INSTRUCTIONS–PARTS LIST

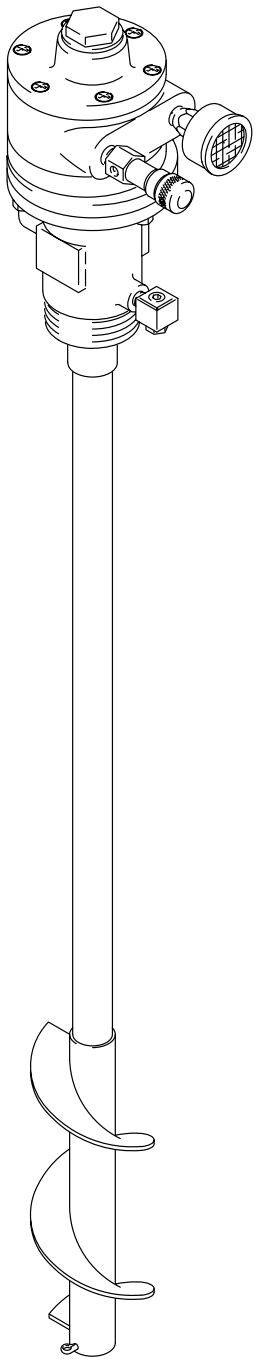
308–246
Rev. B
Supersedes Rev A

This manual contains IMPORTANT WARNINGS AND INSTRUCTIONS
READ AND RETAIN FOR REFERENCE

AIR DRIVEN

Twistork™ HELIX MIXER

100 psi (7 bar) MAXIMUM WORKING AIR PRESSURE



0910A

Model 235–653, Series A

Stainless Steel Agitator, with suction feature
For use in bung-mounted 55 gallon drum

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Patented in the United States and Europe

GRACO INC. P.O. BOX 1441 MINNEAPOLIS, MN 55440–1441

SAFETY WARNINGS

FOR PROFESSIONAL USE ONLY. OBSERVE ALL WARNINGS

Read and understand all instruction manuals before operating equipment.

EQUIPMENT MISUSE HAZARD

General Safety

Any misuse of the equipment or accessories, such as overpressurizing, modifying parts, using incompatible chemicals and fluids, or using worn or damaged parts, can cause them to rupture and result in serious bodily injury, including splashing in the eyes or on the skin, fire, explosion or property damage.

NEVER alter or modify any part of this equipment; doing so could cause it to malfunction and make it dangerous to operate.

CHECK all spray equipment regularly and repair or replace worn or damaged parts immediately.

System Pressure

The *MAXIMUM WORKING PRESSURE* of the agitator is 100 psi (7 bar). Over-pressurizing the agitator or accessories could cause a part to rupture. To reduce the risk of serious bodily injury, including splashing in the eyes or on the skin, and property damage, NEVER exceed the maximum air and fluid working pressure of any component or accessory used in the system.

Fluid Compatibility

BE SURE all fluids and solvents used are chemically compatible with the “Wetted Parts” shown in the **TECHNICAL DATA** on the back page. Always read the fluid and solvent manufacturer’s literature before using the fluid or solvent with this agitator.

FIRE OR EXPLOSION HAZARD

All electrically conductive objects or devices in the spray area MUST be properly grounded.

When operating the system, any ungrounded objects in the spray area can become electrically charged. Arcing may occur if these objects then come in contact or close to ground. Arcing of sufficient energy levels can ignite the fluid being sprayed, fumes from solvents, dust particles, and other flammable substances. This can cause a fire, explosion, or electrostatic shock and result in serious bodily injury and property damage.

To ground the agitator, remove the grounding screw (A) and lockwasher (B). See Fig 1. Secure the ground wire terminal (C) to the agitator with the screw and lockwasher. Connect the other end of the ground wire to a true earth ground. See page **ACCESSORIES** to order a ground wire and clamp.

