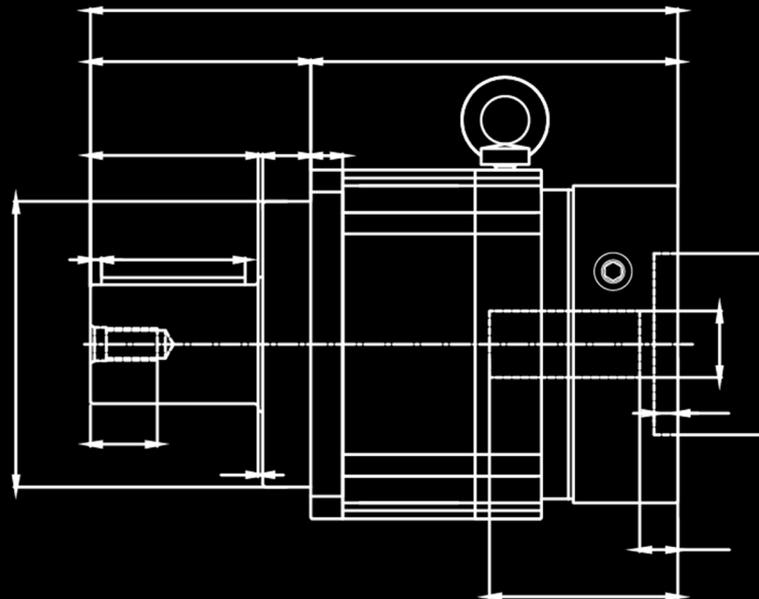




PRECISION PLANETARY GEARBOX CATALOGUE





Index

CHIARAVALLI LINEAR CENTER
PRECISION PLANETARY GEARBOX

| | |
|-----|--------------------------|
| 2 | Introduction |
| 4 | Product introduction |
| 13 | FAB |
| 27 | FABR |
| 41 | FAF |
| 53 | FAFR |
| 65 | FAD |
| 79 | FADR |
| 93 | FB/FE |
| 115 | FBR/FER |
| 139 | FG/FGA |
| 159 | FGR/FGAR |
| 175 | FAT |
| 199 | Installation instruction |
| 201 | Sales condition |



CHIARAVALLI LINEAR CENTER



THE AUTOMATION HUB OF CHIARAVALLI GROUP

Chiaravalli Linear Center was established as a center of excellence dedicated to linear motion and industrial automation within Chiaravalli Group. A project developed with a clear objective: to provide machine builders with a highly specialized reference point, combining a wide product range, strong technical expertise, and real application-oriented support.

As part of an international industrial group with a solid manufacturing structure and a commercial presence in more than 26 countries, Chiaravalli Linear Center represents the natural evolution of Chiaravalli's offering toward advanced automation applications. Not just components, but solutions designed to simplify the work of designers and enhance machine performance.

The strength of Chiaravalli Linear Center lies in its consultative approach: from application analysis to dedicated technical support and the availability of ready-to-use solutions from stock. This model helps reduce development time, increase design reliability, and confidently address increasingly demanding markets.

The introduction of precision planetary gearboxes fits seamlessly into this growth path. It is a strategic expansion that further strengthens Chiaravalli Linear Center's role as a key partner for modern automation, where precision, dynamics, and efficiency are essential requirements.



Discover more,
scan the QR code.

CHIARAVALLI LINEAR CENTER



PRECISION PLANETARY GEARBOXES: WHERE PERFORMANCE MAKES THE DIFFERENCE

Chiaravalli Linear Center precision planetary gearboxes are designed to meet the needs of advanced applications where motion control, repeatability, and energy efficiency are critical.

Thanks to their planetary architecture, these gearboxes deliver an optimal combination of high torque density, compact dimensions, and outstanding efficiency. Extremely low backlash and high torsional stiffness make them ideal for high-dynamic machines, precise positioning systems, and fast, repeatable duty cycles.

Build quality is engineered for long-term reliability. High-strength alloy steel gears, fully hardened profiles, and carefully engineered solutions ensure stable performance over time, even under continuous and demanding operating conditions. The result is a gearbox that maintains precision, quiet operation, and efficiency throughout its service life.

From an application perspective, precision planetary gearboxes open the door to sectors where traditional solutions are no longer sufficient. Robotics, machine tools, packaging, automated logistics, and the food and pharmaceutical industries are just some of the fields where precision and dynamics become true competitive advantages.

Managed directly by Chiaravalli Linear Center, with dedicated technical support, customization possibilities, and a highly competitive price positioning, precision planetary gearboxes represent a strategic choice for manufacturers looking to raise the technological level of their machines - without compromising on performance, reliability, or economic value.



PRODUCT INTRODUCTION

FAB SERIES



| | | |
|---------------------|---------------|---|
| Available Size | | 042/060/090/090A/115 115A/142/142A/180/220 |
| Rated Output Torque | | 14Nm - 2000Nm |
| Ratio | Single Stages | 3/4/5/6/7/8/10 |
| | Dual Stages | 12/15/20/25/30/35 40/50/60/70/80/100 |
| Backlash | Single Stages | ≤1, ≤3, ≤5 arcmin |
| | Dual Stages | ≤3, ≤5, ≤7 arcmin |

FABR SERIES



| | | |
|---------------------|---------------|---|
| Available Size | | 042/060/090/090A/115 115A/142/142A/180/220 |
| Rated Output Torque | | 14Nm - 2000Nm |
| Ratio | Single Stages | 3/4/5/6/7/8/10/14/20 |
| | Dual Stages | 12/15/20/25/30/35/40/50/60 70/80/100/120/140/160/200 |
| Backlash | Single Stages | ≤2, ≤4, ≤6 arcmin |
| | Dual Stages | ≤4, ≤7, ≤9 arcmin |

FAD SERIES



| | | |
|---------------------|---------------|---|
| Available Size | | 047/064/090/090A/110 100A/140/140A/200/255 |
| Rated Output Torque | | 14Nm - 2000Nm |
| Ratio | Single Stages | 4/5/6/7/8/10 |
| | Dual Stages | 20/25/35/40/50/60 70/80/100 |
| Backlash | Single Stages | ≤1, ≤3, ≤5 arcmin |
| | Dual Stages | ≤3, ≤5, ≤7 arcmin |

FADR SERIES



| | | |
|---------------------|---------------|--|
| Available Size | | 047/064/090/090A/110 100A/140/140A/200/255 |
| Rated Output Torque | | 14Nm - 2000Nm |
| Ratio | Single Stages | 4/5/6/7/8/10/14/20 |
| | Dual Stages | 20/25/35/40/50/60/70/80 100/120/140/160/200 |
| Backlash | Single Stages | ≤2, ≤4, ≤6 arcmin |
| | Dual Stages | ≤4, ≤7, ≤9 arcmin |

FB SERIES



| | | |
|---------------------|---------------|---|
| Available Size | | 042/060/090/090A/115 115A/142/142A/180/220 |
| Rated Output Torque | | 14Nm - 2000Nm |
| Ratio | Single Stages | 3/4/5/6/7/8/10 |
| | Dual Stages | 12/15/20/25/30/35 40/50/60/70/80/100 |
| Backlash | Single Stages | ≤5 arcmin |
| | Dual Stages | ≤7 arcmin |

FBR SERIES



| | | |
|---------------------|---------------|---|
| Available Size | | 042/060/090/090A/115 115A/142/142A/180/220 |
| Rated Output Torque | | 40Nm - 650Nm |
| Ratio | Single Stages | 3/4/5/6/7/8/10/14/20 |
| | Dual Stages | 12/15/20/25/30/35/40/50/60 70/80/100/120/140/160/200 |
| Backlash | Single Stages | 10 arcmin |
| | Dual Stages | 12 arcmin |

FE SERIES



| | | |
|---------------------|---------------|---|
| Available Size | | 070/090/090A/120/120A 155/155A/205/235 |
| Rated Output Torque | | 40Nm - 2000Nm |
| Ratio | Single Stages | 3/4/5/6/7/8/10 |
| | Dual Stages | 12/15/20/25/30/35/40 50/60/70/80/100 |
| Backlash | Single Stages | ≤5 arcmin |
| | Dual Stages | ≤7 arcmin |

FER SERIES



| | | |
|---------------------|---------------|---|
| Available Size | | 070/090/090A/120/120A 155/155A/205/235 |
| Rated Output Torque | | 40Nm - 650Nm |
| Ratio | Single Stages | 3/4/5/6/7/8/10/14/20 |
| | Dual Stages | 12/15/20/25/30/35/40/50/60 70/80/100/120/140/160/200 |
| Backlash | Single Stages | 10 arcmin |
| | Dual Stages | 12 arcmin |



PRODUCT INTRODUCTION

FG SERIES



| | | |
|---------------------|---------------|---|
| Available Size | | 040/060/080/080A 120/120A/160/160A |
| Rated Output Torque | | 14Nm - 650Nm |
| Ratio | Single Stages | 3/4/5/6/7/8/10 |
| | Dual Stages | 12/15/20/25/30/35/40 50/60/70/80/100 |
| Backlash | Single Stages | ≤8 arcmin |
| | Dual Stages | ≤10 arcmin |

FGR SERIES



| | | |
|---------------------|---------------|---|
| Available Size | | 060/080/080A/120 120A/160/160A |
| Rated Output Torque | | 40Nm - 650Nm |
| Ratio | Single Stages | 3/4/5/6/7/8/10/14/20 |
| | Dual Stages | 12/15/20/25/30/35/40/50/60 70/80/100/120/140/160/200 |
| Backlash | Single Stages | 13 arcmin |
| | Dual Stages | 15 arcmin |

FGA SERIES



| | | |
|---------------------|---------------|---|
| Available Size | | 040/060/080/080A/120 120A/160/160A |
| Rated Output Torque | | 40Nm - 650Nm |
| Ratio | Single Stages | 3/4/5/6/7/8/10 |
| | Dual Stages | 12/15/20/25/30/35/40 50/60/70/80/100 |
| Backlash | Single Stages | ≤8 arcmin |
| | Dual Stages | ≤10 arcmin |

FGAR SERIES



| | | |
|---------------------|---------------|---|
| Available Size | | 060/080/080A/120 120A/160/160A |
| Rated Output Torque | | 40Nm - 650Nm |
| Ratio | Single Stages | 3/4/5/6/7/8/10/14/20 |
| | Dual Stages | 12/15/20/25/30/35/40/50/60 70/80/100/120/140/160/200 |
| Backlash | Single Stages | 13 arcmin |
| | Dual Stages | 15 arcmin |

FAF SERIES



| | | |
|---------------------|---------------|---|
| Available Size | | 060/075/075A/100 100A/140/140A/180 |
| Rated Output Torque | | 14Nm - 2000Nm |
| Ratio | Single Stages | 3/4/5/6/7/8/10 |
| | Dual Stages | 12/15/20/25/30/35 40/50/60/70/80/100 |
| Backlash | Single Stages | ≤1, ≤3, ≤5 arcmin |
| | Dual Stages | ≤3, ≤5, ≤7 arcmin |

FAFR SERIES



| | | |
|---------------------|---------------|---|
| Available Size | | 060/075/075A/100 100A/140/140A/180 |
| Rated Output Torque | | 14Nm - 2000Nm |
| Ratio | Single Stages | 3/4/5/6/7/8/10/14/20 |
| | Dual Stages | 12/15/20/25/30/35/40/50/60 70/80/100/120/140/160/200 |
| Backlash | Single Stages | ≤2, ≤4, ≤6 arcmin |
| | Dual Stages | ≤4, ≤7, ≤9 arcmin |

FAT SERIES



| | | |
|---------------------|---------------|--------------------------------------|
| Available Size | | 065/075/090/110/170/210 |
| Rated Output Torque | | 12Nm - 1020Nm |
| Ratio | Single Stages | 4/5/6/7/8/10/15/20 |
| | Dual Stages | 25/30/35/40/50/75/100 120/150/200 |
| Backlash | Single Stages | ≤6 arcmin |
| | Dual Stages | ≤10 arcmin |
| | Triple Stages | ≤12 arcmin |



PRODUCTS FEATURES



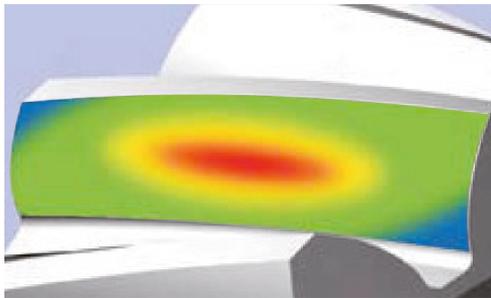
The transmission interface of the planetary gear adopts full needle rolling design without cage, increasing the contact area to improve the structural rigidity and output torque.



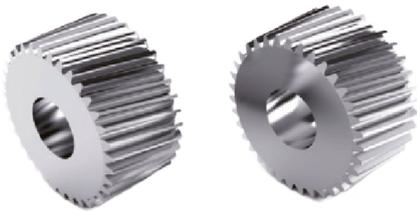
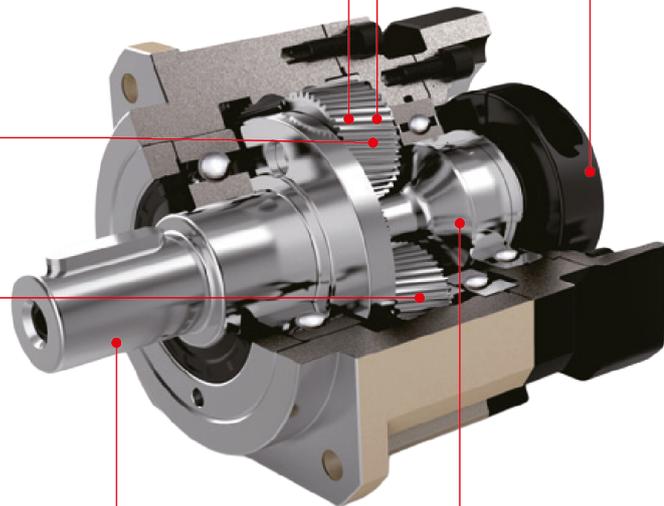
The gearbox mechanism adopts a helical gear design, and its tooth meshing rate is more than twice that of ordinary spur gears. It features with smooth operation, low noise, high output torque and low backlash.



The connection between the input shaft and the motor adopts a collet-type locking mechanism and dynamic balance analysis to ensure the concentricity of the interface and power transmission with zero-backlash at high input speeds.



The finite element analysis of gear strength is carried out by ANSYS technology, and the shape and lead of the tooth surface are modified to reduce the impact and noise of gear meshing and increase the service life of the gear system.



The gear material is made of high-quality alloy steel and treated with carbon and ammonia coinfiltration to obtain the best gear resistance and toughness.



The planetary frame and output shaft are designed with an integrated double support structure to ensure maximum torsional rigidity.



The sun gear and input shaft are integrated to ensure maximum torsional rigidity and zero back lash power transmission at high input speeds.



PRODUCT OVERVIEW

PRODUCT FEATURE

Precision planetary gearbox is a new-generation of product with a compromise of advanced technology both at home and abroad, its main features are as follows:

1. Low Noise: Under 65db.
2. Low Backlash: Single-stage ≤ 1 arcmin; Dual-stage ≤ 3 arcmin.
3. High Efficiency: Single-stage $\geq 95\%$; Dual-stage $\geq 92\%$.
4. High Input Speed: Up to 8000 RPM.
5. High Torque: High output torque density.
6. High Stability: Employs high tensile strength alloy steel. Gear hardening is made for the entire gear instead of only surface hardening, which extends gear service life and maintain high accuracy as new after a long period of operation.
7. High Speed Reduction Ratio: The gear reducer is a modular design. The planetary gear box can be connected. Speed reduction ratio is over 1:1000.

PRECISION USAGE

Precision planetary gearbox is widely used in the following industries:

1. Aerospace, military industry.
2. Medical health, electronic information industry.
3. Industrial robots, production automation, CNC manufacturing industry.
4. Motor, textile, printing, food, metallurgy, environmental engineering, warehouse logistics industry.



SELECTION GUIDE

PLANETARY GEARBOX SELECTION

The selection of planetary gearbox should follow the principle of combining applicability and economy, that is, the technical indicators of the planetary gearbox can not only meet the requirements of the equipment but also save costs. "Passing" and "failing" will bring waste of costs. Improper selection is the main reason for the failure of the gearbox, so it is very important to choose the planetary gearbox correctly.

The selection of gearbox should consider its internal performance indicators such as structural type, bearing capacity, reduction ratio, output speed, axial force, radial force, torsional rigidity, backlash, etc., and should also fully consider external factors such as installation form, working conditions, and working environment. For your convenience, please refer to the following steps to achieve accurate and fast selection.

STEP 1: DETERMINATION OF GEARBOX SPECIFICATIONS

| STEP | INSTRUCTION | CODE | PARAMETER CALCULATION | | | | | | |
|--------------|--|---------------------|--|--------------------|---------------------|------|------|------|------|
| 1 | Service factor of the equipment | f_1 | Loading Classification | Running per hour Z | Using f_s | | | | |
| | | | | | Running per day (h) | | | | |
| | | | Uniform | Z < 10 | 0,85 | 0,95 | 1,00 | 1,20 | 1,60 |
| | | | | 10 < Z < 30 | 0,90 | 1,10 | 1,15 | 1,40 | 1,80 |
| | | | | 30 < Z < 100 | 1,00 | 1,20 | 1,30 | 1,60 | 2,00 |
| | | | Medium Shock | Z < 10 | 1,00 | 1,20 | 1,30 | 1,60 | 2,00 |
| | | | | 10 < Z < 30 | 1,10 | 1,35 | 1,45 | 1,80 | 2,20 |
| | | | | 30 < Z < 100 | 1,20 | 1,45 | 1,60 | 2,00 | 2,40 |
| | | | Heavy Shock | Z < 10 | 1,20 | 1,45 | 1,60 | 2,00 | 2,40 |
| | | | | 10 < Z < 30 | 1,30 | 1,55 | 1,75 | 2,20 | 2,50 |
| 30 < Z < 100 | 1,40 | 1,65 | | 1,90 | 2,40 | 2,80 | | | |
| 2 | Determination of torque | T_{2n} | $T_{2N} > T_{c2}$ (Rated torque of selected gearbox $T_{2N} >$ Calculated torque T_{c2}) $T_{c2} = T_r \times f_s$ (T_{c2} - Calculated torque, T_r - Actual required torque, f_s - Service factor) | | | | | | |
| 3 | Rated input speed | n_1 | Please refer to the performance data of the gearbox for the maximum allowable output speed. | | | | | | |
| 4 | Determine the ratio | i | $i = n_1 / n_2$ | | | | | | |
| 5 | Efficiency of the gearbox | η | $L1 \geq 95\%$, $L2 \geq 92\%$ | | | | | | |
| 6 | The input power of the gearbox is calculated based on the torque or power required by the driven equipment | P_1 | $P_1 = (T_2 \times n_1) / (9550 \times i \times \eta)$ $p_1 = p_2 \div \eta$ | | | | | | |
| 7 | The specifications of the gearbox are determined according to the calculated transmission torque | T_{2n} , P_{1n} | $T_{2N} \geq T_2 \times f_1 \times f_2$ $P_{1N} \geq p_1 \times f_1 \times f_2$ | | | | | | |
| 8 | Output shaft radial force and axial force check | F_r , F_a | Check the performance data table in the product manual. The comparison should be less than the maximum radial force and axial force of the gearbox. For frequent start-stop operation, the enhanced type should be selected. | | | | | | |
| 9 | Confirm the application environment | | Protection level, operating temperature, chemical environment, etc | | | | | | |
| 10 | Check the installation method according to the space | | Inline type or with right angle type | | | | | | |
| 11 | Confirm the model of the gearbox | | According to the performance data sheet, input and output mode, etc., determine the specific series, model, specification and accessories | | | | | | |

Instruction: n_2 , P_2 is the ratio and power for equipment which has been driven;
 $P_1 = P_2$ is the needed power and torque for equipment which has been driven;
 $P_{1N} = T_{2N}$ is the actual needed power and torque which has been driven.

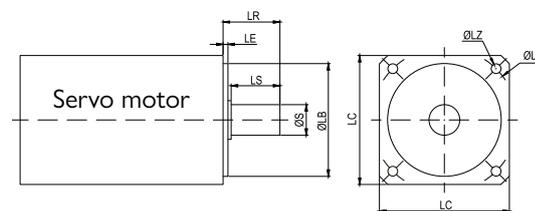


SELECTION GUIDE

STEP 2: DETERMINE THE MOTOR, MOTOR MANUFACTURER, SPECIFICATION MODEL, PERFORMANCE AND EXTERNAL DIMENSION

Motor Model: MHMD-082G1U

| | | |
|-----------------|------|--------------------|
| Output Power | 0.75 | kW |
| Rated Torque | 2.4 | NM |
| Max. Torque | 7.1 | NM |
| Rated Speed | 3000 | RPM |
| Max. Speed | 4500 | RPM |
| Inertia | 6.6 | Kg/cm ² |
| Shaft Dia | Ø19 | mm |
| Diameter | Ø80 | mm |
| Lug boss | Ø70 | mm |
| Center distance | Ø90 | mm |



Notice for ordering

Motor's type & measurement

Planetary gearbox's type

Torque

Ratio

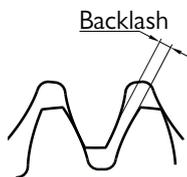
Backlash

Mounting position & others requir

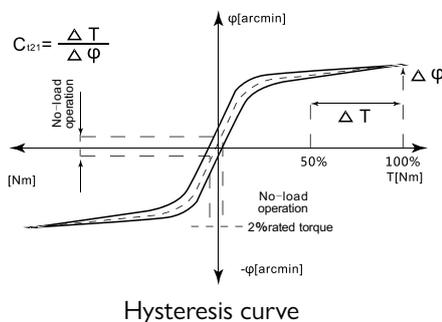
SELECTION GUIDE

BASE CONCEPTS OF PRECISION PLANETARY GEARBOX

| | |
|---------------------------------------|---|
| Ratio | Input speed/Output speed |
| n1 [rpm] Rated input speed | The driving speed of the gearbox, if the gearbox is directly connected to the motor, the speed value is the same as the motor speed, the rated input speed in this book is measured under the condition that the ambient temperature is 20 °C, please reduce the speed n1 when the ambient temperature is higher. |
| n2 [rpm] Output speed | The output speed is calculated by the following formula from the input speed n1 and the gear ratio i: $n_2 = n_1 / i$. |
| Stages | Number of sets of planetary gears. Since one set of planetary gears cannot meet the larger transmission ratio, sometimes two or three sets are needed to meet the user's demand for a larger transmission ratio, that is, the larger the reduction ratio, the more stages. Due to the increase in the number of planetary gears, the length of the two- or three-stage gearbox will increase and the efficiency will decrease. |
| Efficiency | Refers to the transmission efficiency of the gearbox under the condition of rated load. The larger the reduction ratio, the more stages, and the lower the efficiency. |
| Average lifetime | It refers to the gearbox under the rated load, and the rated input speed is the continuous working time of the gearbox. |
| Precise positioning | The key to achieving precise positioning in high-speed mechanical reciprocating motion is to minimize the angular deviation caused by the movement. Positioning accuracy depends on two values, one is the loading related deflection angle, which involves the return clearance and torsional stiffness; The other is the deflection angle related to motion control, which involves the problem of synchronization deviation. |
| Backlash | The maximum deviation angle between the output shaft of the gearbox and the input shaft is fixed when measuring, and then a certain torque ($2\%T_{2n}$) is loaded with a torque meter in the output device to overcome the friction force in the gearbox. |



| | |
|-------------------------|--|
| Hysteresis curve | The hysteresis curve is to obtain the torsional stiffness of the gearbox, and the hysteresis curve is obtained by detection. During the detection, the input end of the gearbox is fixed first, and then the maximum output torque T_{2B} of is continuously loaded in the two rotation directions of the output end, and then gradually unloaded, and the aberration angle of the torque is recorded by the instrument, and the curve obtained is a closed curve, from which the return clearance and torsional stiffness of the gearbox can be calculated. |
|-------------------------|--|





SELECTION GUIDE

BASE CONCEPTS OF PRECISION PLANETARY GEARBOX

| | | | | | | | | | |
|---|--|----------------|-------------|----------------------|-----------|-------------|-----------------------|-------------------|-----|
| Inertia | The values in this catalogue refer to the input terminals. A value that represents the feature of an object's efforts to keep itself in a state of rotation (or stationary or rotation). | | | | | | | | |
| The proportion of inertia | It refers to the ratio between the load inertia and the inertia of the transmission system (motor plus gearbox). This ratio determines the controllability of the system. The larger the λ value, that is, the greater the difference between the moment of inertia, the more difficult it is to accurately control the highly dynamic action process, so it is recommended to control the λ value at <5 as much as possible. The gearbox can reduce the load inertia by $1/i^2$. | | | | | | | | |
| Noise | The unit is decibel (dB). The value is measured when the input revis 3000 r/m without load and at the distance of one meter from the gearboxes. | | | | | | | | |
| Operating conditions | <table border="0"> <tr> <td style="background-color: #f2f2f2;">Operating temp</td> <td>-10°C~+90°C</td> </tr> <tr> <td>Degree of protection</td> <td>IP54/IP65</td> </tr> <tr> <td style="background-color: #f2f2f2;">Lubrication</td> <td>Life time lubrication</td> </tr> <tr> <td>Mounting position</td> <td>Any</td> </tr> </table> | Operating temp | -10°C~+90°C | Degree of protection | IP54/IP65 | Lubrication | Life time lubrication | Mounting position | Any |
| Operating temp | -10°C~+90°C | | | | | | | | |
| Degree of protection | IP54/IP65 | | | | | | | | |
| Lubrication | Life time lubrication | | | | | | | | |
| Mounting position | Any | | | | | | | | |
| T_{2N} [Nm] Rated output torque | The torque (no wear) that can be loaded on the gearbox for a long time (continuous duty system), the conditions should meet the uniform load, the safety factor $S=1$, the following specifications of FG160/FAB142, and the theoretical life is 20,000 hours: The theoretical life of FAB180 and above is 10,000 hours: the T_N value complies with the ISODP6336 gear standard and ISO281 bearing standard. | | | | | | | | |
| [Nm] Acceleration torque | Refers to the maximum torque allowed to be loaded to the output in a short time when the duty cycle is less than 1000 times per hour. When the duty cycle is more than 1000 times per hour, the impact factor must be considered. The acceleration torque is a maximum value in the selection of the cyclic working system, and the acceleration torque in actual use must be less than T_{2B} , otherwise the life of the gearbox will be shortened. | | | | | | | | |
| [Nm] Emergency braking torque | It refers to the maximum torque that can be loaded at the output end of the gearbox, which can be loaded 1000 times during the life of the reducer, and must not exceed 1000 times. (Note: The following specifications of FG160/FAB142 are: $T_{2HOT}=2 \cdot T_{2B}$, FAB180 and above: $T_{2HOT}=1.5 \cdot T_{2B}$) | | | | | | | | |
| T₀₁₂ [Nm] No-load torque | Refers to the moment loaded onto the gearbox to overcome the friction in the gearbox. | | | | | | | | |
| T_{2B} Maximum output torque | Rit refers to the output torque that the gearbox can withstand under static conditions or frequent start-up conditions, usually referring to peak load or starting load. | | | | | | | | |
| T₂ [Nm] Actual torque required | The required torque depends on the actual working conditions of the application, and the rated torque T_{2N} of the proposed gearbox must be greater than this torque. | | | | | | | | |
| T_{c2} [Nm] Torque for calculation | It will be used in the selection of the gearbox, which can be obtained from the actual required torque T_2 and the coefficient f_s , according to the following formula: $T_{c2}=T_2 \cdot f_s \leq T_N$ | | | | | | | | |



SELECTION GUIDE

BASE CONCEPTS OF PRECISION PLANETARY GEARBOX

| | |
|--|--|
| [Nm] Roll torque | Refers to the moment of axial and radial force acting on the radial force point on the bearing at the output end. It is calculated as follows: $M_{2Kmax}=[F_a*y_2+F_r*(X_2+Z_2)]/100$ |
| Fa[N] Axial force | It refers to a force parallel to the axis, and when its application point has a certain axial deviation (Y_2) from the output shaft end, an additional bending moment will be formed, and when the axial force exceeds the rated value shown in the catalog, this bending force must be offset by a coupling. |
| Fr[N] Radial force | Refers to a force acting perpendicular to an axial force, which is parallel to the output shaft, and its point of action is at an axial distance (X_2) from the shaft end. This point becomes a lever point, and the transverse force forms a bending moment. |
| Axial extension radial load, axial load | The additional basis for the selection of the gearbox is the radial load and the axial load on the protruding end of the output shaft. The strength of the shaft and the load-bearing capacity determine the radial load of the allowable shaft extension. The maximum permissible value given in the product catalogue refers to the force acting at the midpoint of the shaft extension (i.e. at $1/2L$) in the most unfavorable direction. When the force is not at the midpoint, the closer to the shoulder is, the greater the allowable radial load; Conversely, the farther the application point is from the shoulder, the less radial load is allowed. |
| s Safety factor | The safety factor is equal to the ratio of the rated input power of the gearbox to the power of the motor. |
| f₁ Use factor | The use factor represents the application characteristics of the gearbox, which takes into account the type of load of the gearbox and the daily operating hours. |
| [Nm/Arcmin] Torsional stiffness | It is defined by the ratio between the loading moment and the resulting torsion angle. It indicates how much torque is needed to rotate the output shaft by an arc. The torsional stiffness is derived from the hysteresis curve. On the graph, you only need to focus on the range of 50% to 100% of T_{2B} , where the curve can be seen as a straight line. |
| [Nm] Installation torque | The assembly of the gearbox and the connection and installation of the motor and the gearbox (the input shaft adopts the requirement of elastic coupling), there are torque requirements. It is recommended to use a torque wrench to complete the installation steps. |
| Pay special attention | The size of all the input ends of the gearbox given in this catalogue is for reference only, and the specific size is determined by the size of the shaft extension end of the adapted motor, so the physical dimensions are different from the catalogue, and the standard drawings of the ordered goods shall prevail, and the output size of the gearbox in the absence of special designation shall prevail in this catalogue. The weights of all gearboxes given in this catalogue are approximate, and the actual weight is subject to the actual product. |

CHIARAVALLI LINEAR CENTER

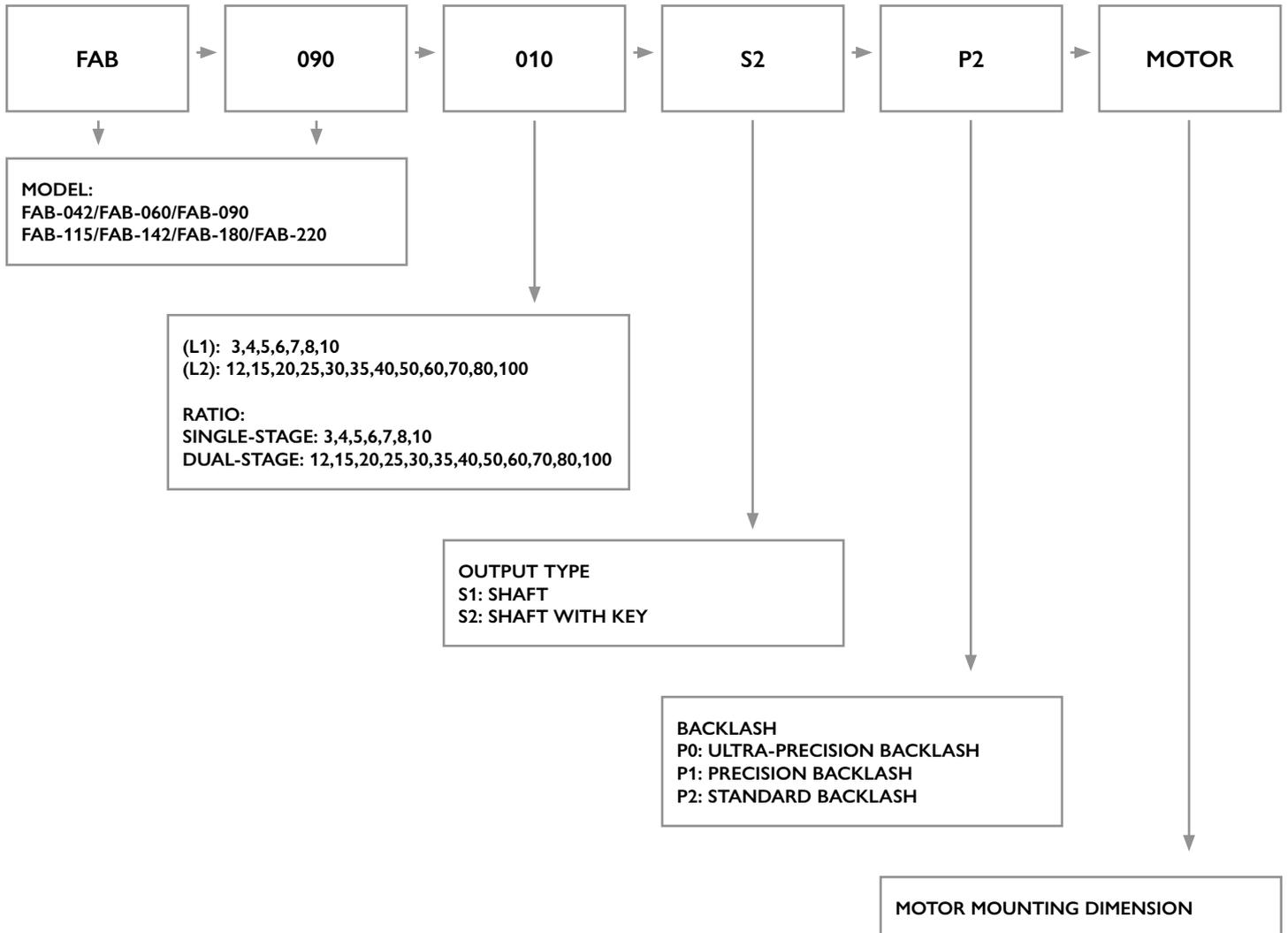
**PRECISION PLANETARY GEARBOX
FAB SERIES**



PRECISION PLANETARY GEARBOX FAB SERIES

MODEL DESCRIPTION

FAB-090-010-S2-P2-19-70-90-M6-42





PRECISION PLANETARY GEARBOX FAB SERIES

TECHNICAL SPECIFICATION

| MODEL | | STAGE | RATIO | FAB042 | FAB060 | FAB090 | FAB090A | FAB115 | FAB115A | FAB142 | FAB142A | FAB180 | FAB220 |
|--|-----------|-------|--------|---------------------------------|--------|--------|---------|--------|---------|--------|---------|--------|--------|
| Rated output torque | Nm | 1 | 3 | 20 | 55 | 130 | - | 208 | - | 342 | - | 588 | 1,140 |
| | | | 4 | 19 | 50 | 140 | - | 290 | - | 542 | - | 1,050 | 1,700 |
| | | | 5 | 22 | 60 | 160 | - | 330 | - | 650 | - | 1,200 | 2,000 |
| | | | 6 | 20 | 55 | 150 | - | 310 | - | 600 | - | 1,100 | 1,900 |
| | | | 7 | 19 | 50 | 140 | - | 300 | - | 550 | - | 1,100 | 1,800 |
| | | | 8 | 17 | 45 | 120 | - | 260 | - | 500 | - | 1,000 | 1,600 |
| | | 10 | 14 | 40 | 100 | - | 230 | - | 450 | - | 900 | 1,500 | |
| | | 12 | 20 | 55 | 130 | 130 | 208 | 208 | 342 | 342 | 588 | 1,140 | |
| | | 15 | 20 | 55 | 130 | 130 | 208 | 208 | 342 | 342 | 588 | 1,140 | |
| | | 20 | 19 | 50 | 140 | 140 | 290 | 290 | 542 | 542 | 1,050 | 1,700 | |
| | | 25 | 22 | 60 | 160 | 160 | 330 | 330 | 650 | 650 | 1,200 | 2,000 | |
| | | 30 | 22 | 55 | 130 | 130 | 208 | 208 | 342 | 342 | 588 | 1,140 | |
| | | 35 | 22 | 60 | 160 | 160 | 330 | 330 | 650 | 650 | 1,200 | 2,000 | |
| | | 40 | 22 | 50 | 140 | 140 | 290 | 290 | 542 | 542 | 1,050 | 1,700 | |
| | | 50 | 22 | 60 | 160 | 160 | 330 | 330 | 650 | 650 | 1,200 | 2,000 | |
| | | 60 | 20 | 55 | 150 | 150 | 310 | 310 | 600 | 600 | 1,100 | 1,900 | |
| | | 70 | 19 | 50 | 140 | 140 | 300 | 300 | 550 | 550 | 1,100 | 1,800 | |
| | | 80 | 17 | 45 | 120 | 120 | 260 | 260 | 500 | 500 | 1,000 | 1,600 | |
| 100 | 14 | 40 | 100 | 100 | 230 | 230 | 450 | 450 | 900 | 1,500 | | | |
| T _{2B} /Max. output torque | Nm | 1,2 | 3~100 | 3 times the rated output torque | | | | | | | | | |
| n ₁ /Rated input speed | rpm | 1,2 | 3~100 | 5,000 | 5,000 | 4,000 | 4,000 | 4,000 | 4,000 | 3,000 | 3,000 | 3,000 | 2,000 |
| n _{1B} /Max.input speed | rpm | 1,2 | 3~100 | 10,000 | 10,000 | 8,000 | 8,000 | 8,000 | 8,000 | 6,000 | 6,000 | 6,000 | 4,000 |
| P0/Ultra-precision backlash | arcmin | 1 | 3~10 | - | - | ≤1 | ≤1 | ≤1 | ≤1 | ≤1 | ≤1 | ≤1 | ≤1 |
| | | 2 | 3~100 | - | - | - | - | ≤3 | ≤3 | ≤3 | ≤3 | ≤3 | ≤3 |
| P1/Precision backlash | arcmin | 1 | 3~10 | ≤3 | ≤3 | ≤3 | ≤5 | ≤3 | ≤5 | ≤3 | ≤5 | ≤3 | ≤3 |
| | | 2 | 12~100 | ≤5 | ≤5 | ≤5 | ≤5 | ≤5 | ≤5 | ≤5 | ≤5 | ≤5 | ≤5 |
| P2/Precision backlash | arcmin | 1 | 3~10 | ≤5 | ≤5 | ≤5 | ≤5 | ≤5 | ≤5 | ≤5 | ≤5 | ≤5 | ≤5 |
| | | 2 | 12~100 | ≤7 | ≤7 | ≤7 | ≤7 | ≤7 | ≤7 | ≤7 | ≤7 | ≤7 | ≤7 |
| Torsional rigidity | Nm/arcmin | 1,2 | 3~100 | 3 | 7 | 14 | 14 | 25 | 25 | 50 | 50 | 145 | 225 |
| F _{2rB} ² /Allowable radial force | N | 1,2 | 3~100 | 780 | 1,530 | 3,250 | 3,250 | 6,700 | 6,700 | 9,400 | 9,400 | 14,500 | 50,000 |
| F _{2a1B} ² /Allowable radial force | N | 1,2 | 3~100 | 350 | 630 | 1,300 | 1,300 | 3,000 | 3,000 | 4,000 | 4,000 | 6,200 | 35,000 |
| F _{2a2B} ² /Allowable radial force | N | 1,2 | 3~100 | 390 | 765 | 1,625 | 1,625 | 3,350 | 3,350 | 4,700 | 4,700 | 7,250 | 25,000 |
| Life time | hr | 1,2 | 3~100 | 20,000* | | | | | | | | | |
| η/Efficiency | % | 1 | 3~10 | ≥97% | | | | | | | | | |
| | | 2 | 12~100 | ≥94% | | | | | | | | | |
| Weight | kg | 1 | 3~10 | 0.5 | 1.3 | 3.7 | - | 7.8 | - | 14.5 | - | 29 | 48 |
| | | 2 | 12~100 | 0.8 | 1.9 | 4.1 | 5.3 | 9 | 11.2 | 17.5 | 17.5 | 33 | 60 |
| Operating temperature | °C | 1,2 | 3~100 | -10°~ +90°C | | | | | | | | | |
| lubrication | | 1,2 | 3~100 | Synthetic lubricating grease | | | | | | | | | |
| Ingress protection | | 1,2 | 3~100 | IP65 | | | | | | | | | |
| Mount position | | 1,2 | 3~100 | Any direction | | | | | | | | | |
| (n ₁ =3000rpm)/Noise level | dB | 1,2 | 3~100 | ≤56 | ≤58 | ≤60 | ≤60 | ≤63 | ≤63 | ≤65 | ≤65 | ≤67 | ≤70 |

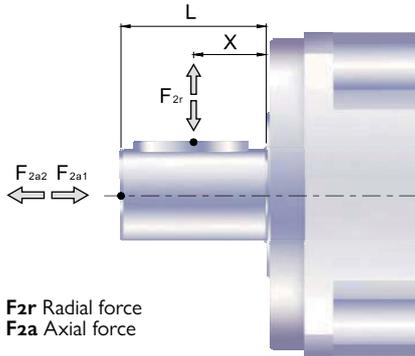
GEARBOX MOMENT OF INERTIA

| MODEL | | STAGE | RATIO | FAB042 | FAB060 | FAB090 | FAB090A | FAB115 | FAB115A | FAB142 | FAB142A | FAB180 | FAB220 |
|-------------------|----------------------|-------|-------|--------|--------|--------|---------|--------|---------|--------|---------|--------|--------|
| Moment of inertia | kg • cm ² | 1 | 3 | 0.03 | 0.16 | 0.61 | - | 3.25 | - | 9.21 | - | 28.98 | 69.61 |
| | | | 4 | 0.03 | 0.14 | 0.48 | - | 2.74 | - | 7.54 | - | 23.67 | 54.37 |
| | | | 5 | 0.03 | 0.13 | 0.47 | - | 2.71 | - | 7.42 | - | 23.29 | 53.27 |
| | | | 6 | 0.03 | 0.13 | 0.45 | - | 2.65 | - | 7.25 | - | 22.75 | 51.72 |
| | | | 7 | 0.03 | 0.13 | 0.45 | - | 2.62 | - | 7.14 | - | 22.48 | 50.97 |
| | | | 8 | 0.03 | 0.13 | 0.44 | - | 2.58 | - | 7.07 | - | 22.59 | 50.84 |
| | | 10 | 0.03 | 0.13 | 0.44 | - | 2.57 | - | 7.03 | - | 22.51 | 50.56 | |
| | | 12 | 0.03 | 0.14 | 0.13 | 0.47 | 0.47 | 2.71 | 2.71 | 7.42 | 7.42 | 7.42 | 23.29 |
| | | 15 | 0.03 | 0.13 | 0.13 | 0.47 | 0.47 | 2.71 | 2.71 | 7.42 | 7.42 | 7.42 | 23.29 |
| | | 20 | 0.03 | 0.13 | 0.13 | 0.47 | 0.47 | 2.71 | 2.71 | 7.42 | 7.42 | 7.42 | 23.29 |
| | | 25 | 0.03 | 0.13 | 0.13 | 0.47 | 0.47 | 2.71 | 2.71 | 7.42 | 7.42 | 7.42 | 23.29 |
| | | 30 | 0.03 | 0.13 | 0.13 | 0.47 | 0.47 | 2.71 | 2.71 | 7.42 | 7.42 | 7.42 | 23.29 |
| | | 35 | 0.03 | 0.13 | 0.13 | 0.47 | 0.47 | 2.71 | 2.71 | 7.42 | 7.42 | 7.42 | 23.29 |
| | | 40 | 0.03 | 0.13 | 0.13 | 0.44 | 0.47 | 2.57 | 2.71 | 7.03 | 7.42 | 7.42 | 23.29 |
| | | 50 | 0.03 | 0.13 | 0.13 | 0.44 | 0.44 | 2.57 | 2.57 | 7.03 | 7.03 | 7.03 | 22.51 |
| | | 60 | 0.03 | 0.13 | 0.13 | 0.44 | 0.44 | 2.57 | 2.57 | 7.03 | 7.03 | 7.03 | 22.51 |
| | | 70 | 0.03 | 0.13 | 0.13 | 0.44 | 0.44 | 2.57 | 2.57 | 7.03 | 7.03 | 7.03 | 22.51 |
| | | 80 | 0.03 | 0.13 | 0.13 | 0.44 | 0.44 | 2.57 | 2.57 | 7.03 | 7.03 | 7.03 | 22.51 |
| 100 | 0.03 | 0.13 | 0.13 | 0.44 | 0.44 | 2.57 | 2.57 | 7.03 | 7.03 | 7.03 | 22.51 | | |

1. Ratio (i=Nin/Nout) - The lifetime will be shortened by half under continuous operation.
2. When the output speed is 100rpm, it applies on the center of the output shaft.

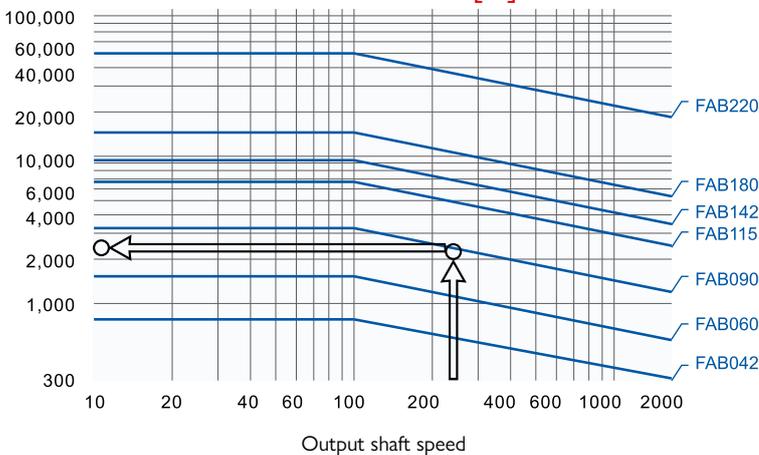
PRECISION PLANETARY GEARBOX FAB SERIES

ALLOWABLE RADIAL AND AXIAL FORCES ON THE OUTPUT SHAFT OF THE GEARBOX



The maximum radial and axial forces that the output shaft of the gearbox can withstand. Looking at the design of internal support bearings, the reducer adopts large-sized bearings and a design with a larger span, which can withstand greater radial and axial loads.

PERMISSIBLE RADIAL FORCE F_{2rB} [N] APPLY FORCE TO THE CENTER OF THE SHAFT

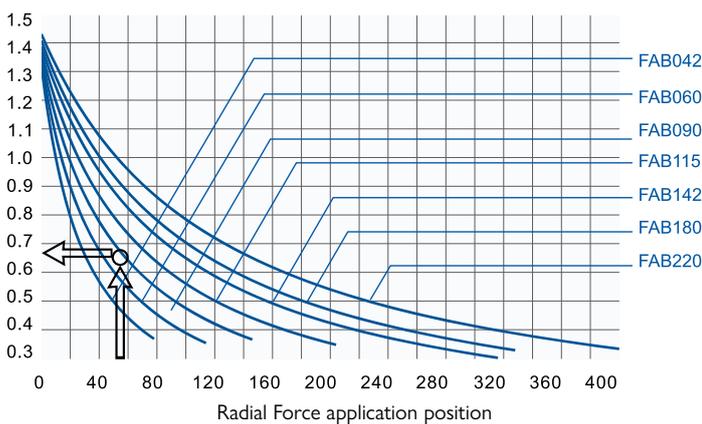


When the radial force F_{2r} is applied to the center of the shaft, i.e. $X=1/2 \times L$, the allowable radial force F_{2rB} that can be withstood by different specifications of reducers with a service life of 20,000hr* under different output speeds is as follows:

$$F_{2a1B} = 0.2 \times F_{2rB}$$

$$F_{2a2B} = 0.1 \times F_{2rB}$$

POSITIONAL LOAD COEFFICIENT



When the radial force F_{2r} is not in the center of the shaft, the closer to the gearbox, that is, $X < 1/2 \times L$, the allowable radial force that can be borne becomes larger, and the farther away from the reducer, i.e., $X > 1/2 \times L$, the allowable force that can be borne becomes smaller.

Radial force
 $F'_{2rB} = K_b \times F_{2rB}$

Axial force
 $F'_{2a1B} = 0.2 \times F'_{2rB}$
 $F'_{2a2B} = 0.1 \times F'_{2rB}$

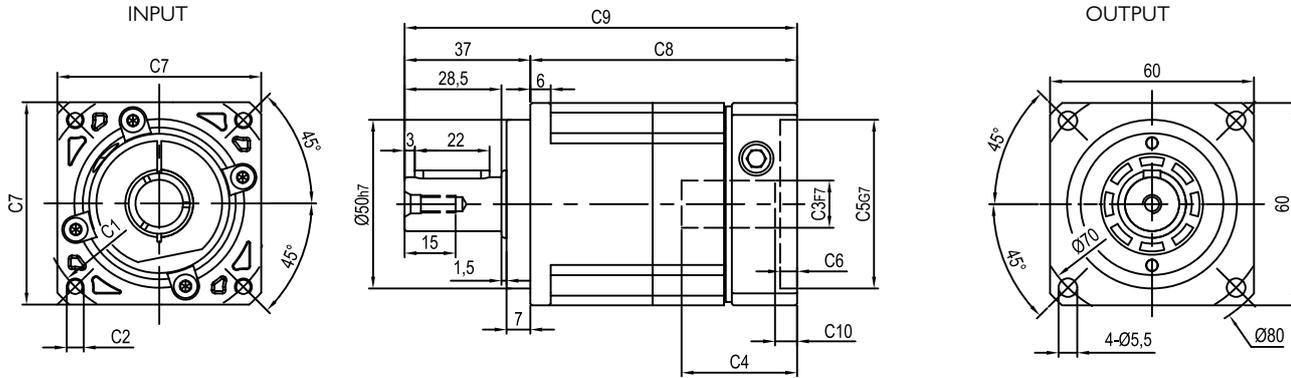
*The lifetime will be shortened by half under continuous operation.



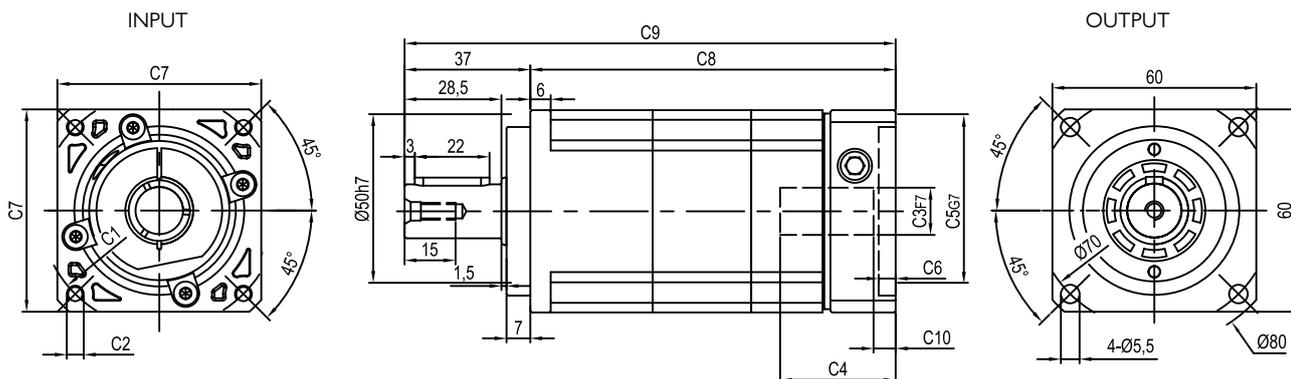
PRECISION PLANETARY GEARBOX FAB SERIES

PRODUCT DIMENSION

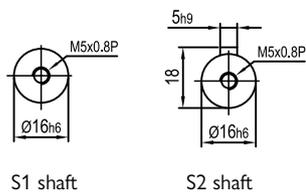
FAB-060-L1



FAB-060-L2



OUTPUT DIAMETER



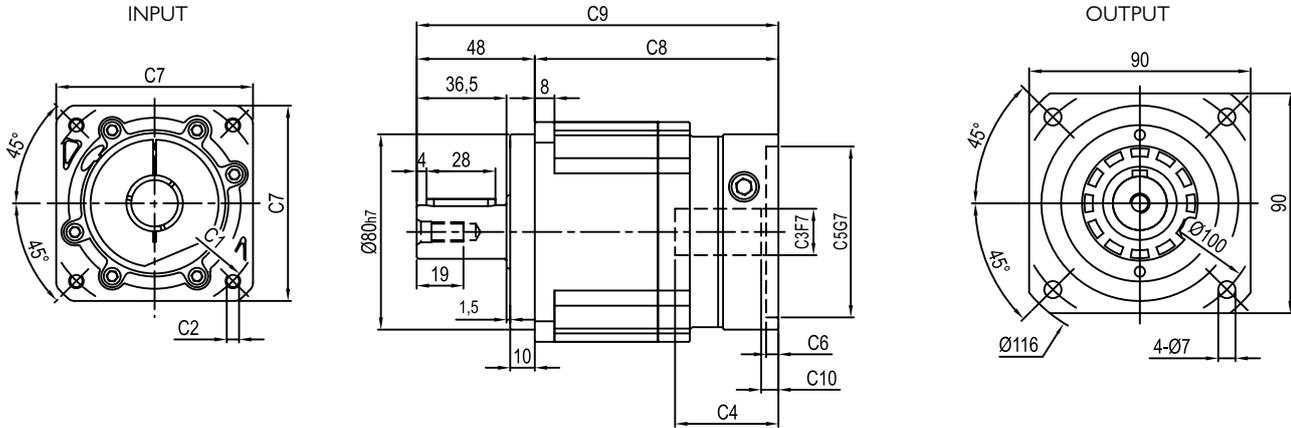
| Size | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 | C10 |
|--------------|-------|---------------------|---------|----|-------|-----|----|-------|-------|------|
| FAB-060-L1 | ø66,7 | 4-M4x10 | ø8 | 34 | ø38,1 | 5 | 60 | 78,5 | 115,5 | 5,5 |
| FAB-060-L2 | | | | | | | | 107,5 | 144,5 | 5,5 |
| FAB-060-L1 | ø70 | 4-M4x10, 4-M5x12 | ø11,ø14 | 34 | ø50 | 5 | 60 | 78,5 | 115,5 | 5,5 |
| FAB-060-L2 | | | | | | | | 107,5 | 144,5 | 5,5 |
| FAB-060M1-L1 | ø90 | 4-M5x12, 4-M6x14 | ø19 | 42 | ø70 | 6,5 | 80 | 85 | 122 | 12 |
| FAB-060M1-L2 | | | | | | | | 114,0 | 151,0 | 12,0 |

- C1~C7 are motor (metric standard) specific dimensions, which could be customized.
- M1: Limit hole (Version number)

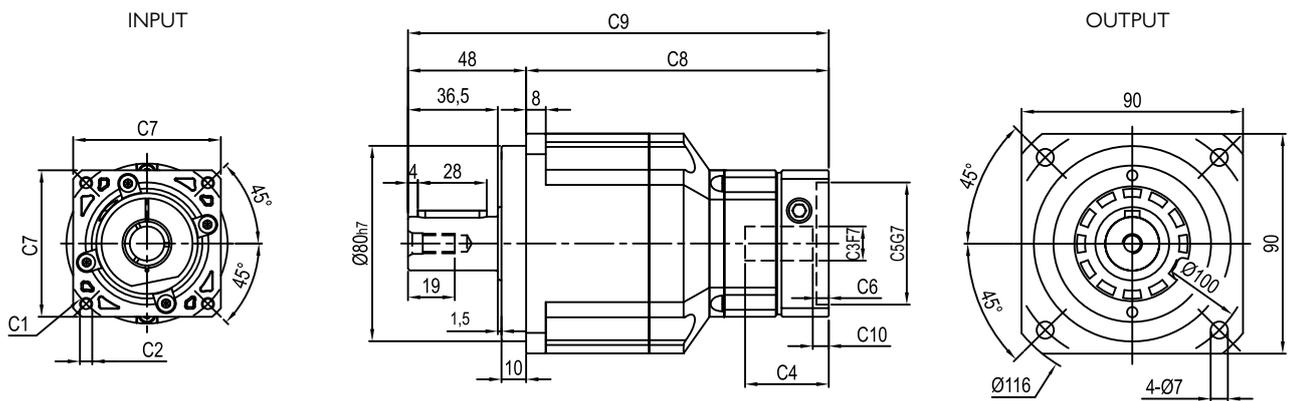
PRECISION PLANETARY GEARBOX FAB SERIES

PRODUCT DIMENSION

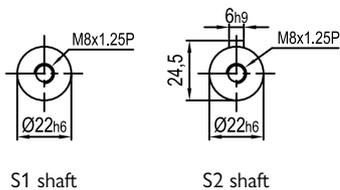
FAB-090-L1



FAB-090-L2



OUTPUT DIAMETER



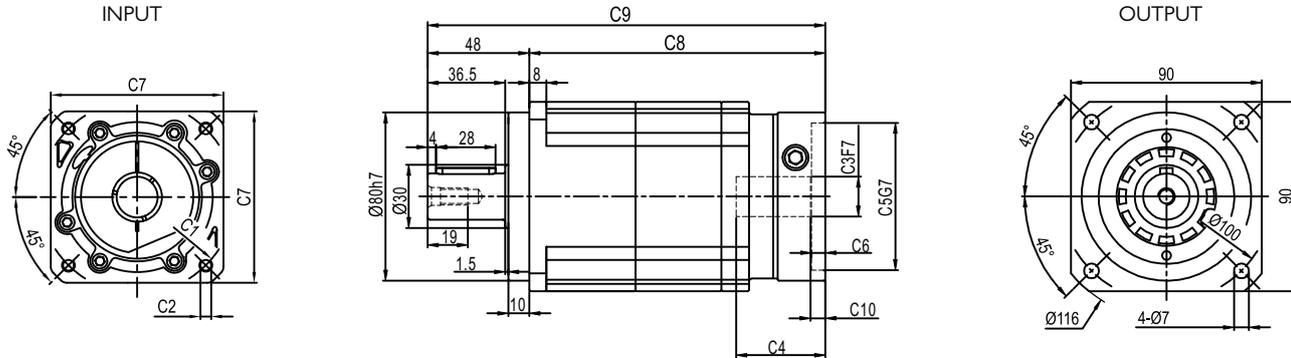
| Size | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 | C10 |
|--------------|--------------------|------------------|--|------|--------------------|-----|-----|-------|-------|------|
| FAB-090-L1 | $\varnothing 90$ | 4-M5x12, 4-M6x14 | $\varnothing 19$ | 42 | $\varnothing 70$ | 6,5 | 80 | 99 | 147 | 7 |
| | $\varnothing 100$ | 4-M6x14 | $\varnothing 16$ | 42 | $\varnothing 80$ | 6,5 | 86 | 99 | 147 | 6 |
| FAB-090M1-L1 | $\varnothing 115$ | 4-M8x20 | $\varnothing 19, \varnothing 22$ | 56,5 | $\varnothing 95$ | 8 | 100 | 114,5 | 162,5 | 16,5 |
| | $\varnothing 145$ | 4-M8x20 | $\varnothing 19, \varnothing 22, \varnothing 24$ | 59 | $\varnothing 110$ | 11 | 130 | 117 | 165 | 19 |
| FAB-090-L2 | $\varnothing 66,7$ | 4-M4x10 | $\varnothing 8$ | 34 | $\varnothing 38,1$ | 5 | 60 | 123 | 171 | 5,5 |
| | $\varnothing 70$ | 4-M4x10, 4-M5x12 | $\varnothing 11, \varnothing 14$ | 34 | $\varnothing 50$ | 5 | 60 | 123 | 171 | 5,5 |
| FAB-090M1-L2 | $\varnothing 90$ | 4-M5x12, 4-M6x14 | $\varnothing 19$ | 42 | $\varnothing 70$ | 6,5 | 80 | 129,5 | 177,5 | 12 |
| | $\varnothing 100$ | 4-M6x14 | $\varnothing 16$ | 42 | $\varnothing 80$ | 6,5 | 86 | 129,5 | 177,5 | 11 |

- C1~C7 are motor (metric standard) specific dimensions, which could be customized.
- M1: Limit hole (Version number)

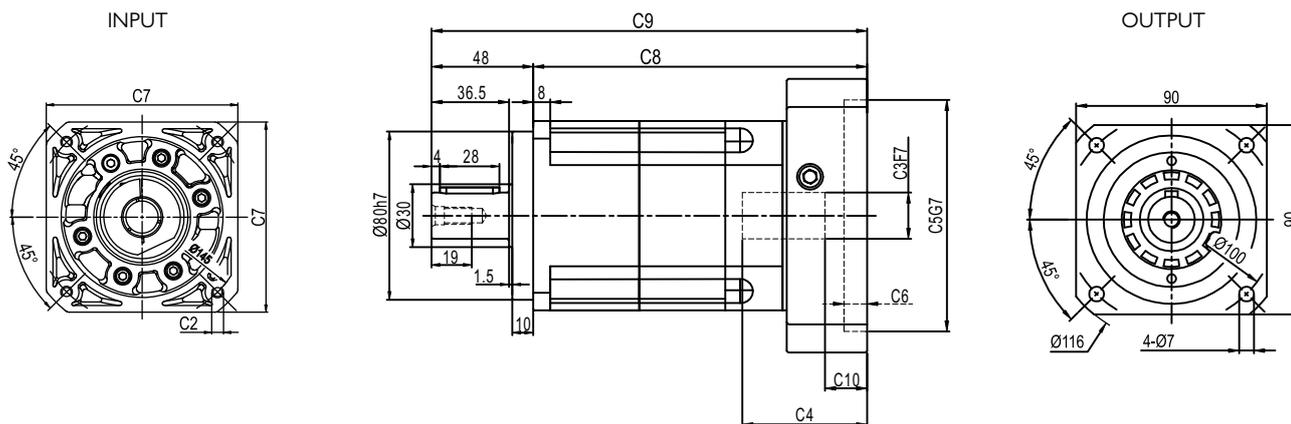
PRECISION PLANETARY GEARBOX FAB SERIES

PRODUCT DIMENSION

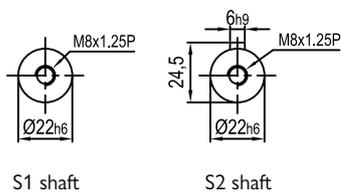
FAB-090A-L2



FAB-090A-L2



OUTPUT DIAMETER



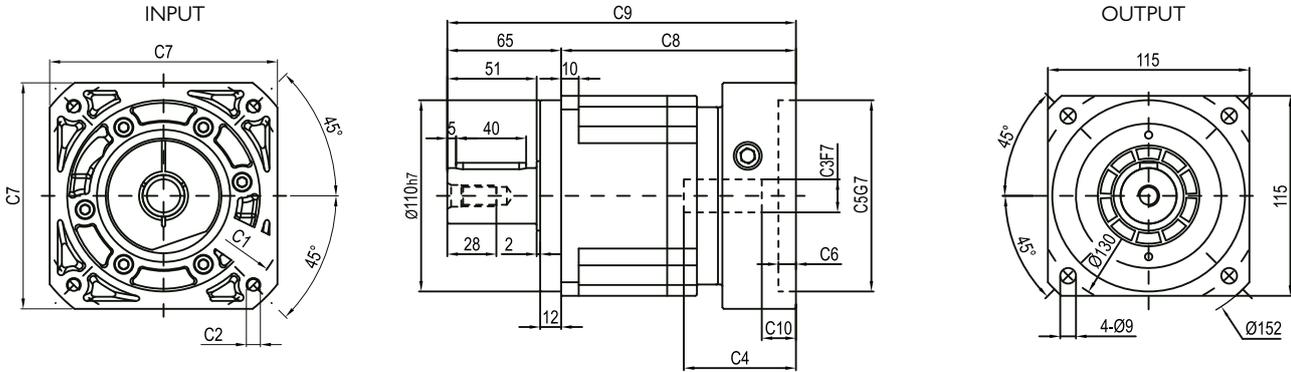
| Size | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 | C10 |
|---------------|------|------------------|---------------|------|------|-----|-----|-------|-------|------|
| FAB-090A-L2 | ø90 | 4-M5x12, 4-M6x14 | ø19 | 42 | ø70 | 6,5 | 80 | 139,5 | 187,5 | 7 |
| | ø100 | 4-M6x14 | ø16 | 42 | ø80 | 6,5 | 86 | 139,5 | 187,5 | 6 |
| FAB-090AM1-L2 | ø115 | 4-M8x20 | ø19, ø22 | 56,5 | ø95 | 8 | 100 | 155,0 | 203 | 16,5 |
| | ø145 | 4-M8x20 | ø19, ø22, ø24 | 59 | ø110 | 11 | 130 | 157,5 | 205,5 | 19 |

- C1~C7 are motor (metric standard) specific dimensions, which could be customized.
- M1: Limit hole (Version number)

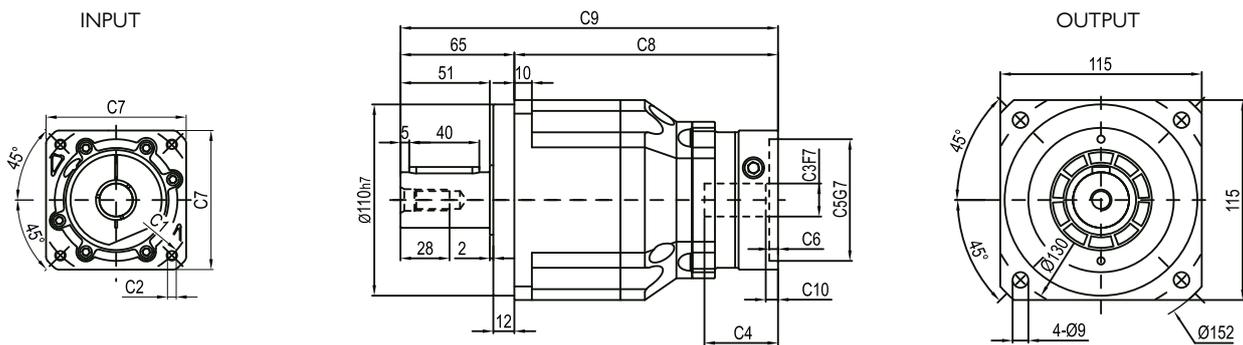
PRECISION PLANETARY GEARBOX FAB SERIES

PRODUCT DIMENSION

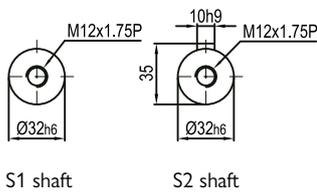
FAB-115-L1



FAB-115-L2



OUTPUT DIAMETER



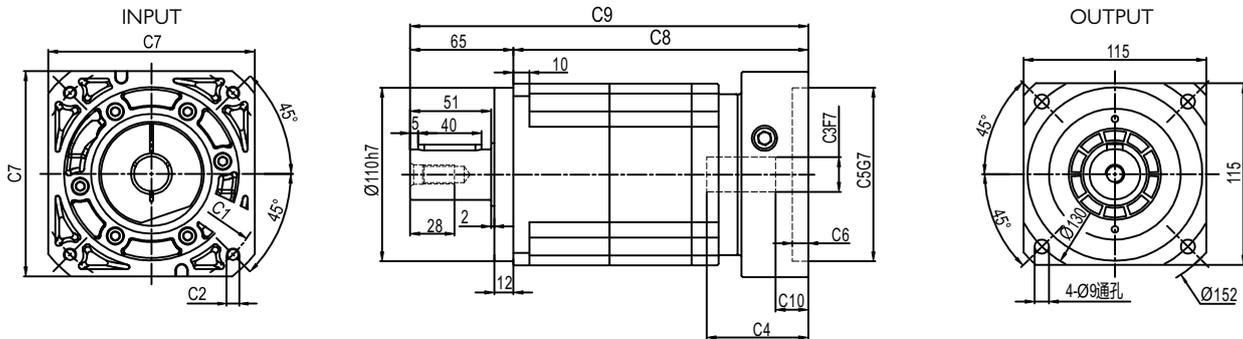
| Size | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 | C10 |
|--------------|-------------------|------------------|--|------|---------------------|-----|-----|-------|-------|------|
| FAB-115-L1 | $\varnothing 145$ | 4-M8x20 | $\varnothing 19, \varnothing 22, \varnothing 24$ | 64 | $\varnothing 110$ | 10 | 130 | 134 | 199 | 19,5 |
| FAB-115M1-L1 | $\varnothing 200$ | 4-M12x28 | $\varnothing 35$ | 81 | $\varnothing 114,3$ | 10 | 180 | 151,5 | 216,5 | 28 |
| FAB-115-L2 | $\varnothing 90$ | 4-M5x12, 4-M6x14 | $\varnothing 19$ | 42 | $\varnothing 70$ | 6,5 | 80 | 150,5 | 215,5 | 7 |
| | $\varnothing 100$ | 4-M6x14 | $\varnothing 16$ | 42 | $\varnothing 80$ | 6,5 | 86 | 150,5 | 215,5 | 6 |
| FAB-115M1-L2 | $\varnothing 115$ | 4-M8x20 | $\varnothing 19, \varnothing 22$ | 56,5 | $\varnothing 95$ | 8 | 100 | 166 | 231 | 16,5 |
| | $\varnothing 145$ | 4-M8x20 | $\varnothing 19, \varnothing 22, \varnothing 24$ | 59 | $\varnothing 110$ | 11 | 130 | 168,5 | 233,5 | 19 |

- C1~ C7 are motor (metric standard) specific dimensions, which could be customized.
- M1: Limit hole (Version number)

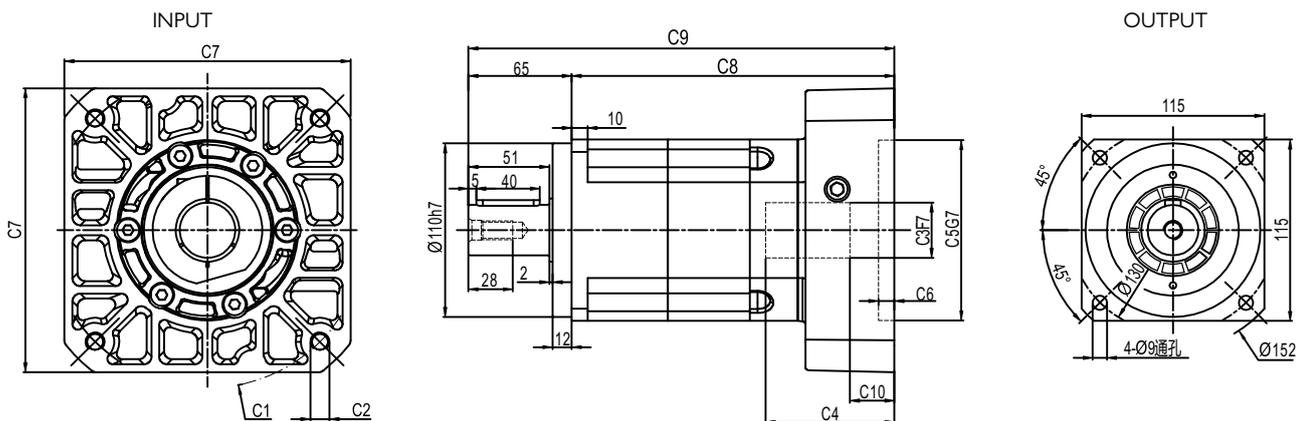
PRECISION PLANETARY GEARBOX FAB SERIES

PRODUCT DIMENSION

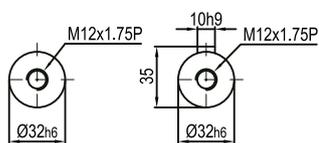
FAB-115A-L2



FAB-115A-L2



OUTPUT DIAMETER



S1 shaft

S2 shaft

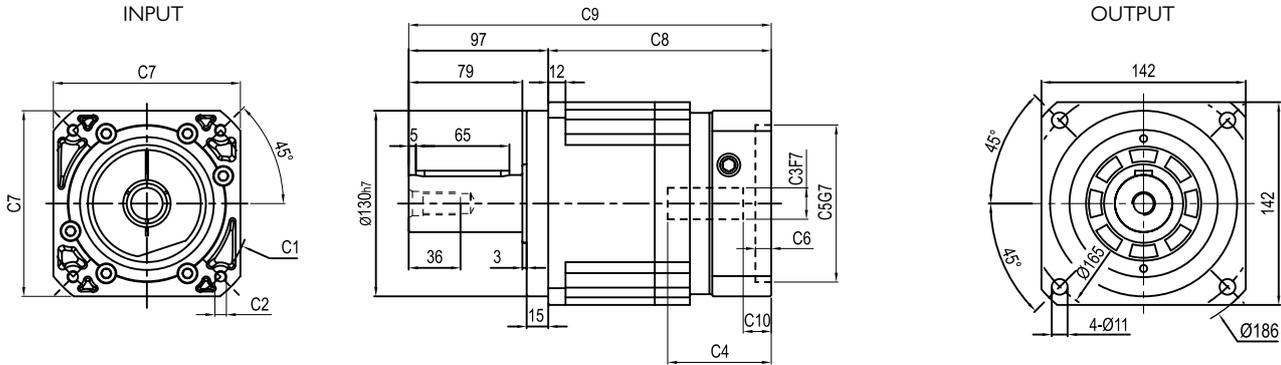
| Size | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 | C10 |
|---------------|-------------------|----------|--|----|---------------------|----|-----|-------|-------|------|
| FAB-115A-L2 | $\varnothing 145$ | 4-M8x20 | $\varnothing 19, \varnothing 22, \varnothing 24$ | 64 | $\varnothing 110$ | 10 | 130 | 185,5 | 205,5 | 19,5 |
| FAB-115AM1-L2 | $\varnothing 200$ | 4-M12x28 | $\varnothing 35$ | 81 | $\varnothing 114,3$ | 10 | 180 | 203,0 | 268 | 28 |

- C1~C7 are motor (metric standard) specific dimensions, which could be customized.
- M1: Limit hole (Version number)

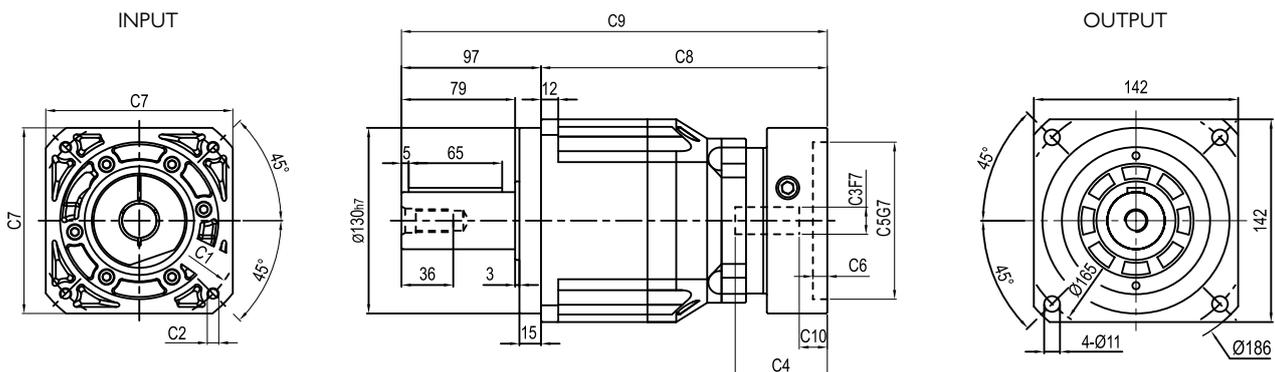
PRECISION PLANETARY GEARBOX FAB SERIES

PRODUCT DIMENSION

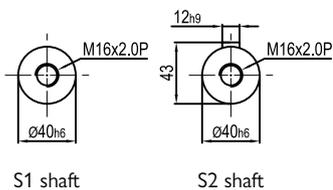
FAB-142-L1



FAB-142-L2



OUTPUT DIAMETER



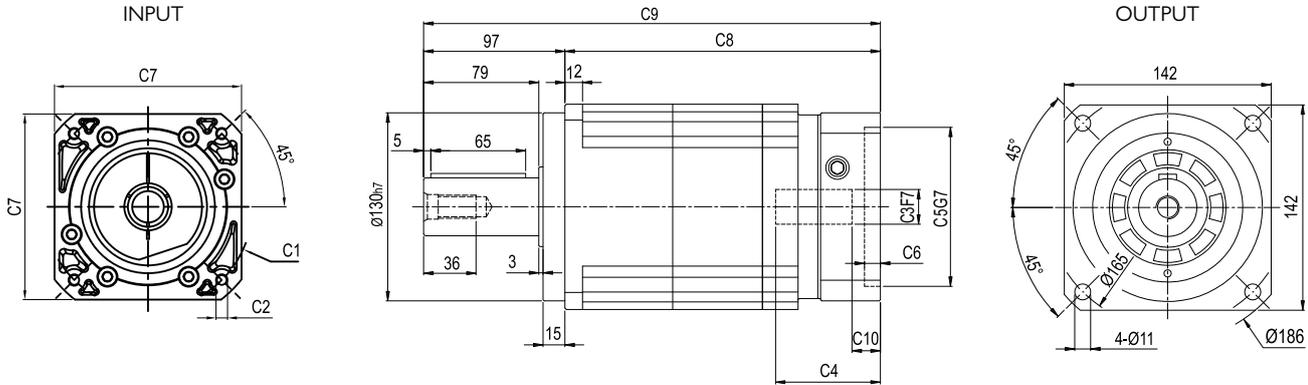
| Size | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 | C10 |
|--------------|------|----------|---------------|------|--------|----|-----|-------|-------|------|
| FAB-142-L1 | Ø145 | 4-M8x20 | Ø22, Ø24 | 72 | Ø110 | 11 | 130 | 155 | 252 | 19,5 |
| | Ø200 | 4-M12x28 | Ø35 | 81,5 | Ø114,3 | 8 | 180 | 165 | 262 | 25 |
| FAB-142-L2 | Ø145 | 4-M8x20 | Ø19, Ø22, Ø24 | 64 | Ø110 | 10 | 130 | 199 | 296 | 19,5 |
| FAB-142M1-L2 | Ø200 | 4-M12x28 | Ø35 | 81 | Ø114,3 | 10 | 180 | 216,5 | 313,5 | 28 |

- C1~C7 are motor (metric standard) specific dimensions, which could be customized.
- M1: Limit hole (Version number)

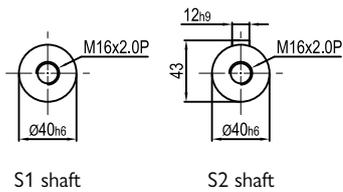
PRECISION PLANETARY GEARBOX FAB SERIES

PRODUCT DIMENSION

FAB-142A-L2



OUTPUT DIAMETER



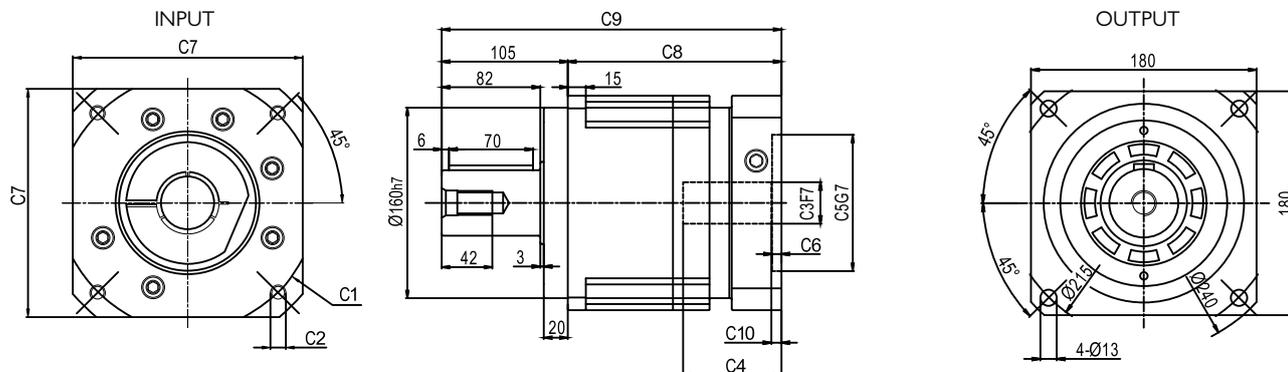
| Size | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 | C10 |
|-------------|-------------------|----------|----------------------------------|------|---------------------|----|-----|-----|-----|------|
| FAB-142A-L2 | $\varnothing 145$ | 4-M8x20 | $\varnothing 22, \varnothing 24$ | 72 | $\varnothing 110$ | 11 | 130 | 155 | 252 | 19,5 |
| | $\varnothing 200$ | 4-M12x28 | $\varnothing 35$ | 81,5 | $\varnothing 114,3$ | 8 | 180 | 165 | 262 | 25 |

▪ C1~C7 are motor (metric standard) specific dimensions, which could be customized.

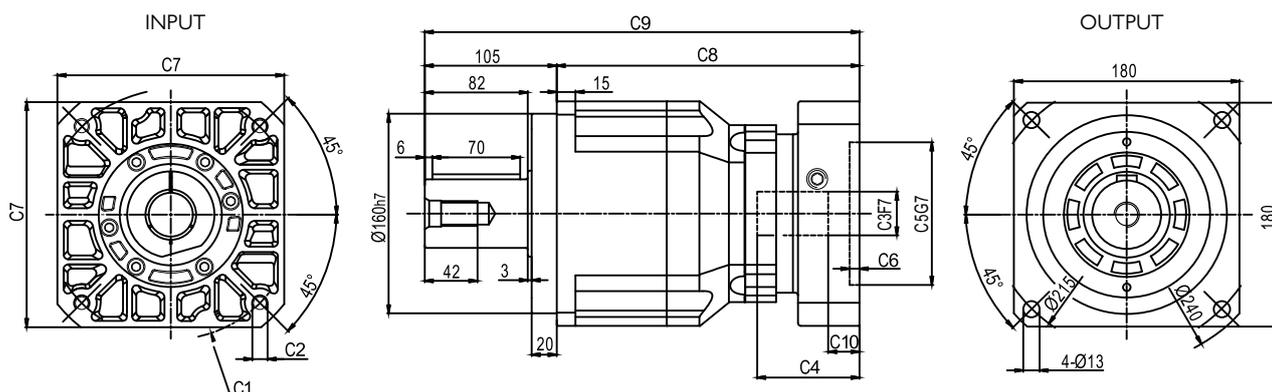
PRECISION PLANETARY GEARBOX FAB SERIES

PRODUCT DIMENSION

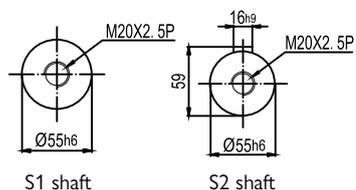
FAB-180-L1



FAB-180-L2



OUTPUT DIAMETER



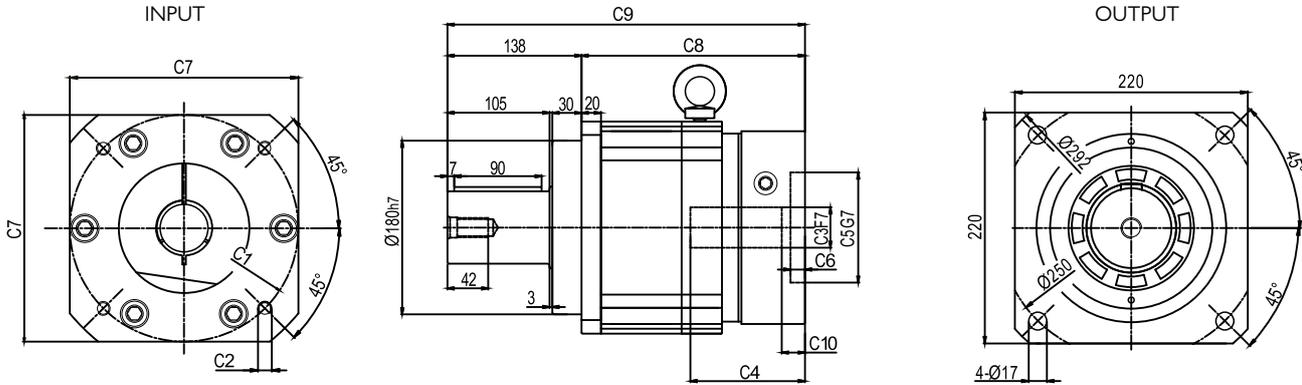
| Size | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 | C10 |
|------------|-------------------|----------|----------------------------------|-------|---------------------|----|-----|-------|-------|------|
| FAB-180-L1 | $\varnothing 200$ | 4-M12x28 | $\varnothing 35$ | 82 | $\varnothing 114,3$ | 8 | 180 | 178 | 283 | 8,5 |
| | $\varnothing 200$ | 4-M12x28 | $\varnothing 42$ | 117,5 | $\varnothing 114,3$ | 8 | 180 | 213,5 | 318,5 | 45,5 |
| | $\varnothing 215$ | 4-M12x28 | $\varnothing 38$ | 87 | $\varnothing 180$ | 8 | 192 | 183 | 288 | 13,5 |
| | $\varnothing 235$ | 4-M12x28 | $\varnothing 42$ | 117,5 | $\varnothing 200$ | 10 | 220 | 213,5 | 318,5 | 45,5 |
| FAB-180-L2 | $\varnothing 145$ | 4-M8x20 | $\varnothing 22, \varnothing 24$ | 72 | $\varnothing 110$ | 11 | 130 | 231 | 336 | 19,5 |
| | $\varnothing 200$ | 4-M12x28 | $\varnothing 35$ | 81,5 | $\varnothing 114,3$ | 8 | 180 | 241 | 346 | 25 |

▪ C1~C7 are motor (metric standard) specific dimensions, which could be customized.

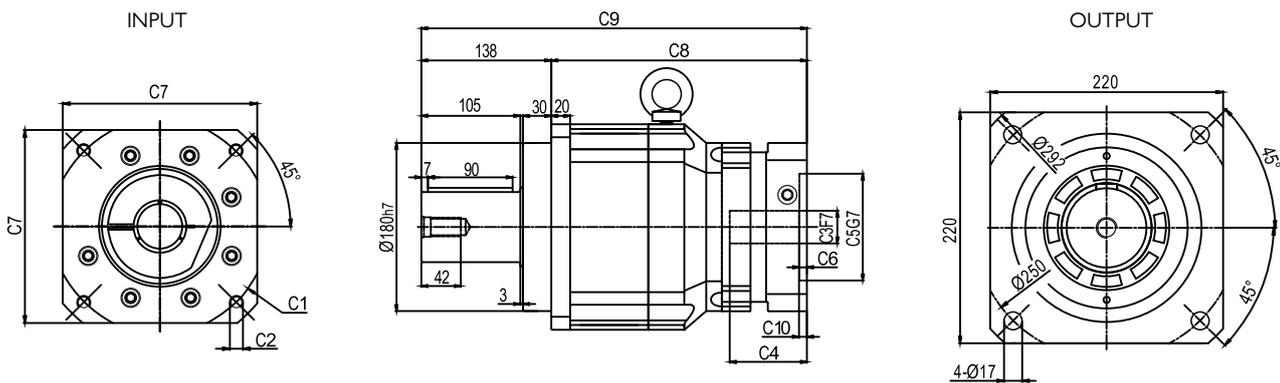
PRECISION PLANETARY GEARBOX FAB SERIES

PRODUCT DIMENSION

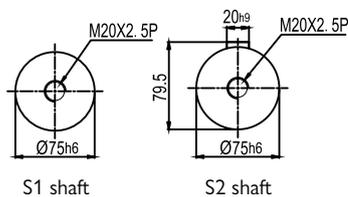
FAB-220-L1



FAB-220-L2



OUTPUT DIAMETER



| Size | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 | C10 |
|------------|------|----------|----------|-------|--------|----|-----|-------|-------|------|
| FAB-220-L1 | ø200 | 4-M12x28 | ø35, ø42 | 118 | ø114,3 | 15 | 200 | 230 | 368 | 24,0 |
| | ø215 | 4-M12x30 | ø38 | 108 | ø180 | 8 | 200 | 220,0 | 358,0 | 11,5 |
| | ø235 | 4-M12x30 | ø42, ø55 | 118 | ø200 | 10 | 220 | 230 | 368 | 24,0 |
| FAB-220-L2 | ø200 | 4-M12x28 | ø35 | 82 | ø114,3 | 8 | 180 | 271,5 | 409,5 | 8,5 |
| | ø200 | 4-M12x28 | ø42 | 117,5 | ø114,3 | 8 | 180 | 307 | 445 | 45,5 |
| | ø215 | 4-M12x28 | ø38 | 87 | ø180 | 8 | 192 | 276,5 | 414,5 | 13,5 |
| | ø235 | 4-M12x28 | ø42 | 117,5 | ø200 | 10 | 220 | 307 | 445 | 45,5 |

▪ C1~C7 are motor (metric standard) specific dimensions, which could be customized.

CHIARAVALLI LINEAR CENTER

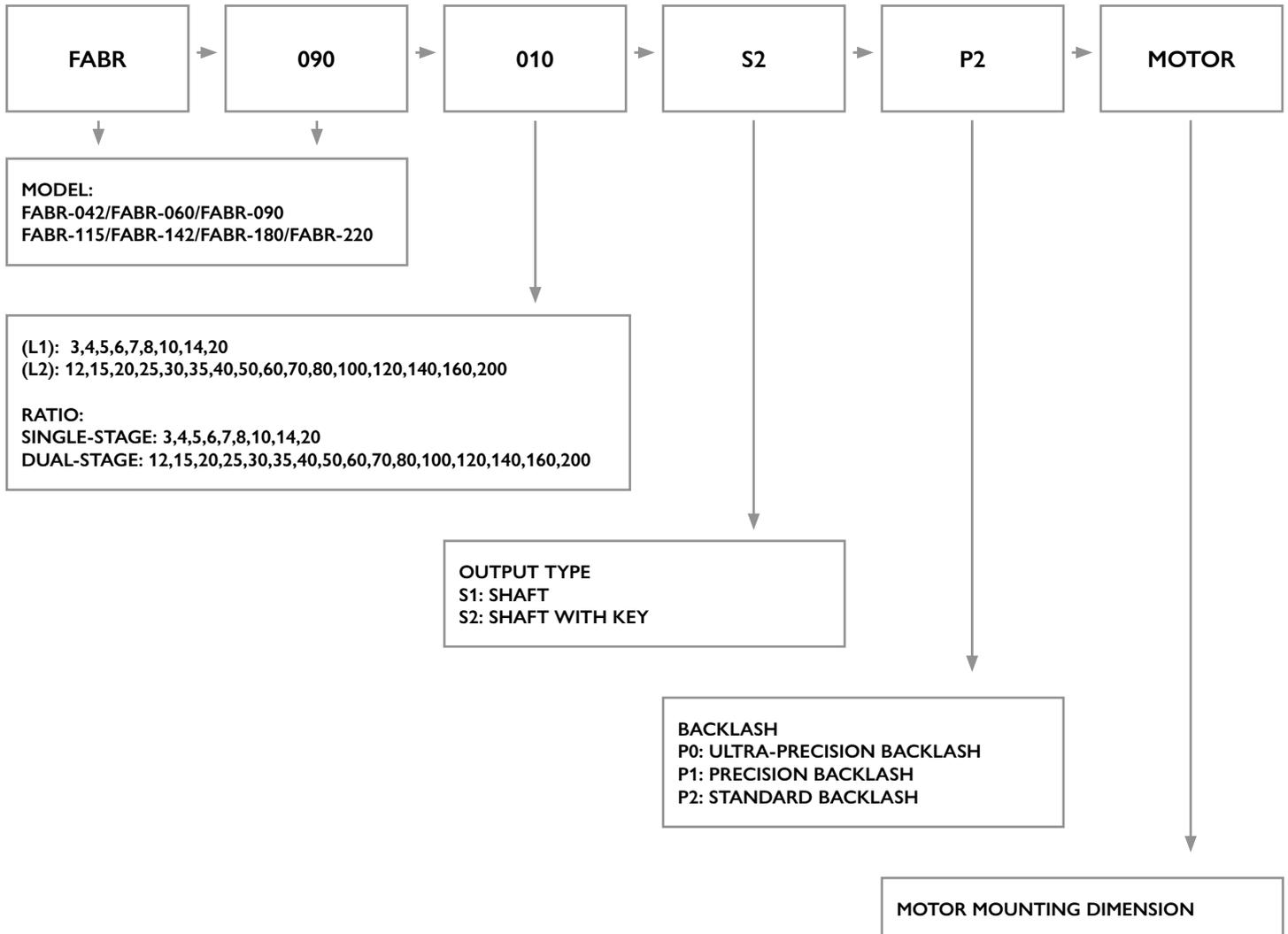
**PRECISION PLANETARY GEARBOX
FABR SERIES**



PRECISION PLANETARY GEARBOX FABR SERIES

MODEL DESCRIPTION

FABR-090-010-S2-P2-19-70-90-M6-45





PRECISION PLANETARY GEARBOX FABR SERIES

TECHNICAL SPECIFICATION

| MODEL | | STAGE | RATIO | FABR042 | FABR060 | FABR090 | FABR090A | FABR115 | FABR115A | FABR142 | FABR142A | FABR180 | FABR220 |
|--|-----------|-------|--------|---------------------------------|---------|---------|----------|---------|----------|---------|----------|---------|---------|
| Rated output torque | Nm | 1 | 3 | 20 | 55 | 130 | - | 208 | - | 342 | - | 588 | 1,140 |
| | | | 4 | 19 | 50 | 140 | - | 290 | - | 542 | - | 1,050 | 1,700 |
| | | | 5 | 22 | 60 | 160 | - | 330 | - | 650 | - | 1,200 | 2,000 |
| | | | 6 | 20 | 55 | 150 | - | 310 | - | 600 | - | 1,100 | 1,900 |
| | | | 7 | 19 | 50 | 140 | - | 300 | - | 550 | - | 1,100 | 1,800 |
| | | | 8 | 17 | 50 | 140 | - | 290 | - | 542 | - | 1,050 | 1,700 |
| | | | 10 | 14 | 60 | 160 | - | 330 | - | 650 | - | 1,200 | 2,000 |
| | | | 14 | - | 50 | 140 | - | 300 | - | 550 | - | 1,100 | 1,800 |
| | | 20 | - | 40 | 100 | - | 230 | - | 450 | - | 900 | 1,500 | |
| | | 2 | 12 | - | 55 | 130 | 130 | 208 | 208 | 342 | 342 | 588 | 1,140 |
| | | | 15 | 20 | 55 | 130 | 130 | 208 | 208 | 342 | 342 | 588 | 1,140 |
| | | | 20 | 19 | 50 | 140 | 140 | 290 | 290 | 542 | 542 | 1,050 | 1,700 |
| | | | 25 | 22 | 60 | 160 | 160 | 330 | 330 | 650 | 650 | 1,200 | 2,000 |
| | | | 30 | 22 | 55 | 130 | 130 | 208 | 208 | 342 | 342 | 588 | 1,140 |
| | | | 35 | 22 | 60 | 160 | 160 | 330 | 330 | 650 | 650 | 1,200 | 2,000 |
| | | | 40 | 22 | 50 | 140 | 140 | 290 | 290 | 542 | 542 | 1,050 | 1,700 |
| | | | 50 | 22 | 60 | 160 | 160 | 330 | 330 | 650 | 650 | 1,200 | 2,000 |
| | | | 60 | 22 | 55 | 150 | 150 | 310 | 310 | 600 | 600 | 1,100 | 1,900 |
| | | | 70 | 22 | 60 | 160 | 160 | 330 | 330 | 650 | 650 | 1,200 | 2,000 |
| | | | 80 | 22 | 50 | 140 | 140 | 290 | 290 | 542 | 542 | 1,050 | 1,700 |
| 100 | 22 | | 60 | 160 | 160 | 330 | 330 | 650 | 650 | 1,200 | 2,000 | | |
| 120 | - | - | 150 | 150 | 310 | 310 | 600 | 600 | 1,100 | 1,900 | | | |
| 140 | - | - | 140 | 140 | 300 | 300 | 550 | 550 | 1,100 | 1,800 | | | |
| 160 | - | - | 120 | 120 | 260 | 260 | 500 | 500 | 1,000 | 1,600 | | | |
| 200 | - | - | 100 | 100 | 230 | 230 | 450 | 450 | 900 | 1,500 | | | |
| T _{2B} /Max. output torque | Nm | 1,2 | 3~200 | 3 times the rated output torque | | | | | | | | | |
| n ₁ /Rated input speed | rpm | 1,2 | 3~200 | 5,000 | 5,000 | 4,000 | 4,000 | 4,000 | 4,000 | 3,000 | 3,000 | 3,000 | 2,000 |
| n _{1B} /Max.input speed | rpm | 1,2 | 3~200 | 10,000 | 10,000 | 8,000 | 8,000 | 8,000 | 8,000 | 6,000 | 6,000 | 6,000 | 4,000 |
| P0/Ultra-precision backlash | arcmin | 1 | 3~20 | - | - | ≤2 | ≤2 | ≤2 | ≤2 | ≤2 | ≤2 | ≤2 | ≤2 |
| | | 2 | 12~200 | - | - | ≤4 | ≤4 | ≤4 | ≤4 | ≤4 | ≤4 | ≤4 | ≤4 |
| P1/Precision backlash | arcmin | 1 | 3~20 | ≤4 | ≤4 | ≤4 | ≤4 | ≤4 | ≤4 | ≤4 | ≤4 | ≤4 | ≤4 |
| | | 2 | 12~200 | ≤7 | ≤7 | ≤7 | ≤7 | ≤7 | ≤7 | ≤7 | ≤7 | ≤7 | ≤7 |
| P2/Precision backlash | arcmin | 1 | 3~20 | ≤6 | ≤6 | ≤6 | ≤7 | ≤6 | ≤7 | ≤6 | ≤7 | ≤6 | ≤6 |
| | | 2 | 12~200 | ≤9 | ≤9 | ≤9 | ≤9 | ≤9 | ≤9 | ≤9 | ≤9 | ≤9 | ≤9 |
| Torsional rigidity | Nm/arcmin | 1,2 | 3~200 | 3 | 7 | 14 | 14 | 25 | 25 | 50 | 50 | 145 | 225 |
| F _{2rB} ² /Allowable radial force | N | | 3~200 | 780 | 1,530 | 3,250 | 3,250 | 6,700 | 6,700 | 9,400 | 9,400 | 14,500 | 50,000 |
| F _{2a1B} ² /Allowable radial force | N | 1,2 | 3~200 | 350 | 630 | 1,300 | 1,300 | 3,000 | 3,000 | 4,000 | 4,000 | 6,200 | 35,000 |
| F _{2a2B} ² /Allowable radial force | N | 1,2 | 3~200 | 390 | 765 | 1,625 | 1,625 | 3,350 | 3,350 | 4,700 | 4,700 | 7,250 | 25,000 |
| Life time | hr | 1,2 | 3~200 | 20,000* | | | | | | | | | |
| η/Efficiency | % | 1 | 3~20 | ≤95% | | | | | | | | | |
| | | 2 | 12~200 | ≤92% | | | | | | | | | |
| Weight | kg | 1 | 3~20 | 0,9 | 2,1 | 6,4 | - | 13 | - | 24,5 | - | 51 | 83 |
| | | 2 | 12~200 | 1,2 | 2,5 | 7,8 | 9,1 | 14,2 | 18,6 | 27,5 | 35 | 54 | 95 |
| Operating temperature | °C | 1,2 | 3~200 | -10°C ~ +90°C | | | | | | | | | |
| lubrication | | 1,2 | 3~200 | Synthetic lubricating grease | | | | | | | | | |
| Ingress protection | | 1,2 | 3~200 | IP65 | | | | | | | | | |
| Mount position | | 1,2 | 3~200 | Any direction | | | | | | | | | |
| (n ₁ =3000rpm) / Noise level | dB | 1,2 | 3~200 | ≤61 | ≤63 | ≤65 | ≤65 | ≤68 | ≤68 | ≤70 | ≤70 | ≤72 | ≤74 |

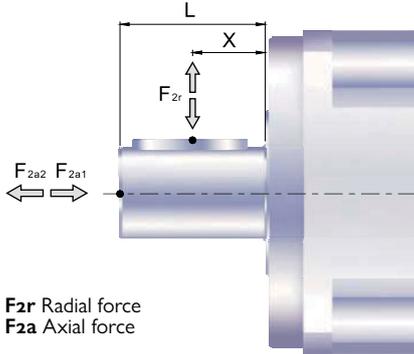
GEARBOX MOMENT OF INERTIA

| MODEL | | STAGE | RATIO | FABR042 | FABR060 | FABR090 | FABR090A | FABR115 | FABR115A | FABR142 | FABR142A | FABR180 | FABR220 |
|-------------------|----------------------|-------|---------|---------|---------|---------|----------|---------|----------|---------|----------|---------|---------|
| Moment of inertia | kg • cm ² | 1 | 3~7 | 0.09 | 0.35 | 2.25 | - | 6.84 | - | 23.4 | - | 68.9 | 135.4 |
| | | | 8~10 | 0.09 | 0.07 | 1.87 | - | 6.25 | - | 21.8 | - | 65.6 | 119.8 |
| | | | 14~20 | - | 0.07 | 1.87 | - | 6.25 | - | 21.8 | - | 65.6 | 119.8 |
| | | 2 | 12~40 | 0.09 | 0.35 | 0.35 | 2.23 | 2.23 | 6.84 | 6.44 | 6.84 | 23.4 | 68.9 |
| | | | 50 | 0.09 | 0.07 | 0.31 | 1.87 | 1.87 | 6.25 | 6.25 | 6.25 | 21.8 | 65.6 |
| | | | 60 | 0.09 | 0.07 | 0.35 | 2.25 | 2.25 | 6.84 | 6.84 | 6.84 | 23.4 | 68.9 |
| | | | 70~100 | 0.09 | 0.07 | 0.31 | 1.87 | 1.87 | 6.25 | 6.25 | 6.25 | 21.8 | 65.6 |
| | | | 120~200 | - | - | 0.31 | 1.87 | 1.87 | 6.25 | 6.25 | 6.25 | 21.8 | 65.6 |

- Ratio (i=N_{in}/N_{out}) - The lifetime will be shortened by half under continuous operation.
- When the output speed is 100rpm, it applies on the center of the output shaft.

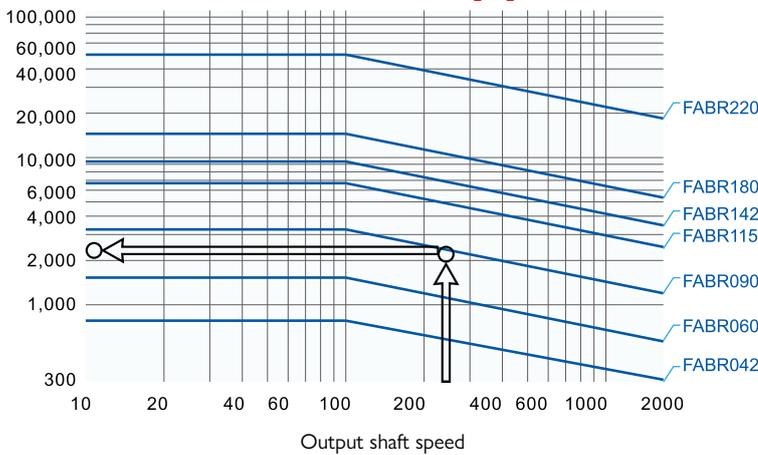
PRECISION PLANETARY GEARBOX FABR SERIES

ALLOWABLE RADIAL AND AXIAL FORCES ON THE OUTPUT SHAFT OF THE GEARBOX



The maximum radial and axial forces that the output shaft of the gearbox can withstand. Looking at the design of internal support bearings, the reducer adopts large-sized bearings and a design with a larger span, which can withstand greater radial and axial loads.

