

KOMATSU

SHOP MANUAL

FORKLIFT TRUCK

AE50 HYBRID Series

Applicable Model

FB15HB-12
FB15HB-12
FB18HB/20AHB-12
FB18HB/20AHB-12

Serial No.

M236-830001 and up
M257-830001 and up
M237-830001 and up
M258-830001 and up

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FOREWORD

1. This Shop Manual is composed to be used mainly for the lift trucks equipped with the battery hybrid system of FB10/20-12 (AE50 Series).

For the items not covered in this Shop Manual, see the applicable sections in the already published Shop Manual "BBA12E1-03".




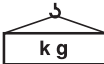


2. This manual describes the correct procedure for inspection, maintenance and troubleshooting in order to maintain the performance of lift trucks and secure workers' safety. Workers are expected to read this newly published Shop Manual "BHA12E1-05" along with the already published Shop Manual "BBA12E1-03" to offer quality service. When the sales-related specifications or other data are needed, refer to the Sales Manual.

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
	Drain	Indicates the drain port of oil and the like, and the volume of drainage.

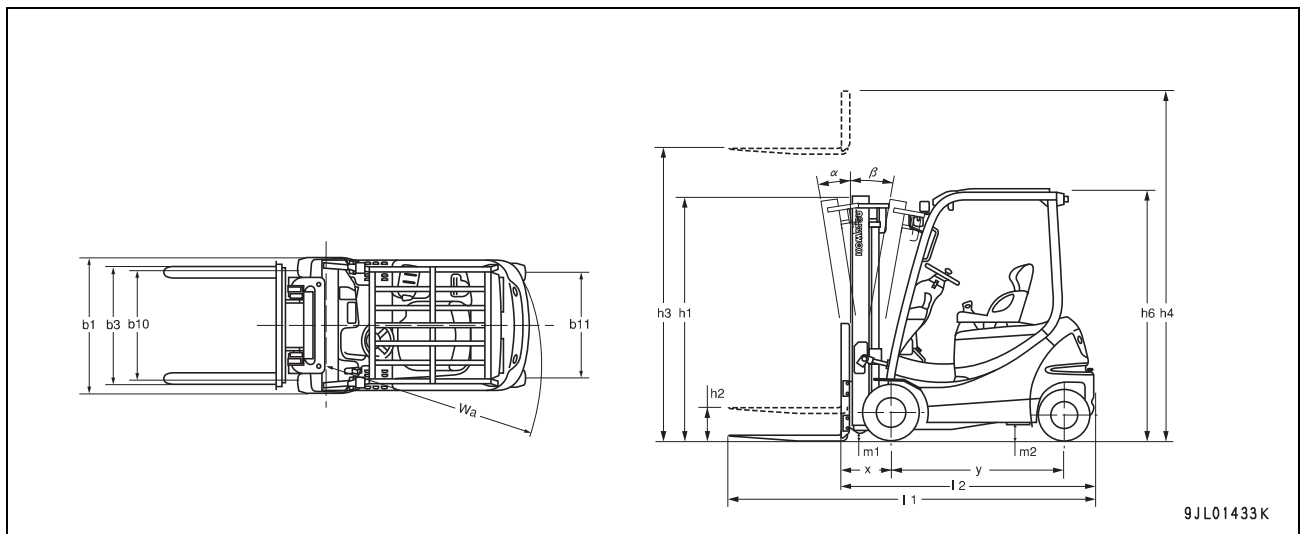
10. GENERAL AND SPECIFICATIONS

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* See the applicable section in Shop Manual "BBA12E1-03".

