

Shop Manual

FORKLIFT TRUCK ***FH60*** -2
 FH70 -2
 FH80 -2

SERIAL NUMBERS	FH60-51001	and up
	FH70-51001	
	FH80-51001	

00 INDEX AND FOREWORD

INDEX

00 INDEX AND FOREWORD

INDEX	00-2
LIST OF ABBREVIATIONS	00-14
FOREWORD, SAFETY AND GENERAL INFORMATION	00-19
HOW TO READ THE SHOP MANUAL	00-19
PRECAUTIONS RELATED TO WORK SAFETY	00-21
FIRE PREVENTION	00-30
IF A FIRE BREAKS OUT	00-32
INSTRUCTIONS FOR WASTE DISPOSAL	00-33
INSTRUCTIONS FOR HANDLING HYDRAULIC COMPONENTS	00-34
INSTRUCTIONS FOR DISCONNECTING AND CONNECTING PIPING	00-36
INSTRUCTIONS FOR HANDLING ELECTRIC COMPONENTS	00-44
INSTRUCTIONS FOR HANDLING FUEL SYSTEM COMPONENTS	00-46
INSTRUCTIONS FOR HANDLING INTAKE SYSTEM COMPONENTS	00-47
USE OF KOMTRAX	00-48
DISCONNECTING AND CONNECTING PUSH-PULL TYPE COUPLER	00-49
INSTRUCTIONS FOR DISCONNECTING AND CONNECTING CONNECTORS	00-53
HOW TO DISCONNECT AND CONNECT DT CONNECTORS	00-58
HOW TO DISCONNECT AND CONNECT SLIDE LOCK TYPE CONNECTORS	00-59
HOW TO DISCONNECT AND CONNECT CONNECTORS THAT REQUIRE PULLING LOCK	00-61
HOW TO DISCONNECT AND CONNECT CONNECTORS THAT REQUIRE PRESSING LOCK	00-62
HOW TO DISCONNECT AND CONNECT CONNECTORS THAT REQUIRE TURNING HOUSING	00-64
HOW TO READ ELECTRIC WIRE CODE	00-65
EXPLANATION OF TERMS FOR MAINTENANCE STANDARD	00-71
STANDARD TIGHTENING TORQUE TABLE	00-73
UNIT CONVERSION TABLE	00-80

01 SPECIFICATION

LIST OF ABBREVIATIONS	01-3
SPECIFICATIONS	01-8
SPECIFICATION DRAWING	01-8
SPECIFICATIONS	01-14
WEIGHT TABLE	01-26
FUEL, COOLANT, AND LUBRICANT	01-29

10 STRUCTURE AND FUNCTION

LIST OF ABBREVIATIONS	10-5
STARTING SYSTEM	10-10
STARTING SYSTEM COMPONENT LAYOUT DRAWING	10-10
PREHEATING SYSTEM	10-11
ENGINE SYSTEM	10-14
ENGINE SYSTEM COMPONENT LAYOUT DRAWING	10-14
ENGINE CONTROL SYSTEM	10-15
AUTOMATIC ENGINE STOP SYSTEM	10-17
ENGINE SYSTEM COMPONENTS	10-20
COOLING SYSTEM	10-37
COOLING SYSTEM COMPONENT LAYOUT DRAWING	10-37
CONTROL SYSTEM	10-39
CONTROL SYSTEM COMPONENT LAYOUT DRAWING	10-39
MONITOR PANEL SYSTEM	10-40
KOMTRAX SYSTEM	10-41
SEAT BELT INTERLOCK SYSTEM	10-42
CONTROL SYSTEM COMPONENTS	10-44

