

KRAKN™ MPI

Solenoid Valve Manifold

3A7379C

EN

For accurately metering and injecting chemicals into multiple wells. Intended to be used only with a Harrier+ MPI control box. For professional use only.

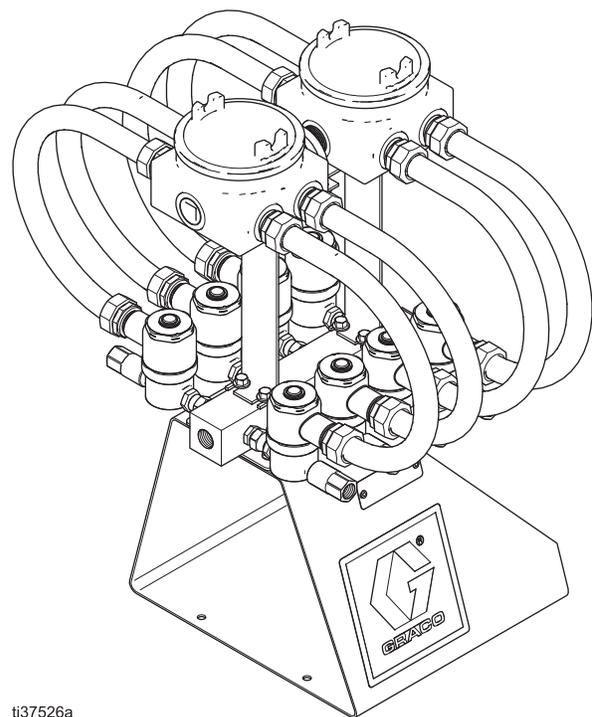
Not approved for use in explosive atmospheres or hazardous (classified) locations.

See page 3 for model information, including maximum working pressure.



Important Safety Instructions

Read all warnings and instructions in this manual before using the equipment. Save all instructions.



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Related Manuals

Manual No.	Description
334513	Wolverine™ Chemical Injection Pump
3A4130	Harrier®+ Chemical Injection Controller
3A5025	Stand Kits
3A5028	G-Chem™ Chemical Injection Pump
3A5375	Tank Level Monitor Kit
3A7378	Harrier®+ MPI Control Box
3A3944	Pressure Sensor Kit

Models and Approvals

Models	Number of Solenoid Valves	Voltage	Maximum Working Pressure psi (MPa, bar)	Solenoid Valve Approvals
25R050	2	24 VDC	3000 psi (20.7, 207)	  Class I, Div 2, Group A & B Class I, Div 2, Group A & B Class I, Div 1, Group C & D Class I, Div 1, Group C & D Class II, Div 1, Group E, F & G Class II, Div 1, Group E, F & G
25R051	3			
25R052	4			
25R053	5			
25R054	6			
25R055	7			
25R056	8			
25R057	2	24 VDC	3000 psi (20.7, 207)	
25R058	3			
25R059	4			
25R060	5			
25R061	6			
25R062	7			
25R063	8			

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 symbols refer to procedure-specific risks. When these symbols appear in the body of this manual or on warning labels, refer back to these Warnings. Product-specific hazard symbols and warnings not covered in this section may appear throughout the body of this manual where applicable.

 <h1 style="margin: 0;">WARNING</h1>	
	<p>FIRE AND EXPLOSION HAZARD</p> <p>When flammable fluids are present in the work area be aware that flammable fumes can ignite or explode. To help prevent fire and explosion:</p> <ul style="list-style-type: none"> • Use equipment only in well ventilated area. • Eliminate all ignition sources, such as cigarettes and portable electric lamps. • Ground all equipment in the work area. • Keep work area free of debris, including rags and spilled or open containers of solvent. • Do not plug or unplug power cords or turn lights on or off when flammable fumes are present. • Use only grounded hoses. • Stop operation immediately if static sparking occurs or you feel a shock. Do not use equipment until you identify and correct the problem. • Keep a working fire extinguisher in the work area.
	<p>SKIN INJECTION HAZARD</p> <p>High-pressure fluid from dispensing device, 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 put your hand over the fluid outlet. • Do not stop or deflect leaks with your hand, body, glove, or rag. • Follow the Pressure Relief Procedure when you stop dispensing and before cleaning, checking, or servicing equipment. • Tighten all fluid connections before operating the equipment. • Check hoses and couplings daily. Replace worn or damaged parts immediately.
	<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) to know the specific hazards of the fluids you are using. • Store hazardous fluid in approved containers, and dispose of it according to applicable guidelines.

WARNING



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 Specifications** in all equipment manuals.
- Use fluids and solvents that are compatible with equipment wetted parts. See **Technical Specifications** in all equipment manuals. Read fluid and solvent manufacturer's warnings. For complete information about your material, request Safety Data Sheet (SDS) from distributor or retailer.
- Turn off all equipment and follow the **Pressure Relief Procedure** when equipment is not in use.
- Check equipment regularly. Repair or replace worn or damaged parts immediately with genuine manufacturer's replacement parts only.
- Do not alter or modify equipment. Alterations or modifications may void agency approvals and create safety hazards.
- Make sure all equipment is rated and approved for the environment in which you are using it.
- 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.

