



LANDING GEAR

OPERATING, MAINTENANCE AND REPAIR PROCEDURES



Formula 150 Landing Gear

DO NOT deviate from these instructions. Any changes or deviations will void all warranties, expressed or implied, unless written consent is first obtained from the factory.

OPERATION OF HOLLAND FORMULA 150 LANDING GEAR:

NOTE: Holland Formula 150 2-speed gearbox has high and low range gears. High range gear is to be used only for rapid traverse up from and down to the ground and is not intended to lift or lower any load. For additional information, see Holland publication XL-FW302-XX, entitled "Fifth Wheel Operating Instructions".



CAUTION

- Always grip crank handle securely.
- Always grip crank handle securely with both hands before shifting.
- Never shift landing gear under load.
- Never leave the crank unsecured.
- Never raise or lower a loaded trailer in high gear.

TO EXTEND:

On outside mounted landing gear, engage the crank with the crankshaft and turn the crank clockwise. Inside mounted landing gear are extended by turning the crank counterclockwise. Using high gear, lower the landing gear until the pads make contact with the ground. To reduce the load on the fifth wheel, shift to low gear and crank an additional four to eight turns. Leave the landing gear in low gear and store the crank handle in the holder provided.

TO RETRACT:

On outside mounted landing gear, engage crank with crankshaft and turn the crank counterclockwise. Inside mounted landing gear are retracted by turning the crank clockwise. Retract the landing gear using low gear until unloaded. Then shift to high gear and continue cranking until fully retracted. Leave the crankshaft engaged to prevent road vibration wind-down. Store the crank in the holder provided.

MAINTENANCE:

LUBRICATION:

Although Formula 150 landing gear are adequately greased and packed with high quality lubricants when manufactured, it may be necessary to periodically supplement this lubrication to maintain satisfactory performance for your particular application.

1. Lube both legs through the grease fittings and access holes provided in the legs two times a year or as required.
2. Lube 2-speed gears through the grease fitting in the gearbox two times a year or as required.



WARNING

DO NOT use lubricants containing teflon.

TROUBLE SHOOTING — HARD TURNING LANDING GEAR — CHECK THE FOLLOWING:

1. Binding cross shaft. Bolts in the cross shaft must not be overtightened to prevent lateral movement of the cross shaft.
2. To determine which leg turns hard, remove the cross shaft and operate each leg individually.
3. Landing gear may be bent or damaged.
4. Alignment - legs must be parallel and extend and retract evenly.
5. Legs and gearbox may need additional lubrication.
6. If crankshaft holder or extension are used, check for alignment with crankshaft.
7. If a through-axle is used, check for binding where the axle goes through the legs.
8. Binding shaft bushings - bushings must have adequate clearance for operation. Check mounting for proper clearance.
9. Examine nut and screw assembly for damage caused by dropping of the trailer.

TROUBLE SHOOTING — GENERAL:

Follow the dismantling and assembly instructions in this manual.

If crankshaft jams or skips while turning—examine parts (10 & 13) and all gearbox gears for worn, broken, or missing teeth.

If the landing gear will not stay in gear while cranking—check the condition of shifter spring (29), shifter grooves in crankshaft (27) and cluster gear (28). Replace as required.

SINGLE SPEED LEG DISMANTLING PROCEDURE:

1. Remove landing gear from trailer.
2. Remove rust from projecting end(s) of shaft (11), and lubricate for easy removal.
3. Remove screws (5), cover (6), and gasket (7).
4. Remove plug (8). Using plug hole, tap out pin (9) from gear (10).
5. Remove shaft (11), gear (10), and shims (12). Note the quantity and location of shims removed.
6. Remove bevel gear (13) from elevating screw.
7. Slip pin (14) out of elevating screw and remove. Remove washer (15).
8. Upper leg (2) and lower leg (1) can now be separated.
9. Remove bushing (16).
10. Remove bearing (17) and collar (18) from the screw in the lower leg.

2-SPEED GEARBOX LEG DISMANTLING PROCEDURE:

1. Remove landing gear from trailer.
2. Remove nut (19), bolt (20), washers (21), and crank handle (22).
3. Remove rust from shafts (27) and (32), and lubricate to ease removal.
4. Remove nuts (23) and bolts (24) from gearbox.
5. Remove gearbox cover (25) and gasket (26).
6. Remove shaft (27) with gear (28) assembled. To remove gear from shaft, remove roll pin (30), and slide gear from shaft (27). Remove pin (31) from shaft (27).
7. Remove screw (5) and shifter spring (29).
8. Remove screws (5), cover (6), and gasket (7).
9. Remove plug (8). Using plug hole, tap out pin (9) from gear (10). Remove shaft (32) with gear (33) assembled.
10. Remove gear (10) and shims (12). Note quantity and location of shims removed. To remove gear (33) from shaft, remove drive pin (9) and slide gear off shaft.
11. Follow procedures outlined in steps 6 through 10 in "Single Speed Leg Dismantling Procedure," to finish leg dismantling.
12. Remove bushings (34) or (35) if required.

