

ELECTRIC LIFT TRUCKS

NY124

00W-2101

SERVICE MANUAL

65 SERIES

FBT13P

FBT15P

FBT18P

FBT20PN

NICHIYU
NIPPON YUSOKI CO.,LTD.
KYOTO, JAPAN

INTRODUCTION

- ▶ Most accident happens due to the disregard of basic safety rules or precautions. In order to prevent accidents, the factors which may cause accidents must be avoided beforehand.

For this reason, please read this manual and fully understand the precautions for safety and the proper procedures and directions for inspection and maintenance before starting operation.



Performing maintenance and repair without adequate knowledge may cause inadvertent accidents.



- ▶ It is not possible to cover all the possible cases of accidents in this "SERVICE MANUAL". Therefore, attention should be given to precautions other than the ones mentioned in this "SERVICE MANUAL". Especially, when repair and maintenance work which are not covered in this "SERVICE MANUAL" are carried out, always work under the direction of an instructor who understands the matter.

■ USING THE "SERVICE MANUAL"

This Service Manual will give explanation on how to maintain and inspect NICHYU forklift trucks of FBT-65 series.

Since the parts used in this machine are subject to change for the sake of better quality, performance enhancement, and safety, some portions of the contents and illustrations of the "SERVICE MANUAL" may not be identified.

Directions with  and  marks are very important, and must be followed.

	DANGER	Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury. You shall observe this instruction.
	WARNING	Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury. You shall observe this instruction.
	CAUTION	Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury. You shall observe this instruction.
	NOTE	Indicates suggestions, tips and hints related to the safety of a operator and maintain of truck.

① Personnel this "SERVICE MANUAL" is aimed at:

This "SERVICE MANUAL" is directed at personnel who possess sufficient knowledge and technical expertise. If you do not understand any of the contents of this "SERVICE MANUAL", perform operation under the guidance of personnel who does.

② Conditions of a facility

The work conditions described in the "SERVICE MANUAL" are written on the assumption that the work is performed at a shop where standard facilities and tools for the maintenance of NICHYU ELECTRIC LIFT TRUCKS are available.

For safe and reliable maintenance, the work should be performed at a shop where the facilities are equivalent to these described in the "SERVICE MANUAL" or better, and the instructions described should be strictly followed.

