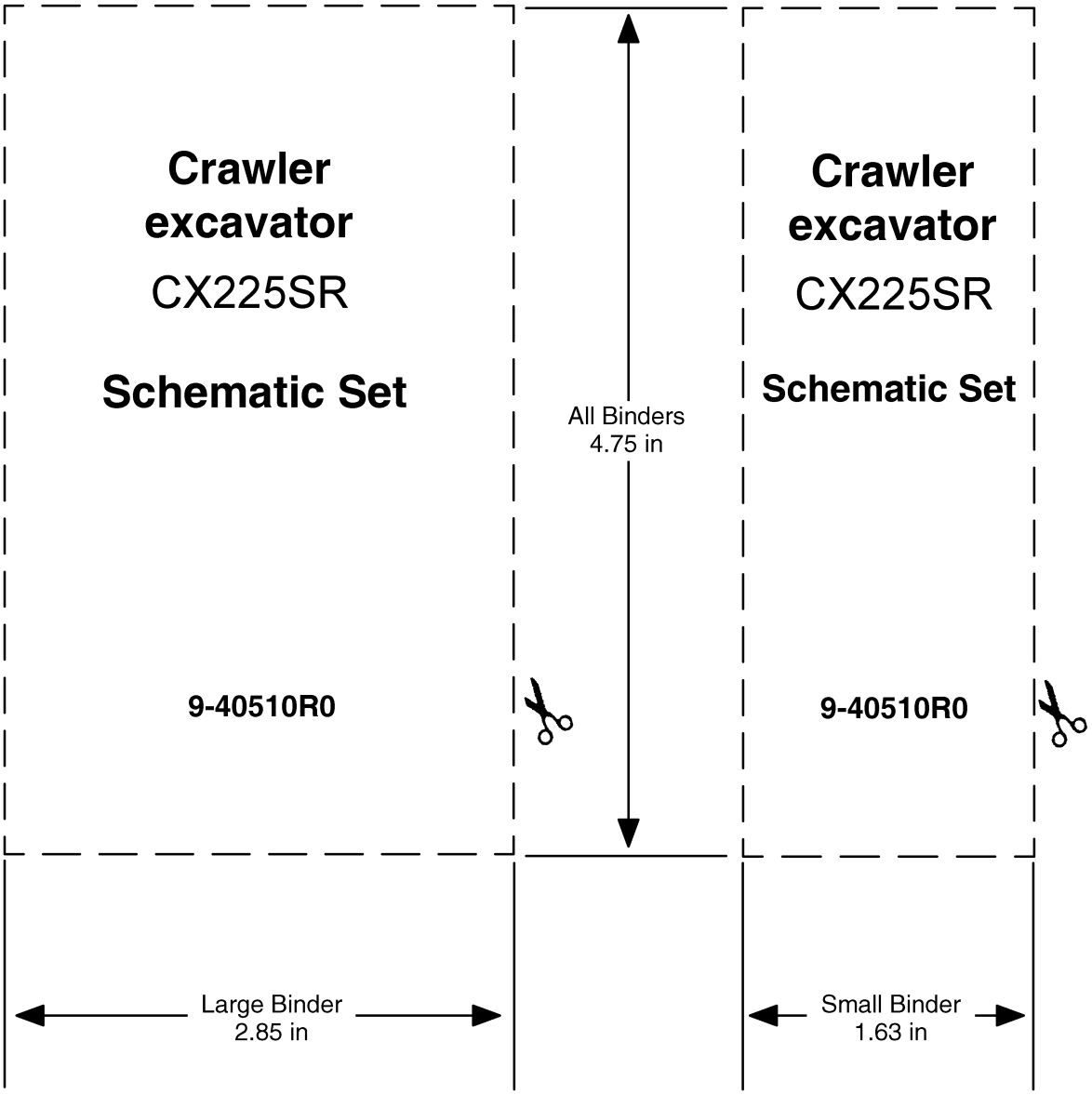
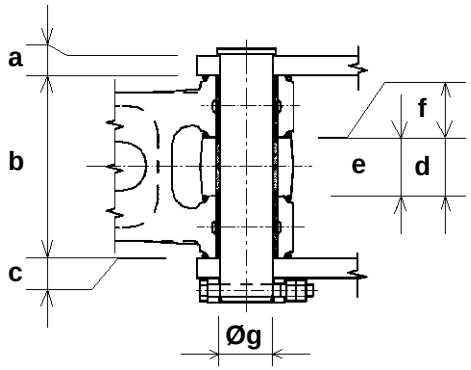

