NCM5000 Jetting Pump User Guide

Version 1.7
September 5, 2018
Part No. 22293180M

for use with:
PN 22110513 - NCM5000 for DS Series
PN 22293180 - NCM5000 for MAX Series
PN 22293180-0001 - Low Profile NCM5000 for MAX Series
PN 22110513-0001 - Low Profile NCM5000 for DS Series

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Safety Notices

The described fluid applicator is a resource for use in industrial environments.

This product is manufactured according to currently valid engineering standards and is operationally safe. Hazards may arise if handled improperly by unqualified personnel. It is recommended that operating personnel thoroughly review these operating instructions.

CAUTION: Qualified personnel are persons who, due to their training, expertise and instruction, as well as their knowledge of relevant standards, provisions, accident prevention regulations and operating conditions, have been authorized by the person responsible for safety of the system to perform the required tasks and, in the process, can identify and prevent potential risks (definitions for specialists according to the VDE 105 or ICE 364).

Contents

Warranty

General Warranty. Subject to the remedy limitation and procedures set forth in the Section "Warranty Procedures and Remedy Limitations," GPD Global warrants that the system will conform to the written description and specifications furnished to Buyer in GPD Global's proposal and specified in the Buyer's purchase order, and that it will be free from defects in materials and workmanship for a period of one (1) year. GPD Global will repair, or, at its option, replace any part which proves defective in the sole judgment of GPD Global within one (1) year of date of shipment/invoice. Separate manufacturers' warranties may apply to components or subassemblies purchased from others and incorporated into the system. THIS WARRANTY IS EXPRESSLY IN LIEU OF ANY AND ALL OTHER WARRANTIES,EXPRESS OR IMPLIED, INCLUDING WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

Limitations. GPD Global reserves the right to refuse warranty replacement, where, in the sole opinion of GPD Global the defect is due to the use of incompatible materials or other damages from the result of improper use or neglect.

This warranty does not apply if the GPD Global product has been damaged by accident, abuse, or has been modified without the written permission of GPD Global.

Items considered replaceable or rendered unusable under normal wear and tear are not covered under the terms of this warranty. Such items include fuses, lights, filters, belts, etc.

Warranty Procedures and Remedy Limitations. The sole and exclusive remedy of the buyer in the event that the system or any components of the system do not conform to the express warranties stated in the Section "Warranties" shall be the replacement of the component or part. If on-site labor of GPD Global personnel is required to replace the non-warranted defective component, GPD Global reserves the right to invoice the Buyer for component cost, personnel compensation, travel expenses and all subsistence costs. GPD Global's liability for a software error will be limited to the cost of correcting the software error and the replacement of any system components damaged as a result of the software error. In no event and under no circumstances shall GPD Global be liable for any incidental or consequential damages; its liability is limited to the cost of the defective part or parts, regardless of the legal theory of any such claim. As to any part claimed to be defective within one (1) year of date of shipment/invoice, Buyer will order a replacement part which will be invoiced in ordinary fashion. If the replaced part is returned to GPD Global by Buyer and found by GPD Global in its sole judgment to be defective, GPD Global will issue to Buyer a credit in the amount of the price of the replacement part. GPD Global's acceptance of any parts so shipped to it shall not be deemed an admission that such parts are defective.

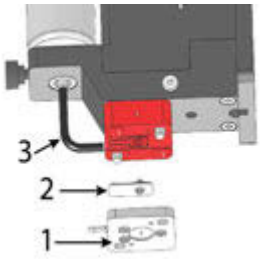
Specifications, descriptions, and all information contained in this manual are subject to change and/or correction without notice.

Although reasonable care has been exercised in the preparation of this manual to make it complete and accurate, this manual does not purport to cover all conceivable problems or applications pertaining to this machine.

Overview

NCM5000 non-contact jetting technology is a major leap in liquid dispensing. The non-contact jetting is fast — allowing dispensing rates up to 300 Hz. The user can adjust the drop size ±20% from the nominal size allowing a wide range of adjustment. The simplicity of NCM5000 is also evident in its ease-of-cleaning since all parts that touch the fluid are easily removed.

The NCM5000 has three components in contact with the fluid: the nozzle plate, diaphragm, and the feed tube. These components can be easily disassembled with two screws, cleaned and reused. The diaphragm should be inspected each time the nozzle plate is removed. If there are signs of wear or deformation, the diaphragm should be replaced. Some diaphragms may have a small spring surrounding the molded in-ball. Care should be taken not to deform the spring during cleaning.



Item	Description	Note
1	Nozzle Plate	These parts are available in various materials. Refer to Parts Lists (pg 12)
2	Diaphragm	
3	Feed Tube	

IMPORTANT: Fluids that could damage the wetted parts (17-4 stainless steel, tungsten carbide, EPDM, viton [FKM], tygon or silicone) should not be dispensed or used for cleaning. Not recommended are anaerobic methacrylate and pre-mixed 2-part adhesives with a short pot life as these can harden in the nozzle plate. Cyanoacrylates may not be dispensed.

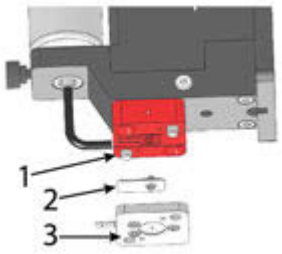
Prepare for Use

Pump Assembly Instructions

The NCM5000 is shipped fully assembled less a diaphragm and nozzle plate. Depending on the application and dispensing fluid, a specific diaphragm material and nozzle plate orifice diameter should be chosen.

To correctly assemble the diaphragm and nozzle plate to the heater block:

1. Mate the diaphragm with the heater block by locating the groove feature on the bottom face of the heater block and the raised bosses on the diaphragm that position the diaphragm correctly on the heater block. The diaphragm also has a metal insert with a post that must be inserted into the central hole on the heater block.

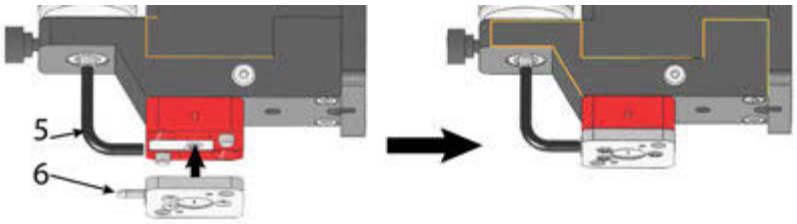


1	heater block
2	diaphragm
3	nozzle plate

NOTE: Although a diaphragm can be inserted without being connected to a system, it will not sit flat on the heater.

2. Connect both the electrical and pneumatic connections to the controlling system.
3. Set the air pressure regulator to 0.276 MPa (40 psi).
4. Turn on the air pressure. You should hear the jet actuate.
5. Insert the diaphragm into the heater block.
6. Attach the nozzle plate to the heater block. The nozzle plate has two locating pins that will guide the nozzle plate onto the heater block. Be sure the fluid barb is facing toward the fluid syringe.