SINGLE SPEED LEG ASSEMBLY PROCEDURE:

1. Replace all worn or broken parts.
2. Place collar (18) on elevating screw, followed by thrust bearing (17). Note: Contoured side of collar must face down.
3. Install bushing (16) into place in upper leg (2). Bushing must be flush with the top of the bearing block in the leg.
4. Place upper leg (2) over lower leg (1). Press down until hole in the elevating screw is clearly visible through the hole in the bearing block in the upper leg (2). Check position of bushing (16).
5. Install washer (15) and slip pin (14) in hole in the elevating screw. Install bevel gear (13) and position it so that the slot on the bottom of the gear captures pin (14).

6. Place the shims (12) and pinion gear (10) on top of the bevel gear with the roll pin hole in the pinion gear facing up.
7. Install shaft (11) in outer leg (2) through shims (12) and gear (10), making certain gear is oriented as shown in the exploded view. Initially start with two shims.
8. Align hole in shaft (11) with gear (10). Install drive pin (9). Check for free movement by rotating shaft (11) (minimum end play 1/32"). It may be necessary to add or remove shims.
9. Install plug (8) in top of leg (2) and fill with permanent type grease (1 pound capacity).
10. Install gasket (7), cover (6) and screws (5). Check to see that the gears turn freely.
11. Install landing gear on trailer. Adjust both legs to the same extended length and install cross shaft (36), bolts (37) and nuts (19). Cross shaft must have enough end play and must rotate freely—adjust bolts accordingly. Mounting bolts should be torqued to 100 ft-lbs minimum.

GEARBOX LEG ASSEMBLY PROCEDURE:

1. Replace all worn and broken parts.
2. Install bushings (34) or (35) if removed.
3. Follow steps 3 through 5 in "Single Speed Assembly Procedure," above.
4. Install gear (33) on shaft (32). Align hole in gear and shaft and secure with pin (9).
5. Insert shaft (32) through top hole in gearbox. Slide two shims (12) on shaft inside upper leg (3). Position gear (10) on top of gear (13), making certain gear is oriented as shown in the exploded view, with hole facing up. Push shaft through until alignment can be made with hole in gear (10) and shaft (32). Install drive pin (9). Check for free movement (minimum 1/32" end play).
6. Install plug (8) and fill with 1 pound of permanent type grease. Install gasket (7), cover (6), and screws (5).
7. Insert pin (31) in shaft (27). Slide gear (28) on shaft (27) until pin engages in slot on gear (28). Then insert pin (30) in front of gear (28).

