

- Hydraulic Gear Pump
- Hydraulic Motor
- Hydraulic Accessories
- Hydraulic Power Pack

To Elevate
Technology & Shifting
World's Expectations



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Minimum Rotation Speed

The versatility of the VGP series pumps can be perceived from the wide range of rotation speeds they can be subject to: max. values are indicated in product tables and change according to the model, while min. values are as follows:

Size	1.6	2	3.2	4	5.6	6.4	7.2									05A VGP
Min. Speed (rpm)		6000		4500	4000	3500										
Size	8.4	11.3	13.2	16.5	20.1	24.8	28.6	34.0	36.5	41.1	51.2					10A VGP
Min. Speed (rpm)		4000		3500	3200		3000		2500							
Size	16	21	25	32	34	39	48	55	66							15A VGP
Min. Speed (rpm)		4000				3500										
Size	23.8	32	41.5	47.5	54.5	66	71.5	85.5	100							20A VGP
Min. Speed (rpm)		3500		3300	3000	2500		2000								
Size	68	81	95	113	138	150	173	200	225	260	300					35A VGP
Min. Speed (rpm)		2800			2400			2200								
Size	8.4	11.3	13.2	16.5	20.1	24.8	28.6	34	36.5	41.1	51.2					10A VGM
Min. Speed (rpm)		4000	3800	3600	3500	3400	3300	3200	3100	2800						

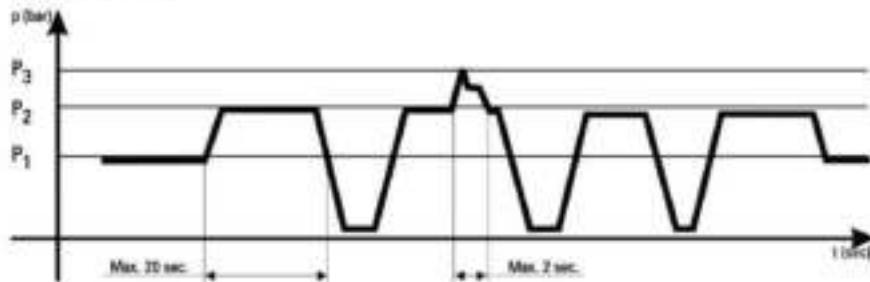
Pressure Definition

Product tables show three max. pressure levels (P1, P2 and P3) to which each pump can be used.

P1 = Peak max. pressure

P2 = Intermittent max. pressure

P3 = Continuous max. pressure



Pressure diagram as a function of time.

P1, P2 and P3 values can be attained only if system does not go over the following rotation speeds:

Size	1.6	2	3.2	4	5.6	6.4	7.2									05A VGP
Min. Speed (rpm)								600								
Size	8.4	11.3	13.2	16.5	20.1	24.8	28.6	34.0	36.5	41.1	51.2					10A VGP
Min. Speed (rpm)								600								
Size	16	21	25	32	34	39	48	55	66							15A VGP
Min. Speed (rpm)							700									
Size	23.8	32	41.5	47.5	54.5	66	71.5	85.5	100							20A VGP
Min. Speed (rpm)						600										
Size	68	81	95	113	138	150	173	200	225	260	300					35A VGP
Min. Speed (rpm)						700										
Size	8.4	11.3	13.2	16.5	20.1	24.8	28.6	34	36.5	41.1	51.2					10A VGM
Min. Speed (rpm)				650			600		500							

Please call our sales and technical dept. for system operating conditions other than indicated in the product tables.

Inlet and Delivery Lines

Hydraulic system pipes should show no sudden changes of direction, sharp bends and sudden differences in cross-section. They should not be too long or out of proportion. Pipe cross-section should be sized so that fluid velocity does not exceed recommended values. It is advisable to carefully consider the possible diameter reduction of the inlet or outlet pipes fitted on flange fittings.

Reference valves are the following:

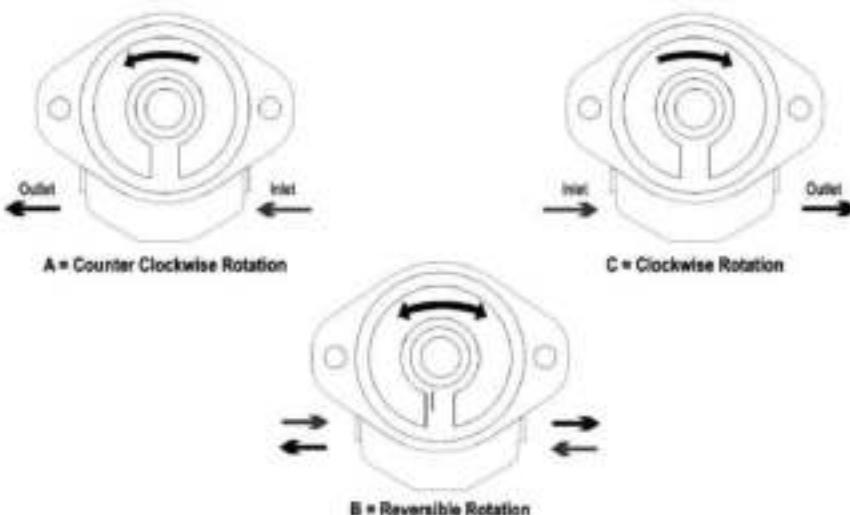
Intake Line	0.5 ~ 1.6 m/s
Delivery Line	2 ~ 6 m/s
Return Line	1.5 ~ 3 m/s

Direction of Rotation

VGP series pumps are available in both single rotation and bi-rotational configurations.

Direction of rotation of single rotation pumps is conventionally defined as follows: when standing before the pump with driving shaft up with its projecting end towards the observer, the pump is rotating clockwise in case of right-hand rotation "C"; therefore, delivery side is on the right, whereas intake side is on the left.

The contrary will happen with left-hand pumps "A", keeping the same point of view.



Bi-rotational VGP series pumps "B", can rotate both clockwise and counter-clockwise.

Drive

Connect the pump to the motor using either a flexible coupling (either box or Oldham coupling) so that no radial and/or axial force is transmitted to the pump shaft during rotation, otherwise pump efficiency will dramatically drop due to early wear of inner moving parts. Therefore, coupling must absorb inevitable-even though reduced-misalignment between pump shaft and motor shaft. Box coupling or Oldham coupling should also move axially freely enough (enough for proper contact surface onto pump driving shaft). Furthermore, to avoid early wear of either splined or Oldham couplings, they should be lubricated at regular intervals using specific grease.

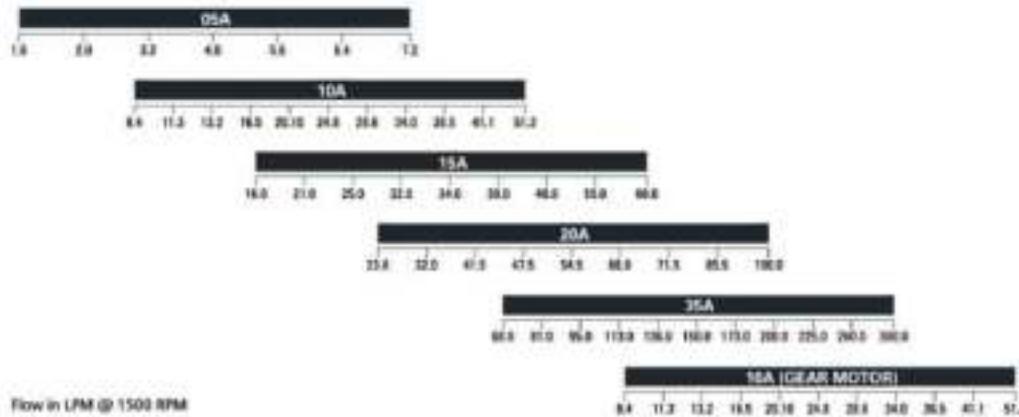
In case of driving through gears, pulleys or chains, the T option is recommended. This option allow radial and/or axial loads on the pump shaft. Please contact our sales or technical department for further details.

Product Range

VBC Hydraulics gear pumps of the series VGP are produced in five different groups. Within each of them, the different displacements (between 0.8 and 200 cm³/rev) are obtained using different width of the gears. Different flanges, shafts, inlet and pressure ports are available.

The following items are also available : Pumps with pressure relief valve.

Available displacements are indicated below :



Technical Information

Please strictly follow assembly and use indications given in this catalogue for top performance and longer life of the VGP series. Some general considerations should be made on the hydraulic system, in which the pump must be fitted.

Special attention shall be devoted to hydraulic system design and assembly, especially to intake, delivery and return pipes and position of system parts (valves, filters, tanks, heat exchangers and accumulators). Proper safety devices and reliable instruments to avoid fluid turbulence, especially in return pipe to the tank, and prevent air, water or foreign bodies from entering into the system are of major importance.

It is also very important to equip the hydraulic system with a proper filtering unit.

Installation Notes

Before starting the system on a continuous basis, we suggest to adopt some simple precautions:

- Check for the direction of rotation of the pump to be consistent with the drive shaft one (in case of single rotation pump).
- Check for the proper alignment of pump shaft and motor shaft: it is necessary that the connection does not induce axial or radial loads.
- Protect drive shaft seal during pump painting. Check if contact area between seal ring and shaft is clean: dust could provoke quicker wear and leakage.
- Remove all dirt, chips and all foreign bodies from flanges connecting inlet and delivery ports.
- Ensure that intake and return pipes ends are always below fluid level and as far from each other as possible.
- Install the pump below head, if possible.
- Fill the pump with fluid, and turn it by hand.
- Disconnect pump drain during startup to bleed air off the circuit.
- At first startup, set pressure limiting valves at min. value possible.
- Avoid lower rotation speed than min. allowed with pressure higher than P1.
- Do not start the system at low temperatures under load conditions or after long stops (always avoid or limit load starting for pump longer life).
- Start the system for a few minutes and turn on all components; bleed air off the circuit to check its proper filling.
- Check fluid level in the tank after loading all components.
- At last, gradually increase pressure, continuously check fluid and moving parts temperature, check rotation speed until you reach set operating values that shall be within the limits indicated in this catalogue.

Cleaning and Filtering The System

It is widely known that most pumps early failures are due to contaminated fluids. The extreme reduction of the tolerances required in the design of the pumps and therefore their operation with minimum clearances, are heavily influenced by a fluid that is not perfectly clean.

It is proved that particles circulating in the fluid act as abrasive agents, damaging the surfaces they touch and increasing the quantity of contaminant. For this reason ensure that system is perfectly clean during startup and keep it clean for its whole operating life. Necessary interventions to check and limit contamination should be performed in a preventive and corrective way.

Preventive actions include: Proper cleaning of the system during assembly, deburring, eliminating the welding scum and fluid filtering before filling up. Starting contamination level of system fluid should not exceed class 18/15 (Ref. ISO 4406). Even fresh fluids might exceed this contamination level; therefore always pre-filter fluid when filling up or topping up the system. Fit a proper tank; its capacity should be proportional to the volume displaced by the pump in one working minute.

Fluid contamination level check and correction during operation can be obtained through filters that retain the particles in the fluid. Two parameters tell which filter is most suitable: absolute filtering power and β_{p} filtering ratio. Low absolute filtering power and high β_{p} filtering ratio for small particles help ensuring good filtration. It is then very important to limit not only max. dimensions, but also the number of smaller particles that pass through the filter.

It goes without saying that with an operating pressure increase and according to the system sophistication degree, filtering should become more and more efficient.

The filtering system shall always ensure contamination levels not exceeding the values indicated below:

Pressure	<140 Bar	140-210 Bar	>210 Bar
NAS 1638 Class	10	9	8
ISO 4406 Class	18/18	18/15	17/14
Ratio $\beta_{\text{p}} = 75$	25-40 μm	12-15 μm	8-12 μm

It is recommended to use a filtering system having absolute filtering power 5 μm or lower in the systems using sophisticated valve slaves.

Hydraulic Fluids

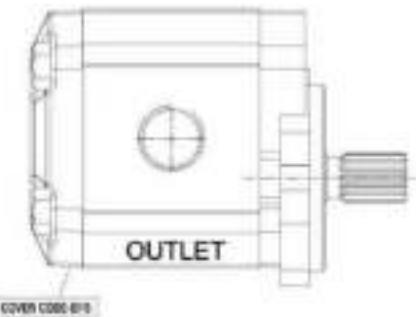
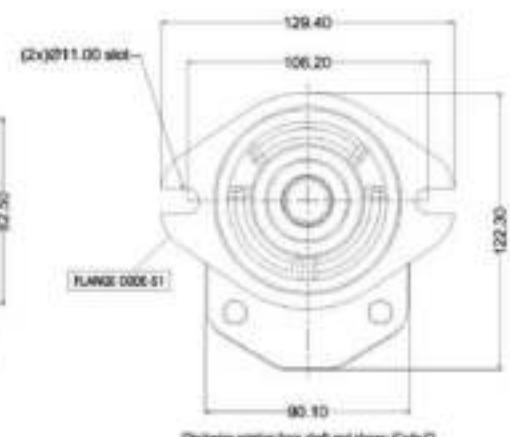
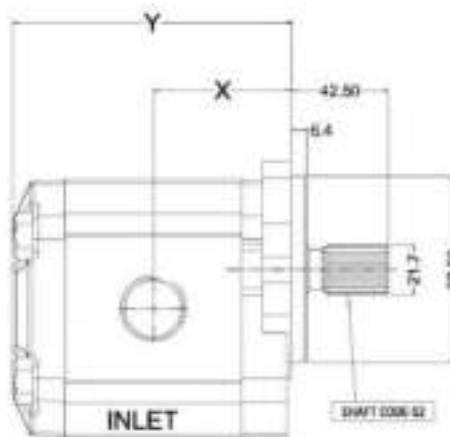
Use specific mineral oil based hydraulic fluids having good anti-wear, anti-foaming (rapid de-aeration), antioxidant, anti-corrosion and lubricating properties. Fluids should also comply with DIN 51525 and VDMA 24317 standards and get through 11th stage of FZG test. For the standard models, the temperature of the fluid should not be between -10°C and +80°C. Fluid kinematic viscosity ranges are the following:

Allowed Value (Upper Verification)	6 + 500 cSt
Recommended Value	10 + 100 cSt
Value Allowed at Startup	<2000 cSt

If fluids other than the above mentioned ones are used, please always indicate type of used fluid and operating conditions so that our Sales and Technical Dept. can weigh possible problems on compatibility or useful life of system parts.

Inlet Pressure

Under standard working conditions, intake pipe pressure is lower than atmospheric pressure. The operating inlet pressure should range between 0.7 and 3 bars (absolute).



Pump Type	Dimension-Z	Dimension-T
VGP-16	53.5	108.0
VGP-21	55.5	112.0
VGP-25	57.0	115.0
VGP-32	60.0	121.0
VGP-34	61.0	123.0
VGP-39	63.0	127.0
VGP-48	67.5	136.0
VGP-55	70.0	141.0
VGP-66	74.5	150.0

All dimensions are in mm.
Tolerances for X & Y - ± 1 mm.



