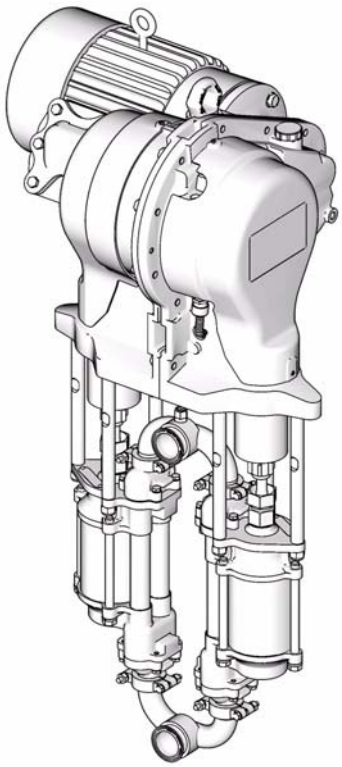
Instructions

15H886 Gear Reducer Replacement Kit

311615 rev.A

To replace the gear reducer assembly on E-Flo™ Plus Electric Circulation Pumps.

Important Safety Instructions
Read all warnings and instructions in this manual and in E-Flo Plus Repair-Parts manual 311594. Save these instructions.



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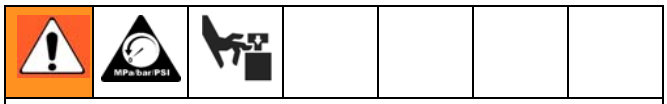
Pressure Relief Procedure



System pressure can cause the pump to cycle unexpectedly, which could result in serious injury from splashing or moving parts.

1. Set START/STOP switch (ST) to STOP.
2. Push in SECURE DISABLE (SD) switch.
3. Open the back pressure regulator and all fluid drain valves in the system, having a waste container ready to catch drainage. Leave open until you are ready to pressurize system again.
4. Check that pressure gauges on fluid supply and return lines read zero. If gauges do not read zero, determine cause and carefully relieve pressure by VERY SLOWLY loosening a fitting. Clear obstruction before pressurizing system again.

Kit Parts

Gear Reducer Kit 15H886 includes parts to replace the entire gear reducer. Parts included in the kit are marked with an asterisk, for example (5*). Use all the new parts in the kit.

Ref. No.	Part No.	Description	Qty
1*	n/a	GEAR REDUCER, 75:1	1
5*	n/a	SCREW, cap, socket-head; 5/8-11 x 3 in. (76 mm)	4
12*	116719	SCREW, 8-32 hex washer head	14
15*	108683	NUT, lock, hex	6
20*	n/a	KEY, square	1
24*	100049	SCREW, cap, hex-head; 1/2-13 x 1.0 in. (25 mm); not shown-for mounting to pump stand	4
27*	n/a	PLUG, TDC sensor port	1
28a*	n/a	MOTOR COUPLER	1
31*	100664	SCREW, set, socket-head; 1/4-20 x 1/2 in. (13 mm)	4
33*	n/a	GASKET, circuit board	1
37*	n/a	SCREW, cap, flange-head; 1/2-13 x 1.25 in. (31 mm)	4

Parts designated n/a are not available separately.

Kit Installation

Disassembly

1. Jog the motor to bring the stand side lower to the bottom of its stroke. This provides access to the coupling nut (14).
2. Relieve pressure, page 2.
3. Shut off electrical power to the unit.
4. Remove the screws (12) and both covers. FIG. 1 shows the cover (32) on the stand side; the motor side cover is (21).
5. Place a clean rag over the top of the slider cylinder (2) to prevent debris from falling into the slider assembly during disassembly.
6. Place a 3/4 in. wrench on the slider piston (9) flats (just above the coupling nut), to keep the slider piston/connecting rod from turning when you are loosening the coupling nut (14). Orient the wrench so it is braced against one of the tie rods (3). Applying excessive force to the slider piston/connecting rod can shorten the life of the lower pin bearing.
7. Using a 1-5/8 in. open-end wrench, unscrew the coupling nut (14) from the slider piston (9) and let it slide down onto the pump piston rod. Be careful not to lose the collars (13).
8. See FIG. 2. Using a 1/2 in. hex driver, unscrew the two cap screws (5). Remove the crank arm cap (38) and key (39). If necessary, use a plastic hammer to break these parts loose.

