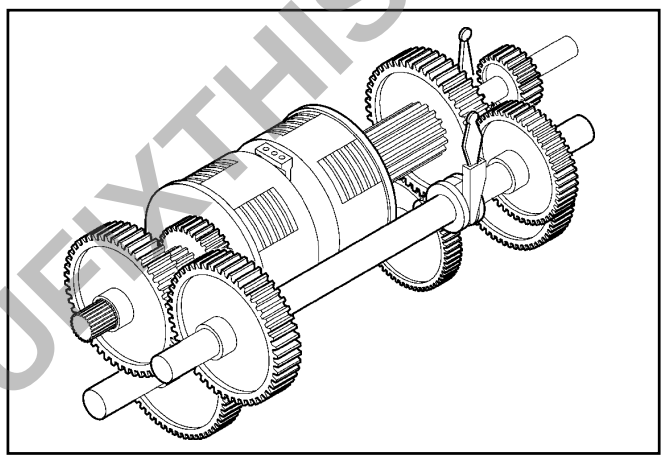
Legend

DELTASIX



Training manual

Publication P/N 3652037M1

Landini

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TABLE OF CONTENTS

Chap. 1 INTRODUCTION

Chap. 2 THE TRANSMISSION

Chap. 3 THE HYDRAULIC CIRCUIT

Chap. 4 THE ELECTRICAL SYSTEM

Chap. 5 CHECK-CONTROL AND TROUBLESHOOTING

Chap. 6 CALIBRATING

Chap. 7 SPECIAL TOOLS

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Working in safety

1-1 Essential rules for prevention

The structures, systems and equipment in repair shops must conform to the current laws governing labour safety in order to safeguard the health and safety of each worker.
Although they are obviously only partial, the regulations given in this section inform the workers about the dangers they may encounter on the job.

Always bear your safety and that of others in mind whenever you work on a machine, whichever type it may be.
To work in complete safety, it is essential to know the nature of the job, to correctly use the tools and materials required and to rely on your common sense.

To prevent accidents, it is important to:

- **BEHAVE** correctly and act with caution;
- Pay **ATTENTION** and keep your actions under control;
- Comply with the **REGULATIONS** and rules of behaviour of a general character.