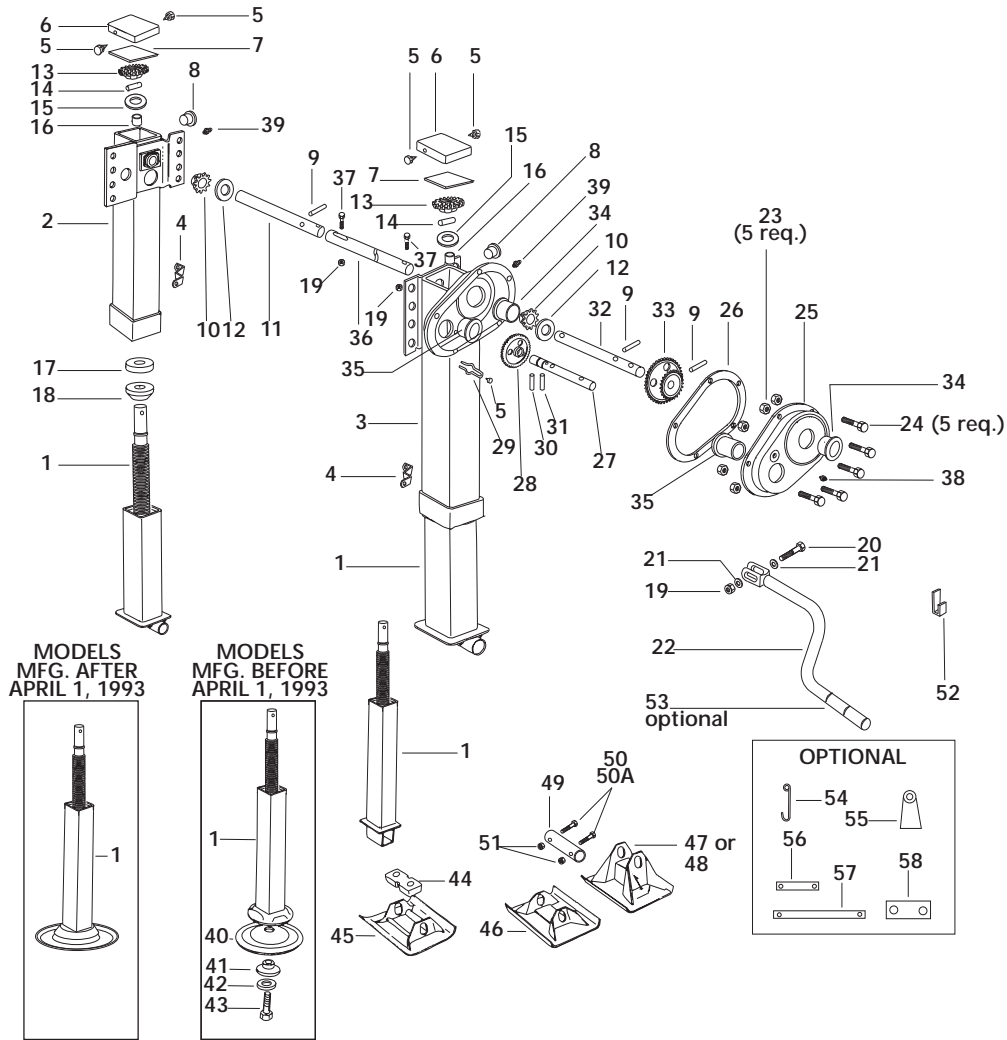


CAUTION

Pin (30) must not extend more than 1/8" above the shaft surface.

8. Install shifter spring (29) and locate with screw (5) installed loosely into gearbox.
9. Insert shaft (27) through shifter spring (29) and lower hole of gearbox. Tighten screw (5). Slide shaft (27) in until spring seats in either groove in shaft (27) and has full tooth engagement with gear (33).
10. Lubricate gears with 1 pound of permanent type grease. Install gasket (26), cover (25), bolts (24) and nuts (23). Tighten to 10 ft-lbs torque.
11. For installation, refer to step 11 in "Single Speed Leg Assembly Procedure."

F150 EXPLODED VIEW



ITEM	PART NUMBER	NO.	PART NAME	ITEM	PART NUMBER	NO.	PART NAME
1	See chart 2 (over)	2	Inner leg & screw assembly	31	XA-01792	1	Pin
2	See chart 1 (over)	1	Single speed outer leg	32	See chart 1 (over)	1	2-speed drive shaft
3	See chart 1 (over)	1	2-speed outer leg	33	XA-02043-1	1	Driven cluster gear (1" bore)
4	XA-01782	2	Brace ear	34	XB-0307-PM	2	Bearing (1" diameter)
5	XB-04112	5	Self-tapping screws	35	XB-0308-PM	2	Bearing (.88" diameter)
6	XA-06218	2	Upper leg cover	36	XA-V-1910	1	Cross shaft
7	XB-06219	2	Leg cover gasket	37	XB-V-444-1	2	.38"-16 x 1.75" hex bolts
8	XB-01789	2	Access plug	38	XB-04113	1	Lube fitting
9	XB-02065	3	.38" x 1.5" groove pin	39	XB-767	2	Lube fitting
10	XA-06217	2	Bevel pinion gear	40	XA-02709	*	Self-leveling foot
11	See chart 1 (over)	1	Single speed drive shaft	41	XA-01774	*	Pivot guide
12	XB-01977		Shims	42	XB-T-45-1	*	.5" lock washer
13	XA-LG0570	2	Bevel gear	43	XB-01987	*	.5"-13 x 1.75" hex bolt
14	XB-GP-38-2-E	2	.38" x 2" groove pin	44	XB-04676	*	Cushion pad
15	XB-PW-1916-2-18	2	Washer	45	XA-04681	*	2.38" cushion foot
16	XB-01744-1	2	Bushing	46	XA-02691	*	Skid foot (1.75" high)
17	XB-V-647-2	2	Thrust bearing	47	XA-03337	*	Skid foot (4.5" high) light duty
18	XB-LG0544	2	Collar	48	XA-02689	*	Skid foot (4.5" high) std. duty
19	XB-338	3	.38"-16 locknut	49	XA-V-1901-1	*	Axle
20	XB-02157	1	.38"-16 x 2.5" hex bolt	50	See chart 2 (over)	4	.38"-16 x .75" hex bolt
21	XB-1108	2	.38" flat washer	50A	See chart 2 (over)	4	.38"-16 x 2.5" hex bolt
22	XA-01918	1	Crank handle assy.	51	See chart 2 (over)	4	.38"-16 thick hex nut
23	XB-3103	5	.25"-28 locknut	52	XA-V-1914	1	Crank holder
24	XB-CX-14-28-F-58	5	.25"-28 x .62" hex bolts	53	XA-01918-1	1	Extra long crank (optional)
25	XA-06224-A	1	Gearbox cover	54	XB-V-1915	1	Crank hanger (optional)
26	XB-01791	1	Gearbox cover gasket	55	XA-02195	1	Extension bracket (optional)
27	See chart 1 (over)	1	Crank shaft	56	XA-02198-2	1	Short ext. shaft (optional)
28	XA-0306-1	1	Drive cluster gear .88" bore	57	XA-02198-1	1	Long ext. shaft (optional)
29	XB-03370-1	1	Shifter spring	58	XA-02197	1	Coupling
30	XB-21-S-187-1000	1	Roll pin .19" x 1"				