PERMISSIBLE RADIAL FORCE F_{2rB} [N] APPLY FORCE TO THE CENTER OF THE SHAFT

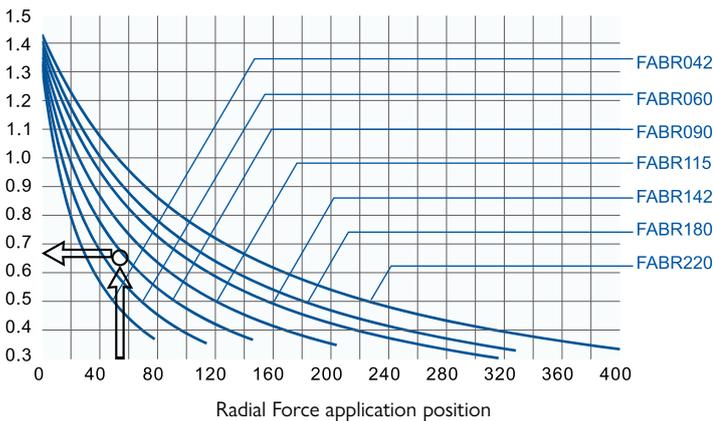


When the radial force F_{2r} is applied to the center of the shaft, i.e. $X=1/2 \times L$, the allowable radial force F_{2rB} that can be withstood by different specifications of reducers with a service life of 20,000hr* under different output speeds is as follows:

$$F_{2a1B} = 0.2 \times F_{2rB}$$

$$F_{2a2B} = 0.1 \times F_{2rB}$$

POSITIONAL LOAD COEFFICIENT



When the radial force F_{2r} is not in the center of the shaft, the closer to the gearbox, that is, $X < 1/2 \times L$, the allowable radial force that can be borne becomes larger, and the farther away from the reducer, i.e., $X > 1/2 \times L$, the allowable force that can be borne becomes smaller.

Radial force
 $F'_{2rB} = K_b \times F_{2rB}$

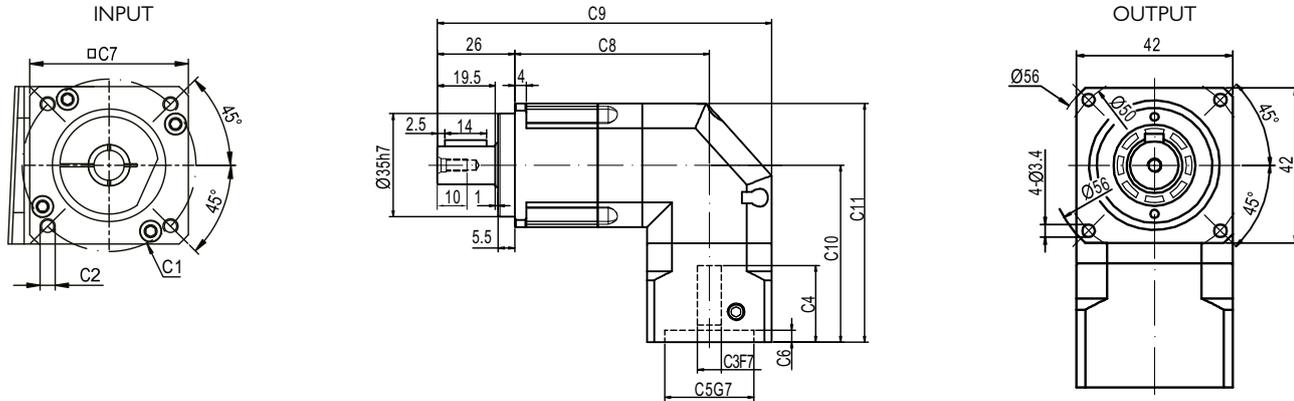
Axial force
 $F'_{2a1B} = 0.2 \times F'_{2rB}$
 $F'_{2a2B} = 0.1 \times F'_{2rB}$

*The lifetime will be shortened by half under continuous operation.

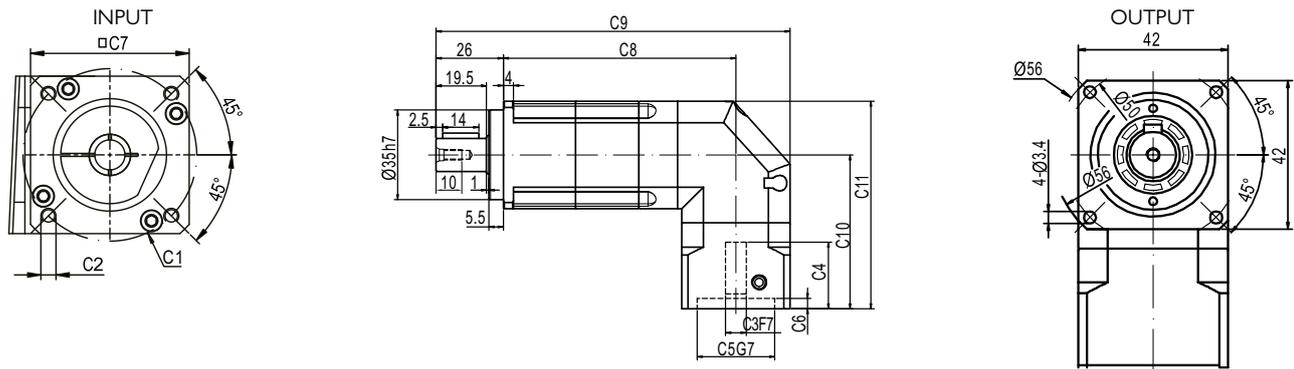
PRECISION PLANETARY GEARBOX FABR SERIES

PRODUCT DIMENSION

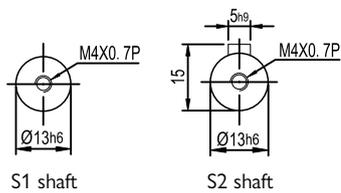
FABR-042-L1



FABR-042-L2



OUTPUT DIAMETER



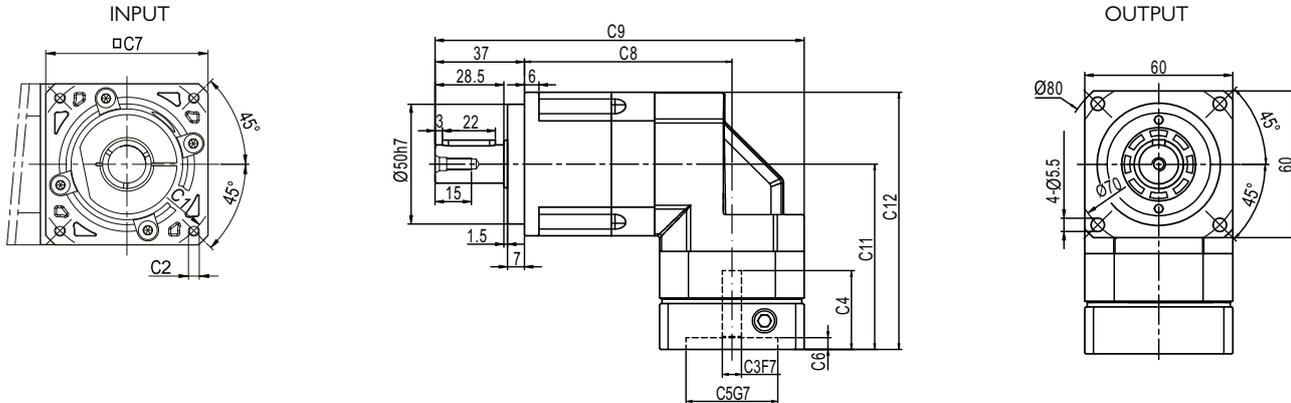
| Size | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 | C10 | C11 |
|-------------|-----|---------|----|----|-----|----|----|------|-------|-----|-----|
| FABR-042-L1 | ø46 | 4-M4x10 | ø8 | 26 | ø30 | 4 | 42 | 65,5 | 112,5 | 60 | 81 |
| | ø45 | 4-M3x8 | | | | | | | | | |
| FABR-042-L2 | ø46 | 4-M4x10 | ø8 | 26 | ø30 | 4 | 42 | 90 | 137 | 60 | 81 |
| | ø45 | 4-M3x8 | | | | | | | | | |

▪ C1~C7 are motor (metric standard) specific dimensions, which could be customized.

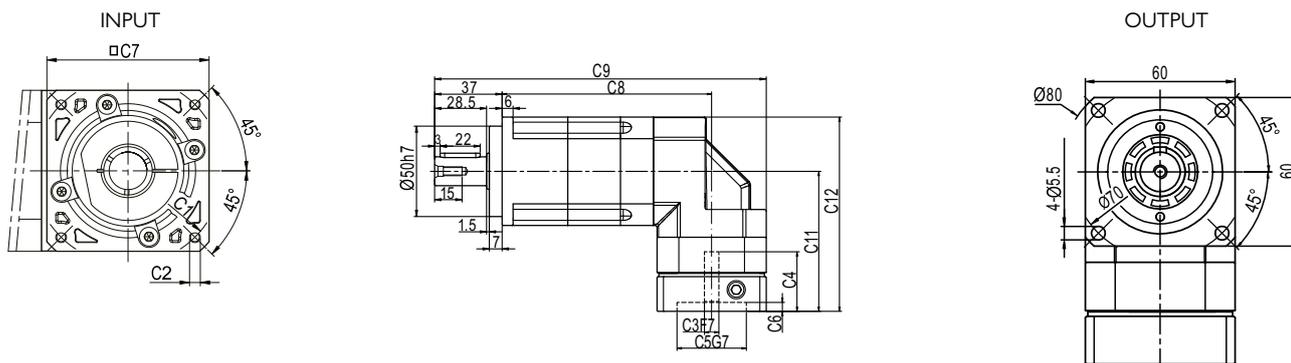
PRECISION PLANETARY GEARBOX FABR SERIES

PRODUCT DIMENSION

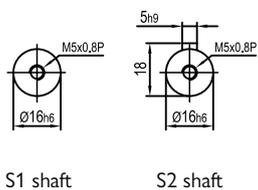
FABR-060-L1



FABR-060-L2



OUTPUT DIAMETER



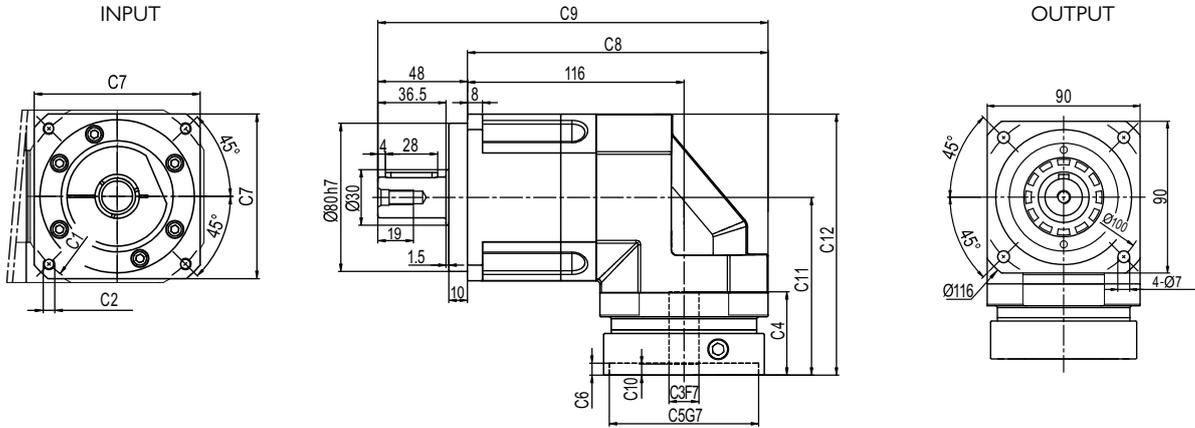
| Size | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 | C10 | C11 | C12 |
|---------------|--------------------|----------|----------------------------------|------|--------------------|-----|----|-----|-----|-----|------|-------|
| FABR-060-L1 | $\varnothing 66,7$ | 4-M4x10 | $\varnothing 8$ | 33 | $\varnothing 38,1$ | 5 | 60 | 86 | 153 | 5,5 | 77,5 | 107,5 |
| FABR-060-L2 | | | | | | | | 115 | 182 | | | |
| FABR-060-L1 | $\varnothing 70$ | 4-M4x10, | $\varnothing 11, \varnothing 14$ | 33 | $\varnothing 50$ | 5 | 60 | 86 | 153 | 5,5 | 77,5 | 107,5 |
| FABR-060-L2 | | 4-M5x12 | | | | | | | 115 | | | |
| FABR-060M1-L1 | $\varnothing 90$ | 4-M5x12, | $\varnothing 19$ | 42,5 | $\varnothing 70$ | 6,5 | 80 | 86 | 163 | 12 | 87 | 117 |
| FABR-060M1-L2 | | 4-M6x14 | | | | | | | 115 | | | |

- C1~C7 are motor (metric standard) specific dimensions, which could be customized.
- M1: Limit hole (Version number)

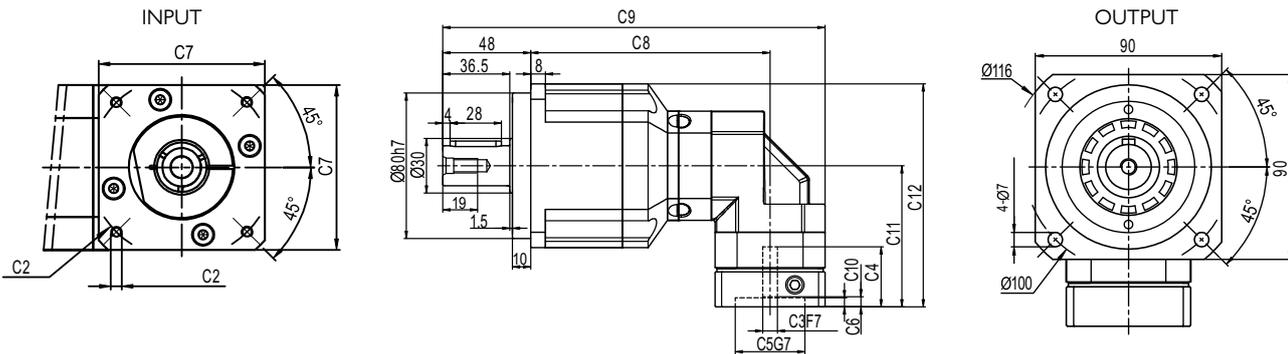
PRECISION PLANETARY GEARBOX FABR SERIES

PRODUCT DIMENSION

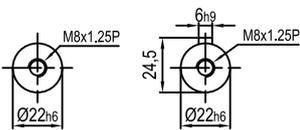
FABR-090-L1



FABR-090-L2



OUTPUT DIAMETER



S1 shaft

S2 shaft

| Size | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 | C10 | C11 | C12 |
|---------------|--------------------|--------------------|--|------|--------------------|-----|-----|-------|-------|------|-------|-------|
| FABR-090-L1 | $\varnothing 90$ | 4-M5x12, 4-4-M6x14 | $\varnothing 19$ | 45 | $\varnothing 70$ | 6,5 | 80 | 116 | 209 | 7 | 96 | 141 |
| | $\varnothing 100$ | 4-M6x14 | $\varnothing 16$ | 45 | $\varnothing 80$ | 6,5 | 86 | 116 | 209 | 6 | 96 | 141 |
| FABR-090M1-L1 | $\varnothing 115$ | 4-M8x20 | $\varnothing 19, \varnothing 22$ | 56,5 | $\varnothing 95$ | 8 | 100 | 116 | 214 | 16,5 | 117,5 | 162,5 |
| | $\varnothing 145$ | 4-M8x20 | $\varnothing 19, \varnothing 22, \varnothing 24$ | 59 | $\varnothing 110$ | 11 | 130 | 116 | 229 | 19 | 120 | 165 |
| FABR-090-L2 | $\varnothing 66,7$ | 4-M4x10 | $\varnothing 8$ | 33 | $\varnothing 38,1$ | 5 | 60 | 130,5 | 208,5 | 5,5 | 77,5 | 122,5 |
| | $\varnothing 70$ | 4-M4x10, 4-M5x12 | $\varnothing 11, \varnothing 14$ | 33 | $\varnothing 50$ | 5 | 60 | 130,5 | 208,5 | 5,5 | 77,5 | 122,5 |
| FABR-090M1-L2 | $\varnothing 90$ | 4-M5x12, 4-4-M6x14 | $\varnothing 19$ | 42,5 | $\varnothing 70$ | 6,5 | 80 | 130,5 | 218,5 | 12 | 87 | 132 |
| | $\varnothing 100$ | 4-M6x14 | $\varnothing 16$ | 42,5 | $\varnothing 80$ | 6,5 | 86 | 130,5 | 221,5 | 11 | 87 | 132 |

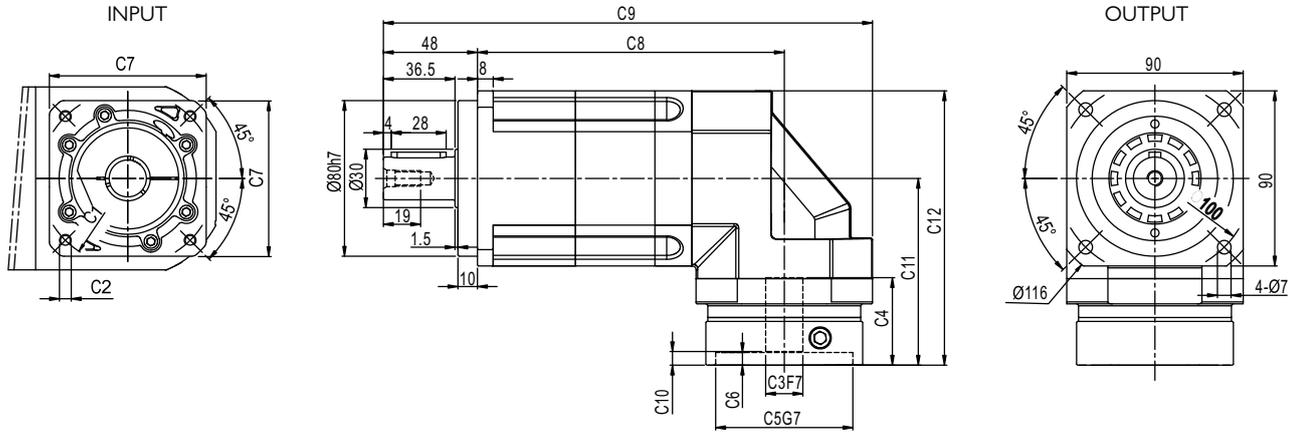
▪ C1~C7 are motor (metric standard) specific dimensions, which could be customized.

▪ M1: Limit hole (Version number)

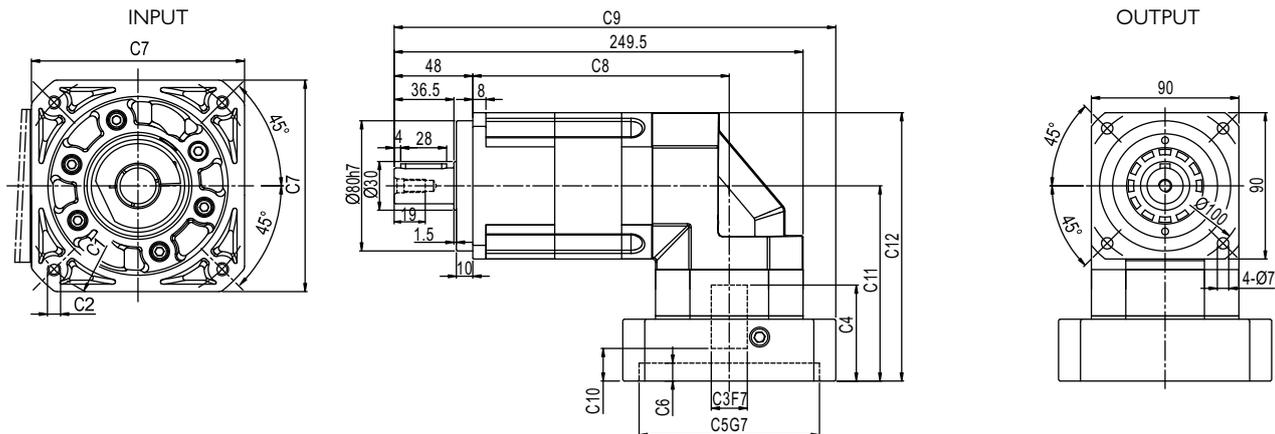
PRECISION PLANETARY GEARBOX FABR SERIES

PRODUCT DIMENSION

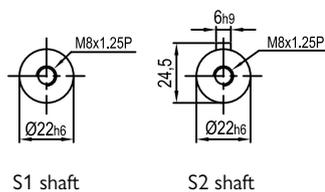
FABR-090A-L2



FABR-090A-L2



OUTPUT DIAMETER



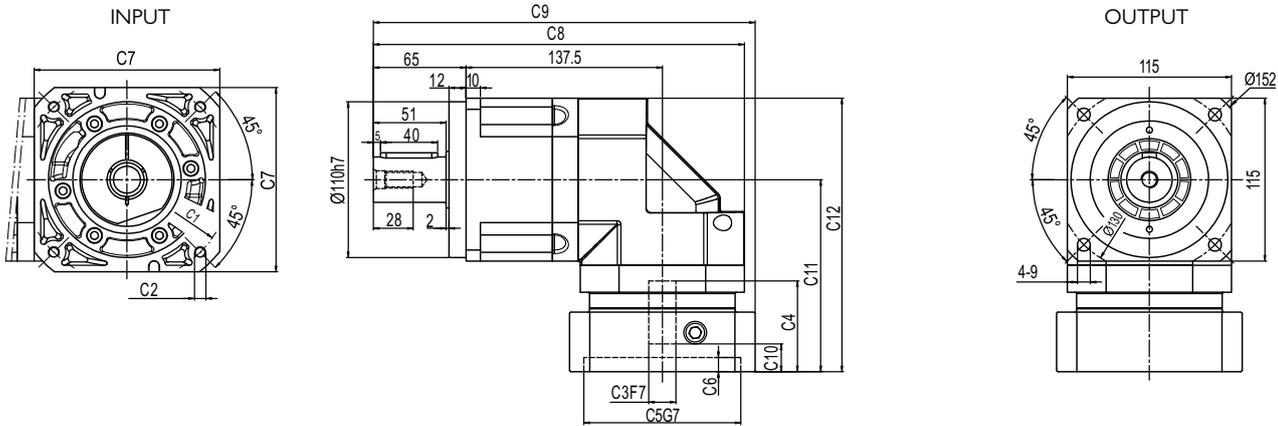
| Size | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 | C10 | C11 | C12 |
|----------------|------|------------------|---------------|------|------|-----|-----|-------|-------|------|-------|-------|
| FABR-090A-L2 | ø90 | 4-M5x12, 4-M6x14 | ø19 | 45 | ø70 | 6,5 | 80 | 156,5 | 249,5 | 7 | 96 | 141 |
| | ø100 | 4-M6x14 | ø16 | 45 | ø80 | 6,5 | 86 | 156,5 | 249,5 | 6 | 96 | 141 |
| FABR-090AM1-L2 | ø115 | 4-M8x20 | ø19, ø22 | 56,5 | ø95 | 8 | 100 | 156,5 | 254,5 | 16,5 | 117,5 | 162,5 |
| | ø145 | 4-M8x20 | ø19, ø22, ø24 | 59 | ø110 | 10 | 130 | 156,5 | 269,5 | 19 | 120 | 165 |

- C1~C7 are motor (metric standard) specific dimensions, which could be customized.
- M1: Limit hole (Version number)

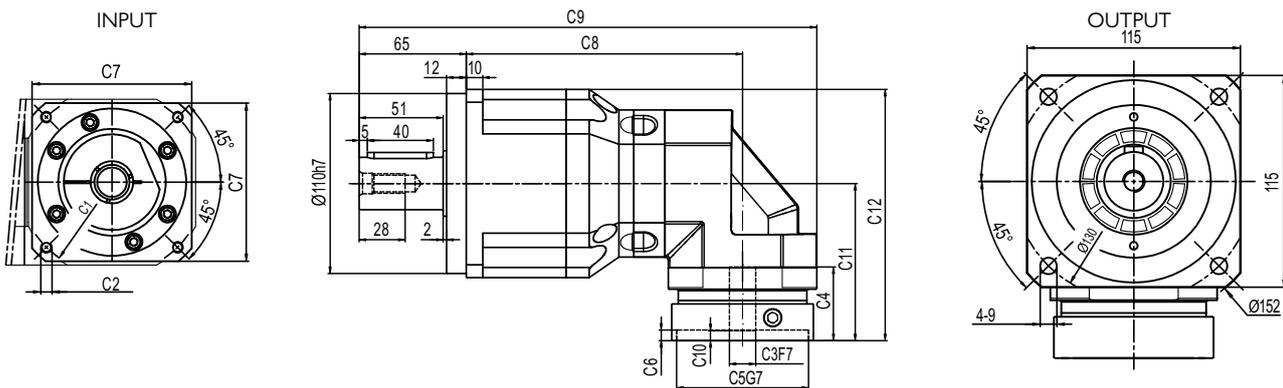
PRECISION PLANETARY GEARBOX FABR SERIES

PRODUCT DIMENSION

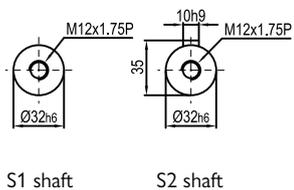
FABR-115-L1



FABR-115-L2



OUTPUT DIAMETER



S1 shaft S2 shaft

| Size | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 | C10 | C11 | C12 |
|---------------|------|------------------|---------------|------|--------|-----|-----|-------|-------|------|-------|-------|
| FABR-115-L1 | ø145 | 4-M8x20 | ø19, ø22, ø24 | 64 | ø110 | 10 | 130 | 137,5 | 267,5 | 19,5 | 135,5 | 193 |
| FABR-115M1-L1 | ø200 | 4-M12x28 | ø35 | 81 | ø114,3 | 10 | 180 | 137,5 | 292,5 | 28 | 152,5 | 210 |
| FABR-115-L2 | ø90 | 4-M5x12, 4-M6x14 | ø19 | 45 | ø70 | 6,5 | 80 | 167,5 | 277,5 | 7 | 96 | 153,5 |
| | ø100 | 4-M6x14 | ø16 | 45 | ø80 | 6,5 | 86 | 167,5 | 277,5 | 6 | 96 | 153,5 |
| FABR-115M1-L2 | ø115 | 4-M8x20 | ø19, ø22 | 56,5 | ø95 | 8 | 100 | 167,5 | 282,5 | 16,5 | 177,5 | 175 |
| | ø145 | 4-M8x20 | ø19, ø22, ø24 | 59 | ø110 | 11 | 130 | 167,5 | 297,5 | 19 | 120 | 177,5 |

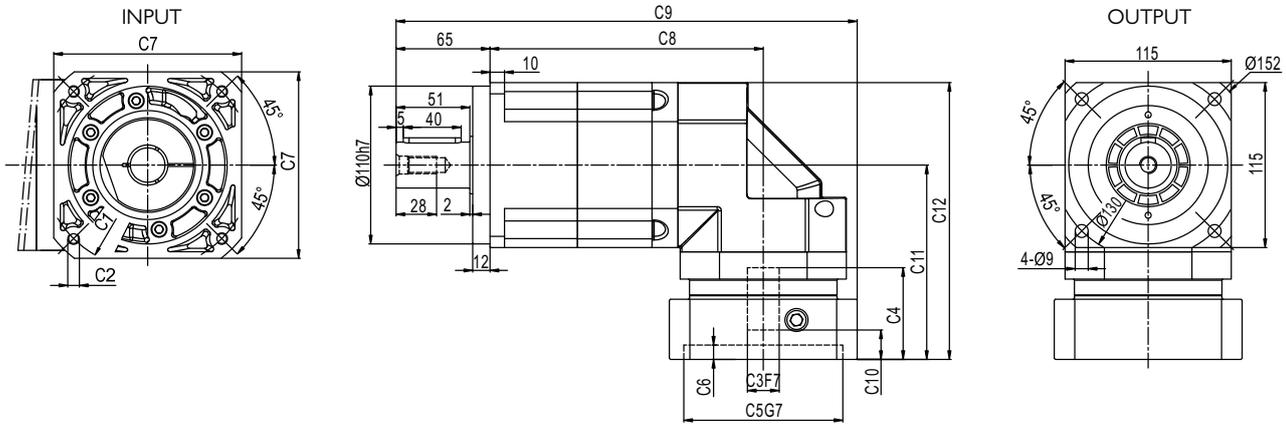
- C1~C7 are motor (metric standard) specific dimensions, which could be customized.
- M1: Limit hole (Version number)



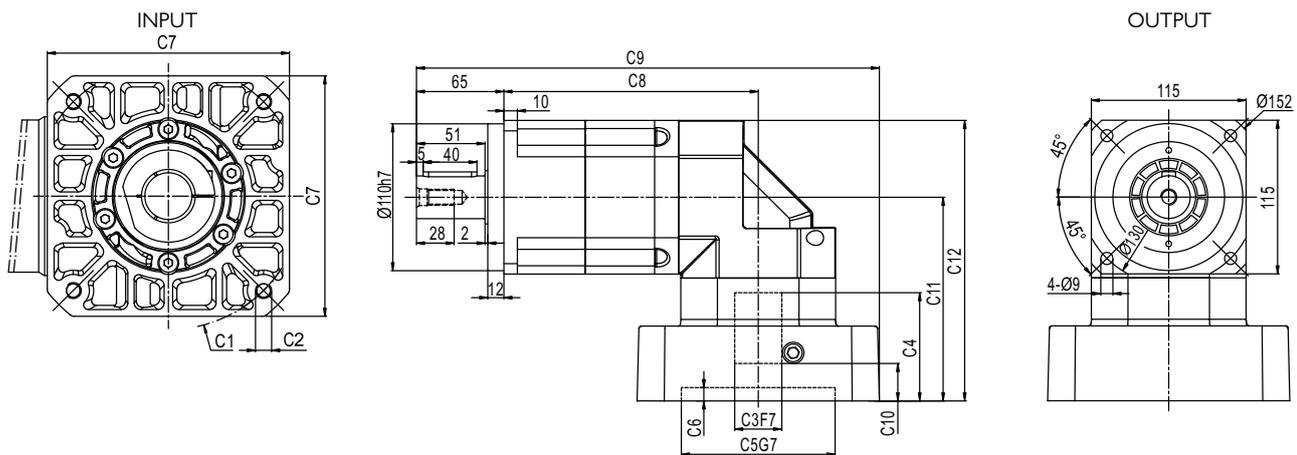
PRECISION PLANETARY GEARBOX FABR SERIES

PRODUCT DIMENSION

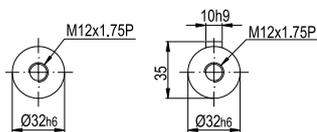
FABR-115A-L2



FABR-115A-L2



OUTPUT DIAMETER



S1 shaft

S2 shaft

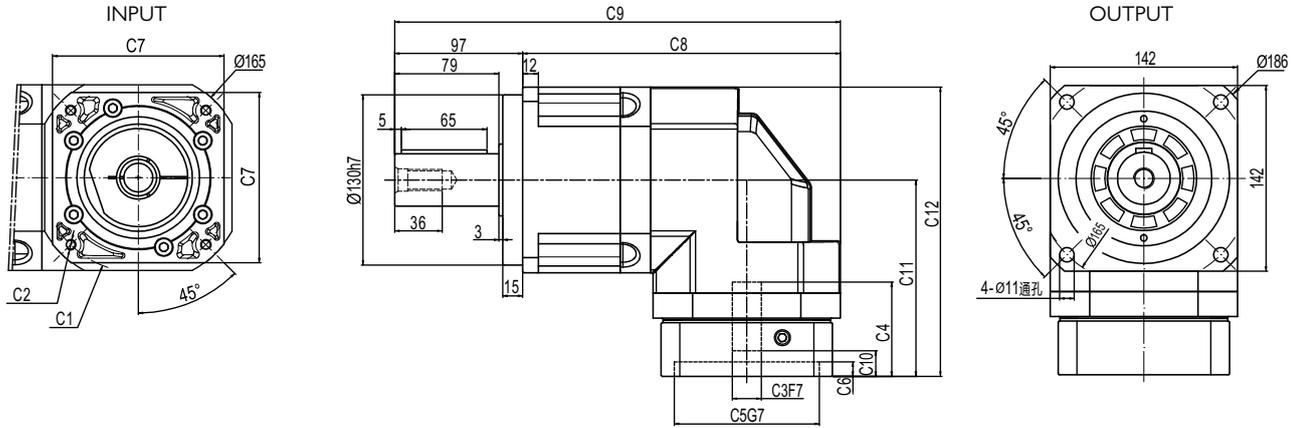
| Size | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 | C10 | C11 | C12 |
|----------------|------|----------|---------------|----|--------|----|-----|-----|-----|------|-------|-----|
| FABR-115A-L2 | ø145 | 4-M8x20 | ø19, ø22, ø24 | 64 | ø110 | 10 | 130 | 189 | 319 | 19,5 | 135,5 | 193 |
| FABR-115AM1-L2 | ø200 | 4-M12x28 | ø35 | 81 | ø114,3 | 10 | 180 | 189 | 344 | 28 | 152,5 | 210 |

- C1~C7 are motor (metric standard) specific dimensions, which could be customized.
- M1: Limit hole (Version number)

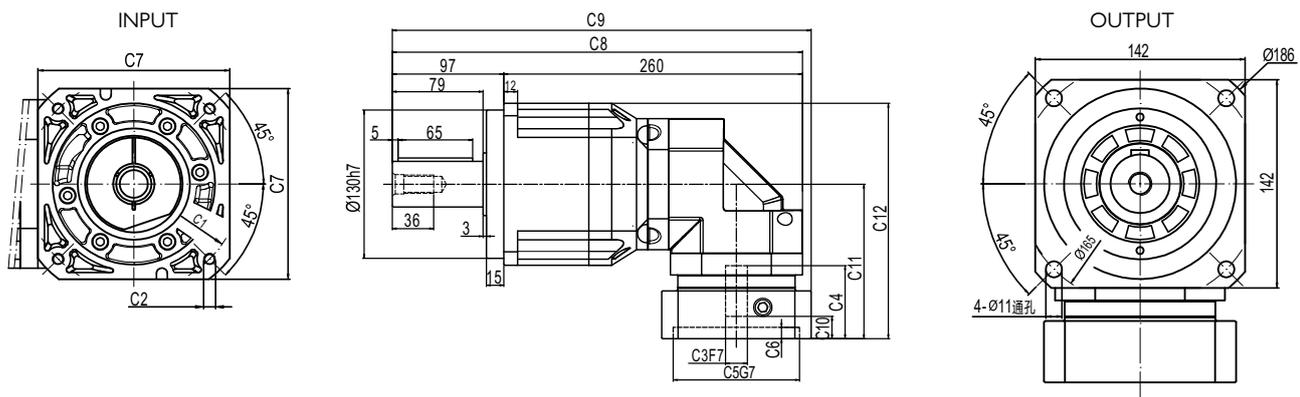
PRECISION PLANETARY GEARBOX FABR SERIES

PRODUCT DIMENSION

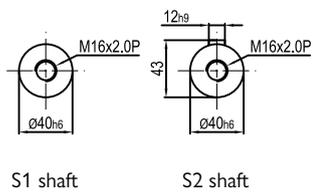
FABR-142-L1



FABR-142-L2



OUTPUT DIAMETER



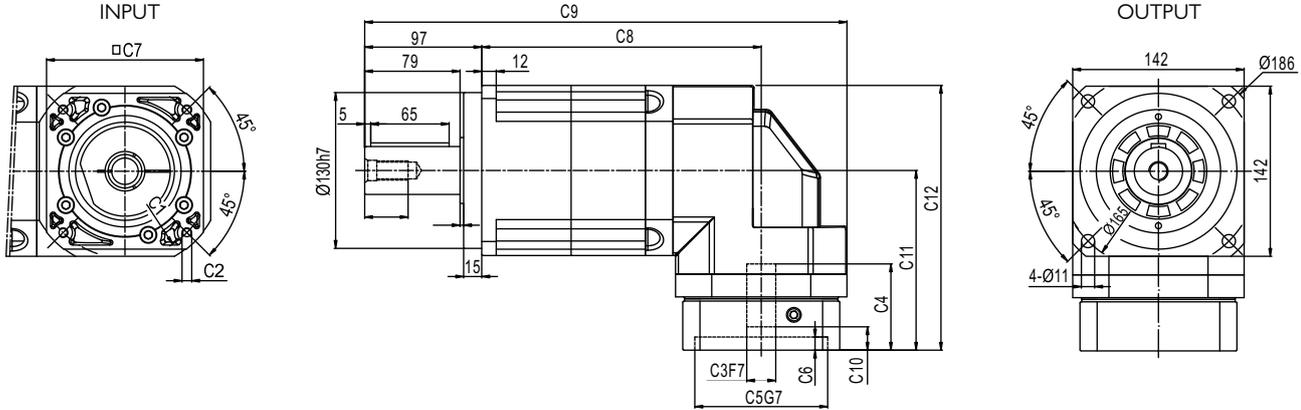
| Size | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 | C10 | C11 | C12 |
|---------------|------|----------|---------------|----|--------|----|-----|-------|-------|------|-------|-------|
| FABR-142-L1 | ø145 | 4-M8x20 | ø22, ø24 | 72 | ø110 | 11 | 130 | 170 | 338 | 19,5 | 150 | 221 |
| | ø200 | 4-M12x28 | ø35 | 82 | ø114,3 | 8 | 180 | 170 | 357 | 25 | 160 | 231 |
| FABR-142-L2 | ø145 | 4-M8x20 | ø19, ø22, ø24 | 64 | ø110 | 10 | 130 | 202,5 | 364,5 | 19,5 | 135,5 | 206,5 |
| FABR-142M1-L2 | ø200 | 4-M12x28 | ø35 | 81 | ø114,3 | 10 | 180 | 202,5 | 389,5 | 28 | 152,5 | 223,5 |

- C1~C7 are motor (metric standard) specific dimensions, which could be customized.
- M1: Limit hole (Version number)

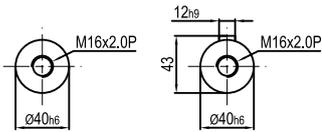
PRECISION PLANETARY GEARBOX FABR SERIES

PRODUCT DIMENSION

FABR-142A-L2



OUTPUT DIAMETER



S1 shaft

S2 shaft

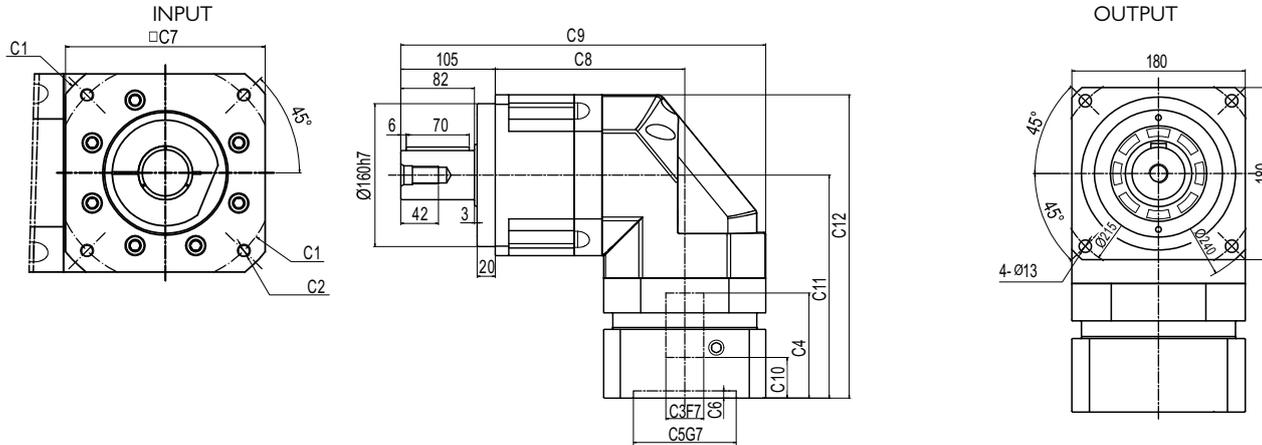
| Size | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 | C10 | C11 | C12 |
|--------------|------|----------|----------|----|--------|----|-----|-------|-------|------|-----|-----|
| FABR-142A-L2 | Ø145 | 4-M8x20 | Ø22, Ø24 | 72 | Ø110 | 11 | 130 | 231,5 | 399,5 | 19,5 | 150 | 221 |
| | Ø200 | 4-M12x28 | Ø35 | 82 | Ø114,3 | 8 | 180 | 231,5 | 418,5 | 25 | 160 | 231 |

▪ C1-C7 are motor (metric standard) specific dimensions, which could be customized.

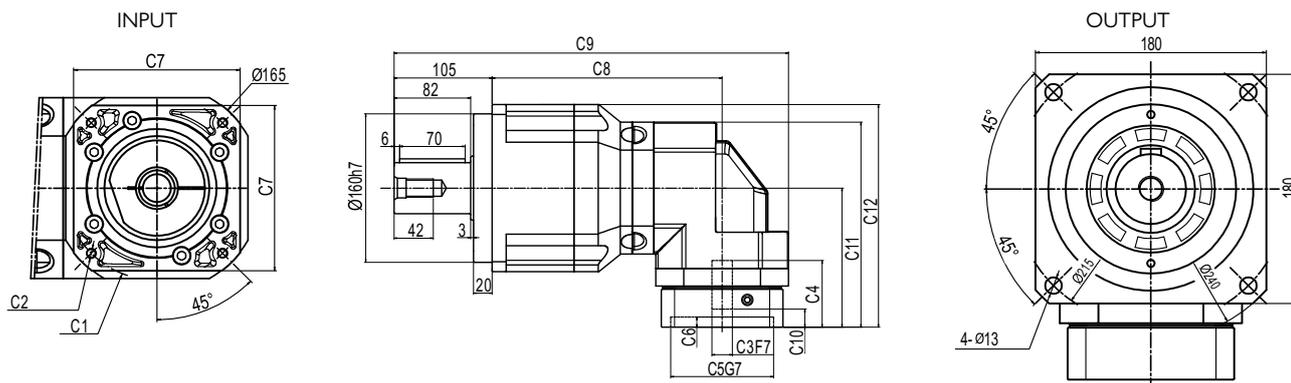
PRECISION PLANETARY GEARBOX FABR SERIES

PRODUCT DIMENSION

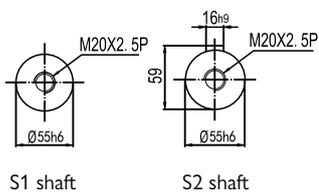
FABR-180-L1



FABR-180-L2



OUTPUT DIAMETER



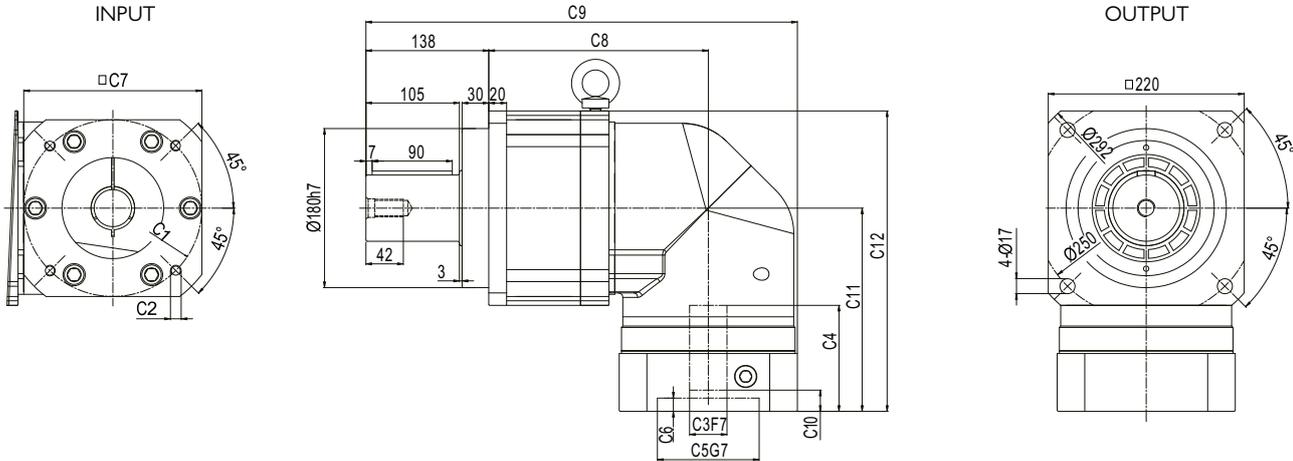
| Size | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 | C10 | C11 | C12 |
|-------------|------|----------|----------|-------|--------|----|-----|-------|-------|------|-------|-------|
| FABR-180-L1 | ø200 | 4-M12x28 | ø35 | 82 | ø114,3 | 8 | 180 | 210,5 | 405,5 | 8,5 | 214 | 304 |
| | ø200 | 4-M12x28 | ø42 | 117,5 | ø114,3 | 8 | 180 | 210,5 | 405,5 | 45,5 | 249,5 | 339,5 |
| | ø215 | 4-M12x28 | ø38 | 87 | ø180 | 8 | 192 | 210,5 | 411,5 | 13,5 | 219 | 309 |
| | ø235 | 4-M12x28 | ø42 | 117,5 | ø200 | 10 | 220 | 213,5 | 318,5 | 45,5 | 249,5 | 339,5 |
| FABR-180-L2 | ø145 | 4-M8x20 | ø22, ø24 | 72 | ø110 | 11 | 130 | 246 | 422 | 19,5 | 150 | 240 |
| | ø200 | 4-M12x28 | ø35 | 82 | ø114,3 | 8 | 180 | 246 | 441 | 25 | 160 | 250 |

▪ C1~C7 are motor (metric standard) specific dimensions, which could be customized.

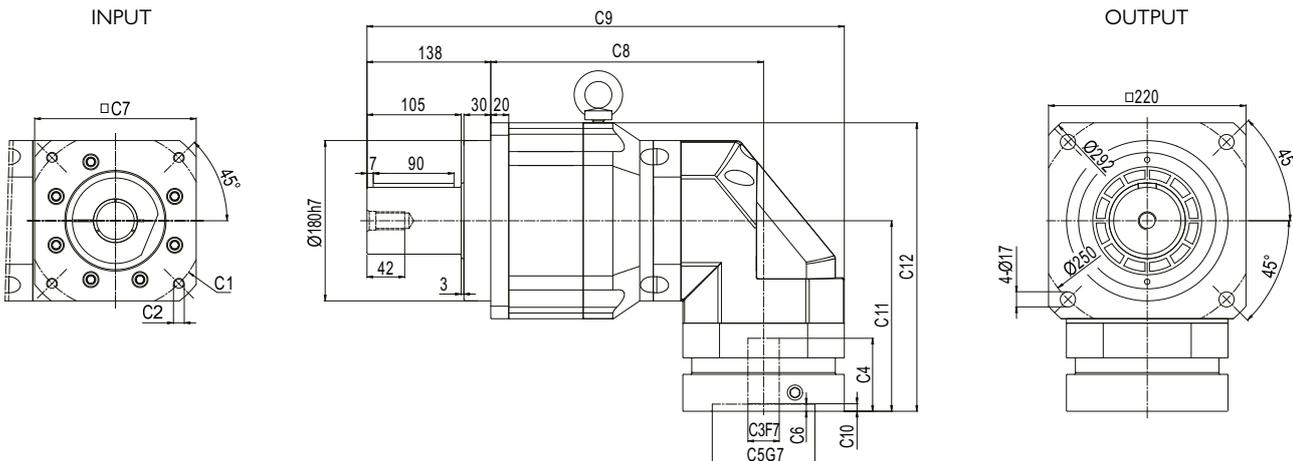
PRECISION PLANETARY GEARBOX FABR SERIES

PRODUCT DIMENSION

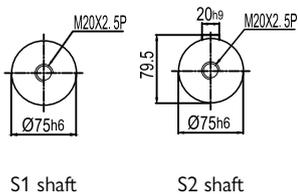
FABR-220-L1



FABR-220-L2



OUTPUT DIAMETER



| Size | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 | C10 | C11 | C12 |
|-------------|------|----------|----------|-------|--------|----|-----|-------|-------|------|-------|-------|
| FABR-220-L1 | ø200 | 4-M12x30 | ø35, ø42 | 120 | ø114,3 | 15 | 200 | 258,5 | 484,5 | 22,5 | 230 | 340 |
| | ø215 | 4-M12x28 | ø38 | 110 | ø180 | 8 | 200 | 258,5 | 484,5 | 12,5 | 220 | 330 |
| | ø235 | 4-M12x28 | ø42, ø55 | 120 | ø200 | 10 | 220 | 258,5 | 494,5 | 24 | 230 | 340 |
| FABR-220-L2 | ø200 | 4-M12x28 | ø35 | 82 | ø114,3 | 8 | 180 | 304 | 532 | 8,5 | 214 | 324 |
| | ø200 | 4-M12x28 | ø42 | 117,5 | ø114,3 | 8 | 180 | 316 | 532 | 45,5 | 249,5 | 359,5 |
| | ø215 | 4-M12x28 | ø38 | 87 | ø180 | 8 | 192 | 316 | 538 | 13,5 | 219 | 329 |
| | ø235 | 4-M12x30 | ø42 | 117,5 | ø200 | 10 | 220 | 316 | 552 | 45,5 | 249,5 | 359,5 |

▪ C1~C7 are motor (metric standard) specific dimensions, which could be customized.

CHIARAVALLI LINEAR CENTER

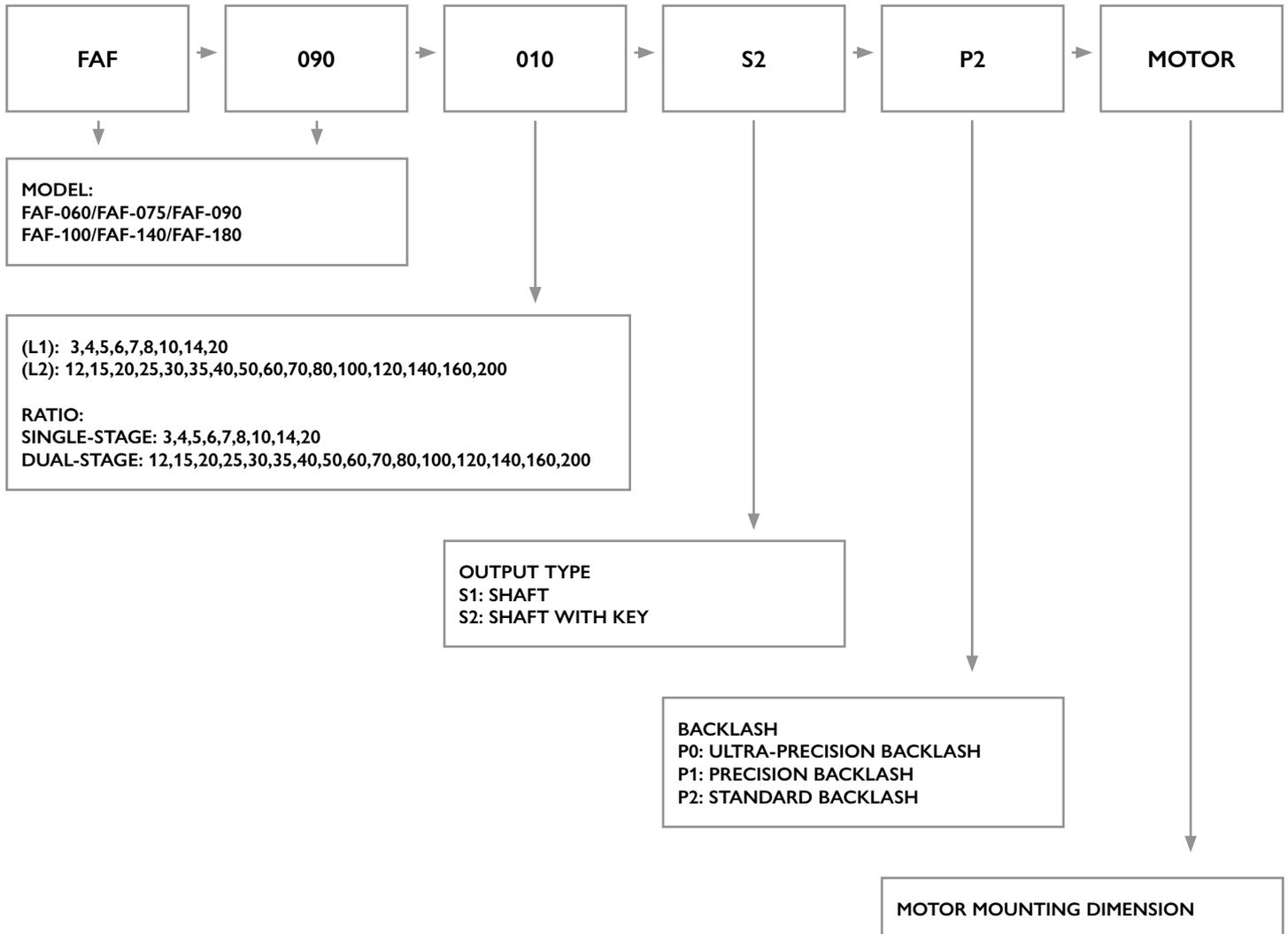
**PRECISION PLANETARY GEARBOX
FAF SERIES**



PRECISION PLANETARY GEARBOX FAF SERIES

MODEL DESCRIPTION

FAF-090-010-S2-P2-19-70-90-M6-45





PRECISION PLANETARY GEARBOX FAF SERIES

TECHNICAL SPECIFICATION

| MODEL | STAGE | RATIO | FAF060 | FAF075 | FAF075A | FAF100 | FAF100A | FAF140 | FAF140A | FAF180 | | |
|--|-----------|-------|---------------------------------|------------------------------|---------|--------|---------|--------|---------|--------|--------|--|
| Rated output torque | 1 | 3 | 55 | 130 | - | 208 | - | 342 | - | 588 | | |
| | | 4 | 50 | 140 | - | 290 | - | 542 | - | 1,050 | | |
| | | 5 | 60 | 160 | - | 330 | - | 650 | - | 1,200 | | |
| | | 6 | 55 | 150 | - | 310 | - | 600 | - | 1,100 | | |
| | | 7 | 50 | 140 | - | 300 | - | 550 | - | 1,100 | | |
| | | 8 | 45 | 120 | - | 260 | - | 500 | - | 1,000 | | |
| | 2 | 10 | 40 | 100 | - | 230 | - | 450 | - | 900 | | |
| | | 15 | 55 | 130 | 130 | 208 | 208 | 342 | 342 | 588 | | |
| | | 20 | 50 | 140 | 140 | 290 | 290 | 542 | 542 | 1,050 | | |
| | | 25 | 60 | 160 | 160 | 330 | 330 | 650 | 650 | 1,200 | | |
| | | 30 | 55 | 160 | 160 | 330 | 330 | 650 | 650 | 1,200 | | |
| | | 35 | 50 | 160 | 160 | 330 | 330 | 650 | 650 | 1,200 | | |
| | | 40 | 45 | 120 | 120 | 260 | 260 | 500 | 500 | 1,000 | | |
| | | 50 | 60 | 160 | 160 | 330 | 330 | 650 | 650 | 1,200 | | |
| | | 60 | 55 | 150 | 150 | 310 | 310 | 600 | 600 | 1,100 | | |
| | | 70 | 50 | 140 | 140 | 300 | 300 | 550 | 550 | 1,100 | | |
| | | 80 | 45 | 120 | 120 | 260 | 260 | 500 | 500 | 1,000 | | |
| | | 100 | 40 | 100 | 100 | 230 | 230 | 450 | 450 | 900 | | |
| T _{2B} /Max. output torque | Nm | 1,2 | 3 times the rated output torque | | | | | | | | | |
| n ₁ /Rated input speed | rpm | 1,2 | 3~100 | 5,000 | 4,000 | 4,000 | 4,000 | 4,000 | 3,000 | 3,000 | 3,000 | |
| n _{1B} /Max.input speed | rpm | 1,2 | 3~100 | 10,000 | 8,000 | 8,000 | 8,000 | 8,000 | 6,000 | 6,000 | 6,000 | |
| P0/Ultra-precision backlash | arcmin | 1 | 3~10 | - | ≤1 | ≤1 | ≤1 | ≤1 | ≤1 | ≤1 | ≤1 | |
| | | 2 | 3~100 | - | - | - | ≤3 | ≤3 | ≤3 | ≤3 | ≤3 | |
| P1/Precision backlash | arcmin | 1 | 3~10 | ≤3 | ≤3 | ≤3 | ≤3 | ≤3 | ≤3 | ≤3 | ≤3 | |
| | | 2 | 12~100 | ≤5 | ≤5 | ≤5 | ≤5 | ≤5 | ≤5 | ≤5 | ≤5 | |
| P2/Precision backlash | arcmin | 1 | 3~10 | ≤5 | ≤5 | ≤5 | ≤5 | ≤5 | ≤5 | ≤5 | ≤5 | |
| | | 2 | 12~100 | ≤7 | ≤7 | ≤7 | ≤7 | ≤7 | ≤7 | ≤7 | ≤7 | |
| Torsional rigidity | Nm/arcmin | 1,2 | 3~100 | 7 | 14 | 14 | 25 | 25 | 50 | 50 | 145 | |
| F _{2rB} ² /Allowable radial force | N | 1,2 | 3~100 | 1,400 | 4,100 | 4,100 | 9,200 | 9,200 | 14,000 | 14,000 | 18,000 | |
| F _{2a1B} ² /Allowable radial force | N | 1,2 | 3~100 | 1,000 | 3,300 | 3,300 | 5,220 | 5,220 | 10,800 | 10,800 | 13,000 | |
| F _{2a2B} ² /Allowable radial force | N | 1,2 | 3~100 | 1,100 | 3,700 | 3,700 | 5,800 | 5,800 | 11,400 | 11,400 | 19,500 | |
| Life time | h | 1,2 | 3~100 | 30,000 ¹ | | | | | | | | |
| η/Efficiency | % | 1 | 3~10 | ≥97% | | | | | | | | |
| | | 2 | 12~100 | ≥94% | | | | | | | | |
| Weight | kg | 1 | 3~10 | 1.3 | 3.7 | - | 7.8 | - | 14.5 | - | 29 | |
| | | 2 | 12~100 | 1.9 | 41 | 41 | 9 | 9 | 17.5 | 17.5 | 33 | |
| Operating temperature | °C | 1,2 | 3~100 | -10C ~ +90C | | | | | | | | |
| lubrication | | 1,2 | 3~100 | Synthetic lubricating grease | | | | | | | | |
| Ingress protection | | 1,2 | 3~100 | IP65 | | | | | | | | |
| Mount position | | 1,2 | 3~100 | Any direction | | | | | | | | |
| (n ₁ =3000rpm) / Noise level | dB | 1,2 | 3~100 | ≤58 | ≤60 | ≤60 | ≤63 | ≤63 | ≤65 | ≤65 | ≤67 | |

GEARBOX MOMENT OF INERTIA

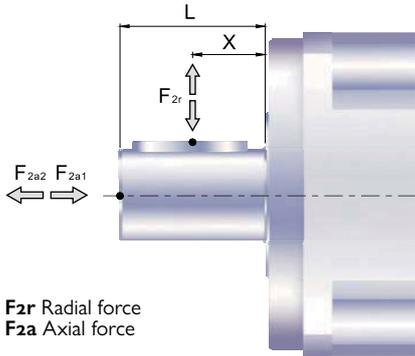
| MODEL | STAGE | RATIO | FAF060 | FAF075 | FAF075A | FAF100 | FAF100A | FAF140 | FAF140A | FAF180 |
|-------------------|-------|-------|--------|--------|---------|--------|---------|--------|---------|--------|
| Moment of inertia | 1 | 3 | 0.16 | 0.61 | - | 3.25 | - | 9.21 | - | 28.98 |
| | | 4 | 0.14 | 0.48 | - | 2.74 | - | 7.54 | - | 23.67 |
| | | 5 | 0.13 | 0.47 | - | 2.71 | - | 7.42 | - | 23.29 |
| | | 6 | 0.13 | 0.45 | - | 2.65 | - | 7.25 | - | 22.75 |
| | | 7 | 0.13 | 0.45 | - | 2.62 | - | 7.14 | - | 22.48 |
| | | 8 | 0.13 | 0.44 | - | 2.58 | - | 7.07 | - | 22.59 |
| | 2 | 10 | 0.13 | 0.44 | - | 2.57 | - | 7.03 | - | 22.51 |
| | | 15 | 0.03 | 0.13 | 0.13 | 0.47 | 0.47 | 2.71 | 2.71 | 7.42 |
| | | 20 | 0.03 | 0.13 | 0.13 | 0.47 | 0.47 | 2.71 | 2.71 | 7.42 |
| | | 25 | 0.03 | 0.13 | 0.13 | 0.47 | 0.47 | 2.71 | 2.71 | 7.42 |
| | | 30 | 0.03 | 0.13 | 0.13 | 0.47 | 0.47 | 2.71 | 2.71 | 7.42 |
| | | 35 | 0.03 | 0.13 | 0.13 | 0.47 | 0.47 | 2.71 | 2.71 | 7.42 |
| | | 40 | 0.03 | 0.13 | 0.13 | 0.47 | 0.47 | 2.71 | 2.71 | 7.42 |
| | | 50 | 0.03 | 0.13 | 0.13 | 0.44 | 0.44 | 2.57 | 2.57 | 7.03 |
| | | 60 | 0.03 | 0.13 | 0.13 | 0.44 | 0.44 | 2.57 | 2.57 | 7.03 |
| | | 70 | 0.03 | 0.13 | 0.13 | 0.44 | 0.44 | 2.57 | 2.57 | 7.03 |
| | | 80 | 0.03 | 0.13 | 0.13 | 0.44 | 0.44 | 2.57 | 2.57 | 7.03 |
| | | 100 | 0.03 | 0.13 | 0.13 | 0.44 | 0.44 | 2.57 | 2.57 | 7.03 |

1. The lifetime will be shortened by half under continuous operation.
When the output speed is 100rpm, it applies on the center of the output shaft.



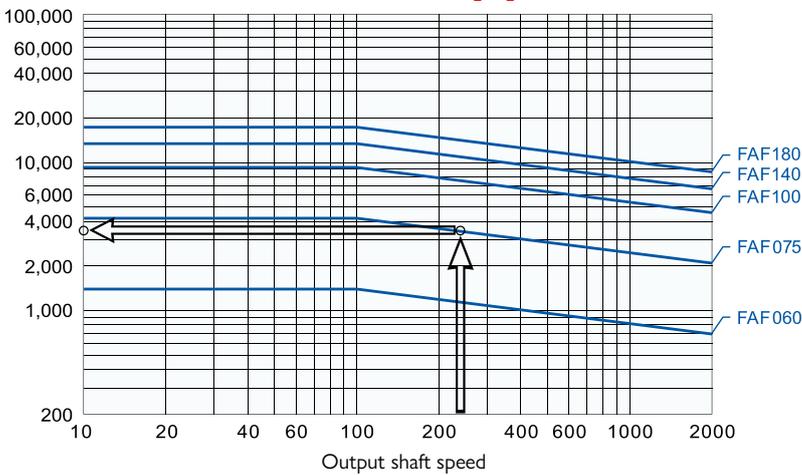
PRECISION PLANETARY GEARBOX FAF SERIES

ALLOWABLE RADIAL AND AXIAL FORCES ON THE OUTPUT SHAFT OF THE GEARBOX



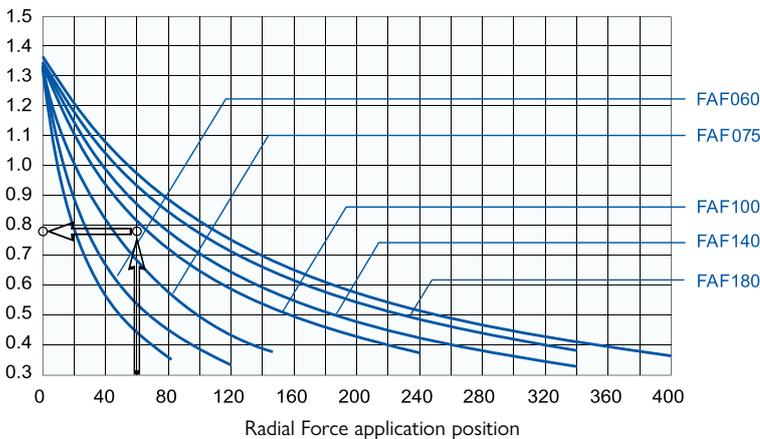
The permitted radial and axial loads on the output shaft depend on the design of the gearbox supporting bearing. A large-span design and high-capacity bearings are adopted to achieve the maximum bearing capacity for radial and axial loads.

PERMISSIBLE RADIAL FORCE F_{2rB} [N] APPLY FORCE TO THE CENTER OF THE SHAFT



When the radial force F_{2r} is applied to the center of the shaft, i.e. $X=1/2 \times L$, the allowable radial force F_{2rB} that can be withstood by different specifications of reducers under different output speeds is refer to the left picture.

POSITIONAL LOAD COEFFICIENT



When the radial force F_{2r} is not in the center of the shaft, the closer to the gearbox, that is, $X < 1/2 \times L$, the allowable radial force that can be borne becomes larger, and the farther away from the reducer, i.e., $X > 1/2 \times L$, the allowable force that can be borne becomes smaller.

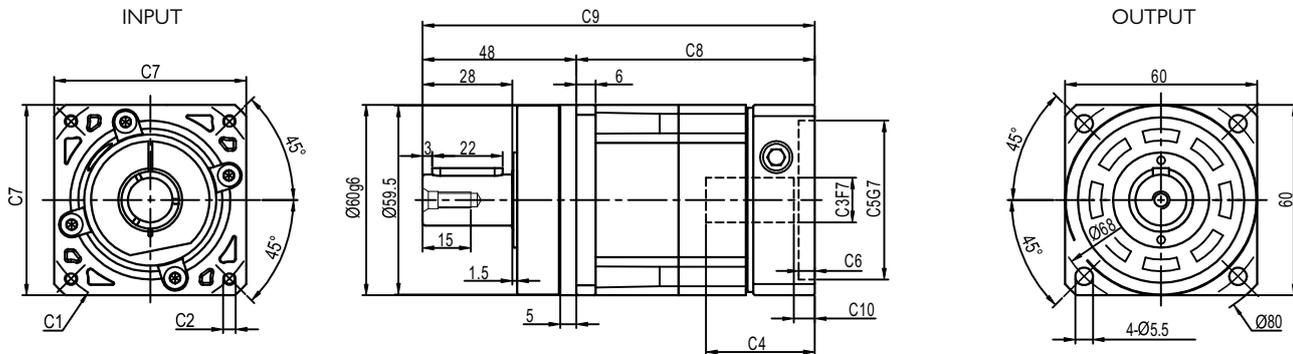
$$F'_{2rB} = K_b X F_{2rB}$$

*The lifetime will be shortened by half under continuous operation.

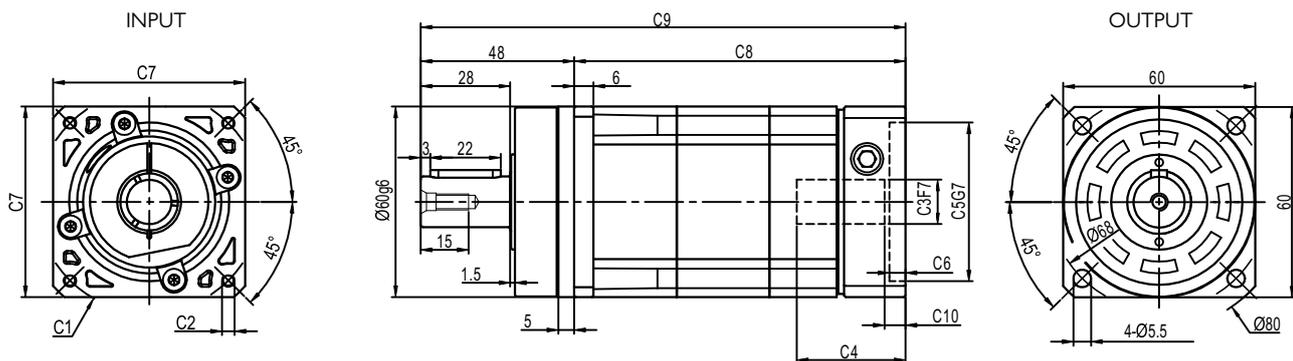
PRECISION PLANETARY GEARBOX FAF SERIES

PRODUCT DIMENSION

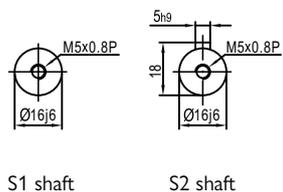
FAF-060-L1



FAF-060-L2



OUTPUT DIAMETER



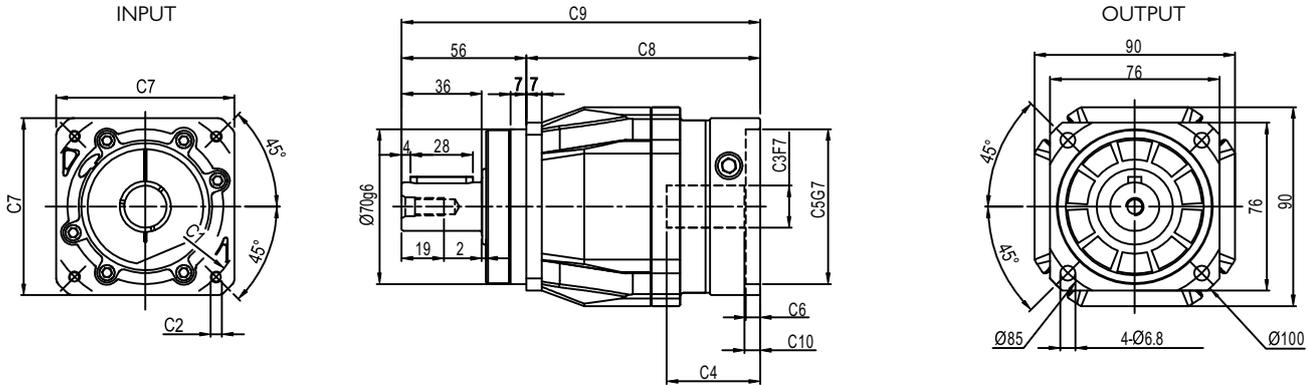
| Size | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 | C10 |
|--------------|--------------------|---------------------|----------------------------------|----|--------------------|-----|----|-------|-------|-----|
| FAF-060-L1 | $\varnothing 66,7$ | 4-M4x10 | $\varnothing 8$ | 34 | $\varnothing 38,1$ | 5 | 60 | 74,5 | 122,5 | 6,5 |
| FAF-060-L2 | | | | | | | | 103,5 | 151,5 | 6,5 |
| FAF-060-L1 | $\varnothing 70$ | 4-M4x10, 4-M5x12 | $\varnothing 11, \varnothing 14$ | 34 | $\varnothing 50$ | 5 | 60 | 74,5 | 122,5 | 6,5 |
| FAF-060-L2 | | | | | | | | 103,5 | 151,5 | 6,5 |
| FAF-060M1-L1 | $\varnothing 90$ | 4-M5x12, 4-M6x14 | $\varnothing 19$ | 42 | $\varnothing 70$ | 6,5 | 80 | 81 | 129 | 12 |
| FAF-060M1-L2 | | | | | | | | 110 | 158 | 12 |

- C1~C7 are motor (metric standard) specific dimensions, which could be customized.
- M1: Limit hole (Version number)

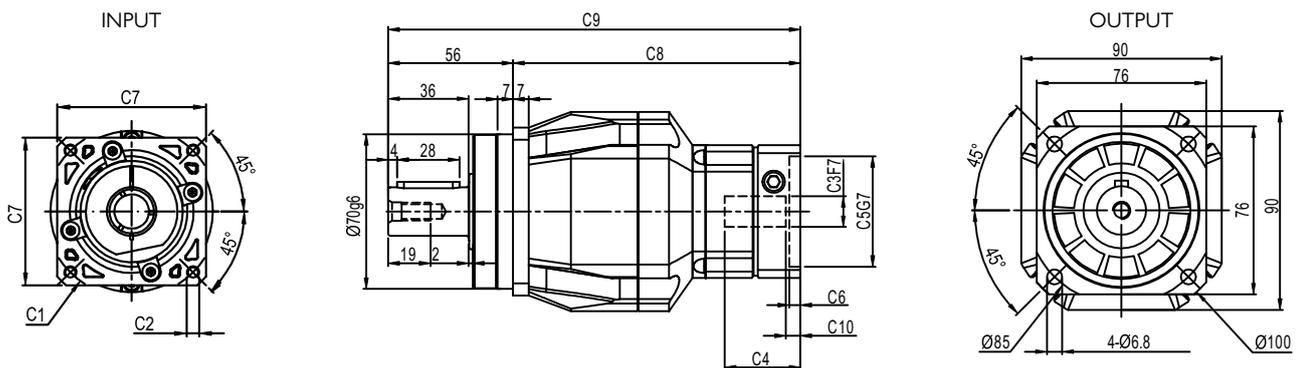
PRECISION PLANETARY GEARBOX FAF SERIES

PRODUCT DIMENSION

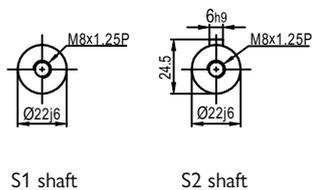
FAF-075-L1



FAF-075-L2



OUTPUT DIAMETER



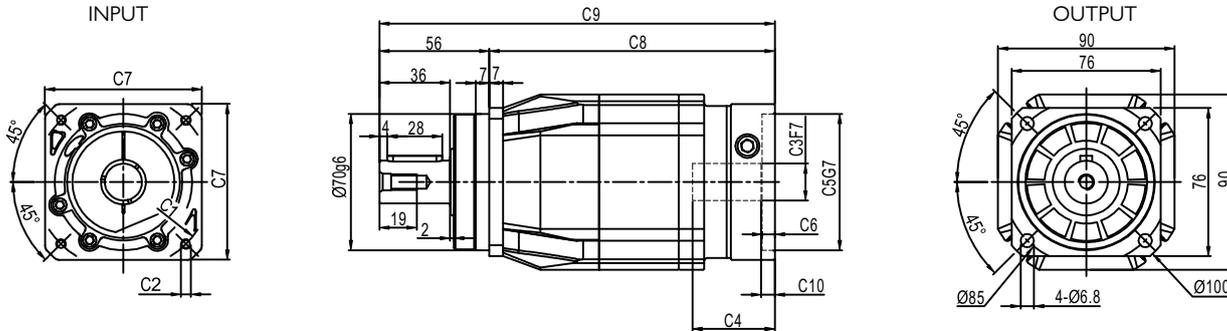
| Size | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 | C10 |
|--------------|--------------------|------------------|--|------|--------------------|-----|-----|-------|-------|------|
| FAF-075-L1 | $\varnothing 90$ | 4-M5x12, 4-M6x14 | $\varnothing 19$ | 42 | $\varnothing 70$ | 6,5 | 80 | 105 | 161 | 7 |
| | $\varnothing 100$ | 4-M6x14 | $\varnothing 16$ | 42 | $\varnothing 80$ | 6,5 | 86 | 105 | 161 | 7 |
| FAF-075M1-L1 | $\varnothing 115$ | 4-M8x20 | $\varnothing 19, \varnothing 22$ | 56,5 | $\varnothing 95$ | 8 | 100 | 120,5 | 176,5 | 17,5 |
| | $\varnothing 145$ | 4-M8x20 | $\varnothing 19, \varnothing 22, \varnothing 24$ | 59 | $\varnothing 110$ | 11 | 130 | 123 | 178 | 20 |
| FAF-075-L2 | $\varnothing 66,7$ | 4-M4x10 | $\varnothing 8$ | 34 | $\varnothing 38,1$ | 5 | 60 | 129 | 185 | 5,5 |
| | $\varnothing 70$ | 4-M4x10, 4-M5x12 | $\varnothing 11, \varnothing 14$ | 34 | $\varnothing 50$ | 5 | 60 | 129 | 185 | 5,5 |
| FAF-075M1-L2 | $\varnothing 90$ | 4-M5x12, 4-M6x14 | $\varnothing 19$ | 42 | $\varnothing 70$ | 6,5 | 80 | 135,5 | 191,5 | 12 |
| | $\varnothing 100$ | 4-M6x14 | $\varnothing 16$ | 42 | $\varnothing 80$ | 6,5 | 86 | 135,5 | 191,5 | 11 |

- C1~C7 are motor (metric standard) specific dimensions, which could be customized.
- M1: Limit hole (Version number)

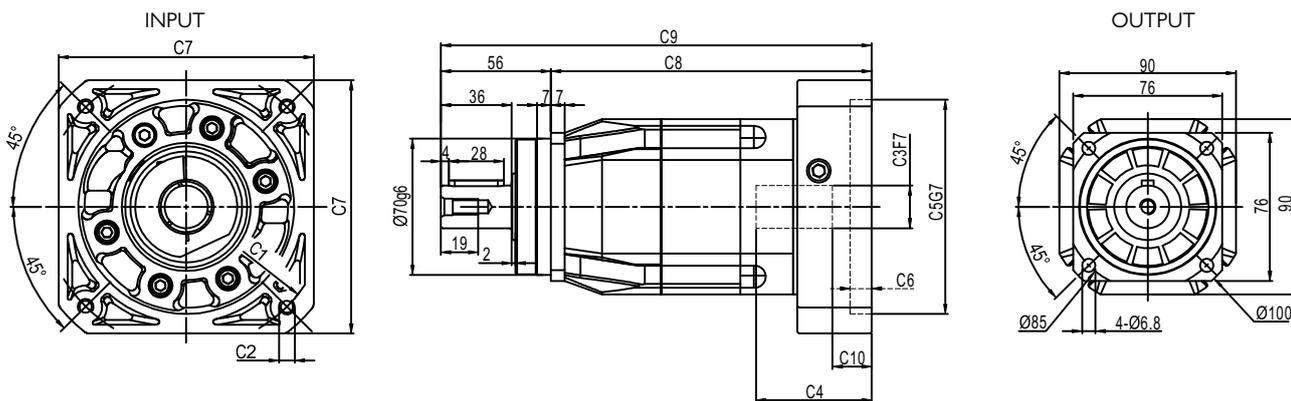
PRECISION PLANETARY GEARBOX FAF SERIES

PRODUCT DIMENSION

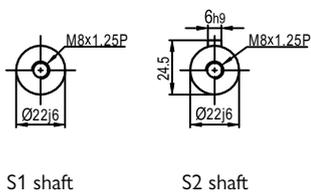
FAF-075A-L2



FAF-075A-L2



OUTPUT DIAMETER



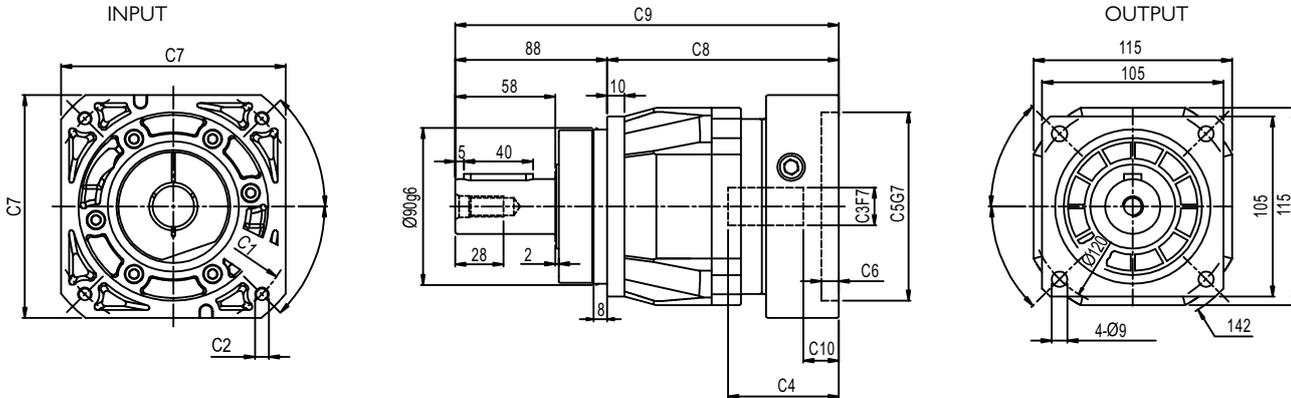
| Size | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 | C10 | C11 | C12 |
|---------------|------|------------------|---------------|------|------|-----|-----|-------|-------|------|-------|-------|
| FAF-075A-L2 | ø90 | 4-M5x12, 4-M6x14 | ø19 | 45 | ø70 | 6,5 | 80 | 156,5 | 249,5 | 7 | 96 | 141 |
| | ø100 | 4-M6x14 | ø16 | 45 | ø80 | 6,5 | 86 | 156,5 | 249,5 | 6 | 96 | 141 |
| FAF-075AM1-L2 | ø115 | 4-M8x20 | ø19, ø22 | 56,5 | ø95 | 8 | 100 | 156,5 | 254,5 | 16,5 | 117,5 | 162,5 |
| | ø145 | 4-M8x20 | ø19, ø22, ø24 | 59 | ø110 | 10 | 130 | 156,5 | 269,5 | 19 | 120 | 165 |

- C1~C7 are motor (metric standard) specific dimensions, which could be customized.
- M1: Limit hole (Version number)

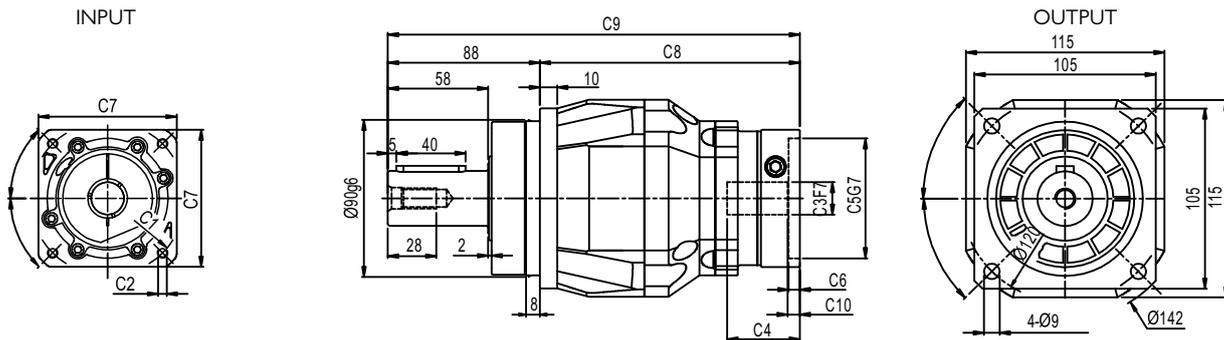
PRECISION PLANETARY GEARBOX FAF SERIES

PRODUCT DIMENSION

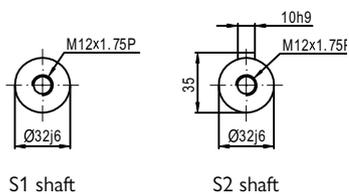
FAF-100-L1



FAF-100-L2



OUTPUT DIAMETER



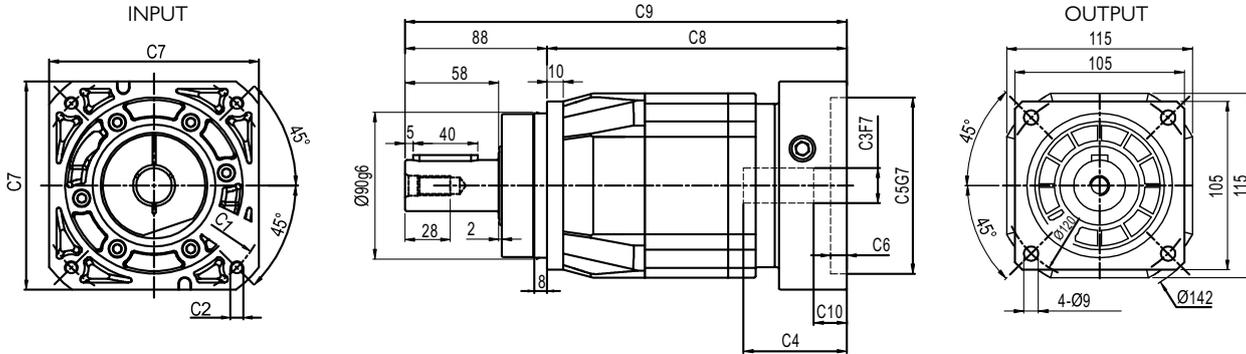
| Size | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 | C10 |
|--------------|------|------------------|---------------|------|--------|-----|-----|-------|-------|------|
| FAF-100-L1 | ø145 | 4-M8x20 | ø19, ø22, ø24 | 64 | ø110 | 10 | 130 | 134 | 222 | 19,5 |
| FAF-100M1-L1 | ø200 | 4-M12x28 | ø35 | 81 | ø114,3 | 10 | 180 | 151,5 | 239,5 | 28 |
| FAF-100-L2 | ø90 | 4-M5x12, 4xM6x14 | ø19 | 42 | ø70 | 6,5 | 80 | 150,5 | 238,5 | 7 |
| | ø100 | 4-M6x14 | ø16 | 42 | ø80 | 6,5 | 86 | 150,5 | 238,5 | 6 |
| FAF-100M1-L2 | ø115 | 4-M8x20 | ø19, ø22 | 56,5 | ø95 | 8 | 100 | 166 | 254 | 16,5 |
| | ø145 | 4-M8x20 | ø19, ø22, ø24 | 59 | ø110 | 11 | 130 | 168,5 | 256,5 | 19 |

- C1~C7 are motor (metric standard) specific dimensions, which could be customized.
- M1: Limit hole (Version number)

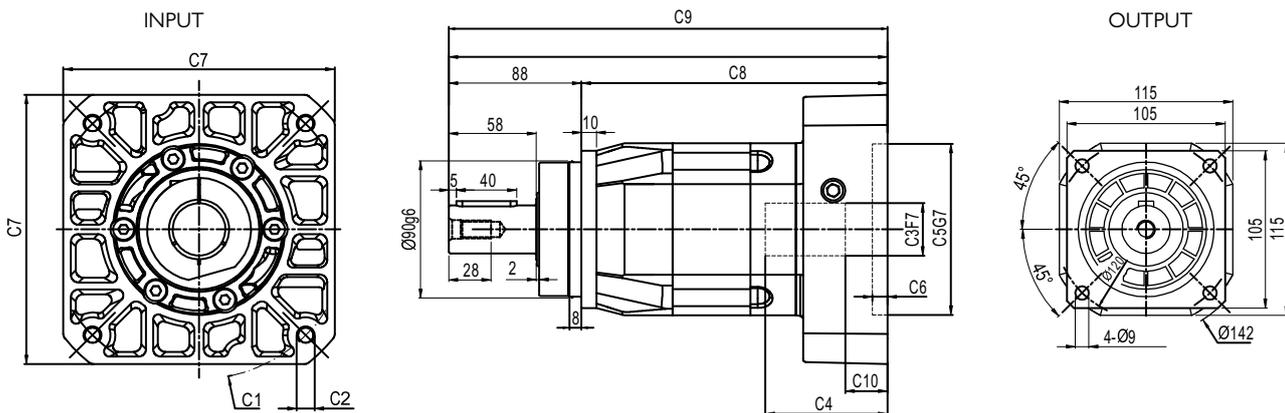
PRECISION PLANETARY GEARBOX FAF SERIES

PRODUCT DIMENSION

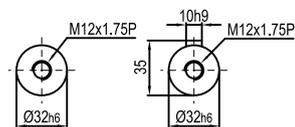
FAF-100A-L2



FAF-100A-L2



OUTPUT DIAMETER



S1 shaft

S2 shaft

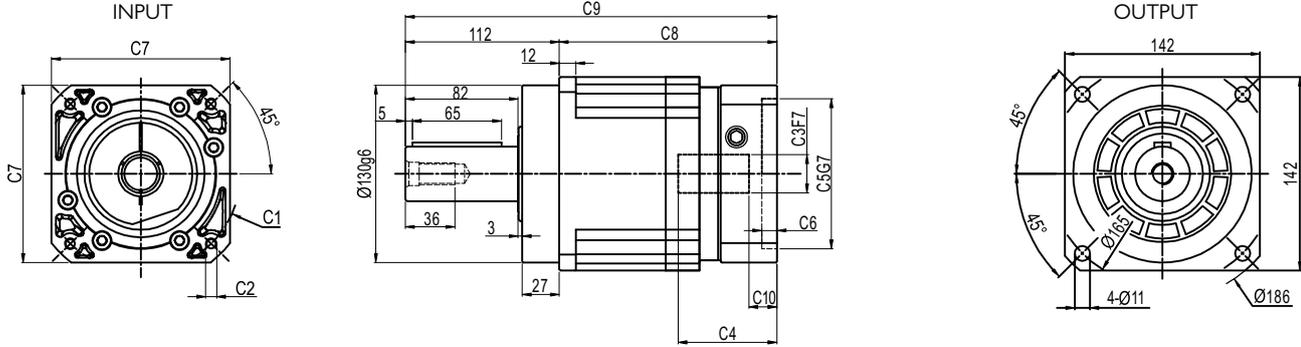
| Size | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 | C10 |
|---------------|------|----------|---------------|----|--------|----|-----|-------|-------|------|
| FAF-100A-L2 | ø145 | 4-M8x20 | ø19, ø22, ø24 | 64 | ø110 | 10 | 130 | 185,5 | 273,5 | 19,5 |
| FAF-100AM1-L2 | ø200 | 4-M12x28 | ø35 | 81 | ø114,3 | 10 | 180 | 203 | 291 | 28 |

- C1~C7 are motor (metric standard) specific dimensions, which could be customized.
- M1: Limit hole (Version number)

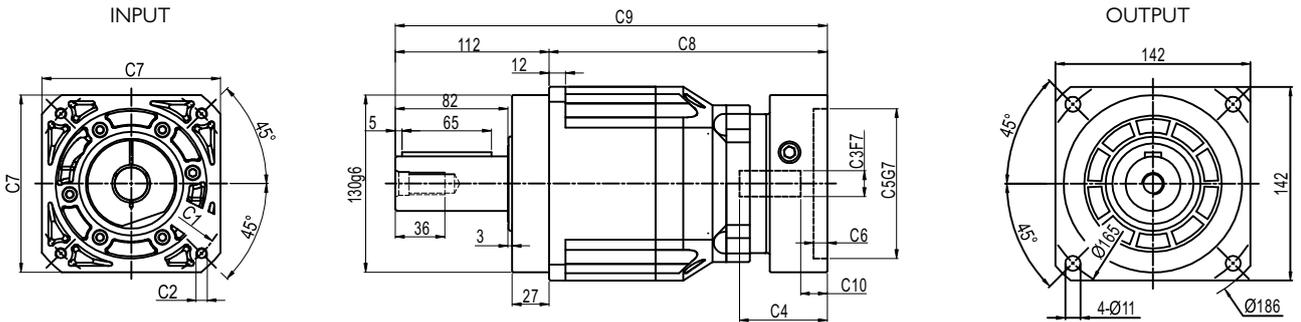
PRECISION PLANETARY GEARBOX FAF SERIES

PRODUCT DIMENSION

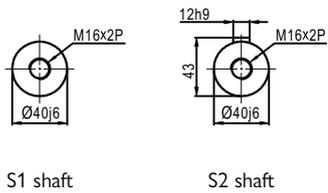
FAF-140-L1



FAF-140-L2



OUTPUT DIAMETER



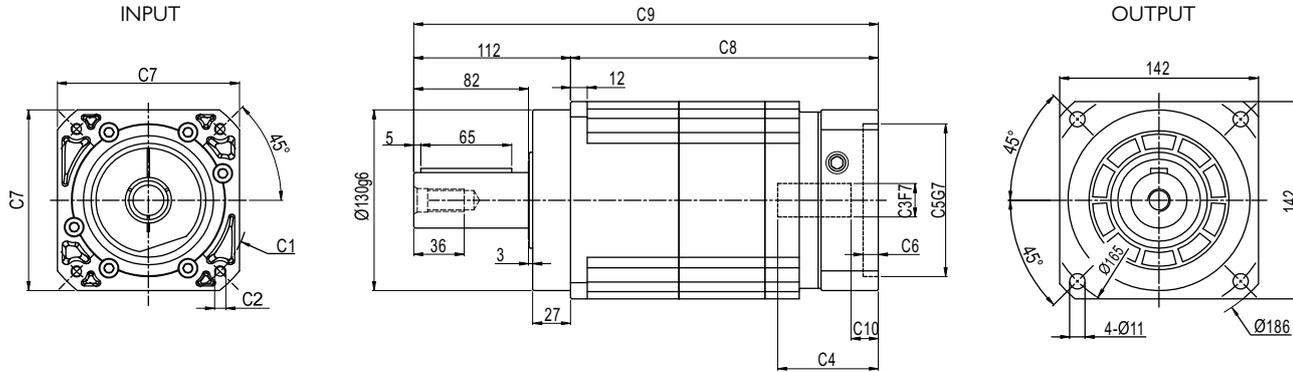
| Size | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 | C10 |
|--------------|------|----------|---------------|------|--------|----|-----|-------|-------|------|
| FAF-140-L1 | ø145 | 4-M8x20 | ø22, ø24 | 72 | ø110 | 11 | 130 | 158,5 | 270,5 | 19,5 |
| | ø200 | 4-M12x20 | ø35 | 81,5 | ø114,3 | 8 | 180 | 168,5 | 280,5 | 25 |
| FAF-140-L2 | ø145 | 4-M8x20 | ø19, ø22, ø24 | 64 | ø110 | 10 | 130 | 202,5 | 314,5 | 19,5 |
| FAF-140M1-L2 | ø200 | 4-M12x20 | ø35 | 81 | ø114,3 | 10 | 180 | 220 | 332 | 28 |

- C1~C7 are motor (metric standard) specific dimensions, which could be customized.
- M1: Limit hole (Version number)

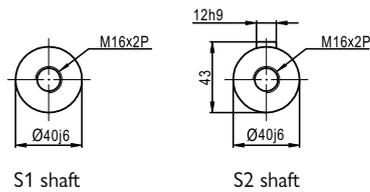
PRECISION PLANETARY GEARBOX FAF SERIES

PRODUCT DIMENSION

FAF-140A-L2



OUTPUT DIAMETER



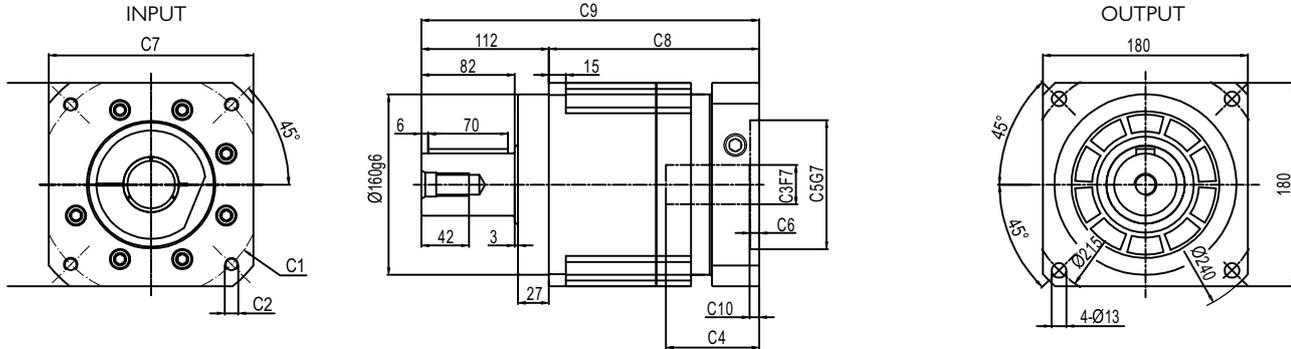
| Size | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 | C10 |
|-------------|------|----------|----------|------|--------|----|-----|-----|-----|------|
| FAF-140A-L2 | Ø145 | 4-M8x20 | Ø22, Ø24 | 72 | Ø110 | 11 | 130 | 220 | 332 | 19,5 |
| | Ø200 | 4-M12x28 | Ø35 | 81,5 | Ø114,3 | 8 | 180 | 230 | 342 | 25 |

▪ C1~C7 are motor (metric standard) specific dimensions, which could be customized.

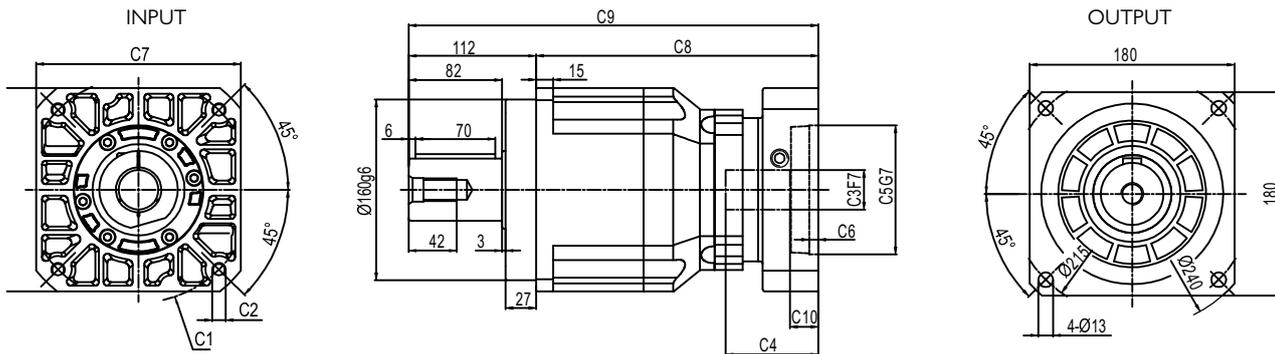
PRECISION PLANETARY GEARBOX FAF SERIES

PRODUCT DIMENSION

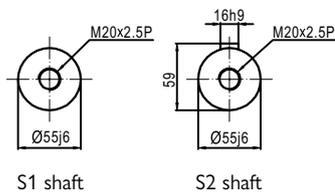
FAF-180-L1



FAF-180-L2



OUTPUT DIAMETER



| Size | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 | C10 |
|------------|------|----------|-----|-------|--------|----|-----|-------|-------|------|
| FAF-180-L1 | ø200 | 4-M12x28 | ø35 | 82 | ø114,3 | 8 | 180 | 185 | 297 | 8,5 |
| | ø200 | 4-M12x28 | ø42 | 117,5 | ø114,3 | 8 | 180 | 220,5 | 332,5 | 45,5 |
| | ø215 | 4-M12x28 | ø38 | 87 | ø180 | 8 | 192 | 190 | 302 | 13,5 |
| | ø235 | 4-M12x28 | ø42 | 117,5 | ø200 | 10 | 200 | 220,5 | 332,5 | 45,5 |
| FAF-180-L2 | ø145 | 4-M8x20 | ø24 | 72 | ø110 | 11 | 130 | 238 | 350 | 19,5 |
| | ø200 | 4-M12x28 | ø35 | 81,5 | ø114,3 | 8 | 180 | 248 | 360 | 25 |

▪ C1~C7 are motor (metric standard) specific dimensions, which could be customized.

