

Dispensit 1093

313566B
ENG



Important Safety Instructions

Read all warnings and instructions in this manual.
Save these instructions.



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GENERAL INFORMATION

The Model 1093 Metering Rod Positive Displacement Dispense Valve is designed for applications that require precise dispensing of beads and/or dots of material at a wide range of material inlet pressures. The 1093 is powered by a servo or stepper motor for programmable precision operation.

The 1093 series operates with material supply pressures up to 1,200 psi (82.7 bar) or 400 psi (27.6 bar) for plastic spool models. Material viscosity dispensing capabilities range from very thin material to high viscosity pastes with viscosities in excess of 1,000,000 cps (1000 Pas).

The Model 1093 ships complete with the following:

- Model 1093 Dispense Valve
- Shift spool position cycle detection sensors
- Home position sensor
- Two 3 foot (0.9m) sections of Pneumatic Air Line
- Seal kit
- Operating & Maintenance Manual

SAFETY INFORMATION

This product should be used only by employees who have been given appropriate training and safety warnings as set forth in this manual. Read completely before operating.

Toxicity and flammability hazards depend upon the product being dispensed by this unit, and the user should take appropriate safety precautions as indicated on the MSDS of the product.

WARNING Do not exceed 1200 psi (82.7 bar) material inlet pressure for valves with steel spools. Do not exceed 400 psi (27.6 bar) for valves with plastic spools. Higher pressures may cause damage to equipment and/or personal injury.

WARNING Pinch Hazard. Keep fingers away from the metering rod area and the metering rod connection block when operating the 1093 valve.

Always wear safety glasses.

ILLUSTRATION REFERENCES

Throughout this manual you will find references by illustration item number to the illustrations in the manual. The references are indicated by parentheses around a number such as: (7). Illustrations represent typical valve configurations. The drawings for your exact model are inserted at the back of the manual and include the part numbers for ordering replacement parts.

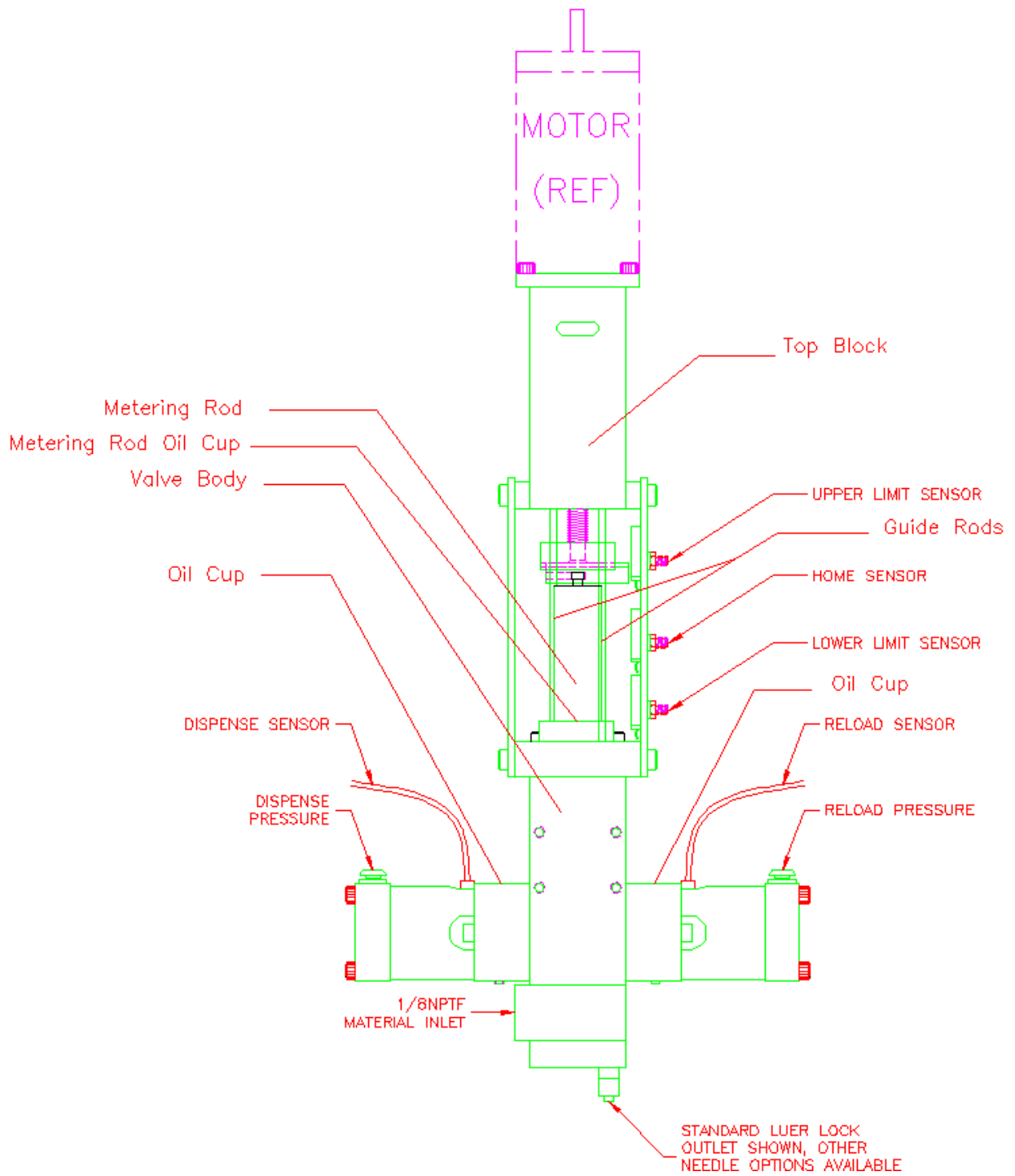
GENERAL ACCESSORIES

Graco Ohio Inc. offers a full line of standard and custom accessories for your dispensing needs including:

- Valve Controllers
- Syringe Feed Systems
- Cartridge Retainers and Pressure Reservoirs
- Titan 200 High Pressure Cartridge Feed Systems
- Transfer Pump Feed Systems for 1, 5 and 55 gallon containers
- Single and Multi-Needle Blocks customized for your application
- Mounting Bases and Brackets

Consult your Dispensit dealer or the factory for details.

