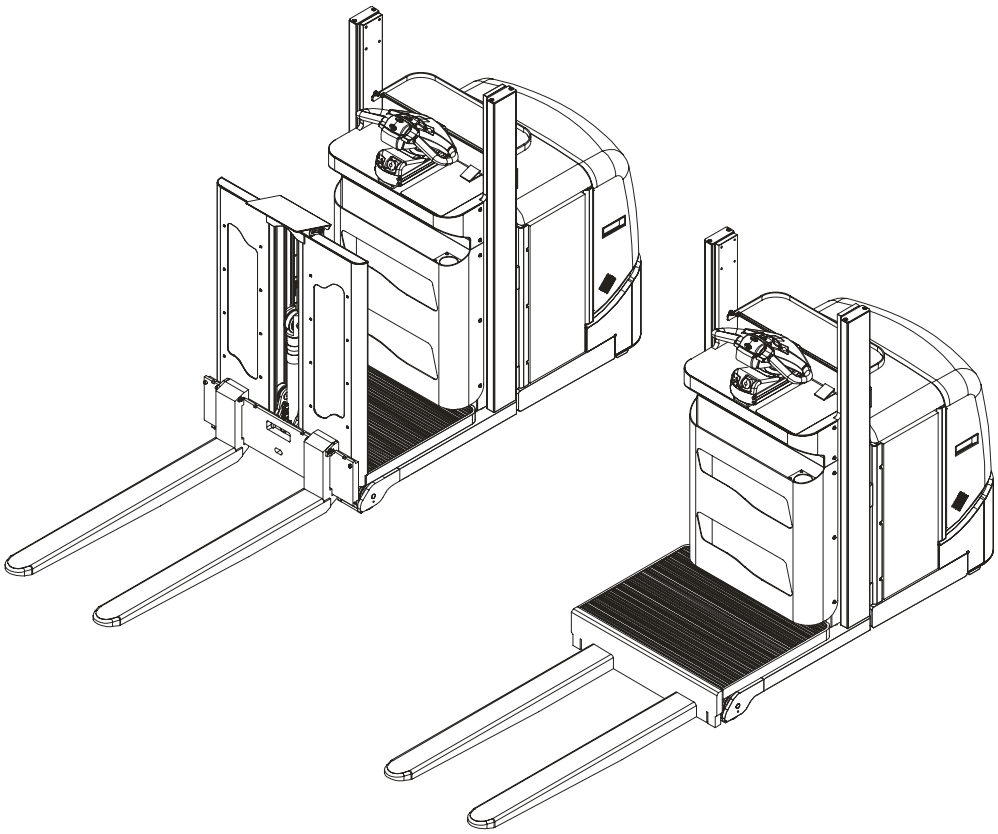
Service Manual

en



7LOP10CW, 7LOP10CF

Valid from serial number: 931876-

Order number: 232370-040
Issued: 2006-04-10 ITS

TOYOTA INDUSTRIAL EQUIPMENT

Order number	Date	Valid from serial number	T-code
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Table 1: Technical data

Model	7LOP10CW	7LOP10CF
Hydraulic system		
Power, kW	2.2	2.2
Intermittence	5%	5%
Minimum carbon brush length, mm	12	12
Minimal commutator diameter, mm	4.75	4.75
Pressure at rated load, bar	180	180
Overflow pressure, bar	200	200
Pump flow, litres/minute	5.0	5.0
Tank volume, litre	4.5	4.5
Oil type at normal temperature at temperatures < -15^{o}C	ISO-HM32 ISO-VG32	ISO-HM32 ISO-VG32
Power steering		
Model	Power steering PST 24/10	Power steering PST 24/10
Power, W	240	240
Torque at rated load	0.68 Nm	0.68 Nm
Max. current	60 A	60 A
Resistance,Ω, phase to phase	0.075	0.075
Fuses		
Control circuit, F50, F51	3 A, 7.5 A	3 A, 7.5 A
Drive motor, F1	160 A	160 A
Pump motor, F3	125 A	125 A
Power steering, F52	30 A	30 A

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Table 4: Maintenance schedule

I: Inspect, adjust and replace if necessary. **T:** Tighten. **C:** Clean **L:** Lubricate.
M: Measure and adjust if necessary.

Pos. no.	Work to be performed					
	Interval in hours - can vary depending on application	**5**	**20**	**500**	**1,000**	**3,000**
	Interval in days/weeks/months - can vary depending on application	**1 d**	**1 w**	**6 m**	**12 m**	**36 m**
3500.	**Wheels**					
3500.1	Remove strings, dirt, etc.	I				
3500.2	Inspect drive wheel and support wheels, wear and there mounting			I		
4110.	**Steering unit**					
4110.1	Inspect any steering response restrictions and jogging			I		
4110.2	Inspect any play in steering couplings and the return spring			I		
4110.3	Inspect mechanical locking of the steering arm and its centre position			I		
4110.4	Inspect the gear of the steering servo-unit			I		
4110.5	Inspect correct mounting of the steering linkage on both sides			I		
5000.	**Electric functions**					
5000.1	Inspect correct operation of the micro brake switch	I		I		
5000.2	Inspect correct operation of the emergency stop switch	I		I		
5000.3	Check lifting/lowering the forks / cabin	I				
5000.4	Inspect correct operation of the platform switch	I		I		
5000.5	Inspect correct operation of the horn	I		I		
5000.6	Inspect cable wear			I		
5000.7	Inspect correct operation of operator controls	I		I		
5000.8	Inspect the error code log, operating hours and all segments in the display panel	I		I		
5000.9	Inspect correct operation of the 0.1 meter switch in the mast	I		I		
5000.10	Inspect correct operation of the double 0.5 meter switch in the mast	I		I		
5000.11	Inspect correct operation of the end lift switch in mast	I		I		

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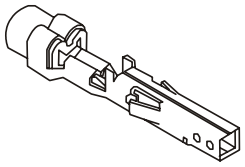
4.3 Molex connectors