9 Place clean rag over slider cylinder (2).

10 Hold slider piston (9) flats with 3/4 in. wrench, and brace against tie rod (3).

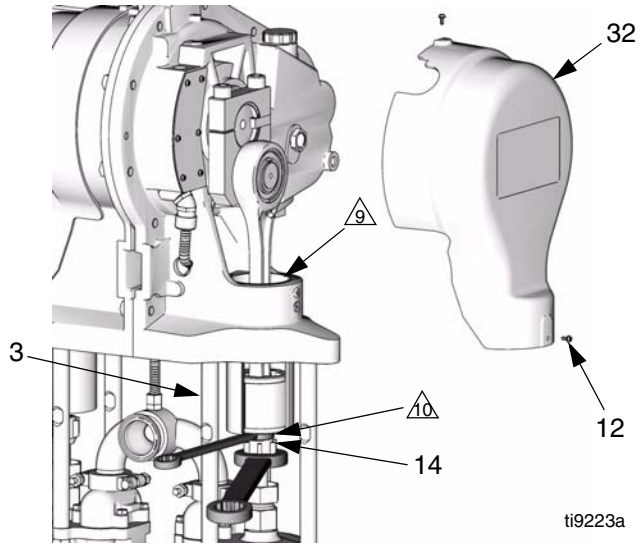


FIG. 1. Remove Coupling Nut

9 Place clean rag over slider cylinder (2).

12 Apply antiseize lubricant to screw (5) threads. Torque key-side screw to 210-230 ft-lb (283-310 N•m) first, then torque gap side screw to 210-230 ft-lb (283-310 N•m).

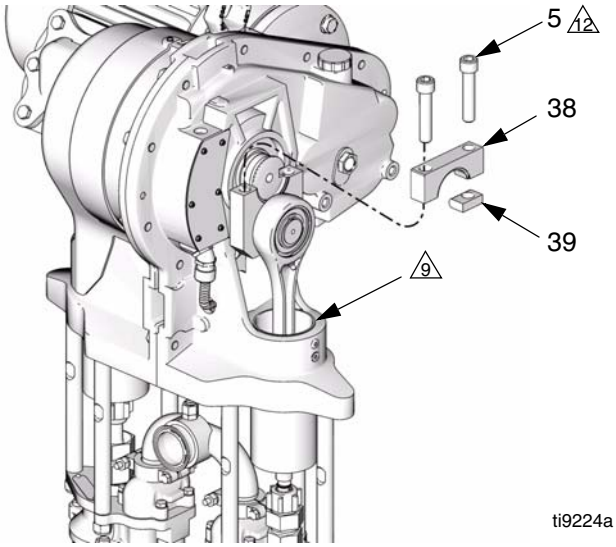


FIG. 2. Remove Crank Arm Cap

9. See FIG. 3. Rotate the crank arm (4) to allow it to be removed from the output shaft (OS).

10. Pull the crank arm/connecting rod/slider piston assembly (CR) up and out of the cylinder.

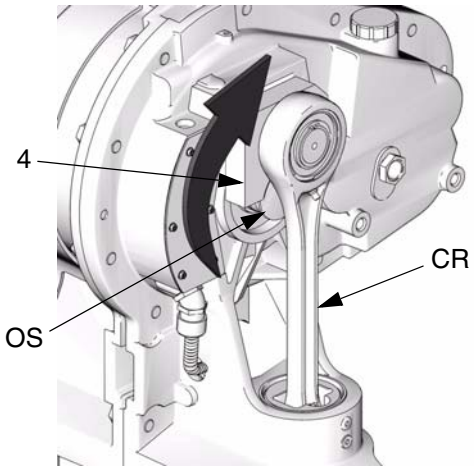


FIG. 3. Rotate Crank Arm

11. Turn on power and jog the motor to bring the motor side lower to the bottom of its stroke.

12. Shut off electrical power to the unit. Repeat the procedure for the motor side lower.

13. Disconnect the fluid inlet and outlet lines from the pump and plug the ends to prevent fluid contamination.

14. See FIG. 4 for NEMA 184 TC Frame electric motors. See FIG. 5 for IEC 112M/B5 Frame electric motors. While one person supports the motor (19), remove the screws (37). Pull the motor away from the gear reducer.

