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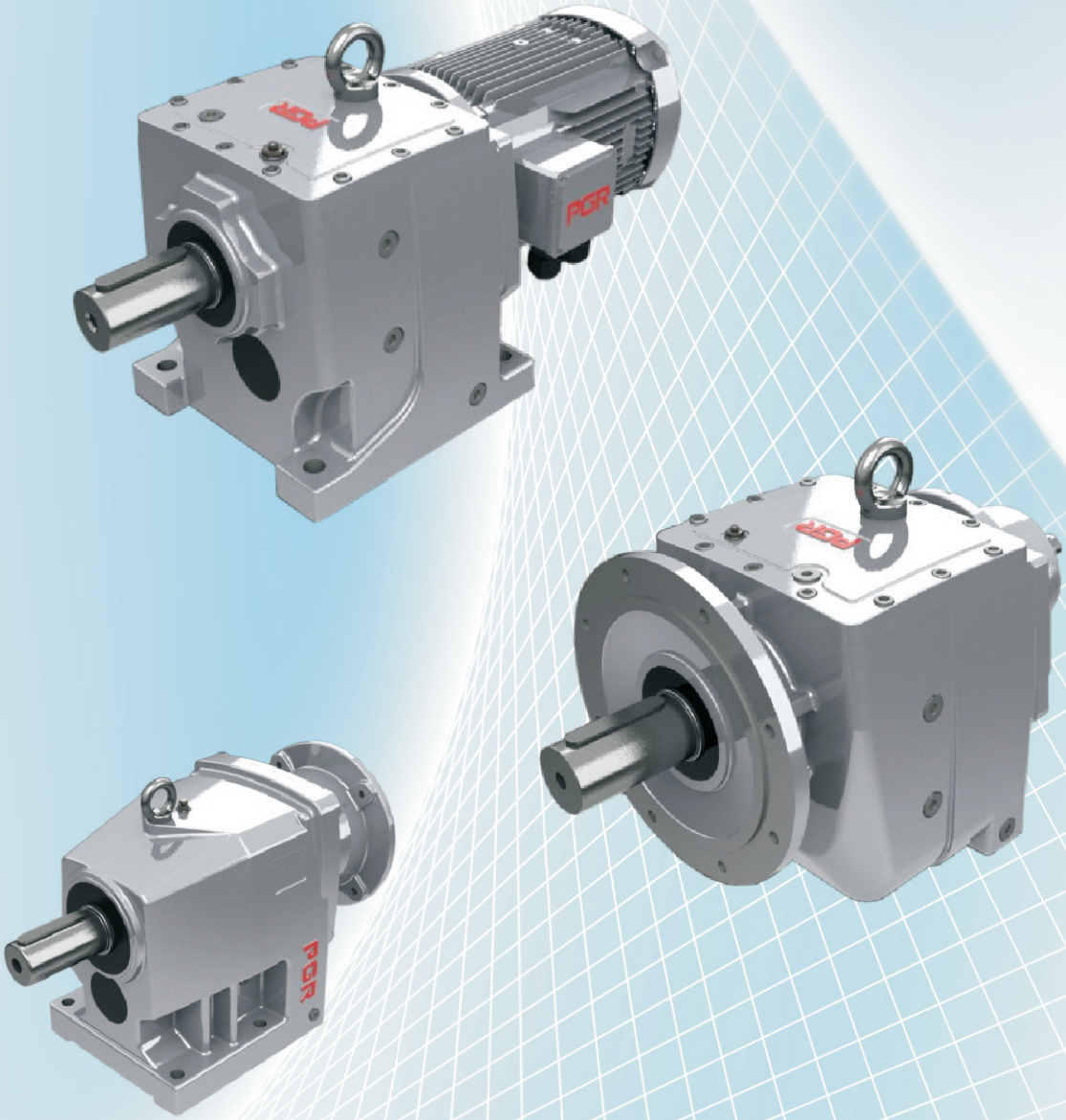
PGR®
Drive Technologies



PA\PF

Serisi
Series

HELİSEL DİŞLİLİ REDÜKTÖR
HELICAL GEAR UNITS

K.No: PA\PF 02/2011


PGR®
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İÇİNDEKİLER
CONTENTS

Redüktörleri oluşturan tüm parçaları modern CNC tezgahlarında ve yatay işleme merkezlerinde imal eden Polat Group Redüktör Ar-Ge çalışmalarına devam etmektedir. PGR, dişlilerin profil taşlamasından sonraki işlem olan HONLAMA yöntemini seçerek, üretimin her kademesinde işlem kontrolü yapmaktadır. Polat Group Redüktör, helis dişlilerde TEKİL GÖVDE kavramını Türkiye'de ilk uygulayan şirkettir. Buna ek olarak P serisinden farklı olarak helis dişlili, tekil gövdeli (ayaklı, flanşlı, ara milli ve çıkış milli) PA,PF, PD, PM serisi ve helisel konik dişlili PKD serisi redüktörlerin tasarım ve üretim işleri büyük bir özenle tamamlanarak seri üretime geçildi. Rulman, dişli ve mil hesapları DIN 3990 Niemann esasına dayalı profesyonel programa (HEXAGON) göre yapıldı. Tüm dişli ünitelerine sementasyon ve normalizasyon ısıl işlemleri uygulanmaktadır. Helis grubunda tekil gövdeler döküldükten sonra doğal şartlar altında (yağmur, sıcak ve soğuk doğa şartları) asgari 5 ay bekletilmekte, gövdeler son şekillerini almakta ve tüm yüzeyler yatay işleme merkezinde aynı anda işlenmektedir. Polat Group Redüktör ayrıca SİKLOİD REDÜKTÖR üzerindeki Ar-Ge çalışmalarına devam etmektedir. Polat Group Redüktör en üst teknolojilerle çalışarak ve Türkiye pazarındaki konumunu koruyarak, yeni ürünler ile ilgili etkinliklerine devam etmektedir.

Polat Group Redüktör, starting it's trial production work all the forming reducer on modern CNC machine tools and horizontal machining centers. The company makes process controls in every stages of the production by choosing the HONING METHOD which comes after profile grinding in gears. Polat Group Redüktör is the first company that applies the consept of single body in helical gears in Turkey. Additionally, as being separately from P series, the design and production works of PA,PF, PD, PM, series and helical bevel gear reductors with helical gear, single body (foot, flange, gap solid shaft and solid shaft out) had been completed with great care and started series production. Bearing, gear and shaft calculations are made according to professional softwares (HEXAGON) based on DIN 3990 and Niemann basics. Carburizing and normalization heat treatment are applied to all the gear units. In helical group, single bodies are left in the natural conditions (rain, hot & cold natural conditions) for a minimum period 5 months after casting and the bodies get their final shapes and then all the surface are treated on horizontal machining center at once at the same. Polat Group Redüktör also continues it's R&D activities on CYCLOIDAL GEARBOX. Polat Group Redüktör continues it's investments for new productions with the aim of high technology and maintaining it's positions on the Turkish Market.

KALİTE POLİTİKAMIZ

POLAT GROUP REDÜKTÖR A.Ş. ürünlerinin kalitesinde en iyiyi yakalamak için; sektöründeki teknolojik gelişmeleri takip etmeyi, pazar payındaki istikrarını sürdürmek için müşterilerinin istek ve beklentilerine eksiksiz ve zamanında cevap vererek, sürekli artan müşteri memnuniyetini sağlamayı, eğitimli çalışanlarının performansını huzurlu bir çalışma ortamı sağlayarak arttırmayı ve bu şekilde kalite yönetim sistemini sürekli iyileştirmeyi kalite politikası olarak benimsemiştir.

OUR QUALITY POLICY

To achieve the best quality of its products, POLAT GROUP REDÜKTÖR A.Ş. adopts with its own quality politics by following the technological developments of its sector, in order to keep up the stabilization on its own market share ensuring the customers' gladness increasing permanently by answering the customers' wishes and expectations completely at the right time, to have the well-educated staffs increase their performance by providing a peaceful working place and making better the quality management system all the time.

VİZYONUMUZ

Müşteri ve çalışan memnuniyetini en üst düzeyde tutan, gelişmeleri izleyen değil yaratan bir dünya şirketi olmaktır.

OUR VISION

Our vision is to become a world company which keeps the customer satisfaction at the top level and which does not only follow the developments but also creates the developments itself.

MİSYONUMUZ

Müşterilerimizin ihtiyaçlarını karşılayacak çözümleri bilgi teknolojilerini kullanarak en verimli ve kaliteli şekilde sunmaktır.

Polat Group Redüktör olarak birçok farklı ürün yelpazesi ile, müşteri ihtiyacını maksimum seviyede karşılamak için eş zamanlı mühendislik yöntemlerini kullanarak çalışmalarını sürdürmektedir. Tasarım faaliyetleri, ürün geliştirme programları ve bilgisayar destekli çalışmalarımız sürekli gelişen bir grafik çizmektedir. Rekabetçi ve güçlü kalite politikamız müşteri yelpazemizi genişletmektedir.

OUR MISSION

Our mission is to provide the solutions to our customers in most efficient and qualified way by make use of the information technologies.

Our reducer group carries out is works using simultaneous engineering methods in order to meet the demands of our customers by presenting several different product ranges. Promotion activities, product development programmes and computer supporting work show a continuously growing chart. Our competitive and strong quality policy is to develop our customer spectrum.

Teknik Açıklamalar

Dişli Ünitesini Seçme

Bir dişli ünitesini seçerken PGR üç fazlı asenkron AC motorlarını veya tek fazlı AC motorları koşul olarak gerektirir ve teknik olarak kıyaslanabilen motorlar için de geçerlidir. Başka motorlar kullanırken, lütfen PGR'e danışınız. Bir dişli ünitesini seçme ile ilgili aşağıdaki önemli ana esaslara bağlı kalınmazsa, aşırı bir yük durumunun olması muhtemeldir. Bu durumda, tüm garantiler geçersizdir. Şüpheli durumda, lütfen dişli ünitesi tasarımını kontrol etmek için birlikte çalışabileceğiniz teknik bilgilerden sorumlu PGR satış ofisi ile irtibata geçiniz. Karşılıklı çıkarlarımız açısından, dişli ünitelerinde aşırı yüklemenin neden olduğu tüm problemler her durumda önlenmelidir.

Kriter

Seçme kriteri aşağıdakilerden oluşur:

1. Termal olarak transfer edilebilen güç (termal sınır)

Dişli ünitesinin aşırı ısınmaması için, bu güç transferi (3 saat) daha uzun bir çalışma zamanını aşmamalıdır. Termal olarak transfer edilebilen güç sadece PA\PF 62, PD\PM 62 ve daha büyük (iki kademeli dişli üniteleri için) gövdeler ve PA\PF 73, PDM 73, PKD 6390 - 7390 ve daha büyük gövdeler (üç kademeli dişli üniteleri için) için olası bir sınırı gösterir. Aşağıdaki maddelerden iki veya daha fazlasının geçerli olması durumunda çalışma durumunu kontrol ediniz.

- Ortam sıcaklığı > 40 °C
- Dönme hızı n_1 > 1500 min^{-1}
- Motor gücü P_1 > 100 kW
- W kovanlı ve IEC adaptörlü redüktörler
- Dik olarak montajı yapılan redüktörler (sayfa 29-30)
- Tahvil oranı i_{top} < 20 (Polat konik dişlili için i_{top} < 40)

2. Mekanik olarak transfer edilebilen güç "P"

Bu güç, katalogdaki ilgili tablodaki servis faktörü f_B tarafından göz önüne alınır. Bir sonraki bölüm ,gerekli servis faktörünün saptanmasını tanımlar.

Genel olarak, dişli ünitesi ekleme, ısı radyasyonu,dar yer vs gibi özel montaj koşulları olduğunda bize danışınız. Özel ölçüler (veya su soğutucusu) termal aşırı yüküne karşı var olduğunda; lütfen PGR'e danışınız.

Giriş gücü ve servis faktörü

Her bir uygulama için gerekli giriş gücü, hesaplama ile saptanır. Motor anma gücü (P_1) , bu giriş gücünden sonra seçilir. Normal olarak, belirli uygulama özel çalıştırma koşullarına ait güvenlik faktörleri gözleneceği, ve anma motor çıkış seviyeleri genellikle standart çıkış seviyesi aralığında olduğu için motorun anma gücü istenilen güçten biraz daha yüksektir.

Montajı yapılacak 3 fazlı bir AC motorun anma gücünü seçerken kısa dönem ve seyrek tork tesirini göz önüne almak gerekmez. Bir frekans inventörü üzerindeki 3 fazlı bir AC motor çalıştırırken ilave faktörler anma çıkış gücünün seçimini etkiler. Motorun aksine, kısa dönem ve seyrek tork tesiri önemli derecede dişli ünitesinin seçimini etkiler. Dişli ünitesi servis faktörü f_B bu kısa dönem ve seyrek tork tesirini ve ayrıca yeterli doğrulukla dişli ünitesi üzerinde etkileri göz önüne alır.

4. sayfadaki **diyagram 1** çalışma saatine veya güne bağlı olarak yük sınflandırması, devir ve minimum servis faktörü arasındaki ilişkiyi sunmaktadır.

Explanatory Notes

Selecting of Gear Unit

Gear unit selection includes PGR's three-phase AC motor or single phase AC motor and technically equal different motor could be applied. When you apply different motor please contact with PGR. There are some condition for selecting gear unit and these condition must be considered overloading could be effected badly if restirictions are not considered. In these situation, all guarantees could be invalidated. Under suspecious situation please refer to PGR sales office department which is responsible for giving technical information to you.

Conditions

Conditions of selecting gear unit;

1. Thermal Limit

Thermal transfer power should not be exceeded over running time (3 hours) for prevent overheated gear unit. In larger gear unit size this condition is important and units have thermal limit for instance PA\PF 62 and greater unit size, PA\PF 73, PD\PM 73, PKD 6390-7390. For these problems, you must check ambient and some other conditions which are explained below. Any suspicion please contact with PGR.

- Ambient temperature > 40 °C
- Rotational speed n_1 > 1500 min^{-1}
- Input power P_1 > 100 kW
- With W-cylinder and IEC adapter gear units
- Vertical mounting position (see page 29-30)
- Reduction ratio i_{top} < 20 (for helical-bevel gear units I_{top} < 40)

2. Power transfer with service factor f_B

Service factor f_B is important for power transfer, determination of minium service factor will be given at following information.

For every operating conditions; eg. heat radiation in bounded field (place) which is required special devices (oil cooler or water cooler) for that reason please contact with PGR.

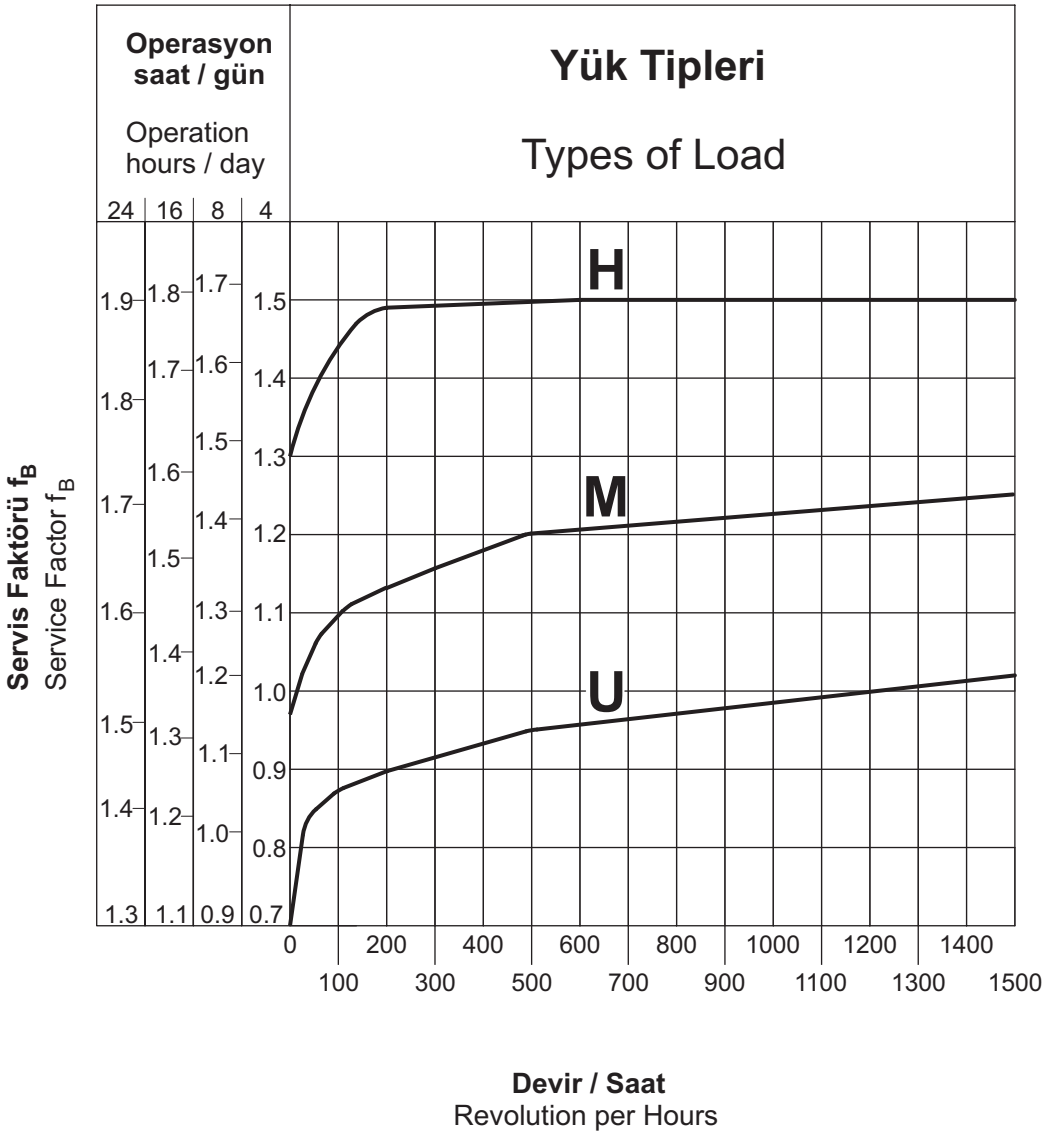
Input power and service factor

For every application requiring input power could be detected or determined by calculation. After determination input power, rated motor power (P_1) is defined. Motor power is greater than require input power due to safety factor is used according to operating conditions.

Selecting a motor type is important for right calculation for instance; three phase AC motor which is mounted to gear unit, affecting infrequent torque could not be considered but if you mount three-phase AC motor on frequency inverter latest available factor effects the output power. Besides of motor type short and infrequent torque impression effects selecting gear unit for that service factor is considered.

Diagram 1 which is shown on page 4, presents relation between types of load, revolution per hour and minimum service factor depend on operation hours or day.

Diyagram - 1



Diyagram 1, günlük çalışma zamanına bağlı gerekli minimum servis faktörü $f_{B\,min}$, 'Z' saatteki çevrimleri, ve uygulama yükü sınıflandırması 'U', 'M', 'H' gösterir. Çalışma düzgünlüğüne ve kütle hız faktörüne bağlı olarak, üç yük sınıflandırması belirlenmiştir. Hareket ettiren makineden gelen etkiler çalışma düzgünlüğü sınıflandırmasında tanımlanırken, kütle hız faktörü en fazla olan yük üzerinde etkili olur.

Not : Elde edilen servis faktörü f_B kullanılan sürücü (tahrik) tipine göre "k" katsayısı ile çarpılır.

k = 1 ; elektrik motoru veya hidromotor,
k = 1.25 ; çok silindirli içten yanmalı motor,
k = 1.50 ; tek silindirli içten yanmalı motor

Diagram 1 shows requiring minimum service factor depend on revolution per hours 'Z' and types of load 'U', 'M' or 'H'. In following information mass acceleration factor will be explained how it effects to or relation between load classification. Forces or loads which are applied from driven machine to gear unit while determine load classification, mass acceleration factor is played important role on the high load classification which is designated with 'H' sign.

Note : Service factor f_B which is acquired from diagram should be modified with factor "k" that, depends on driver type.

k = 1 ; hydraulic motor and electrical motor
k = 1.25 ; multi-cylinder engine
k = 1.50 ; single-cylinder engine

Dişli Ünitesini Seçme

Bir çalışmanın sınıflandırılması :

a) Düzgün çalışma

Küçük karıştırıcılar, asansörler, konveyörler, montaj bantları, doldurma makinaları, bantlı konveyörler, temizleme makinaları, fanlar, test makinaları.

b) Yumuşak şoklar, düzgün olmayan çalışma

Ağır konveyör bantları, değirmenler, ahır gübre makinaları, vinç hareketli mekanizmalar, bükme makinaları, çimento karıştırıcılar, dişli makinaları, ahşap işleme makinaları için sürücüler, vinçler, kayar kapılar, dengeleme makinaları.

c) Ağır şoklar, aşırı düzgün olmayan çalışma

Taş kırıcılar, eksantrik presler, doğrayıcılar, presler, taşlama milleri, çekiçli kırıcılar, kağıt öğütücüler, ağır karıştırıcılar, delme makinaları, katlama makinaları, dönen tezgahlar, yatay karıştırıcılar, kesiciler, vibratörler, santrifüj makinaları, döner tablalar.

Yük sınıflandırması, çalışma düzgünlüğünden ve aşağıdaki tabloya göre kütle hız faktörü ‘ m_{af} ‘ den belirlenir. Burada, çalışma veya kütle hız faktöründen gelen daha yüksek sınıf yük sınıflandırmasında geçerlidir. (Örnek: aşırı düzgün olmayan çalışma ve m_{af} = 2,8 gibi durumda yük sınıfı ‘H’ olarak belirlenir.

Yük Sınıfı	Çalışma	Kütle hız faktörü
U	Düzgün çalışma	$m_{af} \leq 0.25$
M	Düzgün olmayan çalışma	$0.25 < m_{af} \leq 3$
H	Aşırı düzgün olmayan çalışma	$3 < m_{af} \leq 10$

Selecting a Gear Unit

Operation classification;

a) Uniform application

Small agitators, elevators, conveyors, assembly belts,filling machines, conveyor belts, cleaning machines, fans, testing machines.

b) Moderate shocks, non-uniform application

Heavy conveyors belts, mills, stall dunging machines, crane traveling mechanisms, bending machines, cement mixers, gear pumps, decoilers, tapping units, packaging machines, feed drives for wood processing machines, hoists, winches sliding doors, balancing machines.

c) Heavy shocks, extreme non-uniform application

Stone crusher, eccentric presses, choppers, presses, grinding mills, hammer mills, shredders, heavy mixers, punching machines, folding machines, rolling stands, tumbling barrels, shears, vibrators, centrifuges, roller tables.

Load classification is obtained from operation class and mass acceleration factor (m_{af}). For this reason in any situation which factor is greater than other you must take for calculation. (Eg; heavy - shock and m_{af} = 2,8 load classification must be ‘H’ .)

Load Classification	Operation	Mass Acceleration Factor
U	Uniform application	$m_{af} \leq 0.25$
M	Non-uniform application	$0.25 < m_{af} \leq 3$
H	Extreme non-uniform application	$3 < m_{af} \leq 10$

$$m_{af} = \frac{J_{ex.red}}{J_{mot}} = \frac{J_{ex}}{J_{mot}} \times \left(\frac{1}{i_{ges}}\right)^2$$

i_{ges} = Toplam dişli ünitesi oranı
$J_{ex.red}$ = Hareket motoru üzerindeki azaltılmış tüm dış kütle atalet momenti
J_{ex} = Tüm dış kütle atalet momenti
J_{mot} = Motorun kütle atalet momenti

Kütle hız faktörü m_{af}, çıkış tarafındaki dış kütleler ile giriş tarafındaki yüksek hız kütlelerin arasındaki ilişkiyi gösterir.Kütle hız faktörü, başlatma ve frenleme işlemlerine ve titreşime göre dişli ünitesindeki tork tesir seviyesini önemli derecede etkiler. Örneğin; bantlı konveyör sistemlerinde dış kütle atalet momenti taşınan ürün kadar yük uygular. m_{af} > 10 ise, transfer elemanlarında büyük bir oynama,yük sınıflamasında belirsizlik varsa veya şüphedeyseniz, PGR'e danışınız.

Servis faktörü f_B , maksimum dişli ünitesi çıkış momenti M_{amax} ile montajlanmış motor gücü P_1 , çıkış hızı n_2 ve dişli ünitesi verimi (η) sonucu ortaya çıkan momenti M_a arasındaki ilişkidir.

i_{ges} = Total gear unit ratio
$J_{ex.red}$ = All external mass moment of inertia on the drive motor, reduced
J_{ex} = All external mass moment of inertia
J_{mot} = Mass moment of inertia of the motors

Technically mass acceleration factor m_{af} mass different between external output-side and high speed input-side. m_{af} is played important role at the level of torque propulsive in the gear unit. It is mostly effected at start-up, braking operation and vibration. Please contact with PGR where m_{af} is greater than 10 and large play in transfer elements and vibration in the system.

Calculation of service factor is illuminated below. It depends on maximum output moment of gear unit and the output moment which is calculated from motor power, rotation speed and efficiency.

$$M_2 = \frac{9550.\ P1.\ \eta\ [\ Nm\ ]}{n_2} \quad ,P1\ \ [\ kW\ ],\ n_2\ \ [\ min^{-1}\ ]$$

$$f_B = \frac{M_{amax}}{M_2}$$

$$P_1 = \frac{M_2 \cdot n_2}{\eta\ 9550}\ [\,kW\,],\ M_2\ [\,Nm\,],\ n_2\ [\,min^{-1}\,]$$

Dişli ünitesini doğru şekilde seçtiğinizde, çıkış ve hız genel açıklamalarından alınan servis faktörü f_B, diyagram 1'e göre minimum servis faktörü $f_{B\,min}$'den büyük veya eşittir.

If the selecting gear unit is right, service factor which is taken from selection of gear motors table, must be greater than minimum service factor $f_{B\,min}$ which is taken from diagram-1 (see page 4) according to types of load.

$$f_B \geq f_{Bmin}$$

Helisel, parallel mil ve helisel konik dişli ünitelerinde herbir kademe için çok yüksek bir seviyede verimlilik vardır (herbir kademe için yaklaşık %98 veya η = 0,98). Bu yüzden hesaplamalarda verim η =1,0 alınması yeterli doğru sonuçlara ulaşılmasına yardımcı olur. Helisel sonsuz dişliler ile ilgili dişli ünitesi verimliliği, herbir çıkış hızı n_2'ye ait çıkış ve diş oran tablolarında listelenmiştir. W kovanı montajlı (serbest hareket mili) redüktörde çıkış gücü aşağıdaki formülden hesaplanır.

Efficiency is approximately 98 % at helical, helical bevel parallel shaft gear units. For that reason efficiency could be taken η = 1 it shows that efficiency does not effect the calculation. But, for helical worm gear efficiency is given at table which is depended on output speed and gear ratio.

With W cylinder (free drive shafts) ;

$$P_1 = \frac{M_{amax} \cdot n_2}{9550.\ f_{Bmin} \cdot \eta}\ [\,kW\,],\ M_{amax}\ [\,Nm\,],\ n_2\ [\,min^{-1}\,]$$

Burada, azami hareket gücü P_{1max} aşılamaz.

Value which calculated from equation P_1, must be less than $P_{1\,max}$ which is taken from the selection of W cylinder tables.

$$P_1 \leq P_{1max}$$

W ve IEC tipi redüktörler için performans tablosunda herbir çıkış devri n_2, maksimum çıkış momenti $M_{amax.}$, maksimum motor gücü $P_{1max.}$ listelenmiştir.

$P_{1\,max}$ is shown at performance table for W cylinder (with free input shaft) and IEC adapter.

Hareketli tarafa fren bağlandığında,(frenli motorlar gibi) fren momenti de bir dişli ünitesini seçmede göz önüne alınmalıdır. Gezinti hareketleri, çember dişliler, döner tablalar, kapı hareketleri, karıştırıcılar ve yüzey havalandırıcı ile ilgili uygulamalarda sıkça karşılaşılan yüksek dış kütle atalet momentli (m_{af} > 2) kullanımlarda frenleme momentinin, seçilen anma momentinin 1,2 katını aşmamasını öneririz. Daha yüksek frenleme torkları kullanılacaksa, bu durum dişli ünitesini seçerken göz önünde bulundurulmalıdır. Lütfen PGR'e danışınız.

However in selecting gear units brake can be equipped optionally and it is attached to the shaft or solid. It must be considered because of break torque. Application which have high external mass moment of inertia such as m_{af} > 2. We suggest break torque does not overrun 1,2 times motor torque.

Radyal ve Eksenel Kuvvetler

Çıkış momenti ve hız genel açıklamalarındaki tablolarda, çıkış mili üzerine izin verilen radyal kuvvetler F_R ve eksenel kuvvetler F_A listelenmiştir.Tercihen güçlendirilmiş çıkış mili yatakları bir çok dişli ünitesi tipi için geçerlidir. Güçlendirilmiş yataklardaki radyal ve eksenel kuvvetler tablolarda $F_{R\,GR}$ve $F_{A\,GR}$ olarak belirtilmiştir. Listelenen radyal ve eksenel kuvvetler, mil çıkışlı ayak ve flanş bağlantılı dişli üniteleri için uygulanır. Radyal ve eksenel kuvvetler, bu kuvvetlerden biri 0 (sıfır)'a eşit iken hesaplanmıştır.

Ayrıca, radyal ve eksenel kuvvetlere ait bir servis faktörü f_B = 1 çıkış gücü ve devir açıklamalı genel tablolarda verilen kuvvetlerin temeline dayanır. Darbeli tipli kuvvetlerin olduğu ve aşırı çalışmalı (> 8 saat/gün) uygulamalarda uygun servis faktörü f_B > 1 radyal ve eksenel kuvvetler için de gözönünde bulundurulmalıdır. İzin verilen kuvvetler F_A ve F_R belirli oranda azaltılır.

Axial and Radial Forces

Permissible forces on the output shaft are given at the selection of gear motor. F_R represents radial load and F_A represents axial load. $F_{R\,GR}$ and $F_{A\,GR}$ represents permissible load with reinforced bearings. This values are calculated when one of them is equal to zero.

In selection of gear motor tables service factor is given with permissible axial and radial load but it must be considered when operating times is greater than 8 hours and service factor must be greater than 1 for that reason permissible radial and axial loads are reduced.

Listelenen radyal kuvvetler, milin ucunun orta kısmında etki eden bir kuvvete karşılık gelir.İzin verilen kuvvetleri saptarken, uygulanan kuvvetin hiç istenmeyen yönü ve dönme yönü varsayıldı. Tam bir hesaplama için, daha yüksek radyal ve eksenel kuvvetler muhtemeldir bu yüzden lütfen bize istenen servis süresinin yanısıra gerçek güç ve dönme yönünün detaylarını da belirtiniz.

Transfer elemanları, çıkış miline eklenirse, ilgili faktör f_z radyal kuvveti saptamada göz önüne alınmalıdır.

fz için Tablo

Transfer Elemanları	Faktör fz	Açıklama
Dişliler	1.1	z ≤ 17 diş
Zincir Dişliler	1.4	z ≤ 13 diş
Zincir Dişliler	1.2	z ≤ 20 diş
Dar V-Kayış Makaralar	1.7	ön gerilim kuvveti
Düz kayış Makaralar	2.5	

Mil üzerinde ortaya çıkan radyal kuvvet, aşağıdaki formül kullanılarak hesaplanmıştır.

Axial and radial forces are calculated where force acting on the middle of the shaft end see page 34-36. Direction of rotation is played important role in calculation. For that reason this forces are calculated and result's value is found from forces to the shaft worse. Hence, please explain details in your orders.

For belt-pulleys operations or any other motion transfer applications f_z factor must be considered while calculating radial and axial load.

fz values are shown at table.

Transfer Elements	Factor fz	Notice
Gears	1.1	z ≤ 17 diş
Sprockets	1.4	z ≤ 13 diş
Sprockets	1.2	z ≤ 20 diş
Narrow V-belt pulleys	1.7	by
Flat belt pulleys	2.5	Pre-Tensionnig

Radial load is determined with following equation;

$$F_{Rvorth} = \frac{2 \cdot M_2}{d_o} f_z \leq F_R$$

M_2 : Dişli ünitesi çıkış momenti [kN]
f_z : Tablodan alınan katsayı
d_0 : Etkili daire çapı [mm]
F_R : Devir ve çıkış gücü tablolarından alınan müsaade edilebilir radyal kuvvet [kN]
$F_{R\,vorth}$: Mil üzerindeki radyal kuvvet [kN]

Kuvvet mil ortasına uygulanmazsa, herhangi bir 'X' noktasında izin verilen radyal kuvvet **formül I ve II** kullanılarak hesaplanır.

M_2 : Output torque of gear unit [kN]
f_z : Factor which is taken from table
d_0 : Effective circular diameter [mm]
F_R : Permitted radial forcewhich is taken from the speed and output moment tables. [kN]
$F_{R\,vorth}$: Radial force on the gear unit shaft [kN]

Equation which is determined above is used for when force is not acting on the middle of shaft at other situations following equation is applied.

Formül / Equation - I

$$F_{RXL} = F_R \cdot \frac{z}{y + x}$$

Formül / Equation - II

$$F_{RXW} = \frac{c}{(f + x) \cdot 1000}$$

X mil bileziğinden kuvvet uygulama noktasına olan uzaklık [mm]
X noktası - mil kararlılığı

F_{RXW} izin verilen radyal yük [kN]

F_R hız ve çıkış tabloları ve milin ortasına uygulanan kuvvetten alınan radyal kuvvet [kN]
X Noktası - yatak servis ömrü

F_{RXL} izin verilenradyal yük [kN]

c
C_{GR}
f
y
z

34-36

X distance from the shaft collar to the point of force application [mm]
point X - shaft stability

F_{RXW} permitted overhung force [kN]

F_R overhung force from the speed and output tables, force applied at shaft middle [kN]
point X - bearing service life

F_{RXL} permitted overhung load [kN]

[Nmm]
[mm]
[mm]
[mm]

Belirtilmedir ki, hesaplamalarda **formül I** yatak servis ömrünü , **formül II** ise mil kararlılığını hesaplamada kullanılır. Hesaplamalar sonucunda küçük değer dikkate alınmalıdır.

Notify that, **equation I** and **equation II** are applied for calculating radial load where **equation I** is used for sevice life and **equation II** is used for shaft stability. But small result must be considered.

f_B	= Servis Faktörü (Mamax / Ma)	f_B	= Service factor (Mamax / Ma)
F_A	= Çıkış tarafındaki müsaade edilebilir eksenel yük [kN]	F_A	= Permissible thrust load at the output side [kN]
F_R	= Çıkış tarafındaki, milin orta noktasına etkiyen müsaade edilebilir radyal yük [kN]	F_R	= Permissible overhung load at the output side, force acting at the shaft's midpoint [kN]
F_D	= Reaksiyon yükü [kN]	F_D	= Reaction [kN]
i_{toplam}	= Dişli ünitesindeki toplam tahvil oranı	i_{total}	= Gear units total ratio
i_{ges}	= Tahvil oranı	i_{ges}	= Reduction ratio
M_2	= Çıkış momenti [Nm]	M_2	= Output torque [Nm]
M_{amax}	= Müsaade edilebilir maksimum çıkış momenti [Nm]	M_{amax}	= Max. permissible output torque [Nm]
n_2	= Çıkış hızı [d/dk]	n_2	= Output speed [min^{-1}]
P_e	= Mamax referans alınarak hesaplanan güç [kW]	P_e	= Calculated power [kW] with reference to Mamax
P_n	= Motor güç oranı [kW]	P_n	= Rated power of motor [kW]
η	= Verim [%]	η	= Efficiency [%]
kg	= Redüktörün ağırlığı	kg	= Weight of the geared motor

1) 4 ve 5 kademeli redüktörlerin 0,75 kW' a kadar 4 kutuplu olan motorlarında kayıp yaklaşık 40 W olarak hesaplanmıştır. Kayıp, motor hızına bağlı olarak o oranda değişir.

1) Gear units or gear motors which have 4 and 5 stage reduction 4 pole motor up to 0,75 kW losses are calculated nearly 40 W, losses are dependent motor speed.

POLAT HELİSEL DİŞLİLİ REDÜKTÖR (PA\PF)
POLAT HELICAL GEARED MOTOR (PA\PF)

2 ve 3 kademeli helisel tip redüktörler (PA/PF 62-63'den PA\PF 102-103'e) motor ve çıkış miline eşmerkezli olarak montaj edilmiştir. PA\PF 02 'den 52 'ye kadar 2 kademeli redüktörlerimiz mevcuttur. PA\PF 02 'den PA/PF 52 'ye kadar olan 2 kademeli redüktörlerimiz daha yüksek tahvil oranlarında gövde dayanımını arttırarak 3 kademeli olarak üretilebilmektedir. Bu 3 kademeli redüktörler PA\PF 03 - PA\PF 53 adı altında dizayn edilmiştir.PA\PF 62/63 ve üzeri boyutlardaki helisel dişlili redüktörler aynı gövde içerisinde 2 veya 3 kademeli redüktörler haline getirilebilirler. Yüksek tahvil oranlar için 4, 5 ve 6 kademeli helisel dişlili redüktörlerimiz de mevcuttur. Helisel dişlili redüktörlerin ayaklı ve flanşlı versiyonları bulunmaktadır. Flanşlı helisel tip redüktörlerde flanş gövdeyle bir döküm olduğundan dolayı flanş ile gövde arasında herhangi bir bağlantı civatası mevcut değildir. 0,12 - 160 Kw ' dan 26000 Nm ' ye kadar çıkış oranı 11 farklı boyuttaki redüktörlerimizle elde edebiliyoruz.

High quality polat helical gears can be supplied foot or flange mounted products. Foot mounted is designated by 'PA' which is polat foot mounted helical gear and flange mounted is designated by 'PF' which is polat flange mounted helical gear. There are available 2,3 or multistage designs. From PA/PF 02 to PA/PF 52 helical gear units are available in two stage reduction. This designs could be produced in three stage reduction at high ratio with increasing strength of unit case which are designated from PA/PF 03 to PA/PF 53. Greater cases which are designated from PA/PF 62-63 to PA/PF 102-103 to and three stage helical gear units are designed input and output shaft concentrically. Polat multistage helical gear units are designed for high reduction ratios. At flange mounted helical gears, flange is intended on case for strength mounted or installation. Approximately 26000 Nm moment could be obtained with eleven different size of polat helical gear unit altering from 0,12 kW to 160 kW.

Helisel Dişli Redüktör:
0.12 kW dan 160 kW' ya kadar
26000 Nm 'ye kadar çıkış momenti bulunur.

Helical Gear Reducer :
Approx. 26000 Nm output moment
altering power from 0,12 kW to 160 kW.

MAX. MÜSAADE EDİLEBİLİR ÇIKIŞ MOMENTİ $M_{a\ max.}$

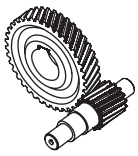
MAX. PERMISSIBLE OUTPUT TORQUES $M_{a\ max.}$

113 - 135

Bir, İki ve Üç kademeli helisel dişlili redüktör

Helical gear boxes single, double and triple reduction

Tip/Type	$M_{a\ max.}$ (Nm)	**Tip**/Type	$M_{a\ max.}$ (Nm)	**Tip**/Type	$M_{a\ max.}$ (Nm)	**Tip**/Type	$M_{a\ max.}$ (Nm)	**Tip**/Type	$M_{a\ max.}$ (Nm)
PA\PF 11	60	**PA\PF 02**	100	**PA\PF 03**	110	**PA\PF 62**	3120	**PA\PF 63**	3700
PA\PF 21	80	**PA\PF 12**	180	**PA\PF 13**	200	**PA\PF 72**	4710	**PA\PF 73**	5650
PA\PF 31	190	**PA\PF 22**	370	**PA\PF 23**	340	**PA\PF 82**	7250	**PA\PF 83**	9180
PA\PF 41	290	**PA\PF 32**	710	**PA\PF 33**	670	**PA\PF 92**	10780	**PA\PF 93**	14000
PA\PF 51	490	**PA\PF 42**	1240	**PA\PF 43**	1290	**PA\PF 102**	17370	**PA\PF 103**	23160
		PA\PF 52	2020	**PA\PF 53**	2230				



W ve IEC Adaptör

W kovanlı redüktörlerin max. tahrik gücü geçerli olan çıkış devri ve tahvil oranına göre tablolarda verilmiştir. (Bknz 115-135) IEC adaptörlü dişli ünitelerinde, her gövde büyüklüğünün standart gücü DIN EN 50347' ye göre verilir. P1 değeri W ve IEC seçim sayfalarında listelenmiştir. Bu listedeki değerlerden fazla bir güç istenirse özel hesaplamalar gerekmektedir. Lütfen danışınız.

W kovanlı redüktörlerin giriş mili rulmanları düzenli olarak yağlanmalıdır. 2 kademeli redüktörlerden PA\PF 62, PD\PM 62 ve üst gövdeler, 3 kademeli redüktörlerden PA\PF 73, PD\PM 73, PKD 6390 ve üst gövdeler için her 4000 çalışma saatinde yaklaşık 20-25 gr gres içeren otomatik yağlayıcı kullanılarak giriş şaftı rulmanı yağlamasını öneririz. Kullanılan yağlayıcı Petamo GHY 133 N' dir. Ayrıca W kovanlı redüktörlerde bu yağlayıcıdan ayrı opsiyon olarak dişli ünitesinin soğumasını sağlamak için dış fan da mevcuttur. Lütfen danışınız.

Otomatik yağlayıcı üniteleri IEC 160 motor büyüklüğünden başlayarak en düşük 2 kademeli redüktörlerden PA\PF 62, PD\PM 62, 3 kademeli redüktörlerden de PA\PF 73, PD\PM 73, PKD 6390 gövdelerine bağlanmaktadır. Bu otomatik yağlayıcı rulmanlara kalıcı bir yağlama sağlar. Redüktörü çalıştırmadan önce devreye sokulmalıdır. Günlük ortalama 8 saat çalışıyorsa yılda 1 kez, bunun dışındaki çalışma saatlerinde 6 ayda bir değiştirilmelidir. otomatik yağlayıcı içindeki gres dış ortam sıcaklığı 0º C - 40º C arasındaki çalışmalara uygundur. Çok uzun süreli çalışmalarda ve belirtilen dış ortam sıcaklığı değişimlerinde daha özel yağlayıcı kullanılmalıdır. Lütfen danışınız.

Otomatik yağlayıcılı IEC'ler belirtilen çalışma şartları içerisinde dikey montaj pozisyonunda (M2 ve M4) önerilmez. Bu gibi durumlarda direkt motor montajı önerilir. Eğer motor boyutu 160 ve daha büyük IEC'ler dikey montaj pozisyonunda kullanılacaksa, kullanım şartları göz önünde bulundurularak tarafımızdan kontrol edilmeli ve onaylanmalıdır. Lütfen buna dikkat ediniz. Dikey montaj pozisyonu çalışmalarında (M2) sızdırmazlık elemanlarının ömrü azalabilmektedir. Bu gibi durumlarda daha kısa aralıklarla bakım yapılmalıdır. 2 kademeli redüktörlerden PA\PF 52, PD\PM 52'ye kadar ve 3 kademeli redüktörlerden PA\PF 63, PD\PM 63, PKD 5390'a kadar olan IEC adaptörlü dişli üniteleri çalışma ömürleri süresince sızdırmazlığa sahip yağlanmış rulman içerir. Bunlar için bakım süreleri kullanım kılavuzunda önerilen bakım süreleri geçerlidir.

Motor boyutu 63'ten 180'e kadar olan IEC adaptörün kaplini arızaya karşı emniyetli değildir. Fakat otomatik yağlayıcı kullanılan IEC 160-180 ve daha büyük boyutlu adaptörlerdeki kaplinler arızaya karşı emniyetlidir. Kaldırma, asansör ve bu gibi insan yaralanmalarına neden olabilecek çalışmalar için özel hesaplamalar gerekmektedir. Lütfen PGR' ye danışınız. Direk motor montajlı redüktörle karşılaştırmak gerekirse IEC ilave mil kaplinine ve extra rulman yataklanmasına sahiptir. Direk motor montajına göre IEC bağlantılı redüktörlerde güç kayıpları daha fazladır. PGR olarak biz direk motor montajını öneririz. Bu size sadece teknik avantaj değil finansal olarak da avantaj sağlar.

W and IEC Adapter for Gear Units

Selection of W cylinder (with free input shaft) and IEC adapter are listed on page 115-135. Maximum power are given according to gear reduction ratio and output speed. Gear units with IEC adapter standard power is specified according to DIN EN 50347. For other power values which are not shown on table, must be required special calculation for operating safety limits. For these cases, please contact with PGR.

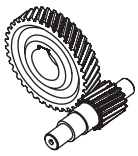
Polat gear unit series such as PA\PF 62, PD\PM 62 and greater case which are 2 stage reducers, PA\PF 73, PD\PM 73, PKD 6390 and greater case which are 3 stage reducers with W adapter (with free input shaft) input solid shaft bearings must be lubricated orderly. Automatic lubricator could be used for increasing service life of bearings. This unit includes approximately 20-25 g grease and it supplies fresh grase at every 4000 running hours. PGR recommends, Petamo GHY 133 N type of lubricate should be used. At the same time, fan option is available for cool gear unit to safe operation. For this option contact with PGR.

Automatic lubricator design is used from IEC 160 motor size and greater motor size to least gear units which are for 2 stage reducers PA\PF 62, PD\PM 62 and for 3 stage reducers PA\PF 73, PD\PM 73 and PKD 6390.This unit provides permenant lubrication to bearings. Automatic lubricator must be changed once at year for where gear unit is run 8 hours or lesser at daily operation for other running hours it must be changed every 6 months. Automatic lubricator must be actuated before start the reducers. Grease is acceptable between 0 ºC - 40 ºC operation conditions. At long-term running and exception from specified ambient temperature special lubricate must be used. Please, consult us.

Under determined operating conditions, IEC with automatic lubricator is not suggested for vertical mounting positions (M2 and M4 mounting positions). For these cases direct motor mounting should be applied. If IEC 160 and greater size will be used at vertical mounting positions, it must be controled by PGR for suitable and safe operations with considering actual operating conditions. For mounting position M2 (vertical alignment) life cycle of seals are effected badly for that reason maintenance of these reducer must be at shorter times from which maintenance time is determined at manual. 2 stage reducers up to PA\PF 52, PD\PM 52 and 3 stage reducer up to PA\PF 63, PD\PM 63, PKD 5390 gear units are included seals for bearings as long as their service life. For these gear units maintenance time is valid which time is specified at manual.

Coupling is used for installing motor to IEC adapter. At from IEC 63 to IEC 180, coupling is not safety for important application where person injuries could be occured. But IEC 160 - IEC 180 with automatic lubricator and greater size of IEC adapter is safe for application but on the other hand for operations where accident could be caused personnel damage special calculation must be required, please consult us. Direct motor mounting has a lot of advantage according to mounting of IEC adapter. At gear units with IEC adapter has additional solid shaft coupling and bearing seats for that reason power losses are greater than direct motor mounting. Last but not least direct motor mounting could be provided more technical and financial advantage.

UYGULAMALAR	APPLICATIONS
KARIŞTIRICILAR	AGITATORS (MIXERS)
*** Saf Sıvılar**	* Pure Liquids
*** Sıvılar ve Katılar**	* Liquids and Solids
*** Değişken Yoğunluklu Sıvılar**	* Liquids - Variable Density
HAVALANDIRMA TERTİBATLARI	BLOWERS
*** Santrifüj**	* Centrifugal
*** Lob**	* Lobe
*** Pervane**	* Vane
MAYALAMA VE DAMITMA	BREWING AND DISTILLING
*** Şişeleme Mekanizması**	* Bottling Machinery
*** Mayalama Kazanları - Kesintisiz İş**	* Brew Kettles - Continuous Duty
*** Fırınlar, Ocaklar - Kesintisiz İş**	* Cookers - Continuous Duty
*** Ezme, Karışım Kazanları - Kesintisiz İş**	* Mash Tubs - Continuous Duty
*** Ölçü Haznesi - Sık Sık Başlama**	* Scale Hopper - Frequent Starts
TOPRAK İŞLEME MAKİNELERİ	CLAY WORKING MACHINERY
*** Tuğla Presi**	* Brick Press
*** Briket Makinesi**	* Briquette Machine
*** Çamur Karma Makinesi**	* Pug Mill
KOMPRESÖRLER	COMPRESSORS
*** Santrifüj**	* Centrifugal
*** Lob**	* Lobe
*** Çok Pistonlu**	* Reciprocating, Multi-Cylinder
*** Tek Pistonlu**	* Reciprocating, Single-Cylinder
KONVEYÖRLER - GENEL MAKSATLI	CONVEYORS - GENERAL PURPOSE
*** Üniform Yüklü**	* Uniformly Loaded or Fed
*** Üniform Yüklü Olmayan**	* Not Uniformly fed
*** Pistonlu veya Karıştırıcılı**	* Reciprocating Or Shaker
VİNÇLER	CRANES
*** Kuru Havuz**	* Dry Dock
Ana Kaldırma vinci	Main Hoist
Yardımcı Vinç	Auxiliary Hoist
Direkli Vinç	Boom Hoist
Döndürme İşi	Slewing Drive
Çekme İşi	Traction Drive
*** Endüstriyel İşi**	* Industrial Duty
Ana Kaldırma Vinci	Main Hoist
ASANSÖRLER	ELEVATORS
*** Kova**	* Bucket
*** Santrifuj Boşaltma**	* Centrifugal Discharge
*** Yürüyen Merdiven**	* Escalators
*** Taşıma, Nakliye**	* Freight
*** Yerçekimi Boşaltım**	* Gravity Discharge
KIRMA MAKİNELERİ	CRUSHER
*** Taş ya da Maden**	* Stone or Ore



UYGULAMALAR	APPLICATIONS
TARAMA MAKİNELERİ	DREDGES
*** Kablo Bobinleri**	* Cable Reels
*** Konveyörler**	* Conveyors
*** Pompalar**	* Pumps
*** İstifleme Makineleri**	* Stackers
*** Vinçler**	* Winches
EKSTRUDERLER	EXTRUDERS
*** Genel**	* General
*** Plastikler**	* Plastics
Değişken Hızlı Tahrik	Variable Speed Drive
Sabit Hızlı Tahrik	Fixed Speed Drive
***Kauçuk, Lastik**	*Rubber
Kesintisiz Vida İşlemleri	Continuous Screw Operation
Kesintili Vida İşlemleri	Intermittent Screw Operation
FANLAR	FANS
*** Santrifüj**	* Centrifugal
*** Yüksek Emişli**	* Forced Draft
*** İndüklenmiş Çekiş**	* Induced Draft
*** Endüstriyel ve Maden Ocağı**	* Industrial and Mine
BESLEME ÜNİTELERİ	FEEDERS
*** Palet**	* Apron
*** Bant**	* Belt
*** Disk**	* Disc
*** Pistonlu**	* Reciprocating
*** Vida**	* Screw
GIDA ENDÜSTRİSİ	FOOD INDUSTRY
*** Hububat Fırını**	* Cereal Cooker
*** Hamur Karıştırıcı**	* Dough Mixer
*** Kıyma Makinesi**	* Meat Grinder
*** Dilimleyici**	* Slicer
METAL İŞLEMELERİ	METAL MILLS
*** Çekme Makinesi Taşıma ve Ana Tahrik**	* Draw Bench Carriage and Main Drive
*** Hammadde İticileri**	* Slab Pushers
*** Makaslar**	* Shears
*** Tel Çekme**	* Wire Drawing
*** Tel Sargı Makinesi**	* Wire Winding Machine
*** Salgı Tezgahı**	* Runout Table
Geri Dönmesiz	Non-Reversing
Tek Tahrik	Individual Drives
Grup Tahriki	Group Drives
DÖNER İŞLEMELER	MILLS (ROTARY TYPE)
*** Küresel ve Çubuk**	* Ball and Rod
Düz Halka Dişli	Spur Ring Gear
Helisel Halka Dişli	Helical Ring Gear
Doğrudan Bağlı	Direct Connected
*** Çimento Fırını**	* Cement Kilns
*** Kurutucular ve Soğutucular**	* Dryers and Coolers

UYGULAMALAR	APPLICATIONS
KERESTE ENDÜSTRİSİ	LUMBER INDUSTRY
*** Kabuk Soyucular**	* Barkers
Besleme Tamburu	Spindle Feed
Ana Tahrik	Main Drive
*** Konveyörler**	* Conveyors
Brülör	Burner
Ana Yük veya Ağır Yük	Main or Heavy Duty
Ana Kütük	Main Log
Hızar ve Taşıma Bandı	Re-saw, Merry-Go-Round
Kalın Dilim	Slab
Taşıma	Transfer
*** Kesme Testereleri**	* Cut-Off Saws
Zincir	Chain
Sürükleme	Drag
*** İndirme Boşaltma Tamburları**	* Debarking Drums
*** Uzun Deste**	* Long Deck
*** Tomruk Çekme-Eğme**	* Log Hauls - Incline
*** Kütük Döndürme Aygıtları**	* Log Turning Devices
*** Sıralama Tablası**	* Sorting Table
*** Taşıma**	* Transfers
Zincir	Chain
Kreynyolu	Causeway
*** Tabla Tahriki**	* Tray Drives
KAĞIT İŞLEMELERİ	PAPER MILLS
*** Karıştırıcı**	* Agitator (Mixer)
*** Saf çözeltiler İçin Karıştırıcı**	* Agitator for Pure Liquors
*** Kabuk Soyma Tromelleri**	* Barking Drums
*** Mekanik Kabuk Soyucu**	* Mechanical Barkers
*** Dövücü - Öğütücü**	* Beater
*** Düzleştirme Makinesi**	* Breaker Stack
*** Kalenderleme**	* Calender
*** Yüzey Pürüzlendirici**	* Chipper
*** Çentik Besleyici**	* Chip Feeder
*** Kaplama Merdanesi**	* Coating Rolls
*** Konveyörler**	* Conveyors
Çentik, Kabuk, Kimyasal	Chip, Bark, Chemical
Kalın Dilimler İçeren Kütükler	Log (including Slab)
*** Kesici**	* Cutter
*** Silindir Kalıpları**	* Cylinder Molds
*** Kurutucu**	* Dryer
Kağıt Makinesi	Paper Machine
Konveyör Tip	Conveyor Type
*** Kabartmalı Basıcı**	* Embosser
*** Ekstruder**	* Extruder
*** Kağıt Merdaneleri**	* Paper Rolls
*** Presler**	* Presses
*** Hamurlaştırıcı**	* Pulper
*** Pompalar**	* Pumps
FİLTRELER	SCREENS
*** Havalı Yıkama**	* Air Washing
*** Döner - Taş veya Çakıl**	* Rotary - Stone or Gravel
*** Hareketli Su Girişi**	* Traveling Water Intake

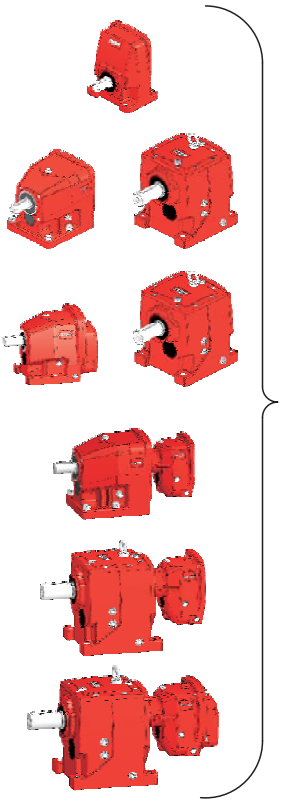
UYGULAMALAR	APPLICATIONS
PLASTİK ENDÜSTRİSİ İLK İŞLEMLER	PLASTIC INDUSTRY PRIMARY PROCESSING
*** Yoğun İç Karıştırıcılar** **Harmanlayıcı** **Kesintisiz Karıştırıcı**	* Intensive Internal Mixers Batch Mixers Continuous Mixers
PLASTİK ENDÜSTRİSİ İKİNCİL İŞLEMLER	PLASTIC INDUSTRY SECONDARY PROCESSING
*** Hacim Kalıpçıları** *** Kaplama** *** Tabaka** *** Boru** *** Ön Plastikleştirme** *** Rot** *** Saç, Plaka** *** Borular**	* Blow Molders * Coating * Film * Pipe * Pre-Plasticizers * Rods * Sheet * Tubing
POMPALAR	PUMPS
*** Santrifüj** *** Oranlama** *** Pistonlu** **Tek Tesirli - 3 veya daha fazla Silindir** **Çift Tesirli - 2 veya daha fazla Silindir** *** Döner** **Şanzuman Tipi** **Lob** **Pervane**	* Centrifugal * Proportioning * Reciprocating Single Acting - 3 or more cylinders Double Acting - 2 or more cylinders *Rotary Gear Type Lobe Vane
KAUÇUK - LASTİK ENDÜSTRİSİ	RUBBER INDUSTRY
*** Yoğun İç Karıştırıcılar** **Harmanlayıcılar** **Kesintisiz Karıştırıcılar** ***Karıştırma İşlemi** **2 Yumuşak Merdane** **1 veya 2 Oluklu Merdane** *** Toplu İşleme - 2 Yumuşak Silindir** *** Kırıcı ve Isıtıcı - 2 Merdane, 1 Oluklu Merdane** *** Kırıcı - 2 Oluklu Merdane** *** Tutma, Besleme, Karıştırma İşlemi - 2 Merdane** *** Arıtıcı - 2 Merdane** *** Kalenderler**	* Intensive Internal Mixers Batch Mixers Continuous Mixers * Mixing Mill 2 Smooth Rolls 1 or 2 corrugated Rolls * Batch Drop Mill - 2 Smooth Rolls * Cracker Warmer-2 Rolls,1 Corr. Roll * Cracker - 2 Corrugated Rolls * Holding, Feed and Blend Mill - 2 Rolls * Refiner - 2 Rolls * Calenders
ATIK SU BOŞALTIM EKİPMANLARI	SEWAGE DISPOSAI EQUIPMENT
*** Çubuklu Elek** *** Kimyasal Besleme Üniteleri** *** Su Boşaltma Eleği** *** Köpük Kesici** *** Yavaş veya Hızlı Karıştırıcılar** *** Tortu Toplayıcı** *** Koyulaştırıcı** *** Vakumlu Filtre**	* Bar Screens * Chemical Feeders * Dewatering Screen * Scum Breaker * Slow or Rapid Mixers * Sludge Collector * Thickener * Vacuum Filter
KOMPAKTÖRLER	COMPACTORS
ÇEKTİRMELER - YAVAŞ VE KUVVETLİ	PULLERS - BARGE HAUL

UYGULAMALAR	APPLICATIONS
ŞEKER ENDÜSTRİSİ	SUGAR INDUSTRY
*** Pancar Dilimleme Aleti**	* Beet Slicer
*** Kamış Bıçakları**	* Cane Knives
*** Kırma Makineleri**	* Crushers
TEKSTİL ENDÜSTRİSİ	TEXTILE INDUSTRY
*** Harman Ölçer**	* Batcher
*** Kalenderler**	* Calenders
*** Şablonlar**	* Cards
*** Kuru Konserveler**	* Dry Cans
*** Boyama Makinesi**	* Dyeing Machinery
*** Dokuma Tezgahları**	* Looms
*** Çamaşır Sıkma Makinesi - Merdane**	* Mangle
*** Kaplama**	* Napper
*** Doldurma Makinesi**	* Pads
*** Haşıl Makinesi**	* Siashers
*** Halat Yıkama Makinesi**	* Soapers
*** Eğirme Makinesi**	* Spinners
*** Germe Kurutma Makineleri**	* Tenter Frames
*** Yıkama Makineleri**	* Washers
*** Masura Sarıcısı**	* Winders
DAMPERLİ ARAÇLAR	CAR DUMPERS
ÇEKİCİ ARAÇLAR	CAR PULLERS
ARITICILAR	CLARIFIERS
KONSERVE DOLUM MAKİNELERİ	CAN FILLING MACHINES

REDÜKTÖR TİPİ
GEAR TYPE

Ayak Montajlı
Foot Mounted

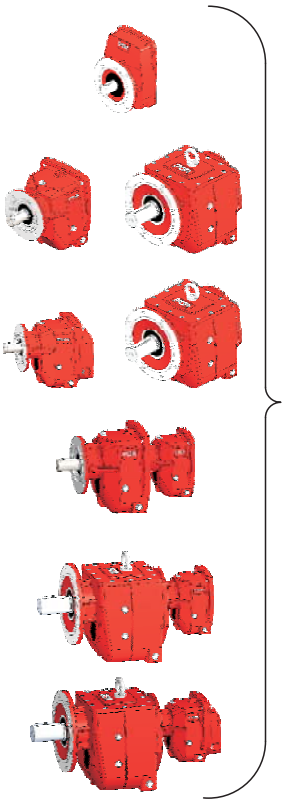
PA 11...PA 51	=	**Tek kademeli, Ayak montajlı, Helisel dişlili redüktör** Single reduction, Foot mounted, Helical gearboxes
PA 02...PA 102	=	**İki kademeli, Ayak montajlı, Helisel dişlili redüktör** Double reduction, Foot mounted, Helical gearboxes
PA 03...PA 103	=	**Üç kademeli, Ayak montajlı, Helisel dişlili redüktör** Triple reduction, Foot mounted, Helical gearboxes
PA 02/12...PA 52/12	=	**Dört kademeli, Ayak montajlı, Helisel dişlili redüktör** Quadruple reduction, Foot mounted, Helical gearboxes
PA 63/22...PA 103/52	=	**Beş kademeli, Ayak montajlı, Helisel dişlili redüktör** Quintuple reduction, Foot mounted, Helical gearboxes
PA 63/23...PA 103/53	=	**Altı kademeli, Ayak montajlı, Helisel dişlili redüktör** Sixtuple reduction, Foot mounted, Helical gearboxes



20

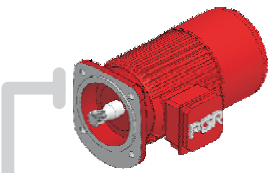
Flanş Montajlı
Flange Mounted

PF 11...PF 51	=	**Tek kademeli, Flanş montajlı, Helisel dişlili redüktör** Single reduction, Flange mounted, Helical gearboxes
PF 02...PF 102	=	**İki kademeli, Flanş montajlı, Helisel dişlili redüktör** Double reduction, Flange mounted, Helical gearboxes
PF 03...PF 103	=	**Üç kademeli, Flanş montajlı, Helisel dişlili redüktör** Triple reduction, Flange mounted, Helical gearboxes
PF 02/12...PF 52/12	=	**Dört kademeli, Flanş montajlı, Helisel dişlili redüktör** Quadruple reduction, Flange mounted, Helical gearboxes
PF 63/22...PF 103/52	=	**Beş kademeli, Flanş montajlı, Helisel dişlili redüktör** Quintuple reduction, Flange mounted, Helical gearboxes
PF 63/23...PF 103/53	=	**Altı kademeli, Flanş montajlı, Helisel dişlili redüktör** Sixtuple reduction, Flange mounted, Helical gearboxes

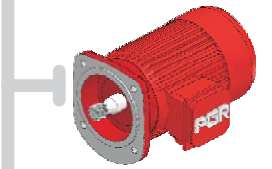


21

Giriş Aksamları Input Options	**Motor** Motor	**Kutup Numarası** Number of Poles	**Motor Seçenekleri** Motor Options
W = Motorsuz girişli redüktörler için aksam = With free input shaft **IEC = DIN 42677' ye göre standart motorlar için aksamlar** = For assembly with IEC standard motors acc. to DIN 42677 **T = Turbo kaplin** = Turbo coupling	**Üç fazlı motor** **Motor boyutu 63 - 315** Three phase motor Motor size 63 - 315 **EExeII = Patlamaya karşı güvenliği arttırılmış üç fazlı motor** = Explosion proof three phase motor increased safety	**2 = 2 Kutuplu** = 2 - Poles **4 = 4 Kutuplu** = 4 - Poles **6 = 6 Kutuplu** = 6 - Poles **4 - 2 = 1:2 oranında hız değiştirici dahlander bağlantısı** = Pole changing 1:2 Dahlander connection **8 - 2 = 1:4 oranında hız değiştirici ayrılmış sarmal dizilişli** = Pole changing 1:4 Separate windings **Diğer kutup kombinasyonları talep karşısında karşılanacaktır** Other pole combinations on request	**BRE = Frenli** = With brake **EF = Tek fazlı, fanlı** = Separate fan, single phase **ZF = Çift fazlı, fanlı** = Separate fan, double phase **DF = Üç fazlı, fanlı** = Separate fan, three phase **IG = Enkoderli** = With encoder **KK/FK= Debriyajlı** = With clutches **SR = Toza karşı korumalı fren** = Brake dust - proof **TF = Termistörlü** = Thermistor **RG = Korozyon korumalı frenli** = Brake corrosion - protected **WU = Yumuşak kalkışlı rotor** = Soft start rotor **RLS = Geri dönmeye karşı kilitli** = Backstop **TW = Isıya duyarlı** = Thermal trip **HL = Manuel frenli motor** = Brake motor with hand release



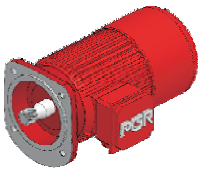
Elektrik Motoru (Frenli)
Electric Motor (With Brake)



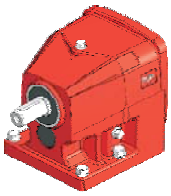
Elektrik Motoru (Frensiz)
Electric Motor (None Brake)

Helisel Dişlili, Ayaklı, Tek Kademeli Redüktör
Helical Gear, Foot Mounted, Single Reduction
20

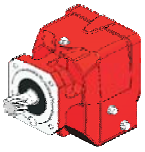
Helisel Dişlili İndirgeç
Helical Reduction Gearcase



Elektrik Motoru (Frenli)
Electric Motor (With Brake)

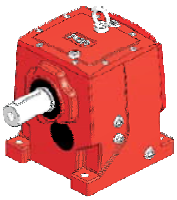


Helisel Dişlili, Ayaklı, Monoblok Redüktör
Helical Gear, Foot Mounted, Monoblock Case
20



Helisel Dişlili, Flanşlı Redüktör
Helical Gearbox, Flange Mounted

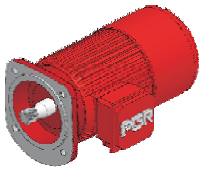
Elektrik Motoru (Frensiz)
Electric Motor (None Brake)



Helisel Dişlili, Ayaklı, Blok Redüktör
Helical Gear, Foot Mounted, Block Case,
20

IEC Adaptörü
IEC Adapter

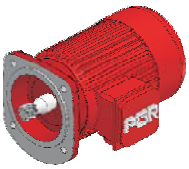
W Kovanı
Free Input Shaft



Elektrik Motoru (Frenli)
Electric Motor (With Brake)

W Kovanı
Free Input Shaft

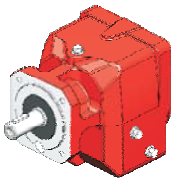
IEC Adaptörü
IEC Adapter



Elektrik Motoru (Frensiz)
Electric Motor (None Brake)

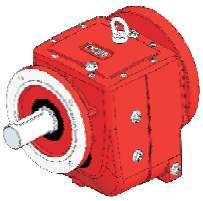
Helisel Dişlili, Flanşlı, Tek Kademeli Redüktör
Helical Gear, Flange Mounted, Single Reduction

21



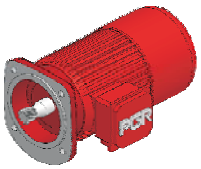
Helisel Dişlili, Flanşlı, Monoblok Redüktör
Helical Gear, Flange Mounted, Monoblock Case

21

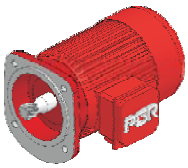


Helisel Dişlili, Flanşlı, Blok Redüktör
Helical Gear, Flange Mounted, Block Case

21

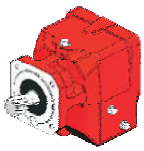


Elektrik Motoru (Frenli)
Electric Motor (With Brake)

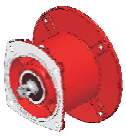


Elektrik Motoru (Frensiz)
Electric Motor (None Brake)

Helisel Dişlili İndirgeç
Helical Reduction Gearcase

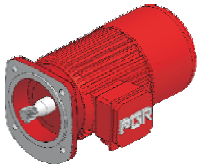


Helisel Dişlili, Flanşlı Redüktör
Helical Gearbox, Flange Mounted

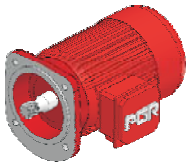


IEC Adaptörü
IEC Adapter

W Kovanı
Free Input Shaft

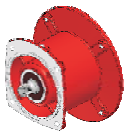


Elektrik Motoru (Frenli)
Electric Motor (With Brake)

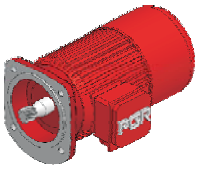


Elektrik Motoru (Frensiz)
Electric Motor (None Brake)

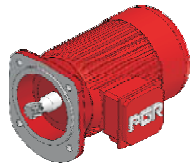
W Kovanı
Free Input Shaft



IEC Adaptörü
IEC Adapter



Elektrik Motoru (Frenli)
Electric Motor (With Brake)

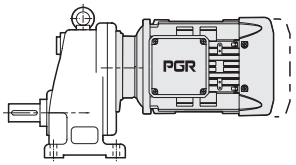


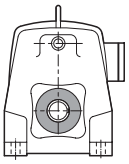
Elektrik Motoru (Frensiz)
Electric Motor (None Brake)

1) **PA 11...PA 51**

Ayak montajlı, Tek kademeli,
Helisel dişlili, Motorlu redüktör

Helical geared motor, Foot mounted,
Single reduction

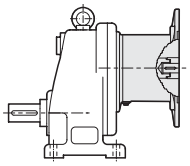


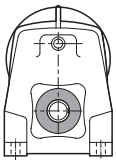


PA 11...PA 51

Ayak montajlı, Tek kademeli,
Helisel dişlili, IEC adaptörlü redüktör

Helical gear unit, Foot mounted,
Single reduction, With IEC adapter

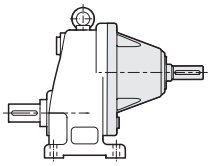


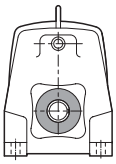


PA 11...PA 51

Ayak montajlı, Tek kademeli,
Helisel dişlili, W kovanlı redüktör

Helical gear unit, Foot mounted,
Single reduction, With free input shaft

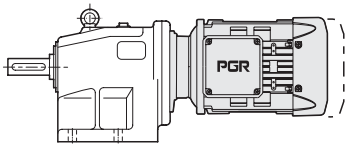


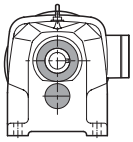


2) **PA 02...PA 52**

Ayak montajlı, İki kademeli,
Helisel dişlili, Motorlu redüktör

Helical geared motor, Foot mounted,
Double reduction

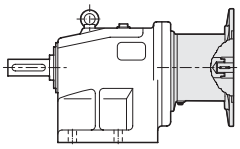


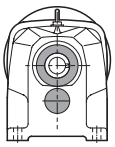


PA 02...PA 52

Ayak montajlı, İki kademeli,
Helisel dişlili, IEC adaptörlü redüktör

Helical gear unit, Foot mounted,
Double reduction, With IEC adapter

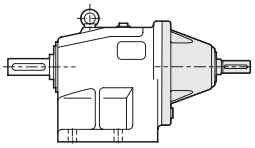


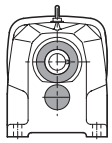


PA 02...PA 52

Ayak montajlı, İki kademeli,
Helisel dişlili, W kovanlı redüktör

Helical gear unit, Foot mounted,
Double reduction, With free input shaft

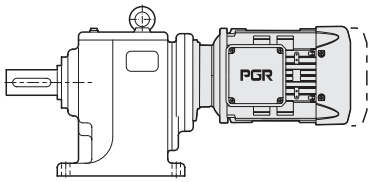


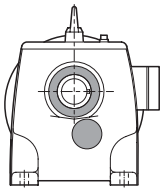


3) **PA 62...102 - PA 63...103**

Ayak montajlı, İki kademeli - Üç kademeli,
Helisel dişlili, Motorlu redüktör

Helical geared motor, Foot mounted,
Double reduction - Triple reduction

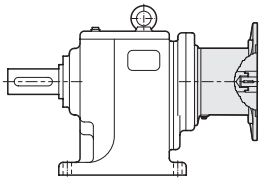


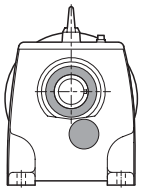


PA 62...102 - PA 63...103

Ayak montajlı, İki kademeli - Üç kademeli,
Helisel dişlili, IEC adaptörlü redüktör

Helical gear unit, Foot mounted,
Double reduction - Triple reduction,
With IEC adapter

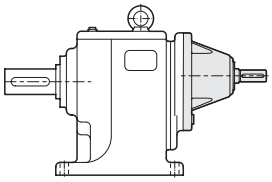


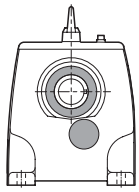


PA 62...102 - PA 63...103

Ayak montajlı, İki kademeli - Üç kademeli,
Helisel dişlili, W kovanlı redüktör

Helical gear unit, Foot mounted,
Double reduction - Triple reduction,
With free input shaft

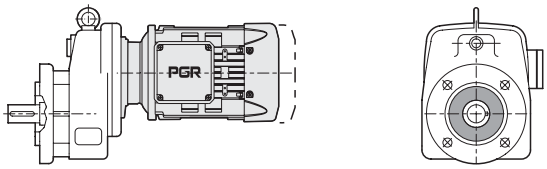




1) PF 11...PF 51

Flanş montajlı, Tek kademeli,
Helisel dişlili, Motorlu redüktör

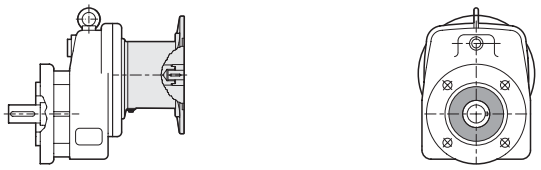
Helical geared motor, Flange mounted,
Single reduction



PF 11...PF 51

Flanş montajlı, Tek kademeli,
Helisel dişlili, IEC adaptörlü redüktör

Helical gear unit, Flange mounted,
Single reduction, With IEC adapter



PF 11...PF 51

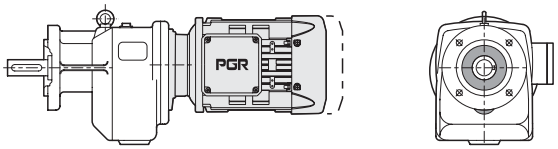
Flanş montajlı, Tek kademeli,
Helisel dişlili, W kovanlı redüktör

Helical gear unit, Flange mounted,
Single reduction, With free input shaft

2) PF 02...PF 52

Flanş montajlı, İki kademeli,
Helisel dişlili, Motorlu redüktör

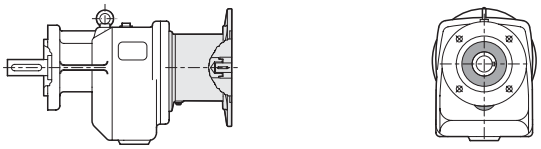
Helical geared motor, Flange mounted,
Double reduction



PF 02...PF 52

Flanş montajlı, İki kademeli,
Helisel dişlili, IEC adaptörlü redüktör

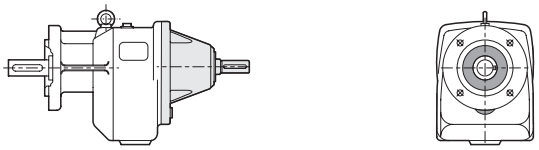
Helical gear unit, Flange mounted,
Double reduction, With IEC adapter



PF 02...PF 52

Flanş montajlı, İki kademeli,
Helisel dişlili, W kovanlı redüktör

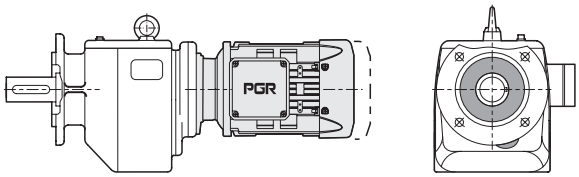
Helical gear unit, Flange mounted,
Double reduction, With free input shaft



3) PF 62...102 - PA 63...103

Flanş montajlı, İki kademeli - Üç kademeli,
Helisel dişlili, Motorlu redüktör

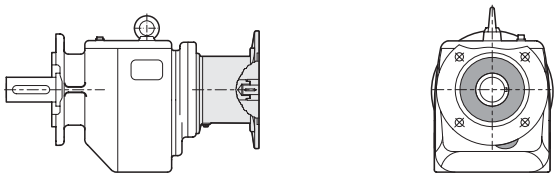
Helical geared motor, Flange mounted,
Double reduction - Triple reduction



PF 62...102 - PA 63...103

Flanş montajlı, İki kademeli - Üç kademeli,
Helisel dişlili, IEC adaptörlü redüktör

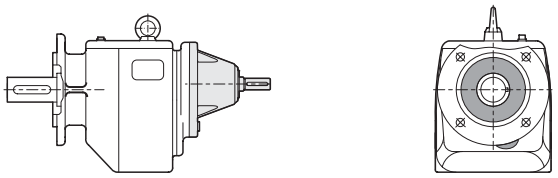
Helical gear unit, Flange mounted,
Double reduction - Triple reduction,
With IEC adapter

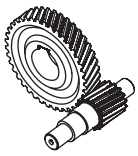


PF 62...102 - PA 63...103

Flanş montajlı, İki kademeli - Üç kademeli,
Helisel dişlili, W kovanlı redüktör

Helical gear unit, Flange mounted,
Double reduction - Triple reduction,
With free input shaft





PA (PF) 103/52 817.82 - 132M / 4 BRE

IEC
IEC

63
71
80
90
100
112
132
160
180
200
225
250
280
315

W
W

Motorlu
With Motor

Gövde Büyüklüğü
Case Width

63 M
71 M
80 M
90 S/L
100 L
112 M
132 S/M
160 M/L
180 M/L
200 L
225 S
250 S/M/L
280 S/M/L
315 S/M/L

Kutup sayısı
Number of Poles

2
4
6
4 - 2
8 - 2

Diğer Kutup kombinasyonları istendiğinde karşılanacaktır.

Other pole combinations on request

Motor Aksesuarları
Motor Accessories

BRE
RG
SR
HL
TF
TW
WU
EF
ZF
DF
IG
KK/FK
RLS

17

İges: Tahvil Oranı
İges: Reduction Ratio
43 - 80

10
Gövde Büyüklüğü
Case Width

0
1
2
3
4
5
6
7
8
9
10

3
Kademe
Reduction

1
2
3

81 - 112

PF GÖVDE
PF CASE

5
Gövde Büyüklüğü
Case Width

0
1
2
3
4
5

2
Kademe
Reduction

2
3

81 - 112

Tip :POLAT Ayaklı Redüktör (POLAT Flanşlı Redüktör)
Type : POLAT Helical Foot Mounted Geared Motor (POLAT Helical Flange Mounted Geared Motor)

YAĞLAMA

Çalıştırmadan veya uzun süreli olarak depoya kaldırmadan önce ventildeki tapa sökülüp, havalandırma tapası takılarak aşırı basınç ve yağ sızıntısı önlenmelidir.

Redüktörler fabrikadan çalışmaya hazır ve mineral yağ doldurulmuş olarak gönderilirler. Bütün dişli üniteler aşağıdaki tablonun ortam sıcaklığı sütununda listesi verilen yağlayıcı (normal) ile dolu olarak sevk edilirler. Diğer ortam sıcaklıkları için listede verilen yağlayıcılar ilave masraf karşılığında temin edilebilir.

Yağlayıcı her 10 000 çalışma saatinde veya 2 yıl sonra değiştirilmelidir. Sentetik yağlar için yağ değişikliği her 20000 çalışma saatinde veya 4 yıl sonra yapılmalıdır. Zorlu çalışma koşullarında örneğin yüksek rutubet ve büyük sıcaklık değişimleri ve kötü çevre şartları gibi durumlarda daha kısa aralıklarla yağ değişimi yapılması tavsiye edilir. Yağ değişiminin üniteyi komple temizleme işlemi ile birleştirilmesi önerilir. Rulman içerisindeki gres her 10000 çalışma saatinde değiştirilmeli ve yeni gres ile doldurulmalıdır. Bu işlem yapılırken rulmanın 1/3 ünün gresle dolu olması sağlanmalıdır.

LUBRICATION

Lubricating oil properties and selection of oil must be correct for the reducers to have long life and to run with good performance. In order to prevent oil leakage during long period storage due to inner pressure, top plug should be removed according to assembly type and venting plug should be mounted.

Reducers are delivered as being filled with mineral olil. Following tables are presented properties of oils depend on ambient temperature. Gear units which is W or IEC adapter type and gear motors are charged with lubricant. Ambient temperature is played important role for choosing lubricant. Relation between ambient temperature and properties of oils are shown in table.

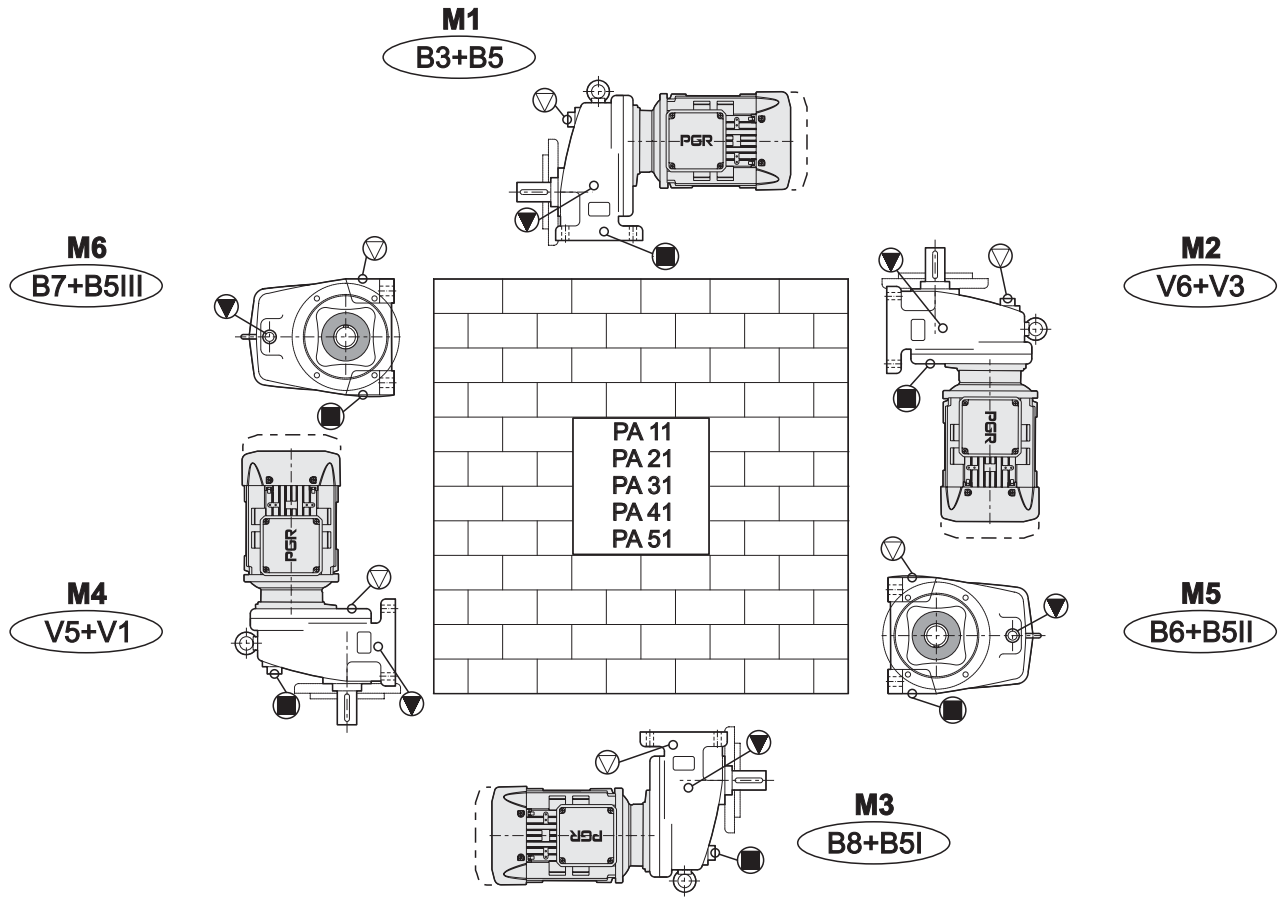
Lubricants must be changed every 10000 hours or after two years, but this time changes when synthetic oil is used. Lubricants must be changed every 20000 hours or after four years where synthetic oil is used. However, operating conditions should be considered for changing oil time eg. in aggressive environment large temperature changing, oil must be changed frequently. For bearings grease should be changed every 10000 running time and it should be done with fresh grease and least 1/3 of bearing must be covered.

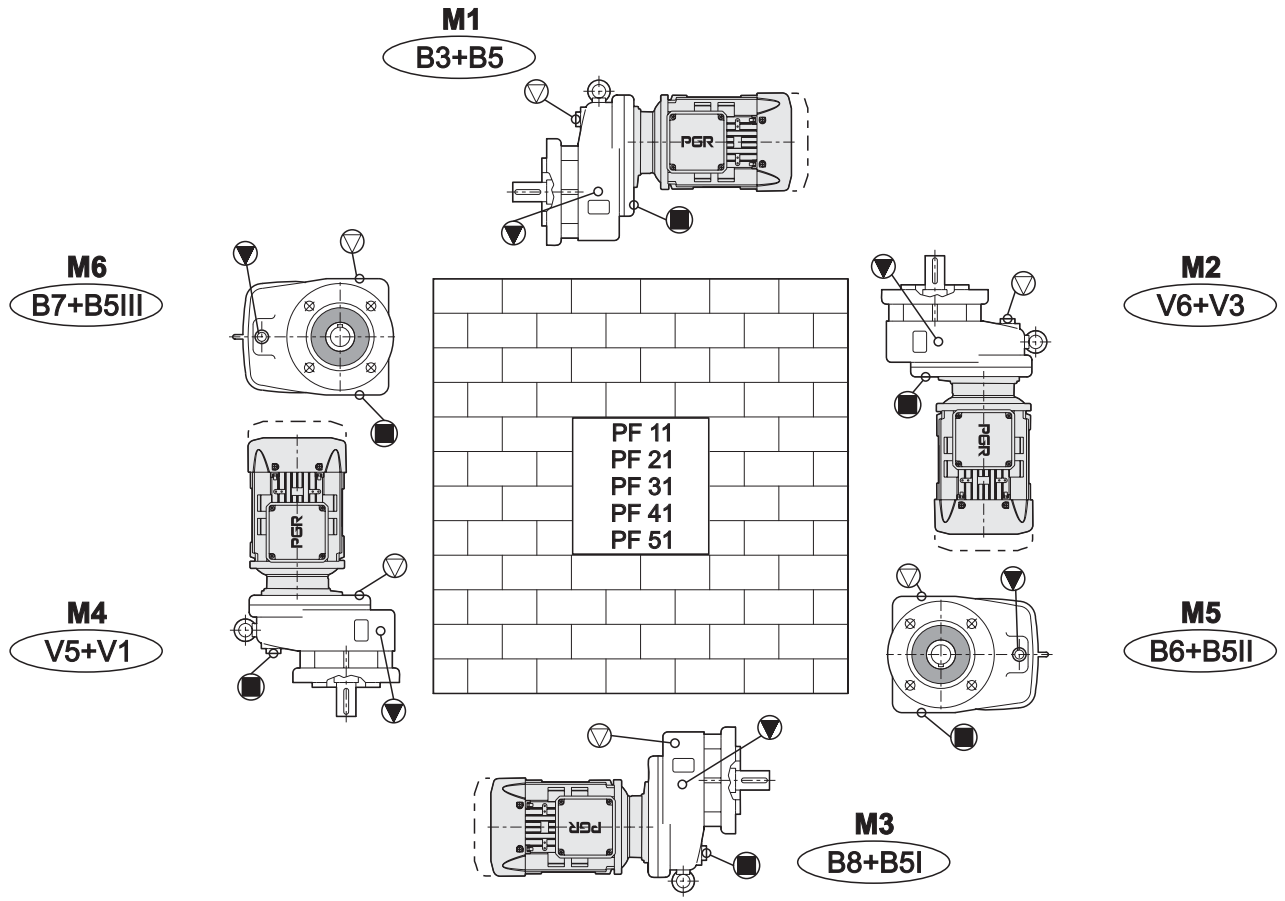
Not: Sentetik ve mineral yağlayıcılar birbirine karıştırılmamalıdır. / Note: Consider that different kind of oil (synthetic and mineral oil) should not be mixed.

Redüktör Tipi Type of gearbox	Yağ Tipi Type of Lubricant	Ortam Sıcaklığı Ambient Temp. °C	ISO vizkozite sınıfı ISO viscosity class	SHELL	MOBİL	BP	ESSO	DEA	ARAL	CASTROL	TRIBOL	KLÜBER
Helisel Dişlili Redüktör Helical Gearboxes	Mineral yağ Mineral oil	- 5...40 Normal	ISO VG 220	Shell Omala Oel 220	Mobilgear 630	Energol GR-XP 220	Spartan EP 220	Deagear DX SAE 85W-90 Falcon CLP 220	Degol BG 220	Alpha SP 220 Alpha MW 220 Alpha MAX 220	Tribol 1100/220	Klüberoil GEM 1-220
		- 15...25	ISO VG 100	Shell omala Oel 100	Mobilgear 627	Energol GR-XP 100	Spartan EP 100	Deagear DX SAE 80W Falcon CLP 150	Degol BG 100	Alpha SP 100 Alpha MW 100 Alpha MAX 220	Tribol 1100/100	Klüberoil GEM 1-100
		# - 50...-15	ISO VG 15	Shell Tellus Oel T 15	Mobil DTE 11 M	Bartran HV 15	Univis J 13	Alrkraft Hydraulic Oil 15	Vitamol 1010	Hyspin AWS 15 Hyspin SP 15 Hyspin ZZ 15	Tribol 770	Isoflex MT 30 rot
	Sentetik yağ Synthetic oil	- 25...80	ISO VG 220	Shell Tivela Oel WB	Glygoyle 30	Enersyn SG-XP 220	ESSO Glycolube 220	Polydea PGLP 220	Degol GS 220	Alphasyn PG 220	Tribol 800/220	Klübersynth GH 6 - 220
	Biyolojik Sentetik yağ Biodegradable oil	- 25...80	ISO VG 220		Mobil DTE FM 220			Plantogear 220 S	Bio-Degol S 220	Carelube GES 220	Tribol Bio Top 1418/220	Klüber - Bio GM 2 - 220
	Gıda yağları Food - grade oil	- 25...80	ISO VG 220	Cassida 220			GEAR OIL FM 220	Renolin 220	Degol FG 220	OPTIMOL optileb GE 220	Tribol Food Proof 1810/220	Klüberoil 4UH1 - 220
	Akışkan sentetik gres Synthetic fluid grease	- 35...60		Shell Tivela compound A	Glygoyle Grease 00	Enersyn GSF	Fliessfett S 420	Glissando 6833 EP 00	Aralub SKA 00	Alpha Gel 00	Tribol 800/1000	Klübersynth GE 46 -1200
Rulmanlar Anti Friction Bearings	Mineral yağlı gres	- 30...60 Normal		Alvania Fett R 3 oder	Mobilux 3	Energrease LS 3	Beacon 3	Glissando 30 Glissando 20	Aralub HL 3 Aralub HL 2	Spheerol AP 3 Spheerol AP 2 LZV - EP	Tribol 3030/100-2 Tribol 4020/220-2	Centoplex 3 Centoplex 2
	Mineral oil grease	# - 50...110		Alvania Fett RL 3	Mobilux 2	Energrease LS 2	Beacon 2	Glissando FT 3	Aralub BAB EP 2	Spheerol EPL 2	Tribol 3785	
	Sentetik gres Synthetic grease	# - 50...110		Aero Shell Grease 16 oder 7	Mobiltemp SHC 32		Beacon 325	Discor 8 - EP 2	Aralub SKL 2	Product 783/46	Tribol 3499	Isoflex Topas NB52

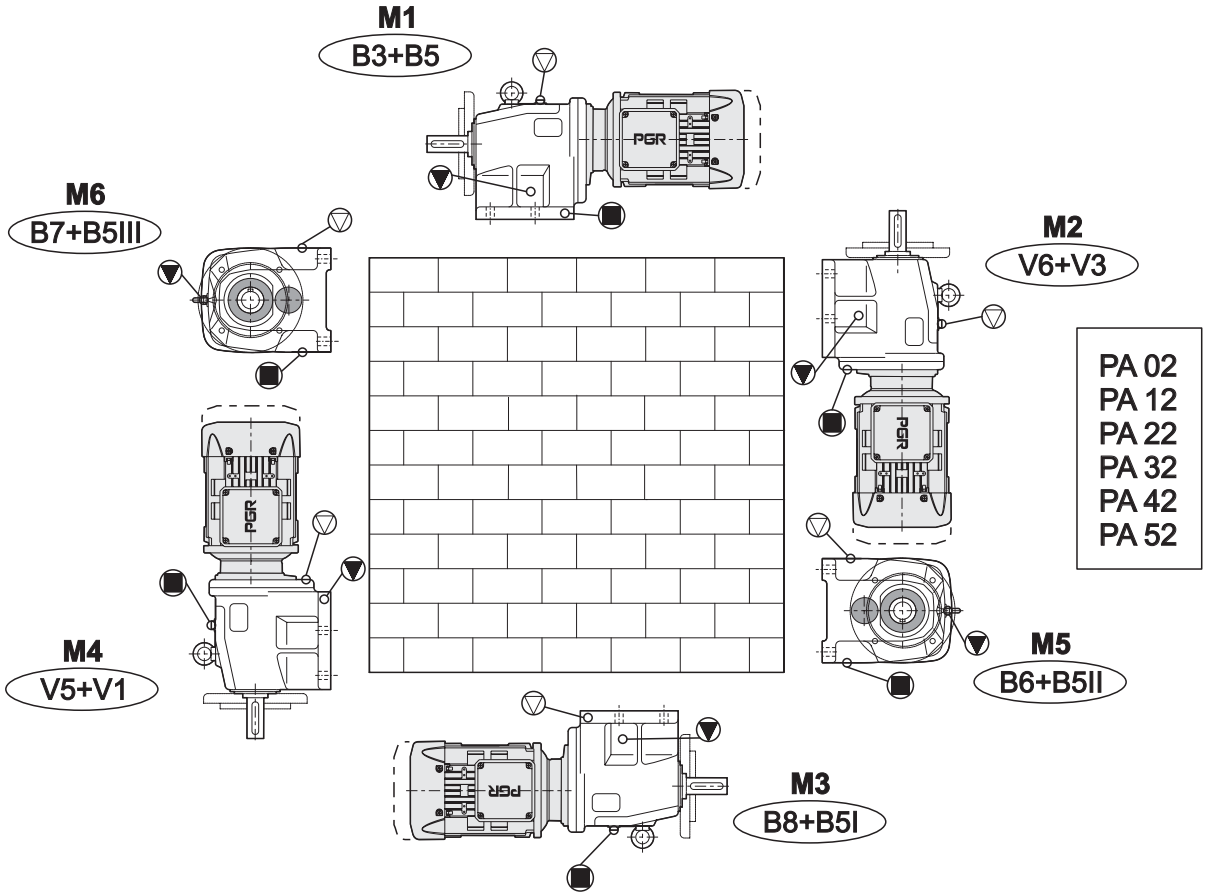
-30° C altında ve 60° C üzerindeki ortam sıcaklıklarında şafttaki sızdırmazlık elemanı için özel kalitedeki malzeme kullanılmalıdır.

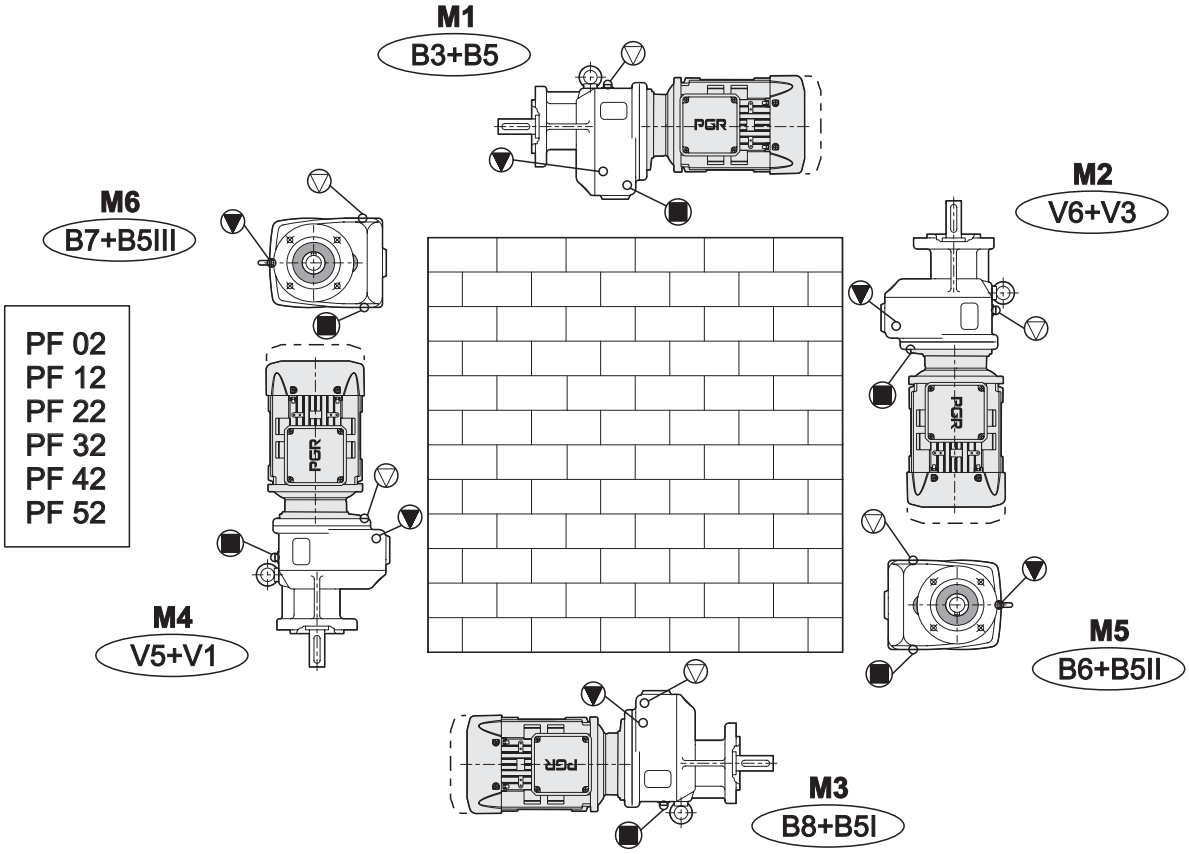
Different materials should be used for sealing rings at operation temperature where temperature is below -30 ºC and above 60 ºC.



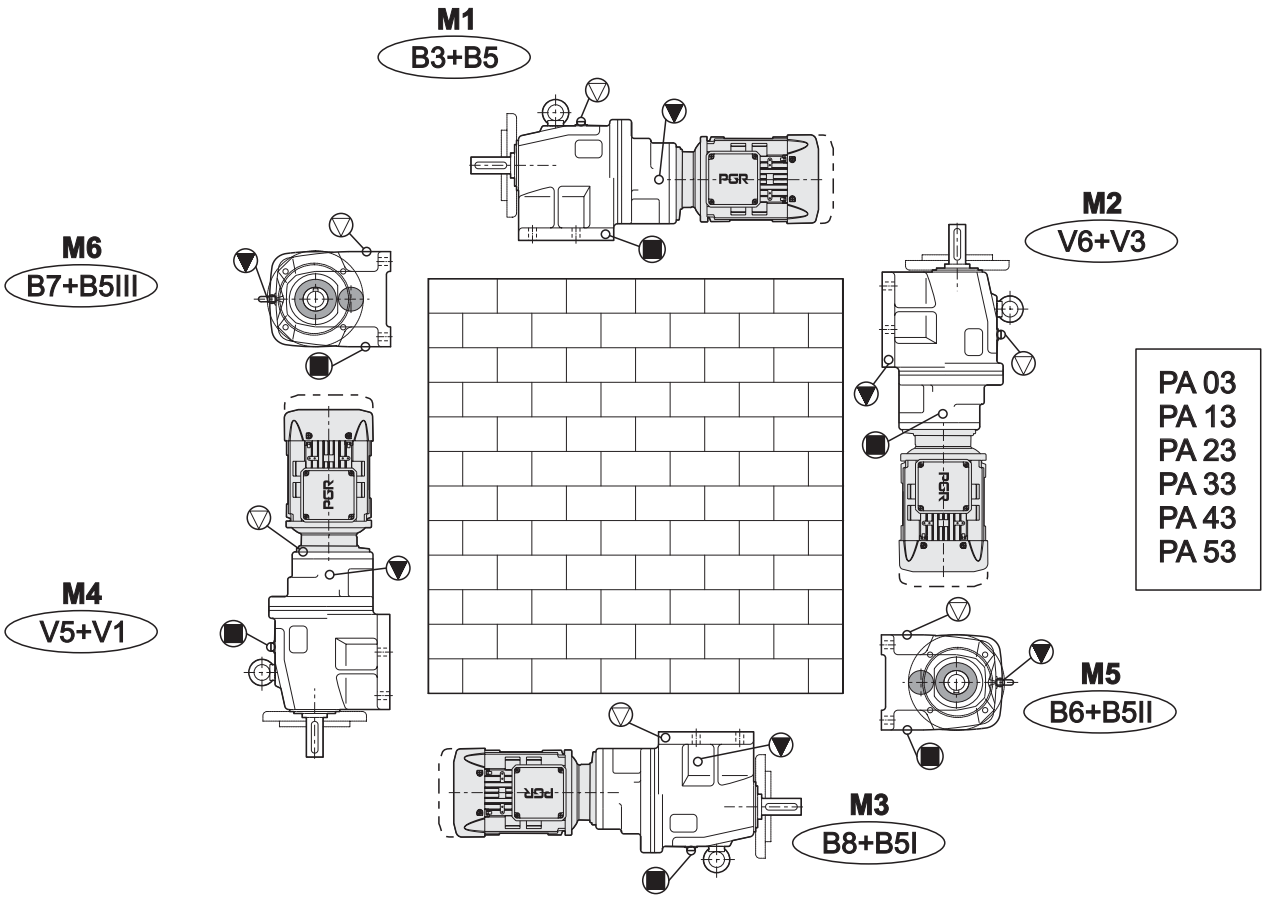


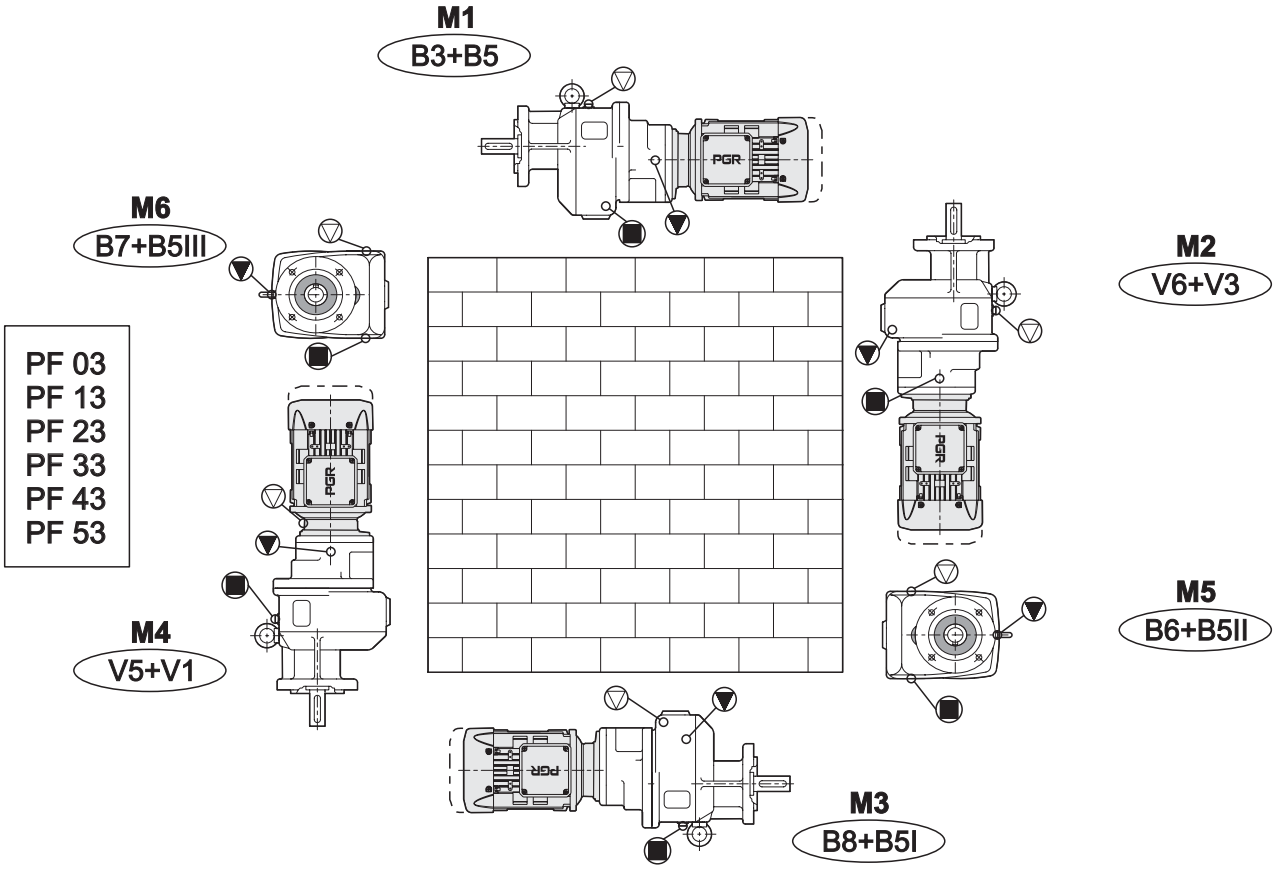
Havalandırma tapası / Vent plug Boşaltma tapası / Drain plug Yağ Seviye tapası / Oil level



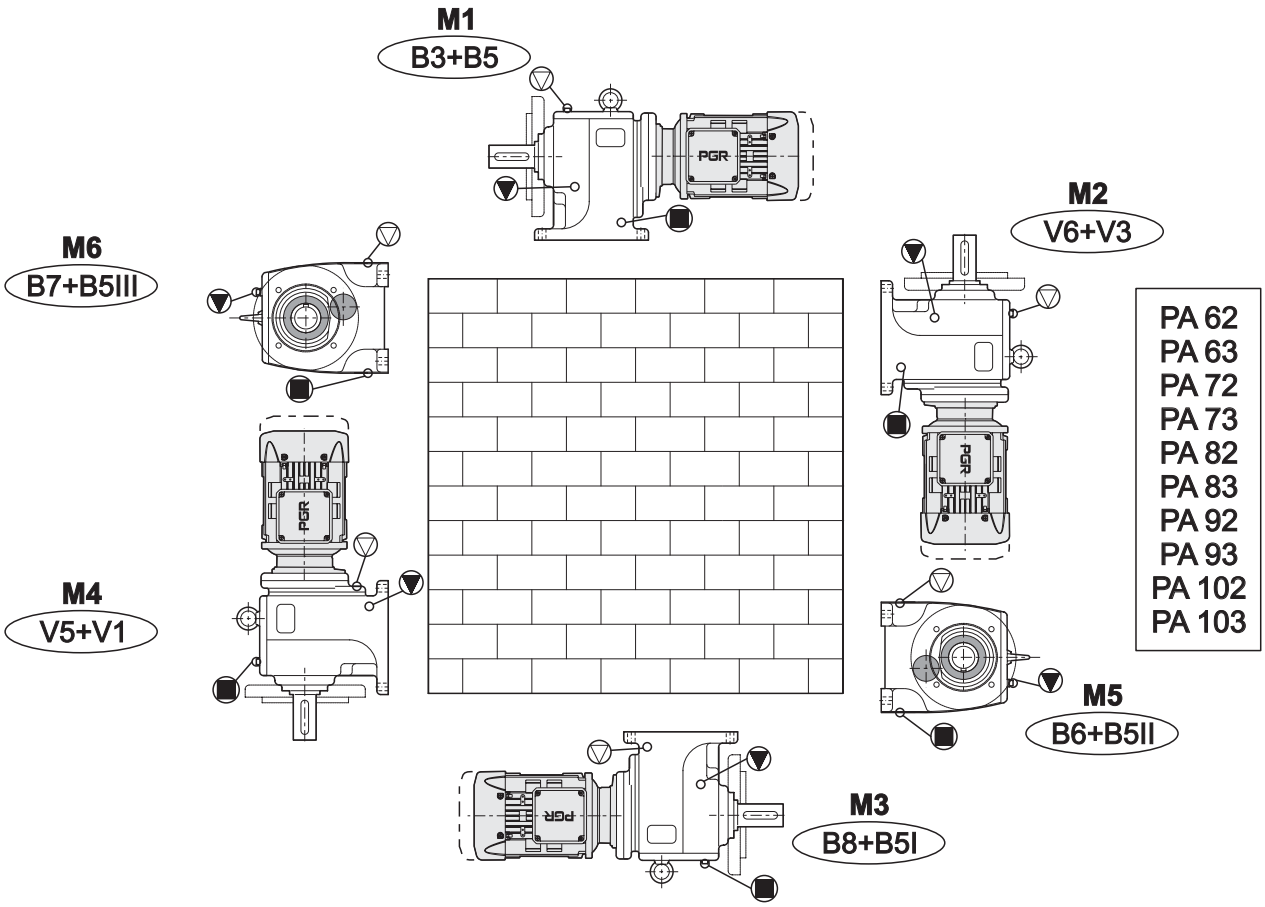


Havalandırma tapası / Vent plug Boşaltma tapası / Drain plug Yağ Seviye tapası / Oil level

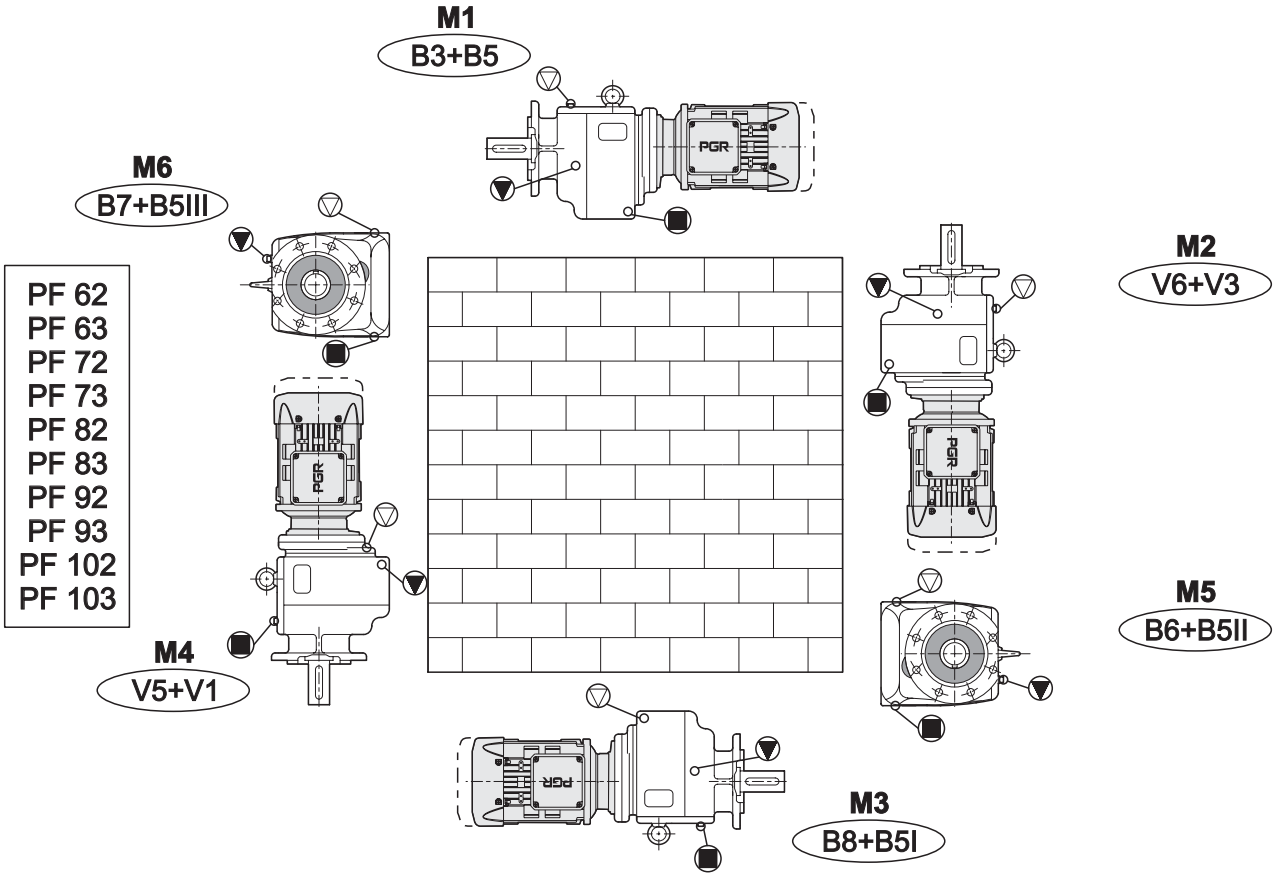




Havalandırma tapası / Vent plug Boşaltma tapası / Drain plug Yağ Seviye tapası / Oil level



PA 62
PA 63
PA 72
PA 73
PA 82
PA 83
PA 92
PA 93
PA 102
PA 103



PF 62
PF 63
PF 72
PF 73
PF 82
PF 83
PF 92
PF 93
PF 102
PF 103

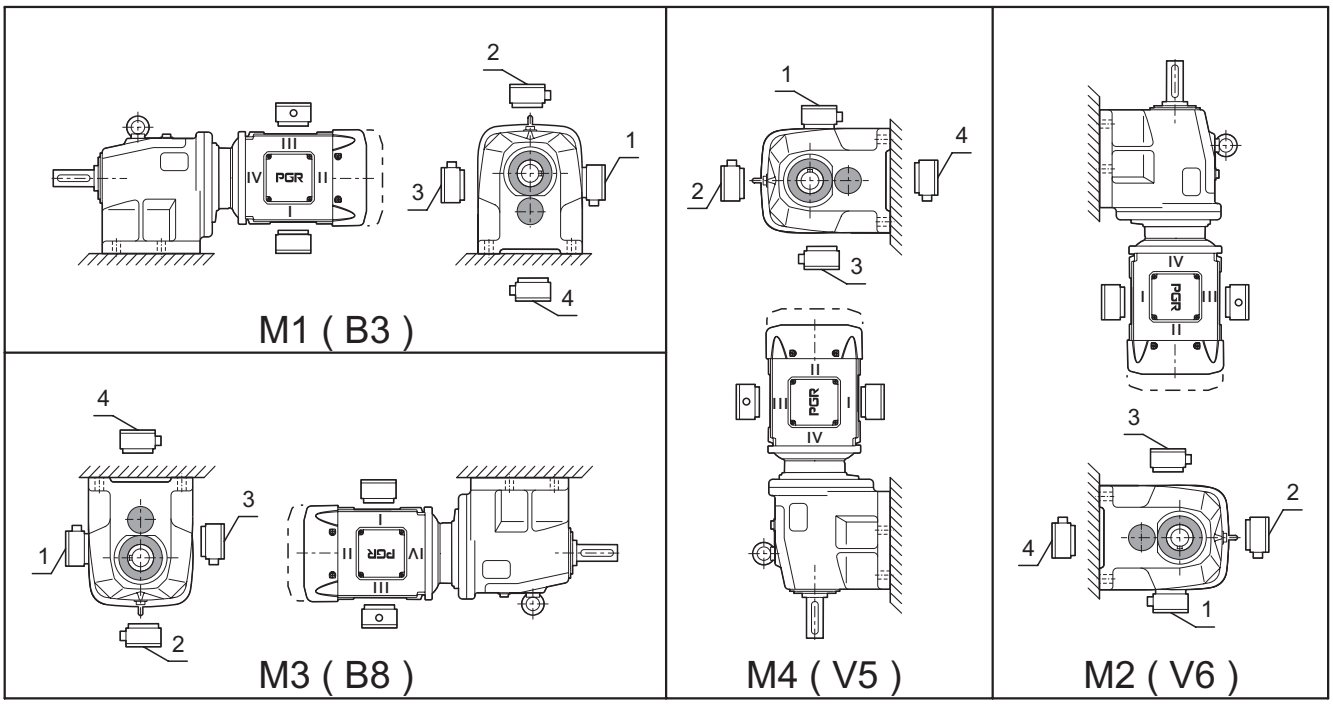
Havalandırma tapası / Vent plug Boşaltma tapası / Drain plug Yağ Seviye tapası / Oil level

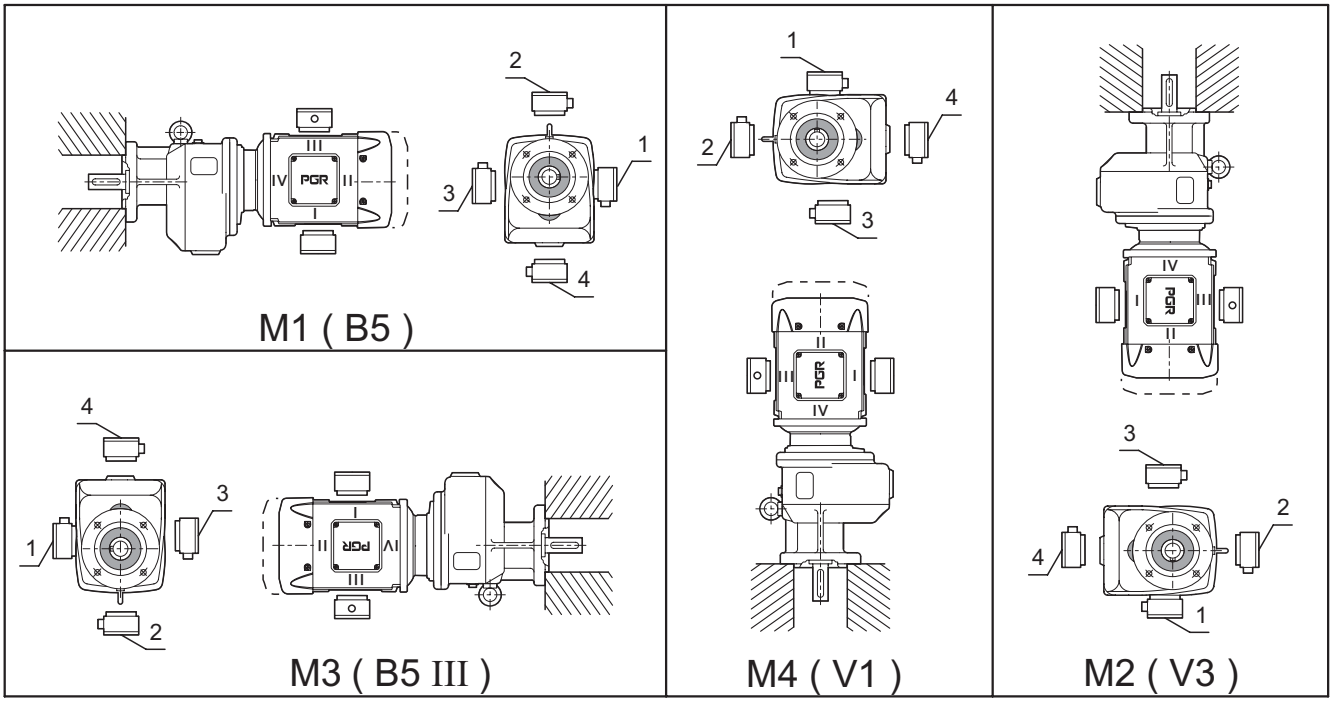
 # M4 montaj pozisyonunda ilave yağlama ünitesi kullanılır

Mounting position M4 with additional lubricant volume 29 - 30

Tabloda gösterilen bu montaj pozisyonları helisel dişlili redüktörlerin W kovanı ve IEC adaptör olanlar için de geçerlidir.

