

Fusion™ CS

312666U

EN

Plural Component, Impingement Mix Air Purge Spray Gun with ClearShot Liquid Technology. For professional use only.

For use with non-flammable foam and polyurea. Not for use in explosive atmospheres.

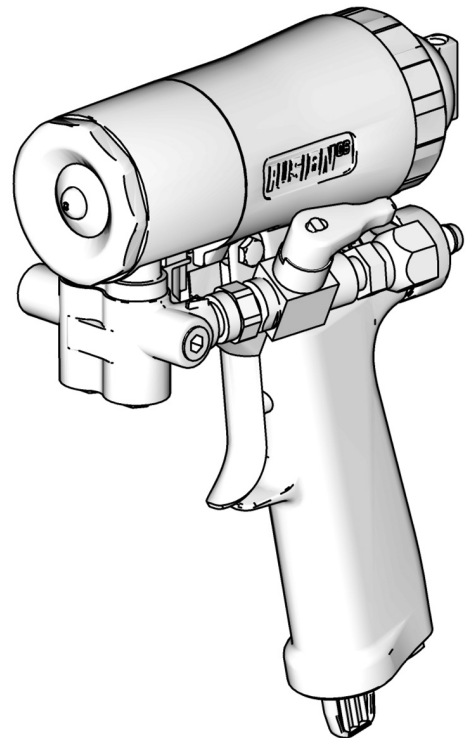
*3500 psi (24.5 MPa, 245 bar) Maximum Fluid Working Pressure
80-130 psi (0.56-0.9 MPa, 5.6-9.0 bar) Air Inlet Pressure Range
200° F (94° C) Maximum Fluid Temperature*



Important Safety Instructions

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

See page 4 for model information.



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Related Manuals

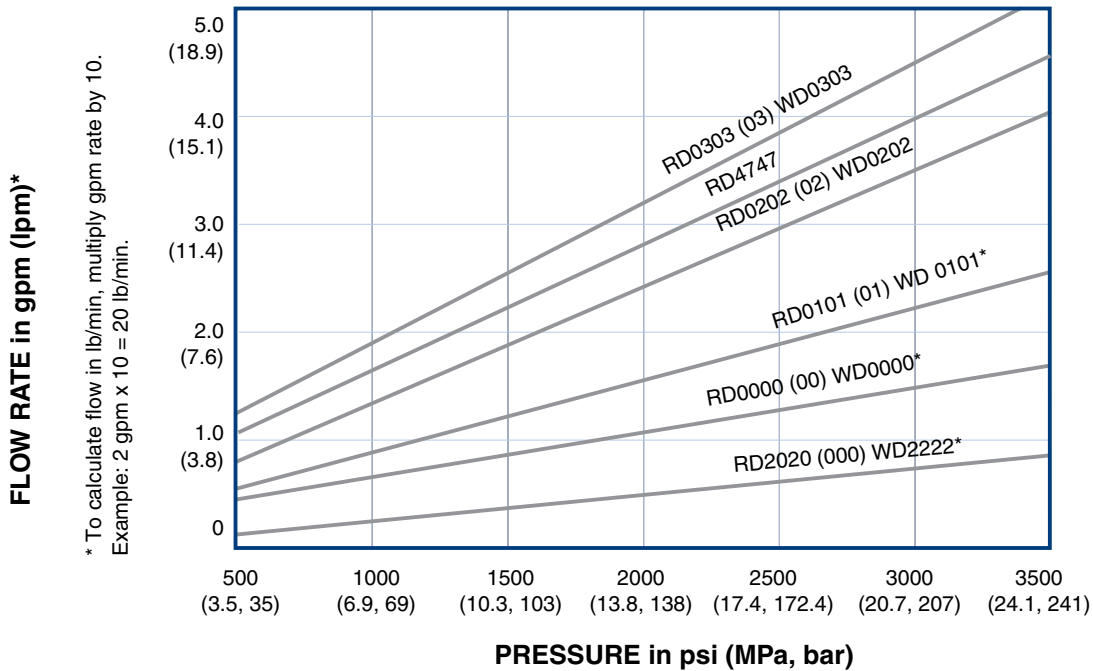
The following manuals are for accessories used with the Fusion CS spray gun. Visit www.graco.com for the most current manual revisions.

Power-Lock™ Heated Hose	
Part	Description
309572	Instructions - Parts Manual (English)
Solvent Flush Kits	
Part	Description
309963	Instructions - Parts Manual (English)
256566 Circulation Manifold Kit	
Part	Description
313058	Instructions - Parts Manual (English)
256569 TP100 Kit and 256570 Stud Wall Foam Kit	
Part	Description
313121	Instructions - Parts Manual (English)
256526 Cleanout Tool Kit	
Part	Description
313129	Instructions - Parts Manual (English)

Models/Mix Chamber Selection Guide

Round Pattern Guns

Gun Part, Series	Mix Chamber			
	Part	Impingement Port Size in. (mm)	Equivalent Size	Seal Material
CS20RD, B	RD2020	0.020 (0.50)	-000	SST
CS00RD, B	RD0000	0.029 (0.70)	-00	SST
CS01RD, B	RD0101	0.042 (1.00)	-01	SST
CS02RD, B	RD0202	0.052 (1.30)	-02	SST
CS03RD, B	RD0303	0.060 (1.50)	-03	SST
17S890	RD4747	0.047 (1.19)	---	SST

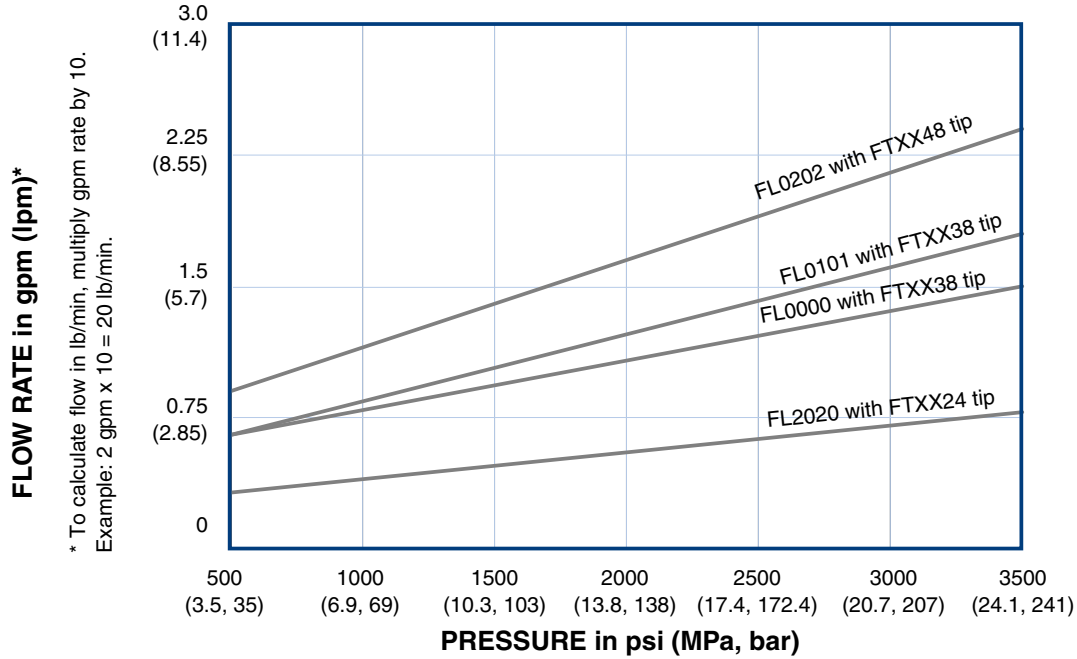


* To calculate flow in lb/min, multiply gpm rate by 10.
Example: 2 gpm x 10 = 20 lb/min.

*Accessory WD (wide pattern) mix chambers are available. See page 49.

Flat Pattern Guns

Gun Part, Series	Mix Chamber			Flat Tip		
	Part	Impingement Port Size in. (mm)	Equivalent Size	Part	Pattern Size in. (mm)	Orifice Size in. (mm)
CS20F1, B	FL2020	0.020 (0.50)	-000	FT0424	8-10 (203-254)	0.024 (0.61)
CS20F2, B	FL2020	0.020 (0.50)	-000	FT0438	8-10 (203-254)	0.038 (0.97)
CS00F1, B	FL0000	0.029 (0.70)	-00	FT0424	8-10 (203-254)	0.024 (0.61)
CS00F2, B	FL0000	0.029 (0.70)	-00	FT0438	8-10 (203-254)	0.038 (0.97)
CS00F3, B	FL0000	0.029 (0.70)	-00	FT0624	12-14 (305-356)	0.024 (0.61)
CS00F4, B	FL0000	0.029 (0.70)	-00	FT0638	12-14 (305-356)	0.038 (0.97)
CS00F5, B	FL0000	0.029 (0.70)	-00	FT0838	16-18 (406-457)	0.038 (0.97)
CS00F6, B	FL0000	0.029 (0.70)	-00	FT0848	16-18 (406-457)	0.048 (1.22)
CS01F1, B	FL0101	0.042 (1.00)	-01	FT0424	8-10 (203-254)	0.024 (0.61)
CS01F2, B	FL0101	0.042 (1.00)	-01	FT0438	8-10 (203-254)	0.038 (0.97)
CS01F3, B	FL0101	0.042 (1.00)	-01	FT0624	12-14 (305-356)	0.024 (0.61)
CS01F4, B	FL0101	0.042 (1.00)	-01	FT0638	12-14 (305-356)	0.038 (0.97)
CS01F5, B	FL0101	0.042 (1.00)	-01	FT0838	16-18 (406-457)	0.038 (0.97)
CS01F6, B	FL0101	0.042 (1.00)	-01	FT0848	16-18 (406-457)	0.048 (1.22)
CS02F1, B	FL0202	0.052 (1.30)	-02	FT0424	8-10 (203-254)	0.024 (0.61)
CS02F2, B	FL0202	0.052 (1.30)	-02	FT0438	8-10 (203-254)	0.038 (0.97)
CS02F3, B	FL0202	0.052 (1.30)	-02	FT0624	12-14 (305-356)	0.024 (0.61)
CS02F4, B	FL0202	0.052 (1.30)	-02	FT0638	12-14 (305-356)	0.038 (0.97)
CS02F5, B	FL0202	0.052 (1.30)	-02	FT0838	16-18 (406-457)	0.038 (0.97)
CS02F6, B	FL0202	0.052 (1.30)	-02	FT0848	16-18 (406-457)	0.048 (1.22)








Wide Round Pattern Gun

Gun Part, Series	Mix Chamber			Pattern Diameter at 24 in. (610 mm) to Target in. (mm)	Equivalent Flow to Mix Chamber Size Reference Part No.
	Part	Impingement Port Size in. (mm)	Equivalent Size		
CS22WD, B	WD2222	0.022 (0.56)	N/A	8-9 (203-229)	4.5 lb/min at 1000 psi
CS00WD, B	WD0000	0.028 (0.71)	-00	15 (381.0)	RD0000
CS01WD, B	WD0101	0.039 (0.99)	-01	16 (406.4)	RD0101
CS02WD, B	WD0202	0.046 (1.17)	-02	18 (457.2)	RD0202
CS03WD, B	WD0303	0.057 (1.45)	-03	18 (457.2)	RD0303

Warnings

The following warnings are for the setup, use, grounding, maintenance, and repair of this equipment. The exclamation point symbol alerts you to a general warning and the hazard symbol refers to procedure-specific risk. Refer back to these warnings. Additional, product-specific warnings may be found throughout the body of this manual where applicable.

 WARNING	
	<p>PERSONAL PROTECTIVE EQUIPMENT</p> <p>Always wear appropriate personal protective equipment and cover all skin when spraying, servicing equipment, or when in the work area. Protective equipment helps prevent serious injury, including long-term exposure; inhalation of toxic fumes, mists or vapors; allergic reaction; burns; eye injury and hearing loss. This protective equipment includes but is not limited to:</p> <ul style="list-style-type: none"> • A properly fitting respirator, which may include a supplied-air respirator, chemically impermeable gloves, protective clothing and foot coverings as recommended by the fluid manufacturer and local regulatory authority. • Protective eyewear and hearing protection.
	<p>TOXIC FLUID OR FUMES HAZARD</p> <p>Toxic fluids or fumes can cause serious injury or death if splashed in the eyes or on skin, inhaled or swallowed.</p> <ul style="list-style-type: none"> • Read Safety Data Sheet (SDS) for handling instructions and to know the specific hazards of the fluids you are using, including the effects of long-term exposure. • When spraying, servicing equipment, or when in the work area, always keep work area well ventilated and always wear appropriate personal protective equipment. See Personal Protective Equipment warnings in this manual. • Store hazardous fluid in approved containers, and dispose of it according to applicable guidelines.
	<p>SKIN INJECTION HAZARD</p> <p>High-pressure fluid from gun, hose leaks, or ruptured components will pierce skin. This may look like just a cut, but it is a serious injury that can result in amputation. Get immediate surgical treatment.</p> <ul style="list-style-type: none"> • Do not point gun at anyone or at any part of the body. • Do not put your hand over the spray tip. • Do not stop or deflect leaks with your hand, body, glove, or rag. • Engage trigger lock when not spraying. • Follow Pressure Relief Procedure in this manual, when you stop spraying and before cleaning, checking, or servicing equipment.
	<p>BURN HAZARD</p> <p>Equipment surfaces and fluid that's heated can become very hot during operation. To avoid severe burns, do not touch hot fluid or equipment. Wait until equipment/fluid has cooled completely.</p>


WARNING
**FIRE AND EXPLOSION HAZARD**

Flammable fumes, such as solvent and paint fumes, in **work area** can ignite or explode. To help prevent fire and explosion:

- Use equipment only in well ventilated area.
- Eliminate all ignition sources; such as pilot lights, cigarettes, portable electric lamps, and plastic drop cloths (potential static arc).
- Keep work area free of debris, including solvent, rags and gasoline.
- Do not plug or unplug power cords, or turn power or light switches on or off when flammable fumes are present.
- Ground all equipment in the work area. See **Grounding** instructions.
- Use only grounded hoses.
- Hold gun firmly to side of grounded pail when triggering into pail.
- If there is static sparking or you feel a shock, **stop operation immediately**. Do not use equipment until you identify and correct the problem.
- Keep a working fire extinguisher in the work area.

**EQUIPMENT MISUSE HAZARD**

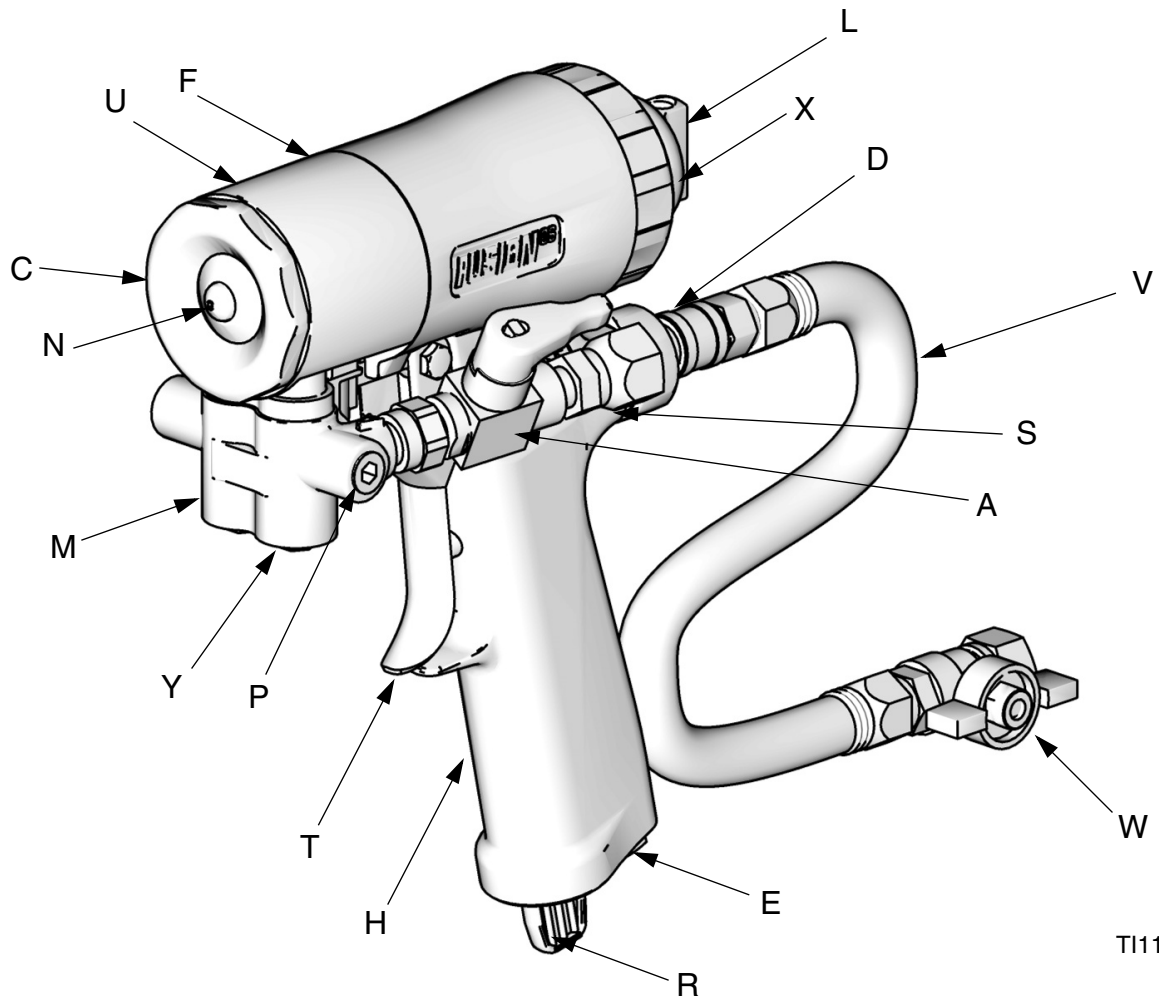
Misuse can cause death or serious injury.

