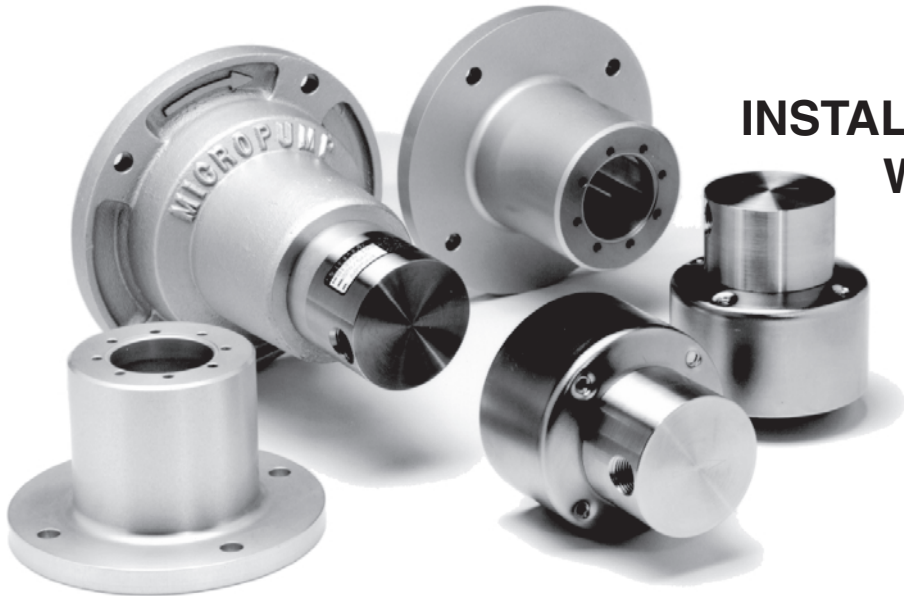




## INSTALLATION, OPERATION AND WARRANTY INFORMATION



- 180 SERIES
- 120 SERIES
- 200 SERIES
- 220 SERIES
- 1330/1350
- 1601
- 5000

**EC DECLARATION OF INCORPORATION****(In accordance with Annex II B of the Machinery Directive 89/392/EEC)**

I, the undersigned Scott Hollister, of  
 MICROPUMP INC.  
 A Unit of IDEX Corporation  
 1402 NE 136th Avenue  
 Vancouver, WA 98684-0818  
 U.S.A.



Declare that the pumps described in this document comply with the following EU directives:

EN809, EN 292 Part 1, EN 292 Part 2

and within the limits specified for the machinery, is in conformity with the essential health and safety requirements of the Machinery Directive 89/392/EEC and subsequent amending directives.

**The machinery described in this certificate must not be put into service until the machinery in which it is incorporated has been declared in conformity with the provisions of the Machinery Directive and its amendments.**

**MANUFACTURER:****IMPORTER IN COUNTRY OF USE:**

.....  
 (Signature)

.....  
 (Signature)

**PUBLISHED BY****MICROPUMP INC.**

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# LIMITED WARRANTY

The products manufactured by Micropump Incorporated are warranted to be free from defects in workmanship and material at the time of shipment from the place of manufacture. Micropump will repair or replace, at its option any part of our product which fails to conform to this warranty for a period of one year from the date of manufacture, plus six months warehouse and transit period, or for a period of one year from the date of purchase by the first user of the product, whichever period expires first. In no event shall this period exceed 18 months from date of original invoice. Micropump's obligation under this warranty is limited to the repairs or replacement of defective equipment returned to us on an F.O.B. basis, providing that our examination discloses that such part or parts were defective at the time of sale.

The warranty described above is the exclusive Micropump warranty and is in lieu of all other warranties, expressed or implied, including any warranty of merchantability or fitness for a particular purpose or any warranty previously issued. We neither assume nor authorise any other person to assume for us any other liability in connection with the sale or use of our equipment.

No warranty of any kind is made or shall be imposed with respect to any pump or parts (1) which have not been properly installed and tested in operation, (2) which have been subject to misuse, negligence, acts of God or the elements, or any other form of casualty, or (3) which have been repaired or altered outside of Micropump's plant so as, in our judgment, to affect performance or reliability.

The parties agree that the buyer's sole and exclusive remedy against Micropump shall be for the repair or replacement of defective parts under the conditions stated above. The buyer agrees that no other remedy, including but not limited to incidental or consequential damages for lost profits, lost sales, loss of use, injury to person or property, or any other incidental or consequential loss shall be available to it.

This warranty shall not apply to prototype pumps, experimental pumps, special pumps, or brush-type electric motors. Our warranty position of the aforementioned equipment is available on request.

The adjustment or replacement of defective parts made under this warranty will not extend the original warranty period.

## Your Micropump Pump....

represents years of fluid handling experience and we feel it is the finest product available of its type.

The pump you have purchased was designed and constructed to handle compatible, clean fluids within designated limits and conditions. Staying within performance limits and following the guidelines given in this manual will result in excellent performance and maximum pump life.