OUTSIDE VIEW AND SPECIFICATIONS

Characteristics	1.2	Model	Manufacturer's Designation			FB15HB-12	FB18HB-12	FB20AHB-12
	1.3	Power Type	Electric, Diesel, Gasoline, LPG, Cable			Electric	Electric	Electric
	1.4	Operation Type				Sitting	Sitting	Sitting
	1.5	Rated Capacity	Q	Rated Capacity	kg	1500	1750	2000
	1.6	Load Center	c	Rated Load Center	mm	500	500	500
	1.6.1	Alternative Capacity	Q2	Capacity@600 mm Load Center	kg	1350	1570	1800
	1.8	Load Distance	x	Front Axle Center to Fork Face	mm	405	405	425
	1.9	Wheelbase	y		mm	1410	1410	1470
	2.1	Service Weight	Including Min. Capacity Battery, See line 6.5		kg	2875	3130	3550
Weight	2.2	Axle Loading	Loaded	Front	kg	3980	4400	5020
	2.2.1			Rear	kg	450	520	600
	2.3		Unloaded	Front	kg	1490	1490	1720
	2.3.1			Rear	kg	1440	1680	1900
Tyres	3.1	Tyre Type	Cushion, Elastic Cushion, Pneumatic, Polyurethane			Pneumatic	Pneumatic	Elastic Cushion
	3.2	Tyre Size	Front			18x7-8-16PR(I)	18x7-8-16PR(I)	200/50-10
	3.3		Rear			16x6-8-10PR(I)	16x6-8-10PR(I)	16x6-8
	3.5	Number of Wheel	Front/Rear (x=driven)			2*/2	2*/2	2*/2
	3.6	Tread, Front	b10		mm	940	940	950
	3.7	Tread, Rear	b11		mm	865	865	865
	4.1	Tilting Angle	a/b	Forward/Backward	degree	6/10	6/10	6/10
Dimensions	4.2	Mast Height, Lowered	h1	2-stage Mast	mm	1995	1995	2110
	4.3	Std. Free Lift	h2	2-stage Std. Mast, from Ground	mm	140	140	150
	4.4	Std. Lift Height	h3	2-stage Std. Mast, from Ground	mm	3000	3000	3000
	4.5	Mast Height, Extended	h4	2-stage Std. Mast	mm	3955	3955	3970
	4.7	Height, Overhead Guard	h6		mm	2070	2070	2070
	4.19	Length, with Std. Forks	l1		mm	2980	3015	3100
	4.20	Length, to Fork Face	l2		mm	2060	2095	2180
	4.21	Width, at Tyre	b1	Single	mm	1110	1110	1160
	4.22	Forks	s/e/l	Thickness / Width / Length	mm	35x100x920	35x100x920	36x122x920
	4.23	Fork Carriage Class	ISO 2328, Type A/B/no			Class 2, Type A	Class 2, Type A	Class 2, Type A
	4.24	Width, Fork Carriage	b3		mm	970	970	970
	4.31	Ground Clearance	m1	Under Mast	mm	95	95	95
	4.32		m2	at Center of Wheelbase	mm	125	125	125
	4.33	Right Angle Stacking	Ast	with L1000 x W1200 pallet	mm	3155	3190	3275
	4.34	Aisle	Ast	with L1200 x W800 pallet	mm	3355	3390	3475
	4.35	Turning Radius	Wa		mm	1750	1785	1850
Performance	5.1	Travel Speed (FWD)	Loaded / Unloaded		km/h	15.0/17.0	15.0/17.0	14.0/16.0
	5.2	Lifting Speed	Loaded / Unloaded		mm/s	340/600	320/600	280/500
	5.3	Lowering Speed	Loaded / Unloaded		mm/s	450/550	450/550	370/440
	5.6	Max. Drawbar Pull	Loaded, 3 min. rating		N	9560	9560	9045
	5.8	Max. Gradeability	Loaded, 3 min. rating/1.5/h		%	19	16	14
	5.10	Service Brake	Operation/Control			Foot/Hydraulic	Foot/Hydraulic	Foot/Hydraulic
	5.10.1	Parking Brake	Operation/Control			Hand/Mechanical	Hand/Mechanical	Hand/Mechanical
	5.10.2	Steering	Type			FHPS	FHPS	FHPS
Drive	6.1	Drive Motor (AC)	60 min.rating		kW	4.5	4.5	4.5
	6.2	Pump Motor (AC)	5 min.rating		kW	9.0	9.0	9.0
	6.4	Battery Voltage			V	48	48	48
	6.4.1	Battery Capacity,Min			Ah/5hr	402	402	468
	6.4.2	Battery Capacity,Max			Ah/5hr	565	565	565
	6.5	Battery Weight	Min.Capacity Battery, see line 6.4.1		kg	720	720	760
Others	8.1	Drive Motor Control				Transistor	Transistor	Transistor
	8.2	Relief Pressure Attachment			bar	176	176	176
	8.2.1	Reservoir Capacity			Ltr	23	23	23



Charger source [voltage] specifications

Battery		Input current [A]	Input voltage [V]	Maximum input electricity [kVA]
Voltage [V]	Capacity [Ah/5H]			
48	360	43/43 [50 Hz/60 Hz]	190 - 219	14.9/14.9 [50 Hz/60 Hz]

**HANDLING OF BATTERY**

- This lift truck (equipped with the hybrid system) has 2 power supply systems of capacitor and battery. A special discharger is required to turn OFF all the power supplies.
- Since every battery handling operation is important for safety, fully understand the precautions on environment, fire, electrical shock, and battery electrolyte, actions against abnormality, storage and disposal of the battery.
- You must understand the hazardous nature involved in handling the battery since its inappropriate handling can lead to explosions, damages of property and personal injuries.

ENVIRONMENT AND CONDITION

- Use the battery within the following temperature ranges. Failing to do so can cause breakage or deformation of the battery.
 - During discharging (operation): -20 – 50 °C
 - During charging: 0 – 40 °C
 - During storage: -20 – 40 °C
- Do not expose the battery to water or marine water. Otherwise, corrosion of the battery, electric shock or fire may result.
- Do not use or store the battery in places where it will be exposed to strong direct sunlight, in the front of a stove, or near fire. If the battery is used or stored in these places, it may leak electrolyte, heat, or burst.
- Do not use the battery in a dusty place. In a dust place, the battery terminals may be shorted. If it is obliged to use the battery in a dusty place, check it periodically.
- Do not drop the battery or give a strong impact to it. A strong impact can break the battery case and lower the battery performance.
- Do not bring a wire cover containing plasticizer or a soft vinyl chloride sheet in contact with the battery. And do not bring an organic solvent such as paint thinner, gasoline, kerosene and benzine or liquid detergent in contact with the battery. If these liquids are brought in contact with the battery case, the case may crack and electrolyte may leak.
- Do not cover the battery with a vinyl sheet, etc. that can generate static electricity. Static electricity can cause an explosion.

CAUTION ON INSPECTION

- Check the appearance of the battery. If its case or cover is cracked or deformed or if electrolyte is leaking, replace it with a new one.¹ If the battery having external abnormality is used as it is, the specified output may not be obtained and electrical leak, smoking, ignition, and other accidents may occur.
- If the charge voltage or discharge characteristics of the battery are abnormal, replace the battery with new one.
- Always charge the battery by the method described in the Operation and Maintenance Manual. If the battery is charged by another method, the battery may leak the electrolyte, heat or burst. If charging is not finished in the shown charge time, stop charging immediately.
- Do not open the battery seal or supply water. Doing so can cause an electrolyte leak or an explosion.
- Do not use the battery with its wiring loosened. Doing so can cause ignition.
- When the battery is used in cold weather, charge it immediately after each use. Otherwise, the battery may be broken due to freeze.
- Be sure to turn off the lift truck's starting switch after using the battery. Otherwise, the battery is over discharged and its performance and service life decrease.