* For drive shaft - see page no. 32, 33, 34 * For mounting flange - see page no. 28, 29

* For suction & delivery port - see page no. 36, 37 * For end cover - see page no. 39 & 40 * For ordering code - see page no. 43

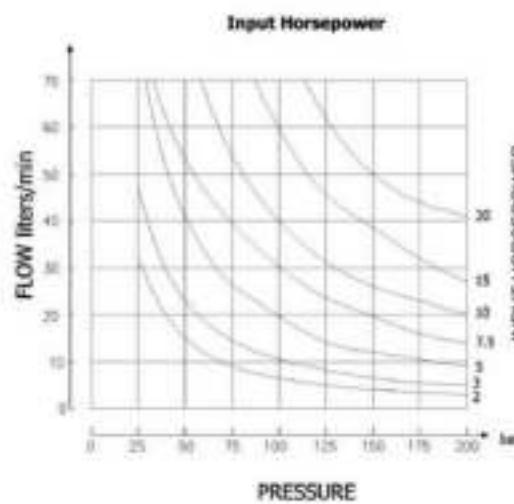
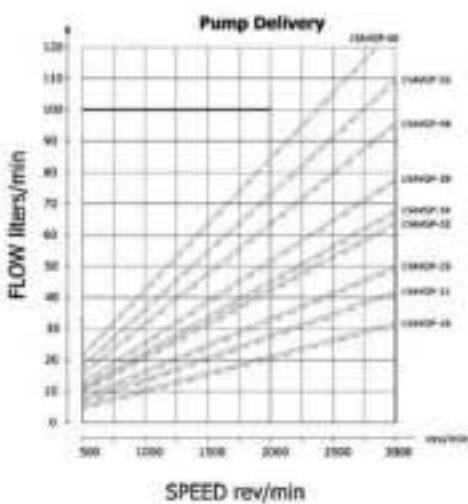
SPECIFICATION DATA

Pump Type	Theoretical Displacement	Nominal Delivery At 1500 RPM	Max. Speed at Max. Pressure	Min. Speed at Max. Continuous Pressure	Inlet	Outlet	P1, Continuous Pressure	P2, Intermittent Pressure	P3, Peak Pressure
	CC REV	L/MIN	Rev/MIN	Rev/MIN	BSP	BSP	BAR	BAR	BAR
VGP-16	11.80	16.00	4000	700	3/4"	3/4"	250	270	290
VGP-21	14.80	21.00	4000	700	1"	3/4"	250	270	280
VGP-25	17.70	25.00	4000	700	1"	3/4"	250	270	280
VGP-32	21.50	32.00	4000	700	1"	3/4"	250	270	280
VGP-34	23.00	34.00	4000	700	1"	3/4"	250	270	280
VGP-39	26.80	39.00	3500	700	1"	3/4"	210	230	250
VGP-48	32.00	48.00	3500	700	1 1/4"	3/4"	210	230	250
VGP-55	37.70	55.00	3500	700	1 1/4"	3/4"	180	180	210
VGP-66	44.00	66.00	3500	700	1 1/4"	3/4"	160	160	190

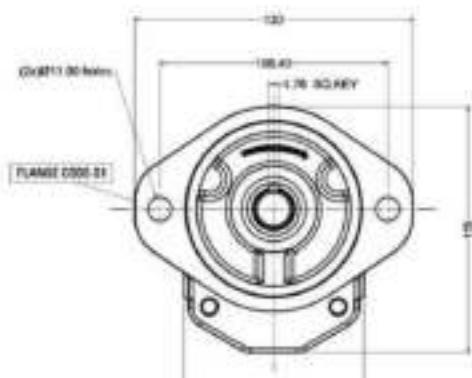
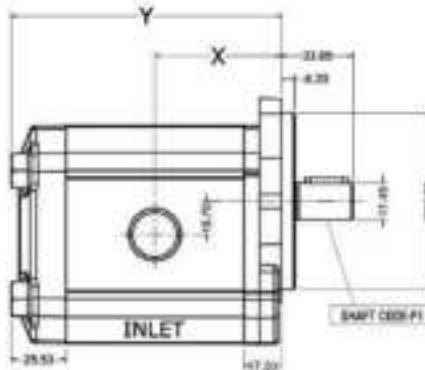
* Pressure with ENCL0 88 cc at 50 °C

* Pump with relief valve also available (Code-R15)

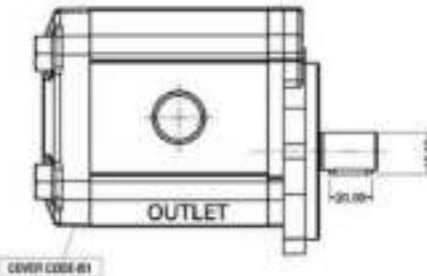
PERFORMANCE CHART



GROUP 10A (4000 SERIES)



Clockwise rotation from shaft end shown (Code Q)



Pump Type	Dimension-X	Dimension-Y
VGP-7	41.0	90.0
VGP-10	42.5	93.0
VGP-12	44.0	96.0
VGP-16	45.5	99.0
VGP-20	48.0	104.0
VGP-23	50.0	108.0
VGP-27	52.0	112.0
VGP-32	55.0	120.0
VGP-36	51.5	131.0
VGP-40	64.0	130.0
VGP-50	69.5	147.0

All dimensions are in mm.

Tolerances for X & Y - ± 1 mm.

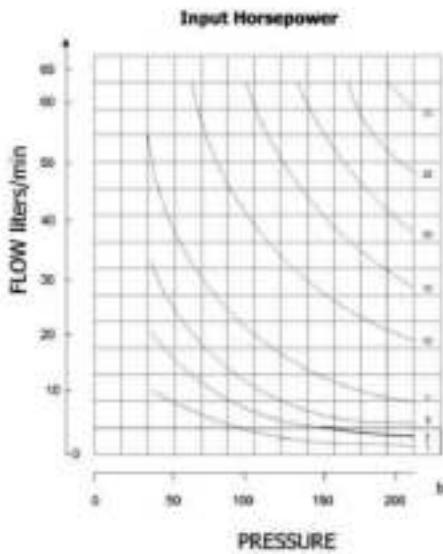
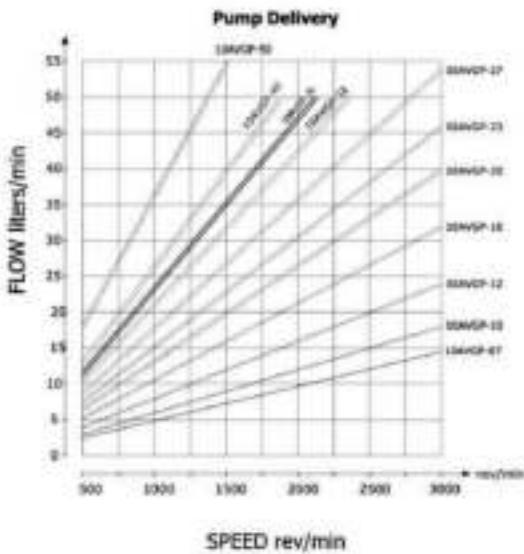
SPECIFICATION DATA

Pump Type	Theoretical Displacement	Nominal Delivery At 1500 RPM	Max. Speed at Max. Pressure	Min. Speed at Max. Continuous Pressure	Inlet	Outlet	P1, Continuous Pressure	P2, Intermittent Pressure	P3, Peak Pressure
	CC/REV	L/MIN	Rev/MIN	Rev/MIN	Inlet	Outlet	P1, Continuous Pressure	P2, Intermittent Pressure	P3, Peak Pressure
VGP-7	5.60	8.40	4000	600	1/2"	1/2"	250	280	300
VGP-10	7.54	11.36	4000	600	1/2"	1/2"	250	280	300
VGP-12	8.80	13.20	4000	600	1/2"	1/2"	250	280	300
VGP-16	11.00	16.50	3500	600	3/4"	1/2"	250	280	300
VGP-20	15.40	20.10	3500	600	3/4"	3/4"	250	280	300
VGP-23	18.50	24.80	3200	600	3/4"	3/4"	250	280	300
VGP-27	19.00	28.60	3000	600	3/4"	3/4"	210	230	250
VGP-32	22.66	34.00	3000	600	1"	3/4"	210	230	250
VGP-36	24.33	36.50	3000	600	1"	3/4"	180	190	210
VGP-40	27.40	41.10	3000	600	1"	3/4"	180	190	210
VGP-50	34.13	51.20	2500	600	1"	3/4"	180	190	210

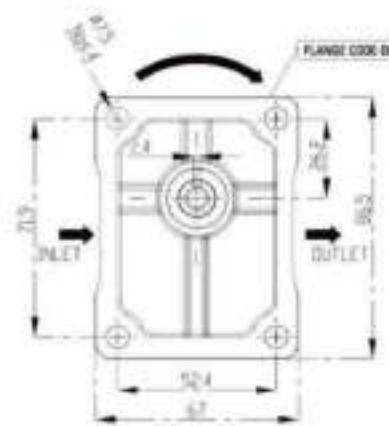
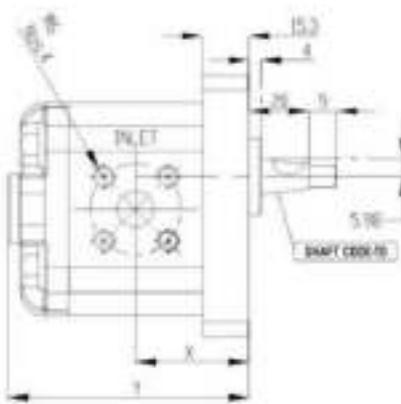
* Pressure with ENCL0 68 oil (0 °C)

* Pump with relief valve also available (Code-R1)

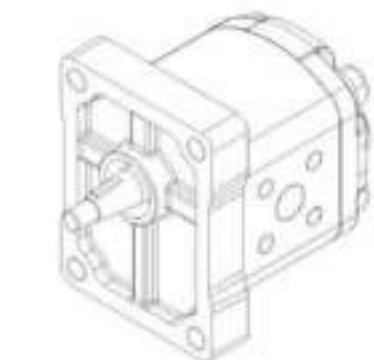
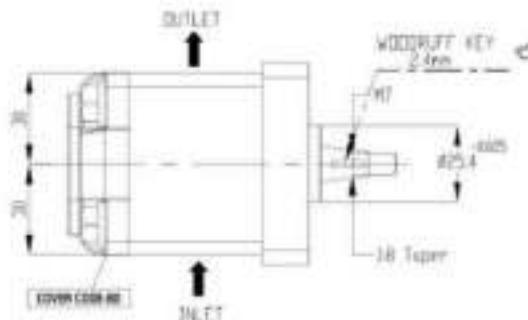
PERFORMANCE CHART



INPUT HORSEPOWER



Classification criterion from smooth and discrete [Carrasco et al., 2004]



Pump Type	Dimensions-X	Dimensions-Y
VGP-1	77	37
VGP-2	78	38
VGP-3	82	39
VGP-4	84	40
VGP-5	89	43
VGP-6	90	44
VGP-7	92	45

III. Dimensional analysis

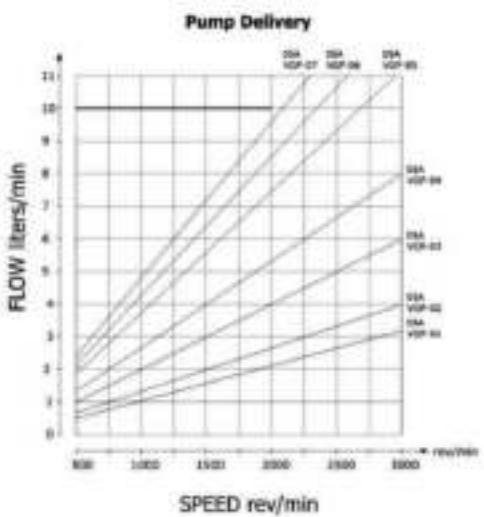
Answers for X & Y = 1 mm

SPECIFICATION DATA

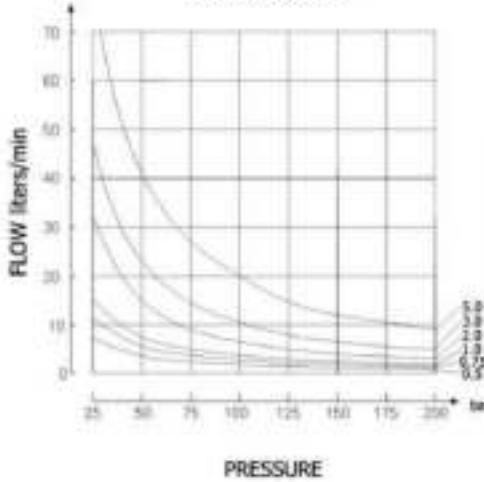
Pump Type	Theoretical Displacement	Nominal Delivery At 1450 REV/MIN.	Min. Speed at Max. Pressure REV/MIN.	Max. Speed at Max. Continuous Pressure REV/MIN.	Body Parts Code-F		Maximum Continuous Pressure		
	CIM/REV	L/MIN	REV/MIN	REV/MIN	Inlet Code	Outlet Code	P1 BAR	P2 BAR	P3 BAR
VGP-1	1.1	1.6	600	6000	F	F	230	250	270
VGP-2	1.3	2.0	600	6000	F	F	230	250	270
VGP-3	2.1	3.0	600	6000	F	F	230	250	270
VGP-4	2.7	4.0	600	6000	F	F	230	250	270
VGP-5	3.7	5.6	600	4500	F	F	210	230	250
VGP-6	4.2	6.4	600	4000	F	F	210	230	250
VGP-7	4.8	7.2	600	3500	F	F	190	210	230

第二章 算法设计与分析

PERFORMANCE CHART

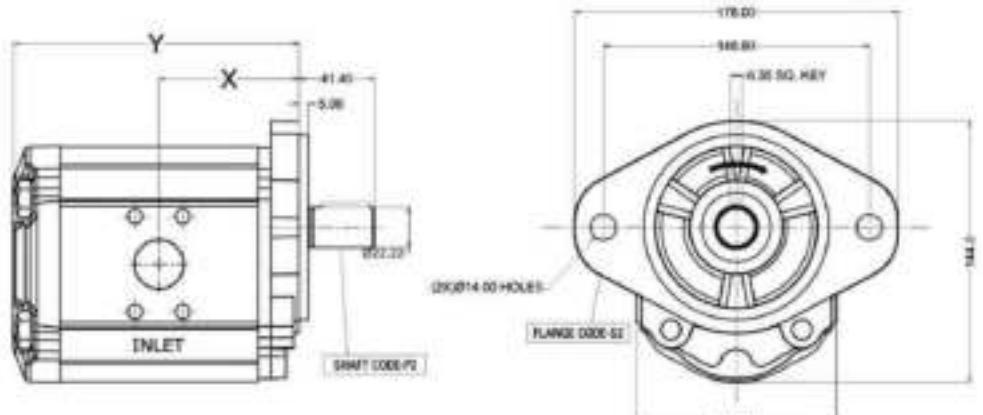


Input Horsepower

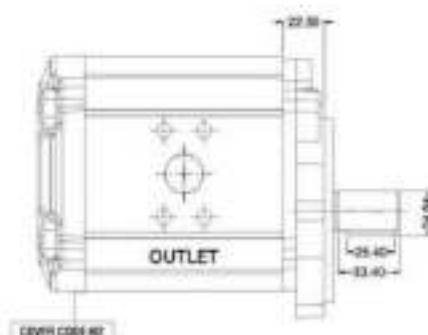


INPUT MODE/POWER

GROUP 20A (4000 SERIES)



Clockwise rotation from shaft end shown (Code-E)



Pump Type	Dimension-X	Dimension-Y
VGP-22	67.0	137
VGP-32	70.5	144
VGP-41	74.0	151
VGP-47	77.0	157
VGP-54	80.0	163
VGP-66	84.0	171
VGP-71	86.0	175
VGP-85	91.5	186
VGP-100	96.0	199

All dimensions are in mm.