Should you have a question or a problem, technical assistance is available both in the USA and Europe. Micropump products are designed for easy field servicing with service kits and technical support available for all products.

## The Purpose of this Guide....

is to provide information to enable suitably qualified technicians and fitters to install, operate and maintain the Micropump range of gear pumps and gear pump/motor combinations.

## How to Use the Guide

You will have purchased a gear pump or gear pump/motor combination. This guide contains specific information for gear pumps and additional general information for gear pump/motor combinations. When installing or operating gear pump/motor combinations the instructions given in this guide should be read in conjunction with the instructions provided with the motor.

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# INTRODUCTION

## Contents

Safety .....	5
Limits of Use .....	6
Unpacking and Storage .....	6
Technical Specifications .....	7
Description .....	11
Function .....	11
Magnet Decoupling .....	11
Installation .....	12
Mounting Plates and Adapters .....	13
Operation .....	16
Maintenance .....	19
Fault Isolation. ....	19
Weights and Dimensions .....	21

## List of Abbreviations

The following abbreviations are used in this guide:

316SS	316 AISI Stainless Steel	PEEK	Polyetheretherketone
CG	Carbon Graphite	PPS	Polyphenylenesulfide
EPDM	Ethylene Propylene	PTFE	Polytetrafluoroethylene
NPSH	Net Positive Suction Head		

# GENERAL

## Safety

The following are used throughout this guide to indicate procedures that, if not followed correctly, may result in injury to personnel or damage to equipment.



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**Warnings are used to alert the reader to a procedure or practice, which if not followed correctly, could result in personal injury.**

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**Cautions are used to alert the reader to a procedure or practice, which if not followed correctly, could result in damage to the gear pump or ancillary equipment.**

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Notes are used to highlight important information that may assist the reader in carrying out a procedure or in understanding the text.

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## Limits of Use

To achieve optimum performance and safe operation Micropump gear pumps must be operated within the limits given for each model in the Technical Specification tables. Operation outside these limits is not recommended and may result in damage to the gear pump and/or ancillary equipment.



**Temperature.** Operating the pump beyond the maximum operating temperature given in the technical specification is not recommended and may result in damage to the pump.



**Dust and Airborne Contamination.** Pump performance is not affected providing the installation instructions given are followed. Reference should always be made to the installation and operating instructions for the motor under such conditions.



**Corrosive Liquids.** Corrosive liquids may eventually produce leak paths around the sealing surfaces of the pump. The pump should be inspected for leaks on a regular basis.



**Flooding and Water Immersion.** The pumps covered by this guide are not designed to operate immersed in water. Reference should always be made to the installation and operating instructions for the motor under such conditions.



**High Humidity.** When pumping cold liquids ensure that condensation does not present a safety hazard. Condensation on the external surfaces of the magnet cup may result in motor seizure. Reference should always be made to the installation and operating instructions for the motor under such conditions.



**High Pressure Fluid Ejection.** Providing the pump is operated within its technical specification the sealing system will prevent high pressure fluid ejection.

## Unpacking and Storage

Before installing the gear pump ensure all transit packaging has been removed. Remove the blanks from the inlet and outlet ports. If the gear pump is to be stored prior to installation re-pack the gear pump in its original packing, refit the blanks to the ports and store in a dry, covered environment.

# TECHNICAL SPECIFICATION 180 SERIES

MODEL No.	180	181	182	183	184	185	186	187	188	1800	1830	1840
FLOW RATE @ 3450rpm (ml/min)	145	145	290	290	145	290	60	60	320	320	320	320
MAX. SPEED (rpm)	8000	8000	8000	8000	8000	8000	8000	8000	8000	10000	10000	10000
MAX. SYSTEM PRESSURE (bar)	20	20	20	20	20	20	20	20	20	20	20	20
MAX. DIFFERENTIAL PRESSURE FOR CONTINUOUS DUTY (bar)	2.75	2.75	2.75	2.75	2.75	2.75	1.4	1.4	1.4	3.4	3.4	3.4
MAX. DIFFERENTIAL PRESSURE FOR INTERMITTENT DUTY (bar)	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	5.5	5.5	5.5
MAX. DIFFERENTIAL PRESSURE (bar) See Note 1	9.7	24.8	4.5	20.7	24.8	20.7	27.6	27.6	11	4.5	20.7	20.7
DE-COUPLING TORQUE (mNm)	21	78	21	78	78	78	78	78	21	21	78	78
VISCOSITY RANGE (Centipoise)	Up to 100	Up to 100	Up to 100	Up to 100	Up to 100	Up to 100	Up to 100	Up to 100	Up to 100	Up to 100	Up to 100	Up to 100
TEMPERATURE RANGE	-46 to 122°C	-46 to 122°C	-46 to 122°C	-46 to 122°C	-46 to 122°C	-46 to 122°C	-46 to 122°C	-46 to 122°C	-46 to 122°C	-46 to 122°C	-46 to 122°C	-46 to 122°C
WETTED MATERIALS												
Pump Body:	316SS	316SS	316SS	316SS	316SS	316SS	316SS	316SS	316SS	316SS	316SS	316SS
Gears/Bushings:	CG	CG	CG	CG	CG	CG	CG	CG	CG	PPS	PPS	PPS
Seals:	PTFE	PTFE	PTFE	PTFE	PTFE	PTFE	PTFE	PTFE	PTFE	PTFE	PTFE	PTFE
Shafts:	316SS	316SS	316SS	316SS	316SS	316SS	316SS	316SS	316SS	316SS	316SS	316SS
Driven Magnet:	316SS & PTFE	316SS & PTFE	316SS & PTFE	316SS & PTFE	316SS & PTFE	316SS & PTFE	316SS & PTFE	316SS & PTFE	316SS & PTFE	316SS & PPS	316SS & PPS	316SS & PPS
BYPASS VALVE	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
NOISE LEVEL dB(A)	<70	<70	<70	<70	<70	<70	<70	<70	<70	<70	<70	<70

