



GS BARON II

INSTRUCTION MANUAL

Become thoroughly familiar with this manual
prior beginning construction.



The rotor head, main rotor blades or the related accessories of this photograph are not included in this kit.

Thank you very much for buying the KALT GS BARON. Please remember, this kit does not include the rotor head, main rotor blades or the related accessories. These should be purchase separately.

For this helicopter, such rotor heads as K-3 head, black head SB, 2, 3, 10S, and 10FS can be used. For the installation, linkage, and adjustment of these rotor heads, see the instruction manual accompanying the head.

As main rotor blades, our K-620, H-680, H-680P, G-55S and G-55W can be used.

Adjust the length of the main rotor blades in accordance with the rotor head used so that the diameter is 1450mm to 1465mm. Appropriate stabilizer blades, stabilizer bars, etc. are required. The contents and quantities of all parts in this kit were carefully inspected at the time of shipment but should be re-checked against the parts list prior to assembly. Should you find any parts missing, please contact your dealer.

The specifications of this kit are subject to change without notice as required for improvement.

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Prior to Assembly

The assembly of this kit is divided into 9 assembly sequences, from frame assembly to rotor head installation and should be done carefully, in accordance with this instruction manual. Screw sets are included in bags numbered for each sequence. Open only the bag required for this assembly sequence to be performed. The kit contains only the quantities necessary for assembling the helicopter. Care must be taken in using bolts, etc. which are of different lengths.

The following hardware and equipment is necessary to assemble and fly this helicopter, but is not provided in this kit.

- R/C equipment for helicopter (5 or more channels) 1 set
- Servo motor for helicopter 5 units
- Gyro (stabilizer) 1 set

This servo mount included in this kit can be used with servo widths up to 20mm and lengths 39mm to 48mm. A larger servo cannot be installed without modification.

- Tools necessary for assembly
 - Screwdriver (small)
 - Pliers
 - Nippers
 - 5.5mm nut driver (box driver)
 - Hand or electric drill and $\phi 2$, $\phi 3$ and $\phi 6$ drill tips.
 - Crescent wrench
 - Cutter

File

Vinyl tape

Cyanoacrylate adhesive

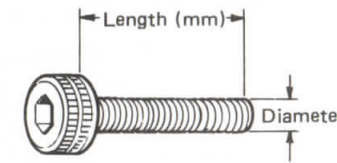
Synthetic rubber adhesive

Silicon grease

■ Nuts and Bolts

The following special bolts and nuts are used with this kit.

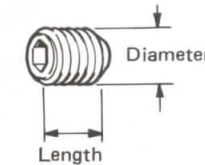
○ Cap Bolt



Has a hexagonal hole in the head; tightened with the hex wrench supplied. In the manual, the following symbol is used.

(Example) M3 x 15 CAP B.
 Diameter 3mm | Cap Bolt
 Length 15mm |

○ Set Bolt



Has a hexagonal hole in one end, but no head.

(Example) M4 x 4 SET B.
 Diameter 4mm | Set Bolt
 Length 4mm |

- Nylon Nut



Includes a locking nylon ring; body is made of plated iron.

(Example) M3 N.N.
3mm Nylon Nut

- Tapping Bolt



A Self-tapping screw; used when the canopy is installed on the body. A 2mm hole must be drilled prior to use.

- Plus Bolt

A round head bolt. To tighten, use a plus screwdriver matching bolt size.

- Serrated Washer



Has teeth; used for locking.

- Other ordinary nuts and washers are identified as M2, M3, etc., which indicate the diameter of screws.

- Hex Wrench

This kit includes 5 sizes of hex wrenches. In tightening cap bolts and set bolts, use hex wrenches as follows:

	Cap Bolt	Set Bolt
M3	2.5mm Wrench	1.5mm Wrench
M4	3.0mm Wrench	2.0mm Wrench
M5	4.0mm Wrench	
M6	5.0mm Wrench	

At the end of each step in this manual, the nuts and bolts used in the step are shown. Be careful to use the correct parts as called for, as only the required number of nuts and bolts are provided in the kit.

(Example) [M3 x 8 CAP B. 4]
 Use 4 M3 x 8 cap bolts.

Be sure to check bolt lengths before using scales are drawn at the top of each page for handy reference.

GS BARON PARTS LIST

No.	Name	Qty.
(Sequence 1)		
0601-017-8	GS Subframe (L, R)	1 ea.
0601-021-7	GS Servo Plate Retainer	2
0601-024-7	Cross Member (A)	1
0601-033-8	Body Mounting Bolt (F)	1
	Body Mounting Bolt (R)	2
0601-038-6	GS Front Bed	1
0601-011-8	GS Main Frame (L, R)	1 ea.
0601-035-6	Radius Support	1
0400-041-8	HG Bell Crank	2
0400-041-8	HG Bell Crank Collar	2
0400-039-7	HG Bell Crank Spacer for 50	1
(Sequence 2)		
0402-006-8	Slide Ring Assembly	1
0101-052-8	GS Pinion Gear (14 teeth)	1
0102-076-8	φ54 Clutch Bell (with Lining)	1
0601-107-8	Bearing Housing (A) (with 1960 OPEN)	1
0601-041-8	Bearing Housing (A) (with 1910 ZZ)	2
0101-047-6	Pinion Gear Spacer (φ6 x φ8 x t1)	1
(Sequence 3)		
0102-025-6	4 Way Clutch Shoe	4
0102-028-8	4 Way Clutch Bolt Set	1
0102-024-8	4 Way Clutch Pulley	1
0102-027-6	4 Way Clutch Damper	1
0102-013-6	Cooling Fan	1
0102-043-6	GS Cooling Shroud Mounting Plate	1
0102-041-6	GS Cooling Shroud	1
0601-029-6	GS Cross Member (F)	1
0601-030-6	GS Cross Member (G)	1
0103-062-8	GS Throttle Lever	1

No.	Name	Qty.
(Sequence 3)		
0103-101-8	KG-22S Throttle Adapter	1
0100-029-6	Starting Belt (MB-440)	1
0103-160-6	GS Muffler	1
0103-060-6	GS Muffler Spacer	1
0103-008-8	Gasket (for Muffler)	2
0103-007-8	Gasket (Spare for Carburetor)	1
0103-100-8	KG-22S Engine	1
(Sequence 4)		
0200-009-6	60 Main Shaft	1
0401-088-8	Scissors Arm (C) Assembly (Plastic)	1
0401-091-6	Pitch Control Ring for Scissors Arm C (Plastic)	1
0401-092-8	Swash Plate Assembly (Plastic)	1
0400-059-7	Pitch Control (PC) Rod (ℓ90)	1
0401-097-6	Swash Plate Collar (φ10 x ℓ14)	1
0101-046-8	Rotor Drive Gear Assembly	1
0101-041-8	Autorotation Assembly for 50	1
0101-057-8	Low Gear Ratio Tail Drive Unit	1
0101-045-6	Gear Spacer (φ12 x φ14 x t2)	1
(Sequence 5)		
0603-016-7	Tubular Landing Gear Clamp	4
0603-017-8	Tubular Landing Gear Mounting Bracket (A)	4
	Tubular Landing Gear Mounting Bracket (B)	4
0603-021-7	Tubular Landing Gear Damper Rubber	4
0603-012-7	Landing Gear Skid Cap	4
0603-014-7	Tubular Landing Gear Bracket (L)	2
0603-009-7	Landing Gear Skid	2
0601-028-7	GS Cross Member (E)	2
0501-022-8	GS 380cc Fuel Tank	1
	GS BARON Fuel Tank Accessory Parts	1

No.	Name	Qty.
(Sequence 6)		
0301-005-8	Tail Gear Assembly	1
0300-001-8	Tail Rotor Hub Assembly (w/1030 ZZ)	1
0300-006-8	Tail Rotor Grip	1 set
0403-013-6	Tail PC Plate	1
0403-012-8	Tail PC Retainer	2
0403-009-8	Tail PC Bracekt	1
	Tail PC Crank	1
	Tail PC Lever	1
	Plastic Ball Joint	1
	Tail Bracket	1
0601-092-6	Tail Bracket	1
0601-069-7	Tail Clamp	3
0601-108-7	Tail Support End	2
0601-075-6	Tail Support Clamp (A)	1
0601-073-6	Tail Boom Support	1
0601-063-5	Tail Boom	1
0601-071-7	Tail Boom Retainer	2
0100-053-8	φ2 Piano Wire Tail Joint	2
	φ2 Piano Wire Tail Joint Spacer	2
0601-120-6	φ2 Piano Wire Guide	1
0100-052-8	φ2 Piano Wire	1
0903-005-6	Wooden Tail Rotor Set	1
0601-080-8	Baron Vertical Fin	1
	Baron Horizontal Stabilizer	1
(Sequence 7)		
0601-050-8	Servo Frame Set	1
0400-028-8	Flexible PP Rod	1
0400-043-7	PP Rod Bracket	4

No.	Name	Qty.
(Sequence 8)		
0602-031-8	50 Baron Cabin (L, R)	1 ea.
0602-035-6	50 Baron Canopy	1
0001-004-6	Body Adhesive	1
(Accessories)		
0001-001-6	KALT TITE (Screw Lock Adhesive)	1
0002-009-8	GS Tool Set	1
0103-049-6	Starter Rope	1
0103-061-6	Fuel Mixing Bottle	1
	GS BARON Screw Set	1
	GS BARON Instruction Manual	1
	KG-22S Instruction Manual	1

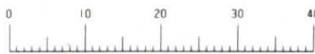
GS BARON SCREW SET CONTENTS LIST

Seq. No.	Dimensions and Name		Qty.
1	M3 x 8	Cap Bolt	10
	M3 x 10	Cap Bolt	3
	M3 x 12	Cap Bolt	4
	M3 x 18	Cap Bolt	1
	M3 x 27	Cap Bolt	1
	M3 x 12	⊕ Bolt	4
	M2 x 10	⊕ Bolt	6
	M3	Nylon Nut	16
	M2	Nut	6
	M3	Nut	4
	φ3 x φ10 x t1	Plate Washer	2
	M3	Plate Washer	4
	Ball Joint		4
	Ball Joint Spacer		4
	1.5	Hex Wrench	1
	2.0	Hex Wrench	1
	2.5	Hex Wrench	1
	3.0	Hex Wrench	1
	4.0	Hex Wrench	1
	5.0	Hex Wrench	1
2	M3 x 8	Cap Bolt	1
	M3 x 30	Cap Bolt	6
	M2 x 10	⊕ Bolt	4
	M4 x 4	Set Bolt	2
	M3	Nylon Nut	6
	M2	Nut	7
	M3	Plate Washer	4
	φ3 x φ10 x t1	Plate Washer	1
Ball Joint		4	

Seq. No.	Dimensions and Name		Qty.
3	M3 x 10	Cap Bolt	3
	M3 x 12	Cap Bolt	2
	M4 x 10	Cap Bolt	1
	M4 x 15	Cap Bolt	2
	M4 x 30	Cap Bolt	2
	M4 x 35	Cap Bolt	2
	M5 x 60	Cap Bolt	2
	M6 x 25	Cap Bolt	1
	M3 x 10	Tapping Bolt	3
	M5 x 8	⊕ Bolt	4
	M3	Nylon Nut	5
	M4	Nylon Nut	4
	M3	Serrated Washer	3
	M4	Serrated Washer	3
	M5	Serrated Washer	6
	M3	Plate Washer	6
	φ3 x φ10 x t1	Plate Washer	6
	M4	Plate Washer	2
	M5	Plate Washer	2
	M6	Spring Washer	1
	M2 x 10	⊕ Bolt	1
	M3 x 4	Set Bolt	4
	M2	Nut	2
Ball Joint		1	
4	M3 x 20	Cap Bolt	1
	M3 x 30	Cap Bolt	3
	M3	Nylon Nut	4