- Do not operate the unit when fatigued or under the influence of drugs or alcohol.
- Do not exceed the maximum working pressure or temperature rating of the lowest rated system component. See **Technical Data** in all equipment manuals.
- Use fluids and solvents that are compatible with equipment wetted parts. See **Technical Data** in all equipment manuals. Read fluid and solvent manufacturer's warnings. For complete information about your material, request MSDS forms from distributor or retailer.
- Check equipment daily. Repair or replace worn or damaged parts immediately with genuine manufacturer's replacement parts only.
- Do not alter or modify equipment.
- Use equipment only for its intended purpose. Call your distributor for information.
- Route hoses and cables away from traffic areas, sharp edges, moving parts, and hot surfaces.
- Do not kink or over bend hoses or use hoses to pull equipment.
- Keep children and animals away from work area.
- Comply with all applicable safety regulations.

**PRESSURIZED ALUMINUM PARTS HAZARD**

Do not use 1,1,1-trichloroethane, methylene chloride, other halogenated hydrocarbon solvents or fluids containing such solvents in pressurized aluminum equipment. Such use can cause serious chemical reaction and equipment rupture, and result in death, serious injury, and property damage.

Overall View



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FIG. 1

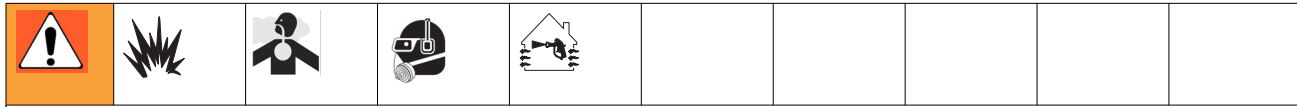
Key:

- | | | | |
|---|--|---|---|
| A | A Side Fluid Valve (ISO) | S | Fluid Inlet Swivels (A Side Shown) |
| B | B Side Fluid Valve (RESIN) (not shown) | T | Trigger |
| C | Front Cover Retainer | U | Front Cover |
| D | Air Line Quick Coupler | V | Gun Air Whip Hose |
| E | Breather Plug | W | Air Valve |
| F | Fluid Housing (under cover) | X | Variable Flow Adjustment Knob |
| H | Handle | Y | Manifold Check Valve/Inlet Screen Housing |
| L | Piston Safety Lock/Flow Selector Knob | | |
| M | Gun Fluid Manifold | | |
| N | Mix Chamber Nozzle | | |
| P | Optional Fluid Inlets (A Side Shown) | | |
| R | ClearShot Liquid Cartridge | | |

Important Isocyanate (ISO) Information

Isocyanates (ISO) are catalysts used in two component materials.

Isocyanate Conditions



Spraying or dispensing fluids that contain isocyanates creates potentially harmful mists, vapors, and atomized particulates.

- Read and understand the fluid manufacturer’s warnings and Safety Data Sheet (SDS) to know specific hazards and precautions related to isocyanates.
- Use of isocyanates involves potentially hazardous procedures. Do not spray with this equipment unless you are trained, qualified, and have read and understood the information in this manual and in the fluid manufacturer’s application instructions and SDS.
- Use of incorrectly maintained or mis-adjusted equipment may result in improperly cured material which could cause off gassing and offensive odors. Equipment must be carefully maintained and adjusted according to instructions in the manual.
- To prevent inhalation of isocyanate mists, vapors and atomized particulates, everyone in the work area must wear appropriate respiratory protection. Always wear a properly fitting respirator, which may include a supplied-air respirator. Ventilate the work area according to instructions in the fluid manufacturer’s SDS.
- Avoid all skin contact with isocyanates. Everyone in the work area must wear chemically impermeable gloves, protective clothing and foot coverings as recommended by the fluid manufacturer and local regulatory authority. Follow all fluid manufacturer recommendations, including those regarding handling of contaminated clothing. After spraying, wash hands and face before eating or drinking.
- Hazard from exposure to isocyanates continues after spraying. Anyone without appropriate personal protective equipment must stay out of the work area during application and after application for the time period specified by the fluid manufacturer. Generally this time period is at least 24 hours.
- Warn others who may enter work area of hazard from exposure to isocyanates. Follow the recommendations of the fluid manufacturer and local regulatory authority. Posting a placard such as the following outside the work area is recommended:

WARNING	
	TOXIC FUMES HAZARD
DO NOT ENTER DURING SPRAY FOAM APPLICATION OR FOR ___ HOURS AFTER APPLICATION IS COMPLETE	
DO NOT ENTER UNTIL:	
DATE: _____ TIME: _____	

For all applications except spray foam



Spraying or dispensing fluids that contain isocyanates creates potentially harmful mists, vapors, and atomized particulates.

- Read and understand the fluid manufacturer's warnings and Safety Data Sheet (SDS) to know specific hazards and precautions related to isocyanates.
- Use of isocyanates involves potentially hazardous procedures. Do not spray with this equipment unless you are trained, qualified, and have read and understood the information in this manual and in the fluid manufacturer's application instructions and SDS.
- Use of incorrectly maintained or mis-adjusted equipment may result in improperly cured material. Equipment must be carefully maintained and adjusted according to instructions in the manual.
- To prevent inhalation of isocyanate mists, vapors, and atomized particulates, everyone in the work area must wear appropriate respiratory protection. Always wear a properly fitting respirator, which may include a supplied-air respirator. Ventilate the work area according to instructions in the fluid manufacturer's SDS.
- Avoid all skin contact with isocyanates. Everyone in the work area must wear chemically impermeable gloves, protective clothing and foot coverings as recommended by the fluid manufacturer and local regulatory authority. Follow all fluid manufacturer recommendations, including those regarding handling of contaminated clothing. After spraying, wash hands and face before eating or drinking.

Material Self-ignition



Some materials may become self-igniting if applied too thick. Read material manufacturer's warnings and Safety Data Sheet (SDS).

Keep Components A and B Separate



Cross-contamination can result in cured material in fluid lines which could cause serious injury or damage equipment. To prevent cross-contamination:

- **Never** interchange component A and component B wetted parts.
- Never use solvent on one side if it has been contaminated from the other side.

Moisture Sensitivity of Isocyanates

Exposure to moisture (such as humidity) will cause ISO to partially cure, forming small, hard, abrasive crystal that become suspended in the fluid. Eventually a film will form on the surface and the ISO will begin to gel, increasing in viscosity.

NOTICE

Partially cured ISO will reduce performance and the life of all wetted parts.

- Always use a sealed container with a desiccant dryer in the vent, or a nitrogen atmosphere. **Never** store ISO in an open container.
- Keep the ISO pump wet cup or reservoir (if installed) filled with appropriate lubricant. The lubricant creates a barrier between the ISO and the atmosphere.
- Use only moisture-proof hoses compatible with ISO.
- Never use reclaimed solvents, which may contain moisture. Always keep solvent containers closed when not in use.
- Always lubricate threaded parts with an appropriate lubricant when reassembling.

NOTE: The amount of film formation and rate of crystallization varies depending on the blend of ISO, the humidity, and the temperature.

Foam Resins with 245 fa Blowing Agents

Some foam blowing agents will froth at temperatures above 90°F (33°C) when not under pressure, especially if agitated. To reduce frothing, minimize preheating in a circulation system.



Changing Materials

NOTICE

Changing the material types used in your equipment requires special attention to avoid equipment damage and downtime.

- When changing materials, flush the equipment multiple times to ensure it is thoroughly clean.
- Always clean the fluid inlet strainers after flushing.
- Check with your material manufacturer for chemical compatibility.
- When changing between epoxies and urethanes or polyureas, disassemble and clean all fluid components and change hoses. Epoxies often have amines on the B (hardener) side. Polyureas often have amines on the B (resin) side.

ClearShot Liquid

					
Read material MSDS to know specific hazards and precautions related to ClearShot Liquid.					

Grounding

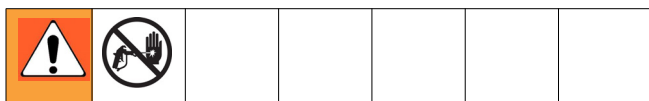


Check your local electrical code and proportioner manual for detailed grounding instructions.

Ground the spray gun through connection to a Graco-approved grounded fluid supply hose.

Piston Safety Lock

Engage piston safety lock whenever you stop spraying to avoid accidental triggering.



Engage

To engage piston safety lock, push knob in and turn clockwise. If engaged, gun will not actuate.

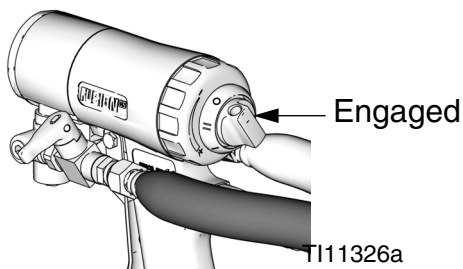


FIG. 2

Disengage

To disengage piston safety lock, push knob in and turn counterclockwise until it pops out. There will be a gap between knob and gun body.

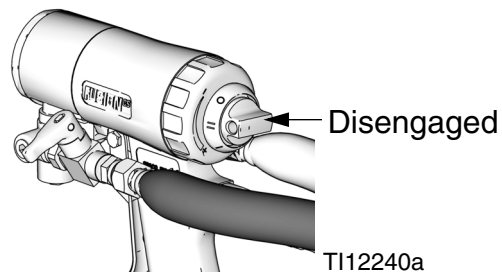
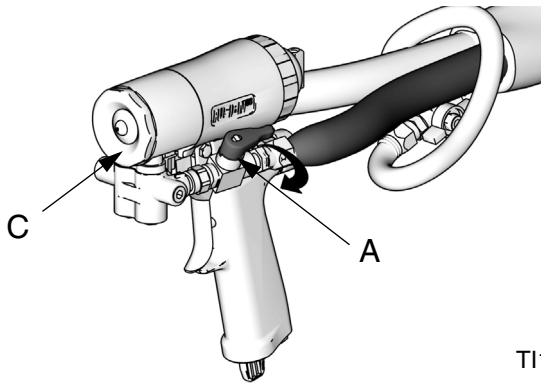


FIG. 3

Remove Front Cover



1. Follow **Pressure Relief Procedure**, page 18.
2. Ensure fluid valves A and B are closed before turning front cover retainer (C).



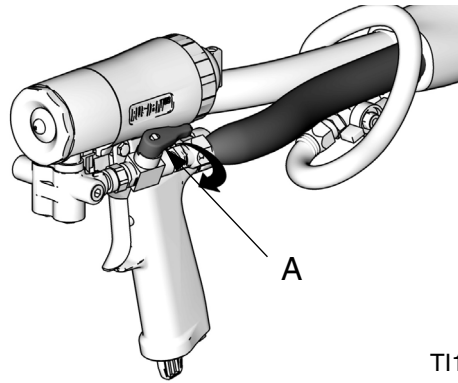
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FIG. 4

Loss of Air Pressure

In event of loss of air pressure, gun will continue to spray. To shut off gun, do one of the following:

- Push in piston safety lock, see page 13.
- Close fluid valves A and B.

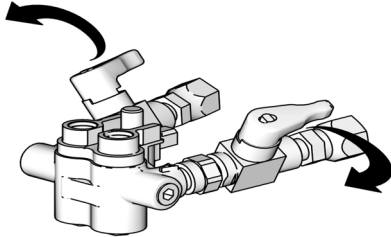


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FIG. 5

Setup

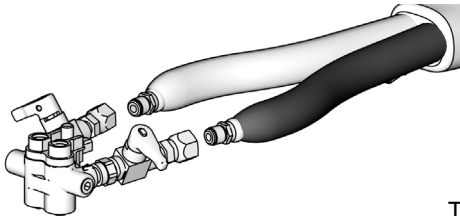
1. Close fluid valves A and B.



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FIG. 6

2. Connect A (ISO) and B (RESIN) fluid hoses to fluid manifold.

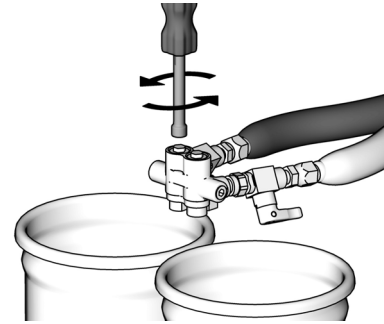


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FIG. 7

3. Purge air from fluid lines using feed pump pressure only (less than 500 psi (3.5 MPa, 35 bar)).
 - a. Ensure fluid valves are closed. Open fluid manifold check valves 2 to 2-1/2 turns.
 - b. Open fluid valves and wait for all air to bleed from fluid hoses.

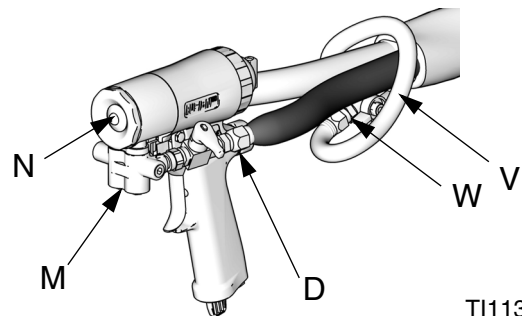
- c. Close fluid valves and retighten fluid manifold check valves.



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FIG. 8

4. Engage piston safety lock, page 13.
5. Install ClearShot Liquid cartridge. See **ClearShot Liquid Cartridge Installation/Removal**, page 23.
6. Connect gun air whip hose (V) air valve (W) to main air hose. Assemble fluid manifold (M) to gun by hand, and then tighten bolt.
7. Connect air line to quick coupler (D). Turn on air. Open air valve (W). Air should flow from nozzle (N).

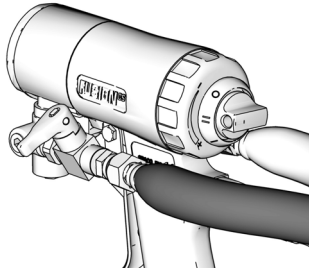


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FIG. 9

8. Apply layer of lubricant over front cover of gun and front cover retainer, or use gun cover to prevent overspray buildup and ease disassembly.

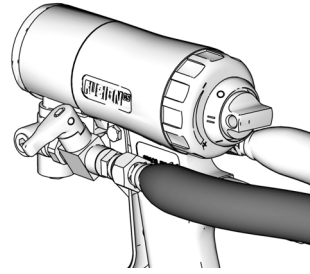
9. Disengage piston safety lock, page 13.



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FIG. 10

14. Disengage piston safety lock, page 13.

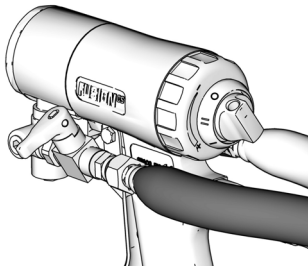


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FIG. 13

10. Trigger gun to check for full mix chamber travel and to prime ClearShot Liquid dosing pump. See **ClearShot Liquid Cartridge Installation/Removal**, page 23.

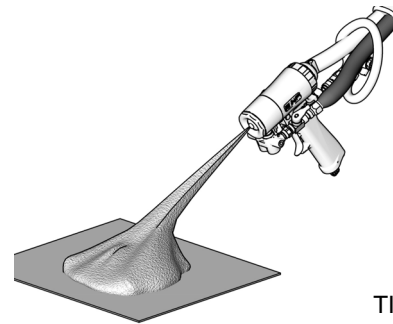
11. Engage piston safety lock, page 13.