Note 1: These pressures are the maximum the pump will generate if the pump outlet becomes blocked.

# TECHNICAL SPECIFICATION 120 SERIES

MODEL No.	114	020	120	122	030	130	132	040	140	142	050	150	152
<b>FLOW RATE @ 3450rpm (ml/min)</b>	9500	1100	2240	3300	1100	2240	3300	1100	2240	3300	1100	2240	3300
<b>MAX. SPEED (rpm)</b>	4000	10000	10000	8000	10000	10000	8000	10000	10000	8000	10000	10000	8000
<b>MAX. SYSTEM PRESSURE (bar)</b>	20 or 92 (See Note 2)	20	20	20	20	20	20	20	20	20	20	20	20
<b>MAX. DIFFERENTIAL PRESSURE FOR CONTINUOUS DUTY (bar)</b>	3.4	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
<b>MAX. DIFFERENTIAL PRESSURE FOR INTERMITTENT DUTY (bar)</b>	4.1	6	6	5.5	6	6	5.5	7.5	7.5	5.5	7.5	7.5	5.5
<b>MAX. DIFFERENTIAL PRESSURE (bar) See Note 1</b>	5.9	6.2	6.2	6.2	6.2	6.2	6.2	19.3	9.8	7.2	19.3	9.8	7.2
<b>DE-COUPLING TORQUE (mNm)</b>	706	134	134	134	134	134	134	78	134	134	134	134	134
<b>VISCOSITY RANGE (Centipoise)</b>	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500
<b>TEMPERATURE RANGE See Note 3</b>	-46 to 54°C	-46 to 54°C	-46 to 54°C	-46 to 54°C	-46 to 122°C	-46 to 122°C	-46 to 122°C	-46 to 54°C	-46 to 54°C	-46 to 54°C	-46 to 122°C	-46 to 122°C	-46 to 122°C
<b>WETTED MATERIALS</b>													
<b>Pump Body:</b>	316SS	316SS	316SS	316SS	316SS	316SS	316SS	316SS	316SS	316SS	316SS	316SS	316SS
<b>Gears/Bushings:</b>	PTFE	PTFE	PTFE	PTFE	PPS	PPS	PPS	PTFE	PTFE	PTFE	PPS	PPS	PPS
<b>Seals:</b>	PTFE	PTFE	PTFE	PTFE	PTFE	PTFE	PTFE	PTFE	PTFE	PTFE	PTFE	PTFE	PTFE
<b>Shafts:</b>	316SS	316SS	316SS	316SS	316SS	316SS	316SS	316SS	316SS	316SS	316SS	316SS	316SS
<b>Driven Magnet:</b>	316SS & PTFE	316SS & PTFE	316SS & PTFE	316SS & PTFE	316SS & PTFE	316SS & PTFE	316SS & PTFE	316SS & PTFE	316SS & PTFE	316SS & PTFE	316SS & PTFE	316SS & PTFE	316SS & PTFE
<b>BYPASS VALVE</b>	NO	YES	YES	YES	YES	YES	YES	NO	NO	NO	NO	NO	NO
<b>NOISE LEVEL dB(A)</b>	<70	<70	<70	<70	<70	<70	<70	<70	<70	<70	<70	<70	<70

Note 1: These pressures are the maximum the pump will generate if the pump outlet becomes blocked.

Note 2: This model is supplied in two configurations. Each configuration has a different maximum system pressure. Models with part number 80943 have a maximum system pressure of 20 bar. Models with part numbers 81427 and 81744 have a maximum system pressure of 92 bar.

Note 3: For pumps with PTFE gears a temperature of 54°C is the maximum temperature with standard seals. Alternative seals can be fitted which will give a maximum temperature of 98°C with the exception of the 114 which has a maximum temperature of 54°C. Consult Micropump or an authorised distributor.