Seq. No.	Dimensions and Name		Qty.
5	M2 x 3	⊕ Bolt	8
	M2 x 16	⊕ Bolt	4
	M3 x 12	Flat Head Bolt	4
	M2	Nut	4
	M3	Nylon Nut	4
	M2	Serrated Washer	12
	M2.3 x 5	Tapping Bolt	4
6	M3 x 8	Cap Bolt	4
	M3 x 10	Cap Bolt	2
	M3 x 12	Cap Bolt	6
	M3 x 15	Cap Bolt	2
	M3 x 30	Cap Bolt	4
	M2 x 10	⊕ Bolt	11
	M2.3 x 8	⊕ Bolt	6
	M3 x 4	Set Bolt	4
	M4 x 4	Set Bolt	8
	M3	Nylon Nut	14
	M2	Nut	8
	M2.3	Nut	4
	M3	Plate Washer	7
	M2	Plate Washer	3
	Ball Joint		2
Universal Link		2	
7	M3 x 8	Cap Bolt	4
	M3 x 10	Cap Bolt	3
	M3	Nylon Nut	11
	M2	Nut	8
	M2 x 10	⊕ Bolt	4

Seq. No.	Dimensions and Name		Qty.
7	M2.6 x 10	⊕ Bolt	20
	M2.6	Flange Nut	20
	M2.3 x 17	Threaded Rod	4
	M2.3 x 50	Threaded Rod	2
	M2.3 x 62	Double-ended Threaded Rod	1
	M2.3 x 85	Double-ended Threaded Rod	1
	M2.3 x 110	Double-ended Threaded Rod	2
	M2.3 x 120	Double-ended Threaded Rod	1
	Universal Link		18
	Quick Link		2
	Ball Joint		4
8	M3 x 12	Cap Bolt	3
	M3	Plate Washer	6
	M2.3 x 5	Tapping Bolt	3
	Rubber Grommet		3
9	M2.3 x 110	Double-ended Threaded Rod	2
	M2.3 x 120	Double-ended Threaded Rod	1
	Universal Link		6



Sequence 1. Main Frame Assembly

- 1** Assemble subframes and servo plate retainer. The width at the rear of the subframes must be 88mm and the sides must be properly aligned relative to the servo plate retainer.

[M3 x 8	CAP B.	4]
M3	N.N.	4]

- 2** Attach front bed plywood together with the cross member (A) in Step **2** to the subframes in Step **1**.

[M3 x 10	CAP B.	1]
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- 3** Attach front bed (plywood) together with the cross member (A) in Step **2** to the subframes in Step **1**.

[M3 x 12	⊕ Bolt	4]
M3	N.N.	4]
M3	Plate Washer	4]

- 4** Attach body mounting bolt (R) to the right and left main frames.

[M3 x 10	CAP B.	2]
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- 5** Attach the radius support to the inner side of the right main frame.

[M2 x 10	⊕ Bolt	2]
M2	Nut	2]

- 6** Attach the right and left main frames to the subframes.

Note: Using a square, make sure that the top face of the subframes and the front edge of the main frames cross at angles.

[M3 x 8	CAP B.	6]
M3	N.N.	6]

- 7** Insert 4 cap bolts from below into the servo plate mounting holes in the upper front part of the main frames. Use M3 nuts.

[M3 x 12	CAP B.	4]
M3	Nut	4]

- 8** Attach the ball joint to the HG bell cranks, making sure of the proper direction. Insert the collars and attach to the main frames.

Note: Use the spacers and attach to the left main frame.

[M3 x 18	CAP B.	1]
M3 x 27	CAP B.	1]
M2 x 10	⊕ Bolt	4]
M3	N.N.	2]
M2	Nut	4]
φ3 x φ10 x t1	Plate Washer	2]
Ball Joint	.....	4]
Ball Joint Spacer	.....	4]

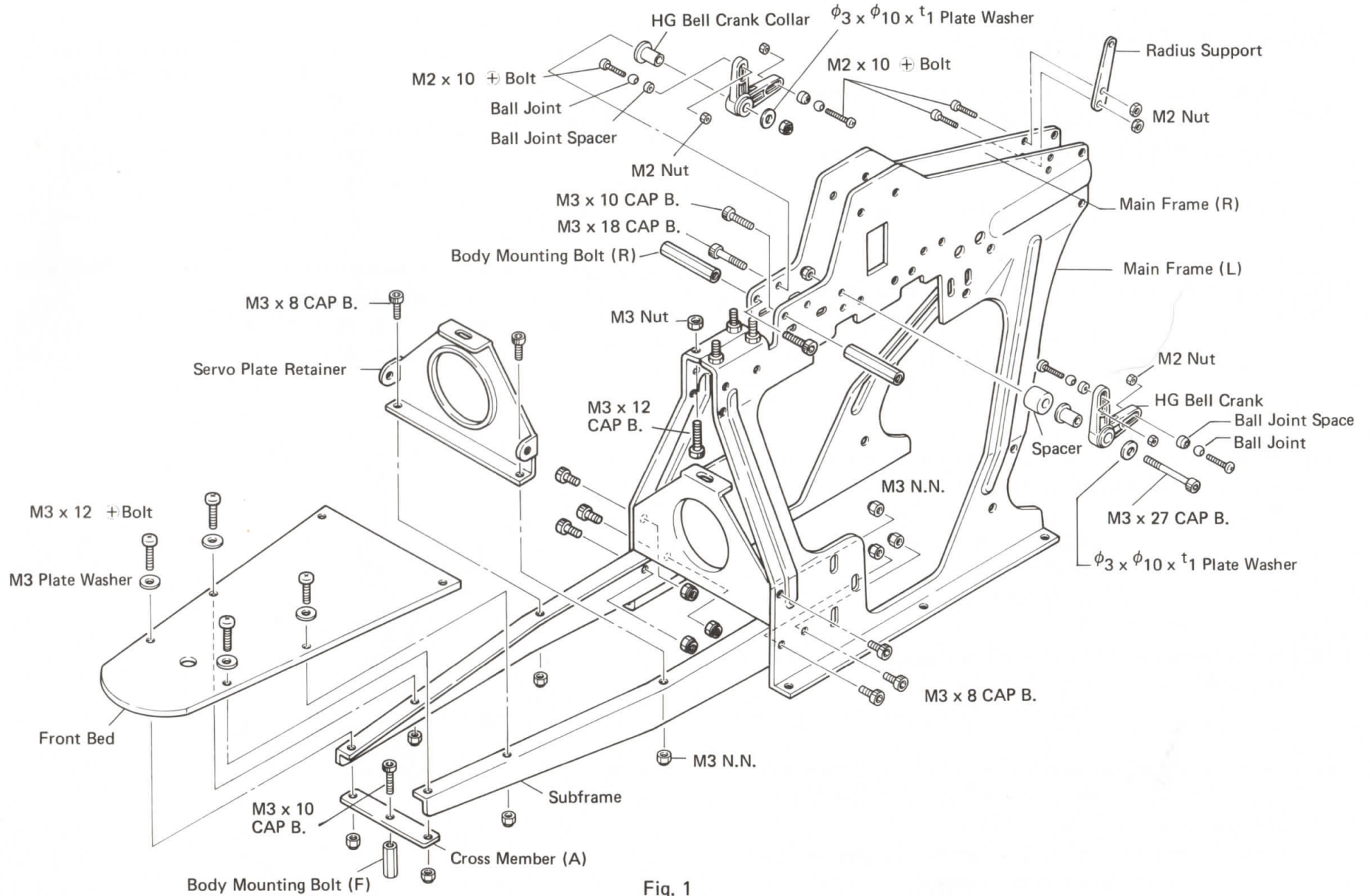
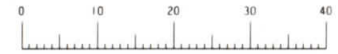
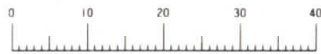


Fig. 1



Sequence 2. Ball Bearing Installation

9 Install the ball joints at the lower front and rear (rear on the left, front on the right) of the holes in the right and left main frames to which the slide rings are inserted.

M2 x 10 ⊕ Bolt	2
M2 Nut	4
Ball Joint	2

10 Attach the ball joint to the end of the radius support installed in Step **5**.

M2 x 10 ⊕ Bolt	1
M2 Nut	1
Ball Joint	1

11 Attach the ball joint to the arm of the slide ring assembly and insert it in the holes in the main frames, making sure of the proper direction.

M2 x 10 ⊕ Bolt	1
M2 Nut	2
Ball Joint	1

12 Attach the clutch bell to the pinion gear. The set bolt must be placed on the flat faces of the shaft.

M4 x 4 SET B.	2
---------------	---

13 Insert the pinion gear spacer ($\phi 6 \times \phi 8 \times t_1$) in the upper part of the pinion gear and install the bearing housing (A) (with OPEN bearing, I.D. $\phi 6$, O.D. $\phi 19$).

Note: In case of using 13 teeth pinion gear (optional), the pinion gear spacer is not needed.

M3 x 8 CAP B.	1
$\phi 3 \times \phi 10 \times t_1$ Plate Washer	1

14 Temporarily attach **13** into the main frame.

M3 x 30 CAP B.	2
M3 N.N.	2
M3 Plate Washer	4

15 Temporarily set two bearing housing (A) (with ZZ bearing I.D. $\phi 10$, O.D. $\phi 19$) into the main frame.

M3 x 30 CAP B.	4
M3 N.N.	4

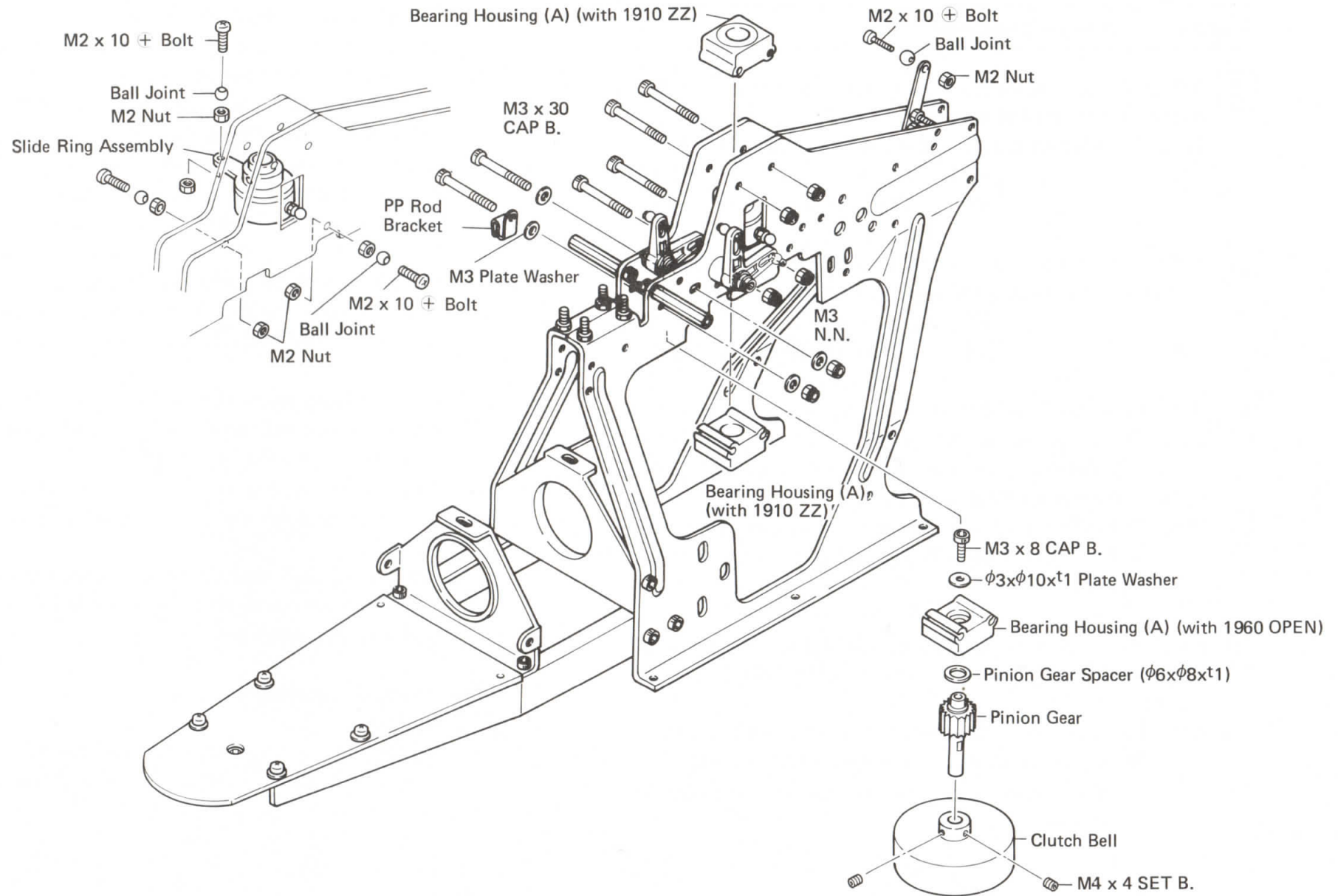
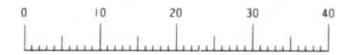


Fig. 2



Sequence 3. Power Unit Assembly

- 16** Attach the cooling shroud mounting plate to the front of the engine, making sure of the proper direction.