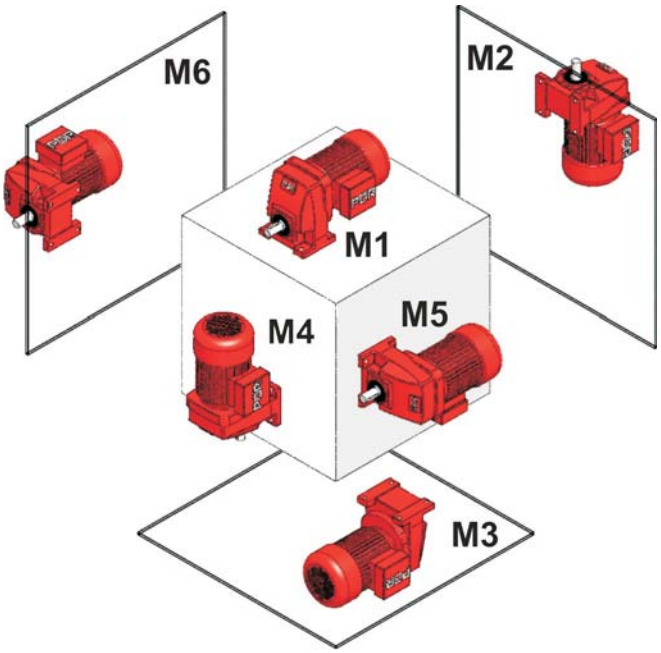
Mounting positions which are shown below of this page are used for all types of helical gear units.(Type W cylinder, IEC adapter and geared motor)





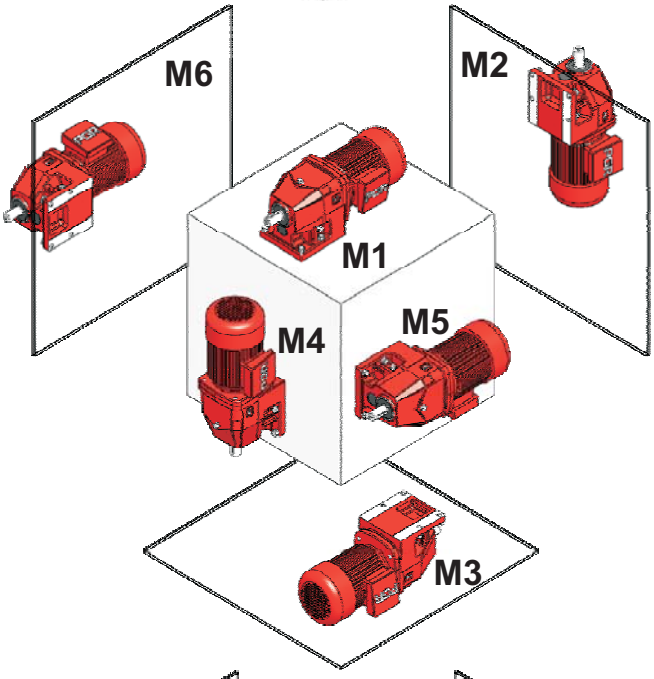
Montaj yüzeyi / Mounting surface

PA TEK KADEME
PA SINGLE REDUCTION



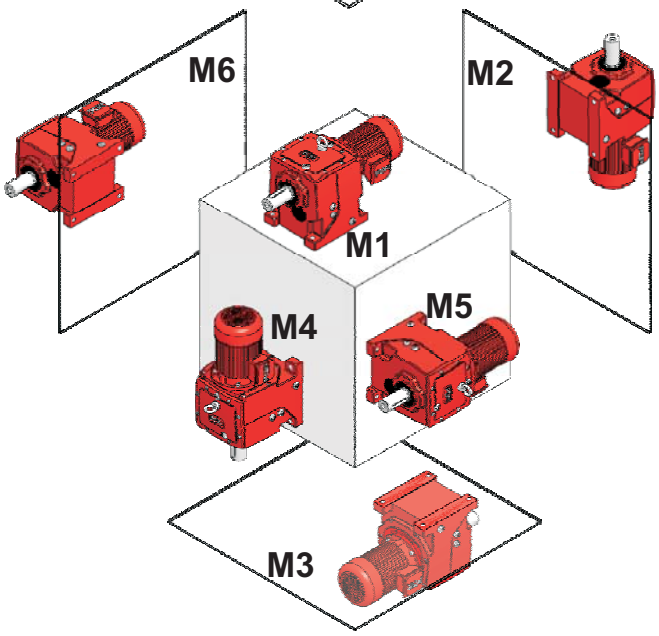
PA İKİ KADEME (MONOBLOK)

PA DOUBLE REDUCTION (MONOBLOC)



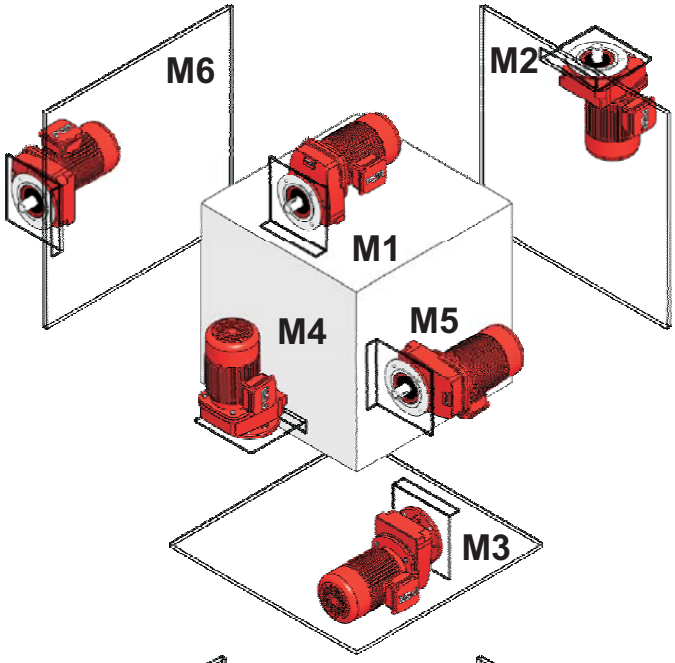
PA İKİ VE ÜÇ KADEME (BLOK)

PA DOUBLE AND TRIBLE REDUCTION (BLOC)



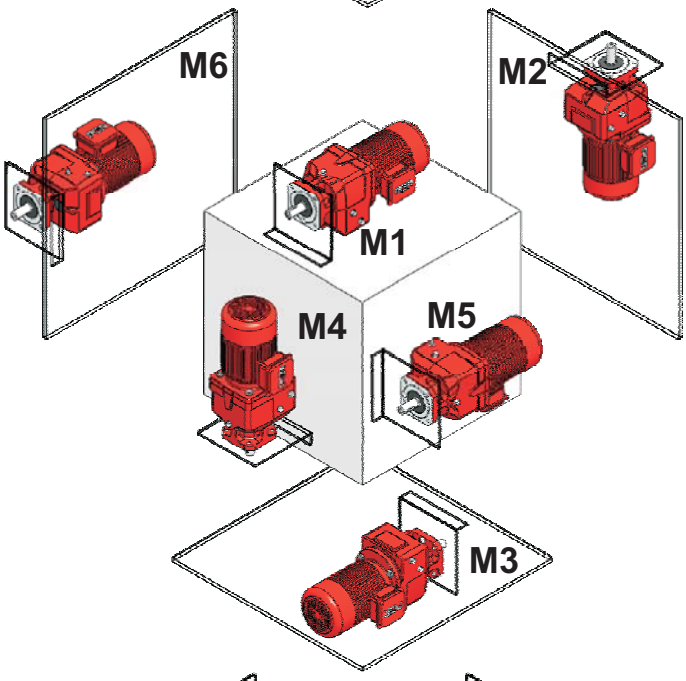
PF TEK KADEME

PF SINGLE REDUCTION



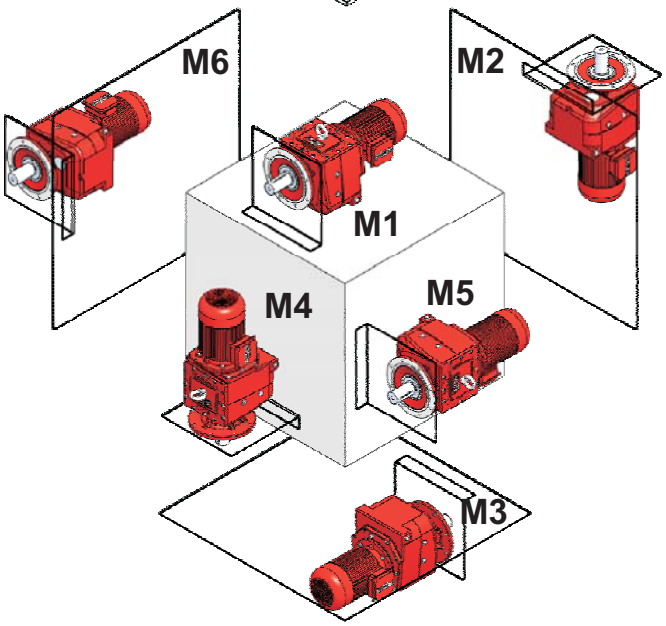
PF İKİ KADEME (MONOBLOK)

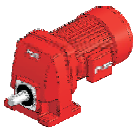
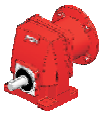
PF DOUBLE REDUCTION (MONOBLOC)

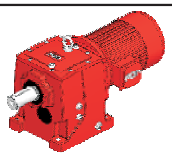
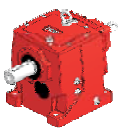
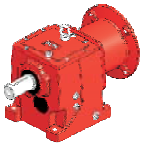


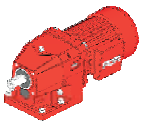
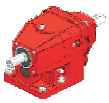
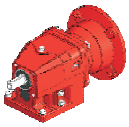
PF İKİ VE ÜÇ KADEME (BLOK)

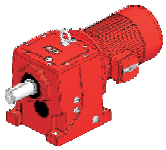
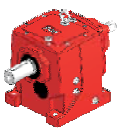
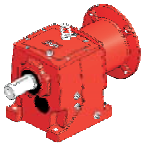
PF DOUBLE AND TRIBLE REDUCTION (BLOC)

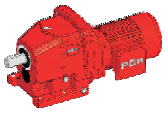
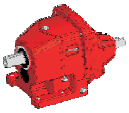
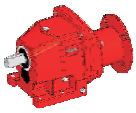


(Litre) (L)						
29 - 30	**M1**	**M2**	**M3**	**M4**	**M5**	**M6**
24 - 27	B3	V6	B8	V5	B6	B7
PA 11	0.25	0.50	0.55	0.40	0.35	0.35
PA 21	0.60	1.20	1.20	1.00	1.00	1.00
PA 31	1.10	2.70	2.20	2.30	1.70	1.70
PA 41	1.70	2.60	3.30	2.50	2.60	2.60
PA 51	2.20	4.40	4.70	4.00	3.40	3.40

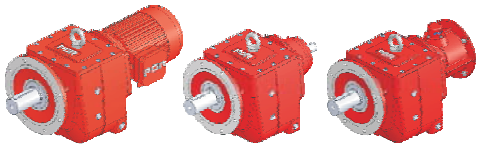
(Litre) (L)						
29 - 30	**M1**	**M2**	**M3**	**M4**	**M5**	**M6**
24 - 27	B3	V6	B8	V5	B6	B7
PA 62	6.50	15.0	13.0	16.0	15.0	15.0
PA 72	9.00	23.0	18.0	26.0	23.0	23.0
PA 82	14.0	35.0	27.0	44.0	32.0	32.0
PA 92	25.0	73.0	47.0	76.0	52.0	52.0
PA 102	36.0	79.0	66.0	102	71.0	71.0

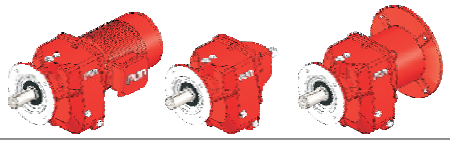
(Litre) (L)						
29 - 30	**M1**	**M2**	**M3**	**M4**	**M5**	**M6**
24 - 27	B3	V6	B8	V5	B6	B7
PA 02	0.15	0.60	0.70	0.60	0.40	0.40
PA 12	0.25	0.75	0.85	0.75	0.50	0.50
PA 22	0.50	1.80	2.00	1.80	1.35	1.35
PA 32	0.90	2.50	3.00	2.90	2.00	2.00
PA 42	1.30	4.50	4.50	4.30	3.20	3.20
PA 52	2.50	7.00	6.80	6.80	5.10	5.10

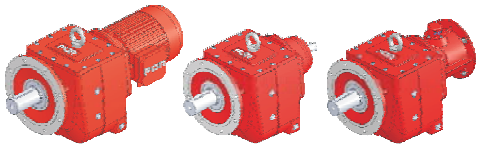
(Litre) (L)						
29 - 30	**M1**	**M2**	**M3**	**M4**	**M5**	**M6**
24 - 27	B3	V6	B8	V5	B6	B7
PA 63	13.0	14.5	14.5	16.0	13.0	13.0
PA 73	20.5	20.0	22.5	27.0	20.0	20.0
PA 83	30.0	31.0	34.0	37.0	33.0	33.0
PA 93	53.0	70.0	59.0	72.0	49.0	49.0
PA 103	69.0	71.0	74.0	97.0	67.0	67.0

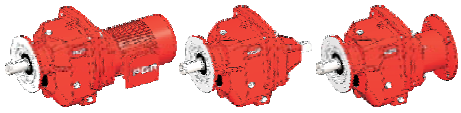
(Litre) (L)						
29 - 30	**M1**	**M2**	**M3**	**M4**	**M5**	**M6**
24 - 27	B3	V6	B8	V5	B6	B7
PA 03	0.30	1.00	0.80	0.90	0.60	0.60
PA 13	0.60	1.25	1.10	1.20	0.70	0.70
PA 23	1.30	2.40	2.30	2.35	1.60	1.60
PA 33	1.60	2.90	3.20	3.70	2.30	2.30
PA 43	3.00	5.60	5.20	6.60	3.60	3.60
PA 53	4.50	8.70	7.70	8.70	6.00	6.00

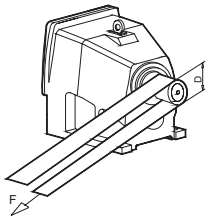
(Litre) (L)						
29 - 30	**M1**	**M2**	**M3**	**M4**	**M5**	**M6**
24 - 27	B5	V3	B5I	VI	B5II	B5III
PF 11	0.30	0.35	0.50	0.30	0.40	0.40
PF 21	0.50	1.40	1.10	0.70	0.90	0.90
PF 31	0.80	1.30	1.65	1.10	2.00	2.00
PF 41	1.00	2.60	2.80	1.60	3.30	3.30
PF 51	1.80	3.50	4.10	3.00	3.80	3.80

(Litre) (L)						
29 - 30	**M1**	**M2**	**M3**	**M4**	**M5**	**M6**
24 - 27	B5	V3	B5I	VI	B5II	B5III
PF 62	7.00	15.0	14.0	18.5	16.0	16.0
PF 72	10.0	23.0	18.5	28.0	23.0	23.0
PF 82	15.0	37.0	29.0	45.0	34.5	34.5
PF 92	26.0	73.0	47.0	78.0	52.0	52.0
PF 102	40.0	81.0	66.0	104	72.0	72.0

(Litre) (L)						
29 - 30	**M1**	**M2**	**M3**	**M4**	**M5**	**M6**
24 - 27	B5	V3	B5I	VI	B5II	B5III
PF 02	0.25	0.60	0.60	0.60	0.50	0.50
PF 12	0.35	0.85	0.90	0.90	0.60	0.60
PF 22	0.70	2.00	2.00	1.80	1.55	1.55
PF 32	1.30	2.90	3.30	3.10	2.40	2.40
PF 42	1.80	4.40	4.50	4.00	3.70	3.70
PF 52	3.00	6.80	6.20	7.40	5.60	5.60

(Litre) (L)						
29 - 30	**M1**	**M2**	**M3**	**M4**	**M5**	**M6**
24 - 27	B5	V3	B5I	VI	B5II	B5III
PF 63	13.5	14.0	15.5	18.0	14.0	14.0
PF 73	22.0	22.5	23.0	27.5	20.0	20.0
PF 83	31.0	34.0	35.0	40.0	34.0	34.0
PF 93	53.0	70.0	59.0	74.0	49.0	49.0
PF 103	69.0	78.0	78.0	99.0	67.0	67.0

(Litre) (L)						
29 - 30	**M1**	**M2**	**M3**	**M4**	**M5**	**M6**
24 - 27	B5	V3	B5I	VI	B5II	B5III
PF 03	0.50	0.80	0.90	1.10	0.80	0.80
PF 13	0.85	1.20	1.20	1.20	0.95	0.95
PF 23	1.50	2.60	2.50	2.80	2.80	2.80
PF 33	1.90	3.40	3.50	4.40	2.60	2.60
PF 43	3.50	5.70	5.00	6.10	4.10	4.10
PF 53	5.20	8.40	7.00	8.90	6.70	6.70

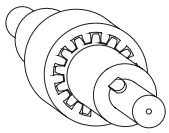


RADYAL YÜKLERİN HESABI

Radyal yük F_R (N)' nun hesaplanmasında gerekli tahrik momenti Ma (Nm), kasnak veya dişli çapı D (mm) olmak üzere aşağıdaki formüller kullanılır.

CALCULATION OF OVERHUNG LOADS

Radial load F_R(N)is calculated with the following equations where required moment Ma (Nm) and hoop or gear diameter D (mm) is used.

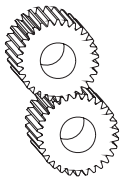


1 - Elastik Kaplin

Çalışma sırasında oluşan sapmalar kaplinin güvenlik sınırları içerisinde ise kuvvetler ihmal edilebilir.

1 - Elastik Coupling

If elastic coupling is working in its reliable working area, the overhung loads can be neglected.



2 - Düz Dişli (20° kavrama açılı)

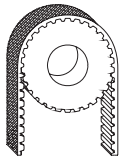
2 - For Spur Gear (Pressure angle 20°)

$$F_R = \frac{2100 \times M_a}{D}$$

3 - Küçük Hızlarda Zincir Dişli (Z < 17)

3 - For Chain Drive With Low Speed (Z < 17)

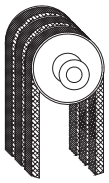
$$F_R = \frac{2100 \times M_a}{D}$$



4 - Triger Kayış

4 - For Trigger Belt

$$F_R = \frac{2500 \times M_a}{D}$$



5 - V Kayış

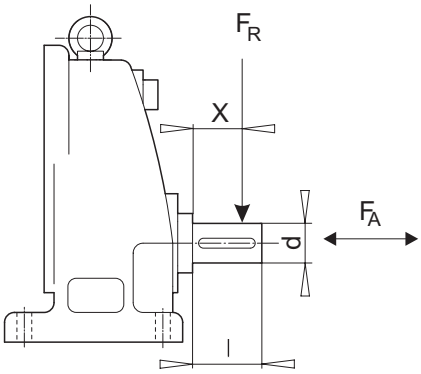
5 - For V Belt

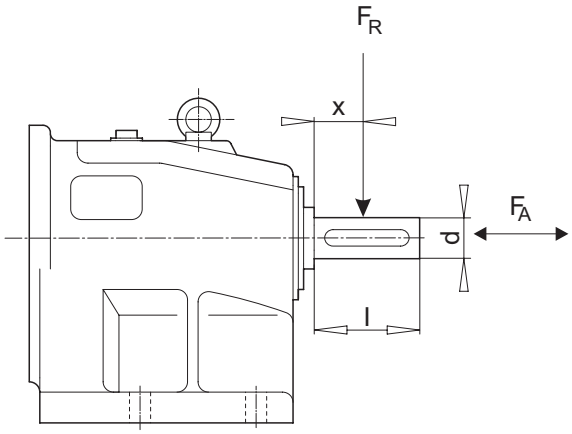
$$F_R = \frac{5000 \times M_a}{D}$$

6 - Gerdirme Makaralı Kayış

6 - Flat Belt With Spanning Puley

$$F_R = \frac{5000 \times M_a}{D}$$



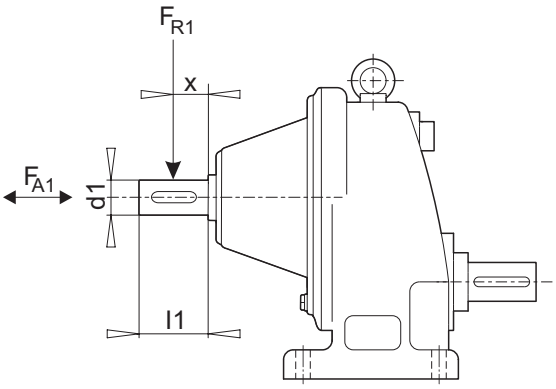


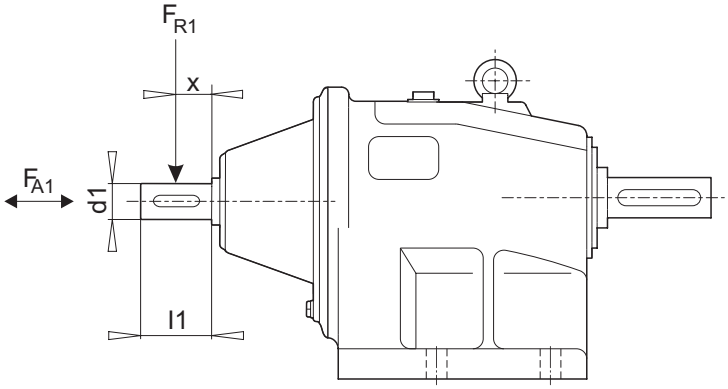
ÇIKIŞ ŞAFTINDAKİ RADYAL VE EKSENEL YÜK HESAPLAMALARI İÇİN DEĞERLER
VALUE TABLE FOR RADIAL AND AXIAL LOADS AT OUTPUT SHAFT

Helisel dişlili redüktör Helical gearboxes	**y** (mm)	**z** (mm)	**c** **Normal** Normal **(Nmm)**	**c** **Güçlendirilmiş** Reinforced **(Nmm)**	**f** (mm)	**d** (mm)	**l** (mm)
PA\PF 11	65.0	85.0	#	-	39.0	20	40
PA\PF 21	77.0	102.0	#	-	50.0	25	50
PA\PF 31	104.5	134.5	#	-	69.5	30	60
PA\PF 41	111.5	146.5	#	-	67.0	35	70
PA\PF 51	125.0	165.0	#	-	74.0	40	80
PA\PF 02 - PA\PF 03	63.8	83.8	0.06×10^6	0.10×10^6	11.8	20	40
PA\PF 12 - PA\PF 13	73.5	98.5	0.12×10^6	0.18×10^6	14.0	25	50
PA\PF 22 - PA\PF 23	86.0	116.0	0.19×10^6	0.30×10^6	14.0	30	60
PA\PF 32- PA\PF 33	112.5	152.5	0.39×10^6	0.60×10^6	30.0	40	80
PA\PF 42 - PA\PF 43	123.0	168.0	0.42×10^6	0.73×10^6	30.0	45	90
PA\PF 52 - PA\PF 53	149.5	204.5	0.92×10^6	1.56×10^6	35.0	55	110
PA\PF 62 - PA\PF 63	191.0	256.0	1.46×10^6	2.46×10^6	35.0	65	130
PA\PF 72 - PA\PF 73	212.0	282.0	2.13×10^6	4.45×10^6	37.0	75	140
PA\PF 82 - PA\PF 83	248.5	333.5	4.24×10^6	6.89×10^6	38.0	90	170
PA\PF 92- PA\PF 93	278.0	383.0	8.07×10^6	12.50×10^6	41.0	110	210
PA\PF 102 - PA\PF 103	323.5	448.5	14.86×10^6	22.84×10^6	46.0	130	250

 # İstediğinde hesaplanacaktır.

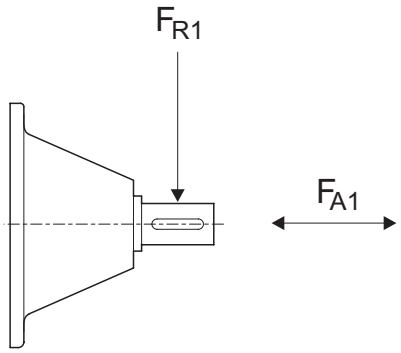
It will be calculated when you demand.





GİRİŞ ŞAFTINDAKİ RADYAL VE EKSENEL YÜK HESAPLAMALARI İÇİN DEĞERLER VALUE TABLE FOR RADIAL AND AXIAL LOADS AT INPUT SHAFT **f=0**					
Helisel dişlili redüktör Helical gearboxes	**y** **(mm)**	**z** **(mm)**	**c** **(Nmm)**	**d1** **(mm)**	**l1** **(mm)**
PA\PF 03 **PA\PF 11** **PA\PF 02** **PA\PF 12** **PA\PF 13** **PA\PF 23** **PA\PF 33**	70.0	90.0	3.64×10^4	16	40
PA\PF 21 **PA\PF 31** **PA\PF 22** **PA\PF 32** **PA\PF 43** **PA\PF 53**	96.5	121.5	1.07×10^5	24	50
PA\PF 41 **PA\PF 51** **PA\PF 42** **PA\PF 52** **PA\PF 63**	110.5	150.5	4.70×10^5	38	80
PA\PF 62 **PA\PF 63*** **PA\PF 72** **PA\PF 73** **PA\PF 83** **PA\PF 93**	149.5	204.5	4.60×10^5	42	110
PA\PF 82 **PA\PF 83*** **PA\PF 92** **PA\PF 93*** **PA\PF 103**	207.5	277.5	1.82×10^6	65	140
PA\PF 102	224.5	294.5	1.66×10^6	65	140

*** W Adaptörlerde Güçlendirilmiş Rulman Kullanılmıştır. / *** Reinforced bearing is used at W Adapters.



Tip Type	**PA\PF 11 PA\PF 02 PA\PF 12 PA\PF 03 PA\PF 13 PA\PF 23 PA\PF 33**		**PA\PF 21 PA\PF 31 PA\PF 22 PA\PF 32 PA\PF 43 PA\PF 53**		**PA\PF 41 PA\PF 51 PA\PF 42 PA\PF 52 PA\PF 63**		**PA\PF 62 PA\PF 72 PA\PF 63* PA\PF 73 PA\PF 83 PA\PF 93**		**PA\PF 82 PA\PF 92 PA\PF 102 PA\PF 83* PA\PF 93* PA\PF 103**	
P_1 (kW)	F_{A1}	F_{R1}	F_{A1}	F_{R1}	F_{A1}	F_{R1}	F_{A1}	F_{R1}	F_{A1}	F_{R1}
0.12	1.2	0.85	2.9	2.1	-	-	-	-	-	-
0.18	1.1	0.82	2.9	2.1	-	-	-	-	-	-
0.25	1.0	0.78	2.8	2.1	-	-	-	-	-	-
0.37	0.89	0.75	2.6	2.1	4.1	2.1	-	-	-	-
0.55	0.77	0.72	2.5	2.0	3.9	2.8	-	-	-	-
0.75	0.58	0.70	2.3	1.9	3.8	2.4	6.1	4.4	-	-
1.10	0.35	0.61	2.1	1.8	3.5	2.7	5.9	4.3	-	-
1.50	0.29	0.43	2.0	1.8	3.3	2.6	5.8	4.2	-	-
2.20	0.20	0.42	1.7	1.7	2.7	2.4	5.5	4.1	-	-
3.00	0.15	0.23	1.5	1.6	2.5	2.3	5.2	3.9	4.3	11.0
4.00	-	-	0.98	1.1	2.3	2.1	4.9	3.7	4.2	10.9
5.50	-	-	0.65	1.0	1.6	1.8	4.4	3.4	4.1	10.8
7.50	-	-	0.27	1.0	1.4	1.3	4.3	3.4	3.8	10.4
9.20	-	-	-	-	1.0	0.98	3.9	3.1	3.6	10.1
11.0	-	-	-	-	0.59	0.47	3.3	2.7	3.4	9.9
15.0	-	-	-	-	-	-	3.3	2.7	3.1	9.5
18.5	-	-	-	-	-	-	2.7	2.3	3.0	9.3
22.0	-	-	-	-	-	-	2.2	1.8	2.9	9.3
30.0	-	-	-	-	-	-	1.1	1.2	2.3	8.4
37.0	-	-	-	-	-	-	0.74	0.87	2.0	8.1
45.0	-	-	-	-	-	-	-	-	2.2	8.3
55.0	-	-	-	-	-	-	-	-	1.5	7.4
75.0	-	-	-	-	-	-	-	-	0.78	4.6
90.0	-	-	-	-	-	-	-	-	0.24	5.2

*** W Adaptörlerde Güçlendirilmiş Rulman Kullanılmıştır.**
* Reinforced bearing is used at W Adapters.

$F_{A1} \longrightarrow F_{R1} = 0$
$F_{R1} \longrightarrow F_{A1} = 0$

7

Kilit

Opsiyonel olarak kilitlerimiz mevcuttur. Bu kilitler tek yöne dönmeye izin verirken, diğer yöne dönmeyi engeller. 80 gövde ve üzeri üç fazlı motorlar, W kovanları ve IEC adaptörleri yağlanması yapılmış kilit ile donatılabilir. Bu kilitler çıkartılabilir, merkezkaç kuvveti tarafından kontrol edilir ve yaklaşık olarak 900 d/dk üzerine çıktıktan sonra aşınmaya maruz kalır.

Kilit mekanizmalı redüktörler için çıkış şaftının veya milinin dönme yönünün verilmesi gerekir. Dönme yönü çıkış şaftına veye çıkış miline göre düzenlenir.

Kararlaştırılan dönme yönü için, tarif edilen dönme yönü her zaman çıkış şaftına veya miline göre düzenlenir. Delik milli redüktörler için konik sıktırma tarafından belirlenir.

DİKKAT: Motoru ve sistemi çalıştırmadan önce redüktörün dönme yönünü kontrol ediniz. Redüktör üzerindeki oklar dönme yönünü gösterir.

Bloke edilen yön **CCW** ise Dönme Yönü **CW**

Bloke edilen yön **CW** ise Dönme Yönü **CCW**

CW : Saat yönü

CCW : Saat yönü tersi

Backstop

Backstop system is available for all type of helical gear unit. Lubricated backstop system could be used optionally for using motor size 80 and greater, W cylinder and IEC adapters. Backstop system permits just one direction rotation it resists another direction rotation. Rotation speed is important for tear. Nearly 900 min^{-1} and greater rotation speed influece abration. Please, determine direction of rotation when you offer. Direction of rotation should be determined according to output shaft.

Arrows which is designated by 'CW' or 'CCW' shows locking direction from viewing at face of output shaft end.

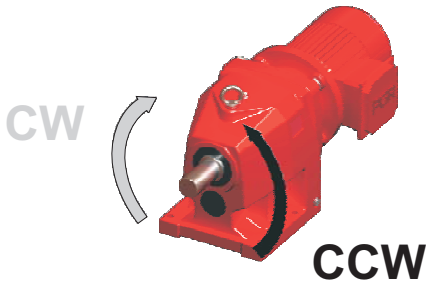
Precaution: When you receive gear units, please check direction of rotation before running or installation for avoid damage.

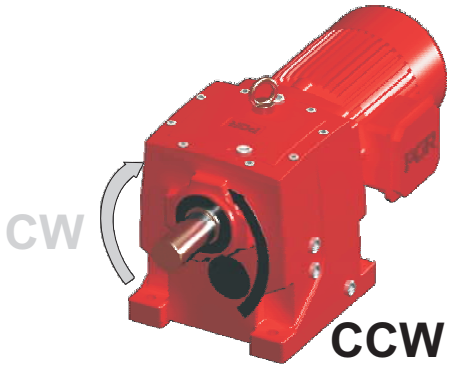
If Locking direction is **CCW** Rotational direction is **CW**

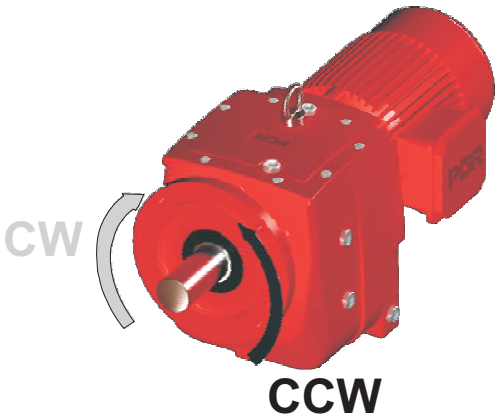
If Locking direction is **CW** Rotational direction is **CCW**

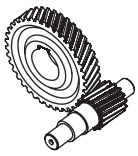
CW : Clockwise rotation

CW : Counterclockwise rotation









MOTOR VE REDÜKTÖRLERDE BOYUT - ÇİZİM BİLGİLERİ

Motor ölçüleri istenen opsiyona göre ölçüleri değişebilir.

DELİK MİLLİLER

Delik mil çapı toleransı için (DIN 748) ISO H7.

Müşteri mili çap toleransı ISO h6. "H" yükleme tipi bulunuyorsa ISO k6

IEC - ADAPTÖR

Flanş merkezi çap toleransı için ISO H7

GİRİŞ VE ÇIKIŞ ŞAFTLARI

Mil çapı toleransı (DIN 748) :

ø 14 ile ø 50 mm arası için ISO k6,
ø 50 mm üzeri için ISO m6

Şaftta diş çekilmiş delikler için DIN 332/2 ye göre;

= ø 13 - ø 16	M5
> ø 16 - ø 21	M6
> ø 21 - ø 24	M8
> ø 24 - ø 30	M10
> ø 30 - ø 38	M12
> ø 38 - ø 50	M16
> ø 50 - ø 85	M20
> ø 85 - ø 130	M24

81 - 109

Kama yatakları DIN 6885

Şaft boyu "h" DIN 747

FLANŞLAR

Flanş merkezi çap toleransı (DIN 42948);

< ø 230 mm' ye kadar ISO j6,
> ø 230 mm üzeri için ISO h6

GEARED MOTORS AND GEARBOXES INFORMATION REFERRING TO DIMENSION - DRAWINGS

Motor dimension could be changed according to customer purchase.

HOLLOW SHAFTS

Tolerance of hollow shaft (DIN 748) ISO H7.

Tolerance of customer's solid shaft which is used for hollow shaft ISO h6, with type of load classification 'H' which is heavy-shock operation ISO k6.

IEC - ADAPTER

Diameter tolerance of flange centering is machined according to ISO H7.

INPUT AND OUTPUT SHAFT

Tolerances of solid shaft (DIN 748) :

between ø 14 - ø 50 mm to ISO k6,
greater than ø 50 mm to ISO m6.

Tapped center hole is machined according to DIN 332, sheet 2 ;

= ø 13 - ø 16	M5
> ø 16 - ø 21	M6
> ø 21 - ø 24	M8
> ø 24 - ø 30	M10
> ø 30 - ø 38	M12
> ø 38 - ø 50	M16
> ø 50 - ø 85	M20
> ø 85 - ø 130	M24

81 - 109

Keyways are machined according to DIN 6885, sheet 1

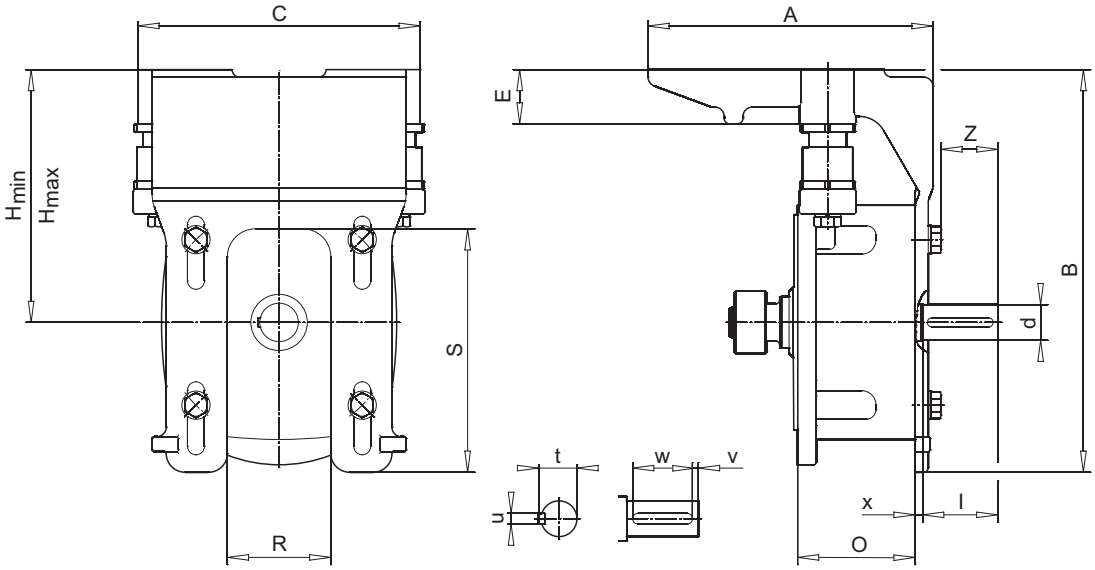
Shaft heights are machined according to "h" to DIN 747

FLANGES

Diameter tolerance of flange centering is machined according to (DIN 42948);

< ø 230 mm to ISO j6,
> ø 230 mm to ISO h6

Motor Platformu Ölçüleri
Motor Platform Dimensions



Tip Type	Bağlantı boyutları ve platform ölçüleri Connection and platform dimensions										Mil Ölçüleri Shaft size				Flanş Flange
	A	B	C	E	R	S	H min	H max	Z	O	d l	t u	v w	x	
MK I 63 M - 100 L	224	253	206	45	60	140	153	173	41	121.5	24 50	27 8	5 40	8	160 S
MK II 80 M - 112 M	238	320	252	50	66	145	199	224	48	115.5	28 60	31 8	5 50	9	250 S
MK III-A 90 S - 132 M	305	430	302	58	110	260	254	286	61	127	38 80	41 10	5 70	8	300 S
MK III-B 90 S - 132 M	305	430	302	58	110	260	254	286	91	172	42 110	45 12	10 90	8	Ø250
MK IV 112 M - 200 L	478	530	402	75	130	315	315	355	116	254	65 140	69 18	15 110	8	Ø350
MK V 200 L - 250 M	664	690	572	105	382	369	465	515	119	247	65 140	69 18	15 110	12	Ø450

Motor Platform Montajı

Motor platform tasarımı PGR monoblok dişli ünitesi serilerinin tüm montaj pozisyonlarında kullanılabilir. 5 motor platformu boyutu tüm motor-redüktör kombinasyonlarını kapsar. Çok kademeli redüktörleri de karşılayan ayrı ayrı redüktörler için seçim tablolarından motor platformları bakılabilir.

* Her montaj pozisyonu için kullanılabilir.
* Optimum kayış gerilimi için kolayca yönlendirilebilen yükseklik ayarlaması yapılabilir.
* Sabitleme elemanlarıda dahil olmak üzere korozyona karşı direçlidir.
* Hafif, vibrasyonu absorbe eden alümiyum yapı mevcuttur.
* Birçok motor boyutu için kullanım kolaylığı sağlar.
* Tabloya göre “I” oranının 1’e eşit olduğu durumlar için önerilir.
* Her yöne 90 °’ ye kadar eksen etrafında dönebilme özelliğine sahiptir.

Assembling of Motor Platform

Motor platform design could be used at all PGR monoblock gear unit series for all mounting positions. There are 5 motor platform designs. This platforms are provide using possibility with all motor-gear unit series. Motor platform type, dimension and suitable belt type could be followed from table which is shown on page 39-41, on the other hand this table is valid for multi stage gear units.

* It could be used for all mounting positions.
* It could be adjusted for optimum belt-tension and height easily.
* It has high corrosion resistance however fixing elements have this property.
* Alumium structure provide vibration absorbing and light weight.
* It could be used with all motor type.
* We recommend, it is suitable for while “i” ratio is equal to one, table is prepared according to this situation
* It could be adjusted to all direction up to 90°

Tip Type	**PA\PF 11** **PA\PF 12**	**PA\PF 21** **PA\PF 31** **PA\PF 22** **PA\PF 32**	**PA\PF 41** **PA\PF 51** **PA\PF 42** **PA\PF 52** **PA\PF 63**	**PA\PF 62** **PA\PF 72** **PA\PF 73** **PA\PF 83**	**PA\PF 93**	**PA\PF 82** **PA\PF 92** **PA\PF 103**	**PA\PF 102**
Motor	W III	W II	W III	W III W IV	W V W IV	W V W IV	W IV
63 M	MK I						
71 M	MK I						
80 M	MK I	MK II					
90 S **90 L**	MK I	MK II	MK III - A	MK III - B			
100 L	MK I	MK II	MK III - A	MK III - B			
112 M		MK II	MK III - A	MK III - B	MK IV	MK IV	
132 S **132 M**			MK III - A	MK III - B	MK IV	MK IV	
160 M **160 L**				MK IV	MK IV	MK IV	
180 M **180 L**				MK IV	MK IV	MK IV **	
200 L				MK IV	MK IV	MK IV **	MK V
225 S **225 M**					MK V	MK V	MK V
250 M					MK V	MK V	MK V

**** Ayarlanabilir mesafe (sınırlı)**

** There is a limit distance for adjustment.

Seçim Örneği:

Çıkış gücü ve hızına göre gerekli olan dişli ünitesinin temel tipini ve gerekli çıkış gücü veya çıkış dönüş hızına dayanan çıkış gücü ve dişli oranını saptayınız.

Örnek :

0.25 kW , 19.4 d/dk = 72.60
PA 12 - 71 M

Bu esas dişli ünitesi tipi için, motor platformu MK I tayin edildiğini tablodan (yukarıya bakınız) saptayınız. Bu nedenle,tam tip tanımı PA 12 - MK I - 71'dir.

MK I tablodan (sayfa 41) bant makarası ve bant tipi ile ilgili daha fazla bilgi alırsınız.

Esas boyutlar, tabloda gösterilmiştir (sayfa 39)

Selection Example:

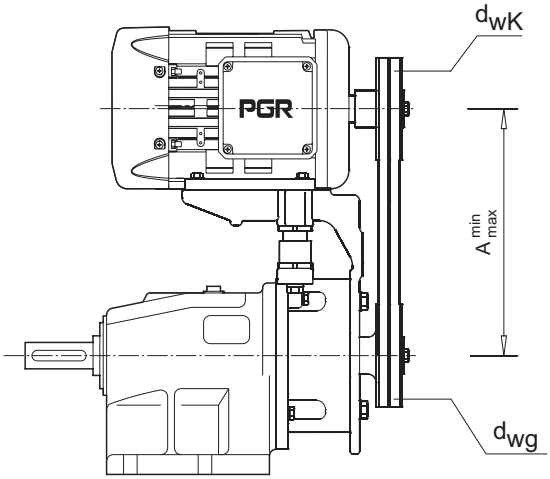
Motor platform assignment could be explained in one example hence, according to selecting gear unit reduction ratio, output speed and motor power is determined.

For instance ;

0.25 kW , 19.4 min^{-1}, i = 72.60
PA 12 - 71 M

From table (see above of this page) type of gear unit (column) and motor type (row) are intersected. Hence, from this motor bracket MK I dimension should be used. Full designation is PA 12 - MK I - 71.

Following page shows more detail about belt pulley and type of belt (see page 41). You can see dimension of belt length with motor platform assignment.



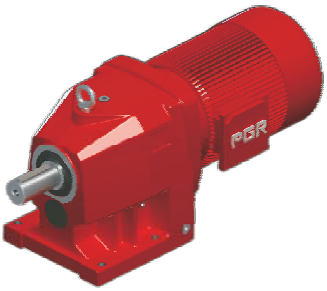
	Motor	Çıkış Output (kW)	Ayar aralığı Adjustment range Amin	Amax	Kayış uzunluğu Belt length	Mil merkezi uzaklığı Shaft centre distance A	Kayış sayısı Number of belts
MK I Kayış Tipi SPZ Belt type SPZ					**(dwg =80) (i = 1) Lw**		
	63 M/4A	0.12	216	236	697	223	1
	63 M/4B	0.18	216	236	697	223	1
	71 M/4A	0.25	224	244	710	229	1
	71 M/4B	0.37	224	244	710	229	1
	80 M/4A	0.55	233	253	737	243	1
	80 M/4B	0.75	233	253	737	243	1
	90 S/4A	1.10	243	263	750	249	1
	90 L/4A	1.50	243	263	750	249	2
	100 L/4A	2.20	253	273	772	260	2
	100 L/4B	3.00	253	273	772	260	3
MK II Kayış Tipi XPZ Belt type XPZ					**(dwg =112) (i = 1) Lw**		
	80 M/4A	0.55	279	304	930	289	1
	80 M/4B	0.75	279	304	930	289	1
	90 S/4A	1.10	289	314	950	299	1
	90 L/4A	1.50	289	314	950	299	1
	100 L/4A	2.20	299	324	980	314	1
	100 L/4B	3.00	299	324	980	314	2
	112 M/4B	4.00	311	336	1000	324	2
MK III Kayış Tipi SPZ Belt type SPZ					**(dwg =160) (i = 1) Lw**		
	90 S/4A	1.10	344	376	1222	360	1
	90 L/4B	1.50	344	376	1222	360	1
	100 L/4A	2.20	354	386	1250	374	1
	100 L/4B	3.00	354	386	1250	374	1
	112 M/4B	4.00	366	398	1262	380	2
	132 S/4C	5.50	386	418	1312	405	2
	132 M/4B	7.50	386	418	1312	405	3
	132 M/4	9.20	386	418	1312	405	3
MK IV Kayış Tipi XPA Belt type XPA					**(dwg =200) (i = 1) Lw**		
	112 M/4B	4.00	427	467	1500	436	1
	132 S/4C	5.50	447	487	1550	461	1
	132 M/4B	7.50	447	487	1550	461	2
	132 M/4	9.20	447	487	1550	461	2
	160 M/4B	11.0	475	515	1600	486	2
	160 L/4A	15.0	475	515	1600	486	3
	180 M/4B	18.5	495	535	1650	511	3
	180 L/4B	22.0	495	535	1650	511	4
	200 L/4C	30.0	515	555	1700	536	4
MK V Kayış Tipi SPA Belt type SPA					**(dwg =250) (i = 1) Lw**		
	200 L/4C	30.0	665	715	2182	698	4
	225 S/4A	37.0	690	740	2207	710	4
	225 M/4C	45.0	690	740	2207	710	5

PGR®
Drive Technologies

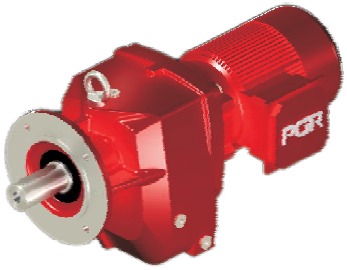
Motorlu Seçim Sayfaları
Selection Of Gearmotors

PA 11...51

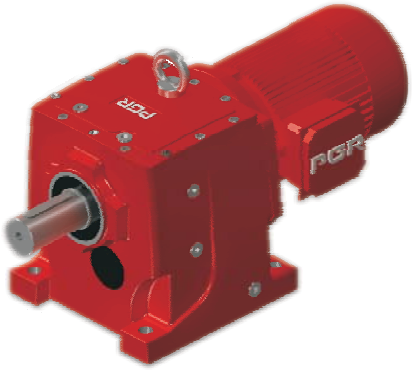
PF 11...51



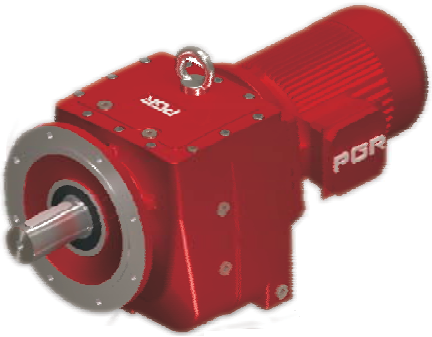
PA 02...52



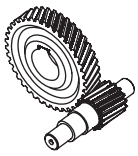
PF 02...52



PA 62...102
63...103



PF 62...102
63...103



Motorlu redüktör performans tablolarının yapısı.
Notify about performance tables for Geared motor.

0.37 kW → **Redüktör motor gücü**
Gear unit motor power

Motor gücü
Rated motor power

Çıkış devri
Output speed

Çıkış momenti
Output torque

Servis faktörü
Service factor

Tahvil oranı
Reduction ratio

Redüktör tipi
Gear unit motor type

Ağırlık
Weight

Ölçü sayfaları
Drawing page

P_1 [kW]	n_2 [Min^{-1}]	M_2 [Nm]	f_B	i_{ges}	F_R [N]	F_A [N]	$F_{R\,GR}$ [N]	$F_{A\,GR}$ [N]	Tip / Type	Kg	Sayfa Page mm
0.37	11.2 13.3 14.3	315 267 247	1.5 2.0 2.3	81.27 72.71 64.22	7.0 7.0 7.0	9.0 9.0 9.0	9.0 9.0 9.0	18.0 17.0 17.0	**PA 32 - 80M/6A** **PF 32 - 80M/6A**	36	94

Müsaade edilebilir radyal yükler
Normal rulmanlarda
F_R için listelenmiş değerlerde
F_A = 0 (N) olarak hesaplanmıştır

Permissible radial force or load on output shaft while normal bearings are used. For this load F_A is assumed equal zero. F_A = 0 (N)

Müsaade edilebilir eksenel yükler
Güçlendirilmiş rulmanlarda

F_A için listelenmiş değerlerde
F_R = 0 (N) olarak hesaplanmıştır

Permissible axial force on output shaft while reinforced bearings are used. For this load F_R is assumed equal to zero. F_R = 0 (N)

Müsaade edilebilir eksenel yükler
Normal rulmanlarda
F_A için listelenmiş değerlerde
F_R = 0 (N) olarak hesaplanmıştır

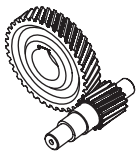
Permissible axial force or load on output shaft while normal bearings are used. For this load F_R is assumed equal zero.
F_R = 0 (N)

Müsaade edilebilir radyal yükler
Güçlendirilmiş rulmanlarda

F_R için listelenmiş değerlerde
F_A = 0 (N) olarak hesaplanmıştır

Permissible radial force or load on output shaft while reinforced bearings are used. For this load F_A is assumed equal to zero. F_A = 0 (N)

P_1 [kW]	n_2 [Min^{-1}]	M_2 [Nm]	f_B	i_{ges}	F_R [kN]	F_A [kN]	$F_{R\,GR}$ [kN]	$F_{A\,GR}$ [kN]	Tip / Type	Kg	Sayfa Page mm
0.12	0.9	808	1.5	1393.57	7.0	12.0	11.0	30.0	PA 42/12 - 63M/4A PF 42/12 - 63M/4A	62	110
	1.2	647	1.9	1114.85	8.0	12.0	11.0	30.0			
	1.8	435	2.8	750.00	8.0	12.0	11.0	29.0			
	2.4	319	3.8	550.63	8.0	12.0	12.0	27.0			
	3.0	251	4.8	433.11	8.0	12.0	12.0	25.0			
	1.0	756	0.8	1304.13	5.0	9.0	9.0	25.0	PA 32/12 - 63M/4A PF 32/12 - 63M/4A	45	110
	1.2	627	1.0	1080.92	6.0	9.0	9.0	25.0			
	1.2	*733	0.8	740.46	6.0	9.0	9.0	25.0	PA 33 - 63M/6A PF 33 - 63M/6A	41	95
	1.3	*697	0.8	662.46	6.0	9.0	9.0	25.0			
	1.5	*805	0.8	585.48	5.0	9.0	8.0	25.0			
	1.8	681	0.8	740.46	6.0	9.0	9.0	25.0	PA 33 - 63M/4A PF 33 - 63M/4A	41	95
	2.0	576	1.0	662.46	6.0	9.0	9.0	25.0			
	2.2	509	1.2	585.48	6.0	9.0	9.0	25.0			
	2.5	456	1.5	523.81	6.0	9.0	9.0	25.0			
	3.1	366	1.8	421.10	7.0	9.0	9.0	25.0			
	3.9	295	2.2	339.07	7.0	9.0	9.0	25.0			
	5.3	216	3.1	248.21	7.0	9.0	9.0	24.0			
	6.4	180	3.7	206.97	7.0	9.0	9.0	23.0			
	1.0	*425	0.8	1440.59	4.0	6.0	6.0	20.0	PA 22/02 - 63M/4A PF 22/02 - 63M/4A	32	110
	1.1	*411	0.8	1156.84	4.0	6.0	6.0	20.0			
	1.5	*426	0.8	881.08	4.0	6.0	6.0	20.0			
	1.7	*348	0.8	516.35	5.0	6.0	7.0	20.0	PA 23 - 63M/6A PF 23 - 63M/6A	29	93
	2.1	*430	0.8	417.44	4.0	6.0	6.0	20.0			
	2.6	336	0.8	516.35	5.0	6.0	7.0	20.0	PA 23 - 63M/4A PF 23 - 63M/4A	29	93
	3.2	363	0.9	417.44	4.0	6.0	7.0	20.0			
	4.1	281	1.2	323.31	5.0	6.0	7.0	19.0			
	5.0	228	1.5	261.93	5.0	6.0	7.0	18.0			
	6.1	189	1.8	217.60	5.0	6.0	7.0	17.0			
	7.3	156	2.0	179.61	5.0	6.0	7.0	16.0			
	8.7	131	2.2	151.11	5.0	6.0	7.0	15.0			
	10.6	108	3.1	124.10	5.0	6.0	7.0	15.0			
	13.1	87	3.9	100.53	5.0	6.0	8.0	14.0			
	1.0	*218	0.8	1277.78	3.0	4.0	5.0	15.0	PA 12/02 - 63M/4A PF 12/02 - 63M/4A	20	110
	1.2	*216	0.8	1053.91	3.0	4.0	5.0	15.0			
	1.5	*227	0.8	886.01	3.0	4.0	5.0	15.0			
	2.1	*213	0.8	420.39	3.0	4.0	5.0	15.0	PA 13 - 63M/6A PF 13 - 63M/6A	17	91
	2.3	*216	0.8	369.18	3.0	4.0	5.0	15.0			
	2.8	*212	0.8	313.35	3.0	4.0	5.0	15.0			
	3.1	*207	0.8	420.39	3.0	4.0	5.0	15.0	PA 13 - 63M/4A PF 13 - 63M/4A	17	91
	3.6	*216	0.8	369.18	3.0	4.0	5.0	15.0			
	4.2	*204	0.8	313.35	3.0	4.0	5.0	15.0			
	4.8	*216	0.8	275.17	3.0	4.0	5.0	15.0			
	5.4	*217	0.8	244.64	3.0	4.0	5.0	14.0			
	6.7	170	1.1	195.71	3.0	4.0	5.0	14.0			
	8.3	139	1.2	159.23	3.0	4.0	5.0	13.0			
	9.9	115	1.3	132.48	4.0	4.0	5.0	12.0			
	12.1	95	1.9	108.73	4.0	4.0	5.0	12.0			
	11.9	96	1.4	72.60	4.0	4.0	5.0	12.0	PA 12 - 63M/6A PF 12 - 63M/6A	12	90
	14.1	81	1.9	61.31	4.0	4.0	5.0	11.0			
	18.1	63	2.2	72.60	4.0	4.0	5.0	11.0	PA 12 - 63M/4A PF 12 - 63M/4A	12	90
	21.5	53	2.9	61.31	4.0	4.0	5.0	10.0			
	24.5	47	3.8	53.84	4.0	4.0	5.0	10.0			
	30.6	37	4.3	43.07	4.0	4.0	5.0	9.0			

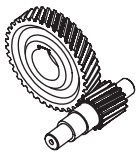


P_1 [kW]	n_2 [Min^{-1}]	M_2 [Nm]	f_B	i_{ges}	F_R [kN]	F_A [kN]	$F_{R\,GR}$ [kN]	$F_{A\,GR}$ [kN]	Tip / Type	Kg	Sayfa Page mm
0.12	4.2	*108	0.8	312.98	2.0	3.0	3.0	6.0	**PA 03 - 63M/4A** **PF 03 - 63M/4A**	14	89
	4.8	*108	0.8	274.18	2.0	3.0	3.0	6.0			
	6.2	*131	0.8	212.39	2.0	3.0	3.0	6.0			
	7.7	*131	0.8	170.56	2.0	3.0	3.0	6.0			
	8.7	*134	0.8	151.24	2.0	3.0	3.0	6.0			
	10.6	109	1.0	124.74	2.0	3.0	3.0	6.0			
	11.8	97	0.9	73.03	2.0	3.0	3.0	6.0	**PA 02 - 63M/6A** **PF 02 - 63M/6A**	10	88
	14.1	81	1.1	61.24	2.0	3.0	3.0	6.0			
	16.1	71	1.3	53.64	2.0	3.0	3.0	6.0			
	18.0	64	1.4	73.03	2.0	3.0	3.0	6.0	**PA 02 - 63M/4A** **PF 02 - 63M/4A**	10	88
	21.5	53	1.7	61.24	2.0	3.0	3.0	6.0			
	24.6	47	1.9	53.64	2.0	3.0	3.0	6.0			
	31.7	36	2.7	41.56	2.0	3.0	3.0	6.0			
	39.5	29	3.3	33.37	2.0	3.0	3.0	6.0			
	47.9	24	3.6	27.52	2.0	3.0	3.0	6.0			
	56.9	20	3.9	23.14	2.0	3.0	3.0	6.0			
	64.0	18	4.1	20.59	2.0	3.0	3.0	6.0			
	82.6	14	5.2	15.95	2.0	3.0	3.0	6.0			
	102.8	11	6.3	12.81	2.0	3.0	3.0	5.0			
	117.2	10	6.8	11.24	2.0	3.0	3.0	5.0			
	132.6	9	7.4	9.94	2.0	3.0	3.0	5.0			
	142.1	8	8.1	9.27	2.0	3.0	3.0	5.0			
	160.7	7	8.8	8.20	2.0	3.0	3.0	5.0			
	169.0	7	9.3	7.80	2.0	3.0	3.0	5.0			
	191.2	6	10.2	6.89	2.0	3.0	3.0	5.0			
	236.6	5	11.8	5.57	2.0	3.0	3.0	4.0			
	273.2	4	13.6	4.82	2.0	3.0	3.0	4.0			
	338.1	3	15.5	3.90	2.0	3.0	3.0	4.0			
	388.2	3	16.3	3.39	2.0	3.0	3.0	4.0			
	444.0	3	16.9	2.97	2.0	3.0	2.0	3.0			
	465.5	2	16.4	2.83	-	4.0	-	-	**PA 11 - 63M/4A** **PF 11 - 63M/4A**	9	82
	567.8	2	17.6	2.32	-	3.0	-	-			
	645.7	2	18.3	2.04	-	3.0	-	-			
	727.7	2	18.9	1.81	-	3.0	-	-			
0.18	0.9	1419	1.3	1427.20	13.0	24.0	19.0	40.0	**PA 52/12 - 63M/4B** **PF 52/12 - 63M/4B**	91	110
	1.5	915	2.0	920.36	14.0	24.0	19.0	40.0			
	1.9	686	2.7	690.27	14.0	24.0	20.0	40.0			
	1.0	1385	0.9	1393.57	5.0	12.0	9.0	30.0	**PA 42/12 - 63M/4B** **PF 42/12 - 63M/4B**	62	110
	1.2	1108	1.1	1114.85	6.0	12.0	10.0	29.0			
	1.8	745	1.6	750.00	8.0	12.0	11.0	27.0			
	2.4	547	2.2	550.63	8.0	12.0	11.0	26.0			
	3.1	430	2.8	433.11	8.0	12.0	11.0	24.0			
	3.9	345	3.5	346.69	8.0	12.0	11.0	23.0			
	4.9	275	4.4	276.49	8.0	12.0	12.0	22.0			
	1.9	695	0.9	699.71	6.0	9.0	9.0	25.0	**PA\PF 32/12 - 63M/4B**	46	110
	2.3	748	0.8	585.48	6.0	9.0	9.0	25.0	**PA 33 - 63M/4B** **PF 33 - 63M/4B**	41	95
	2.6	669	1.0	523.81	6.0	9.0	9.0	25.0			
	3.2	538	1.2	421.10	6.0	9.0	9.0	25.0			
	4.0	433	1.5	339.07	7.0	9.0	9.0	25.0			
	5.4	317	2.1	248.21	7.0	9.0	9.0	23.0			
	6.5	264	2.5	206.97	7.0	9.0	9.0	22.0			
	8.1	213	3.2	166.39	7.0	9.0	9.0	21.0			
	10.0	171	3.8	133.98	7.0	9.0	9.0	20.0			
	11.1	155	3.3	81.27	7.0	9.0	9.0	19.0	**PA\PF 32 - 71M/6A**	33	94
	3.0	441	0.8	444.02	4.0	6.0	6.0	19.0	**PA 22/02 - 63M/4B** **PF 22/02 - 63M/4B**	33	110
	3.9	342	1.0	344.50	4.0	6.0	7.0	18.0			

P_1 [kW]	n_2 [Min^{-1}]	M_2 [Nm]	f_B	i_{ges}	F_R [kN]	F_A [kN]	$F_{R\,GR}$ [kN]	$F_{A\,GR}$ [kN]	Tip / Type	Kg	Sayfa Page mm
0.18	4.2	413	0.8	323.31	4.0	6.0	7.0	17.0	PA 23 - 63M/4B PF 23 - 63M/4B	29	93
	5.1	335	1.0	261.93	5.0	6.0	7.0	17.0			
	6.2	278	1.2	217.60	5.0	6.0	7.0	16.0			
	7.5	229	1.4	179.61	5.0	6.0	7.0	15.0			
	8.9	193	1.5	151.11	5.0	6.0	7.0	15.0			
	10.4	165	1.5	86.26	5.0	6.0	7.0	14.0	PA 22 - 71M/6A PF 22 - 71M/6A	22	92
	12.9	133	2.0	69.74	5.0	6.0	7.0	14.0			
	16.3	106	3.0	55.25	5.0	6.0	8.0	13.0			
	19.6	88	3.3	45.90	5.0	6.0	8.0	12.0			
	6.3	212	0.8	213.21	3.0	4.0	5.0	13.0	PA\PF 12/02 - 63M/4B	20	110
	6.9	250	0.8	195.71	3.0	4.0	4.0	13.0	PA 13 - 63M/4B PF 13 - 63M/4B	17	91
	8.5	203	0.8	159.23	3.0	4.0	5.0	12.0			
	10.2	169	0.9	132.48	3.0	4.0	5.0	12.0			
	12.4	139	1.3	108.73	3.0	4.0	5.0	11.0			
	12.4	139	1.0	72.60	3.0	4.0	5.0	11.0	PA 12 - 71M/6A PF 12 - 71M/6A	13	90
	14.7	117	1.3	61.31	4.0	4.0	5.0	11.0			
	18.5	93	1.5	72.60	4.0	4.0	5.0	10.0	PA 12 - 63M/4B PF 12 - 63M/4B	12	90
	21.9	78	2.0	61.31	4.0	4.0	5.0	10.0			
	25.0	69	2.6	53.84	4.0	4.0	5.0	10.0			
	31.2	55	2.9	43.07	4.0	4.0	5.0	9.0			
	38.4	45	3.3	35.04	4.0	4.0	5.0	9.0			
	16.5	104	1.0	81.52	2.0	3.0	3.0	6.0	PA\PF 03 - 63M/4B	14	89
	14.7	117	0.8	61.24	2.0	3.0	3.0	6.0	PA 02 - 71M/6A PF 02 - 71M/6A	11	88
	16.8	102	0.9	53.64	2.0	3.0	3.0	6.0			
	18.4	93	1.0	73.03	2.0	3.0	3.0	6.0	PA 02 - 63M/4B PF 02 - 63M/4B	10	88
	22.0	78	1.1	61.24	2.0	3.0	3.0	6.0			
	25.1	69	1.3	53.64	2.0	3.0	3.0	6.0			
	32.4	53	1.9	41.56	2.0	3.0	3.0	6.0			
	40.3	43	2.3	33.37	2.0	3.0	3.0	6.0			
	48.9	35	2.5	27.52	2.0	3.0	3.0	6.0			
	58.1	30	2.6	23.14	2.0	3.0	3.0	6.0			
	65.3	26	2.8	20.59	2.0	3.0	3.0	6.0			
	84.4	20	3.5	15.95	2.0	3.0	3.0	6.0			
	105.0	16	4.3	12.81	2.0	3.0	3.0	5.0			
	119.7	14	4.7	11.24	2.0	3.0	3.0	5.0			
	135.4	13	5.0	9.94	2.0	3.0	3.0	5.0			
	145.1	12	5.5	9.27	2.0	3.0	3.0	5.0			
	164.2	10	6.0	8.20	2.0	3.0	3.0	5.0			
	172.6	10	6.3	7.80	2.0	3.0	3.0	5.0			
	195.3	9	6.9	6.89	2.0	3.0	3.0	4.0			
	241.6	7	8.0	5.57	2.0	3.0	3.0	4.0			
	279.1	6	9.3	4.82	2.0	3.0	3.0	4.0			
	345.3	5	10.5	3.90	2.0	3.0	3.0	4.0			
	396.6	4	11.0	3.39	2.0	3.0	3.0	4.0			
	453.5	4	11.5	2.97	2.0	3.0	2.0	3.0			
	475.4	4	11.2	2.83	-	4.0	-	-	PA 11 - 63M/4B PF 11 - 63M/4B	9	82
	580.0	3	12.0	2.32	-	3.0	-	-			
	659.6	3	12.4	2.04	-	3.0	-	-			
	743.4	2	12.9	1.81	-	3.0	-	-			
0.25	1.0	2036	1.6	1410.80	19.0	45.0	27.0	45.0	PA 63/23 - 71M/4A PF 63/23 - 71M/4A	157	112
	1.3	1539	2.1	1066.44	20.0	45.0	28.0	45.0			
	1.0	2059	0.9	1427.20	11.0	24.0	18.0	40.0	PA 52/12 - 71M/4A PF 52/12 - 71M/4A	92	110
	1.5	1328	1.4	920.36	13.0	24.0	19.0	40.0			
	2.0	996	1.8	690.27	14.0	24.0	19.0	40.0			
	2.6	783	2.3	542.36	14.0	24.0	20.0	40.0			
	2.8	709	2.6	491.74	14.0	24.0	20.0	40.0			

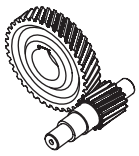
P_1 [kW]	n_2 [Min^{-1}]	M_2 [Nm]	f_B	i_{ges}	F_R [kN]	F_A [kN]	$F_{R\ GR}$ [kN]	$F_{A\ GR}$ [kN]	Tip / Type	Kg	Sayfa Page mm
0.25	1.8	1312	0.8	763.70	5.0	12.0	10.0	25.0	PA 43 - 71M/4A PF 43 - 71M/4A	62	97
	2.2	1062	1.0	618.49	7.0	12.0	10.0	24.0			
	2.6	907	1.1	528.04	7.0	12.0	11.0	23.0			
	3.3	723	1.6	421.21	8.0	12.0	11.0	22.0			
	3.9	618	2.1	359.61	8.0	12.0	11.0	22.0			
	4.7	513	2.2	298.65	8.0	12.0	11.0	21.0			
	5.3	453	2.8	264.02	8.0	12.0	11.0	20.0			
	6.3	377	3.2	219.26	8.0	12.0	11.0	19.0			
	7.6	314	3.2	182.86	8.0	12.0	12.0	19.0			
	2.5	801	0.8	554.87	5.0	9.0	8.0	25.0	PA 32/12 - 71M/4A PF 32/12 - 71M/4A	47	110
	3.1	644	1.0	446.08	6.0	9.0	9.0	25.0			
	3.3	723	0.9	421.10	6.0	9.0	9.0	24.0	PA 33 - 71M/4A PF 33 - 71M/4A	42	95
	4.1	582	1.1	339.07	6.0	9.0	9.0	23.0			
	5.6	426	1.6	248.21	7.0	9.0	9.0	22.0			
	6.7	355	1.9	206.97	7.0	9.0	9.0	21.0			
	8.4	286	2.4	166.39	7.0	9.0	9.0	20.0			
	10.4	230	2.8	133.98	7.0	9.0	9.0	19.0			
	11.2	213	2.4	81.27	7.0	9.0	9.0	19.0	PA 32 - 71M/6B PF 32 - 71M/6B	34	94
	12.5	191	2.9	72.71	7.0	9.0	9.0	18.0			
	17.1	140	3.7	81.27	7.0	9.0	10.0	17.0	PA 32 - 71M/4A PF 32 - 71M/4A	33	94
	19.1	125	4.5	72.71	7.0	9.0	10.0	16.0			
	4.9	410	0.8	284.14	4.0	6.0	7.0	16.0	PA\PF 22/02 - 71M/4A	34	110
	5.3	450	0.8	261.93	4.0	6.0	6.0	16.0	PA 23 - 71M/4A PF 23 - 71M/4A	30	93
	6.4	374	0.9	217.60	4.0	6.0	7.0	15.0			
	7.7	308	1.0	179.61	5.0	6.0	7.0	15.0			
	9.2	260	1.1	151.11	5.0	6.0	7.0	14.0			
	10.5	226	1.1	86.26	5.0	6.0	7.0	14.0	PA 22 - 71M/6B PF 22 - 71M/6B	23	92
	13.0	183	1.4	69.74	5.0	6.0	7.0	13.0			
	16.1	148	1.7	86.26	5.0	6.0	7.0	13.0	PA 22 - 71M/4A PF 22 - 71M/4A	22	92
	19.9	120	2.2	69.74	5.0	6.0	7.0	12.0			
	25.2	95	3.4	55.25	5.0	6.0	8.0	11.0			
	30.3	79	3.7	45.90	5.0	6.0	8.0	11.0			
	10.4	192	0.9	133.10	3.0	4.0	5.0	11.0	PA\PF 12/02 - 71M/4A	21	110
	12.8	187	0.9	108.73	3.0	4.0	5.0	11.0	PA\PF 13 - 71M/4A	18	91
	14.8	161	1.0	61.31	3.0	4.0	5.0	10.0	PA\PF 12 - 71M/6B	14	90
	19.1	125	1.1	72.60	4.0	4.0	5.0	10.0	PA 12 - 71M/4A PF 12 - 71M/4A	13	90
	22.7	105	1.5	61.31	4.0	4.0	5.0	10.0			
	25.8	92	1.9	53.84	4.0	4.0	5.0	9.0			
	32.3	74	2.2	43.07	4.0	4.0	5.0	9.0			
	39.7	60	2.5	35.04	4.0	4.0	5.0	8.0			
	47.7	50	2.5	29.16	4.0	4.0	5.0	8.0			
	17.1	140	0.8	81.52	2.0	3.0	3.0	6.0	PA 03 - 71M/4A PF 03 - 71M/4A	15	89
	21.2	112	1.0	65.46	2.0	3.0	3.0	6.0			

P_1 [kW]	n_2 [Min^{-1}]	M_2 [Nm]	f_B	i_{ges}	F_R [kN]	F_A [kN]	$F_{R\,GR}$ [kN]	$F_{A\,GR}$ [kN]	Tip / Type	Kg	Sayfa Page mm
0.25	22.7	105	0.8	61.24	2.0	3.0	3.0	6.0	PA 02 - 71M/4A PF 02 - 71M/4A	11	88
	25.9	92	1.0	53.64	2.0	3.0	3.0	6.0			
	33.4	71	1.4	41.56	2.0	3.0	3.0	6.0			
	41.7	57	1.7	33.37	2.0	3.0	3.0	6.0			
	50.5	47	1.8	27.52	2.0	3.0	3.0	6.0			
	60.1	40	2.0	23.14	2.0	3.0	3.0	6.0			
	67.5	35	2.1	20.59	2.0	3.0	3.0	6.0			
	87.1	27	2.6	15.95	2.0	3.0	3.0	6.0			
	108.5	22	3.2	12.81	2.0	3.0	3.0	5.0			
	123.6	19	3.5	11.24	2.0	3.0	3.0	5.0			
	139.9	17	3.7	9.94	2.0	3.0	3.0	5.0			
	149.9	16	4.1	9.27	2.0	3.0	3.0	5.0			
	169.6	14	4.5	8.20	2.0	3.0	3.0	5.0			
	178.3	13	4.7	7.80	2.0	3.0	3.0	4.0			
	201.7	12	5.2	6.89	2.0	3.0	3.0	4.0			
	249.6	10	6.0	5.57	2.0	3.0	3.0	4.0			
	288.3	8	6.9	4.82	2.0	3.0	3.0	4.0			
	356.8	7	7.8	3.90	2.0	3.0	3.0	4.0			
	409.7	6	8.2	3.39	2.0	3.0	2.0	3.0			
	468.5	5	8.6	2.97	2.0	3.0	2.0	3.0			
	491.2	5	8.3	2.83	-	4.0	-	-	PA 11 - 71M/4A PF 11 - 71M/4A	9	82
	599.1	4	8.9	2.32	-	3.0	-	-			
	681.4	4	9.3	2.04	-	3.0	-	-			
	768.0	3	9.6	1.81	-	3.0	-	-			
0.37	1.1	2883	1.7	1252.41	27.0	46.0	39.0	50.0	PA 73/22 - 71M/4B PF 73/22 - 71M/4B	231	110
	1.2	2526	2.0	1097.40	27.0	45.0	39.0	50.0			
	1.5	2041	2.5	886.40	27.0	43.0	40.0	50.0			
	1.9	1695	2.9	736.40	28.0	41.0	40.0	50.0			
	2.4	1304	3.8	566.43	28.0	39.0	40.0	50.0			
	1.0	3248	1.0	1410.80	16.0	45.0	25.0	45.0	PA 63/23 - 71M/4B PF 63/23 - 71M/4B	158	112
	1.3	2455	1.3	1066.44	18.0	45.0	27.0	45.0			
	1.6	1959	1.6	851.02	19.0	45.0	27.0	45.0	PA 63/22 - 71M/4B PF 63/22 - 71M/4B	150	110
	1.9	1675	1.9	727.77	19.0	43.0	28.0	45.0			
	2.5	1276	2.5	554.24	20.0	41.0	28.0	45.0			
	1.5	2331	0.8	606.94	10.0	24.0	17.0	40.0	PA 53 - 80M/6A PF 53 - 80M/6A	97	99
	1.7	2107	0.9	548.64	11.0	24.0	18.0	40.0			
	1.8	1918	1.0	499.30	12.0	24.0	18.0	40.0			
	2.3	1507	1.2	392.31	13.0	24.0	19.0	40.0			
	2.5	1438	1.3	374.48	13.0	24.0	19.0	40.0			
	3.1	1130	2.0	294.23	13.0	24.0	19.0	40.0			
	5.8	611	3.1	236.60	14.0	24.0	20.0	40.0	PA\PF 53 - 71M/4B	96	99
	2.0	1545	0.8	670.92	3.0	12.0	9.0	22.0	PA 42/12 - 71M/4B PF 42/12 - 71M/4B	64	110
	2.5	1268	0.9	550.63	6.0	12.0	10.0	22.0			
	3.2	997	1.2	433.11	7.0	12.0	10.0	21.0			
	3.3	1087	1.1	421.21	6.0	12.0	10.0	21.0	PA 43 - 71M/4B PF 43 - 71M/4B	63	97
	3.8	928	1.4	359.61	7.0	12.0	11.0	20.0			
	4.6	771	1.5	298.65	8.0	12.0	11.0	19.0			
	5.2	681	1.9	264.02	8.0	12.0	11.0	19.0			
	6.2	566	2.1	219.26	8.0	12.0	11.0	19.0			
	7.5	472	2.2	182.86	8.0	12.0	11.0	18.0			
	10.6	334	3.7	129.27	8.0	12.0	12.0	16.0			
	5.1	615	1.0	267.35	6.0	9.0	9.0	22.0	PA\PF 32/12 - 71M/4B	48	110
	5.5	641	1.0	248.21	6.0	9.0	9.0	21.0	PA 33 - 71M/4B PF 33 - 71M/4B	43	95
	6.6	534	1.3	206.97	6.0	9.0	9.0	20.0			
	8.2	429	1.6	166.39	7.0	9.0	9.0	19.0			
	10.2	346	1.9	133.98	7.0	9.0	9.0	18.0			



P_1 [kW]	n_2 [Min^{-1}]	M_2 [Nm]	f_B	i_{ges}	F_R [kN]	F_A [kN]	$F_{R\,GR}$ [kN]	$F_{A\,GR}$ [kN]	Tip / Type	Kg	Sayfa Page mm
0.37	11.3	312	1.6	81.27	7.0	9.0	9.0	18.0	PA 32 - 80M/6A PF 32 - 80M/6A	36	94
	12.7	279	2.0	72.71	7.0	9.0	9.0	17.0			
	14.3	247	2.6	64.26	7.0	9.0	9.0	17.0			
	16.8	210	2.5	81.27	7.0	9.0	9.0	16.0	PA 32 - 71M/4B PF 32 - 71M/4B	34	94
	18.8	188	3.0	72.71	7.0	9.0	9.0	16.0			
	8.2	385	0.9	167.14	4.0	6.0	7.0	14.0	PA 22/02 - 71M/4B PF 22/02 - 71M/4B	35	110
	10.1	311	1.1	135.06	5.0	6.0	7.0	13.0			
	11.0	320	1.1	124.10	5.0	6.0	7.0	13.0	PA 23 - 71M/4B PF 23 - 71M/4B	31	93
	13.6	259	1.3	100.53	5.0	6.0	7.0	12.0			
	15.5	228	1.5	88.24	5.0	6.0	7.0	12.0			
	17.6	201	1.7	78.00	5.0	6.0	7.0	12.0			
	21.1	167	2.0	64.80	5.0	6.0	7.0	11.0			
	10.7	331	0.8	86.26	5.0	6.0	7.0	13.0	PA 22 - 80M/6A PF 22 - 80M/6A	25	92
	13.2	268	1.0	69.74	5.0	6.0	7.0	13.0			
	15.9	223	1.1	86.26	5.0	6.0	7.0	12.0	PA 22 - 71M/4B PF 22 - 71M/4B	23	92
	19.6	180	1.5	69.74	5.0	6.0	7.0	12.0			
	24.8	143	2.2	55.25	5.0	6.0	7.0	11.0			
	29.8	118	2.5	45.90	5.0	6.0	7.0	10.0			
	14.8	212	0.8	92.29	3.0	4.0	5.0	10.0	PA\PF 12/02 - 71M/4B	22	110
	16.0	221	0.8	85.57	3.0	4.0	5.0	10.0	PA 13 - 71M/4B PF 13 - 71M/4B	19	91
	20.0	177	1.1	68.46	3.0	4.0	5.0	9.0			
	22.3	158	1.0	61.31	3.0	4.0	5.0	9.0	PA 12 - 71M/4B PF 12 - 71M/4B	14	90
	25.4	139	1.3	53.84	3.0	4.0	5.0	9.0			
	28.6	124	1.4	47.86	4.0	4.0	5.0	9.0			
	31.8	111	1.5	43.07	4.0	4.0	5.0	8.0			
	35.8	99	1.9	38.29	4.0	4.0	5.0	8.0			
	39.1	90	1.6	35.04	4.0	4.0	5.0	8.0			
	43.9	80	2.1	31.15	4.0	4.0	5.0	8.0			
	47.0	75	1.6	29.16	4.0	4.0	5.0	8.0			
	52.8	67	2.0	25.92	3.0	4.0	5.0	8.0			
	64.4	55	3.0	21.27	3.0	4.0	5.0	7.0			
	72.8	49	3.3	18.80	3.0	4.0	5.0	7.0			
	81.8	43	3.6	16.74	3.0	4.0	5.0	7.0			
	102.2	35	4.3	13.39	3.0	4.0	5.0	6.0			
	32.9	107	0.9	41.56	2.0	3.0	3.0	6.0	PA 02 - 71M/4B PF 02 - 71M/4B	12	88
	41.0	86	1.1	33.37	2.0	3.0	3.0	6.0			
	46.3	76	1.2	29.59	2.0	3.0	3.0	6.0			
	49.7	71	1.2	27.52	2.0	3.0	3.0	6.0			
	56.1	63	1.4	24.41	2.0	3.0	3.0	6.0			
	59.2	60	1.3	23.14	2.0	3.0	3.0	6.0			
	66.5	53	1.4	20.59	2.0	3.0	3.0	6.0			
	85.8	41	1.7	15.95	2.0	3.0	3.0	5.0			
	106.9	33	2.1	12.81	2.0	3.0	3.0	5.0			
	121.8	29	2.3	11.24	2.0	3.0	3.0	5.0			
	137.8	26	2.5	9.94	2.0	3.0	3.0	5.0			
	147.7	24	2.7	9.27	2.0	3.0	3.0	5.0			
	167.0	21	3.0	8.20	2.0	3.0	3.0	4.0			
	175.6	20	3.1	7.80	2.0	3.0	3.0	4.0			
	198.7	18	3.4	6.89	2.0	3.0	3.0	4.0			
	245.9	14	4.0	5.57	2.0	3.0	3.0	4.0			
	284.0	12	4.6	4.82	2.0	3.0	3.0	4.0			
	351.4	10	5.2	3.90	2.0	3.0	3.0	4.0			
	403.5	9	5.4	3.39	2.0	3.0	2.0	3.0			
	461.5	8	5.7	2.97	2.0	3.0	2.0	3.0			
	483.8	7	5.5	2.83	-	4.0	-	-	PA 11 - 71M/4B PF 11 - 71M/4B	10	82
	590.2	6	5.9	2.32	-	3.0	-	-			
	671.2	5	6.1	2.04	-	3.0	-	-			
	756.4	5	6.3	1.81	-	3.0	-	-			

P_1 [kW]	n_2 [Min^{-1}]	M_2 [Nm]	f_B	i_{ges}	F_R [kN]	F_A [kN]	$F_{R\,GR}$ [kN]	$F_{A\,GR}$ [kN]	Tip / Type	Kg	Sayfa Page mm
0.55	1.2	4008	2.0	1151.94	44.0	65.0	62.0	65.0	**PA 83/32 - 80M/4A**	351	111
	1.6	3122	2.6	897.44	44.0	65.0	62.0	65.0	**PF 83/32 - 80M/4A**		
	1.1	4357	1.1	1252.41	24.0	42.0	37.0	50.0	**PA 73/22 - 80M/4A**	233	110
	1.3	3818	1.3	1097.40	25.0	41.0	38.0	50.0	**PF 73/22 - 80M/4A**		
	1.6	3084	1.6	886.40	26.0	40.0	39.0	50.0			
	1.9	2562	2.0	736.40	27.0	39.0	39.0	50.0			
	2.5	1971	2.5	566.43	27.0	37.0	40.0	50.0			
	3.1	1592	3.1	457.52	28.0	35.0	40.0	50.0			
	1.3	3710	0.9	1066.44	14.0	43.0	24.0	45.0	**PA\PF 63/23 - 80M/4A**	160	112
	1.6	2961	1.1	851.02	17.0	42.0	26.0	45.0	**PA 63/22 - 80M/4A**	152	110
	1.9	2532	1.3	727.77	18.0	41.0	27.0	45.0	**PF 63/22 - 80M/4A**		
	2.5	1928	1.7	554.24	19.0	39.0	27.0	45.0			
	3.3	1497	2.1	430.20	20.0	37.0	28.0	45.0			
	3.8	1280	2.5	367.90	20.0	36.0	28.0	45.0			
	2.0	2401	0.8	690.27	10.0	24.0	17.0	40.0	**PA\PF 52/12 - 80M/4A**	95	110
	2.3	2277	0.8	606.94	10.0	24.0	17.0	40.0	**PA 53 - 80M/4A**	97	99
	2.6	2058	0.9	548.64	11.0	24.0	18.0	40.0	**PF 53 - 80M/4A**		
	2.8	1873	1.0	499.30	12.0	24.0	18.0	40.0			
	3.6	1472	1.2	392.31	13.0	24.0	19.0	40.0			
	3.7	1405	1.4	374.48	13.0	24.0	19.0	40.0			
	4.8	1104	2.0	294.23	13.0	24.0	19.0	40.0			
	5.7	922	2.0	245.73	14.0	24.0	20.0	40.0			
	5.9	888	2.2	236.60	14.0	24.0	20.0	40.0			
	7.5	697	2.6	185.90	14.0	24.0	20.0	40.0			
	7.9	666	2.9	177.45	14.0	24.0	20.0	40.0			
	10.0	523	3.8	139.42	14.0	24.0	20.0	40.0			
	3.2	1507	0.8	433.11	4.0	12.0	9.0	18.0	**PA\PF 42/12 - 80M/4A**	66	110
	3.9	1349	1.0	359.61	5.0	12.0	9.0	18.0	**PA 43 - 80M/4A**	65	97
	4.7	1120	1.0	298.65	6.0	12.0	10.0	18.0	**PF 43 - 80M/4A**		
	5.0	1045	1.2	278.52	7.0	12.0	10.0	18.0			
	5.3	991	1.3	264.02	7.0	12.0	10.0	17.0			
	6.1	868	1.3	231.31	7.0	12.0	11.0	17.0			
	6.4	823	1.5	219.26	7.0	12.0	11.0	17.0			
	6.8	767	1.7	204.49	8.0	12.0	11.0	17.0			
	7.7	686	1.5	182.86	8.0	12.0	11.0	17.0			
	8.2	637	1.8	169.82	8.0	12.0	11.0	16.0			
	9.9	531	2.0	141.63	8.0	12.0	11.0	16.0			
	10.8	485	2.6	129.27	8.0	12.0	11.0	16.0			
	13.0	403	2.8	107.36	8.0	12.0	11.0	15.0			
	14.8	356	3.5	94.91	8.0	12.0	11.0	15.0			
	17.5	300	3.9	80.01	8.0	12.0	12.0	14.0			
	6.5	749	0.8	215.28	6.0	9.0	9.0	19.0	**PA\PF 32/12 - 80M/4A**	49	110
	6.8	776	0.9	206.97	5.0	9.0	8.0	19.0	**PA 33 - 80M/4A**	45	95
	8.4	624	1.1	166.39	6.0	9.0	9.0	18.0	**PF 33 - 80M/4A**		
	10.4	503	1.3	133.98	6.0	9.0	9.0	17.0			
	11.3	464	1.1	81.27	6.0	9.0	9.0	17.0	**PA 32 - 80M/6B**	37	94
	12.7	415	1.3	72.71	7.0	9.0	9.0	17.0	**PF 32 - 80M/6B**		
	14.3	367	1.7	64.26	7.0	9.0	9.0	16.0			
	17.2	305	1.7	81.27	7.0	9.0	9.0	16.0	**PA 32 - 80M/4A**	36	94
	19.3	273	2.1	72.71	7.0	9.0	9.0	15.0	**PF 32 - 80M/4A**		
	21.8	241	2.7	64.26	7.0	9.0	9.0	15.0			
	24.4	216	2.8	57.49	7.0	9.0	9.0	15.0			
	30.2	174	3.1	46.29	7.0	9.0	9.0	14.0			
	11.9	409	0.8	117.62	4.0	6.0	7.0	12.0	**PA\PF 22/02 - 80M/4A**	37	110
	13.9	377	0.9	100.53	4.0	6.0	7.0	11.0	**PA 23 - 80M/4A**	33	93
	15.9	331	1.0	88.24	5.0	6.0	7.0	11.0	**PF 23 - 80M/4A**		



P_1 [kW]	n_2 [Min^{-1}]	M_2 [Nm]	f_B	i_{ges}	F_R [kN]	F_A [kN]	$F_{R\,GR}$ [kN]	$F_{A\,GR}$ [kN]	Tip / Type	Kg	Sayfa Page mm
0.55	16.2	324	0.8	86.26	5.0	6.0	7.0	11.0	**PA 22 - 80M/4A** **PF 22 - 80M/4A**	25	92
	20.1	262	1.0	69.74	5.0	6.0	7.0	11.0			
	25.3	207	1.5	55.25	5.0	6.0	7.0	10.0			
	30.5	172	1.7	45.90	5.0	6.0	7.0	10.0			
	32.7	161	2.1	42.79	5.0	6.0	7.0	10.0			
	39.4	133	2.5	35.55	5.0	6.0	7.0	9.0			
	47.7	110	2.7	29.34	5.0	6.0	7.0	9.0			
	56.7	93	2.7	24.69	5.0	6.0	8.0	9.0			
	29.2	180	1.0	47.86	3.0	4.0	5.0	8.0	**PA 12 - 80M/4A** **PF 12 - 80M/4A**	16	90
	36.6	144	1.3	38.29	3.0	4.0	5.0	8.0			
	44.9	117	1.4	31.15	3.0	4.0	5.0	7.0			
	54.0	97	1.4	25.92	3.0	4.0	5.0	7.0			
	65.8	80	2.1	21.27	3.0	4.0	5.0	7.0			
	74.5	71	2.3	18.80	3.0	4.0	5.0	7.0			
	83.6	63	2.5	16.74	3.0	4.0	5.0	7.0			
	104.5	50	3.0	13.39	3.0	4.0	5.0	6.0			
	131.1	40	3.3	10.68	3.0	4.0	5.0	6.0			
	145.1	36	3.7	9.65	3.0	4.0	5.0	6.0			
	47.3	111	0.8	29.59	2.0	3.0	3.0	6.0	**PA 02 - 80M/4A** **PF 02 - 80M/4A**	14	88
	57.4	92	1.0	24.41	2.0	3.0	3.0	5.0			
	68.0	77	1.0	20.59	2.0	3.0	3.0	5.0			
	87.8	60	1.2	15.95	2.0	3.0	3.0	5.0			
	109.3	48	1.5	12.81	2.0	3.0	3.0	5.0			
	124.5	42	1.6	11.24	2.0	3.0	3.0	5.0			
	140.9	37	1.7	9.94	2.0	3.0	3.0	5.0			
	151.0	35	1.9	9.27	2.0	3.0	3.0	4.0			
	170.8	31	2.0	8.20	2.0	3.0	3.0	4.0			
	179.6	29	2.2	7.80	2.0	3.0	3.0	4.0			
	203.2	26	2.4	6.89	2.0	3.0	3.0	4.0			
	251.4	21	2.7	5.57	2.0	3.0	3.0	4.0			
	290.4	18	3.2	4.82	2.0	3.0	3.0	4.0			
	359.3	15	3.6	3.90	2.0	3.0	2.0	3.0			
	412.6	13	3.8	3.39	2.0	3.0	2.0	3.0			
	471.9	11	3.9	2.97	2.0	3.0	2.0	3.0			
	494.7	11	3.8	2.83	-	3.0	-	-	**PA 11 - 80M/4A** **PF 11 - 80M/4A**	12	82
	603.4	9	4.1	2.32	-	3.0	-	-			
	686.3	8	4.3	2.04	-	3.0	-	-			
	773.5	7	4.4	1.81	-	3.0	-	-			
0.75	1.2	5579	1.4	1151.94	42.0	65.0	61.0	65.0	**PA 83/32 - 80M/4B** **PF 83/32 - 80M/4B**	352	111
	1.6	4346	1.8	897.44	43.0	65.0	62.0	65.0			
	1.9	3500	2.3	722.63	44.0	65.0	62.0	65.0			
	1.1	6066	0.8	1252.41	18.0	38.0	34.0	50.0	**PA 73/22 - 80M/4B** **PF 73/22 - 80M/4B**	234	110
	1.3	5315	0.9	1097.40	21.0	38.0	36.0	50.0			
	1.6	4293	1.2	886.40	23.0	38.0	37.0	50.0			
	1.9	3566	1.4	736.40	25.0	36.0	38.0	50.0			
	2.5	2743	1.8	566.43	27.0	35.0	39.0	50.0			
	3.1	2216	2.3	457.52	27.0	34.0	39.0	50.0			
	4.0	1679	3.0	346.75	28.0	32.0	40.0	50.0			
	1.6	4122	0.8	851.02	12.0	39.0	23.0	45.0	**PA 63/22 - 80M/4B** **PF 63/22 - 80M/4B**	153	110
	1.9	3525	0.9	727.77	15.0	38.0	25.0	45.0			
	2.5	2684	1.2	554.24	18.0	37.0	26.0	45.0			
	3.3	2084	1.5	430.20	19.0	35.0	27.0	45.0			
	3.8	1782	1.8	367.90	19.0	34.0	28.0	45.0			
	4.9	1371	2.3	283.00	20.0	32.0	28.0	45.0			
	6.2	1091	2.9	225.22	20.0	31.0	28.0	45.0			
	2.5	2886	1.1	372.70	17.0	36.0	26.0	45.0	**PA 63 - 90S/6A** **PF 63 - 90S/6A**	137	101
	3.1	2330	1.4	300.91	18.0	35.0	27.0	45.0			
	3.5	2056	1.8	265.56	19.0	34.0	27.0	45.0			
	4.3	1660	2.2	214.41	19.0	33.0	28.0	45.0			

P_1 [kW]	n_2 [Min^{-1}]	M_2 [Nm]	f_B	i_{ges}	F_R [kN]	F_A [kN]	$F_{R\,GR}$ [kN]	$F_{A\,GR}$ [kN]	Tip / Type	Kg	Sayfa Page mm
0.75	2.8	2554	0.8	499.30	9.0	24.0	17.0	40.0	PA 53 - 80M/4B PF 53 - 80M/4B	98	99
	3.6	2007	0.9	392.31	11.0	24.0	18.0	40.0			
	3.7	1916	1.0	374.48	12.0	24.0	18.0	40.0			
	4.8	1505	1.5	294.23	13.0	24.0	19.0	40.0			
	5.7	1257	1.5	245.73	13.0	24.0	19.0	40.0			
	5.9	1210	1.6	236.60	13.0	24.0	19.0	40.0			
	7.5	951	1.9	185.90	14.0	24.0	19.0	40.0			
	7.9	908	2.1	177.45	14.0	24.0	20.0	40.0			
	10.0	713	2.7	139.42	14.0	24.0	20.0	40.0			
	10.6	673	2.6	86.88	14.0	24.0	20.0	40.0	PA 52 - 90S/6A PF 52 - 90S/6A	83	98
	11.8	608	2.6	78.53	14.0	24.0	20.0	40.0			
	5.0	1425	0.9	278.52	4.0	12.0	9.0	16.0	PA 43 - 80M/4B PF 43 - 80M/4B	66	97
	5.3	1351	0.9	264.02	5.0	12.0	9.0	16.0			
	6.1	1183	0.9	231.31	6.0	12.0	10.0	15.0			
	6.4	1122	1.1	219.26	6.0	12.0	10.0	15.0			
	6.8	1046	1.2	204.49	7.0	12.0	10.0	15.0			
	7.7	936	1.1	182.86	7.0	12.0	11.0	15.0			
	8.2	869	1.3	169.82	7.0	12.0	11.0	15.0			
	9.9	725	1.5	141.63	8.0	12.0	11.0	15.0			
	10.8	661	1.9	129.27	8.0	12.0	11.0	15.0			
	13.0	549	2.0	107.36	8.0	12.0	11.0	14.0			
	14.8	486	2.6	94.91	8.0	12.0	11.0	14.0			
	17.5	409	2.9	80.01	8.0	12.0	11.0	14.0			
	20.0	359	3.0	70.10	8.0	12.0	11.0	13.0			
	8.8	814	1.1	105.08	7.0	12.0	11.0	15.0	PA 42 - 90S/6A PF 42 - 90S/6A	54	96
	10.9	659	1.2	85.10	8.0	12.0	11.0	15.0			
	12.4	580	1.9	74.87	8.0	12.0	11.0	15.0			
	15.3	470	2.1	60.64	8.0	12.0	11.0	14.0			
	8.4	851	0.8	166.39	5.0	9.0	8.0	17.0	PA 33 - 80M/4B PF 33 - 80M/4B	46	95
	10.4	685	0.9	133.98	6.0	9.0	9.0	16.0			
	11.4	629	0.8	81.27	6.0	9.0	9.0	16.0	PA 32 - 90S/6A PF 32 - 90S/6A	40	94
	12.7	563	1.0	72.71	6.0	9.0	9.0	16.0			
	14.4	498	1.3	64.26	6.0	9.0	9.0	15.0			
	17.2	416	1.2	81.27	7.0	9.0	9.0	15.0	PA 32 - 80M/4B PF 32 - 80M/4B	37	94
	19.3	372	1.5	72.71	7.0	9.0	9.0	15.0			
	21.8	329	1.9	64.26	7.0	9.0	9.0	15.0			
	24.4	294	2.1	57.49	7.0	9.0	9.0	14.0			
	30.2	237	2.3	46.29	7.0	9.0	9.0	13.0			
	36.1	198	2.2	38.76	6.0	9.0	9.0	13.0			
	42.4	169	2.3	33.00	6.0	9.0	9.0	12.0			
	60.6	118	3.1	23.10	6.0	9.0	10.0	11.0			
	67.7	106	3.1	20.67	5.0	9.0	10.0	11.0			
	75.1	95	3.2	18.64	5.0	9.0	10.0	11.0			
	15.9	451	0.8	88.24	1.0	6.0	6.0	10.0	PA 23 - 80M/4B PF 23 - 80M/4B	34	93
	17.9	399	0.9	78.00	2.0	6.0	7.0	10.0			
	21.6	332	1.0	64.80	3.0	6.0	7.0	10.0			
	20.2	355	0.8	45.90	3.0	6.0	7.0	10.0	PA\PF 22 - 90S/6A	29	92
	25.3	283	1.1	55.25	5.0	6.0	7.0	10.0	PA 22 - 80M/4B PF 22 - 80M/4B	26	92
	30.5	235	1.2	45.90	5.0	6.0	7.0	9.0			
	32.7	219	1.6	42.79	5.0	6.0	7.0	9.0			
	39.4	182	1.8	35.55	5.0	6.0	7.0	9.0			
	47.7	150	1.9	29.34	5.0	6.0	7.0	9.0			
	56.7	126	1.9	24.69	5.0	6.0	7.0	8.0			
	83.6	86	2.9	16.74	4.0	6.0	8.0	8.0			
	95.4	75	3.0	14.67	4.0	6.0	8.0	7.0			

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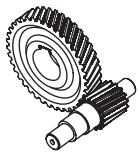
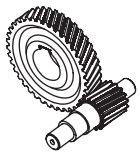
P_1 [kW]	n_2 [Min^{-1}]	M_2 [Nm]	f_B	i_{ges}	F_R [kN]	F_A [kN]	$F_{R\,GR}$ [kN]	$F_{A\,GR}$ [kN]	Tip / Type	Kg	Sayfa Page mm
0.75	36.6	196	0.9	38.29	1.0	4.0	5.0	7.0	**PA 12 - 80M/4B** **PF 12 - 80M/4B**	17	90
	44.9	159	1.0	31.15	1.0	4.0	5.0	7.0			
	54.0	133	1.0	25.92	2.0	4.0	5.0	7.0			
	65.8	109	1.5	21.27	3.0	4.0	5.0	7.0			
	74.5	96	1.7	18.80	3.0	4.0	5.0	6.0			
	83.6	86	1.8	16.74	3.0	4.0	5.0	6.0			
	104.5	69	2.2	13.39	3.0	4.0	5.0	6.0			
	131.1	55	2.5	10.68	3.0	4.0	5.0	6.0			
	145.1	49	2.7	9.65	3.0	4.0	5.0	6.0			
	178.3	40	3.1	7.85	2.0	4.0	5.0	5.0			
	192.1	37	3.4	7.29	2.0	4.0	5.0	5.0			
	214.3	33	3.1	6.53	2.0	4.0	5.0	5.0			
	242.0	30	3.2	5.78	2.0	4.0	5.0	5.0			
	87.8	82	0.9	15.95	2.0	3.0	3.0	5.0	**PA 02 - 80M/4B** **PF 02 - 80M/4B**	15	88
	109.3	66	1.1	12.81	2.0	3.0	3.0	5.0			
	124.5	58	1.2	11.24	2.0	3.0	3.0	4.0			
	140.9	51	1.3	9.94	2.0	3.0	3.0	4.0			
	151.0	47	1.4	9.27	2.0	3.0	3.0	4.0			
	170.8	42	1.5	8.20	2.0	3.0	3.0	4.0			
	179.6	40	1.6	7.80	2.0	3.0	3.0	4.0			
	203.2	35	1.7	6.89	2.0	3.0	3.0	4.0			
	251.4	28	2.0	5.57	2.0	3.0	3.0	4.0			
	290.4	25	2.3	4.82	2.0	3.0	3.0	4.0			
	359.3	20	2.7	3.90	2.0	3.0	2.0	3.0			
	412.6	17	2.7	3.39	2.0	3.0	2.0	3.0			
	471.9	15	2.8	2.97	2.0	3.0	2.0	3.0			
	494.7	14	2.7	2.83	-	3.0	-	-	**PA 11 - 80M/4B** **PF 11 - 80M/4B**	13	82
	603.4	12	3.0	2.32	-	3.0	-	-			
	686.3	10	3.1	2.04	-	3.0	-	-			
	773.5	9	3.3	1.81	-	3.0	-	-			
1.10	1.0	10532	1.9	1413.66	99.0	120.0	120.0	120.0	**PA 103/52 - 90S/4A** **PF 103/52 - 90S/4A**	786	111
	1.2	8549	2.3	1147.52	100.0	120.0	120.0	120.0			
	1.5	7033	2.8	944.01	101.0	120.0	120.0	120.0			
	1.1	9673	1.3	1299.17	62.0	80.0	90.0	80.0	**PA 93/42 - 90S/4A** **PF 93/42 - 90S/4A**	538	111
	1.3	8128	1.5	1090.99	63.0	80.0	91.0	80.0			
	1.7	6049	2.0	811.95	65.0	80.0	92.0	80.0			
	1.9	5638	2.2	756.80	65.0	80.0	92.0	80.0			
	2.6	4082	3.0	547.88	66.0	80.0	93.0	80.0			
	1.0	10183	0.8	1366.81	30.0	65.0	53.0	65.0	**PA 83/32 - 90S/4A** **PF 83/32 - 90S/4A**	355	111
	1.2	8582	0.9	1151.94	36.0	65.0	57.0	65.0			
	1.6	6686	1.2	897.44	39.0	65.0	59.0	65.0			
	2.0	5384	1.5	722.63	42.0	63.0	61.0	65.0			
	2.7	3912	2.0	525.11	44.0	59.0	62.0	65.0	**PA 83/42 - 90S/4A** **PF 83/42 - 90S/4A**	370	111
	3.2	3263	2.5	437.93	44.0	57.0	62.0	65.0			
	3.8	2790	2.9	374.50	45.0	55.0	63.0	65.0			
	1.6	6604	0.8	886.40	16.0	32.0	33.0	50.0	**PA 73/22 - 90S/4A** **PF 73/22 - 90S/4A**	237	110
	1.9	5486	0.9	736.40	20.0	32.0	35.0	50.0			
	2.5	4220	1.2	566.43	24.0	31.0	37.0	50.0			
	3.1	3409	1.5	457.52	26.0	31.0	38.0	50.0			
	4.1	2583	1.9	346.75	27.0	30.0	39.0	50.0			
	5.0	2087	2.4	280.08	27.0	29.0	40.0	50.0			
	6.2	1687	3.0	226.38	28.0	27.0	40.0	50.0	**PA\PF 73/32 - 90S/4A**	248	110
	2.5	4187	0.8	372.70	12.0	32.0	23.0	45.0	**PA 63 - 90L/6B** **PF 63 - 90L/6B**	139	101
	3.1	3381	0.9	300.91	16.0	32.0	25.0	45.0			
	3.5	2984	1.2	265.56	17.0	32.0	26.0	45.0			

P_1 [kW]	n_2 [Min^{-1}]	M_2 [Nm]	f_B	i_{ges}	F_R [kN]	F_A [kN]	$F_{R\,GR}$ [kN]	$F_{A\,GR}$ [kN]	Tip / Type	Kg	Sayfa Page mm
1.10	3.8	2777	1.2	372.70	17.0	31.0	26.0	45.0	PA 63 - 90S/4A PF 63 - 90S/4A	137	101
	4.7	2242	1.4	300.91	18.0	30.0	27.0	45.0			
	5.3	1979	1.8	265.56	19.0	30.0	27.0	45.0			
	6.6	1597	2.3	214.41	20.0	29.0	28.0	45.0			
	4.8	2192	1.0	294.23	11.0	24.0	17.0	40.0	PA 53 - 90S/4A PF 53 - 90S/4A	101	99
	5.7	1831	1.0	245.73	12.0	24.0	18.0	40.0			
	6.0	1763	1.1	236.60	12.0	24.0	18.0	40.0			
	7.6	1385	1.3	185.90	13.0	24.0	19.0	40.0			
	7.9	1322	1.5	177.45	13.0	24.0	19.0	40.0			
	10.1	1039	2.1	139.42	14.0	24.0	19.0	40.0			
	10.8	976	1.8	86.88	14.0	24.0	19.0	40.0	PA 52 - 90L/6B PF 52 - 90L/6B	85	98
	11.9	882	1.8	78.53	14.0	24.0	20.0	40.0			
	13.1	803	2.0	71.47	14.0	24.0	20.0	40.0			
	16.2	647	2.7	86.88	14.0	24.0	20.0	40.0	PA 52 - 90S/4A PF 52 - 90S/4A	83	98
	18.0	585	2.7	78.53	14.0	24.0	20.0	40.0			
	6.9	1523	0.8	204.49	3.0	12.0	9.0	13.0	PA 43 - 90S/4A PF 43 - 90S/4A	69	97
	8.3	1265	0.9	169.82	6.0	12.0	10.0	13.0			
	10.0	1055	1.0	141.63	7.0	12.0	10.0	13.0			
	11.0	956	0.8	85.10	7.0	12.0	11.0	13.0	PA 42 - 90L/6B PF 42 - 90L/6B	56	96
	12.5	841	1.3	74.87	7.0	12.0	11.0	13.0			
	13.4	783	1.1	105.08	7.0	12.0	11.0	13.0	PA 42 - 90S/4A PF 42 - 90S/4A	54	96
	16.6	634	1.3	85.10	8.0	12.0	11.0	13.0			
	18.8	558	1.9	74.87	8.0	12.0	11.0	13.0			
	23.3	452	2.2	60.64	8.0	12.0	11.0	12.0			
	14.6	722	0.9	64.26	6.0	9.0	9.0	14.0	PA\PF 32 - 90L/6B	42	94
	17.3	605	0.9	81.27	6.0	9.0	9.0	14.0	PA 32 - 90S/4A PF 32 - 90S/4A	40	94
	19.4	542	1.0	72.71	6.0	9.0	9.0	14.0			
	21.9	479	1.3	64.26	6.0	9.0	9.0	13.0			
	24.5	428	1.4	57.49	7.0	9.0	9.0	13.0			
	30.5	345	1.5	46.29	6.0	9.0	9.0	13.0			
	30.5	344	2.0	46.22	6.0	9.0	9.0	13.0			
	36.4	289	1.5	38.76	6.0	9.0	9.0	12.0			
	37.9	277	2.1	37.22	6.0	9.0	9.0	12.0			
	42.7	246	1.5	33.00	6.0	9.0	9.0	12.0			
	45.3	232	2.2	31.16	6.0	9.0	9.0	12.0			
	53.1	198	2.2	26.53	5.0	9.0	9.0	11.0			
	61.0	172	3.4	23.10	5.0	9.0	9.0	11.0			
	68.2	154	3.4	20.67	5.0	9.0	9.0	11.0			
	25.5	412	0.8	55.25	-	-	7.0	9.0	PA 22 - 90S/4A PF 22 - 90S/4A	29	92
	30.7	342	0.9	45.90	1.0	6.0	7.0	9.0			
	33.0	319	1.1	42.79	2.0	6.0	7.0	9.0			
	39.7	265	1.2	35.55	3.0	6.0	7.0	8.0			
	40.7	258	1.3	34.67	4.0	6.0	7.0	8.0			
	48.1	219	1.3	29.34	4.0	6.0	7.0	8.0			
	49.0	215	1.7	28.80	4.0	6.0	7.0	8.0			
	57.1	184	1.3	24.69	4.0	6.0	7.0	8.0			
	59.3	177	1.8	23.77	4.0	6.0	7.0	8.0			
	70.5	149	1.9	20.00	4.0	6.0	7.0	8.0			
	84.2	125	2.7	16.74	4.0	6.0	7.0	7.0			
	96.1	109	3.1	14.67	4.0	6.0	7.0	7.0			
	115.7	91	3.1	12.19	4.0	6.0	8.0	7.0			
	129.3	81	3.3	10.90	4.0	6.0	8.0	7.0			
	166.6	63	3.1	8.46	3.0	6.0	8.0	6.0			



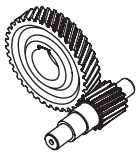
P_1 [kW]	n_2 [Min^{-1}]	M_2 [Nm]	f_B	i_{ges}	F_R [kN]	F_A [kN]	$F_{R\,GR}$ [kN]	$F_{A\,GR}$ [kN]	Tip / Type	Kg	Sayfa Page mm
1.10	66.3	158	1.1	21.27	1.0	4.0	5.0	6.0	PA 12 - 90S/4A PF 12 - 90S/4A	20	90
	75.0	140	1.1	18.80	1.0	4.0	5.0	6.0			
	84.2	125	1.2	16.74	2.0	4.0	5.0	6.0			
	105.3	100	1.5	13.39	2.0	4.0	5.0	6.0			
	132.0	80	1.7	10.68	2.0	4.0	5.0	5.0			
	146.1	72	1.9	9.65	2.0	4.0	5.0	5.0			
	179.6	59	2.2	7.85	2.0	4.0	5.0	5.0			
	193.5	54	2.3	7.29	2.0	4.0	5.0	5.0			
	215.8	49	2.6	6.53	2.0	4.0	5.0	5.0			
	243.8	43	2.8	5.78	2.0	4.0	5.0	5.0			
	285.8	37	3.2	4.93	2.0	3.0	5.0	5.0			
	313.9	33	3.2	4.49	2.0	3.0	5.0	4.0			
	327.3	32	3.4	4.31	2.0	3.0	5.0	4.0			
	354.5	30	3.4	3.98	2.0	3.0	5.0	4.0			
	125.4	84	0.8	11.24	1.0	3.0	3.0	4.0	PA 02 - 90S/4A PF 02 - 90S/4A	18	88
	141.9	74	0.9	9.94	2.0	3.0	3.0	4.0			
	152.1	69	0.9	9.27	2.0	3.0	3.0	4.0			
	172.0	61	1.0	8.20	2.0	3.0	3.0	4.0			
	180.9	58	1.1	7.80	2.0	3.0	3.0	4.0			
	204.6	51	1.2	6.89	2.0	3.0	3.0	4.0			
	253.2	41	1.4	5.57	2.0	3.0	3.0	3.0			
	292.4	36	1.6	4.82	2.0	3.0	2.0	3.0			
	361.9	29	1.8	3.90	2.0	3.0	2.0	3.0			
	415.6	25	2.0	3.39	2.0	3.0	2.0	3.0			
	475.2	22	2.1	2.97	2.0	3.0	2.0	3.0			
	498.2	21	2.6	2.83	-	3.0	-	-	PA 11 - 90S/4A PF 11 - 90S/4A	16	82
	607.8	17	2.8	2.32	-	3.0	-	-			
	691.2	15	3.2	2.04	-	3.0	-	-			
	779.0	13	3.4	1.81	-	3.0	-	-			
1.50	1.0	14261	1.4	1413.66	97.0	120.0	120.0	120.0	PA 103/52 - 90L/4A PF 103/52 - 90L/4A	788	111
	1.2	11576	1.7	1147.52	98.0	120.0	120.0	120.0			
	1.5	9523	2.1	944.01	100.0	120.0	120.0	120.0			
	1.7	8250	2.4	817.82	101.0	120.0	120.0	120.0			
	2.2	6482	3.1	642.57	101.0	120.0	120.0	120.0			
	1.1	13097	0.9	1299.17	57.0	80.0	87.0	80.0	PA 93/42 - 90L/4A PF 93/42 - 90L/4A	540	111
	1.3	11006	1.1	1090.99	60.0	80.0	89.0	80.0			
	1.7	8191	1.5	811.95	63.0	80.0	91.0	80.0			
	1.9	7635	1.6	756.80	63.0	80.0	91.0	80.0			
	2.6	5527	2.2	547.88	65.0	80.0	92.0	80.0			
	3.1	4609	2.6	456.91	66.0	80.0	93.0	80.0			
	1.6	9053	0.9	897.44	33.0	60.0	55.0	65.0	PA 83/32 - 90L/4A PF 83/32 - 90L/4A	357	111
	2.0	7290	1.1	722.63	38.0	58.0	58.0	65.0			
	2.7	5297	1.5	525.11	42.0	56.0	61.0	65.0	PA 83/42 - 90L/4A PF 83/42 - 90L/4A	372	111
	3.2	4418	1.8	437.93	43.0	54.0	62.0	65.0			
	3.8	3778	2.1	374.50	44.0	53.0	62.0	65.0			
	5.1	2784	2.9	276.00	45.0	49.0	63.0	65.0			
	6.0	2381	3.2	236.03	45.0	48.0	63.0	65.0			
	4.3	3299	2.7	216.49	44.0	51.0	62.0	65.0	PA\PF 83 - 100L/6A	331	105
	2.5	5714	0.9	566.43	20.0	28.0	35.0	50.0	PA 73/22 - 90L/4A PF 73/22 - 90L/4A	239	110
	3.1	4616	1.1	457.52	23.0	28.0	36.0	50.0			
	4.1	3498	1.4	346.75	25.0	27.0	38.0	50.0			
	5.1	2826	1.8	280.08	27.0	27.0	39.0	50.0			
	6.3	2284	2.2	226.38	27.0	26.0	39.0	50.0	PA 73/32 - 90L/4A PF 73/32 - 90L/4A	250	110
	8.3	1726	2.9	171.10	28.0	25.0	40.0	50.0			
	10.1	1424	3.0	141.16	28.0	24.0	40.0	50.0			
	11.4	1258	3.0	124.66	28.0	23.0	40.0	50.0			

