

KOMATSU

SHOP MANUAL

FG10/15/18-21

FG15H/18H-21

FD10/15/18-21

FG20/25/30-17

FG20H/25H-17

FG20N/25N/30N-17

FG35A-17

FD20/25/30-16

FD20H/25H/30H-16

FD20N/25N/30N-16

FD35A-16

PRECAUTIONS WHEN PERFORMING THE SERVICE WORK

Always pay attention to “Safety” before starting any work — this is important.

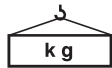
Never attempt any work where danger to yourself or to other persons.

Whenever work requiring safety precautions are described in this manual, a flag mark  inserted, always make double sure that safety measures are taken.

Other unmarked work, should always be performed after studying and using your common sense to prevent accidents.

DESCRIPTION OF THE SYMBOLS

The symbols described below are used in this manual for convenience and better understanding.

Symbol	Item	Description
	Safety	Special safety precautions are needed to perform the work.
	Note	Special technical precautions are needed to perform the work
	Tightening torque	Fastening parts that require specified tightening force when assembling.
	Weight	Weight of parts or systems
	Coat	Places to be coated with adhesives, etc. when assembling

SECTION INDEX

00. FOREWORD

10. GENERAL AND SPECIFICATIONS

20. TESTING AND ADJUSTMENT

30. REMOVAL AND INSTALLATION

40. DISASSEMBLY AND ASSEMBLY

50. MAINTENANCE STANDARD

60. STRUCTURE AND FUNCTION

80. CRITERIA FOR PERIODICAL INSPECTION AND JUDGMENT

90. CONVERSION TABLE

APPENDIX

10. GENERAL AND SPECIFICATIONS

SPECIFICATIONS	10-2
PERIODIC REPLACEMENT OF CONSUMABLE PARTS	10-16
SAFETY ITEMS FOR MAINTENANCE	10-17
STANDARD TIGHTENING TORQUE FOR BOLTS	10-25
STANDARD TIGHTENING TORQUE FOR PIPE JOINTS	10-26