Crawler excavator
CX225SR
Schematic Set
9-40510R0
All Binders
4.75 in
Crawler excavator
CX225SR
Schematic Set
9-40510R0
Large Binder
2.85 in
Small Binder
1.63 in

NOTES

Weight of components

Engine	1074 lbs
Hydraulic pump	276 lbs
Attachment control valve	412 lbs
Swing motor	492 lbs
Travel motor	551 lbs
Boom cylinder	440 lbs
Dipper cylinder	567 lbs
Bucket cylinder	333 lbs
Counterweight	12963 lbs
Cab	560 lbs
Turntable	534 lbs
Upperstructure assembly	25948 lbs
Hydraulic swivel	60 lbs
Frame assembly	15476 lbs
Machine without attachment	41535 lbs
Attachment	8532 lbs
Boom assembly	4850 lbs
Dipper assembly	2006 lbs
Radiator and oil-cooler assembly	121 lbs
Fuel reservoir	353 lbs
Hydraulic reservoir	320 lbs
Idler wheel	181 lbs
Upper roller	37 lbs
Lower roller	77 lbs
Tension damper	313 lbs
23.6 in track	2976 lbs
27.5 in track	3461 lbs
31.5 in track	3770 lbs

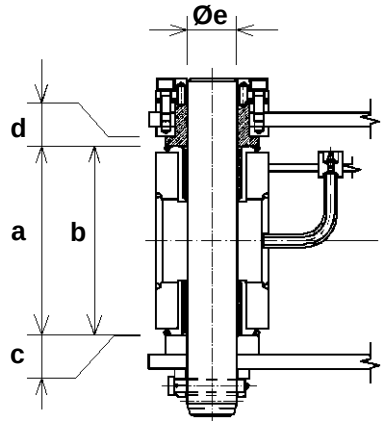
10. Connecting rod/Compensator/Bucket cylinder head



CS01B531

Marking		Dimension (in)
a	Standard	1.26
	Limit	1.18
b	Standard	11.65
	Limit	11.57
c (play)	Standard	0.04 to 0.06
	Limit	Shims
d	Standard	3.78
	Limit	3.86
e	Standard	3.74
	Limit	3.66
f (d - e)	Standard	0.01 to 0.08
	Limit	Shims
Ø g (pin)	Standard	3.15
	Limit	3.11
Ø g (compensator)	Standard	3.15
	Limit	3.21
Ø g (cylinder)	Standard	3.15
	Limit	3.21