Note: For the face and back of the mounting plate, see Fig. 3.

M5 x 8	⊕ Bolt	.....	4
M5	Serrated Washer	.....	4

- 17** Put the cooling fan onto the drive washer of the engine and sufficiently tighten it, using a spring washer.

M6 x 25	CAP B.	.....	1
M6	Spring Washer	.....	1

- 18** Attach the clutch pulley to the cooling fan using two clutch bolts (A) (longer bolts). Pass these through the unthreaded holes in the pulley. Then install two clutch bolts (B) (shorter bolts) in the threaded pulley holes.

Note: The clutch bolts should not be tightened excessively as they may break. Secure clutch bolts using screw lock, etc.

- 19** Install one rubber clutch damper in the bearing housing of the pulley. It should be in close contact with the upper flange.

Note: For the rubber damper to be used, see Clutch Meet Timing Adjustment. The rubber clutch damper can easily be removed by pulling strongly on the outside of the sheet.

[Clutch Meet Timing Adjustment]

Clutch meet timing is adjusted by changing the thickness of the rubber clutch damper. The set includes four types of dampers of different thickness, numbered in order of increasing thickness. The higher the number installed, the high the rotation to which the clutch is connected. Normally one damper (2) is used, but if a slightly higher timing is desired, use (3) or (4). If, on the contrary, lower timing is desired, use (1).

Note: It should be noted that if the clutch meet timing is too high, the clutch may slip during flight, resulting in rapid wear of the lining.

- 20** Apply a little silicon grease to the outside of the rubber clutch damper and the clutch bolts, and put the clutch shoes onto the clutch bolts (A) and (B).

Note: When putting on clutch shoes, be careful that the rubber clutch damper is not pushed down.

- 21** Check once again that the rubber clutch damper is not lower than the clutch shoe, then install the M3 E ring in the upper groove of the clutch bolt.

- 22** Attach the cooling shroud to the cooling shroud mounting plate.

M3 x 10	Tapping Bolt	.....	3
M3	Serrated Washer	.....	3

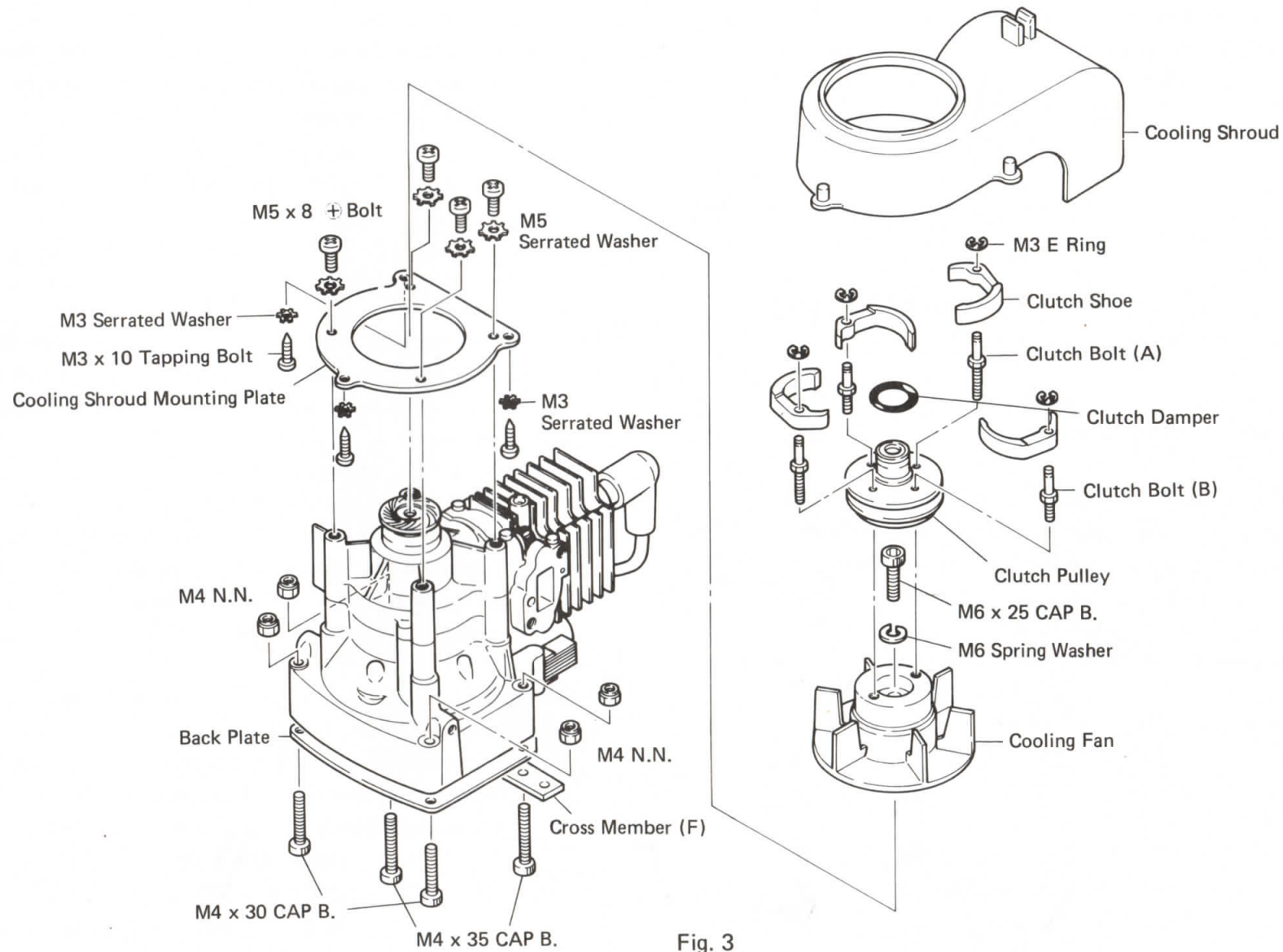
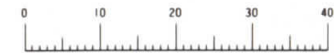
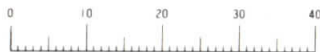


Fig. 3



23 Attach the back plate to the lower part of the engine. At the rear of the engine (cylinder side), use M4 x 35 cap bolts and install the cross member (F) simultaneously. At the front of the engine, use M4 x 30 cap bolts. See Fig. 3.

M4 x 30	CAP B.	.....	2
M4 x 35	CAP B.	.....	2
M4	N.N.	.....	4

24 Remove the engine air cleaner cover, remove the carburetor by removing two M5 ⊕ bolts, and remove the insulator by removing two M5 ⊕ bolts.

Note: When removing the carburetor, remember the direction of parts and their relative positions.

25 Place the engine starting belt over the clutch bell and temporarily mount the engine into the main frame from the underside.

Note: The engine installation position will be corrected in accordance with the pinion gear center and the clutch bell after the gear backlash has been adjusted. Vertical position is adjusted by inserting a $\phi 3 \times \phi 10 \times t1$ plate washer or plural washers between the main frame and the cross member installed under the engine.

If horizontal adjustment is required, file the engine mounting holes in the main frame.

M3 x 12	CAP B.	.....	2
M4 x 15	CAP B.	.....	2
M3	N.N.	.....	2
$\phi 3 \times \phi 10 \times t1$	Plate Washer	.....	6
M4	Plate Washer	.....	2
M4	Serrated Washer	.....	2

26 Attach the cross member (G) to the engine cylinder head with M4 x 10 cap bolt and M4 serrated washer and secure it to the main frame.

Note: Depending on engine installation position, the cross member (G) may not precisely fit the holes in the main frame. If not, enlarge the holes with a file.

M3 x 10	CAP B.	.....	2
M4 x 10	CAP B.	.....	1
M3	N.N.	.....	2
M4	Serrated Washer	.....	1
M3	Plate Washer	.....	4

27 Install the insulator and carburetor removed in Step 24 and the air cleaner body, using gaskets. Check the vertical direction of the carburetor. Insert the air filter, and attach the cleaner cover.

Note: When the carburetor is installed on the insulator, lightly and uniformly screw in, two M5 x 50 bolts, tightening the bolts alternately. Uneven or excessive tightening may cause breaking of the insulator. If the gasket is damaged when the carburetor is removed, replace it with the spare provided in the kit.

28 Install the ball joint on the throttle lever and attach the lever to the carburetor using the throttle adapter.

Note: The throttle lever must be positioned outward (air cleaner side) and must be installed in such a way that it moves uniformly back and forth.

M2 x 10	⊕ Bolt	.....	1
M3 x 4	SET B.	.....	4
M2	Nut	.....	2
Ball Joint	.....	.....	1

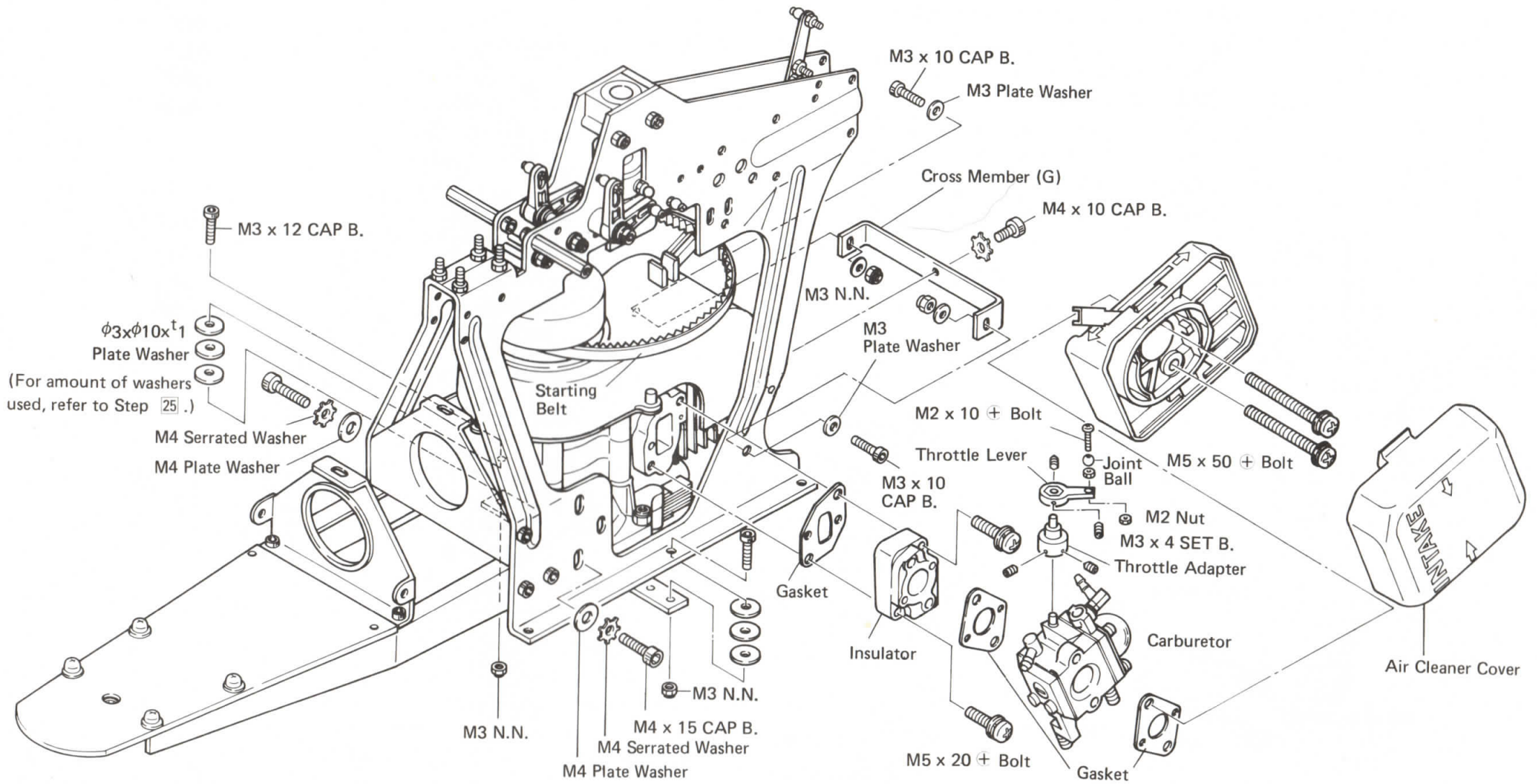
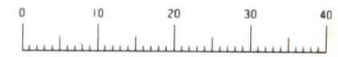
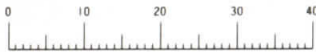


Fig. 4



29 Attach the muffler spacer and muffler on the engine exhaust port, using gaskets. Secure the mounting plate of the muffler with M3 x 10 cap bolts, after adjusting for proper bend.

