CC102/122/142 SERVICE TRAINING
CC102/122/142 Service training program

Figure 1-Hydraulic schematic

Drawing shows the three hydraulic systems:

- Propulsion System
- Vibration System
- Steering System

One common hydraulic tank is used for all the three systems. The oil from the vibration system returns to the tank through the hydraulic filter. After the filter a check valve set for 7 PSI (0.5 bar) maintains a positive pressure on the suction line of the propulsion system charge pump. A by pass valve set for 30 PSI (2 bar) will allow the oil to flow to the tank in case of a clogged filter element. In case of a clogged filter element the return oil from the vibration system will stop feeding the charge pump. An orifice is in parallel with the check valve to prevent the charge pump from starving.

Figure 2-Hydraulic schematic-Propulsion system

The propulsion system consist of a propulsion pump, two propulsion motors (standard machines) or three motors (combi machines). The schematic also shows the flow divider option. The propulsion pump unit includes the charge pump, axial piston pump, two high pressure relief valves/check valves, charge pressure relief valve, piston pump control valve, piston pump control servo and brake solenoid valve. Pump P/N 357008 used on CC142 and pump P/N 358225 used on CC102/122 up to S/N 60110342 have only three orifices #1, 3 & 4. Pump P/N 358470 used on CC102/122 from S/N 60110343 has four orifices #1, 2, 3 & 4.

Figure 3-Propulsion lines and test ports for CC102/122 up to S/N 60110342

Figure 4-Propulsion lines and test ports for CC102/122 from S/N 60110343.

Figure 5-Propulsion lines and test ports for CC102/122 combi machines.

Figure 6-Brake lines for CC102/122.

Figure 6A-Propulsion lines and test ports for CC142

Figure 7-Propulsion lines for CC142.

Figure 8-Brake lines for CC102/122 combi machines.
Brakes are applied and the charge pump output oil is blocked at the brake valve, not reaching the piston pump control valve. Even if the forward/reverse control is moved out of neutral, there is no oil available to actuate the servo control piston and stroke the pump. Three gauges installed on test ports M1, M2 & M3 would show charge pressure controlled by the charge pressure relief valve.

Figure 10-Cut away view of an axial piston pump

Arrows show the internal leakage resulting from the normal operation of the pump. All piston pumps and motors (axial or radial) have internal leakages which result from the normal operating of these components. Oil from the internal leakages will return to the tank through the case drain lines.

Figure 11-Hydraulic schematic-Propulsion-Engine running and brake valve energized.

After the brake valve is energized, the output oil from the charge pump releases the brakes and reaches the piston pump control valve. Since the piston pump is in neutral (the control valve is in neutral) no internal leakages are being generated by the piston pump or motors. Three gauges installed on test ports M1, M2 & M3 would show the same pressure (charge pressure).

Figure 12-Hydraulic schematic-Propulsion-Forward reverse control out of neutral.

Moving the piston pump control valve out of neutral will direct oil to the servo control piston, stroking the piston pump. The thick black arrows show the flow generated by the piston pump to drive the propulsion motors. The thick white arrows shows the return flow from the motors to the pump. This is what is called a closed circuit. The internal leakage oil generated by the operation of the piston pump and motors returns to the tank through the case drain lines. The charge pump makes up for this oil by feeding the return side of the circuit through the charge check valve. Since the charge pump flow is higher than the combined internal leakages, part of the charge pump flow discharges through the charge pressure relief valve into the pump case and from there returns to the tank through the case drain line. Two gauges installed on test ports M1 & M3 will show charge pressure, and a gauge on port M2 will show pressure needed to generate the necessary torque by the motors to propel the machine. As can be seen the two propulsion motors are connected in parallel. In case one drum loses traction, it will spin and the torque the torque to drive that drum is lower than the torque to drive the machine. The other drum will stop and the full pump flow will circulate through the motor of the spinning drum. The machine will stop moving. If this situation is reached very often, the flow divider option is recommended. In case of a drum spinning the operator energizes the flow divider forcing 50% of the pump flow to circulate through the motor of the drum with good traction propelling the machine.
Figure 13-Propulsion pump P/N 357008 used on CC142 and pump P/N 358225 used on CC102/122 up to S/N 60110342.
Note plugs X1, X2, X3, & X4 which can be seen on the hydraulic schematic.
Under plugs X1 & X2 we can find orifices #3 & 4.

Figure 14-Propulsion pump P/N 357008 used on CC142 and pump P/N 358225 used on CC102/122 up to S/N 60110342

Figure 15-Exploded view of pump P/N 358225 used on CC102/122 up to S/N 60110342
Note orifices #1 on brake valve and orifices #3 & 4 under plugs X1 & X2. (size of orifices in millimeters).

Figure 16-Exploded view of pump P/N 357008 used on CC142.
Note orifice #1 on brake valve and orifices #3 & 4 under plugs X1 & X2. (size of orifices in millimeters).

Figure 17-Pump P/N 358470 used on CC102/122 from S/N 60110343.
Note that there are only two plugs X1 & X2.

Figure 18-Cut away view of pump P/N 358470 used on CC102/122 from S/N 60110343.
Figure 19-Pump P/N 358470 used on CC102/122 from S/N 60110343.
Note simpler servo control piston used on this pump.

Figure 20-Exploded view of part of pump P/N 358470.
Note orifices #3 & 4 under plugs X1 & X2.

Figure 21-Exploded view of part of pump P/N 358470
Note orifice #1 on the brake valve and orifice #2 between the control valve housing and the piston pump housing.

Figure 22-Cut away view of pump P/N 357008(CC142) and pump P/N 358225(CC102/122).
Note the servo control piston with the centering springs and center position adjustment screw, the feed back link connecting the servo piston to the pump control valve and the control valve center position adjustment screw.
Figure 23 - Cut away view of the control valve of pump P/N 357008 (CC142) and P/N 358225 (CC102/122).

Note orifices #3 & 4 under plugs X1 & X2, feed back link and control valve center position adjustment screw (hydraulic balance).

Figure 24 - Cut away view of stroking mechanism for pump P/N 357008 and pump P/N 358225.

The pump control valve (servo control spool) is in neutral (center position) blocking oil from the charge pump (arrows).
Both sides of the servo piston are under the same pressure (case drain) and the centering springs keep the servo piston in the center position (neutral).
The piston pump is in neutral.

Figure 25 - Cut away view of the stroking mechanism (during stroking).

The forward/reverse control was moved out of neutral moving the servo control spool up. The charge pump oil is now directed to the top side (solid arrows) of the servo piston through orifice #3(X1) pushing the servo piston down. Oil from the bottom side of the servo piston (interrupted arrows) returns to tank through orifice #4(X2).
Without the feed back link the servo piston would travel all the way down to the full displacement position of the piston pump.

Figure 26 - Cut away view of the stroking mechanism (end of stroking).

The servo piston moves the feed back link which moves the servo control spool to the center position stopping the flow of oil to the top side of the servo piston. The servo piston stops.
In case the operator decides to increase the speed of the machine he/she moves the forward/reverse control a little more moving the servo control spool up and increasing the displacement of the piston pump.

Figure 27 - Neutral adjustment of the piston pump.