15. See FIG. 6. Remove the circuit board cover (34) and gasket (33).

16. See FIG. 9. If present, disconnect the transducer (25a) from J1 on the circuit board (25c).

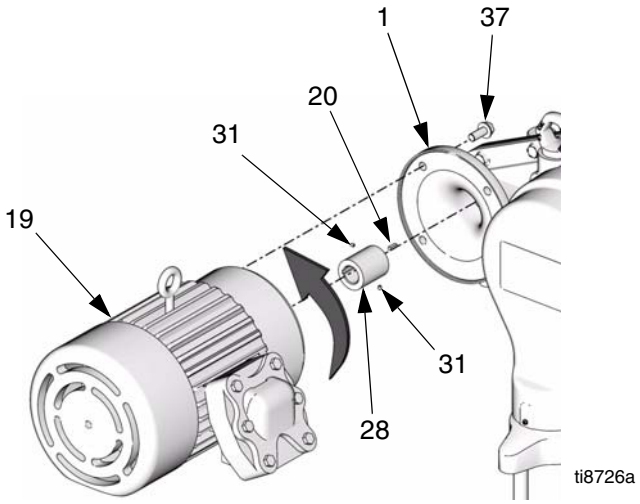
17. If present, disconnect the IS circuit field wire from J2 and J3 on the circuit board.

18. If present, remove the circuit board (25c) and TDC sensor (25b). Retain for reassembly.

19. See FIG. 6. Unscrew the strain relief (35) from the gear housing and pull it and the transducer conduit out of the housing. Do not disconnect the transducer from the pump outlet manifold (17).

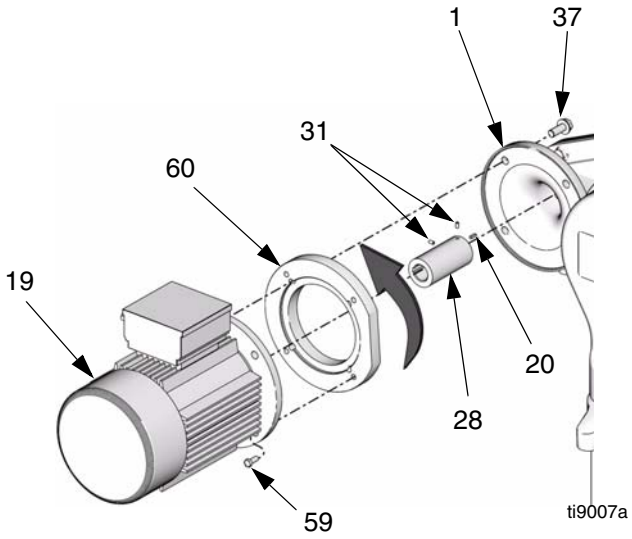
20. Unscrew the locknuts (15) from the tie rods (3). Remove the entire fluid section. Unscrew the tie rods (3) from the gear housing.

21. Remove the setscrew (31). Unscrew the slider cylinder (2) from the gear reducer.



Motor Rotation
(counter-clockwise as viewed from fan end)

FIG. 4. NEMA 184 TC Frame Electric Motors



Motor Rotation
(counter-clockwise as viewed from fan end)