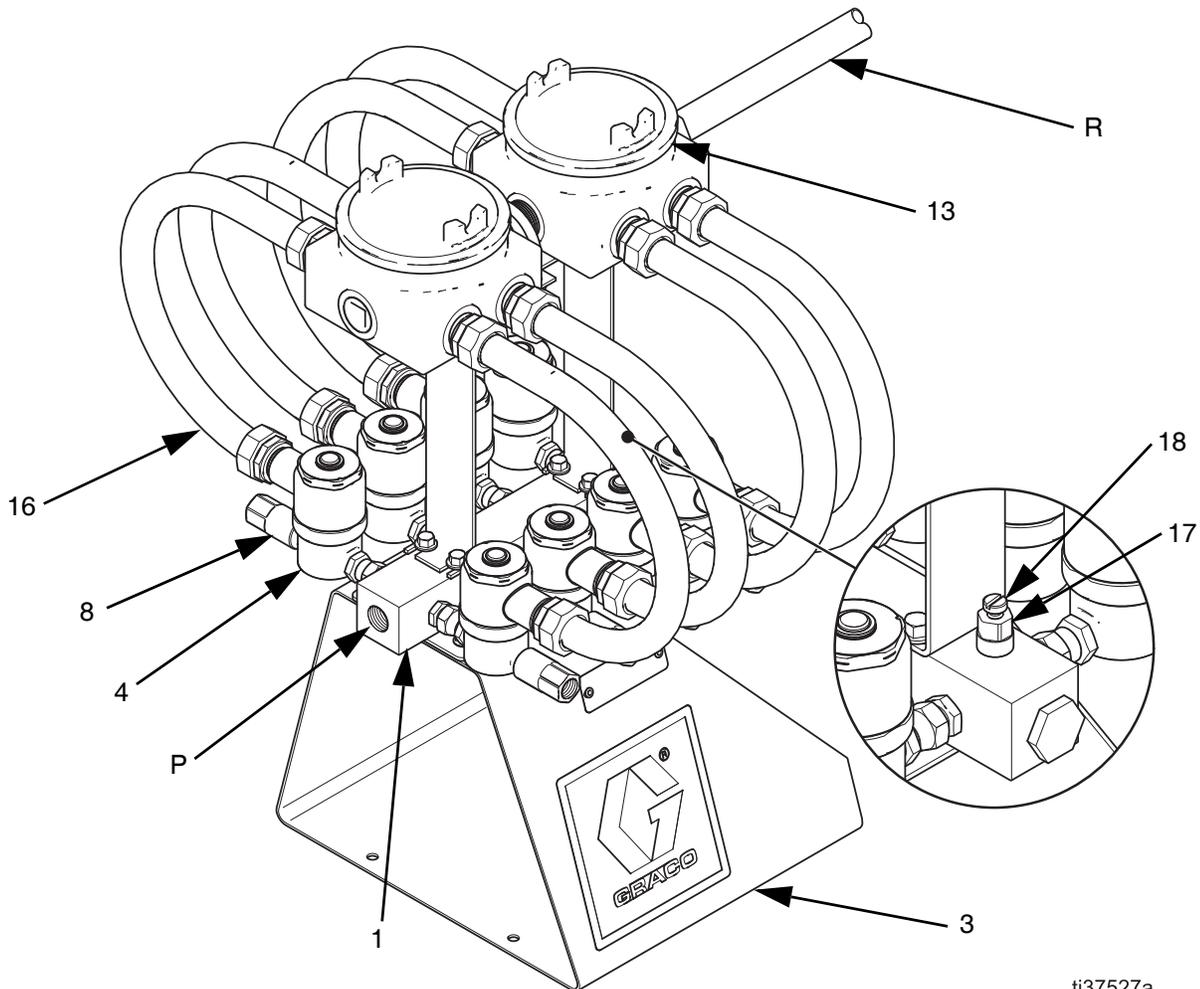


PERSONAL PROTECTIVE EQUIPMENT

Wear appropriate protective equipment when in the work area to help prevent serious injury, including eye injury, hearing loss, inhalation of toxic fumes, and burns. Protective equipment includes but is not limited to:

- Protective eyewear, and hearing protection.
- Respirators, protective clothing, and gloves as recommended by the fluid and solvent manufacturer.

Component Identification



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FIG. 1 Multiple-Point Injection Valve Manifold Components

Key:

- 1 Fluid Manifold (always configured with 8 ports)
- 3 Stand
- 4 Solenoid (normally closed; 2 to 8 depending on model)
- 8 Outlet Check Valve (2 to 8 depending on model)
- 13 Junction Boxes (always configured with 2)
- 16 Solenoid Valve Conduit
- 17 Bleed Needle Housing
- 18 Bleed Needle
- P Inlet Port
- R Wiring Harness (pre-wired; 10 ft. (3 m))

Installation

Grounding



Valve manifold: grounded through **Electrical Connections** on page 9.

Fluid lines: use only electrically conductive lines.

Fluid supply container: follow local code.

Accessories

Install the following required accessories, using adapters as necessary. See **Kits and Accessories** starting on page 17.

- **Fluid filter (Y-Strainer) (included in M):** with a 60 mesh (250 micron) stainless steel element, filters particles from the fluid before it reaches the pump.
- **Fluid shutoff valves (M):** shuts off fluid flow.
- **Pressure relief valve (E):** provides overload protection.

Flush Before Using Equipment

The equipment was tested with lightweight oil, which is left in the fluid passages to protect parts. To avoid contaminating your fluid with oil, flush the equipment with a compatible solvent before using the equipment. See **Prime the Pump**, page 12.

Typical Installation Components

FIG. 2 is an example of an installation with a multiple-point injection valve manifold. Your installation may differ from what is shown here. The multiple-point valve manifold (N), the pump (A), and the control box (B) in FIG. 2 are supplied by Graco. All other components are supplied by customer.

