



Maintenance Manual



ESR4500 Series



TABLE OF CONTENTS

Table of Contents

MA – SAFETY	PAGE
Safety Symbols used in the Manual	3
General Maintenance and Repair Safety Notes	3
ITD – INTRODUCTION	PAGE
Maintenance and Repair	3
Before Leaving the Truck	4
Before Carrying out Work on the Truck	4
Before Operating the Truck	4
Warnings and Labels on the Truck	4
General	7
Operating Instructions	7
Service Training	7
Ordering Spare Parts	7
Using the Manual	7
M1 – LUBRICATION AND ADJUSTMENT	PAGE
Lifting the Truck	11
Towing the Truck	11
Jacking up the Truck	12
Component Access	13
Access to the Motor Compartment	14
Removing the Floorboard	14
Plastic Panel Disassembly / Assembly	14
Maintenance	16
Recommended Lubricants and Oils	16
Lubricants	16
Cold Store Trucks	16
Truck Decommissioning	16
Restoring the Truck to Service	16
Battery Maintenance	16
Daily Safety Check	18
Inspection and Maintenance Schedule	20
Cold Store Trucks	20
Torques	26
Screw Grade Marking	26
Nut Grade Marking	26
Hydraulic Symbols	29
Functional Description	33
Abbreviations	33
Lifting	35
Lowering	35
Mast Reach Carriage Retraction	37
Mast Reach Carriage Extension	37
Tilt Back Circuit	39
Tilt Down Circuit	39
Sideshift Left	41
Sideshift Right	41
M2 – HYDRAULICS	PAGE
Hydraulic Components	42
Hydraulic Lines	42
Valve Block	43
Relief Valve RV1	43
Lowering Speed Adjustment Valve AVL	44
Pressure Load Switch PLS	44

M2 – HYDRAULICS	PAGE
Hydraulic Reservoir	45
Discharging the Hydraulic Reservoir	45
Filling the Hydraulic Tank	45
Filter	46
Replacing the Return Filter	46
Replacing the Aeration Filter	47
Replacing the Suction Filter	47
Pump Motor	48
Hydraulic Pump	48
Disassembly	48
Commissioning	48
Bleeding the Hydraulic System	50
Bleeding the Free Lift Cylinder	50
Bleeding the Lift Cylinders	50
Bleeding the Reach Cylinder	51
Bleeding the Sideshift Cylinder	51
Bleeding the Tilt Cylinders	51
Bleeding the 5th Function Cylinder	51
Flushing the Cylinders	51
Drift Tests	52
Lift cylinder drift test	52
Tilt cylinder drift test	52
Causes of Drift	52
M3 – DRIVE UNIT	PAGE
Gear unit	55
Preparation	55
Removal	55
Servicing	55
General	57
Gear Unit Disassembly / Assembly	57
Disassembly	57
Assembly	57
Preparing the gear unit	57
Inserting the bevel pinion shaft	58
Assembling the flange shaft	58
Adjusting the Bevel Wheel Set	58
Checking the flank tooth bearing	59
Final Assembly	59
Re-Assembly	60
Traction motor	60
M4 – ELECTRICS	PAGE
Electrical Components	63
ACS	63
BFS	63
BLS	63
BPS	63
BRS	63
BRAKE	63
Option BS	63
ECR1	63
ECR2	63
ECR3	63
ECR4	63
Option ECR5 up to serial no. 5A203818	63

M4 – ELECTRICS	PAGE
Option ECR5 from serial no. 5A203820	64
EDS	64
ED1	64
Option ED2	64
Option ED3	64
Option FAN1	64
FAN2	64
FAN3, FAN4	64
Option FKS	64
Option FLS	64
FS	64
FU1 (15 A)	64
FU2 (15 A)	64
FU3 (15 A) up to serial no. 5A204796	64
FU3 (10 A) from serial no. 5A204798	64
FU4 (30 A) up to serial no. 5A204796	65
FU4 (10 A) from serial no. 5A204798	65
Option FU5 (15 A) & FU6 (15 A)	65
FU7 (425 A)	65
Option FU8 (30 A)	65
Option FU9 (50 A)	65
FU13 (50 A) from serial no. 5A204798	65
HDM	65
HN	65
HNS	65
HGTS (up to serial no. 5A203818)	65
HGTS from serial no. 5A203820	65
Option HGTRS up to serial no. 5A203818	65
Option HGTRS from serial no. 5A203820	65
Option K1 & K2	65
Option K3 & K4	65
.....	65
Option K5	66
Option K6	66
Option K7 & K8	66
Option K9 & K10	66
K11	66
Option K12 & K13	66
Option K14	66
KYS	66
LS	66
MVL	66
Option ORS	66
POT1	66
POT2	66
POT3	66

