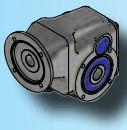
DERTEC

Stainless Steel Hypoid Bevel Gearboxes



FK Series Hypoid Bevel Gearbox

FK series hypoid bevelgeardrives are being developed to achieve high torque, low energy use and less surface heat.
The high efficiency of the drive reduces the energy consumption.
The case hardened gears ensure a long lifetime compared to bronze / steel combinations as used in wormgeardrives and a smooth running.
The footprint and shaft sizes are similar to common used standards in the market.

The design of the gearbox is organic round and the smooth design makes the gearboxes extremely applicable in the foodindustry.
The FK Hypoid bevelgearboxes offers high ratio's up to 300:1 with a maximum output torque of 500 Nm.

The main features are:

Made of high quality carefully electro polished Stainless Steel AISI 316. (Mirror Polished on request)
The smooth design gives the gearbox a nice appearance, ready to suit all kinds of stainless steel machineries for the food industry.

All Hollow shafts are produced in Duplex Stainless Steel 2205.
The special PNS surface treatment ensures enough hardness to collaborate with our Special High Temperature Resistant Blue Shaft Seals.
The PNS treatment increases the lifetime of shaft / seal cooperation and helps to reduce wear on the shaft surface.
By this, the gearbox obtains a longer drip free operation compared to standard shaft / seal combinations made of SS304 with NBR or FKM.

The use of above combination offers all the positive characteristics of stainless steel and the surface hardness of a hardened shaft.

Our high performance engineered shaft seals have a Blue colour.
It is a well overthought feature for food industry applications.
It might be clear that the colour "Blue" is a not existing organic colour.
In the context of food safety it is a common use to embed blue colours as these are very visible and easily to be recognised by Vision scanning systems.

All gearboxes are standard equipped with NSH H1 certified Synthetic Foodgrade lubrication.
On request it can be supplied with a Halal, Kosher or Nut Free certification.

To avoid dirt traps under the commonly used motor identification tagplate,
all our motors and gearboxes are being equipped with a laser engraved tagplates.
Besides for the food safety this also prevents against possible lost of information because of taking away the tagplate or loosing the tagplate from the driveparts.

As a part of our standard procedure every drive is tested in our production facility in the Netherlands to ensure correct functioning.

Properties and features :

Standard ratio's 7,5 : 1 to 300 : 1 with IEC motor adaption.
Standard hollow shafts 20, 25, 30 and 35 mm
Extra hygienic optional shaft covers. (open and closed version)

Easy clean torque arm with built in elastic element to reduce alignment mistakes allows easy assembling of the gearbox on the machine shaft.
There is no need to laser cut and bend your own torque arm.
The Easy clean torque arm has a very open design. This design offers better cleanability during the standard cleaning cycle.

For flange mounted applications we offer several types of secondary output flanges in Electro Polished SS316.

As a problem solver we are happy to investigate the best possible solutions for our customers that fits their budget.

FK 28		FK 38	
Ratio's	7.5: to 300:1	Ratio's	7.5: to 300:1
Standard shaft	20 mm	Standard shaft	25 mm
Torque	Max. 130 Nm	Torque	Max. 200 Nm
Power	Max. 1.5 kW	Power	Max. 1.5 kW
FK 48		**FK 58**	
Ratio's	7.5: to 300:1	Ratio's	7.5: to 300:1
Standard shaft	30 mm	Standard shaft	35 mm
Torque	Max. 350 Nm	Torque	Max. 500 Nm
Power	Max. 3.0 kW	Power	Max. 3.0 kW

Easy Clean Closed Cover

FK28 B & C	SS085 CC
FK38 B & C	SS095 CC
FK48 B & C	SS115 CC
FK58 B & C	SS130 CC

Easy Clean Open Cover

FK28 B & C	SS085 CO20
FK38 B & C	SS095 CO25
FK48 B & C	SS115 CO30
FK58 B & C	SS130 CO35

Foot Plates

FK28 B & C	SS085 VP
FK38 B & C	SS095 VP
FK48 B & C	SS115 VP
FK58 B & C	SS130 VP

Torque Arms

FK28 B & C	SS085 MS
FK38 B & C	SS095 MS
FK48 B & C	SS115 MS
FK58 B & C	SS130 MS

Output Flanges

FK28 B & C	SS 085 FL120
	SS 085 FL125
FK38 B & C	SS 095 FL160
	SS 095 FL180
FK48 B & C	SS 115 FL200
FK58 B & C	SS 130 FL250

Power P

This parameter can be found in the gearbox selection tables and represents the amount kW that can be safely transmitted into the gearbox

$$P_1 = \frac{P_2}{\eta}[kW]$$

$$P_{1n} \geq P_1 \cdot f_s[kW]$$

P_1 *Input Power (kW)*
P_2 *Output Power (kW)*
P_{1n} *Rated Input Power (kW)*
f_s *Service Factor*
η *Transmission Efficiency %*

Rotation Speed n

n_1 *Gear Units Input Speed*
n_2 *Gear Units Output Speed*

All stated values are based on an input speed of 1500 min^{-1}.
We strongly advise , to obtain the expected lifetime, not to exceed the maximum input speed.
In case of a lower input speed the maximum input torque should be taken in consideration too.

Transmission ratio i

$$i = \frac{n_1}{n_2}$$

Torque M

$$M_2 = \frac{9550 \cdot P_1 \cdot \eta}{n_2}[Nm]$$

$$M_{2n} \geq M_2 \cdot f_s[Nm]$$

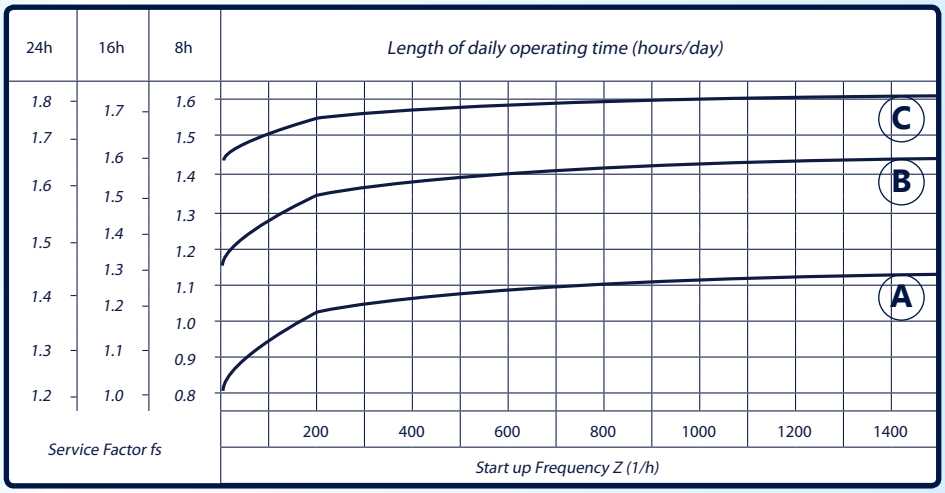
M_2 *= Output Torque (Nm)*
M_{2n} *= Selected Output Torque (Nm)*
P_1 *= Input Power (kW)*
η *= Transmission Efficiency %*
f_s *= Service Factor*

Efficiency of gear units

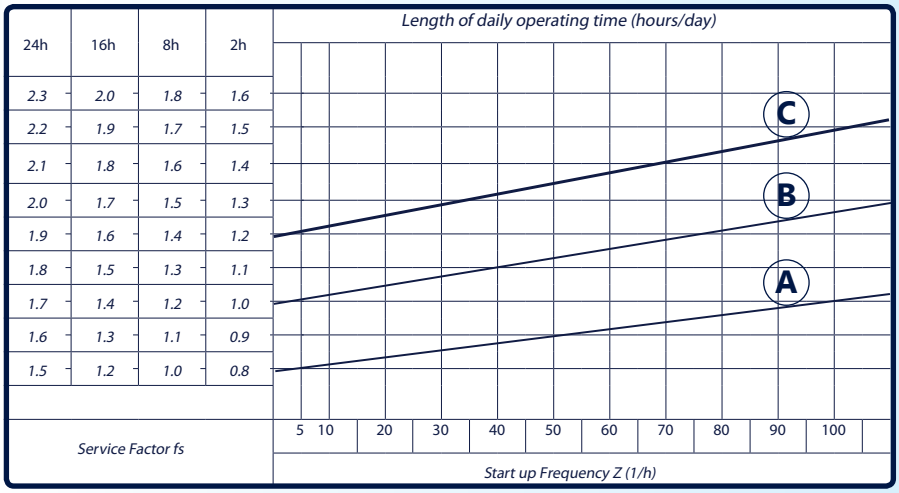
The efficiency of gear units is mainly determined by the gearing and bearing friction. Keep in mind that the starting efficiency of a gear unit is always less than its efficiency at operating speed. This factor is particularly distinctive for worm & helical worm gear boxes.
The gearing in helical worm & worm gearboxes produces a high proportion of sliding friction.
As a result these gearboxes have higher gear efficiency losses than other gearboxes and therefore have a lower total efficiency.
A secondary result is that the surface temperature of these gearboxes will be higher than other gearboxes.
The efficiency of the Dertec Strainless Steel gearboxes can be found in the possible geometrical combinations page's of each gearbox serie.

Service Factor

The effect of the driven machine on the gearbox is taken into account to a sufficient level of accuracy using the Service Factor f_S .
The Service Factor is determined according to the daily operating time and the starting frequency ***Z****.*
Three load classifications are considered depending on the mass acceleration factor.
You can read of the service factor applicable to your application in the figure below.
The service factor selected using this figure must be less than or equal to the service factor as given in the gearbox selection table.



Service Factor for wormgearboxes



Ambient temperature influence on the service factor for wormgearboxes

Service factor fs should be adjusted as following
ambient temperature = 30 ~ 40 : Fs x 1.1 ~1.2
ambient temperature = 40 ~ 50 : Fs x 1.3 ~1.4
ambient temperature = 50 ~ 60 : Fs x 1.5 ~1.6
ambient temperature = > 60, please contact Dertec.

Type of load:

A

Uniform load Permitted mass acceleration factor ***(f_a)≤ 0.3***
Screw feeders for light materials, fans, assembly lines, conveyor belts for light materials, small mixers, lifts, cleaning machines, fillers, control machines.

B

Moderate shock load Permitted mass acceleration factor ***(f_a)≤ 3***
Winding devices, woodworking machine feeders, goods lifts, balancers, threading machines, medium mixers, conveyor belts for heavy materials, winches, sliding doors, fertilizer scrapers, packing machines, concrete mixers, crane mechanism, milling cutters, folding machines, gear pumps.

C

Heavy Shock Load Permitted mass acceleration factor ***(f_a)≤ 10***
Mixers for heavy materials, shears, presses, centrifuges, rotating supports, winches and lifts for heavy materials, grinding lathes, stone mills, bucket elevators, drilling machines, hammer mills, cam presses, folding machines, turntables, tumbling barrels, vibrators, shredders.

To maintain the service life of the gear units,
the Service Factor mentioned in the gearbox selection table must be equal or slightly higher than the calculated service factor.

Mass Acceleration Factor

The Mass acceleration factor is calculated as follows:

$$f_a \frac{Jc}{Jm}$$

f_a = *Mass Acceleration Factor*

Jc = *All External Mass Moments Of Inertia [Kgm²]*

Jm = *Mass Moment Of Inertia on the Motor End [Kgm²]*

If the mass acceleration factor is $f_a > 10$, *please contact us.*

Overhung and axial loads

Determining overhung loads

An important factor for determining the resulting overhung load is the type of transmission element mounted to the shaft end. The following transmission element factors f_z *have to be considered for various transmission elements.*

Transmission Element	Transmission Element Factor Fz	Comments
Gears	1.00	≥ 17 Teeth
	1.15	< 17 Teeth
Chain Sprockets	1.00	≥ 20 Teeth
	1.25	< 20 Teeth
	1.40	< 13 Teeth
Narrow V-belt pulleys	1.75	Influence of the tensile force
Flat Belt Pulleys	2.50	Influence of the tensile force
Toothed Belt Pulleys	2.50	Influence of the tensile force

The overhung load exerted on the motor or gearshaft is calculated as follows

$$F_r = \frac{M \cdot 2000}{d_0} \cdot f_z$$

F_r = *Overhung load in N*

M = *Torque in Nm*

d_0 = *Mean Diameter of the mounted transmission element in mm*

f_z = *Transmission element factor*

Permitted overhung load

The basis for determining the permitted overhung loads is the calculation of the rated bearing service life L_{10h} *of the roller bearings (according ISO281)*

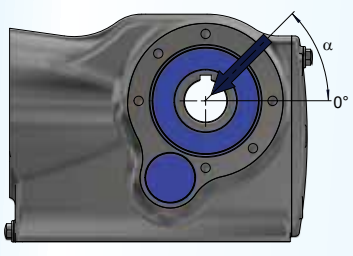
For special operating conditions, the permitted overhung loads can be determined with regard to the modified service life on request.

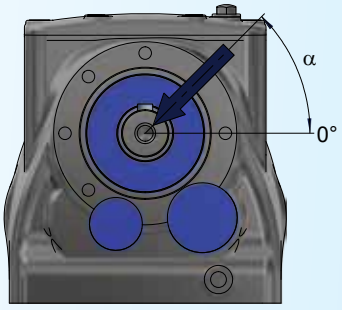
The values refer to force applied to the center of the shaft end (in right angle gear units as viewed onto drive end)

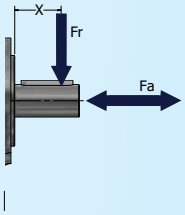
The values for the force application angle α and direction of rotation are based on the most unfavorable conditions.

Definition of force application

The force application is defined according to the following figure.







Fx = Permitted overhung load at point x [N]

Fa = Permitted axial load [N]

Permitted axial forces
If there is no overhung load, than an axial force Fa (Tension or Compression) amounting to 50% of the overhung load given in the selection tables is permitted.

Overhung load conversion for off-center force application
The permitted overhung loads must be calculated according to the selection tables using the following formula in the event that force is not applied at the center of the shaft end. Note that the calculations apply to M2max.

Fxl based on bearing life:

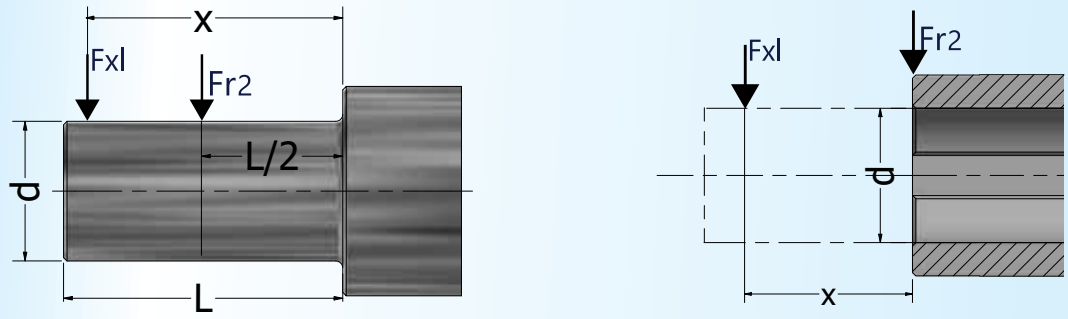
$$Fxl = F_{r2} \cdot \frac{a}{b + x} [N]$$

Fr2 = *Permitted overhung load (x = L/2) for foot mounted gear units according to the selection tables in [N]*

x = *Distance from the shaft shoulder to the force application point in [mm]*

a, b, = *Gear unit constant for overhung load conversions [mm]*

The following figure shows the overhung load Fr with increased distance X to the gear unit.



Values of a & b in mm are given in the following table

FV	a	b	FR	a	b
FV 030	65	50	FR 38	118	93
FV 040	84	64	FR 48	137	107
FV 050	101	76	FR 68	168.5	133.5
FV 063	12	95			
FK	**a**	**b**	**FS(A)**	**a**	**b**
FK 28 B/C	104	78	FS(A) 38	118.5	98.5
FK 38 B/C	118	93	FS(A) 48	130	105
FK 48 B/C	131	101	FS(A) 58	150	120
FK 58 B/C	159	119	FS(A) 68	184	149
FRC	**a**	**b**	**FKA**	**a**	**b**
FRC 01	103	83	FKA 38	123.5	98.5
FRC 02	116.5	91.5	FKA 48	153.5	123.5
FRC 03	130	100	FKA 68	181.3	141.3
FFA	**a**	**b**	FKA 78	215.8	165.8
FFA 38	123.5	98.5	FKA 88	252	192
FFA 48	153.5	123.5			
FFA 68	181.3	141.3			
FFA 78	215.8	165.8			

Efficiency & Irreversibility Characteristics

Efficiency is an important parameter of a wormgear reducer.
Efficiency η depends on the following parameters:

1) Helix angle of gearing
2) Driving speed
3) Running in of gearing
4) The performance of the Lubricant, Oil Seals and Bearings.

The Mesh table shows the dynamic effiency (n_1=1400) and static efficiency values.
Remember that these values are only achieved after the unit has been operating for ca. 24 hours. "Run in period"
Torque values M_{2n} indicated in the gearbox selection tables are calculated by considering the steady state performance of the gearboxes.
The actual values mentioned could have deflection.

Dynamic Irreversibility
Dynamic Irreversibility is achieved when the output shaft stops instantly when power is no longer transmitted through the wormshaft.
This condition requires a dynamic efficiency of η_d<0.4. See mesh table.

η_d	> 0.6	0.5 ~ 0.6	0.4 ~0.5	<0.4
Dynamic irreversibility	Dynamic reversibility	Low Dynamic reversibility	Good Dynamic irreversibility	Dynamic irreversibility

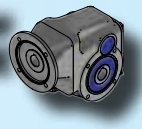
Static Irreversibility
Static Irreversibility is achieved when, at a standstill, the application of a load to the output shaft can't drive the wormshaft of the gear reducer.
This condition requires a static efficiency of η_s <0.5, See mesh table.