# TECHNICAL SPECIFICATION 200 AND 220 SERIES

MODEL No.	200.15	200.35	201	219	220	221	223
FLOW RATE @ 3450rpm (ml/min)	900	2050	3950	3000	6400	11000	11000
MAX. SPEED (rpm)	10000	10000	8000	8000	6000	4000	4000
MAX. SYSTEM PRESSURE (bar)	20	20	20	103	68	68	103
MAX. DIFFERENTIAL PRESSURE FOR CONTINUOUS DUTY (bar)	5	5	3.5	4.1	4.1	4.1	4.1
MAX. DIFFERENTIAL PRESSURE FOR INTERMITTENT DUTY (bar)	5.5	5.5	3.5	10.3	8.3	4.5	4.5
MAX. DIFFERENTIAL PRESSURE (bar) See Note 1	11	7.5	4.5	11	10.3	5.2	7
DE-COUPLING TORQUE (mN/m)	162	162	162	388	692	692	692
VISCOSITY RANGE (Centipoise)	100	100	100	1500	1500	1500	1500
TEMPERATURE RANGE	-46 to 122°C	-46 to 122°C	-46 to 122°C	-46 to 122°C	-46 to 122°C	-46 to 122°C	-46 to 122°C
<b>WETTED MATERIALS</b>							
Pump Body:	316SS	316SS	316SS	316SS	316SS	316SS	316SS
Gears/Bushings:	PPS	PPS	PPS	PPS	PPS	PPS	PPS
Seals:	VITON®	VITON® or EDPM	VITON®	VITON®	VITON®	VITON®	NEOPRENE
Shafts:	316SS	316SS	316SS	316SS	316SS	316SS	316SS
Driven Magnet:	316SS & PPS	316SS & PPS	316SS & PPS	316SS & PPS	316SS & PPS	316SS & PPS	316SS & PPS
BYPASS VALVE	OPTIONAL	OPTIONAL	OPTIONAL	NO	NO	NO	NO
NOISE LEVEL dB(A)	<70	<70	<70	<70	<70	<70	<70

Note 1: These pressures are the maximum the pump will generate if the pump outlet becomes blocked.

# TECHNICAL SPECIFICATION 1330/1350/1601/5000

MODEL No.	1330	1350	1601	5000
FLOW RATE @ 3450rpm (ml/min)	2300	2300	360	20000
MAX. SPEED (rpm)	5000	5000	8000	4000
MAX. SYSTEM PRESSURE (bar)	13.8	13.8	5.2	20
MAX. DIFFERENTIAL PRESSURE FOR CONTINUOUS DUTY (bar)	3.5	3.5	2.75	2
MAX. DIFFERENTIAL PRESSURE FOR INTERMITTENT DUTY (bar)	3.5	3.5	2.75	3
MAX. DIFFERENTIAL PRESSURE (bar) See Note 1	5.5	5.5	4.5	3.5
DE-COUPLING TORQUE (mNm)	134	134	21	680
VISCOSITY RANGE (Centipoise)	100	100	100	1500
TEMPERATURE RANGE	-45 to 65°C	-45 to 65°C	-45 to 65°C	-46 to 122°C
WETTED MATERIALS				
Pump Body:	316SS & PPS	316SS & PPS	PPS	316SS
Gears:	PPS	PPS	PPS	PTFE or PEEK
Bushings:	PPS	PPS	PPS	RULON® or PEEK
Seals:	VITON®	VITON®	EPDM	PTFE or VITON®
Shafts:	316SS	316SS	316SS	316SS
Driven Magnet:	316SS & PPS	316SS & PPS	316SS & PPS	316SS & PPS
BYPASS VALVE	YES	NO	NO	NO
NOISE LEVEL dB(A)	<70	<70	<70	<70

Note 1: These pressures are the maximum the pump will generate if the pump outlet becomes blocked.

# DESCRIPTION

## Description

The pump comprises a sealed unit containing the pumping parts which are connected to a driven magnet. The magnetic cup separates the pumped liquid from the atmosphere and is attached to the pump body. Elastomer seals prevent leakage. The driving magnet, which is attached to a motor shaft, encircles the magnetic cup.

**180 Series Pumps** are suction shoe gear pumps. Each pump is manufactured from 316 stainless steel and is fitted with PTFE seals and carbon graphite gears and suction shoes. 1800, 1830 and 1840 pumps are fitted with PPS gears and suction shoes.

**200 Series Pumps** are suction shoe gear pumps. Each pump is manufactured from 316 stainless steel and is fitted with Viton® seals and PPS gears and suction shoes.

**120 Series Pumps** are conventional cavity style gear pumps. Each pump is manufactured from 316 stainless steel and is fitted with PTFE seals and gears. Model 130 and 150 pumps are fitted with PPS gears.

**1330/1350/1601 Pumps** are conventional cavity style gear pumps. Each pump is manufactured from PPS and is fitted with PPS gears. 1330/1350 models are fitted with Viton® seals. 1601 models are fitted with EPDM seals.

**5000 Pumps** are conventional cavity gear pumps. Each pump is manufactured from 316 stainless steel and is fitted with either PTFE seals and gears or PEEK gears and Viton® seals.

