

SHOP MANUAL

KOMATSU

FB10/14/15/18-5

FB15H/18H-5

FB15H1/18H1-5

FB15SH/18SH-5

MACHINE MODEL

SERIAL No.

FB10/14/15/18-5 : 30001 and up

FB15H/18H-5 : 40001 and up

FB15H1/18H1 : 40001 and up

FB15SH/18SH-5 : 50001 and up

❖ KOMATSU FORKLIFT

SERVICE INFORMATION

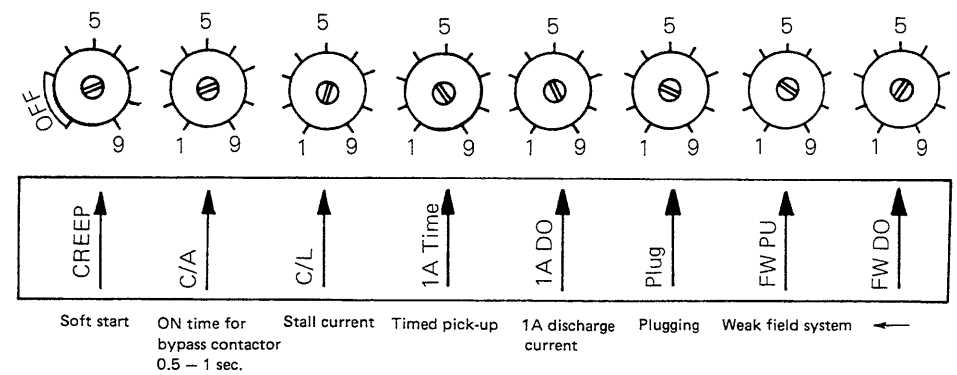
PROCEDURE FOR ADJUSTING VOLUME OF PRINT CARD ON GE CONTROLLER

Table 6

Adjustment volume	Soft start	On time for bypass contactor (1A)	Lock current	Timed pick-up	1A discharge current	Plugging	Weak field system	←
Model	CREEP	C/A	C/L	1A TIME	1A DO	PLUG	FW PU	FW DO
FB15SH-5 FB18SH-5	6	7	6.2	5	8	4		
FB20SH-3 FB30S-3	8	8	9	5	8	5.5		

Adjustment for new card or card that is out of adjustment

The SCR panel is set at the factory to match the motor and truck, so there is no need to adjust it again. The card uses a one-rotation type potentiometer, and the box is marked with a dial. Use these positions as a guide when adjusting. The diagram below is for use in explaining the method of adjustment. It does not indicate the actual positions of the knobs.

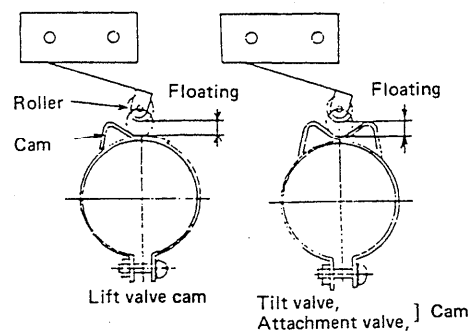


On new cards, all the knobs are turned fully counter-clockwise to position 1, so adjust them to match the truck after installing them. Turn the knob clockwise to increase the function.

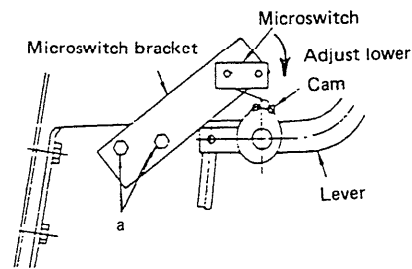
METHOD OF ADJUSTMENT FOR CONTROL VALVE MICROSWITCH

Purpose
Explained below is how to repair the working equipment in the event of malfunctioning due to the contact between the control valve microswitch roller and cam having worsened as a result of rough handling of the control valve lever.

Floating of Roller from Cam (at Lever Neutral)



Method of Adjustment
Slacken the microswitch bracket fixing bolts "a" and adjust the bracket mounting position for the cam lower.