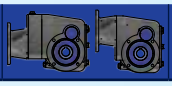
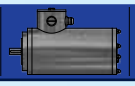
η_s	> 0.55	0.5 ~ 0.55	< 0.5
Static irreversibility	Static reversibility	Low Static reversibility	Static irreversibility

The table shows approximate irreversibility classes. Vibrations and shocks can effect a gear reducers irreversibility.
As it is virtual impossible to provide and guarantee total non reversing, we recommend the use of an external brake with suffficient capability to prevent vibrations in duced starting, where these circumstances are required.
For the irreversibility conditions of a combined geared unit one must consider that the efficiency of the group is given by the product of the efficiencies of each single reducer, i.e.: Ntot = N1 x N2

Mesh Data

	i	7,5	10	15	20	25	30	40	50	60	80	100
FV 030	**z1**	4	3	2	2	1	1	1	1	1	1	
	Mn	1.36	1.39	1.42	1.09	1.69	1.43	1.10	0.89	0.74	0.56	
	Y	18°55′	14°25′	9°44′	7°50′	5°33′	4°54′	3°56′	3°17′	2°43′	2°7′	
	η_d	0.84	0.81	0.76	0.72	0.66	0.64	0.59	0.54	0.50	0.44	
	η_s	0.66	0.62	0.54	0.49	0.41	0.38	0.33	0.29	0.26	0.21	
FV 040	**z1**	4	3	2	2	2	1	1	1	1	1	1
	Mn	1.87	1.95	2.00	1.54	1.26	2.04	1.55	1.27	1.06	0.80	0.65
	Y	23°54′	18°23′	12°30′	10°3′	8°45′	6°19′	5°4′	4°24′	3°42′	2°52′	2°29′
	η_d	0.86	0.84	0.80	0.77	0.74	0.69	0.65	0.61	0.57	0.51	0.47
	η_s	0.70	0.66	0.59	0.54	0.51	0.44	0.39	0.36	0.32	0.27	0.24
FV 050	**z1**	4	3	2	2	2	1	1	1	1	1	1
	Mn	2.34	2.43	2.50	1.92	1.56	2.54	1.94	1.58	1.32	1.00	0.80
	Y	23°49′	18°19′	12°27′	10°3′	8°33′	6°18′	5°4′	4°18′	3°38′	2°52′	2°17′
	η_d	0.87	0.85	0.81	0.78	0.75	0.71	0.67	0.63	0.59	0.53	0.48
	η_s	0.70	0.66	0.59	0.54	0.51	0.44	0.39	0.36	0.32	0.27	0.24
FV 063	**z1**	4	3	2	2	2	1	1	1	1	1	1
	Mn	2.96	3.08	3.17	2.44	1.98	3.23	2.47	1.99	1.68	1.27	1.02
	Y	24°31′	18°53′	12°51′	10°29′	8°45′	6°30′	5°17′	4°24′	3°49′	2°59′	2°26′
	η_d	0.88	0.86	0.82	0.80	0.77	0.73	0.69	0.65	0.62	0.56	0.51
	η_s	0.70	0.66	0.59	0.55	0.51	0.44	0.40	0.36	0.33	0.28	0.24



P_{1n} [kW]	N_2 min^{-1}	M_{2n} [Nm]	i Nominal	i Actual	F_{r2} [N]	f_s		

= Combination with the motor in the header row is not possible

= Combination with the motor in the header row is possible

P_{1n} [kW] = Rated Motor Power [kW]

N_2 min^{-1} = Output Speed [min^{-1}]

M_{2n} [Nm] = Rated Output Torque [Nm]

M2Max = Maximum Permissible Output Torque [Nm]

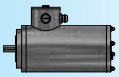
F_{r2} [N] = Permitted Overhung Load Output Side [N]

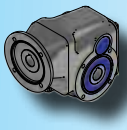
i Nominal = Gear Unit Nominal Ratio

i Actual = Gear Unit Actual Ratio

f_s = Service Factor

 = Gear Unit Type

 = Motor Type



FK 28

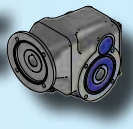
Maximum Torque = 130 Nm @ N1 = 1400r/min

N1 = 1400r/min	i Nominal	i Actual	N_2 min^{-1}	M_{2max} [Nm]	F_{r2} [N]	η %	IEC 63 B5	IEC 71 B14a	IEC 80 B14a	IEC90 B14a
28B = 2 Stage										
FK 28B	60	58.36	24	130	2960	92				
FK 28B	50	48.86	29	130	2790	92				
FK 28B	40	40.09	35	130	2610	92				
FK 28B	30	29.33	48	130	2350	92				
FK 28B	25	24.07	58	130	2200	92				
FK 28B	20	20.21	69	100	2080	92				
FK 28B	15	14.92	94	80	1880	92				
FK 28B	12.5	12.47	112	130	1770	92				
FK 28B	10	10.47	134	100	1670	92				
FK 28B	7.5	7.73	181	80	1510	92				
28C = 3 Stage										
FK 28C	300	291.79	4.8	130	4100	90				
FK 28C	250	244.29	5.7	130	4100	90				
FK 28C	200	200.44	7.0	130	4100	90				
FK 28C	150	146.67	9.5	130	4000	90				
FK 28C	125	120.34	11.6	100	3770	90				
FK 28C	100	101.04	13.9	80	3560	90				
FK 28C	75	74.62	18.8	130	3220	90				
FK 28C	60	62.36	22	100	3030	90				
FK 28C	50	52.36	27	110	2860	90				

FK 38

Maximum Torque = 200 Nm @ N1 = 1400r/min

N1 = 1400r/min	i Nominal	i Actual	N_2 min^{-1}	M_{2max} [Nm]	F_{r2} [N]	η %	IEC 63 B5	IEC 71 B14a	IEC 80 B14a	IEC90 B14a
38B = 2 Stage										
FK 38B	60	60.50	23	200	3430	92				
FK 38B	50	48.71	29	200	3190	92				
FK 38B	40	39.29	36	180	2970	92				
FK 38B	30	30.31	46	200	2720	92				
FK 38B	25	24.44	57	180	2530	92				
FK 38B	20	20.25	69	150	2380	92				
FK 38B	15	14.67	95	110	2130	92				
FK 38B	12.5	12.67	110	180	2030	92				
FK 38B	10	10.50	133	150	1910	92				
FK 38B	7.5	7.60	184	110	1710	92				
38C = 3 Stage										
FK 38C	300	302.50	4.6	200	4800	90				
FK 38C	250	243.57	5.7	200	4800	90				
FK 38C	200	196.43	7.1	180	4800	90				
FK 38C	150	151.56	9.2	200	4650	90				
FK 38C	125	122.22	11.5	180	4330	90				
FK 38C	100	101.27	13.8	150	4070	90				
FK 38C	75	73.33	19.1	110	3650	90				
FK 38C	60	63.33	22	180	3480	90				
FK 38C	50	52.48	27	150	3270	90				



FK 48

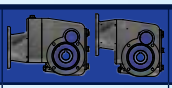
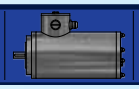
Maximum Torque = 350 Nm @ N1 = 1400r/min

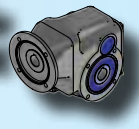
N1 = 1400r/min	i Nominal	i Actual	N_2 min^{-1}	M_{2max} [Nm]	F_{r2} [N]	η %	IEC 63 B5	IEC 71 B14a	IEC 80 B14a	IEC90 B14a	IEC 100 B14a	IEC 112 B14a
48B = 2 Stage												
FK 48B	60	59.44	24	350	4660	92		■	■	■		
FK 48B	50	48.18	29	350	4340	92		■	■	■		
FK 48B	40	40.13	35	300	4080	92		■	■	■		
FK 48B	30	30.24	46	350	3720	92			■	■		
FK 48B	25	25.19	56	300	3500	92			■	■	■	
FK 48B	20	19.84	71	240	3230	92			■	■	■	
FK 48B	15	15.09	93	200	2950	92			■	■	■	
FK 48B	12.5	12.49	112	300	2770	92				■	■	■
FK 48B	10	9.84	142	240	2550	92				■	■	■
FK 48B	7.5	7.48	187	200	2330	92				■	■	■
48C = 3 Stage												
FK 48C	300	297.21	4.7	350	6500	90	■	■				
FK 48C	250	240.89	5.8	350	6500	90	■	■				
FK 48C	200	200.66	7.0	300	6500	90	■	■				
FK 48C	150	151.20	9.3	350	6500	90	■	■	■			
FK 48C	125	125.95	11.1	300	5980	90	■	■	■			
FK 48C	100	99.22	14.1	240	5520	90	■	■	■			
FK 48C	75	75.45	18.6	200	5040	90	■	■	■			
FK 48C	60	62.43	22	300	4730	90		■	■	■		
FK 48C	50	49.18	28	240	4370	90		■	■	■		

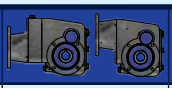
FK 58

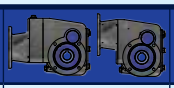
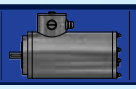
Maximum Torque = 500 Nm @ N1 = 1400r/min

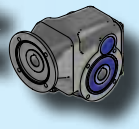
N1 = 1400r/min	i Nominal	i Actual	N_2 min^{-1}	M_{2max} [Nm]	F_{r2} [N]	η %	IEC 63 B5	IEC 71 B14a	IEC 80 B14a	IEC90 B14a	IEC 100 B14a	IEC 112 B14a
58B = 2 Stage												
FK 58B	60	59.04	24	500	5890	92		■	■	■		
FK 58B	50	48.18	29	500	5500	92		■	■	■		
FK 58B	40	40.13	35	480	5170	92			■	■	■	
FK 58B	30	30.24	46	500	4710	92			■	■	■	
FK 58B	25	25.19	56	480	4430	92			■	■	■	■
FK 58B	20	19.84	71	380	4090	92			■	■	■	■
FK 58B	15	15.09	93	300	3730	92			■	■	■	■
FK 58B	12.5	12.49	112	480	3510	92				■	■	■
FK 58B	10	9.84	142	380	3240	92				■	■	■
FK 58B	7.5	7.48	187	300	2950	92				■	■	■
58C = 3 Stage												
FK 58C	300	295.18	4.7	500	8300	90	■	■				
FK 58C	250	240.89	5.8	500	8300	90	■	■	■			
FK 58C	200	200.66	7.0	480	8300	90	■	■	■			
FK 58C	150	151.20	9.3	500	8050	90	■	■	■			
FK 58C	125	125.95	11.1	480	7580	90	■	■	■	■		
FK 58C	100	99.22	14.1	380	7000	90	■	■	■	■		
FK 58C	75	75.45	18.6	300	6390	90	■	■	■	■		
FK 58C	60	62.43	22	480	6000	90		■	■	■		
FK 58C	50	49.18	28	380	5540	90		■	■	■		

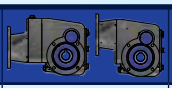
P_{1n} [kW]	N_2 min^{-1}	M_{2n} [Nm]	i Nominal	i Actual	F_{r2} [N]	f_s		
0.12	9.5	108	150	146.67	4000	1.20	FK28C IEC63	631-4 B5
	11.6	89	125	120.34	3770	1.50		
	13.9	74	100	101.04	3560	1.30		
	18.8	55	75	74.62	3220	1.50		
	22	46	60	62.36	3030	2.80		
	27	39	50	52.36	2860	2.60		
	24	44	60	58.36	2960	3.00	FK28B IEC63	631-4 B5
	29	37	50	48.86	2790	3.50		
	35	30	40	40.09	2610	4.30		
	48	22	30	29.33	2350	5.90		
	58	18.1	25	24.07	2200	7.20		
	69	15.2	20	20.21	2080	6.60		
	94	11.2	15	14.92	1880	7.10		
	112	9.4	12.5	12.47	1770	13.8		
	134	7.9	10	10.47	1670	12.7		
	181	5.8	7.5	7.73	1510	13.7		
	5.7	179	250	243.57	4800	1.10	FK38C IEC63	631-4 B5
	7.1	145	200	196.43	4800	1.20		
	9.2	112	150	151.56	4650	1.80		
	11.5	90	125	122.22	4330	2.00		
	13.8	75	100	101.27	4070	2.00		
	19.1	54	75	73.33	3650	2.00		
	22	47	60	63.33	3480	3.90		
	27	39	50	52.48	3270	3.90		
	23	46	60	60.50	3430	4.40	FK38B IEC63	631-4 B5
	29	37	50	48.71	3190	5.50		
	36	30	40	39.29	2970	6.10		
	46	23	30	30.31	2720	8.80		
	4.7	219	300	297.21	6500	1.60	FK48C IEC63	631-4 B5
	5.8	177	250	240.89	6500	2.00		
	7.0	148	200	200.66	6500	2.00		
	9.3	111	150	151.20	6500	3.10		
	11.1	93	125	125.95	5980	3.20		
	14.1	73	100	99.22	5520	3.30		
	18.6	56	75	75.45	5040	3.60		
	4.7	217	300	295.18	8300	2.30	FK58C IEC63	631-4 B5
	5.8	177	250	240.89	8300	2.80		
	7.0	148	200	200.66	8300	3.20		
	9.3	111	150	151.20	8050	4.50		

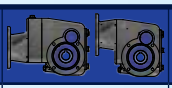
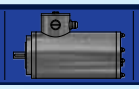


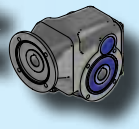
P_{1n} [kW]	N_2 min^{-1}	M_{2n} [Nm]	i Nominal	i Actual	F_{r2} [N]	f_s		
0.18	22	69	60	62.36	3030	1.90	FK28C IEC63	632-4 B5
	27	58	50	52.36	2860	1.70		
	24	66	60	58.36	2960	2.00	FK28B IEC63	632-4 B5
	29	55	50	48.86	2790	2.40		
	35	45	40	40.09	2610	2.90		
	48	33	30	29.33	2350	3.90		
	58	27	25	24.07	2200	4.80		
	69	23	20	20.21	2080	4.40		
	94	16.9	15	14.92	1880	4.70		
	14.4	107	60	62.36	3510	1.20	FK28C IEC71	711-6 B14a
	17.2	90	50	52.36	3310	1.10		
	15.4	103	60	58.36	3430	1.30	FK28B IEC71	711-6 B14a
	18.4	86	50	48.86	3240	1.50		
	22	70	40	40.09	3030	1.80		
	31	52	30	29.33	2730	2.50		
	37	42	25	24.07	2550	3.10		
	45	36	20	20.21	2410	2.80		
	60	26	15	14.92	2180	3.10		
	72	22	12.5	12.47	2050	5.90		
	86	18.4	10	10.47	1930	5.40		
	116	13.6	7.5	7.73	1750	5.90		
	9.2	167	150	151.56	4650	1.20	FK38C IEC63	632-4 B5
	11.5	135	125	122.22	4330	1.30		
	13.8	112	100	101.27	4070	1.30		
	19.1	81	75	73.33	3650	1.40		
	22	70	60	63.33	3480	2.60		
	27	58	50	52.48	3270	2.60		
	23	68	60	60.50	3430	2.90	FK38B IEC63	632-4 B5
	29	55	50	48.71	3190	3.60		
	36	44	40	39.29	2970	4.10		
	14.2	109	60	63.33	4030	1.70	FK38C IEC71	711-6 B14a
	17.1	90	50	52.48	3790	1.70		
	14.9	106	60	60.50	3970	1.90	FK38B IEC71	711-6 B14a
	18.5	86	50	48.71	3690	2.30		
	23	69	40	39.29	3440	2.60		
	30	53	30	30.31	3150	3.80		
	37	43	25	24.44	2930	4.20		
	44	36	20	20.25	2760	4.20		
	61	26	15	14.67	2470	4.30		
	4.7	328	300	297.21	6500	1.10	FK48C IEC63	632-4 B5
	5.8	266	250	240.89	6500	1.30		
	7.0	222	200	200.66	6500	1.40		
	9.3	167	150	151.20	6500	2.10		
	11.1	139	125	125.95	5980	2.20		
	14.1	110	100	99.22	5520	2.20		
	18.6	83	75	75.45	5040	2.40		

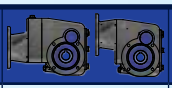
P_{1n} [kW]	N_2 min^{-1}	M_{2n} [Nm]	i Nominal	i Actual	F_{r2} [N]	f_s		
0.18	6.0	260	150	151.20	6500	1.30	FK48C IEC71	711-6 B14a
	7.1	217	125	125.95	6500	1.40		
	9.1	171	100	99.22	6400	1.40		
	11.9	130	75	75.45	5840	1.50		
	14.4	107	60	62.43	5480	2.80		
	18.3	85	50	49.18	5060	2.80		
	15.1	104	60	59.44	5390	3.40	FK48B IEC71	711-6 B14a
	18.7	85	50	48.18	5030	4.10		
	22	71	40	40.13	4730	4.30		
	4.7	326	300	295.18	8300	1.50	FK58C IEC63	632-4 B5
	5.8	266	250	240.89	8300	1.90		
	7.0	222	200	200.66	8300	2.20		
	9.3	167	150	151.20	8050	3.00		
	11.1	139	125	125.95	7580	3.40		
	14.1	110	100	99.22	7000	3.50		
	18.6	83	75	75.45	6390	3.60		
	3.7	414	250	240.89	8300	1.20	FK58C IEC71	711-6 B14a
	4.5	345	200	200.66	8300	1.40		
	6.0	260	150	151.2	8300	1.90		
	7.1	217	125	125.95	8300	2.20		
	9.1	171	100	99.22	8110	2.20		
	11.9	130	75	75.45	7400	2.30		
	14.4	107	60	62.43	6950	4.50		
	18.3	85	50	49.18	6420	4.50		
0.25	22	96	60	62.36	3030	1.40	FK28C IEC71	711-4 B14a
	27	80	50	52.36	2860	1.20		
	24	92	60	58.36	2960	1.40	FK28B IEC71	711-4 B14a
	29	77	50	48.86	2790	1.70		
	35	63	40	40.09	2610	2.10		
	48	46	30	29.33	2350	2.80		
	58	38	25	24.07	2200	3.40		
	69	32	20	20.21	2080	3.20		
	94	23	15	14.92	1880	3.40		
	18.4	119	50	48.86	3240	1.10	FK28B IEC71	712-6 B14a
	22	98	40	40.09	3030	1.30		
	31	72	30	29.33	2730	1.80		
	37	59	25	24.07	2550	2.20		
	45	49	20	20.21	2410	2.00		
	60	36	15	14.92	2180	2.20		
	72	30	12.5	12.47	2050	4.30		
	86	26	10	10.47	1930	3.90		
	116	18.9	7.5	7.73	1750	4.20		
	22	97	60	63.33	3480	1.90	FK38C IEC71	711-4 B14a
	27	81	50	52.48	3270	1.90		
	23	95	60	60.50	3430	2.10	FK38B IEC71	711-4 B14a
	29	76	50	48.71	3190	2.60		
	36	62	40	39.29	2970	2.90		
	46	48	30	30.31	2720	4.20		

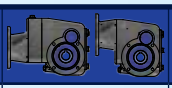


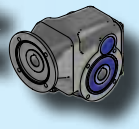
P_{1n} [kW]	N_2 min^{-1}	M_{2n} [Nm]	i Nominal	i Actual	F_{r2} [N]	f_s		
0.25	14.2	151	60	63.33	4030	1.20	FK38C IEC71	712-6 B14a
	17.1	125	50	52.48	3790	1.20		
	14.9	148	60	60.50	3970	1.40	FK38B IEC71	712-6 B14a
	18.5	119	50	48.71	3690	1.70		
	23	96	40	39.29	3440	1.90		
	30	74	30	30.31	3150	2.70		
	37	60	25	24.44	2930	3.00		
	44	49	20	20.25	2760	3.00		
	61	36	15	14.67	2470	3.10		
	9.3	232	150	151.20	6500	1.50	FK48C IEC71	711-4 B14a
	11.1	193	125	125.95	5980	1.60		
	14.1	152	100	99.22	5520	1.60		
	18.6	116	75	75.45	5040	1.70		
	22	96	60	62.43	4730	3.10		
	28	75	50	49.18	4370	3.20		
	24	93	60	59.44	4660	3.80	FK48B IEC71	711-4 B14a
	29	76	50	48.18	4340	4.60		
	7.1	301	125	125.95	6500	1.00	FK48C IEC71	712-6 B14a
	9.1	237	100	99.22	6400	1.00		
	11.9	180	75	75.45	5840	1.10		
	14.4	149	60	62.43	5480	2.00		
	18.3	117	50	49.18	5060	2.00		
	15.1	145	60	59.44	5390	2.40	FK48B IEC71	712-6 B14a
	18.7	118	50	48.18	5030	3.00		
	22	98	40	40.13	4730	3.10		
	4.7	453	300	295.18	8300	1.10	FK58C IEC71	711-4 B14a
	5.8	370	250	240.89	8300	1.40		
	7.0	308	200	200.66	8300	1.60		
	9.3	232	150	151.20	8050	2.20		
	11.1	193	125	125.95	7580	2.50		
	14.1	152	100	99.22	7000	2.50		
	18.6	116	75	75.45	6390	2.60		
	22	96	60	62.43	6000	5.00		
	28	75	50	49.18	5540	5.00		
	4.5	479	200	200.66	8300	1.00	FK58C IEC71	712-6 B14a
	6.0	361	150	151.20	8300	1.40		
	7.1	301	125	125.95	8300	1.60		
	9.1	237	100	99.22	8110	1.60		
	11.9	180	75	75.45	7400	1.70		
	14.4	149	60	62.43	6950	3.20		
	18.3	117	50	49.18	6420	3.20		
	15.2	144	60	59.04	6820	3.50	FK58B IEC71	712-6 B14a
	18.7	118	50	48.18	6370	4.30		

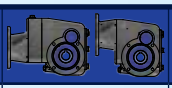
P_{1n} [kW]	N_2 min^{-1}	M_{2n} [Nm]	i Nominal	i Actual	F_{r2} [N]	f_s		
0.37	29	113	50	48.86	2790	1.10	FK28B IEC71	712-4 B14a
	35	93	40	40.09	2610	1.40		
	48	68	30	29.33	2350	1.90		
	58	56	25	24.07	2200	2.30		
	69	47	20	20.21	2080	2.10		
	94	35	15	14.92	1880	2.30		
	112	29	12.5	12.47	1770	4.50		
	134	24	10	10.47	1670	4.10		
	181	17.9	7.5	7.73	1510	4.50		
	31	106	30	29.33	2730	1.20	FK28B IEC80	801-6 B14a
	37	87	25	24.07	2550	1.50		
	45	73	20	20.21	2410	1.40		
	60	54	15	14.92	2180	1.50		
	72	45	12.5	12.47	2050	2.90		
	86	38	10	10.47	1930	2.60		
	116	28	7.5	7.73	1750	2.90		
	22	144	60	63.33	3480	1.30	FK38C IEC71	712-4 B14a
	27	119	50	52.48	3270	1.30		
	23	140	60	60.50	3430	1.40	FK38B IEC71	712-4 B14a
	29	113	50	48.71	3190	1.80		
	36	91	40	39.29	2970	2.00		
	46	70	30	30.31	2720	2.80		
	57	57	25	24.44	2530	3.20		
	69	47	20	20.25	2380	3.20		
	95	34	15	14.67	2130	3.20		
	18.5	176	50	48.71	3690	1.10	FK38B IEC80	801-6 B14a
	23	142	40	39.29	3440	1.30		
	30	109	30	30.31	3150	1.80		
	37	88	25	24.44	2930	2.00		
	44	73	20	20.25	2760	2.10		
	61	53	15	14.67	2470	2.10		
	71	46	12.5	12.67	2360	3.90		
	86	38	10	10.50	2210	4.00		
	118	27	7.5	7.60	1990	4.00		
	9.3	343	150	151.20	6500	1.00	FK48C IEC71	712-4 B14a
	11.1	286	125	125.95	5980	1.00		
	14.1	225	100	99.22	5520	1.10		
	18.6	171	75	75.45	5040	1.20		
	22	142	60	62.43	4730	2.10		
	28	112	50	49.18	4370	2.10		
	24	138	60	59.44	4660	2.50	FK48B IEC71	712-4 B14a
	29	112	50	48.18	4340	3.10		
	35	93	40	40.13	4080	3.20		
	14.4	221	60	62.43	5480	1.40	FK48C IEC80	801-6 B14a
	18.3	174	50	49.18	5060	1.40		