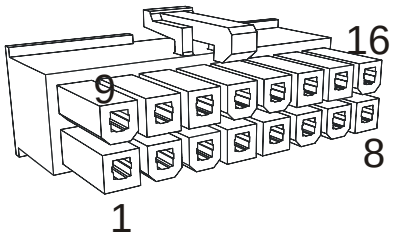
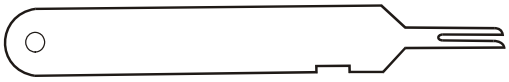
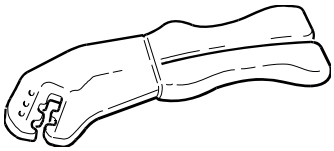


Figure	Number	Application
	156937	Tools for fitting pins/sleeves
	156936	Tools for fitting sleeves/pins

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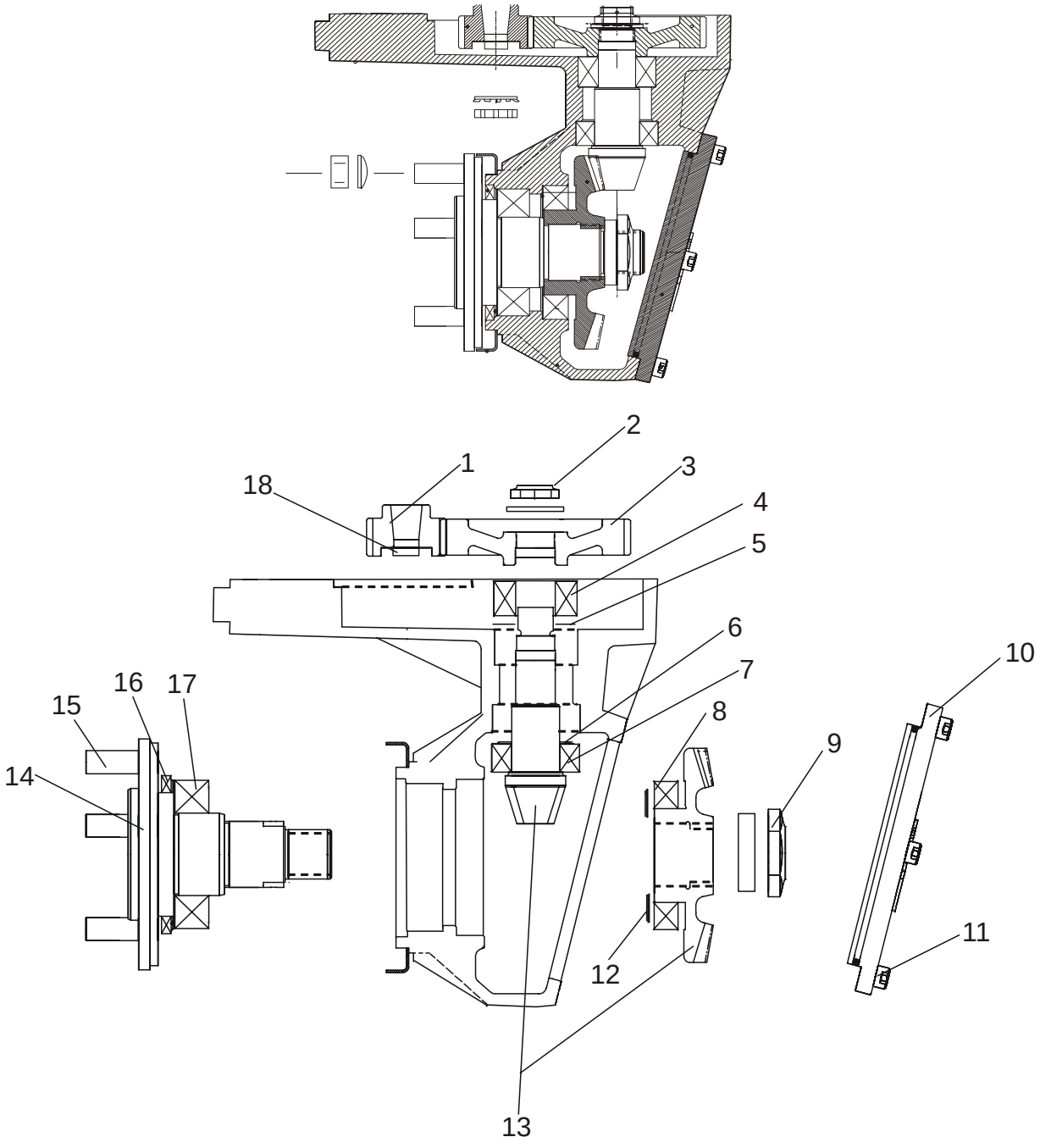
6- Driving unit/gear – 2550



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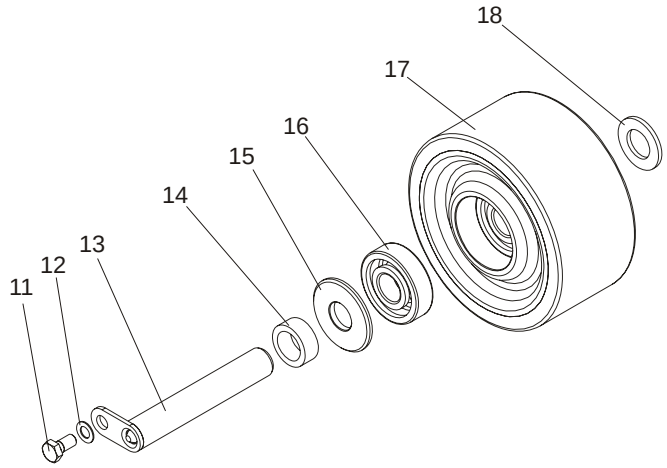
8- Support wheels – 3500

8.1 Main components



Pos. no.	Description
11	Screw
12	Washer
13	Mounting axle with plate
14	Bush
15	Washer
16	Bearing
17	Wheel
18	Washer