MODEL 1093 MAIN COMPONENT ILLUSTRATION



SETUP PROCEDURE

MOUNTING

The 1093 can be used on a workstation or X-Y-Z Dispense Motion System. Mount the valve by using either set of mounting holes drilled into the valve.

AIR CONTROLLER

The Model 1093 requires a programmable servo or stepper motor controller. Both are offered by Graco Ohio Inc., or they can be supplied by the customer. Inside diameter of standard motor coupler is .25".

AIR LINES

Install pneumatic supply lines for spool shifting between fill and dispense cycles.

- Minimum air pressure required is 70 psi (4.8 bar).
- Maximum air pressure is 100 psi (6.9 bar).
- Pneumatic supply lines of .16 inch ID X .25 inch OD.

SPOOL POSITION SENSORS

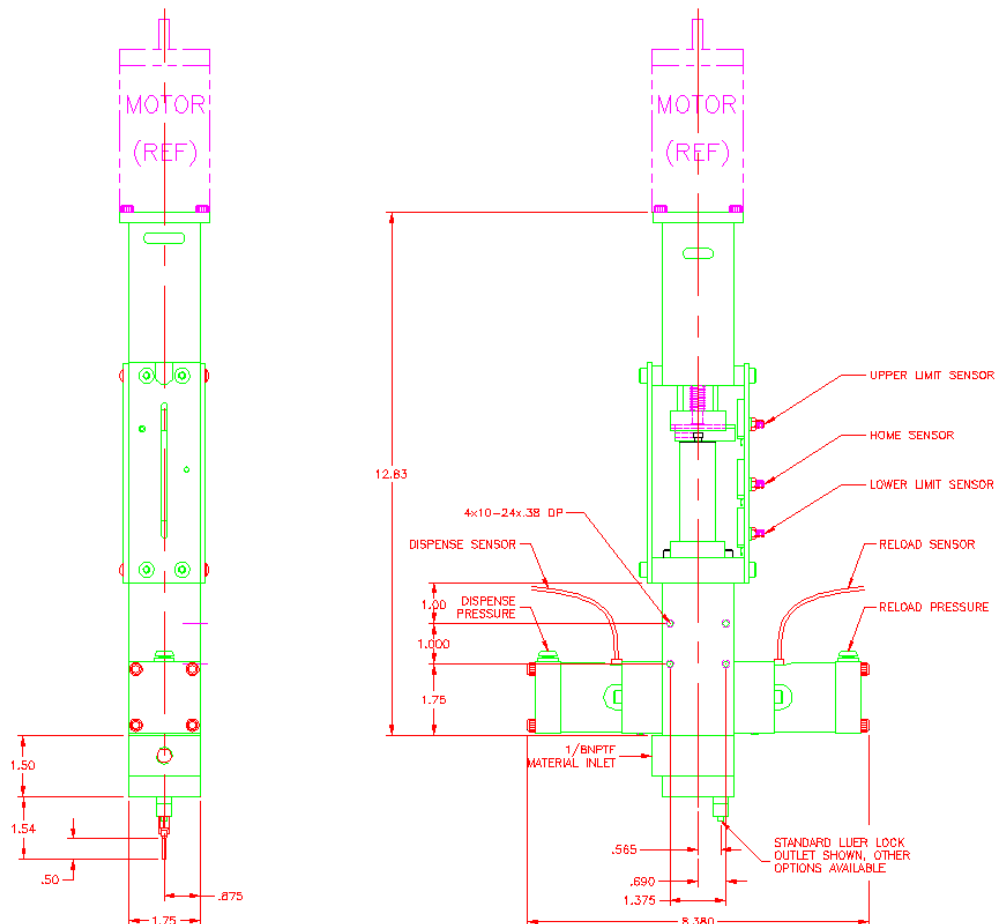
The spool sensors are magnetic reed switches and must be connected to an electrical control. An LED on the switch illuminates to indicate the shifting of the spool.

HOME POSITION SENSOR

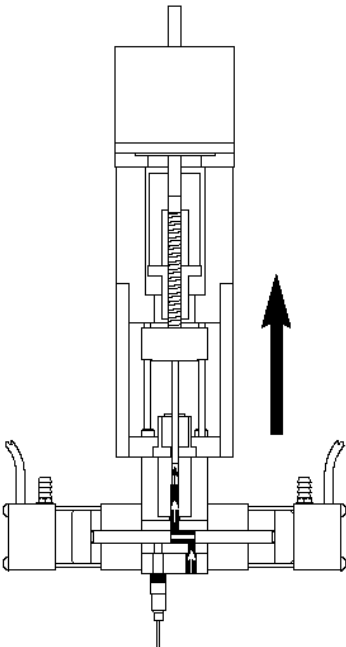
The home sensor indicates the position of the Metering Rod Connection Block (the typical "home" position).

COUPLING AND LEAD SCREW

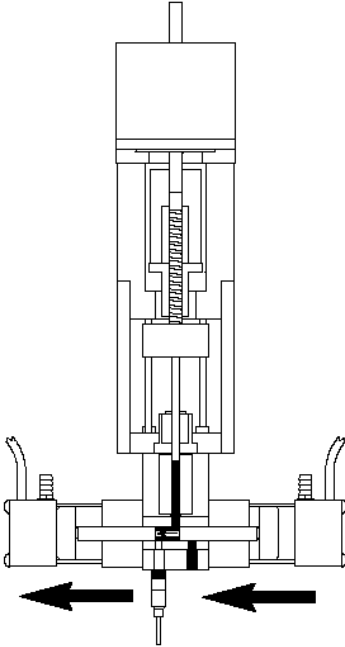
The coupling and lead screw must rotate counter-clockwise to dispense and clock-wise to fill. Verify proper rotation of the servo or stepper motor.