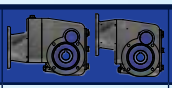


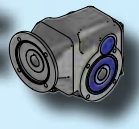
P_{1n} [kW]	N_2 min^{-1}	M_{2n} [Nm]	i Nominal	i Actual	F_{r2} [N]	f_s		
0.37	15.1	215	60	59.44	5390	1.60	FK48B IEC80	801-6 B14a
	18.7	174	50	48.18	5030	2.00		
	22	145	40	40.13	4730	2.10		
	30	109	30	30.24	4310	3.20		
	36	91	25	25.19	4050	3.30		
	45	72	20	19.84	3740	3.30		
	60	55	15	15.09	3410	3.70		
	7.0	456	200	200.66	8300	1.10	FK58C IEC71	712-4 B14a
	9.3	343	150	151.20	8050	1.50		
	11.1	286	125	125.95	7580	1.70		
	14.1	225	100	99.22	7000	1.70		
	18.6	171	75	75.45	6390	1.80		
	22	142	60	62.43	6000	3.40		
	28	112	50	49.18	5540	3.40		
	24	137	60	59.04	5890	3.60	FK58B IEC71	712-4 B14a
	29	112	50	48.18	5500	4.50		
	7.1	445	125	125.95	8300	1.10	FK58C IEC80	801-6 B14a
	9.1	351	100	99.22	8110	1.10		
	11.9	267	75	75.45	7400	1.10		
	14.4	221	60	62.43	6950	2.20		
	18.3	174	50	49.18	6420	2.20		
	15.2	213	60	59.04	6820	2.30	FK58B IEC80	801-6 B14a
	18.7	174	50	48.18	6370	2.90		
	22	145	40	40.13	6000	3.30		
0.55	48	101	30	29.33	2350	1.30	FK28B IEC80	801-4 B14a
	58	83	25	24.07	2200	1.60		
	69	70	20	20.21	2080	1.40		
	94	51	15	14.92	1880	1.60		
	112	43	12.5	12.47	1770	3.00		
	134	36	10	10.47	1670	2.80		
	181	27	7.5	7.73	1510	3.00		
	60	80	15	14.92	2180	1.00	FK28B IEC80	802-6 B14a
	72	67	12.5	12.47	2050	1.90		
	86	56	10	10.47	1930	1.80		
	116	42	7.5	7.73	1750	1.90		
	29	168	50	48.71	3190	1.20	FK38B IEC80	801-4 B14a
	36	136	40	39.29	2970	1.30		
	46	105	30	30.31	2720	1.90		
	57	84	25	24.44	2530	2.10		
	69	70	20	20.25	2380	2.10		
	95	51	15	14.67	2130	2.20		
	110	44	12.5	12.67	2030	4.10		
	133	36	10	10.5	1910	4.10		
	184	26	7.5	7.6	1710	4.20		

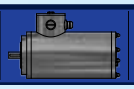
P_{1n} [kW]	N_2 min^{-1}	M_{2n} [Nm]	i Nominal	i Actual	F_{r2} [N]	f_s		
0.55	30	163	30	30.31	3150	1.20	FK38B IEC80	802-6 B14a
	37	131	25	24.44	2930	1.40		
	44	109	20	20.25	2760	1.40		
	61	79	15	14.67	2470	1.40		
	71	68	12.5	12.67	2360	2.60		
	86	56	10	10.50	2210	2.70		
	118	41	7.5	7.60	1990	2.70		
	22	211	60	62.43	4730	1.40	FK48C IEC80	801-4 B14a
	28	166	50	49.18	4370	1.40		
	24	205	60	59.44	4660	1.70	FK48B IEC80	801-4 B14a
	29	166	50	48.18	4340	2.10		
	35	139	40	40.13	4080	2.20		
	46	104	30	30.24	3720	3.40		
	56	87	25	25.19	3500	3.50		
	71	68	20	19.84	3230	3.50		
	93	52	15	15.09	2950	3.80		
	15.1	319	60	59.44	5390	1.10	FK48B IEC80	802-6 B14a
	18.7	259	50	48.18	5030	1.40		
	22	215	40	40.13	4730	1.40		
	30	162	30	30.24	4310	2.20		
	36	135	25	25.19	4050	2.20		
	45	107	20	19.84	3740	2.30		
	60	81	15	15.09	3410	2.50		
	11.1	425	125	125.95	7580	1.10	FK58C IEC80	801-4 B14a
	14.1	335	100	99.22	7000	1.10		
	18.6	255	75	75.45	6390	1.20		
	22	211	60	62.43	6000	2.30		
	28	166	50	49.18	5540	2.30		
	24	204	60	59.04	5890	2.50	FK58B IEC80	801-4 B14a
	29	166	50	48.18	5500	3.00		
	35	139	40	40.13	5170	3.50		
	46	104	30	30.24	4710	4.80		
	14.4	328	60	62.43	6950	1.50	FK58C IEC80	802-6 B14a
	18.3	258	50	49.18	6420	1.50		
	15.2	317	60	59.04	6820	1.60	FK58B IEC80	802-6 B14a
	18.7	259	50	48.18	6370	1.90		
	22	215	40	40.13	6000	2.20		
	30	162	30	30.24	5460	3.10		
	36	135	25	25.19	5130	3.50		
	45	107	20	19.84	4740	3.60		
	60	81	15	15.09	4330	3.70		

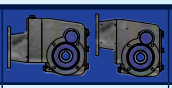
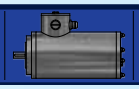


P_{1n} [kW]	N_2 min^{-1}	M_{2n} [Nm]	i Nominal	i Actual	F_{r2} [N]	f_s		
0.75	58	113	25	24.07	2200	1.10	FK28B IEC80	802-4 B14a
	69	95	20	20.21	2080	1.10		
	94	70	15	14.92	1880	1.10		
	112	59	12.5	12.47	1770	2.20		
	134	49	10	10.47	1670	2.00		
	181	36	7.5	7.73	1510	2.20		
	72	91	12.5	12.47	2050	1.40	FK28B IEC90	90S-6 B14a
	86	77	10	10.47	1930	1.30		
	116	57	7.5	7.73	1750	1.40		
	46	143	30	30.31	2720	1.40	FK38B IEC80	802-4 B14a
	57	115	25	24.44	2530	1.60		
	69	95	20	20.25	2380	1.60		
	95	69	15	14.67	2130	1.60		
	110	60	12.5	12.67	2030	3.00		
	133	49	10	10.50	1910	3.00		
	184	36	7.5	7.60	1710	3.10		
	37	179	25	24.44	2930	1.00	FK38B IEC90	90S-6 B14a
	44	148	20	20.25	2760	1.00		
	61	107	15	14.67	2470	1.00		
	71	93	12.5	12.67	2360	1.90		
	86	77	10	10.50	2210	2.00		
	118	56	7.5	7.60	1990	2.00		
	22	287	60	62.43	4730	1.00	FK48C IEC80	802-4 B14a
	28	226	50	49.18	4370	1.10		
	24	280	60	59.44	4660	1.30	FK48B IEC80	802-4 B14a
	29	227	50	48.18	4340	1.50		
	35	189	40	40.13	4080	1.60		
	46	142	30	30.24	3720	2.50		
	56	119	25	25.19	3500	2.50		
	71	93	20	19.84	3230	2.60		
	93	71	15	15.09	2950	2.80		
	22	294	40	40.13	4730	1.00	FK48B IEC90	90S-6 B14a
	30	221	30	30.24	4310	1.60		
	36	184	25	25.19	4050	1.60		
	45	145	20	19.84	3740	1.70		
	60	110	15	15.09	3410	1.80		
	72	91	12.5	12.49	3210	3.30		
	91	72	10	9.84	2960	3.30		
	120	55	7.5	7.48	2700	3.70		
	22	287	60	62.43	6000	1.70	FK58C IEC80	802-4 B14a
	28	226	50	49.18	5540	1.70		
	24	278	60	59.04	5890	1.80	FK58B IEC80	802-4 B14a
	29	227	50	48.18	5500	2.20		
	35	189	40	40.13	5170	2.50		
	46	142	30	30.24	4710	3.50		
	56	119	25	25.19	4430	4.00		
	71	93	20	19.84	4090	4.10		
	93	71	15	15.09	3730	4.20		

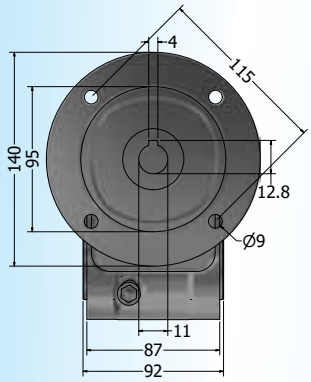
P_{1n} [kW]	N_2 min^{-1}	M_{2n} [Nm]	i Nominal	i Actual	F_{r2} [N]	f_s		
0.75	14.4	447	60	62.43	6950	1.10	FK58C IEC90	90S-6 B14a
	18.3	352	50	49.18	6420	1.10		
	15.2	432	60	59.04	6820	1.20	FK58B IEC90	90S-6 B14a
	18.7	353	50	48.18	6370	1.40		
	22	294	40	40.13	6000	1.60		
	30	221	30	30.24	5460	2.30		
	36	184	25	25.19	5130	2.60		
	45	145	20	19.84	4740	2.60		
	60	110	15	15.09	4330	2.70		
1.1	112	86	12.5	12.47	1770	1.50	FK28B IEC90	90S-4 B14a
	134	72	10	10.47	1670	1.40		
	181	53	7.5	7.73	1510	1.50		
	57	169	25	24.44	2530	1.10	FK38B IEC90	90S-4 B14a
	69	140	20	20.25	2380	1.10		
	95	101	15	14.67	2130	1.10		
	110	87	12.5	12.67	2030	2.10		
	133	72	10	10.50	1910	2.10		
	184	52	7.5	7.60	1710	2.10		
	71	136	12.5	12.67	2360	1.30	FK38B IEC90	90L-6 B14a
	86	113	10	10.5	2210	1.30		
	118	82	7.5	7.6	1990	1.30		
	29	333	50	48.18	4340	1.10	FK48B IEC90	90S-4 B14a
	35	277	40	40.13	4080	1.10		
	46	209	30	30.24	3720	1.70		
	56	174	25	25.19	3500	1.70		
	71	137	20	19.84	3230	1.80		
	93	104	15	15.09	2950	1.90		
	112	86	12.5	12.49	2770	3.50		
	142	68	10	9.84	2550	3.50		
	187	52	7.5	7.48	2330	3.90		
	30	325	30	30.24	4310	1.10	FK48B IEC90	90L-6 B14a
	36	271	25	25.19	4050	1.10		
	45	213	20	19.84	3740	1.10		
	60	162	15	15.09	3410	1.20		
	72	134	12.5	12.49	3210	2.20		
	91	106	10	9.84	2960	2.30		
	120	80	7.5	7.48	2700	2.50		
	22	422	60	62.43	6000	1.10	FK58C IEC90	90S-4 B14a
	28	332	50	49.18	5540	1.10		
	24	408	60	59.04	5890	1.20	FK58B IEC90	90S-4 B14a
	29	333	50	48.18	5500	1.50		
	35	277	40	40.13	5170	1.70		
	46	209	30	30.24	4710	2.40		
	56	174	25	25.19	4430	2.80		
	71	137	20	19.84	4090	2.80		
	93	104	15	15.09	3730	2.90		

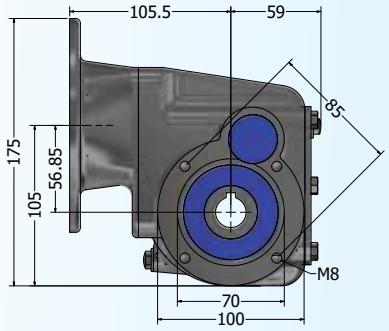


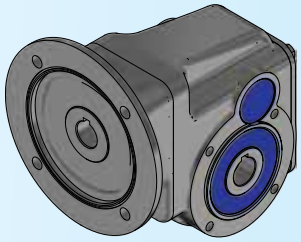
P_{1n} [kW]	N_2 min^{-1}	M_{2n} [Nm]	i Nominal	i Actual	F_{r2} [N]	f_s		
1.1	22	431	40	40.13	6000	1.10	FK58B IEC90	90L-6 B14a
	30	325	30	30.24	5460	1.50		
	36	271	25	25.19	5130	1.80		
	45	213	20	19.84	4740	1.80		
	60	162	15	15.09	4330	1.90		
	72	134	12.5	12.49	4060	3.60		
	91	106	10	9.84	3750	3.60		
	120	80	7.5	7.48	3420	3.70		
1.5	112	117	12.5	12.47	1770	1.10	FK28B IEC90	90L-4 B14a
	134	99	10	10.47	1670	1.00		
	181	73	7.5	7.73	1510	1.10		
	110	119	12.5	12.67	2030	1.50	FK38B IEC90	90L-4 B14a
	133	99	10	10.5	1910	1.50		
	184	72	7.50	7.60	1710	1.50		
	46	285	30	30.24	3720	1.20	FK48B IEC90	90L-4 B14a
	56	237	25	25.19	3500	1.30		
	71	187	20	19.84	3230	1.30		
	93	142	15	15.09	2950	1.40		
	112	118	12.5	12.49	2770	2.60		
	142	93	10	9.84	2550	2.60		
	187	70	7.5	7.48	2330	2.80		
	72	183	12.5	12.49	3210	1.60	FK48B IEC100	100L1-6 B14a
	91	144	10	9.84	2960	1.70		
	120	110	7.5	7.48	2700	1.80		
	29	454	50	48.18	5500	1.10	FK58B IEC90	90L-4 B14a
	35	378	40	40.13	5170	1.30		
	46	285	30	30.24	4710	1.80		
	56	237	25	25.19	4430	2.00		
	71	187	20	19.84	4090	2.00		
	93	142	15	15.09	3730	2.10		
	112	118	12.5	12.49	3510	4.10		
	142	93	10	9.84	3240	4.10		
	187	70	7.5	7.48	2950	4.30		
	30	443	30	30.24	5460	1.10	FK58B IEC100	100L1-6 B14a
	36	369	25	25.19	5130	1.30		
	45	291	20	19.84	4740	1.30		
	60	221	15	15.09	4330	1.40		
	72	183	12.5	12.49	4060	2.60		
	91	144	10	9.84	3750	2.60		
	120	110	7.5	7.48	3420	2.70		

P_{1n} [kW]	N_2 min^{-1}	M_{2n} [Nm]	i Nominal	i Actual	F_{r2} [N]	f_s		
2.2	112	172	12.5	12.49	2770	1.70	FK48B IEC100	100L1-4 B14a
	142	136	10	9.84	2550	1.80		
	187	103	7.5	7.48	2330	1.90		
	72	268	12.5	12.49	3210	1.10	FK48B IEC100	100L2-6 B14a
	91	211	10	9.84	2960	1.10		
	120	161	7.5	7.48	2700	1.20		
	46	418	30	30.24	4710	1.20	FK58B IEC100	100L1-4 B14a
	56	348	25	25.19	4430	1.40		
	71	274	20	19.84	4090	1.40		
	93	208	15	15.09	3730	1.40		
	112	172	12.5	12.49	3510	2.80		
	142	136	10	9.84	3240	2.80		
	187	103	7.5	7.48	2950	2.90		
	72	268	12.5	12.49	4060	1.80	FK58B IEC100	100L2-6 B14a
	91	211	10	9.84	3750	1.80		
	120	161	7.5	7.48	3420	1.90		
3.0	112	235	12.5	12.49	2770	1.30	FK48B IEC100	100L2-4 B14a
	142	185	10	9.84	2550	1.30		
	187	141	7.5	7.48	2330	1.40		
	56	474	25	25.19	4430	1.00	FK58B IEC100	100L2-4 B14a
	71	374	20	19.84	4090	1.00		
	93	284	15	15.09	3730	1.10		
	112	235	12.5	12.49	3510	2.00		
	142	185	10	9.84	3240	2.10		
	187	141	7.5	7.48	2950	2.10		

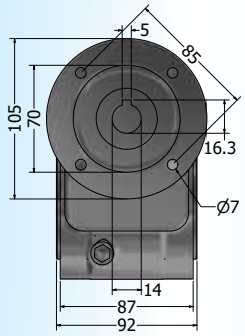
FK 28B IEC63 B5

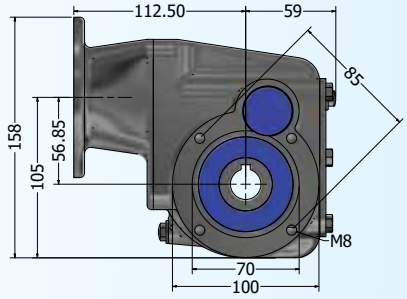


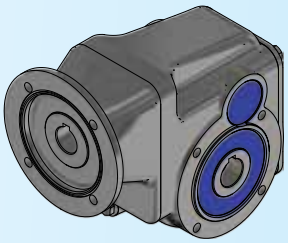




FK 28B IEC71 B14A







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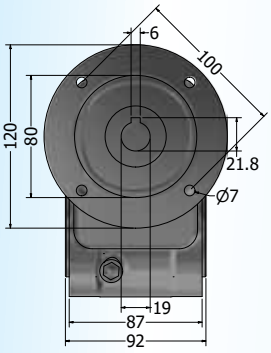
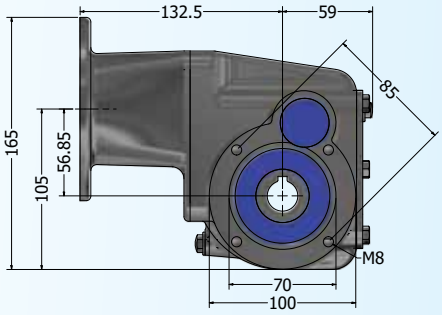
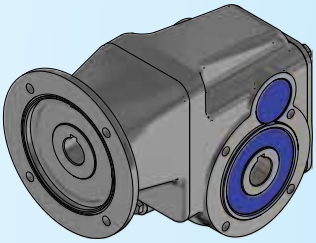
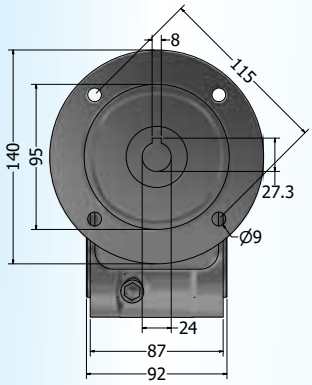
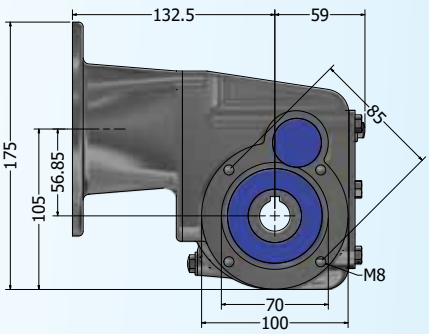