## Function

The driven magnet is connected to the pumping parts and is sealed in the magnet cup. The driving magnet, which is connected to the motor, encircles this cup. The magnets align pole-to-pole and rotate together with no slippage until the decoupling limit is exceeded. Rotation of the pumping elements produces flow.

## Magnet Decoupling

Magnetic decoupling occurs when the load on the pump exceeds the coupling torque between the magnets. The magnets are forced out of pole-to-pole alignment and are decoupled. When decoupling occurs, the driving magnet speed increases to motor no-load speed while the driven magnet and pumping parts remain motionless. To recouple the magnets the motor must be stopped, allowing the magnets to re-align and then restarted.



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Decoupling is an inherent feature of magnetic couplings and DOES NOT indicate a pump failure. Decoupling should only occur when the magnet decoupling torque has been exceeded. Decoupling can be a safety feature, preventing inadvertent pump/motor overloads.

---

The decoupling torque can vary with different fluids, temperatures, system conditions and width of driving magnet. The decoupling torques given in the Technical Specification tables are for pumping clean water at 21°C.

## Installation

**Pump Location.** The following should be observed when selecting the pump location:

- The pump should be located with the inlet below or as close as possible to the fluid level of the fluid supply. The pump can be mounted in any position.
- Ensure that there is adequate space for operation, inspection and maintenance.
- The foundation must be capable of supporting the combined weight of the pump and motor and provide a rigid support.

### Installation in Explosive and Fire Danger Zones.



Ensure the motor is suitable for area classification.



Ensure that the pumphead does not exceed flash point temperature of area if pumping hot liquids.



Ensure that the pump does not run dry for extended periods.

**Space Requirements.** Refer to the illustrations on pages 21-22 for overall dimensions and weights of the pumps covered by this guide.

**Pipework.** The following should be observed when connecting pipework.

- Pipes connected to the pump should be level or slope down towards the pump.
- Ensure that no part of the pipe extends below the level of the pump suction port.
- Ensure all pipes and fittings are of the correct size for the pump being installed. Refer to the following table.



Restrictions in the inlet and discharge lines may cause a loss of pump performance. A restriction can be a valve, small bore tubing, long lengths of tubing or sharp turns/elbows in the line. Limit these restrictions wherever possible.

PUMP MODEL No.	PORT SIZE	MIN. RECOMMENDED TUBING I.D.
180 Series	1/8" NPT	6.5mm (1/4")
040, 120, 130, 122	1/8" NPT	6.5mm (1/4")
114	1/4" NPT	10mm (3/8")
200, 201	1/8" NPT	6.5mm (1/4")
220, 221	3/8" NPT	12.5mm (1/2")
1330/1350	1/8" NPT	6.5mm (1/4")
1601	1/4" UNF	6.5mm (1/4")
5000	1/2" NPT	12.5mm (1/2")

# INSTALLATION

## Filtration.



**The pump can be damaged if the fluid being pumped has suspended solids that are abrasive. Always install a suitable filter or strainer when these fluids are being pumped.**

For open systems the filter must be installed on the inlet side of the pump. For closed loop systems the filter can be installed on the inlet or discharge side.

Recommended filter specifications for the pumps covered by this guide are given below.



All strainers and filters should have large surface areas to prevent excessive pressure drop.

PUMP SERIES	FILTER TYPE/SIZE
180/1601	5 MICRON, [ $<0.14$ bar (2 psi) pressure drop] CANNISTER or FINE MESH style
120 1330/1350/5000	40 MICRON, soft particles [ $<0.27$ bar (4 psi) pressure drop] 5 MICRON, hard particles [ $<0.27$ bar (4 psi) bar pressure drop] CANNISTER style
200/210/220	40 MICRON, soft particles [ $<0.14$ bar (2 psi) bar pressure drop] 5 MICRON, hard particles [ $<0.14$ bar (2 psi) pressure drop] CANNISTER style

## Mounting Plates and Adapters

If you have purchased a pump/motor combination this will be assembled ready for installation.

If you have purchased a pump without a motor you may require an NEMA 56C or IEC/ISO adapter. IEC/ISO adapters are supplied in frame sizes 56, 63 and 71.

Models 114, 219, 220, 221, 223 and 5000 are supplied in ready to mount form in either 56C or IEC/ISO format (frame size 63 and 71).

Models 020, 030, 040, 050, 120, 122, 130, 132, 140, 142, 150, 152, 1840, 184, 185, 187, 200 and 201 couple directly to Micropump 56C or IEC/ISO adapters. Refer to the instructions supplied with the adapter kit for installation details.

Models 180, 181, 182, 183, 186, 188, 1800, 1830, 1300/1350 and 1601 are designed for use with small motors and do not accept 56C or IEC/ISO motors. These models are supplied with a suitable motor mounting bracket. Refer to the instructions supplied with the motor mounting bracket for installation details.