M4 – ELECTRICS	PAGE
POT4	67
POT5	67
<input type="checkbox"/> POT6	67
PLS	67
PVL	67
PVAR	67
PVAL	67
PVRT	67
PVRE	67
RES1	67
RES2	67
RS	67
RV	67
<input type="checkbox"/> SD	68
SDM	68
SES	68
SFS 1SA	68
SFS 2	68
<input type="checkbox"/> SI	68
SPS	68
SVR	68
SVS	68
SVT	68
<input type="checkbox"/> SW	68
TDM	68
THS1	69
THS2	69
<input type="checkbox"/> THS3	69
THS4 (from serial no. 5A203820)	69
ESR4500 Status Codes	71
Status Codes	71
When a Service Code Occurs	71
Truck does not operate and there is no Status Code .	71
1. Fault during power-up	71
2. The fault is not electrical	71
3. Malfunction in one of a group of unmonitored	
inputs	71
Power Up Circuit up to Ser. No. 5A204796	72
Power Up Circuit up from Ser. No. 5A204798	73
Statuscode 100 - 102	74
Statuscode 110 - 111	75
Statuscode 112 - 120	76
Statuscode 121 - 130	77
Statuscode 131 - 160	79
Statuscode 180 - 181	80
Statuscode 182 - 183	81
Statuscode 184 - 186	82
Statuscode 200	83
Statuscode 201 - 210	84
Statuscode 211 - 213	85
Statuscode 214 - 220	86
Statuscode 221 - 222	87
Statuscode 223 - 224	88
Statuscode 225 - 230	89
Statuscode 240 (up to Ser. No. 5A204796)	90

M4 – ELECTRICS	PAGE
Statuscode 240 (up from Ser. No. 5A204798)	91
Statuscode 241 (up to Ser. No. 5A204796)	92
Statuscode 241 (up from Ser. No. 5A204798)	93
Statuscode 243 (up to Ser. No. 5A204796)	94
Statuscode 243 (up from Ser. No. 5A204798)	95
Statuscode 244 (up to Ser. No. 5A204796)	96
Statuscode 244 (up from Ser. No. 5A204798)	97
Statuscode 246 (up to Ser. No. 5A204796)	98
Statuscode 246 (up from Ser. No. 5A204798)	99
Statuscode 247 (up to Ser. No. 5A204796)	100
Statuscode 247 (up from Ser. No. 5A204798)	101
Statuscode 249 (up to Ser. No. 5A204796)	102
Statuscode 249 (up from Ser. No. 5A204798)	103
Statuscode 250 (up to Ser. No. 5A204796)	104
Statuscode 250 (up from Ser. No. 5A204798)	105
Statuscode 252 (up to Ser. No. 5A204796)	106
Statuscode 252 (up from Ser. No. 5A204798)	107
Statuscode 253 (up to Ser. No. 5A204796)	108
Statuscode 253 (up from Ser. No. 5A204798)	109
Statuscode 260	110
Statuscode 261	111
Statuscode 262	112
Statuscode 263	113
Statuscode 264	114
Statuscode 265	115
Statuscode 266	116
Statuscode 267	117
Statuscode 268	118
Statuscode 280 - 282	119
Statuscode 283 - 284	120
Statuscode 285 - 300	121
Statuscode 301 - 310	122
Statuscode 311 - 313	123
Statuscode 314 - 320	124
Statuscode 321 - 322	125
Statuscode 323 - 324	126
Statuscode 325 - 330	127
Statuscode 340	128
Statuscode 341	129
Statuscode 343 - 381	130
Statuscode 382 - 383	130
Statuscode 384 - 385	132
Statuscode 430 - 431	133
Statuscode 460 - 462	134
Statuscode 463 - 465	135
Statuscode 840 - 841	136
Statuscode 880	137
Statuscode 881	138
Statuscode 883	139
Statuscode 884	140
Statuscode 885	141
Statuscode 886	142
APPENDIX	143
Display not active	143
Main contactor switches continuously ON/OFF	143
Only battery discharge indicator and message display active	143

