



SERVICE MANUAL

TR3500 Control 36/48v & 72/80v

36/48v

FBP16	E1BP1-62001-up
FBP18	E1BP1-72001-up
FBP20	E1BP2-62001-up
FBP25	E1BP2-72001-up
FBP30	E1BP3-62001-up

72/80v

FBP16	E1BP1-82001-up
FBP18	E1BP1-87001-up
FBP20	E1BP2-82001-up
FBP25	E1BP2-85001-up
FBP30	E1BP2-82001-up

**AC
MC**

Table of Contents

Mitsubishi Forklift Truck Important Safety Information	1
Specifications	2
Component Measurements	2
Current Measurements	2
Control Panel Thermal Switch	3
Contactors Tip Clearance (Gap)	3
Fuses	3
Traction and Pump Motor Shunt Field Resistances	3
Control Panel	4
Systems Operation	5
Glossary	5
Location of Control Panel Components	8
Symbol Library	9
General Information	12
Programmable Setup Options	13
Accessing Programmable Setup Options	18
Operational Circuit Elements	21
Run-Time Diagnostics	24
Chat Mode	28
Contactors	28
Accelerator Control	28
Circuits	29
Drive Circuit	30
Power Transistors	32
Testing and Adjusting	45
Accessing Stored Fault Codes	45
Finger Control System	55
How to set the Controller	58
Hydraulic System	62
Traction Module Test Procedure	63
Module Replacement	64

Troubleshooting .....	.65
Troubleshooting Checklist .....	.65
Control And Power System Operational Checks .....	.68
Circuit Tests .....	.71
Troubleshooting Charts .....	.74
Systems Operation and Test Equipment .....	.139
Conductor And Switch Continuity Tests .....	.144
Contactor .....	.145
Shunt Driver Board Tests .....	.148
Traction Motor Current Sensor Test .....	.149
Pump Module Test Procedure .....	.150
Thermal Switch .....	.151
Electrical System Adjustments .....	.151
Parking Brake Switch .....	.152
Rapid Tune-up Procedure .....	.153
Current Limit Test Adjustment .....	.154
Electric Braking Test and Adjustment .....	.155
Logic Board Layout .....	.156
Harness Wiring Circuit Guide .....	.158

A

Accelerator

Adjustment	151
Continuity Test	144
Control Diagnostic	28

B

Battery

BDI Adjustment Charts	156
Cell Voltage Test	66
Hydrometer Test	66
Load Test	66
Maintenance	66

Brakes

Parking Brake Switch Adjustment	152
Plugging Circuit	38
Regen Circuit	35
Test and Adjust Electric Brakes	155

Bypass Circuit

Circuit with Shunt Field Activated	42
Circuit Without Shunt Field Activated	43

C

Chat Mode	28
---------------------	----

Circuit Tests	71
-------------------------	----

Circuits

Bypass	42
DC/DC Converter	29
Drive Control	30
Traction motor	41
Drive Power	31
Failure Protection Circuit	41
Horn	29
Hydraulic Circuits	46
Plugging Circuit	37
Power Transistors	32
Regenerative Braking	35
Thermal Protection Circuits	41

Contactors

Continuity Test	144
General Information	28
Pump Contactor Operation Circuit	145

Continuity Tests

Accelerator Control	144
Contactors	145
DC/DC Converter	147
Diodes	147
Head Capacitor	44
Vehicle Monitoring System	147

Control Panel

Component Location	8
Electrical Testing	151
Specifications	4
Thermal Protection Circuit	41

Control System Checks	48
---------------------------------	----

D

DC/DC Converter

Circuit	29
Continuity Test	145

Diagnostics

Built-In Diagnostic Operation	49
Chat Mode	28
Run-Time Diagnostic Functions	49
Run-Time Diagnostics	24
Self-Diagnostics	50
Stored Fault Codes	44