Displacement between Roller and Cam in Circumferential Direction (at Lever Neutral)

	Lift Valve	Tilt Valve/Attachment Valve
Displacement between roller and cam in circumferential direction	<p>Normal</p>	<p>Displacement</p>
Method of Adjustment	Adjust the cam position in the circumferential direction until the cam contacts the roller. (Contractor specifications on hydraulic SCR's lift 1st-stage switch.)	Adjust the cam position in the circumferential direction so that the roller is at the center of the recess between the two cam lobes.

Note:
With the hydraulic SCR, the lift lever is equipped with 2 sets of switch and cam, i.e. the 1st and 2nd stages. Adjust the 2nd-stage switch by shifting the cam position from the 1st stage so that it turns on when the lift lever stroke is within the range of 70 to 80 mm.

General Cautions

1. If there is floating or displacement between the cam and the roller, the pump motor starts suddenly after the control valve's hydraulic circuit opens, in which case oil flows; the working equipment is therefore prone to a shock when it is started.
So eliminate floating or displacement so that the control valve circuit opens only after the switch activates.
2. The control valve microswitch lever must not be bent too harshly with pliers, etc. to remove floating or displacement, or the switch will malfunction or breakdown.

FOREWORD

Proper operation, maintenance, troubleshooting and repairs are necessary to preserve the performance of vehicles and engines (engine-powered forklift trucks) over a long period of time and to ensure that fault and breakdowns do not occur.

The object of this Shop Manual is to provide the information necessary especially in connection with the performance of inspections and repairs mainly in the maintenance areas.

For this purpose, it includes sections on "General Specifications", "Checks and Adjustments", "General Disassembly and Assembly", "Disassembly and Assembly of Components" and the "Electrical System".

Maintenance data necessary for the performance of maintenance on the machines is also included, but reference should be made to the Operation and Maintenance Manual for further details.

Reference should also be made to this manual in connection with correct operation of the machine.

The content of the items mentioned above is as follows.

General and Specifications

This chapter indicates the name of each part of the machine, and the installation positions of the operating devices and instruments.

Checks and Adjustments

This chapter gives the details required for the disassembly and reassembly of machines such as tightening torque, allowances, as well as the wear limits of the parts. However, when necessary, data in line with the procedure mentioned in the following sections, "General Disassembly and Assembly" and "Disassembly and Assembly of Components" is indicated.

General Disassembly and Assembly

The procedure when disassembling a machine comes within one of the two following categories. In the first, the machine, including the frame, is made up roughly of seven component parts, i.e.: a mast section, a cylinder section, a reach leg, a transfer section, a motor section, a pump section and a frame.

This chapter contains details of how to disassemble and assemble these components. The other category of disassembly and assembly is the disassembly and assembly of component parts referred to in the following chapter.

Disassembly and Assembly of Components

This chapter provides additional explanation concerning those of the seven component parts, as touched upon in the preceding chapter, whose disassembly procedure is particularly complicated and for which special care is needed when adjusting. Mention is also made of the functions and structures of the component parts.

Electrical system

Explanation is provided in this chapter of the electrical parts used inside the machine. Troubleshooting when a breakdown occurs is also described.

Reference should be made to the "General Shop Manual" for safe operating and working methods which serve as the basis for the performance of repair and inspection works on machines.

SERVICE INFORMATION

Method of adjustment for control
valve microswitch 60- 2
Procedure for adjusting volume
of print card on GE controller 60- 3