SPECIFICATIONS

AX50 (1.0 - 1.8ton) Series

Characteristics	1.2	Model	Manufacturer's Designation			FG10T-21	FG10C-21	FD10T-21	FD10C-21
	1.3	Power Type	Electric, Diesel, Gasoline, LPG			Gasoline		Diesel	
	1.4	Operation Type				Sitting		Sitting	
	1.5	Rated Capacity	Rated Capacity		kg	1000		1000	
	1.6	Load Center	Rated Load Center		mm	500		500	
	1.6.1	Alternative Capacity	Capacity@600mm Load Center		kg	900		900	
	1.8	Load Distance	Front Axle Center to Fork Face		mm	L2	400		400
	1.9	Wheelbase			mm	L3	1400		1400
Weight	2.1	Service Weight			kg		2080	2120	2180 2220
	2.2	Axle Loading	Loaded	Front	kg		2725	2760	2760 2790
	2.2.1			Rear	kg		355	360	420 430
	2.3		Unloaded	Front	kg		1065	1100	1095 1130
	2.3.1			Rear	kg		1015	1020	1085 1090
Tyres	3.1	Tyre Type					Pneumatic		Pneumatic
	3.2	Tyre Size	Front				6.50-10-10PR(I)		6.50-10-10PR(I)
	3.3		Rear				5.00- 8- 8PR(I)		5.00-8-8PR(I)
	3.5	Number of Wheel	Front/Rear (x=driven)				2*/2		2*/2
	3.6	Tread, Front			mm	b4	890		890
	3.7	Tread, Rear			mm	b3	895		895
	3.7	Tread, Rear			mm	b3	895		895
Dimensions	4.1	Tilting Angle	Forward/Backward		degree		6/10		6/10
	4.2	Mast Height, Lowered	2-stage Mast		mm	h2	1995		1995
	4.3	Std. Free Lift	2-stage Std. Mast, from Ground		mm		135		135
	4.4	Std. Lift Height	2-stage Std. Mast, from Ground		mm	h1	3000		3000
	4.5	Mast Height, Extended	2-stage Std. Mast		mm	h3	3955		3955
	4.7	Height, Overhead Guard			mm	h4	2070		2070
	4.19	Length, with Std. Forks			mm	L1	2965		2965
	4.20	Length, to Fork Face			mm		2195		2195
	4.21	Width, at Tyre	Single		mm	b1	1070		1070
	4.22	Forks	Thickness x Width x Length		mm		31x100x770		31x100x770
	4.23	Fork Carriage Class	ISO 2328, Type A/B/no				Class 2, Type A		Class 2, Type A
	4.24	Width, Fork Carriage			mm		970		970
	4.31	Ground Clearance	Under Mast		mm		120		120
	4.32		at Center of Wheelbase		mm		130		130
	4.33	Right Angle Stacking Aisle	with L1000 x W1200 pallet		mm		3315		3315
	4.34		with L1200 x W800 pallet		mm		3515		3515
	4.35	Turning Radius			mm	Wa	1915		1915
Performance	5.1	Travel Speed (FWD)	Loaded, 1st/2nd		km/h		19.0	9.0/19.0	19.0 8.5/19.0
			Unloaded, 1st/2nd		km/h		19.0	9.0/19.0	19.5 8.5/19.5
	5.2	Lifting Speed	Loaded		mm/s		580		620
			Unloaded		mm/s		640		670
	5.3	Lowering Speed	Loaded		mm/s		500		500
			Unloaded		mm/s		550		550
	5.6	Max. Drawbar Pull	Loaded, 1.5 km/h, 3 min rating		KN		10	11	13 14
	5.8	Max. Gradeability	Loaded, 1.5 km/h, 3 min rating		%		34	38	49 41
	5.10	Service Brake	Operation/Control				Foot/Hydraulic		Foot/Hydraulic
	5.11	Parking Brake	Operation/Control				Hand/Mechanical		Hand/Mechanical
Others	5.12	Steering	Type				FHPS		FHPS
	6.4	Battery	Voltage/ Capacity at 5-hour rating		V/ah		12/33		12/64
	7.1	Maker Model					NISSAN K15 GCT GK15		Komatsu 4D92E
	7.2	Rated Output, SAE net			KW		27.2@2500		34.6@2450
	7.3	Rated RPM			min-1		2500		2450
	7.3.1	Max. Torque, SAE net			Nm@min-1		113@1600		142@1800
	7.4	No. of Cylinder/Displacement			cm ³		4-1486		4-2659
	7.6	Fuel Tank Capacity			Ltr		40		40
	8.2	Relief Pressure for Attachment			bar		172		172
	8.6	Clutch					T/C	Dry	T/C Dry
	8.7	Transmission					TORQFLOW	Synchromesh	TORQFLOW Synchromesh