11. Dipper/Bucket

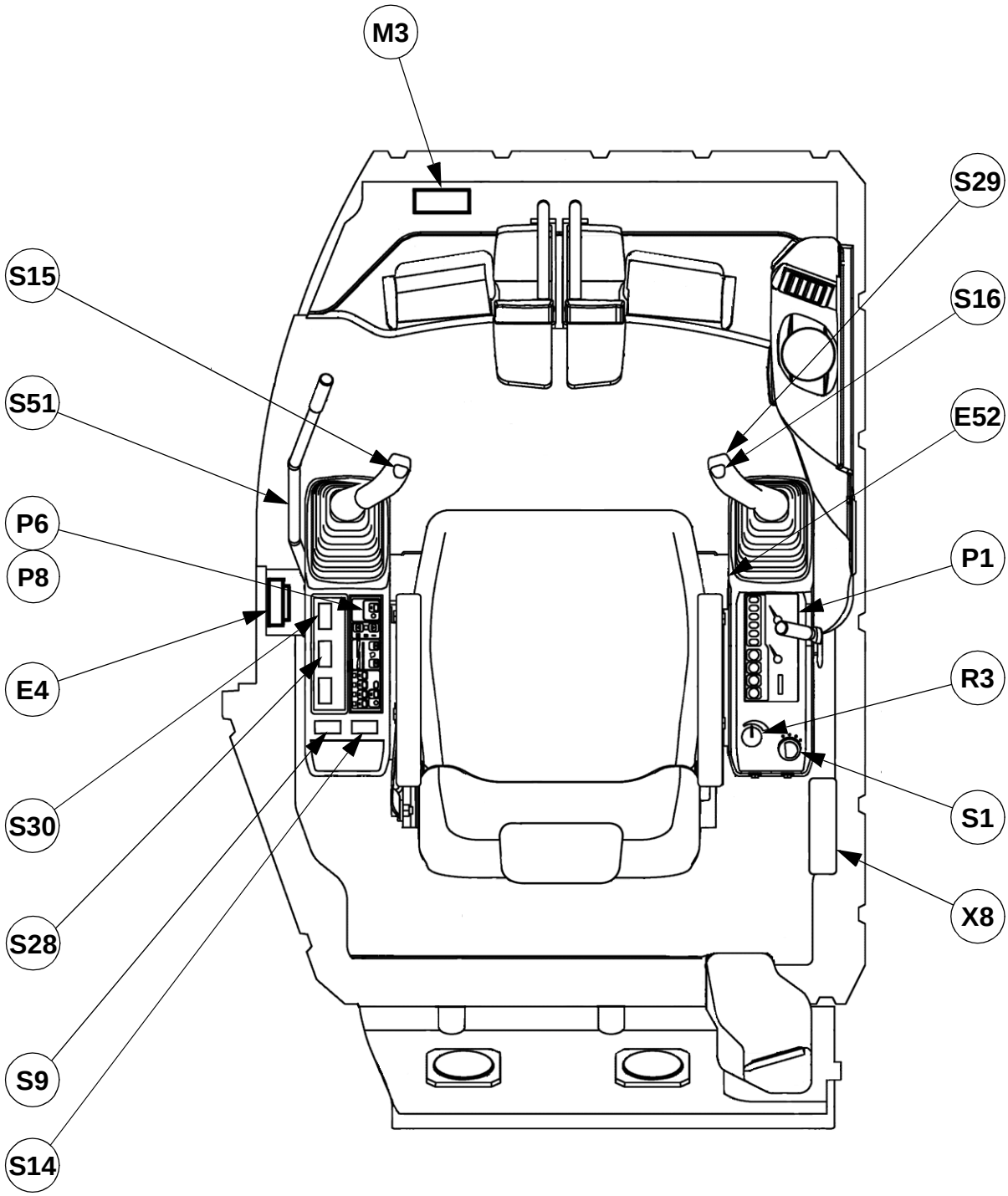


CS01B532

Marking		Dimension (in)
a	Standard	12.09
	Limit	12.32
b	Standard	12.05
	Limit	11.97
c (a - b)	Standard	0.04 to 0.14
	Limit	Shims
d	Standard	0.63
	Limit	0.31
Ø e (pin)	Standard	3.15
	Limit	3.11
Ø e (dipper)	Standard	3.15
	Limit	3.21
Ø e (bucket)	Standard	3.15
	Limit	3.21

TABLE OF CONTENTS

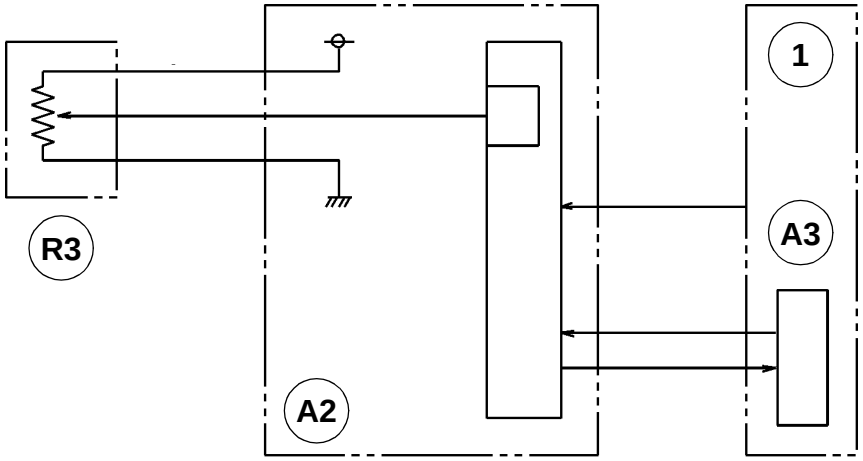
GENERAL LOCATION OF THE COMPONENTS (inside the cab)