P_1 [kW]	n_2 [Min^{-1}]	M_2 [Nm]	f_B	i_{ges}	F_R [kN]	F_A [kN]	$F_{R\,GR}$ [kN]	$F_{A\,GR}$ [kN]	Tip / Type	Kg	Sayfa Page mm
1.50	4.6	3133	1.7	205.59	26.0	27.0	39.0	50.0	**PA 73 - 100L/6A**	224	103
	5.7	2531	2.2	166.07	27.0	26.0	39.0	50.0	**PF 73 - 100L/6A**		
	3.5	4047	0.9	265.56	13.0	29.0	24.0	45.0	**PA\PF 63 - 100L/6A**	143	101
	3.8	3760	0.9	372.70	14.0	28.0	24.0	45.0	**PA 63 - 90L/4A** **PF 63 - 90L/4A**	139	101
	4.7	3036	1.1	300.91	17.0	28.0	26.0	45.0			
	5.3	2679	1.4	265.56	18.0	28.0	26.0	45.0			
	6.6	2163	1.7	214.41	19.0	27.0	27.0	45.0			
	13.2	1081	2.6	107.21	20.0	24.0	28.0	45.0			
	16.3	880	2.6	87.26	20.0	23.0	28.0	45.0			
	6.0	2387	0.8	236.60	10.0	24.0	17.0	40.0	**PA 53 - 90L/4A** **PF 53 - 90L/4A**	103	99
	7.6	1875	1.0	185.90	12.0	24.0	18.0	40.0			
	8.0	1790	1.1	177.45	12.0	24.0	18.0	40.0			
	10.2	1407	1.6	139.42	13.0	24.0	19.0	40.0			
	10.8	1324	1.3	86.88	13.0	24.0	19.0	40.0	**PA 52 - 100L/6A** **PF 52 - 100L/6A**	89	98
	12.0	1197	1.3	78.53	13.0	24.0	19.0	40.0			
	13.2	1089	1.5	71.47	13.0	24.0	19.0	40.0			
	16.3	876	2.0	86.88	14.0	24.0	20.0	40.0	**PA 52 - 90L/4A** **PF 52 - 90L/4A**	85	98
	18.1	792	2.0	78.53	14.0	24.0	20.0	40.0			
	19.9	721	2.2	71.47	14.0	24.0	20.0	40.0			
	39.4	363	3.3	36.00	14.0	24.0	20.0	40.0			
	43.6	328	3.3	32.54	14.0	24.0	20.0	40.0			
	11.0	1304	1.0	129.27	3.0	12.0	10.0	11.0	**PA\PF 43 - 90L/4A**	71	97
	13.5	1060	0.8	105.08	6.0	12.0	10.0	12.0	**PA 42 - 90L/4A** **PF 42 - 90L/4A**	56	96
	16.7	858	0.9	85.10	7.0	12.0	11.0	12.0			
	19.0	755	1.4	74.87	8.0	12.0	11.0	12.0			
	23.4	612	1.6	60.64	8.0	12.0	11.0	11.0			
	46.6	307	2.6	30.47	8.0	12.0	12.0	10.0			
	57.5	249	2.6	24.68	7.0	12.0	12.0	10.0			
	22.1	648	1.0	64.26	6.0	9.0	9.0	12.0	**PA 32 - 90L/4A** **PF 32 - 90L/4A**	42	94
	24.7	580	1.1	57.49	6.0	9.0	9.0	12.0			
	30.7	467	1.1	46.29	6.0	9.0	9.0	12.0			
	30.7	466	1.4	46.22	6.0	9.0	9.0	12.0			
	36.6	391	1.1	38.76	6.0	9.0	9.0	11.0			
	38.2	375	1.6	37.22	6.0	9.0	9.0	12.0			
	43.0	333	1.1	33.00	5.0	9.0	9.0	11.0			
	45.6	314	1.6	31.16	5.0	9.0	9.0	11.0			
	53.5	268	1.6	26.53	5.0	9.0	9.0	11.0			
	61.5	233	2.5	23.10	5.0	9.0	9.0	11.0			
	68.7	208	2.5	20.67	5.0	9.0	9.0	10.0			
	76.2	188	2.5	18.64	5.0	9.0	9.0	10.0			
	33.2	432	0.8	42.79	0.3	0.4	6.0	8.0	**PA 22 - 90L/4A** **PF 22 - 90L/4A**	31	92
	39.9	359	0.9	35.55	0.3	0.4	7.0	8.0			
	41.0	350	1.0	34.67	0.3	0.4	7.0	8.0			
	48.4	296	1.0	29.34	0.4	6.0	7.0	7.0			
	49.3	291	1.3	28.80	1.0	6.0	7.0	8.0			
	57.5	249	1.0	24.69	1.0	6.0	7.0	7.0			
	59.7	240	1.4	23.77	2.0	6.0	7.0	7.0			
	71.0	202	1.4	20.00	3.0	6.0	7.0	7.0			
	84.8	169	2.0	16.74	4.0	6.0	7.0	7.0			
	96.8	148	2.3	14.67	4.0	6.0	7.0	7.0			
	116.5	123	2.4	12.19	4.0	6.0	7.0	7.0			
	130.2	110	2.4	10.90	4.0	6.0	7.0	7.0			
	167.8	85	2.3	8.46	3.0	6.0	8.0	6.0			
	187.5	76	2.4	7.57	3.0	5.0	8.0	6.0			
	207.1	69	2.7	6.86	3.0	5.0	8.0	6.0			
	218.1	66	2.5	6.51	3.0	5.0	8.0	6.0			



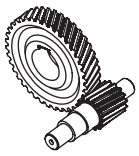
P_1 [kW]	n_2 [Min^{-1}]	M_2 [Nm]	f_B	i_{ges}	F_R [kN]	F_A [kN]	$F_{R\,GR}$ [kN]	$F_{A\,GR}$ [kN]	Tip / Type	Kg	Sayfa Page mm
1.50	66.8	215	0.8	21.27	-	-	5.0	6.0	**PA 12 - 90L/4A** **PF 12 - 90L/4A**	22	90
	75.5	190	0.8	18.80	-	-	5.0	6.0			
	84.8	169	0.9	16.74	-	-	5.0	5.0			
	106.0	135	1.1	13.39	1.0	4.0	5.0	5.0			
	132.9	108	1.2	10.68	2.0	4.0	5.0	5.0			
	147.1	97	1.4	9.65	2.0	4.0	5.0	5.0			
	180.8	79	1.7	7.85	2.0	4.0	5.0	5.0			
	194.8	74	1.7	7.29	2.0	4.0	5.0	5.0			
	217.3	66	1.9	6.53	2.0	3.0	5.0	5.0			
	245.5	58	2.1	5.78	2.0	3.0	5.0	5.0			
	287.8	50	2.3	4.93	2.0	3.0	5.0	4.0			
	316.1	45	2.4	4.49	2.0	3.0	5.0	4.0			
	329.6	43	2.6	4.31	2.0	3.0	5.0	4.0			
	357.1	40	2.5	3.98	2.0	3.0	5.0	4.0			
	418.7	34	2.6	3.39	2.0	3.0	5.0	4.0			
	479.5	30	2.7	2.96	2.0	3.0	5.0	4.0			
	182.2	79	0.8	7.80	0.4	3.0	2.0	3.0	**PA 02 - 90L/4A** **PF 02 - 90L/4A**	20	88
	206.1	70	0.9	6.89	1.0	3.0	2.0	3.0			
	255.0	56	1.0	5.57	1.0	3.0	2.0	3.0			
	294.5	49	1.2	4.82	1.0	3.0	2.0	3.0			
	364.5	39	1.3	3.90	2.0	2.0	2.0	3.0			
	418.5	34	1.5	3.39	2.0	2.0	2.0	3.0			
	478.6	30	1.5	2.97	1.0	2.0	2.0	3.0			
	524.3	27	2.3	2.71	-	4.0	-	-	**PA 21 - 90L/4A** **PF 21 - 90L/4A**	24	83
	586.0	24	2.4	2.42	-	4.0	-	-			
	501.8	29	1.9	2.83	-	3.0	-	-	**PA 11 - 90L/4A** **PF 11 - 90L/4A**	18	82
	612.1	23	2.1	2.32	-	3.0	-	-			
	696.1	21	2.4	2.04	-	3.0	-	-			
	784.5	18	2.5	1.81	-	3.0	-	-			
2.20	1.0	21065	0.9	1413.66	89.0	120.0	120.0	120.0	**PA 103/52 - 100L/4A** **PF 103/52 - 100L/4A**	792	111
	1.2	17099	1.2	1147.52	95.0	120.0	120.0	120.0			
	1.5	14066	1.4	944.01	97.0	120.0	120.0	120.0			
	1.7	12186	1.6	817.82	99.0	120.0	120.0	120.0			
	2.2	9575	2.1	642.57	100.0	120.0	120.0	120.0			
	3.0	6976	2.9	468.19	101.0	120.0	120.0	120.0			
	1.3	16257	0.8	1090.99	51.0	80.0	83.0	80.0	**PA 93/42 - 100L/4A** **PF 93/42 - 100L/4A**	544	111
	1.7	12099	1.0	811.95	59.0	80.0	88.0	80.0			
	1.9	11277	1.1	756.80	60.0	80.0	89.0	80.0			
	2.6	8164	1.5	547.88	63.0	80.0	91.0	80.0			
	3.1	6808	1.8	456.91	64.0	80.0	92.0	80.0			
	4.2	4960	2.5	332.89	66.0	80.0	93.0	80.0			
	4.9	4291	2.8	287.97	66.0	80.0	93.0	80.0			
	2.0	10768	0.7	722.63	30.0	51.0	53.0	65.0	**PA\PF 83/32 - 100L/4A**	361	111
	2.7	7825	1.0	525.11	38.0	51.0	58.0	65.0	**PA 83/42 - 100L/4A** **PF 83/42 - 100L/4A**	376	111
	3.2	6525	1.2	437.93	41.0	50.0	60.0	65.0			
	3.8	5580	1.4	374.50	42.0	49.0	61.0	65.0			
	5.1	4113	1.9	276.00	44.0	46.0	62.0	65.0			
	6.0	3517	2.3	236.03	44.0	45.0	62.0	65.0			
	7.0	2996	2.7	201.09	44.0	44.0	63.0	65.0			
	6.5	3226	2.8	216.49	44.0	44.0	62.0	65.0	**PA\PF 83 - 100L/4A**	331	105
	4.1	5167	1.0	346.75	22.0	24.0	36.0	50.0	**PA 73/22 - 100L/4A** **PF 73/22 - 100L/4A**	243	110
	5.0	4173	1.2	280.08	24.0	24.0	38.0	50.0			
	6.2	3373	1.5	226.38	26.0	23.0	38.0	50.0	**PA\PF 73/32 - 100L/4A**	254	110
	6.9	3064	1.7	205.59	26.0	23.0	39.0	50.0	**PA 73 - 100L/4A** **PF 73 - 100L/4A**	224	103
	8.5	2474	2.3	166.07	27.0	23.0	39.0	50.0			
	11.3	1853	2.6	124.38	28.0	22.0	40.0	50.0			

P_1 [kW]	n_2 [Min^{-1}]	M_2 [Nm]	f_B	i_{ges}	F_R [kN]	F_A [kN]	$F_{R\,GR}$ [kN]	$F_{A\,GR}$ [kN]	Tip / Type	Kg	Sayfa Page mm
2.20	5.0	4217	0.8	283.00	13.0	24.0	23.0	45.0	**PA\PF 63/22 - 100L/4A**	162	110
	5.3	3957	0.9	265.56	14.0	24.0	24.0	45.0	**PA 63 - 100L/4A PF 63 - 100L/4A**	143	101
	6.6	3195	1.1	214.41	16.0	24.0	26.0	45.0			
	7.8	2695	1.4	180.86	18.0	24.0	27.0	45.0			
	9.7	2176	1.7	146.02	19.0	23.0	27.0	45.0			
	13.0	1610	2.3	108.08	20.0	22.0	28.0	45.0			
	16.2	1300	2.4	87.26	20.0	21.0	28.0	45.0			
	18.2	1155	2.9	77.49	20.0	21.0	28.0	45.0			
	22.4	938	3.1	62.96	20.0	20.0	28.0	43.0			
	10.1	2078	1.1	139.42	11.0	24.0	18.0	40.0	**PA 53 - 100L/4A PF 53 - 100L/4A**	107	99
	13.3	1576	1.4	105.77	13.0	24.0	19.0	40.0			
	14.8	1422	1.6	95.41	13.0	24.0	19.0	40.0			
	16.2	1295	1.3	86.88	13.0	24.0	19.0	40.0	**PA 52 - 100L/4A PF 52 - 100L/4A**	89	98
	18.0	1170	1.4	78.53	13.0	24.0	19.0	40.0			
	19.7	1065	1.5	71.47	14.0	24.0	19.0	40.0			
	23.7	887	2.1	59.50	14.0	24.0	20.0	40.0			
	26.2	801	2.4	53.79	14.0	24.0	20.0	40.0			
	28.8	729	2.6	48.95	14.0	24.0	20.0	40.0			
	14.9	1414	0.9	94.91	0.4	0.4	9.0	9.0	**PA 43 - 100L/4A PF 43 - 100L/4A**	75	97
	17.6	1192	1.0	80.01	1.0	12.0	10.0	10.0			
	18.8	1116	1.0	74.87	3.0	12.0	10.0	10.0	**PA 42 - 100L/4A PF 42 - 100L/4A**	60	96
	23.3	904	1.1	60.64	6.0	12.0	11.0	10.0			
	27.7	760	1.4	50.99	8.0	12.0	11.0	10.0			
	34.1	615	1.9	41.30	8.0	12.0	11.0	10.0			
	40.0	525	2.3	35.26	7.0	12.0	11.0	10.0			
	46.3	454	2.4	30.47	7.0	12.0	11.0	10.0			
	48.2	436	2.3	29.28	7.0	12.0	11.0	9.0			
	57.1	368	2.4	24.68	7.0	12.0	11.0	9.0			
	57.7	364	2.4	24.42	7.0	12.0	11.0	9.0			
	64.5	326	2.9	21.85	7.0	12.0	12.0	9.0			
	30.5	689	1.0	46.22	3.0	9.0	9.0	11.0	**PA 32 - 100L/4A PF 32 - 100L/4A**	46	94
	37.9	555	1.1	37.22	4.0	9.0	9.0	10.0			
	45.3	464	1.1	31.16	5.0	9.0	9.0	10.0			
	53.1	395	1.1	26.53	5.0	9.0	9.0	10.0			
	61.0	344	1.8	23.10	5.0	9.0	9.0	10.0			
	68.2	308	2.1	20.67	5.0	9.0	9.0	10.0			
	75.6	278	2.3	18.64	5.0	9.0	9.0	10.0			
	84.7	248	2.1	16.64	4.0	9.0	9.0	9.0			
	86.9	242	2.5	16.23	4.0	9.0	9.0	9.0			
	93.9	224	2.3	15.01	4.0	8.0	9.0	9.0			
	97.1	216	2.5	14.52	4.0	9.0	9.0	9.0			
	120.6	174	2.5	11.70	4.0	8.0	9.0	9.0			
	49.0	429	0.9	28.80	0.3	0.2	7.0	6.0	**PA 22 - 100L/4A PF 22 - 100L/4A**	35	92
	57.1	368	0.9	24.69	0.3	0.4	7.0	6.0			
	70.5	298	1.0	20.00	0.4	0.3	7.0	6.0			
	84.2	249	1.4	16.74	1.0	6.0	7.0	6.0			
	96.1	219	1.5	14.67	2.0	6.0	7.0	6.0			
	115.7	182	1.8	12.19	2.0	6.0	7.0	6.0			
	129.3	162	2.0	10.90	3.0	5.0	7.0	6.0			
	166.6	126	2.1	8.46	3.0	5.0	7.0	6.0			
	186.2	113	2.2	7.57	3.0	5.0	7.0	6.0			
	205.6	102	2.5	6.86	3.0	5.0	8.0	6.0			
	216.6	97	2.4	6.51	3.0	5.0	8.0	5.0			
	244.4	86	2.5	5.77	3.0	5.0	8.0	5.0			
	272.1	77	2.1	5.18	3.0	4.0	8.0	5.0			
	304.2	69	2.2	4.64	3.0	4.0	8.0	5.0			



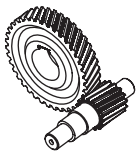
P_1 [kW]	n_2 [Min^{-1}]	M_2 [Nm]	f_B	i_{ges}	F_R [kN]	F_A [kN]	$F_{R\ GR}$ [kN]	$F_{A\ GR}$ [kN]	Tip / Type	Kg	Sayfa Page mm
2.20	105.3	200	0.7	13.39	0.2	0.2	5.0	5.0	**PA 12 - 100L/4A** **PF 12 - 100L/4A**	26	90
	132.0	159	0.8	10.68	0.2	0.2	5.0	5.0			
	146.1	144	0.9	9.65	0.2	0.2	5.0	5.0			
	179.6	117	1.1	7.85	0.2	3.0	5.0	4.0			
	193.5	109	1.1	7.29	1.0	3.0	5.0	4.0			
	215.8	97	1.3	6.53	1.0	3.0	5.0	4.0			
	243.8	86	1.4	5.78	1.0	3.0	5.0	4.0			
	285.8	74	1.6	4.93	1.0	3.0	5.0	4.0			
	313.9	67	1.8	4.49	1.0	3.0	5.0	4.0			
	327.3	64	1.7	4.31	2.0	3.0	5.0	4.0			
	354.5	59	1.9	3.98	1.0	3.0	5.0	4.0			
	415.7	51	2.2	3.39	2.0	3.0	5.0	4.0			
	476.1	44	2.4	2.96	2.0	2.0	5.0	4.0			
	520.6	40	1.9	2.71	-	4.0	-	-	**PA 21 - 100L/4A** **PF 21 - 100L/4A**	28	83
	581.9	36	2.0	2.42	-	4.0	-	-			
	676.8	31	2.2	2.08	-	4.0	-	-			
	763.8	28	2.3	1.85	-	3.0	-	-			
	498.2	42	1.3	2.83	-	3.0	-	-	**PA 11 - 100L/4A** **PF 11 - 100L/4A**	22	82
	607.8	35	1.4	2.32	-	3.0	-	-			
	691.2	30	1.9	2.04	-	3.0	-	-			
	779.0	27	2.0	1.81	-	2.0	-	-			
3.00	1.2	23317	0.9	1147.52	85.0	120.0	120.0	120.0	**PA 103/52 - 100L/4B** **PF 103/52 - 100L/4B**	795	111
	1.5	19181	1.0	944.01	92.0	120.0	120.0	120.0			
	1.7	16617	1.2	817.82	94.0	120.0	120.0	120.0			
	2.2	13057	1.5	642.57	98.0	120.0	120.0	120.0			
	3.0	9513	2.1	468.19	100.0	120.0	120.0	120.0			
	4.1	6931	2.9	341.11	101.0	120.0	120.0	120.0			
	1.9	15377	0.8	756.80	53.0	80.0	84.0	80.0	**PA 93/42 - 100L/4B** **PF 93/42 - 100L/4B**	547	111
	2.6	11132	1.1	547.88	60.0	80.0	89.0	80.0			
	3.1	9284	1.3	456.91	62.0	80.0	90.0	80.0			
	4.2	6764	1.8	332.89	64.0	80.0	92.0	80.0			
	4.9	5851	2.1	287.97	65.0	77.0	92.0	80.0			
	5.9	4890	2.5	240.68	66.0	74.0	93.0	80.0			
	2.7	10670	0.7	525.11	30.0	45.0	53.0	65.0	**PA 83/42 - 100L/4B** **PF 83/42 - 100L/4B**	379	111
	3.2	8898	0.9	437.93	35.0	45.0	56.0	65.0			
	3.8	7610	1.1	374.50	38.0	45.0	58.0	65.0			
	5.1	5608	1.4	276.00	42.0	44.0	61.0	65.0			
	6.0	4796	1.7	236.03	43.0	43.0	61.0	65.0			
	7.0	4086	2.0	201.09	44.0	42.0	62.0	65.0			
	9.5	3028	2.5	149.01	44.0	39.0	63.0	65.0			
	11.1	2580	2.6	126.95	45.0	38.0	63.0	65.0			
	6.5	4399	2.0	216.49	43.0	42.0	62.0	65.0	**PA 83 - 100L/4B** **PF 83 - 100L/4B**	334	105
	10.3	2777	2.7	136.67	45.0	39.0	63.0	65.0			
	5.0	5691	0.9	280.08	20.0	20.0	35.0	50.0	**PA\PF 73/22 - 100L/4B**	246	110
	6.2	4600	1.1	226.38	23.0	21.0	37.0	50.0	**PA\PF 73/32 - 100L/4B**	257	110
	6.9	4178	1.3	205.59	24.0	21.0	37.0	50.0	**PA 73 - 100L/4B** **PF 73 - 100L/4B**	227	103
	8.5	3374	1.7	166.07	26.0	21.0	38.0	50.0			
	11.3	2527	1.9	124.38	27.0	20.0	39.0	50.0			
	14.0	2041	1.9	100.47	27.0	20.0	40.0	50.0			
	15.4	1856	2.3	91.33	28.0	20.0	40.0	50.0			

P_1 [kW]	n_2 [Min^{-1}]	M_2 [Nm]	f_B	i_{ges}	F_R [kN]	F_A [kN]	$F_{R\,GR}$ [kN]	$F_{A\,GR}$ [kN]	Tip / Type	Kg	Sayfa Page mm
3.00	6.6	4357	0.8	214.41	12.0	21.0	23.0	45.0	PA 63 - 100L/4B PF 63 - 100L/4B	146	101
	7.8	3675	1.0	180.86	15.0	21.0	25.0	45.0			
	9.7	2967	1.2	146.02	17.0	21.0	26.0	45.0			
	13.0	2196	1.7	108.08	19.0	21.0	27.0	45.0			
	16.2	1773	1.8	87.26	19.0	20.0	28.0	45.0			
	18.2	1574	2.1	77.49	20.0	20.0	28.0	44.0			
	22.4	1279	2.3	62.96	20.0	19.0	28.0	42.0			
	26.2	1094	2.4	53.84	20.0	19.0	28.0	40.0			
	27.7	1033	2.3	50.83	20.0	19.0	28.0	40.0			
	32.4	883	2.5	43.47	20.0	18.0	28.0	38.0			
	10.1	2833	0.8	139.42	7.0	24.0	16.0	40.0	PA 53 - 100L/4B PF 53 - 100L/4B	110	99
	13.3	2149	1.0	105.77	11.0	24.0	17.0	40.0			
	14.8	1939	1.2	95.41	12.0	24.0	18.0	40.0			
	16.2	1765	1.0	86.88	12.0	24.0	18.0	40.0	PA 52 - 100L/4B PF 52 - 100L/4B	92	98
	18.0	1596	1.0	78.53	13.0	24.0	19.0	40.0			
	19.7	1452	1.1	71.47	13.0	24.0	19.0	40.0			
	23.7	1209	1.6	59.50	13.0	24.0	19.0	40.0			
	26.2	1093	1.7	53.79	13.0	24.0	19.0	40.0			
	28.8	995	1.9	48.95	14.0	24.0	19.0	40.0			
	36.7	782	2.1	38.46	14.0	24.0	20.0	40.0			
	39.2	731	1.9	36.00	14.0	24.0	20.0	40.0			
	43.3	661	1.9	32.54	14.0	24.0	20.0	39.0			
	43.9	653	2.1	32.12	14.0	24.0	20.0	39.0			
	53.3	537	2.2	26.43	14.0	24.0	20.0	37.0			
	59.0	486	2.2	23.89	14.0	24.0	20.0	36.0			
	17.6	1626	0.8	80.01	0.4	0.3	9.0	7.0	PA 43 - 100L/4B PF 43 - 100L/4B	78	97
	20.1	1424	0.9	70.10	0.3	0.3	9.0	8.0			
	23.3	1232	0.8	60.64	0.4	0.4	10.0	8.0	PA 42 - 100L/4B PF 42 - 100L/4B	63	96
	27.7	1036	1.1	50.99	1.0	12.0	10.0	9.0			
	34.1	839	1.4	41.30	3.0	12.0	11.0	9.0			
	40.0	716	1.7	35.26	5.0	12.0	11.0	9.0			
	46.3	619	1.7	30.47	7.0	12.0	11.0	9.0			
	48.2	595	1.7	29.28	6.0	12.0	11.0	9.0			
	57.1	501	1.8	24.68	6.0	12.0	11.0	9.0			
	57.7	496	1.7	24.42	6.0	12.0	11.0	8.0			
	64.5	444	2.1	21.85	6.0	12.0	11.0	8.0			
	79.7	359	2.1	17.69	6.0	11.0	11.0	8.0			
	93.3	307	2.1	15.10	6.0	11.0	12.0	8.0			
	98.1	292	2.3	14.38	6.0	11.0	12.0	8.0			
	114.9	249	2.3	12.27	6.0	10.0	12.0	8.0			
	138.3	207	2.3	10.19	5.0	10.0	12.0	7.0			
	165.9	173	2.3	8.50	5.0	9.0	12.0	7.0			
	61.0	469	1.3	23.10	4.0	8.0	9.0	9.0	PA 32 - 100L/4B PF 32 - 100L/4B	48	94
	68.2	420	1.6	20.67	4.0	8.0	9.0	9.0			
	75.6	379	1.7	18.64	4.0	8.0	9.0	9.0			
	84.7	338	1.6	16.64	4.0	8.0	9.0	9.0			
	86.9	330	1.9	16.23	4.0	8.0	9.0	9.0			
	93.9	305	1.7	15.01	4.0	8.0	9.0	9.0			
	97.1	295	1.9	14.52	4.0	8.0	9.0	9.0			
	120.6	238	1.9	11.70	4.0	7.0	9.0	8.0			
	144.0	199	1.9	9.79	4.0	7.0	9.0	8.0			
	178.7	160	2.1	7.89	4.0	7.0	9.0	8.0			
	209.8	137	2.1	6.72	3.0	6.0	10.0	7.0			
	247.8	116	2.2	5.69	3.0	6.0	10.0	7.0			
	256.8	112	1.9	5.49	3.0	6.0	10.0	7.0			
	266.4	108	2.3	5.29	3.0	6.0	10.0	7.0			
	318.7	90	2.1	4.42	3.0	5.0	10.0	7.0			
	376.3	76	2.2	3.75	3.0	5.0	10.0	6.0			
	475.2	60	2.3	2.97	3.0	5.0	10.0	6.0			



P_1 [kW]	n_2 [Min^{-1}]	M_2 [Nm]	f_B	i_{ges}	F_R [kN]	F_A [kN]	$F_{R\,GR}$ [kN]	$F_{A\,GR}$ [kN]	Tip / Type	Kg	Sayfa Page mm
3.00	84.2	340	1.0	16.74	0.3	0.3	7.0	6.0	**PA 22 - 100L/4B** **PF 22 - 100L/4B**	38	92
	96.1	298	1.1	14.67	0.4	0.3	7.0	6.0			
	115.7	248	1.3	12.19	0.3	0.3	7.0	6.0			
	129.3	222	1.4	10.90	0.3	5.0	7.0	6.0			
	166.6	172	1.5	8.46	1.0	4.0	7.0	5.0			
	186.2	154	1.6	7.57	2.0	4.0	7.0	5.0			
	205.6	139	1.8	6.86	2.0	4.0	7.0	5.0			
	216.6	132	1.7	6.51	2.0	4.0	7.0	5.0			
	244.4	117	1.8	5.77	3.0	4.0	7.0	5.0			
	272.1	105	1.5	5.18	2.0	4.0	7.0	5.0			
	304.2	94	1.6	4.64	2.0	4.0	8.0	5.0			
	353.8	81	1.7	3.99	2.0	4.0	8.0	5.0			
	399.2	72	1.8	3.53	2.0	4.0	8.0	5.0			
	504.3	57	2.0	2.80	2.0	3.0	7.0	4.0			
	179.6	160	0.8	7.85	0.2	0.2	5.0	4.0	**PA 12 - 100L/4B** **PF 12 - 100L/4B**	29	90
	193.5	148	0.8	7.29	0.2	0.2	5.0	4.0			
	215.8	133	0.9	6.53	0.2	0.2	5.0	4.0			
	243.8	118	1.0	5.78	0.2	0.2	5.0	4.0			
	285.8	100	1.2	4.93	0.2	0.2	5.0	4.0			
	313.9	91	1.3	4.49	0.2	0.2	5.0	4.0			
	327.3	88	1.3	4.31	0.4	2.0	5.0	4.0			
	354.5	81	1.4	3.98	0.2	2.0	5.0	4.0			
	415.7	69	1.6	3.39	1.0	2.0	5.0	4.0			
	476.1	60	1.7	2.96	1.0	2.0	5.0	4.0			
	546.5	52	1.9	2.58	-	4.0	-	-	**PA 31 - 100L/4B** **PF 31 - 100L/4B**	36	84
	677.9	42	2.1	2.08	-	4.0	-	-			
	801.1	36	2.2	1.76	-	4.0	-	-			
	520.6	55	1.4	2.71	-	4.0	-	-	**PA 21 - 100L/4B** **PF 21 - 100L/4B**	31	83
	581.9	49	1.5	2.42	-	4.0	-	-			
	676.8	42	1.6	2.08	-	3.0	-	-			
	763.8	38	1.7	1.85	-	3.0	-	-			
	498.2	58	0.9	2.83	-	2.0	-	-	**PA 11 - 100L/4B** **PF 11 - 100L/4B**	25	82
	607.8	47	1.0	2.32	-	2.0	-	-			
	691.2	41	1.4	2.04	-	2.0	-	-			
	779.0	37	1.5	1.81	-	2.0	-	-			
4.00	1.5	25218	0.8	944.01	83.0	120.0	120.0	120.0	**PA 103/52 - 112M/4B** **PF 103/52 - 112M/4B**	804	111
	1.7	21847	0.9	817.82	89.0	120.0	120.0	120.0			
	2.2	17165	1.2	642.57	94.0	120.0	120.0	120.0			
	3.1	12507	1.6	468.19	98.0	120.0	120.0	120.0			
	4.2	9112	2.2	341.11	100.0	116.0	120.0	120.0			
	4.8	7922	2.5	296.56	101.0	112.0	120.0	120.0			
	5.8	6536	3.1	244.66	101.0	108.0	120.0	120.0			
	7.7	4936	3.3	184.77	102.0	101.0	120.0	120.0			
	2.6	14636	0.8	547.88	54.0	80.0	85.0	80.0	**PA 93/42 - 112M/4B** **PF 93/42 - 112M/4B**	556	111
	3.1	12206	1.0	456.91	59.0	78.0	88.0	80.0			
	4.3	8893	1.4	332.89	62.0	75.0	90.0	80.0			
	5.0	7693	1.6	287.97	64.0	74.0	91.0	80.0			
	5.9	6429	1.9	240.68	65.0	71.0	92.0	80.0			
	7.9	4862	2.5	182.00	66.0	67.0	93.0	80.0			
	8.9	4297	2.8	160.87	66.0	66.0	93.0	80.0	**PA\PF 93/52 - 112M/4B**	585	111
	3.8	10004	0.8	374.50	33.0	39.0	55.0	65.0	**PA 83/42 - 112M/4B** **PF 83/42 - 112M/4B**	388	111
	5.2	7373	1.1	276.00	39.0	40.0	59.0	65.0			
	6.1	6305	1.3	236.03	41.0	39.0	60.0	65.0			
	7.1	5372	1.5	201.09	42.0	39.0	61.0	65.0			
	9.6	3981	2.0	149.01	44.0	37.0	62.0	65.0			

P_1 [kW]	n_2 [Min^{-1}]	M_2 [Nm]	f_B	i_{ges}	F_R [kN]	F_A [kN]	$F_{R\,GR}$ [kN]	$F_{A\,GR}$ [kN]	Tip / Type	Kg	Sayfa Page mm
4.00	6.6	5783	1.5	216.49	42.0	39.0	61.0	65.0	PA 83 - 112M/4B PF 83 - 112M/4B	343	105
	10.5	3651	2.0	136.67	44.0	37.0	62.0	65.0			
	17.7	2154	2.0	80.63	45.0	33.0	63.0	65.0			
	20.4	1875	2.0	70.19	45.0	32.0	63.0	65.0			
	23.1	1651	2.1	61.79	45.0	32.0	63.0	65.0			
	6.3	6047	0.8	226.38	19.0	17.0	34.0	50.0	PA\PF 73/32 - 112M/4B	266	110
	7.0	5492	1.0	205.59	21.0	18.0	35.0	50.0	PA 73 - 112M/4B PF 73 - 112M/4B	236	103
	8.6	4436	1.3	166.07	24.0	18.0	37.0	50.0			
	11.5	3323	1.4	124.38	26.0	18.0	39.0	50.0			
	14.2	2684	1.4	100.47	27.0	18.0	39.0	50.0			
	15.7	2440	1.7	91.33	27.0	18.0	39.0	50.0			
	19.1	1998	1.9	74.80	27.0	18.0	40.0	50.0			
	23.7	1614	1.9	60.42	28.0	17.0	40.0	47.0			
	27.4	1397	2.0	52.28	28.0	17.0	40.0	46.0			
	31.3	1220	2.1	45.67	28.0	16.0	40.0	44.0			
	38.0	1006	2.2	37.68	28.0	16.0	40.0	42.0			
	43.0	889	2.2	33.27	28.0	15.0	40.0	41.0			
	50.4	757	2.1	28.35	28.0	15.0	40.0	39.0			
	7.9	4831	0.8	180.86	9.0	18.0	21.0	45.0	PA 63 - 112M/4B PF 63 - 112M/4B	155	101
	9.8	3901	0.9	146.02	14.0	18.0	24.0	45.0			
	13.2	2887	1.3	108.08	17.0	19.0	26.0	44.0			
	16.4	2331	1.4	87.26	19.0	19.0	27.0	42.0			
	18.5	2070	1.7	77.49	19.0	18.0	27.0	42.0			
	22.7	1682	1.8	62.96	19.0	18.0	28.0	40.0			
	26.6	1438	1.9	53.84	20.0	18.0	28.0	39.0			
	28.1	1358	1.8	50.83	20.0	18.0	28.0	38.0			
	32.9	1161	1.9	43.47	20.0	17.0	28.0	37.0			
	39.6	965	1.8	36.14	20.0	17.0	28.0	35.0			
	46.3	826	1.9	30.90	20.0	16.0	28.0	34.0			
	29.3	1302	1.9	48.75	20.0	17.0	28.0	38.0	PA\PF 62 - 112M/4B	157	100
	13.5	2825	0.8	105.77	8.0	24.0	16.0	40.0	PA 53 - 112M/4B PF 53 - 112M/4B	119	99
	15.0	2549	0.9	95.41	9.0	24.0	17.0	40.0			
	17.9	2129	0.9	79.69	11.0	24.0	18.0	40.0			
	21.9	1745	1.1	65.31	12.0	24.0	18.0	40.0			
	24.0	1590	1.2	59.50	13.0	24.0	19.0	40.0	PA 52 - 112M/4B PF 52 - 112M/4B	100	98
	26.6	1437	1.3	53.79	13.0	24.0	19.0	40.0			
	29.2	1308	1.5	48.95	13.0	24.0	19.0	40.0			
	37.2	1027	1.6	38.46	14.0	24.0	19.0	39.0			
	39.7	962	1.4	36.00	14.0	24.0	19.0	39.0			
	43.9	869	1.4	32.54	14.0	24.0	20.0	38.0			
	44.5	858	1.6	32.12	14.0	24.0	20.0	37.0			
	54.1	706	2.6	26.43	14.0	24.0	20.0	36.0			
	59.8	638	2.5	23.89	14.0	24.0	20.0	35.0			
	66.0	578	2.8	21.65	14.0	24.0	20.0	34.0			
	73.1	523	2.8	19.57	14.0	24.0	20.0	33.0			
	80.3	476	2.8	17.81	14.0	24.0	20.0	32.0			
	24.6	1555	0.7	58.22	0.4	0.3	9.0	6.0	PA\PF 43 - 112M/4B	87	97
	28.0	1362	0.8	50.99	0.4	0.3	9.0	7.0	PA 42 - 112M/4B PF 42 - 112M/4B	72	96
	34.6	1103	1.1	41.30	1.0	0.3	10.0	7.0			
	40.6	942	1.3	35.26	1.0	0.3	11.0	7.0			
	46.9	814	1.3	30.47	2.0	11.0	11.0	8.0			
	48.8	782	1.3	29.28	2.0	10.0	11.0	7.0			
	57.9	659	1.4	24.68	4.0	11.0	11.0	8.0			
	58.6	652	1.3	24.42	3.0	10.0	11.0	7.0			
	65.5	584	1.9	21.85	5.0	11.0	11.0	8.0			
	80.8	473	2.4	17.69	6.0	10.0	11.0	8.0			
	94.7	404	2.4	15.10	5.0	10.0	11.0	7.0			
	99.5	384	2.6	14.38	5.0	10.0	11.0	7.0			
	116.5	328	2.6	12.27	5.0	9.0	12.0	7.0			



P_1 [kW]	n_2 [Min^{-1}]	M_2 [Nm]	f_B	i_{ges}	F_R [kN]	F_A [kN]	$F_{R\,GR}$ [kN]	$F_{A\,GR}$ [kN]	Tip / Type	Kg	Sayfa Page mm
4.00	61.9	617	1.0	23.10	1.0	7.0	9.0	8.0	PA 32 - 112M/4B PF 32 - 112M/4B	57	94
	69.2	552	1.2	20.67	2.0	7.0	9.0	8.0			
	76.7	498	1.3	18.64	2.0	7.0	9.0	8.0			
	85.9	445	1.2	16.64	3.0	7.0	9.0	8.0			
	88.1	434	1.5	16.23	4.0	7.0	9.0	8.0			
	95.3	401	1.3	15.01	3.0	7.0	9.0	8.0			
	98.5	388	1.7	14.52	4.0	7.0	9.0	8.0			
	122.3	312	2.1	11.70	4.0	6.0	9.0	8.0			
	146.0	262	2.1	9.79	3.0	6.0	9.0	8.0			
	181.2	211	2.4	7.89	3.0	6.0	9.0	7.0			
	212.8	179	2.4	6.72	3.0	6.0	9.0	7.0			
	251.3	152	2.5	5.69	3.0	6.0	10.0	7.0			
	260.5	147	2.1	5.49	3.0	5.0	10.0	7.0			
	270.2	141	2.6	5.29	3.0	5.0	10.0	7.0			
	323.2	118	2.4	4.42	3.0	5.0	10.0	6.0			
	381.7	100	2.5	3.75	3.0	5.0	10.0	6.0			
	481.9	79	2.6	2.97	3.0	5.0	10.0	6.0			
	85.4	447	0.8	16.74	0.3	0.2	6.0	5.0	PA 22 - 112M/4B PF 22 - 112M/4B	47	92
	97.5	392	0.9	14.67	0.3	0.2	7.0	5.0			
	117.3	326	1.0	12.19	0.3	0.2	7.0	5.0			
	131.1	291	1.1	10.90	0.3	0.2	7.0	5.0			
	169.0	226	1.1	8.46	0.3	0.2	7.0	5.0			
	188.9	202	1.2	7.57	0.3	0.2	7.0	5.0			
	208.5	183	1.4	6.86	0.3	4.0	7.0	5.0			
	219.6	174	1.3	6.51	0.3	4.0	7.0	5.0			
	247.9	154	1.4	5.77	1.0	4.0	7.0	5.0			
	276.0	138	1.1	5.18	1.0	3.0	7.0	5.0			
	308.5	124	1.2	4.64	1.0	3.0	7.0	4.0			
	358.8	106	1.3	3.99	2.0	3.0	7.0	4.0			
	404.9	94	1.4	3.53	2.0	3.0	8.0	4.0			
	511.4	75	1.5	2.80	2.0	3.0	7.0	4.0			
	247.2	155	0.8	5.78	-	-	5.0	4.0	PA 12 - 112M/4B PF 12 - 112M/4B	38	90
	289.9	132	0.9	4.93	-	-	5.0	4.0			
	318.4	120	1.0	4.49	-	-	5.0	3.0			
	332.0	115	1.0	4.31	-	-	5.0	4.0			
	359.6	106	1.1	3.98	-	-	5.0	3.0			
	421.6	91	1.2	3.39	-	-	5.0	3.0			
	482.9	79	1.3	2.96	-	-	5.0	3.0			
	499.6	76	2.9	2.86	-	7.0	-	-	PA 51 - 112M/4B PF 51 - 112M/4B	62	86
	572.0	67	3.0	2.50	-	6.0	-	-			
	693.3	55	3.3	2.06	-	6.0	-	-			
	785.1	49	3.0	1.82	-	6.0	-	-			
	572.0	67	2.6	2.50	-	5.0	-	-	PA 41 - 112M/4B PF 41 - 112M/4B	53	85
	668.9	57	2.8	2.14	-	5.0	-	-			
	785.1	49	2.9	1.82	-	4.0	-	-			
	554.3	69	2.1	2.58	-	4.0	-	-	PA 31 - 112M/4B PF 31 - 112M/4B	45	84
	687.5	56	2.4	2.08	-	4.0	-	-			
	812.5	47	2.5	1.76	-	4.0	-	-			
	528.0	72	1.1	2.71	-	3.0	-	-	PA 21 - 112M/4B PF 21 - 112M/4B	40	83
	590.2	65	1.1	2.42	-	3.0	-	-			
	686.4	56	1.2	2.08	-	3.0	-	-			
	774.6	49	1.3	1.85	-	3.0	-	-			
	978.4	39	1.5	1.46	-	3.0	-	-			
	616.4	62	0.8	2.32	-	2.0	-	-	PA 11 - 112M/4B PF 11 - 112M/4B	34	82
	701.0	54	1.1	2.04	-	2.0	-	-			
	790.1	48	1.1	1.81	-	2.0	-	-			
	928.6	41	1.2	1.54	-	2.0	-	-			
	1059.3	36	1.4	1.35	-	2.0	-	-			

P_1 [kW]	n_2 [Min^{-1}]	M_2 [Nm]	f_B	i_{ges}	F_R [kN]	F_A [kN]	$F_{R\,GR}$ [kN]	$F_{A\,GR}$ [kN]	Tip / Type	Kg	Sayfa Page mm
5.50	2.2	23357	0.9	642.57	85.0	120.0	120.0	120.0	PA 103/52 - 132S/4C PF 103/52 - 132S/4C	818	111
	3.1	17018	1.2	468.19	94.0	116.0	120.0	120.0			
	4.2	12399	1.6	341.11	98.0	111.0	120.0	120.0			
	4.9	10780	1.9	296.56	99.0	108.0	120.0	120.0			
	5.9	8893	2.2	244.66	100.0	104.0	120.0	120.0			
	7.0	7537	3.1	207.36	101.0	100.0	120.0	120.0	PA\PF 103 - 132S/4C	744	109
	4.3	12100	1.0	332.89	58.0	69.0	88.0	80.0	PA 93/42 - 132S/4C PF 93/42 - 132S/4C	570	111
	5.0	10468	1.2	287.97	61.0	69.0	89.0	80.0			
	6.0	8749	1.4	240.68	63.0	67.0	91.0	80.0			
	7.7	6833	2.0	187.99	64.0	65.0	92.0	80.0	PA 93 - 132S/4C PF 93 - 132S/4C	525	107
	13.2	3971	2.9	109.25	66.0	58.0	93.0	80.0			
	5.2	10033	0.8	276.00	32.0	34.0	54.0	65.0	PA 83/42 - 132S/4C PF 83/42 - 132S/4C	402	111
	6.1	8580	0.9	236.03	36.0	34.0	57.0	65.0			
	6.7	7869	1.1	216.49	38.0	35.0	58.0	65.0	PA 83 - 132S/4C PF 83 - 132S/4C	357	105
	8.8	5986	1.5	164.68	41.0	34.0	60.0	65.0			
	10.6	4968	1.5	136.67	43.0	34.0	61.0	65.0			
	13.9	3779	2.4	103.97	44.0	33.0	62.0	65.0			
	17.9	2931	3.1	80.63	44.0	32.0	63.0	65.0			
	20.6	2551	3.3	70.19	45.0	31.0	63.0	65.0			
	23.4	2246	3.5	61.79	45.0	30.0	63.0	65.0			
	8.4	6219	0.8	171.10	18.0	14.0	33.0	50.0	PA\PF 73/32 - 132S/4C	280	110
	8.7	6036	0.9	166.07	19.0	14.0	34.0	50.0	PA 73 - 132S/4C PF 73 - 132S/4C	250	103
	11.6	4527	1.2	124.55	24.0	16.0	37.0	50.0			
	11.6	4521	1.1	124.38	24.0	16.0	37.0	50.0			
	14.4	3652	1.0	100.47	25.0	16.0	38.0	50.0			
	15.8	3320	1.6	91.33	26.0	16.0	38.0	49.0			
	19.3	2719	2.0	74.80	27.0	16.0	39.0	48.0			
	23.9	2196	2.6	60.42	27.0	16.0	39.0	46.0			
	27.6	1900	2.9	52.28	28.0	16.0	40.0	44.0			
	10.9	4827	0.8	132.78	9.0	15.0	21.0	41.0	PA 63 - 132S/4C PF 63 - 132S/4C	169	101
	13.4	3928	0.9	108.08	13.0	16.0	24.0	40.0			
	13.5	3897	0.9	107.21	14.0	16.0	24.0	40.0			
	16.6	3172	1.0	87.26	17.0	16.0	26.0	40.0			
	18.6	2817	1.3	77.49	17.0	16.0	26.0	39.0			
	23.0	2288	1.6	62.96	18.0	16.0	27.0	38.0			
	26.8	1957	1.9	53.84	19.0	16.0	27.0	37.0			
	28.4	1848	2.0	50.83	19.0	16.0	27.0	37.0			
	33.2	1580	2.3	43.47	20.0	16.0	28.0	36.0			
	40.0	1314	2.7	36.14	20.0	16.0	28.0	34.0			
	46.8	1123	2.9	30.90	20.0	15.0	28.0	33.0			
	29.6	1772	1.4	48.75	19.0	16.0	28.0	36.0	PA 62 - 132S/4C PF 62 - 132S/4C	171	100
	39.0	1348	2.2	37.08	20.0	16.0	28.0	34.0			
	24.3	2163	0.9	59.50	11.0	24.0	18.0	40.0	PA 52 - 132S/4C PF 52 - 132S/4C	114	98
	26.9	1955	1.0	53.79	12.0	24.0	18.0	40.0			
	29.5	1779	1.1	48.95	12.0	24.0	18.0	40.0			
	35.8	1466	1.3	40.34	13.0	24.0	19.0	39.0			
	37.6	1398	1.2	38.46	13.0	24.0	19.0	38.0			
	40.1	1309	1.1	36.71	13.0	24.0	19.0	38.0			
	39.4	1335	1.4	36.00	13.0	24.0	19.0	37.0			
	44.4	1183	1.1	32.54	13.0	24.0	19.0	38.0			
	45.0	1168	1.2	32.12	13.0	24.0	19.0	36.0			
	50.1	1049	1.9	28.85	14.0	24.0	19.0	36.0			
	54.7	961	2.0	26.43	14.0	24.0	19.0	35.0			
	60.0	876	1.9	24.09	14.0	24.0	20.0	34.0			
	60.5	869	2.2	23.89	14.0	24.0	20.0	34.0			
	66.7	787	2.4	21.65	14.0	24.0	20.0	33.0			
	73.8	711	2.7	19.57	13.0	24.0	20.0	33.0			
	81.1	647	2.9	17.81	13.0	24.0	20.0	32.0			

P_1 [kW]	n_2 [Min^{-1}]	M_2 [Nm]	f_B	i_{ges}	F_R [kN]	F_A [kN]	$F_{R\,GR}$ [kN]	$F_{A\,GR}$ [kN]	Tip / Type	Kg	Sayfa Page mm
5.50	35.0	1501	0.8	41.30	0.4	0.2	9.0	5.0	**PA 42 - 132S/4C** **PF 42 - 132S/4C**	86	96
	41.0	1282	1.0	35.26	0.4	0.2	10.0	6.0			
	47.4	1108	1.0	30.47	1.0	0.3	10.0	6.0			
	49.4	1064	1.0	29.28	1.0	0.3	10.0	6.0			
	55.8	941	1.3	25.88	1.0	0.3	11.0	6.0			
	58.6	897	1.0	24.68	1.0	0.3	11.0	6.0			
	59.2	888	1.0	24.42	1.0	0.3	11.0	6.0			
	66.1	794	1.4	21.85	1.0	9.0	11.0	7.0			
	67.2	781	1.5	21.50	1.0	0.3	11.0	6.0			
	80.6	652	1.5	17.93	1.0	8.0	11.0	6.0			
	81.7	643	1.8	17.69	2.0	8.0	11.0	7.0			
	95.7	549	2.3	15.10	3.0	8.0	11.0	7.0			
	100.5	523	2.2	14.38	4.0	8.0	11.0	7.0			
	117.7	446	2.7	12.27	5.0	8.0	11.0	7.0			
	141.8	370	2.8	10.19	5.0	8.0	11.0	6.0			
	170.0	309	2.7	8.50	5.0	8.0	12.0	6.0			
	62.6	840	0.8	23.10	0.4	0.3	8.0	7.0	**PA 32 - 132S/4C** **PF 32 - 132S/4C**	71	94
	69.9	751	0.9	20.67	0.4	0.3	9.0	7.0			
	77.5	678	0.9	18.64	0.4	0.3	9.0	7.0			
	86.8	605	0.9	16.64	0.4	0.3	9.0	7.0			
	89.0	590	1.1	16.23	0.4	0.3	9.0	7.0			
	96.3	546	0.9	15.01	0.4	0.3	9.0	7.0			
	99.5	528	1.3	14.52	0.3	5.0	9.0	7.0			
	123.6	425	1.7	11.70	2.0	5.0	9.0	7.0			
	147.6	356	1.8	9.79	2.0	5.0	9.0	7.0			
	183.1	287	2.3	7.89	3.0	5.0	9.0	7.0			
	215.0	244	2.5	6.72	3.0	5.0	9.0	7.0			
	254.0	207	2.7	5.69	3.0	5.0	9.0	6.0			
	263.2	200	2.2	5.49	3.0	5.0	9.0	6.0			
	273.0	192	2.8	5.29	3.0	5.0	9.0	6.0			
	326.6	161	2.5	4.42	3.0	5.0	9.0	6.0			
	385.7	136	2.7	3.75	3.0	4.0	10.0	6.0			
	487.0	108	2.8	2.97	3.0	4.0	9.0	6.0			
	504.9	104	3.1	2.86	-	6.0	-	-	**PA\PF 51 - 132S/4C**	76	86
	578.0	91	2.7	2.50	-	5.0	-	-	**PA 41 - 132S/4C** **PF 41 - 132S/4C**	67	85
	675.9	78	2.9	2.14	-	4.0	-	-			
	793.3	66	3.1	1.82	-	4.0	-	-			
	560.1	94	2.0	2.58	-	4.0	-	-	**PA 31 - 132S/4C** **PF 31 - 132S/4C**	58	84
	694.7	76	2.2	2.08	-	3.0	-	-			
7.50	3.1	23127	0.9	468.19	86.0	106.0	120.0	120.0	**PA 103/52 - 132M/4B** **PF 103/52 - 132M/4B**	829	111
	4.3	16850	1.2	341.11	94.0	103.0	120.0	120.0			
	4.9	14649	1.4	296.56	96.0	101.0	120.0	120.0			
	5.9	12086	1.7	244.66	98.0	99.0	120.0	120.0			
	7.8	9127	2.2	184.77	100.0	94.0	120.0	120.0			
	9.4	7646	2.6	154.79	101.0	91.0	120.0	120.0			
	7.0	10243	2.3	207.36	100.0	96.0	120.0	120.0	**PA\PF 103 - 132M/4B**	755	109
	5.0	14225	0.9	287.97	55.0	62.0	85.0	80.0	**PA 93/42 - 132M/4B** **PF 93/42 - 132M/4B**	581	111
	6.0	11889	1.0	240.68	59.0	61.0	88.0	80.0			
	7.7	9286	1.5	187.99	62.0	60.0	90.0	80.0	**PA 93 - 132M/4B** **PF 93 - 132M/4B**	536	107
	13.3	5397	2.1	109.25	65.0	56.0	92.0	80.0			
	15.5	4615	2.5	93.43	66.0	54.0	93.0	80.0			
	7.2	9933	0.8	201.09	32.0	29.0	54.0	65.0	**PA\PF 83/42 - 132M/4B**	413	111
	8.8	8135	1.1	164.68	37.0	30.0	58.0	65.0	**PA 83 - 132M/4B** **PF 83 - 132M/4B**	368	105
	13.9	5136	1.8	103.97	42.0	30.0	61.0	65.0			
	18.0	3983	2.3	80.63	44.0	30.0	62.0	65.0			
	20.7	3467	2.5	70.19	44.0	29.0	62.0	65.0			
	23.5	3052	2.6	61.79	44.0	29.0	62.0	65.0			

P_1 [kW]	n_2 [Min^{-1}]	M_2 [Nm]	f_B	i_{ges}	F_R [kN]	F_A [kN]	$F_{R\,GR}$ [kN]	$F_{A\,GR}$ [kN]	Tip / Type	Kg	Sayfa Page mm
7.50	11.7	6152	0.9	124.55	19.0	12.0	34.0	46.0	PA 73 - 132M/4B PF 73 - 132M/4B	261	103
	14.4	4963	0.8	100.47	22.0	13.0	36.0	46.0			
	15.9	4511	1.2	91.33	24.0	13.0	37.0	45.0			
	19.4	3695	1.4	74.80	25.0	14.0	38.0	45.0			
	24.0	2985	1.9	60.42	26.0	14.0	39.0	43.0			
	27.7	2583	2.2	52.28	27.0	14.0	39.0	42.0			
	31.8	2256	2.4	45.67	27.0	14.0	39.0	41.0			
	38.5	1861	2.5	37.68	28.0	14.0	40.0	40.0			
	33.2	2158	1.9	43.70	27.0	14.0	39.0	41.0	PA\PF 72 - 132M/4B	251	102
	18.7	3828	1.0	77.49	14.0	14.0	24.0	36.0	PA 63 - 132M/4B PF 63 - 132M/4B	180	101
	23.0	3110	1.2	62.96	17.0	14.0	26.0	35.0			
	26.9	2659	1.4	53.84	18.0	14.0	26.0	35.0			
	28.5	2511	1.5	50.83	18.0	14.0	27.0	34.0			
	33.4	2147	1.7	43.47	19.0	14.0	27.0	34.0			
	40.1	1785	2.0	36.14	19.0	14.0	28.0	33.0			
	46.9	1527	2.2	30.90	20.0	14.0	28.0	32.0			
	55.1	1301	2.3	26.33	20.0	14.0	28.0	31.0			
	66.0	1085	2.3	21.97	20.0	13.0	28.0	29.0			
	69.7	1028	2.3	20.81	20.0	13.0	28.0	29.0			
	39.1	1832	1.6	37.08	19.0	14.0	28.0	33.0	PA\PF 62 - 132M/4B	182	100
	35.9	1993	1.0	40.34	11.0	24.0	18.0	37.0	PA 52 - 132M/4B PF 52 - 132M/4B	125	98
	40.3	1778	0.8	36.71	12.0	24.0	18.0	36.0			
	39.5	1814	1.1	36.00	12.0	24.0	18.0	36.0			
	44.6	1607	0.8	32.54	12.0	24.0	19.0	35.0			
	50.3	1425	1.4	28.85	13.0	24.0	19.0	34.0			
	54.9	1306	1.4	26.43	13.0	24.0	19.0	34.0			
	60.2	1190	1.4	24.09	13.0	24.0	19.0	33.0			
	60.7	1180	1.6	23.89	13.0	24.0	19.0	33.0			
	67.0	1069	1.8	21.65	13.0	24.0	19.0	32.0			
	74.1	967	2.0	19.57	13.0	24.0	19.0	32.0			
	81.4	880	2.1	17.81	13.0	24.0	20.0	31.0			
	103.6	691	2.1	13.99	12.0	24.0	20.0	29.0			
	107.7	665	2.4	13.46	12.0	23.0	20.0	29.0			
	56.0	1279	1.0	25.88	0.4	0.2	10.0	4.0	PA 42 - 132M/4B PF 42 - 132M/4B	97	96
	66.4	1079	1.0	21.85	1.0	0.2	10.0	5.0			
	67.5	1062	1.1	21.50	1.0	0.2	10.0	5.0			
	80.9	886	1.1	17.93	1.0	0.2	11.0	5.0			
	82.0	874	1.4	17.69	1.0	0.2	11.0	6.0			
	96.0	746	1.7	15.10	1.0	0.2	11.0	6.0			
	100.9	710	1.6	14.38	1.0	0.2	11.0	6.0			
	118.1	606	2.0	12.27	1.0	7.0	11.0	6.0			
	142.3	503	2.0	10.19	2.0	7.0	11.0	6.0			
	170.6	420	2.0	8.50	3.0	7.0	11.0	6.0			
	199.5	359	2.1	7.27	4.0	6.0	11.0	6.0			
	234.1	306	2.3	6.19	4.0	6.0	12.0	6.0			
	270.7	265	2.0	5.36	4.0	6.0	11.0	5.0			
	316.5	226	2.2	4.58	4.0	6.0	11.0	5.0			
	371.5	193	2.3	3.90	4.0	6.0	11.0	5.0			

P_1 [kW]	n_2 [Min^{-1}]	M_2 [Nm]	f_B	i_{ges}	F_R [kN]	F_A [kN]	$F_{R\,GR}$ [kN]	$F_{A\,GR}$ [kN]	Tip / Type	Kg	Sayfa Page mm
7.50	89.3	802	0.8	16.23	-	-	8.0	6.0	**PA 32 - 132M/4B** **PF 32 - 132M/4B**	82	94
	99.8	717	0.9	14.52	-	-	9.0	6.0			
	124.0	578	1.2	11.70	-	-	9.0	6.0			
	148.1	484	1.3	9.79	-	-	9.0	6.0			
	183.7	390	1.7	7.89	1.0	4.0	9.0	6.0			
	215.8	332	1.8	6.72	1.0	4.0	9.0	6.0			
	254.8	281	2.0	5.69	2.0	4.0	9.0	6.0			
	264.1	271	1.6	5.49	1.0	4.0	9.0	6.0			
	274.0	261	2.1	5.29	3.0	4.0	9.0	6.0			
	327.7	219	1.8	4.42	2.0	4.0	9.0	6.0			
	387.0	185	2.0	3.75	2.0	4.0	9.0	6.0			
	488.6	147	2.1	2.97	2.0	4.0	9.0	5.0			
	506.6	141	2.3	2.86	-	6.0	-	-	**PA\PF 51 - 132M/4B**	87	86
	580.0	123	2.0	2.50	-	4.0	-	-	**PA 41 - 132M/4B** **PF 41 - 132M/4B**	78	85
	678.2	106	2.1	2.14	-	4.0	-	-			
	562.0	127	1.4	2.58	-	3.0	-	-	**PA 31 - 132M/4B** **PF 31 - 132M/4B**	69	84
	697.1	103	1.6	2.08	-	3.0	-	-			
9.20	4.3	20699	1.0	341.11	90.0	97.0	120.0	120.0	**PA 103/52 - 132M/4** **PF 103/52 - 132M/4**	836	111
	4.9	17970	1.1	296.56	93.0	96.0	120.0	120.0			
	5.9	14825	1.3	244.66	96.0	94.0	120.0	120.0			
	7.8	11196	1.8	184.77	99.0	90.0	120.0	120.0			
	9.4	9379	2.1	154.79	100.0	88.0	120.0	120.0			
	11.8	7438	2.7	122.75	101.0	84.0	120.0	120.0			
	13.7	6392	3.1	105.49	101.0	81.0	120.0	120.0			
	7.0	12565	1.8	207.36	98.0	92.0	120.0	120.0	**PA\PF 103 - 132M/4**	762	109
	6.0	14584	0.8	240.68	54.0	57.0	85.0	80.0	**PA\PF 93/42 - 132M/4**	588	111
	7.7	11391	1.2	187.99	59.0	56.0	88.0	80.0	**PA 93 - 132M/4** **PF 93 - 132M/4**	543	107
	13.3	6620	1.7	109.25	64.0	53.0	92.0	80.0			
	15.5	5662	2.5	93.43	65.0	52.0	92.0	80.0			
	20.0	4388	3.1	72.42	66.0	50.0	93.0	80.0			
	8.8	9979	0.9	164.68	32.0	26.0	54.0	65.0	**PA 83 - 132M/4** **PF 83 - 132M/4**	375	105
	13.9	6300	1.5	103.97	41.0	28.0	60.0	65.0			
	18.0	4886	1.8	80.63	43.0	28.0	61.0	65.0			
	20.7	4253	2.1	70.19	43.0	27.0	62.0	65.0			
	23.5	3744	2.4	61.79	44.0	27.0	62.0	65.0			
	28.1	3122	2.9	51.52	44.0	27.0	62.0	65.0			
	29.7	2955	1.8	48.76	44.0	26.0	63.0	65.0	**PA\PF 82 - 132M/4**	367	104
	11.7	7537	0.7	124.38	11.0	9.0	31.0	42.0	**PA 73 - 132M/4** **PF 73 - 132M/4**	268	103
	15.9	5534	1.0	91.33	21.0	11.0	35.0	42.0			
	19.4	4533	1.2	74.80	23.0	12.0	37.0	42.0			
	24.0	3661	1.5	60.42	25.0	12.0	38.0	41.0			
	27.7	3168	1.8	52.28	26.0	13.0	39.0	40.0			
	31.8	2767	1.9	45.67	27.0	13.0	39.0	40.0			
	38.5	2283	2.2	37.68	27.0	13.0	39.0	38.0			
	43.6	2016	2.5	33.27	28.0	13.0	40.0	38.0			
	51.1	1718	2.9	28.35	28.0	13.0	40.0	36.0			
	33.2	2648	1.5	43.70	27.0	13.0	39.0	40.0	**PA 72 - 132M/4** **PF 72 - 132M/4**	258	102
	43.8	2005	1.6	33.08	28.0	13.0	40.0	37.0			

P_1 [kW]	n_2 [Min^{-1}]	M_2 [Nm]	f_B	i_{ges}	F_R [kN]	F_A [kN]	$F_{R\,GR}$ [kN]	$F_{A\,GR}$ [kN]	Tip / Type	Kg	Sayfa Page mm
9.20	18.7	4695	0.8	77.49	10.0	11.0	22.0	33.0	PA 63 - 132M/4 PF 63 - 132M/4	187	101
	23.0	3815	1.0	62.96	14.0	12.0	24.0	33.0			
	26.9	3262	1.1	53.84	16.0	13.0	25.0	33.0			
	28.5	3080	1.2	50.83	17.0	13.0	26.0	32.0			
	33.4	2634	1.4	43.47	18.0	13.0	26.0	32.0			
	40.1	2190	1.7	36.14	19.0	13.0	27.0	31.0			
	46.9	1873	1.9	30.90	19.0	13.0	27.0	31.0			
	55.1	1595	2.0	26.33	20.0	13.0	28.0	30.0			
	66.0	1331	2.4	21.97	20.0	13.0	28.0	29.0			
	69.7	1261	2.5	20.81	20.0	13.0	28.0	29.0			
	83.5	1052	2.9	17.36	20.0	12.0	28.0	27.0			
	39.1	2247	1.3	37.08	19.0	13.0	27.0	31.0	PA 62 - 132M/4 PF 62 - 132M/4	189	100
	79.9	1100	2.8	18.16	20.0	13.0	28.0	28.0			
	91.7	958	3.1	15.80	20.0	12.0	28.0	27.0			
	35.9	2444	0.8	40.34	4.0	24.0	17.0	35.0	PA 52 - 132M/4 PF 52 - 132M/4	132	98
	39.5	2225	0.9	36.71	6.0	24.0	18.0	35.0			
	50.3	1748	1.2	28.85	9.0	24.0	18.0	33.0			
	54.9	1602	1.2	26.43	13.0	24.0	19.0	33.0			
	60.2	1460	1.2	24.09	11.0	24.0	19.0	32.0			
	60.7	1448	1.3	23.89	13.0	24.0	19.0	32.0			
	67.0	1312	1.4	21.65	13.0	24.0	19.0	32.0			
	74.1	1186	1.6	19.57	12.0	24.0	19.0	31.0			
	81.4	1079	1.8	17.81	12.0	24.0	19.0	30.0			
	103.6	848	2.3	13.99	11.0	22.0	20.0	29.0			
	107.7	816	2.3	13.46	11.0	22.0	20.0	28.0			
	137.1	641	2.7	10.58	11.0	21.0	20.0	27.0			
	164.2	535	3.1	8.83	10.0	19.0	20.0	26.0			
	56.0	1568	0.8	25.88	0.3	0.2	7.0	3.0	PA 42 - 132M/4 PF 42 - 132M/4	103	96
	66.4	1324	0.8	21.85	0.4	0.2	10.0	4.0			
	67.5	1303	0.9	21.50	1.0	0.2	10.0	4.0			
	80.9	1086	0.9	17.93	1.0	0.2	10.0	4.0			
	82.0	1072	1.1	17.69	1.0	0.2	10.0	4.0			
	96.0	915	1.4	15.10	1.0	0.2	11.0	5.0			
	100.9	871	1.3	14.38	1.0	0.2	11.0	5.0			
	118.1	744	1.6	12.27	1.0	0.2	11.0	5.0			
	142.3	618	1.9	10.19	1.0	0.2	11.0	5.0			
	170.6	515	2.1	8.50	1.0	6.0	11.0	5.0			
	199.5	440	2.4	7.27	2.0	6.0	11.0	5.0			
	234.1	375	2.9	6.19	3.0	6.0	11.0	5.0			
	270.7	325	2.5	5.36	2.0	5.0	11.0	5.0			
	316.5	278	2.8	4.58	3.0	5.0	11.0	5.0			
	371.5	236	3.0	3.90	3.0	5.0	10.0	5.0			
	99.8	880	0.8	14.52	0.3	0.2	7.0	5.0	PA 32 - 132M/4 PF 32 - 132M/4	89	94
	124.0	709	1.0	11.70	0.4	0.2	8.0	5.0			
	148.1	593	1.1	9.79	0.4	0.2	9.0	5.0			
	183.7	478	1.4	7.89	0.4	0.2	9.0	5.0			
	215.8	407	1.5	6.72	0.4	0.2	9.0	5.0			
	254.8	345	1.8	5.69	0.3	3.0	9.0	5.0			
	264.1	333	1.3	5.49	0.4	0.3	9.0	5.0			
	274.0	321	2.0	5.29	1.0	4.0	9.0	6.0			
	327.7	268	1.7	4.42	1.0	3.0	9.0	5.0			
	387.0	227	2.0	3.75	2.0	3.0	9.0	5.0			
	488.6	180	2.4	2.97	2.0	3.0	9.0	5.0			
	506.6	173	2.6	2.86	-	6.0	-	-	PA\PF 51 - 132M/4	94	86
	580.0	151	1.8	2.50	-	4.0	-	-	PA 41 - 132M/4 PF 41 - 132M/4	85	85
	678.2	130	1.9	2.14	-	4.0	-	-			
	562.0	156	1.2	2.58	-	3.0	-	-	PA 31 - 132M/4 PF 31 - 132M/4	76	84
	697.1	126	1.3	2.08	-	3.0	-	-			

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P_1 [kW]	n_2 [Min^{-1}]	M_2 [Nm]	f_B	i_{ges}	F_R [kN]	F_A [kN]	$F_{R\,GR}$ [kN]	$F_{A\,GR}$ [kN]	Tip / Type	Kg	Sayfa Page mm
11.0	4.3	24713	0.8	341.11	84.0	91.0	120.0	120.0	PA 103/52 - 160M/4B PF 103/52 - 160M/4B	856	111
	4.9	21485	0.9	296.56	89.0	90.0	120.0	120.0			
	5.9	17725	1.1	244.66	94.0	89.0	120.0	120.0			
	7.8	13387	1.5	184.77	97.0	87.0	120.0	120.0			
	9.4	11214	1.8	154.79	99.0	85.0	120.0	120.0			
	11.8	8893	2.2	122.75	100.0	81.0	120.0	120.0			
	13.7	7643	2.6	105.49	101.0	79.0	120.0	120.0			
	7.0	15023	1.5	207.36	96.0	88.0	120.0	120.0	PA 103 - 160M/4B PF 103 - 160M/4B	782	109
	10.6	9891	2.3	136.52	100.0	83.0	120.0	120.0			
	8.0	13186	0.9	182.00	57.0	52.0	87.0	80.0	PA\PF 93/42 - 160M/4B	608	111
	9.0	11654	1.0	160.87	59.0	52.0	88.0	80.0	PA 93/52 - 160M/4B PF 93/52 - 160M/4B	637	111
	11.4	9226	1.3	127.35	62.0	52.0	90.0	80.0			
	13.5	7793	1.6	107.56	64.0	51.0	91.0	80.0			
	7.7	13620	1.0	187.99	56.0	52.0	86.0	80.0	PA 93 - 160M/4B PF 93 - 160M/4B	563	107
	11.8	8909	1.6	122.97	63.0	52.0	91.0	80.0			
	13.3	7915	1.5	109.25	63.0	51.0	91.0	80.0			
	15.5	6769	2.1	93.43	64.0	50.0	92.0	80.0			
	20.0	5247	2.6	72.42	65.0	48.0	92.0	80.0			
	8.8	11931	0.7	164.68	25.0	22.0	50.0	65.0	PA 83 - 160M/4B PF 83 - 160M/4B	395	105
	13.9	7532	1.2	103.97	38.0	25.0	58.0	65.0			
	18.0	5842	1.5	80.63	41.0	26.0	60.0	65.0			
	20.7	5085	1.8	70.19	42.0	26.0	61.0	65.0			
	23.5	4476	2.0	61.79	43.0	26.0	62.0	65.0			
	28.1	3733	2.4	51.52	44.0	25.0	62.0	64.0			
	32.7	3213	2.8	44.34	44.0	25.0	62.0	62.0			
	37.2	2826	2.8	39.01	45.0	25.0	63.0	61.0			
	29.7	3533	1.5	48.76	44.0	25.0	62.0	63.0	PA 82 - 160M/4B PF 82 - 160M/4B	387	104
	35.9	2929	1.4	40.43	44.0	25.0	63.0	61.0			
	15.9	6617	0.8	91.33	16.0	9.0	33.0	39.0	PA 73 - 160M/4B PF 73 - 160M/4B	288	103
	19.4	5419	1.0	74.80	21.0	10.0	36.0	39.0			
	24.0	4377	1.3	60.42	24.0	11.0	37.0	39.0			
	27.7	3788	1.5	52.28	25.0	11.0	38.0	39.0			
	31.8	3309	1.6	45.67	26.0	12.0	38.0	38.0			
	38.5	2730	1.8	37.68	27.0	12.0	39.0	37.0			
	43.6	2411	2.1	33.27	27.0	12.0	39.0	36.0			
	51.1	2054	2.4	28.35	27.0	12.0	40.0	35.0			
	62.0	1695	2.8	23.39	28.0	12.0	40.0	34.0			
	33.2	3166	1.3	43.70	26.0	12.0	39.0	38.0	PA 72 - 160M/4B PF 72 - 160M/4B	278	102
	43.8	2397	1.3	33.08	27.0	12.0	39.0	36.0			
	50.7	2071	2.0	28.58	27.0	12.0	40.0	36.0			
	23.0	4561	0.8	62.96	10.0	10.0	22.0	30.0	PA 63 - 160M/4B PF 63 - 160M/4B	207	101
	26.9	3901	0.9	53.84	14.0	11.0	24.0	30.0			
	28.5	3683	1.0	50.83	15.0	11.0	25.0	30.0			
	33.4	3149	1.2	43.47	17.0	12.0	26.0	30.0			
	40.1	2618	1.4	36.14	18.0	12.0	27.0	30.0			
	46.9	2239	1.6	30.90	19.0	12.0	27.0	29.0			
	55.1	1908	1.7	26.33	19.0	12.0	27.0	29.0			
	66.0	1592	2.0	21.97	20.0	12.0	28.0	28.0			
	69.7	1507	2.1	20.81	20.0	12.0	28.0	28.0			
	39.1	2687	1.1	37.08	18.0	12.0	26.0	30.0	PA 62 - 160M/4B PF 62 - 160M/4B	209	100
	79.9	1315	2.3	18.16	20.0	12.0	28.0	27.0			
	91.7	1145	2.6	15.80	20.0	12.0	28.0	26.0			
	104.2	1008	2.8	13.91	20.0	12.0	28.0	26.0			
	125.0	841	3.0	11.60	20.0	11.0	28.0	25.0			
	137.8	762	2.8	10.52	20.0	11.0	28.0	24.0			

P_1 [kW]	n_2 [Min^{-1}]	M_2 [Nm]	f_B	i_{ges}	F_R [kN]	F_A [kN]	$F_{R\,GR}$ [kN]	$F_{A\,GR}$ [kN]	Tip / Type	Kg	Sayfa Page mm
11.0	54.9	1915	1.0	26.43	8.0	24.0	18.0	32.0	**PA 52 - 160M/4B** **PF 52 - 160M/4B**	152	98
	60.7	1731	1.1	23.89	9.0	24.0	18.0	31.0			
	67.0	1569	1.2	21.65	11.0	24.0	19.0	31.0			
	74.1	1418	1.3	19.57	12.0	24.0	19.0	30.0			
	81.4	1290	1.5	17.81	12.0	23.0	19.0	30.0			
	103.6	1014	1.9	13.99	11.0	21.0	19.0	28.0			
	107.7	975	1.9	13.46	11.0	22.0	19.0	28.0			
	137.1	766	2.3	10.58	10.0	20.0	20.0	26.0			
	164.2	640	2.6	8.83	10.0	19.0	20.0	25.0			
	82.0	1282	0.9	17.69	0.4	0.2	9.0	3.0	**PA 42 - 160M/4B** **PF 42 - 160M/4B**	123	96
	96.0	1094	1.1	15.10	0.4	0.2	10.0	4.0			
	100.9	1041	1.1	14.38	1.0	0.2	10.0	4.0			
	118.1	889	1.3	12.27	1.0	0.2	10.0	4.0			
	142.3	738	1.6	10.19	1.0	0.2	11.0	5.0			
	170.6	616	1.7	8.50	1.0	0.2	11.0	5.0			
	199.5	527	2.0	7.27	1.0	0.2	11.0	5.0			
	234.1	449	2.4	6.19	1.0	5.0	11.0	5.0			
	270.7	388	2.1	5.36	1.0	5.0	10.0	5.0			
	316.5	332	2.3	4.58	2.0	5.0	10.0	5.0			
	371.5	283	2.5	3.90	2.0	5.0	10.0	5.0			
	414.3	254	2.6	3.50	3.0	5.0	10.0	5.0			
	451.1	233	2.7	3.21	3.0	5.0	10.0	5.0			
	480.8	218	2.8	3.02	3.0	5.0	10.0	5.0			
	506.6	207	2.2	2.86	-	5.0	-	-	**PA 51 - 160M/4B** **PF 51 - 160M/4B**	113	86
	580.0	181	2.4	2.50	-	5.0	-	-			
	703.0	149	2.6	2.06	-	5.0	-	-			
	580.0	181	1.5	2.50	-	3.0	-	-	**PA 41 - 160M/4B** **PF 41 - 160M/4B**	104	85
	678.2	155	1.6	2.14	-	3.0	-	-			
15.0	5.9	24171	0.8	244.66	85.0	79.0	120.0	120.0	**PA 103/52 - 160L/4A** **PF 103/52 - 160L/4A**	881	111
	7.8	18254	1.1	184.77	93.0	79.0	120.0	120.0			
	9.4	15292	1.3	154.79	96.0	78.0	120.0	120.0			
	11.8	12127	1.6	122.75	98.0	76.0	120.0	120.0			
	13.7	10422	1.9	105.49	100.0	75.0	120.0	120.0			
	7.0	20486	1.1	207.36	90.0	79.0	120.0	120.0	**PA 103 - 160L/4A** **PF 103 - 160L/4A**	807	109
	10.6	13487	1.7	136.52	98.0	77.0	120.0	120.0			
	17.8	8048	2.2	81.46	101.0	72.0	120.0	120.0			
	20.6	6957	2.4	70.42	101.0	70.0	120.0	119.0			
	7.7	18572	0.8	187.99	45.0	43.0	80.0	80.0	**PA 93 - 160L/4A** **PF 93 - 160L/4A**	588	107
	11.8	12149	1.1	122.97	59.0	46.0	88.0	80.0			
	13.3	10793	1.1	109.25	60.0	46.0	89.0	80.0			
	15.5	9231	1.5	93.43	62.0	46.0	90.0	80.0			
	20.0	7155	1.9	72.42	64.0	45.0	92.0	80.0			
	23.5	6092	2.1	61.66	65.0	44.0	92.0	80.0			
	27.0	5311	2.3	53.75	65.0	43.0	92.0	80.0			
	31.1	4607	2.5	46.63	66.0	42.0	93.0	80.0			
	13.9	10271	0.9	103.97	31.0	20.0	54.0	64.0	**PA 83 - 160L/4A** **PF 83 - 160L/4A**	420	105
	18.0	7966	1.1	80.63	37.0	21.0	58.0	63.0			
	20.7	6934	1.3	70.19	40.0	22.0	59.0	62.0			
	23.5	6104	1.5	61.79	41.0	22.0	60.0	62.0			
	28.1	5090	1.8	51.52	42.0	23.0	61.0	60.0			
	32.7	4381	2.0	44.34	43.0	23.0	62.0	59.0			
	37.2	3854	2.0	39.01	44.0	22.0	62.0	58.0			
	44.6	3213	2.2	32.53	44.0	22.0	62.0	56.0			
	51.8	2766	2.3	27.99	45.0	22.0	63.0	54.0			
	59.5	2409	2.2	24.38	45.0	21.0	63.0	53.0			

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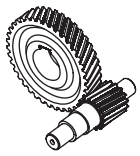
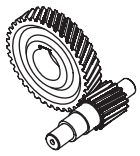


P_1 [kW]	n_2 [Min^{-1}]	M_2 [Nm]	f_B	i_{ges}	F_R [kN]	F_A [kN]	$F_{R\,GR}$ [kN]	$F_{A\,GR}$ [kN]	Tip / Type	Kg	Sayfa Page mm
15.0	29.7	4817	1.1	48.76	43.0	23.0	61.0	60.0	**PA 82 - 160L/4A** **PF 82 - 160L/4A**	412	104
	35.9	3995	1.0	40.43	44.0	22.0	62.0	58.0			
	45.2	3171	2.1	32.10	44.0	22.0	62.0	56.0			
	54.5	2630	2.4	26.62	45.0	22.0	63.0	54.0			
	24.0	5969	0.9	60.42	19.0	7.0	34.0	34.0	**PA 73 - 160L/4A** **PF 73 - 160L/4A**	313	103
	27.7	5165	1.1	52.28	22.0	8.0	36.0	34.0			
	31.8	4512	1.2	45.67	24.0	9.0	37.0	34.0			
	38.5	3722	1.3	37.68	25.0	10.0	38.0	34.0			
	43.6	3287	1.5	33.27	26.0	10.0	39.0	34.0			
	51.1	2801	1.8	28.35	27.0	10.0	39.0	33.0			
	62.0	2311	2.1	23.39	27.0	10.0	39.0	32.0			
	33.2	4317	0.9	43.70	24.0	9.0	37.0	35.0	**PA 72 - 160L/4A** **PF 72 - 160L/4A**	303	102
	43.8	3269	1.0	33.08	26.0	10.0	39.0	34.0			
	50.7	2824	1.4	28.58	27.0	10.0	39.0	33.0			
	67.0	2146	1.9	21.72	27.0	10.0	39.0	32.0			
	86.1	1663	2.2	16.83	28.0	11.0	39.0	32.0			
	101.2	1416	2.3	14.33	28.0	10.0	37.0	31.0			
								30.0			
	33.4	4294	0.9	43.47	12.0	9.0	23.0	26.0	**PA 63 - 160L/4A** **PF 63 - 160L/4A**	232	101
	40.1	3570	1.0	36.14	15.0	9.0	25.0	27.0			
	46.9	3053	1.2	30.90	17.0	10.0	26.0	27.0			
	55.1	2601	1.2	26.33	18.0	10.0	27.0	26.0			
	66.0	2171	1.5	21.97	19.0	10.0	27.0	26.0			
	69.7	2056	1.6	20.81	19.0	11.0	27.0	26.0			
	39.1	3664	0.8	37.08	15.0	9.0	25.0	27.0	**PA 62 - 160L/4A** **PF 62 - 160L/4A**	234	100
	79.9	1794	1.7	18.16	19.0	11.0	28.0	26.0			
	91.7	1561	1.9	15.80	20.0	11.0	28.0	25.0			
	104.2	1375	2.1	13.91	20.0	11.0	28.0	24.0			
	125.0	1146	2.2	11.60	20.0	11.0	28.0	24.0			
	137.8	1040	2.0	10.52	20.0	10.0	28.0	23.0			
	165.2	867	2.2	8.78	20.0	10.0	28.0	22.0			
	192.0	746	2.3	7.55	20.0	10.0	28.0	22.0			
	60.7	2361	0.8	23.89	1.0	1.0	12.0	29.0	**PA 52 - 160L/4A** **PF 52 - 160L/4A**	177	98
	67.0	2139	0.9	21.65	2.0	21.0	15.0	29.0			
	74.1	1933	1.0	19.57	4.0	21.0	16.0	28.0			
	81.4	1760	1.1	17.81	5.0	20.0	17.0	28.0			
	103.6	1383	1.4	13.99	8.0	19.0	18.0	27.0			
	107.7	1330	1.4	13.46	10.0	19.0	19.0	27.0			
	137.1	1045	1.7	10.58	10.0	18.0	19.0	25.0			
	164.2	873	1.9	8.83	9.0	17.0	20.0	24.0			
	199.0	720	2.1	7.29	9.0	16.0	20.0	23.0			
	225.3	636	2.2	6.44	9.0	16.0	20.0	23.0			
	259.1	553	1.9	5.60	8.0	15.0	20.0	22.0			
	314.1	456	2.1	4.62	8.0	14.0	20.0	21.0			
	355.7	403	2.2	4.08	8.0	14.0	20.0	20.0			
	395.0	363	2.3	3.67	8.0	13.0	20.0	20.0			
	421.1	340	2.3	3.44	7.0	13.0	20.0	19.0			
	96.0	1492	0.8	15.10	0.1	0.1	3.0	2.0	**PA 42 - 160L/4A** **PF 42 - 160L/4A**	148	96
	100.9	1420	0.8	14.38	0.3	0.1	5.0	2.0			
	118.1	1212	1.0	12.27	0.3	0.1	7.0	3.0			
	142.3	1007	1.2	10.19	0.4	0.1	8.0	3.0			
	170.6	840	1.3	8.50	0.4	0.1	8.0	3.0			
	199.5	718	1.5	7.27	0.4	0.1	9.0	4.0			
	234.1	612	1.8	6.19	0.4	0.1	9.0	4.0			
	270.7	529	1.5	5.36	0.4	0.2	9.0	4.0			
	316.5	453	1.7	4.58	0.4	0.2	9.0	4.0			
	371.5	386	1.8	3.90	0.4	0.2	9.0	4.0			
	414.3	346	1.9	3.50	0.4	4.0	9.0	4.0			
	451.1	318	2.0	3.21	1.0	4.0	9.0	4.0			
	480.8	298	2.0	3.02	1.0	4.0	9.0	4.0			

P_1 [kW]	n_2 [Min^{-1}]	M_2 [Nm]	f_B	i_{ges}	F_R [kN]	F_A [kN]	$F_{R\,GR}$ [kN]	$F_{A\,GR}$ [kN]	Tip / Type	Kg	Sayfa Page mm
15.0	506.6	283	1.6	2.86	-	5.0	-	-	PA 51 - 160L/4A PF 51 - 160L/4A	138	86
	580.0	247	1.7	2.50	-	5.0	-	-			
	703.0	204	1.9	2.06	-	4.0	-	-			
	580.0	247	1.1	2.50	-	3.0	-	-	PA 41 - 160L/4A PF 41 - 160L/4A	129	85
	678.2	211	1.2	2.14	-	3.0	-	-			
18.5	7.8	22514	0.9	184.77	88.0	72.0	120.0	120.0	PA 103/52 - 180M/4B PF 103/52 - 180M/4B	895	111
	9.4	18860	1.1	154.79	92.0	73.0	120.0	120.0			
	11.8	14957	1.3	122.75	96.0	72.0	120.0	120.0			
	13.7	12854	1.6	105.49	98.0	71.0	120.0	120.0			
	10.6	16634	1.4	136.52	95.0	72.0	120.0	120.0	PA 103 - 180M/4B PF 103 - 180M/4B	821	109
	17.8	9926	2.1	81.46	100.0	69.0	120.0	119.0			
	20.6	8580	2.3	70.42	101.0	67.0	120.0	116.0			
	23.9	7402	2.7	60.75	101.0	66.0	120.0	113.0			
	27.4	6458	3.1	53.00	101.0	64.0	120.0	109.0			
	11.4	15517	0.8	127.35	51.0	40.0	83.0	80.0	PA 93/52 - 180M/4B PF 93/52 - 180M/4B	676	111
	13.5	13106	0.9	107.56	58.0	41.0	87.0	80.0			
	11.8	14983	0.9	122.97	54.0	41.0	85.0	80.0	PA 93 - 180M/4B PF 93 - 180M/4B	602	107
	15.5	11385	1.2	93.43	60.0	42.0	89.0	80.0			
	20.0	8824	1.5	72.42	63.0	42.0	91.0	80.0			
	23.5	7514	1.7	61.66	64.0	41.0	91.0	80.0			
	27.0	6550	1.9	53.75	65.0	41.0	92.0	80.0			
	31.1	5682	2.1	46.63	65.0	40.0	92.0	80.0			
	36.7	4808	2.5	39.46	66.0	39.0	93.0	80.0			
	40.9	4322	2.2	35.47	66.0	39.0	93.0	80.0	PA\PF 92 - 180M/4B	591	106
	18.0	9825	0.9	80.63	32.0	17.0	55.0	58.0	PA 83 - 180M/4B PF 83 - 180M/4B	434	105
	20.7	8552	1.0	70.19	36.0	19.0	57.0	58.0			
	23.5	7529	1.2	61.79	39.0	19.0	59.0	58.0			
	28.1	6278	1.4	51.52	41.0	20.0	60.0	57.0			
	32.7	5403	1.6	44.34	42.0	20.0	61.0	56.0			
	37.2	4753	1.9	39.01	43.0	21.0	61.0	55.0			
	44.6	3963	2.2	32.53	44.0	21.0	62.0	54.0			
	51.8	3411	2.4	27.99	44.0	20.0	62.0	52.0			
	59.5	2971	2.7	24.38	44.0	20.0	63.0	51.0			
	69.1	2557	3.1	20.99	45.0	20.0	62.0	50.0			
	45.2	3911	1.7	32.10	44.0	21.0	62.0	54.0	PA 82 - 180M/4B PF 82 - 180M/4B	426	104
	54.5	3244	2.0	26.62	44.0	20.0	62.0	52.0			
	24.0	7362	0.8	60.42	11.0	4.0	25.0	30.0	PA 73 - 180M/4B PF 73 - 180M/4B	327	103
	27.7	6370	0.9	52.28	17.0	5.0	29.0	31.0			
	31.8	5564	1.0	45.67	20.0	7.0	31.0	31.0			
	38.5	4591	1.1	37.68	23.0	8.0	34.0	31.0			
	43.6	4054	1.2	33.27	25.0	8.0	35.0	31.0			
	51.1	3455	1.4	28.35	26.0	9.0	36.0	31.0			
	62.0	2850	1.8	23.39	26.0	9.0	36.0	31.0			
	50.7	3483	1.2	28.58	26.0	9.0	37.0	32.0	PA 72 - 180M/4B PF 72 - 180M/4B	317	102
	66.8	2637	1.7	21.64	27.0	9.0	37.0	31.0			
	86.1	2051	2.0	16.83	27.0	10.0	37.0	30.0			
	101.2	1746	2.3	14.33	27.0	10.0	36.0	29.0			
	116.0	1522	2.7	12.49	27.0	10.0	35.0	28.0			
	40.1	4403	0.8	36.14	11.0	7.0	21.0	24.0	PA 63 - 180M/4B PF 63 - 180M/4B	246	101
	46.9	3766	1.0	30.90	14.0	8.0	24.0	24.0			
	55.1	3208	1.0	26.33	16.0	9.0	26.0	24.0			
	66.0	2677	1.2	21.97	18.0	9.0	26.0	24.0			
	69.7	2535	1.3	20.81	18.0	9.0	27.0	24.0			



P_1 [kW]	n_2 [Min^{-1}]	M_2 [Nm]	f_B	i_{ges}	F_R [kN]	F_A [kN]	$F_{R\,GR}$ [kN]	$F_{A\,GR}$ [kN]	Tip / Type	Kg	Sayfa Page mm
18.5	79.9	2212	1.4	18.16	19.0	10.0	27.0	24.0	**PA 62 - 180M/4B** **PF 62 - 180M/4B**	248	100
	91.7	1926	1.6	15.80	19.0	10.0	27.0	24.0			
	104.2	1695	1.8	13.91	19.0	10.0	28.0	23.0			
	125.0	1414	2.2	11.60	20.0	10.0	28.0	23.0			
	137.8	1282	2.4	10.52	20.0	10.0	28.0	22.0			
	165.2	1069	2.8	8.78	20.0	9.0	27.0	22.0			
	192.0	920	3.3	7.55	20.0	9.0	27.0	21.0			
	228.4	773	2.5	6.35	20.0	9.0	25.0	20.0			
	274.0	645	2.9	5.29	20.0	9.0	25.0	19.0			
	74.1	2385	0.8	19.57	-	-	9.0	27.0	**PA 52 - 180M/4B** **PF 52 - 180M/4B**	191	98
	81.4	2170	0.9	17.81	-	-	11.0	27.0			
	103.6	1705	1.1	13.99	2.0	17.0	13.0	25.0			
	107.7	1640	1.1	13.46	5.0	18.0	15.0	26.0			
	137.1	1289	1.4	10.58	7.0	17.0	16.0	24.0			
	164.2	1076	1.6	8.83	9.0	16.0	17.0	24.0			
	199.0	888	1.8	7.29	9.0	15.0	18.0	23.0			
	225.3	784	1.9	6.44	8.0	15.0	19.0	22.0			
	259.1	682	1.7	5.60	8.0	14.0	18.0	21.0			
	314.1	562	2.1	4.62	8.0	13.0	18.0	20.0			
	355.7	497	2.3	4.08	8.0	13.0	18.0	20.0			
	395.0	447	2.4	3.67	7.0	13.0	18.0	19.0			
	421.1	420	2.4	3.44	7.0	12.0	18.0	19.0			
	448.5	394	2.4	3.23	7.0	12.0	18.0	19.0			
	521.9	339	2.6	2.78	7.0	12.0	18.0	18.0			
	580.0	305	1.4	2.50	-	4.0	-	-	**PA 51 - 180M/4B** **PF 51 - 180M/4B**	152	86
	703.0	251	1.5	2.06	-	4.0	-	-			
22.0	7.8	26842	0.7	184.77	81.0	66.0	120.0	120.0	**PA 103/52 - 180L/4B** **PF 103/52 - 180L/4B**	926	111
	9.3	22486	0.9	154.79	88.0	67.0	120.0	120.0			
	11.8	17832	1.1	122.75	94.0	67.0	120.0	120.0			
	13.7	15325	1.3	105.49	96.0	67.0	120.0	120.0			
	10.6	19832	1.2	136.52	92.0	67.0	120.0	120.0	**PA 103 - 180L/4B** **PF 103 - 180L/4B**	852	109
	17.8	11834	1.7	81.46	99.0	66.0	120.0	115.0			
	20.5	10230	2.0	70.42	100.0	65.0	120.0	113.0			
	23.8	8826	2.3	60.75	100.0	63.0	120.0	110.0			
	27.3	7700	2.6	53.00	101.0	62.0	120.0	107.0			
	31.9	6585	3.0	45.33	101.0	61.0	120.0	104.0			
	11.8	17864	0.8	122.97	48.0	36.0	81.0	80.0	**PA 93 - 180L/4B** **PF 93 - 180L/4B**	633	107
	15.5	13573	1.0	93.43	57.0	38.0	87.0	80.0			
	20.0	10521	1.3	72.42	61.0	39.0	89.0	80.0			
	23.5	8958	1.4	61.66	63.0	39.0	91.0	80.0			
	26.9	7809	1.6	53.75	64.0	39.0	91.0	80.0			
	31.0	6774	1.8	46.63	64.0	38.0	92.0	80.0			
	36.7	5733	2.1	39.46	65.0	38.0	92.0	80.0			
	46.3	4538	2.7	31.24	66.0	37.0	91.0	80.0			
	40.8	5153	1.9	35.47	65.0	37.0	93.0	80.0	**PA\PF 92 - 180L/4B**	622	106
	17.9	11714	0.8	80.63	25.0	14.0	51.0	53.0	**PA 83 - 180L/4B** **PF 83 - 180L/4B**	465	105
	20.6	10196	0.9	70.19	32.0	15.0	54.0	54.0			
	23.4	8976	1.0	61.79	35.0	16.0	56.0	54.0			
	28.1	7484	1.2	51.52	38.0	17.0	58.0	54.0			
	32.6	6442	1.4	44.34	41.0	18.0	60.0	53.0			
	37.1	5667	1.6	39.01	42.0	19.0	61.0	53.0			
	44.5	4725	1.8	32.53	43.0	19.0	61.0	52.0			
	51.7	4067	2.0	27.99	44.0	19.0	62.0	51.0			
	59.3	3542	2.3	24.38	44.0	19.0	62.0	50.0			
	68.9	3049	2.6	20.99	44.0	19.0	61.0	48.0			
	87.3	2405	2.7	16.56	45.0	19.0	58.0	46.0	**PA\PF 82 - 180L/4B**	457	104

P_1 [kW]	n_2 [Min^{-1}]	M_2 [Nm]	f_B	i_{ges}	F_R [kN]	F_A [kN]	$F_{R\,GR}$ [kN]	$F_{A\,GR}$ [kN]	Tip / Type	Kg	Sayfa Page mm
22.0	31.7	6634	0.8	45.67	15.0	4.0	24.0	28.0	**PA 73 - 180L/4B** **PF 73 - 180L/4B**	358	103
	38.4	5473	0.9	37.68	19.0	6.0	28.0	29.0			
	43.5	4833	1.0	33.27	21.0	6.0	30.0	29.0			
	51.0	4119	1.2	28.35	22.0	7.0	32.0	29.0			
	61.8	3398	1.5	23.39	24.0	8.0	33.0	29.0			
	50.9	4132	1.0	28.58	23.0	8.0	33.0	30.0	**PA 72 - 180L/4B** **PF 72 - 180L/4B**	348	102
	66.9	3139	1.3	21.72	25.0	8.0	34.0	29.0			
	86.3	2433	1.7	16.83	25.0	9.0	34.0	28.0			
	100.8	2084	1.9	14.33	25.0	9.0	34.0	28.0			
	115.6	1817	2.2	12.49	25.0	9.0	34.0	27.0			
	133.3	1576	2.8	10.84	24.0	9.0	33.0	26.0			
	46.8	4494	0.8	30.90	11.0	6.0	18.0	22.0	**PA 63 - 180L/4B** **PF 63 - 180L/4B**	277	101
	54.9	3829	0.8	26.33	14.0	7.0	21.0	22.0			
	65.8	3195	1.0	21.97	16.0	7.0	22.0	22.0			
	69.4	3026	1.1	20.81	17.0	8.0	24.0	23.0			
	79.6	2640	1.2	18.16	18.0	8.0	25.0	23.0	**PA 62 - 180L/4B** **PF 62 - 180L/4B**	279	100
	91.4	2298	1.3	15.80	18.0	9.0	26.0	23.0			
	103.8	2023	1.5	13.91	19.0	9.0	26.0	22.0			
	124.5	1687	1.8	11.60	19.0	9.0	26.0	22.0			
	137.3	1530	2.0	10.52	20.0	9.0	26.0	21.0			
	164.7	1276	2.4	8.78	20.0	9.0	26.0	21.0			
	191.3	1098	2.8	7.55	20.0	9.0	25.0	20.0			
	227.6	923	2.1	6.35	20.0	8.0	24.0	19.0			
	273.0	770	2.5	5.29	20.0	8.0	24.0	19.0			
	317.2	662	2.8	4.56	19.0	8.0	23.0	18.0			
	356.0	590	2.9	4.06	19.0	8.0	23.0	18.0			
	369.3	569	2.9	3.91	19.0	8.0	23.0	18.0			
	388.7	541	3.0	3.72	19.0	8.0	23.0	17.0			
	103.2	2035	0.9	13.99	0.4	1.0	8.0	24.0	**PA 52 - 180L/4B** **PF 52 - 180L/4B**	212	98
	107.3	1958	0.9	13.46	1.0	1.0	10.0	25.0			
	136.6	1538	1.1	10.58	2.0	15.0	13.0	24.0			
	163.6	1285	1.3	8.83	5.0	15.0	14.0	23.0			
	198.3	1060	1.5	7.29	7.0	14.0	16.0	22.0			
	224.5	936	1.6	6.44	8.0	14.0	16.0	22.0			
	258.2	814	1.4	5.60	8.0	13.0	15.0	21.0			
	313.0	671	1.8	4.62	7.0	13.0	16.0	20.0			
	354.4	593	1.9	4.08	7.0	12.0	17.0	19.0			
	393.6	534	2.0	3.67	7.0	12.0	17.0	19.0			
	419.6	501	2.0	3.44	7.0	12.0	17.0	19.0			
	446.9	470	2.0	3.23	7.0	12.0	17.0	18.0			
	520.0	404	2.2	2.78	7.0	11.0	17.0	18.0			
	577.9	364	1.2	2.50	-	3.0	-	-	**PA 51 - 180L/4B** **PF 51 - 180L/4B**	163	86
	700.5	300	1.3	2.06	-	3.0	-	-			
30.0	17.9	15986	1.3	81.46	95.0	59.0	120.0	107.0	**PA 103 - 200L/4C** **PF 103 - 200L/4C**	885	109
	20.7	13818	1.4	70.42	97.0	59.0	120.0	105.0			
	24.0	11922	1.7	60.75	98.0	58.0	120.0	104.0			
	27.5	10401	1.9	53.00	100.0	58.0	120.0	101.0			
	32.2	8895	2.2	45.33	100.0	57.0	120.0	99.0			
	38.5	7451	2.7	37.97	101.0	55.0	120.0	95.0			
	20.2	14211	0.9	72.42	55.0	32.0	80.0	80.0	**PA 93 - 200L/4C** **PF 93 - 200L/4C**	666	107
	23.7	12101	1.0	61.66	59.0	33.0	83.0	80.0			
	27.2	10548	1.2	53.75	61.0	34.0	84.0	80.0			
	31.3	9150	1.3	46.63	62.0	34.0	84.0	80.0			
	37.0	7744	1.6	39.46	64.0	34.0	84.0	79.0			
	46.7	6130	2.0	31.24	65.0	34.0	83.0	76.0			
	53.9	5318	2.3	27.10	65.0	33.0	82.0	74.0			
	63.7	4500	2.7	22.93	66.0	33.0	81.0	72.0			

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P_1 [kW]	n_2 [Min^{-1}]	M_2 [Nm]	f_B	i_{ges}	F_R [kN]	F_A [kN]	$F_{R\,GR}$ [kN]	$F_{A\,GR}$ [kN]	Tip / Type	Kg	Sayfa Page mm
30.0	23.6	12125	0.7	61.79	24.0	10.0	41.0	45.0	**PA 83 - 200L/4C** **PF 83 - 200L/4C**	498	105
	28.3	10110	0.9	51.52	31.0	12.0	46.0	47.0			
	32.9	8701	1.0	44.34	36.0	13.0	50.0	47.0			
	37.4	7655	1.2	39.01	38.0	14.0	52.0	47.0			
	44.9	6383	1.3	32.53	41.0	15.0	54.0	47.0			
	52.2	5493	1.5	27.99	42.0	16.0	55.0	47.0			
	59.9	4785	1.7	24.38	43.0	16.0	55.0	46.0			
	69.6	4118	1.9	20.99	43.0	17.0	55.0	45.0			
	88.2	3249	2.0	16.56	43.0	17.0	55.0	44.0	**PA 82 - 200L/4C** **PF 82 - 200L/4C**	490	104
	102.2	2803	2.3	14.29	43.0	17.0	54.0	43.0			
	123.2	2325	2.5	11.85	41.0	16.0	52.0	41.0			
	43.9	6529	0.8	33.27	11.0	3.0	18.0	24.0	**PA 73 - 200L/4C** **PF 73 - 200L/4C**	391	103
	51.5	5564	0.9	28.35	14.0	4.0	22.0	25.0			
	62.4	4590	1.1	23.39	17.0	5.0	25.0	25.0			
	70.7	4053	1.2	20.66	18.0	6.0	27.0	26.0			
	81.1	3533	1.4	18.01	20.0	6.0	28.0	26.0			
	86.7	3303	1.2	16.83	21.0	7.0	29.0	26.0	**PA 72 - 200L/4C** **PF 72 - 200L/4C**	381	102
	101.9	2813	1.4	14.33	21.0	7.0	30.0	26.0			
	116.9	2452	1.7	12.49	22.0	8.0	30.0	25.0			
	134.7	2127	2.2	10.84	21.0	8.0	29.0	25.0			
	154.3	1856	2.4	9.46	22.0	8.0	29.0	24.0			
	177.9	1610	2.5	8.21	21.0	8.0	29.0	24.0			
	210.2	1363	2.7	6.94	21.0	8.0	29.0	23.0			
	227.3	1260	2.2	6.42	20.0	7.0	27.0	22.0			
	260.8	1099	2.4	5.60	20.0	7.0	27.0	22.0			
	300.6	953	2.5	4.86	20.0	7.0	26.0	21.0			
	104.9	2730	1.1	13.91	18.0	7.0	21.0	20.0	**PA 62 - 200L/4C** **PF 62 - 200L/4C**	312	100
	125.8	2277	1.4	11.60	18.0	7.0	22.0	20.0			
	138.7	2065	1.5	10.52	18.0	7.0	21.0	19.0			
	166.4	1722	1.7	8.78	19.0	8.0	22.0	19.0			
	193.3	1482	2.1	7.55	19.0	8.0	22.0	19.0			
	230.0	1246	1.5	6.35	18.0	7.0	21.0	18.0			
	275.9	1039	1.8	5.29	18.0	7.0	21.0	18.0			
	320.5	894	2.3	4.56	18.0	7.0	21.0	17.0			
	359.7	796	2.4	4.06	18.0	7.0	21.0	17.0			
	373.2	768	2.4	3.91	18.0	7.0	21.0	17.0			
	392.8	729	2.5	3.72	17.0	7.0	21.0	17.0			
	440.2	651	2.6	3.32	17.0	7.0	21.0	16.0			
	492.0	582	2.7	2.97	17.0	7.0	20.0	16.0			
37.0	17.9	19716	1.0	81.46	91.0	53.0	120.0	100.0	**PA 103 - 225S/4A** **PF 103 - 225S/4A**	918	109
	20.7	17043	1.2	70.42	94.0	54.0	120.0	99.0			
	24.0	14703	1.4	60.75	96.0	54.0	120.0	98.0			
	27.5	12828	1.6	53.00	98.0	54.0	120.0	96.0			
	32.2	10970	1.8	45.33	99.0	53.0	119.0	95.0			
	38.5	9190	2.2	37.97	100.0	52.0	115.0	92.0			
	49.3	7169	2.2	29.62	101.0	51.0	111.0	88.0			
	57.6	6131	2.3	25.33	101.0	50.0	107.0	86.0			
	20.2	17527	0.8	72.42	47.0	26.0	64.0	76.0	**PA 93 - 225S/4A** **PF 93 - 225S/4A**	699	107
	23.7	14924	0.9	61.66	54.0	28.0	70.0	77.0			
	27.2	13010	0.9	53.75	57.0	29.0	72.0	76.0			
	31.3	11285	1.1	46.63	60.0	30.0	75.0	76.0			
	37.0	9551	1.3	39.46	62.0	31.0	77.0	75.0			
	46.7	7561	1.6	31.24	64.0	31.0	77.0	73.0			
	53.9	6559	1.9	27.10	65.0	31.0	77.0	71.0			
	63.7	5550	2.2	22.93	65.0	31.0	76.0	69.0			
	76.2	4639	2.3	19.17	66.0	30.0	75.0	67.0			
	88.7	3985	2.1	16.47	66.0	30.0	74.0	66.0	**PA 92 - 225S/4A** **PF 92 - 225S/4A**	688	106
	101.7	3475	2.2	14.36	66.0	29.0	72.0	64.0			
	117.8	2999	2.3	12.39	64.0	29.0	70.0	61.0			

P_1 [kW]	n_2 [Min^{-1}]	M_2 [Nm]	f_B	i_{ges}	F_R [kN]	F_A [kN]	$F_{R\,GR}$ [kN]	$F_{A\,GR}$ [kN]	Tip / Type	Kg	Sayfa Page mm
37.0	32.9	10732	0.8	44.34	28.0	9.0	39.0	42.0	**PA 83 - 225S/4A** **PF 83 - 225S/4A**	520	105
	37.4	9441	1.0	39.01	32.0	11.0	42.0	43.0			
	44.9	7872	1.1	32.53	35.0	12.0	46.0	43.0			
	52.2	6775	1.2	27.99	37.0	13.0	48.0	43.0			
	59.9	5901	1.4	24.38	38.0	14.0	49.0	43.0			
	69.6	5079	1.6	20.99	39.0	15.0	50.0	43.0			
	88.2	4007	1.6	16.56	40.0	15.0	51.0	42.0	**PA 82 - 225S/4A** **PF 82 - 225S/4A**	512	104
	102.2	3457	1.9	14.29	40.0	15.0	50.0	41.0			
	123.2	2867	2.0	11.85	39.0	15.0	49.0	40.0			
	141.3	2501	2.1	10.33	39.0	15.0	49.0	39.0			
	165.2	2139	2.3	8.84	38.0	15.0	47.0	38.0			
	197.2	1792	2.4	7.40	37.0	15.0	46.0	36.0			
	235.3	1502	2.1	6.21	35.0	14.0	43.0	35.0			
	275.1	1284	2.3	5.31	34.0	14.0	42.0	33.0			
	62.4	5661	0.9	23.39	11.0	3.0	18.0	22.0	**PA 73 - 225S/4A** **PF 73 - 225S/4A**	424	103
	70.7	4999	1.0	20.66	13.0	4.0	20.0	23.0			
	81.1	4358	1.1	18.01	15.0	5.0	23.0	23.0			
	86.7	4074	1.0	16.83	17.0	5.0	24.0	24.0	**PA 72 - 225S/4A** **PF 72 - 225S/4A**	414	102
	101.9	3469	1.2	14.33	18.0	6.0	26.0	24.0			
	116.9	3024	1.3	12.49	19.0	6.0	27.0	24.0			
	134.7	2623	1.8	10.84	19.0	6.0	26.0	23.0			
	154.3	2290	1.9	9.46	19.0	7.0	27.0	23.0			
	177.9	1986	2.0	8.21	20.0	7.0	27.0	22.0			
	210.2	1681	2.2	6.94	20.0	7.0	27.0	22.0			
	227.3	1554	1.8	6.42	18.0	6.0	25.0	21.0			
	260.8	1355	1.9	5.60	19.0	7.0	25.0	21.0			
	300.6	1175	2.0	4.86	18.0	7.0	25.0	20.0			
	355.3	995	2.2	4.11	18.0	7.0	25.0	20.0			
	104.9	3367	0.9	13.91	14.0	5.0	16.0	18.0	**PA 62 - 225S/4A** **PF 62 - 225S/4A**	345	100
	125.8	2808	1.1	11.60	16.0	6.0	18.0	18.0			
	138.7	2547	1.2	10.52	15.0	6.0	18.0	18.0			
	166.4	2124	1.4	8.78	16.0	6.0	19.0	18.0			
	193.3	1828	1.7	7.55	17.0	7.0	20.0	18.0			
	230.0	1536	1.3	6.35	16.0	6.0	19.0	17.0			
	275.9	1281	1.5	5.29	16.0	7.0	19.0	17.0			
	320.5	1102	1.8	4.56	16.0	7.0	20.0	16.0			
	359.7	982	1.9	4.06	16.0	7.0	20.0	16.0			
	373.2	947	2.0	3.91	16.0	7.0	20.0	16.0			
	392.8	900	2.0	3.72	16.0	7.0	20.0	16.0			
	440.2	803	2.1	3.32	16.0	7.0	19.0	16.0			
	492.0	718	2.2	2.97	16.0	7.0	19.0	15.0			
45.0	20.7	20727	1.0	70.42	90.0	48.0	108.0	91.0	**PA 103 - 225M/4C** **PF 103 - 225M/4C**	951	109
	24.0	17882	1.1	60.75	93.0	49.0	110.0	91.0			
	27.5	15601	1.3	53.00	96.0	49.0	112.0	91.0			
	32.2	13342	1.5	45.33	97.0	50.0	113.0	90.0			
	38.5	11177	1.8	37.97	99.0	49.0	111.0	88.0			
	49.3	8719	2.3	29.62	100.0	48.0	107.0	85.0			
	57.6	7457	2.7	25.33	101.0	48.0	104.0	83.0			
	68.8	6246	3.2	21.22	101.0	46.0	101.0	81.0			
	27.2	15823	0.8	53.75	52.0	24.0	60.0	70.0	**PA 93 - 225M/4C** **PF 93 - 225M/4C**	732	107
	31.3	13726	0.9	46.63	56.0	26.0	64.0	70.0			
	37.0	11615	1.1	39.46	59.0	27.0	67.0	70.0			
	46.7	9195	1.3	31.24	62.0	28.0	70.0	69.0			
	53.9	7977	1.5	27.10	63.0	28.0	71.0	68.0			
	63.7	6750	1.8	22.93	64.0	29.0	71.0	67.0			
	76.2	5642	2.2	19.17	65.0	28.0	71.0	65.0			
	88.7	4846	2.2	16.47	65.0	28.0	70.0	64.0	**PA 92 - 225M/4C** **PF 92 - 225M/4C**	721	106
	101.7	4226	2.5	14.36	63.0	28.0	69.0	62.0			
	117.8	3647	2.9	12.39	62.0	27.0	68.0	60.0			

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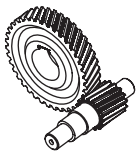
P_1 [kW]	n_2 [Min^{-1}]	M_2 [Nm]	f_B	i_{ges}	F_R [kN]	F_A [kN]	$F_{R\,GR}$ [kN]	$F_{A\,GR}$ [kN]	Tip / Type	Kg	Sayfa Page mm
45.0	44.9	9574	0.9	32.53	27.0	9.0	36.0	39.0	**PA 83 - 225M/4C** **PF 83 - 225M/4C**	553	105
	52.2	8240	1.0	27.99	30.0	10.0	40.0	39.0			
	59.9	7177	1.1	24.38	32.0	11.0	42.0	40.0			
	69.6	6177	1.3	20.99	34.0	12.0	44.0	40.0			
	88.2	4874	1.3	16.56	36.0	14.0	46.0	40.0	**PA 82 - 225M/4C** **PF 82 - 225M/4C**	545	104
	102.2	4205	1.6	14.29	37.0	14.0	47.0	39.0			
	123.2	3487	2.0	11.85	36.0	14.0	46.0	38.0			
	141.3	3042	2.3	10.33	36.0	14.0	46.0	37.0			
	165.2	2602	2.5	8.84	36.0	14.0	45.0	36.0			
	197.2	2179	2.9	7.40	35.0	14.0	44.0	35.0			
	235.3	1827	2.4	6.21	33.0	13.0	42.0	34.0			
	275.1	1562	3.1	5.31	33.0	13.0	41.0	33.0			
	70.7	6080	0.8	20.66	6.0	1.0	13.0	19.0	**PA 73 - 225M/4C** **PF 73 - 225M/4C**	457	103
	81.1	5300	0.9	18.01	10.0	2.0	16.0	20.0			
	101.9	4219	1.0	14.33	14.0	4.0	21.0	22.0	**PA 72 - 225M/4C** **PF 72 - 225M/4C**	447	102
	116.9	3678	1.1	12.49	16.0	5.0	22.0	22.0			
	134.7	3190	1.5	10.84	16.0	5.0	23.0	21.0			
	154.3	2785	1.7	9.46	17.0	5.0	24.0	21.0			
	177.9	2416	1.9	8.21	17.0	6.0	24.0	21.0			
	210.2	2044	2.1	6.94	18.0	6.0	25.0	21.0			
	227.3	1890	1.5	6.42	16.0	6.0	23.0	20.0			
	260.8	1648	1.7	5.60	17.0	6.0	23.0	20.0			
	300.6	1429	2.0	4.86	17.0	6.0	23.0	19.0			
	355.3	1210	2.2	4.11	17.0	6.0	23.0	19.0			
	378.2	1136	2.3	3.86	17.0	6.0	23.0	19.0			
	425.0	1011	2.4	3.44	17.0	6.0	23.0	18.0			
	125.8	3415	0.9	11.60	12.0	4.0	13.0	16.0	**PA 62 - 225M/4C** **PF 62 - 225M/4C**	358	100
	166.4	2583	1.2	8.78	14.0	5.0	15.0	16.0			
	193.3	2223	1.4	7.55	14.0	6.0	17.0	16.0			
	275.9	1558	1.2	5.29	14.0	6.0	17.0	16.0			
	320.5	1341	1.6	4.56	15.0	6.0	17.0	15.0			
	359.7	1195	1.6	4.06	15.0	6.0	18.0	15.0			
	373.2	1152	1.7	3.91	15.0	6.0	18.0	15.0			
	392.8	1094	1.9	3.72	15.0	6.0	18.0	15.0			
	440.2	976	2.0	3.32	15.0	6.0	18.0	15.0			
	492.0	874	2.2	2.97	15.0	6.0	18.0	15.0			
55.0	20.8	25247	0.8	70.42	83.0	41.0	89.0	82.0	**PA 103 - 250M/4C** **PF 103 - 250M/4C**	1120	109
	24.1	21782	0.9	60.75	88.0	43.0	94.0	83.0			
	27.6	19003	1.1	53.00	92.0	44.0	99.0	84.0			
	32.3	16251	1.2	45.33	95.0	45.0	102.0	84.0			
	38.6	13614	1.5	37.97	97.0	45.0	103.0	83.0			
	49.5	10621	1.9	29.62	99.0	45.0	102.0	81.0			
	57.8	9082	2.2	25.33	100.0	45.0	100.0	80.0			
	69.0	7608	2.6	21.22	97.0	44.0	97.0	77.0			
	75.7	6939	2.4	19.35	97.0	44.0	96.0	77.0	**PA 102 - 250M/4C** **PF 102 - 250M/4C**	1111	108
	88.2	5957	2.9	16.61	95.0	43.0	94.0	75.0			
	37.1	14148	0.9	39.46	55.0	22.0	55.0	64.0	**PA 93 - 250M/4C** **PF 93 - 250M/4C**	916	107
	46.9	11200	1.1	31.24	59.0	25.0	61.0	64.0			
	54.1	9716	1.3	27.10	60.0	25.0	63.0	64.0			
	63.9	8222	1.5	22.93	61.0	26.0	65.0	63.0			
	76.4	6872	1.8	19.17	61.0	26.0	65.0	62.0			
	89.0	5903	1.8	16.47	61.0	26.0	66.0	61.0	**PA 92 - 250M/4C** **PF 92 - 250M/4C**	905	106
	102.0	5148	2.1	14.36	60.0	26.0	65.0	60.0			
	118.2	4443	2.4	12.39	59.0	26.0	64.0	58.0			
	139.5	3765	2.7	10.50	58.0	26.0	63.0	56.0			