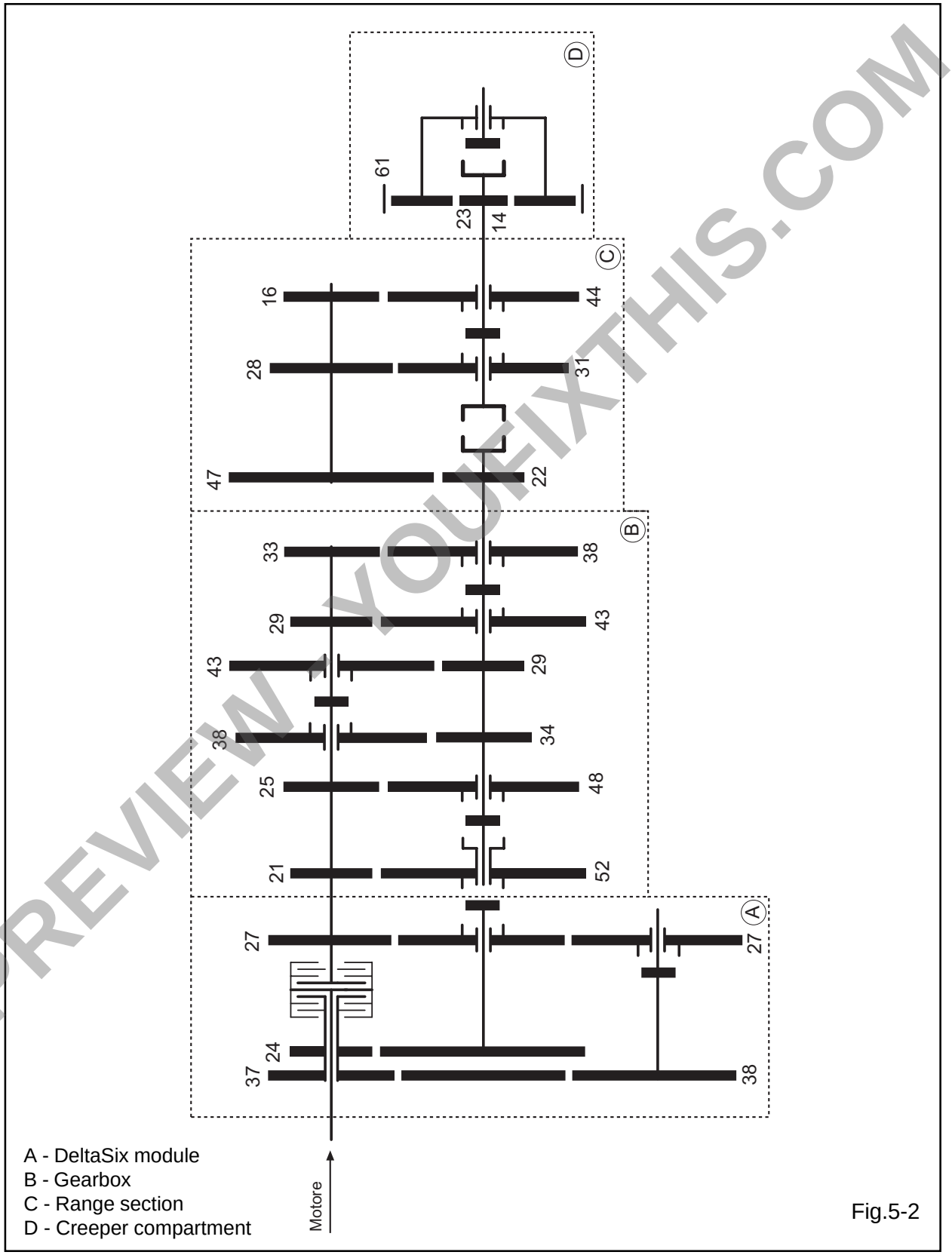


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Technical specifications

2-3 Power train diagram



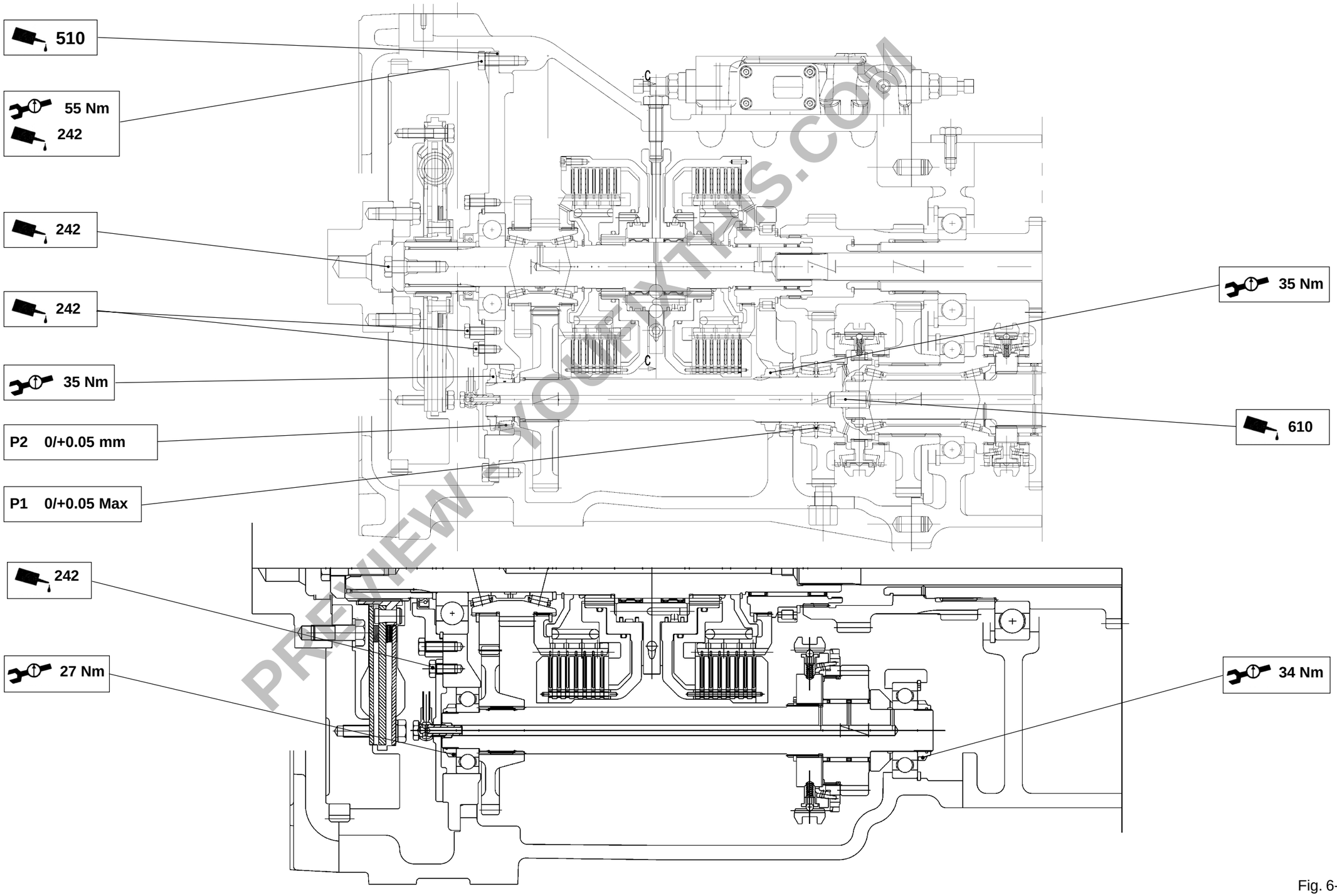
A - DeltaSix module
B - Gearbox
C - Range section
D - Creeper compartment

Fig.5-2

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General description

2-4 Driving torque values and sealants



P - Preload
- Driving torque
- Type of Loctite

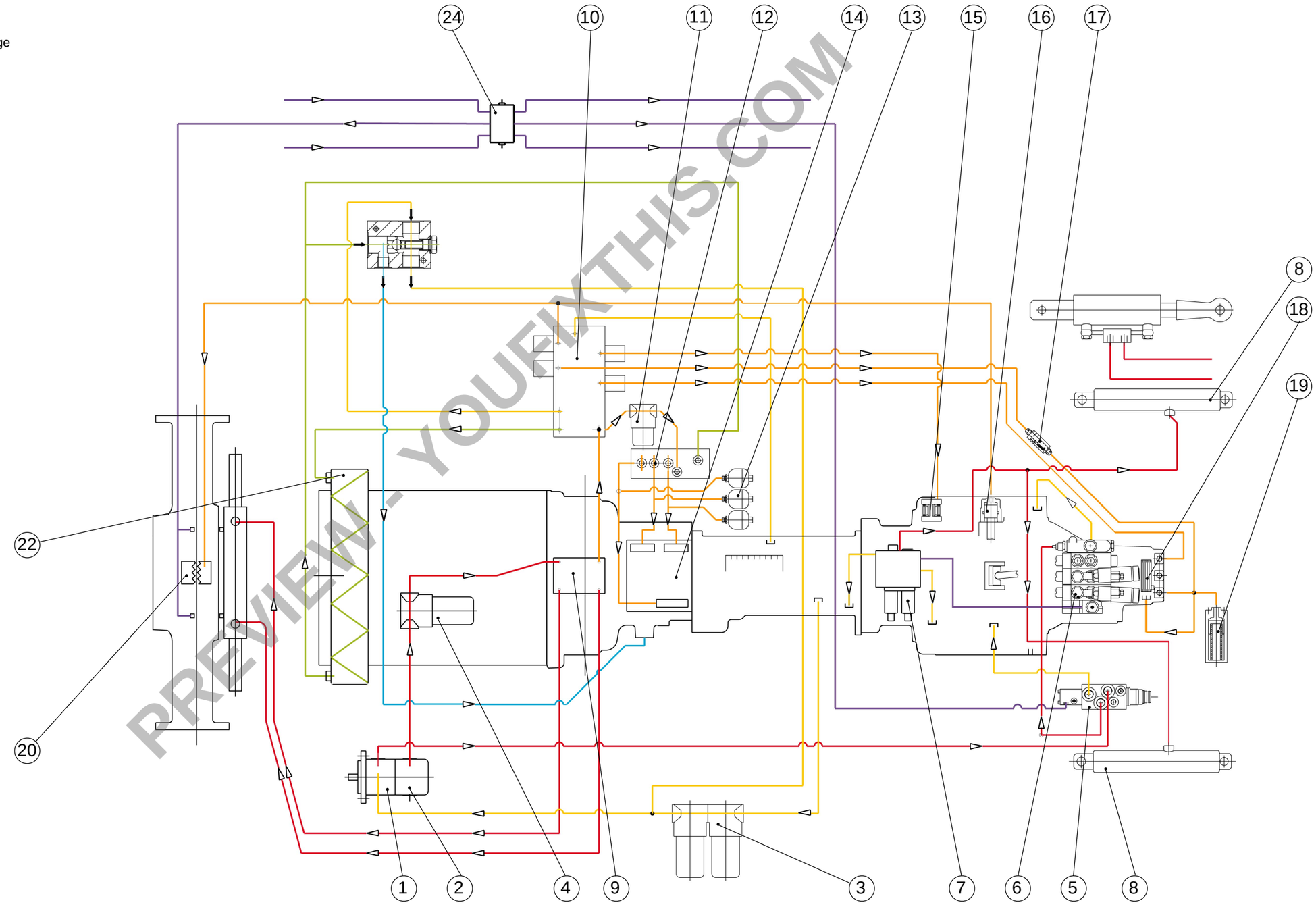
Fig. 6-2

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General description

1-1 General hydraulic circuit of DeltaSix tractors (with conventional axles)