FG15T-21	FG15C-21	FD15T-21	FD15C-21	FG15HT-21	FG15HC-21
Gasoline		Diesel		Gasoline	
Sitting		Sitting		Sitting	
1500		1500		1500	
500		500		500	
1350		1350		1350	
405		405		405	
1400		1400		1400	
2450	2490	2550	2590	2450	2490
3500	3535	3530	3565	3500	3535
450	455	520	525	450	455
1005	1040	1035	1070	1005	1040
1445	1450	1515	1520	1445	1450
Pneumatic		Pneumatic		Pneumatic	
6.50-10-10PR(I)		6.50-10-10PR(I)		6.50-10-10PR(I)	
5.00- 8- 8PR(I)		5.00-8-8PR(I)		5.00- 8- 8PR(I)	
2*/2		2*/2		2*/2	
890		890		890	
895		895		895	
6/10		6/10		6/10	
1995		1995		1995	
140		140		140	
3000		3000		3000	
3955		3955		3955	
2070		2070		2070	
3160		3160		3160	
2240		2240		2240	
1070		1070		1070	
35x100x920		35x100x920		35x100x920	
Class 2, Type A		Class 2, Type A		Class 2, Type A	
970		970		970	
120		120		120	
130		130		130	
3360		3360		3360	
3560		3560		3560	
1955		1955		1955	
18.5	8.5/18.5	18.5	8.5/19.0	18.5	8.5/18.5
19.0	9.0/19.0	19.0	8.5/19.5	19.0	9.0/19.0
570		620		590	
640		670		640	
500		500		500	
550		550		550	
10	11	13	14	15	14
26	27	33	31	37	35
Foot/Hydraulic		Foot/Hydraulic		Foot/Hydraulic	
Hand/Mechanical		Hand/Mechanical		Hand/Mechanical	
FHPS		FHPS		FHPS	
12/33		12/64		12/33	
NISSAN K15 GCT GK15		Komatsu 4D92E		NISSAN K21 GCT GK21	
27.2@2500		34.6@2450		34.6@2450	
2500		2450		2450	
113@1600		142@1800		152@1600	
4-1486		4-2659		4-2065	
40		40		40	
172		172		172	
T/C	Dry	T/C	Dry	T/C	Dry
TORQFLOW	Synchromesh	TORQFLOW	Synchromesh	TORQFLOW	Synchromesh

Characteristics	1.2	Model	Manufacturer's Designation			FG18T-21	FG18C-21	FD18T-21	FD18C-21
	1.3	Power Type	Electric, Diesel, Gasoline, LPG			Gasoline		Diesel	
	1.4	Operation Type				Sitting		Sitting	
	1.5	Rated Capacity	Rated Capacity		kg	1750		1750	
	1.6	Load Center	Rated Load Center		mm	500		500	
	1.6.1	Alternative Capacity	Capacity@600mm Load Center		kg	1570		1570	
	1.8	Load Distance	Front Axle Center to Fork Face		mm	L2	405		405
	1.9	Wheelbase			mm	L3	1400		1400
	2.1	Service Weight			kg		2645	2685	2745
Weight	2.2	Axle Loading	Loaded	Front	kg		3870	3905	3900
	2.2.1			Rear	kg		525	530	595
	2.3		Unloaded	Front	kg		960	995	990
	2.3.1			Rear	kg		1685	1690	1755
	2.3.1			Rear	kg		1685	1690	1760
Tyres	3.1	Tyre Type					Pneumatic		Pneumatic
	3.2	Tyre Size	Front				6.50-10-10PR(I)		6.50-10-10PR(I)