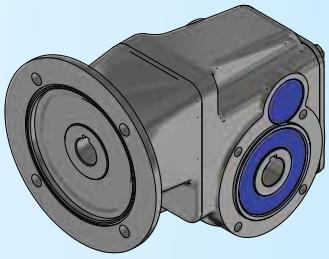




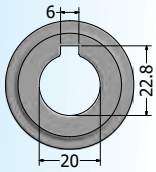
FK 28B IEC90 B14A

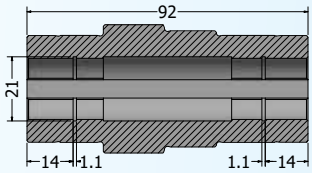






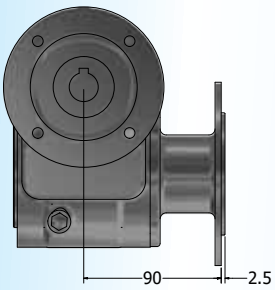
Hollow Shaft Dimensions HA20

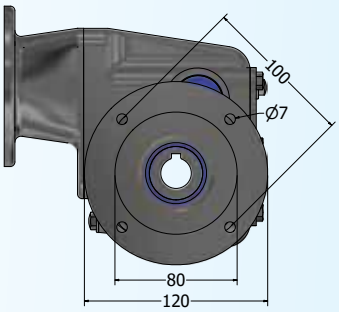


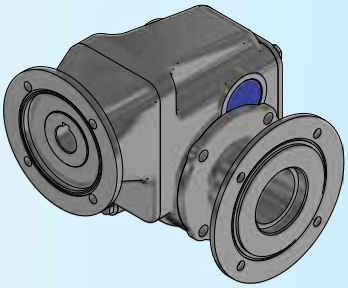


The standard hollow shaft diameter for a FK28B is 20mm
Different hollow shaft diameters on request

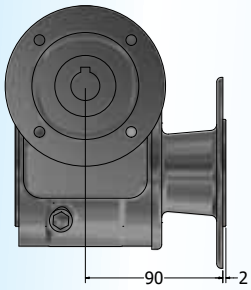
Output Flange SS085 FL120

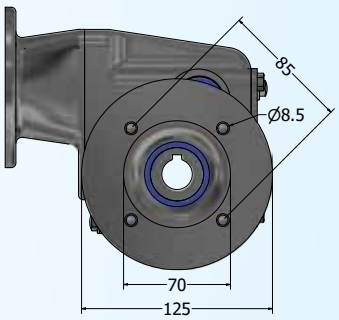


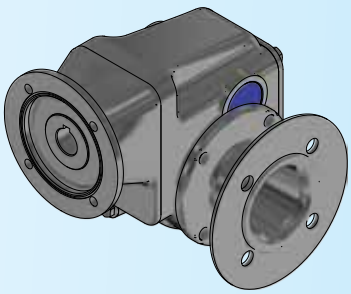




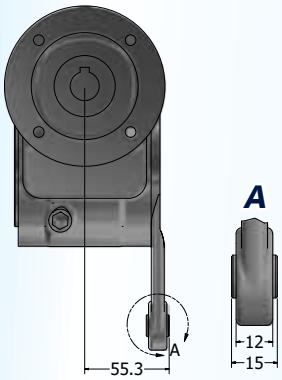
Output Flange SS085 FL125

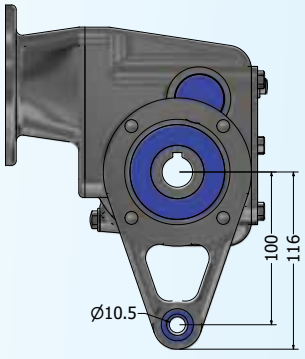


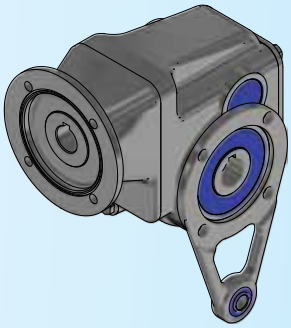




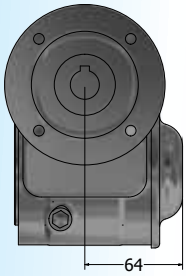
Torque Arm SS085 MS

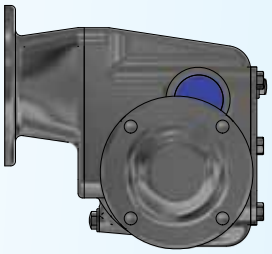


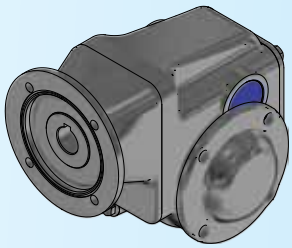




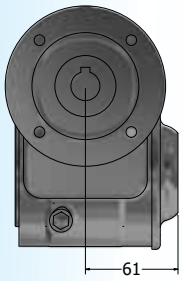
Closed Safety Cap SS085 CC

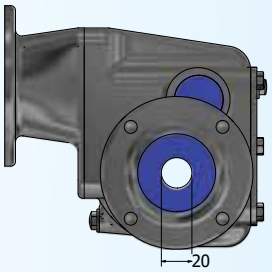


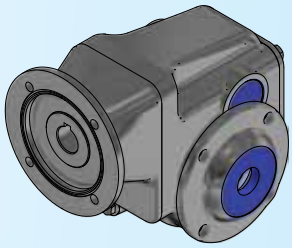




Open Safety Cap SS085 CO20

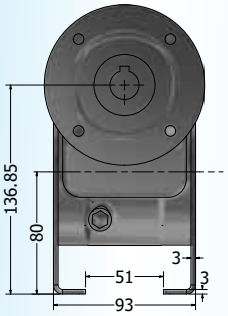


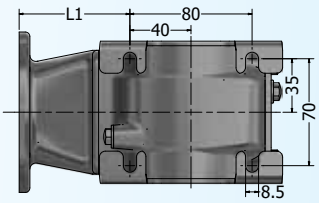


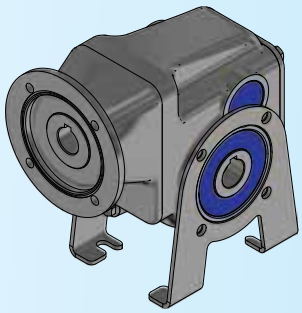


The standard shaft diameter for a SS085 CO is 20mm
Different diameters on request

Mounting Feet SS 085 VP (mounted inwards)

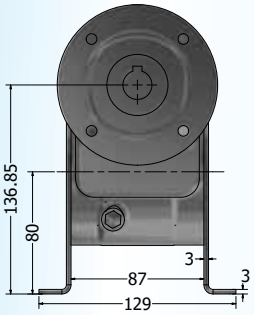


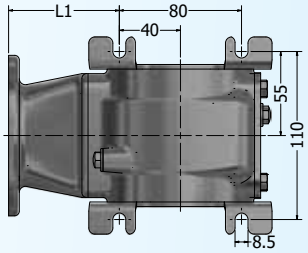


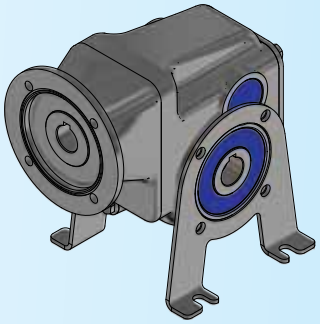


L1			
IEC63	*65.5 mm*	**IEC80**	*92.5 mm*
IEC71	*72.5 mm*	**IEC90**	*92.5 mm*

Mounting Feet SS 085 VP (mounted outwards)

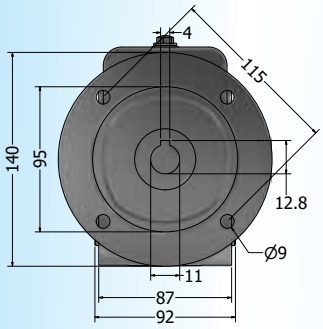


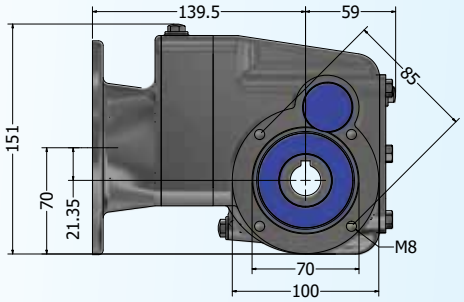


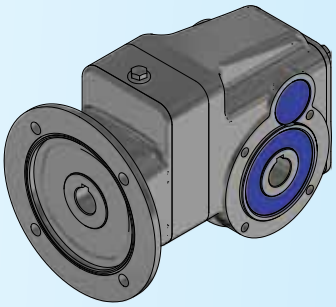


L1			
IEC63	*65.5 mm*	**IEC80**	*92.5 mm*
IEC71	*72.5 mm*	**IEC90**	*92.5 mm*

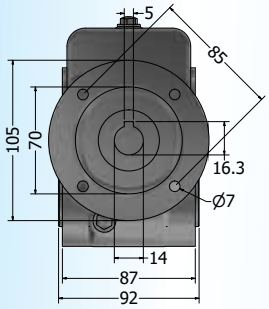
FK 28C IEC63 B5

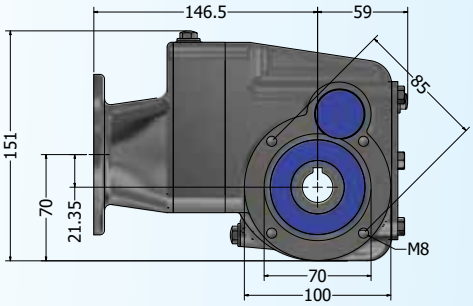


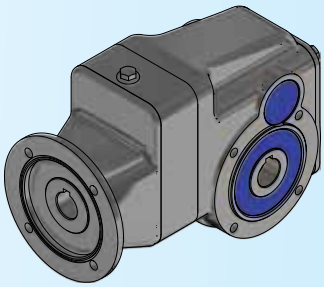




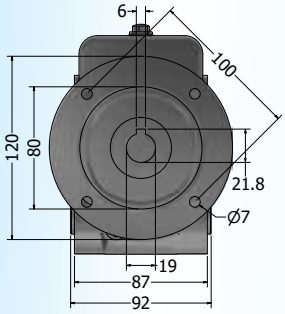
FK 28C IEC71 B14A

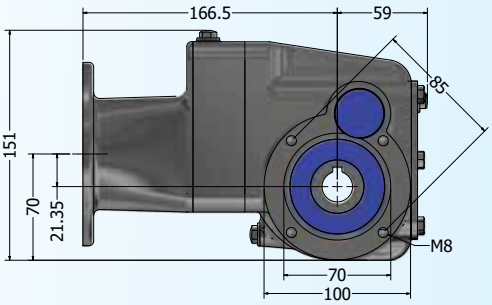


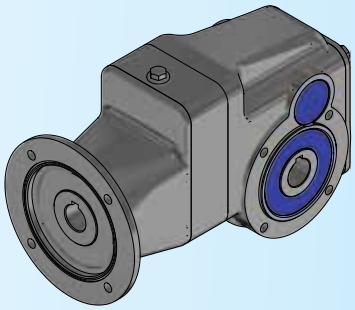




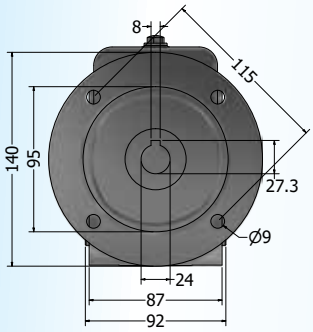
FK 28C IEC80 B14A

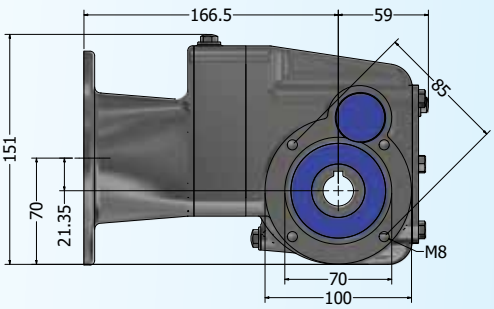


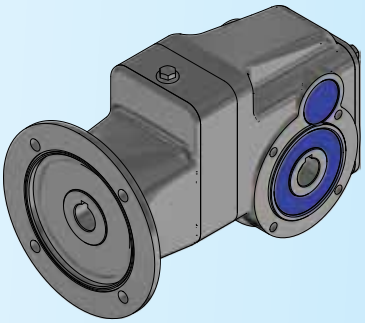




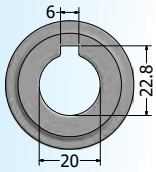
FK 28C IEC90 B14A

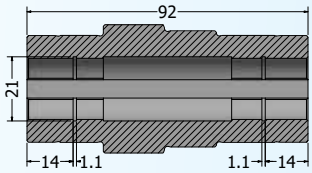






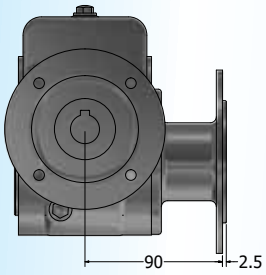
Hollow Shaft Dimensions HA20

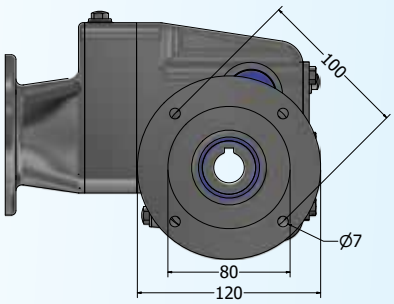


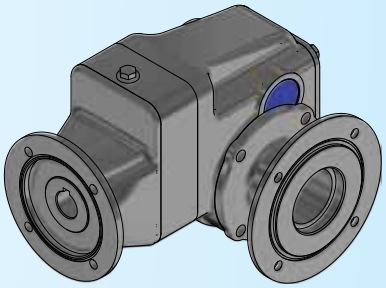


The standard hollow shaft diameter for a FK28C is 20mm
Different hollow shaft diameters on request

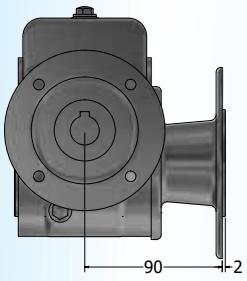
Output Flange SS085 FL120

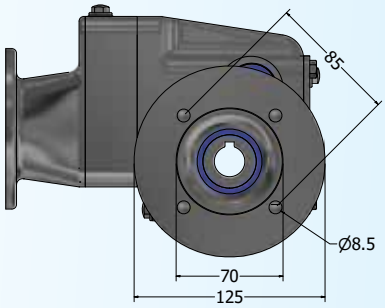


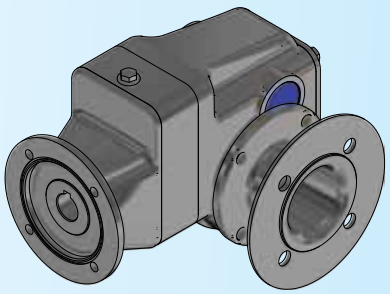




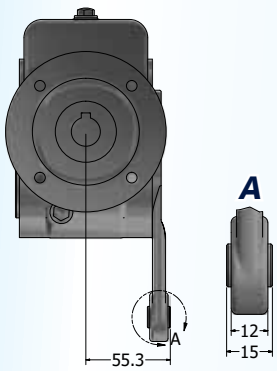
Output Flange SS085 FL125

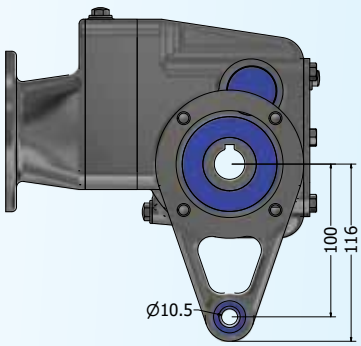


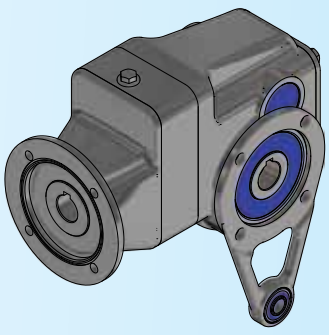




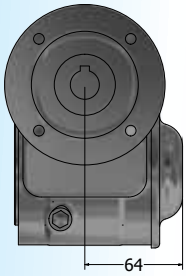
Torque Arm SS085 MS

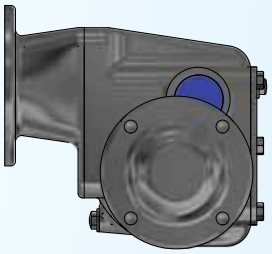


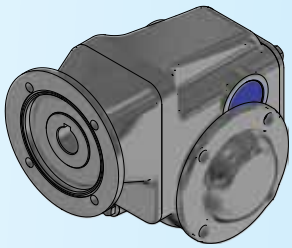




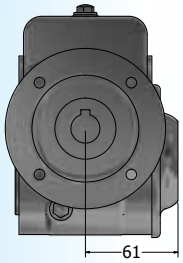
Closed Safety Cap SS085 CC

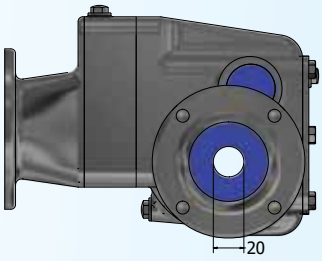


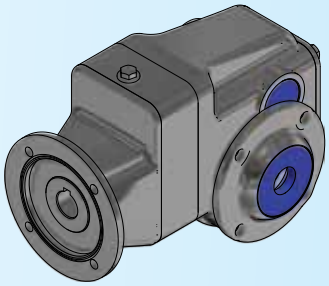




Open Safety Cap SS085 CO20

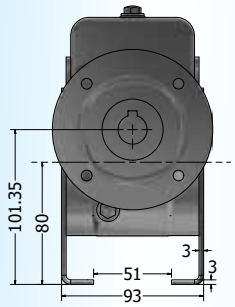


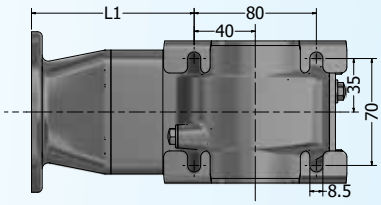


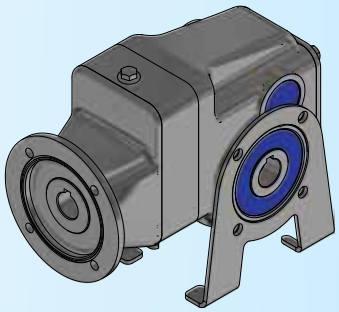


The standard shaft diameter for a SS085 CO is 20mm
Different diameters on request

Mounting Feet SS 085 VP (mounted inwards)

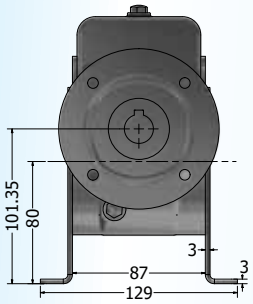


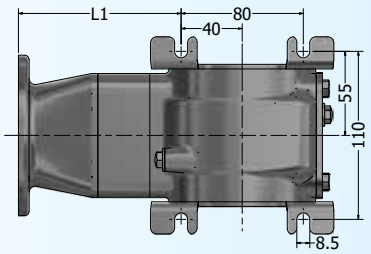


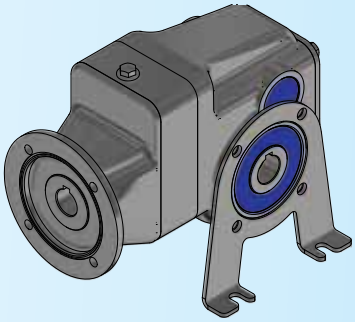


L1			
IEC63	*99.5 mm*	**IEC80**	*126.5 mm*
IEC71	*106.5 mm*	**IEC90**	*126.5 mm*

Mounting Feet SS 085 VP (mounted outwards)