FIG. 5. IEC 112M/B5 Frame Electric Motors

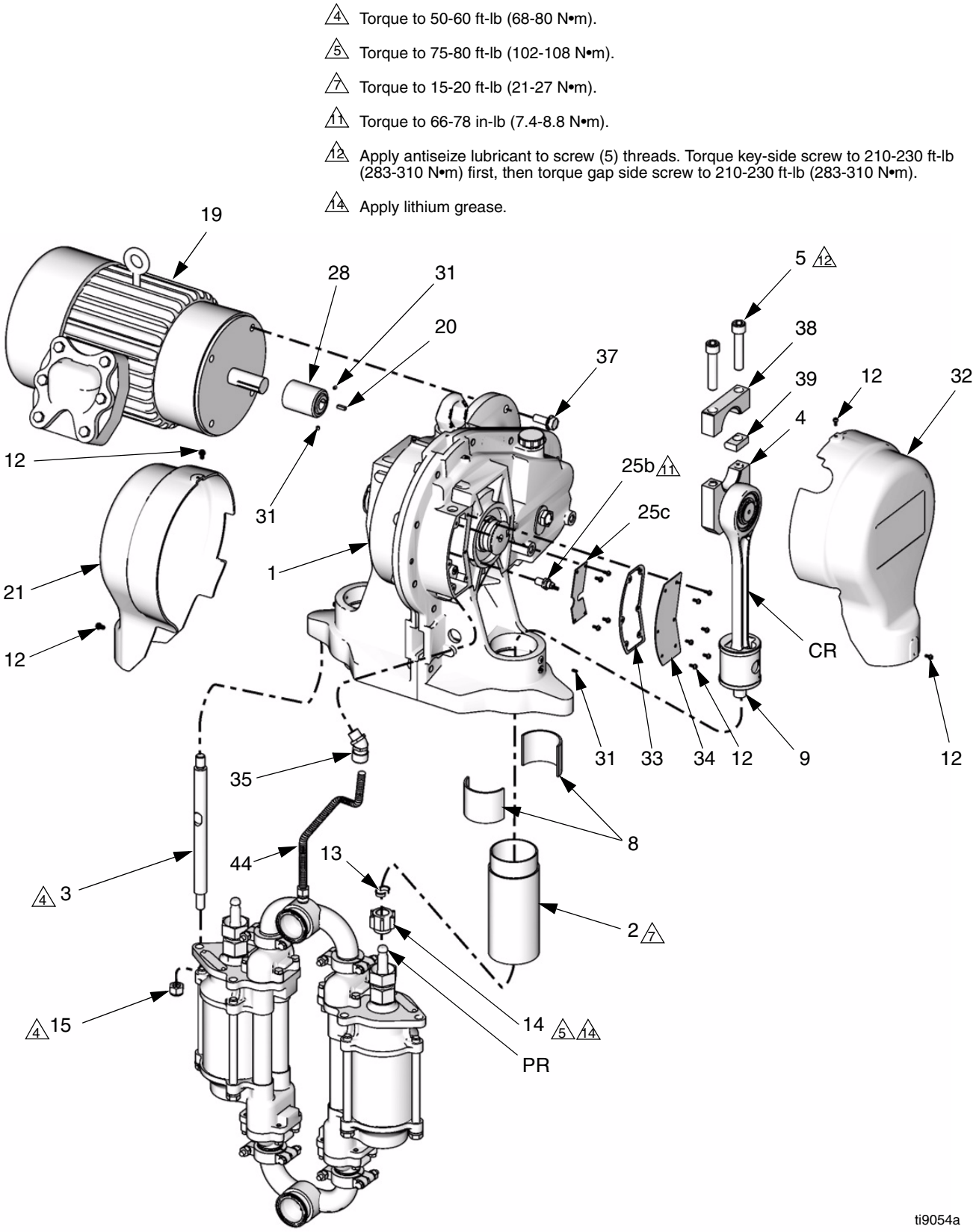


FIG. 6: Gear Reducer Replacement

Reassembly

The kit includes a motor coupler (28a) for a NEMA 184 TC Frame electric motor.

To install an IEC 112M/B5 Frame electric motor, order Motor Adapter Kit 15J893. See manual 311605.

1. See FIG. 7. Apply antiseize lubricant to bore of coupling.

15 Apply antiseize lubricant to bore of coupling (28).

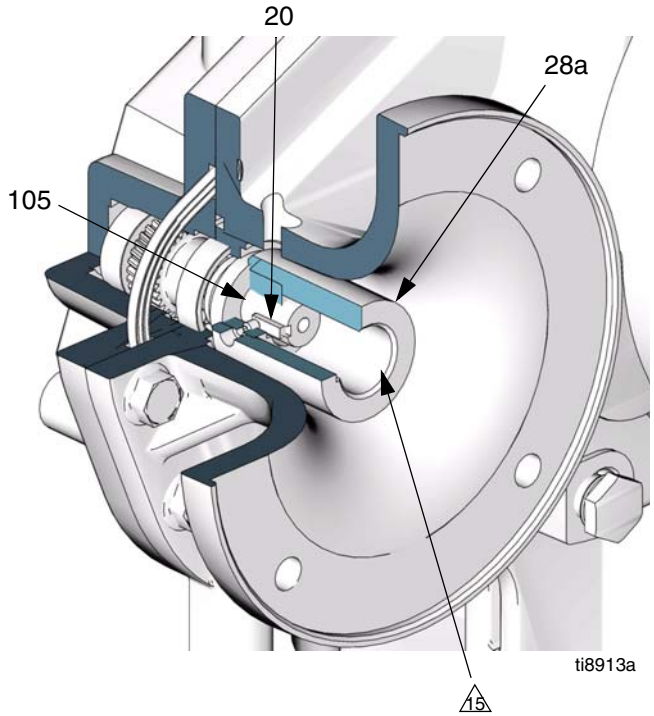


FIG. 7. Motor Coupler Installation

When installing an IEC 112M/B5 Frame electric motor, ensure that the motor adapter (60) and screws (59) are in place before mounting the motor on the gear reducer. See FIG. 5.