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FIG. 11

15. Test spray onto cardboard. Adjust pressure and temperature to get desired results.

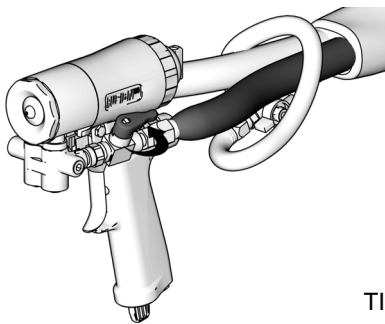


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FIG. 14

12. Turn on proportioner.

13. Open B (RESIN) fluid valve. Then open A (ISO) fluid valve.



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FIG. 12

16. The gun is now ready to spray.

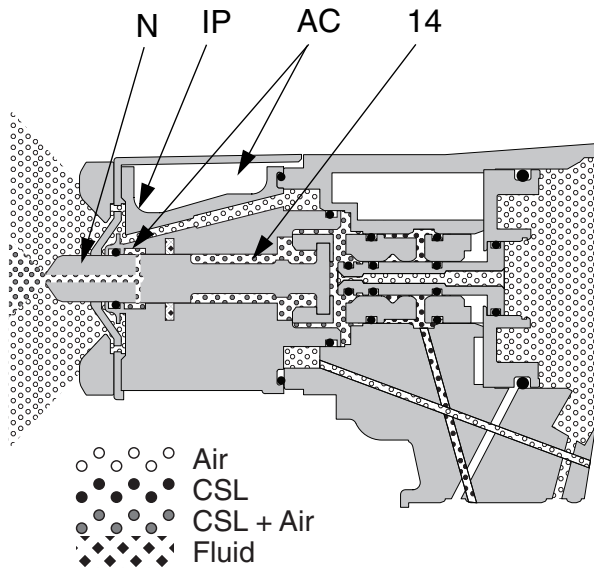
CAUTION

Air supply is required for gun actuation. Do not disconnect gun air supply until fluid pressure is relieved, page 18.

Shutdown

Overnight Shutdown

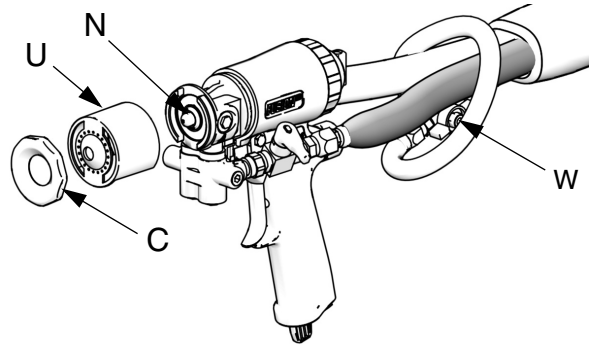
1. Follow **Pressure Relief Procedure**, page 18.
2. Leave air turned on and gun detriggered.



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FIG. 15


3. Unscrew and remove front cover retainer (C). Remove front cover (U).



TI11335d

FIG. 16

4. Replace front cover (U) and front cover retainer (C).

 Always leave a ClearShot Liquid cartridge in gun handle to prevent cartridge bore contamination.

Pressure Relief Procedure



1. Engage piston safety lock, page 13.

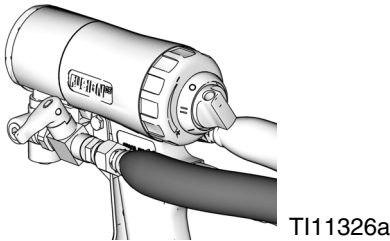


FIG. 17

CAUTION

Air supply is required for gun actuation. Do not disconnect gun air supply until fluid pressure is relieved.

2. Close fluid valves A and B. Leave air valve (W) open.

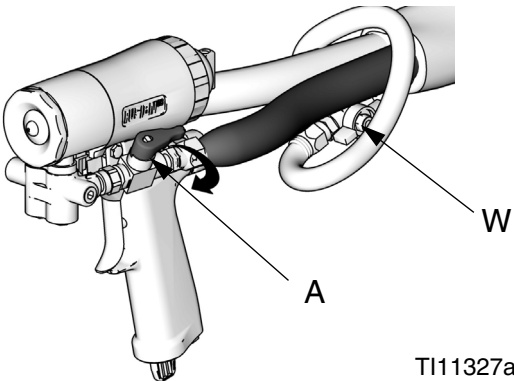


FIG. 18

3. Disengage piston safety lock, page 13.

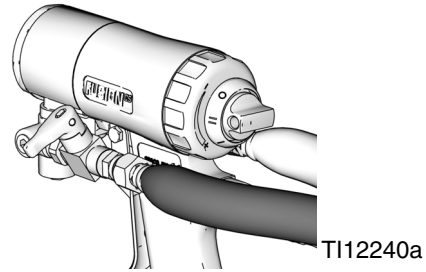


FIG. 19

4. Trigger gun onto cardboard or into waste container to relieve pressure.

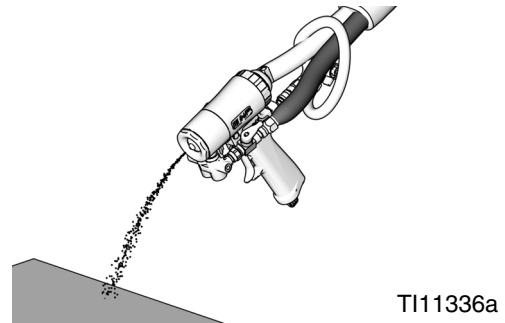
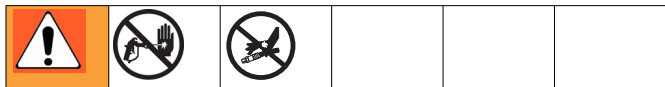


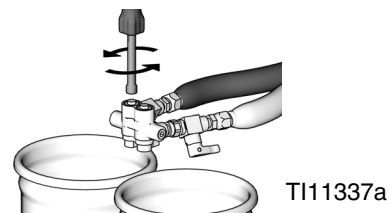
FIG. 20

5. Engage piston safety lock, page 13.



Fluid in the hose and proportioner is still under pressure. Follow the Pressure Relief Procedure in the proportioner manual.

To relieve pressure in the hose manifold after the gun is removed, place the fluid manifold over containers, facing away from you. Ensure fluid valves are closed. Very slowly open fluid manifold check valves 2 to 2-1/2 turn. Under high pressure, fluid will spray sideways from the fluid ports.



Optional Hose Position

Fluid inlet swivel fittings point to rear. If desired, these positions can be changed so hoses point downward.

CAUTION

To prevent cross-contamination of gun's wetted parts, do not interchange A component (isocyanate) and B component (resin) parts.

1. Follow **Pressure Relief Procedure**, page 18. Also relieve system pressure, see proportioner manual.
2. Disconnect air (D) and remove fluid manifold (M).

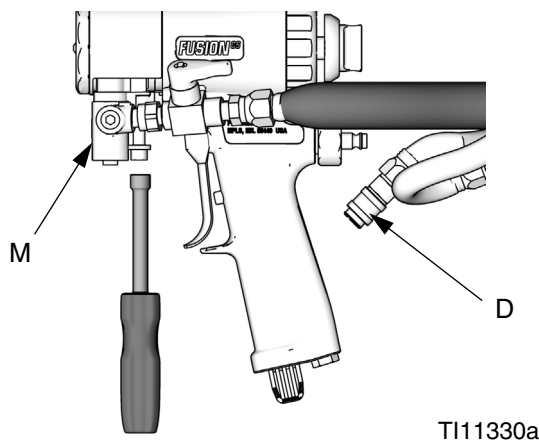
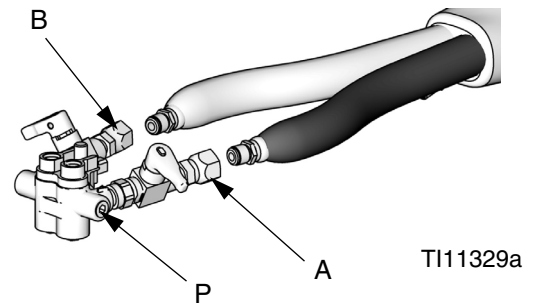


FIG. 21

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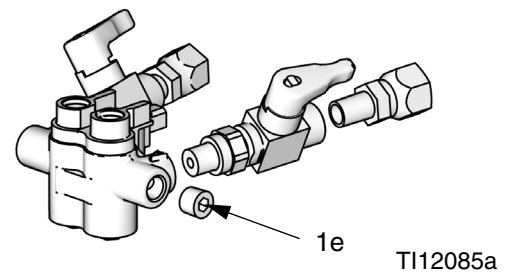
3. Disconnect fluid hoses from inlet swivels (A, B). Remove fluid valve assemblies. Remove plugs from optional inlets (P).



TI11329a

FIG. 22

4. Apply thread sealant to plugs (1e), elbows (35), and male threads of fluid valve assemblies. Install elbows (35) in optional inlets, facing down. Install fluid valve assemblies in elbows. Be sure to install A fluid assembly in A side. Install plugs where swivels had been. Torque all parts to 235-245 in-lb (26.6-27.7 N•m).



TI12085a

FIG. 23

5. Connect A and B hoses to A and B swivels.
6. Attach fluid manifold. Connect air. Return gun to service.

Flat Spray Tips

1. Follow **Pressure Relief Procedure**, page 18.
2. Unscrew and remove front cover retainer (C).
3. Remove front cover (U) and o-ring (2b). Inspect o-ring.
4. Remove tip retainer (46) and tip (21). Inspect o-ring (47).
5. Remove fluid housing (F). Loosen A and B side seals. Slide flat mix chamber (14) out rear of fluid housing.

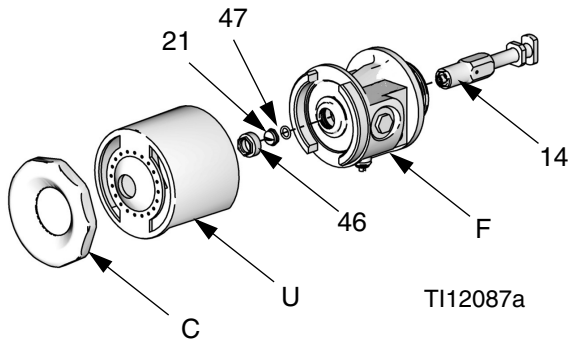

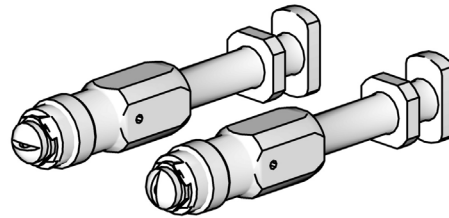


FIG. 24

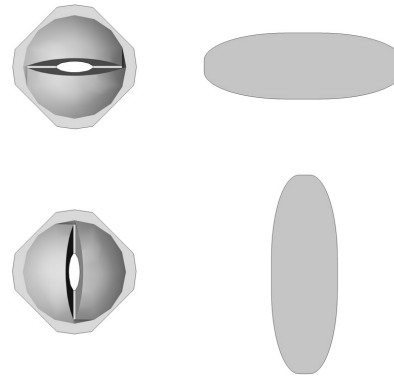
 If tip is stuck, pry off with small screwdriver or pull off with pliers. Tip is hardened to resist damage.

6. To clean, soak tip in compatible solvent. Clean gently with tip cleanout tool 15D234; page 56 for details of tool.
7. Reassemble in reverse order.
 - a. Insert mix chamber (14) from rear of fluid housing.
 - b. Tighten A and B side seals on fluid housing.

- c. Assemble o-ring (47), tip (21), and tip retainer (46) to front of mix chamber (14).
8. Reposition tip horizontally or vertically, or install different tip size.




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FIG. 25

 Tips marked on back with last three digits of part number. See **Flat Tip Kits**, page 50.

9. Reinstall fluid housing (F) to handle.
10. Reinstall front cover (U) and front cover retainer (C).

Variable Flow

Operation

 The variable flow feature is designed to provide immediate adjustment between a full flow pattern (determined by mix chamber size) and a user defined reduced flow pattern.

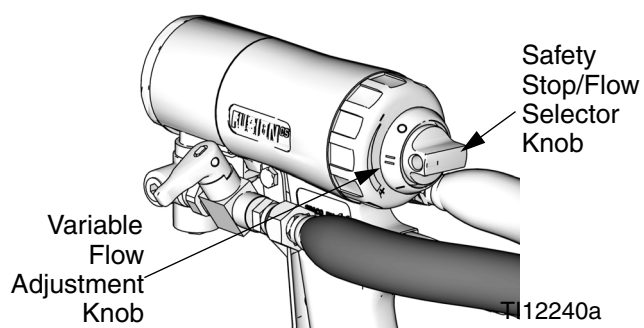


FIG. 26

Change Variable Flow Adjustment Knob

1. Turn air valve (W) OFF.
2. Turn flow selector knob to variable flow position. See FIG. 27.

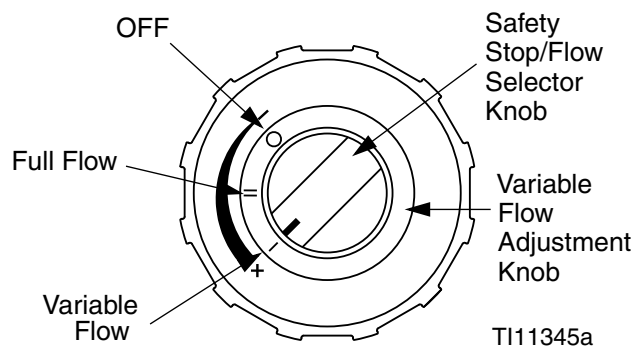


FIG. 27

Reduced Flow

To spray a reduced flow pattern, push in and turn flow selector knob to variable flow position. See FIG. 27.

Full Flow

To return to a full flow pattern, push in and turn flow selector knob to full flow position. See FIG. 27.

3. To increase variable flow: push in and turn variable flow knob counterclockwise.

To decrease variable flow: push in and turn variable flow knob clockwise.

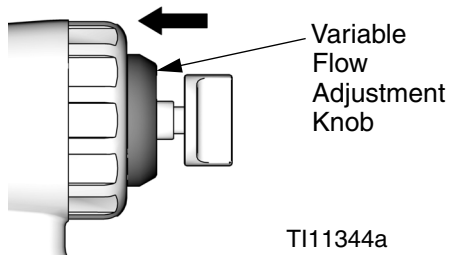


FIG. 28

4. Turn air valve ON, and open fluid valves. Verify that flow selector knob is set to the variable flow position. See FIG. 27.
5. Test spray pattern on cardboard. Repeat steps 1 through 6 until desired spray pattern is reached.

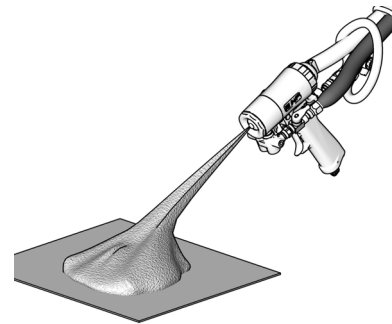





FIG. 29

 The variable flow adjustment knob cannot be adjusted when the flow selector knob is in the safety stop position. See FIG. 27.

The variable flow adjustment knob locks into detents every 15°. Ensure knob is locked into a detent before proceeding to step 5.

ClearShot Liquid Cartridge Installation/Removal

 If ClearShot Liquid cartridge removal or installation is difficult, lubricate cartridge o-rings and/or cartridge bore with a few drops of ClearShot Liquid. Water-based lubricants can be used as well.

 Do not use Fusion grease or other petroleum- or vegetable-based lubricants. They will cause cartridge o-rings to swell and stick inside gun handle.

Installation

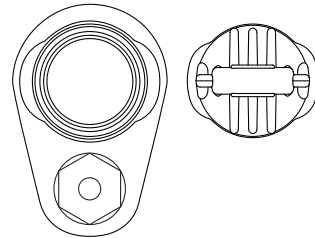
1. Follow **Pressure Relief Procedure**, page 18.
2. Remove plastic cap from new ClearShot Liquid cartridge.



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FIG. 30

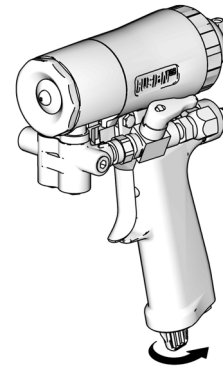
3. Insert cartridge into gun handle. Ensure cartridge tabs are aligned correctly with cartridge tab recesses in gun handle.



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FIG. 31

4. After cartridge is fully inserted, turn cartridge 1/4 turn clockwise to lock it into gun handle.



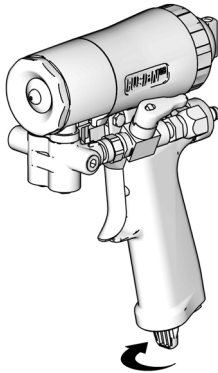
TI113342a

FIG. 32

5. Turn air valve ON and prime ClearShot Liquid dosing pump.
 - a. Trigger gun 20 times to prime dosing pump.
 - b. Trigger gun onto cardboard to see dosed ClearShot Liquid.
6. Resume spraying.

Removal

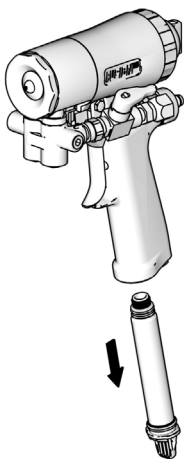
1. Follow **Pressure Relief Procedure**, page 18.
2. Turn air valve (W) OFF.
3. Push in and turn cartridge 1/4 turn counter-clockwise (viewed from bottom).



