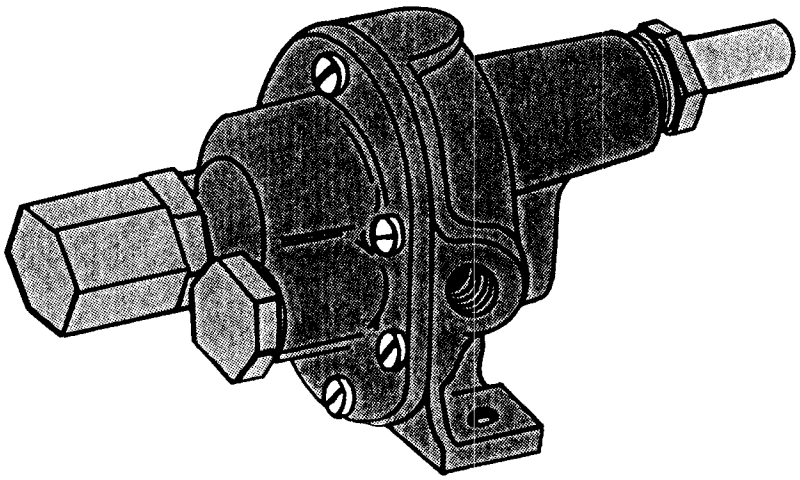
FPUGR200 Series

Gear Pumps



OMEGA®

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Operator's Manual
M1336/0192

FPUGR200 Series
Gear Pumps

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Gear Pumps

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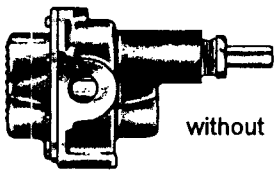
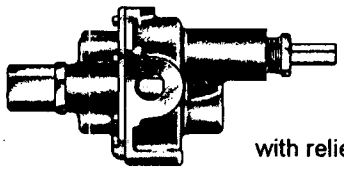
(CB Option)



without relief valve

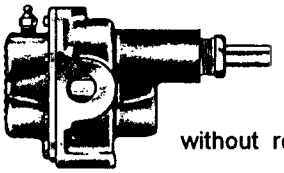


with relief valve

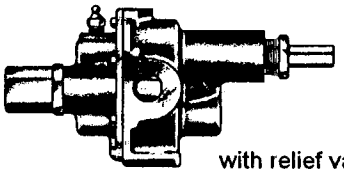
Models
FPUGR 201
FPUGR 202
FPUGR 203
FPUGR 204
FPUGR 205
FPUGR 206

Models
FPUGR 201R
FPUGR 202R
FPUGR 203R
FPUGR 204R
FPUGR 205R
FPUGR 206R

Bronze Bearings



without relief valve



with relief valve

General Description

Pump housing and gears are made of top quality bronze, shafts are from stainless steel 303. Pumps are available with bronze bearings and grease fittings or with carbon bearings which require no lubrication.

Gear pumps are **positive displacement pumps**. Each shaft revolution displaces a definite amount of liquid relatively unaffected by the back pressure in the discharge line. Shaft speed and flow are directly proportional.

Recommended pressure limits are **100 psi** for water and non-lubricants, **150 psi** for oil and lubricants. The maximum shaft speed is **1750 rpm**.

Specifications and Performance Tables

Wetted Parts:
Bronze gears, 303SS shaft, Buna-N lip seal (Viton optional), carbon-graphite bearings.
Maximum Pressure:
100 PSIG; FPUGR206: 50 PSIG for water and low viscosity liquids.
Temperature Range:
Buna N (nitrile): -65°F to +250°F
Viton (optional): -40°F to 300°F
Maximum Viscosity (SSU):
100,000 with 200 rpm motor speed

SECTION 1

FPUGR200 Series Gear Pumps

GENERAL INSTRUCTIONS

Performance Table (For FPUGR200 Series) *

	0 PSI		50 PSI		100 PSI		150 PSI	
Part Number	GPM	HP	GPM	HP	GPM	HP	GPM	HP
FPUGR201/201-R	2.10	.05	1.80	.17	1.50	.28	1.20	.39
FPUGR202/202-R	4.07	.10	3.55	.25	3.03	.43	2.50	.68
FPUGR203/203-R	7.25	.38	6.63	.73	6.00	1.10	5.50	1.40
FPUGR204/204-R	10.6	.50	9.97	1.05	9.42	1.75	9.00	2.32
FPUGR205/205-R	19.8	.80	18.9	1.63	18.0	2.65	17.4	3.60
FPUGR206/206-R	23.3	.90	22.3	1.73	21.3**	2.70**	20.1**	3.70**