CAUTION

If installing an IEC 112M/B5 Frame electric motor which is not supplied by Graco, ensure that the motor shaft key cannot move out of position. If the key works loose it could cause excessive heat and equipment damage.

2. Lift the motor (19) into position. Align the key on the motor shaft with the mating slot of the motor coupler, and the four mounting holes with the holes in the gear reducer (1). Slide the motor into place.

3. While one person supports the motor (19), install the screws (37*). Torque to 75-80 ft-lb (102-108 N•m).

4. See FIG. 6. Screw the slider cylinders (2) into the new gear reducer (1). Torque to 15-20 ft-lb (21-27 N•m). Install the setscrews (31). Torque to 30-35 in-lb (3.4-3.9 N•m).

5. Screw the tie rods (3) into the gear housing. Torque to 50-60 ft-lb (68-80 N•m).

6. Orient the lowers (22) to the gear reducer (1) as shown. Position the lowers on the tie rods (3). Screw the tie rod locknuts (15*) onto the tie rods. Torque the locknuts to 50-60 ft-lb (68-80 N•m).

7. See FIG. 8. Ensure that the joints between the slider bearings (8) align with the pin hole (PH) in the slider piston (9).

8. Slide the piston (9) and connecting rod (7) into the cylinder (2).

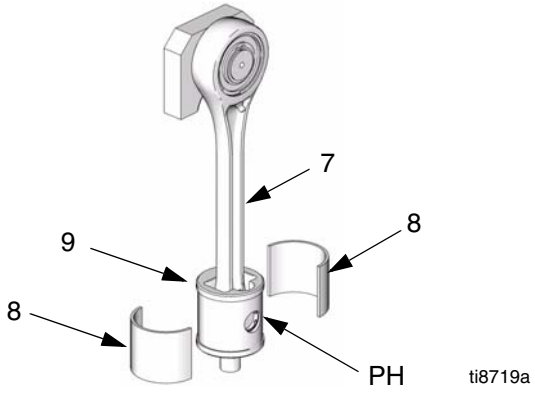


FIG. 8. Slider Bearings

9. Position the crank arm (4) to engage the output shaft (OS), and rotate it to the bottom of the output shaft.

10. Place a clean rag over the top of the slider cylinder (2) to prevent debris from falling into the slider assembly during reassembly.

11. See FIG. 2. Apply antiseize lubricant to the threads of the cap screws (5*). Install the key (39), crank arm cap (38), and cap screws (5*), oriented as shown. While the gap-side screw is still loose, torque the key-side screw to 210-230 ft-lb (283-310 N•m). Then torque the gap-side screw to 210-230 ft-lb (283-310 N•m).

12. Ensure that the collars (13) are in place in the coupling nut (14).

13. Place a 3/4 in. wrench on the flats of the slider piston (9), to keep it from turning when you are tightening the coupling nut (14). Orient the wrench so it is braced against one of the tie rods (3) or the pump stand. Tighten the coupling nut (14) onto the slider piston (9) and torque to 75-80 ft-lb (102-108 N•m).

14. Remove the rag from the slider cylinder.

15. Turn on power and jog the motor to bring the other drive to the bottom of its stroke. Repeat procedure to connect the other lower.

16. On pumps with the sensor circuit:

    a. Remove the plug from the TDC sensor port at the back of the circuit board cavity. Clean any excess sealant from the area.

    b. Apply pipe sealant and screw the TDC sensor (25b) into the port. Torque to 66-78 in-lb (7.4-8.8 N•m).

    c. Install the strain relief (35) and the transducer conduit into the gear housing.

    d. Connect the transducer (25a) to J1 on the circuit board (25c). See FIG. 9.

    e. Connect the IS circuit field wire to J2 and J3. See the Electrical Schematic in the E-Flo Plus Repair-Parts Manual 311594.

    f. Connect the TDC sensor (25b) to J2 on the circuit board (25c). See FIG. 9.

    g. Install the circuit board (25c), circuit board cover (34), and new gasket (33*).

