Instructions – Parts List



PrecisionSwirl [™] **Module**

Part No. 241658 and 234029

310554 rev.S

3500 psi (24.1 MPa, 241 bar) Maximum Fluid Working Pressure

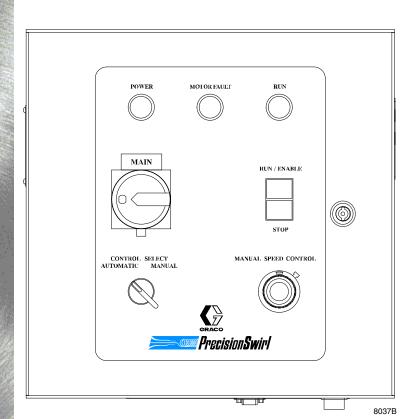
See page 2 for List of Models.

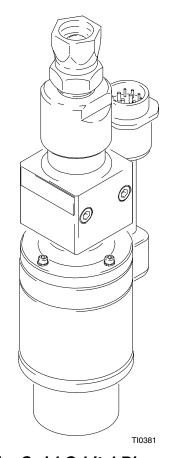
U.S. Patent No. 6,499,673 EU Patent No. 0852160



Important Safety Instructions

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





PrecisionSwirl Control Assembly

PrecisionSwirl Orbital Dispenser

PROVEN QUALITY, LEADING TECHNOLOGY.

CE

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List of Models

Tool Mounted Dispensers

Part No. 241658, Series A

PrecisionSwirl Orbital Dispenser and Control Assembly Kit includes 233123, 243403, 617829, 617870 and 918616.

Part No. 234029, Series A

PrecisionSwirl Orbital Dispenser and Control Assembly Kit includes 233123, 243402, 617829, 617870 and 918616.

Part No. 243402, Series C

PrecisionSwirl Orbital Dispenser .012 in. coupler offset for smaller bead widths. Typical applications are hem flange, after hem, etc.

Part No. 243403, Series C

PrecisionSwirl Orbital Dispenser .028 in. coupler offset for larger bead widths. Typical for seam sealing applications.

Part No. 918616, Series D

PrecisionSwirl Control Assembly

Cable Assemblies

Part No. 241954

6 ft (1.8 m) Motor Extension Cable Assembly

Part No. 241955

9 ft (2.7 m) Motor Extension Cable Assembly

Part No. 233123

15 ft (4.6 m) Motor Extension Cable Assembly

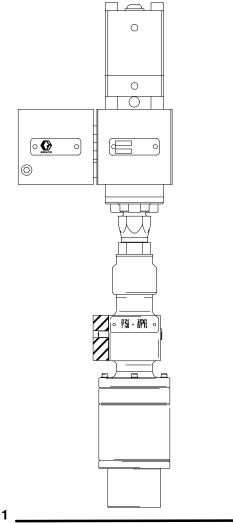
Part No. 617870

55 ft (16.8 m) Motor Extension Cable Assembly

Part No. 617829

40 ft (12.2 m) Robot Interface Cable Assembly

Tool Mount



8130B

Fig. 1

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Warnings

Warning Symbol

A WARNING

This symbol alerts you to the possibility of serious injury or death if you do not follow the instructions.

Caution Symbol

A CAUTION

This symbol alerts you to the possibility of damage to or destruction of equipment if you do not follow the instructions.

WARNING



EQUIPMENT MISUSE HAZARD

Equipment misuse can cause the equipment to rupture, malfunction, or start unexpectedly and result in serious injury.



- This equipment is for professional use only.
- Read all instruction manuals, warnings, tags, and labels before operating the equipment.
- Use the equipment only for its intended purpose. If you are uncertain about usage, call your Graco distributor.
- Do not alter or modify this equipment. Use only genuine Graco parts and accessories.
- Check the equipment daily. Repair or replace worn or damaged parts immediately.
- Do not exceed the maximum fluid working pressure of 3500 psi (241 bar, 24.1 MPa) to the dispenser or manifold.
- Never exceed the recommended working pressure or the maximum air inlet pressure stated on your pump or in the **Technical Data** section on page 63.
- Be sure that all spray/dispensing equipment and accessories are rated to withstand the maximum working pressure of the pump. Do not exceed the maximum working pressure of any component or accessory used in the system.
- Route hoses and cables away from traffic areas, sharp edges, moving parts, and hot surfaces.
- Do not expose Graco standard hoses to temperatures above 180°F (82°C) or below –40°F (-40°C).
- Do not use the hoses to pull the equipment.
- Use only fluids and solvents that are compatible with the equipment wetted parts. See the
 Technical Data sections of all the equipment manuals. Read the fluid manufacturer's warnings.
- Always wear protective eyewear, gloves, clothing, and respirator as recommended by the fluid and solvent manufacturers.
- Comply with all applicable local, state, and national fire, electrical, and other safety regulations.

WARNING



SKIN INJECTION HAZARD

Spray from the applicator, hose leaks, or ruptured components can inject fluid into your body and cause extremely serious injury, including the need for amputation. Fluid splashed in the eyes or on the skin can also cause serious injury.

- Fluid injected into the skin might look like just a cut, but it is a serious injury. Get immediate surgical treatment.
- Do not point the applicator at anyone or at any part of the body.
- Do not put hand or fingers over the front of the applicator.
- Do not stop or deflect fluid leaks with your hand, body, glove, or rag.
- Follow the **Pressure Relief Procedure** on page 27 whenever you are instructed to: relieve pressure; stop dispensing; clean, check, or service the equipment; or install or clean a nozzle.
- Tighten all the fluid connections before operating the equipment.
- Check the hoses, tubes, and couplings daily. Replace worn, damaged, or loose parts immediately. Permanently coupled hoses cannot be repaired; replace the entire hose.
- Always wear eye protection and protective clothing when installing, operating, or servicing this
 dispensing equipment.
- Do not remove or modify any part of the applicator; this can cause a malfunction and result in serious bodily injury.
- Use extreme caution when cleaning or changing nozzles. If the nozzle clogs while applying material, Always follow the **Pressure Relief Procedure** on page 27, then remove the nozzle to clean it.
- Never wipe off build-up around the nozzle or inlet cap until pressure is fully relieved.

WARNING



FIRE, EXPLOSION, AND ELECTRIC SHOCK HAZARD

Improper grounding, poor air ventilation, open flames, or sparks can cause a hazardous condition and result in fire or explosion and serious injury.

- Ground the equipment and the object being dispensed. See Grounding on page 22.
- Ground the equipment and the object being sprayed, and all other electrically conductive objects in the dispense area. Proper grounding dissipates static electricity generated in the equipment. See Grounding on page 22.
- Do not use this equipment with flammable liquids.
- Keep the dispense area free of debris, including solvent, rags, and gasoline.
- If there is any static sparking or you feel an electric shock while using the equipment, stop dispensing immediately. Do not use the equipment until you have identified and corrected the problem.
- Be sure all electrical work is performed by a qualified electrician only.
- Have any checks, installation, or service to electrical equipment performed by a qualified electrician only.
- Be sure all electrical equipment is installed and operated in compliance with applicable codes.
- Be sure power is disconnected when servicing and repairing equipment.
- Before operating the equipment, extinguish all open flames or pilot lights in the dispense area.
- Do not smoke in the dispensing area.
- Keep liquids away from the electrical components
- Disconnect electrical power at the main switch before servicing the equipment.

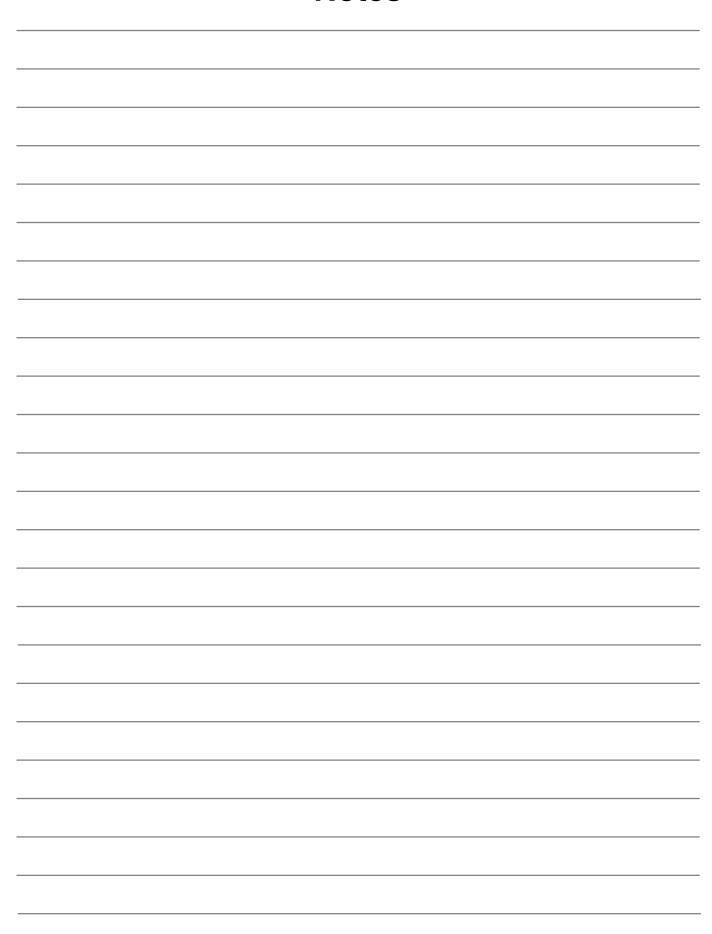


TOXIC FLUID HAZARD

Hazardous fluids or toxic fumes can cause serious injury or death if splashed in the eyes or on the skin, swallowed, or inhaled.

- Provide fresh air ventilation to avoid the buildup of vapors from the fluid being dispensed.
- Know the specific hazards of the fluid you are using.
- Store hazardous fluid in an approved container. Dispose of hazardous fluid according to all local, state, and national guidelines.
- Always wear protective eyewear, gloves, clothing, and respirator as recommended by the fluid and solvent manufacturer.
- Avoid exposure to heated material fumes.

Notes



Unpacking and Repacking

Unpacking the Product

The PrecisionSwirl orbital dispenser and control assembly were carefully packaged for shipment by Graco. When the package arrives, perform the following procedure to unpack the units:

- Inspect the shipping box carefully for shipping damage. Contact the carrier promptly if damage is discovered.
- 2. Unseal the box and inspect the contents carefully. There should not be any loose or damaged parts in the bag.
- Compare the packing slip against all items included in the box. Any shortages or other inspection problems should be reported immediately.
- 4. Store the box and packing materials in a safe place for future use. Graco recommends that all packing materials be saved in case the unit needs to be shipped again.

Repair and Repacking the Product

When the PrecisionSwirl orbital dispenser requires service, it is the purchaser's responsibility to have the unit repaired. As an option, the purchaser can have the unit repaired by an authorized Graco distributor. For additional information, read the following subsections.

On-site Service

PrecisionSwirl components are customarily serviced by the purchaser or an authorized Graco technician. When service is required, follow the **Service** procedures in this manual.

Service by an Authorized Graco Distributor

The PrecisionSwirl orbital dispenser can be serviced by an authorized Graco distributor *after* completing a Return Goods Authorization (RGA) form. The purchaser must re-package and ship the orbital dispenser to the Graco distributor. When repacking the orbital dispenser, perform the following steps:

- Retrieve the original box and packing materials for shipment.
- Place the orbital dispenser and any loose or damaged parts in the same bag and box used in the original shipment. Fill the box with filler material to minimize the possibility of damage.
- 3. Seal the box tightly to protect its contents and prevent shipping damage.
- 4. Insure your shipment for the proper replacement value of its contents.
- Ship the orbital dispenser freight prepaid to your authorized Graco distributor for service.

PrecisionSwirl Overview

PrecisionSwirl Capabilities

The PrecisionSwirl orbital dispenser is regulated through the control assembly. The orbital dispenser is used to swirl sealant and adhesives in a variety of applications.

In a basic robotic system, the control assembly serves as the interface between the robot controller and the orbital dispenser via an interface cable. Refer to **Robot Interface Cable Assembly** on page 52.

The orbital dispenser is operated either manually from the control assembly or automatically from a robot controller where the orbital dispenser is programmed to apply material continuously, or at interrupted intervals, or both. The orbital dispenser can be stopped, started, and regulated to suit the application, making high quality swirl patterns that hold form after the material is dispensed.

The orbital dispenser applies a continuous swirled bead of material directly on components in targeted areas, such as the hem flanges on car doors, the interior seams of the chassis, and on the fixed glass openings of autos.

Bead profile is "pre-shaped" in a uniform pattern of overlaid circular loops (see Fig. 2). Bead shape is affected by nozzle size, material composition, flow rate, stand off distance, and orbital dispenser motor speed. The oscillating nozzle on the orbital dispenser can apply an accurate swirled bead of material on vertical and horizontal planes.

The orbital dispenser is small enough to apply sealant and adhesives on any type of surface or material, and can be directed on any programmable path, including: a series of crevices, creases, or around a maze of straight lines, sharp angles, contours, curves, corners, and openings.