CONTENTS

SAFETY WORK	1	4 . TYRE	26
1. Precautions related to safe inspection and maintenance work	1	4-1. FRONT TYRE	26
• Conditions of a shop (location) for inspection and maintenance	1	4-1-1. DISASSEMBLING AND ASSEMBLING	26
• WORK CLOTHING	2	4-1-2. TYRE SIZE (FRONT)	26
• TOOLS AND GAUGES	2	4-2. REAR TYRE	27
• SAFETY WORK	2	4-2-1. DISASSEMBLING AND ASSEMBLING	27
• PARTS	3	4-2-2. TYRE SIZE (REAR)	27
• REPAIR OF ELECTRICAL COMPONENTS	3	5 . STEERING LINKAGE	28
• HYDRAULICS	4	5-1. DISASSEMBLING AND ASSEMBLING	28
• TIGHTENING TORQUE	4	6 . BRAKE LINKAGE	31
2. LOCATION OF SAFETY LABELS	5	6-1. FOOT BRAKE	31
3. MODEL NAME AND SERIAL NUMBERS	8	6-1-1. DISASSEMBLING AND ASSEMBLING	31
4. CAUTIONS FOR MAINTENANCE	10	6-1-2. MASTER CYLINDER ADJUSTMENT	32
5. TIGHTENING TORQUE OF BOLTS	13	6-1-3. BRAKE PEDAL ADJUSTMENT	34
6. STABILITY OF FORKLIFT TRUCK	14	6-2. PARKING BRAKE	35
7. LOAD CENTER AND LOAD CHART	14	6-2-1. DISASSEMBLING AND ASSEMBLING OF PARKING BRAKE	35
1 . GENERAL	16	6-2-2. DISASSEMBLING AND ASSEMBLING OF DISK BRAKE	36
1-1. APPEARANCE	16	6-3. INSPECTION AND ADJUSTMENT	39
1-2. SPECIFICATIONS	17	6-3-1. INSPECTION OF PAD ASS'Y	39
2 . FRONT AXLE (DRIVE)	19	6-3-2. INSPECTION OF WHEEL CYLINDER	40
2-1. FRONT AXLE ASS'Y	19	6-3-3. MICRO SWITCH ADJUSTMENT	40
2-1-1. DISASSEMBLING AND ASSEMBLING	19	7 . HYDRAULIC SYSTEM	41
2-1-2. ADJUSTMENT	20	7-1. VALVE LINKAGE	41
2-2. FRONT AXLE COMP.	21	7-1-1. DISASSEMBLING AND ASSEMBLING	41
2-2-1. DISASSEMBLING AND ASSEMBLING	21	7-1-2. MICRO SWITCH ADJUSTMENT	42
2-2-2. ADJUSTMENT	22	7-1-3. LIFT (FAST) MICRO SWITCH ADJUSTMENT	42
3 . REAR AXLE (STEERING)	23	7-2. CONTROL VALVE	43
3-1. DISASSEMBLING AND ASSEMBLING	23	7-2-1. DISASSEMBLING AND ASSEMBLING	43
3-2. ADJUSTMENT	25	7-2-2. RELIEF PRESSURE ADJUSTMENT	44
3-2-1. MICRO SWITCH ADJUSTMENT	25	7-3. OIL TANK	45
3-3. PRECAUTIONS DURING ASSEMBLING	25	7-3-1. DISASSEMBLING AND ASSEMBLING	45
		7-3-2. FORK OIL AND QUANTITY	46
		7-4. OIL PUMP	47
		7-4-1. DISASSEMBLING AND ASSEMBLING	47
		7-4-2. GEAR PUMP TYPE	47

8 .CYLINDER 48

8-1.LIFT CYLINDER.....	48
8-1-1.DISASSEMBLING AND ASSEMBLING...	48
8-2.TILT CYLINDER.....	49
8-2-1.DISASSEMBLING AND ASSEMBLING...	49

9 .MAST 50

9-1.DISASSEMBLING AND ASSEMBLING.....	50
9-1-1.SIMPLEX MAST.....	50
9-1-2.TRIPLEX MAST.....	52
9-2.INSPECTION AND ADJUSTMENT.....	54
9-2-1.CLEARANCE BETWEEN ROLLER AND MAST.....	54
9-2-2.MAST, LIFT BRACKET, AND ROLLER SHAFT.....	54
9-2-3.BACK SHOE.....	55
9-2-4.LIFT CHAIN.....	55
9-2-5.CHAIN BOLT.....	55
9-2-6.CHAIN WHEEL.....	56
9-2-7.HOSE PULLEY.....	56
9-2-8.ROLLER.....	56
9-2-9.FORK.....	57

**10.MOTOR
(TRACTION, HYDRAULIC, EPS) 58**

10-1.DISASSEMBLING AND ASSEMBLING.....	58
10-1-1.TRACTION MOTOR.....	58
10-1-2.HYDRAULIC MOTOR.....	59
10-1-3.EPS MOTOR.....	60
10-2.INSPECTION.....	61
10-2-1.ARMATURE COMP.....	61
10-2-2.CARBON BRUSH, CARBON BRUSH HOLDER AND SPRING.....	63
10-2-3.FIELD COIL.....	65
10-2-4.MOTOR ASS'Y.....	65
10-2-5.OIL SEAL AND PERMANENT MAGNET.....	66

