chassis ground. Standard voltage : 24 V or more (3) When starter switch is ON, measure voltage between fuel pump relay terminal 5 outlet wire BY and chassis ground. Standard voltage : 24 V or more • If above items (1) and (2) are OK and item (3) is NG, fuel pump relay is faulty.	Replace engine stop solenoid.
3. Main Relay	(1) When starter switch is ON, measure voltage between main relay terminal 1 inlet wire WL and chassis ground. Standard voltage : 24 V or more (2) Measure voltage between main relay terminal 5 inlet wire LY and chassis ground. Standard voltage : 24 V or more (3) When starter switch is ON, measure voltage between main relay terminal 3 outlet wire BR and chassis ground. Standard voltage : 24 V or more • If above items (1) and (2) are OK and item (3) is NG, main relay is faulty.	Replace main relay.
4. ECM	(1) When starter switch is ON, measure voltage between ECM terminal V24 wire RB and chassis ground. Standard voltage : 24 V or more (2) Check ECM terminals are reliably grounded. • ECM terminals V1, V3, V4, V43 and V62 wires B • ECM terminal V81 wire B (3) When starter switch is ON, measure voltage between ECM terminals V21, V40 wires WL and chassis ground. Standard voltage : 24 V or more • If above items (1) and (2) are OK and item (3) is NG, ECM is faulty.	Replace ECM.
5. Harness Connecting Between Terminals	• Measure resistance of harness connecting between terminals. Standard resistance : 10 Ω or less • If resistance is abnormal, harness is faulty.	Repair or replace harness.

Fig.: 2-4-1



SW770-10001

2-4-3. No charging

Reference Fig.: 2-4-1

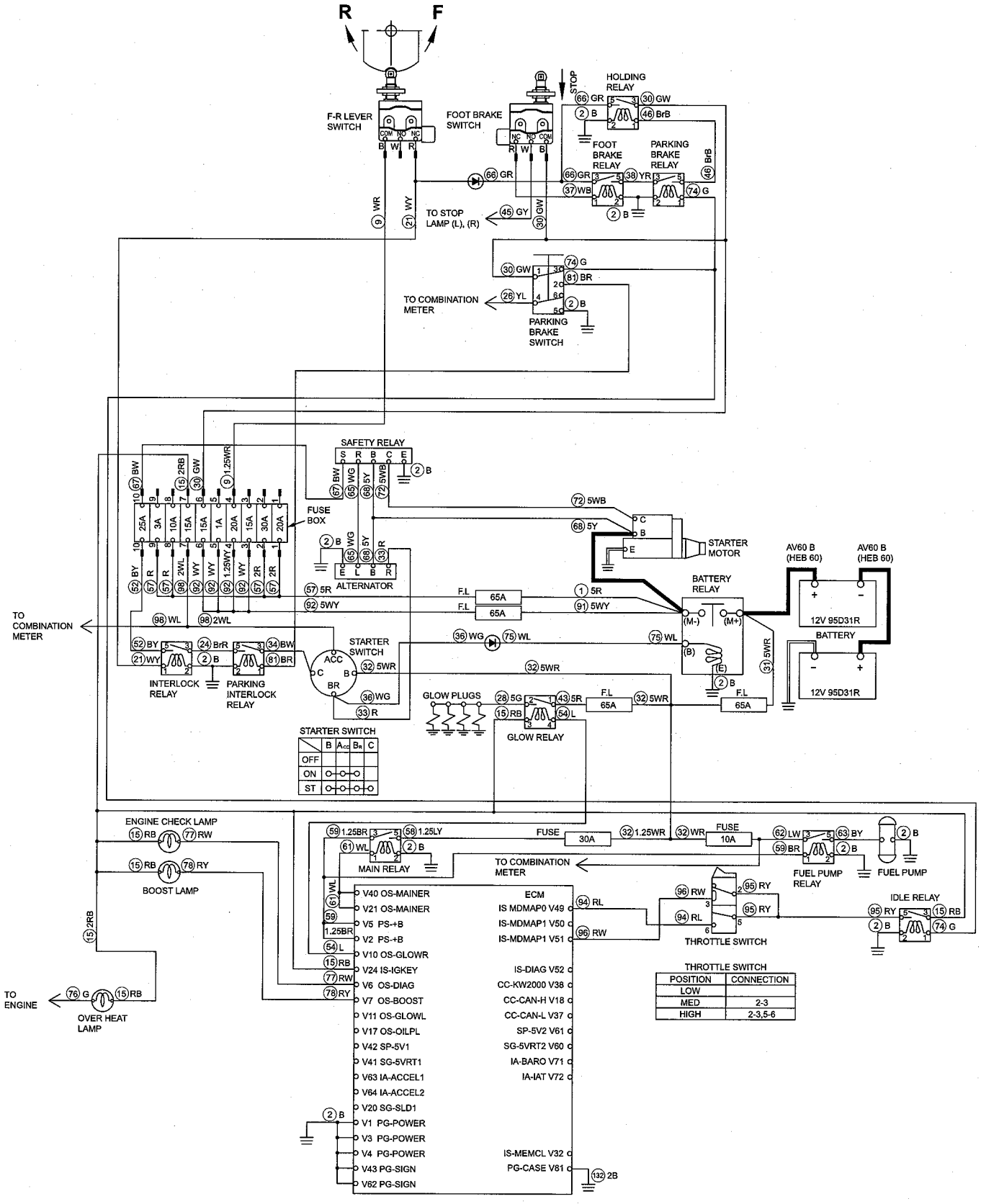
Check point	Check/Cause	Action
1. Alternator	• After starting engine, measure voltage between alternator terminal B wire Y and chassis ground. Standard voltage : At least intermediate engine speed, 27 V or more • If voltage is lower than standard, alternator is faulty. • If voltage is normal and battery is not charged, battery is faulty.	Replace alternator or battery.

2-4-4. Glow plug is not heated (Engine starting performance is bad in cold weather)

Reference Fig. : 2-4-1

Check point	Check/Cause	Action
1. Glow Plug	• When starter switch is ON, measure voltage between glow plug inlet wire G and chassis ground. Standard voltage : 24 V or more • If voltage is normal, glow plug is faulty.	Replace glow plug.
2. Glow Relay	(1) When starter switch is ON, measure voltage between glow relay terminal 3 inlet wire RB and chassis ground. Standard voltage : 24 V or more (2) Measure voltage between glow relay terminal 1 inlet wire R and chassis ground. Standard voltage : 24 V or more (3) When starter switch is ON, measure voltage between glow relay terminal 2 outlet wire G and chassis ground. Standard voltage : 24 V or more • If above items (1) and (2) are OK and item (3) is NG, glow relay is faulty.	Replace glow relay.
3. Harness Connecting Between Terminals	• Measure resistance of harness connecting between terminals. Standard resistance : 10 Ω or less • If resistance is abnormal, harness is faulty.	Repair or replace harness.

Fig.: 2-4-1



SW770-10001

2-4-5. Engine speed cannot be switched

Reference Fig. : 2-4-1

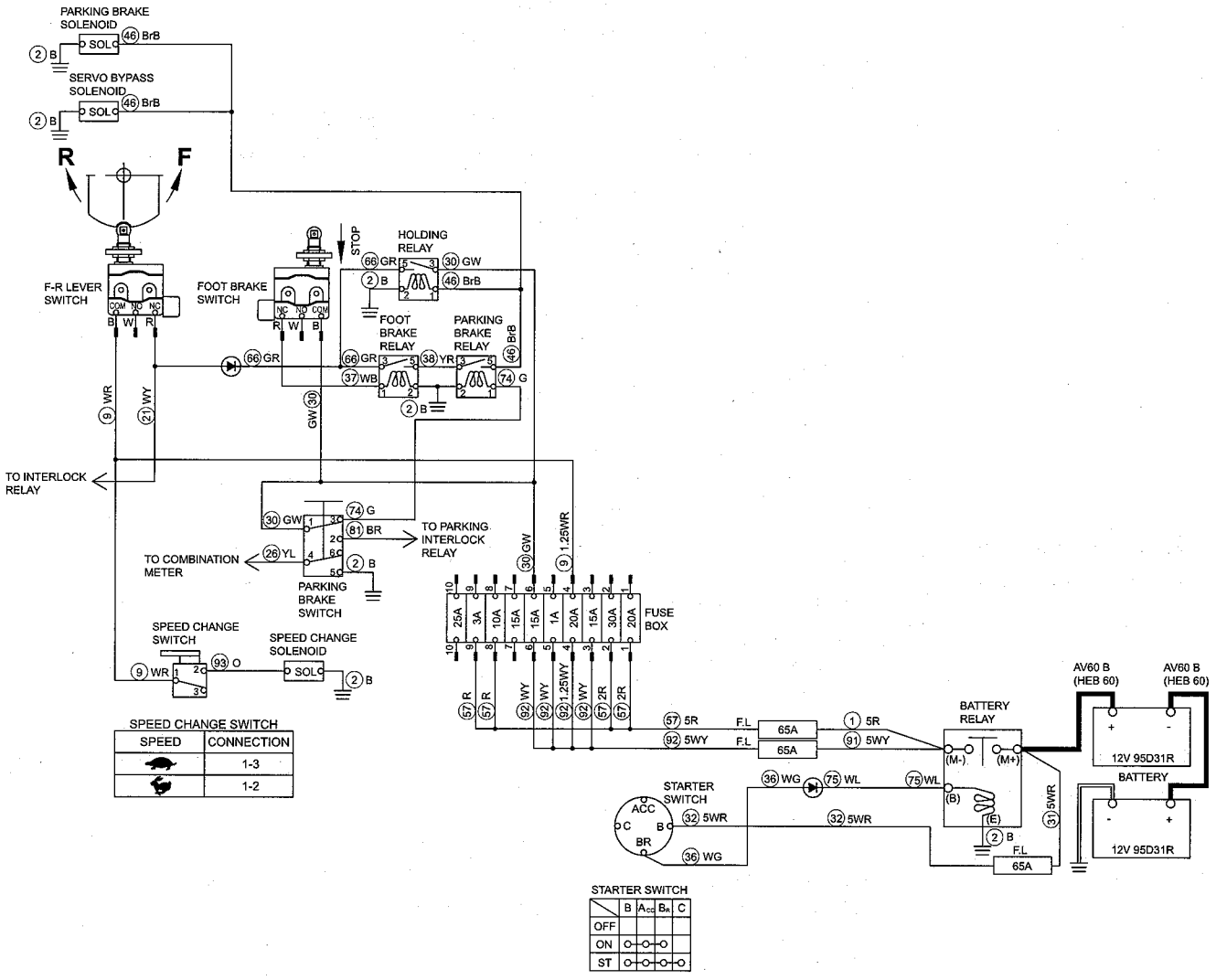
Check point	Check/Cause	Action
1. Throttle Switch	(1) When throttle switch is "LOW", check continuity between throttle switch terminals 2 and 3, 5 and 6. There is no continuity in normal condition. (2) When throttle switch is "MED", check continuity between throttle switch terminals. • Throttle switch terminal 2 and 3. There is continuity in normal condition. • Throttle switch terminal 5 and 6. There is no continuity in normal condition. (3) When throttle switch is "HIGH", check continuity between throttle switch terminals 2 and 3, 5 and 6. There is continuity in normal condition. • If above item (1), (2) or (3) is NG, throttle switch is faulty.	Replace throttle switch.
2. Idle Relay	(1) When starter switch is ON and parking brake switch is released, measure voltage between idle relay terminal 1 inlet wire G and chassis ground. Standard voltage : 24 V or more (2) When starter switch is ON, measure voltage between idle relay terminal 3 inlet wire RB and chassis ground. Standard voltage : 24 V or more (3) When starter switch is ON and parking brake switch is released, measure voltage between idle relay terminal 5 outlet wire RY and chassis ground. Standard voltage : 24 V or more • If above items (1) and (2) are OK and item (3) is NG, idle relay is faulty.	Replace Idle relay.
3. Harness Connecting Between Terminals	• Measure resistance of harness connecting between terminals. Standard resistance : 10 Ω or less • If resistance is abnormal, harness is faulty.	Repair or replace harness.

2-4-6. Starter motor runs even when F-R lever is not at "N" and parking brake is not applied

Reference Fig.: 2-4-1

Check point	Check/Cause	Action
1. F-R Lever Switch	• When starter switch is OFF and F-R lever is "F" or "R", check continuity between F-R lever switch terminal COM and terminal NC. There is no continuity in normal condition. • If there is continuity, F-R lever switch is faulty.	Replace F-R lever switch.
2. Parking Brake Switch	• When starter switch is OFF and parking brake switch is released position, check continuity between parking brake switch terminal 1 and 2. There is no continuity in normal condition. • If there is continuity, parking brake switch is faulty.	Replace parking brake switch.

Fig.: 2-5-1



SW770-10002

2-5. Propulsion

Check following items before troubleshooting.

- No blown fuses and power is applied up to fuses.
- When measuring voltage and current without disconnecting connectors, refer to "Measuring voltage and current flowing using tester" (P.10-006 to P.10-008).
- Check any ground circuit which belongs to components to be checked.

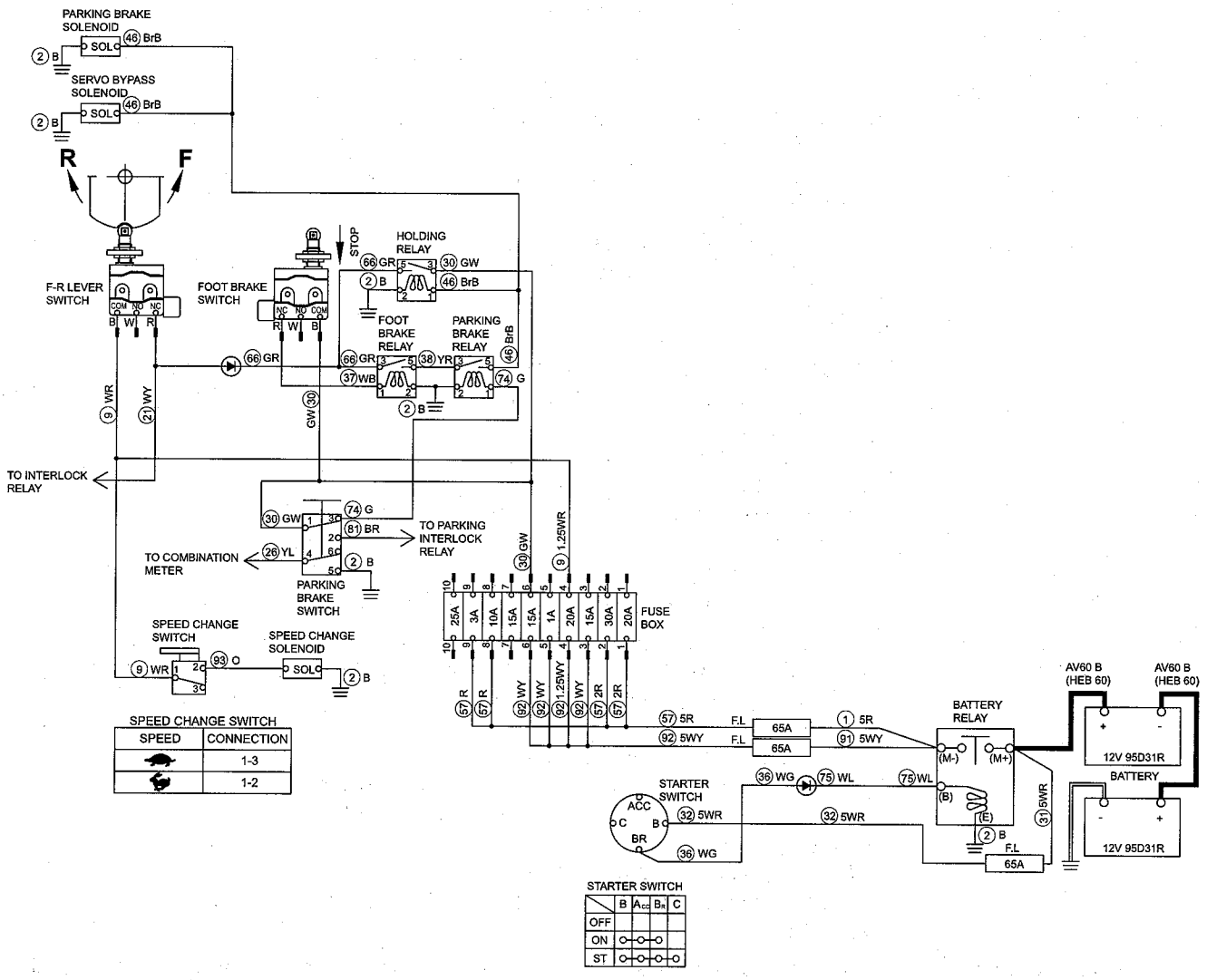
2-5-1. Machine moves neither forward nor backward 1/3

- Parking brake switch must be released.
- Foot brake switch must be ON (Brake pedal is not depressed).

Reference Fig.: 2-5-1

Check point	Check/Cause	Action
1. Servo Bypass Solenoid	• Disconnect harness and measure resistance of coil. Standard resistance : 45 ±4.5 Ω • If measured resistance is abnormal, servo bypass solenoid is faulty.	Replace servo bypass solenoid.
2. Parking Brake Solenoid	• Disconnect harness and measure resistance of coil. Standard resistance : 30.5 Ω • If measured resistance is abnormal, parking brake solenoid is faulty.	Replace parking brake solenoid.
3. F-R Lever Switch	(1) When starter switch is ON, measure voltage between F-R lever switch terminal COM inlet wire WR and chassis ground. Standard voltage : 24 V or more (2) When starter switch is ON and F-R lever is "N", measure voltage between F-R lever switch terminal NC outlet wire WY and chassis ground. Standard voltage : 24 V or more • If above item (1) is OK and item (2) is NG, F-R lever switch is faulty.	Replace F-R lever switch.
4. Foot Brake Switch	(1) When starter switch is ON, measure voltage between foot brake switch terminal COM inlet wire GW and chassis ground. Standard voltage : 24 V or more (2) When starter switch is ON, measure voltage between foot brake switch terminal NC outlet wire WB and chassis ground. Standard voltage : 24 V or more • If above item (1) is OK and item (2) is NG, foot brake switch is faulty.	Replace foot brake switch.
5. Parking Brake Switch	(1) When starter switch is ON, measure voltage between parking brake switch terminal 1 inlet wire GW and chassis ground. Standard voltage : 24 V or more (2) When starter switch is ON, measure voltage between parking brake switch terminal 3 outlet wire G and chassis ground. Standard voltage : 24 V or more • If above item (1) is OK and item (2) is NG, parking brake switch is faulty.	Replace parking brake switch.

Fig.: 2-5-1



SW770-10002

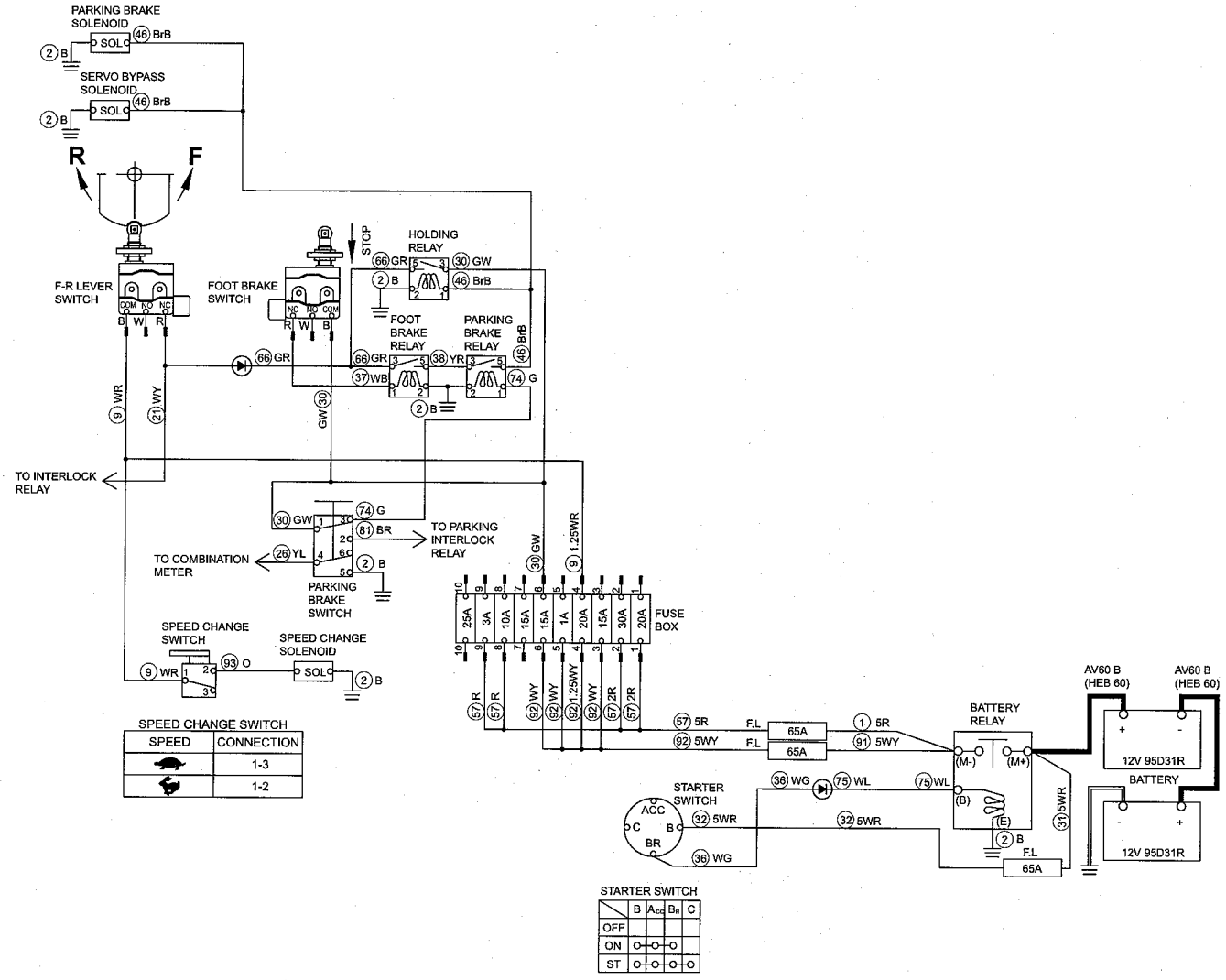
2-5-1. Machine moves neither forward nor backward 2/3

- Parking brake switch must be released.
- Foot brake switch must be ON (Brake pedal is not depressed).

Reference Fig.: 2-5-1

Check point	Check/Cause	Action
6. Foot Brake Relay	(1) When starter switch is ON, measure voltage between foot brake relay terminal 1 inlet wire WB and chassis ground. Standard voltage : 24 V or more (2) When starter switch is ON and F-R lever is "N", measure voltage between foot brake relay terminal 3 inlet wire GR and chassis ground. Standard voltage : 24 V or more (3) After starting engine and F-R lever is "F" or "R", measure voltage between foot brake relay terminal 3 inlet wire GR and chassis ground. Standard voltage : 24 V or more (4) When starter switch is ON and F-R lever is "N", or after starting engine and F-R lever is "F" or "R", measure voltage between foot brake relay terminal 5 outlet wire YR and chassis ground. Standard voltage : 24 V or more • If above items (1), (2) and (3) are OK and item (4) is NG, foot brake relay is faulty.	Replace foot brake relay.
7. Parking Brake Relay	(1) When starter switch is ON, measure voltage between parking brake relay terminal 1 inlet wire G and chassis ground. Standard voltage : 24 V or more (2) When starter switch is ON and F-R lever is "N", measure voltage between parking brake relay terminal 3 inlet wire YR and chassis ground. Standard voltage : 24 V or more (3) After starting engine and F-R lever is "F" or "R", measure voltage between parking brake relay terminal 3 inlet wire YR and chassis ground. Standard voltage : 24 V or more (4) When starter switch is ON and F-R lever is "N", or after starting engine and F-R lever is "F" or "R", measure voltage between parking brake relay terminal 5 outlet wire BrB and chassis ground. Standard voltage : 24 V or more • If above items (1), (2) and (3) are OK and item (4) is NG, parking brake relay is faulty.	Replace parking brake relay.

Fig.: 2-5-1



SW770-10002

2-5-1. Machine moves neither forward nor backward 3/3

- Parking brake switch must be released.
- Foot brake switch must be ON (Brake pedal is not depressed).

Reference Fig.: 2-5-1

Check point	Check/Cause	Action
8. Holding Relay	(1) When starter switch is ON, measure voltage between holding relay terminal 3 inlet wire GW and chassis ground. Standard voltage : 24 V or more (2) When starter switch is ON and F-R lever is "N", measure voltage between holding relay terminal 1 inlet wire BrB and chassis ground. Standard voltage : 24 V or more (3) After starting engine and F-R lever is "F" or "R", measure voltage between holding relay terminal 1 inlet wire BrB and chassis ground. Standard voltage : 24 V or more (4) When starter switch is ON and F-R lever is "N", or after starting engine and F-R lever is "F" or "R", measure voltage between holding relay terminal 5 outlet wire GR and chassis ground. Standard voltage : 24 V or more • If above items (1), (2) and (3) are OK and item (4) is NG, holding relay is faulty.	Replace holding relay.
9. Harness Connecting Between Terminals	• Measure resistance of harness connecting between terminals. Standard resistance : 10 Ω or less • If resistance is abnormal, harness is faulty.	Repair or replace harness.

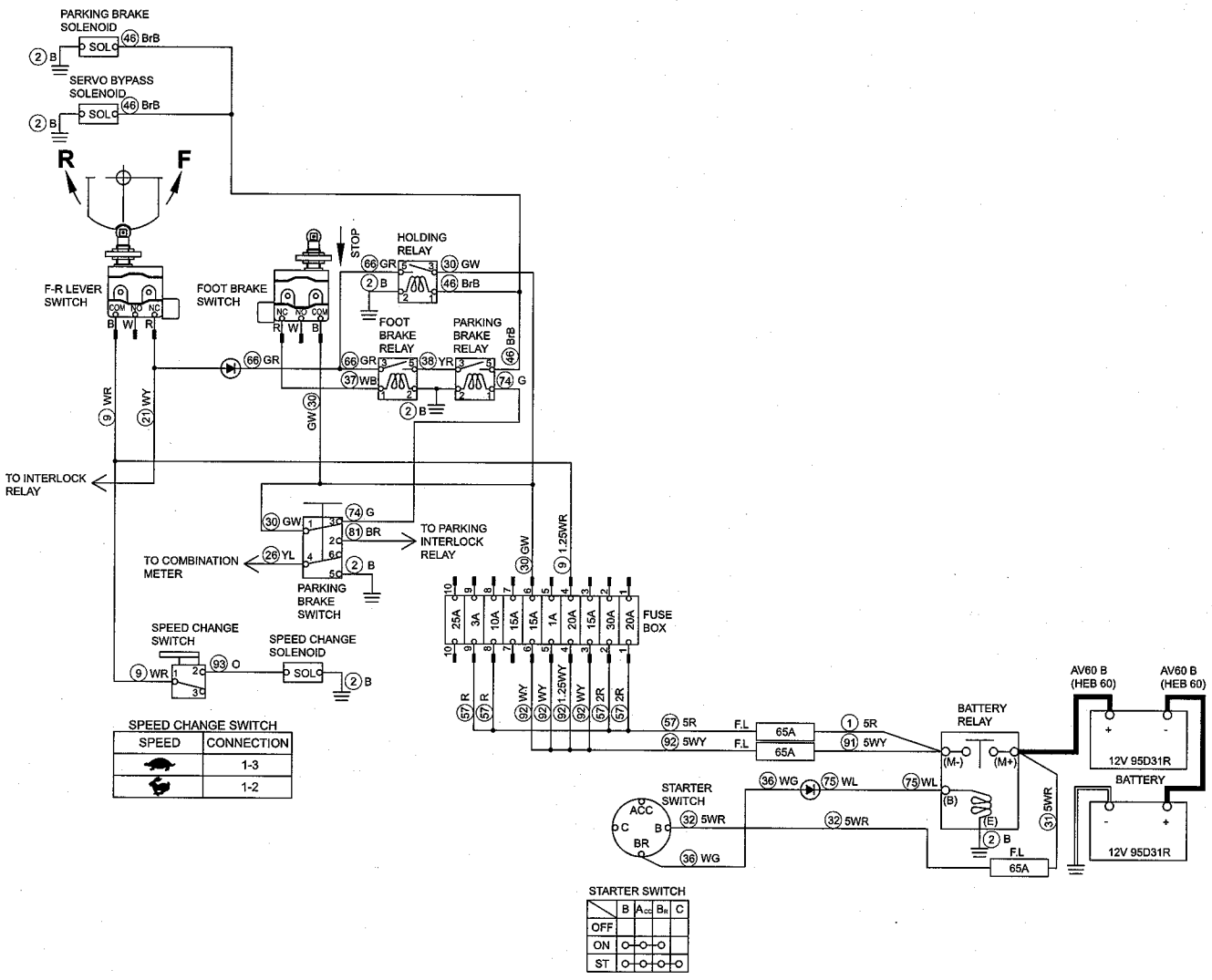
2-5-2. Machine speed cannot be changed

- Speed change switch must be "  ".

Reference Fig.: 2-5-1

Check point	Check/Cause	Action
1. Speed Change Solenoid	• Disconnect harness and measure resistance of coil. Standard resistance : 30.5 Ω • If measured resistance is abnormal, speed change solenoid is faulty.	Replace speed change solenoid.
2. Speed Change Switch	(1) When starter switch is ON, measure voltage between speed change switch terminal 1 inlet wire WR and chassis ground. Standard voltage : 24 V or more (2) When starter switch is ON, measure voltage between speed change switch terminal 2 outlet wire O and chassis ground. Standard voltage : 24 V or more • If above item (1) is OK and (2) is NG, speed change switch is faulty.	Replace speed change switch.
3. Harness Connecting Between Terminals	• Measure resistance of harness connecting between terminals. Standard resistance : 10 Ω or less • If resistance is abnormal, harness is faulty.	Repair or replace harness.

Fig.: 2-5-1



SW770-10002

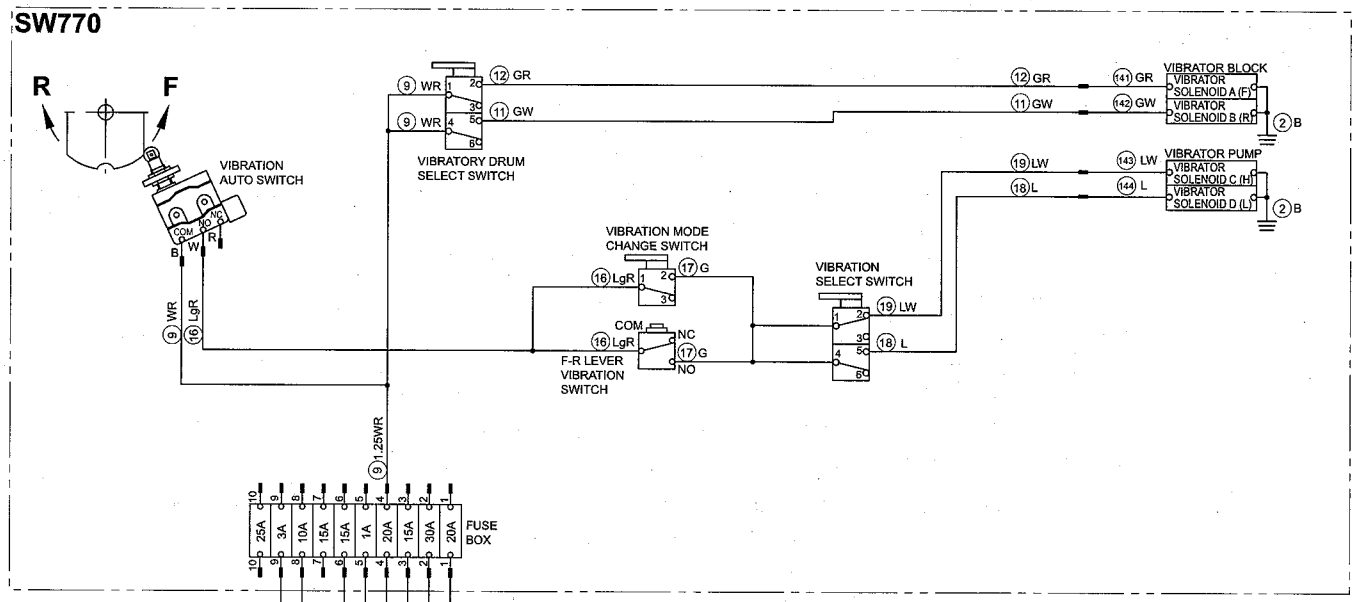
2-5-3. Brake does not work

- Parking brake switch must be applied.
- Foot brake switch must be OFF (Brake pedal is depressed).

