TOYOTA

INDUSTRIAL EQUIPMENT

SERVICE MANUAL

Reach Lift Truck

Models: 8BRU18
8BRU23
8BDRU15

24 Volt Models - Serial No. 24,000 and Up
36 Volt Models - Serial No. 36,000 and Up

00700-CL220-08

Issued: 23 Jan 2009

MidWestTech | Toyota 8BRU18, 8BRU23, 8BDRU15 Reach Truck Service Manual | Public... Order the manual at mid-west-tech.com >

Table of Contents

How to Use This Manual **1-1**
Map of the Manual 1-2
Manual Design 1-3
Abbreviations and Symbols 1-4
Safety **2-1**
Definitions 2-2
General Safety 2-3
Battery Safety 2-6
Static Precautions 2-9
Jacking Safety 2-10
Tie-down for Transport 2-11
Welding Safety 2-12
Systems Overview **3-1**
Vehicle Specifications 3-2
General System Data 3-3
Modes of Operation 3-5
Definitions 3-6
Planned Maintenance **4-1**
Planned Maintenance Guidelines 4-2
Initial 90 Day/250 Deadman Hour (HD) Maintenance 4-3
Every 180 days or 500 Deadman Hours (HD) 4-4
Every 360 Days or 2000 Deadman Hours (HD) 4-7
Lift Chain Inspection 4-8
Fork Inspection 4-9
Troubleshooting **5-1**
Electrical Troubleshooting 5-2
Hydraulic Troubleshooting 5-15
Symptom Tables 5-16
Codes and Tests **6-1**
Modes of Operation 6-2
Operator's Display 6-3
Self-Diagnosis Mode 6-4
Passwords 6-5
Disable Brush Wear Indicator (DC lift only) 6-6
Start the Hour Meter 6-7
Analyzer (AnL) Mode 6-8
Calibrate (Calibrtc) Mode 6-22
Configure (Configur) Mode 6-24
Tuning Mode 6-25
Code Summary List 6-28
Component Procedures **7-1**
List of Component Procedures 7-2
Component Locator Photos 7-5
Frame and Accessories **7-11**
Panels and Covers 7-12
Decals 7-15
Steering and Controls **7-17**
Steer Motor 7-18
Steer Controller 7-20
Control Handle 7-22

MidWestTech | Toyota 8BRU18, 8BRU23, 8BDRU15 Reach Truck Service Manual | Public... Order the manual at mid-west-tech.com >

Traction and Braking 7-23
Deadman Pedal Assembly 7-24
Caster Assembly 7-25
Caster Springs and Stops 7-33
Brake 7-36
Drive Wheel 7-38
Drive Unit 7-40
Electrical 7-45
Battery Procedures 7-46
Wiring and Harness Connectors 7-48
Contactors 7-56
Switches (General) 7-57
Key Switch (S1) 7-58
EPO Switch (S2) 7-59
Lift Inhibit Switch (S4) 7-60
Mast Switch 1 (S6) 7-61
Deadman (Left Foot) Switch (S3) 7-62
Platform (Right Foot) Switch (S7) 7-63
Staging Switch (S8) 7-64
180° Switch 7-65
Steer Stop Sensors 7-66
Horn 7-67
Motors 7-68
Traction Motor 7-73
Power Amplifiers 7-74
Height Indicator (optional) 7-75
Hydraulics 7-77
Hydraulic Fluid 7-78
Control Valve 7-80
Reach/Tilt/Sideshift Manifold 7-83
Solenoids 7-84
Free Lift Cylinder Repair 7-85
Staging Cylinder Repair 7-86
Tilt Cylinder (single cylinder carriage) 7-87
Tilt Cylinder (dual cylinder carriage) 7-89
Reach Cylinder 7-91
Velocity Fuses 7-94
Mast 7-95
Mast Roller Bearings 7-99
Lift Chains 7-101
Free Lift Chain Anchors 7-105
Staging Chain Anchors 7-106
Over-the-Mast Hose/Cable 7-107
Reach Carriage Assembly 7-108
Theory of Operation 8-1
Electrical Functions 8-2
Braking System 8-3
Steering System 8-5
Traction System 8-7
Lift/Lower System 8-9
Auxiliary Hydraulic Functions 8-10
Indicators and Switches 8-13