1 - 62 l/min high pressure pump
2 - 35 l/min low pressure pump
3 - 40 micron filter on the intake with double cartridge
4 - 20 micron oil filter on the delivery side
5 - Hydraulic valve for trailer brake
6 - Auxiliary control valves
7 - Electro-valve unit for power lift
8 - Lifting cylinders
9 - Power steering system
10 - Hydraulic power pack
11 - 12 micron delivery filter (DeltaSix oil supply)
12 - DeltaSix supply plant
13 - Accumulators
14 - Control cover
15 - 4WD hydraulic clutch
16 - Rear differential lock
17 - PTO engagement modulating valve
18 - PTO hydraulic clutch
19 - Hydraulic accumulator for PTO
20 - Front differential lock
21 - Steering cylinder
22 - Transmission oil cooling radiator
23 - 4,5 bar lubricating circuit calibration valve
24 - Brake circuit on-off valve



COLOURS
high pressure
low pressure
discharge / intake
cooling
lubricating
brakes

Fig. 1-3

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Sect.2- Technical specifications

2-1 Main technical specifications

PUMP

Type	Double gear type (in tandem)
Manufacturer	Bosch
Model	A – 510 - 345 - 207
Engine / pump RPM ratio	1:1
Max. operating pressure	180 $\pm^{5}_{0}$bar
Max. flow rate at nmax. engine rate	62 l./min (High pressure circuit)
Max. flow rate at max. engine rate	35 l./min (Low pressure circuit)
Positioning	front lh side of engine
Drive	Valve system gears
Transmission / hydraulic oil quantity	85 l.
Type of oil	transfluid AS/C

FILTERS

Type (on intake)	With double cartridge
filtering degree	40 micron
Type (on delivery)	With single replaceable paper cartridge
filtering degree	15/20 micron
Type (on delivery)	With single replaceable cartridge on DeltaSix supply
filtering degree	12 micron

STEERING SYSTEM

System	Hydrostatic control
Manufacturer	Danfoss
Type	Orbitrol ospc 200 4 W.D. Orbitrol ospc 100 2 W.D.
4 W.D. nominal cylinder	200 cc. per rev.
2 W.D. nominal cylinder	100 cc. per rev.
Valve setting	175±5 bar (built into the valve system)
Antishock valve calibration	225/240 bar (built into the valve system)

HYDRAULIC POWER PACK

Make	Comatrol / Slanzi
Type	Electro-hydraulic
Low pressure calibrating valve	18 bar
Cooling circuit calibrating valve	5 bar
Forced lubrication valve	4.5 bar
Oil discharged by the transmission	Spray lubrication
Users	Diff lock PTO / PTO brake / 4WD / DeltaSix
Type of engagement	Electro-hydraulic