Reference Fig.: 2-5-1

Check point	Check/Cause	Action
1. Parking Brake Solenoid	• Disconnect harness and measure resistance of coil. Standard resistance : 30.5 Ω • If measured resistance is abnormal, parking brake solenoid is faulty.	Replace parking brake solenoid.
2. Parking Brake Switch	• When starter switch is ON, measure voltage between parking brake switch terminal 3 outlet wire G and chassis ground. There is no electricity in normal condition. • If there is continuity, parking brake switch is faulty.	Replace parking brake switch.
3. Foot Brake Switch	• When starter switch is ON, measure voltage between foot brake switch terminal NC outlet wire WB and chassis ground. There is no electricity in normal condition. • If there is continuity, foot brake switch is faulty.	Replace foot brake switch.
4. Harness Connecting Between Terminals	• Measure resistance of harness connecting between terminals. Standard resistance : 10 Ω or less • If resistance is abnormal, harness is faulty.	Repair or replace harness.

Fig.: 2-6-1



VIBRATORY DRUM SELECT SWITCH

POSITION	CONNECTION
F R	1-2,4-6
F R	1-3,4-6
F R	1-3,4-5

VIBRATION MODE CHANGE SWITCH

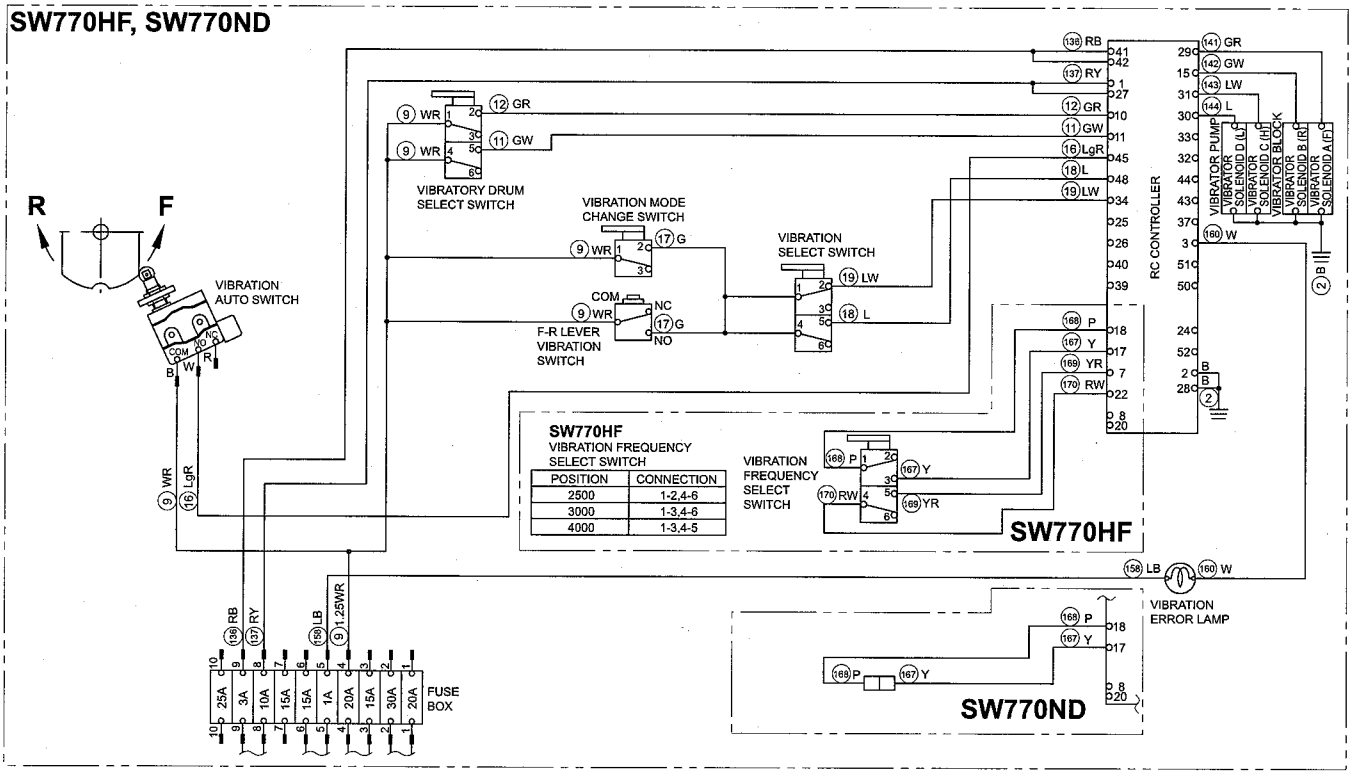
POSITION	CONNECTION
	1-3
AUTO	1-2

SW770, SW770HF
VIBRATION SELECT SWITCH

POSITION	CONNECTION
	1-2,4-6
	1-3,4-6
	1-3,4-5

SW770ND
VIBRATION SELECT SWITCH

POSITION	CONNECTION
	1-2,4-6
	1-3,4-6
	1-3,4-5



SW770HF
VIBRATION FREQUENCY SELECT SWITCH

POSITION	CONNECTION
2500	1-2,4-6
3000	1-3,4-6
4000	1-3,4-5

SW770-10003

2-6. Vibration

Check following items before troubleshooting.

- No blown fuses and power is applied up to fuses.
- When measuring voltage and current without disconnecting connectors, refer to "measuring voltage and current following using tester" (P. 10-006 to P. 10-008).
- Check any ground circuit which belongs to components to be checked.
- Throttle switch must be "HIGH".
- F-R lever must be "F" or "R".
- Vibration error lamp is not lighting. (SW770HF, SW770ND)

2-6-1. No vibration occurs 1/4

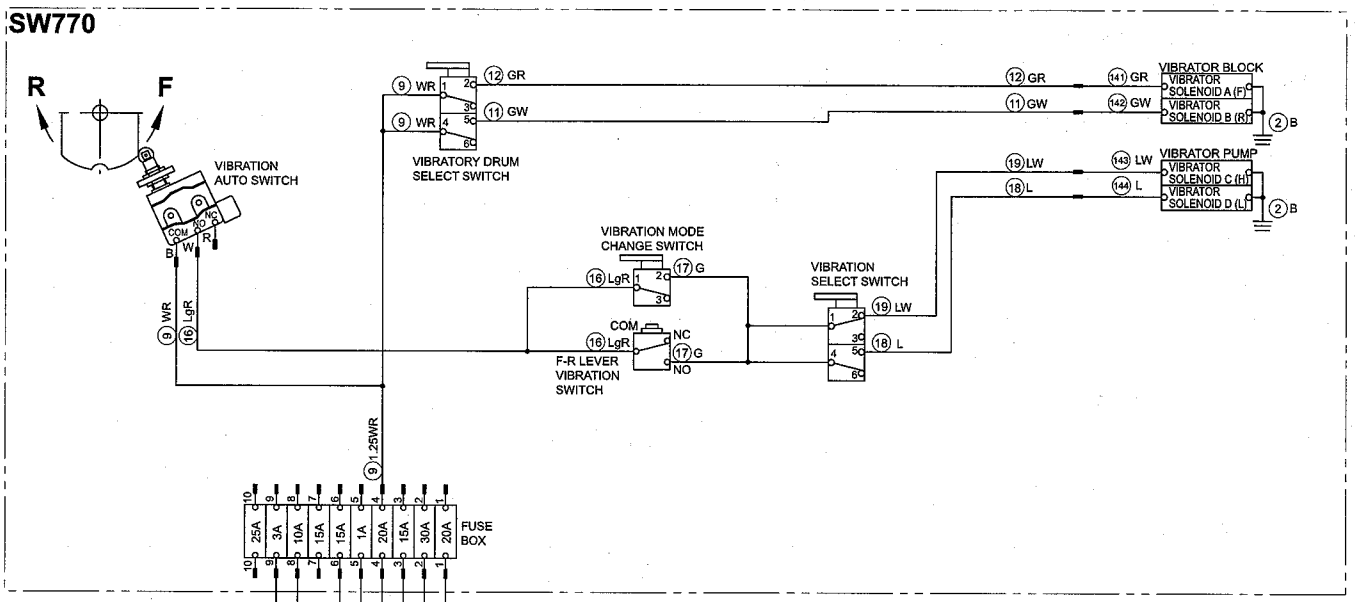
- Vibration mode change switch must be "AUTO" (automatic mode).
- Vibration select switch must not be "◯".

Reference Fig.: 2-6-1

Check point	Check/Cause	Action
1. Vibrator Solenoid A (F)	• Disconnect harness and measure resistance of coil. Standard resistance : 45.0 ±4.5 Ω • If resistance is abnormal, vibrator solenoid A (F) is faulty.	Replace vibrator solenoid A (F).
2. Vibrator Solenoid B (R)	• Disconnect harness and measure resistance of coil. Standard resistance : 45.0 ±4.5 Ω • If resistance is abnormal, vibrator solenoid B (R) is faulty.	Replace vibrator solenoid B (R).
3. Vibrator Solenoid C (H)	• Disconnect harness and measure resistance of coil. Standard resistance : 22.7 Ω • If resistance is abnormal, vibrator solenoid C (H) is faulty.	Replace vibrator solenoid.
4. Vibrator Solenoid D (L)	• Disconnect harness and measure resistance of coil. Standard resistance : 22.7 Ω • If resistance is abnormal, vibrator solenoid D (L) is faulty.	

Fig.: 2-6-1

SW770



VIBRATORY DRUM SELECT SWITCH

POSITION	CONNECTION
F R	1-2,4-6
F R	1-3,4-6
F R	1-3,4-5

VIBRATION MODE CHANGE SWITCH

POSITION	CONNECTION
	1-3
AUTO	1-2

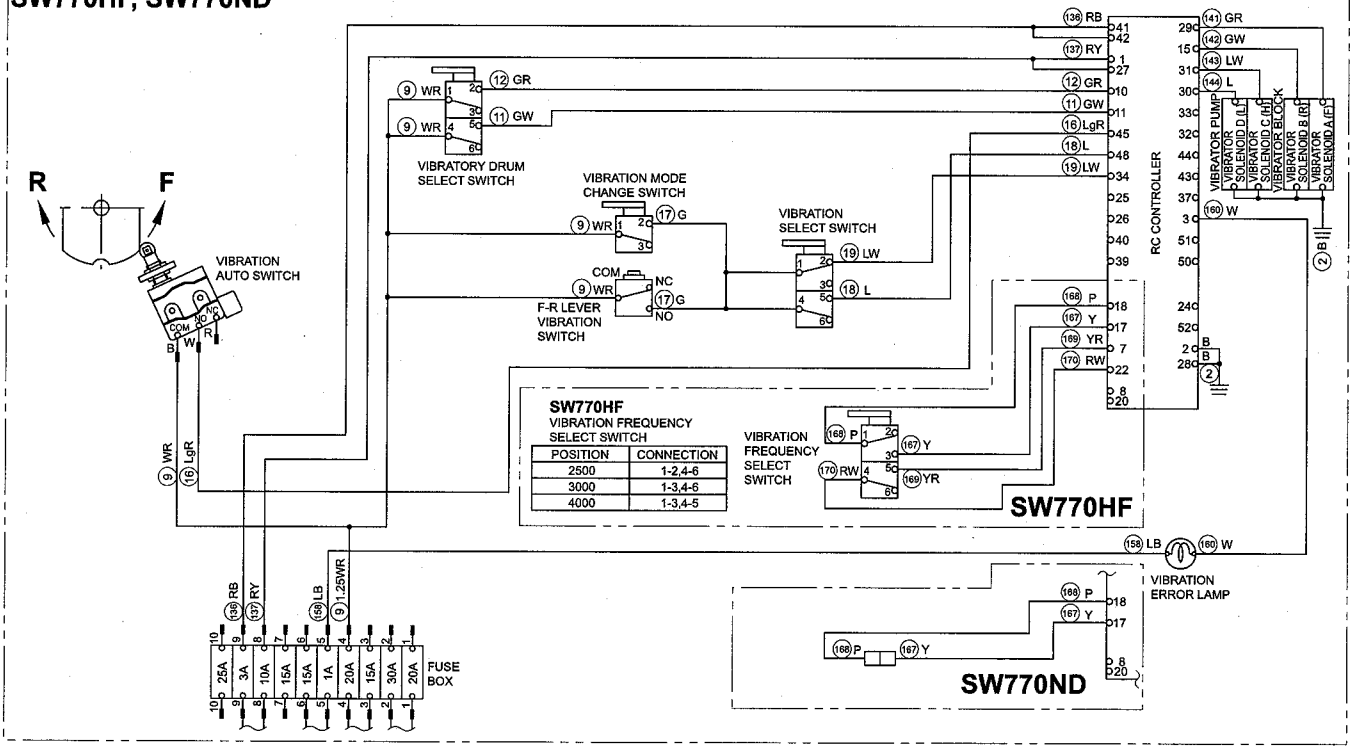
SW770, SW770HF
VIBRATION SELECT SWITCH

POSITION	CONNECTION
	1-2,4-6
	1-3,4-6
	1-3,4-5

SW770ND
VIBRATION SELECT SWITCH

POSITION	CONNECTION
	1-2,4-6
	1-3,4-6
1	1-3,4-5

SW770HF, SW770ND



SW770HF
VIBRATION FREQUENCY SELECT SWITCH

POSITION	CONNECTION
2500	1-2,4-6
3000	1-3,4-6
4000	1-3,4-5

SW770-10003

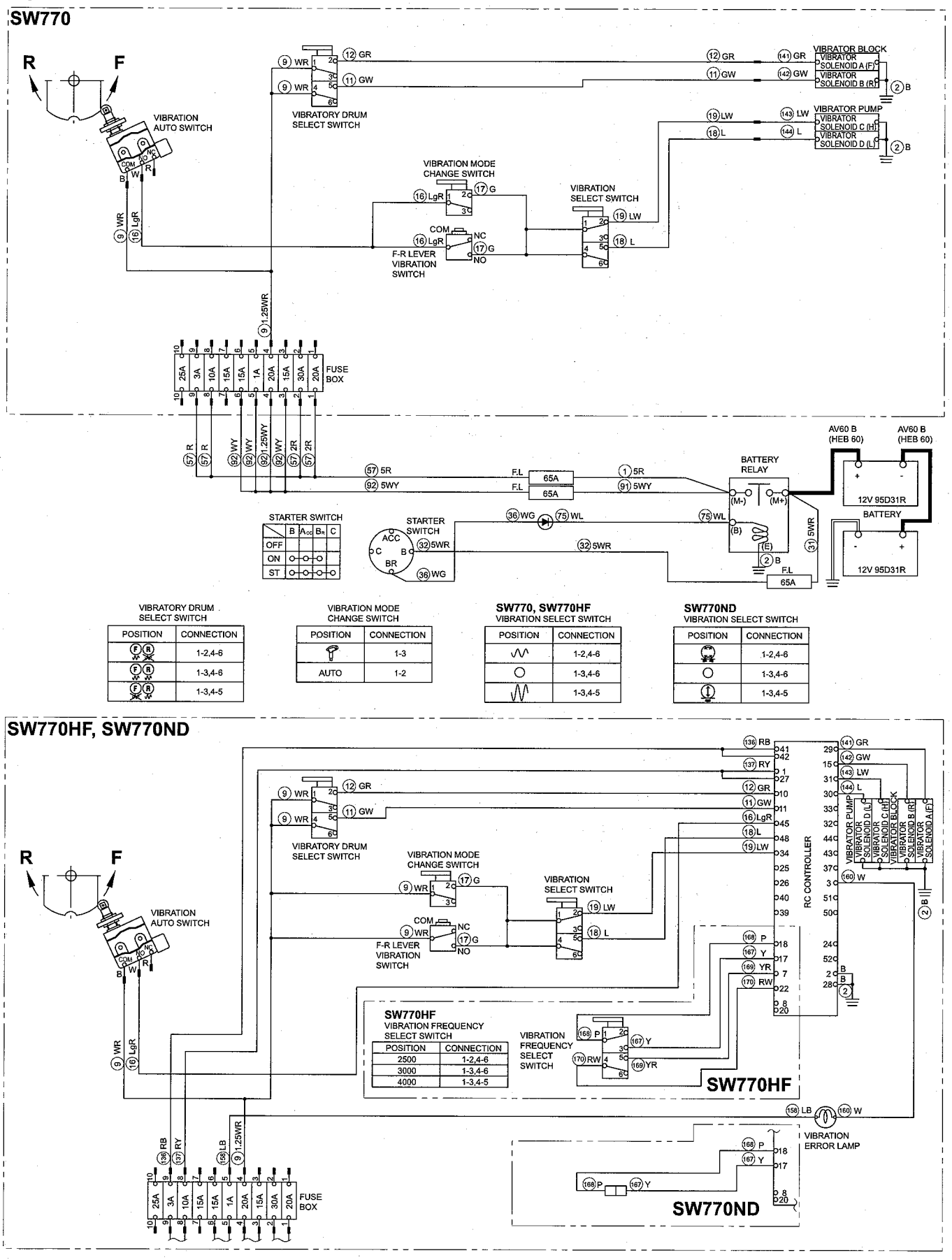
2-6-1. No vibration occurs 2/4

- Vibration mode change switch must be "AUTO" (automatic mode).
- Vibration select switch must not be "◯".

Reference Fig.: 2-6-1

Check point	Check/Cause	Action
5. Vibration Select Switch	**SW770:** (1) When starter switch is ON and F-R lever is "F" or "R", measure voltage between vibration select switch terminal 1 inlet wire G, terminal 4 inlet wire G and chassis ground. Standard voltage : 24 V or more (2) When starter switch is ON, F-R lever is "F" or "R" and vibration select switch is "⩘", measure voltage between vibration select switch terminal 2 outlet wire LW and chassis ground. Standard voltage : 24 V or more (3) When starter switch is ON, F-R lever is "F" or "R" and vibration select switch is "⩘", measure voltage between vibration select switch terminal 5 outlet wire L and chassis ground. Standard voltage : 24 V or more • If above item (1) is OK and item (2) or (3) is NG, vibration select switch is faulty. **SW770HF, SW770ND:** (1) When starter switch is ON, measure voltage between vibration select switch terminal 1 inlet wire G, terminal 4 inlet wire G and chassis ground. Standard voltage : 24 V or more (2) When starter switch is ON and vibration select switch is "⩘" / "  ", measure voltage between vibration select switch terminal 2 outlet wire LW and chassis ground. Standard voltage : 24 V or more (3) When starter switch is ON and vibration select switch is "⩘" / "  ", measure voltage between vibration select switch terminal 5 outlet wire L and chassis ground. Standard voltage : 24 V or more • If above item (1) is OK and item (2) or (3) is NG, vibration select switch is faulty.	Replace vibration select switch.

Fig.: 2-6-1



VIBRATORY DRUM SELECT SWITCH

POSITION	CONNECTION
F R	1-2,4-6
F R	1-3,4-6
F R	1-3,4-5

VIBRATION MODE CHANGE SWITCH

POSITION	CONNECTION
	1-3
AUTO	1-2

SW770, SW770HF
VIBRATION SELECT SWITCH

POSITION	CONNECTION
	1-2,4-6
	1-3,4-6
	1-3,4-5

SW770ND
VIBRATION SELECT SWITCH

POSITION	CONNECTION
	1-2,4-6
	1-3,4-6
	1-3,4-5

SW770HF
VIBRATION FREQUENCY SELECT SWITCH

POSITION	CONNECTION
2500	1-2,4-6
3000	1-3,4-6
4000	1-3,4-5

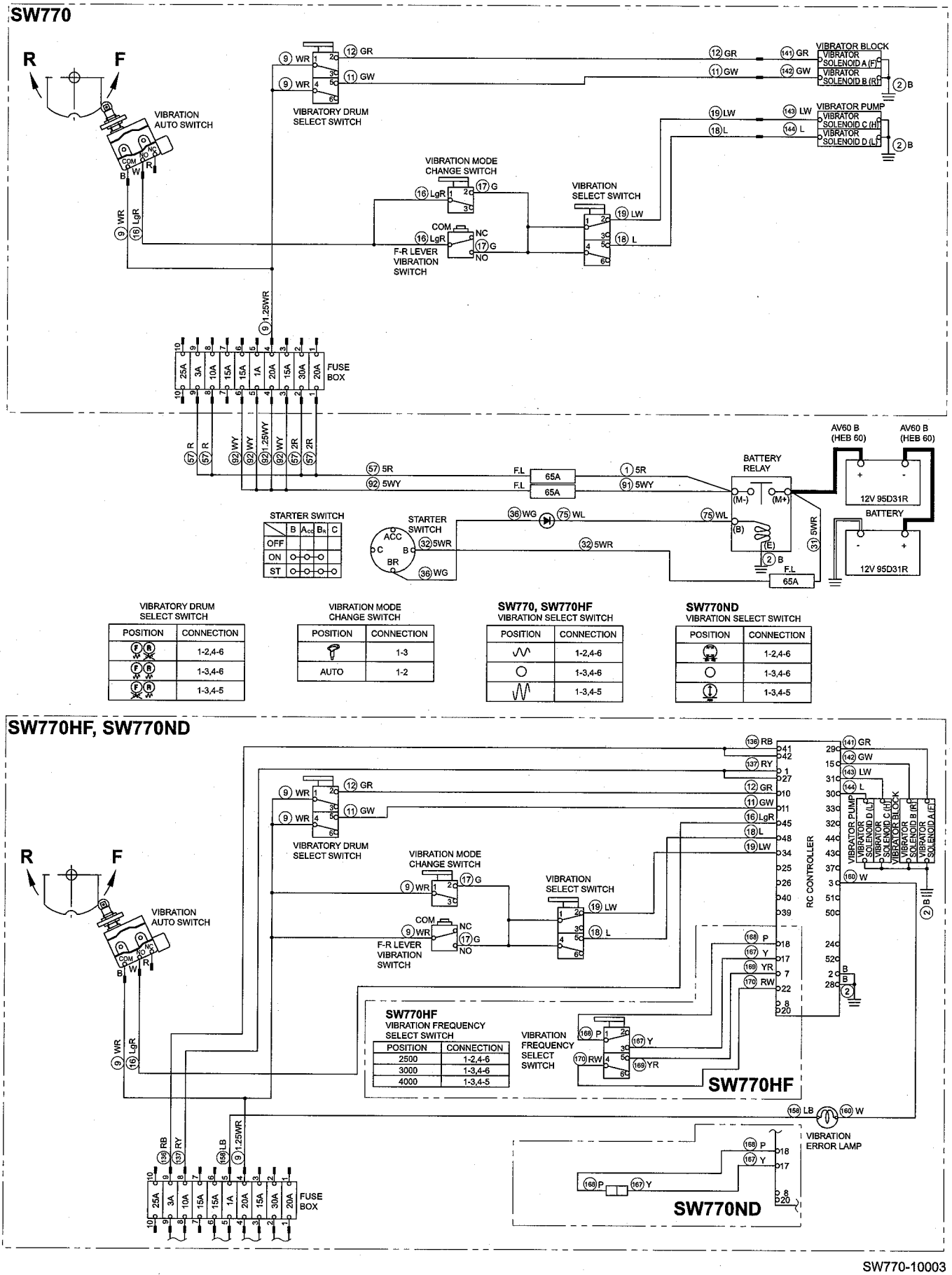
2-6-1. No vibration occurs 3/4

- Vibration mode change switch must be "AUTO" (automatic mode).
- Vibration select switch must not be "◯".

Reference Fig.: 2-6-1

Check point	Check/Cause	Action
6. Vibration Mode Change Switch	**SW770:** (1) When starter switch is ON and F-R lever is "F" or "R", measure voltage between vibration mode change switch terminal 1 inlet wire LgR and chassis ground. Standard voltage : 24 V or more (2) When starter switch is ON and F-R lever is "F" or "R", measure voltage between vibration mode change switch terminal 2 outlet wire G and chassis ground. Standard voltage : 24 V or more • If above item (1) is OK and item (2) is NG, vibration mode change switch is faulty. **SW770HF, SW770ND:** (1) When starter switch is ON, measure voltage between vibration mode change switch terminal 1 inlet wire WR and chassis ground. Standard voltage : 24 V or more (2) When starter switch is ON, measure voltage between vibration mode change switch terminal 2 outlet wire G and chassis ground. Standard voltage : 24 V or more • If above item (1) is OK and item (2) is NG, vibration mode change switch is faulty.	Replace vibration mode change switch.
7. Vibration Auto Switch	(1) When starter switch is ON, measure voltage between vibration auto switch terminal COM inlet wire WR and chassis ground. Standard voltage : 24 V or more (2) When starter switch is ON, measure voltage between vibration auto switch terminal NO outlet wire LgR and chassis ground. Standard voltage : 24 V or more • If above item (1) is OK and item (2) is NG, vibration auto switch is faulty.	Replace vibration auto switch.

Fig.: 2-6-1


SW770
R
F
VIBRATION AUTO SWITCH
VIBRATORY DRUM SELECT SWITCH
VIBRATION MODE CHANGE SWITCH
F-R LEVER VIBRATION SWITCH
VIBRATION SELECT SWITCH
VIBRATOR BLOCK
VIBRATOR SOLENOID A (F)
VIBRATOR SOLENOID B (R)
VIBRATOR PUMP
VIBRATOR SOLENOID C (H)
VIBRATOR SOLENOID D (L)
FUSE BOX
BATTERY RELAY
AV60 B (HEB 60)
12V 95D31R
BATTERY
STARTER SWITCH
OFF
ON
ST
VIBRATORY DRUM SELECT SWITCH
POSITION
CONNECTION
1-2,4-6
1-3,4-6
1-3,4-5
VIBRATION MODE CHANGE SWITCH
AUTO
1-3
1-2
SW770, SW770HF
VIBRATION SELECT SWITCH
SW770ND
SW770HF, SW770ND
RC CONTROLLER
SW770HF
VIBRATION FREQUENCY SELECT SWITCH
2500
3000
4000
1-2,4-6
1-3,4-6
1-3,4-5
VIBRATION ERROR LAMP
SW770ND
SW770-10003

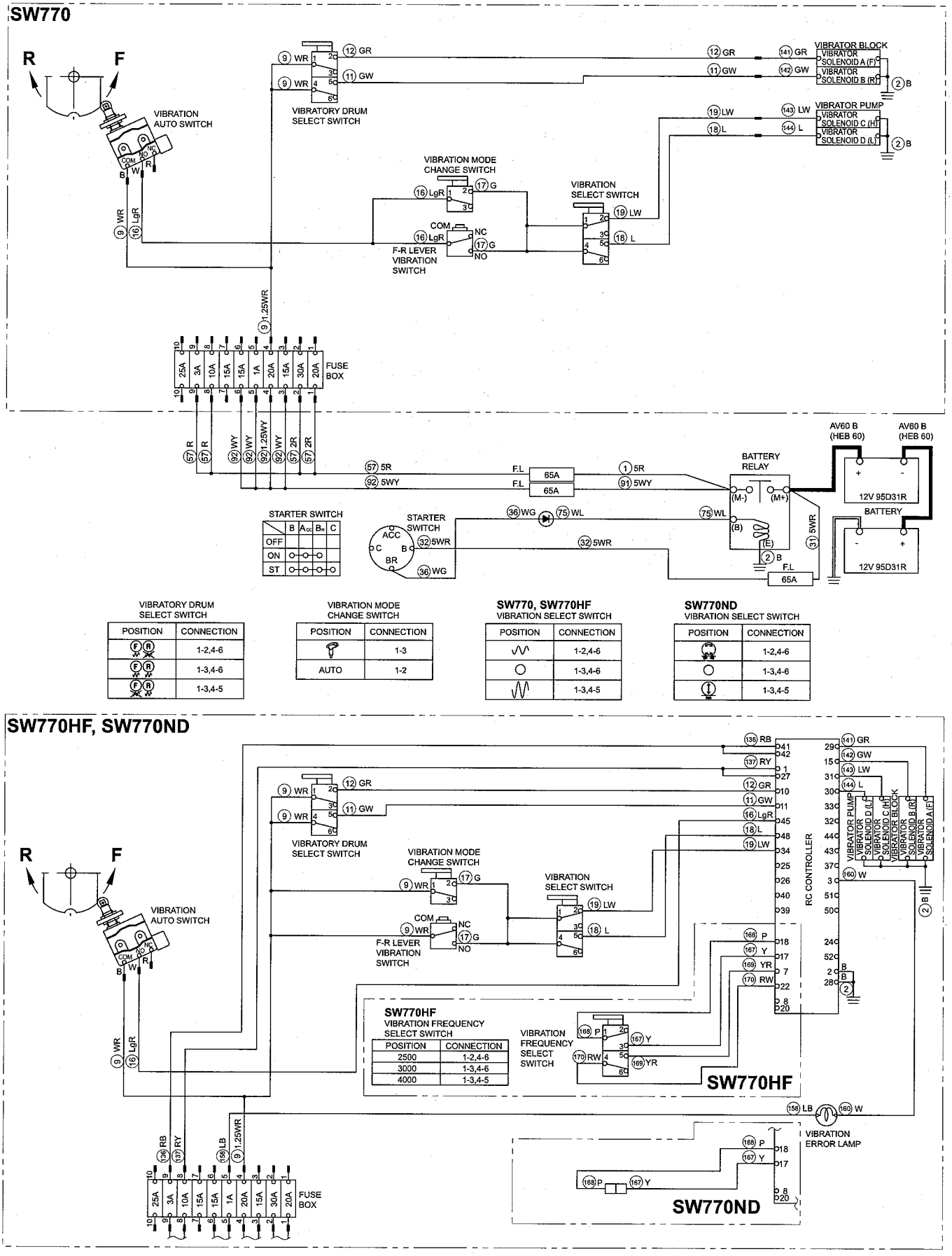
2-6-1. No vibration occurs 4/4

- Vibration mode change switch must be "AUTO" (automatic mode).
- Vibration select switch must not be "◯".

Reference Fig.: 2-6-1

Check point	Check/Cause	Action
8. RC Controller (SW770HF, SW770ND)	(1) When starter switch is ON, measure voltage between RC controller terminals and chassis ground. • Terminal 1, 27 inlet wires RY and chassis ground. • Terminal 41, 42 inlet wires RB and chassis ground. • Terminal 45 inlet wire LgR and chassis ground. • Terminal 34 inlet wire LW and chassis ground when vibration select switch is "∿∿" / "  ". • Terminal 48 inlet wire L and chassis ground when vibration select switch is "∿" / "  ". Standard voltage : 24 V or more (2) Check RC controller terminals are reliably grounded. • Terminal 2 and 28 wires B. (3) After starting engine, check current flows between RC controller terminals and vibrator pump solenoids. • Terminal 30 outlet wire L and vibrator solenoid D (L) when vibration select switch is "∿∿" / "  ". • Terminal 31 outlet wire LW and vibrator solenoid C (H) when vibration select switch is "∿" / "  ". There is current flow. • If above items (1) and (2) are OK and item (3) is NG, RC controller is faulty.	Replace RC controller.
9. Harness Connecting Between Terminals	• Measure resistance of harness connecting between terminals. Standard resistance : 10 Ω or less • If resistance is abnormal, harness is faulty.	Repair or replace harness.

Fig.: 2-6-1



SW770-10003

2-6-2. Amplitude does not change (Remains either low/horizontal or high/normal) 1/3

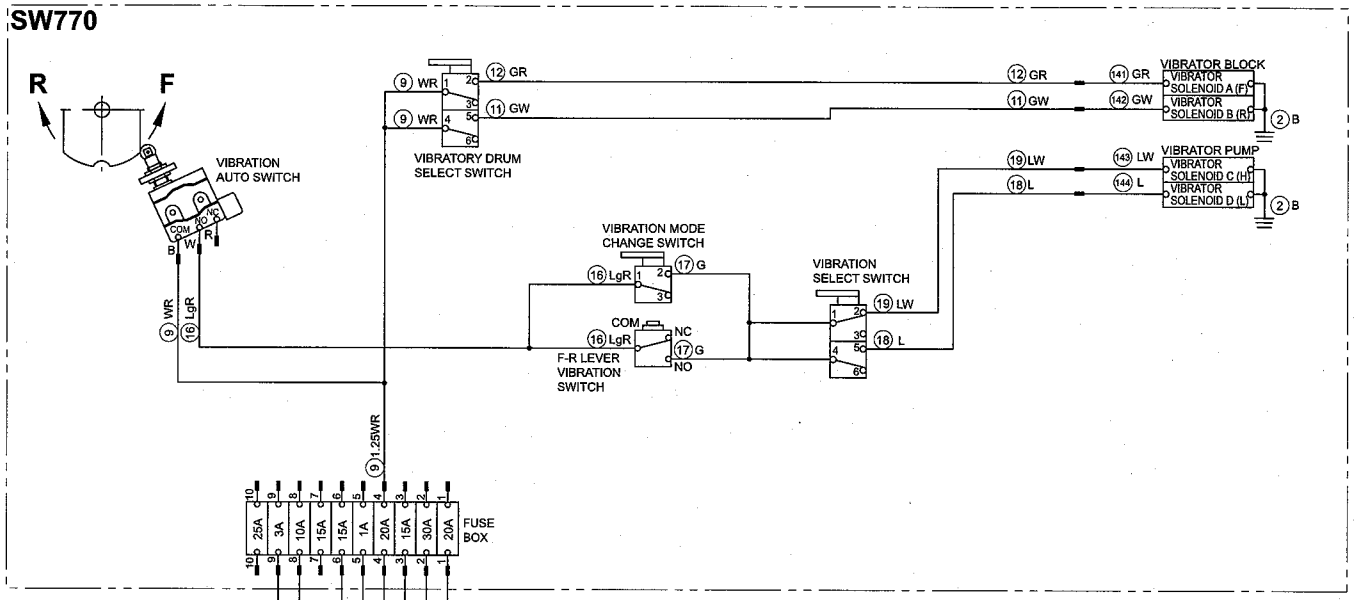
- Vibration mode change switch must be "AUTO" (automatic mode).