Tolerances for X & Y - ± 1 mm.

* For drive shaft - see page no. 32, 33, 34 * For mounting flange - see page no. 29, 30

* For suction & delivery port - see page no. 36, 37 * For end cover - see page no. 39 & 40 * For ordering code - see page no. 43

* Accessories supplied with standard pump - Threaded connection, suitable for SAE standard flange (See page no. 45)

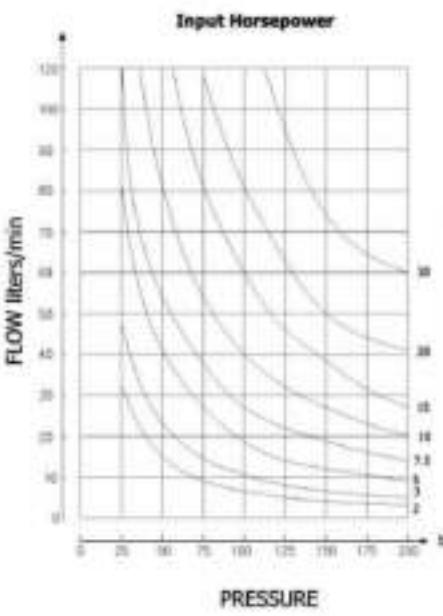
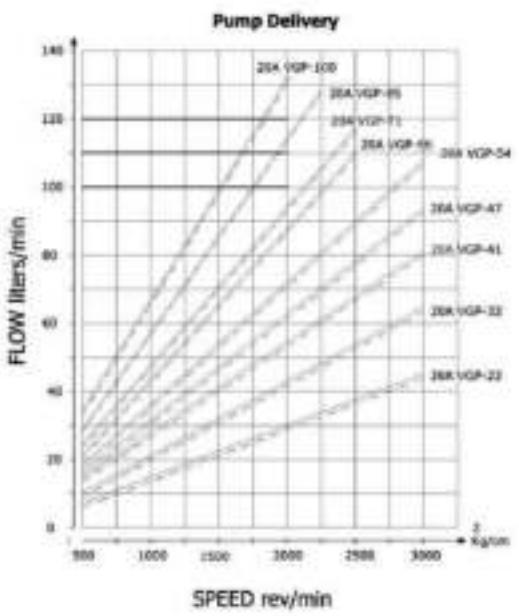
SPECIFICATION DATA

Pump Type	Theoretical Displacement	Nominal Delivery At 1500 RPM	Max. Speed at Max. Pressure	Min. Speed at Max. Continuous Pressure	Inlet	Outlet	P1, Continuous Pressure	P2, Intermittent Pressure	P3, Peak Pressure
	CC/REV	L/MIN	Rev/MIN	Rev/MIN	SAE Flange	SAE Flange	BAR	BAR	BAR
VGP-22	16.70	23.00	3500	600	S	R	250	270	290
VGP-32	22.50	32.00	3500	600	S	R	230	250	270
VGP-41	29.00	41.50	3300	600	S	R	230	250	270
VGP-47	33.00	47.50	3300	600	S	R	230	250	270
VGP-54	36.00	54.50	3000	600	S	R	210	230	250
VGP-66	46.00	66.00	2500	600	S	R	210	230	250
VGP-71	49.50	71.50	2500	600	S	R	180	190	210
VGP-85	59.00	85.50	2000	600	V	S	180	190	210
VGP-100	67.00	100.00	2000	600	V	S	180	190	210

* Pressure with ENCLIO 80 oil @ 50°C

* Pump with relief valve also available (Code-R2)

PERFORMANCE CHART



INPUT HORSEPOWER

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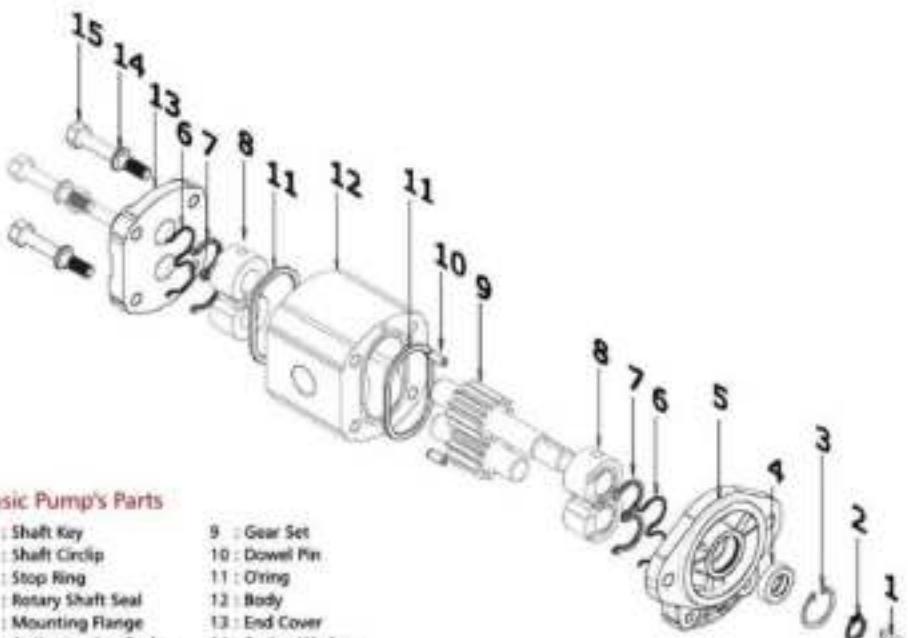
Basic Design

External gear pumps are the most popular pumps used in modern hydraulic systems. They feature versatility, strength and long useful life. Their simple construction ensures limited purchase costs and servicing. Thanks to these basic concepts, together with ever-improving product design and features, research-based on many years of experience, accuracy in material selection, production process followed in great detail and tests on mass-produced parts, our gear pumps have reached top quality standards.

For this reason, our products can work under heavy operating conditions and transmit high hydraulic power. Furthermore, VBC pumps feature good hydraulic, mechanical and volumetric efficiency, low noise level and, last but not least, compact dimensions and low weight/power ratio.

VBC Hydraulics has renovated its own range of products with a new series of pumps named VGP where groups named 05A, 10A, 15A, 20A & 35A are suitable for the most different application in both industrial and mobile sectors. Generally these gear pumps usually consist of a gear pair supported by two aluminium bushings, a body, a securing flange and a cover. Shaft of the driving gear projecting beyond the flange mounts a twin-lip seal ring (the inner lip being a seal and the outer being a dust seal). An elastic securing ring secures the ring in place. Pump body, flange and cover are made of special hi-resistant aluminium alloys for minimized deformation even when subject to high pressure, be it continuous or intermittent or peak pressure. The body is profiled by means of extrusion, whereas flange and cover are obtained by means of die-casting or gravity casting. Gears are made of special steel. Their manufacturing process includes case-hardening and quench hardening. Then gears are ground and fine finished so to have a high degree of surface finishing. Proper tooth profile design and geometric proportions ensure low pulsation levels and low noise levels during pump operation.

Bushings are made of special low-friction and hi-resistant aluminum alloy and manufactured from die-casting. They are equipped with anti-friction DU bearings. Special compensation zones onto bushing, insulated by special preformed seals with anti-extrusion ring, allow fully free axial and radial movement to bushings, which is proportional to pump operating pressure. In this way, internal dripping is dramatically reduced, thus ensuring very good pump performance (both in terms of volume and in general) and proper lubrication of pump moving parts.



Basic Pump's Parts

1 : Shaft Key	9 : Gear Set
2 : Shaft Circlip	10 : Dowel Pin
3 : Stop Ring	11 : O-ring
4 : Rotary Shaft Seal	12 : Body
5 : Mounting Flange	13 : End Cover
6 : Anti-extrusion Seals	14 : Spring Washer
7 : Compensation Seals	15 : Bolt
8 : Bushings	

Frequently Used Formulas

Fluid Velocity

Calculate the velocity (v) of a fluid in a pipe as follows:

$$v = Q/S \cdot A \text{ [m/s]}$$

Q = Flow rate [liter/min]

A = Inside area of pipe (cm^2)

Delivered Flow Rate

Calculate flow rate (Q) as follows :

$$Q = V \cdot n \cdot \eta_{\text{m}} \cdot 10^{-3} \text{ [litres/min]}$$

V = Displacement [$\text{cm}^3/\text{rotation}$]

n = Rotation speed [rotations per minute]

η_{m} = pump volumetric efficiency

(take 0.95 as an indicative value for rotation speeds ranging between 1000 and 2000 rotations per minute)

Absorbed Torque

Calculate necessary torque (M) of a pump subject to pressure differential between inlet and delivery as follow:

$$M = (V \cdot \Delta p) / (62,8 \cdot \eta_{\text{m}}) \text{ [Nm]}$$

V = Displacement [$\text{cm}^3/\text{rotation}$]

Δp = Pressure differential [bar]

η_{m} = Hydro mechanical efficiency (take 0.80 as indicative value under cold conditions and 0.85 under working conditions).

Absorbed Power

Calculate hydraulic power (P) transferred to fluid from a pump subject to a pressure differential between inlet and delivery as follows :

$$P = (Q \cdot \Delta p) / (600 \cdot \eta_{\text{m}}) \text{ [kW]}$$

Q = Flow rate [liter/min.]

Δp = Pressure differential [bar]

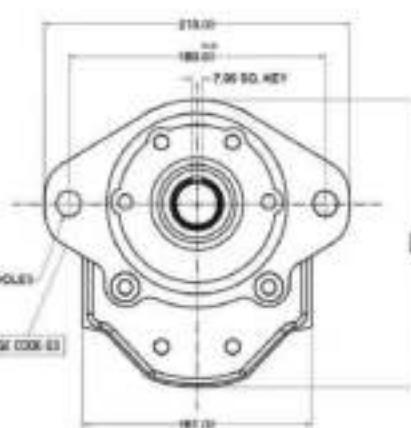
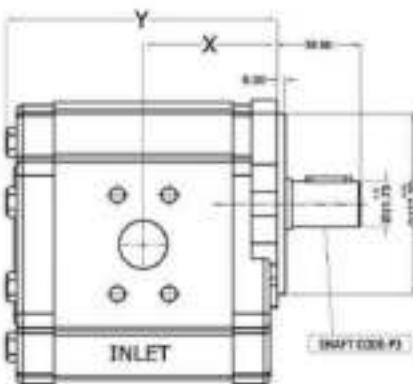
η_{m} = total pump efficiency ($\eta_{\text{m}} \cdot \eta_{\text{h}}$)

Values for η_{m} and η_{h} (and consequently η_{m}) depend on pressure differential between inlet and delivery, rotation speed, fluid features (temperature and viscosity) and filtering degree. Call our sales and technical dept. for further details on efficiency. The proper values for flow rate, torque and power absorbed according to pressure differential, rotation speed and set test conditions, can be found on the pages dedicated to the performance curves.

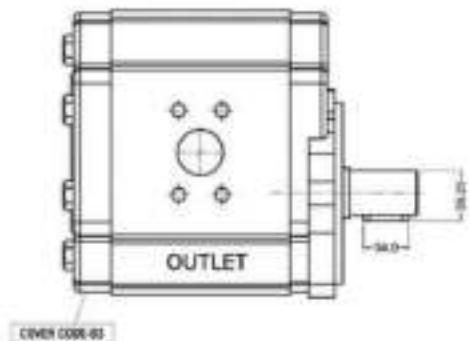
Monodirectional VGP Single Pumps

This chapter describes VGP series in their single version, their operating features and how to select the right pump for the required application. The pumps are hydraulic machines converting mechanical power into hydraulic power. This section deals with rotary positive displacement pumps. In this type of pump, a given volume of fluid flows from inlet to outlet at each shaft rotation (theoretical displacement). Pressure depends on delivery line resistance to fluid flow. As gear pumps only transfer fluid, they are subject to pressure generated by the circuit. Therefore, if system flow rate and motor rotation speed are known, it is easy to select the right pump displacement and its model. The diagram indicating flow rate variations according to speed and pressure, shows that not all the theoretically available fluid is transferred from inlet to outlet because of pump internal dripping. Dripping can be remarkably reduced through pressure axial compensating systems (as described at the beginning of this catalog) but never eliminated. Dripping increases as circuit pressure increases. A pump requires energy just like any other hydraulic machine. Part of this power is given to the fluid to increase pressure required by the circuit, the remaining part is used to win pump internal friction. Therefore, for proper pump operation, supplied torque shall be higher than theoretical torque. The following diagrams show, for each single displacement, the typical required power as a function of rotation speed and pressure generated by the system and allow you to easily spot the product suitable for your application. Once the pump flow rate has been selected, different flanges, shafts, inlet and outlet port position and type are available to meet our customer's needs. In the product tables, the flow shown at 1500 rpm, has been evaluated using a value of volumetric efficiency of 95%. All the drawings are shown gear pumps with clockwise rotation. The inlet and outlet ports in a counterclockwise rotating pump are in the opposite position compared to a clockwise pump.

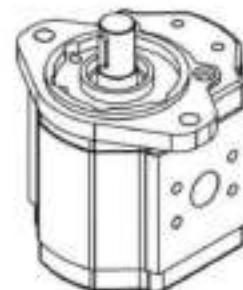
GROUP 35A (4000 SERIES)



Discharge rotator from shaft and shown (Code-D)



Cover code E3



Pump Type	Dimension-X	Dimension-Y
VGP-58	81.0	165.5
VGP-81	83.0	172.5
VGP-95	85.0	176.5
VGP-113	87.0	180.5
VGP-136	90.0	186.5
VGP-156	92.0	190.5
VGP-173	95.0	190.5
VGP-206	98.0	204.5
VGP-225	102.0	210.5
VGP-290	108.0	222.5
VGP-300	113.0	232.5

All dimensions are in mm.
Tolerances for X & Y - ± 1 mm.