CHIARAVALLI LINEAR CENTER

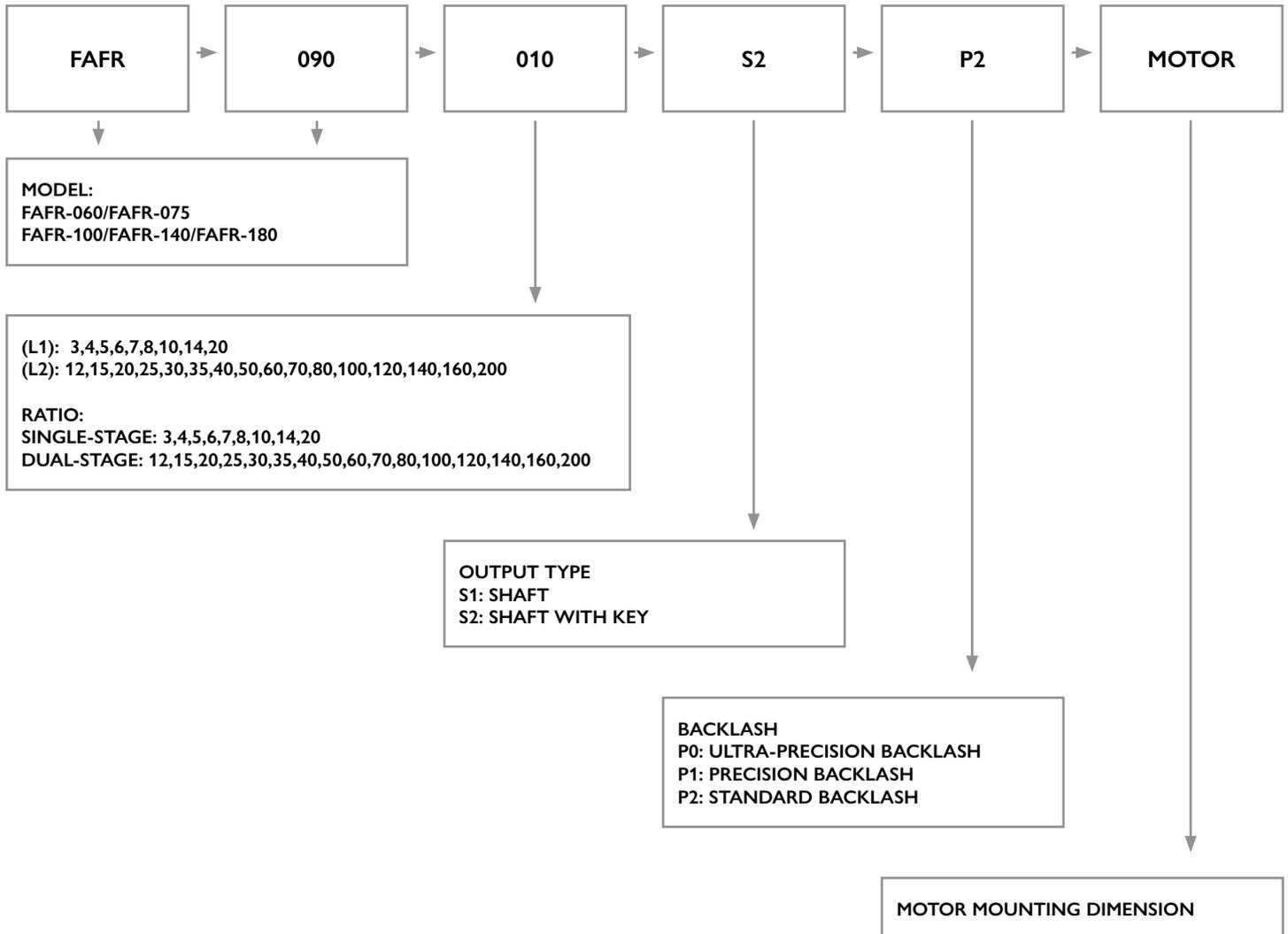
**PRECISION PLANETARY GEARBOX
FAFR SERIES**



PRECISION PLANETARY GEARBOX FAFR SERIES

MODEL DESCRIPTION

FAFR-090-010-S2-P2-19-70-90-M6-45





PRECISION PLANETARY GEARBOX FAFR SERIES

TECHNICAL SPECIFICATION

| MODEL | | STAGE | RATIO | FAFR060 | FAFR075 | FAFR075A | FAFR100 | FAFR100A | FAFR140 | FAFR140A | FAFR180 |
|--|-----------|-------|--------|---------------------------------|---------|----------|---------|----------|---------|----------|---------|
| Rated output torque | Nm | 1 | 3 | 55 | 130 | - | 208 | - | 342 | - | 588 |
| | | | 4 | 50 | 140 | - | 290 | - | 542 | - | 1,050 |
| | | | 5 | 60 | 160 | - | 330 | - | 650 | - | 1,200 |
| | | | 6 | 55 | 150 | - | 310 | - | 600 | - | 1,100 |
| | | | 7 | 50 | 140 | - | 300 | - | 550 | - | 1,100 |
| | | | 8 | 50 | 140 | - | 290 | - | 542 | - | 1,000 |
| | | | 10 | 60 | 160 | - | 330 | - | 650 | - | 520 |
| | | | 14 | 50 | 140 | - | 300 | - | 550 | - | 1,100 |
| | | 20 | 40 | 100 | - | 230 | - | 450 | - | 520 | |
| | | 2 | 12 | 55 | 130 | 130 | 208 | 208 | 342 | 342 | 588 |
| | | | 15 | 55 | 130 | 130 | 208 | 208 | 342 | 342 | 588 |
| | | | 20 | 50 | 140 | 140 | 290 | 290 | 542 | 542 | 1,050 |
| | | | 25 | 60 | 160 | 160 | 330 | 330 | 650 | 650 | 1,200 |
| | | | 30 | 55 | 130 | 130 | 208 | 208 | 342 | 342 | 1,200 |
| | | | 35 | 60 | 160 | 160 | 330 | 330 | 650 | 650 | 1,200 |
| | | | 40 | 50 | 140 | 140 | 290 | 290 | 542 | 542 | 1,200 |
| | | | 50 | 60 | 160 | 160 | 330 | 330 | 650 | 650 | 1,200 |
| | | | 60 | 55 | 150 | 150 | 310 | 310 | 600 | 600 | 1,200 |
| | | | 70 | 60 | 160 | 160 | 330 | 330 | 650 | 650 | 1,200 |
| | | | 80 | 50 | 140 | 140 | 290 | 290 | 542 | 542 | 1,200 |
| 100 | 60 | | 160 | 160 | 330 | 330 | 650 | 650 | 1,200 | | |
| 120 | - | 150 | 150 | 310 | 310 | 600 | 600 | 1,100 | | | |
| 140 | - | 140 | 140 | 300 | 300 | 550 | 550 | 1,100 | | | |
| 160 | - | 120 | 120 | 260 | 260 | 500 | 500 | 1,000 | | | |
| 200 | - | 100 | 100 | 230 | 230 | 450 | 450 | 520 | | | |
| T _{2B} /Max. output torque | Nm | 1,2 | 3~200 | 3 times the rated output torque | | | | | | | |
| n ₁ /Rated input speed | rpm | 1,2 | 3~200 | 5,000 | 4,000 | 4,000 | 4,000 | 4,000 | 3,000 | 3,000 | 3,000 |
| n _{1B} /Max.input speed | rpm | 1,2 | 3~200 | 10,000 | 8,000 | 8,000 | 8,000 | 8,000 | 6,000 | 6,000 | 6,000 |
| P0/Ultra-precision backlash | arcmin | 1 | 3~20 | - | ≤2 | ≤2 | ≤2 | ≤2 | ≤2 | ≤2 | ≤2 |
| | | 2 | 12~200 | - | ≤4 | ≤4 | ≤4 | ≤4 | ≤4 | ≤4 | ≤4 |
| P1/Precision backlash | arcmin | 1 | 3~20 | ≤4 | ≤4 | ≤4 | ≤4 | ≤4 | ≤4 | ≤4 | ≤4 |
| | | 2 | 12~200 | ≤7 | ≤7 | ≤7 | ≤7 | ≤7 | ≤7 | ≤7 | ≤7 |
| P2/Precision backlash | arcmin | 1 | 3~20 | ≤6 | ≤6 | ≤7 | ≤6 | ≤7 | ≤6 | ≤7 | ≤6 |
| | | 2 | 12~200 | ≤9 | ≤9 | ≤9 | ≤9 | ≤9 | ≤9 | ≤9 | ≤9 |
| Torsional rigidity | Nm/arcmin | 1,2 | 3~200 | 7 | 14 | 14 | 25 | 25 | 50 | 50 | 145 |
| F _{2rB} /Allowable radial force | N | 1,2 | 3~200 | 1,400 | 4,100 | 4,100 | 9,200 | 9,200 | 14,000 | 14,000 | 18,000 |
| F _{2rB} /Allowable radial force | N | 1,2 | 3~200 | 1,000 | 3,300 | 3,300 | 5,220 | 5,220 | 10,800 | 10,800 | 13,000 |
| F _{2rB} /Allowable radial force | N | 1,2 | 3~200 | 1,100 | 3,700 | 3,700 | 5,800 | 5,800 | 11,400 | 11,400 | 19,500 |
| Life time | hr | 1,2 | 3~200 | 30,000 ¹ | | | | | | | |
| η/Efficiency | % | 1 | 3~20 | ≤95% | | | | | | | |
| | | 2 | 12~200 | ≤92% | | | | | | | |
| Weight | kg | 1 | 3~20 | 2.1 | 6.4 | - | 13 | - | 24.5 | - | 51 |
| | | 2 | 12~200 | 2.5 | 7.8 | 8.9 | 14.2 | 18.2 | 27.5 | 34.3 | 54 |
| Operating temperature | °C | 1,2 | 3~200 | -10°C ~ +90°C | | | | | | | |
| lubrication | | 1,2 | 3~200 | Synthetic lubricating grease | | | | | | | |
| Ingress protection | | 1,2 | 3~200 | IP65 | | | | | | | |
| Mount position | | 1,2 | 3~200 | Any direction | | | | | | | |
| (n ₁ =3000rpm) / Noise level | dB | 1,2 | 3~200 | ≤63 | ≤65 | ≤65 | ≤68 | ≤68 | ≤70 | ≤70 | ≤72 |

GEARBOX MOMENT OF INERTIA

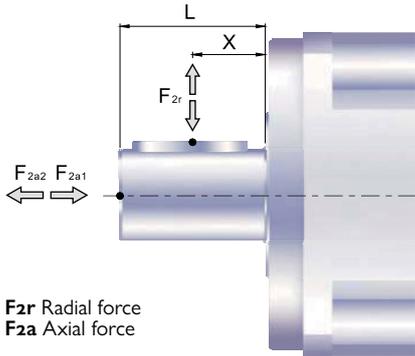
| MODEL | | STAGE | RATIO | FAFR060 | FAFR075 | FAFR075A | FAFR100 | FAFR100A | FAFR140 | FAFR140A | FAFR180 | |
|-------------------|----------------------|-------|--------|---------|---------|----------|---------|----------|---------|----------|---------|---|
| Moment of inertia | kg • cm ² | 1 | 3~10 | 0.35 | 2.25 | - | 6.84 | - | 23.4 | - | 68.9 | |
| | | | 14 | 0.07 | 1.87 | - | 6.25 | - | 21.8 | - | 65.6 | |
| | | | 20 | 0.07 | 1.87 | - | 6.25 | - | 21.8 | - | 65.6 | |
| | | 2 | 15 | - | - | - | - | - | - | - | - | - |
| | | | 20 | - | - | - | - | - | - | - | - | - |
| | | | 25~100 | 0.09 | 0.35 | 2.25 | 2.25 | 6.89 | 6.84 | 23.4 | 23.4 | |
| 120~200 | - | 0.31 | 1.87 | 1.87 | 6.25 | 6.25 | 21.8 | 21.8 | | | | |

1. The lifetime will be shortened by half under continuous operation.
When the output speed is 100rpm, it applies on the center of the output shaft.



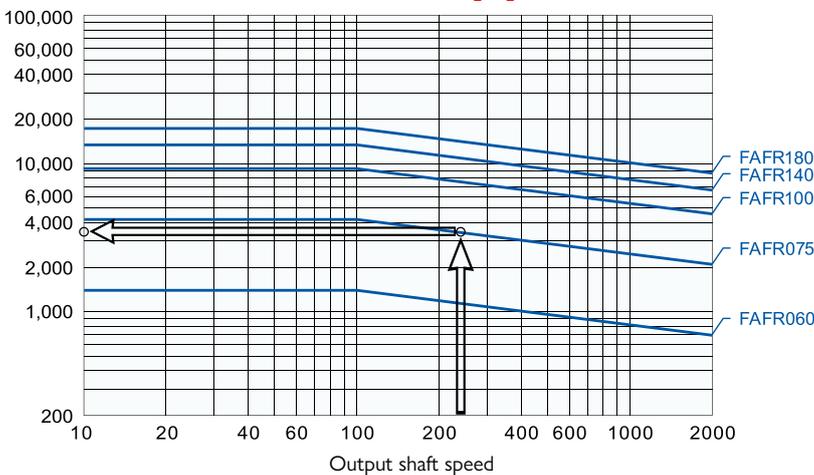
PRECISION PLANETARY GEARBOX FAFR SERIES

ALLOWABLE RADIAL AND AXIAL FORCES ON THE OUTPUT SHAFT OF THE GEARBOX



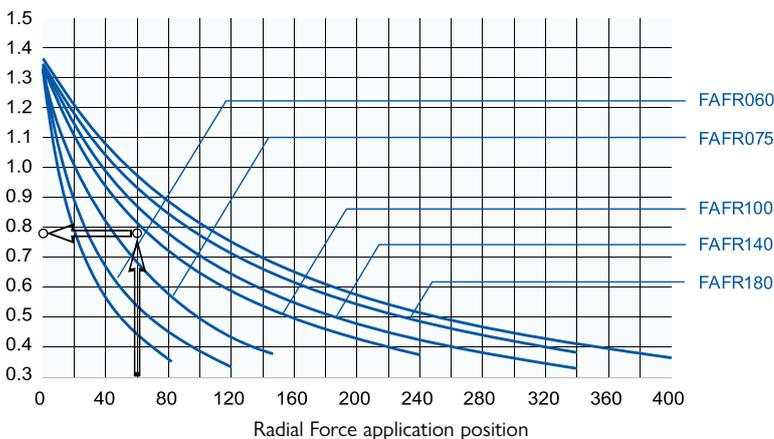
The permitted radial and axial loads on the output shaft depend on the design of the gearbox supporting bearing. A large-span design and high-capacity bearings are adopted to achieve the maximum bearing capacity for radial and axial loads.

PERMISSIBLE RADIAL FORCE F_{2rB} [N] APPLY FORCE TO THE CENTER OF THE SHAFT



When the radial force F_{2r} is applied to the center of the shaft, i.e. $X=1/2 \times L$, the allowable radial force F_{2rB} that can be withstood by different specifications of reducers under different output speeds is refer to the left picture.

POSITIONAL LOAD COEFFICIENT



When the radial force F_{2r} is not in the center of the shaft, the closer to the gearbox, that is, $X < 1/2 \times L$, the allowable radial force that can be borne becomes larger, and the farther away from the reducer, i.e., $X > 1/2 \times L$, the allowable force that can be borne becomes smaller.

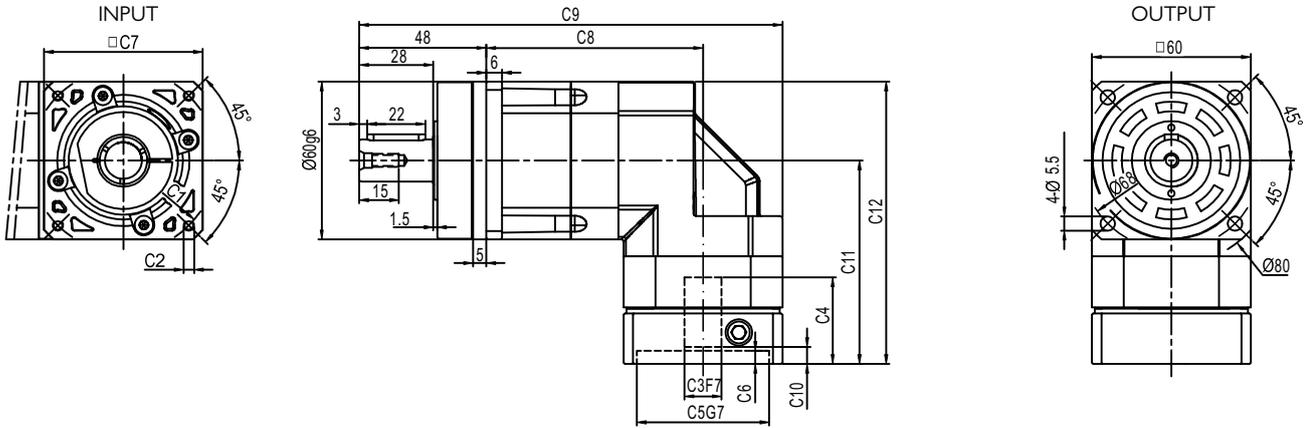
$$F'_{2rB} = K_b X F_{2rB}$$

*The lifetime will be shortened by half under continuous operation.

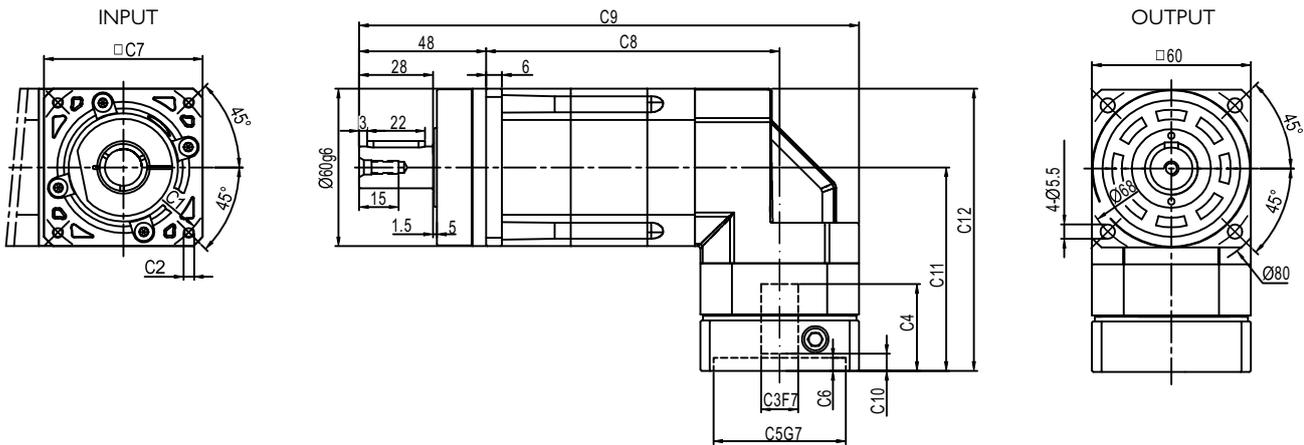
PRECISION PLANETARY GEARBOX FAFR SERIES

PRODUCT DIMENSION

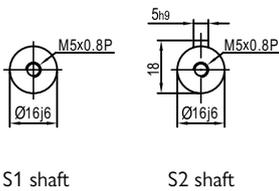
FAFR-060-L1



FAFR-060-L2



OUTPUT DIAMETER



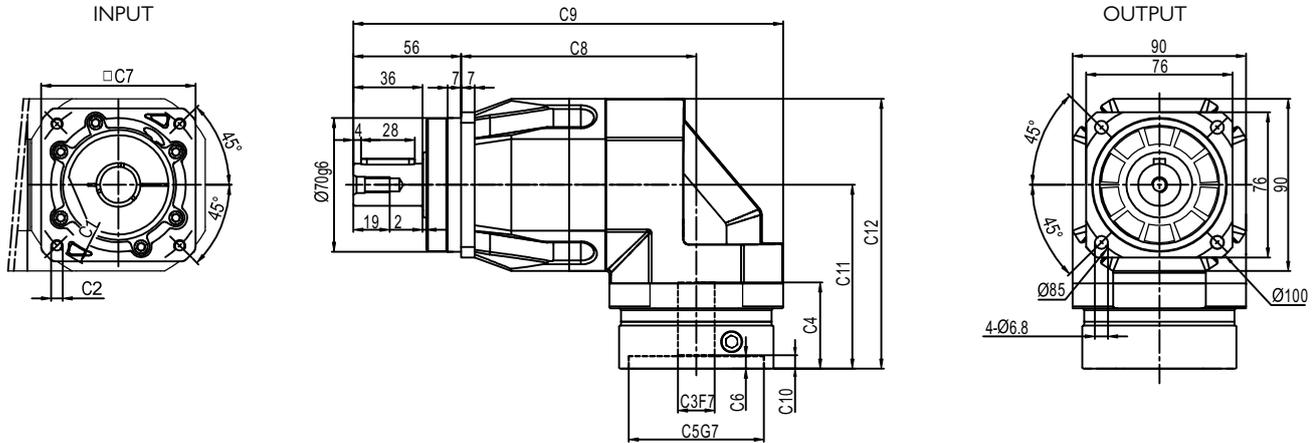
| Size | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 | C10 | C11 | C12 |
|---------------|-------|---------------------|----------|------|-----|-----|----|-----|-----|-----|------|-------|
| FAFR-060-L1 | Ø66,7 | 4-M4x10 | Ø8 | 33 | Ø38 | 5 | 60 | 82 | 160 | 5,5 | 77,5 | 107,5 |
| FAFR-060-L2 | | | | | | | | 111 | 189 | | | |
| FAFR-060-L1 | Ø70 | 4-M4x10, 4-M5x12 | Ø11, Ø14 | 33 | Ø50 | 5 | 60 | 82 | 160 | 5,5 | 77,5 | 107,5 |
| FAFR-060-L2 | | | | | | | | 111 | 189 | | | |
| FAFR-060M1-L1 | Ø90 | 4-M5x12, 4-M6x14 | Ø19 | 42,5 | Ø70 | 6,5 | 80 | 82 | 170 | 12 | 87 | 117 |
| FAFR-060M1-L2 | | | | | | | | 111 | 199 | | | |

- C1~C7 are motor (metric standard) specific dimensions, which could be customized.
- M1: Limit hole (Version number)

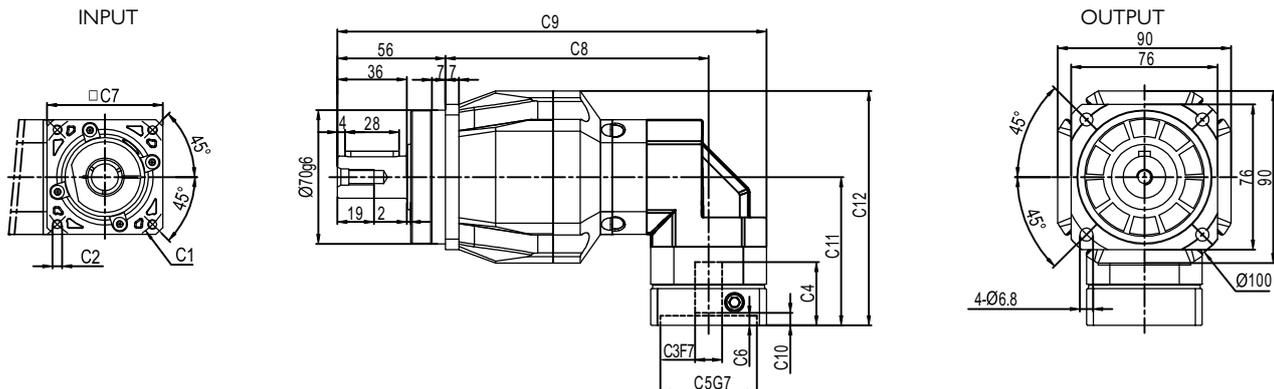
PRECISION PLANETARY GEARBOX FAFR SERIES

PRODUCT DIMENSION

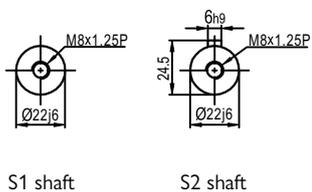
FAFR-075-L1



FAFR-075-L2



OUTPUT DIAMETER



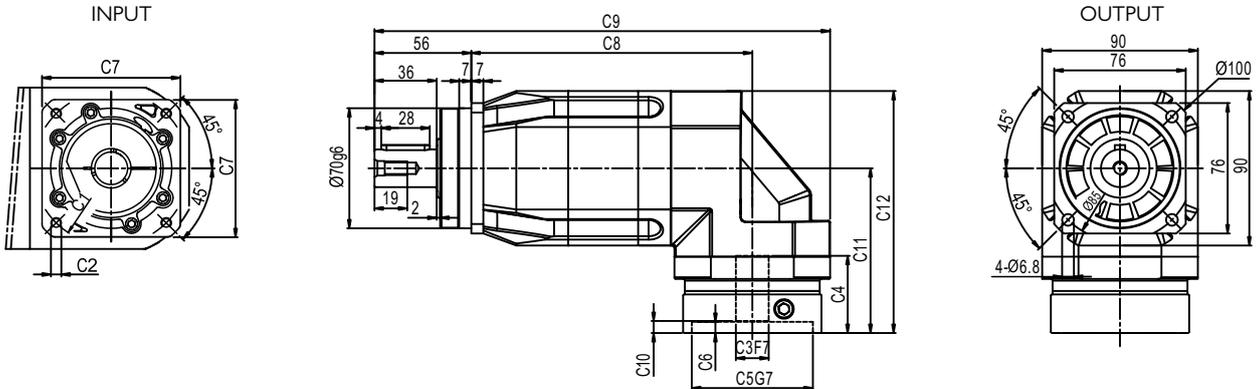
| Size | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 | C10 | C11 | C12 |
|---------------|-------|------------------|---------------|------|-------|-----|-----|-------|-------|------|-------|-------|
| FAFR-075-L1 | ø90 | 4-M5x12, 4-M6x14 | ø19 | 45 | ø70 | 6,5 | 80 | 122 | 223 | 7 | 96 | 141 |
| | ø100 | 4-M6x14 | ø16 | 45 | ø80 | 6,5 | 86 | 122 | 223 | 6 | 96 | 141 |
| FAFR-075M1-L1 | ø115 | 4-M8x20 | ø19, ø22 | 56,5 | ø95 | 8 | 100 | 122 | 228 | 16,5 | 117,5 | 162,5 |
| | ø145 | 4-M8x20 | ø19, ø22, ø24 | 59 | ø110 | 11 | 130 | 122 | 243 | 19 | 120 | 165 |
| FAFR-075-L2 | ø66,7 | 4-M4x10 | ø8 | 33 | ø38,1 | 5 | 60 | 136,5 | 222,5 | 5,5 | 77,5 | 122,5 |
| | ø70 | 4-M4x10, 4-M5x12 | ø11, ø14 | 33 | ø50 | 5 | 60 | 136,5 | 222,5 | 5,5 | 77,5 | 122,5 |
| FAFR-075M1-L2 | ø90 | 4-M5x12, 4-M6x14 | ø19 | 42,5 | ø70 | 6,5 | 80 | 136,5 | 232,5 | 12 | 87 | 132 |
| | ø100 | 4-M6x14 | ø16 | 42,5 | ø80 | 6,5 | 86 | 136,5 | 232,5 | 11 | 87 | 132 |

- C1~C7 are motor (metric standard) specific dimensions, which could be customized.
- M1: Limit hole (Version number)

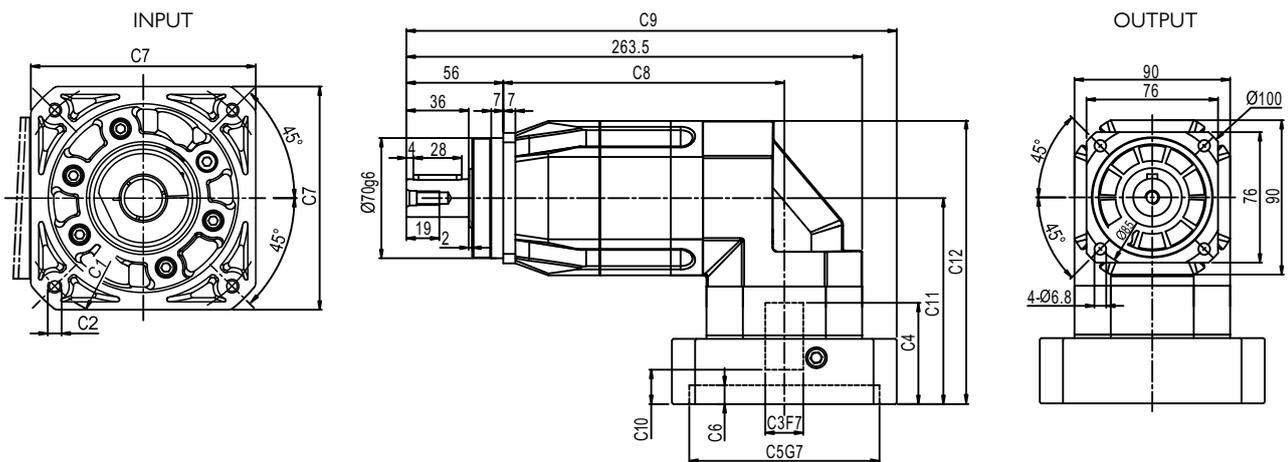
PRECISION PLANETARY GEARBOX FAFR SERIES

PRODUCT DIMENSION

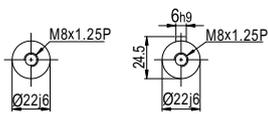
FAFR-075A-L2



FAFR-075A-L2



OUTPUT DIAMETER



S1 shaft

S2 shaft

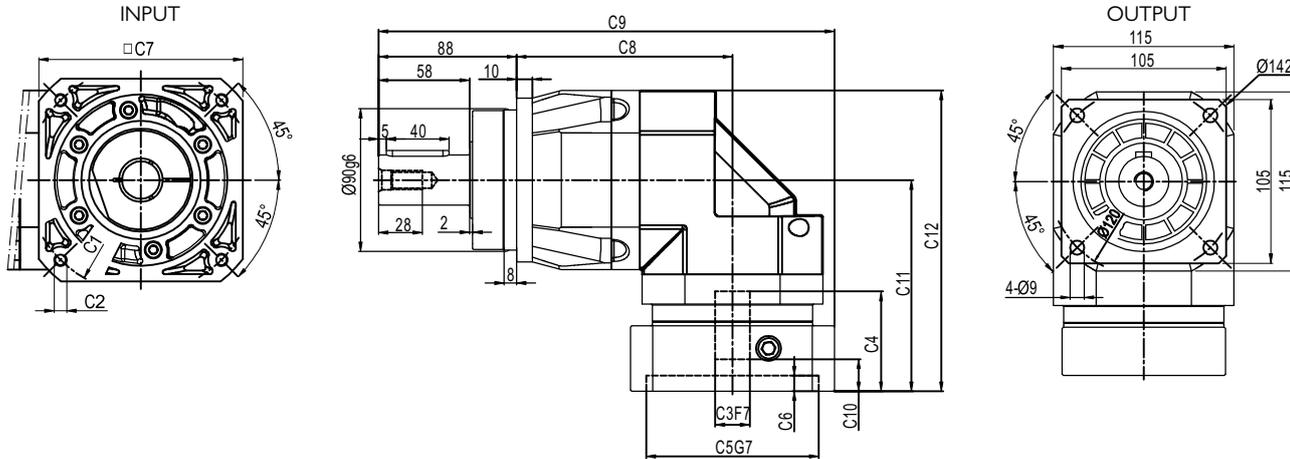
| Size | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 | C10 | C11 | C12 |
|----------------|------|------------------|---------------|------|------|-----|-----|-------|-------|------|-------|-------|
| FAFR-075A-L2 | ø90 | 4-M5x12, 4-M6x14 | ø19 | 45 | ø70 | 6,5 | 80 | 156,5 | 249,5 | 7 | 96 | 141 |
| | ø100 | 4-M6x14 | ø16 | 45 | ø80 | 6,5 | 86 | 156,5 | 249,5 | 6 | 96 | 141 |
| FAFR-075AM1-L2 | ø115 | 4-M8x20 | ø19, ø22 | 56,5 | ø95 | 8 | 100 | 156,5 | 254,5 | 16,5 | 117,5 | 162,5 |
| | ø145 | 4-M8x20 | ø19, ø22, ø24 | 59 | ø110 | 10 | 130 | 156,5 | 269,5 | 19 | 120 | 165 |

- C1~C7 are motor (metric standard) specific dimensions, which could be customized.
- M1: Limit hole (Version number)

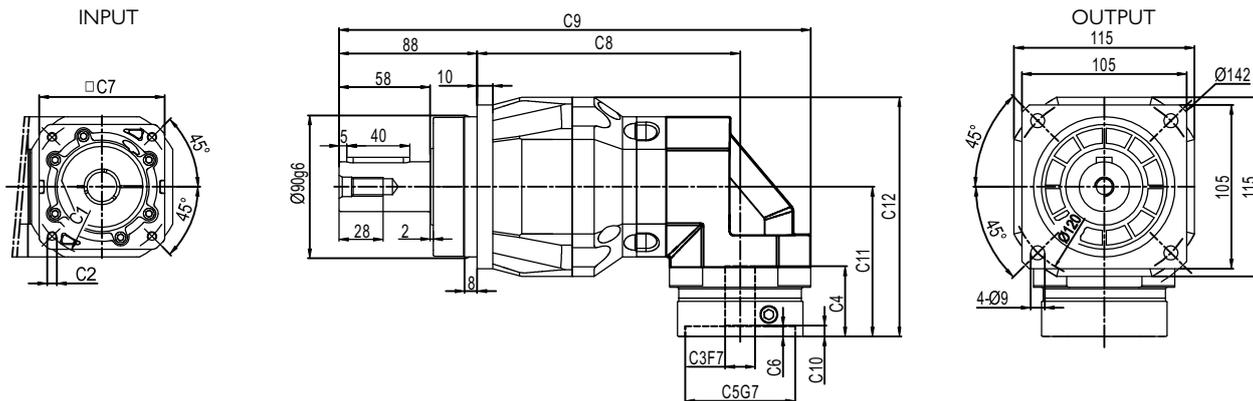
PRECISION PLANETARY GEARBOX FAFR SERIES

PRODUCT DIMENSION

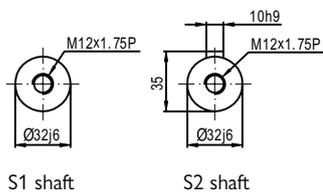
FAFR-100-L1



FAFR-100-L2



OUTPUT DIAMETER



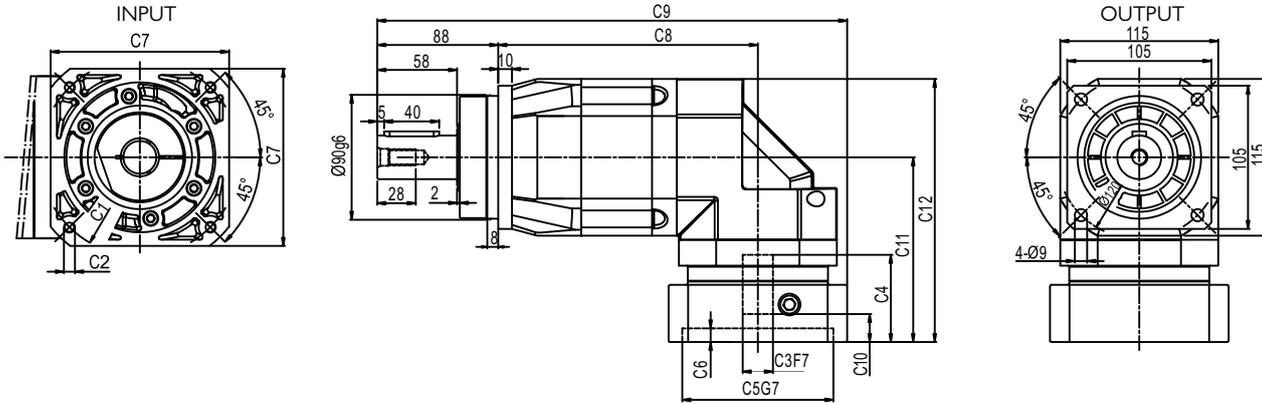
| Size | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 | C10 | C11 | C12 |
|---------------|------|------------------|---------------|------|--------|-----|-----|-------|-------|------|-------|-------|
| FAFR-100-L1 | ø145 | 4-M8x20 | ø19, ø22, ø24 | 64 | ø110 | 10 | 130 | 137,5 | 290,5 | 195 | 135,5 | 193 |
| FAFR-100M1-L1 | ø200 | 4-M12x28 | ø35 | 81 | ø114,3 | 10 | 180 | 137,5 | 315,5 | 28 | 152,5 | 210 |
| FAFR-100-L2 | ø90 | 4-M5x12, 4-M6x14 | ø19 | 45 | ø70 | 6,5 | 80 | 167,5 | 300,5 | 7 | 96 | 153,5 |
| | ø100 | 4-M6x14 | ø16 | 45 | ø80 | 65 | 86 | 167,5 | 300,5 | 6 | 96 | 153,5 |
| FAFR-100M1-L2 | ø115 | 4-M8x20 | ø19, ø22 | 56,5 | ø95 | 8 | 100 | 167,5 | 305,5 | 16,5 | 117,5 | 175 |
| | ø145 | 4-M8x20 | ø19, ø22, ø24 | 59 | ø110 | 11 | 130 | 167,5 | 320,5 | 19 | 120 | 177,5 |

- C1~C7 are motor (metric standard) specific dimensions, which could be customized.
- M1: Limit hole (Version number)

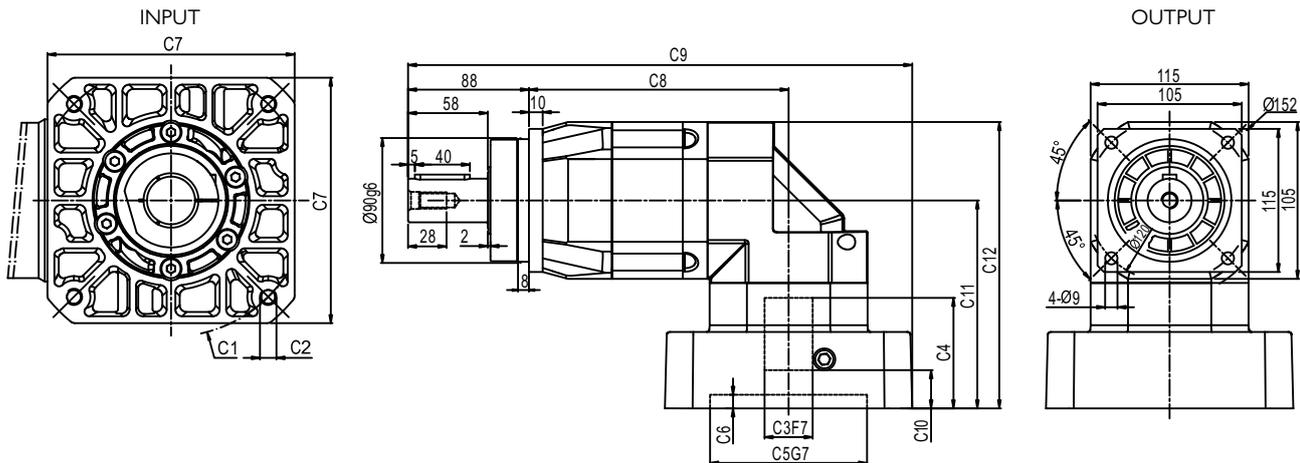
PRECISION PLANETARY GEARBOX FAFR SERIES

PRODUCT DIMENSION

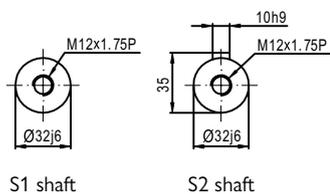
FAFR-100A-L2



FAFR-100A-L2



OUTPUT DIAMETER



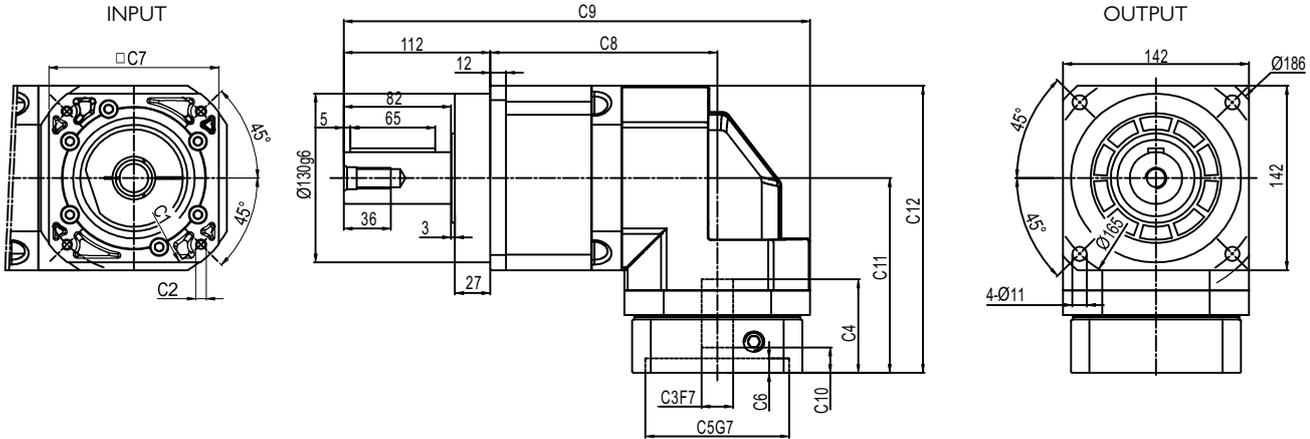
| Size | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 | C10 | C11 | C12 |
|----------------|------|----------|---------------|----|--------|----|-----|-------|-------|-----|-------|-----|
| FAFR-100A-L2 | ø145 | 4-M8x20 | ø19, ø22, ø24 | 64 | ø110 | 10 | 130 | 137,5 | 290,5 | 195 | 135,5 | 193 |
| FAFR-100AM1-L2 | ø200 | 4-M12x28 | ø35 | 81 | ø114,3 | 10 | 180 | 137,5 | 315,5 | 28 | 152,5 | 210 |

- C1~C7 are motor (metric standard) specific dimensions, which could be customized.
- M1: Limit hole (Version number)

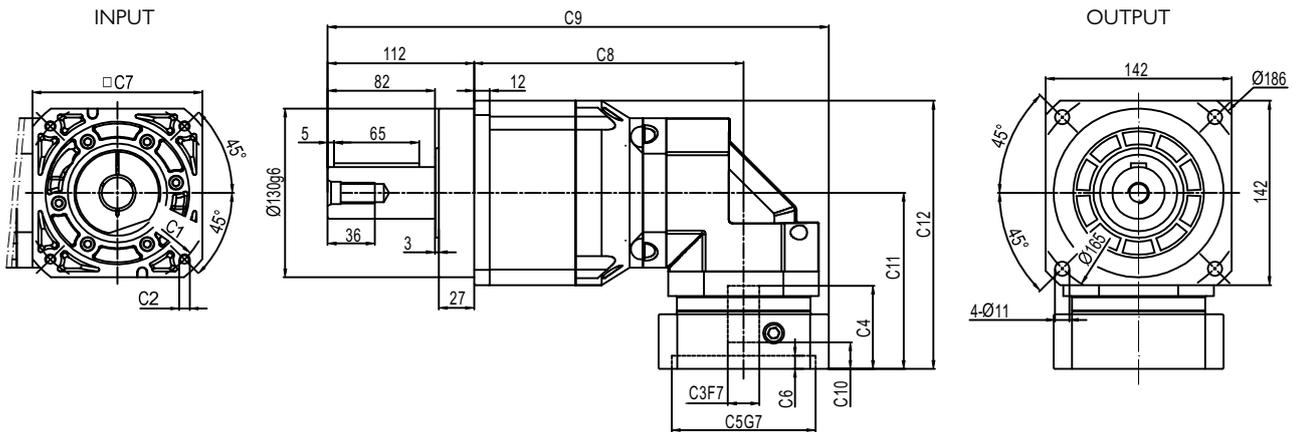
PRECISION PLANETARY GEARBOX FAFR SERIES

PRODUCT DIMENSION

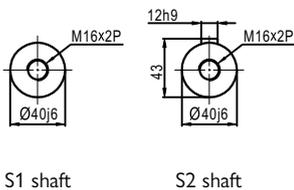
FAFR-140-L1



FAFR-140-L2



OUTPUT DIAMETER



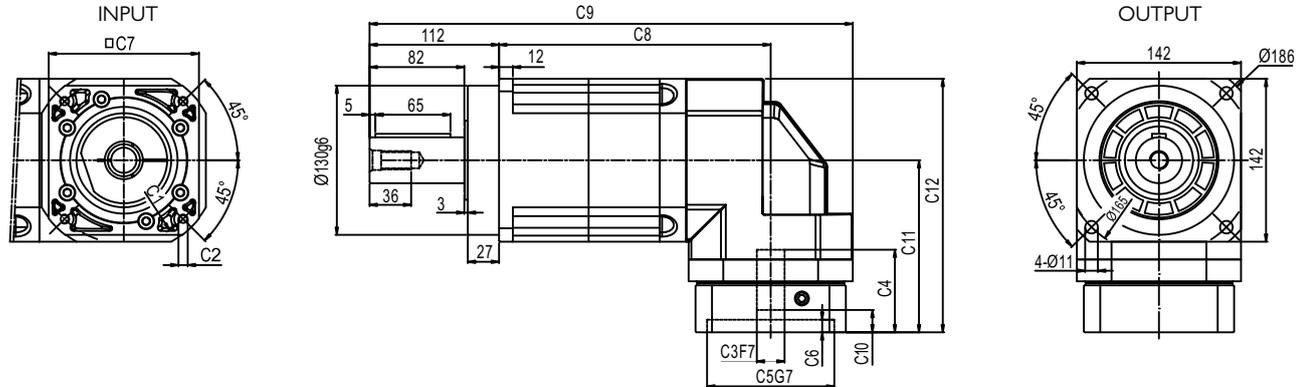
| Size | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 | C10 | C11 | C12 |
|---------------|------|----------|---------------|----|--------|----|-----|-------|-------|------|------|------|
| FAFR-140-L1 | ø145 | 4-M8x20 | ø19, ø22 | 72 | ø110 | 11 | 130 | 173,5 | 356,5 | 19,5 | 150 | 221 |
| | ø200 | 4-M12x28 | ø35 | 82 | ø114,3 | 8 | 180 | 173,5 | 375,5 | 25 | 160 | 231 |
| FAFR-140-L2 | ø145 | 4-M8x20 | ø19, ø22, ø24 | 64 | ø110 | 10 | 130 | 206 | 383 | 19,5 | 35,5 | 6,5 |
| FAFR-140M1-L2 | ø200 | 4-M12x28 | ø35 | 81 | ø114,3 | 10 | 180 | 206 | 408 | 28 | 52,5 | 23,5 |

- C1~C7 are motor (metric standard) specific dimensions, which could be customized.
- M1: Limit hole (Version number)

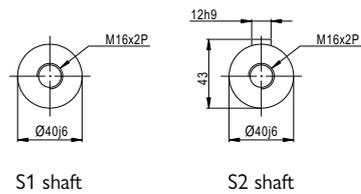
PRECISION PLANETARY GEARBOX FAFR SERIES

PRODUCT DIMENSION

FAFR-140A-L2



OUTPUT DIAMETER



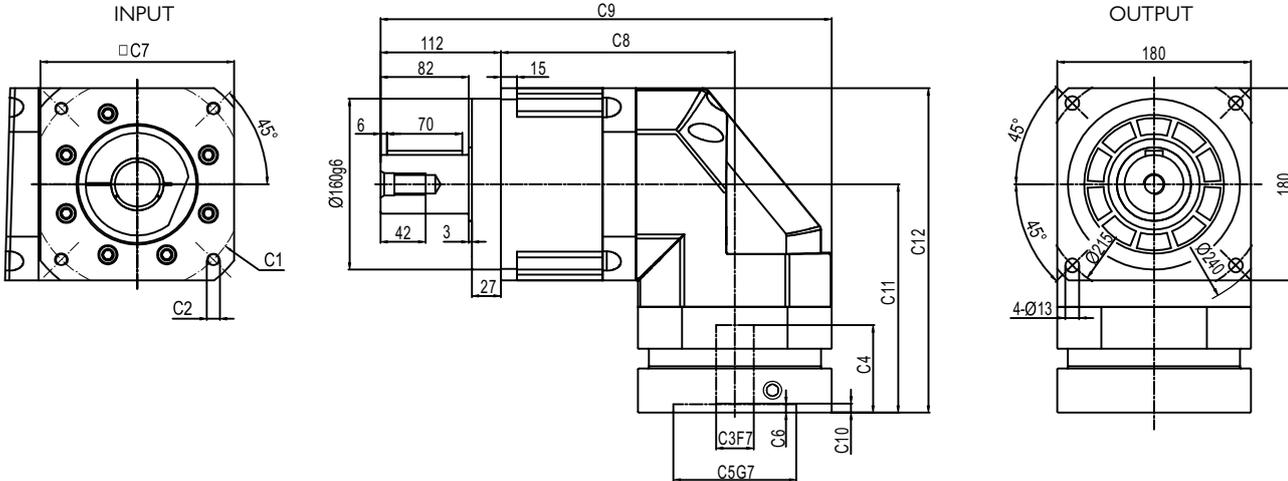
| Size | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 | C10 | C11 | C12 |
|--------------|------|----------|----------|----|--------|----|-----|-----|-----|------|-----|-----|
| FAFR-140A-L2 | ø145 | 4-M8x20 | ø22, ø24 | 72 | ø110 | 11 | 130 | 235 | 418 | 19,5 | 150 | 221 |
| | ø200 | 4-M12x28 | ø35 | 81 | ø114,3 | 8 | 180 | 235 | 437 | 25 | 160 | 231 |

▪ C1-C7 are motor (metric standard) specific dimensions, which could be customized.

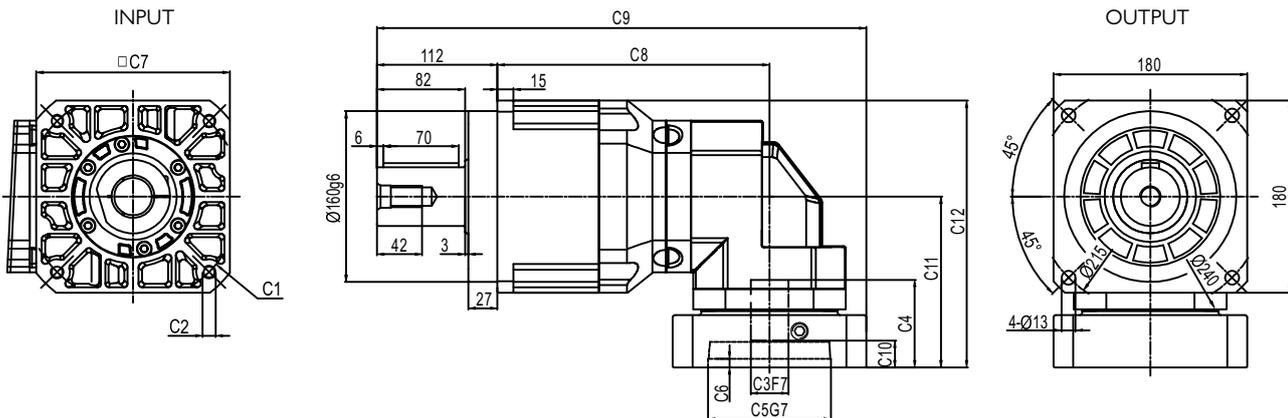
PRECISION PLANETARY GEARBOX FAFR SERIES

PRODUCT DIMENSION

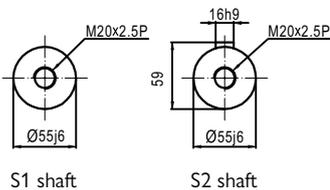
FAFR-180-L1



FAFR-180-L2



OUTPUT DIAMETER



| Size | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 | C10 | C11 | C12 |
|-------------|-------------------|----------|----------------------------------|-------|---------------------|----|-----|-------|-------|------|-------|-------|
| FAFR-180-L1 | $\varnothing 200$ | 4-M12x28 | $\varnothing 35$ | 82 | $\varnothing 114,3$ | 8 | 180 | 217,5 | 419,5 | 8,5 | 214 | 304 |
| | $\varnothing 200$ | 4-M12x28 | $\varnothing 42$ | 117,5 | $\varnothing 114,3$ | 8 | 180 | 217,5 | 419,5 | 45,5 | 249,5 | 339,5 |
| | $\varnothing 215$ | 4-M8x20 | $\varnothing 38$ | 87 | $\varnothing 180$ | 8 | 192 | 217,5 | 425,5 | 13,5 | 219 | 309 |
| | $\varnothing 235$ | 4-M12x28 | $\varnothing 42$ | 117,5 | $\varnothing 200$ | 10 | 220 | 217,5 | 439,5 | 45,5 | 249,5 | 339,5 |
| FAFR-180-L2 | $\varnothing 145$ | 4-M8x20 | $\varnothing 19, \varnothing 24$ | 72 | $\varnothing 110$ | 11 | 130 | 246 | 383 | 19,5 | 150 | 240 |
| | $\varnothing 200$ | 4-M12x28 | $\varnothing 35$ | 82 | $\varnothing 114,3$ | 8 | 180 | 253 | 408 | 25 | 160 | 250 |

▪ C1~C7 are motor (metric standard) specific dimensions, which could be customized.

CHIARAVALLI LINEAR CENTER

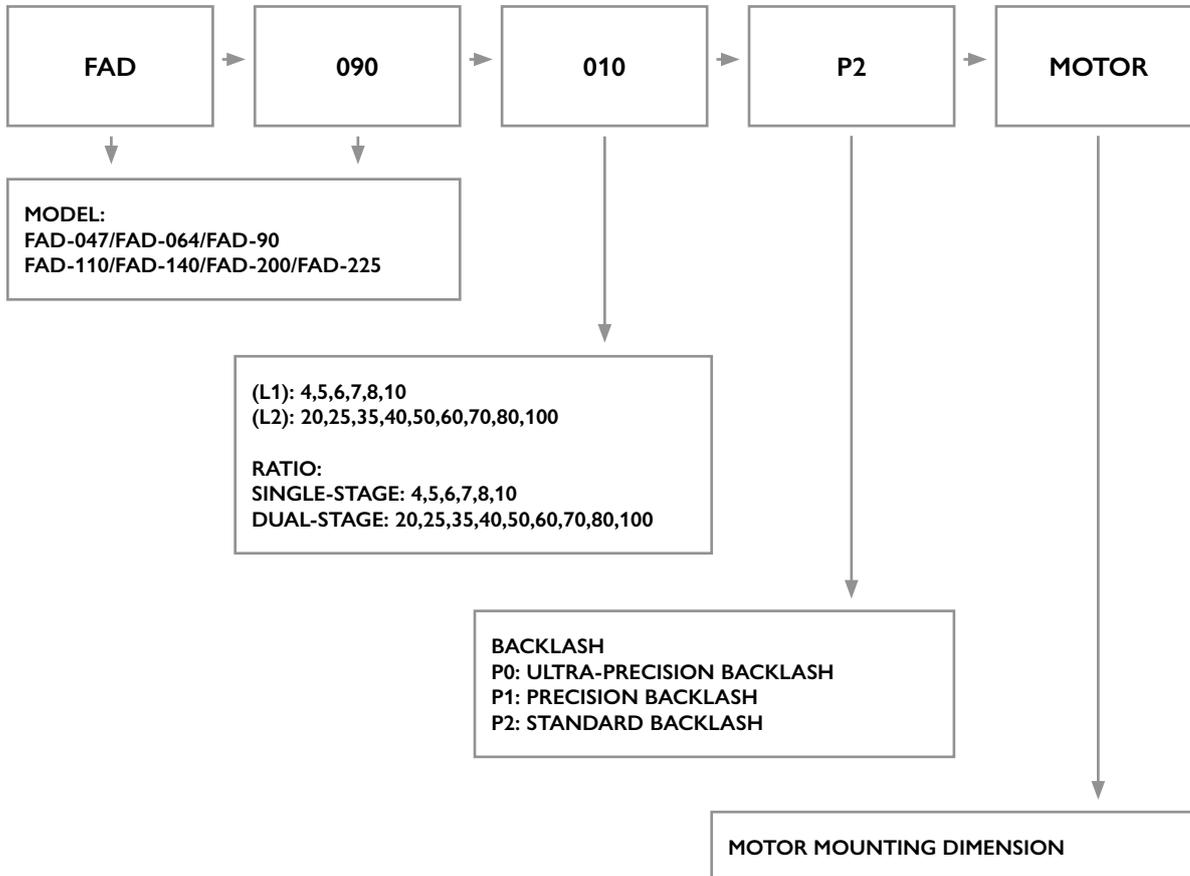
**PRECISION PLANETARY GEARBOX
FAD SERIES**



PRECISION PLANETARY GEARBOX FAD SERIES

MODEL DESCRIPTION

FAD-090-010-P2-19-70-90-M6-42





PRECISION PLANETARY GEARBOX FAD SERIES

TECHNICAL SPECIFICATION

| MODEL | | STAGE | RATIO | FAD047 | FAD064 | FAD090 | FAD090A | FAD110 | FAD110A | FAD140 | FAD140A | FAD200 | FAD255 |
|---|-----------|-------|--------|---------------------------------|--------|--------|---------|--------|---------|--------|---------|--------|--------|
| Rated output torque | Nm | 1 | 4 | 19 | 48 | 130 | - | 270 | - | 560 | - | 1,100 | 1,700 |
| | | | 5 | 22 | 60 | 160 | - | 330 | - | 650 | - | 1,200 | 2,000 |
| | | | 6 | - | 55 | 150 | - | 310 | - | 600 | - | 1,100 | 1,900 |
| | | | 7 | 19 | 50 | 140 | - | 300 | - | 550 | - | 1,100 | 1,800 |
| | | | 8 | 17 | 45 | 120 | - | 260 | - | 500 | - | 1,000 | 1,600 |
| | | 10 | 14 | 40 | 100 | - | 230 | - | 450 | - | 900 | 1,500 | |
| | | 20 | 19 | 48 | 130 | 130 | 270 | 270 | 560 | 560 | 1,100 | 1,700 | |
| | | 25 | 22 | 60 | 160 | 160 | 330 | 330 | 650 | 650 | 1,200 | 2,000 | |
| | | 35 | 22 | 60 | 160 | 160 | 330 | 330 | 650 | 650 | 1,200 | 2,000 | |
| | | 40 | 22 | 48 | 130 | 130 | 270 | 270 | 560 | 560 | 1,100 | 1,700 | |
| | | 50 | 22 | 60 | 160 | 160 | 330 | 330 | 650 | 650 | 1,200 | 2,000 | |
| | | 60 | - | 55 | 150 | 150 | 310 | 310 | 600 | 600 | 1,100 | 1,900 | |
| | | 70 | 19 | 50 | 140 | 140 | 300 | 300 | 550 | 550 | 1,100 | 1,800 | |
| | | 80 | - | 45 | 120 | 120 | 260 | 260 | 500 | 500 | 1,000 | 1,600 | |
| 100 | 14 | 40 | 100 | 100 | 230 | 230 | 450 | 450 | 900 | 1,500 | | | |
| T _{2B} /Max. output torque | Nm | 1,2 | 4~100 | 3 times the rated output torque | | | | | | | | | |
| n ₁ /Rated input speed | rpm | 1,2 | 4~100 | 5,000 | 5,000 | 4,000 | 4,000 | 4,000 | 4,000 | 3,000 | 3,000 | 3,000 | 2,000 |
| n _{1B} /Max.input speed | rpm | 1,2 | 4~100 | 10,000 | 10,000 | 8,000 | 8,000 | 8,000 | 8,000 | 6,000 | 6,000 | 6,000 | 4,000 |
| P0/Ultra-precision backlash | arcmin | 1 | 4~100 | - | - | ≤1 | ≤1 | ≤1 | ≤1 | ≤1 | ≤1 | ≤1 | ≤1 |
| | | 2 | 4~10 | - | - | - | - | ≤3 | ≤3 | ≤3 | ≤3 | ≤3 | ≤3 |
| P1/Precision backlash | arcmin | 1 | 20~100 | ≤3 | ≤3 | ≤3 | ≤5 | ≤3 | ≤5 | ≤3 | ≤5 | ≤3 | ≤3 |
| | | 2 | 4~10 | ≤5 | ≤5 | ≤5 | ≤5 | ≤5 | ≤5 | ≤5 | ≤5 | ≤5 | ≤5 |
| P2/Precision backlash | arcmin | 1 | 20~100 | ≤5 | ≤5 | ≤5 | ≤5 | ≤5 | ≤5 | ≤5 | ≤5 | ≤5 | ≤5 |
| | | 2 | 4~10 | ≤7 | ≤7 | ≤7 | ≤7 | ≤7 | ≤7 | ≤7 | ≤7 | ≤7 | ≤7 |
| Torsional rigidity | Nm/arcmin | 1,2 | 20~100 | 7 | 13 | 31 | 31 | 82 | 82 | 151 | 151 | 440 | 1,006 |
| M _{2kB} ² /Maximum bending moment | Nm | 1,2 | 4~100 | 42,5 | 125 | 235 | 235 | 430 | 430 | 1,300 | 1,300 | 3,064 | 5,900 |
| F _{2B} /Allowable radial force | N | 1,2 | 4~100 | 1,080 | 2,110 | 2,310 | 2,310 | 4,800 | 4,800 | 6,200 | 6,200 | 5,450 | 10,600 |
| Life time | hr | 1,2 | 4~100 | 20,000 ¹ | | | | | | | | | |
| η/Efficiency | % | 1 | 4~10 | ≥97% | | | | | | | | | |
| | | 2 | 20~100 | ≥94% | | | | | | | | | |
| Weight | kg | 1 | 4~10 | 0.7 | 1.2 | 3.0 | - | 5.6 | - | 11.9 | - | 31.6 | 56.1 |
| | | 2 | 20~100 | 1.0 | 1.6 | 3.7 | 4.2 | 7.3 | 7.84 | 15.9 | 16.6 | 36.9 | 70.4 |
| Operating temperature | °C | 1,2 | 4~100 | -10°C ~ +90°C | | | | | | | | | |
| lubrication | | 1,2 | 4~100 | Synthetic lubricating grease | | | | | | | | | |
| Ingress protection | | 1,2 | 4~100 | IP65 | | | | | | | | | |
| Mount position | | 1,2 | 4~100 | Any direction | | | | | | | | | |
| (n ₁ =3000rpm) / Noise level | dB | 1,2 | 4~100 | ≤56 | ≤58 | ≤60 | ≤60 | ≤63 | ≤63 | ≤65 | ≤65 | ≤67 | ≤70 |

GEARBOX MOMENT OF INERTIA

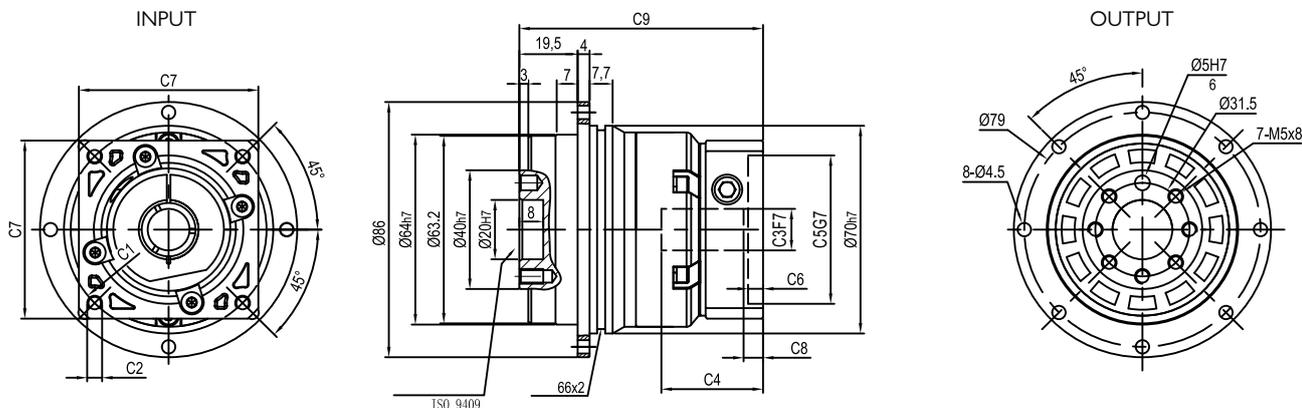
| MODEL | | STAGE | RATIO | FAD047 | FAD064 | FAD090 | FAD090A | FAD110 | FAD110A | FAD140 | FAD140A | FAD200 | FAD255 |
|-------------------|----------------------|-------|-------|--------|--------|--------|---------|--------|---------|--------|---------|--------|--------|
| Moment of inertia | kg • cm ² | 1 | 4 | 0.03 | 0.14 | 0.51 | - | 2.87 | - | 7.54 | - | 25.03 | 58.31 |
| | | | 5 | 0.03 | 0.13 | 0.47 | - | 2.71 | - | 7.42 | - | 23.29 | 53.27 |
| | | | 6 | - | 0.13 | 0.45 | - | 2.65 | - | 7.25 | - | - | - |
| | | | 7 | 0.03 | 0.13 | 0.45 | - | 2.62 | - | 7.14 | - | 22.48 | 50.97 |
| | | | 8 | 0.03 | 0.13 | 0.45 | - | 2.58 | - | 7.07 | - | 22.48 | 50.97 |
| | | 10 | 0.03 | 0.13 | 0.44 | - | 2.57 | - | 7.03 | - | 22.51 | 50.56 | |
| | | 20 | 0.03 | 0.13 | 0.13 | 0.47 | 0.47 | 2.71 | 2.71 | 7.42 | 7.42 | 23.29 | |
| | | 25 | 0.03 | 0.13 | 0.13 | 0.47 | 0.47 | 2.71 | 2.71 | 7.42 | 7.42 | 23.29 | |
| | | 35 | 0.03 | 0.13 | 0.13 | 0.47 | 0.47 | 2.71 | 2.71 | 7.42 | 7.42 | 23.29 | |
| | | 40 | 0.03 | 0.13 | 0.13 | 0.44 | 0.44 | 2.57 | 2.57 | 7.03 | 7.03 | 22.51 | |
| | | 50 | 0.03 | 0.13 | 0.13 | 0.44 | 0.44 | 2.57 | 2.57 | 7.03 | 7.03 | 22.51 | |
| | | 60 | - | 0.13 | 0.13 | 0.44 | 0.44 | 2.57 | 2.57 | 7.03 | 7.03 | - | |
| | | 70 | 0.03 | 0.13 | 0.13 | 0.13 | 0.44 | 0.44 | 2.57 | 7.03 | 7.03 | 22.51 | |
| | | 80 | - | 0.13 | 0.13 | 0.13 | 0.44 | 0.44 | 2.57 | 2.57 | - | - | |
| 100 | 0.03 | 0.13 | 0.13 | 0.13 | 0.44 | 0.44 | 2.57 | 7.03 | 7.03 | 22.51 | | | |

1. The lifetime will be shortened by half under continuous operation.
When the output speed is 100rpm, it applies on the center of the output shaft.

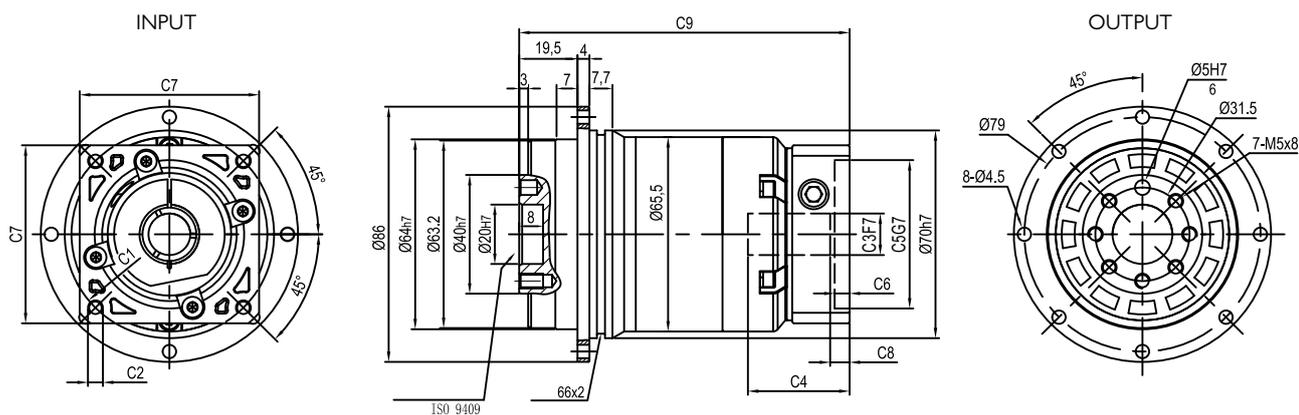
PRECISION PLANETARY GEARBOX FAD SERIES

PRODUCT DIMENSION

FAD-064-L1



FAD-064-L2



OUTPUT DIAMETER

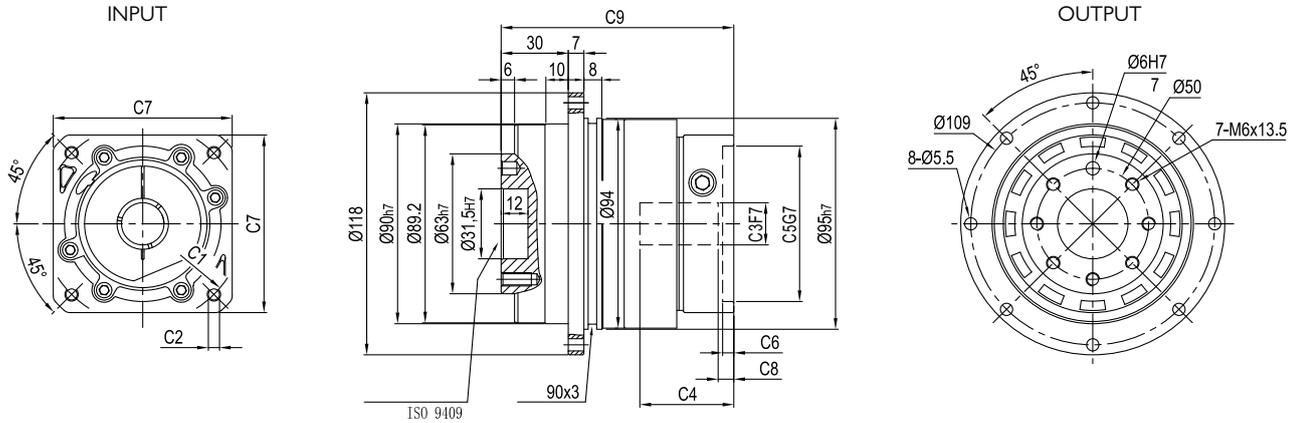
| Size | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 |
|--------------|-------|---------------------|----------|----|-------|-----|----|-----|-------|
| FAD-064-L1 | ø66,7 | 4-M4x10 | ø8 | 34 | ø38,1 | 5 | 60 | 5,5 | 81,5 |
| FAD-064-L2 | | | | | | | | | 110,5 |
| FAD-064-L1 | ø70 | 4-M4x10, 4-M5x12 | ø11, ø14 | 34 | ø50 | 5 | 60 | 5,5 | 81,5 |
| FAD-064-L2 | | | | | | | | | 110,5 |
| FAD-064M1-L1 | ø90 | 4-M4x12, 4-M6x14 | ø19 | 42 | ø70 | 6,5 | 80 | 12 | 88 |
| FAD-064M1-L2 | | | | | | | | | 117 |

- C1~C7 are motor (metric standard) specific dimensions, which could be customized.
- M1: Limit hole (Version number)

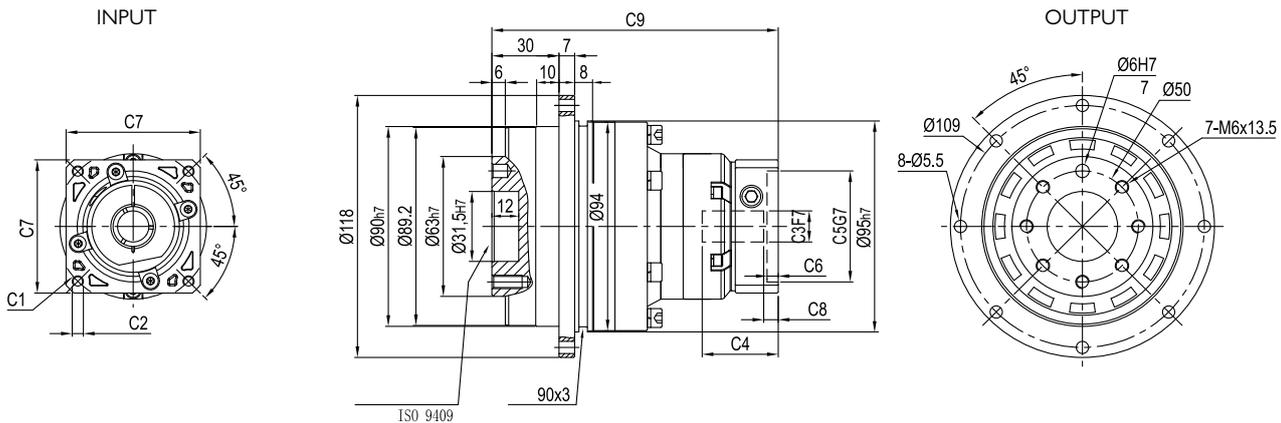
PRECISION PLANETARY GEARBOX FAD SERIES

PRODUCT DIMENSION

FAD-090-L1



FAD-090-L2



OUTPUT DIAMETER

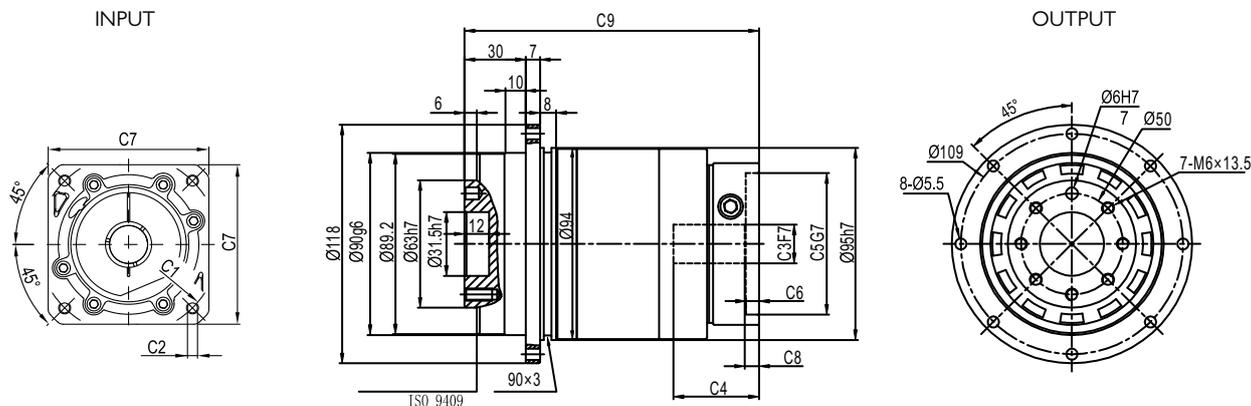
| Size | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 |
|--------------|-------|------------------|---------------|------|-------|-----|-----|------|-------|
| FAD-090-L1 | ø90 | 4-M5x12, 4-M6x14 | ø19 | 42 | ø70 | 6,5 | 80 | 7 | 104 |
| | ø100 | 4-M6x14 | ø16 | 42 | ø80 | 6,5 | 86 | 6 | 104 |
| FAD-090M1-L1 | ø115 | 4-M8x20 | ø19, ø22 | 56,5 | ø95 | 8 | 100 | 16,5 | 119,5 |
| | ø145 | 4-M8x20 | ø19, ø22, ø24 | 59 | ø110 | 11 | 130 | 19 | 122 |
| FAD-090-L2 | ø66,7 | 4-M4x10 | ø8 | 34 | ø38,1 | 5 | 60 | 5,5 | 128 |
| | ø70 | 4-M4x10, 4-M5x12 | ø11, ø14 | 34 | ø50 | 5 | 60 | 5,5 | 128 |
| FAD-090M1-L2 | ø90 | 4-M5x12, 4-M6x14 | ø19 | 42 | ø70 | 6,5 | 80 | 12 | 134,5 |
| | ø100 | 4-M6x14 | ø16 | 42 | ø80 | 6,5 | 86 | 11 | 134,5 |

- C1~C7 are motor (metric standard) specific dimensions, which could be customized.
- M1: Limit hole (Version number)

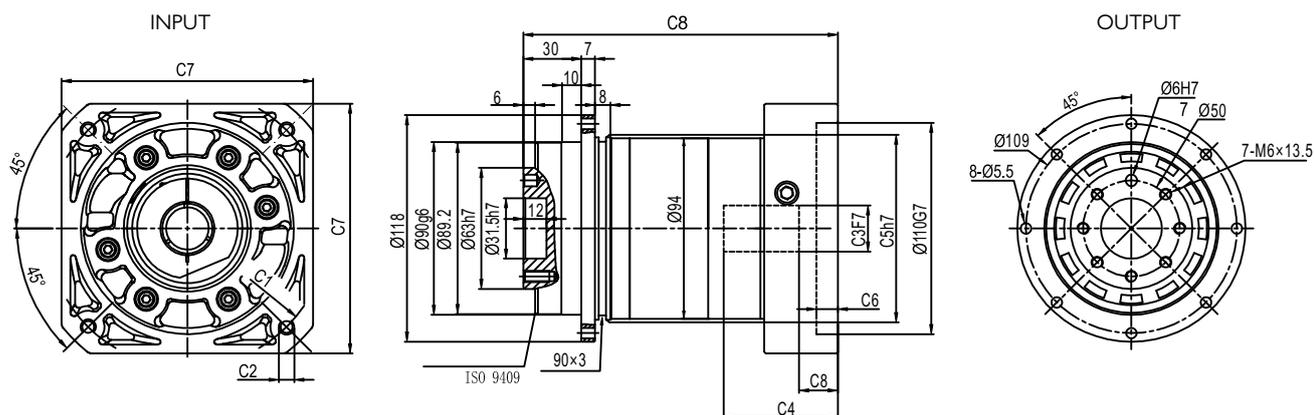
PRECISION PLANETARY GEARBOX FAD SERIES

PRODUCT DIMENSION

FAD-090A-L1



FAD-090A-L2



OUTPUT DIAMETER

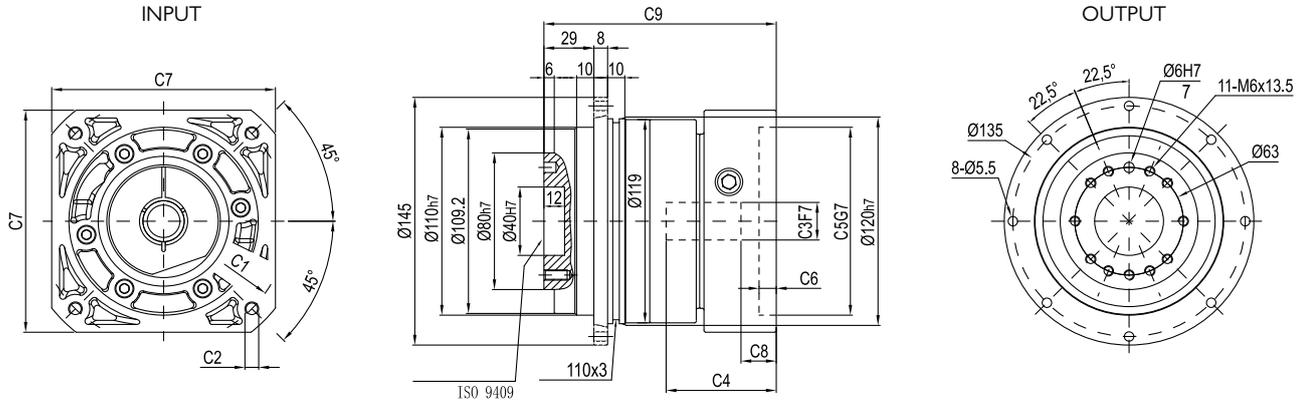
| Size | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 |
|---------------|------|------------------|---------------|------|------|-----|-----|------|-------|
| FAD-090A-L2 | ø90 | 4-M5x12, 4-M6x14 | ø19 | 42 | ø70 | 6,5 | 80 | 7 | 144,5 |
| | ø100 | 4-M6x14 | ø16 | 42 | ø80 | 6,5 | 86 | 6 | 144,5 |
| FAD-090AM1-L2 | ø115 | 4-M8x20 | ø19, ø22 | 56,5 | ø95 | 8 | 100 | 16,5 | 160 |
| | ø145 | 4-M8x20 | ø19, ø22, ø24 | 59 | ø110 | 11 | 130 | 19 | 162,5 |

- C1~C7 are motor (metric standard) specific dimensions, which could be customized.
- M1: Limit hole (Version number)

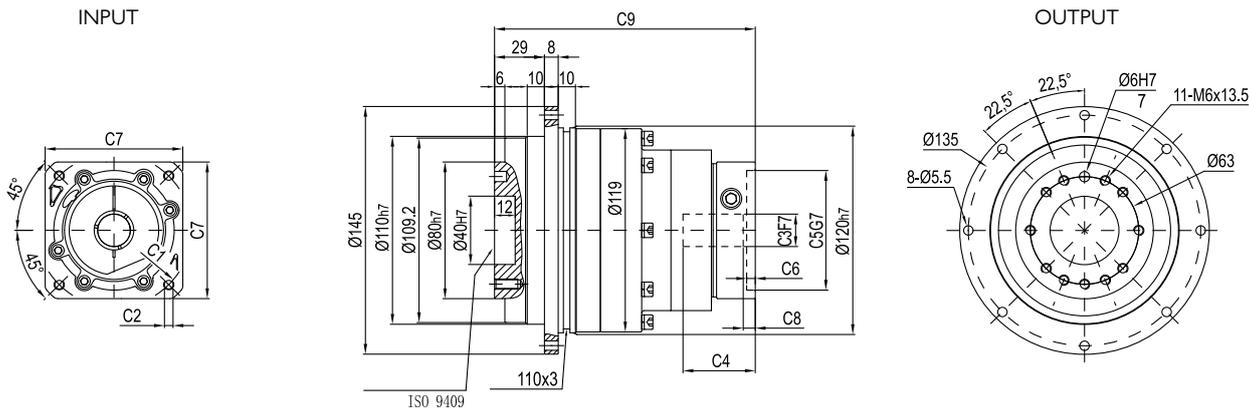
PRECISION PLANETARY GEARBOX FAD SERIES

PRODUCT DIMENSION

FAD-110-L1



FAD-110-L2



OUTPUT DIAMETER

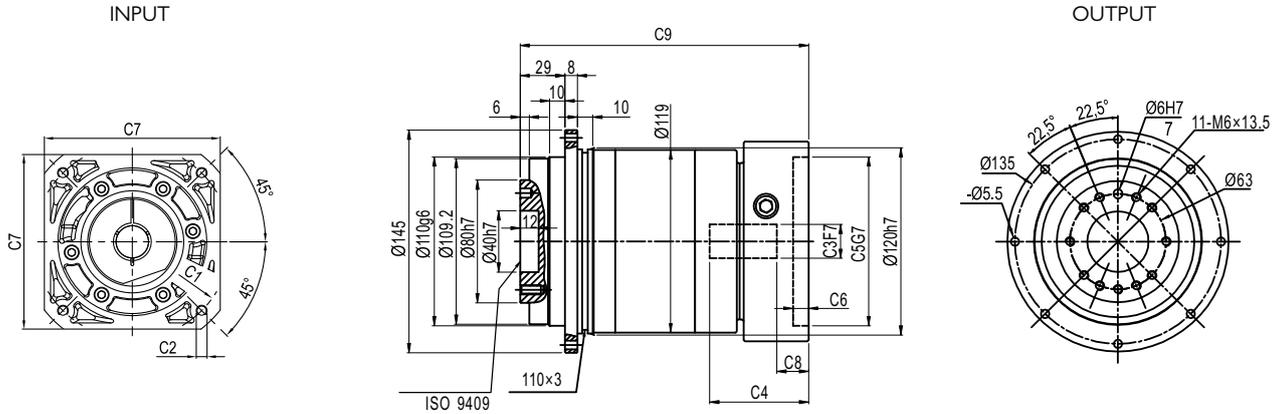
| Size | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 |
|--------------|------|------------------|---------------|------|--------|-----|-----|------|-------|
| FAD-110-L1 | Ø145 | 4-M8x20 | Ø19, Ø22, Ø24 | 64 | Ø110 | 10 | 130 | 19,5 | 135 |
| FAD-110M1-L1 | Ø200 | 4-M12x28 | Ø35 | 81 | Ø114,3 | 10 | 180 | 28 | 152,5 |
| FAD-110-L2 | Ø90 | 4-M5x12, 4-M6x14 | Ø19 | 42 | Ø70 | 6,5 | 80 | 7 | 151,5 |
| | Ø100 | 4-M6x14 | Ø16 | 42 | Ø80 | 6,5 | 86 | 6 | 151,5 |
| FAD-110M1-L2 | Ø115 | 4-M8x20 | Ø19, Ø22 | 56,5 | Ø95 | 8 | 100 | 16,5 | 167 |
| | Ø145 | 4-M8x20 | Ø19, Ø22, Ø24 | 59 | Ø110 | 11 | 130 | 19 | 169,5 |

- C1~C7 are motor (metric standard) specific dimensions, which could be customized.
- M1: Limit hole (Version number)

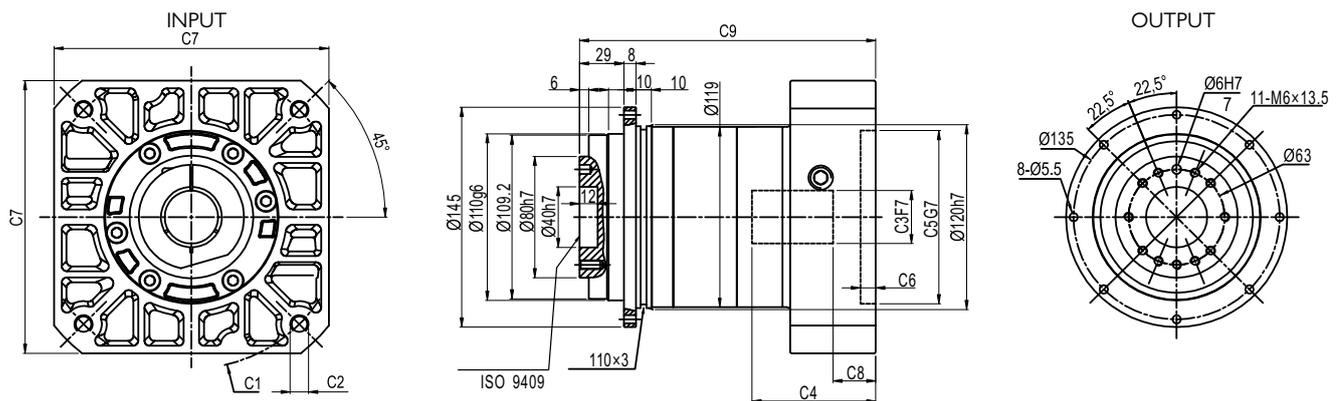
PRECISION PLANETARY GEARBOX FAD SERIES

PRODUCT DIMENSION

FAD-110A-L1



FAD-110A-L2



OUTPUT DIAMETER

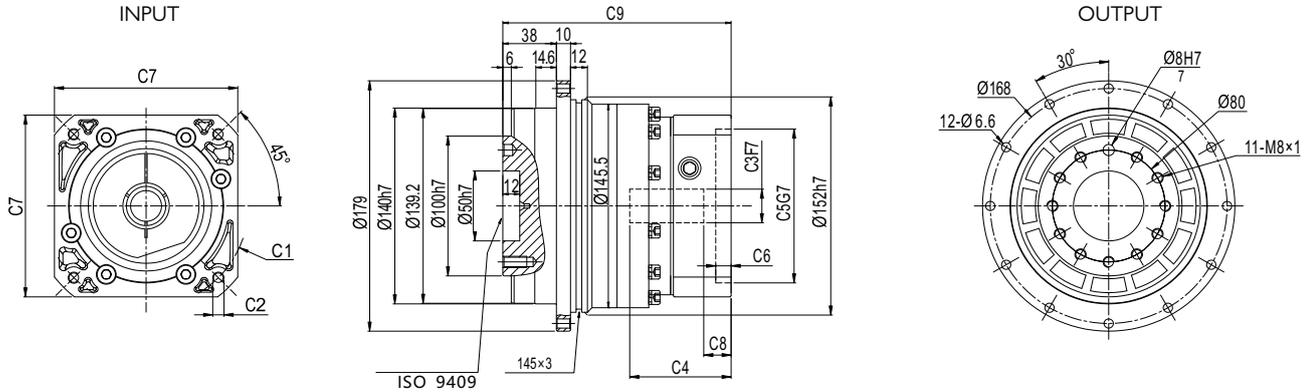
| Size | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 |
|---------------|------|----------|---------------|----|--------|----|-----|------|-------|
| FAD-110A-L2 | ø145 | 4-M8x20 | ø19, ø22, ø24 | 64 | ø110 | 10 | 130 | 19,5 | 186,5 |
| FAD-110AM1-L2 | ø200 | 4-M12x28 | ø35 | 81 | ø114,3 | 10 | 180 | 28 | 194 |

▪ C1~C7 are motor (metric standard) specific dimensions, which could be customized.

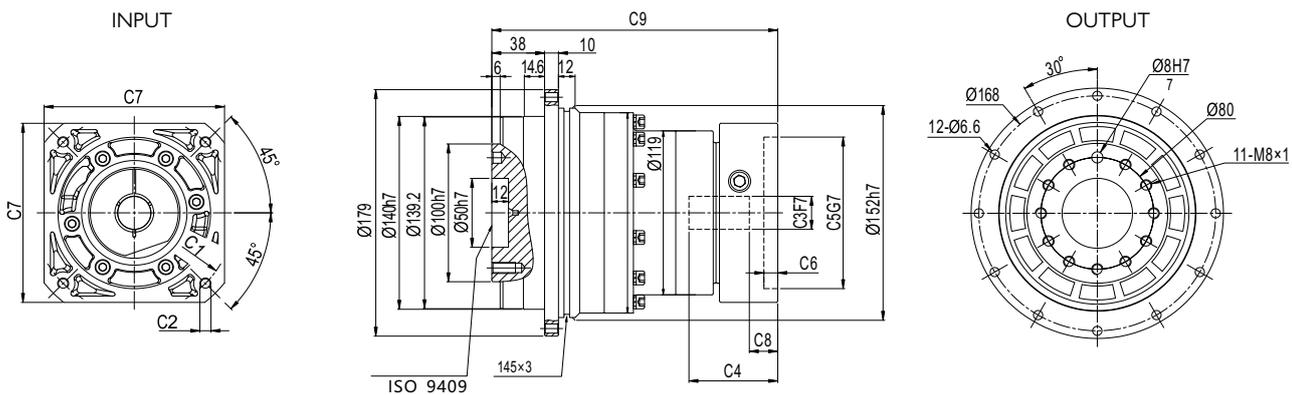
PRECISION PLANETARY GEARBOX FAD SERIES

PRODUCT DIMENSION

FAD-140-L1



FAD-140-L2



OUTPUT DIAMETER

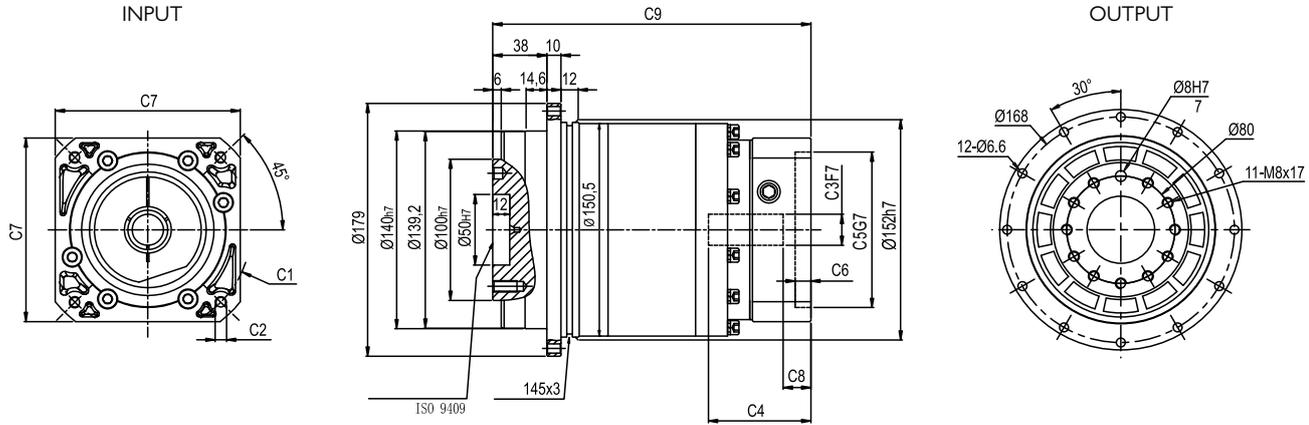
| Size | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 |
|--------------|------|----------|---------------|------|--------|----|-----|------|-------|
| FAD-140-L1 | ø145 | 4-M8x20 | ø22, ø24 | 72 | ø110 | 11 | 130 | 19,5 | 162 |
| | ø200 | 4-M12x28 | ø35 | 81,5 | ø114,3 | 8 | 180 | 25 | 172 |
| FAD-140-L2 | ø145 | 4-M8x20 | ø19, ø22, ø24 | 64 | ø110 | 10 | 130 | 19,5 | 206 |
| FAD-140M1-L2 | ø200 | 4-M12x28 | ø35 | 81 | ø114,3 | 10 | 180 | 28 | 223,5 |

- C1~C7 are motor (metric standard) specific dimensions, which could be customized.
- M1: Limit hole (Version number)

PRECISION PLANETARY GEARBOX FAD SERIES

PRODUCT DIMENSION

FAD-140A-L2



OUTPUT DIAMETER

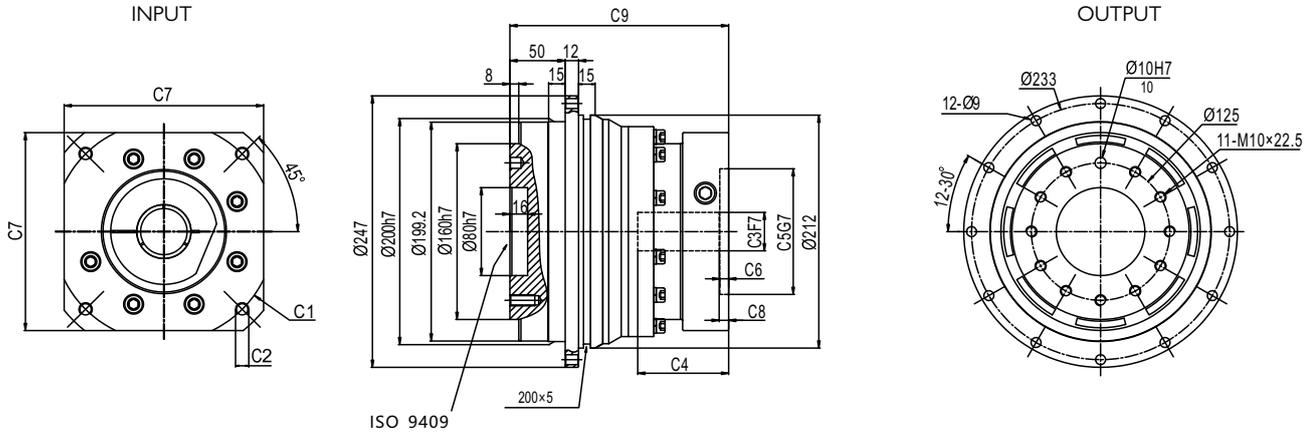
| Size | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 |
|-------------|------|----------|----------|------|--------|----|-----|------|-------|
| FAD-140A-L2 | ø145 | 4-M8x20 | ø22, ø24 | 72 | ø110 | 11 | 130 | 19,5 | 223,5 |
| | ø200 | 4-M12x28 | ø35 | 81,5 | ø114,3 | 8 | 180 | 25 | 233,5 |

▪ C1~C7 are motor (metric standard) specific dimensions, which could be customized.

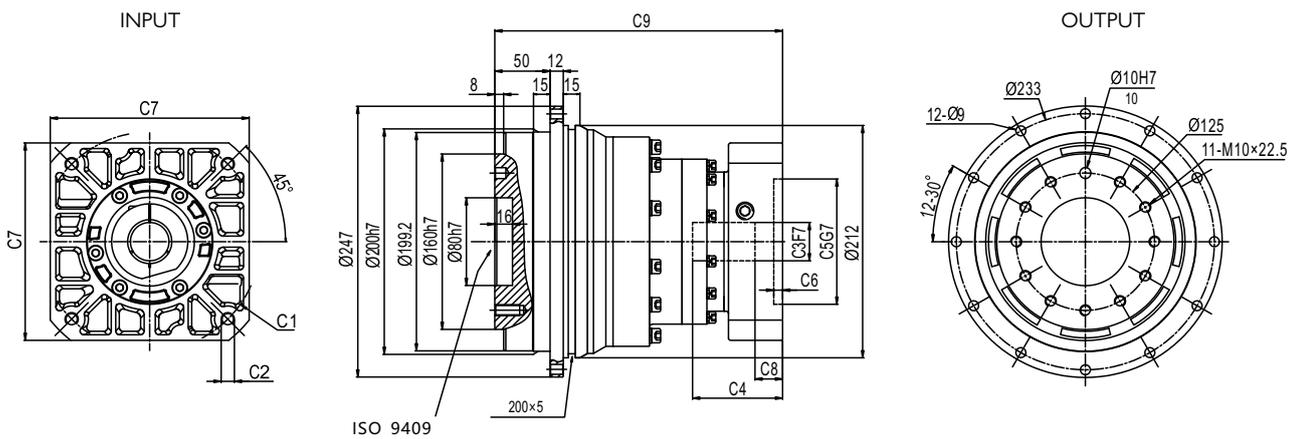
PRECISION PLANETARY GEARBOX FAD SERIES

PRODUCT DIMENSION

FAD-200-L1



FAD-200-L2



OUTPUT DIAMETER

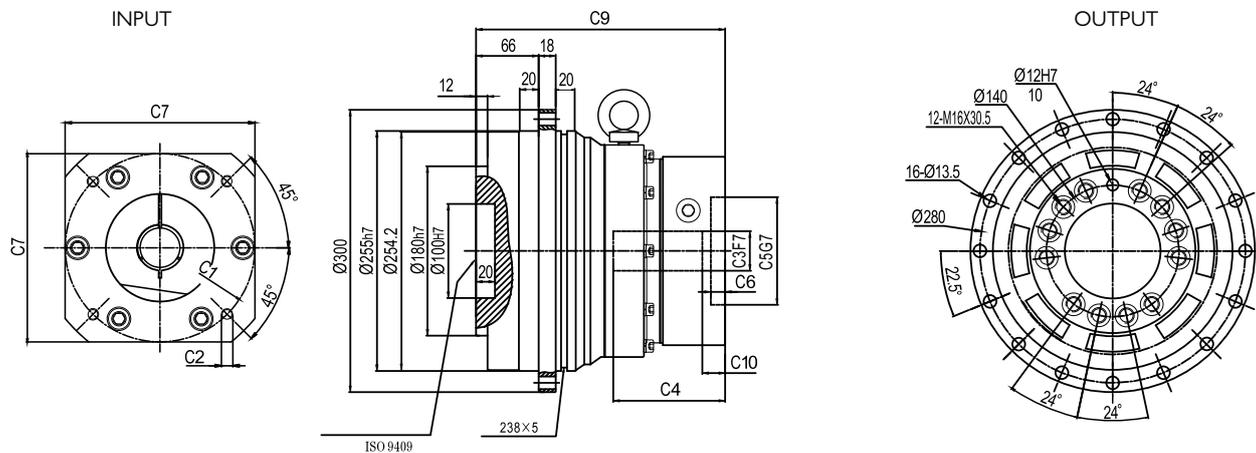
| Size | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 |
|------------|------|----------|----------|-------|--------|----|-----|------|-------|
| FAD-200-L1 | ø200 | 4-M12x28 | ø35 | 82 | ø114,3 | 8 | 180 | 8,5 | 197,5 |
| | ø200 | 4-M12x28 | ø42 | 117,5 | ø114,3 | 8 | 180 | 45,5 | 233 |
| | ø215 | 4-M12x28 | ø38 | 87 | ø180 | 8 | 192 | 13,5 | 202,5 |
| | ø235 | 4-M12x28 | ø42 | 117,5 | ø200 | 10 | 220 | 45,5 | 233 |
| FAD-200-L2 | ø145 | 4-M8x20 | ø22, ø24 | 72 | ø110 | 11 | 130 | 19,5 | 250,5 |
| | ø200 | 4-M12x28 | ø35 | 81,5 | ø114,3 | 8 | 180 | 25 | 260,5 |

▪ C1~C7 are motor (metric standard) specific dimensions, which could be customized.

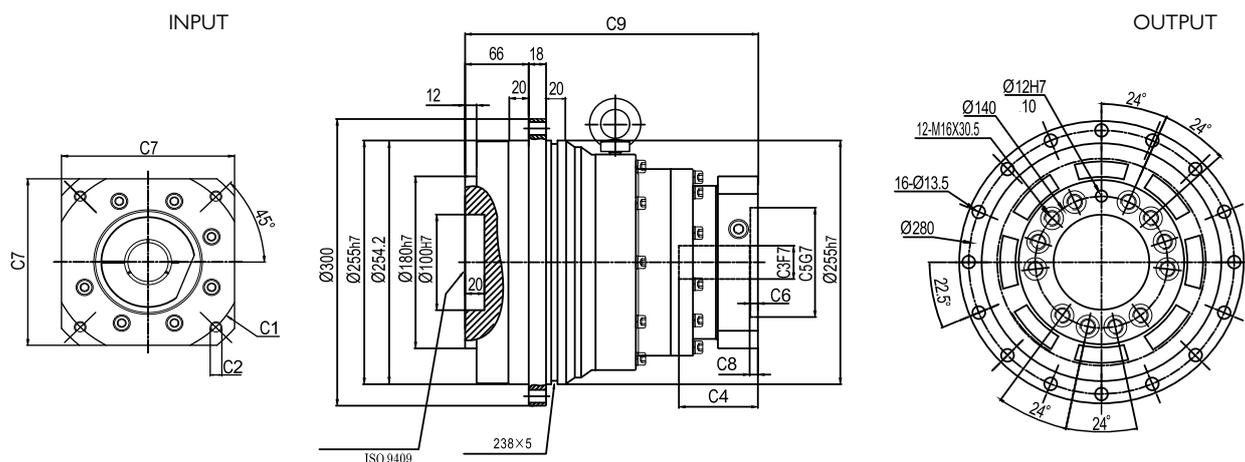
PRECISION PLANETARY GEARBOX FAD SERIES

PRODUCT DIMENSION

FAD-225-L1



FAD-225-L2



OUTPUT DIAMETER

| Size | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 |
|------------|------|----------|----------|-------|--------|----|-----|------|-------|
| FAD-255-L1 | ø200 | 4-M12x28 | ø35, ø42 | 118 | ø114,3 | 15 | 200 | 24 | 262,5 |
| | ø215 | 4-M12x30 | ø38 | 108 | ø180 | 8 | 200 | 11,5 | 252,5 |
| | ø235 | 4-M12x30 | ø42, ø55 | 118 | ø200 | 10 | 220 | 24 | 262,5 |
| FAD-255-L2 | ø200 | 4-M12x28 | ø35 | 82 | ø114,3 | 8 | 180 | 8,5 | 304 |
| | ø200 | 4-M12x28 | ø42 | 117,5 | ø114,3 | 8 | 180 | 45,5 | 339,5 |
| | ø215 | 4-M12x28 | ø38 | 87 | ø180 | 8 | 192 | 13,5 | 309 |
| | ø235 | 4-M12x28 | ø42 | 117,5 | ø200 | 10 | 220 | 45,5 | 339,5 |

▪ C1~C7 are motor (metric standard) specific dimensions, which could be customized.