CS02D771

Acceleration checking

1) Circuit configuration



CS02D777

1 Engine
A2 Engine controller
A3 Electronic acceleration
R3 Throttle volume

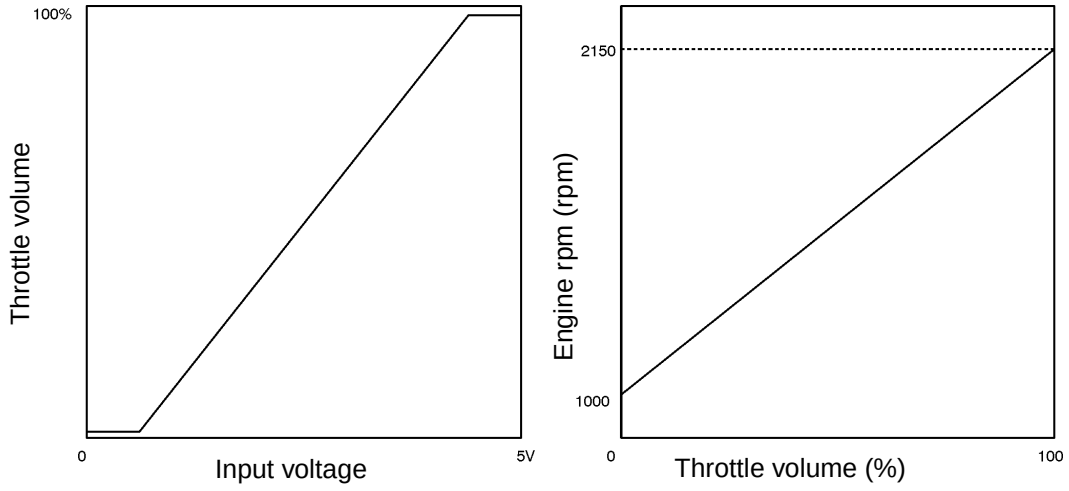
2) Operation

1. The engine controller (A2) calculates the target position of the rack using the target rpm and data from each sensor (actual engine rpm, actual position of the rack, fuel flow adjustment resistor), and it transmits the signal to the electronic acceleration.

2. The electronic acceleration (A3) calculates the target position of the rack and its actual position (value measured by the rack sensor) and moves the rack by rotating the electric motor to adjust the fuel injection quantity.

3. By repeating this process, the engine controller (A2) checks the electronic acceleration (A3) to obtain: actual number of rotations = target number of rotations.

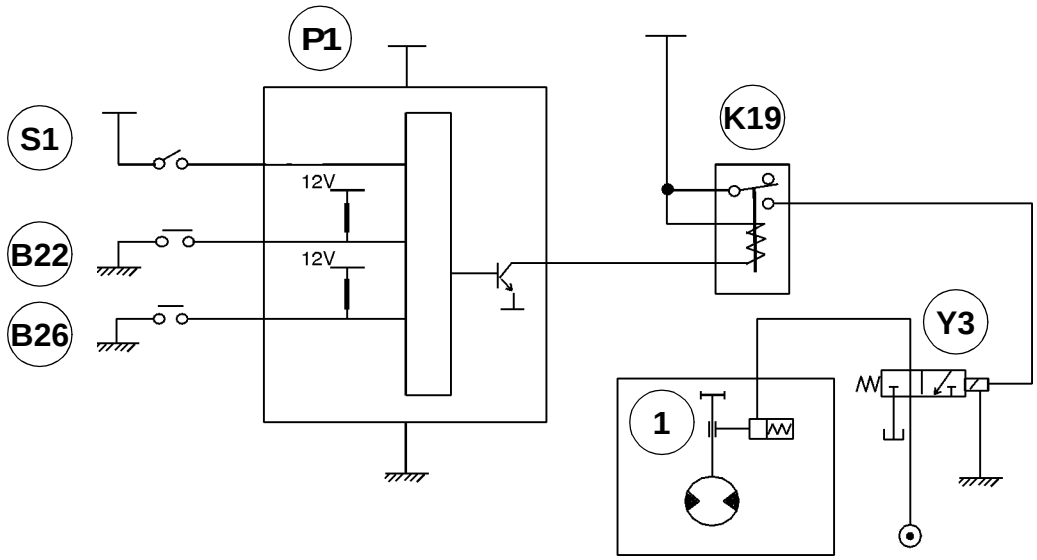
3) Relationship between the throttle volume and the engine rpm