Key:

- A Pump; includes pump inlet (J) and outlet (K) ports, and pump bleed valve (T)
- B Multiple-point injection control box
- C Stand
- D Tank
- E Pressure relief valve
- F Inlet line
- G Outlet line
- H Pressure relief line
- J Pump inlet port
- K Pump outlet port
- L Manifold assembly; includes y-strainer and fluid shutoff valve (M)
- M Fluid shutoff valve (inlet & outlet)
- N KRAKN MPI solenoid valve manifold assembly
- S Check valve
- T Pump bleed valve
- U Pressure Sensor

Choosing an Installation Location

- Select a location that will adequately support the weight of the valve manifold assembly (N).
- Refer to the stand (3) mounting hole layout provided in **Dimensions** on page 18.
- If you have a mounting configuration that requires installation in a manner different than depicted in FIG. 2, please contact your Graco distributor for assistance.

Typical Installation

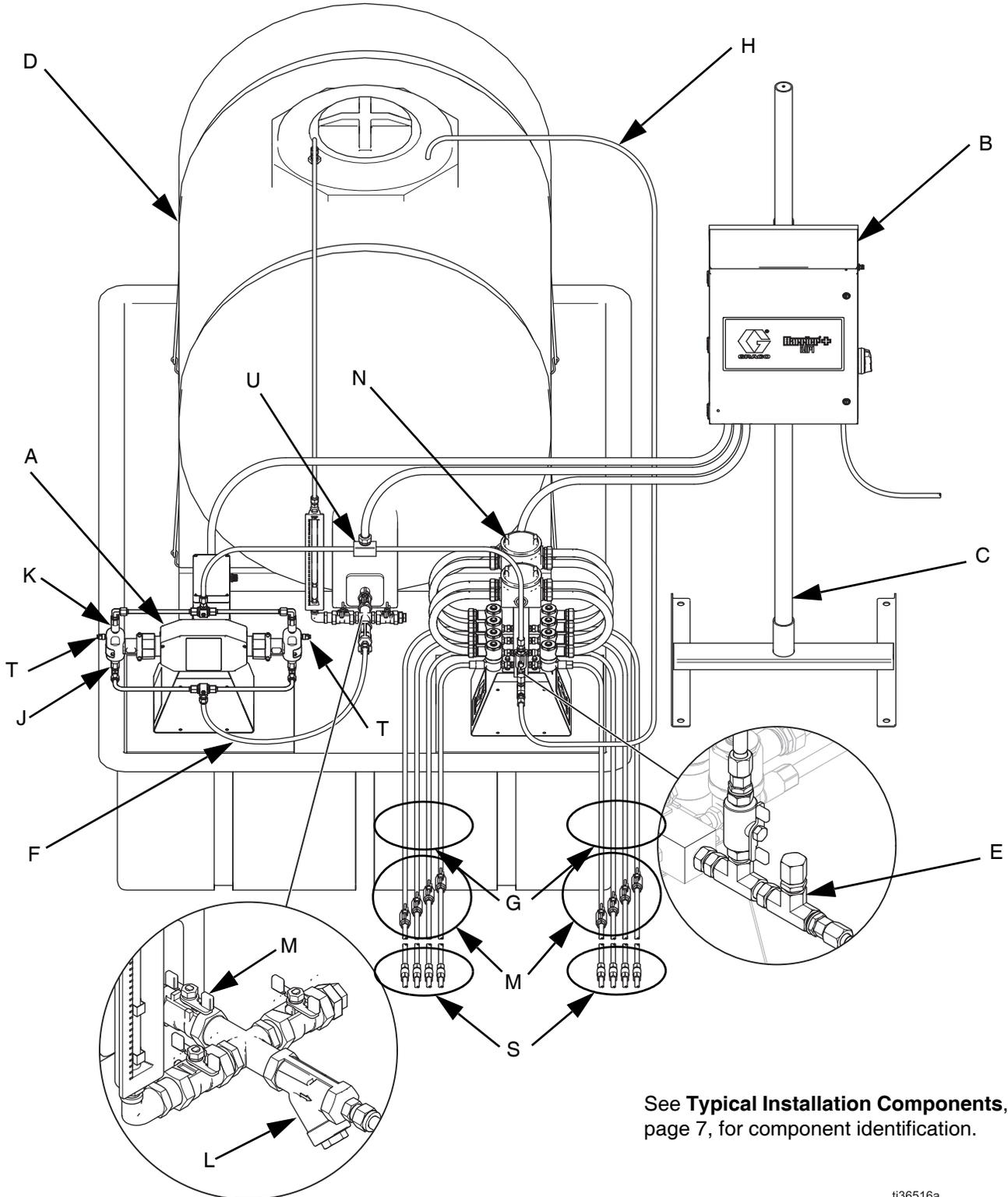


FIG. 2 Multiple-Point Injection System Layout

Fluid Connections

1. Remove and discard plugs on the 1/2 in. NPTF fluid inlet port (P) and the 1/4 in. NPTF outlet check valves (8).
2. Install a pressure relief valve (E) with a pressure relief return line (H) between the pump (A) and the 1/2 in. NPTF fluid inlet port (P) using a conductive fluid line.

NOTE: A pressure relief valve is available from Graco and can be connected back to the tank or directly to the inlet side of the pump. See **Kits and Accessories** on page 17.

NOTE: An optional B32072 Pressure Sensor Kit can be installed between the pump (A) and the KRAKN MPI solenoid valve manifold assembly (N) to enable the solenoid alarm functionality. Follow the procedures in the Pressure Sensor Kit manual to complete the wiring, and the Harrier+ Chemical Injection Controller manual for setup. (See **Related Manuals** on page 2.)

				
In the event of an injection line blockage, and to reduce the risk of skin injection and damage to the pump, ensure the pressure relief valve is set at or below the maximum working pressure of the pump or valve manifold assembly, whichever is less.				