CHIARAVALLI LINEAR CENTER

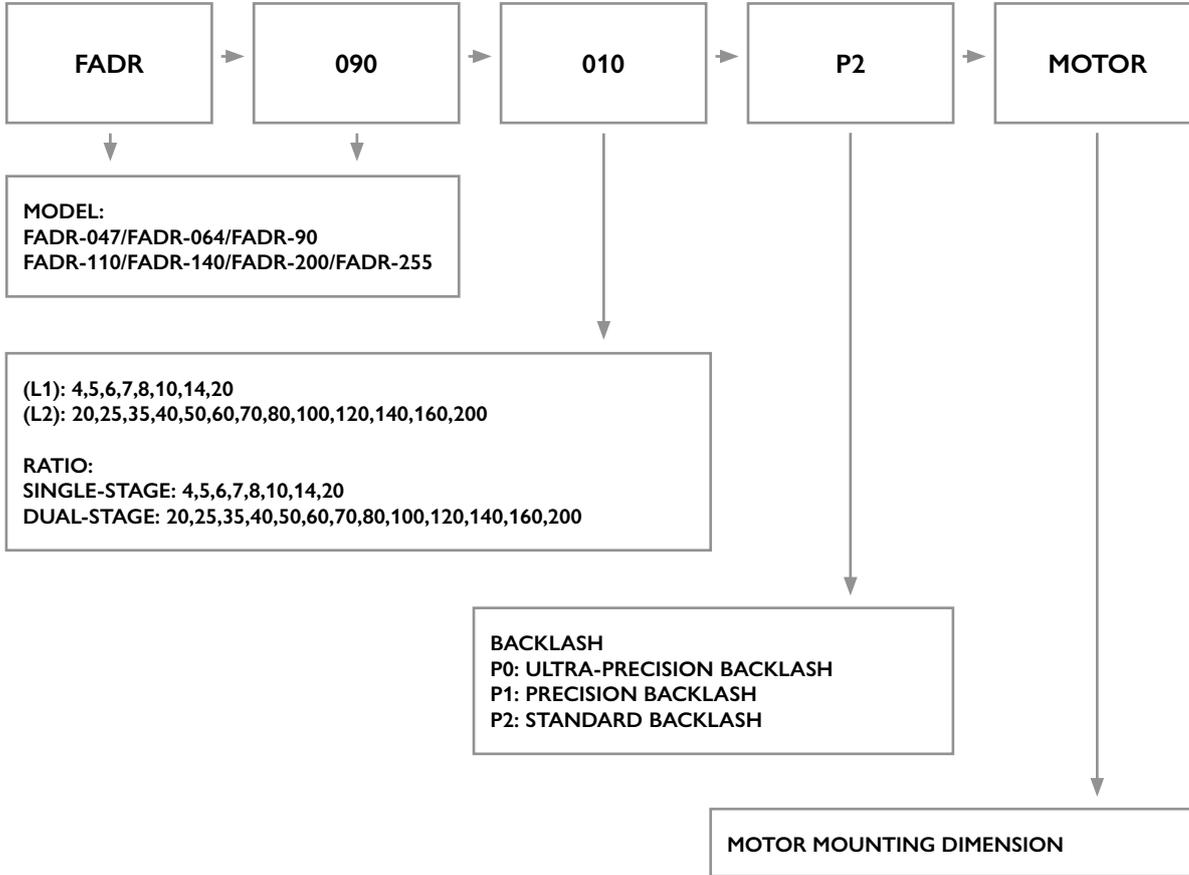
**PRECISION PLANETARY GEARBOX
FADR SERIES**



PRECISION PLANETARY GEARBOX FADR SERIES

MODEL DESCRIPTION

FADR-090-010-S2-P2-19-70-90-M6-45





PRECISION PLANETARY GEARBOX FADR SERIES

TECHNICAL SPECIFICATION

| MODEL | STAGE | RATIO | FADR041 | FADR064 | FADR090 | FDR090A | FADR110 | FADR110A | FADR140 | FADR140A | FADR200 | FADR255 | |
|--|--------|-------|---------|---------|---------|---------------------------------|---------|----------|---------|------------------------------|---------|---------|--------|
| Rated output torque | 1 | 4 | 19 | 48 | 130 | - | 270 | - | 560 | - | 1,100 | 1,700 | |
| | | 5 | 22 | 60 | 160 | - | 330 | - | 650 | - | 1,200 | 2,000 | |
| | | 6 | - | 55 | 150 | - | 310 | - | 600 | - | 1,100 | 1,900 | |
| | | 7 | 19 | 50 | 140 | - | 300 | - | 550 | - | 1,100 | 1,800 | |
| | | 8 | 17 | 48 | 130 | - | 270 | - | 560 | - | 1,100 | 1,700 | |
| | | 10 | 14 | 60 | 160 | - | 330 | - | 650 | - | 1,200 | 2,000 | |
| | | 14 | - | 50 | 140 | - | 300 | - | 550 | - | 1,100 | 1,800 | |
| | 20 | - | 40 | 100 | - | 230 | - | 450 | - | 900 | 1,500 | | |
| | 2 | 20 | 19 | 48 | 130 | 130 | 270 | 270 | 560 | 560 | 1,100 | 1,700 | |
| | | 25 | 22 | 60 | 160 | 160 | 330 | 330 | 650 | 650 | 1,200 | 2,000 | |
| | | 35 | 22 | 60 | 160 | 160 | 330 | 330 | 650 | 650 | 1,200 | 2,000 | |
| | | 40 | 22 | 48 | 130 | 130 | 270 | 270 | 560 | 560 | 1,100 | 1,700 | |
| | | 50 | 22 | 60 | 160 | 160 | 330 | 330 | 650 | 650 | 1,200 | 2,000 | |
| | | 60 | - | 55 | 150 | 150 | 310 | 310 | 600 | 600 | 1,100 | 1,900 | |
| | | 70 | 22 | 60 | 160 | 160 | 330 | 330 | 650 | 650 | 1,200 | 2,000 | |
| | | 80 | - | 48 | 130 | 130 | 270 | 270 | 560 | 560 | 1,100 | 1,700 | |
| | | 100 | 22 | 60 | 160 | 160 | 330 | 330 | 650 | 650 | 1,200 | 2,000 | |
| | | 120 | - | - | 150 | 150 | 310 | 310 | 600 | 600 | 1,100 | 1,900 | |
| | | 140 | - | - | 140 | 140 | 300 | 300 | 550 | 550 | 1,100 | 1,800 | |
| | | 160 | - | - | 120 | 120 | 260 | 260 | 500 | 500 | 1,000 | 1,600 | |
| 200 | | - | - | 100 | 100 | 230 | 230 | 450 | 450 | 900 | 1,500 | | |
| T _{2B} /Max. output torque | Nm | 1,2 | 4~200 | - | - | 3 times the rated output torque | | | | | | | |
| n ₁ /Rated input speed | rpm | 1,2 | 4~200 | 5,000 | 5,000 | 4,000 | 4,000 | 4,000 | 4,000 | 3,000 | 3,000 | 3,000 | 2,000 |
| n _{1B} /Max.input speed | rpm | 1,2 | 4~200 | 10,000 | 10,000 | 8,000 | 8,000 | 8,000 | 8,000 | 6,000 | 6,000 | 6,000 | 4,000 |
| P0/Ultra-precision backlash | arcmin | 2 | 4~20 | - | - | ≤2 | ≤2 | ≤2 | ≤2 | ≤2 | ≤2 | ≤2 | ≤2 |
| | | | 20~200 | - | - | ≤4 | ≤4 | ≤4 | ≤4 | ≤4 | ≤4 | ≤4 | ≤4 |
| P1/Precision backlash | arcmin | 2 | 4~20 | ≤4 | ≤4 | ≤4 | ≤4 | ≤4 | ≤4 | ≤4 | ≤4 | ≤4 | ≤4 |
| | | | 20~200 | ≤7 | ≤7 | ≤7 | ≤7 | ≤7 | ≤7 | ≤7 | ≤7 | ≤7 | ≤7 |
| P2/Precision backlash | arcmin | 2 | 4~20 | ≤6 | ≤6 | ≤6 | ≤6 | ≤6 | ≤6 | ≤6 | ≤6 | ≤6 | ≤6 |
| | | | 20~200 | ≤9 | ≤9 | ≤9 | ≤9 | ≤9 | ≤9 | ≤9 | ≤9 | ≤9 | ≤9 |
| Torsional rigidity | | 1,2 | 4~200 | 7 | 13 | 31 | 31 | 82 | 82 | 151 | 151 | 440 | 1,006 |
| M _{2B} ² /Maximum bending moment | Nm | 1,2 | 4~200 | 42.5 | 125 | 235 | 235 | 430 | 430 | 1,300 | 1,300 | 3,064 | 5,900 |
| F _{2B} /Allowable radial force | N | 1,2 | 4~200 | 1,080 | 2,110 | 2,310 | 2,310 | 4,800 | 4,800 | 6,200 | 6,200 | 5,450 | 10,600 |
| Life time | hr | 1,2 | 4~200 | | | | | | | 20,000 ¹ | | | |
| η/Efficiency | % | 2 | 4~20 | | | | | | | | | | ≥95% |
| | | | 20~200 | | | | | | | | | | |
| Weight | kg | 1 | 4~20 | 1.1 | 2.1 | 5.9 | - | 10.5 | - | 21.9 | - | 50.9 | 85.4 |
| | | | 2 | 20~200 | 1.4 | 1.9 | 4.5 | 8.26 | 9.8 | 14.7 | 20.1 | 30.6 | 45.4 |
| Operating temperature | °C | 1,2 | 4~200 | | | | | | | -10°C ~ +90°C | | | |
| lubrication | | 1,2 | 4~200 | | | | | | | Synthetic lubricating grease | | | |
| Ingress protection | | 1,2 | 4~200 | | | | | | | IP65 | | | |
| Mount position | | 1,2 | 4~200 | | | | | | | Any direction | | | |
| (n ₁ =3000rpm) / Noise level | dB | 1,2 | 4~200 | ≤61 | ≤63 | ≤65 | ≤65 | ≤68 | ≤68 | ≤70 | ≤70 | ≤72 | ≤74 |

GEARBOX MOMENT OF INERTIA

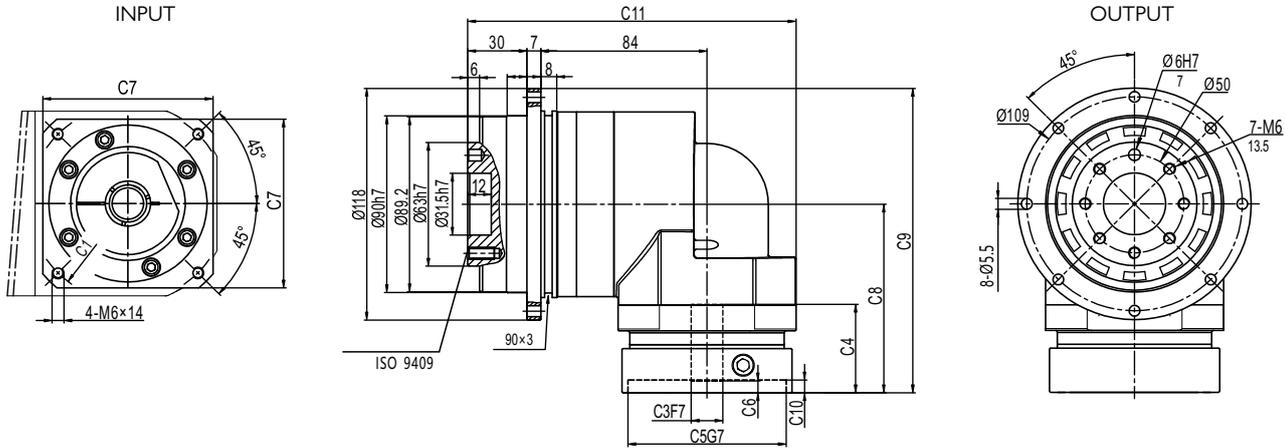
| MODEL | STAGE | RATIO | FADR047 | FADR064 | FADR090 | FDR090A | FADR110 | FADR110A | FADR140 | FADR140A | FADR200 | FADR255 |
|-------------------|-------|---------|---------|---------|---------|---------|---------|----------|---------|----------|---------|---------|
| Moment of inertia | 1 | 4~7 | 0.09 | 0.35 | 2.25 | - | 6.84 | - | 23.4 | - | 68.9 | 135.4 |
| | | 8~10 | 0.09 | 0.07 | 1.87 | - | 6.25 | - | 21.8 | - | 65.6 | 119.8 |
| | | 14~20 | - | 0.07 | 1.87 | - | 6.25 | - | 21.8 | - | 65.6 | 119.8 |
| | 2 | 20~40 | 0.09 | 0.35 | 0.35 | 2.25 | 2.25 | 6.84 | 6.84 | 23.4 | 23.4 | 68.9 |
| | | 50 | - | 0.07 | 0.31 | 1.87 | 1.87 | 6.25 | 6.25 | 21.8 | 21.8 | 65.6 |
| | | 60 | - | 0.07 | 0.35 | 2.25 | 2.25 | 6.84 | 6.84 | - | - | - |
| | | 70~100 | - | 0.07 | 0.31 | 1.87 | 1.87 | 6.25 | 6.25 | 21.8 | 21.8 | 65.6 |
| | | 120~200 | - | 0.07 | 0.31 | 1.87 | 1.87 | 6.25 | 6.25 | 21.8 | 21.8 | 65.6 |

1. The lifetime will be shortened by half under continuous operation.
When the output speed is 100rpm, it applies on the center of the output shaft.

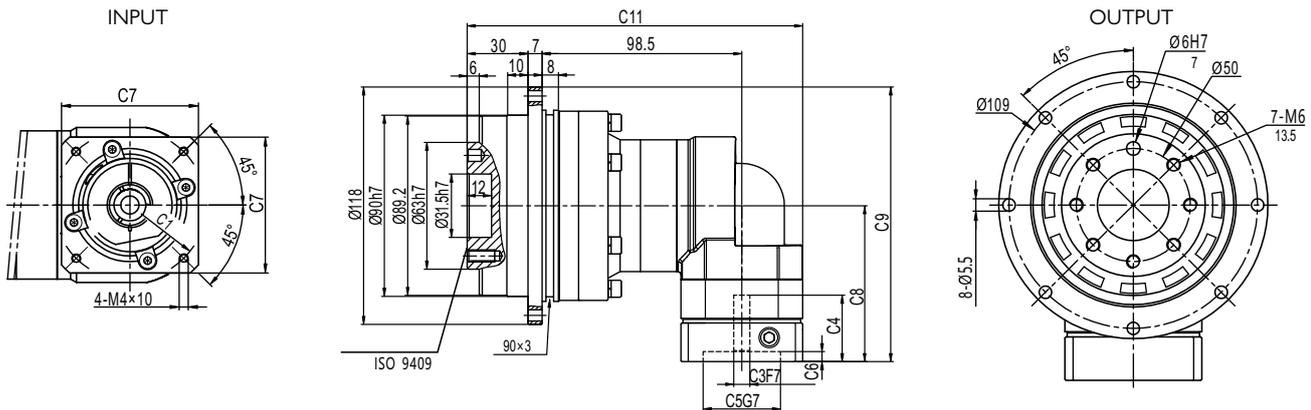
PRECISION PLANETARY GEARBOX FADR SERIES

PRODUCT DIMENSION

FADR-090-L1



FADR-090-L2



OUTPUT DIAMETER

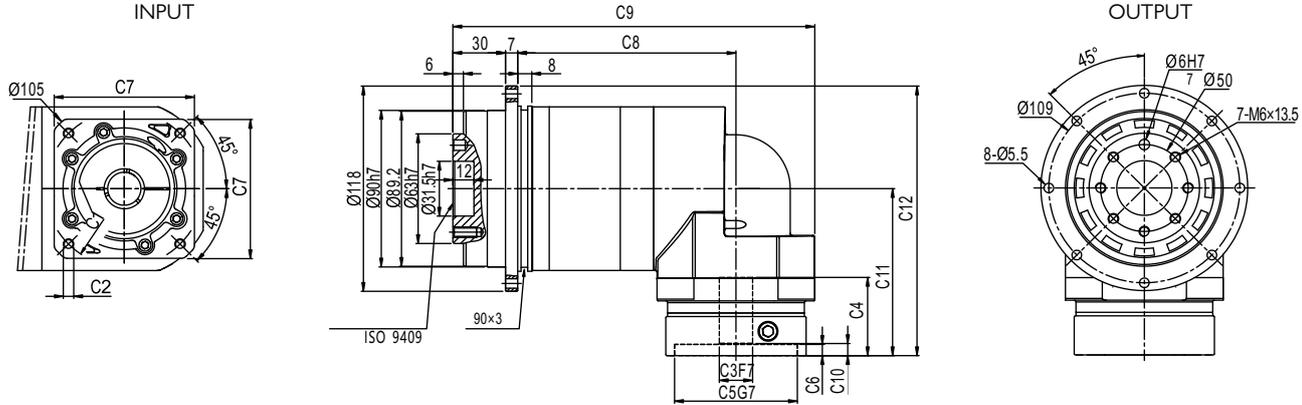
| Size | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 | C10 | C11 |
|---------------|-------|------------------|---------------|------|-------|-----|-----|-------|-------|------|-------|
| FADR-090-L1 | ø90 | 4-M5x12, 4-M6x14 | ø19 | 45 | ø70 | 6,5 | 80 | 96 | 155 | 7 | 166 |
| | ø100 | 4-M6x14 | ø16 | 45 | ø80 | 6,5 | 86 | 96 | 155 | 6 | 166 |
| FADR-090M1-L1 | ø115 | 4-M8x20 | ø19, ø22 | 56,5 | ø95 | 8 | 100 | 117,5 | 176,5 | 16,5 | 171 |
| | ø145 | 4-M8x20 | ø19, ø22, ø24 | 59 | ø110 | 11 | 130 | 120 | 179 | 19 | 186 |
| FADR-090-L2 | ø66,7 | 4-M4x10 | ø8 | 33 | ø38,1 | 5 | 60 | 77,5 | 136,5 | 5,5 | 165,5 |
| | ø70 | 4-M4x10, 4-M5x12 | ø11, ø14 | 33 | ø50 | 5 | 60 | 77,5 | 136,5 | 5,5 | 165,5 |
| FADR-090M1-L2 | ø90 | 4-M5x12, 4-M6x14 | ø19 | 42,5 | ø70 | 6,5 | 80 | 87 | 146 | 12 | 175,5 |
| | ø100 | 4-M6x14 | ø16 | 42,5 | ø80 | 6,5 | 86 | 87 | 146 | 11 | 175,5 |

- C1~C7 are motor (metric standard) specific dimensions, which could be customized.
- M1: Limit hole (Version number)

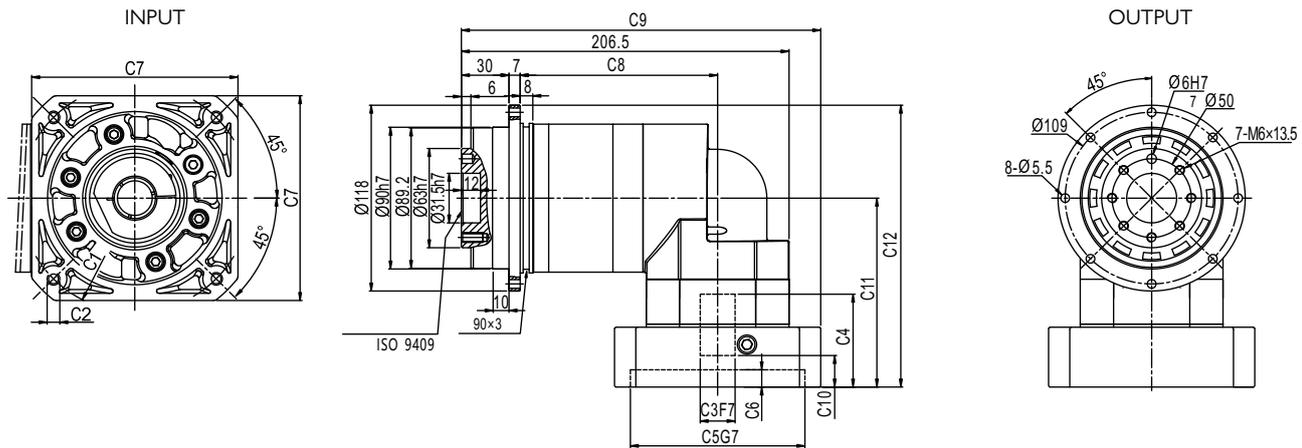
PRECISION PLANETARY GEARBOX FADR SERIES

PRODUCT DIMENSION

FADR-90A-L2



FADR-90A-L2



OUTPUT DIAMETER

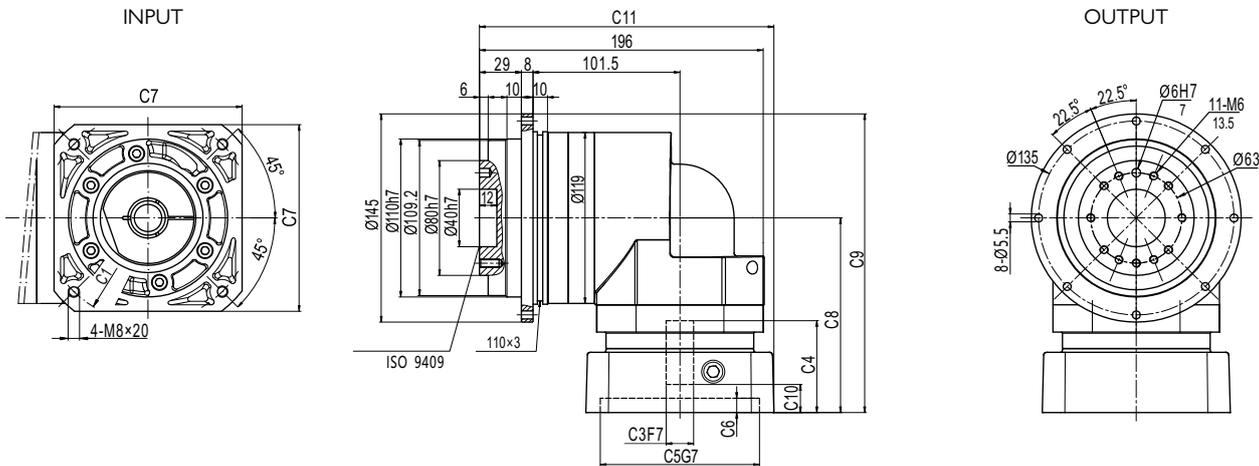
| Size | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 | C10 | C11 | C12 |
|----------------|------|------------------|---------------|------|------|-----|-----|-------|-------|------|-------|-------|
| FADR-090A-L2 | ø90 | 4-M5x12, 4-M6x14 | ø19 | 45 | ø70 | 6,5 | 80 | 124,5 | 206,5 | 7 | 96 | 155 |
| | ø100 | 4-M6x14 | ø16 | 45 | ø80 | 6,5 | 86 | 124,5 | 206,5 | 6 | 96 | 155 |
| FADR-090AM1-L2 | ø115 | 4-M8x20 | ø19, ø22 | 56,5 | ø95 | 8 | 100 | 124,5 | 211,5 | 16,5 | 117,5 | 176,5 |
| | ø145 | 4-M8x20 | ø19, ø22, ø24 | 59 | ø110 | 10 | 130 | 124,5 | 269,5 | 19 | 120 | 179 |

- C1~C7 are motor (metric standard) specific dimensions, which could be customized.
- M1: Limit hole (Version number)

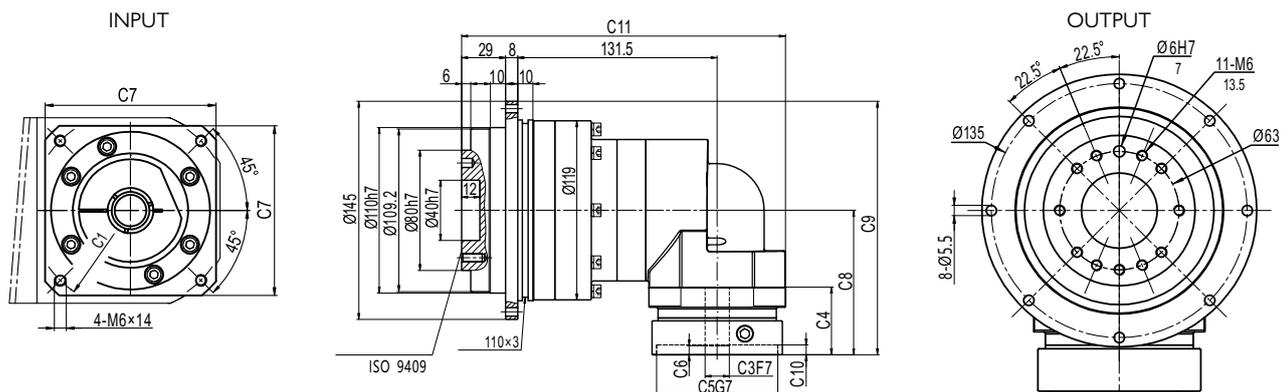
PRECISION PLANETARY GEARBOX FADR SERIES

PRODUCT DIMENSION

FADR-110-L1



FADR-110-L2



OUTPUT DIAMETER

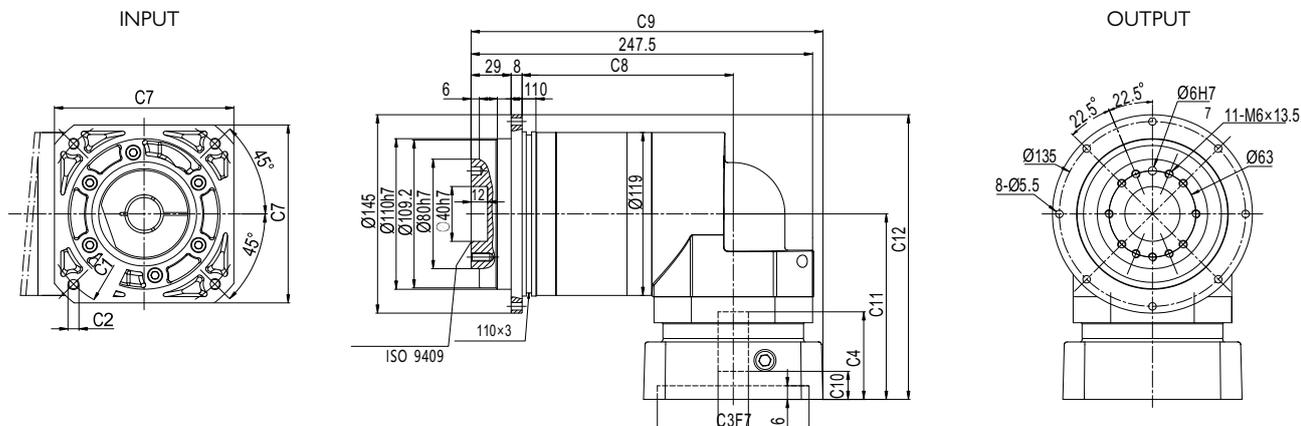
| Size | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 | C10 | C11 |
|---------------|------|------------------|---------------|------|--------|-----|-----|-------|-------|------|-------|
| FADR-110-L1 | Ø145 | 4-M8x20 | Ø19, Ø22, Ø24 | 64 | Ø110 | 10 | 130 | 135,5 | 208 | 19,5 | 203,5 |
| FADR-110M1-L1 | Ø200 | 4-M12x28 | Ø35 | 81 | Ø114,3 | 10 | 180 | 152,5 | 225 | 28 | 228,5 |
| FADR-110-L2 | Ø90 | 4-M5x12, 4-M6x14 | Ø19 | 45 | Ø70 | 6,5 | 80 | 96 | 168,5 | 7 | 213,5 |
| | Ø100 | 4-M6x14 | Ø16 | 45 | Ø80 | 6,5 | 86 | 96 | 168,5 | 6 | 213,5 |
| FADR-110M1-L2 | Ø115 | 4-M8x20 | Ø19, Ø22 | 56,5 | Ø95 | 8 | 100 | 117,5 | 190 | 16,5 | 218,5 |
| | Ø145 | 4-M8x20 | Ø19, Ø22, Ø24 | 59 | Ø110 | 11 | 130 | 120 | 192,5 | 19 | 233,5 |

- C1-C7 are motor (metric standard) specific dimensions, which could be customized.
- M1: Limit hole (Version number)

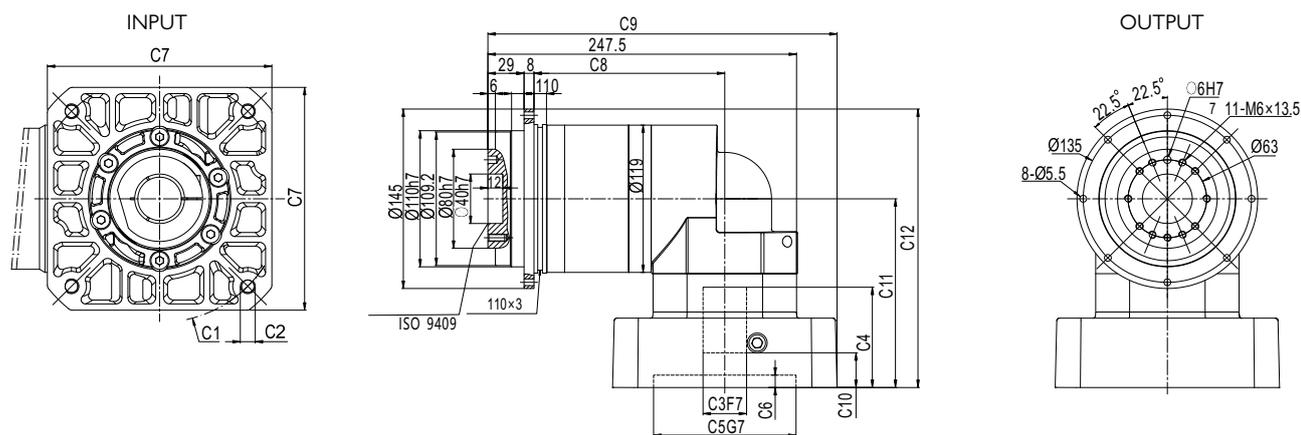
PRECISION PLANETARY GEARBOX FADR SERIES

PRODUCT DIMENSION

FADR-110A-L2



FADR-110A-L2



OUTPUT DIAMETER

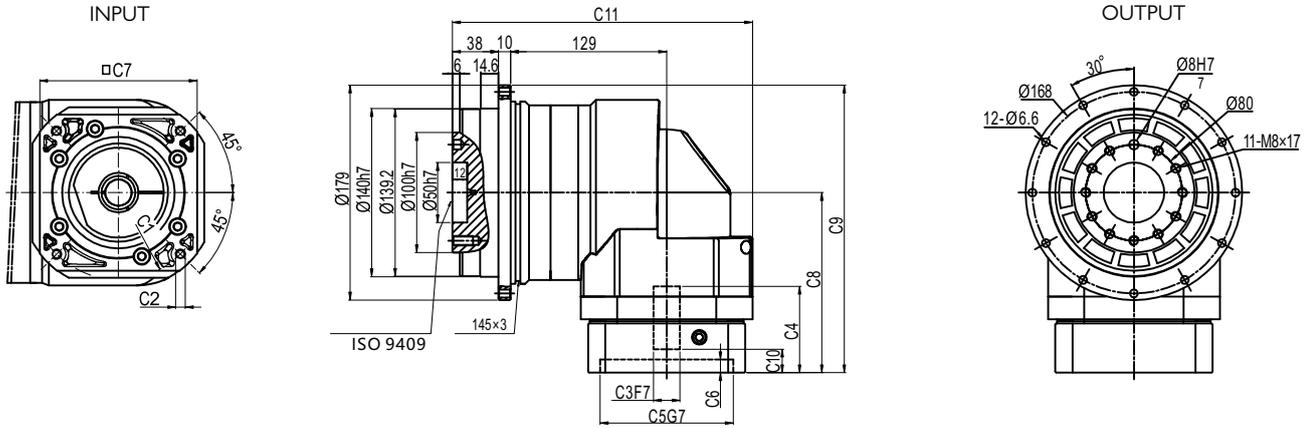
| Size | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 | C10 | C11 | C12 |
|----------------|------|----------|---------------|----|--------|----|-----|-----|-----|------|-------|-----|
| FADR-110A-L2 | Ø145 | 4-M8x20 | Ø19, Ø22, Ø24 | 64 | Ø110 | 10 | 130 | 153 | 255 | 19,5 | 135,5 | 208 |
| FADR-110AM1-L2 | Ø200 | 4-M12x28 | Ø35 | 81 | Ø114,3 | 10 | 180 | 153 | 180 | 28 | 152,5 | 225 |

- C1~C7 are motor (metric standard) specific dimensions, which could be customized.
- M1: Limit hole (Version number)

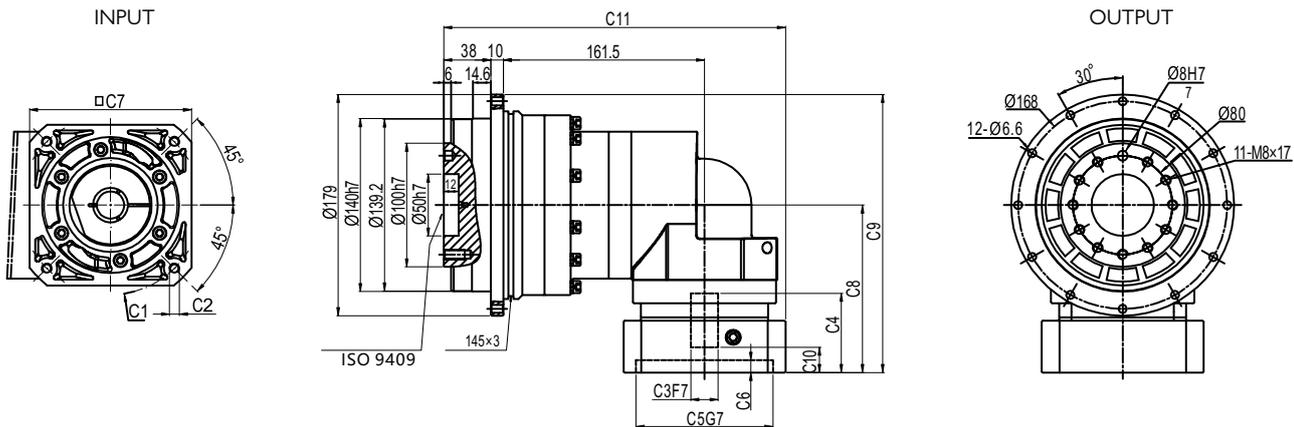
PRECISION PLANETARY GEARBOX FADR SERIES

PRODUCT DIMENSION

FADR-140-L1



FADR-140-L2



OUTPUT DIAMETER

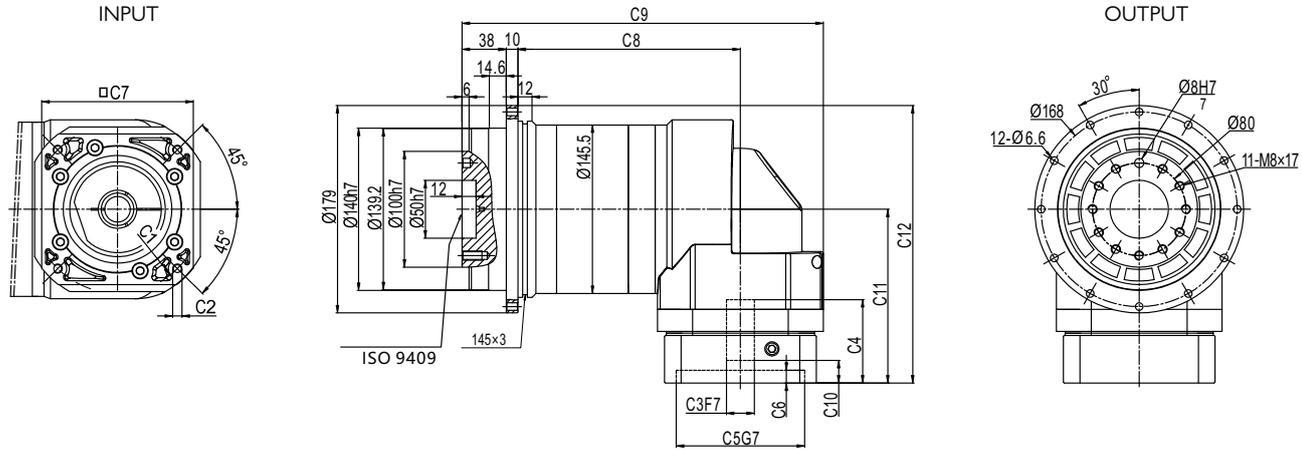
| Size | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 | C10 | C11 |
|---------------|------|----------|---------------|----|--------|----|-----|-------|-------|------|-------|
| FADR-140-L1 | ø145 | 4-M8x20 | ø22, ø24 | 72 | ø110 | 11 | 130 | 150 | 239,5 | 19,5 | 248 |
| | ø200 | 4-M12x28 | ø35 | 82 | ø114,3 | 8 | 180 | 160 | 249,5 | 25 | 267 |
| FADR-140-L2 | ø145 | 4-M8x20 | ø19, ø22, ø24 | 64 | ø110 | 10 | 130 | 135,5 | 225 | 19,5 | 274,5 |
| FADR-140M1-L2 | ø200 | 4-M12x28 | ø35 | 81 | ø114,3 | 10 | 180 | 152,5 | 242 | 28 | 299,5 |

- C1~C7 are motor (metric standard) specific dimensions, which could be customized.
- M1: Limit hole (Version number)

PRECISION PLANETARY GEARBOX FADR SERIES

PRODUCT DIMENSION

FADR-140A-L2



OUTPUT DIAMETER

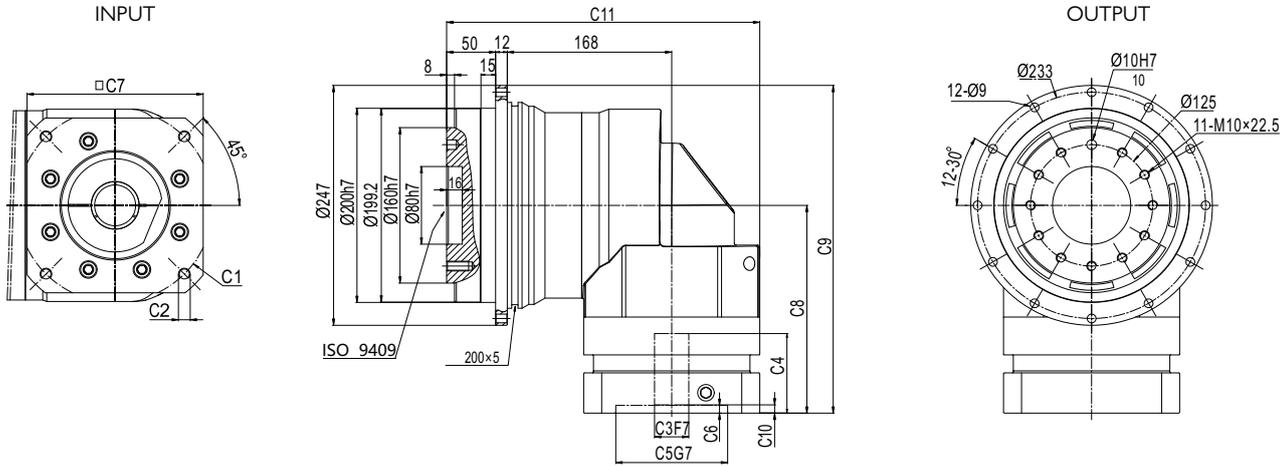
| Size | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 | C10 | C11 | C12 |
|--------------|-------------------|----------|----------------------------------|----|---------------------|----|-----|-------|-------|------|-----|-------|
| FADR-140A-L2 | $\varnothing 145$ | 4-M8x20 | $\varnothing 22, \varnothing 24$ | 72 | $\varnothing 110$ | 11 | 130 | 190,5 | 309,5 | 19,5 | 150 | 239,5 |
| | $\varnothing 200$ | 4-M12x28 | $\varnothing 35$ | 82 | $\varnothing 114,3$ | 8 | 180 | 190,5 | 328,5 | 25 | 160 | 248,5 |

▪ C1~C7 are motor (metric standard) specific dimensions, which could be customized.

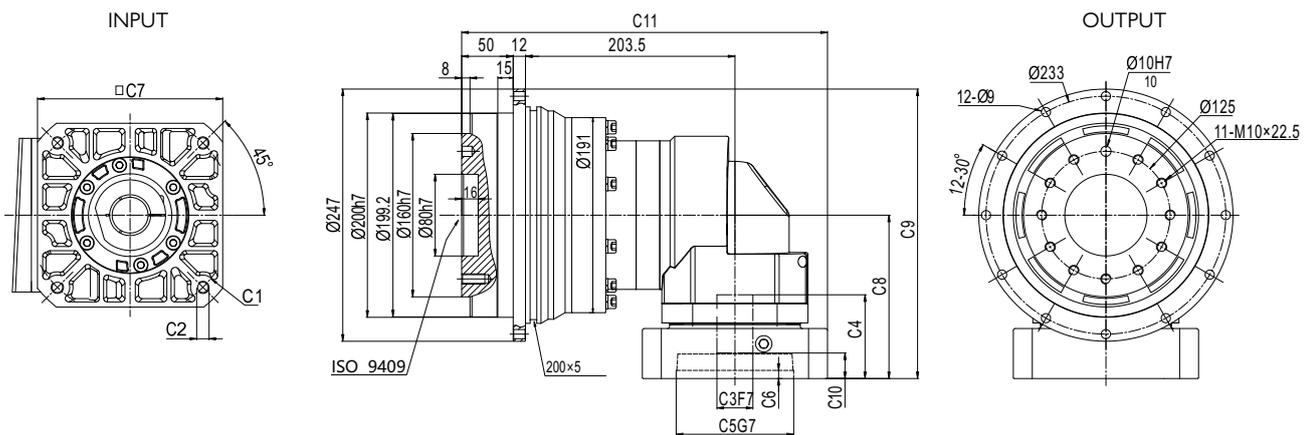
PRECISION PLANETARY GEARBOX FADR SERIES

PRODUCT DIMENSION

FADR-200-L1



FADR-200-L2



OUTPUT DIAMETER

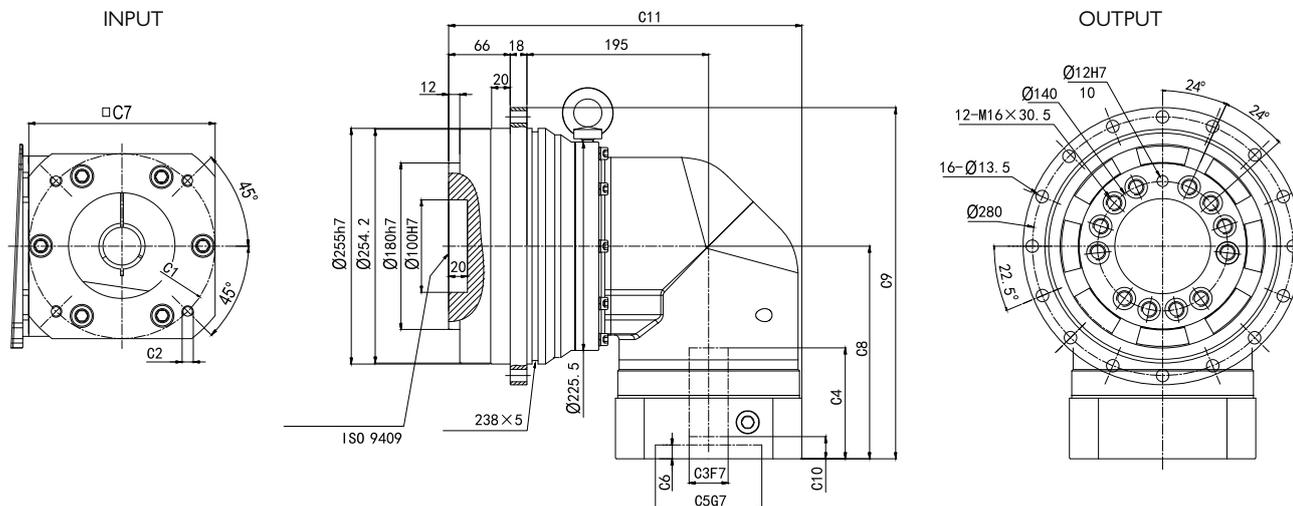
| Size | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 | C10 | C11 |
|-------------|-------------------|----------|----------------------------------|-------|---------------------|----|-----|-------|-------|------|-------|
| FADR-200-L1 | $\varnothing 200$ | 4-M12x28 | $\varnothing 35$ | 82 | $\varnothing 114,3$ | 8 | 180 | 214 | 337,5 | 8,5 | 320 |
| | $\varnothing 200$ | 4-M12x28 | $\varnothing 42$ | 117,5 | $\varnothing 114,3$ | 8 | 180 | 249,5 | 373 | 45,5 | 320 |
| | $\varnothing 215$ | 4-M12x28 | $\varnothing 38$ | 87 | $\varnothing 180$ | 8 | 192 | 219 | 342,5 | 13,5 | 326 |
| | $\varnothing 235$ | 4-M12x28 | $\varnothing 42$ | 117,5 | $\varnothing 200$ | 10 | 220 | 249,5 | 373 | 45,5 | 320 |
| FADR-200-L2 | $\varnothing 145$ | 4-M8x20 | $\varnothing 22, \varnothing 24$ | 72 | $\varnothing 110$ | 11 | 130 | 150 | 247,5 | 19,5 | 336,5 |
| | $\varnothing 200$ | 4-M12x28 | $\varnothing 35$ | 82 | $\varnothing 114,3$ | 8 | 180 | 160 | 283,5 | 25 | 355,5 |

▪ C1~C7 are motor (metric standard) specific dimensions, which could be customized.

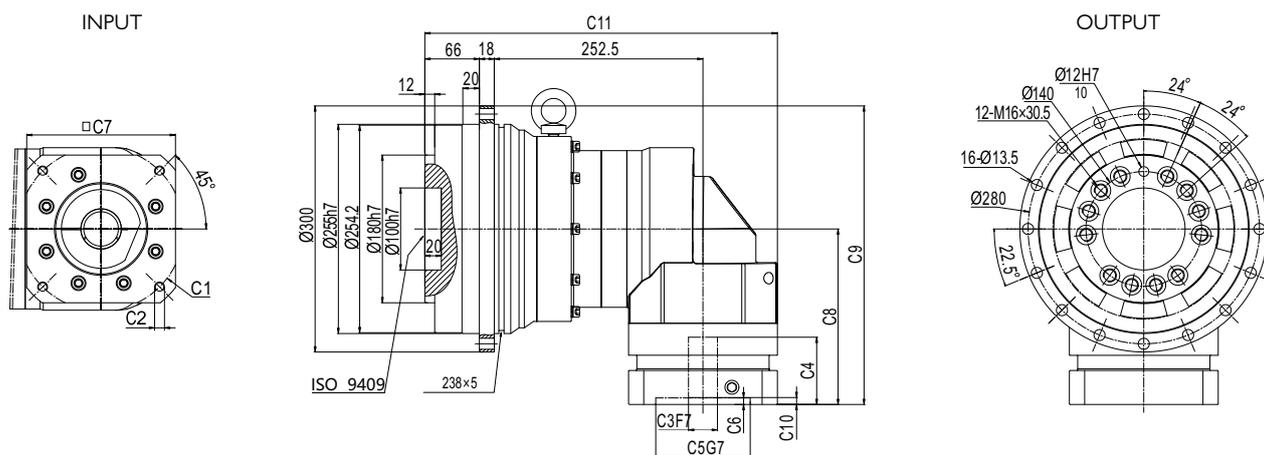
PRECISION PLANETARY GEARBOX FADR SERIES

PRODUCT DIMENSION

FADR-255-L1



FADR-255-L2



OUTPUT DIAMETER

| Size | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 | C10 | C11 |
|-------------|-------------------|----------|----------------------------------|-------|---------------------|----|-----|-------|-------|------|-------|
| FADR-255-L1 | $\varnothing 200$ | 4-M12x30 | $\varnothing 35, \varnothing 42$ | 120 | $\varnothing 114,3$ | 15 | 200 | 230 | 380 | 22,5 | 379 |
| | $\varnothing 215$ | 4-M12x30 | $\varnothing 38$ | 110 | $\varnothing 180$ | 8 | 200 | 220 | 370 | 12,5 | 379 |
| | $\varnothing 235$ | 4-M12x30 | $\varnothing 42, \varnothing 55$ | 120 | $\varnothing 200$ | 10 | 220 | 230 | 380 | 24 | 389 |
| FADR-255-L2 | $\varnothing 200$ | 4-M12x28 | $\varnothing 35$ | 82 | $\varnothing 114,3$ | 8 | 180 | 214 | 364 | 8,5 | 426,5 |
| | $\varnothing 200$ | 4-M12x28 | $\varnothing 42$ | 117,5 | $\varnothing 114,3$ | 8 | 180 | 249,5 | 399,5 | 45,5 | 426,5 |
| | $\varnothing 215$ | 4-M12x28 | $\varnothing 38$ | 87 | $\varnothing 180$ | 8 | 192 | 219 | 369 | 13,5 | 432,5 |
| | $\varnothing 235$ | 4-M12x28 | $\varnothing 42$ | 117,5 | $\varnothing 200$ | 10 | 220 | 249,5 | 399,5 | 45,5 | 446,5 |

▪ C1~C7 are motor (metric standard) specific dimensions, which could be customized.

CHIARAVALLI LINEAR CENTER

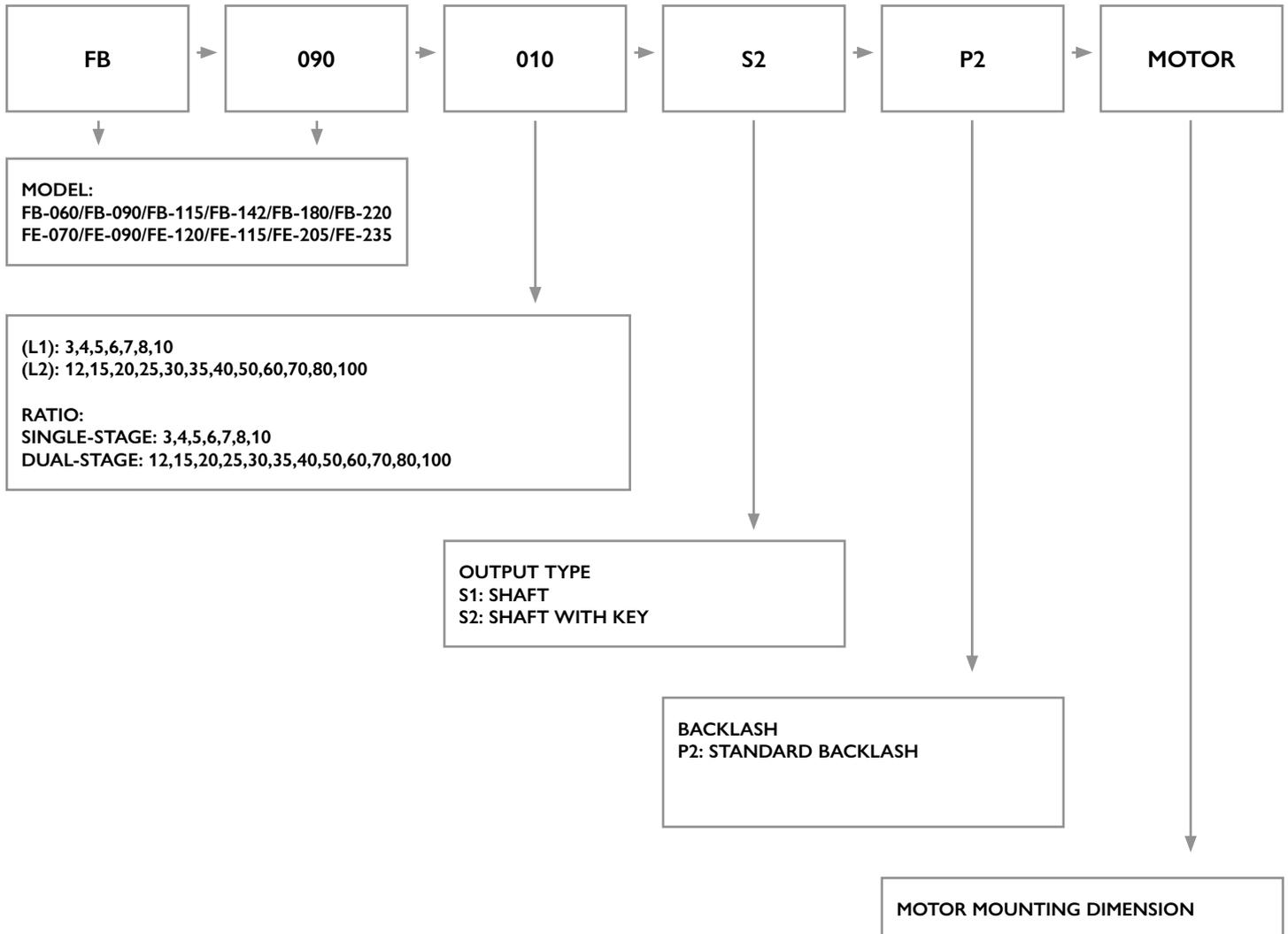
**PRECISION PLANETARY GEARBOX
FB/FE SERIES**



PRECISION PLANETARY GEARBOX FB/FE SERIES

MODEL DESCRIPTION

FB-090-010-S2-P2-19-70-90-M6-42





PRECISION PLANETARY GEARBOX FB/FE SERIES

TECHNICAL SPECIFICATION

| MODEL | | STAGE | RATIO | FB060 FE070 | FB090 FE090 | FB090A FE090A | FB115 FE120 | FB115A FE120A | FB142 FE155 | FB142A FE155A | FB180 FE205 | FB220 FE235 |
|---|-----------|-------|--------|---------------------------------|----------------|------------------|----------------|------------------|----------------|------------------|----------------|----------------|
| Rated output torque | Nm | 1 | 3 | 55 | 130 | - | 208 | - | 342 | - | 588 | 1,140 |
| | | | 4 | 50 | 140 | - | 290 | - | 542 | - | 1,050 | 1,700 |
| | | | 5 | 60 | 160 | - | 330 | - | 650 | - | 1,200 | 2,000 |
| | | | 6 | 55 | 150 | - | 310 | - | 600 | - | 1,100 | 1,900 |
| | | | 7 | 50 | 140 | - | 300 | - | 550 | - | 1,100 | 1,800 |
| | | | 8 | 45 | 120 | - | 260 | - | 500 | - | 1,000 | 1,600 |
| | | 10 | 40 | 100 | - | 230 | - | 450 | - | 900 | 1,500 | |
| | | 2 | 12 | 55 | 130 | 130 | 208 | 208 | 342 | 342 | 588 | 1,140 |
| | | | 15 | 55 | 130 | 130 | 208 | 208 | 342 | 342 | 588 | 1,140 |
| | | | 20 | 50 | 140 | 140 | 290 | 290 | 542 | 542 | 1,050 | 1,700 |
| | | | 25 | 60 | 160 | 160 | 330 | 330 | 650 | 650 | 1,200 | 2,000 |
| | | | 30 | 50 | 130 | 130 | 208 | 208 | 342 | 342 | 588 | 1,140 |
| | | | 35 | 60 | 160 | 160 | 330 | 330 | 650 | 650 | 1,200 | 2,000 |
| | | | 40 | 50 | 140 | 140 | 290 | 290 | 542 | 542 | 1,050 | 1,700 |
| | | | 50 | 60 | 160 | 160 | 330 | 330 | 650 | 650 | 1,200 | 2,000 |
| | | | 60 | 55 | 150 | 150 | 310 | 310 | 600 | 600 | 1,100 | 1,900 |
| | | | 70 | 50 | 140 | 140 | 300 | 300 | 550 | 550 | 1,100 | 1,800 |
| | | | 80 | 45 | 120 | 120 | 260 | 260 | 500 | 500 | 1,000 | 1,600 |
| 100 | 40 | | 100 | 100 | 230 | 230 | 450 | 450 | 900 | 1,500 | | |
| T _{2B} /Max. output torque | Nm | 1,2 | 3~100 | 3 times the rated output torque | | | | | | | | |
| n ₁ /Rated input speed | rpm | 1,2 | 3~100 | 5,000 | 4,000 | 4,000 | 4,000 | 4,000 | 3,000 | 3,000 | 3,000 | 2,000 |
| n _{1B} /Max.input speed | rpm | 1,2 | 3~100 | 10,000 | 8,000 | 8,000 | 8,000 | 8,000 | 6,000 | 6,000 | 6,000 | 4,000 |
| P2/Precision backlash | arcmin | 1 | 3~10 | ≤5 | ≤5 | ≤5 | ≤5 | ≤5 | ≤5 | ≤5 | ≤5 | ≤5 |
| | | 2 | 12~100 | ≤7 | ≤7 | ≤7 | ≤7 | ≤7 | ≤7 | ≤7 | ≤7 | ≤7 |
| Torsional rigidity | Nm/arcmin | 1,2 | 3~100 | 7 | 14 | 14 | 25 | 25 | 50 | 50 | 145 | 225 |
| F _{21B} ² /Allowable radial force | N | 1,2 | 3~100 | 1,530 | 3,250 | 3,250 | 6,700 | 6,700 | 9,400 | 9,400 | 14,500 | 50,000 |
| F _{21B} ² /Allowable radial force | N | 1,2 | 3~100 | 630 | 1,300 | 1,300 | 3,000 | 3,000 | 4,000 | 4,000 | 6,200 | 35,000 |
| F _{22B} ² /Allowable radial force | N | 1,2 | 3~100 | 765 | 1,625 | 1,625 | 3,350 | 3,350 | 4,700 | 4,700 | 7,250 | 25,000 |
| Life time | hr | 1,2 | 3~100 | 20,000 ¹ | | | | | | | | |
| η/Efficiency | % | 1 | 3~10 | ≥97% | | | | | | | | |
| | | 2 | 12~100 | ≥94% | | | | | | | | |
| Weight | kg | 1 | 3~10 | 1.3 | 3.7 | - | 7.8 | - | 14.5 | - | 29 | 48 |
| | | 2 | 12~100 | 1.9 | 4.1 | 4.1 | 9 | 9 | 17.5 | 17.5 | 33 | 60 |
| Operating temperature | °C | 1,2 | 3~100 | -10°C ~ +90°C | | | | | | | | |
| lubrication | | 1,2 | 3~100 | Synthetic lubricating grease | | | | | | | | |
| Ingress protection | | 1,2 | 3~100 | IP65 | | | | | | | | |
| Mount position | | 1,2 | 3~100 | Any direction | | | | | | | | |
| (n ₁ =3000rpm) / Noise level | dB | 1,2 | 3~100 | ≤58 | ≤60 | ≤60 | ≤63 | ≤63 | ≤65 | ≤65 | ≤67 | ≤70 |

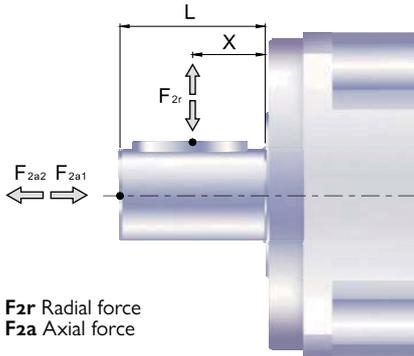
GEARBOX MOMENT OF INERTIA

| MODEL | | STAGE | RATIO | FB060 FE070 | FB090 FE090 | FB090A FE090A | FB115 FE120 | FB115A FE120A | FB142 FE155 | FB142A FE155A | FB180 FE205 | FB220 FE235 |
|-------------------|----------------------|-------|-------|----------------|----------------|------------------|----------------|------------------|----------------|------------------|----------------|----------------|
| Moment of inertia | kg • cm ² | 1 | 3 | 0.16 | 0.61 | - | 3.25 | - | 9.21 | - | 28.98 | 69.61 |
| | | | 4 | 0.14 | 0.48 | - | 2.74 | - | 7.54 | - | 23.67 | 54.37 |
| | | | 5 | 0.13 | 0.47 | - | 2.71 | - | 7.42 | - | 23.29 | 53.27 |
| | | | 6 | 0.13 | 0.45 | - | 2.65 | - | 7.25 | - | 22.75 | 51.72 |
| | | | 7 | 0.13 | 0.45 | - | 2.62 | - | 7.14 | - | 22.48 | 50.97 |
| | | | 8 | 0.13 | 0.44 | - | 2.58 | - | 7.07 | - | 22.59 | 50.84 |
| | | 10 | 0.13 | 0.44 | - | 2.57 | - | 7.03 | - | 22.51 | 50.56 | |
| | | 2 | 12 | 0.14 | 0.13 | 0.47 | 0.47 | 2.71 | 2.71 | 7.42 | 7.42 | 23.29 |
| | | | 15 | 0.13 | 0.13 | 0.13 | 0.47 | 2.71 | 2.71 | 7.42 | 7.42 | 23.29 |
| | | | 20 | 0.13 | 0.13 | 0.47 | 0.47 | 2.71 | 2.71 | 7.42 | 7.42 | 23.29 |
| | | | 25 | 0.13 | 0.13 | 0.13 | 0.47 | 2.71 | 2.71 | 7.42 | 7.42 | 23.29 |
| | | | 30 | 0.13 | 0.13 | 0.47 | 0.47 | 2.71 | 2.71 | 7.42 | 7.42 | 23.29 |
| | | | 35 | 0.13 | 0.13 | 0.47 | 0.47 | 2.71 | 2.71 | 7.42 | 7.42 | 23.29 |
| | | | 40 | 0.13 | 0.13 | 0.47 | 0.47 | 2.71 | 2.71 | 7.42 | 7.42 | 23.29 |
| | | | 50 | 0.13 | 0.13 | 0.44 | 0.44 | 2.57 | 2.57 | 7.03 | 7.03 | 22.51 |
| | | | 60 | 0.13 | 0.13 | 0.44 | 0.44 | 2.57 | 2.57 | 7.03 | 7.03 | 22.51 |
| | | | 70 | 0.13 | 0.13 | 0.44 | 0.44 | 2.57 | 2.57 | 7.03 | 7.03 | 22.51 |
| | | | 80 | 0.13 | 0.13 | 0.44 | 0.44 | 2.57 | 2.57 | 7.03 | 7.03 | 22.51 |
| 100 | 0.13 | | 0.13 | 0.44 | 0.44 | 2.57 | 2.57 | 7.03 | 7.03 | 22.51 | | |

1. The lifetime will be shortened by half under continuous operation.
When the output speed is 100rpm, it applies on the center of the output shaft.

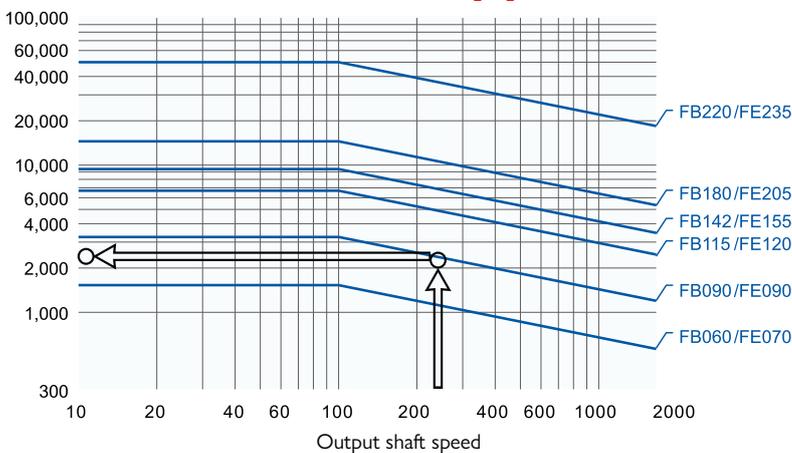
PRECISION PLANETARY GEARBOX FB/FE SERIES

ALLOWABLE RADIAL AND AXIAL FORCES ON THE OUTPUT SHAFT OF THE GEAR REDUCER



The maximum radial and axial forces that the output shaft of the gearbox can withstand. Looking at the design of internal support bearings, the reducer adopts large-sized bearings and a design with a larger span, which can withstand greater radial and axial loads.

PERMISSIBLE RADIAL FORCE F_{2rB} [N] APPLY FORCE TO THE CENTER OF THE SHAFT

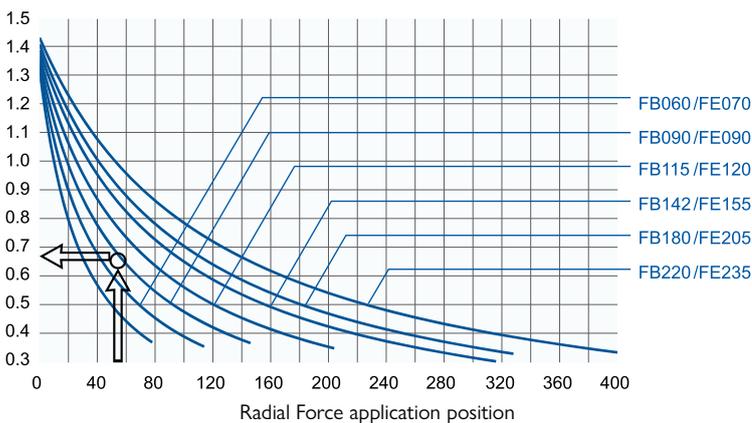


When the radial force F_{2r} is applied to the center of the shaft, i.e. $X=1/2 \times L$, the allowable radial force F_{2rB} that can be withstood by different specifications of reducers with a service life of 20,000hr* under different output speeds is as follows:

$$F_{2a1B} = 0,2 \times F_{2rB}$$

$$F_{2a2B} = 0,1 \times F_{2rB}$$

POSITIONAL LOAD COEFFICIENT



When the radial force F_{2r} is not in the center of the shaft, the closer to the gearbox, that is, $X < 1/2 \times L$, the allowable radial force that can be borne becomes larger, and the farther away from the reducer, i.e., $X > 1/2 \times L$, the allowable force that can be borne becomes smaller.

Radial force
 $F'_{2rB} = K_b \times F_{2rB}$

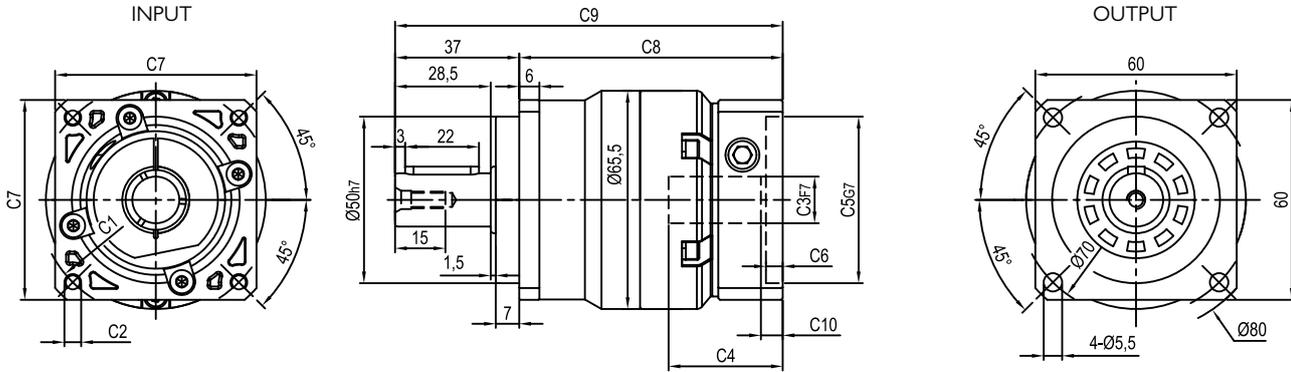
Axial force
 $F'_{2a1B} = 0,2 \times F'_{2rB}$
 $F'_{2a2B} = 0,1 \times F'_{2rB}$

*The lifetime will be shortened by half under continuous operation.

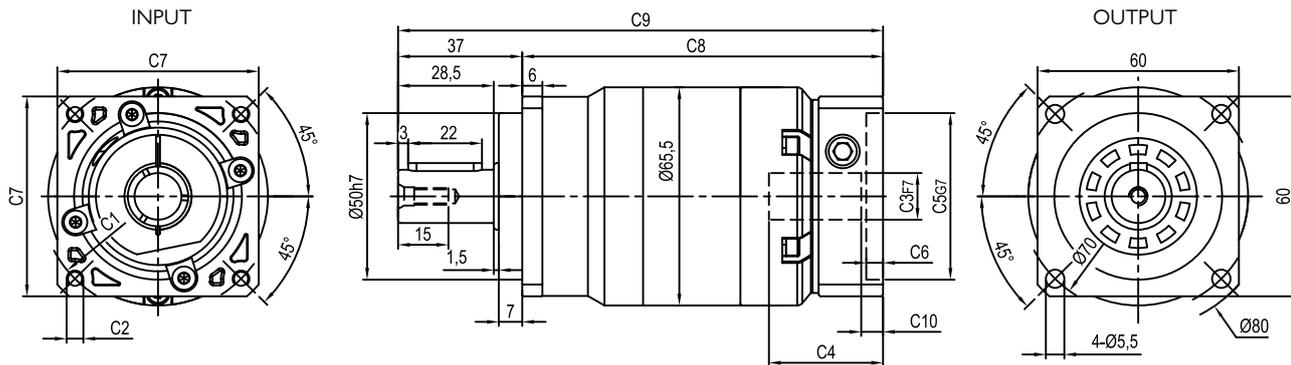
PRECISION PLANETARY GEARBOX FB/FE SERIES

PRODUCT DIMENSION

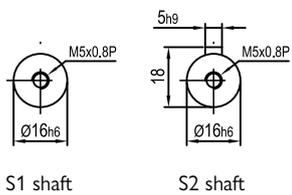
FB-060-L1



FB-060-L2



OUTPUT DIAMETER



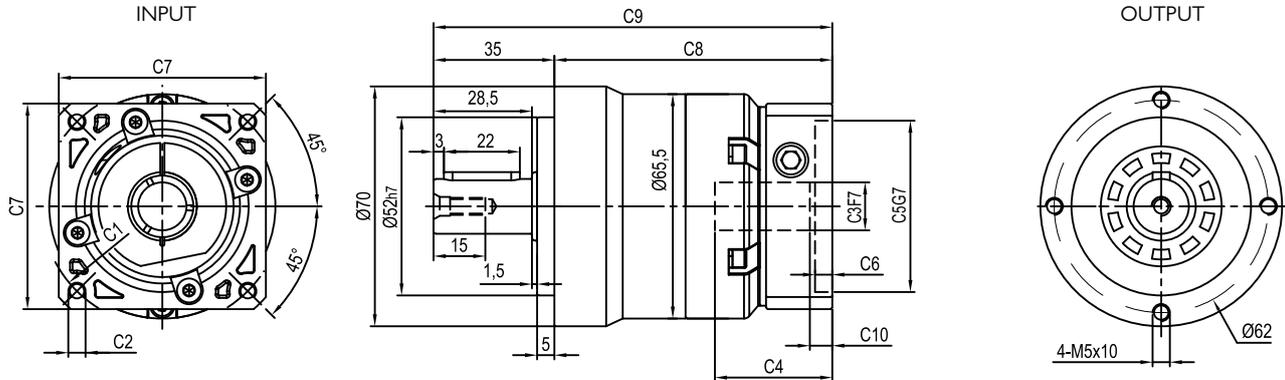
| Size | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 | C10 |
|-------------|--------------------|------------------|----------------------------------|----|--------------------|-----|----|-------|-------|-----|
| FB-060-L1 | $\varnothing 66,7$ | 4-M4x10 | $\varnothing 8$ | 34 | $\varnothing 38,1$ | 5 | 60 | 78,5 | 115,5 | 5,5 |
| FB-060-L2 | | | | | | | | 107,5 | 144,5 | 5,5 |
| FB-060-L1 | $\varnothing 70$ | 4-M4x10, 4-M5x12 | $\varnothing 11, \varnothing 14$ | 34 | $\varnothing 50$ | 5 | 60 | 78,5 | 115,5 | 5,5 |
| FB-060-L2 | | | | | | | | 107,5 | 144,5 | 5,5 |
| FB-060M1-L1 | $\varnothing 90$ | 4-M5x12, 4-M6x14 | $\varnothing 19$ | 42 | $\varnothing 70$ | 6,5 | 80 | 85 | 122 | 12 |
| FB-060M1-L2 | | | | | | | | 114 | 151 | 12 |

- C1~C7 are motor (metric standard) specific dimensions, which could be customized.
- M1: Limit hole (Version number)

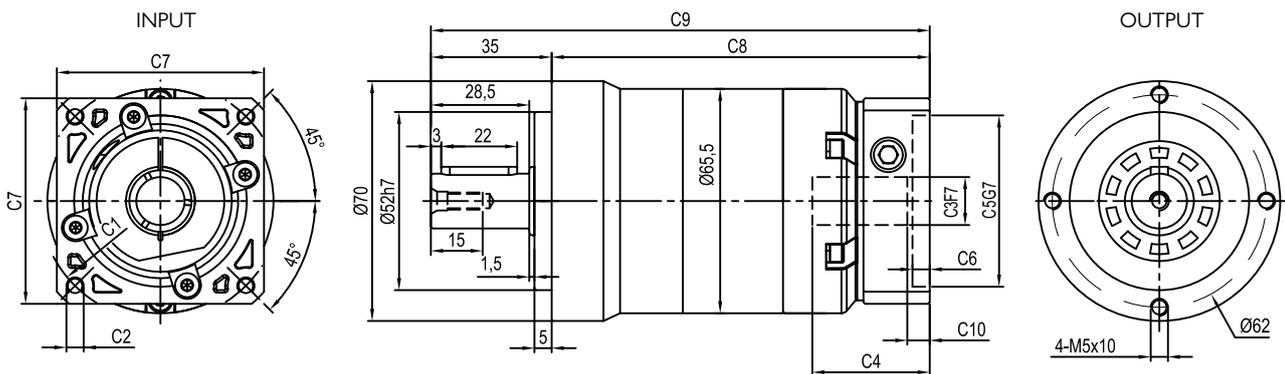
PRECISION PLANETARY GEARBOX FB/FE SERIES

PRODUCT DIMENSION

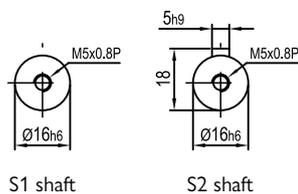
FE-070-L1



FE-070-L2



OUTPUT DIAMETER



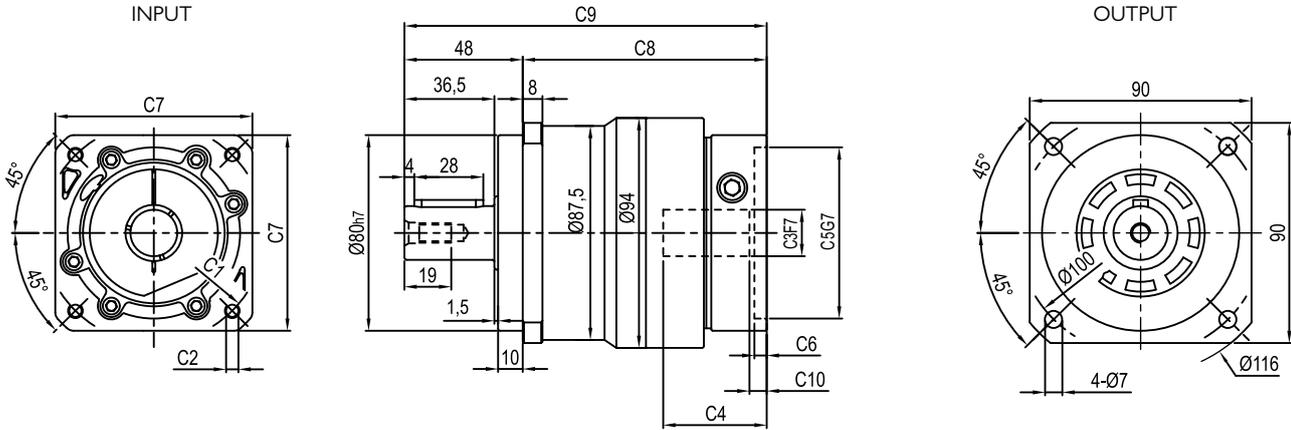
| Size | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 | C10 |
|-------------|-------|------------------|----------|----|-------|-----|----|-------|-------|-----|
| FE-070-L1 | ø66,7 | 4-M4x10 | ø8 | 34 | ø38,1 | 5 | 60 | 80,5 | 115,5 | 5,5 |
| FE-070-L2 | | | | | | | | 109,5 | 144,5 | 5,5 |
| FE-070-L1 | ø70 | 4-M4x10, 4-M5x12 | ø11, ø14 | 34 | ø50 | 5 | 60 | 80,5 | 115,5 | 5,5 |
| FE-070-L2 | | | | | | | | 109,5 | 144,5 | 5,5 |
| FE-070M1-L1 | ø90 | 4-M5x12, 4-M6x14 | ø19 | 42 | ø70 | 6,5 | 80 | 87 | 122 | 12 |
| FE-070M1-L2 | | | | | | | | 116 | 151 | 12 |

- C1~C7 are motor (metric standard) specific dimensions, which could be customized.
- M1: Limit hole (Version number)

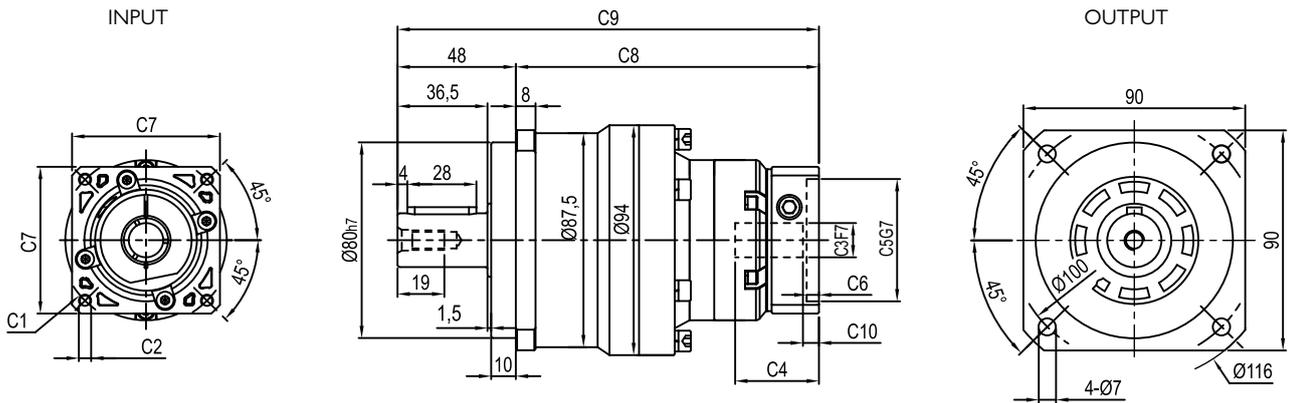
PRECISION PLANETARY GEARBOX FB/FE SERIES

PRODUCT DIMENSION

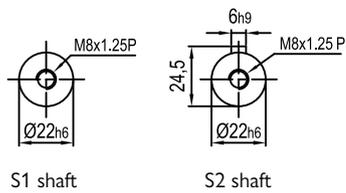
FB-090-L1



FB-090-L2



OUTPUT DIAMETER



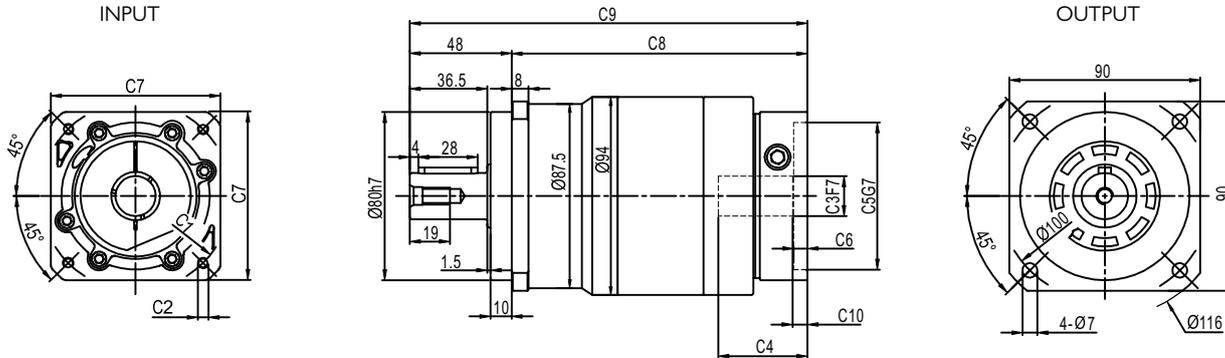
| Size | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 | C10 |
|-------------|-------|------------------|---------------|------|-------|-----|-----|-------|-------|------|
| FB-090-L1 | ø90 | 4-M5x12, 4-M6x14 | ø19 | 42 | ø70 | 6,5 | 80 | 99 | 147 | 7 |
| | ø100 | 4-M6x14 | ø16 | 42 | ø80 | 6,5 | 86 | 99 | 147 | 6 |
| FB-090M1-L1 | ø115 | 4-M8x20 | ø19, ø22 | 56,5 | ø95 | 8 | 100 | 114,5 | 162,5 | 16,5 |
| | ø145 | 4-M8x20 | ø19, ø22, ø24 | 59 | ø110 | 11 | 130 | 117 | 165 | 19 |
| FB-090-L2 | ø66,7 | 4-M4x10 | ø8 | 34 | ø38,1 | 5 | 60 | 123 | 171 | 5,5 |
| | ø70 | 4-M4x10, 4-M5x12 | ø11, ø14 | 34 | ø50 | 5 | 60 | 123 | 171 | 5,5 |
| FB-090M1-L2 | ø90 | 4-M5x12, 4-M6x14 | ø19 | 42 | ø70 | 6,5 | 80 | 129,5 | 177,5 | 12 |
| | ø100 | 4-M6x14 | ø16 | 42 | ø80 | 6,5 | 86 | 129,5 | 177,5 | 11 |

- C1~C7 are motor (metric standard) specific dimensions, which could be customized.
- M1: Limit hole (Version number)

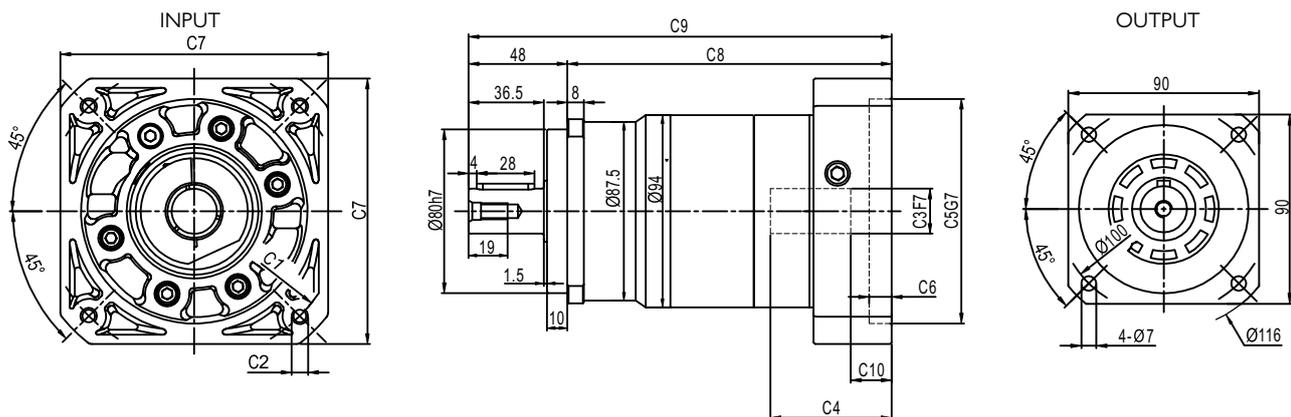
PRECISION PLANETARY GEARBOX FB/FE SERIES

PRODUCT DIMENSION

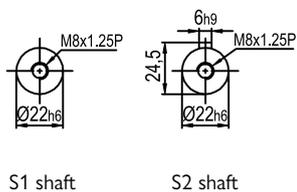
FB-090A-L2



FB-090A-L2



OUTPUT DIAMETER



S1 shaft

S2 shaft

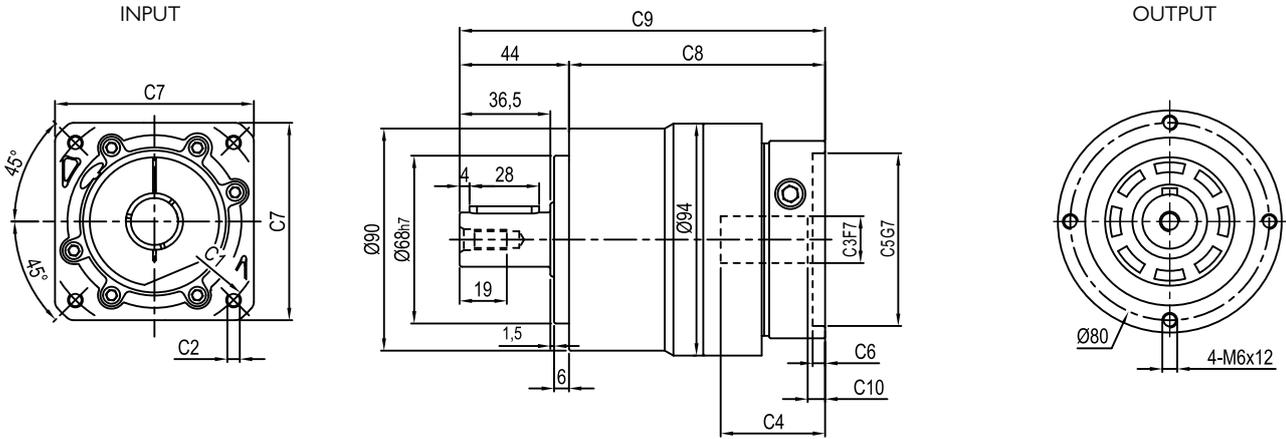
| Size | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 | C10 |
|--------------|------|------------------|---------------|------|------|-----|-----|-------|-------|------|
| FB-090A-L2 | ø90 | 4-M5X12, 4-M6X14 | ø19 | 42 | ø70 | 6,5 | 80 | 139,5 | 187,5 | 7 |
| | ø100 | 4-M6X14 | ø16 | 42 | ø80 | 6,5 | 86 | 139,5 | 187,5 | 6 |
| FB-090AM1-L2 | ø115 | 4-M8X20 | ø19, ø22 | 56,5 | ø95 | 8 | 100 | 155 | 203 | 16,5 |
| | ø145 | 4-M8X20 | ø19, ø22, ø24 | 59 | ø110 | 10 | 130 | 157,5 | 205,5 | 19 |

- C1~C7 are motor (metric standard) specific dimensions, which could be customized.
- M1: Limit hole (Version number)

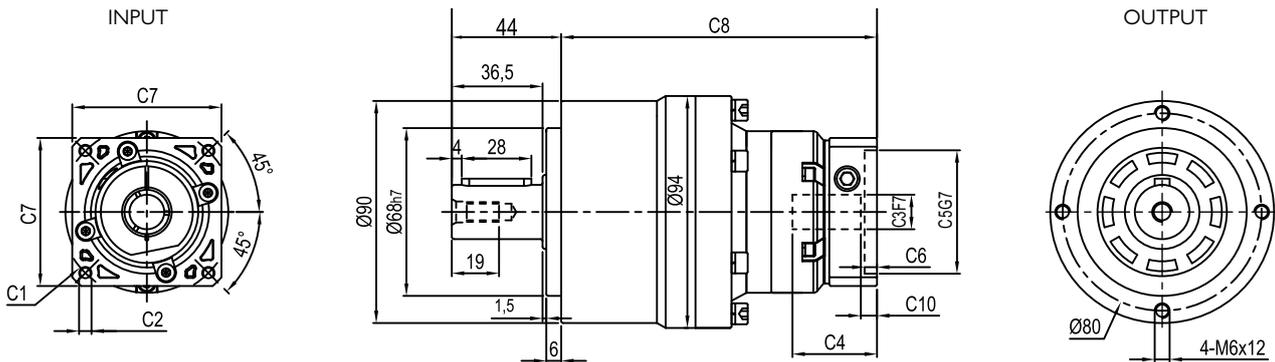
PRECISION PLANETARY GEARBOX FB/FE SERIES

PRODUCT DIMENSION

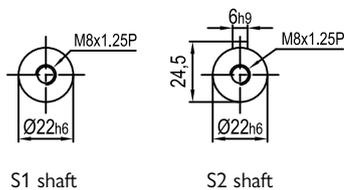
FE-090-L1



FE-090-L2



OUTPUT DIAMETER



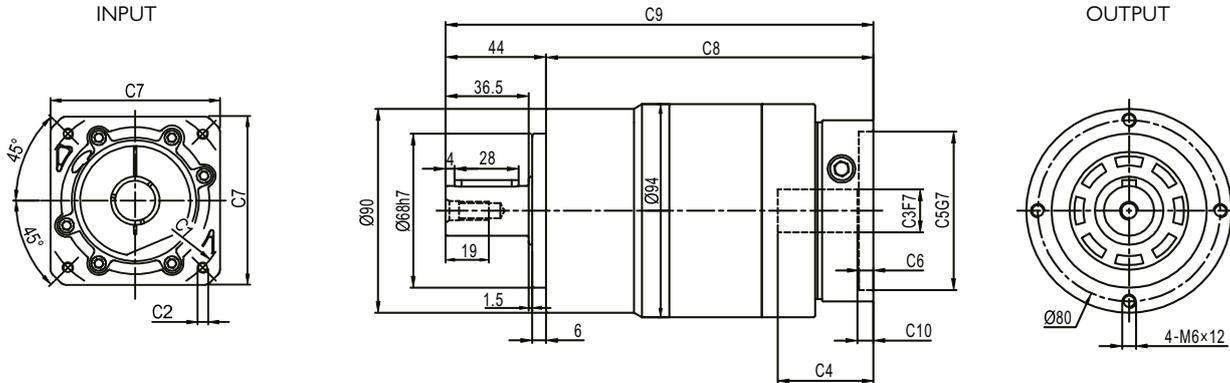
| Size | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 | C10 |
|-------------|-------|------------------|---------------|------|-------|-----|-----|-------|-------|------|
| FE-090-L1 | ø90 | 4-M5x12, 4-M6x14 | ø19 | 42 | ø70 | 6,5 | 80 | 103 | 147 | 7 |
| | ø100 | 4-M6x14 | ø16 | 42 | ø80 | 6,5 | 86 | 103 | 147 | 6 |
| FE-090M1-L1 | ø115 | 4-M8x20 | ø19, ø22 | 56,5 | ø95 | 8 | 100 | 118,5 | 162,5 | 16,5 |
| | ø145 | 4-M8x20 | ø19, ø22, ø24 | 59 | ø110 | 11 | 130 | 121 | 165 | 19 |
| FE-090-L2 | ø66,7 | 4-M4x10 | ø8 | 34 | ø38,1 | 5 | 60 | 127 | 171 | 5,5 |
| | ø70 | 4-M4x10, 4-M5x12 | ø11, ø14 | 34 | ø50 | 5 | 60 | 127 | 171 | 5,5 |
| FE-090M1-L2 | ø90 | 4-M5x12, 4-M6x14 | ø19 | 42 | ø70 | 6,5 | 80 | 133,5 | 177,5 | 12 |
| | ø100 | 4-M6x14 | ø16 | 42 | ø80 | 6,5 | 86 | 133,5 | 177,5 | 11 |

- C1~C7 are motor (metric standard) specific dimensions, which could be customized.
- M1: Limit hole (Version number)

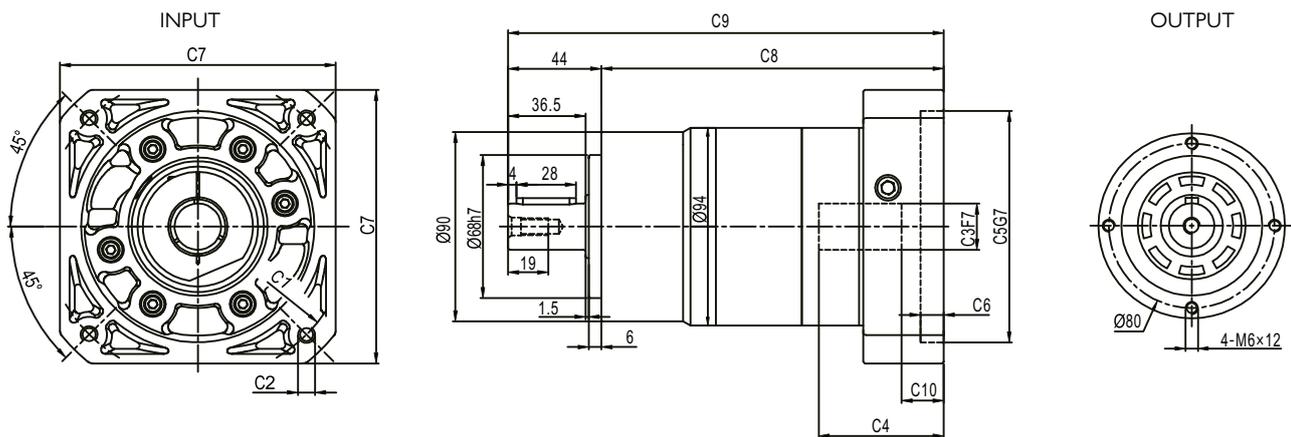
PRECISION PLANETARY GEARBOX FB/FE SERIES

PRODUCT DIMENSION

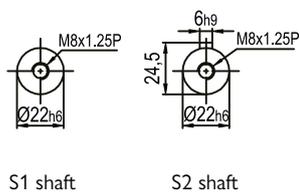
FE-090A-L2



FE-090A-L2



OUTPUT DIAMETER



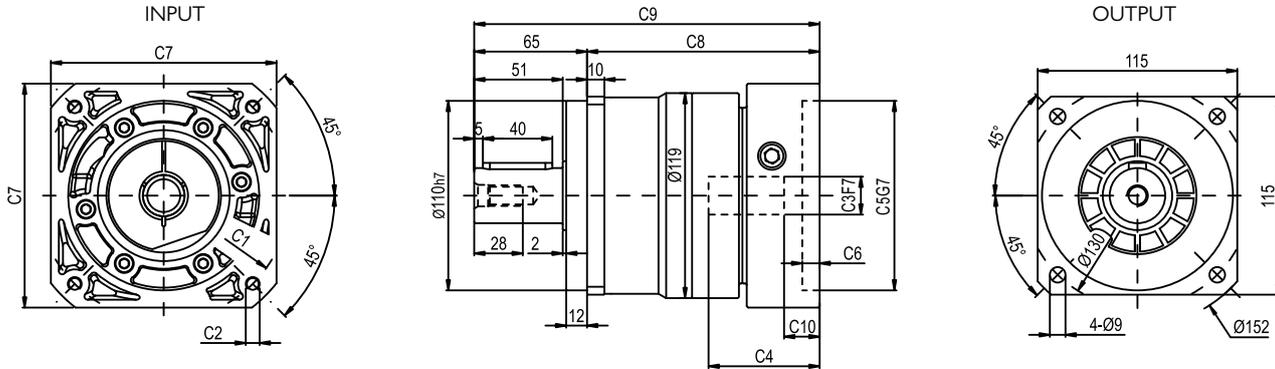
| Size | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 | C10 |
|--------------|-------------------|------------------|--|------|-------------------|-----|-----|-------|-------|------|
| FE-090A-L2 | $\varnothing 90$ | 4-M5x12, 4-M6x14 | $\varnothing 19$ | 42 | $\varnothing 70$ | 6,5 | 80 | 143,5 | 187,5 | 7 |
| | $\varnothing 100$ | 4-M6x14 | $\varnothing 16$ | 42 | $\varnothing 80$ | 6,5 | 86 | 143,5 | 187,5 | 6 |
| FE-090AM1-L2 | $\varnothing 115$ | 4-M8x20 | $\varnothing 19, \varnothing 22$ | 56,5 | $\varnothing 95$ | 8 | 100 | 159 | 203 | 16,5 |
| | $\varnothing 145$ | 4-M8x20 | $\varnothing 19, \varnothing 22, \varnothing 24$ | 59 | $\varnothing 110$ | 10 | 130 | 161,5 | 205,5 | 19 |

- C1~C7 are motor (metric standard) specific dimensions, which could be customized.
- M1: Limit hole (Version number)

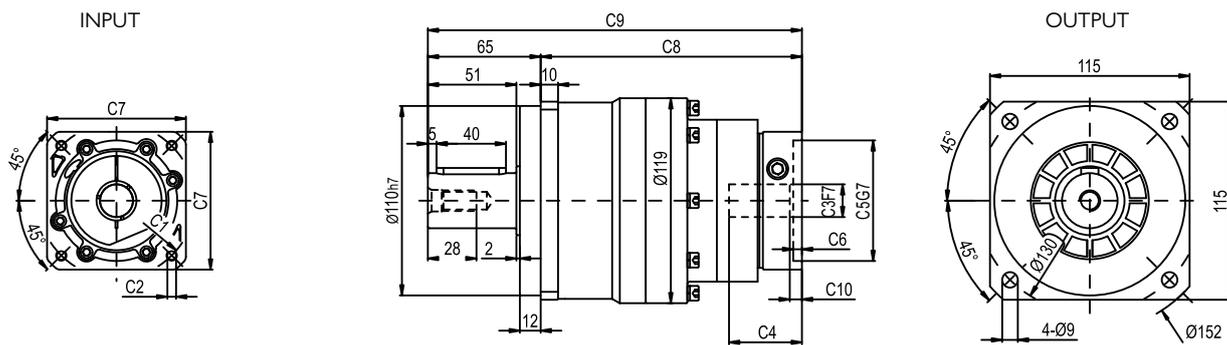
PRECISION PLANETARY GEARBOX FB/FE SERIES

PRODUCT DIMENSION

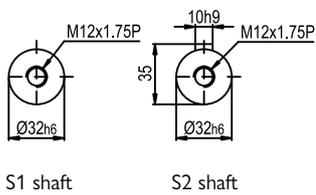
FB-115-L1



FB-115-L2



OUTPUT DIAMETER



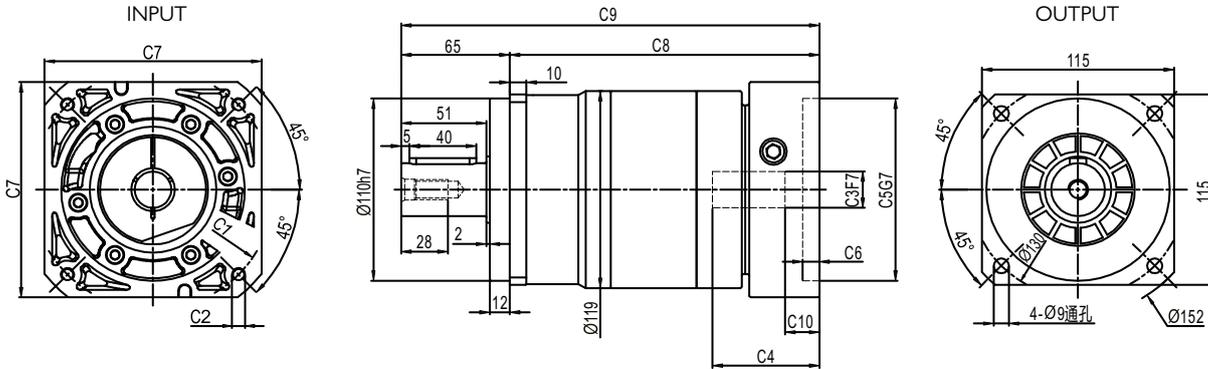
| Size | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 | C10 |
|-------------|------|------------------|---------------|------|--------|-----|-----|-------|-------|------|
| FB-115-L1 | ø145 | 4-M8x20 | ø19, ø22, ø24 | 64 | ø110 | 10 | 130 | 134 | 199 | 19,5 |
| FB-115M1-L1 | ø200 | 4-M12x28 | ø35 | 81 | ø114,3 | 10 | 180 | 151,5 | 216,5 | 28 |
| FB-115-L2 | ø90 | 4-M5x12, 4-M6x14 | ø19 | 42 | ø70 | 6,5 | 80 | 150,5 | 215,5 | 7 |
| | ø100 | 4-M6x14 | ø16 | 42 | ø80 | 6,5 | 86 | 150,5 | 215,5 | 6 |
| FB-115M1-L2 | ø115 | 4-M8x20 | ø19, ø22 | 56,5 | ø95 | 8 | 100 | 166 | 231 | 16,5 |
| | ø145 | 4-M8x20 | ø19, ø22, ø24 | 59 | ø110 | 11 | 130 | 168,5 | 233,5 | 19 |

- C1~C7 are motor (metric standard) specific dimensions, which could be customized.
- M1: Limit hole (Version number)

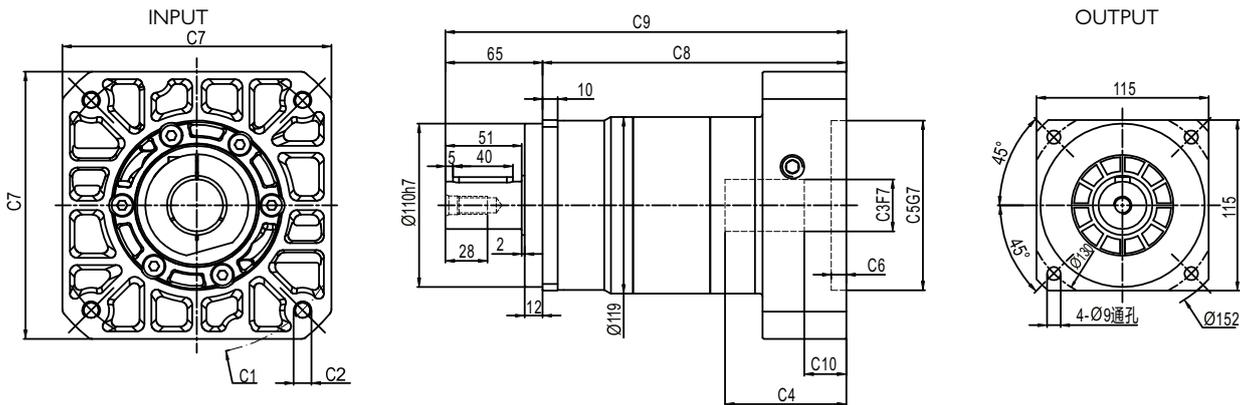
PRECISION PLANETARY GEARBOX FB/FE SERIES

PRODUCT DIMENSION

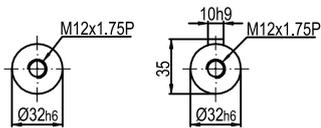
FB-115A-L2



FB-115A-L2



OUTPUT DIAMETER



S1 shaft

S2 shaft

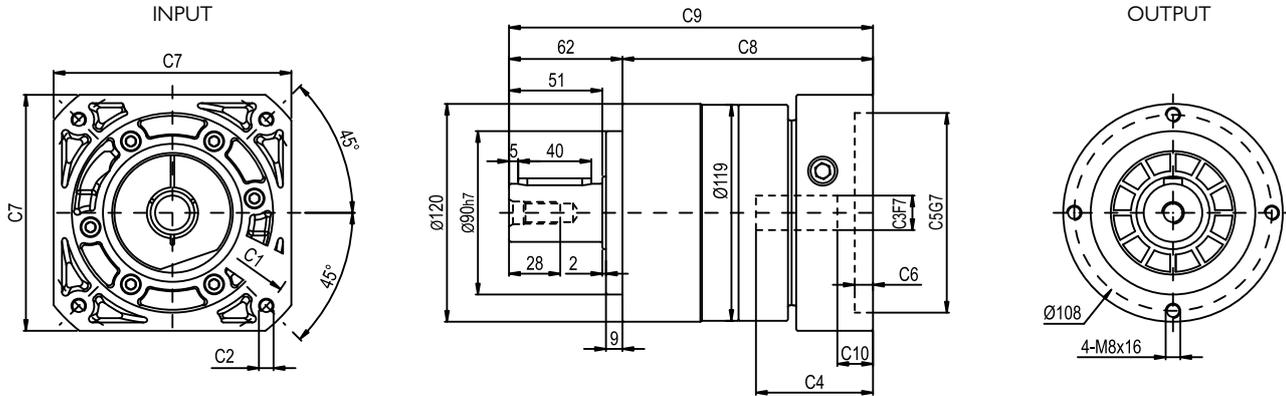
| Size | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 | C10 |
|--------------|-------------------|----------|--|----|---------------------|----|-----|-------|-------|------|
| FB-115A-L2 | $\varnothing 145$ | 4-M8x20 | $\varnothing 19, \varnothing 22, \varnothing 24$ | 64 | $\varnothing 110$ | 10 | 130 | 185,5 | 205,5 | 19,5 |
| FB-115AM1-L2 | $\varnothing 200$ | 4-M12x28 | $\varnothing 35$ | 81 | $\varnothing 114,3$ | 10 | 180 | 203 | 268 | 28 |