1 - With oil at normal operating temperature (140 F - 160 F) shut off engine.
2 - Remove plugs X1 & X2 and install a hose between these two ports. This equalizes pressure on both sides of the servo piston.
3 - Install two 6000 PSI gauges on the high pressure test ports (M1 & M2 on hydraulic schematic). Restart engine and keep it running at 1500 RPM.
Read pressure on both gauges. If different swap gauges (It should be charge pressure) and read pressure again. If different adjust the servo piston center position adjusting screw until same pressure is shown on both gauges.
Replace the 6000 PSI gauges with 600 PSI gauges and read the pressure. If different, adjust the center position adjusting screw to reach same reading on both gauges (Lock adjusting screw).
4 - Shut off the engine and remove hose and reinstall plugs X1 & X2.
5 - Restart engine and read pressure on both gauges. If different adjust the control valve center
position adjusting screw (hydraulic balance) to reach the same reading on both gauges.
Lock the adjusting screw.
Note: Do not turn the adjusting screw more than 90 degrees to either side.

Figure 28 - Radial piston motor with built in multi-disc fail safe brake used on the rear wheels of corn bi machines.
To release this brake the plug on the brake cover must be removed giving access to the plug on the brake piston. Screwing this plug in all the way will release the brake.

Figure 29 - Radial piston motor with built in multi-disc brake used on drums of the CC102/122

Figure 21 - Radial piston motor used on the drums of the CC142.

Figure 30A - Radial piston motor used on CC142.
To release the brake a square tube with a hole in the center is held against the brake housing while a screw with a nut is passed through the hole and screwed into the brake piston. Tightening the nut will move the piston out releasing the brake.

Figure 31 - Hydraulic schematic - Vibration system.
The vibration system consist of a fixed displacement pump (gear pump), control valve (part of the pump) and vibration motors. The control consist of a solenoid valve, 0.8 millimeter orifice, piston with a 45 PSI (3 bar) spring and a poppet with spring (relief valve). A test port is provided.
Note that the two vibration motors are in series.

Figure 32 - Vibration lines for CC102/122/142.

Figure 33 - Vibration lines for Combi machines.

Figure 34 - Steering and vibration pump.

Figure 35 - Vibration motor.

Figure 36 - Vibration control valve.
Note the solenoid valve, the piston with the 45 PSI (3 bar) spring and the poppet with spring inside the piston.

Figure 37 - Hydraulic schematic - Vibration - Engine running and solenoid valve de-energized.
When the solenoid valve is de-energized the pump output oil can flow through the 0.8 orifice and solenoid valve to the suction side of the pump. Oil flowing through the orifice originates a pressure drop. Pressure before the orifice (solid arrow) is higher than after the orifice (dashed arrow). Higher pressure on top of piston moves the piston down opening a passage for the pump flow to return the tank. Vibration is off.
Figure 38-Cut away view of the vibration control valve with the solenoid valve de-energized.

Figure 39-Hydraulic schematic-Vibration -Engine running and solenoid valve energized.

When the solenoid valve is energized shuts off the passage for the to return to suction side of the pump. When the oil stops flowing through the orifice pressure equalizes on both sides of the orifice. Pressure will be the same on both sides of the piston and the 45 PSI(3bar) spring moves the piston up shutting off the passage to the return. The pump flow is forced is forced to flow to the front motor driving it, and from there to the rear motor and returning to the tank. The moment the solenoid valve is energized and the pump flow is forced to drive the motors, the relief valve will open until the motors reach their normal operating speed. A gauge installed on the pressure test port will show initially the setting of the relief valve for a brief moment and then the normal operating pressure.

Figure 40-Cut away view of the control valve with the solenoid valve energized.

Figure 41-Hydraulic schematic-Vibration -Motor lock up.

In case of a motor lock up, pressure in the system will increase until it reaches the setting of the relief valve(poppet). When the relief valve opens, oil can flow through the relief 0.8 orifice to the tank and the higher pressure on top of the piston will move the piston against the 45PSI(3bar) spring opening the passage to the tank.

Figure 42-Hydraulic schematic-Steering

The steering system consists of a gear pump, control valve and steering cylinder. Built in the control valve are the main pressure relief valve and the shock valves. The two shock valves protect the cylinder when the control valve is in neutral and the drum suffers an impact. The oil compressed by the cylinder pistonis blocked at the control valve, opens the shock valve and discharges into the other side of the circuit.

Figure 43-Steering lines

Figure 44-Main pressure relief valve and shock valves.

There are three plugs on top of the control valve. Under the big plug is located the main pressure relief valve. Under the two small plugs are located the two shock valves.

Figure 45-Explodede view of the steering control valve.

Note-item 24-Main pressure relief valve
Item 26-Shock valves.
Figure 46-Electrical system

Vibration, hour meter and neutral/brake relays are located inside the pedestal.
The fuse boxes are located outside the pedestal.

Figure 47-Electrical system

Hour meter, master switch and starter relay are located on a bracket inside the engine compartment.
Neutral switch is located on the propulsion pump.
Vibration control switch is located on top of the forward/reverse control lever.

Figure 48-Electrical system

On combi machines as on standard machines, the hourmeter, master switch and starter relay are located on a bracket inside the engine compartment.

Figure 49-Electrical schematic with master switch open.

Figure 50-Electrical schematic

The master switch feeds the ignition switch through wire # 203. The ignition switch feeds the fuse box through wire # 201.
From fuse # 1 wire #210 feeds the hour meter, wire #214 feeds the neutral switch and wire #242 feeds the hour meter.
From the same fuse wire #211 feeds the start button and brake switch, wire #310 feeds the engine shut off solenoid and wire #204 & 207 feed the warning lights of the instrument panel (Battery charge, brake and engine low oil pressure and high temperature).
When the engine is not running the engine oil pressure switch is closed, closing ground through wire #805 for the hour meter relay energizing it. Relay contacts #30 & 87 are closed, closing ground through wire #813 for the engine low oil pressure warning light. This light is on.
Ground for the hour meter is open. The hour meter is not working.
The alternator is not running and ground for the battery charge warning light is closed through wires #804, 801 and alternator. This light is on.
Moving the forward/reverse control into neutral will close the neutral switch energizing the neutral and brake relays. If now the starter button is pushed down it will energize the starter relay through wire #301 neutral relay and wire #302.

Figure 51-Electrical schematic

As soon as the engine starts running, the alternator starts charging the battery and the battery charge light will go off.
Note: In case the bulb of the battery charge light is burnt or missing, the alternator will not charge the battery.
With the engine running the engine oil pressure will open the contacts of the engine oil pressure switch de-energizing the hour meter relay. Now contacts #30 & 87a close, closing ground through wire #841 for the hour meter. The hour meter is working.
The brake switch is in the released position (up) energizing the brake solenoid valve through wire # 205, brake relay and wire #808.
When forward/reverse control is moved out of neutral, opens the contacts of the neutral switch de-energizing the neutral relay. The brake relay remains energized through the diode built in the relay unit. Machine is moving.

Figure 52-Electrical schematic

The brake switch was used to apply the brakes while the machine is moving. The brake switch was pushed down opening the contacts for wire #205 and closing contacts for wire #206. Brake light is on. Opening the contacts for wire #205 de-energizes the brake valve and brake relay, applying the brakes. To be able to release the brakes, the forward/reverse control has to be moved into neutral to close the neutral switch contacts and energize the brake relay.

Figure 53-Electrical schematic-Vibration system

From fuse #2 wire #212 feeds the vibration selector switch on the instrument panel. From the selector switch wire # 706 feeds the front drum vibration shut off valve (option), and wire #702 feeds the vibration relay. Schematic shows the selector switch in the off position.

Figure 54-Electrical schematic-Vibration system

Selector switch was rotated to the right to the vibration on both drums position closing contacts for wire #702. To energize the vibration relay the operator pushes the vibration control switch down closing ground for the vibration relay energizing it. Contacts #4 & 5 close and current flowing through wire#703 will energize the vibration control valve.

Figure 55-Electrical schematic-Vibration system.

In case the machine is equipped with the front drum vibration shut off, when the selector switch is rotated to the left it will close contacts for wires #702 & 706 at the same time. The front drum vibration shut off valve is energized.