Reference Fig. : 2-6-1

Check point	Check/Cause	Action
1. Vibrator Solenoid A (F)	• Disconnect harness and measure resistance of coil. Standard resistance : 45.0 ± 4.5 Ω • If resistance is abnormal, vibrator solenoid A (F) is faulty.	Replace vibrator solenoid A (F).
2. Vibrator Solenoid B (R)	• Disconnect harness and measure resistance of coil. Standard resistance : 45.0 ± 4.5 Ω • If resistance is abnormal, vibrator solenoid B (R) is faulty.	Replace vibrator solenoid B (R).
3. Vibrator Solenoid C (H)	• Disconnect harness and measure resistance of coil. Standard resistance : 22.7 Ω • If resistance is abnormal, vibrator solenoid C (H) is faulty.	Replace vibrator solenoid.
4. Vibrator Solenoid D (L)	• Disconnect harness and measure resistance of coil. Standard resistance : 22.7 Ω • If resistance is abnormal, vibrator solenoid D (L) is faulty.	

Fig.: 2-6-1

SW770



VIBRATORY DRUM SELECT SWITCH

POSITION	CONNECTION
F R	1-2,4-6
F R	1-3,4-6
F R	1-3,4-5

VIBRATION MODE CHANGE SWITCH

POSITION	CONNECTION
	1-3
AUTO	1-2

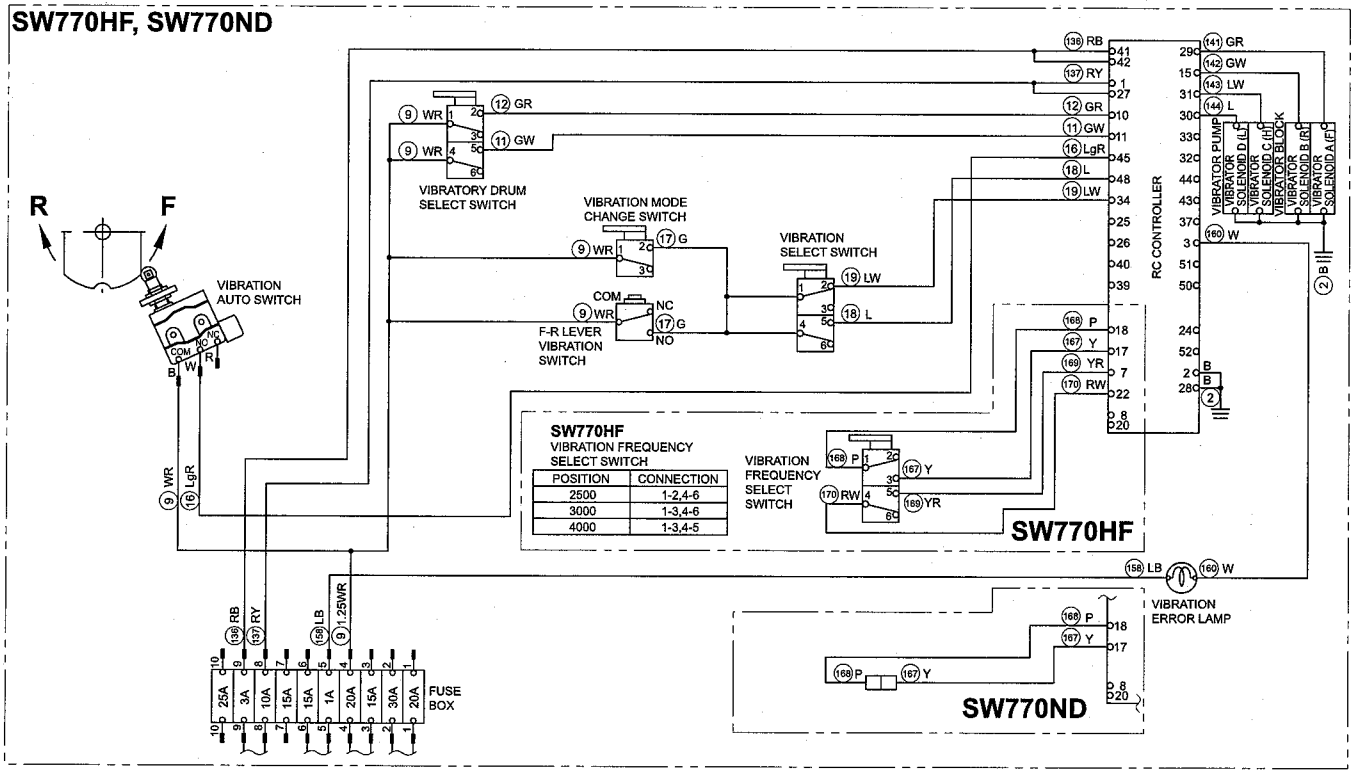
SW770, SW770HF
VIBRATION SELECT SWITCH

POSITION	CONNECTION
	1-2,4-6
	1-3,4-6
	1-3,4-5

SW770ND
VIBRATION SELECT SWITCH

POSITION	CONNECTION
	1-2,4-6
	1-3,4-6
	1-3,4-5

SW770HF, SW770ND



SW770HF
VIBRATION FREQUENCY SELECT SWITCH

POSITION	CONNECTION
2500	1-2,4-6
3000	1-3,4-6
4000	1-3,4-5

SW770-10003

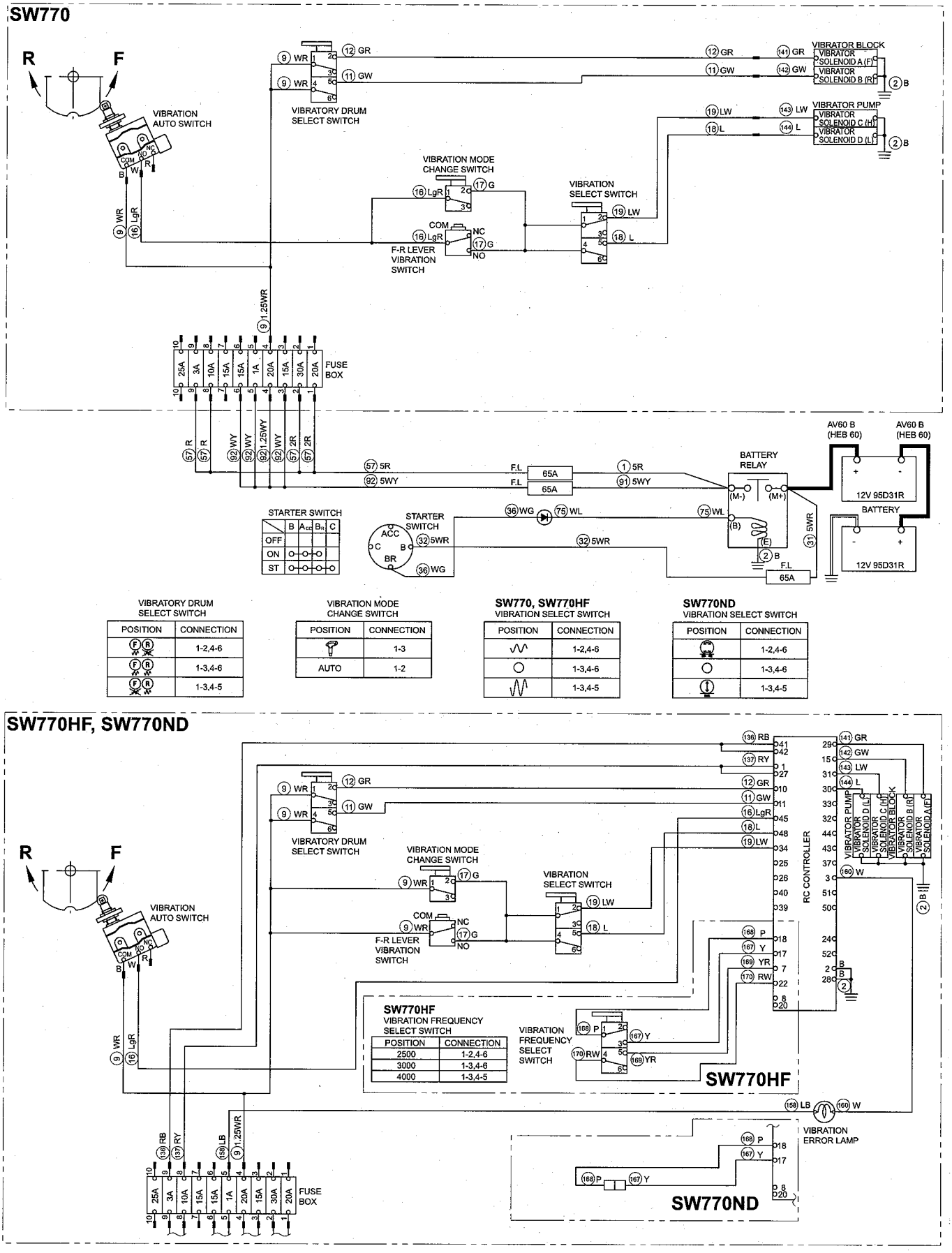
2-6-2. Amplitude does not change (Remains either low/horizontal or high/normal) 2/3

- Vibration mode change switch must be "AUTO" (automatic mode).

Reference Fig. : 2-6-1

Check point	Check/Cause	Action
5. Vibration Select Switch	**SW770:** (1) When starter switch is ON and F-R lever is "F" or "R", measure voltage between vibration select switch terminal 1 inlet wire G, terminal 4 inlet wire G and chassis ground. Standard voltage : 24 V or more (2) When starter switch is ON, F-R lever is "F" or "R" and vibration select switch is "◯", measure voltage vibration select switch terminal wires and chassis ground. • Vibration select switch terminal 2 outlet wire LW and chassis ground. • Vibration select switch terminal 5 outlet wire L and chassis ground. There is no electricity in normal condition. (3) When starter switch is ON, F-R lever is "F" or "R" and vibration select switch is "⩘", measure voltage between vibration select switch terminal 2 outlet wire LW and chassis ground. Standard voltage : 24 V or more. (4) When starter switch is ON, F-R lever is "F" or "R" and vibration select switch is "⩘", measure voltage between vibration select switch terminal 5 outlet wire L and chassis ground. Standard voltage : 24 V or more. • If above item (1) is OK and item (2), (3) or (4) is NG, vibration switch is faulty. **SW770HF, SW770ND:** (1) When starter switch is ON, measure voltage between vibration select switch terminal 1 inlet wire G, terminal 4 inlet wire G and chassis ground. Standard voltage : 24 V or more (2) When starter switch is ON and vibration select switch is "◯", measure voltage vibration select switch terminal wires and chassis ground. • Vibration select switch terminal 2 outlet wire LW and chassis ground. • Vibration select switch terminal 5 outlet wire L and chassis ground. There is no electricity in normal condition. (3) When starter switch is ON and vibration select switch is "⩘" / "⩘", measure voltage between vibration select switch terminal 2 outlet wire LW and chassis ground. Standard voltage : 24 V or more. (4) When starter switch is ON and vibration select switch is "⩘" / "⩘", measure voltage between vibration select switch terminal 5 outlet wire L and chassis ground. Standard voltage : 24 V or more. • If above item (1) is OK and item (2), (3) or (4) is NG, vibration switch is faulty.	Replace vibration select switch.

Fig.: 2-6-1



VIBRATORY DRUM SELECT SWITCH

POSITION	CONNECTION
F R	1-2,4-6
F R	1-3,4-6
F R	1-3,4-5

VIBRATION MODE CHANGE SWITCH

POSITION	CONNECTION
	1-3
AUTO	1-2

SW770, SW770HF
VIBRATION SELECT SWITCH

POSITION	CONNECTION
	1-2,4-6
	1-3,4-6
	1-3,4-5

SW770ND
VIBRATION SELECT SWITCH

POSITION	CONNECTION
	1-2,4-6
	1-3,4-6
	1-3,4-5

SW770HF
VIBRATION FREQUENCY SELECT SWITCH

POSITION	CONNECTION
2500	1-2,4-6
3000	1-3,4-6
4000	1-3,4-5

SW770-10003

2-6-2. Amplitude does not change (Remains either low/horizontal or high/normal) 3/3

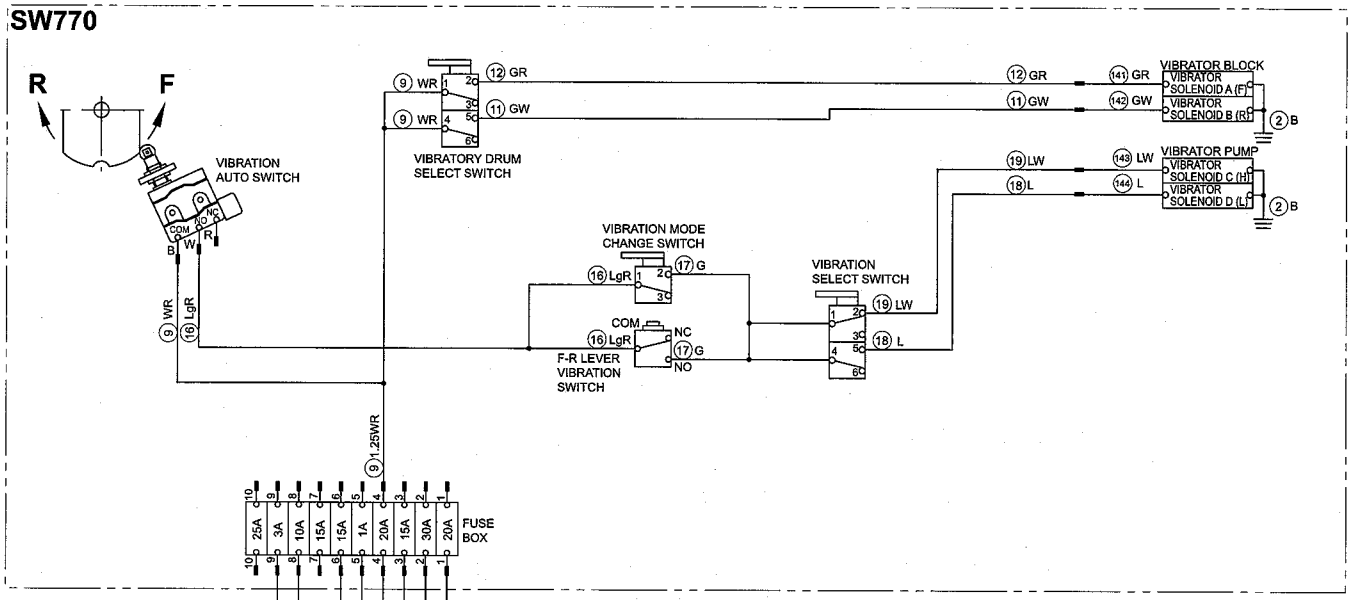
- Vibration mode change switch must be "AUTO" (automatic mode).

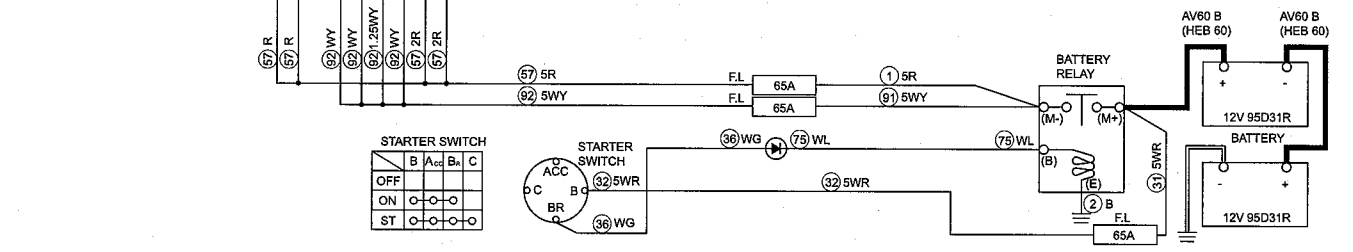
Reference Fig. : 2-6-1

Check point	Check/Cause	Action
6. RC controller (SW770HF, SW770ND)	(1) When starter switch is ON, measure voltage between RC controller terminals and chassis ground. • Terminal 1, 27 inlet wires RY and chassis ground. • Terminal 41, 42 inlet wires RB and chassis ground. • Terminal 45 inlet wire LgR and chassis ground. • Terminal 34 inlet wire LW and chassis ground when vibration select switch is "∿" / "⊙". • Terminal 48 inlet wire L and chassis ground when vibration select switch is "⋀⋀" / "↕". Standard voltage : 24 V or more (2) Check RC controller terminals are reliably grounded. • Terminal 2 and 28 wires B. (3) After starting engine, check current flows out at RC controller terminals after changing vibration select switch respectively. • Terminal 30 outlet wire L when vibration select switch is "∿" / "⊙". • Terminal 31 outlet wire LW when vibration select switch is "⋀⋀" / "↕". There is current flow. • If above items (1) and (2) are OK and item (3) is NG, RC controller is faulty.	Replace RC controller.
7. Harness Connecting Between Terminals	• Measure resistance of harness connecting between terminals. Standard resistance : 10 Ω or less • If resistance is abnormal, harness is faulty.	Repair or replace harness.

Fig.: 2-6-1

SW770





VIBRATORY DRUM SELECT SWITCH

POSITION	CONNECTION
F R	1-2,4-6
F R	1-3,4-6
F R	1-3,4-5

VIBRATION MODE CHANGE SWITCH

POSITION	CONNECTION
	1-3
AUTO	1-2

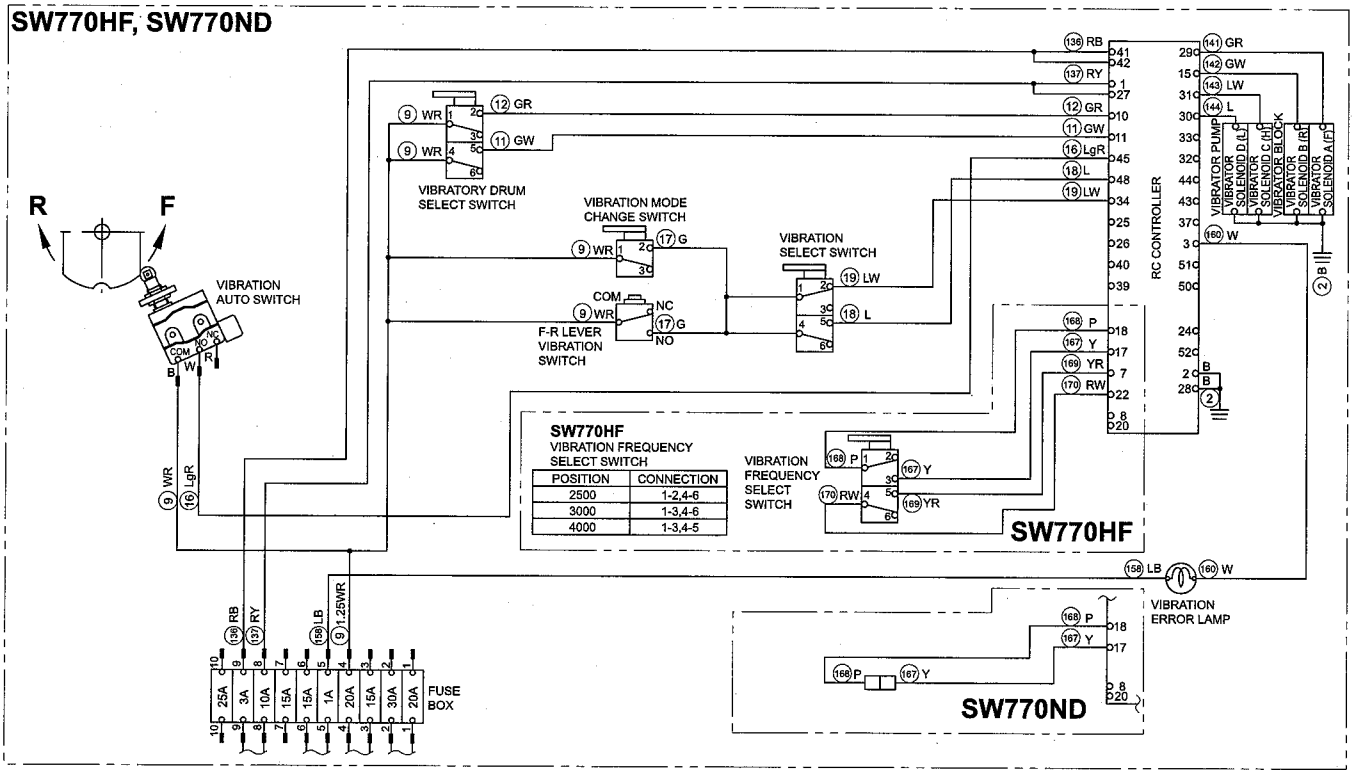
SW770, SW770HF
VIBRATION SELECT SWITCH

POSITION	CONNECTION
	1-2,4-6
	1-3,4-6
	1-3,4-5

SW770ND
VIBRATION SELECT SWITCH

POSITION	CONNECTION
	1-2,4-6
	1-3,4-6
	1-3,4-5

SW770HF, SW770ND



SW770HF
VIBRATION FREQUENCY SELECT SWITCH

POSITION	CONNECTION
2500	1-2,4-6
3000	1-3,4-6
4000	1-3,4-5

SW770-10003

2-6-3. Frequency does not change (Remains either frequency) (SW770HF) 1/2

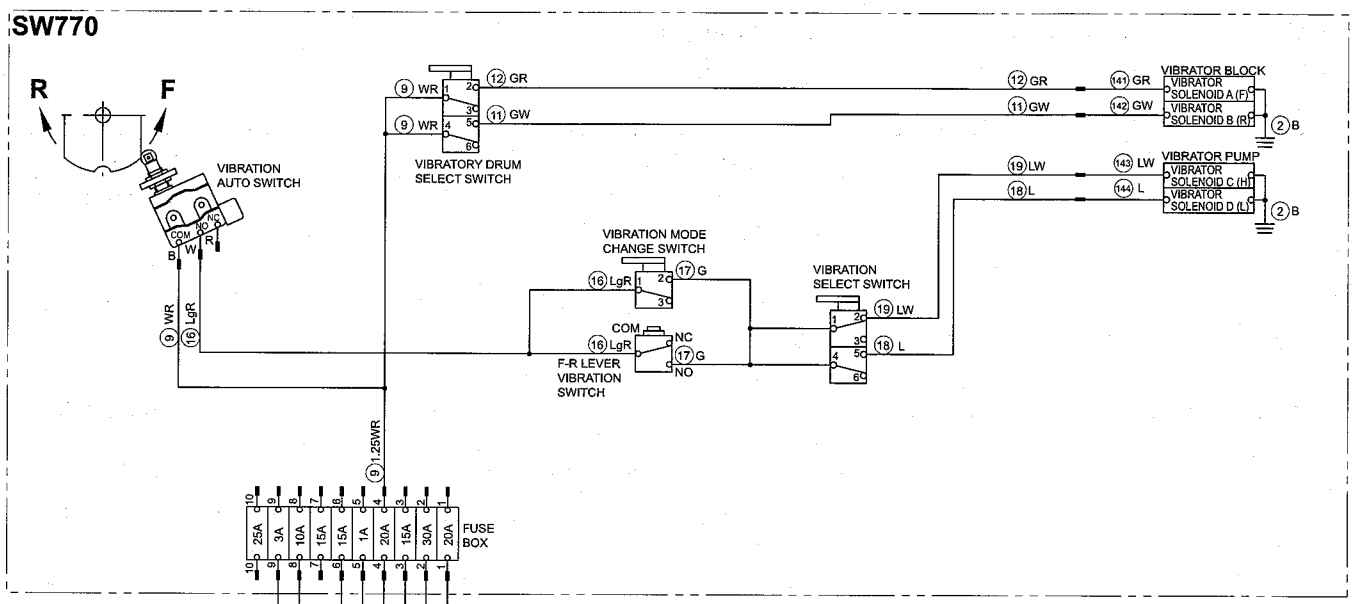
- Vibration mode change switch must be "AUTO" (automatic mode).
- Vibration select switch must be " ⩘ ".

Reference Fig. : 2-6-1

Check point	Check/Cause	Action
1. Vibrator Solenoid A (F)	• Disconnect harness and measure resistance of coil. Standard resistance : 45.0 ± 4.5 Ω • If resistance is abnormal, vibrator solenoid A (F) is faulty.	Replace vibrator solenoid A (F).
2. Vibrator Solenoid B (R)	• Disconnect harness and measure resistance of coil. Standard resistance : 45.0 ± 4.5 Ω • If resistance is abnormal, vibrator solenoid B (R) is faulty.	Replace vibrator solenoid B (R).
3. Vibrator Solenoid C (H)	• Disconnect harness and measure resistance of coil. Standard resistance : 22.7 Ω • If resistance is abnormal, vibrator solenoid C (H) is faulty.	Replace vibrator solenoid C (H).
4. Vibrator Solenoid D (L)	• Disconnect harness and measure resistance of coil. Standard resistance : 22.7 Ω • If resistance is abnormal, vibrator solenoid D (L) is faulty.	Replace vibrator solenoid D (L).
5. Vibration Frequency Select Switch	(1) When starter switch is ON, measure voltage between vibration frequency select switch terminal 1 inlet wire P, terminal 4 inlet wire RW and chassis ground. Standard voltage : 24 V or more (2) When starter switch is ON and vibration frequency select switch is "2500", measure voltage vibration frequency select switch terminal wires and chassis ground. • Vibration frequency select switch terminal 3 outlet wire Y and chassis ground. • Vibration frequency select switch terminal 5 outlet wire YR and chassis ground. There is no electricity in normal condition. (3) When starter switch is ON and vibration frequency select switch is "3000", measure voltage between vibration frequency select switch terminal 3 outlet wire Y and chassis ground. Standard voltage : 8 V or more. (4) When starter switch is ON and vibration frequency select switch is "4000", measure voltage between vibration frequency select switch terminal 5 outlet wire YR and chassis ground. Standard voltage : 8 V or more. • If above item (1) is OK and item (2), (3) or (4) is NG, vibration frequency select switch is faulty.	Replace vibration frequency select switch.

Fig.: 2-6-1

SW770



VIBRATORY DRUM SELECT SWITCH

POSITION	CONNECTION
F R	1-2,4-6
F R	1-3,4-6
F R	1-3,4-5

VIBRATION MODE CHANGE SWITCH

POSITION	CONNECTION
	1-3
AUTO	1-2

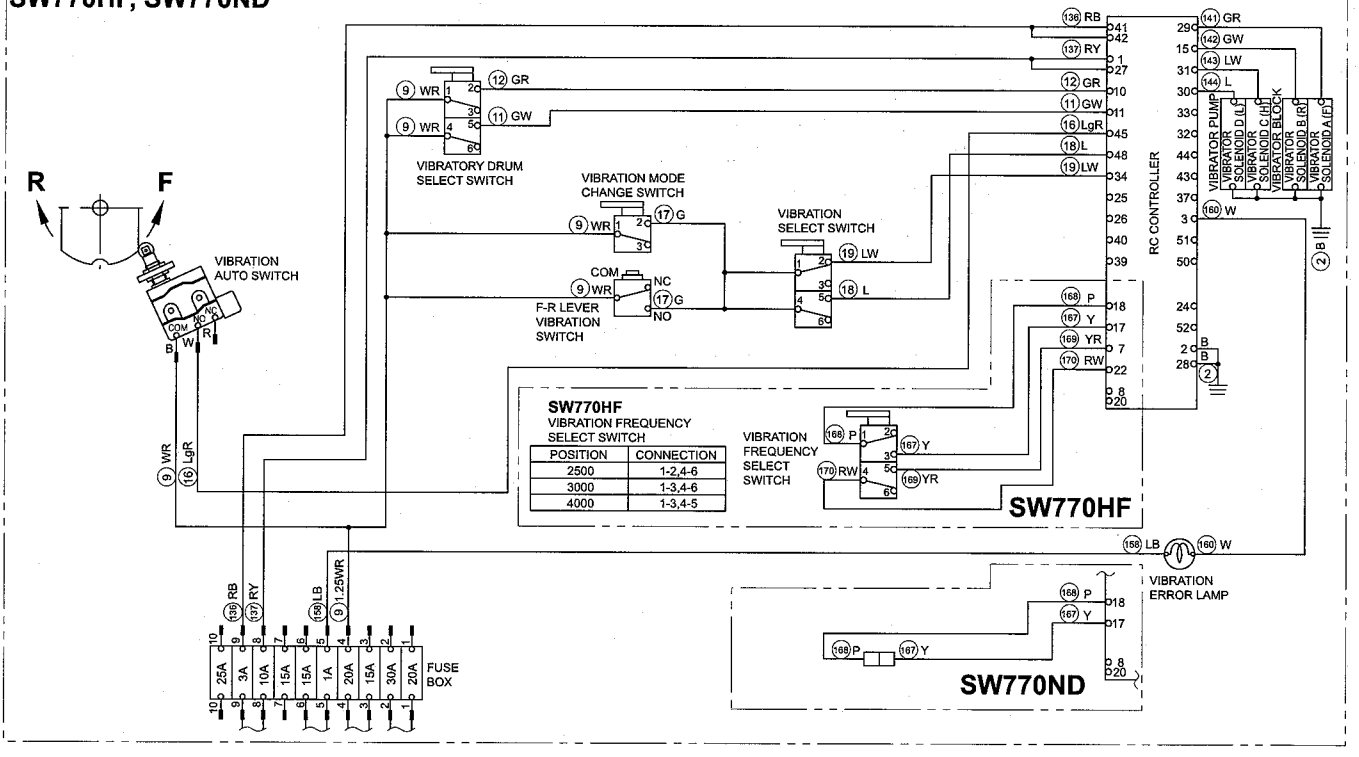
SW770, SW770HF
VIBRATION SELECT SWITCH

POSITION	CONNECTION
	1-2,4-6
	1-3,4-6
	1-3,4-5

SW770ND
VIBRATION SELECT SWITCH

POSITION	CONNECTION
	1-2,4-6
	1-3,4-6
	1-3,4-5

SW770HF, SW770ND



SW770HF
VIBRATION FREQUENCY SELECT SWITCH

POSITION	CONNECTION
2500	1-2,4-6
3000	1-3,4-6
4000	1-3,4-5

SW770-10003

2-6-3. Frequency does not change (Remains either frequency) (SW770HF) 2/2

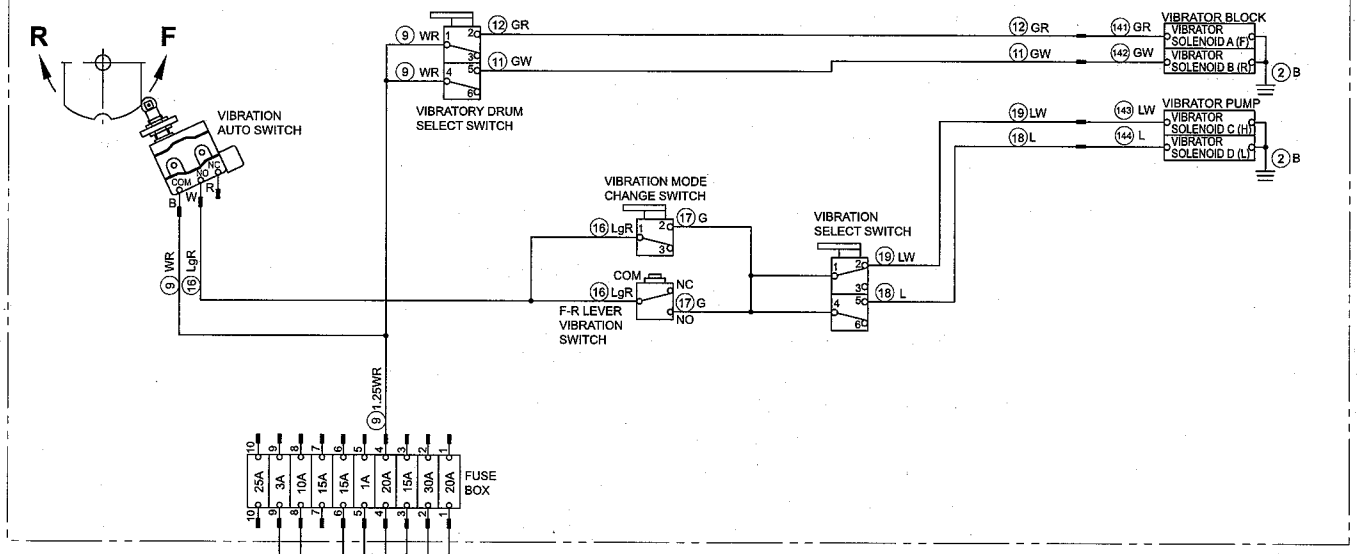
- Vibration mode change switch must be "AUTO" (automatic mode).
- Vibration select switch must be " ⩘ ".