HYDRAULIC SYSTEM	10-67
HYDRAULIC SYSTEM COMPONENT LAYOUT DRAWING	10-67
CLSS	10-68
HYDRAULIC SYSTEM COMPONENTS	10-70
POWER TRAIN SYSTEM	10-100
POWER TRAIN SYSTEM COMPONENT LAYOUT DRAWING	10-100
TRAVEL SPEED LIMIT SYSTEM	10-102
DIRECTIONAL LEVER NEUTRAL ALARM SYSTEM	10-103
TRAVEL INTERLOCK SYSTEM	10-104
POWER TRAIN SYSTEM COMPONENTS	10-106
WORK EQUIPMENT SYSTEM	10-136
WORK EQUIPMENT SYSTEM COMPONENT LAYOUT DRAWING	10-136
STRUCTURE OF VALVE CONTROL	10-137
LIFT INTERLOCK SYSTEM	10-138
WORK EQUIPMENT SYSTEM COMPONENTS	10-140
STEERING SYSTEM	10-146
STEERING SYSTEM COMPONENT LAYOUT DRAWING	10-146
STEERING COLUMN	10-147
STEERING SYSTEM COMPONENT LAYOUT DRAWING	10-148
BRAKE SYSTEM	10-156
BRAKE SYSTEM COMPONENT LAYOUT DRAWING	10-156
PARKING BRAKE REMINDER SYSTEM	10-157
PARKING BRAKE DRAGGING PREVENTION SYSTEM	10-159
BRAKE SYSTEM COMPONENTS	10-161
FRONT BRAKE	10-171
BRAKE COOLING PUMP	10-174
UNDERCARRIAGE AND FRAME	10-175
STRUCTURE OF FRAME	10-175
TIRE	10-176
WORK EQUIPMENT	10-177
STRUCTURE OF WORK EQUIPMENT	10-177
 20 STANDARD VALUE TABLE	
LIST OF ABBREVIATIONS	20-3
STANDARD VALUE TABLE FOR ENGINE	20-8
STANDARD VALUE TABLE FOR ENGINE: FH60-2	20-8
STANDARD VALUE TABLE FOR ENGINE: FH70-2	20-10
STANDARD VALUE TABLE FOR ENGINE: FH80-2	20-12
STANDARD VALUE TABLE FOR MACHINE	20-14
STANDARD VALUE TABLE FOR MACHINE: FH60-2	20-14
STANDARD VALUE TABLE FOR MACHINE: FH70-2	20-18
STANDARD VALUE TABLE FOR MACHINE: FH80-2	20-22
 30 TESTING AND ADJUSTING	
LIST OF ABBREVIATIONS	30-4
RELATED INFORMATION ON TESTING AND ADJUSTING	30-9
TOOLS FOR TESTING AND ADJUSTING	30-9
ENGINE AND COOLING SYSTEM	30-14
TESTING ENGINE SPEED	30-14
TESTING EXHAUST GAS COLOR	30-15
TESTING AND ADJUSTING VALVE CLEARANCE	30-17
TESTING COMPRESSION PRESSURE	30-19
TESTING BLOWBY PRESSURE	30-22
TESTING ENGINE OIL PRESSURE	30-23