7. Attach the feed tube to the fluid barb on the nozzle plate.



5	feed tube
6	fluid barb

8. Secure the nozzle plate on the heater block using two captive screws located in the holes and the 3 mm hex driver supplied with the NCM5000 jet. Insert the hex driver into the two holes and tighten until the nozzle plate is secure. The jet is now ready for priming.

7	screw holes
8	hex driver

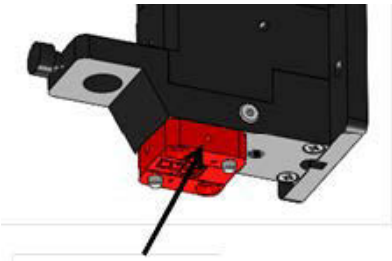
Pump Inspection (Look for Leaks)

1. Before running a program, it is important to check for fluid leaks. Assemble the diaphragm and nozzle plate to the jet per Pump Assembly Instructions (pg 2).
2. Fill a syringe with fluid and attach to the Feed Tube.
3. Connect the receiver head to the syringe and turn on the air pressure.
4. Set pressures:
   – Fluid air pressure to 0.070 MPa (10 psi)
   – Jet pressure to 0.310 MPa (45 psi)

   The fluid should not drip through the orifice. If fluid is leaking through the nozzle tip when the Jet valve is closed, verify that the Jet pressure is set to at least 0.241 MPa (35 psi). Increase the pressure to 0.414 MPa (60 psi) and check to see if the leak stops. If the leak continues, the Diaphragm or Nozzle Plate is likely dirty or damaged and should be cleaned or replaced.

There are several areas to check for fluid leaks:

- Fluid can leak out the luer fitting that attaches the syringe to the Feed Tube. Sometimes the luer fitting is a little snug and hard to twist in completely. If fluid is leaking, give the fitting an extra turn to seat it completely. If this does not solve the leaking, replace the Feed Tube and/or the syringe and check again.
- Fluid can leak at the junction between the Feed Tube and the Nozzle Plate inlet fitting. The Feed Tube is connected using a standard barb to the inlet fitting. If fluid is leaking at the barb end of the fitting, replace the Feed Tube.
- Check for leaks between the Diaphragm and the Nozzle Plate. The Nozzle Plate must be attached correctly with well-tightened screws. Make sure the Jet is closed on the controller. If you observe fluid leaking under the diaphragm, then the jet has not been assembled correctly. Disassemble the dispensing components and inspect and/or replace the Diaphragm as required.
- Check to see if fluid leaks out the two holes in the heater block. If fluid is leaking, the diaphragm is missing or the diaphragm is damaged and should be replaced.



IMPORTANT: If fluid leaks between the Diaphragm and the Nozzle Plate, the jet will not function correctly. In fact, dispensing should be discontinued and the components should be cleaned or replaced as required.

Installation & Set Up

Pneumatic System

The NCM5000 jet is supplied with a 6 mm OD air tube and terminates with a slip connect coupler.

The NCM5000 is supplied with a syringe mount that can accommodate a 5, 10, or 30 cc syringe. A receiver head attaches to the syringe. If a syringe is not desired, fluid can be connected directly to the feed tube using a luer lock connector.

CAUTION: It is imperative that the NCM5000 air supplied to the is clean and dry, free from debris and water. A 40 micron filter and a water separator are highly recommended to keep the air debris free. If the air is not clean and dry, serious damage can occur to the air solenoid valves. The maximum allowable supply air pressure is 0.620 MPa (90 psi).

Mounting Pump

To mount an NCM5000 jet on a standard GPD Global MAX Series or DS Series system:

1. Mount material on the pump.
2. Mount the pump in the Taper-Lock™ mount:
   a. Press down and hold the latching lever at the top of the mount.
   b. Align and engage the pump with the top dowel pin of the mount.
   c. Apply downward pressure to the pump while releasing the latching lever.
3. Connect the pump to the interconnect panel:

   Figure 1: *System interconnect panel*

   a. Insert the round electrical connector from pump into the appropriate location on the interconnect panel.
   b. Connect the pump air hose into B# on the interconnect panel.
   c. Plug the syringe air hose into Air Pres # on the interconnect panel.

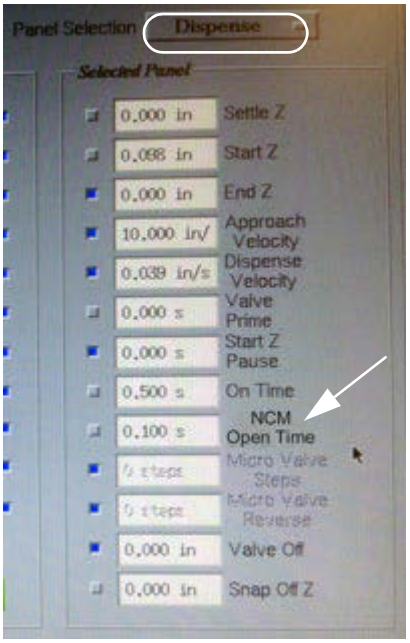
Set Up

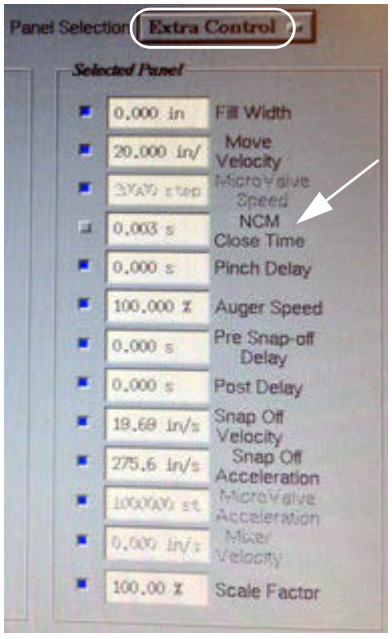
When using NCM5000 pump(s) on a GPD Global MAX Series or DS Series system, adopt these rules:

- Use NEEDLE to designate Type for the NCM5000 pump in the heads library.
- If a vacuum nozzle cleaner (typically used with NCM5000 pump) is present, update Base Locations in the system control software prior to use of this hardware.

Also note these NCM5000-related changes that occur automatically during factory system configuration:

- All fields with units in “seconds” become 4 place values (0.0000 rather than 0.000) in the control software.
- Two field names change in the Selected Panel area of the Program Detail window:
  - NCM Open Time displays in the Dispense panel.
  - NCM Close Time displays in the Extra Control panel.





Application Hints

Material Effects on Jetting Quality

The NCM5000 works on the principle of rapidly changing the momentum of a minute volume of fluid to eject a drop of material. Like all jetting systems, the state of the material is extremely important for high-quality dispensing. For example, in the case of an ink jet printer, the ink is carefully packaged to ensure there is no trapped air in the cartridge and the rheology of the ink is carefully controlled by the manufacturer for successful jetting. The NCM5000 on the other hand, is designed to dispense a wide variety of fluids; however, not all fluids can be successfully dispensed using a jetting system. In general, there are several areas to consider when choosing a material to jet dispense.