ACCUMULATORS

Manufacturer	Bosch
type	gas
pressure setting	5 bar

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General description

1-3 Main wiring diagram

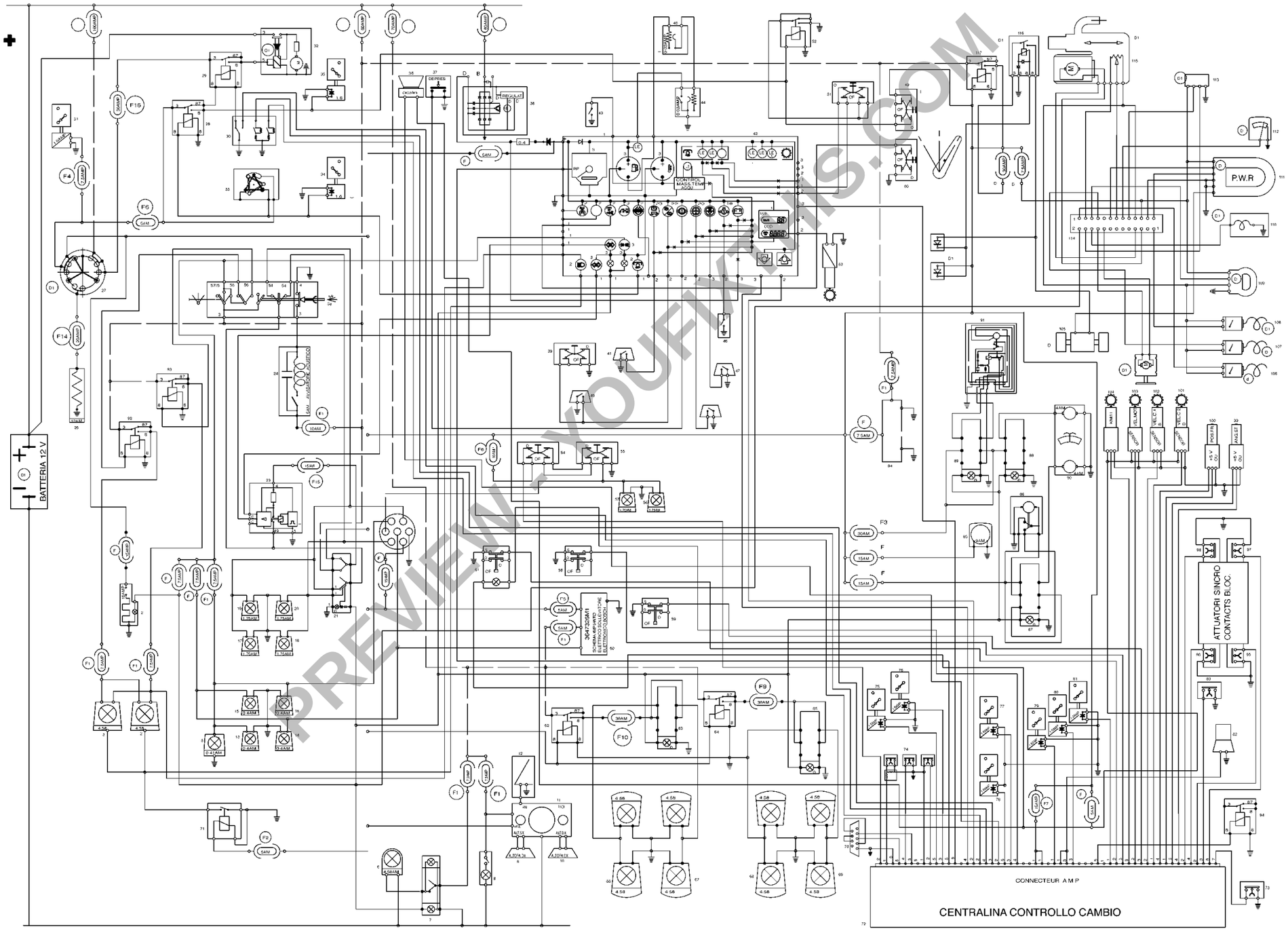


Fig. 5-4

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Introduction

1-2 Fault codes

FAULT CODE	FAULT LOCATING	FAULT
11	Faulty Hall effect sensors	One or both of the Hall effect sensors fails to function or has broken wires
15	Faulty clutch pedal limit switch	The switch fails to function or has broken wires
17/18	Faulty reverse shuttle lever contacts	The reverse shuttle lever fails to function or has broken wires
19	Faulty gearshift lever knob buttons	The knob of the gearshift lever (Declutch/Underdrive/Overdrive buttons) fails to function or has broken wires
20	Electric faults involving the solenoid valve and/or Reverse synchronizer switch	The Reverse synchronizer fails to mesh
21	Electric faults involving the solenoid valve and/or the Underdrive synchronizer switch	The Underdrive synchronizer fails to mesh
22	Electric faults involving the solenoid valve and/or the Overdrive synchronizer switch	The Overdrive synchronizer fails to mesh
29	Electric faults involving the Modes or Direct drive clutch control solenoid valves	The relative hydraulic clutch fails to engage fully

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Check control

11 - Faults involving the Hall effect sensors

OPERATION SEQUENCE	REQUIRED INSPECTION	RESULT OF INSPECTION	REQUIRED ACTION
1	Make sure that the connectors (16-17-24) are correctly connected	NO	Connect them correctly
RESULT OF INSPECTION	YES		
2	Disconnect the sensor connectors and check the wiring for continuity. Check whether there is an open circuit or short circuit (as in the table on page 5-15)	YES	Locate and repair the broken wire or short circuit
RESULT OF INSPECTION	NO		
3	Demount the faulty sensors		Fit new sensors in their place

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Wiring

Correspondence between connector pins (cab interior)

MAIN CONNECTOR (1)	COLOUR	DESCRIPTION	DESTINATION
1	Light blue (a)	Speed detection	47-way through connector pin N° 10
2	Grey-red (hr)	Engine RPM speed	47-way through connector pin N° 13
3	Light blue-black (an)	Differential lock key	Differential lock key pin N° 5
4	Green (v)	Gearshift lever	Gearshift lever pin N° 2
5	Pink-black (sn)	Slow ranges	47-way through connector pin N° 26
6	White (b)	Gnd in cab	Ground in cab
7	Light blue-red (ar)	6th gear switch	47-way through connector pin N° 20
8	Orange(c)	Neutral switch	47-way through connector pin N° 7
9	Yellow-black (gn)	Slave select	Dashboard pin N° 34
10	Pink-yellow (sg)	Oil temperature	47-way through connector pin N°22
11	Red (r)	+12 V power supply	Fuse f7'
12	Grey-green (hv)	Clutch position signal	Clutch pedal pos. sensor pin N° 4
13	Orange (c)	Gearshift lever	Gearshift lever pin N°1
14	White (b)	Gnd in cab	Ground in cab
15	Red (r)	+12 V power supply	Fuse f7'
16		Not used	
17	Red-yellow (rg)	Reverse solenoid valve	47-way through connector pin N° 19
18	Grey (h)	Overdrive solenoid valve	47-way through connector pin N° 18
19	Brown-black (mn)		47-way through connector pin N° 46
20	Orange-black (cn)	Lh sensor D6 gearbox speed	47-way through connector pin N° 9
21	Blue (l)	Steering angle (+ 5 V)	47-way through connector pin N° 27
22	Pink (s)	Auto key	Auto key pin N° 3
23	Green-black (vn)	Gearshift lever	Gearshift lever term. N° 4
24	Red (r)	Reverse lever forward-back	Reverse shuttle lever red wire
25	Brown-green (mv)	Brake pedal	Brake pedal pin N° 4
26	Blue-red (bl)	Reverse switch	47-way through connector pin N° 2
27	Red-green (rv)	Overdrive switch	47-way through connector pin N° 3
28	Grey-green (hv)	Out data	Dashboard pin N° 23
29	Grey-white (hb)	Buzzer	Buzzer
30	Pink-yellow (sg)	Oil temperature	47-way through connector pin N° 22
31	Light blue-black (an)	Reverse shuttle lever forward	Reverse shuttle lever light blue-black wire
32	Purple (z)	Clutch switch	47-way through connector pin N° 12
33	Pink (s)	Rs 232 tx	9-pin serial connector term. N° 2
34	Light blue-white (ab)	4WD solenoid valve	47-way through connector pin N° 29
35	Green-white (vb)	Creeper solenoid valve	47-way through connector pin N° 25
36	Orange-green (cv)	Modes clutch solenoid valve	47-way through connector pin N° 16
37	Blue-black (ln)	Underdrive solenoid valve	47-way through connector pin N° 17
38	White-black (bn)	Tractor speed	47-way through connector pin N° 23
39	Purple-white (zb)	4WD key	4WD key pin N° 5
40	Grey-black (hn)	4WD brake oil pressure	47-way through connector pin N° 24
41		Not used	
42		Not used	
43	Red-black (rn)	Oil pressure	47-way through connector pin N° 11
44	Green-black (vn)	Underdrive switch	47-way through connector pin N° 8
45	Red-black (rn)	Clutch sensor (+5 v)	Clutch pedal pos. sensor pin N° 1
46	Yellow-blue (gl)	Sck	Dashboard pin N° 32
47	Grey (g)	Auto led	Auto key pin N° 7
48	Orange-blue (cl)	Steering angle	47-way through connector pin N° 14
49	Light blue (a)	Reverse shuttle lever back	Reverse shuttle lever light blue wire
50	Yellow-red (gr)	Engine speed for dashboard	Dashboard pin N° 25
51	White-green (bv)	Rs 232 rx	9-pin serisl connector pin N° 3
52	Grey-blue (gl)	Diff lock solenoid valve	47-way through connector pin N° 28
53	White-red (br)	Direct drive clutch sol. valve	47-way through connector pin N° 15
54	Brown-white (mb)	Rear light	Rear light
55	White-blue (bl)		47-pin through connector pin N° 47