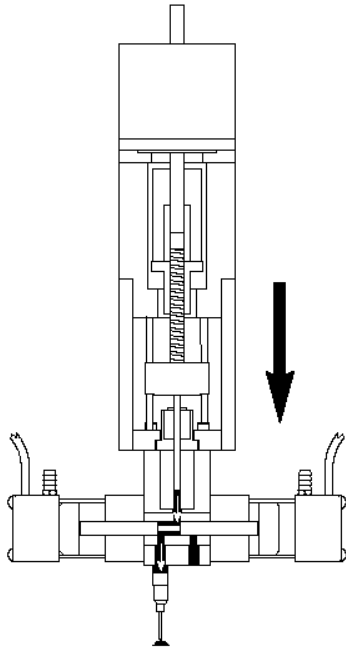
SEQUENCE OF OPERATION



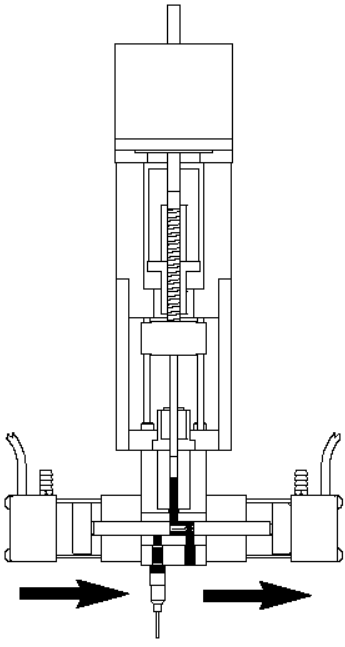
1. Fill Cycle



2. Dispense Shuttle



3. Dispense Cycle



4. Refill Shuttle

OPERATING PROCEDURES

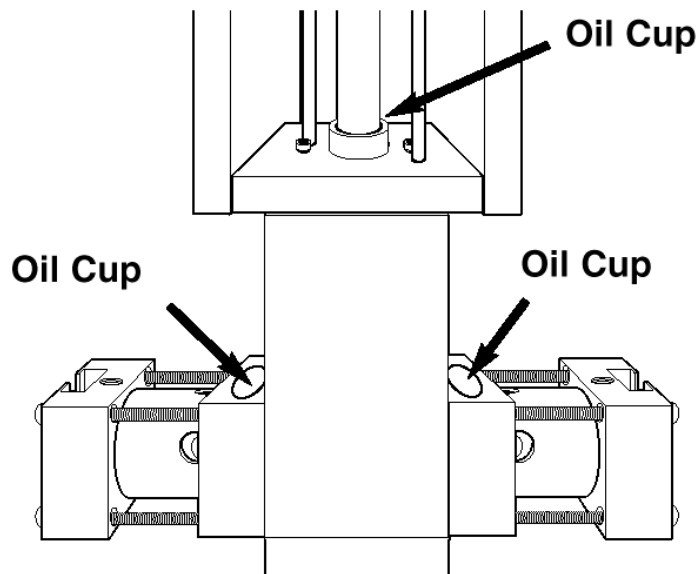
A Dry Run demonstrates the valve's controls and dispensing steps. It also verifies that the valve is working correctly before you load materials.

DRY RUN

1. Cycle the valve to verify sequence of operation. Refer to Sequence of Operation.
2. To verify spool shifting check the illumination of the LED's on the spool reed sensors.
3. The system is installed correctly if valve performs properly.

LOADING & PRIMING

1. Fill the oil cups with a compatible lubricant (suitable for use with material).



2. If not removed, remove the material line from the inlet port of the valve.
3. Prime the material line.
4. Extend the valve to the Dispense Cycle (refer to Sequence of Operation).
5. Install the material line to the inlet port of the valve.
6. Increase the material inlet pressure for loading.

Recommended Material Supply Pressure
Minimum - 20 psi (1.4 bar)
For Plastic Spools Maximum - 400 psi (27.6 bar)
For Steel Spools Maximum - 1200 psi (82.7 bar)
The above settings depend on the cycle rate and viscosity of the material.

7. Perform the loading sequence of the valve until air free material is visible.

OPERATING PROCEDURES

Output verification is a simple procedure where individual samples of material are collected, weighed, and compared for desired output. We recommend that you perform output verification at least once a day, and if the machine is used in production for more than one shift, then once a shift.

OUTPUT VERIFICATION

1. Position a clean container under the valve outlet.
2. Set the stroke of the metering rod to desired shot size.
3. Weigh three small empty cups and label.
4. Take a purge shot into a waste container.
5. Dispense ten shots into the first labeled cup.
6. Proceed in the same manner with the other labeled cups.
7. Reweigh all three cups and record results (results will be ten times desired shot size).

If shot weights are inconsistent an adjustment of the material pressure and/or the frequency of the pulses to the motor may be necessary.

DAILY OPERATION & MAINTENANCE

Before operating, perform all Daily maintenance listed below. Also, complete all loading, priming, and output verification procedures.

If there are any problems in getting started, refer to the Troubleshooting section or call Technical Service at (330) 494-1313.

MATERIAL RESERVOIR

Check material levels and refill as necessary.

OIL CUPS

Fill with lubrication suitable for use with material.

EXTERIOR

Check and clean the exterior of the valve.

PERIODIC MAINTENANCE

Before proceeding, remove material feed line and pump material out of the valve. Shut power off from control panel and disconnect main power. Disconnect the motor wire harness from the system. Loosen the home and spool sensor set screws. Note the position of the sensors and slide them out of the valve. Disconnect the air lines.

DISASSEMBLY

Refer to the illustration on page 10 and the assembly drawings in the back of this manual for your exact model.

DISASSEMBLY OF 1093 VALVE SECTION

1. Remove motor from Mounting Plate (32).
2. Remove mounting screws to remove valve from its support.
3. On the right side of the valve, remove Valve End Cap (9). The Valve Piston (12) will be inside the end cap.

Note: If necessary, remove Valve Piston Spool (12) from valve End Cap (9) by applying low air pressure through valve air inlet to push out the Valve Piston Spool (12).