- **Very compliant fluids or fluids with large amounts of dissolved gas** are problematic and care should be taken to prepare the material for dispensing. If the fluid contains a large amount of dissolved gas, it is likely the gas will come out of solution and form bubbles. Bubbles in the fluid path will cause erratic dispensing and missed drops. Make sure all material is carefully degassed.

  If you are using a batch reservoir, make sure the fluid is not open to air after degassing or the air will quickly be reabsorbed into the fluid. Alternatively, for low viscosity fluids, an in-line de-gasser can be supplied that de-gases the material just prior to entering the nozzle plate. It is also highly recommended, when using fluids with entrapped air or gas, that a frequent purging is done to expel any air collecting in the fluid path. It is best however, by carefully degassing the material, to never introduce bubbles into the fluid path.

- **Fluids with very high surface tension can also be problematic as they tend to form "satellites"**. Satellites are very small droplets that are sometimes formed during the jetting process. These satellites fly off in many directions – even backwards toward the dispensing tip. If the satellites stick to the dispensing tip, they can build up and attract more satellites. Eventually, the tip has a glob of fluid on the tip that can interfere with the quality of the dispensing. It is recommended that the lowest jet air pressure as possible be used. Limiting the jet air pressure has the effect of reducing the energy imparted to the fluid which can reduce the production of satellites.

  Also, it is highly recommended that the tip be located over a "service station" when not actually dispensing. A well-designed service station should have a slight vacuum which can clean material off the tip as well as provide a cup for purging fluid as described above.

- **High viscosity fluids** often require the addition of heat to facilitate jetting. If the material you are using does not eject a drop, heat may be needed. The NCM5000 has an internal heater and integrated heater controller which can elevate the fluid temperature. Only the fluid inside the nozzle plate is heated. Heating the fluid reservoir is rarely required. The addition of heat is often the solution for hard-to-dispense materials. When using heat, be sure not to heat the material so high that it cures inside the nozzle plate.
- The NCM5000 has an adjustment to change the amount of energy imparted during jetting. The factory default setting is generally sufficient to provide enough energy for most mate-

rials; however, for reliable jetting, some materials will need additional energy and some materials will need less.

Selecting a Nozzle Size

Pick a nozzle size that will give you the approximate, desired drop volume or drop diameter. Some customers will specify a drop diameter and others will specify a drop weight.

- Drop diameter is highly dependent on the surface tension of the material and the wetting characteristic of the substrate and therefore not always straight forward to determine. For example, epoxy such as SMA is designed to stand up and has a “tall” drop profile resulting in a small diameter to weight ratio.

- Underfill material is designed to wick into small gaps and tends to spread out and form a larger, “flat” drop profile resulting in a large diameter to weight ratio.

Recommendation: Use drop weight when initially qualifying a new material. Therefore, weighing 100 or 200 drops on a scale is the most reliable method to determine the drop weight. Alternatively, drops dispensed on pre-weighed slides also works well.

Table 1: *Drop Weight & Diameter by Nozzle Size*

Nozzle Size (µm)	Drop Weight (µg)	Drop Diameter (mm)
125	20 - 40	0.4 - 0.7
150	50 - 80	0.6 - 1.0
200	90 - 120	0.8 - 1.4

Selecting a Diaphragm

Diaphragms are currently available in three different materials: Ethylene Propylene (EPDM), Silicone, and Fluoroelastomer (Viton).

In most cases, the chemical compatibility of the diaphragm and the fluid is determined by the solvent in the fluid. The chemicals in the material can be found in the Material Data Safety Sheet (MSDS). The table below shows typical chemical compatibilities. In some cases, even if there is an incompatible solvent in the fluid, it might not affect the diaphragm. The best way to insure compatibility is to leave the material in the jet for 24-48 hours and then inspect the diaphragm for swelling. If there is any swelling, then the diaphragm material is incompatible with the fluid.

Figure 2: *Diaphragm Materials: EPDM, Silicone Soft, Viton*

IMPORTANT: If you are unsure which diaphragm material to use, contact the factory for recommendations. In general, if the diaphragm material is incompatible with the fluid, the diaphragm will exhibit slight swelling around the metal insert. If swelling occurs, the performance of the jet will be adversely affected.

Table 2: *Diaphragm Material Compatibility*

Dispense Fluid Chemical	Diaphragm Materials		
	Viton	Silicon	EPDM
Acetone			OK
Acetic Acid		OK	
Ammonia		OK	
Benzene	OK		
Cyclohexame	OK		
Cyclohexanol	OK		
Dimethyl Formaide	N	OK	OK
Ethanol	N	OK	OK
Heptane	OK		
Hexame	OK		
Isopropanol	OK	OK	OK
Methyl Ethyl Ketone			OK
Pentane	OK		
Silicone Oil	OK	OK	OK
Terpineal	OK		
Toulene	OK		
Xylene	OK		

Selecting a Feed Tube

Two different feed tube materials are available. The clear Tygon feed tube is recommended for most fluids except UV cure materials. If you are dispensing a UV material, a black silicon feed tube is recommended.

Dispensing Temperature

In order to get reliable and repeatable dispensing, the drop must eject from the nozzle forcefully and cleanly. If the jet does not have adequate energy to break off cleanly, it forms multiple small drops or “tails” that will cling to the nozzle tip and eventually completely block the orifice. This phenomenon is called “accumulation”.

Temperature is the most important parameter for excellent and reliable jetting conditions. The goal is to heat the fluid in order to lower its viscosity so it flows through the nozzle, as well as enabling the jet to break off cleanly. You can select temperature based on the viscosity of the material, but viscosity is not always the only factor. Generally, the higher the viscosity, the higher the temperature required for high-quality jetting; however, the rheology of the material is important. Some materials are “stringy” and need a higher temperature to jet cleanly.

Table 3: *Fluid Viscosity & Temperature Guideline*

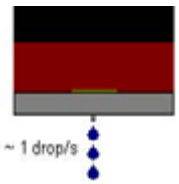
Fluid Type	Viscosity (cps)	Temperature (° C)
EMI 3553	1K	40
Loctite 3621	50K	45
Namics 8439	50K	55
Namics 8410	60K	55
EMI 1768-VTG	65K	45
Alpha WS-619	100K	50
Norland 123 TKHGA	200K	50
Hysol	300K	35
EMI 1748S-HTG-HV3	400K	45

Fluid Pressure (FP)

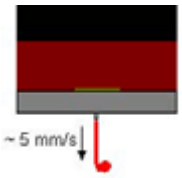
Another important jet parameter is the Fluid Pressure. The fluid reservoir (the syringe) must supply enough fluid to the jet chamber to generate clean drop formation. The criterion is that the fluid must flow out of the nozzle freely when you open the jet. As a general rule, a higher fluid pressure is more desirable than lower pressure; however, the material rheology has a big effect on how the fluid flows out the nozzle.

Table 4: *Typical Flow Patterns - when Jet is Open & Fluid Pressure is applied*

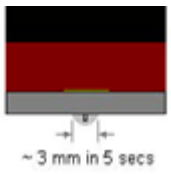
Stream
The first example is a material that flows freely and forms a stream. Many low viscosity epoxies will for a stream. For example a low viscosity underfill like Hysol 3800 and Namics 8443 will form a stream, while a low viscosity UV epoxy like EMI 3553 will not. Set the Fluid Pressure to the minimum value that allows a clean stream to form.