Reference Fig. : 2-6-1

Check point	Check/Cause	Action
6. RC controller	(1) When starter switch is ON, measure voltage between RC controller terminals and chassis ground. • Terminal 1, 27 inlet wires RY and chassis ground. • Terminal 41, 42 inlet wires RB and chassis ground. • Terminal 45 inlet wire LgR and chassis ground. • Terminal 34 inlet wire LW and chassis ground when vibration select switch is " ⩘ ". • Terminal 48 inlet wire L and chassis ground when vibration select switch is " ⩘ ". Standard voltage : 24 V or more (2) Check RC controller terminals are reliably grounded. • Terminal 2 and 28 wires B. (3) After starting engine and vibration frequency select switch is 2500, 3000 or 4000, measure current between RC controller terminals and vibrator pump solenoids respectively. • Terminal 30 outlet wire L for low amplitude, 2500, 3000 and 4000 rpm. • Terminal 31 outlet wire LW for high amplitude, 2500 and 3000 rpm. Standard current : In between 200 mA to 600 mA • If above items (1), (2) and (3) are OK, but when no change frequency, RC controller is faulty.	Replace RC controller.
7. Harness Connecting Between Terminals	• Measure resistance of harness connecting between terminals. Standard resistance : 10 Ω or less • If resistance is abnormal, harness is faulty.	Repair or replace harness.

Fig.: 2-6-1

SW770



VIBRATORY DRUM SELECT SWITCH	
POSITION	CONNECTION
F R	1-2,4-6
F R	1-3,4-6
F R	1-3,4-5

VIBRATION MODE CHANGE SWITCH	
POSITION	CONNECTION
	1-3
AUTO	1-2

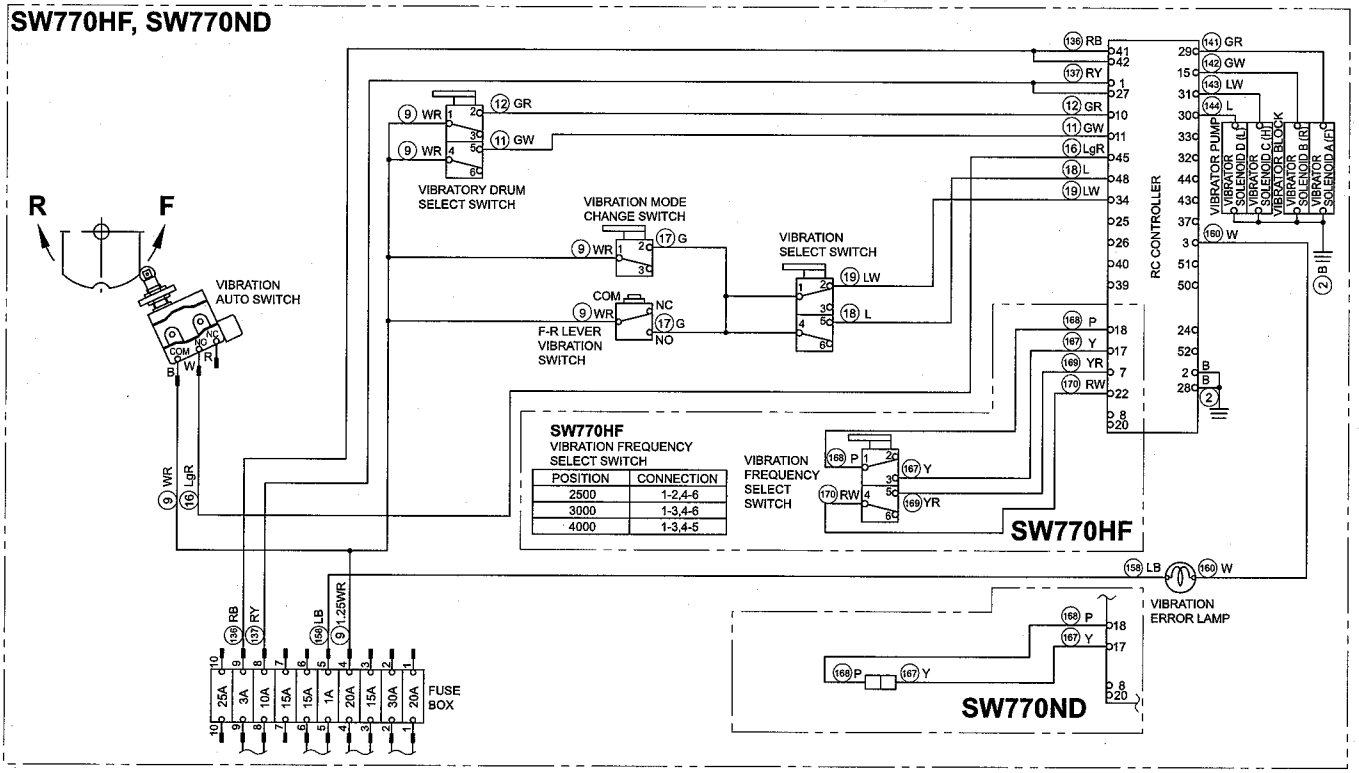
SW770, SW770HF

VIBRATION SELECT SWITCH	
POSITION	CONNECTION
	1-2,4-6
	1-3,4-6
	1-3,4-5

SW770ND

VIBRATION SELECT SWITCH	
POSITION	CONNECTION
	1-2,4-6
	1-3,4-6
	1-3,4-5

SW770HF, SW770ND



SW770HF
VIBRATION FREQUENCY SELECT SWITCH

POSITION	CONNECTION
2500	1-2,4-6
3000	1-3,4-6
4000	1-3,4-5

SW770-10003

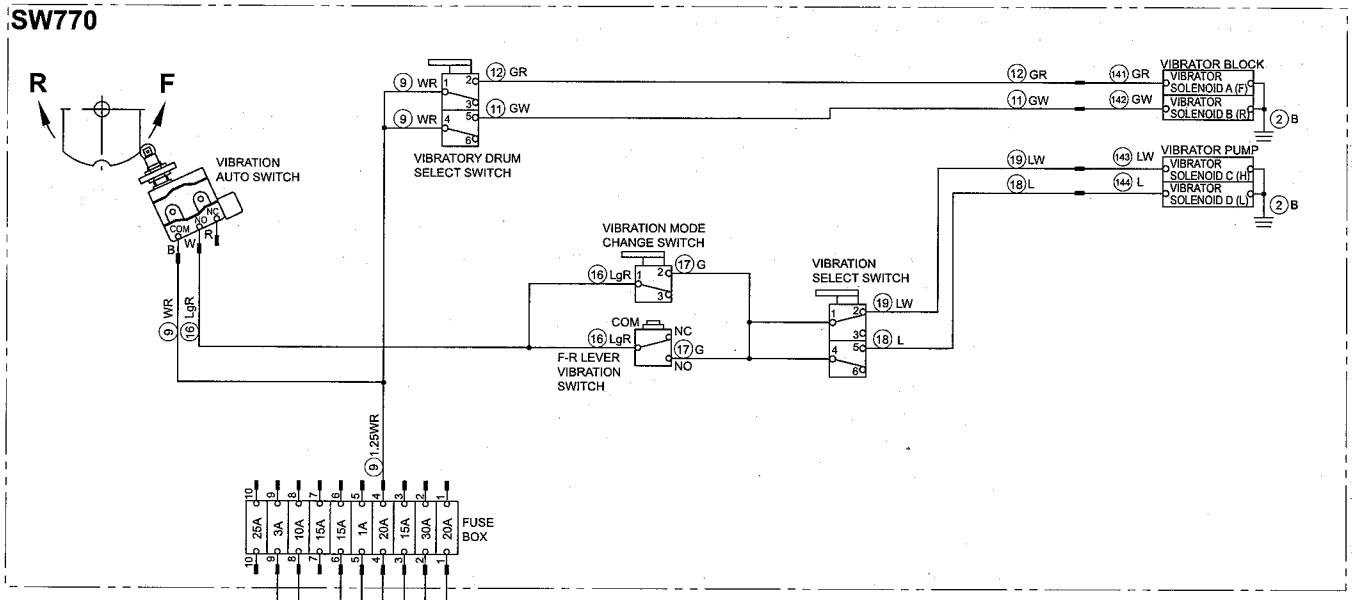
2-6-4. Vibration mode cannot be switched (F-R lever vibration switch does not work)

- Vibration mode change switch must be " " (manual mode).
- Vibration select switch must not be "◯".

Reference Fig. : 2-6-1

Check point	Check/Cause	Action
1. Vibration Mode Change Switch	**SW770:** (1) When starter switch is ON and F-R lever is "F" or "R", measure voltage between vibration mode change switch terminal 1 inlet wire LgR and chassis ground. Standard voltage : 24 V or more (2) When starter switch is ON and F-R lever is "F" or "R", measure voltage between vibration mode change switch terminal 2 outlet wire G and chassis ground. There is no electricity in normal condition. • If above item (1) is OK and item (2) is NG, vibration mode change switch is faulty. **SW770HF, SW770ND:** (1) When starter switch is ON, measure voltage between vibration mode change switch terminal 1 inlet wire WR and chassis ground. Standard voltage : 24 V or more (2) When starter switch is ON, measure voltage between vibration mode change switch terminal 2 outlet wire G and chassis ground. There is no electricity in normal condition. • If above item (1) is OK and item (2) is NG, vibration mode change switch is faulty.	Replace vibration mode change switch.
2. F-R Lever Vibration Switch	• Check continuity between F-R lever vibration switch terminals. • Terminal NC and terminal COM • Terminal NO and terminal COM • If continuity is made and broken when switch is operated, it is normal. If not, F-R lever vibration switch is faulty.	Replace F-R lever vibration switch.
3. Harness Connecting Between Terminals	• Measure resistance of harness connecting between terminals. Standard resistance : 10 Ω or less • If resistance is abnormal, harness is faulty.	Repair or replace harness.

Fig.: 2-6-1



VIBRATORY DRUM SELECT SWITCH	
POSITION	CONNECTION
F R W	1-2,4-6
F R W	1-3,4-6
F R W	1-3,4-5

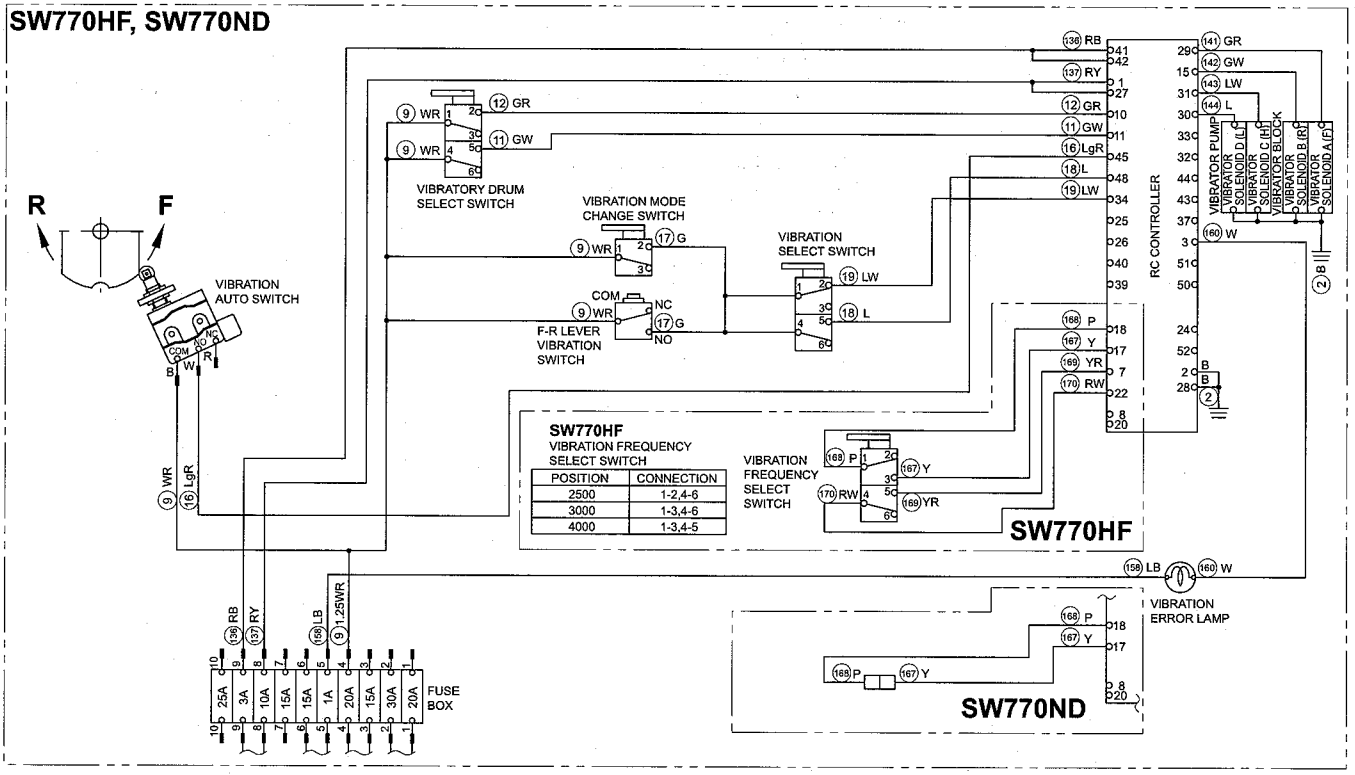
VIBRATION MODE CHANGE SWITCH	
POSITION	CONNECTION
	1-3
AUTO	1-2

SW770, SW770HF
VIBRATION SELECT SWITCH

POSITION	CONNECTION
	1-2,4-6
	1-3,4-6
	1-3,4-5

SW770ND
VIBRATION SELECT SWITCH

POSITION	CONNECTION
	1-2,4-6
	1-3,4-6
	1-3,4-5



SW770HF
VIBRATION FREQUENCY SELECT SWITCH

POSITION	CONNECTION
2500	1-2,4-6
3000	1-3,4-6
4000	1-3,4-5

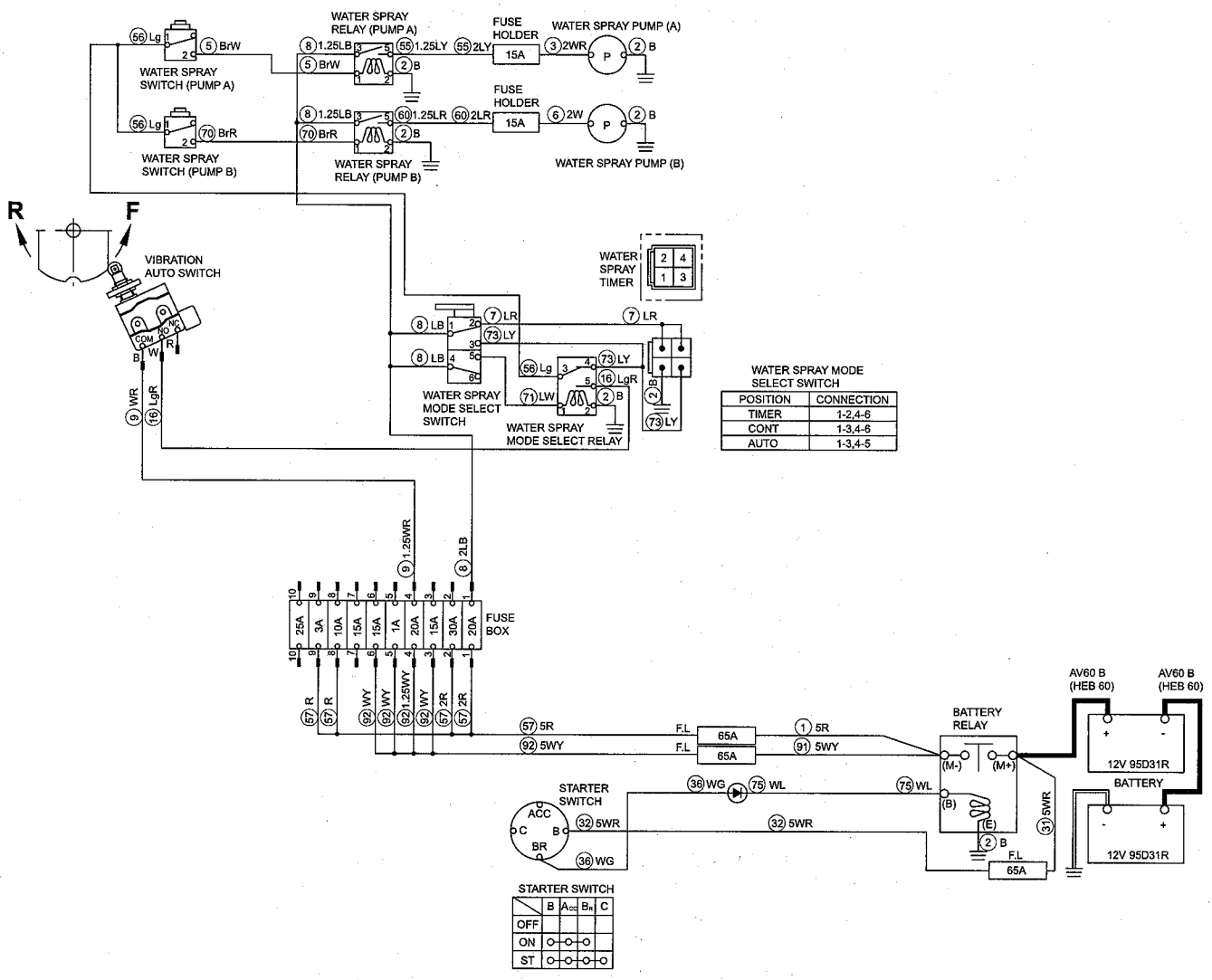
SW770-10003

2-6-5. Vibratory drum cannot be switched

Reference Fig. : 2-6-1

Check point	Check/Cause	Action
1. Vibratory Drum Select Switch	(1) When starter switch is ON, measure voltage between vibratory drum select switch terminal 1 inlet wire WR, terminal 4 inlet wire WR and chassis ground. Standard voltage : 24 V or more (2) When starter switch is ON and vibratory drum select switch is " Ⓕ Ⓡ ", measure voltage between vibratory drum select switch terminal 2 outlet wire GR and chassis ground. Standard voltage : 24 V or more (3) When starter switch is ON and vibratory drum select switch is " Ⓕ Ⓡ ", measure voltage between vibratory drum select switch terminal 2 outlet wire GR, terminal 5 outlet wire GW and chassis ground. There is no electricity in normal condition. (4) When starter switch is ON and vibratory drum select switch is " Ⓕ Ⓡ ", measure voltage between vibratory drum select switch terminal 5 outlet wire GW and chassis ground. Standard voltage : 24 V or more • If above item (1) is OK and item (2), (3) or (4) is NG, vibratory drum select switch is faulty.	Replace vibratory drum select switch.
2. RC controller (SW770HF, SW770ND)	(1) When starter switch is ON, measure voltage between RC controller terminals and chassis ground. • Terminal 1, 27 inlet wires RY and chassis ground. • Terminal 41, 42 inlet wires RB and chassis ground. • Terminal 45 inlet wire LgR and chassis ground. • Terminal 10 inlet wire GR and chassis ground when vibratory drum select switch is " Ⓕ Ⓡ ". • Terminal 11 inlet wire GW and chassis ground when vibratory drum select switch is " Ⓕ Ⓡ ". Standard voltage : 24 V or more (2) Check RC controller terminals are reliably grounded. • Terminal 2 and 28 wires B. (3) After starting engine, measure voltage between RC controller terminals and chassis ground. • Terminal 29 outlet wire GR and chassis ground when vibratory drum select switch is " Ⓕ Ⓡ ". • Terminal 15 outlet wire GW and chassis ground when vibratory drum select switch is " Ⓕ Ⓡ ". • Terminal 29 outlet wire GR, terminal 15 outlet wire GW and chassis ground when vibratory drum select switch is " Ⓕ Ⓡ ". Standard voltage : 24 V or more • If above items (1) and (2) are OK and item (3) is NG, RC controller is faulty.	Replace RC controller.
3. Harness Connecting Between Terminals	• Measure resistance of harness connecting between terminals. Standard resistance : 10 Ω or less • If resistance is abnormal, harness is faulty.	Repair or replace harness.

Fig.: 2-7-1



SW770-10004

2-7. Water Spray

Check following item before troubleshooting.

- No blown fuse and power is applied up to fuses.
- Check any ground circuit which belongs to components to be checked.
- Water spray switch (pump A) and (pump B) must be ON.

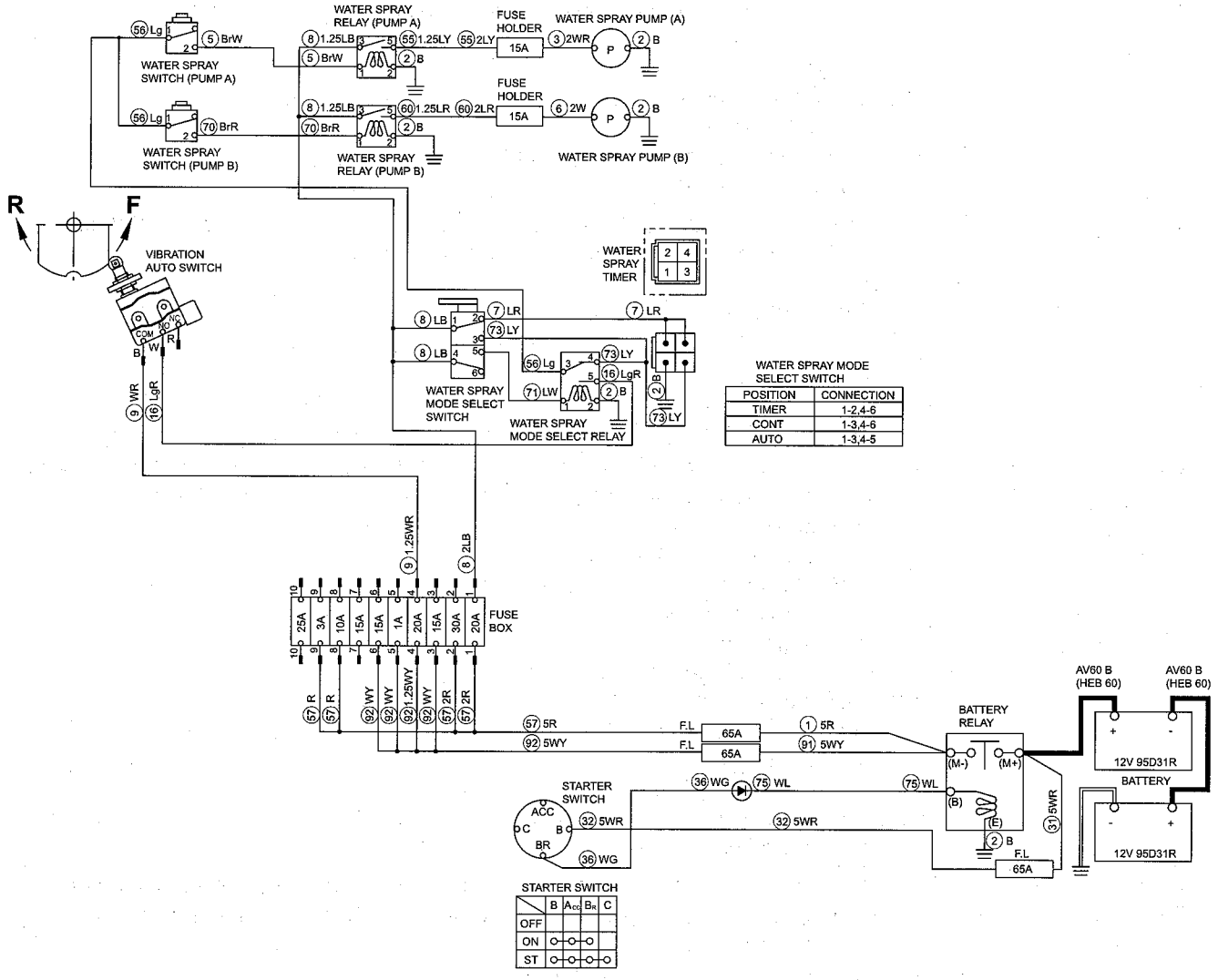
2-7-1. Continuous water spray does not operate 1/2

- Water spray mode select switch must be "CONT".

Reference Fig.: 2-7-1

Check point	Check/Cause	Action
1. Water Spray Pump (A)	(1) When starter switch is ON, measure voltage between water spray pump (A) terminal inlet wire WR and chassis ground. Standard voltage : 24 V or more (2) Check that no abnormality is found in water spray pump (A) ground terminal. • If above items (1) and (2) are OK and water spray pump (A) does not operate, water spray pump (A) is faulty.	Replace water spray pump (A).
2. Water Spray Pump (B)	(1) When starter switch is ON, measure voltage between water spray pump (B) terminal inlet wire W and chassis ground. Standard voltage : 24 V or more (2) Check that no abnormality is found in water spray pump (B) ground terminal. • If above items (1) and (2) are OK and water spray pump (B) does not operate, water spray pump (B) is faulty.	Replace water spray pump (B).
3. Water Spray Relay (Pump A)	(1) When starter switch is ON, measure voltage between water spray relay (pump A) terminal 1 inlet wire BrW and chassis ground. Standard voltage : 24 V or more (2) When starter switch is ON, measure voltage between water spray relay (pump A) terminal 3 inlet wire LB and chassis ground. Standard voltage : 24 V or more (3) When starter switch is ON, measure voltage between water spray relay (pump A) terminal 5 outlet wire LY and chassis ground. Standard voltage : 24 V or more • If above items (1) and (2) are OK and item (3) is NG, water spray relay (pump A) is faulty.	Replace water spray relay (pump A).
4. Water Spray Relay (Pump B)	(1) When starter switch is ON, measure voltage between water spray relay (pump B) terminal 1 inlet wire BrR and chassis ground. Standard voltage : 24 V or more (2) When starter switch is ON, measure voltage between water spray relay (pump B) terminal 3 inlet wire LB and chassis ground. Standard voltage : 24 V or more (3) When starter switch is ON, measure voltage between water spray relay (pump B) terminal 5 outlet wire LR and chassis ground. Standard voltage : 24 V or more • If above items (1) and (2) are OK and item (3) is NG, water spray relay (pump B) is faulty.	Replace water spray relay (pump B).

Fig.: 2-7-1



SW770-10004

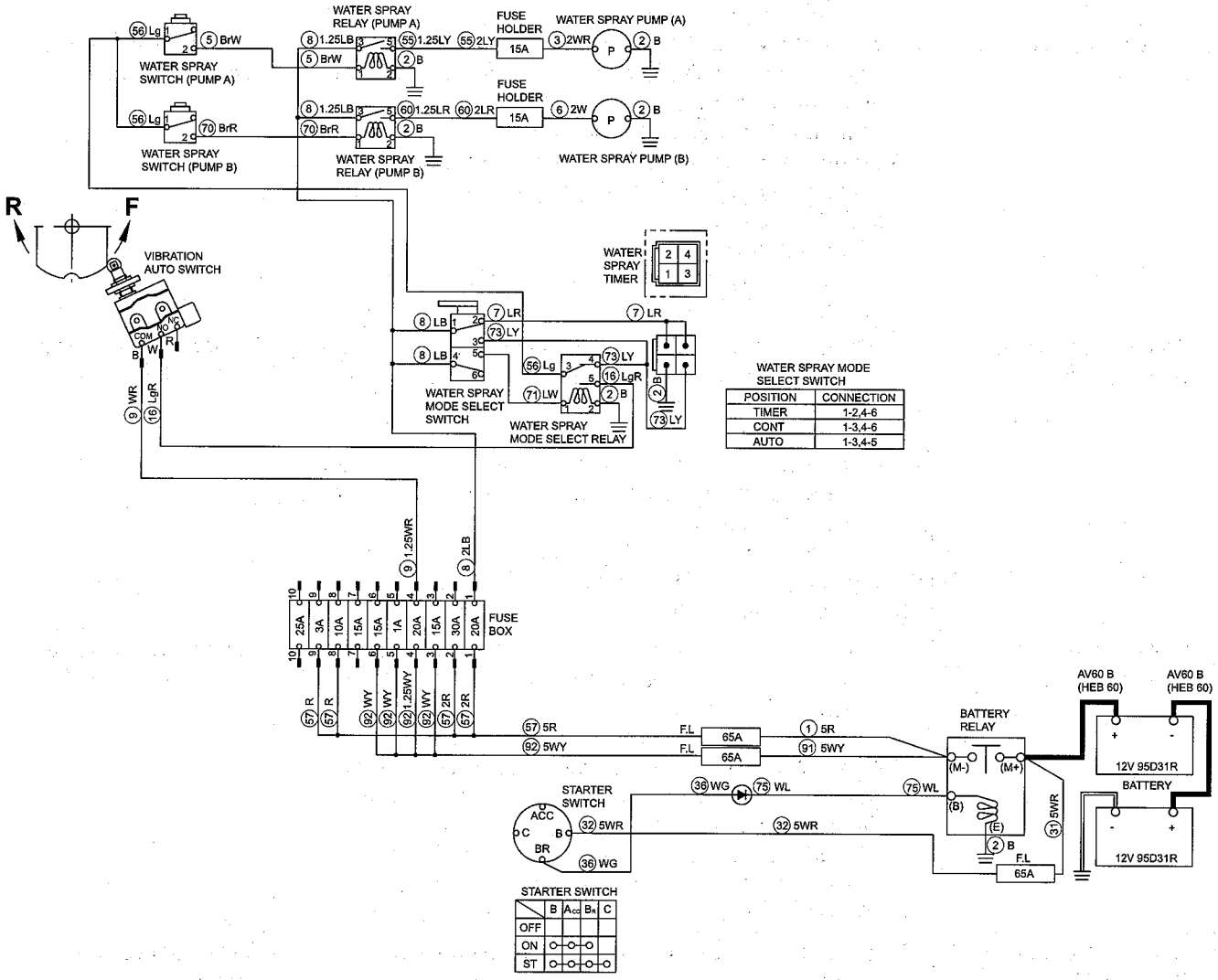
2-7-1. Continuous water spray does not operate 2/2

- Water spray mode select switch must be "CONT".

Reference Fig.: 2-7-1

Check point	Check/Cause	Action
5. Water Spray Switch (Pump A)	(1) When starter switch is ON, measure voltage between water spray switch (pump A) terminal 1 inlet wire Lg and chassis ground. Standard voltage : 24 V or more (2) When starter switch is ON, measure voltage between water spray switch (pump A) terminal 2 outlet wire BrW and chassis ground. Standard voltage : 24 V or more • If above item (1) is OK and item (2) is NG, water spray switch (pump A) is faulty.	Replace water spray switch (pump A).
6. Water Spray Switch (Pump B)	(1) When starter switch is ON, measure voltage between water spray switch (pump B) terminal 1 inlet wire Lg and chassis ground. Standard voltage : 24 V or more (2) When starter switch is ON, measure voltage between water spray switch (pump B) terminal 2 outlet wire BrR and chassis ground. Standard voltage : 24 V or more • If above item (1) is OK and item (2) is NG, water spray switch (pump B) is faulty.	Replace water spray switch (pump B).
7. Water Spray Mode Select Relay	(1) When starter switch is ON, measure voltage between water spray mode select relay terminal 4 inlet wire LY and chassis ground. Standard voltage : 24 V or more (2) When starter switch is ON, measure voltage between water spray mode select relay terminal 3 outlet wire Lg and chassis ground. Standard voltage : 24 V or more • If above item (1) is OK and item (2) is NG, water spray mode select relay is faulty.	Replace water spray mode select relay.
8. Water Spray Mode Select Switch	(1) When starter switch is ON, measure voltage between water spray mode select switch terminal 1 inlet wire LB and chassis ground. Standard voltage : 24 V or more (2) When starter switch is ON, measure voltage between water spray mode select switch terminal 3 outlet wire LY and chassis ground. Standard voltage : 24 V or more • If above item (1) is OK and item (2) is NG, water spray mode select switch is faulty.	Replace water spray mode select switch.
9. Harness Connecting Between Terminals	• Measure resistance of harness connecting between terminals. Standard resistance : 10 Ω or less • If resistance is abnormal, harness is faulty.	Repair or replace harness.

