



# LANDING GEAR

## OPERATING, MAINTENANCE, AND REPAIR PROCEDURES



### Formula 150 Landing Gear (Manufactured after March 1, 2000)

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.

Before operating, identify the mounting style of your landing gear — inside or outside mount (see figures below).

#### OPERATION OF HOLLAND FORMULA 150 LANDING GEAR:

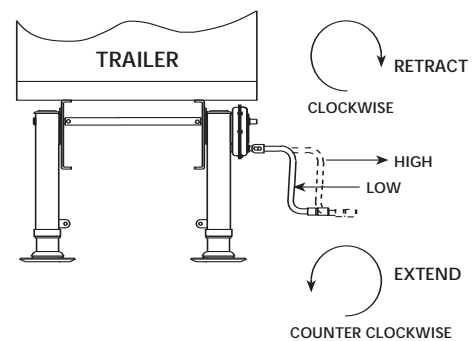
NOTE: Holland Formula 150 2-speed gearbox has high and low range gears. High range gear is to be used only for rapid traverse up from and down to the ground and is not intended to lift or lower any load. For additional information, see Holland publication XL-FW302-XX, entitled "Fifth Wheel Operating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

#### OUTSIDE MOUNT



- Push crank handle in for low speed.
- Pull crank handle out for high speed.
- Turn crank:  
Counterclockwise = extend  
Clockwise = retract

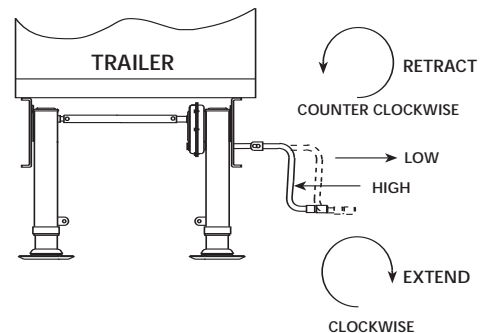
#### TO EXTEND:

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.

#### INSIDE MOUNT



- Push crank handle in for high speed.
- Pull crank handle out for low speed.
- Turn crank:  
Counterclockwise = retract  
Clockwise = extend

## MAINTENANCE:

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### 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 with a molybdenum-type grease through the grease fittings and access holes provided in the legs two times a year or as required. Add one quarter pound grease at each grease fitting.
2. Lube 2-speed gears through the grease fitting in the gearbox two times a year or as required. Add one quarter pound grease at each grease fitting.



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

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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:

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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:

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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. Tap out pins (8) from shaft (11). Remove shaft (11), pinion gear (10) and key (9).
5. Tap out pin (14) from top of screw.
6. Remove washer (15).
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 lower leg (1).

## 2-SPEED GEARBOX LEG DISMANTLING PROCEDURE:

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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. Drive pins (8) from shaft (32).
10. Remove gear (10) and washer (12). Remove spacer (37), gear (33), key (9), and spacer (16).
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:

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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. 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).
4. 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).
5. 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.
5. 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.

continued


**SINGLE SPEED LEG ASSEMBLY  
PROCEDURE (continued):**

7. Put key (9) into slot on shaft (11). Slide gear (10) over key (9) on shaft (11). Check for free movement by rotating shaft (11) (minimum end play 1/32"). It may be necessary to add or remove shims.
8. Fill with permanent type grease (1 pound capacity).
9. Install gasket (7), cover (6) and screws (5). Check to see that the gears turn freely.
10. Install landing gear on trailer. Adjust both legs to the same extended length and install cross shaft (36), bolts (20) 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). Put key (9) into slot on shaft (32) and slide gear (33).
5. Insert shaft (32) through top hole in gearbox. Slide washer (12) onto 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. Check for free movement (minimum 1/32" end play).
6. 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).



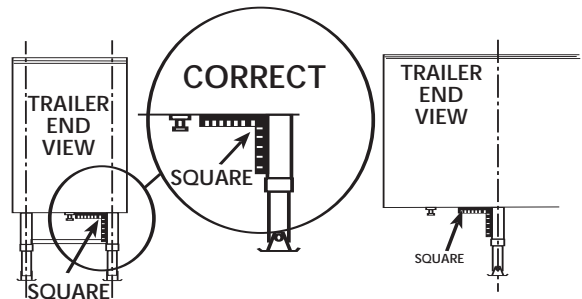
**WARNING**

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."

**ALIGNMENT:**

Using a square, check that both landing gear legs are square with the trailer and parallel with each other as shown. Bent or damaged legs are an indication of possible damage to the lift screw, lift nut or other internal components and should be replaced.