TESTING FUEL PRESSURE	30-25
TESTING FUEL RETURN VOLUME AND LEAKAGE VOLUME	30-27
BLEEDING FUEL SYSTEM OF AIR	30-31
TESTING LEAKAGES FROM FUEL SYSTEM	30-33
HANDLING OF CYLINDER CUTOFF MODE OPERATION	30-35
HANDLING OF NO-INJECTION CRANKING OPERATION	30-36
CHANGING ENGINE OIL	30-37
REPLACING ENGINE OIL FILTER	30-38
REPLACING KCCV FILTER ELEMENT	30-39
REPLACEMENT OF FUEL FILTER	30-41
DRAINING FUEL PREFILTER OF WATER	30-44
BLEEDING FUEL FILTER OF AIR	30-45
BLEEDING COOLING CIRCUIT OF AIR	30-46
RADIATOR CLEANING	30-47
TESTING AIR CLEANER AND CLEANING AND REPLACING ELEMENT	30-48
WRITING COMPENSATION VALUES AT REPLACEMENT OF INJECTOR AND ENGINE CONTROLLER	30-53
TESTING ALTERNATOR BELT	30-59
TESTING AUTO-TENSIONER	30-60
POWER TRAIN	30-61
TESTING HST OIL PRESSURE	30-61
TESTING OIL IN FLYWHEEL HOUSING	30-65
TESTING OIL LEVEL AND CHANGING AXLE OIL IN DIFFERENTIAL CASE	30-66
REPLACING FRONT AXLE LUBRICATION FILTER	30-68
STEERING SYSTEM	30-69
TESTING STEERING WHEEL	30-69
BLEEDING STEERING CYLINDER CIRCUIT OF AIR	30-70
TESTING AND ADJUSTING STEERING CIRCUIT OIL PRESSURE	30-71
BRAKE SYSTEM	30-73
BLEEDING BRAKE CIRCUIT OF AIR	30-73
TESTING BRAKE OIL PRESSURE	30-74
TESTING ACCUMULATOR CHARGE PRESSURE	30-76
TESTING BRAKING PERFORMANCE OF BRAKE	30-77
TESTING WEAR OF SERVICE BRAKE DISC	30-78
TESTING AND ADJUSTING PARKING BRAKE	30-79
TESTING AND ADJUSTING BRAKE PEDAL	30-81
TESTING AND ADJUSTING BRAKE PEDAL ANGLE SENSOR LINKAGE	30-83
HYDRAULIC SYSTEM	30-85
RELEASING REMAINING PRESSURE FROM HYDRAULIC PIPING	30-85
CHANGING HYDRAULIC OIL	30-86
REPLACING HYDRAULIC OIL LINE FILTER	30-87
CLEANING HYDRAULIC TANK STRAINER	30-88
TESTING HYDRAULIC TANK BREATHER	30-90
WORK EQUIPMENT	30-91
BLEED AIR FROM LIFT CYLINDER	30-91
TESTING HYDRAULIC DRIFT AND HYDRAULIC DRIFT FORWARD TILTING OF THE HYDRAULIC CYLINDER	30-92
ADJUSTMENT OF MAST	30-94
ADJUSTMENT OF FINGER BAR	30-97
CAB AND ITS ATTACHMENTS	30-98
TESTING LIFT LEVER AND TILT LEVER	30-98
ELECTRICAL SYSTEM	30-99
SETTING AND OPERATION OF MONITOR PANEL	30-99
KOMTRAX TERMINAL START-UP PROCEDURE	30-154

HANDLING OF ENGINE CONTROLLER VOLTAGE CIRCUIT-----	30-159
PROCEDURE FOR CHECKING DIODE -----	30-160
40 TROUBLESHOOTING	
LIST OF ABBREVIATIONS -----	40-9
INFORMATION RELATED TO TROUBLESHOOTING-----	40-14
POINTS TO REMEMBER WHEN TROUBLESHOOTING -----	40-14
HOW TO PROCEED WITH TROUBLESHOOTING-----	40-16
CHECK BEFORE TROUBLESHOOTING-----	40-18
CLASSIFICATION AND PROCEDURES OF TROUBLESHOOTING -----	40-20
SYMPTOMS OF FAILURE AND TROUBLESHOOTING NUMBERS-----	40-21
INFORMATION DESCRIBED IN TROUBLESHOOTING TABLE -----	40-24
LOCATIONS OF FUSES (EXCEPT NORTH AMERICA SPEC.)-----	40-26
LOCATIONS OF FUSES (NORTH AMERICA SPEC.)-----	40-29
CONNECTOR LIST AND LAYOUT -----	40-33
CONNECTION TABLE FOR CONNECTOR PIN NO. -----	40-44
T-BOX AND T-ADAPTER LIST -----	40-83
FAILURE CODES TABLE-----	40-87
TROUBLESHOOTING BY FAILURE CODE -----	40-96
FAILURE CODE [2G40ZG]-----	40-96
FAILURE CODE [6091NX] -----	40-97
FAILURE CODE [7REAKA]-----	40-98
FAILURE CODE [7REHKA] -----	40-100
FAILURE CODE [AB00KY]-----	40-102
FAILURE CODE [AB00MA]-----	40-104
FAILURE CODE [B@BAZG]-----	40-106
FAILURE CODE [B@BCNS]-----	40-107
FAILURE CODE [B@CRNS]-----	40-108
FAILURE CODE [CA115] -----	40-109
FAILURE CODE [CA122] -----	40-110
FAILURE CODE [CA123] -----	40-112
FAILURE CODE [CA131] -----	40-114
FAILURE CODE [CA132] -----	40-116
FAILURE CODE [CA144] -----	40-119
FAILURE CODE [CA145] -----	40-121
FAILURE CODE [CA153] -----	40-123
FAILURE CODE [CA154] -----	40-125
FAILURE CODE [CA187] -----	40-127
FAILURE CODE [CA221] -----	40-129
FAILURE CODE [CA222] -----	40-131
FAILURE CODE [CA227] -----	40-133
FAILURE CODE [CA234] -----	40-134
FAILURE CODE [CA238] -----	40-135
FAILURE CODE [CA239] -----	40-136
FAILURE CODE [CA271] -----	40-137
FAILURE CODE [CA272] -----	40-138
FAILURE CODE [CA322] -----	40-139
FAILURE CODE [CA324] -----	40-141
FAILURE CODE [CA331] -----	40-143
FAILURE CODE [CA332] -----	40-145
FAILURE CODE [CA343] -----	40-147
FAILURE CODE [CA351] -----	40-148
FAILURE CODE [CA352] -----	40-149
FAILURE CODE [CA356] -----	40-151