- C1~C7 are motor (metric standard) specific dimensions, which could be customized.
- M1: Limit hole (Version number)

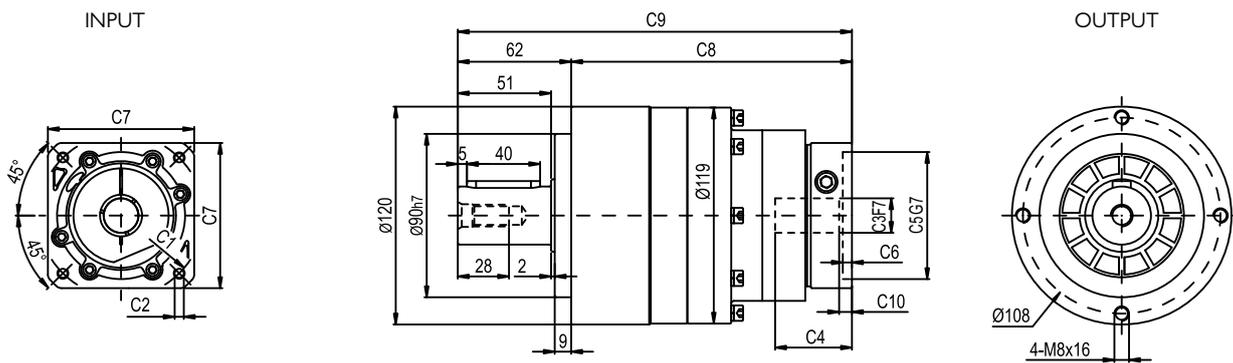
PRECISION PLANETARY GEARBOX FB/FE SERIES

PRODUCT DIMENSION

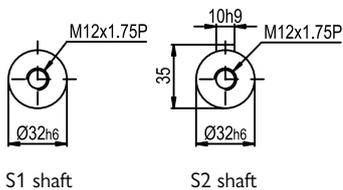
FE-120-L1



FE-120-L2



OUTPUT DIAMETER



| Size | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 | C10 |
|-------------|------|------------------|---------------|------|--------|-----|-----|-------|-------|------|
| FE-120-L1 | Ø145 | 4-M8x20 | Ø19, Ø22, Ø24 | 64 | Ø110 | 10 | 130 | 137 | 199 | 19,5 |
| FE-120M1-L1 | Ø200 | 4-M12x28 | Ø35 | 81 | Ø114,3 | 10 | 180 | 154,5 | 216,5 | 28 |
| FE-120-L2 | Ø90 | 4-M5x12, 4-M6x14 | Ø19 | 42 | Ø70 | 6,5 | 80 | 153,5 | 215,5 | 7 |
| | Ø100 | 4-M6x14 | Ø16 | 42 | Ø80 | 6,5 | 86 | 153,5 | 215,5 | 6 |
| FE-120M1-L2 | Ø115 | 4-M8x20 | Ø19, Ø22 | 56,5 | Ø95 | 8 | 100 | 169 | 231 | 16,5 |
| | Ø145 | 4-M8x20 | Ø19, Ø22, Ø24 | 59 | Ø110 | 11 | 130 | 171,5 | 233,5 | 19 |

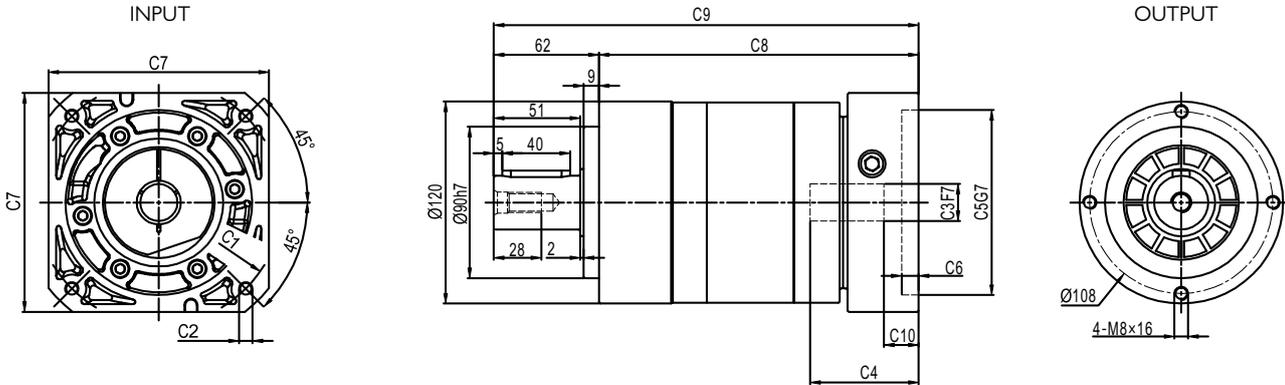
- C1~C7 are motor (metric standard) specific dimensions, which could be customized.
- M1: Limit hole (Version number)



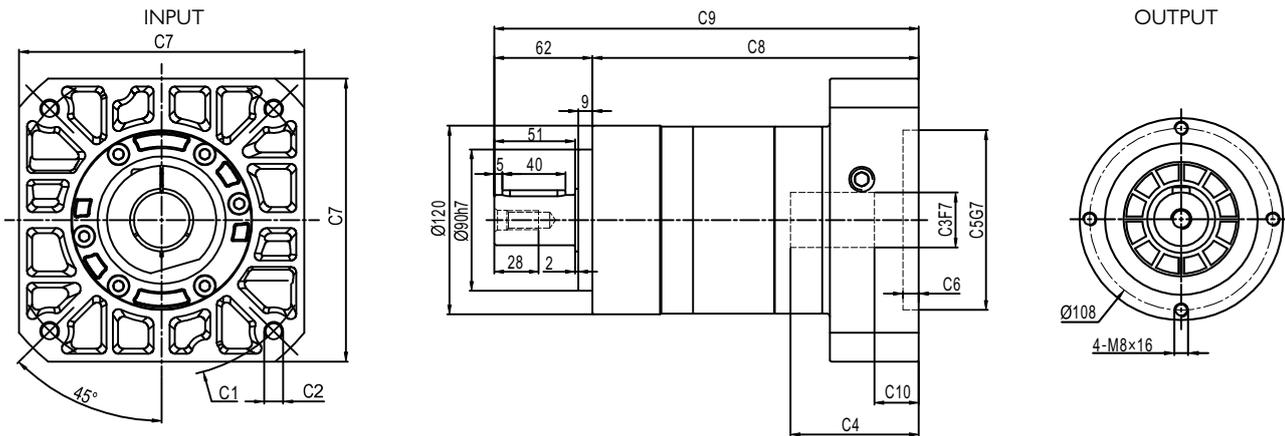
PRECISION PLANETARY GEARBOX FB/FE SERIES

PRODUCT DIMENSION

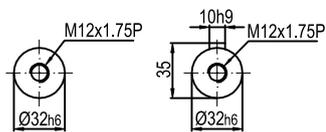
FE-120A-L2



FE-120A-L2



OUTPUT DIAMETER



S1 shaft

S2 shaft

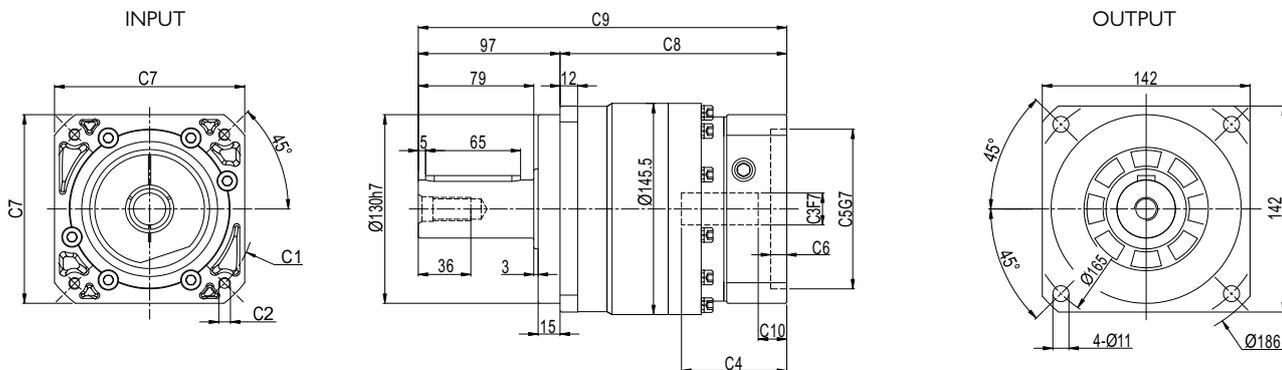
| Size | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 | C10 |
|--------------|------|----------|---------------|----|--------|----|-----|-------|-------|------|
| FE-120A-L2 | ø145 | 4-M8x20 | ø19, ø22, ø24 | 64 | ø100 | 10 | 130 | 188,5 | 205,5 | 19,5 |
| FE-120AM1-L2 | ø200 | 4-M12x28 | ø35 | 81 | ø114,3 | 10 | 180 | 206 | 268 | 28 |

- C1~C7 are motor (metric standard) specific dimensions, which could be customized.
- M1: Limit hole (Version number)

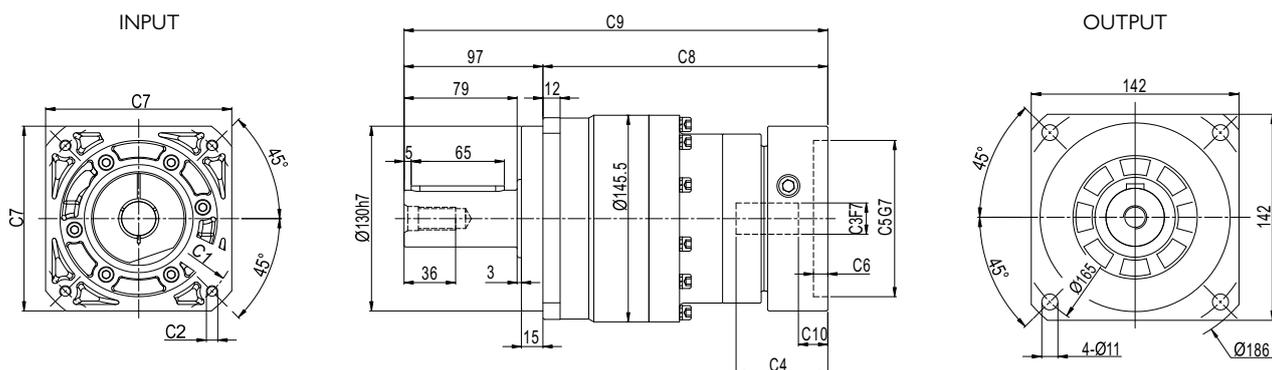
PRECISION PLANETARY GEARBOX FB/FE SERIES

PRODUCT DIMENSION

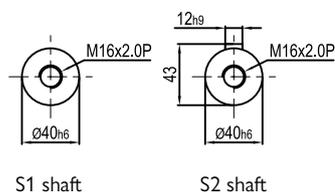
FB-142-L1



FB-142-L2



OUTPUT DIAMETER



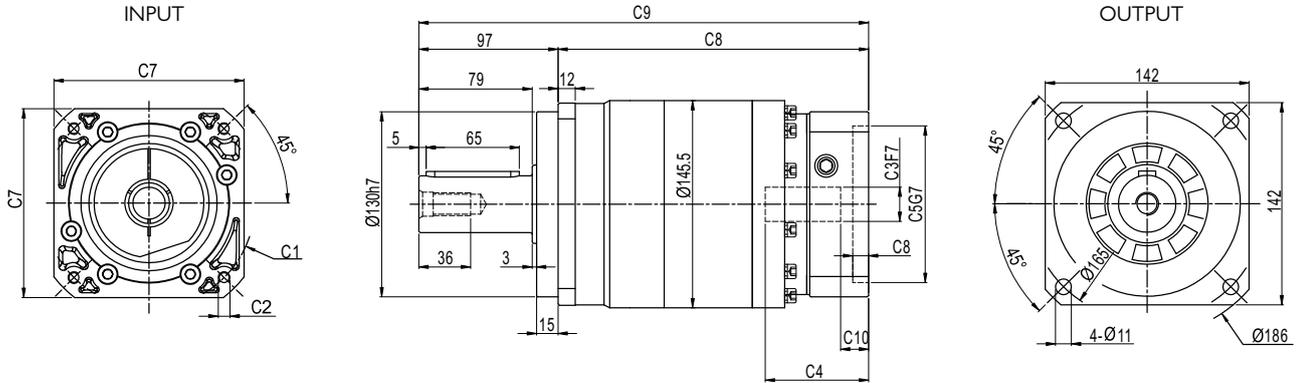
| Size | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 | C10 |
|-------------|-------------------|----------|--|------|---------------------|----|-----|-------|-------|------|
| FB-142-L1 | $\varnothing 145$ | 4-M8x20 | $\varnothing 22, \varnothing 24$ | 72 | $\varnothing 110$ | 11 | 130 | 155 | 252 | 19,5 |
| | $\varnothing 200$ | 4-M12x28 | $\varnothing 35$ | 81,5 | $\varnothing 114,3$ | 8 | 180 | 165 | 262 | 25 |
| FB-142-L2 | $\varnothing 145$ | 4-M8x20 | $\varnothing 19, \varnothing 22, \varnothing 24$ | 64 | $\varnothing 110$ | 10 | 130 | 199 | 296 | 19,5 |
| FB-142M1-L2 | $\varnothing 200$ | 4-M12x28 | $\varnothing 35$ | 81 | $\varnothing 114,3$ | 10 | 180 | 216,5 | 313,5 | 28 |

- C1~C7 are motor (metric standard) specific dimensions, which could be customized.
- M1: Limit hole (Version number)

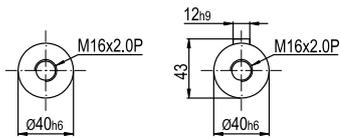
PRECISION PLANETARY GEARBOX FB/FE SERIES

PRODUCT DIMENSION

FB-142A-L2



OUTPUT DIAMETER



S1 shaft

S2 shaft

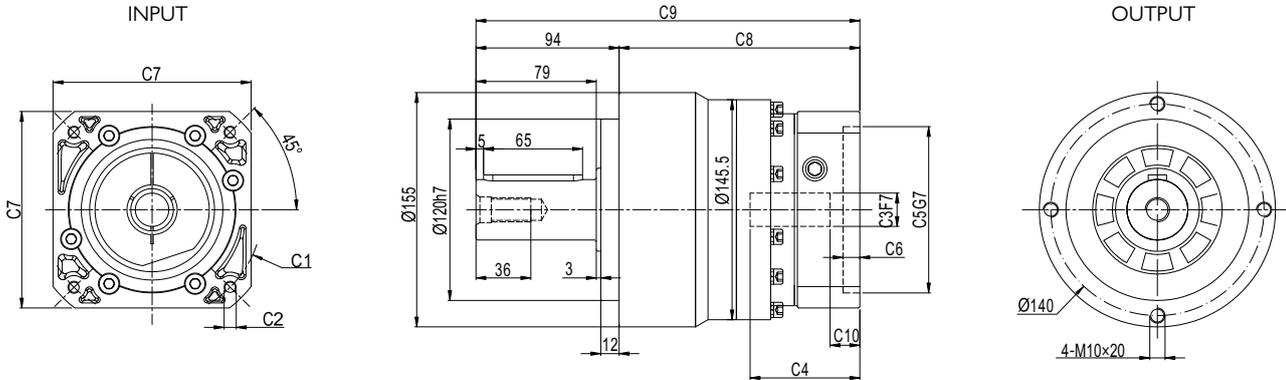
| Size | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 | C10 |
|------------|------------|----------|--------------------|------|--------------|----|-----|-------|-------|------|
| FB-142A-L2 | $\phi 145$ | 4-M8x20 | $\phi 22, \phi 24$ | 72 | $\phi 110$ | 11 | 130 | 216,5 | 313,5 | 19,5 |
| | $\phi 200$ | 4-M12x28 | $\phi 35$ | 81,5 | $\phi 114,3$ | 8 | 180 | 226,5 | 323,5 | 25 |

▪ C1~C7 are motor (metric standard) specific dimensions, which could be customized.

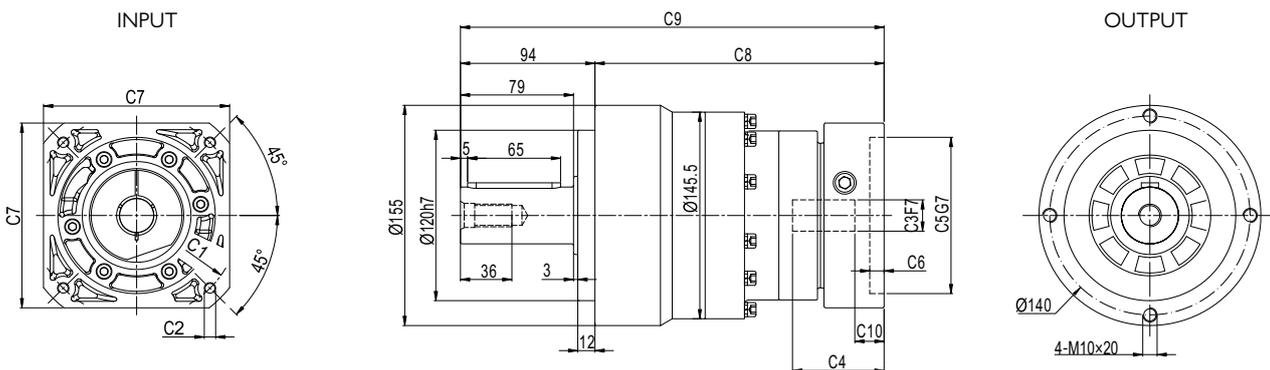
PRECISION PLANETARY GEARBOX FB/FE SERIES

PRODUCT DIMENSION

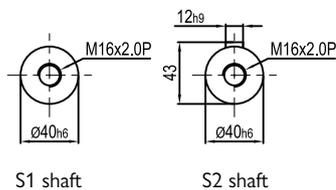
FE-155-L1



FE-155-L2



OUTPUT DIAMETER



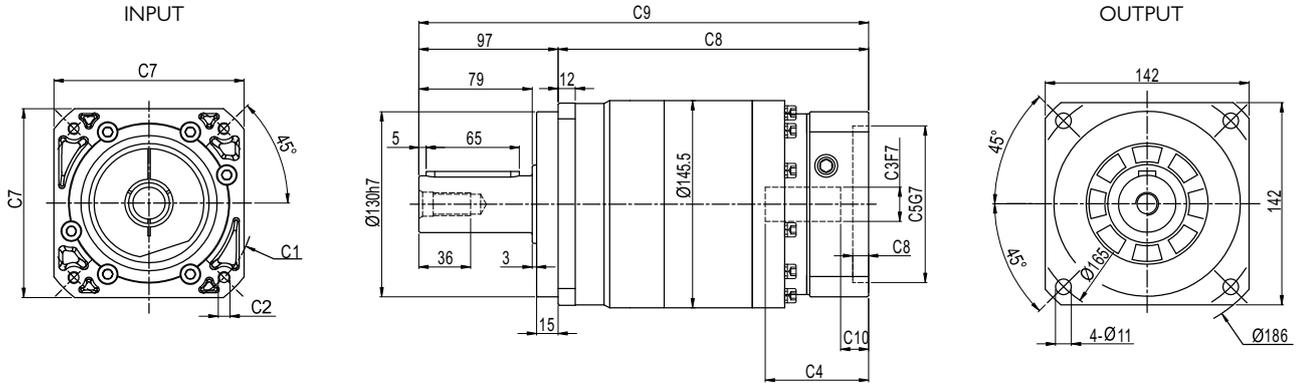
| Size | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 | C10 |
|-------------|------|----------|---------------|------|--------|----|-----|-------|-------|------|
| FE-155-L1 | Ø145 | 4-M8x20 | Ø22, Ø24 | 72 | Ø110 | 11 | 130 | 158 | 252 | 19,5 |
| | Ø200 | 4-M12x28 | Ø35 | 81,5 | Ø114,3 | 8 | 180 | 168 | 262 | 25 |
| FE-155-L2 | Ø145 | 4-M8x20 | Ø19, Ø22, Ø24 | 64 | Ø110 | 10 | 130 | 202 | 296 | 19,5 |
| FE-155M1-L2 | Ø200 | 4-M12x28 | Ø35 | 81 | Ø114,3 | 10 | 180 | 219,5 | 313,5 | 28 |

- C1~C7 are motor (metric standard) specific dimensions, which could be customized.
- M1: Limit hole (Version number)

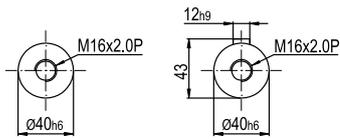
PRECISION PLANETARY GEARBOX FB/FE SERIES

PRODUCT DIMENSION

FE-155A-L2



OUTPUT DIAMETER



S1 shaft

S2 shaft

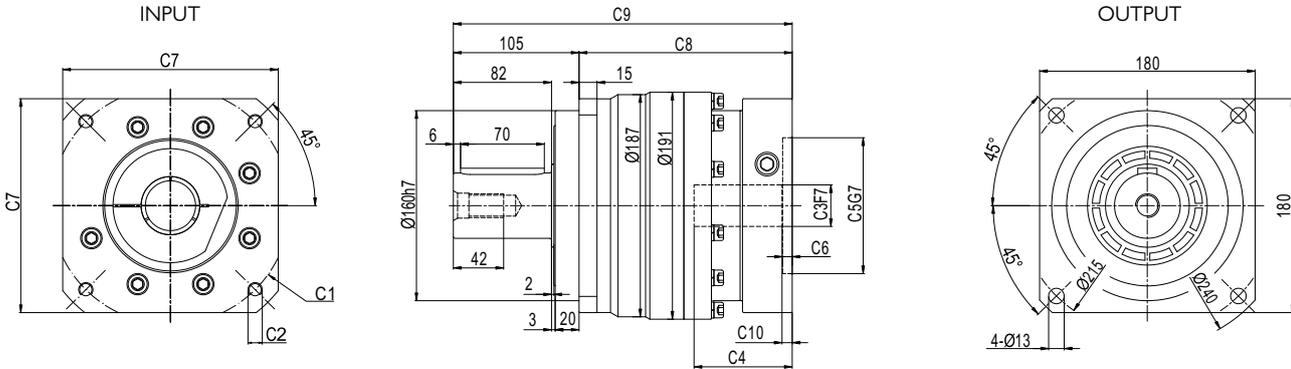
| Size | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 | C10 |
|------------|-------------------|----------|----------------------------------|------|---------------------|----|-----|-------|-------|------|
| FE-155A-L2 | $\varnothing 145$ | 4-M8x20 | $\varnothing 22, \varnothing 24$ | 72 | $\varnothing 110$ | 11 | 130 | 219,5 | 313,5 | 19,5 |
| | $\varnothing 200$ | 4-M12x28 | $\varnothing 35$ | 81,5 | $\varnothing 114,3$ | 8 | 180 | 229,5 | 323,5 | 25 |

▪ C1~C7 are motor (metric standard) specific dimensions, which could be customized.

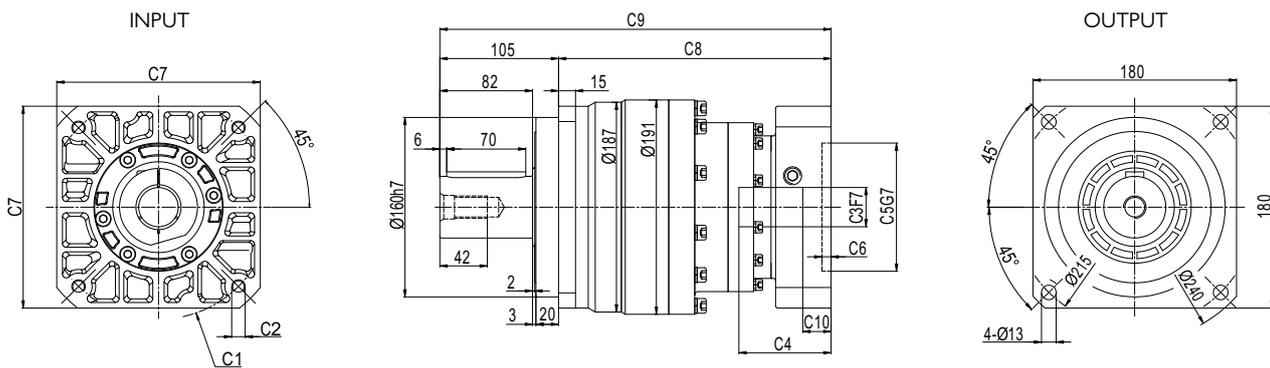
PRECISION PLANETARY GEARBOX FB/FE SERIES

PRODUCT DIMENSION

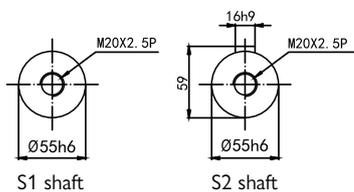
FB-180-L1



FB-180-L2



OUTPUT DIAMETER



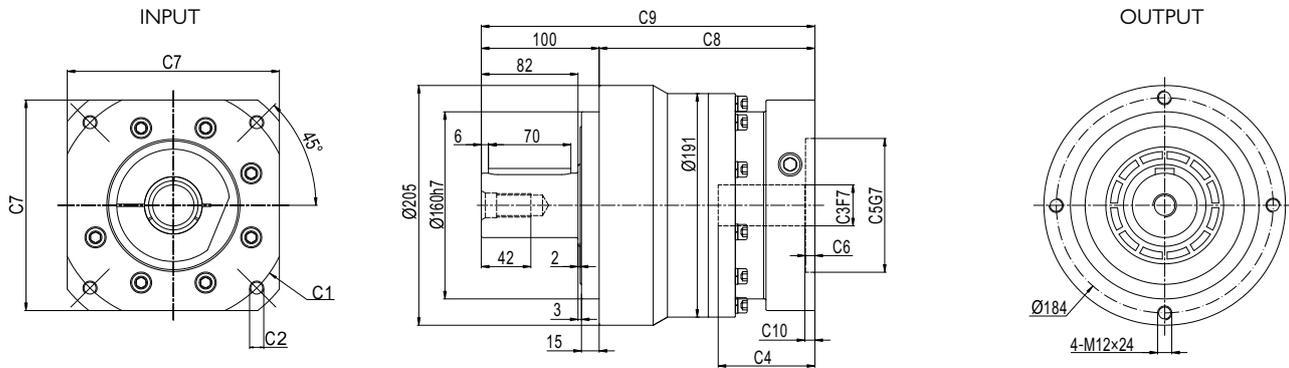
| Size | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 | C10 |
|-----------|-------------------|----------|----------------------------------|-------|---------------------|----|-----|-------|-------|------|
| FB-180-L1 | $\varnothing 200$ | 4-M12x28 | $\varnothing 35$ | 82 | $\varnothing 114,3$ | 8 | 180 | 178 | 283 | 8,5 |
| | $\varnothing 200$ | 4-M12x28 | $\varnothing 42$ | 177,5 | $\varnothing 114,3$ | 8 | 180 | 213,5 | 318,5 | 45,5 |
| | $\varnothing 215$ | 4-M12x28 | $\varnothing 38$ | 87 | $\varnothing 180$ | 8 | 192 | 183 | 288 | 13,5 |
| | $\varnothing 235$ | 4-M12x28 | $\varnothing 42$ | 117,5 | $\varnothing 200$ | 10 | 220 | 213,5 | 318,5 | 45,5 |
| FB-180-L2 | $\varnothing 145$ | 4-M8x20 | $\varnothing 22, \varnothing 24$ | 72 | $\varnothing 110$ | 11 | 130 | 231 | 336 | 19,5 |
| | $\varnothing 200$ | 4-M12x28 | $\varnothing 35$ | 81,5 | $\varnothing 114,3$ | 8 | 180 | 241 | 346 | 25 |

▪ C1~C7 are motor (metric standard) specific dimensions, which could be customized.

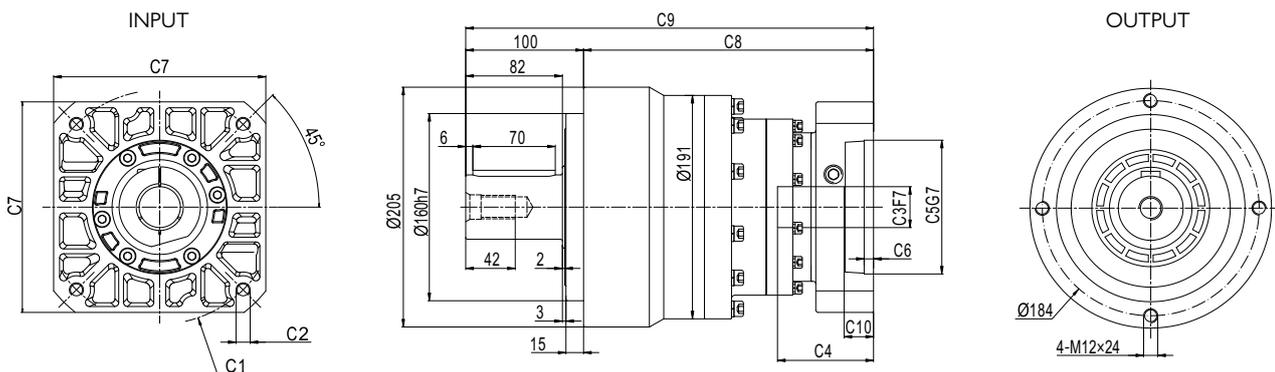
PRECISION PLANETARY GEARBOX FB/FE SERIES

PRODUCT DIMENSION

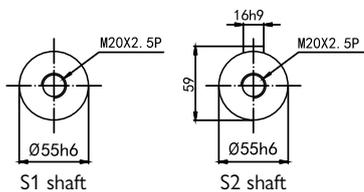
FE-205-L1



FE-205-L2



OUTPUT DIAMETER



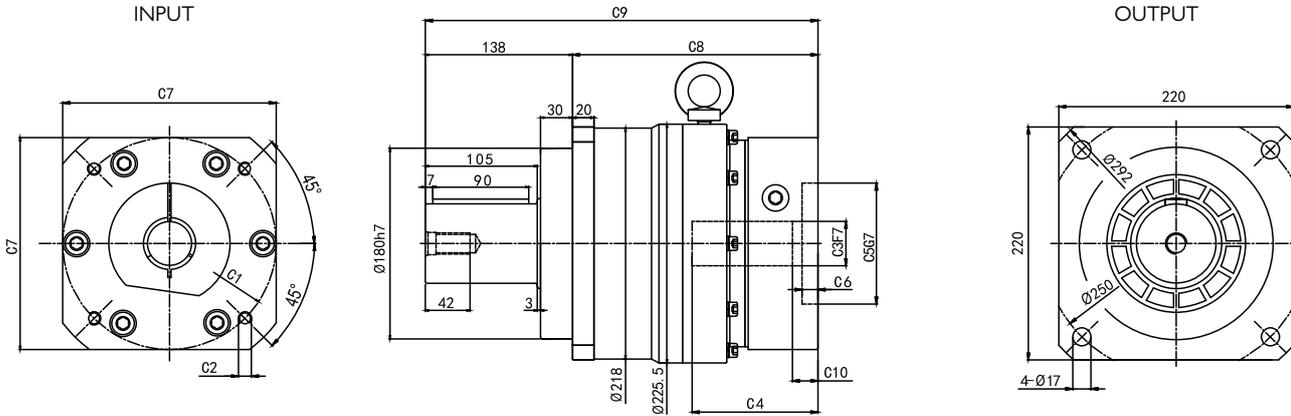
| Size | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 | C10 |
|-----------|------|----------|----------|-------|--------|----|-----|-------|-------|------|
| FE-205-L1 | ø200 | 4-M12x28 | ø35 | 82 | ø114,3 | 8 | 180 | 183 | 283 | 8,5 |
| | ø200 | 4-M12x28 | ø42 | 117,5 | ø114,3 | 8 | 180 | 218,5 | 318,5 | 45,5 |
| | ø215 | 4-M12x28 | ø38 | 87 | ø180 | 8 | 192 | 188 | 288 | 13,5 |
| | ø235 | 4-M12x28 | ø42 | 117,5 | ø200 | 10 | 220 | 218,5 | 318,5 | 45,5 |
| FE-205-L2 | ø145 | 4-M8x20 | ø22, ø24 | 72 | ø110 | 11 | 130 | 236 | 336 | 19,5 |
| | ø200 | 4-M12x28 | ø35 | 81,5 | ø114,3 | 8 | 180 | 246 | 346 | 25 |

▪ C1~C7 are motor (metric standard) specific dimensions, which could be customized.

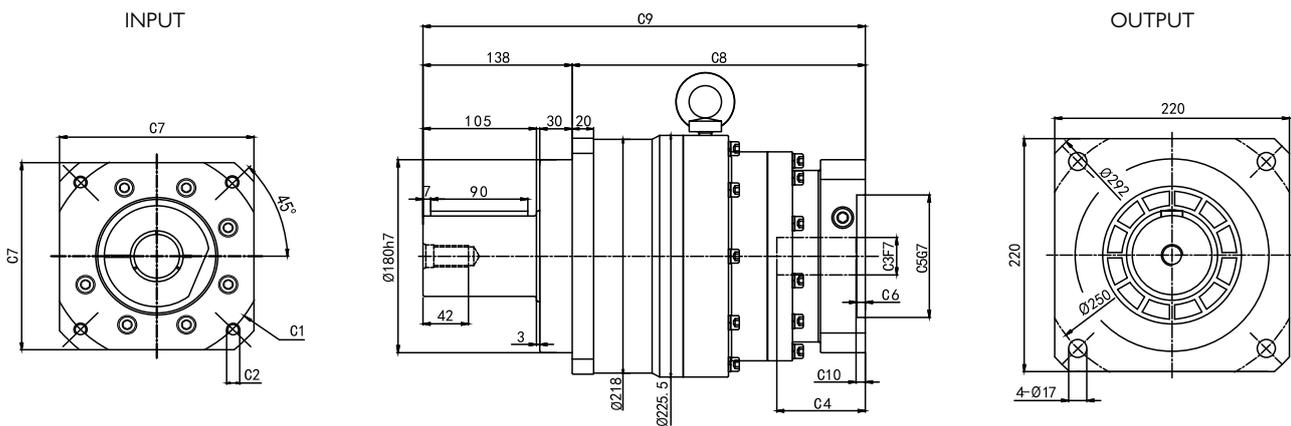
PRECISION PLANETARY GEARBOX FB/FE SERIES

PRODUCT DIMENSION

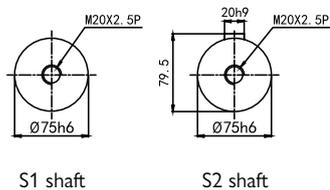
FB-220-L1



FB-220-L2



OUTPUT DIAMETER



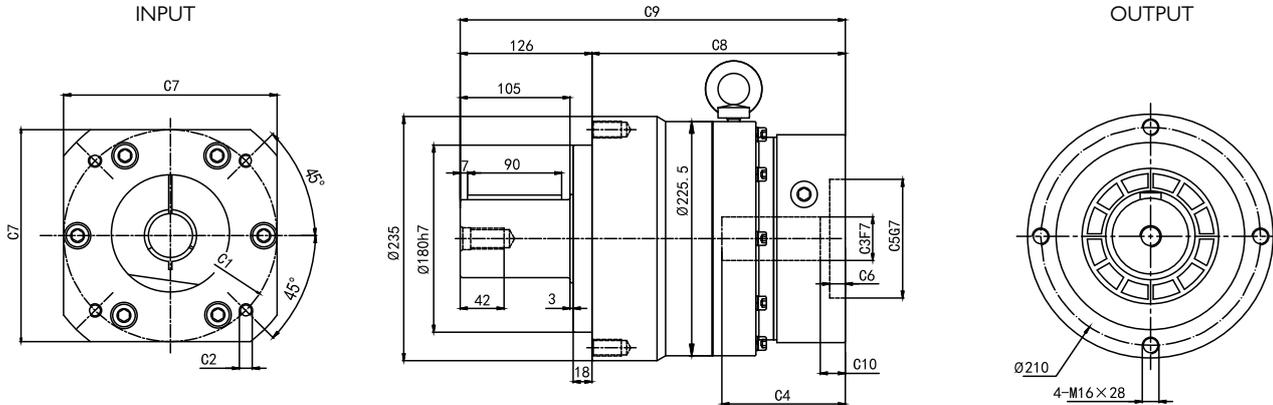
| Size | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 | C10 |
|-----------|------|----------|----------|-------|--------|----|-----|-------|-------|------|
| FB-220-L1 | Ø200 | 4-M12x28 | Ø35, Ø42 | 118 | Ø114,3 | 15 | 200 | 230 | 368 | 24 |
| | Ø215 | 4-M12x30 | Ø38 | 108 | Ø180 | 8 | 200 | 220 | 358 | 11,5 |
| | Ø235 | 4-M12x30 | Ø42, Ø55 | 118 | Ø200 | 10 | 220 | 230 | 368 | 24 |
| FB-220-L2 | Ø200 | 4-M12x28 | Ø35 | 82 | Ø114,3 | 8 | 180 | 271,5 | 409,5 | 8,5 |
| | Ø200 | 4-M12x28 | Ø42 | 117,5 | Ø114,3 | 8 | 180 | 307 | 445 | 45,5 |
| | Ø215 | 4-M12x28 | Ø38 | 87 | Ø180 | 8 | 192 | 276,5 | 414,5 | 13,5 |
| | Ø235 | 4-M12x28 | Ø42 | 117,5 | Ø200 | 10 | 220 | 307 | 445 | 45,5 |

▪ C1~C7 are motor (metric standard) specific dimensions, which could be customized.

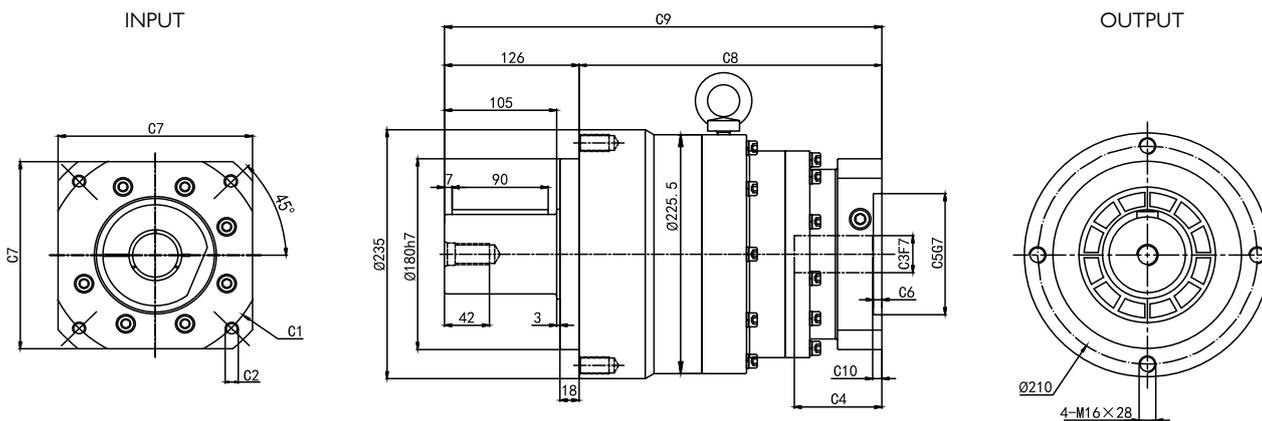
PRECISION PLANETARY GEARBOX FB/FE SERIES

PRODUCT DIMENSION

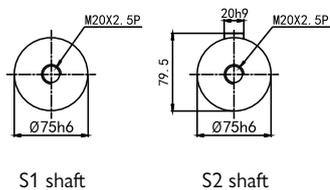
FE-235-L1



FE-235-L2



OUTPUT DIAMETER



| Size | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 | C10 |
|-----------|------|----------|----------|-------|--------|----|-----|-------|-------|------|
| FE-235-L1 | 0200 | 4-M12x28 | 035, 042 | 118 | 0114,3 | 15 | 200 | 242 | 368 | 24 |
| | 0215 | 4-M12x30 | 038 | 108 | 0180 | 8 | 200 | 230 | 358 | 11,5 |
| | 0235 | 4-M12x30 | 042, 055 | 118 | 0200 | 10 | 220 | 242 | 368 | 24 |
| FE-235-L2 | 0200 | 4-M12x28 | 035 | 82 | 0114,3 | 8 | 180 | 283,5 | 409,5 | 8,5 |
| | 0200 | 4-M12x28 | 042 | 117,5 | 0114,3 | 8 | 180 | 319 | 445 | 45,5 |
| | 0215 | 4-M12x28 | 038 | 87 | 0180 | 8 | 192 | 288,5 | 414,5 | 13,5 |
| | 0235 | 4-M12x28 | 042 | 117,5 | 0200 | 10 | 220 | 319 | 445 | 45,5 |

▪ C1~C7 are motor (metric standard) specific dimensions, which could be customized.

CHIARAVALLI LINEAR CENTER

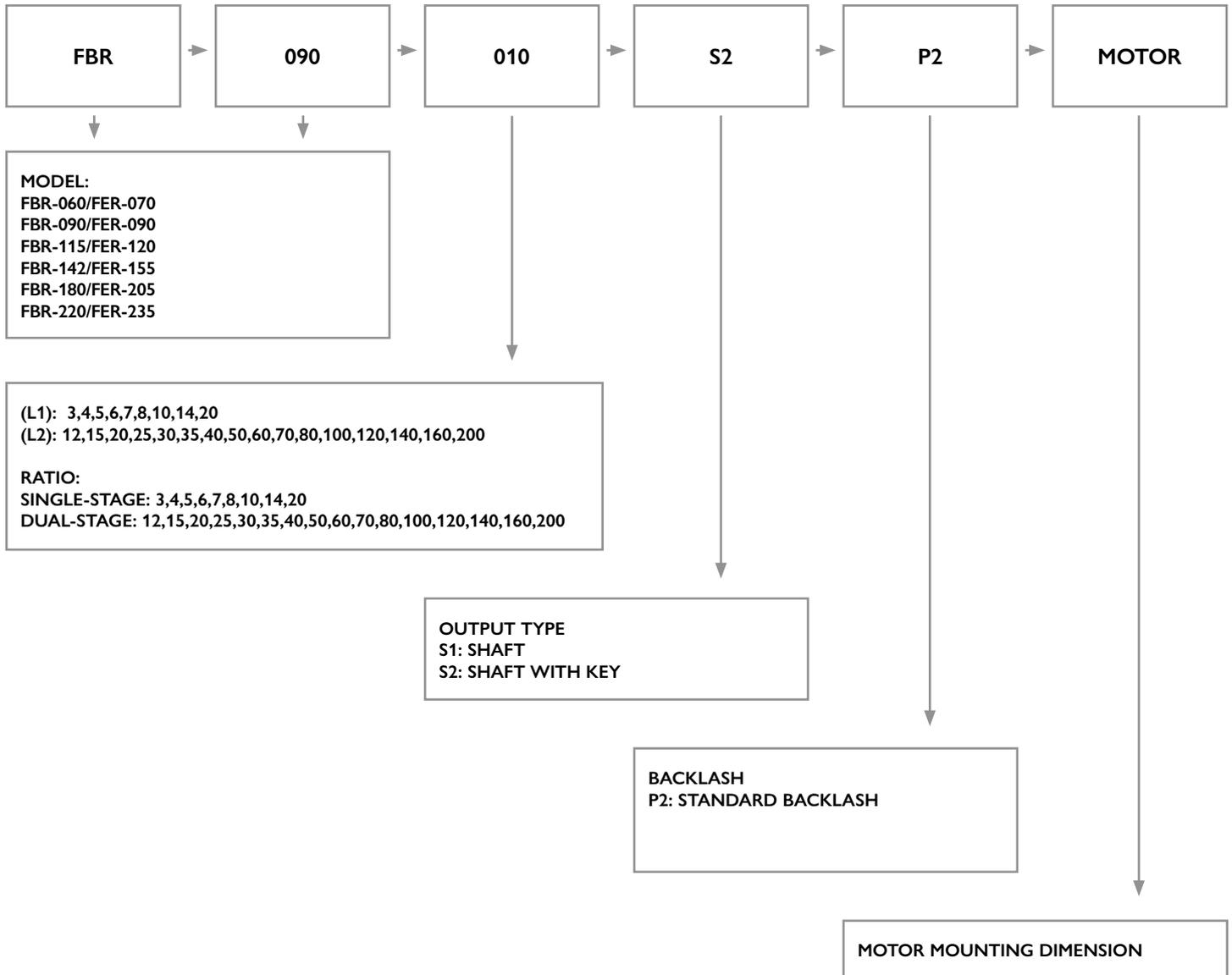
**PRECISION PLANETARY GEARBOX
FBR/FER SERIES**



PRECISION PLANETARY GEARBOX FBR/FER SERIES

MODEL DESCRIPTION

FBR-090-010-S2-P2-19-70-90-M6-45





PRECISION PLANETARY GEARBOX FBR/FER SERIES

TECHNICAL SPECIFICATION

| MODEL | | STAGE | RATIO | FBR060 FER070 | FBR090 FER090 | FBR090A FER090A | FBR115 FER120 | FBR115A FER120A | FBR142 FER155 | FBR142A FER155A | FBR180 FER205 | FBR220 FER235 |
|--|-----------|-------|--------|---------------------------------|------------------|--------------------|------------------|--------------------|------------------|--------------------|------------------|------------------|
| Rated output torque | Nm | 1 | 3 | 55 | 130 | - | 208 | - | 342 | - | 588 | 1,140 |
| | | | 4 | 50 | 140 | - | 290 | - | 542 | - | 1,050 | 1,700 |
| | | | 5 | 60 | 160 | - | 330 | - | 650 | - | 1,200 | 2,000 |
| | | | 6 | 55 | 150 | - | 310 | - | 600 | - | 1,100 | 1,900 |
| | | | 7 | 50 | 140 | - | 300 | - | 550 | - | 1,100 | 1,800 |
| | | | 8 | 50 | 140 | - | 290 | - | 542 | - | 1,050 | 1,700 |
| | | | 10 | 60 | 160 | - | 330 | - | 650 | - | 1,200 | 2,000 |
| | | | 14 | 50 | 140 | - | 300 | - | 550 | - | 1,100 | 1,800 |
| | | 20 | 40 | 100 | - | 230 | - | 450 | - | 900 | 1,500 | |
| | | 2 | 12 | 55 | 130 | 130 | 208 | 208 | 342 | 342 | 588 | 1,140 |
| | | | 15 | 55 | 130 | 130 | 208 | 208 | 342 | 342 | 588 | 1,140 |
| | | | 20 | 50 | 140 | 140 | 290 | 290 | 542 | 542 | 1,050 | 1,700 |
| | | | 25 | 60 | 160 | 160 | 330 | 330 | 650 | 650 | 1,200 | 2,000 |
| | | | 30 | 55 | 130 | 130 | 208 | 208 | 342 | 342 | 588 | 1,140 |
| | | | 35 | 60 | 160 | 160 | 330 | 330 | 650 | 650 | 1,200 | 2,000 |
| | | | 40 | 50 | 140 | 140 | 290 | 290 | 542 | 542 | 1,050 | 1,700 |
| | | | 50 | 60 | 160 | 160 | 330 | 330 | 650 | 650 | 1,200 | 2,000 |
| | | | 60 | 55 | 150 | 150 | 310 | 310 | 600 | 600 | 1,100 | 1,900 |
| | | | 70 | 60 | 160 | 160 | 330 | 330 | 650 | 650 | 1,200 | 2,000 |
| | | | 80 | 50 | 140 | 140 | 290 | 290 | 542 | 542 | 1,050 | 1,700 |
| 100 | 60 | | 160 | 160 | 330 | 330 | 650 | 650 | 1,200 | 2,000 | | |
| 120 | - | 150 | 150 | 310 | 310 | 600 | 600 | 1,100 | 1,900 | | | |
| 140 | - | 140 | 140 | 300 | 300 | 550 | 550 | 1,100 | 1,800 | | | |
| 160 | - | 120 | 120 | 260 | 260 | 500 | 500 | 1,000 | 1,600 | | | |
| 200 | - | 100 | 100 | 230 | 230 | 450 | 450 | 900 | 1,500 | | | |
| T _{2B} /Max. output torque | Nm | 1,2 | 3~200 | 3 times the rated output torque | | | | | | | | |
| n ₁ /Rated input speed | rpm | 1,2 | 3~200 | 5,000 | 4,000 | 4,000 | 4,000 | 4,000 | 3,000 | 3,000 | 3,000 | 2,000 |
| n _{1B} /Max. input speed | rpm | 1,2 | 3~200 | 10,000 | 8,000 | 8,000 | 8,000 | 8,000 | 6,000 | 6,000 | 6,000 | 4,000 |
| P2/Precision backlash | arcmin | 1 | 3~20 | ≤10 | ≤10 | ≤10 | ≤10 | ≤10 | ≤10 | ≤10 | ≤10 | ≤10 |
| | | 2 | 12~200 | ≤12 | ≤12 | ≤12 | ≤12 | ≤12 | ≤12 | ≤12 | ≤12 | ≤12 |
| Torsional rigidity | Nm/arcmin | 1,2 | 3~200 | 7 | 14 | 14 | 25 | 25 | 50 | 50 | 145 | 225 |
| F _{2rB} ² /Allowable radial force | N | 1,2 | 3~200 | 1,530 | 3,250 | 3,250 | 6,700 | 6,700 | 9,400 | 9,400 | 14,500 | 50,000 |
| F _{2a1B} ² /Allowable radial force | N | 1,2 | 3~200 | 630 | 1,300 | 1,300 | 3,000 | 3,000 | 4,000 | 4,000 | 6,200 | 35,000 |
| F _{2a2B} ² /Allowable radial force | N | 1,2 | 3~200 | 765 | 1,625 | 1,625 | 3,350 | 3,350 | 4,700 | 4,700 | 7,250 | 25,000 |
| Life time | hr | 1,2 | 3~200 | 20,000 ¹ | | | | | | | | |
| η/Efficiency | % | 1 | 3~20 | ≤95% | | | | | | | | |
| | | 2 | 12~200 | ≤92% | | | | | | | | |
| Weight | kg | 1 | 3~20 | 2.1 | 6.4 | - | 13 | - | 24.5 | - | 51 | 83 |
| | | 2 | 12~200 | 2.5 | 7.8 | 8.46 | 14.2 | 18.2 | 27.5 | 34.3 | 54 | 95 |
| Operating temperature | °C | 1,2 | 3~200 | -10°C ~ +90°C | | | | | | | | |
| lubrication | | 1,2 | 3~200 | Synthetic lubricating grease | | | | | | | | |
| Ingress protection | | 1,2 | 3~200 | IP65 | | | | | | | | |
| Mount position | | 1,2 | 3~200 | Any direction | | | | | | | | |
| (n ₁ =3000rpm) / Noise level | dB | 1,2 | 3~200 | ≤63 | ≤65 | ≤65 | ≤68 | ≤68 | ≤70 | ≤70 | ≤72 | ≤74 |

GEARBOX MOMENT OF INERTIA

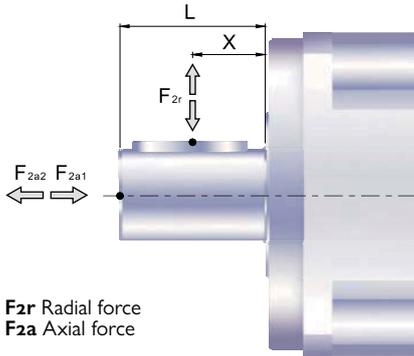
| MODEL | | STAGE | RATIO | FBR060 FER070 | FBR090 FER090 | FBR090A FER090A | FBR115 FER120 | FBR115A FER120A | FBR142 FER155 | FBR142A FER155A | FBR180 FER205 | FBR220 FER235 |
|-------------------|----------------------|-------|---------|------------------|------------------|--------------------|------------------|--------------------|------------------|--------------------|------------------|------------------|
| Moment of inertia | kg • cm ² | 1 | 3~7 | 0.35 | 2.25 | - | 6.84 | - | 23.4 | - | 68.9 | 135.4 |
| | | | 8~10 | 0.07 | 1.87 | - | 6.25 | - | 21.8 | - | 65.6 | 119.8 |
| | | | 14~20 | 0.07 | 1.87 | - | 6.25 | - | 21.8 | - | 65.6 | 119.8 |
| | | 2 | 12v40 | 0.35 | 0.35 | 2.25 | 2.25 | 6.84 | 6.84 | 23.4 | 23.4 | 68.9 |
| | | | 50 | 0.07 | 0.31 | 1.87 | 1.87 | 6.25 | 6.25 | 21.8 | 21.8 | 65.6 |
| | | | 60 | 0.07 | 0.35 | 2.25 | 2.25 | 6.84 | 6.84 | 23.4 | 23.4 | 68.9 |
| | | | 70~100 | 0.07 | 0.31 | 1.87 | 1.87 | 6.25 | 6.25 | 21.8 | 21.8 | 65.6 |
| | | | 120~200 | 0.07 | 0.31 | 1.87 | 1.87 | 6.25 | 6.25 | 21.8 | 21.8 | 65.6 |

1. The lifetime will be shortened by half under continuous operation.

When the output speed is 100rpm, it applies on the center of the output shaft.

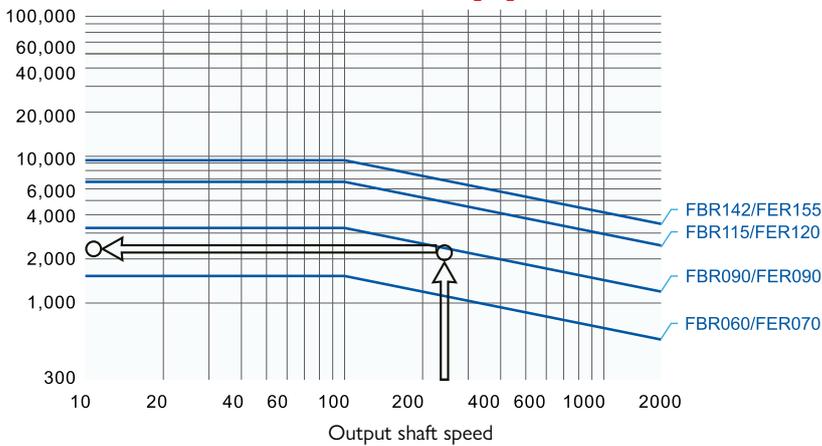
PRECISION PLANETARY GEARBOX FBR/FER SERIES

ALLOWABLE RADIAL AND AXIAL FORCES ON THE OUTPUT SHAFT OF THE GEAR REDUCER



The maximum radial and axial forces that the output shaft of the gearbox can withstand. Looking at the design of internal support bearings, the reducer adopts large-sized bearings and a design with a larger span, which can withstand greater radial and axial loads.

PERMISSIBLE RADIAL FORCE F_{2rB} [N] APPLY FORCE TO THE CENTER OF THE SHAFT

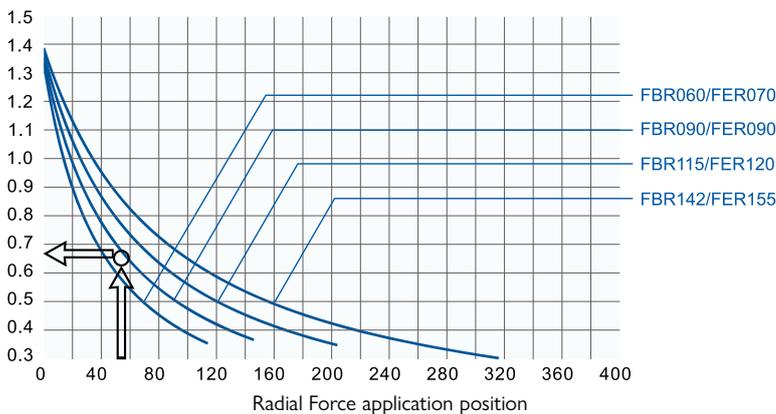


When the radial force F_{2r} is applied to the center of the shaft, i.e. $X=1/2 \times L$, the allowable radial force F_{2rB} that can be withstood by different specifications of reducers with a service life of 20,000hr* under different output speeds is as follows:

$$F_{2a1B} = 0,2 \times F_{2rB}$$

$$F_{2a2B} = 0,1 \times F_{2rB}$$

POSITIONAL LOAD COEFFICIENT



When the radial force F_{2r} is not in the center of the shaft, the closer to the gearbox, that is, $X < 1/2 \times L$, the allowable radial force that can be borne becomes larger, and the farther away from the reducer, i.e., $X > 1/2 \times L$, the allowable force that can be borne becomes smaller.

Radial force
 $F'_{2rB} = K_b \times F_{2rB}$

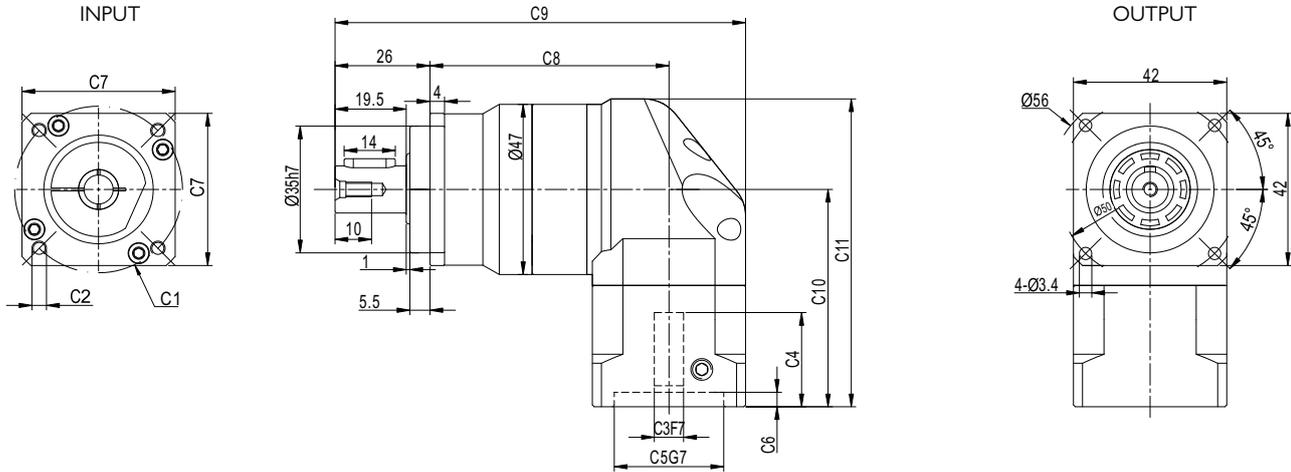
Axial force
 $F'_{2a1B} = 0,2 \times F'_{2rB}$
 $F'_{2a2B} = 0,1 \times F'_{2rB}$

*The lifetime will be shortened by half under continuous operation.

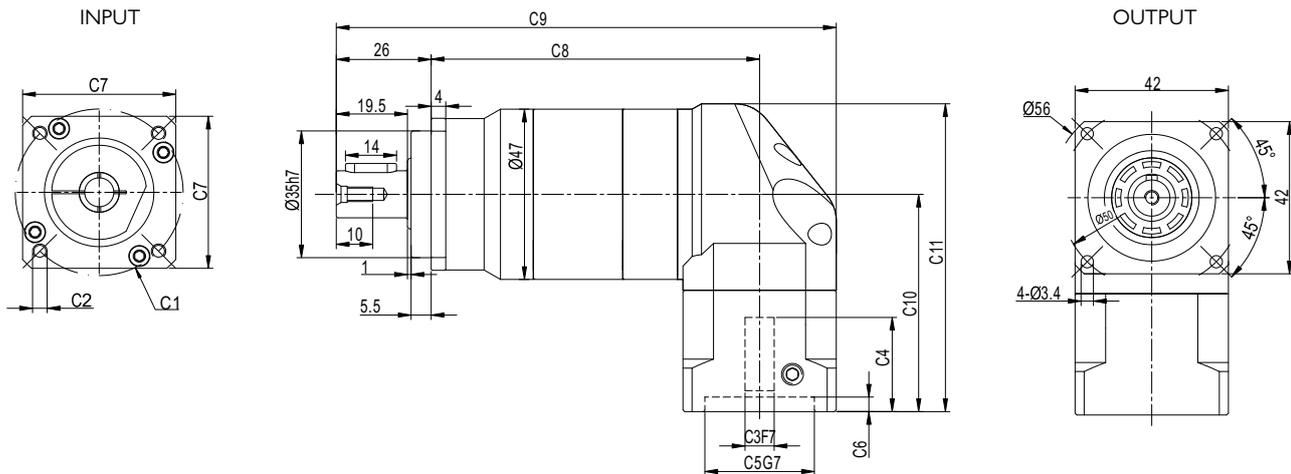
PRECISION PLANETARY GEARBOX FBR/FER SERIES

PRODUCT DIMENSION

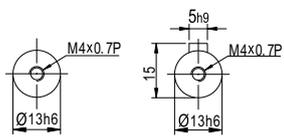
FBR-042-L1



FBR-042-L2



OUTPUT DIAMETER



S1 shaft

S2 shaft

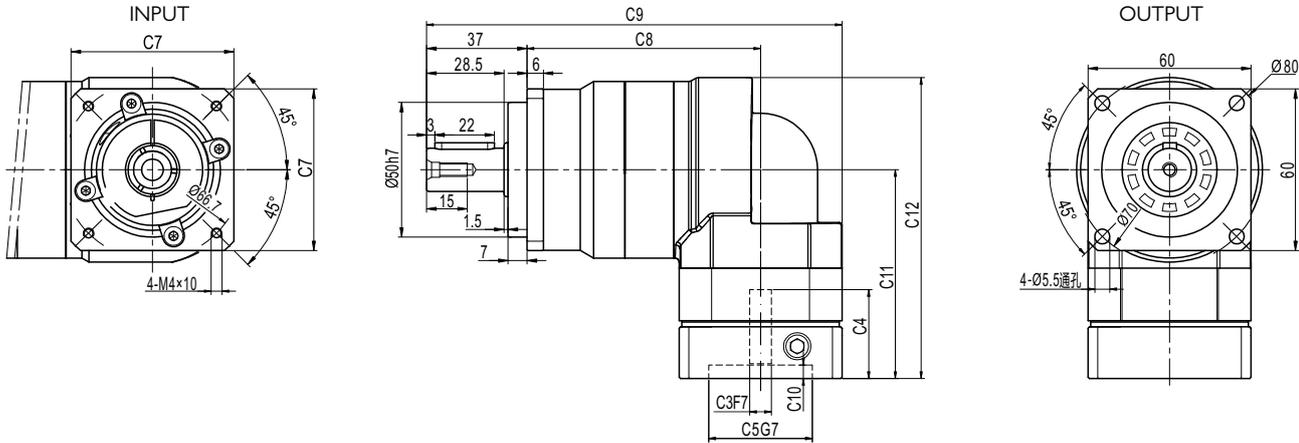
| Size | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 | C10 | C11 |
|------------|------------------|---------|-----------------|----|------------------|----|----|------|-------|-----|-----|
| FBR-042-L1 | $\varnothing 46$ | 4-M4x10 | $\varnothing 8$ | 26 | $\varnothing 30$ | 4 | 42 | 65,5 | 112,5 | 60 | 85 |
| | $\varnothing 45$ | 4-M3x8 | | | | | | | | | |
| FBR-042-L2 | $\varnothing 46$ | 4-M4x10 | $\varnothing 8$ | 26 | $\varnothing 30$ | 4 | 42 | 90 | 60 | 60 | 85 |
| | $\varnothing 45$ | 4-M3x8 | | | | | | | | | |

▪ C1~C7 are motor (metric standard) specific dimensions, which could be customized.

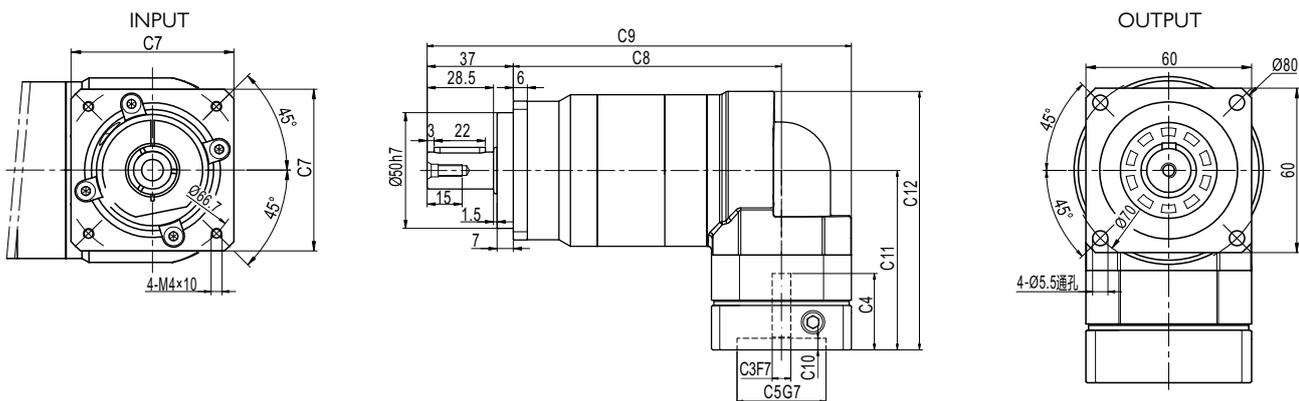
PRECISION PLANETARY GEARBOX FBR/FER SERIES

PRODUCT DIMENSION

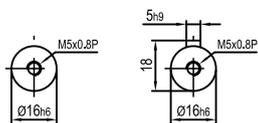
FBR-060-L1



FBR-060-L2



OUTPUT DIAMETER



S1 shaft

S2 shaft

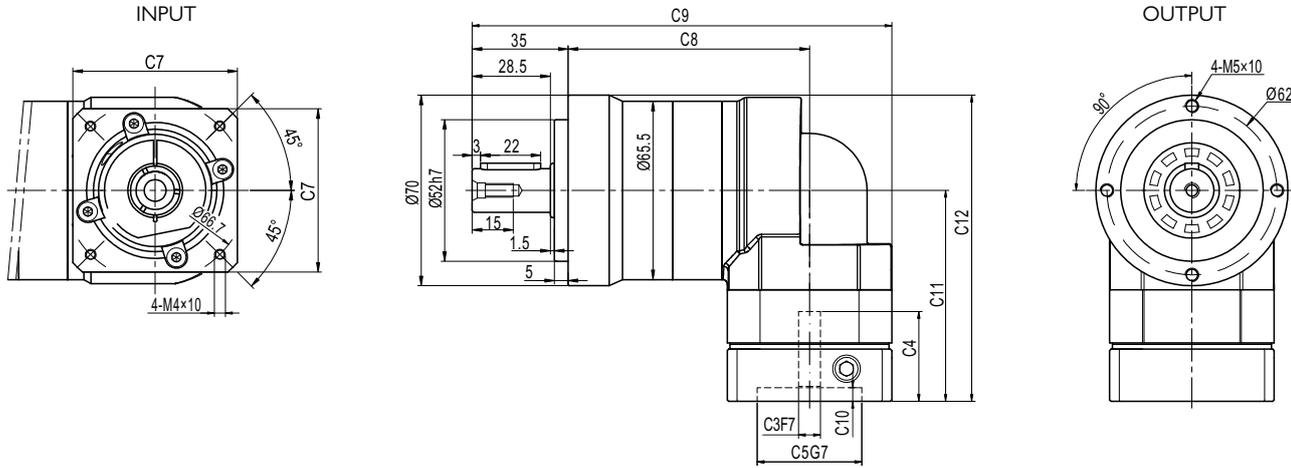
| Size | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 | C10 | C11 | C12 |
|--------------|-------|------------------|----------|------|-------|-----|----|-----|-----|-----|------|--------|
| FBR-060-L1 | ø66,7 | 4-M4x10 | ø8 | 33 | ø38,1 | 5 | 60 | 86 | 153 | 5,5 | 77,5 | 111,75 |
| FBR-060-L2 | | | | | | | | 115 | 182 | | | |
| FBR-060-L1 | ø70 | 4-M4x10, 4-M5x12 | ø11, ø14 | 33 | ø50 | 5 | 60 | 86 | 153 | 5,5 | 77,5 | 111,75 |
| FBR-060-L2 | | | | | | | | 115 | 182 | | | |
| FBR-060M1-L1 | ø90 | 4-M5x12, 4-M6x14 | ø19 | 42,5 | ø70 | 6,5 | 80 | 86 | 163 | 12 | 87 | 121,25 |
| FBR-060M1-L2 | | | | | | | | 115 | 192 | | | |

- C1~C7 are motor (metric standard) specific dimensions, which could be customized.
- M1: Limit hole (Version number)

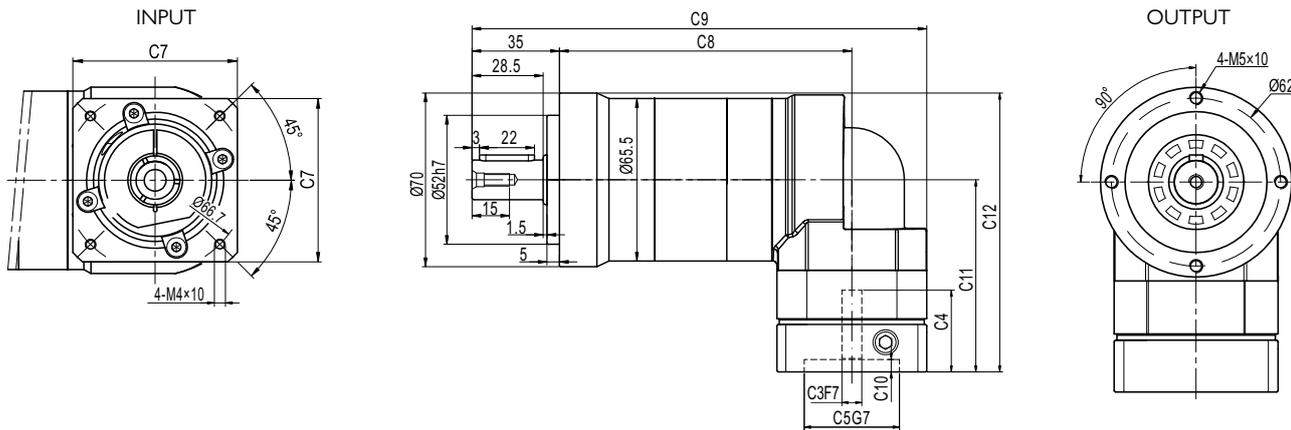
PRECISION PLANETARY GEARBOX FBR/FER SERIES

PRODUCT DIMENSION

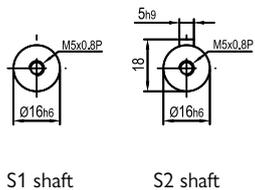
FER-070-L1



FER-070-L2



OUTPUT DIAMETER



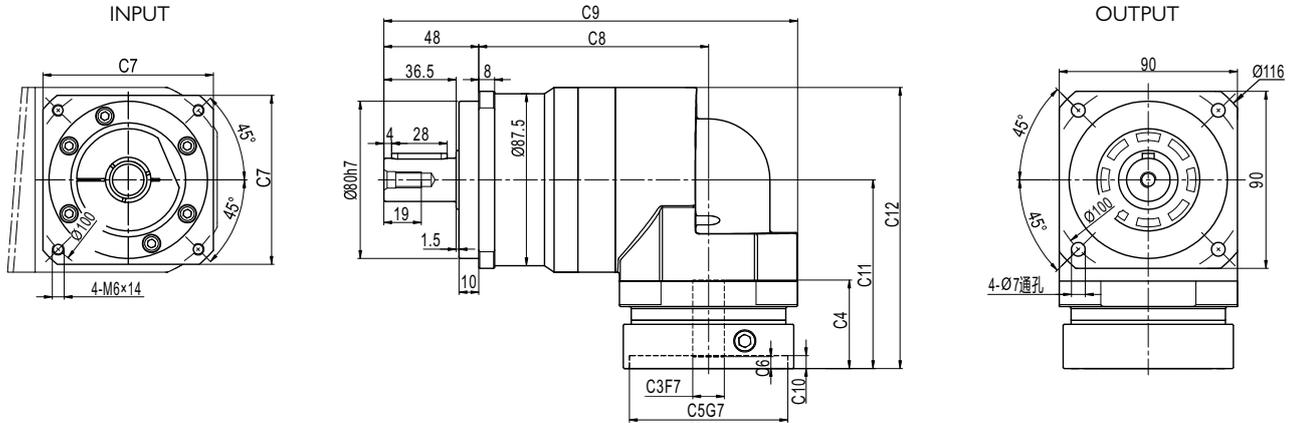
| Size | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 | C10 | C11 | C12 |
|--------------|-------|------------------|----------|------|-------|-----|----|-----|-----|-----|------|-------|
| FER-070-L1 | ø66,7 | 4-M4x10 | ø8 | 33 | ø38,1 | 5 | 60 | 88 | 153 | 5,5 | 77,5 | 112,5 |
| FER-070-L2 | | | | | | | | 117 | 182 | | | |
| FER-070-L1 | ø70 | 4-M4x10, 4-M5x12 | ø11, ø14 | 33 | ø50 | 5 | 60 | 88 | 153 | 5,5 | 77,5 | 112,5 |
| FER-070-L2 | | | | | | | | 117 | 182 | | | |
| FER-070M1-L1 | ø90 | 4-M5x12, 4-M6x14 | ø19 | 42,5 | ø70 | 6,5 | 80 | 88 | 163 | 12 | 87 | 122 |
| FER-070M1-L2 | | | | | | | | 117 | 192 | | | |

- C1~C7 are motor (metric standard) specific dimensions, which could be customized.
- M1: Limit hole (Version number)

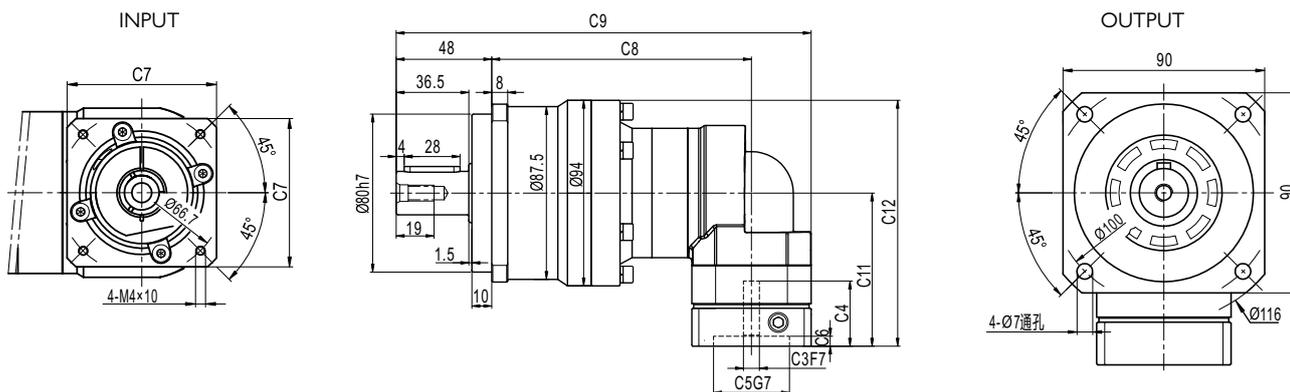
PRECISION PLANETARY GEARBOX FBR/FER SERIES

PRODUCT DIMENSION

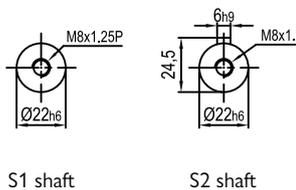
FBR-090-L1



FBR-090-L2



OUTPUT DIAMETER



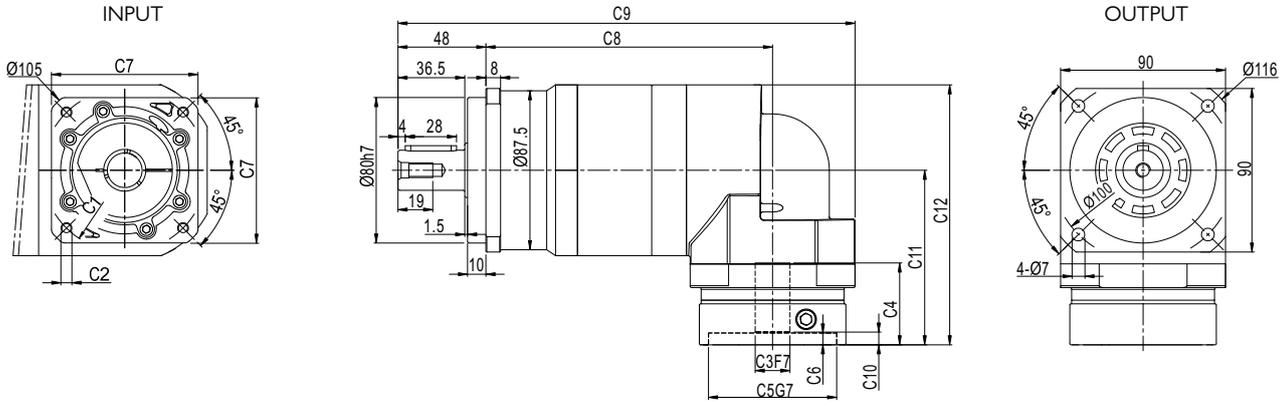
| Size | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 | C10 | C11 | C12 |
|--------------|--------------------|------------------|--|------|--------------------|-----|-----|-------|-------|------|-------|-------|
| FBR-090-L1 | $\varnothing 90$ | 4-M5x12, 4-M6x14 | $\varnothing 19$ | 45 | $\varnothing 70$ | 6,5 | 80 | 116 | 209 | 7 | 96 | 143 |
| | $\varnothing 100$ | 4-M6x14 | $\varnothing 16$ | 45 | $\varnothing 80$ | 6,5 | 86 | 116 | 209 | 6 | 96 | 143 |
| FBR-090M1-L1 | $\varnothing 115$ | 4-M8x20 | $\varnothing 19, \varnothing 22$ | 56,5 | $\varnothing 95$ | 8 | 100 | 116 | 214 | 16,5 | 117,5 | 164,5 |
| | $\varnothing 145$ | 4-M8x20 | $\varnothing 19, \varnothing 22, \varnothing 24$ | 59 | $\varnothing 110$ | 11 | 130 | 116 | 229 | 19 | 120 | 167 |
| FBR-090-L2 | $\varnothing 66,7$ | 4-M4x10 | $\varnothing 8$ | 33 | $\varnothing 38,1$ | 5 | 60 | 130,5 | 208,5 | 5,5 | 77,5 | 124,5 |
| | $\varnothing 70$ | 4-M4x10, 4-M5x12 | $\varnothing 11, \varnothing 14$ | 33 | $\varnothing 50$ | 5 | 60 | 130,5 | 208,5 | 5,5 | 77,5 | 124,5 |
| FBR-090M1-L2 | $\varnothing 90$ | 4-M5x12, 4-M6x14 | $\varnothing 19$ | 42,5 | $\varnothing 70$ | 6,5 | 80 | 130,5 | 218,5 | 12 | 87 | 134 |
| | $\varnothing 100$ | 4-M6x14 | $\varnothing 16$ | 42,5 | $\varnothing 80$ | 6,5 | 86 | 130,5 | 221,5 | 11 | 87 | 134 |

- C1~C7 are motor (metric standard) specific dimensions, which could be customized.
- M1: Limit hole (Version number)

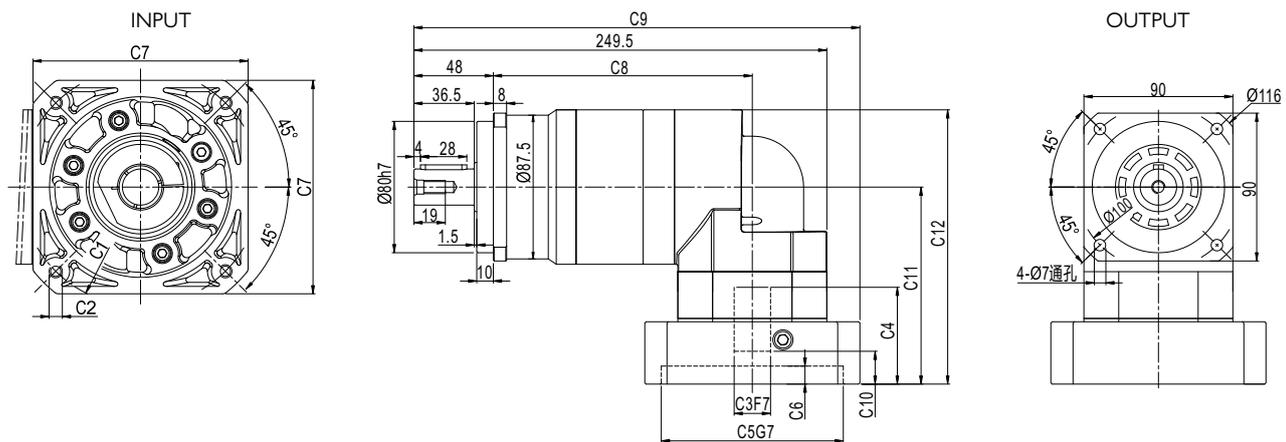
PRECISION PLANETARY GEARBOX FBR/FER SERIES

PRODUCT DIMENSION

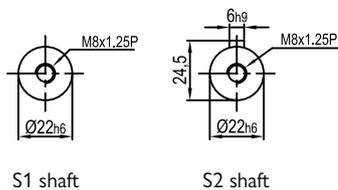
FBR-090A-L2



FBR-090A-L2



OUTPUT DIAMETER



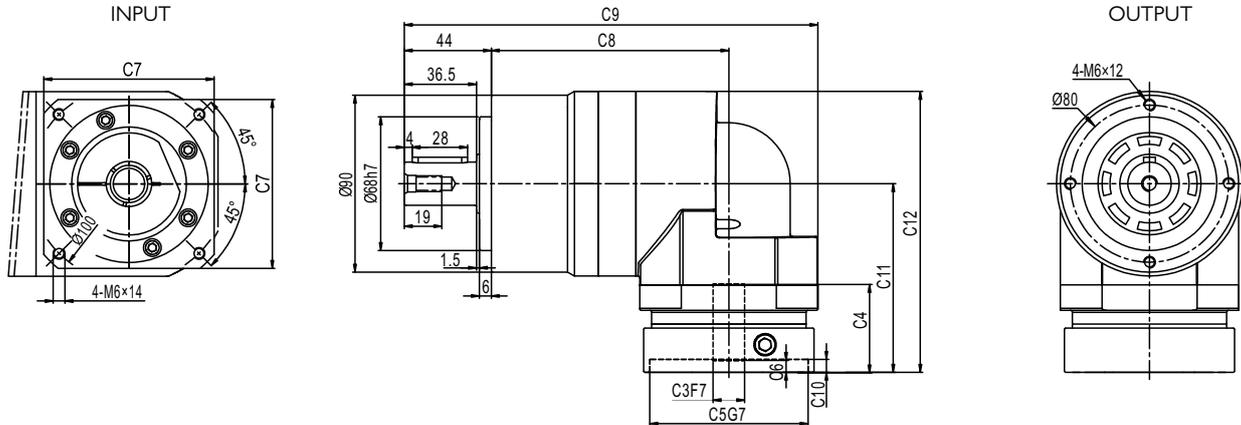
| Size | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 | C10 | C11 | C12 |
|---------------|-------------------|------------------|--|------|-------------------|-----|-----|-------|-------|------|-------|-------|
| FBR-090A-L2 | $\varnothing 90$ | 4-M5x12, 4-M6x14 | $\varnothing 19$ | 45 | $\varnothing 70$ | 6,5 | 80 | 156,5 | 249,5 | 7 | 96 | 141 |
| | $\varnothing 100$ | 4-M6x14 | $\varnothing 16$ | 45 | $\varnothing 80$ | 6,5 | 86 | 156,5 | 249,5 | 6 | 96 | 141 |
| FBR-090AM1-L2 | $\varnothing 115$ | 4-M8x20 | $\varnothing 19, \varnothing 22$ | 56,5 | $\varnothing 95$ | 8 | 100 | 156,5 | 254,5 | 16,5 | 117,5 | 164,5 |
| | $\varnothing 145$ | 4-M8x20 | $\varnothing 19, \varnothing 22, \varnothing 24$ | 59 | $\varnothing 110$ | 10 | 130 | 156,5 | 269,5 | 19 | 120 | 167 |

- C1~C7 are motor (metric standard) specific dimensions, which could be customized.
- M1: Limit hole (Version number)

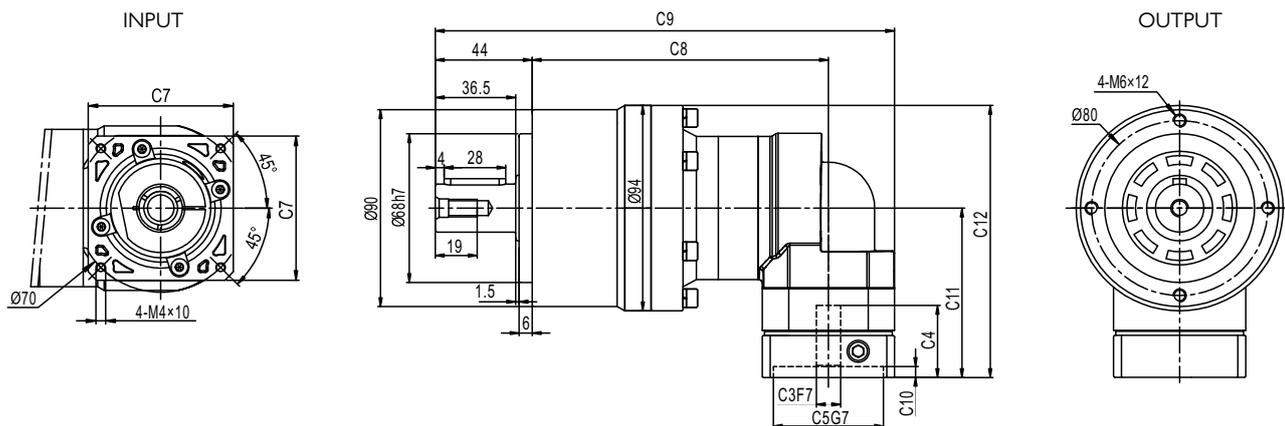
PRECISION PLANETARY GEARBOX FBR/FER SERIES

PRODUCT DIMENSION

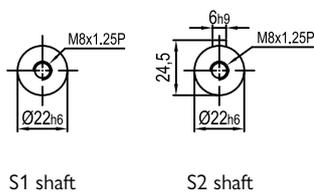
FER-090-L1



FER-090-L2



OUTPUT DIAMETER



S1 shaft

S2 shaft

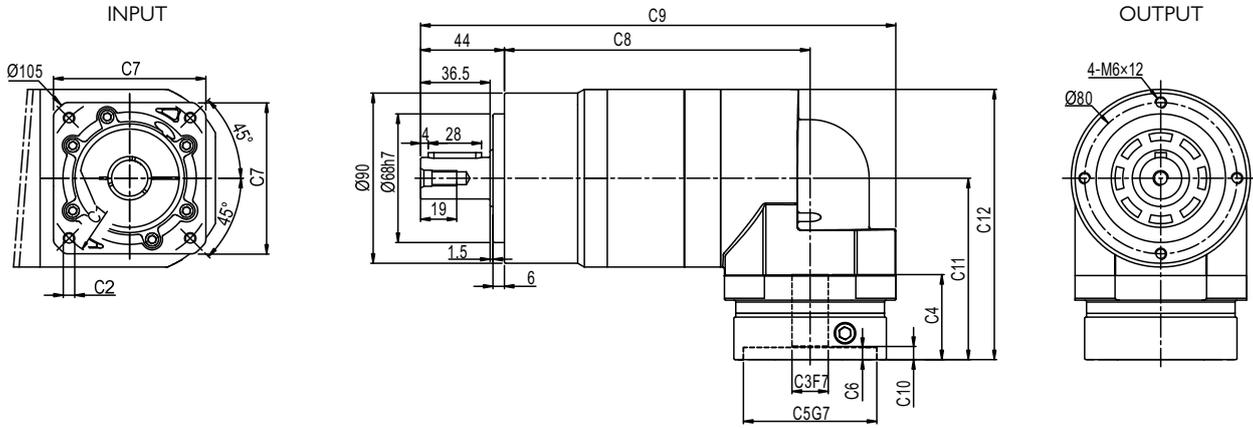
| Size | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 | C10 | C11 | C12 |
|--------------|-------|------------------|---------------|------|-------|-----|-----|-------|-------|------|-------|-------|
| FER-090-L1 | ø90 | 4-M5x12, 4-M6x14 | ø19 | 45 | ø70 | 6,5 | 80 | 120 | 209 | 7 | 96 | 143 |
| | ø100 | 4-M6x14 | ø16 | 45 | ø80 | 6,5 | 86 | 120 | 209 | 6 | 96 | 143 |
| FER-090M1-L1 | ø115 | 4-M8x20 | ø19, ø22 | 56,5 | ø95 | 8 | 100 | 120 | 214 | 16,5 | 117,5 | 164,5 |
| | ø145 | 4-M8x20 | ø19, ø22, ø24 | 59 | ø110 | 11 | 130 | 120 | 229 | 19 | 120 | 167 |
| FER-090-L2 | ø66,7 | 4-M4x10 | ø8 | 33 | ø38,1 | 5 | 60 | 134,5 | 208,5 | 5,5 | 77,5 | 124,5 |
| | ø70 | 4-M4x10, 4-M5x12 | ø11, ø14 | 33 | ø50 | 5 | 60 | 134,5 | 208,5 | 5,5 | 77,5 | 124,5 |
| FER-090M1-L2 | ø90 | 4-M5x12, 4-M6x14 | ø19 | 42,5 | ø70 | 6,5 | 80 | 134,5 | 218,5 | 12 | 87 | 134 |
| | ø100 | 4-M6x14 | ø16 | 42,5 | ø80 | 6,5 | 86 | 134,5 | 221,5 | 11 | 87 | 134 |

- C1~C7 are motor (metric standard) specific dimensions, which could be customized.
- M1: Limit hole (Version number)

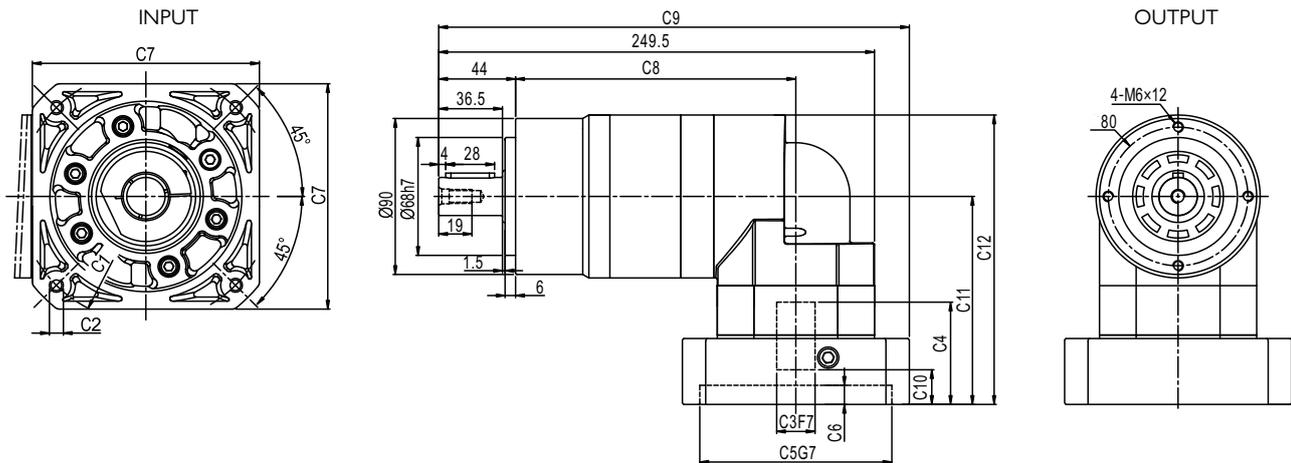
PRECISION PLANETARY GEARBOX FBR/FER SERIES

PRODUCT DIMENSION

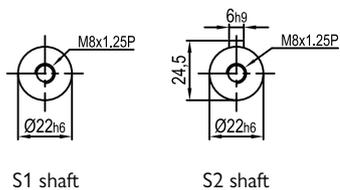
FER-090A-L2



FER-090A-L2



OUTPUT DIAMETER



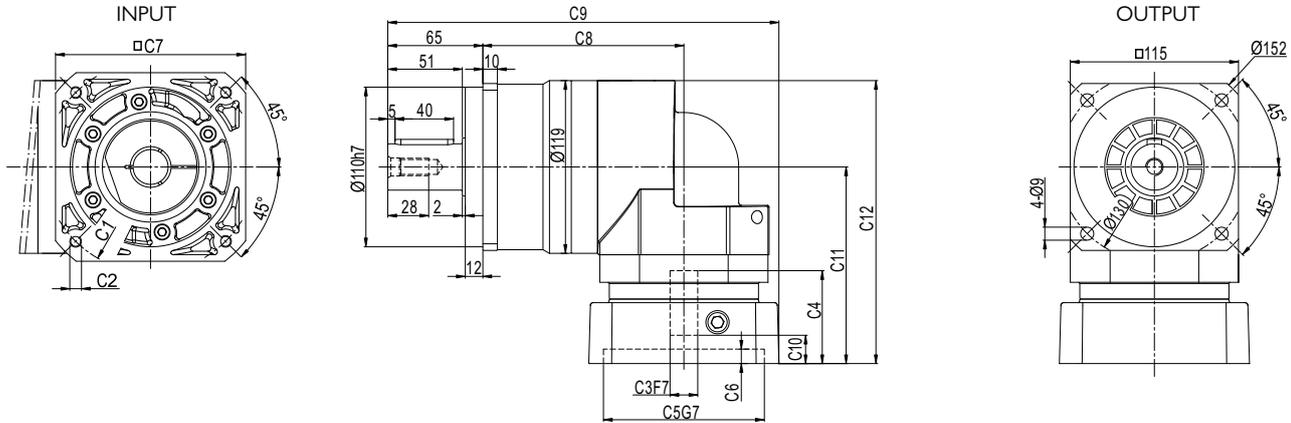
| Size | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 | C10 | C11 | C12 |
|---------------|-------------------|------------------|--|------|-------------------|-----|-----|-------|-------|------|-------|-------|
| FER-090A-L2 | $\varnothing 90$ | 4-M5x12, 4-M6x14 | $\varnothing 19$ | 45 | $\varnothing 70$ | 6,5 | 80 | 160,5 | 249,5 | 7 | 96 | 143 |
| | $\varnothing 100$ | 4-M6x14 | $\varnothing 16$ | 45 | $\varnothing 80$ | 6,5 | 86 | 160,5 | 249,5 | 6 | 96 | 143 |
| FER-090AM1-L2 | $\varnothing 115$ | 4-M8x20 | $\varnothing 19, \varnothing 22$ | 56,5 | $\varnothing 95$ | 8 | 100 | 160,5 | 254,5 | 16,5 | 117,5 | 164,5 |
| | $\varnothing 145$ | 4-M8x20 | $\varnothing 19, \varnothing 22, \varnothing 24$ | 59 | $\varnothing 110$ | 10 | 130 | 160,5 | 269,5 | 19 | 120 | 167 |

- C1~C7 are motor (metric standard) specific dimensions, which could be customized.
- M1: Limit hole (Version number)

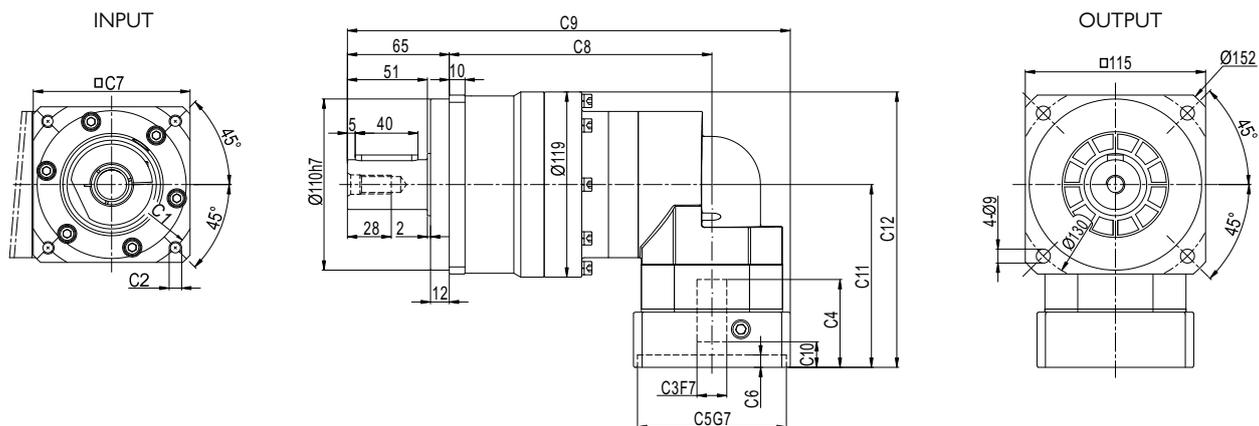
PRECISION PLANETARY GEARBOX FBR/FER SERIES

PRODUCT DIMENSION

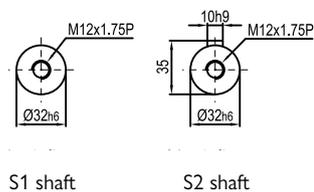
FBR-115-L1



FBR-115-L2



OUTPUT DIAMETER



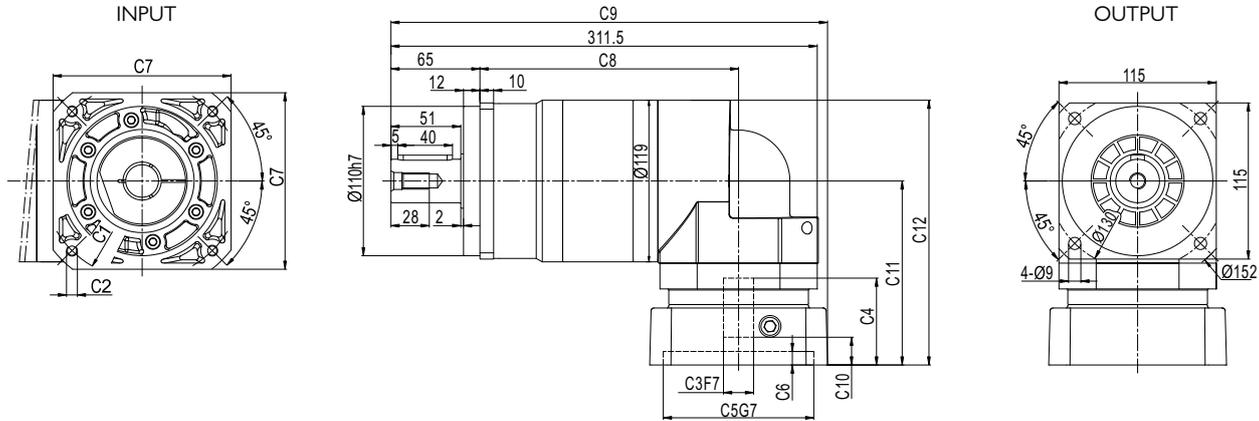
| Size | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 | C10 | C11 | C12 |
|--------------|-------------------|------------------|--|------|---------------------|-----|-----|-------|-------|------|-------|-------|
| FBR-115-L1 | $\varnothing 145$ | 4-M8x20 | $\varnothing 19, \varnothing 22, \varnothing 24$ | 64 | $\varnothing 110$ | 10 | 130 | 137,5 | 267,5 | 19,5 | 135,5 | 195 |
| FBR-115M1-L1 | $\varnothing 200$ | 4-M12x28 | $\varnothing 35$ | 81 | $\varnothing 114,3$ | 10 | 180 | 137,5 | 292,5 | 28 | 152,5 | 212 |
| FBR-115-L2 | $\varnothing 90$ | 4-M5x12, 4-M6x14 | $\varnothing 19$ | 45 | $\varnothing 70$ | 6,5 | 80 | 167,5 | 277,5 | 7 | 96 | 155,5 |
| | $\varnothing 100$ | 4-M6x14 | $\varnothing 16$ | 45 | $\varnothing 80$ | 6,5 | 86 | 167,5 | 277,5 | 6 | 96 | 155,5 |
| FBR-115M1-L2 | $\varnothing 115$ | 4-M8x20 | $\varnothing 19, \varnothing 22$ | 56,5 | $\varnothing 95$ | 8 | 100 | 167,5 | 282,5 | 16,5 | 117,5 | 177 |
| | $\varnothing 145$ | 4-M8x20 | $\varnothing 19, \varnothing 22, \varnothing 24$ | 59 | $\varnothing 110$ | 11 | 130 | 167,5 | 297,5 | 19 | 120 | 179,5 |

- C1~C7 are motor (metric standard) specific dimensions, which could be customized.
- M1: Limit hole (Version number)