- For drive shaft - see page no. 32, 33, 34
- For mounting flange - see page no. 26, 28
- For suction & delivery port - see page no. 36, 37
- For end cover - see page no. 39 & 40
- For ordering code - see page no. 43
- Accessories supplied with standard pump - Threaded connections, suitable for SAE standard flanges (see page no. 45)

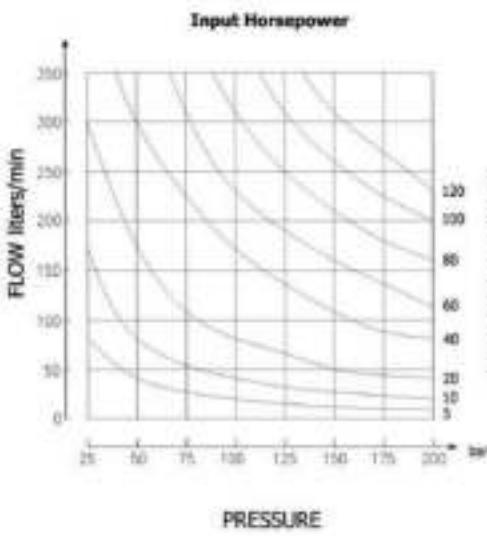
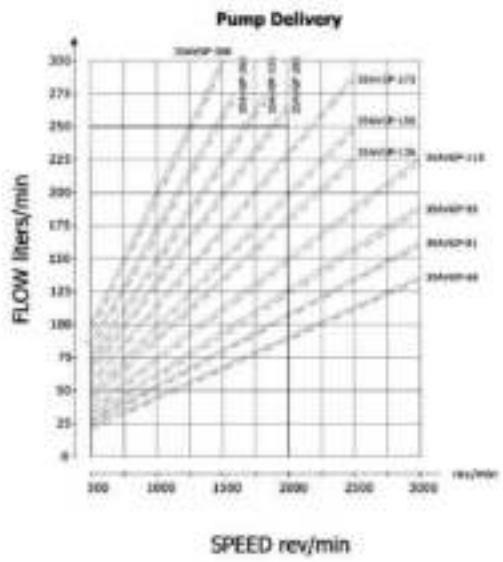
SPECIFICATION DATA

Pump Type	Theoretical Displacement	Nominal Delivery At 1500 RPM	Max. Speed at Max. Pressure	Min. Speed at Max. Continuous Pressure	Inlet	Outlet	P1, Continuous Pressure	P2, Intermediate Pressure	P3, Peak Pressure
	CC/REV	L/MIN			Rev/Min	Rev/Min	SAE Flange	SAE Flange	BAR
VGP-58	45.00	68.00	2800	700	U	T	240	270	280
VGP-81	54.70	81.00	2800	700	U	T	240	270	280
VGP-95	64.00	95.00	2800	700	U	T	240	270	280
VGP-113	76.00	113.00	2800	700	U	T	240	270	280
VGP-136	91.40	136.00	2400	700	U	T	200	230	250
VGP-156	100.70	150.00	2400	700	V	T	200	230	250
VGP-173	116.10	173.00	2400	700	V	T	180	190	210
VGP-206	134.10	200.00	2400	700	W	V	180	190	210
VGP-225	150.70	225.00	2200	700	W	V	160	180	190
VGP-290	174.10	260.00	2200	700	W	V	140	150	160
VGP-300	201.00	300.00	2200	700	W	V	130	140	150

* Pressure with ENGLD 68 oil @ 50°C

* Pump with relief valve also available (Code-R3)

PERFORMANCE CHART



INPUT HORSEPOWER

bar

psi

kg/cm²

atm

MPa

lb/in²

ft-lb/in

kg/m³

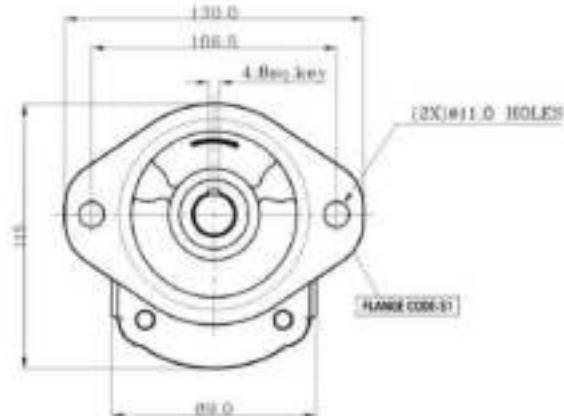
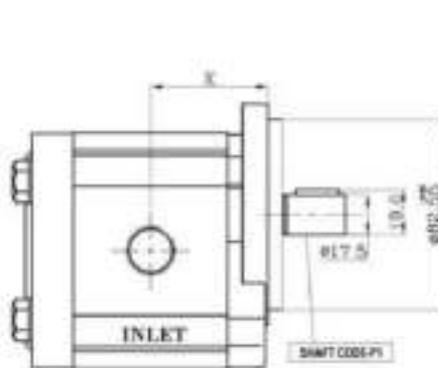
lb/ft³

g/cm³

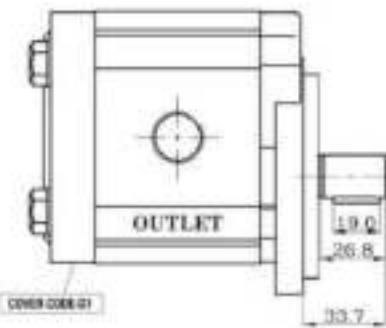
kg/l

lb/gal

GROUP 10A (GEAR MOTOR)



Counter-clockwise rotation from shaft end viewing (Code C)



Pump Type	Dimension-X	Dimension-Y
VGM-7	45.0	99.0
VGM-9	46.5	102.0
VGM-12	48.0	105.0
VGM-16	49.5	108.0
VGM-20	52.0	113.0
VGM-23	54.0	117.0
VGM-27	56.0	121.0
VGM-32	59.0	127.0
VGM-36	61.5	132.0
VGM-40	64.0	137.0
VGM-50	69.5	148.0

All dimensions are in mm.
Tolerances for X & Y - ± 1 mm.

- For drive shaft - see page no. 32, 33, 34
- For mounting flange - see page no. 25, 26
- For suction & delivery port - see page nos. 35, 37
- For end cover - see page no. 39 & 40
- For ordering code - see page no. 43

SPECIFICATION DATA

Pump Type	Theoretical Displacement	Nominal Delivery At 1450 REV/MIN	Max. Speed at Max. Pressure	Max. Speed at Max. Continuous Pressure	Body Parts Code-F		Torque	Maximum Pressure
	CM/REV	L/MIN	Rev/MIN	Rev/MIN	Inlet Code	Outlet Code		
VGM-7	5.60	840	650	4000	B	B	5.8	250
VGM-10	7.54	1130	650	3800	B	B	8.12	250
VGM-12	8.80	1320	650	3600	B	B	11.36	240
VGM-16	11.00	1550	650	3600	C	C	14.61	240
VGM-20	13.40	2010	650	3600	C	C	19.4	240
VGM-23	16.50	2480	650	3500	C	C	21.7	230
VGM-27	19.00	2860	650	3400	C	C	25.87	230
VGM-32	22.66	3400	650	3300	D	D	30.64	210
VGM-36	24.33	3650	650	3200	D	D	33.8	200
VGM-40	27.40	4110	650	3100	D	D	35.44	190
VGM-50	34.13	5120	550	2800	D	D	46.27	160

* Pressure with ENCL0 88 ml @ 50°C

Maximum torque ratings are referred to ideal working condition,
such values may reduce based on the quality of joint and connections used.

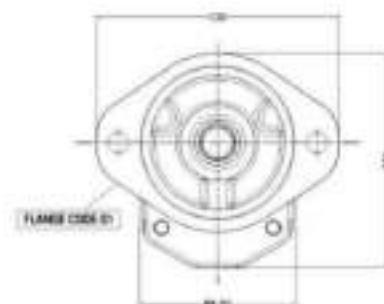
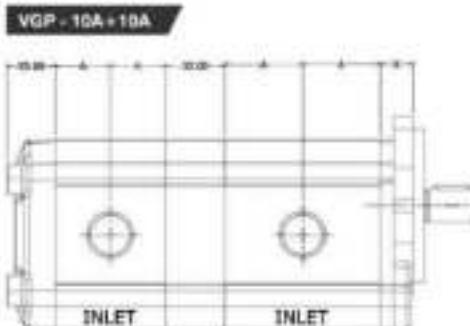
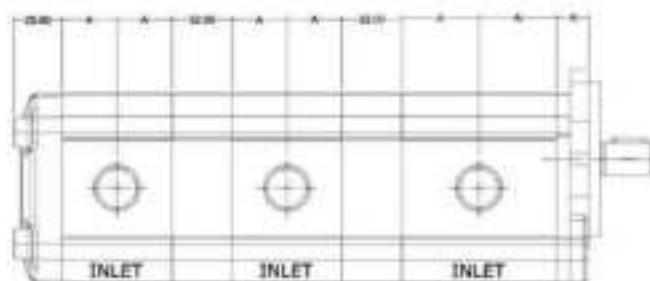
SPECIFICATIONS

Construction	External gear type motor
Mounting	See page no. 31
Port Connections	See page no. 38
Direction of rotation	Uni-directional & Bi-directional
Mounting position	Any
Ambient Temperature Range	-15°C ... + 60°C (+5°F... 140°F)
Fluid	Mineral oil based hydraulic fluids to DIN150, other fluids to order
Viscosity	12...600 mm²/s permitted range, 20...100 mm²/s recommended range, ...2000 mm²/s permitted for starting
Fluid temperature range	-15°C ... + 80°C (+5°F... 176°F)
Filtration	NAS 1638, class 10/ISO/DIS 4406, Class 19/16; obtained with filter fitness (j25 > 75)

Oirt particles retention > 25 µm 1.25, i.e. 99.67%

Safety requirements pertaining to the whole system must be observed.
In the case of the applications with high numbers of load cycles, please consult us.

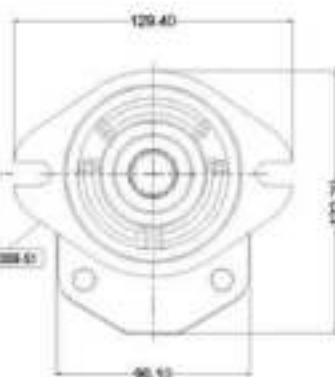
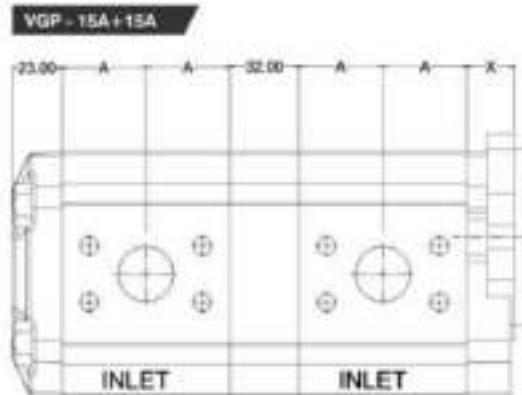
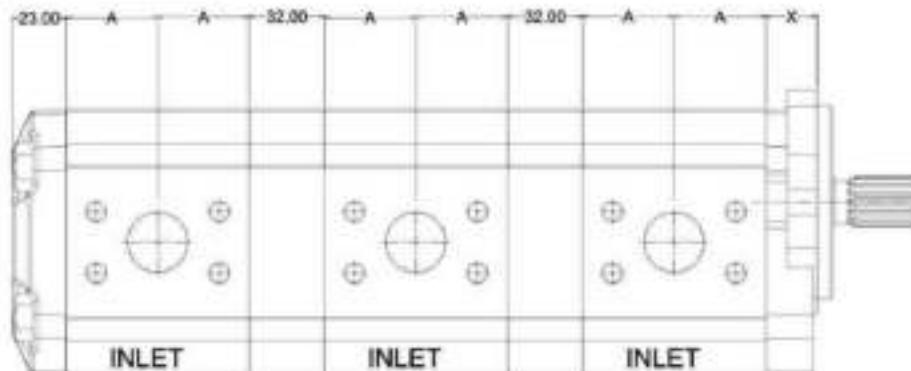
Bi-directional motor are comes with drain line (See cover D1 on page no. 40)

GROUP 10A - MULTIPLE STAGES

VGP - 10A + 10A + 10A


Pump Type	A
VGP-7	23.5
VGP-10	25
VGP-12	26.5
VGP-16	29
VGP-20	30.5
VGP-25	32.5
VGP-27	34.5
VGP-32	41.5
VGP-36	44
VGP-40	55.5
VGP-55	54

Mounting Flange	X in mm
S1	17.5
D1	19
K1	17
R1	19

All dimension are in mm.
Tolerances for total length = ± 1 mm.


GROUP 15A - MULTIPLE STAGES

VGP - 15A + 15A + 15A


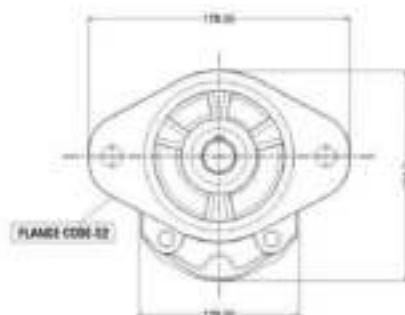
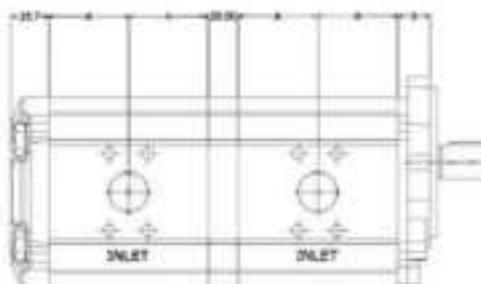
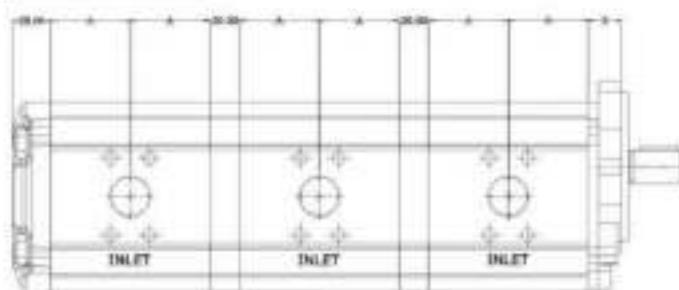
Pump Type	A
VGP-16	32
VGP-21	34
VGP-25	36
VGP-32	38
VGP-34	39
VGP-39	41
VGP-48	46
VGP-55	48
VGP-66	53

Mounting Flange	X in mm
S1	17.5
R1	19
S2	22.3
D2	20.6

All dimension are in mm.
Tolerances for total length = ± 1 mm.