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FIG. 33

4. Pull cartridge out of gun handle.



TI11339a

FIG. 34

Troubleshooting

For ClearShot Liquid cartridge troubleshooting, see **Troubleshooting** on page 31.

Maintenance

Supplied Tool Kit

- Hex Nut Driver; 5/16
- Screwdriver; 1/8 blade
- Nozzle Drill Bit; various sizes depending on nozzle size. See Table 1.
- Impingement Port Drill Bit; various sizes depending on port size. See Table 3.
- 117661 Pin Vise; dual reversible chucks

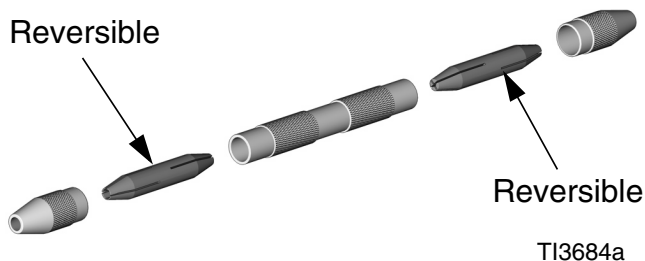


FIG. 35

- 15B817 Flush Manifold

Keep Gun Clean

Keep gun clean with accessory gun cover, page 55.

Applying a light coat of lubricant will make cleaning easier.

As Needed

1. **Clean Outside of Gun**, page 26.
2. **Clean Mix Chamber Nozzle**, page 28, a minimum of once a day.
3. **Clean Breather Plug**, page 26.
4. **Clean Fluid Manifold**, page 27.
5. **Clean Passages**, page 29.
6. **Clean Impingement Ports**, page 29.
7. **Adjust Fluid Valve Packings**, page 27.

Daily

Follow **Shutdown**, page 17.


Weekly to Monthly

1. Clean **Mix Chamber and Side Seal Assemblies**, page 38. Check o-rings.
2. Clean **Check Valves**, page 41. Check o-rings and filters.

Flush Gun



1. Follow **Pressure Relief Procedure**, page 18.
2. Flush with compatible solvent into a grounded metal pail, holding a metal part of fluid manifold firmly to side of pail. Use lowest possible fluid pressure when flushing.
3. Follow **Pressure Relief Procedure**, page 18.

 For a more thorough flush, a solvent flush kit (256510 248229) is available as an accessory.

Clean Outside of Gun

Wipe off outside of gun with compatible solvent. Use N-Methylpyrrolidone (NMP), Dynasolve CU-6, Dzolv, or an equivalent to soften cured material.

CAUTION
These solvents are not recommended for flushing; use only for cleaning.

Clean or Replace Front Cover and Retainer

Soak front cover retainer (C) and front cover (U) in compatible solvent. Brush or wipe clean. Replace as needed.

Clean Breather Plug

Remove and clean breather plug with compatible solvent.

Clean Fluid Manifold

Clean fluid manifold fluid ports with compatible solvent and brush whenever removed from gun. Do not damage the internal sealing surfaces. Fill fluid ports with grease if left exposed, to seal out moisture.

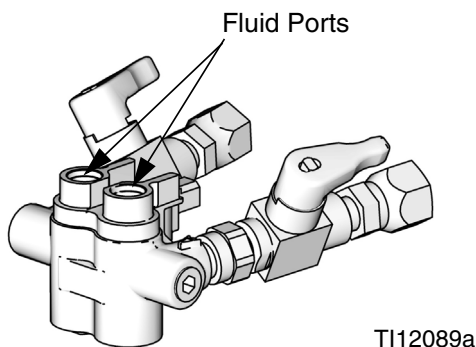


FIG. 36:

Clean or Replace Fluid Screens

1. Follow **Pressure Relief Procedure**, page 18.
2. Relieve pressure in hose manifold after gun is removed.
 - a. Place the fluid manifold over containers, facing away from you.
 - b. Ensure fluid valves are closed.
 - c. Very slowly open fluid manifold check valves 2 to 2-1/2 turn. Under high pressure, fluid will spray sideways from the fluid ports.

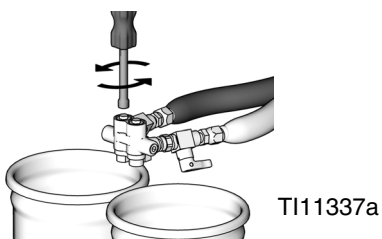


FIG. 37

3. Remove fluid screens by unthreading them from fluid manifold.

CAUTION

To prevent cross-contamination of the check valves, do not interchange A component and B component parts. The A component check valve is marked with an A.

4. Clean or replace fluid screens. See **Accessories**, page 55.
5. Carefully inspect o-rings and fluid screen surfaces. Replace if worn or damaged.
6. Liberally lubricate o-rings and reassemble. Use a hex nut driver to tighten.

Adjust Fluid Valve Packings

Periodic adjustment may be necessary to stop fluid leakage. If fluid valve is leaking, adjust the packings:

1. Follow **Pressure Relief Procedure**, page 18.
2. Loosen set screw and remove valve handle.
3. Turn valve packing nut clockwise in 1/8-turn increments until leak is corrected.
4. Re-pressurize system then check for leaks. Repeat procedure as necessary.

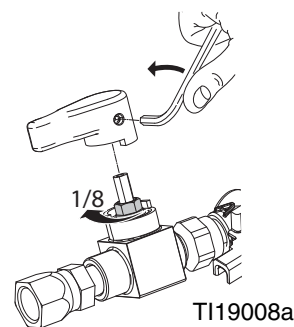


FIG. 38

Clean Mix Chamber Nozzle

1. Engage piston safety lock, page 13.

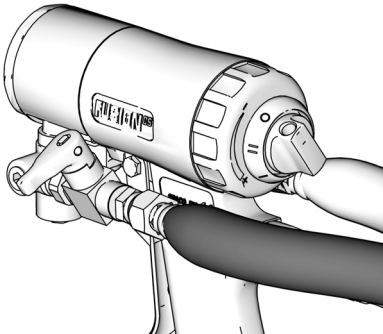


FIG. 39

2. Refer to Table 1. Also see identification chart under **Drill Bit Kits**, page 53. Use appropriate size drill bit to clean mix chamber nozzle (N).

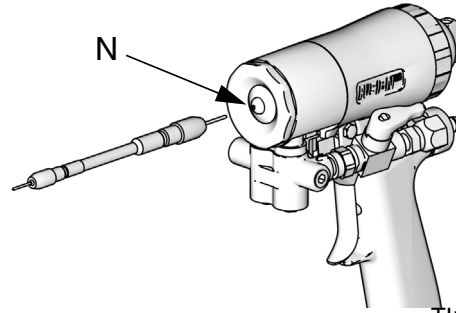


FIG. 40

Table 1: Nozzle Drill Bit Sizes

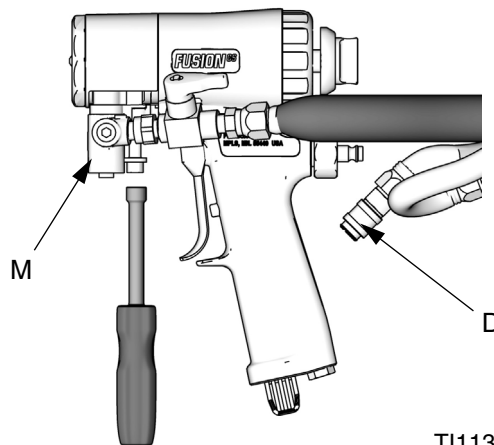
Round Spray		Flat Spray	
Mix Chamber	Drill Size in. (mm)	Mix Chamber	Drill Size in. (mm)
RD2020	#58, .042 (1.00)	FL2020	3/32, .094 (2.35)
RD0000	#55, .052 (1.30)	FL0000	3/32, .094 (2.35)
RD0101	#53, .060 (1.50)	FL0101	3/32, .094 (2.35)
RD4747	.045 (1.15)		
RD0202	#50, .070 (1.75)	FL0202	3/32, .094 (2.35)
RD0303	#44, .086 (2.15)		

Clean Passages

If necessary, clean out passages in fluid housing and handle with drill bits. All drill bits are available in an accessory kit. Order kit 256526 for ClearShot Handle Drill Kit; see **Accessories**, page 55.

Clean Impingement Ports

1. Follow **Pressure Relief Procedure**, page 18.
2. Disconnect air (D) and remove fluid manifold (M).




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FIG. 41

3. **Flush Gun**, page 26. If gun will not flush, see **Mix Chamber and Side Seal Assemblies**, page 38.
4. **Remove Front End**, page 36.

5. Loosen A and B side seals two turns.
6. Pull out mix chamber from back of fluid housing. See Table 2 for appropriate size drill to clean ports. Also see identification chart under **Drill Bit Kits**, page 53.

 Some mix chambers have counter bored holes and require two drill sizes to clean impingement ports completely.

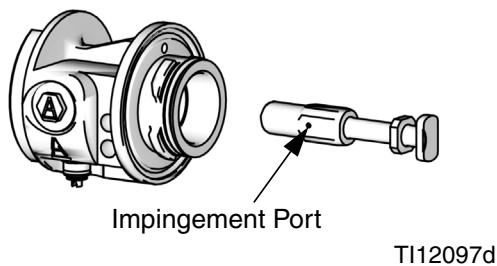


Table 2: Impingement Port Drill Bit Sizes

Mix Chamber	Impingement Port (IP) Drill Bit Size in. (mm)	Counter-bore (CB) Drill Bit Size in. (mm)
RD2020	#76, .020 (0.50)	#53, .060 (1.50)
RD0000	#69, .029 (0.70)	#53, .060 (1.50)
RD0101	#58, .042 (1.00)	N/A
RD4747	.045 (1.15)	N/A
RD0202	#55, .052 (1.30)	N/A
RD0303	#53, .060 (1.50)	N/A
FL2020	#76, .020 (0.50)	#53, .060 (1.50)
FL0000	#69, .029 (0.70)	#53, .060 (1.50)
FL0101	#58, .042 (1.00)	N/A
FL0202	#55, .052 (1.30)	N/A

7. Push mix chamber back into position.
8. Tighten A and B side seals.
9. **Attach Front End**, page 37.
10. Attach fluid manifold (M). Connect air (D). Return gun to service.

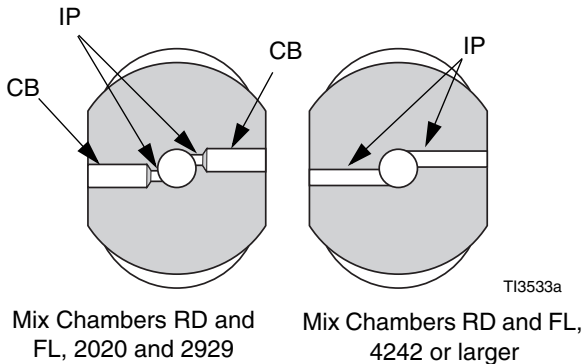


FIG. 42

Troubleshooting

1. Follow **Pressure Relief Procedure**, page 18, before checking or repairing gun.
2. Check all possible problems and causes before disassembling gun.

CAUTION
To prevent cross-contamination of gun's wetted parts, do not interchange A component (isocyanate) and B component (resin) parts.

PROBLEM	CAUSE	SOLUTION
Gun does not fully actuate when triggered.	Safety lock engaged.	Disengage piston safety lock. See Piston Safety Lock , page 13.
	Plugged breather plug (9).	Clean Breather Plug , page 26.
	Damaged air valve o-rings (15).	Replace. See Air Valve , page 43.
Fluid does not spray when gun is fully actuated.	Closed fluid valves (1b).	Open.
	Plugged impingement ports.	Clean Impingement Ports , page 29.
	Plugged check valves (44,45).	Clean. See Check Valves , page 41.
Gun actuates slowly.	Plugged breather plug (9).	Clean Breather Plug , page 26.
	Damaged piston o-rings (4a, 4c).	Replace. See Piston , page 42.
	Dirty air valve, or damaged o-rings (15).	Clean air valve or replace o-rings. See Air Valve , page 43.
Gun delays, then actuates abruptly.	Cured material around side seals (42, 43).	Inspect side seals (42c) and mix chamber (14) for scratches. Replace; see Mix Chamber and Side Seal Assemblies , page 38.
Loss of round pattern.	Dirty mix chamber (14) nozzle.	Clean Mix Chamber Nozzle , page 28.
	Empty ClearShot Liquid cartridge.	Replace. See ClearShot Liquid Cartridge Installation/Removal , page 23.
	ClearShot Liquid dosing pump is not primed.	Prime dosing pump. See ClearShot Liquid Cartridge Installation/Removal , page 23.
Loss of flat pattern.	Plugged spray tip.	Clean in compatible solvent.
	Worn tip.	Replace. See Flat Spray Tips , page 20.
	Empty ClearShot Liquid cartridge.	Replace. See ClearShot Liquid Cartridge Installation/Removal , page 23.
	Dirty mix chamber (14) nozzle.	Clean Mix Chamber Nozzle , page 28.


PROBLEM	CAUSE	SOLUTION
Leakage between flat tip and mix chamber.	Tip not seated properly.	Reassemble. See Flat Spray Tips , page 20.
	Damaged/missing o-ring (47).	Replace. See Flat Spray Tips , page 20.
Pressure imbalance.	Plugged impingement ports.	Clean Impingement Ports , page 29.
	Plugged check valves (44, 45).	Clean. See Check Valves , page 41.
	Viscosities not equal.	Adjust temperature to compensate.
	Plugged fluid screens.	Clean. See Clean or Replace Fluid Screens , page 27.
A and/or B fluid in gun air section.	Damaged side seals (42, 43).	Replace. See Mix Chamber and Side Seal Assemblies , page 38.
	Damaged mix chamber (14).	Replace. See Mix Chamber and Side Seal Assemblies , page 38.
	Damaged side seal o-rings (42d, 42e).	Replace. See Mix Chamber and Side Seal Assemblies , page 38.
	Tightened flat tip retainer with fluid valves (1b) open.	Close valves first.
Fluid mist from mix chamber.	Damaged side seals (42, 43).	Replace. See Mix Chamber and Side Seal Assemblies , page 38.
	Damaged side seal o-rings (42d, 42e).	Replace. See Mix Chamber and Side Seal Assemblies , page 38.
	Damaged mix chamber (14).	Replace. See Mix Chamber and Side Seal Assemblies , page 38.
	Dosed ClearShot Liquid normal.	No action required.
Rapid buildup of material on air cap.	Plugged front cover holes.	Clean or Replace Front Cover and Retainer , page 26.
	Damaged/missing fluid housing o-ring (2b or 2c).	Replace. See Parts , page 44.
	Damaged front o-ring (2b).	Replace. See Parts , page 44.
Reduced cleanoff air.	Damaged fluid housing o-ring (2d).	Replace. See Parts , page 44.
Excessive purge air when fluid valves are closed and gun is de-triggered.	Damaged/missing fluid housing o-ring (2c).	Replace. See Parts , page 44.
Fluid does not shut off when fluid valves are closed.	Damaged fluid valves (1b).	Replace. See Parts , page 44.
Burst of air from muffler when gun is triggered.	Normal.	No action required.

PROBLEM	CAUSE	SOLUTION
Steady air leakage from muffler.	Damaged air valve o-rings (4d).	Replace. See Air Valve , page 43.
	Damaged piston o-rings (4a, 4c).	Replace. See Piston , page 42.
Air leakage from front air valve.	Damaged air valve o-rings (4d).	Replace. See Air Valve , page 43.
Air leak between handle and fluid housing	Damaged o-ring (2c or 2d).	Replace. See Parts , page 44.
Cannot tighten front cover retainer (20) until it bottoms out.	Installing round mix chamber front cover on a flat tip gun.	Inspect front cover for flat tips 256416 and for round tips 256414.
Gun does not dose ClearShot Liquid.	Empty ClearShot Liquid cartridge.	Replace. See ClearShot Liquid Cartridge Installation/Removal , page 23.
	ClearShot Liquid dosing pump is not primed.	Prime dosing pump. See ClearShot Liquid Cartridge Installation/Removal , page 23.
	Damaged cartridge o-rings.	Replace. See ClearShot Liquid Cartridge Installation/Removal , page 23.
	Damaged or cracked cartridge.	Replace. See ClearShot Liquid Cartridge Installation/Removal , page 23.
	Damaged dosing piston.	Repair. See Piston , page 42.
Excessive ClearShot Liquid dosing; producing less than 1000 doses per cartridge.	Non-regulated air supply to gun.	Regulate air supply to gun.
	Excessive air pressure at gun.	Regulate air supply to 80 psi (0.56 MPa, 5.6 bar).
	Damaged or dirty o-rings on air piston and/or dosing piston.	Repair or clean o-rings. See Piston , page 42.
ClearShot Liquid cartridge installation or removal is difficult.	Friction between cartridge o-rings and cartridge bore.	Lubricate cartridge o-rings and/or cartridge bore with a few drops of ClearShot Liquid. See, page 23.
ClearShot Liquid cartridge is pressure locked in cartridge bore.	Cartridge is empty. Temporary cartridge pressure lock.	Engage piston safety lock and trigger gun 20 times to bleed pressure in cartridge. See ClearShot Liquid Cartridge Installation/Removal , page 23.

