

## Introduction

### About this Manual

#### Machine Model and Serial Number

This manual provides information for the following model(s) in the JCB machine range:

JCB JS360 from serial number 1807000 to 1807299.

#### Using the Service Manual

T11-004

This publication is designed for the benefit of JCB Distributor Service Engineers who are receiving, or have received, training by JCB Technical Training Department.

These personnel should have a sound knowledge of workshop practice, safety procedures, and general techniques associated with the maintenance and repair of hydraulic earthmoving equipment.

The illustrations in this publication are for guidance only. Where the machines differ, the text and/or the illustration will specify.

General warnings in Section 2 are repeated throughout the manual, as well as specific warnings. Read all safety statements regularly, so you do not forget them.

Renewal of oil seals, gaskets, etc., and any component showing obvious signs of wear or damage is expected as a matter of course. It is expected that components will be cleaned and lubricated where appropriate, and that any opened hose or pipe connections will be blanked to prevent excessive loss of hydraulic fluid and ingress of dirt.

Where a torque setting is given as a single figure it may be varied by plus or minus 3%. Torque figures indicated are for dry threads, hence for lubricated threads may be reduced by one third.

The manufacturer's policy is one of continuous improvement. The right to change the specification of the machine without notice is reserved. No responsibility will be accepted for discrepancies which may occur between specifications of the machine and the descriptions contained in this publication.

Finally, please remember above all else safety must come first!

#### Section Numbering

T11-005

The manual is compiled in sections, the first three are numbered and contain information as follows:

- 1** General Information - includes torque settings and service tools.
- 2** Care and Safety - includes warnings and cautions pertinent to aspects of workshop procedures etc.
- 3** Maintenance - includes service schedules and recommended lubricants for all the machine.

The remaining sections are alphabetically coded and deal with Dismantling, Overhaul etc. of specific components, for example:

- A** Attachments
- B** Body and Framework, etc.

Section contents, technical data, circuit descriptions, operation descriptions etc. are inserted at the beginning of each alphabetically coded section.

# Service Tools

## Numerical List

The tools listed in the table are special tools required for carrying out the procedures described in this manual. These tools are available from JCB Service.

Some tools are available as kits or sets, the part numbers for parts within such kits or sets are not listed here. For full

details of all tools, including the content of kits and sets, refer to **Tool Detail Reference, Section 1**.

**Note:** Tools other than those listed will be required. It is expected that such general tools will be available in any well equipped workshop or be available locally from any good tool supplier.

Part Number	Description	See Section
993/68100	Slide Hammer Kit - see <b>Tool Detail Reference (Section 1)</b> for content	B
-	Rivet Nut Tool - see <b>Tool Detail Reference (Section 1)</b>	B
892/00842	Glass Lifter	B
892/00843	Folding Stand for Holding Glass	B
892/00845	Cartridge Gun	B
892/00846	Glass Extractor (Handles)	B
892/00847	Nylon Spatula	B
892/00848	Wire Starter	B
892/00849	Braided Cutting Wire	B
926/15500	Rubber Spacer Blocks	B
992/12300	12V Mobile Oven	B
992/12400	240V Static Oven (2 Cartridge)	B
992/12800	Cut-Out Knife	B
992/12801	'L' Blades	B
4104/1310	Hand Cleaner	B
892/00281	AVO Meter (not illustrated)	C
892/00298	Fluke Meter	C
892/00285	Hyd. Oil Temperature Probe	C
892/00284	Digital Tachometer	C
892/01174	DLA Kit	C
331/22966	Pump Drive Alignment Tool (not illustrated)	E
-	Male Adapters - BSP x BSP - see <b>Tool Detail Reference (Section 1)</b>	E
-	Male Adapters - BSP x NPT (USA only) - see <b>Tool Detail Reference (Section 1)</b>	E
-	Pressure Test Points - Adaptors - see <b>Tool Detail Reference (Section 1)</b>	E
-	Pressure Test Points - 'T' Adaptors - see <b>Tool Detail Reference (Section 1)</b>	E
-	'T' Adaptors - see <b>Tool Detail Reference (Section 1)</b>	E

# Routine Maintenance

## Service Requirements

### Introduction

T3-095

Your machine has been designed and built to give maximum performance, economy and ease of use under a wide variety of operating conditions. Prior to delivery, your machine was inspected both at the Factory and by your Distributor to ensure that it reaches you in optimum condition. To maintain this condition and ensure trouble free operation it is important that the routine services, as specified in this Manual, are carried out by an approved JCB Distributor at the recommended intervals.