Refer to **List of Nozzles** on page 53 for the available nozzle sizes.

The material source for the orbital dispenser is commonly supplied via a dual ram pump fluid supply system, which can be equipped with filters, temperature conditioning, and a fluid supply header.

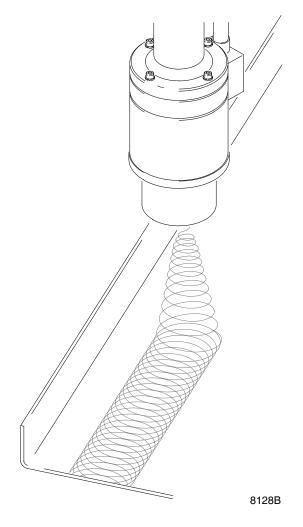


Fig. 2

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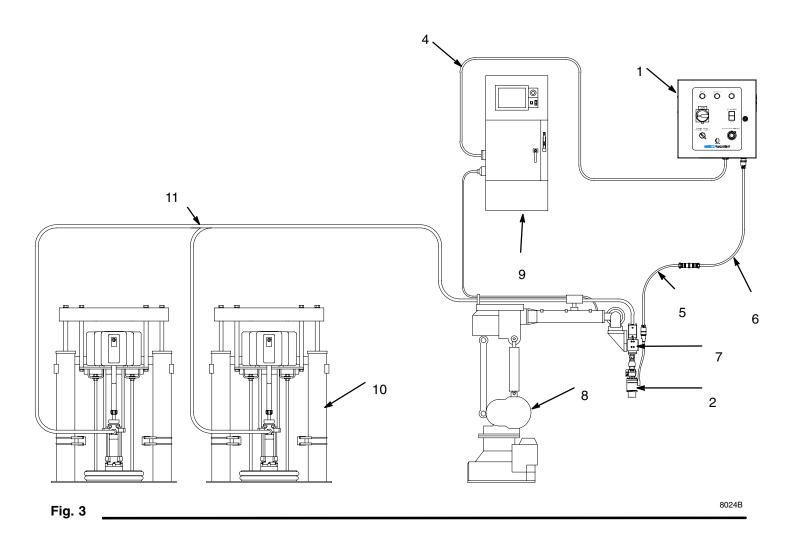
PrecisionSwirl in Basic Robotic System

Fig. 3 shows the PrecisionSwirl components in a basic robotic system. The following list identifies the PrecisionSwirl components:

	·
No.	Description
1	Control assembly (PrecisionSwirl)
2	Orbital dispenser (PrecisionSwirl)
4	Automatic control cable (PrecisionSwirl). Also
	called robot interface cable in this manual.
5	6, 9, or 15 ft (1.8, 2.7, or 4.6 m) flexible motor
	cable for robot mounting (PrecisionSwirl)
6	55 ft (16.8 m) motor cable (PrecisionSwirl)
7	Dispense valve (not included)
8	Sealer robot
9	Robot controller
10	Fluid supply system

Fluid supply header

PrecisionSwirl Overview



To install the control assembly, you:

- Prepare to install the control assembly
- Mount the control assembly
- Ground the control assembly (electrically)
- Connect control assembly to a power source
- Check resistance between the control assembly and a true earth ground

▲ WARNING



ELECTROCUTION HAZARD

Installing and servicing this equipment requires access to parts which could cause an electric shock or other serious

injury. Have only qualified electricians access the control assembly.

Preparing to Install the Control Assembly

Before installing the control assembly:

- See component manuals for specific data on component requirements, such as a robot. Data presented here pertains to the PrecisionSwirl control assembly only.
- Have all applicable documentation available during installation.
- Use only the Graco PrecisionSwirl control assembly with the PrecisionSwirl applicator.

A WARNING

SI V

EQUIPMENT MISUSE HAZARD

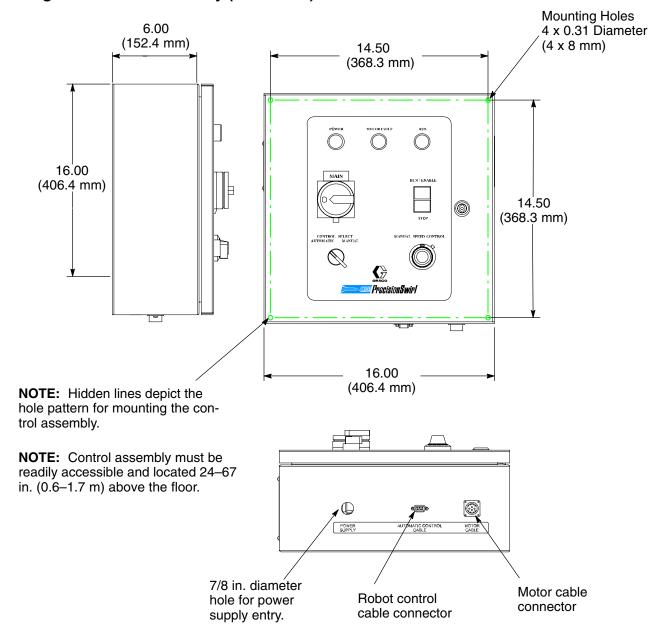
The PrecisionSwirl control assembly weighs approximately 23.5 lb. (10.7 kg). Exercise care when mounting and

handling the control assembly to prevent equipment damage or personal injury.

Mounting the Control Assembly

- Select a location to mount the PrecisionSwirl control assembly. Keep the following in mind:
 Allow sufficient space for mounting and using the equipment:
 - Mount the control assembly approximately 24–67 in. (0.6–1.7 m) above the floor.
 - Make sure all cables reach components without strain.
 - Make sure there is sufficient space for repair, maintenance, and operation of the robot and applicator. The National Electrical Code requires 3 ft (91.4 cm) of open space in front of the control assembly.
 - Make sure there is sufficient clearance around the control assembly for running fluid lines and cables to other components.
 - Make sure there is easy and safe access to an appropriate electrical power source.
- Secure the PrecisionSwirl control assembly with four 1/4 in. bolts through the 0.31 in. diameter holes in the mounting flanges. See Fig. 4 for the mounting hole spacing in the control assembly.

Mounting the Control Assembly (continued)



8037B Fig. 4 _

Grounding the Control Assembly

WARNING



FIRE, EXPLOSION, AND ELECTRIC SHOCK HAZARD

To reduce the risk of fire, explosion, or electric shock:



- The PrecisionSwirl control assembly must be electrically connected to a true earth ground; the ground in the electrical system may not be sufficient.
- All wires used for grounding must be 8 AWG (8.36 mm²) minimum.
- A qualified electrician must complete all grounding and wiring connections.
- Refer to your local code for the requirements for a "true earth ground" in your area.
- Also read and follow the warnings on pages 5–7.

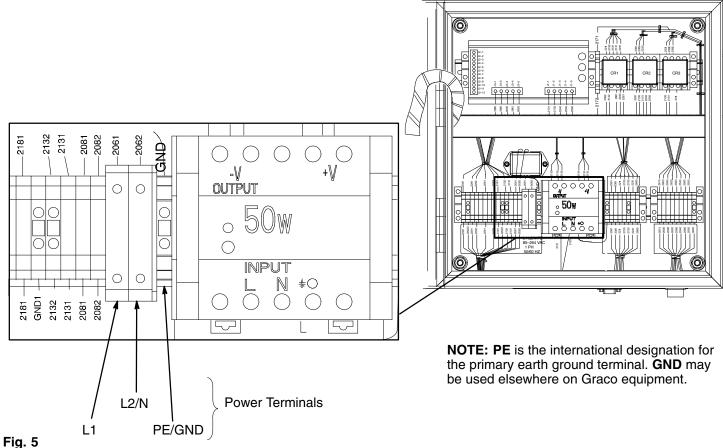
A CAUTION

If power and grounding connections are not done properly, the equipment may be damaged and the warranty will be voided.

A CAUTION

To help avoid damage to equipment, make sure that the robot and PrecisionSwirl equipment are grounded to the same point.

Connect a ground wire from the GND terminal in the PrecisionSwirl control assembly (shown in Fig. 5) to a true earth ground.



Connecting the Control Assembly to a Power Source

Perform the following procedure to connect the control assembly to a power source.

A WARNING



ELECTRIC SHOCK HAZARD

Do not connect the PrecisionSwirl control assembly to a power source unless you are a trained electrician. Failure to

follow standard procedures or to observe the necessary precautions could result in serious bodily injury or equipment damage.

CAUTION

If power and grounding connections are not done properly, the equipment may be damaged and the warranty will be voided.

Have a qualified electrician connect the PrecisionSwirl control assembly to a grounded electrical source that has the following required service ratings:

Description	Requirements
Vac	100–240
Hz	50/60
Phase	1
Full Load Amps	0.42 at 120 Vac
Circuit Breaker	5 Amp

NOTE: Power to the control assembly must be supplied from a source with a lockable-off disconnect switch, or by use of a cord with a plug-and-socket connection to the source of power.

To connect the control assembly to the electrical source:

- 1. Shut off system power at the main circuit breaker.
- Locate the opening on the bottom of the control assembly, labeled POWER SUPPLY. See Fig. 6.

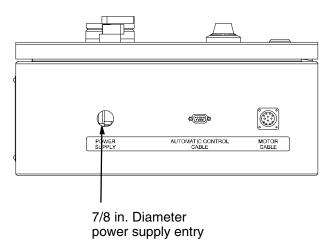


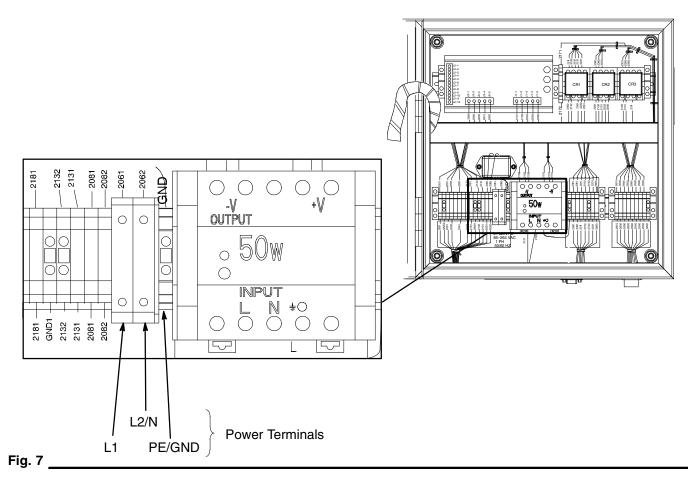
Fig. 6

- 3. Using 16 AWG wire or larger, connect electrical power to L1 (hot), L2 (neutral) power terminals in the PrecisionSwirl control assembly. See Fig. 7.
- 4. Use a cord grip to seal the area where wires enter the control assembly.

NOTE: Any fitting that is used to connect a power cord (or conduit for power wiring) to the control assembly must provide a liquid-tight seal.

- 5. Apply system power at the main circuit breaker.
- 6. Move the POWER switch to the ON position, applying power to the control assembly.

Connecting the Control Assembly to a Power Source (continued)



Checking Resistance Between the Control Assembly and the True Earth Ground

FIRE, EXPLOSION, AND ELECTRIC SHOCK HAZARD To reduce the risk of fire, explosion, or electric shock, the resistance between the supply unit components and true earth ground must be less than 0.25 ohms.

Have a qualified electrician check the resistance between each system component and the true earth ground. The resistance must be less than 0.25 ohms. If the resistance is greater than 0.25 ohms, a different ground site may be required. Do not operate the PrecisionSwirl module until the problem is corrected.

Installing the Dispense Valve

To install the dispense valve:

- Mount the dispense valve
- Connect the air lines
- Connect material hose

Mounting the Dispense Valve

Attach the dispense valve to the mounting bracket on a stationary support or robotic arm, using two socket head screws (38) and flat washers (39).

NOTE: The customer must provide a four-way pneumatic valve, activated by a separate on/off dispense signal via the robot, to control material flow.

Connecting Air Lines to Dispense Valve

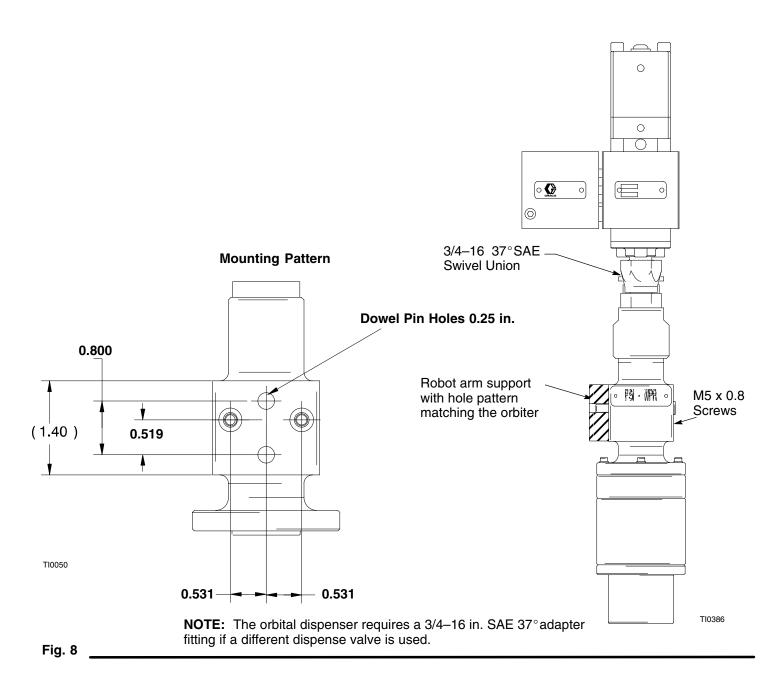
Securely connect air lines to dispense valve air ports (F). Make sure to connect the appropriate air lines to the appropriate ports.