Drop
Some materials form drops of fluid rather than a stream. These fluids tend to be higher viscosity and will not stream. A good rule of thumb is to set the Fluid Pressure so you have about 1 drop/sec. Many highly filled underfill epoxies exhibit this flow pattern. Examples of this type of fluid are Namics 8439 ad 8410.



Curl
Other fluids will form a stream, but are “stringy” enough that they will curl at the end of the stream. A good example of this behavior is Loctite Chipbonder 3621. A good rule of thumb is to set the Fluid Pressure so that the stream flows cleanly and don’t worry about the curl at the end.



Pool
Another type of fluid will not for a drop or a stream. These fluids are very “stringy” and will form a “pool” of fluid around the nozzle tip very similar to accumulation that occurs when a jet is not performing correctly. A good rule of thumb is to set the Fluid Pressure so that a 3mm pool forms in 5 seconds. UV epoxies like EMI 3553, and 1768 are examples of this type of flow.

Maintenance

Part Replacement Schedules

Table 5: *Heater Block & Bushing*

	Monthly	Quarterly	Semi-Annually
Inspect	X		
Clean	X		
Replace			
Calibrate			

Table 6: *Heater Block, Bushing, Cylinder, Spring, Solenoid*

	Monthly	Quarterly	Semi-Annually
Inspect	X		X
Clean	X		X
Replace			X
Calibrate			X

Parts Lists

For information about consumable parts, spare parts, general parts, and their life expectancy, refer to this document: *NCM5000 Pump Parts List* (PN 22200614).

Cleaning the Jetting Pump

Cleaning Jet Exterior

To clean the exterior of the jet, please use a soft, cotton or cellulose cloth. If extremely dirty, a small amount of alcohol can be used.

CAUTION: Make sure you have proper ventilation. Wear appropriate eye and skin protection as instructed by the solvent manufacturer. Move the nozzle in a position so there is minimal misting of the solvent during flushing.

CAUTION: Do not use a dripping wet cloth and do not pour solvents, alcohol, water, or other liquids directly on the jet. Do not submerge the jet in the cleaning agent; otherwise, the jet can be damaged.

Cleaning Jet Interior

The NCM5000 is a very precise jet for dispensing very precise and minute amounts of fluid. The operation can become clogged by the smallest contaminates or become blocked which will adversely affect dispensing results. Never submerge the diaphragm in solvents as it might be damaged. Diaphragms can be cleaned successfully with a small amount of solvent and a soft brush and cotton swab. Do not submerge the diaphragm into the ultrasonic cleaner because the diaphragm will deteriorate and its life will be shortened.

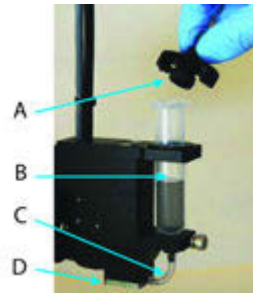
IMPORTANT: It is important the nozzle plate and diaphragm are clean and free of debris before installing onto the Jet. If the nozzle plate is not clean, it could affect the dispensing quality, or in the worst case, could plug the nozzle orifice.

The nozzle plate can be purged, rinsed with the recommended solvent for the fluid and cleaned with an ultrasonic cleaner. Normally only 5 minutes are required to clean the nozzle plate in the ultrasonic cleaner. If after 5 minutes the nozzle plate is still not clean, repeat a second time. Do not submerge the nozzle plate for extended periods of time.

CAUTION: Never submerge the diaphragm in solvents as it might be damaged. Diaphragms can be cleaned successfully with a small amount of solvent and a soft brush and cotton swab. Do not submerge the diaphragm into the ultrasonic cleaner because the diaphragm will deteriorate and its life will be shortened.

To clean jet interior:

1. Prepare the Jet for general cleaning:
   a. Turn off the air pressure.
   b. Remove the Receiver Head.



A	Receiver head
B	Syringe
C	Feed tube
D	Nozzle plate

   c. Remove the Feed Tube from the Nozzle Plate.
   d. Remove the Syringe from the Jet.

2. Install an empty syringe with a feed tube onto the Fluid Barb of the Nozzle Plate.

3. Fill the syringe with approximately 3 cc of mild solvent compatible with your fluid material. For example, use isopropyl alcohol to flush most underfill material, flushes, etc.

IMPORTANT: Do not use alcohol to flush SMA (Surface Mount Adhesive) because the alcohol will solidify the epoxy into small particles that will plug the orifice

4. Install the Receiver Head on the syringe.
5. Set parameter value.
6. Turn on the air pressure.
7. Place a paper towel or a catch dish under the Nozzle.

CAUTION: Make sure you have proper ventilation. Wear appropriate eye and skin protection as instructed by the solvent manufacturer. Move the nozzle close to the paper or catch dish so there is minimal misting of the solvent during flushing.

8. Repeat until the liquid exiting the nozzle is clear and clean. This process typically requires 5 to 6 flushes of 250 drops.

   NOTE: It is easier to work with an empty syringe. Let the remaining solvent totally empty to manage the solvent in the cleanest way. If there is too much solvent in the syringe, you can OPEN the Jet to let out the remaining solvent.

9. Prepare Jet for thorough cleaning:
   a. Turn off the air.
   b. Remove the flushing syringe.
   c. Remove the Nozzle Plate with the 3 mm hex driver
   d. Remove the Diaphragm from the Heater Block.
   e. Inspect the Diaphragm and Nozzle Plate and determine if they require additional cleaning. Normally, the flushing process gets them 90% clean.
   f. Hand clean the Diaphragm with mild solvent and a brush.
   g. If necessary, submerge the Nozzle Plate into an ultra-sonic cleaner for 10 minutes for a thorough cleaning. The Nozzle Plate can be cleaned with a stronger solvent than the Diaphragm.

Troubleshooting

Symptoms

Contamination of the jet can manifest as various symptoms:

- Unclean or uneven dispensing or the drops become irregular or vary in size
- Residual flow or drooling out the tip when the jet is in the closed position
- Interrupted dispensing where fluid no longer is dispensed
- Splatter or satellites are present

Solution

Clean the NCM5000 per Cleaning the Jetting Pump (pg 12) instructions.

If further maintenance or part replacement is required, refer to *NCM5000 Jetting Pump Maintenance Guide* (PN 22200601).