This section of the Manual gives full details of the service requirements necessary to maintain your JCB machine at peak efficiency.

A Service Manual for your machine is available from your JCB Distributor. The Service Manual contains information on how to repair, dismantle and assemble your machine correctly.

It can be seen from the Service Schedules on the following pages that many essential service checks should only be carried out by a JCB trained specialist. Only JCB Distributor Service Engineers have been trained by JCB to carry out such specialist tasks, and only JCB Distributor Service Engineers are equipped with the necessary special tools and test equipment to perform such tasks, thoroughly, safely, accurately and efficiently.

JCB regularly updates its Distributors advising them of any product developments, changes in specifications and procedures. Therefore only a JCB Distributor is fully able to maintain and service your machine.

A Service Record Sheet or Book is provided which will enable you to plan your service requirements and keep a service history record. It should be dated, signed and stamped by your Distributor each time your machine is serviced.

Remember, if your machine has been correctly maintained, not only will it give you improved reliability but its resale value will be greatly enhanced.

### Owner/Operator Support

JCB together with your Distributor wants you to be completely satisfied with your new JCB machine. If you do encounter a problem however, you should contact your Distributor's Service Department who are there to help you!

You will have been given the names of the relevant service contacts at your Distributor when the machine was installed.

To get the most from your Distributor please help them to satisfy you by:

- 1 Giving your name, address and telephone number.
- 2 Quoting your machine model and serial number.
- 3 Date of purchase and hours of work.
- 4 Nature of the problem.

Remember, only your JCB Distributor has access to the vast resources available at JCB to help support you. In addition, your Distributor is able to offer a variety of programmes covering Warranty, Fixed Price Servicing, Safety Inspections, including weight tests, covering both legal and insurance requirements.

### Service/Maintenance Agreements

To help plan and spread the costs of maintaining your machine, we strongly recommend you take advantage of the many Service and Maintenance Agreements your Distributor can offer. These can be tailor made to meet your operating conditions, work schedule etc.

Please consult your JCB Distributor for details.

## Tools

### Carrying Tools onto the Machine

When you carry tools onto the machine you must maintain three points of contact with the machine at all times. Lift tools onto the machine in intervals if necessary. Place the tools down before you adjust your grips on the machine. Do not try to adjust your grips on the machine while holding tools.

### Locations

The machine is equipped with a grease gun (option) and remote oil-drain tube attachment.

The grease gun is stowed into position with clips **A**, ⇒ [Fig 2. \(□ 3-28\)](#).

The drain tube is stowed into position by its screw thread **B**, ⇒ [Fig 3. \(□ 3-28\)](#).

Keep the tools in their stowage positions until they are needed. The location of the tools will vary dependant on the machine variant:

#### JS115-JS290

The grease gun is stowed in the toolbox. The toolbox can be locked with the key.

The drain tube is stowed in the service bay behind the cab, next to the engine air filter. The service bay can be locked with the key.

#### JS330/JS360

The grease gun is stowed in the service bay behind the cab. The service bay can be locked with the key.

The drain tube is stowed in the radiator bay. The radiator bay can be locked with the key.

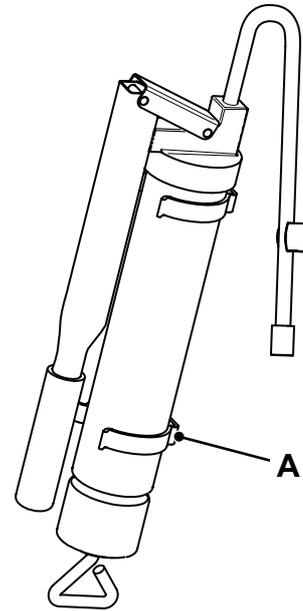


Fig 2.

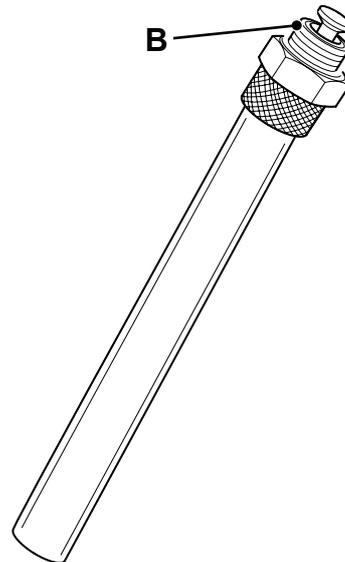


Fig 3.

