



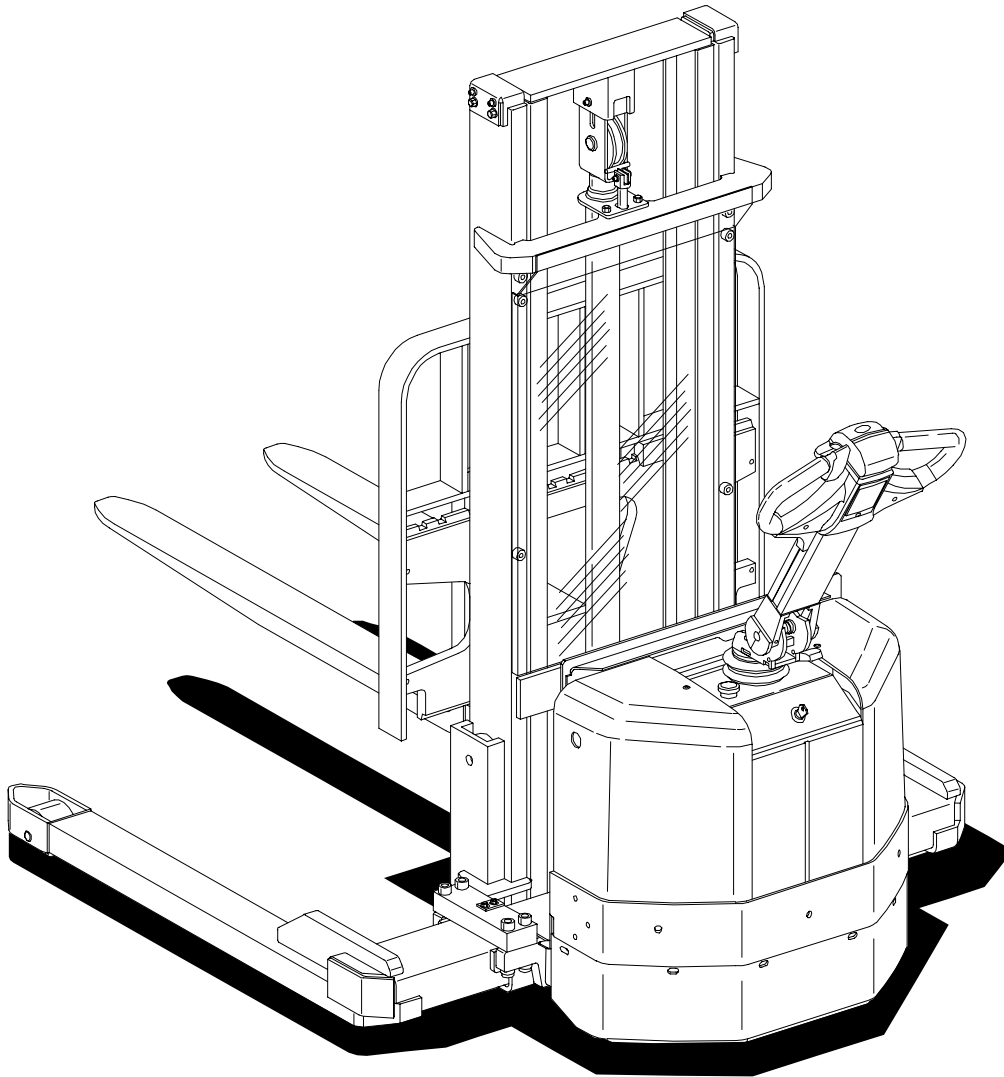
MATERIAL HANDLING U.S.A.

Service Guide

6BWS10/13

Electric Walkie Adjustable Straddle Stacker

Effective Serial Number 585890 - UP



- ⚠ Warning** Read and observe all warnings on this unit before operating it.
- ⚠ Warning** **DO NOT** operate this equipment unless all factory installed guards and shields are properly secured in place.