M4 – ELECTRICS	PAGE
Main contactor briefly activated after power up	143
Service Level	
(Software Version 814759-012)	145
Display	145
Design and Functions	145
Steer Angle Display	145
Travel Direction Display	145
Battery Charge Status Display	145
Operator error display	145
Service Display	146
Function Keys	146
Message Display	146
Capacity Data Monitor	146
Brake Fluid Level Indicator	146
Steer Fault Display	146
Parking Brake Display	146
Performance Setting Display	146
Operator Menu	147
Tilt Position - Assist On / Off	148
Rack Height Select On / Off	149
Programming Rack Height Select	149
Programming Rack Height Select	150
Service Level	151
Chapter structure :	151
ANALYZER	151
A1 STATUS	151
A2 INPUTS	151
A3 OUTPUTS	151
CALIBRATION	151
C1 Accelerator Pedal	151
C2 Raise Lower Handle	151
C3 Reach Handle	151
C4 Tilt Handle	151
C5 Sideshift Handle	152
C6 5th Function Handle	152
C7 Height	152
C8 Weight	152
C9 Fork Positioning	152
C10 Reach retract slow down	152
C11 Save?	152
FEATURE	152
F1 Truck size	152
F2 FLS Switch	152
F3 Height Encoder	152
F4 Lower Cut out	152
F5 Fifth Function	152
F6 Max Load	152
F7 Capacity Data Monitor CDM	152
F8 Alarm 2	152
F9 Beacon	153
F10 User Performance	153
F11 User Codes	153
F12 Language	153
F13 Truck lockout	153
F14 Rack select	153
F15 Height & weight on/off	153
F16 Timer on/off	153
F17 Error log on/off	153

M4 – ELECTRICS	PAGE
F18 Operator Alarm1 on/off	153
F19 Battery low level alarm	153
F20 Fork positioning	153
F21 Change value Euro/US	153
F22 Save	153
HOUR METER	153
H1 Run	153
H2 TDM Traction Drive Module	153
H3 HDM Pump Drive Module	153
H4 VCM Vehicle Control Module	153
H5 SDM Steer Drive Module	153
H6 Display	153
H7 Set Service Timer	153
H8 Escape	153
LOG EVENTS	153
L1 History	153
L2 Totals	153
L3 Erase	153
L4 Escape	153
PERFORMANCE	154
P1 Setup P1	154
P2 Setup P2	154
P3 Setup P3	154
P4 BDI setting	154
P5 Travel > LCS	154
P6 Travel > FLS	154
P7 Travel > Custom	154
P8 Lower > Custom	154
P9 Reach > Custom	154
P10 5th Function left	154
P11 5th Function right	154
P12 Steer low speed	154
P13 Steer high speed	154
P14 Brake at ramp	154
P15 Save	154
UTILITIES	154
U1 Software Version	154
U2 Hour Set	154
U3 Accy Override	154
U4 Escape	154
Overview of Performance Default Settings	155
Service Menu	156
Access to Service Level	156
Overview of menu items	156
Analyzer	156
Calibration	156
Feature	156
Hour Meter	156
Log Events	156
Performance	156
Utilities	156
Analyzer	158
A1.1 - A1.12 Status	158
A2.1 - A2.6 Inputs	159
A2.7 - A2.13 Inputs	160
A2.14 - A2.20 Inputs	161
A2.21 - A2.25 Inputs	162
A2.26 - A2.32 Inputs	163

M4 – ELECTRICS	PAGE
A2.33 - A2.37 Inputs	164
A3.1 - A3.9 Outputs	165
A3.10 - A3.16 Outputs	166
A3.17 - A3.18 Outputs	167
Calibration	168
C1 - C3 Calibration	168
C4 - C5 Calibration	169
C6 - C7.1 Calibration	170
C7.1.3 Calibration	171
C7.2 Calibration	172
C7.3 Calibration	173
C7.3.4 - C7.5 Calibration	174
C8 Calibration	175
C9 Calibration	176
C10 - 11.2 Calibration	177
Feature	178
F1 - F3 Feature	178
F4 - F6 Feature	179
F7 Feature	180
F8 Feature	181
F9 - F10 Feature	182
F11 Feature	183
F12 - F14 Feature	184
F15 - F19 Feature	185
F20 - F22 Feature	186
H1 - H3 Hourmeter	187
H4 - H8 Hourmeter	188
Log Events	189
L1 - L3.2 Feature	189
L3.2.1 - L4 Log Events	190
Performance	191
P1 - P1.5.1 Performance	191
P1.6 - P1.10.1 Performance	192
P1.11 - P1.15 Performance	193
P2 - P6 Performance	194
P7 - P10 Performance	195
P11 - P15.2 Performance	196
Utilities	197
U1 - U2 Utilities	197
U3 - U4 Utilities	198
Service Level (Software Version 814759-014)	199
Display	199
Design and Functions	199
Steer Angle Display	199
Travel Direction Display	199
Battery Charge Status Display	199
Operator error display	199
Service Display	200
Function Keys	200
Message Display	200
Capacity Data Monitor	200
Brake Fluid Level Indicator	200
Steer Fault Display	200
Parking Brake Display	200
Performance Setting Display	200
Operator Menu	201
Tilt Position - Assist On / Off	202

