

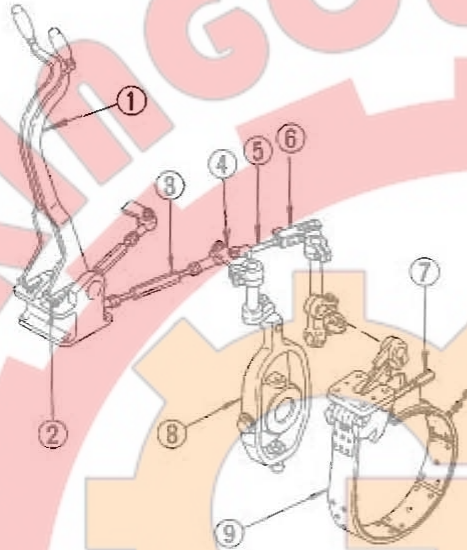
STEERING CLUTCHES AND BRAKES

Control linkage adjustment

The steering clutch and clutch brake are interrelated with each other. This means that they must be adjusted at one time.

How to adjust

- (1) Remove the floor plate, and loosen lock nut (1).
- (2) Turn stopper bolt (2) to obtain the correct "release" position of the lever.
- (3) After adjusting, tighten the lock nut good and hard.



- 1-Steering clutch lever
- 2-Stopper bolt
- 3-Rod
- 4-Link lever
- 5-Rod
- 6-Clevis
- 7-Adjusting nut
- 8-Shifter yoke
- 9-Brake band

Adjusting the steering clutch lever "release" position

The "release" position of the lever can be checked by measuring any of two kinds of distance, oblique or horizontal, from the rear end of the dashboard to the tip of the lever, as shown.

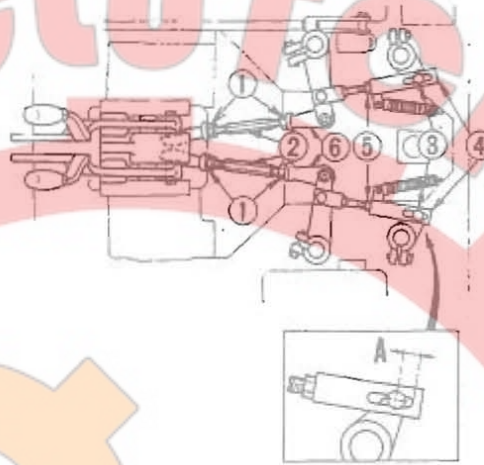


Unit: mm (in.)

	a <sub>1</sub> (horizontal distance)	a <sub>2</sub> (oblique distance)
BS3F	220 (8-5/8)	260 (10-1/4)
BD2F	240 (9-1/2)	240 (9-1/2)

**Adjusting the steering clutch lever play and operating position**

This adjustment is to be made after the “release” position of the lever is properly adjusted.

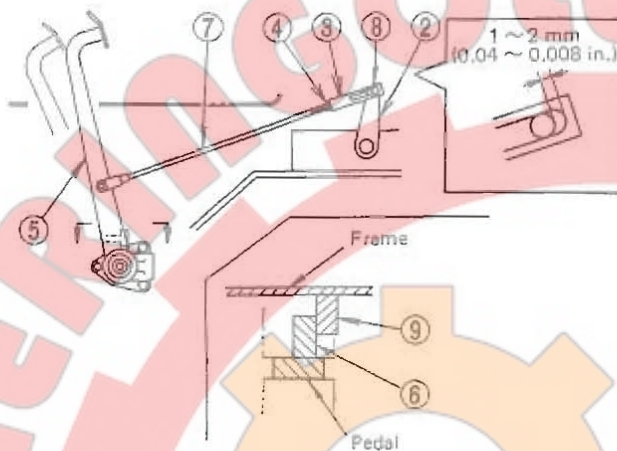


Unit: mm (in.)