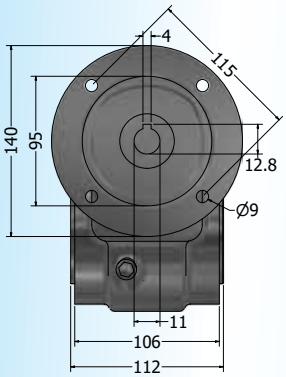


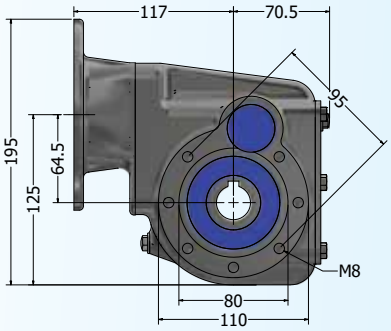


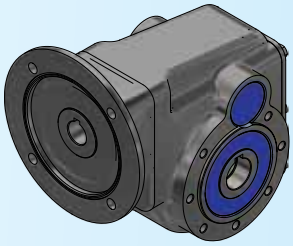


L1			
IEC63	*99.5 mm*	**IEC80**	*126.5 mm*
IEC71	*106.5 mm*	**IEC90**	*126.5 mm*

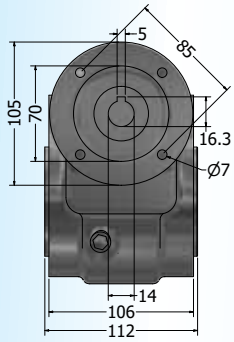
FK 38B IEC63 B5

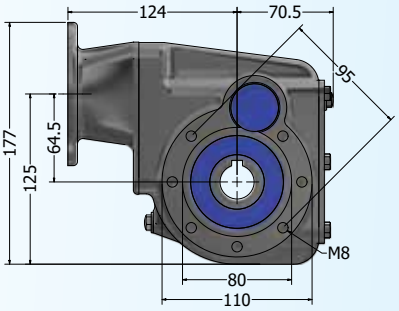


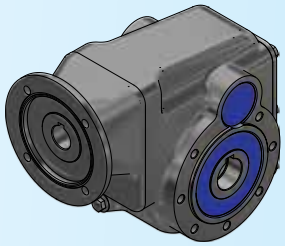




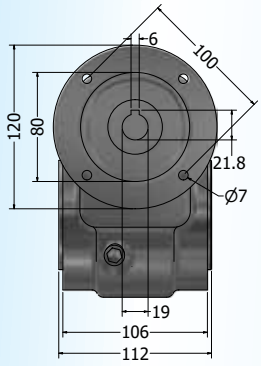
FK 38B IEC71 B14A

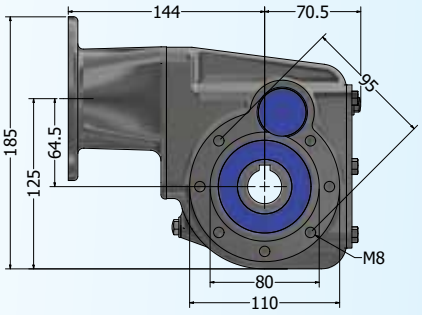


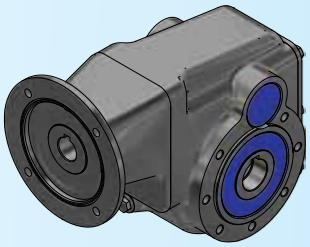




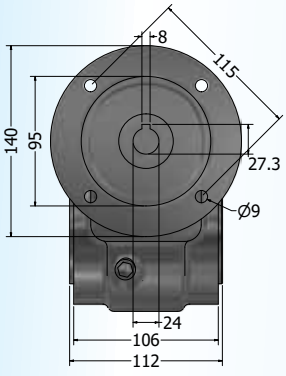
FK 38B IEC80 B14A

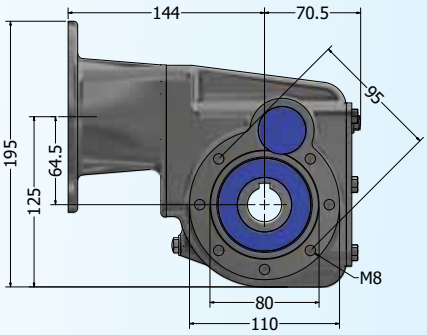


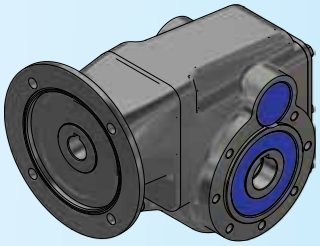




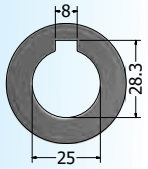
FK 38B IEC90 B14A

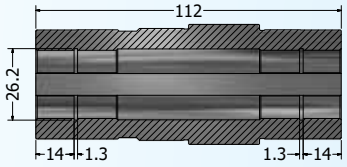






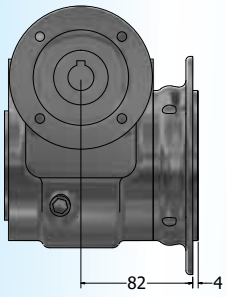
Hollow Shaft Dimensions HA25

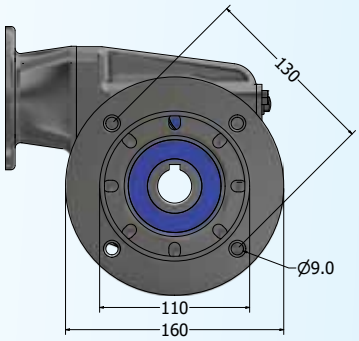


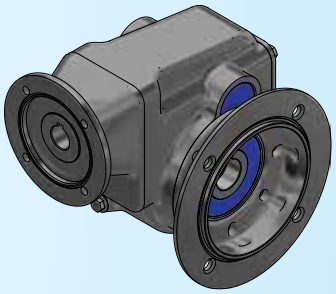


The standard hollow shaft diameter for a FK38B is 25mm
Different hollow shaft diameters on request

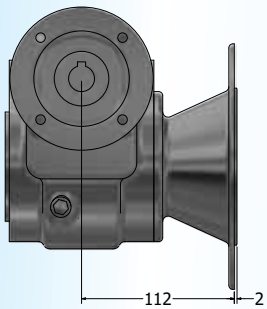
Output Flange SS095 FL160

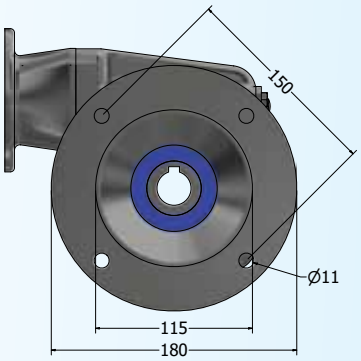


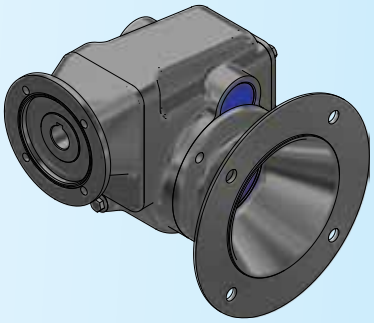




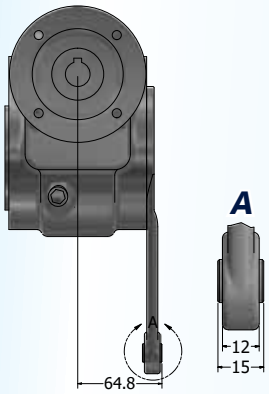
Output Flange SS095 FL180

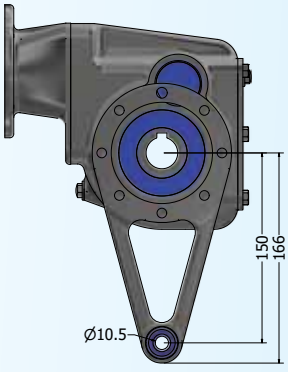


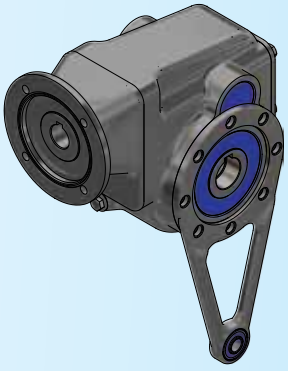




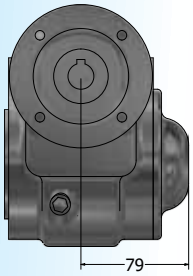
Torque Arm SS095 MS

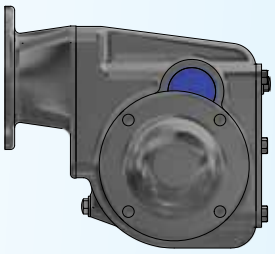


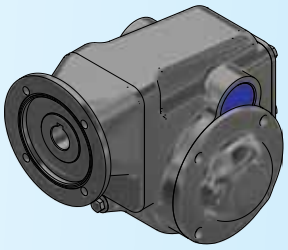




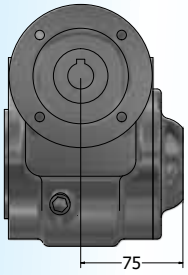
Closed Safety Cap SS095 CC

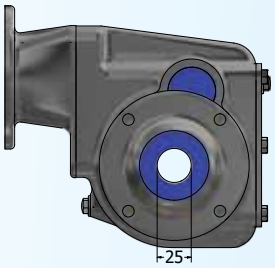


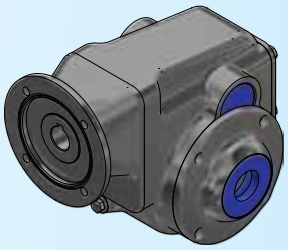




Open Safety Cap SS095 CO25

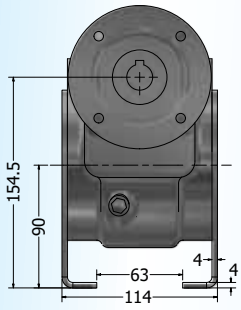


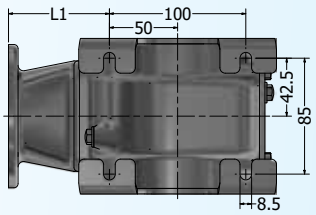


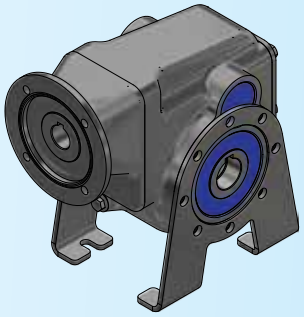


The standard shaft diameter for a SS095 CO is 25mm
Different diameters on request

Mounting Feet SS 095 VP (mounted inwards)

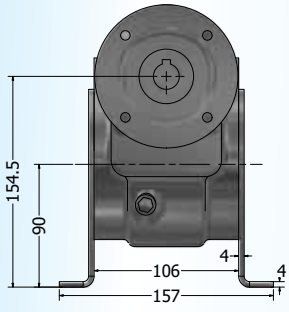


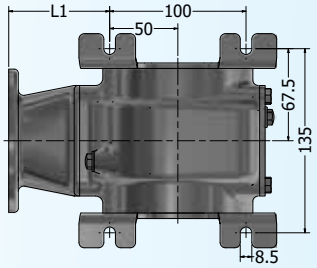


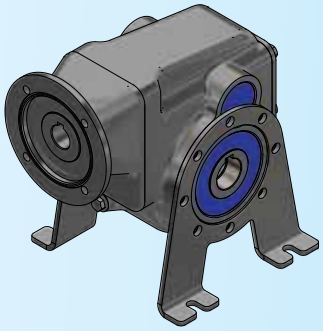


L1			
IEC63	*67 mm*	**IEC80**	*94 mm*
IEC71	*74 mm*	**IEC90**	*94 mm*

Mounting Feet SS 095 VP (mounted outwards)

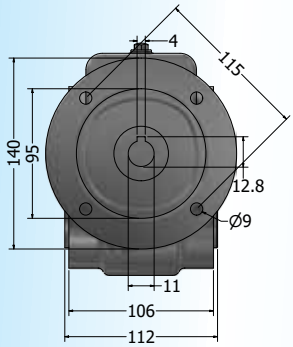


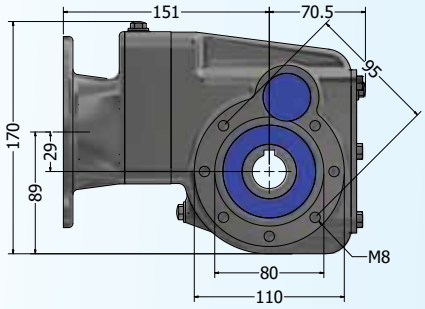


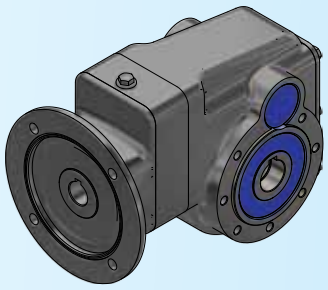


L1			
IEC63	*67 mm*	**IEC80**	*94 mm*
IEC71	*74 mm*	**IEC90**	*94 mm*

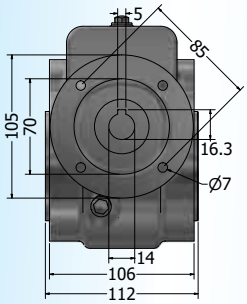
FK 38C IEC63 B5

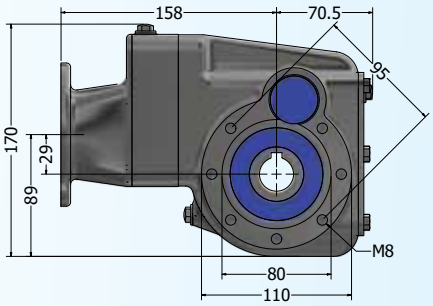


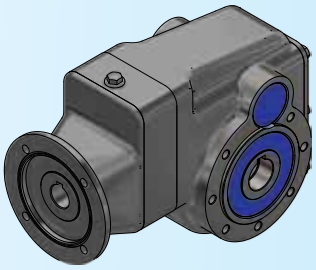




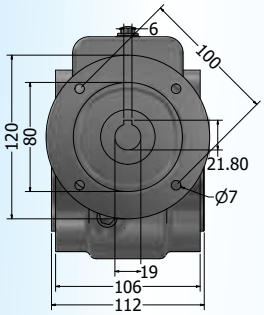
FK 38C IEC71 B14A

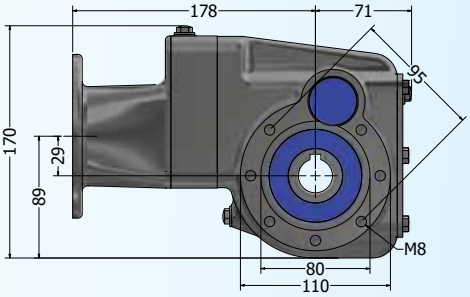


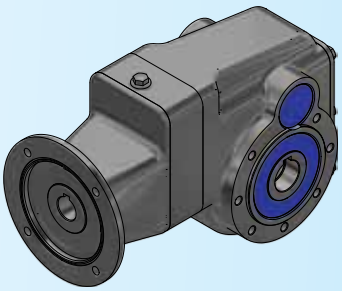




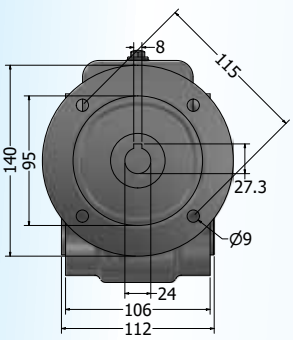
FK 38C IEC80 B14A

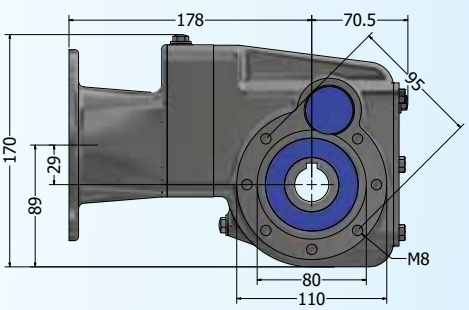


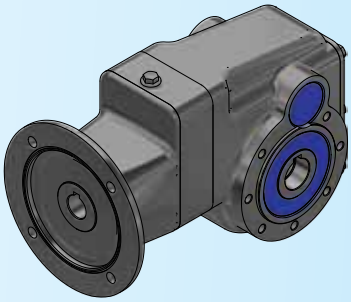




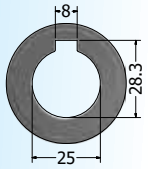
FK 38C IEC90 B14A

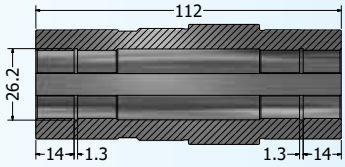






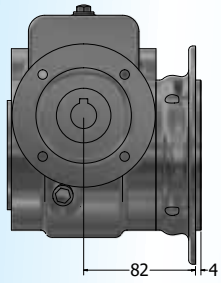
Hollow Shaft Dimensions HA25

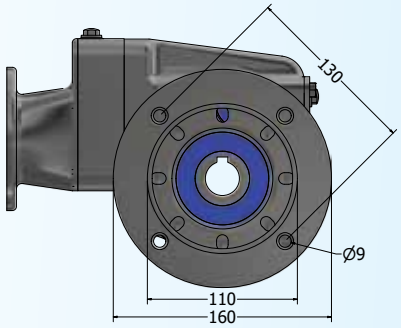


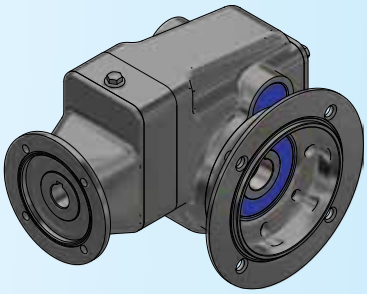


The standard hollow shaft diameter for a FK38C is 25mm
Different hollow shaft diameters on request

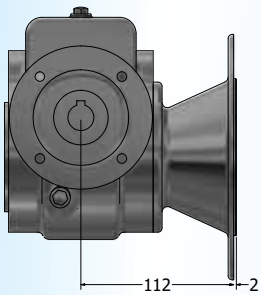
Output Flange SS095 FL160

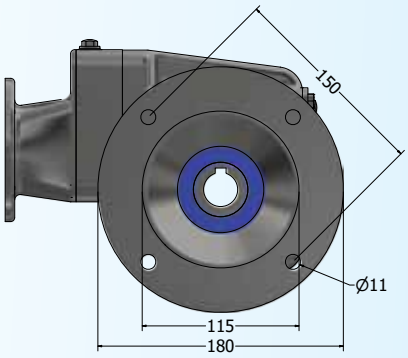


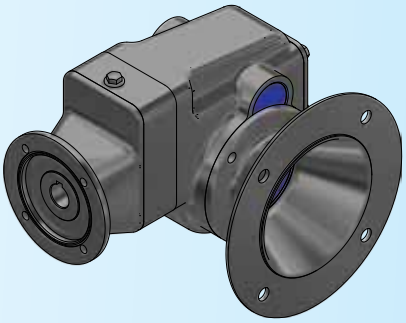




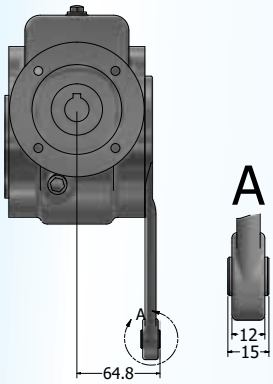
Output Flange SS095 FL180

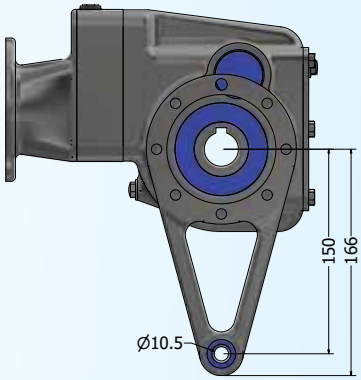


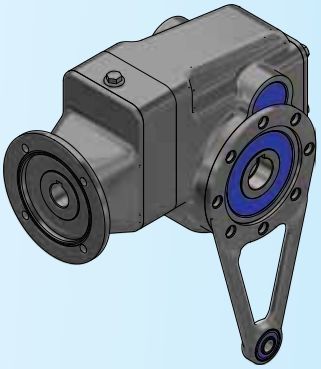




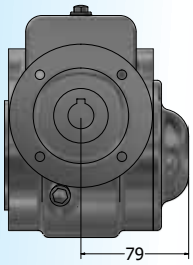
Torque Arm SS095 MS

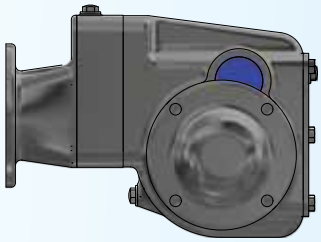


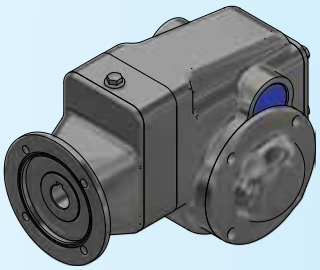




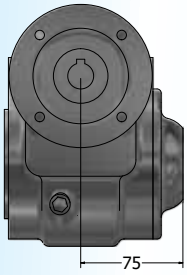
Closed Safety Cap SS095 CC

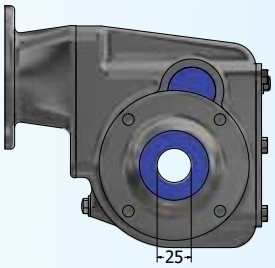


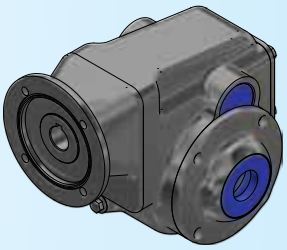




Open Safety Cap SS095 CO25

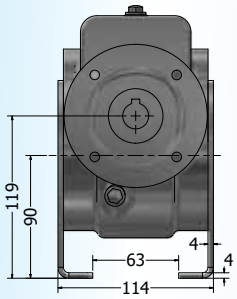


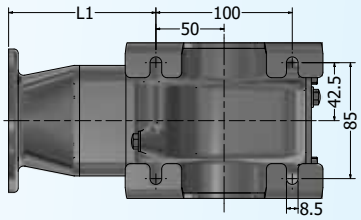


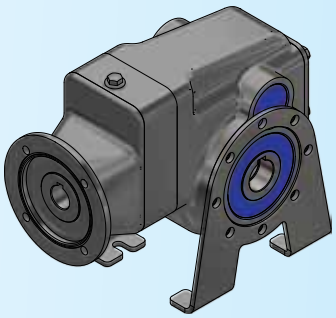


The standard shaft diameter for a SS095 CO is 25mm
Different diameters on request