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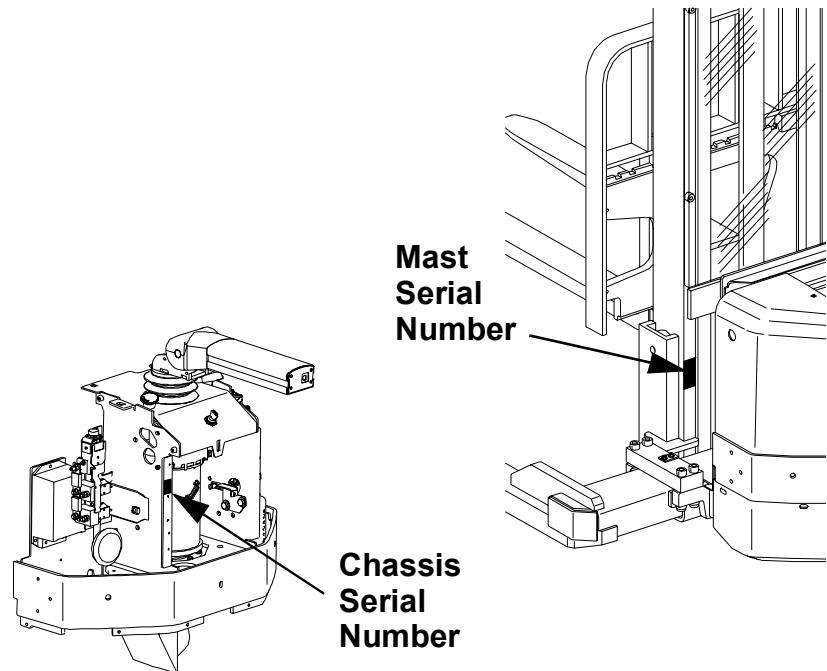
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Parts ordering instructions

How to order

When you order parts, supply the part number, quantity, model, chassis serial number, and mast serial number of your machine. The serial number on the figure refers to either the Mast serial number or Chassis serial number (see figure below for location of serial numbers) and not the truck serial number (shown on next page). Supplying this information will assure prompt, efficient handling of your order. The pictorial reference number is not needed and including it can only add confusion.



Field modifications

The regulations imposed by OSHA make it mandatory that alteration of industrial trucks be done only as approved in advance and in writing by the manufacturer. Their regulations apply to counter-weighting, changes in masts when such changes affect capacity and any other safety modifications. It is mandatory that nameplate and instructions be changed accordingly (1910.178 (a)(4)).

Toyota will review such changes requested as we can properly evaluate and rerate as to capacity. A change will be

Parts ordering instructions

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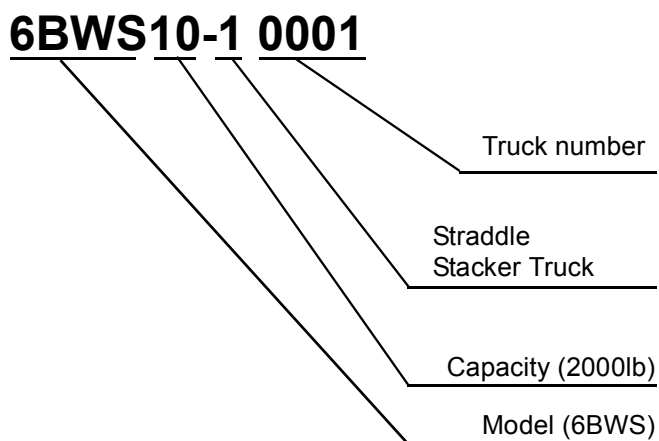
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evaluated upon receipt of a written request which includes truck and mast serial number and a description of all proposed changes.

If the change is approved, authorization will be sent, as will new nameplates or other labeling where appropriate. The new nameplates should be installed over the earlier nameplate.

The modifier should send confirmation of the change to the factory along with pictures of the revised truck.