Fig.: 2-7-1



SW770-10004

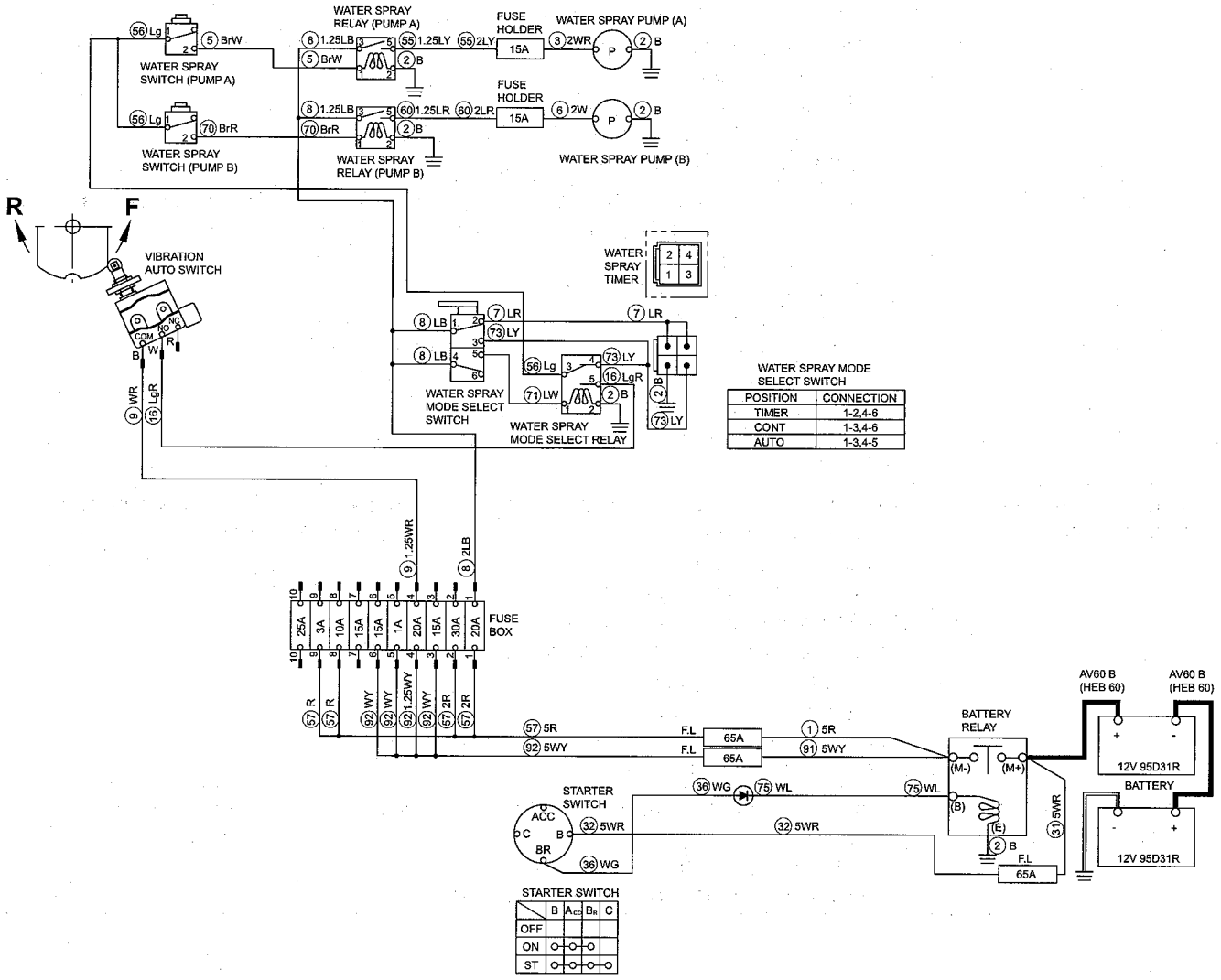
2-7-2. Continuous water spray works, but auto water spray does not operate

- Water spray mode select switch must be "AUTO".
- F-R lever must be "F" or "R".

Reference Fig.: 2-7-1

Check point	Check/Cause	Action
1. Water Spray Mode Select Relay	(1) When starter switch is ON, measure voltage between water spray mode select relay terminal 1 inlet wire LW and chassis ground. Standard voltage : 24 V or more (2) When starter switch is ON, measure voltage between water spray mode select relay terminal 5 inlet wire LgR and chassis ground. Standard voltage : 24 V or more (3) When starter switch is ON, measure voltage between water spray mode select relay terminal 3 outlet wire Lg and chassis ground. Standard voltage : 24 V or more • If above items (1) and (2) are OK and item (3) is NG, water spray mode select relay is faulty.	Replace water spray mode select relay.
2. Vibration Auto Switch	(1) When starter switch is ON, measure voltage between vibration auto switch terminal COM inlet wire WR and chassis ground. Standard voltage : 24 V or more (2) When starter switch is ON, measure voltage between vibration auto switch terminal NO outlet wire LgR and chassis ground. Standard voltage : 24 V or more • If above item (1) is OK and item (2) is NG, vibration auto switch is faulty.	Replace vibration auto switch.
3. Water Spray Mode Select Switch	(1) When starter switch is ON, measure voltage between water spray mode select switch terminal 4 inlet wire LB and chassis ground. Standard voltage : 24 V or more (2) When starter switch is ON, measure voltage between water spray mode select switch terminal 5 outlet wire LW and chassis ground. Standard voltage : 24 V or more • If above item (1) is OK and item (2) is NG, water spray mode select switch is faulty.	Replace water spray mode select switch.
4. Harness Connecting Between Terminals	• Measure resistance of harness connecting between terminals. Standard resistance : 10 Ω or less • If resistance is abnormal, harness is faulty.	Repair or replace harness.

Fig.: 2-7-1



SW770-10004

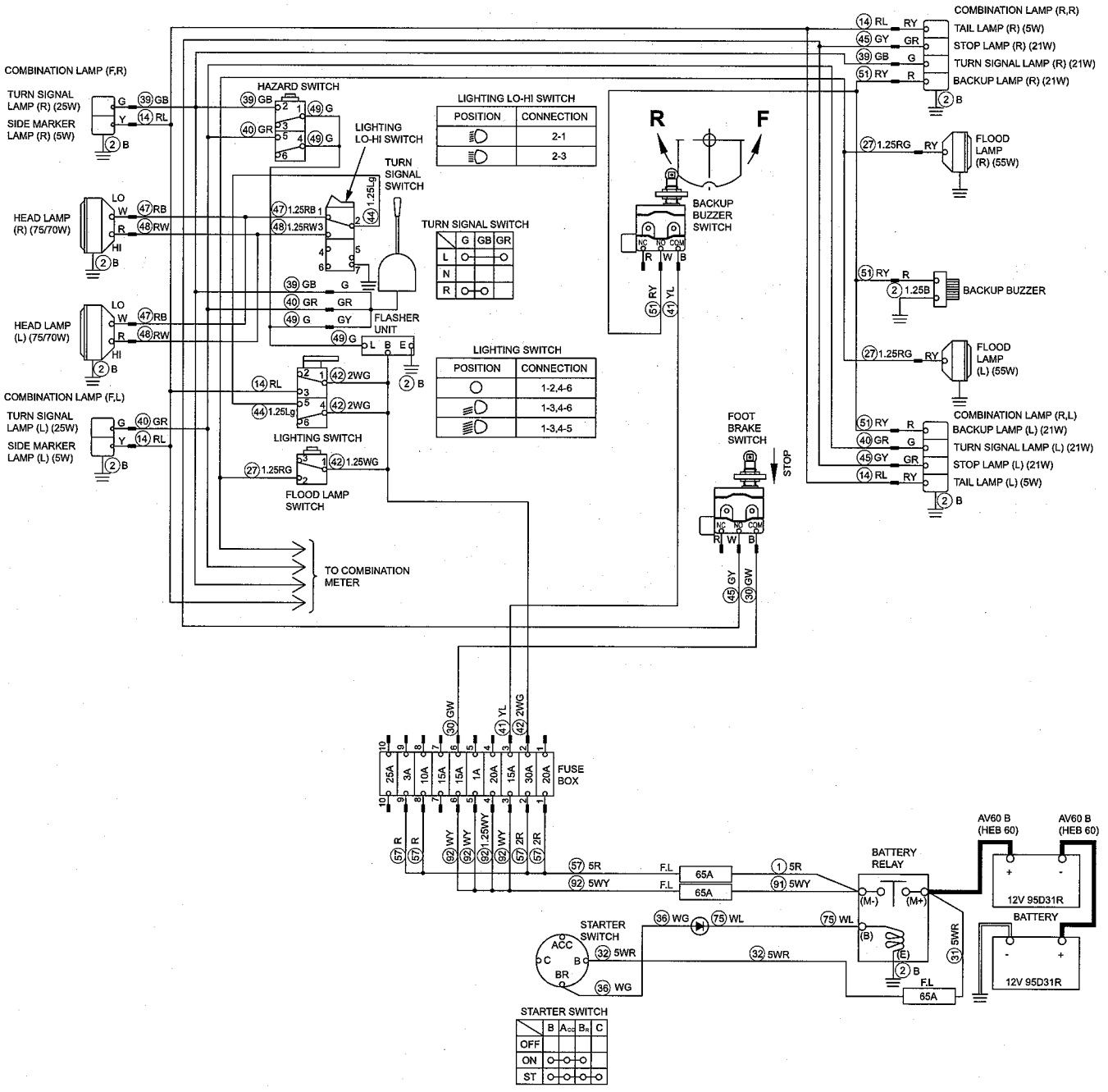
2-7-3. Continuous water spray works, but intermittent water spray does not operate

- Water spray mode select switch must be "TIMER".

Reference Fig.: 2-7-1

Check point	Check/Cause	Action
1. Water Spray Timer	(1) When starter switch is ON, measure voltage between water spray timer terminal 1 inlet wire LR, terminal 3 inlet wire LR and chassis ground. Standard voltage : 24 V or more (2) When starter switch is ON, measure voltage between water spray timer terminal 4 outlet wire LY and chassis ground. Standard voltage : 24 V or more with constant intervals • If above item (1) is OK and item (2) is NG, water spray timer is faulty.	Replace water spray timer.
2. Water Spray Mode Select Switch	(1) When starter switch is ON, measure voltage between water spray mode select switch terminal 1 inlet wire LB and chassis ground. Standard voltage : 24 V or more (2) When starter switch is ON, measure voltage between water spray mode select switch terminal 2 outlet wire LR and chassis ground. Standard voltage : 24 V or more • If above item (1) is OK and item (2) is NG, water spray mode select switch is faulty.	Replace water spray mode select switch.
3. Harness Connecting Between Terminals	• Measure resistance of harness connecting between terminals. Standard resistance : 10 Ω or less • If resistance is abnormal, harness is faulty.	Repair or replace harness.

Fig.: 2-8-1



SW770-10005

2-8. Lighting

Check following items before troubleshooting.

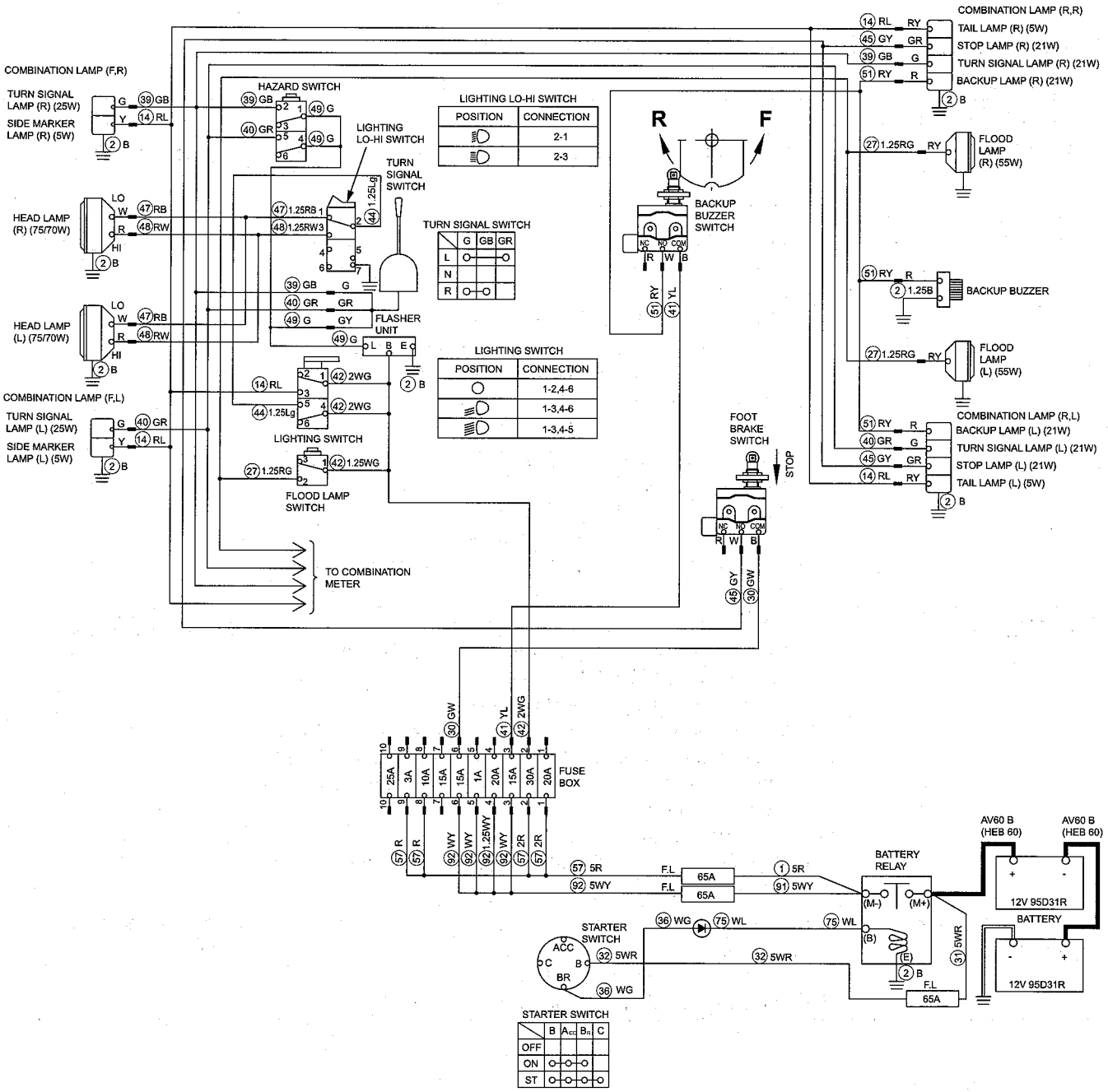
- No blown fuse and power is applied up to fuses.
- When measuring voltage and current without disconnecting connectors, refer to "measuring voltage and current following using tester" (P. 10-006 to P. 10-008).
- Check any ground circuit which belongs to components to be checked.

2-8-1. Head lamp, side marker lamp and tail lamp do not light

Reference Fig.: 2-8-1

Check point	Check/Cause	Action
1. Each Bulb	• Check that none of lamp bulbs is burned out or has a contact failure. • Bulb is faulty or poorly connected.	Replace each bulb.
2. Lighting Switch	(1) When starter switch is ON, measure voltage between lighting switch terminal 1 and 4 inlet wire WG and chassis ground. Standard voltage : 24 V or more (2) When starter switch is ON and lighting switch is "≡D", measure voltage between lighting switch terminal 3 outlet wire RL and chassis ground. Standard voltage : 24 V or more (3) When starter switch is ON and lighting switch is "≡D", measure voltage between lighting switch terminal 5 outlet wire Lg and chassis ground. Standard voltage : 24 V or more • If above item (1) is OK and item (2) or (3) is NG, lighting switch is faulty.	Replace lighting switch.
3. Lighting Lo-Hi Switch	(1) When starter switch is ON and lighting switch is "≡D", measure voltage between lighting Lo-Hi switch terminal 2 inlet wire Lg and chassis ground. Standard voltage : 24 V or more (2) When starter switch is ON, lighting switch is "≡D" and lighting Lo-Hi switch is "≡D", measure voltage between lighting Lo-Hi switch terminal 1 outlet wire RB and chassis ground. Standard voltage : 24 V or more • If above item (1) is OK and item (2) is NG, lighting Lo-Hi switch is faulty.	Replace lighting Lo-Hi switch.
4. Harness Connecting Between Terminals	• Measure resistance of harness connecting between terminals. Standard resistance : 10 Ω or less • If resistance is abnormal, the harness is faulty.	Repair or replace harness.

Fig.: 2-8-1



SW770-10005

2-8-2. Flood lamp does not light

Reference Fig.: 2-8-1

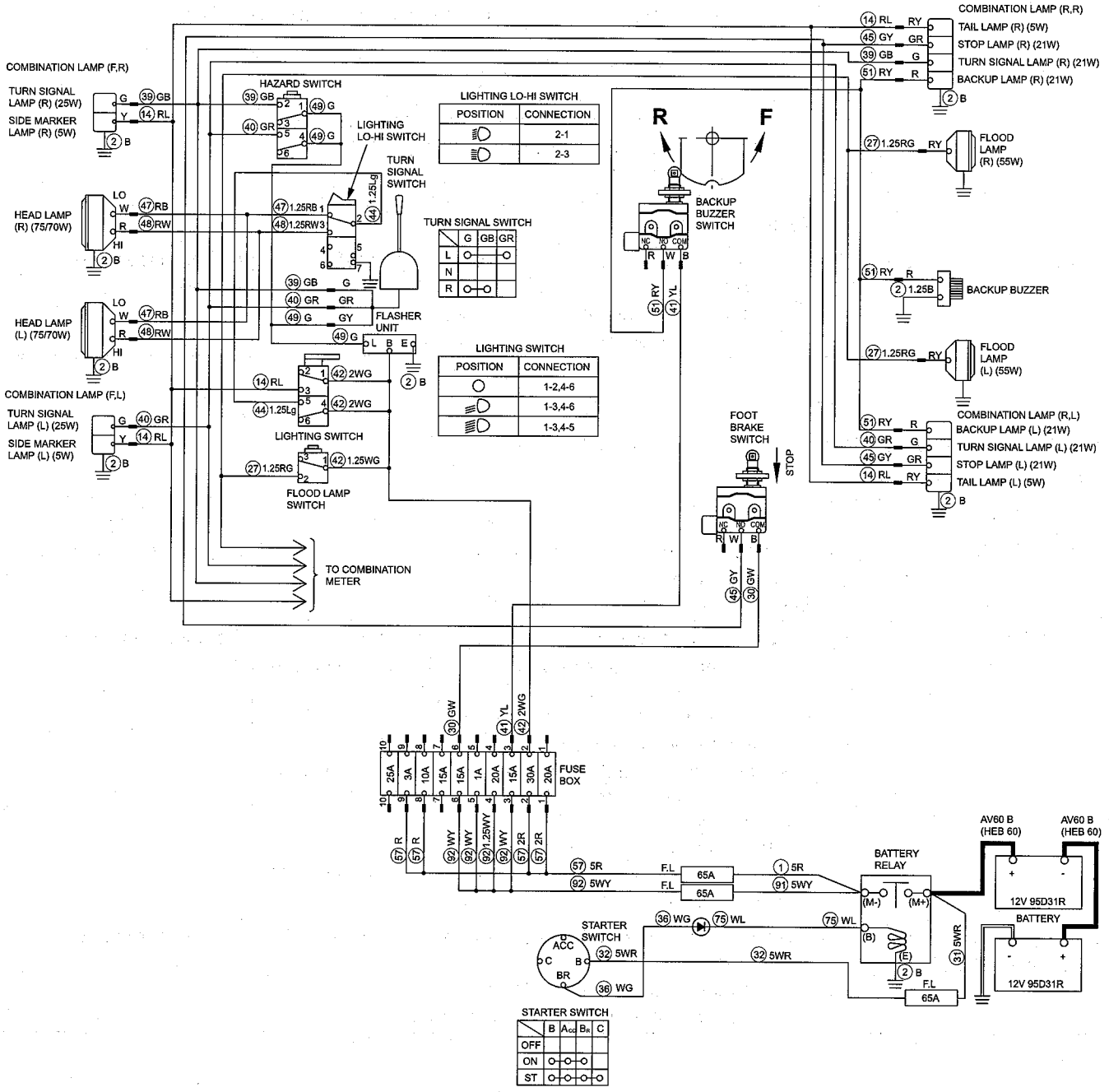
Check point	Check/Cause	Action
1. Each Bulb	• Check that none of lamp bulbs is burned out or has a contact failure. • Bulb is faulty or poorly connected.	Replace each bulb.
2. Flood Lamp Switch	(1) When starter switch is ON, measure voltage between flood lamp switch terminal 1 inlet wire WG and chassis ground. Standard voltage : 24 V or more (2) When starter switch is ON and flood lamp switch is ON, measure voltage between flood lamp switch terminal 2 outlet wire RG and chassis ground. Standard voltage : 24 V or more • If above item (1) is OK and item (2) is NG, flood lamp switch is faulty.	Replace flood lamp switch.
3. Harness Connecting Between Terminals	• Measure resistance of harness connecting between terminals. Standard resistance : 10 Ω or less • If resistance is abnormal, harness is faulty.	Repair or replace harness.

2-8-3. High-beam of head lamp does not light

Reference Fig.: 2-8-1

Check point	Check/Cause	Action
1. Each Bulb	• Check that none of lamp bulbs is burned out or has a contact failure. • Bulb is faulty or poorly connected.	Replace each bulb.
2. Lighting Lo-Hi Switch	(1) When starter switch is ON and lighting switch is "≣D", measure voltage between lighting Lo-Hi switch terminal 2 inlet wire Lg and chassis ground. Standard voltage : 24 V or more (2) When starter switch is ON, lighting switch is "≣D" and lighting Lo-Hi switch is "≣D", measure voltage between lighting Lo-Hi switch terminal 3 outlet wire RW and chassis ground. Standard voltage : 24 V or more • If above item (1) is OK and item (2) is NG, lighting Lo-Hi switch is faulty.	Replace lighting Lo-Hi switch.
3. Harness Connecting Between Terminals	• Measure resistance of harness connecting between terminals. Standard resistance : 10 Ω or less • If resistance is abnormal, harness is faulty.	Repair or replace harness.

Fig.: 2-8-1



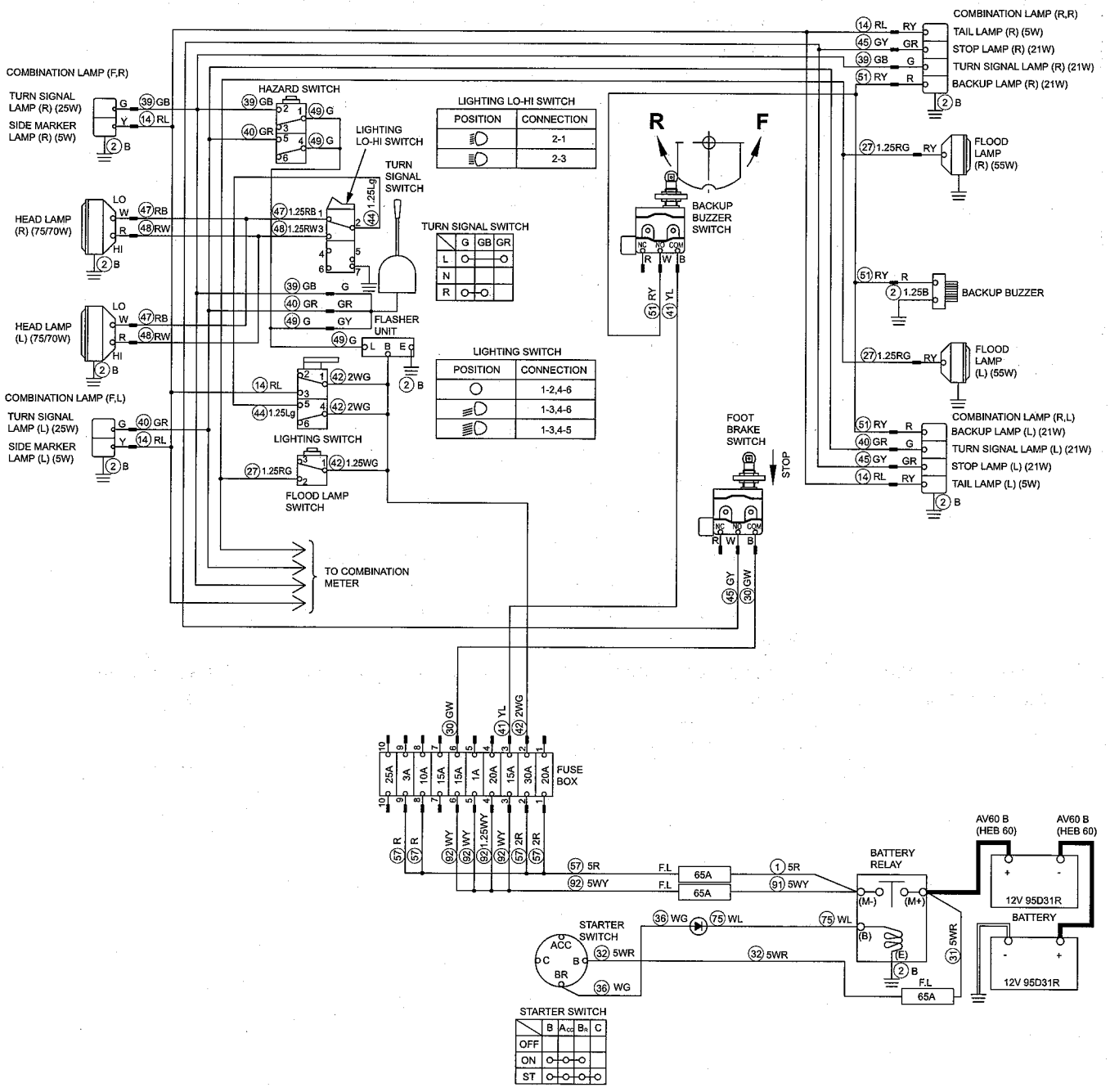
SW770-10005

2-8-4. Turn signal lamp does not blink

Reference Fig.: 2-8-1

Check point	Check/Cause	Action
1. Each Bulb	• Check that none of lamp bulbs is burned out or has a contact failure. • Bulb is faulty or poorly connected.	Replace each bulb.
2. Flasher Unit	(1) When starter switch is ON, measure voltage between flasher unit terminal B inlet wire WG and chassis ground. Standard voltage : 24 V or more (2) When starter switch is ON and turn signal lever is moved, measure voltage between flasher unit terminal L outlet wire G and chassis ground. Standard voltage : 24 V or more with constant intervals • If above item (1) is OK and item (2) is NG, flasher unit is faulty.	Replace flasher unit.
3. Turn Signal Switch	(1) When starter switch is ON and turn signal lever is moved, measure voltage between turn signal switch terminal inlet wire G and chassis ground. Standard voltage: 24 V or more with constant intervals (2) When starter switch is ON and turn signal lever is moved, measure voltage between turn signal switch terminals and chassis ground. Turn signal (L) : Outlet wire GR Turn signal (R) : Outlet wire GB Standard voltage : 24 V or more with constant intervals • If above item (1) is OK and item (2) is NG, turn signal switch is faulty.	Replace turn signal switch.
4. Harness Connecting Between Terminals	• Measure resistance of harness connecting between terminals. Standard resistance : 10 Ω or less • If resistance is abnormal, harness is faulty.	Repair or replace harness.

Fig.: 2-8-1



SW770-10005

2-8-5. Hazard lamp does not light (Turn signal blinks)

Reference Fig.: 2-8-1

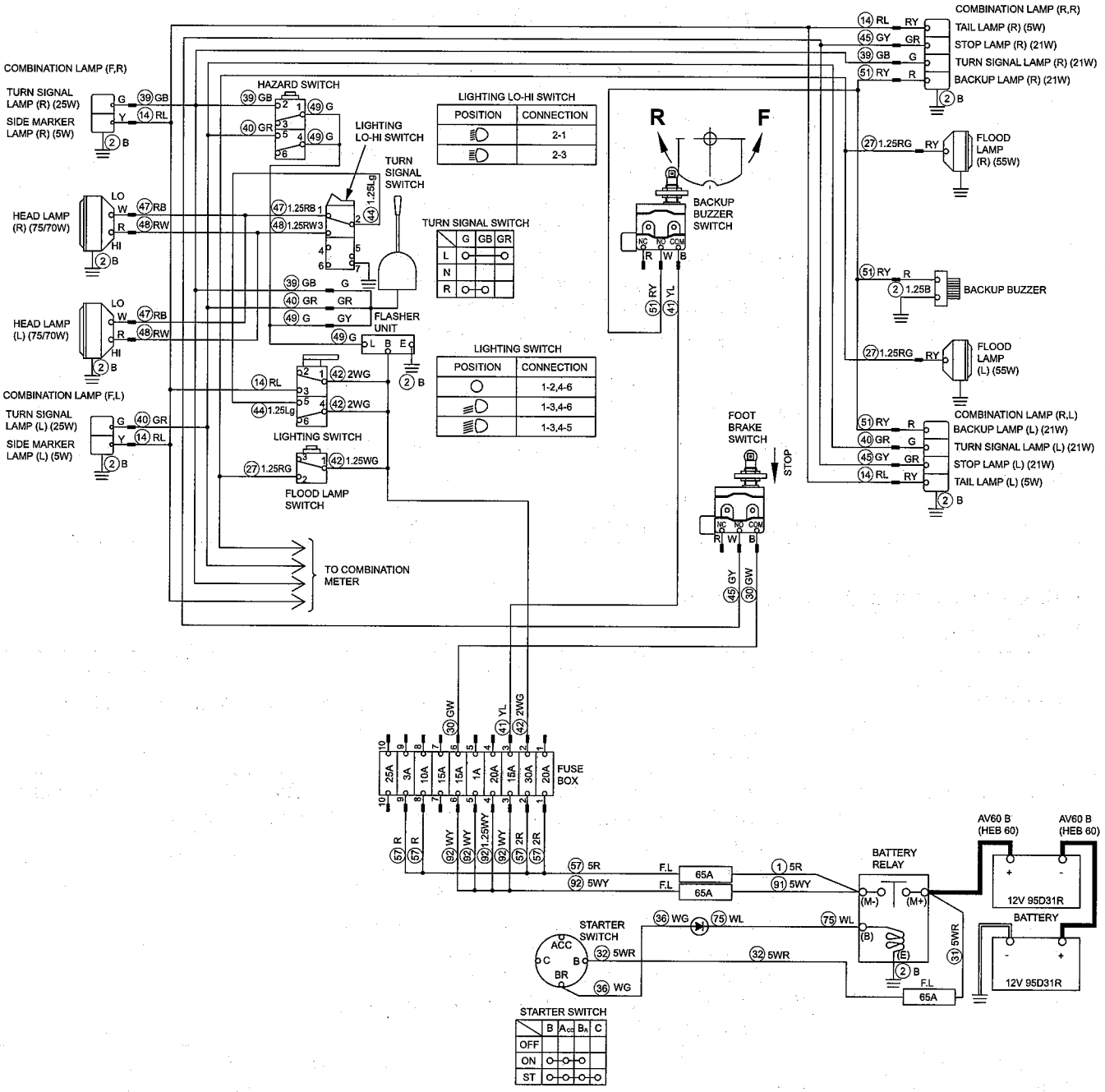
Check point	Check/Cause	Action
1. Each Bulb	• Check none of lamp bulbs is burned out or has a contact failure. • Bulb is faulty or poorly connected.	Replace each bulb.
2. Hazard Switch	(1) When starter switch is ON, measure voltage between hazard switch terminal 1 and 4 inlet wire G and chassis ground. Standard voltage : 24 V or more with constant intervals (2) When starter switch is ON and hazard switch is ON, measure voltage between hazard switch terminal 2 outlet wire GB and chassis ground. Standard voltage : 24 V or more with constant intervals (3) When starter switch is ON and hazard switch is ON, measure voltage between hazard switch terminal 5 outlet wire GR and chassis ground. Standard voltage : 24 V or more with constant intervals • If above item (1) is OK and item (2) or (3) is NG, hazard switch is faulty.	Replace hazard switch.
3. Harness Connecting Between Terminals	• Measure resistance of harness connecting between terminals. Standard resistance : 10 Ω or less • If resistance is abnormal, harness is faulty.	Repair or replace harness.

2-8-6. Backup lamp does not light

Reference Fig.: 2-8-1

Check point	Check/Cause	Action
1. Each Bulb	• Check that none of lamp bulbs is burned out or has a contact failure. • Bulb is faulty or poorly connected.	Replace each bulb.
2. Backup Buzzer Switch	(1) When starter switch is ON, measure voltage between backup buzzer switch terminal COM inlet wire YL and chassis ground. Standard voltage : 24 V or more (2) When starter switch is ON and F-R lever is "R", measure voltage between backup buzzer switch terminal NO outlet wire RY and chassis ground. Standard voltage : 24 V or more • If above item (1) is OK and item (2) is NG, backup buzzer switch is faulty.	Replace backup buzzer switch.
3. Harness Connecting Between Terminals	• Measure resistance of harness connecting between terminals. Standard resistance : 10 Ω or less • If resistance is abnormal, harness is faulty.	Repair or replace harness.