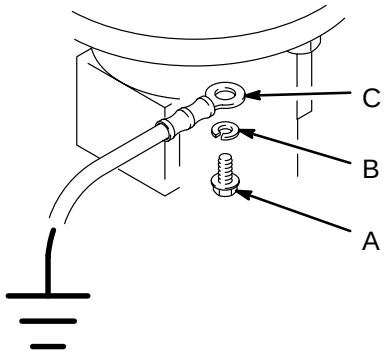

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Fig 1

MOVING PARTS HAZARD

The rotating helix of the agitator can pinch or amputate your fingers or other body parts and can cause splashing in the eyes or on the skin. To reduce this risk, always shut off the agitator and disconnect the air line before checking or repairing any part of the agitator.

IMPORTANT

United States Government safety standards have been adopted under the Occupational Safety and Health Act. These standards – particularly the General Standards, Part 1910, and the Construction Standards, Part 1926 – should be consulted.

Air Requirements

For continuous use, the 1/2 HP agitator air motor typically requires 2 scfm (0.06 m^3/min.) of air at 400 rpm and with 100 psi (7 bar) inlet pressure.

Air Line Accessories

Install an air line filter to remove harmful dirt and moisture from the air supply. See **ACCESSORIES**.

Downstream from the filter, install an air line lubricator for automatic air motor lubrication. Set the lubricator feed rate at 1 to 3 drops per hour.

Installing the Agitator

1. If using the agitator suction feature, remove the fluid tube plug (7) at the bottom of the agitator, before installing it into the drum. See **PARTS DRAWING**.

NOTE: If there is a thick sediment in the bottom of the fluid container that could clog the agitator's fluid tube, thoroughly mix the fluid with the plug (7) still in place in the agitator before removing it to use the suction feature.

2. Install the agitator on the container cover by screwing the helix through the drum bung hole and screwing the agitator housing into the bung hole. Refer to the **DIMENSION DRAWING**.

3. Position the air motor so the air line can easily be attached to the needle valve's 1/8 npt inlet (B), without obstructing any other system components. See Fig 2.

4. Attach the air line between the needle valve's 1/8 npt air inlet and the 1/8 npt air supply manifold outlet.

5. If using the agitator suction feature, connect a fluid line to the 3/4–14 npt(f) agitator fluid outlet (A).

KEY

A Fluid Outlet
B 1/8 npt Air Inlet
1a Muffler
11 Needle Valve
12 Check Valve

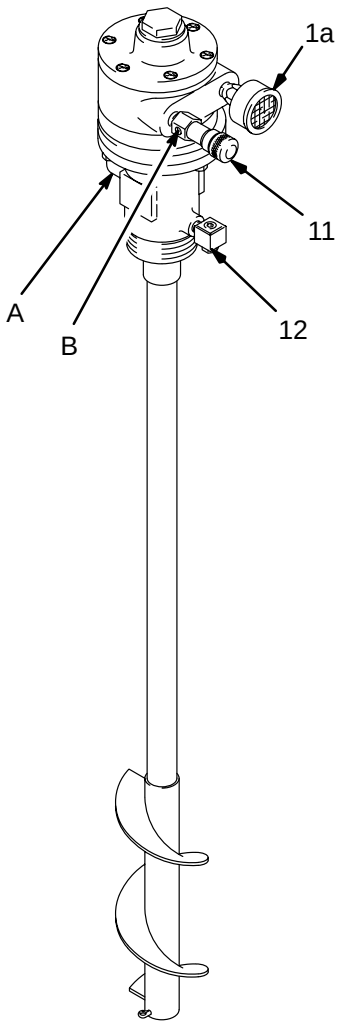

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Fig 2

WARNING

To reduce the risk of serious bodily injury, including cuts, amputation of fingers, and splashing in the eyes or on the skin, always shut off the agitator and disconnect the air line before checking or repairing the agitator.

Operating the Agitator

NOTE: If there is a thick sediment in the bottom of the fluid container that could clog the agitator's fluid tube, thoroughly mix the fluid with the plug (7) still in place in the agitator before removing it to use the suction feature. Refer to the **PARTS DRAWING**.

1. Fill the fluid supply container.
2. Start the agitator.
3. Use the agitator needle valve to regulate the agitator speed. The needle valve has numbered graduations to refer to when setting the agitator speed.