#### Changing the Primary Filter/Sedimenter Element

- 1 Park the machine on firm and level ground. Stop the engine and remove the key.
- 2 Locate filter/sedimenter **A**.
- 3 Drain and remove the water separator bowl.
- 4 To remove the filter element, release locking ring **D** and discard element.
- 5 Fit new element and secure in position with locking ring **D**.
- 6 Refit water separator bowl.

#### Changing the Fuel Feed Pump Filter

- 1 Park the machine on firm and level ground. Stop the engine and remove the key.
- 2 Locate fuel feed pump **A**.

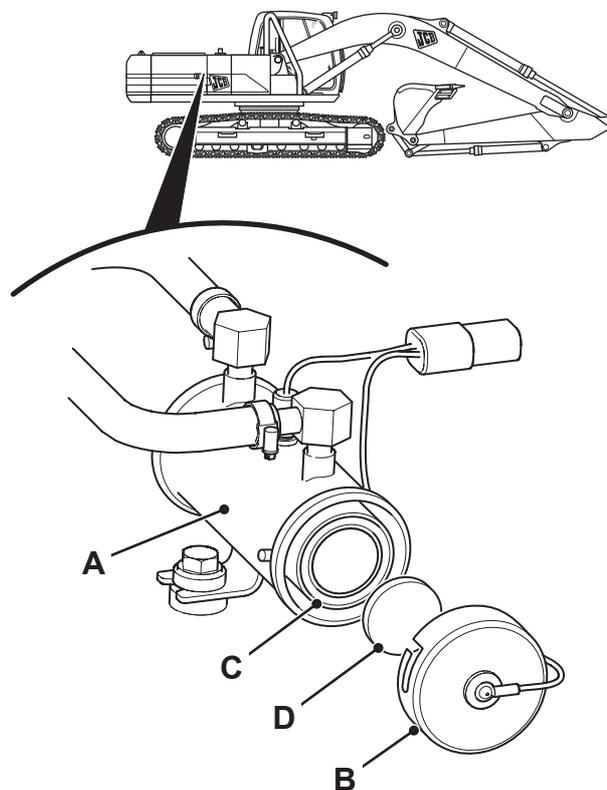


Fig 52.

- 3 Rotate cover **B** counter clockwise and remove.
- 4 Remove magnet **D** and wash with clean fuel.
- 5 Remove filter element **C**.
- 6 Replace magnet and fit new filter element.
- 7 Fit cover **B** and rotate clockwise to secure.
- 8 Remove any spilt fuel.

## Slew

**Table 58. Insufficient slew force**

Cause	Remedy
Performance reduction of slew motor	Replace slew motor <sup>(1)</sup>
Thermal seizure of slew shaft	Supply grease or replace the slew shaft <sup>(1)</sup>

**Table 59. Idle slew during slew braking**

Cause	Remedy
Low setting of brake valve	Adjust the pressure <sup>(1)</sup>
Clogged valve	Wash the valve <sup>(1)</sup>
Performance reduction of slew motor	Replace slew motor <sup>(1)</sup>
Internal oil leakage of control valve	Repair or replace valve assembly <sup>(1)</sup>

**Table 60. Idle slew during slew stopping**

Cause	Remedy
Low setting of brake valve or port relief	Adjust the pressure <sup>(1)</sup>
Clogged valve	Wash the valve <sup>(1)</sup>
Performance reduction of slew motor	Replace slew motor <sup>(1)</sup>
Internal oil leakage of control valve	Repair or replace valve assembly <sup>(1)</sup>

**Table 61. Abnormal noise during slew**

Cause	Remedy
Air in slew motor	Refill with oil
Insufficient greasing of slew bearing	Add grease

## Hydraulic ram

**Table 62. Insufficient force of hydraulic ram**

Cause	Remedy
Low pressure setting for the relief valve	Adjust the pressure <sup>(1)</sup>
Oil leakage inside the hydraulic ram	Replace the ram seals <sup>(1)</sup>
Damage of the hydraulic ram or rod	Replace the hydraulic ram or rod <sup>(1)</sup>
Oil leakage inside the control valve	Repair or replace the valve assembly <sup>(1)</sup>