SECTION INDEX

00. FOREWORD

01. GENERAL AND SPECIFICATIONS

10. REMOVAL AND INSTALLATION

20. DISASSEMBLY AND ASSEMBLY

30. ELECTRICAL SYSTEM

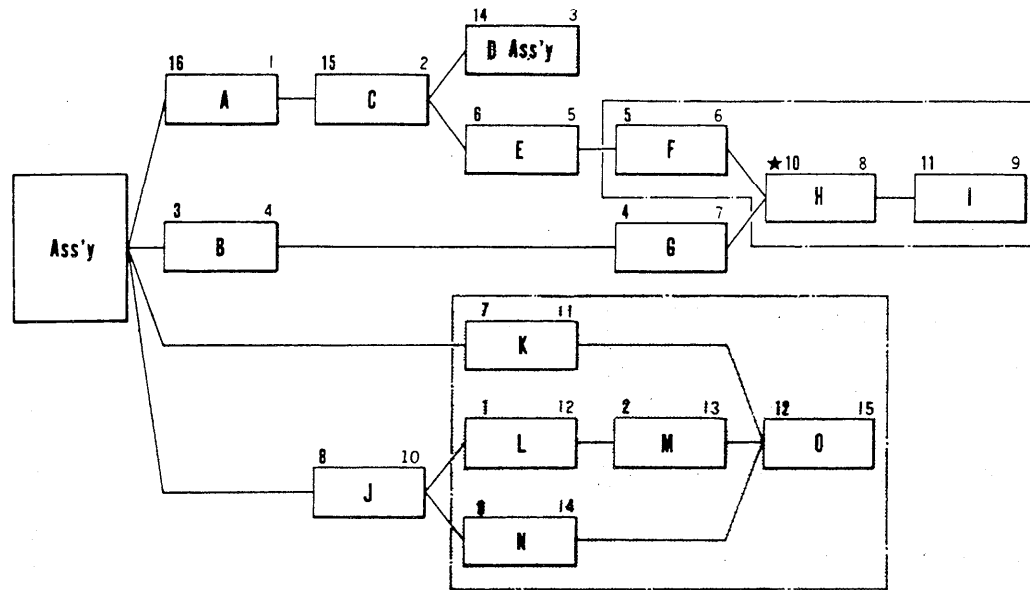
40. TESTING AND ADJUSTING

50. APPENDIX (1)(2)

60. SERVICE INFORMATION



DISASSEMBLY AND ASSEMBLY DIAGRAM






DISASSEMBLY DIAGRAMS

Sequential procedure to be followed when disassembling a machine or its components are illustrated in these manuals in the form of a diagram; no sentential descriptions are provided. Therefore, you are required to be familiar with such diagrams by thoroughly understanding the following descriptions. The disassembling diagrams include the following information:

- Sequential procedure to be followed when disassembling a machine or a component thoroughly
- The shortest procedure which requires the minimum number of parts to be removed from the machine prior to removal of a desired component part
- The same as above necessary to remove a desired assembly

HOW TO READ THE DIAGRAMS

In the diagram shown as an example on the preceding page, the name of machine (or assembly) to be disassembled is shown in the square at far left. All other squares represent parts or sub-assemblies to be removed from the preceding parts or sub-assembly. Mutual relations between the parts (or sub-assembly) can be classified as follows:

-  "C" can not be removed unless "A" is removed.
-  Both "D" and "E" can be removed after "C" is removed.
-  "H" cannot be removed unless both "F" and "G" are removed.
- This indicates an assembly composed of enclosed parts such as "F", "H" and "I". To remove these parts as an assembly, it is necessary to remove previously all parts connected to the lines leading from the left-hand edge of the block.

Temperature

Fahrenheit-Centigrade Conversion. —A simple way to convert a Fahrenheit temperature reading into a Centigrade temperature reading or vice versa is to enter the accompanying table in the center or boldface column of figures.

These figures refer to the temperature in either Fahrenheit or Centigrade degrees.

If it is desired to convert from Fahrenheit to Centigrade degrees, consider the center column as a table of Fahrenheit temperatures and read the corresponding Centigrade temperature in the column at the left.

If it is desired to convert from Centigrade to Fahrenheit degrees, consider the center column as a table of Centigrade values, and read the corresponding Fahrenheit temperature on the right.