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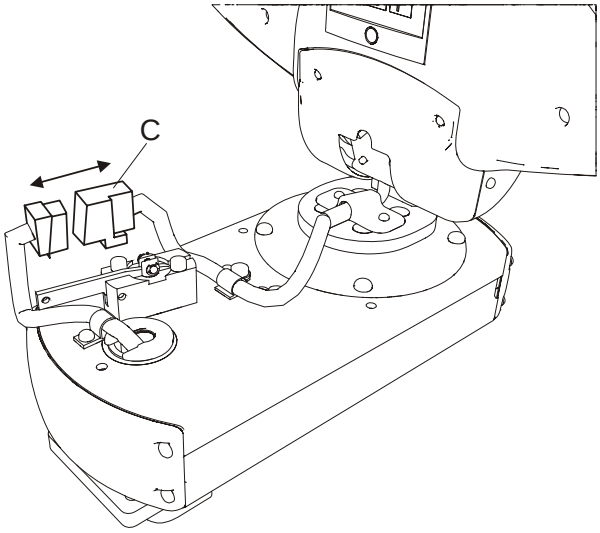
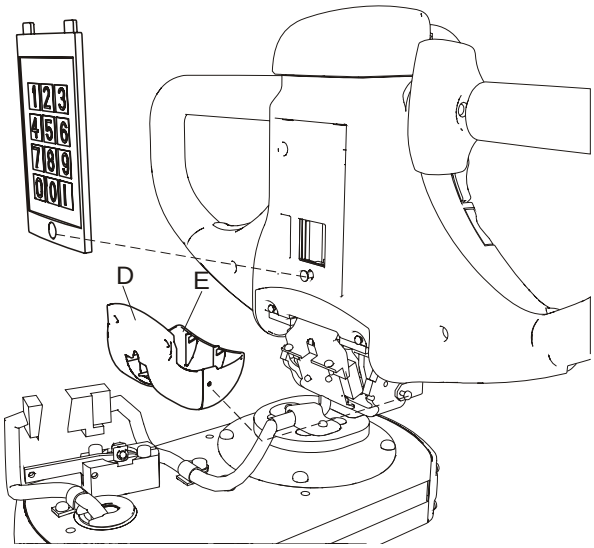
- Separate the switch at the Ergo arm (C) and pull the entire cable assembly mount straight up.



- Disassemble the pivot covers (D, E) and the keypad.



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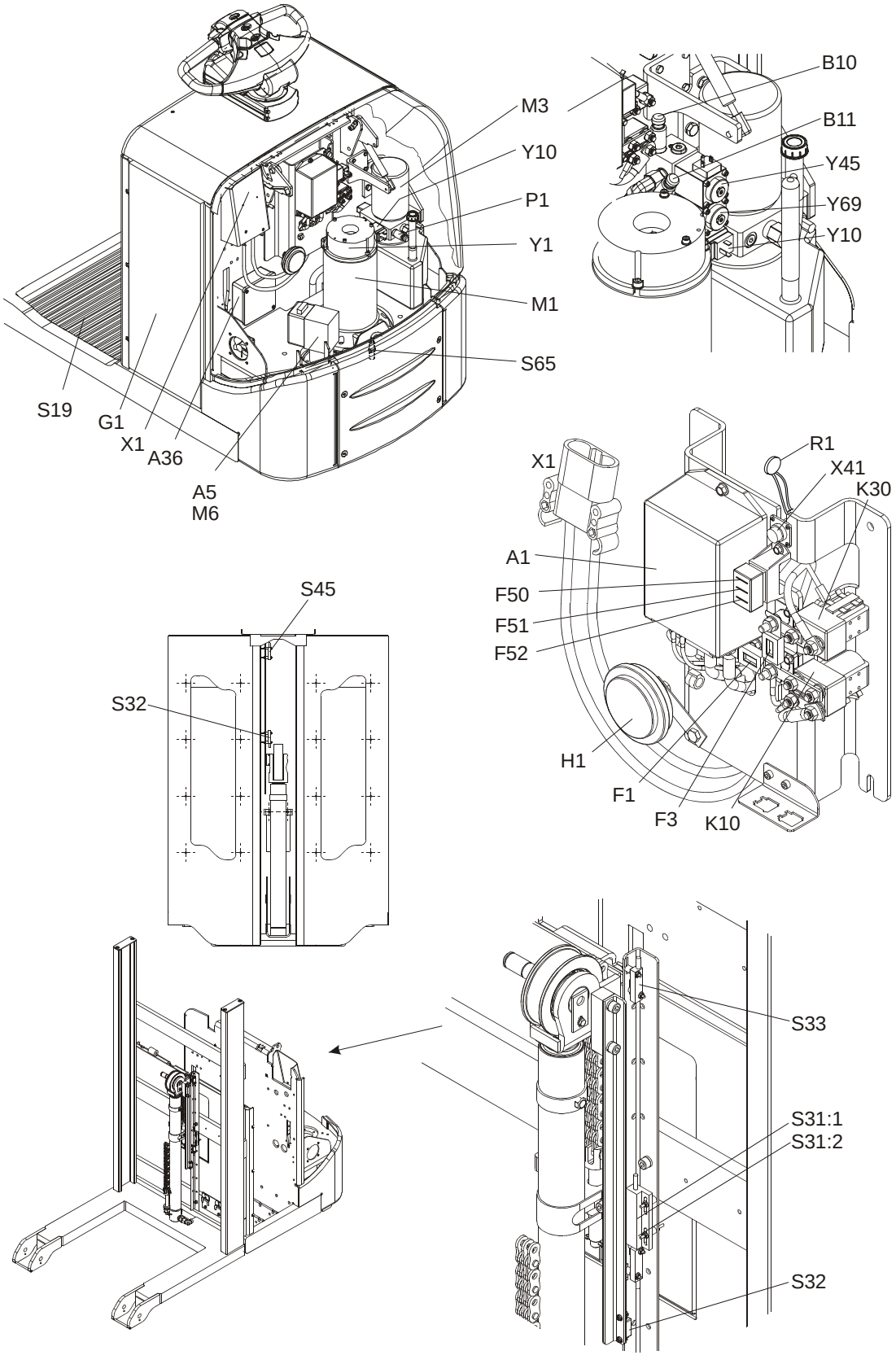
10.2 Electrical equipment overview