Mounting Feet SS 095 VP (mounted inwards)

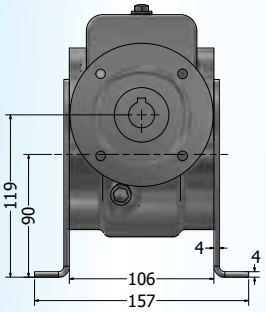


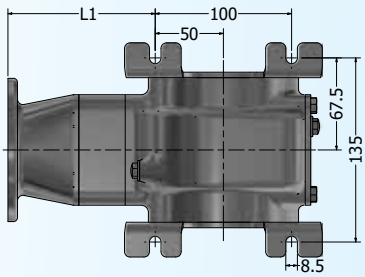


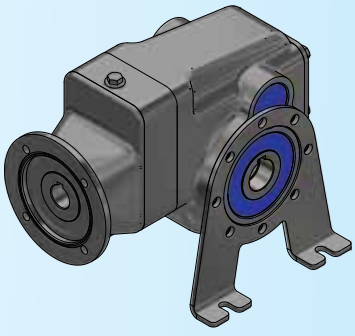


L1			
IEC63	*101 mm*	**IEC80**	*128 mm*
IEC71	*108 mm*	**IEC90**	*128 mm*

Mounting Feet SS 095 VP (mounted outwards)

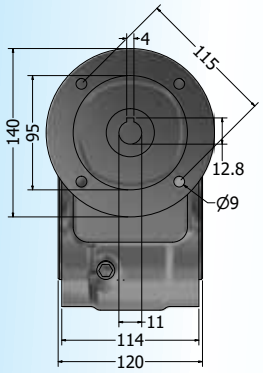


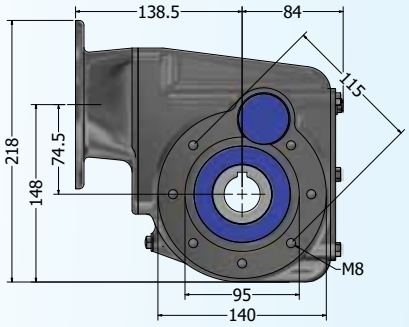


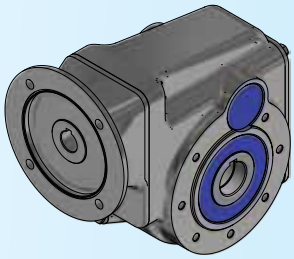


L1			
IEC63	*101 mm*	**IEC80**	*128 mm*
IEC71	*108 mm*	**IEC90**	*128 mm*

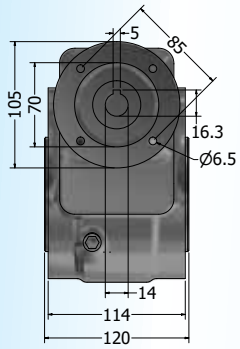
FK 48B IEC63 B5

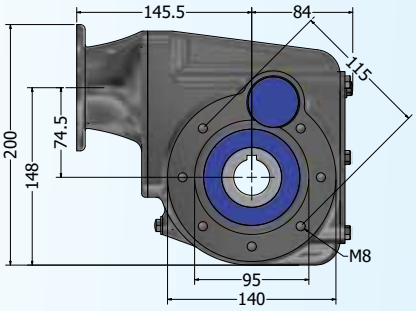


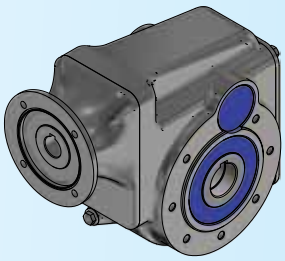




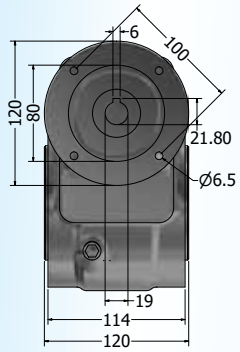
FK 48B IEC71 B14A

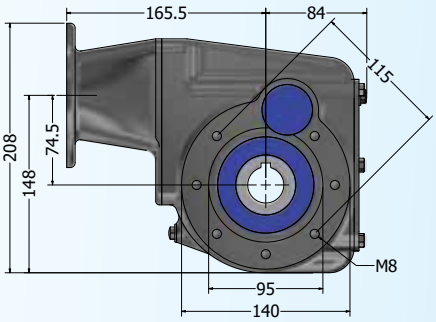


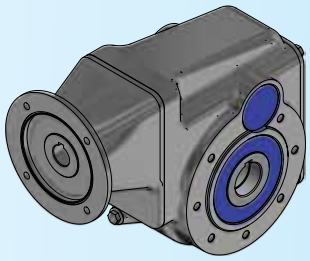




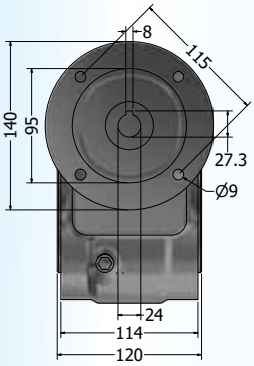
FK 48B IEC80 B14A

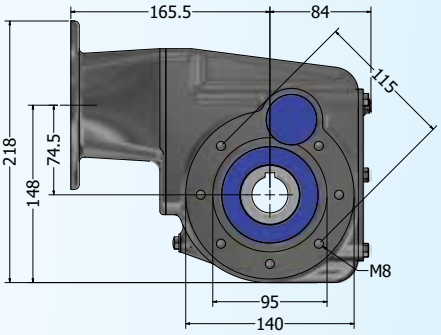


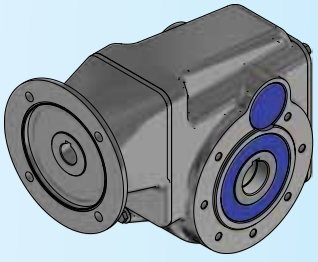




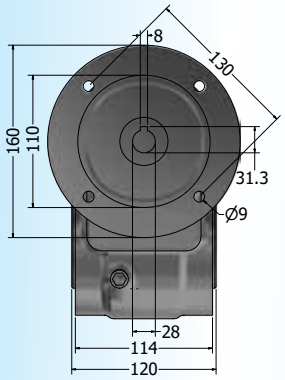
FK 48B IEC90 B14A

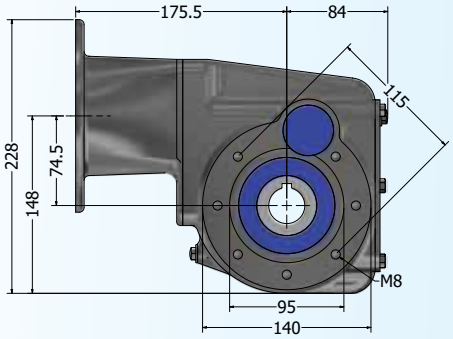


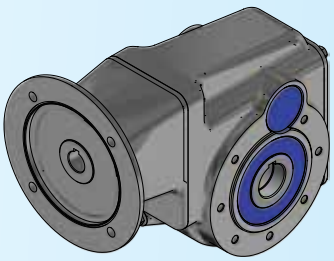




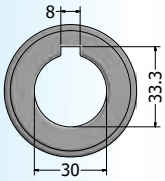
FK 48B IEC100 B14A

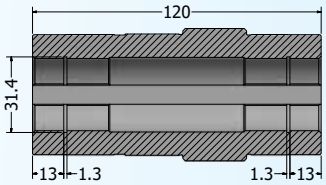






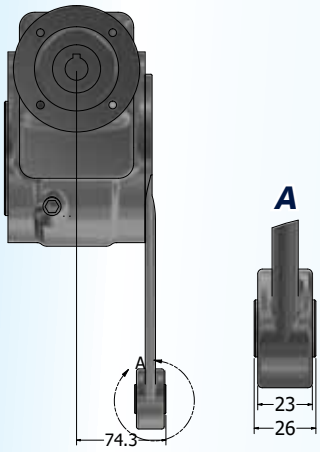
Hollow Shaft Dimensions HA30

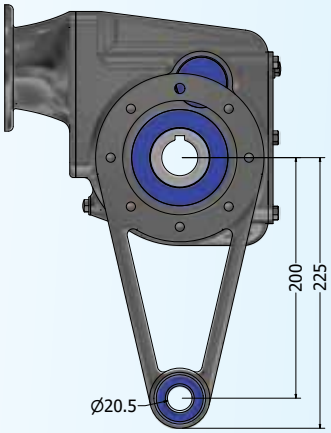


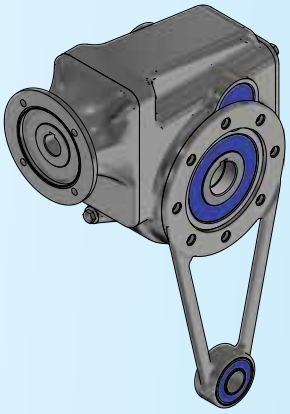


The standard hollow shaft diameter for a FK48B is 30mm
Different hollow shaft diameters on request

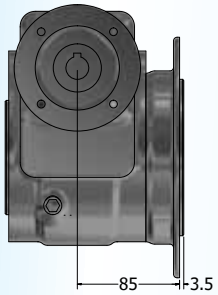
Torque Arm SS115 MS

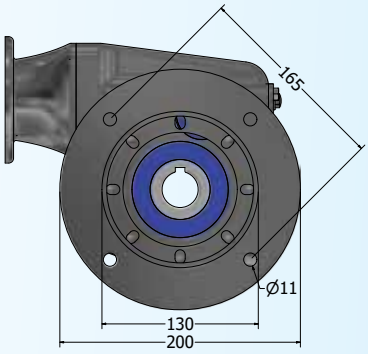


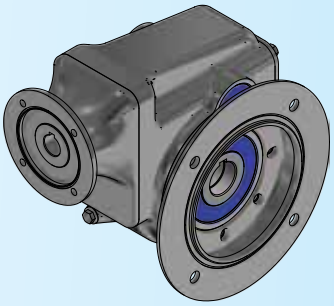




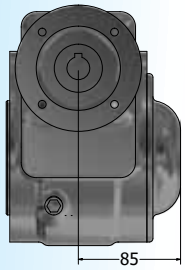
Output Flange SS115 FL200

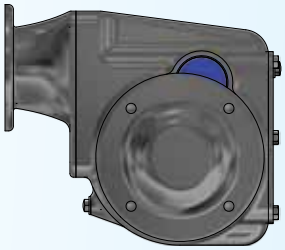


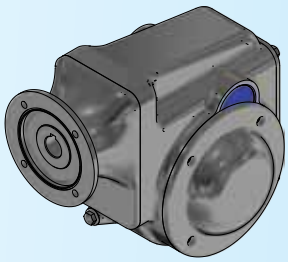




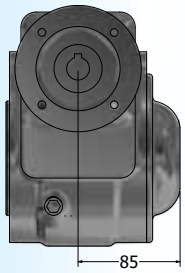
Closed Safety Cap SS115 CC

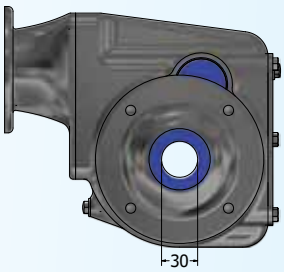


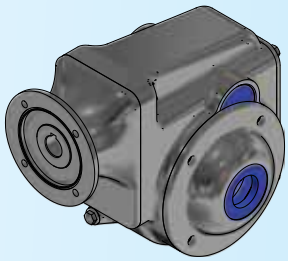




Open Safety Cap SS115 CO30

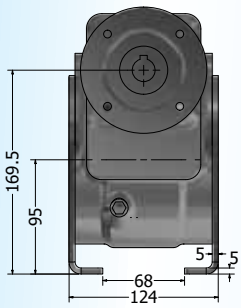


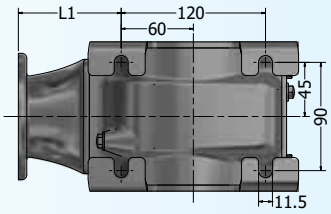


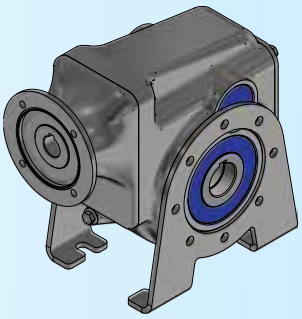


The standard shaft diameter for a SS115 CO is 30mm
Different diameters on request

Mounting Feet SS 115 VP (mounted inwards)

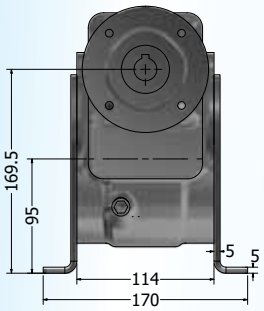


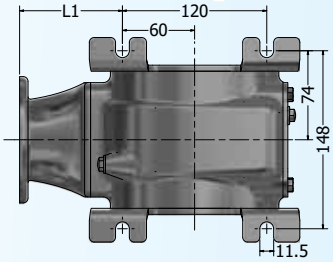


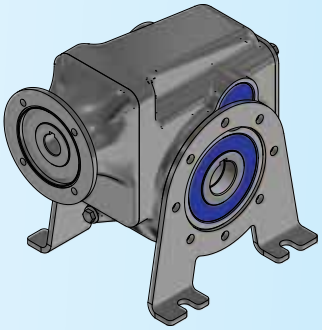


L1			
IEC63	*78.5 mm*	**IEC90**	*105.5 mm*
IEC71	*85.5 mm*	**IEC 100**	*115.5 mm*
IEC80	*105.5 mm*		

Mounting Feet SS 115 VP (mounted outwards)

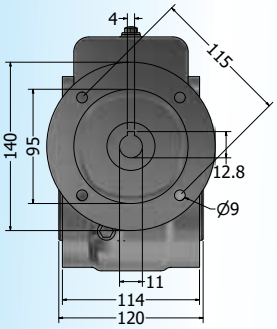


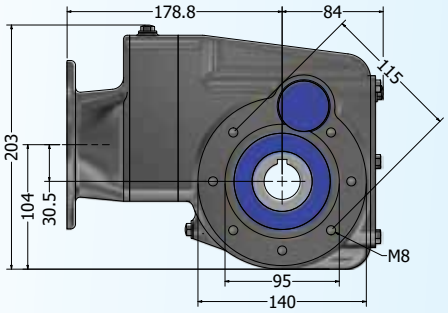


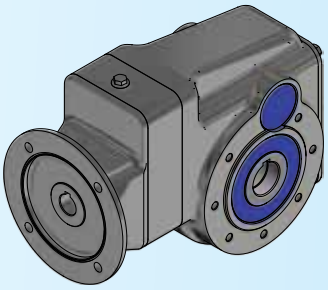


L1			
IEC63	*78.5 mm*	**IEC90**	*105.5 mm*
IEC71	*85.5 mm*	**IEC 100**	*115.5 mm*
IEC80	*105.5 mm*		

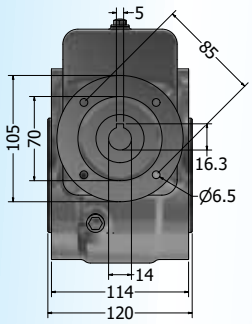
FK 48C IEC63 B5

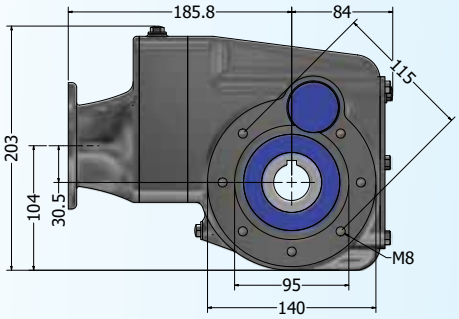


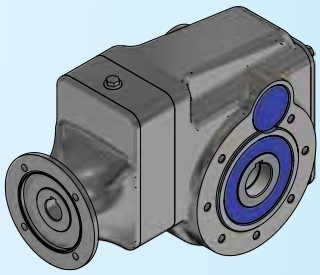




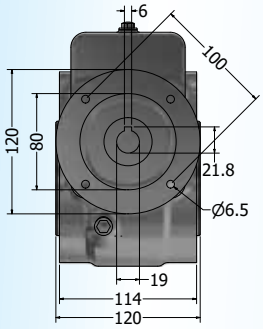
FK 48C IEC71 B14A

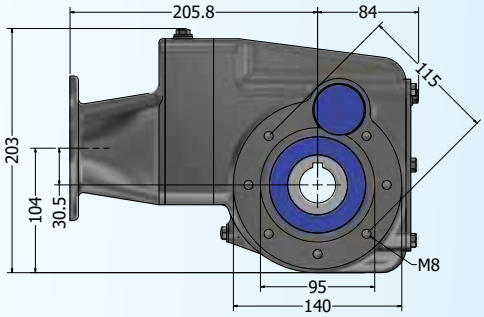


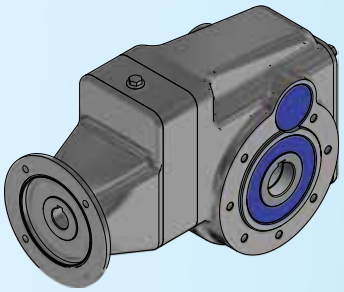




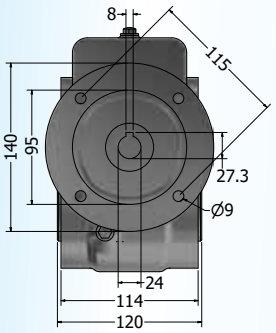
FK 48C IEC80 B14A

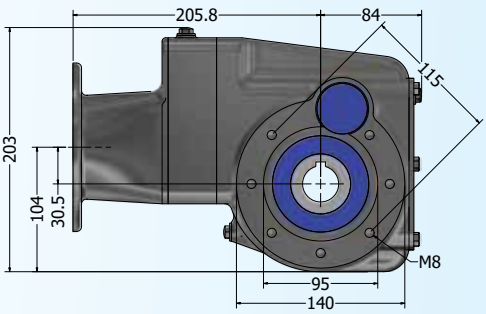


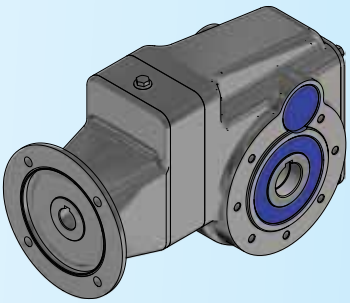




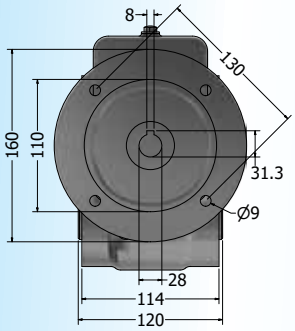
FK 48C IEC90 B14A

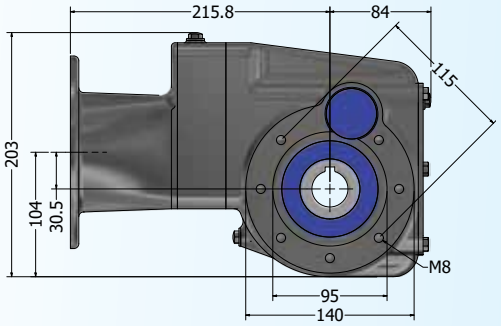


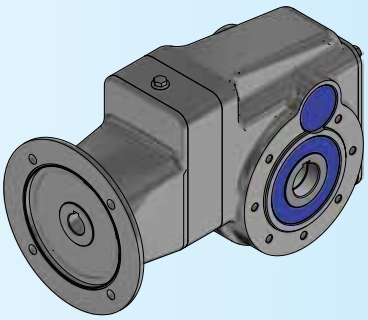




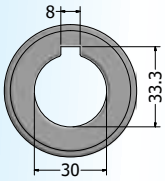
FK 48C IEC100 B14A

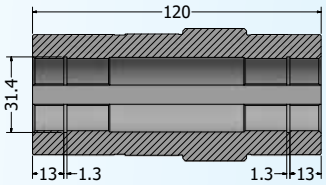






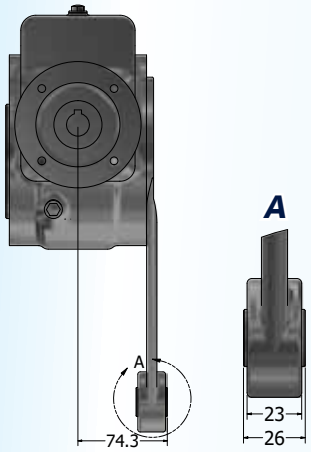
Hollow Shaft Dimensions HA30

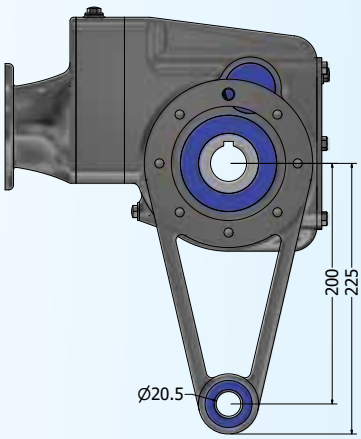


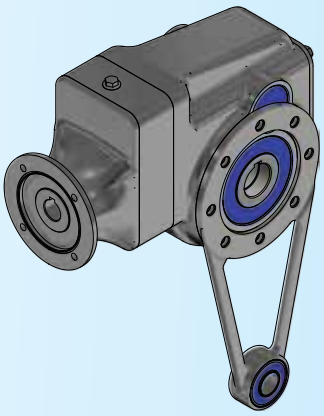


The standard hollow shaft diameter for a FK48C is 30mm
Different hollow shaft diameters on request