Connecting Material Hose to Dispense Valve

Securely connect the material hose to dispense valve inlet port (A).

Refer to Dispense Valve manuals 308876 and 309376.

Installing the Tool Mounted Orbital Dispenser



To attach the tool mounted orbital dispenser, perform the following steps:

- Align the dispenser with the alignment pins in the robot arm.
- Tighten the two M5 x 0.8 screws securing the dispenser to the robot arm.

For detailed specifications, refer to the information

NOTE: The dispense valve must also be supported by

additional bracketing. The swivel union is not intended

3. Attach the dispense valve to the orbital dispenser by tightening the 3/4–16 37° SAE swivel union.

4. Make sure the coupling is tight to avoid material

to support the weight of the dispense valve.

leakage.

- provided in **Dimensions** on page 59.

Installing Cable Assemblies

A CAUTION

Always make connections to the control assembly with power turned off.

Connecting the Motor Control Cable

Motor control cables are supplied in four lengths, 6 ft (1.8 m), 9 ft (2.7 m), 15 ft (4.6 m), and 55 ft (16.8). The 55 ft cable may be used by itself. The 6 ft, 9 ft, and 15 ft cable must be used with the 55 ft cable.

To connect the motor cable between the control assembly and the orbital dispenser, do the following:

 Locate the receptacle on the bottom of the control assembly that is labeled MOTOR CABLE. See Fig. 9.

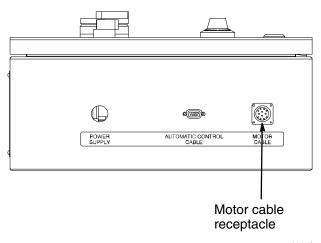
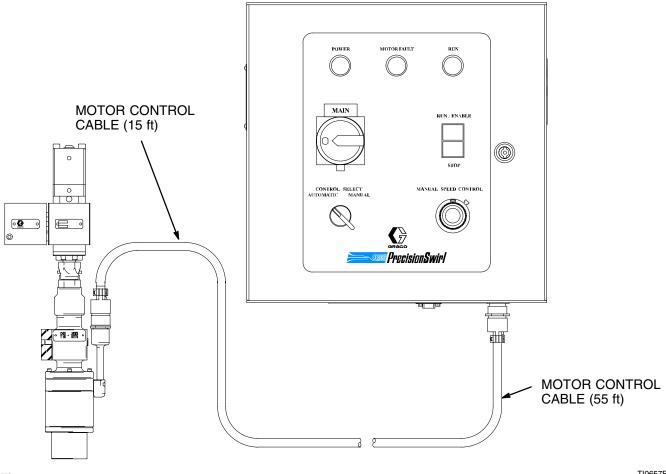


Fig. 9

- 2. Connect the orbital dispenser cable (55 ft) to the MOTOR CABLE receptacle. See Fig. 10.
- Check the connections to ensure the cable is connected correctly.
- 4. Route the motor control cable and conform to the following cable routing requirements:
 - Avoid a bend radius of less than 5 in. (12.7 cm).
 - Avoid pinch points.
 - Avoid cable pulling or stretching.
 - Keep cables from rubbing against other components or machinery.
 - If a lot of robot wrist motion is required, leave sufficient cable length to allow for the motion, avoiding any cable droops that may interfere with the machinery or substrate.
 - Route and secure the 7 in. motor cable to minimize any movement. The 7 in. motor cable is not intended to handle severe flexing motions.
 - Cable ties should only be used to loosely bundle hoses together. Do not tighten cable ties to the point where cable movement is restricted.

Installing Cable Assemblies

Connecting the Motor Control Cable (continued)



Installing the Cable Assemblies

CAUTION

Always make connections to the control assembly with power turned off.

Connecting the Automatic Control Cable

The PrecisionSwirl control assembly is provided with a 9-pin receptacle for the robot interface cable.

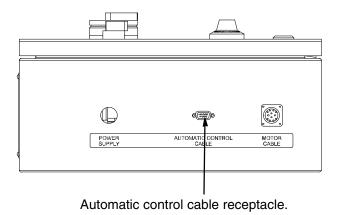
NOTE: Any wiring from an external source, such as a robot controller, must follow the robot manufacturer's instructions and must comply with the appropriate codes and standards.

To connect the automatic control cable (P/N 617829) between the control assembly and the robot, perform the following steps:

- 1. Locate the receptacle on the bottom of the control assembly that is labeled AUTOMATIC CONTROL CABLE. See Fig. 11.
- 2. Connect the cable assembly to the AUTOMATIC CONTROL CABLE receptacle in Fig. 11.
- 3. Secure the cable by tightening the two mounting screws.
- 4. Connect the opposite end of the cable assembly to the applicable terminals or receptacle on the robot controller.

For information about specific control assembly circuitry and connections, read the chart below and see the Wiring Diagrams on pages 56 and 57, and Fig. 12.

5. Check the connections to ensure the cable is connected correctly.



Signal	Description
Enable	The 24V enable signal starts the orbital dispenser motor.
Swirl Speed Command	This 0–10VDC analog signal is used to adjust the motor speed. (0–10 VDC = 6600–24,000 RPM)
Motor Fault Alarm	The alarm relay activates when the motor speed drops below 1500 RPM or does not start. The relay contacts are normally closed.
	A fault will be generated if any of the front panel controls are in the wrong position for automatic operation.
Swirl Speed Readout	This analog signal can be used to monitor motor speed. (0–10 VDC = 0–24,000 RPM)

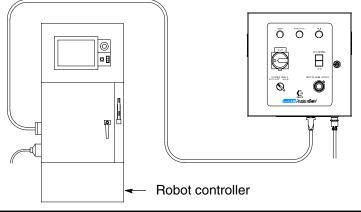


Fig. 12 _

Verifying Ground Continuity

Verifying Ground Continuity

Verify ground continuity between:

- True earth ground and the control assembly ground terminal
- The orbital dispenser and the robot

Adjusting the Orbital Dispenser

The PrecisionSwirl orbital dispenser is calibrated at the factory. No adjustment is required during initial setup.

Before applying power, read the reference information provided about controls and indicators to become familiar with the equipment.

Inspecting the Orbital Dispenser

Inspect the orbital dispenser cables, material, and air hoses daily for leakage and other visible damage.

Grounding the System

▲ WARNING



FIRE AND EXPLOSION HAZARD

To reduce the risk of a fire, explosion, and serious injury, proper electrical grounding of every part of your system is essential. Read the warning section, **FIRE AND EXPLOSION HAZARD**, on page 7 and follow the grounding instructions below.

The following grounding instructions are minimum requirements for a basic dispensing system. Your system may include other equipment or objects which must be grounded. Check your local electrical code for detailed grounding instructions for your area and type of equipment. Your system must be connected to a true earth ground.

- 1. *Pump:* connect a ground wire and clamp to a true earth ground as shown in separate pump manual.
- 2. *Orbital Dispenser:* obtain grounding through the motor cable assembly.
- 3. Fluid and air hoses: use only electrically conductive material and air hoses.
- 4. *Dispense gun:* obtain grounding through the connection of the hose, or cable.
- 5. *Air compressor:* follow the manufacturer's recommendations.
- 6. Object being sprayed: according to local code.
- 7. Fluid supply container: according to local code.

Reading the PrecisionSwirl Control Assembly Controls and Indicators

Table 1 describes the controls on the PrecisionSwirl control assembly. See Fig. 13 for an illustration of the controls and indicators.

Table 1. Control Assembly Controls

Button/Switch	What it Does
MAIN ON/OFF Switch	 Controls power to the system. In the MAIN ON (I) position, system power is turned on. In the OFF (0) position, system power is turned off.
Control Select Switch AUTOMATIC / MANUAL	 Switches the orbital dispenser to automatic or manual control. In the AUTOMATIC position, the orbital dispenser is controlled from a remote source, such as a robot, via an interface cable. In the MANUAL position, the orbital dispenser is controlled directly from the control assembly front panel.
RUN / ENABLE Button	Pushing the RUN/ENABLE (black) button starts the orbital dispenser motor in manual mode or enables the motor to be started in automatic mode.
STOP Button	Pushing the STOP (red) button removes power from the orbital dispenser.
MANUAL SPEED CONTROL Knob (potentiometer)	Regulates the motor speed of the orbital dispenser in the manual control mode. Rotating the control knob clockwise increases motor speed. Rotating the control knob counter-clockwise decreases motor speed.

Table 2 describes the indicators on the PrecisionSwirl control assembly. See Fig. 13 for an illustration of the controls and indicators.

Table 2. Control Assembly Indicators

Indicator Light	Indicator Light is	Meaning
POWER (white)	ON	Power is on.
	OFF	Power is off.
RUN (green)	ON	PrecisionSwirl orbital dispenser is ready for operation, or is operating in manual control mode.
	OFF	PrecisionSwirl orbital dispenser is not ready for operation, or is not operating in manual control mode.
MOTOR FAULT (red)	ON	Motor is not rotating. Or, the motor is rotating below the minimum speed.
	OFF	Motor is functioning properly.

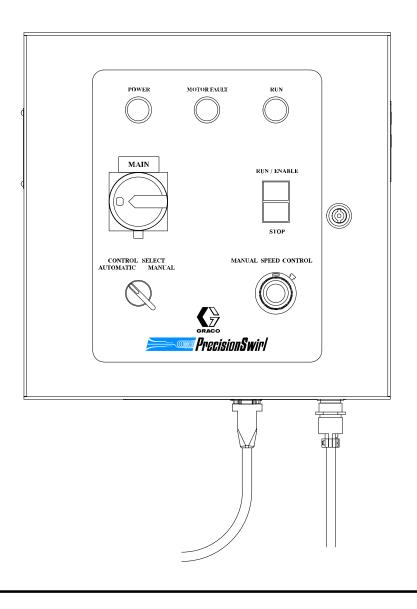


Fig. 13

Setting Operation Modes

The PrecisionSwirl module has two operating states:

- Automatic mode enables the PrecisionSwirl orbital dispenser to be controlled by a remote signal source, such as a robot control. Motor speed can be controlled by a 0–10 VDC analog signal.
- Manual mode enables the PrecisionSwirl orbital dispenser to swirl when you press the RUN/EN-ABLE button on the control assembly. Swirling continues until the STOP button is pressed.

NOTE: Material flow rate and "ON/OFF" flow are not controlled by the PrecisionSwirl orbital dispenser. These must be controlled by the other interfaces. Contact your Graco Distributor for assistance.

8030A

The PrecisionSwirl orbital dispenser is in an idle state until you press the RUN/ENABLE button on the control assembly. The only time the PrecisionSwirl orbital dispenser can swirl material is when the RUN/ENABLE button is pressed in either Automatic or Manual mode. When the STOP button is pressed, the PrecisionSwirl orbital dispenser becomes idle and will not swirl material.

The procedures in this section configure the module for manual or automatic operation.

Using Automatic Mode

Entering Automatic Mode

To put the PrecisionSwirl module into Automatic mode:

△ WARNING

You are about to place the system under robotic control. Make sure dispensing will not endanger people or equipment before proceeding.

- 1. Make sure the POWER indicator, shown in Fig. 13, is lit at the control assembly. If it is not, turn the MAIN power switch to the ON position, turning on power to the PrecisionSwirl control assembly circuitry.
- 2. Set the CONTROL SELECT switch to AUTOMAT-IC.
- 3. Press the RUN/ENABLE (black) button. Make sure the green RUN indicator, shown in Fig. 13, is lit at the control assembly.

The PrecisionSwirl orbital dispenser is now enabled. When it receives a 24 Volt RUN/ENABLE command from the robot, the PrecisionSwirl orbital dispenser motor starts and reaches full speed in about one second. The orbital dispenser motor stops when the 24 Volt RUN/ENABLE command is removed.

4. Leave the control assembly in this state during normal operation.

Leaving Automatic Mode

To leave Automatic dispense mode and idle the mod-

- 1. Press the STOP (red) button.
- 2. Set the CONTROL SELECT switch to MANUAL.
- 3. Make sure the green RUN indicator, shown in Fig. 13, is off at the control assembly.

Using Manual Mode

- Make sure the POWER indicator, in Fig. 13, is lit at the control assembly. If it is not, turn the MAIN power switch to the ON position, turning on power to the PrecisionSwirl control assembly circuitry.
- 2. Set the CONTROL SELECT switch to MANUAL.