4a-p6b

Swing brake

1) Circuit configuration



CS02D781

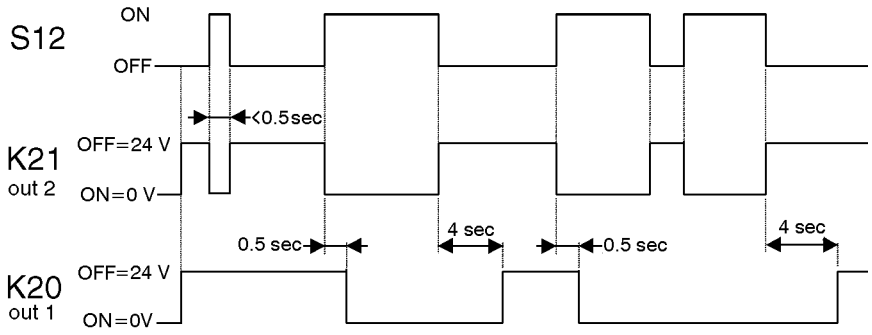
1 Swing brake
B22 Swing pilot pressure switch
B26 Upper pilot pressure switch (yellow band)
B27 Travel pilot pressure switch
K19 Relay-swing brake
P1 Instrument panel
S1 Key switch
Y3 Swing brake solenoid valve (pink band)

2) Operation of the swing brake control

The swing brake (1) will be activated 5 seconds after the upper pilot pressure switch (B26) is in the open position.

The swing brake (1) will be activated 3 seconds after the supply cut-off delay.

2. Windshield wiper/Windshield washer



CS02D789

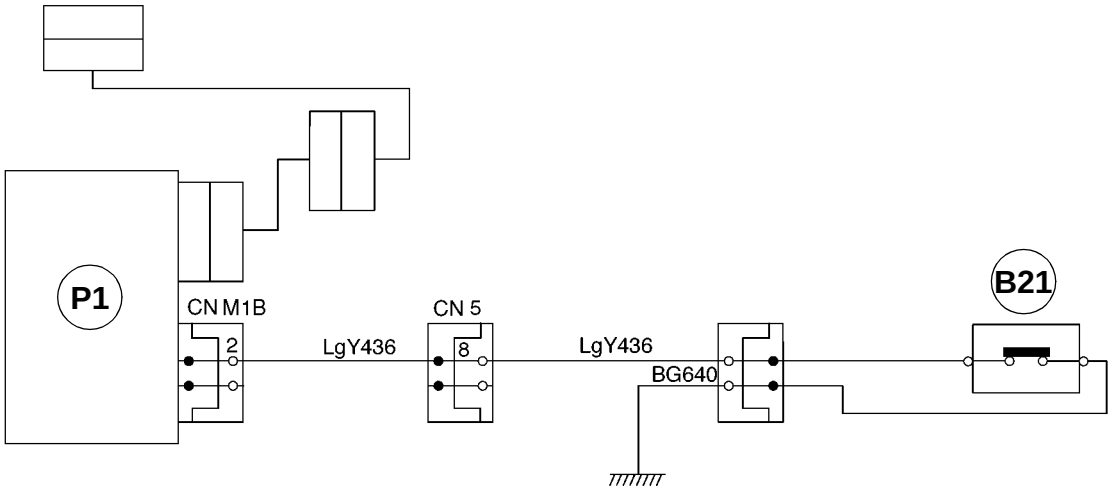
3) Operation

The intermittent (1) and continuous (2) windshield wiper indicator lamps do not come on when the washer switch (S12) is operated.

Low engine oil pressure

Description of problem No. 1

- The warning lamp is still on even when the engine oil level is satisfactory.



CS02H549

B21 Engine oil pressure switch

P1 Instrument panel

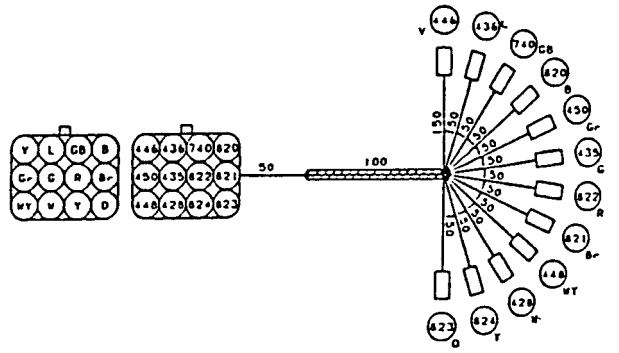
Troubleshooting	Cause	Action
Check the following points during the 12 seconds following starting the engine		
Disconnect the engine oil pressure switch connector (B21) to see if the message disappears → YES	Oil pressure switch (B21) defective	Replace the engine oil pressure switch (B21)
NO → Disconnect connector CN5 to see if the message disappears → YES	Short-circuit on wire LgY between the engine oil pressure switch (B21) and CN5	Repair wire LgY
NO → Disconnect connector CNM1B to see if the message disappears → YES	Short-circuit on wire LgY between CN5 and CNM1B	Repair wire LgY
NO	Instrument panel (P1) defective	Replace the instrument panel (P1)