4. Remove Seal Plate (23).
5. Repeat steps 3 and 4 with the left side of the valve.
6. Push the Spool/Sleeve (16) out with a finger. If it does not slide out, tap it gently using a wood or plastic dowel. *A worn spool and sleeve assembly must be replaced with a new (matched) assembly. If you are rebuilding multiple valves be sure to keep the spools and sleeves matched.*
7. Remove Needle Block (31) from Inlet Block (35).
8. Remove Inlet Block (35) from Valve Body (7).
9. Remove O-Rings (19) from Valve Body (7).
10. Remove Spool Wet Seal Retainers (14) on the left and right of the Main Body (7).
11. Remove Valve Body (7) from Bottom Block (24) by removing Screws (26).
12. Remove Rod Sleeve (6) from Valve Body (7).
13. Remove Metering Block (24) by remove screws (36) shoulder bolt.
14. Remove Seal Cup (3) from metering block (24). Remove Posipak Rod Seal (4) from Seal Cup (3).
15. Slide Guide Rods out of Connection Block (37).
16. Remove Metering Rod (2) from Connection Block (37).

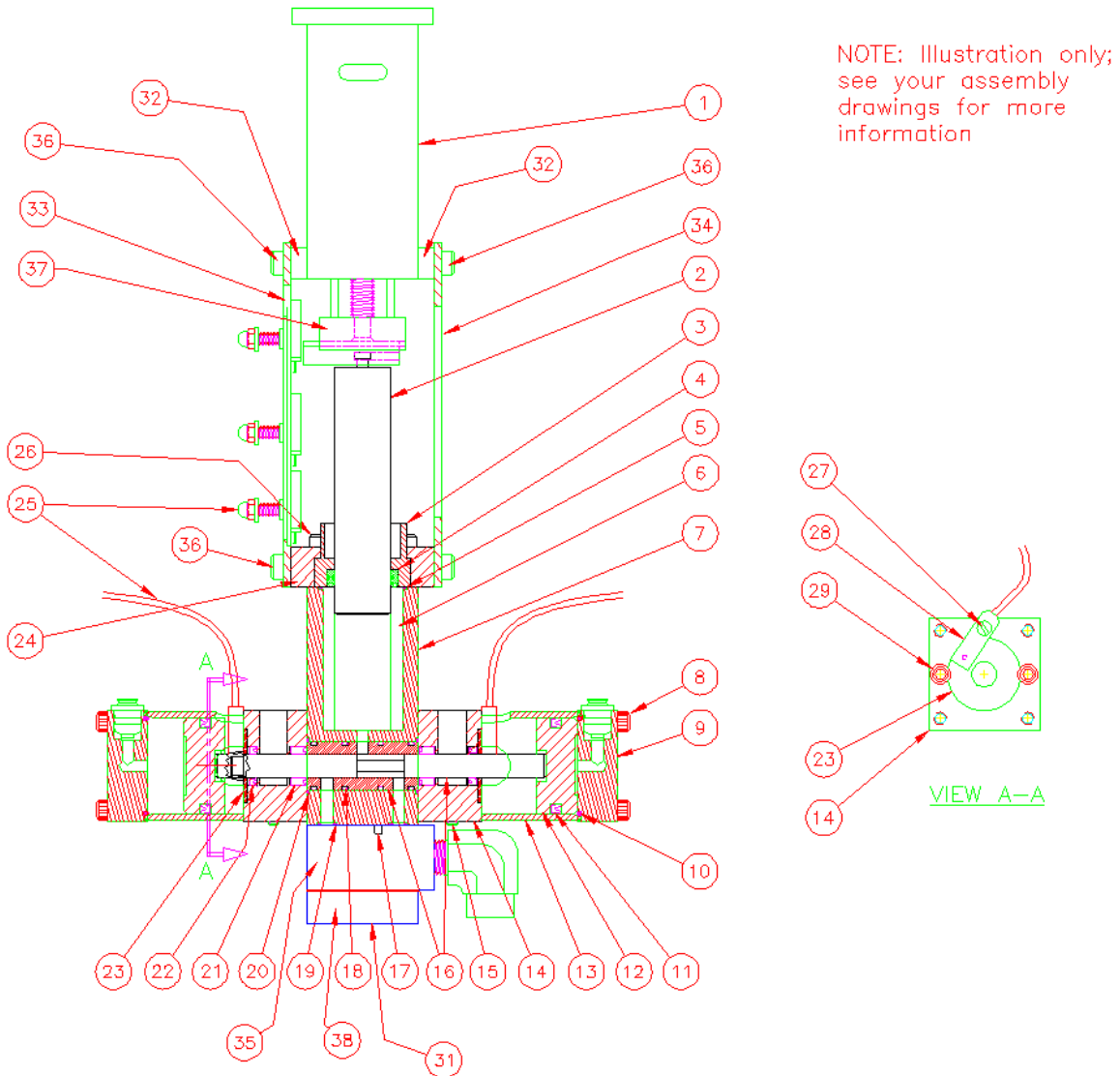
Only perform the steps below if the Motor Coupling Section needs rebuilt.

DISASSEMBLY OF MOTOR COUPLING SECTION

Refer to the illustration on page 14 and the drawings in the back of this manual for your exact model.

17. Remove Screws (7) to disconnect Connection Block (6) from Lead Screw Connector Block.
18. Remove Lead Screw Connecting Block from lead screw by removing the FHSC screw (9).
19. Remove Mounting Plate (21) from drive assembly by removing SHC Screws (22).
20. Remove Retaining Sleeve (20) from drive assembly by removing screws (12).
21. Remove Lead Screw (16) and Lead Screw Nut (15) with the ball bearing assembly (14) attached.