WARNING

The system is now ready to dispense. Make sure dispensing will not endanger people or equipment before proceeding.

3. Press the RUN/ENABLE (black) button. Make sure the green RUN indicator, shown in Fig. 13, is lit at the control assembly.

The PrecisionSwirl orbital dispenser motor starts immediately.

Stop Manual Swirling

To stop manual swirling and idle the module:

1. Press the STOP (red) button.

The PrecisionSwirl orbital dispenser is now disabled and will stop swirling material.

2. Make sure the green RUN indicator, shown in Fig. 13, is off at the control assembly.

Analyzing Causes for a Motor Fault Alarm

Circuitry on the relay board monitors the motor speed to verify that the motor is functioning properly.

When the motor functions improperly, the circuitry on the relay board activates the motor fault alarm. The alarm turns on when:

- the motor speed has not risen within the +/-50% tolerance range within five seconds after startup.
- the motor speed is outside the tolerance range for at least five seconds while operating.

When a fault occurs, the motor fault light on the control panel illuminates, and the alarm relay activates sending the fault signal out via the automatic control cable. The alarm remains turned on until the fault condition is corrected or the run command is removed.

A fault will also be generated if any of the front panel controls are not in the correct position for automatic operation (power switch, enable switch, manual/auto switch).

Adjusting Orbital Dispenser Motor Speed

Adjust the orbital dispenser motor speed in the manual or automatic control mode as described in the following paragraphs.

Manual Mode:

Adjust motor speed by rotating the MANUAL SPEED CONTROL knob on the control box. See Fig. 13.

Rotate the knob clockwise to increase speed and counterclockwise to decrease speed. Use the motor speed chart (Fig. 14) to find the manual control setting required to achieve the desired motor speed.

Automatic Mode:

Use the motor speed chart (Fig. 14) to find the voltage setting required to achieve the desired motor speed. When the control signal voltage is increased, the motor speed increases. When the control signal voltage is decreased, the motor speed decreases.

▲ WARNING

Exceeding the maximum analog speed control voltage may result in damage to the motor controller.

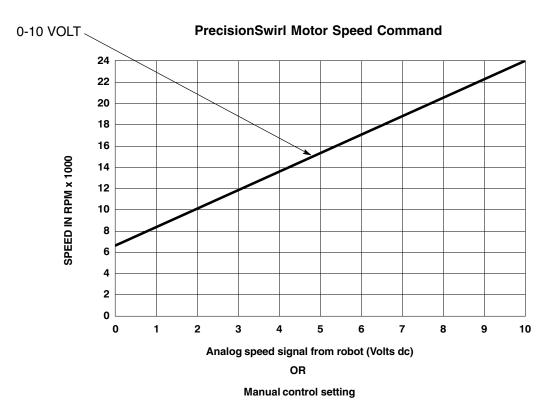


Fig. 14

Operation

Pressure Relief Procedure

WARNING



MATERIAL FLUID HAZARD

To reduce risk of injury, wear eye protection, gloves, and protective clothing when installing, operating, or servicing this orbital dispenser.



INJECTION HAZARD

The system pressure must be manually relieved to prevent the system from starting or spraying accidentally. Fluid under high pressure can be injected through the skin and cause serious injury. To reduce the risk of an injury from injection, splashing fluid, or moving parts, follow the Pressure Relief Procedure whenever you:

- Are instructed to relieve the pressure
- Stop spraying/dispensing
- Install or clean the nozzle
- Check or service any of the system equipment



PRESSURIZED FLUID HAZARD

High pressures can cause serious personal injury. Be sure to open the orbital dispenser during system start-up to alleviate pressure which might occur in the system due to material expansion.

This procedure describes how to relieve pressure from the orbital dispenser. See your supply unit or system documentation for instructions on relieving pressure for the entire system. Use this procedure whenever you shut off the orbital dispenser and before checking or adjusting any part of the system, to reduce the risk of serious injury.

- 1. Shut off the material supply. Follow the **Pressure** Relief Procedure in the material supply instruction manual.
- 2. Make sure that all material valves are open.
- 3. Make sure the pump air supply has been turned OFF.
- 4. Shut off the conditioning unit to the automatic dispense valve. See the conditioning unit's documentation for more information.

- 5. Actuate the PrecisionSwirl dispense valve repeatedly until no fluid flows. Have a container ready to catch the drainage from the orbital dispenser.
- 6. Relieve air pressure to the dispense valve.
- 7. If the orbital dispenser nozzle or dispense valve fluid hose is completely clogged or if pressure has not been fully relieved after following the steps above, very slowly loosen the 3/4 in.-16 swivel union between the dispense valve and the orbital dispenser, and relieve pressure gradually, then loosen completely. Now clear the nozzle or hose.

Orbital Dispenser Operation

The PrecisionSwirl orbital dispenser is calibrated to run from 6600-24,000 RPM maximum, in either automatic or manual control mode.

The orbital dispenser, regardless of the nozzle size, swirls material in a continuous path, over contours, curves, and corners in a consistent bead when the control assembly and dispense valve are configured and adjusted correctly.

The nozzle does not rotate, but its orifice moves in a small circle at high speed to dispense a smooth, neat, consistent bead of concentric loops without dimples. air pockets, depressions, or protuberances. Bead shape is affected by nozzle size, material composition, material pressure, and the distance from the nozzle to the substrate.

The orbital dispenser motor must be turned on at least one second before applying a bead to ensure peak efficiency.

Whether the PrecisionSwirl orbital dispenser is controlled in either the Automatic or Manual mode, material cannot be applied from the orbital dispenser unless the dispense valve is actuated by some other interface to enable material flow.

WARNING

Turn off the PrecisionSwirl orbital dispenser when the unit is not being used. The material inside the orbital dispenser may cure if the motor runs continuously when the orbital dispenser is not being used.

To extend bearing life, the orbital dispenser motor must not run continuously. Shutting off the motor after each dispense cycle reduces bearing wear and minimizes temperature rise.

Troubleshooting

Some solutions require disassembling the dispense valve or orbital dispenser. Always relieve system pressure before performing these procedures.

WARNING



To reduce the risk of serious injury whenever you are instructed to relieve pressure, always follow the **Pressure Relief Procedure** (page 27).



To reduce the risk of serious injury whenever you are instructed to remove, change, check, clean, or handle the nozzle in any manner, always disconnect the **motor control cable** from the control assembly (see Fig. 9 on page 19), or place the control assembly in the MANUAL mode of operation using the CONTROL SELECT switch. (See Fig. 13 on page 24.)

Troubleshooting Information

Table 3 provides troubleshooting information. For other troubleshooting situations, call your Graco distributor.

Table 3. Troubleshooting

Problem	Causes	Solutions
No material being dispensed	Clogged nozzle	Change nozzle.
	No material or pressure	Check fluid delivery system.
	Broken or clogged dispense tube	Rebuild the orbital dispenser.
	Fault in dispense valve	Refer to Dispense Valve manuals 308876 or 309376.
Material dispensing but not swirling	Motor not operating	Check wiring connections and cable.
(Motor fault light is on)		Tube bearing defective; replace tube bearing.
		Motor defective; replace motor.
		Check for fluid leak.
	Control assembly failure	Check analog voltage control setting and enable signal.
		Check RPM setting.
		Check power and fuses.
		Check wiring.
	Orbiter bearing failure	Replace bearing.
Material dispensing but not swirling	Material accumulating on nozzle	Clean nozzle.
(Motor fault light is off)		
Motor is rotating but poor swirl pattern	Flow rate has changed	Check flow rate.
or change in bead size	Motor speed has changed	Check analog speed signal.
	Material viscosity has changed	Check material parameters.
	Partially clogged nozzle	Clean nozzle.

Preventive Maintenance Schedule

Table 4 shows the preventive maintenance schedule for the PrecisionSwirl module.

Repair technicians must conform to the prescribed maintenance intervals to prevent malfunctions and unscheduled production interruptions.

For components or procedures that are not listed in the table, call your Graco distributor.

Table 4. Preventive Maintenance Schedule

Schedule	Component Description	Refer to:
Daily	Clean the nozzle and deflector.	310554
	Inspect the lower housing on the applicator, especially behind the deflector. Remove the material from behind the deflector to prevent any fluid seepage into the tube bearing.	
Daily	Inspect bellows seal for damage.	310554
Daily	Clean bellows seal.	310554
Weekly	Inspect cables and hoses.	310554
Weekly	Inspect the dispense valve for signs of leakage.	308876 309376
Monthly	Change bellows seal***.	310554
3–6 months*	Service the dispense valve.	308876 309376
Yearly**	Rebuild the PrecisionSwirl applicator.	310554

^{*}Service life is dependent upon on production load factors and material characteristics.

^{**}For applications running higher than 16,000 RPM, rebuild the applicator every six months. For heavy usage (for example, operation at 23,000 RPM or 16 hours/day), rebuild more frequently.

^{***}Preventive maintenance schedule for the bellows seal is dependent on material and application parameters. More frequent changes may be required for difficult materials.

Control Assembly Service

Servicing the Control Assembly

This part of the manual provides information about the following control assembly components:

- Indicator Lamp Button and Select Switch (page 30)
- Light Bulb (page 30)
- MAIN Power Switch (page 31)
- Potentiometer (page 32)

NOTE: Refer to the **Parts** information on pages 42, 43, and 46 while servicing the control assembly.

Lamp Button and Switch Removal

▲ WARNING



ELECTROCUTION HAZARD

Installing and servicing this equipment requires access to parts which could cause an electric shock or other serious to only qualified electricians access the

injury. Have only qualified electricians access the control assembly.

- 1. Shut off system power at the main circuit breaker.
- 2. At the control assembly, move the MAIN power switch to the OFF position.
- 3. Unlock and open the hinged cover of the control assembly enclosure.
- Disconnect the lead wires from the fixture terminals. Refer to Figs. 27 and 28 for lead wire identification. If necessary, label the wires to facilitate reassembly after the fixture is replaced.
- Loosen two screws which clamp the fixture to the cover. Rotate the fixture counter-clockwise relative to the lens cover or switch operator. Separate the two parts of the fixture and remove them from the cover.

Lamp Button and Switch Replacement

- 1. Reverse the disassembly procedures 3–5 in the previous section.
- 2. Refer to Figs. 27 and 28 for lead wire identification.

- 3. Apply system power at the main circuit breaker.
- Move the MAIN power switch to the ON position, applying power to the control assembly.
- 5. Verify that the replaced fixture operates correctly.
- 6. Return the orbital dispenser and control assembly to normal operating condition.

Light Bulb Removal

Remove the light bulb as follows:

WARNING



ELECTROCUTION HAZARD

Installing and servicing this equipment requires access to parts which could cause an electric shock or other serious apply qualified electricians access the

injury. Have only qualified electricians access the control assembly.

- 1. Shut off system power at the main circuit breaker.
- At the control assembly, move the MAIN power switch to the OFF position.
- 3. Unscrew and remove the indicator light lens.
- 4. Gently press and rotate the bulb counter-clockwise, 1/4 in. of a turn, unlocking the bulb from its socket. Remove the bulb from the socket.

Light Bulb Replacement

Replace the light bulb as follows:

- 1. Insert the light bulb in the socket.
- 2. Gently press and rotate the bulb clockwise, 1/4 in. of a turn to lock the bulb in its socket.
- Replace the lens.
- 4. Apply system power at the main circuit breaker.
- 5. Move the MAIN power switch to the ON position, applying power to the control assembly.
- 6. Verify that the light bulb operates correctly.
- Return the control assembly to normal operating condition.

Control Assembly Service

MAIN Power Switch Removal

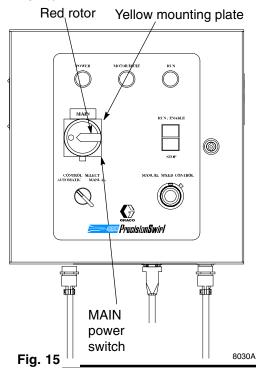
Remove the MAIN power switch as follows:

▲ WARNING

Installing and servicing this equipment requires access to parts which could cause an electric shock or other serious injury. Have only qualified electricians access the

injury. Have only qualified electricians access the control assembly.

- 1. Shut off system power at the main circuit breaker.
- 2. At the control assembly, move the MAIN power switch to the OFF position. See Fig. 15.
- Unlock and open the hinged cover of the control assembly.
- Disconnect the lead wires from the four terminals on the MAIN power switch. Refer to Figs. 27 and 28 for lead wire identification. If necessary, label the wires to facilitate reassembly after the switch is replaced.
- Remove one flat head screw that secures the red rotor to the switch assembly. Lift the rotor from the switch.



6. Remove two flat head screws from the yellow mounting plate, which fastens the switch to the hinged cover. Remove the switch.

MAIN Power Switch Replacement

Replace the MAIN power switch as follows:

- 1. Assemble the switch assembly to the yellow mounting plate with two flat head screws.
- 2. Assemble the red rotor, which is keyed, onto the yellow mounting plate with one flat head screw. See Fig. 15.
- 3. Turn the rotor to point down to ensure that the switch is in the OFF position.
- Reconnect the lead wires to the terminals on the switch. Refer to Fig. 18 to make sure that the connections are correct.
- 5. Close and lock the hinged cover on the control assembly.
- 6. Apply system power at the main circuit breaker.
- 7. Move the MAIN power switch to the ON position, applying power to the control assembly.
- 8. Verify that the switch operates correctly.
- 9. Return the orbital dispenser and control assembly to normal operating condition.