Lever position	Lever stroke		Lever pull at the middle of lever	Adjustment
	(horizontal distance)	(oblique distance)		
1 Play	$b_1$ 35 ~ 40 (1-3/8 ~ 1-5/8) [Target: 40 (1-5/8)]	$b_2 - a_2$ 30 ~ 35 (1-1/8 ~ 1-3/8)	1 ~ 2 kg (2.2 ~ 4.4 lb)	Loosen lock nut (1) and turn rod (2). After adjusting, tighten lock nut (1).
2 Brake adjusting nut setting				See the topic, Steering clutch brake adjustment.
3 Brake band starts to be contracted	$c_1$ 145 ~ 155 (5-3/4 ~ 6-1/8) [Target: 150 (5-7/8)]	$c_2 - a_2$ 140 ~ 150 (5-1/2 ~ 5-7/8) [Target: 145 (5-3/4)]	5 ~ 7 kg (11 ~ 15 lb)	Pull lever to position where brake band starts to be contracted. Loosen lock nut (5) and turn rod (6) until dimension (A) becomes zero. After adjusting, tighten lock nut. (Dimension (A) will be about 15 mm (5/8 in.) with lever in “released” position.)
4 Brake band is fully contracted	$d_1$ 350 ~ 360 (13-3/4 ~ 14-1/8) [Target: 355 (14)]	$d_2 - a_2$ 335 ~ 345 (13-1/4 ~ 13-5/8) [Target: 340 (13-3/8)]	8 ~ 11 kg (18 ~ 24 lb)	The correct strokes given at left will be obtained, provided that items 1 thru 3 are properly adjusted.

**Steering clutch brake adjustment**

The entire stroke of lever (2) is prescribed to be about 33 mm (1-1/4 in.) at the tip of the lever. This stroke increases if the brake linings are worn down. In such a case, adjust the lever stroke to the specification by means of adjusting nut (1) (shown in the photo).

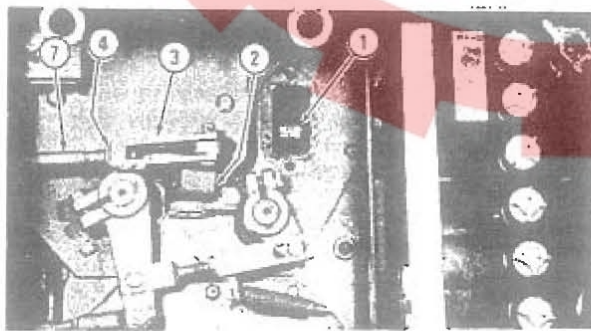


**How to adjust**

- (1) Screw the adjusting nut all the way. The torque for this nut is  $2 \pm 0.5$  kg-m ( $14 \pm 3.6$  lb-ft).
- (2) Unscrew the adjusting nut by  $2-2/3 \pm 1/6$  turns.

**Adjusting the brake pedal**

- (1) Loosen lock nut (4).
- (2) Bring stopper (6) of pedal (5) into contact with stopper (9) of frame and hold it there.
- (3) Adjust the length of rod (7) so that the gap of pin (8) in clevis (3) is 1 to 2 mm (0.04 to 0.08 in.). Note, at this time, that the center-to-center distance between pins of rod (7) must be about 543 mm (21-3/8 in.).
- (4) After adjusting, tighten the lock nut good and hard.



**Brake pedal stroke and operating effort**

The brake pedal adjustment, if properly made, will produce the following pedal stroke and operating effort:

	Pedal stroke	Pedal operating effort
Play	3 ~ 6 mm (0.12 ~ 0.24 in.)	1 ~ 2 kg (2.2 ~ 4.4 lb)
Brake band is fully contracted	95 ~ 110 mm (3-3/4 ~ 4-3/8 in.) [Target: 100 mm (3-7/8 in.)]	10 kg (22 lb), max

**Troubleshooting**

**Bevel gear**

**Complaint A: Excessive gear noise**

Possible cause	Remedy	Remarks
a) Gear oil wanting or dirty b) Too much backlash	a) Replenish or change. b) Adjust.	b) Noise on turning to one side means some rattling condition due to worn splines, loose bearings or excessive backlash.
c) Bearings worn down, damaged or loose	c) Adjust or replace.	
d) Damaged or worn gear teeth or poor tooth contact	d) Repair or replace.	e) Misalignment could be the cause.
e) Bevel gear improperly installed	e) Adjust.	