*Recommended HP listed in this chart is for pumping water (33 SSU viscosity) with a 1725 rpm motor. Liquids of higher viscosities require lower shaft speed, higher horsepower, and inlet/outlet piping must be at least one, preferably two, sizes larger than the pump ports. Refer to Speed Reduction Table and Multipliers for HP Table.
**Not recommended for pumping water at these pressures.

Multipliers for HP Table (For FPUGR200 Series)

Pressure PSI	Viscosity (SSU)					
	500	1000	5000	10,000	50,000	100,000
2	1.30	1.60	2.20	3.00	4.00	5.00
20	1.25	1.50	2.00	2.60	3.60	4.50
40	1.20	1.40	1.80	2.20	3.20	4.00
60	1.15	1.30	1.60	2.05	2.80	3.50
80	1.12	1.25	1.50	1.90	2.50	3.00
100	1.10	1.20	1.40	1.80	2.20	2.50

Speed Reduction Table (FPUGR200 Series)

Viscosity SSU	Recommended Speed (RPM)
50	1725
500	1500
1000	1300
5000	1000
10,000	600
50,000	400
100,000	200

FPUGR200 Pedestal Pump Heads
(Require user supplied motors to 1725 rpm Max.)**

To Order *(Specify Model Number)*					
Model Number	Relief Valve	Port Size NPT(F)	Shp Wt. Lbs (kg)	Overall Dim. H x W x L in.	Shaft Dia. x Center line
FPUGR201	No	1/8"	3(1.4)	3 x 3 x 8	1/2 x 1.88
FPUGR201-R	Yes	1/8"	3(1.4)	3 x 3 x 7	1/2 x 1.88
FPUGR202	No	1/4"	4(1.8)	4 x 3 x 6	1/2 x 2.36
FPUGR202-R	Yes	1/4"	5(2.3)	4 x 3 x 7	1/2 x 2.36
FPUGR203	No	3/8"	6(2.7)	4 x 4 x 7	5/8 x 2.63
FPUGR203-R	Yes	3/8"	7(3.2)	4 x 4 x 8	5/8 x 2.63
FPUGR204	No	1/2"	7(3.2)	4 x 4 x 7	5/8 x 2.63
FPUGR204-R	Yes	1/2"	8(3.6)	4 x 4 x 9	5/8 x 2.63
FPUGR205	No	3/4"	10(4.5)	5 x 4 x 7	5/8 x 3.56
FPUGR205-R	Yes	3/4"	11(5)	5 x 4 x 9	5/8 x 3.56
FPUGR206	No	1"	11(5)	5 x 4 x 7	5/8 x 3.56
FPUGR206-R	Yes	1"	12(5.5)	5 x 4 x 9	5/8 x 3.56

Example: Determining the required horsepower for a viscous liquid:

Gear pump motor rpm must be reduced when pumping viscous liquids, and horsepower must be increased over the amount of horsepower required for pumping water (33 SSU), and inlet/outlet piping must be at least one, preferably two, sizes larger than the pump ports. Use the Multipliers for HP Table to multiply the water horsepower (from Performance Table) to arrive at the viscous horsepower.

Model FPUGR204, 40 PSI, 1000 SSU; water HP from Performance Chart is 1.05 HP
Therefore; viscous HP is 1.05 x 1.4 (from Multiplier Table) = 1.5 HP

GENERAL INSTRUCTIONS

Mounting and Drive Arrangement

Pumps should be mounted on a rigid base in line with the electric motor. Direct drive with a flexible shaft coupling is the preferred method.

WARNING: **Extreme** care must be taken to align the pump shaft within .005 inch.

When a V-belt drive is chosen, a separate ball bearing pedestal (pillow block) must be added to the pump in order to absorb the belt tension.