Driver Board Tests

Drive Driver Board	148
Pump Driver Board	148

E

Electrical System Adjustments	
Method A (Mechanical)	151
Method B (Electrical)	152
Electrical Tests and Adjustments	
Accelerator Group	152
Current Limit Test and Adjust	154
Electric Braking	155
Harness Wiring Circuit Guide	158
Logic Board Layout	156
Park Brake Switch	152
Resistor R312	151

G

General Information	12
Glossary	5

H

Harness Wiring Circuit Guide	158
Horn	29
Hydraulic Circuits	
Actuation Circuit	46
Flyback Circuit	48
Lift Control	51
Lift Power	52
Power Steering Idle	47
Power Steering In Use	50
Pump Contactor	53
Pump Motor	47
Pump Shunt Field	51
Pump Shunt Field Circuit	49
Tilt and Auxiliary Control	153

L

Lift Control	
Additional Information	54
Lift Control Circuit	51
Lift Power Circuit	52
Logics	
Circuit Elements	21
Component Tests	140
Removal	140
Test Board Layout	156
Voltage Check	141
Voltage Test Chart	142

O

Operational Circuit Elements	21
--	----

P

Power Steering	
Power Steering Idle	47
Power Steering In Use	50
Programmable Setup Options	
General Information	13
Setup Option 1	19
Setup Options Other Than Option 1	20

R

Rapid Tune-Up	153
-------------------------	-----

S

Safety Information	1
Specifications	2
Stored Fault Codes	46
Symbol Library	9
Systems Operation and Test Equipment	
Continuity Tests	
Head Capacitor	45

T

Test Equipment	140
Testing and Adjusting	46
Thermal Protection Circuits	42
Tilt/Auxiliary Control	154
Tilt/Auxiliary Circuit	154
TR3500 Control Panel	10
Traction Motor	
Circuit	39
Current Limit	41
Drive Control Circuit	30
Drive Power Circuit	31
Electrical Testing	152
Thermal Protection Circuit	42
Transistors	
Electrical Tests	150
Power Transistor Circuit	32
Replacement	151
Troubleshooting	
Charts	75
Checklist	69
Circuit Tests	72
Preparation Tests	70

V

Vehicle Monitoring System Display Unit	
Circuit Test	75
General Information	22

Mitsubishi Forklift Truck

Important Safety Information

Most accidents involving product operation, maintenance and repair are caused by failure to observe basic safety rules or precautions. An accident can often be avoided by recognizing potentially hazardous situations before an accident occurs. A person must be alert to potential hazards. This person should also have the necessary training, skills and tools to perform these functions properly.

Improper operation, lubrication, maintenance or repair of this product can be dangerous and could result in injury or death.

Do not operate or perform any lubrication, maintenance or repair on this product, until you have read and understood the operation, lubrication, maintenance and repair information.

Safety precautions and warnings are provided in this manual and on the product. If these hazard warnings are not heeded, bodily injury or death could occur to you or other persons.

The hazards are identified by the "Safety Alert Symbol" and followed by a "Signal Word" such as "WARNING" as shown below.



The meaning of this safety alert symbol is as follows:

Attention! Become Alert! Your Safety is Involved.

The message that appears under the warning, explaining the hazard, can be either written or pictorially presented.

Operations that may cause product damage are identified by NOTICE labels on the product and in this publication.

Mitsubishi Caterpillar Forklift America Inc. cannot anticipate every possible circumstance that might involve a potential hazard. The warnings in this publication and on the product are therefore not all-inclusive. If a tool, procedure, work method or operating technique not specifically recommended by Mitsubishi Caterpillar Forklift America Inc. is used, you must satisfy yourself that it is safe for you and others. You should also ensure that the product will not be damaged or made unsafe by the operation, lubrication, maintenance or repair procedures you choose.

The information, specifications, and illustrations in this publication are on the basis of information available at the time it was written. The specifications, torques, pressures, measurements, adjustments, illustrations, and other items can change at any time. These changes can affect the service given to the product. Obtain the complete and most current information before starting any job.

Mitsubishi Forklift Truck Dealers have the most current information available.