MODEL 1093 GENERAL ILLUSTRATION



1	DRIVE ASSEMBLY	14	SPOOL WET SEAL RETAINER	25	HARNES ASSEMBLY
2	METERING ROD	15	1/8NPT PLUG	26	SCREW 10-24 X 1.00
3	SEAL CUP	16	SPOOL ASSEMBLY (ROD AND SLEEVE)	27	SCREW 4-40 X 0.31
4	ROD SEAL	17	1/8 X.38 ROLL PIN	28	PROXIMITY SWITCH
5	O-RING, VIT	18	O-RING, VIT	29	SCREW 10-32 X 1.25
6	ROD SLEEVE	19	O-RING, VIT	30	SEAL KIT
7	MAIN BODY	20	O-RING, VIT	31	NEEDLE BLOCK
8	SCREW 10-32 X 2.50	21	POSIPAK, 3/8ID X 5/8OD,B,P/VIT	32	MOUNTING PLATE
9	END CAP SPOOL AIR CYL.	22	POSIPAK, 3/8ID X5/8OD ,STD,P/V	33	LEFT TIE PLATE (3 SLOT)
10	O-RING	23	SEAL RETAINER	34	RIGHT TIE PLATE
11	U-CUP 1-3/16ID X 1-1/2OD	24	METERING BLOCK	35	INLET BLOCK ASSEMBLY
12	PISTON SPOOL	24	CUP OIL RETAINER SMALL	36	SHOULDER BOLT
13	SPOOL TUBE AIR CYL,	24	CUP OIL RETAINER LARGE	37	METERING ROD CONNECTOR BLOCK
				38	GASKET

PERIODIC MAINTENANCE

Before proceeding, remove any old o-rings or seals from the valve and discard, clean the valve parts with an appropriate solvent and replace o-rings and seals with new parts from seal kit. Use Krytox 203GPL (part number 84/0200-K3/11) for lubricating valve parts including seals and o-rings.

ASSEMBLY

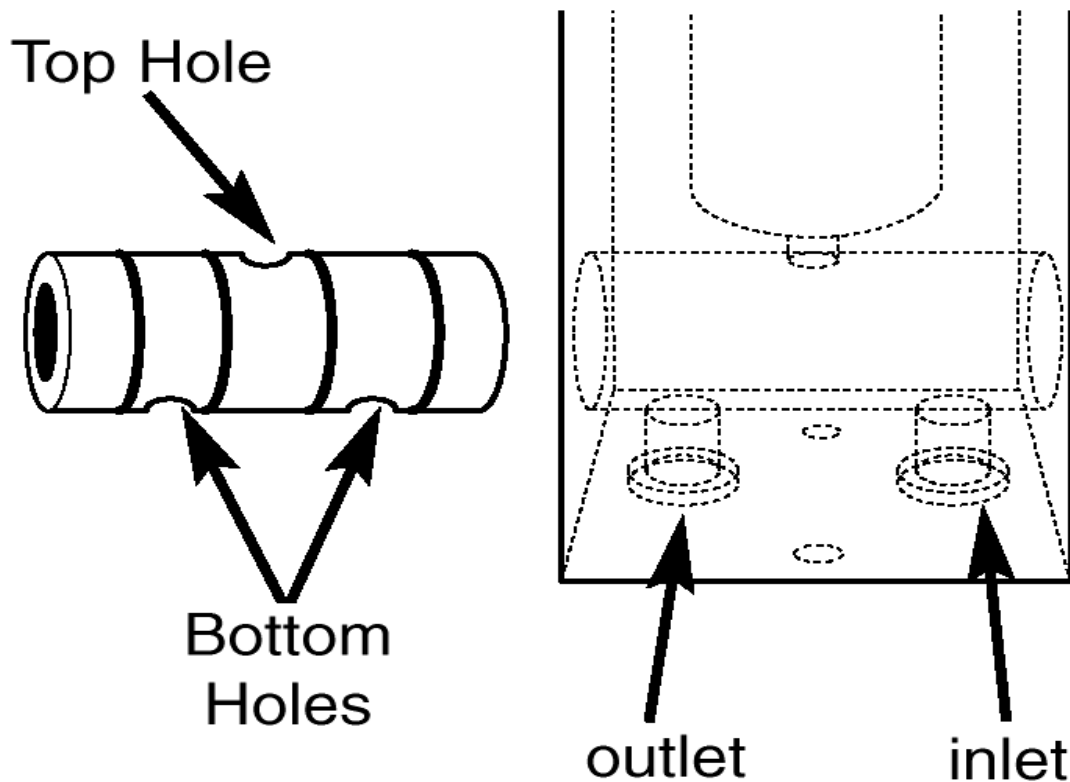
Refer to the illustration on pages 10, 14 and the assembly drawings in the back of this manual for your exact model.

ASSEMBLY OF 1093 VALVE SECTION

Note: Check the Metering Rod (2), Rod Sleeve (6), and Spool/Sleeve Assembly (16) and main body (7) for wear and if they are worn secure replacements before proceeding.

Note: Use caution as you install new U-cup and Posipak seals so that they are not pinched or torn. Do this by making sure they are lubricated, and by tucking the lips of the seal inward before uniformly pushing them into position.

1. Install four lubricated O-rings (18) onto the Spool/Sleeve Assembly (16). Lubricate the Spool Rod and the outside of the Spool Rod Sleeve along with the inside of the main body (7).
2. Insert the Spool/Sleeve Assembly (16) carefully into the Valve Body (7) rocking it to ease it into place. Be sure to align the Bottom holes of the Sleeve piece of the Spool/Sleeve (16) with the outlet and inlet holes of the Valve Body (7).



PERIODIC MAINTENANCE

ASSEMBLY

Install the spool wet seal retainer on the main body

3. Install a lubricated O-ring (20) on the left side of the Valve Body (3) next to the sleeve part of the Main Body (7) next to the sleeve parts of the Spool/Sleeve assembly (16).
4. Install two lubricated Posipak Seals (21) wet seal retainer (14) so that the O-ring side of both Posipaks will be facing the Valve Body (7). Be sure to tuck the lip of the Posipak into its cavity to avoid tearing it.
5. Position the wet seal retainer with the oil cup upwards and slide it over the Spool part of the Spool/Sleeve Assembly (16) with the counterbore for the Seal Retainer (14) facing out. Slide the Seal Retainer (14) over the Spool and install two Screws (29). Install the Rod Sleeve and connect the motor and motor coupling assembly.
6. Repeat steps 3, 4 and 5 for the right side Seal Plates.