11.ELECTRIC PARTS 67

11-1.LOCATION AND NAME.....	67
11-2.CONTROL UNIT.....	68
11-2-1.LOCATION AND NAME.....	68
11-2-2.DISASSEMBLING AND ASSEMBLING.....	70
11-2-3.DISASSEMBLING AND ASSEMBLING OF HYDRAULIC CONTACTOR (M7).....	71
11-2-4.PRECAUTIONS DURING INSPECTION AND REPLACEMENT.....	72
11-3.FORWARD/BACKWARD CONTACTOR.....	76
11-3-1.DISASSEMBLING AND ASSEMBLING.....	76
11-3-2.FUSE REPLACEMENT PROCEDURE.....	77
11-4.ACCELERATOR.....	78
11-4-1.REMOVAL AND INSTALLATION OF ACCELERATOR LINKAGE.....	78
11-4-2.CONFIGURATION AND FEATURE OF ACCELERATOR.....	78
11-4-3.ADJUSTMENT PROCEDURE OF ACCELERATOR LINKAGE.....	79
11-5.INDICATOR PANEL & DIRECTIONAL SWITCH.....	80
11-5-1.DISASSEMBLING AND ASSEMBLING OF INDICATOR PANEL.....	80
11-5-2.DISASSEMBLING AND ASSEMBLING OF DIRECTIONAL SWITCH.....	81
11-6.BATTERY.....	82
11-6-1.DISASSEMBLING AND ASSEMBLING.....	82
11-6-2.INSPECTION OF BATTERY.....	82
11-6-3.CLEANING.....	84
11-7.CHARGER PANEL.....	85
11-7-1.DISASSEMBLING AND ASSEMBLING.....	85
11-7-2.POWER TAP SWITCHING PROCEDURE.....	86

12.LASER POINTER 88

12-1.ADJUSTMENT PROCEDURE.....	88
12-1-1.HORIZONTAL ADJUSTMENT OF FORKS.....	88
12-1-2.LASER OPTICAL AXIS ADJUSTMENT.....	88

13. TROUBLESHOOTING 89

13-1.OUTLINE OF FBT-65.....	89
13-1-1.CHANGE FROM FBT-60	89
13-1-2.CHECKING OPERATION OF AUTO POWER OFF FUNCTION	89
13-1-3.CHECKING DISPLAY OF WARNING FOR BATTERY ELECTROLYTE LEVEL.....	89
13-1-4.WIRING CONNECTION OF HOUR METER OPERATION.....	89
13-2.How to adjust New SICOS60 (Major point only).....	90
13-2-1.The name and function of mode select switch	90
13-2-2.How to set the each mode	91
13-2-3.Adjustment of starting current and current limitation	95
13-2-4.Adjustment of other specifications	101
13-2-5.Check and adjustment for other functions	104
13-3.NEW EPS SYSTEM	105
13-3-1.AUTO POWER OFF FUNCTION.....	105
13-3-2.CHECKING AND ADJUSTMENT	105
13-4.LIST OF SETTINGS FOR FBT-65	107
13-5.SETTING OF VOLUME AND ROTARY SWITCH	108
13-5-1.VOLUME	108
13-5-2.ROTARY SWITCH	108
13-6.SELF DIAGNOSIS HISTORY MEMORY AND I/O CHECK.....	111
13-6-1.SELF DIAGNOSIS HISTORY MEMORY ...	111
13-6-2.I/O CHECK.....	117
13-6-3.ANALYSIS OF FAULT CAUSE.....	121

14.SERVICE DATA AND WIRING (DIAGRAMS) 122

14-1.STANDARD WORK HOURS	122
14-2.FBT-65 SYSTEM WIRING	130
14-3.FBT-65 BODY WIRING.....	131
14-3-1.WITHOUT HYD. CHOPPER AND REGEN.....	131
14-3-2.WITH HYD. CHOPPER AND REGEN....	132
14-3-3.WITH HYD. CHOPPER AND WITHOUT REGEN	133