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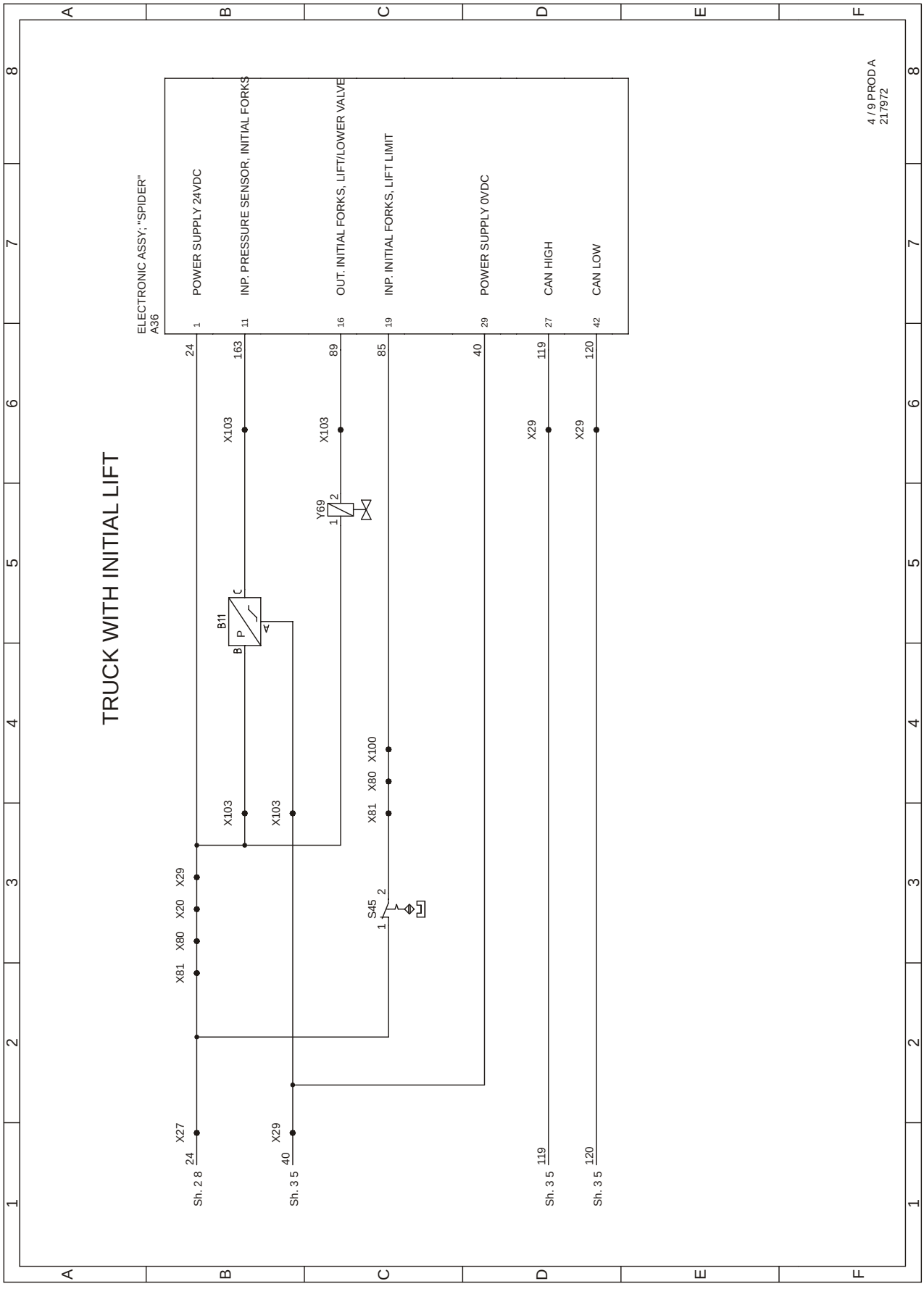

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Table 9: Functional description

Event:	**10. Cabin lifting**
Prior event(s)	2
Action(s)	Press the lift cabin button
Influencing elements	Cabin lift button [A2:S19] Battery status ok (>20% charge left) Lift height limit S33 [A1:INP.CABIN IN TOP POSITION] not activated
Resulting conditions	[A1:OUT.PUMP CONTACTOR] goes low [A1:OUT.CABIN LIFT/LOWER] goes low Cabin hydraulic soft closing valve [Y45] activates. Pump contactor [K30] activates Pump motor [M3] starts
Event:	**11. Cabin lowering**
Prior event(s)	2
Action(s)	Press the lower cabin button
Influencing elements	Cabin lower button [A2:S20] Lift height < 0,1 m, S32 [A1:INP. CABIN/FORKS LOWER THAN 100mm] activated
Resulting conditions	[A1:OUT.LOWER VALVE] goes low [A1:OUT.CABIN LIFT/LOWER] goes low Cabin lowering hydraulic valve [Y10] activates. Cabin hydraulic soft closing valve [Y45] activates. When S32 [A1: INP. CABIN/FORKS LOWER THAN 100mm] is not activated, pallet to ground protection or footprotection is active.
Event:	**12. Initial forks lifting**
Prior event(s)	2
Action(s)	Press the lift forks button
Influencing elements	Fork lift button [A2:S21] Battery status ok (>20% charge left) Lift height limit S45[A36:INP.INITIAL FORKS LIFT LIMIT] not activated
Resulting conditions	[A1:OUT.PUMP CONTACTOR] goes low [A36:OUT.INITIAL FORKS SOFT CLOSING VALVE] goes low Forks hydraulic soft closing valve [Y69] activates. Pump contactor [K30] activates Pump motor [M3] starts

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10.5 Parameters & adjustments

10.5.1 General

The truck's control system stores a number of parameters. These parameters are used to configure the truck for correct operation in the particular application for which it was designed. The parameters are divided into two groups, Operator parameters and Service parameters.