Specifications

General Specifications

Table 7: *Pump Dimensions by Model (without mounting bracket)*

model	part number	width	height	depth
DS	22110513	50.80 mm (2.00”)	90.42 mm (3.56”)	91.44 mm (3.60”)
MAX	22293180			
MAX Low Profile	22293180-0001	25.4 mm (1.00”)	90.3 mm (3.56”)	78.7 mm (3.10”)

Weight . . . . . approximately 400 g
Minimum Volume . . . . . approximately 10 nL
Drop Size Range by Nozzle:
- 100 µ Nozzle . . . . . approximately 10-25 µgrams
- 125 µ Nozzle . . . . . approximately 25-40 µgrams
- 150 µ Nozzle . . . . . approximately 50-70 µgrams
- 200 µ Nozzle . . . . . approximately 100-150 µgrams

Speed:
- Refill time . . . . . >1.7 msec
- Dwell time . . . . . >1.9 msec

Viscosity Range . . . . . 1-50,000 cps
Fluid Syringes . . . . . 5, 10, 30, and 55 cc
Air Pressure:
- Requirements . . . . . 40 µm filter. Clean, dry air
- Jet . . . . . Minimum 0.241 MPa (35 psi). Maximum 0.620 MPa (90 psi)
- Fluid . . . . . Maximum 0.276 MPa (40 psi)
- Source. . . . . Maximum 0.689 MPa (100 psi)

Nozzle Heater:
- Heating . . . . . Up to maximum 70° C
- Range . . . . . ± 1.0° C @ 50 ° C
- Control . . . . . PID control using platinum RTD
- Power . . . . . 24 VDC, 5.7 W, 100 ohm

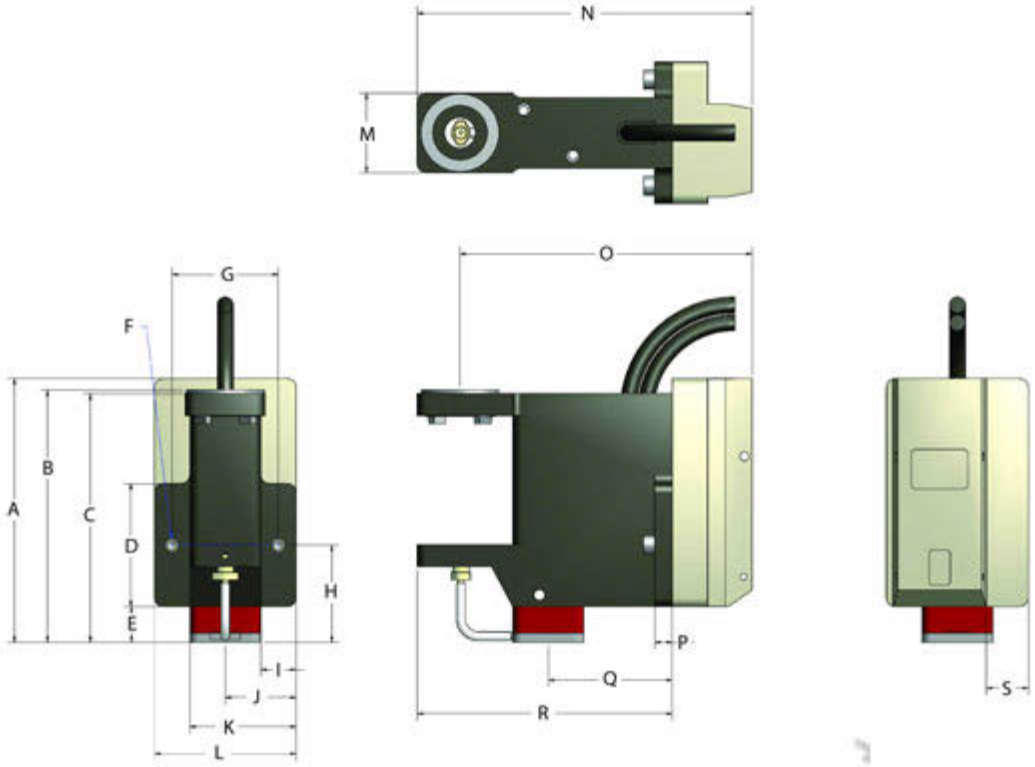
Ambient Temperature . . . . . Up to 50 ° C
Wetted Materials . . . . . Carbide or Ceramic/EPDM/Viton or Silicon

Dimensions

The NCM5000 can be mounted to a variety of robots when X-Y-Z motion is desired. It can also be mounted rigidly over a transporting mechanism like a conveyor belt or shuttle table.

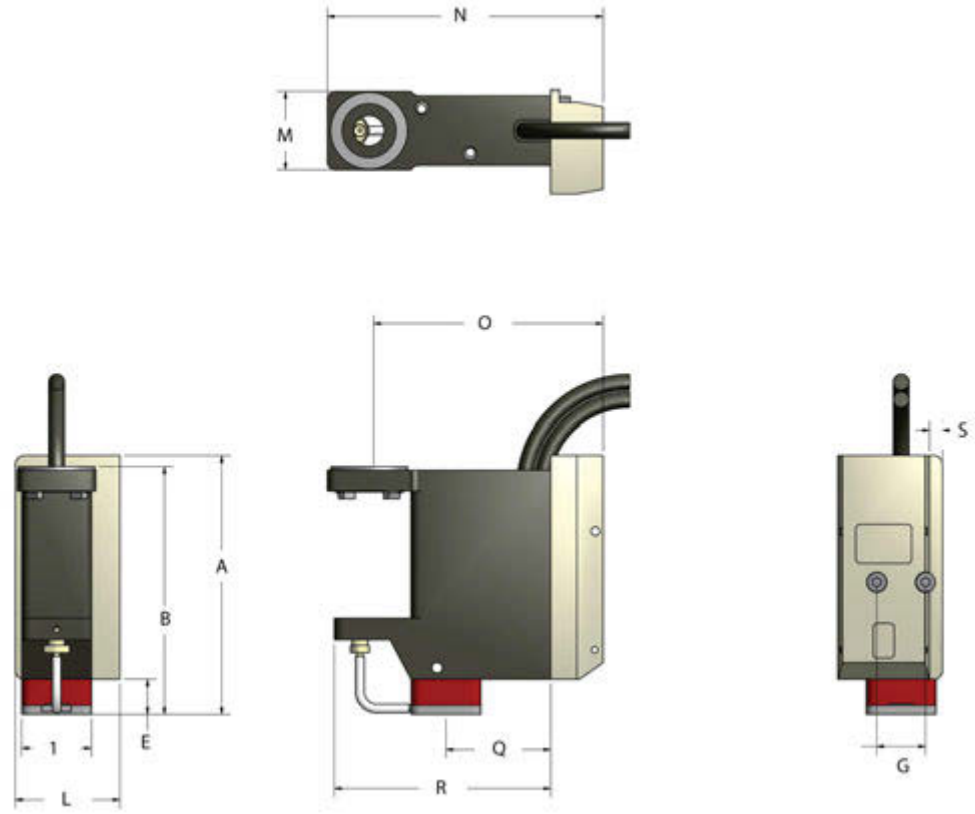
The NCM5000 provides two mounting holes located on the rear mounting plate for rigid attachment to a robot’s X-Y-Z stage. Additionally, the rear mounting plate allows the jet to be mounted in a channel which allows adjustment of the dispense nozzle to the dispensing surface. The dispense nozzle is shown relative to the mounting holes and the rear mounting plate dimensions. It is highly recommended that any mounting scheme allow for vertical adjustment so the dispensing nozzle to dispensing surface can be easily adjusted.