Install the Rod Sleeve and Connect the Motor & Motor Coupling Assembly

7. Lubricate the dispense sleeve bore in the Valve Body (7). Insert the Rod Sleeve (6) into the Main Body (7). Insert the rod sleeve (6) into the main body (7).
8. Place lubricated O-ring (5) over the Rod Sleeve (6) and against the Main Body (7).
9. Insert the Seal Cup (3) into the Retainer Oil Cup (1).
10. Slide a lubricated Posipak Seal (4) into the Seal Cup (3) with the o-ring side facing down *toward Main Body (7)*.
11. Lubricate the Metering Rod (2) and slide it carefully through the Posipak Seal (4), Seal Cup (3) and Oil Cup Retainer (24) so that it projects about 1/2" through this assembly.
12. Using the projecting Metering Rod (2) to guide the assembly into the Rod Sleeve (6), slide the Oil Cup Retainer (24) down against the Main Body (7) and secure with Screws (26).
13. Pull the Metering Rod (2) away from the Valve Body (7) so that the end of it is only slightly in the Rod Sleeve (6).
14. Slide the key slot in the Connection Block (37) over the end of the Metering Rod (2).
15. Insert the Guide Rods (5) *from page 14* through the Connection Block (37) and into the Rod Block (24).
Note: If the Motor and Motor Coupling Assembly had been disassembled, then reassemble per the instructions below before proceeding with these next steps.
16. Position the Motor and Motor Coupling Assembly above the Main Body Assembly and bring them together so that the Guide Rods (5) enter their holes in the Drive Assembly (1) and the end of the Lead Screw (16) seats in the Connection Block (37).
17. Install the Screws (26) into the Connection Block (37).
18. Install the left Side Block *3-Slot* (33) with Screws (36). Install the clear plastic Guards (not shown) into the slots in the left Side Block (36) so that the access hole in the guard is toward the top of the valve. Install the right Side Block (34) so that the Guards seat in the slots and secure with Screws (36).

Mount the Valve End Caps to the Seal Plate Cups

19. Install a lubricated U-cup Seal (11) into the groove of the left Spool Shift Piston (13). The piston is thicker on one side of the groove. The lip of the seal must be facing the thicker section.
20. Lubricate the bore in the End Cap (9). Slide the Spool Shift Piston (12) into the left End Cap (9) tucking the lip of the U-cup seal (11) into the End Cap (9) carefully.
21. Install the Piston/End Cap onto the left Spool Wet Retainer (14) using four Screws (8). Tighten the screws in a cross pattern gradually to prevent binding due to misalignment (like you would tighten lug nuts on a car tire).
22. Push the Spool Rod (16) into the left side until it contacts the piston. Repeat steps 19 - 21 for the right side.
23. Install lubricated O-rings (19) to the Main Body (7) and attach the Inlet Block (35) with Screws.
24. Lubricate the Gasket (38) and stick it to the Inlet Block (35).
25. Install the Needle Block (31) with Screws. Remount the valve. Install the home and spool sensors being careful not to overtighten the set screws. Install the air supply lines and connect the power. Perform the Dry Run, Loading & Priming and Output Verification procedures seen on page 7 and 8.
26. Install shift spool position cycle detection sensors (28). See view A-A on page 10.

PERIODIC MAINTENANCE

Disconnect electrical power before servicing the motor and motor coupling assembly. Refer to the illustrations on the following page.

ASSEMBLY

MOTOR & MOTOR COUPLING ASSEMBLY

1. Assemble Motor Coupler by inserting Roll Pins and Screws (19). *See Figure 1 pin alignment on page 14 for more information.*

Note: This step is only required if the motor coupler has been disassembled for service or removed from the motor.

2. Assemble Lead Screw Nut (15) with Bearing (14) and E-ring (13).
3. Thread Lead Screw (16) into Lead Screw Nut assembly until lead screw is flush with top of nut.
4. Slide Lead Screw & Nut Assembly into Divorced Section (11).
5. Slide Bearing Retaining Sleeve (20) on to the lead screw assembly. Taking care to line up the slots in the two pieces (11) and (20). Secure in place with Socket Head Cap Screws (10).
6. Secure Motor Mounting Plate (1) to Divorced Section using Socket Head Cap Screws.
7. Place Motor Coupler (18) on motor shaft and lightly snug Screws (19) leaving about $\frac{1}{2}$ " of motor shaft visible between Motor Coupler and motor. Insert Motor Coupler (18) through Motor Mounting Plate (21), align 3 Roll Pins (*see figure 1 on page 14*) and insert into Lead Screw Nut (15) and gently seat the motor.

Note: This step is only required if the motor coupler has been disassembled for service or removed from the motor.

8. Remove motor and motor coupler, tighten Screws (22) and reassemble securing motor to Motor Mounting Plate using Socket Head Cap Screws (17).