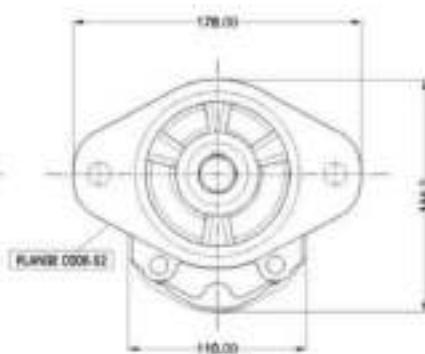
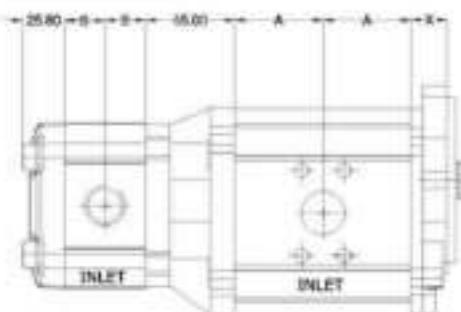
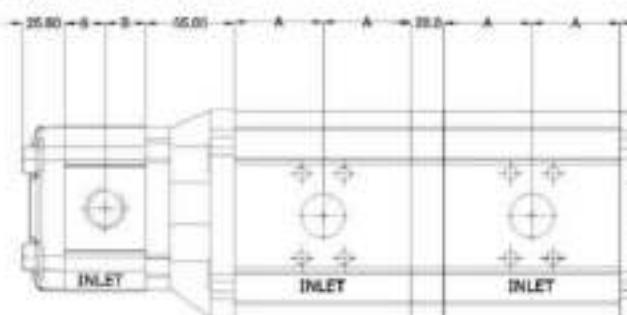
GROUP 20A - MULTIPLE STAGES

VGP - 20A + 20A

VGP - 20A + 20A + 20A


Pump Type	A in MM
VGP-22	44.5
VGP-32	48
VGP-41	51.5
VGP-47	54.5
VGP-54	57.5
VGP-66	61.5
VGP-71	63.5
VGP-85	69
VGP-100	75.5

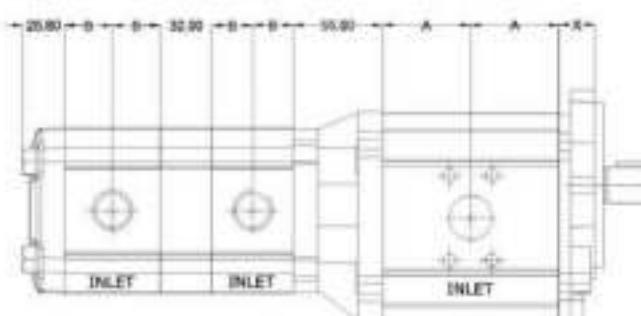
Mounting Flange	X in mm
S1	22.3
S2	20.2

All dimensions are in mm.
Tolerances for total length = ± 1 mm.

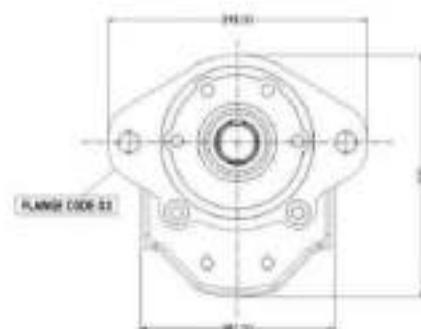
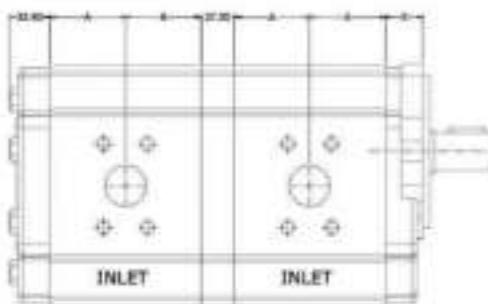
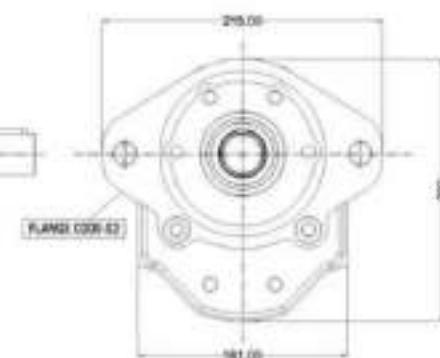
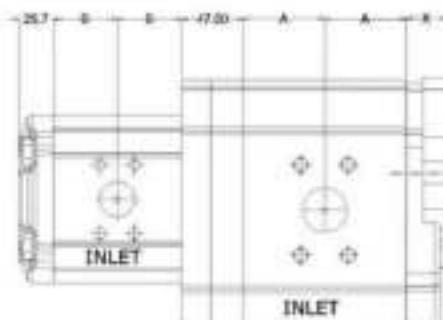
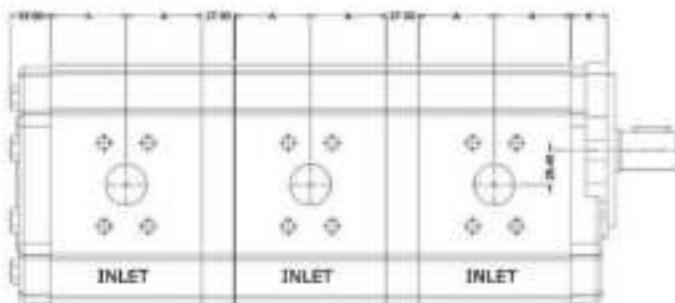
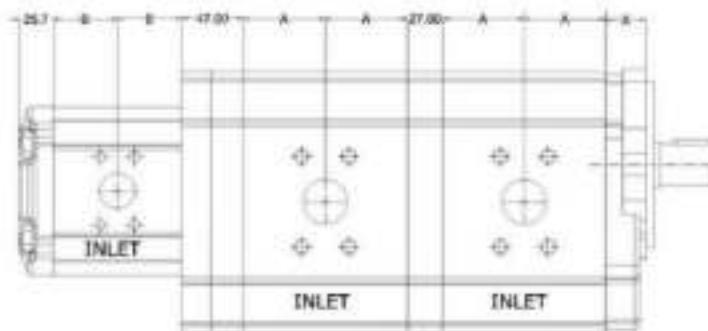

VGP - 20A + 10A

VGP - 20A + 20A + 10A


Pump Type	A in MM
VGP-22	44.5
VGP-32	48
VGP-41	51.5
VGP-47	54.5
VGP-54	57.5
VGP-66	61.5
VGP-71	63.5
VGP-85	69
VGP-100	75.5

Pump Type	B in MM
VGP-7	23.5
VGP-10	25
VGP-12	26.5
VGP-16	28
VGP-20	30.5
VGP-23	32.5
VGP-27	34.5
VGP-32	41.5
VGP-36	44
VGP-40	56.5
VGP-55	54

VGP - 20A + 10A + 10A


Mounting Flange	X in mm
S1	22.3
S2	20.2

GROUP 35A - MULTIPLE STAGES
VGP + 35A+35A

VGP + 35A+20A

VGP + 35A+35A+35A

VGP + 35A+35A+20A


Pump Type	A in MM
VGP-68	54
VGP-81	56
VGP-95	58
VGP-113	60
VGP-136	63
VGP-150	65
VGP-173	69
VGP-200	72
VGP-225	75
VGP-260	81
VGP-300	86

Pump Type	A in MM
VGP-68	54
VGP-81	56
VGP-95	58
VGP-113	60
VGP-136	63
VGP-150	65
VGP-173	69
VGP-200	72
VGP-225	75
VGP-260	81
VGP-300	86

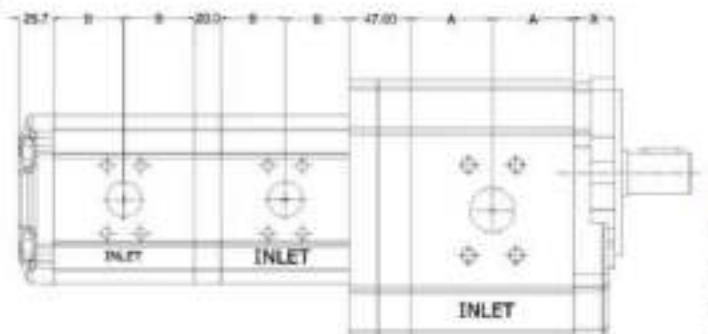
Mounting Flange	X in mm
53	27
C3	63.5
83	63.5
Y3	63.5



All dimensions are in mm.
Tolerances for total length - ± 1 mm.

• For drive shaft - see page no. 32, 33, 34 • For mounting flange - see page no. 29, 30

• For suction & delivery port - see page no. 36, 37 • For end cover - see page no. 39 & 40 • For ordering code - see page no. 44

VGP + 35A+20A+20A


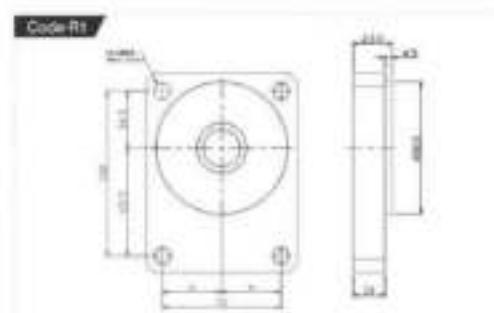
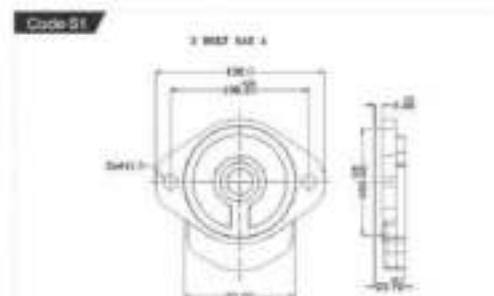
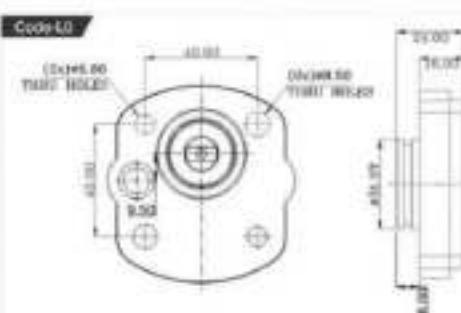
Mounting Flange	X in mm
53	27
C3	63.5
83	63.5
Y3	63.5

All dimensions are in mm.
Tolerances for total length - ± 1 mm.

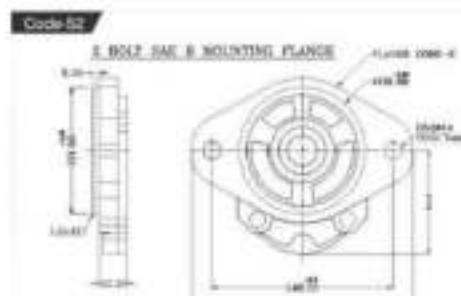
• For drive shaft - see page no. 32, 33, 34 • For mounting flange - see page no. 29, 30

• For suction & delivery port - see page no. 36, 37 • For end cover - see page no. 39 & 40 • For ordering code - see page no. 44

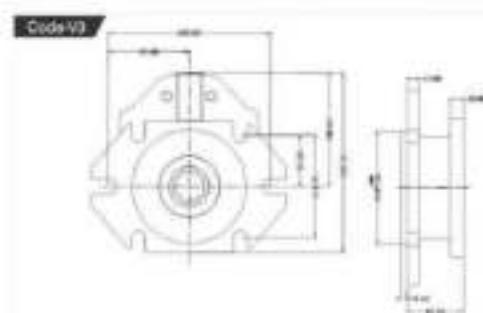
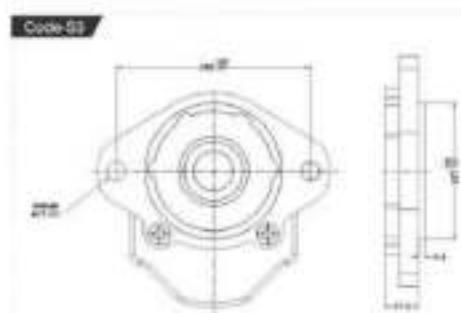
Mounting Flange



The drawing shows a part with a total height of 50.00. The top section has a width of 30.00 and a height of 17.00. The bottom section has a width of 80.00. There are two holes at the top edge, one on each side of the center, both with a diameter of 14.00. A note indicates "#6.5 TIR 0.000 HOLE# 2NOD".



The drawing shows a rectangular flange with four circular mounting holes. The top edge has a height of 10.00 mm. The bottom edge has a height of 10.00 mm. The left edge has a height of 10.00 mm. The right edge has a height of 10.00 mm. The distance between the centers of the four holes is 45.00 mm. The overall width of the flange is 45.00 mm.

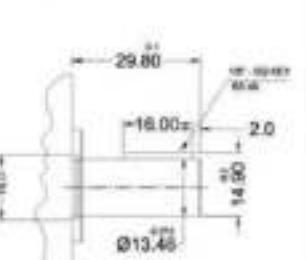


AVAILABLE MOUNTING FLANGE COMBINATION

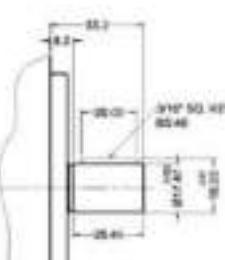
Group	Model	Plate													
		S0	S0	L0	R0	S1	S1	R1	S1	S2	D2	S3	C3	S3	V3
15A	VGP-01	✓	✓	✓	✓										
	VGP-02	✓	✓	✓	✓	✓	✓								
	VGP-03	✓	✓	✓	✓	✓	✓								
	VGP-04	✓	✓	✓	✓	✓	✓								
	VGP-05	✓	✓	✓	✓	✓	✓								
	VGP-06	✓	✓	✓	✓	✓	✓								
	VGP-07	✓	✓	✓	✓	✓	✓								
16A	VGP-07					✓	✓	✓	✓						
	VGP-10					✓	✓	✓	✓						
	VGP-12					✓	✓	✓	✓						
	VGP-14					✓	✓	✓	✓						
	VGP-20					✓	✓	✓	✓						
	VGP-23					✓	✓	✓	✓						
	VGP-27					✓	✓	✓	✓						
	VGP-32					✓	✓	✓	✓						
	VGP-36					✓	✓	✓	✓						
	VGP-40					✓	✓	✓	✓						
18A	VGP-50					✓	✓	✓	✓						
	VGP-18					✓	✓	✓	✓						
	VGP-21					✓	✓	✓	✓						
	VGP-25					✓	✓	✓	✓						
	VGP-32					✓	✓	✓	✓						
	VGP-34					✓	✓	✓	✓						
	VGP-39					✓	✓	✓	✓						
	VGP-48					✓	✓	✓	✓						
	VGP-55					✓	✓	✓	✓						
	VGP-66					✓	✓	✓	✓						
20A	VGP-22								✓	✓					
	VGP-32								✓	✓					
	VGP-41								✓	✓					
	VGP-47								✓	✓					
	VGP-54								✓	✓					
	VGP-66								✓	✓					
	VGP-71								✓	✓					
	VGP-85								✓	✓					
	VGP-100								✓	✓					
	VGP-68								✓	✓	✓	✓	✓	✓	✓
25A	VGP-81								✓	✓	✓	✓	✓	✓	✓
	VGP-85								✓	✓	✓	✓	✓	✓	✓
	VGP-113								✓	✓	✓	✓	✓	✓	✓
	VGP-138								✓	✓	✓	✓	✓	✓	✓
	VGP-159								✓	✓	✓	✓	✓	✓	✓
	VGP-173								✓	✓	✓	✓	✓	✓	✓
	VGP-200								✓	✓	✓	✓	✓	✓	✓
	VGP-225								✓	✓	✓	✓	✓	✓	✓
	VGP-260								✓	✓	✓	✓	✓	✓	✓
	VGP-300								✓	✓	✓	✓	✓	✓	✓
16A (MOTOR)	VGM-07					✓	✓	✓	✓						
	VGM-10					✓	✓	✓	✓						
	VGM-12					✓	✓	✓	✓						
	VGM-16					✓	✓	✓	✓						
	VGM-20					✓	✓	✓	✓						
	VGM-23					✓	✓	✓	✓						
	VGM-27					✓	✓	✓	✓						
	VGM-32					✓	✓	✓	✓						
	VGM-36					✓	✓	✓	✓						
	VGM-40					✓	✓	✓	✓						
	VGM-50					✓	✓	✓	✓						

SHAFT

Code-P0



Code-P1



Code-L1



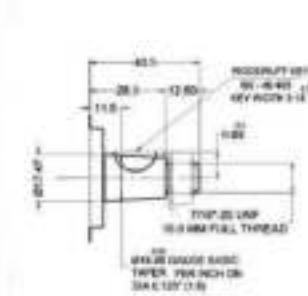
Max. Torque : 100 Nm.