M3 x 10	CAP B.	1
M5 x 60	CAP B.	2
M3	N.N.	1
M5	Serrated Washer	2
M3	Plate Washer	2
M5	Plate Washer	2

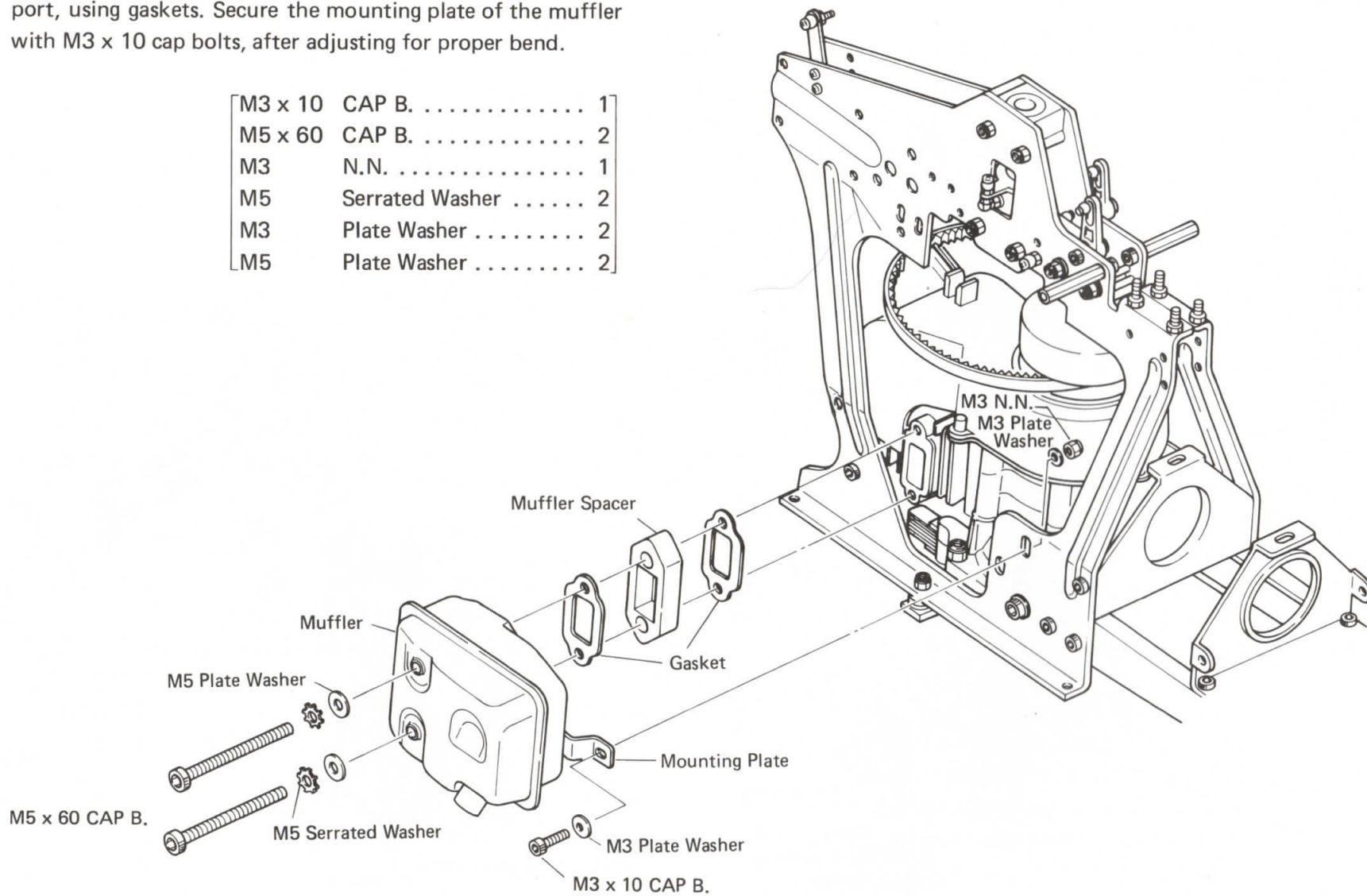
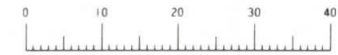


Fig. 5



Sequence 4. Main Shaft, Drive Gear and Swash Plate Assembly

- 30** Insert the bent end of the pitch control rod into the $\phi 2$ hole in the pitch control ring from the inside, then slide the main shaft through.

Note: Make sure that the pitch control ring moves smoothly on the main shaft. If not, correct the bend angle of the pitch control rod.

- 31** Position the end of the pitch control rod slightly away from the underside of the main shaft, then pass the scissors arm unit, swash plate, and swash plate collar, in that order, through the main shaft.

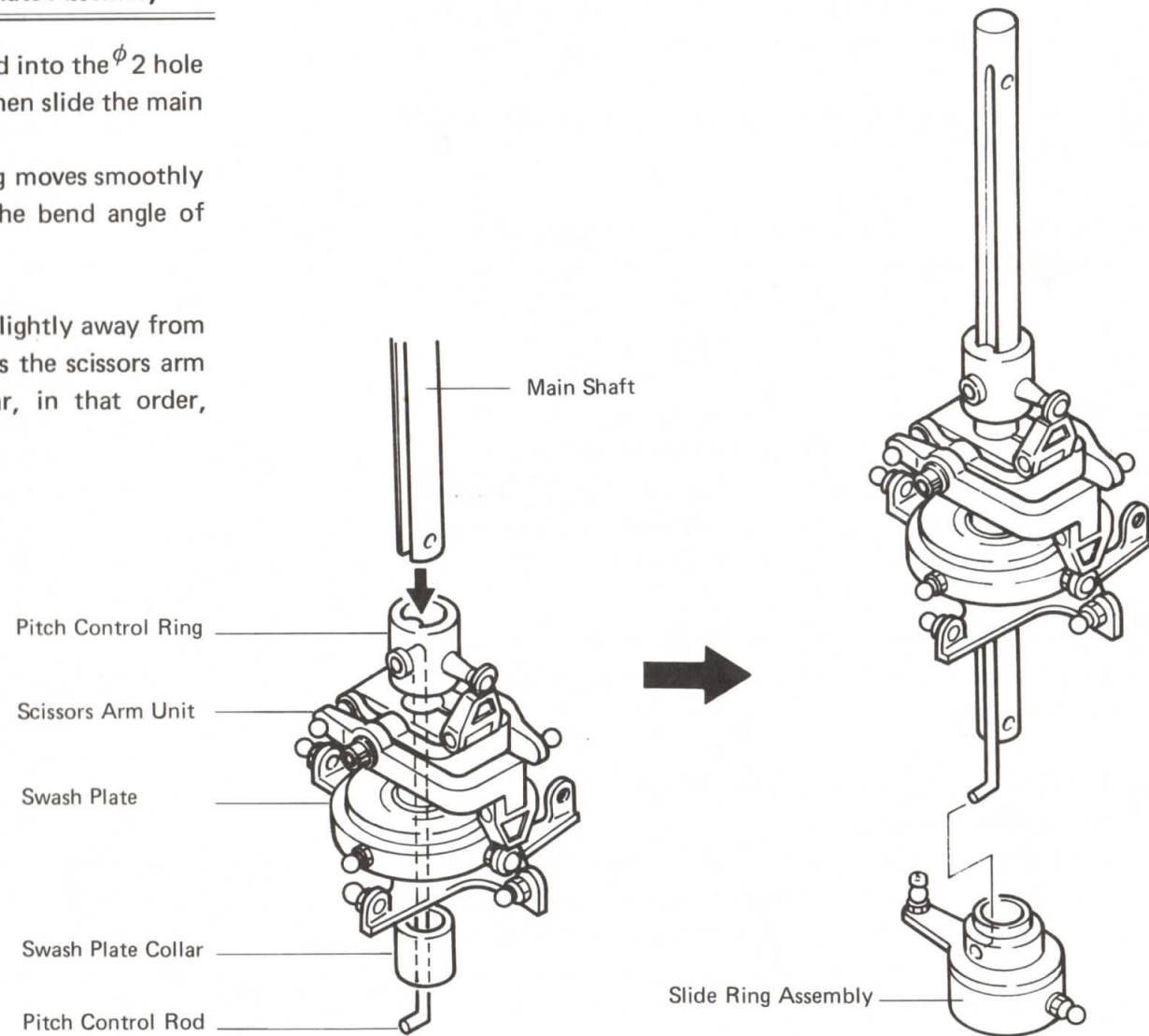


Fig. 6



32 Insert the lower bent portion of the pitch control rod into the $\phi 2$ hole in the slide ring in the main frame and pass the main shaft from the top into the bottom bearing. See Fig. 6.

33 Firmly secure the bearing housing (A) temporarily installed in Step **15**.

34 Bolt the rotor drive gear assembly to the lower part of the main shaft via the gear spacer ($\phi 12 \times \phi 14 \times t_2$).

[	M3 x 20	CAP B.	.....	1]
[	M3	N.N.	.....	1]

35 With the main shaft pulled fully upward, push down the scissors arm assembly and tighten up the scissors arm bolt. At that time, the scissors arm assembly must be 90 degrees from the $\phi 3$ hole in the main shaft (when looking from the top of the main shaft).

36 Adjust the backlash between the rotor drive gear and the pinion gear and secure bearing housing (A) temporarily installed in step **14**.

37 Secure the temporarily installed engine, aligning it with the center of the pinion gear.

Note: For the adjustment of the engine installation position, see Step **25**. The vertical position should be adjusted to leave a clearance of 1mm between the bottom of the clutch bell and the clutch installation surface of the pulley.

38 Remove any oil from the shafts and bearings of the low gear ratio tail drive unit, insert these pieces in one of the low gear ratio tail drive unit housings, and glue the inner rings of the bearings to the shafts using cyanoacrylate adhesive.

Note: The shaft on the output side should be pulled backward and then glued. Utmost care must be taken to prevent any adhesive from entering the bearings.

39 When the adhesive has hardened sufficiently, apply good quality grease to the bearings and gears, place the right and left housings together, and install the housing unit between the main frames.

Note: When the low gear ratio tail drive unit is installed, adjust the backlash with the rotor drive gear.