14-3-4.WITHOUT HYD. CHOPPER AND WITH REGEN.....	134
14-4.FBT-65 BODY HARNESS.....	135
14-5.FBT-65 CONTROL UNIT HARNESS.....	136
14-5-1.WITHOUT HYD. CHOPPER AND REGEN.....	136
14-5-2.WITH HYD. CHOPPER AND REGEN.....	137
14-5-3.WITH HYD. CHOPPER AND WITHOUT REGEN	138
14-5-4.WITHOUT HYD. CHOPPER AND WITH REGEN.....	139

SAFETY WORK

1. Precautions related to safe inspection and maintenance work

Conditions of a shop (location) for inspection and maintenance.



Facilities with adequate space and level surfaces:

- The floor area of the shop (location) where inspection and maintenance are performed must have adequate floor space, and have level surfaces without holes.

➔ If these conditions are not met, unexpected accidents, such as a roll-over of the forklift truck, may result.



WELL-VENTILATED AREA

- Work such as welding painted components or sanding down coated parts should be carried out in well-ventilated areas.

➔ If this is not observed, harmful toxic gas or dust may be inhaled.



LOCATION EQUIPPED WITH FIRE EXTINGUISHING EQUIPMENT

- Equipment such as first-aid boxes and fire extinguishers should be nearby when work is performed.



SAFE AND WELL-LIGHTED AREA

- The work area should be safe and well lighted. When working inside the machine or underneath of it, always use a safety lamp with a shielded light bulb.

➔ If this is not observed, leaked oil may catch fire when a light bulb pops.



PROPER ARRANGEMENT

- Arrange and clean always at a working place to work safety.
- Especially, arrange disassembled parts well.

WORK CLOTHING

CAUTION

- The worker should wear a hat, work clothes, and safety shoes that are suitable for safe work. The work clothes should be close-fitting.
- ➔ If this is not observed, loose clothing may become caught in a machine, resulting in serious injury.

TOOLS AND GAUGES

CAUTION

- Always use tools that are suitable for the work being performed. Use proper size tools when tightening and loosening the parts of the forklift truck.
- ➔ Failure to observe the above could result in serious injury or damage to machines.

CAUTION

- Prepare tools and gauges before starting to work.

SAFETY WORK

WARNING

- When hoisting a forklift truck or a heavy component, use ropes or cable with correct capacity.
- Do not use ropes or cables which are kinked.

WARNING

- After lifting or jacking up a forklift truck, support it with safety blocks or rigid stands.

WARNING

- Prevent tires from moving with wheel chocks etc.

WARNING

- When working under a forklift truck, use a pit or proper safety precautions.

PARTS

CAUTION

- When replacing any parts, be sure to use NICHYU genuine parts.

CAUTION

- When replenishing battery electrolyte, be sure to use refined or distilled water.

REPAIR OF ELECTRICAL COMPONENTS

CAUTION

- Be sure to disconnect the battery plug when replacing electrical component.

CAUTION

- Be sure to jack up the drive wheel when troubleshooting electrical operations.

NOTE

Record the places of lead wire connection when disassembling.

CAUTION

CHARGING BATTERY

- Batteries produce flammable gas during charging. Do not allow batteries in the vicinity of fire or flames.
→ Failure to observe the above could result in an explosion.

CAUTION

- Diluted sulfuric acid is used as the battery's electrolyte. Keep clothing and skin away from contact with battery fluid.
→ If this is not observed, the fluid may corrode clothing or cause burns.

HYDRAULICS

CAUTION

- When removing the hydraulic pipes, cap them to prevent dust from entering into the hydraulic components and pipes.

CAUTION

- When disassembling and assembling the hydraulic components, work at clean place and do not damage the parts.

TIGHTENING TORQUE

CAUTION

- Observe tightening torque specified in this manual.
If not specified, refer to the table [Tightening torque for bolts]. [→ See page 13](#)