Explanation, truck serial number





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Technical Data

Model	6BWS10/13
Drive Motor	
Type	TSL140S-DS30
Output, hp (kW)	1.6 (1.2)
Duty cycle	S2, 60 min
Minimum carbon brush length, inch (mm)	0.5 (13)
Nominal commutator diameter, inch (mm)	2 (50)
Minimum commutator diameter, inch (mm)	1.85 (47)
Resistance, shunt field winding, Ω at 77° F (25° C)	0.49
Resistance armature winding, Ω at 75° F (24° C)	0.0156
Insulation resistance between the windings and motor casing	≥ 1 Mohm
Weight, lb (kg)	30 (14)
Brakes	
Type	BFK457-08
Braking force, ft-lbs (N•m)	8.85 (12)
Output, W	25
Resistance coil, Ω	23
Nominal play in actuated position, inch (mm)	0.078-0.157 (0.2-0.4)
Minimum thickness brake disc, inch (mm)	0.216 (5.5)
Thickness of a new brake disc, inch (mm)	0.275 (7.0)
Transmission/Drive Gear	
Type	2-stage angle transmission
Gear ratio	19,14:1
Oil volume, gallon (liter)	0.26 (1.0)
Oil type at normal temperature at temperature < 5° F (-15° C)	Hypoid oil SAE 80W/90 SAE 75W

Technical Data

Model	6BWS10/13
Wheels	
Drive wheel, inch (mm)	Dia 8.5 x 3 (215 x 70)
Axle pressure without load, lbs (kg)	1521 (690)
Axle pressure at rated load, lbs (kg)	1620 (735)
Tightening torque for wheel bolts, ft-lbs (N•m)	47 (65)
Support arm wheel, inch (mm)	Dia 14 x 3 (100 x 75)
Axle pressure without load, lbs (kg)	2 x 355 (240)
Axle pressure at rated load, lbs (kg)	2 x 1510 (240)
Hydraulic System	
Output, hp (kW)	2.95 (2.2)
Duty cycle, %	5
Minimum carbon brush length, inch (mm)	0.5 (12)
Minimum commutator thickness/diameter, inch (mm)	0.187 (4.75)
Pressure at rated load, psi (bar)	2800 (193)
Overflow pressure, psi (bar)	3046 (210)
Pump flow, gpm (liter/minute)	1.32 (5.0)
Tank volume, gpm (liter/minute)	1.19 (4.5)
Oil type: at normal temperature at temperature < 5° F (-15° C)	Hydraulic oil ISO-L-HM32 ISO-L-HV32
Fuses	
Drive motor circuits, A	125
Pump motor circuits, A	125
Control circuits, A	7.5
Battery Compartment, Batteries	
Dimensions LxWxH, inch (mm), 180 Ah 240 Ah 320 Ah	7.72 x 25.31 x 17.80 (196 x 643 x 452) 7.72 x 25.31 x 22.52 (196 x 643 x 572) 9.60 x 25.31 x 22.52 (244 x 643 x 572)
Capacity, Ah	180-255
Weight, lbs (kg)	290-600 (131-272)



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Model	6BWS10/13
Driving Speed	
Without load, 0-750 kg, m/h (km/h)	3.73 (6.0)
With rated load, m/h (km/h)	3.29 (5.3)
Lift/Lowering Speed	
Lift without load, f/s (m/s)	6.7 (0.19)
Lift with rated load, f/s (m/s)	3.5 (0.10)
Lowering without load, f/s (m/s)	5.3 (0.15)
Lowering with rated load, f/s (m/s)	6.7 (0.19)
Power Consumption	
Driving without load, A	23
Driving with rated load, A	34
Lift without load, A	54
Lift with rated load, A	148
Incline Climbing Ability	
With rated load	8%
Turning radius	
Turning radius WA, inch (mm)	60 (1519)
Weight	
Truck without battery, (medium) lbs (kg) With mast 83/128 [2108/3251 mm]	1686 (765)

Introduction, Maintenance

Safety Regulations with Maintenance Work

Only authorized personnel that have been trained in the service and repair of this type of truck should carry out service and repair work.