M4 – ELECTRICS	PAGE
Rack Height Select On / Off	203
Programming Rack Height Select	203
Programming Rack Height Select	204
Service Level (Software Version 814759-014)	205
Chapter structure :	205
ANALYZER	205
A1 STATUS	205
A2 INPUTS	205
A3 OUTPUTS	205
CALIBRATION	205
C1 Accelerator Pedal	205
C2 Raise Lower Handle	205
C3 Reach Handle	205
C4 Tilt Handle	205
C5 Sideshift Handle	206
C6 5th Function Handle	206
C7 Height	206
C8 Weight	206
C9 Fork Positioning	206
C10 Reach retract slow down	206
C11 Save?	206
FEATURE	206
F1 Truck size	206
F2 FLS Switch	206
F3 Height Encoder	206
F4 Lower Cut out	206
F5 Fifth Function	206
F6 Max Load	206
F7 Capacity Data Monitor CDM	206
F8 Alarm 2	207
F9 Beacon	207
F10 User Performance	207
F11 User Codes	207
F12 Language	207
F13 Change value Euro/US	207
F14 Rack select	207
F15 Height & weight on/off	207
F16 Timer on/off	207
F17 Error log on/off	207
F18 Operator Alarm1 on/off	207
F19 Battery low level alarm	207
F20 Fork positioning	207
F21 Truck lockout	207
F22 Save	207
HOUR METER	207
H1 Run	207
H2 SDM Steer Drive Module	207
Low / Middle / Full	207
H3 TDM Traction Drive Module	207
H4 HDM Pump Drive Module	207
H5 VCM Vehicle Control Module	207
H6 Display	207
H7 Set Service Timer	207
H8 Escape	207
LOG EVENTS	207
L1 History	207
L2 Totals	207

M4 – ELECTRICS	PAGE
L3 Erase	207
L4 Escape	207
PERFORMANCE	208
P1 Setup P1	208
P2 Setup P2	208
P3 Setup P3	208
P4 BDI setting	208
P5 Travel > LCS	208
P6 Travel > FLS	208
P7 Travel > Custom	208
P8 Lower > Custom	208
P9 Reach > Custom	208
P10 5th Function left	208
P11 5th Function right	208
P12 Steer low speed	208
P13 Steer high speed	208
P14 Brake at ramp	208
P15 Save	208
UTILITIES	208
U1 Software Version	208
U2 Hour Set	208
U3 Accy Override	208
U4 Escape	208
Overview of Performance Default Settings	209
Service Menu	210
Access to Service Level	210
Overview of menu items	210
Analyzer	210
Calibration	210
Feature	210
Hour Meter	210
Log Events	210
Performance	210
Utilities	210
Analyzer	212
A1.1 - A1.12 Status	212
A2.1 - A2.6 Inputs	213
A2.7 - A2.13 Inputs	214
A2.14 - A2.20 Inputs	215
A2.21 - A2.25 Inputs	216
A2.26 - A2.32 Inputs	217
A2.33 - A2.37 Inputs	218
A3.1 - A3.9 Outputs	219
A3.10 - A3.16 Outputs	220
A3.17 - A3.18 Outputs	221
Calibration	222
C1 - C3 Calibration	222
C4 - C5 Calibration	223
C6 - C7.1 Calibration	224
C7.1.3 Calibration	225
C7.2 Calibration	226
C7.3 Calibration	227
C7.3.4 - C7.5 Calibration	228
C8 Calibration	229
C9 Calibration	230
C10 - 11.2 Calibration	231
Feature	232
F1 - F3 Feature	232