NOTE: If an air shut-off valve is installed in the supply line and used to stop the agitator, the same agitator speed will be set each time the agitator is used without repeating the above procedure. See **ACCESSORIES**.

CAUTION

DO NOT operate the agitator at a high speed for a long period of time. Excessive agitator speed can cause foaming of fluid (making the fluid unusable), vibration, and increased wear on parts. Always agitate the fluid only enough to maintain even mixing.

4. Operate the agitator continuously while supplying paints or other fluids to the system.
5. To stop the agitator, close the air valve in the air supply line if you have one, or close the agitator needle valve.

NOTE: The agitator rotation may be reversed by switching the muffler (1a) and needle valve (11). Refer to Fig 2.

Checking Fluid Viscosity

Install a fitting and siphon tube (not provided) into the agitator's 3/4 npt(f) fluid outlet (A). Refer to Fig 2. With the siphon tube routed to a separate container, pump the fluid out through the agitator outlet port to check viscosity.

Maintaining the Agitator Air Motor

If an air line lubricator is not installed, the air motor must be manually lubricated every 8 hours. Lubricate the agitator air motor by placing 2 or 3 drops of SAE No. 10 light oil in the motor's air inlet. Run the agitator for about 30 seconds.

The air check valve (12) allows make-up air to enter the closed drum as fluid is drawn out through the agitator outlet port. Refer to Fig 2. The air check valve should be inspected and cleaned periodically.

If the air motor operation is erratic or sluggish, flush the motor as follows:

1. Remove the needle valve and fill the air inlet cavity with kerosene. Screw the needle valve back in. See Fig 2.
2. Soak for about 10 minutes, then run the agitator slowly until all the kerosene is blown out. Repeat the process if the motor still doesn't run smoothly.

WARNING

To reduce risk of serious bodily injury, including splashing kerosene in the eyes or on skin, keep face and body away from exhaust while flushing.

NOTE: An Air Motor Repair Kit is available. Order part number 224–954.

Aligning the Outlet Housing after Repairing or Replacing the Outlet Housing or Air Motor

CAUTION

Improper installation of the outlet housing could cause the agitator shaft to bind against the outlet housing bearing and damage it.

1. Place the agitator in a vertical position and loosen the three outlet housing screws (17). See the **PARTS DRAWING**.
2. Apply 25 psi (1.7 bar) minimum air pressure to the air motor. Adjust the needle valve so the agitator is barely turning.
3. While the agitator shaft is turning, torque the three outlet housing screws to 80 to 100 in-lbs (9 to 11.3 N•m).
4. If the agitator shaft still binds, repeat steps 1 to 3 above.

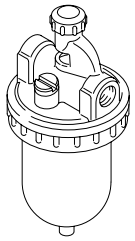
ACCESSORIES

Must be purchased separately.

AIR LINE LUBRICATOR

250 psi (17.5 bar) MAXIMUM WORKING PRESSURE

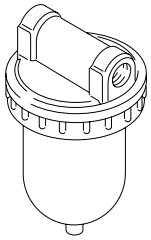
214–847 3/8 npt(f); 5 oz. capacity
214–848 1/2 npt(f); 8 oz. capacity; 80 cfm flow rate



AIR FILTER

250 psi (17.5 bar) MAXIMUM WORKING PRESSURE

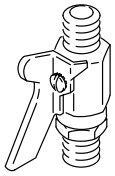
106–148 Includes 40 micron element, 5 oz bowl; 3/8 npt(f)
106–149 Includes 40 micron element, 8 oz. bowl; 1/2 npt(f)



AIR SHUT–OFF VALVE

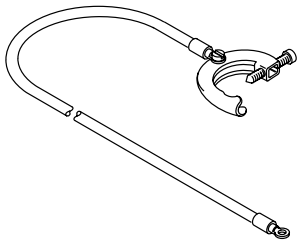
500 psi (35 bar) MAXIMUM WORKING PRESSURE
Nickel-plated steel with PTFE packings

208–390 1/4 npt(m) x 1/4 npt(m)
208–391 3/8 npt(m) x 3/8 npt(f)
208–392 3/8 npt(f) x 1/4 npt(m)
208–393 3/8 npt(m) x 3/8 npt(m)