- Do not carry out any maintenance work on the truck unless you have the correct training and knowledge to do so
- Keep the area clean where you carry out the service. Oil or water makes the floor slippery
- Do not wear watches, rings, or jewelry when working on the truck
- Avoid wearing loose-fitting clothing
- Wear personal protection equipment to protect eyes, face, and skin
- Use insulated tools



WARNING Short-circuiting/Burns.

When working with the truck's electrical system, short-circuiting/burns can occur if a metal object comes into contact with live electrical connections.

Remove watches, rings or other types of metal jewelry.

- Always disconnect the battery by pulling out the battery isolator when carrying out maintenance work on the truck unless otherwise stated in this Service Manual
- Always switch off the truck's power supply before opening the covers on the drive unit or electrical system
- Relieve the system pressure slowly before starting work on the truck's hydraulic system
- Use paper or a rigid sheet of cardboard when checking for oil leakage. **Never** use your hand

**WARNING** Risk of burns.

Hot transmission and hydraulic oil.

Let the truck cool before changing the oil.

Only fill the hydraulic system with new and clean oil

- Bear in mind that the oil in the transmission or the hydraulic system can be hot

**WARNING** The hydraulic system can be damaged.

If the oil is contaminated, hydraulic components can be damaged.

Always use new and clean oil in the hydraulic system.

- Store and dispose of changed oil in accordance with local directives
- Do not release solvents and the like, which are used for cleaning/washing, into drains that are not intended for this purpose. Follow the local directives that apply for disposal

NOTE! The battery can be damaged.

When welding using an electric power source, the welding current can enter the battery.

The battery should therefore be disconnected.

- Disconnect the battery when welding on the truck

**CAUTION** Harmful gases.

Paint that is heated gives off harmful gases.

Remove 4.0 inches (100 mm) of paint from the work area.

- Remove at least 4.0 inches (100 mm) of paint around the welding/grinding area through sand-blasting or the use of a paint stripper when welding or grinding on painted surfaces

1. Service Program

All points in the service program should be carried out to attain proper operation and the least possible downtime. The service intervals are only a guide and do not need to be followed to the letter. They may be adapted to local conditions, but it is important that the intervals comply with Toyota's minimum requirements.

The service intervals are based on the running times and can be adapted to most normal 8 hour shifts. The service interval may be shortened if the truck is used more frequently or in more demanding situations, such as cold store, dusty or corrosive situations. The following running times have been used when calculating the intervals:

- Single shift operation: 20 hr./week
- 2-shift operation: 40 hr./week
- 3-shift operation: 60 hr./week

Ensure the truck is given a regular maintenance service after every 500 driving hours. The truck's safety, efficiency and service life is dependent on the service and maintenance it is given.

Only use Toyota approved spare parts when service and repair work are carried out.

2. Cleaning and Washing

Cleaning and washing of the truck is important to ensure the truck's reliability.

NOTE! Risk of short-circuiting.
The electrical system can be damaged
Disconnect the battery before washing by pulling out the battery connector.

- Carry out general cleaning and washing weekly

2.1 External Cleaning

- Remove rubbish, etc. from the wheels daily
- Use a well-known degreasing agent, diluted to a suitable concentration
- Rinse off loose grime using tepid water

NOTE! Jamming, corrosion.
Mechanical components can be damaged.
After washing, the truck should be lubricated as set out in the "**Maintenance Schedule**" on page 17 and "**Lubrication Schedule**" on page 22.


2.2 Motor Compartment Cleaning

- Cover the electric motors, connections and valves before washing

NOTE! Risk of short-circuiting.
The electrical system can be damaged.
Electrical components must not be cleaned with a high pressure washing unit.