**See page 4 for Exploded View and Parts List**

**CHART 1: Shaft Requirements**

		TRAVEL CODE	FOOTWARE CODE	MOUNTING CODE
1 - 17" TRAVEL 2 - 19" TRAVEL		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
TRAVEL CODE	MTG CODE	ITEM (1) PART NO.	ITEM (32) PART NO.	ITEM (27) PART NO.
1	A	LG2127	LG2099	XA-06226-A
1	B	LG2127-10	LG2099-10	XA-06226-B
1	C	LG2127-20	LG2099-20	XA-06226-C
1	D	LG2127-30	LG2099-30	XA-06226-C
2	A	LG2127	LG2099	XA-06226-A
2	B	LG2127-10	LG2099-10	XA-06226-B
2	C	LG2127-20	LG2099-20	XA-06226-C
2	D	LG2127-30	LG2099-30	XA-06226-C

A - UNIVERSAL  
B - INSIDE  
C - OUTSIDE  
D - OUTSIDE, EXTRA LONG

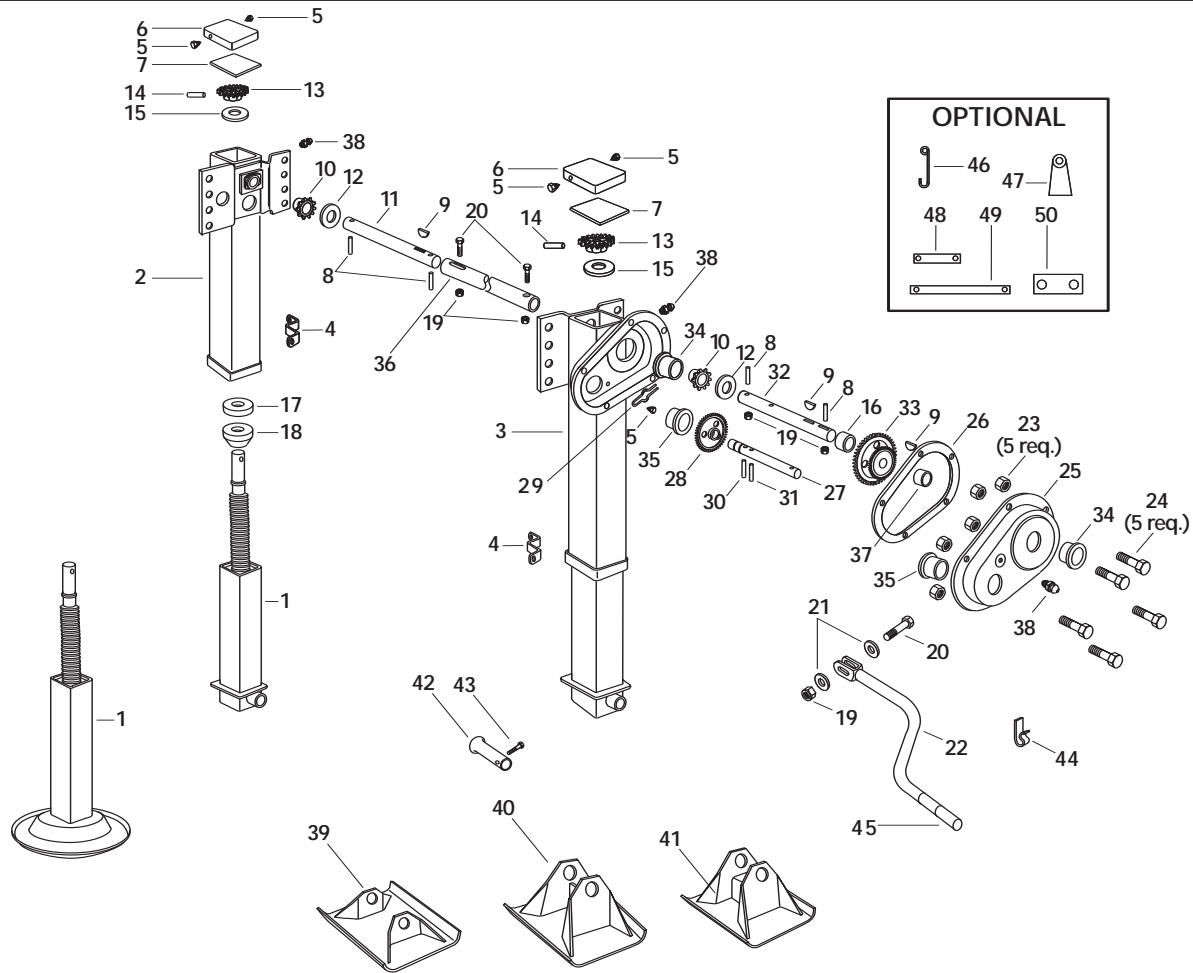
**CHART 2: Inner Leg and Outer Leg**

		TRAVEL CODE	MOUNTING CODE	FOOTWARE CODE
1 - 17" TRAVEL 2 - 19" TRAVEL		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
TRAVEL CODE	FTWR CODE*	ITEM (1) PART NO.	ITEM (2) PART NO.	ITEM (3) PART NO.
1	T	LG2135-01	LG2093-02	LG2136-02
1	U	LG2129-01	LG2093-01	LG2136-01
1	V	LG2129-01	LG2093-01	LG2136-01
1	X	LG2129-01	LG2093-01	LG2136-01
1	Y	LG2129-01	LG2093-01	LG2136-01
2	T	LG2135-02	LG2093-03	LG2136-03
2	U	LG2129-02	LG2093-02	LG2136-02
2	V	LG2129-02	LG2093-02	LG2136-02
2	X	LG2129-02	LG2093-02	LG2136-02
2	Y	LG2129-02	LG2093-02	LG2136-02

\* FOOTWARE CODE LEGEND  
T 10" Diameter Shockfoot  
U Heavy Duty Skid Foot, 10x10x4 1/2  
V Low Profile Skid Foot, 10x10x2  
X No Footware  
Y Skid Foot 10x10x4 1/2

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.

# F150 EXPLODED VIEW for Parts Manufactured AFTER March 1, 2000



ITEM	PART NUMBER	NO.	PART NAME	ITEM	PART NUMBER	NO.	PART NAME
1	See chart 2 (over)	2	Inner leg and screw assembly	26	XB-01791	1	Gearbox cover gasket