°C		°F	°C		°F	°C		°F	°C		°F
-40.4	-40	-40.0	-11.7	11	51.8	7.8	46	114.8	27.2	81	117.8
-37.2	-35	-31.0	-11.1	12	53.6	8.3	47	116.6	27.8	82	119.6
-34.4	-30	-22.0	-10.6	13	55.4	8.9	48	118.4	28.3	83	121.4
-31.7	-25	-13.0	-10.0	14	57.2	9.4	49	120.2	28.9	84	123.2
-28.9	-20	-4.0	-9.4	15	59.0	10.0	50	122.0	29.4	85	125.0
-28.3	-19	-2.2	-8.9	16	60.8	10.6	51	123.8	30.0	86	126.8
-27.8	-18	-0.4	-8.3	17	62.6	11.1	52	125.6	30.6	87	128.6
-27.2	-17	1.4	-7.8	18	64.4	11.7	53	127.4	31.1	88	130.4
-26.7	-16	3.2	-7.2	19	66.2	12.2	54	129.2	31.7	89	132.2
-26.1	-15	5.0	-6.7	20	68.0	12.8	55	131.0	32.2	90	134.0
-25.6	-14	6.8	-6.1	21	69.8	13.3	56	132.8	32.8	91	135.8
-25.0	-13	8.6	-5.6	22	71.6	13.9	57	134.6	33.3	92	137.6
-24.4	-12	10.4	-5.0	23	73.4	14.4	58	136.4	33.9	93	139.4
-23.9	-11	12.2	-4.4	24	75.2	15.0	59	138.2	34.4	94	141.2
-23.3	-10	14.0	-3.9	25	77.0	15.6	60	140.0	35.0	95	143.0
-22.8	-9	15.8	-3.3	26	78.8	16.1	61	141.8	35.6	96	144.8
-22.2	-8	17.6	-2.8	27	80.6	16.7	62	143.6	36.1	97	146.6
-21.7	-7	19.4	-2.2	28	82.4	17.2	63	145.4	36.7	98	148.4
-21.1	-6	21.2	-1.7	29	84.2	17.8	64	147.2	37.2	99	150.2
-20.6	-5	23.0	-1.1	30	86.0	18.3	65	149.0	37.8	100	152.0
-20.0	-4	24.8	-0.6	31	87.8	18.9	66	150.8	40.6	105	221.0
-19.4	-3	26.6	0	32	89.6	19.4	67	152.6	43.3	110	230.0
-18.9	-2	28.4	0.6	33	91.4	20.0	68	154.4	46.1	115	239.0
-18.3	-1	30.2	1.1	34	93.2	20.6	69	156.2	48.9	120	248.0
-17.8	0	32.0	1.7	35	95.0	21.1	70	158.0	51.7	125	257.0
-17.2	1	33.8	2.2	36	96.8	21.7	71	159.8	54.4	130	266.0
-16.7	2	35.6	2.8	37	98.6	22.2	72	161.6	57.2	135	275.0
-16.1	3	37.4	3.3	38	100.4	22.8	73	163.4	60.0	140	284.0
-15.6	4	39.2	3.9	39	102.2	23.3	74	165.2	62.7	145	293.0
-15.0	5	41.0	4.4	40	104.0	23.9	75	167.0	65.6	150	302.0
-14.4	6	42.8	5.0	41	105.8	24.4	76	168.8	68.3	155	311.0
-13.9	7	44.6	5.6	42	107.6	25.0	77	170.6	71.1	160	320.0
-13.3	8	46.4	6.1	43	109.4	25.6	78	172.4	73.9	165	329.0
-12.8	9	48.2	6.7	44	111.2	26.1	79	174.2	76.7	170	338.0
-12.2	10	50.0	7.2	45	113.0	26.7	80	176.0	79.4	175	347.0