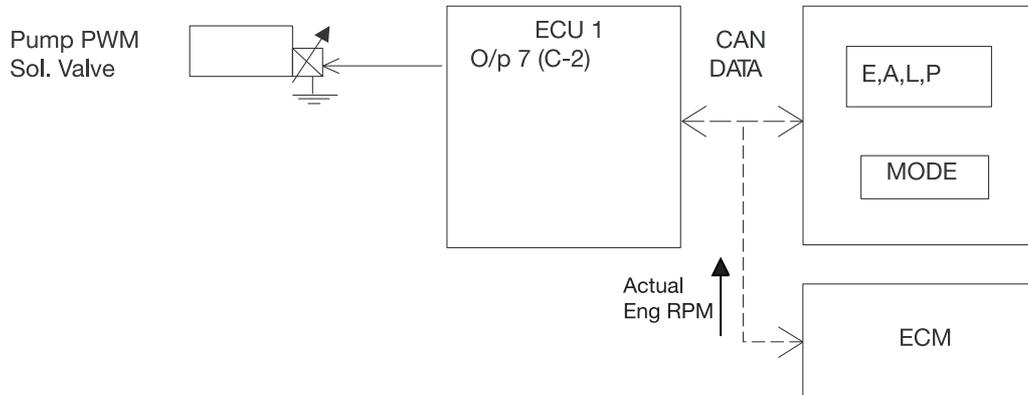
**Table 63. Oil leakage outside the hydraulic ram**

Cause	Remedy
Defective hydraulic ram seals	Replace hydraulic ram seals <sup>(1)</sup>
Hydraulic cylinder rod damage*	Replace hydraulic ram rod <sup>(1)</sup>

(1) Indicates jobs which should be done by a specialist.

**Pump Control for Each Mode**

**Operation**



**Fig 23.**

The machine can operate in four different modes, depending upon the type of work required ⇒ [Engine Throttle Control \(□ C-18\)](#). The pump output horsepower is varied by means of a PWM signal to the pump control solenoid valve which varies for each mode.

Tier III machines are required to reduce the "range band" "X to Y" (pump milliamps) ⇒ [Fig 25. \(□ C-24\)](#), to improve engine stability dependant on specific factors which include:

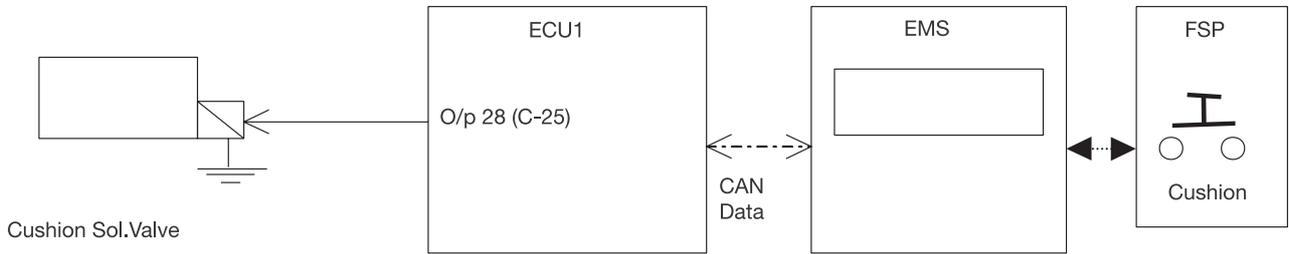
- Barometric Pressure
- Fuel Temperature
- Air Intake Temperature
- Air Conditioning
- Engine and Hydraulic Temperature

These conditions are monitored by ECU1. Engine power and pump power are then varied to suit the operating conditions.

Each of the above factors has a value calculated by ECU1 of between 0 and 1. All values are then calculated to give a dynamic control factor (DCF) of 0 to 1 which will determine the pump output power and will vary the pump mA to suit.

## Soft/Hard (Cushion)

### Operation



**Fig 59.**

C005600GB-2

The soft/hard mode allows the operator to select the response of the hydraulic circuits, soft being controlled and hard being fierce when de-selecting boom and dipper functions. Soft mode is the default setting when starting the machine.

To change to hard mode the operator must select the option by pressing cushion switch on the facia switch panel. Cushion solenoid output ECU o/p 28 (C-25) is energised.

The hard mode is cancelled either by turning the ignition off, or by pressing the cushion switch for a second time.