Alignment

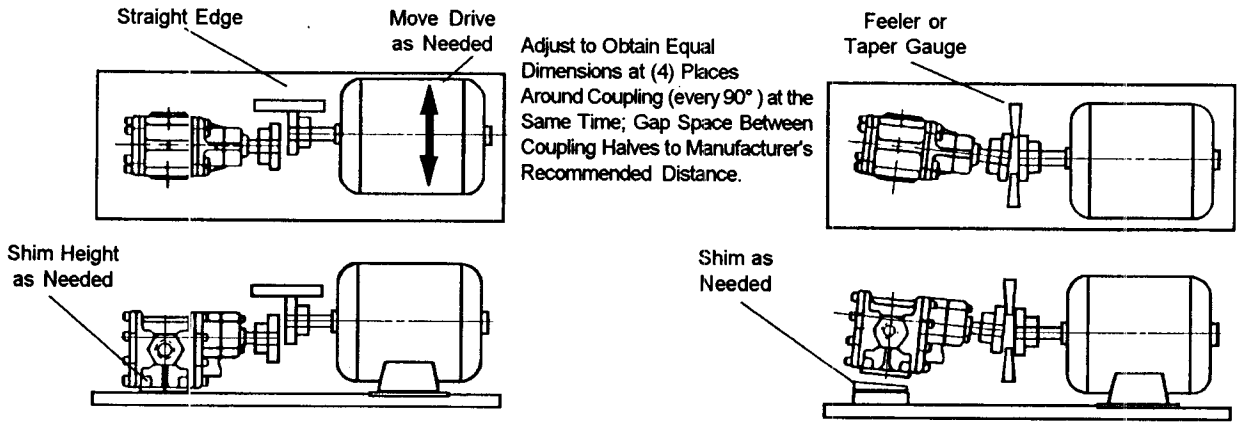
When pumps only are supplied for field mounting, it is important that the proper alignment between pump and drive is maintained.

The baseplate should be secured to a flat surface plate and the driver and pump set so that the shafts are level and parallel. The use of a flexible coupling **will not** compensate for poor alignment.

Parallel alignment can be determined by use of a straight edge across the rim of both coupling halves at four positions 90° apart. Couplings aligned in this manner should be true to within .005" at any position.

Angular alignment can be checked by gauging the coupling gap at several points. (See Fig. 1, Below)

It is **particularly important** that pumps driven through a flexible coupling be mounted in such a manner as to ensure sufficient gap between the coupling components to allow for any end play in the driver.



Checking Alignment with Straight Edge

Checking Alignment with Taper or Feeler Gauge

Fig. # 1

GENERAL INSTRUCTIONS

Liquids and Temperature

These pumps are suitable for all liquids that are compatible with bronze. The most common liquids (in the PH-range of 4 to 10) are:

Water
Oil
Mild Chemicals

Gear pumps are particularly suitable for viscous liquids up to **100,000 SSU** viscosity at reduced shaft speeds as low as **200 rpm**. Refer to performance tables.

Because of their close internal clearances gear pumps are **definitely not recommended** for liquids containing:

Solids
Abrasives
Powders
Paint Pigments

If abrasives are unavoidable and the resulting short pump life is acceptable, pump should be driven at **slow** shaft speed and **bronze bearings** should be chosen.

Best liquid temperature range is from **32°F to 140°F**. More extreme temperatures are possible from **-40°F to 400°F**. However, factory should be consulted for choices of shaft seal, bearing selection and other points of caution.

WARNING: Freezing of water-filled pumps can cause damage and **must** be avoided.

Suction Strainers

Gear pumps are designed and fitted with very close internal clearances. The entry of foreign material or abrasives will cause rapid wear or extensive damage to the pump.

WARNING: It is therefore necessary to install a strainer at the pump suction.

Select a strainer of proper size and material with as fine a mesh as is practical, being careful that the pressure drop through the strainer will not add to the suction lift to exceed the suction capability of the pump.

Install the strainer as near the pump suction as is practical and in such a manner that it can be easily opened and cleaned. Be sure to arrange a regular inspection on the strainer basket to avoid clogging.

GENERAL INSTRUCTIONS

Suction Lift

As a general rule the suction lift should be kept at an absolute minimum by placing the pump as close to the liquid source as possible. A gear pump in new condition can lift **20 feet** of water in the suction line. A foot valve (preferably with built-in strainer) is recommended at the beginning of the suction line.

For a first start-up the pump should be primed to avoid running dry.

Minimum size of the suction pipe is the size of the pump inlet port. For longer suction lines (over 3 feet) or for viscous liquids the pipe size should be at least one size or two sizes larger than the pump inlet port. A reducing pipe coupling must be used at the pump entrance port.