P_1 [kW]	n_2 [Min^{-1}]	M_2 [Nm]	f_B	i_{ges}	F_R [kN]	F_A [kN]	$F_{R\,GR}$ [kN]	$F_{A\,GR}$ [kN]	Tip / Type	Kg	Sayfa Page mm
55.0	88.5	5937	1.1	16.56	31.0	11.0	41.0	37.0	**PA 82 - 250M/4C** **PF 82 - 250M/4C**	729	104
	102.6	5122	1.3	14.29	32.0	12.0	42.0	37.0			
	123.7	4247	1.7	11.85	33.0	12.0	42.0	36.0			
	141.8	3705	1.9	10.33	33.0	13.0	42.0	36.0			
	165.8	3169	2.1	8.84	33.0	13.0	43.0	35.0			
	197.9	2655	2.4	7.40	33.0	13.0	42.0	34.0			
	236.1	2225	1.9	6.21	31.0	12.0	40.0	32.0			
	276.1	1903	2.5	5.31	31.0	12.0	39.0	32.0			
	329.5	1594	2.7	4.45	30.0	12.0	38.0	30.0			
	402.8	1304	3.0	3.64	30.0	12.0	37.0	29.0			
	505.2	1040	3.0	2.90	29.0	11.0	35.0	28.0			
75.0	27.8	25738	0.8	53.00	69.0	33.0	71.0	70.0	**PA 103 - 280S/4** **PF 103 - 280S/4**	1295	109
	32.5	22010	0.9	45.33	78.0	36.0	78.0	72.0			
	38.8	18438	1.1	37.97	84.0	38.0	84.0	73.0			
	49.8	14384	1.4	29.62	89.0	39.0	89.0	73.0			
	58.2	12301	1.6	25.33	89.0	40.0	90.0	73.0			
	69.5	10305	1.9	21.22	89.0	40.0	90.0	72.0			
	76.2	9399	1.8	19.35	90.0	40.0	90.0	72.0	**PA 102 - 280S/4** **PF 102 - 280S/4**	1286	108
	88.8	8068	2.1	16.61	88.0	40.0	89.0	71.0			
	103.3	6937	2.2	14.29	86.0	39.0	86.0	69.0			
	124.5	5755	2.3	11.85	84.0	38.0	84.0	67.0			
	148.3	4828	2.4	9.94	82.0	37.0	81.0	64.0			
	196.5	3646	2.2	7.51	76.0	35.0	75.0	60.0			
	47.2	15170	0.8	31.24	45.0	18.0	43.0	55.0	**PA 93 - 280S/4** **PF 93 - 280S/4**	1076	107
	54.4	13159	0.9	27.10	48.0	19.0	47.0	56.0			
	64.3	11136	1.1	22.93	51.0	21.0	51.0	57.0			
	76.9	9308	1.3	19.17	52.0	22.0	54.0	56.0			
	89.6	7995	1.3	16.47	54.0	23.0	57.0	56.0	**PA 92 - 280S/4** **PF 92 - 280S/4**	1065	106
	102.7	6972	1.5	14.36	54.0	23.0	57.0	56.0			
	119.0	6017	1.8	12.39	54.0	23.0	58.0	55.0			
	140.5	5099	2.0	10.50	53.0	23.0	57.0	53.0			
	189.6	3778	1.6	7.78	50.0	22.0	54.0	49.0			
	219.9	3257	2.0	6.71	49.0	21.0	53.0	48.0			
	259.5	2760	2.1	5.68	48.0	21.0	52.0	47.0			
	89.1	8041	0.8	16.56	21.0	7.0	29.0	31.0	**PA 82 - 280S/4** **PF 82 - 280S/4**	904	104
	103.3	6937	0.9	14.29	24.0	8.0	32.0	32.0			
	124.5	5752	1.2	11.85	26.0	9.0	34.0	32.0			
	142.7	5019	1.4	10.33	27.0	10.0	35.0	32.0			
	166.9	4292	1.5	8.84	28.0	10.0	36.0	32.0			
	199.2	3595	1.7	7.40	29.0	11.0	37.0	32.0			
	237.7	3013	1.4	6.21	27.0	10.0	35.0	30.0			
	277.9	2577	1.9	5.31	28.0	11.0	35.0	29.0			
	331.8	2159	2.0	4.45	28.0	11.0	35.0	29.0			
	405.5	1766	2.2	3.64	27.0	11.0	35.0	28.0			
	508.7	1408	2.2	2.90	27.0	11.0	34.0	27.0			
90.0	32.7	26323	0.8	45.33	58.0	29.0	60.0	63.0	**PA 103 - 280M/4** **PF 103 - 280M/4**	1345	109
	39.0	22051	0.9	37.97	67.0	32.0	69.0	66.0			
	50.0	17203	1.2	29.62	77.0	35.0	77.0	68.0			
	58.4	14711	1.4	25.33	81.0	36.0	81.0	68.0			
	69.7	12324	1.6	21.22	83.0	37.0	83.0	68.0			
	76.5	11240	1.5	19.35	84.0	37.0	85.0	68.0	**PA 102 - 280M/4** **PF 102 - 280M/4**	1336	108
	89.1	9649	1.8	16.61	83.0	37.0	85.0	67.0			
	103.6	8296	2.0	14.29	82.0	37.0	83.0	66.0			
	124.9	6882	2.3	11.85	81.0	37.0	81.0	64.0			
	148.8	5774	2.6	9.94	79.0	36.0	79.0	63.0			
	197.1	4360	2.4	7.51	73.0	33.0	73.0	58.0			
	237.6	3617	2.6	6.23	71.0	33.0	70.0	56.0			
	283.2	3035	2.7	5.23	69.0	32.0	68.0	54.0			



P_1 [kW]	n_2 [Min^{-1}]	M_2 [Nm]	f_B	i_{ges}	F_R [kN]	F_A [kN]	$F_{R\,GR}$ [kN]	$F_{A\,GR}$ [kN]	Tip / Type	Kg	Sayfa Page mm
90.0	89.9	9562	1.1	16.47	48.0	20.0	50.0	53.0	**PA 92 - 280M/4** **PF 92 - 280M/4**	1115	106
	103.1	8338	1.3	14.36	49.0	21.0	51.0	52.0			
	119.4	7196	1.5	12.39	50.0	21.0	52.0	52.0			
	141.0	6098	1.7	10.50	50.0	21.0	53.0	51.0			
	190.2	4518	1.3	7.78	47.0	20.0	50.0	47.0			
	220.6	3895	2.0	6.71	46.0	20.0	50.0	46.0			
	260.4	3301	2.2	5.68	46.0	20.0	49.0	45.0			
	421.6	2039	2.7	3.51	43.0	19.0	47.0	41.0			
110	50.0	21026	1.0	29.62	60.0	29.0	62.0	60.0	**PA 103 - 315S/4** **PF 103 - 315S/4**	1515	109
	58.4	17981	1.1	25.33	67.0	31.0	68.0	61.0			
	69.7	15063	1.3	21.22	72.0	32.0	72.0	62.0			
	76.5	13738	1.2	19.35	76.0	34.0	76.0	63.0	**PA 102 - 315S/4** **PF 102 - 315S/4**	1506	108
	89.1	11793	1.5	16.61	77.0	34.0	77.0	63.0			
	103.6	10140	1.6	14.29	77.0	34.0	78.0	63.0			
	124.9	8412	1.9	11.85	76.0	34.0	77.0	61.0			
	148.8	7058	2.1	9.94	75.0	34.0	75.0	60.0			
	197.1	5329	2.0	7.51	70.0	32.0	70.0	56.0			
	237.6	4421	2.1	6.23	68.0	31.0	68.0	54.0			
	283.2	3709	2.3	5.23	66.0	30.0	66.0	53.0			
	89.9	11687	0.9	16.47	41.0	16.0	40.0	48.0	**PA 92 - 315S/4** **PF 92 - 315S/4**	1285	106
	103.1	10191	1.1	14.36	43.0	17.0	43.0	48.0			
	119.4	8795	1.2	12.39	44.0	18.0	45.0	48.0			
	141.0	7453	1.4	10.50	45.0	19.0	47.0	48.0			
	190.2	5522	1.1	7.78	43.0	18.0	45.0	45.0			
	220.6	4761	1.6	6.71	43.0	18.0	46.0	44.0			
	260.4	4035	1.8	5.68	43.0	18.0	46.0	43.0			
	421.6	2492	2.2	3.51	41.0	18.0	45.0	40.0			
132	89.1	14151	1.2	16.61	69.0	31.0	68.0	58.0	**PA 102 - 315M/4** **PF 102 - 315M/4**	1586	108
	103.6	12168	1.4	14.29	71.0	31.0	71.0	59.0			
	124.9	10094	1.6	11.85	71.0	32.0	72.0	58.0			
	148.8	8469	1.8	9.94	71.0	32.0	72.0	57.0			
	197.1	6395	1.8	7.51	66.0	30.0	67.0	53.0			
	237.6	5305	2.2	6.23	65.0	29.0	66.0	52.0			
	283.2	4451	2.4	5.23	64.0	29.0	64.0	51.0			
	345.5	3649	2.6	4.28	62.0	28.0	62.0	49.0			
	119.4	10554	1.0	12.39	38.0	15.0	37.0	45.0	**PA 92 - 315M/4** **PF 92 - 315M/4**	1365	106
	141.0	8943	1.1	10.50	40.0	16.0	41.0	45.0			
	220.6	5713	1.4	6.71	39.0	16.0	41.0	42.0			
	260.4	4842	1.5	5.68	40.0	17.0	42.0	41.0			
	421.6	2990	1.9	3.51	39.0	17.0	42.0	39.0			
160	89.4	17096	1.0	16.61	56.0	26.0	56.0	53.0	**PA 102 - 315M/4** **PF 102 - 315M/4**	1736	108
	104.0	14700	1.1	14.29	60.0	27.0	61.0	54.0			
	125.3	12194	1.3	11.85	64.0	28.0	64.0	54.0			
	149.3	10231	1.5	9.94	66.0	29.0	66.0	54.0			
	197.8	7725	1.5	7.51	62.0	27.0	62.0	51.0			
	238.4	6409	1.8	6.23	61.0	28.0	62.0	50.0			
	284.2	5377	2.0	5.23	61.0	27.0	61.0	49.0			
	346.7	4408	2.1	4.28	59.0	27.0	59.0	47.0			
	119.8	12750	0.8	12.39	27.0	11.0	27.0	39.0	**PA 92 - 315M/4** **PF 92 - 315M/4**	1515	106
	141.4	10804	0.9	10.50	33.0	13.0	32.0	41.0			
	221.4	6902	1.1	6.71	34.0	14.0	35.0	39.0			
	261.3	5849	1.2	5.68	35.0	15.0	37.0	39.0			
	423.0	3613	1.5	3.51	36.0	16.0	39.0	37.0			

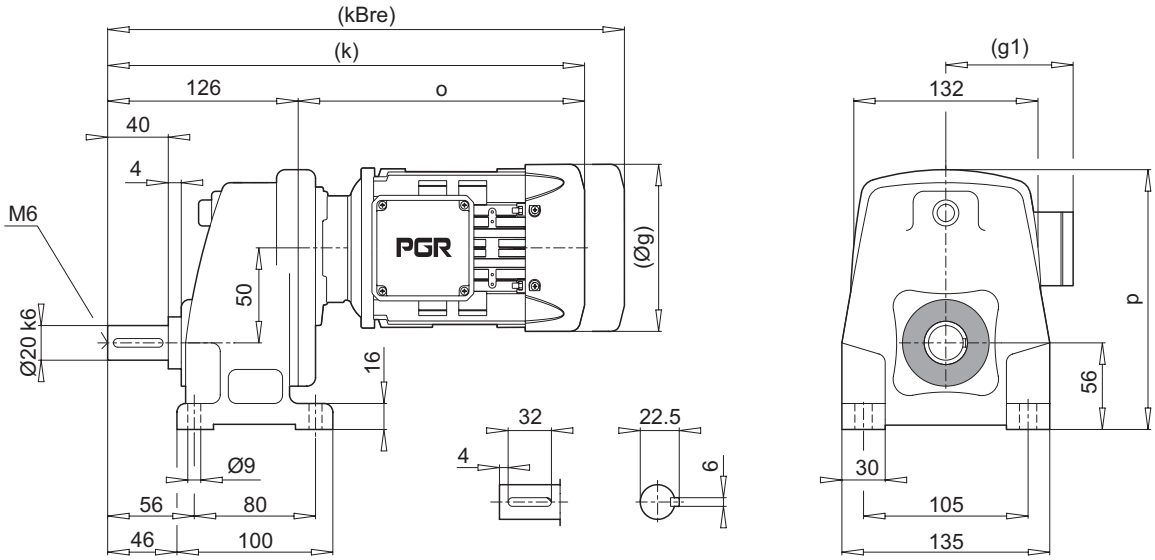
TEK KADEMELİ MOTORLU ÖLÇÜ SAYFALARI

SINGLE STAGE DIMENSION OF GEARMOTORS

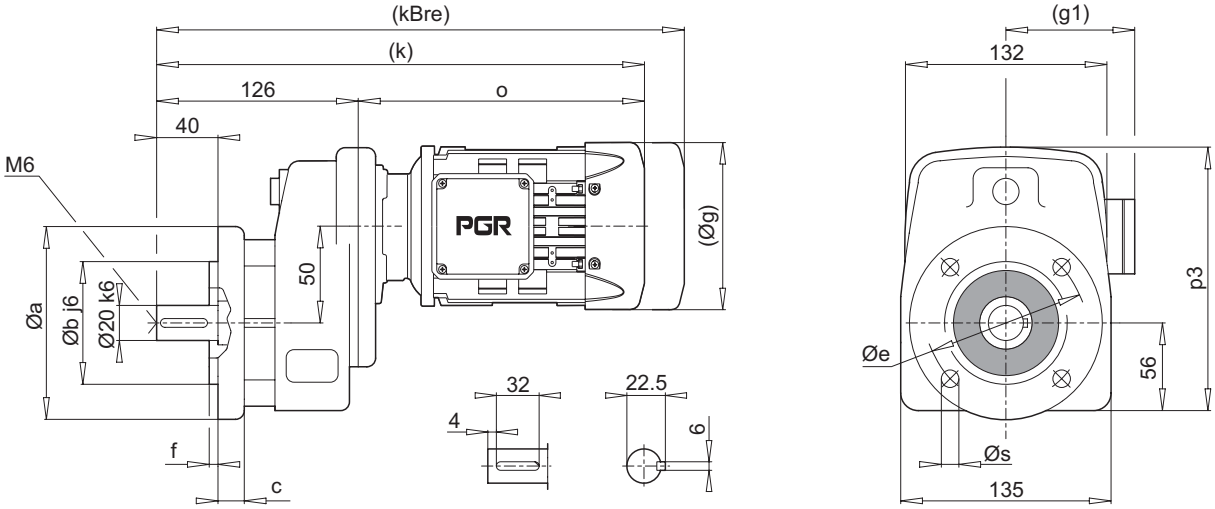
PF 11 ... PF 51

PA 11 ... PF 51

PA 11



PF 11

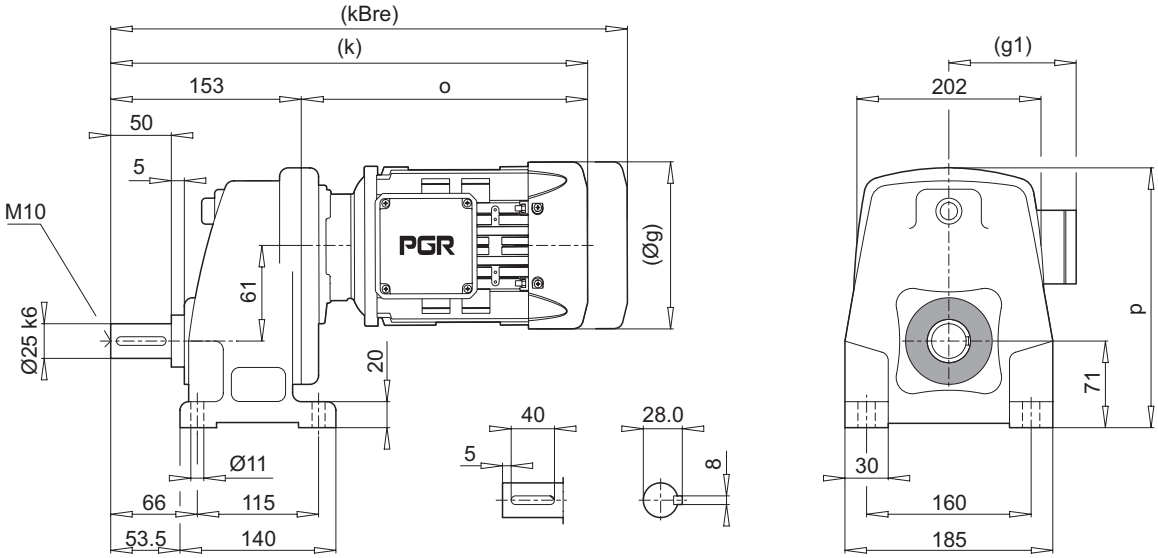


a	b	c	e	f	s
120	80	10	100	3.0	7
140	95	10	115	3.0	9

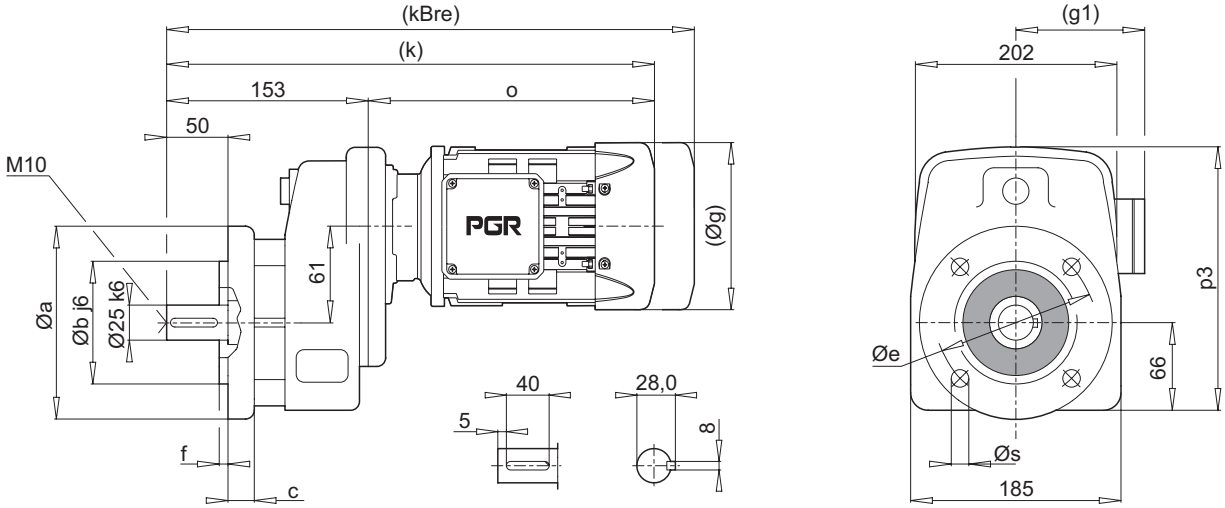
	63 M	71 M	80 M	90 S/L	100 L	112 M		
g	124	140	159	193	217	232		
g1	111	119	127	151	160	168		
k	324	366	393	416/436	464	509		
kBre	376	426	455	489/509	545	589		
o	198	240	267	290/310	338	383		
p	171	179	189	199	208	220		
p3	171	179	189	199	208	220		

Not : (...) İşaretli olan ölçüler Motor markasına göre farklılık gösterir.
Note : Dimension which is designated by (...) depends on marks of motor.

PA 21



PF 21

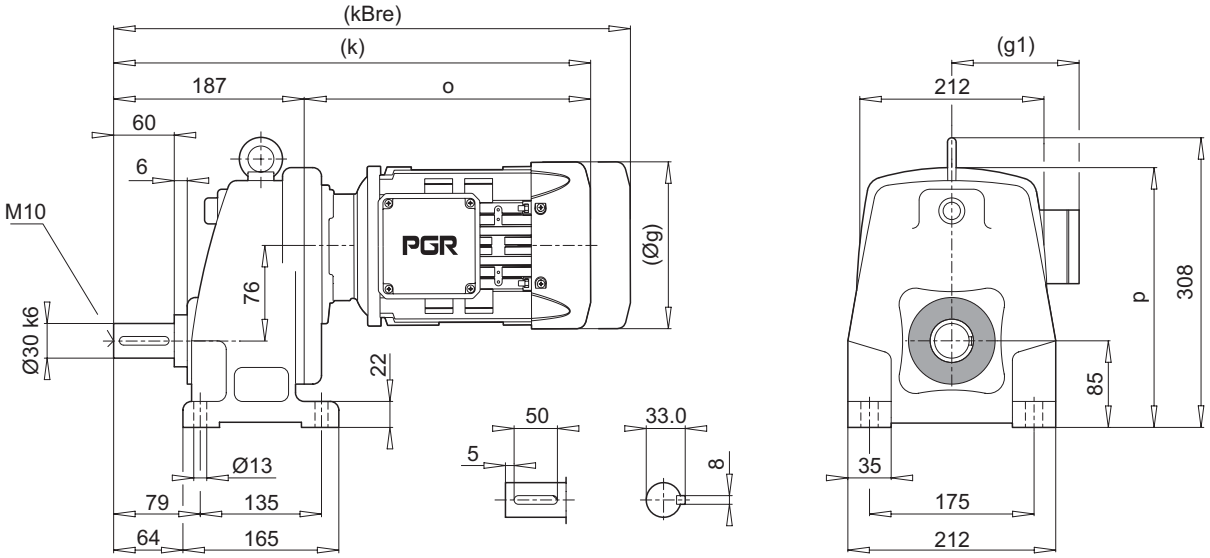


a	b	c	e	f	s
140	95	10	115	3.0	9
160	110	10	130	3.5	9

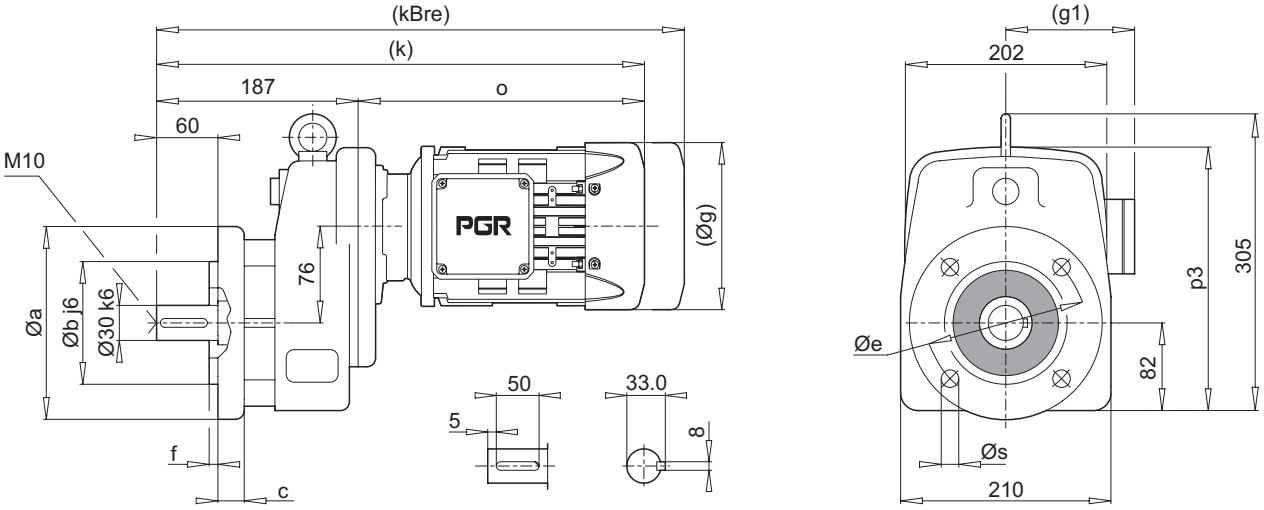
	90 L	100 L	112 M					
g	193	217	232					
g1	151	160	168					
k	458	486	531					
kBre	531	567	611					
o	305	333	378					
p	232	234	246					
p3	227	229	241					

Not : (...) İşaretli olan ölçüler Motor markasına göre farklılık gösterir.
Note : Dimension which is designated by (...) depends on marks of motor.

PA 31



PF 31

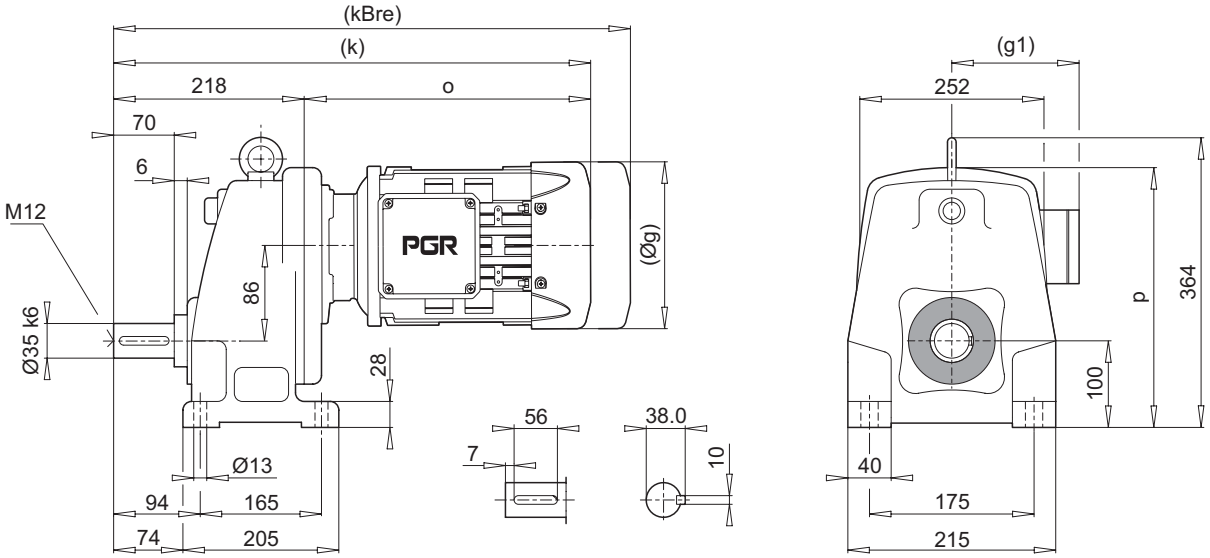


a	b	c	e	f	s
200	130	12	165	3.5	11

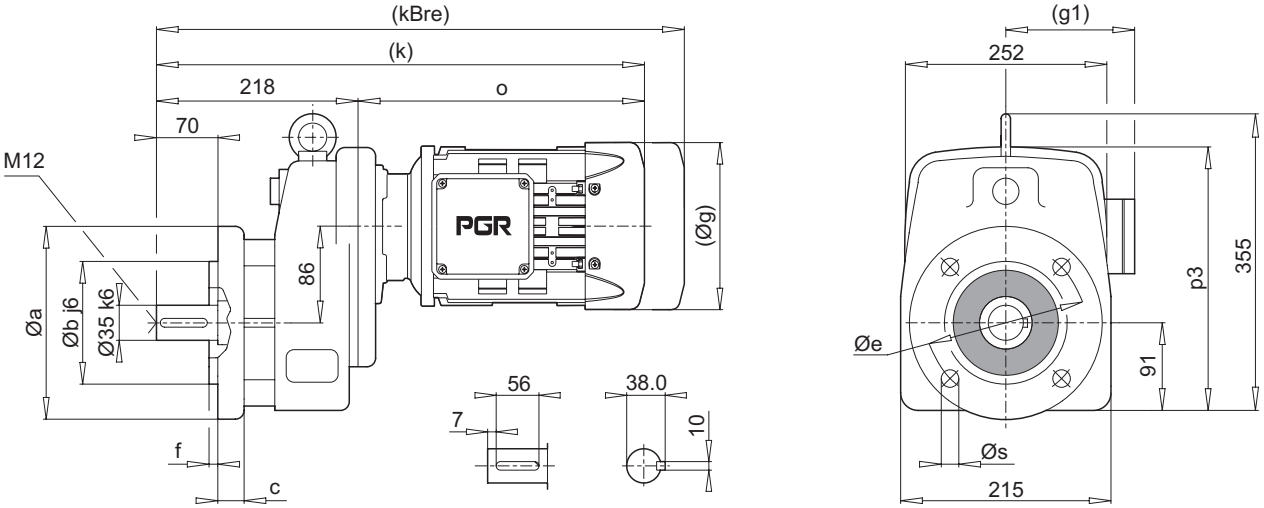
	100 L	112 M	132 S/M					
g	217	232	279					
g1	160	168	182					
k	520	565	572/607					
kBre	601	645	680/715					
o	333	378	385/420					
p	263	275	294					
p3	260	272	291					

Not : (...) İşaretli olan ölçüler Motor markasına göre farklılık gösterir.
Note : Dimension which is designated by (...) depends on marks of motor.

PA 41



PF 41

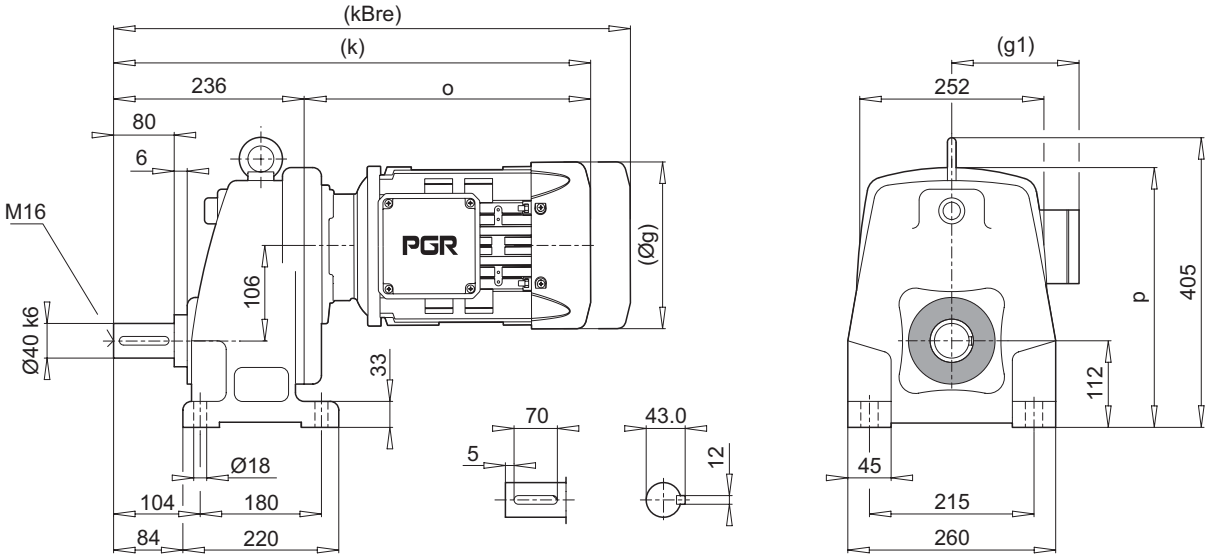


a	b	c	e	f	s
200	130	14	165	3.5	11
250	180	16	215	4.0	14

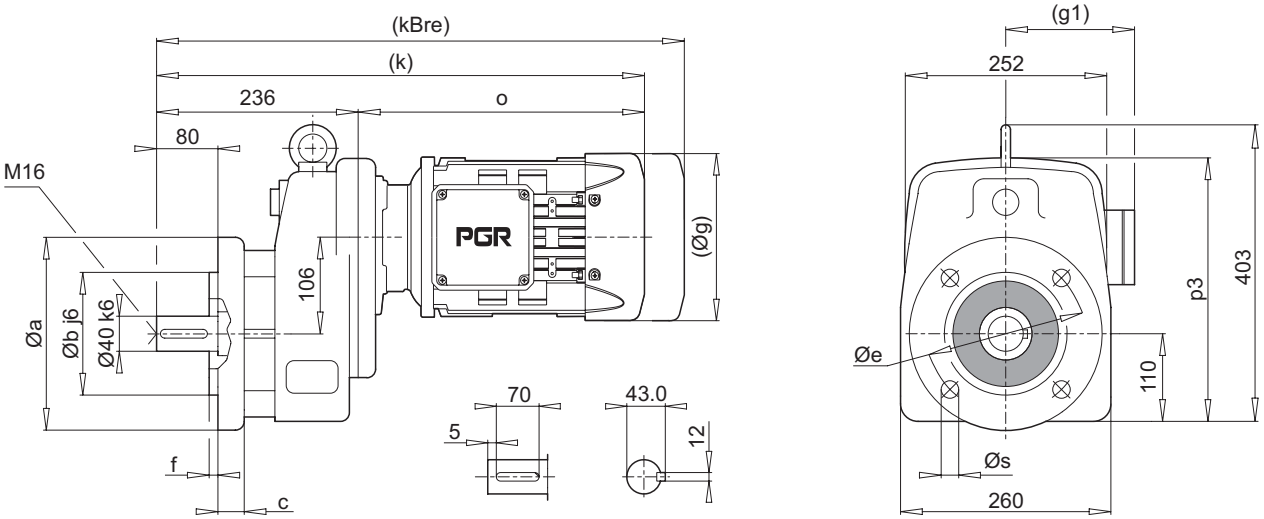
	112 M	132 S/M	160 M/L					
g	232	279	323					
g1	168	182	200					
k	576	583/618	738					
kBre	656	691/726	890					
o	358	365/400	520					
p	311	319	346					
p3	302	310	337					

Not : (...) İşaretli olan ölçüler Motor markasına göre farklılık gösterir.
Note : Dimension which is designated by (...) depends on marks of motor.

PA 51



PF 51



a	b	c	e	f	s
250	180	16	215	4.0	14
300	230	20	265	4.0	14

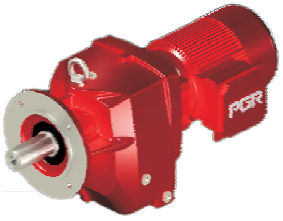
	112 M	132 S/M	160 M/L	180 M/L				
g	232	279	323	370				
g1	168	182	200	248				
k	594	601/636	756	815				
kBre	674	709/744	908	977				
o	358	365/400	520	579				
p	343	351	378	378				
p3	341	349	376	376				

Not : (...) İşaretli olan ölçüler Motor markasına göre farklılık gösterir.
Note : Dimension which is designated by (...) depends on marks of motor.

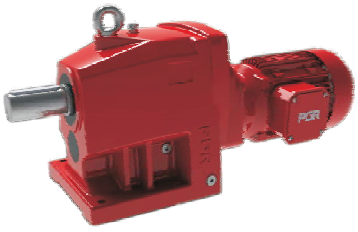
İKİ - ÜÇ KADEMELİ MOTORLU ÖLÇÜ SAYFALARI

DOUBLE - TRIBLE STAGE DIMENSION OF GEARMOTORS

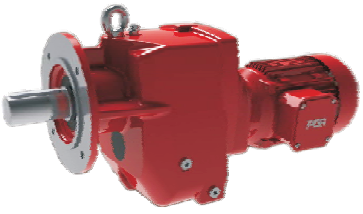
PA 02 ... 52



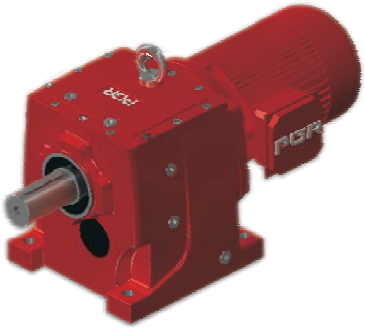
PF 02 ... 52



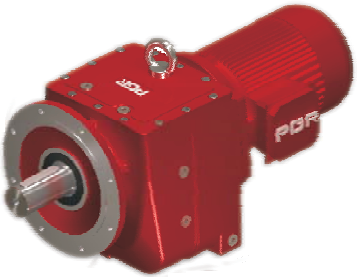
PA 03 ... 53



PF 03 ... 53

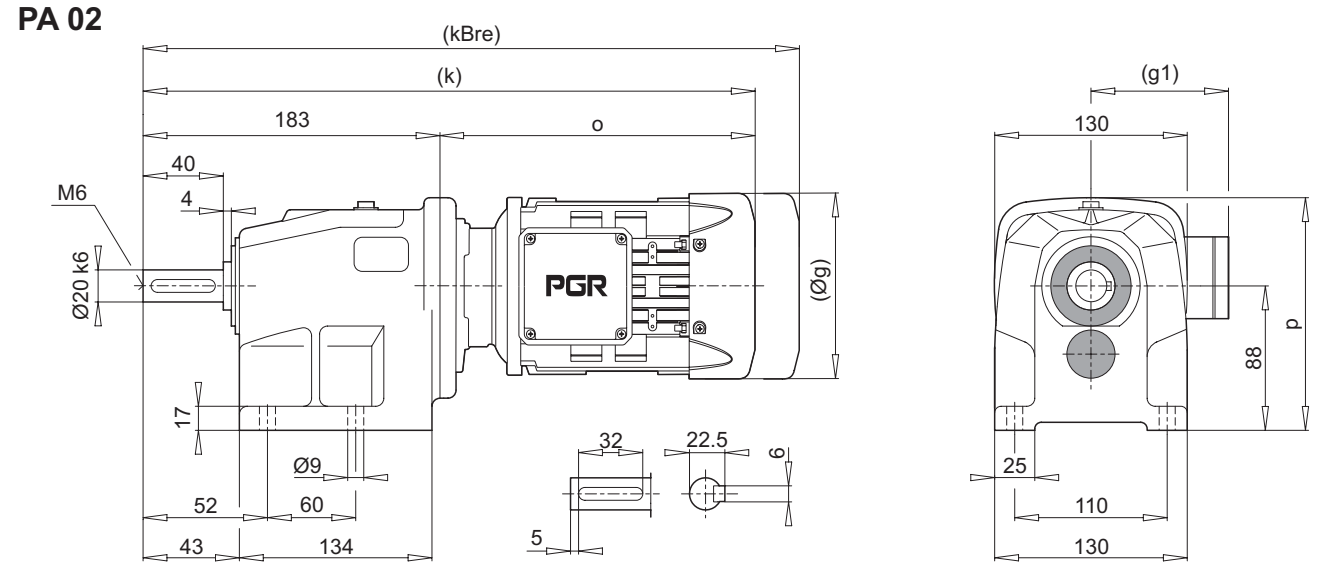


PA 62 ... 102
63 ... 103

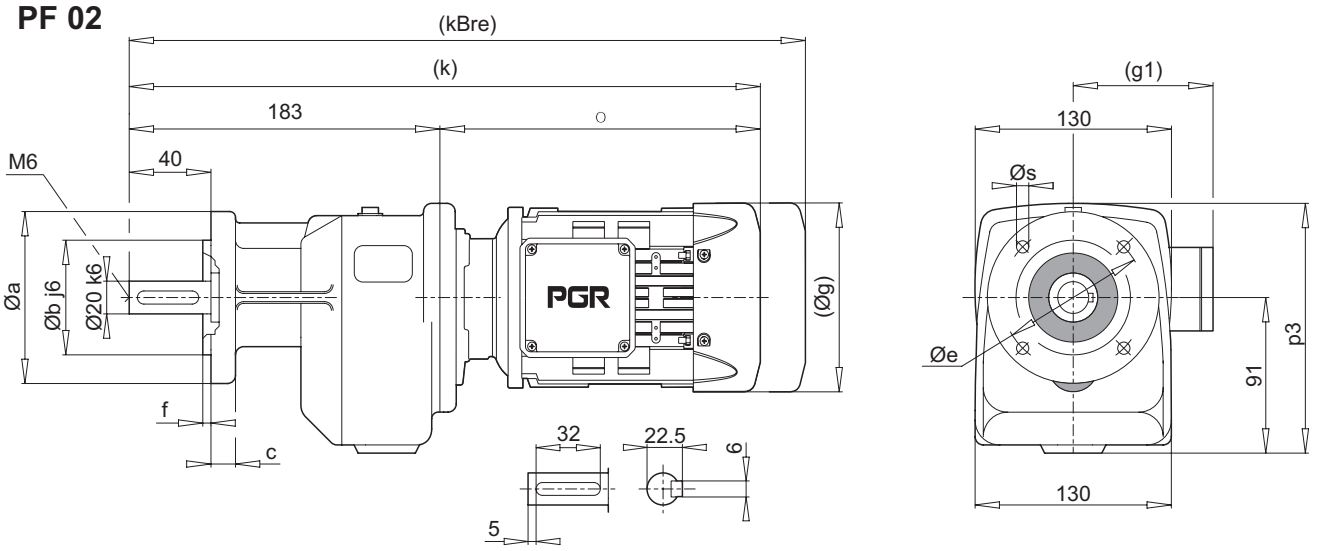


PF 62 ... 102
63 ... 103

PA 02



PF 02

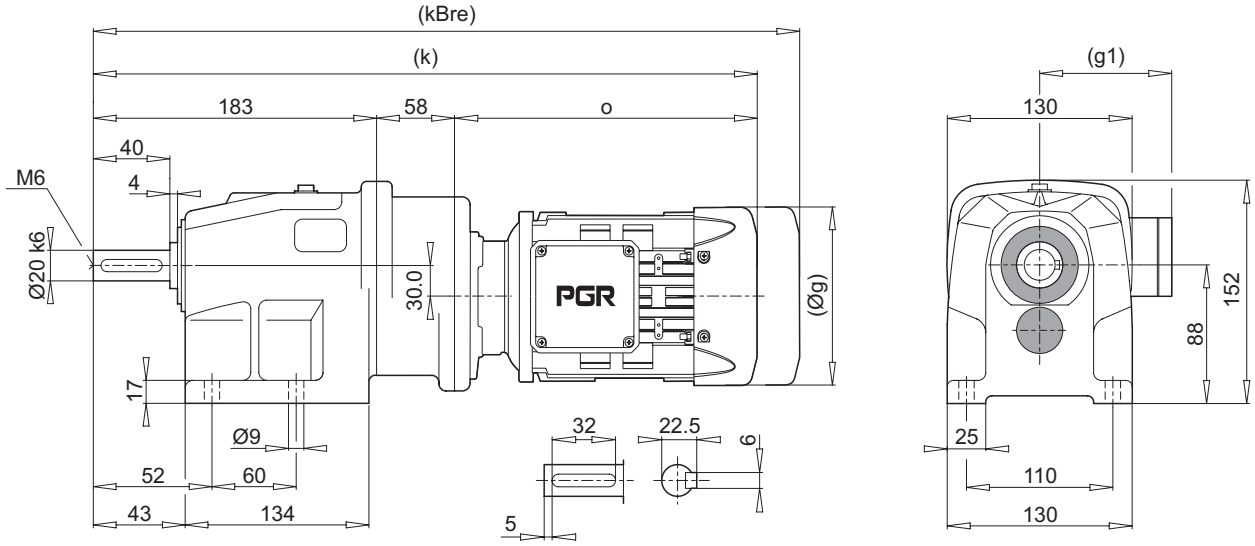


a	b	c	e	f	s
120	80	11	100	3.0	7
140	95	11	115	3.0	9
160	110	11	130	3.5	9

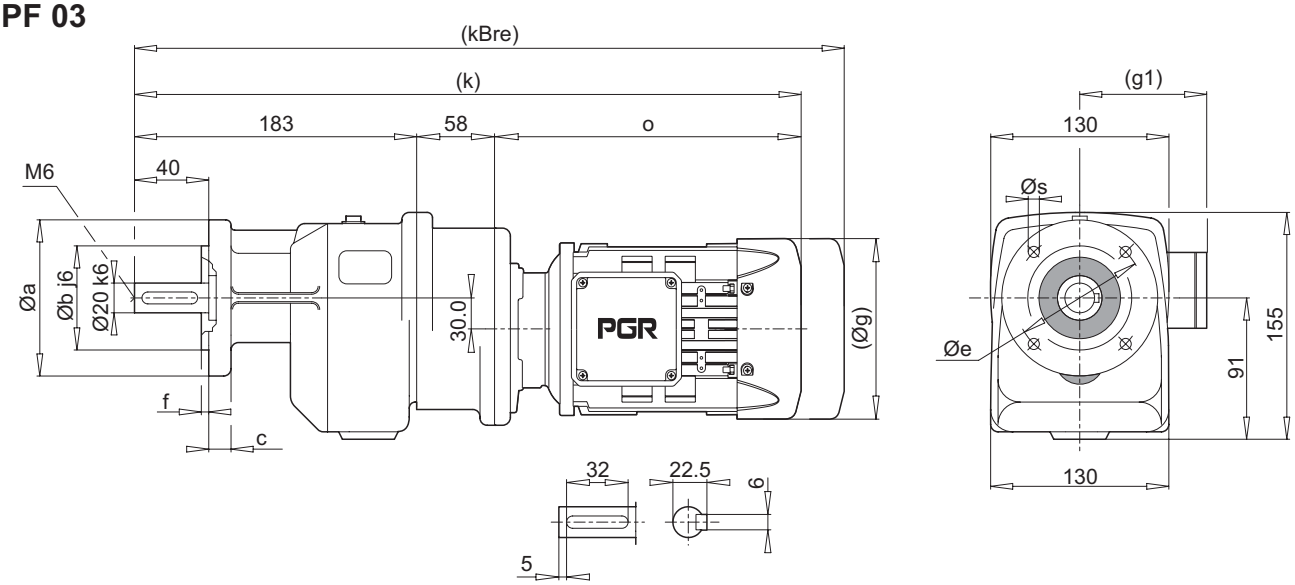
	63 M	71 M	80 M	90 S/L				
g	124	140	159	193				
g1	111	119	127	151				
k	381	423	450	473/493				
kBre	433	483	512	546/566				
o	198	240	267	290/310				
p	152	160	170	180				
p3	155	163	173	183				

Not : (...) İşaretli olan ölçüler Motor markasına göre farklılık gösterir.
Note : Dimension which is designated by (...) depends on marks of motor.

PA 03



PF 03

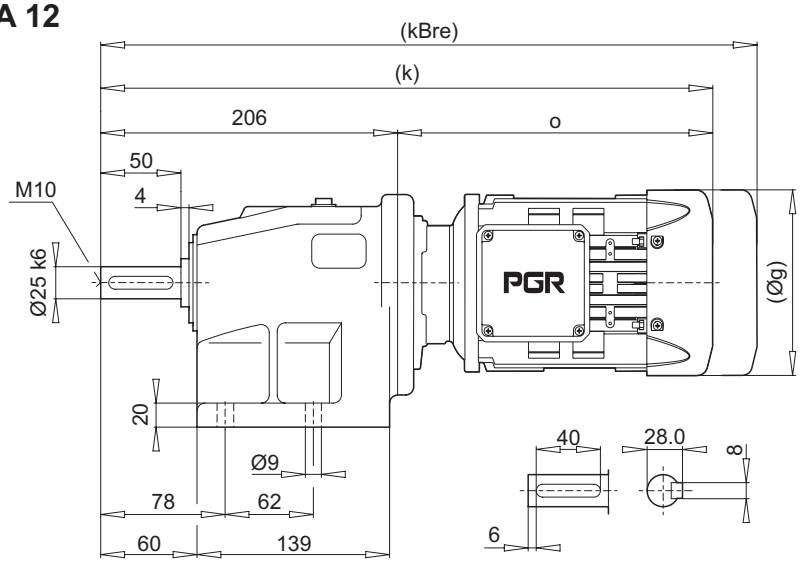


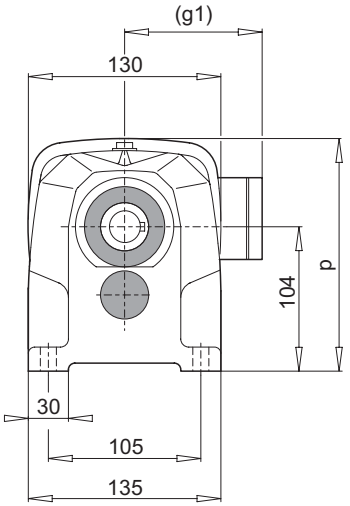
a	b	c	e	f	s
120	80	11	100	3.0	7
140	95	11	115	3.0	9
160	110	11	130	3.5	9

	63 M	71 M						
g	124	140						
g1	111	119						
k	439	481						
kBre	491	541						
o	198	240						

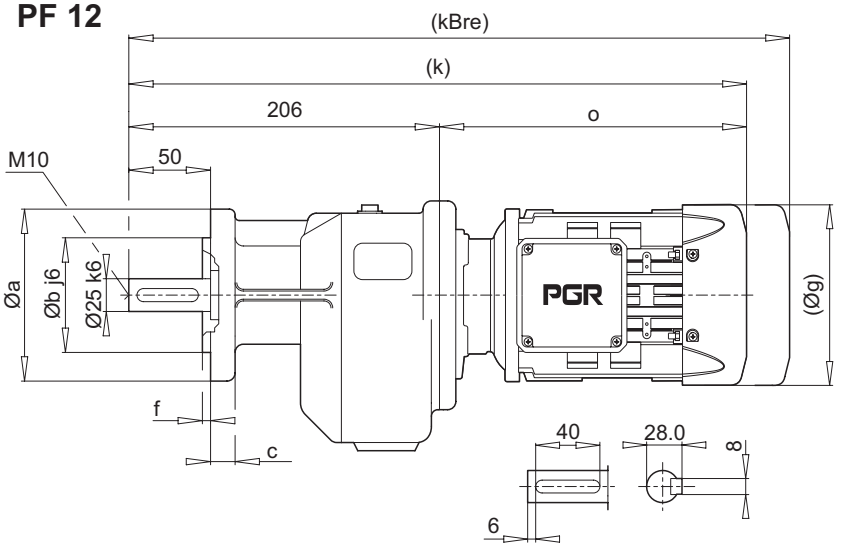
Not : (...) İşaretli olan ölçüler Motor markasına göre farklılık gösterir.
Note : Dimension which is designated by (...) depends on marks of motor.

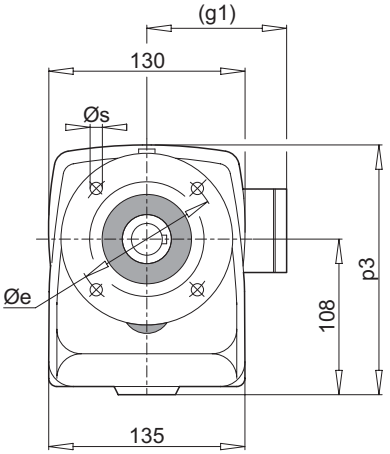
PA 12





PF 12



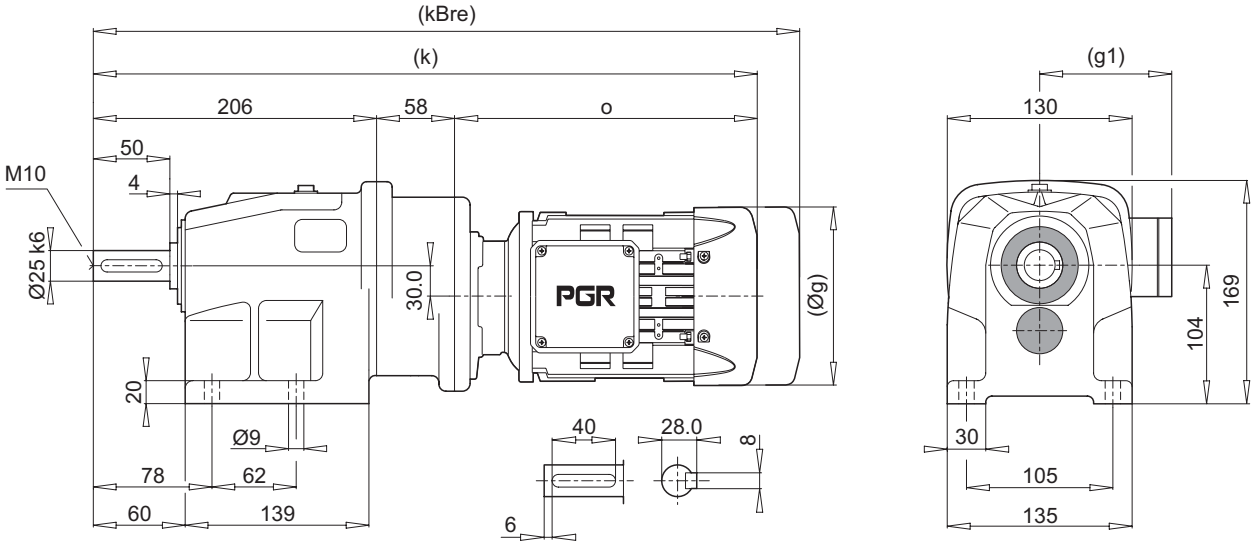


a	b	c	e	f	s
120	80	13	100	3.0	7
140	95	13	115	3.0	9
160	110	13	130	3.5	9

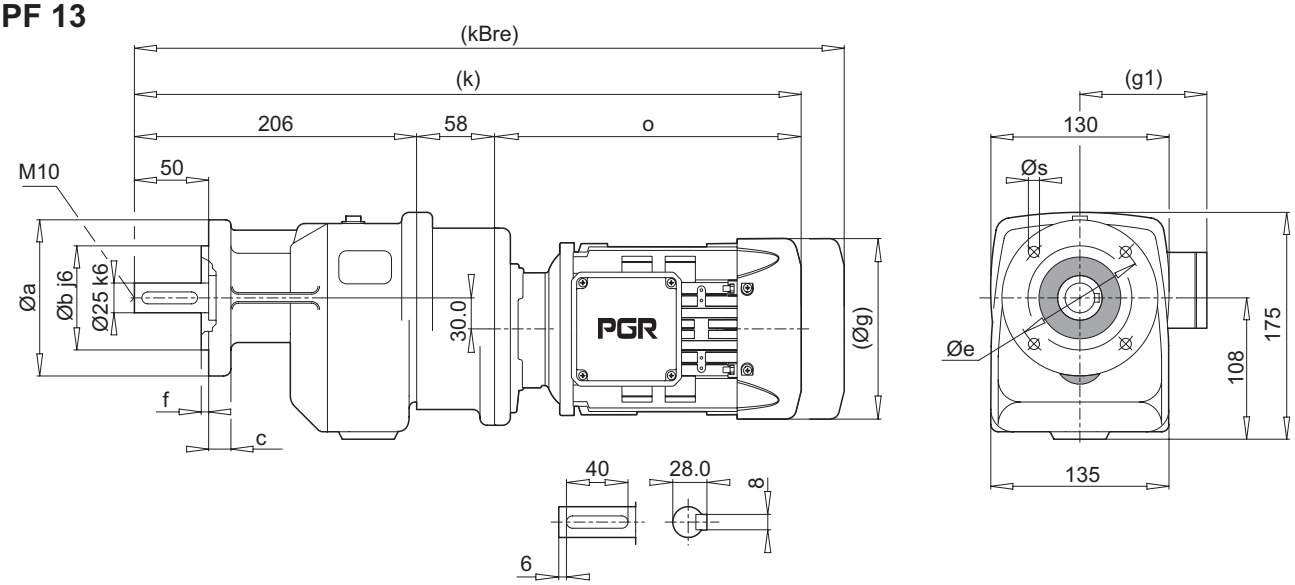
	63 M	71 M	80 M	90 S/L	100 L	112 M		
g	124	140	159	193	217	232		
g1	111	119	127	151	160	168		
k	404	446	473	496/516	544	589		
kBre	456	506	535	569/589	625	669		
o	198	240	267	290/310	338	383		
p	169	176	186	196	205	216		
p3	175	180	190	200	209	220		

Not : (...) İşaretli olan ölçüler Motor markasına göre farklılık gösterir.
Note : Dimension which is designated by (...) depends on marks of motor.

PA 13



PF 13

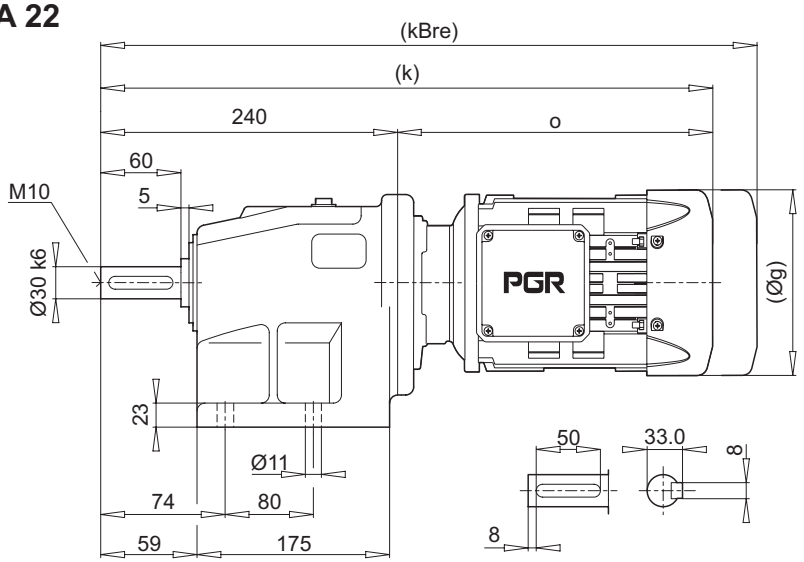


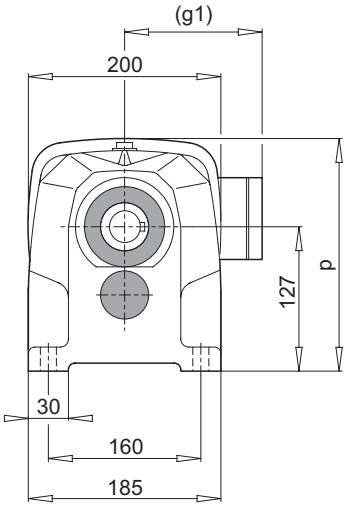
a	b	c	e	f	s
120	80	13	100	3.0	7
140	95	13	115	3.0	9
160	110	13	130	3.5	9

	63 M	71 M						
g	124	140						
g1	111	119						
k	462	504						
kBre	514	564						
o	198	240						

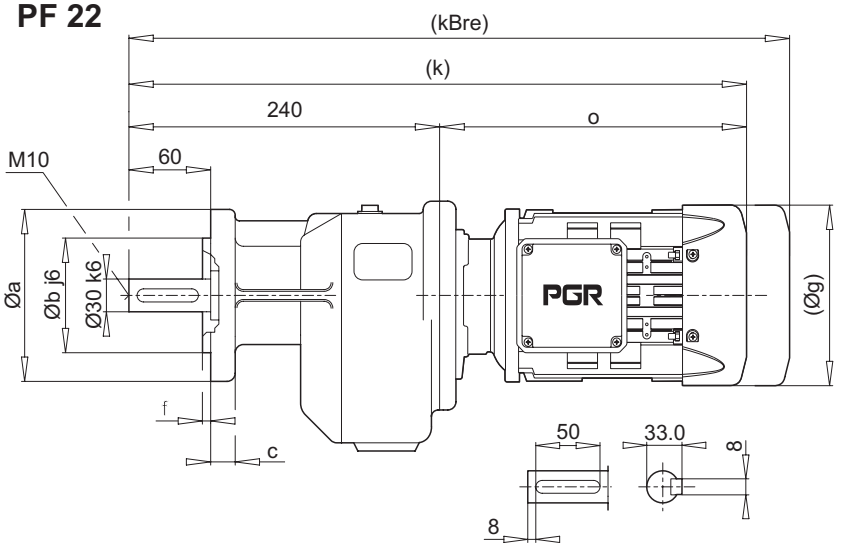
Not : (...) İşaretli olan ölçüler Motor markasına göre farklılık gösterir.
Note : Dimension which is designated by (...) depends on marks of motor.

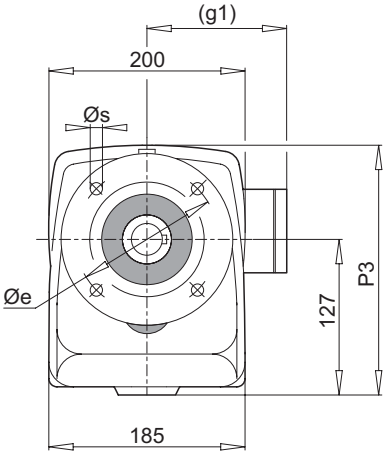
PA 22





PF 22



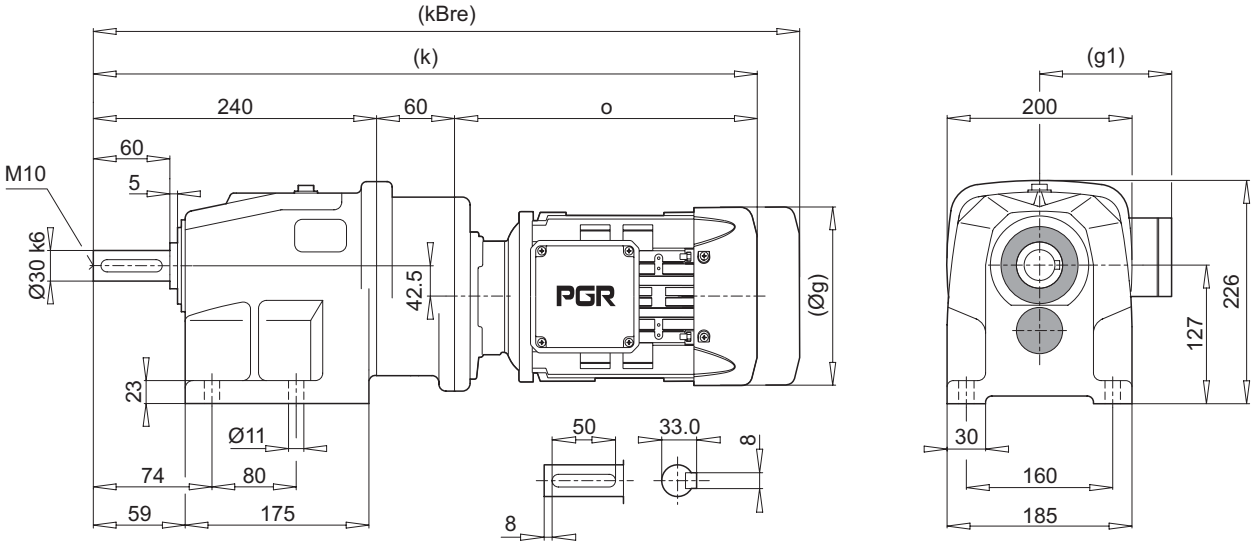


a	b	c	e	f	s
160	110	13	130	3.5	9
200	130	14	165	3.5	11

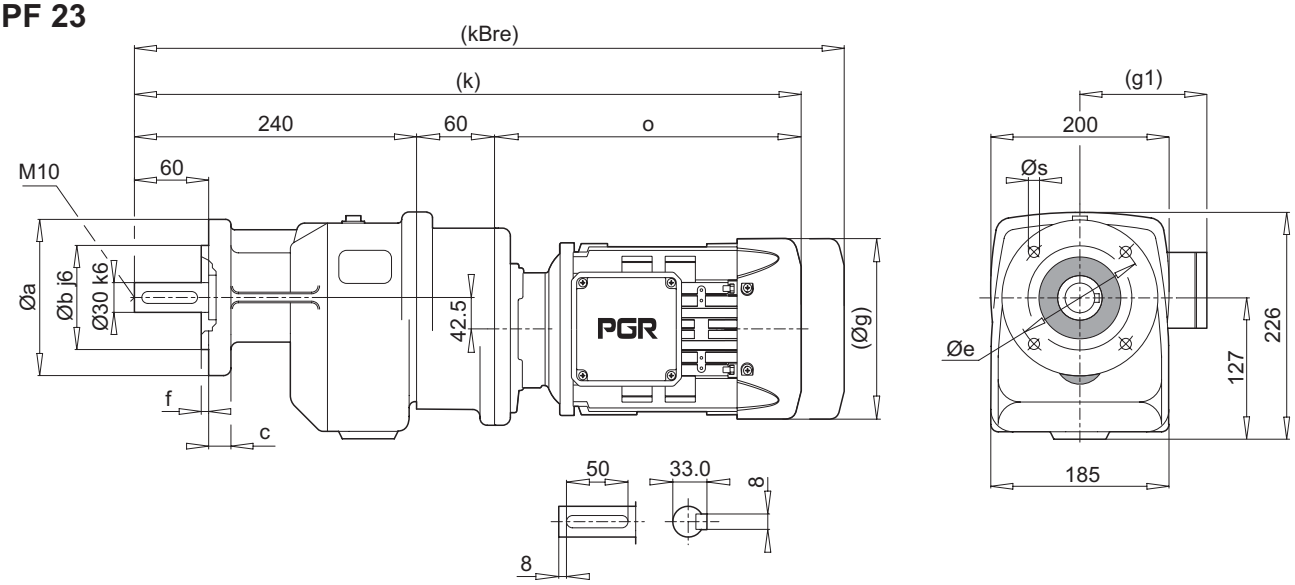
	71 M	80 M	90 S/L	100 L	112 M			
g	140	159	193	217	232			
g1	119	127	151	160	168			
k	476	502	525/545	573	618			
kBre	536	564	598/618	654	698			
o	236	262	285/305	333	378			
p	226	226	226	228	240			
p3	226	226	226	228	240			

Not : (...) İşaretli olan ölçüler Motor markasına göre farklılık gösterir.
Note : Dimension which is designated by (...) depends on marks of motor.

PA 23



PF 23

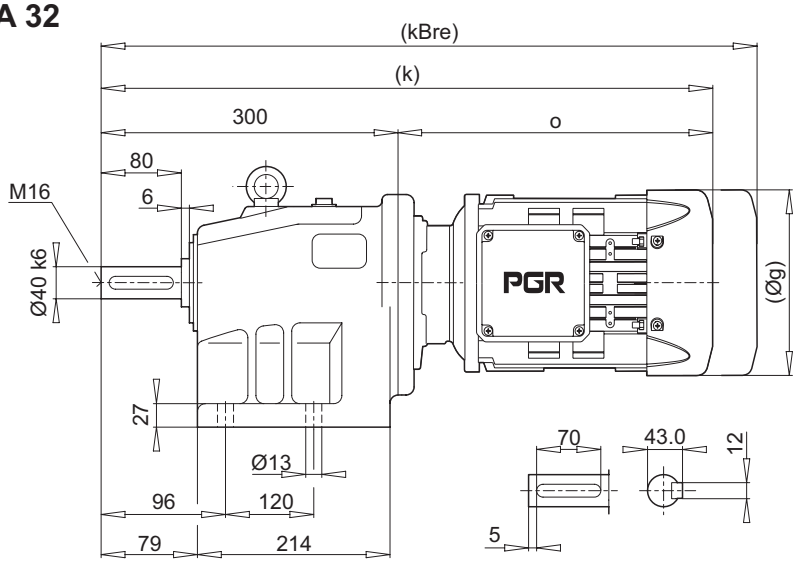


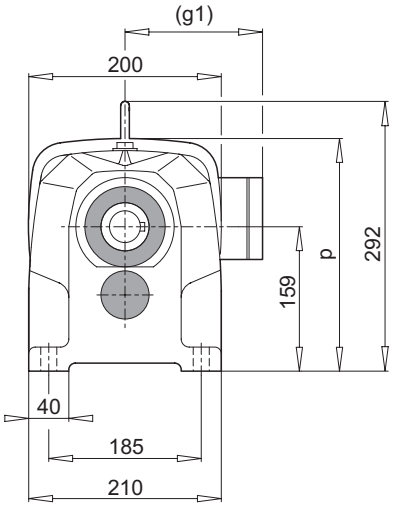
a	b	c	e	f	s
160	110	13	130	3.5	9
200	130	14	165	3.5	11

	63 M	71 M	80 M					
g	124	140	159					
g1	111	119	127					
k	498	540	567					
kBre	550	600	629					
o	198	240	267					

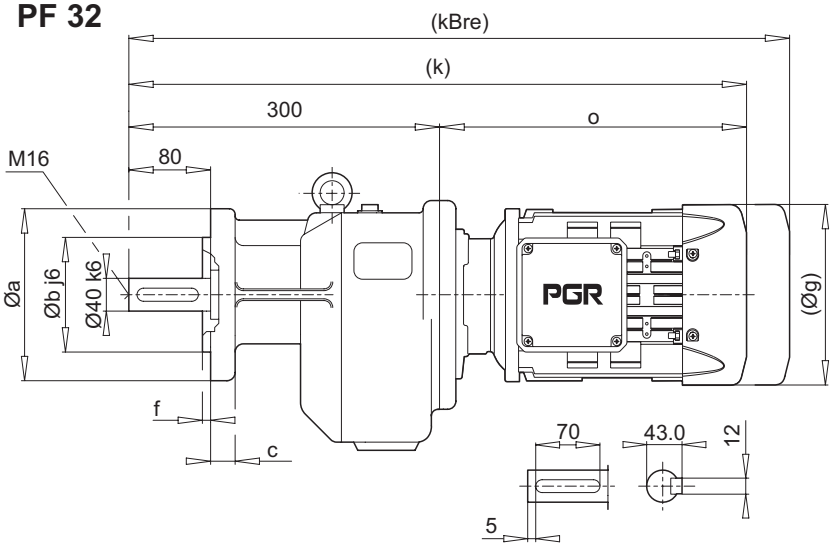
Not : (...) İşaretli olan ölçüler Motor markasına göre farklılık gösterir.
Note : Dimension which is designated by (...) depends on marks of motor.

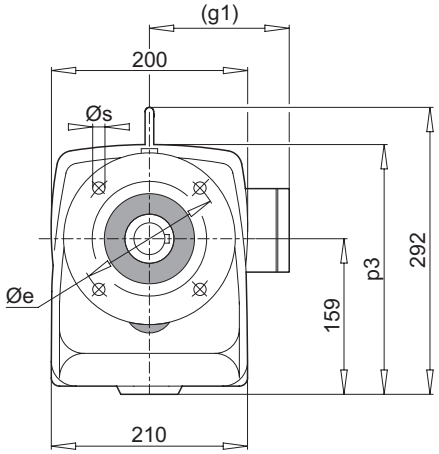
PA 32





PF 32



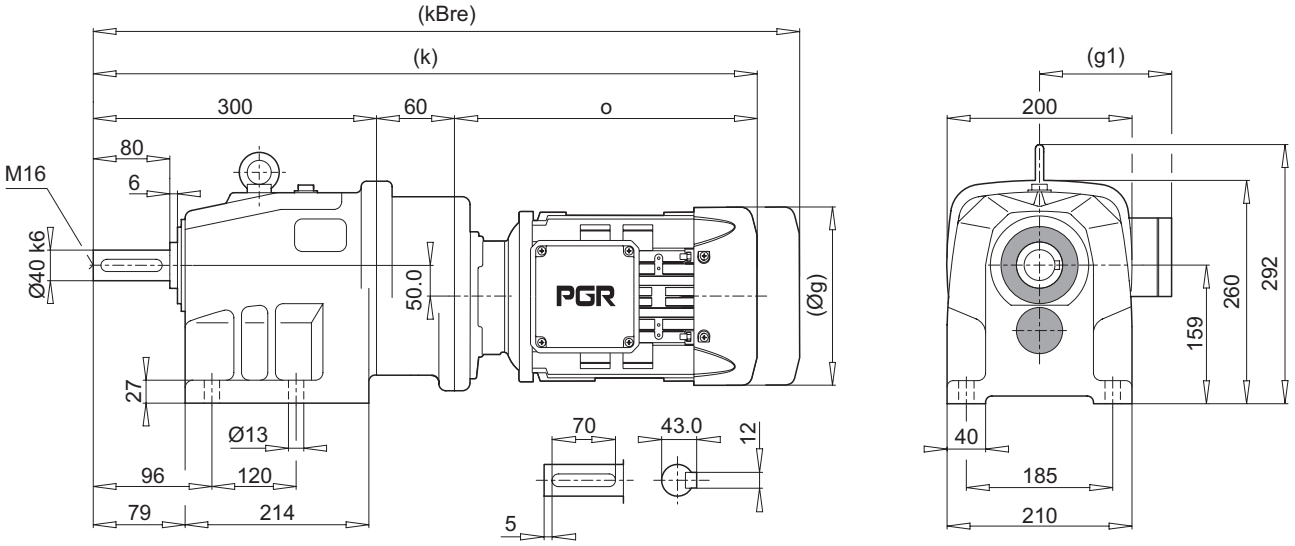


a	b	c	e	f	s
200	130	14	165	3.5	11
250	180	16	215	4.0	14

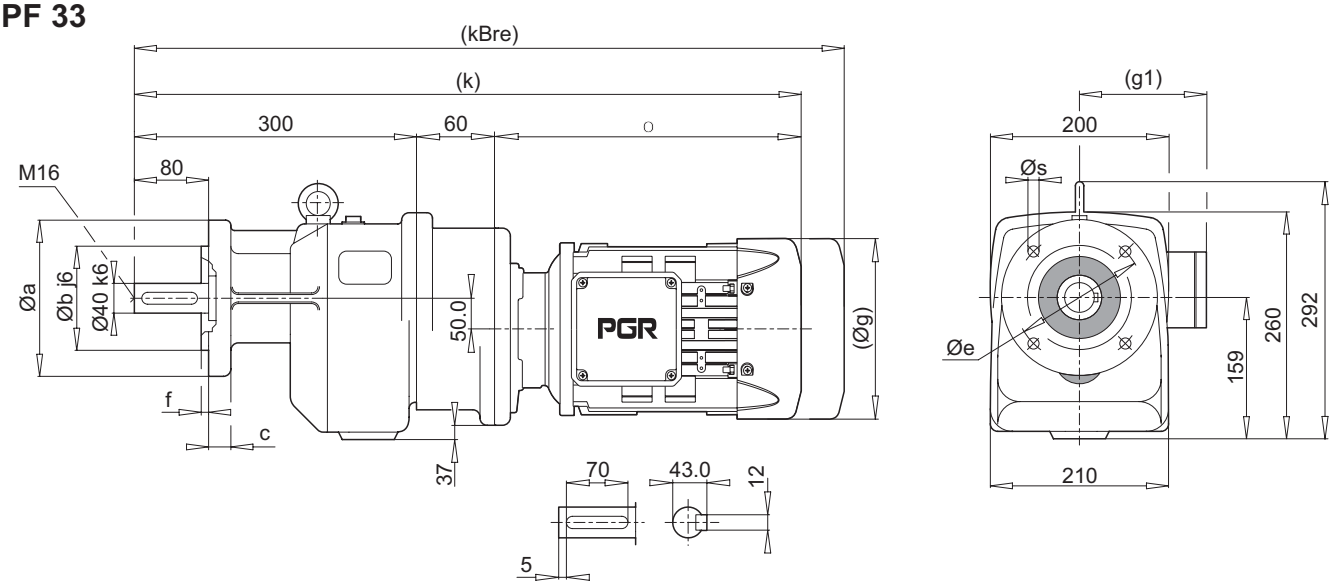
	71 M	80 M	90 S/L	100 L	112 M	132 S/M		
g	140	159	193	217	232	279		
g1	119	127	151	160	168	182		
k	536	562	585/605	633	678	685/720		
kBre	596	624	658/678	714	758	793/828		
o	236	262	285/305	333	378	385/420		
p	260	260	260	260	271	290		
p3	260	260	260	260	271	290		

Not : (...) İşaretli olan ölçüler Motor markasına göre farklılık gösterir.
Note : Dimension which is designated by (...) depends on marks of motor.

PA 33



PF 33

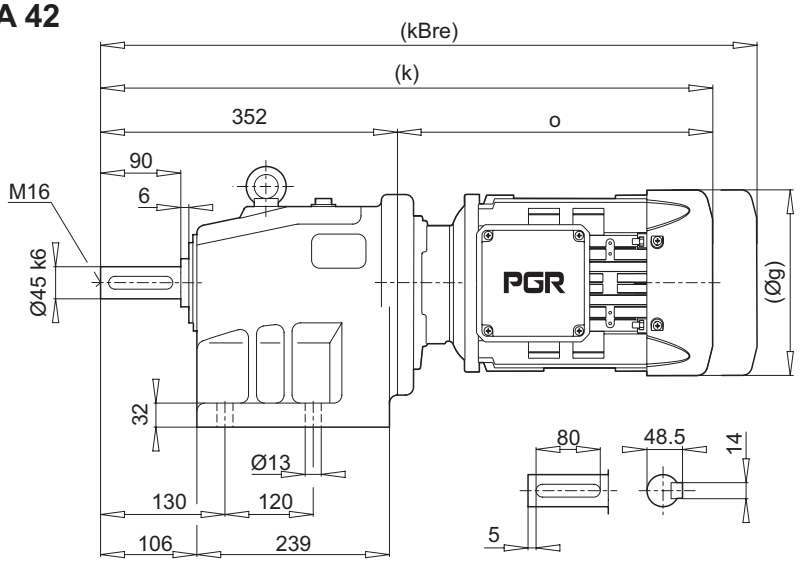


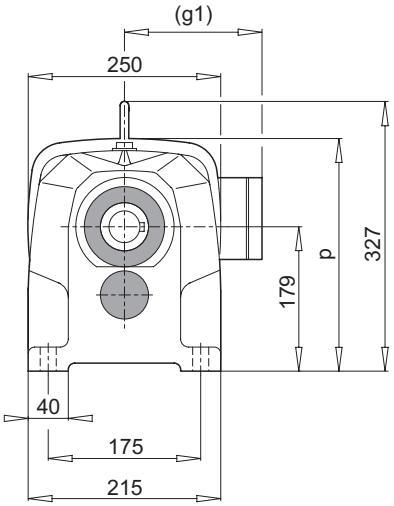
a	b	c	e	f	s
200	130	14	165	3.5	11
250	180	16	215	4.0	14

	63 M	71 M	80 M					
g	124	140	159					
g1	111	119	127					
k	558	600	627					
kBre	610	660	689					
o	198	240	267					

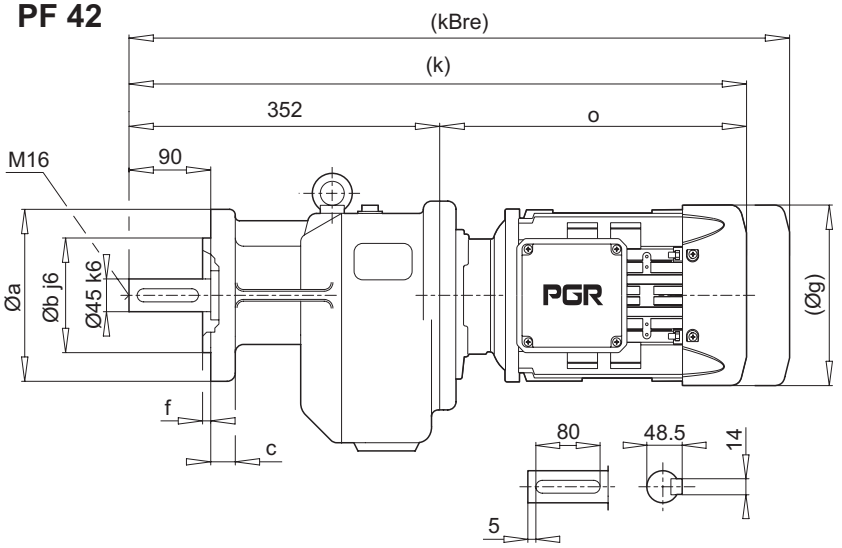
Not : (...) İşaretli olan ölçüler Motor markasına göre farklılık gösterir.
Note : Dimension which is designated by (...) depends on marks of motor.

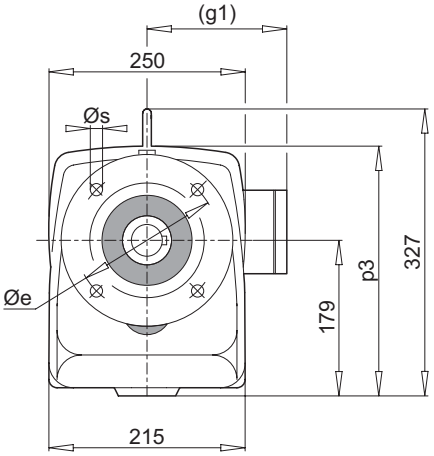
PA 42





PF 42



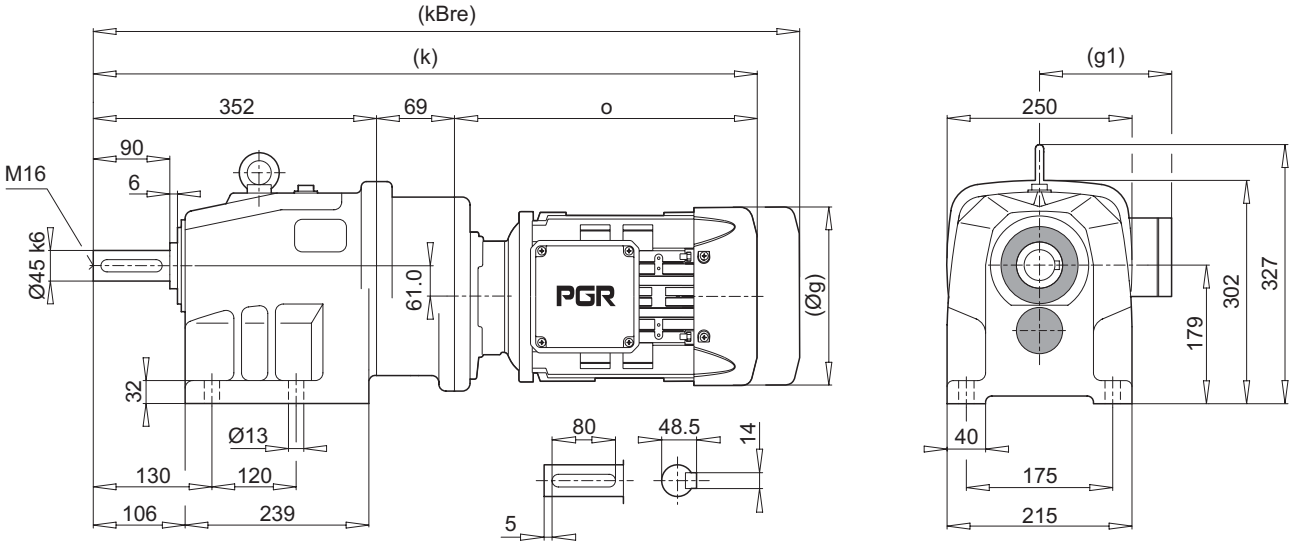


a	b	c	e	f	s
200	130	14	165	3.5	11
250	180	16	215	4.0	14

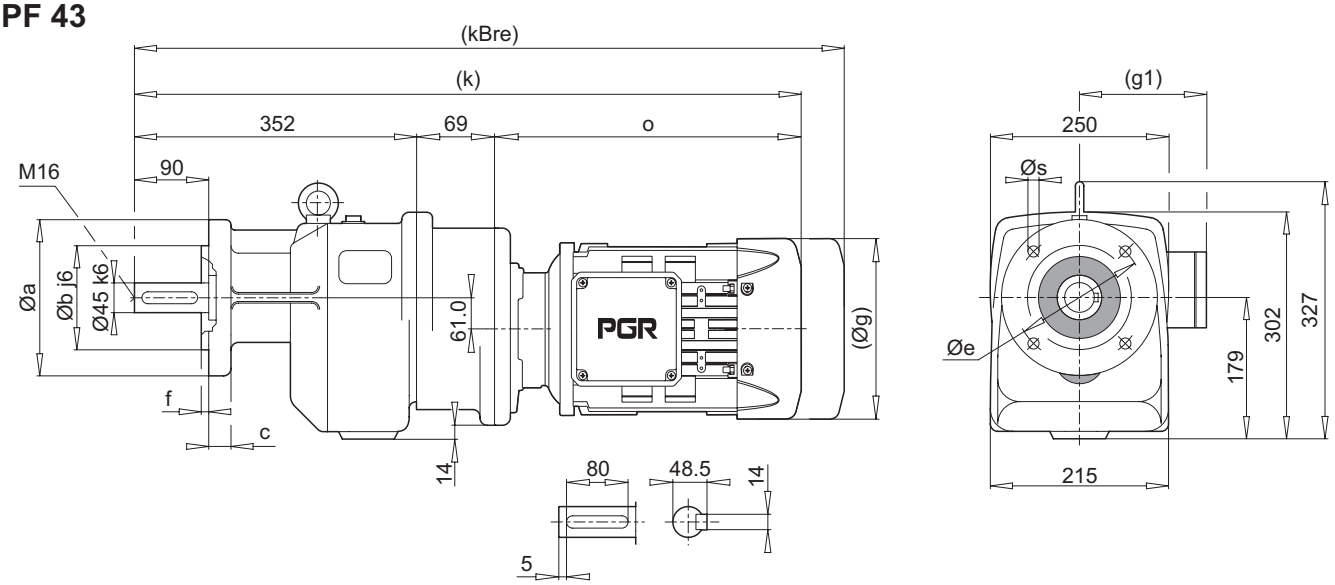
	90 S/L	100 L	112 M	132 S/M	160 M/L			
g	193	217	232	279	323			
g1	151	160	168	182	200			
k	617/637	665	710	717/752	872			
kBre	690/710	746	790	825/860	1024			
o	265/285	313	358	365/400	520			
p	302	302	302	310	337			
p3	302	302	302	310	337			

Not : (...) İşaretli olan ölçüler Motor markasına göre farklılık gösterir.
Note : Dimension which is designated by (...) depends on marks of motor.

PA 43



PF 43

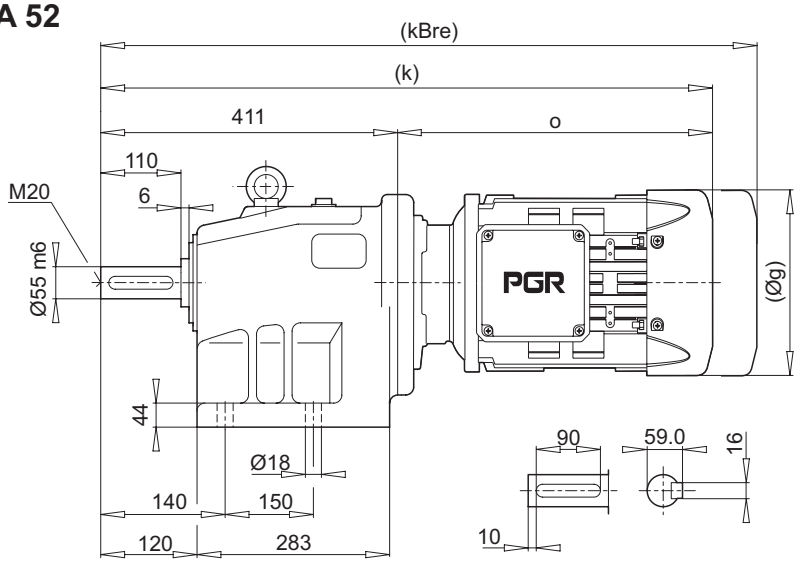


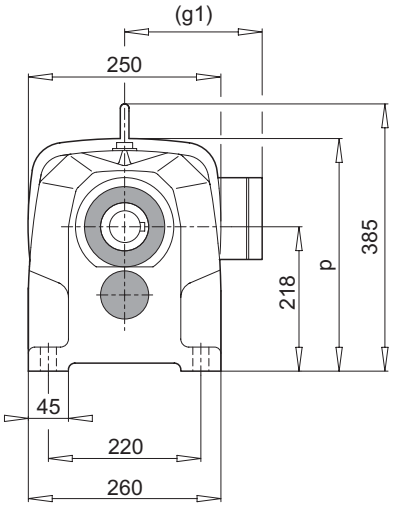
a	b	c	e	f	s
200	130	14	165	3.5	11
250	180	16	215	4.0	14

	71 M	80 M	90 S/L	100 L	112 M			
g	140	159	193	217	232			
g1	119	127	151	160	168			
k	657	683	706/726	754	799			
kBre	717	745	779/799	835	879			
o	236	262	285/305	333	378			

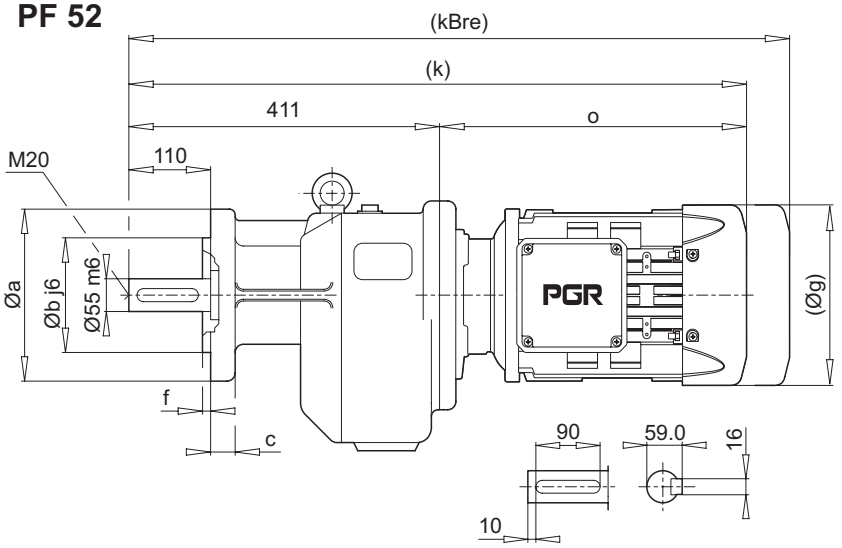
Not : (...) İşaretli olan ölçüler Motor markasına göre farklılık gösterir.
Note : Dimension which is designated by (...) depends on marks of motor.

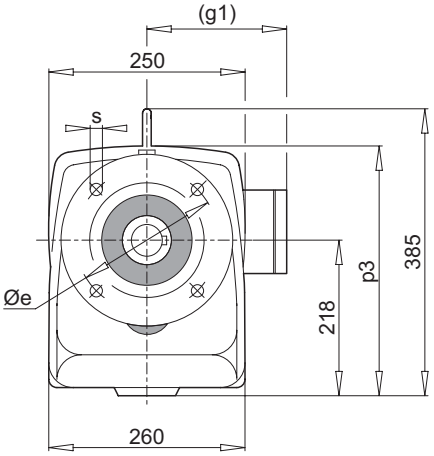
PA 52





PF 52



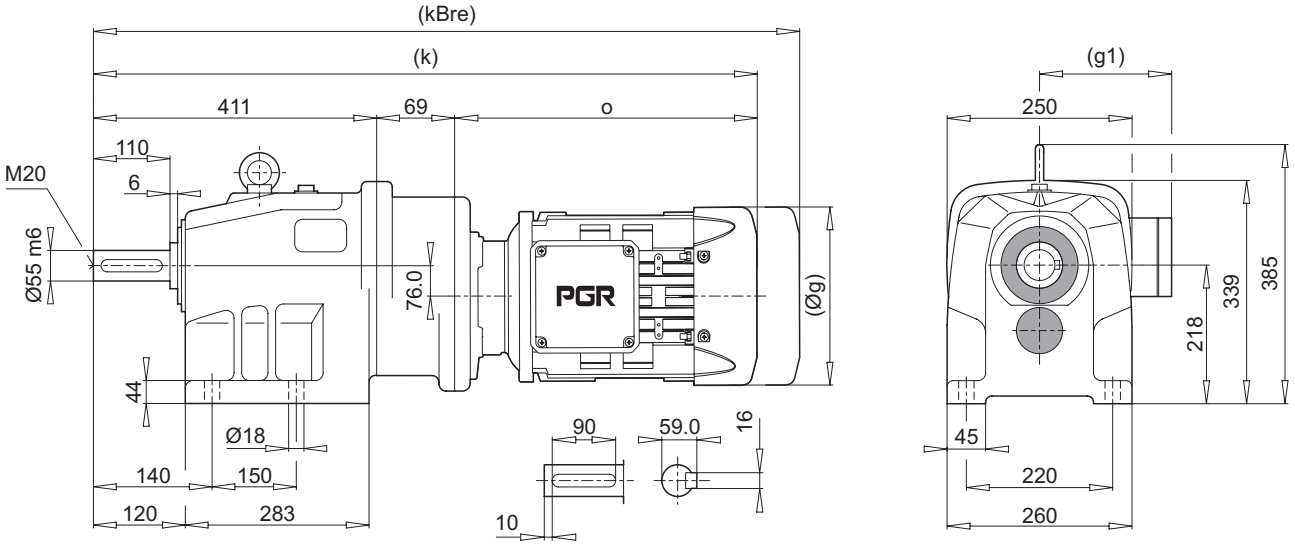


a	b	c	e	f	s
250	180	16	215	4.0	14
300	230	20	265	4.0	14

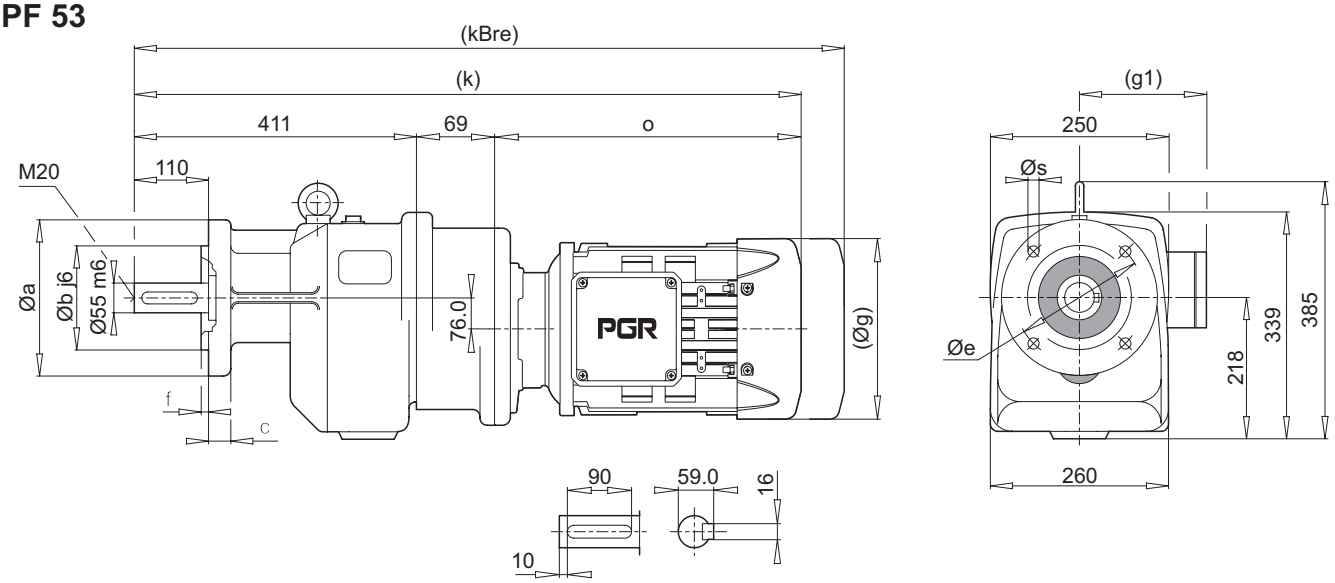
	90 S/L	100 L	112 M	132 S/M	160 M/L	180 M/L		
g	193	217	232	279	323	370		
g1	151	160	168	182	200	248		
k	676/696	724	769	776/811	931	990		
kBre	749/769	805	849	884/919	1083	1152		
o	265/285	313	358	365/400	520	579		
p	339	339	339	347	374	374		
p3	339	339	339	347	374	374		

Not : (...) İşaretli olan ölçüler Motor markasına göre farklılık gösterir.
Note : Dimension which is designated by (...) depend on marks of motor.

PA 53



PF 53

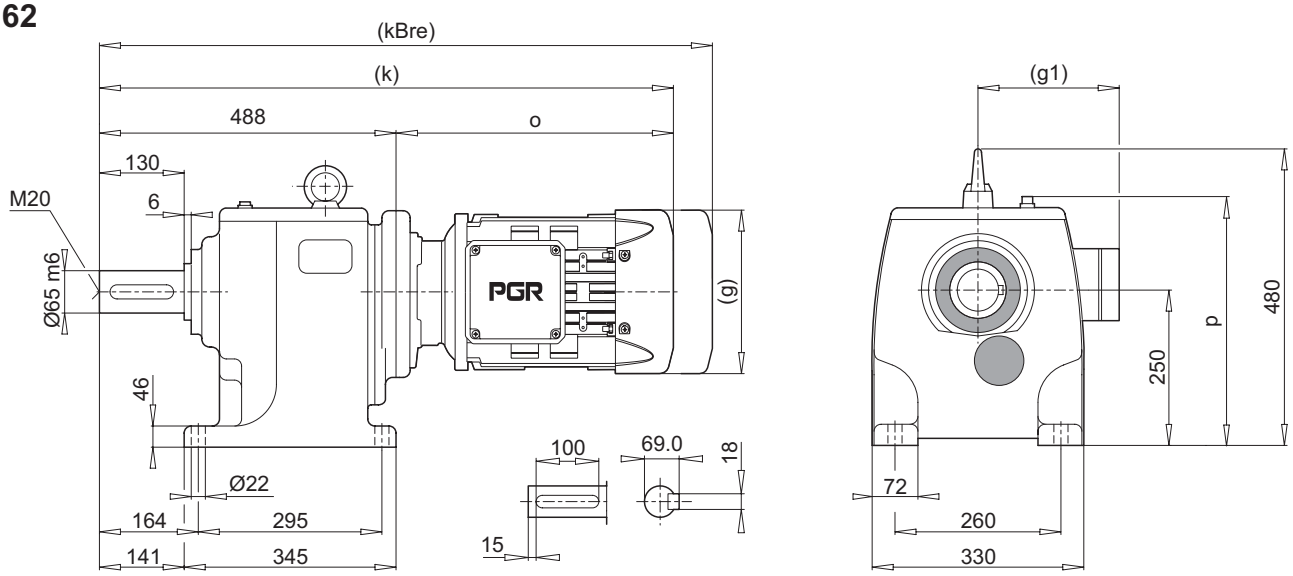


a	b	c	e	f	s
250	180	16	215	4.0	14
300	230	20	265	4.0	14

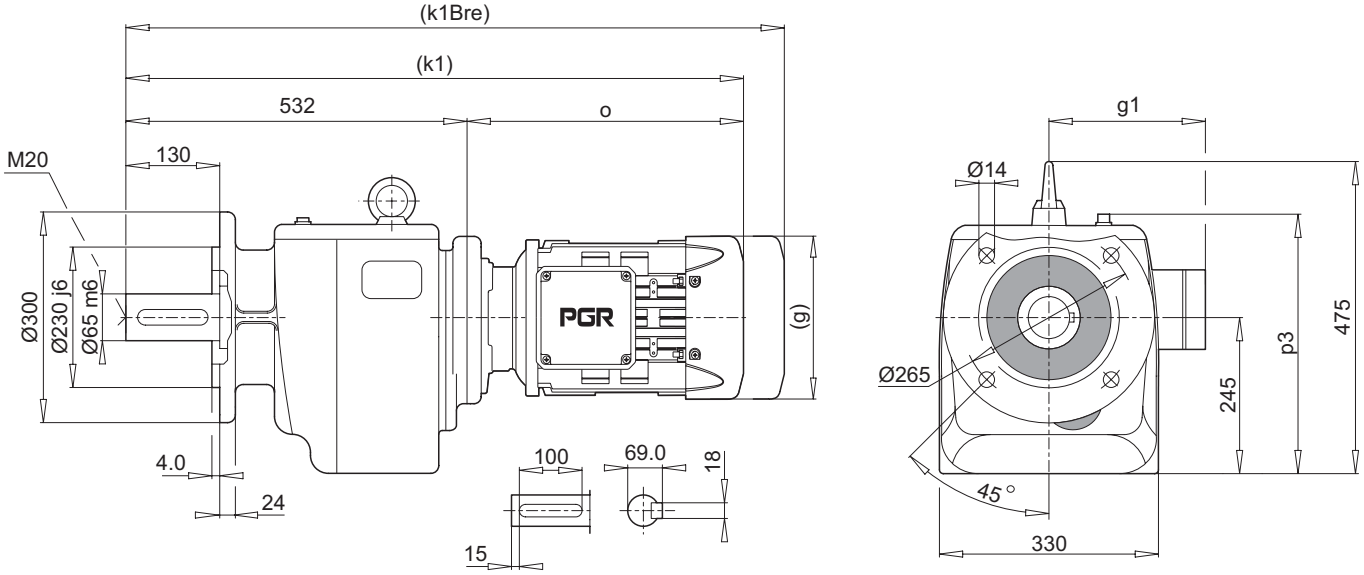
	71 M	80 M	90 S/L	100 L	112 M			
g	140	159	193	217	232			
g1	119	127	151	160	168			
k	716	742	765/785	813	858			
kBre	776	804	838/858	894	938			
o	236	262	285/305	333	378			

Not : (...) İşaretli olan ölçüler Motor markasına göre farklılık gösterir.
Note : Dimension which is designated by (...) depends on marks of motor.

PA 62



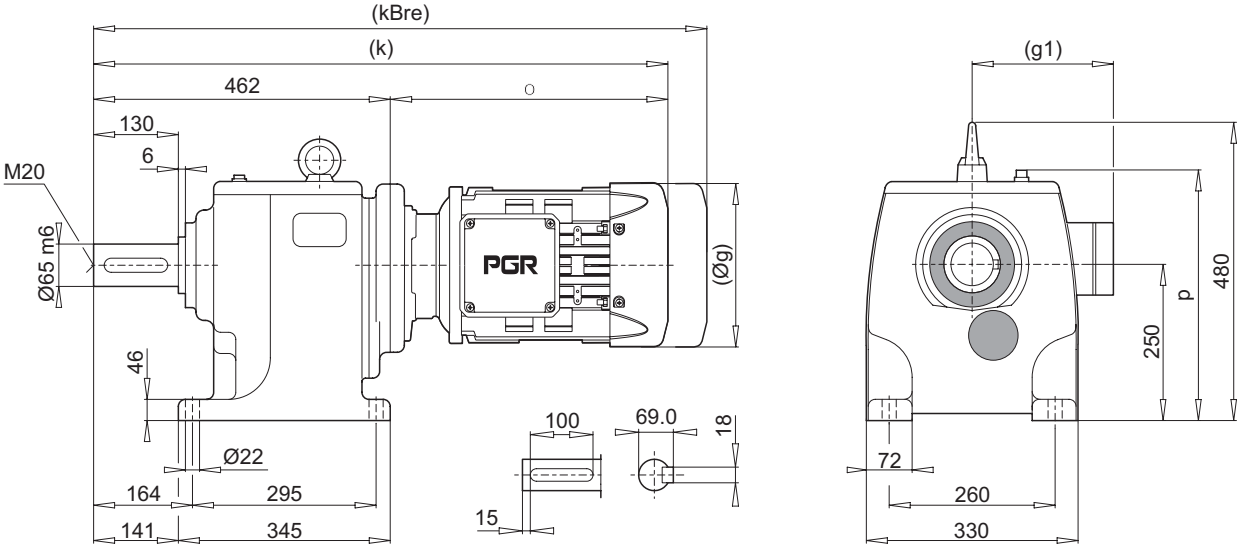
PF 62



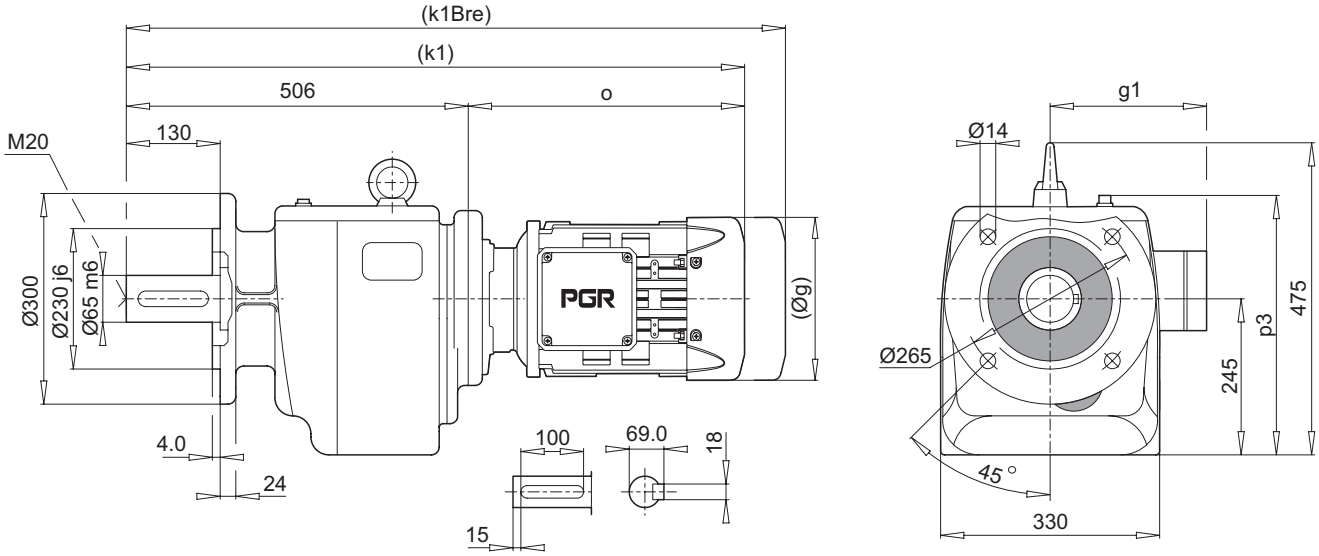
	112 M	132 S/M	160 M/L	180 M/L	200 L	225 S/M		
g	232	279	323	370	415	456		
g1	168	182	200	248	260	260		
k	845	901	971	1011	1180	1180		
kBre	925	1009	1123	1173	1327	1352		
k1	889	945	1015	1055	1224	1224		
k1Bre	969	1053	1167	1217	1371	1396		
o	357	413	483	523	692	692		
p	400	400	425	425	449	485		
p3	395	395	420	420	449	485		

Not : (...) İşaretli olan ölçüler Motor markasına göre farklılık gösterir.
Note : Dimension which is designated by (...) depends on marks of motor.

PA 63



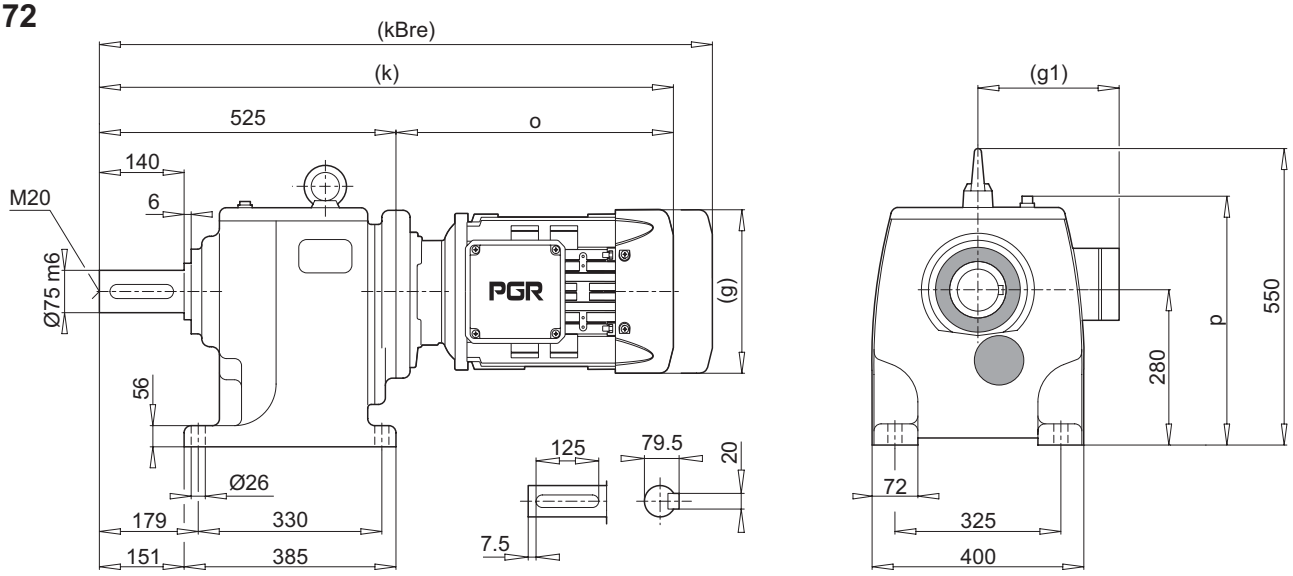
PF 63



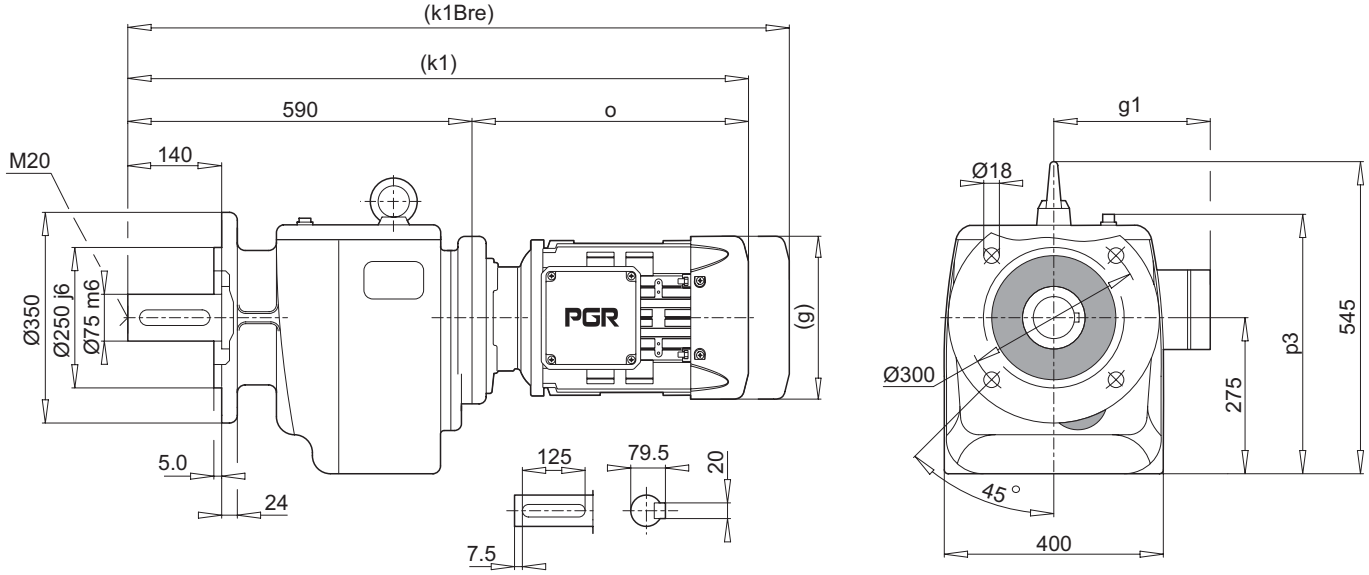
	90 S/L	100 L	112 M	132 S/M	160 M/L	180 M/L		
g	193	217	232	279	323	370		
g1	151	160	168	182	200	248		
k	727/747	775	820	827/862	982	1041		
kBre	800/820	856	900	935/970	1134	1203		
k1	771/791	819	864	871/906	1026	1085		
k1Bre	844/864	900	944	979/1014	1178	1247		
o	265/285	313	358	365/400	520	579		
p	400	400	400	400	410	410		
p3	395	395	395	395	405	405		

Not : (...) İşaretli olan ölçüler Motor markasına göre farklılık gösterir.
Note : Dimension which is designated by (...) depends on marks of motor.

PA 72



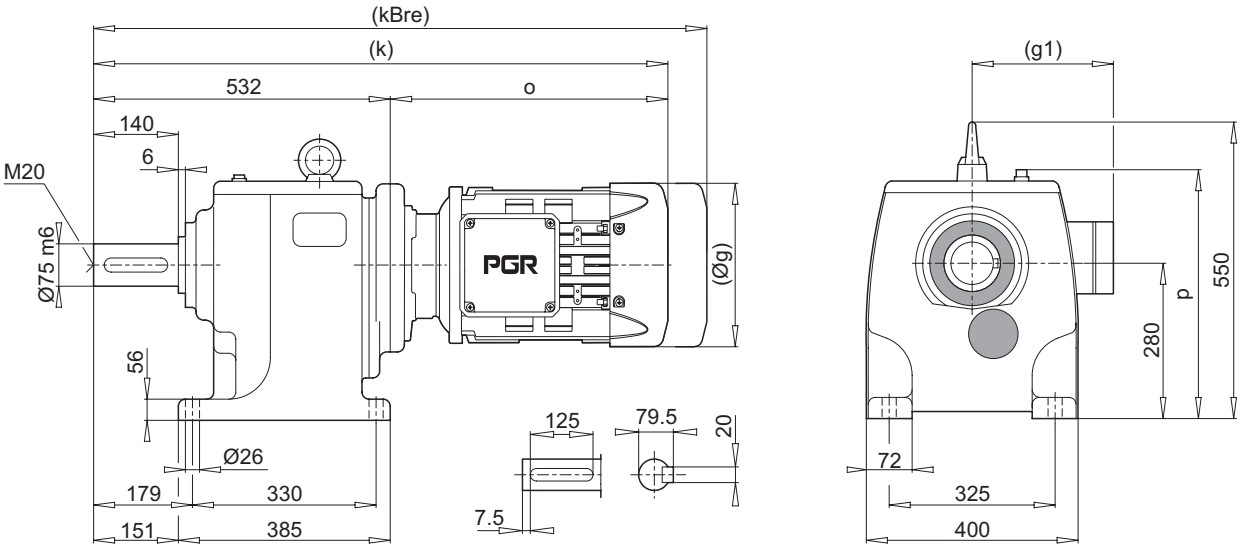
PF 72



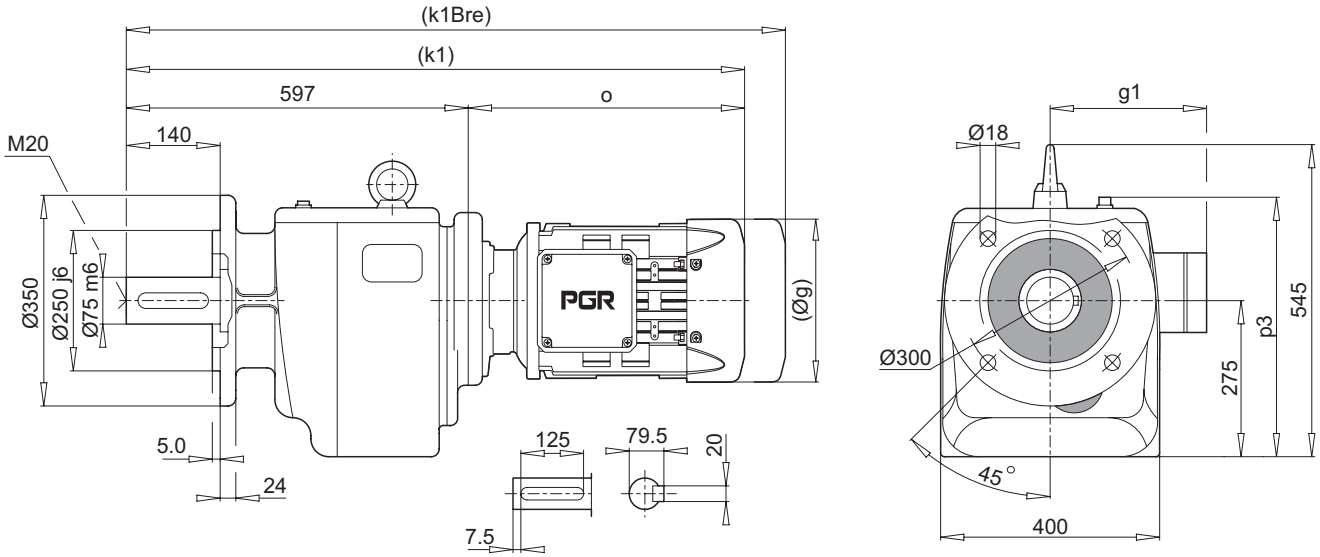
	132 S/M	160 M/L	180 M/L	200 L	225 S/M			
g	279	323	370	415	456			
g1	182	200	248	260	260			
k	938	1008	1048	1217	1217			
kBre	1046	1160	1210	1364	1389			
k1	1003	1073	1113	1282	1282			
k1Bre	1111	1225	1275	1429	1454			
o	413	483	523	692	692			
p	447	455	459	479	479			
p3	442	450	450	479	479			

Not : (...) İşaretli olan ölçüler Motor markasına göre farklılık gösterir.
Note : Dimension which is designated by (...) depends on marks of motor.