MAIN power switch (back panel)

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Control Assembly Service

Potentiometer Removal

Remove the potentiometer as follows:

WARNING



ELECTROCUTION HAZARD

Installing and servicing this equipment requires access to parts which could cause an electric shock or other serious injury. Have only qualified electricians access the control assembly.

- Shut off system power at the main circuit breaker.
- At the control assembly, move the MAIN power switch to the OFF position.
- Unlock and open the hinged cover of the control assembly.
- Pull lead wires to remove from potentiometer.
- 5. Loosen setscrew (not shown) in the vernier dial knob and remove dial assembly from the potentiometer shaft.
- Remove the hex nut and lockwasher from potentiometer shaft, and remove the potentiometer.

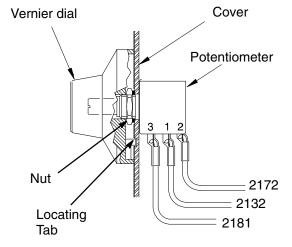
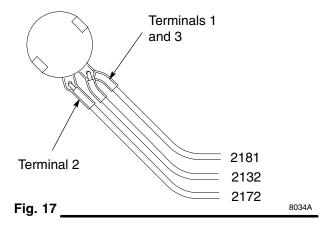


Fig. 16

Potentiometer Replacement

Replace the potentiometer as follows:

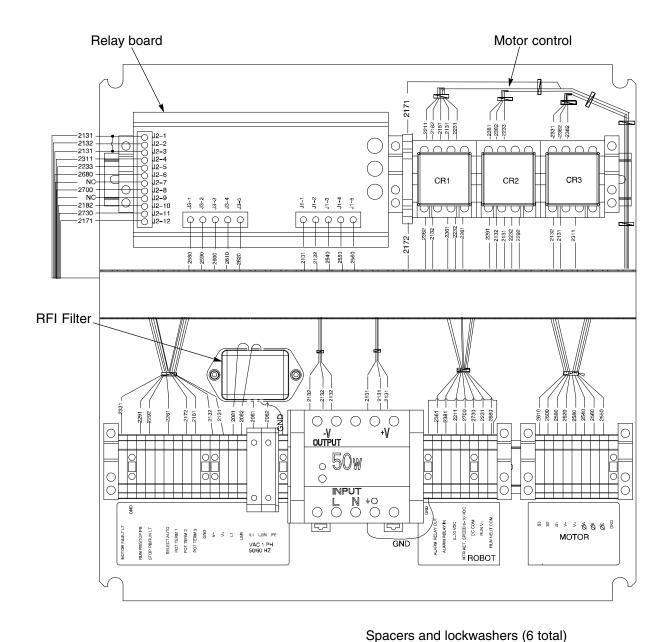
- 1. Insert the potentiometer through its hole from the back of the enclosure cover and rotate it so that terminals 1 and 3 are oriented at approximately 4:30 when viewed from the back. Refer to Fig. 17. Assemble the lockwasher and nut onto the shaft and secure the potentiometer to the cover.
- 2. At the front of the cover, turn the potentiometer shaft counter-clockwise to its stop.
- 3. Pre-set the vernier dial to 0.00 and place it over the potentiometer shaft, with its key tab inserted into the blind hole in the cover front surface. Tighten the dial setscrew (not shown) against the shaft.
- 4. Verify that the potentiometer is turned fully counterclockwise when the vernier dial indicates 0.00. Loosen the setscrew and reposition the shaft and dial if necessary, then retighten the setscrew.
- 5. Connect wire leads to potentiometer.
- 6. Close and lock the cover on the control assembly.
- 7. Apply system power at the main circuit breaker.
- Move the MAIN power switch to the ON position. applying power to the control assembly.
- 9. In the MANUAL control mode, verify that the potentiometer operates correctly.
- 10. Return the orbital dispenser and control assembly to normal operating condition.



Servicing the Panel Assembly

This part of the manual provides information about the following panel assembly components:

- Swirl Control Board (page 34)
- RFI Filter (page 35)
- Relay (page 36)
- Fuse (page 37)



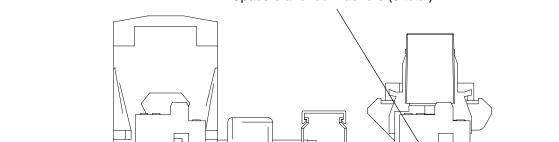


Fig. 18

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Swirl Control Board Removal

Remove the relay board as follows:

▲ WARNING



ELECTROCUTION HAZARD

Installing and servicing this equipment requires access to parts which could cause an electric shock or other serious to only qualified electricians access the

injury. Have only qualified electricians access the control assembly.

- 1. Shut off system power at the main circuit breaker.
- 2. At the control assembly, move the MAIN power switch to the OFF position.
- 3. Unlock and open the hinged cover of the control assembly.
- Unplug the connectors from the swirl control board.
- 5. Pry the plastic cups off the board with a screwdriver to release the board from the din rail.

Swirl Control Board Replacement

Replace the relay board as follows:

- 1. Snap the swirl control board onto the din rail.
- 2. Plug the connectors into the swirl control board. Refer to Fig. 18 for lead wire identification.
- 3. Close and lock the hinged cover on the control assembly.
- 4. Apply system power at the main circuit breaker.
- 5. Move the MAIN power switch to the ON position, applying power to the control assembly.
- 6. Verify that the relay board operates correctly.
- 7. Return the control assembly to normal operating condition.

RFI Filter Removal

Remove the RFI filter as follows:

▲ WARNING



ELECTROCUTION HAZARD

Installing and servicing this equipment requires access to parts which could cause an electric shock or other serious

injury. Have only qualified electricians access the control assembly.

- 1. Shut off system power at the main circuit breaker.
- 2. At the control assembly, move the MAIN power switch to the OFF position.
- 3. Unlock and open the hinged cover of the control assembly.
- Disconnect the wires from the terminal blocks on on the control board. If necessary, label the wires to facilitate reassembly after the control board is replaced.
- 5. Remove the two screws and lockwashers from the RFI filter on the panel assembly. See Fig. 18.
- 6. Remove the RFI filter.

RFI Filter Replacement

Replace the RFI filter as follows:

- Install the RFI filter using the two screws and lockwashers to secure the component on the panel assembly. See Fig. 18.
- 2. Connect the wires to the correct terminal block on the control board. Refer to Fig. 18 for lead wire identification.
- 3. Close and lock the hinged cover on the control assembly.
- 4. Apply system power at the main circuit breaker.
- 5. Move the MAIN power switch to the ON position, applying power to the control assembly.
- 6. Verify that the RFI filter operates correctly.
- Return the control assembly to normal operating condition.

Relay Removal

Remove the relay as follows:

▲ WARNING



ELECTROCUTION HAZARD

Installing and servicing this equipment requires access to parts which could cause an electric shock or other serious re only qualified electricians access the

injury. Have only qualified electricians access the control assembly.

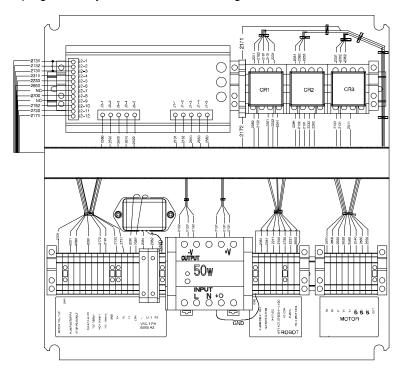
- 1. Shut off system power at the main circuit breaker.
- 2. At the control assembly, move the MAIN power switch to the OFF position.
- 3. Unlock and open the hinged cover of the control assembly.
- 4. With force, carefully pull the top of the relay to unplug the relay from the base. See Fig. 19.

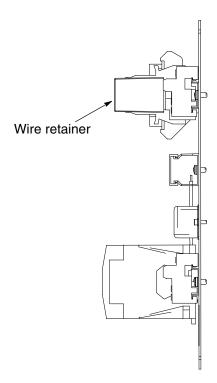
Relay Replacement

Replace the relay as follows:

NOTE: Relays are always P/N 15A797, 24 VDC. If the robot run command signal for automatic control mode is 24 VDC, then relay is also P/N 15A797.

- 1. Match pattern on bottom side of relay to base. Plug relay into base. See Fig. 19.
- 2. Close and lock the hinged cover on the control assembly.
- 3. Apply system power at the main circuit breaker.
- 4. Move the MAIN power switch to the ON position, applying power to the control assembly.
- 5. Verify that the relay operates correctly.
- 6. Return the control assembly to normal operating condition.





Panel Assembly Service

Fuse Removal

Remove the fuse as follows:

▲ WARNING



ELECTROCUTION HAZARD

Installing and servicing this equipment requires access to parts which could cause an electric shock or other serious

injury. Have only qualified electricians access the control assembly.

- 1. Shut off system power at the main circuit breaker.
- 2. At the control assembly, move the MAIN power switch to the OFF position.
- 3. Unlock and open the hinged cover of the control assembly.
- Lift to unlock the top of the fuse holder (10), which is hinged at the bottom, from its clamp. See Fig. 20.
- Open the fuse holder fully. Locate the failed fuse inside. Refer to Figs. 27 and 28 for fuse identification.

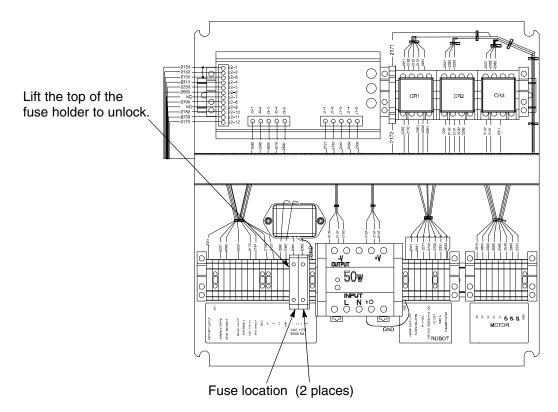
Carefully remove the fuse (24) from the fuse holder.

Fuse Replacement

Replace the fuse as follows:

NOTE: Check the new fuse (24) to ensure that it matches the Amp rating of the failed fuse.

- 1. Press both ends of the new fuse evenly into place in the fuse holder. See Fig. 20.
- 2. Close and lock the fuse holder into place.
- 3. Close and lock the hinged cover on the control assembly.
- 4. Apply system power at the main circuit breaker.
- 5. Move the MAIN power switch to the ON position, applying power to the control assembly.
- 6. Verify that the fuse operates correctly.
- 7. Return the orbital dispenser and control assembly to normal operating condition.



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Servicing the Orbital Dispenser

This manual provides information about the following orbital dispenser components:

- Orbital Dispenser (page 38)
- Tube Bearing (page 39)
- Tube Support Bearing (pages 39–40)
- Orbital Dispenser (page 40)

NOTE: Refer to tool kit 241569 for a 3/32 in. Allen wrench and 1/4 in. combination wrench to facilitate disassembly and reassembly procedures.

Orbital Dispenser Disassembly

Disassemble the orbital dispenser as follows:

NOTE: Tool kit (918620) is required for replacement of the tube support bearing.

NOTE: Refer to the **Parts** information on pages 48–49 while performing orbital dispenser disassembly and reassembly procedures.

WARNING



ELECTROCUTION HAZARD

Installing and servicing this equipment requires access to parts which could cause an electric shock or other serious

injury. Have only qualified electricians access the control assembly.

WARNING

To reduce the risk of serious injury whenever you are instructed to relieve pressure, always follow the **Pressure Relief Procedure** on page 27.

- 1. Shut off material supply to the orbital dispenser.
- 2. Relieve material pressure in the system.

- 3. To ensure that power is removed from the orbital dispenser, perform the following steps:
 - a. At the control assembly, move the MAIN power switch to the OFF position.
 - Disconnect the motor control cable from the control assembly.

WARNING



HOT MATERIAL AND EQUIPMENT HAZARD

To prevent personal injury, make sure the orbital dispenser has cooled to ambient temperature before service is performed.

- 4. Disconnect the orbital dispenser cable from motor control cable. (Refer to Fig. 10 on page 19.)
- Separate the orbital dispenser from the dispense valve at the 3/4–16 swivel fitting. Carry the orbital dispenser to a work bench to do the following procedures.
- 6. Remove nozzle (15).
- 7. On model 918330 only, remove deflector (14).
- 8. On all other models, remove the nozzle guard (80) and bellows seal (140).
- Remove four screws (7) and lockwashers (5).
 Separate lower housing (8) from motor assembly (6).
- 10. Remove inlet cap (2) from upper housing (3), exposing top end of tube assembly (13).

NOTE: Swivel fitting (1) may remain assembled to inlet cap.