ELECTRICAL INSPECTION OF COMPONENTS

Inspection equipment

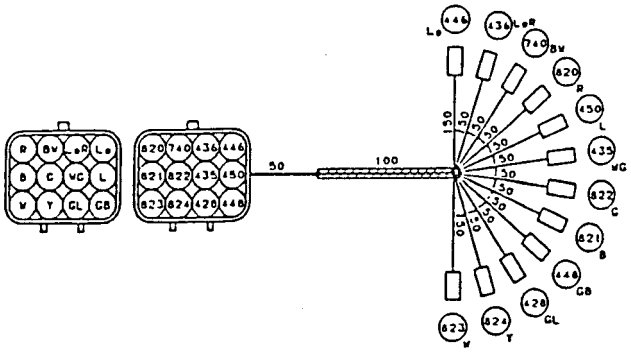
Tool: see "Special tools".

Details of service connector kit



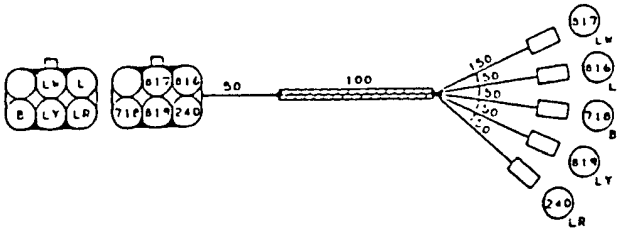
BS98F222

1. Not used



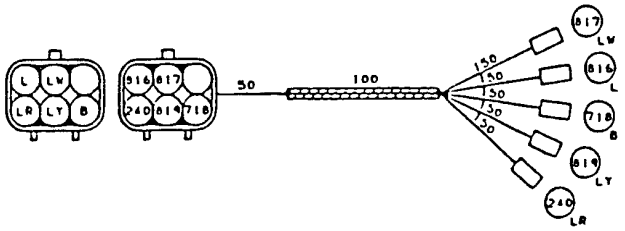
BS98F223

2. Not used



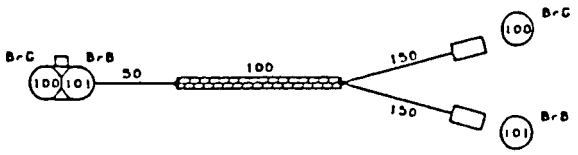
BS98F224

3. For engine emergency stop motor (6P)



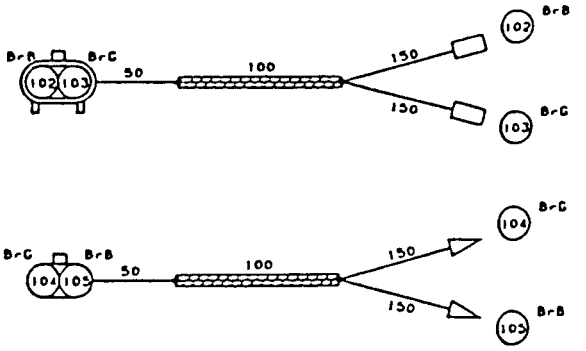
BS98F225

4. For harness end of engine emergency stop motor (6P)



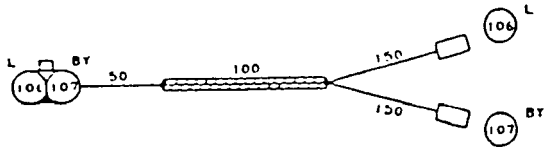
BS98F226

5. For solenoid valve and fuel sensor



BS98F227

6. 7. Not used



BS98F228

8. For pressure switch (2P)

PREPARATION BEFORE INSPECTION

WARNING: *Hydraulic fluid output under pressure can penetrate the skin. Hydraulic fluid can also cause or infect a slight skin cut. In the event of being injured by hydraulic fluid under pressure, consult a doctor immediately. Any delay in obtaining treatment for an injury can cause a serious infection or reaction. Before pressurising the circuit, make sure that all the connections are correctly tightened and that the hoses and pipes are in good condition. Release pressure in the circuit completely before disconnecting pipes or carrying out any operation on the hydraulic system. Always use a small piece of cardboard or wood to detect leaks of fluid under pressure. Never use your hands.*