[	M3 x 30	CAP B.	.....	3]
[	M3	N.N.	.....	3]

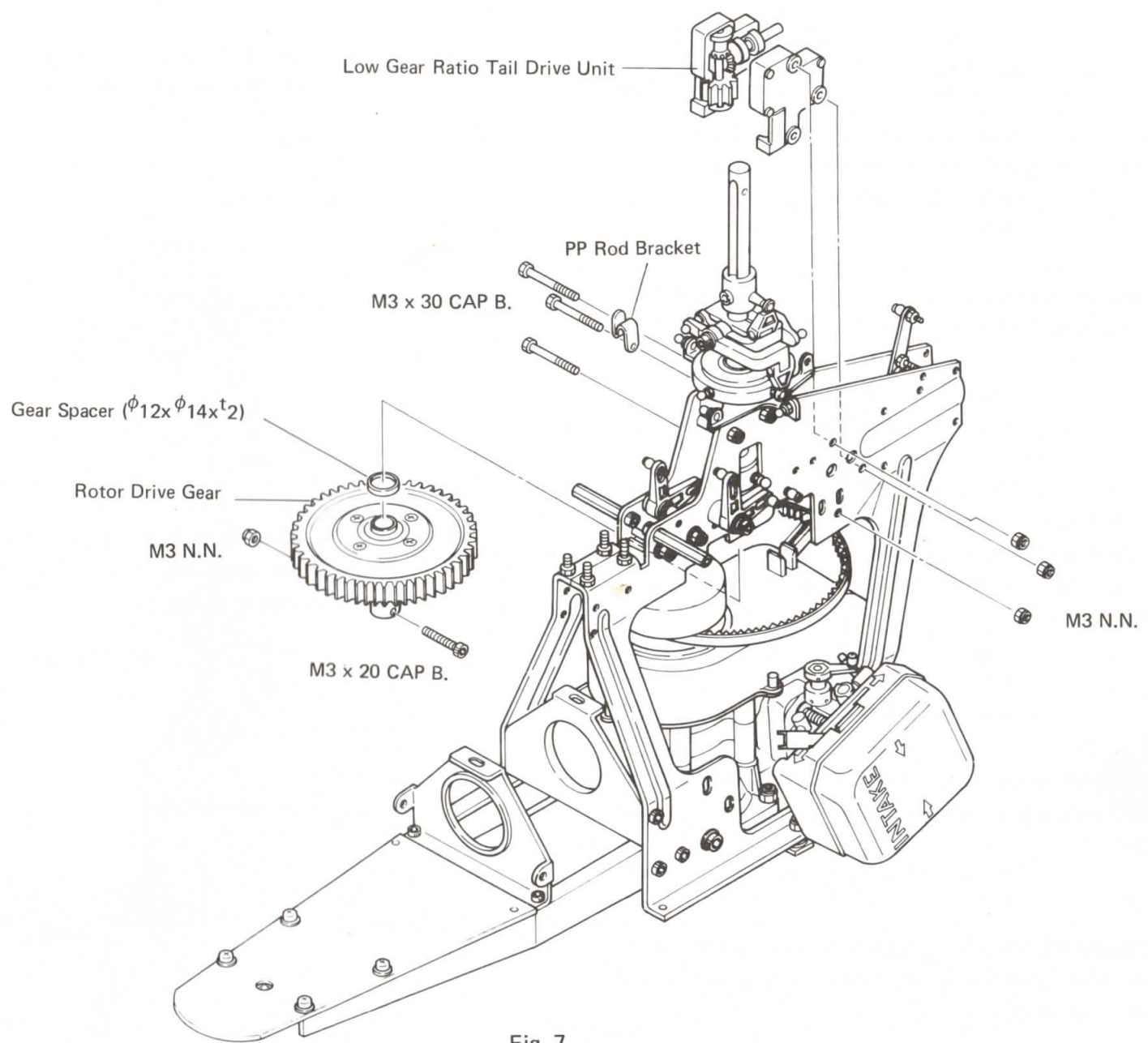
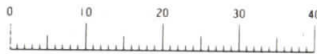


Fig. 7
- 19 -



Sequence 5. Landing Gear and Fuel Tank Assembly

- 40** Install the two cross members (E) and four under carriage damper retainers (A) to the bottom of the main frames.

[M3 x 12 Flat Head Bolt 4]
[M3 N.N. 4]

- 41** Fit the rubber damper on the under carriage brace and attach it to under carriage damper retainer (A) with damper retainer (B).

[M2 x 3 ⊕ Bolt 8]
[M2 Serrated Washer 8]

- 42** Fasten the under carriage clamp onto the tip of the brace, attach the skid to the clamp from the front, and secure the brace and clamp with nuts and bolts.

Note: The tapping bolt hole in the clamp must be on the inside.

[M2 x 16 ⊕ Bolt 4]
[M2 Nut 4]
[M2 Serrated Washer 4]

- 43** Position the skids properly and drill 2mm holes in the skids through the tapping bolt holes in the clamp, then secure with tapping bolts.

[M2.3 x 5 Tapping Bolt 4]

- 44** Using cyanoacrylate adhesive, glue the dampers, braces, skids and clamps. Also, glue the under carriage cap to skid using the synthetic rubber adhesive.

- 45** Assemble the fuel tank cap as show in Fig. 8, then insert it into the tank. Bolt securely after folding back.

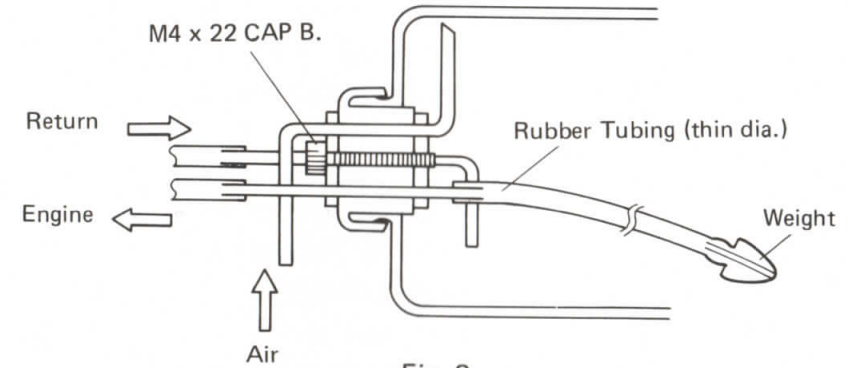


Fig. 8

- 46** Place the completed fuel tank into the frame, then connect up the tank and carburetor using thick diameter rubber tubings as shown in Fig. 9.

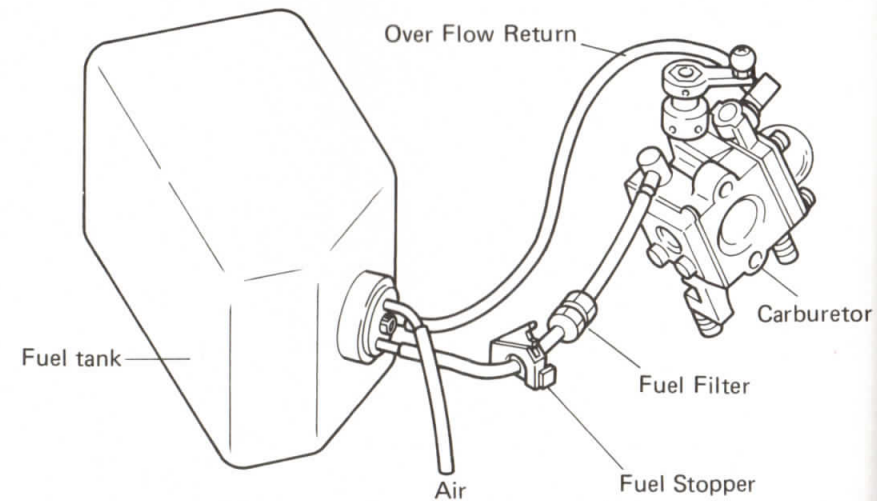


Fig. 9

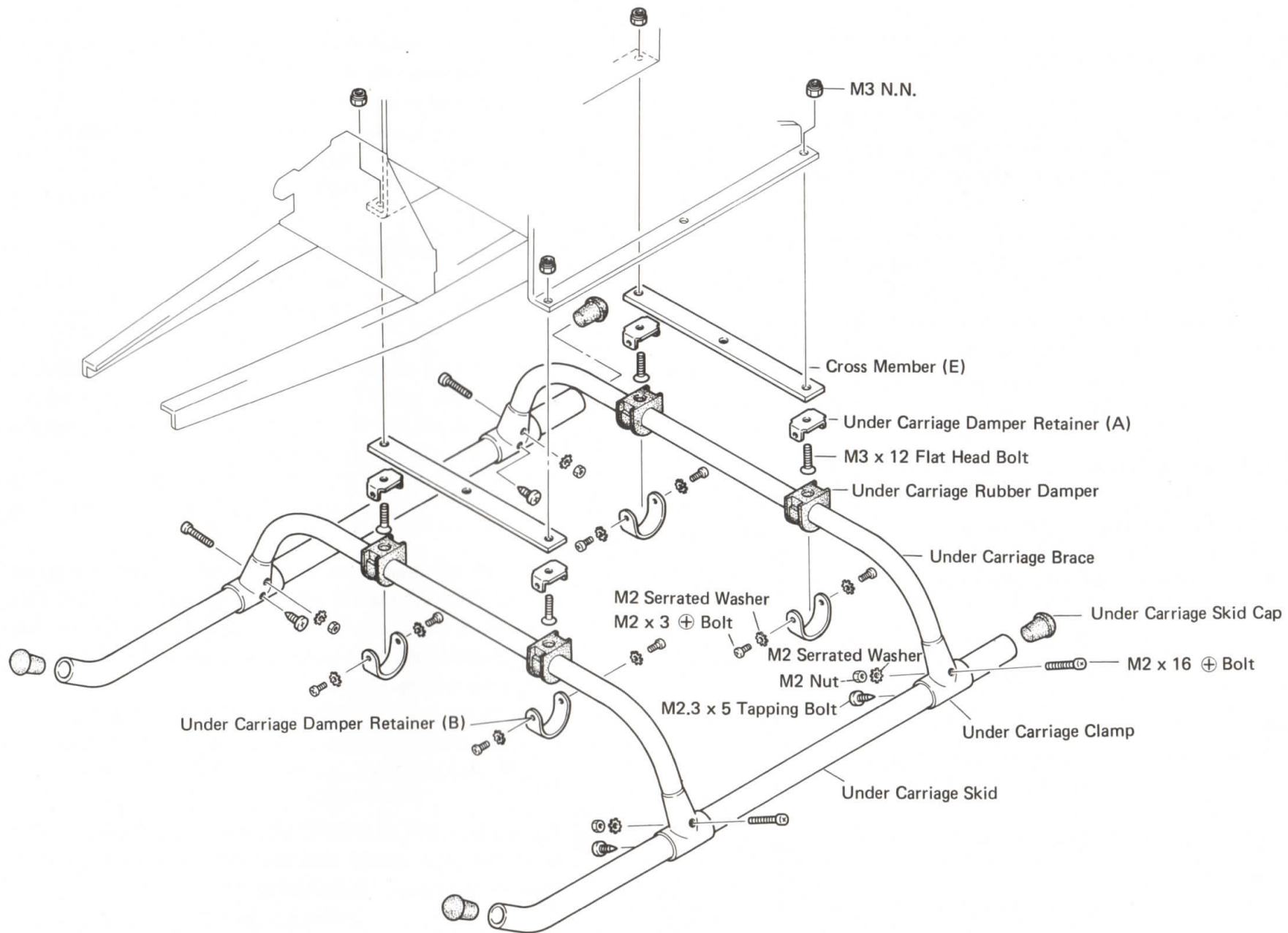
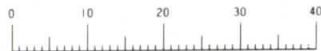


Fig. 10



Sequence 6. Tail Rotor Unit Assembly

- 47** Remove all oil from the tail gear shafts and bearings using benzine, etc., put these parts in one housing piece, and glue the shaft and the inner ring of bearing with cyanoacrylate adhesive.

Note: Pull the shafts outward when gluing. Be careful to prevent the adhesive from entering the bearing.

- 48** Grease the bearings and gears, place the second housing piece over this assembly, and secure with nuts and bolts.

M2.3 x 8 ⊕ Bolt	4
M2.3 Nut	4

- 49** Fit the tail rotor hub (1030 bearings are installed) onto the tail output shaft, securely tighten it, then glue it with adhesive.