## Air Filter Blocked Warning

### Operation

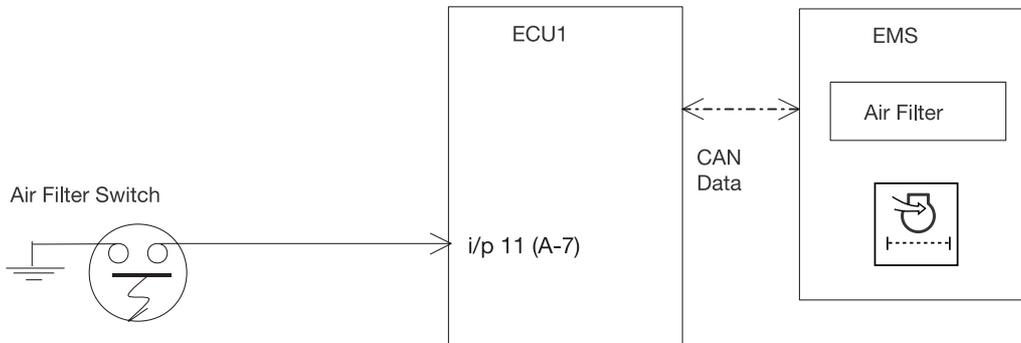


Fig 78.

C005690GB-2

A pressure switch is fitted to the engine air filter. When the filter is blocked the pressure increases, thus triggering the switch and the ECU1 i/p 11 (A-7) is connected to ground. This causes the EMS to alarm. The buzzer sounds for 1.5 seconds, a "AIR FILTER" message is displayed on the EMS and a flashing engine air filter blocked LED illuminates for 5 seconds. This is followed by a repetitive message and constant LED on.

# Service Procedure

## Testing of ECU Inputs + Outputs

TC-014\_2

Remove panel behind drivers seat, for access to the ECU  
A.

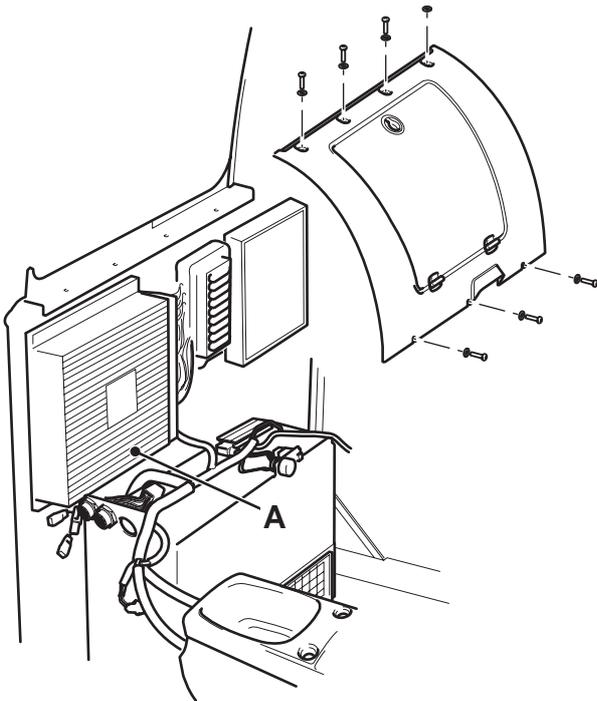


Fig 1.

C030670-C1

Care should be taken when testing the inputs + outputs of the ECU to ensure that correct test method is used to determine if the ECU is functioning normally.

**Note:** Inputs/outputs should be checked with engine running or in solenoid override mode, refer to **Section C, EMS Set+Mode (20 sec) Menu.**

### Testing Low Side Input

With the switch open the meter will read 0v.

With the switch closed the meter will read 24-28v.

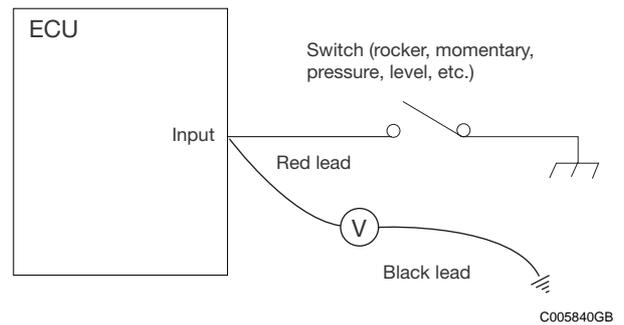


Fig 2.

### Testing High Side Input

With the switch open the meter will read 0v.

With the switch closed the meter will read 24-28v.