- 11. Reassemble nozzle loosely onto tube assembly, then press or lightly tap nozzle to force tube end free of motor assembly (6).
- 12. Remove nozzle and remove tube assembly (13) from upper housing (3).
- 13. Remove o-ring (12) from tube assembly (13).
- 14. Remove four screws (4) and lockwashers (5), and separate the motor assembly (6) from the upper housing (3).

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Tube Bearing Replacement

There are three ball bearing assemblies in the PrecisionSwirl orbital dispenser — two in the motor and one in the motor coupling for tube support.

Only the tube support bearing may be removed and replaced in the orbital dispenser. The tube support bearing should not be removed unless a new replacement bearing is available and on-hand.

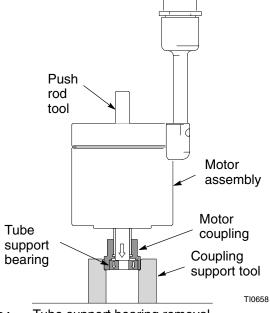
WARNING

The repair technician must use the proper tools to avoid damaging the bearings. Tools are provided in bearing repair tool kit 241569.

Tube Support Bearing Removal

Remove tube support bearing as follows:

- 1. Place the motor assembly onto the coupling support tool. Refer to Fig. 21.
- 2. Use the push rod tool to press the bearing out of the coupling. Discard the bearing.



Tube support bearing removal Fig. 21

Use a gear puller and coupler removal tool to separate the coupler from the motor shaft. Discard the old coupler. Refer to Fig. 22.

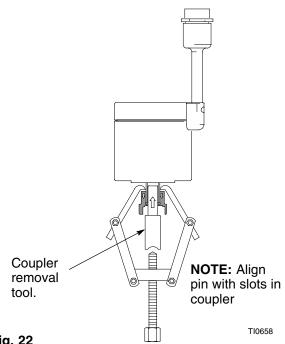


Fig. 22

Tube Support Bearing Assembly

Assemble tube support bearing as follows:

- Place the motor assembly onto the motor support tool. Refer to Fig. 23.
- Press a new coupler/bearing onto the motor shaft until it bottoms out.

NOTE: The new bearing may require a short break–in period before start–up. Run the swirl application motor for 15 minutes (no dispensing required). This will ensure the orbiter comes up to speed quickly for normal operation.

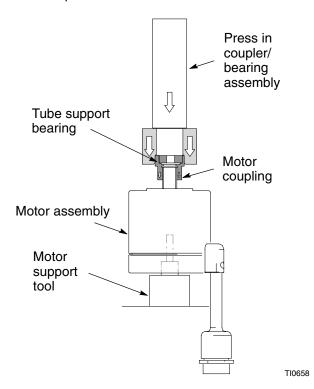


Fig. 23 Tube support bearing assembly

Orbital Dispenser Assembly

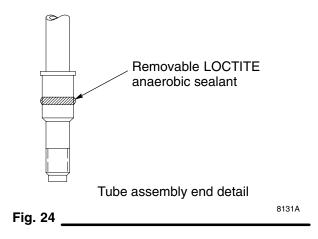
Reassemble the orbital dispenser performing the following procedure:

- Assemble upper housing (3) to motor assembly (6) with four screws (4) and lockwashers (5), see Fig. 30, page 49. Torque the screws to 16–18 in–lb (1.81–2.03 N•m).
- 2. Install o-ring (12) onto the tube assembly (13).

 Apply a small amount of removable Loctite® anaerobic sealant (17) to the bearing surface of the tube assembly (13). Refer to Fig. 24. Loctite adhesive is provided in bearing repair tool kit 241569.

CAUTION

Apply sealant sparingly. If an excessive amount of sealant is applied between the tube end and tube support bearing, the sealant may contaminate the bearing, and result in bearing failure.



- 4. Insert tube assembly (13) into upper housing (3) and through the tube support bearing in motor assembly (6). Push the tube assembly into the counterbore at the top of the upper housing.
- 5. Prior to installation, lubricate o-ring (12) with PARKER-O-LUBE™ or an equivalent seal lubricant.
- 6. If the 3/4–16 swivel fitting (1) on the orbital dispenser has been separated from the inlet cap (2), apply Loctite anaerobic sealant (17) to the 3/4–16 male threads on the fitting and assemble the fitting to the inlet cap.
- Install the inlet cap/swivel fitting assembly over the tube assembly (13). Screw the fitting onto the upper housing (3) until the tube assembly is firmly clamped against the upper housing.

- Assemble lower housing (150) to the motor assembly (6) with four screws (7) and lockwashers (5), see Fig. 30, page 49. Torque the screws to 16–18 in–lb (1.81–2.03 N•m).
- 9. On model 918330 only, install deflector (14) over the exposed end of the tube assembly (13).
- 10. On all other models, install the bellows seal (140) and nozzle guard (80).

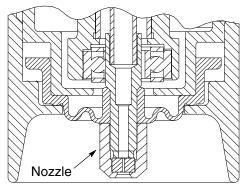


Fig. 25

Deflector and nozzle detail

8131C

- 11. Assemble nozzle (15) to the tube assembly (13). Torque the nozzle to 12–15 in–lb (1.36–1.69 N•m).
- 12. Install nozzle guard (80).
- 13. Allow Loctite anaerobic sealant to cure for one hour.

A CAUTION

Do not exceed the 12–15 in–lb (1.36–1.69 N•m) torque limit when tightening the nozzle. The fluid tube may be damaged if the torque limit is exceeded.

14. Reassemble orbital dispenser to dispense valve. Be sure the 3/4 in.–16 37° SAE male fitting on dispense valve is free of fluid material residue.

- Connect orbital dispenser cable to motor control cable.
- 16. To reconnect power to the orbital dispenser, perform steps a and b as follows:
 - Reconnect the motor control cable to the control assembly.
 - At the control assembly, move the MAIN power switch to the ON position.
- Turn on the material supply to the orbital dispenser.
- 18. Verify that the orbital dispenser operates correctly.
- Return the orbital dispenser to normal operating condition.

Bellows Seal Replacement

- 1. Clean excess material from the bellows seal (140) and nozzle guard (80).
- 2. Remove the nozzle guard (80).
- 3. Remove the nozzle (15).
- 4. Lift the bellows seal (140) and pull it over the threads on the fluid tube (13).
- Inspect the surface of the tube bearing. If there are any signs of material contamination, replace the tube bearing and increase the frequency of the seal replacement.

Part No. 918616, PrecisionSwirl Control Assembly

For additional information, refer to pages 43-46.

Ref No.	Part No.	Description	Qty.	Ref No.	Part No.	Description	Qty.
1	241487	CABINET, PrecisionSwirl	1	22†	113285	TERMINAL, ring, #10	2
2	194896	LABEL, front panel,	1	23†	100718	WASHER	2
3	241580	PANEL, ASSY, control	1	24†	617774	NUT, hex, #10-32, brass	4
4	241600	CONNECTOR, motor	1	31	194897	LABEL, cable connector	1
5	617771	GASKET, flange, electrical	1	32▲†	617472	LABEL, danger, electric shock	1
		connector, #14		34†	C19738	SCREW, drive, round head	4
6	241599	CONNECTOR, robot	1	35	C78216	CLAMP, ty-rap	7
8	C19949	SCREW, SHC, #4-40 x .25	4	36	C78321	TIE, cable, 3.62 long	18
9	115237	SWITCH, power, rotary	1	42	100731	WASHER	4
13	617777	LIGHT base, direct supply	2	43	100133	WASHER, lock	4
14	617778	LENS, light, white, 7/8	1	44†	100307	NUT, full, hex	4
15	617779	LENS, light, green, 7/8	1	45	195899	DUCT, wire, 10 in.	1
16	617780	LAMP, incandescent, 24V	2	47†	114887	KEY, latch, door	1
17	617781	SWITCH BASE, 1-NO, 1-NC	2	51	115217	SCREW, female, kit	1
18	617782	ACTUATOR, switch, 2-PB, rect	1	52	194984	COVER, wire, duct, 10 in.	1
19	617783	ACTUATOR, switch, 2 position	1	53	115434	LENS, light, red, 7/8	1
20	617775	POTENTIOMETER, 10 turn, 10K ohm, .5W	1	† The	se parts are	e not shown on the parts drawing.	
21	617776	DIAL, vernier, 15 turn	1			Danger and Warning labels, tags at	nd

cards are available at no cost.

Part No. 918616, PrecisionSwirl Control Assembly

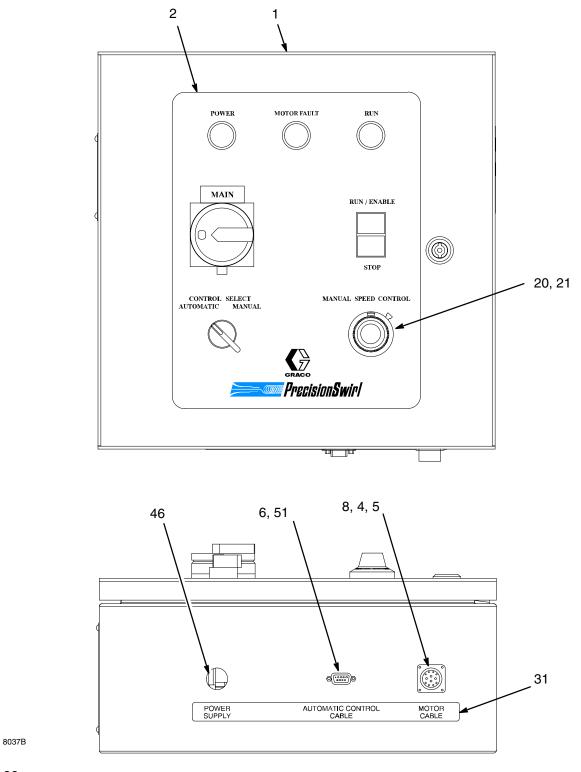
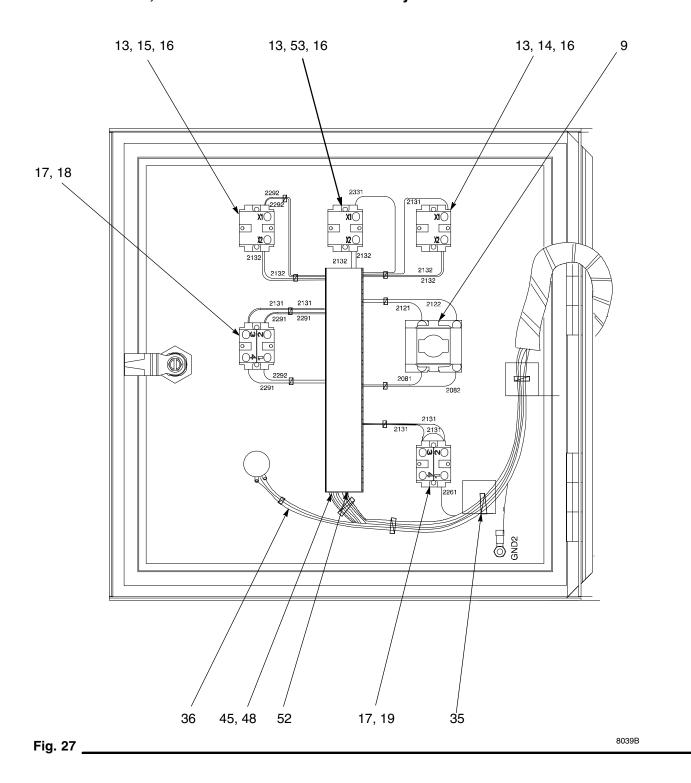
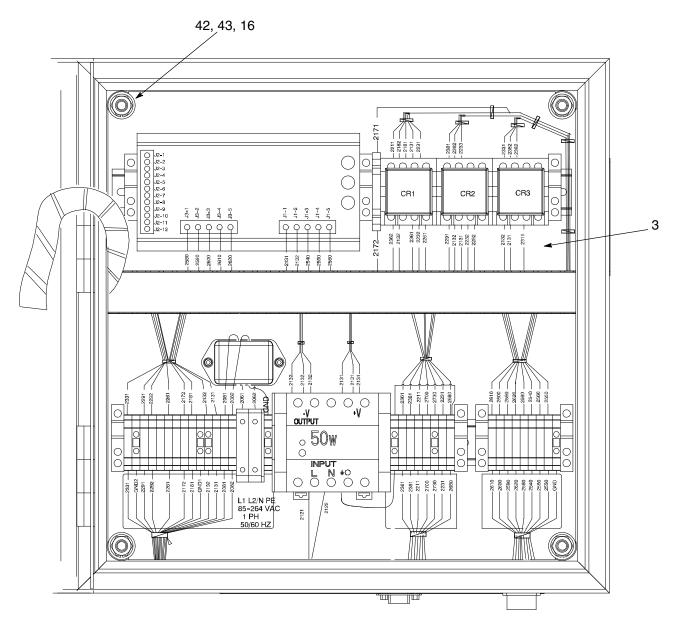