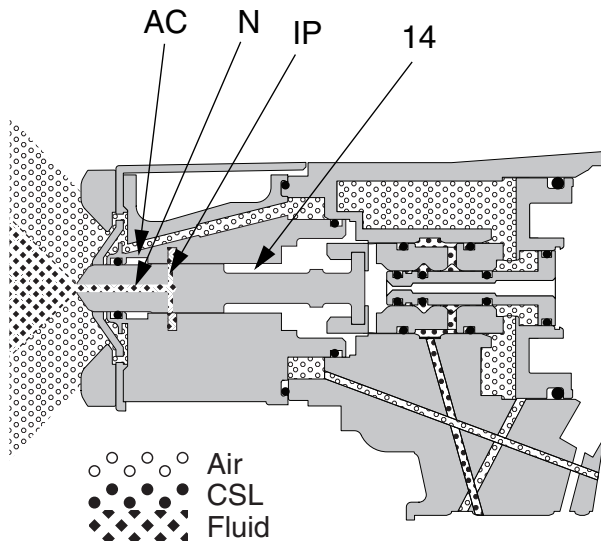
Theory of Operation

Gun Triggered (Fluid Spraying)

Mix chamber (14) moves back, shutting off purge air flow. Impingement ports (IP) align with fluid ports of side seals (42, 43), allowing fluid to flow through mix chamber nozzle (N).

 Flow paths are not shown to scale, for clarity.


CSL is dosed into purge air.



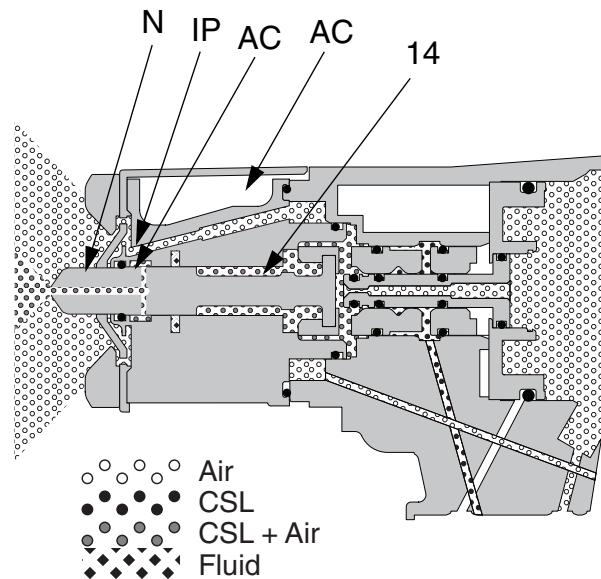
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Gun Detriggered (Air Purging)

Mix chamber (14) moves forward, shutting off fluid flow. Impingement ports (IP) open to air chamber (AC), allowing purge air to flow through mix chamber nozzle (N).

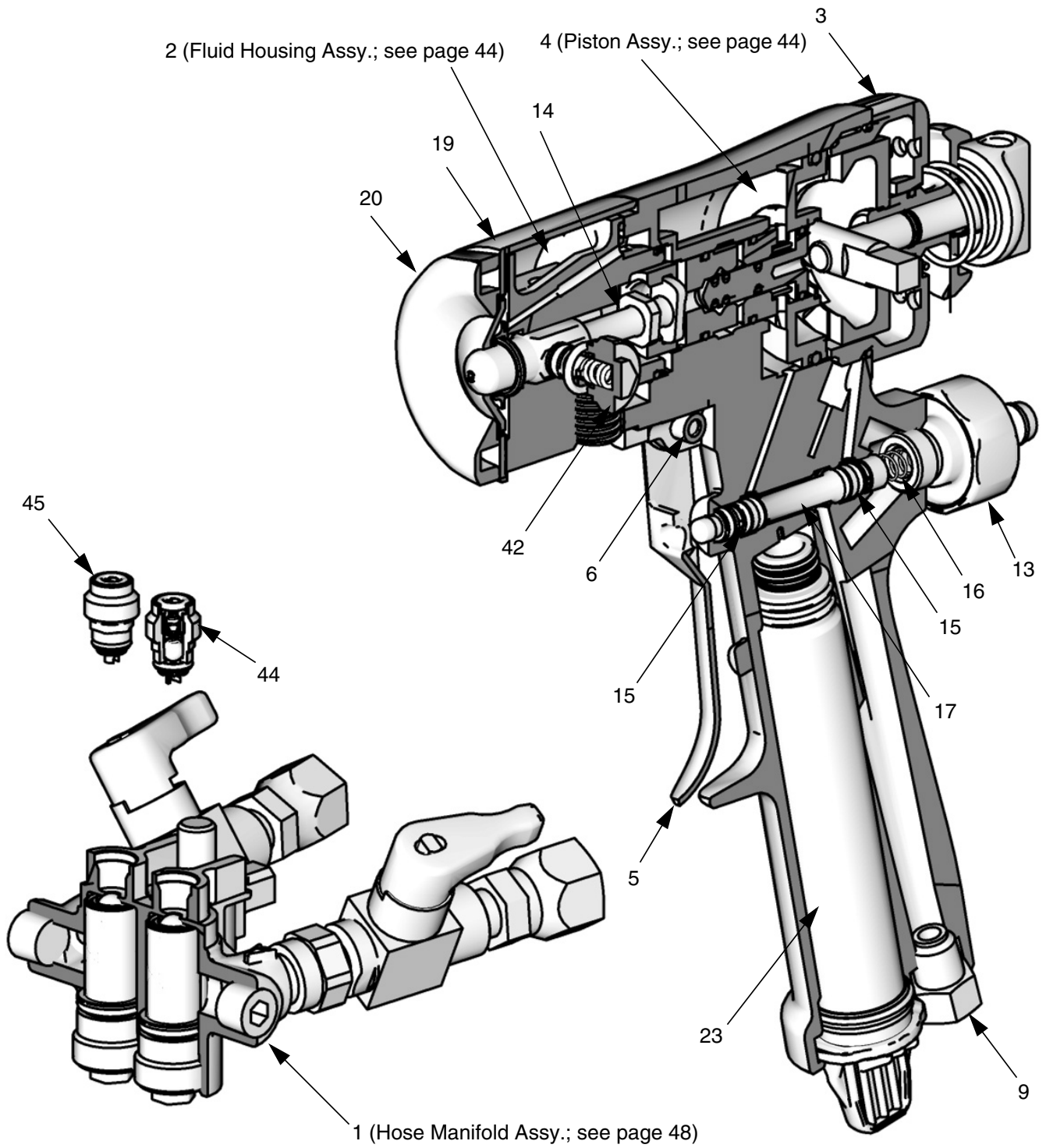
 Flow paths are not shown to scale, for clarity.

CSL is dosed into purge air.



TI12124a

Cutaway View



T112091a

Repair


Tools Required

Tools required to complete gun repair procedures:



- adjustable wrench
- flat head screwdriver (included)
- 5/16 hex nut driver (included)

Lubrication

See page 55 to order lubricant. Liberally lubricate all o-rings, seals, and threads.

 Do not lubricate o-ring, seals, and threads on ClearShot Liquid cartridge.

Remove Front End

					
<p>Proper attachment of front end is critical. Do not operate gun if front end is loose or not snug against handle.</p>					

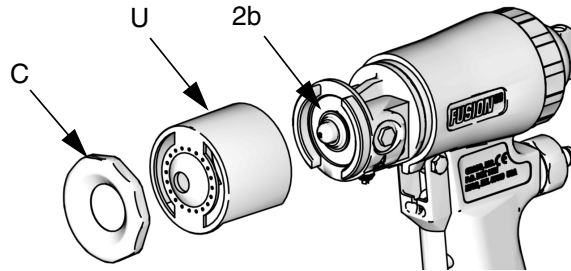
1. Follow **Pressure Relief Procedure**, page page 18.
2. **Flush Gun**, page 26.

CAUTION

If front cover retainer (C) and front cover (U) are stuck due to material buildup, do not force it by turning entire front end. Soak front of gun in solvent to soften cured material and free front cover and front cover retainer.

3. Use hex nut driver to remove fluid manifold (M).

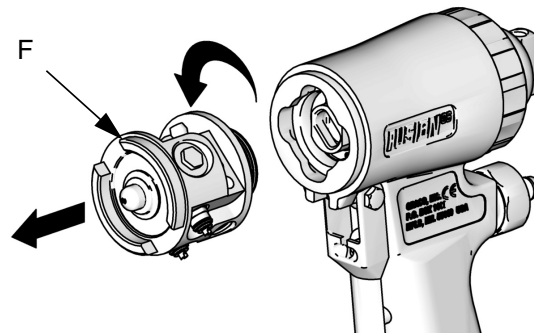
4. Unscrew and remove front cover retainer (C).
5. Remove front cover (U).



TI12092d

FIG. 43

6. Turn fluid housing (F) 1/4 turn counter-clockwise to disengage slots. Remove fluid housing.





TI12093a

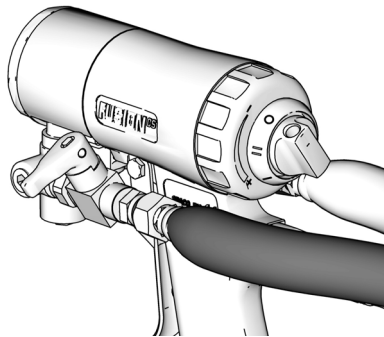
FIG. 44

7. Inspect fluid housing o-rings for wear or damage. Replace if necessary.

Attach Front End

					
<p>Proper attachment of front end is critical. Do not operate gun if front end is loose or not snug against handle.</p>					

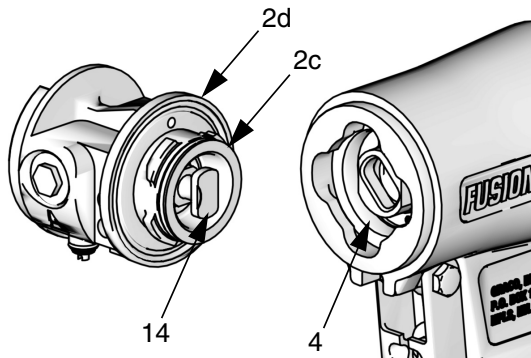
1. Engage piston safety lock, page 13.



TI11326a

FIG. 45

2. Liberally lubricate o-rings (2c, 2d) and reassemble on fluid housing. Insert keyed end of mix chamber (14) in socket of piston assembly (4).

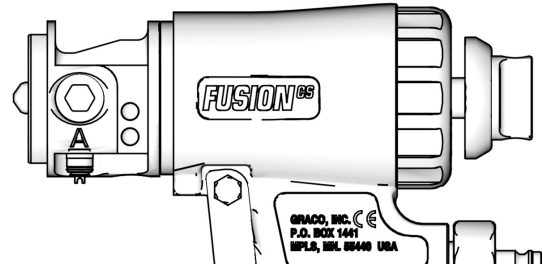


TI12129d

FIG. 46

3. Push fluid housing (F) flush to handle.

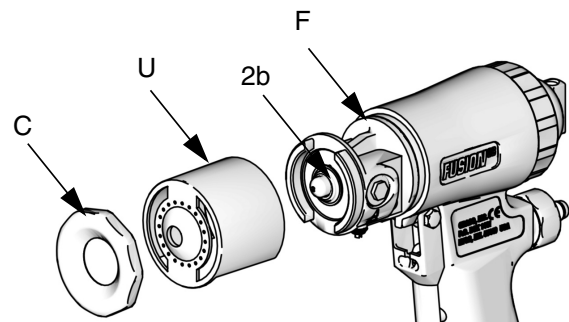
4. Turn fluid housing 1/4 turn clockwise to engage slots.



TI12094d

FIG. 47

5. Replace front cover (U).
6. Screw on front cover retainer (C).



TI12092d

FIG. 48

Mix Chamber and Side Seal Assemblies

See **Models/Mix Chamber Selection Guide**, page 4, for available mix chamber sizes.

1. Follow **Pressure Relief Procedure**, page 18.
2. Remove fluid manifold (M). Leave air connected.

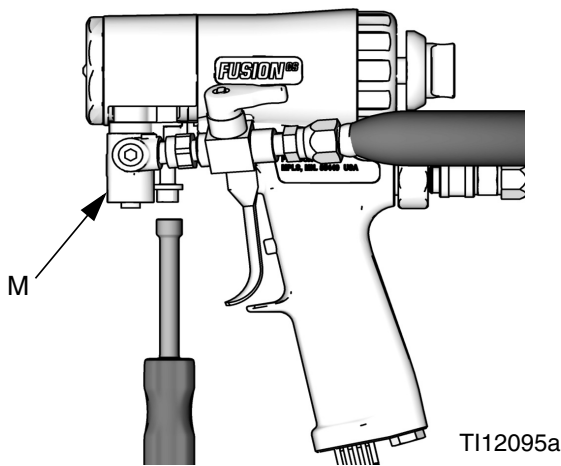


FIG. 49

3. Flush gun to remove residual A and B components. See **Flush Gun**, page 26. Follow **Pressure Relief Procedure**, page 18.
4. Disconnect air (D).

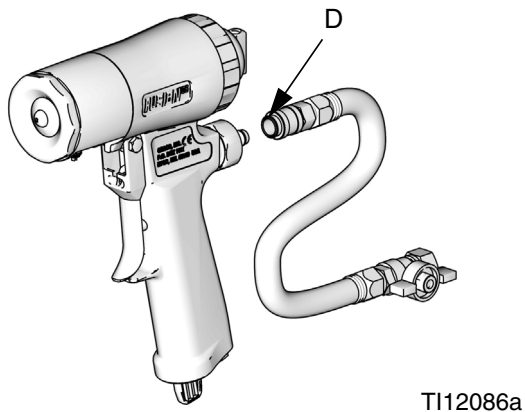


FIG. 50

5. Remove Front End, page 36.

CAUTION

To prevent cross-contamination of side seal assemblies, do not interchange A component and B component parts. The A component assembly is marked with an A.

6. Use hex nut driver to remove side seal assemblies (42, 43).

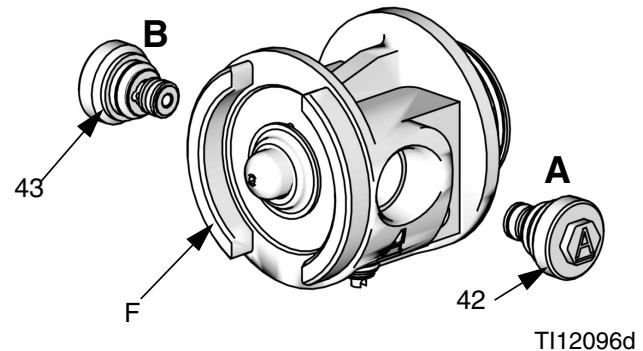


FIG. 51

7. Push on front of mix chamber (14) to loosen. Pull mix chamber out rear of fluid housing (F). Inspect for damage and **Clean Impingement Ports**, page 29.

CAUTION

To prevent cross-contamination of the gun's wetted parts, mix chamber is marked with an A and a notch on back edge. Be sure the A side of mix chamber is on the A side of gun.

8. Apply thin coat of lubricant to mix chamber (14). Install mix chamber. Etched **A** and notch must be on same side as **A** on fluid housing. Mix chamber is keyed to fit in fluid housing.

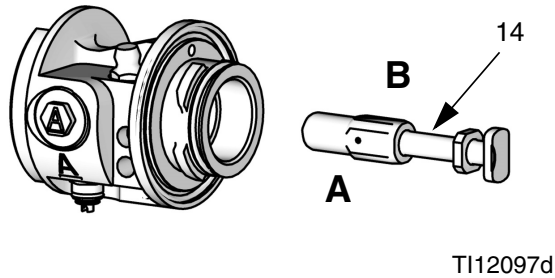


FIG. 52

11. Line up tabs on seal (42c) and seal housing (42a); insert seal into housing. Push down on seal and turn to lock in place.

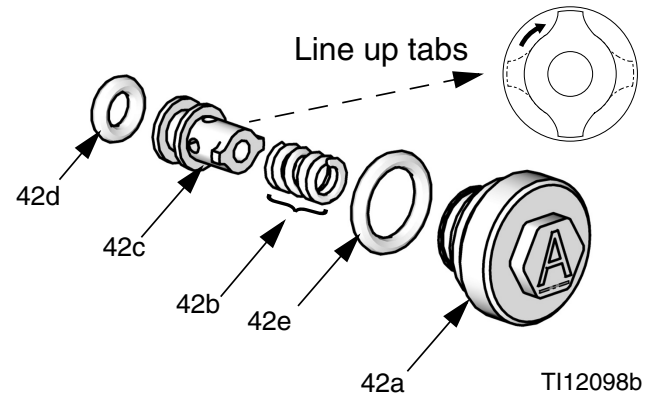


FIG. 53

CAUTION
To prevent cross-contamination of side seal assemblies, do not interchange A component and B component parts. The A component assembly is marked with an A.