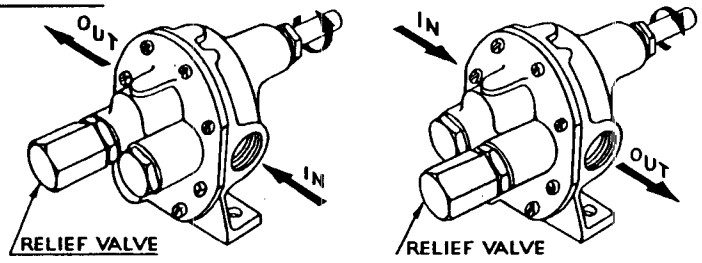
Relief Valve

WARNING: If the discharge line contains any throttling devices such as a shut-off valve, a spray nozzle or other restrictive device it is necessary to have a relief valve in the system which returns the liquid to the suction side or to the tank.

The relief valve is also available as part of the pump itself (R-model pumps). However, built-in relief valves are only good for intermittent service. If used continuously, pump will overheat.

A built-in relief valve is strictly a safety device against overpressure. It will not work successfully as a pressure or flow control device. For this purpose a separate relief valve in the pressure line must be used.

Rotation and Relief Valve



The drawing above shows the relationship between **shaft rotation, direction of flow** and **location of relief valve** (R-models only). If valve happens to be on wrong side for a chosen rotation, it can easily be relocated.

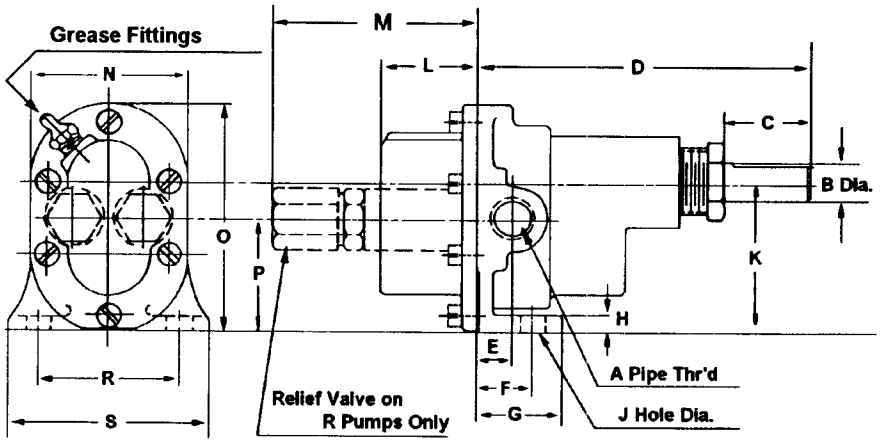
Standard pressure setting for valve is 50 psi. Increase pressure by turning adjusting screw (see parts list) in clockwise direction.

GENERAL INSTRUCTIONS

Product Contamination

Warning: All Chemical Gear pumps are assembled and tested using a suitable grade of machinery oil. Unless specified this oil is left in the pump during shipmentIt ensures some lubrication during start up. If this oil is detrimental to the system, it will be **necessary** to dismantle the pump and clean all parts thoroughly. **Before** starting, be sure to fill the pump with a compatible liquid.

Dimensions



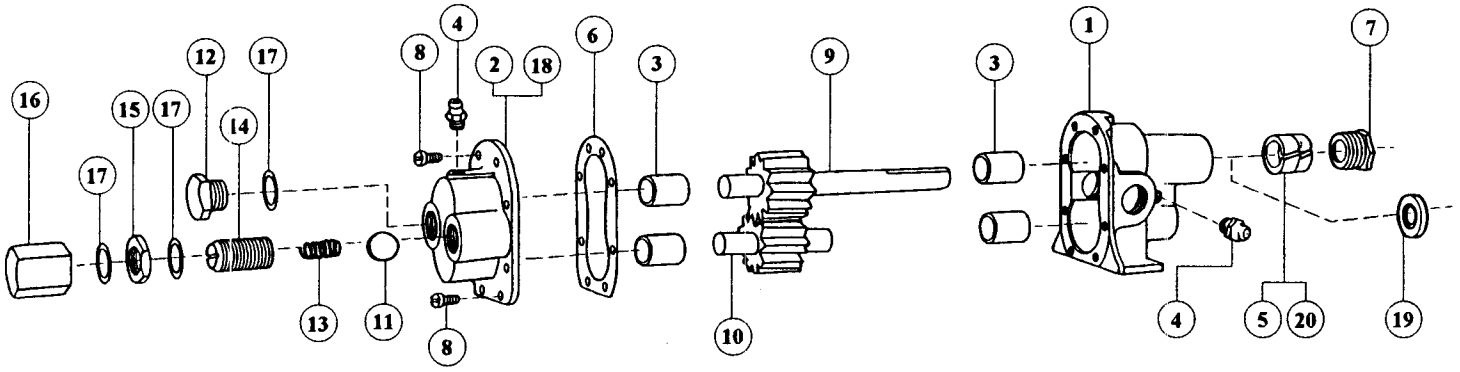
See letter A for pipe size (inlet and outlet same)