M4 – ELECTRICS	PAGE
F4 - F6 Feature	233
F7 Feature	234
F8 Feature	235
F9 - F10 Feature	236
F11 Feature	237
F12 - F14 Feature	238
F15 - F19 Feature	239
F20 - F22 Feature	240
H1 - H3 Hourmeter	241
H4 - H8 Hourmeter	242
Log Events	243
L1 - L3.2 Feature	243
L3.2.1 - L4 Log Events	244
Performance	245
P1 - P1.5.1 Performance	245
P1.6 - P1.10.1 Performance	246
P1.11 - P1.15 Performance	247
P2 - P6 Performance	248
P7 - P10 Performance	249
P11 - P15 Performance	250
Utilities	251
U1 - U2 Utilities	251
U3 - U4 Utilities	252
Service Level (Software Version 814759-031)	253
Display (from Ser. No. 5A204798)	253
Design and Functions	253
Steer Angle Display	253
Travel Direction Display	253
Battery Charge Status Display	253
Operator error display	253
Service Display	254
Function Keys	254
Message Display	254
Capacity Data Monitor	254
Brake Fluid Level Indicator	254
Display 360° steering status	254
Parking Brake Display	254
Performance Setting Display	254
Operator Menu (Software Version 814759-031)	255
Tilt Position - Assist On / Off	256
Rack Height Select On / Off	257
Programming Rack Height Select	257
Programming Rack Height Select	258
Service Level (Software Version 814759-031)	259
Chapter structure :	259
ANALYZER	259
A1 STATUS	259
A2 INPUTS	259
A3 OUTPUTS	259
A4 ESCAPE	259
CALIBRATION	259
C1 Accelerator Pedal	259
C2 Raise Lower Handle	259
C3 Reach Handle	259
C4 Tilt Handle	259
C5 Sideshift Handle	260
C6 5th Function Handle	260
C7 Height	260

M4 – ELECTRICS	PAGE
C8 Weight	260
C9 Fork Positioning	260
C10 Reach retract slow down	260
C11 Save?	260
FEATURE	260
F1 Truck size	260
F2 FLS Switch	260
F3 Height Encoder	260
F4 Lower Cut Out	260
F5 Fifth Function	260
F6 Max Load	260
F7 Capacity Data Monitor CDM	260
F8Alarm 2	261
F9 Beacon	261
F10 User Performance	261
F11 User Codes	261
F12 Language	261
F13 Change value Euro/US Unit	261
F14 Rack select	261
F15 Height & weight	261
F16 Timer on/off	261
F17 Error log No/Yes	261
F18 Operator Alarm1 on/off	261
F19 Battery Low Level Alarm	261
F20 Fork positioning	261
F21 Choose Steering	261
F22 Truck Lockout No/Yes	261
F23 Save	261
HOUR METER	261
H1 Run	261
(H2 Not available)	261
H3 TDM Traction Drive Module	261
H4 HDM Hydraulic Drive Module	261
H5 Key On Time	261
(H6 Not available)	261
H7 Set Service Timer	261
H8 Escape	261
LOG EVENTS	261
L1 History	261
L2 Totals	261
L3 Erase	261
L4 Escape	261
PERFORMANCE	262
P1 Setup P1	262
P2 Setup P2	262
P3 Setup P3	262
P4 BDI setting	262
P5 Travel > LCS	262
P6 Travel > FLS	262
P7 Travel > Custom	262
P8 Lower > Custom	262
P9 Reach > Custom	262
P10 5th Function left	262
P11 5th Function right	262
P12 Steer Sensitivity	262
(P13 Not available)	262
P14 Brake at ramp	262
P15 Set default	262

M4 – ELECTRICS	PAGE
P16 Save	262
UTILITIES	262
U1 Software Version	262
U2 Hour Set	262
U3 Brake Override	262
U4 Check Fan 1 - 4 ON/OFF	262
U5 Escape	262
Overview of Performance Default Settings	263
Service Menu	264
Access to Service Level	264
Overview of menu items	264
Analyzer	264
Calibration	264
Feature	264
Hour Meter	264
Log Events	264
Performance	264
Utilities	264
Analyzer	266
A1.1 - A1.12 Status	266
A2.1 - A2.6 Inputs	267
A2.7 - A2.13 Inputs	268
A2.14 - A2.20 Inputs	269
A2.21 - A2.25 Inputs	270
A2.26 - A2.32 Inputs	271
A2.33 - A2.37 Inputs	272
A3.1 - A3.9 Outputs	273
A3.10 - A3.16 Outputs	274
A3.17 - A3.18 Outputs	275
Calibration	276
C1 - C3 Calibration	276
C4 - C5 Calibration	277
C6 - C7.1 Calibration	278
C7.1.3 Calibration	279
C7.2 Calibration	280
C7.3 Calibration	281
C7.3.4 - C7.5 Calibration	282
C8 Calibration	283
C9 Calibration	284
C10 - 11.2 Calibration	285
Feature	286
F1 - F3 Feature	286
F4 - F6 Feature	287
F7 Feature	288
F8 Feature	289
F9 - F10 Feature	290
F11 Feature	291
F12 - F14 Feature	292
F15 - F19 Feature	293
F20 - F22 Feature	294
H1 - H3 Hourmeter	295
H4 - H8 Hourmeter	296
Log Events	297
L1 - L3.2 Log Events	297
L3.2.1 - L4 Log Events	298
Performance	299
P1 - P1.5.1 Performance	299
P1.6 - P1.10.1 Performance	300