MOTOR & MOTOR COUPLING ILLUSTRATION

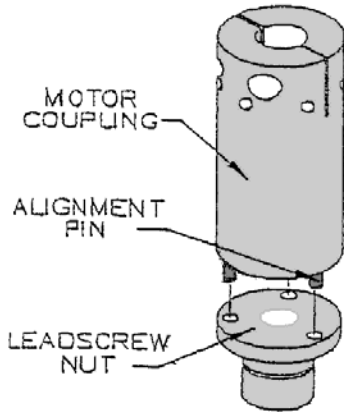
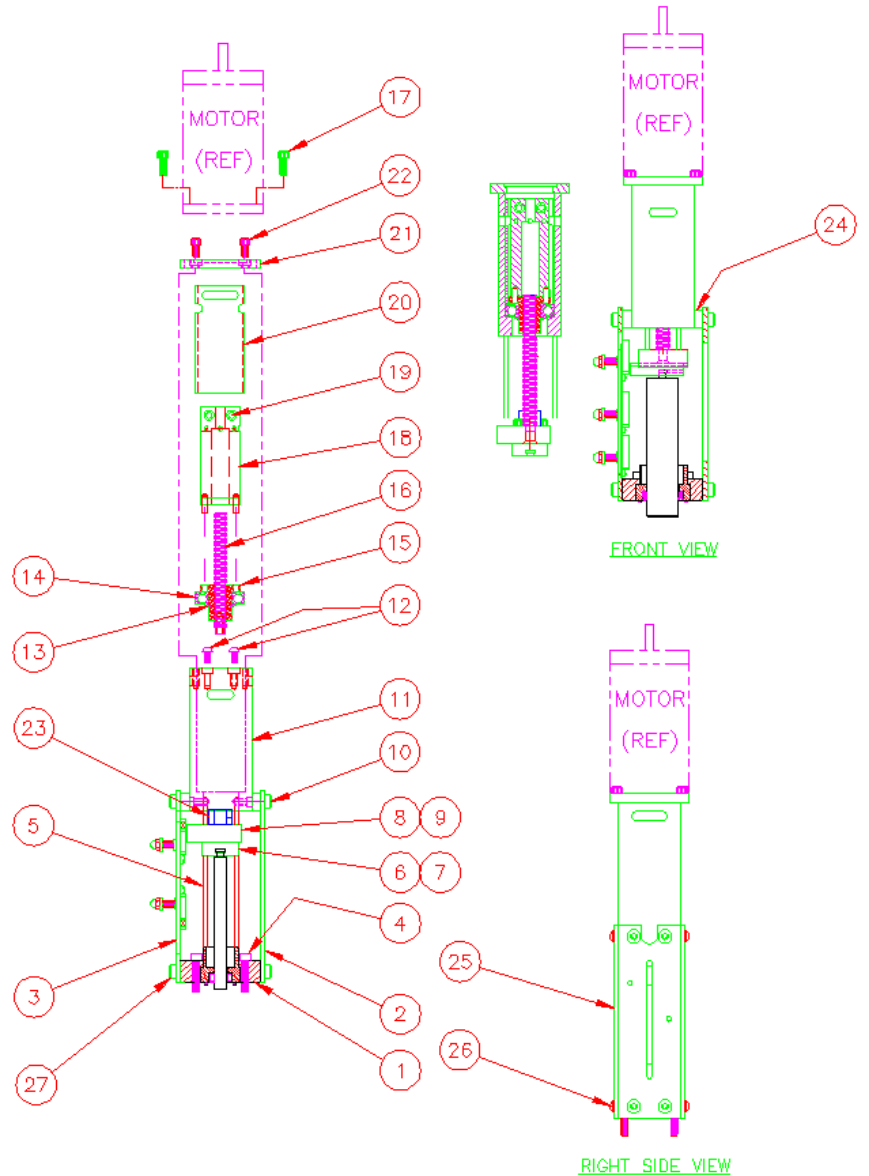


Figure 1 Pin Alignment

Illust #	DESCRIPTION
1	1093,RETAINER,OIL CUP,SMALL
1	1093,RETAINER,OIL CUP,LARGE
2	PLATE,TIE,RIGHT,PD,1.5B
3	PLATE,TIE,LEFT,PD44,3SLOT>
4	SCREW,SHC,10-24X1.00,MS,E@@
5	ROD,GUIDE,1093,1.5BX2.0S
6	1093,CONNECTOR BLK,METERING
7	SCREW,SHC,8-32X0.63,SS>
8	1093,CONNECTOR BLK,LEAD SCR
9	SCREW,FHSC,10-32X0.50,MS,E@
10	SCREW,SHC,SHLDR,1/4X.50,10-
11	HOUSING,LEADSCREW,STPR/SRVO
12	SCREW,BHCS,8-32X0.31,MS,E@@
13	RING,RET,EXT,0.625,MS>
14	BEARING,BALL,,625IDX1.375OD
15	NUT,LEADSCREW,DRIVE,STPR/SR
16	LEADSCREW,DRIVE,1093
17	SCREW,SHC,10-32X0.50,MS,E@@
18	COUPLER,LDSCREW,PD3,1/4 MTR
19	SCREW,SHC,6-32X0.38,MS@@@
20	RETAINER,BEARING,LEADSCREW,
21	PLATE,MTG,STPR,PD44,REM
22	SCREW,SHC,8-32X0.38,SS@@@
23	SPACER,DRIVE NUT,STPR/SRVO,
24	1093,SPACER,DRIVE
25	GUARD,SIDE,1093
26	SCREW,BHCS,8-32X0.31,MS,E@@
27	SCREW,SHC,SHLDR,1/4X.25,10-



TROUBLESHOOTING

The 1093 valve will not cycle.

Is power applied to the control panel?

Plug in power supply.
Turn on power to control panel.

Is pneumatic power applied?

Apply pneumatic power to machine.
Minimum air pressure of 70 psi required.

Are cycle detection sensors working?

Check connections or replace as needed.

The 1093 valve cycles, but will not dispense material.

Is there proper air pressure?

Air pressure must be 70 psi or higher.

Is material cured in the reservoir or needle path?

Examine, clear, or replace.

The 1093 valve dispenses irregular volume of material.

Is material contaminated?

Replace material.

Is the material filling properly?

Check material pressure.

The 1093 valve cycles slowly.

Is the cycle time correct?

Adjust cycle time for proper dispensing.

Are the oil cups supplied with lubrication?

Add lubrication to the oil cups.*

*Note: Lubrication must be compatible with all seals.

The 1093 valve drools or leaks.

Is there air trapped in the valve?

Prime the valve until air free material is visible.

Is the Spool/Sleeve Assembly worn?

Replace the spool/sleeve assembly with a new matched set.

Are the seals worn?

Replace the seals.

MODEL 1093 RECOMMENDED SPARE PARTS

Note: These parts are routine supply items or wear parts not covered by warranty for normal wear.