MidWestTech | Toyota 8BRU18, 8BRU23, 8BDRU15 Reach Truck Service Manual | Public... Order the manual at mid-west-tech.com >

Appendix **A-1**
Lubrication Specification Chart A-2
Thread Adhesives, Sealants, and Lubricants A-3
Torque Chart - Hydraulic Fittings A-4
Torque Chart - Straight Thread Face Seal O-Rings A-5
Torque Chart - Standard (Ferrous) A-6
Torque Chart - Metric (Ferrous) A-8
Torque Chart - Standard (Brass) A-9
Torque Chart - Metric (Brass) A-10
Decimal Equivalent Chart A-11
Standard/Metric Conversions A-14
Schematics A-15
Index **I-1**

MidWestTech | Toyota 8BRU18, 8BRU23, 8BDRU15 Reach Truck Service Manual | Public... Order the manual at mid-west-tech.com >

Test 21 - Error Code Display

This test is used to display the last ten error codes and the corresponding "key ON" hour meter reading. The LEDs of the battery discharge indicator represents the error code being displayed. The top LED on the battery discharge indicator represents the most recent error, the bottom LED represents the oldest error. The display shows the two digit error code followed by the "key ON" hour meter reading (in whole hours). If there is no error for a particular location, "ERR 00" is displayed. The UP and DOWN Arrow switches are used to move through the LEDs.

Use the Power Control Select switch to end the test and return to the Self-Diagnosis Mode.

Related Codes and Tests

- Test 11- Simple Test; ESY02 thru ESY11

The test result is displayed as the error code and the "key ON" hour meter reading at the time of the code. For example: 36 h 9485:

Sub-Menu Test No.	Test Description
Top LED	Most recent error code and key switch hours
Bottom LED	Oldest error code and key switch hours

MidWestTech | Toyota 8BRU18, 8BRU23, 8BDRU15 Reach Truck Service Manual | Public...
Order the manual at mid-west-tech.com >

1. Check for continuity of speed sensor wires between speed sensor harness connector and TPA connector. Repair or replace harness.
2. Check voltage to speed sensor from the TPA. Voltage at JT1-26 wrt JT1-7 should be approx 5V. If not, replace the TPA. Measure voltage from the speed sensor to the TPA. Voltage at JT1-26 wrt JT1-31 while traveling should be approx 2.8V. Voltage at JT1-26 wrt JT1-32 while traveling should be approx 2.8V. If either voltage is not correct, check the wiring harness to the Traction Motor for opens and shorts. If the harness is OK, replace the speed sensor. If both voltages are correct, replace the TPA.

MidWestTech | Toyota 8BRU18, 8BRU23, 8BDRU15 Reach Truck Service Manual | Public... Order the manual at mid-west-tech.com >

Lift Chains

There are two types of lift chains on the Toyota Reach lift truck. The main lift chains raise and lower the telescopics. The free lift chains raise and lower the reach carriage assembly.

Check the lift chains monthly. Most unsatisfactory chain performance is traced directly to inadequate chain maintenance. Remove the chain and inspect its condition using the supplied chart and the procedures.

Main Lift Chain Adjustment

1. Remove the mast guard.
2. Adjust the lift chains by turning the nut on the lift chain anchor on the mast main frame assembly. Turn the nut clockwise to tighten the chain and counterclockwise to loosen the chain.
3. Keeping equal tension on chains, adjust the chain anchor nuts so the inner and outer telescopics are flush at the bottom of the mast.
4. When height adjustment is complete, torque the jam nut to 200 ft. lb. (271 Nm).
5. Liberally apply oil to each chain using a narrow paint brush. See "Lubrication Specification Chart" on page A-2.
6. Re-install the mast guard.
7. Test operation.