Code-T0



Max. Torque : 100 Nm.

Code-T1



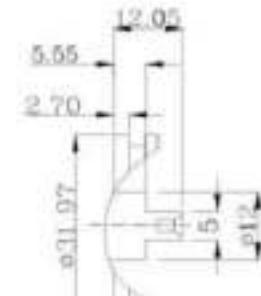
Max. Torque : 140 Nm.

Code-R1



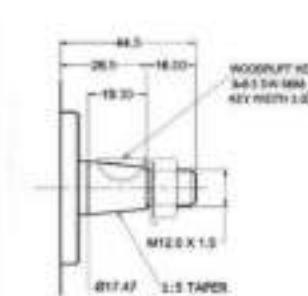
Max. Torque : 140 Nm.

Code-K0



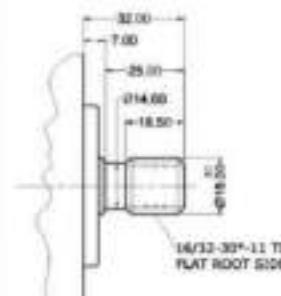
Max. Torque : 140 Nm.

Code-K1



Max. Torque : 180 Nm.

Code-G1

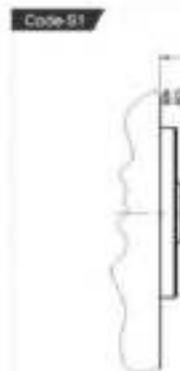


Max. Torque : 0 Nm.

Max. Torque : 140 Nm.

Max. Torque : 200 Nm.

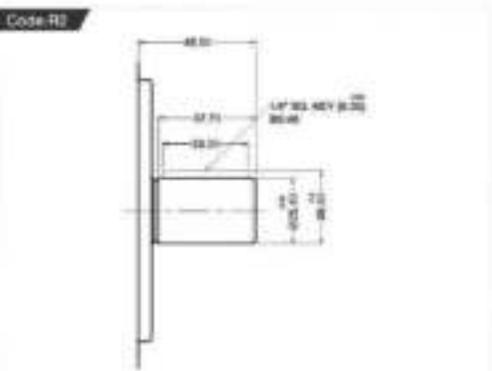
SHAFT



Max. Torque: 185 Nm



Max. Torque: 450 Nm



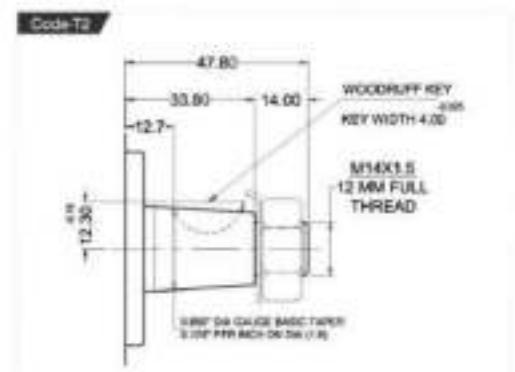
Max. Torque: 0 Nm



Max. Torque: 350 Nm



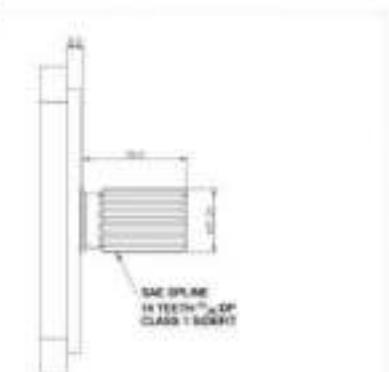
Max. Torque: 200 Nm



Max. Torque: 300 Nm



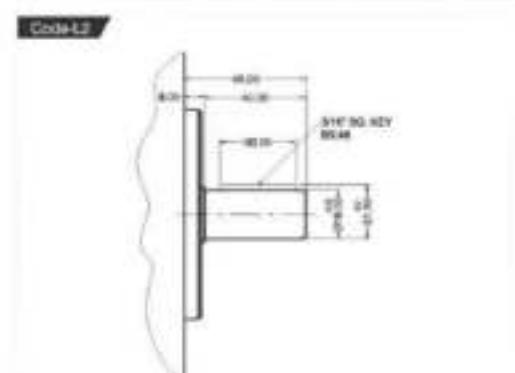
Max. Torque: 600 Nm



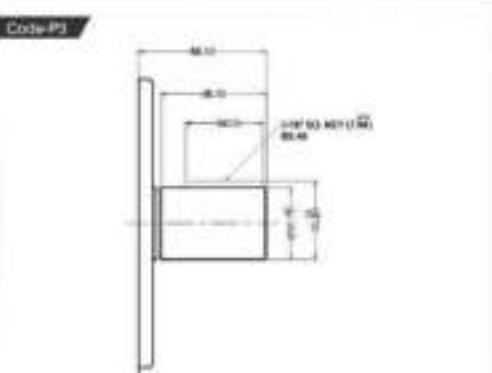
Max. Torque: 0 Nm



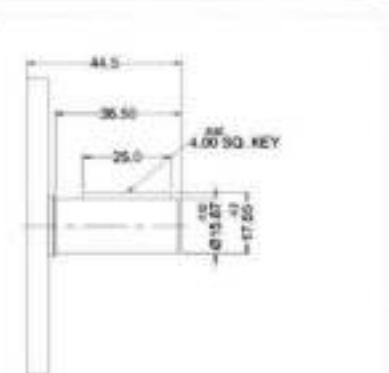
Max. Torque: 180 Nm



Max. Torque: 180 Nm



Max. Torque: 450 Nm



Max. Torque: 140 Nm

AVAILABLE SHAFT COMBINATION

Group	Model	Shaft																			
		P0	T0	K0	P1	T1	K1	L1	R1	S1	S1	P1	U1	P2	T2	L2	R2	S2	P3	T3	S3
BSA	VGP-01	✓	✓	✓																	
	VGP-02	✓	✓	✓																	
	VGP-03	✓	✓	✓																	
	VGP-04	✓	✓	✓																	
	VGP-05	✓	✓	✓																	
	VGP-06	✓	✓	✓																	
	VGP-07	✓	✓	✓																	
10A	VGP-07		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	VGP-10		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	VGP-12		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	VGP-15		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	VGP-20		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	VGP-23		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	VGP-27		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	VGP-32		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	VGP-36		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	VGP-40		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
15A	VGP-50		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	VGP-16		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	VGP-21		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	VGP-25		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	VGP-32		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	VGP-34		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	VGP-39		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
20A	VGP-48		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	VGP-55		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	VGP-65		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	VGP-22		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	VGP-32		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	VGP-41		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	VGP-47		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
25A	VGP-54		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	VGP-66		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	VGP-71		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	VGP-85		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	VGP-100		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	VGP-88																	✓	✓	✓	✓
	VGP-81																	✓	✓	✓	✓
35A	VGP-85																	✓	✓	✓	✓
	VGP-113																	✓	✓	✓	✓
	VGP-136																	✓	✓	✓	✓
	VGP-150																	✓	✓	✓	✓
	VGP-173																	✓	✓	✓	✓
	VGP-200																	✓	✓	✓	✓
	VGP-225																	✓	✓	✓	✓
10A (MOTOR)	VGM-260																	✓	✓	✓	✓
	VGM-300																	✓	✓	✓	✓
	VGM-07		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	VGM-10		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	VGM-12		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	VGM-16		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	VGM-20		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
(MOTOR)	VGM-23		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	VGM-27		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	VGM-32		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	VGM-36		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	VGM-40		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	VGM-50		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

PORTS

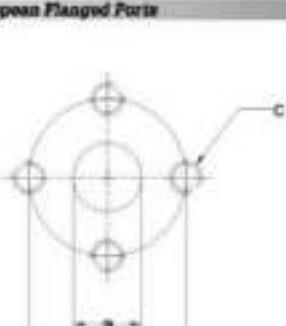


Gas Straight Thread Ports

Code	a (Nominal Size)	b mm	c mm	Nm	Nm
A	3/8" BSP	20.0	15.0	15 ^{1/2}	25 ^{1/2}
B	1/2" BSP	20.0	19.0	20 ^{1/2}	50 ^{1/2}
C	3/4" BSP	21.0	24.5	30 ^{1/2}	90 ^{1/2}
D	1" BSP	22.0	30.5	50 ^{1/2}	130 ^{1/2}
E	1 1/4" BSP	25.0	38.0	60 ^{1/2}	170 ^{1/2}

Note : Tightening torque for low pressure side port

✓ Tightening torque for high pressure side port



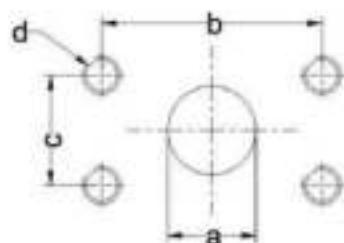
German Flanged Ports

Code	a mm	b mm	c Thread Depth mm	Nm	Nm
H	13.0	30.0	M6 (13)	8 ^{1/2}	8 ^{1/2}
I	19.0	40.0	M8 (14)	15 ^{1/2}	15 ^{1/2}
J	19.0	43.15	M8 (15)●	15 ^{1/2} ●	15 ^{1/2} ●
K	19.0	55.0	M10 (16)	20 ^{1/2}	20 ^{1/2}
L	27.0	61.0	M12 (18)	25 ^{1/2}	30 ^{1/2}

Note :

✓ Tightening torque for low pressure side port

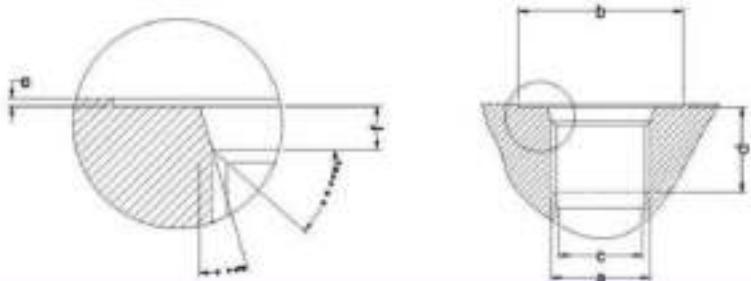
● For 20A Group

SAE Flanged Ports


Code	**** mm	b mm	c mm	d Thread Depth mm	Nm	Nm
G	12.5	38.1	17.5	M8 (14) ●	15° ¹	15° ¹
				M8 (22)	20° ¹	20° ¹
H	19.0	47.6	22.2	M10 (14) ●	20° ¹	25° ¹
				3/8UNC (22)	35° ¹⁸	35° ¹⁸
				M10 (14) ●	20° ¹	25° ¹
I	27	52.4	26.2	3/8UNC (22)	20° ¹	35° ¹⁸
T	32	50.5	38.7	7/16UNC (23)	35° ¹⁸	60° ¹
U	38	69.5	36.5	3/8UNC (22)	20° ¹	35° ¹⁸
V	38	77.6	42.0	1/2UNC (25) ●	35° ¹⁸	65° ¹⁸
	48 *			7/16UNC (23)	35° ¹⁸	60° ¹
				1/2UNC (25) ●	35° ¹⁸	65° ¹⁸
W	60	108.5	62.0	1/2UNC (25)	35° ¹⁸	60° ¹

Note :

- Tightening torque for low pressure side port
- Tightening torque for high pressure side port
- For low pressure port
- For SAE Group

SAE Straight Thread Ports


Code	a (Nominal Size)	**** mm	**** mm	d mm	e mm	f mm	**** mm	Nm	Nm
SA	3/4" - 16 UNF	32.0	17.5	15.0	1	2.5	-----	70° ¹¹	45° ¹¹
SB	7/8" - 14 UNF	35.0	20.5	15.0	1	2.5	-----	70° ¹¹	70° ¹¹
SC	1.1/16" - 12 UNF	42.0	24.8	20.0	1	3.3	-----	40° ¹	120° ¹
SD	1.5/16" - 12 UNF	49.0	30.5	20.0	1	3.3	-----	60° ¹	170° ¹

Note :

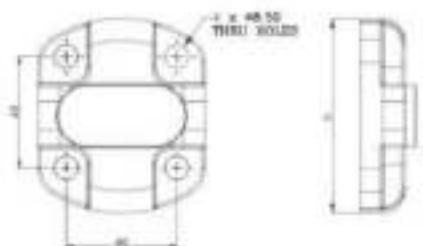
- Tightening torque for low pressure side port
- Tightening torque for high pressure side port

AVAILABLE PORTS COMBINATION

Group	Model	BSP THREAD		GERMAN FLANGE		EUROPEAN FLANGE		SAE FLANGE		UNF THREAD	
		IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT
0SA	1	A	A								
	2	A	A								
	3	A	A								
	4	A	A								
	5	B	A								
	6	B	A								
	7	B	A								
1SA	8	B	B	I	H	M	M			UB	UB
	9	B	B	I	H	M	M			UB	UB
	10	B	B	I	H	M	M			UB	UB
	11	C	B	I	H	M	M			UC	UB
	12	C	B	I	H	M	M			UC	UB
	13	C	C	I	H	M	M			UC	UB
	14	C	C	I	H	M	M			UC	UB
	15	C	C	I	H	M	M			UC	UB
	16	C	C	I	H	M	M			UC	UB
	17	C	C	I	H	M	M			UC	UB
	18	C	C	I	H	M	M			UC	UB
	19	C	C	I	H	M	M			UC	UB
1SA	20	D	C	I	H	N	M			UC	UB
	21	D	C	I	H	N	M			UC	UB
	22	D	C	I	H	N	M			UC	UB
	23	D	C	I	H	N	M			UC	UB
	24	D	C	I	H	N	M			UC	UB
	25	D	C	K	J	O	N			UD	UC
	26	D	C	K	J	O	N			UD	UC
2SA	27	E	E	I	H	N	M			UD	UC
	28	E	E	I	H	N	S	S	S	UD	UC
	29	E	E	I	H	N	S	S	S	UD	UC
	30	E	E	I	H	N	S	S	S	UD	UC
	31	E	E	I	H	N	S	S	S	UD	UC
	32	E	E	I	H	N	S	S	S	UD	UC
	33	E	E	I	H	N	S	S	S	UD	UC
	34	E	E	I	H	N	S	S	S	UD	UC
	35	E	E	I	H	N	S	S	S	UD	UC
	36	E	E	I	H	N	S	S	S	UD	UC
3SA	37	F	F	I	H	N	S	S	S	UD	UC
	38	F	F	I	H	N	S	S	S	UD	UC
	39	F	F	I	H	N	S	S	S	UD	UC
	40	F	F	I	H	N	S	S	S	UD	UC
	41	F	F	I	H	N	S	S	S	UD	UC
	42	F	F	I	H	N	S	S	S	UD	UC
	43	F	F	I	H	N	S	S	S	UD	UC
	44	F	F	I	H	N	S	S	S	UD	UC
	45	F	F	I	H	N	S	S	S	UD	UC
	46	F	F	I	H	N	S	S	S	UD	UC
3SA MOTOR	47	G	G	I	H	N	S	S	S	UD	UC
	48	G	G	I	H	N	S	S	S	UD	UC
	49	G	G	I	H	N	S	S	S	UD	UC
	50	G	G	I	H	N	S	S	S	UD	UC
	51	G	G	I	H	N	S	S	S	UD	UC
	52	G	G	I	H	N	S	S	S	UD	UC
	53	G	G	I	H	N	S	S	S	UD	UC
	54	G	G	I	H	N	S	S	S	UD	UC
	55	G	G	I	H	N	S	S	S	UD	UC
	56	G	G	I	H	N	S	S	S	UD	UC
1SA MOTOR	57	H	H	I	H	N	S	S	S	UD	UC
	58	H	H	I	H	N	S	S	S	UD	UC
	59	H	H	I	H	N	S	S	S	UD	UC
	60	H	H	I	H	N	S	S	S	UD	UC
	61	H	H	I	H	N	S	S	S	UD	UC
	62	H	H	I	H	N	S	S	S	UD	UC
	63	H	H	I	H	N	S	S	S	UD	UC
	64	H	H	I	H	N	S	S	S	UD	UC
	65	H	H	I	H	N	S	S	S	UD	UC
	66	H	H	I	H	N	S	S	S	UD	UC