9. Push down on seal housing (42a) and turn so side seal detents unlock and remove.
10. Carefully inspect side seal assembly o-rings and surfaces. Replace worn or damaged parts. Liberally lubricate o-rings (42d, 42e) and reassemble.

12. Check for proper spring (42b) operation, and that the seal (42c) rotates slightly in the seal housing (42a) detents.

When the seal is installed correctly the spring will be flexible and all four cross holes of the seal will be completely visible. See FIG. 54 for an example of the correct and incorrect seal installation.

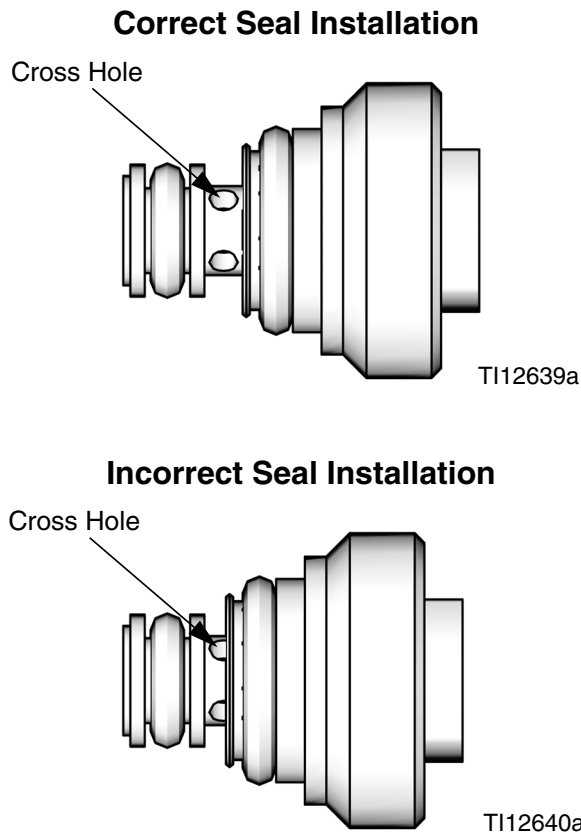


FIG. 54

13. Liberally lubricate and reinstall side seal assemblies (42, 43). Use hex nut driver to tighten.

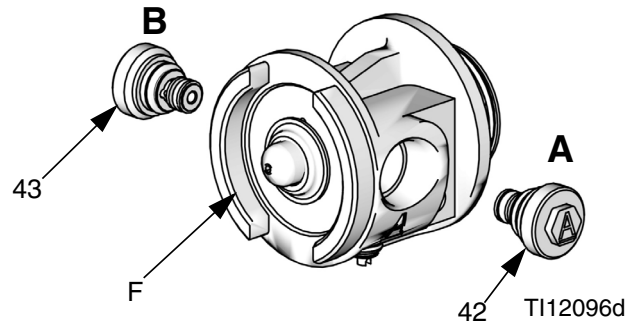
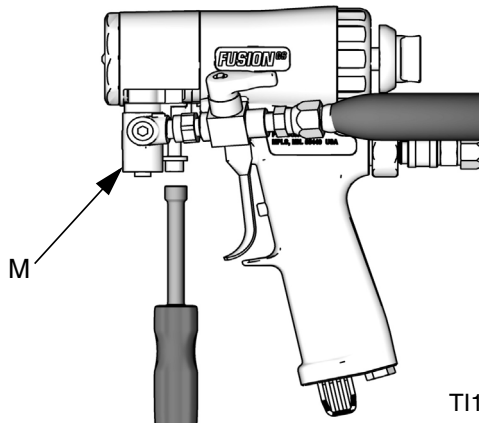


FIG. 55

14. **Attach Front End**, page 37.
15. Connect air, and trigger the gun a few times to check for leaks. If purge air leaks from mix chamber nozzle when gun is triggered, inspect mix chamber and side seals. Correct the problem before attaching fluid manifold.
16. Attach fluid manifold (F). Connect air. Return gun to service.

Check Valves

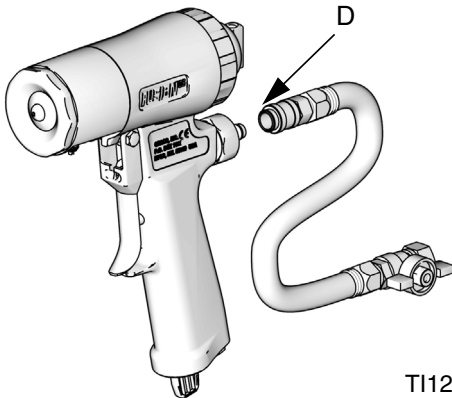
1. Follow **Pressure Relief Procedure**, page 18.
2. Remove fluid manifold (M). Leave air connected. **Clean Fluid Manifold**, page 27.



TI12095a

FIG. 56

3. Flush gun to remove residual A and B components. See **Flush Gun**, page 26. Follow **Pressure Relief Procedure**, page 18.
4. Disconnect air (D).



TI12086a

FIG. 57

CAUTION

To prevent cross-contamination of the check valves, do not interchange A component and B component parts. The A component check valve is marked with an A.

5. Use hex nut driver to remove check valves (44, 45).
6. Disassemble check valves using a flat head screwdriver.

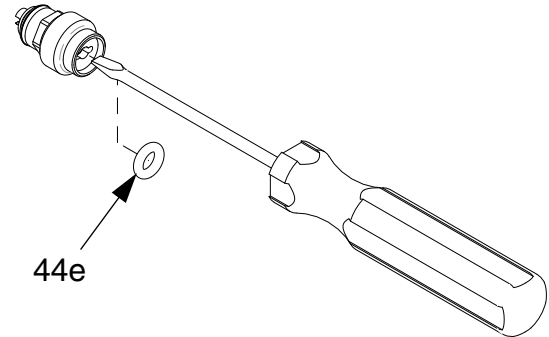
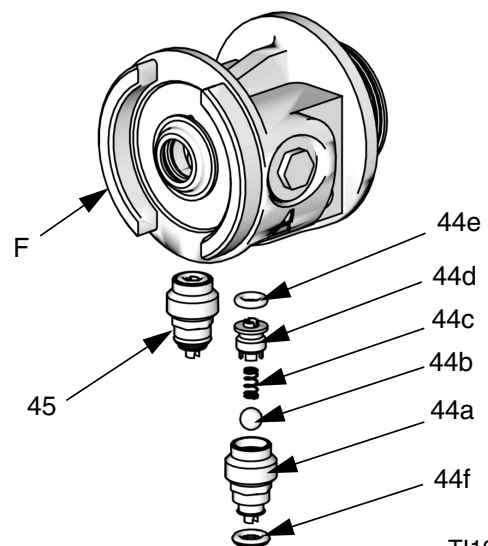


FIG. 58

CAUTION

Damaged check valve o-rings (44e, 44f) may result in external leakage. Replace o-rings if they are damaged.

7. Clean and inspect all parts. Thoroughly inspect o-rings (44e, 44f). Press on ball (44b) to test check valve for proper movement and spring action. Replace individual check valve parts as needed.



TI12099d

FIG. 59

8. Liberally lubricate o-rings (44e, 44f) and carefully reinstall in fluid housing (F). Use hex nut driver to tighten.
9. Attach fluid manifold (M). Connect air (D). Return gun to service.

Piston

1. Follow **Pressure Relief Procedure**, page 18
2. Disconnect air (D) and remove fluid manifold (M).

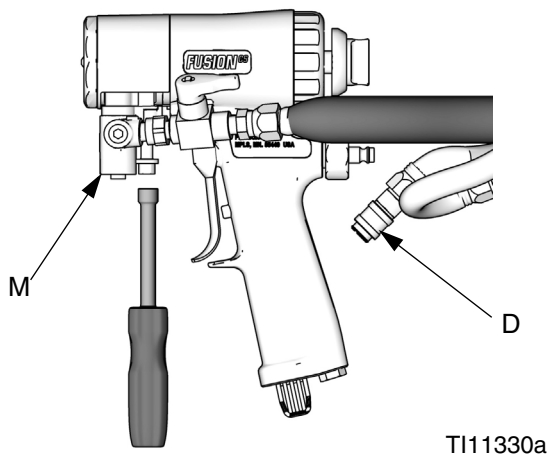


FIG. 60

3. **Remove Front End**, page 36.
4. Unscrew variable flow adjustment knob (X) and inspect o-ring (3a).

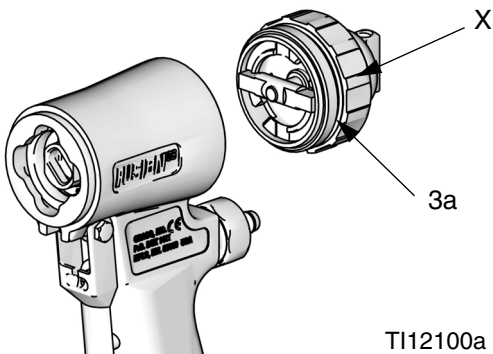


FIG. 61

5. Push piston shaft to remove piston (4b). Inspect piston o-ring (4c) and shaft o-rings (4a).

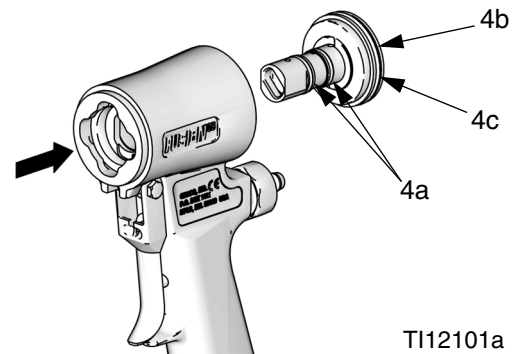
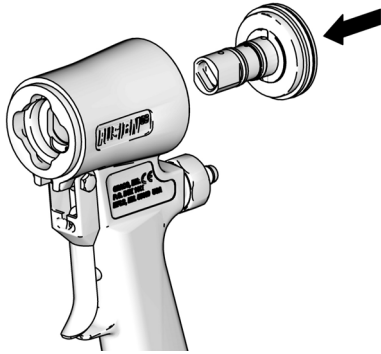


FIG. 62

6. Remove dosing piston.
 - a. Use supplied screw driver to remove spiral retaining ring (4g).
 - b. Use screw driver to push dosing piston (4e) out back of piston (4b) through access hole on front side.
7. Clean and inspect o-rings on dosing piston (4e). Clean dosing bore in piston (4b) with a nylon brush and compatible solvent.
8. Lubricate dosing piston (4e) o-rings with ClearShot Liquid prior to reassembly.
9. Liberally lubricate piston o-ring (4c) and lightly lubricate shaft o-rings (4a).
10. Reinstall retaining ring (4g). Press it into groove of dosing piston (4e).

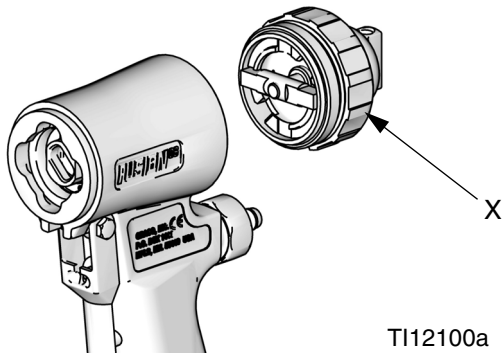
11. Reinstall piston. Shaft is keyed for proper assembly. Push firmly to seat piston.



TI12102a

FIG. 63

12. Install variable flow adjustment knob (X).



TI12100a

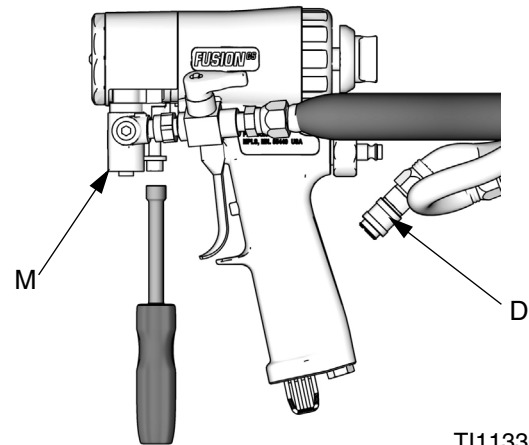
FIG. 64

13. Attach Front End, page 37.
14. Attach fluid manifold (M).
15. Install ClearShot Liquid cartridge. See **ClearShot Liquid Cartridge Installation/Removal**, page 23.
16. Connect air. Return gun to service.

Air Valve

1. Follow **Pressure Relief Procedure**, page 18

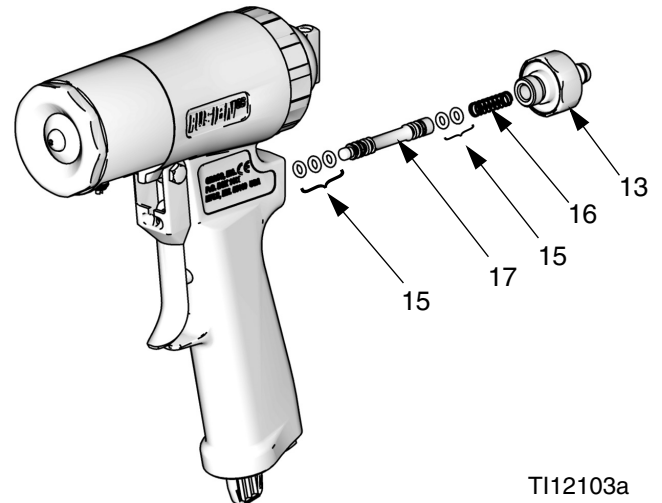
2. Disconnect air (D) and remove fluid manifold (M).



TI11330a

FIG. 65

3. Unscrew air valve plug (13) and remove spring (16). Using a small diameter tool, push spool (17) out from front. Inspect all five o-rings (15).