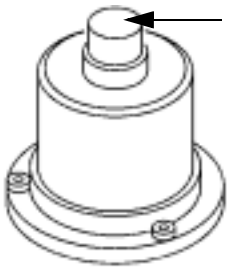
WARNING: *Any incorrect use or maintenance of a construction machine can cause accidents. Only persons who have read, understood and who observe the instructions in the operator's manual are accredited to use or maintain this machine.*

WARNING: *The accumulator of this machine is charged with nitrogen under pressure. In the event of incorrect operation of the circuit, change the accumulator. Never attempt to repair it. Non-observance of these instructions and the procedure shown below can cause serious or fatal injury.*

Releasing pressure in the hydraulic system

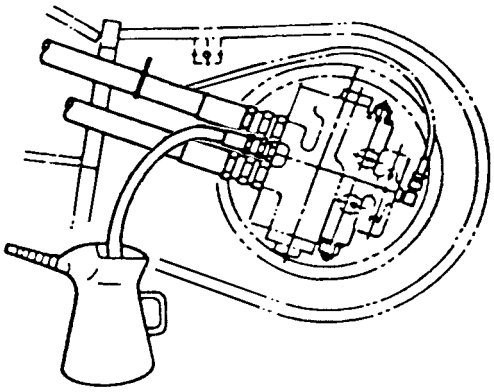
NOTE: *Operation to be carried out before every service operation on the hydraulic system.*

1. Position the machine on hard, flat ground.
2. Open the bucket until the cylinder rod is completely retracted.
3. Extend the dipper until the cylinder rod is completely retracted. Lower the boom so that the end of the dipper is resting on the ground. Lower the tool to the ground.
4. Lower the engine speed to idle for 30 seconds, then shut down the engine.
5. Turn the ignition key to "ON" without starting the engine.
6. Lower the pilot control cancellation lever.
7. Operate each control more than 10 times in both directions to release pressure in the circuits.



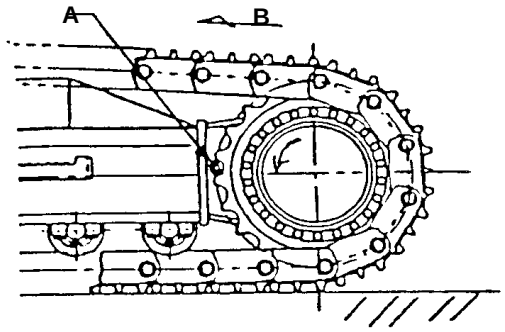
CS00E544

8. Press the button located on the hydraulic reservoir breather to release pressure in the reservoir.



CS00E546

3. Disconnect the hydraulic motor drain hose and plug it.
4. Use a hose to connect the drain port to the receptacle.



CS99B580

A: Locking pin
B: Forward

5. Lock the travel mechanically on the side to be checked by positioning the locking pin (A) between the sprocket and the undercarriage as shown above.
6. With the engine running at full speed (mode "N"), press the travel switch of the hydraulic motor to be checked and measure the quantity of oil flowing out of the drain in 1 min.
7. Repeat Steps 1 to 6 to check the other motor.
8. Compare the quantities of oil collected; if the difference between the two motors is greater than 0.26 gal/min, repair or change the motor which has output the greatest quantity of oil.

Checking the swing motor for leaks

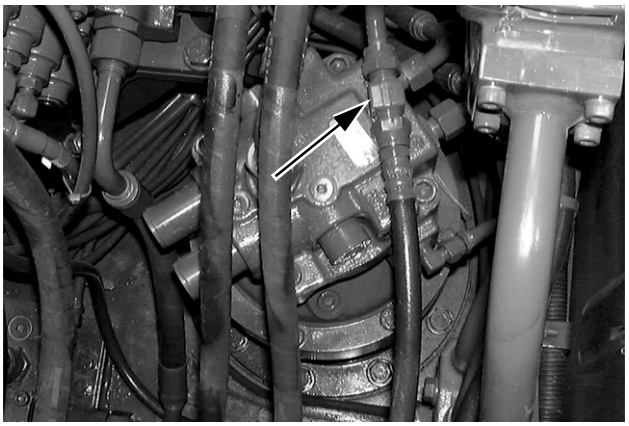
Tools required

1 receptacle with a capacity of 2.6 gal
1 hose
1 plug

Checking for leaks

(With the hydraulic oil between 113 and 131°F)

1. Disconnect and plug the swing brake pilot hose from port P of the swing motor (see "Swing safety valves").
2. Start the engine.
3. Slowly operate the swing control lever and gradually increase the engine speed to full speed (mode "N") to ensure that the swing is locked.
4. Shut down the engine.
5. Press the breather to release pressure in the hydraulic reservoir.