Figure 56- Electrical schematic-Sprinkler system-CC102/122 up tp S/N 60110566
CC142 up to S/N 60210342

From fuse #3 wire 214 feeds the selector switch on the instrument panel, while wire #213 has a
resistance in series between the fuse and the selector switch. From fuse #5 wire 216 feeds the selector switch on the instrument panel (combi machines only).

Figure 57-Electrical schematic-Sprinkler system-CC102/122 Up to S/N 60110566
CC142- up to S/N 60210342

Rotating the selector switch to the right will close contacts for between wire #214 & 731. Full voltage is supplied to the water pump motor which will run at full speed generating full flow.

Figure 58-Electrical schematic-Sprinkler system-CC102/122 up to S/N 60110566
CC142- up to S/N 60210342

Rotating the selector switch to the left will close contacts between wires #213 & 731. Due to the voltage drop through the resistance the water pump motor will not turn at full speed generating a limited flow.

Figure 59-Electrical schematic-Sprinkler system-CC102/122 up to S/N 60110566
CC142 up to S/N 60210342

Combi machine with both sprinkler systems (drum & tires) at full flow.

Figure 60-Electrical schematic-Sprinkler system-CC1023/122 from S/N 60110567
CC142 from S/N 60210343

Wire #214 connects fuse #3 to the selector switch on the instrument panel.
Wire #224 connects the neutral switch (NO) to the selector switch.
Wire #216 connects fuse #5 to the tire sprinkler selector switch through a resistance.

Figure 61-Electrical Schematic-Sprinkler system-CC102/122 from S/N 60110567
CC142 from S/N 60210343

Rotating the selector switch to the right will close contacts between wires # 214 & 731. Sprinkler system is on all the time (Manual control).

Figure 62-Electrical schematic-Sprinkler system- CC102/122 from S/N 60110567
CC142 from S/N 60120343

Rotating the selector switch to the left closes contacts between wires #224 & 731. Forward/reverse control is out of neutral and the contact of the neutral switch is closed. Sprinkler is on.
When the forward/reverse control is moved into neutral the neutral switch contact will open (NO) and sprinkler is off (automatic control).
Figure 63-Electrical schematic-Sprinkler system-CC102/122 from S/N 60110567
               CC142 from S/N 60210343

Combi machine with the drum sprinkler system on manual control and the tire sprinkler system on limited flow.

Figure 64-Electrical schematic-Traffic lights(option)
CC 102/122/142 Hydraulic diagram
Propulsion

PP CC102/122+C  0 - 62 l/min
CC142+C  0 - 78 l/min

CC102/122 P=330 bar
CC143  P=350 bar
P/N 35 84 70 (CC102,122) Orifice i=k4=0.4  i2=0.8  3,4=k7=0.64
P/N 35 70 08 (CC142) Orifice i=0.7  i3=0.8
Group Grupp 50

CHECK POINTS
A - FORWARD
B - REVERSE
C - CHARGE

CC 102/122 UP TO S/N 601110342
PROPUSSION
CC102/122 PROPULSION LINES (S/N 60113600 & UP)
CHECKING POINTS
A - FORWARD
B - REVERSE
C - CHARGE

CC 102/122 C
PROPULSION
CC102/122 BRAKE LINES (S/N 60113600 & UP)
CC 102/122 C
BRAKES
Brake Valve de-energized.
Charge pump oil blocked at valve.
Brakes applied. It is not possible to stroke the propulsion pump.
Brake valve energized.
Oil from charge pump flows to brakes releasing them.
It is possible to stroke the propulsion pump.
Propulsion pump CC 102/122/142

1  Mechanical neutral adjustment
2  Forw/Rev lever
3  Brake valve
4  Hydraulic neutral adjustment
5  Feed back link
X1  Test port before servo cylinder
X2  Test port before servo cylinder
X3  Test port in servo cylinder
X4  Test port in servo cylinder
R  Housing pressure test port
1  Port A, (REVERSE)
2  Return port, tank
3  Port B, (forward)
4  Test P\textsubscript{R\textsuperscript{T}, M1 (Mb)}
5  Suction port
6  Relief valve, charge pressure
7  Test P\textsubscript{T\textsuperscript{R}, charge pressure}
8  Relief valves, high pressure
9  Charge pump behind cover
10 Test P\textsubscript{T\textsuperscript{R}, M2 (Ma)}
Charge pressure test port
M14X1.5

372352-Propulsion Pump

CC102/122 S/N 60113690 & Up
CC142 S/N 60211600 & Up
372352 Hydraulic pump, propulsion
CC102/122 S/N 601X3600 AND UP
CC142 S/N 602X1600 AND UP
CC102 PROPULSION PUMP
CC102 PROP. PUMP 372352

- High Pressure relief
- Charge pressure relief
- Brake Valve
CC102 PROP. PUMP 372352

Plug X1

Plug X2

Neutral Switch

Ports A & B
Control unit of propulsion pump (viewed from side)

Orifice

X3, X4

X1, X2

Adjusting screw of the hydraulic balance

Feedback link

Brake valve housing

CC 102/122/142, CC 102C/122C/142C
Servo control valve (viewed from top)

- Forward & reverse control
- Orifice X1
- Spring centered F&R assist
- Servo piston
- Feed back link
- Orifice X2
- Servo control spool
- Brake valve housing

**NEUTRAL**

CC 102/122/142, CC 102C/122C/142C
F/R control moves propulsion pump control valve spool, opening a passage for charge pump oil to flow to the top side of the servo piston.

Piston starts moving down. Feed back link moves with piston, moving the spool to the center position. Piston stops moving.
Piston stopped moving. The feed back link allow control of the pump displacement from zero to Max. displacement.
ADJUSTING OF NEUTRAL POSITION OF TRACTION PUMP
CC 102/122/142, CC102C/122C/142C

⚠️ Block the drums to prevent machine from moving.

Fig 1. See to that operating temperature >50°C is achieved.
When adjusting keep engine rpm on 1500.

Fig 2. Connect both control chambers with a hose. Disconnect forward/reverse control wire (in order to avoid residual signal).

Fig 3. Connect high pressure gauges (400 bar) to test nipples on port A & B respective. Adjust 0-position so that pressure on both gauges is below 40 bar.
Interchange position of gauges to avoid gauge malfunction.
Should read same on both gauges as before.

Fig 4. Replace the 400 bar gauges by 40 bar in the same nipples.
Repeat adjusting procedure acc. to earlier until LOWEST possible reading is obtained on both gauges.
Interchange position of gauges to avoid gauge malfunction.

Fig 5. Remove connecting hose between chambers. Repeat measurements as indicated in items 4 and 5.
Now the pressure can be adjusted, if needed, on the small allen screw on the valve housing after innking locnut.
Do not turn the allen screw more than ±90°.

Reset machine after adjustments and test run acc. to O&M instructions.
CC102/122 Neutral Checking (Propulsion pump 358470)

1. Remove plugs X1 & X2. Install hose between the two ports. Install two pressure gauges (6000 PSI) on the high pressure test ports (Forward & reverse). Start the engine and increase engine speed at least up to 1500 RPM. Read the pressure on both gauges. If different adjust the servo piston adjusting screw until the gauges show the same reading. Stop the engine, remove the 6000 PSI gauges and install two 600 PSI gauges. Start the engine, increase speed to at least 1500 RPM and read pressure on both gauges. If different, adjust the servo piston adjusting screw until the gauges show the same reading. Lock servo piston adjusting screw. Shut off engine.