**If a non-Micropump mount/adapter is used it must comply with the requirements of EN 809.**



**Mounting screws are provided with Micropump supplied motors. Mounting screws are not provided with gear pumps.**

**Fitting the Pump/Motor to the Installation.** It is recommended that the pipe fittings are connected to the pump before the pump/motor is fitted into the installation. The following should be observed when connecting pipe fittings:

- Pipe sealing compound or PTFE tape should be applied to the threads to prevent leakage.
- Apply sealant or tape sparingly to prevent a build up of excess material which may dislodge and clog the pump. Two wraps of PTFE tape are usually sufficient.
- Secure the pump in a vice (use pads to protect the pump body) and support the motor when installing fittings.




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**Do not overtighten fittings. Refer to the manufacturers installation instructions for torque values .**

---

Ensure all piping is clean and flushed out prior to connection to the pump. Do not force piping into position as this will place unnecessary strain on the pump.




---

**Ensure that inlet and discharge pipes are connected correctly in relation to the direction of flow arrow marked on the pump.**

---

Piping should be installed according to the following guidelines:

- Design piping runs to minimise friction losses. Restrictions in the inlet and discharge lines may cause a loss in performance.
- Piping that handles hot liquid requires installation of expansion loops/joints to prevent misalignment from linear expansion.
- Never size suction piping diameter smaller than the pump suction port.
- Ensure all joints are airtight.
- Separate suction lines are recommended when more than one pump is operating from the same medium source.

If in doubt refer to the guidelines for piping given in the "Hydraulic Institute Standards".

Secure the pump/motor to the installation using suitable fixing bolts. Connect the inlet and discharge pipework to the pump.

# INSTALLATION

**Electrical Connection.** Refer to the installation instructions supplied with the motor for connection details.



**Electrical installation must be carried out by qualified personnel who are conversant with local electricity installation regulations.**



**Before starting any electrical installation work ensure that the main electrical supply is adequately isolated.**



**Ensure that the voltage and frequency of the supply are correct for the motor being connected.**



**When using DC motors they must be connected to a class II power supply.**



**The pump may be electrically isolated from the motor depending on the mounting configuration. Some installations may need an earthing connection on the pumphead.**



**Pumping flammable fluids without a proper earthing connection may cause spontaneous ignition.**

**Compressed Air Connection.** Refer to the installation instructions supplied with the motor for connection details.



**Compressed air connections must be carried out by qualified personnel who are conversant with the hazards associated with high pressure air supplies.**



**Ensure that the compressed air supply is suitable for the type of motor being used.**

## Operation

**Start-up Procedure.** Before starting the pump ensure that any valves in the inlet or discharge lines are open and that any inlet filters are clean and free from obstruction.



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**Starting or running the pump with the discharge valve closed will result in overloading of the drive motor and overpressure in the discharge pipe.**

---

Once started the pump should prime if it has not already been filled with fluid. If the pump fails to prime, stop the pump and fill the pumphead with liquid.

**Post Start-up Checks.** Once the pump has started carry out the following checks:



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**Check that the pump is rotating in the correct direction. This should be clockwise when viewing the drive shaft of the drive unit. If the direction of rotation is incorrect check the motor electrical connections.**

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**Flow rate should always be adjusted by the valve fitted in the discharge line. Ensure that overpressure does not occur in the discharge pipe. NEVER throttle flow by the inlet valve.**

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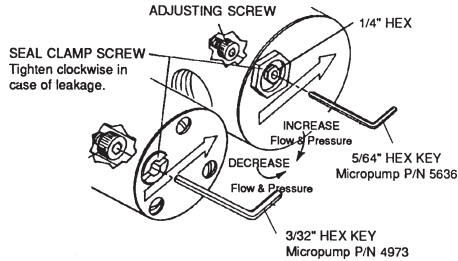
- Check that the pump and motor operate smoothly and are free from vibration.
- Check the inlet and discharge fittings are free from leaks.

**Shut-down Procedure.** Switch off the drive motor and check that the unit runs down in a steady manner. Close the inlet and discharge valves. Drain the pump if it is to be shut-down for long periods or installed in areas where the liquid may freeze.



# OPERATION

**Bypass Valve Adjustment.** The bypass valve is an internal relief valve that permits recirculation of the working fluid when the pre-set pressure is reached. The bypass can be activated from 0.7 bar (10psi) to the maximum differential pressure of the pump. The bypass can be adjusted in situation while the pump is operating by rotating the adjusting screw with the hexagon key provided. Turn the screw clockwise to increase pump pre-set pressure and anticlockwise to decrease pump pre-set pressure.



**The pump internally re-circulates bypass fluid and heat can be produced as a result. Increasing the amount of fluid that is re-circulated through the bypass will increase the heat produced. It is possible that at full bypass the fluid temperature will exceed the operating temperature of the pump. Micro-pump recommend that pumps are not run continuously at full bypass.**

**How to Recognise Magnet De-coupling.** Magnet decoupling occurs when the load on the pump exceeds the coupling torque between the magnets. The magnets are forced out of pole-to-pole alignment and are decoupled. When decoupling occurs, the driving magnet speed increases to motor no-load speed while the driven magnet and pumping parts remain motionless.