3. Set the pressure relief valve (E) at or below the maximum working pressure of the pump (A) and valve manifold assembly (N).
4. Connect a fluid line from each 1/4 in. NPTF outlet check valve (8) to an injection point.
5. Connect a 10-32 UNF fluid outlet from the bleed needle housing (17) to a waste reservoir.

Electrical Connections

				
To reduce the risk of fire or explosion due to static sparking, all electrical wiring must be done by a qualified electrician and comply with all local codes and regulations.				

The KRAKN MPI solenoid valve manifold assembly (N) is configured from the factory with a wiring harness. The wiring harness has 10 ft. (3 m) of 1/2 in. (12.7 mm) liquid-tight flexible metal conduit (R) with 12 ft. (3.7 m) of cable terminated with labeled flying electrical leads.

NOTE: The wiring harness (R) contains four spare wires labeled 9 (+), 10 (-), 21 (TLM+), and 22 (TLM-). These spare wires can be used to connect accessory devices from the KRAKN MPI solenoid valve manifold junction box (13) to the Harrier+ MPI control box (B).

All valve manifold solenoids (4) are pre-wired from the factory with a liquid-tight flexible metal conduit (16) between the solenoid and the junction boxes (13).

A detailed diagram of the junction box (13) wiring can be found in **Junction Box Wiring Diagrams** on pages 10 and 11.

1. Connect the valve manifold wiring harness (R) to the Harrier+ MPI control box (B).
2. Follow the procedure described in the Harrier+ MPI control box manual to complete the wiring. (See **Related Manuals** on page 2.)