	3.3		Rear				5.00- 8- 8PR(I)		5.00-8-8PR(I)
	3.5	Number of Wheel	Front/Rear (x=driven)				2*/2		2*/2
	3.6	Tread, Front			mm	b4	890		890
	3.7	Tread, Rear			mm	b3	895		895
	3.7	Tread, Rear			mm	b3	895		895
Dimensions	4.1	Tilting Angle	Forward/Backward		degree		6/10		6/10
	4.2	Mast Height, Lowered	2-stage Mast		mm	h2	1995		1995
	4.3	Std. Free Lift	2-stage Std. Mast, from Ground		mm		140		140
	4.4	Std. Lift Height	2-stage Std. Mast, from Ground		mm	h1	3000		3000
	4.5	Mast Height, Extended	2-stage Std. Mast		mm	h3	3955		3955
	4.7	Height, Overhead Guard			mm	h4	2070		2070
	4.19	Length, with Std. Forks			mm	L1	3200		3200
	4.20	Length, to Fork Face			mm		2280		2280
	4.21	Width, at Tyre	Single		mm	b1	1070		1070
	4.22	Forks	Thickness x Width x Length		mm		35x100x920		35x100x920
	4.23	Fork Carriage Class	ISO 2328, Type A/B/no				Class 2, Type A		Class 2, Type A
	4.24	Width, Fork Carriage			mm		970		970
	4.31	Ground Clearance	Under Mast		mm		120		120
	4.32		at Center of Wheelbase		mm		130		130
	4.33		with L1000 x W1200 pallet		mm		3395		3395
	4.34		with L1200 x W800 pallet		mm		3595		3595
	4.35	Turning Radius			mm	Wa	1990		1990
Performance	5.1	Travel Speed (FWD)	Loaded, 1st/2nd		km/h		18.5	8.5/18.5	18.5
			Unloaded, 1st/2nd		km/h		19.0	9.0/19.0	19.0
	5.2	Lifting Speed	Loaded		mm/s		570		620
			Unloaded		mm/s		640		670
	5.3	Lowering Speed	Loaded		mm/s		500		500
			Unloaded		mm/s		550		550
	5.6	Max. Drawbar Pull	Loaded, 1.5 km/h, 3 min rating		KN		10	11	13
	5.8	Max. Gradeability	Loaded, 1.5 km/h, 3 min rating		%		25	24	29
	5.10	Service Brake	Operation/Control				Foot/Hydraulic		Foot/Hydraulic
	5.11	Parking Brake	Operation/Control				Hand/Mechanical		Hand/Mechanical
	5.12	Steering	Type				FHPS		FHPS
	6.4	Battery	Voltage/ Capacity at 5-hour rating		V/ah		12/33		12/64
I.C Engine	7.1	Maker Model					NISSAN K15 GCT GK15		Komatsu 4D92E
	7.2	Rated Output, SAE net			KW		27.2@2500		34.6@2450
	7.3	Rated RPM			min-1		2500		2450
	7.3.1	Max. Torque, SAE net			Nm@min-1		113@1600		142@1800
	7.4	No. of Cylinder/Displacement			cm ³		4-1486		4-2659
	7.6	Fuel Tank Capacity			Ltr		40		40
Others	8.2	Relief Pressure for Attachment			bar		172		172
	8.6	Clutch					T/C	Dry	T/C
	8.7	Transmission					TORQFLOW	Synchromesh	TORQFLOW