Decoupling is an inherent feature of magnetic couplings and DOES NOT indicate a pump failure. Decoupling should only occur when the magnet decoupling torque has been exceeded. Decoupling can be a safety feature, preventing inadvertent pump/motor overloads.

**Causes of Magnet De-coupling.** Due to the quiet operation of magnetic pumps it is not always possible to detect, without disassembly of the pump, when the magnet coupling and pumping parts are operating incorrectly. It is therefore important to be able to recognise possible causes of magnet de-coupling:

- Blockage or restriction in the discharge side of the system
- Discharge pressure exceeds decouple point
- Fluid viscosity too high
- Foreign particles jamming pumping parts
- Binding or stuck pumping parts - this may occur between pumping cycles as a result of dried residue of the fluid being pumped. Drain and flush the pump to remove the residue.

**Magnet Re-coupling.** Before re-coupling ensure that the cause of the de-coupling has been identified and rectified. To recouple the magnets the motor must be stopped, allowing the magnets to re-align, and then restarted.

**Draining.** The pump should only require draining prior to disassembly for service, changing the type of liquid being pumped or to prevent frozen liquid damage to the pump



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**The pump cannot be drained completely, a certain amount of liquid will remain in the magnet cup area. Ensure that the pump is either flushed with a suitable flushing agent or precautions are taken against the effect of any remaining liquid during servicing. When the pump has been handling flammable, toxic or hazardous fluid, the pump internals must be properly decontaminated by suitably qualified personnel. The Material Safety Data Sheet for the pumped liquid must be referred to for correct procedures and precautions to be followed when handling the liquid.**

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**Dry Running.** Dry running for short intervals (i.e. when dry lifting to prime the pump) may not affect pump performance.



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**Extended periods of dry running may result in permanent damage to the pump.**

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**Mixed Phase.** Micropump gear pumps can handle mixed phase (gas/fluid) pumping.

**Reverse Pressure.** Pressure loaded suction shoe pumps (Series 180, 200, 220) cannot operate conventionally under reverse pressure conditions. This occurs when the fluid pressure coming into the pump is greater than the fluid on the discharge side. Contact your Micropump distributor for information on reverse pressure installations.

# MAINTENANCE AND FAULT ISOLATION

## Maintenance

Micropump magnetic drive gear pumps are designed to be maintenance free and, apart from bypass models, require no adjustments. To ensure the pump retains optimum performance maintain the fluid circuit to keep filters clean and prevent abrasive solids from passing through the pump.

Like all pumps Micropump gear pumps contain components that will wear over a period of time. This will be noticeable by a gradual deterioration in performance and you should contact your Micropump distributor for a service kit. Each service kit contains full fitting and service instructions.

## Fault Isolation.

If the pump does not meet its design performance or fails to operate correctly refer to the following tables for assistance in identifying the cause and remedy:

PUMP PRODUCES NO LIQUID AT START UP	
CAUSE	REMEDY
Suction valve closed. Discharge valve closed.	Open suction valve. Open discharge valve.
Pump does not come up to speed, magnets de-couple.	Shut off the motor. Check the motor is running. Ensure inlet and outlet valves are open.

PUMP DOES NOT SUCTION LIFT OR SELF PRIME	
CAUSE	REMEDY
Suction pipe is not properly sealed and the pump is pulling in air.	Check suction pipe and fittings are airtight.
Viscosity of liquid is too high or too thin causing loss of self-priming capability.	Install foot valve at the bottom of the suction line, fill suction line and pump with liquid before restart. Modify pipe layout.

PUMP SEIZES IMMEDIATELY AFTER START-UP	
CAUSE	REMEDY
Solids are present in the pump.	Clean tank and piping system. Replace any damaged parts before reassembly

PUMP IS NOISY AND VIBRATES AFTER START-UP	
CAUSE	REMEDY
Magnet coupling out of alignment. Signs of rubbing may be present on magnet cup.	Check alignment. Ensure adapter/mount is of the correct type and is not damaged or distorted. Use only Micropump adapter/mounts.
Mounting base not rigid.	Ensure the base is adequately supported, particularly in the area of the motor attaching points. Ensure attachment bolts are of the correct size and tightened sufficiently.
Pump cavitates; NPSH available < NPSH required.	Increase NPSH available.

## MAINTENANCE AND FAULT ISOLATION

### PUMP DOES NOT OBTAIN RATED FLOW OR PRESSURE AT START UP

CAUSE	REMEDY
Suction line valve is not fully open.	Open suction valve.
Suction line strainer or filter is blocked.	Clean.
Pump rotates in wrong direction.	Check motor electrical connections (refer to connection details supplied with motor).
Suction pipe is not properly sealed and the pump is pulling in air.	Check suction pipe and fittings are airtight.
Differential head of the system is higher than specified.	If differential head cannot be reduced, a higher pressure pump is required.
Viscosity is higher than pump specification.	Contact your Micropump application engineer.
Pump cavitates; NPSH available < NPSH required.	Increase NPSH available.