Fig.: 2-8-1



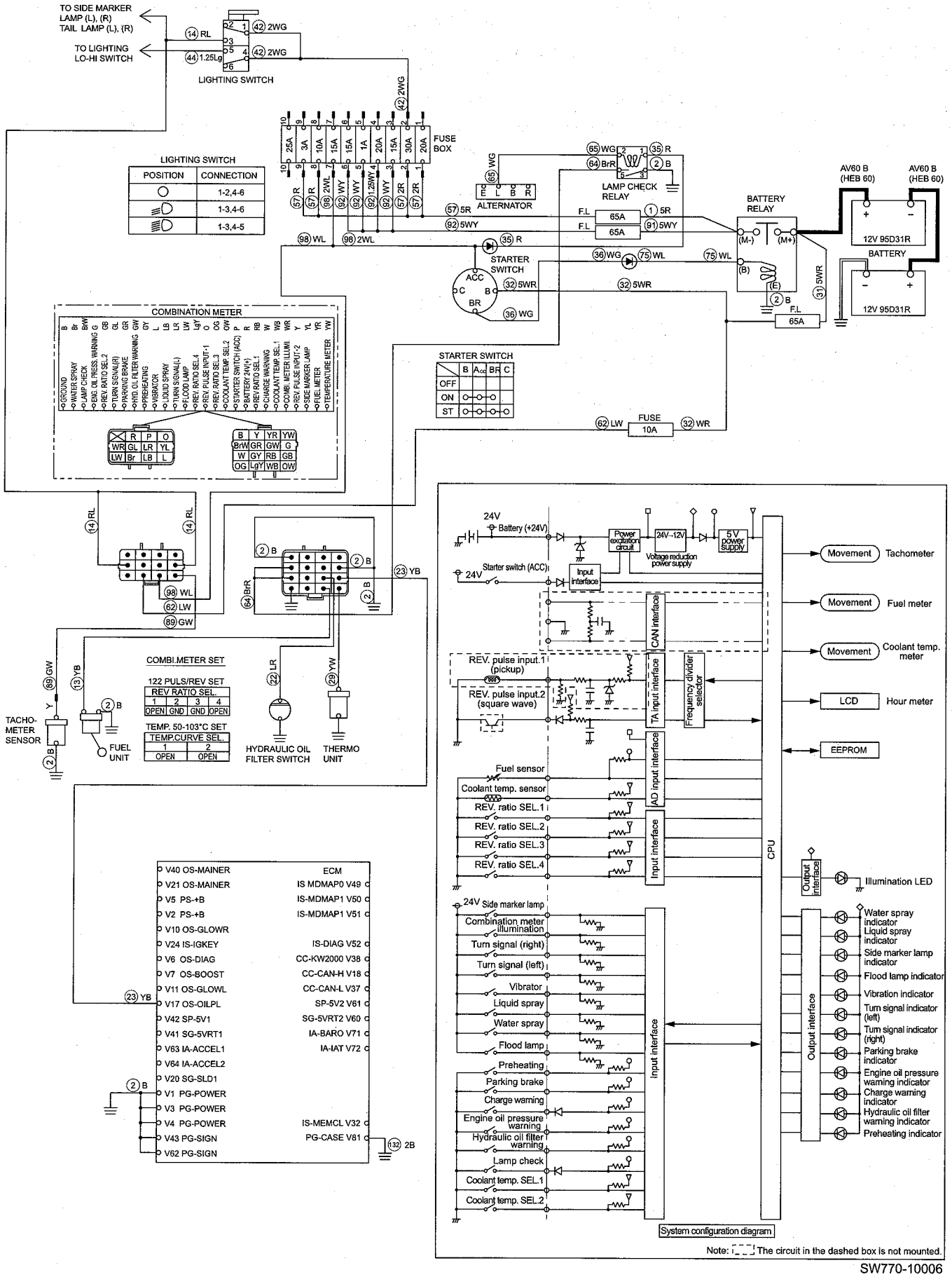
SW770-10005

2-8-7. Stop lamp does not light

Reference Fig.: 2-8-1

Check point	Check/Cause	Action
1. Each Bulb	• Check that none of lamp bulbs is burned out or has a contact failure. • Bulb is faulty or poorly connected.	Replace each bulb.
2. Foot Brake Switch	(1) When starter switch is ON, measure voltage between foot brake switch terminal COM inlet wire GW and chassis ground. Standard voltage : 24 V or more (2) When starter switch is ON while foot brake is depressed, measure voltage between foot brake switch terminal NO outlet wire GY and chassis ground. Standard voltage : 24 V or more • If above item (1) is OK and item (2) is NG, foot brake switch is faulty.	Replace foot brake switch.
3. Harness Connecting Between Terminals	• Measure resistance of harness connecting between terminals. Standard resistance : 10 Ω or less • If resistance is abnormal, harness is faulty.	Repair or replace harness.

Fig.: 2-8-2



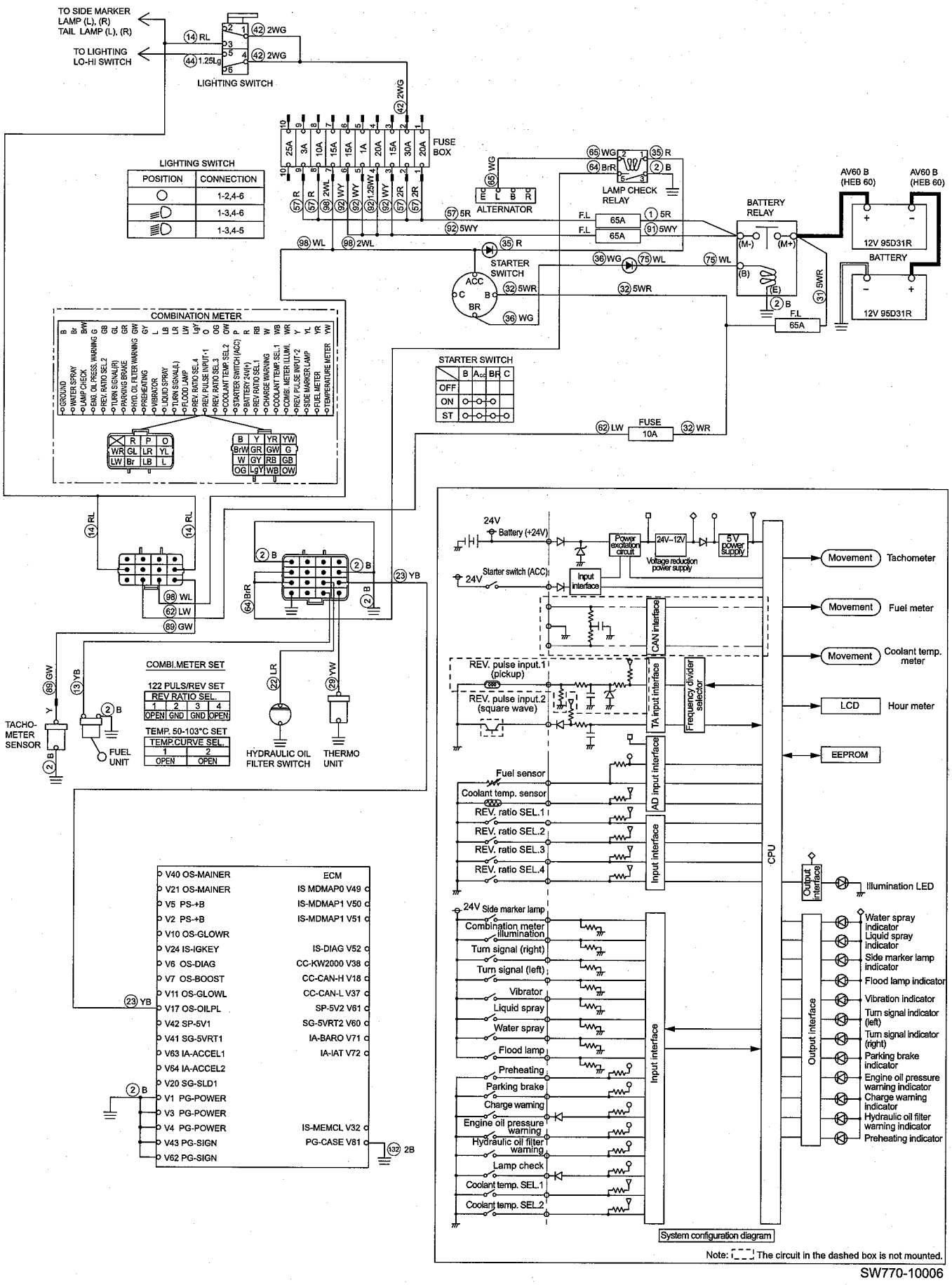
SW770-10006

2-8-8. Illumination of combination meter does not turn on

Reference Fig. : 2-8-2

Check point	Check/Cause	Action
1. Harness	• Measure resistance between lighting switch terminal 3 wire RL and combination meter connector terminal wire No. 14 wire RL. Standard resistance : 10 Ω or less • If resistance is abnormal, harness is faulty.	Repair or replace harness.
2. Combination Meter (Combination meter illumination)	(1) When starter switch is ON, measure voltage between combination meter terminal wires and ground terminal wire. • Battery terminal wire No. 62 inlet wire LW and ground terminal wire No. 2 wire B. • Starter switch terminal wire No. 98 inlet wire WL and ground terminal wire No. 2 wire B. Standard voltage : 24 V or more (2) When starter switch is ON and lighting switch is "≡○", measure voltage between combination meter illumination terminal wire No. 14 inlet wire RL and chassis ground. Standard voltage : 24 V or more • If above items (1) and (2) are OK and combination meter does not turn on, combination meter is faulty.	Replace combination meter.

Fig.: 2-8-2



SW770-10006

2-8-9. Combination meter warning lamp or indicator lamp is abnormal

Reference Fig. : 2-8-2

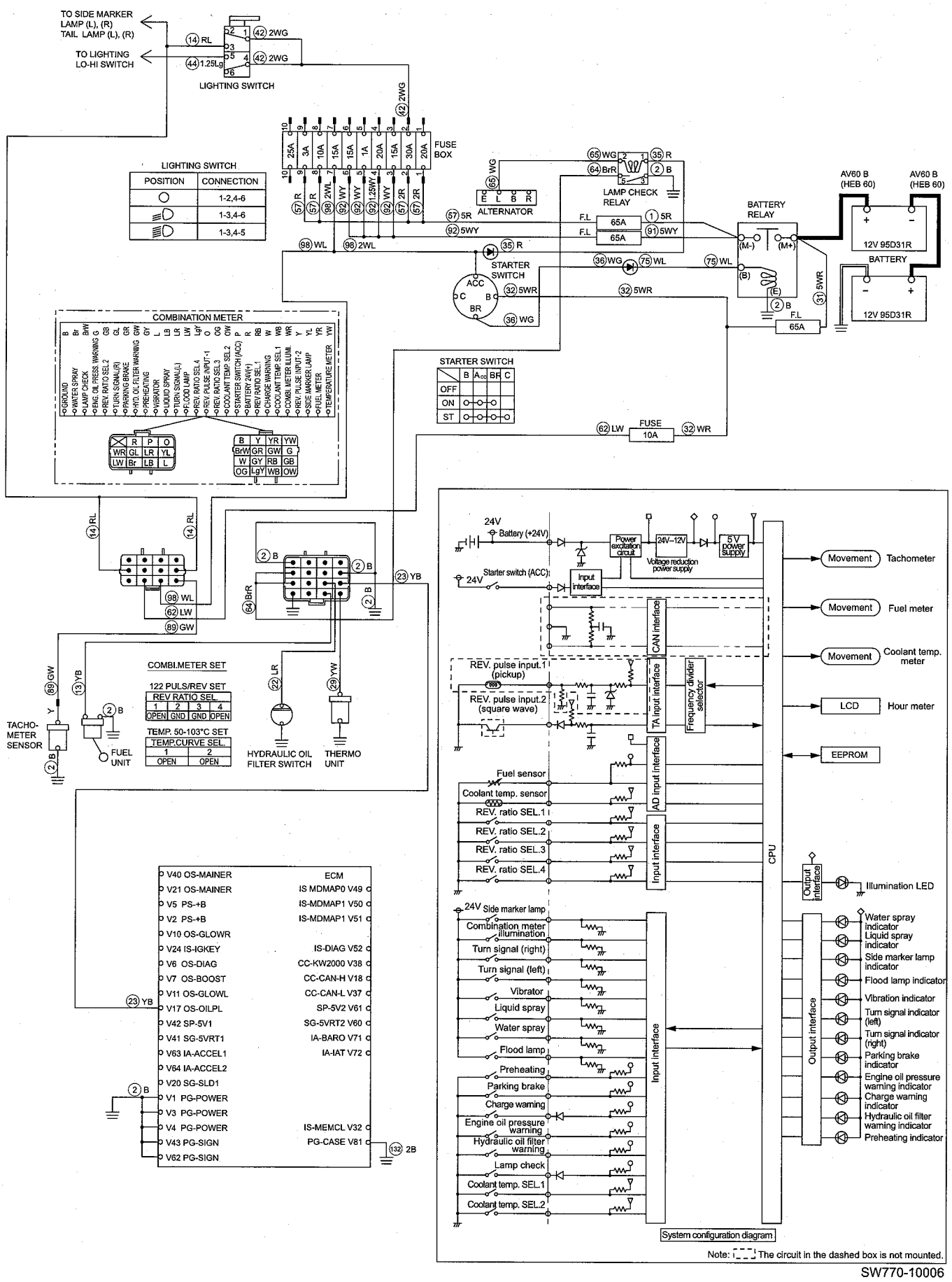
Check point	Check/Cause	Action

1. Harness	• Disconnect connectors between combination meter and lamp check relay.
	• Measure resistance between terminals and chassis ground.
	  • Combination meter connector terminal wire No. 64 wire BrR and chassis ground
	  • Lamp check relay terminal 5 wire BrR and chassis ground
	  Standard resistance: 100 kΩ or more
	• If resistance is abnormal, harness is faulty.
		Repair or replace harness.

2. Lamp Check Relay	(1) When starter switch is ON, measure voltage between lamp check relay terminal 1 inlet wire R and chassis ground.
	  Standard voltage : 24 V or more
	(2) When starter switch is ON, check continuity between lamp check relay terminal 5 inlet wire BrR and chassis ground.
	  There is continuity in normal condition.
	(3) After starting engine, measure voltage between lamp check relay terminal 2 inlet wire WG and chassis ground.
	  Standard voltage : 24 V or more
	(4) After starting engine, check continuity between lamp check relay terminal 5 inlet wire BrR and chassis ground.
	  There is no continuity in normal condition.
	• If above items (1) and (3) are OK and item (2) or (4) is NG, lamp check relay is faulty.
	• If above items (1) and (2) are OK and items (3) and (4) are NG, alternator is faulty.
		Repair or replace lamp check relay or alternator.

3. Combination Meter (Lamp check)	(1) When starter switch is ON, measure voltage between combination meter terminal wires and ground terminal wire.
	  • Battery terminal wire No. 62 inlet wire LW and ground terminal wire No. 2 wire B.
	  • Starter switch terminal wire No. 98 inlet wire WL and ground terminal wire No. 2 wire B.
	  Standard voltage : 24 V or more
	(2) When starter switch is ON, check that parking brake indicator lamp, hydraulic oil filter warning lamp, engine oil pressure warning lamp and charge warning lamp illuminate and then go out after starting engine.
	• If above item (1) is OK and item (2) is NG, combination meter is faulty.
	
	(NOTICE)
	• **Since engine cannot start unless parking brake switch is applied, parking brake indicator lamp does not go out even after starting engine.**
		Replace combination meter.

Fig.: 2-8-2



SW770-10006

2-8-10. Tachometer reading is abnormal

Reference Fig. : 2-8-2

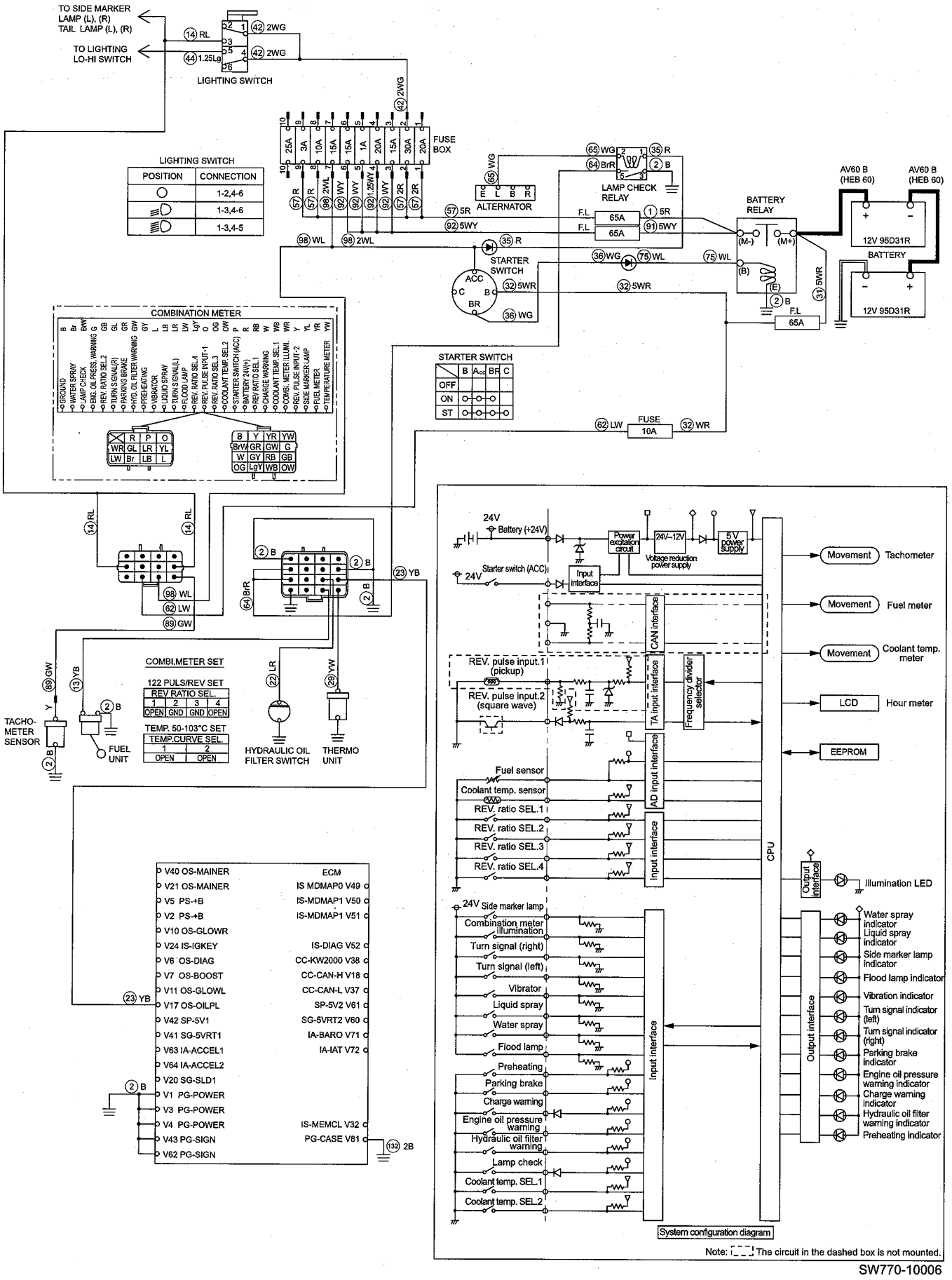
Check point	Check/Cause	Action
1. Combination Meter (Tachometer)	(1) When starter switch is ON, measure voltage between combination meter terminal wires and ground terminal wire. • Battery terminal wire No. 62 inlet wire LW and ground terminal wire No. 2 wire B. • Starter switch terminal wire No. 98 inlet wire WL and ground terminal wire No. 2 wire B. Standard voltage : 24 V or more (2) Check that combination meter terminal wire B (rev. ratio 2 and 3) are grounded. (3) Start engine and measure pulse between combination meter rev. pulse input 1 terminal wire No. 89 inlet wire GW and chassis ground. Standard pulse : 122 pulses/rotation of engine • If above items (1) and (2) are OK and pulse is NG in item (3), tachometer sensor is faulty. • If above items (1) and (2) are OK and tachometer reading is NG in item (3), combination meter is faulty.	Replace tachometer sensor or combination meter.
2. Harness Connecting Between Terminals	• Measure resistance of harness connecting between terminals. Standard resistance : 10 Ω or less • If resistance is abnormal, harness is faulty.	Repair or replace harness.

2-8-11. Hour meter is abnormal

Reference Fig. : 2-8-2

Check point	Check/Cause	Action
1. Combination Meter (Hour meter)	• When starter switch is ON, measure voltage between combination meter terminal wires and ground terminal wire. • Battery terminal wire No. 62 inlet wire LW and ground terminal wire No. 2 wire B. • Starter switch terminal wire No. 98 inlet wire WL and ground terminal wire No. 2 wire B. Standard voltage : 24 V or more • If no abnormality is found, combination meter is faulty.	Replace combination meter.

Fig.: 2-8-2



SW770-10006

2-8-12. Temperature meter is abnormal

Reference Fig. : 2-8-2

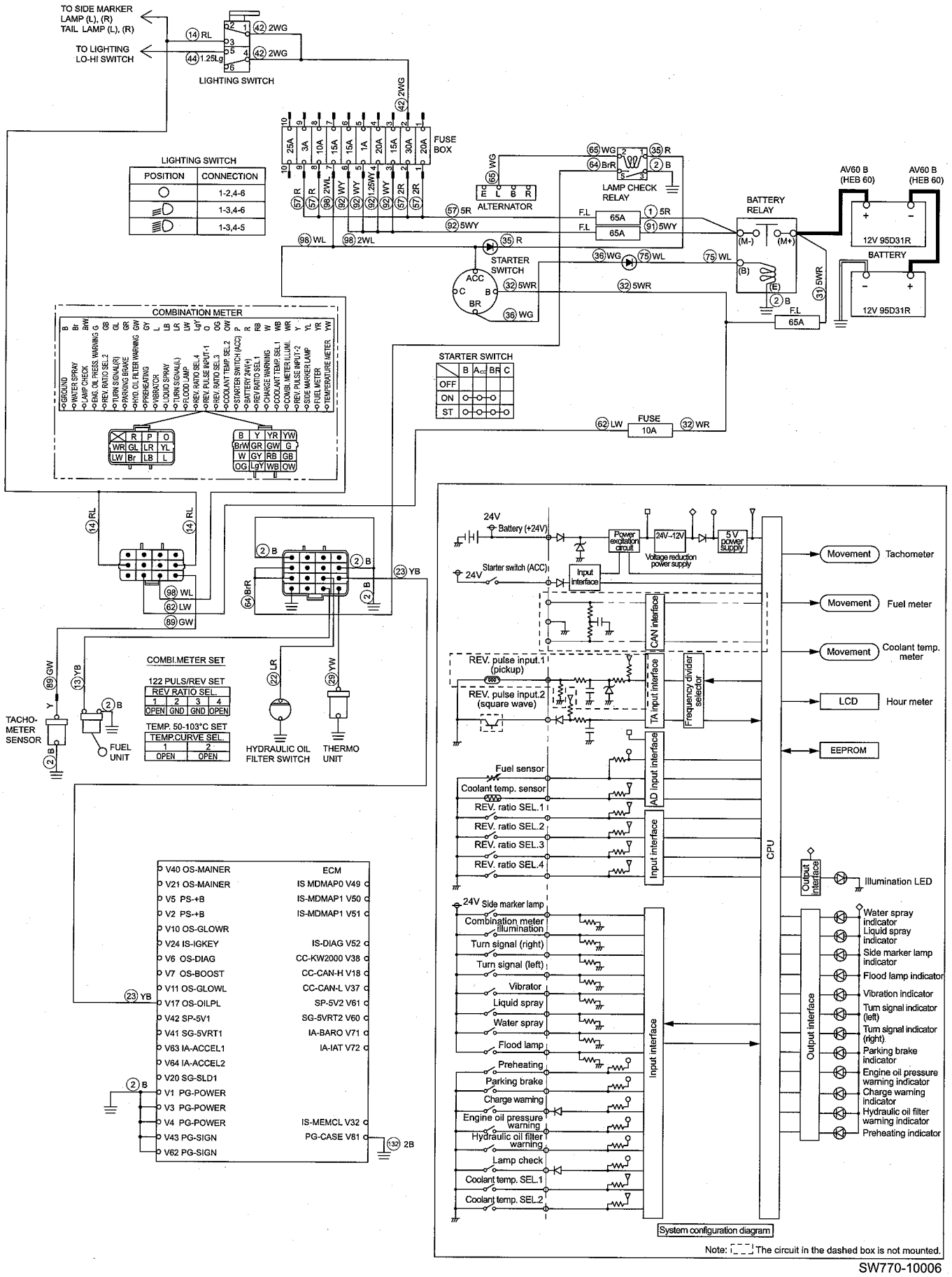
Check point	Check/Cause	Action
1. Thermo Unit	• Disconnect harness and measure resistance of thermo unit. Standard resistance : 164.6 Ω [(at unit temperature of 50°C (122°F)] 26.44 Ω [(at unit temperature of 103°C (217°F)] • If resistance is abnormal, thermo unit is faulty.	Replace thermo unit.
2. Combination Meter (Coolant temperature meter)	• When starter switch is ON, measure voltage between combination meter terminal wires and ground terminal wire. • Battery terminal wire No. 62 inlet wire LW and ground terminal wire No. 2 wire B. • Starter switch terminal wire No. 98 inlet wire WL and ground terminal wire No. 2 wire B. Standard voltage : 24 V or more • If no abnormality is found, combination meter is faulty.	Replace combination meter.
3. Harness Connecting Between Terminals	• Measure resistance of harness connecting between terminals. Standard resistance : 10 Ω or less • If resistance is abnormal, harness is faulty.	Repair or replace harness.

2-8-13. Fuel meter is abnormal

Reference Fig. : 2-8-2

Check point	Check/Cause	Action
1. Fuel Unit	• Disconnect harness and measure resistance of fuel unit. Standard resistance : 13.5 Ω (with float in "F") 80.0 Ω (with float in "E") • If resistance is abnormal, fuel unit is faulty.	Replace fuel unit.
2. Combination Meter (Fuel meter)	• When starter switch is ON, measure voltage between combination meter terminal wires and ground terminal wire. • Battery terminal wire No. 62 inlet wire LW and ground terminal wire No. 2 wire B. • Starter switch terminal wire No. 98 inlet wire WL and ground terminal wire No. 2 wire B. Standard voltage : 24 V or more • If no abnormality is found, combination meter is faulty.	Replace combination meter.
3. Harness Connecting Between Terminals	• Measure resistance of harness connecting between terminals. Standard resistance : 10 Ω or less • If resistance is abnormal, harness is faulty.	Repair or replace harness.

Fig.: 2-8-2



SW770-10006

2-8-14. Hydraulic oil filter warning lamp remains ON

Reference Fig. : 2-8-2

Check point	Check/Cause	Action

1. Harness	• Disconnect connectors between combination meter and hydraulic oil filter switch.
	• Measure resistance between terminals and chassis ground.
	  • Combination meter connector terminal wire No. 22 wire LR and chassis ground
	  • Hydraulic oil filter switch terminal wire LR and chassis ground
	  Standard resistance : 100 kΩ or more
	• If resistance is abnormal, harness is faulty.
		Repair or replace harness.

2. Hydraulic Oil filter Switch	• When starter switch is OFF, check continuity between hydraulic oil filter switch inlet terminal wire LR and chassis ground. There is no continuity in normal condition. • If there is continuity, hydraulic oil filter switch is faulty.	Replace hydraulic oil filter switch.

3. Combination Meter (Hydraulic oil filter warning lamp)	(1) When starter switch is ON, measure voltage between combination meter terminal wires and ground terminal wire.
	  • Battery terminal wire No. 62 inlet wire LW and ground terminal wire No. 2 wire B.
	  • Starter switch terminal wire No. 98 inlet wire WL and ground terminal wire No. 2 wire B.
	  Standard voltage : 24 V or more
	(2) When starter switch is ON, measure voltage between combination meter hydraulic oil filter warning terminal outlet wire No. 22 wire LR and chassis ground.
	  Standard voltage : 24 V or more
	• If above items (1) and (2) are OK but hydraulic oil filter warning lamp remains on after starting engine, combination meter is faulty.
		Replace combination meter.

2-8-15. Engine oil pressure warning lamp remains ON

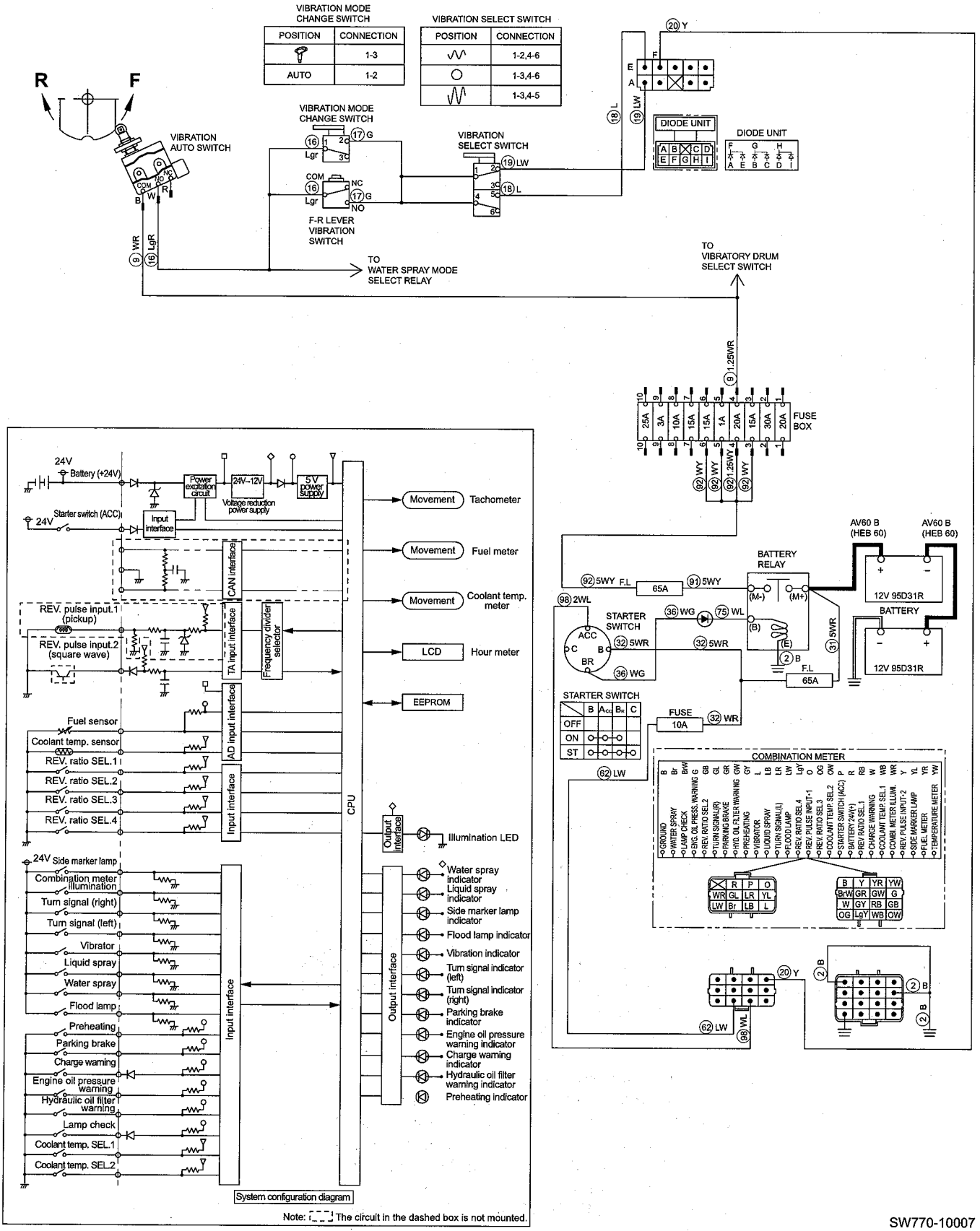
Reference Fig. : 2-8-2

Check point	Check/Cause	Action

1. Harness	• Disconnect connectors between combination meter and ECM.
	• Measure resistance between terminals and chassis ground.
	  • Combination meter connector terminal wire No.23 wire YB and chassis ground.
	  • ECM terminal wire YB and chassis ground.
	  Standard resistance : 100 kΩ or more
	• If resistance is abnormal, harness is faulty.
		Repair or replace harness.

2. Combination Meter (Engine oil pressure warning lamp)	(1) When starter switch is ON, measure voltage between combination meter terminal wires and ground terminal wire.
	  • Battery terminal wire No. 62 inlet wire LW and ground terminal wire No. 2 wire B.
	  • Starter switch terminal wire No. 98 inlet wire WL and ground terminal wire No. 2 wire B.
	  Standard voltage : 24 V or more
	(2) When starter switch is ON, measure voltage between combination meter engine oil pressure warning terminal outlet wire No. 23 wire YB and chassis ground.
	  Standard voltage : 24 V or more
	• If above items (1) and (2) are OK but engine oil pressure warning lamp remains on after starting engine, combination meter is faulty.
		Replace combination meter.