- **Operator parameters (1 to 7)** - These parameters are used to tailor the driving characteristics of a truck for a specific operator or operation. A maximum of 10 operator parameter sets, so called operator profiles, can be stored in a truck. Operator parameters can be adjusted directly without the requirement for a suitable CAN service key.[1]
- **Service parameters (10 to 40)** - These parameters are used to tailor the truck's performance / operation characteristics and include all other parameters not designated as operator parameters. Service parameters can ONLY be adjusted when a suitable CAN service key is plugged into the truck.[2]

10.5.2 Displaying parameters - without the CAN service key

Proceed as follows to display parameters when a CAN service key is not connected:

- Ensure the battery is connected.
- Ensure the truck is switched off. Press  on the keypad.
- Press and hold horn button S18 for at least 1 second, enter a valid PIN code and then press  on the keypad.
- Hold S18 depressed until "P" is displayed, then release S18. Fig. 5

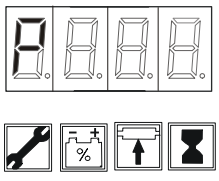
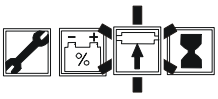


Fig. 5

Parameters symbol lights. 

The different parameters are now displayed by repeatedly operating speed control L1. Operator parameters can be both viewed and changed.[1]

1.Operator parameters can only be set without a CAN key if parameter #39 is set to value "1", "3", "5", "7", "9" or "11". See # 39 - Log-in method & operator parameter access on page 47.
2.Service parameters can be viewed without a CAN key being plugged in but they cannot be adjusted.

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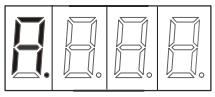
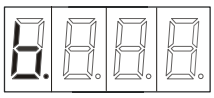
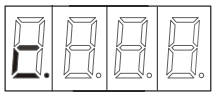
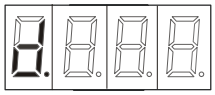
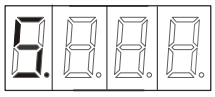
20 - Hour meter selection

This parameter determines which hour meter mode to display during normal use.

Table 17: Hour meter parameter selection

Value	Description	Display
1	Key time: Total time truck has been switched on	
2	Activity time: Combined time either pump or drive motor has been in operation (Default display mode)	
3	Drive motor time: Total time drive motor has been in operation	
4	Pump motor time: Total time pump motor has been in operation	
5	Remaining time to next service (Parameter #25 controls the initial value) See # 25 - Service interval on page 45	

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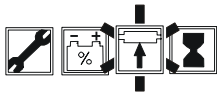
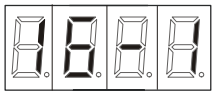
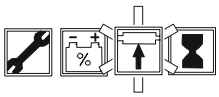
Parameters symbol lights (stops flashing). 



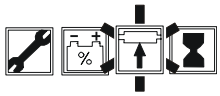
- Select argument #1 by operating speed control L1.

After 1 second the value of argument #1 will be displayed.

- Press horn button S18.

Parameter symbol flashes.. 

- Set argument #1 value by repeatedly operating speed control L1 up or down. Refer to base option list Table 21:
- Press horn button S18 once to confirm the new setting.

Parameters symbol lights (stops flashing). 

Adjust arguments #2, #3 and #4 using the same method as above.

- Switch off the truck by pressing  on the keypad.

The special option shall now be activated.

- Ensure the special option operates correctly before returning the truck for normal use.

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10.6 Diagnostic and troubleshooting

10.6.1 General

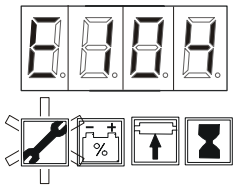
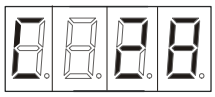
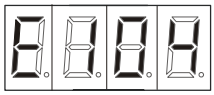


Fig. 9





 means constantly on  means flashing.

The trucks's electronic control system incorporates built-in fault code display and logging. This capability works as a powerful complement in assessing the cause of eventual truck malfunctions. When a fault code occurs the code number is displayed and the fault condition LED flashes. Fig. 9.

The codes can be broadly divided into two groups:

- Caution codes - denoted by prefix "C". These codes alert the operator to the presence of a caution condition. Caution codes in the range C50 to C99 will limit the truck's maximum speed to creep-speed. The conditions which cause such codes can usually be easily remedied without further attention. Caution codes C3 to C43 are not stored in the code history log.
- Error codes - denoted by prefix "E". These codes alert the operator to the presence of a fault condition in the truck. Error codes E100 and higher will stop all truck driving functions until the error code is cleared.

The first time any fault code is displayed it is advisable to check if the condition persists by switching the truck off completely, i.e. disconnect the battery and then switch back on. Check to see if the fault code is again displayed.

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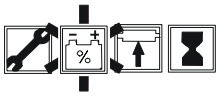
10.6.5 Built-in Test Function

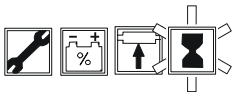
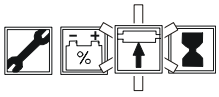
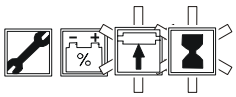
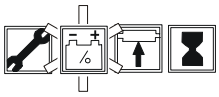
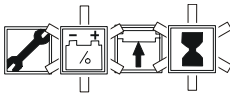
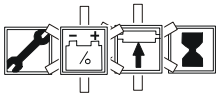
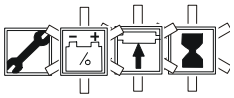
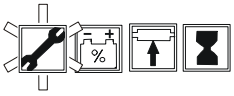
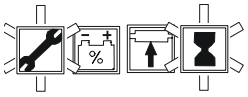
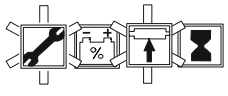
The truck's control system provides a number of useful built-in test functions

- Connect CAN-key in X41 and press  [A17].
- Battery status is shown. 
- Press Horn S18 repeatedly to choose Built-in Test mode.