Junction Box Wiring Diagrams

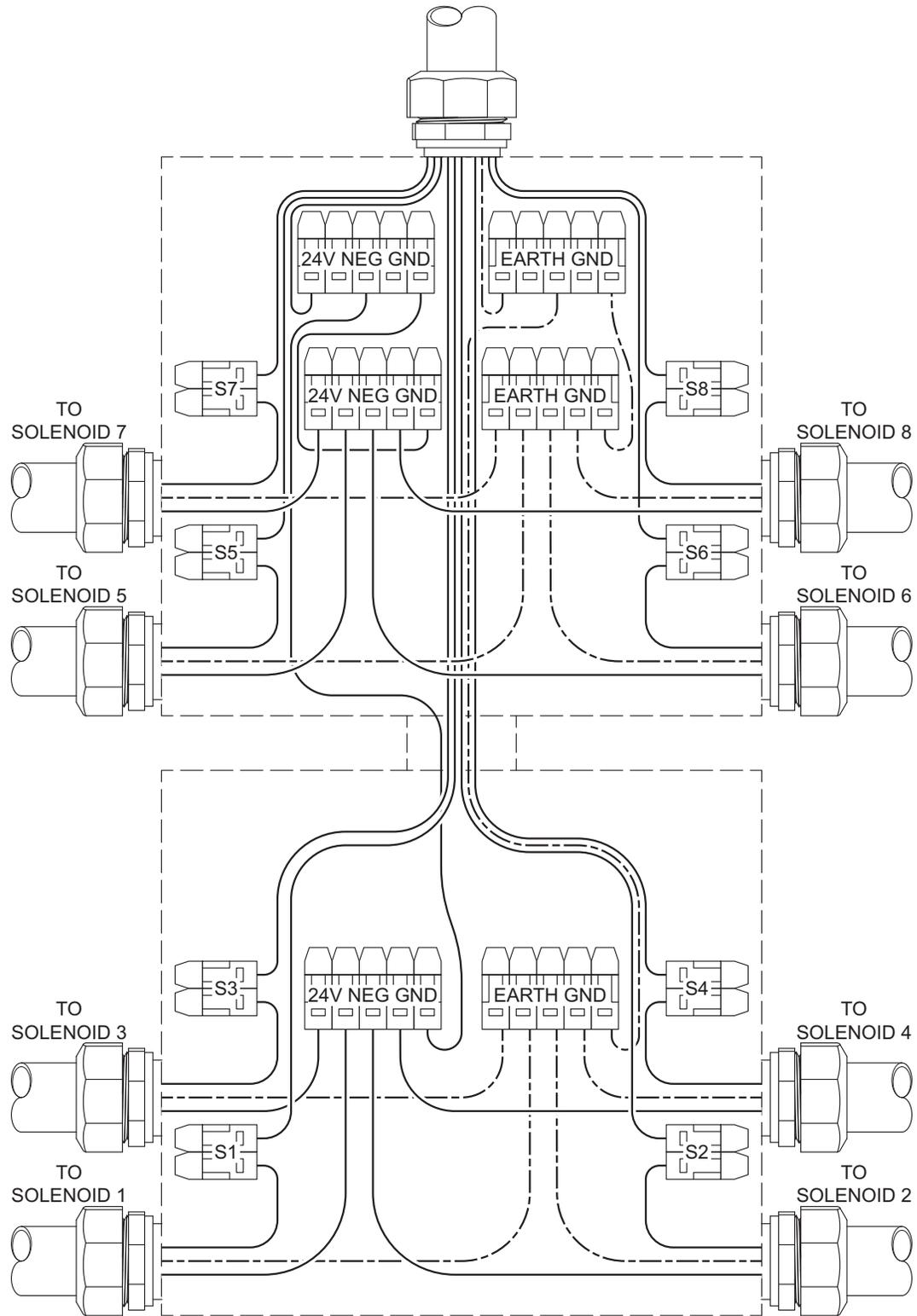


FIG. 3 Junction Box Wiring Diagram, with Hazardous Location Solenoid Valves

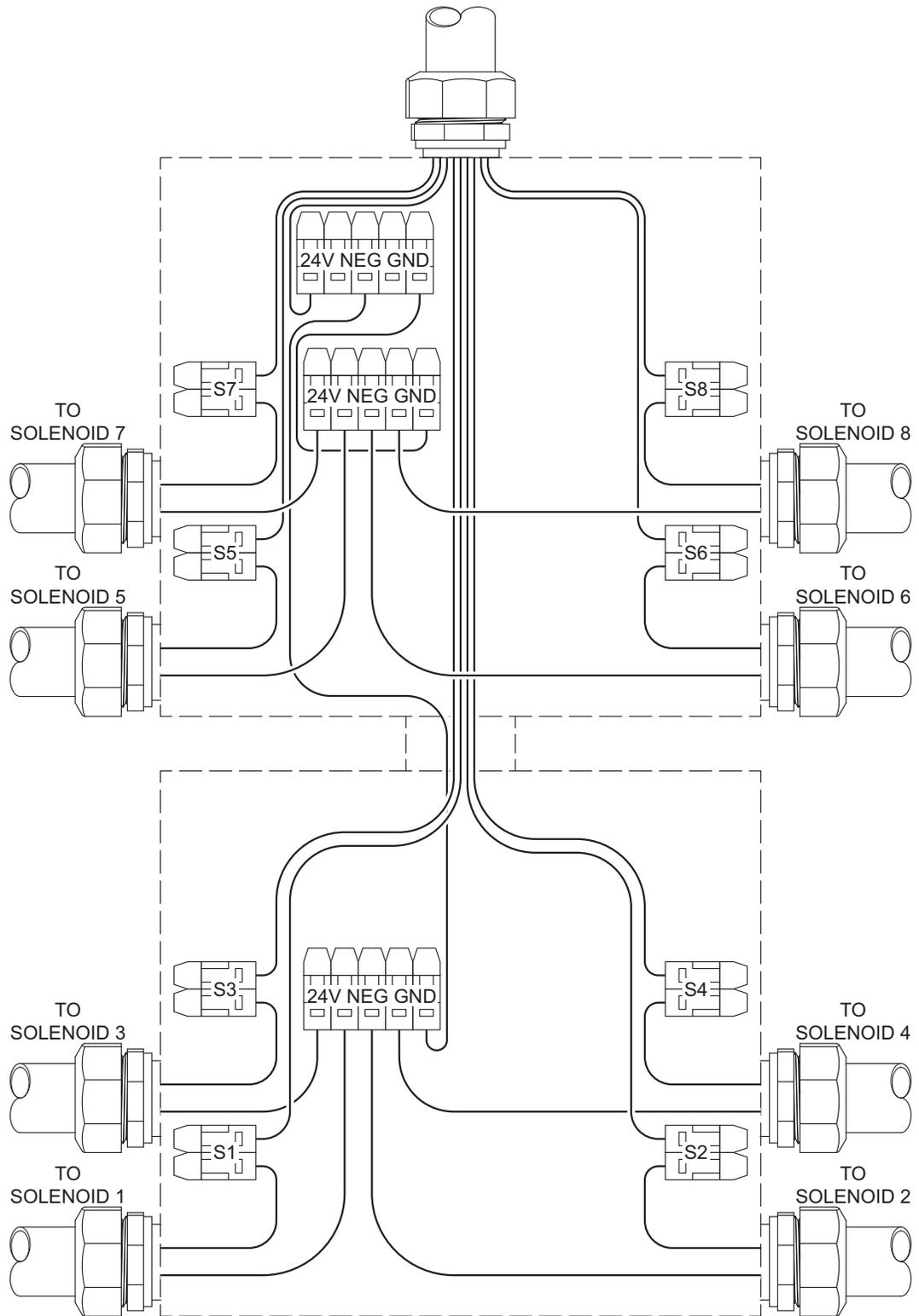


FIG. 4 Junction Box Wiring Diagram, with Ordinary Location Solenoid Valves

Operation

Pressure Relief Procedure

 Follow the Pressure Relief Procedure whenever you see this symbol.



This equipment stays pressurized until pressure is manually relieved. To help prevent serious injury from pressurized fluid, such as skin injection and splashing fluid, follow the **Pressure Relief Procedure** when you stop dispensing and before cleaning, checking, or servicing the equipment.

NOTE: Always discharge fluid into an approved container or location.

1. Disconnect power from the pump (A) and the valve manifold assembly (N). (See FIG. 2 on page 8.)
2. Shut off the inlet and outlet lines using the shutoff valves (M).
3. Slowly loosen each fitting connected to the solenoid valve manifold outlet check valves (8) to relieve downstream fluid pressure.
4. Open the bleed needle (18) by turning the needle counter-clockwise with a flathead screwdriver to relieve internal valve manifold assembly (N) fluid pressure.
5. Open the pump bleed valve (T).

Prime the Pump



1. Verify all connections and fluid lines are tight.
2. Follow the priming procedure in the pump (A) instruction manual. (See **Related Manuals** on page 2.)

Prime the KRAKN MPI Solenoid Valve Manifold



1. Verify all connections and fluid lines are tight.
2. Open the bleed needle (18) by turning the needle counter-clockwise with a flathead screwdriver.
3. Turn the pump (A) on and it will begin cycling.
4. The valve manifold (N) is primed when discharge from the bleed needle housing (17) has transitioned from air, to bubbly liquid chemical, to pure liquid chemical.
5. Close the bleed needle (18) tightly and verify that fluid has stopped draining from the port.

Pressure Loss Table

Use the following table to determine the approximate pressure loss, based on plunger size of the pump, through the KRAKN MPI Solenoid Valve Manifold.