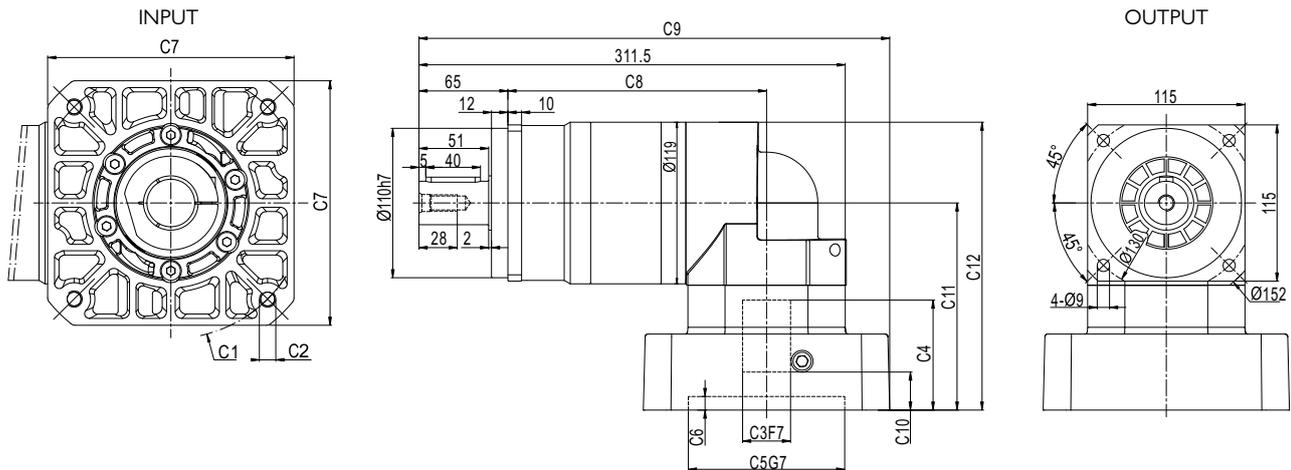
PRECISION PLANETARY GEARBOX FBR/FER SERIES

PRODUCT DIMENSION

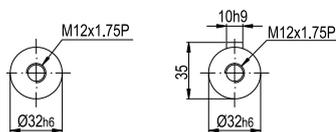
FBR-115A-L2



FBR-115A-L2



OUTPUT DIAMETER



S1 shaft

S2 shaft

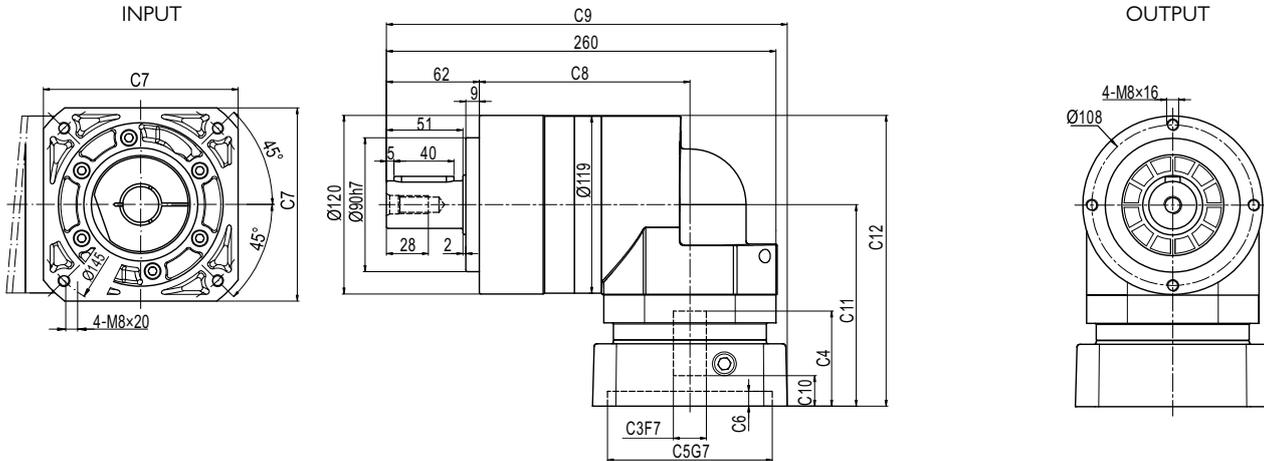
| Size | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 | C10 | C11 | C12 |
|---------------|------|----------|---------------|----|--------|----|-----|-----|-----|------|-------|-------|
| FBR-115A-L2 | ø145 | 4-M8x20 | ø19, ø22, ø24 | 64 | ø110 | 10 | 130 | 189 | 319 | 19,5 | 135,5 | 195,5 |
| FBR-115AM1-L2 | ø200 | 4-M12x28 | ø35 | 81 | ø114,3 | 10 | 180 | 189 | 344 | 28 | 152,5 | 212,5 |

- C1~C7 are motor (metric standard) specific dimensions, which could be customized.
- M1: Limit hole (Version number)

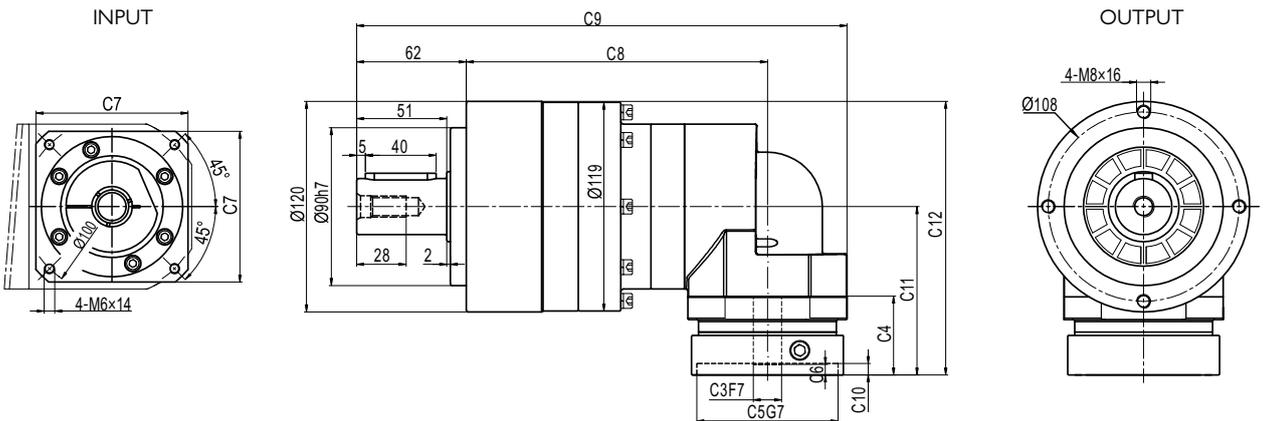
PRECISION PLANETARY GEARBOX FBR/FER SERIES

PRODUCT DIMENSION

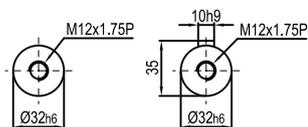
FER-120-L1



FER-120-L2



OUTPUT DIAMETER



S1 shaft

S2 shaft

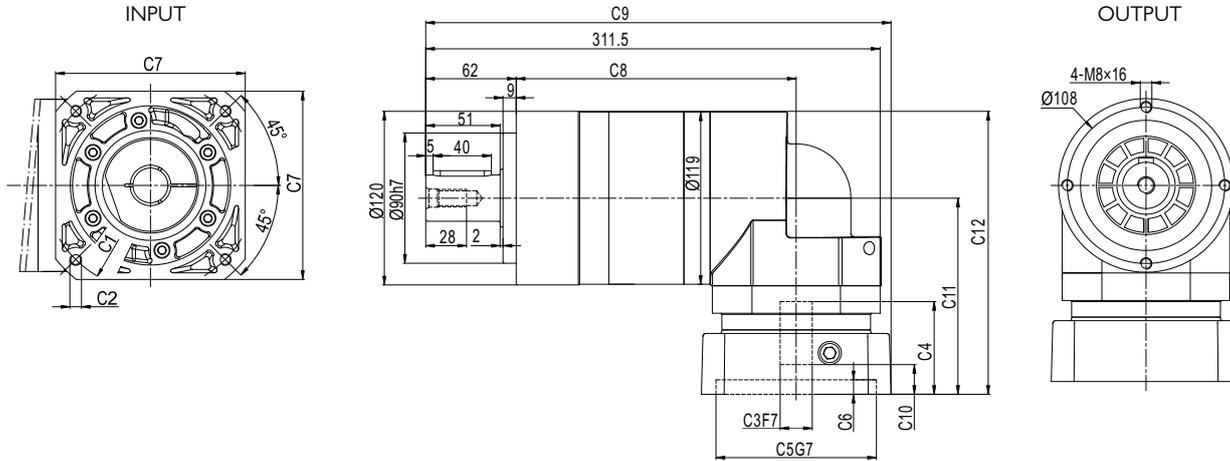
| Size | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 | C10 | C11 | C12 |
|--------------|-------------------|------------------|--|------|---------------------|-----|-----|-------|-------|------|-------|-------|
| FER-120-L1 | $\varnothing 145$ | 4-M8x20 | $\varnothing 19, \varnothing 22, \varnothing 24$ | 64 | $\varnothing 110$ | 10 | 130 | 140,5 | 267,5 | 19,5 | 135,5 | 195,5 |
| FER-120M1-L1 | $\varnothing 200$ | 4-M12x28 | $\varnothing 35$ | 81 | $\varnothing 114,3$ | 10 | 180 | 140,5 | 292,5 | 28 | 152,5 | 212,5 |
| FER-120-L2 | $\varnothing 90$ | 4-M5x12, 4-M6x14 | $\varnothing 19$ | 45 | $\varnothing 70$ | 6,5 | 80 | 170,5 | 277,5 | 7 | 96 | 156 |
| | $\varnothing 100$ | 4-M6x14 | $\varnothing 16$ | 45 | $\varnothing 80$ | 6,5 | 86 | 170,5 | 277,5 | 6 | 96 | 156 |
| FER-120M1-L2 | $\varnothing 115$ | 4-M8x20 | $\varnothing 19, \varnothing 22$ | 56,5 | $\varnothing 95$ | 8 | 100 | 170,5 | 282,5 | 16,5 | 117,5 | 177,5 |
| | $\varnothing 145$ | 4-M8x20 | $\varnothing 19, \varnothing 22, \varnothing 24$ | 59 | $\varnothing 110$ | 11 | 130 | 170,5 | 297,5 | 19 | 120 | 180 |

- C1-C7 are motor (metric standard) specific dimensions, which could be customized.
- M1: Limit hole (Version number)

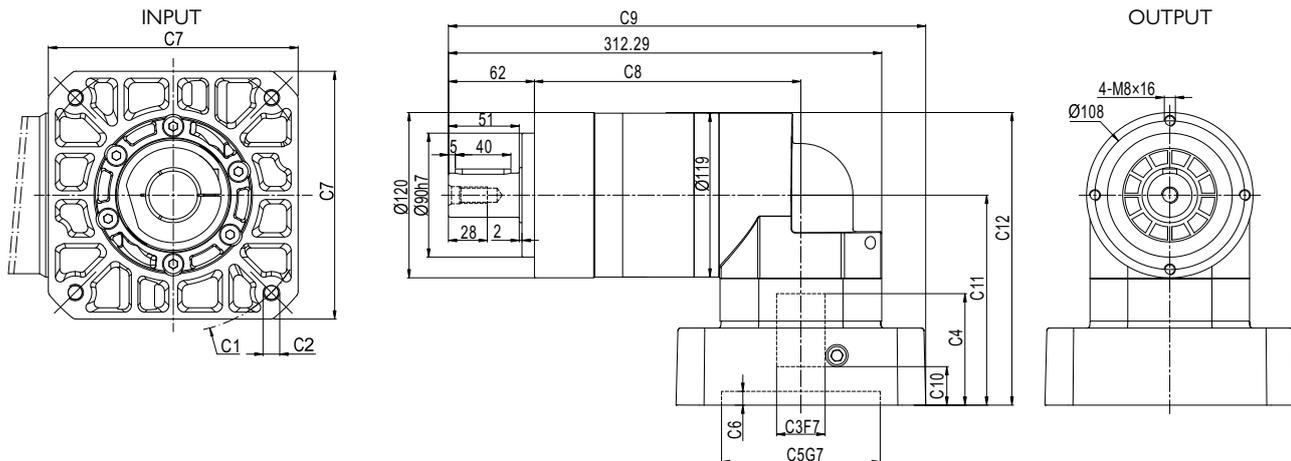
PRECISION PLANETARY GEARBOX FBR/FER SERIES

PRODUCT DIMENSION

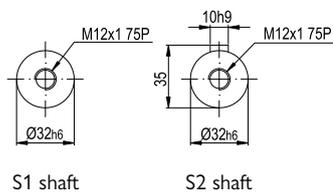
FER-120A-L2



FER-120A-L2



OUTPUT DIAMETER



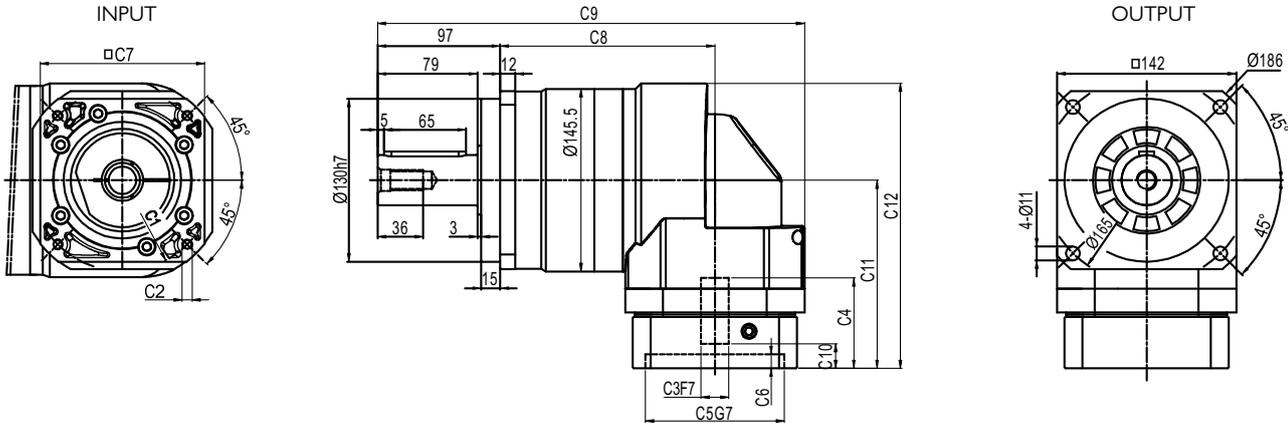
| Size | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 | C10 | C11 | C12 |
|---------------|------|----------|---------------|----|--------|----|-----|-----|-----|------|-------|-------|
| FER-120A-L2 | ø145 | 4-M8x20 | ø19, ø22, ø24 | 64 | ø110 | 10 | 130 | 192 | 319 | 19,5 | 135,5 | 195,5 |
| FER-120AM1-L1 | ø200 | 4-M12x28 | ø35 | 81 | ø114,3 | 10 | 180 | 192 | 344 | 28 | 152,5 | 212,5 |

- C1~C7 are motor (metric standard) specific dimensions, which could be customized.
- M1: Limit hole (Version number)

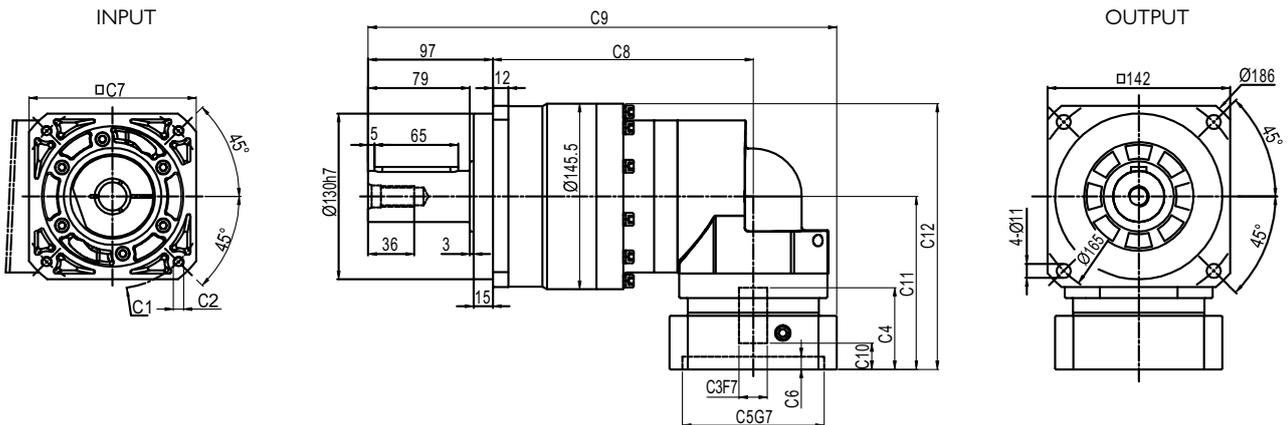
PRECISION PLANETARY GEARBOX FBR/FER SERIES

PRODUCT DIMENSION

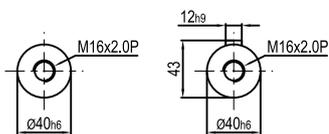
FBR-142-L1



FBR-142-L2



OUTPUT DIAMETER



S1 shaft

S2 shaft

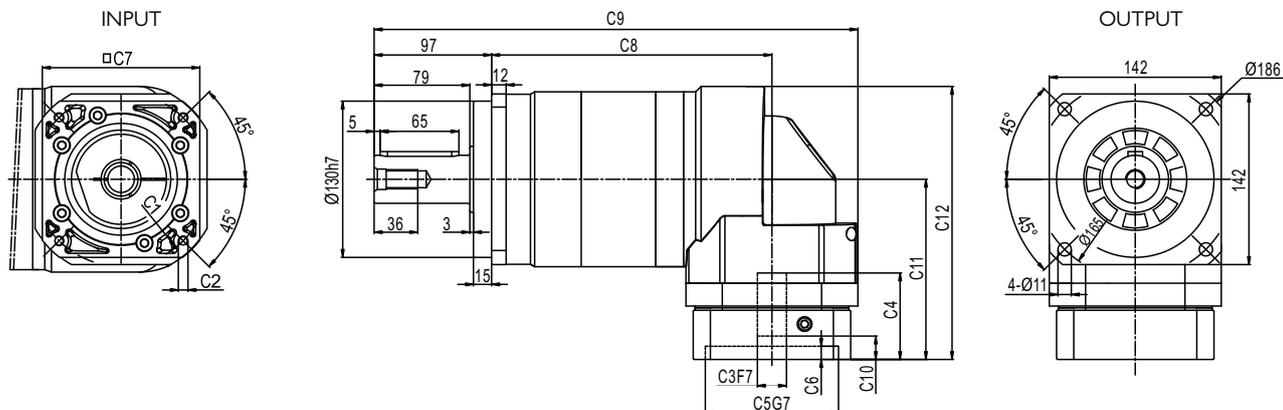
| Size | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 | C10 | C11 | C12 |
|--------------|-------------------|----------|--|----|---------------------|----|-----|-------|-------|------|-------|--------|
| FBR-142-L1 | $\varnothing 145$ | 4-M8x20 | $\varnothing 22, \varnothing 24$ | 72 | $\varnothing 110$ | 11 | 130 | 170 | 338 | 19,5 | 150 | 227,25 |
| | $\varnothing 200$ | 4-M12x28 | $\varnothing 35$ | 82 | $\varnothing 114,3$ | 8 | 180 | 170 | 357 | 25 | 160 | 237,25 |
| FBR-142-L2 | $\varnothing 145$ | 4-M8x20 | $\varnothing 19, \varnothing 22, \varnothing 24$ | 64 | $\varnothing 110$ | 10 | 130 | 202,5 | 364,5 | 19,5 | 135,5 | 210,75 |
| FBR-142M1-L2 | $\varnothing 200$ | 4-M12x28 | $\varnothing 35$ | 81 | $\varnothing 114,3$ | 10 | 180 | 202,5 | 389,5 | 28 | 152,5 | 227,75 |

- C1-C7 are motor (metric standard) specific dimensions, which could be customized.
- M1: Limit hole (Version number)

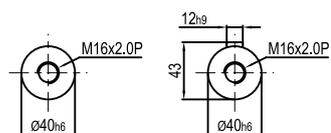
PRECISION PLANETARY GEARBOX FBR/FER SERIES

PRODUCT DIMENSION

FBR-142A-L2



OUTPUT DIAMETER



S1 shaft

S2 shaft

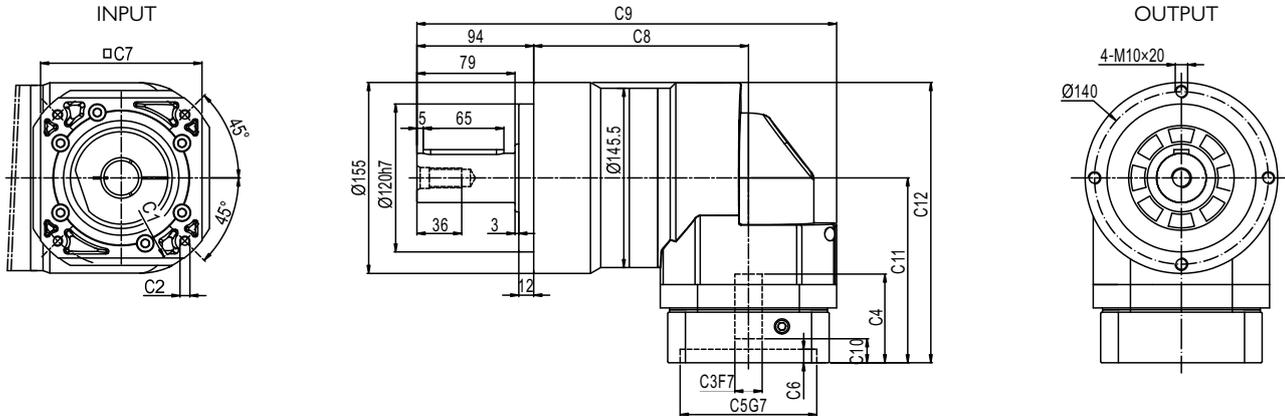
| Size | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 | C10 | C11 | C12 |
|-------------|-------------------|----------|----------------------------------|----|---------------------|----|-----|-------|-------|------|-----|--------|
| FBR-142A-L2 | $\varnothing 145$ | 4-M8x20 | $\varnothing 22, \varnothing 24$ | 72 | $\varnothing 110$ | 11 | 130 | 231,5 | 399,5 | 19,5 | 150 | 227,25 |
| | $\varnothing 200$ | 4-M12x28 | $\varnothing 35$ | 82 | $\varnothing 114,3$ | 8 | 180 | 231,5 | 418,5 | 25 | 160 | 237,25 |

▪ C1~C7 are motor (metric standard) specific dimensions, which could be customized.

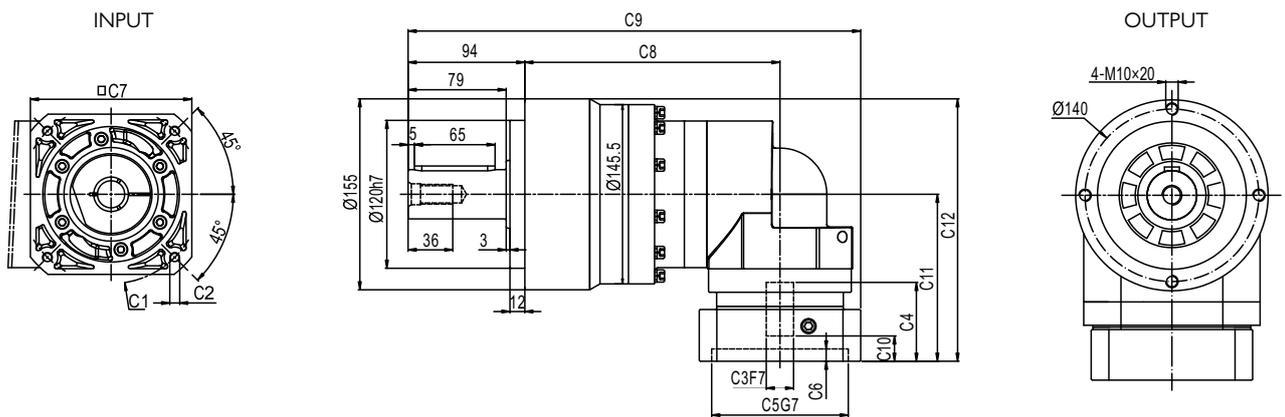
PRECISION PLANETARY GEARBOX FBR/FER SERIES

PRODUCT DIMENSION

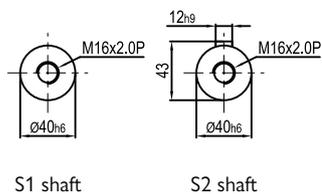
FER-155-L1



FER-155-L2



OUTPUT DIAMETER



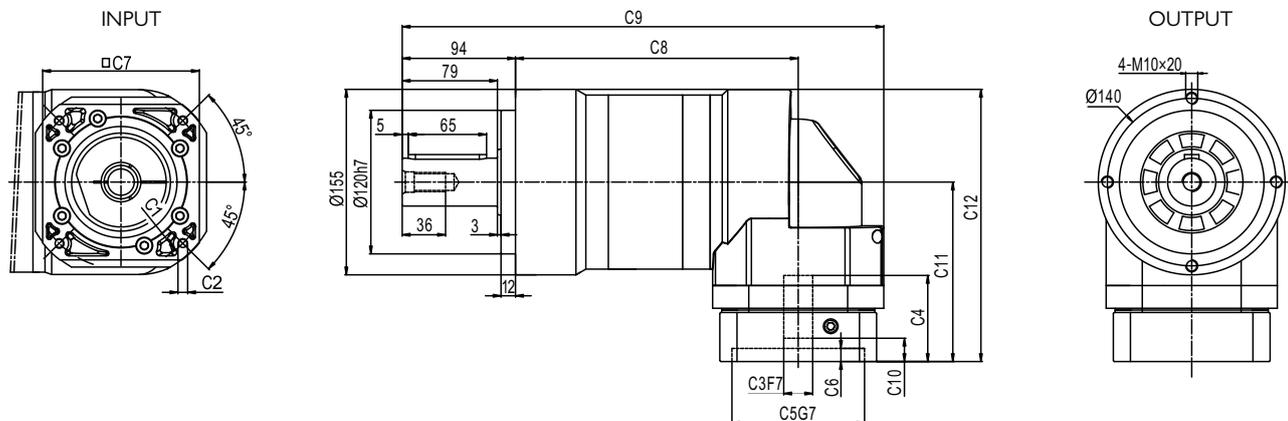
| Size | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 | C10 | C11 | C12 |
|--------------|-----|----------|------------|----|-------|----|-----|-------|-------|------|-------|-------|
| FER-155-L1 | 145 | 4-M8x20 | 22, 24 | 72 | 110 | 11 | 130 | 173 | 338 | 19,5 | 150 | 227,5 |
| | 200 | 4-M12x28 | 35 | 82 | 114,3 | 8 | 180 | 173 | 357 | 25 | 160 | 237,5 |
| FER-155-L2 | 145 | 4-M8x20 | 19, 22, 24 | 64 | 110 | 10 | 130 | 205,5 | 364,5 | 19,5 | 135,5 | 213 |
| FER-155M1-L2 | 200 | 4-M12x28 | 35 | 81 | 114,3 | 10 | 180 | 205,5 | 389,5 | 28 | 152,5 | 230 |

- C1-C7 are motor (metric standard) specific dimensions, which could be customized.
- M1: Limit hole (Version number)

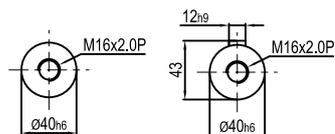
PRECISION PLANETARY GEARBOX FBR/FER SERIES

PRODUCT DIMENSION

FER-155A-L2



OUTPUT DIAMETER



S1 shaft

S2 shaft

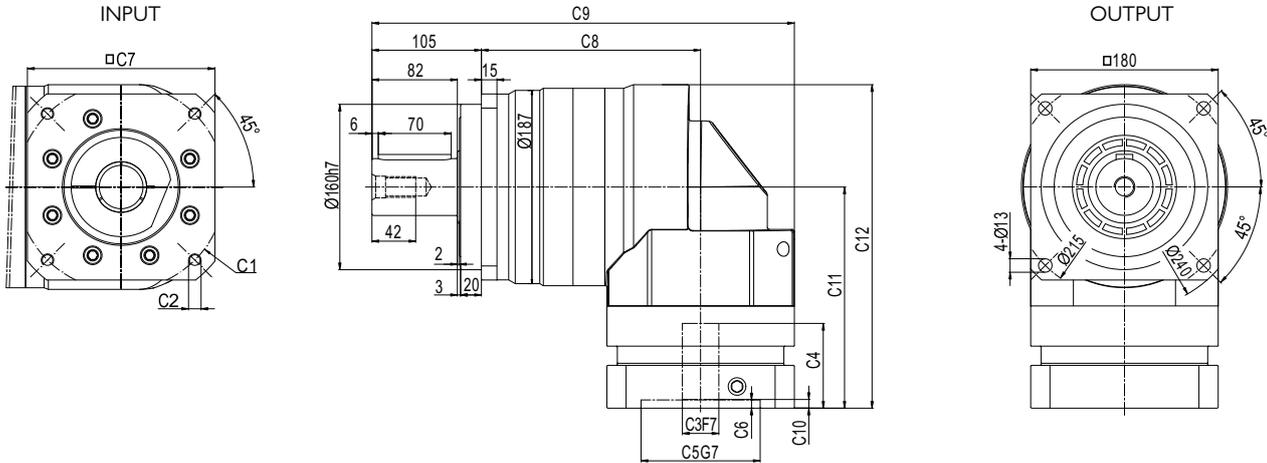
| Size | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 | C10 | C11 | C12 |
|-------------|------|----------|----------|----|--------|----|-----|-------|-------|------|-----|-------|
| FER-155A-L1 | Ø145 | 4-M8x20 | Ø22, Ø24 | 72 | Ø110 | 11 | 130 | 234,5 | 399,5 | 19,5 | 150 | 227,5 |
| | Ø200 | 4-M12x28 | Ø35 | 82 | Ø114,3 | 8 | 180 | 234,5 | 418,5 | 25 | 160 | 237,5 |

▪ C1-C7 are motor (metric standard) specific dimensions, which could be customized.

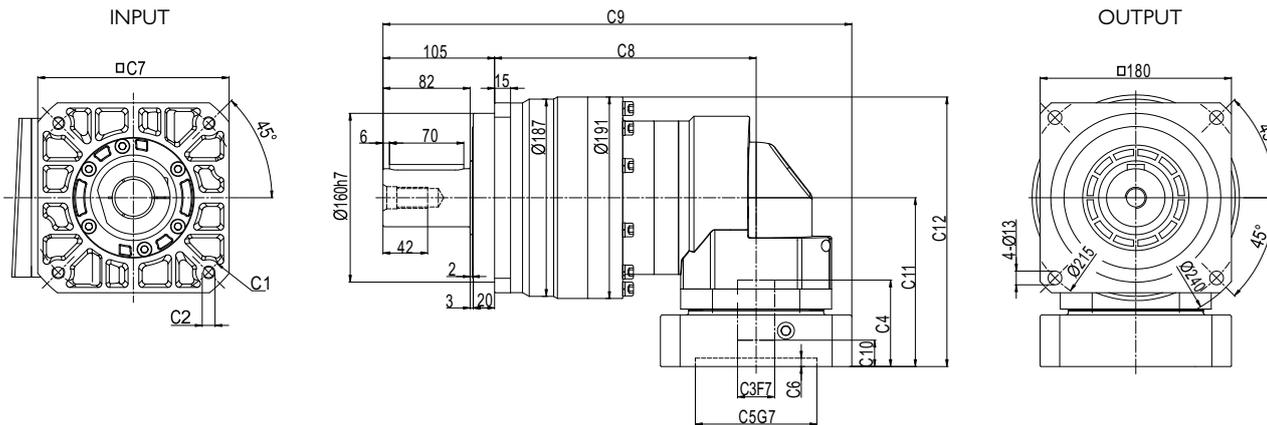
PRECISION PLANETARY GEARBOX FBR/FER SERIES

PRODUCT DIMENSION

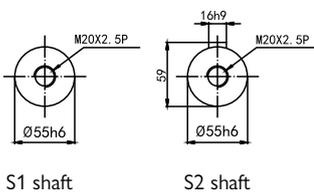
FBR-180-L1



FBR-180-L2



OUTPUT DIAMETER



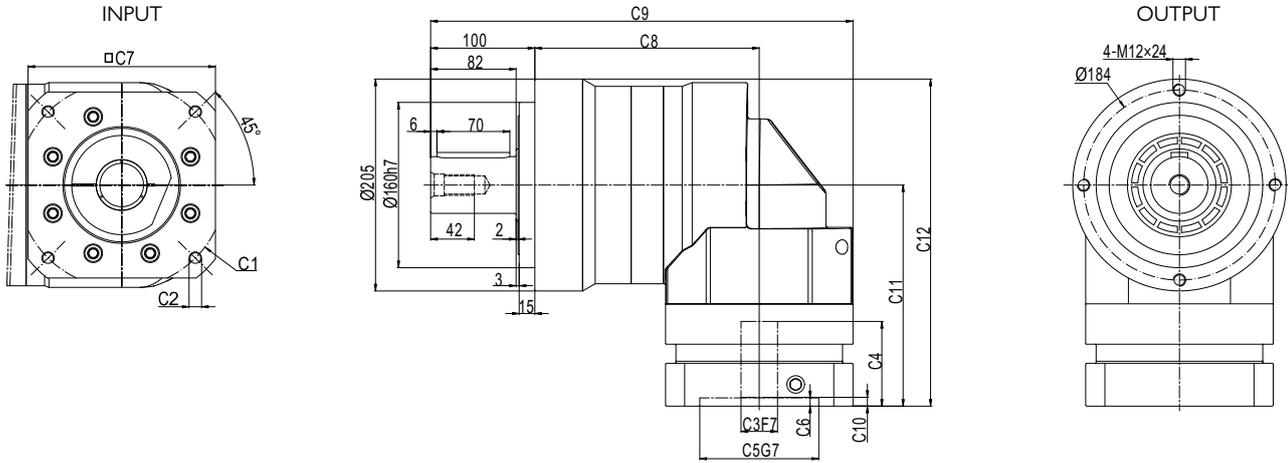
| Size | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 | C10 | C11 | C12 |
|------------|-------------------|----------|----------------------------------|-------|---------------------|----|-----|-------|-------|------|-------|-------|
| FBR-180-L1 | $\varnothing 200$ | 4-M12x28 | $\varnothing 35$ | 82 | $\varnothing 114,3$ | 8 | 180 | 210,5 | 405,5 | 8,5 | 214 | 313 |
| | $\varnothing 200$ | 4-M12x28 | $\varnothing 42$ | 117,5 | $\varnothing 114,3$ | 8 | 180 | 210,5 | 405,5 | 45,5 | 249,5 | 348,5 |
| | $\varnothing 215$ | 4-M12x28 | $\varnothing 38$ | 87 | $\varnothing 180$ | 8 | 192 | 210,5 | 411,5 | 13,5 | 219 | 318 |
| | $\varnothing 235$ | 4-M12x28 | $\varnothing 42$ | 117,5 | $\varnothing 200$ | 10 | 220 | 213,5 | 318,5 | 45,5 | 249,5 | 348,5 |
| FBR-180-L2 | $\varnothing 145$ | 4-M8x20 | $\varnothing 22, \varnothing 24$ | 72 | $\varnothing 110$ | 11 | 130 | 246 | 422 | 19,5 | 150 | 247,5 |
| | $\varnothing 200$ | 4-M12x28 | $\varnothing 35$ | 82 | $\varnothing 114,3$ | 8 | 180 | 246 | 441 | 25 | 160 | 257,5 |

▪ C1~C7 are motor (metric standard) specific dimensions, which could be customized.

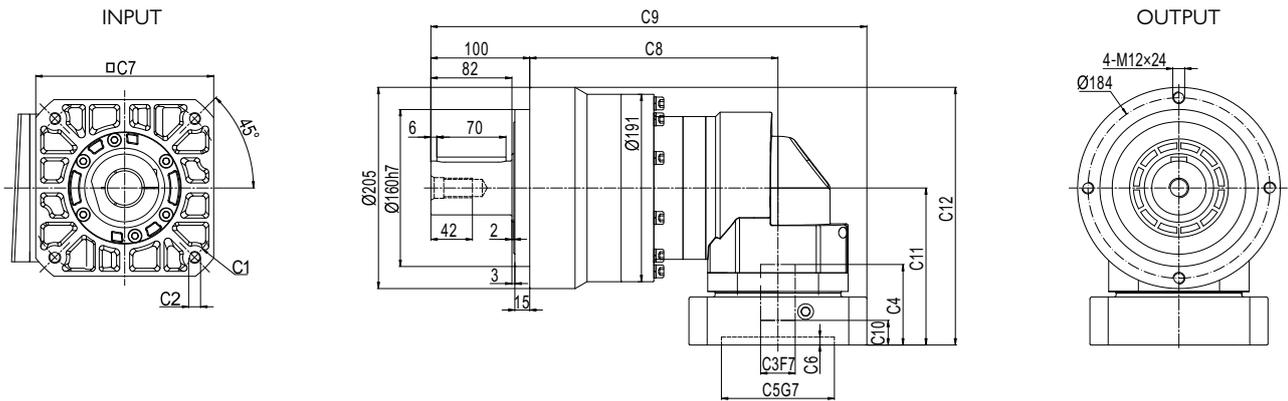
PRECISION PLANETARY GEARBOX FBR/FER SERIES

PRODUCT DIMENSION

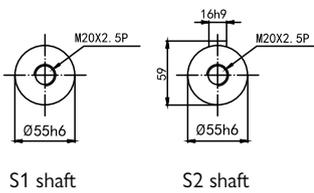
FER-205-L1



FER-205-L2



OUTPUT DIAMETER



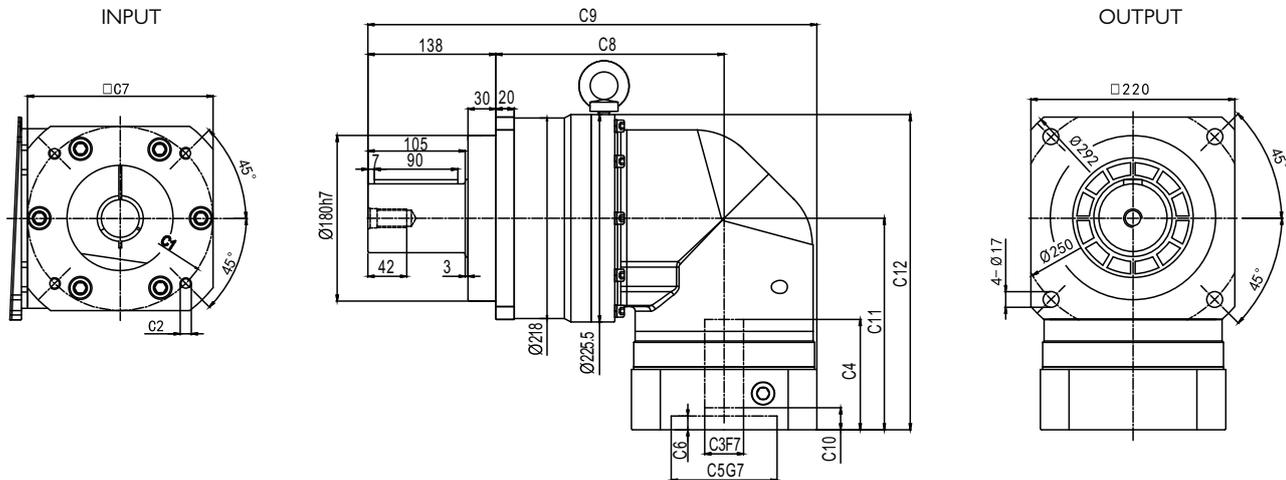
| Size | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 | C10 | C11 | C12 |
|------------|-------------------|----------|----------------------------------|-------|---------------------|----|-----|-------|-------|------|-------|-------|
| FER-205-L1 | $\varnothing 200$ | 4-M12x28 | $\varnothing 35$ | 82 | $\varnothing 114,3$ | 8 | 180 | 215,5 | 405,5 | 8,5 | 214 | 318 |
| | $\varnothing 200$ | 4-M12x28 | $\varnothing 42$ | 117,5 | $\varnothing 114,3$ | 8 | 180 | 215,5 | 405,5 | 45,5 | 249,5 | 353,5 |
| | $\varnothing 215$ | 4-M12x28 | $\varnothing 38$ | 87 | $\varnothing 180$ | 8 | 192 | 215,5 | 411,5 | 13,5 | 219 | 323 |
| | $\varnothing 235$ | 4-M12x28 | $\varnothing 42$ | 117,5 | $\varnothing 200$ | 10 | 220 | 218,5 | 318,5 | 45,5 | 249,5 | 353,5 |
| FER-205-L2 | $\varnothing 145$ | 4-M8x20 | $\varnothing 22, \varnothing 24$ | 72 | $\varnothing 110$ | 11 | 130 | 251 | 422 | 19,5 | 150 | 252,5 |
| | $\varnothing 200$ | 4-M12x28 | $\varnothing 35$ | 82 | $\varnothing 114,3$ | 8 | 180 | 251 | 441 | 25 | 160 | 262,5 |

▪ C1~C7 are motor (metric standard) specific dimensions, which could be customized.

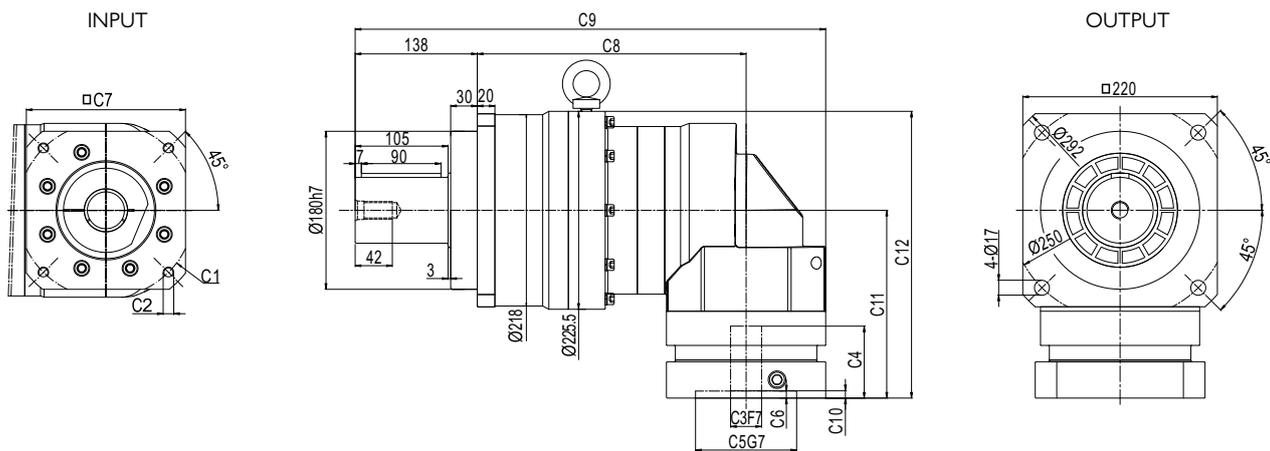
PRECISION PLANETARY GEARBOX FBR/FER SERIES

PRODUCT DIMENSION

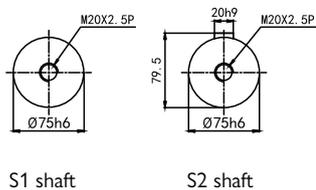
FBR-220-L1



FBR-220-L2



OUTPUT DIAMETER



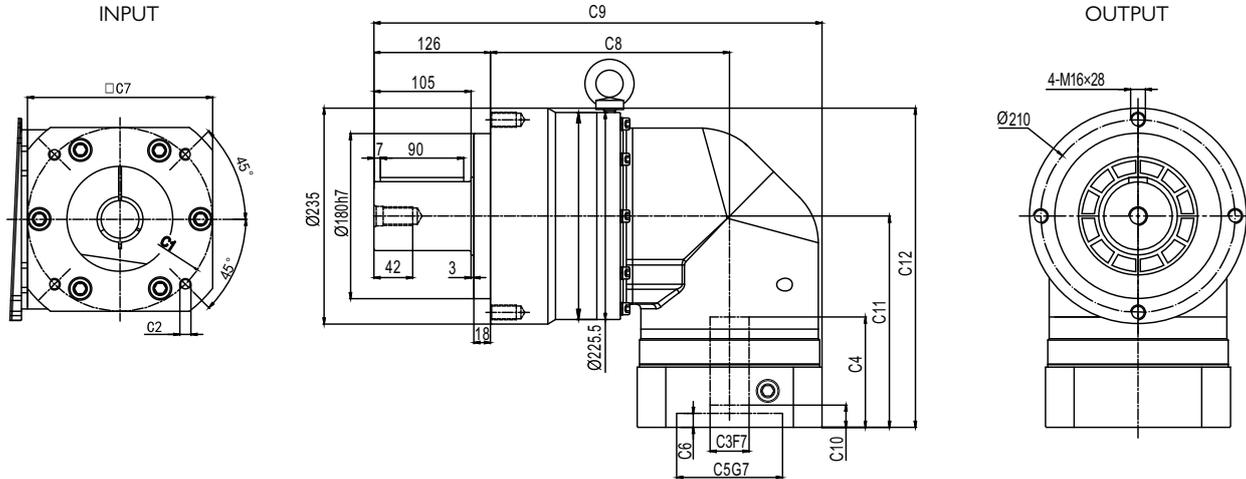
| Size | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 | C10 | C11 | C12 |
|------------|------|----------|----------|-------|--------|----|-----|-------|-------|------|-------|--------|
| FBR-220-L1 | ø200 | 4-M12x28 | ø35, ø42 | 120 | ø114,3 | 15 | 200 | 246,5 | 484,5 | 22,5 | 230 | 342,75 |
| | ø215 | 4-M12x30 | ø38 | 110 | ø180 | 8 | 200 | 246,5 | 484,5 | 12,5 | 220 | 332,75 |
| | ø235 | 4-M12x30 | ø42, ø55 | 120 | ø200 | 10 | 220 | 246,5 | 494,5 | 24 | 230 | 342,75 |
| FBR-220-L2 | ø200 | 4-M12x28 | ø35 | 82 | ø114,3 | 8 | 180 | 304 | 532 | 8,5 | 214 | 326,75 |
| | ø200 | 4-M12x28 | ø42 | 117,5 | ø114,3 | 8 | 180 | 304 | 532 | 45,5 | 249,5 | 362,25 |
| | ø215 | 4-M12x28 | ø38 | 87 | ø180 | 8 | 192 | 304 | 538 | 13,5 | 219 | 331,75 |
| | ø235 | 4-M12x28 | ø42 | 117,5 | ø200 | 10 | 220 | 304 | 532 | 45,5 | 249,5 | 362,25 |

▪ C1~C7 are motor (metric standard) specific dimensions, which could be customized.

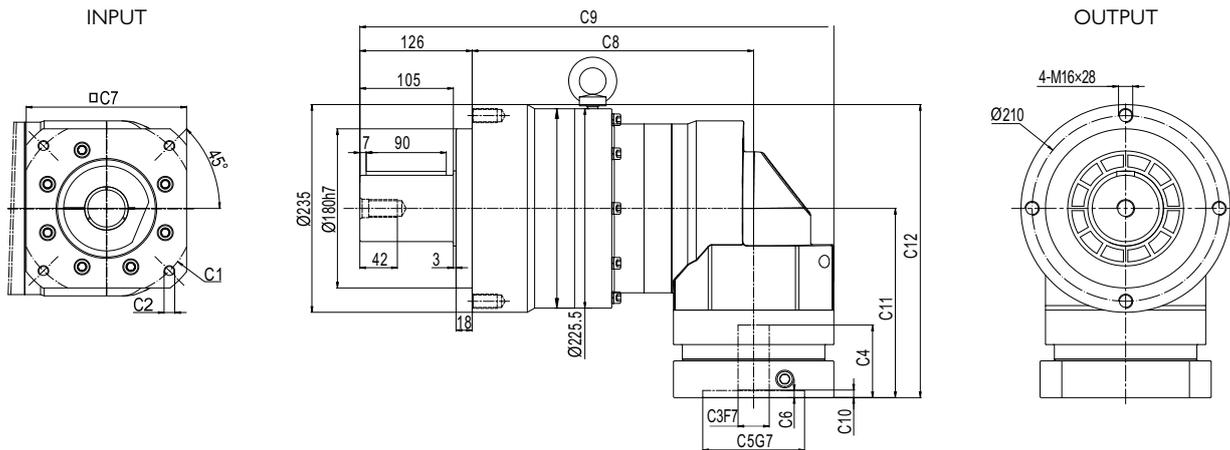
PRECISION PLANETARY GEARBOX FBR/FER SERIES

PRODUCT DIMENSION

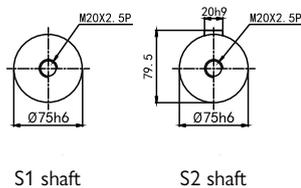
FER-235-L1



FER-235-L2



OUTPUT DIAMETER



| Size | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 | C10 | C11 | C12 |
|------------|------|----------|----------|-------|--------|----|-----|-------|-------|------|-------|-------|
| FER-235-L1 | Ø200 | 4-M12x28 | Ø35, Ø42 | 120 | Ø114,3 | 15 | 200 | 258,5 | 484,5 | 22,5 | 230 | 347,5 |
| | Ø215 | 4-M12x30 | Ø38 | 110 | Ø180 | 8 | 200 | 258,5 | 484,5 | 12,5 | 220 | 337,5 |
| | Ø235 | 4-M12x30 | Ø42, Ø55 | 120 | Ø200 | 10 | 220 | 258,5 | 494,5 | 24 | 230 | 347,5 |
| FER-235-L2 | Ø200 | 4-M12x28 | Ø35 | 82 | Ø114,3 | 8 | 180 | 316 | 532 | 8,5 | 214 | 331,5 |
| | Ø200 | 4-M12x28 | Ø42 | 117,5 | Ø114,3 | 8 | 180 | 316 | 532 | 45,5 | 249,5 | 367 |
| | Ø215 | 4-M12x28 | Ø38 | 87 | Ø180 | 8 | 192 | 316 | 538 | 13,5 | 219 | 336,5 |
| | Ø235 | 4-M12x28 | Ø42 | 117,5 | Ø200 | 10 | 220 | 316 | 552 | 45,5 | 249,5 | 367 |

▪ C1~C7 are motor (metric standard) specific dimensions, which could be customized.

CHIARAVALLI LINEAR CENTER

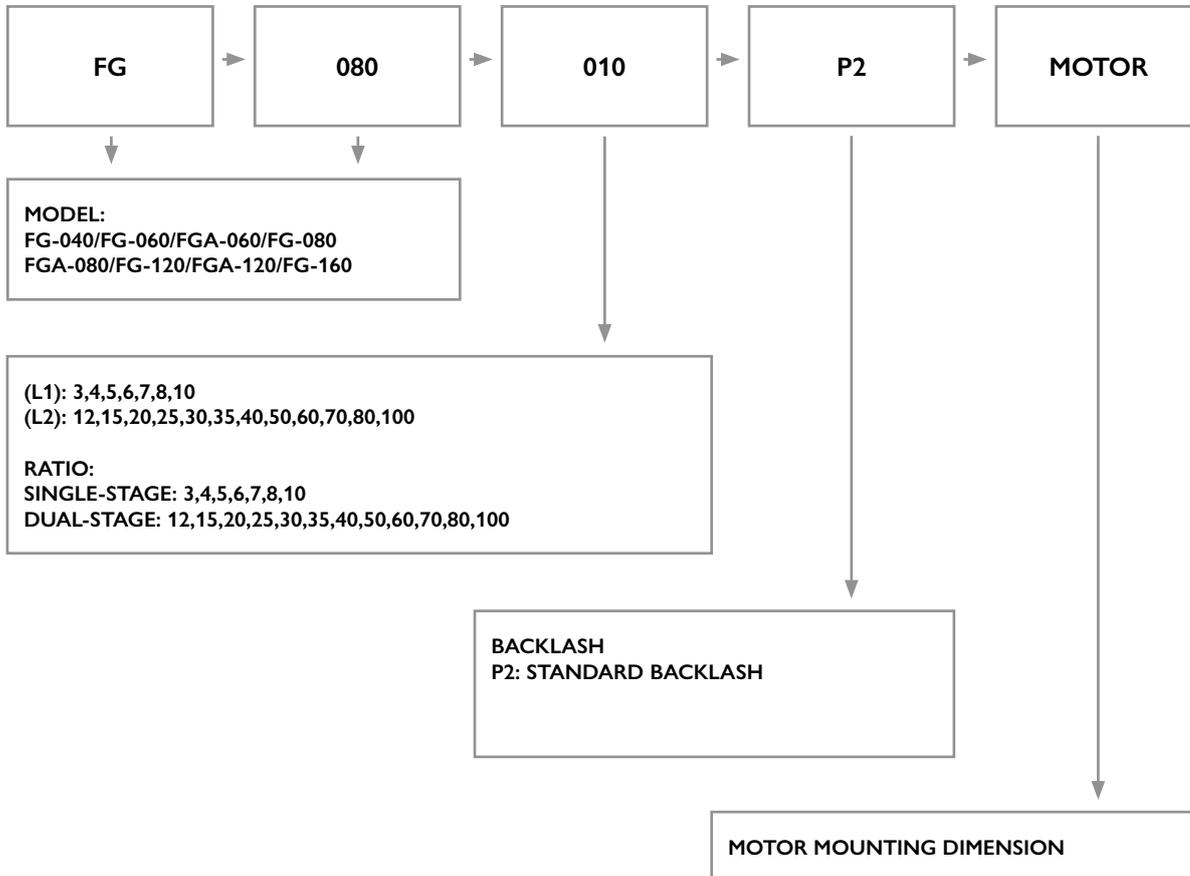
**PRECISION PLANETARY GEARBOX
FG/FGA SERIES**



PRECISION PLANETARY GEARBOX FG/FGA SERIES

MODEL DESCRIPTION

FG-080-010-P2-19-70-90-M6-42





PRECISION PLANETARY GEARBOX FG/FGA SERIES

TECHNICAL SPECIFICATION

| MODEL | | STA-GE | RATIO | FG040 FGA040 | FG060 FGA060 | FG080 FGA080 | FG080A FGA080A | FG120 FGA120 | FG120A FGA120A | FG160 FGA160 | FG160A FGA160A |
|---|-----------|--------|--------|---------------------------------|-----------------|-----------------|-------------------|-----------------|-------------------|-----------------|-------------------|
| Rated output torque | Nm | 1 | 3 | 20 | 55 | 130 | - | 208 | - | 342 | - |
| | | | 4 | 19 | 50 | 140 | - | 290 | - | 542 | - |
| | | | 5 | 22 | 60 | 160 | - | 330 | - | 650 | - |
| | | | 6 | 20 | 55 | 150 | - | 310 | - | 600 | - |
| | | | 7 | 19 | 50 | 140 | - | 300 | - | 550 | - |
| | | | 8 | 17 | 45 | 120 | - | 260 | - | 500 | - |
| | | 10 | 14 | 40 | 100 | - | 230 | - | 450 | - | |
| | | 12 | 20 | 55 | 130 | 130 | 208 | 208 | 342 | 342 | |
| | | 15 | 20 | 55 | 130 | 130 | 208 | 208 | 342 | 342 | |
| | | 20 | 19 | 50 | 140 | 140 | 290 | 290 | 542 | 542 | |
| | | 25 | 22 | 60 | 160 | 160 | 330 | 330 | 650 | 650 | |
| | | 30 | 22 | 55 | 130 | 130 | 208 | 208 | 342 | 342 | |
| | | 35 | 22 | 60 | 160 | 160 | 330 | 330 | 650 | 650 | |
| | | 40 | 22 | 50 | 140 | 140 | 290 | 290 | 542 | 542 | |
| | | 50 | 22 | 60 | 160 | 160 | 330 | 330 | 650 | 650 | |
| | | 60 | 20 | 55 | 150 | 150 | 310 | 310 | 600 | 600 | |
| | | 70 | 19 | 50 | 140 | 140 | 300 | 300 | 550 | 550 | |
| | | 80 | 17 | 45 | 120 | 120 | 260 | 260 | 500 | 500 | |
| 100 | 14 | 40 | 100 | 100 | 230 | 230 | 450 | 450 | | | |
| T _{2B} /Max. output torque | Nm | 1,2 | 3~100 | 3 times the rated output torque | | | | | | | |
| n ₁ /Rated input speed | rpm | 1,2 | 3~100 | 5,000 | 5,000 | 4,000 | 4,000 | 4,000 | 4,000 | 3,000 | 3,000 |
| n _{1B} /Max. input speed | rpm | 1,2 | 3~100 | 10,000 | 10,000 | 8,000 | 8,000 | 8,000 | 8,000 | 6,000 | 6,000 |
| P2/Precision backlash | arcmin | 1 | 3~10 | ≤8 | ≤8 | ≤8 | ≤8 | ≤8 | ≤8 | ≤8 | ≤8 |
| | | 2 | 12~100 | ≤10 | ≤10 | ≤10 | ≤10 | ≤10 | ≤10 | ≤10 | ≤10 |
| Torsional rigidity | Nm/arcmin | 2 | 3~100 | 3 | 7 | 14 | 14 | 25 | 25 | 50 | 50 |
| F _{21B} ² /Allowable radial force | N | 1,2 | 3~100 | 780 | 1,530 | 3,250 | 3,250 | 6,700 | 6,700 | 9,400 | 9,400 |
| F _{21B} ² /Allowable radial force | N | 1,2 | 3~100 | 350 | 630 | 1,300 | 1,300 | 3,000 | 3,000 | 4,000 | 4,000 |
| F _{22B} ² /Allowable radial force | N | 1,2 | 3~100 | 390 | 765 | 1,625 | 1,625 | 3,350 | 3,350 | 4,700 | 4,700 |
| Life time | hr | 1,2 | 3~100 | 20,000 ¹ | | | | | | | |
| η/Efficiency | % | 1 | 03~10 | ≥97% | | | | | | | |
| | | 2 | 12~100 | ≥94% | | | | | | | |
| Weight | kg | 1 | 3~10 | 0.5 | 1.3 | 3.7 | - | 7.8 | - | 14.5 | - |
| | | 2 | 12~100 | 0.8 | 1.9 | 4.1 | 4.76 | 9 | 10.92 | 17.5 | 20.3 |
| Operating temperature | °C | 1,2 | 3~100 | -10°C ~ +90°C | | | | | | | |
| lubrication | | 1,2 | 3~100 | Synthetic lubricating grease | | | | | | | |
| Ingress protection | | 1,2 | 3~100 | IP65 | | | | | | | |
| Mount position | | 1,2 | 3~100 | Any Direction | | | | | | | |
| (n ₁ =3000rpm)/Noise level | dB | 1,2 | 3~100 | ≤56 | ≤58 | ≤60 | ≤60 | ≤63 | ≤63 | ≤65 | ≤65 |

GEARBOX MOMENT OF INERTIA

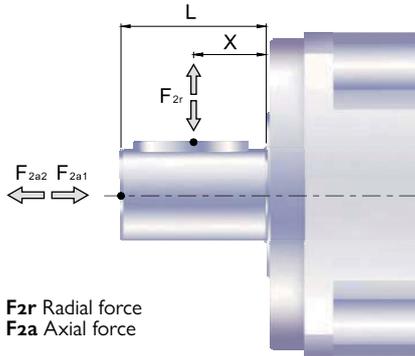
| MODEL | | STAGE | RATIO | FG040 FGR040 | FG060 FGR060 | FG080 FGR080 | FG080A FGR080A | FG120 FGR120 | FG120A FGR120A | FG160 FGR160 | FG160A FGR160A |
|-------------------|----------------------|-------|-------|-----------------|-----------------|-----------------|-------------------|-----------------|-------------------|-----------------|-------------------|
| Moment of inertia | kg · cm ² | 1 | 3 | 0.03 | 0.16 | 0.61 | - | 3.25 | - | 9.21 | - |
| | | | 4 | 0.03 | 0.14 | 0.48 | - | 2.74 | - | 7.54 | - |
| | | | 5 | 0.03 | 0.13 | 0.47 | - | 2.71 | - | 7.42 | - |
| | | | 6 | 0.03 | 0.13 | 0.45 | - | 2.65 | - | 7.25 | - |
| | | | 7 | 0.03 | 0.13 | 0.45 | - | 2.62 | - | 7.14 | - |
| | | | 8 | 0.03 | 0.13 | 0.44 | - | 2.58 | - | 7.07 | - |
| | | 10 | 0.03 | 0.13 | 0.44 | - | 2.57 | - | 7.03 | - | |
| | | 12 | 0.03 | 0.03 | 0.03 | 0.47 | 0.47 | 2.71 | 2.71 | 7.42 | |
| | | 15 | 0.03 | 0.03 | 0.03 | 0.47 | 0.47 | 2.71 | 2.71 | 7.42 | |
| | | 20 | 0.03 | 0.03 | 0.03 | 0.47 | 0.47 | 2.71 | 2.71 | 7.42 | |
| | | 25 | 0.03 | 0.03 | 0.03 | 0.47 | 0.47 | 2.71 | 2.71 | 7.42 | |
| | | 30 | 0.03 | 0.03 | 0.03 | 0.47 | 0.47 | 2.71 | 2.71 | 7.42 | |
| | | 35 | 0.03 | 0.03 | 0.03 | 0.47 | 0.47 | 2.71 | 2.71 | 7.42 | |
| | | 40 | 0.03 | 0.03 | 0.03 | 0.47 | 0.47 | 2.71 | 2.71 | 7.42 | |
| | | 50 | 0.03 | 0.03 | 0.03 | 0.44 | 0.44 | 2.57 | 2.57 | 7.03 | |
| | | 60 | 0.03 | 0.03 | 0.03 | 0.44 | 0.44 | 2.57 | 2.57 | 7.03 | |
| | | 70 | 0.03 | 0.03 | 0.03 | 0.44 | 0.44 | 2.57 | 2.57 | 7.03 | |
| | | 80 | 0.03 | 0.03 | 0.03 | 0.44 | 0.44 | 2.57 | 2.57 | 7.03 | |
| 100 | 0.03 | 0.03 | 0.03 | 0.44 | 0.44 | 2.57 | 2.57 | 7.03 | | | |

1. The lifetime will be shortened by half under continuous operation.
When the output speed is 100rpm, it applies on the center of the output shaft.



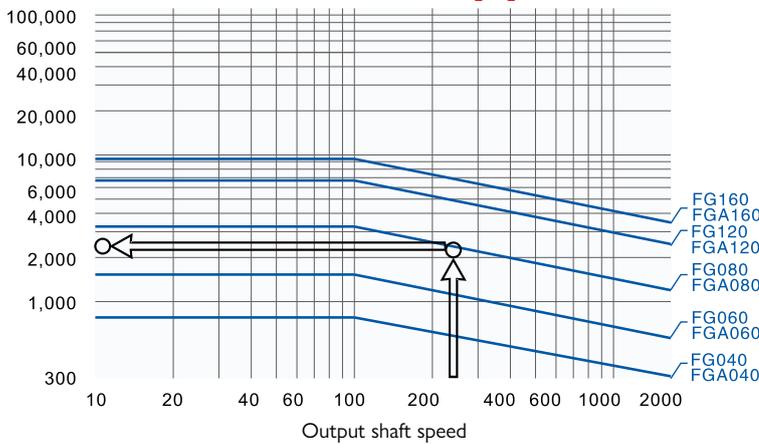
PRECISION PLANETARY GEARBOX FG/FGA SERIES

ALLOWABLE RADIAL AND AXIAL FORCES ON THE OUTPUT SHAFT OF THE GEAR REDUCER



The maximum radial and axial forces that the output shaft of the gearbox can withstand. Looking at the design of internal support bearings, the reducer adopts large-sized bearings and a design with a larger span, which can withstand greater radial and axial loads.

PERMISSIBLE RADIAL FORCE F_{2rB} [N] APPLY FORCE TO THE CENTER OF THE SHAFT

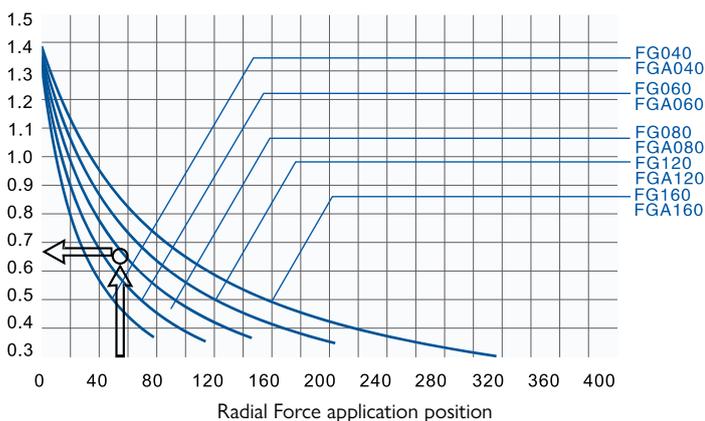


When the radial force F_{2r} is applied to the center of the shaft, i.e. $X=1/2 \times L$, the allowable radial force F_{2rB} that can be withstood by different specifications of reducers with a service life of 20,000hr* under different output speeds is as follows:

$$F_{2a1B} = 0,2 \times F_{2rB}$$

$$F_{2a2B} = 0,1 \times F_{2rB}$$

POSITIONAL LOAD COEFFICIENT



When the radial force F_{2r} is not in the center of the shaft, the closer to the gearbox, that is, $X < 1/2 \times L$, the allowable radial force that can be borne becomes larger, and the farther away from the reducer, i.e., $X > 1/2 \times L$, the allowable force that can be borne becomes smaller.

Radial force
 $F'_{2rB} = K_b \times F_{2rB}$

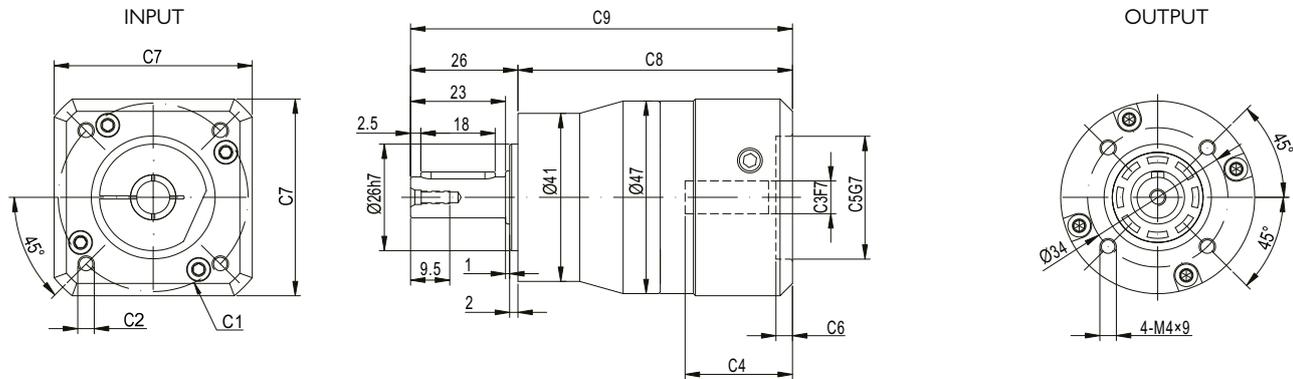
Axial force
 $F'_{2a1B} = 0,2 \times F'_{2rB}$
 $F'_{2a2B} = 0,1 \times F'_{2rB}$

*The lifetime will be shortened by half under continuous operation.

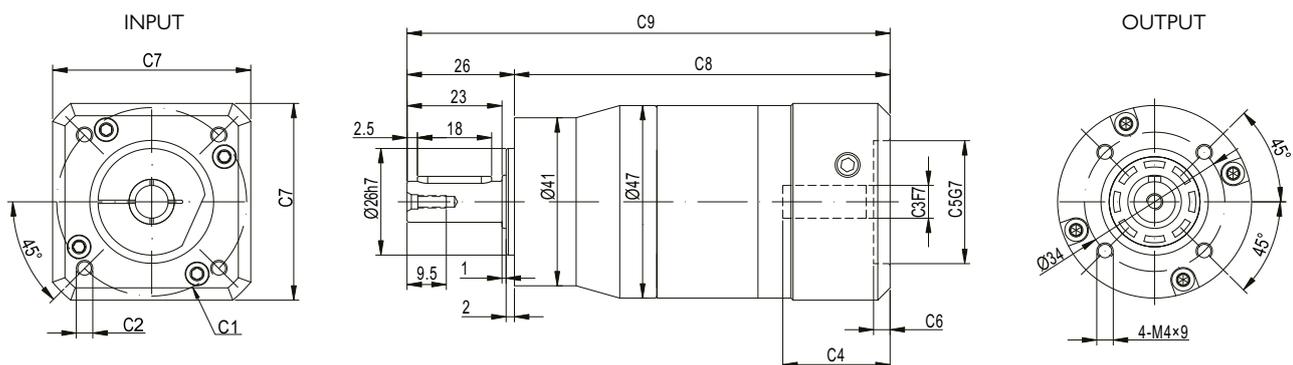
PRECISION PLANETARY GEARBOX FG/FGA SERIES

PRODUCT DIMENSION

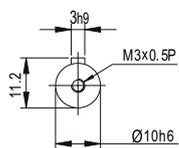
FG-040-L1



FG-040-L2



OUTPUT DIAMETER



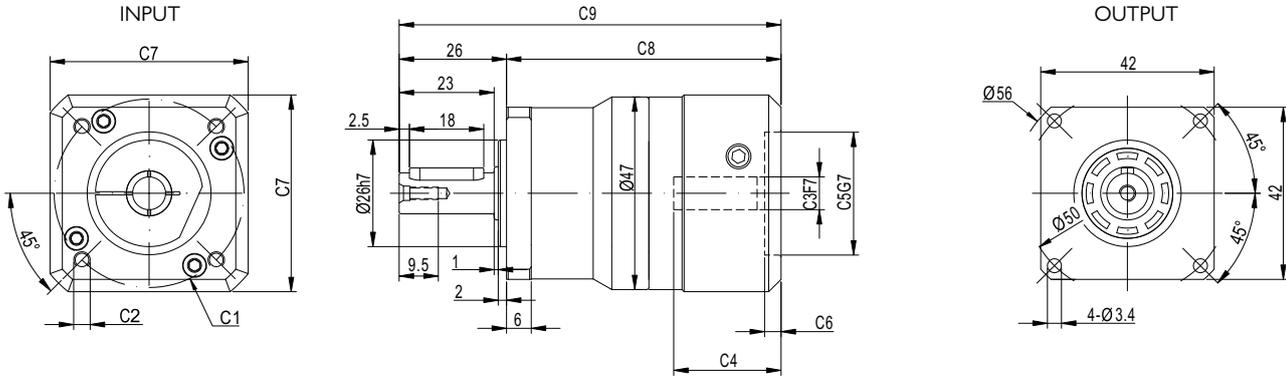
| Size | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 |
|-----------|-----|---------|----|----|-----|----|----|------|------|
| FG-040-L1 | ø46 | 4-M4x10 | ø8 | 26 | ø30 | 4 | 42 | 66,5 | 92,5 |
| | ø45 | 4-M3x8 | | | | | | | |
| FG-040-L2 | ø46 | 4-M4x10 | ø8 | 26 | ø30 | 4 | 42 | 91 | 117 |
| | ø45 | 4-M3x8 | | | | | | | |

▪ C1~C7 are motor (metric standard) specific dimensions, which could be customized.

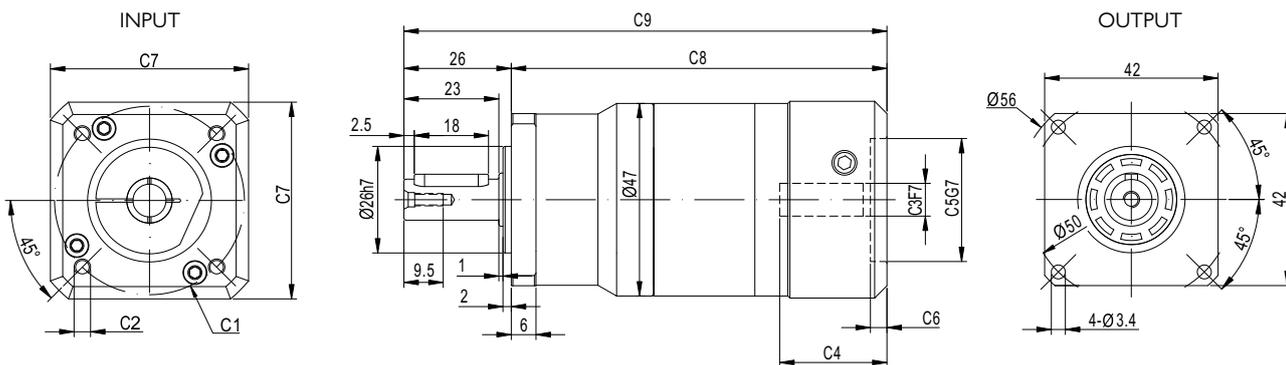
PRECISION PLANETARY GEARBOX FG/FGA SERIES

PRODUCT DIMENSION

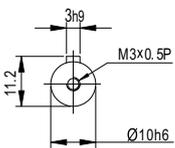
FGA-040-L1



FGA-040-L2



OUTPUT DIAMETER



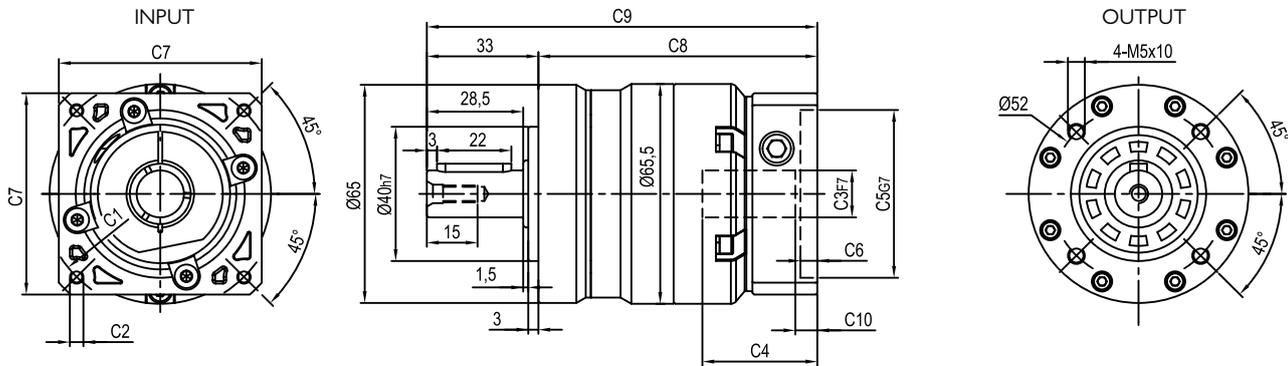
| Size | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 |
|-----------|-----|---------|----|----|-----|----|----|------|------|
| FG-040-L1 | ø46 | 4-M4x10 | ø8 | 26 | ø30 | 4 | 42 | 66,5 | 92,5 |
| | ø45 | 4-M3x8 | | | | | | | |
| FG-040-L2 | ø46 | 4-M4x10 | ø8 | 26 | ø30 | 4 | 42 | 91 | 117 |
| | ø45 | 4-M3x8 | | | | | | | |

▪ C1~C7 are motor (metric standard) specific dimensions, which could be customized.

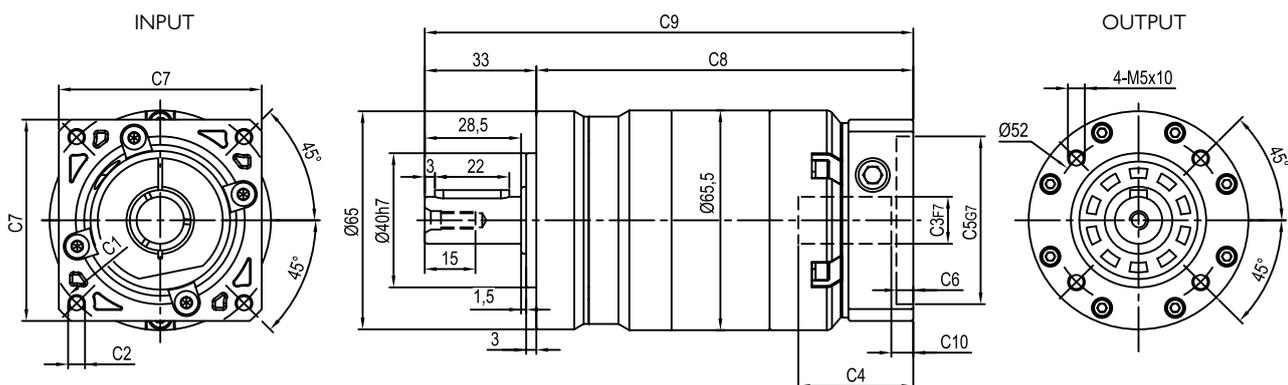
PRECISION PLANETARY GEARBOX FG/FGA SERIES

PRODUCT DIMENSION

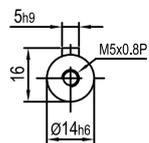
FG-060-L1



FG-060-L2



OUTPUT DIAMETER



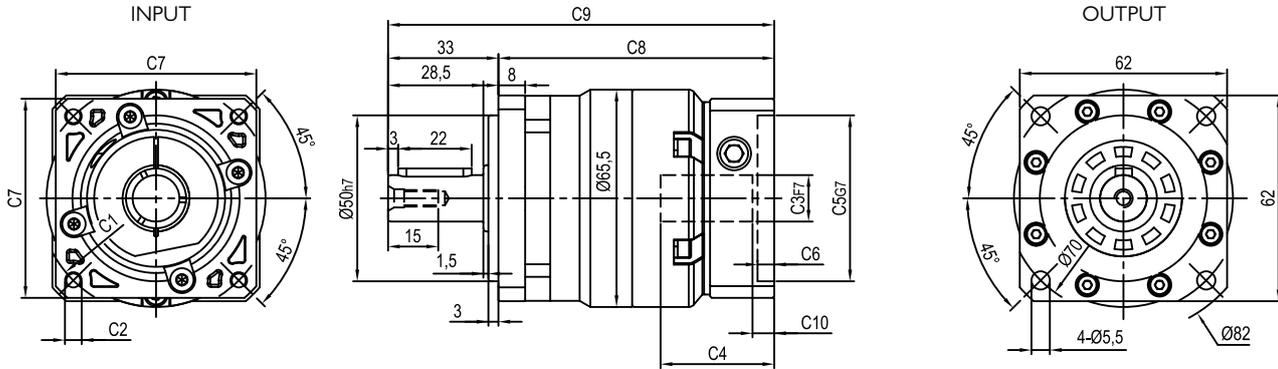
| Size | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 | C10 |
|-------------|--------------------|------------------|----------------------------------|----|--------------------|-----|----|-------|-------|-----|
| FG-060-L1 | $\varnothing 66.7$ | 4-M4x10 | $\varnothing 8$ | 34 | $\varnothing 38.1$ | 5 | 60 | 82,5 | 115,5 | 5,5 |
| FG-060-L2 | | | | | | | | 111,5 | 144,5 | 5,5 |
| FG-060-L1 | $\varnothing 70$ | 4-M4x10, 4-M5x12 | $\varnothing 11, \varnothing 14$ | 34 | $\varnothing 50$ | 5 | 60 | 82,5 | 115,5 | 5,5 |
| FG-060-L2 | | | | | | | | 111,5 | 144,5 | 5,5 |
| FG-060M1-L1 | $\varnothing 90$ | 4-M5x12, 4-M6x14 | $\varnothing 19$ | 42 | $\varnothing 70$ | 6,5 | 80 | 89 | 122 | 12 |
| FG-060M1-L2 | | | | | | | | 118 | 151 | 12 |

- C1~C7 are motor (metric standard) specific dimensions, which could be customized.
- M1: Limit hole (Version number)

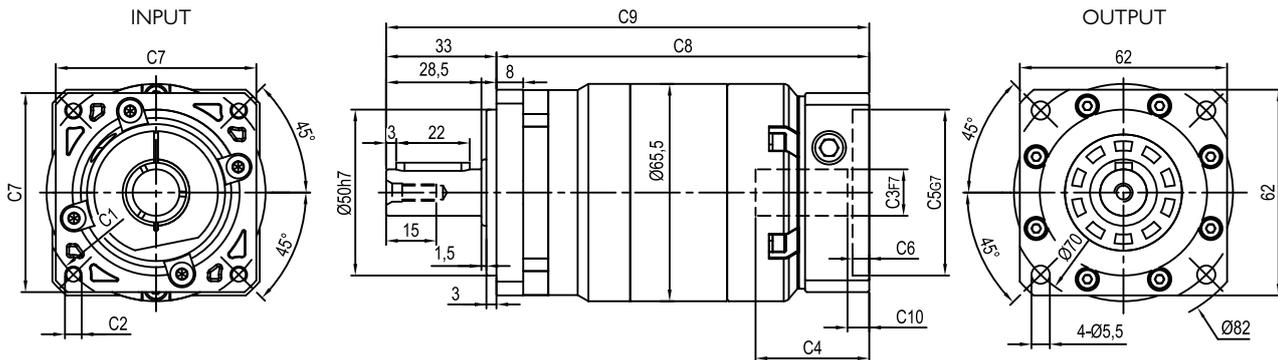
PRECISION PLANETARY GEARBOX FG/FGA SERIES

PRODUCT DIMENSION

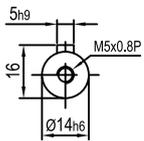
FGA-060-L1



FGA-060-L2



OUTPUT DIAMETER



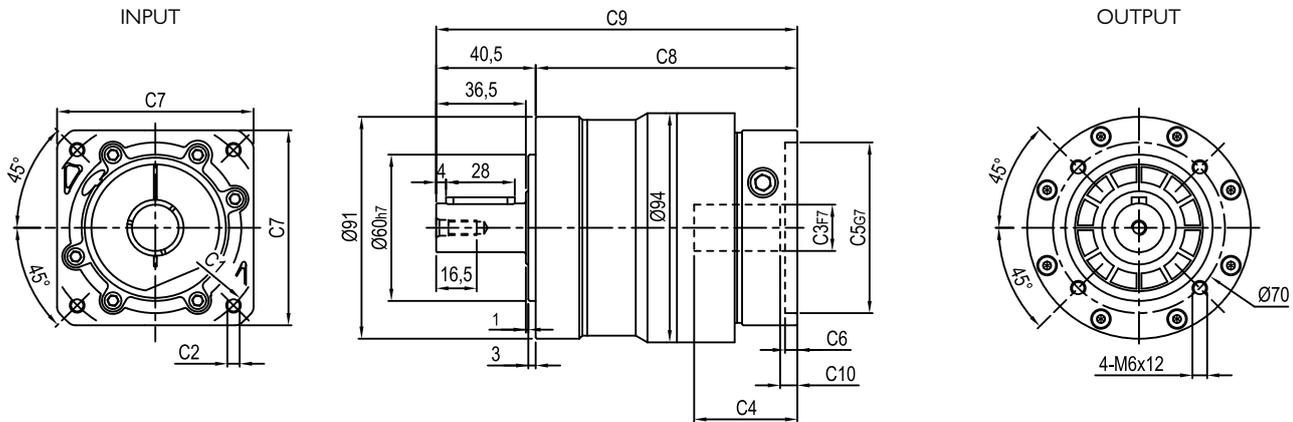
| Size | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 | C10 |
|--------------|-------|------------------|----------|----|-------|-----|----|-------|-------|-----|
| FGA-060-L1 | ø66.7 | 4-M4x10 | ø8 | 34 | ø38,1 | 5 | 60 | 82,5 | 115,5 | 5,5 |
| FGA-060-L2 | | | | | | | | 111,5 | 144,5 | 5,5 |
| FGA-060-L1 | ø70 | 4-M4x10, 4-M5x12 | ø11, ø14 | 34 | ø50 | 5 | 60 | 82,5 | 115,5 | 5,5 |
| FGA-060-L2 | | | | | | | | 111,5 | 144,5 | 5,5 |
| FGA-060M1-L1 | ø90 | 4-M5x12, 4-M6x14 | ø19 | 42 | ø70 | 6,5 | 80 | 89 | 122 | 12 |
| FGA-060M2-L2 | | | | | | | | 118 | 151 | 12 |

- C1~C7 are motor (metric standard) specific dimensions, which could be customized.
- M1: Limit hole (Version number)

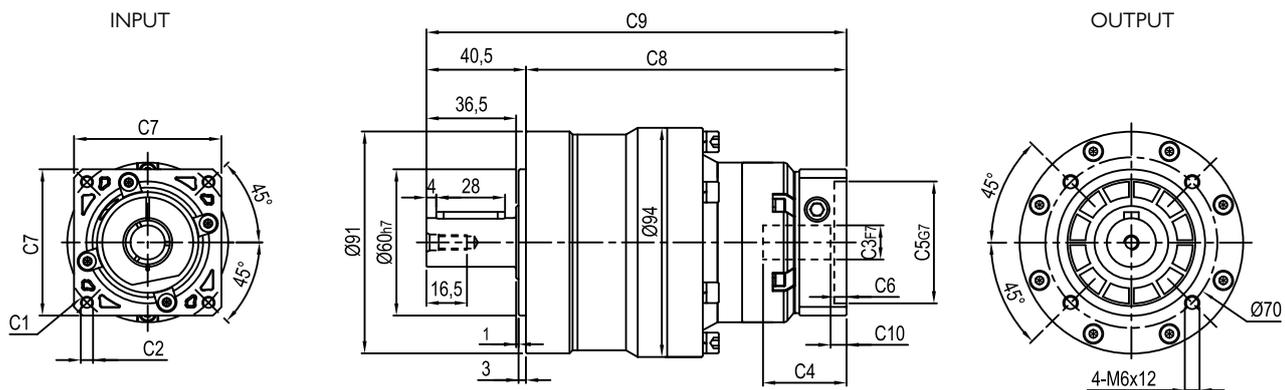
PRECISION PLANETARY GEARBOX FG/FGA SERIES

PRODUCT DIMENSION

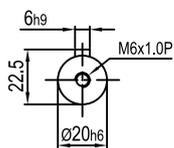
FG-080-L1



FG-080-L2



OUTPUT DIAMETER



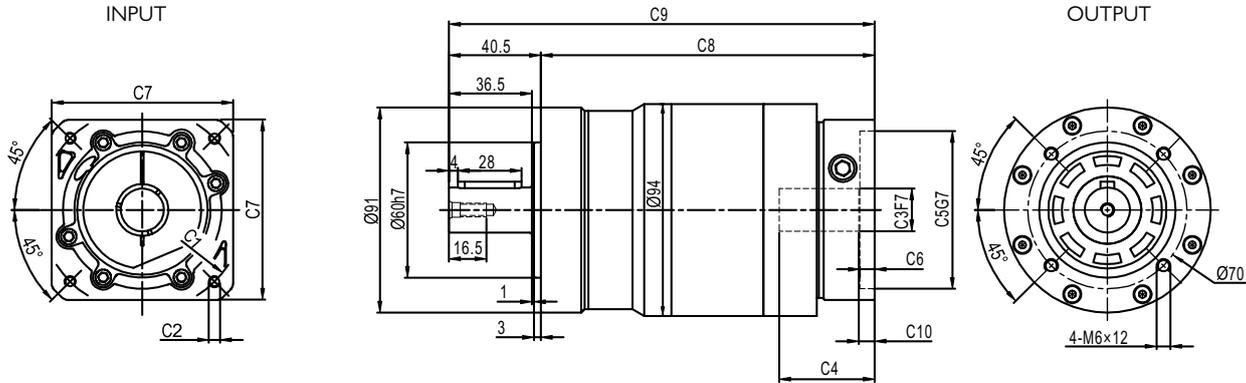
| Size | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 | C10 |
|-------------|-------|------------------|---------------|------|-------|-----|-----|-------|-------|------|
| FG-080-L1 | ø90 | 4-M5x12, 4-M6x14 | ø19 | 42 | ø70 | 6,5 | 80 | 106,5 | 147 | 7 |
| | ø100 | 4-M6x14 | ø16 | 42 | ø80 | 6,5 | 86 | 106,5 | 147 | 6 |
| FG-080M1-L1 | ø115 | 4-M8x20 | ø19, ø22 | 56,5 | ø95 | 8 | 100 | 122 | 162,5 | 16,5 |
| | ø145 | 4-M8x20 | ø19, ø22, ø24 | 59 | ø110 | 11 | 130 | 124,5 | 165 | 19 |
| FG-080-L2 | ø66.7 | 4-M4x10 | ø8 | 34 | ø38,1 | 5 | 60 | 130,5 | 171 | 5,5 |
| | ø70 | 4-M4x10, 4-M5x12 | ø11, ø14 | 34 | ø50 | 5 | 60 | 130,5 | 171 | 5,5 |
| FG-080M1-L2 | ø90 | 4-M5x12, 4-M6x14 | ø19 | 42 | ø70 | 6,5 | 80 | 137 | 177,5 | 12 |
| | ø100 | 4-M6x14 | ø16 | 42 | ø80 | 6,5 | 86 | 137 | 177,5 | 11 |

- C1~C7 are motor (metric standard) specific dimensions, which could be customized.
- M1: Limit hole (Version number)

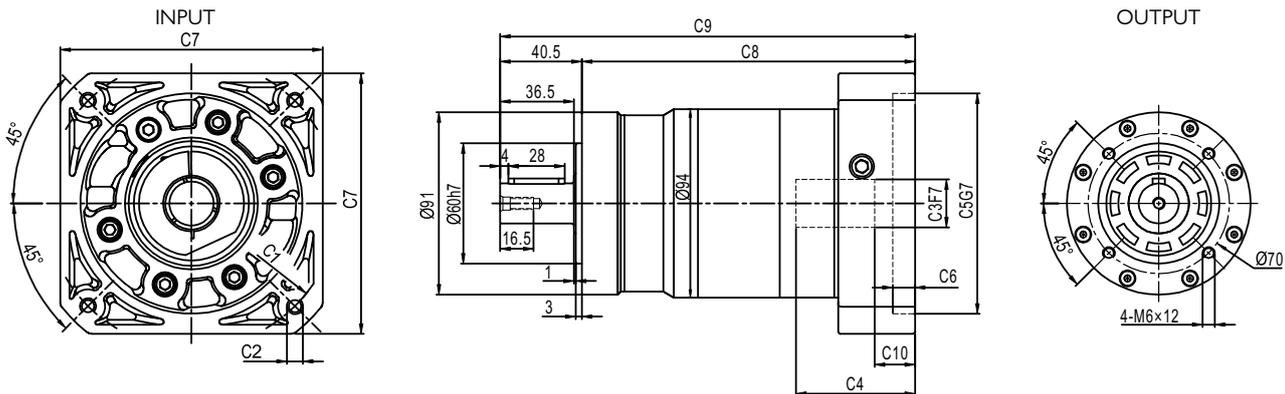
PRECISION PLANETARY GEARBOX FG/FGA SERIES

PRODUCT DIMENSION

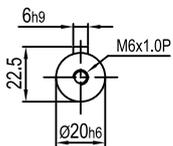
FG-080A-L2



FG-080A-L2



OUTPUT DIAMETER



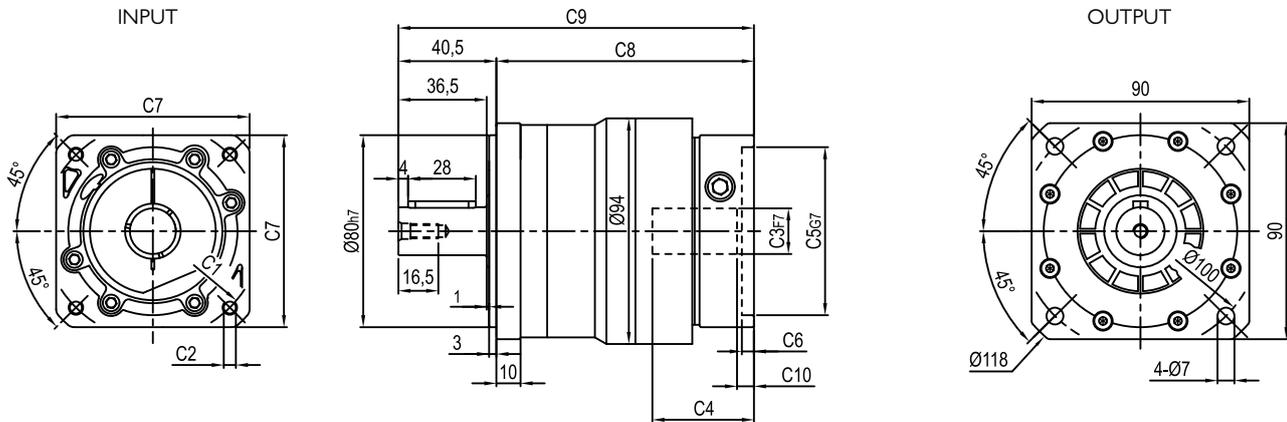
| Size | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 | C10 |
|--------------|------|------------------|---------------|------|------|-----|-----|-------|-------|------|
| FG-080A-L2 | ø90 | 4-M5x12, 4-M6x14 | ø19 | 42 | ø70 | 6,5 | 80 | 147 | 187,5 | 7 |
| | ø100 | 4-M6x14 | ø16 | 42 | ø80 | 6,5 | 86 | 147 | 187,5 | 6 |
| FG-080AM1-L2 | ø115 | 4-M8x20 | ø19, ø22 | 56,5 | ø95 | 8 | 100 | 162,5 | 203 | 16,5 |
| | ø145 | 4-M8x20 | ø19, ø22, ø24 | 59 | ø110 | 10 | 130 | 165 | 205,5 | 19 |

- C1~C7 are motor (metric standard) specific dimensions, which could be customized.
- M1: Limit hole (Version number)

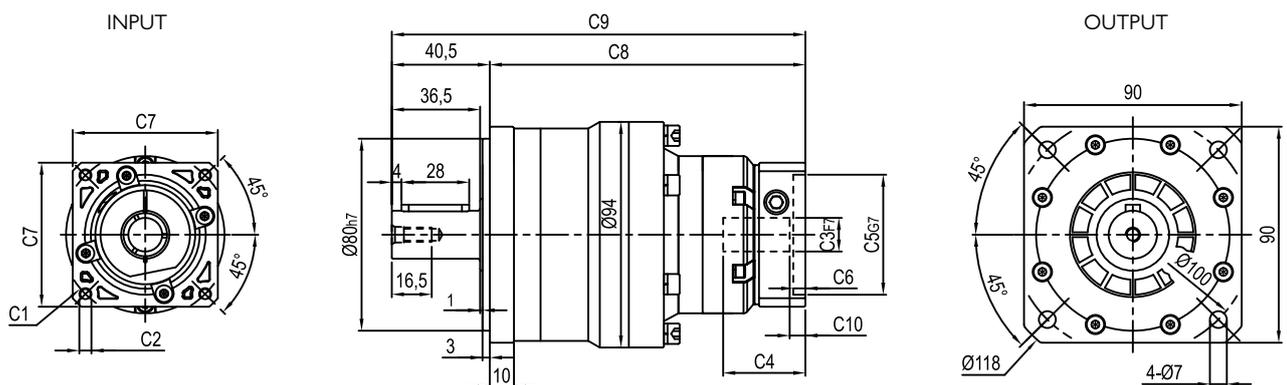
PRECISION PLANETARY GEARBOX FGA/FGA SERIES

PRODUCT DIMENSION

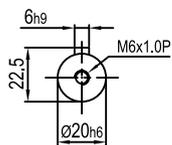
FGA-080-L1



FGA-080-L2



OUTPUT DIAMETER



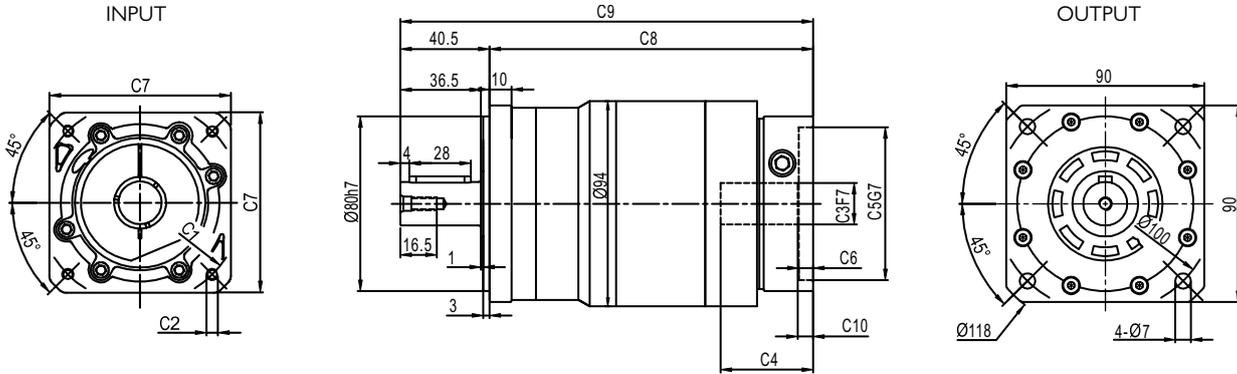
| Size | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 | C10 |
|--------------|-------|------------------|---------------|------|-------|-----|-----|-------|-------|------|
| FGA-080-L1 | ø90 | 4-M5x12, 4-M6x14 | ø19 | 42 | ø70 | 6,5 | 80 | 106,5 | 147 | 7 |
| | ø100 | 4-M6x14 | ø16 | 42 | ø80 | 6,5 | 86 | 106,5 | 147 | 6 |
| FGA-080M1-L1 | ø115 | 4-M8x20 | ø19, ø22 | 56,5 | ø95 | 8 | 100 | 122 | 162,5 | 16,5 |
| | ø145 | 4-M8x20 | ø19, ø22, ø24 | 59 | ø110 | 11 | 130 | 124,5 | 165 | 19 |
| FGA-080-L2 | ø66.7 | 4-M4x10 | ø8 | 34 | ø38,1 | 5 | 60 | 130,5 | 171 | 5,5 |
| | ø70 | 4-M4x10, 4-M5x12 | ø11, ø14 | 34 | ø50 | 5 | 60 | 130,5 | 171 | 5,5 |
| FGA-080M1-L2 | ø90 | 4-M5x12, 4-M6x14 | ø19 | 42 | ø70 | 6,5 | 80 | 137 | 177,5 | 12 |
| | ø100 | 4-M6x14 | ø16 | 42 | ø80 | 6,5 | 86 | 137 | 177,5 | 11 |

- C1~C7 are motor (metric standard) specific dimensions, which could be customized.
- M1: Limit hole (Version number)

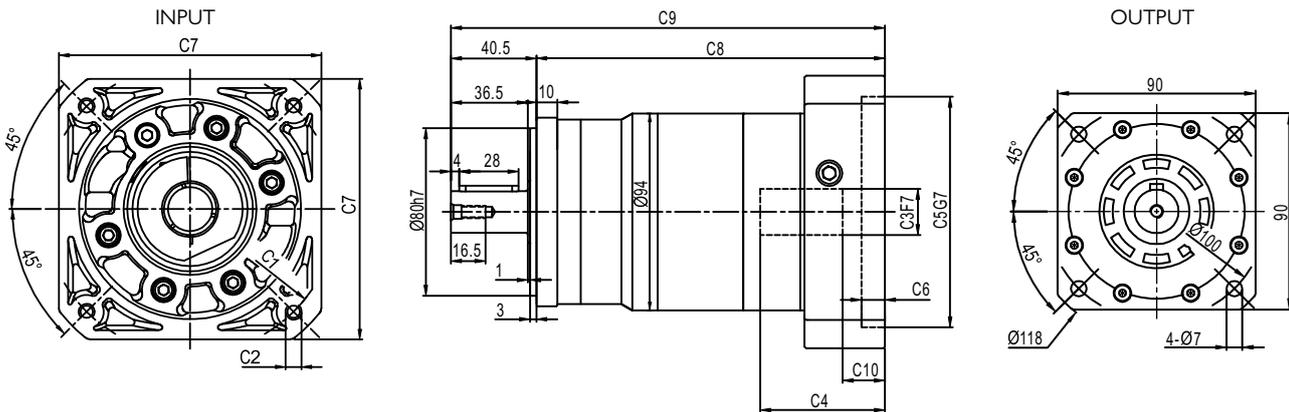
PRECISION PLANETARY GEARBOX FG/FGA SERIES

PRODUCT DIMENSION

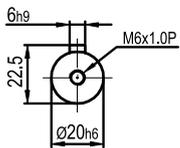
FGA-080A-L2



FGA-080A-L2



OUTPUT DIAMETER



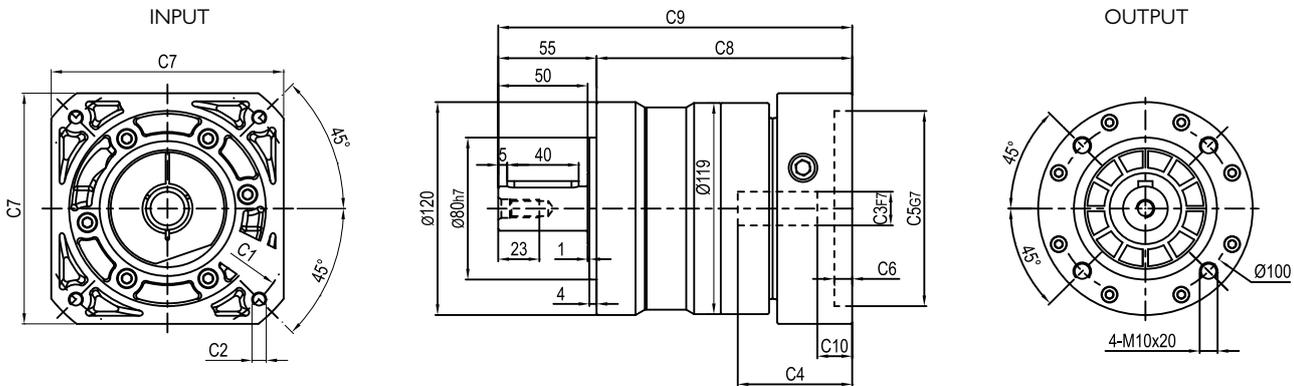
| Size | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 | C10 |
|---------------|-------------------|------------------|--|------|-------------------|-----|-----|-------|-------|------|
| FGA-080A-L2 | $\varnothing 90$ | 4-M5x12, 4-M6x14 | $\varnothing 19$ | 42 | $\varnothing 70$ | 6,5 | 80 | 147 | 187,5 | 7 |
| | $\varnothing 100$ | 4-M6x14 | $\varnothing 16$ | 42 | $\varnothing 80$ | 6,5 | 86 | 147 | 187,5 | 6 |
| FGA-080AM1-L2 | $\varnothing 115$ | 4-M8x20 | $\varnothing 19, \varnothing 22$ | 56,5 | $\varnothing 95$ | 8 | 100 | 162,5 | 203 | 16,5 |
| | $\varnothing 145$ | 4-M8x20 | $\varnothing 19, \varnothing 22, \varnothing 24$ | 59 | $\varnothing 110$ | 10 | 130 | 165 | 205,5 | 19 |

- C1~C7 are motor (metric standard) specific dimensions, which could be customized.
- M1: Limit hole (Version number)