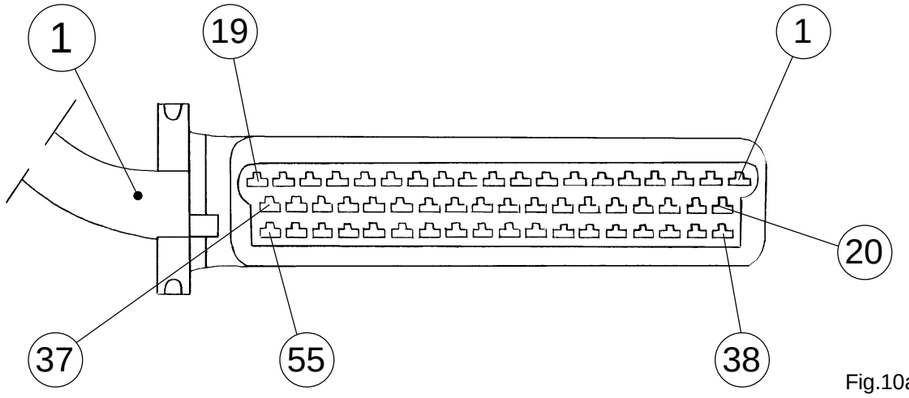


Fig.10a-4

List of cab interior connector ground pins

CONNECTOR NUMBER	PIN	DESCRIPTION	COLOUR	DESTINATION
1	6	Main connector	White	Ground in cab
1	14	Main connector	White	Ground in cab
2	6	Dashboard	White	Ground on chassis
3	-	Reverse shuttle lever	White	Ground in cab
4	4	Gearshift lever	White	Ground on chassis
5	2	Clutch pedal potentiometer	White	Ground in cab
6	5	PC check-control socket	White	Ground in cab

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Sect.3 - Disassembly and dismantling guide lines

3-1 Splitting the DeltaSix unit from the tractor

It is not difficult to access the gearbox drive shaft. In the Legend Delta Six version, drive is transmitted from the engine to the gearbox by means of a demper plate (S Fig. 7/8-2) which substitutes the conventional clutch units.

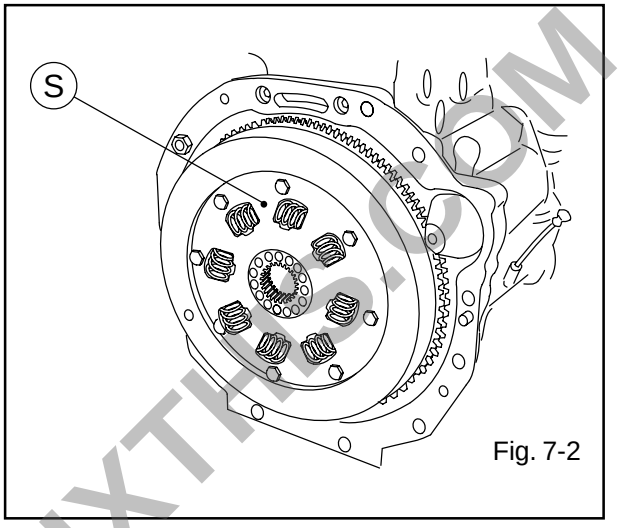


Fig. 7-2

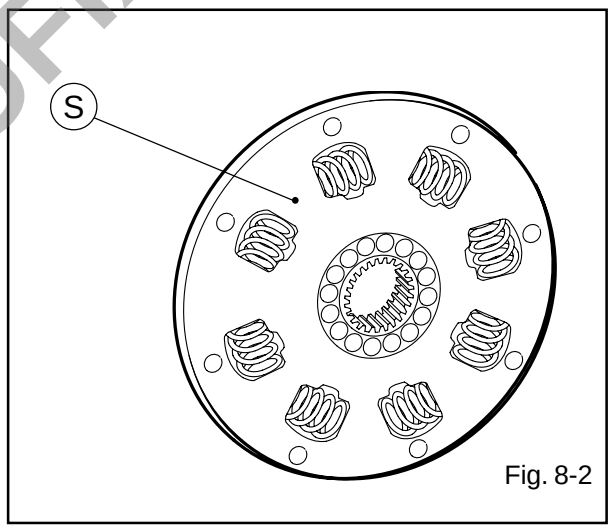
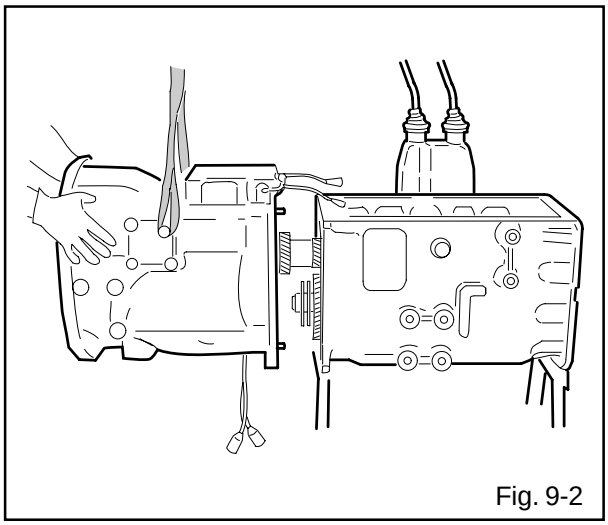


Fig. 8-2

To remove the shaft from the gearbox, just unscrew the four bolts inside the gearbox itself along with the external ones (Fig. 9-2).


Fig. 9-2

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Sect.4 - Guide to the "calibration" module