Free Lift Chain Adjustment

1. Remove the mast guard.
2. Adjust the lift chains by turning the nut on the lift chain anchor on the inner telescopic. Turn the nut clockwise to tighten the chain and counterclockwise to loosen the chain.
3. Retract the reach mechanism fully.
4. The carriage may rest on the floor with slack in chains.
5. Keeping equal tension on chains, adjust the chain anchor nuts so the carriage is slightly off the floor.
6. If the lift truck is equipped with tilt, use the tilt button to tilt the forks so they are parallel with the floor.
7. With the reach mechanism retracted, forks level with floor, and key switch OFF, adjust anchor nuts equally until the bottom of the reach carriage is 3/4 in. (19 mm) up from the bottom of the inner telescopic when in the fully lowered position. The heel of the forks will be 0.5 in. (12.7 mm) off of the floor.
8. Liberally apply oil to each chain using a narrow paint brush. See "Lubrication Specification Chart" on page A-2.
9. Re-install the mast guard.
10. Test operation.

Lubrication

⚠CAUTION

Do not steam clean or degrease lift chains.

1. Apply oil to the chain using a narrow paint brush. See "Lubrication Specification Chart" on page A-2.
2. Make sure the exterior surface is covered to prevent rust and to make sure that the oil penetrates the chain joints to reduce wear.

MidWestTech | Toyota 8BRU18, 8BRU23, 8BDRU15 Reach Truck Service Manual | Public... Order the manual at mid-west-tech.com >

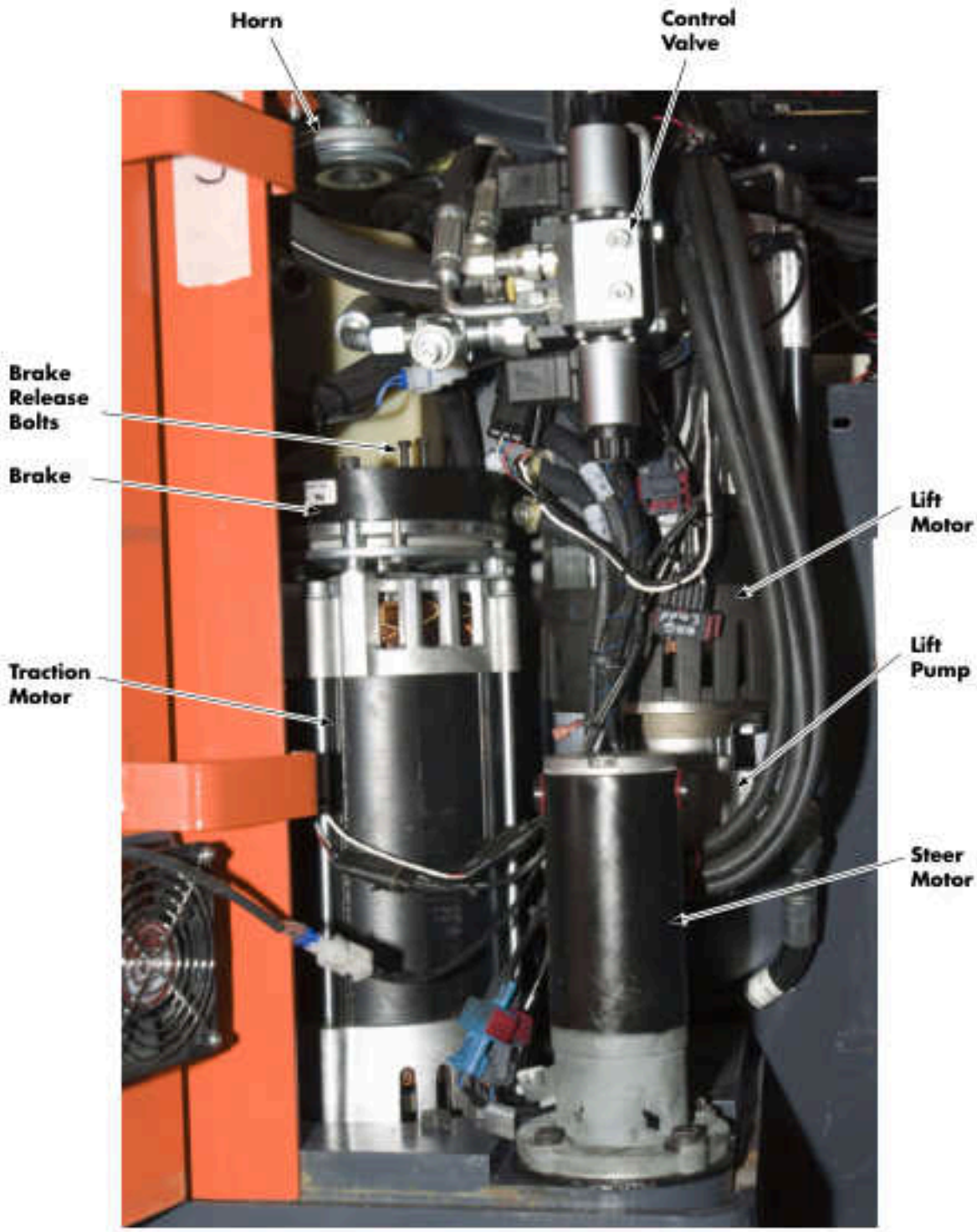
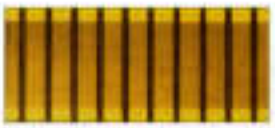
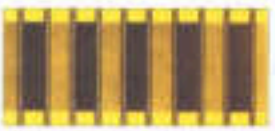
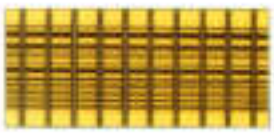
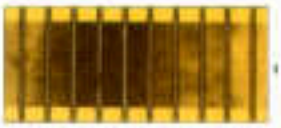
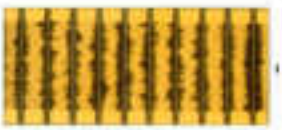
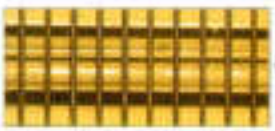