M4 – ELECTRICS	PAGE
P1.11 - P1.15 Performance	301
P2 - P6 Performance	302
P7 - P10 Performance	303
P11 - P15.2 Performance	304
Utilities	305
U1 - U2 Utilities	305
U3 - U5 Utilities	306
M5 – BRAKE	PAGE
Load Wheel Brake	309
General	309
Brake Lining	309
Disassembly	309
Assembly	309
Wheel Brake Cylinder	310
General	310
Disassembly	310
Assembly	310
Bleeding the load wheel brake and replacing the brake fluid	310
Operating Brake	312
Disassembly	312
Test and Inspection	312
Assembly	312
Air gap setting	312
Setting the brake pedal clearance	314
M6 – STEERING	PAGE
Steering (till 5A204796)	317
General	317
Functional Description	317
Quadrant - Definition	318
Error routine	318
When the error routine starts	318
Ending the error routine	318
Causes of error routine activation	318
Other error causes	318
Examples of steer faults	319
Example 1: Manual wheel change, drive wheel turned 160° to the right	319
Ending the error routine	319
Setting the SFS ... proximity switches	322
Replacing the steer motor	322
Disassembly	322
Assembly	322
Steering wheel	324
Disassembly	324
Assembly	324
Steering Sensor (ECR4)	326
Disassembly	326
Assembly	326
Steering (from 5A204798)	329
General	329
Feature Description	329
Quadrant - Definition	330
Error routine	330
When the error routine starts	330
Ending the error routine	330

M6 – STEERING	PAGE
Causes of error routine activation	330
Other error causes	330
Examples of steer faults	331
Setting the proximity switches SFS	334
Steer Motor and Gear Unit	334
Removal	334
Separating Gear Unit and Motor	334
Assembling Gear Unit and Motor	334
Assembly	336
Steering Wheel	336
Removal	336
Assembly	336
Steering Sensor (ECR4)	338
Removal	338
Assembly	338
M7 – MAST	PAGE
Mast	343
General	343
Torque Requirements	343
Lifting Gear Minimum Capacity	343
Mast Testing (Assembled)	344
Flaking	344
Mast Shock Absorbers	344
Mast end stops	344
Fork Adjustment	344
Mast Removal and Assembly	345
General	345
Disassembly	345
Assembly	347
Dismantling and Assembling the Mast	348
General	348
Dismantling	348
Fork Carriage Removal	348
2nd Mast Stage Removal	348
1st Mast Stage Removal	348
Replacing the Mast Rollers	350
General	350
Mast Roller Assembly	350
Calculating the Roller Diameter	350
Calculating the Required Number of Shims	350
Outer Mast / 1st Mast Stage	350
1st Mast Stage / 2nd Mast Stage	352
Fork Carriage	354
Final Work and Settings	355
Free lift cylinder removal / installation with mast attached	356
General	356
Torque Requirements	356
Lifting Gear Minimum Capacity	356
Disassembly	356
Assembly	357
Lift cylinder removal / assembly	359
General	359
Lifting Gear Minimum Capacity	359
Disassembly	359
Assembly	361
Lift Chains	362
General	362

M7 – MAST	PAGE
Inspection	362
Cleaning	362
Wear	362
Freedom of Movement of Chain Links	363
Chain Tension	363
Chain Anchor and Pulleys	364
Worn Connection Plates	364
Protruding or Turned Chain Pins	364
Corrosion	364
Chain Lateral Wear	365
Uneven Chain Tension	365
Misalignment of Lift Components	365
Lift Chain Lubrication	366
Detaching Lift Chains	367
Tools and Equipment Required	367
Detachment	367
Fork Tines	368
General	368
Terms	368
Fork Identification	368
Repairs	368
Checking the Fork	368
Crack Inspection	368
Verticality Test	369
Fork Blade Warping	369
Measuring the Fork Tip Width	369
Fork Tine Height Difference	369
Stop Mechanism	370
Fork Blade Wear	370
Reach	372
Disassembly	372
Assembly	372
Side Roller Adjustment	372
Backing Roller Adjustment	373
Reach Cylinder	374
Disassembly	374
Assembly	374
Integrated Sideshifter	375
Disassembly	375
Assembly	375
M8 – CYLINDERS	PAGE
Cylinders	379
General	379
Safety when working on hydraulic systems	379
General Instructions for Repairing Hydraulic Components	379
Rod Seal Assembly	380
General	380
Large Rod Seal Assembly	380
Small Seal Rod Assembly	381
Rod Seal Assembly, Sealing Lip First	382
Lift cylinder	385
General	385
Removal and Assembly	385
Dismantling	385
Rod Seal Removal	385
Piston Rod Removal	385