4-1 How to load the standard values

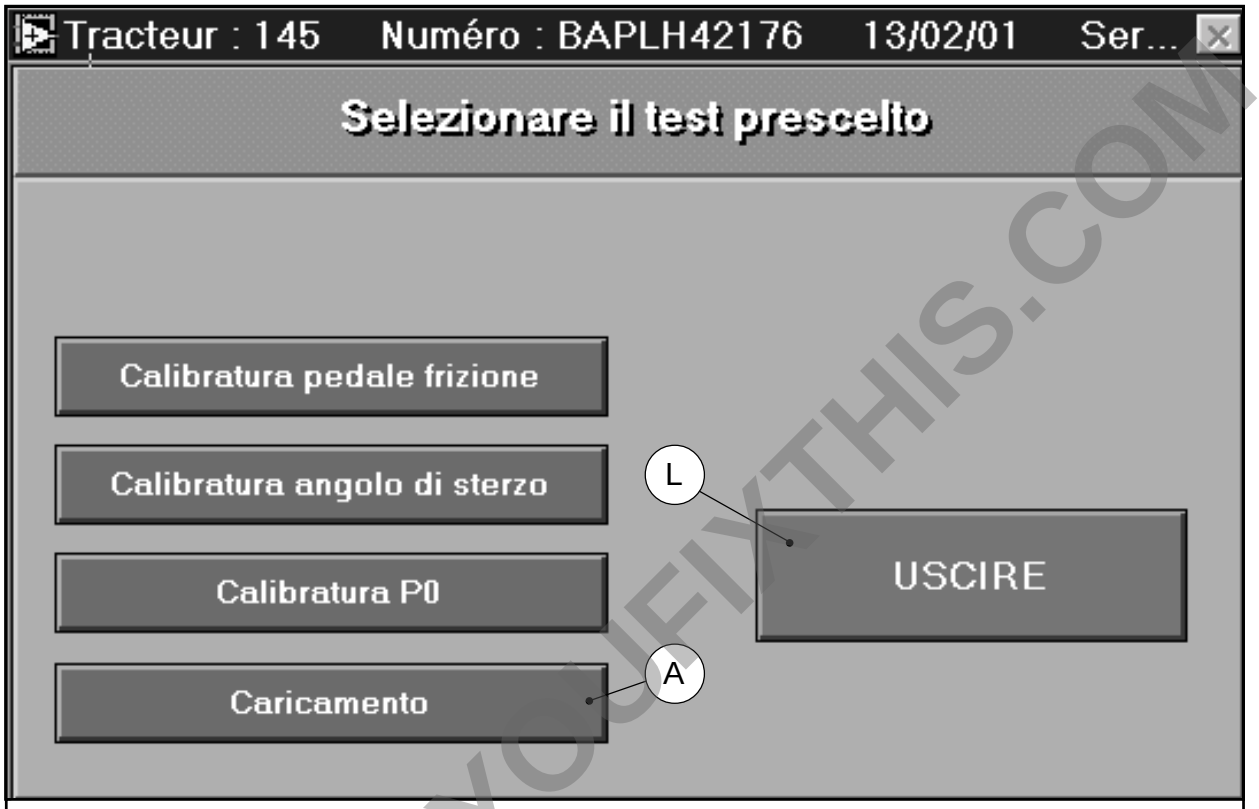


Fig.75-6

Access the main control panel of LandTools (Fig.15-6) and press the relative "calibration key to access the window of Fig.75-6 which gives all the tests that can be conducted to ascertain whether the components mounted on the **Legend Deltasix** tractor operate correctly.
Click on the respective button to access each test.
Click on key (L Fig.75-6) to return to the LandTools control panel.
The standard values are loaded by pressing the relative selector key (A Fig.75-6). The tractor need not be on.
This operation allows the LandTools program to write the standard parameters of Legend Deltasix tractors, established by the manufacturer, to be written into the memory of the electronic plant in a special system file in the actual program itself. It also writes in the speed coefficients linked to the choice of tyres and the type of tractor in question.

This operation is carried out when:
- the steering angle sensor is calibrated (tractors with sprung axles)
- the electronic plant is replaced
- the set of tractor parameters is simply updated.

It may also be carried out if the parameters of the tested tractor are decidedly wrong and need to be reset, after which the operator should proceed with P0 calibration.

Note: *when the loading operation has terminated, calibrate the P0 and clutch pedal to satisfactorily adjust the tractor. This is because you are unlikely to obtain the best operating conditions with the standard parameter configuration alone.*

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E - Reverse shuttle lever

E 1- General description

The reverse shuttle lever (L Fig. 104-4) installed under the steering wheel, transmits a permanent signal to the monitoring plant in order to modify the driving direction of the tractor.
The reverse shuttle lever unit consists of:
- a mechanical block (1 Fig. 105-4) which maintains the lever in one of its three positions (FWD, N, REV,) (L Fig. 104-4);
- a printed electrical circuit (2 Fig. 105-4) which transmits a signal to the monitoring plant according to the position of the actual lever itself (Fig. 106-4);
- A connector (3 Fig. 105-4 and Fig. 107-4)

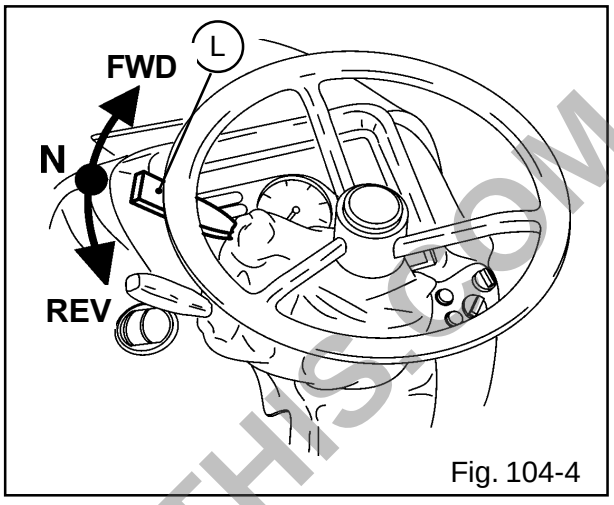


Fig. 104-4

How to check the functionality of the reverse shuttle lever:

Make sure that the values indicated in the following table are present, using a tester:

Lever Position	Wire Colours	Value
FWD/REV	Grey-Red	Open circuit
N	Grey-Black	Closed circuit
N	Grey/Black Light blue/Black	2740±10w
FWD	Grey/Black Light blue/Black	550±10w
N	Grey/Black Light blue	2740±10w
REV	Grey/Black Light blue	550±10w