- Clean the motor compartment using a well-known degreasing agent, diluted to a suitable concentration
- Rinse off loose grime using tepid water

2.3 Electrical Components

 **WARNING** When using compressed air, wear effective chip-guarding and personal protective equipment. Compressed air used for cleaning **MUST** be reduced to less than 30 psi (207 kPa).

- Blow electric motors down using compressed air
- Clean the electrical panels, electronic boards, contactors, connections, solenoid valves, etc. using a damp cloth and a cleaning agent

NOTE! Risk of short-circuiting.
Electrical components can be damaged.
Do not break the guarantee seal on the electronic board.

3. Safe Jacking

All lifting must be carried out on a flat, non-slip and firm surface. Avoid new laid asphalt or asphalt on a hot summer's day.

- Activate the parking brake to prevent the truck from moving during the lift. If the lift applies to the brake wheel, chock the other wheels so that the truck stands still
- Select a lifting point so that the lift is as easy as possible (one corner at a time). If the truck has marked lifting points on the under side of the chassis these can be used to obtain a well balanced lift
- Ensure that the surface under the jack is clean and free from oil and grease
- Ensure that your hands and the jack's lever are free from oil and grease
- Use the lever that belongs to the jack. A lever that is too short requires more force than is necessary. If the lever is too long there is a risk of the jack being overloaded
- Support the truck:
 - as close as possible to the part of the chassis that is to be lifted. This reduces the risk of the truck tipping over
 - so that the truck cannot roll
- **Never** lift up the jack in order to lift higher
- **Never** work under a lifted truck unless it is well supported



WARNING Risk of crushing.

A badly supported truck can fall.

Never work under a truck that is not supported on trestle-blocks and secured by a lifting device.

Planned Maintenance

1. Maintenance Schedule

I: Inspect, rectify and change if necessary. T: Tighten. C: Clean. L: Lubricate.
 M: Control measurement, rectify if necessary

Pos. No.	Work to carry out						
		Interval in hours - may vary due to application					
		5	20	80	500	1000	3000
Interval in days/weeks/months - may vary due to application		1d	1w	1m	6m	12m	36m
0000.	Chassis						
0000.1	Check all links and locking pins					I	
0000.2	Check wear on cover/battery locking					I	
0000.3	Check of cracking and damage					I	
0000.4	Check the drive housing's mounting on the chassis				T		
0000.5	Check finger guard					I	
0000.6	Check signs and stickers					I	
0380.	Fork Carriage						
0380.1	Check for crack formation and damage					I	
0380.2	Check clearance in bushes and links					I	
1700.	Drive Motor						
1700.1	Check clearance in connections			I/T ¹		I/T	
1700.2	Check the carbon brushes in the drive motor					M	
1700.3	Clean the drive motor					C	
1700.4	Re-tighten the attachment bolts			T ²			
1700.5	Check for abnormal noise in bearing					I	

Planned Maintenance

I: Inspect, rectify and change if necessary. T: Tighten. C: Clean. L: Lubricate. M: Control measurement, rectify if necessary							
Pos. No.	Work to carry out						
	Interval in hours - may vary due to application	5	20	80	500	1000	3000
	Interval in days/weeks/months - may vary due to application	1d	1w	1m	6m	12m	36m
2550	Drive Gear						
2550.1	Check for leakage			I ³			I
2550.2	Check the oil level. Use the screwed in dipstick to measure oil					I	
2550.3	Check for abnormal noise					I	
2550.4	Check the attachment and clearance in steering bearing					I	
2550.5	Change the oil in the drive gear			L ⁴			L
3100.	Brake						
3100.1	Clean and check functionality				C		
3100.2	Check the brake disc					M	
3100.3	Check the clearance in disengaged position 0.0078-0.02 inch (0.2-0.5 mm)					M	
3500	Wheels						
3500.1	Remove string and other rubbish	I					
3500.2	Check the drive wheel for wear and the tightening torque on bolts (New wheel: Drive tread thickness = 1.18 inch [30mm]) (Tightening torque = 48 ft-lbs [65 N•m])				I/T		
3500.3	Check that the caster wheel turns and rotates freely				I		
3500.4	Check for wear on the caster wheel (New wheel: Drive tread thickness = 0.40 inch [10 mm])				I		
4110	Steering (Tiller) Arm						
4110.1	Check the mountings					I	
4110.2	Check the power in the gas damper				I		
4110.3	Check steering	I					