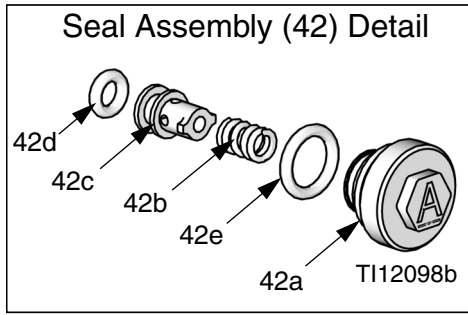


TI12103a

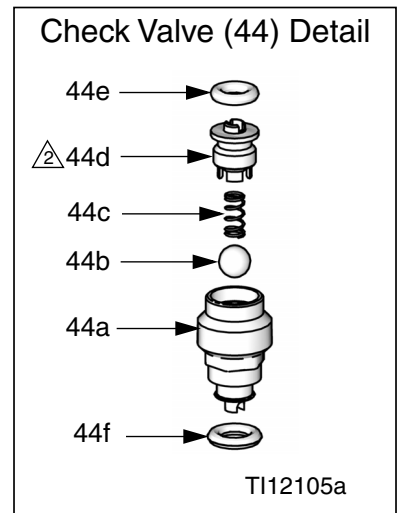
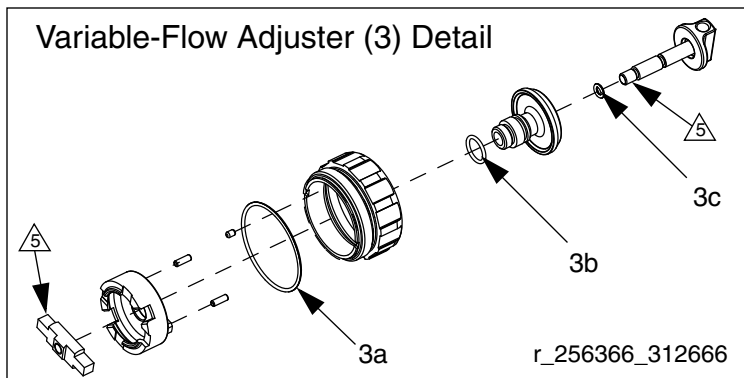
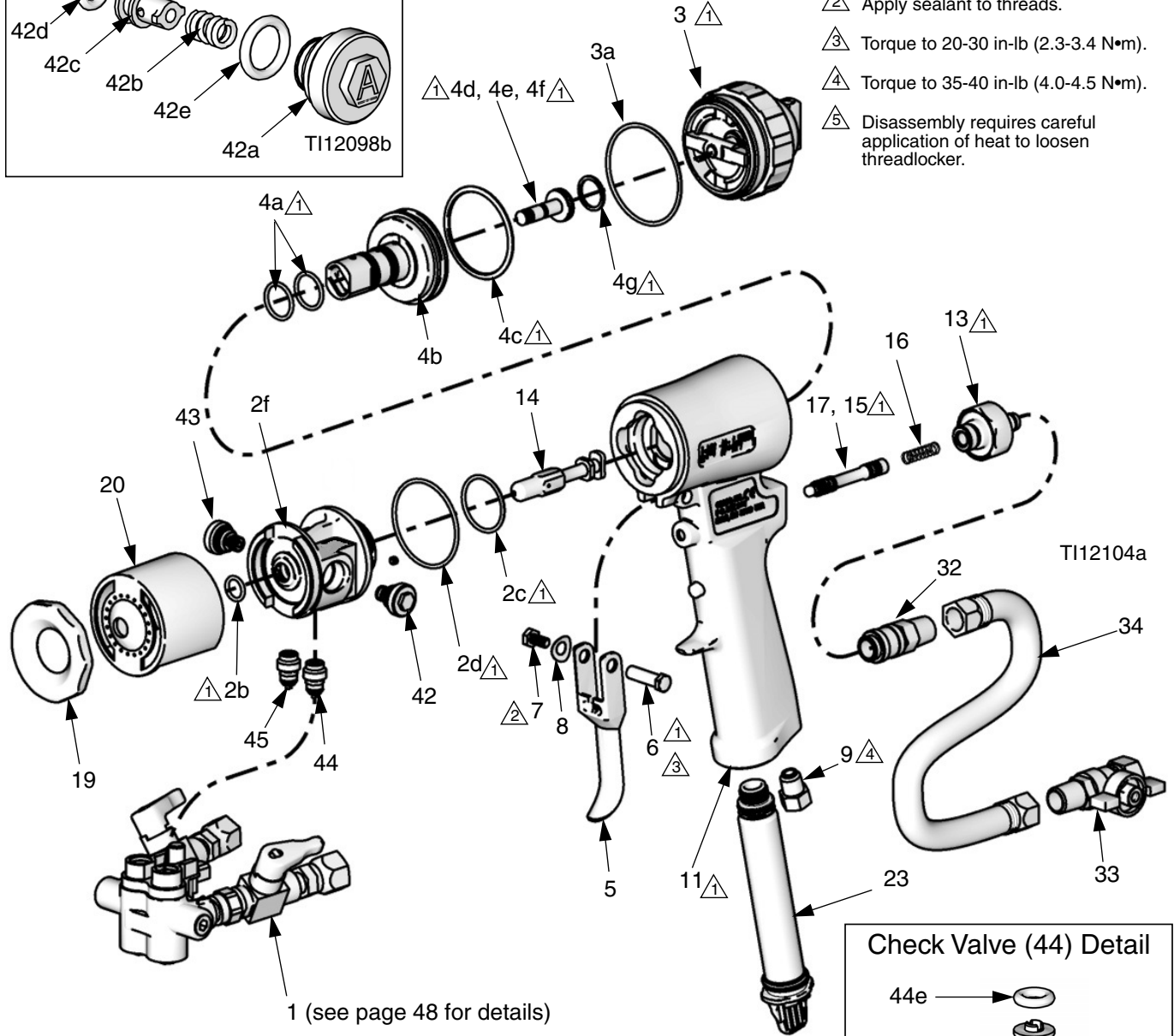
FIG. 66

4. Liberally lubricate o-rings and reassemble. Torque plug (13) to 25-135 in-lb (14-15 N•m).
5. Attach fluid manifold (M). Connect air (D). Return gun to service.

Parts



- ① Apply light coating of Fusion grease (31).
- ② Apply sealant to threads.
- ③ Torque to 20-30 in-lb (2.3-3.4 N•m).
- ④ Torque to 35-40 in-lb (4.0-4.5 N•m).
- ⑤ Disassembly requires careful application of heat to loosen threadlocker.



Parts

Ref.	Part	Description	Qty.	Ref.	Part	Description	Qty.
1	256466	MANIFOLD, hose, assy.	1	16	117485	SPRING, compression	1
1a		MANIFOLD	1	17	256455	VALVE, spool; includes 15	1
1d	15B221	BOLT; 5/16-24	3	19	256414	RETAINER, cover (pack of 5)	1
1e	100139	PLUG, pipe	1	20	✖256415	COVER, front, round, tip (pack of 5)	1
1f	117634	SWIVEL, union; #6 JIC	1		✖256416	COVER, front, flat, tip (pack of 5)	1
1g	117635	SWIVEL, union	1	21✖*		TIP, spray	1
1h†	256460	VALVE, ball, resin	1	23★	256385	KIT, clearshot cartridge (pack of 25)	1
1j†	256459	VALVE, ball, iso	1	25❖		TOOL, cleanout	1
1k	15U395	ADAPTER, male x female; 1/8 npt	2	26❖		TOOL, cleanout	1
2	256457	HOUSING, fluid, assy; includes 2b-2f and 42-45	1	27❖		TOOL, cleanout, #69	1
2b✓	248648	O-RING (pack of 6)	1	28	117661	PIN, vise	1
2c✓	256773	O-RING (pack of 6)	1	31†	118665	GREASE, Fusion; 4 oz	1
2d✓	248132	O-RING (pack of 6)	1	32	117510	COUPLER, line, air; 1/4 npt	1
2f		HOUSING	1	33	15B565	VALVE, ball	1
3	256456	ADJUSTER, variable-flow	1	34	15B772	HOSE, air; 18 in.	1
3a✓	256774	O-RING (pack of 6)	1	35	112307	ELBOW, street	2
3b	257426	O-RING (pack of 6)	1	36	117642	NUT DRIVER	1
3c	257425	O-RING (pack of 6)	1	37	118575	SCREW DRIVER, 1/8 blade	1
4	256454	PISTON, assy.	1	38▲	172479	TAG, instruction	1
4a✓	256772	O-RING (pack of 6)	2	39▲	222385	TAG, warning	1
4b		PISTON	1	40	256641	MANIFOLD, flush; includes 1d, 49, and 50.	1
4c✓	256775	O-RING (pack of 6)	1	41	256642	KIT, inlet cap; includes 1d	1
4d		O-RING	3	42	256463	KIT, seal, a side, assy; includes 42a-42e and 43	1
4e	257424	PISTON, dosing, assy; includes 4d and 4f	1	42a		HOUSING, seal, side	1
4f	257426	O-RING (pack of 6)	1	42b	256923	SPRING, compression (pack of 10)	1
4g	121642	RING, retaining, internal spiral	1	42c*	256464	SEAL, side; includes 42d	1
5	15B209	TRIGGER	1	42d✓	256467	O-RING (pack of 6)	1
6	192272	PIN, pivot	1	42e✓	256468	O-RING (pack of 6)	1
7	203953	SCREW; 10-24 x 3/8 in. (10 mm)	1	43†	256463	KIT, seal, b side, assy; includes 42 and 43a-43e	1
8	15C480	WASHER, wave	1	43a		HOUSING, seal, side	1
9	121540	PLUG, breather	1	43b	256923	SPRING, compression	1
11	256458	HANDLE, kit; includes ref. 12	1	43c*	256464	SEAL, side; includes 43d	1
13	15T897	PLUG, air valve	1	43d✓	256467	O-RING (pack of 6)	1
14❖		CHAMBER, mix	1	43e✓	256468	O-RING (pack of 6)	1
15		O-RING	5				

Ref.	Part	Description	Qty.
44◆	257422	KIT, valve, check, a side; includes 44a-44f	1
44a	257427	HOUSING, check valve, a side (pack of 10)	1
44b	257420	BALL; carbide (pack of 10)	1
44c	257419	SPRING, compression (pack of 10)	1
44d	257421	RETAINER, ball (pack of 10)	1
44e✓	246354	O-RING (pack of 6)	1
44f✓	256771	O-RING (pack of 6)	1
45◆†	257423	KIT, valve, check, b side; includes 45a-45f	1
45a	257428	HOUSING, check valve, b side (pack of 10)	1
45b	257420	BALL; carbide (pack of 10)	1
45c	257419	SPRING, compression (pack of 10)	1
45d	257421	RETAINER, ball (pack of 10)	1
45e✓	246354	O-RING (pack of 6)	1
45f✓	256771	O-RING (pack of 6)	1
46✖	256567	RETAINER, tip	1
47✖✱	246360	O-RING; PTFE (pack of 3)	1
49	100721	PLUG, pipe	1
50	117509	FITTING, air line; 1/4 npt	1
51•	25A677	VALVE, check, a side	1
51a		HOUSING, a side	1
51b✓	256469	O-RING (pack of 6)	1
51c		SCREEN, filter (see page 52)	1
51d	113876	SPRING	1
51e	25A679	BALL, check (pack of 10)	1
51f	25A680	RETAINER, ball check	1
52•†	25A678	VALVE, check, b side	1
52a		HOUSING, b side	1
52b✓	256469	O-RING (pack of 6)	1
52c		SCREEN, filter (see page 52)	1
52d	113876	SPRING	1
52e	25A679	BALL, check (pack of 10)	1
52f	25A680	RETAINER, ball check	1

▲ Replacement Danger and Warning labels, tags, and cards are available at no cost.

† Not shown.

✖ Wide and round pattern models only.

✖ Flat pattern models only.

❖ See tables on page 47 for kit number.

✓ Also included in o-ring repair kit(s); see page 51.

★ ClearShot Liquid cartridges also available in packages of 50 and 100. See **Accessories**, page 55.

* Side seals also available in packages of 2 and 20. See **Accessories**, page 55.

✱ Also included in Kits FL0000, FL0101, FL0202, and FL2020.

◆ Parts included in kit 256461.

* See **Flat Tip Kits**, page 50, for part number.

‡ Replacement handles are available in Kit 24W375.

• Parts included in kit 256462.

Wide and Round Pattern Models Varying Parts Table

Model	Reference Number			
	14	25	26	27
CS00WD	Order Kit WD0000			
CS01WD	Order Kit WD0101			
CS02WD	Order Kit WD0202			
CS03WD	Order Kit WD0303			
CS22WD	Order Kit WD2222			
CS01RD	Order Kit RD0101			
17S890	Order Kit RD4747			
CS02RD	Order Kit RD0202			
CS03RD	Order Kit RD0303			
CS20RD	Order Kit RD2020			
CS00RD	Order Kit RD0000			

Flat Pattern Models Varying Parts Table

Model	Reference Number			
	14	25	26	27
CS00F1	Order Kit FL0000			
CS00F2	Order Kit FL0000			
CS00F3	Order Kit FL0000			
CS00F4	Order Kit FL0000			
CS00F5	Order Kit FL0000			
CS00F6	Order Kit FL0000			
CS01F1	Order Kit FL0101			
CS01F2	Order Kit FL0101			
CS01F3	Order Kit FL0101			
CS01F4	Order Kit FL0101			
CS01F5	Order Kit FL0101			
CS01F6	Order Kit FL0101			
CS02F1	Order Kit FL0202			
CS02F2	Order Kit FL0202			
CS02F3	Order Kit FL0202			
CS02F4	Order Kit FL0202			
CS02F5	Order Kit FL0202			
CS02F6	Order Kit FL0202			
CS20F1	Order Kit FL2020			
CS20F2	Order Kit FL2020			

Convert Round Pattern to Flat Pattern

To convert a round pattern gun to a flat pattern gun, order the following parts.

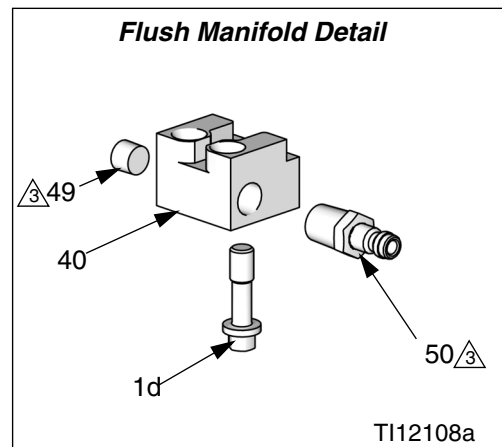
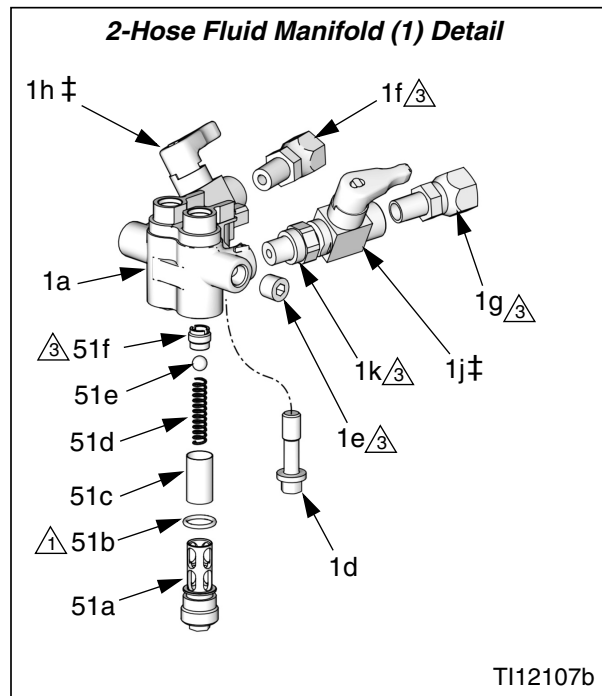
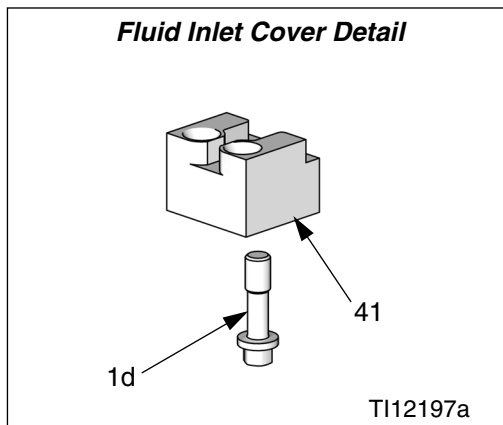
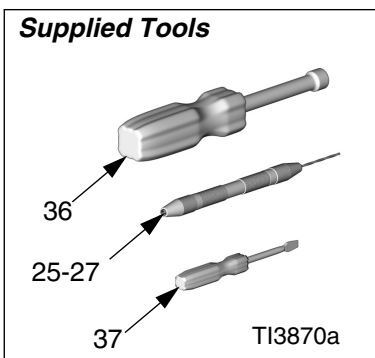
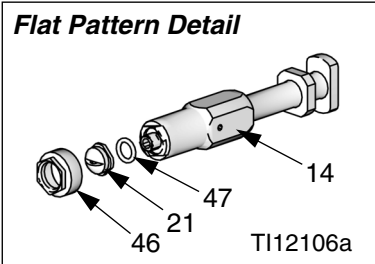
Ref.	Part	Description	Qty.
14	FLxxxx	CHAMBER, mix; see Flat Pattern Mix Chamber Kits , page 50	1
20	256416	COVER, front, flat, tip (pack of 5)	1
21	FTxxxx	TIP, spray; see Flat Tip Part Reference Guide , page 50	1
46	256567	RETAINER, tip	1

Convert Flat Pattern to Round Pattern

To convert a flat pattern gun to a round pattern gun, order the following parts.

Ref.	Part	Description	Qty.
14	RDxxxx	CHAMBER, mix; see Round Pattern Mix Chamber Kits , page 49	1
	WDxxxx	CHAMBER, mix; see Wide Pattern Mix Chamber Kits , page 49	
20	256415	COVER, front, round, tip (pack of 5)	1

Detail Views



- ‡1 Apply lubricant to seals.
- ‡3 Apply sealant to threads.

Mix Chamber Kits

Round Pattern Mix Chamber Kits

Mix Chamber Kit (includes drill bits)	Pattern Diameter at 24 in. (609.6 mm) to target in (mm)	Nozzle Orifice Size	Nozzle Drill Bit Size, in. (mm)	Impingement Port Size	Impingement Port Drill Bit Size, in. (mm)	Counter-bore Size	Counter-bore Drill Bit Size, in. (mm)
RD2020	5 (127)	0.042	#58 (1.00)	0.020	#76 (0.50)	0.060	#53 (1.50)
RD0000	8 (203)	0.052	#55 (1.30)	0.029	#69 (0.70)	0.060	#53 (1.50)
RD0101	11 (279)	0.060	#53 (1.50)	0.042	#58 (1.00)	N/A	N/A
RD4747	11.5 (292)	0.0635	1/16 (1.55)	0.047	(1.15)	N/A	N/A
RD0202	12 (305)	0.070	#50 (1.75)	0.052	#55 (1.30)	N/A	N/A
RD0303	14 (356)	0.086	#44 (2.15)	0.060	#53 (1.50)	N/A	N/A

Wide Pattern Mix Chamber Kits

Kits include mix chamber and cleanout drills. To spray larger diameter patterns than standard mix chambers.