PA 73



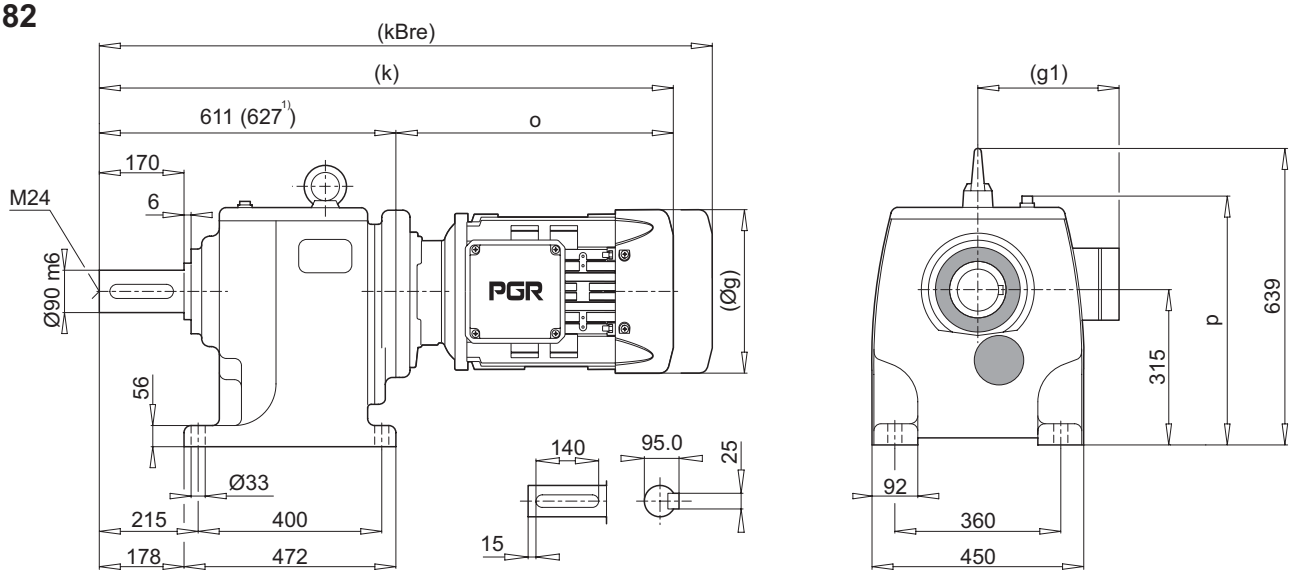
PF 73



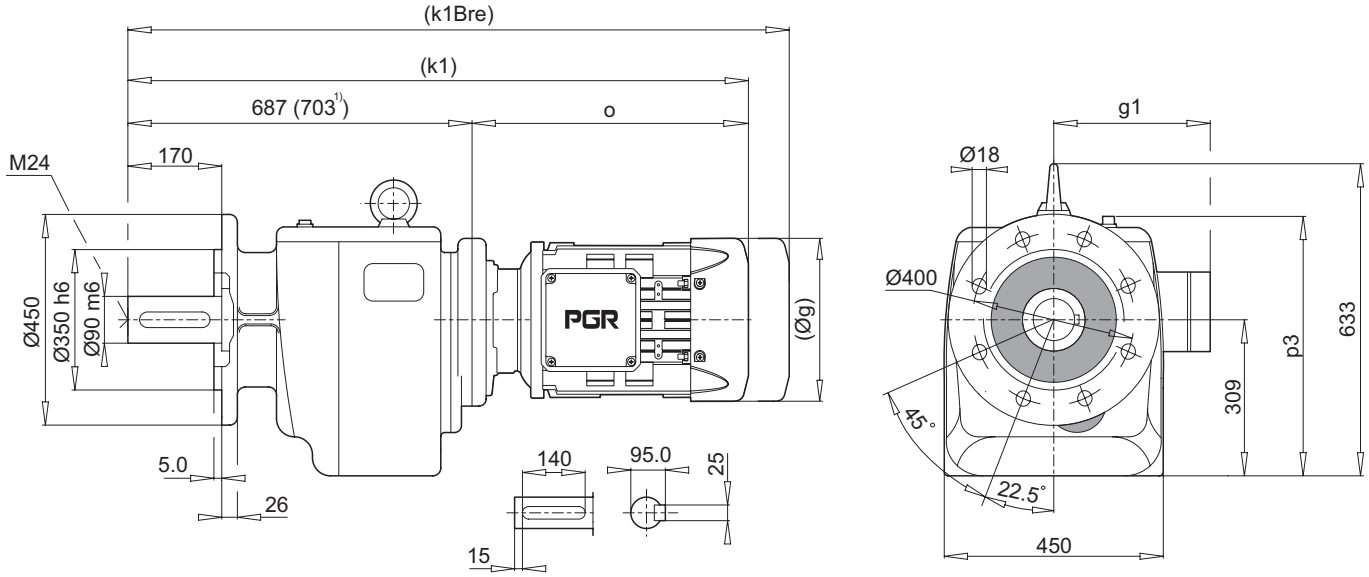
	100 L	112 M	132 S/M	160 M/L	180 M/L	200 L	225 S/M	
g	217	232	279	323	370	415	456	
g1	160	168	182	200	248	260	260	
k	861	889	945	1015	1055	1224	1224	
kBre	942	969	1053	1167	1217	1371	1396	
k1	926	954	1010	1080	1120	1289	1289	
k1Bre	1007	1034	1118	1232	1282	1436	1461	
o	329	357	413	483	523	692	692	
p	447	447	447	455	455	479	479	
p3	442	442	442	450	450	474	474	

Not : (...) İşaretli olan ölçüler Motor markasına göre farklılık gösterir.
Note : Dimension which is designated by (...) depends on marks of motor.

PA 82



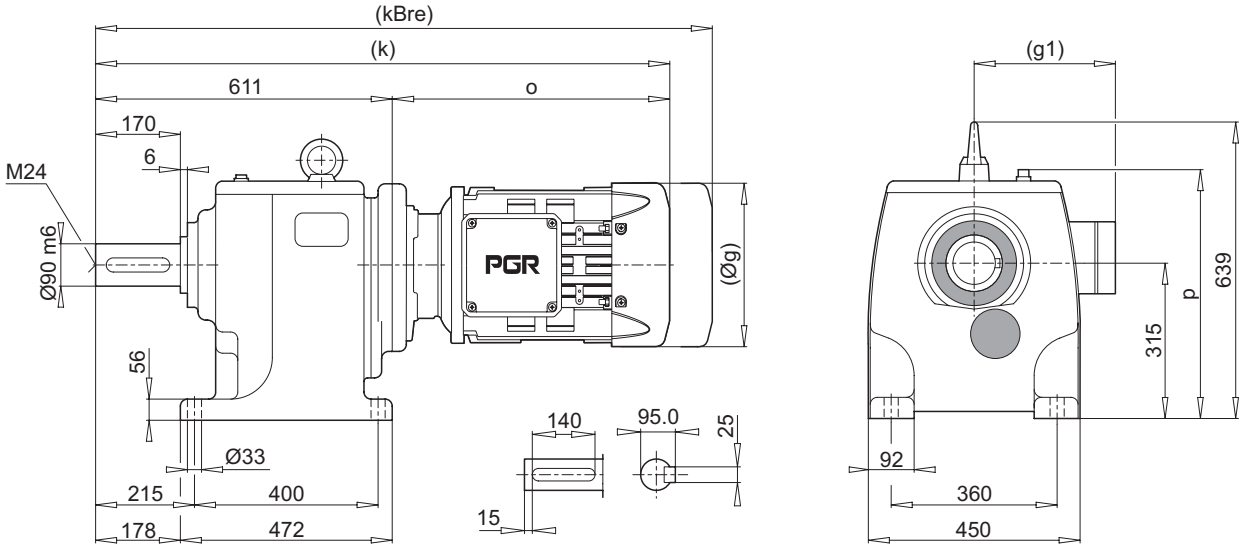
PF 82



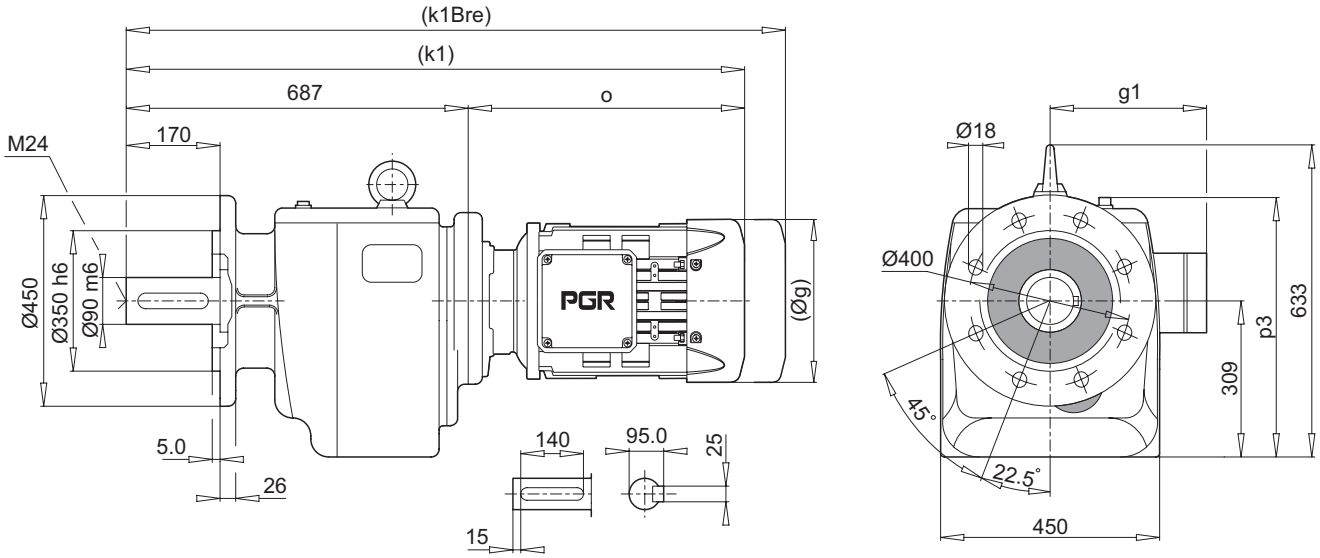
	132 S/M	160 M/L	180 M/L	200 L	225 S/M	250 M[1]	280 S[1]	
g	279	323	370	415	456	495	-	
g1	182	200	248	260	260	392	-	
k	1024	1094	1134	1303	1303	1422	-	
kBre	1132	1246	1296	1450	1475	1677	-	
k1	1100	1170	1210	1379	1379	1498	-	
k1Bre	1208	1322	1372	1526	1551	1753	-	
o	413	483	523	692	692	795	-	
p	512	512	512	514	514	575	-	
p3	506	506	506	508	508	569	-	

Not : (...) İşaretli olan ölçüler Motor markasına göre farklılık gösterir.
Note : Dimension which is designated by (...) depends on marks of motor.

PA 83



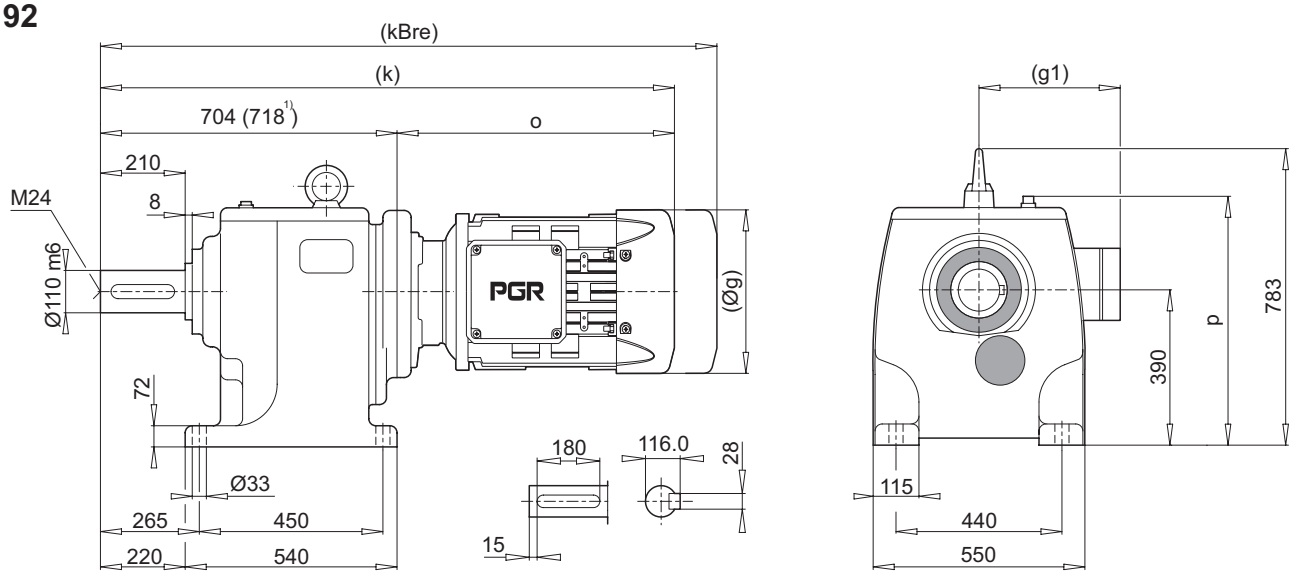
PF 83



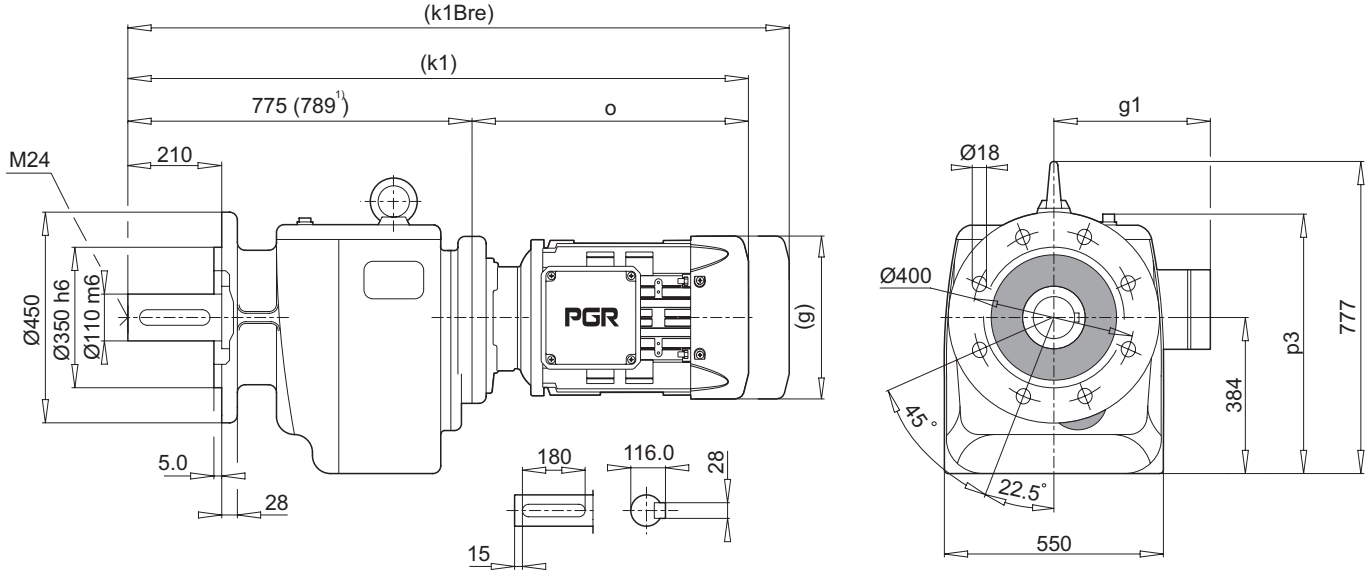
	100 L	112 M	132 S/M	160 M/L	180 M/L	200 L	225 S/M	
g	217	232	279	323	370	415	456	
g1	160	168	182	200	248	260	260	
k	940	968	1024	1094	1134	1303	1303	
kBre	1021	1048	1132	1246	1296	1450	1475	
k1	1016	1044	1100	1170	1210	1379	1379	
k1Bre	1097	1124	1208	1322	1372	1526	1551	
o	329	357	413	483	523	692	692	
p	512	512	512	512	512	514	514	
p3	506	506	506	506	506	508	508	

Not : (...) İşaretli olan ölçüler Motor markasına göre farklılık gösterir.
Note : Dimension which is designated by (...) depends on marks of motor.

PA 92



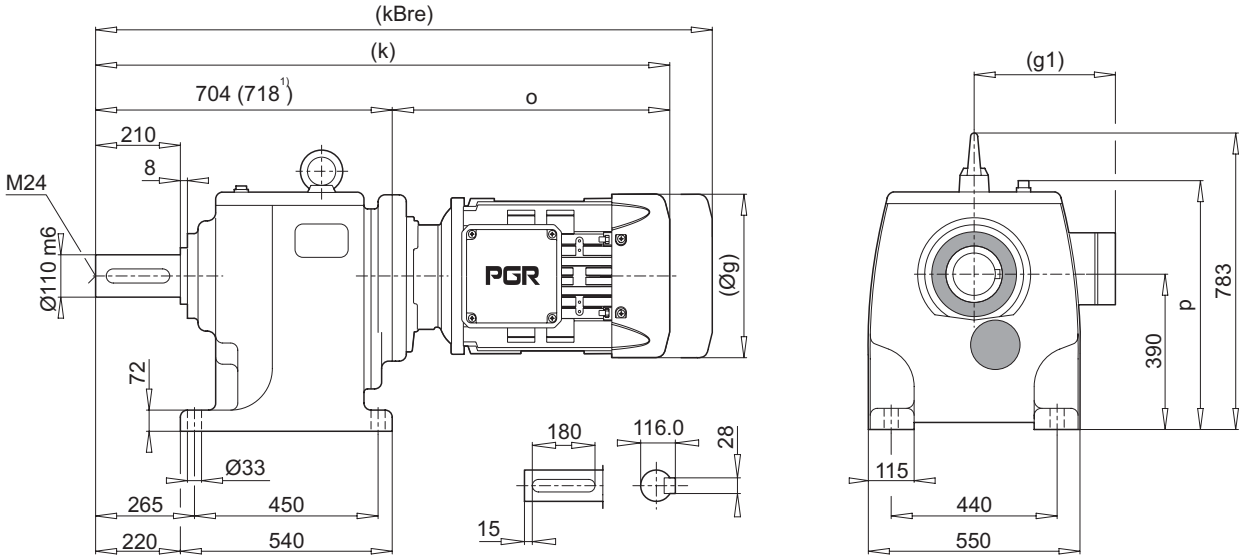
PF 92



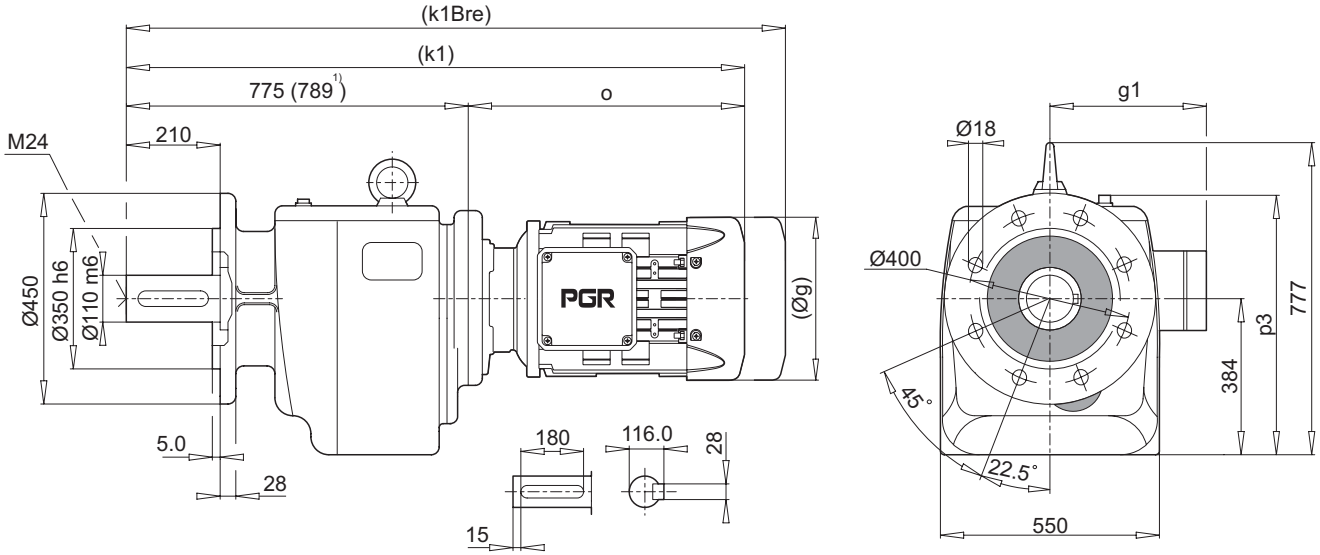
	180 M/L	200 L	225 S/M	250 M[1]	280 S[1]	280 M[1]	315 S[1]	315 M[1]
g	370	415	456	495	-	-	-	-
g1	248	260	260	392	-	-	-	-
k	1227	1396	1396	1513	-	-	-	-
kBre	1389	1543	1568	1768	-	-	-	-
k1	1298	1467	1467	1584	-	-	-	-
k1Bre	1460	1614	1639	1839	-	-	-	-
o	523	692	692	795	-	-	-	-
p	622	622	622	650	-	-	-	-
p3	616	616	616	644	-	-	-	-

Not : (...) İşaretli olan ölçüler Motor markasına göre farklılık gösterir.
Note : Dimension which is designated by (...) depends on marks of motor.

PA 93



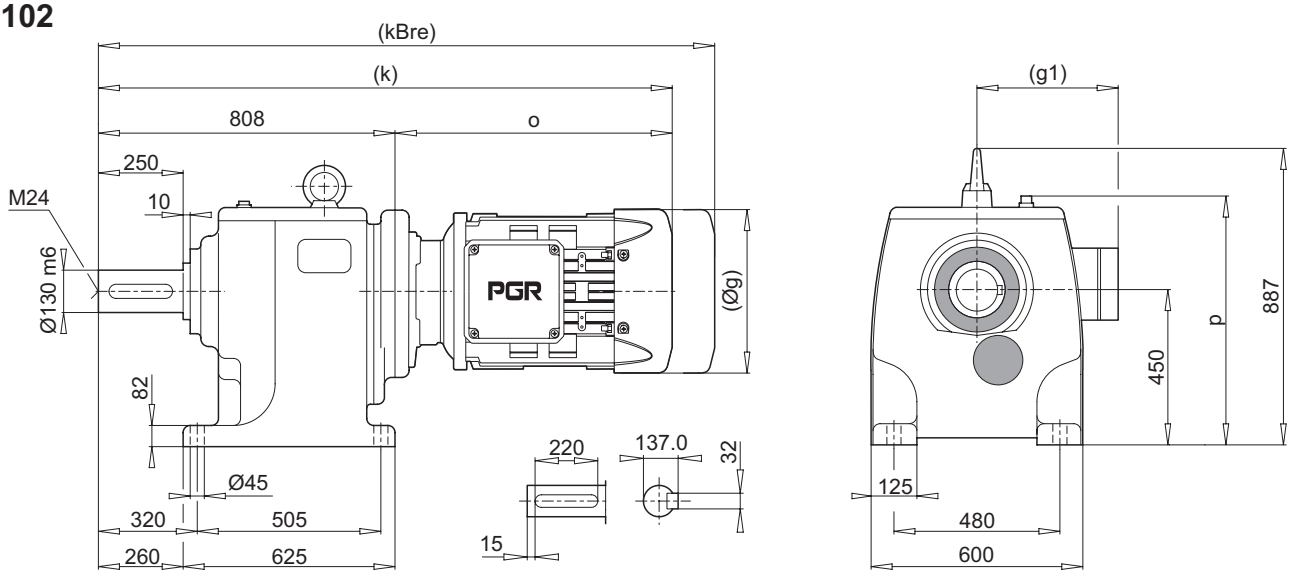
PF 93



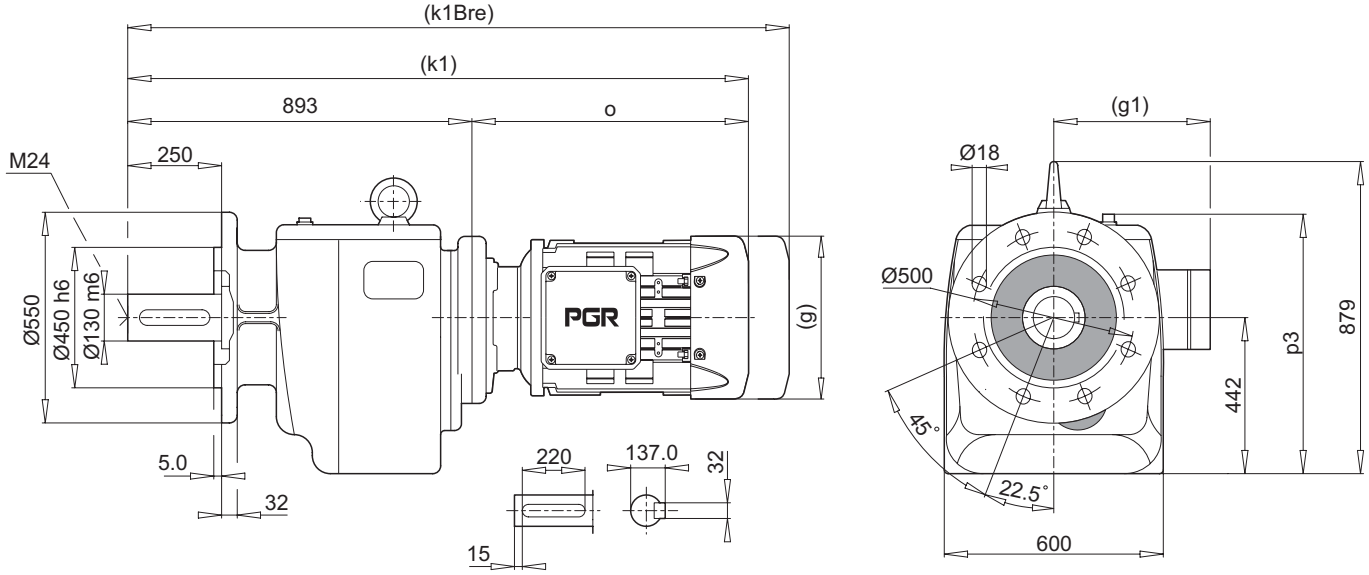
	132 S/M	160 M/L	180 M/L	200 L	225 S/M	250 M 1)	280 S 1)	
g	279	323	370	415	456	495	-	
g1	182	200	248	260	260	392	-	
k	1117	1187	1227	1396	1396	1513	-	
kBre	1225	1339	1389	1543	1568	1768	-	
k1	1188	1258	1298	1467	1467	1584	-	
k1Bre	1296	1410	1460	1614	1639	1839	-	
o	413	483	523	692	692	795	-	
p	622	622	622	622	622	650	-	
p3	616	616	616	616	616	644	-	

Not : (...) İşaretli olan ölçüler Motor markasına göre farklılık gösterir.
Note : Dimension which is designated by (...) depends on marks of motor.

PA 102



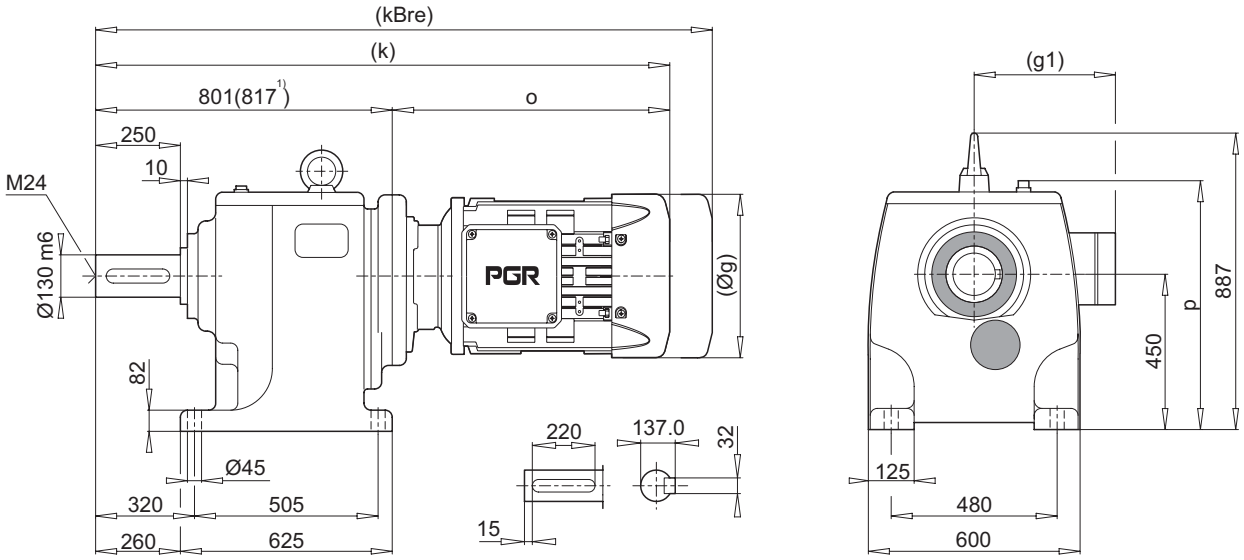
PF 102



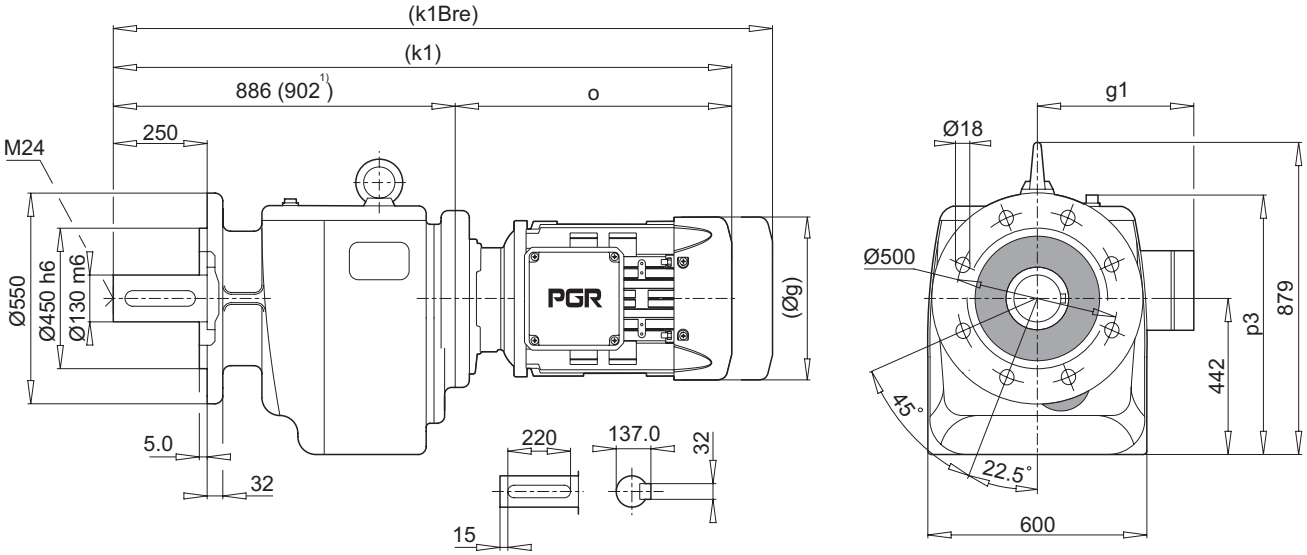
	250 M	280 S	280 M	315 S	315 M			
g	495	-	-	-	-			
g1	392	-	-	-	-			
k	1603	-	-	-	-			
kBre	1858	-	-	-	-			
k1	1688	-	-	-	-			
k1Bre	1943	-	-	-	-			
o	795	-	-	-	-			
p	702	-	-	-	-			
p3	706	-	-	-	-			

Not : (...) İşaretli olan ölçüler Motor markasına göre farklılık gösterir.
Note : Dimension which is designated by (...) depends on marks of motor.

PA 103

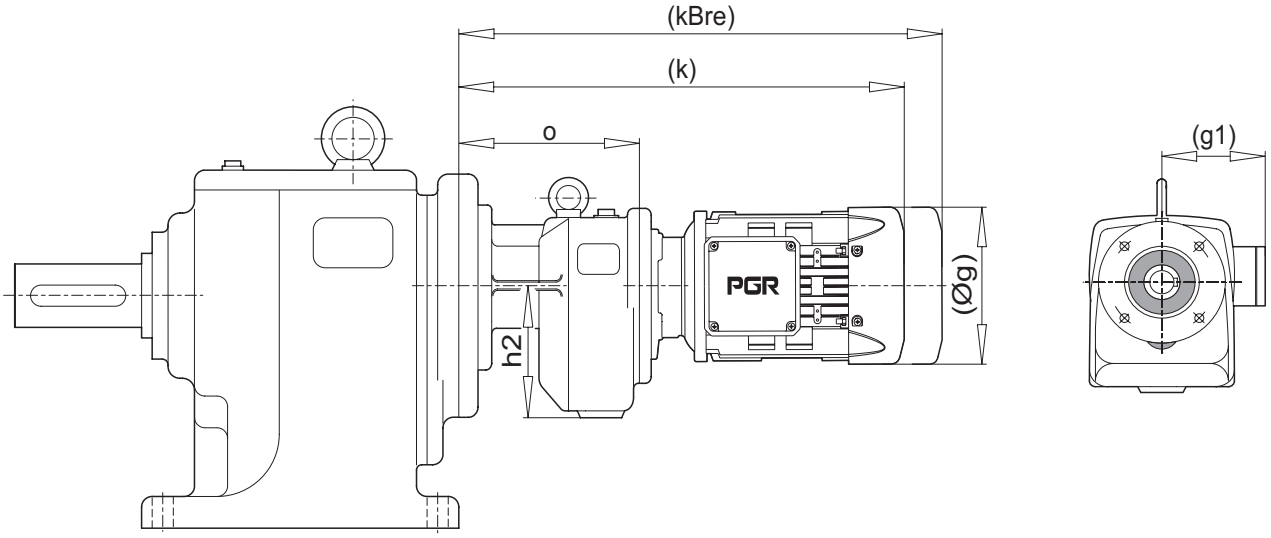


PF 103



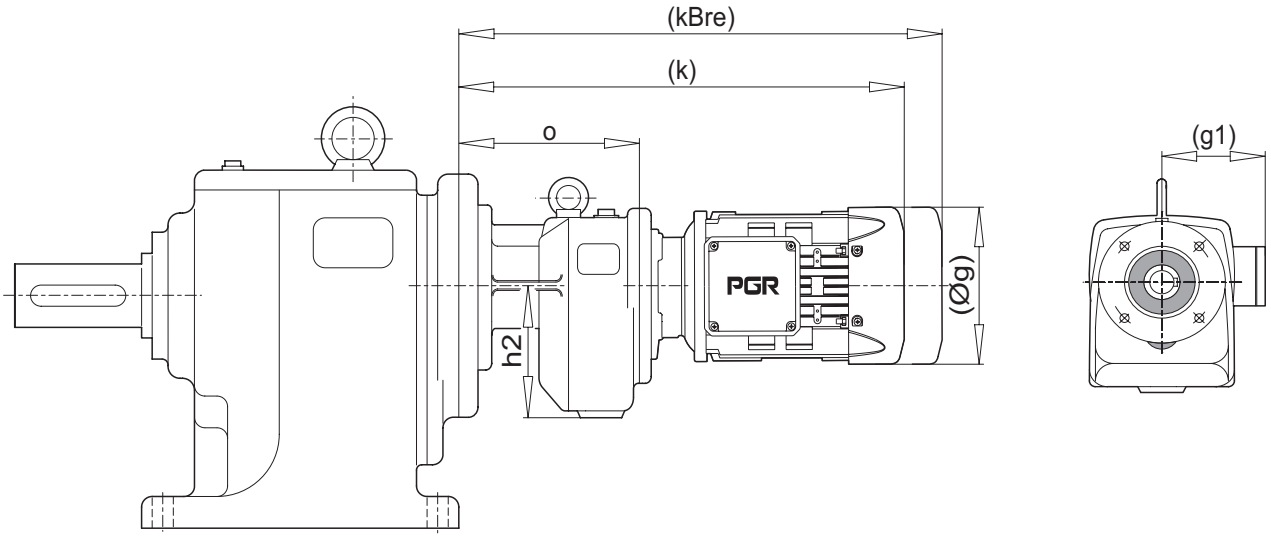
	132 S/M	160 M/L	180 M/L	200 L	225 S/M	250 M[1]	280 S[1]	280 M[1]	315 S[1]	315 M[1]
g	279	323	370	415	456	495	-	-	-	-
g1	182	200	248	260	260	392	-	-	-	-
k	1214	1284	1324	1493	1493	1612	-	-	-	-
kBre	1322	1436	1486	1640	1665	1867	-	-	-	-
k1	1299	1369	1409	1578	1578	1697	-	-	-	-
k1Bre	1407	1521	1571	1725	1750	1952	-	-	-	-
o	413	483	523	692	692	795	-	-	-	-
p	702	702	702	702	702	710	-	-	-	-
p3	706	706	706	706	706	710	-	-	-	-

Not : (...) İşaretli olan ölçüler Motor markasına göre farklılık gösterir.
Note : Dimension which is designated by (...) depends on marks of motor.



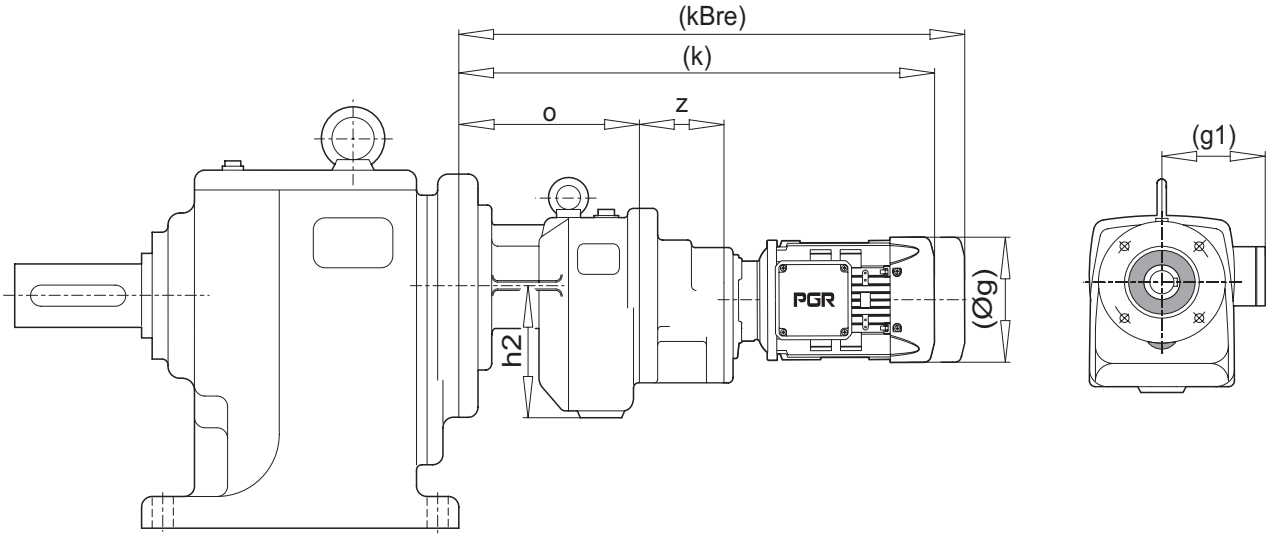
Tip / Type	Motor	g	g1	h2	o	k	kBre
PA\PF 12/02	63 M 71 M	124 140	111 119	91	143	341 383	393 443
PA\PF 22/02	63 M 71 M 80 M	124 140 159	111 119 127	91	159	357 399 426	409 459 488
PA\PF 32/12	63 M 71 M 80 M	124 140 159	111 119 127	108	172	370 412 439	422 472 488
PA\PF 42/12 **PA\PF 52/12**	63 M 71 M 80 M	124 140 159	111 119 127	108	168	366 408 435	418 468 497
PA\PF 63/22 **PA\PF 73/22**	71 M 80 M 90 S/L 100 L	140 159 193 217	119 127 151 160	127	180	416 442 465/485 513	476 503 538/558 594

Not : (...) İşaretli olan ölçüler Motor markasına göre farklılık gösterir.
Note : Dimension which is designated by (...) depends on marks of motor.



Tip / Type	Motor	g	g1	h2	o	k	kBre
PA\PF 73/32 PA\PF 83/32	80 M	159	127	159	220	482	544
	90 S/L	193	151			505/525	578/598
	100 L	217	160			553	634
	112 M	232	168			598	678
	132 S/M	279	182			605/640	713/748
PA\PF 83/42 PA\PF 93/42	90 S/L	193	151	179	262	527/547	600/620
	100 L	217	160			575	656
	112 M	232	168			620	700
	132 S/M	279	182			627/662	735/770
PA\PF 93/52 PA\PF 103/52	90 S/L	193	151	218	301	566/586	639/659
	100 L	217	160			614	695
	112 M	232	168			659	739
	132 S/M	279	182			666/701	774/809
	160 M/L	323	200			821	973
	180 M/L	370	248			880	1042

Not : (...) İşaretli olan ölçüler Motor markasına göre farklılık gösterir.
Note : Dimension which is designated by (...) depends on marks of motor.



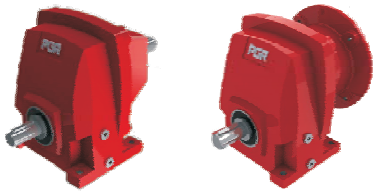
Tip / Type	**Motor**	**g**	**g1**	**h2**	**o**	**z**	**k**	**kBre**
PA\PF 63/23	71 M 80 M	140 159	119 127	127	180	60	480 507	540 569

Not : (...) İşaretli olan ölçüler Motor markasına göre farklılık gösterir.
Note : Dimension which is designated by (...) depends on marks of motor.

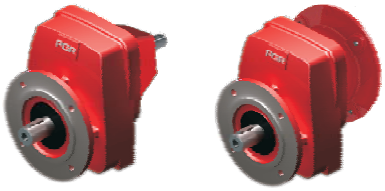
W VE IEC ADAPTÖRÜ SEÇİM TABLOLARI

SELECTION OF W AND IEC ADAPTERS

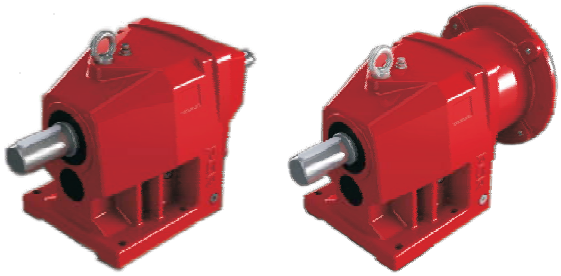
PA
TEK KADEME
SINGLE REDUCTION



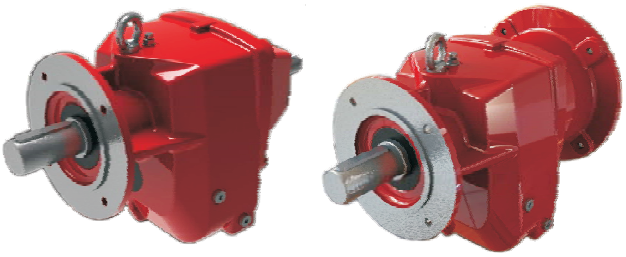
PF
TEK KADEME
SINGLE REDUCTION



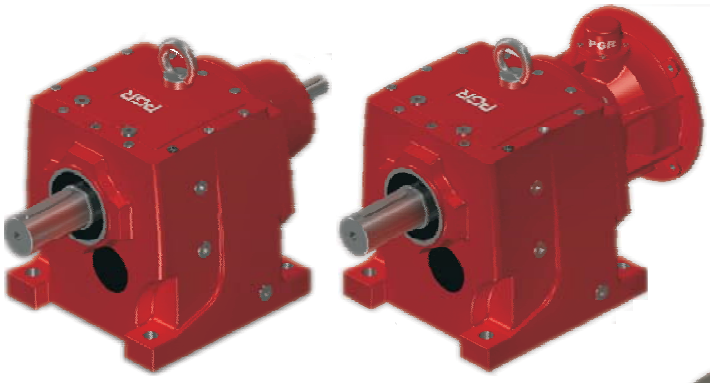
PA
İKİ KADEME
DOUBLE REDUCTION



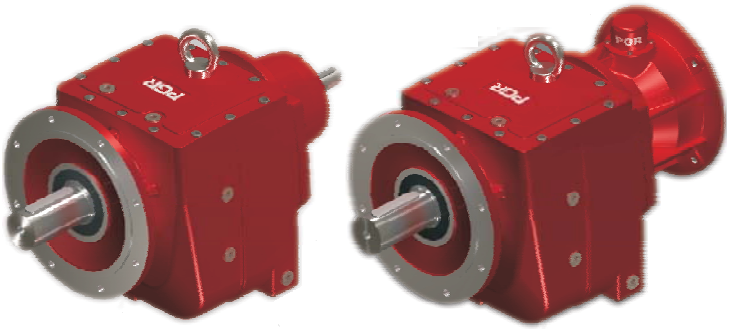
PF
İKİ KADEME
DOUBLE REDUCTION

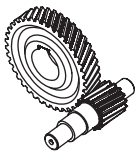


PA
ÜÇ KADEME
TRIBLE REDUCTION



PF
ÜÇ KADEME
TRIBLE REDUCTION





W ve IEC adaptörü için performans tablolarının yapısı

Notify about performance tables for W and IEC adapter type

PA 32
PF 32 → **Redüktör Tipi** / Gear unit type

Motor gövde büyüklüğü ile IEC gövde büyüklüğü aynı olan IEC montajlı redüktörler için Servis faktörü f_B motor seçim sayfalarından alınabilir.

Service factor f_B could be seen from selection of geared motor tables. Because this value is same for geared motor and geared motor with IEC adapters.

IEC motor büyüklükleri ve IEC standart çıkışları DIN 50347' e göredir.

According to DIN EN 50347 IEC motor sizes.

Tip Type	Tahvil Reduction i_{ges}	Çıkış Hızı Output speed 4-pol. 50 Hz 1400rpm n_2 [min^{-1}]	M_{amax} f_B=1 4 - pol. [Nm]	Max. Giriş Gücü Max. Input Power P_{1max} W $f_B \geq 1$ 4 - pol. 1400rpm [kW]	6 - pol. 930rpm [kW]	8 - pol. 700rpm [kW]	12 - pol. 465rpm [kW]	IEC f_B ⇨ 📖 43 - 80			DIN 42677' ye göre IEC Adaptöre Bağlanacak Motor Boyutu According to DIN 42677 IEC motor power depend on pole number of motor.				
PA 32 **PF 32**	81.27	17.20	515	0.93	0.62	0.46	0.31	71	80	90*					
	72.71	19.30	560	1.13	0.75	0.56	0.38	71	80	90*					
	64.26	21.80	640	1.46	0.97	0.73	0.48		80	90*					
	57.49	24.40	613	1.56	1.04	0.78	0.52		80						
	46.29	30.20	533	1.69	1.12	0.84	0.56		80						
	46.22	30.30	672	2.13	1.42	1.07	0.71				100*	112*			
	38.76	36.10	446	1.69	1.12	0.84	0.56								
				⋮	⋮										
				9.20	*6.07*	*4.60*	*3.04*								
				9.20	*6.07*	*4.60*	*3.04*								

Tip W azami tahrik gücü hesaplanırken *italik* olmayan değerler alınmıştır. P_{1max} ile $f_B = 1$

P_{1max} value which is *non-italic* is calculated when service factor f_B is equal to one.

Yıldız işareti : Dikkat Tip W sütunundaki P_{1max} değerlerini aşmamalıdır.

Star sign is shown precautions which is value of P_{1max} must be greater than drive power.

P_{1max} hesaplanırken *italik* olan değerlerde f_B>1 alınmıştır.

P_{1max} value which is *italic*, is calculated when service factor f_B is greater than one.

71	80
71	80
	80
	80
	80

Rakamlı alanlar IEC adaptörünün, IEC motor büyüklüğü ve tahvil oranına uygun olduğunu belirtir.

This area which is colorless is shown IEC adapter is applicable for this IEC motor size and reduction ratio

Max.çıkış momenti
Max.output torque while service factor f_B = 1

Çıkış Devri
Output speed

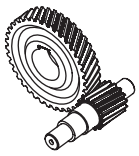
Redüktör Tahvili
Reduction ratio

Redüktör Tipi
Gear unit type

Tip Type	Tahvil Reduction i_{ges}	Çıkış Hızı Output speed 4-pol. 50 Hz 1400rpm n_2 [min^{-1}]	M_{amax} f_B=1 4 - pol. [Nm]	Max. Giriş Gücü Max. Input Power P_{1max} W $f_B \geq 1$ 4 - pol. 1400rpm [kW]	6 - pol. 930rpm [kW]	8 - pol. 700rpm [kW]	12 - pol. 465rpm [kW]	IEC f_B ⇨ 📖 43 - 80								DIN 42677' ye göre IEC Adaptöre Bağlanacak Motor Boyutu According to DIN 42677 IEC motor power depend on pole number of motor.
PA 03 **PF 03** **W** mm 📖 142 - 143 **+** **IEC** mm 📖 156 - 157	312.98	4.50	89	0.04	0.03	0.02	0.01	63*	71*							
	274.18	5.10	89	0.05	0.03	0.02	0.02	63*	71*							
	212.39	6.60	106	0.07	0.05	0.04	0.02	63*	71*							
	170.56	8.20	108	0.09	0.06	0.05	0.03	63*	71*							
	151.24	9.30	110	0.11	0.07	0.05	0.04	63*	71*							
	124.74	11.20	106	0.12	0.08	0.06	0.04	63*	71*							
	105.24	13.30	95	0.13	0.09	0.07	0.04	63*	71*							
	81.52	17.20	106	0.19	0.13	0.10	0.06	63	71*							
	65.46	21.40	110	0.25	0.16	0.12	0.08	63	71*							
PA 02 **PF 02** **W** mm 📖 140 - 141 **+** **IEC** mm 📖 154 - 155	73.03	19.20	89	0.18	0.12	0.09	0.06	63	71*							
	61.24	22.90	89	0.21	0.14	0.11	0.07	63	71*							
	53.64	26.10	89	0.24	0.16	0.12	0.08	63	71*							
	41.56	33.70	99	0.35	0.23	0.17	0.12	63	71*							
	33.37	42.00	96	0.42	0.28	0.21	0.14	63	71	80*						
	29.59	47.30	92	0.46	0.30	0.23	0.15		71	80*						
	27.52	50.90	87	0.46	0.31	0.23	0.15	63	71	80*						
	24.41	57.40	89	0.53	0.36	0.27	0.18		71	80*						
	23.14	60.50	78	0.49	0.33	0.25	0.16	63	71							
	20.59	**68.00**	74	0.53	0.35	0.26	0.17	63	71	80*	90*					
	15.95	**87.80**	72	0.66	0.44	0.33	0.22	63	71	80*	90					
	12.81	**109.30**	70	0.80	0.53	0.40	0.27	63	71	80	90*					
	11.24	**124.60**	67	0.87	0.58	0.44	0.29	63	71	80	90*					
	9.94	**140.80**	64	0.94	0.63	0.47	0.31	63	71	80	90*					
	9.27	**151.00**	65	1.03	0.68	0.51	0.34	63	71	80	90*					
	8.20	**170.70**	63	1.13	0.75	0.56	0.37	63	71	80	90*					
	7.80	**179.50**	63	1.18	0.79	0.59	0.39	63	71	80	90*					
	6.89	**203.20**	61	1.30	0.86	0.65	0.43	63	71	80	90*					
	5.57	**251.30**	57	*1.50*	*0.96*	*0.75*	*0.48*	63	71	80	90					
	4.82	**290.50**	57	*1.50*	*0.96*	*0.75*	*0.48*	63	71	80	90					
	3.90	**359.00**	53	*1.50*	*0.96*	*0.75*	*0.48*	63	71	80	90					
	3.39	**413.00**	51	*1.50*	*0.96*	*0.75*	*0.48*	63	71	80	90					
	2.97	**471.40**	46	*1.50*	*0.96*	*0.75*	*0.48*	63	71	80	90					

	IEC bağlantısı yoktur - No IEC assembling on empty fields
63	**IEC bağlantısı yapılır -** IEC assembling available on numbered fields
80*	**IEC bağlantısı yapılacaksa P_{1max} değerleri aşılmamalıdır -** Do not exceed the P_{1max} values indicated on fields with asterisk

PGR® Drive Technologies



Tip Type	Tahvil Reduction i_{ges}	Çıkış Hızı Output speed 4-pol. 50 Hz 1400rpm n_2 [min^{-1}]	M_{amax} f_B=1 4 - pol. [Nm]	Max. Giriş Gücü Max. Input Power P_{1max} W $f_B \geq 1$ 4 - pol. 1400rpm [kW]	6 - pol. 930rpm [kW]	8 - pol. 700rpm [kW]	12 - pol. 465rpm [kW]	IEC f_B ⇨ 📖 43 - 80							
PA 12/02 **PF 12/02** **W** mm 📖 146 - 147 **+** **IEC** mm 📖 164 - 165	2796.33	0.50	180	0.05	0.03	0.03	0.02	63*	71*						
	2054.09	0.68	180	0.05	0.03	0.03	0.02	63*	71*						
	1591.20	0.88	180	0.06	0.04	0.03	0.02	63*	71*						
	1277.78	1.10	180	0.06	0.04	0.03	0.02	63*	71*						
	1053.91	1.30	180	0.07	0.04	0.03	0.02	63*	71*						
	886.01	1.60	180	0.07	0.04	0.03	0.02	63*	71*						
	619.95	2.30	180	0.08	0.05	0.04	0.03	63*	71*						
	536.07	**2.60**	180	0.09	0.06	0.04	0.03	63*	71*	80*	90*				
	430.48	**3.30**	180	0.10	0.07	0.05	0.03	63*	71*	80*	90*				
	340.07	**4.10**	180	0.12	0.08	0.06	0.04	63*	71*	80*	90*				
	263.85	**5.30**	180	0.14	0.09	0.07	0.05	63*	71*	80*	90*				
	213.21	**6.60**	180	0.16	0.11	0.08	0.05	63*	71*	80*	90*				
	165.75	**8.40**	180	0.20	0.13	0.10	0.07	63	71*	80*	90*				
	133.10	**10.50**	164	0.22	0.14	0.11	0.07	63	71*	80*	90*				
	109.78	**12.80**	164	0.26	0.17	0.13	0.09	63	71*	80*	90*				
	92.29	**15.20**	164	0.30	0.20	0.15	0.10	63	71*	80*	90*				
PA 13 **PF 13** **W** mm 📖 142 - 143 **+** **IEC** mm 📖 156 - 157	420.39	3.30	167	0.06	0.04	0.03	0.02	63*	71*						
	369.18	3.80	176	0.07	0.05	0.03	0.02	63*	71*						
	313.35	4.50	167	0.08	0.05	0.04	0.03	63*	71*						
	275.17	5.10	176	0.09	0.06	0.05	0.03	63*	71*						
	244.64	5.70	177	0.11	0.07	0.05	0.04	63*	71*						
	195.71	7.20	194	0.15	0.10	0.07	0.05	63*	71*						
	159.23	8.80	167	0.15	0.10	0.08	0.05	63*	71*						
	132.48	10.60	148	0.16	0.11	0.08	0.05	63*	71*						
	108.73	12.90	177	0.24	0.16	0.12	0.08	63	71*						
	85.57	16.40	176	0.30	0.20	0.15	0.10	63	71*						
	68.46	20.40	196	*0.37*	*0.24*	*0.19*	*0.12*	63	71						

DIN 42677' ye göre IEC Adaptöre Bağlanacak Motor Boyutu

According to DIN 42677 IEC motor power depend on pole number of motor.

	IEC bağlantısı yoktur - No IEC assembling on empty fields
63	**IEC bağlantısı yapılır -** IEC assembling available on numbered fields
80*	**IEC bağlantısı yapılacaksa P_{1max} değerleri aşılmamalıdır -** Do not exceed the P_{1max} values indicated on fields with asterisk

Tip Type	Tahvil Reduction i_{ges}	Çıkış Hızı Output speed 4-pol. 50 Hz 1400rpm n_2 [min^{-1}]	M_{amax} f_B=1 4 - pol. [Nm]	Max. Giriş Gücü Max. Input Power P_{1max} W $f_B \geq 1$ 4 - pol. 1400rpm [kW]	6 - pol. 930rpm [kW]	8 - pol. 700rpm [kW]	12 - pol. 465rpm [kW]	IEC f_B ⇨ 📖 43 - 80							
								DIN 42677' ye göre IEC Adaptöre Bağlanacak Motor Boyutu According to DIN 42677 IEC motor power depend on pole number of motor.							
PA 12 **PF 12** **W** mm 📖 140 - 141 **+** **IEC** mm 📖 154 - 155	72.60	19.30	139	0.28	0.19	0.14	0.09	63	71*						
	61.31	22.80	154	0.37	0.24	0.18	0.12	63	71						
	53.84	26.00	176	0.48	0.32	0.24	0.16	63	71						
	47.86	29.30	177	0.54	0.36	0.27	0.18		71	80*					
	43.07	32.50	162	0.55	0.37	0.28	0.18	63	71						
	38.29	36.60	184	0.70	0.47	0.35	0.23		71	80*					
	35.04	40.00	149	0.62	0.41	0.31	0.21	63	71						
	31.15	44.90	165	0.78	0.52	0.39	0.26		71	80					
	29.16	48.00	124	0.62	0.41	0.31	0.21	63	71						
	25.92	54.00	137	0.77	0.51	0.39	0.26		71	80					
	21.27	**65.80**	167	1.15	0.76	0.58	0.38	63	71	80	90*				
	18.80	**74.50**	161	1.26	0.83	0.63	0.42	63	71	80	90*				
	16.74	**83.60**	154	1.35	0.90	0.67	0.45	63	71	80	90*	100*	112*		
	13.39	**104.60**	149	1.63	1.08	0.82	0.54	63	71	80	90	100*	112*		
	10.68	**131.10**	134	1.84	1.22	0.92	0.61	63	71	80	90	100*	112*		
	9.65	**145.10**	135	2.05	1.36	1.03	0.68	63	71	80	90	100*	112*		
	7.85	**178.30**	131	2.45	1.63	1.22	0.81	63	71	80	90	100*	112*		
	7.29	**192.00**	124	2.49	1.66	1.25	0.83	63	71	80	90	100*	112*		
	6.53	**214.40**	126	2.83	1.88	1.41	0.94	63	71	80	90	100*	112*		
	5.78	**242.20**	122	3.09	2.06	1.55	1.03	63	71	80	90	100	112*		
	4.93	**284.00**	116	3.45	2.29	1.72	1.15	63	71	80	90	100	112*		
	4.49	**311.80**	118	3.85	2.56	1.93	1.28	63	71	80	90	100	112*		
	4.31	**324.80**	112	3.81	2.53	1.90	1.27	63	71	80	90	100	112*		
	3.98	**351.80**	114	*4.00*	*2.64*	*2.00*	*1.32*	63	71	80	90	100	112		
	3.39	**413.00**	109	*4.00*	*2.64*	*2.00*	*1.32*	63	71	80	90	100	112		
	2.96	**473.00**	105	*4.00*	*2.64*	*2.00*	*1.32*	63	71	80	90	100	112		
PA 11 **PF 11** **W** mm 📖 138 - 139 **+** **IEC** mm 📖 152 - 153	9.11	153.70	23	0.37	0.25	0.19	0.12	63	71						
	8.10	172.80	30	0.54	0.36	0.27	0.18		71	80*					
	3.60	**388.90**	42	1.71	1.14	0.86	0.57	63	71	80	90				
	3.18	**440.30**	40	1.84	1.22	0.92	0.61	63	71	80	90				
	2.83	**494.70**	54	2.80	1.86	1.40	0.93	63	71	80	90	100*	112*		
	2.32	**603.40**	48	*3.00*	*1.98*	*1.50*	*0.99*	63	71	80	90	100	112*		
	2.04	**686.30**	58	*3.00*	*1.98*	*1.50*	*0.99*	63	71	80	90	100	112*		
	1.81	**773.50**	55	*3.00*	*1.98*	*1.50*	*0.99*	63	71	80	90	100	112*		
	1.54	**909.10**	50	*3.00*	*1.98*	*1.50*	*0.99*	63	71	80	90	100	112*		
	1.35	**1037.00**	50	*3.00*	*1.98*	*1.50*	*0.99*	63	71	80	90	100	112*		

	IEC bağlantısı yoktur - No IEC assembling on empty fields
63	**IEC bağlantısı yapılır -** IEC assembling available on numbered fields
80*	**IEC bağlantısı yapılacaksa P_{1max} değerleri aşılmamalıdır -** Do not exceed the P_{1max} values indicated on fields with asterisk

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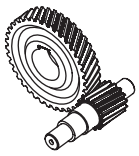

Tip Type	Tahvil Reduction i_{ges}	Çıkış Hızı Output speed 4-pol. 50 Hz 1400rpm n_2 [min^{-1}]	M_{amax} f_B=1 4 - pol. [Nm]	Max. Giriş Gücü Max. Input Power P_{1max} W $f_B \geq 1$ 4 - pol. 1400rpm [kW]	6 - pol. 930rpm [kW]	8 - pol. 700rpm [kW]	12 - pol. 465rpm [kW]	IEC f_B ⇨ 📖 43 - 80							
								DIN 42677' ye göre IEC Adaptöre Bağlanacak Motor Boyutu According to DIN 42677 IEC motor power depend on pole number of motor.							
PA 22/02 **PF 22/02** **W** mm 📖 146 - 147 **+** **IEC** mm 📖 164 - 165	2531.66	0.55	340	0.06	0.03	0.03	0.02	63*	71*						
	2122.90	0.66	340	0.06	0.04	0.03	0.02	63*	71*						
	1778.23	0.79	340	0.07	0.04	0.03	0.02	63*	71*						
	1440.59	0.97	340	0.07	0.04	0.04	0.02	63*	71*						
	1156.84	1.20	340	0.08	0.05	0.04	0.02	63*	71*						
	881.08	**1.60**	340	0.10	0.06	0.05	0.03	63*	71*	80*	90*				
	682.53	**2.10**	340	0.11	0.07	0.06	0.03	63*	71*	80*	90*				
	552.93	**2.50**	340	0.13	0.08	0.07	0.04	63*	71*	80*	90*				
	444.02	**3.20**	340	0.15	0.09	0.08	0.05	63*	71*	80*	90*				
	344.50	**4.10**	340	0.18	0.12	0.09	0.06	63	71*	80*	90*				
	284.14	**4.90**	340	0.22	0.14	0.11	0.07	63	71*	80*	90*				
	238.88	**5.90**	340	0.25	0.16	0.12	0.08	63	71*	80*	90*				
	167.14	**8.40**	340	0.34	0.22	0.17	0.11	63	71*	80*	90*				
	135.06	**10.40**	340	0.41	0.27	0.20	0.13	63	71	80*	90*				
	117.62	**11.90**	340	0.46	0.30	0.23	0.15	63	71	80*	90*				
PA 23 **PF 23** **W** mm 📖 142 - 143 **+** **IEC** mm 📖 156 - 157	516.35	2.70	274	0.08	0.05	0.04	0.03	63*	71*						
	417.44	3.40	340	0.12	0.08	0.06	0.04	63*	71*						
	323.31	4.30	340	0.15	0.10	0.08	0.05	63*	71*						
	261.93	5.30	340	0.19	0.13	0.10	0.06	63	71*						
	217.60	6.40	340	0.23	0.15	0.11	0.08	63	71*						
	179.61	7.80	312	0.25	0.17	0.13	0.08	63	71*						
	151.11	9.30	294	0.29	0.19	0.14	0.09	63	71*						
	124.10	**11.30**	340	0.40	0.27	0.20	0.13	63	71	80*	90*				
	100.53	**13.90**	340	0.50	0.33	0.25	0.16	63	71	80*	90*				
	88.24	**15.90**	340	0.56	0.38	0.28	0.19	63	71	80*	90*				
	78.00	**17.90**	340	0.64	0.42	0.32	0.21	63	71	80*	90*				
	64.80	**21.60**	340	*0.75*	*0.50*	*0.38*	*0.25*	63	71	80	90*				

	IEC bağlantısı yoktur - No IEC assembling on empty fields
63	**IEC bağlantısı yapılır -** IEC assembling available on numbered fields
80*	**IEC bağlantısı yapılacaksa P_{1max} değerleri aşılmamalıdır -** Do not exceed the P_{1max} values indicated on fields with asterisk

Tip Type	Tahvil Reduction i_{ges}	Çıkış Hızı Output speed 4-pol. 50 Hz 1400rpm n_2 [min^{-1}]	M_{amax} f_B=1 4 - pol. [Nm]	Max. Giriş Gücü Max. Input Power P_{1max} W $f_B \geq 1$ 4 - pol. 1400rpm [kW]	6 - pol. 930rpm [kW]	8 - pol. 700rpm [kW]	12 - pol. 465rpm [kW]	IEC f_B ⇨ 📖 43 - 80							
								DIN 42677' ye göre IEC Adaptöre Bağlanacak Motor Boyutu According to DIN 42677 IEC motor power depend on pole number of motor.							
PA 22 PF 22 W mm 📖 140 - 141 + IEC mm 📖 154 - 155	86.26	16.20	250	0.42	0.28	0.21	0.14	71	80*						
	69.74	20.10	263	0.55	0.37	0.28	0.18	71	80*						
	55.25	25.30	320	0.85	0.56	0.42	0.28	71	80	90*					
	45.90	30.50	292	0.93	0.62	0.47	0.31	71	80	90*					
	42.79	32.70	340	1.16	0.77	0.58	0.39		80	90*					
	35.55	39.40	330	1.36	0.90	0.68	0.45		80	90*					
	34.67	40.40	340	1.44	0.96	0.72	0.48			90*	100*	112*			
	29.34	47.70	292	1.46	0.97	0.73	0.48		80	90*					
	28.80	48.60	374	1.90	1.26	0.95	0.63			90	100*	112*			
	24.69	56.70	246	1.46	0.97	0.73	0.49		80	90*					
	23.77	58.90	326	2.01	1.34	1.01	0.67			90	100*	112*			
	20.00	70.00	285	2.09	1.39	1.04	0.69			90	100*	112*			
	16.74	**83.60**	339	2.97	1.97	1.48	0.99	71	80	90	100*	112*			
	14.67	**95.40**	337	3.37	2.24	1.68	1.12	71	80	90	100	112*			
	12.19	**114.80**	329	3.96	2.63	1.98	1.31	71	80	90	100	112*			
	10.90	**128.40**	317	*4.00*	*2.64*	*2.00*	*1.32*	71	80	90	100	112			
	8.46	**165.50**	259	*4.00*	*2.64*	*2.00*	*1.32*	71	80	90	100	112			
	7.57	**184.90**	246	*4.00*	*2.64*	*2.00*	*1.32*	71	80	90	100	112			
	6.86	**204.10**	255	*4.00*	*2.64*	*2.00*	*1.32*	71	80	90	100	112			
	6.51	**215.10**	228	*4.00*	*2.64*	*2.00*	*1.32*	71	80	90	100	112			
	5.77	**242.60**	215	*4.00*	*2.64*	*2.00*	*1.32*	71	80	90	100	112			
	5.18	**270.30**	159	*4.00*	*2.64*	*2.00*	*1.32*	71	80	90	100	112			
	4.64	**301.70**	150	*4.00*	*2.64*	*2.00*	*1.32*	71	80	90	100	112			
	3.99	**350.90**	139	*4.00*	*2.64*	*2.00*	*1.32*	71	80	90	100	112			
	3.53	**396.60**	131	*4.00*	*2.64*	*2.00*	*1.32*	71	80	90	100	112			
	2.80	**500.00**	115	*4.00*	*2.64*	*2.00*	*1.32*			90	100	112			
PA 21 PF 21 W mm 📖 138 - 139 + IEC mm 📖 152 - 153	10.20	137.30	40	0.57	0.38	0.29	0.19	71	80*	90*					
	7.90	177.20	60	1.11	0.74	0.56	0.37		80	90*					
	6.40	218.80	65	1.49	0.99	0.74	0.49			90*	100*	112*			
	4.60	**304.30**	56	1.78	1.19	0.89	0.59	71	80						
	3.67	**381.50**	68	2.72	1.80	1.36	0.90	71	80	90	100*	112*			
	3.09	**453.10**	62	2.94	1.95	1.47	0.98	71	80	90	100*	112*			
	2.71	**516.60**	77	*4.00*	*2.64*	*2.00*	*1.32*	71	80	90	100	112			
	2.42	**578.50**	73	*4.00*	*2.64*	*2.00*	*1.32*	71	80	90	100	112			
	2.08	**673.10**	68	*4.00*	*2.64*	*2.00*	*1.32*	71	80	90	100	112			
	1.85	**756.80**	64	*4.00*	*2.64*	*2.00*	*1.32*	71	80	90	100	112			
	1.46	**958.90**	60	*4.00*	*2.64*	*2.00*	*1.32*			90	100	112			

	IEC bağlantısı yoktur - No IEC assembling on empty fields
63	**IEC bağlantısı yapılır -** IEC assembling available on numbered fields
80*	**IEC bağlantısı yapılacaksa P_{1max} değerleri aşılmamalıdır -** Do not exceed the P_{1max} values indicated on fields with asterisk

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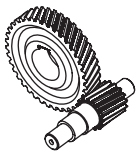

Tip Type	Tahvil Reduction i_{ges}	Çıkış Hızı Output speed 4-pol. 50 Hz 1400rpm n_2 [min^{-1}]	M_{amax} f_B=1 4 - pol. [Nm]	Max. Giriş Gücü Max. Input Power P_{1max} W $f_B \geq 1$ 4 - pol. 1400rpm [kW]	6 - pol. 930rpm [kW]	8 - pol. 700rpm [kW]	12 - pol. 465rpm [kW]	IEC f_B ⇨ 📖 43 - 80							
								DIN 42677' ye göre IEC Adaptöre Bağlanacak Motor Boyutu According to DIN 42677 IEC motor power depend on pole number of motor.							
PA 32/12 **PF 32/12** **W** mm 📖 146 - 147 **+** **IEC** mm 📖 164 - 165	2702.77	0.52	620	0.07	0.04	0.04	0.02	63*	71*						
	2003.62	0.70	620	0.09	0.05	0.04	0.03	63*	71*						
	1602.89	0.87	620	0.10	0.06	0.05	0.03	63*	71*						
	1304.13	1.10	620	0.11	0.07	0.05	0.03	63*	71*						
	1080.92	**1.30**	620	0.12	0.08	0.06	0.04	63*	71*	80*	90*				
	868.98	**1.60**	620	0.14	0.09	0.07	0.05	63*	71*	80*	90*				
	699.71	**2.00**	620	0.17	0.11	0.08	0.05	63*	71*	80*	90*				
	554.87	**2.50**	620	0.20	0.13	0.10	0.06	63	71*	80*	90*	100*	112*		
	446.08	**3.10**	620	0.24	0.16	0.12	0.08	63	71*	80*	90*	100*	112*		
	362.93	**3.90**	620	0.29	0.19	0.15	0.09	63	71*	80*	90*	100*	112*		
	267.35	**5.20**	620	0.38	0.25	0.19	0.12	63	71	80*	90*	100*	112*		
	215.28	**6.50**	620	0.46	0.30	0.23	0.15	63	71	80*	90*	100*	112*		
	167.16	**8.40**	620	0.58	0.38	0.29	0.19	63	71	80*	90*	100*	112*		
	148.00	**9.50**	620	0.65	0.43	0.33	0.21	63	71	80*	90*	100*	112*		
	126.22	**11.10**	620	0.75	0.50	0.38	0.25	63	71	80	90*	100*	112*		
	82.19	**17.00**	620	1.10	0.73	0.55	0.37	63	71	80	90*	100*	112*		
PA 33 **PF 33** **W** mm 📖 142 - 143 **+** **IEC** mm 📖 156 - 157	740.46	1.90	570	0.11	0.07	0.06	0.04	63*	71*						
	662.46	2.10	560	0.12	0.08	0.06	0.04	63*	71*						
	585.48	2.40	634	0.16	0.11	0.08	0.05	63*	71*						
	523.81	2.70	672	0.19	0.12	0.09	0.06	63	71*						
	421.10	3.30	672	0.23	0.16	0.12	0.08	63	71*						
	339.07	4.10	651	0.28	0.19	0.14	0.09	63	71*						
	248.21	5.60	672	0.40	0.26	0.20	0.13	63	71						
	206.97	**6.80**	672	0.48	0.32	0.24	0.16	63	71	80*	90*				
	166.39	**8.40**	672	0.59	0.39	0.30	0.20	63	71	80*	90*				
	133.98	**10.40**	651	0.71	0.47	0.36	0.24	63	71	80*	90*				
	112.18	**12.50**	548	0.72	0.48	0.36	0.24	63	71	80*	90*				
	88.29	**15.90**	537	0.89	0.59	0.45	0.30	63	71	80	90*	100*	112*		

	IEC bağlantısı yoktur - No IEC assembling on empty fields
63	**IEC bağlantısı yapılır -** IEC assembling available on numbered fields
80*	**IEC bağlantısı yapılacaksa P_{1max} değerleri aşılmamalıdır -** Do not exceed the P_{1max} values indicated on fields with asterisk

Tip Type	Tahvil Reduction i_{ges}	Çıkış Hızı Output speed 4-pol. 50 Hz 1400rpm n_2 [min^{-1}]	M_{amax} f_B=1 4 - pol. [Nm]	Max. Giriş Gücü Max. Input Power P_{1max} W $f_B \geq 1$ 4 - pol. 1400rpm [kW]	6 - pol. 930rpm [kW]	8 - pol. 700rpm [kW]	12 - pol. 465rpm [kW]	IEC f_B ⇨ 📖 43 - 80							
								DIN 42677' ye göre IEC Adaptöre Bağlanacak Motor Boyutu According to DIN 42677 IEC motor power depend on pole number of motor.							
PA 32 **PF 32** **W** mm 📖 140 - 141 **+** **IEC** mm 📖 154 - 155	81.27	17.20	515	0.93	0.62	0.46	0.31	71	80	90*					
	72.71	19.30	560	1.13	0.75	0.56	0.38	71	80	90*					
	64.26	21.80	640	1.46	0.97	0.73	0.48		80	90*					
	57.49	24.40	613	1.56	1.04	0.78	0.52		80	90					
	46.29	30.20	533	1.69	1.12	0.84	0.56		80	90					
	46.22	30.30	672	2.13	1.42	1.07	0.71			90	100*	112*			
	38.76	36.10	446	1.69	1.12	0.84	0.56		80	90					
	37.22	37.60	589	2.32	1.54	1.16	0.77			90	100*	112*			
	33.00	42.40	380	1.69	1.12	0.84	0.56		80	90					
	31.16	44.90	512	2.41	1.60	1.20	0.80			90	100*	112*			
	30.45	**46.00**	639	3.08	2.04	1.54	1.02	71	80	90	100	112*			
	27.24	**51.40**	602	3.24	2.15	1.62	1.08	71	80	90	100	112*			
	26.53	52.80	436	2.41	1.60	1.20	0.80			90	100*	112*			
	23.10	**60.60**	630	4.00	2.66	2.00	1.33	71	80	90	100	112			
	20.67	**67.70**	658	4.67	3.10	2.33	1.55	71	80	90	100	112			
	18.64	**75.10**	631	4.96	3.30	2.48	1.65	71	80	90	100	112			
	16.64	**84.10**	530	4.67	3.10	2.33	1.55	71	80	90	100	112			
	16.23	**86.30**	639	5.77	3.83	2.89	1.92	71	80	90	100	112	132*		
	15.01	**93.30**	508	4.96	3.30	2.48	1.65	71	80	90	100	112			
	14.52	**96.40**	672	6.78	4.51	3.39	2.25	71	80	90	100	112	132*		
	11.70	**119.70**	710	8.90	5.91	4.45	2.95	71	80	90	100	112	132*		
	9.79	**143.00**	647	*9.20*	*6.07*	*4.60*	*3.04*	71	80	90	100	112	132		
	7.89	**177.40**	655	*9.20*	*6.07*	*4.60*	*3.04*			90	100	112	132		
	6.72	**208.30**	604	*9.20*	*6.07*	*4.60*	*3.04*			90	100	112	132		
	5.69	**246.00**	604	*9.20*	*6.07*	*4.60*	*3.04*			90	100	112	132		
	5.49	**255.00**	448	*9.20*	*6.07*	*4.60*	*3.04*	71	80	90	100	112	132		
	5.29	**264.70**	639	*9.20*	*6.07*	*4.60*	*3.04*			90	100	112	132		
	4.42	**316.70**	463	*9.20*	*6.07*	*4.60*	*3.04*			90	100	112	132		
	3.75	**373.30**	459	*9.20*	*6.07*	*4.60*	*3.04*			90	100	112	132		
	2.97	**471.40**	436	*9.20*	*6.07*	*4.60*	*3.04*			90	100	112	132		
PA 31 **PF 31** **W** mm 📖 138 - 139 **+** **IEC** mm 📖 152 - 153	10.20	137.30	90	1.29	0.86	0.65	0.43		80	90*					
	8.20	170.70	105	1.88	1.25	0.94	0.62			90	100*	112*			
	4.83	**289.90**	98	2.97	1.98	1.49	0.99	71	80	90	100*	112*			
	3.67	**381.50**	110	4.39	2.92	2.20	1.46	71	80	90	100	112			
	3.31	**423.00**	105	4.65	3.09	2.33	1.54	71	80	90	100	112			
	2.58	**542.60**	185	*9.20*	*6.07*	*4.60*	*3.04*	71	80	90	100	112	132		
	2.08	**673.10**	165	*9.20*	*6.07*	*4.60*	*3.04*			90	100	112	132		
	1.76	**795.50**	150	*9.20*	*6.07*	*4.60*	*3.04*			90	100	112	132		
	1.39	**1007.20**	143	*9.20*	*6.07*	*4.60*	*3.04*						132		

	IEC bağlantısı yoktur - No IEC assembling on empty fields
63	**IEC bağlantısı yapılır -** IEC assembling available on numbered fields
80*	**IEC bağlantısı yapılacaksa P_{1max} değerleri aşılmamalıdır -** Do not exceed the P_{1max} values indicated on fields with asterisk

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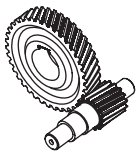


Tip Type	Tahvil Reduction i_{ges}	Çıkış Hızı Output speed 4-pol. 50 Hz 1400rpm n_2 [min^{-1}]	M_{amax} f_B=1 4 - pol. [Nm]	Max. Giriş Gücü Max. Input Power P_{1max} W $f_B \geq 1$ 4 - pol. 1400rpm [kW]	6 - pol. 930rpm [kW]	8 - pol. 700rpm [kW]	12 - pol. 465rpm [kW]	IEC f_B ⇨ 📖 43 - 80							
PA 42/12 **PF 42/12** **W** mm 📖 146 - 147 **+** **IEC** mm 📖 164 - 165	2560.48	0.55	1200	0.11	0.07	0.05	0.03	63*	71*						
	2161.45	0.65	1200	0.12	0.07	0.06	0.04	63*	71*						
	1561.18	0.90	1200	0.15	0.09	0.08	0.05	63*	71*						
	1393.57	1.00	1200	0.17	0.10	0.08	0.05	63*	71*						
	1114.85	1.30	1200	0.20	0.12	0.10	0.06	63	71*						
	750.00	**1.90**	1200	0.27	0.18	0.14	0.09	63	71*	80*	90*				
	670.92	2.10	1200	0.30	0.19	0.15	0.10		71*	80*					
	550.63	**2.50**	1200	0.36	0.23	0.18	0.12	63	71*	80*	90*				
	433.11	**3.20**	1200	0.45	0.29	0.22	0.14	63	71	80*	90*	100*	112*		
	346.69	**4.00**	1200	0.55	0.36	0.27	0.18	63	71	80*	90*	100*	112*		
	276.49	**5.10**	1200	0.68	0.44	0.34	0.22	63	71	80*	90*	100*	112*		
	229.62	**6.10**	1200	0.77	0.51	0.38	0.25	63	71	80	90*	100*	112*		
	169.11	**8.30**	1200	1.04	0.69	0.52	0.35	63	71	80	90*	100*	112*		
	140.44	**10.00**	1200	1.25	0.83	0.63	0.42	63	71	80	90*	100*	112*		
	116.26	**12.00**	1200	1.51	1.01	0.76	0.50	63	71	80	90	100*	112*		
	87.79	**15.90**	1200	2.00	1.33	1.00	0.67	63	71	80	90	100*	112*		
PA 43 **PF 43** **W** mm 📖 142 - 143 **+** **IEC** mm 📖 156 - 157	1071.82	1.30	960	0.13	0.09	0.07	0.04	71*	80*	90*					
	868.02	1.60	860	0.15	0.10	0.07	0.05	71*	80*	90*					
	763.70	1.80	1031	0.20	0.13	0.10	0.07	71*	80*	90*					
	618.49	2.30	1112	0.26	0.18	0.13	0.09	71*	80*	90*					
	528.04	2.70	990	0.27	0.18	0.14	0.09	71*	80*	90*					
	421.21	3.30	1186	0.41	0.27	0.21	0.14	71	80*	90*					
	359.61	3.90	1286	0.52	0.35	0.26	0.17	71	80*	90*					
	298.65	4.70	1118	0.55	0.36	0.27	0.18	71	80*	90*					
	278.52	5.00	1279	0.67	0.45	0.34	0.22		80*	90*					
	264.02	5.30	1267	0.70	0.47	0.35	0.23	71	80*	90*					
	231.31	6.10	1116	0.71	0.47	0.35	0.23		80*	90*					
	219.26	6.40	1200	0.80	0.53	0.40	0.27	71	80	90*					
	204.49	6.80	1289	0.92	0.61	0.46	0.31		80	90*					
	182.86	7.70	1017	0.82	0.54	0.41	0.27	71	80	90*					
	169.82	8.20	1166	1.01	0.67	0.50	0.33		80	90*					
	141.63	9.90	1053	1.09	0.72	0.54	0.36		80	90*					
	129.27	**10.80**	1240	1.41	0.93	0.70	0.47	71	80	90*	100*	112*			
	107.36	**13.00**	1116	1.52	1.01	0.76	0.51	71	80	90	100*	112*			
	94.91	**14.80**	1240	1.92	1.27	0.96	0.64	71	80	90	100*	112*			
	80.01	**17.50**	1230	2.25	1.50	1.13	0.75	71	80	90	100*	112*			
	70.10	**20.00**	1260	2.63	1.75	1.32	0.88	71	80	90	100*	112*			
	58.22	**24.00**	1166	2.94	1.95	1.47	0.98	71	80	90	100*	112*			
	48.55	**28.80**	1045	3.16	2.10	1.58	1.05	71	80	90	100	112*			
	40.91	**34.20**	1041	3.73	2.48	1.87	1.24	71	80	90	100	112*			

DIN 42677' ye göre IEC Adaptöre Bağlanacak Motor Boyutu

According to DIN 42677 IEC motor power depend on pole number of motor.

	IEC bağlantısı yoktur - No IEC assembling on empty fields
63	**IEC bağlantısı yapılır -** IEC assembling available on numbered fields
80*	**IEC bağlantısı yapılacaksa P_{1max} değerleri aşılmamalıdır -** Do not exceed the P_{1max} values indicated on fields with asterisk

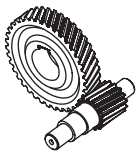
Tip Type	Tahvil Reduction i_{ges}	Çıkış Hızı Output speed 4-pol. 50 Hz 1400rpm n_2 [min^{-1}]	M_{amax} f_B=1 4 - pol. [Nm]	Max. Giriş Gücü Max. Input Power P_{1max} W $f_B \geq 1$ 4 - pol. 1400rpm [kW]	6 - pol. 930rpm [kW]	8 - pol. 700rpm [kW]	12 - pol. 465rpm [kW]	IEC f_B ⇨ 📖 43 - 80							
PA 42 **PF 42** **W** mm 📖 140 - 141 **+** **IEC** mm 📖 154 - 155	105.08	13.30	862	1.20	0.80	0.60	0.40	90*							
	85.10	16.50	796	1.37	0.91	0.69	0.46	90*							
	74.87	18.70	1080	2.11	1.40	1.06	0.70	90	100*	112*					
	60.64	23.10	1004	2.43	1.61	1.21	0.81	90	100*	112*					
	50.99	27.50	1098	3.16	2.10	1.58	1.05		100	112*	132*				
	41.30	33.90	1186	4.21	2.80	2.10	1.40		100	112	132*				
	35.26	39.70	1228	5.11	3.39	2.55	1.70		100	112	132*				
	30.47	**45.90**	1078	5.19	3.45	2.59	1.72	90	100	112					
	29.28	47.80	1021	5.11	3.40	2.56	1.70		100	112	132*				
	25.88	54.10	1243	7.04	4.68	3.52	2.34				132*				
	24.68	**56.70**	891	5.29	3.52	2.65	1.76	90	100	112					
	24.42	57.30	858	5.15	3.42	2.58	1.71		100	112	132*				
	21.85	**64.10**	1096	7.35	4.88	3.68	2.44	90	100	112	132*	160*			
	21.50	65.10	1163	7.93	5.27	3.96	2.63				132*				
	17.93	78.10	998	8.16	5.42	4.08	2.71				132*				
	17.69	**79.10**	1186	9.83	6.53	4.91	3.26	90	100	112	132	160*			
	15.10	**92.70**	1244	12.08	8.02	6.04	4.01	90	100	112	132	160*			
	14.38	**97.40**	1158	11.81	7.84	5.90	3.92	90	100	112	132	160*			
	12.27	**114.10**	1196	14.29	9.49	7.14	4.75	90	100	112	132	160*			
	10.19	**137.40**	1167	*15.00*	*9.90*	*7.50*	*4.95*	90	100	112	132	160			
	8.50	**164.70**	1076	*15.00*	*9.90*	*7.50*	*4.95*	90	100	112	132	160			
	7.27	**192.60**	1076	*15.00*	*9.90*	*7.50*	*4.95*	90	100	112	132	160			
	6.19	**226.20**	1075	*15.00*	*9.90*	*7.50*	*4.95*	90	100	112	132	160			
	5.36	**261.20**	817	*15.00*	*9.90*	*7.50*	*4.95*	90	100	112	132	160			
	4.58	**305.70**	772	*15.00*	*9.90*	*7.50*	*4.95*	90	100	112	132	160			
	3.90	**359.00**	700	*15.00*	*9.90*	*7.50*	*4.95*	90	100	112	132	160			
	3.50	**400.00**	665	*15.00*	*9.90*	*7.50*	*4.95*				132	160			
	3.21	**436.10**	620	*15.00*	*9.90*	*7.50*	*4.95*				132	160			
	3.02	**463.60**	604	*15.00*	*9.90*	*7.50*	*4.95*				132	160			
PA 41 **PF 41** **W** mm 📖 138 - 139 **+** **IEC** mm 📖 152 - 153	14.80	94.60	133	1.32	0.88	0.66	0.44	90							
	10.55	132.70	190	2.64	1.75	1.32	0.88	90	100*	112*					
	7.18	195.00	190	3.88	2.58	1.94	1.29		100	112*	132*				
	5.27	265.70	195	5.42	3.60	2.71	1.80				132*				
	4.29	**326.30**	155	5.30	3.52	2.65	1.76	90	100	112					
	3.88	**360.80**	145	5.48	3.64	2.74	1.82	90	100	112					
	3.42	**409.40**	140	6.00	3.99	3.00	1.99	90	100	112					
	3.08	**454.50**	290	13.80	9.17	6.90	4.58	90	100	112	132	160*			
	2.50	**560.00**	271	*15.00*	*9.90*	*7.50*	*4.95*	90	100	112	132	160			
	2.14	**654.20**	248	*15.00*	*9.90*	*7.50*	*4.95*	90	100	112	132	160			
	1.82	**769.20**	223	*15.00*	*9.90*	*7.50*	*4.95*	90	100	112	132	160			
	1.63	**858.90**	200	*15.00*	*9.90*	*7.50*	*4.95*				132	160			
	1.50	**933.30**	190	*15.00*	*9.90*	*7.50*	*4.95*				132	160			
	1.41	**992.90**	180	*15.00*	*9.90*	*7.50*	*4.95*				132	160			

DIN 42677' ye göre IEC Adaptöre Bağlanacak Motor Boyutu

According to DIN 42677 IEC motor power depend on pole number of motor.

	IEC bağlantısı yoktur - No IEC assembling on empty fields
63	**IEC bağlantısı yapılır -** IEC assembling available on numbered fields
80*	**IEC bağlantısı yapılacaksa P_{1max} değerleri aşılmamalıdır -** Do not exceed the P_{1max} values indicated on fields with asterisk

PGR® Drive Technologies



Tip Type	Tahvil Reduction i_{ges}	Çıkış Hızı Output speed 4-pol. 50 Hz 1400rpm n_2 [min^{-1}]	M_{amax} f_B=1 4 - pol. [Nm]	Max. Giriş Gücü Max. Input Power P_{1max} W $f_B \geq 1$ 4 - pol. 1400rpm [kW]	6 - pol. 930rpm [kW]	8 - pol. 700rpm [kW]	12 - pol. 465rpm [kW]	IEC f_B ⇨ 📖 43 - 80							
								DIN 42677' ye göre IEC Adaptöre Bağlanacak Motor Boyutu According to DIN 42677 IEC motor power depend on pole number of motor.							
PA 52/12 **PF 52/12** **W** mm 📖 146 - 147 **+** **IEC** mm 📖 164 - 165	2635.45	0.53	1830	0.14	0.09	0.07	0.04	63*	71*						
	2108.36	0.66	1830	0.17	0.10	0.08	0.05	63*	71*						
	1715.38	0.82	1830	0.20	0.12	0.10	0.06	63	71*						
	1427.20	0.98	1830	0.23	0.14	0.11	0.07	63	71*						
	1143.76	1.20	1830	0.27	0.18	0.14	0.09		71*	80*					
	920.36	**1.50**	1830	0.33	0.21	0.17	0.11	63	71*	80*	90*				
	690.27	**2.00**	1830	0.43	0.28	0.21	0.14	63	71	80*	90*				
	542.36	**2.60**	1830	0.53	0.35	0.27	0.17	63	71	80*	90*				
	491.74	**2.80**	1830	0.59	0.38	0.29	0.19	63	71	80*	90*	100*	112		
	354.34	**4.00**	1830	0.76	0.50	0.38	0.25	63	71	80	90*	100*	112*		
	283.16	**4.90**	1830	0.95	0.63	0.47	0.31	63	71	80	90*	100*	112*		
	219.87	**6.40**	1830	1.22	0.81	0.61	0.41	63	71	80	90*	100*	112*		
	194.67	**7.20**	1830	1.38	0.92	0.69	0.46	63	71	80	90*	100*	112*		
	146.01	**9.60**	1830	1.84	1.22	0.92	0.61	63	71	80	90	100*	112*		
	124.52	**11.20**	1830	2.15	1.43	1.08	0.72	63	71	80	90	100*	112*		
	97.84	**14.30**	1830	2.74	1.82	1.37	0.91	63	71	80	90	100*	112*		
PA 53 **PF 53** **W** mm 📖 142 - 143 **+** **IEC** mm 📖 156 - 157	728.98	1.90	1595	0.32	0.21	0.16	0.11		80*	90*					
	606.94	2.30	1882	0.45	0.30	0.23	0.15		80*	90*					
	548.64	2.60	1911	0.51	0.34	0.26	0.17		80*	90*					
	499.30	2.80	1920	0.56	0.37	0.28	0.19		80*	90*					
	392.31	3.60	1823	0.68	0.45	0.34	0.23		80*	90*					
	374.48	3.70	1920	0.75	0.50	0.38	0.25		80*	90*					
	294.23	4.80	2227	1.11	0.74	0.55	0.37		80	90*					
	245.73	5.70	1859	1.11	0.74	0.55	0.37		80	90*					
	236.60	**5.90**	1920	1.19	0.79	0.59	0.40	71	80	90*	100*	112*			
	185.90	**7.50**	1820	1.44	0.95	0.72	0.48	71	80	90*	100*	112*			
	177.45	**7.90**	1920	1.59	1.05	0.79	0.53	71	80	90	100*	112*			
	139.42	**10.00**	2232	2.35	1.56	1.17	0.78	71	80	90	100*	112*			
	105.77	**13.20**	2224	3.08	2.05	1.54	1.02	71	80	90	100	112*			
	95.41	**14.70**	2231	3.43	2.28	1.71	1.14	71	80	90	100	112*			
	79.69	**17.60**	1862	3.43	2.28	1.71	1.14	71	80	90	100	112			
	65.31	**21.40**	1920	*4.00*	*2.64*	*2.00*	*1.32*	71	80	90	100	112			
	58.91	**23.80**	1920	*4.00*	*2.64*	*2.00*	*1.32*	71	80	90	100	112			

	IEC bağlantısı yoktur - No IEC assembling on empty fields
63	**IEC bağlantısı yapılır -** IEC assembling available on numbered fields
80*	**IEC bağlantısı yapılacaksa P_{1max} değerleri aşılmamalıdır -** Do not exceed the P_{1max} values indicated on fields with asterisk

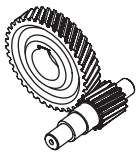
Tip Type	Tahvil Reduction i_{ges}	Çıkış Hızı Output speed 4-pol. 50 Hz 1400rpm n_2 [min^{-1}]	M_{amax} f_B=1 4 - pol. [Nm]	Max. Giriş Gücü Max. Input Power P_{1max} W $f_B \geq 1$ 4 - pol. 1400rpm [kW]	6 - pol. 930rpm [kW]	8 - pol. 700rpm [kW]	12 - pol. 465rpm [kW]	IEC f_B ⇨ 📖 43 - 80							
	86.88	16.10	1721	2.90	1.93	1.45	0.96	90	100*	112*					
PA 52	78.53	17.80	1596	2.98	1.98	1.49	0.99	90	100	112*					
PF 52	71.47	19.60	1588	3.26	2.16	1.63	1.08	90	100	112*					
W	59.50	23.50	1893	4.66	3.10	2.33	1.55		100	112	132*				
mm	53.79	26.00	1911	5.21	3.46	2.60	1.73		100	112	132*				
📖 140 - 141	48.95	28.60	1920	5.75	3.82	2.88	1.91		100	112	132*				
+	40.34	34.70	1911	6.94	4.61	3.47	2.31				132*				
IEC	38.46	36.40	1668	6.36	4.22	3.18	2.11		100	112	132*				
mm	36.71	38.10	1920	7.67	5.09	3.83	2.55				132*				
📖 154 - 155	**36.00**	**38.90**	1396	5.68	3.78	2.84	1.89	90	100	112					
	32.54	**43.00**	1260	5.68	3.77	2.84	1.89	90	100	112					
	32.12	43.60	1393	6.36	4.22	3.18	2.11		100	112	132*				
	28.85	48.50	2024	10.28	6.83	5.14	3.42				132				
	26.43	**53.00**	1893	10.50	6.97	5.25	3.49	90	100	112	132	160*			
	24.09	58.10	1689	10.28	6.83	5.14	3.41				132				
	23.89	**58.60**	1911	11.73	7.79	5.86	3.89	90	100	112	132	160*			
	21.65	**64.70**	1893	12.82	8.51	6.41	4.26	90	100	112	132	160*			
	19.57	**71.50**	1911	14.32	9.51	7.16	4.75	90	100	112	132	160*			
	17.81	**78.60**	1920	15.80	10.50	7.90	5.25	90	100	112	132	160			
	13.99	**100.10**	1920	20.12	13.36	10.06	6.68	90	100	112	132	160			
	13.46	**104.00**	1851	20.16	13.39	10.08	6.70	90	100	112	132	160	180*		
	10.58	**132.30**	1761	*22.00*	*14.52*	*11.00*	*7.26*	90	100	112	132	160	180		
	8.83	**158.60**	1676	*22.00*	*14.52*	*11.00*	*7.26*	90	100	112	132	160	180		
	7.29	**192.00**	1565	*22.00*	*14.52*	*11.00*	*7.26*		100	112	132	160	180		
	6.44	**217.40**	1498	*22.00*	*14.52*	*11.00*	*7.26*		100	112	132	160	180		
	5.60	**250.00**	1170	*22.00*	*14.52*	*11.00*	*7.26*	90	100	112	132	160	180		
	4.62	**303.00**	1195	*22.00*	*14.52*	*11.00*	*7.26*		100	112	132	160	180		
	4.08	**343.10**	1127	*22.00*	*14.52*	*11.00*	*7.26*		100	112	132	160	180		
	3.67	**381.50**	1057	*22.00*	*14.52*	*11.00*	*7.26*					160	180		
	3.44	**407.00**	1009	*22.00*	*14.52*	*11.00*	*7.26*					160	180		
	3.23	**433.40**	959	*22.00*	*14.52*	*11.00*	*7.26*					160	180		
	2.78	**503.60**	888	*22.00*	*14.52*	*11.00*	*7.26*					160	180		
	13.27	105.50	290	3.20	2.13	1.60	1.06	90	100	112*					
PA 51	9.09	154.00	320	5.16	3.43	2.58	1.71		100	112	132*				
PF 51	6.82	205.30	400	8.60	5.71	4.30	2.86				132*				
W	**5.50**	**254.50**	220	5.86	3.90	2.93	1.95	90	100	112					
mm	**4.04**	**346.50**	410	14.88	9.88	7.44	4.94	90	100	112	132	160*			
📖 138 - 139	**3.31**	**423.00**	492	21.79	14.47	10.90	7.24	90	100	112	132	160			
+	**2.86**	**489.50**	456	*22.00*	*14.52*	*11.00*	*7.26*	90	100	112	132	160			
IEC	**2.50**	**560.00**	426	*22.00*	*14.52*	*11.00*	*7.26*	90	100	112	132	160	180		
mm	**2.06**	**679.60**	382	*22.00*	*14.52*	*11.00*	*7.26*		100	112	132	160	180		
📖 152 - 153	**1.82**	**769.20**	341	*22.00*	*14.52*	*11.00*	*7.26*	90	100	112	132	160	180		
	1.64	**853.70**	325	*22.00*	*14.52*	*11.00*	*7.26*					160	180		
	1.54	**909.10**	310	*22.00*	*14.52*	*11.00*	*7.26*					160	180		
	1.44	**972.20**	305	*22.00*	*14.52*	*11.00*	*7.26*					160	180		
	1.24	**1129.00**	275	*22.00*	*14.52*	*11.00*	*7.26*					160	180		

DIN 42677' ye göre IEC Adaptöre Bağlanacak Motor Boyutu

According to DIN 42677 IEC motor power depend on pole number of motor.

	IEC bağlantısı yoktur - No IEC assembling on empty fields
63	**IEC bağlantısı yapılır -** IEC assembling available on numbered fields
80*	**IEC bağlantısı yapılacaksa P_{1max} değerleri aşılmamalıdır -** Do not exceed the P_{1max} values indicated on fields with asterisk

PGR® Drive Technologies



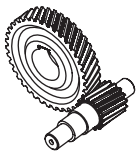
Tip Type	Tahvil Reduction i_{ges}	Çıkış Hızı Output speed 4-pol. 50 Hz 1400rpm n_2 [min^{-1}]	M_{amax} f_B=1 4 - pol. [Nm]	Max. Giriş Gücü Max. Input Power P_{1max} W $f_B \geq 1$ 4 - pol. 1400rpm [kW]	6 - pol. 930rpm [kW]	8 - pol. 700rpm [kW]	12 - pol. 465rpm [kW]	IEC f_B ⇨ 📖 43 - 80							
								DIN 42677' ye göre IEC Adaptöre Bağlanacak Motor Boyutu According to DIN 42677 IEC motor power depend on pole number of motor.							
PA 63/23 PF 63/23 W mm 📖 150 - 151 + IEC mm 📖 170 - 171	13313.68	0.11	3200	0.08	0.04	0.04	0.02	63*	71*						
	11060.60	0.13	3200	0.08	0.05	0.04	0.02	63*	71*						
	8135.65	0.17	3200	0.10	0.06	0.05	0.03	63*	71*						
	6681.18	**0.21**	3200	0.11	0.07	0.06	0.03	63*	71*	80*	90*				
	5394.24	**0.26**	3200	0.13	0.08	0.06	0.04	63*	71*	80*	90*				
	4370.02	**0.32**	3200	0.15	0.09	0.07	0.05	63*	71*	80*	90*				
	3390.53	**0.41**	3200	0.18	0.11	0.09	0.06	63	71*	80*	90*				
	2816.75	**0.50**	3200	0.21	0.13	0.10	0.07	63	71*	80*	90*				
	2162.48	**0.65**	3200	0.26	0.16	0.13	0.08	63	71*	80*	90*				
	1677.79	**0.83**	3200	0.32	0.21	0.16	0.10	63	71*	80*	90*				
	1410.80	**1.00**	3200	0.37	0.24	0.19	0.12	63	71	80*	90*				
	1066.44	**1.30**	3200	0.48	0.31	0.24	0.16	63	71	80*	90*				
PA 63/22 PF 63/22 W mm 📖 148 - 149 + IEC mm 📖 166 - 167	**851.02**	**1.60**	3200	0.59	0.39	0.30	0.19	71	80*	90*	100*	112*			
	727.77	**1.90**	3200	0.68	0.45	0.34	0.22	71	80*	90*	100*	112*			
	554.24	**2.50**	3200	0.85	0.56	0.42	0.28	71	80	90*	100*	112*			
	430.20	**3.30**	3200	1.09	0.72	0.55	0.36	71	80	90*	100*	112*			
	367.90	**3.80**	3200	1.28	0.85	0.64	0.42	71	80	90*	100*	112*			
	283.00	**4.90**	3200	1.66	1.10	0.83	0.55	71	80	90	100*	112*			
	225.22	**6.20**	3200	2.08	1.38	1.04	0.69	71	80	90	100*	112*			
	173.24	**8.10**	3200	2.71	1.80	1.35	0.90	71	80	90	100*	112*			
	153.52	**9.10**	3200	3.06	2.03	1.53	1.01	71	80	90	100	112*			

	IEC bağlantısı yoktur - No IEC assembling on empty fields
63	**IEC bağlantısı yapılır -** IEC assembling available on numbered fields
80*	**IEC bağlantısı yapılacaksa P_{1max} değerleri aşılmamalıdır -** Do not exceed the P_{1max} values indicated on fields with asterisk

Tip Type	Tahvil Reduction i_{ges}	Çıkış Hızı Output speed 4-pol. 50 Hz 1400rpm n_2 [min^{-1}]	M_{amax} f_B=1 4 - pol. [Nm]	Max. Giriş Gücü Max. Input Power P_{1max} W $f_B \geq 1$ 4 - pol. 1400rpm [kW]	6 - pol. 930rpm [kW]	8 - pol. 700rpm [kW]	12 - pol. 465rpm [kW]	IEC f_B ⇨ 📖 43 - 80							
								DIN 42677' ye göre IEC Adaptöre Bağlanacak Motor Boyutu According to DIN 42677 IEC motor power depend on pole number of motor.							
PA 63 **PF 63** **W** mm 📖 144 - 145 **+** **IEC** mm 📖 158 - 159	372.70	3.80	3200	1.26	0.84	0.63	0.42	90*							
	300.91	4.70	3200	1.56	1.04	0.78	0.52	90							
	265.56	5.30	3640	2.01	1.33	1.00	0.67	90	100*	112*					
	214.41	6.50	3640	2.49	1.65	1.24	0.83	90	100*	112*					
	180.86	7.70	3660	2.97	1.97	1.48	0.99		100*	112*	132*				
	146.02	9.60	3700	3.71	2.47	1.86	1.23		100	112*	132*				
	132.78	10.50	3700	4.09	2.71	2.04	1.36				132*				
	108.08	**13.00**	3650	4.95	3.29	2.48	1.64	90	100	112					
	107.21	13.10	3700	5.06	3.36	2.53	1.68				132*				
	87.26	**16.00**	3200	5.38	3.57	2.69	1.79	90	100	112					
	77.49	**18.10**	3700	7.00	4.65	3.50	2.32	90	100	112	132*	160*			
	62.96	**22.20**	3670	8.55	5.68	4.27	2.84	90	100	112	132*	160*			
	53.84	**26.00**	3700	10.07	6.69	5.04	3.35	90	100	112	132	160*			
	50.83	**27.50**	3700	10.67	7.09	5.34	3.54	90	100	112	132	160*			
	43.47	**32.20**	3680	12.40	8.24	6.21	4.12	90	100	112	132	160*			
	36.14	**38.70**	3690	14.97	9.94	7.48	4.97	90	100	112	132	160			
	30.90	**45.30**	3590	17.03	11.31	8.52	5.66	90	100	112	132	160			
	26.33	**53.20**	3200	17.82	11.84	8.91	5.92	90	100	112	132	160	180*		
	21.97	**63.70**	3200	21.35	14.18	10.68	7.09	90	100	112	132	160	180*		
	20.81	**67.28**	3200	*22.00*	*14.52*	*11.00*	*7.26*	90	100	112	132	160	180		
	17.36	**80.60**	3200	*22.00*	*14.52*	*11.00*	*7.26*	90	100	112	132	160	180		
PA 62 **PF 62** **W** mm 📖 144 - 145 **+** **IEC** mm 📖 158 - 159	48.75	28.70	2510	7.55	5.01	3.77	2.51	100	112	132*					
	37.08	37.80	3010	11.90	7.91	5.95	3.95			132	160*	180*			
	18.16	**77.10**	3077	24.84	16.50	12.42	8.25	100	112	132	160	180			
	15.80	**88.60**	3004	27.87	18.51	13.94	9.26	100	112	132	160	180			
	13.91	**100.60**	3080	32.46	21.56	16.23	10.78	100	112	132	160	180	200	225*	
	11.60	**120.70**	3077	38.89	25.83	19.44	12.92	100	112	132	160	180	200	225*	
	10.52	**133.10**	3093	43.10	28.63	21.55	14.32	100	112	132	160	180	200	225*	
	8.78	**159.50**	3012	*45.00*	*29.70*	*22.50*	*14.85*	100	112	132	160	180	200	225	
	7.55	**185.40**	3120	*45.00*	*29.70*	*22.50*	*14.85*	100	112	132	160	180	200	225	
	6.35	**220.50**	1930	44.56	29.60	22.28	14.80	100	112	132	160	180	200	225	
	5.29	**264.70**	1882	*45.00*	*29.70*	*22.50*	*14.85*	100	112	132	160	180	200	225	
	4.56	**307.00**	2081	*45.00*	*29.70*	*22.50*	*14.85*	100	112	132	160	180	200	225	
	4.06	**344.80**	1885	*45.00*	*29.70*	*22.50*	*14.85*					180	200	225	
	3.91	**358.10**	2009	*45.00*	*29.70*	*22.50*	*14.85*			132	160	180	200	225	
	3.72	**376.30**	2030	*45.00*	*29.70*	*22.50*	*14.85*			132	160	180	200	225	
	3.32	**421.70**	1980	*45.00*	*29.70*	*22.50*	*14.85*			132	160	180	200	225	
	2.97	**471.40**	1960	*45.00*	*29.70*	*22.50*	*14.85*					180	200	225	

	IEC bağlantısı yoktur - No IEC assembling on empty fields
63	**IEC bağlantısı yapılır -** IEC assembling available on numbered fields
80*	**IEC bağlantısı yapılacaksa P_{1max} değerleri aşılmamalıdır -** Do not exceed the P_{1max} values indicated on fields with asterisk

PGR® Drive Technologies



Tip Type	Tahvil Reduction i_{ges}	Çıkış Hızı Output speed 4-pol. 50 Hz 1400rpm n_2 [min^{-1}]	M_{amax} f_B=1 4 - pol. [Nm]	Max. Giriş Gücü Max. Input Power P_{1max} W $f_B \geq 1$ 4 - pol. 1400rpm [kW]	6 - pol. 930rpm [kW]	8 - pol. 700rpm [kW]	12 - pol. 465rpm [kW]	IEC f_B ⇨ 📖 43 - 80							
PA 73/23 **PF 73/23** **W** mm 📖 150 - 151 **+** **IEC** mm 📖 170 - 171	13435.41	0.10	5000	0.09	0.07	0.05	0.03	63*	71*						
	11303.83	0.12	5000	0.10	0.07	0.05	0.04	63*	71*						
	8164.87	0.17	5000	0.13	0.09	0.06	0.04	63*	71*	80*	90*				
	6600.95	**0.21**	5000	0.15	0.10	0.08	0.05	63*	71*	80*	90*				
	5483.87	**0.26**	5000	0.17	0.12	0.09	0.06	63*	71*	80*	90*				
	4429.50	**0.32**	5000	0.21	0.14	0.10	0.07	63	71*	80*	90*				
PA 73/22 **PF 73/22** **W** mm 📖 148 - 149 **+** **IEC** mm 📖 166 - 167	3433.54	0.41	5000	0.25	0.17	0.13	0.09	71*	80*	90*					
	2773.38	0.50	5000	0.30	0.21	0.15	0.10	71*	80*	90*					
	2194.98	0.64	5000	0.37	0.25	0.19	0.13		80*	90*					
	1772.96	0.79	5000	0.45	0.30	0.23	0.15		80*	90*					
	1252.41	**1.10**	5000	0.63	0.42	0.31	0.21	71	80*	90*	100*	112*			
	1097.40	**1.30**	5000	0.71	0.47	0.35	0.24	71	80*	90*	100*	112*			
	886.40	**1.60**	5000	0.83	0.55	0.41	0.27	71	80	90*	100*	112*			
	736.40	**1.90**	5000	1.00	0.66	0.50	0.33	71	80	90*	100*	112*			
	566.43	**2.50**	5000	1.29	0.86	0.65	0.43	71	80	90*	100*	112*			
	457.52	**3.10**	5000	1.60	1.06	0.80	0.53	71	80	90	100*	112*			
	346.75	**4.00**	5000	2.11	1.40	1.06	0.70	71	80	90	100*	112*			
	280.08	**5.00**	5000	2.62	1.74	1.31	0.87	71	80	90	100*	112*			
PA 73/32 **PF 73/32** **W** mm 📖 148 - 149 **+** **IEC** mm 📖 166 - 167	**226.38**	**6.20**	5000	3.24	2.15	1.62	1.08	90	100	112*	132*				
	171.10	**8.20**	5000	4.28	2.85	2.14	1.42	90	100	112	132*				
	141.16	**9.90**	5000	5.19	3.45	2.60	1.72	90	100	112	132*				
	124.66	**11.20**	5000	5.88	3.91	2.94	1.95	90	100	112	132*				

DIN 42677' ye göre IEC Adaptöre Bağlanacak Motor Boyutu

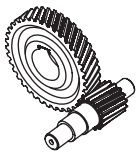
According to DIN 42677 IEC motor power depend on pole number of motor.

	IEC bağlantısı yoktur - No IEC assembling on empty fields
63	**IEC bağlantısı yapılır -** IEC assembling available on numbered fields
80*	**IEC bağlantısı yapılacaksa P_{1max} değerleri aşılmamalıdır -** Do not exceed the P_{1max} values indicated on fields with asterisk

Tip Type	Tahvil Reduction i_{ges}	Çıkış Hızı Output speed 4-pol. 50 Hz 1400rpm n_2 [min^{-1}]	M_{amax} f_B=1 4 - pol. [Nm]	Max. Giriş Gücü Max. Input Power P_{1max} W $f_B \geq 1$ 4 - pol. 1400rpm [kW]	6 - pol. 930rpm [kW]	8 - pol. 700rpm [kW]	12 - pol. 465rpm [kW]	IEC f_B ⇨ 📖 43 - 80							
								DIN 42677' ye göre IEC Adaptöre Bağlanacak Motor Boyutu According to DIN 42677 IEC motor power depend on pole number of motor.							
PA 73 **PF 73** **W** mm 📖 144 - 145 **+** **IEC** mm 📖 158 - 159	205.59	6.80	5330	3.80	2.52	1.90	1.26	100	112*	132*					
	166.07	8.40	5630	4.97	3.30	2.48	1.65	100	112	132*					
	124.55	11.20	5620	6.61	4.39	3.31	2.20			132*	160*	180*			
	124.38	**11.30**	5000	5.89	3.91	2.95	1.96	100	112	132*					
	100.47	**13.90**	4000	5.84	3.88	2.92	1.94	100	112	132*					
	91.33	**15.30**	5330	8.56	5.68	4.28	2.84	100	112	132*					
	74.80	**18.70**	5330	10.45	6.94	5.22	3.47	100	112	132	160*	180*			
	60.42	**23.20**	5650	13.71	9.11	6.85	4.55	100	112	132	160*	180*			
	52.28	**26.80**	5560	15.59	10.36	7.80	5.18	100	112	132	160	180*			
	45.67	**30.70**	5370	17.24	11.45	8.62	5.73	100	112	132	160	180*	200*	225*	
	37.68	**37.20**	5000	19.45	12.92	9.73	6.46	100	112	132	160	180*	200*	225*	
	33.27	**42.10**	5000	22.03	14.64	11.02	7.32	100	112	132	160	180*	200*	225*	
	28.35	**49.40**	5000	25.85	17.17	12.93	8.59	100	112	132	160	180	200*	225*	
	23.39	**59.90**	5000	31.34	20.82	15.67	10.41	100	112	132	160	180	200	225*	
	20.66	**67.80**	5000	35.48	23.57	17.74	11.78	100	112	132	160	180	200	225*	
	18.01	**77.70**	5000	40.70	27.04	20.35	13.52	100	112	132	160	180	200	225*	
PA 72 **PF 72** **W** mm 📖 144 - 145 **+** **IEC** mm 📖 158 - 159	43.70	32.00	4050	13.59	9.03	6.79	4.51	132	160*	180*					
	33.08	42.30	3217	14.26	9.47	7.13	4.74	132	160*	180*					
	28.58	49.00	4053	20.79	13.81	10.39	6.91		160	180*	200*				
	21.64	64.70	4492	30.43	20.21	15.22	10.11		160	180	200				
	21.72	**64.50**	4053	27.36	18.17	13.68	9.09	132	160	180					
	16.83	**83.20**	4053	35.30	23.45	17.65	11.73	132	160	180	200	225*			
	14.33	**97.70**	4053	41.46	27.54	20.73	13.77	132	160	180	200	225*			
	12.49	**112.10**	4053	47.57	31.60	23.79	15.80	132	160	180	200	225			
	10.84	**129.20**	4677	*55.00*	*36.30*	*27.50*	*18.15*	132	160	180	200	225			
	9.46	**148.00**	4708	*55.00*	*36.30*	*27.50*	*18.15*	132	160	180	200	225			
	8.21	**170.50**	4657	*55.00*	*36.30*	*27.50*	*18.15*	132	160	180	200	225			
	6.94	**201.70**	4292	*55.00*	*36.30*	*27.50*	*18.15*	132	160	180	200	225			
	6.42	**218.10**	2770	*55.00*	*36.30*	*27.50*	*18.15*	132	160	180	200	225			
	5.60	**250.00**	2831	*55.00*	*36.30*	*27.50*	*18.15*	132	160	180	200	225			
	4.86	**288.10**	2910	*55.00*	*36.30*	*27.50*	*18.15*	132	160	180	200	225			
	4.11	**340.60**	2673	*55.00*	*36.30*	*27.50*	*18.15*	132	160	180	200	225			
	3.86	**362.70**	2589	*55.00*	*36.30*	*27.50*	*18.15*					225			
	3.44	**407.00**	2423	*55.00*	*36.30*	*27.50*	*18.15*	132	160	180	200	225			
	3.26	**429.40**	2333	*55.00*	*36.30*	*27.50*	*18.15*					225			
	2.76	**507.20**	2135	*55.00*	*36.30*	*27.50*	*18.15*	132	160	180	200	225			

	IEC bağlantısı yoktur - No IEC assembling on empty fields
63	**IEC bağlantısı yapılır -** IEC assembling available on numbered fields
80*	**IEC bağlantısı yapılacaksa P_{1max} değerleri aşılmamalıdır -** Do not exceed the P_{1max} values indicated on fields with asterisk

PGR® Drive Technologies



Tip Type	Tahvil Reduction i_{ges}	Çıkış Hızı Output speed 4-pol. 50 Hz 1400rpm n_2 [min^{-1}]	M_{amax} f_B=1 4 - pol. [Nm]	Max. Giriş Gücü Max. Input Power P_{1max} W $f_B \geq 1$ 4 - pol. 1400rpm [kW]	6 - pol. 930rpm [kW]	8 - pol. 700rpm [kW]	12 - pol. 465rpm [kW]	IEC f_B ⇨ 📖 43 - 80							
PA 83/33 **PF 83/33** **W** mm 📖 150 - 151 **+** **IEC** mm 📖 170 - 171	12787.88	0.11	8000	0.13	0.09	0.07	0.05	63*	71*						
	10858.81	**0.13**	8000	0.15	0.10	0.07	0.05	63*	71*	80*	90*				
	8572.29	**0.16**	8000	0.18	0.12	0.09	0.06	63*	71*	80*	90*				
	6931.18	**0.20**	8000	0.21	0.14	0.10	0.07	63	71*	80*	90*				
	5432.52	**0.26**	8000	0.26	0.17	0.13	0.09	63	71*	80*	90*				
	4548.59	**0.31**	8000	0.30	0.20	0.15	0.10	63	71*	80*	90*				
PA 83/32 **PF 83/32** **W** mm 📖 148 - 149 **+** **IEC** mm 📖 166 - 167	3552.27	0.39	8000	0.37	0.25	0.19	0.12		80*	90*					
	2860.33	0.49	8000	0.45	0.30	0.23	0.15		80*	90*					
	2039.02	0.69	8000	0.62	0.41	0.31	0.21		80*	90*					
	1683.27	**0.83**	8000	0.74	0.49	0.37	0.25	71	80*	90*	100*	112*			
	1366.81	1.00	8000	0.86	0.57	0.43	0.28			90*	100*	112*			
	1151.94	**1.20**	8000	1.02	0.68	0.51	0.34	71	80	90*	100*	112*			
	897.44	**1.60**	8000	1.31	0.87	0.65	0.43	71	80	90*	100*	112*	132*		
	722.63	**1.90**	8000	1.62	1.08	0.81	0.54	71	80	90	100*	112*	132*		
PA 83/42 **PF 83/42** **W** mm 📖 148 - 149 **+** **IEC** mm 📖 166 - 167	**525.11**	**2.70**	8000	2.23	1.48	1.12	0.74	90	100*	112*	132*	160*			
	437.93	**3.20**	8000	2.68	1.78	1.34	0.89	90	100*	112*	132*	160*			
	374.50	**3.70**	8000	3.13	2.08	1.57	1.04	90	100	112*	132*	160*			
	276.00	**5.10**	8000	4.25	2.82	2.12	1.41	90	100	112	132*	160*			
	236.03	**5.90**	8000	4.97	3.30	2.48	1.65	90	100	112	132*	160*			
	201.09	**7.00**	8000	5.83	3.87	2.92	1.94	90	100	112	132*	160*			
	149.01	**9.40**	8000	7.87	5.23	3.94	2.61	90	100	112	132*	160*			
	126.95	**11.00**	8000	9.24	6.14	4.62	3.07	90	100	112	132	160*			

DIN 42677' ye göre IEC Adaptöre Bağlanacak Motor Boyutu

According to DIN 42677 IEC motor power depend on pole number of motor.