Figure 7-4. Motor Compartment

MidWestTech | Toyota 8BRU18, 8BRU23, 8BDRU15 Reach Truck Service Manual | Public... Order the manual at mid-west-tech.com >

Table 5-2. Commutator Surfaces

Condition	Probable Cause	Commutator Surface
Good Condition-Light Film	Uniform coloring indicates satisfactory operation of machine and brushes. Film color is largely an effect of thickness; therefore provided the film is uniform, it is perfectly acceptable.	
Satisfactory Condition-Light and Dark Pattern	This is not a good condition but in our experience it is known that machines having this commutator pattern have operated with satisfactory results for long periods of time. This condition can appear in alternating bars as shown or every 3rd or 4th bar. This is related to the winding design of the armature or difficulty caused from split windings crossing in the same slot.	
Unsatisfactory Condition-Streaky Film With No Commutator Wear	Frequently due to under-loaded operation, machine grossly over-brushed, or brush grade incorrect for particular machine application. Atmosphere and environmental conditions can contribute.	
Unsatisfactory Condition-Uneven Film	Patchy colors of varying densities and shape. Due to unclean operating conditions or incorrect physical condition of commutator.	
Unsatisfactory Condition-Film With Dark Areas	These areas can be isolated or regular. Commutator out of round. This can be caused by vibration or mechanical deficiencies in equipment operation, bearings, couplings, and so forth.	
Unsatisfactory Condition-Example of Poor Commutator Machining	Bars are low on entry and leaving edges giving rise to the brushes riding on the middle of the bars.	
Unsatisfactory Condition-Example of Poor Commutator machining	Bars are low in the middle giving rise to the brushes riding on entry and leaving bar edges. This and the previous illustration indicate the need for better maintenance.	
Unsatisfactory Condition-Streaky Film With commutator Wear	This is a further development of the third example. Brush grade, machine applications, and working environment are all suspect. Earlier corrective action should have been taken.	

MidWestTech | Toyota 8BRU18, 8BRU23, 8BDRU15 Reach Truck Service Manual | Public... Order the manual at mid-west-tech.com >