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I: Inspect, rectify and change if necessary. T: Tighten. C: Clean. L: Lubricate.
M: Control measurement, rectify if necessary

Pos. No.	Work to carry out						
		Interval in hours - may vary due to application					
		5	20	80	500	1000	3000
Interval in days/weeks/months - may vary due to application		1d	1w	1m	6m	12m	36m
5000	Electrical Functions						
5000.1	Check the function of the brake microswitch	I			I		
5000.2	Check the function of the reverser switch	I					
5000.3	Check the function of the horn	I			I		
5000.4	Check for wear to cables in the steering (tiller) arm				I		
5000.5	Check the function of the driver's control	I			I		
5000.6	Check the error code log and operating times	I			I		
5110	Battery						
5110.1	Check the electrolyte level, 0.40-0.60 inch (10-15 mm) over the cell plates		M				
5110.2	Check connections to battery, truck and charger		I				
5110.3	Check that the cell and pole guards are undamaged		I				
5110.4	Check the fluid density and temperature		M				
5110.5	Remove overflow fluid from the battery trough		C				
5110.6	Check the battery locking					I	
5400	Power System						
5400.1	Cleaning and checking of mounting in chassis			C/T ¹		C/T	
5400.2	Re-tighten cable connections			T ¹			
5400.3	Check the contactor points on K10 and K30					I	
5400.4	Check the movement of the contactors					I	
5400.5	Check the cable insulation					I	



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Planned Maintenance

I: Inspect, rectify and change if necessary. T: Tighten. C: Clean. L: Lubricate. M: Control measurement, rectify if necessary							
Pos. No.	Work to carry out						
	Interval in hours - may vary due to application	5	20	80	500	1000	3000
	Interval in days/weeks/months - may vary due to application	1d	1w	1m	6m	12m	36m
5700	Electronic Circuit Board						
5700.1	Check connectors and cables			T ¹			
5700.2	Check all segments on display					I	
6000	Hydraulic System						
6000.1	Check hoses and connections for leakage					I	
6000.2	Check hoses for wear and damage					I	
6000.3	Check the oil tank for cracks, leakage and damaged mountings					I	
6000.4	Check that the oil level is correct		I			I	
6100.5	Change the oil and clean the filter			L ⁵		L	
6600	Lift Cylinder						
6600.1	Check for leakage					I	
6600.2	Check the mountings					I	
7100	Lifting Mast						
7100.1	Check for damage and crack formation				I		
7100.2	Retighten the mast mounting bolts (Tightening torque = 145 ft-lbs [197 N•m])				T		
7100.3	Check the play of the inner section rollers				I	X	
7100.4	Check the lateral play of the inner section				I	X	
7100.5	Check for wear on the lifting chains and chain rollers				I	X	
7100.6	Check the adjustment of the lifting chains				I	X	

1 = The connections are re-tightened for the first time after 80 h, and then every 1000 h/12 months.