2	See chart 1 (over)	1	Single speed outer leg	27	See chart 1 (over)	1	Crank shaft
3	See chart 1 (over)	1	2-speed outer leg	28	XA-0306-1	1	Drive cluster gear .88" bore
4	LG0266	2	Brace ear	29	XB-03370-1	1	Shifter spring
5	XB-STS-008-11	5	Self-tapping screws	30	XB-21-S-187-1000	1	Roll pin .19" x 1"
6	XA-06218	2	Upper leg cover	31	XA-01792	1	Pin
7	XB-LG0893	2	Leg cover gasket	32	See chart 1 (over)	1	2-speed drive shaft
8	XB-SP-014-27	4	.25" x 1.50 spring pin	33	LG2131-02	1	Driven cluster gear (1" bore)
9	XB-KEY-018-02	3	Woodruff key	34	XB-0307-PM	2	Bearing (1" diameter)
10	XB-LG1823-01	2	Pinion gear	35	XB-0308-PM	2	Bearing (.88" diameter)
11	See chart 1 (over)	1	Single speed drive shaft	36	LG0094-6825	1	Cross shaft
12	XB-PW-016-19	2	Washer	37	LG2125	1	Tube spacer
13	XA-LG0570	2	Bevel gear	38	XB-GRF-022-16	5	Lube fitting
14	XB-GP-052-21	2	.38" x 2" groove pin	39	LG0056	2	Skid foot (2.00" high)
15	XB-PW-016-62	2	Washer	40	LG0055	2	Skid foot (4.5" high) standard
16	LG2126	1	Spacer	41	LG0055-01	2	Skid foot (4.5" high) hvy. duty
17	XB-BRG-013-77	2	Thrust bearing	42	LG0070-02	2	Axle
18	XB-LG0544	2	Collar	43	XB-HHC-050-69	2	.38"-16 x .75" hex bolt
19	XB-SLN-012-04	5	.38"-16 locknut	44	XB-LG0085	1	Crank holder
20	XB-HHC-050-42	3	.38"-16 x 2.25 hex bolt	45	XA-01918-1	1	Extra long crank (optional)
21	XB-PW-016-03	2	.38" flat washer	46	LG0086-01	1	Crank hanger (optional)
22	XA-01918	1	Crank handle assy.	47	XA-02195	1	Extension bracket (optional)
23	XB-3103	5	.25"-28 locknut	48	XA-02198-2	1	Short ext. shaft (optional)
24	XB-CX-14-28-F-58	5	.25"-28 x .62" hex bolts	49	XA-02198-1	1	Long ext. shaft (optional)
25	XA-06224-A	1	Gearbox cover	50	XA-02197	1	Coupling

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