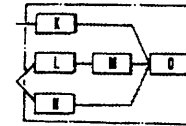
kgm to ft.lb

1 kg.m = 7.233 ft.lb

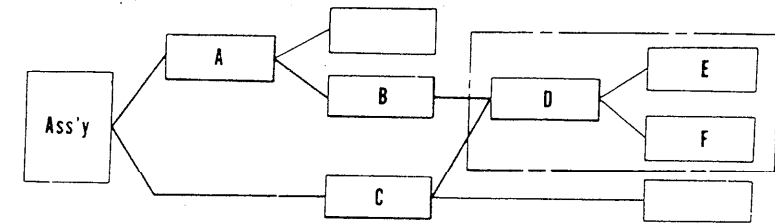
	0	1	2	3	4	5	6	7	8	9
		7.2	14.5	21.7	28.9	36.2	43.4	50.6	57.9	65.1
10	72.3	79.6	86.8	94.0	101.3	108.5	115.7	123.0	130.2	137.4
20	144.7	151.9	159.1	166.4	173.6	180.8	188.1	195.3	202.5	209.8
30	217.0	224.2	231.5	238.7	245.9	253.2	260.4	267.6	274.9	282.1
40	289.3	296.6	303.8	311.0	318.3	325.5	332.7	340.0	347.2	354.4
50	361.7	368.9	376.1	383.4	390.6	397.8	405.1	412.3	419.5	426.8
60	434.0	441.2	448.5	455.7	462.9	470.2	477.4	484.6	491.8	499.1
70	506.3	513.5	520.8	528.0	535.2	542.5	549.7	556.9	564.2	571.4
80	578.6	585.9	593.1	600.3	607.6	614.8	622.0	629.3	636.5	643.7
90	651.0	658.2	665.4	672.7	679.9	687.1	694.4	701.6	708.8	716.1
100	723.3	730.5	737.8	745.0	752.2	759.5	766.7	773.9	781.2	788.4
110	795.6	802.9	810.1	817.3	824.6	831.8	839.0	846.3	853.5	860.7
120	868.0	875.2	882.4	889.7	896.9	904.1	911.4	918.6	925.8	933.1
130	940.3	947.5	954.8	962.0	969.2	976.5	983.7	990.9	998.2	1005.4
140	1012.6	1019.9	1027.1	1034.3	1041.5	1048.8	1056.0	1063.2	1070.5	1077.7
150	1084.9	1092.2	1099.4	1106.6	1113.9	1121.1	1128.3	1135.6	1142.8	1150.0
160	1157.3	1164.5	1171.7	1179.0	1186.2	1193.4	1200.7	1207.9	1215.1	1222.4
170	1129.6	1236.8	1244.1	1251.3	1258.5	1265.8	1273.0	1280.1	1287.5	1294.7
180	1301.9	1309.2	1316.4	1323.6	1330.9	1338.1	1345.3	1352.6	1359.8	1367.0
190	1374.3	1381.5	1388.7	1396.0	1403.2	1410.4	1417.7	1424.9	1432.1	1439.4

B Ass'y

This is an assembly of which the disassembling procedure is described separately.



This indicates an assembly composed of enclosed parts. All of the enclosed parts may be removed individually according to the procedure shown by this diagram, or may be removed first as an assembly and then divided into individual parts according to the separately illustrated disassembly diagram.



When a part (or an assembly) in the diagram is specified as an object to be removed, trace all paths leading the specified part (or the block of the specified assembly) to the original machine (or assembly) located at the far left of the diagram. The parts arranged in such paths are the minimum parts necessary to be removed. In the diagram above, for example, the part "D" (or an assembly composed of "D", "E" and "F") can be removed after removing only the parts "A", "B" and "C" arranged on the thick lines.

ASSEMBLY DIAGRAM

The same manner as described above to read the disassembly drawings are also applicable to the assembly drawings. A part (machine chassis, case, etc.) with which the assembling procedure is to be started is indicated in the square located at the far left end in the diagram. All other squares represent parts (or sub-assemblies) to be installed to the preceding parts or sub-assemblies.

In the assembly diagrams, in which all parts are arranged in the sequence of assembly from left to right, the parts have mutual relations with each other as shown in the following:

- "B" cannot be installed unless "A" is installed.
- Both "D" and "E" can be installed after "C" is installed.
- "H" cannot be installed unless both "F" and "G" are installed.

All marks and numerals have the same designations as described for the disassembly diagram.

SYMBOL AND NUMERALS ABOVE A SQUARE

- The mark ★ is a reference to a note describing the precautions to be followed when removing the part.
- The boldface numeral located at the top left of a square corresponds to the index number used in the structural drawing to indicate that part. Only in the disassembly diagram indicating the general disassembly of a machine (or an assembly), however, is another form of numerals such as 12-24 used, **12** corresponds to the item code number used on each page as part of the page numbers, and **24** corresponds to the index number used in the structural drawing.
- The numeral located at the top right of a square indicates the disassembling order recommended by Komatsu.