GROUNDING CLAMP AND WIRE 222–011

12 ga, 25 ft (7.6 m) wire

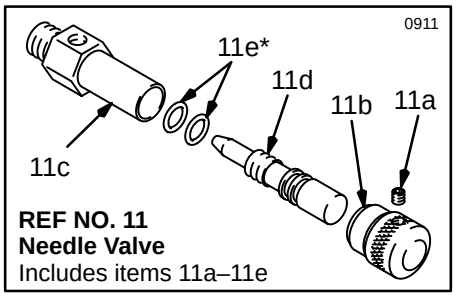


QUICK DISCONNECT FLUID FITTING 235–221

2500 psi (172 bar) MAXIMUM WORKING PRESSURE
Pin type, push locking; 316 stainless steel; 3/4 npt
Includes the following parts:

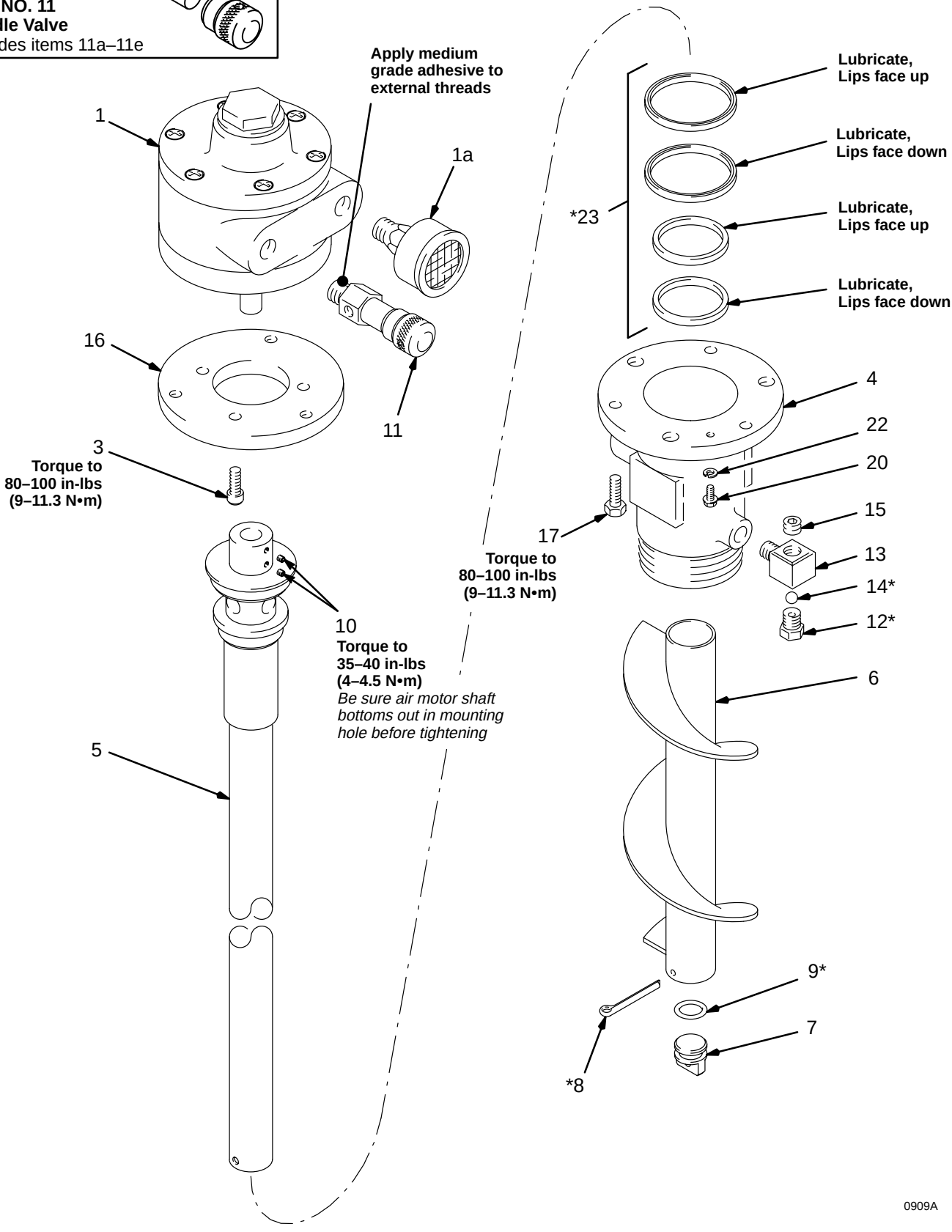
111–740 Quick Disconnect Fluid Coupler
111–739 Quick Disconnect Fluid Fitting
111–749 Quick Disconnect Fluid Adapter