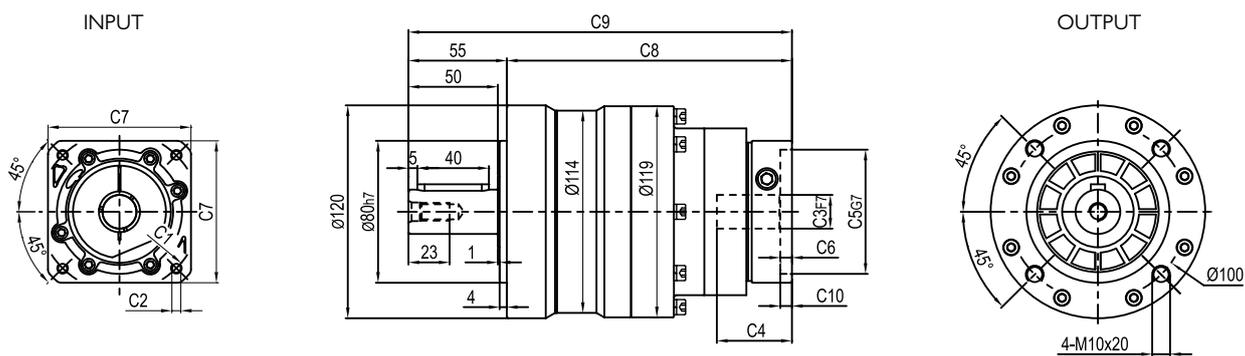
PRECISION PLANETARY GEARBOX FG/FGA SERIES

PRODUCT DIMENSION

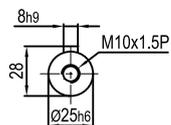
FG-120-L1



FG-120-L2



OUTPUT DIAMETER



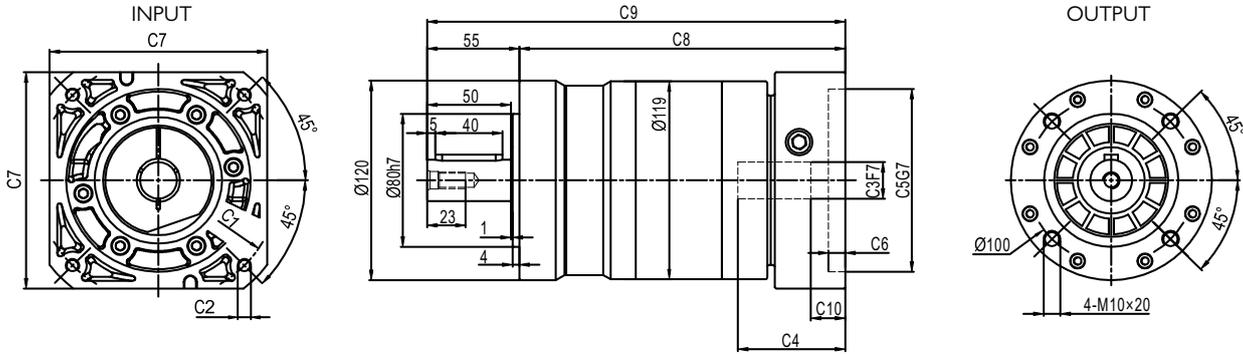
| Size | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 | C10 |
|-------------|------|------------------|---------------|------|--------|-----|-----|-------|-------|------|
| FG-120-L1 | Ø145 | 4-M8x20 | Ø19, Ø22, Ø24 | 64 | Ø110 | 10 | 130 | 143 | 198 | 19,5 |
| FG-120M1-L1 | Ø200 | 4-M12x28 | Ø35 | 81 | Ø114,3 | 10 | 180 | 160,5 | 215,5 | 28 |
| FG-120-L2 | Ø90 | 4-M5x12, 4-M6x14 | Ø19 | 42 | Ø70 | 6,5 | 80 | 159,5 | 214,5 | 7 |
| | Ø100 | 4-M6x14 | Ø16 | 42 | Ø80 | 6,5 | 86 | 159,5 | 214,5 | 6 |
| FG-120M1-L2 | Ø115 | 4-M8x20 | Ø19, Ø22 | 56,5 | Ø95 | 8 | 100 | 175 | 230 | 16,5 |
| | Ø145 | 4-M8x20 | Ø19, Ø22, Ø24 | 59 | Ø110 | 11 | 130 | 177,5 | 232,5 | 19 |

- C1~C7 are motor (metric standard) specific dimensions, which could be customized.
- M1: Limit hole (Version number)

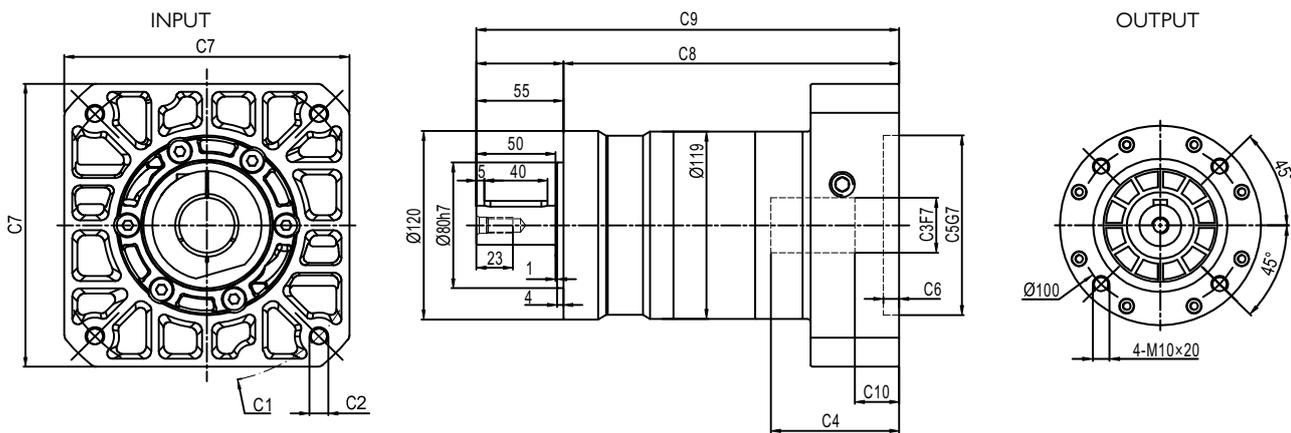
PRECISION PLANETARY GEARBOX FG/FGA SERIES

PRODUCT DIMENSION

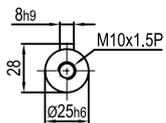
FG-120A-L2



FG-120A-L2



OUTPUT DIAMETER



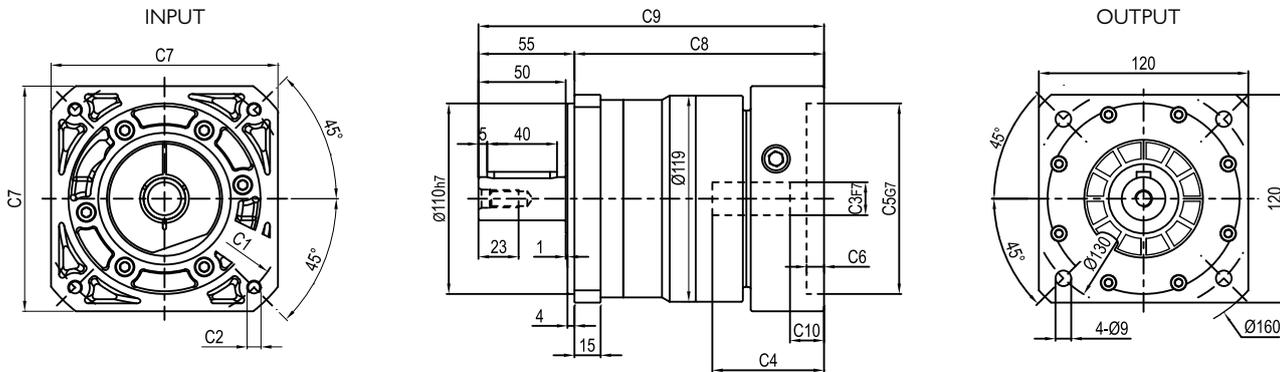
| Size | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 | C10 |
|--------------|------|----------|---------------|----|--------|----|-----|-------|-------|------|
| FG-120A-L1 | ø145 | 4-M8x20 | ø19, ø22, ø24 | 64 | ø110 | 10 | 130 | 194,5 | 249,5 | 19,5 |
| FG-120AM1-L1 | ø200 | 4-M12x28 | ø35 | 81 | ø114,3 | 10 | 180 | 212 | 267 | 28 |

- C1-C7 are motor (metric standard) specific dimensions, which could be customized.
- M1: Limit hole (Version number)

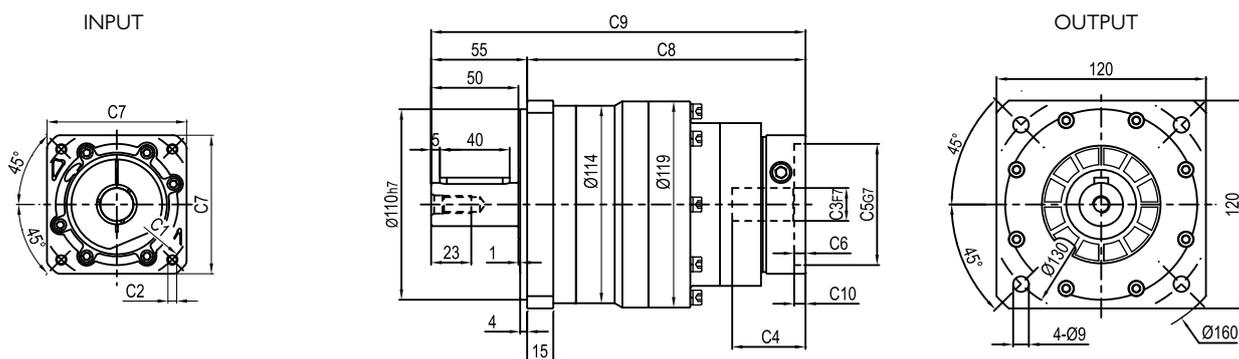
PRECISION PLANETARY GEARBOX FG/FGA SERIES

PRODUCT DIMENSION

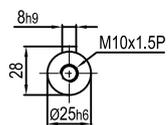
FGA-120-L1



FGA-120-L2



OUTPUT DIAMETER



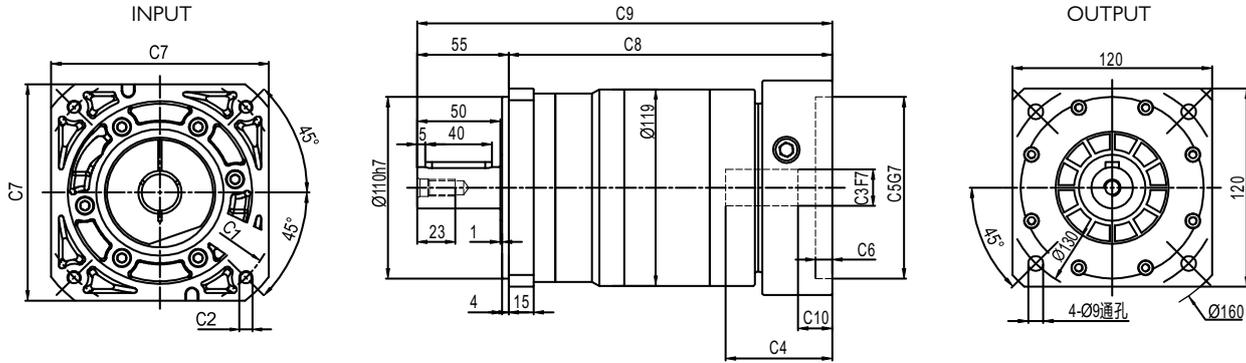
| Size | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 | C10 |
|--------------|------|------------------|---------------|------|--------|-----|-----|-------|-------|------|
| FGA-120-L1 | Ø145 | 4-M8x20 | Ø19, Ø22, Ø24 | 64 | Ø110 | 10 | 130 | 143 | 198 | 19,5 |
| FGA-120M1-L1 | Ø200 | 4-M12x28 | Ø35 | 81 | Ø114,3 | 10 | 180 | 160,5 | 215,5 | 28 |
| FGA-120-L2 | Ø90 | 4-M5x12, 4-M6x14 | Ø19 | 42 | Ø70 | 6,5 | 80 | 159,5 | 214,5 | 7 |
| | Ø100 | 4-M6x14 | Ø16 | 42 | Ø80 | 6,5 | 86 | 159,5 | 214,5 | 6 |
| FGA-120M1-L2 | Ø115 | 4-M8x20 | Ø19, Ø22 | 56,5 | Ø95 | 8 | 100 | 175 | 230 | 16,5 |
| | Ø145 | 4-M8x20 | Ø19, Ø22, Ø24 | 59 | Ø110 | 11 | 130 | 177,5 | 232,5 | 19 |

- C1~C7 are motor (metric standard) specific dimensions, which could be customized.
- M1: Limit hole (Version number)

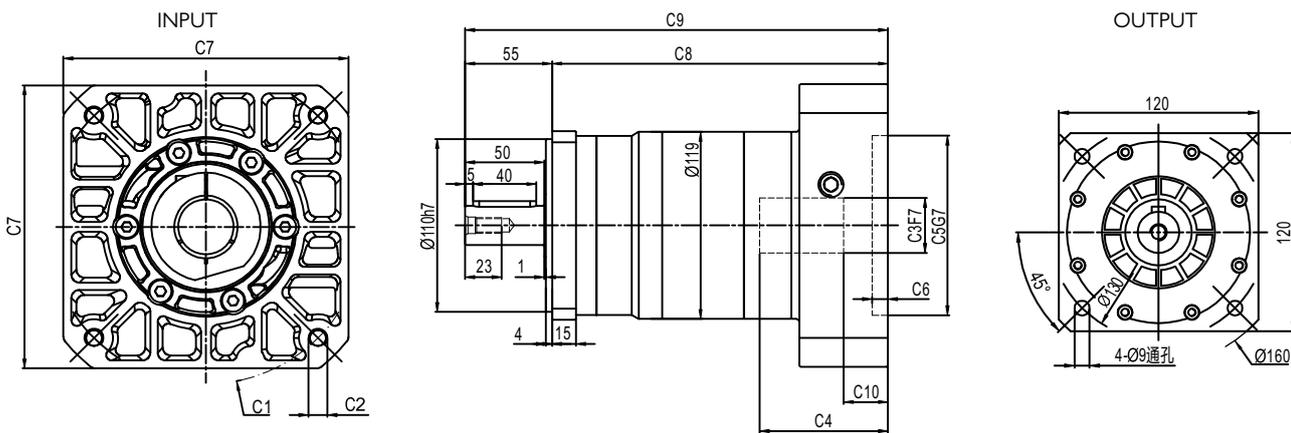
PRECISION PLANETARY GEARBOX FG/FGA SERIES

PRODUCT DIMENSION

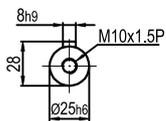
FGA-120A-L2



FGA-120A-L2



OUTPUT DIAMETER



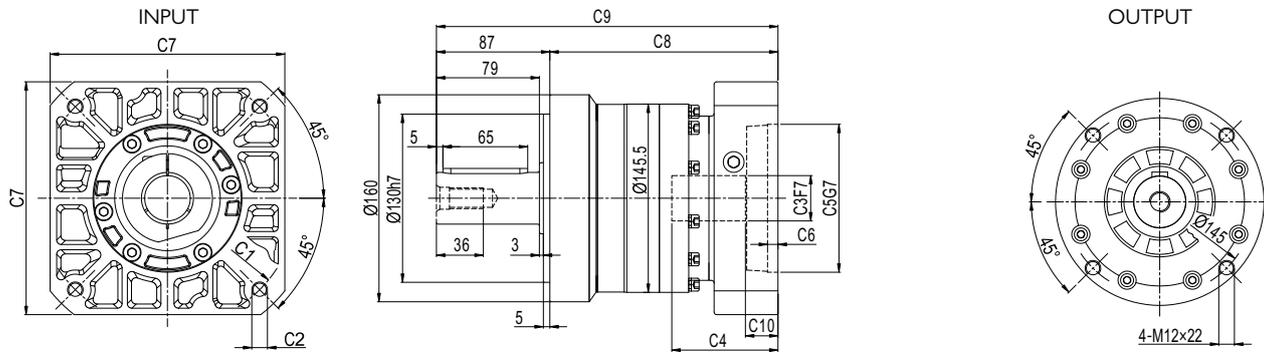
| Size | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 | C10 |
|---------------|-------------------|----------|--|----|---------------------|----|-----|-------|-------|------|
| FGA-120A-L2 | $\varnothing 145$ | 4-M8x20 | $\varnothing 19, \varnothing 22, \varnothing 24$ | 64 | $\varnothing 110$ | 10 | 130 | 194,5 | 249,5 | 19,5 |
| FGA-120AM1-L2 | $\varnothing 200$ | 4-M12x28 | $\varnothing 35$ | 81 | $\varnothing 114,3$ | 10 | 180 | 212 | 267 | 28 |

- C1-C7 are motor (metric standard) specific dimensions, which could be customized.
- M1: Limit hole (Version number)

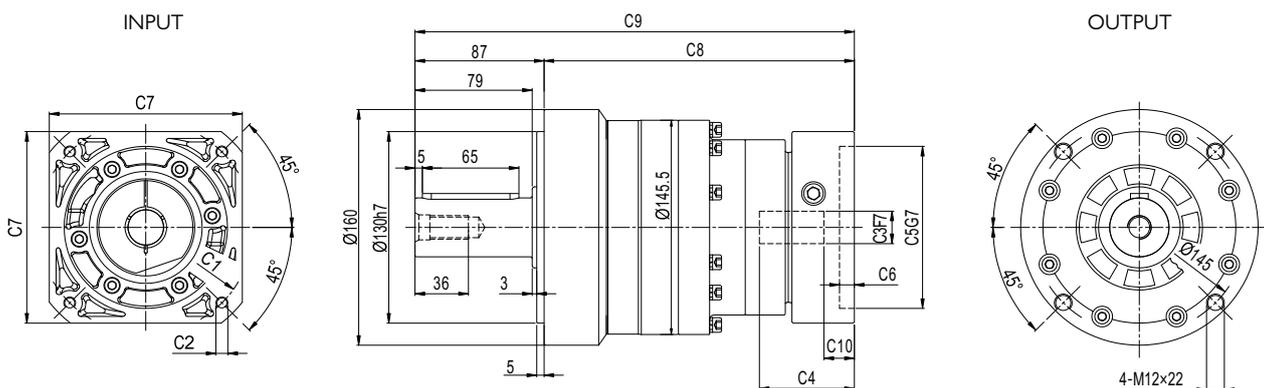
PRECISION PLANETARY GEARBOX FG/FGA SERIES

PRODUCT DIMENSION

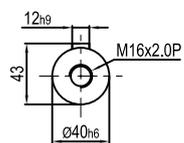
FG-160-L1



FG-160-L2



OUTPUT DIAMETER



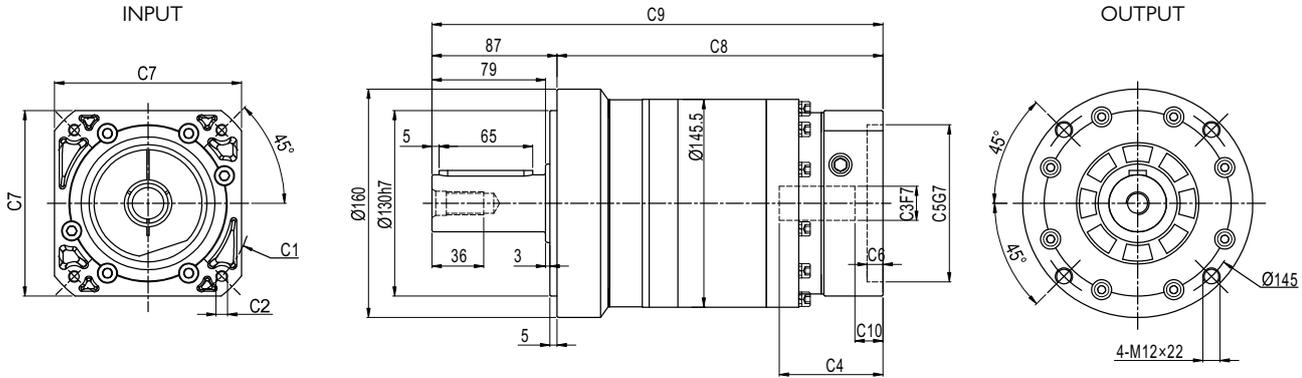
| Size | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 | C10 |
|-------------|------|----------|---------------|------|--------|----|-----|-------|-------|------|
| FG-160-L1 | ø145 | 4-M8x20 | ø22, ø24 | 72 | ø110 | 11 | 130 | 165 | 252 | 19,5 |
| | ø200 | 4-M12x28 | ø35 | 81,5 | ø114,3 | 8 | 180 | 175 | 262 | 25 |
| FG-160-L2 | ø145 | 4-M8x20 | ø19, ø22, ø24 | 64 | ø110 | 10 | 130 | 209 | 296 | 19,5 |
| FG-160M1-L2 | ø200 | 4-M12x28 | ø35 | 81 | ø114,3 | 10 | 180 | 226,5 | 313,5 | 28 |

- C1~C7 are motor (metric standard) specific dimensions, which could be customized.
- M1: Limit hole (Version number)

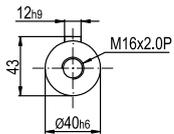
PRECISION PLANETARY GEARBOX FG/FGA SERIES

PRODUCT DIMENSION

FG-160A-L2



OUTPUT DIAMETER



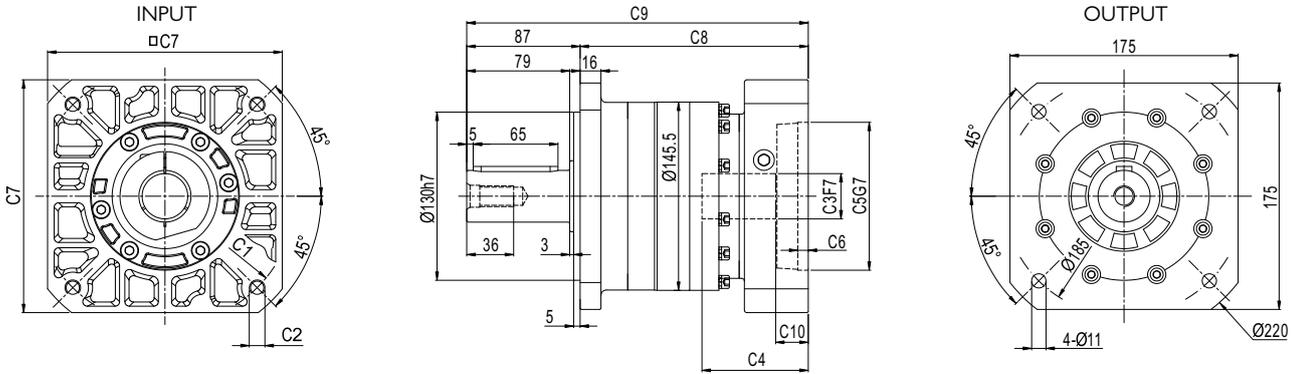
| Size | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 | C10 |
|------------|-------------------|----------|----------------------------------|------|---------------------|----|-----|-------|-------|------|
| FG-160A-L2 | $\varnothing 145$ | 4-M8x20 | $\varnothing 22, \varnothing 24$ | 72 | $\varnothing 110$ | 11 | 130 | 226,5 | 313,5 | 19,5 |
| | $\varnothing 200$ | 4-M12x28 | $\varnothing 35$ | 81,5 | $\varnothing 114,3$ | 8 | 180 | 236,5 | 323,5 | 25 |

- C1~C7 are motor (metric standard) specific dimensions, which could be customized.

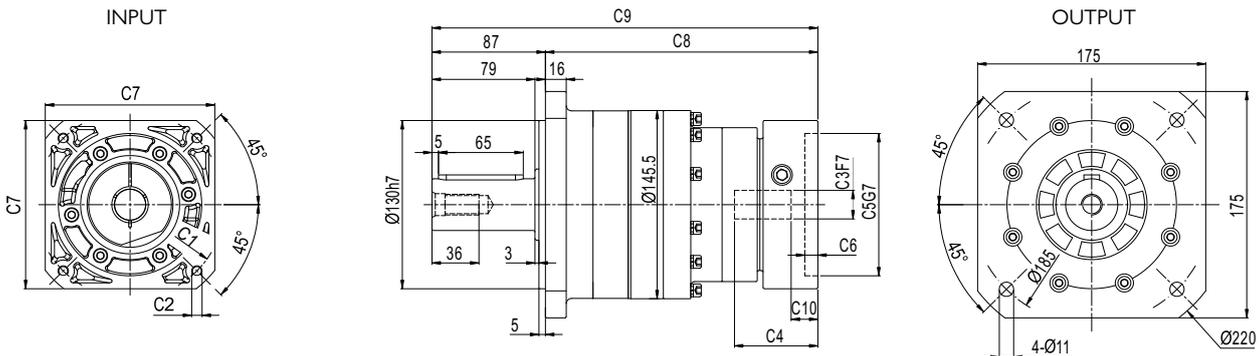
PRECISION PLANETARY GEARBOX FGA/FGA SERIES

PRODUCT DIMENSION

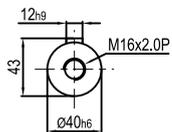
FGA-160-L1



FGA-160-L2



OUTPUT DIAMETER



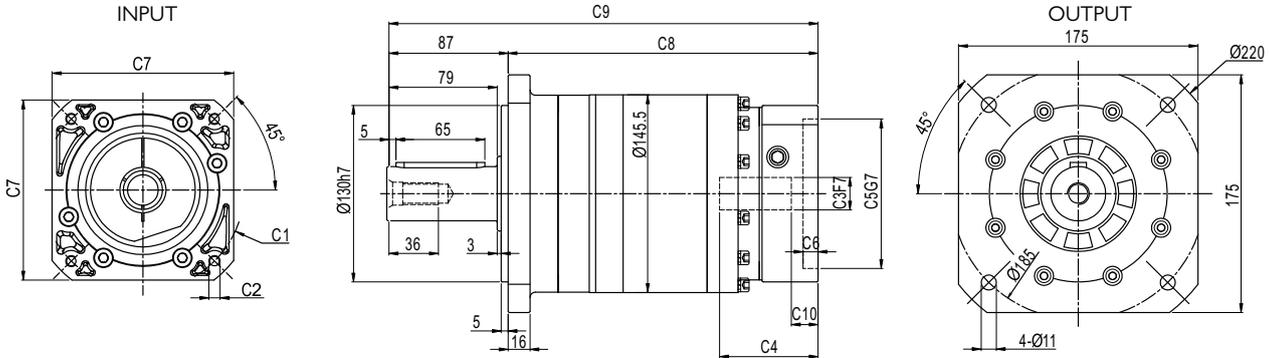
| Size | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 | C10 |
|--------------|-------------------|----------|--|------|---------------------|----|-----|-------|-------|------|
| FGA-160-L1 | $\varnothing 145$ | 4-M8x20 | $\varnothing 22, \varnothing 24$ | 72 | $\varnothing 110$ | 11 | 130 | 165 | 252 | 19,5 |
| | $\varnothing 200$ | 4-M12x28 | $\varnothing 35$ | 81,5 | $\varnothing 114,3$ | 8 | 180 | 175 | 262 | 25 |
| FGA-160-L2 | $\varnothing 145$ | 4-M8x20 | $\varnothing 19, \varnothing 22, \varnothing 24$ | 64 | $\varnothing 110$ | 10 | 130 | 209 | 296 | 19,5 |
| FGA-160M1-L2 | $\varnothing 200$ | 4-M12x28 | $\varnothing 35$ | 81 | $\varnothing 114,3$ | 10 | 180 | 226,5 | 313,5 | 28 |

- C1~C7 are motor (metric standard) specific dimensions, which could be customized.
- M1: Limit hole (Version number)

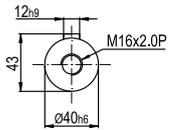
PRECISION PLANETARY GEARBOX FG/FGA SERIES

PRODUCT DIMENSION

FGA-160A-L2



OUTPUT DIAMETER



| Size | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 | C10 |
|-------------|-------------------|----------|----------------------------------|------|---------------------|----|-----|-------|-------|------|
| FGA-160A-L2 | $\varnothing 145$ | 4-M8x20 | $\varnothing 22, \varnothing 24$ | 72 | $\varnothing 110$ | 11 | 130 | 226,5 | 313,5 | 19,5 |
| | $\varnothing 200$ | 4-M12x28 | $\varnothing 35$ | 81,5 | $\varnothing 114,3$ | 8 | 180 | 236,5 | 323,5 | 25 |

- C1~C7 are motor (metric standard) specific dimensions, which could be customized.

CHIARAVALLI LINEAR CENTER

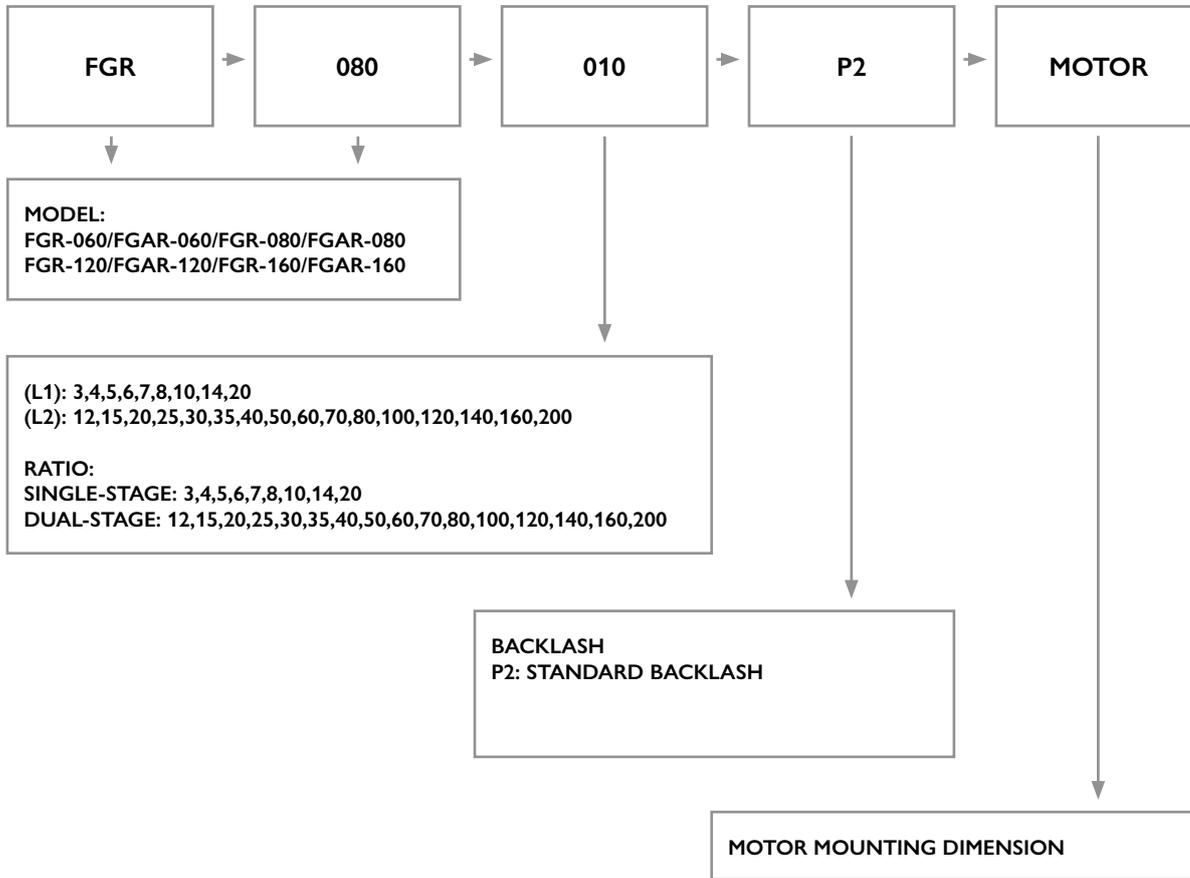
**PRECISION PLANETARY GEARBOX
FGR/FGAR SERIES**



PRECISION PLANETARY GEARBOX FGR/FGAR SERIES

MODEL DESCRIPTION

FGR-080-010-P2-19-70-90-M6-45





PRECISION PLANETARY GEARBOX FGR/FGAR SERIES

TECHNICAL SPECIFICATION

| MODEL | | STAGE | RATIO | FGR060 FGAR060 | FGR080 FGAR080 | FGR080A FGAR080A | FGR120 FGAR120 | FGR120A FGAR120A | FGR160 FGAR160 | FGR160A FGAR160A |
|--|-----------|-------|--------|---------------------------------|-------------------|---------------------|-------------------|---------------------|-------------------|---------------------|
| Rated output torque | Nm | 1 | 3 | 55 | 130 | - | 208 | - | 342 | - |
| | | | 4 | 50 | 140 | - | 290 | - | 542 | - |
| | | | 5 | 60 | 160 | - | 330 | - | 650 | - |
| | | | 6 | 55 | 150 | - | 310 | - | 600 | - |
| | | | 7 | 50 | 140 | - | 300 | - | 550 | - |
| | | | 8 | 50 | 140 | - | 290 | - | 542 | - |
| | | | 10 | 60 | 160 | - | 330 | - | 650 | - |
| | | | 14 | 50 | 140 | - | 300 | - | 550 | - |
| | | 20 | 40 | 100 | - | 230 | - | 450 | - | |
| | | 12 | 55 | 130 | 130 | 208 | 208 | 342 | 342 | |
| | | 15 | 55 | 130 | 130 | 208 | 208 | 342 | 342 | |
| | | 20 | 50 | 140 | 140 | 290 | 290 | 542 | 542 | |
| | | 25 | 60 | 160 | 160 | 330 | 330 | 650 | 650 | |
| | | 30 | 55 | 130 | 130 | 208 | 208 | 342 | 342 | |
| | | 35 | 60 | 160 | 160 | 330 | 330 | 650 | 650 | |
| | | 40 | 50 | 140 | 140 | 290 | 290 | 542 | 542 | |
| | | 50 | 60 | 160 | 160 | 330 | 330 | 650 | 650 | |
| | | 60 | 55 | 150 | 150 | 310 | 310 | 600 | 600 | |
| | | 70 | 60 | 160 | 160 | 330 | 330 | 650 | 650 | |
| | | 80 | 50 | 140 | 140 | 290 | 290 | 542 | 542 | |
| 100 | 60 | 160 | 160 | 330 | 330 | 650 | 650 | | | |
| 120 | - | 150 | 150 | 310 | 310 | 600 | 600 | | | |
| 140 | - | 140 | 140 | 300 | 300 | 550 | 550 | | | |
| 160 | - | 120 | 120 | 260 | 260 | 500 | 500 | | | |
| 200 | - | 100 | 100 | 230 | 230 | 450 | 450 | | | |
| T _{2B} /Max. output torque | Nm | 1,2 | 3~200 | 3 times the rated output torque | | | | | | |
| n ₁ /Rated input speed | rpm | 1,2 | 3~200 | 5,000 | 4,000 | 4,000 | 4,000 | 4,000 | 3,000 | 3,000 |
| n _{1B} /Max. input speed | rpm | 1,2 | 3~200 | 10,000 | 8,000 | 8,000 | 8,000 | 8,000 | 6,000 | 6,000 |
| P2/Precision backlash | arcmin | 1 | 3~20 | ≤13 | ≤13 | ≤13 | ≤13 | ≤13 | ≤13 | ≤13 |
| | | 2 | 12~200 | ≤15 | ≤15 | ≤15 | ≤15 | ≤15 | ≤15 | ≤15 |
| Torsional rigidity | Nm/arcmin | 1,2 | 3~200 | 7 | 14 | 14 | 25 | 25 | 50 | 50 |
| F _{2rB} ² /Allowable radial force | N | 1,2 | 3~200 | 1,530 | 3,250 | 3,250 | 6,700 | 6,700 | 9,400 | 9,400 |
| F _{2a1B} ² /Allowable radial force | N | 1,2 | 3~200 | 630 | 1,300 | 1,300 | 3,000 | 3,000 | 4,000 | 4,000 |
| F _{2a2B} ² /Allowable radial force | N | 1,2 | 3~200 | 765 | 1,625 | 1,625 | 3,350 | 3,350 | 4,700 | 4,700 |
| Life time | hr | 1,2 | 3~200 | 20,000 ¹ | | | | | | |
| η/Efficiency | % | 1 | 3~20 | ≤95% | | | | | | |
| | | 2 | 12~200 | ≤92% | | | | | | |
| Weight | kg | 1 | 3~20 | 2.1 | 6.4 | - | 13 | - | 24.5 | - |
| | | 2 | 12~200 | 2.5 | 7.8 | 7.8 | 14.2 | 14.2 | 27.5 | 27.5 |
| Operating temperature | °C | 1,2 | 3~200 | -10°C ~ +90°C | | | | | | |
| Lubrication | | 1,2 | 3~200 | Synthetic lubricating grease | | | | | | |
| Ingress protectbn | | 1,2 | 3~200 | IP65 | | | | | | |
| Mount position | | 1,2 | 3~200 | Any direction | | | | | | |
| (n ₁ =3000rpm)/Noise level | dB | 1,2 | 3~200 | ≤63 | ≤65 | ≤65 | ≤68 | ≤68 | ≤70 | ≤70 |

GEARBOX MOMENT OF INERTIA

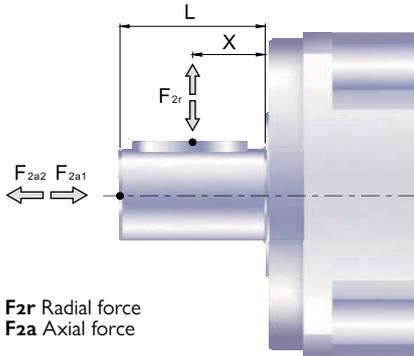
| MODEL | | STAGE | RATIO | FGR060 FGAR060 | FGR080 FGAR080 | FGR080A FGAR080A | FGR120 FGAR120 | FGR120A FGAR120A | FGR160 FGAR160 | FGR160A FGAR160A |
|-------------------|----------------------|-------|---------|-------------------|-------------------|---------------------|-------------------|---------------------|-------------------|---------------------|
| Moment of inertia | kg • cm ² | 1 | 3~7 | 0.35 | 2.25 | - | 6.84 | - | 23.4 | - |
| | | | 8~10 | 0.07 | 1.87 | - | 6.25 | - | 21.8 | - |
| | | | 14~20 | 0.07 | 1.87 | - | 6.25 | - | 21.8 | - |
| | | 2 | 12~40 | 0.09 | 0.35 | 0.35 | 2.25 | 2.25 | 6.84 | 6.84 |
| | | | 50 | 0.09 | 0.31 | 0.31 | 1.87 | 1.87 | 6.25 | 6.25 |
| | | | 60 | 0.09 | 0.35 | 0.35 | 2.25 | 2.25 | 6.84 | 6.84 |
| | | | 70~100 | 0.09 | 0.31 | 0.31 | 1.87 | 1.87 | 6.25 | 6.25 |
| | | | 120~200 | - | 0.31 | 0.31 | 1.87 | 1.87 | 6.25 | 6.25 |

1. The lifetime will be shortened by half under continuous operation.
When the output speed is 100rpm, it applies on the center of the output shaft.



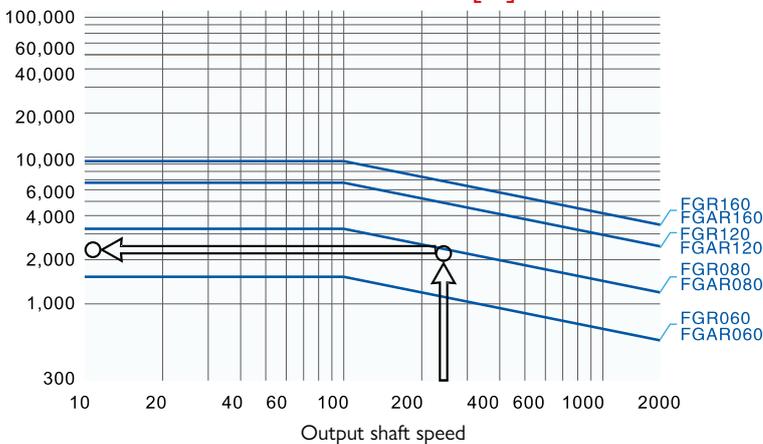
PRECISION PLANETARY GEARBOX FGR/FGAR SERIES

ALLOWABLE RADIAL AND AXIAL FORCES ON THE OUTPUT SHAFT OF THE GEAR REDUCER



The maximum radial and axial forces that the output shaft of the gearbox can withstand. Looking at the design of internal support bearings, the reducer adopts large-sized bearings and a design with a larger span, which can withstand greater radial and axial loads.

PERMISSIBLE RADIAL FORCE F_{2rB} [N] APPLY FORCE TO THE CENTER OF THE SHAFT

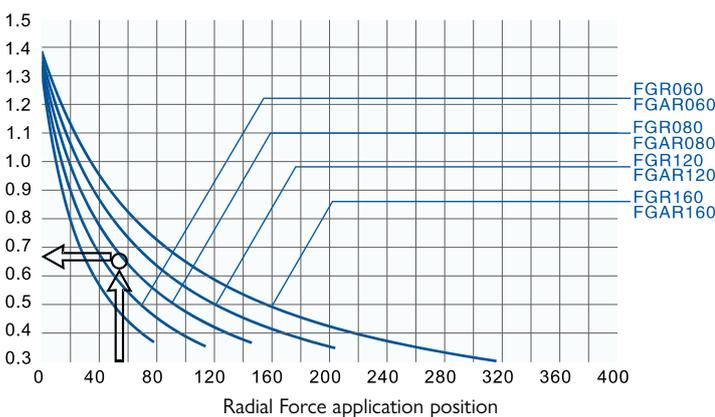


When the radial force F_{2r} is applied to the center of the shaft, i.e. $X=1/2 \times L$, the allowable radial force F_{2rB} that can be withstood by different specifications of reducers with a service life of 20,000hr* under different output speeds is as follows:

$$F_{2a1B} = 0,2 \times F_{2rB}$$

$$F_{2a2B} = 0,1 \times F_{2rB}$$

POSITIONAL LOAD COEFFICIENT



When the radial force F_{2r} is not in the center of the shaft, the closer to the gearbox, that is, $X < 1/2 \times L$, the allowable radial force that can be borne becomes larger, and the farther away from the reducer, i.e., $X > 1/2 \times L$, the allowable force that can be borne becomes smaller.

Radial force
 $F'_{2rB} = K_b \times F_{2rB}$

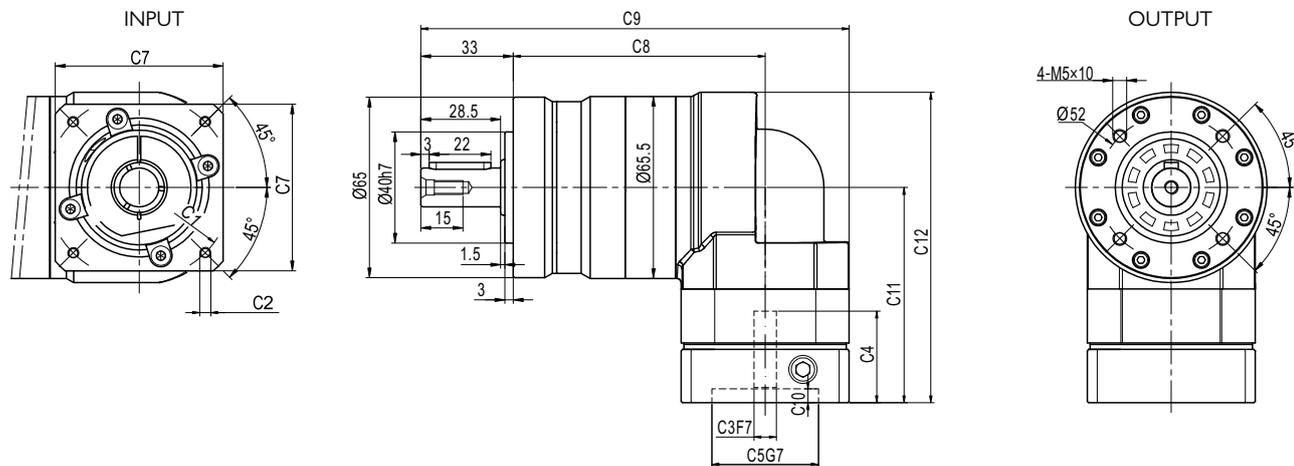
Axial force
 $F'_{2a1B} = 0,2 \times F'_{2rB}$
 $F'_{2a2B} = 0,1 \times F'_{2rB}$

*The lifetime will be shortened by half under continuous operation.

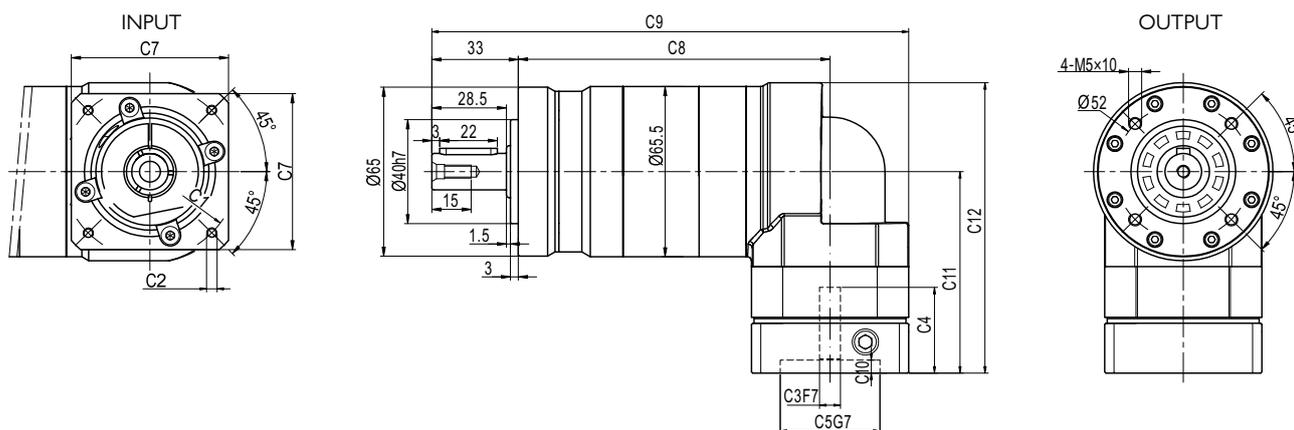
PRECISION PLANETARY GEARBOX FGR/FGAR SERIES

PRODUCT DIMENSION

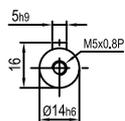
FGR-060-L1



FGR-060-L2



OUTPUT DIAMETER



| Size | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 | C10 | C11 | C12 |
|--------------|-------|------------------|----------|------|-------|-----|----|-----|-----|-----|------|--------|
| FGR-060-L1 | ø66,7 | 4-M4x10 | ø8 | 33 | ø38,1 | 5 | 60 | 90 | 153 | 5,5 | 77,5 | 111,75 |
| FGR-060-L2 | | | | | | | | 119 | 182 | | | |
| FGR-060-L1 | ø70 | 4-M4x10, 4-M5x12 | ø11, ø14 | 33 | ø50 | 5 | 60 | 90 | 153 | 5,5 | 77,5 | 111,75 |
| FGR-060-L2 | | | | | | | | 119 | 182 | | | |
| FGR-060M1-L1 | ø90 | 4-M5x12, 4-M6x14 | ø19 | 42,5 | ø70 | 6,5 | 80 | 90 | 163 | 12 | 87 | 121,25 |
| FGR-060M1-L2 | | | | | | | | 119 | 192 | | | |

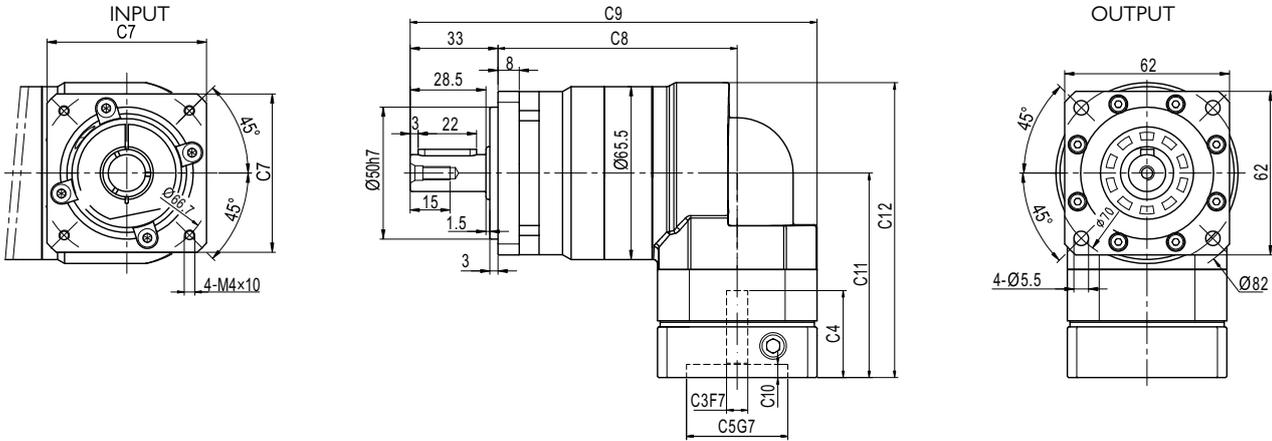
- C1~C7 are motor (metric standard) specific dimensions, which could be customized.
- M1: Limit hole (Version number)



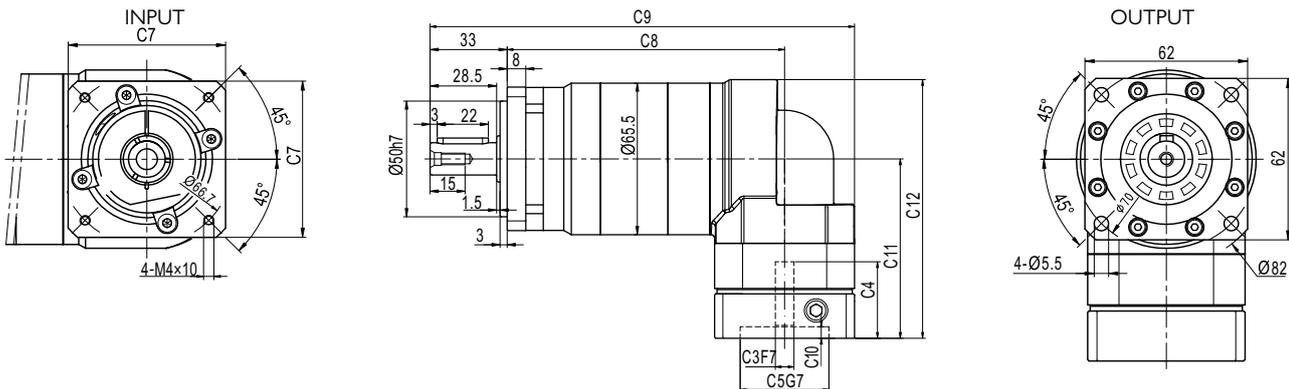
PRECISION PLANETARY GEARBOX FGR/FGAR SERIES

PRODUCT DIMENSION

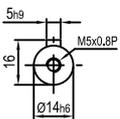
FGAR-060-L1



FGAR-060-L2



OUTPUT DIAMETER



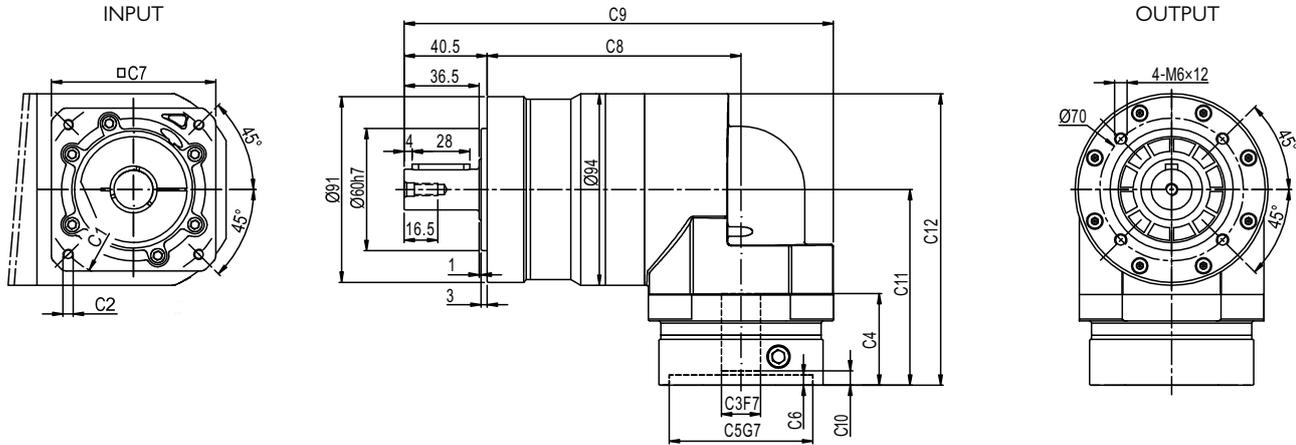
| Size | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 | C10 | C11 | C12 |
|---------------|-------|------------------|----------|------|-------|-----|----|-----|-----|-----|------|--------|
| FGAR-060-L1 | Ø66,7 | 4-M4x10 | Ø8 | 33 | Ø38,1 | 5 | 60 | 90 | 153 | 5,5 | 77,5 | 111,75 |
| FGAR-060-L2 | | | | | | | | 119 | 182 | | | |
| FGAR-060-L1 | Ø70 | 4-M4x10, 4-M5x12 | Ø11, Ø14 | 33 | Ø50 | 5 | 60 | 90 | 153 | 5,5 | 77,5 | 111,75 |
| FGAR-060-L2 | | | | | | | | 119 | 182 | | | |
| FGAR-060M1-L1 | Ø90 | 4-M5x12, 4-M6x14 | Ø19 | 42,5 | Ø70 | 6,5 | 80 | 90 | 163 | 12 | 87 | 121,25 |
| FGAR-060M1-L2 | | | | | | | | 119 | 192 | | | |

- C1~C7 are motor (metric standard) specific dimensions, which could be customized.
- M1: Limit hole (Version number)

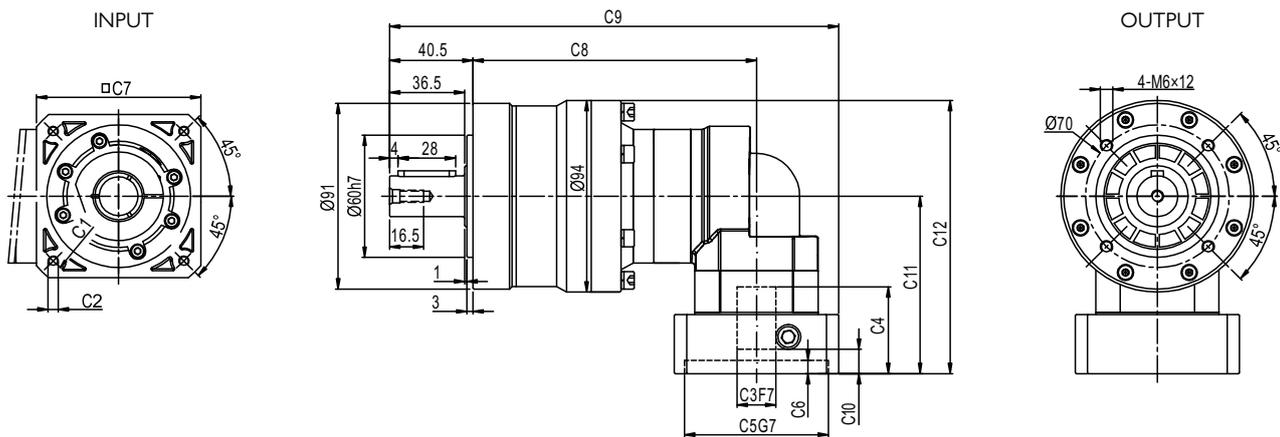
PRECISION PLANETARY GEARBOX FGR/FGAR SERIES

PRODUCT DIMENSION

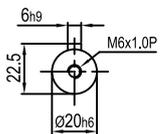
FGR-080-L1



FGR-080-L2



OUTPUT DIAMETER



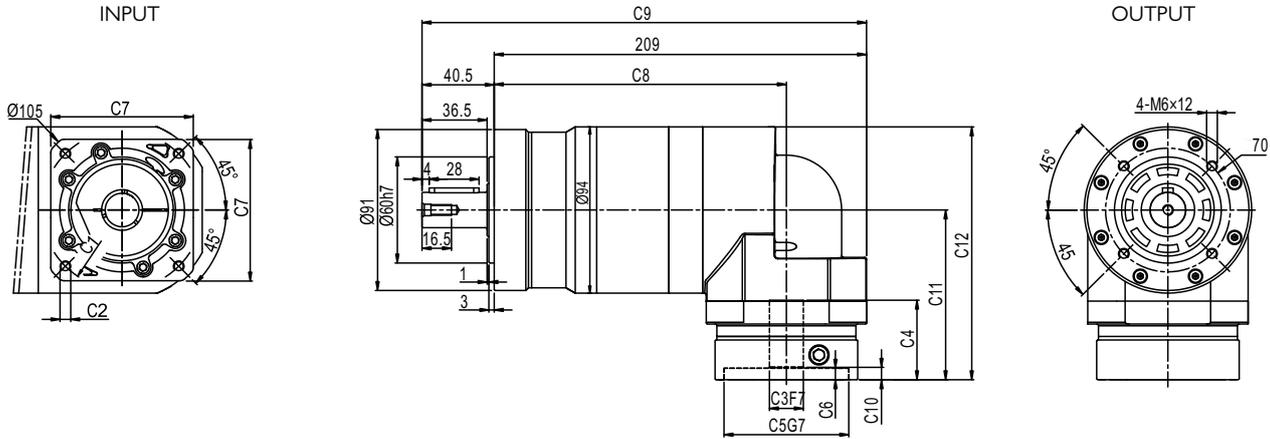
| Size | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 | C10 | C11 | C12 |
|--------------|-------|------------------|---------------|------|-------|------|-----|-------|-------|------|-------|-------|
| FGR-080-L1 | ø90 | 4-M5x12, 4-M6x14 | ø19 | 45 | ø70 | 6,5 | 80 | 123,5 | 209 | 7 | 96 | 143 |
| | ø100 | 4-M6x14 | ø16 | 45 | ø80 | 6,5 | 86 | 123,5 | 209 | 6 | 96 | 143 |
| FGR-080M1-L1 | ø115 | 4-M8x20 | ø19, ø22 | 56,5 | ø95 | 8 | 100 | 123,5 | 214 | 16,5 | 117,5 | 164,5 |
| | ø145 | 4-M8x20 | ø19, ø22, ø24 | 59 | ø110 | 11 | 130 | 123,5 | 229 | 19 | 120 | 167 |
| FGR-080-L2 | ø66,7 | 4-M4x10 | ø8 | 33 | ø38,1 | 5 | 60 | 138 | 208,5 | 5,5 | 77,5 | 124,5 |
| | ø70 | 4-M4x10, 4-M5x12 | ø11, ø14 | 33 | ø50 | 5 | 60 | 138 | 208,5 | 5,5 | 77,5 | 124,5 |
| FGR-080M1-L2 | ø90 | 4-M5x12, 4-M6x14 | ø19 | 42,5 | ø70 | 6,5 | 80 | 138 | 218,5 | 12 | 87 | 134 |
| | ø100 | 4-M6x14 | ø16 | 42,5 | ø80 | 6,55 | 86 | 138 | 221,5 | 11 | 87 | 134 |

- C1~C7 are motor (metric standard) specific dimensions, which could be customized.
- M1: Limit hole (Version number)

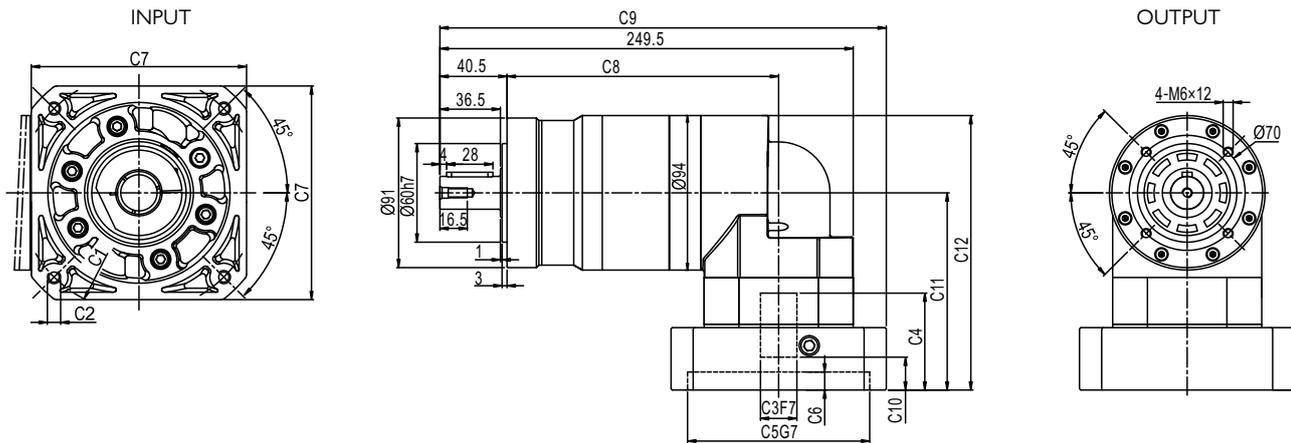
PRECISION PLANETARY GEARBOX FGR/FGAR SERIES

PRODUCT DIMENSION

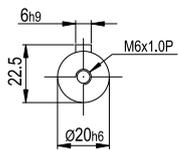
FGR-080A-L2



FGR-080A-L2



OUTPUT DIAMETER



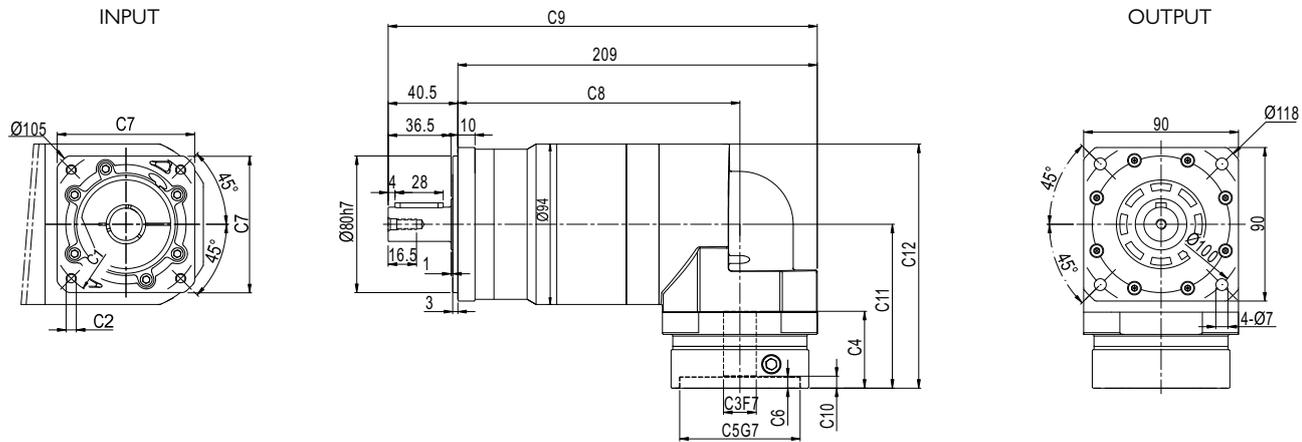
| Size | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 | C10 | C11 | C12 |
|---------------|------|------------------|---------------|------|------|-----|-----|-----|-------|------|-------|-------|
| FGR-080A-L2 | ø90 | 4-M5x12, 4-M6x14 | ø19 | 45 | ø70 | 6,5 | 80 | 164 | 249,5 | 7 | 96 | 143 |
| | ø100 | 4-M6x14 | ø16 | 45 | ø80 | 6,5 | 86 | 164 | 249,5 | 6 | 96 | 143 |
| FGR-080AM1-L2 | ø115 | 4-M8x20 | ø19, ø22 | 56,5 | ø95 | 8 | 100 | 164 | 254,5 | 16,5 | 117,5 | 164,5 |
| | ø145 | 4-M8x20 | ø19, ø22, ø24 | 59 | ø110 | 10 | 130 | 164 | 269,5 | 19 | 120 | 167 |

- C1~C7 are motor (metric standard) specific dimensions, which could be customized.
- M1: Limit hole (Version number)

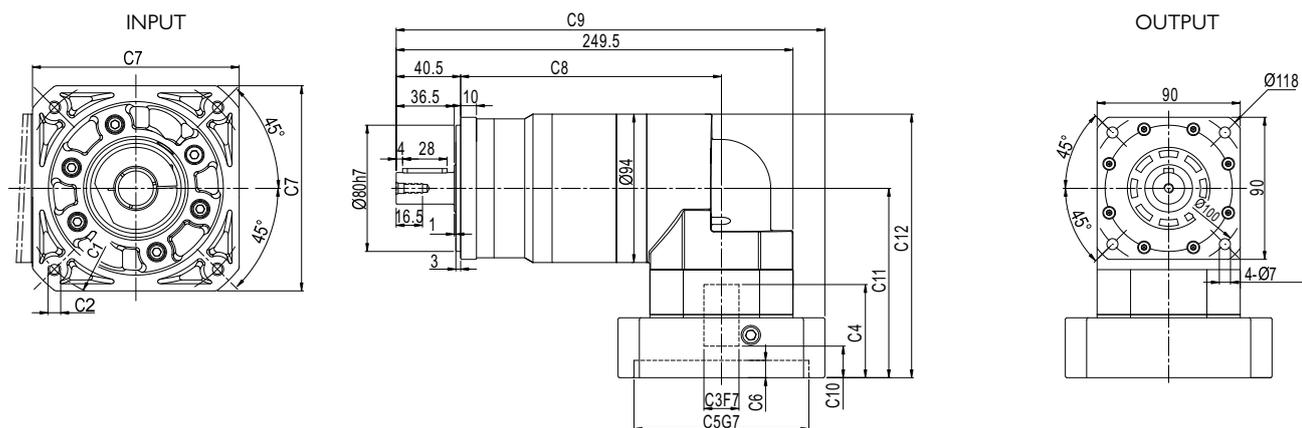
PRECISION PLANETARY GEARBOX FGR/FGAR SERIES

PRODUCT DIMENSION

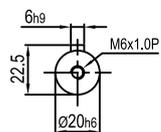
FGAR-080-L1



FGAR-080-L2



OUTPUT DIAMETER



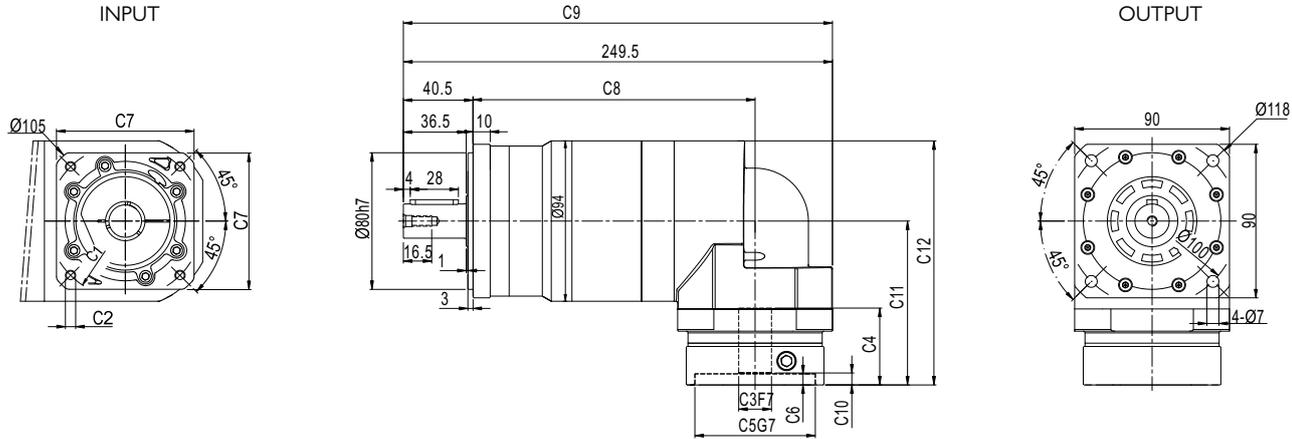
| Size | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 | C10 | C11 | C12 |
|---------------|--------------------|------------------|--|------|--------------------|-----|-----|-------|-------|------|-------|-------|
| FGAR-080-L1 | $\varnothing 90$ | 4-M5x12, 4-M6x14 | $\varnothing 19$ | 45 | $\varnothing 70$ | 6,5 | 80 | 123,5 | 209 | 7 | 96 | 143 |
| | $\varnothing 100$ | 4-M6x14 | $\varnothing 16$ | 45 | $\varnothing 80$ | 6,5 | 86 | 123,5 | 209 | 6 | 96 | 143 |
| FGAR-080M1-L2 | $\varnothing 115$ | 4-M8x20 | $\varnothing 19, \varnothing 22$ | 56,5 | $\varnothing 95$ | 8 | 100 | 123,5 | 214 | 16,5 | 117,5 | 164,5 |
| | $\varnothing 145$ | 4-M8x20 | $\varnothing 19, \varnothing 22, \varnothing 24$ | 59 | $\varnothing 110$ | 11 | 130 | 123,5 | 229 | 19 | 120 | 167 |
| FGAR-080-L2 | $\varnothing 66,7$ | 4-M4x10 | $\varnothing 8$ | 33 | $\varnothing 38,1$ | 5 | 60 | 138 | 208,5 | 5,5 | 77,5 | 124,5 |
| | $\varnothing 70$ | 4-M4x10, 4-M5x12 | $\varnothing 11, \varnothing 14$ | 33 | $\varnothing 50$ | 5 | 60 | 138 | 208,5 | 5,5 | 77,5 | 124,5 |
| FGAR-080M1-L2 | $\varnothing 90$ | 4-M5x12, 4-M6x14 | $\varnothing 19$ | 42,5 | $\varnothing 70$ | 6,5 | 80 | 138 | 218,5 | 12 | 87 | 134 |
| | $\varnothing 100$ | 4-M6x14 | $\varnothing 16$ | 42,5 | $\varnothing 80$ | 6,5 | 86 | 138 | 221,5 | 11 | 87 | 134 |

- C1~C7 are motor (metric standard) specific dimensions, which could be customized.
- M1: Limit hole (Version number)

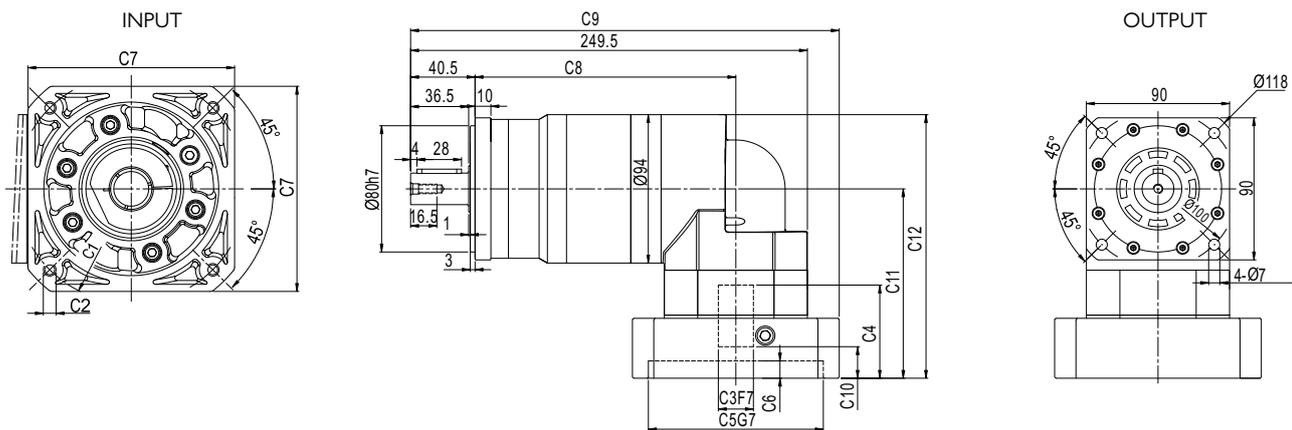
PRECISION PLANETARY GEARBOX FGR/FGAR SERIES

PRODUCT DIMENSION

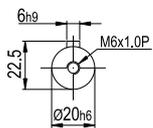
FGAR-080A-L2



FGAR-080A-L2



OUTPUT DIAMETER



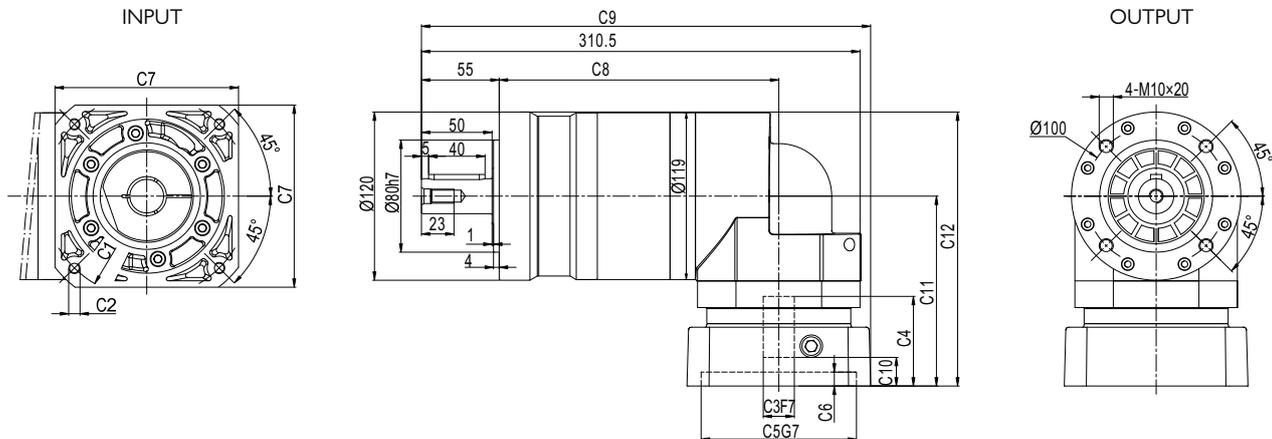
| Size | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 | C10 | C11 | C12 |
|----------------|-------------------|------------------|--|------|-------------------|-----|-----|-----|-------|------|-------|-------|
| FGAR-080A-L2 | $\varnothing 90$ | 4-M5x12, 4-M6x14 | $\varnothing 19$ | 45 | $\varnothing 70$ | 6,5 | 80 | 164 | 249,5 | 7 | 96 | 143 |
| | $\varnothing 100$ | 4-M6x14 | $\varnothing 16$ | 45 | $\varnothing 80$ | 6,5 | 86 | 164 | 249,5 | 6 | 96 | 143 |
| FGAR-080AM1-L2 | $\varnothing 115$ | 4-M8x20 | $\varnothing 19, \varnothing 22$ | 56,5 | $\varnothing 95$ | 8 | 100 | 164 | 254,5 | 16,5 | 117,5 | 164,5 |
| | $\varnothing 145$ | 4-M8x20 | $\varnothing 19, \varnothing 22, \varnothing 24$ | 59 | $\varnothing 110$ | 11 | 130 | 164 | 269,5 | 19 | 120 | 167 |

- C1~C7 are motor (metric standard) specific dimensions, which could be customized.
- M1: Limit hole (Version number)

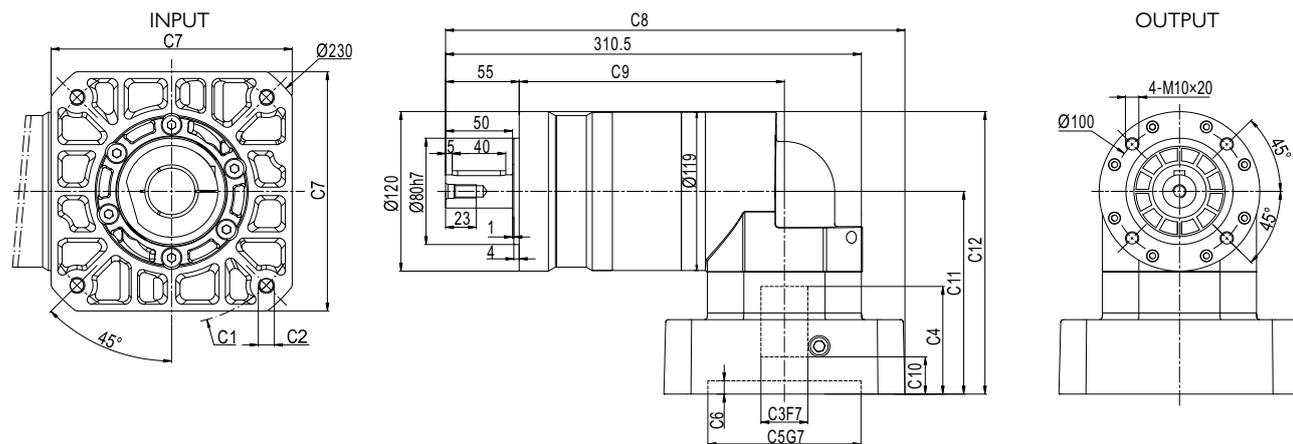
PRECISION PLANETARY GEARBOX FGR/FGAR SERIES

PRODUCT DIMENSION

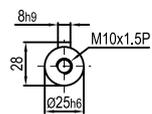
FGR-120-L1



FGR-120-L2



OUTPUT DIAMETER



| Size | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 | C10 | C11 | C12 |
|--------------|------|------------------|---------------|------|--------|-----|-----|-------|-------|------|-------|-------|
| FGR-120-L1 | ø145 | 4-M8x20 | ø19, ø22, ø24 | 64 | ø110 | 10 | 130 | 146,5 | 266,5 | 19,5 | 135,5 | 195,5 |
| FGR-120M1-L1 | ø200 | 4-M12x28 | ø35 | 81 | ø114,3 | 10 | 180 | 146,5 | 291,5 | 28 | 152,5 | 212,5 |
| FGR-120-L2 | ø90 | 4-M5x12, 4-M6x14 | ø19 | 45 | ø70 | 6,5 | 80 | 176,5 | 276,5 | 7 | 96 | 156 |
| | ø100 | 4-M6x14 | ø16 | 45 | ø80 | 6,5 | 86 | 176,5 | 276,5 | 6 | 96 | 156 |
| FGR-120M1-L2 | ø115 | 4-M8x20 | ø19, ø22 | 56,5 | ø95 | 8 | 100 | 176,5 | 281,5 | 6,5 | 117,5 | 177,5 |
| | ø145 | 4-M8x20 | ø19, ø22, ø24 | 59 | ø110 | 11 | 130 | 176,5 | 296,5 | 19 | 120 | 180 |

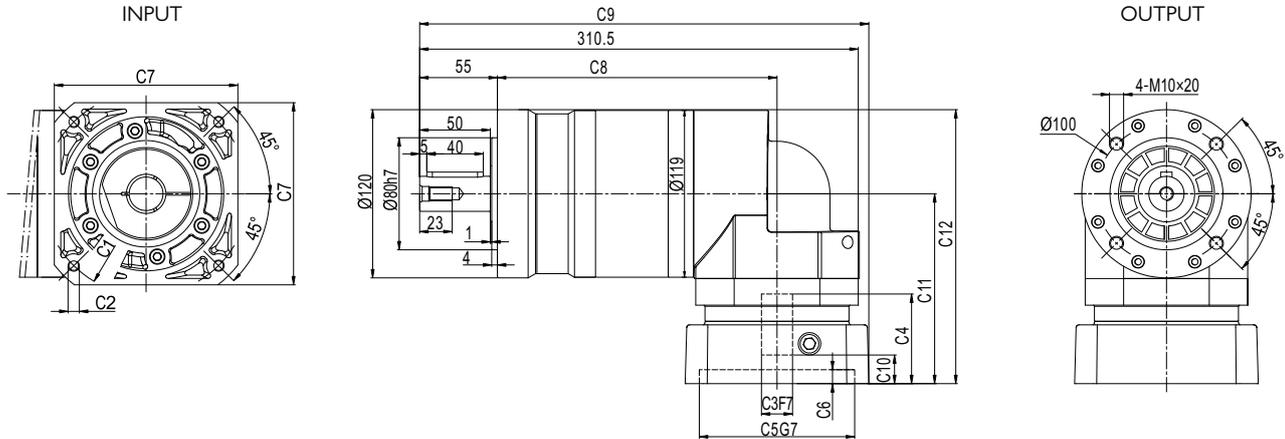
- C1-C7 are motor (metric standard) specific dimensions, which could be customized.
- M1: Limit hole (Version number)



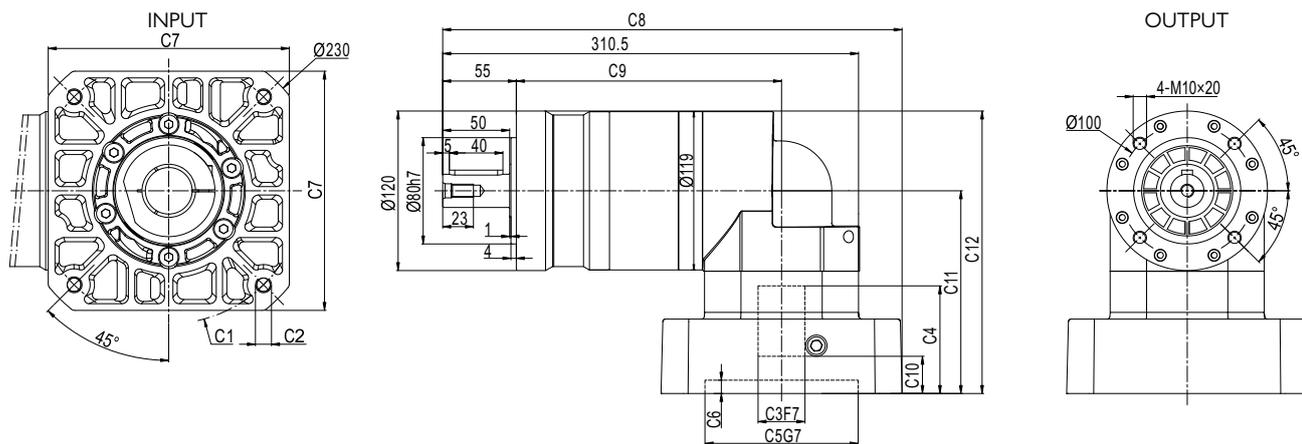
PRECISION PLANETARY GEARBOX FGR/FGAR SERIES

PRODUCT DIMENSION

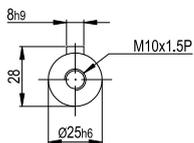
FGR-120A-L2



FGR-120A-L2



OUTPUT DIAMETER



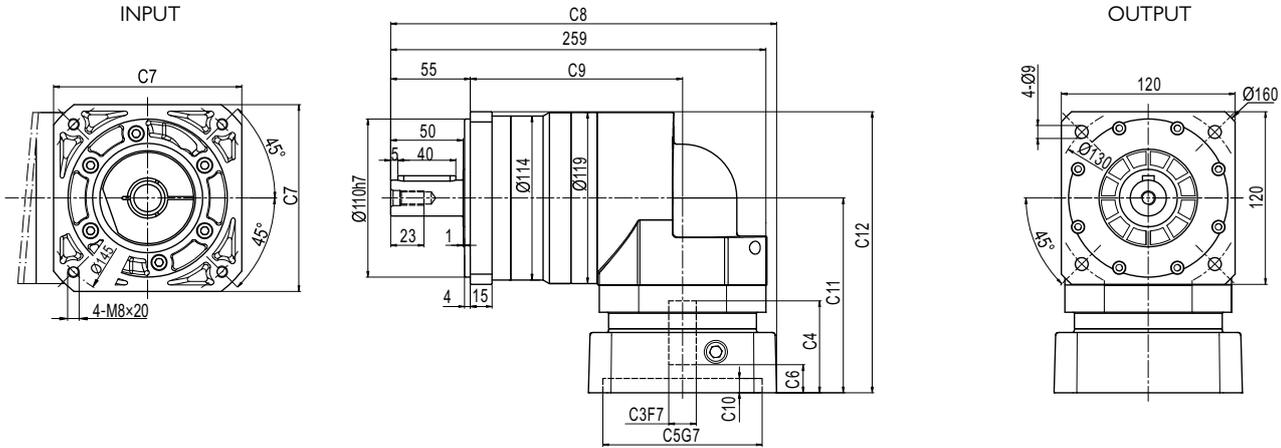
| Size | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 | C10 | C11 | C12 |
|---------------|------|----------|---------------|----|--------|----|-----|-----|-----|------|-------|-------|
| FGR-120A-L2 | ø145 | 4-M8x20 | ø19, ø22, ø24 | 64 | ø110 | 10 | 130 | 198 | 318 | 19,5 | 135,5 | 195,5 |
| FGR-120AM2-L2 | ø200 | 4-M12x28 | ø35 | 81 | ø114,3 | 10 | 180 | 198 | 343 | 28 | 152,5 | 212,5 |

- C1-C7 are motor (metric standard) specific dimensions, which could be customized.
- M1: Limit hole (Version number)

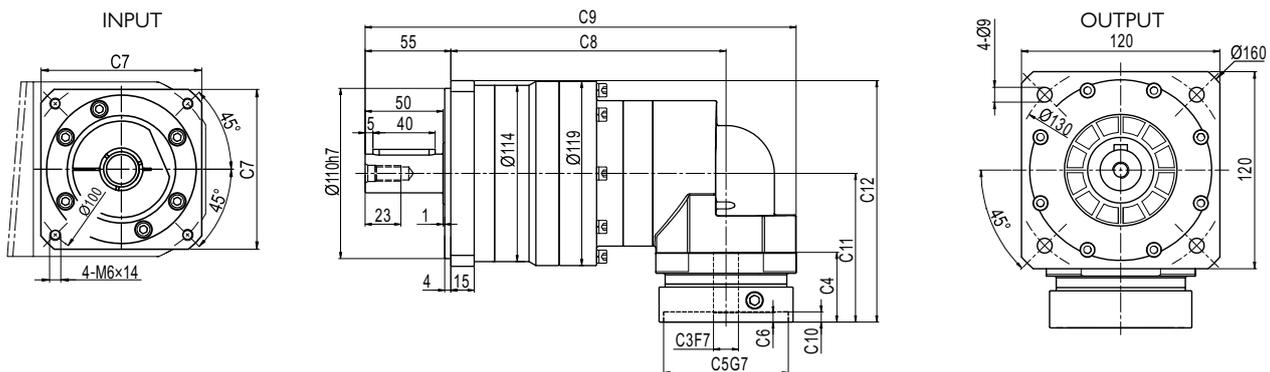
PRECISION PLANETARY GEARBOX FGR/FGAR SERIES

PRODUCT DIMENSION

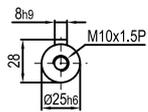
FGAR-120-L1



FGAR-120-L2



OUTPUT DIAMETER



| Size | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 | C10 | C11 | C12 |
|---------------|------|------------------|---------------|------|--------|-----|-----|-------|-------|------|-------|-------|
| FGAR-120-L1 | ø145 | 4-M8x20 | ø19, ø22, ø24 | 64 | ø110 | 10 | 130 | 146,5 | 266,5 | 19,5 | 135,5 | 195,5 |
| FGAR-120M1-L1 | ø200 | 4-M12x28 | ø35 | 81 | ø114,3 | 10 | 180 | 146,5 | 291,5 | 28 | 152,5 | 212,5 |
| FGAR-120-L2 | ø90 | 4-M5x12, 4-M6x14 | ø19 | 45 | ø70 | 6,5 | 80 | 176,5 | 276,5 | 7 | 96 | 156 |
| | ø100 | 4-M6x14 | ø16 | 45 | ø80 | 6,5 | 86 | 176,5 | 276,5 | 6 | 96 | 156 |
| FGAR-120M1-L2 | ø115 | 4-M8x20 | ø19, ø22 | 56,5 | ø95 | 8 | 100 | 176,5 | 281,5 | 6,5 | 117,5 | 177,5 |
| | ø145 | 4-M8x20 | ø19, ø22, ø24 | 59 | ø110 | 11 | 130 | 176,5 | 296,5 | 19 | 120 | 180 |

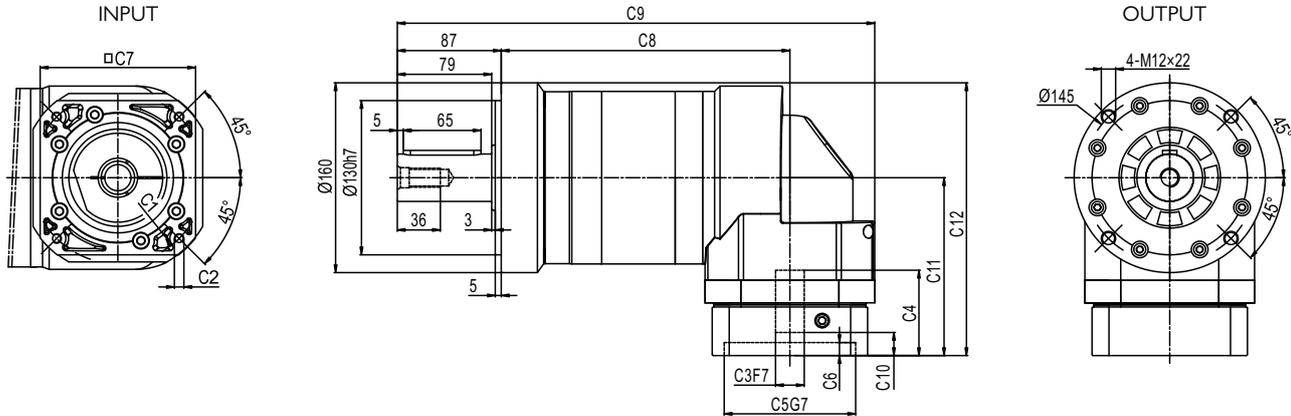
- C1-C7 are motor (metric standard) specific dimensions, which could be customized.
- M1: Limit hole (Version number)



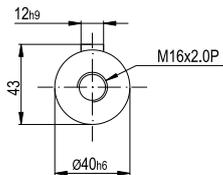
PRECISION PLANETARY GEARBOX FGR/FGAR SERIES

PRODUCT DIMENSION

FGR-160A-L2



OUTPUT DIAMETER



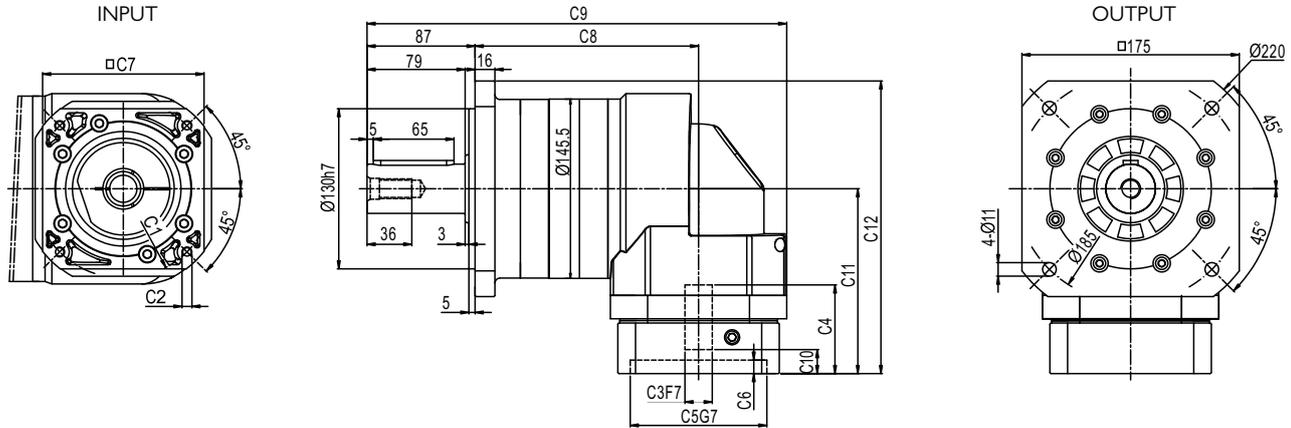
| Size | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 | C10 | C11 | C12 |
|-------------|------|----------|----------|----|--------|----|-----|-------|-------|------|-----|-----|
| FGR-160A-L2 | Ø145 | 4-M8x20 | Ø22, Ø24 | 72 | Ø110 | 11 | 130 | 241,5 | 399,5 | 19,5 | 150 | 230 |
| | Ø200 | 4-M12x28 | Ø35 | 82 | Ø114,3 | 8 | 180 | 241,5 | 418,5 | 25 | 160 | 240 |

▪ C1-C7 are motor (metric standard) specific dimensions, which could be customized.

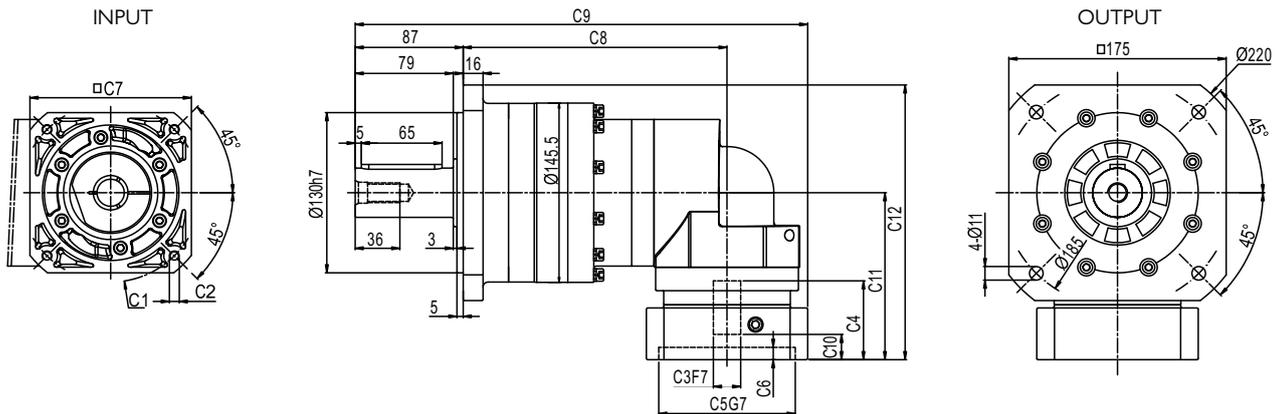
PRECISION PLANETARY GEARBOX FGR/FGAR SERIES

PRODUCT DIMENSION

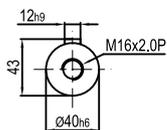
FGAR-160-L1



FGR-160-L2



OUTPUT DIAMETER



| Size | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 | C10 | C11 | C12 |
|---------------|------|----------|---------------|----|--------|----|-----|-------|-------|------|-------|-------|
| FGR-160A-L2 | ø145 | 4-M8x20 | ø22, ø24 | 72 | ø110 | 11 | 130 | 180 | 338 | 19,5 | 150 | 237,5 |
| | ø200 | 4-M12x28 | ø35 | 82 | ø114,3 | 8 | 180 | 180 | 357 | 25 | 160 | 247,5 |
| FGAR-160-L2 | ø145 | 4-M8x20 | ø19, ø22, ø24 | 64 | ø110 | 10 | 130 | 212,5 | 364,5 | 19,5 | 135,5 | 223 |
| FGAR-160M1-L2 | ø200 | 4-M12x28 | ø35 | 81 | ø114,3 | 10 | 180 | 212,5 | 389,5 | 28 | 152,5 | 240 |

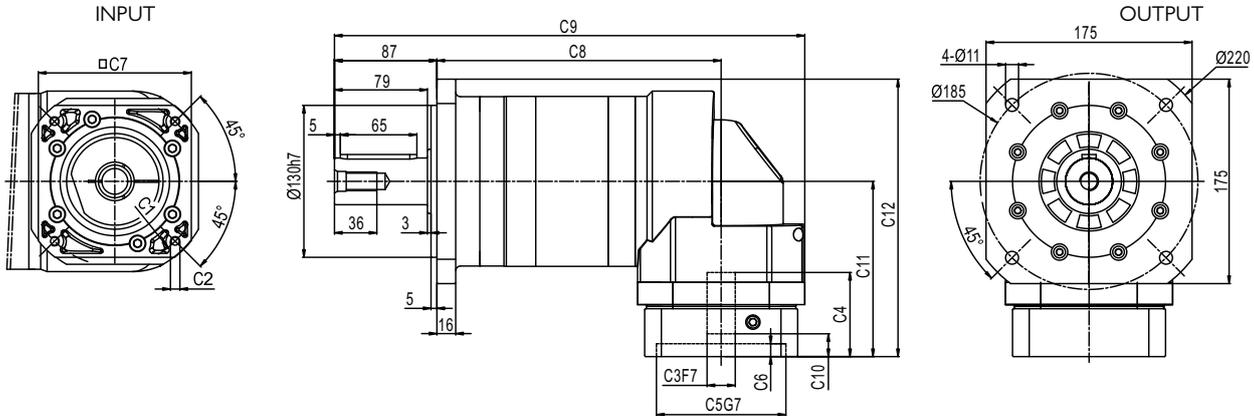
- C1-C7 are motor (metric standard) specific dimensions, which could be customized.
- M1: Limit hole (Version number)



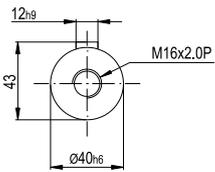
PRECISION PLANETARY GEARBOX FGR/FGAR SERIES

PRODUCT DIMENSION

FGAR-160A-L2



OUTPUT DIAMETER



| Size | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 | C10 | C11 | C12 |
|-------------|-------------------|----------|----------------------------------|----|---------------------|----|-----|-------|-------|------|-----|-------|
| FGR-160A-L2 | $\varnothing 145$ | 4-M8x20 | $\varnothing 22, \varnothing 24$ | 72 | $\varnothing 110$ | 11 | 130 | 241,5 | 399,5 | 19,5 | 150 | 237,5 |
| | $\varnothing 200$ | 4-M12x28 | $\varnothing 35$ | 82 | $\varnothing 114,3$ | 8 | 180 | 241,5 | 418,5 | 25 | 160 | 247,5 |

- C1-C7 are motor (metric standard) specific dimensions, which could be customized.

CHIARAVALLI LINEAR CENTER

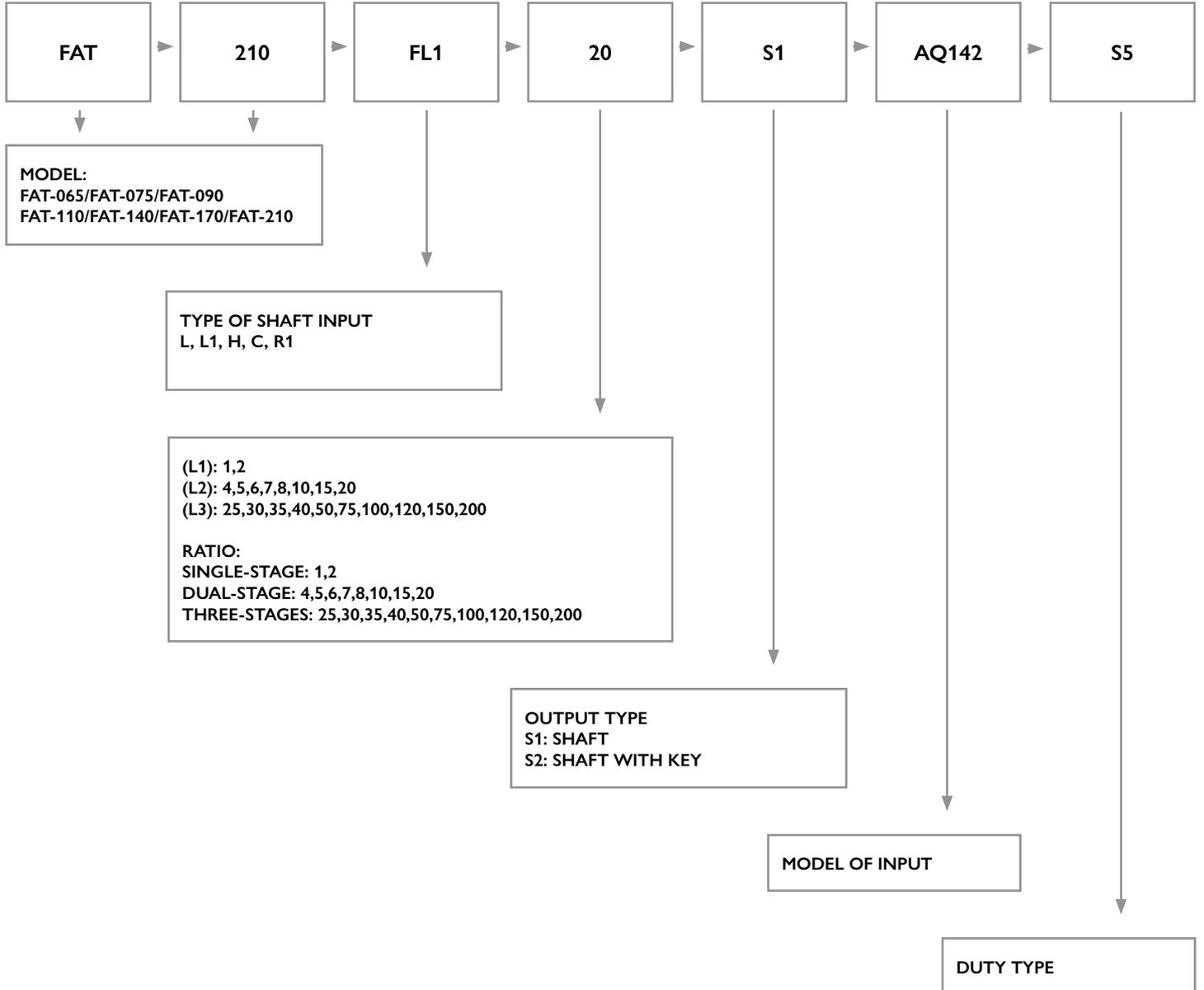
**PRECISION PLANETARY GEARBOX
FAT SERIES**



PRECISION PLANETARY GEARBOX FAT SERIES

MODEL DESCRIPTION

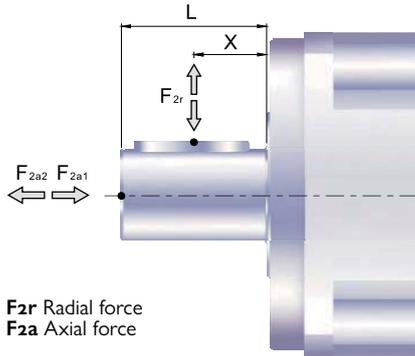
FAT-065-L-1.5-S1-S5



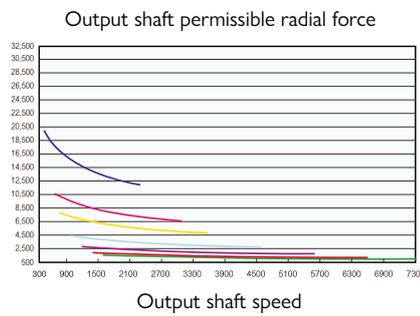
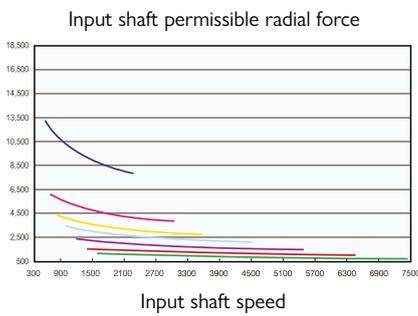


PRECISION PLANETARY GEARBOX FAT SERIES

ALLOWABLE RADIAL AND AXIAL FORCES ON THE OUTPUT SHAFT OF THE GEAR REDUCER



The permitted radial and axial loads on the output shaft depend on the design of the gearbox supporting bearings. Large-span design and high bearing capacity are adopted to achieve the maximum permissible radial and axial loads.