2. Remove hose.

3. Install two 600 PSI gauges on the two ports on top of the servo housing. Start the engine and increase speed at least to 1500 RPM. Read pressure on both gauges. If different adjust the control valve center adjusting screw until the gauges show the same reading. Caution: Do not turn this screw more than 90 deg. Lock the adjusting screw.

Propulsion motor P/N 35 72 66  CC 102C/122C (rear)
CC 142C (rear)
Propulsion motor P/N 35 70 23 CC 102/122 (front & rear)
CC 102C/122C (front)
To release brakes, red screw should be turned clockwise.
CC102/122 new front motor
S/N 60119695 Up
Brake releasing.
Put square tubing against motor housing.
Pass big screw with nut through the center hole of tubing.
Screw bolt into brake piston.
Turn nut clockwise to release brake.
CC 102/122/142, Hydraulic diagram

Vibration

CC 102/122/142, CC 102C/122C/142C
PRESSURE CHECK POINT

CC 102/122/142 C VIBRATION
Vibration & Steering pump P/N 35 70 09
with built in vibration control valve

Vibration control valve

Steering pump

Vibration pump

CC 102/122/142, CC 102C/122C/142C
Vibration motor
Vibration control valve

- Orifice Ø 0.8
- Port to motor (Pressure side)
- Test nipple position, vibration
- Solenoid valve
- "3 bar spring"
- Tank port
- Pilot return to suction line
- Relief valve
- Poppet
- Valve spring
- Drain to tankport
- Control valve housing

CC 102/122/142, CC 102C/122C/142C
When the solenoid valve is de-energized oil from pump flows through the orifice. Higher pressure before the orifice pushes spool down opening a passage for pump oil to flow to tank. No vibration.
Pump Flow: 11.75 GPM
Pressure drops:
Through oil cooler: 30 PSI
Through Filter element: 10 PSI
Through Hose "A": 3 PSI
Through Hose "B": 2 PSI
Solenoid valve energized. Oil stops flowing through orifice. Spring (3 bar spring) pushes spool up stopping flow to tank. Pump flow goes to front vibration motor.
Front motor locks up. Pressure goes up opening poppet. Oil flow through orifice. Higher pressure before orifice pushes spool down opening passage to tank. Poppet remains open.
CC102 VIBRATION/STEERING PUMP

- To Tank
- To vibration motor
- Plug access to orifice
- To Steering
- To pump suction
CC102 VIBRATION/STEERING PUMP

To Vibration motor

Spool+Poppet+spring
CC102 VIBRATION/STEERING PUMP

Note: Poppet side of spool towards spring.

Spring

Spool+(poppet+spring)inside
CC 102/122/142 Hydraulic diagram

Steering system
CC102/122 STEERING LINES (S/N 60113600 & UP)

TEST PORT

ISUZU ENGINE

DEUTZ ENGINE

TEST PORT
Steering valve P/N 90 20 99,
viewed from top
Remove steering column to reach valves.

Main relief valve (170 bar)

Two shock valves,
(set on 225 bar)
CC102/122/142 Rear drum vibration shut off (S/N 60113600 and up)

Selector switch

Solenoid valve

Rear motor

Front motor
CC102/122/142 Front drum vibration shut off (S/N 60113600 and up)

Selector switch

Solenoid valve

Front motor

Rear motor

DYNAPAC
CC102/122/142 REAR DRUM VIBRATION SHUT OFF (ISUZU)
CC102/122 S/N 601X3600 & UP
CC142 S/N 60221600 & UP
CC102/122/142 REAR DRUM VIBRATION SHUT OFF
(S/N 60113600 & UP)

FRONT MOTOR

SOLENOID VALVE

REAR MOTOR
CC102/122/142 FRONT DRUM VIBRATION SHUT OFF
(S/N 60113600 & UP)

FRONT MOTOR

SOLENOID VALVE

REAR MOTOR
CC102/122/142 FRONT DRUM VIBRATION SHUT OFF
(S/N 60113600 & UP)

FRONT MOTOR

SOLENOID VALVE

REAR MOTOR
Electric wires up to 1999

Group 1
Wire color: White
Numbers: 101-199

Group 2
Wire color: Black
Numbers: 201-299

Group 3
Wire color: Red
Numbers: 301-399

Group 5
Wire color: Green
Numbers: 501-599

Group 6
Wire color: Yellow
Numbers: 601-699

Group 7
Wire color: Blue
701-799

Group 8
Wire color: Brown
Numbers: 801-899

Group 9
Wire color: Green/yellow
Numbers: 901-999
VIBRATION SWITCH

NEUTRAL SWITCH

HOURMETER

MASTER SWITCH

START RELAY

CC 102/122
ELECTRICAL

15483
CC102/122/Electrical system
Up to CC102/122 S/N 60113599
CC142 S/N 60211599
Alternator is ground for Starter relay and battery charge light. If battery charge light does not turn ON, alternator will not charge the battery.
To release brakes relay 348485 must be energized.
Only when F/R is in neutral, neutral switch closes and energizes the relay.
To release brakes relay 348485 must be energized. Only when F/R control is in neutral, neutral switch closes and energizes the relay.
Vibration selector
- Single drum
- Off
- Dual drums

Vibration ON/OFF

Vibration relay

Vibration control valve

CC 102/122/142 VIBRATION
Ignition OFF
Vibration Relay 927925

Resistance 1 to 2  45 Ohms

Terminal “3” not used
When button on top of F/R control is pushed in energizes relay. Contacts latch closed. When button is pushed again, de-energizes relay and contacts open.
Vibration selector
- Single drum
- Off
- Dual drums

Vibration ON/OFF

Battery
Starter motor

Master

Ignition

Fuse box

201

212

702

706

203

30

50

Vibration shut off
single drum

931

Vibration control valve

912

703

701

705

CC 102/122/142 VIBRATION
Vibration ON, single drum
CC 102/122/142
SPRINKLER
CC 102C/122C/142C
Sprinkler ON, full flow, standard machine

Up to S/N 60110566
60210342
CC 102C/122C/142C
Sprinkler ON, manual, standard machine

60110567UP
60210343UP
In Sprinkler Auto control, when F/R is in neutral system is 'de-energized

Sprinkler ON, Automatic (AVC), standard machine
When selector switch is in Manual, system is energized all the time.
CC102/122/142 Electrical system Rev H
CC10/122 S/N 601 113600 Up
CC142 S/N 60211600 Up
CC102 Rev H Ignition Switch

- Wire 208 to F2.5
- Wire 203 from Master Switch

This wire from start Button (24), and wire 211 from F1.1

Knob to the left: All contacts Open
Knob to the right (Ignition ON) All contacts closed

Wire 202 to F2.1
Wire 209 to F2.2
Wire 201 to F1.1
Wire 310 to engine Shut off solenoid
CC102 Rev H Fuse Box #1

- Wire 201 from Ignition Switch (14)
- 210 to hourmeter Relay(85)
- 242 to Neutral switch
- 211 to Start Button
- 212 to VBS (1)
- 228 to AVC Switch
- 214 Sprinkler switch
- 215 to Horn Sw
- 225 to fuel gauge
- 216 to combi sprinkler sw
- 226 to Speedometer
- 217 to B.U Alarm Sw
- 227 to Freq. Meter
CC102 Rev H Brake Switch

Wire 204 to IP lights
Wire 630 to Brake lights

This wire From start button (24), and wire 211 from F1.1

Wire 206 To IP Brake light
Wire 205 to the Driving Restriction Relay (30)
Wire 311 to the Neutral Switch relay (86)
Wire 320 from the Neutral Switch

When Red knob is UP:
Brakes released
Contacts 13-14-open
Contacts 22-21-Closed
Contacts 42-41-Closed
When knob is Down
Brakes applied
Contacts 13-14-Closed
Contacts 22-21-Open
Contacts 42-41-Open
CC102/122/142 VBS Relay

To start engine:
1-Power to VBS (1) from Fuse F1.2 (wire 212)
2-Power to VBS (6) from Neutral Sw relay (K4) wire 312
3-Power to VBS (2) from start button (Wire 301)
4-Out of VBS (4) power goes to starter relay (wire 302)

To release brakes:
1-Power to VBS (8) from Eme.Sw. wire 229
2-Power out VBS (3) goes to brake valve (wire 808)

To start vibration:
1-Ground closed to VBS (7) energizing VBS (wire 701)
2-Power out of VBS (9) goes to vibration selector sw (wire 702)
When the F/R control is in Neutral, the Neutral Switch relay is energized and power goes to VBS terminal “6” (wire 312), and to the Seat switch (wire 231). If the operator is not seating, the Seat switch is closed and power goes to the Driving restriction relay (wire 230), energizing it. (30 to 87) This cuts off power coming from the brake switch (wire 205). Brakes cannot be released. At the same time the capacitor is being charged.