FAILURE CODE [CA357]	40-153
FAILURE CODE [CA386]	40-155
FAILURE CODE [CA428]	40-156
FAILURE CODE [CA429]	40-157
FAILURE CODE [CA431]	40-158
FAILURE CODE [CA432]	40-161
FAILURE CODE [CA435]	40-165
FAILURE CODE [CA441]	40-167
FAILURE CODE [CA442]	40-169
FAILURE CODE [CA449]	40-170
FAILURE CODE [CA451]	40-171
FAILURE CODE [CA452]	40-173
FAILURE CODE [CA466]	40-175
FAILURE CODE [CA515]	40-177
FAILURE CODE [CA516]	40-179
FAILURE CODE [CA553]	40-181
FAILURE CODE [CA555]	40-182
FAILURE CODE [CA556]	40-183
FAILURE CODE [CA559]	40-184
FAILURE CODE [CA689]	40-187
FAILURE CODE [CA691]	40-189
FAILURE CODE [CA692]	40-191
FAILURE CODE [CA697]	40-193
FAILURE CODE [CA698]	40-194
FAILURE CODE [CA731]	40-195
FAILURE CODE [CA778]	40-197
FAILURE CODE [CA1117]	40-199
FAILURE CODE [CA1695]	40-200
FAILURE CODE [CA1696]	40-201
FAILURE CODE [CA1843]	40-202
FAILURE CODE [CA1844]	40-204
FAILURE CODE [CA1896]	40-206
FAILURE CODE [CA1942]	40-207
FAILURE CODE [CA1961]	40-208
FAILURE CODE [CA2185]	40-209
FAILURE CODE [CA2186]	40-210
FAILURE CODE [CA2249]	40-212
FAILURE CODE [CA2272]	40-213
FAILURE CODE [CA2311]	40-215
FAILURE CODE [CA2349]	40-216
FAILURE CODE [CA2353]	40-218
FAILURE CODE [CA2357]	40-220
FAILURE CODE [CA2555]	40-221
FAILURE CODE [CA2556]	40-223
FAILURE CODE [CA2765]	40-225
FAILURE CODE [CA3419]	40-226
FAILURE CODE [CA3421]	40-228
FAILURE CODE [CA3724]	40-230
FAILURE CODE [CA3918]	40-232
FAILURE CODE [CA3919]	40-233
FAILURE CODE [CA3921]	40-234
FAILURE CODE [CA3922]	40-235
FAILURE CODE [CA3923]	40-237
FAILURE CODE [D110KA]	40-239