Fig. 26 _

Part No. 918616, PrecisionSwirl Control Assembly

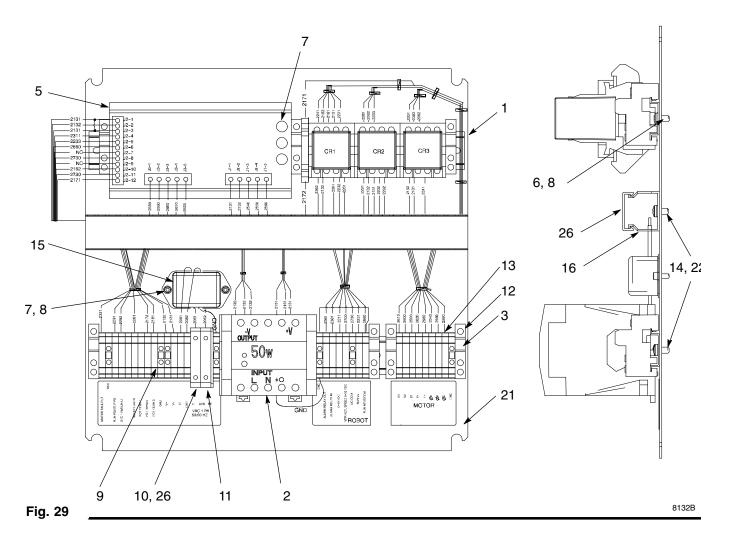


Part No. 918616, PrecisionSwirl Control Assembly



Part No. 241580, PrecisionSwirl Panel Assembly

Ref No.	Part No.	Description	Qty.	Ref No.	Part No.	Description	Qty.
1	194693	PLATE	1	13	112442	BLOCK, terminal	23
2	115215	POWER SUPPLY	1	14	103833	SCREW, machine, bdgn	12
3	194895	RAIL, mount	2	15	115212	FILTER, RFI	1
5	244355	BOARD, swirl control	1	16	194894	DUCT, wire	1
7	102410	SCREW, cap, socket head	2	21	194976	LABEL, wiring	1
8	100272	WASHER, lock, internal tooth	2	22	100718	WASHER	12
9	112443	BLOCK, terminal, ground	8	23†	115130	JUMPER PIN	1
10	514556	HOLDER, fuse	2	24†	115216	FUSE, 2 AMP High Interrupting	2
11	115234	COVER, terminal	1	26	194985	COVER, wire, duct, 14 in.	1
12	112446	BLOCK, clamp, end	7	† The	ese parts are	e not shown on the parts drawing.	



Notes



Orbital Dispenser Parts

Part No. 243402 and 243403 PrecisionSwirl Orbital Dispenser (Tool Mount)

Ref No.	Part No.	Description	Qty.	Ref No.	Part No.	Description	Qty.
1 2 3	617567 617561 195923	UNION, swivel CAP, inlet HOUSING, upper	1 1 1	17† 24a*	070518 243256	ANAEROBIC RESIN, Loctite Liquid COUPLER ASSEMBLY	1
4 5 6 7	C19953 C19208 241479 C19950	SCREW, SHC, #4-40 x .75 WASHER, lock, #4 MOTOR ASSEMBLY SCREW, SHC, #4-40 x .375	4 8 1 4	24b*	241466	243402 assembly .012 offset (includes tube bearing) COUPLER ASSEMBLY 243403 assembly .028 offset (includes tube bearing)	1
10 11 12*	617626 617712 C20084	PLATE, Identification, Graco PLATE, 3500 PSI WPR O-RING, –011, EPDM	1 1 1	25 26 80	100020 114135 196038	WASHER, lock SCREW, mounting, manifold GUARD, nozzle	2 2
13*	241465	TUBE ASSEMBLY	1	117† 140	617756 15B619	KIT, tool GUARD, coupler sealant, fluo- roelastomer	1 1
				150 160**	196037 15D259	HOUSING, lower KIT, control cable support	1 1

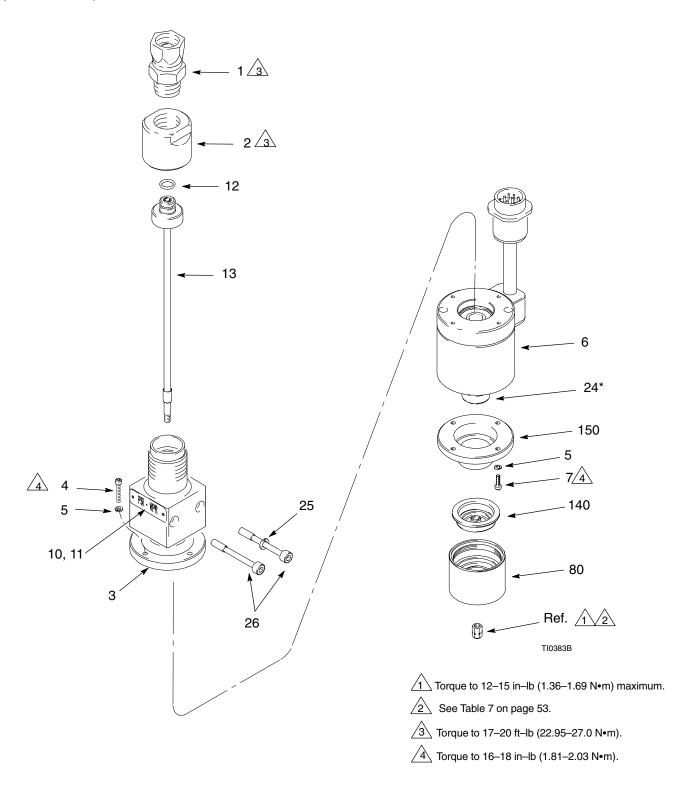
[†] These parts are not shown on the parts drawing.

^{*} This part may be purchased separately as part of the tube bearing repair kit. See **Accessory Parts** on page 53.

^{**.} These parts are not shown on the parts drawing. See Accessory Parts on page 54 for installation instructions.

Orbital Dispenser Parts

Part No. 243402 and 243403 PrecisionSwirl Orbital Dispenser (Tool Mount)



Motor Control Cable Assemblies

The motor control cables that are provided with the module are OLFLEX® brand cables. The 55 ft (16.8) motor cable (617870) can be used alone. The 6 ft (1.8) motor cable, the 9 ft (2.7) motor cable or the 15 ft (4.6 m) cable (233123) must be used in conjunction with the 55 ft cable.

Table 5. Motor Control Cables

Part Number	Length	Description
241954	6 ft (1.8 m)	Motor cable assembly
241955	9 ft (2.7 m)	Motor cable assembly
233123	15 ft (4.6 m)	Motor cable assembly
617870	55 ft (16.8 m)	Motor cable assembly

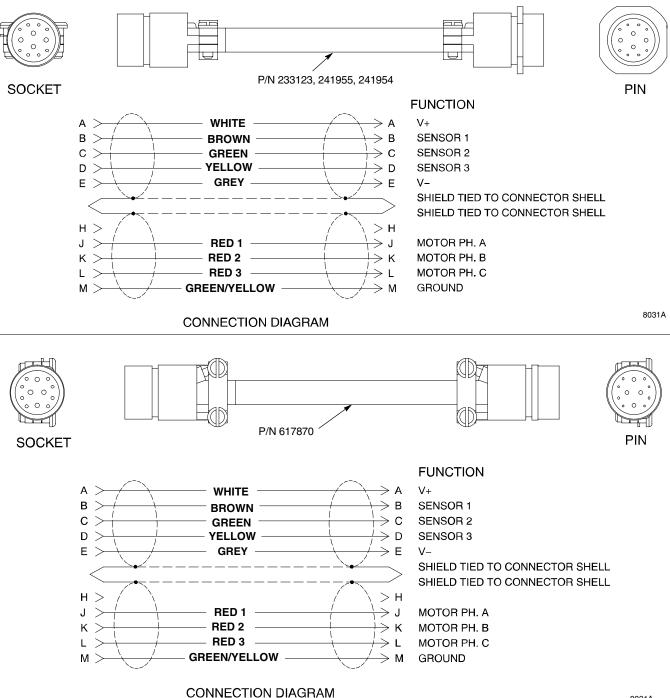


Fig. 31

Torsional Motor Control Cable Assemblies

Table 6. Motor Control Cables

For robot applications that have a lot of torsional motion to the cable in addition to bending. These cables are made from Olflex 900 series robot cable that are designed to handle more torsional loads. The cables must be used in conjunction with the 55 ft motor cable.

Part Number	Length	Description
233125	6 ft (1.8 m)	Motor cable assembly
233124	9 ft (2.7 m)	Motor cable assembly
233123	15 ft (4.6 m)	Motor cable assembly

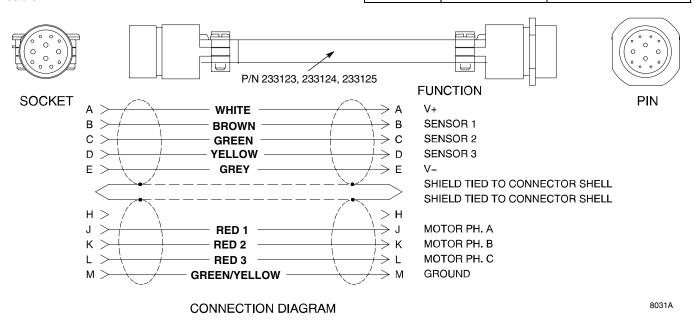
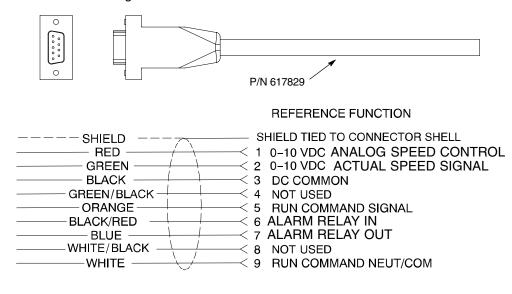


Fig. 32

Robot Interface Cable Assembly

The cable length of robot interface cable assembly 617829 is 40 ft (12.2 m). Fig. 33 shows the 9-pin cable and identifies the cable interface signals.



CONNECTION DIAGRAM

8031A

Fig. 33_

List of Orbital Dispenser Nozzles

Table 7 provides a complete list of nozzles for the PrecisionSwirl orbiter.

Table 7. Nozzles

Nozzle Housing No.	Orifice Diameter
241813	0.051
241814	0.055
241816	0.070
918601	0.015
918603	0.019
918605	0.023
918607	0.027
918608	0.030
918610	0.012
918611	0.035
918612	0.039
918613	0.043
918614	0.047

Part No. 241569 Bearing Repair Tool Kit

Ref No.	Part No.	Description	Qty.
1	617825	TOOL, push rod	1
2	617826	TOOL, coupling support	1
3	617828	TOOL, motor support	1
4	241517	TOOL, coupler puller	1
5	115740	TOOL, bearing puller	1
6	115741	ADHESIVE	1

Recommended Dispense Valves

Dispense Valve	Part. No.	Manual
1K Ultra-Lite™	243482	308876
EnDure [™] (Ambient or Water Conditioned)	244910	
EnDure™ (120 Volt, Electric Heat)	244961	309376
EnDure™ (230 Volt, Electric Heat)	244962	

Part No. 246292 Tube Support Bearing Repair Kit (Wide Pattern Coupler .028")

Ref No.	Part No.	Description	Qty.
1	241466	COUPLER, ASSEMBLY	1
2	C20084	O-RING, -011, EPDM	1
3	241465	TUBE ASSEMBLY	1
4	15B619	SEAL, fluoroelastomer	1

NOTE: Part No. 918620 Repair Kit comes with 196008 Buna-N Bellows.

Part No. 246293 Tube Bearing Repair Kit (Small Pattern Coupler .012")

Ref No.	Part No.	Description	Qty.
1	243256	COUPLER, ASSEMBLY	1
2	C20084	O-RING, -011, EPDM	1
3	241465	TUBE ASSEMBLY	1
4	15B619	SEAL, fluoroelastomer	1

NOTE: Part No. 243437 Repair Kit comes with 196008 Buna-N Bellows.

Part No. 246290 Bellows Seal Kit

Ref No.	Part No.	Description	Qty.
1	15B619	SEAL, fluoroelastomer	12
NOTE: F Buna-N		43647 Repair Kit comes with	196008

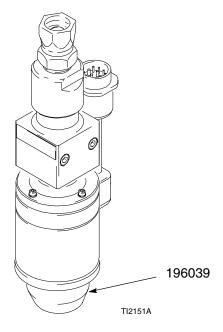
Dispense Valve Adapter Fittings

Ref No.	Part No.	Description	Qty.
1	197504	Straight flange adapter, EnDure	1
2	197842	45 degree nosepiece	1
3	198323	Alternative orbiter nut	1
4	198324	Fitting, nosepiece to orbiter	1

NOTE: 45 degree orbiter mount uses reference numbers 2 - 4.

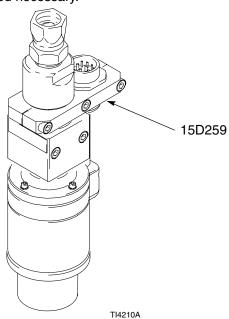
Part No. 196039 Small Profile Retainer

Replaces the standard nozzle guard. This retainer has a smaller profile allowing easier access into tight locations.