FG18HT-21	FG18HC-21
Gasoline	
Sitting	
1750	
500	
1570	
405	
1400	
2645	2685
3870	3905
525	530
960	995
1685	1690
Pneumatic	
6.50-10-10PR(I)	
5.00- 8- 8PR(I)	
2*/2	
890	
895	
6/10	
1995	
140	
3000	
3955	
2070	
3200	
2280	
1070	
35x100x920	
Class 2, Type A	
970	
120	
130	
3395	
3595	
1990	
18.5	8.5/18.5
19.0	9.0/19.0
590	
640	
500	
550	
15	14
33	32
Foot/Hydraulic	
Hand/Mechanical	
FHPS	
12/33	
NISSAN K21	
GCT GK21	
34.6@2450	
2450	
152@1600	
4-2065	
40	
172	
T/C	Dry
TORQFLOW	Synchromesh

BX50 (2.0 - 2.5ton) Series

Characteristics	1.2	Model	Manufacturer's Designation					FG20T-17	FG20C-17	FD20T-16	FD20C-16
	1.3	Power Type	Electric, Diesel, Gasoline, LPG					Gasoline		Diesel	
	1.4	Operation Type						Sitting		Sitting	
	1.5	Rated Capacity	Rated Capacity		kg			2000		2000	
	1.6	Load Center	Rated Load Center		mm			500		500	
	1.6.1	Alternative Capacity	Capacity@600mm Load Center			kg		1810		1810	
	1.8	Load Distance	Front Axle Center to Fork Face		mm	L2		460		460	
	1.9	Wheelbase			mm	L3		1650		1650	
	Weight	2.1	Service Weight			kg			3220	3255	3310
2.2		Axle Loading	Loaded	Front	kg			4670	4705	4700	4745
Rear				kg			550	550	610	610	
2.3			Unloaded	Front	kg			1480	1505	1510	1545
2.3.1				Rear	kg			1740	1750	1800	1810
Tyres	3.1	Tyre Type						Pneumatic		Pneumatic	
	3.2	Tyre Size	Front					7.00-12-12PR(I)		7.00-12-12PR(I)	
	3.3		Rear					6.00-09-10PR(I)		6.00-09-10PR(I)	
	3.5	Number of Wheel	Front/Rear (x=driven)					2*/2		2*/2	
	3.6	Tread, Front				mm	b4	965		965	
	3.7	Tread, Rear				mm	b3	960		960	
	Dimensions	4.1	Tilting Angle	Forward/Backward		degree			6/12		6/12
4.2		Mast Height, Lowered	2-stage Mast		mm	h2		1995		1995	
4.3		Std. Free Lift	2-stage Std. Mast, from Ground		mm			150		150	
4.4		Std. Lift Height	2-stage Std. Mast, from Ground		mm	h1		3000		3000	
4.5		Mast Height, Extended	2-stage Std. Mast		mm	h3		4050		4050	
4.7		Height, Overhead Guard			mm	h4		2110		2070	
4.19		Length, with Std. Forks			mm	L1		3450		3450	
4.20		Length, to Fork Face			mm			2530		2530	
4.21		Width, at Tyre	Single		mm	b1		1150		1150	
4.22		Forks	Thickness x Width x Length		mm			36x122x920		36x122x920	
4.23		Fork Carriage Class	ISO 2328, Type A/B/no					Class 2, Type A		Class 2, Type A	
4.24		Width, Fork Carriage			mm			1020		1020	
4.31		Ground Clearance	Under Mast		mm			115		115	
4.32			at Center of Wheelbase		mm			160		160	
4.33		Right Angle Stacking Aisle	with L1000 x W1200 pallet		mm			3650		3650	
4.34			with L1200 x W800 pallet		mm			3850		3850	
4.35		Turning Radius			mm	Wa		2190		2190	
Performance	5.1	Travel Speed (FWD)	Loaded, 1st/2nd		km/h			18.5	8.5/18.5	18.5	8.5/18.5
	Unloaded, 1st/2nd		km/h			19.0	9.0/19.0	19.0	8.5/19.0		
	5.2	Lifting Speed	Loaded		mm/s			545		630	
	Unloaded		mm/s			600		685			
	5.3	Lowering Speed	Loaded		mm/s			450		450	
	Unloaded		mm/s			500		500			
	5.6	Max. Drawbar Pull	Loaded, 1.5 km/h, 3 min rating		KN			14	14	18	17
	5.8	Max. Gradeability	Loaded, 1.5 km/h, 3 min rating		%			28	27	36	34
	5.10	Service Brake	Operation/Control					Foot/Hydraulic		Foot/Hydraulic	
5.11	Parking Brake	Operation/Control					Hand/Mechanical		Hand/Mechanical		
5.12	Steering	Type					FHPS		FHPS		
	6.4	Battery	Voltage/ Capacity at 5-hour rating		V/ah			12/33		12/64	
I.C Engine	7.1	Maker Model						NISSAN K21 GCT GK21		Komatsu 4D94LE	
	7.2	Rated Output, SAE net			KW			34.6@2450		46.3@2450	
	7.3	Rated RPM			min-1			2450		2450	
	7.3.1	Max. Torque, SAE net			Nm@min-1			152@1600		186@1800	
	7.4	No. of Cylinder/Displacement			cm ³			4-2065		4-3052	
	7.6	Fuel Tank Capacity			Ltr			58		58	
Others	8.2	Relief Pressure for Attachment		bar				181		181	
	8.6	Clutch						T/C	Dry	T/C	Dry
	8.7	Transmission						TORQFLOW	Synchromesh	TORQFLOW	Synchromesh