	IEC bağlantısı yoktur - No IEC assembling on empty fields
63	**IEC bağlantısı yapılır -** IEC assembling available on numbered fields
80*	**IEC bağlantısı yapılacaksa P_{1max} değerleri aşılmamalıdır -** Do not exceed the P_{1max} values indicated on fields with asterisk

Tip Type	Tahvil Reduction i_{ges}	Çıkış Hızı Output speed 4-pol. 50 Hz 1400rpm n_2 [min^{-1}]	M_{amax} f_B=1 4 - pol. [Nm]	Max. Giriş Gücü Max. Input Power P_{1max} W $f_B \geq 1$ 4 - pol. 1400rpm [kW]	6 - pol. 930rpm [kW]	8 - pol. 700rpm [kW]	12 - pol. 465rpm [kW]	IEC f_B ⇨ 📖 43 - 80							
								DIN 42677' ye göre IEC Adaptöre Bağlanacak Motor Boyutu According to DIN 42677 IEC motor power depend on pole number of motor.							
PA 83 **PF 83** **W** mm 📖 144 - 145 **+** **IEC** mm 📖 160 - 161	216.49	6.50	8890	6.02	4.00	3.01	2.00	100	112	132*					
	164.68	8.50	8930	7.95	5.28	3.97	2.64			132*	160*	180*			
	136.67	10.20	7380	7.92	5.26	3.96	2.63	100	112	132*					
	103.97	13.50	9180	12.94	8.60	6.47	4.30			132	160*	180*			
	80.63	**17.40**	8980	16.30	10.85	8.16	5.42	100	112	132	160	180*			
	70.19	**19.90**	8960	18.71	12.43	9.36	6.22	100	112	132	160	180*			
	61.79	**22.70**	9000	21.35	14.18	10.68	7.09	100	112	132	160	180*	200*	225*	
	51.52	**27.20**	8930	25.41	16.88	12.70	8.44	100	112	132	160	180	200*	225*	
	44.34	**31.60**	8890	29.39	19.52	14.70	9.76	100	112	132	160	180	200*	225*	
	39.01	**35.90**	9000	33.82	22.47	16.91	11.23	100	112	132	160	180	200	225*	
	32.53	**43.00**	8550	38.50	25.60	19.27	12.80	100	112	132	160	180	200	225*	
	27.99	**50.00**	8130	42.58	28.29	21.29	14.14	100	112	132	160	180	200	225*	
	24.38	**57.40**	8000	*45.00*	*29.70*	*22.50*	*14.85*	100	112	132	160	180	200	225	
	20.99	**66.70**	8000	*45.00*	*29.70*	*22.50*	*14.85*	100	112	132	160	180	200	225	
PA 82 **PF 82** **W** mm 📖 144 - 145 **+** **IEC** mm 📖 160 - 161	48.76	28.70	5320	16.00	10.62	8.00	5.31	132	160	180*					
	40.43	34.60	4144	15.03	9.98	7.51	4.99	132	160	180*					
	32.10	43.60	6591	30.10	20.00	15.05	10.00		160	180	200				
	26.62	52.60	6357	35.01	23.26	17.50	11.63		160	180	200				
	26.47	52.90	6591	36.50	24.25	18.25	12.12				200	225*			
	21.95	63.80	7246	48.39	32.15	24.20	16.07				200	225			
	16.56	**84.50**	6579	58.24	38.69	29.12	19.34	132	160	180	200	225	250		
	14.29	**98.00**	6581	67.51	44.85	33.76	22.42	132	160	180	200	225	250	280*	
	11.85	**118.10**	7135	*75.00*	*49.50*	*37.50*	*24.75*	132	160	180	200	225	250	280*	
	10.33	**135.50**	6866	*75.00*	*49.50*	*37.50*	*24.75*	132	160	180	200	225	250	280*	
	8.84	**158.40**	6569	*75.00*	*49.50*	*37.50*	*24.75*	132	160	180	200	225	250	280*	
	7.40	**189.20**	6256	*75.00*	*49.50*	*37.50*	*24.75*	132	160	180	200	225	250	280*	
	6.21	**225.40**	4304	*75.00*	*49.50*	*37.50*	*24.75*	132	160	180	200	225	250	280*	
	5.31	**263.70**	4784	*75.00*	*49.50*	*37.50*	*24.75*	132	160	180	200	225	250	280*	
	4.45	**314.60**	4344	*75.00*	*49.50*	*37.50*	*24.75*	132	160	180	200	225	250	280*	
	3.64	**384.60**	3950	*75.00*	*49.50*	*37.50*	*24.75*	132	160	180	200	225	250	280*	
	2.90	**482.80**	3127	*75.00*	*49.50*	*37.50*	*24.75*	132	160	180	200	225	250	280*	

	IEC bağlantısı yoktur - No IEC assembling on empty fields
63	**IEC bağlantısı yapılır -** IEC assembling available on numbered fields
80*	**IEC bağlantısı yapılacaksa P_{1max} değerleri aşılmamalıdır -** Do not exceed the P_{1max} values indicated on fields with asterisk

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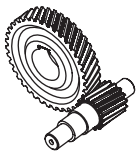

Tip Type	Tahvil Reduction i_{ges}	Çıkış Hızı Output speed 4-pol. 50 Hz 1400rpm n_2 [min^{-1}]	M_{amax} f_B=1 4 - pol. [Nm]	Max. Giriş Gücü Max. Input Power P_{1max} W $f_B \geq 1$ 4 - pol. 1400rpm [kW]	6 - pol. 930rpm [kW]	8 - pol. 700rpm [kW]	12 - pol. 465rpm [kW]	IEC f_B ⇨ 📖 43 - 80							
PA 93/43 **PF 93/43** **W** mm 📖 150 - 151 **+** **IEC** mm 📖 170 - 171	13926.28	0.10	12200	0.17	0.11	0.08	0.05	71*	80*	90*					
	11275.92	0.12	12200	0.20	0.13	0.10	0.06	71*	80*	90*					
	8526.73	0.16	12200	0.25	0.16	0.12	0.08	71*	80*	90*					
	6948.97	**0.20**	12200	0.30	0.19	0.15	0.10	71*	80*	90*	100*	112*			
	5771.01	**0.24**	12200	0.35	0.23	0.17	0.11	71*	80*	90*	100*	112*			
	4300.67	**0.33**	12200	0.46	0.30	0.23	0.15	71	80*	90*	100*	112*			
	3730.70	**0.38**	12200	0.52	0.34	0.26	0.17	71	80*	90*	100*	112*			
	2714.80	**0.52**	12200	0.70	0.46	0.35	0.23	71	80*	90*	100*	112*			
	2199.04	**0.64**	12200	0.81	0.54	0.41	0.27	71	80	90*	100*	112*			
PA 93/42 **PF 93/42** **W** mm 📖 148 - 149 **+** **IEC** mm 📖 168 - 169	1644.01	0.85	12200	1.09	0.72	0.54	0.36		100*	112*	132*				
	1299.17	**1.10**	12200	1.38	0.91	0.69	0.46	90*	100*	112*					
	1090.99	**1.30**	12200	1.64	1.09	0.82	0.54	90	100*	112*	132*	160*			
	811.95	**1.70**	12200	2.20	1.46	1.10	0.73	90	100*	112*	132*	160*			
	756.80	**1.80**	12200	2.36	1.57	1.18	0.78	90	100*	112*	132*	160*			
	547.88	**2.60**	12200	3.26	2.17	1.63	1.08	90	100	112*	132*	160*			
	456.91	**3.10**	12200	3.91	2.60	1.96	1.30	90	100	112*	132*	160*			
	332.89	**4.20**	12200	5.37	3.57	2.69	1.78	90	100	112	132*	160*			
	287.97	**4.90**	12200	6.21	4.13	3.11	2.06	90	100	112	132*	160*			
	240.68	**5.80**	12200	7.43	4.94	3.72	2.47	90	100	112	132*	160*			
	182.00	**7.70**	12200	9.83	6.53	4.91	3.26	90	100	112	132	160*			
PA 93/52 **PF 93/52** **W** mm 📖 148 - 149 **+** **IEC** mm 📖 168 - 169	**160.87**	**8.70**	12200	11.12	7.39	5.56	3.69	100	112	132	160*	180*			
	127.35	**11.00**	12200	14.04	9.33	7.02	4.66	100	112	132	160*	180*			
	107.56	**13.00**	12200	16.63	11.05	8.31	5.52				160	180*			

DIN 42677' ye göre IEC Adaptöre Bağlanacak Motor Boyutu

According to DIN 42677 IEC motor power depend on pole number of motor.

	IEC bağlantısı yoktur - No IEC assembling on empty fields
63	**IEC bağlantısı yapılır -** IEC assembling available on numbered fields
80*	**IEC bağlantısı yapılacaksa P_{1max} değerleri aşılmamalıdır -** Do not exceed the P_{1max} values indicated on fields with asterisk

Tip Type	Tahvil Reduction i_{ges}	Çıkış Hızı Output speed 4-pol. 50 Hz 1400rpm n_2 [min^{-1}]	M_{amax} f_B=1 4 - pol. [Nm]	Max. Giriş Gücü Max. Input Power P_{1max} W $f_B \geq 1$ 4 - pol. 1400rpm [kW]	6 - pol. 930rpm [kW]	8 - pol. 700rpm [kW]	12 - pol. 465rpm [kW]	IEC f_B ⇨ 📖 43 - 80								DIN 42677' ye göre IEC Adaptöre Bağlanacak Motor Boyutu According to DIN 42677 IEC motor power depend on pole number of motor.
PA 93 **PF 93** **W** mm 📖 144 - 145 **+** **IEC** mm 📖 160 - 161	187.99	7.40	13980	10.90	7.24	5.45	3.62	132	160*	180*						
	122.97	11.40	13950	16.63	11.05	8.32	5.52		160	180*	200*					
	109.25	12.80	11560	15.51	10.30	7.76	5.15	132	160	180*						
	93.43	**15.00**	14000	21.97	14.59	10.98	7.30	132	160	180*						
	72.42	**19.30**	13400	27.13	18.02	13.56	9.01	132	160	180	200*	225*				
	61.66	**22.70**	12700	30.19	20.06	15.10	10.03	132	160	180	200	225*	250*			
	53.75	**26.00**	12250	33.41	22.19	16.71	11.10	132	160	180	200	225*	250*	280*		
	46.63	**30.00**	12200	38.35	25.48	19.18	12.74	132	160	180	200	225*	250*	280*		
	39.46	**35.50**	12200	45.32	30.11	22.66	15.05	132	160	180	200	225*	250*	280*		
	31.24	**44.80**	12200	57.25	38.03	28.62	19.02	132	160	180	200	225	250	280*		
	27.10	**51.70**	12200	66.00	43.84	33.00	21.92	132	160	180	200	225	250	280*		
	22.93	**61.10**	12200	*75.00*	*49.50*	*37.50*	*24.75*	132	160	180	200	225	250	280*		
	19.17	**73.00**	12200	*75.00*	*49.50*	*37.50*	*24.75*	132	160	180	200	225	250	280*		
PA 92 **PF 92** **W** mm 📖 144 - 145 **+** **IEC** mm 📖 162 - 163	35.47	39.50	9640	39.84	26.47	19.92	13.23	160	180	200						
	29.30	47.80	10775	53.91	35.81	26.96	17.91			200	225					
	16.47	**85.00**	10613	94.46	62.75	47.23	31.38		180	200	225	250	280			
	14.36	**97.50**	10774	109.99	73.06	54.99	36.53		180	200	225	250	280			
	12.39	**113.00**	10592	125.32	83.25	62.66	41.63		180	200	225	250	280	315*		
	10.50	**133.30**	10112	141.18	93.78	70.59	46.89		180	200	225	250	280	315*		
	7.78	**179.90**	6085	114.66	76.17	57.33	38.08		180	200	225	250	280			
	6.71	**208.60**	7012	153.19	101.77	76.60	50.88		180	200	225	250	280	315*		
	5.68	**246.50**	7212	*160.00*	*105.60*	*80.00*	*52.80*		180	200	225	250	280	315*		
	3.51	**398.90**	5572	*160.00*	*105.60*	*80.00*	*52.80*					250	280	315*		

	IEC bağlantısı yoktur - No IEC assembling on empty fields
63	**IEC bağlantısı yapılır -** IEC assembling available on numbered fields
80*	**IEC bağlantısı yapılacaksa P_{1max} değerleri aşılmamalıdır -** Do not exceed the P_{1max} values indicated on fields with asterisk

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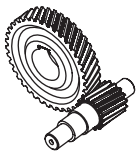


Tip Type	Tahvil Reduction i_{ges}	Çıkış Hızı Output speed 4-pol. 50 Hz 1400rpm n_2 [min^{-1}]	M_{amax} f_B=1 4 - pol. [Nm]	Max. Giriş Gücü Max. Input Power P_{1max} W $f_B \geq 1$ 4 - pol. 1400rpm [kW]	6 - pol. 930rpm [kW]	8 - pol. 700rpm [kW]	12 - pol. 465rpm [kW]	IEC f_B ⇨ 📖 43 - 80							
PA 103/53 **PF 103/53** **W** mm 📖 150 - 151 **+** **IEC** mm 📖 170 - 171	**14373.83**	**0.10**	20000	0.24	0.16	0.12	0.08	71*	80*	90*	100*	112*			
	11293.72	**0.12**	20000	0.30	0.19	0.15	0.10	71*	80*	90*	100*	112*			
	8470.29	**0.17**	20000	0.39	0.25	0.19	0.12	71	80*	90*	100*	112*			
	7155.29	**0.20**	20000	0.45	0.29	0.22	0.15	71	80*	90*	100*	112*			
	5796.64	**0.24**	20000	0.55	0.36	0.27	0.18	71	80*	90*	100*	112*			
	4223.52	**0.33**	20000	0.73	0.48	0.37	0.24	71	80*	90*	100*	112*			
	3461.37	**0.40**	20000	0.85	0.56	0.42	0.28	71	80	90*	100*	112*			
	2719.64	**0.51**	20000	1.08	0.72	0.54	0.36	71	80	90*	100*	112*			
PA 103/52 **PF 103/52** **W** mm 📖 148 - 149 **+** **IEC** mm 📖 168 - 169	2038.56	0.69	20000	1.44	0.96	0.72	0.48		100*	112*	132*				
	1702.50	0.82	20000	1.72	1.14	0.86	0.57		100*	112*	132*				
	1413.66	**0.99**	20000	2.07	1.38	1.04	0.69	90	100*	112*					
	1147.52	**1.20**	20000	2.56	1.70	1.28	0.85	90	100*	112*	132*	160*			
	944.01	**1.50**	20000	3.11	2.06	1.55	1.03	90	100	112*	132*	160*			
	817.82	**1.70**	20000	3.59	2.38	1.79	1.19	90	100	112*	132*	160*	180*		
	642.57	**2.20**	20000	4.56	3.03	2.28	1.52	90	100	112	132*	160*	180*		
	468.19	**3.00**	20000	6.26	4.16	3.13	2.08	90	100	112	132*	160*	180*		
	341.11	**4.10**	20000	8.60	5.71	4.30	2.85		100	112	132*	160*	180*		
	296.56	**4.70**	20000	9.89	6.57	4.94	3.28	90	100	112	132	160*	180*		
	244.66	**5.70**	20000	11.98	7.96	5.99	3.98		100	112	132	160*	180*		
	184.77	**7.60**	20000	15.87	10.54	7.93	5.27		100	112	132	160	180*		
	154.79	**9.00**	20000	18.94	12.58	9.47	6.29		100	112	132	160	180*		
	122.75	**11.40**	20000	*22.00*	*14.52*	*11.00*	*7.26*					160	180		
	105.49	**13.30**	20000	*22.00*	*14.52*	*11.00*	*7.26*					160	180		

DIN 42677' ye göre IEC Adaptöre Bağlanacak Motor Boyutu

According to DIN 42677 IEC motor power depend on pole number of motor.

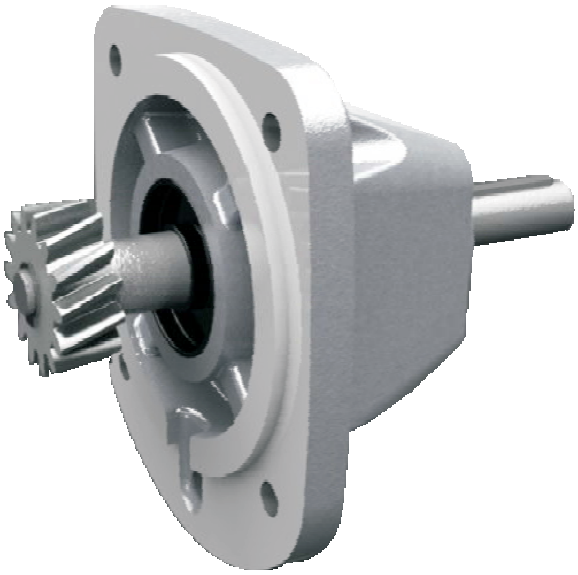
	IEC bağlantısı yoktur - No IEC assembling on empty fields
63	**IEC bağlantısı yapılır -** IEC assembling available on numbered fields
80*	**IEC bağlantısı yapılacaksa P_{1max} değerleri aşılmamalıdır -** Do not exceed the P_{1max} values indicated on fields with asterisk

Tip Type	Tahvil Reduction i_{ges}	Çıkış Hızı Output speed 4-pol. 50 Hz 1400rpm n_2 [min^{-1}]	M_{amax} f_B=1 4 - pol. [Nm]	Max. Giriş Gücü Max. Input Power P_{1max} W $f_B \geq 1$ 4 - pol. 1400rpm [kW]	6 - pol. 930rpm [kW]	8 - pol. 700rpm [kW]	12 - pol. 465rpm [kW]	IEC f_B ⇨ 📖 43 - 80								DIN 42677' ye göre IEC Adaptöre Bağlanacak Motor Boyutu According to DIN 42677 IEC motor power depend on pole number of motor.
PA 103 **PF 103** **W** mm 📖 144 - 145 **+** **IEC** mm 📖 162 - 163	207.36	6.80	23160	16.37	10.88	8.19	5.44	132	160	180*					
	136.52	10.30	23000	24.70	16.41	12.35	8.20		160	180	200*				
	112.57	12.40	23160	30.16	20.04	15.08	10.02				200*	225*			
	81.46	**17.20**	20500	36.89	24.51	18.45	12.25	132	160	180	200	225*			
	70.42	**19.90**	20000	41.64	27.66	20.82	13.83	132	160	180	200	225*	250*		
	60.75	**23.00**	20000	48.26	32.06	24.13	16.03	132	160	180	200	225	250*	280*	
	53.00	**26.40**	20000	55.32	36.75	27.66	18.37	132	160	180	200	225	250*	280*	315*
	45.33	**30.90**	20000	64.68	42.97	32.34	21.48	132	160	180	200	225	250	280*	315*
	37.97	**36.90**	20000	77.22	51.29	38.61	25.65	132	160	180	200	225	250	280*	315*
	29.62	**47.30**	20000	98.99	65.75	49.49	32.88	132	160	180	200	225	250	280	315*
	25.33	**55.30**	20000	*110.00*	*72.60*	*55.00*	*36.30*	132	160	180	200	225	250	280	315*
	21.22	**66.00**	20000	*110.00*	*72.60*	*55.00*	*36.30*	132	160	180	200	225	250	280	315*
PA 102 **PF 102** **W** mm 📖 144 - 145 **+** **IEC** mm 📖 162 - 163	38.77	36.10	16059	60.72	40.34	30.36	20.17								
	19.35	**72.40**	16808	127.34	84.59	63.67	42.29	250	280	315					
	16.61	**84.30**	17367	153.28	101.82	76.64	50.91	250	280	315*					
	14.29	**98.00**	16620	170.50	113.26	85.25	56.63	250	280	315*					
	11.85	**118.10**	15773	195.13	129.62	97.56	64.81	250	280	315*					
	9.94	**140.80**	15004	*200.00*	*132.00*	*100.00*	*66.00*	250	280	315					
	7.51	**186.40**	11270	*200.00*	*132.00*	*100.00*	*66.00*	250	280	315					
	6.23	**224.70**	11491	*200.00*	*132.00*	*100.00*	*66.00*	250	280	315					
	5.23	**267.70**	10602	*200.00*	*132.00*	*100.00*	*66.00*	250	280	315					
	4.28	**327.10**	9387	*200.00*	*132.00*	*100.00*	*66.00*			315					

	IEC bağlantısı yoktur - No IEC assembling on empty fields
63	**IEC bağlantısı yapılır -** IEC assembling available on numbered fields
80*	**IEC bağlantısı yapılacaksa P_{1max} değerleri aşılmamalıdır -** Do not exceed the P_{1max} values indicated on fields with asterisk

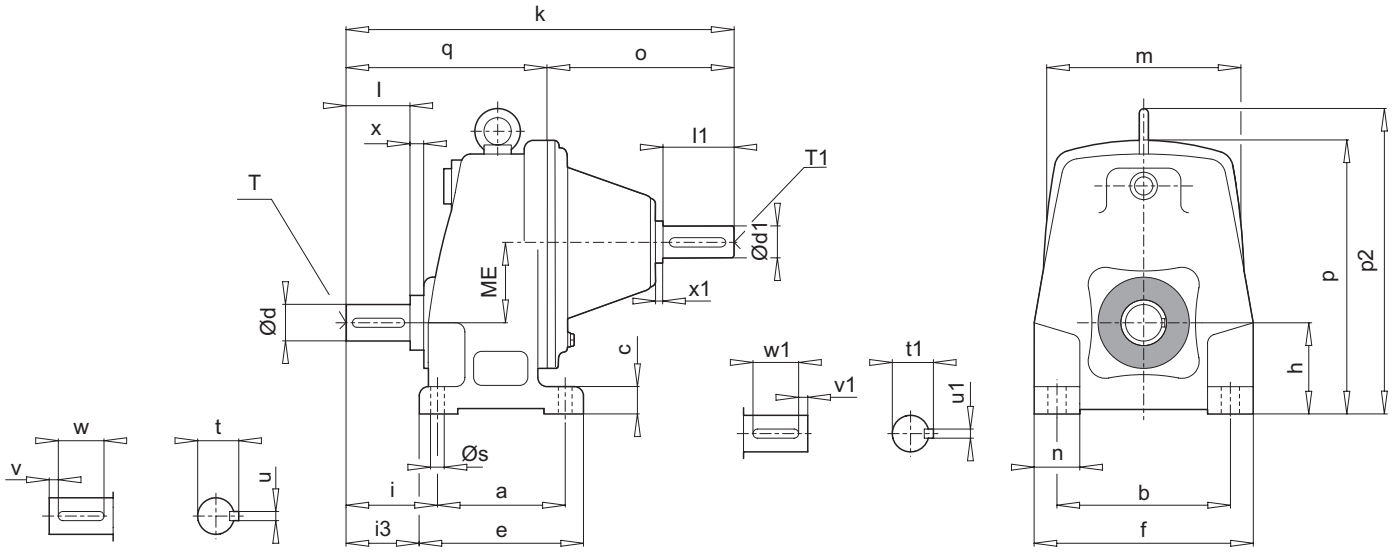
PGR®
Drive Technologies

W - IEC Seçim Sayfaları
Selection Of W - IEC

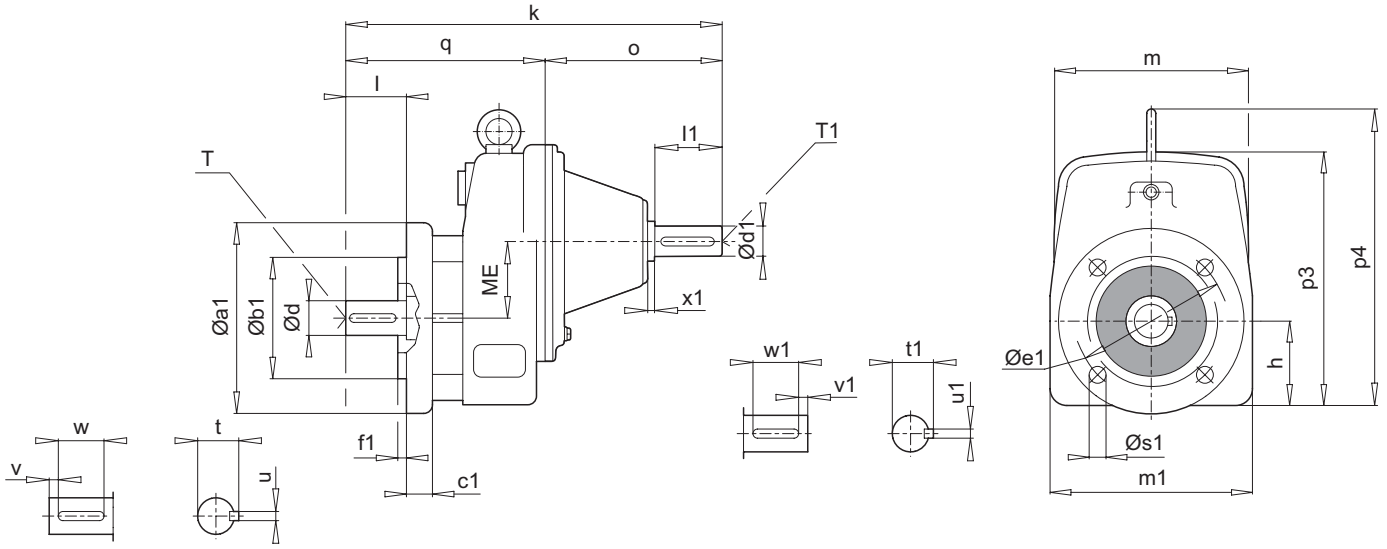


W

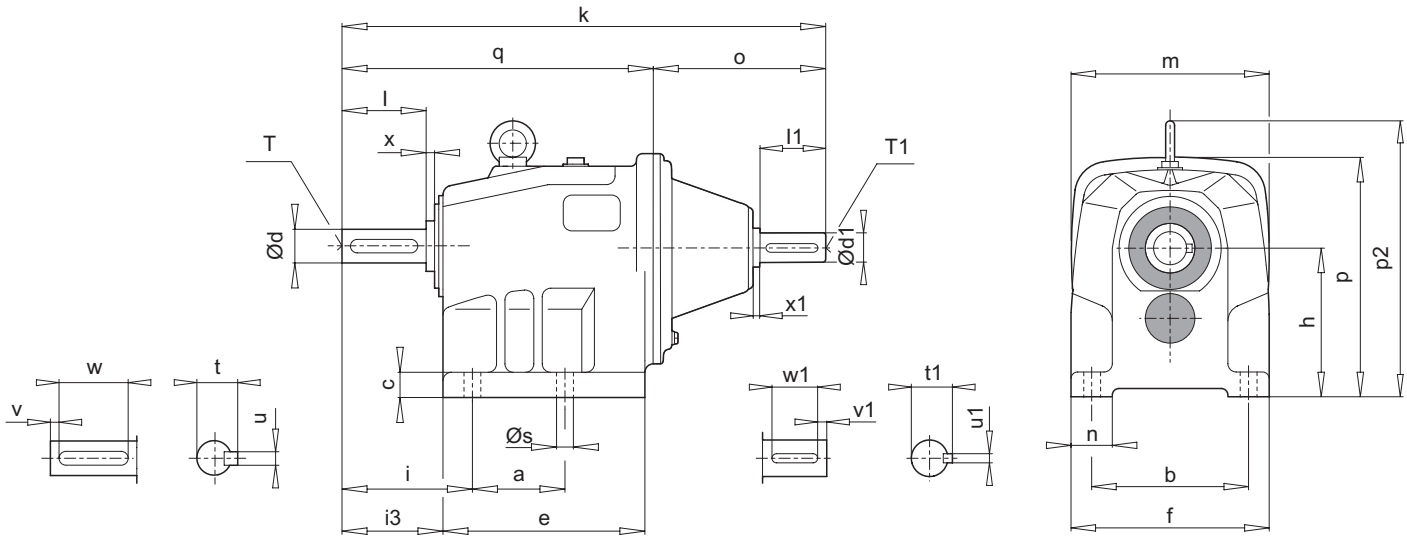
IEC



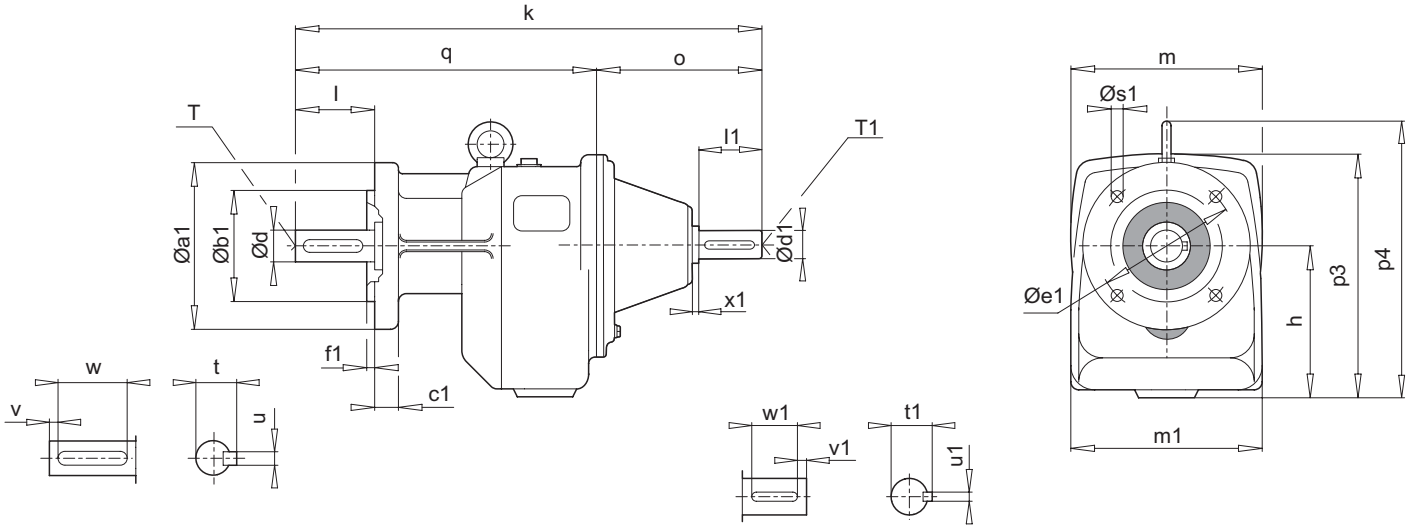
Tip Type	Montaj ölçüleri (Ayak) Mounting dimensions (Foot)							Ana ölçüler Outline dimensions										Çıkış Şaftı Output Shaft				Giriş Şaftı Input Shaft			
	a	**b**	**c**	**e**	**f**	**n**	**s**	**h**	**i**	**i3**	**k**	**m**	**o**	**p**	**p2**	**q**	**ME**	**d** **l**	**t** **u**	**v** **w**	**x** **T**	**d1** **l1**	**t1** **u1**	**v1** **w1**	**x1** **T1**
PA 11 + W	80	105	16	100	135	30	9	56	56	46	248	132	122	171	-	126	50	20 40	22.5 6	4 32	4 M6	16 40	18 5	4 32	7 M5
PA 21 + W	115	160	20	140	185	30	11	71	66	53.5	325	202	172	232	-	153	61	25 50	28.0 8	5 40	5 M10	24 50	27 8	5 40	8 M8
PA 31 + W	135	175	22	165	212	35	13	85	79	64	359	212	172	263	308	187	76	30 60	33.0 8	5 50	6 M10	24 50	27 8	5 40	8 M8
PA 41 + W	165	175	28	205	215	40	13	100	94	74	431	252	213	311	364	218	86	35 70	38.0 10	7 56	6 M12	38 80	41 10	5 70	8 M12
PA 51 + W	180	215	33	220	260	45	18	112	104	84	449	252	213	343	405	236	106	40 80	43.0 12	5 70	6 M16	38 80	41 10	5 70	8 M12



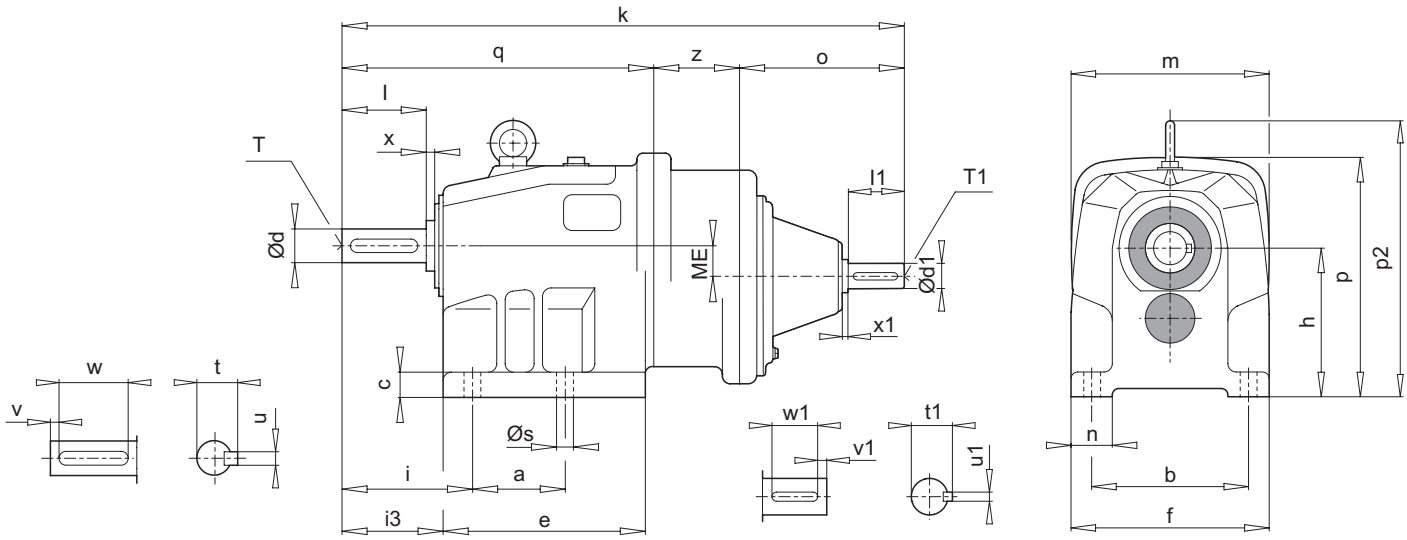
Tip Type	Montaj ölçüleri (Flanş) Mounting dimensions (Flange)						Ana ölçüler Outline dimensions									Çıkış Şaftı Output Shaft				Giriş Şaftı Input Shaft			
	a1	**b1**	**c1**	**e1**	**f1**	**s1**	**h**	**k**	**m**	**m1**	**o**	**p3**	**p4**	**q**	**ME**	**d** **l**	**t** **u**	**v** **w**	**T**	**d1** **l1**	**t1** **u1**	**v1** **w1**	**x1** **T1**
PF 11 + W	120 140	80 95	10 10	100 115	3.0 3.0	7 9	56	248	132	135	122	171	-	126	50	20 40	22.5 6	4 32	M6	16 40	18 5	4 32	7 M5
PF 21 + W	140 160	95 110	10 10	115 130	3.0 3.5	9 9	66	325	202	185	172	227	-	153	61	25 50	28.0 8	5 40	M10	24 50	27 8	5 40	8 M8
PF 31 + W	200	130	12	165	3.5	11	82	359	202	210	172	260	305	187	76	30 60	33.0 8	5 50	M10	24 50	27 8	5 40	8 M8
PF 41 + W	200 250	130 180	14 16	165 215	3.5 4.0	11 14	91	431	252	215	213	302	355	218	86	35 70	38.0 10	7 56	M12	38 80	41 10	5 70	8 M12
PF 51 + W	250 300	180 230	16 20	215 265	4.0 4.0	14 14	110	449	252	260	213	341	403	236	106	40 80	43.0 12	5 70	M16	38 80	41 10	5 70	8 M12



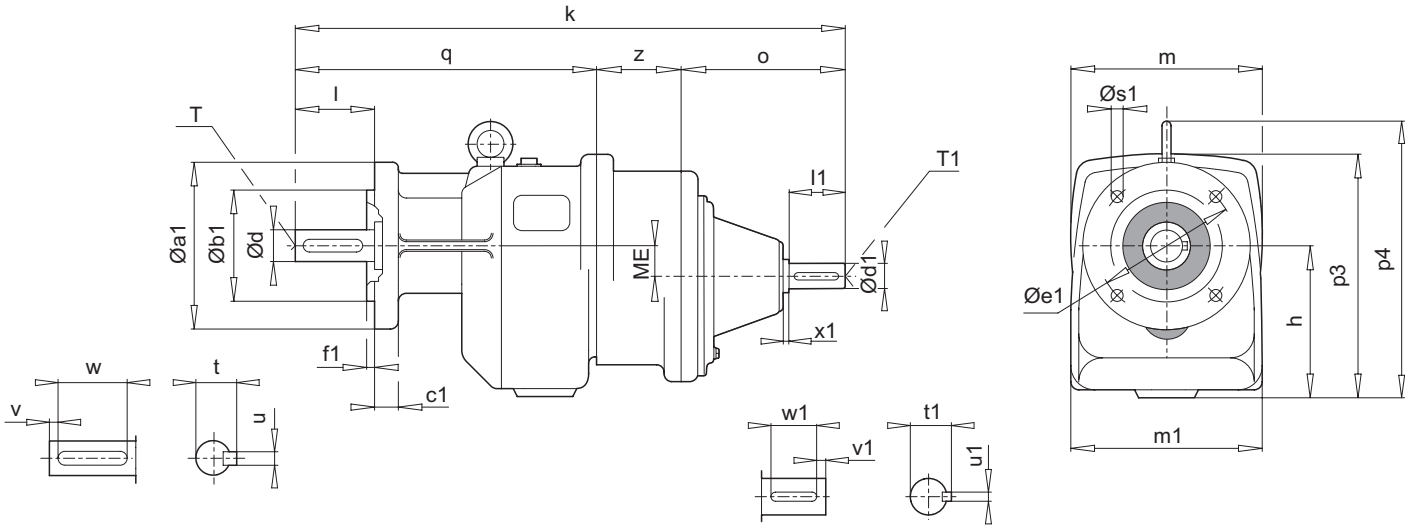
Tip Type	Montaj ölçüleri (Ayak) Mounting dimensions (Foot)							Ana ölçüler Outline dimensions									Çıkış Şaftı Output Shaft				Giriş Şaftı Input Shaft			
	a	**b**	**c**	**e**	**f**	**n**	**s**	**h**	**i**	**i3**	**k**	**m**	**o**	**p**	**p2**	**q**	**d** **l**	**t** **u**	**v** **w**	**x** **T**	**d1** **l1**	**t1** **u1**	**v1** **w1**	**x1** **T1**
PA 02 + W	60	110	17	134	130	25	9	88	52	43	305	130	122	152	-	183	20 40	22.5 6	5 32	4 M6	16 40	18 5	4 32	7 M5
PA 12 + W	62	105	20	139	135	30	9	104	78	60	328	130	122	169	-	206	25 50	28.0 8	6 40	4 M10	16 40	18 5	4 32	7 M5
PA 22 + W	80	160	23	175	185	30	11	127	74	59	412	200	172	226	-	240	30 60	33.0 8	8 50	5 M10	24 50	27 8	5 40	8 M8
PA 32 + W	120	185	27	214	210	40	13	159	96	79	472	200	172	260	292	300	40 80	43.0 12	5 70	6 M16	24 50	27 8	5 40	8 M8
PA 42 + W	120	175	32	239	215	40	13	179	130	106	565	250	213	302	327	352	45 90	48.5 14	5 80	6 M16	38 80	41 10	5 70	8 M12
PA 52 + W	150	220	44	283	260	45	18	218	140	120	624	250	213	339	385	411	55 110	59.0 16	10 90	6 M20	38 80	41 10	5 70	8 M12



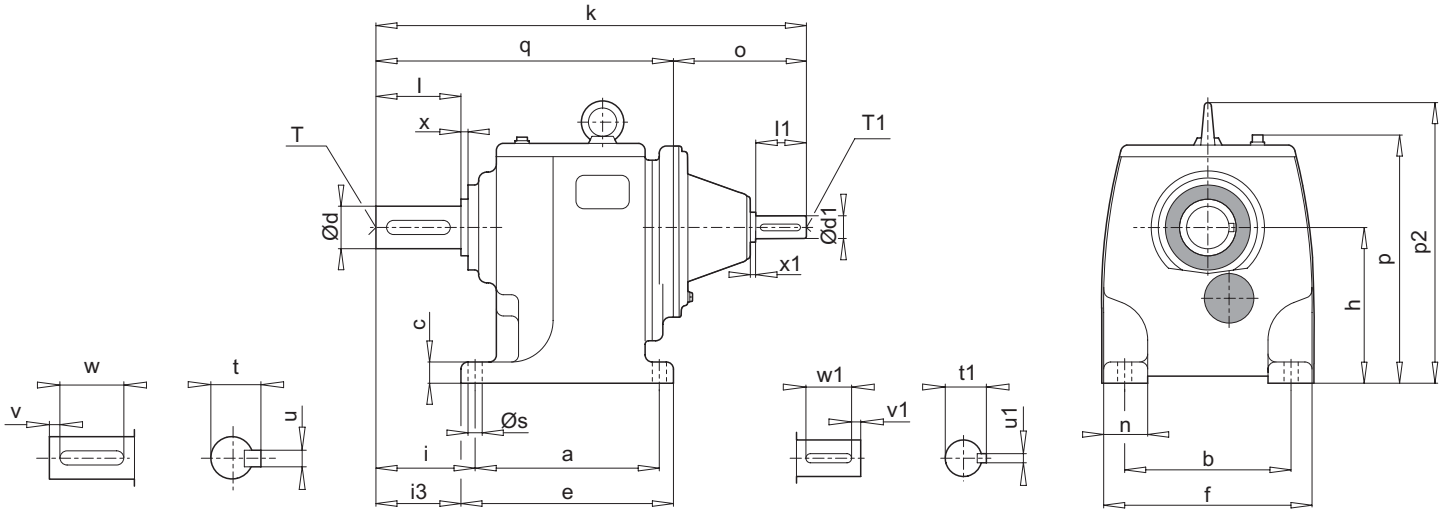
Tip Type	Montaj ölçüleri (Flanş) Mounting dimensions (Flange)						Ana ölçüler Outline dimensions								Çıkış Şaftı Output Shaft				Giriş Şaftı Input Shaft			
	a1	**b1**	**c1**	**e1**	**f1**	**s1**	**h**	**k**	**m**	**m1**	**o**	**p3**	**p4**	**q**	**d** **l**	**t** **u**	**v** **w**	**T**	**d1** **l1**	**t1** **u1**	**v1** **w1**	**x1** **T1**
PF 02 + W	120 140 160	80 95 110	11 11 11	100 115 130	3.0 3.0 3.5	7 9 9	91	305	130	130	122	155	-	183	20 40	22.5 6	5 32	M6	16 40	18 5	4 32	7 M5
PF 12 + W	120 140 160	80 95 110	13 13 13	100 115 130	3.0 3.0 3.5	7 9 9	108	328	130	135	122	175	-	206	25 50	28.0 8	6 40	M10	16 40	18 5	4 32	7 M5
PF 22 + W	160 200	110 130	13 14	130 165	3.5 3.5	9 11	127	412	200	185	172	226	-	240	30 60	33.0 8	8 50	M10	24 50	27 8	5 40	8 M8
PF 32 + W	200 250	130 180	14 16	165 215	3.5 4.0	11 14	159	472	200	210	172	260	292	300	40 80	43.0 12	5 70	M16	24 50	27 8	5 40	8 M8
PF 42 + W	200 250	130 180	14 16	165 215	3.5 4.0	11 14	179	565	250	215	213	302	327	352	45 90	48.5 14	5 80	M16	38 80	41 10	5 70	8 M12
PF 52 + W	250 300	180 230	16 20	215 265	4.0 4.0	14 14	218	624	250	260	213	339	385	411	55 110	59.0 16	10 90	M20	38 80	41 10	5 70	8 M12



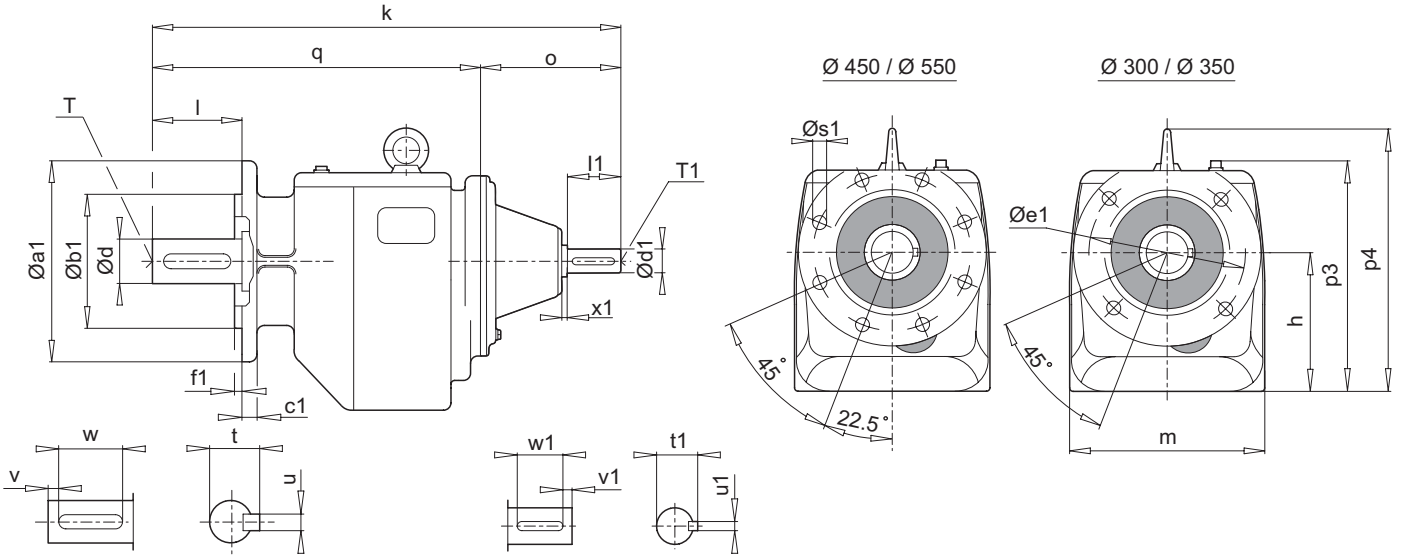
Tip Type	Montaj ölçüleri (Ayak) Mounting dimensions (Foot)							Ana ölçüler Outline dimensions											Çıkış Şaftı Output Shaft				Giriş Şaftı Input Shaft			
	a	**b**	**c**	**e**	**f**	**n**	**s**	**h**	**i**	**i3**	**k**	**m**	**o**	**p**	**p2**	**q**	**z**	**ME**	**d** **l**	**t** **u**	**v** **w**	**x** **T**	**d1** **l1**	**t1** **u1**	**v1** **w1**	**x1** **T1**
PA 03 + W	60	110	17	134	130	25	9	88	52	43	363	130	122	152	-	183	58	30.0	20 40	22.5 6	5 32	4 M6	16 40	18 5	4 32	7 M5
PA 13 + W	62	105	20	139	135	30	9	104	78	60	386	130	122	169	-	206	58	30.0	25 50	28.0 8	6 40	4 M10	16 40	18 5	4 32	7 M5
PA 23 + W	80	160	23	175	185	30	11	127	74	59	422	200	122	226	-	240	60	42.5	30 60	33.0 8	8 50	5 M10	16 40	18 5	4 32	7 M5
PA 33 + W	120	185	27	214	210	40	13	159	96	79	482	200	122	260	292	300	60	50.0	40 80	43.0 12	5 70	6 M16	16 40	18 5	4 32	7 M5
PA 43 + W	120	175	32	239	215	40	13	179	130	106	593	250	172	302	327	352	69	61.0	45 90	48.5 14	5 80	6 M16	24 50	27 8	5 40	8 M8
PA 53 + W	150	220	44	283	260	45	18	218	140	120	652	250	172	339	385	411	69	76.0	55 110	59.0 16	10 90	6 M20	24 50	27 8	5 40	8 M8



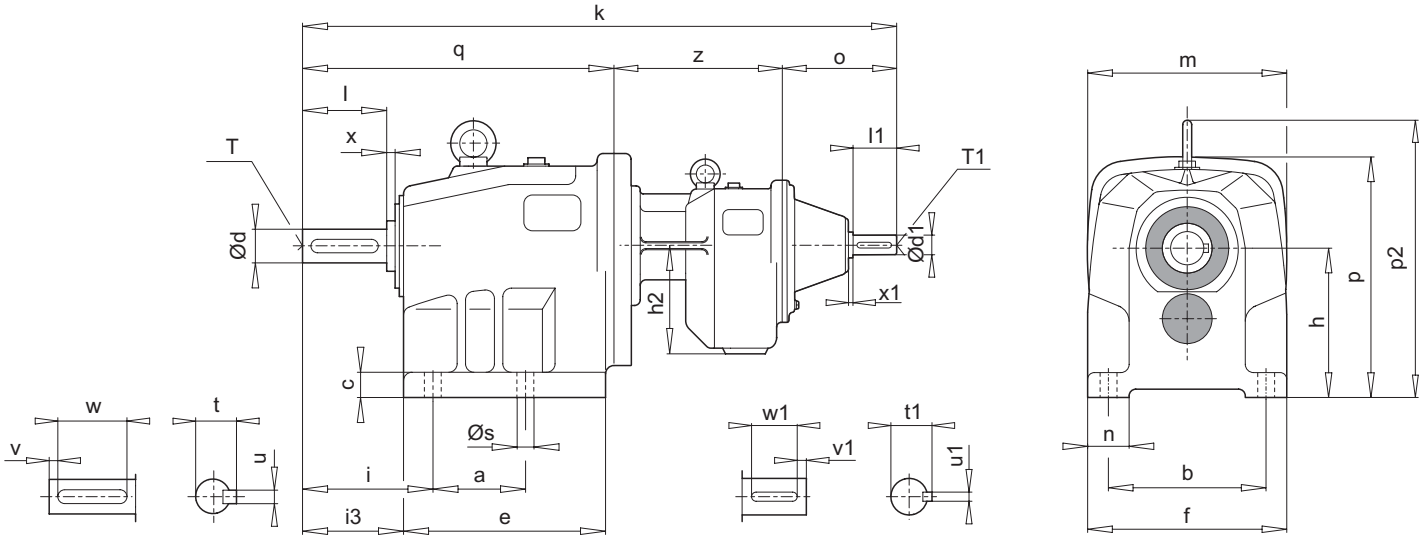
Tip Type	Montaj ölçüleri (Flanş) Mounting dimensions (Flange)						Ana ölçüler Outline dimensions										Çıkış Şaftı Output Shaft				Giriş Şaftı Input Shaft			
	a1	b1	c1	e1	f1	s1	h	k	m	m1	o	p3	p4	q	z	ME	d l	t u	v w	T	d1 l1	t1 u1	v1 w1	x1 T1
PF 03 + W	120 140 160	80 95 110	11 11 11	100 115 130	3.0 3.0 3.5	7 9 9	91	363	130	130	122	155	-	183	58	30.0	20 40	22.5 6	5 32	M6	16 40	18 5	4 32	7 M5
PF 13 + W	120 140 160	80 95 110	13 13 13	100 115 130	3.0 3.0 3.5	7 9 9	108	386	130	135	122	175	-	206	58	30.0	25 50	28.0 8	6 40	M10	16 40	18 5	4 32	7 M5
PF 23 + W	160 200	110 130	13 14	130 165	3.5 3.5	9 11	127	422	200	185	122	226	-	240	60	42.5	30 60	33.0 8	8 50	M10	16 40	18 5	4 32	7 M5
PF 33 + W	200 250	130 180	14 16	165 215	3.5 4.0	11 14	159	482	200	210	122	260	292	300	60	50.0	40 80	43.0 12	5 70	M16	16 40	18 5	4 32	7 M5
PF 43 + W	200 250	130 180	14 16	165 215	3.5 4.0	11 14	179	593	250	215	172	302	327	352	69	61.0	45 90	48.5 14	5 80	M16	24 50	27 8	5 40	8 M8
PF 53 + W	250 300	180 230	16 20	215 265	4.0 4.0	14 14	218	652	250	260	172	339	385	411	69	76.0	55 110	59.0 16	10 90	M20	24 50	27 8	5 40	8 M8



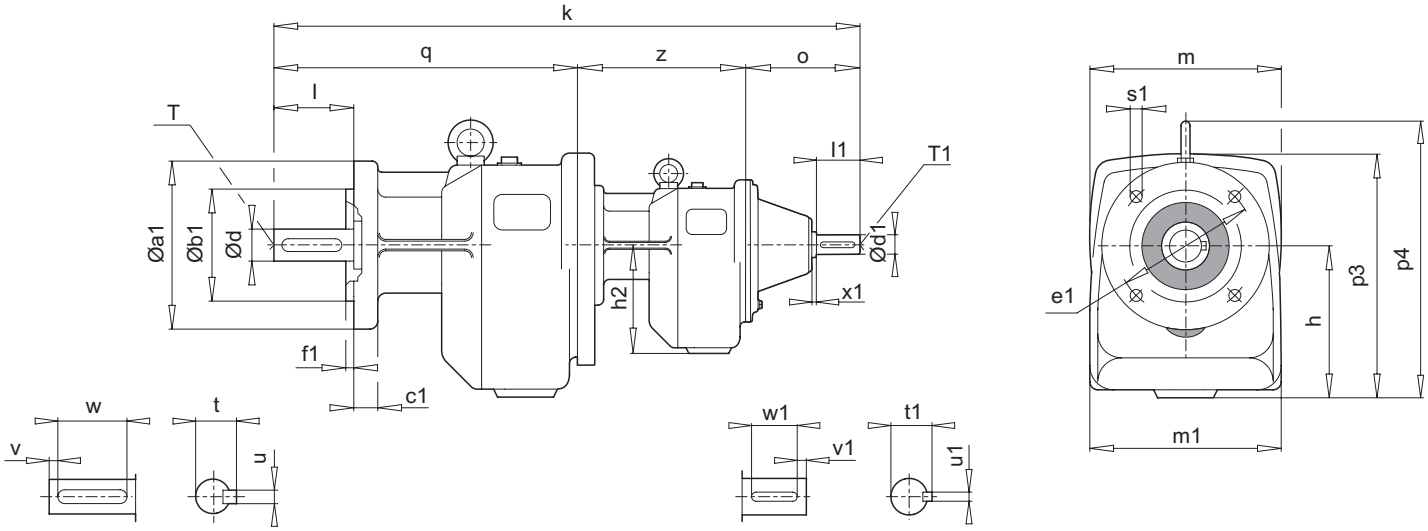
Tip Type	Montaj ölçüleri (Ayak) Mounting dimensions (Foot)							Ana ölçüler Outline dimensions								Çıkış Şaftı Output Shaft				Giriş Şaftı Input Shaft			
	a	**b**	**c**	**e**	**f**	**n**	**s**	**h**	**i**	**i3**	**k**	**o**	**p**	**p2**	**q**	**d** **l**	**t** **u**	**v** **w**	**x** **T**	**d1** **l1**	**t1** **u1**	**v1** **w1**	**x1** **T1**
PA 63 + W	295	260	46	345	330	72	22	250	164	141	675	213	400	480	462	65 130	69.0 18	15 100	6 M20	38 80	41 10	5 70	8 M12
PA 62 + W	295	260	46	345	330	72	22	250	164	141	776	288	400	480	488	65 130	69.0 18	15 100	6 M20	42 110	45 12	10 90	8 M16
PA 73 + W	330	325	56	385	400	72	26	280	179	151	820	288	447	550	532	75 140	79.5 20	7.5 125	6 M20	42 110	45 12	10 90	8 M16
PA 72 + W	330	325	56	385	400	72	26	280	179	151	813	288	447	550	525	75 140	79.5 20	7.5 125	6 M20	42 110	45 12	10 90	8 M16
PA 83 + W	400	360	56	472	450	92	33	315	215	178	899	288	512	639	611	90 170	95.0 25	15 140	6 M24	42 110	45 12	10 90	8 M16
PA 82 + W	400	360	56	472	450	92	33	315	215	178	1024	397	512	639	627	90 170	95.0 25	15 140	6 M24	65 140	69 18	15 110	12 M20
PA 93 + W	450	440	72	540	550	115	33	390	265	220	992	288	622	783	704	110 210	116 28	15 180	8 M24	42 110	45 12	10 90	8 M16
PA 92 + W	450	440	72	540	550	115	33	390	265	220	1115	397	622	783	718	110 210	116 28	15 180	8 M24	65 140	69 18	15 110	12 M20
PA 103 + W	505	480	82	625	600	125	45	450	320	260	1214	397	702	887	817	130 250	137 32	15 220	10 M24	65 140	69 18	15 110	12 M20
PA 102 + W	505	480	82	625	600	125	45	450	320	260	1205	397	702	887	808	130 250	137 32	15 220	10 M24	65 140	69 18	15 110	12 M20



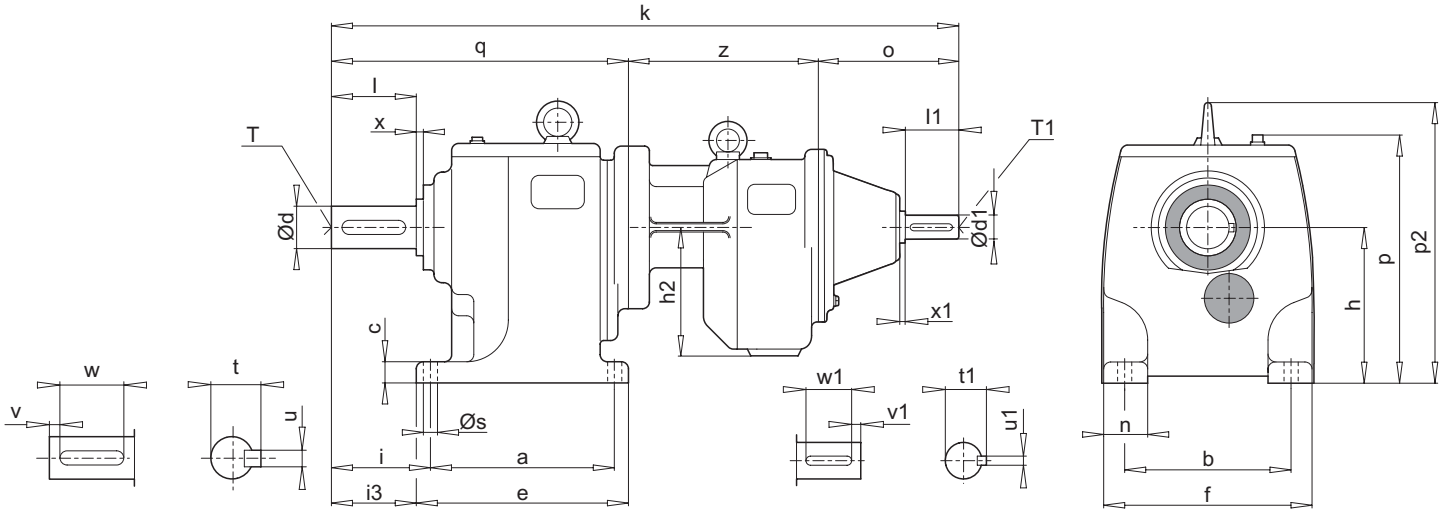
Tip Type	Montaj ölçüleri (Flanş) Mounting dimensions (Flange)						Ana ölçüler Outline dimensions							Çıkış Şaftı Output Shaft				Giriş Şaftı Input Shaft			
	a1	b1	c1	e1	f1	s1	h	k	m	o	p3	p4	q	d l	t u	v w	T	d1 l1	t1 u1	v1 w1	x1 T1
PF 63 + W	300	230	24	265	4.0	14	245	719	330	213	395	475	506	65 130	69.0 18	15 100	M20	38 80	41 10	5 70	8 M12
PF 62 + W	300	230	24	265	4.0	14	245	820	330	288	395	475	532	65 130	69.0 18	15 100	M20	42 110	45 12	10 90	8 M16
PF 73 + W	350	250	24	300	5.0	18	275	885	400	288	442	545	597	75 140	79.5 20	7.5 125	M20	42 110	45 12	10 90	8 M16
PF 72 + W	350	250	24	300	5.0	18	275	878	400	288	442	545	590	75 140	79.5 20	7.5 125	M20	42 110	45 12	10 90	8 M16
PF 83 + W	450	350	26	400	5.0	18	309	975	450	288	506	633	687	90 170	95.0 25	15 140	M24	42 110	45 12	10 90	8 M16
PF 82 + W	450	350	26	400	5.0	18	309	1100	450	397	506	633	703	90 170	95.0 25	15 140	M24	65 140	69 18	15 110	12 M20
PF 93 + W	450	350	28	400	5.0	18	384	1063	550	288	616	777	775	110 210	116 28	15 180	M24	42 110	45 12	10 90	8 M16
PF 92 + W	450	350	28	400	5.0	18	384	1186	550	397	616	777	789	110 210	116 28	15 180	M24	65 140	69 18	15 110	12 M20
PF 103 + W	550	450	32	500	5.0	18	442	1299	600	397	706	879	902	130 250	137 32	15 220	M24	65 140	69 18	15 110	12 M20
PF 102 + W	550	450	32	500	5.0	18	442	1290	600	397	706	879	893	130 250	137 32	15 220	M24	65 140	69 18	15 110	12 M20



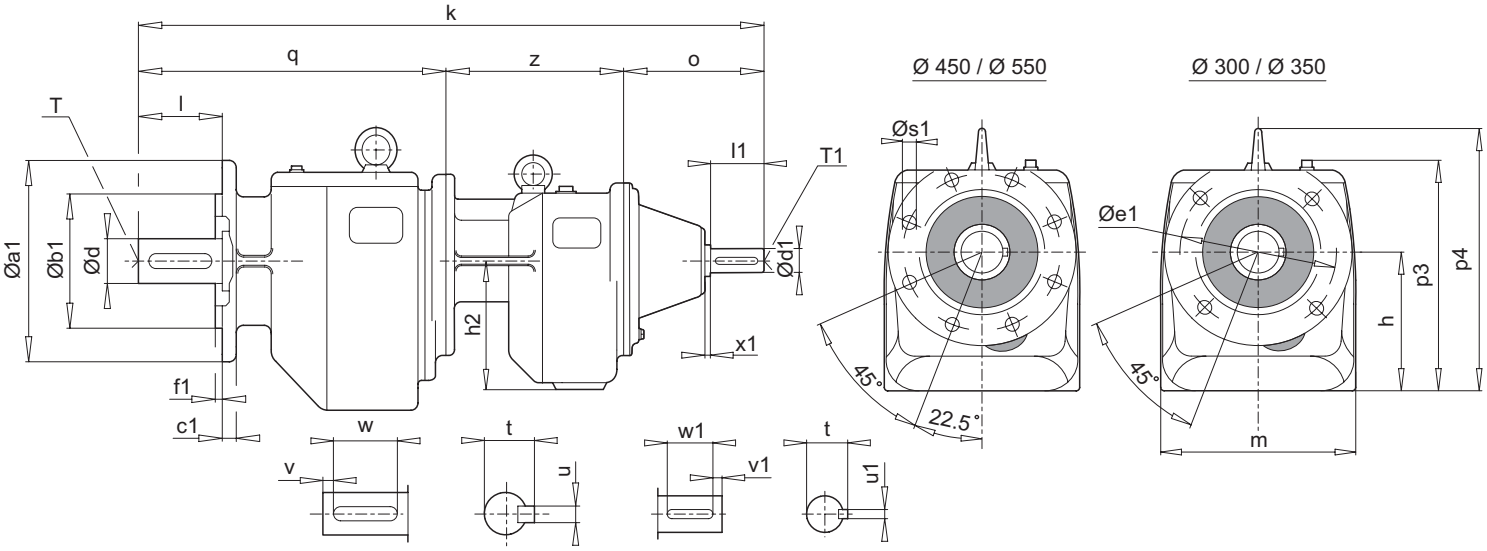
Tip Type	Montaj ölçüleri (Ayak) Mounting dimensions (Foot)							Ana ölçüler Outline dimensions											Çıkış Şaftı Output Shaft				Giriş Şaftı Input Shaft			
	a	**b**	**c**	**e**	**f**	**n**	**s**	**h**	**h2**	**i**	**i3**	**k**	**m**	**o**	**p**	**p2**	**q**	**z**	**d** **l**	**t** **u**	**v** **w**	**x** **T**	**d1** **l1**	**t1** **u1**	**v1** **w1**	**x1** **T1**
PA 12/02 + W	62	105	20	139	135	30	9	104	91	78	60	470	160	122	169	-	206	142	25 50	28.0 8	6 40	4 M10	16 40	18 5	4 32	7 M5
PA 22/02 + W	80	160	23	175	185	30	11	127	91	74	59	520	200	122	226	-	240	158	30 60	33.0 8	8 50	5 M10	16 40	18 5	4 32	7 M5
PA 32/12 + W	120	185	27	214	210	40	13	159	108	96	79	593	200	122	260	292	300	171	40 80	43.0 12	5 70	6 M16	16 40	18 5	4 32	7 M5
PA 42/12 + W	120	175	32	239	215	40	13	179	108	130	106	649	250	122	302	327	352	175	45 90	48.5 14	5 80	6 M16	16 40	18 5	4 32	7 M5
PA 52/12 + W	150	220	44	283	260	45	18	218	108	140	120	708	250	122	339	385	411	175	55 110	59.0 16	10 90	6 M20	16 40	18 5	4 32	7 M5



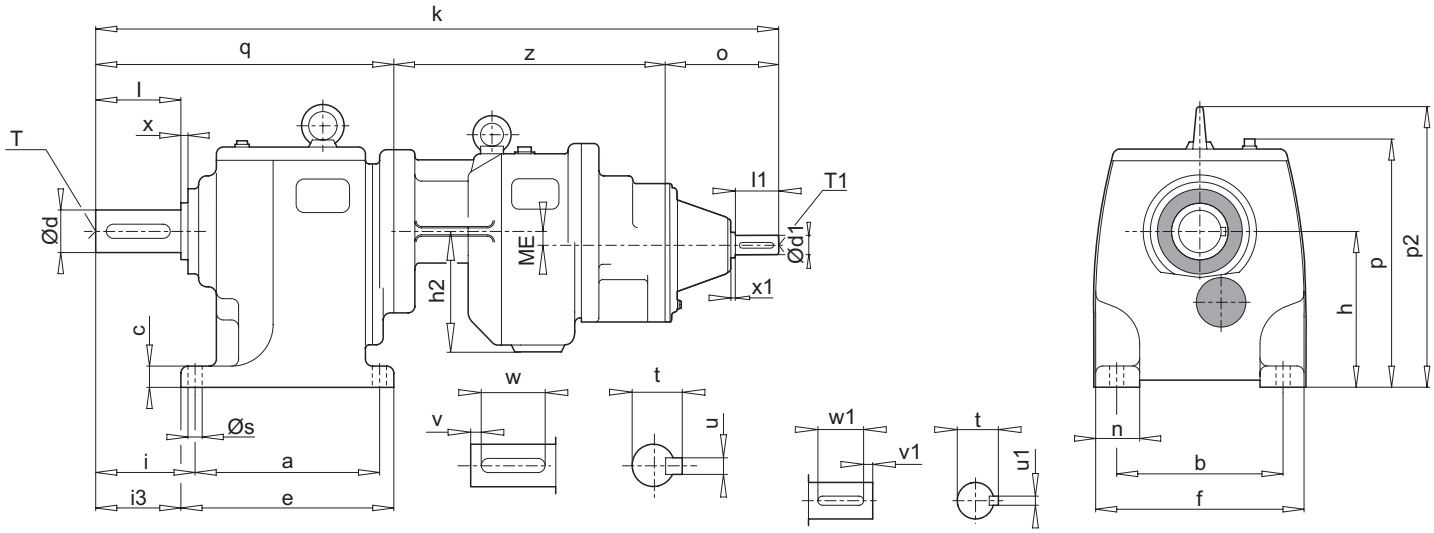
Tip Type	Montaj ölçüleri (Flanş) Mounting dimensions (Flange)						Ana ölçüler Outline dimensions										Çıkış Şaftı Output Shaft				Giriş Şaftı Input Shaft			
	a1	**b1**	**c1**	**e1**	**f1**	**s1**	**h**	**h2**	**k**	**m**	**m1**	**o**	**p3**	**p4**	**q**	**z**	**d** **l**	**t** **u**	**v** **w**	**T**	**d1** **l1**	**t1** **u1**	**v1** **w1**	**x1** **T1**
PF 12/02 + W	120 140 160	80 95 110	13 13 13	100 115 130	3.0 3.0 3.5	7 9 9	108	91	470	130	135	122	175	-	206	142	25 50	28.0 8	6 40	M10	16 40	18 5	4 32	7 M5
PF 22/02 + W	160 200	110 130	13 14	130 165	3.5 3.5	9 11	127	91	520	200	185	122	226	-	240	158	30 60	33.0 8	8 50	M10	16 40	18 5	4 32	7 M5
PF 32/12 + W	200 250	130 180	14 16	165 215	3.5 4.0	11 14	159	108	593	200	210	122	260	292	300	171	40 80	43.0 12	5 70	M16	16 40	18 5	4 32	7 M5
PF 42/12 + W	200 250	130 180	14 16	165 215	3.5 4.0	11 14	179	108	649	250	215	122	302	327	352	175	45 90	48.5 14	5 80	M16	16 40	18 5	4 32	7 M5
PF 52/12 + W	250 300	180 230	16 20	215 265	4.0 4.0	14 14	218	108	708	250	260	122	339	385	411	175	55 110	59.0 16	10 90	M20	16 40	18 5	4 32	7 M5



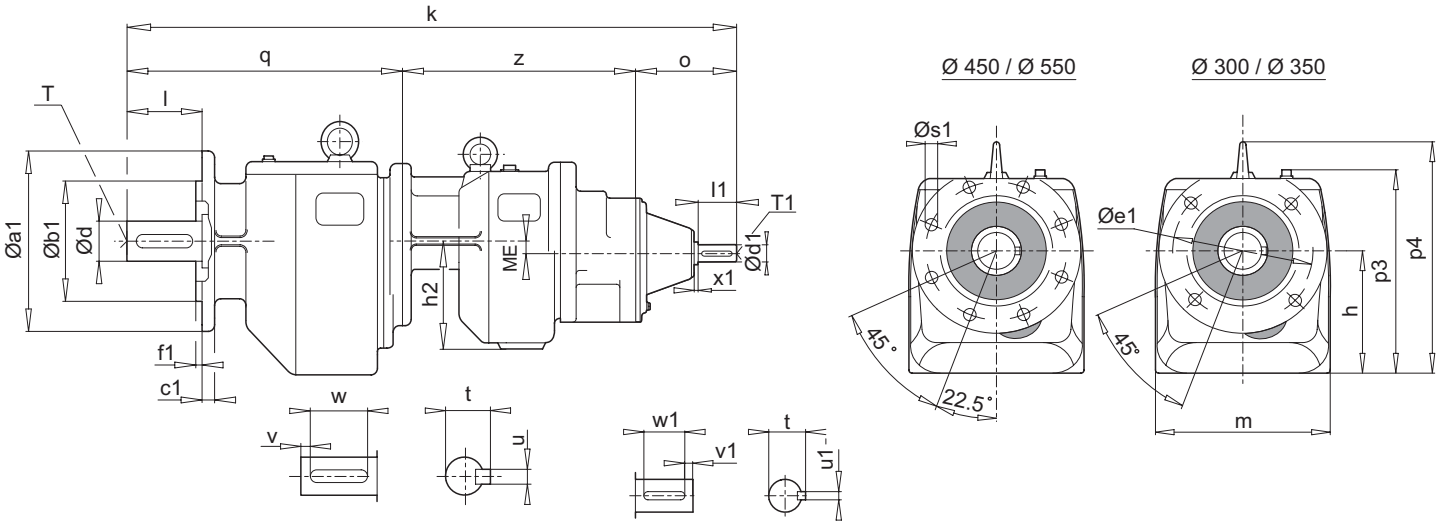
Tip Type	Montaj ölçüleri (Ayak) Mounting dimensions (Foot)							Ana ölçüler Outline dimensions										Çıkış Şaftı Output Shaft				Giriş Şaftı Input Shaft			
	a	b	c	e	f	n	s	h	h2	i	i3	k	o	p	p2	q	z	d l	t u	v w	x T	d1 l1	t1 u1	v1 w1	x1 T1
PA 63/22 + W	295	260	46	345	330	72	22	250	127	164	141	817	172	400	480	466	179	65 130	69.0 18	15 100	6 M20	24 50	27 8	5 40	8 M8
PA 73/22 + W	330	325	56	385	400	72	26	280	127	179	151	861	172	447	550	510	179	75 140	79.5 20	7.5 125	6 M20	24 50	27 8	5 40	8 M8
PA 73/32 + W	330	325	56	385	400	72	26	280	159	179	151	901	172	447	550	510	219	75 140	79.5 20	7.5 125	6 M20	24 50	27 8	5 40	8 M8
PA 83/32 + W	400	360	56	472	450	92	33	315	159	215	178	1003	172	512	639	612	219	90 170	95.0 25	15 140	6 M24	24 50	27 8	5 40	8 M8
PA 83/42 + W	400	360	56	472	450	92	33	315	179	215	178	1086	213	512	639	612	261	90 170	95.0 25	15 140	6 M24	38 80	41 10	5 70	8 M12
PA 93/42 + W	450	440	72	540	550	115	33	390	179	265	220	1177	213	622	783	703	261	110 210	116 28	15 180	8 M24	38 80	41 10	5 70	8 M12
PA 93/52 + W	450	440	72	540	550	115	33	390	218	265	220	1216	213	622	783	703	300	110 210	116 28	15 180	8 M24	38 80	41 10	5 70	8 M12
PA 103/52 + W	505	480	82	625	600	125	45	450	218	320	260	1314	213	702	887	801	300	130 250	137 32	15 220	10 M24	38 80	41 10	5 70	8 M12



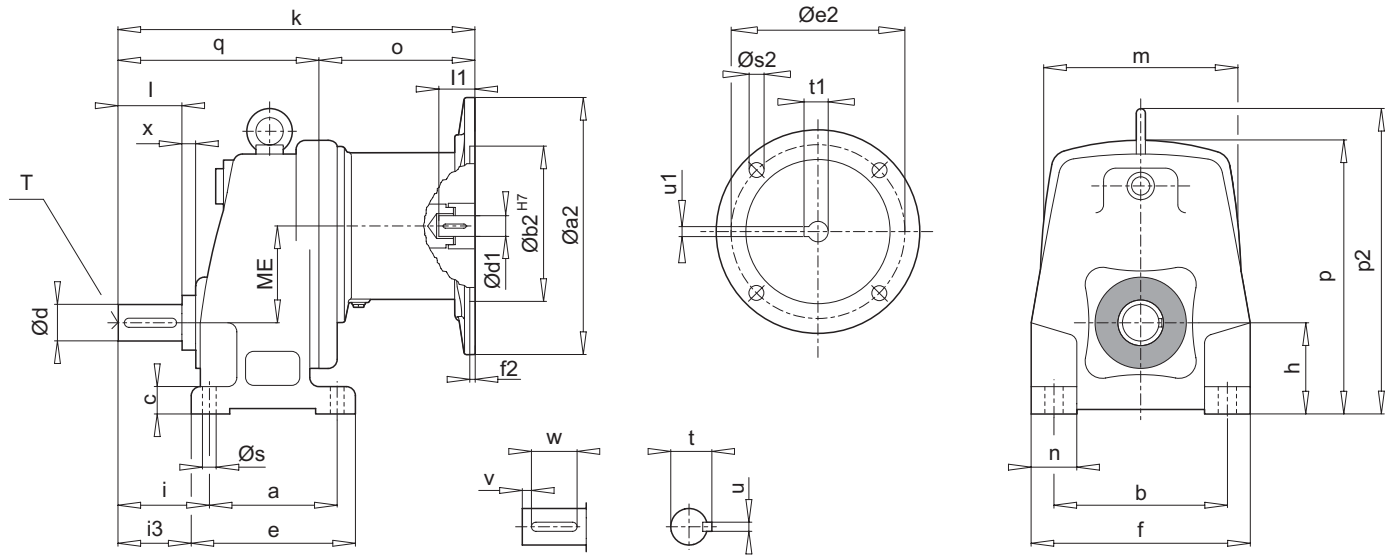
Tip Type	Montaj ölçüleri (Flanş) Mounting dimensions (Flange)						Ana ölçüler Outline dimensions									Çıkış Şaftı Output Shaft				Giriş Şaftı Input Shaft			
	a1	b1	c1	e1	f1	s1	h	h2	k	m	o	p3	p4	q	z	d l	t u	v w	T	d1 l1	t1 u1	v1 w1	x1 T1
PF 63/22 + W	300	230	24	265	4.0	14	245	127	861	330	172	395	475	510	179	65 130	69.0 18	15 100	M20	24 50	27 8	5 40	8 M8
PF 73/22 + W	350	250	24	300	5.0	18	275	127	926	400	172	442	545	575	179	75 140	79.5 20	7.5 125	M20	24 50	27 8	5 40	8 M8
PF 73/32 + W	350	250	24	300	5.0	18	275	159	966	400	172	442	545	575	219	75 140	79.5 20	7.5 125	M20	24 50	27 8	5 40	8 M8
PF 83/32 + W	450	350	26	400	5.0	18	309	159	1079	450	172	506	633	688	219	90 170	95.0 25	15 140	M24	24 50	27 8	5 40	8 M8
PF 83/42 + W	450	350	26	400	5.0	18	309	179	1162	450	213	506	633	688	261	90 170	95.0 25	15 140	M24	38 80	41 10	5 70	8 M12
PF 93/42 + W	450	350	28	400	5.0	18	384	179	1249	550	213	616	777	775	261	110 210	116 28	15 180	M24	38 80	41 10	5 70	8 M12
PF 93/52 + W	450	350	28	400	5.0	18	384	218	1288	550	213	616	777	775	300	110 210	116 28	15 180	M24	38 80	41 10	5 70	8 M12
PF 103/52 + W	550	450	32	500	5.0	18	442	218	1399	600	213	706	879	886	300	130 250	137 32	15 220	M24	38 80	41 10	5 70	8 M12



Tip Type	Montaj ölçüleri (Ayak) Mounting dimensions (Foot)							Ana ölçüler Outline dimensions											Çıkış Şaftı Output Shaft				Giriş Şaftı Input Shaft			
	a	b	c	e	f	n	s	h	h2	i	i3	k	o	p	p2	q	z	ME	d l	t u	v w	x T	d1 l1	t1 u1	v1 w1	x1 T1
PA 63/23 + W	295	260	46	345	330	72	22	250	127	164	141	828	122	400	480	466	240	42.5	65 130	69.0 18	15 100	6 M20	16 40	18 5	4 32	7 M5
PA 73/23 + W	330	325	56	385	400	72	26	280	127	179	151	872	122	447	550	510	240	42.5	75 140	79.5 20	7.5 125	6 M20	16 40	18 5	4 32	7 M5
PA 83/33 + W	400	360	56	472	450	92	33	315	159	215	178	1014	122	512	639	612	280	50.0	90 170	95.0 25	15 140	6 M24	16 40	18 5	4 32	7 M5
PA 93/43 + W	450	440	72	540	550	115	33	390	179	265	220	1206	172	622	783	703	331	61.0	110 210	116 28	15 180	8 M24	24 50	27 8	5 40	8 M8
PA 103/53 + W	505	480	82	625	600	125	45	450	218	320	260	1343	172	702	887	801	370	76.0	130 250	137 32	15 220	10 M24	24 50	27 8	5 40	8 M8

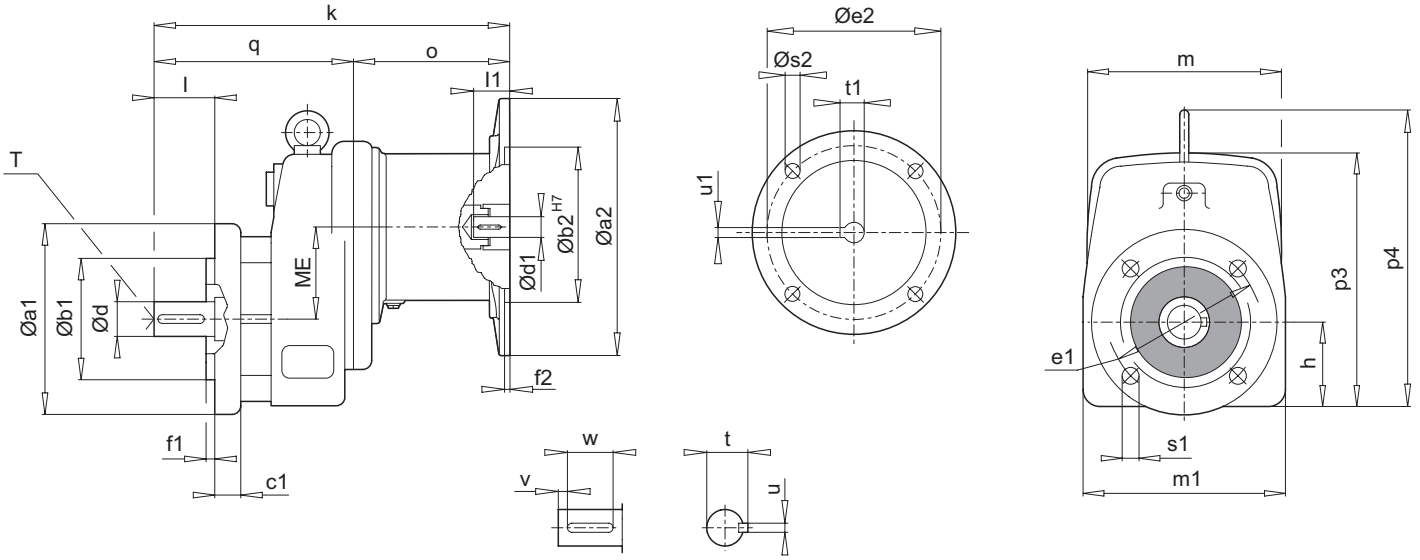


Tip Type	Montaj ölçüleri (Flanş) Mounting dimensions (Flange)						Ana ölçüler Outline dimensions										Çıkış Şaftı Output Shaft				Giriş Şaftı Input Shaft			
	a1	**b1**	**c1**	**e1**	**f1**	**s1**	**h**	**h2**	**k**	**m**	**o**	**p3**	**p4**	**q**	**z**	**ME**	**d** **l**	**t** **u**	**v** **w**	**T**	**d1** **l1**	**t1** **u1**	**v1** **w1**	**x1** **T1**
PF 63/23 + W	300	230	24	265	4.0	14	245	127	872	330	122	395	475	510	240	42.5	65 130	69.0 18	15 100	M20	16 40	18 5	4 32	7 M5
PF 73/23 + W	350	250	24	300	5.0	18	275	127	937	400	122	442	545	575	240	42.5	75 140	79.5 20	7.5 125	M20	16 40	18 5	4 32	7 M5
PF 83/33 + W	450	350	26	400	5.0	18	309	159	1090	450	122	506	633	688	280	50.0	90 170	95.0 25	15 140	M24	16 40	18 5	4 32	7 M5
PF 93/43 + W	450	350	28	400	5.0	18	384	179	1278	550	172	616	777	775	331	61.0	110 210	116 28	15 180	M24	24 50	27 8	5 40	8 M8
PF 103/53 + W	550	450	32	500	5.0	18	442	218	1428	600	172	706	879	886	370	76.0	130 250	137 32	15 220	M24	24 50	27 8	5 40	8 M8



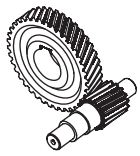
Tip Type		Montaj ölçüleri (Ayak) Mounting dimensions (Foot)							Ana ölçüler Outline dimensions										Şaft Ölçüleri Shaft Dimensions			
		a	b	c	e	f	n	s	h	i	i3	k	m	o	p	p2	q	ME	d l	t u	v w	x T
PA 11	- IEC 63	80	105	16	100	135	30	9	56	56	46	211	132	85	171	-	126	50	20 40	22.5 6	4 32	4 M6
	- IEC 71											215		89								
	- IEC 80											231		105								
	- IEC 90											231		105								
	- IEC 100											256		130								
	- IEC 112											256		130								
PA 21	- IEC 71	115	160	20	140	185	30	11	71	66	53.5	241	202	88	232	-	153	61	25 50	28.0 8	5 40	5 M10
	- IEC 80											260		107								
	- IEC 90											260		107								
	- IEC 100											277		124								
	- IEC 112											277		124								
PA 31	- IEC 71	135	175	22	165	212	35	13	85	79	64	275	212	88	263	308	187	76	30 60	33.0 8	5 50	6 M10
	- IEC 80											294		107								
	- IEC 90											294		107								
	- IEC 100											311		124								
	- IEC 112											311		124								
	- IEC 132											343		156								
PA 41	- IEC 90	165	175	28	205	215	40	13	100	94	74	327	252	109	311	364	218	86	35 70	38.0 10	7 56	6 M12
	- IEC 100											351		133								
	- IEC 112											351		133								
	- IEC 132											408		190								
	- IEC 160											412		194								
PA 51	- IEC 90	180	215	33	220	260	45	18	112	104	84	345	252	109	343	405	236	106	40 80	43.0 12	5 70	6 M16
	- IEC 100											369		133								
	- IEC 112											369		133								
	- IEC 132											426		190								
	- IEC 160											430		194								
	- IEC 180											430		194								

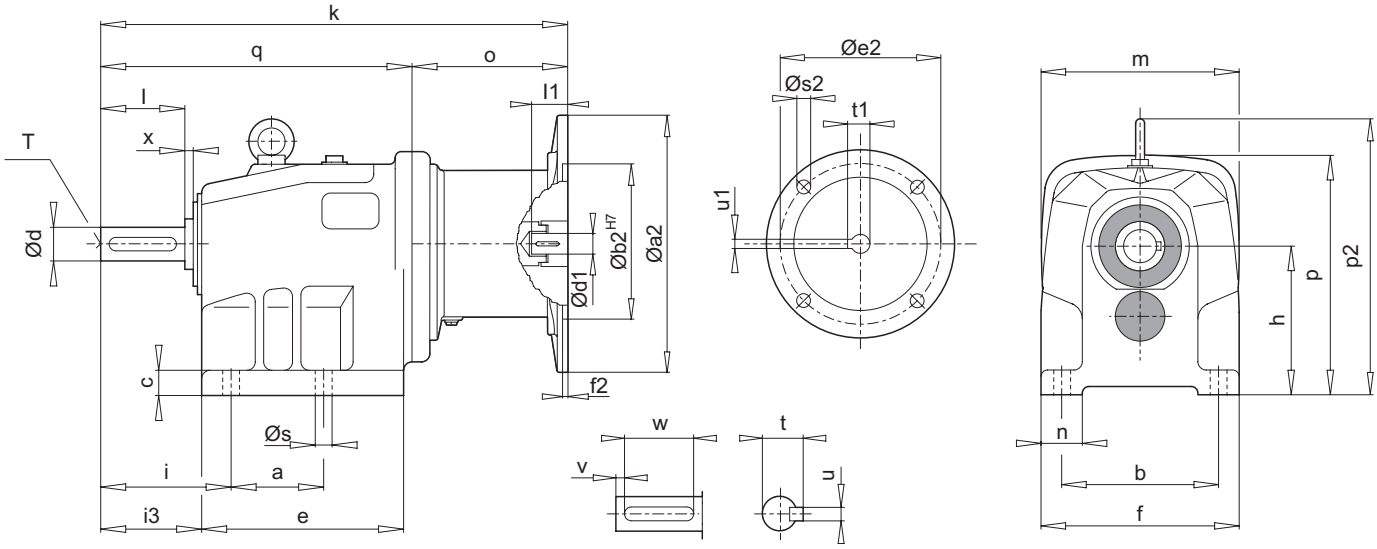
Motor Büyüklüğü Motor Frame Size	Motor Bağlantı Ölçüleri Motor Mounting Dimensions									Kama Ölçüleri Key	Kaplin Tipi Type of coupling	
	a2	b2	e2	f2	s2	d1	l1	t1	u1		Çiftel	KTR
63	140	95	115	3.5	M8	11	23	12.8	4	A 4x4x18	DK - 14	BJ - 14
71	160	110	130	4.0	M8	14	30	16.3	5	A 5x5x25	DK - 14	BJ - 14
80	200	130	165	4.0	M10	19	40	21.8	6	A 6x6x35	DK - 24	BJ - 24
90	200	130	165	4.0	M10	24	50	27.3	8	A 8x7x40	DK - 24	BJ - 24
100	250	180	215	5.0	M12	28	60	31.3	8	A 8x7x50	DK - 28	BJ - 28
112	250	180	215	5.0	M12	28	60	31.3	8	A 8x7x50	DK - 28	BJ - 28
132	300	230	265	5.0	M12	38	80	41.3	10	A 10x8x60	DK - 38	BM - 38
160	350	250	300	6.0	M16	42	110	45.3	12	A 12x8x75	DK - 42	BM - 42
180	350	250	300	6.0	M16	48	110	51.8	14	A 14x9x80	DK - 48	BM - 48



Tip Type		Montaj ölçüleri (Flanş) Mounting dimensions (Flange)						Ana ölçüler Outline dimensions									Şaft Ölçüleri Shaft Dimensions			
		a1	b1	c1	e1	f1	s1	h	k	m	m1	o	p3	p4	q	ME	d l	t u	v w	T
PF 11	- IEC 63	120	80	10	100	3.0	7	56	211	132	135	85	171	-	126	50	20 40	22.5 6	4 32	M6
	- IEC 71	140	95	10	115	3.0	9		215			89								
	- IEC 80								231			105								
	- IEC 90								231			105								
	- IEC 100								256			130								
	- IEC 112								256			130								
PF 21	- IEC 71	140	95	10	115	3.0	9	66	241	202	185	88	227	-	153	61	25 50	28.0 8	5 40	M10
	- IEC 80	160	110	10	130	3.5	9		260			107								
	- IEC 90								260			107								
	- IEC 100								277			124								
	- IEC 112								277			124								
PF 31	- IEC 71	200	130	12	165	3.5	11	82	275	202	210	88	260	305	187	76	30 60	33.0 8	5 50	M10
	- IEC 80								294			107								
	- IEC 90								294			107								
	- IEC 100								311			124								
	- IEC 112								311			124								
	- IEC 132								343			156								
PF 41	- IEC 90	200	130	14	165	3.5	11	91	327	252	215	109	302	355	218	86	35 70	38.0 10	7 56	M12
	- IEC 100	250	180	16	215	4.0	14		351			133								
	- IEC 112								351			133								
	- IEC 132								408			190								
	- IEC 160								412			194								
PF 51	- IEC 90	250	180	16	215	4.0	14	110	345	252	260	109	341	403	236	106	40 80	43.0 12	5 70	M16
	- IEC 100	300	230	20	265	4.0	14		369			133								
	- IEC 112								369			133								
	- IEC 132								426			190								
	- IEC 160								430			194								
	- IEC 180								430			194								

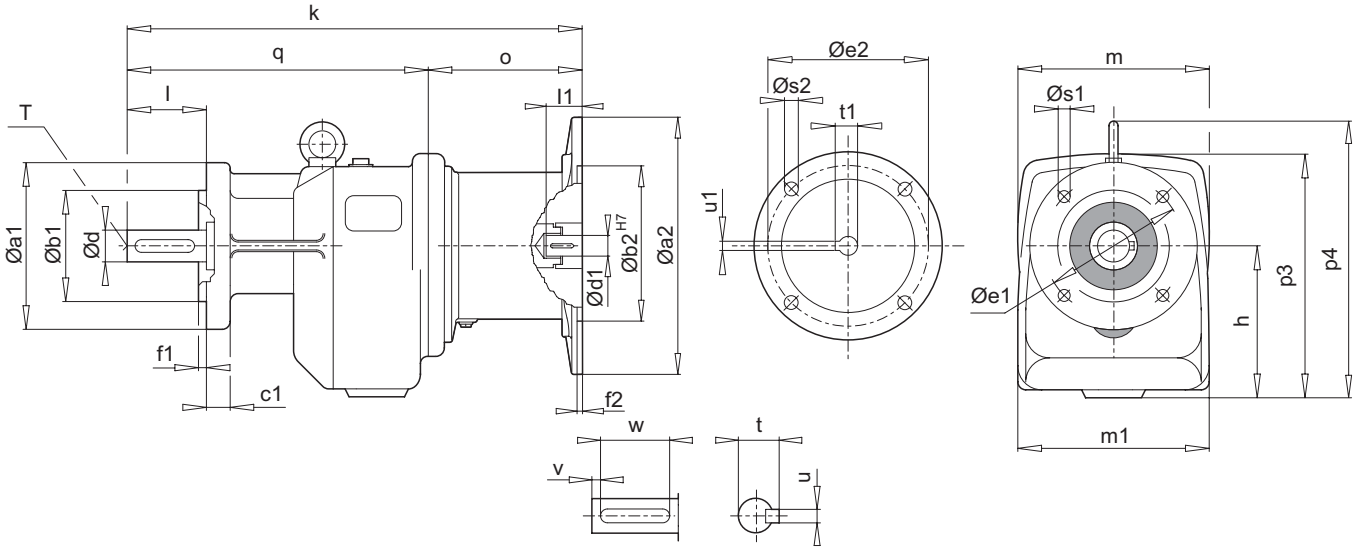
Motor Büyüklüğü Motor Frame Size	Motor Bağlantı Ölçüleri Motor Mounting Dimensions									Kama Ölçüleri Key	Kaplin Tipi Type of coupling	
	a2	b2	e2	f2	s2	d1	l1	t1	u1		Çiftel	KTR
63	140	95	115	3.5	M8	11	23	12.8	4	A 4x4x18	DK - 14	BJ - 14
71	160	110	130	4.0	M8	14	30	16.3	5	A 5x5x25	DK - 14	BJ - 14
80	200	130	165	4.0	M10	19	40	21.8	6	A 6x6x35	DK - 24	BJ - 24
90	200	130	165	4.0	M10	24	50	27.3	8	A 8x7x40	DK - 24	BJ - 24
100	250	180	215	5.0	M12	28	60	31.3	8	A 8x7x50	DK - 28	BJ - 28
112	250	180	215	5.0	M12	28	60	31.3	8	A 8x7x50	DK - 28	BJ - 28
132	300	230	265	5.0	M12	38	80	41.3	10	A 10x8x60	DK - 38	BM - 38
160	350	250	300	6.0	M16	42	110	45.3	12	A 12x8x75	DK - 42	BM - 42
180	350	250	300	6.0	M16	48	110	51.8	14	A 14x9x80	DK - 48	BM - 48





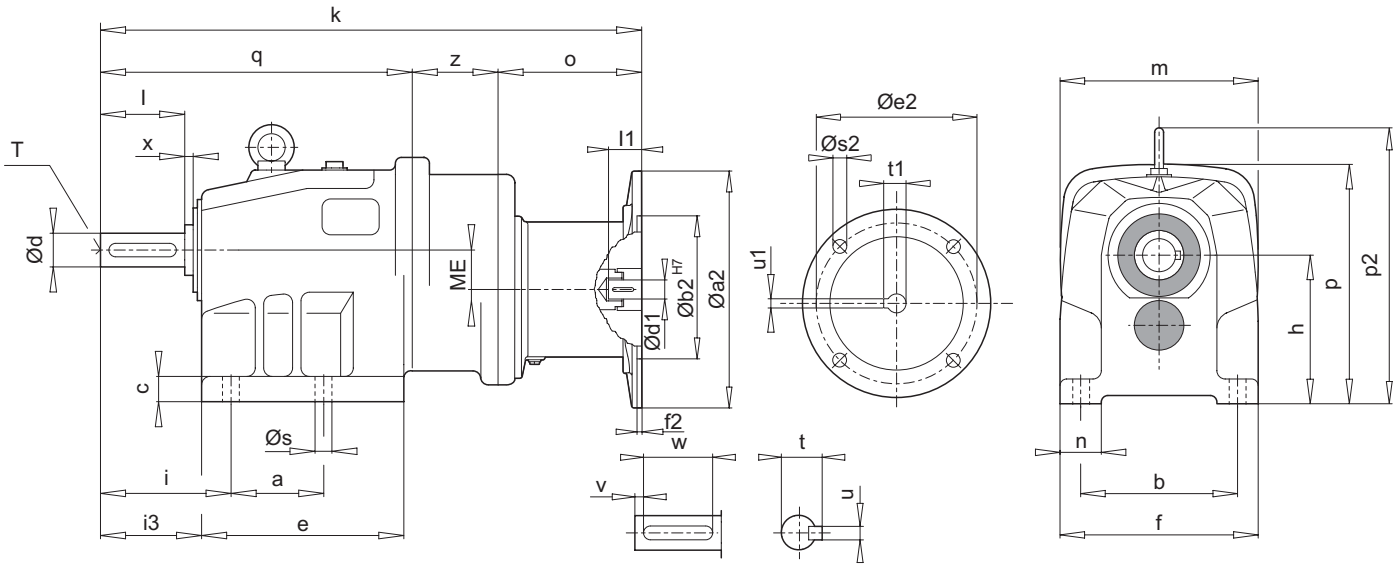
Tip Type		Montaj ölçüleri (Ayak) Mounting dimensions (Foot)							Ana ölçüler Outline dimensions									Şaft Ölçüleri Shaft Dimensions			
		a	b	c	e	f	n	s	h	i	i3	k	m	o	p	p2	q	d l	t u	v w	x T
PA 02	- IEC 63	60	110	17	134	130	25	9	88	52	43	268	130	85	152	-	183	20 40	22.5 6	5 32	4 M6
	- IEC 71											272		89							
	- IEC 80											288		105							
	- IEC 90											288		105							
PA 12	- IEC 63	62	105	20	139	135	30	9	104	78	60	291	130	85	169	-	206	25 50	28.0 8	6 40	4 M10
	- IEC 71											295		89							
	- IEC 80											311		105							
	- IEC 90											311		105							
	- IEC 100											336		130							
	- IEC 112											336		130							
PA 22	- IEC 71	80	160	23	175	185	30	11	127	74	59	328	200	88	226	-	240	30 60	33.0 8	8 50	5 M10
	- IEC 80											347		107							
	- IEC 90											347		107							
	- IEC 100											364		124							
	- IEC 112											364		124							
PA 32	- IEC 71	120	185	27	214	210	40	13	159	96	79	388	200	88	260	292	300	40 80	43.0 12	5 70	6 M16
	- IEC 80											407		107							
	- IEC 90											407		107							
	- IEC 100											424		124							
	- IEC 112											424		124							
	- IEC 132											456		156							
PA 42	- IEC 90	120	175	32	239	215	40	13	179	130	106	461	250	109	302	327	352	45 90	48.5 14	5 80	6 M16
	- IEC 100											485		133							
	- IEC 112											485		133							
	- IEC 132											542		190							
	- IEC 160											546		194							
PA 52	- IEC 90	150	220	44	283	260	45	18	218	140	120	520	250	109	339	385	411	55 110	59.0 16	10 90	6 M20
	- IEC 100											544		133							
	- IEC 112											544		133							
	- IEC 132											601		190							
	- IEC 160											605		194							
	- IEC 180											605		194							

Motor Büyüklüğü Motor Frame Size	Motor Bağlantı Ölçüleri Motor Mounting Dimensions									Kama Ölçüleri Key	Kaplin Tipi Type of coupling	
	a2	b2	e2	f2	s2	d1	l1	t1	u1		Çiftel	KTR
63	140	95	115	3.5	M8	11	23	12.8	4	A 4x4x18	DK - 14	BJ - 14
71	160	110	130	4.0	M8	14	30	16.3	5	A 5x5x25	DK - 14	BJ - 14
80	200	130	165	4.0	M10	19	40	21.8	6	A 6x6x35	DK - 24	BJ - 24
90	200	130	165	4.0	M10	24	50	27.3	8	A 8x7x40	DK - 24	BJ - 24
100	250	180	215	5.0	M12	28	60	31.3	8	A 8x7x50	DK - 28	BJ - 28
112	250	180	215	5.0	M12	28	60	31.3	8	A 8x7x50	DK - 28	BJ - 28
132	300	230	265	5.0	M12	38	80	41.3	10	A 10x8x60	DK - 38	BM - 38
160	350	250	300	6.0	M16	42	110	45.3	12	A 12x8x75	DK - 42	BM - 42
180	350	250	300	6.0	M16	48	110	51.8	14	A 14x9x80	DK - 48	BM - 48



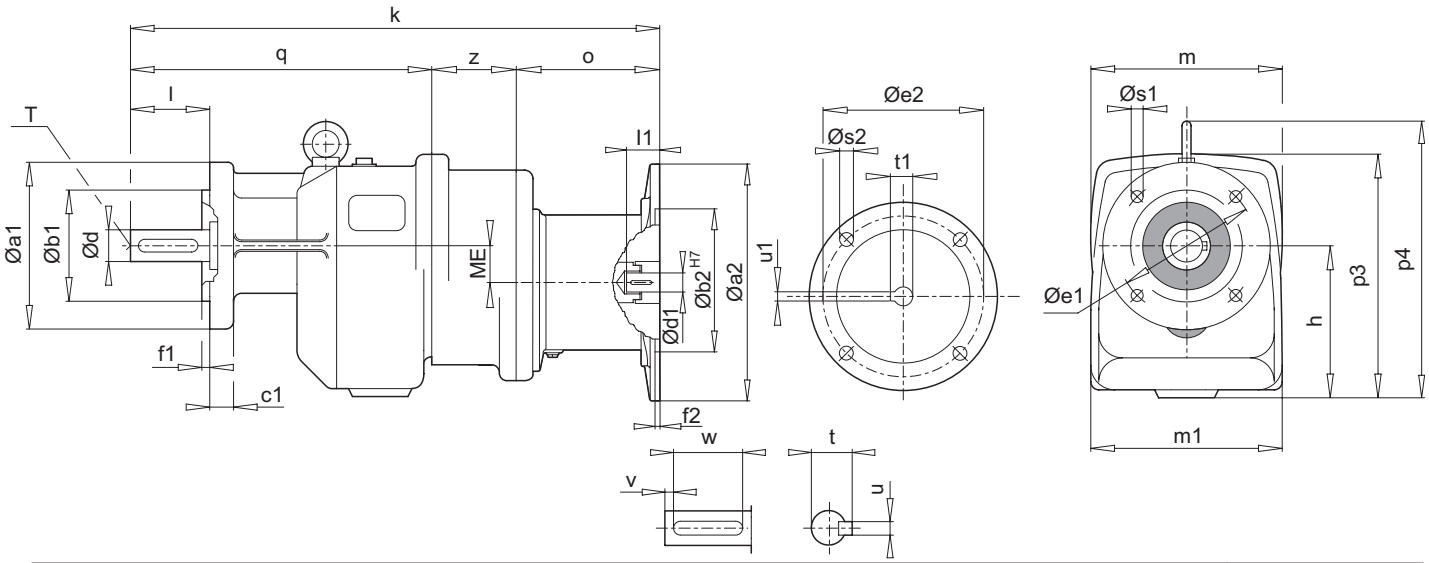
Tip Type		Montaj ölçüleri (Flanş) Mounting dimensions (Flange)						Ana ölçüler Outline dimensions								Şaft Ölçüleri Shaft Dimensions			
		a1	b1	c1	e1	f1	s1	h	k	m	m1	o	p3	p4	q	d l	t u	v w	T
PF 02	- IEC 63	120	80	11	100	3.0	7	91	268	130	130	85	155	-	183	20 40	22.5 6	5 32	M6
	- IEC 71	140	95	11	115	3.0	9		272			89							
	- IEC 80	160	110	11	130	3.5	9		288			105							
	- IEC 90								288			105							
PF 12	- IEC 63	120	80	13	100	3.0	7	108	291	130	135	85	175	-	206	25 50	28.0 8	6 40	M10
	- IEC 71	140	95	13	115	3.0	9		295			89							
	- IEC 80	160	110	13	130	3.5	9		311			105							
	- IEC 90								311			105							
	- IEC 100								336			130							
	- IEC 112								336			130							
PF 22	- IEC 71	160	110	13	130	3.5	9	127	328	200	185	88	226	-	240	30 60	33.0 8	8 50	M10
	- IEC 80	200	130	14	165	3.5	11		347			107							
	- IEC 90								347			107							
	- IEC 100								364			124							
	- IEC 112								364			124							
PF 32	- IEC 71	200	130	14	165	3.5	11	159	388	200	210	88	260	292	300	40 80	43.0 12	5 70	M16
	- IEC 80	250	180	16	215	4.0	14		407			107							
	- IEC 90								407			107							
	- IEC 100								424			124							
	- IEC 112								424			124							
	- IEC 132								456			156							
PF 42	- IEC 90	200	130	14	165	3.5	11	179	461	250	215	109	302	327	352	45 90	48.5 14	5 80	M16
	- IEC 100	250	180	16	215	4.0	14		485			133							
	- IEC 112								485			133							
	- IEC 132								542			190							
	- IEC 160								546			194							
PF 52	- IEC 90	250	180	16	215	4.0	14	218	520	250	260	109	339	385	411	55 110	59.0 16	10 90	M20
	- IEC 100	300	230	20	265	4.0	14		544			133							
	- IEC 112								544			133							
	- IEC 132								601			190							
	- IEC 160								605			194							
	- IEC 180								605			194							

Motor Büyüklüğü Motor Frame Size	Motor Bağlantı Ölçüleri Motor Mounting Dimensions									Kama Ölçüleri Key	Kaplin Tipi Type of coupling	
	a2	b2	e2	f2	s2	d1	l1	t1	u1		Çiftel	KTR
63	140	95	115	3.5	M8	11	23	12.8	4	A 4x4x18	DK - 14	BJ - 14
71	160	110	130	4.0	M8	14	30	16.3	5	A 5x5x25	DK - 14	BJ - 14
80	200	130	165	4.0	M10	19	40	21.8	6	A 6x6x35	DK - 24	BJ - 24
90	200	130	165	4.0	M10	24	50	27.3	8	A 8x7x40	DK - 24	BJ - 24
100	250	180	215	5.0	M12	28	60	31.3	8	A 8x7x50	DK - 28	BJ - 28
112	250	180	215	5.0	M12	28	60	31.3	8	A 8x7x50	DK - 28	BJ - 28
132	300	230	265	5.0	M12	38	80	41.3	10	A 10x8x60	DK - 38	BM - 38
160	350	250	300	6.0	M16	42	110	45.3	12	A 12x8x75	DK - 42	BM - 42
180	350	250	300	6.0	M16	48	110	51.8	14	A 14x9x80	DK - 48	BM - 48



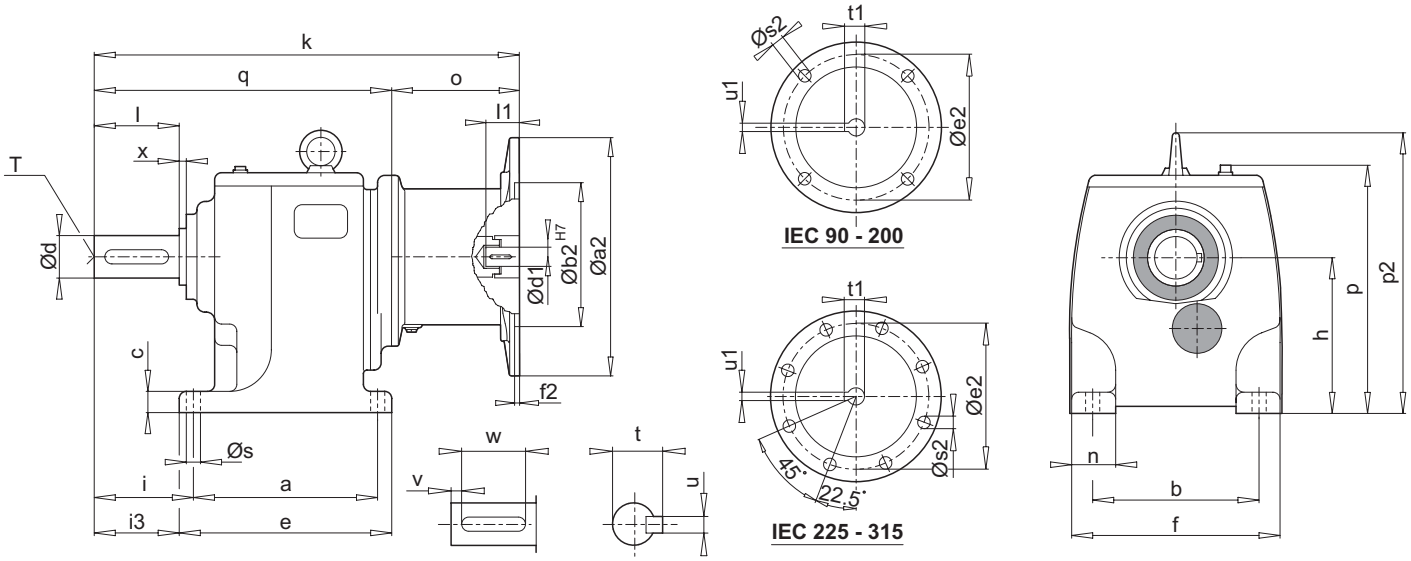
Tip Type		Montaj ölçüleri (Ayak) Mounting dimensions (Foot)							Ana ölçüler Outline dimensions											Şaft Ölçüleri Shaft Dimensions			
		a	b	c	e	f	n	s	h	i	i3	k	m	o	p	p2	q	z	ME	d l	t u	v w	x T
PA 03	- IEC 63 - IEC 71	60	110	17	134	130	25	9	88	52	43	326 330	130	85 89	152	-	183	58	30.0	20 40	22.5 6	5 32	4 M6
PA 13	- IEC 63 - IEC 71	62	105	20	139	135	30	9	104	78	60	349 353	130	85 89	169	-	206	58	30.0	25 50	28.0 8	6 40	4 M10
PA 23	- IEC 63 - IEC 71 - IEC 80 - IEC 90	80	160	23	175	185	30	11	127	74	59	385 389 405 405	200	85 89 105 105	226	-	240	60	42.5	30 60	33.0 8	8 50	5 M10
PA 33	- IEC 63 - IEC 71 - IEC 80 - IEC 90 - IEC 100 - IEC 112	120	185	27	214	210	40	13	159	96	79	445 449 465 465 490 490	200	85 89 105 105 130 130	260	292	300	60	50.0	40 80	43.0 12	5 70	6 M16
PA 43	- IEC 71 - IEC 80 - IEC 90 - IEC 100 - IEC 112	120	175	32	239	215	40	13	179	130	106	509 528 528 545 545	250	88 107 107 124 124	302	327	352	69	61.0	45 90	48.5 14	5 80	6 M16
PA 53	- IEC 71 - IEC 80 - IEC 90 - IEC 100 - IEC 112	150	220	44	283	260	45	18	218	140	120	568 587 587 604 604	250	88 107 107 124 124	339	385	411	69	76.0	55 110	59.0 16	10 90	6 M20

Motor Büyüklüğü Motor Frame Size	Motor Bağlantı Ölçüleri Motor Mounting Dimensions									Kama Ölçüleri Key	Kaplin Tipi Type of coupling	
	a2	b2	e2	f2	s2	d1	l1	t1	u1		Çiftel	KTR
63	140	95	115	3.5	M8	11	23	12.8	4	A 4x4x18	DK - 14	BJ - 14
71	160	110	130	4.0	M8	14	30	16.3	5	A 5x5x25	DK - 14	BJ - 14
80	200	130	165	4.0	M10	19	40	21.8	6	A 6x6x35	DK - 24	BJ - 24
90	200	130	165	4.0	M10	24	50	27.3	8	A 8x7x40	DK - 24	BJ - 24
100	250	180	215	5.0	M12	28	60	31.3	8	A 8x7x50	DK - 28	BJ - 28
112	250	180	215	5.0	M12	28	60	31.3	8	A 8x7x50	DK - 28	BJ - 28



Tip Type		Montaj ölçüleri (Flanş) Mounting dimensions (Flange)						Ana ölçüler Outline dimensions										Şaft Ölçüleri Shaft Dimensions			
		a1	b1	c1	e1	f1	s1	h	k	m	m1	o	p3	p4	q	z	ME	d l	t u	v w	T
PF 03	- IEC 63 - IEC 71	120 140 160	80 95 110	11 11 11	100 115 130	3.0 3.0 3.5	7 9 9	91	326 330	130	130	85 89	155	-	183	58	30.0	20 40	22.5 6	5 32	M6
PF 13	- IEC 63 - IEC 71	120 140 160	80 95 110	13 13 13	100 115 130	3.0 3.0 3.5	7 9 9	108	349 353	130	135	85 89	175	-	206	58	30.0	25 50	28.0 8	6 40	M10
PF 23	- IEC 63 - IEC 71 - IEC 80 - IEC 90	160 200	110 130	13 14	130 165	3.5 3.5	9 11	127	385 389 405 405	200	185	85 89 105 105	226	-	240	60	42.5	30 60	33.0 8	8 50	M10
PF 33	- IEC 63 - IEC 71 - IEC 80 - IEC 90 - IEC 100 - IEC 112	200 250	130 180	14 16	165 215	3.5 4.0	11 14	159	445 449 465 465 490 490	200	210	85 89 105 105 130 130	260	292	300	60	50.0	40 80	43.0 12	5 70	M16
PF 43	- IEC 71 - IEC 80 - IEC 90 - IEC 100 - IEC 112	200 250	130 180	14 16	165 215	3.5 4.0	11 14	179	509 528 528 545 545	250	215	88 107 107 124 124	302	327	352	69	61.0	45 90	48.5 14	5 80	M16
PF 53	- IEC 71 - IEC 80 - IEC 90 - IEC 100 - IEC 112	250 300	180 230	16 20	215 265	4.0 4.0	14 14	218	568 587 587 604 604	250	260	88 107 107 124 124	339	385	411	69	76.0	55 110	59.0 16	10 90	M20

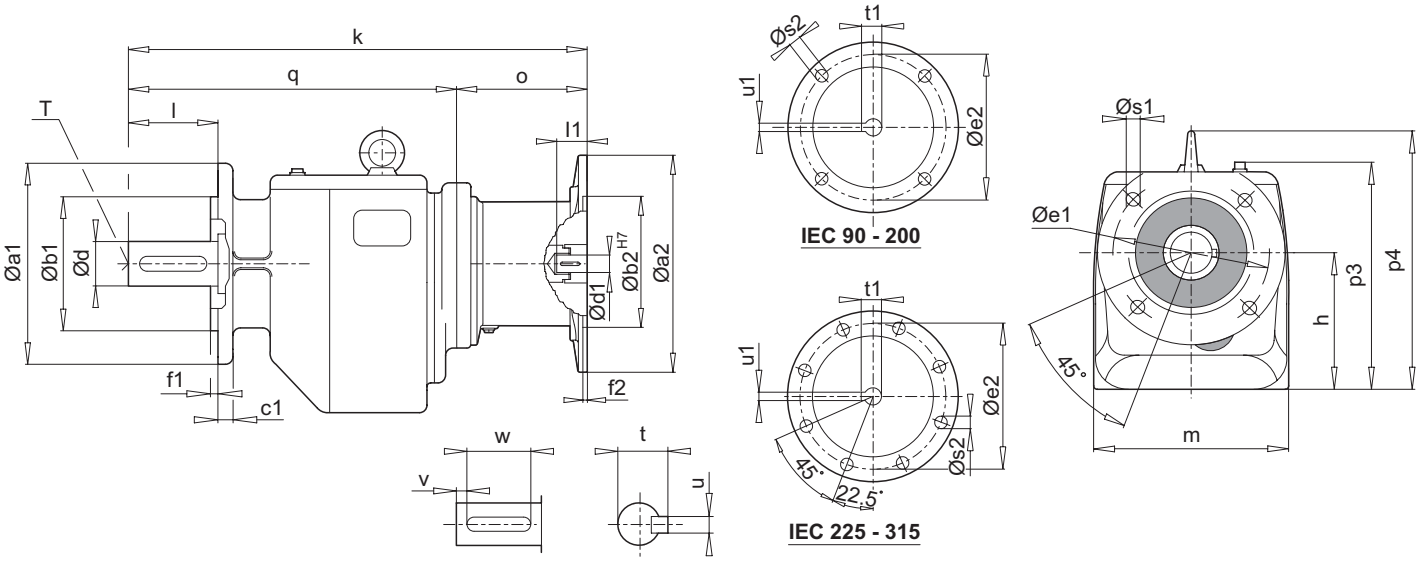
Motor Büyüklüğü Motor Frame Size	Motor Bağlantı Ölçüleri Motor Mounting Dimensions									Kama Ölçüleri Key	Kaplin Tipi Type of coupling	
	a2	b2	e2	f2	s2	d1	l1	t1	u1		Çiftel	KTR
63	140	95	115	3.5	M8	11	23	12.8	4	A 4x4x18	DK - 14	BJ - 14
71	160	110	130	4.0	M8	14	30	16.3	5	A 5x5x25	DK - 14	BJ - 14
80	200	130	165	4.0	M10	19	40	21.8	6	A 6x6x35	DK - 24	BJ - 24
90	200	130	165	4.0	M10	24	50	27.3	8	A 8x7x40	DK - 24	BJ - 24
100	250	180	215	5.0	M12	28	60	31.3	8	A 8x7x50	DK - 28	BJ - 28
112	250	180	215	5.0	M12	28	60	31.3	8	A 8x7x50	DK - 28	BJ - 28



Tip Type		Montaj ölçüleri (Ayak) Mounting dimensions (Foot)							Ana ölçüler Outline dimensions								Şaft Ölçüleri Shaft Dimensions			
		a	b	c	e	f	n	s	h	i	i3	k	o	p	p2	q	d l	t u	v w	x T
PA 63	- IEC 90	295	260	46	345	330	72	22	250	164	141	571	109	400	480	462	65 130	69.0 18	15 100	6 M20
	- IEC 100											595	133							
	- IEC 112											595	133							
	- IEC 132											652	190							
	- IEC 160											656	194							
	- IEC 180											656	194							
PA 62	- IEC 100	295	260	46	345	330	72	22	250	164	141	615	127	400	480	488	65 130	69.0 18	15 100	6 M20
	- IEC 112											615	127							
	- IEC 132											665	177							
	- IEC 160											754	266							
	- IEC 180											754	266							
	- IEC 200											717	229							
	- IEC 225											791	303							
PA 73	- IEC 100	330	325	56	385	400	72	26	280	179	151	659	127	447	550	532	75 140	79.5 20	7.5 125	6 M20
	- IEC 112											659	127							
	- IEC 132											709	177							
	- IEC 160											798	266							
	- IEC 180											798	266							
	- IEC 200											761	229							
	- IEC 225											835	303							
PA 72	- IEC 132	330	325	56	385	400	72	26	280	179	151	702	177	447	550	525	75 140	79.5 20	7.5 125	6 M20
	- IEC 160											791	266							
	- IEC 180											791	266							
	- IEC 200											754	229							
	- IEC 225											828	303							

 # PA 62 - PA 72 - PA 73 redüktör ünitelerinin 160 - 180 IEC bağlantılarında R-48 KTR kaplin kullanılmaktadır.
R-48 KTR coupling is used at PA 62 - PA 72 - PA 73 gear units for 160 - 180 IEC mounting.