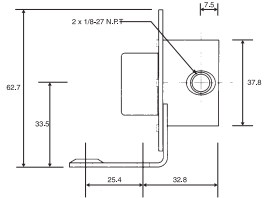
### MOTOR IS OVERLOADED

CAUSE	REMEDY
Differential head is higher than specification, discharge valve is fully open. Pump operates with reduced capacity and increased power consumption.	If capacity is more than required, install additional bypass line from discharge to suction. Adjust the capacity and differential head with a throttle valve in the bypass line.
Density or viscosity is higher than pump specification.	Contact your Micropump application engineer.

# WEIGHTS AND DIMENSIONS

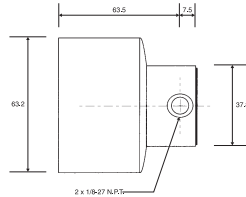
## Weights and Dimensions

All dimensions in mm.

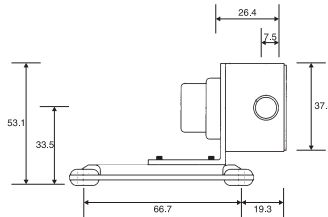


**Model 181, 183, 186, 1830**  
Weight = 0.27kg

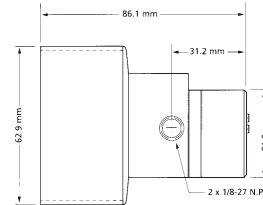
NOTE: Bracket is supplied with some motor assemblies and is shown here for dimensional purposes only.



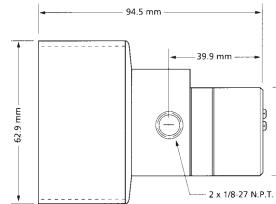
**Model 184, 185, 187, 1840**  
Weight = 0.31kg



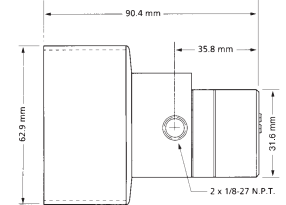
**Model 180, 182, 188, 1800**  
Weight = 0.24kg



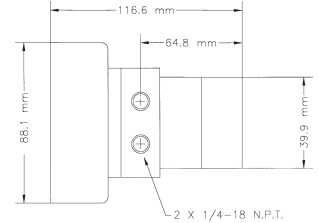
**Models 020, 030, 040, 050**  
Weight = 0.43kg



**Models 122, 132, 142, 152**  
Weight = 0.47kg

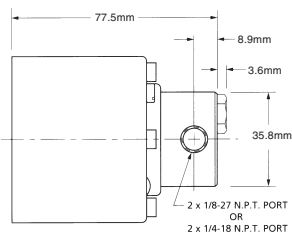


**Models 120, 130, 140, 150**  
Weight = 0.46kg

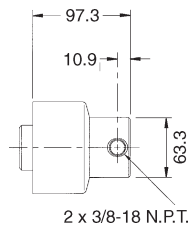


**Model 114**  
Weight = 1.63kg

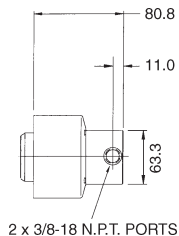
## WEIGHTS AND DIMENSIONS



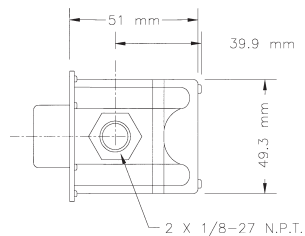
**Models 200, 201**  
Weight = 0.36kg



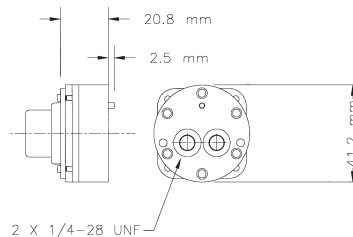
**Models 220, 221, 223**  
Weight = 1.63kg



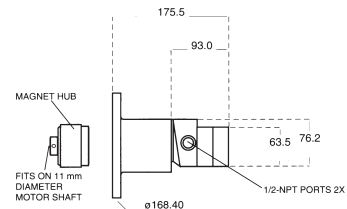
**Model 219**  
Weight = 1.63kg



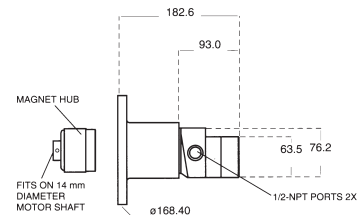
**Models 1300/1350**  
Weight = 0.25kg



**Model 1601**  
Weight = 0.06kg



**Model 5000 on IEC/ISO 63 Adapter**  
Weight = 3.9Kg



**Model 5000 on IEC/ISO 71 Adapter**  
Weight = 3.9Kg

# DISTRIBUTOR INFORMATION

To purchase pumps, parts or receive further information contact your local Micropump distributor or contact Micropump direct.

## **Micropump, Inc.**

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E-mail: [info@micropump.com](mailto:info@micropump.com)  
Web: [www.micropump.com](http://www.micropump.com)

## **Micropump Limited**

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