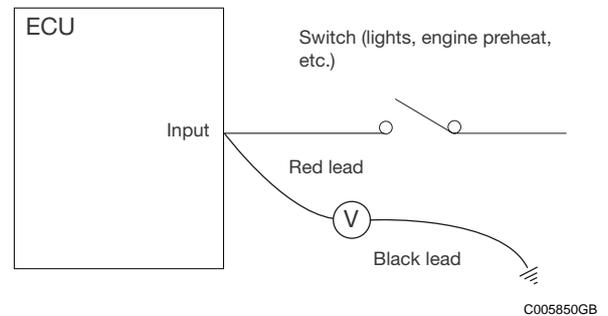


Fig 3.

# Technical Data

## General Data

### Valve Block

**Table 1.**

Type	Hydraulic Pilot System
Operating System	Set pressure relief
Main Relief Pressure:	
Standard	319 bar (4626 lb/in <sup>2</sup> ) at 220 litre/min (48 UK gal)
Pressure Raising	343 bar (4975 lb/in <sup>2</sup> ) at 240 litre/min (53 UK gal)
Overload Relief Pressure:	
Bucket open/close	363 bar (5264 lb/in <sup>2</sup> ) at 20 litre/min (4.4 UK gal)
Dipper	363 bar (5264 lb/in <sup>2</sup> ) at 20 litre/min (4.4 UK gal)
Boom Raising	363 bar (5264 lb/in <sup>2</sup> ) at 20 litre/min (4.4 UK gal)
Boom Lowering	245 bar (3553 lb/in <sup>2</sup> ) at 20 litre/min (4.4 UK gal)
Aux	300 bar (4351 lb/in <sup>2</sup> ) at 20 litre/min (4.4 UK gal)
TAB	363 bar (5264 lb/in <sup>2</sup> ) at 20 litre/min (4.4 UK gal)
Function	Travel priority, Slew priority, Boom and Dipper holding valves, Boom and Dipper 2-Speed internal confluence

### Slew Motor

**Table 2.**

Displacement	210.1 cc/rev
Pressure Relief	284 bar @ 305 l/min
Rated Speed	840 rpm
Brake Torque	1050 Nm
Release Pressure	24 bar
Max Release Pressure	49 bar
Oil Quantity	approx 1.5 litres
Dry Weight	77kg

### Slew Gearbox

**Table 3.**

Ratio	23.17:1
Output Torque	19649 Nm
Output Speed	60.2 rpm
Oil Quantity	approx 16 litres
Dry Weight	approx 300 kg

## Dipper In

For schematic, [⇒ Fig 14. \(□ E-43\)](#)

Servo pressure from the hand controller **50** is sent to port A6 of the servo shuttle valve **46** and is distributed to:

- 1 Port C9 to activate the auto pressure switch **43**.
- 2 Port B6 to port A on the cushion valve **49**, through the valve leaving at port C (if machine is fitted with HBCV, pressure is also sent via port A1 to port P on the HBCV to allow trapped oil in the ram to exit). From port C to port Pb5 on the main control valve **14** to the dipper (1) spool, dipper (2) spool, dipper holding valve the upper pressure switch.

Flow from pump 2 enters main control valve **14** at P1 and is available at the dipper (1) spool via the left hand neutral gallery, or after passing over the straight line travel spool via the parallel working passage. At the dipper (1) spool the flow is diverted to the dipper ram **3**. Pressure is sensed at the regeneration spool **RGS** and moves it to the lesser restricted position.

Flow from pump 1 is blocked at the dipper (2) spool and joins the flow of pump 2 before the dipper (1) spool. The pressure from both pumps is now cut off from the negative control ports Ps1 and Ps2. This reduced pressure is sensed at both pumps which now come into full flow.

Exhaust oil from the ram passes (through the HBCV if fitted) to the main control valve **14** at port A5 through the dipper hold check valve DHV (that has been released by servo pressure) to the dipper (1) spool.

Exhaust oil from the dipper ram **3** can be at a "higher" pressure than the feed oil due to the effect of gravity on the dipper arm when first selected. This causes the regeneration check valve **RG** to open, feeding a proportion of exhaust oil into the feed side. The remaining exhaust oil returns to tank passing over the regeneration spool **RGS**. The regeneration spool has two restrictors, one more restricted than the other. The restrictors cause back pressure encouraging the regeneration check valve to open. As the pressure drops the regeneration spool moves across to the less restricted position. When the feed pressure is greater than the exhaust pressure the regeneration check valve will move to the unrestricted position allowing return oil to free flow to tank.

## Coupling

TE-031

### Assembly

- 1 Secure the coupling plate/flywheel **A** to the engine with bolts **B**.