Note: This is a counter clockwise screw.

- 50** Attach the tail rotor grips to the bearing portion of the tail rotor hub.

M2 x 10 ⊕ Bolt	8
M2 Nut	8

- 51** Attach ball joints to the tail rotor grip arms.

M2 x 10 ⊕ Bolt	2
Ball Joint	2

- 52** Bolt the tail bracket and tail PC bracket to the tail gear housing.

M3 x 8 CAP B.	4
---------------	---

- 53** Insert the PC lever into the tail gear housing. Snap in the plastic ball joint to the PC crank, and secure the crank in the bracket with a ⊕ bolt and plate washer.

Note: Do not screw down too tightly as the PC crank moves lightly.

M2 x 10 ⊕ Bolt	1
M2 Plate Washer	1

- 54** Attach the universal links to the PC plate.

M2.3 x 8 ⊕ Bolt	2
Universal Link	2

- 55** From the end of the PC lever, install the PC retainers, M2 plate washers, and PC plate as shown in Fig. 11, then temporarily tighten the PC retainers. Connect the universal links and the tail rotor grips ball joint.

M3 x 4 SET B.	4
M2 Plate Washer	2

- 56** Insert the tail drive piano wire into the two joint spacers and the tail drive wire guide, and bend the wire at a right angle, 5mm from the end of the wire, as shown in Fig. 14. Also, after checking that the length is as illustrated, bend the other end of the wire and cut.

Note: Check the direction of the joint spacer. The direction cannot be changed after the wire is bent, and if the direction is incorrect, the wire cannot be used.

- 57** Put the bent end of the wire into the $\phi 2$ hole in the tail joint, push the joint spacer into the joint, and secure with set bolts on both ends. (Refer to Fig. 14.)

M4 x 4 SET B.	4
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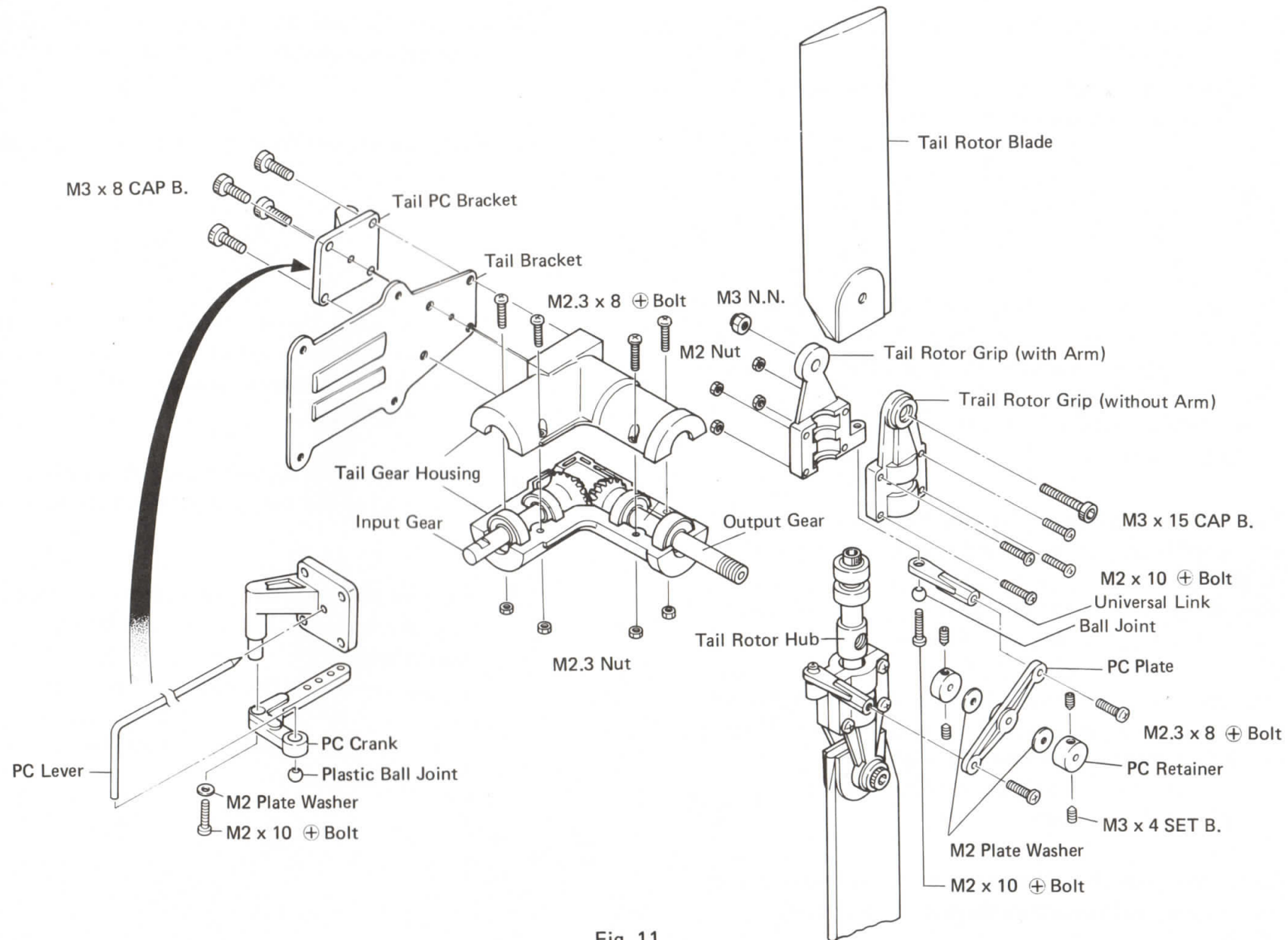
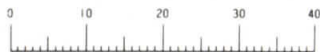


Fig. 11



- 58** Drill and cut the small-diameter end of the tail boom as shown in Fig. 12.

Note: The boom is tapered. Check the size of the end before drilling. The small end must be used.

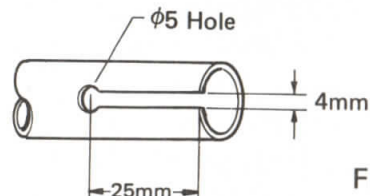


Fig. 12

- 59** Insert **57** into the boom from the larger end, checking the direction of the tail drive wire guide. Lightly pull the wire toward the smaller diameter end of the boom, and secure the tail drive wire guide.

Note: For the direction of the tail drive wire guide, see the illustration.

- 60** Install the front tail joint (the joint showing at the larger end of the tail boom) on the output shaft of the low gear ratio tail drive unit.

Note: Do not to bend the wire when the joint is connected.

[M4 x 4 SET B. 2]

- 61** Place the tail boom retainer between the main frames and temporarily secure it with bolts and nuts. Make sure that the projecting portion on the inside is forward.

[M3 x 30 CAP B. 4]
[M3 N.N. 4]

- 62** Completely push the tail boom into the tail boom retainer, then place the tail support clamp onto the tail boom.

- 63** Insert the tail gear into the rear end of the tail boom and connect the tail joint and the tail input shaft.

[M4 x 4 SET B. 2]

- 64** Attach the vertical fin to the tail bracket using the two tail clamps.

[M3 x 12 CAP B. 4]
[M3 N.N. 4]
[M3 Plate Washer 4]

- 65** Turn and adjust the tail boom so that the vertical fin is parallel to the main shaft of the helicopter, and secure by tightening the tail boom retainer, which was temporarily tightened in Step **61**.

- 66** Attach the two tail support ends, right-angled to each other, to the ends of the tail support, using synthetic rubber adhesive.

- 67** Attach the tail support to cross member (E) at the center and secure the opposite end to the tail boom, using the tail support clamp.

[M3 x 10 CAP B. 2]
[M3 N.N. 2]
[M3 Plate Washer 1]

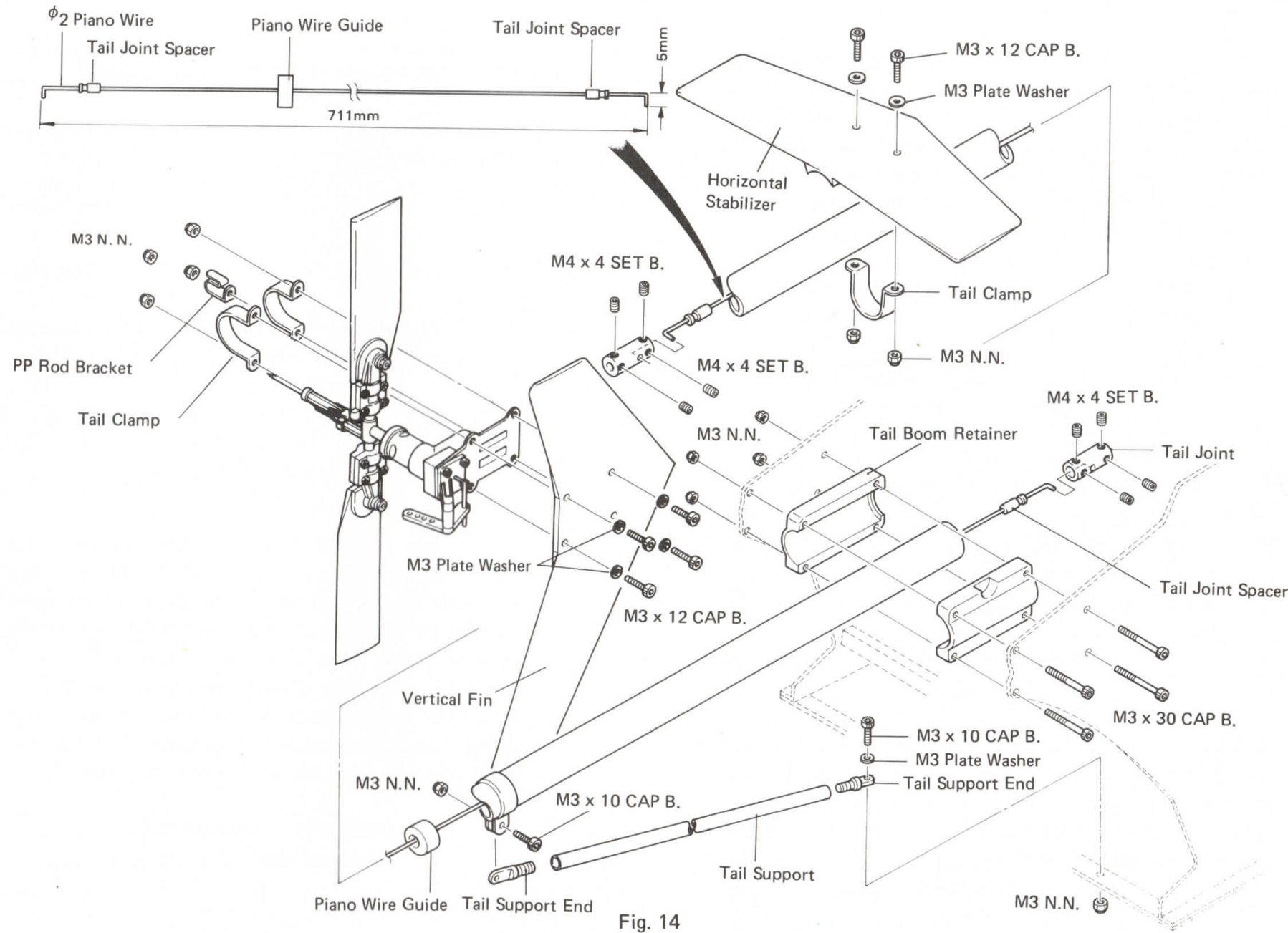
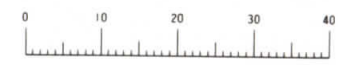
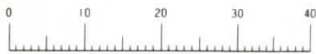


Fig. 14



68 Shave both sides of the tail rotor blade installation portion in parallel a thickness of about 3.5mm, cut the plywood provided into four pieces, and glue the pieces with epoxy adhesive. When the adhesive has hardened, make a $\phi 5$ hole at the position illustrated, insert the aluminium collar, and glue it with cyanoacrylate adhesive. Adjust the thickness of the installation surface so it properly fits the tail rotor grip, then apply the final coat of paint.