NOTE!

All truck functions operate as normal in this mode. Care should be taken when operating the truck and reading the display at the same time!

Table 30: Built-in test modes

Mode	Flashing symbol	Displayed data
1		Speed reference value sent to Curtis.
2		Digital inputs/outputs can be tested. See Table 31:, Table 32: & Table 33:for more information.
3		Battery voltage (V)
4		Armature current (A)
5		Field current (A)
6		PWM Armature in %
7		Status Curtis
8		Signal from pressure sensor [B10] (Hydraulic pressure in lift circuit) (V)
9		Digital inputs/outputs of expansion unit [A36]. Seetable 34 on page 76
10		Signal from pressure sensor [B11] (Hydraulic pressure in initial lift circuit) (V)

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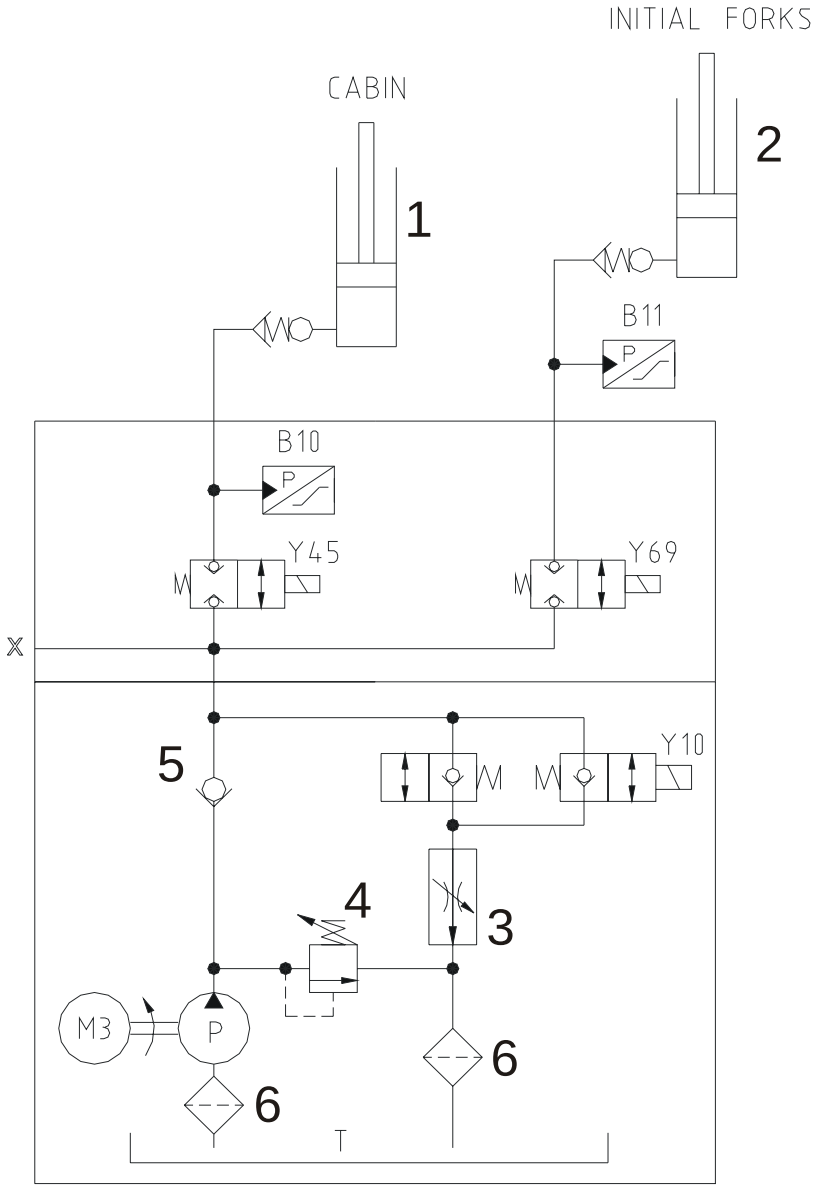
11.2.2 Hydraulic drawing and symbol list