Model	A	B	C	C*	C**	D	E	F	G	H	J	K	L	M	N	O	P	R	S
201	1/4	.500	1.00	1.69	1.03	4.44	.44	.69	1.06	.19	.32	1.88	1.19	2.81	1.94	2.88	1.41	1.75	2.50
202	1/4	.500	1.00	1.69	1.03	4.44	.47	.75	1.19	.25	.34	2.36	1.25	2.69	2.38	3.56	1.70	2.25	3.00
203	3/8	.625	1.19	1.88	1.13	5.13	.53	.75	1.25	.25	.41	2.63	1.44	3.13	2.75	4.00	1.88	2.88	3.75
204	1/2	.625	1.13	1.81	1.13	5.44	.69	.88	1.44	.25	.41	2.63	1.44	3.13	2.75	4.00	1.88	2.88	3.75
205	3/4	.625	1.31	2.00	1.25	5.63	.75	.88	1.44	.31	.41	3.56	1.44	3.38	3.75	5.25	2.56	3.25	4.25
206	1	.625	1.31	2.00	1.25	5.88	.88	.88	1.69	.31	.41	3.56	1.44	3.38	3.75	5.25	2.56	3.25	4.25

C-for Packing Optional **C*-for Lip Seal Standard** **C**–for Mechanical Seal Optional**

FPUGR200 Series
Gear Pumps

SECTION 2
PARTS LIST



No.	PARTS LIST Part Name	Req.	201 Opt.*	201 201R	202 Opt.*	202 202R	203 Opt.*	203 203R	204 Opt.*	204 204R	205 Opt.*	205 205R	206 Opt.*	206 206R
1	Body	1	5170	5804	5171	5833	5172	5877	5173	5878	5174	5879	5175	5880
2*	Cover (see *Note)	1	5779	5778	5802	5801	5900	5807	5900	5807	5901	5810	5901	5810
3	Bearings, Carbon/Optional	4	5024		5024		5091		5091		5091(3) 5092(1)		5091(3) 5092(1)	
4	Grease Fitting	2		5390		5390		5390		5390		5390		5390
5	Packing Ring	2		5481		5481		5479		5479		5479		5479
6	Gasket	1		5226		5258		5227		5227		5247		5247
7	Packnut	1		1892		1892		1762		1762		1762		1762
8	Screw	8		5385		5385		5385		5385		5385		5385
9	Drive Gear Assembly	1		32101		32102		32103		32104		32105		32106
10	Idle Gear Assembly	1		32110		32111		32112		32113		32114		32115
11	Ball	1		5809		5238		5206		5206		6217		6217
12	Plug Nut	1		5775		1838		5205		5205		5278		5278
13	Spring	1		5806		1840		5207		5207		5277		5277
14	Adjusting Screw	1		5766		5237		5200		5200		5275		5275
15	Locknut	1		5774		5240		5209		5209		1642		1642
16	Valve Nut	1		5767		5239		5204		5204		5276		5276
17	Fiber Washer	3		6966		6533		6964		6964		6965		6965
18*	R-Cover (see *Note)	1		5765		5808		5811		5811		5812		5812
19	Lip Seal Viton (Opt.)	1	7580		7580		6916		6916		6916		6916	
20	Packing Teflon	1	7129		7129		8309		8309		8309		8309	

***Note:** On R-model pumps item 18 (R-Cover) replaces item 2 (Cover).

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