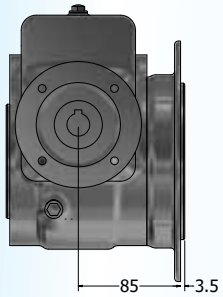
Torque Arm SS115 MS

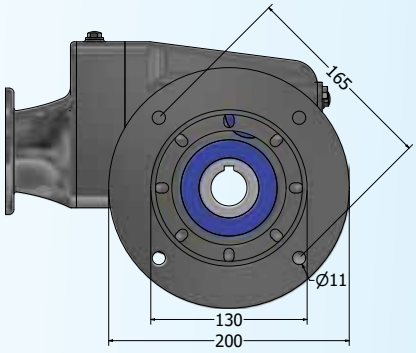


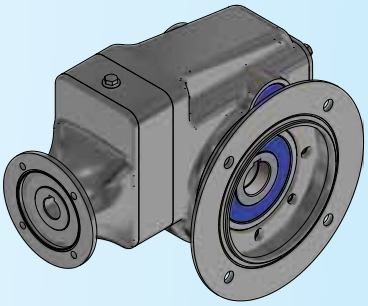




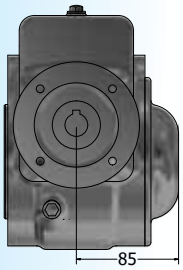
Output Flange SS115 FL200

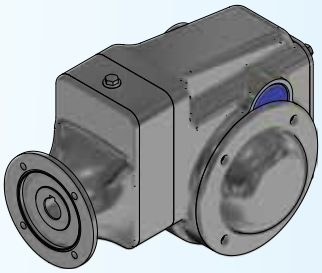


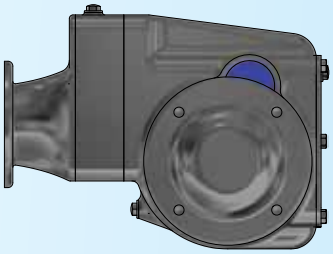




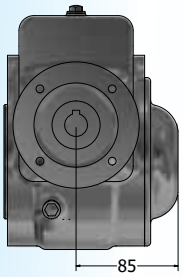
Closed Safety Cap SS115 CC

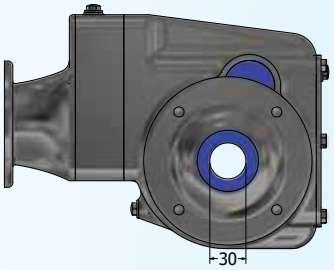


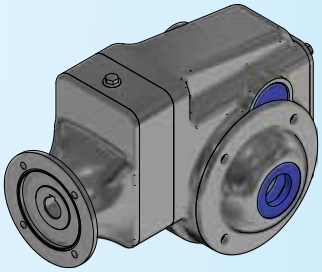




Open Safety Cap SS115 CO30

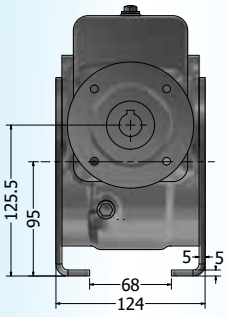


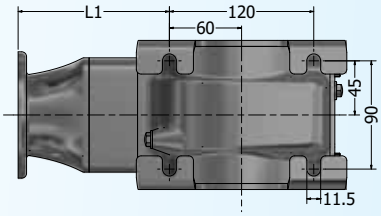


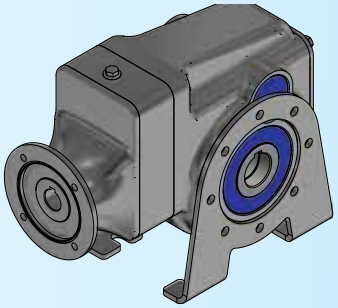


The standard shaft diameter for a SS115 CO is 30mm
Different diameters on request

Mounting Feet SS 115 VP (mounted inwards)

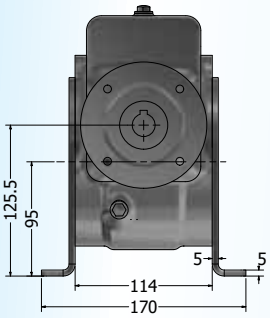


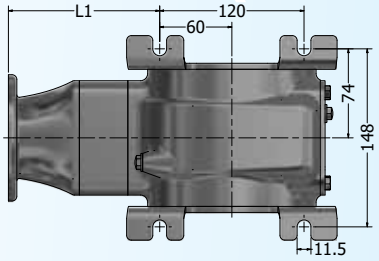


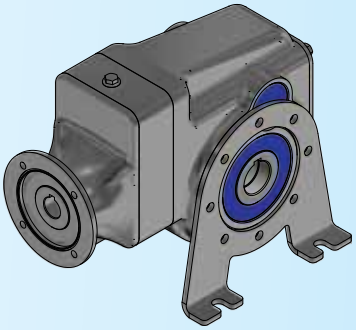


L1			
IEC63	118.8 mm	**IEC90**	145.8 mm
IEC71	125.8 mm	**IEC 100**	155.8 mm
IEC80	145.8 mm		

Mounting Feet SS 115 VP (mounted outwards)

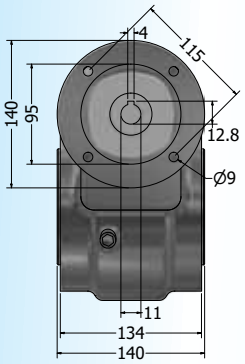


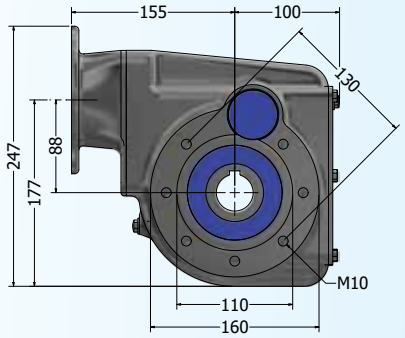


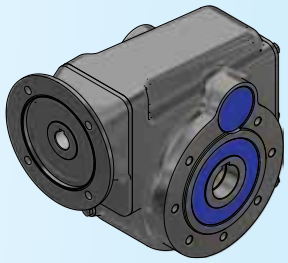


L1			
IEC63	118.8 mm	**IEC90**	145.8 mm
IEC71	125.8 mm	**IEC 100**	155.8 mm
IEC80	145.8 mm		

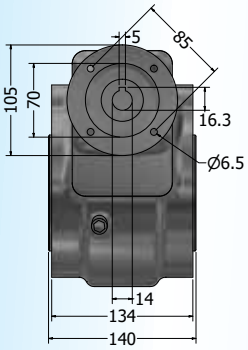
FK 58B IEC63 B5

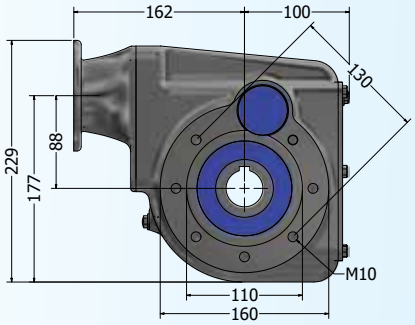


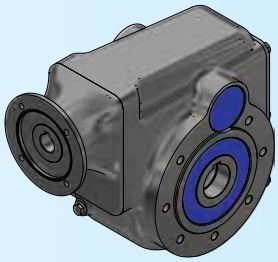




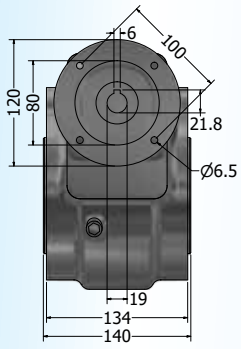
FK 58B IEC71 B14A

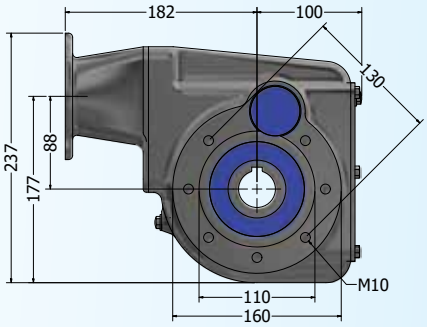


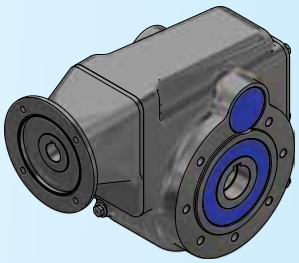




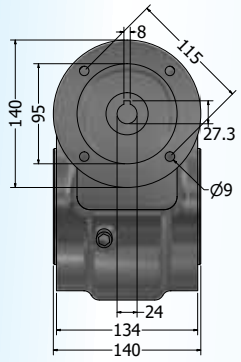
FK 58B IEC80 B14A

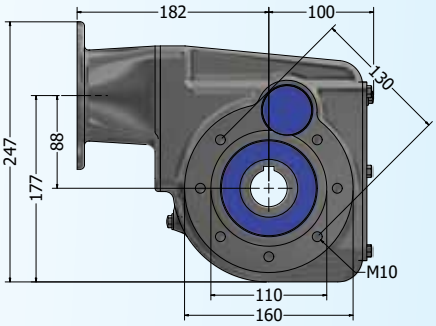


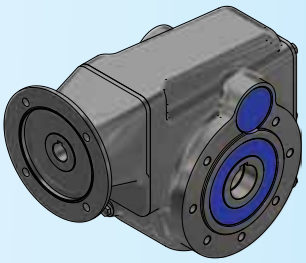




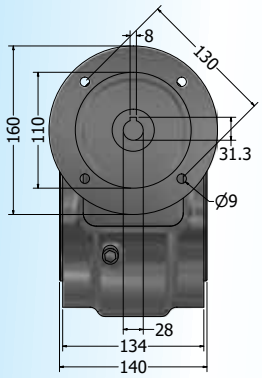
FK 58B IEC90 B14A

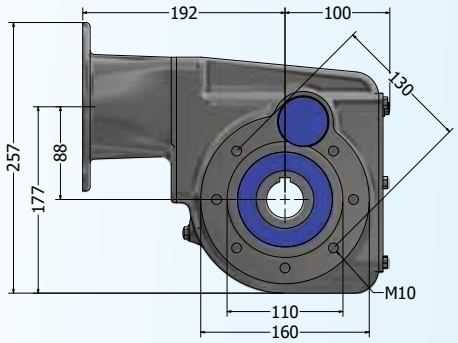


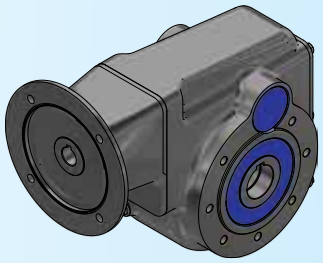




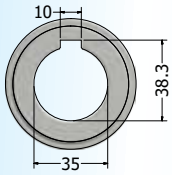
FK 58B IEC100 B14A

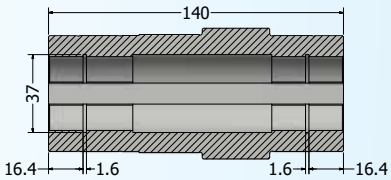






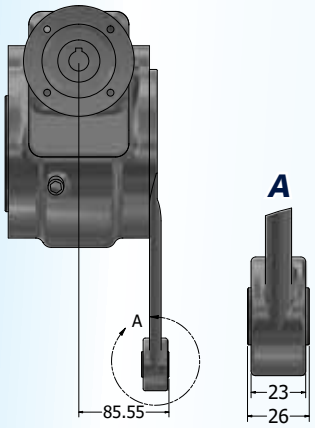
Hollow Shaft Dimensions HA35

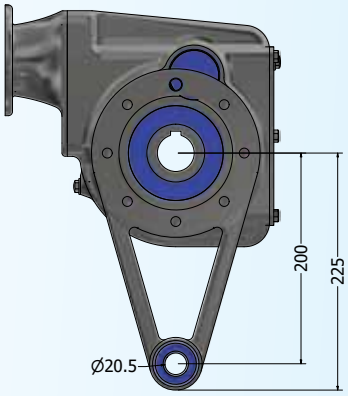


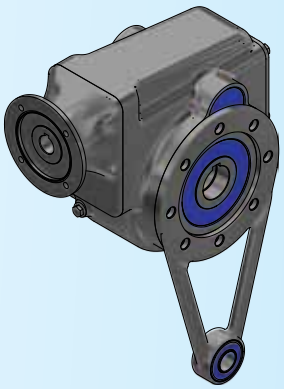


The standard hollow shaft diameter for a FK58B is 35mm
Different hollow shaft diameters on request

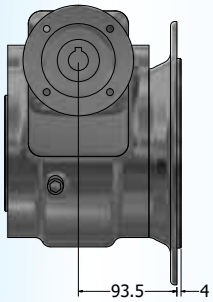
Torque Arm SS130 MS

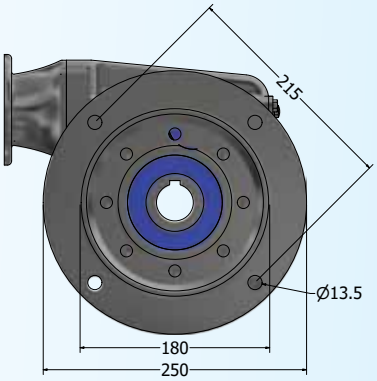


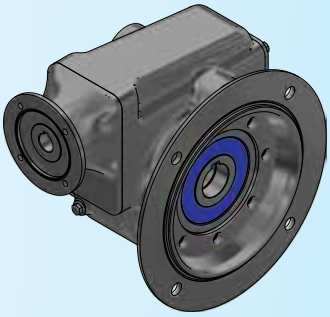




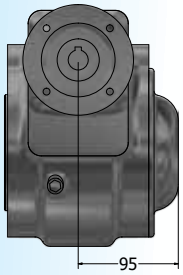
Output Flange SS130 FL250

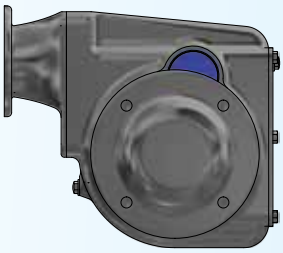


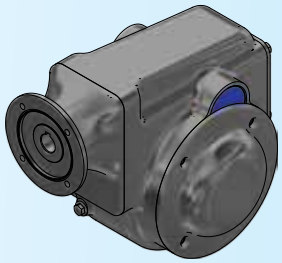




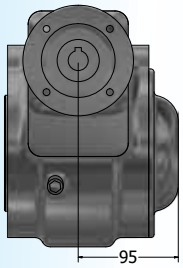
Closed Safety Cap SS130 CC

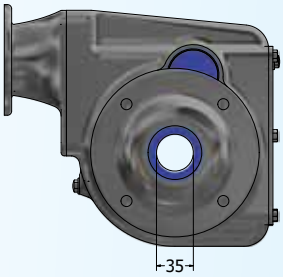


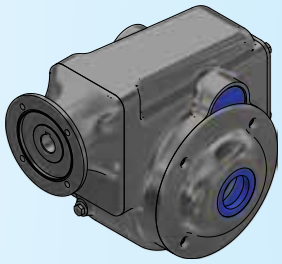




Open Safety Cap SS130 CO35

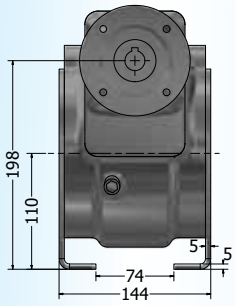


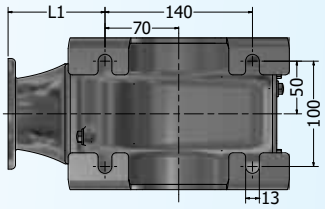


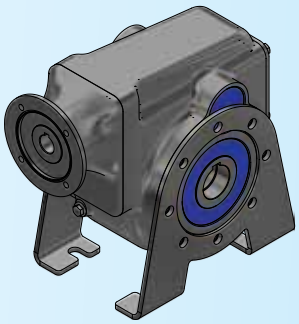


The standard shaft diameter for a SS130 CO is 35mm
Different diameters on request

Mounting Feet SS 130 VP (mounted inwards)

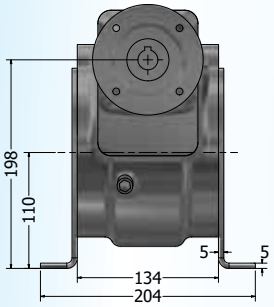


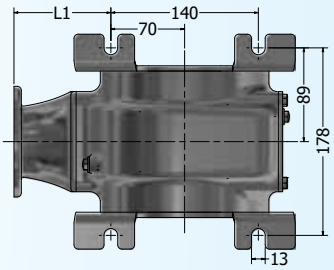


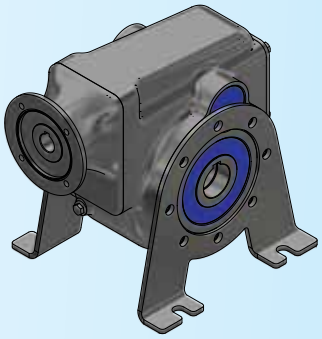


L1			
IEC63	*85 mm*	**IEC90**	*112 mm*
IEC71	*92 mm*	**IEC 100**	*122 mm*
IEC80	*112 mm*		

Mounting Feet SS 130 VP (mounted outwards)

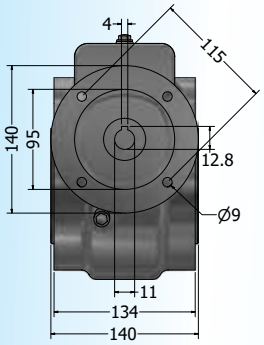


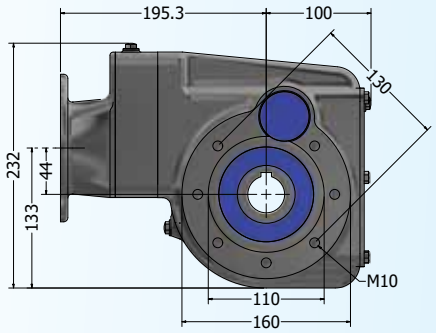


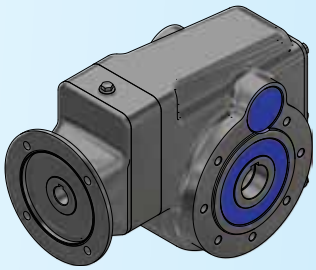


L1			
IEC63	*85 mm*	**IEC90**	*112 mm*
IEC71	*92 mm*	**IEC 100**	*122 mm*
IEC80	*112 mm*		