Note: Before final painting, adjust the balance of the two tail blades.

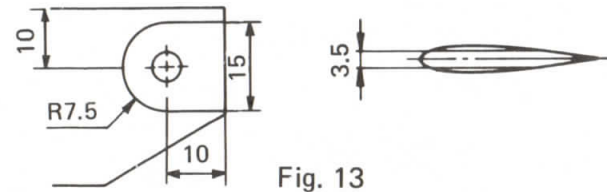


Fig. 13

69 Bolt the finished tail rotor blades to the tail rotor grips. (Refer to Fig. 14)

Note: Check the direction of the tail rotor blades. Do not tighten the bolts excessively. The blades must be able to be moved by centrifugal force when the tail rotor is rotating.

M3 x 15	CAP B.	2
M3	N.N.	2

70 Secure the horizontal stabilizer to the tail boom with the tail clamp. Maintain a clearance of about 2cm to prevent the stabilizer from hitting the tail rotor. The horizontal stabilizer must be installed at right angles to the vertical stabilizer (as seen from the rear). (Refer to Fig. 14)

M3 x 12	CAP B.	2
M3	N.N.	2
M3	Plate Washer	2

Sequence 7. R/C Equipment Installation and Linkage

71 Match the width of the servo frames to the servo to be used and secure with bolts.

M3 x 8	CAP B.	4
M3	N.N.	4

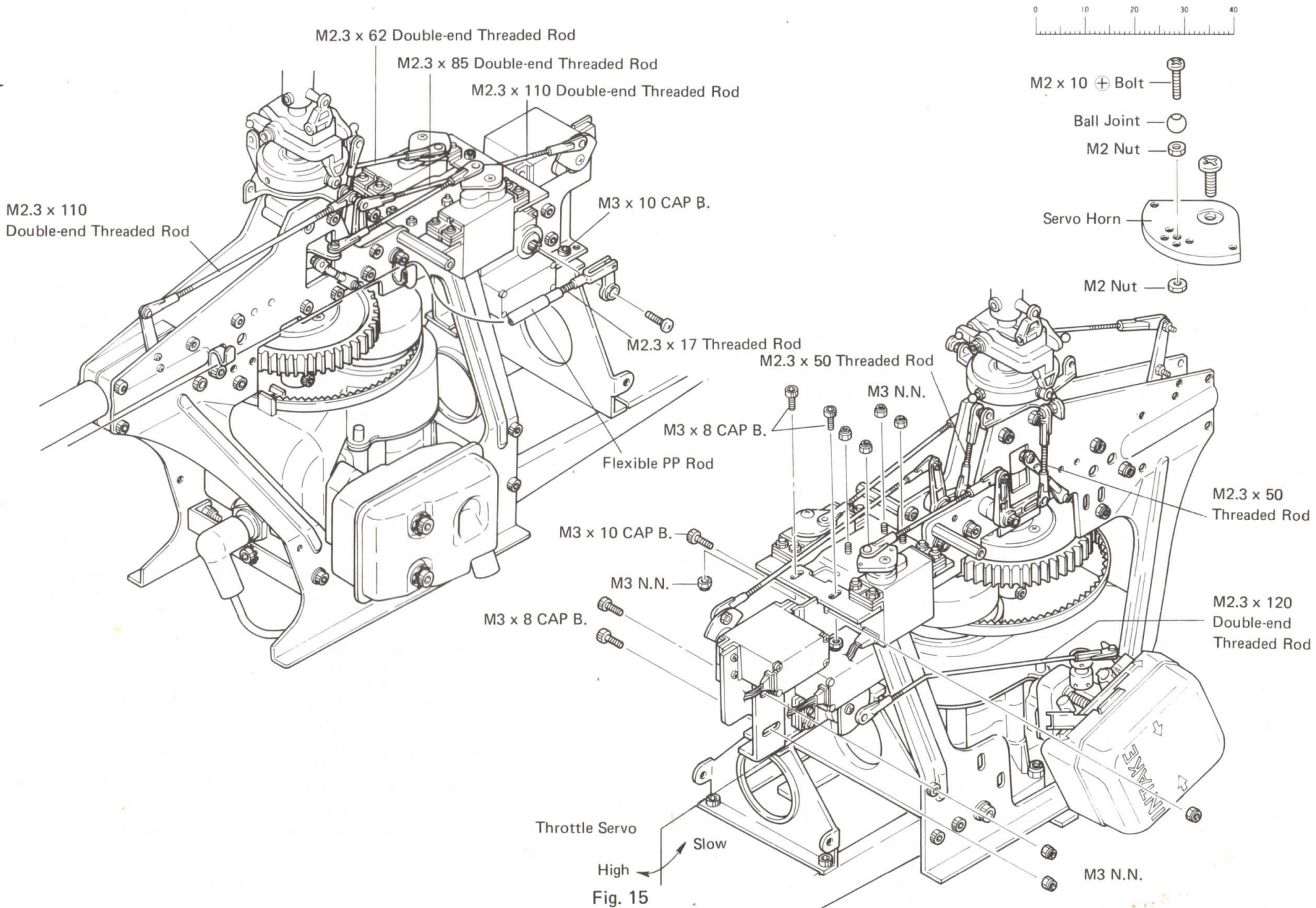
72 Attach the servos to the servo frames and install on the main frame.

Note: Since servo motion direction varies by maker, check prior to assembly, referring to Fig. 15 and 16.

M3 x 10	CAP B.	3
M2.6 x 10	⊕ Bolt	20
M2.6	Flange Nut	20
M3	N.N.	7

73 Cut the four universal links about 4mm shorter, screw the links at the two ends of the two M2.3 x 17 threaded rods, and make up two rods to support the slide ring assembly. Connect the slide ring assembly and the ball joint installed to the main frame. The total length of the rod should be 42mm (from one end of the universal link to the other end) and the tie rod length should be carefully adjusted so that the slide ring assembly smoothly moves vertically. It should move freely vertically from top to bottom in the hole in the main frame.

M2.3 x 17	Threaded Rod	2
Universal Link	.....	4





74 Hook up the linkages, referring to Fig. 15. For the aileron, elevator, and pitch servos, disk-type horns should be used wherever possible, and should be used as shown in Fig. 15. The ball joint should also be installed.

- Connect the ball joint attached to the radius support in Step 10 and the swash plate.

Note: With the swash plate kept level, adjust the rod length so that the lower arms are properly aligned and parallel to the main frame.

M2.3 x 110 Double-end Threaded Rod ..	1
Universal Link	2

- Connect the ball joint attached to the slide ring assembly in Step 11 and the pitch servo. The throw of the pitch servo should be adjusted after the rotor head and main rotor blades are installed.

M2 x 10 ⊕ Bolt	1
M2.3 x 85 Double-end Threaded Rod ..	1
M2 Nut	2
Universal Link	2
Ball Joint	1

- Link the aileron and elevator servos and the bell cranks. On the aileron side, use M2.3 x 62 threaded rod, and on the elevator side, M2.3 x 110 threaded rod. Determine the servo horn hole position so that the total throw is 18mm (9mm on each side).

M2 x 10 ⊕ Bolt	2
M2.3 x 62 Double-end Threaded Rod ..	1
M2.3 x 110 Double-end Threaded Rod ..	1
M2 Nut	4
Universal Link	4
Ball Joint	2

- Link the swash plate and the bell cranks with the threaded rods and universal links. Adjust the rod length so that the swash plate and bell cranks are aligned and parallel to each other.

M2.3 x 50 Threaded Rod	2
Universal Link	4

- Connect the throttle servo and the throttle lever installed in Step 28. The servo throw must match that of the engine throttle lever, and it must be possible to shut off the engine when necessary. In the high state, the servo must remain unlocked, and the throttle must be fully opened.

M2 x 10 ⊕ Bolt	1
M2.3 x 120 Double-end Threaded Rod ..	1
M2 Nut	2
Universal Link	2
Ball Joint	1

- The tail pitch linkage is made using the flexible PP rod, M2.3 x 17 threaded rods, and quick links. Screw the threaded rods into the PP rod and quick link about 5mm or more. Adjust the length of the PP rod so that the PC crank is neutral when the servo horn is neutral.

Set the stroke so that the PC lever can be moved 5mm to both the right and left, and set the tail rotor pitch at about 10° (as a guideline) when the engine speed is slow and the rudder stick is in the neutral position. Adjust the tail pitch by moving the two PC retainers, and grease the PC plate. A small clearance should be maintained to allow light rotation. Secure the flexible PP rod using the PP rod bracket. The PP rod should be taped to the tail boom at several points to prevent deflection. Use vinyl tape.

M2.3 x 17 Threaded Rod	2
Quick Link	2

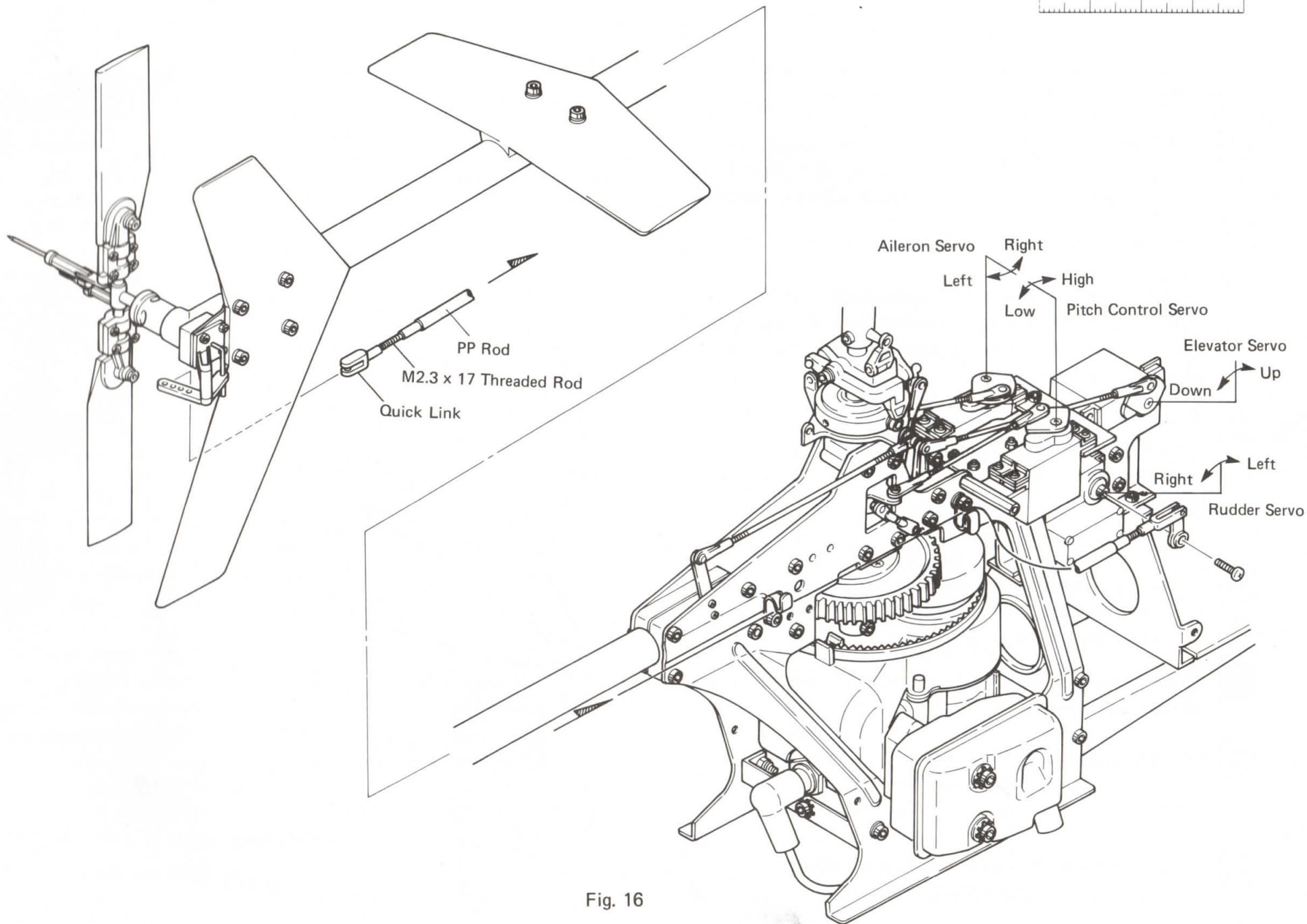
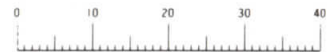


Fig. 16



Sequence 8. Cabin Assembly

76 Temporarily join the right and left cabin halves with cellophane tape, then glue the cabin halves together using the liquid adhesive provided. Apply adhesive with a small brush.