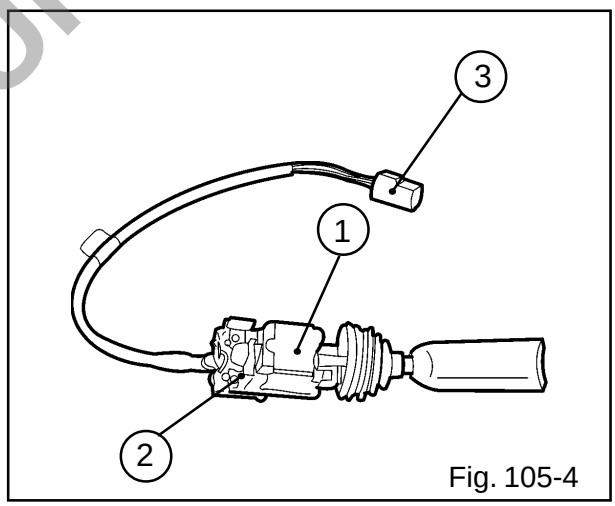


Fig. 105-4

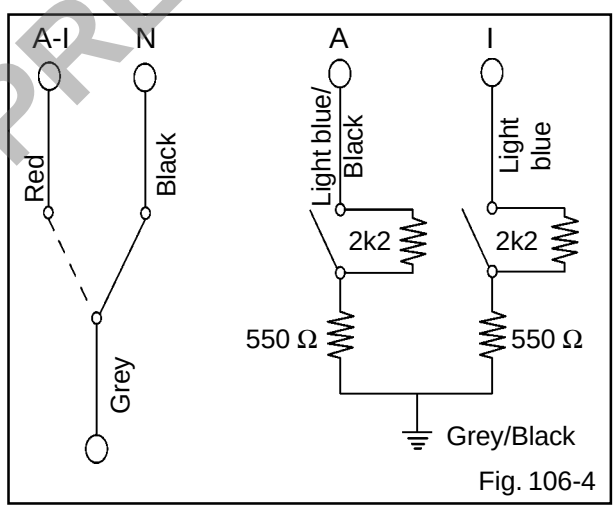


Fig. 106-4

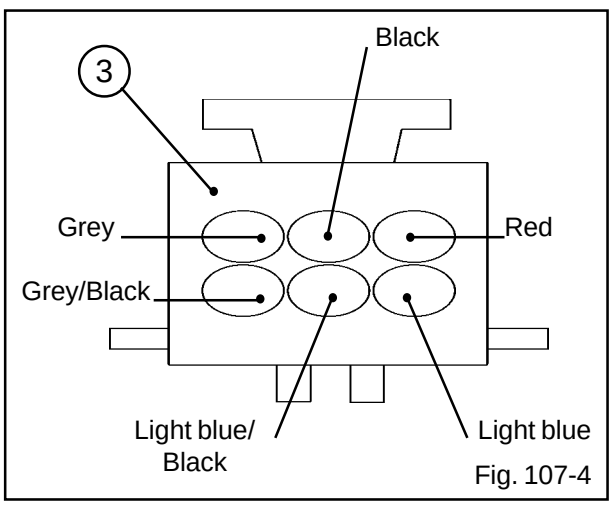


Fig. 107-4

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Technical specifications

2-2 Ground speed table

LEGEND 105 - 115 - 130

DeltaSix
with CREEPER - Speeds in kph

18.4 R38; 520/70 R38; 600/65 R38 tyres

Gear	UNDERDRIVE with CREEPER	DIRECT DRIVE with CREEPER	OVERDRIVE with CREEPER	REVERSE with CREEPER
1st Slow	0.295	0.353	0.428	0.363
2nd Slow	0.380	0.455	0.552	0.468
3rd Slow	0.492	0.590	0.715	0.606
4th Slow	0.633	0.759	0.921	0.780
5th Slow	0.815	0.977	1.185	1.004
*6th Slow	1.082	1.296	-	1.332
1st Normal	0.732	0.877	1.063	0.901
2nd Normal	0.944	1.131	1.371	1.162
3rd Normal	1.222	1.464	1.776	1.505
4th Normal	1.573	1.885	2.287	1.938
5th Normal	2.025	2.427	2.943	2.494
6th Normal	2.686	3.219	-	3.309
1st Fast	1.731	2.074	2.515	2.132
2nd Fast	2.232	2.675	3.244	2.749
3rd Fast	2.890	3.463	4.201	3.560
* 4th Fast	3.721	4.460	5.409	4.584
5th Fast	4.789	5.740	6.961	5.899
6th Fast	6.354	7.615	-	7.826

* the 6th gear is inhibited with the Overdrive function

LEGEND 105 - 115 - 130

DeltaSix
Speeds in kph

18.4 R38; 520/70 R38; 600/65 R38 tyres

Gear	UNDERDRIVE	DIRECT DRIVE	OVERDRIVE	REVERSE
1st Slow	1.578	1.891	2.294	1.944
2nd Slow	2..035	2.439	2.958	2.507
3rd Slow	2.635	3.158	3.830	3.246
4th Slow	3.393	4.067	4.932	4.180
5th Slow	4.367	5.234	6.347	5.379
*6th Slow	5.794	6.943	-	7.136
1st Normal	3.920	4.697	5.697	4.828
2nd Normal	5.055	6.058	7.347	6.226
*3rd Normal	6.546	7.844	9.514	8.062
4th Normal	8.429	10.101	12.251	10.381
5th Normal	10.484	13.000	15.766	13.361
6th Normal	14.392	17.246	-	17.725
1st Fast	9.271	11.110	13.475	11.419
2nd Fast	11.957	14.329	17.378	14.727
3rd Fast	15.483	18.554	22.503	19.069
4th Fast	19.936	23.891	28.976	24.555
5th Fast	25.658	30.748	37.291	31.602
* 6th Fast	34.040	40.792	-	41.925

* the 6th gear is inhibited with the Overdrive function

LEGEND 145 -165

DeltaSix
with CREEPER - Speeds in kph

18.4 R38; 520/70 R38; 600/65 R38 tyres

Gear	UNDERDRIVE with CREEPER	DIRECT DRIVE with CREEPER	OVERDRIVE with CREEPER	REVERSE with CREEPER
1st Slow	0.285	0.342	0.415	0.351
2nd Slow	0.368	0.441	0.535	0.453
3rd Slow	0.476	0.571	0.692	0.587
4th Slow	0.613	0.735	0.891	0.755
*5th Slow	0.789	0.946	1.147	0.972
6th Slow	1.047	1.255	-	1.290
1st Normal	0.708	0.849	1.030	0.873
2nd Normal	0.914	1.095	1.328	1.125
3rd Normal	1.183	1.418	1.719	1.457
4th Normal	1.523	1.826	2.214	1.876
5th Normal	1.961	2.349	2.849	2.415
6th Normal	2.601	3.117	-	3.204
1st Fast	1.676	2.008	2.435	2.064
2nd Fast	2.161	2.590	3.141	2.662
3rd Fast	2.798	3.353	4.067	3.446
4th Fast	3.603	4.318	5.237	4.438
5th Fast	4.637	5.557	6.740	5.711
* 6th Fast	6.152	7.372	-	7.577

* the 6th gear is inhibited with the Overdrive function

LEGEND 145 - 165

DeltaSix
Speeds in kph

18.4 R38; 520/70 R38; 600/65 R38 tyres

Gear	UNDERDRIVE	DIRECT DRIVE	OVERDRIVE	REVERSE
1st Slow	1.528	1.831	2.221	1.882
2nd Slow	1.970	2.361	2.864	2.427
3rd Slow	2.552	3.058	3.708	3.143
4th Slow	3.286	3.937	4.775	4.047
5th Slow	4.228	5.067	6.146	5.208
*6th Slow	5.610	6.723	-	6.909
1st Normal	3.795	4.548	5.516	4.674
2nd Normal	4.894	5.865	7.114	6.028
3rd Normal	6.338	7.595	9.211	7.806
4th Normal	8.161	9.780	11.861	10.051
5th Normal	10.503	12.586	15.265	12.936
*6th Normal	13.934	16.698	-	17.162
1st Fast	8.976	10.757	13.046	11.056
2nd Fast	11.577	13.873	16.826	14.285
3rd Fast	14.990	17.964	21.787	18.463
4th Fast	19.302	23.131	28.055	23.774
5th Fast	24.842	29.770	36.106	30.597
* 6th Fast	32.957	39.495	-	40.592