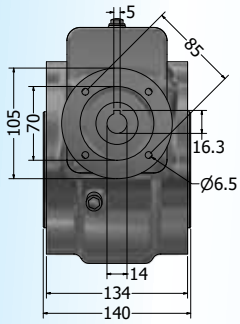
FK 58C IEC63 B5

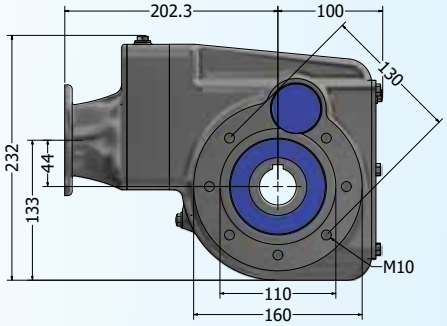


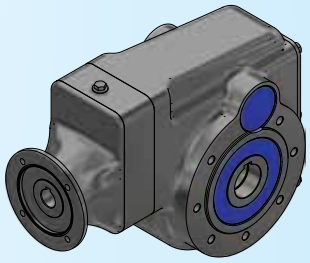




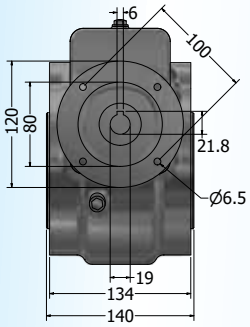
FK 58C IEC71 B14A

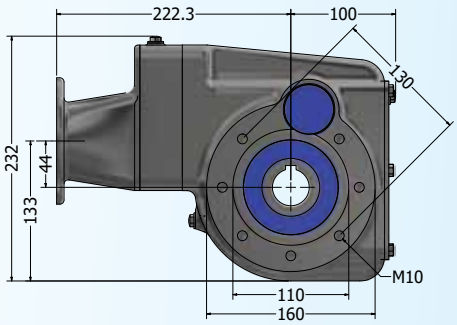


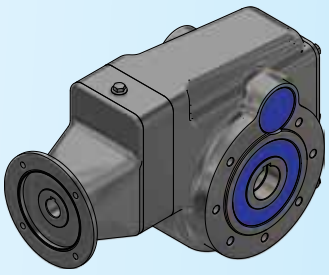




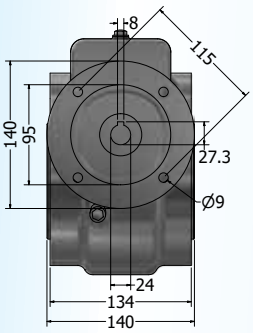
FK 58C IEC80 B14A

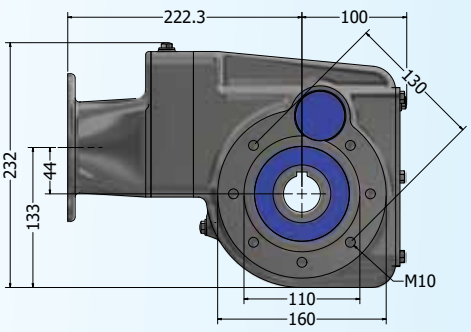


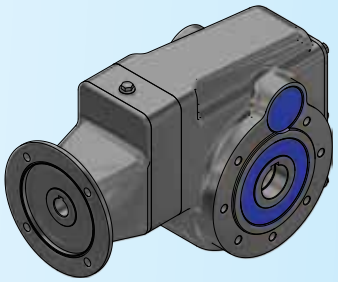




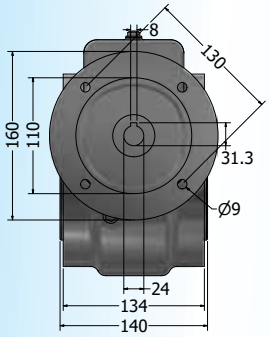
FK 58C IEC90 B14A

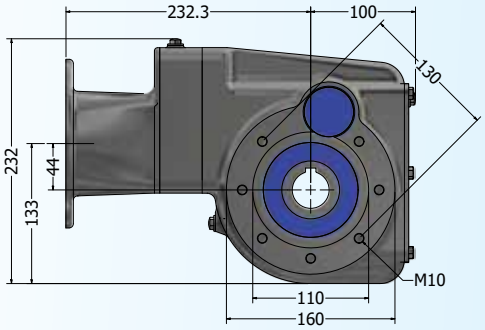


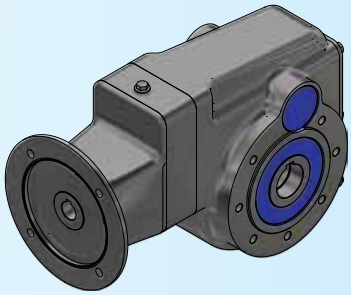




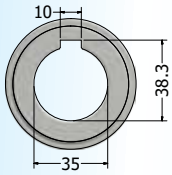
FK 58C IEC100 B14A

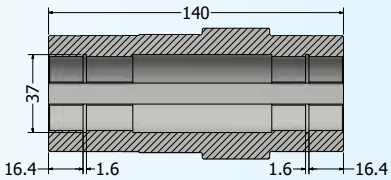






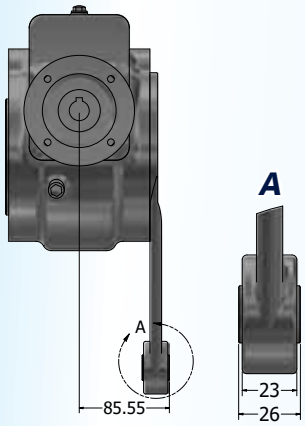
Hollow Shaft Dimensions HA35

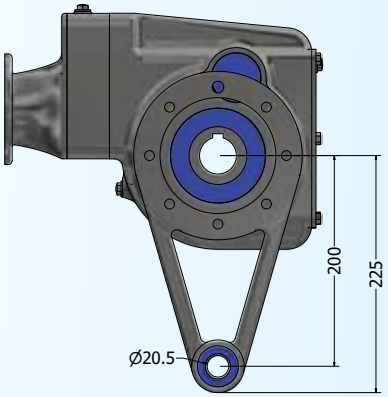


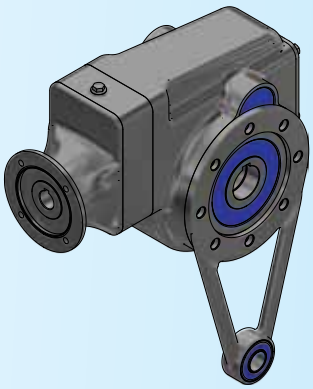


The standard hollow shaft diameter for a FK58C is 35mm
Different hollow shaft diameters on request

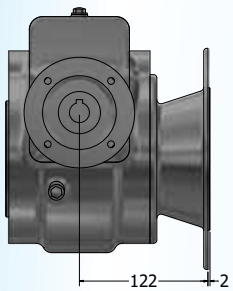
Torque Arm SS130 MS

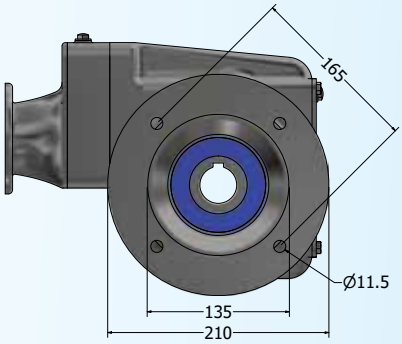


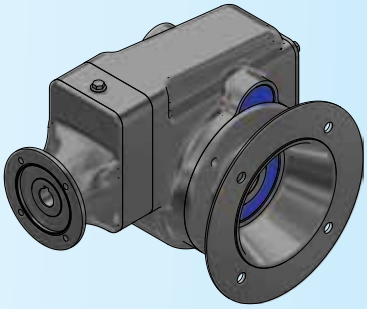




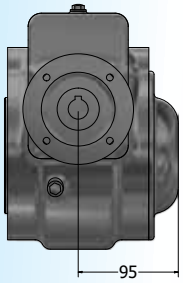
Output Flange SS130 FL250

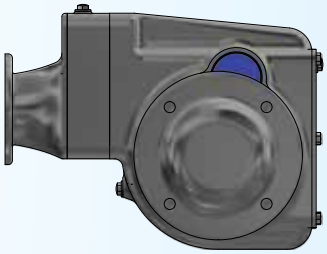


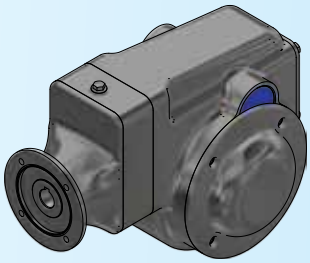




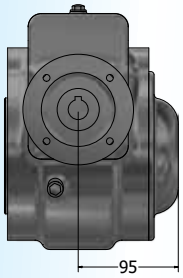
Closed Safety Cap SS130 CC

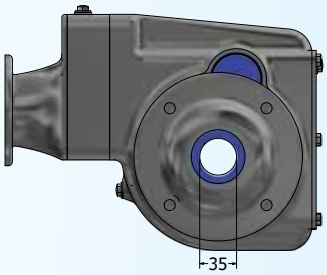


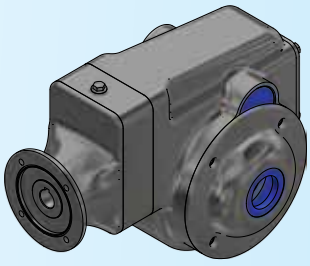




Open Safety Cap SS130 CO35

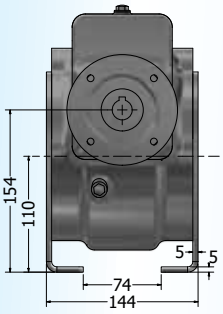


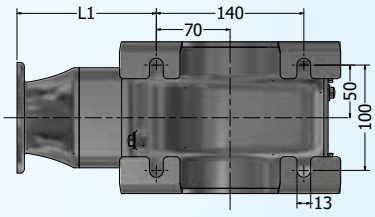


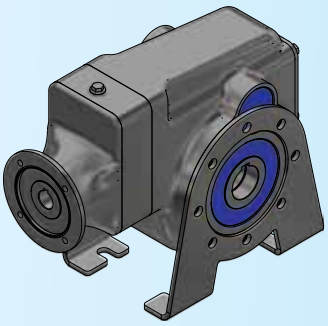


The standard shaft diameter for a SS130 CO is 35mm
Different diameters on request

Mounting Feet SS 130 VP (mounted inwards)

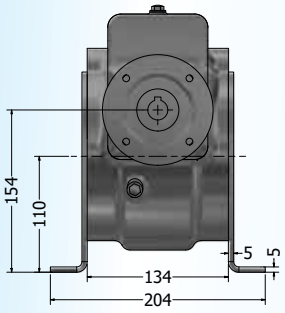


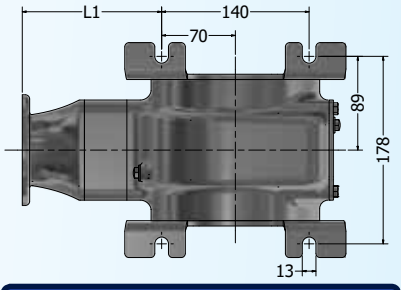


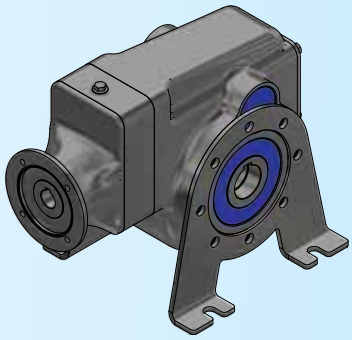


L1			
IEC63	*125.3 mm*	**IEC90**	*152.3 mm*
IEC71	*132.3 mm*	**IEC 100**	*162.3 mm*
IEC80	*152.3 mm*		

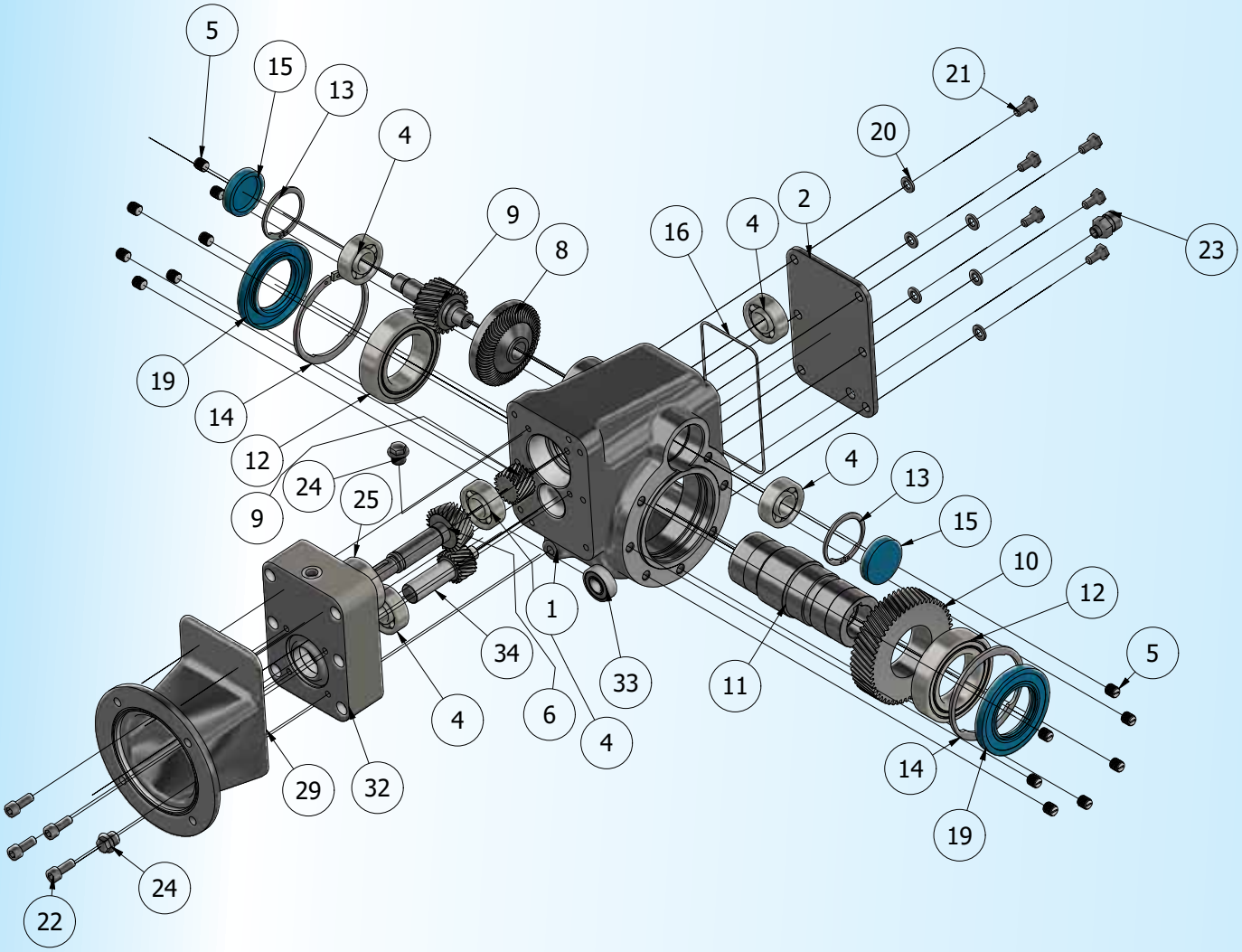
Mounting Feet SS 130 VP (mounted outwards)





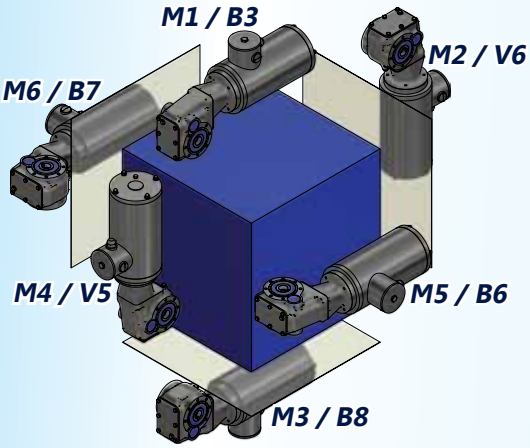


L1			
IEC63	*125.3 mm*	**IEC90**	*152.3 mm*
IEC71	*132.3 mm*	**IEC 100**	*162.3 mm*
IEC80	*152.3 mm*		

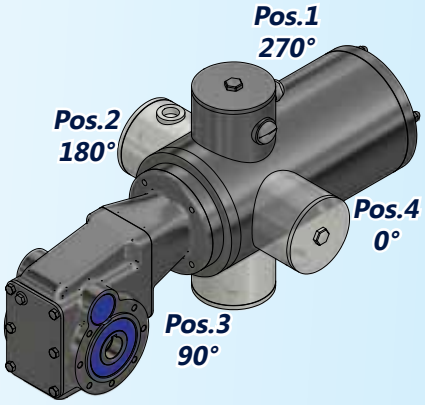


1	*Casing*	**8**	*Distance Ring*	**15**	*Blind plug*
2	*Cover*	**9**	*Bearing*	**16**	*Bolt*
3	*Input Flange*	**10**	*Oil Seal*	**17**	*O-Ring*
4	*Oil Seal*	**11**	*Worm Shaft*	**18**	*Treadhole plug*
5	*Hollow Shaft*	**12**	*Worm Wheel*	**19**	*Circlip*
6	*Bearing*	**13**	*Bolt*	**20**	*Shim*
7	*Bearing*	**14**	*Ring*	**21**	*O-ring*

Mounting Positions



Terminal Box Positions



Lubrication Quantity

Oil Quantity in ML.	Mounting Position					
Gearbox	M1 (B3)	M3 (B8)	M6 (B7)	M5 (B6)	M4 (V5)	M2 (V6)
FK 28 B/C	210	150	150	180	210	130
FK 38 B/C	350	250	280	350	450	280
FK 48 B/C	850	500	550	700	950	550
FK 58 B/C	1500	800	900	1250	1600	1100
Pre stage						
FK 28 / 38 PG	110	110	110	110	110	110
FK 48 / 58 PG	180	180	180	180	180	180

Lubrication Type

Gearbox	Oil Type	Temp. Range
FK 28 B/C FK 38 B/C FK 48 B/C FK 58 B/C	Matrix Foodmax 460	-20˚C ~ +40˚C
	Castrol Optileb GT 460	-20˚C ~ +40˚C
	Bechem Berusynth 460 H1	-20˚C ~ +40˚C
	Shell Casida Fluid GL460	-20˚C ~ +40˚C
	Mobil SHC Cibus 460	-20˚C ~ +40˚C

Weight

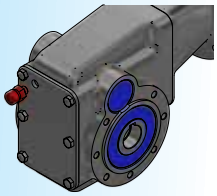
Gearbox	Weight	Gearbox	Weight
FK 28 B	7.0 Kg.	FK 28 C	8.5 Kg.
FK 38 B	9.5 Kg.	FK 38 C	11 Kg.
FK 48 B	15.5 Kg.	FK 48 C	17.5 Kg.
FK 58 B	20 Kg.	FK 58 C	21.5 Kg.

Maintenance

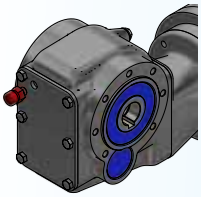
For maintenance instructions
please see our maintenance manual on page .....

Positioning of the debreather

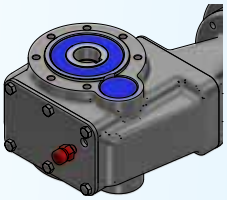
M1 / B3



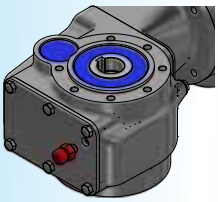
M3 / B8



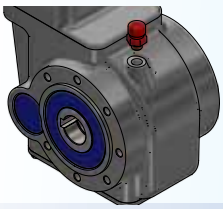
M5 / B6



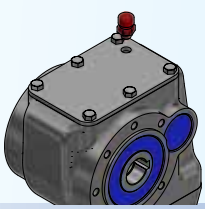
M6 / B7



M4 / V5

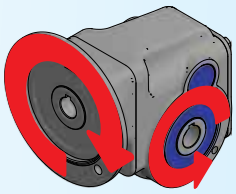


M2 / V6



Preferred direction of rotation

FK..B



FK..C