77 Glue the instrument panel to the cabin.

78 Glue 2 ~ 3 reinforcing plates to the interior surface of the cabin at each of the proper positions for the tapping bolts used in mounting the canopy. Then drill holes for the bolts, using a $\phi 2\text{mm}$ drill.

79 Drill 6mm holes for the body mounting bolts (F, R), insert the rubber grommets (black rubber bushes), and glue the plate washers on the inner side with synthetic rubber adhesive.

[Rubber Grommet	3]
[M3 Plate Washer	3]

80 Cut or drill holes in the cabin for switch mounting and antenna throughout, temporarily place the cabin on the helicopter, and cut openings for the servos and linkage rods.

81 Install the receiver and battery on the front bed. Mount the switches on the cabin.

82 Attach the cabin to the helicopter.

[M3 x 12 CAP B.	3]
[M3 Plate Washer	3]

83 Attach the canopy to the cabin with tapping bolts.

[M2.3 x 5 Tapping Bolt	3]
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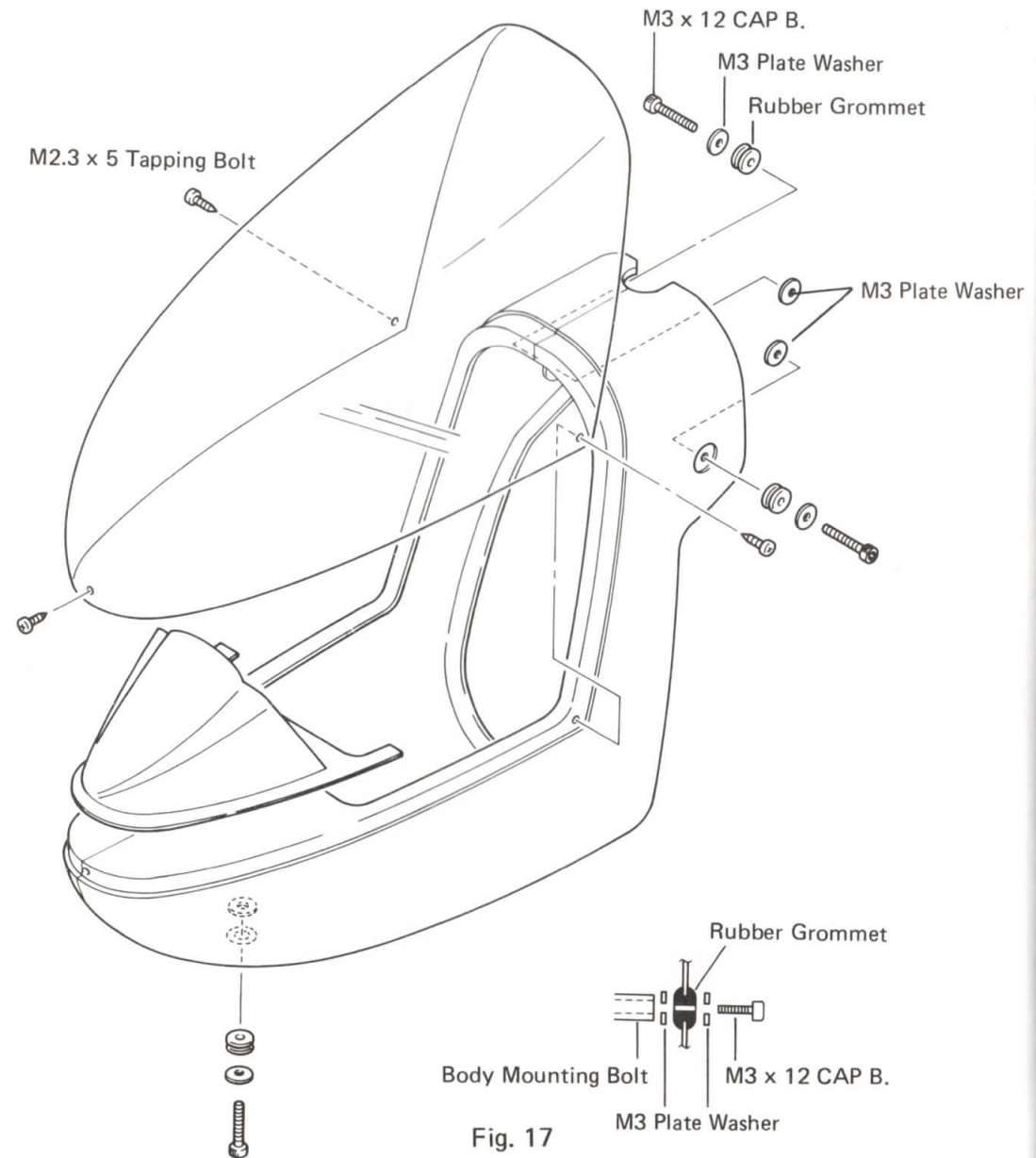
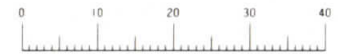


Fig. 17



Sequence 9. Rotor Head Assembly Installation

84 Installation and linkage of the rotor head and rotor adjustment should be done in accordance with the rotor head instruction manual.

Note: The length of the main rotor should be determined before cutting so that during rotation a clearance of at least 15mm with the tail rotor is ensured.

M2.3 x 110 Double-end Threaded Rod ..	2
M2.3 x 120 Double-end Threaded Rod ..	1
Universal Link	6

Adjustments after Construction

When assembly is completed, re-check all assembly sequences prior to making flight adjustments. Make sure that there are no assembly mistakes. Check all fasteners for tightness. Operate the servos to check the linkages. Sufficiently charge the receiver and transmitter for the subsequent flight adjustments.

○ Center of Gravity

The center of gravity of the helicopter is very important. In the unfueled helicopter, the center of gravity prior to flight should be between the main shaft and a point 5mm forward of the main shaft. When the helicopter is properly balanced, the nose will appear slightly heavier than the tail when the helicopter is lifted by the main shaft.

○ Main, Tail Rotor Pitch

For main rotor pitch, see the instruction manual for the rotor head.

Main rotor pitch differs considerably with helicopter weight, engine power, diameter of main rotor, and operator preference, and should be adjusted during flight. As a guideline, a pitch between a minimum 0° and maximum 8° is recommended initially.

The tail rotor pitch also differs with individual helicopters, but the PC retainer position should be so set that a pitch of about 10° is obtained when the rudder stick is in the neutral position and the throttle stick in the lowest position.

Precautions in Handling Gasoline Fuel

- Since the fuel use is highly flammable gasoline, due attention must be paid to fire. Be especially carefully with cigarettes.
- When fuel must be transported, carry only the minimum quantity necessary. Do not store gasoline in a high temperature conditions (such as car trunks, or near fires).
- Never use gasoline in burning rubbish.
- Do not handle gasoline or operate the engine in closed or confined places.
- In transporting gasoline, use a sturdy metal container. Polyethylene containers should not be used as they may fail due to gasification and expansion. Do not carry gasoline with an uncovered battery.
- As a precaution, carrying a car fire extinguisher is recommended.

Precautions in Flying the GS BARON

- A noise-proofed spark plug is used with the KG-22S engine, but as there may still be some electric noise, the radio equipment installed in the helicopter should be protected against noise.
- If, during flight, the spark plug cap comes loose, the engine will die. Therefore, make certain the plug cap is securely attached. Insert the plug into the plug cap to a point about 19mm (the lowest of the three insulator grooves) from the end of the plug.
- The carburetor of the KG-22S engine has a precision bypass. If this bypass becomes clogged with fine dust, engine problems may result. To avoid such problems, use a fuel filter. All fuel should be passed through the filter. Do not supply fuel directly to the carburetor.
- Do not attempt to tighten the spark plug excessively. This is unnecessary, as the plug includes a special washer. About a half turn after manually tightening is sufficient. Over tightening may deform the washer and cause loosening of the plug.

In Flight Adjustments

The following adjustments must be made under the guidance of a person who is experienced in the operation of radio controlled helicopters. To ensure safe operation, make sure bystanders are well clear of the rotors. Make certain that there is adequate space for rotation of the rotors, and that the nearby area is free of potential obstacles to the operation of the helicopter. The operator himself must remember at all times to stay clear of the rotating main and tail rotors, as well as the extended plane of rotation. While the rotors are rotating, carefully check the helicop-

ter for any abnormal vibration or sound. If any abnormality is noticed, immediately stop the engine and locate the cause before flying.

- Adjustment of GS Engine
See the separate instruction manual for the KG-22S engine.
- Tracking Adjustment
With the helicopter at a distance of at least 5m, gradually open up the throttle. When the helicopter is at the point of lifting off, check the two rotor blades from the side to see if their tracking is the same. If their tracking is not aligned and they appear doubled, adjust the pitch of one rotor blade.
- Tail Rotor Pitch Adjustment
Place the helicopter on the ground with the nose into the wind, gradually increase engine speed, and when the helicopter is at the point of lifting off, check the tail for swinging. If the tail swings, the tail rotor pitch must be adjusted as follows. (The transmitter rudder stick and the trim should be in the neutral position.) If the tail swings to the right (nose leftward), this indicates insufficient tail rotor pitch – Move the PC retainer outward to increase the pitch. If the tail swings to the left (nose rightward), decrease the pitch.

Repair and Spare Parts

All parts used in our kits are available as replacement parts. If any part is damaged due to accident, replacement parts can be obtained from your dealer. For special parts not in stock, please order

through your dealer, indicating model name, part name and item number, and quantity.

Also, please remember that our helicopters are designed as units, taking into consideration the strength and durability of all parts. For this reason, we strongly advise against the use of parts produced by other companies.

We cannot accept responsibility for any problems caused by use of parts other than our genuine parts, and we offer no guarantees in such cases. Further, we advise against modification and/or partial reinforcement of the helicopter, and cannot accept responsibility in such cases. Repairs and adjustments should be performed in accordance with this instruction manual, as for assembly.

Request

The adjustment of radio controlled helicopters is very complicated, and to obtain best results, the adjustment of all parts considered as a whole is required. This delicate total balance is very difficult for beginners to achieve, and adjustments should be made under the guidance of an experienced operator. If errors are made, the operation of the helicopter may become very dangerous. It is strongly recommended that operators have proper insurance coverage and in all circumstances give the fullest possible attention to safety.

Should crashes or accidents occur, carefully check all parts, and avoid using any parts about which you have any doubt. Always remember that the helicopter is controlled by wireless equipment using relatively weak signals. Avoid operating it to fly near or above people or buildings. The operator must also remember his own safety.

If any parts of this kit are missing, please contact your dealer before beginning assembly. Should any parts included in the kit be defective, please contact your dealer for replacements before operating the helicopter.

Please note that this company cannot accept responsibility for accidents which occur in operation due to customer failure to comply with the above request, or due to errors in this manual and drawings.

For all main parts and designs of our Kalt helicopters, the applicable Patents, Utility Model, Registrations and Registrations of Design have been granted or applied for.

No part of this manual or drawings may be reproduced in any form without permission.

Specifications of GS BARON

Main Rotor Diameter	1,450mm ~ 1,465mm
Total Length of Helicopter	1,300mm
Weight	4.8kg ~ 5.0kg
Engine	KALT KG-22S
R/C Equipment	5 Channels
Mechanism	GS BARON
Revolution Ratio (engine:main rotor:tail rotor)	6.14:1:5.375
Body Material	ABS (vacuum formed)
Safe Flight Temperature Range	0°C ~ 40°C



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