M8 – CYLINDERS	PAGE
Assembly	385
Piston Rod Assembly	385
Installing the Rod Seal	385
Free-Lift Cylinder	389
General	389
Removal and Assembly	389
Dismantling	389
Rod Seal Removal	389
Piston Rod Removal	389
Cushion Removal	389
Assembly	389
Cushion Installation	389
Piston Rod Assembly	389
Installing the Rod Seal	389
Reach Cylinder	393
General	393
Removal and Assembly	393
Dismantling	393
Rod Seal Removal	393
Piston Rod Removal	393
Assembly	393
Piston Rod Assembly	393
Installing the Rod Seal	393
Sideshift, Cylinder	396
Dismantling	396
Assembly	396
DIA – ELECTRICAL SCHEMATICS	PAGE
Wiring Schematic - AC System up to Ser. No. 5A203818 ..	401
Wiring Schematic - AC System up to Ser. No. 5A203818 ..	402
Wiring Schematic - AC System from Ser. No. 5A203820 ...	403
Wiring Schematic - AC System from Ser. No. 5A203820 ...	404
Wiring Schematic - AC System from Ser. No. 5A204798 ...	405
Wiring Schematic - AC System from Ser. No. 5A204798 ...	406
Wiring Schematic Options	407
Wiring Diagram Coldstore Option	408
Wiring Diagram Coldstore Cabin	409
Main Harness up to Ser. No. 5A204796	410
Main Harness up to Ser. No. 5A204796	411
Connector Table	412
Main Harness from Ser. No. 5A204798	414
Main Harness from Ser. No. 5A204798	415
Connector Table from Ser. No. 5A204798	416
Connector Table from Ser. No. 5A204798	417
Harness: Connector Panel to Reach Carriage till Ser. No. 5A203818	418
Harness: Connector Panel to Reach Carriage from Ser. No. 5A203820	419
Harness: Reach Carriage	420
Mast Cable	421
Cable Hight Encoder from Ser. No. 5A203820	422
Harness Options	423
Harness Beacon	424
Harness Beacon Switch	425
Harness Coldstore	426
Harness Working Light 12 V	427
Harness Working Light 24 V	428
Harness Driving Light	429

DIA – ELECTRICAL SCHEMATICS **PAGE**

Harness Travel Alarm	430
Harness DC/DC Converter with Harness Options 813445	431
Harness DC/DC Converter without Harness Options 813445	432
Harness Heated Seat	433
Harness 12V / 24V Supply to B/W Screen	434
Harness Monitor B/W or Connection Box to Connector Panel	435
Harness (Camera) Connector Panel to Reach Carriage	436
Harness (Camera) Reach Carriage to Mast	437
Harness (Camera) Mast to Camera	438
Harness (Camera) TFT Display to Connection Box	439
Harness 12 V Supply to Connection Box	440
Motec Camera Power Lead	441
Harness and Installation Drawing 6th Function	442
Harness Davis Derby System	443
Davis Derby EV 16 Circuit Program	444
Davis Derby S 16 Circuit Program	445
Harness 1 Coldstore Cabin	446
Harness 2 Coldstore Cabin	447

HYD – HYDRAULIC SCHEMATICS **PAGE**

Hydraulic Schematic	455
Hydraulic Lines to the Valve Block	456



SAFETY

Safety Symbols used in the Manual

To help guide you through the manual and to highlight particular danger areas, we have used graphic illustrations:

DANGER



This symbol indicates life-threatening risks

- Failure to comply with this notice may result in fatal injuries to yourself or other people.

WARNING



This symbol indicates the risk of serious injury and/or serious material damage.

- Failure to comply with this notice may result in severe injuries to yourself or other people and/or serious material damage.

CAUTION



This symbol indicates the risk of minor injury and/or minor material damage.

- Failure to comply with this notice may result in minor injuries to yourself or other people and/or minor material damage.

INFORMATION



Contains additional information with supplementary notes and hints.

OPTION



These items relate to optional features not supplied with the standard version.

General Maintenance and Repair Safety Notes

DANGER



Read the safety notices in the truck Maintenance and Operator's Manuals.

- Failure to do so could result in severe or fatal injuries to maintenance personnel and/or other persons.

Motorised vehicles can be dangerous if maintenance and service are neglected. For this reason maintenance and inspections must be carried out at regular short intervals by trained personnel working to approved company guidelines.