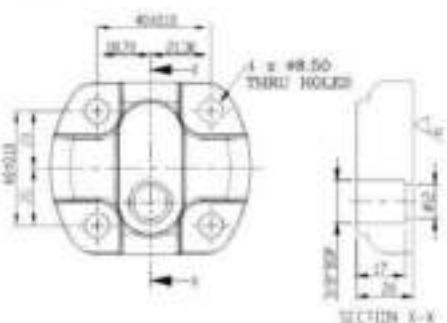
END COVER

Code-B0



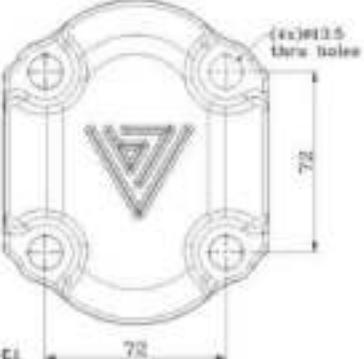
MOC - CI

Code-L0



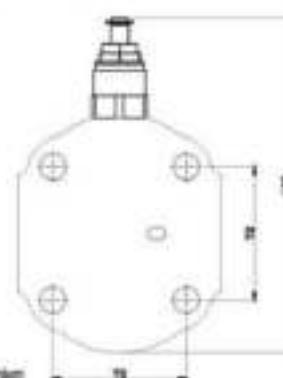
MOC - CI

Code-R0



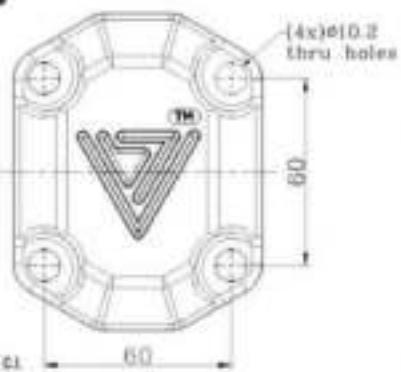
MOC - CI

Code-R2



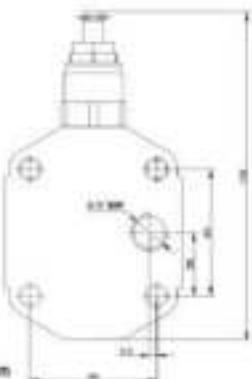
MOC - Aluminum

Code-B1



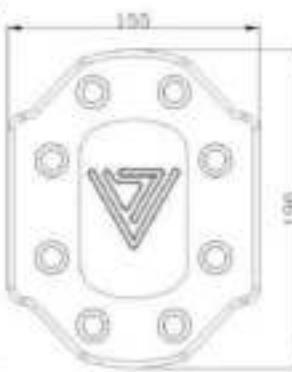
MOC - CI

Code-R1



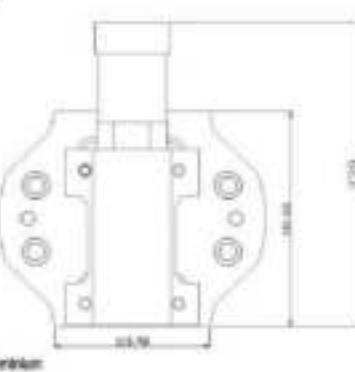
MOC - Aluminum

Code-B3



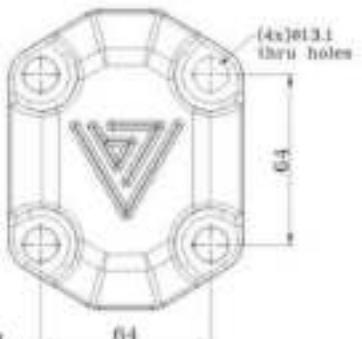
MOC - CI

Code-R3



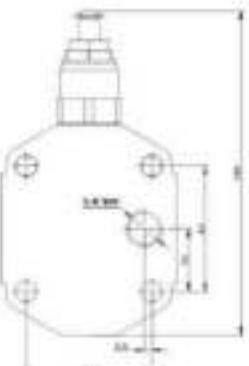
MOC - Aluminum

Code-B15



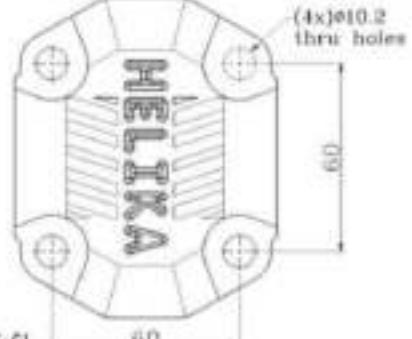
MOC - CI

Code-R15



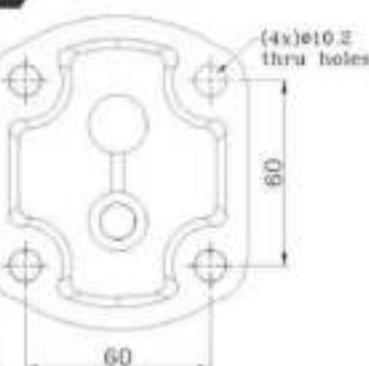
MOC - Aluminum

Helika - H10



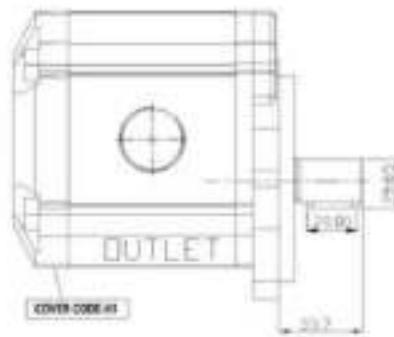
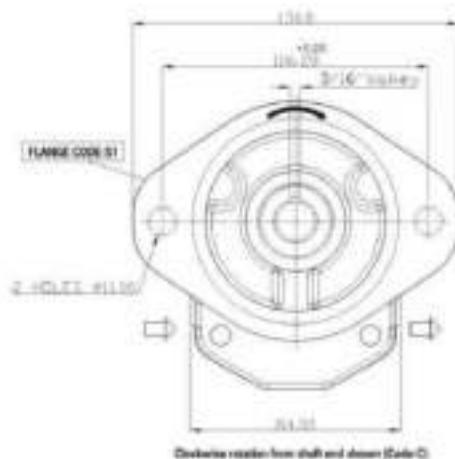
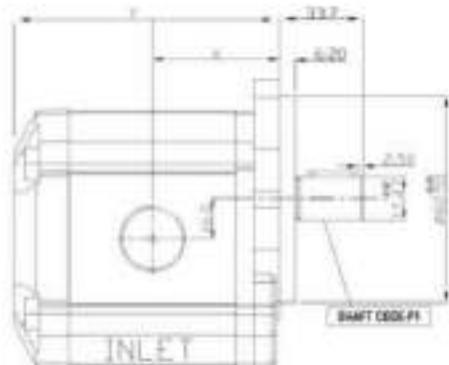
MOC - CI

Motor - D1



MOC - CI

HELIKA HYDRAULIC GEAR PUMP



SPECIFICATION DATA

Pump Type	Theoretical Displacement	Nominal Delivery at 1500 RPM	Max. Speed at Max. Continuous Pressure	Min. Speed at Max. Continuous Pressure	Inlet	Outlet	P1, Continuous Pressure	P2, Intermittent Pressure	P3, Peak Pressure	Dimension X	Dimension Y
	CC/REV	L/MIN	Rev/MIN	Rev/MIN	BSP	BSP	BAR	BAR	BAR		
HGP-7	5.60	8.40	4000	600	1/2"	1/2"	250	280	300	44.5	95.5
HGP-10	7.54	11.30	4000	600	1/2"	1/2"	250	280	300	44.5	94.5
HGP-12	8.60	13.20	4000	600	1/2"	1/2"	250	280	300	45.5	95.5
HGP-16	11.00	16.50	3500	600	3/4"	1/2"	250	280	300	47.0	96.5
HGP-20	13.40	20.10	3500	600	3/4"	3/4"	250	280	300	49.0	102.0
HGP-25	16.50	24.80	3200	600	3/4"	3/4"	250	280	300	51.0	106.0
HGP-27	19.00	28.60	3000	600	3/4"	3/4"	210	230	250	47.5	99.0
HGP-32	22.66	34.00	3000	600	1"	3/4"	210	230	250	54.0	112.5
HGP-36	24.33	36.50	3000	600	1"	3/4"	160	180	210	56.5	117.5
HGP-40	27.40	41.10	3000	600	1"	3/4"	160	180	210	60.0	124.5

* For drive shaft - see page no. 32, 33, 34 * For mounting flange - see page no. 29, 36

* For suction & delivery port - see page no. 38, 37 * For end cover - see page no. 39 & 40 * For ordering code - see page no. 43

ORDER CODE - SINGLE

16A GROUP	V1P TYPE	12 MODEL	C ROTATION	F1 SHAFT	S1 MOUNTING	X1 PORT	S COVER
0SA							
1SA							
15A							
2SA							
25A							
12A							

TYPE	V1P VGM HGP

MODEL
0SA 1,2,3,4,5,6,7
1SA 7,10,12,16,20,25,27,32,33,46,58
15A 16,21,25,32,34,35,39,46,55,66
2SA 22,32,41,47,54,66,71,85,100
25A 68,81,95,113,138,155,173,189,225,260,300
12A 6,7,9,12,18,29,23,27,32,40,58

ROTATION WITH SHAFT SEAL
C Clockwise with inner shaft seal
A Anti clockwise with outer shaft seal
V Clockwise with outer shaft seal
U Anti clockwise with outer shaft seal
E Clockwise with double wistle shaft seal
D Anti clockwise with double wistle shaft seal
G Clockwise with double wistle & outer shaft seal
F Anti clockwise with double wistle & outer shaft seal
B Bi-directional with outer seal

SHAFT
P1 Parallel with key (Ø13.0)
T1 Taper shaft (1/8)
K1 Long shaft
P2 Parallel with key (Ø17.45)
T2 Taper shaft (1/8)
K2 Taper shaft (1/8)
L1 Parallel with key (Ø15.88)
U1 Parallel key shaft with thread (Ø17.45)
R1 Parallel with key (Ø18.00)
S1 9 Spline
O1 13 Spline
F1 14 Spline
P3 Parallel key shaft (Ø22.22)
T3 Taper shaft (1/8)
K3 13 Spline shaft
P4 Parallel key shaft (Ø21.85)
S3 14 Spline shaft
L2 Parallel key shaft (Ø19.00)
R2 Parallel key shaft (Ø15.40)
T3 Taper shaft (1/8)
S4 Other

MOUNTING
00 2 Bolt Mounting with Spigot Ø 62.50
01 4 Bolt Mounting with Spigot Ø 36.47
02 2 Bolt Mounting with collar (Spigot Ø 31.97)
03 2 Bolt Mounting with collar (Spigot Ø 31.97)
04 2 Bolt Mounting with Spline Ø 82.55
05 4 Bolt Mounting with Spline Ø 36.47
06 2 Bolt Mounting with Spigot Ø 56.00
07 4 Bolt Mounting with Spigot Ø 60.00
08 2 Bolt Mounting with Spigot Ø 101.5
09 4 Bolt Mounting with Spigot Ø 50.80
10 4 Bolt Mounting with Spigot Ø 127.00
11 2 Bolt Mounting with Spigot Ø 127.00
12 8 Bolt Mounting with Spigot Ø 127.00
13 4 Bolt Mounting with Spigot Ø 101.5
14 6 Spline
15 8 Spline
16 10 Spline
17 12 Spline
18 14 Spline
19 16 Spline
20 18 Spline
21 20 Spline
22 22 Spline
23 24 Spline
24 26 Spline
25 28 Spline
26 30 Spline
27 32 Spline
28 34 Spline
29 36 Spline
30 38 Spline
31 40 Spline
32 42 Spline
33 44 Spline
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342 662 Spline
343 664 Spline
344 666 Spline
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346 670 Spline
347 672 Spline
348 674 Spline
349 676 Spline
350 678 Spline
351 680 Spline
352 682 Spline
353 684 Spline
354 686 Spline
355 688 Spline

ORDER CODE - MULTIPLE STAGES

THREADED CONNECTORS SUITABLE FOR SAE FLANGE

XXX / XXX	VGP	XXX / XXX	C	P1	S1	XX / XX	B
GROUP	TYPE	MODEL	ROTATION	SHAFT	MOUNTING	PORT	COVER

05A
10A
15A
20A
25A
30A

TYPE	VGP
	VGM
	HGP

MODEL
05A 1,2,3,4,5,6,7
10A 7,10,12,16,20,23,27,32,36,40,50
15A 16,21,25,32,34,35,39,48,55,66
20A 22,23,41,47,54,66,71,85,100
25A 68,81,95,113,136,156,173,200,225,260,300
30A 6,7,8,12,16,20,23,27,32,40,50

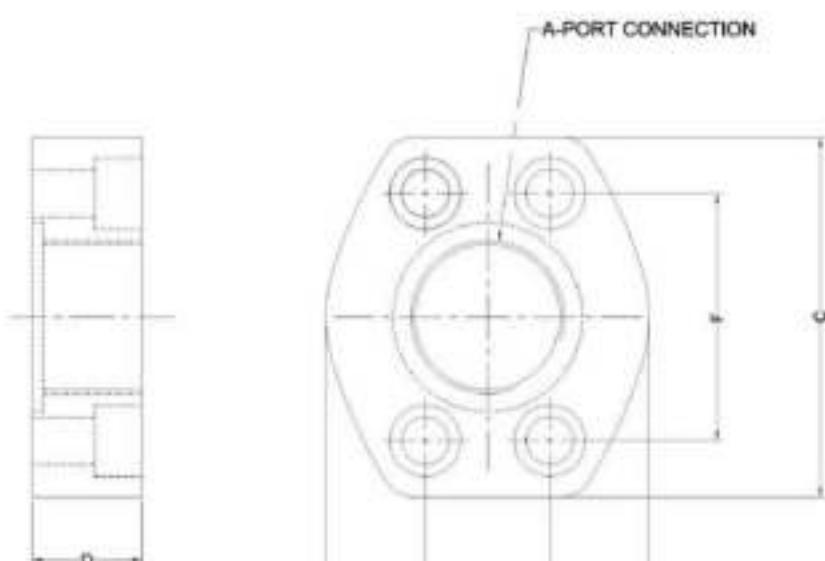
ROTATION WITH SHAFT SEAL
C Clockwise with viton shaft seal
A Anti clockwise with viton shaft seal
V Clockwise with viton shaft seal
U Anti clockwise with viton shaft seal
E Clockwise with double viton shaft seal
D Anti clockwise with double viton shaft seal
G Clockwise with double viton & viton shaft seal
F Anti clockwise with double viton & viton shaft seal
H Bi-directional with viton seal