Part No. 15D259 Control Cable Support

Add to orbiter assembly if extreme stresses are being applied to the Motor Control Cable. Not all installation requires this support bracket, and should be used only if deemed necessary.



Part No. 196160 Teach Adapter

Replaces the nozzle guard during robot path teaching. 1/4 - 20 threads allow probes to be assembled to help determine the aiming direction. Face of cap is offset 0.75 in. from the end of the actual nozzle.

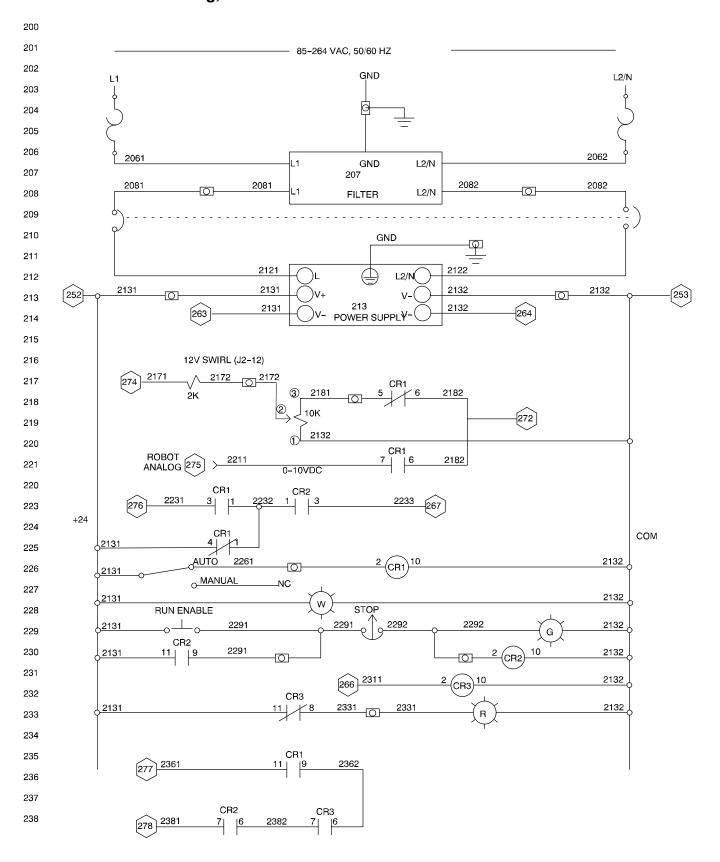


Notes



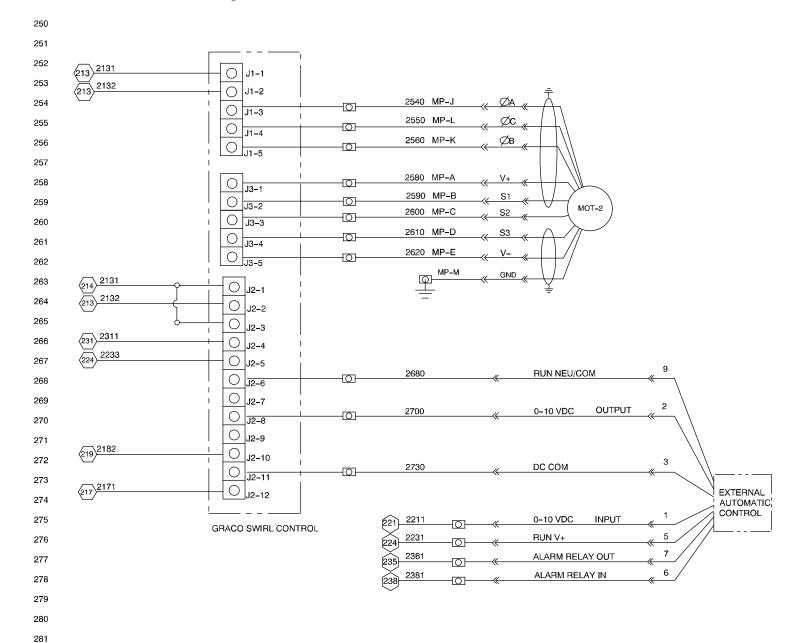
Wiring Diagrams

Motor Controller Wiring, Lines 200-238



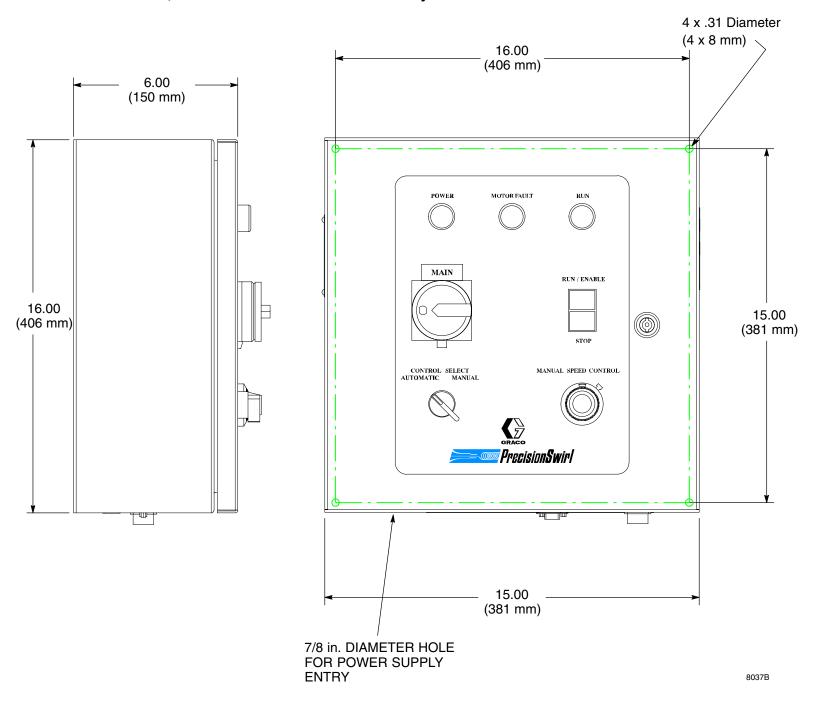
Wiring Diagrams

Motor Controller Wiring, Lines 250-288



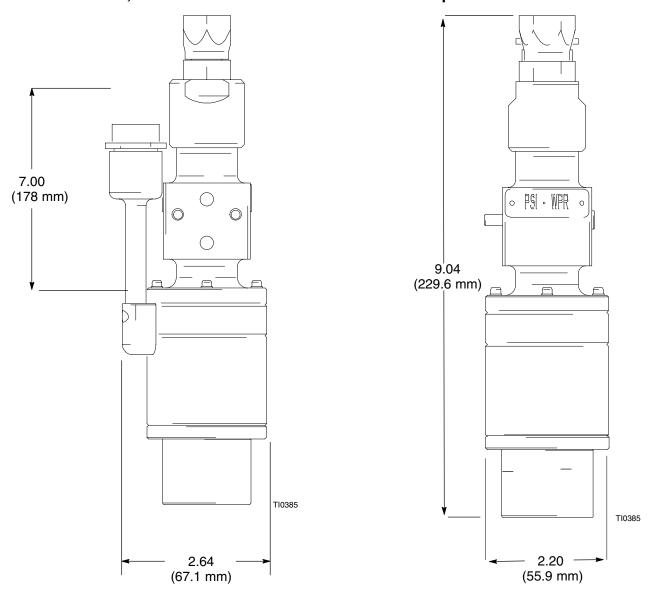
Control Assembly Dimensions

Part No. 918616, PrecisionSwirl Control Assembly



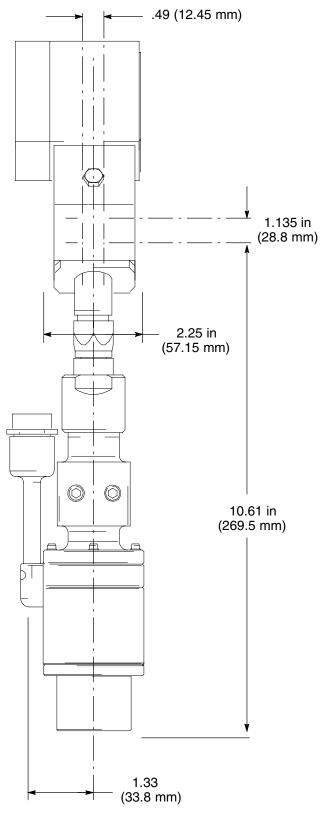
Orbital Dispenser Dimensions

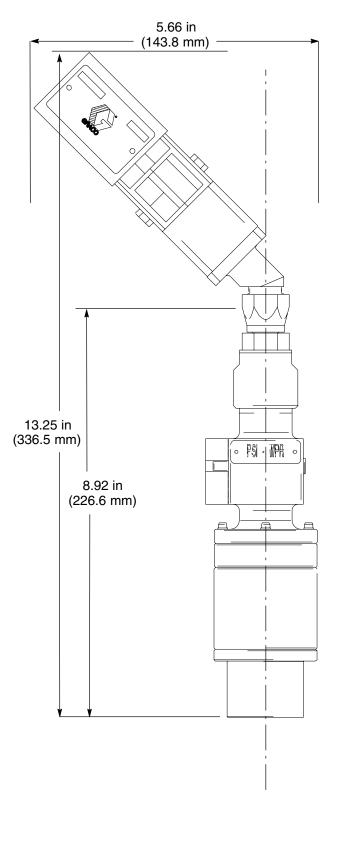
Part No. 243403, Tool Mounted PrecisionSwirl Orbital Dispenser



Dispense Valve and Orbital Dispenser Dimensions

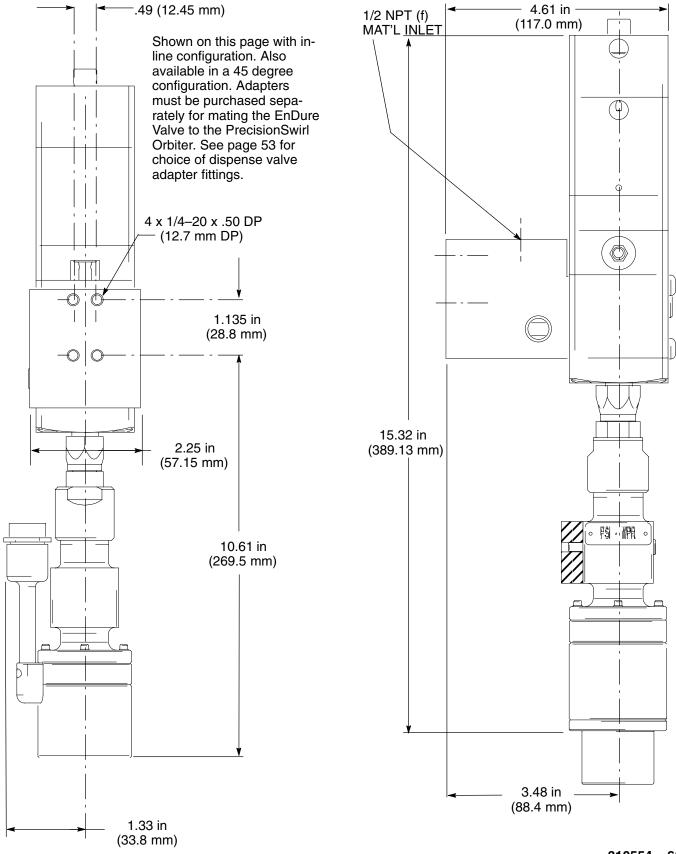
Part No. 243482, Ambient Snuff-Back Dispense Valve and Part No. 243403, Orbital Dispenser





Dispense Valve and Orbital Dispenser Dimensions

Part No. 244910, EnDure Dispense Valve and Part No. 243403, Orbital Dispenser



Notes



Technical Data

Unit **Description Specification** Control Assembly 100 - 240 Vac, 50/60Hz, 1 PH Input power Proprietary PWM voltage to the motor, less than 24V Output power Automatic control analog input 0-10 VDC for 6600-24,000 RPM 0-10 VDC for 0-24,000 RPM Speed signal output Auto control relay contact rating 3 Amps at 30 VDC Weight 23.5 lbs (10.7 kg) Orbital Dispenser Input power Proprietary PWM voltage to the motor, less than 24V 1.5 oz-in. Motor torque Maximum motor speed 24,000 RPM Maximum operating pressure 3500 psi (241 bar, 24.1 MPa) Fluid inlet 3/4-16 37° JIC female swivel Nozzle attachment #10-32 proprietary connection Wetted components Stainless steel, nickel alloy, brazing alloy, epoxy, EPDM rubber Noise levels Sound pressure level - 67 dBa Weight 1.6 lbs (0.7 kg)

Related Publications

Dispense Valve	Part. No.	Manual
1K Ultra-Lite™	243482	308876
EnDure [™] (Ambient or Water Conditioned)	244910	
EnDure [™] (120 Volt, Electric Heat)	244961	309376
EnDure™ (230 Volt, Electric Heat)	244962	

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