* See chart 2 (over)

CHART 1: Model Number LG150

TRAVEL CODE	MOUNTING CODE	ITEM (2) PART NO.	ITEM (3) PART NO.	item (11) PART NO.	ITEM (32) PART NO.	ITEM (27) PART NO.
1	A	XA-06215-1L	XA-06215-1R	XA-06216-A-L	XA-06216-A-R	XA-06226-A
1	B			XA-06216-B-L	XA-06216-B-R	XA-06226-B
1	C			XA-06216-C-L	XA-06216-C-R	XA-06226-C
1	D			XA-06216-D-L	XA-06216-D-R	XA-06226-C
2	A	XA-06215-2L	XA-06215-SR	XA-06216-A-L	XA-06216-A-R	XA-06226-A
2	B			XA-06216-B-L	XA-06216-B-R	XA-06226-B
2	C			XA-06216-C-L	XA-06216-C-R	XA-06226-C
2	D			XA-06216-D-L	XA-06216-D-R	XA-06226-C

CHART 2: Model Number LG150

TRAVEL CODE	FOOTWEAR CODE	ITEM (1) PART NO.	ITEM (50) QUANTITY - 4	item (50A) QUANTITY - 4	ITEM (51) QUANTITY - 4
1	1	XA-06220-1-1	---	---	---
1	4	XA-06220-1-4	---	---	---
1	5	XA-06220-1-4	XB-06187	---	XB-06188
1	6	XA-06220-1-4	XB-06187	---	XB-06188
1	8	XA-06220-1-4	XB-06187	---	XB-06188
1	9	XA-06220-1-9	---	XB-06263	XB-06188
2	1	XA-06220-2-1	---	---	---
2	4	XA-06220-2-4	---	---	---
2	5	XA-06220-2-4	XB-06187	---	XB-06188
2	6	XA-06220-2-4	XB-06187	---	XB-06188
2	8	XA-06220-2-4	XB-06187	---	XB-06188
2	9	XA-06220-2-9	---	XB-06263	XB-06188

This product is covered by Holland's Formula 150 5-year parts and 2-year labor warranty. Holland reserves the right, without giving prior notice, to change specifications and dimensions as designs are altered or improved.

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Holland USA, Inc. Facilities:

Denmark, SC Warrenton, MO
 Dumas, AR Whitehouse Station, NJ
 Holland, MI Wylie, TX
 Muskegon, MI

Holland International, Inc.

Holland, MI
 Phone: 616-396-6501
 Fax: 616-396-1511

Holland Hitch of Canada, Ltd.

Woodstock, Ontario • Canada
 Phone: 519-537-3494
 Fax: 800-565-7753

Holland Equipment, Ltd.

Norwich, Ontario • Canada
 Phone: 519-863-3414
 Fax: 519-863-2398

Holland Hitch Western, Ltd.

Surrey, British Columbia • Canada
 Phone: 604-574-7491
 Fax: 604-574-0244

Ph: 888-396-6501 Fax: 800-356-3929