Pump Plunger size	Simplex			Duplex		
	psi	MPa	bar	psi	MPa	bar
3/16 in.	3	0.02	0.2	3	0.02	0.2
1/4 in.	4	0.03	0.3	5	0.03	0.3
3/8 in.	6	0.04	0.4	8	0.06	0.6
1/2 in.	16	0.11	1.1	18	0.12	1.2
5/8 in.	50	0.34	3.4	53	0.37	3.7
3/4 in.	132	0.91	9.1	140	0.97	9.7

Troubleshooting



1. Follow **Pressure Relief Procedure**, page 12, before checking or repairing the valve manifold.
2. Check all possible problems and causes before disassembling the manifold.

Problem	Cause	Solution
Fluid leaking	Loose fittings	Tighten fittings
	Damaged seals	Replace solenoid
Solenoid valve not operating	Electrical	Check electrical connections
	Damaged solenoid	Replace solenoid

Repair



Replace a Solenoid

1. Follow the **Pressure Relief Procedure**, page 12.
2. Remove the junction box (13) lid and disconnect the solenoid valve wiring. See **Junction Box Wiring Diagrams**, on pages 10-11, for more detail.
3. Disconnect the solenoid valve conduit (16) from the junction box (13).
4. Loosen and disconnect the solenoid valve (4) from the fluid manifold (1).
5. Remove the outlet check valve (8) from the solenoid (4).
6. Inspect and reuse the outlet check valve (8), if desired.
7. Install the existing or replacement outlet check valve (8) into the solenoid (4) using pipe sealant.
8. Install the solenoid (4) onto the fluid manifold (1).
9. Connect the solenoid valve conduit (16) to the junction box (13).
10. Connect the solenoid (4) electrical wiring per the **Junction Box Wiring Diagrams** on pages 10-11.
11. Replace the junction box (13) lid.
12. Reconnect the fluid lines to the inlet port (P) and the outlet check valve (8).
13. **Prime the KRAKN MPI Solenoid Valve Manifold** on page 12.