Kit Part	Pattern Diameter at 24 in. (609.6 mm) to target in (mm)	Equivalent flow to mix chamber size	Nozzle Drill Bit Size in (mm) *	Impingement Drill Bit Size in. (mm) *
WD2222	8 (203.2)	N/A	0.047 (1.20)	#74, 0.022 (0.56)
WD0000	15 (381.0)	Ref. RD0000	1/16, 0.062 (1.59)	#70, 0.028 (0.71)
WD0101	16 (406.4)	Ref. RD0101	#50, 0.070 (1.78)	#61, 0.039 (0.99)
WD0202	18 (457.2)	Ref. RD0202	0.085 (2.15)	#56, 0.046 (1.17)
WD0303	18 (457.2)	Ref. RD0303	#42, 0.089 (2.26)	1.45 mm, 0.057 (1.45)

Flat Pattern Mix Chamber Kits

Mix Chamber Kit (includes drill bits and o-ring)	Ref. 47†, O-ring	Nozzle Orifice Size	Nozzle Drill Bit Size, in. (mm)	Impingement Port Size	Impingement Port Drill Bit Size, in. (mm)	Counter-bore Size	Counter-bore Drill Bit Size, in. (mm)
FL2020	246360	0.094	3/32 (2.35)	0.020	#76 (0.50)	0.060	#53 (1.50)
FL0000	246360	0.094	3/32 (2.35)	0.029	#69 (0.70)	0.060	#53 (1.50)
FL0101	246360	0.094	3/32 (2.35)	0.042	#58 (1.00)	N/A	N/A
FL0202	246360	0.094	3/32 (2.35)	0.052	#55 (1.30)	N/A	N/A

† Available only in flat mix chamber kits or in 246360 multi-pack kit.

Mix Chamber Part Reference Guide

Sample part RD0101:

RD	01	01
RD= round pattern	A orifice size (0.042 in.)	B orifice size (0.042 in.)
FL= flat pattern		
WD = wide pattern		

Flat Tip Kits

Flat Pattern Model	Ref. 21, Spray Tip	Pattern Size, in. (mm)
CSxxF1	FT0424	low flow, 8-10 (203-254)
CSxxF2	FT0438	medium flow, 8-10 (203-254)
CSxxF3	FT0624	low flow, 12-14 (305-356)
CSxxF4	FT0638	medium flow, 12-14 (305-356)
CSxxF5	FT0838	medium flow, 16-18 (406-457)
CSxxF6	FT0848	high flow, 16-18 (406-457)

Flat Tip Part Reference Guide

Sample part FT0848:

FT	08	48
FT=Flat tip	x2=pattern length (8x2=16 in.)	Equivalent orifice diameter size (.048 in.)

O-ring Repair Kits

The following table indicates the specific o-ring(s) reference number and quantity included in each o-ring kit.

Kit	Reference Number										
	51b, 52b	2b	2c	2d	3a	4a	4c	42d, 43d	42e, 43e	44e, 45e	44f, 45f
256490 Complete Kit	2	1	1	1	1	2	1	2	2	2	2
256467 Side Seal								6			
256468 Side Seal Housing									6		
256640 Fluid Head Check Valves										6	6
256471 Fluid Head		1	1	1							
256470 Air Piston						2	1				
256472 Back Cap					1						
256469 Hose Manifold Check Valves	6										

Bulk O-ring Kits

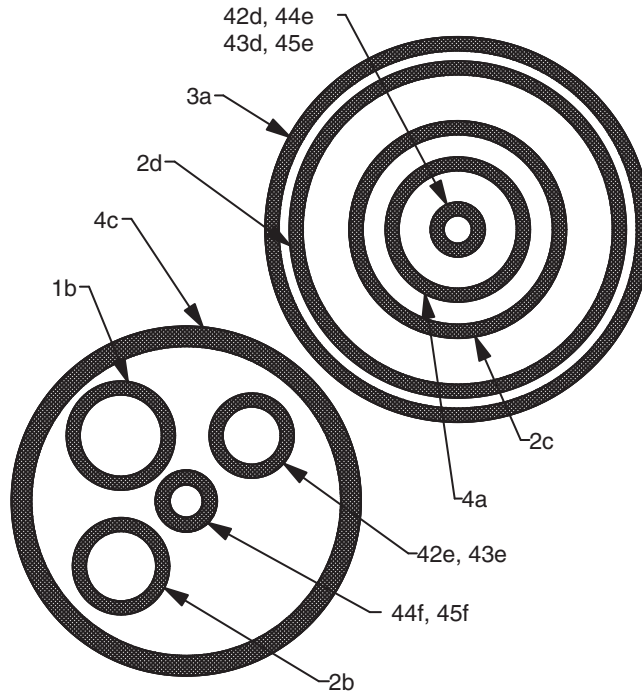
The following table indicates the specific o-ring(s) reference number and corresponding kit number. Each kit includes a quantity of six o-rings.

Kit	Reference Number										
	51b, 52b	2b	2c	2d	3a	4a	4c	42d, 43d	42e, 43e	44e, 45e	44f, 45f
	256469	248648	256773	248132	256774	256772	256775	*256467	256468	246354	256771

* Includes installation tools and side seal springs.

Complete O-ring Kit Placement Guide

Each o-ring in kit 256490 is labeled by the reference number. See the table entry for 256490 in **O-ring Repair Kits** on page 51 for the quantity of each.




Check Valve Filter Screen Kits

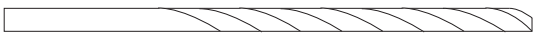

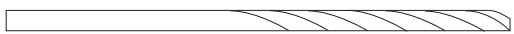

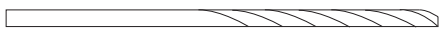
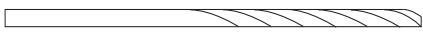
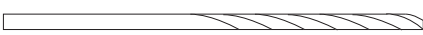

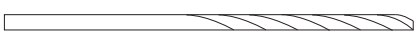
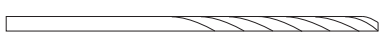
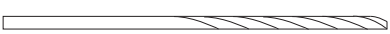

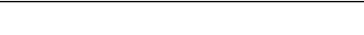

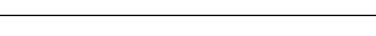

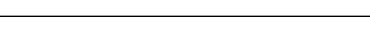
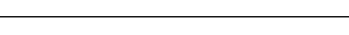

Kits include 10 filter screens.
The 80 mesh filter screen is standard with gun.














Part	Description
246357	40 mesh (0.015 in., 375 micron)
246358	60 mesh (0.010 in., 238 micron)
246359	80 mesh (0.007 in., 175 micron)

Drill Bit Kits

For cleaning gun ports and orifices. Illustrations are actual size for comparison.

 Not all sizes are used with every gun model.

Kit Part	Qty in Kit	Drill Bit Size			Illustration
		nominal	in.	mm	
249115	6	1/8	0.125	3.18	
246623	3	#32	0.116	2.90	
246810	3	7/64	0.109	2.77	
246813	3	#39	0.099	2.51	
246624	3	3/32	0.094	2.39	
246812	3	#43	0.089	2.26	
246625	3	#44	0.086	2.18	
248639	6	2.15 mm	0.085	2.15	
249114	6	#45	0.082	2.08	
246811	3	2 mm	0.079	2.00	
246626	6	#50	0.070	1.78	
249113	6	#52	0.64	1.63	
248893	6	1/16	0.062	1.59	
246627	6	#53	0.060	1.52	
249112	6	1.45 mm	0.057	1.45	
246809	6	#54	0.055	1.40	
246628	6	#55	0.052	1.32	
249764	6	1.20 mm	0.047	1.20	
246814	6	#56	0.046	1.18	

Kit Part	Qty in Kit	Drill Bit Size			Illustration
		nominal	in.	mm	
246629	6	#58	0.042	1.07	
246808	6	#60	0.040	1.02	
248640	6	#61	0.039	0.99	
248618	6	#63	0.037	0.94	
248891	6	#66	0.033	0.84	
246807	6	#67	0.032	0.81	
246630	6	#69	0.029	0.74	
248892	6	#70	0.028	0.71	
246815	6	#73	0.024	0.61	
276984	6	#74	0.023	0.57	
246631	6	#76	0.020	0.51	
246816	6	#77	0.018	0.46	
246817	6	#81	0.013	0.33	

ClearShot Handle Cleanout Drill Kit

256526

Kit includes all 7 drill bits of extra length needed to clean out all air passages in the Fusion CS gun handle and fluid housing. See **Clean Passages**, page 29.

Accessories

Stainless Steel Side Seal Kit

Kit 256464 includes 2 stainless steel side seals and 2 o-rings.

Polycarballoy Side Seal Kits

Kits include a packing o-ring for each polycarballoy side seal. The optional high wear, non-metallic polycarballoy seals are for alternate fluids.

Kit	Description	Number of Seals Per Kit
256465	SEAL KIT, Polycarballoy	2
256489	SEAL KIT, Polycarballoy	20

Flat Pattern Stud Wall Kits

Use to spray wall insulation foam into stud walls with a single pass.

Kit	Description
256569	Includes TP100
256570	Includes FTM979

Gun Cover

244914 Covers

Keeps gun clean while spraying. Pack of 10.

Lubricant for Gun Rebuild

248279, 4 oz (113 gram) [10]

High adhesion, water resistant, lithium-based lubricant. MSDS sheet available at www.graco.com.

Flushing Manifold

256641 Manifold Block

See page 48.

Fluid Inlet Cover

Kit 256642; includes 15R910 and 15B221. See page 48.

Gun Cleaning Kit

15D546

Kit includes 11 tools and brushes to clean the gun.

ClearShot Liquid Cartridges

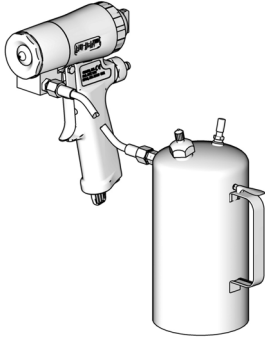
See MSD060.

Kit	Description
256385	Package of 25 cartridges
256386	Package of 50 cartridges
256387	Package of 100 cartridges

Solvent Flush Canister Kit

256510, 1 qt (0.95 liter) Solvent Cup

Includes flushing manifold to flush gun with solvent. Portable for remote flushing. See manual 309963.

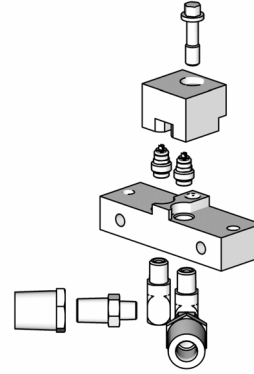


T112110a

Circulation Manifold

256566

Attach to gun fluid manifold to enable preheating of hose. See manual 313058.

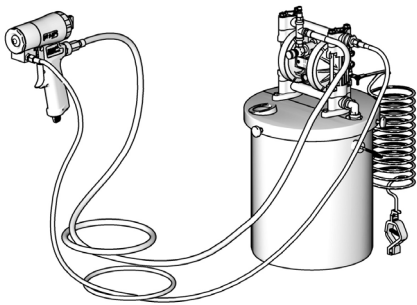


T112109a

Solvent Flush Pail Kit

248229 5.0 gal. (19 liter) Pail

Includes flush manifold with individual A and B shutoff valves, and air regulator. See manual 309963.

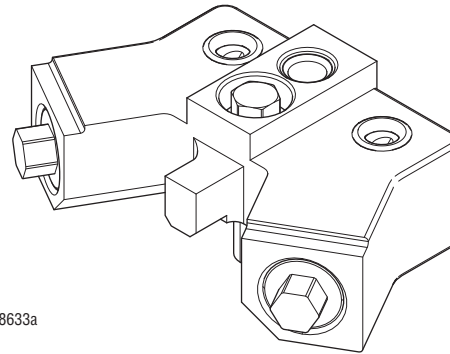


T112111a

Fusion AP Manifold Adapter

258996

Allows Fusion CS gun to fit onto existing Fusion manifold.

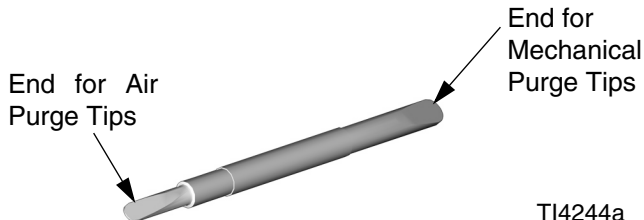


ti18633a

Tip Cleanout Tool

15D234

Designed to fit CeramTip internal dome and flat tip slits.



T14244a

Gun and Palm Grips

Applicator's comfort level with a spray gun is an essential part of the spray foam and polyurea installation process. The applicator's fatigue level can dramatically affect the pattern and productivity of a project. 3M™ Gripping Material Technology is designed to:

- Reduce fatigue
- Provide comfort
- Give thermal protection

Gun Grips can be used alone to provide a strong secure grip, or in combination with the Palm Grips to maximize the comfort and anti-fatigue properties and minimize the applicator's grip strength.

Gun Grip Kit

Graco Gun Grips are designed to be used on Fusion® A, CS, or Probler® P2 Guns.

Kit Part No.	Qty in Kit
17G542	10 Pack
17G543	50 Pack
17G544	100 Pack

Palm Grip Kit

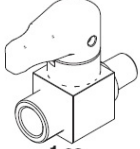
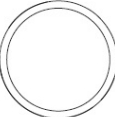
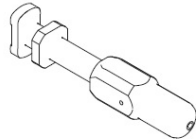

















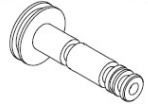

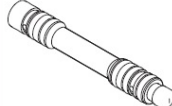


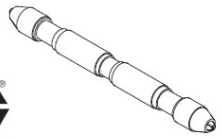




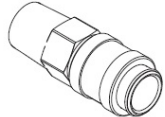
Palm Grips are designed to adhere to any disposable/removable glove.

Kit Part No.	Qty in Kit
17G545	10 Pack
17G546	50 Pack
17G547	100 Pack

Repair Kit

24X573

Keep bulk spare parts on-hand to rebuild Fusion CS gun. Packaged in convenient carry case.

256460 - Shutoff Valve "B" 256459 - Shutoff Valve "A"  1 ea		256773 O-ring (6 pk) 	Mix Chamber 		256772 O-ring (6 pk) 	246357 #40 Mesh Screen  10 ea	256469 O-ring (6 pk) 	256462 House Manifold Check Valves (A & B)  1 ea	
256463 Side Seals Assemblies (A & B)  1 ea	256464 Side Seal Kit (2 pk) 	256467 O-ring, Side Seal + Springs 	256468 O-ring (6 pk) 	248132 O-ring (6 pk) 		248648 O-ring (6 pk) 	256774 O-rings (6 pk) 		256775 O-rings (6 pk) 
257423 - Check Valve "B" 257422 - Check Valve "A"  1 ea	246354 O-ring (6 pk) 	256771 O-ring (6 pk) 	257420 Ball (10 pk) 	257419 Spring (10 pk) 	257424 Dosing Piston (Includes O-rings)  1 ea	257425 O-ring (6 pk) 	256455 Spool Valve (Includes O-ring)  1 ea	117485 Spool Valve Spring  6 ea	121642 Retaining Ring  6 ea
117661 - Drill Vise  		256526 - Handle Cleanout Kit Ø 1/8 Drill Ø 3/32 Drill Ø 1/16 Drill Ø 9/32 Drill Ø 5/16 Drill Ø 7/16 Drill .75 MM Drill			256414 Retaining Cover  5 ea	257426 O-ring (6 pk) 	121540 Breather Plug  1 ea	117510 Air Coupler  1 ea	

Repair Kit Contents

Technical Data

Category	Data
Maximum Fluid Working Pressure	3500 psi (24.5 MPa, 245 bar)
Minimum Air Inlet Pressure	80 psi (0.56 MPa, 5.6 bar)
Maximum Air Inlet Pressure	130 psi (0.9 MPa, 9 bar)
Air Flow Range	See chart below
Maximum Fluid Temperature	200° F (94° C)
Air Inlet Size	1/4 npt Quick Disconnect Nipple
A Component (ISO) Inlet Size	-5 JIC; 1/2-20 UNF
B Component (Resin) Inlet Size	-6 JIC; 9/16-18 UNF
Sound Pressure	75.27 dB(A), using RD0202 at 100 psi (0.7 MPa, 7 bar)
Sound Power, measured per ISO 9416-2	73.45 dB(A), using RD0202 at 100 psi (0.7 MPa, 7 bar)
Dimensions	7.5 x 8.1 x 3.3 in. (191 x 206 x 84 mm)
Weight	2.6 lbs (1.18 kg)
Wetted Parts	Aluminum, stainless steel, carbon steel, carbide, chemically resistant o-rings

All other brand names or marks are used for identification purposes and are trademarks of their respective owners.

Air Flow Data

Air Pressure (detriggered) psi (MPa, bar)	Air Flow in scfm (m ³ /min) for all mix chambers
80 (0.56, 5.6)	2.1 (0.059)
100 (0.7, 7)	3.1 (0.088)
130 (0.9, 9)	5.2 (0.147)

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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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Original instructions. This manual contains English. MM 312666

Graco Headquarters: Minneapolis

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