Fig.: 2-8-3



SW770-10007

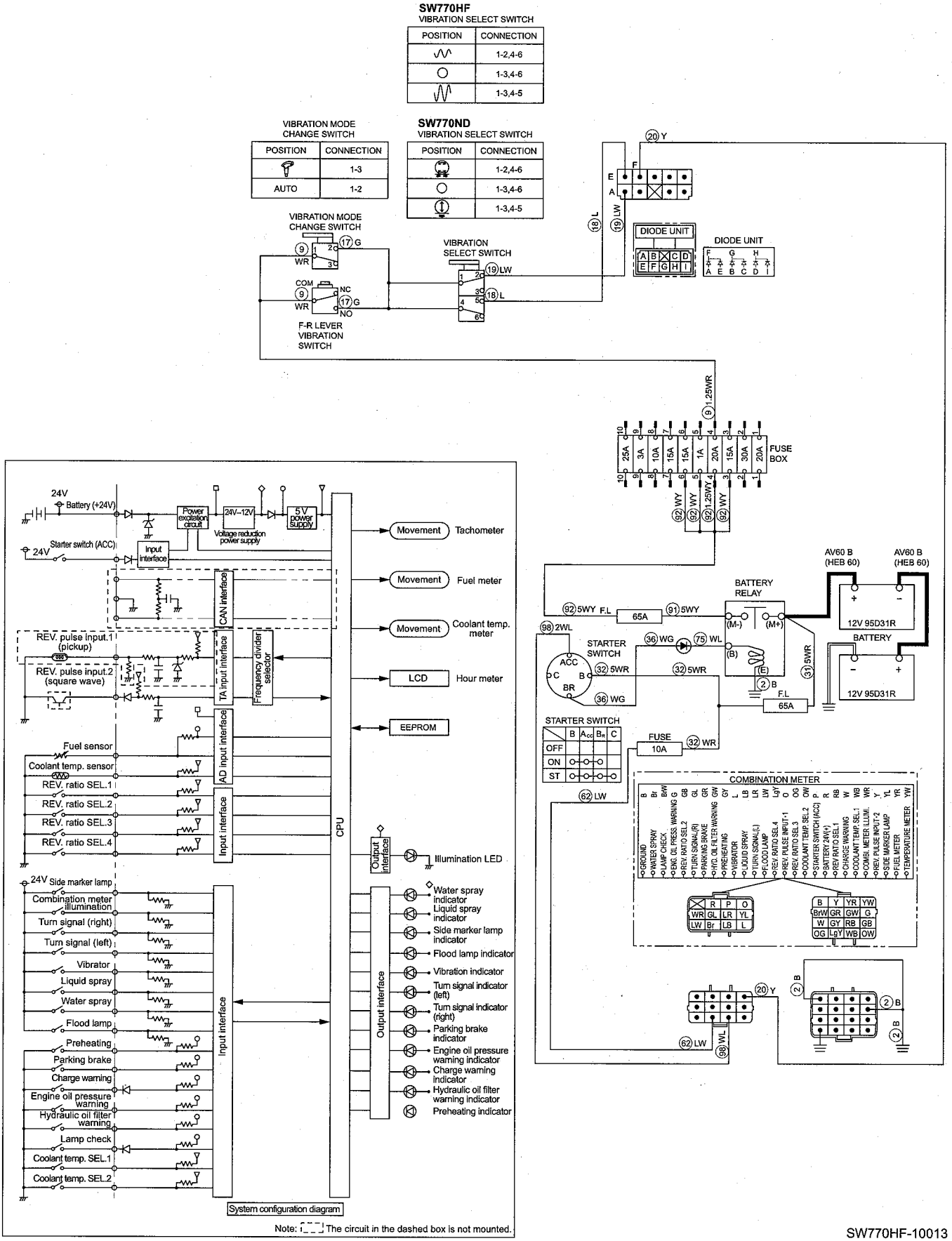
2-8-16. Vibration indicator lamp does not light (SW770)

- Check that vibrator can be operated.
- Vibration mode change switch must be "AUTO".

Reference Fig. : 2-8-3

Check point	Check/Cause	Action
1. Harness	(1) Measure resistance between vibration select switch terminal 5 wire L and diode unit terminal E wire L. Standard resistance : 10 Ω or less (2) Measure resistance between vibration select switch terminal 2 wire LW and diode unit terminal A wire LW. Standard resistance : 10 Ω or less (3) Measure resistance between diode unit terminal F wire Y and combination meter connector terminal wire No. 20 wire Y. Standard resistance : 10 Ω or less • If above item (1), (2) or (3) is NG, harness is faulty.	Repair or replace harness.
2. Diode Unit	(1) When starter switch is ON, F-R lever is "F" or "R" and vibration select switch is "⋀⋀", measure voltage between diode unit terminal A inlet wire LW and chassis ground. Standard voltage : 24 V or more (2) When starter switch is ON, F-R lever is "F" or "R" and vibration select switch is "⋀⋀", measure voltage between diode unit terminal E inlet wire L and chassis ground. Standard voltage : 24 V or more (3) When starter switch is ON, F-R lever is "F" or "R" and vibration select switch must not be "◯", measure voltage between diode unit terminal F outlet wire Y and chassis ground. Standard voltage : 24 V or more • If above items (1) and (2) are OK and item (3) is NG, diode unit is faulty.	Replace diode unit.
3. Combination Meter (Vibration indicator lamp)	(1) When starter switch is ON, measure voltage between combination meter terminal wires and ground terminal wire. • Battery terminal wire No. 62 inlet wire LW and ground terminal wire No. 2 wire B. • Starter switch terminal wire No. 98 inlet wire WL and ground terminal wire No. 2 wire B. Standard voltage : 24 V or more (2) When starter switch is ON, F-R lever is "F" or "R" and vibration select switch must not be "◯", measure voltage between combination meter vibration terminal wire No.20 inlet wire Y and chassis ground. Standard voltage : 24 V or more • If above items (1) and (2) are OK and vibration indicator lamp does not light, combination meter is faulty.	Replace combination meter.

Fig.: 2-8-6


SW770HF
VIBRATION SELECT SWITCH
POSITION
CONNECTION
1-2,4-6
1-3,4-6
1-3,4-5
SW770ND
VIBRATION SELECT SWITCH
VIBRATION MODE CHANGE SWITCH
AUTO
1-2
1-3
VIBRATION MODE CHANGE SWITCH
VIBRATION SELECT SWITCH
F-R LEVER VIBRATION SWITCH
DIODE UNIT
FUSE BOX
24V
Battery (+24V)
Starter switch (ACC)
Power excitation circuit
24V–12V
Voltage reduction power supply
5V power supply
Input interface
CAN interface
TA input interface
Frequency divider selector
AD input interface
Input interface
CPU
Output interface
Movement
Tachometer
Fuel meter
Coolant temp. meter
LCD
Hour meter
EEPROM
Illumination LED
REV. pulse input.1 (pickup)
REV. pulse input.2 (square wave)
Fuel sensor
Coolant temp. sensor
REV. ratio SEL.1
REV. ratio SEL.2
REV. ratio SEL.3
REV. ratio SEL.4
Side marker lamp
Combination meter illumination
Turn signal (right)
Turn signal (left)
Vibrator
Liquid spray
Water spray
Flood lamp
Preheating
Parking brake
Charge warning
Engine oil pressure warning
Hydraulic oil filter warning
Lamp check
Coolant temp. SEL.1
Coolant temp. SEL.2
Water spray indicator
Liquid spray indicator
Side marker lamp indicator
Flood lamp indicator
Vibration indicator
Turn signal indicator (left)
Turn signal indicator (right)
Parking brake indicator
Engine oil pressure warning indicator
Charge warning indicator
Hydraulic oil filter warning indicator
Preheating indicator
System configuration diagram
Note: The circuit in the dashed box is not mounted.
BATTERY RELAY
STARTER SWITCH
FUSE
10A
65A
AV60 B (HEB 60)
12V 95D31R
BATTERY
COMBINATION METER
SW770HF-10013

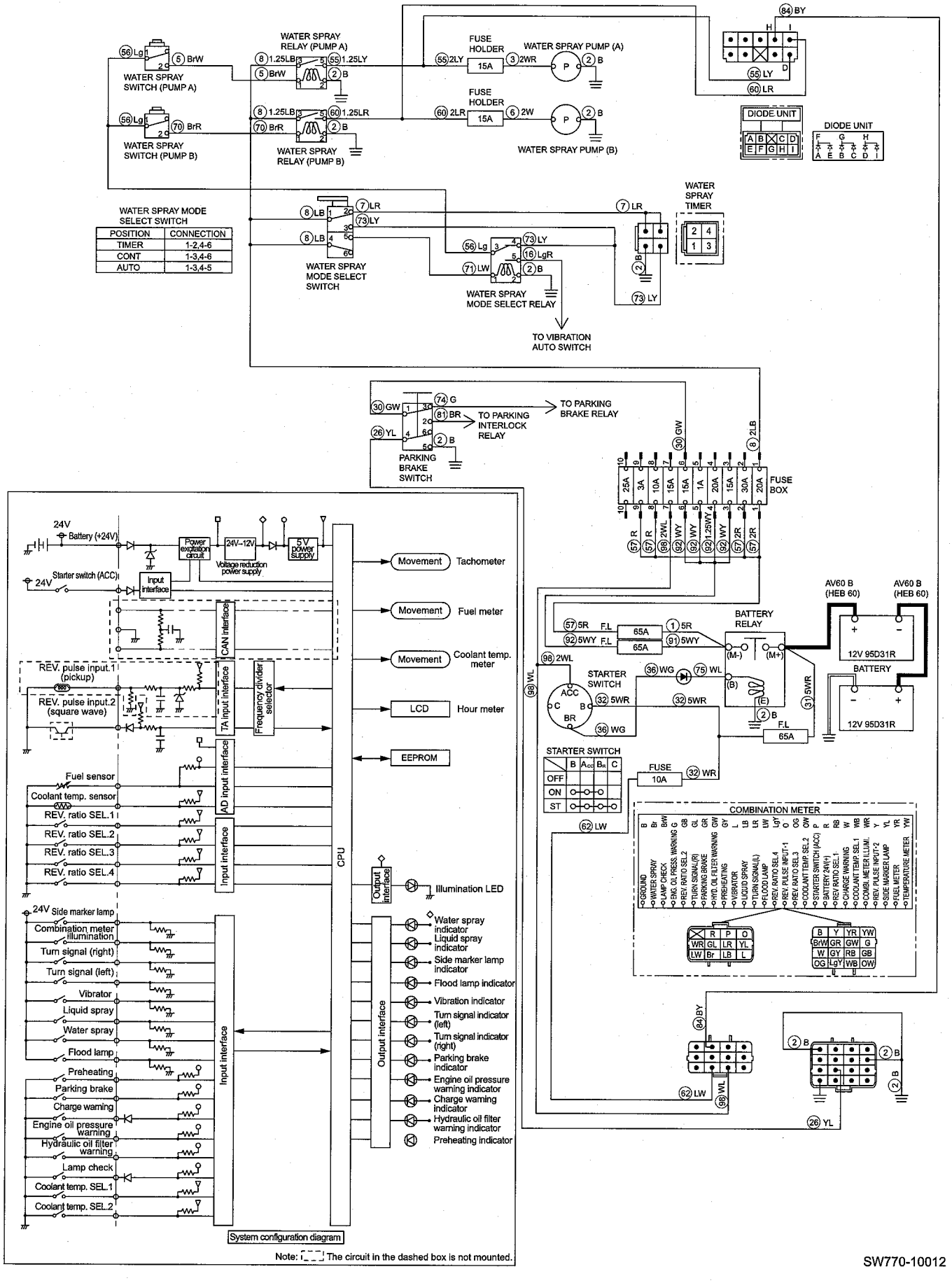
2-8-17. Vibration indicator lamp does not light (SW770HF, SW770ND)

- Check that vibrator can be operated.
- Vibration mode change switch must be "AUTO".

Reference Fig. : 2-8-6

Check point	Check/Cause	Action
1. Harness	(1) Measure resistance between vibration select switch terminal 5 wire L and diode unit terminal E wire L. Standard resistance : 10 Ω or less (2) Measure resistance between vibration select switch terminal 2 wire LW and diode unit terminal A wire LW. Standard resistance : 10 Ω or less (3) Measure resistance between diode unit terminal F wire Y and combination meter connector terminal wire No. 20 wire Y. Standard resistance : 10 Ω or less • If above item (1), (2) or (3) is NG, harness is faulty.	Repair or replace harness.
2. Diode Unit	(1) When starter switch is ON and vibration select switch is "⋀⋀" / "", measure voltage between diode unit terminal A inlet wire LW and chassis ground. Standard voltage : 24 V or more (2) When starter switch is ON and vibration select switch is "⋀⋀" / "", measure voltage between diode unit terminal E inlet wire L and chassis ground. Standard voltage : 24 V or more (3) When starter switch is ON and vibration select switch must not be "◯" , measure voltage between diode unit terminal F outlet wire Y and chassis ground. Standard voltage : 24 V or more • If above items (1) and (2) are OK and item (3) is NG, diode unit is faulty.	Replace diode unit.
3. Combination Meter (Vibration indicator lamp)	(1) When starter switch is ON, measure voltage between combination meter terminal wires and ground terminal wire. • Battery terminal wire No. 62 inlet wire LW and ground terminal wire No. 2 wire B. • Starter switch terminal wire No. 98 inlet wire WL and ground terminal wire No. 2 wire B. Standard voltage : 24 V or more (2) When starter switch is ON and vibration select switch must not be "◯" , measure voltage between combination meter vibration terminal wire No.20 inlet wire Y and chassis ground. Standard voltage : 24 V or more • If above items (1) and (2) are OK and vibration indicator lamp does not light, combination meter is faulty.	Replace combination meter.

Fig.: 2-8-7



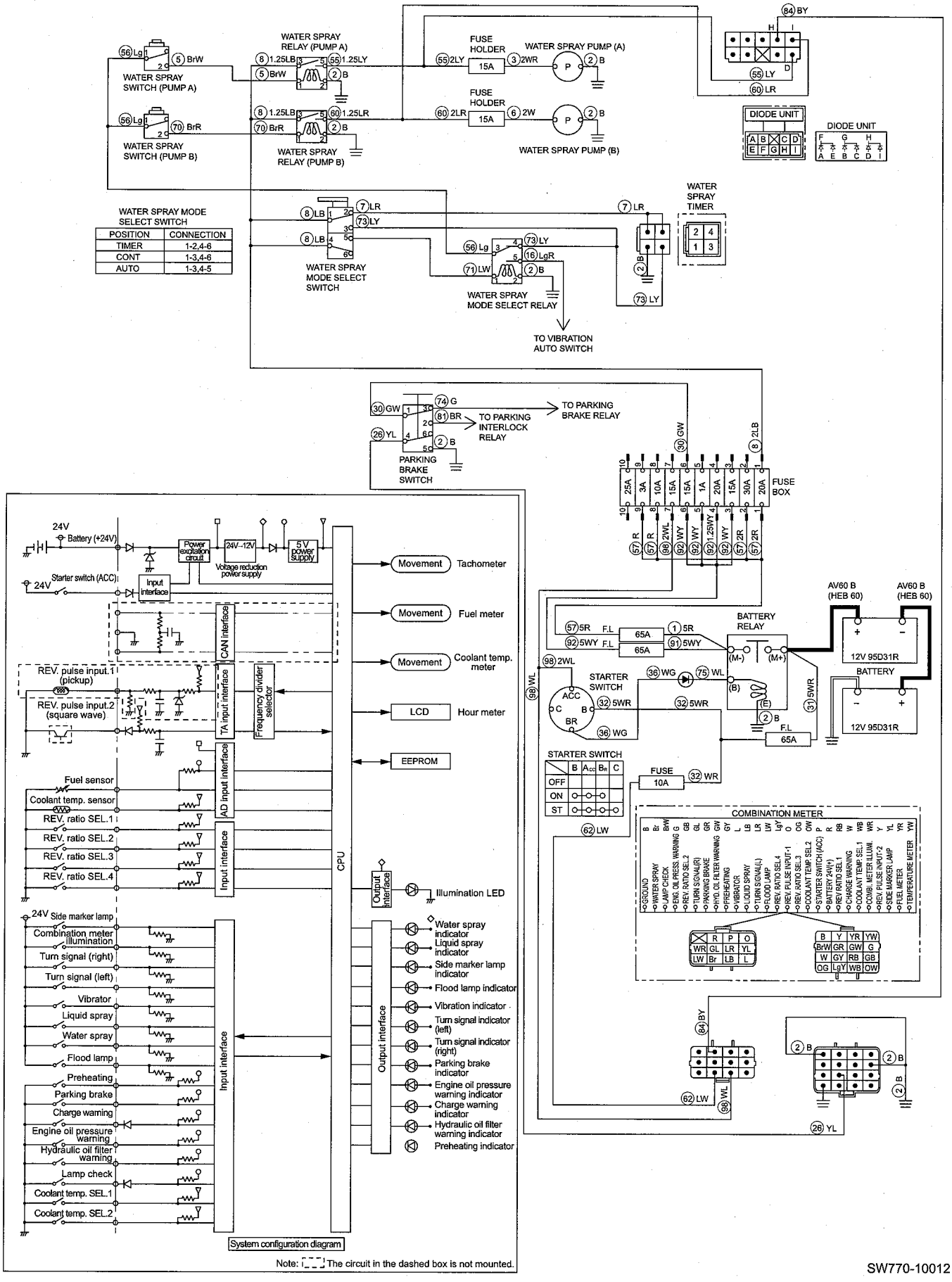
SW770-10012

2-8-18. Parking brake indicator lamp does not light

Reference Fig. : 2-8-7

Check point	Check/Cause	Action
1. Harness	• Measure resistance between parking brake switch terminal 4 wire YL and combination meter connector terminal wire No. 26 wire YL. Standard resistance : 10 Ω or less • If resistance is abnormal, harness is faulty.	Repair or replace harness.
2. Parking Brake Switch	• When parking brake is applied, check continuity between parking brake switch terminal 4 wire YL and terminal 5 wire B. There is continuity in normal condition. • If there is no continuity, parking brake switch is faulty.	Replace parking brake switch.
3. Combination Meter (Parking brake indicator lamp)	(1) When starter switch is ON, measure voltage between combination meter terminal wires and ground terminal wire. • Battery terminal wire No. 62 inlet wire LW and ground terminal wire No. 2 wire B. • Starter switch terminal wire No. 98 inlet wire WL and ground terminal wire No. 2 wire B. Standard voltage : 24 V or more (2) When starter switch is ON and parking brake is applied, measure voltage between combination meter parking brake terminal wire No. 26 outlet wire YL and chassis ground. Standard voltage : 24 V or more • If above items (1) and (2) are OK and parking brake indicator lamp does not light, combination meter is faulty.	Replace combination meter.

Fig.: 2-8-7



SW770-10012

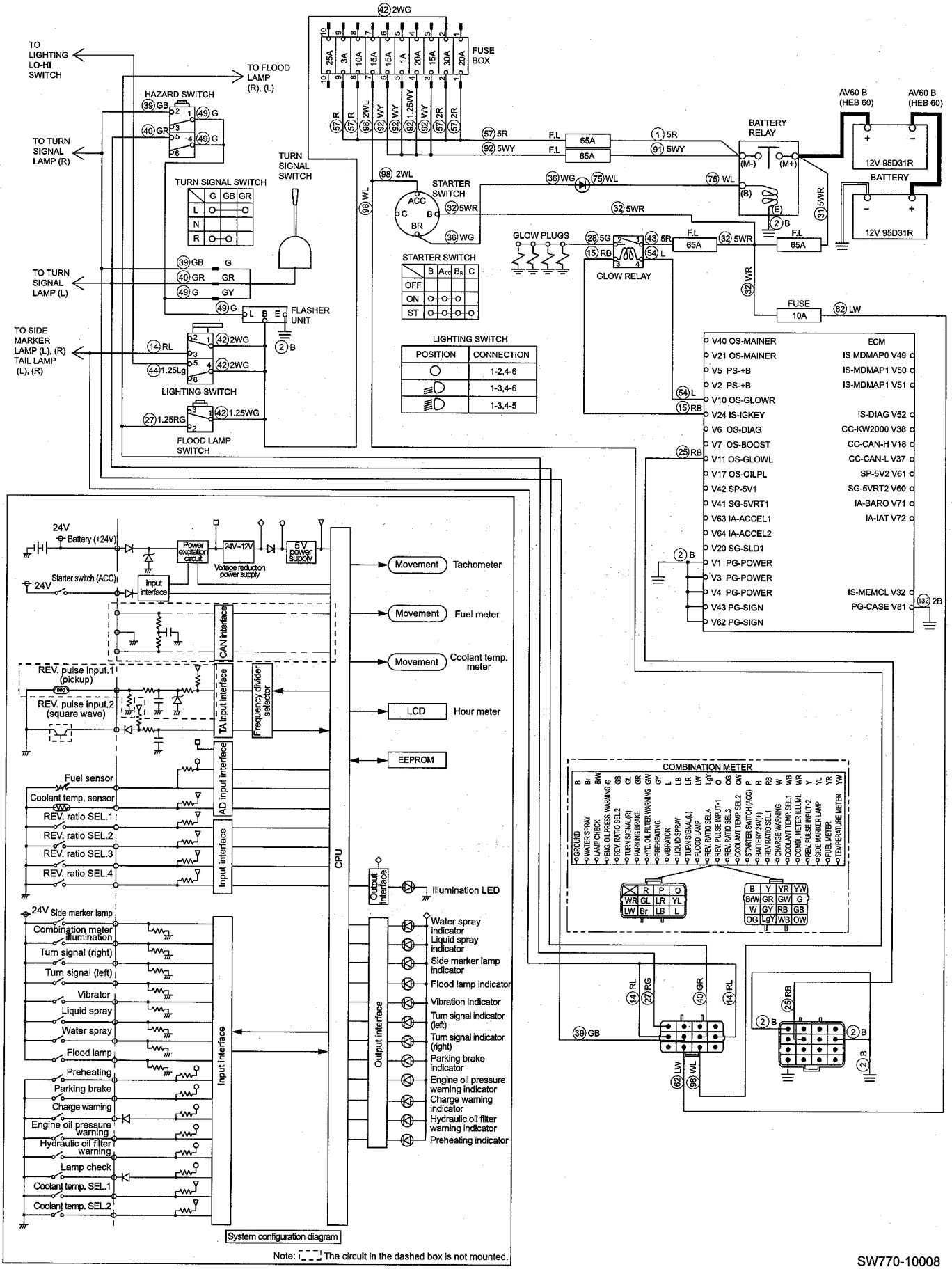
2-8-19. Water spray indicator lamp does not light

- Check that water spray pump can be activated.
- Water spray mode select switch must be "CONT".

Reference Fig. : 2-8-7

Check point	Check/Cause	Action
1. Harness	(1) Measure resistance between water spray relay (pump A) terminal 5 wire LY and diode unit terminal D wire LY. Standard resistance : 10 Ω or less (2) Measure resistance between water spray relay (pump B) terminal 5 wire LR and diode unit terminal I wire LR. Standard resistance : 10 Ω or less (3) Measure resistance between diode unit terminal H wire BY and combination meter connector terminal wire No. 84 wire BY. Standard resistance : 10 Ω or less • If above items (1) , (2) or (3) is NG, harness is faulty.	Repair or replace harness.
2. Diode Unit	(1) When starter switch is ON, water spray switch (pump A) is ON, measure voltage between diode unit terminal D inlet wire LY and chassis ground. Standard voltage : 24 V or more (2) When starter switch is ON, water spray switch (pump B) is ON, measure voltage between diode unit terminal I inlet wire LR and chassis ground. Standard voltage : 24 V or more (3) When starter switch is ON, water spray switch (pump A) or (pump B) is ON, measure voltage between diode unit terminal H outlet wire BY and chassis ground. Standard voltage : 24 V or more • If above items (1) and (2) are OK and item (3) is NG, diode unit is faulty.	Replace diode unit.
3. Combination Meter (Water spray indicator lamp)	(1) When starter switch is ON, measure voltage between combination meter terminal wires and ground terminal wire. • Battery terminal wire No. 62 inlet wire LW and ground terminal wire No. 2 wire B. • Starter switch terminal wire No. 98 inlet wire WL and ground terminal wire No. 2 wire B. Standard voltage : 24 V or more (2) When starter switch is ON, water spray switch (pump A) or (pump B) is ON, measure voltage between combination meter water spray terminal wire No. 84 inlet wire BY and chassis ground. Standard voltage : 24 V or more • If above items (1) and (2) are OK and water spray indicator lamp does not light, combination meter is faulty.	Replace combination meter.

Fig.: 2-8-4



SW770-10008

2-8-20. Flood lamp indicator lamp does not light

• Check that flood lamp lights.

Reference Fig. : 2-8-4

Check point	Check/Cause	Action
1. Harness	• Measure resistance between flood lamp switch terminal 2 wire RG and combination meter connector terminal wire No. 27 wire RG. Standard resistance : 10 Ω or less • If resistance is abnormal, harness is faulty.	Repair or replace harness.
2. Combination Meter (Flood lamp indicator lamp)	(1) When starter switch is ON, measure voltage between combination meter terminal wires and ground terminal wire. • Battery terminal wire No. 62 inlet wire LW and ground terminal wire No. 2 wire B. • Starter switch terminal wire No. 98 inlet wire WL and ground terminal wire No. 2 wire B. Standard voltage : 24 V or more (2) When starter switch is ON and flood lamp switch is ON, measure voltage between combination meter flood lamp terminal wire No. 27 inlet wire RG and chassis ground. Standard voltage : 24 V or more • If above items (1) and (2) are OK and flood lamp indicator lamp does not light, combination meter is faulty.	Replace combination meter.

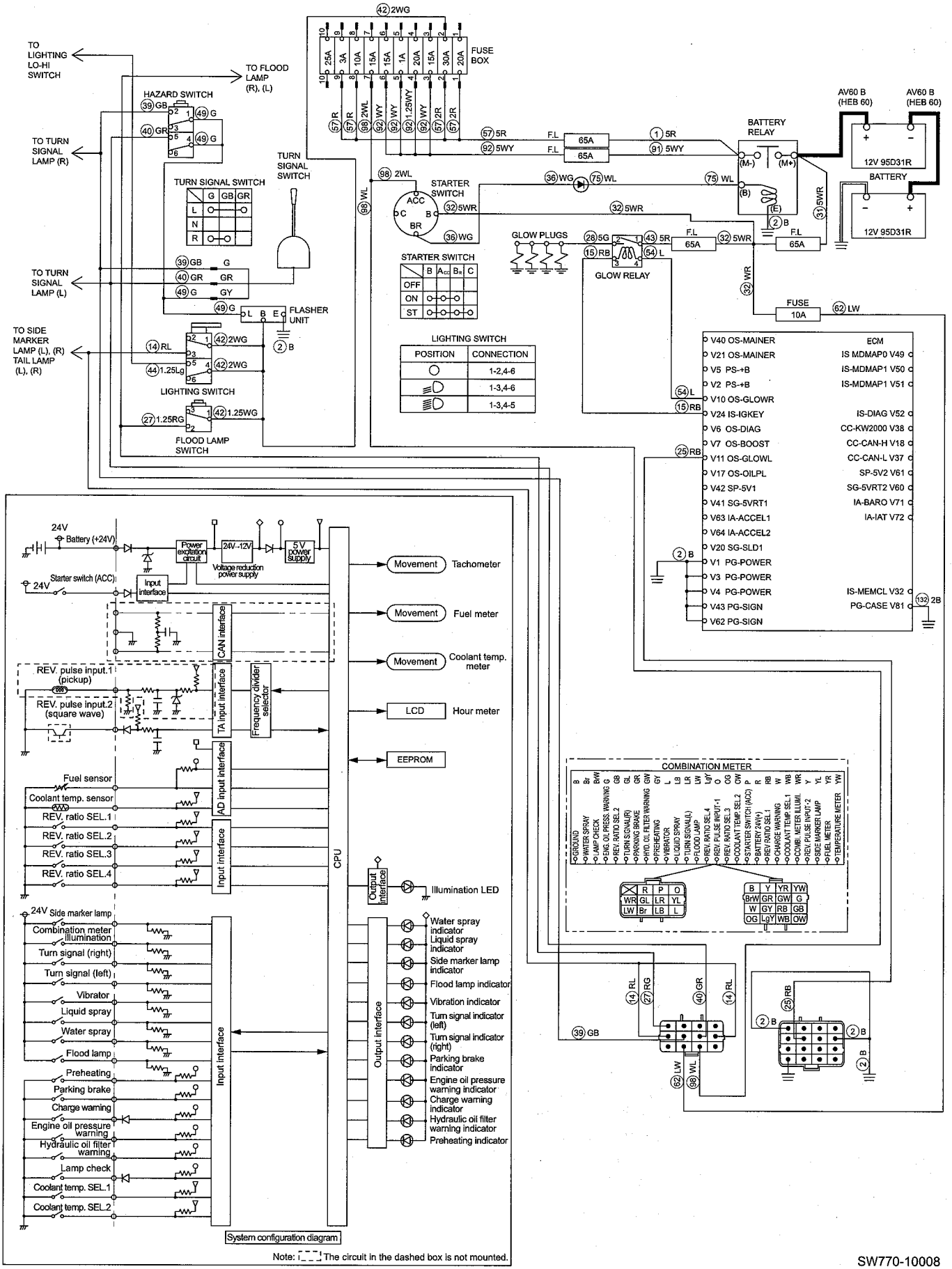
2-8-21. Side marker lamp indicator lamp does not light

• Check that head lamp, side marker lamp and tail lamp light.

Reference Fig.: 2-8-4

Check point	Check/Cause	Action
1. Harness	• Measure resistance between lighting switch terminal 3 wire RL and combination meter connector terminal wire No. 14 wire RL. Standard resistance : 10 Ω or less. • If above resistance value is abnormal, harness is faulty.	Repair or replace harness.
2. Combination Meter (Side marker lamp indicator lamp)	(1) When starter switch is ON, measure voltage between combination meter terminal wires and ground terminal wire. • Battery terminal wire No. 62 inlet wire LW and ground terminal wire No. 2 wire B. • Starter switch terminal wire No. 98 inlet wire WL and ground terminal wire No. 2 wire B. Standard voltage : 24 V or more (2) When starter switch is ON and lighting switch is "≡○", measure voltage between combination meter side marker lamp terminal wire No. 14 inlet wire RL and chassis ground. Standard voltage : 24 V or more • If above items (1) and (2) are OK and side marker lamp indicator lamp does not turn on, combination meter is faulty.	Replace combination meter.

Fig.: 2-8-4



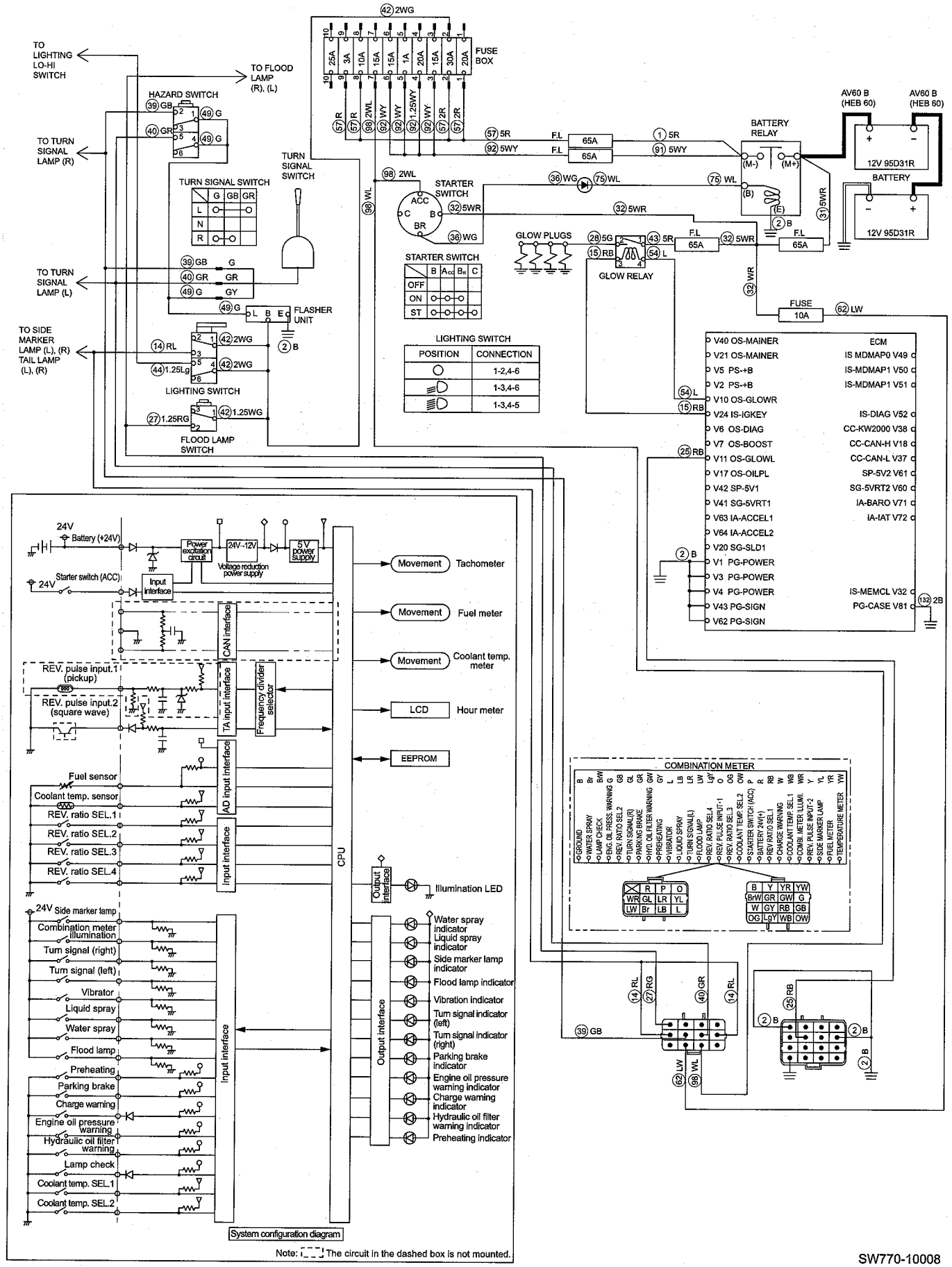
SW770-10008

2-8-22. Turn signal indicator lamp does not light

Reference Fig.: 2-8-4

Check point	Check/Cause	Action
1. Harness	(1) Measure resistance between turn signal switch terminal wire GR (left-hand side) and combination meter connector terminal wire No. 40 wire GR. Standard resistance : 10 Ω or less (2) Measure resistance between turn signal switch terminal wire GB (right-hand side) and combination meter connector terminal wire No. 39 wire GB. Standard resistance : 10 Ω or less • If above item (1) or (2) is NG, harness is faulty.	Repair or replace harness.
2. Turn Signal Switch	• When turn signal switch is ON, check continuity between turn signal switch terminals. Turn signal (L) : Between wire G and wire GR Turn signal (R) : Between wire G and wire GB There is continuity in normal condition. • If there is no continuity, turn signal switch is faulty.	Replace turn signal switch.
3. Combination Meter (Turn signal indicator lamp)	(1) When starter switch is ON, measure voltage between combination meter terminal wires and ground terminal wire. • Battery terminal wire No. 62 inlet wire LW and ground terminal wire No. 2 wire B. • Starter switch terminal wire No. 98 inlet wire WL and ground terminal wire No. 2 wire B. Standard voltage : 24 V or more (2) When starter switch is ON and turn signal lever is moved, measure voltage between combination meter terminal wires and chassis ground. • Turn signal (L) terminal wire No. 40 inlet wire GR and chassis ground • Turn signal (R) terminal wire No. 39 inlet wire GB and chassis ground Standard voltage : 24 V or more • If above items (1) and (2) are OK and turn signal indicator lamp does not turn on, combination meter is faulty.	Replace combination meter.