Figure 3: *Standard Profile models: 22110513, 22293180*



A	94.49 mm (3.72”)	K	38.10 mm (1.50”)
B	90.42 mm (3.56”)	L	50.80 mm (2.00”)
C	89.15 mm (3.51”)	M	28.58 mm (1.125”)
D	44.20 mm (1.74”)	N	116.21 mm (4.575”)
E	12.95 mm (0.51”)	O	101.09 mm (3.98”)
F	2X Ø 0.188 through (mounting without Taper Lock)	P	6.35 mm (0.25”)
G	38.10 mm (1.50”)	Q	44.45 mm (1.75”)
H	34.93 mm (1.375”)	R	91.44 mm (3.60”)
I	12.70 mm (0.500”)	S	14.99 mm (0.59”)
J	25.40 mm (1.00”)		

Figure 4: *Low Profile model: 22293180-0001*



1	25.4 mm (1.00”)	M	28.6 mm (1.13”)
A	94.4 mm (3.72”)	N	100.3 mm (3.95”)
B	90.3 mm (3.56”)	O	83.5 mm (3.29”)
E	12.8 mm (0.51”)	Q	38.1 mm (1.50”)
G	17.8 mm (0.70”)	R	78.7 mm (3.10”)
L	38.1 mm (1.50”)	S	4.7 mm (0.18”)

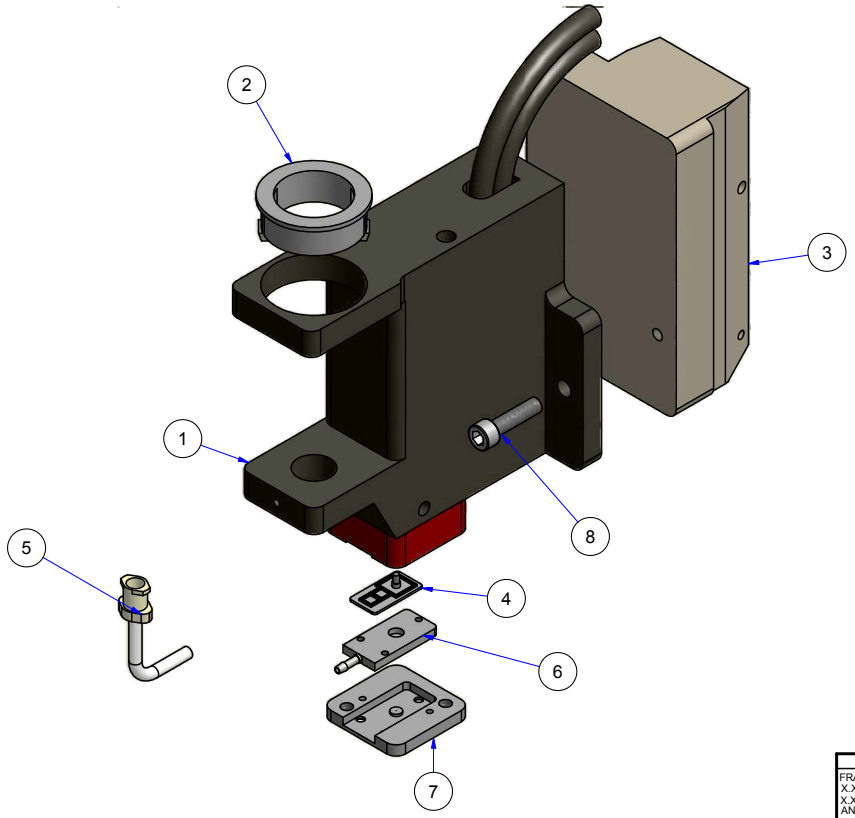
References

Pump Models

Option

22110513 - NCM5000 Pump for DS Series

REVISION HISTORY			
REV	DATE	BY	DESCRIPTION
-	-	-	ORIGINAL ISSUE



Parts List			
ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	22110512	VALVE_ASSY_NCM5000_DS
2	1	22203598	BUSHING_10CC_NCM5000
3	1	22203599	MALE ADAPTER_NCM 5000
4	1	2650-0150	DIAPHRAGM_GREY SILICONE_QTY5
5	1	2650-0152	FEEDTUBE_TYGON_QTY50
6	1	2650-0163	NOZZLE_PLATE _TOP
7	1	2650-0164	NOZZLE_PLATE_BOTTOM
8	2	SACSN0832062	SCREW,ALLEN,CAP,SS_8-32 X 5/8

TOLERANCES UNLESS OTHERWISE SPECIFIED

		METRIC	
FRACTIONS	± 1/32		
X.XX	± 0.015	0 MM	± 1.0 MM
X.XXX	± 0.005	0.0 MM	± 0.4 MM
ANGULAR	± 0.5°	0.00 MM	± 0.1 MM
RUNOUT	± 0.003 T.I.R.		

FINISH: NONE

HEAT TREATMENT: N/A

DWG SIZE: B

GPD Global

DESCRIPTION: PUMP_JETTING NCM5000_DS

ASSEMBLY:

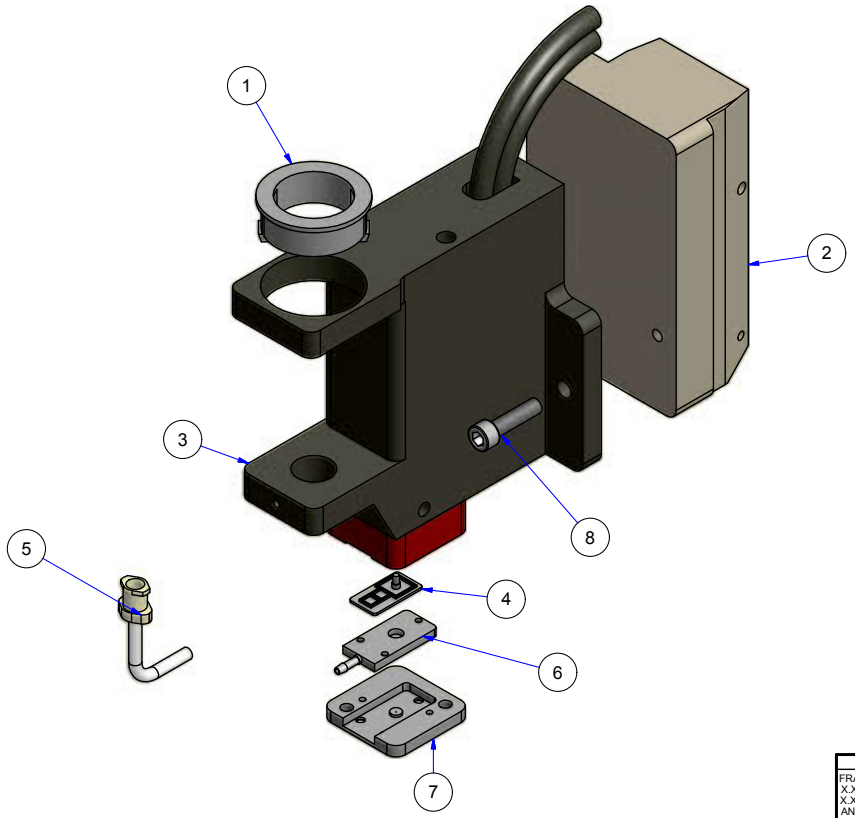
MATERIAL: NOTED

DWG NO: 22110513

DRAWN BY IAH | 9/22/2014 | SHEET 3 OF 3

22293180 - NCM5000 Pump for MAX Series

REVISION HISTORY			
REV	DATE	BY	DESCRIPTION
-	-	-	ORIGINAL ISSUE



Parts List			
ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	22203598	BUSHING_10CC_NCM5000
2	1	22203599	MALE ADAPTER_NCM 5000
3	1	22293200	VALVE_ASSY_NCM5000_MAX SERIES
4	1	2650-0150	DIAPHRAGM_GREY SILICONE_QTY5
5	1	2650-0152	FEEDTUBE_TYGON_QTY50
6	1	2650-0163	NOZZLE_PLATE _TOP
7	1	2650-0164	NOZZLE_PLATE_BOTTOM
8	2	SACSN0832062	8-32 X 1/2 CAP SCREW

TOLERANCES UNLESS OTHERWISE SPECIFIED

		METRIC	
FRACTIONS	± 1/32		
X.XX	± 0.015	0 MM	± 1.0 MM
X.XXX	± 0.005	0.0 MM	± 0.4 MM
ANGULAR	± 0.5	0.00 MM	± 0.1 MM
RUNOUT	± 0.003 T.I.R.		

FINISH: NONE

HEAT TREATMENT: N/A

DWG SIZE: B

GPD Global

DESCRIPTION: PUMP_JETTING NCM5000

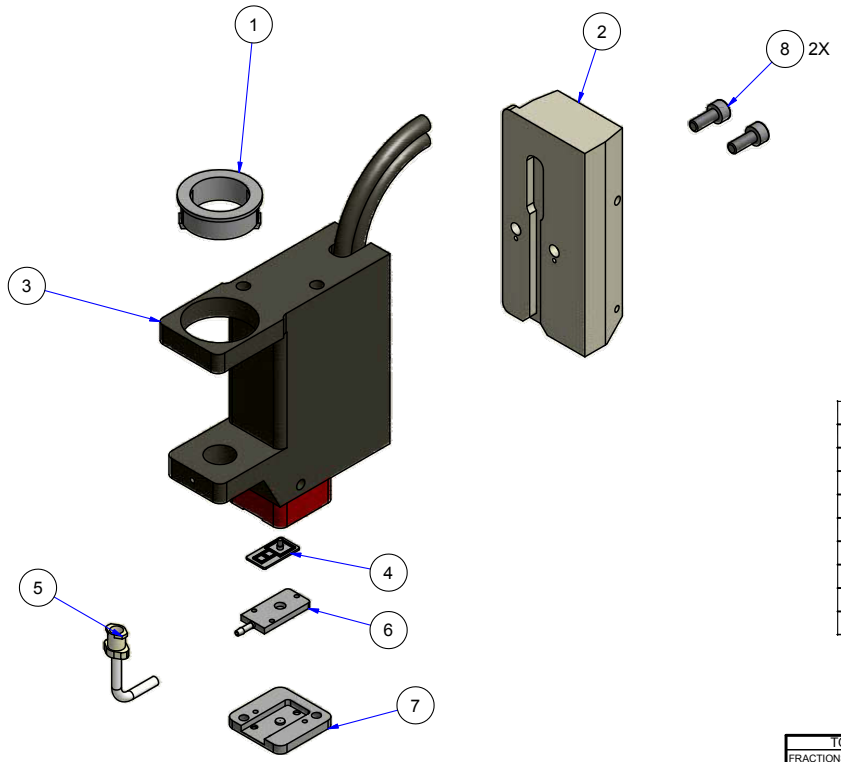
ASSEMBLY:

MATERIAL: NOTED

DWG NO: 22293180

DRAWN BY BLH | 6/20/2013 | SHEET 3 OF 3

22110513-0001 - Low Profile NCM5000 Pump for DS Series



REVISION HISTORY			
REV	DATE	BY	DESCRIPTION
-	-	-	ORIGINAL ISSUE

Parts List			
ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	22203598	BUSHING_10CC_NCM5000
2	1	22203686	MALE ADAPTER_NCM 5000_NO INTRFC BKT
3	1	2650-0131	VALVE_ASSY_NCM5000_MAX SERIES
4	1	2650-0150	DIAPHRAGM_GREY SILICONE_QTY5
5	1	2650-0152	FEEDTUBE_TYGON_QTY50
6	1	2650-0163	NOZZLE_PLATE _TOP
7	1	2650-0164	NOZZLE_PLATE_BOTTOM
8	2	SACSM040070010	SCR.A.CP.SST.MET.M4X0.7_10MM

TOLERANCES UNLESS OTHERWISE SPECIFIED

		METRIC	
FRACTIONS	± 1/32		
X.XX	± 0.015	0 MM	± 1.0 MM
X.XXX	± 0.005	0.0 MM	± 0.4 MM
ANGULAR	± 0.5°	0.00 MM	± 0.1 MM
RUNOUT	± 0.003 T.I.R.		