**Note:** The mating faces of the coupling plate/flywheel and engine must be clean.

- 2 Position the 4 x aluminium inserts **C** onto the coupling plate/flywheel. Ensure the dowels are installed correctly and the inserts are flush with the coupling/flywheel. Secure the inserts to the coupling plate/flywheel with bolts **D**.

**Important:** Apply a small amount of grease under head prior to tightening.

- 3 Install the cylindrical hub **E** onto the splined pump shaft and secure with the bolts **F**.

**Note:** The hub must be installed with the recess closest to the pump.

**Note:** The hub surface must be flush with the end of the pump shaft.

**Note:** The radial aluminium inserts are already installed on the hub.

- 4 Push the flexible element **G** over the aluminium inserts on the hub.

- 5 Push the pump and engine assemblies together to engage the mesh and secure with bolts **H**.

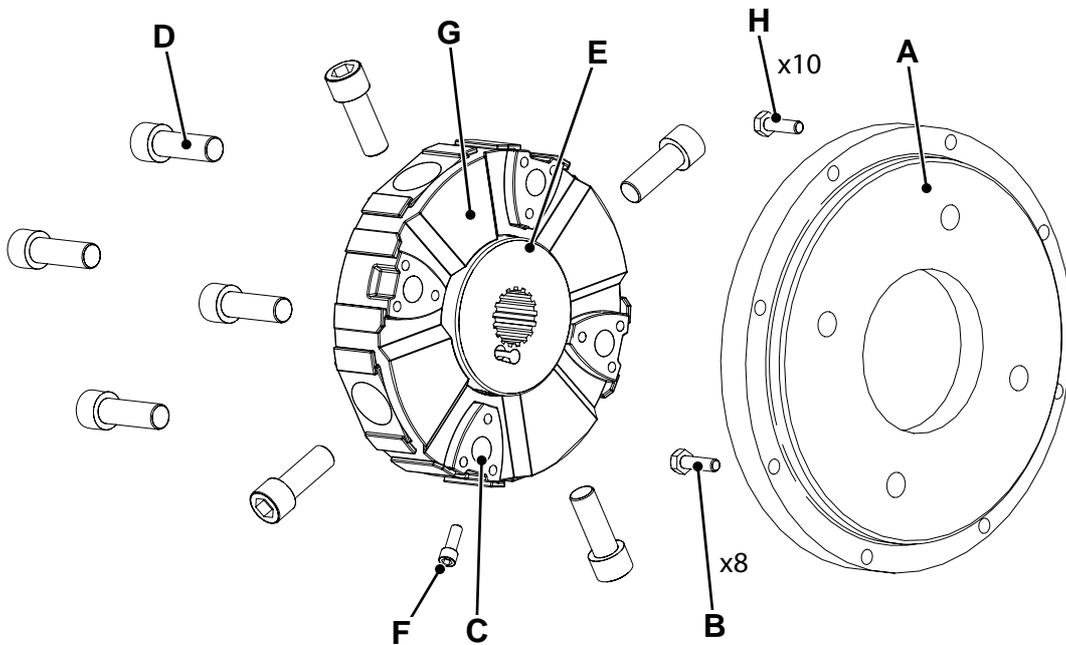


Fig 42.

T022490-1

Table 2.

Item	Torque Nm (lbf ft)							
	M10x30	M12x20	M12x35	M14x40	M16x50	M18x55	M20x50	M20x55
D	50	120	90	140	220	300	600	600
	M10	M12	M14	M16	M20			
F	30	50	70	120	200			