DANGER



Follow all national/local safety regulations applicable for maintenance work, e.g. for work on higher levels.

- Failure to do so could result in severe or fatal injuries to maintenance personnel and/or other persons.

Maintenance and Repair

1. Maintenance work must only be carried out in accordance with the test and maintenance program contained in the present Maintenance Manual and any applicable service notices.
2. Only qualified and authorised personnel may carry out work on the truck.
3. Always keep fire extinguishers in good working condition. Do not approach fluid levels or leaks with a naked flame.
4. To clean, use a non flammable, non combustible cleaning solution which is groundwater-neutral. Only carry out cleaning with an oil separator. Protect the electrical system from dampness.
5. Keep the service area clean, dry and well-ventilated.
6. Do not allow oil to penetrate the ground or enter the draining system. Used oil must be recycled. Oil filters and desiccants must be treated as special waste products. Relevant applicable regulations must be followed.
7. Neutralise and thoroughly rinse any spilled battery fluid immediately.
8. Keep the truck clean. This will facilitate the location of loose or faulty components.

9. Make sure that capacity and data plates, warnings and labels are legible at all times.
10. Alterations or modifications by the owner or operator are not permitted without the express written authorisation from Crown.
11. Only use original Crown spare parts to ensure the reliability, safety and suitability of the Crown truck.

Before Leaving the Truck

- Stop the truck.
- Lower the fork carriage fully.
- Apply the parking brake.
- Turn off the truck and remove the key.
- Block all wheels when parking on an uneven surface.

Before Carrying out Work on the Truck

- Raise the truck to free the drive wheel. Press the emergency Stop button and disconnect the battery.
- Prevent the truck from rolling away.
- Before carrying out work on the hoist frame, the lift mast or on the fork carriage: Block these parts according to maintenance instructions in order to prevent them from dropping.
- Only carry out operational testing when there is sufficient room to manoeuvre, to avoid the risk of injury to yourself and others.

Before Operating the Truck

- Check the safety devices.
- Get into the driver's seat.
- Check the operation of the lifting device, travel direction switch, speed control, steering, warning devices and brakes.

Warnings and Labels on the Truck

During regular maintenance check that the warnings and labels on the truck are complete and legible.

- Clean any illegible labels.
- Replace any faulty or missing labels.

The order and meaning of the warnings and labels on the truck are described in section 10.9 of the parts manual.



INTRODUCTION

Blank page

General

The present manual is designed for Customer Service engineers who wish to familiarise themselves with the maintenance work required for the various truck components.

It also contains troubleshooting sections which can be used to identify and remedy truck faults.

INFORMATION



This book is not an operating manual. It is designed solely for specialist personnel who have been trained and authorised to carry out the work described in the manual.

This manual therefore contains fewer and less detailed warnings than the Operator's Manual, as the latter is aimed at persons who have very little or no prior experience at all.

Operating Instructions

This manual contains no operating instructions. An operating instructions manual is supplied with the vehicle. Additional copies can be ordered as required.

With the help of this manual you and your personnel will be able to ensure the long service life, operational safety and error free functioning of your CROWN vehicle.

Service Training

CROWN offers the appropriate vehicle related training for service personnel. Details on this training can be obtained from CROWN on request.

Ordering Spare Parts

The maintenance manual does not cover spare parts. These are listed in a separate manual.

Spare parts can be ordered by quoting:

- The truck specification number
- The truck model number
- The truck serial number

This information can be found on the truck's data plate. Only if this information is provided can the order be processed quickly, correctly and reliably.

Please refer to the Technical Specifications Sheet for the utilisable loads, technical data and dimensions for this series. Brochures can be obtained from your CROWN dealer or from the following address:

CROWN Gabelstapler GmbH & Co.KG
Moosacher Str. 52
80809 Munich
GERMANY
Tel.: +49 (0)89 / 93 002 -0
Fax: +49 (0)89 / 93 002 -175 oder 133

Using the Manual

The manual is divided into sections. The following table shows how the manual is structured.

Sections Maintenance	
Section	Description
IDX	Table of Content
MA	Safety
ITD	Introduction
M1	Lubrication and Adjustment
M2	Hydraulics
M3	Drive Unit
M4	Electrical
M5	Brake
M6	Steering
M7	Mast / Lifting Mechanism
M8	Cylinder
DIA	Electrical Diagrams
HYD	Hydraulic Schematic

A01M-gb

Blank page



LUBRICATION AND ADJUSTMENT

Blank page

BUY NOW

**Then Instant Download
the Complete Manual
Thank you very much!**