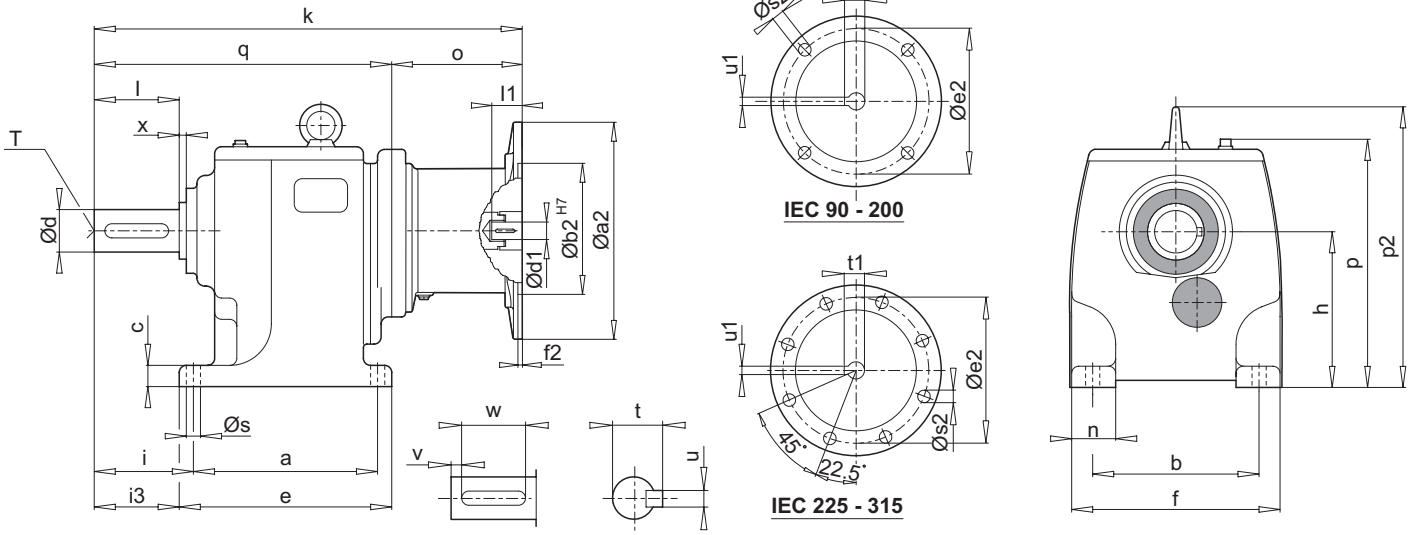
Motor Büyüklüğü Motor Frame Size	Motor Bağlantı Ölçüleri Motor Mounting Dimensions									Kama Ölçüleri Key	Kaplin Tipi Type of coupling	
	a2	b2	e2	f2	s2	d1	l1	t1	u1		Çiftel	KTR
90	200	130	165	4.0	M10	24	50	27.3	8	A 8x7x40	DK - 24	BJ - 24
100	250	180	215	5.0	M12	28	60	31.3	8	A 8x7x50	DK - 28	BJ - 28
112	250	180	215	5.0	M12	28	60	31.3	8	A 8x7x50	DK - 28	BJ - 28
132	300	230	265	5.0	M12	38	80	41.3	10	A 10x8x60	DK - 38	BM - 38
160	350	250	300	6.0	M16	42	110	45.3	12	A 12x8x75	DK - 42	BM - 42
180	350	250	300	6.0	M16	48	110	51.8	14	A 14x9x80	DK - 48	BM - 48
200	400	300	350	6.0	M16	55	110	59.3	16	A 16x10x95	-	R - 65
225	450	350	400	6.0	M16	60	140	64.4	18	A 18x11x100	-	R - 65



Tip / Type		Montaj ölçüleri (Flanş) / Mounting dimensions (Flange)						Ana ölçüler / Outline dimensions							Şaft Ölçüleri / Shaft Dimensions			
		a1	b1	c1	e1	f1	s1	h	k	m	o	p3	p4	q	d l	t u	v w	T
PF 63	- IEC 90	300	230	24	265	4.0	14	245	615	330	109	395	475	506	65 130	69.0 18	15 100	M20
	- IEC 100								639		133							
	- IEC 112								639		133							
	- IEC 132								696		190							
	- IEC 160								700		194							
	- IEC 180								700		194							
PF 62	- IEC 100	300	230	24	265	4.0	14	245	659	330	127	395	475	532	65 130	69.0 18	15 100	M20
	- IEC 112								659		127							
	- IEC 132								709		177							
	- IEC 160								798		266							
	- IEC 180								798		266							
	- IEC 200								761		229							
	- IEC 225								835		303							
PF 73	- IEC 100	350	250	24	300	5.0	18	275	724	400	127	442	545	597	75 140	79.5 20	7.5 125	M20
	- IEC 112								724		127							
	- IEC 132								774		177							
	- IEC 160								863		266							
	- IEC 180								863		266							
	- IEC 200								826		229							
	- IEC 225								900		303							
PF 72	- IEC 132	350	250	24	300	5.0	18	275	767	400	177	442	545	590	75 140	79.5 20	7.5 125	M20
	- IEC 160								856		266							
	- IEC 180								856		266							
	- IEC 200								819		229							
	- IEC 225								893		303							

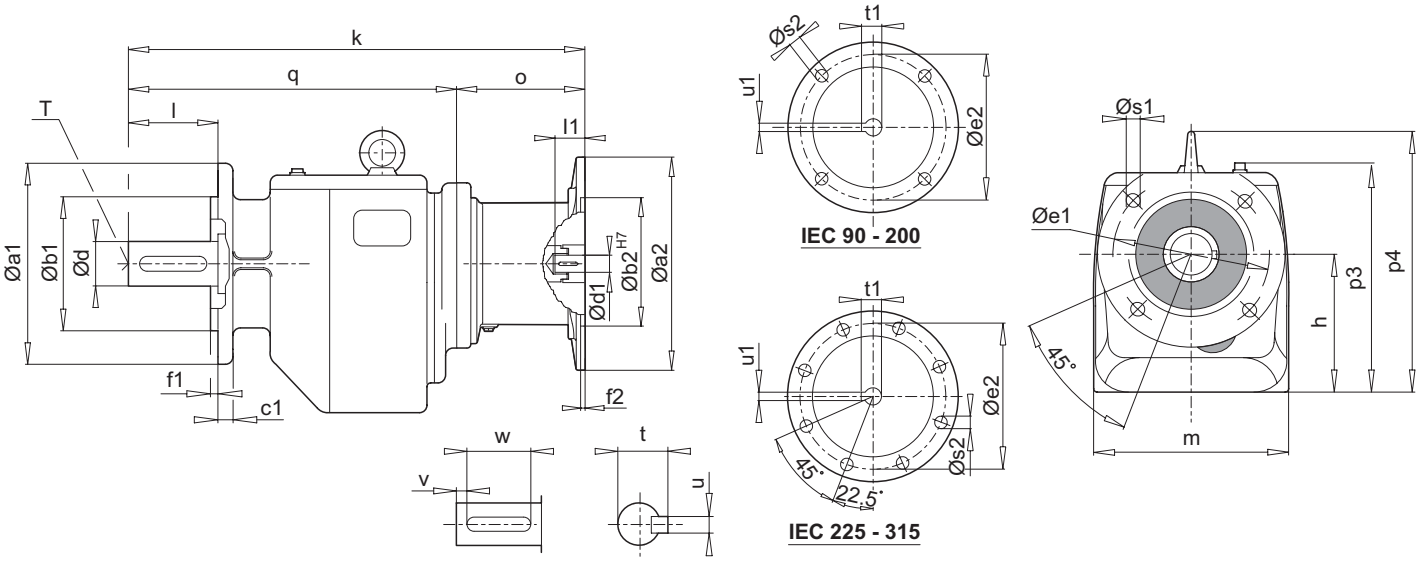
 # PF 62 - PF 72 - PF 73 redüktör ünitelerinin 160 - 180 IEC bağlantılarında R-48 KTR kaplin kullanılmaktadır.
R-48 KTR coupling is used at PF 62 - PF 72 - PF 73 gear units for 160 - 180 IEC mounting.

Motor Büyüklüğü / Motor Frame Size	Motor Bağlantı Ölçüleri / Motor Mounting Dimensions									Kama Ölçüleri / Key	Kaplin Tipi / Type of coupling	
	a2	b2	e2	f2	s2	d1	l1	t1	u1		Çiftel	KTR
90	200	130	165	4.0	M10	24	50	27.3	8	A 8x7x40	DK - 24	BJ - 24
100	250	180	215	5.0	M12	28	60	31.3	8	A 8x7x50	DK - 28	BJ - 28
112	250	180	215	5.0	M12	28	60	31.3	8	A 8x7x50	DK - 28	BJ - 28
132	300	230	265	5.0	M12	38	80	41.3	10	A 10x8x60	DK - 38	BM - 38
160	350	250	300	6.0	M16	42	110	45.3	12	A 12x8x75	DK - 42	BM - 42
180	350	250	300	6.0	M16	48	110	51.8	14	A 14x9x80	DK - 48	BM - 48
200	400	300	350	6.0	M16	55	110	59.3	16	A 16x10x95	-	R - 65
225	450	350	400	6.0	M16	60	140	64.4	18	A 18x11x100	-	R - 65



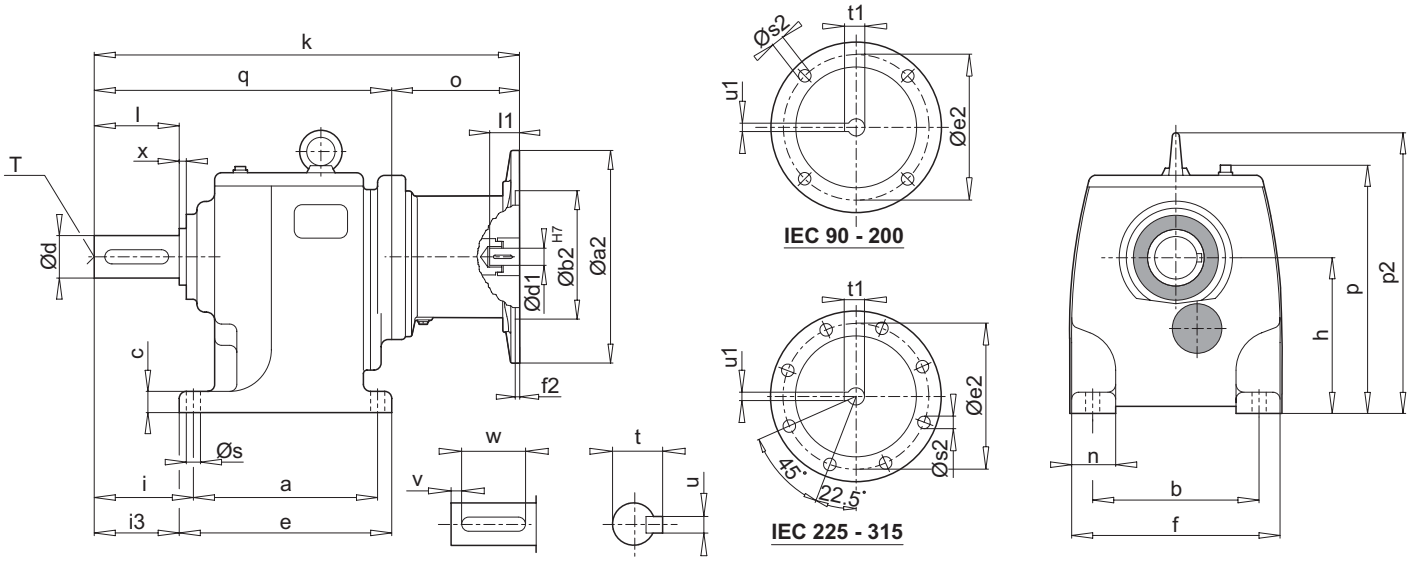
Tip Type		Montaj ölçüleri (Ayak) Mounting dimensions (Foot)							Ana ölçüler Outline dimensions								Şaft Ölçüleri Shaft Dimensions			
		a	b	c	e	f	n	s	h	i	i3	k	o	p	p2	q	d l	t u	v w	x T
PA 83	- IEC 100	400	360	56	472	450	92	33	315	215	178	738	127	512	639	611	90 170	95.0 25	15 140	6 M24
	- IEC 112											738	127							
	- IEC 132											788	177							
	- IEC 160											877	266							
	- IEC 180											877	266							
	- IEC 200											840	229							
	- IEC 225											914	303							
PA 82	- IEC 132	400	360	56	472	450	92	33	315	215	178	788	177	512	639	611	90 170	95.0 25	15 140	6 M24
	- IEC 160											877	266							
	- IEC 180											877	266							
	- IEC 200											840	229							
	- IEC 225											914	303							
PA 82	- IEC 250	400	360	56	472	450	92	33	315	215	178	931	304	512	639	627	90 170	95.0 25	15 140	6 M24
	- IEC 280											931	304							
PA 93	- IEC 132	450	440	72	540	550	115	33	390	265	220	881	177	622	783	704	110 210	116 28	15 180	8 M24
	- IEC 160											970	266							
	- IEC 180											970	266							
	- IEC 200											933	229							
	- IEC 225											1007	303							
PA 93	- IEC 250	450	440	72	540	550	115	33	390	265	220	1022	304	622	783	718	110 210	116 28	15 180	8 M24
	- IEC 280											1022	304							

Motor Büyüklüğü Motor Frame Size	Motor Bağlantı Ölçüleri Motor Mounting Dimensions									Kama Ölçüleri Key	Kaplin Tipi Type of coupling	
	a2	b2	e2	f2	s2	d1	l1	t1	u1		Çiftel	KTR
100	250	180	215	5.0	M12	28	60	31.3	8	A 8x7x50	DK - 28	BJ - 28
112	250	180	215	5.0	M12	28	60	31.3	8	A 8x7x50	DK - 28	BJ - 28
132	300	230	265	5.0	M12	38	80	41.3	10	A 10x8x60	DK - 38	BM - 38
160	350	250	300	6.0	M16	42	110	45.3	12	A 12x8x75	DK - 42	BM - 42
180	350	250	300	6.0	M16	48	110	51.8	14	A 14x9x80	DK - 48	BM - 48
200	400	300	350	6.0	M16	55	110	59.3	16	A 16x10x95	-	R - 65
225	450	350	400	6.0	M16	60	140	64.4	18	A 18x11x100	-	R - 65
250	550	450	500	6.0	M16	65	140	69.4	18	A 18x11x100	-	R - 75
280	550	450	500	6.0	M16	75	140	79.9	20	A 20x12x110	-	R - 90



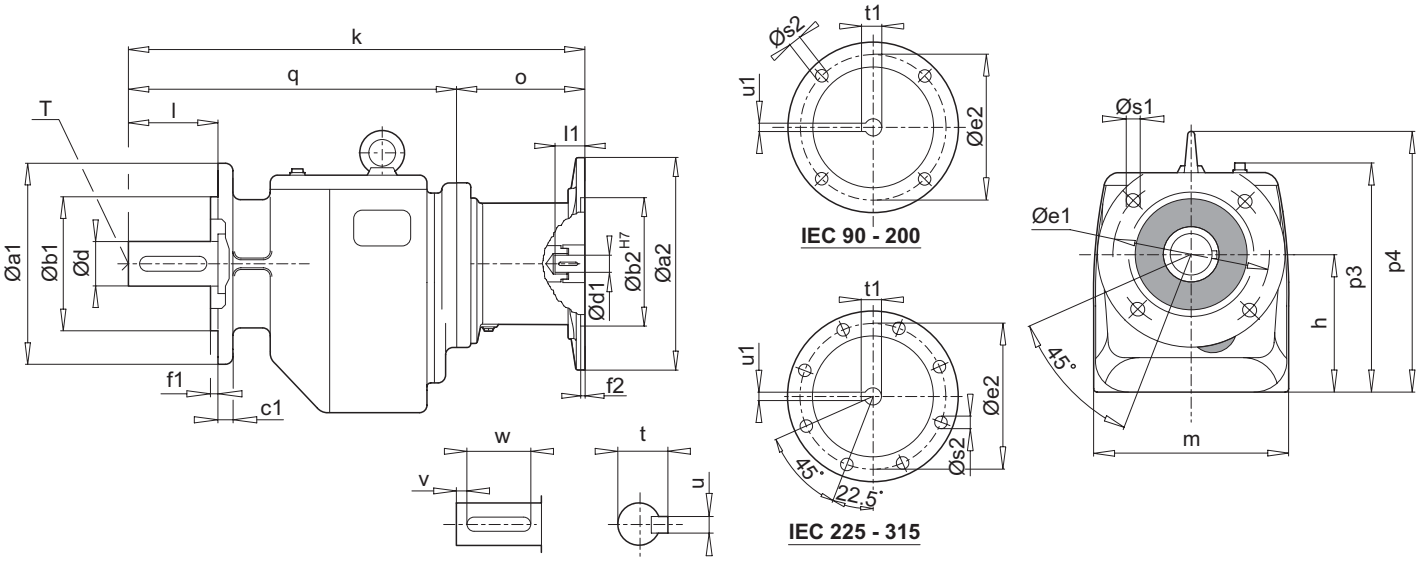
Tip Type		Montaj ölçüleri (Flanş) Mounting dimensions (Flange)						Ana ölçüler Outline dimensions							Şaft Ölçüleri Shaft Dimensions			
		a1	b1	c1	e1	f1	s1	h	k	m	o	p3	p4	q	d l	t u	v w	T
PF 83	- IEC 100	450	350	26	400	5.0	18	309	814	450	127	506	633	687	90 170	95.0 25	15 140	M24
	- IEC 112								814		127							
	- IEC 132								864		177							
	- IEC 160								953		266							
	- IEC 180								953		266							
	- IEC 200								916		229							
	- IEC 225								990		303							
PF 82	- IEC 132	450	350	26	400	5.0	18	309	864	450	177	506	633	687	90 170	95.0 25	15 140	M24
	- IEC 160								953		266							
	- IEC 180								953		266							
	- IEC 200								916		229							
	- IEC 225								990		303							
PF 82	- IEC 250	450	350	26	400	5.0	18	309	1007	450	304	506	633	703	90 170	95.0 25	15 140	M24
	- IEC 280								1007		304							
PF 93	- IEC 132	450	350	28	400	5.0	18	384	952	550	177	616	777	775	110 210	116 28	15 180	M24
	- IEC 160								1041		266							
	- IEC 180								1041		266							
	- IEC 200								1004		229							
	- IEC 225								1078		303							
PF 93	- IEC 250	450	350	28	400	5.0	18	384	1093	550	304	616	777	789	110 210	116 28	15 180	M24
	- IEC 280								1093		304							

Motor Büyüklüğü Motor Frame Size	Motor Bağlantı Ölçüleri Motor Mounting Dimensions									Kama Ölçüleri Key	Kaplin Tipi Type of coupling	
	a2	b2	e2	f2	s2	d1	l1	t1	u1		Çiftel	KTR
100	250	180	215	5.0	M12	28	60	31.3	8	A 8x7x50	DK - 28	BJ - 28
112	250	180	215	5.0	M12	28	60	31.3	8	A 8x7x50	DK - 28	BJ - 28
132	300	230	265	5.0	M12	38	80	41.3	10	A 10x8x60	DK - 38	BM - 38
160	350	250	300	6.0	M16	42	110	45.3	12	A 12x8x75	DK - 42	BM - 42
180	350	250	300	6.0	M16	48	110	51.8	14	A 14x9x80	DK - 48	BM - 48
200	400	300	350	6.0	M16	55	110	59.3	16	A 16x10x95	-	R - 65
225	450	350	400	6.0	M16	60	140	64.4	18	A 18x11x100	-	R - 65
250	550	450	500	6.0	M16	65	140	69.4	18	A 18x11x100	-	R - 75
280	550	450	500	6.0	M16	75	140	79.9	20	A 20x12x110	-	R - 90



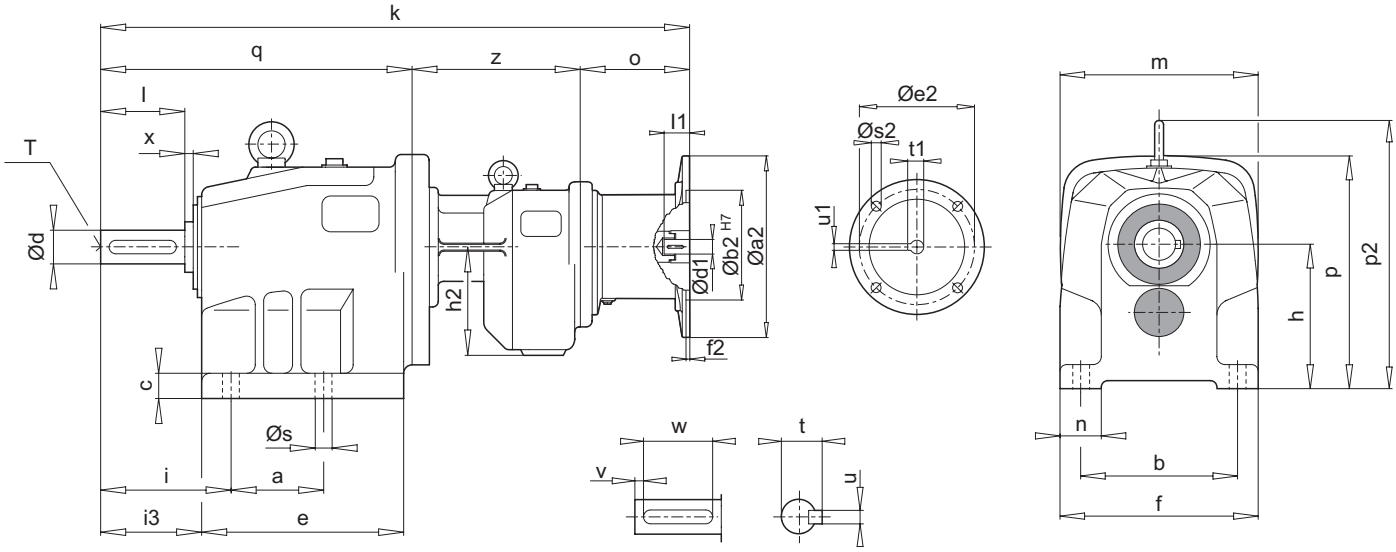
Tip Type		Montaj ölçüleri (Ayak) Mounting dimensions (Foot)							Ana ölçüler Outline dimensions								Şaft Ölçüleri Shaft Dimensions			
		a	b	c	e	f	n	s	h	i	i3	k	o	p	p2	q	d l	t u	v w	x T
PA 92	- IEC 160 - IEC 180 - IEC 200 - IEC 225	450	440	72	540	550	115	33	390	265	220	970 970 933 1007	266 266 229 303	622	783	704	110 210	116 28	15 180	8 M24
PA 92	- IEC 250 - IEC 280 - IEC 315	450	440	72	540	550	115	33	390	265	220	1022 1022 1100	304 304 382	622	783	718	110 210	116 28	15 180	8 M24
PA 103	- IEC 132 - IEC 160 - IEC 180 - IEC 200 - IEC 225	505	480	82	625	600	125	45	450	320	260	978 1067 1067 1030 1104	177 266 266 229 303	702	887	801	130 250	137 32	15 220	10 M24
PA 103	- IEC 250 - IEC 280 - IEC 315	505	480	82	625	600	125	45	450	320	260	1121 1121 1199	304 304 382	702	887	817	130 250	137 32	15 220	10 M24
PA 102	- IEC 250 - IEC 280 - IEC 315	505	480	82	625	600	125	45	450	320	260	1112 1112 1190	304 304 382	702	887	808	130 250	137 32	15 220	10 M24

Motor Büyüklüğü Motor Frame Size	Motor Bağlantı Ölçüleri Motor Mounting Dimensions									Kama Ölçüleri Key	Kaplin Tipi Type of coupling	
	a2	b2	e2	f2	s2	d1	l1	t1	u1		Çiftel	KTR
160	350	250	300	6.0	M16	42	110	45.3	12	A 12x8x75	DK - 42	BM - 42
180	350	250	300	6.0	M16	48	110	51.8	14	A 14x9x80	DK - 48	BM - 48
200	400	300	350	6.0	M16	55	110	59.3	16	A 16x10x95	-	R - 65
225	450	350	400	6.0	M16	60	140	64.4	18	A 18x11x100	-	R - 65
250	550	450	500	6.0	M16	65	140	69.4	18	A 18x11x100	-	R - 75
280	550	450	500	6.0	M16	75	140	79.9	20	A 20x12x110	-	R - 90
315	660	550	600	7.0	M20	80	170	85.4	22	A 22x14x130	-	R - 90



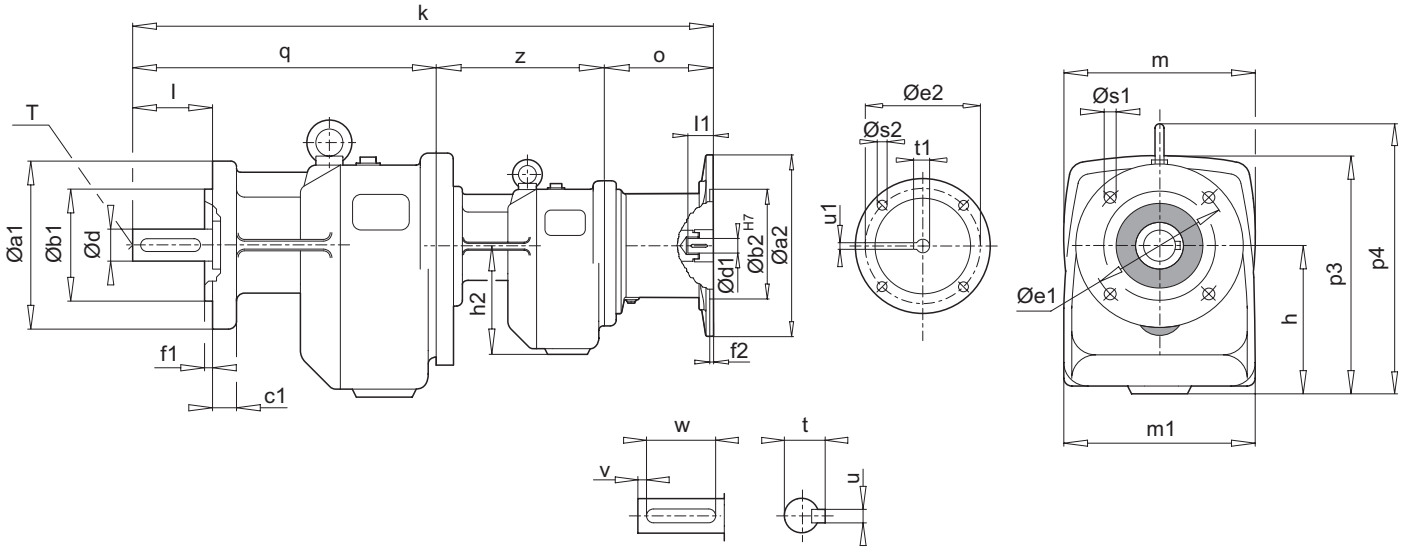
Tip Type		Montaj ölçüleri (Flanş) Mounting dimensions (Flange)						Ana ölçüler Outline dimensions							Giriş Şaftı Input Shaft			
		a1	b1	c1	e1	f1	s1	h	k	m	o	p3	p4	q	d l	t u	v w	x T
PF 92	- IEC 160 - IEC 180 - IEC 200 - IEC 225	450	350	28	400	5.0	18	384	1041 1041 1004 1078	550	266 266 229 303	616	777	775	110 210	116 28	15 180	M24
PF 92	- IEC 250 - IEC 280 - IEC 315	450	350	28	400	5.0	18	384	1093 1093 1171	550	304 304 382	616	777	789	110 210	116 28	15 180	M24
PF 103	- IEC 132 - IEC 160 - IEC 180 - IEC 200 - IEC 225	550	450	32	500	5.0	18	442	1063 1152 1152 1115 1189	600	177 266 266 229 303	706	879	886	130 250	137 32	15 220	M24
PF 103	- IEC 250 - IEC 280 - IEC 315	550	450	32	500	5.0	18	442	1206 1206 1284	600	304 304 382	706	879	902	130 250	137 32	15 220	M24
PF 102	- IEC 250 - IEC 280 - IEC 315	550	450	32	500	5.0	18	442	1197 1197 1275	600	304 304 382	706	879	893	130 250	137 32	15 220	M24

Motor Büyüklüğü Motor Frame Size	Motor Bağlantı Ölçüleri Motor Mounting Dimensions									Kama Ölçüleri Key	Kaplin Tipi Type of coupling	
	a2	b2	e2	f2	s2	d1	l1	t1	u1		Çiftel	KTR
160	350	250	300	6.0	M16	42	110	45.3	12	A 12x8x75	DK - 42	BM - 42
180	350	250	300	6.0	M16	48	110	51.8	14	A 14x9x80	DK - 48	BM - 48
200	400	300	350	6.0	M16	55	110	59.3	16	A 16x10x95	-	R - 65
225	450	350	400	6.0	M16	60	140	64.4	18	A 18x11x100	-	R - 65
250	550	450	500	6.0	M16	65	140	69.4	18	A 18x11x100	-	R - 75
280	550	450	500	6.0	M16	75	140	79.9	20	A 20x12x110	-	R - 90
315	660	550	600	7.0	M20	80	170	85.4	22	A 22x14x130	-	R - 90



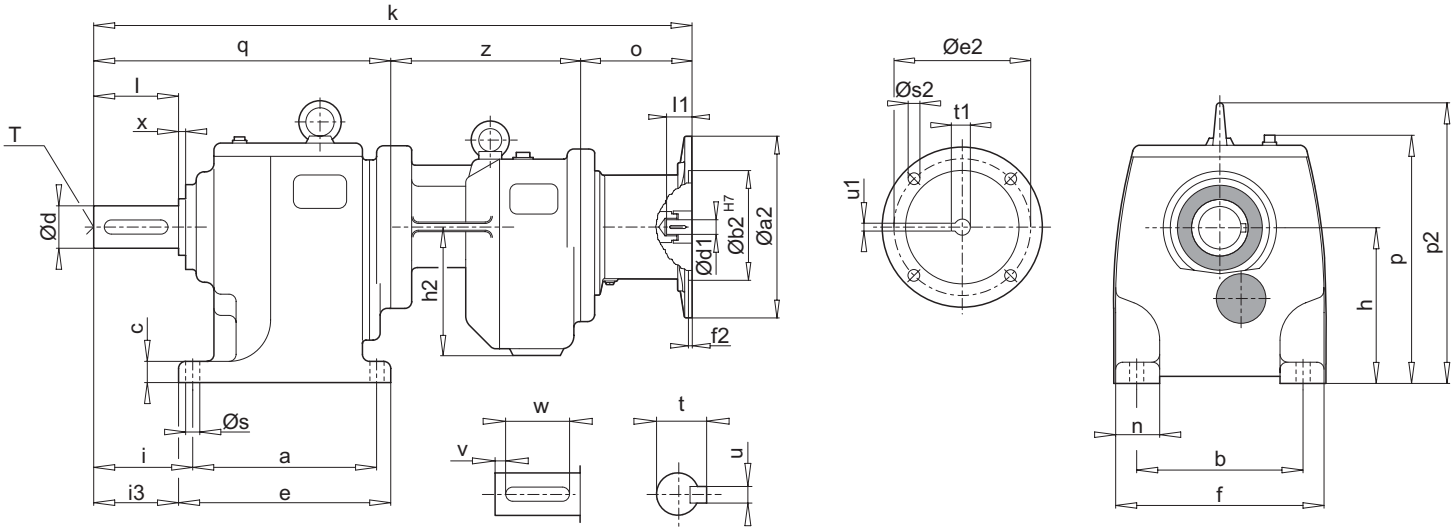
Tip Type		Montaj ölçüleri (Ayak) Mounting dimensions (Foot)							Ana ölçüler Outline dimensions											Şaft Ölçüleri Shaft Dimensions			
		a	b	c	e	f	n	s	h	h2	i	i3	k	m	o	p	p2	q	z	d l	t u	v w	x T
PA 12/02	- IEC 63	62	105	20	139	135	30	9	104	91	78	60	433	130	85	169	-	206	142	25 50	28.0 8	6 40	4 M10
	- IEC 71												437		89								
	- IEC 80												453		105								
	- IEC 90												453		105								
PA 22/02	- IEC 63	80	160	23	175	185	30	11	127	91	74	59	483	200	85	226	-	240	158	30 60	33.0 8	8 50	5 M10
	- IEC 71												487		89								
	- IEC 80												503		105								
	- IEC 90												503		105								
PA 32/12	- IEC 63	120	185	27	214	210	40	13	159	108	96	79	556	200	85	260	292	300	171	40 80	43.0 12	5 70	6 M16
	- IEC 71												560		89								
	- IEC 80												576		105								
	- IEC 90												576		105								
	- IEC 100												601		130								
	- IEC 112												601		130								
PA 42/12	- IEC 63	120	175	32	239	215	40	13	179	108	130	106	612	250	85	302	327	352	175	45 90	48.5 14	5 80	6 M16
	- IEC 71												616		89								
	- IEC 80												632		105								
	- IEC 90												632		105								
	- IEC 100												657		130								
	- IEC 112												657		130								
PA 52/12	- IEC 63	150	220	44	283	260	45	18	218	108	140	120	671	250	85	339	385	411	175	55 110	59.0 16	10 90	6 M20
	- IEC 71												675		89								
	- IEC 80												691		105								
	- IEC 90												691		105								
	- IEC 100												716		130								
	- IEC 112												716		130								

Motor Büyüklüğü Motor Frame Size	Motor Bağlantı Ölçüleri Motor Mounting Dimensions									Kama Ölçüleri Key	Kaplin Tipi Type of coupling	
	a2	b2	e2	f2	s2	d1	l1	t1	u1		Çiftel	KTR
63	140	95	115	3.5	M8	11	23	12.8	4	A 4x4x18	DK - 14	BJ - 14
71	160	110	130	4.0	M8	14	30	16.3	5	A 5x5x25	DK - 14	BJ - 14
80	200	130	165	4.0	M10	19	40	21.8	6	A 6x6x35	DK - 24	BJ - 24
90	200	130	165	4.0	M10	24	50	27.3	8	A 8x7x40	DK - 24	BJ - 24
100	250	180	215	5.0	M12	28	60	31.3	8	A 8x7x50	DK - 28	BJ - 28
112	250	180	215	5.0	M12	28	60	31.3	8	A 8x7x50	DK - 28	BJ - 28



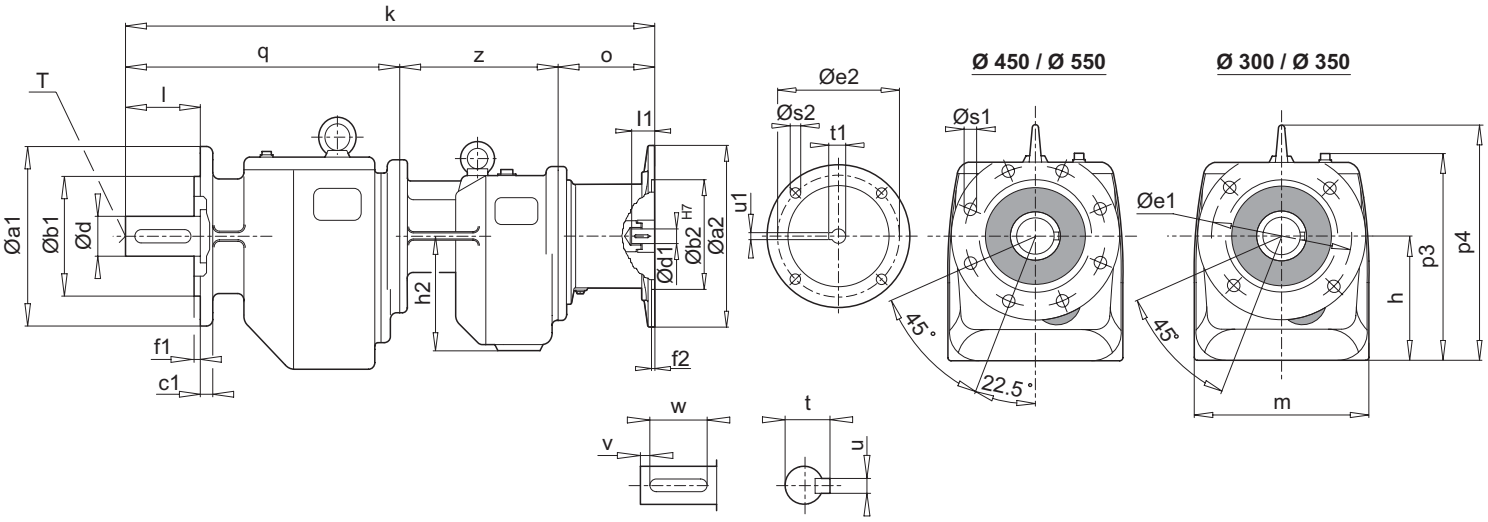
Tip Type		Montaj ölçüleri (Flanş) Mounting dimensions (Flange)						Ana ölçüler Outline dimensions										Şaft Ölçüleri Shaft Dimensions			
		a1	b1	c1	e1	f1	s1	h	h2	k	m	m1	o	p3	p4	q	z	d l	t u	v w	T
PF 12/02	- IEC 63	120	80	13	100	3.0	7	108	91	433	130	135	85	175	-	206	142	25 50	28.0 8	6 40	M10
	- IEC 71	140	95	13	115	3.0	9			437			89								
	- IEC 80	160	110	13	130	3.5	9			453			105								
	- IEC 90									453			105								
PF 22/02	- IEC 63	160	110	13	130	3.5	9	127	91	483	200	185	85	226	-	240	158	30 60	33.0 8	8 50	M10
	- IEC 71	200	130	14	165	3.5	11			487			89								
	- IEC 80									503			105								
	- IEC 90									503			105								
PF 32/12	- IEC 63	200	130	14	165	3.5	11	159	108	556	200	210	85	260	292	300	171	40 80	43.0 12	5 70	M16
	- IEC 71	250	180	16	215	4.0	14			560			89								
	- IEC 80									576			105								
	- IEC 90									576			105								
	- IEC 100									601			130								
	- IEC 112									601			130								
PF 42/12	- IEC 63	200	130	14	165	3.5	11	179	108	612	250	215	85	302	327	352	175	45 90	48.5 14	5 80	M16
	- IEC 71	250	180	16	215	4.0	14			616			89								
	- IEC 80									632			105								
	- IEC 90									632			105								
	- IEC 100									657			130								
	- IEC 112									657			130								
PF 52/12	- IEC 63	250	180	16	215	4.0	14	218	108	671	250	260	85	339	385	411	175	55 110	59.0 16	10 90	M20
	- IEC 71	300	230	20	265	4.0	14			675			89								
	- IEC 80									691			105								
	- IEC 90									691			105								
	- IEC 100									716			130								
	- IEC 112									716			130								

Motor Büyüklüğü Motor Frame Size	Motor Bağlantı Ölçüleri Motor Mounting Dimensions									Kama Ölçüleri Key	Kaplin Tipi Type of coupling	
	a2	b2	e2	f2	s2	d1	l1	t1	u1		Çiftel	KTR
63	140	95	115	3.5	M8	11	23	12.8	4	A 4x4x18	DK - 14	BJ - 14
71	160	110	130	4.0	M8	14	30	16.3	5	A 5x5x25	DK - 14	BJ - 14
80	200	130	165	4.0	M10	19	40	21.8	6	A 6x6x35	DK - 24	BJ - 24
90	200	130	165	4.0	M10	24	50	27.3	8	A 8x7x40	DK - 24	BJ - 24
100	250	180	215	5.0	M12	28	60	31.3	8	A 8x7x50	DK - 28	BJ - 28
112	250	180	215	5.0	M12	28	60	31.3	8	A 8x7x50	DK - 28	BJ - 28



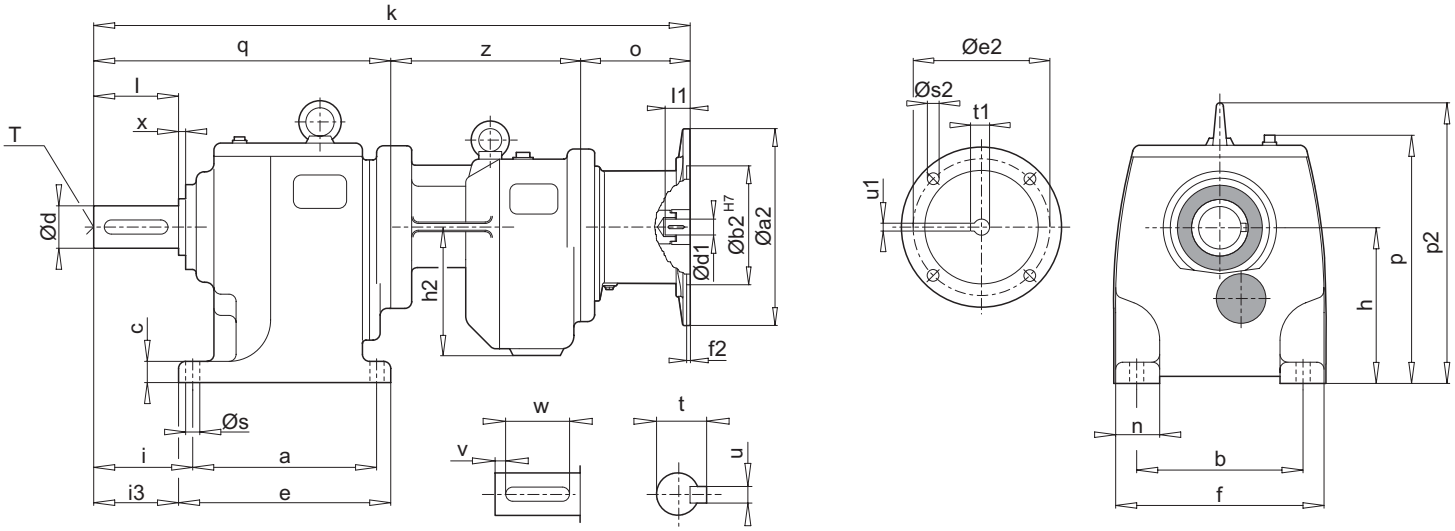
Tip Type		Montaj ölçüleri (Ayak) Mounting dimensions (Foot)							Ana ölçüler Outline dimensions										Şaft Ölçüleri Shaft Dimensions			
		a	b	c	e	f	n	s	h	h2	i	i3	k	o	p	p2	q	z	d l	t u	v w	x T
PA 63/22	- IEC 71	295	260	46	345	330	72	22	250	127	164	141	733	88	400	480	466	179	65	69.0	15	6
	- IEC 80												752	107					130	18	100	M20
	- IEC 90												752	107								
	- IEC 100												769	124								
	- IEC 112												769	124								
PA 73/22	- IEC 71	330	325	56	385	400	72	26	280	127	179	151	777	88	447	550	510	179	75	79.5	7.5	6
	- IEC 80												796	107					140	20	125	M20
	- IEC 90												796	107								
	- IEC 100												813	124								
	- IEC 112												813	124								
PA 73/32	- IEC 90	330	325	56	385	400	72	26	280	159	179	151	836	107	447	550	510	219	75	79.5	7.5	6
	- IEC 100												853	124					140	20	125	M20
	- IEC 112												853	124								
	- IEC 132												885	156								
PA 83/32	- IEC 71	400	360	56	472	450	92	33	315	159	215	178	919	88	512	639	612	219	90	95.0	15	6
	- IEC 80												938	107					170	25	140	M24
	- IEC 90												938	107								
	- IEC 100												955	124								
	- IEC 112												955	124								
	- IEC 132												987	156								
PA 83/42	- IEC 90	400	360	56	472	450	92	33	315	179	215	178	982	109	512	639	612	261	90	95.0	15	6
	- IEC 100												1006	133					170	25	140	M24
	- IEC 112												1006	133								
	- IEC 132												1063	190								
	- IEC 160												1067	194								

Motor Büyüklüğü Motor Frame Size	Motor Bağlantı Ölçüleri Motor Mounting Dimensions									Kama Ölçüleri Key	Kaplin Tipi Type of coupling	
	a2	b2	e2	f2	s2	d1	l1	t1	u1		Çiftel	KTR
71	160	110	130	4.0	M8	14	30	16.3	5	A 5x5x25	DK - 14	BJ - 14
80	200	130	165	4.0	M10	19	40	21.8	6	A 6x6x35	DK - 24	BJ - 24
90	200	130	165	4.0	M10	24	50	27.3	8	A 8x7x40	DK - 24	BJ - 24
100	250	180	215	5.0	M12	28	60	31.3	8	A 8x7x50	DK - 28	BJ - 28
112	250	180	215	5.0	M12	28	60	31.3	8	A 8x7x50	DK - 28	BJ - 28
132	300	230	265	5.0	M12	38	80	41.3	10	A 10x8x60	DK - 38	BM - 38
160	350	250	300	6.0	M16	42	110	45.3	12	A 12x8x75	DK - 42	BM - 42



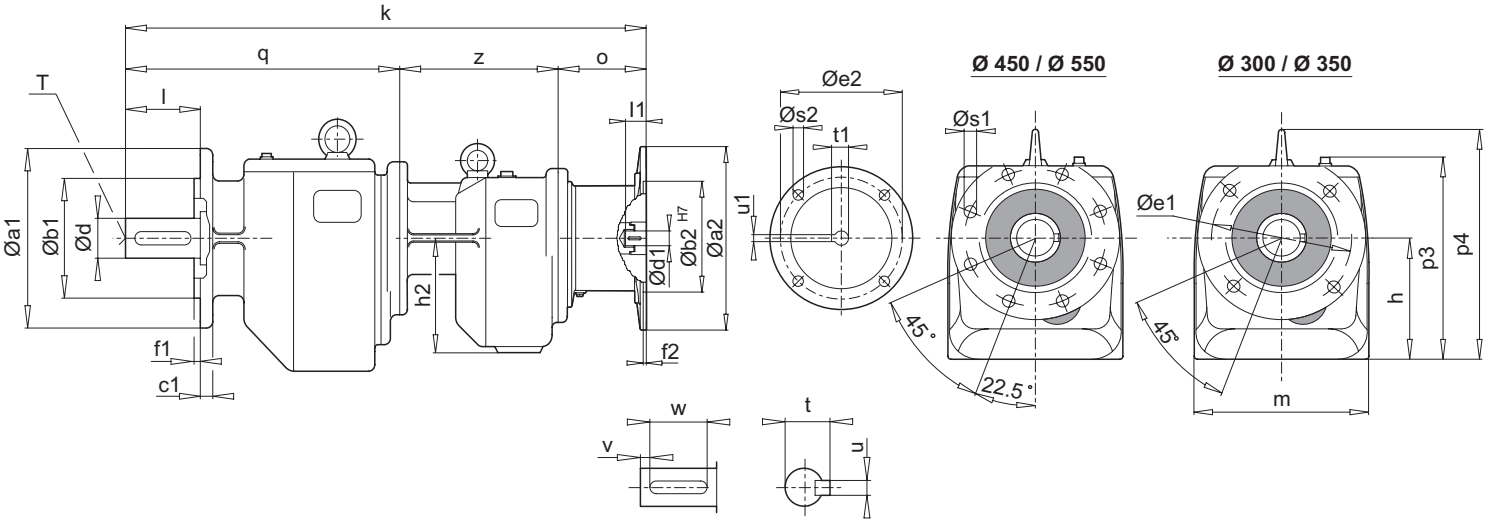
Tip Type		Montaj ölçüleri (Flanş) Mounting dimensions (Flange)						Ana ölçüler Outline dimensions									Şaft Ölçüleri Shaft Dimensions			
		a1	b1	c1	e1	f1	s1	h	h2	k	m	o	p3	p4	q	z	d l	t u	v w	T
PF 63/22	- IEC 71 - IEC 80 - IEC 90 - IEC 100 - IEC 112	300	230	24	265	4.0	14	245	127	777 796 796 813 813	330	88 107 107 124 124	395	475	510	179	65 130	69.0 18	15 100	M20
PF 73/22	- IEC 71 - IEC 80 - IEC 90 - IEC 100 - IEC 112	350	250	24	300	5.0	18	275	127	842 861 861 878 878	400	88 107 107 124 124	442	545	575	179	75 140	79.5 20	7.5 125	M20
PF 73/32	- IEC 90 - IEC 100 - IEC 112 - IEC 132	350	250	24	300	5.0	18	275	159	901 918 918 950	400	107 124 124 156	442	545	575	219	75 140	79.5 20	7.5 125	M20
PF 83/32	- IEC 71 - IEC 80 - IEC 90 - IEC 100 - IEC 112 - IEC 132	450	350	26	400	5.0	18	309	159	995 1014 1014 1031 1031 1063	450	88 107 107 124 124 156	506	633	688	219	90 170	95.0 25	15 140	M24
PF 83/42	- IEC 90 - IEC 100 - IEC 112 - IEC 132 - IEC 160	450	350	26	400	5.0	18	309	179	1058 1082 1082 1139 1143	450	109 133 133 190 194	506	633	688	261	90 170	95.0 25	15 140	M24

Motor Büyüklüğü Motor Frame Size	Motor Bağlantı Ölçüleri Motor Mounting Dimensions									Kama Ölçüleri Key	Kaplin Tipi Type of coupling	
	a2	b2	e2	f2	s2	d1	l1	t1	u1		Çiftel	KTR
71	160	110	130	4.0	M8	14	30	16.3	5	A 5x5x25	DK - 14	BJ - 14
80	200	130	165	4.0	M10	19	40	21.8	6	A 6x6x35	DK - 24	BJ - 24
90	200	130	165	4.0	M10	24	50	27.3	8	A 8x7x40	DK - 24	BJ - 24
100	250	180	215	5.0	M12	28	60	31.3	8	A 8x7x50	DK - 28	BJ - 28
112	250	180	215	5.0	M12	28	60	31.3	8	A 8x7x50	DK - 28	BJ - 28
132	300	230	265	5.0	M12	38	80	41.3	10	A 10x8x60	DK - 38	BM - 38
160	350	250	300	6.0	M16	42	110	45.3	12	A 12x8x75	DK - 42	BM - 42



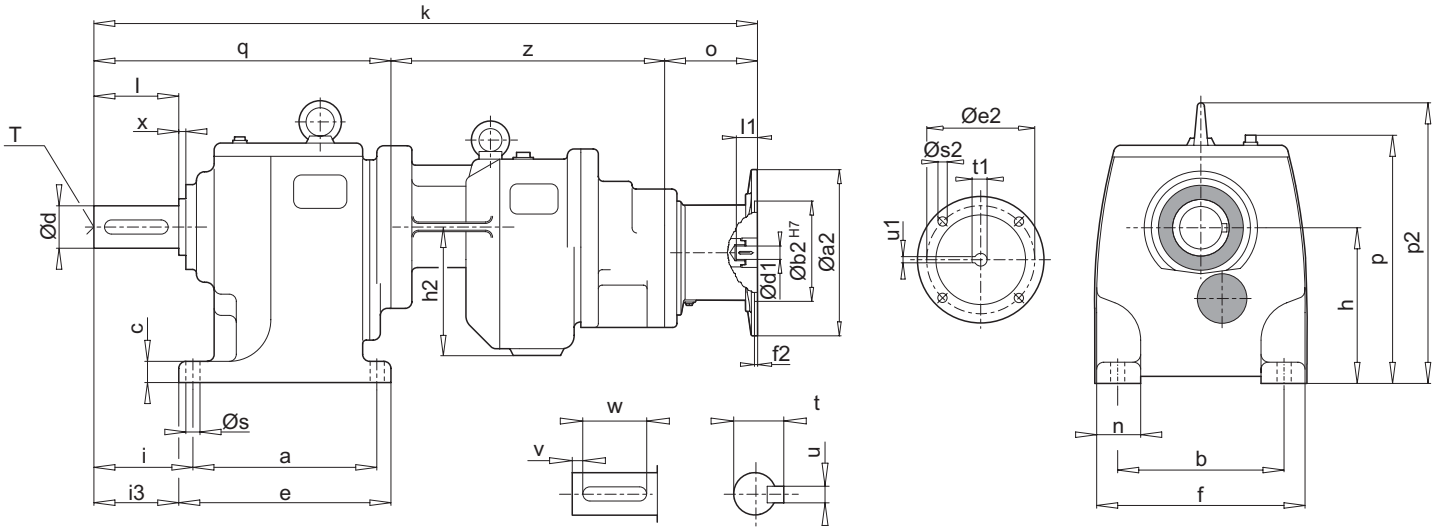
Tip Type		Montaj ölçüleri (Ayak) Mounting dimensions (Foot)							Ana ölçüler Outline dimensions										Şaft Ölçüleri Shaft Dimensions			
		a	b	c	e	f	n	s	h	h2	i	i3	k	o	p	p2	q	z	d l	t u	v w	x T
PA 93/42	- IEC 90	450	440	72	540	550	115	33	390	179	265	220	1073	109	622	783	703	261	110 210	116 28	15 180	8 M24
	- IEC 100												1097	133								
	- IEC 112												1097	133								
	- IEC 132												1154	190								
	- IEC 160												1158	194								
PA 93/52	- IEC 100	450	440	72	540	550	115	33	390	218	265	220	1136	133	622	783	703	300	110 210	116 28	15 180	8 M24
	- IEC 112												1136	133								
	- IEC 132												1193	190								
	- IEC 160												1197	194								
	- IEC 180												1197	194								
PA 103/52	- IEC 90	505	480	82	625	600	125	45	450	218	320	260	1210	109	702	887	801	300	130 250	137 32	15 220	10 M24
	- IEC 100												1234	133								
	- IEC 112												1234	133								
	- IEC 132												1291	190								
	- IEC 160												1295	194								
	- IEC 180												1295	194								

Motor Büyüklüğü Motor Frame Size	Motor Bağlantı Ölçüleri Motor Mounting Dimensions									Kama Ölçüleri Key	Kaplin Tipi Type of coupling	
	a2	b2	e2	f2	s2	d1	l1	t1	u1		Çiftel	KTR
90	200	130	165	4.0	M10	24	50	27.3	8	A 8x7x40	DK - 24	BJ - 24
100	250	180	215	5.0	M12	28	60	31.3	8	A 8x7x50	DK - 28	BJ - 28
112	250	180	215	5.0	M12	28	60	31.3	8	A 8x7x50	DK - 28	BJ - 28
132	300	230	265	5.0	M12	38	80	41.3	10	A 10x8x60	DK - 38	BM - 38
160	350	250	300	6.0	M16	42	110	45.3	12	A 12x8x75	DK - 42	BM - 42
180	350	250	300	6.0	M16	48	110	51.8	14	A 14x9x80	DK - 48	BM - 48



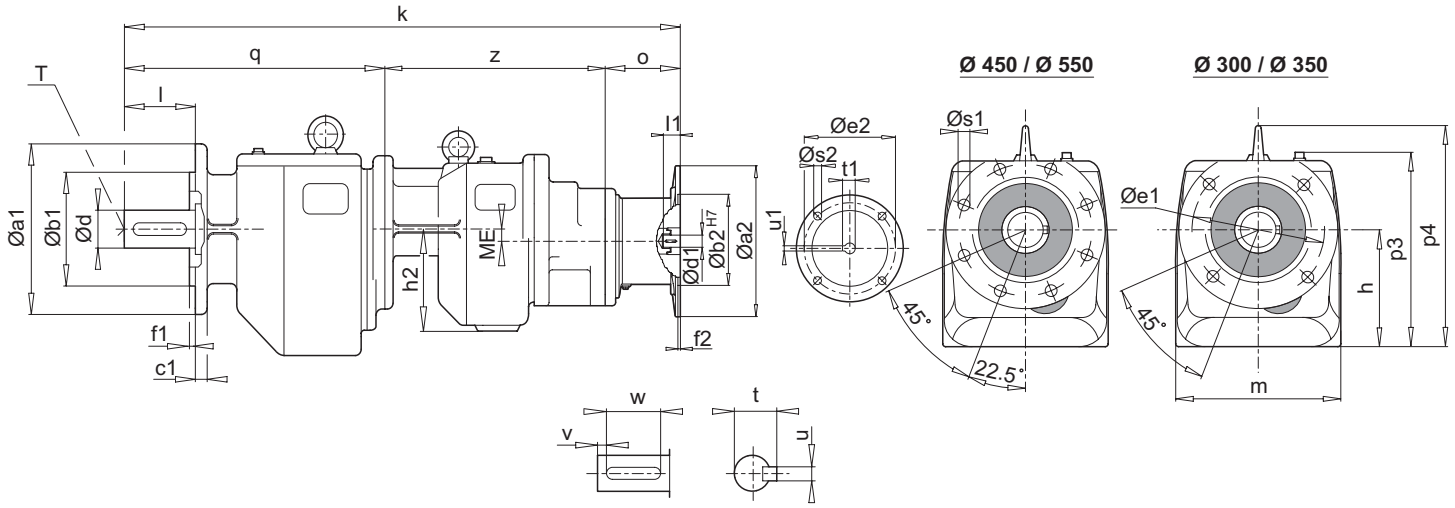
Tip Type		Montaj ölçüleri (Flanş) Mounting dimensions (Flange)						Ana ölçüler Outline dimensions									Şaft Ölçüleri Shaft Dimensions			
		a1	b1	c1	e1	f1	s1	h	h2	k	m	o	p	p2	q	z	d l	t u	v w	T
PF 93/42	- IEC 90	450	350	28	400	5.0	18	384	179	1145	550	109	616	777	775	261	110 210	116 28	15 180	M24
	- IEC 100									1169		133								
	- IEC 112									1169		133								
	- IEC 132									1226		190								
	- IEC 160									1230		194								
PF 93/52	- IEC 100	450	350	28	400	5.0	18	384	218	1208	550	133	616	777	775	300	110 210	116 28	15 180	M24
	- IEC 112									1208		133								
	- IEC 132									1265		190								
	- IEC 160									1269		194								
	- IEC 180									1269		194								
PF 103/52	- IEC 90	550	450	32	500	5.0	18	442	218	1295	600	109	706	879	886	300	130 250	137 32	15 220	M24
	- IEC 100									1319		133								
	- IEC 112									1319		133								
	- IEC 132									1376		190								
	- IEC 160									1380		194								
	- IEC 180									1380		194								

Motor Büyüklüğü Motor Frame Size	Motor Bağlantı Ölçüleri Motor Mounting Dimensions									Kama Ölçüleri Key	Kaplin Tipi Type of coupling	
	a2	b2	e2	f2	s2	d1	l1	t1	u1		Çiftel	KTR
90	200	130	165	4.0	M10	24	50	27.3	8	A 8x7x40	DK - 24	BJ - 24
100	250	180	215	5.0	M12	28	60	31.3	8	A 8x7x50	DK - 28	BJ - 28
112	250	180	215	5.0	M12	28	60	31.3	8	A 8x7x50	DK - 28	BJ - 28
132	300	230	265	5.0	M12	38	80	41.3	10	A 10x8x60	DK - 38	BM - 38
160	350	250	300	6.0	M16	42	110	45.3	12	A 12x8x75	DK - 42	BM - 42
180	350	250	300	6.0	M16	48	110	51.8	14	A 14x9x80	DK - 48	BM - 48



Tip Type		Montaj ölçüleri (Ayak) Mounting dimensions (Foot)							Ana ölçüler Outline dimensions											Şaft Ölçüleri Shaft Dimensions			
		a	b	c	e	f	n	s	h	h2	i	i3	k	o	p	p2	q	z	ME	d l	t u	v w	x T
PA 63/23	- IEC 63	295	260	46	345	330	72	22	250	127	164	141	791	85	400	480	466	240	42.5	65	69.0	15	6
	- IEC 71												795	89						130	18	100	M20
	- IEC 80												811	105									
	- IEC 90												811	105									
PA 73/23	- IEC 63	330	325	56	385	400	72	26	280	127	179	151	835	85	447	550	510	240	42.5	75	79.5	7.5	6
	- IEC 71												839	89						140	20	125	M20
	- IEC 80												855	105									
	- IEC 90												855	105									
PA 83/33	- IEC 63	400	360	56	472	450	92	33	315	159	215	178	977	85	512	639	612	280	50.0	90	95.0	15	6
	- IEC 71												981	89						170	25	140	M24
	- IEC 80												997	105									
	- IEC 90												997	105									
PA 93/43	- IEC 71	450	440	72	540	550	115	33	390	179	265	220	1122	88	622	783	703	331	61.0	110	116	15	8
	- IEC 80												1141	107						210	28	180	M24
	- IEC 90												1141	107									
	- IEC 100												1158	124									
	- IEC 112												1158	124									
PA 103/53	- IEC 71	505	480	82	625	600	125	45	450	218	320	260	1259	88	702	887	801	370	76.0	130	137	15	10
	- IEC 80												1278	107						250	32	220	M24
	- IEC 90												1278	107									
	- IEC 100												1295	124									
	- IEC 112												1295	124									

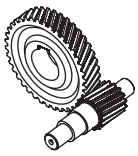
Motor Büyüklüğü Motor Frame Size	Motor Bağlantı Ölçüleri Motor Mounting Dimensions									Kama Ölçüleri Key	Kaplin Tipi Type of coupling	
	a2	b2	e2	f2	s2	d1	l1	t1	u1		Çiftel	KTR
63	140	95	115	3.5	M8	11	23	12.8	4	A 4x4x18	DK - 14	BJ - 14
71	160	110	130	4.0	M8	14	30	16.3	5	A 5x5x25	DK - 14	BJ - 14
80	200	130	165	4.0	M10	19	40	21.8	6	A 6x6x35	DK - 24	BJ - 24
90	200	130	165	4.0	M10	24	50	27.3	8	A 8x7x40	DK - 24	BJ - 24
100	250	180	215	5.0	M12	28	60	31.3	8	A 8x7x50	DK - 28	BJ - 28
112	250	180	215	5.0	M12	28	60	31.3	8	A 8x7x50	DK - 28	BJ - 28



Tip Type		Montaj ölçüleri (Flanş) Mounting dimensions (Flange)						Ana ölçüler Outline dimensions										Şaft Ölçüleri Shaft Dimensions			
		a1	b1	c1	e1	f1	s1	h	h2	k	m	o	p3	p4	q	z	ME	d l	t u	v w	T
PF 63/23	- IEC 63 - IEC 71 - IEC 80 - IEC 90	300	230	24	265	4.0	14	245	127	835 839 855 855	330	85 89 105 105	395	475	510	240	42.5	65 130	69.0 18	15 100	M20
PF 73/23	- IEC 63 - IEC 71 - IEC 80 - IEC 90	350	250	24	300	5.0	18	275	127	900 904 920 920	400	85 89 105 105	442	545	575	240	42.5	75 140	79.5 20	7.5 125	M20
PF 83/33	- IEC 63 - IEC 71 - IEC 80 - IEC 90	450	350	26	400	5.0	18	309	159	1053 1057 1073 1073	450	85 89 105 105	506	633	688	280	50.0	90 170	95.0 25	15 140	M24
PF 93/43	- IEC 71 - IEC 80 - IEC 90 - IEC 100 - IEC 112	450	350	28	400	5.0	18	384	179	1194 1213 1213 1230 1230	550	88 107 107 124 124	616	777	775	331	61.0	110 210	116 28	15 180	M24
PF 103/53	- IEC 71 - IEC 80 - IEC 90 - IEC 100 - IEC 112	550	450	32	500	5.0	18	442	218	1344 1363 1363 1380 1380	600	88 107 107 124 124	706	879	886	370	76.0	130 250	137 32	15 220	M24

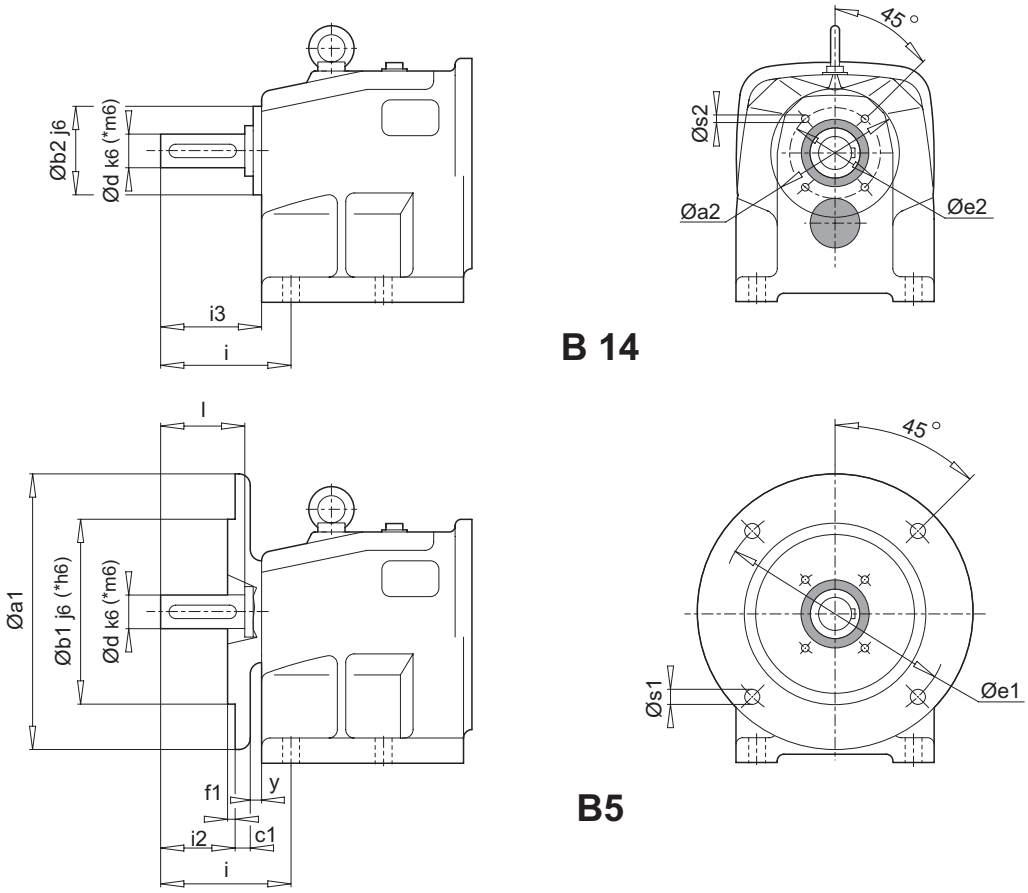
Motor Büyüklüğü Motor Frame Size	Motor Bağlantı Ölçüleri Motor Mounting Dimensions									Kama Ölçüleri Key	Kaplin Tipi Type of coupling	
	a2	b2	e2	f2	s2	d1	l1	t1	u1		Çiftel	KTR
63	140	95	115	3.5	M8	11	23	12.8	4	A 4x4x18	DK - 14	BJ - 14
71	160	110	130	4.0	M8	14	30	16.3	5	A 5x5x25	DK - 14	BJ - 14
80	200	130	165	4.0	M10	19	40	21.8	6	A 6x6x35	DK - 24	BJ - 24
90	200	130	165	4.0	M10	24	50	27.3	8	A 8x7x40	DK - 24	BJ - 24
100	250	180	215	5.0	M12	28	60	31.3	8	A 8x7x50	DK - 28	BJ - 28
112	250	180	215	5.0	M12	28	60	31.3	8	A 8x7x50	DK - 28	BJ - 28

PGR® Drive Technologies



**Ağırlıklar (Yaklaşık kg) ** Weights (approx. kg)

Tip Type	**W**	**IEC**													
		63	**71**	**80**	**90**	**100**	**112**	**132**	**160**	**180**	**200**	**225**	**250**	**280**	**315**
PA\PF 03	17	18	19												
PA\PF 02	12	14	15	18	18										
PA\PF 12/02	23	24	25	28	28										
PA\PF 13	20	21	22												
PA\PF 12	15	16	17	20	20	27	27								
PA\PF 11	10	11	12	16	16	23	23								
PA\PF 22/02	36	37	38	42	42										
PA\PF 23	32	33	34	37	37										
PA\PF 22	30		28	32	32	36	36								
PA\PF 21	23		21	25	25	29	29								
PA\PF 32/12	50	51	52	55	55	62	62								
PA\PF 33	45	46	47	50	50	57	57								
PA\PF 32	42		40	44	44	48	48	57							
PA\PF 31	28		26	30	30	34	34	44							
PA\PF 42/12	68	69	70	73	73	80	80								
PA\PF 43	73		71	75	75	79	79								
PA\PF 42	68				62	70	70	84	95	95					
PA\PF 41	48				43	50	50	64	75	75					
PA\PF 52/12	99	100	101	104	104	111	111								
PA\PF 53	108		106	110	110	114	114								
PA\PF 52	99				93	101	101	116	126	126					
PA\PF 51	58				53	60	60	75	85	85					
PA\PF 63/23	168	169	170	173	173										
PA\PF 63/22	166		164	168	168	172	172								
PA\PF 63	156				151	159	159	173	184	184					
PA\PF 62	180					167	167	181	207	207	222	237			
PA\PF 73/23	253	254	255	258	258										
PA\PF 73/22	251		249	253	253	257	257								
PA\PF 73/32	263				265	269	269	278							
PA\PF 73	263					250	250	264	290	290	305	320			
PA\PF 72	252							253	279	279	294	310			
PA\PF 83/33	382	383	384	387	387										
PA\PF 83/32	378		376	381	381	385	385	394							
PA\PF 83/42	405				400	407	407	422	432						
PA\PF 83	378					366	366	379	406	406	421	437			
PA\PF 82	449							371	398	398	412	428	487	487	
PA\PF 93/43	600		598	602	602	606	606								
PA\PF 93/42	595				589	597	597	612	622	622					
PA\PF 93/52	625					628	628	642	653	653					
PA\PF 93	568							569	596	596	611	626	685	685	
PA\PF 92	610								584	584	599	615	673	673	758
PA\PF 103/53	867		865	869	869	873	873								
PA\PF 103/52	858				852	860	860	875	885	885					
PA\PF 103	880							801	828	828	843	859	917	917	1002
PA\PF 102	870												907	907	992



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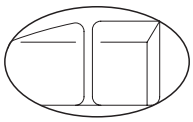
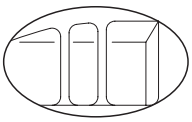


PA 02-12-22

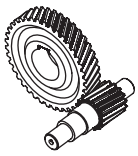
NOT : PA 02-12-22 Gövdelerde tek feder,
PA 32-42-52 Gövdelerde çift feder bulunmaktadır.

NOTE : PA 02-12-22 Cases have single support,
PA 32-42-52 Cases have double support.



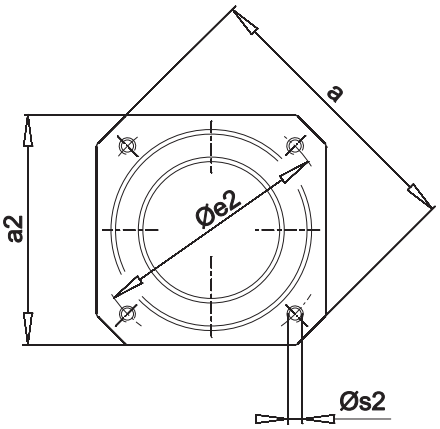
PA 32-42-52

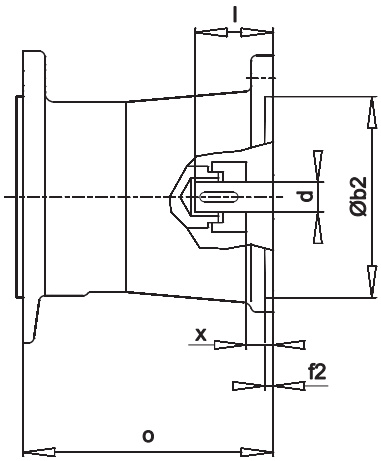
Tip / Type	**a2**	**b2**	**e2**	**f2**	**s2**	**i**	**i3**	**a1**	**b1**	**c1**	**e1**	**f1**	**s1**	**i2**	**y**	**d**	**l**	**x**
PA 02 **PA 03**	90	55	72	8	M 8x13	52	42	160	110	11	130	3,5	9	27	5	20	40	3
PA 12 **PA 13**	95	60	80	9	M 8x13	78	60	200	130	14	165	3,5	11	43	5	25	50	4
PA 22 **PA 23**	130	72	100	10	M 12x20	74	59	250	180	16	215	4,0	14	38	5	30	60	5
PA 32 **PA 33**	150	90	120	11	M 16x25	96	79	300	230	20	265	4,0	14	54	5	40	80	6
PA 42 **PA 43**	165	105	135	14	M 16x25	130	106	300	230	20	265	4,0	14	81	5	45	90	6
PA 52 **PA 53**	200	134	165	19	M 16x25	140	120	350	250	20	300	5,0	18	95	5	55*	110	6



SERVOMOTOR MONTAJI İÇİN ADAPTÖR

ADAPTER FOR MOUNTING SERVOMOTOR





Redüktör Tipi Gear Unit Type	**Motor Büyüklüğü** / Motor Size							**Şaft Ebatı** Shaft Size		**Silindir** Cylinder	M_{knom}	**Adaptör tipi** Adapter type
	a	**a2**	**b2**	**e2**	**f2**	**s2**	**x**	**d**	**l**	**o**	[Nm]	
PA\PF 02 , PA\PF 12	120	96	80	100	4	M6	15	19	40	124	10	Servo 100 / 160 S
PA\PF 02 , PA\PF 12	165	126	110	130	4	M8	20	24	50	136	35	Servo 130 / 160 S
PA\PF 22 , PA\PF 32	155	126	110	130	4	M8	20	24	50	150	35	Servo 130 / 250 S
PA\PF 02 , PA\PF 12	186	155	130	165	5	M10	23	32	58	151	95	Servo 165 / 160 S
PA\PF 22 , PA\PF 32	186	155	130	165	5	M10	23	32	58	166	95	Servo 165 / 250 S
PA\PF 22 , PA\PF 32	240	192	180	215	5	M12	45	38	80	187	95	Servo 215/ 250 S
PA\PF 42 , PA\PF 52	240	192	180	215	5	M12	24	38	80	229	310	Servo 215/ 300 S
PA\PF 42 , PA\PF 52	350	260	250	300	5	M16	26	48	82	231	310	Servo 300/ 300 S
PA\PF 62 , PA\PF 72 PA\PF 82 , PA\PF 92	350	260	250	300	5	M16	26	48	82	249	310	Servo 300/ 350 S

SEP tipi servo motor bağlantı adaptörünün bağlantısı kamalı olarak yapılmaktadır. SEK tiplerinde ise servo motor adaptörünün bağlantısı setuskur civata sıktırması ile yapılmaktadır.

Servo motor bağlantı adaptörünün bağlantı flanşının farklı olması durumunda yüksek adetteki siparişler üretime alınır.

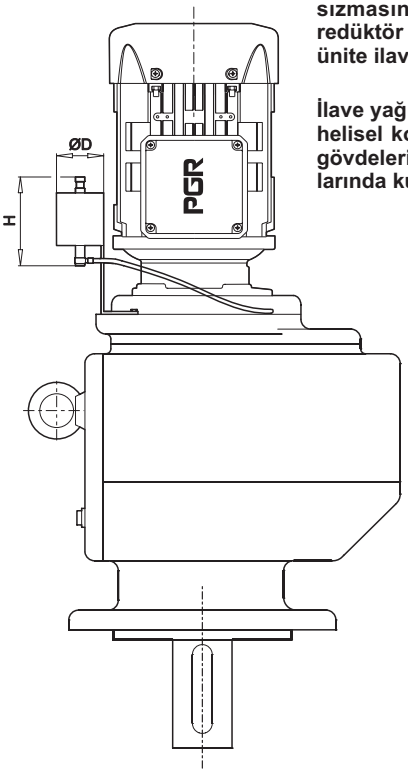
For connecting SEP adapter which is shown above on this page, servo motor's output shaft is designed with locking key. For connecting SEK type adapter, connecting is supplied with a clamp coupling sleeve.

An intermediate flange is required when other servo motor types are used with IEC adapter. Offers are manufactured gladly by PGR.

M4 MONTAJ POZİSYONU İÇİN İLAVE YAĞ HACMİ

ADDITIONAL LUBRICANT VOLUME FOR MOUNTING POSITION M4

Tip Type	Boyut Size	ø D [mm]	H [mm]	[kg]
PF 42 - PF 43	**I**	100	180	6
PF 52 - PF 53				
PF 63				
PF 62	**II**	150	300	7
PF 72 - PF 73				
PF 82 - PF 83	**III**	180	300	8
PF 92 - PF 93				
PF 102 - PF 103				



Bu ilave yağ hacim ünitesinin kullanılması, dikey montaj pozisyonlarında (M4) ve kötü çalışma şartları altında bile havalandırma tapasından yağ sızmasını önler. Dikey çalışma ortamlarında redüktör içindeki yağ köpüklenme yapabilir ve bu ünite ilave bir hacim sağlar.

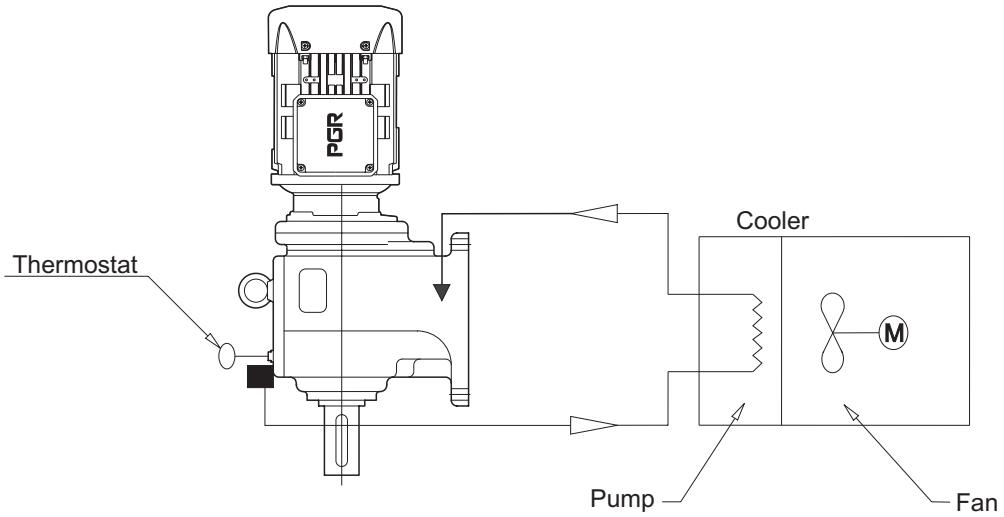
İlave yağ hacim ünitesi, tahvil oranı 20' den küçük helisel konik dişli üniteler PKD 4390 ve daha üst gövdelerin dikey montaj pozisyonu uygulamalarında kullanımı önerilir.

30

Additional lubricant volume unit uses for preventing oil laekage from venting plug when gear unit is mounted with M4 mounting position. It is important because at vertical mounting position oil could be foamed.

PGR suggest that additional lubrication volume units should be used where gear reduction is less than 20 and for polat helical bevel gear unit series such as PKD 4390 and greater case when M4 vertical mounting position is applied.

30

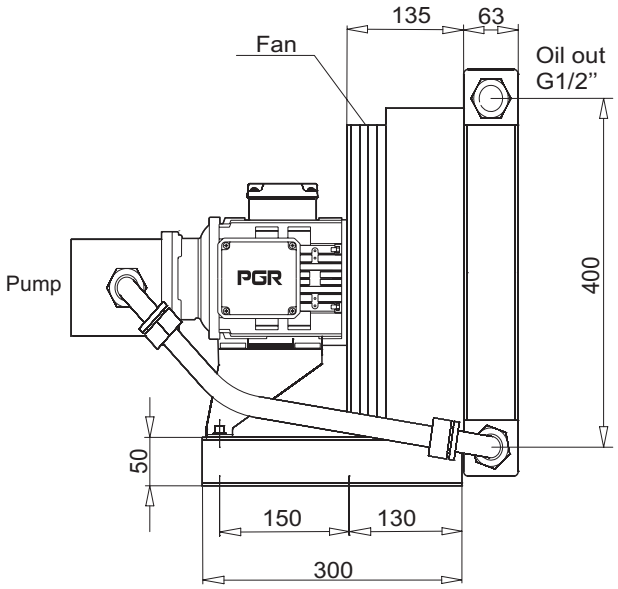


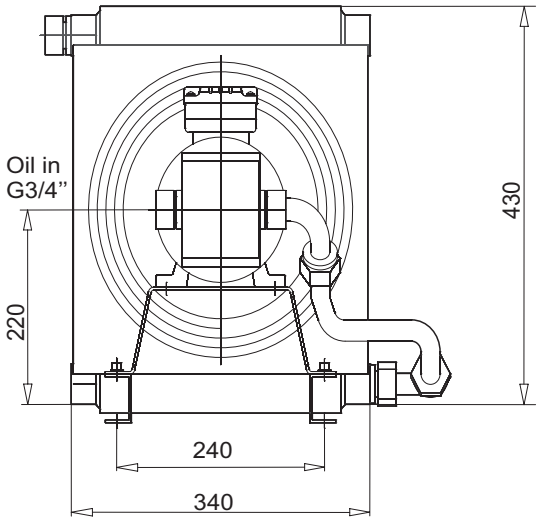
■ Çıkış = Emme hattı ▼ Yağ seviyesi = Basınç hattı

Dişli ünitesi yağı,bir pompa tarafından çekilir ve bir ısı dönüştürücüsü boyunca akar. Yağ, bir fan tarafından yaratılan bir hava akımı ile soğutulur. Yağ, ısı dönüştürücünün dışına taşınır ve tekrar haznesine geri gönderilir. Sıcaklık bir termostat tarafından kontrol edilir.PGR, sıcaklığın izlenmesini önerir.

■ Outlet = Suction line ▼ Oil level = Pressure line

Picture which is above on this page shows cycle of the cooling unit. There is a thermostat on the gear unit for checking oil temperature. Oil flows from suction line to pressure line which is provided by pump. In this way, oil temperature is cooled down by a fan which is supplying air flow to the coil. Then, oil flows to the house of gear unit.





* Potansiyel patlayıcı atmosferli alanlar için uygun değildir.

Dizayn

Soğutucu	: TFS/A 8,5-400-F-03-11
Düşürme	: Dış 1/2"/ iç 3/4''
Motorlar	: Spannung 3x400 V
Çıkış gücü	: 0.55 kW
Hız	: 1350 minimum
Koruma sınıfı	: IP 55
Yalıtım sınıfı	: F
Sıcaklık sınıfı	: B

Aşağıdaki özelliklerde mevcuttur:
- Özel voltaj 60 HZ - Özel motor

Ağırlık : 32 kg

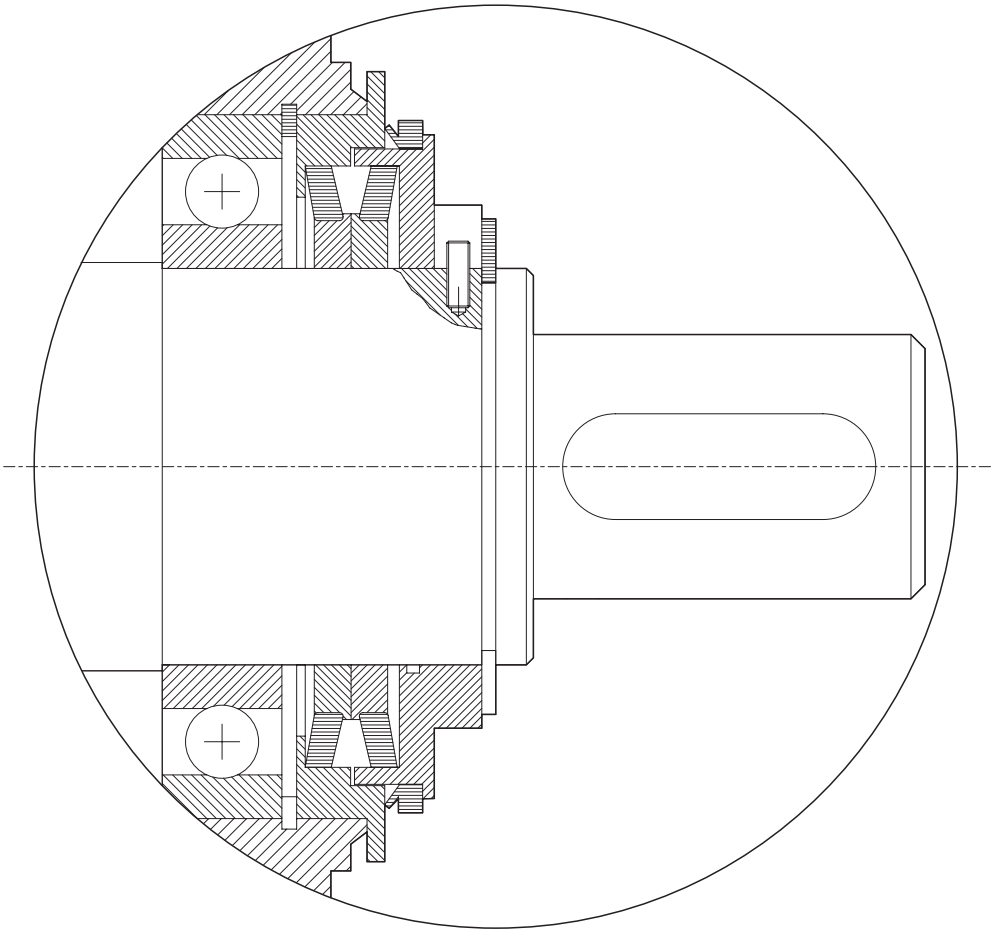
* Not suited for areas with potantially explosive atmospheres

Design

Cooler	: TFS/A 8,5-400-F-03-11
Reduction	: Out 1/2"/ in 3/4''
Motors	: Spannung 3x400 V
Output	: 0.55 kW
Speed	: 1350 minimum
Protection Class	: IP 55
Insulation Class	: F
Temperature Class	: B

Available with:
- Special voltage 60 HZ - Special motor

Weight : 32 kg



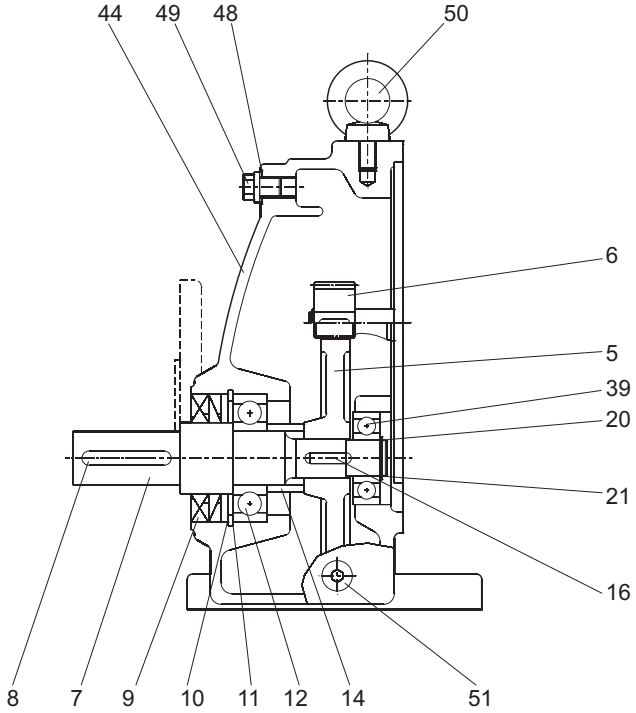
MEKANİK KEÇE

Özellikle aşırı çalışmalarda ve çok kötü çalışma koşullarında uygundur. Daldırmalı veya sulu çalışma ortamlarından etkilenmemektedir. Bu keçe tipi dış çevre koşullarından kesin koruma sağlar.

MECHANICAL SEAL

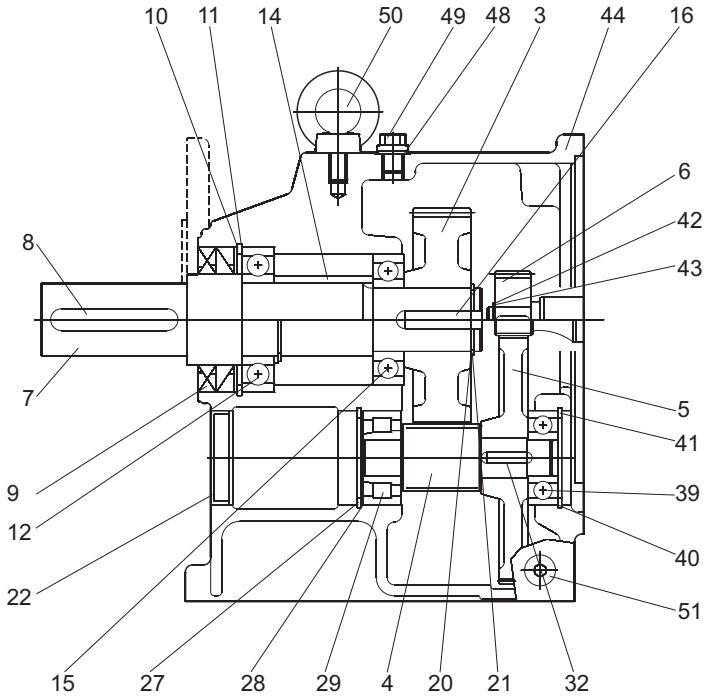
Seals are important for prevent oil leakage from gear unit and protect from environment. In hazardous environment and extreme operation conditions sealing must be considered. For that reason mechanical seals are applicable for using at hazardous environment, submerged operation.

PA\PF 11 - 51

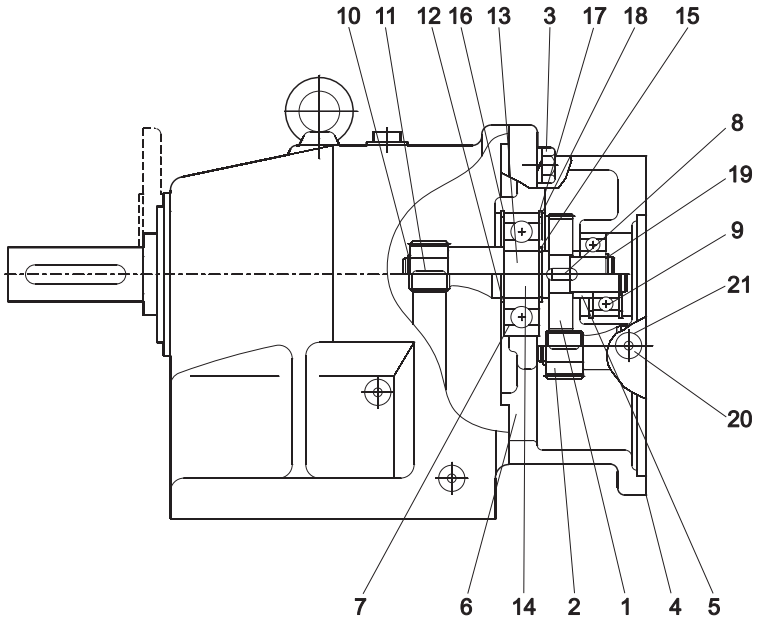


3	**Z4 Dişlisi**	Driven Gear
4	**Z3 Dişlisi**	Pinion Shaft
5	**Z2 Dişlisi**	Driving Gear
6	**Z1 Dişlisi**	Driving Pinion Gear
7	**Çıkış Mili**	Solid Shaft
8	**Kama**	Key
9	**Keçe**	Shaft Seal
10	**Segman**	Circlip
11	**Layner**	Shim
12	**Rulman**	Bearing
14	**Burç**	Spacer
15	**Rulman**	Bearing
16	**Kama**	Key
20	**Layner**	Shim
21	**Segman**	Circlip
22	**Yağ Kapağı**	Oil Filler Cup
27	**Segman**	Circlip
28	**Layner**	Shim
29	**Rulman**	Bearing
32	**Kama**	Key
39	**Rulman**	Bearing
40	**Layner**	Shim
41	**Segman**	Circlip
42	**Layner**	Shim
43	**Segman**	Circlip
44	**Gövde**	Gear Case
48	**Rondela**	Washer
49	**Tapa**	Vent Plug
50	**Mapa**	Flanged Eye Bolt
51	**Tapa**	Drain Plug

PA\PF 02 - 52

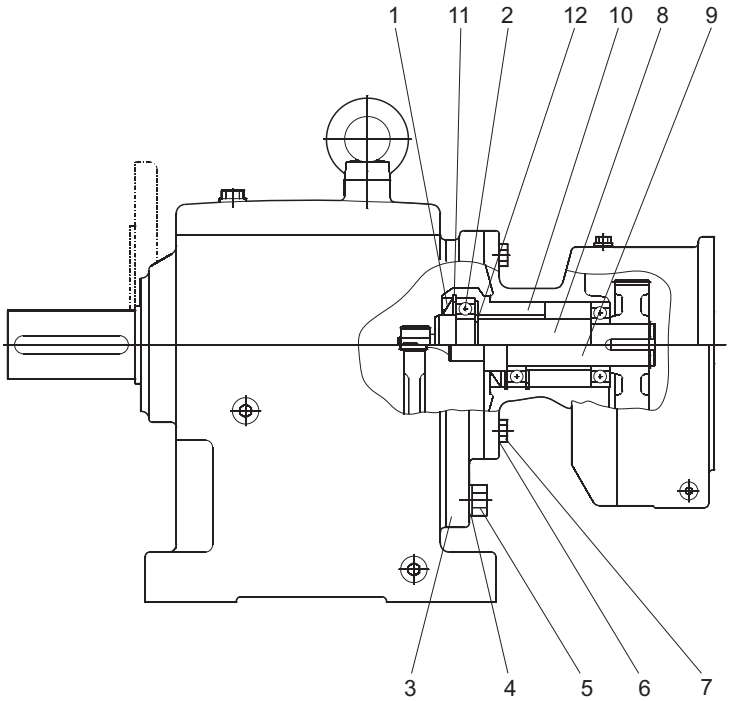


PA\PF 03 - 53

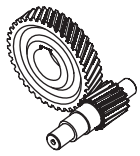


1	**Z2 Dişlisi**	Input gear
2	**Z1 Dişlisi**	Input pinion
3	**Civata**	Bolt
4	**Conta**	Gasket
5	**Rondela**	Supporting disc
6	**İndirgeyici Gövdesi**	Third reduction gearcase
7	**Rulman**	Bearing
8	**Kama**	Key
9	**Rulman**	Bearing
10	**Segman**	Circlip
11	**Kama**	Key
12	**Segman**	Circlip
13	**İndirgeyici mili Çakma**	Intermediate Shaft, Plain
14	**İndirgeyici mili Yekpare**	Intermediate Shaft, Gearcut
15	**Segman**	Circlip
16	**Layner**	Shim
17	**Layner**	Shim
18	**Segman**	Circlip
19	**Segman**	Circlip
20	**Tapa**	Plug
21	**Tapa Contası**	Plug joint

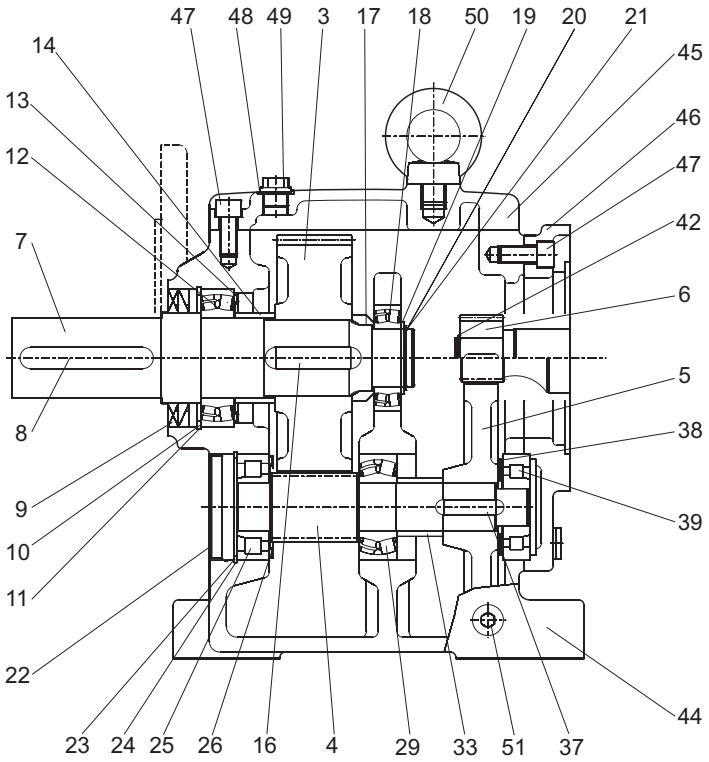
PA\PF 12/02 - 103/52



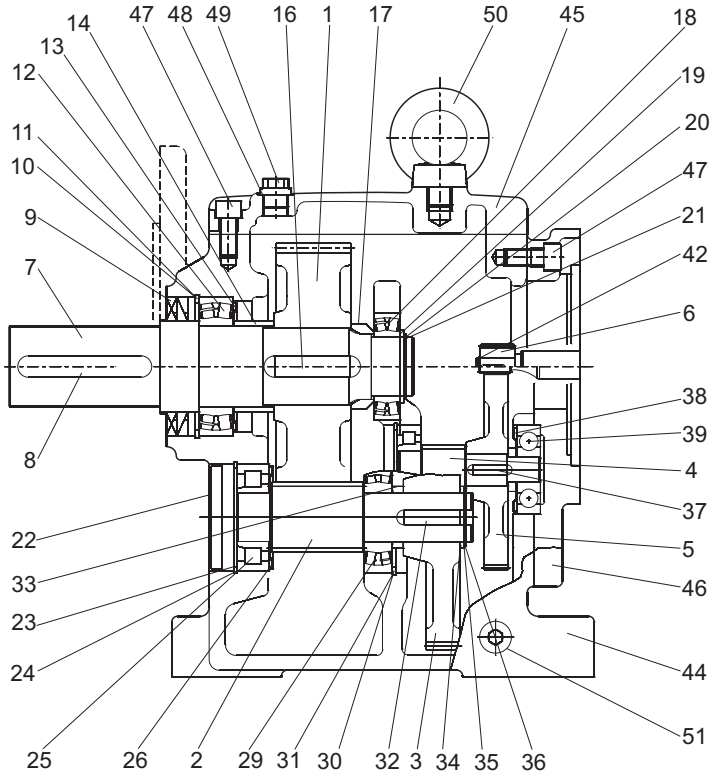
1	**Şaft Keçesi**	Shaft Seal
2	**Rulman**	Bearing
3	**Ara Flanş**	Intermediate Flange
4	**Yaylı Rondela**	Spring Washer
5	**Civata**	Bolt
6	**Yaylı Rondela**	Spring Washer
7	**Civata**	Bolt
8	**Ara Mil Çakma**	Intermediate Shaft, Plain
9	**Ara Mil Yekpare**	Intermediate Shaft, Gearcut
10	**Ara Burç**	Bearing Sleeve
11	**Segman**	Circlip
12	**Segman**	Circlip



PA\PF 62-102

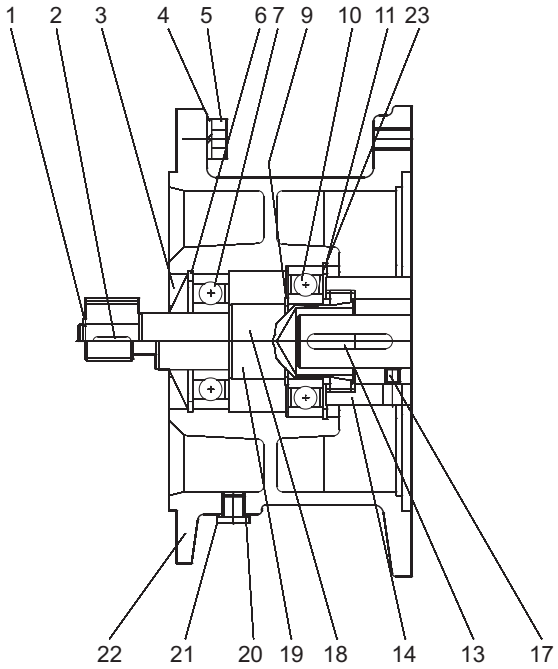


PA\PF 63-103



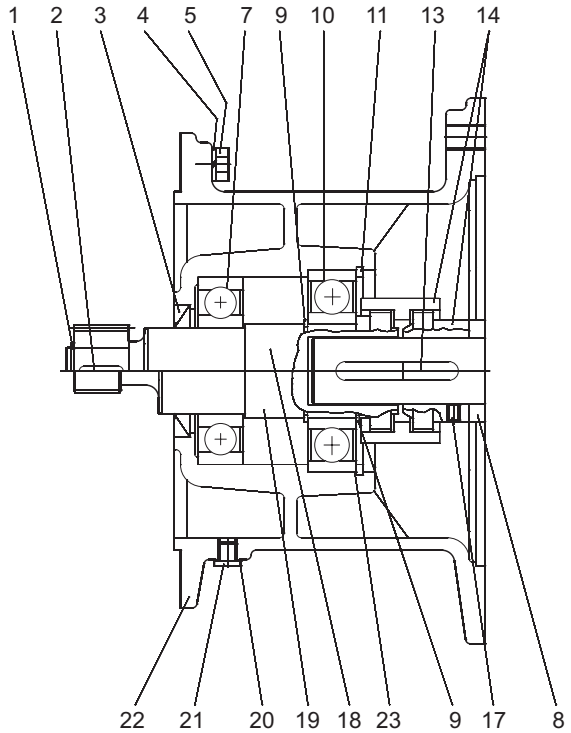
1	**Z6 Dişlisi**	Output Gear
2	**Z5 Dişlisi**	Output Pinion Shaft
3	**Z4 Dişlisi**	Driven Gear
4	**Z3 Dişlisi**	Pinion Shaft
5	**Z2 Dişlisi**	Driving Gear
6	**Z1 Dişlisi**	Driving Pinion Gear
7	**Çıkış Mili**	Solid Shaft
8	**Kama**	Key
9	**Keçe**	Shaft Seal
10	**Layner**	Shim
11	**Segman**	Circlip
12	**Rulman**	Bearing
13	**Nilos Ring**	Nilos Ring
14	**Burç**	Spacer
16	**Kama**	Key
17	**Konik Burç**	Spacer
18	**Rulman**	Bearing
19	**Rondela**	Washer
20	**Layner**	Shim
21	**Segman**	Circlip
22	**Yağ Kapağı**	Oil Filler Cup
23	**Segman**	Circlip
24	**Layner**	Shim
25	**Rulman**	Bearing
26	**Nilos Ring**	Nilos Ring
29	**Rulman**	Bearing
30	**Layner**	Shim
31	**Segman**	Circlip
32	**Kama**	Key
33	**Burç**	Spacer
34	**Rondela**	Washer
35	**Layner**	Shim
36	**Segman**	Circlip
37	**Kama**	Key
38	**Nilos Ring**	Nilos Ring
39	**Rulman**	Bearing
42	**Segman**	Circlip
44	**Gövde**	Gear Case
45	**Üst Kapak**	Cover
46	**Ara Flanş**	İntermediate Flange
47	**İmbus Civata**	Socked Head Flange
48	**Rondela**	Washer
49	**Tapa**	Vent Plug
50	**Mapa**	Flanged Eye Bolt
51	**Tapa**	Drain Plug

IEC 63 - 112

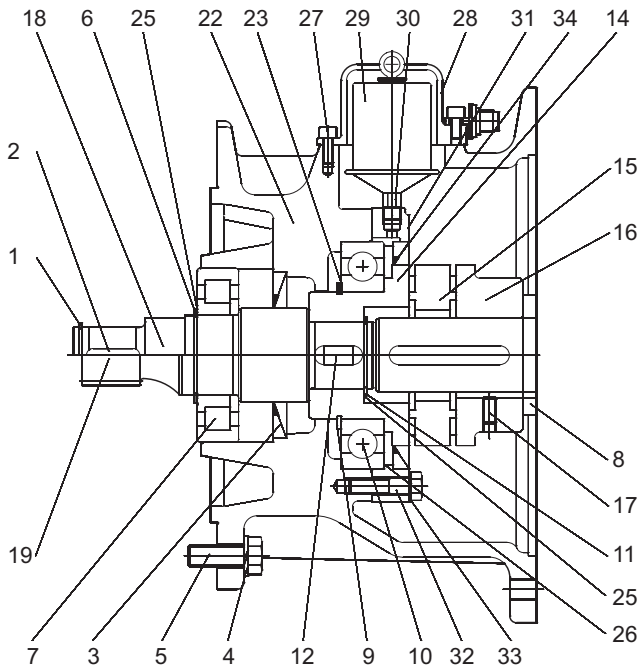


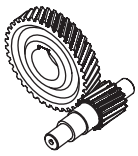
1	**Segman**	Circlip
2	**Kama**	Key
3	**Mil keçesi**	Solid shaft seal
4	**Rondela**	Washer
5	**Altıköşe başlı civata**	Hexagon screw
6	**Segman**	Circlip
7	**Rulman**	Clutch shaft bearing
8	**Burç**	Spacer
9	**Segman**	Circlip
10	**Rulman**	Clutch shaft bearing
11	**Segman**	Circlip
12	**Kama**	Key
13	**Kama**	Key
14	**Kaplin**	Coupling
15	**Kaplin**	Coupling
16	**Kaplin**	Coupling
17	**Setuskur civata**	Set screw
18	**İec mili çakma**	Clutch shaft
19	**İec mili yekpare**	Clutch pinion shaft
20	**Rondela**	Washer
21	**Yağ tapası**	Oil plug
22	**İec gövdesi**	IEC adapter
23	**Layner**	Shim
25	**Layner**	Shim
26	**Layner**	Shim
27	**Alyan başlı civata**	Socket head screw
28	**Kapak**	Cover
29	**Otomatik yağlayıcı**	Automatic lubricator
30	**Adaptör**	Adapter
31	**Rulman kapağı**	Bearing cover
32	**Altıköşe başlı civata**	Hexagon screw
33	**Rondela**	Washer
34	**Mil keçesi**	Solid shaft seal

IEC 132 - 180

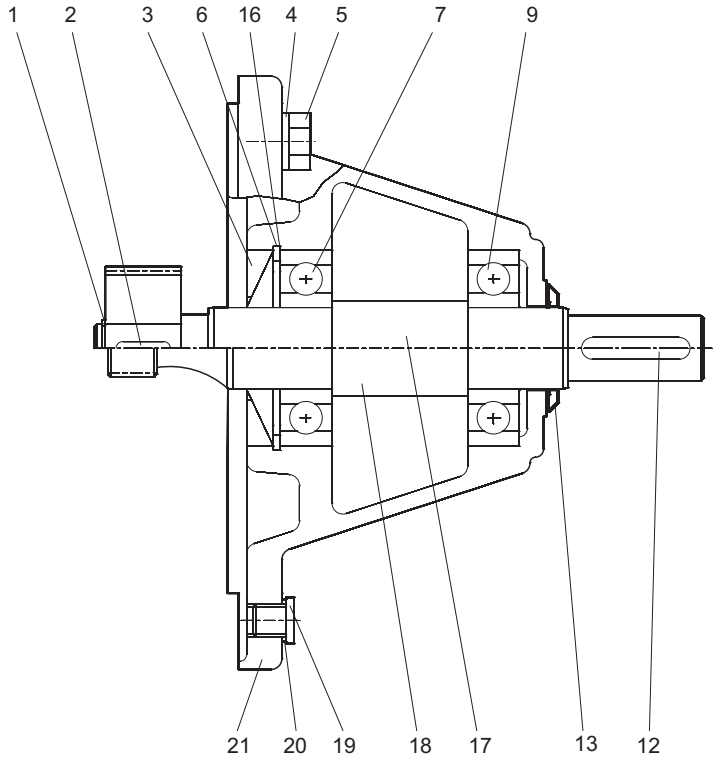


IEC 160 - 315



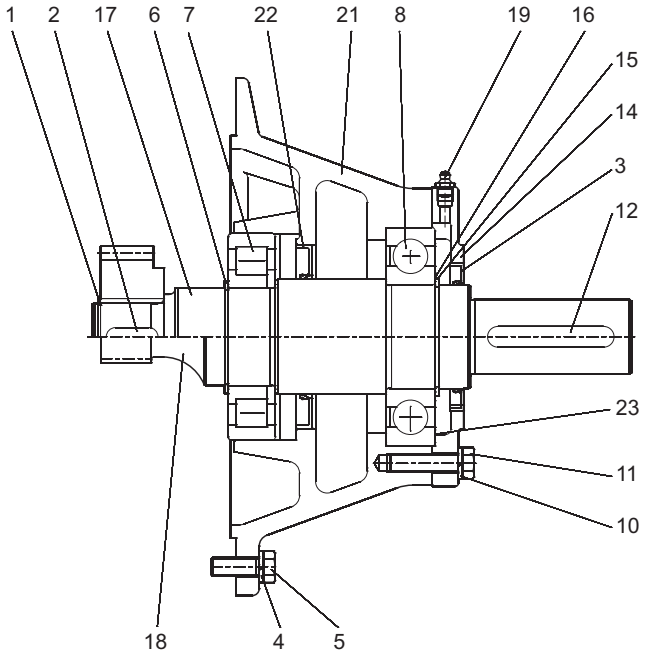


PA\PF 11-51 , PA\PF 02-52 , PA\PF 03-63

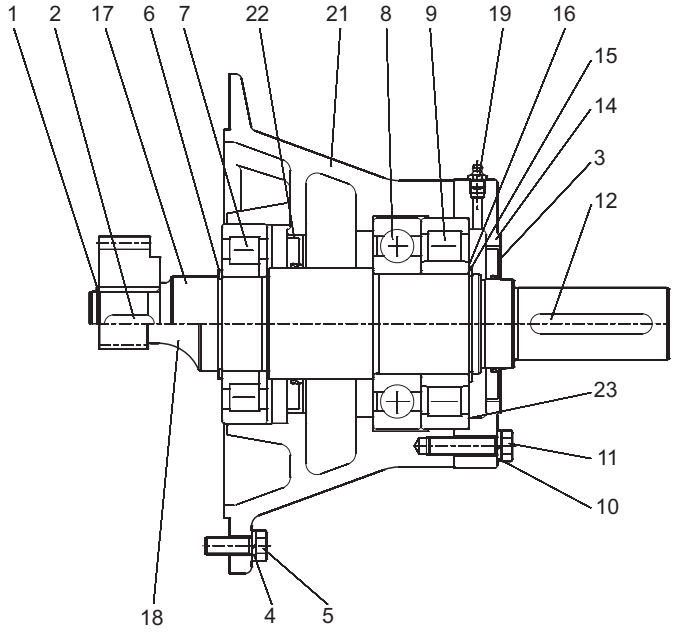


1	**Segman**	Circlip
2	**Kama**	Key
3	**Şaft keçesi**	Shaft seal
4	**Rondela**	Washer
5	**Altıköşe başlı civata**	Hexagon screw
6	**Segman**	Circlip
7	**Rulman**	Input shaft bearing
8	**Rulman**	Bearing
9	**Rulman**	Input shaft bearing
10	**Rondela**	Washer
11	**Altıköşe baş civata**	Hexagon screw
12	**Kama**	Key
13	**Yağ tutucu**	Oil flinger
14	**Rulman kapağı**	Bearing cover
15	**Segman**	Circlip
16	**Layner**	Shim
17	**W mili çakma**	Input shaft, plain
18	**W mili yekpare**	Input shaft, gearcut
19	**Yağ tapası**	Drain plug
20	**Rondela**	Washer
21	**W gövdesi**	Input bearing housing
22	**Şaft keçesi**	Shaft seal (Oil flinger)
23	**Layner**	Shim

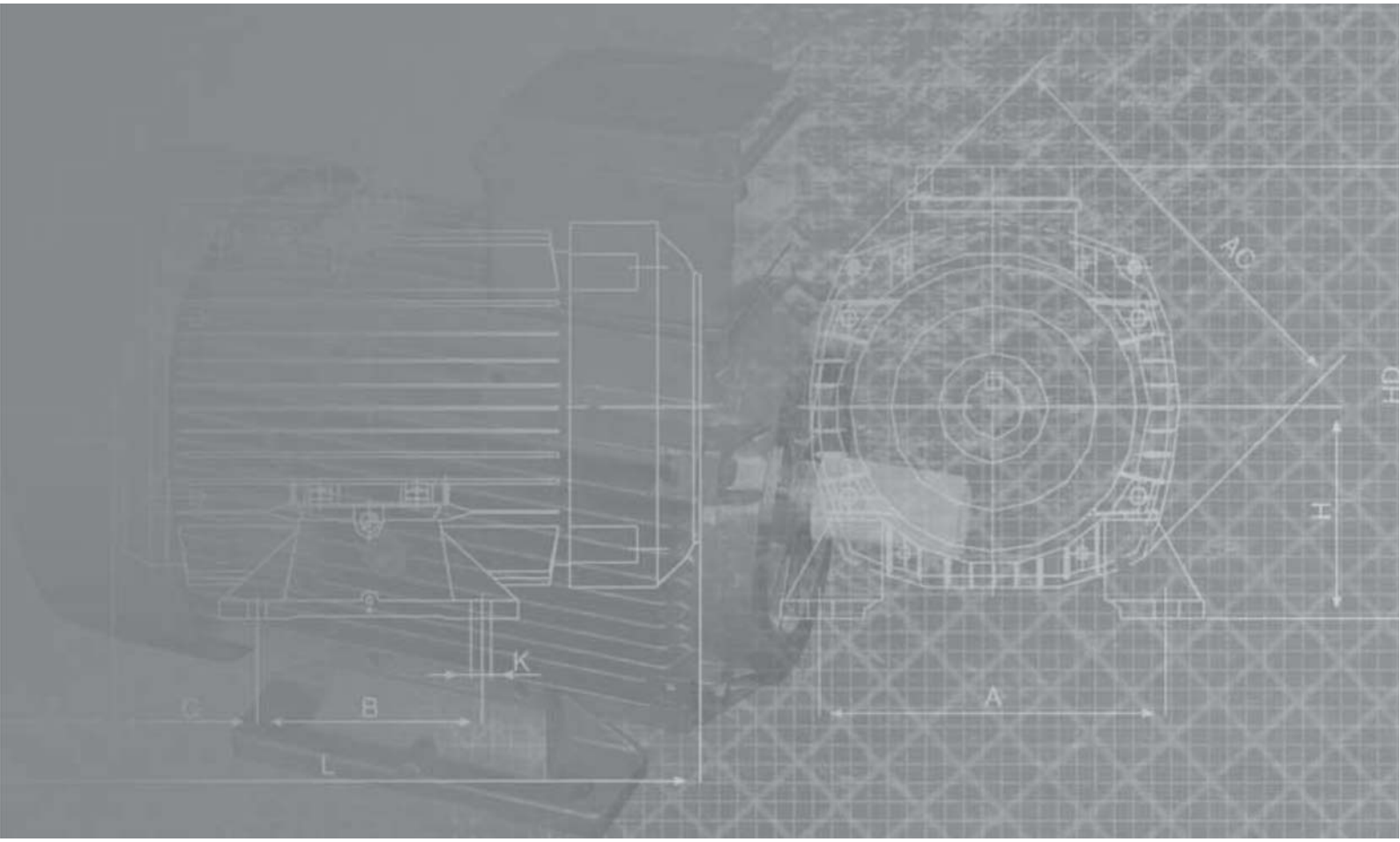
PA\PF 62-72 , PA\PF 73-93

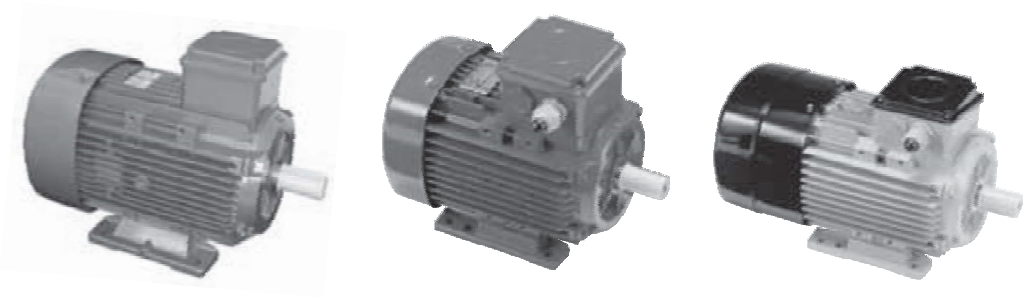


PA\PF 82-102 , PA\PF 103



ÜÇ FAZLI VE BİR FAZLI
ELEKTRİK MOTORLARI





İÇERİK

STANDARTLAR

Elektrik motorları, aşağıda listesi verilen Uluslararası Standartlara uygun olarak üretilmektedir:

IEC 60034-1	Sınıflama ve performans
IEC 60034-2	Kayıp ve verim ölçme metodları
IEC 60034-5	Koruma derecesi sınıflandırması
IEC 60034-6	Soğutma metodları
IEC 60034-7	Yapı şekil ve montaj düzenleme sembolleri
IEC 60034-8	Terminal işaretlemesi ve dönüş yönü
IEC 60034-9	Ses seviyesi limitleri
IEC 60034-11	Sıcaklık koruması
IEC 60034-14	Vibrasyon limitleri
IEC 60034-18-1	İzolasyon sistemlerinin fonksiyonel değerlendirmesi
IEC 60038	Standart gerilimler
EN 50347	Elektrik makineleri için boyutlar ve çıkış güçleri
EN 55014-1 EN 61000-3-2 EN 61000-3-3	Elektromanyetik uyumluluk

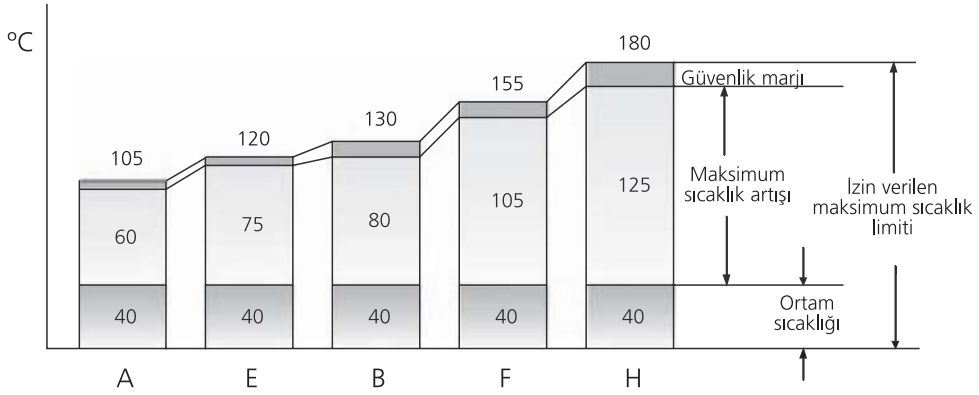
Türkiye	Almanya	İngiltere
TSE 3067	DIN VDE 0530	BS EN 60034
TSE 4239	DIN EN 60034	

Üç fazlı ve bir fazlı motor serimiz için, UL 1004 ve CSA C 22.2 No 100.95 standartlarını sağlayan, UL ve C-UL sertifikalı motor üretimimiz mevcuttur.