FAILURE CODE [D110KB]	40-241
FAILURE CODE [D140KB]	40-243
FAILURE CODE [D140KY]	40-245
FAILURE CODE [D160KA]	40-248
FAILURE CODE [D160KB]	40-250
FAILURE CODE [D160KY]	40-252
FAILURE CODE [D161KB]	40-254
FAILURE CODE [D161KY]	40-255
FAILURE CODE [D190KB]	40-256
FAILURE CODE [D190KY]	40-257
FAILURE CODE [D19SKB]	40-258
FAILURE CODE [D19SKY]	40-259
FAILURE CODE [D19TKB]	40-260
FAILURE CODE [D19TKY]	40-261
FAILURE CODE [D19UKA]	40-262
FAILURE CODE [D19UKB]	40-264
FAILURE CODE [D19UKY]	40-266
FAILURE CODE [D5XWKA] (EXCEPT NORTH AMERICA SPEC.)	40-268
FAILURE CODE [D5XWKA] (NORTH AMERICA SPEC.)	40-271
FAILURE CODE [D5XWKB] (EXCEPT NORTH AMERICA SPEC.)	40-274
FAILURE CODE [D5XWKB] (NORTH AMERICA SPEC.)	40-276
FAILURE CODE [D5XXKA]	40-278
FAILURE CODE [D5XXKB]	40-279
FAILURE CODE [D5XYL4]	40-280
FAILURE CODE [D5ZKKA]	40-281
FAILURE CODE [D5ZKKB]	40-283
FAILURE CODE [D5ZTKA]	40-284
FAILURE CODE [D811MC]	40-286
FAILURE CODE [D862KA]	40-287
FAILURE CODE [D8ALKA]	40-288
FAILURE CODE [D8ALKB]	40-289
FAILURE CODE [D8AQK4]	40-290
FAILURE CODE [D8AQKR]	40-295
FAILURE CODE [DAF0KT]	40-300
FAILURE CODE [DAF0MB]	40-301
FAILURE CODE [DAF0MC]	40-302
FAILURE CODE [DAF3KK]	40-303
FAILURE CODE [DAFGMC]	40-305
FAILURE CODE [DAFLKA]	40-306
FAILURE CODE [DAFLKB]	40-307
FAILURE CODE [DAFQKR]	40-308
FAILURE CODE [DAJ000]	40-314
FAILURE CODE [DAJ0KK]	40-315
FAILURE CODE [DAJ0KT]	40-317
FAILURE CODE [DAJ0MC]	40-318
FAILURE CODE [DAJ2KK]	40-319
FAILURE CODE [DAJ5KX] (EXCEPT NORTH AMERICA SPEC.)	40-321
FAILURE CODE [DAJ5KX] (NORTH AMERICA SPEC.)	40-323
FAILURE CODE [DAJ9KQ]	40-326
FAILURE CODE [DAJJKB]	40-327
FAILURE CODE [DAJLKA]	40-328
FAILURE CODE [DAJLKY]	40-329
FAILURE CODE [DAJQKR]	40-330
FAILURE CODE [DAJRMA]	40-336