If the operator moves the F/R control out of neutral, the neutral Switch relay is de-energized.

The neutral switch relay cuts off power to the VBS and seat switch, but the capacitor will maintain the driving restriction relay energized.

Only after the operator sits down opening the seat switch, the brakes can be released.
CC102 Seat switch S/N 60113600 Up and CC142 S/N 60211600 Up

Wire 231 goes to VBS terminal “6”
Wire 230 goes to driving restriction relay terminal”86”.

When the operator is seating down the switch is open, and when the operator stands up the switch closes, energizing the driving restriction relay.
CC102 Neutral switch relay Rev R operation

Wire 232 from F1.3
Wire 311+320 to neutral switch

When the Propulsion Pump is in neutral, closes the neutral switch sending Power to the neutral switch Relay through wires 320+311 energizing it. Terminal “30” connects to terminal “87” sending power to VBS (6). This is the signal to the VBS that the F/R control is in neutral and the VBS allows the starting of the engine.

When the Propulsion pump is out of neutral, opens the neutral switch, de-energizing the neutral switch relay. Terminal “30” connects to terminal “87a” sending power to the Sprinkler Selector switch (wire 224)
Neutral Switch (Propulsion Pump)

Wire 242 from F1.1

Wire 320 to Brake switch (41)

When pump is in neutral switch energizes Neutral relay K4 through wire 320+311
Wire 702 from “VBS” (8)  
Wire 703 to Vibration valve  

When Manual vibration is selected, the F/R button energizes and de-energizes the VBS relay.  
When Auto vibration is selected, the AVC switch energizes and de-energizes the vibration valve.

Wire 228 from F1.2
Starter relay

- Wire 804 to battery charge light
- Wire 801 to alternator D+
- Wire 240 to battery
- Wire 302 from VBS "4"
- Wire 305 to starter
CC102/122/142 Electrical System (R)
CC102/122 S/N 601X5705 Up
CC142 S/N 602X1997 Up
Electric connectors of the top wire harness
CC102 Rev R Ignition Switch

- Wire 208 to F2.5
- Wire 203 from Master Switch
- Wire 202 to F2.1
- Wire 209 to F2.2
- Wire 201 to F1.1
- Wire 330 to Interlock relay (30)
- Wire 310 to engine shut off solenoid

Knob to left: All contacts Open
Knob to right: All contacts Closed
Wire 203 - power from Master switch

When the Ignition switch is turned “ON”, wire 201 feeds fuse box #1
Wire 203 power from Master switch
When Ignition switch is turned “ON”
feeds Fuse Box #1 through wire 201
CC102 Rev R Brake switch

Wire 204 to IP Lights
Wire 630 To Brake Lights
Wire 332 from seat switch ©

Emergency brake

Knob Up; Brakes released
13-14-Open
22-21 Closed
42-41-Closed
32-31 Closed

Knob Down; Brakes Applied
13-14-Closed
22-21-Open
42-41 Open
32-31-Open

Wire 206 to IP Brake light
Wire 205 to driving
Restriction relay (30)
Wire 235-to Buzzer

Wire 311 to Neutral switch
Relay (86)

Wire 320 from Neutral Switch
Wire 905 ground

This wire from Start Button and wire 211
From F 1.1
CC102/122/142 VBS Relay

To start engine:
1-Power to VBS (1) from Fuse F1.2 (wire 212)
2-Power to VBS (6) from Neutral Sw relay (K4) wire 312
3-Power to VBS (2) from start button (Wire 301)
4-Out of VBS (4) power goes to starter relay (wire 302)

To release brakes:
1-Power to VBS (8) from Eme.Sw. wire 229
2-Power out VBS (3) goes to brake valve (wire 808)

To start vibration:
1-Ground closed to VBS (7) energizing VBS (wire 701)
2-Power out of VBS (9) goes To vibration selector sw
(wire 702)
CC102 seat switch frm60115705 & 60211997

Seat switch: Operator seating, “C” open to “A”
Operator standing, “C” closed to “A”

Wire 334 to driving restriction relay (85)
Wire 332 to Brake switch (32)

When brake switch is in the releasing position (Up) closes ground for the seat switch. If the operator stands Up, closes the seat switch and closes ground for the Driving restriction relay energizing it, which cuts off power from the brake switch (wire 205) to the VBS (8). Brakes cannot be released.
Power from ignition switch (wire 330)

Power to engine shut off sol. (wire 310)

When Eme Sw is in the released position (Up) and the operator stands up closing the seat switch, it closes ground for the Interlock relay (wire 311) and buzzer (wire 605), energizing them. Buzzer warns the operator that in 4 seconds the Interlock relay energizes and shuts off power to the engine shut off solenoid.

When the Eme Sw is in the applied position (Down), even if the operator stands up closing the seat switch, no ground is closed for the interlock relay. The interlock system is not activated.

Wiring 310 connect at ignition switch when interlock not is used. Kabel 310 ansluts p? startnyckeln n?r inte interlock skall monteras.
CC102-122-142 Interlock (Energizing relay)
Wire 333 from VBS (6)
Wire 205 from Brake switch(21)
Wire 334 from seat switch (A)
Wire 335 to interlock relay (85)

When the Brake switch is in the released position (Up) and the operator stands up, ground is closed for the driving restriction relay through wire 334 and interlock relay and buzzer through wire 331. The driving restriction relay energizes cutting off power from the brake valve to the VBS. The buzzer energizes and informs the operator that in 4 seconds the interlock relay will energize Shutting off power to the engine shut off solenoid (wire 301).

If the Brake switch is in the applied position (Down), even if the operator stands up no ground is closed for the driving restriction relay and interlock relay.
Neutral Switch (Propulsion Pump)

Wire 242 from F1.1

Wire 320 to Brake switch (41)

When pump is in neutral switch energizes Neutral relay K4 through wire 320+311
Wire 232 from F1.3
Wire 311+320 to neutral switch

When the Propulsion Pump is in neutral, closes the neutral switch sending Power to the neutral switch Relay through wires 320+311 energizing it. Terminal “30” connects to terminal “87” sending power to VBS (6). This is the signal to the VBS that the F/R control is in neutral and the VBS allows the starting of the engine.