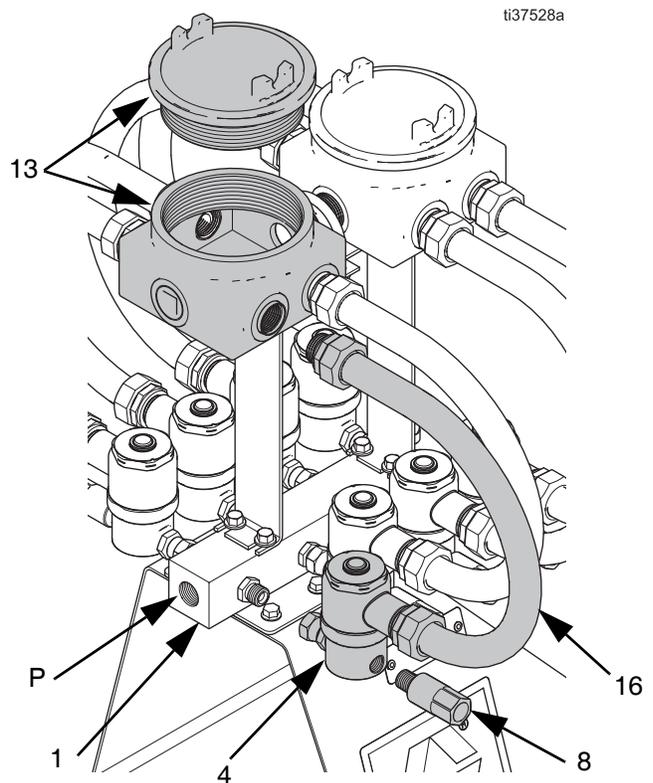


FIG. 5 Solenoid Replacement

Add a Solenoid

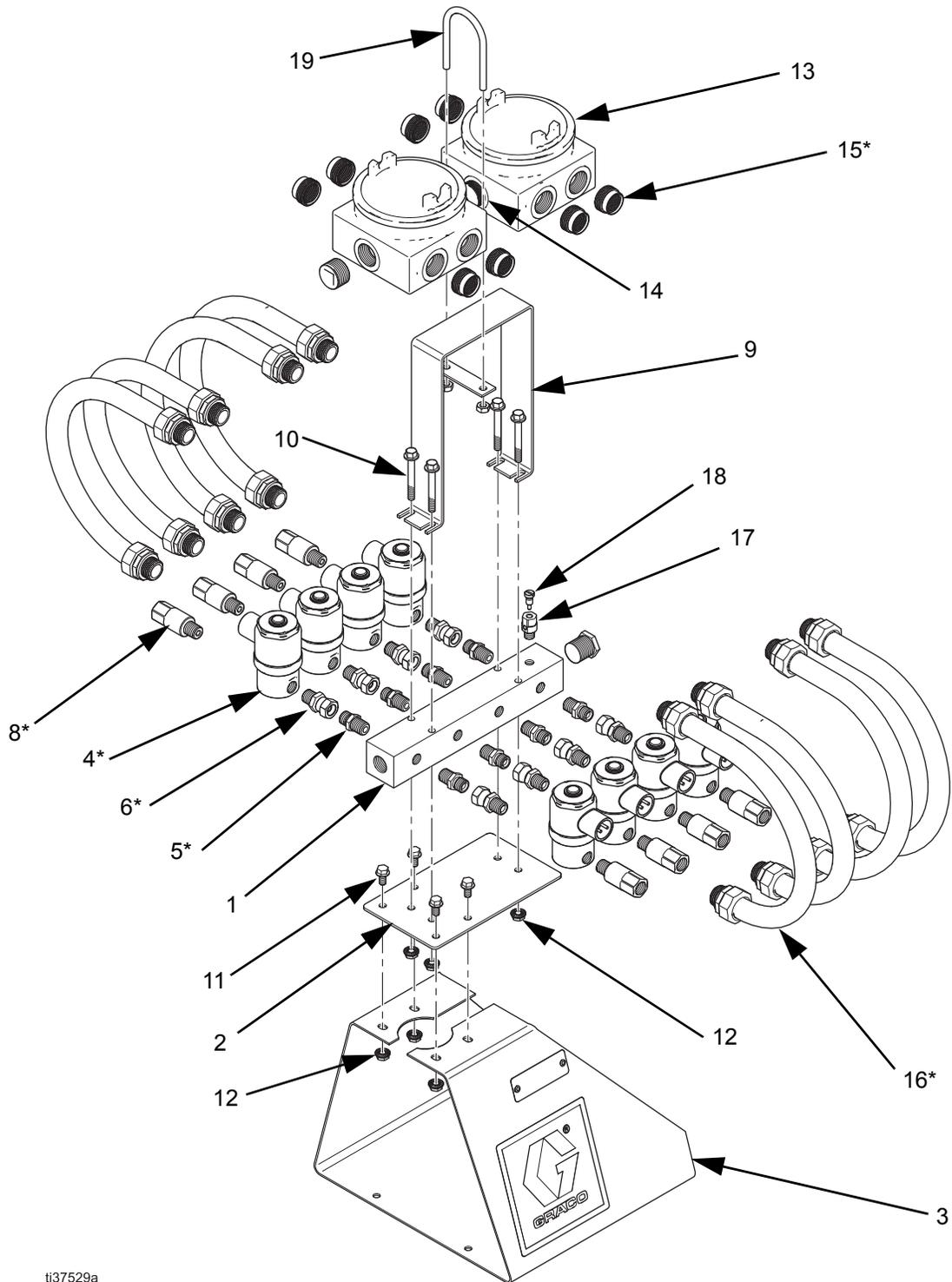
NOTE: Two Solenoid Add-On Kits are available: B33063 (Hazardous Location) and B33064 (Ordinary Location). The solenoid (4) in each kit is pre-assembled with a swivel union fitting (6), outlet check valve (8), and conduit (16). An adapter fitting (5) and pipe sealant is also included with each kit.

The following procedure assumes that the KRAKN MPI Solenoid Valve Manifold currently has fewer than eight solenoids (4), and that there are plugs in both the fluid manifold (1) and the junction box (13) where the solenoid will be added.

1. Follow the **Pressure Relief Procedure**, page 12.
2. Remove the plug from the fluid manifold (1).
3. Remove the plug from the junction box (13).
4. Install the adapter fitting (5) into the fluid manifold (1) using pipe sealant, and tighten.
5. Attach the swivel unit fitting (6) of the pre-assembled solenoid (4) to the adapter fitting (5), and tighten.
6. Remove junction box (13) lid.
7. Feed the wires from the conduit (16) through the hole where the junction box (13) plug was removed.
8. Apply pipe sealant onto the threads of the conduit (16) fitting, and install the conduit fitting into the junction box (13) and tighten both the conduit fitting and the conduit nut.
9. Connect the solenoid (4) electrical wiring per the **Junction Box Wiring Diagrams** on pages 10-11.
10. Replace the junction box (13) lid.
11. Connect the fluid lines to the inlet port (P) and the outlet check valve (8).
12. Follow the **Prime the KRAKN MPI Solenoid Valve Manifold** procedure on page 12.

Parts

MPI KRAKN



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MPI KRAKN Parts List

Ref.	Part	Description	Qty
1	B33049	MPI Fluid Manifold	1
2		Mounting Bracket	1
3	B32817	Stand	1
4*		2-Way Solenoid (normally closed; 2 to 8, per configuration)	
	B33061	Hazardous Location	8
	B33062	Ordinary Location	8
5*	166846	Adapter Fitting (2 to 8, per configuration)	8
6*	114339	Swivel Union Fitting; 1/4 NPT, stainless steel (2 to 8, per configuration)	8
8*	B32029	Outlet Check Valve; FFKM (2 to 8, per configuration)	8
9		Junction Box Mounting Bracket	1
10	129705	Flange Bolt	4
11	113161	Flange Screw	4
12	115942	Flange Nut	8
13		Junction Box	2
14		Nipple Pipe	1
15*		Reducer Bushing	2
16*	B33052	Conduit; 16 in.	2
17	B32191	Bleed Needle Housing (includes ref. 18)	1
18	17F572	Bleed Needle (included with ref. 17)	1
19		U-Bolt (includes mounting plate and 2 nuts)	1
22		Designation Plate	1
23	B33065	Splice Connector; 2-position (not shown)	2
24	B33065	Splice Connector; 5-position (not shown)	2
28	B33051	MPI Control Conduit; 120 in.	1
29▲	17G318	Multiple Warning Safety Label	1

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

* Included in the solenoid add-on kit for hazardous locations (B33063) or ordinary locations (B33064).