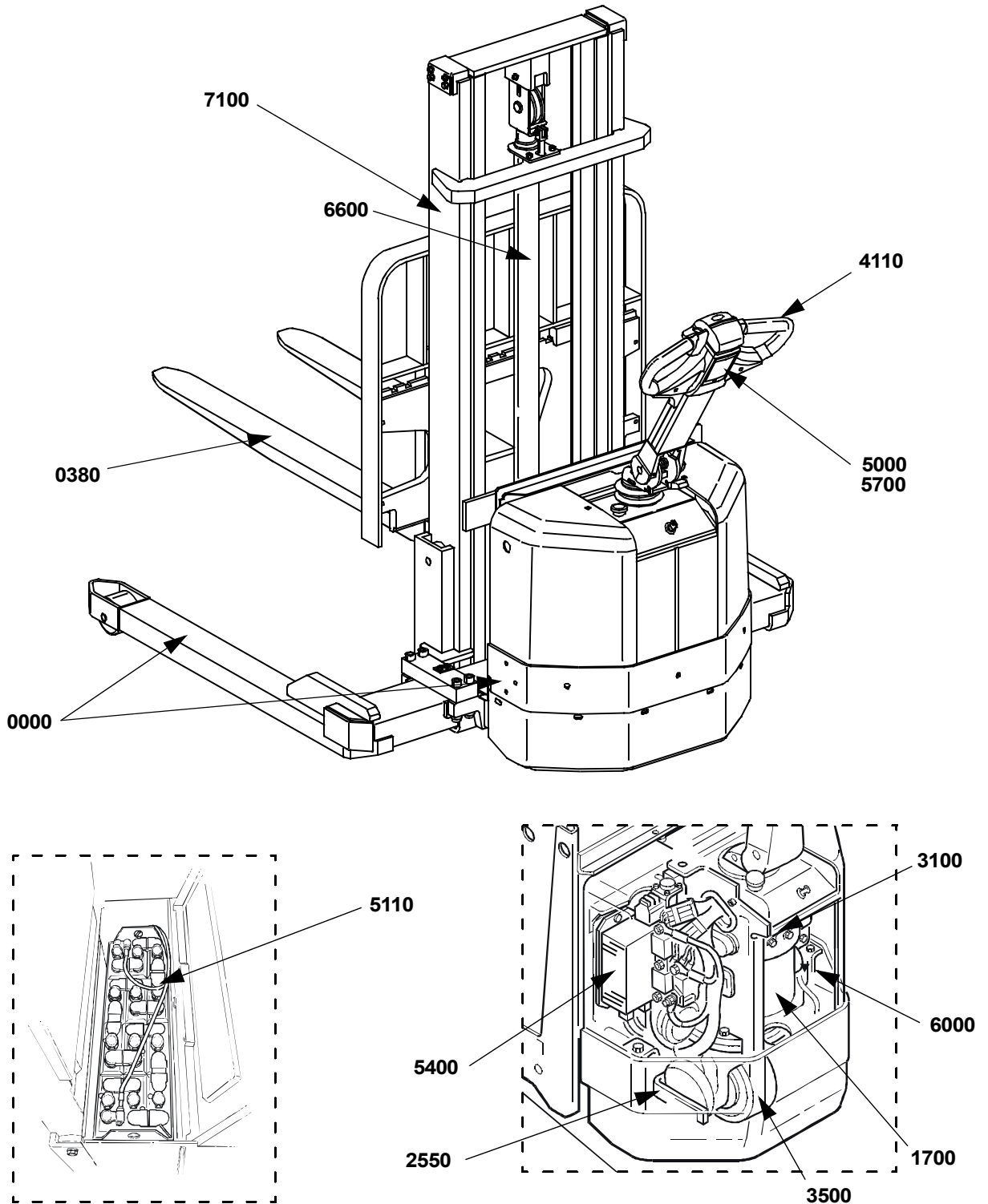
2 = The attachment bolts are re-tightened after 80 h/ 1 month to 33 ft-lbs (45 N•m).

3 = Check for leakage in conjunction with the first oil change.

4 = The oil is changed for the first time after 80 h/1 month, and then every 3000 h/36 months

5 = The oil is changed and the filter cleaned for the first time after 80 h/1 month, and then every 1000 h/12 months

When points with higher hour intervals are carried out, the points with lower hour intervals should also be carried out unless otherwise specified.



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