When the Propulsion pump is out of neutral, opens the neutral switch, de-energizing the neutral switch relay. Terminal “30” connects to terminal “87a” sending power to the Sprinkler Selector switch (wire 224)
wire 805-to eng oil press switch
wire 841-to hourmeter
wire 813-to eng oil press light

wire 210-frm F1.1
wire 241-to hourmeter

Hourmeter Relay

wire 805-to eng oil press switch
wire 841-to hourmeter
wire 813-to eng oil press light
wire 804-to battery charge light
wire 801-to alternator D+
wire 240-from battery

wire 302-from VBS "4"
wire 305-to starter
Wire 812-to eng temp switch
wire 813-to hourmeter relay
wire 804-to starter relay
Wire 702-power from VBS
Wire 228 to AVC switch
Wire 704 to AVC switch

In Manual Mode 14 to 13 button on top of F/R control energizes and de-energizes the VBS starting and stopping vibration.

In Auto Mode 24 to 23, after the VBS is energized by the button, the “AVC” starts vibration when the F/R control is out of neutral (contacts closed) and stops vibration when the F/R is in neutral (contacts open).

Wire 703 to Vibration Control valve

A-Automatic
V-Vibration
C-Control
Wire 224 from Neutral Switch relay K4(87a)

Wire 731 to water
Shut off valve
And pump

Wire 214 From F1.3

When the F/R control is in neutral energizes the Neutral Switch Relay K4 shutting off power to terminal “87a”.

When the F/R control goes out of neutral, de-energizes the Neutral Switch Relay K4 connecting power to terminal “87a.”
CC102 TIMER

Sprinkler “OFF”

4 s “ON”
16 s “OFF”

4 s “ON”
8 s “OFF”

4 s “ON”
4 s “OFF”

“ON” all time

Automatic
CC102 Interlock relay

Buzzer

Interlock relay

2/26/2008
8:17:31 AM
CC102/122/142 Electrical Schematic Rev S

CC102/122 S/n60119777-778-784-785-787-789-791-792-796 Up

CC142 S/N 60213580
Electric connectors of the top wire harness
Wire 203 power from Master switch
When Ignition switch is turned “ON” feeds Fuse Box #1 through wire 201
CC102/122/142 Ignition switch

208-To F2.5; F2.6
203-From Master Switch
202-To F2.1
209-To F2.2
201-To F1 (all fuses)
330-To Interlock relay (K20)(30)

From start button (F1.1)
CC102 IGNITION SWITCH
CC102 Ignition Switch

930163-ZB2-BE101 (NO) 33-34

930192-ZB2-BD2 2 position knob (maintained)

930163-ZB2-BE101(NO) 43-44

903876-ZB2-BZ009 ring

930163-ZB2-BE101 (NO) 13-14

930163-ZB2-BE101(NO) 23-24

5/1/2007 2:06:34 PM
CC102 Ignition Switch

Knob to the left-all (NO) contact blocks
De-actuated-all open

Knob to the right-all (NO) contact blocks
Actuated-All closed
wire 211-from F1.1 from start button "13" wire goes to ignition switch "34". When Igniton is "ON" power goes to interlock relay wire 330.
Wire 310 goes to engine shut off solenoid
To start the engine we need:
1-Power to “VBS” terminal “1” from F1.2 (wire 212)
2-Ground to terminal “5” (wire 902)
3-Power to terminal “6” from the neutral sw relay (wire 312)
4-Power to terminal “2” from the start button (wire 301)
Out of terminal “4” power flows to the start relay (wire 302)

To start vibration ground is momentarily closed to terminal (7), and to stop vibration ground is momentarily closed to terminal (7).
Note: Vibration only operates when the brakes are released.

To release the brakes power from the Brake switch goes to terminal (8), and power out of terminal (3) goes to the brake valve.
Note-Brakes can only be released when the F/R control is in neutral energizing the neutral switch relay and sending a signal to terminal (6).
Seat Switch: Operator seating C to B
Operator standing C to A

Wire 332 to brake switch (32)
Wire 334 to Driving restriction relay (85) and Buzzer
Wire 337 to Interlock relay terminal C2

When the brake switch is in the release position (Up), with operator standing ground is closed to the driving restriction relay and buzzer.
In 4 seconds the Interlock relay de-energizes and shuts off the engine.

When the brake switch is in the apply position (Down), if the operator stands, no ground is closed for the Driving restriction relay.
CC102/122/142 Emergency/Brake switch

Power from F1.1

Emergency brake

Starter motor

Sprinkler on/off

204-To “IP” lights
630-To Brake lights
332-To seat switch ©
338-To interlock Relay (K20)(C2)
206-To “IP” Brake lights
205-To driving restriction relay (K3)(85)
311-To neutral switch relay (K4)(85)
320-To Neutral Switch
935-To ground
911-To interlock relay (K20)(85)
CC102 EMERGENCY SWITCH
Knob OUT
Brakes released
CC102 Emergency Switch

53-54 (NO) (Open)

31-32 (NC) (Closed)

13-14 (NO) (Open)

41-42 (NC) (Closed)

21-22 (NC) (Closed)

932036-Knob 2 positions
Out (Brakes released)

All contact blocks de-actuated
CC102

Knob IN
Brakes applied

Emergency brake
CC102 Emergency Switch

- 53-53 (NO) (Closed)
- 31-32 (NC) (Open)
- 13-14 (NO) (Closed)
- 41-42 (NC) (Open)
- 21-22 (NC) (Open)

932026- 2 positions knob
IN-Brakes applied

All contact blocks actuated
The Neutral Switch Relay “K4” is energized when the F/R control is in neutral. (30 to 87), sending a signal to the VBS (wire 312).

The Driving restriction relay “K3” is energized by the seat switch. When the operator is not seating down, the relay is energized (30 to 87) and cuts off power from the brake switch to the VBS (wire 205). This way the brakes cannot be released until the operator seats down and de-energizes this relay.
Neutral Switch (Propulsion Pump)

Wire 242 from F1.1

Wire 320 to Brake switch (41)

When pump is in neutral switch energizes Neutral relay K4 through wire 320+311
Wire 333—from VBS “6” (neutral signal)
Wire 205—From Brake Switch
Wire 334—To seat switch “A”
Wire 335—336—To Buzzer H10 (-)
Wire 229—To VBS “8”

When the F/R control is in neutral energizes the Neutral switch relay (K4)
sending a signal through wire 312 to the VBS “6”, and to the Driving restriction relay “K3”
through wire 333. When the Brake switch is in the released position and the operator stands
Up, closes ground through wire 334 energizing the Driving restriction relay, opening connection
between terminals “30” & “87a” and shutting off power to the VBS “8”. Brake valve is de-
energized and brakes apply. To release the brakes and start moving the machine, the operator
needs to sit down to de-energize the Driving restriction relay and send power to VBS “8”.

Driving restriction relay revS

When the F/R control is in neutral energizes the Neutral switch relay (K4)
sending a signal through wire 312 to the VBS “6”, and to the Driving restriction relay “K3”
through wire 333. When the Brake switch is in the released position and the operator stands
Up, closes ground through wire 334 energizing the Driving restriction relay, opening connection
between terminals “30” & “87a” and shutting off power to the VBS “8”. Brake valve is de-
energized and brakes apply. To release the brakes and start moving the machine, the operator
needs to sit down to de-energize the Driving restriction relay and send power to VBS “8”.

Driving restriction

Neutral switch relay

K20

Interlock relay

(option relay)
Wire 812-to eng temp switch
wire 813-to hourmeter relay
wire 804-to starter relay

IP Lights
Wire 702-power from VBS
Wire 228 to AVC switch
Wire 704 to AVC switch

Wire 703 to Vibration Control valve

In Manual Mode 14 to 13 button on top of F/R control energizes and de-energizes the VBS starting and stopping vibration.

In Auto Mode 24 to 23, after the VBS is energized by the button, the “AVC” starts vibration when the F/R control is out of neutral (contacts closed) and stops vibration when the F/R is in neutral (contacts open).