# Solenoid Valve (8 Station)

## Operation

TE-026

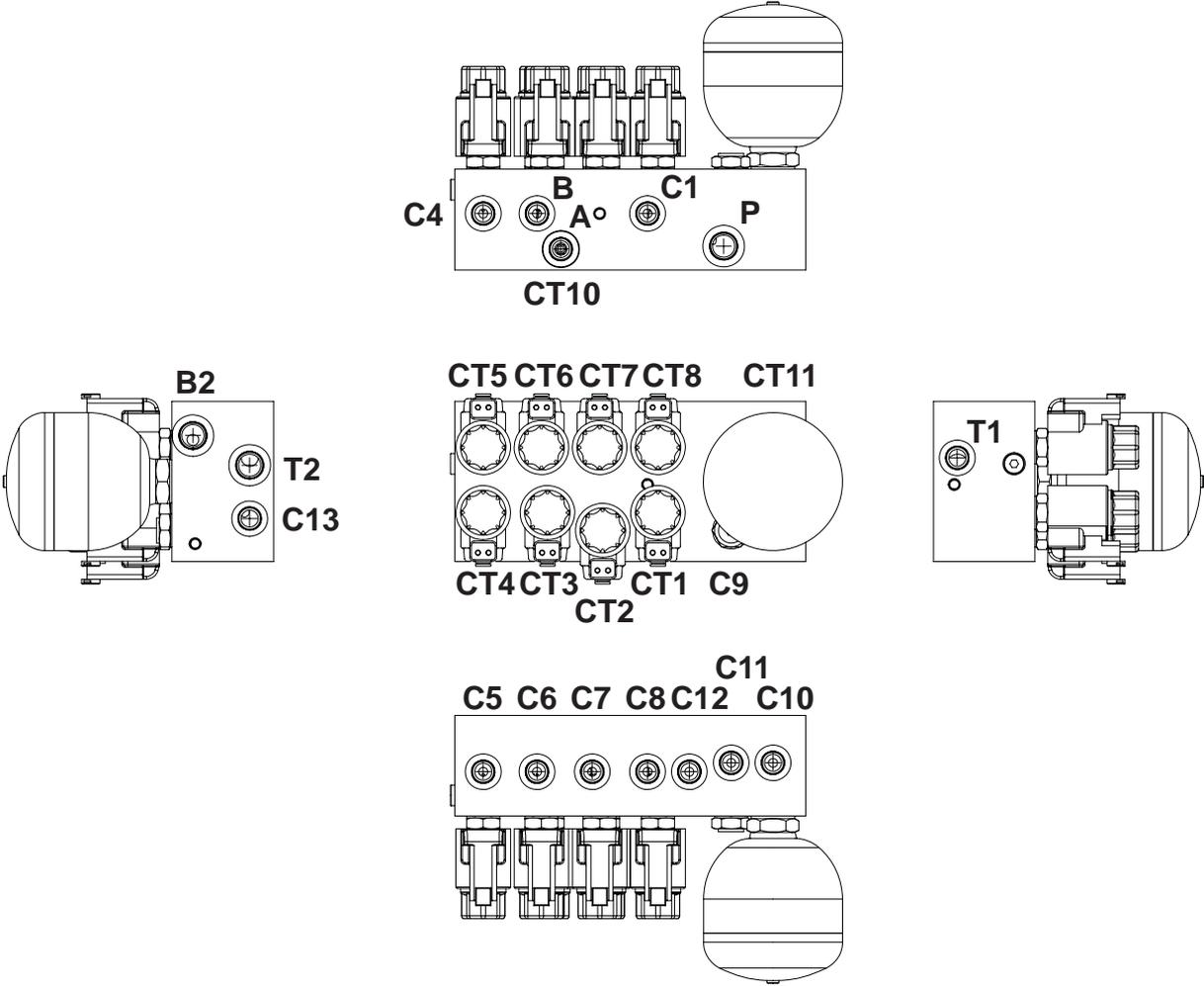


Fig 1.

T023420

## Fault Finding

### Motor Does Not Rotate

Symptom	Cause	Remedy
The pressure is low.	The relief valve is not set correctly.	Set to the correct value.
	The relief valve does not work properly. Plunger sticking. Plunger orifice contaminated.	Repair or renew the plunger. Dismantle and clean.
	Plunger not seating correctly.	Renew the plunger seat.
	The pressure is correct but no rotation.	Overload protection operating.
The moving part is burnt.		Check and repair the piston/shoe, cylinder/valve plate, etc.
No release pressure acting on the rake.		Check and repair the circuit.
The brake piston is sticking.		Dismantle and clean/repair.
The brake friction plate is burnt and sticking to counter plate.		Dismantle and renew the damaged parts.

### Motor Rotates in the Reverse Direction

Symptom	Cause	Remedy
Reverse rotation.	The motor has been incorrectly assembled.	Check step 16 of the Assembly procedure to verify that the valve housing 303 and main housing 301 are in their correct relative positions. Rectify if necessary.
	Inlet/outlet hoses reversed.	Re-locate hoses.

### Motor Speed is Low

Symptom	Cause	Remedy
Slow rotation.	The oil flow volume is low.	Check the pump output and the circuit to the motor.
	The temperature is high and leakage is serious.	Check the oil cooling circuit.
	The sliding parts are worn out or broken.	Renew suspect parts.