**Complaint B: Oil becomes too hot**

Possible cause	Remedy	Remarks
a) Gear oil wanting or dirty, or of wrong kind	a) Replenish, or change.	c) Raceways could be in cracked, spalled or otherwise damaged condition.
b) Backlash too much or too little	b) Adjust or replace.	
c) Bearings too tight, too loose, or damaged	c) Adjust or replace.	
d) Bearings out of alignment	d) Adjust.	

**Complaint C: Oil leakage**

Possible cause	Remedy	Remarks
a) Too much gear oil, or oil viscosity too low	a) Remove excess oil to hold oil level as prescribed, or replace the oil by the one meeting the viscosity specification.	a) Leakage of oil into steering clutch side incapacitates this device.
b) Faulty oil seal	b) Replace.	c) Loose bearings cause shaft to wobble and thus promote oil leakage even if oil seals are in sound condition.
c) The portions of shaft in contact with oil seals are worn down	c) Repair or replace.	
d) Cracked case	d) Repair or replace.	

**Complaint D: Abnormal wear**

Possible cause	Remedy	Remarks
a) Gear oil not enough, dirty or of wrong kind	a) Replenish, or change.	a) Change oil if metal particles are noted in the oil. Such particles or gritty matters promote wear.
b) Bevel gear out of adjustment	b) Adjust.	

Steering clutch and brake

Complaint A Slipping clutch (accompanied by overheating tendency)

Possible cause	Remedy	Remarks
a) Control linkage out of adjustment	a) Adjust.	a) Check lever play.
b) Linings are dirty	b) Wash with gasoline, or replace the disc plates.	b) Investigate to locate the point through which oil is entering the clutch case. Wash the case interior clean, as necessary.
c) Disc plates (drive and driven) are not capable of smooth sliding movement	c) Repair drums and plates, eliminating offsets or any irregularity interfering with smooth axial sliding movement.	c) Be sure that each disc plate moves smoothly in or on the drum.
d) Spalled, flaked or damaged linings of disc plates	d) Replace plates.	
e) Weakened or broken clutch springs	e) Replace.	e) Habitual "half-clutch" operation tends to overheat the clutch and thus weaken springs.
f) Disc plates (drive and driven) are warped	f) Repair or replace.	f) Warped plates are usually a result of overheating, for which habitual "half-clutch" operation is usually to blame.

Complaint B: Dragging clutch

Possible cause	Remedy	Remarks
a) Clutch out of adjustment	a) Adjust.	
b) Worn-down yoke hinge point or hinge bolt	b) Repair or replace.	
c) Excessive rattle in steering control linkage	c) Adjust.	
d) Worn or damaged release bearing	d) Replace.	d) Grease the bearing fully at the time of reassembly.
e) Dirty disc linings.	e) Clean by washing, or replace.	
f) Disc plates (drive and driven) are sticking or warped	f) Repair or replace.	f) Warped disc plates are caused by overheating resulting from habitual "half-clutch" operation.

## Complaint C: Not enough braking force

Possible cause	Remedy	Remarks
a) Brake out of adjustment b) Brake lining is dirty	a) Adjust. b) Clean by washing.	b) Be aware of possibility of oil leaking in from final drive case and bevel gear compartment. Drain out oil and water, if any, now and then.
c) Lining is worn down, with rivet heads in rubbing condition	c) Replace.	
d) Brake band is warped, broken or otherwise damaged	d) Repair or replace.	
e) Dragging clutch	e) Adjust or repair.	e) Dragging clutch is often the cause of apparent poor braking.

## Complaint D: Dragging brake

Possible cause	Remedy	Remarks
a) Maladjustment	a) Adjust as prescribed.	a) Uneven or inadequate band-to-drum clearance is likely to result in overheating. Readjustment is necessary if pulling the lever just a little causes the machine to turn.
b) Return spring is weakened	b) Readjust or replace.	
c) Brake band is distorted	c) Repair or replace.	