FINISH

HEAT TREATMENT

DWG SIZE B

GPD Global

DESCRIPTION: PUMP_JETTING NCM5000_LOW PROFILE

ASSEMBLY

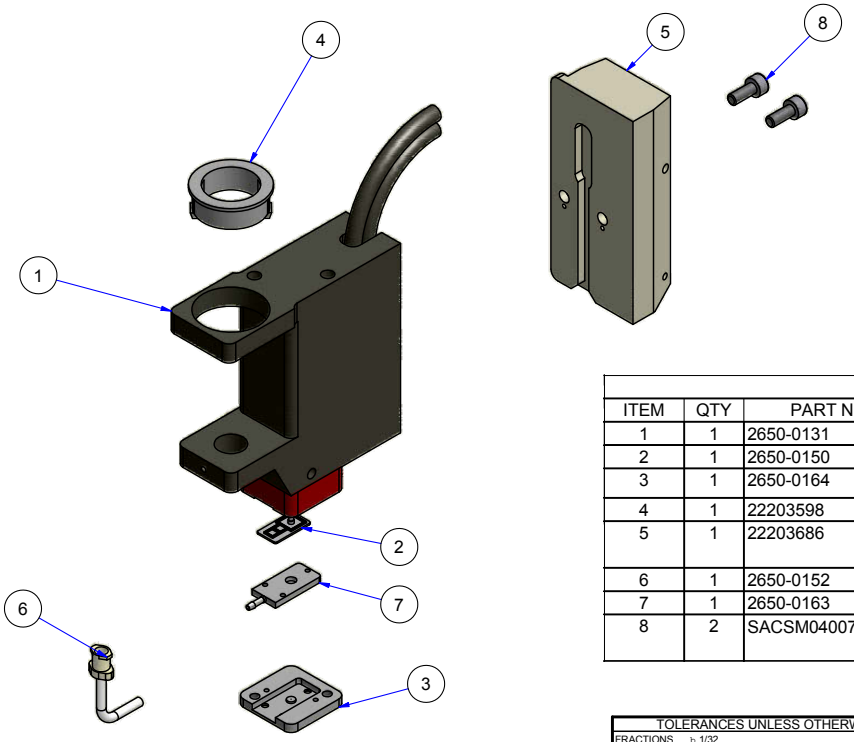
MATERIAL

DWG NO: 22110513-0001

DRAWN BY MW | 1/19/2017 | SHEET 1 OF 1

22293180-0001 - Low Profile NCM5000 Pump for MAX Series

REVISION HISTORY			
REV	DATE	BY	DESCRIPTION
-	-	-	ORIGINAL ISSUE



Parts List

ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	2650-0131	VALVE_ASSY_NCM5000_MAX SERIES
2	1	2650-0150	DIAPHRAGM_GREY SILICONE_QTY5
3	1	2650-0164	NOZZLE_PLATE_BOTTOM
4	1	22203598	BUSHING_10CC_NCM5000
5	1	22203686	MALE ADAPTER_NCM 5000_NO INTRFC BKT
6	1	2650-0152	FEEDTUBE_TYGON_QTY50
7	1	2650-0163	NOZZLE_PLATE_TOP
8	2	SACSM040070010	SCR.A.CP.SST.MET.M4X0.7_10MM

GPD Global

TOLERANCES UNLESS OTHERWISE SPECIFIED

		METRIC	
FRACTIONS	± 1/32		
X.XX	± 0.015	0 MM	± 1.0 MM
X.XXX	± 0.005	0.0 MM	± 0.4 MM
ANGULAR	± 0.5°	0.00 MM	± 0.1 MM
RUNOUT	± 0.003 T.I.R.		

FINISH

HEAT TREATMENT

DWG SIZE: B

DESCRIPTION: PUMP_JETTING NCM5000_LOW PROFILE

ASSEMBLY

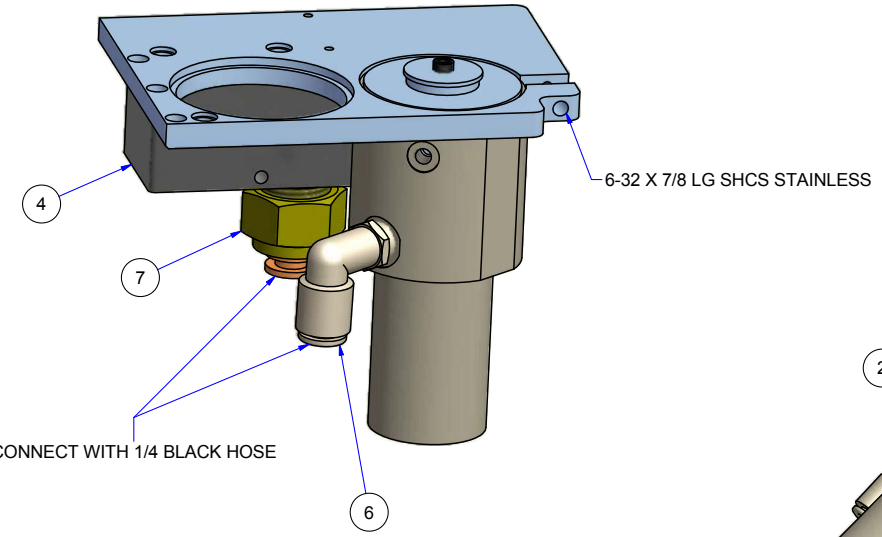
MATERIAL

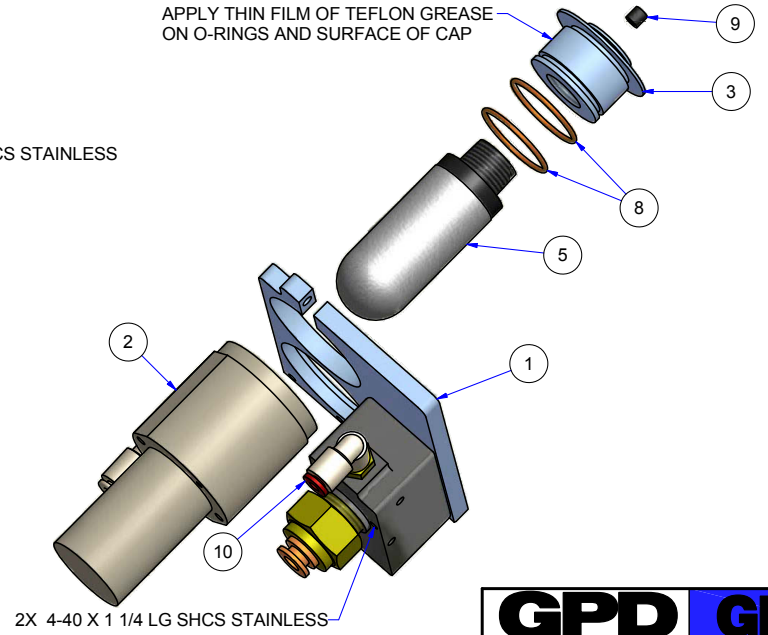
DWG NO: 22293180-0001

DRAWN BY BTM | 12/9/2015 | SHEET 1 OF 1

22295630 - Vacuum Nozzle Clean

REVISION HISTORY			
REV	DATE	BY	DESCRIPTION
A	1/8/2013	TJJ	CHANGED SIZE OF 22205828, AND REPLACED 10/3408 WITH 2725-0034
B	7/7/2014	ALJ	ADDED 10/1805, 1X & REDUCED QTY OF 10/0906 FROM 2 TO 1 EA.





Parts List			
ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	22205917	MOUNT_CAL STATION/NCM VAC
2	1	22205827	NCM VACUUM CHAMBER W/SENSOR
3	1	22205828	NCM VACUUM CAP,SENSOR MODEL
4	1	P0069	VACUUM UNIT
5	1	10/4140	EXHAUST FILTER
6	1	10/0906	FITTING_1/8 NPT X 1/4 TUBE
7	1	10/4669	CONNECTOR, MALE-3/8 NPT X 1/4 TUBE
8	2	10/4141	O-RING 1 1/8 X 1 1/4 X .062
9	1	2725-0034	VACUUM TIP_SILICON_NEEDLE CLEANER
10	1	10_1805	ELBOW-1/8 NPT X 5/32 TUBE

TOLERANCES UNLESS OTHERWISE SPECIFIED

		METRIC	
FRACTIONS	± 1/32		
X.XX	± 0.015	0 MM	± 1.0 MM
X.XXX	± 0.005	0.0 MM	± 0.4 MM
ANGULAR	± 0.5°	0.00 MM	± 0.1 MM
RUNOUT	± 0.003 T.I.R.		

FINISH

HEAT TREATMENT
-

DWG SIZE
B

GPD Global

DESCRIPTION
NOZZLE VACUUM_NCM CLEAN

ASSEMBLY
MICROMAX

MATERIAL
-

DWG NO
22295630

DRAWN BY ARM | 1/19/2010 | SHEET 1 OF 2