Fig.: 2-8-4



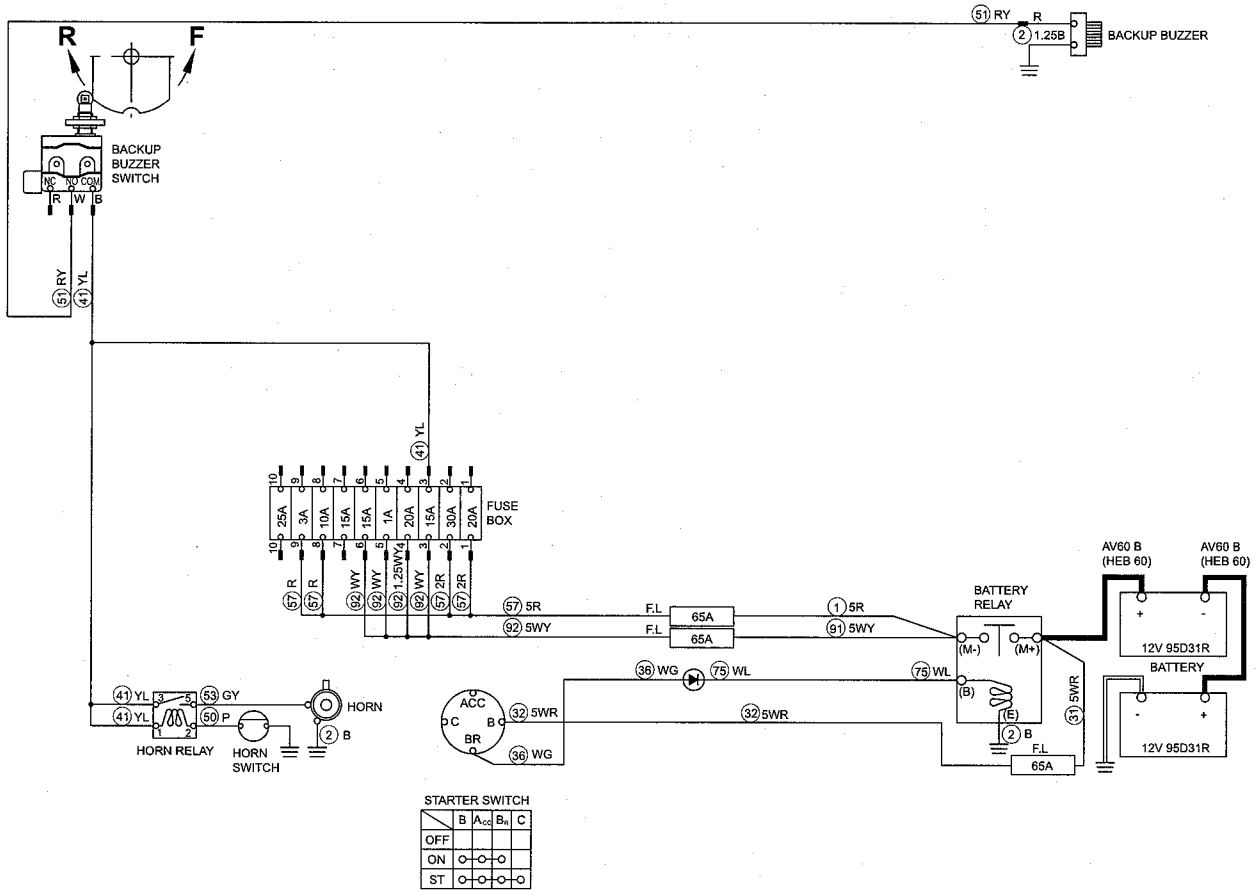
SW770-10008

2-8-23. Preheating indicator lamp does not light

Reference Fig. : 2-8-4

Check point	Check/Cause	Action
1. Harness	• Measure resistance between ECM terminal wire No. 25 wire RB and combination meter connector terminal wire No. 25 wire RB. Standard resistance : 10 Ω or less • If resistance is abnormal, harness is faulty.	Repair or replace harness.
2. Combination Meter (Preheating indicator lamp)	(1) When starter switch is ON, measure voltage between combination meter terminal wires and ground terminal wire. • Battery terminal wire No. 62 inlet wire LW and ground terminal wire No. 2 wire B. • Starter switch terminal wire No. 98 inlet wire WL and ground terminal wire No. 2 wire B. Standard voltage : 24 V or more (2) When starter switch is ON, measure voltage between combination meter preheating terminal wire No. 25 outlet wire RB and ground terminal wire No. 2 wire B. Standard voltage : 24 V or more (for a certain period) • If above items (1) and (2) are OK and preheating indicator lamp does not light, combination meter is faulty.	Replace combination meter.

Fig.: 2-8-5



SW770-10009

2-8-24. Horn does not sound

Reference Fig. : 2-8-5

Check point	Check/Cause	Action
1. Horn	• Disconnect horn and directly connect battery positive terminal to horn terminal wire GY side and negative terminal to horn terminal wire B side. • If horn does not sound, horn is faulty.	Replace horn.
2. Horn Relay	(1) When starter switch is ON, measure voltage between horn relay terminal 1 inlet wire YL and chassis ground. Standard voltage : 24 V or more (2) When starter switch is ON, measure voltage between horn relay terminal 3 inlet wire YL and chassis ground. Standard voltage : 24 V or more (3) When starter switch is ON and horn switch is pressed, measure voltage between horn relay terminal 5 outlet wire GY and chassis ground. Standard voltage : 24 V or more • If above items (1) and (2) are OK and item (3) is NG, horn relay is faulty.	Replace horn relay.
3. Horn Switch	• When horn switch is ON, check continuity between horn switch terminals. There is continuity in normal condition. • If there is no continuity, horn switch is faulty.	Replace horn switch.
4. Harness Connecting Between Terminals	• Measure resistance of harness connecting between terminals. Standard resistance : 10 Ω or less • If resistance is abnormal, harness is faulty.	Repair or replace harness.

2-8-25. Backup buzzer does not sound

Reference Fig. : 2-8-5

Check point	Check/Cause	Action
1. Backup Buzzer	• Disconnect backup buzzer and directly connect battery positive terminal to backup buzzer terminal wire RY side and negative terminal to backup buzzer terminal wire B side. • If backup buzzer does not sound, backup buzzer is faulty.	Replace backup buzzer.
2. Backup Buzzer Switch	(1) When starter switch is ON, measure voltage between backup buzzer switch terminal COM inlet wire YL and chassis ground. Standard voltage : 24 V or more (2) When starter switch is ON and F-R lever is "R", measure voltage between backup buzzer switch terminal NO outlet wire RY and chassis ground. Standard voltage : 24 V or more • If above item (1) is OK and item (2) is NG, backup buzzer switch is faulty.	Replace backup buzzer switch.
3. Harness Connecting Between Terminals	• Measure resistance of harness connecting between terminals. Standard resistance : 10 Ω or less • If resistance is abnormal, harness is faulty.	Repair or replace harness.

3. HYDRAULIC SYSTEM TROUBLESHOOTING

3-1. When Performing Hydraulic System Troubleshooting

- The largest factor in the majority of failures of hydraulic devices operating under conditions of higher pressure and greater precision is the entry of dirt (foreign substances) into the hydraulic circuit. Particular caution is required when supplying hydraulic oil or when disassembling and assembling hydraulic devices.

1) Pay attention to the work environment.
As much as possible, avoid performing tasks such as supplying hydraulic oil, replacing filters and repair work on rainy days, when there is strong wind, or in locations where there is much dust.

2) Disassembly and maintenance work in the field
There is the danger of dust entry when disassembly and maintenance work for hydraulic components is performed in the field. In addition, because performance verification after repairs are completed is difficult, replacement of the entire assembly is preferred. Perform disassembly and maintenance of hydraulic components in a special room protected from dust, and use special testers to verify the performance.

3) Sealing of openings
Use caps, tape, plastic bags or other means to seal the openings of removed pipes and components in order to prevent foreign substances from entering. Never leave the openings exposed or put a shop cloth into them. There is the danger of foreign substances entering or of leaking oil causing environmental contamination.
Do not dispose of waste oil on-site. Either deliver it to the customer and request disposal or take it back with you and dispose of it.

4) Prevent entry of foreign substances when supplying oil.
Take care that foreign substances do not enter when supplying hydraulic oil. Clean the oil supply port and the area around it, as well as the supply pump, oilcan and other items. A more reliable method is to use oil cleaning equipment, which can filter out the contamination that occurred during storage.

5) Change hydraulic oil while the temperature is still high.
All oils, including hydraulic oil, flow more readily when they are warm. Higher temperatures also make it easier to eject the sludge and other substances outside the circuit together with the oil. For these reasons, oil changes should be performed while the oil temperature is high. When changing the oil, it is necessary to drain out as much of the old hydraulic oil as possible. (In addition to the hydraulic oil tank, also drain the oil from the filter and circuit drain plugs.) If old hydraulic oil remains in the system, the contaminants and sludge in the old oil will mix with the new oil and shorten the hydraulic oil lifetime.

3-2. Propulsion System

If a problem occurs in the propulsion systems such as the propulsion pump, propulsion motor and brakes, determine the cause and carry out action as required, according to the following general troubleshooting items.

(NOTICE)

- **When checking whether or not the pressure is correct, refer to the pressure standard value for each hydraulic circuit.**

3-2-1. Machine moves neither forward nor backward 1/2

Check point	Cause	Check/Action
1. Oil Level of Hydraulic Oil Tank	Oil level in hydraulic oil tank is low.	Fill tank until correct oil level is obtained.
2. Bypass Valve	Bypass valve is open.	Close bypass valve.
3. F-R Lever Linkage	F-R lever linkage is faulty.	Check and adjust F-R lever linkage or replace it if necessary.
4. Charge Circuit Pressure	Propulsion pump does not discharge oil because charge pressure is low.	• Measure charge pressure. • If low, check and adjust charge relief valve or replace it if necessary.
	Charge pressure decreases due to pressure leakage from cut off valve.	Check and adjust cut off valve or replace it if necessary.
	Insufficient steering • charge pump discharge.	Repair steering • charge pump or replace it if necessary.
	Charge pressure decreases due to internal leakage of solenoid valve connecting oil supply circuit with charge circuit. • Parking brake solenoid valve • Speed change solenoid valve	• When solenoid is energized, check if oil flows in return circuit to tank. • If oil is flowing, repair solenoid valve or replace it if necessary.
5. Servo Bypass Solenoid Valve	If spool of servo bypass solenoid valve is stuck, pressure in both sides of servo cylinder chamber is equalized. This causes propulsion pump unable to discharge oil.	• Measure pressure in servo cylinder chambers. • If pressure is equal in both chambers, repair servo bypass solenoid valve or replace it if necessary.
6. Suction Filter for Steering • Charge Pump	Steering • charge pump flow is reduced due to clogged filter.	Clean suction filter or replace it if necessary.
7. Propulsion Circuit Pressure	Pump does not discharge oil because setting pressure of cut off valve is low.	• Measure propulsion circuit pressure. • If low, check and adjust cut off valve or replace it if necessary.
	Circuit does not obtain required pressure because setting pressure of high pressure relief is low.	• Measure propulsion circuit pressure. • If low, check and adjust high pressure relief valve or replace it if necessary.
8. Propulsion Motor	Propulsion circuit pressure is not held in propulsion motor case.	If pressure in propulsion motor case is not within allowable range, repair propulsion motor or replace it if necessary.
	Internal leakage of propulsion motor.	• Measure drain quantity from propulsion motor. • If drain quantity is larger than standard value, repair propulsion motor or replace it if necessary.
9. Gear Box	Sticking of disc brakes causes brakes to remain applied.	• Replace disc brakes.

3-2-1. Machine moves neither forward nor backward 2/2

Check point	Cause	Check/Action
10. Propulsion Pump	Discharge flow rate is insufficient due to efficiency degradation of propulsion pump.	• Measure discharge flow rate of propulsion pump with flow meter. • If discharge flow rate is not within specified range, repair propulsion pump or replace it if necessary.
	Discharge flow rate is insufficient due to wear of propulsion pump drive shaft splines.	Replace propulsion pump.
	Propulsion circuit pressure is not held in propulsion pump case.	If pressure in propulsion pump case is not within allowable range, repair propulsion pump or replace it if necessary.
11. Parking Brake Solenoid Valve	Brake remains applied because spool of parking brake solenoid valve does not shift.	Repair parking brake solenoid valve or replace it if necessary.
12. Brake Inlet Pressure	Brake cannot be released because brake inlet pressure is low.	• Measure brake release pressure. • If low, repair or replace propulsion motor.
13. Flange	Drive torque is not transmitted to pump due to faulty flange.	Replace flange.

3-2-2. Machine moves in one direction only (forward or backward)

Check point	Cause	Check/Action
1. F-R Lever Linkage	F-R lever linkage is faulty.	Check and adjust F-R lever linkage or replace it if necessary.
2. High Pressure Relief Valve	Low circuit pressure due to incorrect high pressure relief setting or internal leakage of high pressure relief valve.	• Interchange two high pressure relief valves. • If faulty condition is accordingly reversed, check and adjust high pressure relief valve or replace it if necessary.

3-2-3. Slow machine speed or small drive force 1/2

Check point	Cause	Check/Action
1. Bypass Valve	Bypass valve is slightly open.	Close bypass valve completely.
2. F-R Lever Linkage	F-R lever linkage is faulty.	Check and adjust F-R lever linkage or replace it if necessary.
3. Charge Circuit Pressure	Stroke of propulsion pump swash plate is small because charge pressure is low, decreasing discharge rate of propulsion pump.	• Measure charge pressure. • If low, check and adjust charge relief valve or replace it if necessary.
	Insufficient steering • charge pump discharge.	Repair steering • charge pump or replace it if necessary.
	Charge pressure decreases due to internal leakage of solenoid valve connecting oil supply circuit with charge circuit. • Parking brake solenoid valve • Speed change solenoid valve	• When solenoid is energized, check if oil flows in return circuit to tank. • If oil is flowing, repair solenoid valve or replace it if necessary.
4. Suction Filter for Steering • Charge Pump	Flow rate of steering • charge pump decreases as well as charge pressure decreases due to clogged filter.	Clean suction filter or replace it if necessary.

3-2-3. Slow machine speed or small drive force 2/2

Check point	Cause	Check/Action
5. Propulsion Motor	Propulsion motor inlet pressure is low.	• Measure propulsion motor inlet pressure. • If low, check and adjust high pressure relief valve or replace it if necessary.
	Propulsion circuit pressure is not held in propulsion motor case.	If pressure in propulsion motor case is not within allowable range, repair propulsion motor or replace it if necessary.
	Output of propulsion motor decreases and number of revolutions decreases due to internal leakage of propulsion motor.	• Measure drain quantity from propulsion motor. • If drain quantity is larger than standard value, repair propulsion motor or replace it if necessary.
6. Propulsion Pump	Discharge flow rate is insufficient due to efficiency degradation of propulsion pump.	• Measure discharge flow rate of propulsion pump with flow meter. • If discharge flow rate is not within specified range, repair propulsion pump or replace it if necessary.
	Discharge flow rate is insufficient due to wear of propulsion pump drive shaft splines.	Replace propulsion pump.
	Propulsion circuit pressure is not held in propulsion pump case.	If pressure in propulsion pump case is not within allowable range, repair propulsion pump or replace it if necessary.

3-2-4. Machine speed cannot be switched

Check point	Cause	Check/Action
1. Speed Change Solenoid Valve	Machine speed does not change because spool of speed change solenoid valve does not change.	Repair speed change solenoid valve or replace it if necessary.
2. Propulsion Motor Swash Plate Stroke Cylinder	Faulty propulsion motor swash plate stroke cylinder.	Repair propulsion motor or replace it if necessary.

3-2-5. Machine does not stop completely with F-R lever in "N"

Check point	Cause	Check/Action
1. F-R lever Linkage	F-R lever linkage is faulty.	Check and adjust F-R lever linkage or replace it if necessary.
2. Servo Control Valve	Servo control valve neutral position adjustment failure.	Check and adjust servo control valve or replace it if necessary.
3. Propulsion Pump Servo Cylinder	Faulty propulsion pump servo cylinder or faulty pump swash plate setting.	Repair propulsion pump or replace it if necessary.

3-2-6. Propulsion system is overheating

Check point	Cause	Check/Action
1. Oil Level of Hydraulic Oil Tank	Oil level in hydraulic oil tank is low.	Fill tank until correct oil level is obtained.
2. Oil Cooler	Cooling efficiency is reduced due to clogged oil cooler fins.	Clean oil cooler fins.
3. Flushing Valve	Hydraulic oil in propulsion closed circuit is insufficiently cooled due to flushing valve shuttle spool sticking.	Repair flushing valve or replace it if necessary.
	Hydraulic oil in propulsion closed circuit is insufficiently cooled because flushing valve relief setting pressure is excessively high.	Check dust or damage in flushing relief valve and replace it if necessary.
	Hydraulic oil in propulsion closed circuit is insufficiently cooled due to flushing valve relief valve poppet sticking.	Clean flushing relief valve or replace it if necessary.
4. Propulsion Circuit Pressure	If circuit pressure setting is excessively low, relief valve opens, causing temperature of hydraulic oil in circuit to rise.	• Measure propulsion circuit pressure. • If low, increase relief setting pressure.
	If load is excessively heavy, relief valve opens, causing temperature of hydraulic oil in circuit to rise.	• Measure propulsion circuit pressure. • If high, decrease propulsion load.
5. Suction Filter for Steering • Charge Pump	Load of steering • charge pump increases due to clogged filter, causing temperature of hydraulic oil in circuit to rise.	Clean suction filter or replace it if necessary.
6. Hydraulic Oil Filter	Charge circuit pressure increases due to clogged filter.	Clean hydraulic oil filter or replace it if necessary.

3-2-7. Abnormal noise from propulsion system

Check point	Cause	Check/Action
1. Axle Bearings	Axle bearings supporting front and rear drums are damaged.	Replace axle bearings.
2. Hydraulic Hose Clamp	Vibrator sound of hydraulic hose is generated because clamp securing hydraulic hose is loose.	Tighten bolts of loose hydraulic hose clamp to specified torque.
3. Suction Filter for Steering • Charge Pump	Cavitation is occurring in steering • charge pump due to clogged filter.	Clean suction filter or replace it if necessary.
4. Charge Circuit Pressure	If charge pressure is low, brake cannot be released completely, which causes brake drag.	• Measure charge pressure. • If low, check and adjust charge relief valve or replace it if necessary.
5. Propulsion Motor	Internal bearing of propulsion motor is damaged.	Repair propulsion motor or replace it if necessary.

3-3. Vibrator System

If a problem occurs in the vibrator systems such as the vibrator pump, vibrator motor and vibrator solenoid valve, determine the cause and carry out action as required, according to the following general troubleshooting items.

(NOTICE)

- **When checking whether or not the pressure is correct, refer to the pressure standard value for each hydraulic circuit.**

3-3-1. No vibration 1/2

Check point	Cause	Check/Action
1. Oil Level of Hydraulic Oil Tank	Oil level in hydraulic oil tank is low.	Fill tank until correct oil level is obtained.
2. Charge Circuit Pressure	Vibrator pump does not discharge oil because charge pressure is low.	• Measure charge pressure. • If low, check and adjust charge relief valve or replace it if necessary.
	Vibrator pressure decreases due to pressure leakage from cut off valve.	Check and adjust cut off valve or replace it if necessary.
	Insufficient steering • charge pump discharge.	Repair steering • charge pump or replace it if necessary.
	Charge pressure decreases due to internal leakage of solenoid valve connecting oil supply circuit with charge circuit. • Parking brake solenoid valve • Speed change solenoid valve	• When solenoid is energized, check if oil flows in return circuit to tank. • If oil is flowing, repair solenoid valve or replace it if necessary.
3. Suction Filter for Steering • Charge Pump	Steering • charge pump flow is reduced due to clogged filler.	Clean suction filter or replace it if necessary.
4. Vibrator Circuit Pressure	Pump does not discharge oil because setting pressure of cut off valve is low.	• Measure vibrator circuit pressure. • If low, check and adjust cut off valve or replace it if necessary.
	Circuit does not obtain required pressure because setting pressure of high pressure relief is low.	• Measure vibrator circuit pressure. • If low, check and adjust high pressure relief valve or replace them if necessary.
5. Vibrator Solenoid Valve	Vibrator pump cannot discharge oil because spool of vibrator solenoid valve does not shift.	Repair vibrator solenoid valve or replace it if necessary.
6. Vibrator Motor	Vibrator circuit pressure is not held in vibrator motor case.	If pressure in vibrator motor case is not within allowable range, repair vibrator motor or replace it if necessary.
	Internal leakage of vibrator motor.	• Measure drain quantity from vibrator motor. • If drain quantity is larger than standard value, repair vibrator motor or replace it if necessary.
	Output torque is not transmitted due to worn spline of vibrator motor output shaft.	Replace vibrator motor.

3-3-1. No vibration 2/2

Check point	Cause	Check/Action
7. Vibrator Pump	Insufficient discharge rate from vibrator pump due to reduced efficiency of vibrator pump.	• Measure discharge flow rate of vibrator pump with flow meter. • If discharge flow rate is not within specified range, repair vibrator pump or replace it if necessary.
	Insufficient pump discharge due to wear of vibrator pump drive shaft spline.	Replace vibrator pump.
	Vibrator circuit pressure is not held in vibrator pump case.	If pressure in vibrator pump case is not within allowable range, repair vibrator pump or replace it if necessary.

3-3-2. Vibrator frequency is too low

Check point	Cause	Check/Action
1. Oil Level of Hydraulic Oil Tank	Oil level in hydraulic oil tank is low.	Fill tank until correct oil level is obtained.
2. Charge Circuit Pressure	Stroke of vibrator pump swash plate is small because charge pressure is low, decreasing discharge rate of vibrator pump.	• Measure charge circuit pressure. • If low, check charge relief valve or replace it if necessary.
	Insufficient steering • charge pump discharge.	Repair steering • charge pump or replace it if necessary.
	Charge pressure decreases due to internal leakage of solenoid valve connecting oil supply circuit with charge circuit. • Parking brake solenoid valve • Speed vibrator solenoid valve	• When solenoid is energized, check if oil flows in return circuit to tank. • If oil is flowing, repair solenoid valve or replace it if necessary.
3. Suction Filter for Steering • Charge Pump	Flow rate of steering • charge pump decreases as well as charge pressure decreases due to clogged filter.	Clean suction filter or replace it if necessary.
4. Vibrator Motor	Vibrator motor inlet pressure is low.	• Measure vibrator motor inlet pressure. • If low, check and adjust high pressure relief valve or replace it if necessary.
	Vibrator circuit pressure is not held in vibrator motor case.	If pressure in vibrator motor case is not within allowable range, repair vibrator motor or replace it if necessary.
	Decrease in vibrator motor rpm due to internal leakage in vibrator motor.	• Measure drain quantity from vibrator motor. • If drain quantity is larger than standard value, repair vibrator motor or replace it if necessary.
5. Vibrator Pump	Insufficient discharge rate from vibrator pump due to reduced efficiency of vibrator pump.	• Measure discharge flow rate of vibrator pump with flow meter. • If discharge flow rate is not within specified range, repair vibrator pump or replace it if necessary.
	Insufficient pump discharge due to wear of vibrator pump drive shaft spline.	Replace vibrator pump.
	Vibrator circuit pressure is not held in vibrator pump case.	If pressure in vibrator pump case is not within allowable range, repair vibrator pump or replace it if necessary.

3-3-3. Vibrator amplitude does not change

Check point	Cause	Check/Action
1. Vibrator Solenoid Valve	Vibrator solenoid valve spool shifts only in one direction.	Repair vibrator solenoid valve or replace it if necessary.

3-3-4. Vibratory drum does not changeover vibrating

Check point	Cause	Check/Action
1. Vibratory Drum Select Solenoid Valve	Vibratory drum does not changeover vibrating because spool of vibrator solenoid valve does not change.	Repair vibrator solenoid valve or replace it if necessary.

3-3-5. Vibrator does not stop

Check point	Cause	Check/Action
1. Vibrator Solenoid Valve	Vibrator solenoid valve spool does not return to neutral position.	Repair vibrator solenoid valve or replace it if necessary.
2. Vibrator Pump	Vibrator pump swash plate does not return to neutral position.	Repair or replace vibrator pump or replace it if necessary.

3-3-6. Vibrator system is overheating

Check point	Cause	Check/Action
1. Oil Level of Hydraulic Oil Tank	Oil level in hydraulic oil tank is low.	Fill tank until correct oil level is obtained.
2. Oil Cooler	Cooling efficiency is reduced due to clogged oil cooler fins.	Clean oil cooler fins.
3. Vibrator Circuit Pressure	If circuit pressure setting is excessively low, relief valve opens, causing temperature of hydraulic oil in circuit to rise.	• Measure vibrator circuit pressure. • If low, increase relief setting pressure.
	If load is excessively heavy, relief valve opens, causing temperature of hydraulic oil in circuit to rise.	• Measure vibrator circuit pressure. • If high, decrease vibration load.
4. Suction Filter for Steering • Charge Pump	Load of steering • charge pump increases due to clogged filter, causing temperature of hydraulic oil in circuit to rise.	Clean suction filter or replace it if necessary.
5. Hydraulic Oil Filter	Charge circuit pressure increases due to clogged filter.	Clean hydraulic oil filter or replace it if necessary.

3-3-7. Abnormal noise from vibrator system

Check point	Cause	Check/Action
1. Vibrator Bearings	Vibrator bearings supporting eccentric shaft are damaged.	Replace vibrator bearings.
2. Hydraulic Hose Clamp	Vibrator sound of hydraulic hose is generated because clamp securing hydraulic hose is loose.	Tighten bolts of loose hydraulic hose clamp to specified torque.
3. Suction Filter for Steering • Charge Pump	Cavitation is occurring in steering • charge pump due to clogged filter.	Clean suction filter or replace it if necessary.
4. Vibrator Motor	Internal bearing of vibrator motor is damaged.	Repair vibrator motor or replace it if necessary.

3-4. Steering System

If a problem occurs in the steering systems such as the steering•charge pump and orbitrol, determine the cause and carry out action as required, according to the following general troubleshooting items.

(NOTICE)

- **When checking whether or not the pressure is correct, refer to the pressure standard value for each hydraulic circuit.**

3-4-1. Steering wheel is hard to turn

Check point	Cause	Check/Action
1. Oil Level of Hydraulic Oil Tank	Oil level in hydraulic oil tank is low.	Fill tank until correct oil level is obtained.
2. Orbitrol	Relief valve is open or setting pressure is low.	• Measure steering circuit pressure. • If low, check and clean relief valve or replace it if necessary.
	Flow to steering cylinder circuit is insufficient due to leakage from check valve.	Check and clean check valve or replace it if necessary.
	Spool and sleeve of orbitrol are contaminated or clearance is incorrect.	Check and clean orbitrol or replace it if necessary.
3. Steering Circuit Pressure	Pressure in return circuit from orbitrol increases due to clogged charging hydraulic oil filter.	Clean hydraulic oil filter or replace it if necessary.
4. Steering Cylinder	Cylinder thrust decreases due to internal leakage of steering cylinder.	Repair steering cylinder or replace it if necessary.
5. Suction Filter for Steering•Charge Pump	Steering•charge pump discharge rate decreases due to clogged filter.	Clean suction filter or replace it if necessary.
6. Steering•Charge Pump	Discharging pressure is insufficient due to efficiency degradation of steering•charge pump.	• Measure steering circuit pressure. • If low, replace steering•charge pump.
7. Steering Column	Column shaft and orbitrol shaft center are misaligned.	Align column shaft with orbitrol shaft center or replace it if necessary.
	Column shaft bearing is worn or damaged.	Repair column shaft or replace it if necessary.

3-4-2. Steering response is slow

Check point	Cause	Check/Action
1. Oil Level of Hydraulic Oil Tank	Oil level in hydraulic oil tank is low.	Fill tank until correct oil level is obtained.
2. Orbitrol	Oil is bypassing because relief valve is open.	• Measure steering circuit pressure. • If low, inspect relief valve or replace it if necessary.
3. Steering Cylinder	Internal leakage of steering cylinder.	Repair steering cylinder or replace it if necessary.
4. Suction Filter for Steering•Charge Pump	Steering•charge pump discharge rate decreases due to clogged filter.	Clean suction filter or replace it if necessary.
5. Steering•Charge Pump	Discharging pressure is insufficient due to efficiency degradation of steering•charge pump.	• Measure steering circuit pressure. • If low, replace steering•charge pump.

3-4-3. Steering wheel backlash or play is large

Check point	Cause	Check/Action
1. Steering Column	Spline of column shaft or orbitrol is worn.	Replace column shaft or orbitrol.
	Column shaft bearings are worn.	Replace column shaft bearings.
2. Steering Wheel	Serration (spline) of wheel or column shaft is worn.	Replace wheel or column shaft.

3-4-4. Steering system is overheating

Check point	Cause	Check/Action
1. Oil Level of Hydraulic Oil Tank	Oil level in hydraulic oil tank is low.	Fill tank until correct oil level is obtained.
2. Oil Cooler	Cooling efficiency is reduced due to clogged oil cooler fins.	Clean oil cooler fins.
3. Steering Circuit Pressure	If circuit pressure setting is excessively low, relief valve is open, causing temperature of hydraulic oil in circuit to rise.	• Measure steering circuit pressure. • If low, replace relief valve.
	If load is excessively heavy, relief valve is open, causing temperature of hydraulic oil in circuit to rise.	• Measure steering circuit pressure. • If high, decrease steering load.
4. Suction Filter for Steering • Charge Pump	Load of steering • charge pump increases due to clogged filter, causing temperature of hydraulic oil in circuit to rise.	Clean suction filter or replace it if necessary.

3-4-5. Abnormal noise from steering system

Check point	Cause	Check/Action
1. Oil Level of Hydraulic Oil Tank	Pump suction pressure is high because oil level of hydraulic oil tank is low, causing cavitation in steering circuit system.	Fill tank until correct oil level is obtained.
2. Steering Circuit	Cavitation is caused by air in circuit.	Bleed circuit.
3. Hydraulic Hose Clamp	Vibrator sound of hydraulic hose is generated because clamp securing hydraulic hose is loose.	Tighten bolts of loose hydraulic hose clamp to specified torque.
4. Suction Filter for Steering • Charge Pump	Cavitation is occurring in steering • charge pump due to clogged filter.	Clean suction filter or replace it if necessary.

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