SHAFT
P0 Parallel with key (Ø13.5)
T0 Taper shaft (1:8)
K0 Taper shaft
P1 Parallel with key (Ø17.45)
T1 Taper shaft (1:8)
K1 Taper shaft (1:5)
L1 Parallel with key (Ø15.85)
Q1 Parallel key shaft with thread (Ø17.45)
R1 Parallel with key (Ø18.00)
S1 8 Spline
Q2 11 Spline
P2 14 Spline
P3 Parallel key shaft (Ø22.22)
T2 Taper shaft (1:8)
S2 12 Spline shaft
P4 Parallel key shaft (Ø21.85)
S3 14 Spline shaft
L2 Parallel key shaft (Ø19.00)
R2 Parallel key shaft (Ø15.40)
T3 Taper shaft (1:8)
Q0 Other

MOUNTING
S0 2 Bolt Mounting with Salign Ø 82.50
S0 4 Bolt Mounting with Salign Ø 36.47
L0 2 Bolt Mounting with center Salign Ø 31.87
R0 2 Bolt Mounting with center Salign Ø 31.87
S1 2 Bolt Mounting with Salign Ø 82.50
S1 4 Bolt Mounting with Salign Ø 36.47
K1 2 Bolt Mounting with Salign Ø 50.00
R1 4 Bolt Mounting with Salign Ø 80.00
S2 2 Bolt Mounting with Salign Ø 101.00
D0 4 Bolt Mounting with Salign Ø 50.00
C2 4 Bolt Mounting with Salign Ø 127.00
S3 2 Bolt Mounting with Salign Ø 127.00
V3 6 Bolt Mounting with Salign Ø 127.00
S4 4 Bolt Mounting with Salign Ø 131.00
Z0 Cover Inlet / outlet
Q0 Other

90	Standard cover
10	Cover with Inlet
91	Standard cover
R1	Cover with PRV
R15	Standard Cover
R15	Cover with PRV
R2	Standard cover
R2	Cover with PRV
R3	Standard cover
R3	Cover with PRV
R1	Standard cover
Q1	Cover with drain
30	Other

SECTION DELIVERY
A,B,C,D,E Gas Straight Thread Port (BSP)
F,G,H,I,J,K German Flange Port
M,N,O,P European Flange Port
Q,R,S,T,U,V,W SAE Flange Port
X,Y,U,V,C,D SAE Straight Thread Port (NM) Other



Model No.	INLET			
	A THREAD	B	C	F
20A VGP 22 to 41	1" BSP	68.25	76.00	52.40
20A VGP 47, 85	1.1/4" BSP	68.25	76.00	52.40
20A VGP 71, 100	1.1/2" BSP	65.00	89.00	69.50
35A VGP 68 to 136	1.1/2" BSP	75.00	99.00	69.50
35A VGP 150, 173	2" BSP	74.00	105.6	77.80
35A VGP 225	2.1/2" PIPE	110.0	136.0	106.5

Model No.	INLET			
	A THREAD	B	C	H
20A VGP 22 to 41	3/4" BSP	57.75	71.00	47.60
20A VGP 47, 85	3/4" BSP	57.75	71.00	47.60
20A VGP 71, 100	1" BSP	68.25	76.00	52.40
35A VGP 68 to 136	1.1/4" BSP	65.00	89.00	69.50
35A VGP 150, 173	1.1/4" BSP	65.00	89.00	69.50
35A VGP 225	2.1/2" PIPE	75.00	99.00	66.50

TRACTOR RANGE

FIAT / NEW HOLLAND (REPLACEMENT PARTS)

TRACTOR & MODEL	F16 NO.	OUR MODEL NO.	ITEM NUMBER	DISPLACEMENT
Fiat New Holland Tractor 80115, 980, 1180, 1280	1		A62X / 5129488 / 5179714	19 CC
Fiat New Holland Tractor 480, 580, 780, 980, 1170	1		C58X / 8273385 / 44969638 / 5179722	11 CC
Fiat New Holland Tractor 550, 570, 580, 600, 640 650, 670, 680, 750, 780, 800, 1000, 1300/45-68	1		5129481 / 5179724 / 5681682 / 13001329 / 5130133 C18 (REF NO. 644 425 032)	8 CC
Fiat Tractor	1		A33	15 CC
Fiat Tractor	1		C26	9.50 CC
Fiat New Holland 480, 680, 780, 980	1		A30X 98617608 / 5179716 / 8280137 / 1801326 / 6280138	16 CC
Fiat Tractor	1		A44	18.50 CC
Fiat Tractor 610, 550, 750, 780, 800, 980	1		A25 5129474 / 8280040 / 680008 / 1801321 / 5179738 (REF NO. 650 525 327)	11 CC
Fiat Tractor 410, 411, 412, 420, 500M 38	1		A18 5179732 / 5130127 / 1801319 / 548309 / 6400309	8 CC
Fiat Tractor 450, 470, 480, 500, 540	1		C33 8273371 / 5179486	15 CC

SAME (REPLACEMENT PARTS)

TRACTOR & MODEL	F16 NO.	OUR MODEL NO.	ITEM NUMBER	DISPLACEMENT
SAME Tractor Lusignano	1		(REF NO. 637 525 311) 245262980 (F16712006)	11 CC
SAME / Valtra / Hafnia - Auter 85, 70	1		8183 NO. 638 425 315	16 CC
SAME Tractor	1		8183 NO. 642 425 320	20.5 CC
SAME - Lamborghini H - 8130	2		8186 NO. 677 625 317	16 CC
SAME - Lamborghini H - 8160	2		8186 NO. 678 625 316	19 CC
Lamborghini H360, H470, H480	4		8181 NO. 679 725 346	23.5 CC
Lamborghini H360, H470, H480	5		245263000 (REF NO. 680 525 312)	11 CC

MF / LANDINI (REPLACEMENT PARTS)

TRACTOR & MODEL	F16 NO.	OUR MODEL NO.	ITEM NUMBER	DISPLACEMENT
MF 373 383 LANDINI 5530, 6860, 6880	2		3623381 MF01354H1 MF01 (REF NO. 662 525 320)	11 CC
MF/LANDINI 4530, 5000, 5200, 5800	1		3620658 MF01 (REF NO. 664 525 313/346)	11 CC
LANDINI 2500, 6830, 7830, 8830, 8840, 7500, 7800	1		25204857 MF01 (REF NO. 665 525 340)	11 CC
LANDINI 6530, 7530, 8530, 6830, 7830, (REF # 525216)	1		3620657 MF01 (ONLY PUMP)	16 CC
MF 154E-154S, 164S, 174S, 184S, 194F	1		3620650 MF01 (REF NO. 674 425 308)	8 CC

DEUTZ FAHR/STEYR (REPLACEMENT PARTS)

TRACTOR & MODEL	F16 NO.	OUR MODEL NO.	ITEM NUMBER	DISPLACEMENT
DEUTZ FAHR D20K, D25K, D35K	1		01174510 (REF NO. 679 515 380)	11 CC
DEUTZ FAHR D20K, D25K, D35K	1		01174517 / 0116000 (REF NO. 620 515 318-320)	14 CC
DEUTZ FAHR D20, D25C, D30, M30	1		01174502 (REF NO. 621 615 318)	16 CC
DEUTZ FAHR AGROTRON 4.17, 5.17, 6.17/4.61-4.71	2		01174210 (REF NO. 661 610 366)	19 + 11 CC
STEYR 6500, 6510, 6700, 6800, 1080, 1120, 6550L, 6550L, 6850, 6870L, 6875, 6890L, 9090, 8120L, 8130, 8110A, 8130, 8140, 8150	2		(REF NO. 622 615 314)	16 CC
STEYR 8100, 8090, 8090A	2		(REF NO. 623 615 310)	11 CC
STEYR 8130, 8116A, 8120L	2		(REF NO. 624 615 310)	14 CC
STEYR 8145, 840, 850, 854, 858, 860, 865, 870	2		(REF NO. 625 415 313)	8 CC

TRACTOR RANGE

FENDT/JOHN DEERE (REPLACEMENT PARTS)

TRACTOR & MODEL	F16 NO.	OUR MODEL NO.	ITEM NUMBER	DISPLACEMENT
FENDT TRACTOR 1888, 2000, 2020, 2030P	1		6144, 948, 612, 916 (REF NO. 643 515 318)	14 CC
FARMER 29				
FENDT 610, 611, 612, 612, FARMER 35	1		6136, 403, 181, 102 (REF NO. 687 515 309)	11 CC
JOHN DEERE 500, 510, 700, 710, 35	2		AL 10881, AL 61001, AL 37753 (REF NO. 657 415 310)	8 CC
JOHN DEERE 500, 510, 700, 710 with power steering				
JOHN DEERE 510, 510, 700, 710	2		AL 183 49 (REF NO. 658 610 310)	11 CC
JOHN DEERE 500, 510, 700, 710	2		AL 188 63, AL 37757 (REF NO. 658 610 314)	16 CC
JOHN DEERE 500, 510, 700, 710	2		AL 14903, AL 37752 (REF NO. 676 610 314)	16 CC

BOBARD / IH, INTER CASE (REPLACEMENT PARTS)

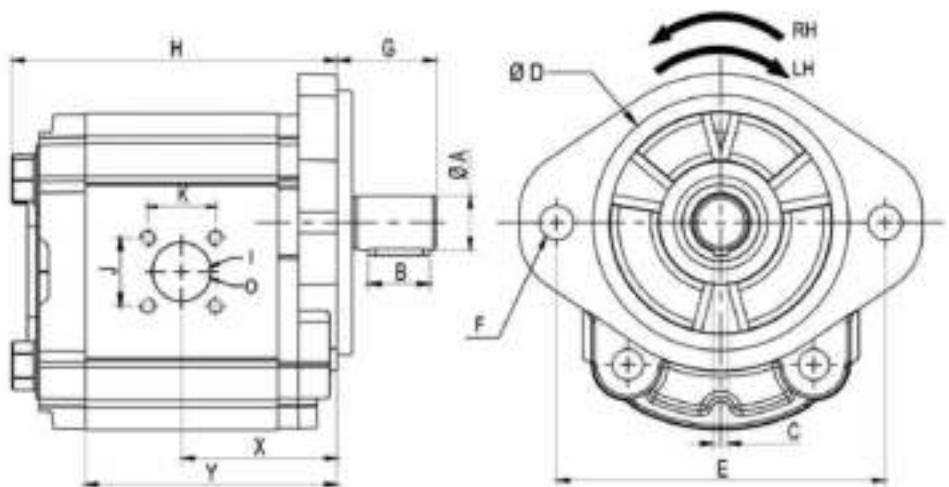
TRACTOR & MODEL	F16 NO.	OUR MODEL NO.	ITEM NUMBER	DISPLACEMENT
BOBARD M75	1		(REF NO. 681 325 006)	5.5 CC
BOBARD 620, CC25, 521, CC75	1		(REF NO. 682 625 021)	11 CC
BOBARD K30, X40, K35, K42	2		(REF NO. 683 415 313)	8 CC
BOBARD K40, M55	2		(REF NO. 684 515 314)	16 CC
BOBARD 4531	2		(REF NO. 685 615 315)	16 CC
TANDEM PUMP FOR BOBARD	3		(REF NO. 681 585 325)	11 CC + 5.5 CC
IH, INTER CASE TRACTOR 270, 276, 294, 374,	4		402 80 157201 / 704 30 886	11 CC
384, 414, 424, 444				

HYDRAULIC MINI POWER PACK

AC - 1 & 3 PHASE ARE AVAILABLE
DC - 12 & 24 VOLT ARE AVAILABLE

Note : Original equipment manufacturer name and part numbers are used for reference purpose only, and are not intended to use that our replacement parts are used as original equipments. Some of the parts shown on this catalogue for more product details please contact to our export department.

QUESTIONNAIRE - FOR SINGLE STAGE PUMP



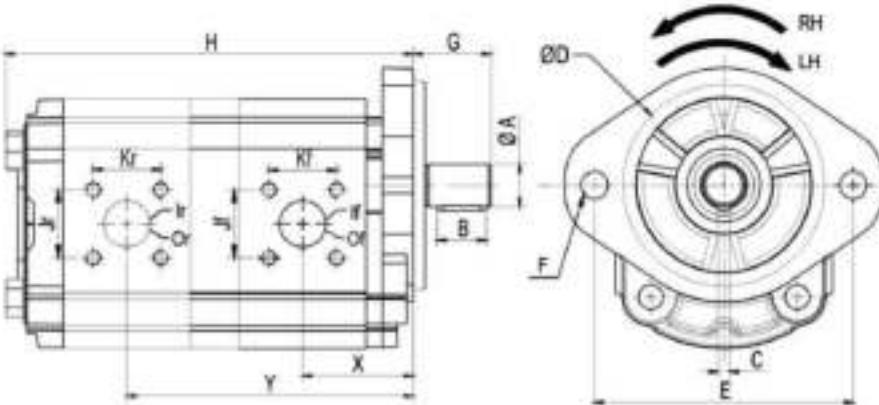
1	Customer
2	Pump Model
3	Flow (lpm/min)
4	Application
5	Rated Speed (RPM)
6	Working Pressure
7	Direction of Rotation
8	Oil used
9	Oil Seal Requirement: Single seal Double seal
10	A - Drive shaft details
11	B - Type of key
12	C - Key Dimension
13	D - Bore/dia
14	E - PCD
15	F - No. of holes & dim.
16	G - Length as per dwg
17	H - Length as per dwg
18	X - Length as per dwg
19	Y - Length as per dwg
20	I - Inlet port details
21	O - Outlet port details
22	K - CTC of hole in X
23	J - CTC of hole in Y

Remark / Suggestion :

Modification if any :

Imported pump details :

QUESTIONNAIRE - FOR MULTI STAGE PUMP



1	Customer
2	Pump Model
3	Flow (lpm/min)
4	Application
5	Rated Speed (RPM)
6	Working Pressure
7	Direction of Rotation
8	Oil used
9	Oil Seal Requirement: Single seal Double seal
10	A - Drive shaft details
11	B - Type of key
12	C - Key Dimension
13	D - Bore/dia
14	E - PCD
15	F - No. of holes & dim.
16	G - Length as per dwg
17	H - Length as per dwg
18	X - Length as per dwg
19	Y - Length as per dwg
20	I - Inlet port front pump
21	OF - O/D of hole front pump in X
22	JF - CTC of hole front pump in Y
23	IR - Inlet port of rear pump
24	OR - O/D of hole rear pump
25	KR - CTC of hole rear pump in X
26	JR - CTC of hole rear pump in Y

Remark / Suggestion :

Modification if any :

Imported pump details :