17. Reinstall the covers (32 and 21) and screws (12*).

18. Add 2 quarts of gear oil, Part No. 288414.

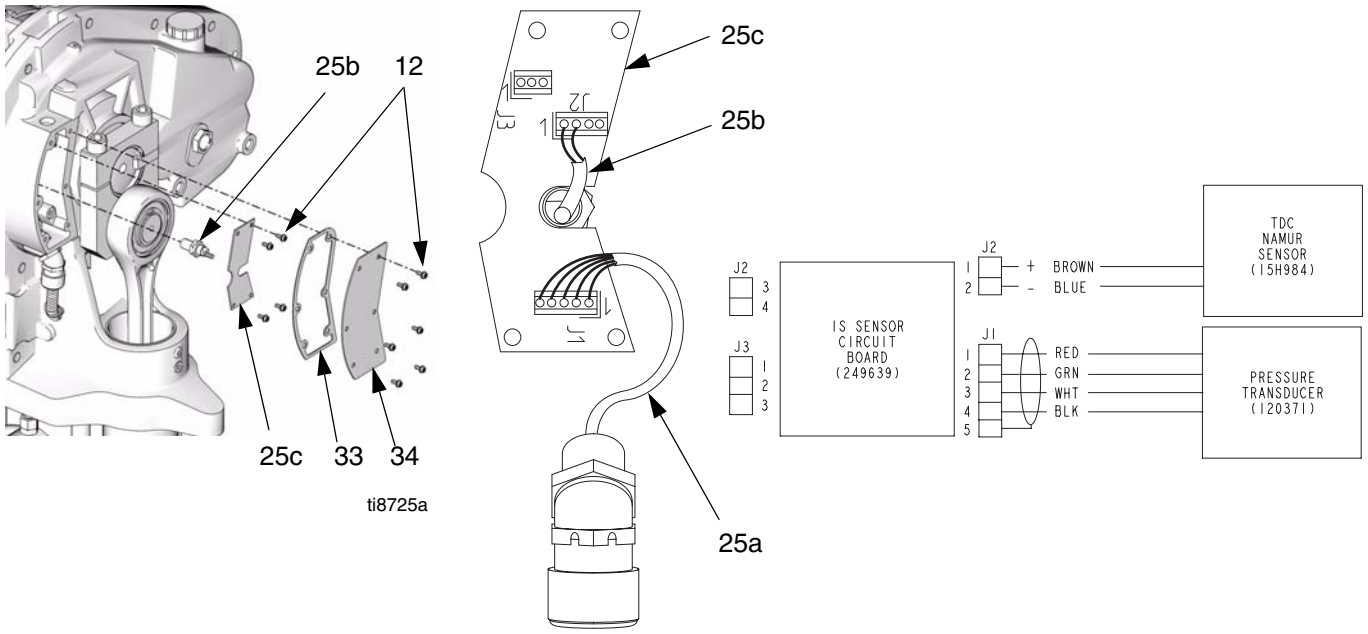


FIG. 9. Circuit Board

Graco Standard Warranty

Graco warrants all equipment referenced in this document which is manufactured by Graco and bearing its name to be free from defects in material and workmanship on the date of sale to the original purchaser for use. With the exception of any special, extended, or limited warranty published by Graco, Graco will, for a period of twelve months from the date of sale, repair or replace any part of the equipment determined by Graco to be defective. This warranty applies only when the equipment is installed, operated and maintained in accordance with Graco's written recommendations.

This warranty does not cover, and Graco shall not be liable for general wear and tear, or any malfunction, damage or wear caused by faulty installation, misapplication, abrasion, corrosion, inadequate or improper maintenance, negligence, accident, tampering, or substitution of non-Graco component parts. Nor shall Graco be liable for malfunction, damage or wear caused by the incompatibility of Graco equipment with structures, accessories, equipment or materials not supplied by Graco, or the improper design, manufacture, installation, operation or maintenance of structures, accessories, equipment or materials not supplied by Graco.

This warranty is conditioned upon the prepaid return of the equipment claimed to be defective to an authorized Graco distributor for verification of the claimed defect. If the claimed defect is verified, Graco will repair or replace free of charge any defective parts. The equipment will be returned to the original purchaser transportation prepaid. If inspection of the equipment does not disclose any defect in material or workmanship, repairs will be made at a reasonable charge, which charges may include the costs of parts, labor, and transportation.

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