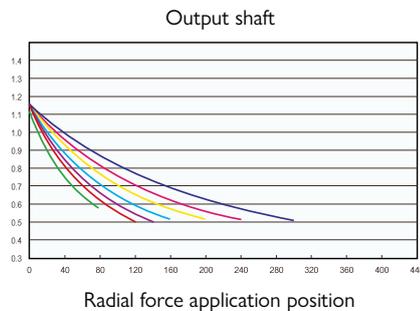
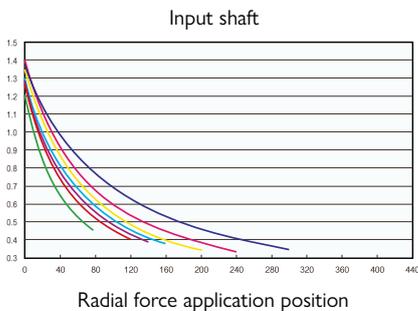


— FAT210 — FAT170 — FAT140 — FAT110 — FAT090 — FAT075 — FAT065

When the radial force F_{2r} is applied to the center of the shaft, i.e. $X=1/2 \times L$, the allowable radial force F_{2rB} that can be withstood by different specifications of reducers with a service life of 20,000hr* under different output speeds is as follows:

$$F_{2a1B} = 0,2 \times F_{2rB}$$

$$F_{2a2B} = 0,1 \times F_{2rB}$$



— FAT210 — FAT170 — FAT140 — FAT110 — FAT090 — FAT075 — FAT065

When the radial force F_{2r} is not in the center of the shaft, the closer to the gearbox, that is, $X < 1/2 \times L$, the allowable radial force that can be borne becomes larger, and the farther away from the reducer, i.e., $X > 1/2 \times L$, the allowable force that can be borne becomes smaller.

Radial force
 $F'_{2rB} = K_b \times F_{2rB}$

Axial force
 $F'_{2a1B} = 0,2 \times F'_{2rB}$
 $F'_{2a2B} = 0,1 \times F'_{2rB}$



PRECISION PLANETARY GEARBOX FAT SERIES

PRODUCT DIMENSION

FAT-L



FAT-FL



FAT-H



FAT-FH



FAT-C



FAT-FC





PRECISION PLANETARY GEARBOX FAT SERIES

TECHNICAL SPECIFICATION SHAFT INPUT TYPE

| MODEL | STAGE | RATIO | FAT065L | FAT075L | FAT090L | FAT110L | FAT140L | FAT170L | FAT210L | |
|---|--------|-------|--|--|--|--|--|--|--|--------|
| | | | FAT065L1 FAT065H FAT065C FAT065R1 | FAT075L1 FAT075H FAT075C FAT075R1 | FAT090L1 FAT090H FAT090C FAT090R1 | FAT110L1 FAT110H FAT110C FAT110R1 | FAT140L1 FAT140H FAT140C FAT140R1 | FAT170L1 FAT170H FAT170C FAT170R1 | FAT210L1 FAT210H FAT210C FAT210R1 | |
| T _{2N} /Rated output torque | Nm | 1 | 1 | 25 | 45 | 78 | 150 | 360 | 585 | 1,300 |
| | | | 1.5 | 25 | 45 | 78 | 150 | 360 | 585 | 1,300 |
| | | | 2 | 24 | 42 | 68 | 150 | 330 | 544 | 1,220 |
| | | | 3 | 18 | 33 | 54 | 120 | 270 | 450 | 1,020 |
| T _{2B} /Maximum acceleration moment | Nm | 1 | 1~3 | 1.5 times of Nominal Output Torque | | | | | | |
| n _{1B} /Maximum acceleration input speed | rpm | 1 | 1~3 | 7,500 | 6,500 | 5,500 | 4,500 | 3,500 | 3,000 | 2,200 |
| Backlash | arcmin | 1 | 1~3 | ≤6 | ≤6 | ≤6 | ≤6 | ≤6 | ≤6 | ≤6 |
| F _{1rB} /Maximum input shaft radial force | N | 1 | 1~3 | 700 | 950 | 1,450 | 2,100 | 2,700 | 3,800 | 7,800 |
| F _{2rB} /Maximum output shaft radial force | N | 1 | 1~3 | 900 | 1,100 | 1,700 | 2,700 | 4,800 | 6,600 | 11,500 |
| F _{1aB} /Maximum input shaft axial force | N | 1 | 1~3 | 350 | 425 | 725 | 1,050 | 1,350 | 1,900 | 3,900 |
| F _{2aB} /Maximum output shaft axial force | N | 1 | 1~3 | 450 | 550 | 850 | 1,350 | 2,400 | 3,300 | 5,750 |
| Life time | h | 1 | 1~3 | 20,000 (S5 working mode) | | | | | | |
| Efficiency | % | 1 | 1~3 | ≥95% | | | | | | |
| Operating temperature | °C | 1 | 1~3 | -10°C ~ -90°C | | | | | | |
| lubrication | | | | Synthetic lubrication oils | | | | | | |
| Noise level (n _l =1500rpm, no load) | dB (A) | 1 | 1~3 | ≤68 | ≤70 | ≤74 | ≤76 | ≤77 | ≤78 | ≤80 |

MOMENT OF INERTIA

| MODEL | STAGE | RATIO | FAT065L | FAT075L | FAT090L | FAT110L | FAT140L | FAT170L | FAT210L |
|---|-------|-------|--|--|--|--|--|--|--|
| | | | FAT065L1 FAT065H FAT065C FAT065R1 | FAT075L1 FAT075H FAT075C FAT075R1 | FAT090L1 FAT090H FAT090C FAT090R1 | FAT110L1 FAT110H FAT110C FAT110R1 | FAT140L1 FAT140H FAT140C FAT140R1 | FAT170L1 FAT170H FAT170C FAT170R1 | FAT210L1 FAT210H FAT210C FAT210R1 |
| Mass Moments of Inertia J ₁ (kg · cm ²) | 1 | 1 | 0.51 | 1.30 | 3.16 | 7.70 | 23.57 | 58.99 | 195.40 |
| | | 1.5 | 0.64 | 1.16 | 2.82 | 6.74 | 19.37 | 49.28 | 155.45 |
| | | 2 | 0.44 | 1.11 | 2.70 | 6.31 | 17.75 | 45.35 | 140.24 |
| | | 3 | 0.43 | 1.09 | 2.66 | 6.17 | 17.18 | 44.01 | 134.95 |

WEIGHT

| MODEL | STAGE | RATIO | FAT065 | FAT075 | FAT090 | FAT110 | FAT 140 | FAT170 | FAT210 |
|-------------|-------|-------|--------|--------|--------|--------|---------|--------|--------|
| L (Series) | kg | 1 | 2.6 | 4.2 | 6.8 | 11.6 | 19.8 | 34.8 | 66.2 |
| L1 (Series) | | 1 | 2.6 | 4.1 | 6.7 | 11.5 | 19.5 | 34.2 | 65.1 |
| H(Series) | | 1 | 2.5 | 3.9 | 6.4 | 11.0 | 18.1 | 31.6 | 60.0 |
| C (Series) | | 1 | 2.8 | 4.2 | 6.9 | 11.4 | 19.6 | 33.7 | 63.3 |
| R1 (Series) | | 1 | 2.6 | 4.1 | 6.7 | 11.5 | 19.5 | 34.2 | 65.1 |

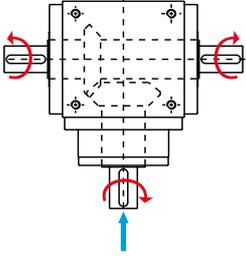
- The above performance parameters are based on the gearbox operating at duty type S5. If it operates at duty type S1, please contact CLC.
- The above backlash is measured under at 2% rated torque T_{2N}.



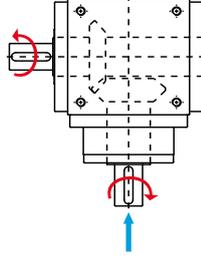
PRECISION PLANETARY GEARBOX FAT SERIES

ROTATE DIRECTIONS - SHAFT INPUT TYPE

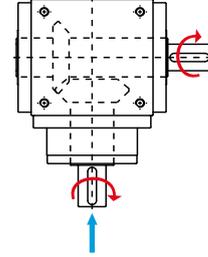
FAT-L, FAT-H, FAT-C,
FAT-FL, FAT-FH, FAT-FC



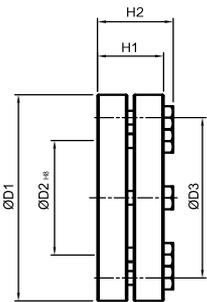
FAT-L1, FAT-FL1



FAT-R1, FAT-FR1



SHRINK DISCS

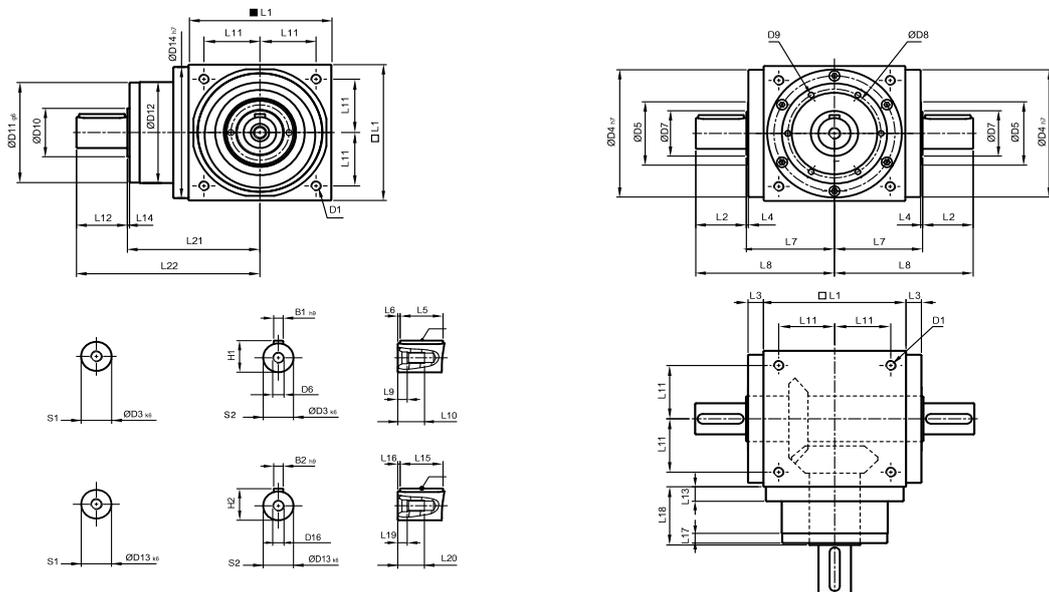


| FAT.. C FAT.. TC | D1 | D2 | D3 | H1 | H2 |
|------------------|-----|----|-----|------|------|
| SSD-d16xdw14 | 41 | 16 | 26 | 15 | 18,5 |
| SSD-d22xdw18 | 50 | 22 | 36 | 19,5 | 23 |
| SSD-d25xdw22 | 50 | 25 | 38 | 19,5 | 23 |
| SSD-d44xdw32 | 80 | 44 | 61 | 25,5 | 29,5 |
| SSD-d50xdw40 | 90 | 50 | 70 | 27,5 | 31,5 |
| SSD-d62xdw50 | 110 | 62 | 86 | 30,5 | 34,5 |
| SSD-d68xdw55 | 115 | 68 | 86 | 30,5 | 34,5 |
| SSD-d75xdw60 | 138 | 75 | 100 | 32,5 | 38 |

PRECISION PLANETARY GEARBOX FAT SERIES

PRODUCT DIMENSION

FAT-L, 1 STAGE



(Unit: mm)

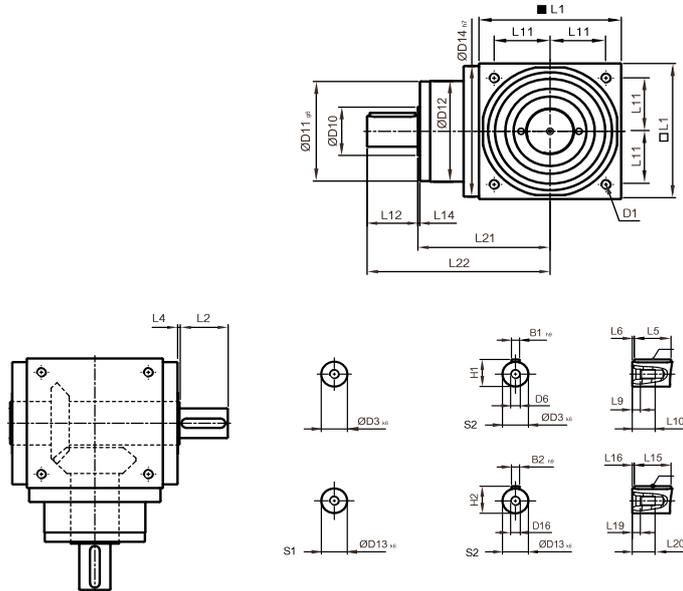
| MODEL | FAT065L | FAT075L | FAT090L | FAT110L | FAT140L | FAT170L | FAT210L |
|--------|---------|---------|---------|----------|----------|------------|------------|
| D1 | M4 | M6 | M6 | M8 | M10 | M12 | M16 |
| D3 k6 | 13 | 16 | 18 | 22 | 32 | 40 | 50 |
| D4 h7 | 63 | 73 | 88 | 108 | 135 | 165 | 205 |
| D5 | 31 | 35 | 43 | 53 | 68 | 83 | 104 |
| D6 | M4 | M5 | M5 | M8 | M12 | M16 | M16 |
| D7 | 21 | 22 | 28 | 33 | 47 | 55 | 75 |
| D8 | 53 | 62 | 76 | 95 | 92 | 114 | 142 |
| D9 | 4xM4xL7 | 4xM5xL8 | 4xM5xL8 | 6xM6xL10 | 6xM6xL10 | 6xM8xL12,5 | 6xM8xL12,5 |
| D10 | 15,4 | 20,4 | 25,8 | 35,8 | 49,8 | 59,3 | 79,3 |
| D11 g6 | 62,9 | 72,9 | 87 | 107 | 103 | 127 | 158 |
| D12 | 62 | 72 | 86 | 106 | 104 | 128 | 160 |
| D13 k6 | 13 | 16 | 18 | 22 | 32 | 40 | 50 |
| D14 h7 | 63 | 73 | 88 | 108 | 135 | 165 | 205 |
| D16 | M4 | M5 | M5 | M8 | M12 | M16 | M16 |
| L1 | 65 | 75 | 90 | 110 | 140 | 170 | 210 |
| L2 | 19,5 | 30 | 35 | 40 | 50 | 60 | 75 |
| L3 | 13 | 14,5 | 15 | 15 | 15 | 15 | 20 |
| L4 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| L5 | 16 | 25 | 28 | 32 | 45 | 50 | 70 |
| L6 | 2 | 2,5 | 3,5 | 4 | 2,5 | 5 | 2,5 |
| L7 | 47,5 | 54 | 62 | 72 | 87 | 102 | 127 |
| L8 | 67 | 84 | 97 | 112 | 137 | 162 | 202 |
| L9 | 4,5 | 4,8 | 4,8 | 7,2 | 10 | 12 | 12 |
| L10 | 10 | 12,5 | 12,5 | 19 | 28 | 36 | 36 |
| L11 | 27 | 30 | 36 | 44 | 55 | 67 | 85 |
| L12 | 19,5 | 30 | 35 | 40 | 50 | 60 | 75 |
| L13 | 13 | 15 | 15 | 15 | 15 | 15 | 20 |
| L14 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| L15 | 16 | 25 | 28 | 32 | 45 | 50 | 70 |
| L16 | 2 | 2,5 | 3,5 | 4 | 2,5 | 5 | 2,5 |
| L17 | 6 | 8 | 8 | 8 | 10 | 10 | 10 |
| L18 | 43 | 52,5 | 55 | 60 | 60 | 70 | 90 |
| L19 | 4,5 | 4,8 | 4,8 | 7,2 | 10 | 12 | 12 |
| L20 | 10 | 12,5 | 12,5 | 19 | 28 | 36 | 36 |
| L21 | 75,5 | 90 | 100 | 115 | 130 | 155 | 195 |
| L22 | 95 | 120 | 135 | 155 | 180 | 215 | 270 |
| B1 h9 | 5 | 5 | 6 | 6 | 10 | 12 | 14 |
| B2 h9 | 5 | 5 | 6 | 6 | 10 | 12 | 14 |
| H1 | 15 | 18 | 20,5 | 24,5 | 35 | 43 | 53,5 |
| H2 | 15 | 18 | 20,5 | 24,5 | 35 | 43 | 53,5 |



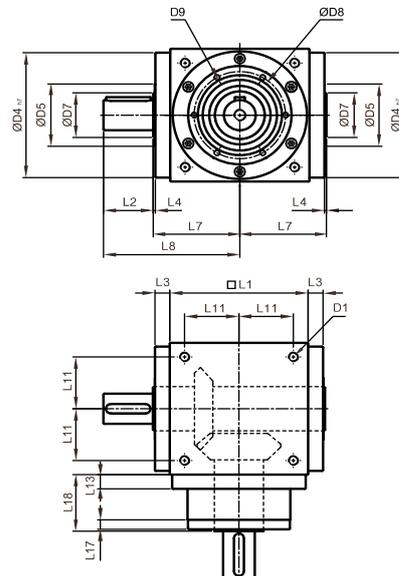
PRECISION PLANETARY GEARBOX FAT SERIES

PRODUCT DIMENSION

FAT-R1, 1 STAGE



FAT-L1, 1 STAGE



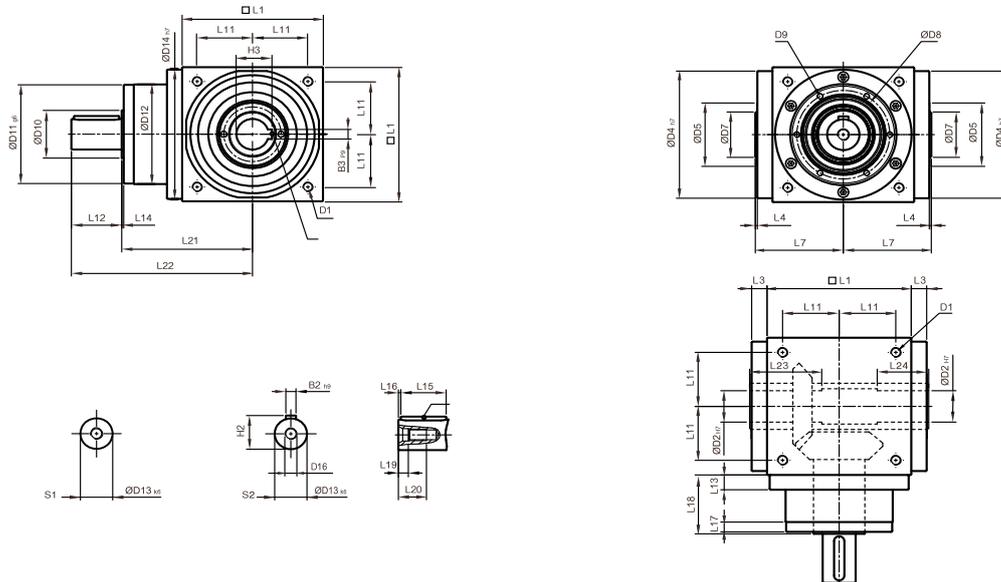
(Unit: mm)

| MODEL | FAT065 L1/R1 | FAT075 L1/R1 | FAT090 L1/R1 | FAT110 L1/R1 | FAT140 L1/R1 | FAT170 L1/R1 | FAT210 L1/R1 |
|--------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| D1 | M4 | M6 | M6 | M8 | M10 | M12 | M16 |
| D3 k6 | 13 | 16 | 18 | 22 | 32 | 40 | 50 |
| D4 h7 | 63 | 73 | 88 | 108 | 135 | 165 | 205 |
| D5 | 31 | 35 | 43 | 53 | 68 | 83 | 104 |
| D6 | M4 | M5 | M5 | M8 | M12 | M16 | M16 |
| D7 | 21 | 22 | 28 | 33 | 47 | 55 | 75 |
| D8 | 53 | 62 | 76 | 95 | 92 | 114 | 142 |
| D9 | 4xM4xL7 | 4xM5xL8 | 4xM5xL8 | 6xM6xL10 | 6xM6xL10 | 6xM8xL12,5 | 6xM8xL12,5 |
| D10 | 15,4 | 20,4 | 25,8 | 35,8 | 49,8 | 59,3 | 79,3 |
| D11 g6 | 62,9 | 72,9 | 87 | 107 | 103 | 127 | 158 |
| D12 | 62 | 72 | 86 | 106 | 104 | 128 | 160 |
| D13 k6 | 13 | 16 | 18 | 22 | 32 | 40 | 50 |
| D14 h7 | 63 | 73 | 88 | 108 | 135 | 165 | 205 |
| D16 | M4 | M5 | M5 | M8 | M12 | M16 | M16 |
| L1 | 65 | 75 | 90 | 110 | 140 | 170 | 210 |
| L2 | 19,5 | 30 | 35 | 40 | 50 | 60 | 75 |
| L3 | 13 | 14,5 | 15 | 15 | 15 | 15 | 20 |
| L4 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| L5 | 16 | 25 | 28 | 32 | 45 | 50 | 70 |
| L6 | 2 | 2,5 | 3,5 | 4 | 2,5 | 5 | 2,5 |
| L7 | 47,5 | 54 | 62 | 72 | 87 | 102 | 127 |
| L8 | 67 | 84 | 97 | 112 | 137 | 162 | 202 |
| L9 | 4,5 | 4,8 | 4,8 | 7,2 | 10 | 12 | 12 |
| L10 | 10 | 12,5 | 12,5 | 19 | 28 | 36 | 36 |
| L11 | 27 | 30 | 36 | 44 | 55 | 67 | 85 |
| L12 | 19,5 | 30 | 35 | 40 | 50 | 60 | 75 |
| L13 | 13 | 15 | 15 | 15 | 15 | 15 | 20 |
| L14 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| L15 | 16 | 25 | 28 | 32 | 45 | 50 | 70 |
| L16 | 2 | 2,5 | 3,5 | 4 | 2,5 | 5 | 2,5 |
| L17 | 6 | 8 | 8 | 8 | 10 | 10 | 10 |
| L18 | 43 | 52,5 | 55 | 60 | 60 | 70 | 90 |
| L19 | 4,5 | 4,8 | 4,8 | 7,2 | 10 | 12 | 12 |
| L20 | 10 | 12,5 | 12,5 | 19 | 28 | 36 | 36 |
| L21 | 75,5 | 90 | 100 | 115 | 130 | 155 | 195 |
| L22 | 95 | 120 | 135 | 155 | 180 | 215 | 270 |
| B1 h9 | 5 | 5 | 6 | 6 | 10 | 12 | 14 |
| B2 h9 | 5 | 5 | 6 | 6 | 10 | 12 | 14 |
| H1 | 15 | 18 | 20,5 | 24,5 | 35 | 43 | 53,5 |
| H2 | 15 | 18 | 20,5 | 24,5 | 35 | 43 | 53,5 |

PRECISION PLANETARY GEARBOX FAT SERIES

PRODUCT DIMENSION

FAT-H, 1 STAGE



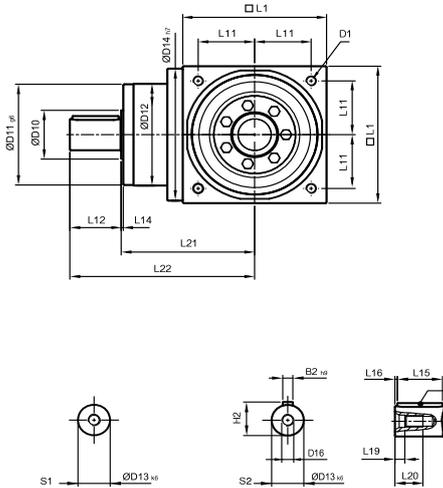
(Unit: mm)

| MODEL | FAT065 H | FAT075 H | FAT090 H | FAT110 H | FAT140 H | FAT170 H | FAT210 H |
|--------|----------|----------|----------|----------|----------|------------|------------|
| D1 | M4 | M6 | M6 | M8 | M10 | M12 | M16 |
| D2 H7 | 13 | 14 | 18 | 22 | 32 | 40 | 50 |
| D4 h7 | 63 | 73 | 88 | 108 | 135 | 165 | 205 |
| D5 | 31 | 35 | 43 | 53 | 68 | 83 | 104 |
| D7 | 21 | 22 | 28 | 33 | 47 | 55 | 75 |
| D8 | 53 | 62 | 76 | 95 | 62 | 114 | 142 |
| D9 | 4xM4xL7 | 4xM5xL8 | 4xM5xL8 | 6xM6xL10 | 6xM6xL10 | 6xM8xL12,5 | 6xM8xL12,5 |
| D10 | 15,4 | 20,4 | 25,8 | 35,8 | 49,8 | 59,3 | 79,3 |
| D11 g6 | 62,9 | 72,9 | 87 | 107 | 103 | 127 | 158 |
| D12 | 62 | 72 | 86 | 106 | 104 | 128 | 160 |
| D13 k6 | 13 | 16 | 18 | 22 | 32 | 40 | 50 |
| D14 h7 | 63 | 73 | 88 | 108 | 135 | 165 | 205 |
| D16 | M4 | M5 | M5 | M8 | M12 | M16 | M16 |
| L1 | 65 | 75 | 90 | 110 | 140 | 170 | 210 |
| L3 | 13 | 14,5 | 15 | 15 | 15 | 15 | 20 |
| L4 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| L7 | 47,5 | 54 | 62 | 72 | 87 | 102 | 127 |
| L11 | 27 | 30 | 36 | 44 | 55 | 67 | 85 |
| L12 | 19,5 | 30 | 35 | 40 | 50 | 60 | 75 |
| L13 | 13 | 15 | 15 | 15 | 15 | 15 | 20 |
| L14 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| L15 | 16 | 25 | 28 | 32 | 45 | 50 | 70 |
| L16 | 2 | 2,5 | 3,5 | 4 | 2,5 | 5 | 2,5 |
| L17 | 6 | 8 | 8 | 8 | 10 | 10 | 10 |
| L18 | 43 | 52,5 | 55 | 60 | 60 | 70 | 90 |
| L19 | 4,5 | 4,8 | 4,8 | 7,2 | 10 | 12 | 12 |
| L20 | 10 | 12,5 | 12,5 | 19 | 28 | 36 | 36 |
| L21 | 75,5 | 90 | 100 | 115 | 130 | 155 | 195 |
| L22 | 95 | 120 | 135 | 155 | 180 | 215 | 270 |
| L23 | 23 | 47 | 52 | 53 | 70 | 80 | 95 |
| L24 | 30 | 32 | 35 | 35 | 50 | 55 | 65 |
| B2 h9 | 5 | 5 | 6 | 6 | 10 | 12 | 14 |
| B3 P9 | 5 | 5 | 6 | 6 | 10 | 12 | 14 |
| H2 | 15 | 18 | 20,5 | 24,5 | 35 | 43 | 53,5 |
| H3 | 15,3 | 16,3 | 20,8 | 24,8 | 35,3 | 43,3 | 53,8 |

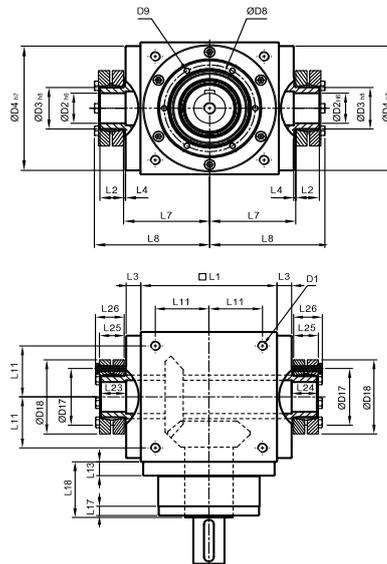
PRECISION PLANETARY GEARBOX FAT SERIES

PRODUCT DIMENSION

FAT-C, 1 STAGE



FAT-L1, 1 STAGE



(Unit: mm)

| MODEL | FAT065 C | FAT075 C | FAT090 C | FAT110 C | FAT140 C | FAT170 C | FAT210 C |
|--------|----------|----------|----------|----------|----------|------------|------------|
| D1 | M4 | M6 | M6 | M8 | M10 | M12 | M16 |
| D2 H6 | 13 | 14 | 18 | 22 | 32 | 40 | 50 |
| D3 h8 | 16 | 16 | 22 | 25 | 44 | 50 | 62 |
| D4 h7 | 63 | 73 | 88 | 108 | 135 | 165 | 205 |
| D8 | 53 | 62 | 76 | 95 | 92 | 114 | 142 |
| D9 | 4xM4xL7 | 4xM5xL8 | 4xM5xL8 | 6xM6xL10 | 6xM6xL10 | 6xM8xL12,5 | 6xM8xL12,5 |
| D10 | 15,4 | 20,4 | 25,8 | 35,8 | 49,8 | 59,3 | 79,3 |
| D11 g6 | 62,9 | 72,9 | 87 | 107 | 103 | 127 | 158 |
| D12 | 62 | 72 | 86 | 106 | 104 | 128 | 160 |
| D13 K6 | 13 | 16 | 18 | 22 | 32 | 40 | 50 |
| D14 h7 | 63 | 63 | 88 | 108 | 135 | 165 | 205 |
| D16 | M4 | M5 | M5 | M8 | M12 | M16 | M16 |
| D17 | 26 | 26 | 36 | 38 | 61 | 70 | 86 |
| D18 | 41 | 41 | 50 | 50 | 80 | 90 | 110 |
| L1 | 65 | 75 | 90 | 110 | 140 | 170 | 210 |
| L2 | 14 | 14 | 18 | 18 | 24 | 26 | 29 |
| L3 | 13 | 14,5 | 15 | 15 | 15 | 15 | 20 |
| L4 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| L7 | 47,5 | 54 | 54 | 72 | 87 | 102 | 127 |
| L8 | 66 | 72,5 | 72,5 | 95 | 116,5 | 133,5 | 161,5 |
| L11 | 27 | 30 | 30 | 44 | 55 | 67 | 85 |
| L12 | 19,5 | 30 | 30 | 40 | 50 | 60 | 75 |
| L13 | 13 | 15 | 15 | 15 | 15 | 15 | 20 |
| L14 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| L15 | 16 | 25 | 25 | 32 | 45 | 50 | 70 |
| L16 | 2 | 2,5 | 2,5 | 4 | 2,5 | 5 | 2,5 |
| L17 | 6 | 8 | 8 | 8 | 10 | 10 | 10 |
| L18 | 43 | 52,5 | 52,5 | 60 | 60 | 70 | 90 |
| L19 | 4,5 | 4,8 | 4,8 | 7,2 | 10 | 12 | 12 |
| L20 | 10 | 12,5 | 12,5 | 19 | 28 | 36 | 36 |
| L21 | 75,5 | 90 | 100 | 115 | 130 | 155 | 195 |
| L22 | 95 | 120 | 135 | 155 | 180 | 215 | 270 |
| L23 | 15 | 15 | 20 | 20 | 26 | 28 | 31 |
| L24 | 15 | 15 | 20 | 20 | 26 | 28 | 31 |
| L25 | 15 | 15 | 19,5 | 19,5 | 25,5 | 27,5 | 30,5 |
| L26 | 18,5 | 18,5 | 23 | 23 | 29,5 | 31,5 | 34,5 |
| B2 h9 | 5 | 5 | 6 | 6 | 10 | 12 | 14 |
| H2 | 15 | 18 | 20,5 | 24,5 | 35 | 43 | 53,5 |



PRECISION PLANETARY GEARBOX FAT SERIES

TECHNICAL SPECIFICATION - FLANGE INPUT TYPE

(Unit: mm)

| MODEL | | STAGE | RATIO | FAT065 FL | FAT075 FL | FAT090 FL | FAT110 FL | FAT140 FL | FAT170 FL | FAT210 FL |
|--|--------|-------|--------|--|--|--|--|--|--|--|
| | | | | FAT065 FL1 FAT065 FH FAT065 FC FAT065 FR1 | FAT075 FL1 FAT075 FH FAT075 FC FAT075 FR1 | FAT090 FL1 FAT090 FH FAT090 FC FAT090 FR1 | FAT110 FL1 FAT110 FH FAT110 FC FAT110 FR1 | FAT140 FL1 FAT140 FH FAT140 FC FAT140 FR1 | FAT170 FL1 FAT170 FH FAT170 FC FAT170 FR1 | FAT210 FL1 FAT210 FH FAT210 FC FAT210 FR1 |
| T _{2N} Rated output torque | Nm | 1 | 1 | 25 | 45 | 78 | 150 | 360 | 585 | 1,300 |
| | | | 1.5 | 25 | 45 | 78 | 150 | 360 | 585 | 1,300 |
| | | | 2 | 24 | 42 | 68 | 150 | 330 | 544 | 1,220 |
| | | | 3 | 18 | 33 | 54 | 120 | 270 | 450 | 1,020 |
| | | 2 | 4 | 25 | 45 | 78 | 150 | 360 | 585 | 1,300 |
| | | | 5 | 25 | 45 | 78 | 150 | 360 | 585 | 1,300 |
| | | | 6 | 25 | 45 | 78 | 150 | 360 | 585 | 1,300 |
| | | | 7 | 25 | 45 | 78 | 150 | 360 | 585 | 1,300 |
| | | | 8 | 24 | 42 | 68 | 150 | 330 | 544 | 1,220 |
| | | | 10 | 24 | 42 | 68 | 150 | 330 | 544 | 1,220 |
| | | | 15 | 18 | 33 | 54 | 120 | 270 | 450 | 1,020 |
| | | | 20 | 24 | 42 | 68 | 150 | 330 | 544 | 1,220 |
| | | 3 | 25 | 25 | 45 | 78 | 150 | 360 | 585 | 1,300 |
| | | | 30 | 25 | 45 | 78 | 150 | 360 | 585 | 1,300 |
| | | | 35 | 25 | 45 | 78 | 150 | 360 | 585 | 1,300 |
| | | | 40 | 25 | 45 | 78 | 150 | 360 | 585 | 1,300 |
| | | | 50 | 24 | 42 | 68 | 150 | 330 | 544 | 1,220 |
| | | | 75 | - | - | - | 120 | 270 | 450 | 1,020 |
| | | | 100 | - | - | - | 150 | 330 | 544 | 1,220 |
| | | | 120 | - | - | - | 120 | 270 | 450 | 1,020 |
| 150 | - | | - | - | 120 | 270 | 450 | 1,020 | | |
| 200 | - | | - | - | 150 | 330 | 544 | 1,220 | | |
| 300 | - | | - | - | 120 | 270 | 450 | 1,020 | | |
| T _{2B} /Maximum acceleration moment | Nm | | 1,2,3 | 1~300 | (1.5 times of Nominal Output Torque) | | | | | |
| η _{1B} /Maximum acceleration input speed | rpm | 1 | 1~3 | 7,500 | 6,500 | 5,500 | 4,500 | 3,500 | 3,000 | 2,200 |
| | | 2 | 4~20 | 8,000 | 8,000 | 6,000 | 6,000 | 6,000 | 6,000 | 4,800 |
| | | 3 | 25~300 | - | - | - | 8,000 | 8,000 | 6,000 | 6,000 |
| Backlash | arcmin | 1 | 1~3 | ≤6 | ≤6 | ≤6 | ≤6 | ≤6 | ≤6 | ≤6 |
| | | 2 | 4~20 | ≤10 | ≤10 | ≤10 | ≤10 | ≤10 | ≤10 | ≤10 |
| | | 3 | 25~300 | - | - | - | ≤12 | ≤12 | ≤12 | ≤12 |
| F _{2rB} /Maximum input shaft radial force | N | 1,2,3 | 1~300 | 900 | 1,100 | 1,700 | 2,700 | 4,800 | 6,600 | 11,500 |
| F _{2aB} /Maximum input shaft axial force | N | 1,2,3 | 1~300 | 450 | 550 | 850 | 1,350 | 2,400 | 3,300 | 5,750 |
| Life time | h | 1,2,3 | 1~300 | 20,000 (S5 working mode) | | | | | | |
| η/Efficiency | % | 1 | 01~300 | ≥95% | | | | | | |
| | | 2,3 | 4~300 | ≥92% | | | | | | |
| Operating temperature | °C | 1,2,3 | 1~300 | -10°C ~ 90°C | | | | | | |
| Lubrication | | | | Synthetic lubrication oils | | | | | | |
| Noise level (nl=1500rpm, no load) ⁶ | dB (A) | 1,2,3 | 1~300 | ≤71 | ≤72 | ≤76 | ≤77 | ≤78 | ≤79 | ≤81 |

1. The above performance parameters are based on the gearbox operating at duty type S5. If it operates at duty type S1, please contact CLC.

2. The above backlash is measured under at 2% rated torque T_{2N}



PRECISION PLANETARY GEARBOX FAT SERIES

MOMENT OF INERTIA - FLANGE INPUT TYPE

(Unit: mm)

| MODEL | STAGE | RATIO | FAT065 FL | FAT075 FL | FAT090 FL | FAT110 FL | FAT140 FL | FAT170 FL | FAT210 FL |
|--|-------|-------|--|--|--|--|--|--|--|
| | | | FAT065 FL1 FAT065 FH FAT065 FC FAT065 FR1 | FAT075 FL1 FAT075 FH FAT075 FC FAT075 FR1 | FAT090 FL1 FAT090 FH FAT090 FC FAT090 FR1 | FAT110 FL1 FAT110 FH FAT110 FC FAT110 FR1 | FAT140 FL1 FAT140 FH FAT140 FC FAT140 FR1 | FAT170 FL1 FAT170 FH FAT170 FC FAT170 FR1 | FAT210 FL1 FAT210 FH FAT210 FC FAT210 FR1 |
| J_1 (kg · cm ²) Mass Moments of Inertia J_1 | 1 | 1 | 0,51 | 1,30 | 3,14 | 7,62 | 23,54 | 59,09 | 195,96 |
| | | 1,5 | 0,46 | 1,15 | 2,80 | 6,65 | 19,34 | 49,38 | 156,02 |
| | | 2 | 0,44 | 1,10 | 2,68 | 6,23 | 17,72 | 45,44 | 140,8 |
| | | 3 | 0,43 | 1,09 | 2,64 | 6,08 | 17,16 | 44,11 | 135,51 |
| | 2 | 4 | 0,43 | 1,08 | 2,63 | 6,05 | 17,03 | 43,79 | 134,14 |
| | | 5 | 0,43 | 1,08 | 2,63 | 6,04 | 16,99 | 43,69 | 133,71 |
| | | 6 | 0,15 | 0,15 | 0,50 | 2,79 | 2,79 | 2,79 | 9,91 |
| | | 7 | 0,15 | 0,15 | 0,50 | 2,79 | 2,79 | 2,79 | 9,91 |
| | | 8 | 0,15 | 0,15 | 0,50 | 2,80 | 2,80 | 2,80 | 9,96 |
| | | 10 | 0,15 | 0,15 | 0,50 | 2,80 | 2,80 | 2,80 | 9,96 |
| | | 15 | 0,15 | 0,15 | 0,50 | 2,80 | 2,80 | 2,80 | 9,96 |
| | | 20 | 0,15 | 0,15 | 0,50 | 2,80 | 2,80 | 2,80 | 9,96 |
| | 3 | 25 | 0,15 | 0,15 | 0,50 | 2,80 | 2,80 | 2,80 | 9,96 |
| | | 30 | 0,15 | 0,15 | 0,50 | 2,80 | 2,80 | 2,80 | 9,96 |
| | | 35 | 0,15 | 0,15 | 0,50 | 2,79 | 2,79 | 2,79 | 9,91 |
| | | 40 | 0,15 | 0,15 | 0,50 | 2,79 | 2,79 | 2,79 | 9,91 |
| | | 50 | 0,15 | 0,15 | 0,50 | 2,79 | 2,79 | 2,79 | 9,89 |
| | | 75 | - | - | - | 0,15 | 0,15 | 0,50 | 0,50 |
| | | 100 | - | - | - | 0,15 | 0,15 | 0,50 | 0,50 |
| | | 120 | - | - | - | 0,15 | 0,15 | 0,50 | 0,50 |
| 150 | | - | - | - | 0,15 | 0,15 | 0,50 | 0,50 | |
| 200 | | - | - | - | 0,15 | 0,15 | 0,50 | 0,50 | |
| 300 | - | - | - | 0,15 | 0,15 | 0,50 | 0,50 | | |

WEIGHT

(Unit: mm)

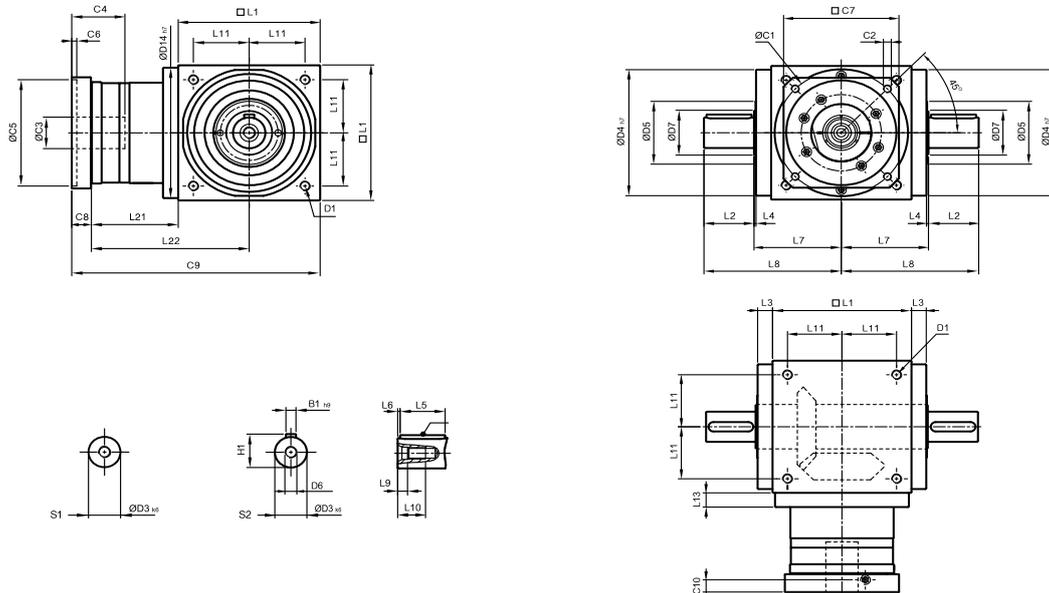
| MODEL | STAGE | RATIO | PT065 | PT075 | PT090 | PT110 | PT140 | PT170 | PT210 | |
|--------------|-------|-------|--------|-------|-------|-------|-------|-------|-------|------|
| FL (Series) | kg | 1 | 1~3 | 2,8 | 4,4 | 7,1 | 12,1 | 20,9 | 36,1 | 69,4 |
| | | 2 | 4~20 | 3,2 | 4,8 | 8,1 | 14,3 | 24,2 | 38,5 | 38,5 |
| | | 3 | 25~300 | - | - | - | 13,9 | 23,7 | 38,8 | 73,4 |
| FL1 (Series) | kg | 1 | 1~3 | 2,7 | 4,3 | 7,1 | 11,9 | 20,3 | 35,5 | 68,3 |
| | | 2 | 4~20 | 3,2 | 4,8 | 8,0 | 14,2 | 23,9 | 37,9 | 73,0 |
| | | 3 | 25~300 | - | - | - | 13,8 | 23,4 | 38,2 | 72,3 |
| FH (Series) | kg | 1 | 1~3 | 2,6 | 4,1 | 6,7 | 11,4 | 18,9 | 32,9 | 63,2 |
| | | 2 | 4~20 | 3,1 | 4,6 | 7,7 | 13,6 | 22,4 | 35,3 | 67,9 |
| | | 3 | 25~300 | - | - | - | 13,3 | 21,9 | 35,6 | 67,2 |
| FC (Series) | kg | 1 | 1~3 | 2,9 | 4,4 | 7,2 | 11,8 | 20,4 | 35,0 | 66,5 |
| | | 2 | 4~20 | 3,3 | 4,9 | 8,2 | 14,1 | 24,1 | 37,4 | 71,2 |
| | | 3 | 25~300 | - | - | - | 13,7 | 23,5 | 37,5 | 70,5 |
| FR1 (Series) | kg | 1 | 1~3 | 2,7 | 4,3 | 7,1 | 11,9 | 20,3 | 35,5 | 68,3 |
| | | 2 | 4~20 | 3,2 | 4,8 | 8,0 | 14,2 | 23,9 | 37,9 | 73 |
| | | 3 | 25~300 | - | - | - | 13,8 | 23,4 | 38,2 | 72,3 |



PRECISION PLANETARY GEARBOX FAT SERIES

PRODUCT DIMENSION

FAT-FL, 1 STAGE



(Unit: mm)

| MODEL | FAT065 FL | FAT075 FL | FAT090 FL | FAT110 FL | FAT140 FL | FAT170 FL | FAT210 FL |
|------------------|----------------------|------------------------------|-----------|-----------|-----------|-----------|-----------|
| D1 | M4 | M6 | M6 | M8 | M10 | M12 | M16 |
| D3 k6 | 13 | 16 | 18 | 22 | 32 | 40 | 50 |
| D4 h7 | 63 | 73 | 88 | 108 | 135 | 165 | 205 |
| D5 | 31 | 35 | 43 | 53 | 68 | 83 | 104 |
| D6 | M4 | M5 | M5 | M8 | M12 | M16 | M16 |
| D7 | 21 | 22 | 28 | 33 | 47 | 55 | 75 |
| D14 h7 | 63 | 73 | 88 | 108 | 135 | 165 | 205 |
| L1 | 65 | 75 | 90 | 110 | 140 | 170 | 210 |
| L2 | 19,5 | 30 | 35 | 40 | 50 | 60 | 75 |
| L3 | 13 | 14,5 | 15 | 15 | 15 | 15 | 20 |
| L4 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| L5 | 16 | 25 | 28 | 32 | 45 | 50 | 70 |
| L6 | 2 | 2,5 | 3,5 | 4 | 2,5 | 5 | 2,5 |
| L7 | 47,5 | 54 | 62 | 72 | 87 | 102 | 127 |
| L8 | 67 | 84 | 97 | 112 | 137 | 162 | 202 |
| L9 | 4,5 | 4,8 | 4,8 | 7,2 | 10 | 12 | 12 |
| L10 | 10 | 12,5 | 12,5 | 19 | 28 | 36 | 36 |
| L11 | 27 | 30 | 36 | 44 | 55 | 67 | 85 |
| L13 | 13 | 15 | 15 | 15 | 15 | 15 | 20 |
| L21 | 49 | 60,5 | 63 | 69,5 | 85,5 | 95 | 130 |
| L22 | 81,5 | 98 | 1,8 | 124,5 | 155,5 | 180 | 235 |
| C1 ¹ | 46 | 70 | 100 | 100 | 130 | 165 | 215 |
| C2 ¹ | M4 | M5 | M6 | M6 | M8 | M10 | M12 |
| C3 ¹ | ≤11/≤12 ² | ≤14/≤15,875/≤16 ² | ≤19 | ≤24 | ≤32 | ≤38 | ≤42 |
| C4 ¹ | 30 | 34 | 40 | 40 | 50 | 60 | 85 |
| C5 ¹ | 30 | 50 | 80 | 80 | 110 | 130 | 180 |
| C6 ¹ | 3,5 | 8 | 4 | 4 | 5 | 6 | 6 |
| C7 ¹ | 42 | 60 | 90 | 90 | 115 | 142 | 190 |
| C8 ¹ | 19,5 | 19 | 17 | 17 | 19,5 | 22,5 | 29 |
| C9 ¹ | 133,5 | 154,5 | 170 | 196,5 | 245 | 287,5 | 369 |
| C10 ¹ | 13,25 | 13,5 | 10,75 | 10,75 | 13 | 15 | 20,75 |
| B1 h9 | 5 | 5 | 6 | 6 | 10 | 12 | 14 |
| H1 | 15 | 18 | 20,5 | 24,5 | 35 | 43 | 53,5 |

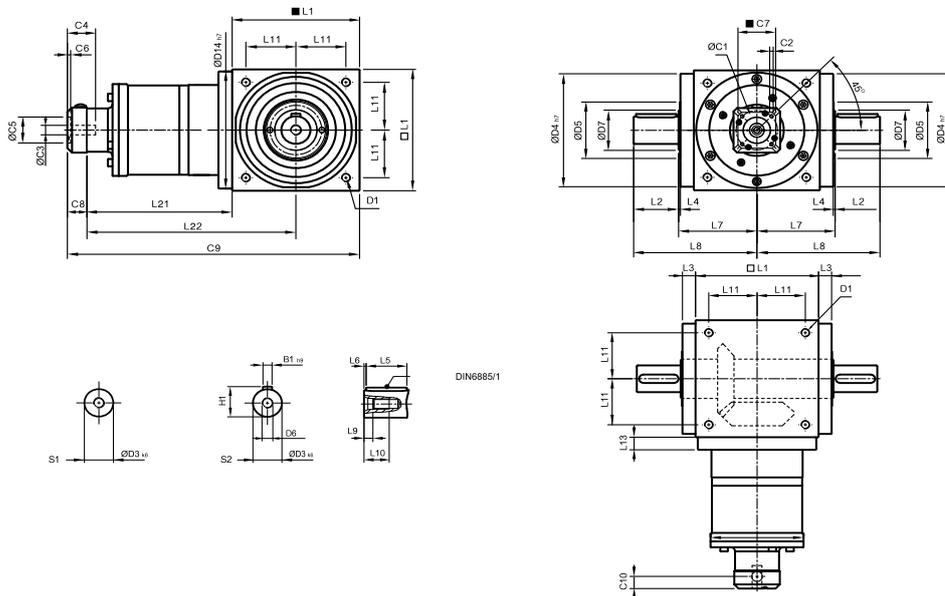
Some dimensions of gearbox refer to ISO9409 standard.

For more detailed information, or special sizes, please: contact CLC.

PRECISION PLANETARY GEARBOX FAT SERIES

PRODUCT DIMENSION

FAT-FL, 3 STAGES



(Unit: mm)

| MODEL | FAT110 FL | FAT140 FL | FAT170 FL | FAT210 FL |
|--------|-----------|-----------|-----------|-----------|
| D1 | M8 | M10 | M12 | M16 |
| D3 k6 | 22 | 32 | 40 | 50 |
| D4 h7 | 108 | 135 | 165 | 205 |
| D5 | 53 | 68 | 83 | 104 |
| D6 | M8 | M12 | M16 | M16 |
| D7 | 33 | 47 | 55 | 75 |
| D14 h7 | 108 | 135 | 165 | 205 |
| L1 | 110 | 140 | 170 | 210 |
| L2 | 40 | 50 | 60 | 75 |
| L3 | 15 | 15 | 15 | 20 |
| L4 | 2 | 2 | 2 | 2 |
| L5 | 32 | 45 | 50 | 70 |
| L6 | 4 | 2,5 | 5 | 2,5 |
| L7 | 72 | 87 | 102 | 127 |
| L8 | 112 | 137 | 162 | 202 |
| L9 | 7,2 | 10 | 12 | 12 |
| L10 | 19 | 28 | 36 | 36 |
| L11 | 44 | 55 | 67 | 85 |
| L13 | 15 | 15 | 15 | 20 |
| L21 | 136,5 | 159,5 | 183,5 | 226 |
| L22 | 191,5 | 229,5 | 268,5 | 331 |
| C1 | 46 | 46 | 70 | 70 |
| C2 | M4 | M4 | M5 | M5 |
| C3 | ≤12 | ≤12 | ≤16 | ≤16 |
| C4 | 30 | 30 | 34 | 34 |
| C5 | 30 | 30 | 50 | 50 |
| C6 | 3,5 | 3,5 | 8 | 8 |
| C7 | 42 | 42 | 60 | 60 |
| C8 | 21,5 | 21,5 | 21,5 | 21,5 |
| C9 | 268 | 321 | 375 | 457,5 |
| C10 | 14,5 | 14,5 | 15,5 | 15,5 |
| B1 h9 | 6 | 10 | 12 | 14 |
| H1 | 24,5 | 35 | 43 | 53,5 |

Some dimensions of gearbox refer to ISO9409 standard.

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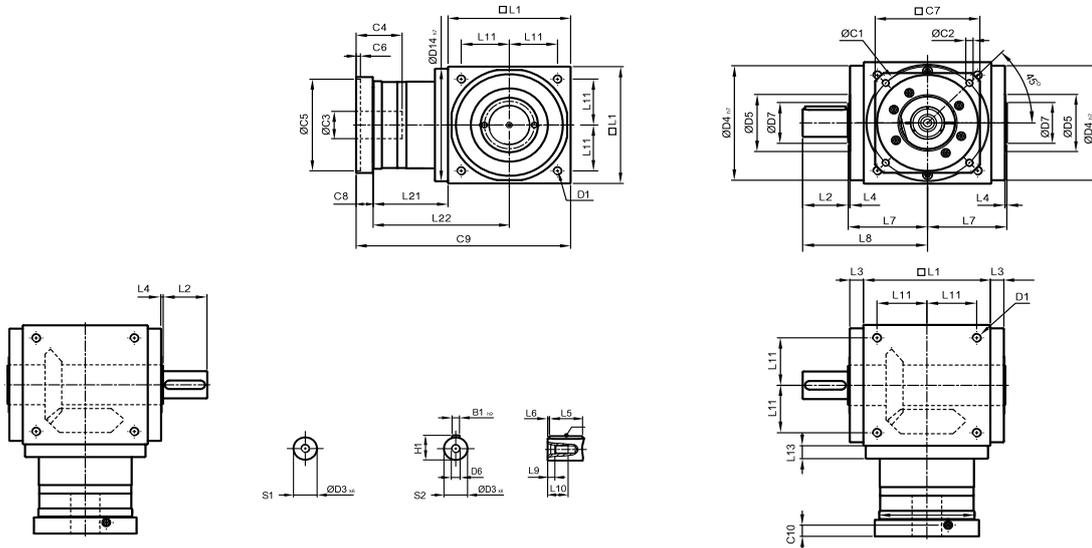


PRECISION PLANETARY GEARBOX FAT SERIES

PRODUCT DIMENSION

FAT-FR1, 1 STAGE

FAT-FL1, 1 STAGE



(Unit: mm)

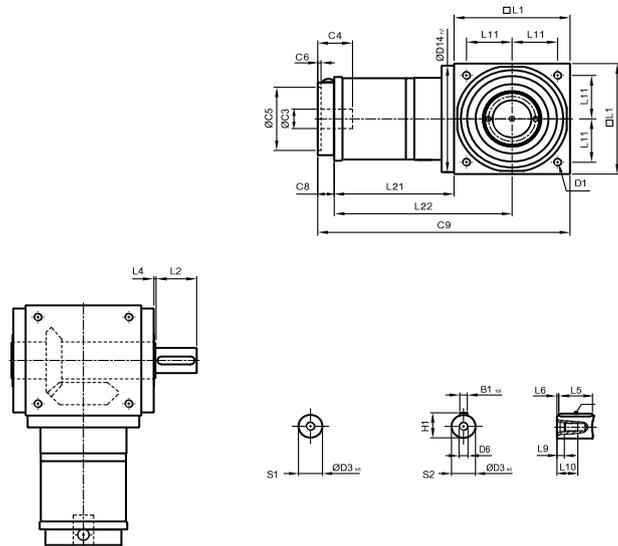
| MODEL | FAT065 FL1/FR1 | FAT075 FL1/FR1 | FAT090 FL1/FR1 | FAT110 FL1/FR1 | FAT140 FL1/FR1 | FAT170 FL1/FR1 | FAT210 FL1/FR1 |
|--------|----------------|-----------------|----------------|----------------|----------------|----------------|----------------|
| D1 | M4 | M6 | M6 | M8 | M10 | M12 | M16 |
| D3 k6 | 13 | 16 | 18 | 22 | 32 | 40 | 50 |
| D4 h7 | 63 | 73 | 88 | 108 | 135 | 165 | 205 |
| D5 | 31 | 35 | 43 | 53 | 68 | 83 | 104 |
| D6 | M4 | M5 | M5 | M8 | M12 | M16 | M16 |
| D7 | 21 | 22 | 28 | 33 | 47 | 55 | 75 |
| D14 h7 | 63 | 73 | 88 | 108 | 135 | 165 | 205 |
| L1 | 65 | 75 | 90 | 110 | 140 | 170 | 210 |
| L2 | 19,5 | 30 | 35 | 40 | 50 | 60 | 75 |
| L3 | 13 | 14,5 | 15 | 15 | 15 | 15 | 20 |
| L4 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| L5 | 16 | 25 | 28 | 45 | 45 | 50 | 70 |
| L6 | 2 | 2,5 | 3,5 | 4 | 2,5 | 5 | 2,5 |
| L7 | 47,5 | 54 | 62 | 72 | 87 | 102 | 127 |
| L8 | 67 | 84 | 97 | 112 | 137 | 162 | 202 |
| L9 | 4,5 | 4,8 | 4,8 | 7,2 | 10 | 12 | 12 |
| L10 | 10 | 12,5 | 12,5 | 19 | 28 | 36 | 36 |
| L11 | 27 | 30 | 36 | 44 | 55 | 67 | 85 |
| L13 | 13 | 15 | 15 | 15 | 15 | 15 | 20 |
| L21 | 49 | 60,5 | 63 | 69,5 | 85,5 | 95 | 130 |
| L22 | 81,5 | 98 | 108 | 124,5 | 155,5 | 180 | 235 |
| C1 | 46 | 70 | 100 | 100 | 130 | 165 | 215 |
| C2 | M4 | M5 | M6 | M6 | M8 | M10 | M12 |
| C3 | ≤11/≤12 | ≤14/≤15,875/≤16 | ≤19 | ≤24 | ≤32 | ≤38 | ≤42 |
| C4 | 30 | 34 | 40 | 40 | 50 | 60 | 85 |
| C5 | 30 | 50 | 80 | 80 | 110 | 130 | 180 |
| C6 | 3,5 | 8 | 4 | 4 | 5 | 6 | 6 |
| C7 | 42 | 60 | 90 | 90 | 115 | 142 | 190 |
| C8 | 19,5 | 19 | 17 | 17 | 19,5 | 22,5 | 29 |
| C9 | 133,5 | 154,5 | 170 | 196,5 | 245 | 287,5 | 369 |
| C10 | 13,25 | 13,5 | 10,75 | 10,75 | 13 | 15 | 20,75 |
| B1 h9 | 5 | 5 | 6 | 6 | 10 | 12 | 14 |
| H1 | 15 | 18 | 20,5 | 24,5 | 30 | 43 | 53,5 |

Some dimensions of gearbox refer to ISO9409 standard.
For more detailed information, or special sizes, please: contact CLC.

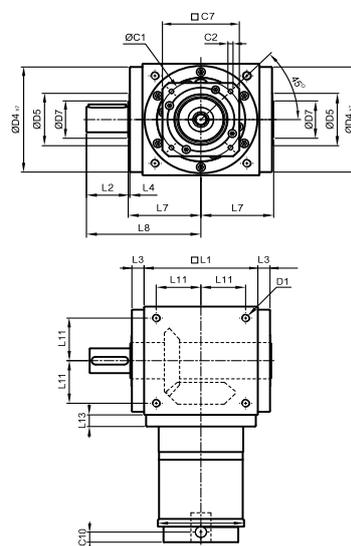
PRECISION PLANETARY GEARBOX FAT SERIES

PRODUCT DIMENSION

FAT-FR1, 2 STAGES



FAT-FL1, 2 STAGES



(Unit: mm)

| MODEL | FAT065 FL1/FR1 | FAT075 FL1/FR1 | FAT090 FL1/FR1 | FAT110 FL1/FR1 | FAT140 FL1/FR1 | FAT170 FL1/FR1 | FAT210 FL1/FR1 |
|--------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| D1 | M4 | M6 | M6 | M8 | M10 | M12 | M16 |
| D3 k6 | 13 | 16 | 18 | 22 | 32 | 40 | 50 |
| D4 h7 | 63 | 73 | 88 | 108 | 135 | 165 | 205 |
| D5 | 31 | 35 | 43 | 53 | 68 | 83 | 104 |
| D6 | M4 | M5 | M5 | M8 | M12 | M16 | M16 |
| D7 | 21 | 22 | 28 | 33 | 47 | 55 | 75 |
| D14 h7 | 63 | 73 | 88 | 108 | 135 | 165 | 205 |
| L1 | 65 | 75 | 90 | 110 | 140 | 170 | 210 |
| L2 | 19,5 | 30 | 35 | 40 | 50 | 60 | 75 |
| L3 | 13 | 14,5 | 15 | 15 | 15 | 15 | 20 |
| L4 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| L5 | 16 | 25 | 28 | 32 | 45 | 50 | 70 |
| L6 | 2 | 2,5 | 3,5 | 4 | 2,5 | 5 | 2,5 |
| L7 | 47,5 | 54 | 62 | 72 | 87 | 102 | 127 |
| L8 | 67 | 84 | 97 | 112 | 137 | 162 | 202 |
| L9 | 4,5 | 4,8 | 4,8 | 7,2 | 10 | 12 | 12 |
| L10 | 10 | 12,5 | 12,5 | 19 | 28 | 36 | 36 |
| L11 | 27 | 30 | 36 | 44 | 55 | 67 | 85 |
| L13 | 13 | 15 | 15 | 15 | 15 | 15 | 20 |
| L21 | 75 | 84,5 | 99 | 122 | 144,5 | 157,5 | 206,5 |
| L22 | 107,5 | 122 | 144 | 177 | 214,5 | 242,5 | 311,5 |
| C1 | 46 | 46 | 70 | 100 | 100 | 100 | 130 |
| C2 | M4 | M4 | M5 | M6 | M6 | M6 | M8 |
| C3 | ≤12 | ≤12 | ≤16 | ≤24 | ≤24 | ≤24 | ≤32 |
| C4 | 30 | 30 | 34 | 40 | 40 | 40 | 50 |
| C5 | 30 | 30 | 50 | 80 | 80 | 80 | 110 |
| C6 | 3,5 | 3,5 | 8 | 4 | 4 | 4 | 5 |
| C7 | 42 | 42 | 60 | 92 | 92 | 92 | 115 |
| C8 | 21,5 | 21,5 | 21,5 | 20 | 20 | 20 | 24 |
| C9 | 161,5 | 181 | 210,5 | 252 | 304,5 | 347,5 | 440,5 |
| C10 | 14,55 | 14,5 | 15,5 | 13 | 13 | 1 | 16 |
| B1 h9 | 5 | 5 | 6 | 6 | 10 | 12 | 14 |
| H1 | 15 | 18 | 20,5 | 24,5 | 35 | 43 | 53,5 |

Some dimensions of gearbox refer to ISO9409 standard.

For more detailed information, or special sizes, please: contact CLC.

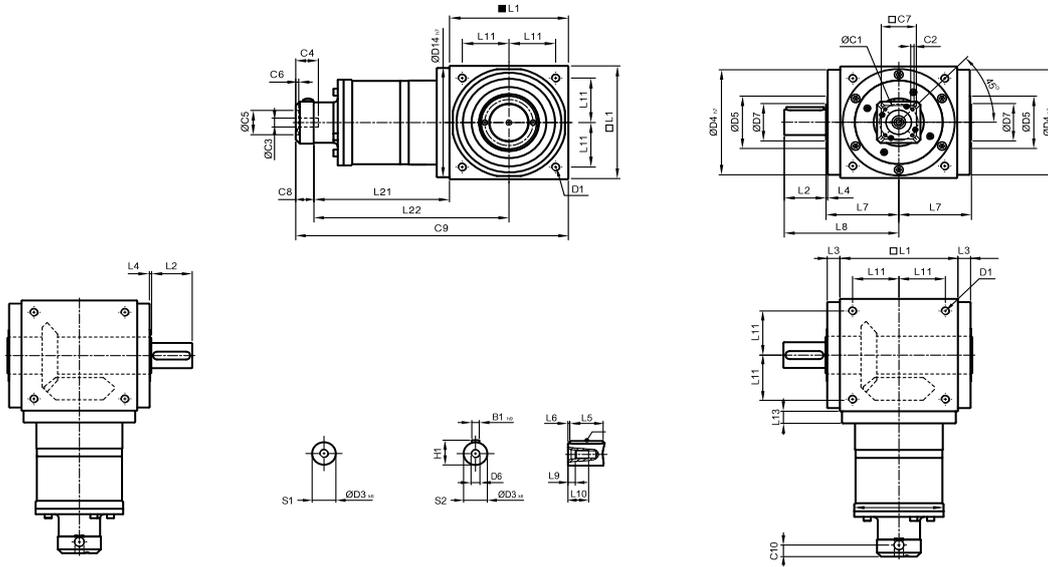


PRECISION PLANETARY GEARBOX FAT SERIES

PRODUCT DIMENSION

FAT-FR1, 3 STAGES

FAT-FL1, 3 STAGES



(Unit: mm)

| MODEL | FAT110 FL1/FR1 | FAT140 FL1/FR1 | FAT170 FL1/FR1 | FAT210 FL1/FR1 |
|--------|----------------|----------------|----------------|----------------|
| D1 | M8 | M10 | M12 | M16 |
| D3 k6 | 22 | 32 | 40 | 50 |
| D4 h7 | 108 | 135 | 165 | 205 |
| D5 | 53 | 68 | 83 | 104 |
| D6 | M8 | M12 | M16 | M16 |
| D7 | 33 | 47 | 55 | 75 |
| D14 h7 | 108 | 135 | 165 | 205 |
| L1 | 110 | 140 | 170 | 210 |
| L2 | 40 | 50 | 60 | 75 |
| L3 | 15 | 15 | 15 | 20 |
| L4 | 2 | 2 | 2 | 2 |
| L5 | 32 | 45 | 50 | 70 |
| L6 | 4 | 2,5 | 5 | 2,5 |
| L7 | 72 | 87 | 102 | 127 |
| L8 | 112 | 137 | 162 | 202 |
| L9 | 7,2 | 10 | 12 | 12 |
| L10 | 19 | 28 | 36 | 36 |
| L11 | 44 | 55 | 67 | 85 |
| L13 | 15 | 15 | 15 | 20 |
| L21 | 136,5 | 159,5 | 183,5 | 226 |
| L22 | 191,5 | 229,5 | 268,5 | 331 |
| C1 | 46 | 46 | 70 | 70 |
| C2 | M4 | M4 | M5 | M5 |
| C3 | ≤12 | ≤12 | ≤16 | ≤16 |
| C4 | 30 | 30 | 34 | 34 |
| C5 | 30 | 30 | 50 | 50 |
| C6 | 3,5 | 3,5 | 8 | 8 |
| C7 | 42 | 42 | 60 | 60 |
| C8 | 21,5 | 21,5 | 21,5 | 21,5 |
| C9 | 268 | 321 | 375 | 457,5 |
| C10 | 14,5 | 14,5 | 15,5 | 15,5 |
| B1 h9 | 6 | 10 | 12 | 14 |
| H1 | 24,5 | 35 | 43 | 53,5 |

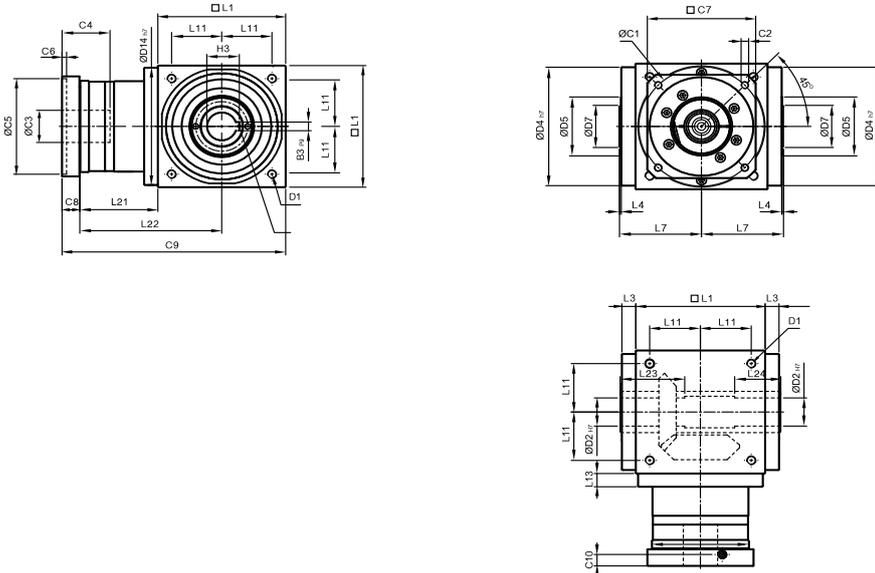
Some dimensions of gearbox refer to ISO9409 standard.
For more detailed information, or special sizes, please: contact CLC.



PRECISION PLANETARY GEARBOX FAT SERIES

PRODUCT DIMENSION

FAT-FH, 1 STAGE



(Unit: mm)

| MODEL | FAT065 FH | FAT075 FH | FAT090 FH | FAT110 FH | FAT140 FH | FAT170 FH | FAT210 FH |
|--------|-----------|-----------------|-----------|-----------|-----------|-----------|-----------|
| D1 | M4 | M6 | M6 | M8 | M10 | M12 | M16 |
| D2 H7 | 13 | 14 | 18 | 22 | 32 | 40 | 50 |
| D4 h7 | 63 | 73 | 88 | 108 | 135 | 165 | 205 |
| D5 | 31 | 35 | 43 | 53 | 68 | 83 | 104 |
| D7 | 21 | 22 | 28 | 33 | 47 | 55 | 75 |
| D14 h7 | 63 | 73 | 88 | 108 | 135 | 165 | 205 |
| L1 | 65 | 75 | 90 | 110 | 140 | 170 | 210 |
| L3 | 13 | 14,5 | 15 | 15 | 15 | 15 | 20 |
| L4 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| L7 | 47,5 | 54 | 62 | 72 | 87 | 102 | 127 |
| L11 | 27 | 30 | 36 | 44 | 55 | 67 | 85 |
| L13 | 13 | 15 | 15 | 15 | 15 | 15 | 20 |
| L21 | 49 | 60,5 | 63 | 69,5 | 85,5 | 95 | 130 |
| L22 | 81,5 | 98 | 108 | 124,5 | 155,5 | 180 | 235 |
| L23 | 40 | 47 | 52 | 53 | 70 | 80 | 95 |
| L24 | 30 | 32 | 35 | 35 | 50 | 55 | 65 |
| C1 | 46 | 70 | 100 | 100 | 130 | 165 | 215 |
| C2 | M4 | M5 | M6 | M6 | M8 | M10 | M12 |
| C3 | ≤11/≤12 | ≤14/≤15,875/≤16 | ≤19 | ≤24 | ≤32 | ≤38 | ≤42 |
| C4 | 30 | 34 | 40 | 40 | 50 | 60 | 85 |
| C5 | 30 | 50 | 80 | 80 | 110 | 130 | 180 |
| C6 | 3,5 | 8 | 4 | 4 | 5 | 6 | 6 |
| C7 | 42 | 60 | 90 | 90 | 115 | 142 | 190 |
| C8 | 19,5 | 19 | 17 | 17 | 19,5 | 22,5 | 29 |
| C9 | 133,5 | 154,5 | 170 | 196,5 | 245 | 287,5 | 369 |
| C10 | 13,25 | 13,5 | 10,75 | 10,75 | 13 | 15 | 20,75 |
| B3 P9 | 5 | 5 | 6 | 6 | 10 | 12 | 14 |
| H3 | 15,3 | 16,3 | 20,8 | 24,8 | 35,3 | 43,3 | 53,8 |

Some dimensions of gearbox refer to ISO9409 standard.

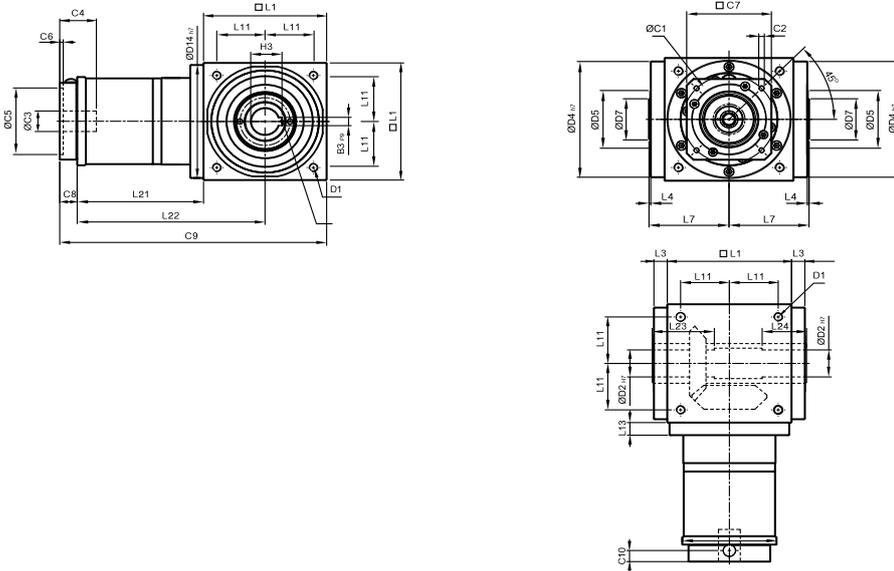
For more detailed information, or special sizes, please: contact CLC.



PRECISION PLANETARY GEARBOX FAT SERIES

PRODUCT DIMENSION

FAT-FH, 2 STAGES



(Unit: mm)

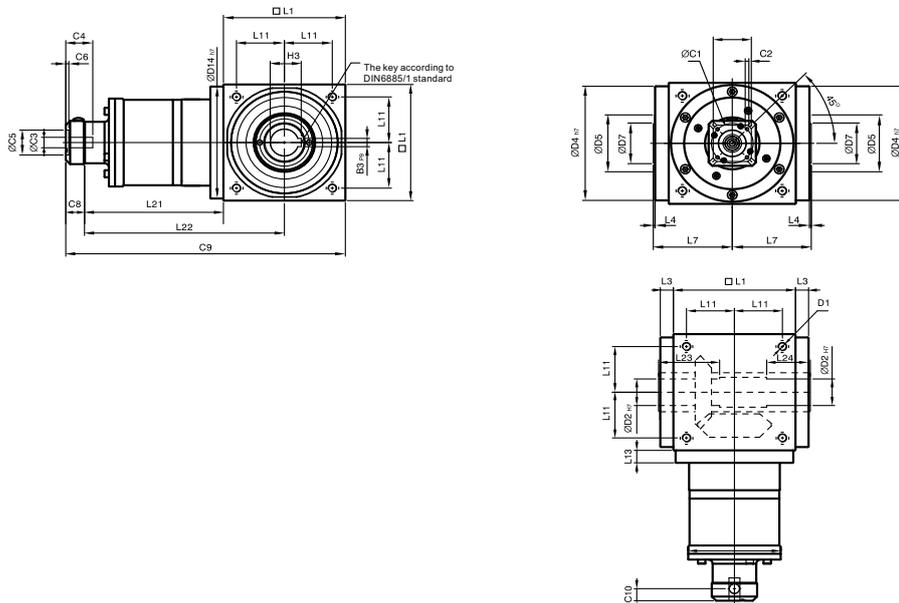
| MODEL | FAT065 FH | FAT075 FH | FAT090 FH | FAT110 FH | FAT140 FH | FAT170 FH | FAT210 FH |
|--------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| D1 | M4 | M6 | M6 | M8 | M10 | M12 | M16 |
| D2 H7 | 13 | 14 | 18 | 22 | 32 | 40 | 50 |
| D4 h7 | 63 | 73 | 88 | 108 | 135 | 165 | 205 |
| D5 | 31 | 35 | 43 | 53 | 68 | 83 | 104 |
| D7 | 21 | 22 | 28 | 33 | 47 | 55 | 75 |
| D14 h7 | 63 | 73 | 88 | 108 | 135 | 165 | 205 |
| L1 | 65 | 75 | 90 | 110 | 140 | 170 | 210 |
| L3 | 13 | 14,5 | 15 | 15 | 15 | 15 | 2 |
| L4 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| L7 | 47,5 | 54 | 62 | 72 | 87 | 102 | 127 |
| L11 | 27 | 30 | 36 | 44 | 55 | 67 | 85 |
| L13 | 13 | 15 | 15 | 15 | 15 | 15 | 20 |
| L21 | 75 | 84,5 | 99 | 122 | 144,5 | 157,5 | 206,5 |
| L22 | 107,5 | 122 | 144 | 177 | 214,5 | 242,5 | 311,5 |
| L23 | 40 | 47 | 52 | 53 | 70 | 80 | 95 |
| L24 | 30 | 32 | 35 | 35 | 50 | 55 | 65 |
| C1 | 46 | 46 | 70 | 100 | 100 | 100 | 130 |
| C2 | M4 | M4 | M5 | M6 | M6 | M6 | M8 |
| C3 | ≤12 | ≤12 | ≤16 | ≤24 | ≤24 | ≤24 | ≤32 |
| C4 | 30 | 30 | 34 | 40 | 40 | 40 | 50 |
| C5 | 30 | 30 | 50 | 80 | 80 | 80 | 110 |
| C6 | 3,5 | 3,5 | 8 | 4 | 4 | 4 | 5 |
| C7 | 42 | 42 | 60 | 92 | 92 | 92 | 115 |
| C8 | 21,5 | 21,5 | 21,5 | 20 | 20 | 20 | 24 |
| C9 | 161,5 | 181 | 210,5 | 252 | 304,5 | 347,5 | 440,5 |
| C10 | 14,5 | 14,5 | 15,5 | 13 | 13 | 13 | 16 |
| B3 P9 | 5 | 5 | 6 | 6 | 10 | 12 | 14 |
| H3 | 15,3 | 16,3 | 20,8 | 24,8 | 35,3 | 43,3 | 53,8 |

Some dimensions of gearbox refer to ISO9409 standard.
For more detailed information, or special sizes, please: contact CLC.

PRECISION PLANETARY GEARBOX FAT SERIES

PRODUCT DIMENSION

FAT-FH, 3 STAGE



(Unit: mm)

| MODEL | FAT110 FH | FAT140 FH | FAT170 FH | FAT210 FH |
|--------|-----------|-----------|-----------|-----------|
| D1 | M8 | M10 | M12 | M16 |
| D2 H7 | 22 | 32 | 40 | 50 |
| D4 h7 | 108 | 135 | 165 | 205 |
| D5 | 53 | 68 | 83 | 104 |
| D7 | 33 | 47 | 55 | 75 |
| D14 h7 | 108 | 135 | 165 | 205 |
| L1 | 110 | 140 | 170 | 210 |
| L3 | 15 | 15 | 15 | 20 |
| L4 | 2 | 2 | 2 | 2 |
| L7 | 72 | 87 | 102 | 127 |
| L11 | 44 | 55 | 67 | 85 |
| L13 | 15 | 15 | 15 | 20 |
| L21 | 136,5 | 159,5 | 183,5 | 226 |
| L22 | 191,5 | 229,5 | 268,5 | 331 |
| L23 | 53 | 70 | 80 | 95 |
| L24 | 35 | 50 | 55 | 65 |
| C1 | 46 | 46 | 70 | 70 |
| C2 | M4 | M4 | M5 | M5 |
| C3 | ≤12 | ≤12 | ≤16 | ≤16 |
| C4 | 30 | 30 | 34 | 34 |
| C5 | 30 | 30 | 50 | 50 |
| C6 | 3,5 | 3,5 | 8 | 8 |
| C7 | 42 | 42 | 60 | 60 |
| C8 | 21,5 | 21,5 | 21,5 | 21,5 |
| C9 | 268 | 321 | 375 | 457,5 |
| C10 | 14,5 | 14,5 | 15,5 | 15,5 |
| B3 P9 | 6 | 10 | 12 | 14 |
| H3 | 24,8 | 35,3 | 43,3 | 53,8 |

Some dimensions of gearbox refer to ISO9409 standard.

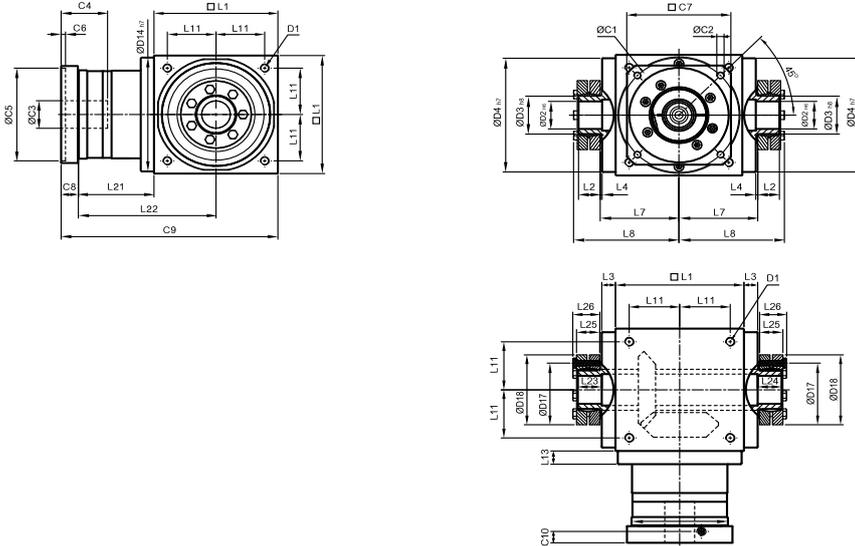
For more detailed information, or special sizes, please: contact CLC.



PRECISION PLANETARY GEARBOX FAT SERIES

PRODUCT DIMENSION

FAT-FC, 1 STAGE



(Unit: mm)

| MODEL | FAT065 FC | FAT075 FC | FAT090 FC | FAT110 FC | FAT140 FC | FAT170 FC | FAT210 FC |
|--------|-----------|-----------------|-----------|-----------|-----------|-----------|-----------|
| D1 | M4 | M6 | M6 | M8 | M10 | M12 | M16 |
| D2 H6 | 13 | 14 | 18 | 22 | 32 | 40 | 50 |
| D3 h8 | 16 | 16 | 22 | 25 | 44 | 50 | 62 |
| D4 h7 | 63 | 73 | 88 | 108 | 135 | 165 | 205 |
| D14 h7 | 63 | 73 | 88 | 108 | 135 | 165 | 205 |
| D17 | 26 | 26 | 36 | 38 | 61 | 70 | 86 |
| D18 | 41 | 41 | 50 | 50 | 80 | 90 | 110 |
| L1 | 65 | 75 | 90 | 90 | 140 | 170 | 210 |
| L2 | 14 | 14 | 18 | 18 | 24 | 26 | 29 |
| L3 | 13 | 14,5 | 15 | 15 | 15 | 15 | 20 |
| L4 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| L7 | 47,5 | 54 | 62 | 62 | 87 | 102 | 127 |
| L8 | 66 | 72,5 | 85 | 85 | 116,5 | 133,5 | 161,5 |
| L11 | 27 | 30 | 36 | 36 | 55 | 67 | 85 |
| L13 | 13 | 15 | 15 | 15 | 12 | 15 | 20 |
| L21 | 49 | 60,5 | 63 | 63 | 85,5 | 95 | 130 |
| L22 | 81,5 | 98 | 108 | 108 | 155,5 | 180 | 235 |
| L23 | 15 | 15 | 20 | 20 | 26 | 28 | 31 |
| L24 | 15 | 15 | 20 | 20 | 26 | 28 | 31 |
| L25 | 15 | 15 | 19,5 | 19,5 | 25,5 | 27,5 | 30,5 |
| L26 | 18,5 | 18,5 | 23 | 23 | 29,5 | 31,5 | 34,5 |
| C1 | 46 | 70 | 100 | 100 | 130 | 165 | 215 |
| C2 | M4 | M5 | M6 | M6 | M8 | M10 | M12 |
| C3 | ≤11/≤12 | ≤14/≤15,875/≤16 | ≤19 | ≤24 | ≤32 | ≤38 | ≤42 |
| C4 | 30 | 34 | 40 | 40 | 50 | 60 | 85 |
| C5 | 30 | 50 | 80 | 80 | 110 | 130 | 180 |
| C6 | 3,5 | 8 | 4 | 4 | 5 | 6 | 6 |
| C7 | 42 | 60 | 90 | 90 | 115 | 142 | 190 |
| C8 | 19,5 | 19 | 17 | 17 | 19,5 | 22,5 | 29 |
| C9 | 133,5 | 154,5 | 170 | 196,5 | 245 | 287,5 | 369 |
| C10 | 13,25 | 13,5 | 10,75 | 10,75 | 13 | 15 | 20,75 |

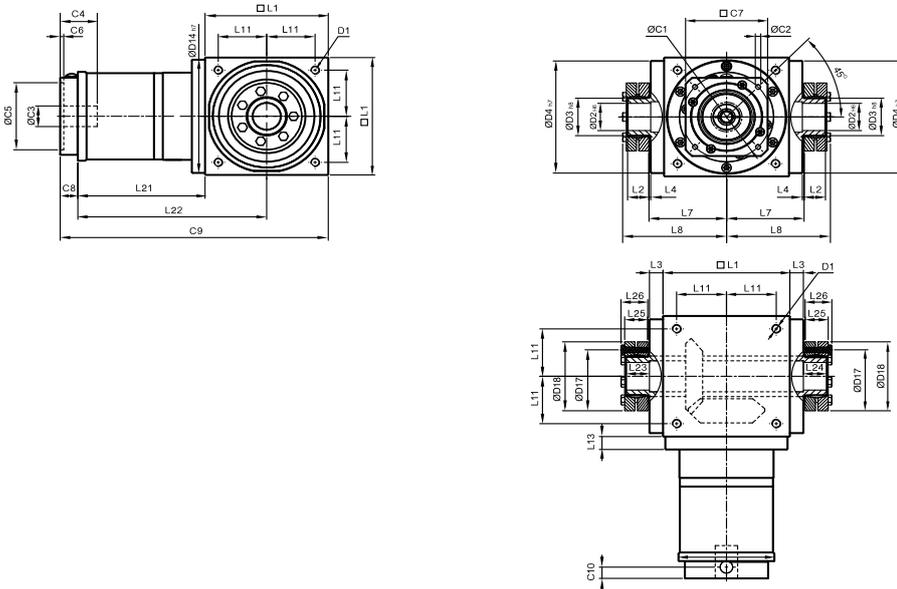
Some dimensions of gearbox refer to ISO9409 standard.
For more detailed information, or special sizes, please: contact CLC.



PRECISION PLANETARY GEARBOX FAT SERIES

PRODUCT DIMENSION

FAT-FC, 2 STAGES



(Unit: mm)

| MODEL | FAT065 FC | FAT075 FC | FAT090 FC | FAT110 FC | FAT140 FC | FAT170 FC | FAT210 FC |
|--------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| D1 | M4 | M6 | M6 | M8 | M10 | M12 | M16 |
| D2 H6 | 13 | 14 | 18 | 22 | 32 | 40 | 50 |
| D3 h8 | 16 | 16 | 22 | 25 | 44 | 50 | 62 |
| D4 h7 | 63 | 73 | 88 | 108 | 135 | 165 | 205 |
| D14 h7 | 63 | 73 | 88 | 108 | 135 | 165 | 205 |
| D17 | 26 | 26 | 36 | 38 | 61 | 70 | 86 |
| D18 | 41 | 41 | 50 | 50 | 80 | 90 | 110 |
| L1 | 65 | 75 | 90 | 110 | 140 | 170 | 210 |
| L2 | 14 | 14 | 18 | 18 | 24 | 26 | 29 |
| L3 | 13 | 14,5 | 15 | 15 | 15 | 15 | 20 |
| L4 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| L7 | 47,5 | 54 | 62 | 72 | 87 | 102 | 12 |
| L8 | 66 | 72,5 | 85 | 95 | 116,5 | 133,5 | 161,5 |
| L11 | 27 | 30 | 36 | 44 | 55 | 67 | 85 |
| L13 | 13 | 15 | 15 | 15 | 15 | 15 | 20 |
| L21 | 75 | 84,5 | 99 | 122 | 144,5 | 157,5 | 206,5 |
| L22 | 107,5 | 122 | 144 | 177 | 214,5 | 242,5 | 311,5 |
| L23 | 15 | 15 | 20 | 20 | 26 | 28 | 31 |
| L24 | 15 | 15 | 20 | 20 | 26 | 28 | 31 |
| L25 | 15 | 15 | 19 | 19,5 | 25,5 | 27,5 | 30,5 |
| L26 | 18,5 | 18,5 | 23 | 23 | 29,5 | 31,5 | 34,5 |
| C1 | 46 | 46 | 70 | 100 | 100 | 100 | 130 |
| C2 | M4 | M4 | M5 | M6 | M6 | M6 | M8 |
| C3 | ≤12 | ≤12 | ≤16 | ≤24 | ≤24 | ≤24 | ≤32 |
| C4 | 30 | 30 | 34 | 40 | 40 | 40 | 50 |
| C5 | 30 | 30 | 50 | 80 | 80 | 80 | 110 |
| C6 | 3,5 | 3,5 | 8 | 4 | 4 | 4 | 5 |
| C7 | 42 | 42 | 60 | 92 | 92 | 92 | 115 |
| C8 | 21,5 | 21,5 | 21,5 | 20 | 20 | 20 | 24 |
| C9 | 161,5 | 181 | 210,5 | 252 | 304,5 | 347,5 | 440,5 |
| C10 | 14,5 | 14,5 | 15,5 | 13 | 13 | 13 | 16 |

Some dimensions of gearbox refer to ISO9409 standard.

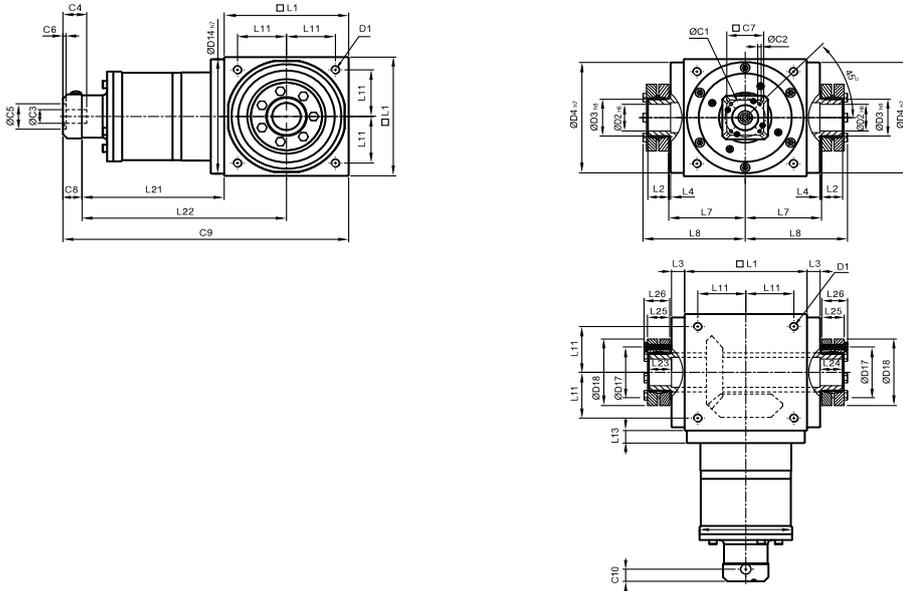
For more detailed information, or special sizes, please: contact CLC.



PRECISION PLANETARY GEARBOX FAT SERIES

PRODUCT DIMENSION

FAT-FC, 3 STAGES



(Unit: mm)

| MODEL | FAT110 FC | FAT140 FC | FAT170 FC | FAT210 FC |
|--------|-----------|-----------|-----------|-----------|
| D1 | M8 | M10 | M12 | M16 |
| D2 H6 | 22 | 32 | 40 | 50 |
| D3 h8 | 25 | 44 | 50 | 62 |
| D4 h7 | 108 | 135 | 165 | 205 |
| D14 h7 | 108 | 135 | 165 | 205 |
| D17 | 38 | 61 | 70 | 86 |
| D18 | 50 | 80 | 90 | 110 |
| L1 | 110 | 140 | 170 | 210 |
| L2 | 18 | 24 | 26 | 29 |
| L3 | 15 | 15 | 15 | 20 |
| L4 | 2 | 2 | 2 | 2 |
| L7 | 72 | 87 | 102 | 127 |
| L8 | 95 | 116,5 | 133,5 | 161,5 |
| L11 | 44 | 55 | 67 | 85 |
| L13 | 15 | 15 | 15 | 20 |
| L21 | 136,5 | 159,5 | 183,5 | 226 |
| L22 | 191,5 | 229,5 | 268,5 | 331 |
| L23 | 20 | 26 | 28 | 31 |
| L24 | 20 | 26 | 28 | 31 |
| L25 | 19,5 | 25,5 | 27,5 | 30,5 |
| L26 | 23 | 29,5 | 31,5 | 34,5 |
| C1 | 46 | 46 | 70 | 70 |
| C2 | M4 | M4 | M5 | M5 |
| C3 | ≤12 | ≤12 | ≤16 | ≤16 |
| C4 | 30 | 30 | 34 | 34 |
| C5 | 30 | 30 | 50 | 50 |
| C6 | 3,5 | 3,5 | 8 | 8 |
| C7 | 42 | 42 | 60 | 60 |
| C8 | 21,5 | 21,5 | 21,5 | 21,5 |
| C9 | 268 | 321 | 375 | 457,5 |
| C10 | 14,5 | 14,5 | 15,5 | 15,5 |

Some dimensions of gearbox refer to ISO9409 standard.
For more detailed information, or special sizes, please: contact CLC.



PRECISION PLANETARY GEARBOX

INSTALLATION INSTRUCTION

SUGGESTED TORQUE TABLE FOR MOTOR LOCKING SCREWS

| SCREW SIZE | HEXAGON HEAD SIZE | STRENGTH 8.8 | | STRENGTH 10.9 | | STRENGTH 12.9 | |
|------------|-------------------|--------------|----------|---------------|----------|---------------|----------|
| | [mm] | [Nm] | [In-lbs] | [NMI] | [In-lbs] | [Nm] | [In-lbs] |
| M3x0.5P | 2.5 | 1.3 | 12 | 1.8 | 16 | 2.1 | 19 |
| M4x0.7P | 3 | 3 | 27 | 4.1 | 37 | 4.9 | 44 |
| M5x0.8P | 4 | 6.1 | 55 | 8.2 | 73 | 9.8 | 87 |
| M6x1P | 5 | 11 | 98 | 14 | 124 | 17 | 151 |
| M8x1.25P | 6 | 25 | 222 | 34 | 302 | 41 | 364 |
| M10x1.5P | 8 | 49 | 434 | 67 | 594 | 80 | 709 |
| M12x1.75P | 10 | 85 | 753 | 116 | 1028 | 139 | 1232 |
| M14x2P | 12 | 137 | 1214 | 186 | 1648 | 223 | 1976 |
| M16x2P | 14 | 210 | 1860 | 286 | 2534 | 343 | 3038 |

SUGGESTED TORQUE TABLE FOR THE LOCKING SCREW OF THE GEARBOX

| REDUCER MODEL | | MOTOR SHAFT DIAMETER | SCREW SIZE | HEXAGON HEAD SIZE | LOCKING TORQUE | |
|---|--------------|----------------------|---------------|-------------------|----------------|----------|
| | | [mm] | [mm] | [mm] | [Nm] | [In-lbs] |
| FAB042 FABR042 FAD047 FADR047 FG040 FGA040 FB042 FBR042 | Single Stage | ≤12 | M3x0.5Px10L | 2.5 | 2.1 | 19 |
| | Dual Stage | ≤12 | M3x0.5Px10L | 2.5 | 2.1 | 19 |
| FAB060 FABR060 FAD064 FADR064 FB060 FBR060 FE070 FER070 FG060 FGA060 FGR060 FGAR060 FAF060 FAFR060 | Single Stage | ≤19 | M5x0.8Px14L | 4 | 9.8 | 87 |
| | Dual Stage | ≤19 | M5x0.8Px14L | 4 | 9.8 | 87 |
| FAB090 FABR090 FAD090 FADR090 FB090 FBR090 FE090 FER090 FG080 FGA080 FGR080 FGAR080 FAF070 FAFR070 | Single Stage | ≤24 | M6x1Px20L | 5 | 17 | 151 |
| | Dual Stage | ≤19 | M5x0.8Px14L | 4 | 9.8 | 87 |
| FAB115 FABR115 FAD110 FADR110 FB115 FBR115 FE120 FER120 FG120 FGR120 FGA120 FGAR120 FAF100 FAFR100 | Single Stage | ≤35 | M8x1.25P25L | 6 | 41 | 364 |
| | Dual Stage | ≤24 | M6x1Px20L | 5 | 17 | 151 |
| FAB142 FABR142 FAD140 FADR140 FB142 FBR142 FE155 FER155 FG160 FGR160 FGA160 FGAR160 FAF140 FAFR140 | Single Stage | ≤38 | M10x1,5Px30L | 8 | 80 | 709 |
| | Dual Stage | ≤35 | M8x1.25P25L | 6 | 41 | 364 |
| FAB180 FABR180 FAD200 FADR200 FB180 FE205 FBR180 FER205 FAF180 FAFR180 | Single Stage | ≤50 | M12x1.75Px35L | 10 | 139 | 1232 |
| | Dual Stage | ≤38 | M10x1,5Px30L | 8 | 80 | 709 |
| FAB220 FABR220 FAD255 FADR255 FE235 FB220 FBR220 FER235 | Single Stage | ≤55 | M16x2Px40L | 14 | 343 | 3038 |
| | Dual Stage | ≤50 | M12x1.75Px35L | 10 | 139 | 1232 |

Note: The screw tightening torque must be greater than the above value.

If necessary, the tightening torque can be increased by 20% of the above recommended value to avoid slipping.



PRECISION PLANETARY GEARBOX

INSTALLATION INSTRUCTION

1. Confirm the appearance of the reducer.

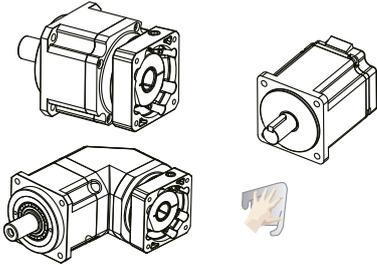
Please confirm if the reducer model is correct.

2. Installation of the servo motor.

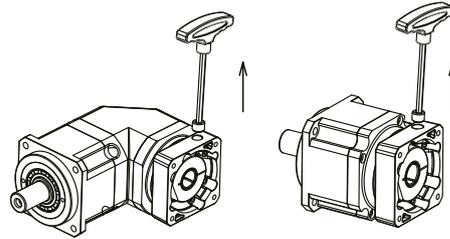
The installation of servo motor according to the following steps.

Please proceed with the installation of the servo motor according to the order.

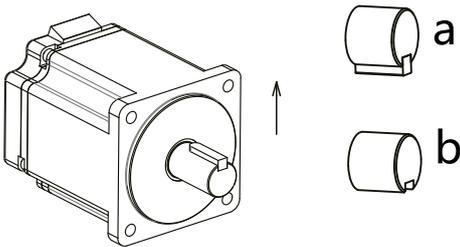
1. Confirm the specifications of motor and reducer, and wipe the mounting surface of motor and reducer clean.



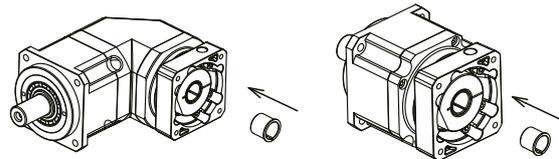
2. Take the plug screw out of the flange side hole, and rotate the motor locking hub until the locking hub screw is aligned with the flange side hole.



3. Remove the original flat key from the motor; if necessary, install the balance key.



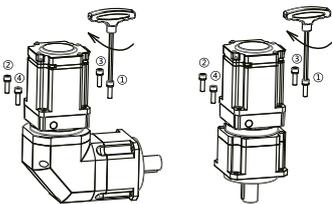
4. Confirm the axis size of the motor and install the sleeve if necessary.



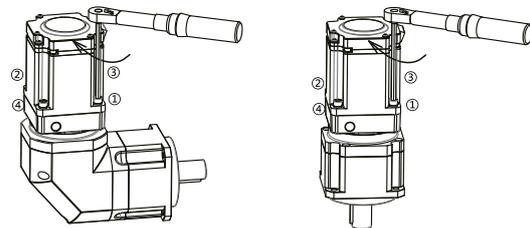
Correct locking method

When the motor is in the shape of a flat shaft, the opposite shaft is clamped on the center line of the flat shaft, so that the locking hub screw is perpendicular to the flat shaft.

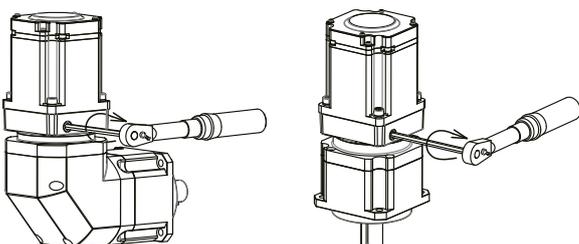
5. Install the motor in a vertical position, and use a wrench to lock the screws with gaskets according to the order from 1 ~ 4, using 5% of the recommended torque value in the screw torque table (Table 1).



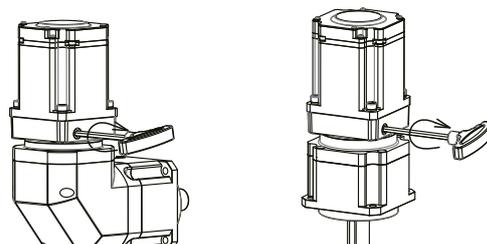
6. Place the motor and reducer vertically. Lock the screws with a torque wrench in the order of 1 ~ 4, according to the recommended torque values in the screw torque table (Table 1).



7. According to the recommended torque value in Table 2, lock the locking hub screw with a torque wrench.



8. Lock the flange side hole plug screw.





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