A-Automatic
V-Vibration
C-Control
Wire 224 from Neutral Switch relay K4(87a)

Wire 214 From F1.3

Wire 731 to water
Shut off valve
And pump

When the F/R control is in neutral energizes the Neutral Switch Relay K4 shutting off power to terminal “87a”.
When the F/R control goes out of neutral, de-energizes the Neutral Switch Relay K4 connecting power to terminal “87a.”
CC102 TIMER

4s “ON”  8s “OFF”

4s “ON”  4s “OFF”

Sprinkler “OFF”

4 s “ON”  16 s “OFF”

Automatic

“ON” all time
wire 804-to battery charge light
wire 801-to alternator D+
wire 240-from battery
wire 302-from VBS "4"
wire 305-to starter
CC102/122 S/N 60119777-778,784-785,787,789,791-792,796 up
CC142 60213580 up
CC102/122/142 B.U.Alarm

FRONT
Contact Block installed on ring
Knob locked into ring
Ring with one contact block

Ring with Three Contact blocks

Contact block(NO)

Contact block(NC)

Knob
Contact Blocks

Normally Closed (NC) 1-2
Contacts are closed when block not actuated. Red pin out.
Contacts are open when block is actuated. Red pin in.

Normally Open (NO) 3-4
Contacts are open when block is not actuated. Green pin out.
Contacts are closed when block is actuated. Green pin in.
Two columns of contact blocks
Right column-odd numbers
Left column-even numbers.
All contact blocks in the same column are actuated at the same time

Contact block 13-14 is normally open
Contact blocks 21-22
41-42
61-62
81-82
101-102
are normally closed

Knob to left:
Contact blocks
23-24
43-44
actuated and CLOSED.
Knob to right:
Contact blocks
13-14
33-34
are actuated and CLOSED

Knob to left:
Contact blocks
23-24
43-44
actuated and CLOSED.
Knob to right:
Contact blocks
13-14
33-34
are actuated and CLOSED

Key ignition switch with starter

Figure 3
CC102/122/142 HYDRAULIC CHECKING
## HYDRAULIC SYSTEMS

<table>
<thead>
<tr>
<th>Hydraulics Data</th>
<th>Charge:</th>
<th>Neutral:</th>
<th>Prop on:</th>
<th>Vib on:</th>
</tr>
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<tbody>
<tr>
<td>Vibration pressures</td>
<td></td>
<td>320 PSI</td>
<td>320 PSI</td>
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<tr>
<td>High pressure relief</td>
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<td>4785 PSI</td>
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<td></td>
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<tr>
<td>Max suction vacuum</td>
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<td>7”HG</td>
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<tr>
<td>Max case drain press</td>
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<td>29 PSI</td>
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<table>
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<td>Engine RPM:</td>
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<td>High Idle</td>
<td>Operation</td>
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<td></td>
<td>Hi Amplitude</td>
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<td>Hydraulic systems Propulsion pressures:</td>
<td>Charge:</td>
<td>Neutral:</td>
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<td>Prop on:</td>
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<td>Vib. On:</td>
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<td>Max case drain press:</td>
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<td></td>
<td>Pump Flow:</td>
<td>4.58 GPM</td>
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CC102/122/142 PROPULSION SYSTEM CHECKING

CC102/122 Prop. Pump servo ports (plugs X1 & X2)

Up to S/N 60110341 (pump 358225)-Wrench to remove plugs- 3/16” Allen
   Ports #4 SAE o-ring

Frm S/N 60110342 to 60113599 (pump 358470)-Wrench 6mm Allen
   Ports M12X1.5 w/ washer seal

Frm S/N 60113600 (pump 372352)-Wrench 6mm Allen
   Ports M12X1.5 w/ washer seal

CC142 Prop pump servo ports (plugs X1 & X2)

Up to S/N 60111599 (pump 357008)-Wrench to remove plugs X1 & X2- 3/16” Allen
   Ports #4 SAE o-ring

Frm S/N 60211600 (pump 372325)-Wrench 6mm Allen
   Ports M12X1.5 w/ washer seal

Recommended Tools:

- #8 JIC Plugs 4
- #4 JIC plugs 2
- 901157-Test Port adapter (M12X1.5) 2
- 902115-Test Port adapter (M14X1.5) 1
- 910162-Test Port adapter (#4 SAE o-ring) 2
- 799953-Test Hose 2
- 799954-Gage adapter 2
- 334221-Adapter (4MJ-4MP) 1
- 600 PSI Gauge 2
- 10,000 PSI Gauge 2

CC102/122/142 VIBRATION SYSTEM CHECKING

Recommended tools:

- #8 JIC nipple 1
- #8 JIC plug 1
- #4 JIC cap 1
- #4 JIC plug 1

CC102/122/142 STEERING SYSTEM CHECKING

- 334172-Adapter (4MP-6MJ) 1
- 334234-Adapter “T” 1
- 799960-Adapter (4MP-6FJ) 1
CC102/122/142 PROPULSION SYSTEM CHECKING

A-No movement in any direction

Check:
1-Hydraulic oil level.
2-Operation of Forward/Reverse control.
3-Charge pressure (pump in neutral).
4-Operation of brake valve.
5-Orifices #3 & #4.
6-Charge pressure (pump in stroke).
7-Operation of pump control valve.
8-Operation of propulsion pump.
9-Operation of propulsion motors.

B-Movement in one direction only.

Check:
1-Operation of Forward/Reverse control.
2-High pressure relief valves.
3-Operation of pump control valve.

C-Erratic response of the propulsion system.

Check:
1-Hydraulic oil level.
2-Charge pressure (pump in neutral).
3-Orifices #3&#4.
4-Operation of pump control valve.
PROPULSION SYSTEM CHECKING

A-NO MOVEMENT IN ANY DIRECTION

1-Check operation of forward/reverse control
   Correct Proceed
   Incorrect Repair

2-Check tank oil level
   Correct Proceed

3-Check charge pressure with engine at normal operating speed and oil at normal operating temperature, and control in neutral
   Correct Proceed

4-Check operation of the brake valve. Disconnect line from brake valve to brakes and install a 600 PSI on the brake valve port. With the engine at normal operating speed and oil at normal operating temperature, when brake valve is de-energized the gauge should show 0 PSI, and when the valve is energized gauge should show charge pressure.
   Correct Proceed

5-Check orifices #3 & #4
   Remove plugs X1 & X2 and check orifices.
   Correct Proceed

6-Check charge pressure with forward/reverse actuated (pump in stroke).
   Correct Proceed

7-Check operation of the pump control valve.
   Remove plugs X1 & X2 on pump control servo and install two 600 PSI gauges. With engine at normal operating speed, when actuating the pump control lever in one direction, one of the gauges should show charge pressure and the other one case pressure, and when actuating the control in the opposite direction, the gauge previously showing charge pressure should show now case pressure and the other gauge charge pressure.
   Correct Proceed

Check:
1-Suction filter
2-Suction line.
3-Charge pressure relief valve.
4-Charge pump.

Check the electrical system to be sure that the brake valve is being energized.
If the brake valve is energized and does not work properly, check brake valve.

If one of the orifices (or both) is plugged, clean it. If orifice is loose, tighten it.

Charge pressure Dropped when pump was stroked. Check pump and motors as described below.

Pump should be repaired
8-Propulsion pump Checking
Disconnect the lines from the pump to the motors and plug off those lines with JIC plugs. Install two 10000 PSI gauges on the high pressure test ports. Install a 600 PSI gauge on the charge pressure test port.
With the engine at normal operating speed and oil at normal operating temperature, actuate the pump control into forward. The gauge on the forward test port should show the setting of the high pressure relief valve while the other two gauges should show charge pressure.
Repeat the test actuating the control into reverse.