PARTS DRAWING



REF NO. 11
Needle Valve
Includes items 11a–11e

NOTE: Install the seals (23) on the agitator shaft (5) before installing the shaft into the housing (4).



PARTS LIST

Model 235–653 Twistork™ Helix Mixer

Stainless Steel, with suction feature

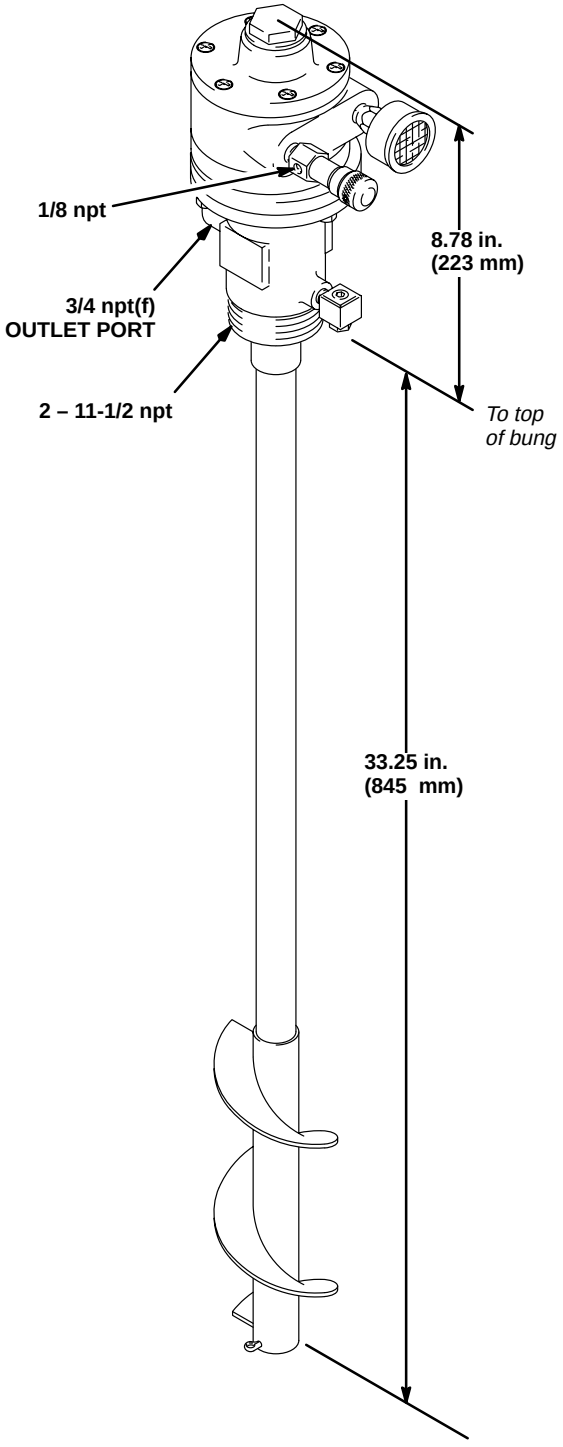
Includes items 1 to 23

REF NO.	PART NO.	DESCRIPTION	QTY
1**	111–310	MOTOR, air; Includes item 1a	1
1a	101–709	• MUFFLER, exhaust	1
3	101–682	SCREW, cap, sch; 1/4–20 x 0.625	3
4	224–875	HOUSING, outlet, stainless steel	1
5	224–395	SHAFT, agitator	1
6	224–393	HELIX, agitator	1
7	187–054	PLUG, fluid tube	1
8*	101–946	PIN, cotter	1
9*	111–312	O-RING, Viton®	1
10	102–207	SCREW, set, socket; 1/4–20 UNC 3A	2
11	202–233	NEEDLE VALVE ASSEMBLY Includes items 18a to 18e	1
11a	101–326	• SCREW, set, sch; #10	1
11b	156–930	• BARREL, needle	1
11c	159–448	• HOUSING, valve	1
11d	159–449	• NEEDLE, valve	1
11e*	159–589	• O-RING, buna-N	2
12*	187–053	SEAT, check valve	1
13	187–050	HOUSING, check valve	1
14*	105–691	BEARING, ball	1
15	110–208	PLUG, hdless pipe; 1/8–27 nptf	1
16	187–577	PLATE, motor mounting	1
17	102–023	SCREW, cap, hex hd; 1/4–20 x 0.75	3
20	111–593	SCREW, grounding; hex, No. 8–32	1
22	157–021	WASHER, lock	1
23*	235–994	SEAL KIT; graphite-filled PTFE	1

* *Recommended "tool box" spare part. Keep on hand to reduce down time.*

** *An Air Motor Repair Kit is available. Order part no. 224–954.*

DIMENSIONAL DRAWING



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MANUAL CHANGE SUMMARY

The manual was changed from Rev A to Rev B to make the following changes:

Assembly Changed	Status	Ref No.	Part No.	Name
235–653	DELETED	18	111–923	Seal
	DELETED	19	111–922	Seal
	ADDED	23	235–994	Seal Kit

THE GRACO WARRANTY AND DISCLAIMERS

WARRANTY

Graco warrants all equipment manufactured by it and bearing its name to be free from defects in material and workmanship on the date of sale by an authorized Graco distributor to the original purchaser for use. As purchaser's sole remedy for breach of this warranty, Graco will, for a period of twelve months from the date of sale, repair or replace any part of the equipment proven 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, 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 with Graco equipment of 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 claim. 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.