Quantity	Description	Part Number
1	SEAL KIT,1093	<i>see assembly drawing for part number</i>
1	DISPENSE SLEEVE	<i>see assembly drawing for part number</i>
1	METERING ROD	<i>see assembly drawing for part number</i>
1	SPOOL/SLEEVE ASSEMBLY	<i>see assembly drawing for part number</i>
1	LEAD SCREW	<i>see assembly drawing for part number</i>
1	BEARING (LEAD SCREW)	<i>see assembly drawing for part number</i>
1	E-RING (LEAD SCREW)	<i>see assembly drawing for part number</i>
**	KRYTOX 203GPL ASSEMBLY LUBRICANT	84/0200-K3/11
#10-32 Hub Replacement Needles for Single Needle Block Models Needle Length is .75" from mounting face to needle tip. Custom lengths available.		
Quantity	Description	Needle Part Number
**	NEEDLE, 12 GAUGE x .75", Pack of 4	A9010017-4
**	NEEDLE, 14 GAUGE x .75", Pack of 4	A9010019-4
**	NEEDLE, 16 GAUGE x .75", Pack of 4	A9010010-4
**	NEEDLE, 17 GAUGE x .75", Pack of 4	A9010011-4
**	NEEDLE, 18 GAUGE x .75", Pack of 4	A9010012-4
**	NEEDLE, 19 GAUGE x .75", Pack of 4	A9010013-4
**	NEEDLE, 20 GAUGE x .75", Pack of 4	A9010014-4
**	NEEDLE, 22 GAUGE x .75", Pack of 4	A9010020-4
Luer Lock Hub Replacement Needles for Single Needle Block Models Needle length shown is length projecting from LL hub. Other lengths available.		
Quantity	Description	Needle Part Number
**	Needle Sampler Package, 10 each of 14, 16, 18, 20 and 22 gauge ½" long needles	E4000025-50
**	Needle,LL,14 ga.x ½", Dark Green,Pack of 50 *	E4000001-50
**	Needle,LL,14 ga.x 1", Dark Green, Pack of 50	E4000014-50
**	Needle,LL,15 ga.x ½", Orange, Pack of 50	E4000004-50
**	Needle,LL,16 ga.x ½", Purple, Pack of 50 *	E4000088-50
**	Needle,LL,16 ga.x 1", Purple, Pack of 50 *	E4000005-50
**	Needle,LL,18 ga.x ½", Pin, Pack of 50 *	E4000006-50
**	Needle,LL,19 ga.x ½", Brown, Pack of 50	E4000008-50
**	Needle,LL,20 ga.x ½", Yellow, Pack of 50 *	E4000009-50
**	Needle,LL,22 ga.x ½", Black, Pack of 50 *	E4000011-50
**	Needle,LL,23 ga.x ½", Light Blue, Pack of 50	E4000024-50

* Needles are included in Needle Sampler Package.

** The quantity or needle size may vary for your application.

GENERAL GUIDELINES FOR O-RINGS AND U-CUP SEALS

Sizes and materials of construction for O-rings and U-cup seals are selected by Graco Ohio Inc. based on compatibility with the chemicals to which they will be exposed. Solvents that may remove residual chemicals often have negative effects on the mechanical properties of O-rings and seals.

O-Ring Guidelines

- Always replace an O-ring with the identical one in size, durometer hardness, type and material of construction. Always be alert to the location and size of each O-ring as many look alike and be careful not to mix them. Often similar sizes may be used in various locations on the equipment and if replaced incorrectly, the equipment may not function properly. Refer to the Machine Operation and Service Manual for the correct part number of all O-rings used throughout the equipment and replace them with factory approved parts only.
- Re-use of O-rings is not recommended. Only re-use O-rings as a last resort. If you must re-use them, be sure that they are clean, have no cuts or flat spots and contain NO foreign material. Also, be sure not to soak them in solvent for extended periods as this can cause deterioration of the O-ring. Always replace O-rings that are cut, nicked, or distorted in shape or cross-section.
- Always apply a very thin film of Krytox 203GPL lubricant, item 84/0200-K3/11, to the entire surface of the o-ring before installation. Avoid excessive lubrication. If installing O-rings over threads on a shaft or across sharp edges, roll or push the O-ring carefully into place being careful to avoid cutting or nicking it.
- Avoid stretching the O-ring too much as it may not return to the proper size.
- Do not use any sharp tools or objects to install O-rings

U-cup Seal Guidelines

- Always replace a U-cup seal with the identical one in size, durometer hardness, type and material of construction. Always be alert to the location and size of each U-cup seal as many look alike and be careful not to mix them. Often similar sizes may be used in various locations on the equipment and if replaced incorrectly, the equipment may not function properly. Refer to the Machine Operation and Service Manual for the correct part number of all U-cups used throughout the equipment and replace them with factory approved parts only.
- Always apply a very thin film of Krytox 203GPL lubricant, item 84/0200-K3/11, to the inner and outer lips of the seal before installation.
- Re-use of U-cup seals is not recommended. Only re-use U-cups as a last resort. If you must re-use them, be sure that they are clean, have no cuts or flat spots and contain NO foreign material. Also, be sure not to soak them in solvent for extended periods as this can cause deterioration of the seal. Always replace U-cups that are cut, have flat spots, are distorted in shape or are damaged in any manner.
- Always be alert to the proper orientation of the sealing lips and re-install them in the same direction as shown on the specific equipment assembly drawing. The U-cup seals are intended to seal in only one direction and if installed incorrectly, chemical leakage through the U-cup can occur.
- Whenever possible, push the back side of the seal over the shaft to protect the inner and outer lips. If this is not possible, carefully tuck the lip in to avoid rolling it back or cutting it.
- If installing over sharp edges, slide the seal carefully into place to avoid cutting it.
- Do not use any sharp tools or objects to install U-cups.

Graco Ohio 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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In no event will Graco be liable for indirect, incidental, special or consequential damages resulting from Graco supplying equipment hereunder, or the furnishing, performance, or use of any products or other goods sold hereto, whether due to a breach of contract, breach of warranty, the negligence of Graco, or otherwise.

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Graco Ohio Information

For the latest information about Graco products, visit www.graco.com.

TO PLACE AN ORDER, contact your Graco distributor or call to identify the nearest distributor.
Toll Free: 1-800-746-1334 or Fax: 330-966-3006

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Original instructions. This manual contains English. MM 313566

Graco Headquarters: Minneapolis

International Offices: Belgium, China, Japan, Korea

GRACO OHIO INC. 8400 PORT JACKSON AVE NW, NORTH CANTON, OH 44720

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Rev 10/2010