* the 6th gear is inhibited with the Overdrive function

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General description

1-2 Drawing of assembly and main components

1 - Main shaft
2 - Clutch shaft
3 - Front cover for clutch shaft
5 - Ball bearing
6 - Spring rings
7 - Reverse driving gear
8 - Under-over driving gear
9 - Bearing spacer
10 - Taper roller bearing
11 - Internal bowl for secondary clutch
12 - Washer
13 - Spring ring
14 - Fixed hydraulic hub
15 - Rotating seal
16 - External bowl for main clutch
17 - Hydraulic clutch piston
18 - Needle bearing
19 - Clutch cover
20 - Piston return spring
21 - External bowl for secondary clutch
23 - Fixing bolt
24 - Spring support
25 - Parallel roller bearing
26 - Spring ring
27 - Connecting hub
28 - Roller bearing
29 - Double clutch output gear
30 - PTO shaft
31 - Transmission shaft
32 - 1st gear input gear
33 - Mono-cone synchromesh
34 - Under-over transmission shaft
35 - Tube
36 - Underdrive transmitting gear
37 - Adjuster shim
38 - Spring ring
39a/b - Taper roller bearing
40 - Special ring nut
41 - Screw
42 - Internal bell for main clutch
43 - Counter-disc
44 - Clutch plate
45 - Transmission shaft
46 - Check ring
47 - Retention ring
48 - Retention ring
49 - Washer
50 - Adjuster shim
51 - Spring ring
52 - Under-over driven gear
53 - Taper roller bearing
53a - Taper roller bearing
54 - Transmission shaft cover
56 - Screw
57 - Transmission shaft nut
58 - Union
59 - Screw
60 - Screw
61 - Flywheel
62 - Dempener
63 - Bearing washer
64 - Retention ring
65 - Intermediate disc hub
66 - Retention ring
67 - Washer
68 - Screw
69 - Drive shaft
70 - Main shaft cover

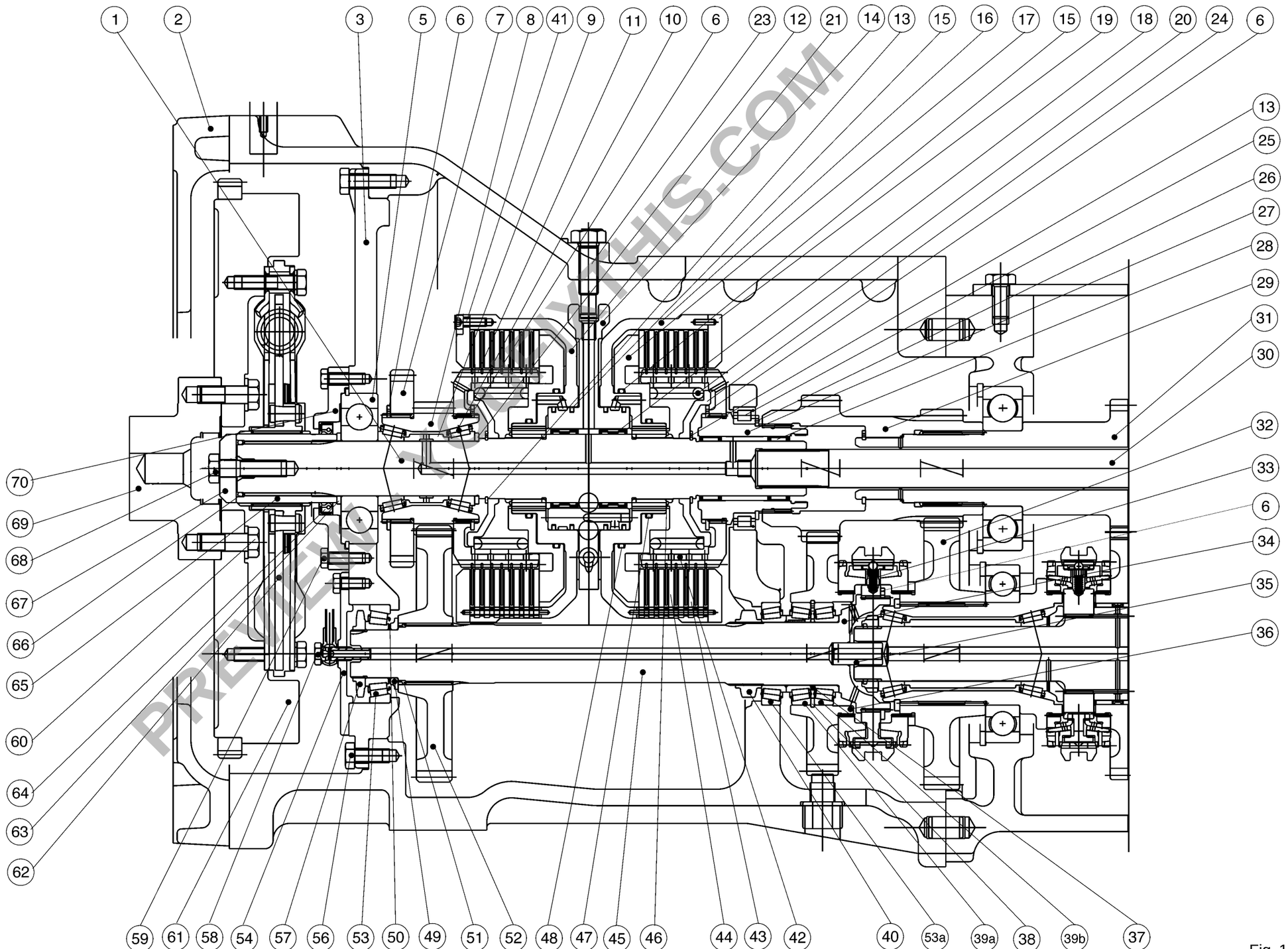


Fig. 1-2

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CHAP. 1

Introduction

INDEX

Sect. 1 Working in safety

1-1 Essential rules for accident prevention 1-4
1-2 Danger decals 1-10
1-3 Replacing tractor parts 1-13
1-4 Safe use of the tractor 1-14

Sect. 2 Introduction to the DeltaSix transmission

2-1 Modular transmission 1-16
2-2 Deltasix: its target 1-17
2-3 Main components 1-18
2-4 The performances of the Deltasix transmission 1-19

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CHAP. 4

Main components

INDEX

Sect. 4 Main components

A - Monitoring plant
A 1 - General description 4-48
A 2 - Functional architecture 4-49

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