Kits and Accessories

Part No.	Description
B32045	225-750 PSI Pressure Relief Valve Kit
B32046	750-1500 PSI Pressure Relief Valve Kit
B32047	1500-2250 PSI Pressure Relief Valve Kit
B32048	2250-3000 PSI Pressure Relief Valve Kit
B32049	3000-4000 PSI Pressure Relief Valve Kit
B32050	4000-5000 PSI Pressure Relief Valve Kit
B32051	5000-6000 PSI Pressure Relief Valve Kit
B33050	MPI Control Conduit; 240 in.
B32072	Pressure Sensor Kit (0-6000 PSI)

Dimensions

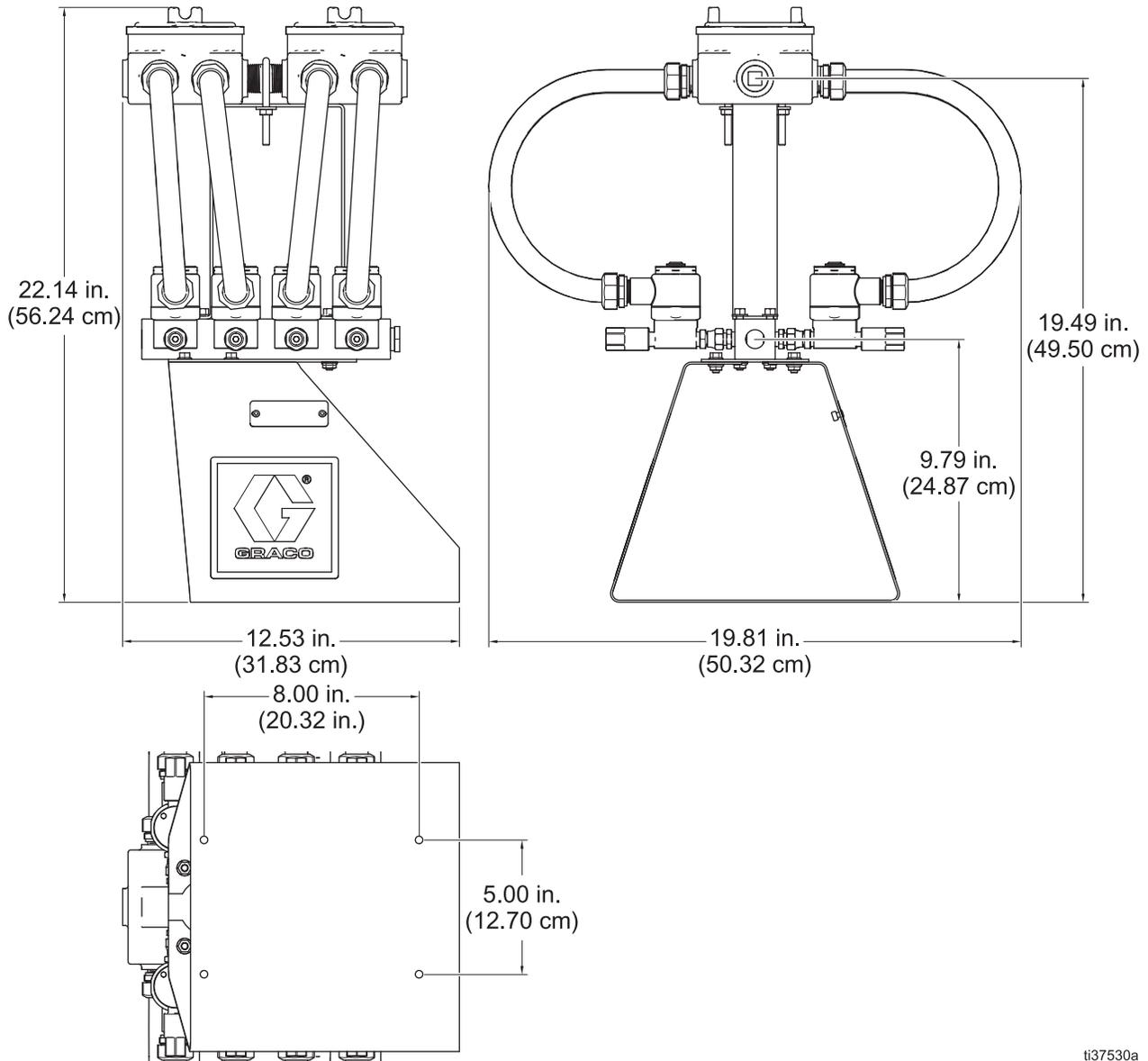


Fig. 6 Multiple-Point Injection Valve Manifold Dimensions

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Technical Specifications

MPI KRAKN		
	US	Metric
Maximum working pressure	3000 psi (20.7 MPa, 207 bar)	
Input Voltage	24 VDC	
Maximum Input Current	0.4 A	
Temperature range	-40°–176°F	-40°–80°C
Noise (dBa)		
Maximum sound pressure	<70 dBa	
Inlet/Outlet Sizes		
Fluid inlet size	1/2 in. NPTF	
Fluid outlet size	1/4 in. NPTF	
Materials of Construction		
Wetted Parts	316, 303, and 430F stainless steels, PTFE, FFKM, PCTFE	
Weight		
2 Valve Manifold	35.5 lb.	16.1 kg.
3 Valve Manifold	37.0 lb.	16.8 kg.
4 Valve Manifold	38.5 lb.	17.5 kg.
5 Valve Manifold	40.0 lb.	18.1 kg.
6 Valve Manifold	41.5 lb.	18.8 kg.
7 Valve Manifold	43.0 lb.	19.5 kg.
8 Valve Manifold	44.5 lb.	20.2 kg.

Graco Standard Warranty

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

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

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

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Graco's sole obligation and buyer's sole remedy for any breach of warranty shall be as set forth above. The buyer agrees that no other remedy (including, but not limited to, incidental or consequential damages for lost profits, lost sales, injury to person or property, or any other incidental or consequential loss) shall be available. Any action for breach of warranty must be brought within two (2) years of the date of sale.

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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.

Graco Information

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

For patent information, see www.graco.com/patents.

TO PLACE AN ORDER, contact your Graco distributor or call to identify the nearest distributor.

Phone: 612-623-6921 **or Toll Free:** 1-800-328-0211 **Fax:** 612-378-3505

All written and visual data contained in this document reflects the latest product information available at the time of publication. Graco reserves the right to make changes at any time without notice.

Original instructions. This manual contains English. MM 3A7379

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