DISCLAIMERS AND LIMITATIONS

The terms of this warranty constitute purchaser's sole and exclusive remedy and are in lieu of any other warranties (express or implied), **including warranty of merchantability or warranty of fitness for a particular purpose**, and of any non–contractual liabilities, including product liabilities, based on negligence or strict liability. Every form of liability for direct, special or consequential damages or loss is expressly excluded and denied. In no case shall Graco's liability exceed the amount of the purchase price. Any action for breach of warranty must be brought within two (2) years of the date of sale.

EQUIPMENT NOT COVERED BY GRACO WARRANTY

Graco makes no warranty, and disclaims all implied **warranties of merchantability and fitness for a particular purpose**, with respect to accessories, equipment, materials, or components sold but not manufactured by Graco. These items sold, but not manufactured by Graco (such as electric motor, switches, hose, etc.) are subject to the warranty, if any, of their manufacturer. Graco will provide purchaser with reasonable assistance in making any claim for breach of these warranties.

TECHNICAL DATA

Maximum Working Pressure . . . . . 100 psi (7 bar)
Maximum Recommended Agitator Speed: 800 rpm
Air Consumption
At 800 rpm with 100 psi (7 bar) air inlet pressure:
5 scfm (0.14 m^3/min.)
At 400 rpm with 100 psi (7 bar) air inlet pressure:
2 scfm (0.06 m^3/min.)

Noise Level at 800 rpm . . . . . 68 dBA
Wetted Parts . . . . . 304 & 316 Stainless Steel, Ryton® filled PTFE, Viton®

Viton® is a registered trademarks of the DuPont Co.

GRACO PHONE NUMBERS

TO PLACE AN ORDER, contact your Graco distributor, or call Graco: **1–800–328–0211 Toll Free**

FOR TECHNICAL ASSISTANCE**,** service repair information or answers about the application of Graco equipment, call: **1–800–543–0339 Toll Free**

Sales Offices: Atlanta, Chicago, Dallas, Detroit, Los Angeles, Mt. Arlington (N.J.)
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