FAILURE CODE [DB2QKR]-----	40-337
FAILURE CODE [DB2RKR]-----	40-343
FAILURE CODE [DDDTKA] (EXCEPT NORTH AMERICA SPEC.)-----	40-348
FAILURE CODE [DDDTKA] (NORTH AMERICA SPEC.)-----	40-350
FAILURE CODE [DDDTKB] (EXCEPT NORTH AMERICA SPEC.)-----	40-352
FAILURE CODE [DDDTKB] (NORTH AMERICA SPEC.)-----	40-354
FAILURE CODE [DDDUKA] (EXCEPT NORTH AMERICA SPEC.)-----	40-356
FAILURE CODE [DDDUKA] (NORTH AMERICA SPEC.)-----	40-358
FAILURE CODE [DDDUKB] (EXCEPT NORTH AMERICA SPEC.)-----	40-360
FAILURE CODE [DDDUKB] (NORTH AMERICA SPEC.)-----	40-362
FAILURE CODE [DDDVKA] (EXCEPT NORTH AMERICA SPEC.)-----	40-364
FAILURE CODE [DDDVKA] (NORTH AMERICA SPEC.)-----	40-366
FAILURE CODE [DDDVKM] (EXCEPT NORTH AMERICA SPEC.)-----	40-369
FAILURE CODE [DDDVKM] (NORTH AMERICA SPEC.)-----	40-371
FAILURE CODE [DDK6KA]-----	40-374
FAILURE CODE [DDK6KY]-----	40-377
FAILURE CODE [DGS1KA] (EXCEPT NORTH AMERICA SPEC.)-----	40-379
FAILURE CODE [DGS1KA] (NORTH AMERICA SPEC.)-----	40-381
FAILURE CODE [DGS1KB] (EXCEPT NORTH AMERICA SPEC.)-----	40-383
FAILURE CODE [DGS1KB] (NORTH AMERICA SPEC.)-----	40-385
FAILURE CODE [DH2FKA] (EXCEPT NORTH AMERICA SPEC.)-----	40-387
FAILURE CODE [DH2FKA] (NORTH AMERICA SPEC.)-----	40-389
FAILURE CODE [DH2FKY]-----	40-391
FAILURE CODE [DHHBKA] (EXCEPT NORTH AMERICA SPEC.)-----	40-393
FAILURE CODE [DHHBKA] (NORTH AMERICA SPEC.)-----	40-395
FAILURE CODE [DHHBKY]-----	40-397
FAILURE CODE [DHHCKA] (EXCEPT NORTH AMERICA SPEC.)-----	40-400
FAILURE CODE [DHHCKA] (NORTH AMERICA SPEC.)-----	40-402
FAILURE CODE [DHHCKY]-----	40-404
FAILURE CODE [DHPCKA] (EXCEPT NORTH AMERICA SPEC.)-----	40-407
FAILURE CODE [DHPCKA] (NORTH AMERICA SPEC.)-----	40-409
FAILURE CODE [DHPCKY]-----	40-411
FAILURE CODE [DJF1KA] (EXCEPT NORTH AMERICA SPEC.)-----	40-413
FAILURE CODE [DJF1KA] (NORTH AMERICA SPEC.)-----	40-415
FAILURE CODE [DJF1L8] (EXCEPT NORTH AMERICA SPEC.)-----	40-417
FAILURE CODE [DJF1L8] (NORTH AMERICA SPEC.)-----	40-418
FAILURE CODE [DK30KA]-----	40-420
FAILURE CODE [DK30KY]-----	40-422
FAILURE CODE [DK5YKA] (EXCEPT NORTH AMERICA SPEC.)-----	40-424
FAILURE CODE [DK5YKA] (NORTH AMERICA SPEC.)-----	40-426
FAILURE CODE [DK5YKY]-----	40-428
FAILURE CODE [DK5YMA]-----	40-430
FAILURE CODE [DK70KA] (EXCEPT NORTH AMERICA SPEC.)-----	40-432
FAILURE CODE [DK70KA] (NORTH AMERICA SPEC.)-----	40-434
FAILURE CODE [DK70KY]-----	40-436
FAILURE CODE [DLT4KA] (EXCEPT NORTH AMERICA SPEC.)-----	40-438
FAILURE CODE [DLT4KA] (NORTH AMERICA SPEC.)-----	40-440
FAILURE CODE [DLT4KA+DLT6KA] (EXCEPT NORTH AMERICA SPEC.)-----	40-442
FAILURE CODE [DLT4KA+DLT6KA] (NORTH AMERICA SPEC.)-----	40-444
FAILURE CODE [DLT4LC]-----	40-446
FAILURE CODE [DLT4MA]-----	40-447
FAILURE CODE [DLT6KA] (EXCEPT NORTH AMERICA SPEC.)-----	40-448
FAILURE CODE [DLT6KA] (NORTH AMERICA SPEC.)-----	40-450
FAILURE CODE [DV00KB]-----	40-452