9-Front propulsion motor checking
Connect the lines to the front motor only.
Actuate forward/reverse control. Charge pressure should be the same in neutral as in stroke.

10-Rear propulsion motor checking.
Plug the lines to the front motor and connect the lines to the rear motor.
Actuate forward/reverse control. Charge pressure should be the same in neutral and in stroke.

B-MOVEMENT IN ONE DIRECTION ONLY

1-Check operation of forward/reverse control
Proceed  Repair

2-Switch the two high pressure relief valves.
If problem changes direction, replace the defective relief valve. If problem does not change direction, proceed to next step.

3-Check operation of the pump control valve.
Remove plugs X1 & X2 on the pump servo control and install two 600 PSI gauges. With engine at normal operating speed actuate forward/reverse control into forward. Gauge on forward side should show charge pressure. Gauge on reverse side should show case pressure. Actuate control into reverse, gauge on reverse side should show charge pressure. Gauge on forward side should show case pressure.
C-ERRATIC RESPONSE OF PROPULSION SYSTEM.

1-Check hydraulic oil level  Proceed  Correct
Check oil filter
Check suction line
Check charge pump.

2-Check charge pressure with engine at normal operating speed and oil at normal operating temperature.  Proceed

3-Remove plugs X1 & X2 on the control servo of the pump. Check if orifices #3 & #4 are properly installed and open.  Proceed
Remove orifices clean them and Reinstall them.

4-Check operation of pump control valve.  Repair pump.
   Install two 600 PSI gauges on ports X1 & X2.  
   With engine at normal operating speed actuate forward/reverse control into forward. Gauge on forward port should show charge pressure and gauge on reverse port should show case pressure. Actuate control into reverse, gauge on reverse port should show charge pressure and gauge on forward port should show case pressure.
CC102/122/142 VIBRATION SYSTEM CHECKING

A-No vibration

Note: Vibration control valve is a solenoid valve. Before checking hydraulic components be sure that the valve is being energized.

Check:

1-Hydraulic oil level.
2-If steering works
3-Pressure on vibration circuit
4-Orifice on control valve
5-Operation of solenoid valve
6-Operation of vibration pump
7-Operation of vibration motors
CC102/122/142

VIBRATION SYSTEM CHECKING

A-NO VIBRATION

Correct    Incorrect

Note: Vibration control valve is a solenoid valve. Before checking hydraulic components, be sure that the valve is being energized.

1-Check hydraulic oil level
   Proceed    Correct

2-Check if steering operates.
   If steering does not operate, pump drive belt must have failed.
   Proceed    Check pump drive belt. Replace if needed.

3-Check pressure on vibration circuit.
   Install a 5000 PSI on the vibration test port.
   Start vibration and watch gauge. If pressure increases to setting of relief valve, one of the motors has locked up.
   Check motors    Proceed

4-Check orifice on control valve.
   Proceed    Correct

5-Check operation of solenoid valve.
   Plug line from control valve to suction line.
   If now vibration operates, solenoid valve is not working.
   Proceed    Correct

6-Check operation of pump.
   Plug line from pump to front motor.
   Install a 5000 PSI gauge on test port.
   Start vibration and check pressure. If pressure increases to setting of relief valve, pump is O.K.
   Proceed    Correct

7-Check operation of motors.
   By-pass rear motor by disconnecting the two hoses and connecting them with a -8 JIC nipple.
   If vibration works front motor is O.K. If vibration does not work, front motor needs to be repaired.
   By-pass front motor and repeat test.
   Correct
CC102/122/142 STEERING SYSTEM CHECKING

A- No steering (Vibration works)

Check

1- Steering cylinder
2- Control valve

B- No steering (No vibration)

1- Hydraulic oil level
2- Steering/vibration pump drive

C- Steering to one side only

1- Steering cylinder
2- Control valve

D- Difficulty in steering

1- Control valve
2- Pump flow
CC102/122/142

STEERING SYSTEM CHECKING

A-NO STEERING (VIBRATION WORKS)

1-Check operation of steering cylinder.
   Disconnect hose to rod end side port. Start engine and
   Turn steering wheel to extend cylinder. If oil comes out
   of open port, cylinder needs to be repaired.
   Correct  Incorrect
   Proceed  Repair

2-Check operation of control valve.
   Disconnect hose to rod side port of cylinder. Install a
   5,000 PSI gauge on that hose. Start engine and turn
   steering wheel to extend cylinder. Gauge should show
   relief valve setting. Disconnect the hose to the other
   port of cylinder. Install a 5,000 PSI gauge on that hose.
   Start engine and turn steering wheel to retract the
   cylinder. Gauge should show relief valve setting.
   Repair

B-NO STEERING (NO VIBRATION)

1-Check hydraulic oil level
   Proceed  Correct

2-Check steering/vibration pump drive
   Repair

C-STEERING TO ONE SIDE ONLY

1-Check operation of steering cylinder.
   Turn steering wheel full to the side that works.
   Disconnect hose from port being pressurized.
   Start engine and turn steering wheel to side that
   does not work. If oil comes out of open port,
   cylinder needs to be repaired.
   Proceed  Repair

2-Check operation of control valve (See above)
   Repair

D-DIFFICULTY IN STEERING

1-Check control valve (See above)
   Proceed  Repair

2-Check pump flow using a flowmeter.
   Repair
To check solenoid valve, disconnect hose, plug hose with -4 JIC plug, and fitting with -4 JIC cap.

To check rear motor, disconnect two hoses and connect them with a -8 JIC nipple.

To check pump, disconnect hose and plug it with -8 JIC plug.

To check front motor, disconnect two hoses and connect them with a -8 JIC nipple.

CC102/122 Up to S/N 60111462

CC142 Up to S/N 60210706
1 Mechanical neutral adjustment
2 Forw/Rev lever
3 Brake valve
4 Hydraulic neutral adjustment
5 Feed back link
X1 Test port before servo cylinder
X2 Test port before servo cylinder
X3 Test port in servo cylinder
X4 Test port in servo cylinder
R Housing pressure test port
Charge pressure test port M14X1.5

372352-Propulsion Pump

CC102/122 S/N 60113600 & Up
CC142 S/N 60211600 & Up
CHECK POINTS
A - FORWARD
B - REVERSE
C - CHARGE

CC 102/122  UP TO SN 60110342
PROPULSION
CHECK POINTS
A FORWARD
B REVERSE
C CHARGE

TO CHECK PUMP
PLUG LINES HERE
#8 JIC PLUGS

TO CHECK PUMP
PLUG LINES HERE
#8 JIC PLUGS

CC102/122  S/N 60110343 UP
PROPULSION
TO APPLY BRAKES PLUG LINES HERE
#4 JIC PLUGS

To check brake valve install 334221-adapter

TO APPLY BRAKES PLUG LINES HERE
#4 JIC PLUGS

CC 102/122
BRAKES
TO CHECK PUMP PLUG LINES HERE #8 JIC PLUGS

CHECKING POINTS
A - FORWARD
B - REVERSE
C - CHARGE

CC 142
PROPELLION
TO APPLY BRAKES
PLUG LINES HERE
#4 JIC PLUGS

To check brake valve
install 334221-adapter

TO APPLY BRAKES
PLUG LINES HERE
#4 JIC PLUGS

CC 142
BRAKES
To check pressure, install
"T" 334234+adapter 799960+gage adapter 799954

Install adapter 334172+gage adapter 799954 here to check control valve.
CC102/122/142 STEERING

CC102/122 S/N 60113600 up
CC142 S/N 60211600 up

Pressure test port

Install adapter 334172+ gage adapter 799954 here to check control valve.

Pressure test port