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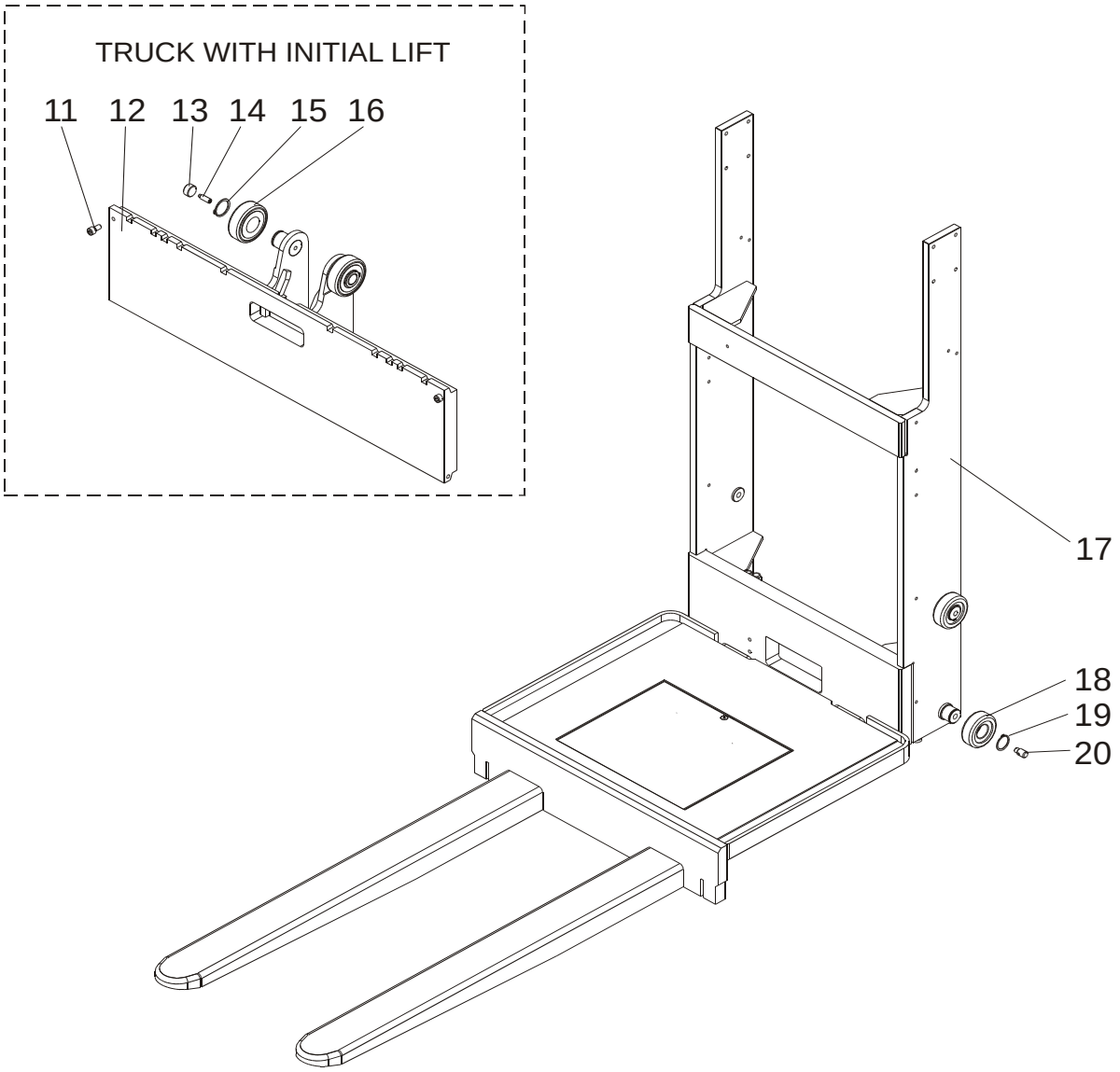
13- Fork carriage – 7420

13.1 Included components



Order number	Date	Valid from serial number	T-code
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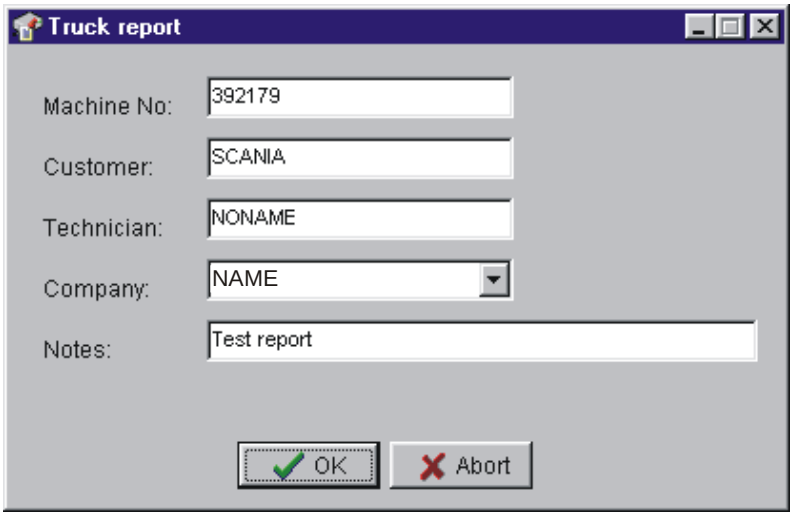
14.7 Truck report function

It is possible to generate a report to a file or disk with the truck's configuration and status. Select menu <*Tools* | *Generate truck report...*> or with the tool button *Truck report*. Save the report in Report.file.



Example of information generated in the truck report:

```
[GENERAL]
REPORT DATE-TIME=2004-01-19 11:11:58
CPC-PP SERIAL No=8002041
MACHINE NUMBER=555555
CUSTOMER=CUSTOMER 1
TECHNICIAN=NONAME
COMPANY=Other
NOTES=Test report

[CAN NODES]
MAIN CARD=0
CURTIS DRIVE CONTROLLER=16

[MAIN CARD CONFIGURATION]
SOFTWARE=181179-001
HARDWARE=167833-004
SERIAL NO=53676

[DRIVE CONTROLLER CONFIGURATION]
SOFTWARE=5
DRIVE CURRENT LIMIT (A)=300
FIELD MAXIMUM (A)=34
SERIAL NO=52857
MFG Date:=26/05/03

HOUR METERS]
A IGNITION TIME=81
B TOTAL MOVEMENT=7
C DRIVE MOTOR TIME=7
D PUMP MOTOR TIME=0
S SERVICE TIME=7

[ERROR LOG]
01=104  00007.5
02=104  00007.5
03=104  00007.5
04=104  00007.5
05=104  00007.5
-
-
-
09=104  00005.0

[DRIVER PARAMETERS]
1=100
2=100
3=75
-
-
-
100=0

[TRUCK PARAMETERS]
11=0
12=0
13=0
```

The contents of certain rows can vary according to truck type.