CD00E192

6. Disconnect the hydraulic motor drain hose and plug it.
7. Use a hose to connect the drain port to the receptacle.
8. Start the engine at full speed (mode "N"). Operate the swing control to the right or the left and measure the quantity of oil which flows out of the drain during 1 min.
9. Since the quantity of oil can vary depending on the test point used, repeat the measurement (Step 8) with the upperstructure at 90°, then at 180°.

Controls in neutral position

In neutral position, with the engine running, part of the flow coming from the low pressure pump D3 arrives at PP, and is divided by a restrictor bridge. One part goes through the two travel spools, the other part goes via all the other spools and then into the general return circuit. When the spools are moved, these circuits will be locked, which will close the upper pilot (B26) and travel pilot (B27) pressure switches so as to inform the instrument panel (P1).

The outlet from pump D2 enters via port P1 on the main control valve (15) but pump D1 enters via port P2 on the main control valve (15), passes through the control valve via the free passages. They are checked by two pressure limiters (1) and (2) set to 370 psi at 13.2 gal/min and two restrictors (3) and (4). These two pressures are sent to the D1 and D2 pumps via ports Pi1 and Pi2, to set them to minimum flow.

1. Pressure limiter
2. Pressure limiter
3. Restriction
4. Restriction
15. Main control valve
B26. Upper pilot pressure switch
B27. Travel pilot pressure switch
P1. Pump D2 outlet flow
P2. Pump D1 outlet flow

Swing variable priority circuit

The swing pilot pressure arrives in the main control valve (15) via port Pc3 after passing through the swing shuttle block (81), and then pilots the swing priority valve (1). Which provides the maximum possible torque on the swing motor (22) at a high swing pressure, even the dipper is used at the same time.

When digging, the boom raising pilot pressure pilots the swing priority valve (1) via port Pbu. The swing flow is therefore in parallel with the dipper via the swing priority valve (1). Which has the effect of increasing the speed of the dipper.

The trench is dug more uniformly even if the free passage is closed by the spool on boom 2.

When upperstructure swing and dipper retraction or boom raising take place simultaneously, the parallel connection is reduced and the swing pressure is maintained.

1. Swing priority valve
15. Main control valve
22. Travel motor
81. Swing shuttle block
Pa5/A5. Extending the dipper
Pb5/B5. Retracting the dipper
Pa9/Pb9. Dipper 2 spool
Pa3/A3. LH swing
Pb3/B3. RH swing
Pc3. Swing priority
Pb4. Boom 2 spool
Pbu. Swing priority valve piloting

Dipper retracting circuit

Dipper retracting (cylinder large chamber) (27) is supplied by flows from pumps D2 (P1) and D1 (P2).

When the dipper retracting control is operated, the dipper 1 (1) and dipper 2 (3) spools are piloted respectively by ports Pb5 and Pb9 on the main control valve (15).

The flow coming from pump D2 arrives at port P1 on the dipper 1 spool (1) via the free passage or through the parallel passage after passing through the straight-line travel valve (2).

The flow coming from pump D1 arrives at the port P2 on the dipper 2 spool (3) via the free passage or through the parallel passage after passing through the straight-line travel valve (2). It joins the flow from pump P1 before the dipper 1 spool (1). The flows P1 and P2 supply the large chamber of the dipper cylinder (27). The return from the large chamber passes through the two dipper spools (1) (3), which reduces pressure drops.

Dipper retracting additional supply circuit

When the dipper retraction control is operated, the pilot pressure arrives via port Pc1 on the main control valve (15) and unlocks the dipper load holding valve (31). Therefore the oil from the dipper cylinder small chamber (27) is re-injected into the large chamber of the dipper cylinder (27) passing via the small restriction in the recycling valve (4) and the non-return check valve (5).

When the pressure in the large chamber of the dipper cylinder (27) increases, the recycling valve (4) is piloted and set in the large restriction position. Which has the effect of stopping reinjection from the small chamber to the large chamber of the dipper cylinder (27).

1. Dipper 1 spool
2. Straight-line travel valve
3. Dipper 2 spool
4. Recycling valve
5. Non-return check valve
15. Main control valve
27. Dipper cylinder
31. Dipper load holding valve
P1. Pump D2 outlet flow
P2. Pump D1 outlet flow
Pa5/A5. Extending the dipper
Pb5/B5. Retracting the dipper
Pa9/Pb9. Dipper 2 spool piloting