Order number	Date	Valid from serial number	T-code
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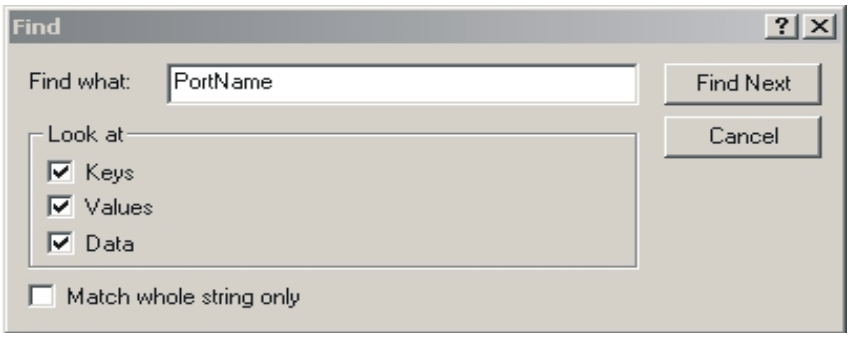
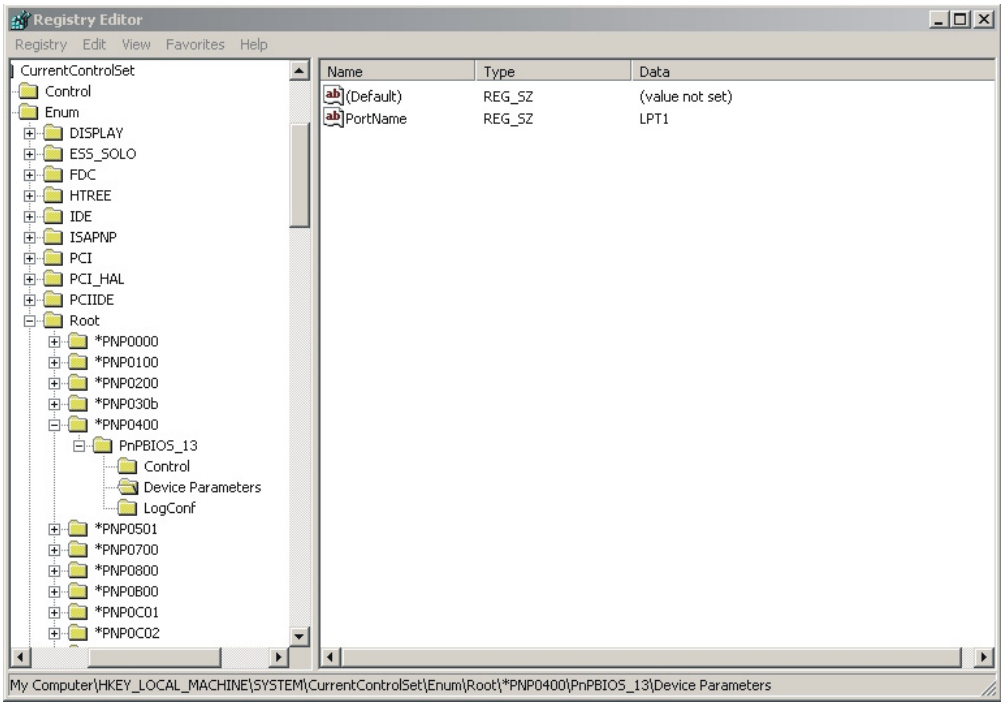
NOTE! The location of the folder differs between different computers (some may be \Enum\Root\.., while others could be \Enum\ACPI\ etc.). Thus be sure to search for the correct folder.



When the folder is found, check that **LPTx (x=1, 2, 3, 4)** is displayed in the PortName data field and that the folder name is Device Parameters.



Order number	Date	Valid from serial number	T-code
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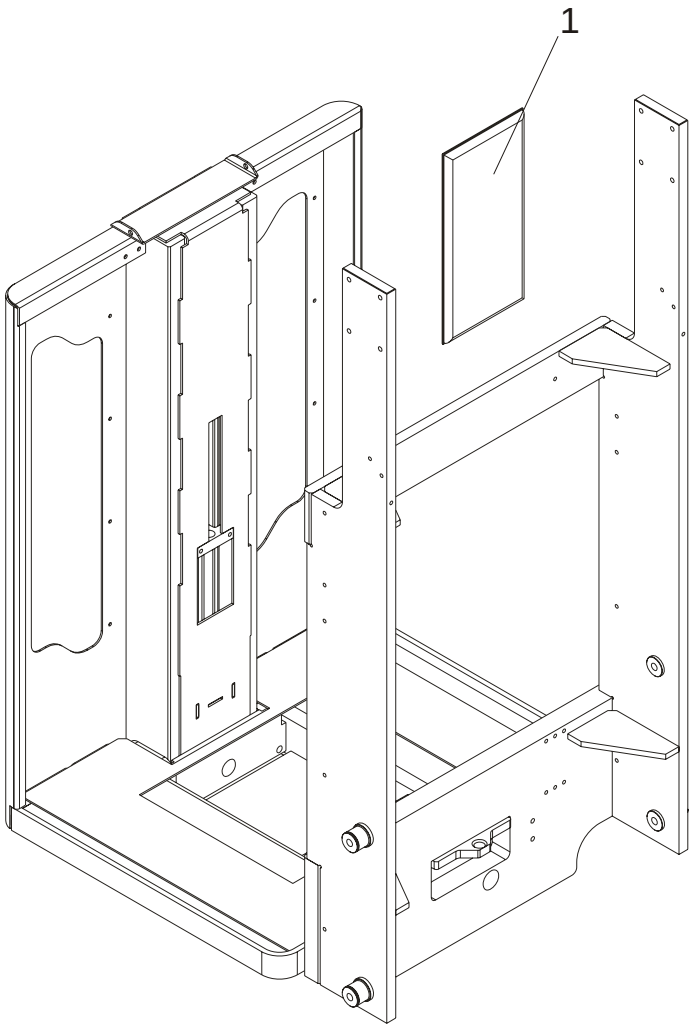
15.7 Seat, cushions (0620)



15.7.1 Dismantling

- Remove the cushion (1).

15.7.2 Material handling

The cushion must be placed in a container intended for combustible material.