İZOLASYON SINIFI

Standart motorlarımız, B sınıfı sıcaklık artışı limitleri içinde tasarlanmış olup, F sınıfı izolasyona sahiptir. Bu özellik, motorların daha uzun çalışma ömrüne sahip olmasını sağlamaktadır.

IEC 60034-1 standartlarına uygun ölçüm yapıldığında, F izolasyon sınıfı motorlar, 40°C ortam sıcaklığında, 10°C güvenlik marjı dikkate alındığında maximum 105°C sargı sıcaklığı artışına izin vermektedir.



İzolasyon sınıfı

KORUMA SINIFI

IEC 60034-5 standardına göre, yabancı maddelerin ve / veya suyun elektrik motoru gövdesini geçerek tehlike yaratacak motor kısımlarına ulaşmasının engellenme derecesini belirleyen IP kodu motorların üzerinde belirtilmektedir.

Standart motorlarımızın koruma sınıfı IP54'tür.

X	Katı yabancı maddelerin girişine karşı koruma	Y	Suya karşı koruma	IP XY
5	Muhafazanın içindeki hareketli ve gerilimli kısımlara rasgele dokunmaya karşı koruma. Zarar verici miktarda toz birikmesine karşı koruma. Toz girişi tam olarak önlenmemiştir, ancak motorun çalışmasını bozacak miktarda toz muuhafazadan içeri giremez.	4	Herhangi bir doğrultudan motorun üzerine sıçrayan suyun zarar vermesine karşı koruma.	IP 54
		5	Herhangi bir doğrultudan motorun üzerine püskürtülen suyun zarar vermesine karşı koruma.	IP 55

VİBRASYON/BALANS

Bütün rotorlar yarım kama ile dinamik olarak balans yapılmakta olup bu motor etiketinde 'H' harfi ile belirtilmektedir.

IEC 60034-14'e göre, standart motorlarda **A vibrasyon seviyesi** sağlanmaktadır. Müşteri isteğine göre, B vibrasyon seviyesine sahip motor üretimi mümkündür.

Vibrasyon (mm/s)

Gövde büyüklüğü	Vibrasyon derecesi	
	A	B
63-132	1,6	0,7
160-250	2,2	1,1

ELEKTRİKSEL BAĞLANTI

Terminal plakasında IEC 60034-8'e göre işaretlenmiş 6 bağlantı terminali bulunmaktadır.

Gövde büyüklüğü	63-80	90-100	112	132-160	180	200	225-250
Kablo girişi	M20	M25	M25	M32	M40	M32	M40
Giriş sayısı	1	1	2	2	2	2	2

TOLERANSLAR

IEC 60034-1'e göre, katalog değerlerinden sapma toleransları aşağıda belirtilmiştir:

Hız (n)	$\Delta n = \pm 20\% (n_S - n_N)$ for $P_N > 1$ kW $\Delta n = \pm 30\% (n_S - n_N)$ for $P_N \leq 1$ kW
Verim % (η)	$\Delta\eta = -15\% (100 - \eta_N)$ for $P_N \leq 50$ kW $\Delta\eta = -10\% (100 - \eta_N)$ for $P_N > 50$ kW
Güç faktörü (cos φ)	$\Delta \cos\varphi = -1/6 (1 - \cos\varphi)$
Kilitli rotor akımı (I_L/I_N)	$\Delta (I_L/I_N) = +20\% (I_L/I_N)$
Kilitli rotor momenti (M_L/M_N)	min. $(M_L/M_N) = -15\% (M_L/M_N)$ max. $(M_L/M_N) = +25\% (M_L/M_N)$
Devrilme momenti (M_K/M_N)	$\Delta (M_K/M_N) = -10\% (M_K/M_N)$
Semer momenti (M_P/M_N)	$\Delta (M_P/M_N) = -15\% (M_P/M_N)$
Eylemsizlik momenti (J) [kgm^2]	$\Delta J = \pm 10\% J$
Ses seviyesi (LPA) [dB]	Δ LPA = +3 dB (A)

ORTAM KOŞULLARI

Üç fazlı ve bir fazlı motorlar en fazla deniz seviyesinden 1000 metre yükseklikte ve 40°C ortam sıcaklığında çalışacak şekilde tasarlanmıştır. Diğer yükseklik ve ortam sıcaklıklarındaki güç hesaplamalarında aşağıdaki % katsayılar kullanılmalıdır.

YÜKSEKLİK		1000 m'ye kadar	1500 m'ye kadar	2000 m'ye kadar	2500 m'ye kadar	3000 m'ye kadar	3500 m'ye kadar	4000 m'ye kadar
İzolasyon sınıfına göre % olarak katalog güçlerinin katları	B	100	97	94	90	86	82	77
	F	100	98	95	91	87	83	78

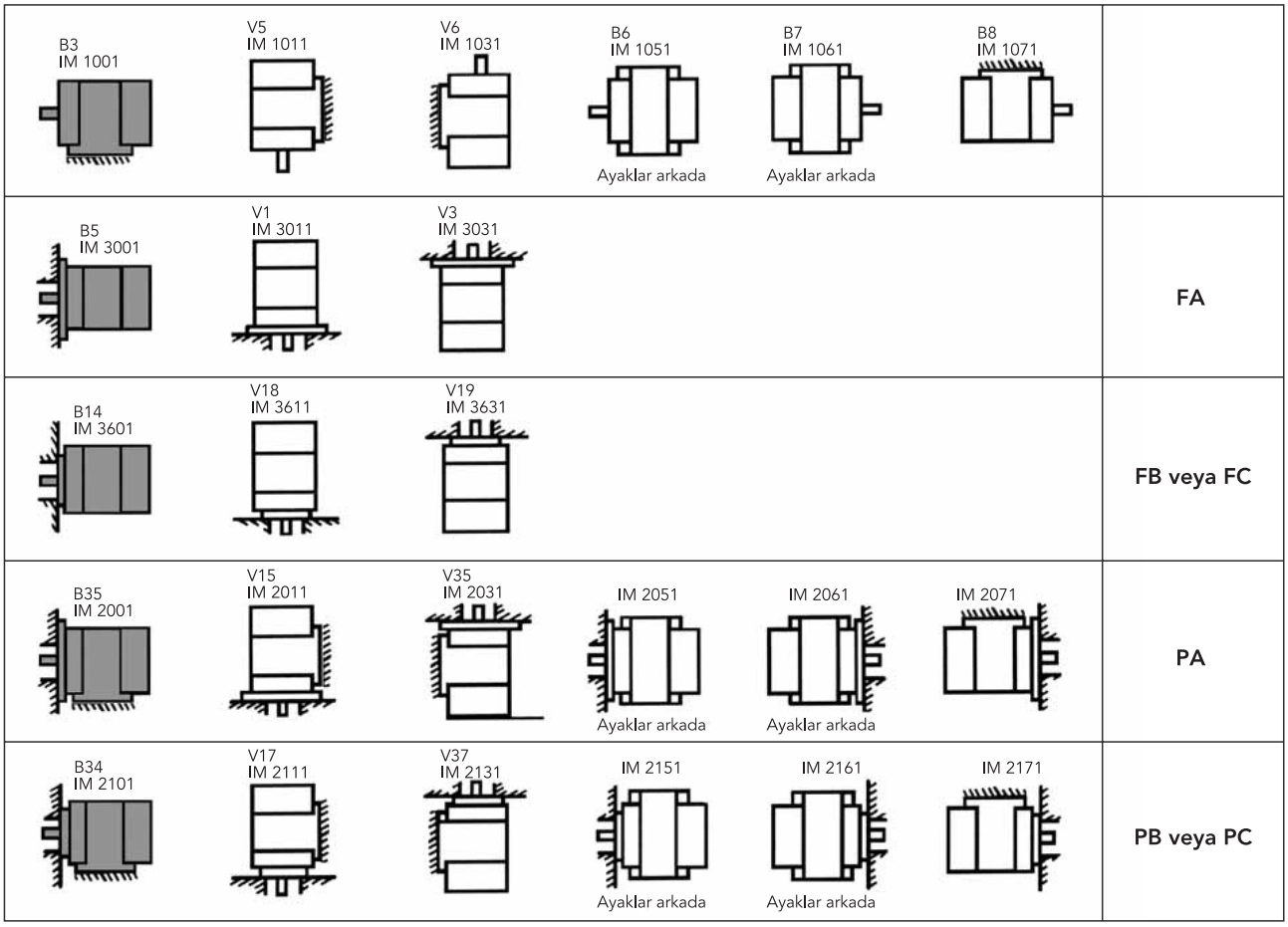
ORTAM SICAKLIĞI		30°C	35°C	40°C	45°C	50°C	55°C	60°C
İzolasyon sınıfına göre % olarak katalog güçlerinin katları	B	106	106	100	97	92	86	80
	F	105	102	100	97	93	87	82

MALZEME

Gövde Büyüklüğü	Gövde	Fan	Fan kapağı	Motor Kapakları	B5 Flanş	B14 Flanş
63	Alüminyum	Plastik	Sac	Alüminyum	Alüminyum	Aluminyum
71						
80						
90						
100						
112						
132						Pik Döküm
160			Plastik [1]		Pik Döküm	
180						
200						
225						
250						

[1] Sac fan kapağı opsiyoneldir.

YAPI ŞEKİLLERİ



RULMANLAR

Standart motorlarda yataklama için sabit bilyalı ZZ (her iki tarafı kapaklı) rulmanlar kullanılmaktadır. Sadece 250 gövde motorların kasnak tarafında sabit bilyalı açık rulman kullanılır.

Rulman ve keçe tipleri

Gövde büyüklüğü	Rulman		Keçe	
	KT	KTA	KT	KTA
63	6201-2Z	6201-2Z	12*22*7	12*22*7
71	6202-2Z	6202-2Z	15*24*5	15*24*5
80	6204-2Z	6204-2Z	20*30*7	20*30*7
90	6305-2Z	6205-2Z	25*40*7	25*40*7
100	6306-2Z	6205-2Z	30*47*7	25*40*7
112	6306-2Z	6206-2Z	30*47*7	30*47*7
132	6208-2Z	6208-2Z	40*62*10	40*62*10
160	6309-2Z	6309-2Z	45*72*10	45*72*10
180	6310-2Z	6310-2Z	50*80*10	50*80*10
200	6312-2Z	6312-2Z	60*90*10	60*90*10
225	6313-2Z	6313-2Z	65*100*13	65*100*13
250/2	6314	6313-2Z	70*112*12	65*100*13
250/4	6315	6313-2Z	75*112*12	65*100*13

KT = Kasnak tarafı
KTA = Kasnak tarafı aksi

BOYA

Standart motorlar RAL 6011 yeşil renkte boya ile boyanarak teslim edilir.

AYAKLAR

QSX tip gövdelerin ayakları sökülebilme ve üç yüzeye takılabilme özelliğine sahiptir. QU tip gövdelerde ayakların sökülebilme özelliği değişik montaj şekilleri için esneklik sağlar.

TERMİNAL KUTUSU

63-132 gövdelerde üstte ve mil tarafına yakındır. Ayakların 90'ar derece dönerek takılabilme özelliğinden dolayı terminal kutusu gövdenin sağ veya sol tarafına gelebilmektedir. Terminal kutusunun kendi ekseni etrafında dönerek montaj edilebilme özelliğinden dolayı, rakor bağlantı delikleri istenen her yönde olabilme şansına sahiptir. Diğer gövdelerde ise terminal kutusu üstte ve mil tarafına yakındır.

TAHLİYE DELİĞİ

Standart motorlar, tahliye deliksiz olarak üretilmektedir. İsteğe bağlı olarak,tahliye deliği bulunan motor üretimimiz mevcuttur.

MOTOR TİP KODLARI

QU FA 225 M 4 C-43 (Örnek model numarası)

QU .	**Motor Tipi**	QU Tip QSX Tip QH Tip QB Tip QM Tip	
FA .	**İnşa tipi**		
---	Ayaklı	B3,B6,B7,B8,V5,V6/V19	
FA	A flanşlı	B5,V1,V3	
FB	B flanşlı	B14,V18,V19	
FC	C flanşlı	B14,V18,V19	
FS	Özel flanşlı	-	
PA	Ayaklı A flanşlı	B3/B5,V1/V5,V3/V6	
PB	Ayaklı B flanşlı	B3/B14,V5/V18,V6/V19	
PC	Ayakıl C flanşlı	B3/B14,V5/V18,V6/V19	
PS	Ayaklı ve özel flanşlı	-	
X	Ayaksız, flanşsız	B9,V8,V9	

225 .	**Gövde büyüklüğü**		Mil yüksekliği (mm)
M .	**Motor uzunluğu**	S	Kısa
		M	Orta
		L	Uzun
4 .	**Kutup sayısı**		2,4,6,8 Kutup
C .	**Sac paketi uzunluğu**		(Dış boyutlardan bağımsız olarak)
		A	Kısa
		B	Orta
		C	Uzun
		D, CE	Ekstra uzun
43 .	**Özel motor numarası**		01 - ... - 99

FREKANS DEĞİŞİMİ

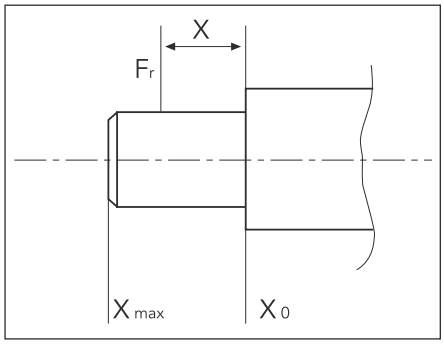
50 Hz'lik şebeke için sarılan motorlar, hiç bir değişiklik yapılmadan 60 Hz'lik bir şebekede çalıştırılabilirler. Bu durumda 50 Hz'lik değerler aşağıda verilen katsayılarla çarpılmalıdır.

		50 Hz motorun 60 Hz'de çalışma katsayıları						
50 Hz'e göre sarılmış motor	60 Hz'e bağlantı	Nominal Devir	Nominal Güç	Nominal Moment	Nominal Akım	Kalkış Momenti	Devrilme Momenti	Kalkış Akımı
220 V	220 V	1.2	1	0.83	1	0.83	0.83	0.83
220 V	255 V	1.2	1.15	0.96	1	0.96	0.96	0.96
380 V	380 V	1.2	1	0.83	1	0.70	0.83	0.83
380 V	440 V	1.2	1.15	0.96	1	0.95	0.98	0.97

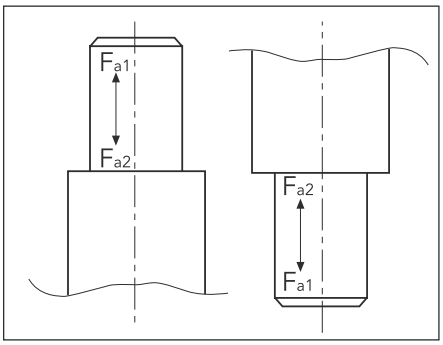
MİL ÜZERİNDE İZİN VERİLEN YÜK MİKTARI

GÖVDE BÜYÜKLÜĞÜ	KUTUP SAYISI	Yatay çalışma		Dikey çalışma	
		$F_r(x=0)$ (kN)	$F_r(x=max)$ (kN)	$F_{a1}(x=0)$ (kN)	$F_{a2}(x=max)$ (kN)
63	2	0,25	0,22	0,18	0,18
	4	0,29	0,25	0,21	0,21
	6	0,31	0,27	0,23	0,23
71	2	0,30	0,26	0,21	0,21
	4	0,35	0,29	0,25	0,25
	6	0,37	0,31	0,27	0,27
	8	0,38	0,32	0,28	0,28
80	2	0,54	0,45	0,38	0,38
	4	0,62	0,51	0,44	0,44
	6	0,66	0,54	0,48	0,48
	8	0,67	0,55	0,49	0,49
90	2	0,91	0,74	0,70	0,36
	4	0,99	0,80	0,77	0,40
	6	1,04	0,84	0,82	0,43
	8	1,03	0,83	0,80	0,43
100	2	1,21	0,96	0,91	0,36
	4	1,31	1,04	1,01	0,40
	6	1,38	1,09	1,07	0,43
	8	1,38	1,09	1,07	0,43
112	2	1,23	1,00	0,91	0,54
	4	1,33	1,09	1,01	0,60
	6	1,40	1,14	1,07	0,64
	8	1,40	1,14	1,07	0,61
132	2	1,22	0,98	0,86	0,86
	4	1,31	1,04	0,92	0,92
	6	1,34	1,08	0,95	0,95
	8	1,42	1,14	1,03	1,03
160	2	2,22	1,72	1,59	1,59
	4	2,34	1,82	1,71	1,71
	6	2,34	1,82	1.71	1,71
	8	2,48	1,92	1,83	1,83
180	2	2,68	2,12	1,94	1,94
	4	2,82	2,23	2,07	2,07
	6	2,93	2,31	2,17	2,17
	8	2,92	2,31	2,16	2,16
200	2	3,80	3,04	2,79	2,79
	4	3,95	3,16	2,93	2,93
	6	4,07	3,26	3,05	3,05
	8	3,95	3,16	2,93	2,93
225	2	4,45	3,65	3,25	3,25
	4	4,59	3,60	3,39	3,39
	6	4,73	3,71	3,52	3,52
	8	4,53	3,55	3,32	3,32
250	2	4,97	3,93	3,61	2,94
	4	5,78	4,57	4,26	3,15

Yatay çalışma



Dikey çalışma



Hesaplamalar 20.000 saat (L_{10aah}) rulman ömrü baz alınarak yapılmıştır. Radyal ve axial yüklerin aynı anda etkimesi durumunda değerler değişecektir. Kritik uygulamalarda kapakların mekanik mukavemeti de dikkate alınmalıdır.
Milin herhangi bir noktasında (X=max ve X=0 noktaları arasında) uygulanan F_r kuvvetinin değeri aşağıdaki formül kullanılarak hesaplanabilir:

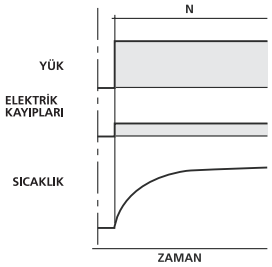
$$F_r = F_{x0} - \frac{x}{E}\,(F_{x0} - F_{xmax})[kN]$$

Burada; F_{x0} - Mil ucu başlangıcında etkiyen F_r kuvvetinin değeri
F_{xmax} - Mil ucu sonunda etkiyen F_r kuvvetinin değeri
E - Mil ucu uzunluğu

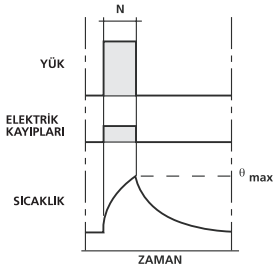
ÇALIŞMA TİPİ

IEC 60034-1 standardında motor çalışma tipleri aşağıdaki şekilde belirtilmiştir.

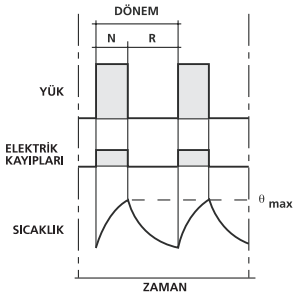
S1: Sürekli çalışma



S2: Kısa süreli çalışma

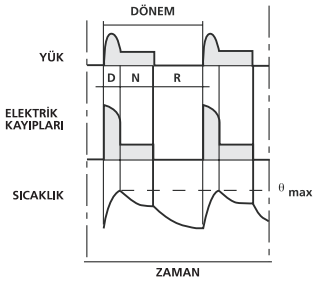


S3: Dönemli kesintili çal›flma



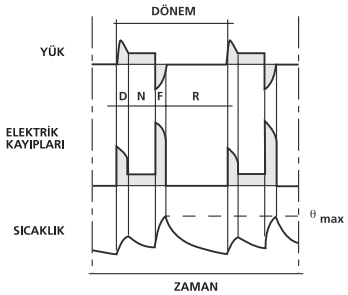
$$Ç.K.= \frac{N}{N+R} \times 100\ \%$$

S4: Yolvermeli dönemli kesintili çalışma



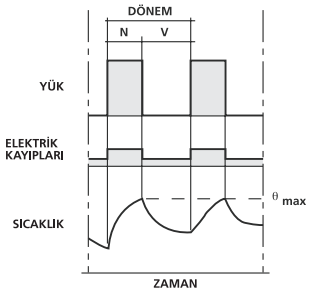
$$Ç.K.= \frac{D+N}{D+N+R} \times 100\ \%$$

S5: Elektriksel frenlemeli dönemsel kesintili çalışma



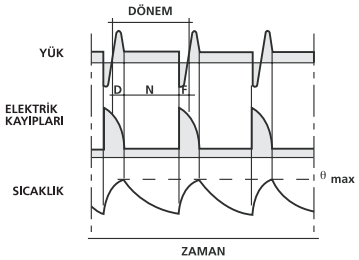
$$Ç.K.= \frac{D+N+F}{D+N+F+R} \times 100\ \%$$

S6: Sürekli dönemli çalışma



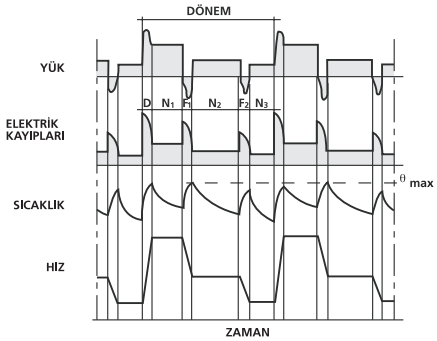
$$Ç.K.= \frac{N}{N+V} \times 100\ \%$$

S7: Elektriksel frenlemeli sürekli dönemli çalışma



Ç.K.= 1

S8: Dönemli yük-hız değişmeli sürekli çalışma



$$Ç.K.= \frac{D+N}{D+N_1+F_1+N_2+F_2+N_3} \times 100\ \%$$

$$\frac{F_1+N_2}{D+N_2+F_1+N_2+F_2+N_3} \times 100\ \%$$

$$\frac{F_2+N_3}{D+N_1+F_1+N_2+F_2+N_3} \times 100\ \%$$

N = Anma Koşullarında Çalışma

θ max = Ulaşılan en yüksek sıcaklık

R = Durma

D = Yolverme

F = Elektriksel Frenleme

V = Boşta Çalışma

Ç.K. = Çalışma katsayısı

Standart motorlarımız S1 sürekli çalışma motor çalışma tipinde olup müşteri isteğine bağlı farklı çalışma tipine sahip motor üretimi mümkündür.

ÜÇ FAZLI-QSX / QU / QH TİPLER

- 63-250 gövde büyüklüğü
- 55 kW'a kadar
- 2, 4, 6 ve 8 kutup

BİR FAZLI "Daimi Devre Kondansatörlü"-QM TİP

- 63-90 gövde büyüklüğü
- 2,2 kW'a kadar
- 2 ve 4 kutup

FRENLİ MOTOR-QB TİP

- 63-112 gövde büyüklüğü
- 4 kW'a kadar
- 2, 4 ve 6 kutup

ELEKTRİKSEL ÖZELLİKLER, 50 Hz

EFF2

	MOTOR TİPİ	NOMİNAL GÜÇ HP	NOMİNAL GÜÇ kW	NOMİNAL DEVİR d/d	NOMİNAL AKIM A	NOMİNAL MOMENT Nm	KALKIŞTAKİ DEĞERLER AKIM I_A / I_N ⅄	KALKIŞTAKİ DEĞERLER AKIM I_A / I_N △	KALKIŞTAKİ DEĞERLER MOMENT M_A / M_N ⅄	KALKIŞTAKİ DEĞERLER MOMENT M_A / M_N △	Devrilme Momenti Oranı Mk/Mn	Verim** %η 3/4	Verim** %η 4/4	Cosφ 4/4	J kgm²	Ağırlık (B3) kg	Ses Seviyesi dB(A)*
	2 Kutup 3000 d/d																
220/380 V	QSX 63M2A	1/4	0,18	2800	0,6	0,62	4,20	-	2,3	-	2,4	63	64	0,78	0,00017	5	52
220/380 V	QSX 63M2B	1/3	0,25	2800	0,7	0,86	4,20	-	2,2	-	2,3	66	67	0,83	0,00022	6	52
220/380 V	QSX 71M2A	1/2	0,37	2800	1,0	1,27	4,30	-	2,0	-	2,4	67	68	0,83	0,00028	7	54
220/380 V	QSX 71M2B	3/4	0,55	2820	1,4	1,87	5,00	-	2,2	-	2,5	69	71	0,84	0,00036	8	54
220/380 V	QSX 80M2A	1	0,75	2840	1,8	2,53	5,20	-	2,2	-	2,6	72	74	0,86	0,00088	10	58
220/380 V	QSX 80M2B	1,5	1,1	2850	2,5	3,69	6,00	-	2,6	-	2,9	74,8	77	0,86	0,00109	11	58
220/380 V	QSX 90S2A	2	1,5	2850	3,3	5,01	6,30	-	2,6	-	3,1	78	79	0,87	0,00129	14	62
220/380 V	QSX 90L2A	3	2,2	2860	4,6	7,37	6,90	-	2,6	-	3,2	81	81,5	0,88	0,00162	16	62
220/380 V	QSX 100L2A	4	3	2880	6,2	9,94	7,10	-	2,8	-	3,5	82	83	0,89	0,00241	21	64
380/660 V	QSX 112M2A	5,5	4	2870	8,0	13,31	2,20	6,9	0,87	2,6	3,4	84	85	0,90	0,00394	29	67
380/660 V	QSX 132S2A	7,5	5,5	2890	10,9	18,24	2,20	6,9	0,72	2,7	3,4	86	86,5	0,89	0,01123	34	70
380/660 V	QSX 132S2C	10	7,5	2880	14,1	24,9	2,30	6,9	0,78	2,7	3,4	87	88	0,92	0,01424	41	70
380/660 V	QSX 132M2A	15	11	2890	20,8	36,35	2,30	7,0	0,80	2,8	3,4	88	88,5	0,91	0,01596	55	70
380/660 V	QU 160M2A	15	11	2900	21	36,23	2,25	7	0,79	2,6	3,5	88,5	89	0,89	0,02644	69	71
380/660 V	QU 160M2B	20	15	2900	28	49,4	2,25	7	0,87	2,7	3,5	89	90	0,90	0,03317	76	71
380/660 V	QU 160L2A	25	18,5	2900	34	60,9	2,25	7	0,80	2,7	3,5	90	90,5	0,91	0,04075	91	71
380/660 V	QU 180M2A	30	22	2940	40,5	71,47	2,26	7	0,74	2,6	3,5	90,5	91	0,91	0,06193	114	77
380/660 V	QU 200L2A	40	30	2940	55,8	97,45	2,26	7	0,71	2,4	3,5	91	92	0,89	0,11917	148	80
380/660 V	QU 200L2B	50	37	2945	68	120	2,26	7	0,68	2,4	3,5	91,5	92,5	0,89	0,13885	167	80
380/660 V	QU 225M2A	60	45	2950	83	145,7	2,26	7	0,69	2,3	3,5	92,5	92,5	0,89	0,19833	206	81
380/660 V	QU 250M2A	75	55	2960	100	177,4	2,26	7	0,69	2,3	3,6	92,3	93	0,90	0,23505	235	81

	4 Kutup 1500 d/d																
220/380 V	QSX 63M4A	1/6	0,12	1365	0,5	0,84	2,8	-	2,0	-	2,3	53	54	0,65	0,00020	5	41
220/380 V	QSX 63M4B	1/4	0,18	1380	0,7	1,25	3,2	-	2,2	-	2,4	57	61	0,62	0,00025	5	41
220/380 V	QSX 71M4A	1/3	0,25	1390	0,9	1,72	3,5	-	2,2	-	2,4	63	64	0,67	0,00071	7	45
220/380 V	QSX 71M4B	1/2	0,37	1390	1,2	2,54	4,0	-	2,3	-	2,6	66	67	0,68	0,00095	8	45
220/380 V	QSX 80M4A	3/4	0,55	1400	1,6	3,75	4,0	-	2,1	-	2,3	71	72	0,73	0,00168	10	49
220/380 V	QSX 80M4B	1	0,75	1400	2,1	5,12	4,2	-	2,1	-	2,2	73	74	0,74	0,00205	11	49
220/380 V	QSX 90S4A	1,5	1,1	1410	2,7	7,45	5,4	-	2,4	-	2,7	78	78	0,78	0,00243	13	54
220/380 V	QSX 90L4A	2	1,5	1420	3,6	10,09	5,5	-	2,4	-	2,7	80	80	0,79	0,00322	15	54
220/380 V	QSX 100L4A	3	2,2	1410	5,1	14,90	5,4	-	2,5	-	2,7	82	82	0,80	0,00398	21	56
220/380 V	QSX 100L4B	4	3	1410	6,8	20,32	5,4	-	2,5	-	2,7	83	83	0,81	0,00471	24	56
380/660 V	QSX 112M4B	5,5	4	1430	8,7	26,71	2,1	6,7	0,72	2,8	3,2	85	85	0,82	0,00933	31	58
380/660 V	QSX 132S4C	7,5	5,5	1445	11,3	36,35	1,9	6,5	0,75	2,6	3,0	86	86,5	0,85	0,02111	39	61
380/660 V	QSX 132M4B	10	7,5	1450	15,4	49,40	2	6,5	0,75	2,6	3,1	87	87	0,85	002763	60	61
380/660 V	QU 160M4B	15	11	1450	22,3	72,4	2,1	6,5	0,71	2,5	3,0	88	89	0,84	0,05547	76	63
380/660 V	QU 160L4A	20	15	1450	30,2	98,8	2,1	6,5	0,74	2,6	3,1	88,5	89,5	0,84	0,06922	90	63
380/660 V	QU 180M4B	25	18,5	1450	36,8	121,8	2,1	6,5	0,71	2,4	2,8	90	90,5	0,84	0,11220	119	69
380/660 V	QU 180L4B	30	22	1455	42,5	144,4	2,1	6.5	0,74	2,5	3,0	90	91	0,86	0,12773	127	69
380/660 V	QU 200L4C	40	30	1460	56	196,2	2,1	6.5	0,68	2,3	3,0	91	91,7	0,89	0,25035	176	70
380/660 V	QU 225S4A	50	37	1460	70	242	2,1	6.5	0,74	2,5	3,0	91	92	0,87	0,36429	223	71
380/660 V	QU 225M4C	60	45	1460	85	294,4	2,1	6.5	0,74	2,5	3,0	92	92,5	0,87	0,43513	260	71
380/660 V	QU 250M4C	75	55	1465	103	358,5	2,1	6.5	0,73	2,6	3,0	92,5	93,5	0,87	0,46270	280	71

* Ses seviyesi ölçümleri, motordan 1 metre uzaklıktan alınır.
* Tolerans + 3 dB(A)
** 1.1 ve 55 kW arası 2 ve 4 kutup motorlarımız "EFF2" verimlilik seviyesindedir.

ELEKTRİKSEL ÖZELLİKLER, 50 Hz

	MOTOR TİPİ	NOMİNAL GÜÇ HP	NOMİNAL GÜÇ kW	NOMİNAL DEVİR d/d	NOMİNAL AKIM A	NOMİNAL MOMENT Nm	KALKIŞTAKİ DEĞERLER AKIM I_A / I_N ⅄	KALKIŞTAKİ DEĞERLER AKIM I_A / I_N △	KALKIŞTAKİ DEĞERLER MOMENT M_A / M_N ⅄	KALKIŞTAKİ DEĞERLER MOMENT M_A / M_N △	Devrilme Momenti Oranı Mk/Mn	Verim % η 3/4	Verim % η 4/4	Cosφ 4/4	J kgm²	Ağırlık (B3) kg	Ses Seviyesi dB(A)*
	6 Kutup 1000 d/d																
220/380 V	QSX 71M6A	1/4	0,18	900	0,78	1,91	3,0	-	2,0	-	2,3	55	58	0,60	0,00068	8	42
220/380 V	QSX 71M6B	1/3	0,25	910	0,95	2,63	3,1	-	2,0	-	2,3	61	63	0,63	0,00090	10	42
220/380 V	QSX 80M6A	1/2	0,37	920	1,35	3,84	3,3	-	2,1	-	2,4	65	68	0,61	0,00160	11	49
220/380 V	QSX 80M6B	3/4	0,55	920	1,85	5,71	3,2	-	2,1	-	2,5	68	69	0,65	0,00196	12	49
220/380 V	QSX 90S6A	1	0,75	925	2,3	7,75	3,6	-	1,9	-	2,1	71	72	0,69	0,00255	13	51
220/380 V	QSX 90L6B	1,5	1,1	935	3,3	11,24	4,0	-	2,0	-	2,2	72	73	0,69	0,00328	17	51
220/380 V	QSX 100L6A	2	1,5	940	4,2	15,24	4,2	-	2,1	-	2,3	74	75	0,72	0,00463	20	53
220/380 V	QSX 112M6A	3	2,2	945	5,8	22,12	4,5	-	2,1	-	2,4	76	77	0,75	0,00916	29	58
380/660 V	QSX 132S6B	4	3	955	7,2	30	1,75	5,5	0,63	2	2,6	80	81	0,78	0,02070	36	62
380/660 V	QSX 132M6A	5,5	4	960	9,3	39,79	1,75	5,5	0,6	1,9	2,6	81	82	0,80	0,02070	53	62
380/660 V	QSX 132M6B	7,5	5,5	960	12,5	54,72	1,76	5,5	0,61	1,9	2,5	82,5	84	0,80	0,02709	58	62
380/660 V	QU 160M6B	10	7,5	960	16,8	74,61	1,90	6,5	0,69	2,2	3,0	86	87	0,78	0,05641	76	63
380/660 V	QU 160L6B	15	11	960	24,3	109,5	1,89	6,5	0,72	2,2	3,0	86,5	87	0,79	0,07040	94	63
380/660 V	QU 180L6A	20	15	965	32	148,5	1,91	6,5	0,62	2	2,8	87	88	0,81	0,18369	115	63
380/660 V	QU 200L6B	25	18,5	970	37,8	182,2	1,90	6,5	0,6	1,85	2,7	89	90	0,83	0,27088	155	64
380/660 V	QU 200L6C	30	22	970	44,7	216,6	1,85	6,5	0,6	1,85	2,7	89	90	0,83	0,31281	165	64
380/660 V	QU 225M6B	40	30	975	60,5	294	1,85	6,5	0,57	1,8	2,5	90	91	0,83	0,49334	221	65

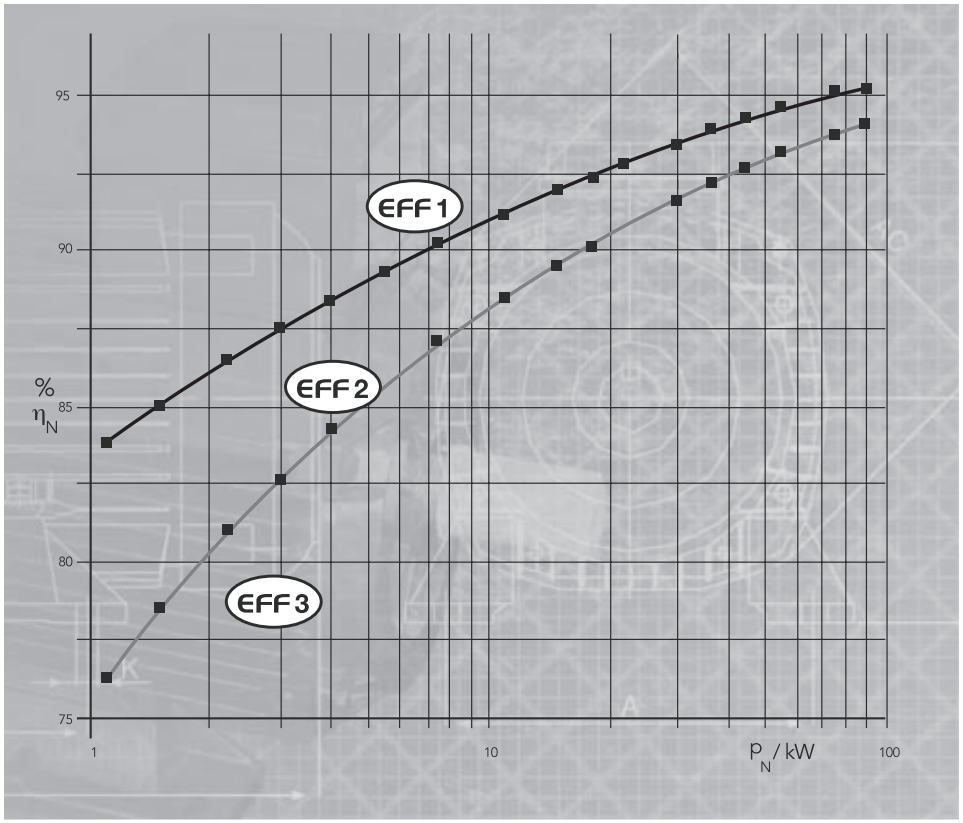
	8 Kutup 750 d/d																
220/380 V	QSX 80M8A	1/4	0,18	650	0,95	2,64	2,10	-	1,50	-	1,8	52	54	0,53	0,00168	10	44
220/380 V	QSX 80M8B	1/3	0,25	675	1,2	3,54	2,20	-	1,50	-	1,7	55	57	0,56	0,00205	11	44
220/380 V	QSX 90S8A	1/2	0,37	680	1,7	5,2	3,00	-	1,80	-	2,3	59	61	0,54	0,00243	12	49
220/380 V	QSX 90L8A	3/4	0,55	690	2,1	7,62	3,00	-	1,80	-	2,3	64	65	0,61	0,00322	15	49
220/380 V	QSX 100L8A	1	0,75	700	2,8	10,24	3,50	-	1,70	-	2,2	69	70	0,58	0,00398	19	48
220/380 V	QSX 100L8B	1,5	1,1	690	3,6	15,23	3,50	-	1,80	-	2,2	72	73	0,64	0,00471	21	48
220/380 V	QSX 112M8A	2	1,5	700	4,7	20,47	3,50	-	1,80	-	2,3	73	74	0,66	0,00933	28	54
220/380 V	QSX 132S8B	3	2,2	705	6,3	29,81	1,27	4	0,60	1,7	2,2	76	77	0,69	0,02111	36	56
220/380 V	QSX 132M8A	4	3	705	8,2	40,64	1,40	4,5	0,60	1,8	2,2	77,5	79	0,70	0,02763	52	56
380/660 V	QU 160M8A	5,5	4	720	10,6	53,1	1,75	5,5	0,61	1,90	2,3	82	83	0,69	0,05612	65	60
380/660 V	QU 160M8B	7,5	5,5	720	14,8	73	1,74	5,5	0,61	1,90	2,5	82,5	83,5	0,68	0,05612	74	60
380/660 V	QU 160L8A	10	7,5	720	19,2	99,5	1,74	5,5	0,62	2,00	2,5	83	84	0,71	0,07004	85	60
380/660 V	QU 180L8B	15	11	720	25	146	1,75	5,5	0,65	2,10	2,8	85	87	0,77	0,12773	122	60
380/660 V	QU 200L8C	20	15	725	32,5	197,6	1,74	5,5	0,68	2,20	2,8	87	89	0,79	0,25035	169	61
380/660 V	QU 225S8A	25	18,5	725	39	244	1,75	5,5	0,62	2,00	2,5	88	90	0,80	0,36429	224	61
380/660 V	QU 225M8C	30	22	725	46,8	290	1,74	5.,5	0,66	2,10	2,6	89	90	0,79	0,43513	256	61

* Ses seviyesi ölçümleri, motordan 1 metre uzaklıktan alınır.
* Tolerans + 3 dB(A)

VERİMLİLİK SEVİYELERİ

Elektriksel tahrik sistemlerinin, enerji tasarrufu ve çevre korumasındaki rolü çok büyüktür. Endüstriyel enerji tüketiminin üçte ikisi bu sistemler tarafından gerçekleştirilmektedir.

Avrupa Elektrik Makinaları Üreticileri Komitesi (CEMEP), Avrupa Enerji Komitesi'nin direktifleri doğrultusunda, elektrik motorlarını enerji seviyelerine göre sınıflandırmıştır. Bu amaçla, 1.1 ve 90kW arası çıkış gücündeki üç fazlı elektrik motorları verimliliklerine göre üç guruba ayrılmıştır.



Yüksek verimli motorların kullanıcıya faydaları nelerdir?

- *Enerji tasarrufu*
- *Enerji giderlerinin azaltılması*
- *Varolan sisteme kolayca adapte edilmesi*
- *Çevre duyarlılığı*

Yüksek verimli motorların tasarımı, motor kayıpları ve çalışma karakteristiğinin optimizasyonu ile gerçekleştirilmiştir. Verimlilik, stator sargısında daha fazla bakır ve rotor enjeksiyonunda daha fazla alüminyum kullanımı, veya daha uzun paket boyu ile elde edilmektedir. Bu değişiklikler, motor maliyetinde artışa yol açmasına rağmen, uygulamada getirdiği enerji tasarrufu ile kısa sürede kendini amorti etmektedir.

Verimlilik limitlerinin sağlandığı üretici tarafından beyan edilmektedir.

Verim seviyesini gösteren işaret motor etiketinde ve üretici dökümanlarında yer alır. Sadece bu anlaşmaya dahil olan Avrupalı üreticiler logoyu kullanmaya yetkilidir.
Arçelik, bu anlaşma uyarınca onaylı üretici olup, yüksek verimli motorları üretmektedir.

ÜÇ FAZLI-QH TİP

EFF1

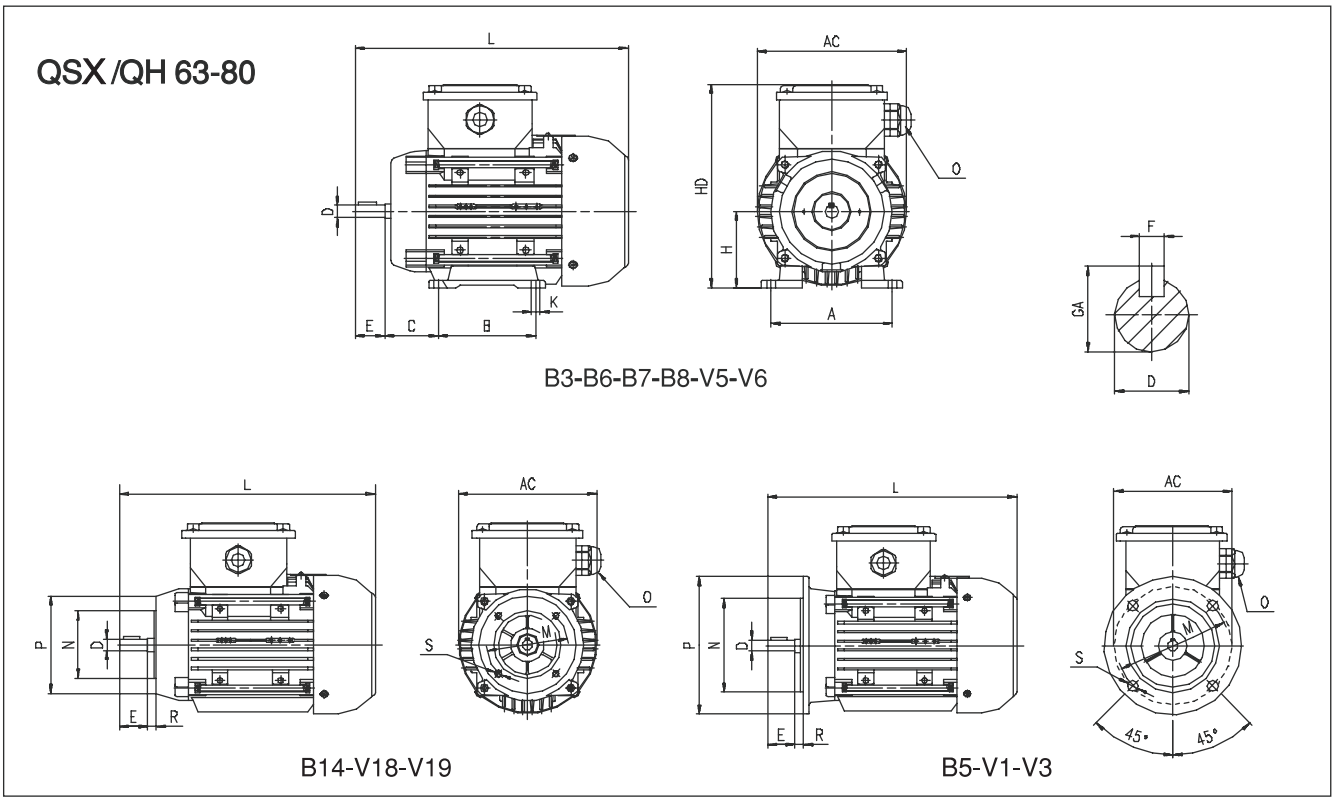
ELEKTRİKSEL ÖZELLİKLER, 50 Hz

	MOTOR TİPİ	NOMİNAL GÜÇ HP	NOMİNAL GÜÇ kW	NOMİNAL DEVİR d/d	NOMİNAL AKIM A	NOMİNAL MOMENT Nm	KALKIŞTAKİ DEĞERLER AKIM I_A / I_N ⅄	KALKIŞTAKİ DEĞERLER AKIM I_A / I_N △	KALKIŞTAKİ DEĞERLER MOMENT M_A / M_N ⅄	KALKIŞTAKİ DEĞERLER MOMENT M_A / M_N △	Devrilme Momenti Oranı Mk/Mn	Verim %η 3/4	Verim %η 4/4	Cosφ 4/4	J kgm²	Ağırlık (B3) kg	Ses Seviyesi dB(A)*
	2 Kutup 3000 d/d																
220/380 V	QH 80M2D	1,5	1,1	2880	2,45	3,65	8,1	-	3,6	-	3,8	82,5	82,9	0.82	0.00150	13	58
220/380 V	QH 90L2C	2	1,5	2900	3,2	4,94	8,3	-	3,8	-	4,3	84,8	85,2	0,83	0,00182	17	62
220/380 V	QH 90L2D	3	2,2	2900	4,7	7,24	8,6	-	3,9	-	4,4	85,2	85,7	0,84	0,00182	18	62
220/380 V	QH 100L2D	4	3	2920	6,1	9,81	9,6	-	4,3	-	5,1	86,3	86,8	0,86	0,00335	27	64
380/660 V	QH 112M2C	5,5	4	2890	7,8	13,22	3,00	9,5	1,4	4,2	5,0	87	87,6	0,88	0,00489	34	67
380/660 V	QH 132S2C	7,5	5,5	2920	10,6	17,99	2,90	9,0	1,1	3,3	3,7	88,3	88,6	0,89	0,01424	41	70
380/660 V	QH 132M2A	10	7,5	2920	14,1	24,53	2,90	9,0	1,1	3,4	3,8	89	89,5	0,90	0,01596	55	70
380/660 V	QH 160M2A	15	11	2930	21	35,85	2,90	9,0	0,9	2,6	3,3	90,3	90,8	0,88	0,02644	69	71
380/660 V	QH 160M2B	20	15	2940	27,2	48,7	2,90	9,0	1,0	3,2	3,8	91,5	92	0,91	0,03317	77	71
380/660 V	QH 160L2A	25	18,5	2930	33,2	60,3	2,90	9,0	1,0	3,1	3,7	92,5	92,2	0,92	0,04075	92	71
380/660 V	QH 180M2A	30	22	2945	39,2	71,3	2,74	8,5	0,8	2,4	3,5	92,8	93	0,92	0,06193	115	77
380/660 V	QH 200L2A	40	30	2950	54,6	97,1	2,74	8,5	0,7	2,1	3,5	93,2	93,5	0,89	0,11917	148	80
380/660 V	QH 200L2B	50	37	2955	67,1	119,6	2,74	8,6	0,8	2,3	3,8	93,6	94	0,89	0,13885	168	80
380/660 V	QH 225M2A	60	45	2960	81,3	145,2	2,74	8,5	0,8	2,3	3,1	93,7	94,3	0,89	0,19833	206	81
380/660 V	QH 250M2A	75	55	2960	96,9	177,4	2,74	8,5	0,7	2,2	3,6	94,4	94,5	0,91	0,23505	235	81

	4 Kutup 1500 d/d																
220/380 V	QH 90L4C	1,5	1,1	1430	2,6	7,35	7,3	-	3,2	-	3,7	83,5	83,9	0,75	0,00365	18	54
220/380 V	QH 90L4D	2	1,5	1430	3,5	10,02	7,5	-	3,5	-	4,0	84,5	85	0,76	0,00365	18	54
220/380 V	QH 100L4C	3	2,2	1440	5	14,59	7,9	-	4,1	-	4,4	86,0	86,6	0,78	0,00545	26	56
220/380 V	QH 100L4D	4	3	1440	6,6	19,9	7,8	-	3,8	-	4,2	87,0	87,4	0,79	0,00581	29	56
380/660 V	QH 112M4D	5,5	4	1450	8,6	26,34	2,7	8,5	1,1	3,2	4,3	87,8	88,3	0,80	0,01123	35	58
380/660 V	QH 132M4B	7,5	5,5	1450	11,6	36,22	3,1	9,5	1,0	3,0	4,0	88,6	89,3	0,81	0,02763	60	61
380/660 V	QH 132M4C	10	7,5	1450	15,8	49,4	2,7	8,5	1,1	3,3	4,0	87,6	90,2	0,80	0,02980	67	61
380/660 V	QH 160M4B	15	11	1460	22,3	71,95	2,9	9,0	0,9	2,7	3,7	91,2	91,5	0,82	0,05547	77	63
380/660 V	QH 160L4A	20	15	1455	29,5	98,45	2,9	9,0	0,8	2,5	3,4	91,8	92	0,84	0,06922	90	63
380/660 V	QH 180M4B	25	18,5	1465	36,5	120,6	2,9	9,0	1,0	3,0	3,1	92	92,5	0,83	0,11220	120	69
380/660 V	QH 180L4B	30	22	1465	44,5	143,4	2,9	9,0	0,9	2,6	3,7	92,5	93	0,81	0,12773	127	69
380/660 V	QH 200L4C	40	30	1465	57,0	195,6	2,7	8,3	0,7	2,2	3,1	94,2	94	0,85	0,25035	176	70
380/660 V	QH 225S4A	50	37	1470	71,4	240,4	2,7	8,5	1,0	3,0	3,2	94,7	94,5	0,83	0,36429	223	71
380/660 V	QH 225M4C	60	45	1470	84,3	292,3	2,6	8,0	0,9	2,8	3,5	95,1	95	0,85	0,43513	260	71
380/660 V	QH 250M4C	75	55	1475	99,2	356,1	2,6	8,0	1,0	2,9	3,50	95,2	95,3	0,88	0,46270	280	71

* Ses seviyesi ölçümleri, motordan 1 metre uzaklıktan alınır.
* Tolerans + 3 dB(A)

BOYUTLAR



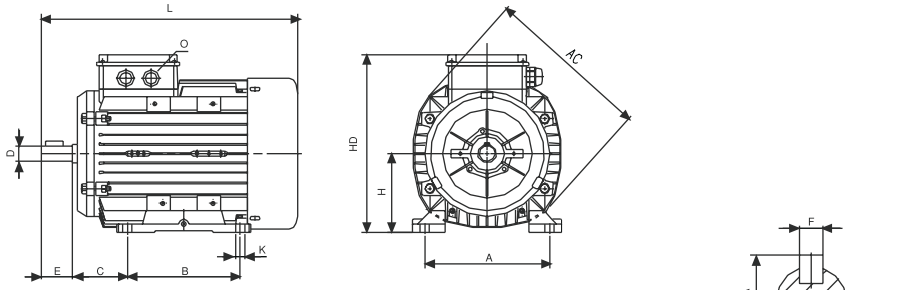
		Ana Boyutlar			Ayaklı Motorlar						Mil				Rulman		Keçe		Flanş						
Gövde[4] Büyüklüğü	Kutup Sayısı	AC	L	O	B	A	H	HD	K	C	D[1]	E	GA	F[3]	Kasnak Tarafı	Kasnak Tarafı Aksi	Kasnak Tarafı	Kasnak Tarafı Aksi[5]	Yapı Şekli	Flanş Tipi	P	N[2]	M	R	S
63 M	2...8	123	219.5	1*M20	80	100	63	174	7	40	11	23	12.5	4	6201-2Z	6201-2Z	12*22*7	12*22*7	B5	FA	140	95	115	0	10
																			B14	FB	120	80	100	0	M6
																			B14	FC	90	60	75	0	M5
71 M	2...8	138	252.5	1*M20	90	112	71	190	7	45	14	30	16.0	5	6202-2Z	6202-2Z	15*24*5	15*24*5	B5	FA	160	110	130	0	10
																			B14	FB	140	95	115	0	M8
																			B14	FC	105	70	85	0	M6
80 M	2...8	158	283.5	1*M20	100	125	80	207	10	50	19	40	21.5	6	6204-2Z	6204-2Z	20*30*7	20*30*7	B5	FA	200	130	165	0	12
																			B14	FB	160	110	130	0	M8
																			B14	FC	120	80	100	0	M6

Ölçüler "mm" olarak verilmiştir.

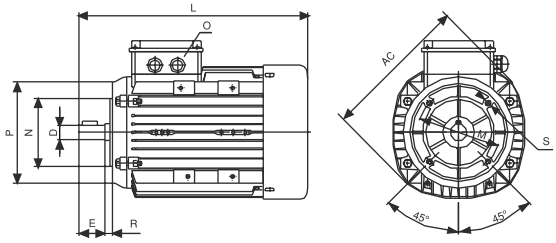
(1) Tolerans DIN EN 50347 "j6"
(2) Tolerans DIN EN 50347 "j6"
(3) DIN 6885'e göre
(4) 112 yapı büyüklüğünden itibaren kaldırma halkası mevcuttur.
(5) IP55

BOYUTLAR

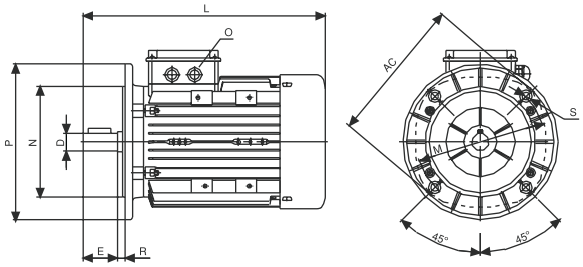
QSX /QH 90-132



B3-B6-B7-B8-V5-V6



B14-V18-V19



B5-V1-V3

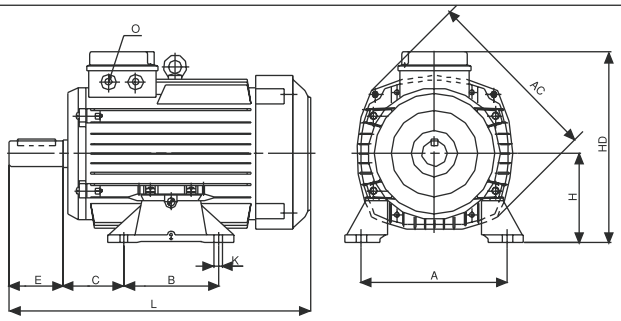
		Ana Boyutlar			Ayaklı Motorlar						Mil				Rulman		Keçe		Flanş						
Gövde[4] Büyüklüğü	Kutup Sayısı	AC	L	O	B	A	H	HD	K	C	D[1]	E	GA	F[3]	Kasnak Tarafı	Kasnak Tarafı Aksi	Kasnak Tarafı	Kasnak Tarafı Aksi[5]	Yapı Şekli	Flanş Tipi	P	N[2]	M	R	S
90 S/L	2...8	193	296.5 316.5	1*M25	100 125	140	90	241	10	56	24	50	27	8	6305-2Z	6205-2Z	25*40*7	25*40*7	B5	FA	200	130	165	0	12
																			B14	FB	160	110	130	0	M8
																			B14	FC	140	95	115	0	M8
100 L	2...8	217	352.0	1*M25	140	160	100	260	12	63	28	60	31	8	6306-2Z	6205-2Z	30*47*7	25*40*7	B5	FA	250	180	215	0	15
																			B14	FB	200	130	165	0	M10
																			B14	FC	160	110	130	0	M8
112 M	2...8	232	395.5	2*M25	140	190	112	280	12	70	28	60	31	8	6306-2Z	6206-2Z	30*47*7	30*47*7	B5	FA	250	180	215	0	15
																			B14	FB	200	130	165	0	M10
																			B14	FC	160	110	130	0	M8
132 S/M	2...8	279	440.5 475.5	2*M32	140 178	216	132	314	12	89	38	80	41	10	6208-2Z	6208-2Z	40*62*10	40*62*10	B5	FA	300	230	265	0	15

Ölçüler "mm" olarak verilmiştir.

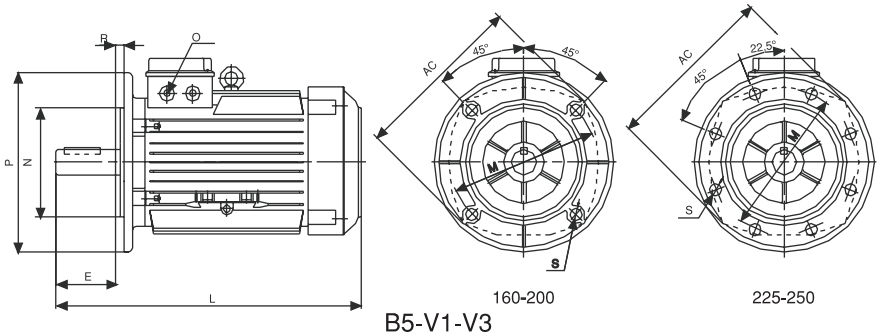
(1) Tolerans 28 mm'ye kadar DIN EN 50347 "j6", 28 mm ve üzeri "k6".
(2) Tolerans DIN EN 50347 "j6"
(3) DIN 6885'e göre
(4) 112 yapı büyüklüğünden itibaren kaldırma halkası mevcuttur.
(5) IP55

BOYUTLAR

QU/QH 160-250



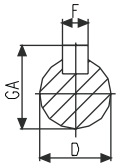
B3-B6-B7-B8-V5-V6



160-200

225-250

B5-V1-V3



		Ana Boyutlar			Ayaklı Motorlar						Mil				Rulman		Keçe		Flanş						
Gövde[4] Büyüklüğü	Kutup Sayısı	AC	L	O	B	A	H	HD	K	C	D[1]	E	GA	F[3]	Kasnak Tarafı	Kasnak Tarafı Aksi	Kasnak Tarafı	Kasnak Tarafı Aksi[5]	Yapı Şekli	Flanş Tipi	P	N[2]	M	R	S
160 M	2...8	323	586	2*M32	210	254	160	360	15	108	42	110	45,0	12	6309-2Z	6309-2Z	45*72*10	45*72*10	B5	FA	350	250	300	0	19
160 L	2...8	323	586	2*M32	254	254	160	360	15	108	42	110	45,0	12	6309-2Z	6309-2Z	45*72*10	45*72*10	B5	FA	350	250	300	0	19
180 M	2...8	370	629	2*M40	241	279	180	428	15	121	48	110	51,5	14	6310-2Z	6310-2Z	50*80*10	50*80*10	B5	FA	350	250	300	0	19
180 L	2...8	370	629	2*M40	279	279	180	428	15	121	48	110	51,5	14	6310-2Z	6310-2Z	50*80*10	50*80*10	B5	FA	350	250	300	0	19
200 L	2...8	415	665	2*M32	305	318	200	435	19	133	55	110	59,0	16	6312-2Z	6312-2Z	60*90*10	60*90*10	B5	FA	400	300	350	0	19
225 S	2 4...8	456	735 765	2*M40	286	356	225	485	19	149	55 60	110 140	59 64	16 18	6313-2Z	6313-2Z	65*100*13	65*100*13	B5	FA	450	350	400	0	19
225 M	2 4...8	456	735 765	2*M40	311	356	225	485	19	149	55 60	110 140	59 64	16 18	6313-2Z	6313-2Z	65*100*13	65*100*13	B5	FA	450	350	400	0	19
250	2	456	784	2*M40	349	406	250	510	24	168	60	140	64,0	18	6314[6]	6313-2Z	70*112*12	65*100*13	B5	FA	550	450	500	0	19
250	4	456	784	2*M40	349	406	250	510	24	168	65	140	69,0	18	6315[6]	6313-2Z	75*112*12	65*100*13	B5	FA	550	450	500	0	19

Ölçüler "mm" olarak verilmiştir.

(1) Tolerans 48 mm'ye kadar DIN EN 50347 "k6", 48 mm ve üzeri "m6".
(2) Tolerans 250 mm'ye kadar DIN EN 50347 "j6", 250 mm ve üzeri "h6".
(3) DIN 6885'e göre
(4) 112 yapı büyüklüğünden itibaren kaldırma halkası mevcuttur.
(5) IP55
(6) Harici yağlama

TEKNİK BİLGİLER

A. Mekanik Özellikler

Motorlar IEC 63-90 gövde büyüklüklerinde, tek fazlı, tam kapalı, kısa devre rotorlu ve fan soğutmalı olarak üretilmektedir.

Yapı Şekli
Tüm gövde büyüklüklerinde ayaklı, flanşlı ve ayaklı flanşlı yapı şekilleri mümkündür.

Koruma Sınıfı
Standart koruma sınıfı IP 54'dür.

Yataklar
Yataklama için sabit bilyalı ZZ rulmanlar kullanılır.

Mil Ucu
Mil uçlarına DIN 6885/6888'e uygun olarak kama kanalı açılır.Motor kamalı olarak teslim edilir.

Fan
Sıcaklığa dayanıklı sentetik malzemeden yapılmıştır ve her iki dönüş yönünde çalışmaya uygundur.

Boya
Standart motorlar yeşil (RAL 6011) renkte boyanmıştır.

B. Konstrüksiyon Özellikleri

Stator Gövde
Motor gövdeleri hafif, korozyona ve mekaniksel şoklara dayanıklı, ısı iletme özelliği yüksek olan alüminyum alaşımdan basınçlı döküm metoduyla üretilmektedir.

Ayaklar
Tüm gövdelerin ayakları, sökülebilme ve üç yüzeye takılabilme özelliğine sahiptir.

Kapaklar
Kapaklar alüminyumdan yapılmaktadır.Fan kapağı ise sac malzemeden yapılmaktadır.

Terminal Kutusu
Terminal kutusu tüm motorlarda üstte ve mil tarafına yakındır. Ayakların 90'ar derece dönerek takılabilme özelliğinden dolayı terminal kutusu gövdenin sağ veya sol tarafına gelebilmektedir.

C. Elektriksel Özellikler

Gerilim ve Frekans
Motorlar normal olarak 220V, 50 Hz' e göre dizayn edilmiştir. Bunun dışındaki gerilim ve 60 Hz frekans değerine sahip motorlar da üretilebilir.

Kondansatör
Motorlarda 400 V daimi devre kondansatör kullanılmaktadır.

Teknik Bilgiler
Tabloda verilen teknik bilgiler aşağıdaki şartlar için geçerlidir.
- 220 V kaynak gerilimi
- 50 Hz frekans
- Çalışma tipi: Sürekli çalışma (S1)
- Maksimum 40°C ortam sıcaklığı
- Deniz seviyesinden 1000 m'ye kadar olan yükseklikler

İzolasyon Sınıfı
Motorların standart izolasyon sınıfı F'dir. 40°C ortam sıcaklığında, maksimum sıcaklık artışı 100°K olabilir.

Yüksüz Çalışma
Yüksüz çalışmada kayıplar, nominal yükte çalışmaya nazaran daha yüksektir. Bu nedenle, standart bir fazlı motorlar uzun süre yüksüz çalıştırılmamalıdır. Motorun, uzun süre yüksüz çalışacağı uygulamalar özel sargı tasarımı gerektirir.

D. Özel Uygulamalar

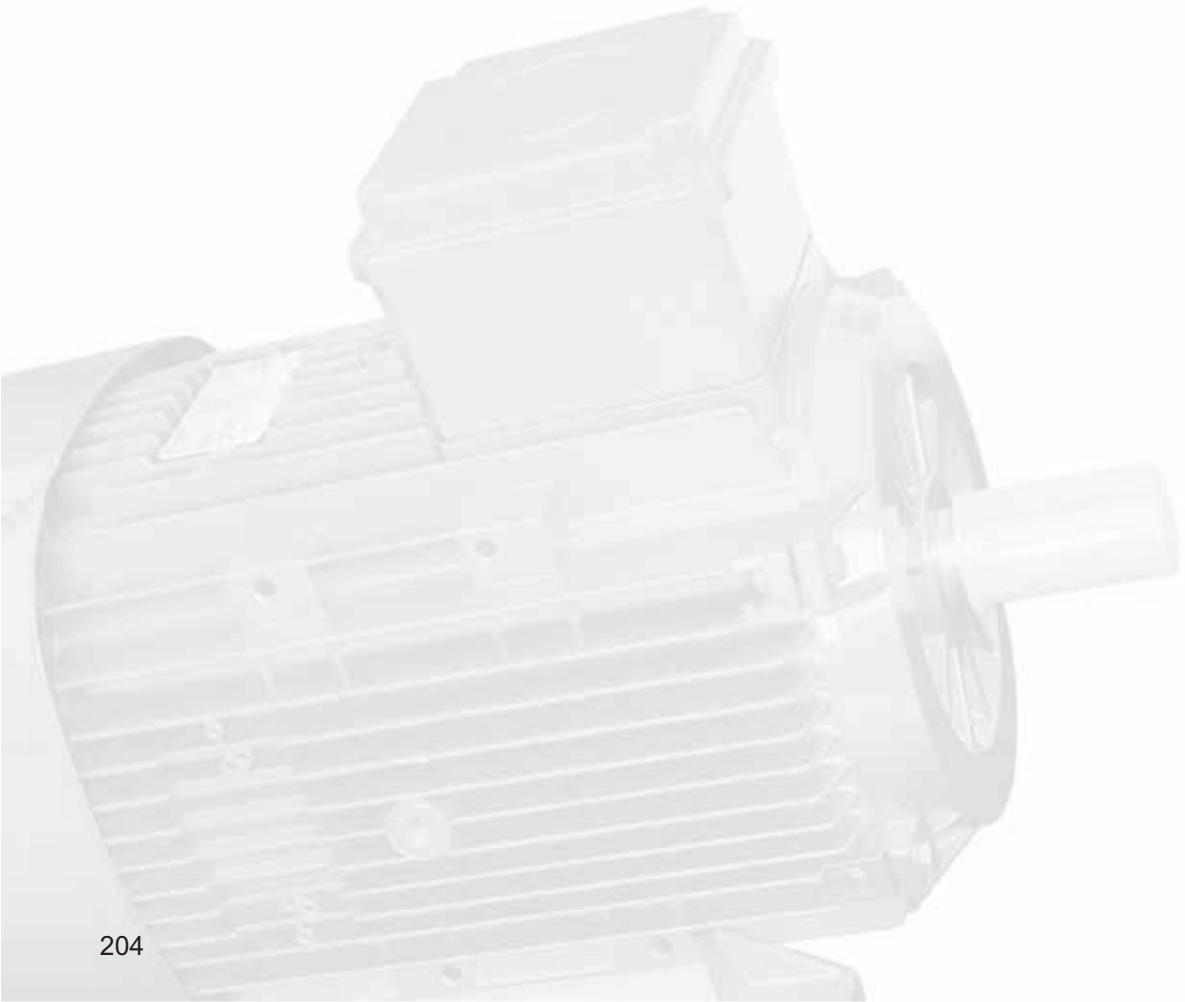
Aşağıdaki özel konstrüksiyon özelliklerine sahip motorlar, isteğe bağlı olarak üretilebilmektedir.
- Özel mil veya çift mil çıkışı
- Özel flanş
- Değişik gerilim ve 60 Hz frekans
- Daha yüksek koruma sınıfı (IP 55)
- Sabit yatak
- Yoğunlaşmayı gidermek için tahliye deliği
- Motor sargı sıcaklığının, istenmeyen durumlarda limit değerlerinin üzerine çıkmasını önlemek için termik veya termistör kullanılması.

Motorlarımız IEC tavsiyelerine, DIN, VDE ve Türk Standartları TS 4239'a uygun olarak üretilmektedir.

ELEKTRİKSEL ÖZELLİKLER, 50 Hz

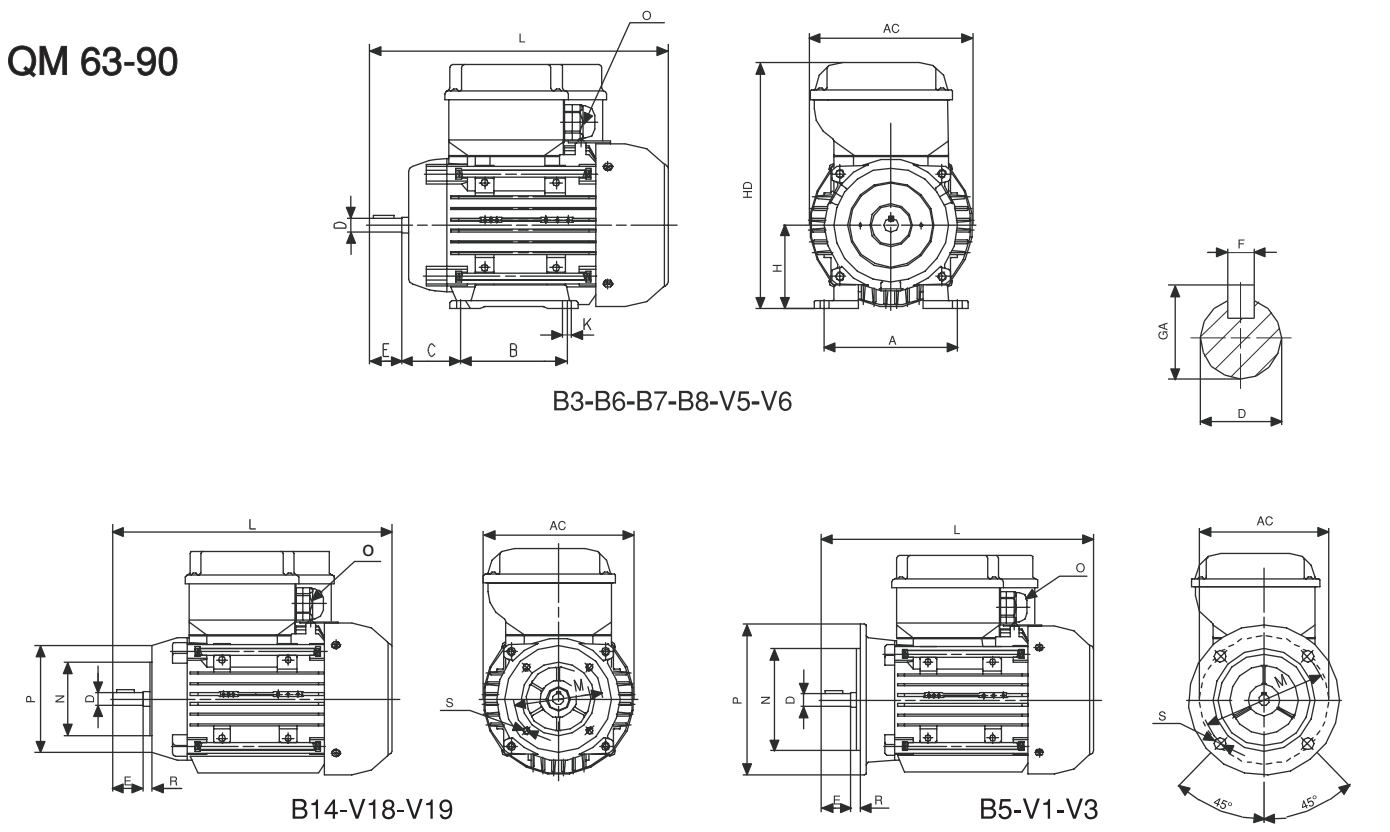
	MOTOR TİPİ	NOMİNAL GÜÇ HP	NOMİNAL GÜÇ kW	NOMİNAL DEVİR d/d	NOMİNAL AKIM A	NOMİNAL MOMENT Nm	KALKIŞTAKİ DEĞERLER AKIM I_A / I_N	KALKIŞTAKİ DEĞERLER MOMENT M_A / M_N	Devrilme Momenti Oranı Mk/Mn	%η	Cosφ	Kondansatör µF (400 V)	J kgm²	Ağırlık (B3) kg
	2 Kutup 3000 d/d													
220 V	QM 63M2B	1/3	0,25	2780	2,1	0,86	4,0	0,50	2,10	58	0,93	10	0,00021	6
	QM 71M2A	1/3	0,25	2780	1,85	0,86	5,0	0,70	2,20	64	0,96	12,5	0,00028	7
	QM 71M2B	1/2	0,37	2780	2,7	1,27	5,0	0,70	2,20	66	0,94	18	0,00035	8
	QM 71M2C	3/4	0,55	2780	4,1	1,89	5,0	0,70	2,20	67	0,91	20	0,00040	9
	QM 80M2A	3/4	0,55	2800	3,8	1,88	4,0	0,70	2,10	67	0,98	20	0,00092	10
	QM 80M2B	1	0,75	2800	5,0	2,56	4,0	0,70	2,10	70	0,97	25	0,00107	11
	QM 80M2C	1,5	1,1	2800	7,55	3,75	5,0	0,55	1,80	71	0,93	30	0,00126	12
	QM 90S2A	1,5	1,1	2800	7,3	3,75	4,0	0,60	2,00	74	0,93	30	0,00119	14
	QM 90L2A	2	1,5	2810	10,5	5,1	4,5	0,60	2,10	72	0,90	40	0,00152	16
	QM 90L2C	3	2,2	2790	14,8	7,53	4,0	0,50	2,00	74	0,91	50	0,00172	17

	4 Kutup 1500 d/d													
220 V	QM 71M4A	1/4	0,18	1390	1,5	1,24	3,5	0,70	1,80	57	0,96	12,5	0,00071	7
	QM 71M4B	1/3	0,25	1390	1,95	1,72	4,0	0,70	1,85	63	0,93	15	0,00095	8
	QM 71M4C	1/2	0,37	1390	2,7	2,54	4,0	0,65	1,55	65	0,96	20	0,00107	10
	QM 80M4A	1/2	0,37	1390	2,65	2,54	4,0	0,70	1,55	66	0,96	20	0,00167	11
	QM 80M4B	3/4	0,55	1390	3,7	3,78	4,0	0,65	1,55	69	0,98	25	0,00204	12
	QM 80M4C	1	0,75	1370	4,95	5,23	3,2	0,60	1,55	71	0,97	30	0,00229	13
	QM 90S4A	1	0,75	1390	5,6	5,15	4,5	0,60	1,80	68	0,90	30	0,00238	15
	QM 90L4A	1,5	1,1	1400	8,0	7,5	4,5	0,60	1,80	69	0,91	40	0,00309	16
	QM 90L4C	2	1,5	1390	10,0	10,31	4,5	0,50	1,60	73	0,93	50	0,00351	17



BOYUTLAR

QM 63-90



			Ana Boyutlar			Ayaklı Motorlar						Mil				Rulman		Keçe		Flanş						
Gövde Büyüklüğü	Gövde Büyüklüğü	Kutup Sayısı	AC	L	O	B	A	H	HD	K	C	D(1)	E	GA	F(3)	Kasnak Tarafı	Kasnak Tarafı Aksi	Kasnak Tarafı	Kasnak Tarafı Aksi(4)	Yapı Şekli	Flanş Tipi	P	N(2)	M	R	S
QM63M2B	63 M	2	123	219,5	1*M20	80	100	63	182	7	40	11	23	12.5	4	6201-2Z	6201-2Z	12*22*7	12*22*7	B5	FA	140	95	115	0	10
																				B14	FB	120	80	100	0	M6
																				B14	FC	90	60	75	0	M5
QM63M2C QM63M2D	63 M	2	123	233,5	1*M20	80	100	63	182	7	40	11	23	12.5	4	6201-2Z	6201-2Z	12*22*7	12*22*7	B5	FA	140	95	115	0	10
																				B14	FB	120	80	100	0	M6
																				B14	FC	90	60	75	0	M5
QM71M2A QM71M2B QM71M2C QM71M4A QM71M4B QM71M4C	71 M	2...4	138	252,5	1*M20	90	112	71	198	7	45	14	30	16.0	5	6202-2Z	6202-2Z	15*24*5	15*24*5	B5	FA	160	110	130	0	10
																				B14	FB	140	95	115	0	M8
																				B14	FC	105	70	85	0	M6
QM71M2D	71 M	2	138	262,5	1*M20	90	112	71	198	7	45	14	30	16.0	5	6202-2Z	6202-2Z	15*24*5	15*24*5	B5	FA	160	110	130	0	10
																				B14	FB	140	95	115	0	M8
																				B14	FC	105	70	85	0	M6
80 M	80 M	2...4	158	283,5	1*M20	100	125	80	215	10	50	19	40	21.5	6	6204-2Z	6204-2Z	20*30*7	20*30*7	B5	FA	200	130	165	0	12
																				B14	FB	160	110	130	0	M8
																				B14	FC	120	80	100	0	M6
90 S/L	90 S/L	2...4	193	296,5 316,5	1*M20	100 125	140	90	241	10	56	24	50	27	8	6305-2Z	6205-2Z	25*40*7	25*40*7	B5	FA	200	130	165	0	12
																				B14	FB	160	110	130	0	M8
																				B14	FC	140	95	115	0	M8

Ölçüler "mm" olarak verilmiştir.

(1) Tolerans DIN EN 50347 "j6"
(2) Tolerans DIN EN 50347 "j6"
(3) DIN 6885'e göre
(4) IP55

TEKNİK BİLGİLER

Mekanik ve elektriksel özellikleri QSX tip motorlar ile aynıdır. Kasnak tarafı aksi motor kapağı pik dökümüdür.

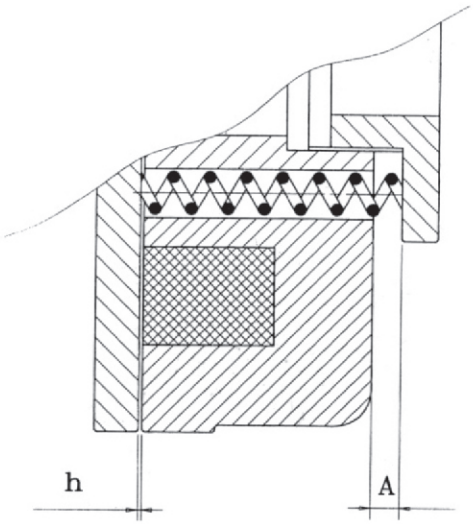
Fren Mekanizması Özellikleri
Frenli motorlarda standart olarak 100 V, D.C. gerilimle çalışan, güvenilir elektromanyetik fren mekanizması kullanılmaktadır. Özel uygulamalar için fren voltajı değiştirilebilir.

Çalışma Prensibi
Enerji kesildiğinde, yay kuvveti ile fren balatasını sıkıştıran hareketli disk otomatik olarak frenlemeyi gerçekleştirir. Tekrar enerji verildiğinde manyetik olarak geri çekilen disk fren balatasının serbest kalmasını sağlayarak milin hareketine imkan sağlar.

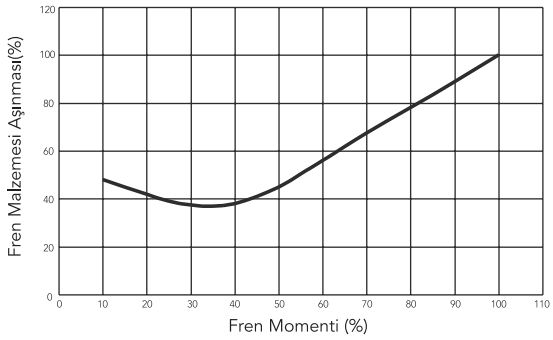
Fren Balatası
Asbestsiz malzemeden yapılmış olup uzun ömürlüdür.

Özel Uygulamalar
Standardın dışındaki özel uygulamalar mümkündür;
- Özel mil
- Özel flanş
- Değişik tip yataklar
- Sabit yatak
- IP 55 koruma tipi
- Değişik gerilim ve frekans
- AC tip fren

Frenleme Momenti
Ayar halkası yardımıyla fren momenti değiştirilebilir. Aşağıdaki tabloda "A" mesafesini ayarlayarak elde edilebilecek değişik fren momentleri verilmiştir. Frenleme momentinin değiştirilmesi ile balata malzemesinde oluşacak aşınma değişimi aşağıdaki grafik yardımıyla bulunabilir.



Model	Ayar Halkası ile Elektromagnet Arasındaki Mesafe: "A" (mm)									
	9	8	7	6	5	4	3	2	1	"A"
QB 63	-	-	-	0.3	0.1	1.7	2.4	3.1	3.8	4.5
QB 71	-	-	-	-	0.8	2.2	3.7	5.1	6.6	8
QB 80	-	-	-	-	0.1	32	5.4	7.6	9.8	12
QB 90	-	-	-	-	-	1.6	5.2	8.8	12.4	16
QB 100	3.5	7.0	14.5	14.0	17.5	21.0	24.5	28.0	31.5	35
QB 112	-	4.0	11.0	18.0	25.0	32.0	39.0	46.0	53.0	60
	Frenleme Momenti (Kgm)									Max.Moment (Kgm)



Hava Aralığı
İdeal hava aralığı (h) ölçüleri yandaki tabloda verilmiştir. Kabul edilebilir en yüksek hava aralığı 0,7 mm'dir. Bu değer aşıldığında frenleme performansı değişecektir ve hava aralığının tekrar ayarlanması gerekmektedir.

Açma-Kapama Süreleri
Normal fren açma ve kapama süreleri aşağıdaki tabloda verilmiştir. Bu süreler yük özelliğine göre değişebilir.

Diyot Köprüsü
Standart motorun üzerinde normal tip (AS) yarım dalga diyot köprüsü bulunmaktadır. Hızlı tip (ASR) yarım dalga diyot köprüsü kullanarak aşağıdaki tabloda verilen hızlı kapanma sürelerini elde etmek mümkündür.

Model	QB63	QB71	QB80	QB90	QB100	QB112
İdeal hava aralığı (mm)	0.2	0.2	0.2	0.2	0.3	0.3

Model	Normal açma süresi ms	Normal kapama süresi ms	Hızlı kapama süresi ms
QB63	10	45	20
QB71	15	50	30
QB80	15	55	30
QB90	15	65	40
QB100	20	75	45
QB112	25	180	85

FRENLİ MOTOR - QB TİP

ELEKTRİKSEL ÖZELLİKLER, 50 Hz

	MOTOR TİPİ	NOMİNAL GÜÇ HP	NOMİNAL GÜÇ kW	NOMİNAL DEVİR d/d	NOMİNAL AKIM A	NOMİNAL MOMENT Nm	KALKIŞTAKİ DEĞERLER AKIM I_A / I_N ⅄	KALKIŞTAKİ DEĞERLER AKIM I_A / I_N △	KALKIŞTAKİ DEĞERLER MOMENT M_A / M_N ⅄	KALKIŞTAKİ DEĞERLER MOMENT M_A / M_N △	Devrilme Momenti Oranı Mk/Mn	Verim* %η	Cosφ	FREN Max. Moment kgm	J kgm²	Ağırlık (B3) kg
	2 Kutup 3000 d/d															
220/380 V	QB 63M2A	1/4	0,18	2800	0,6	0,62	4,20	-	2,3	-	2,4	64	0,78	0,46	0,00017	6
220/380 V	QB 63M2B	1/3	0,25	2800	0,7	0,86	4,20	-	2,2	-	2,3	67	0,83	0,46	0,00022	7
220/380 V	QB 71M2A	1/2	0,37	2800	1,0	1,27	4,30	-	2,0	-	2,4	68	0,83	0,82	0,00028	9
220/380 V	QB 71M2B	3/4	0,55	2820	1,4	1,87	5,00	-	2,2	-	2,5	71	0,84	0,82	0,00036	10
220/380 V	QB 80M2A	1	0,75	2840	1,8	2,53	5,20	-	2,2	-	2,6	74	0,86	1,22	0,00088	13
220/380 V	QB 80M2B	1,5	1,1	2850	2,5	3,69	6,00	-	2,6	-	2,9	77	0,86	1,22	0,00109	14
220/380 V	QB 90S2A	2	1,5	2850	3,3	5,01	6,30	-	2,6	-	3,1	79	0,87	1,63	0,00130	18
220/380 V	QB 90L2A	3	2,2	2860	4,6	7,37	6,90	-	2,6	-	3,2	81,5	0,88	1,63	0,00164	20
220/380 V	QB 100L2A	4	3	2880	6,2	9,94	7,10	-	2,8	-	3,5	83	0,89	3,57	0,00243	26
380/660 V	QB 112M2A	5,5	4	2870	8	13,31	2,20	6,9	0,87	2,6	3,4	85	0,90	60	0,00399	37

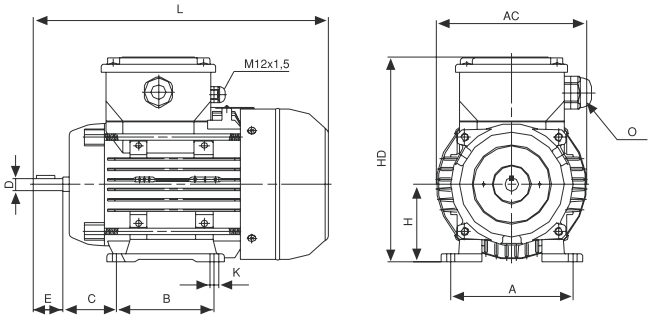
	4 Kutup 1500 d/d															
220/380 V	QB 63M4A	1/6	0,12	1365	0,5	0,84	2,8	-	2,0	-	2,3	54	0,65	0,46	0,00020	6
220/380 V	QB 63M4B	1/4	0,18	1380	0,7	1,25	3,2	-	2,2	-	2,4	61	0,62	0,46	0,00025	6
220/380 V	QB 71M4A	1/3	0,25	1390	0,9	1,72	3,5	-	2,2	-	2,4	64	0,67	0,82	0,00071	9
220/380 V	QB 71M4B	1/2	0,37	1390	1,2	2,54	4,0	-	2,3	-	2,6	67	0,68	0,82	0,00095	10
220/380 V	QB 80M4A	3/4	0,55	1400	1,6	3,75	4,0	-	2,1	-	2,3	72	0,73	1,22	0,00168	13
220/380 V	QB 80M4B	1	0,75	1400	2,1	5,12	4,2	-	2,1	-	2,2	74	0,74	1,22	0,00205	14
220/380 V	QB 90S4A	1,5	1,1	1410	2,7	7,45	5,4	-	2,4	-	2,7	78	0,78	1,63	0,00243	17
220/380 V	QB 90L4A	2	1,5	1420	3,6	10,09	5,5	-	2,4	-	2,7	80	0,79	1,63	0,00322	19
220/380 V	QB 100L4A	3	2,2	1410	5,1	14,9	5,4	-	2,5	-	2,7	82	0,80	3,57	0,00398	26
220/380 V	QB 100L4B	4	3	1410	6,8	20,32	5,4	-	2,5	-	2,7	83	0,81	3,57	0,00471	29
380/660 V	QB 112M4B	5,5	4	1430	8,7	26,71	2,1	6,7	0,72	2,8	3,2	85	0,82	6,12	0,00933	39

	6 Kutup 1000 d/d															
220/380 V	QB 71M6A	1/4	0,18	900	0,78	1,91	3,0	-	2,0	-	2,3	58	0,60	0,82	0,00068	10
220/380 V	QB 71M6B	1/3	0,25	910	0,95	2,63	3,1	-	2,0	-	2,3	63	0,63	0,82	0,00090	12
220/380 V	QB 80M6A	1/2	0,37	920	1,35	3,84	3,3	-	2,1	-	2,4	68	0,61	1,22	0,00160	14
220/380 V	QB 80M6B	3/4	0,55	920	1,85	5,71	3,2	-	2,1	-	2,5	69	0,65	1,22	0,00196	15
220/380 V	QB 90S6A	1	0,75	925	2,3	7,75	3,6	-	1,9	-	2,1	72	0,69	1,63	0,00255	17
220/380 V	QB 90L6B	1,5	1,1	935	3,3	11,24	4,0	-	2,0	-	2,2	73	0,69	1,63	0,00328	21
220/380 V	QB 100L6A	2	1,5	940	4,2	15,24	4,2	-	2,1	-	2,3	75	0,72	3,57	0,00463	25
220/380 V	QB 112M6A	3	2,2	945	5,8	22,12	4,5	-	2,1	-	2,4	77	0,75	6,12	0,00916	37

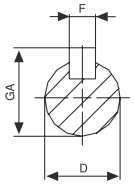
* 1.1 ve 4 kW arası 2 ve 4 kutup motorlarımız "EFF2" verimlilik seviyesindedir.

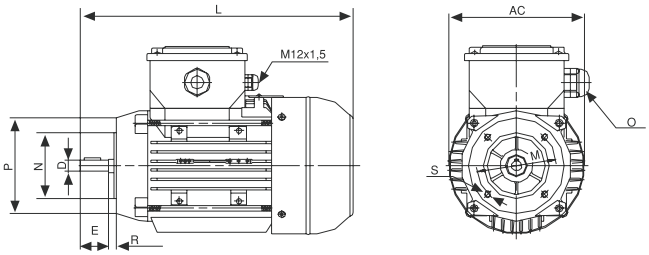
BOYUTLAR

QB 63-80

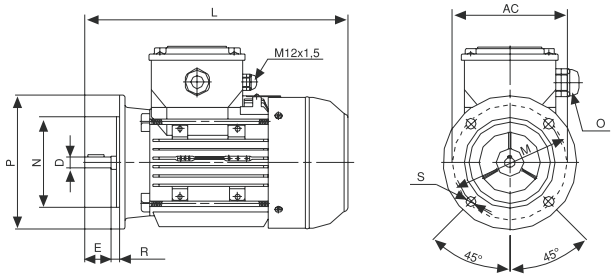


B3-B6-B7-B8-V5-V6





B14-V18-V19



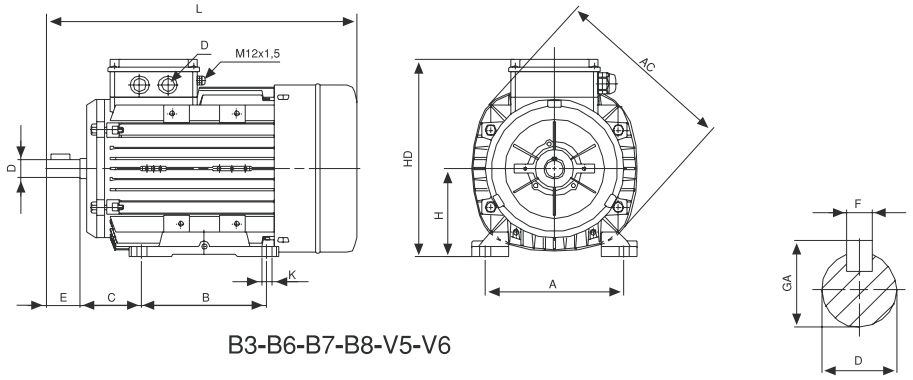
B5-V1-V3

		Ana Boyutlar			Ayaklı Motorlar						Mil				Rulman		Keçe		Flanş						
Gövde[4] Büyüklüğü	Kutup Sayısı	AC	L	O	B	A	H	HD	K	C	D[1]	E	GA	F[3]	Kasnak Tarafı	Kasnak Tarafı Aksi	Kasnak Tarafı	Kasnak Tarafı Aksi[5]	Yapı Şekli	Flanş Tipi	P	N[2]	M	R	S
63 M	2...6	123	278,5	1*M20	80	100	63	174	7	40	11	23	12,5	4	6201-2Z	6201-2Z	12*22*7	12*22*7	B5	FA	140	95	115	0	10
																			B14	FB	120	80	100	0	M6
																			B14	FC	90	60	75	0	M5
71 M	2...6	138	314,5	1*M20	90	112	71	190	7	45	14	30	16,0	5	6202-2Z	6202-2Z	15*24*5	15*24*5	B5	FA	160	110	130	0	10
																			B14	FB	140	95	115	0	M8
																			B14	FC	105	70	85	0	M6
80 M	2...6	158	347,5	1*M20	100	125	80	207	10	50	19	40	21,5	6	6204-2Z	6204-2Z	20*30*7	20*30*7	B5	FA	200	130	165	0	12
																			B14	FB	160	110	130	0	M8
																			B14	FC	120	80	100	0	M6

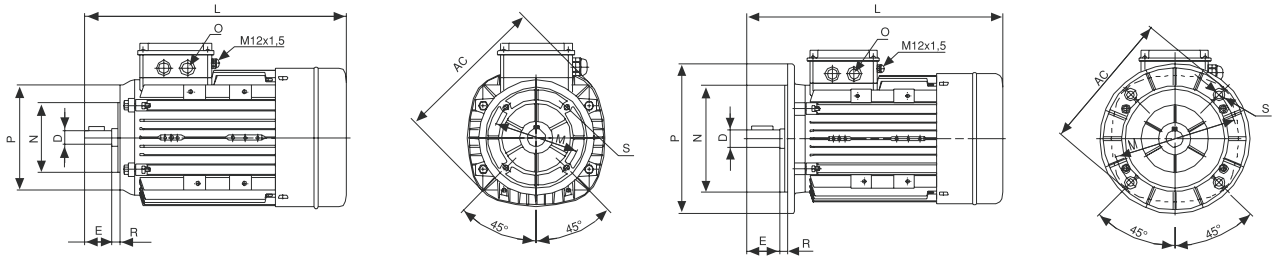
Ölçüler "mm" olarak verilmiştir.

(1) Tolerans 28 mm'ye kadar DIN EN 50347 "j6", 28 mm ve üzeri "k6".
(2) Tolerans DIN EN 50347 "j6"
(3) DIN 6885'e göre
(4) 112 yapı büyüklüğünden itibaren kaldırma halkası mevcuttur.
(5) IP55

QB 90-112



B3-B6-B7-B8-V5-V6



B14-V18-V19 B5-V1-V3

		Ana Boyutlar			Ayaklı Motorlar						Mil				Rulman		Keçe		Flanş						
Gövde[4] Büyüklüğü	Kutup Sayısı	AC	L	O	B	A	H	HD	K	C	D[1]	E	GA	F[3]	Kasnak Tarafı	Kasnak Tarafı Aksi	Kasnak Tarafı	Kasnak Tarafı Aksi[5]	Yapı Şekli	Flanş Tipi	P	N[2]	M	R	S
90 S/L	2...6	193	365,5 385,5	1*M25	100 125	140	90	241	10	56	24	50	27	8	6305-2Z	6205-2Z	25*40*7	25*40*7	B5	FA	200	130	165	0	12
																			B14	FB	160	110	130	0	M8
																			B14	FC	140	95	115	0	M8
100 L	2...6	217	432,0	1*M25	140	160	100	260	12	63	28	60	31	8	6306-2Z	6205-2Z	30*47*7	25*40*7	B5	FA	250	180	215	0	15
																			B14	FB	200	130	165	0	M10
																			B14	FC	160	110	130	0	M8
112 M	2...6	232	475,5	2*M25	140	190	112	280	12	70	28	60	31	8	6306-2Z	6206-2Z	30*47*7	30*47*7	B5	FA	250	180	215	0	15
																			B14	FB	200	130	165	0	M10
																			B14	FC	160	110	130	0	M8

Ölçüler "mm" olarak verilmiştir.

(1) Tolerans 28 mm'ye kadar DIN EN 50347 "j6", 28 mm ve üzeri "k6".
(2) Tolerans DIN EN 50347 "j6"
(3) DIN 6885'e göre
(4) 112 yapı büyüklüğünden itibaren kaldırma halkası mevcuttur.
(5) IP55

MOTOR PARÇA LİSTESİ

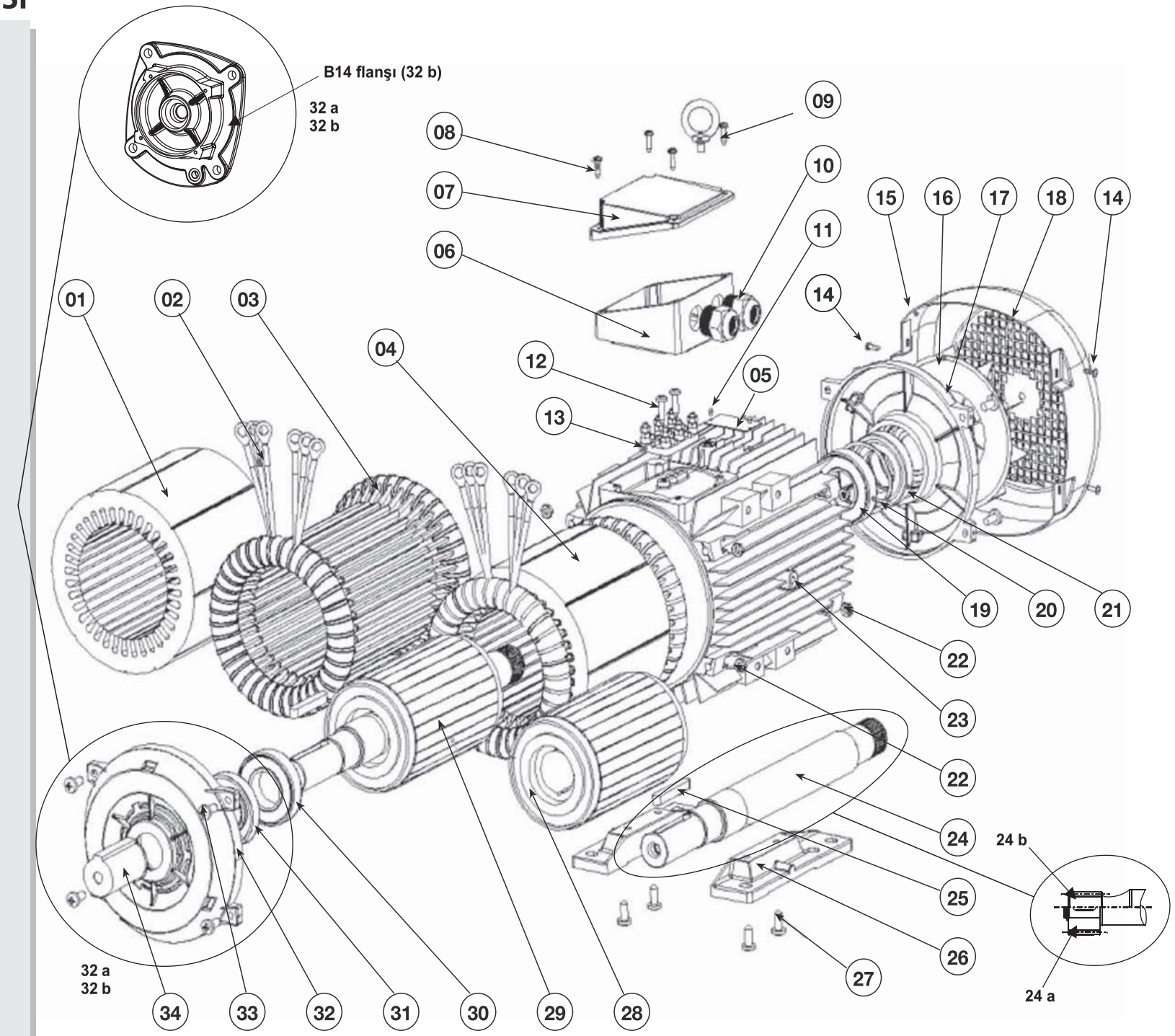
1. Stator çekirdek
2. Kamçı grubu
3. Sargı
4. Sargılı stator
5. Etiket
6. Terminal kutusu
7. Terminal kutu kapağı
8. Terminal kutu vidaları
9. Taşıma halkası
10. Rakor
11. Perçin
12. Terminal vidaları
13. Terminal plakası
14. Fan kapağı vidaları
15. Fan kapağı
16. Fan
17. Motor arka kapağı
18. Arka kapak vidaları
19. Arka rulman
20. Rulman gergi yayı
21. Keçe (Arka)
22. Somun
23. Gövde
24. Mil

24 a Çakma
24 b Yekpare

25. Kama
26. Ayak
27. Ayak vidalı
28. Rotor
29. Rotor-mil grubu
30. Ön rulman
31. Keçe (Ön)
32. Ön kapak (B3 Flanşı)

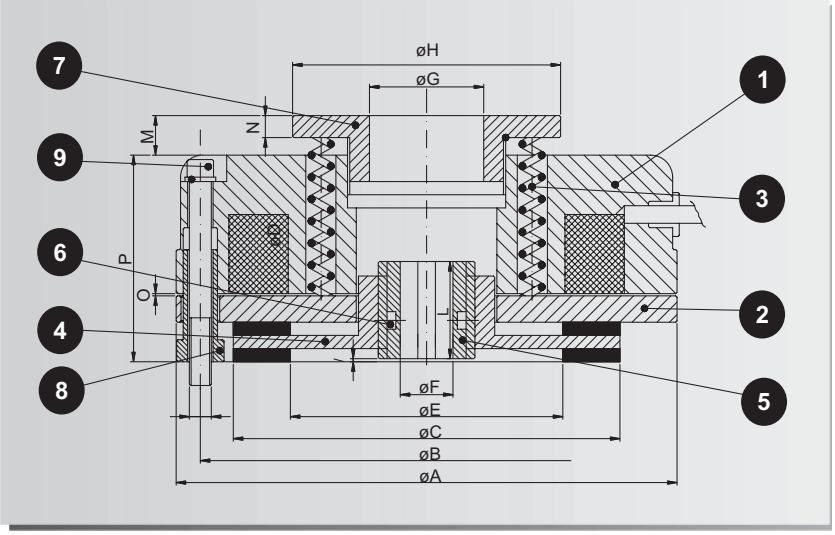
32 a B5 Flanşı
32 b B14 Flanşı

33. Ön kapak vidaları
34. Mil koruyucu kılıf



FREN PARÇA LİSTESİ VE ÖZELLİKLERİ

1 Elektro mıknatıs
2 Endüvi plakası
3 Tork yayı
4 Disk
5 Kamalı burç
6 O-ring
7 Ayar halkası
8 Ayar somunu
9 Bağlantı cıvataları

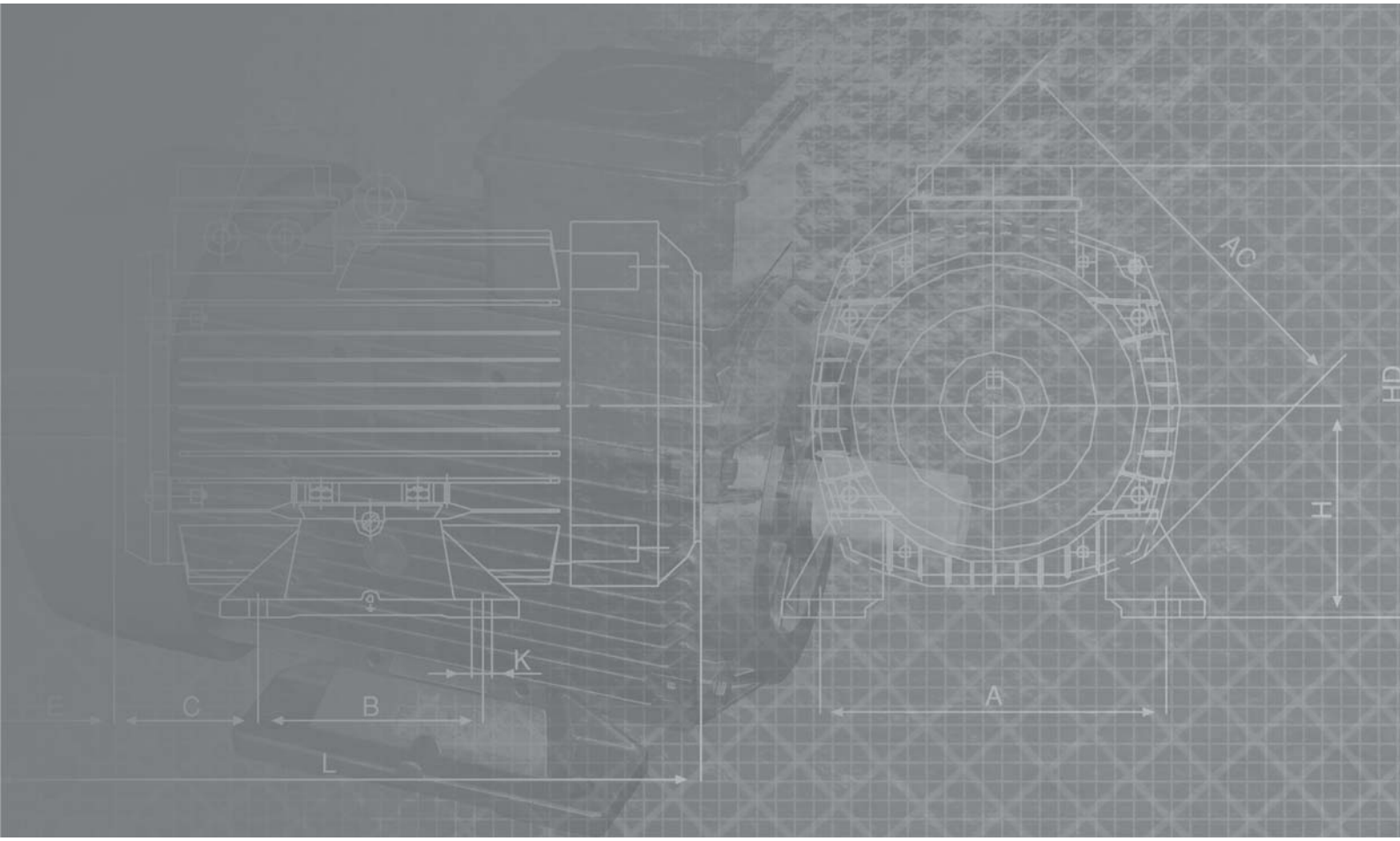


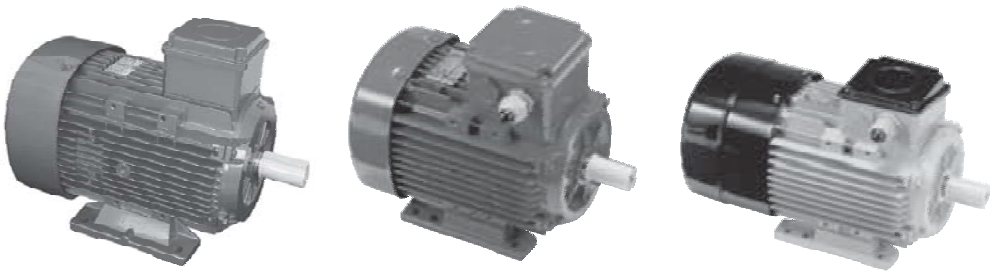
Tip Fren Modeli	K1	K2	K3	K4	K5	K6	K7	K7/D	K8	K8/D	K9	K9/D	K9/T
Statik Fren Momenti (Nm)	5	12	16	20	40	60	90	180	200	400	300	600	900
Motorun Max. Hızı (rpm)	3000	3000	3000	3000	3000	3000	3000	3000	1500	1500	1500	1500	1500
Giriş Gücü (W)	15	20	25	30	45	50	55	55	60	60	65	65	65
Max. Ses (≤ dB-A)	68	69	68	69	70	70	70	70	70	69	69	69	70
Ağırlık (Kg.)	1,1	1,85	2,55	2,84	4,8	7	12	15	14,3	18	23	28	34
A	84	104	114	124	148	159	189	189	218	218	248	248	248
B	72	90	103	112	132	145	170	170	196	196	230	230	230
C	61	77	88	98	119	128	151	151	176	176	204	204	204
D	3XM4	3xM5	3xM5	3xM6	3xM6	3xM8	3xM8	3xM8	6xM10	6xM10	6xM10	6xM10	9xM10
E	35	44	62	69	79	80	90	90	103	103	132	132	132
Delik toleransı K3'e kadar H7, diğerleri +0,01/-0,01 F	10-11 12	11-14 15	11-15	14-25	24-25 28	25-30 34	25-30 34	25 H40 34 H60	24-34	34 H60 48	44-45 48	44-45 48	44-45 48-50
G	20	26	26	42	60	60	60	60	60	60	60	60	60
H	50	61	61	79	104	104	104	104	104	104	104	104	104
I	1,5	1,5	1,5	1,5	1,5	1,5	1,5	1,5	1,5	1,5	1,5	1,5	1,5
L	18	20	20	20	25	30	30	60	40	60	40	60	80
M (max)	9	9	9	9,5	18	16	14	14	18	18	18	18	18
N	4	4	4	5,5	8	8	8	8	8	8	8	8	8
O	0,2	0,2	0,2	0,2	0,3	0,3	0,3	0,3	0,3	0,4	0,4	0,4	0,4÷0,5
P	38,5	41,5	47	46,5	64	69,5	79	101,5	78	98	80	105	130

Not

• Fren alıştırılmadan önce statik fren momenti tabloda verilen değerlere göre ± % 20 değişiklik gösterebilir.

THREE PHASE & SINGLE PHASE
INDUSTRIAL MOTORS





CONTENT

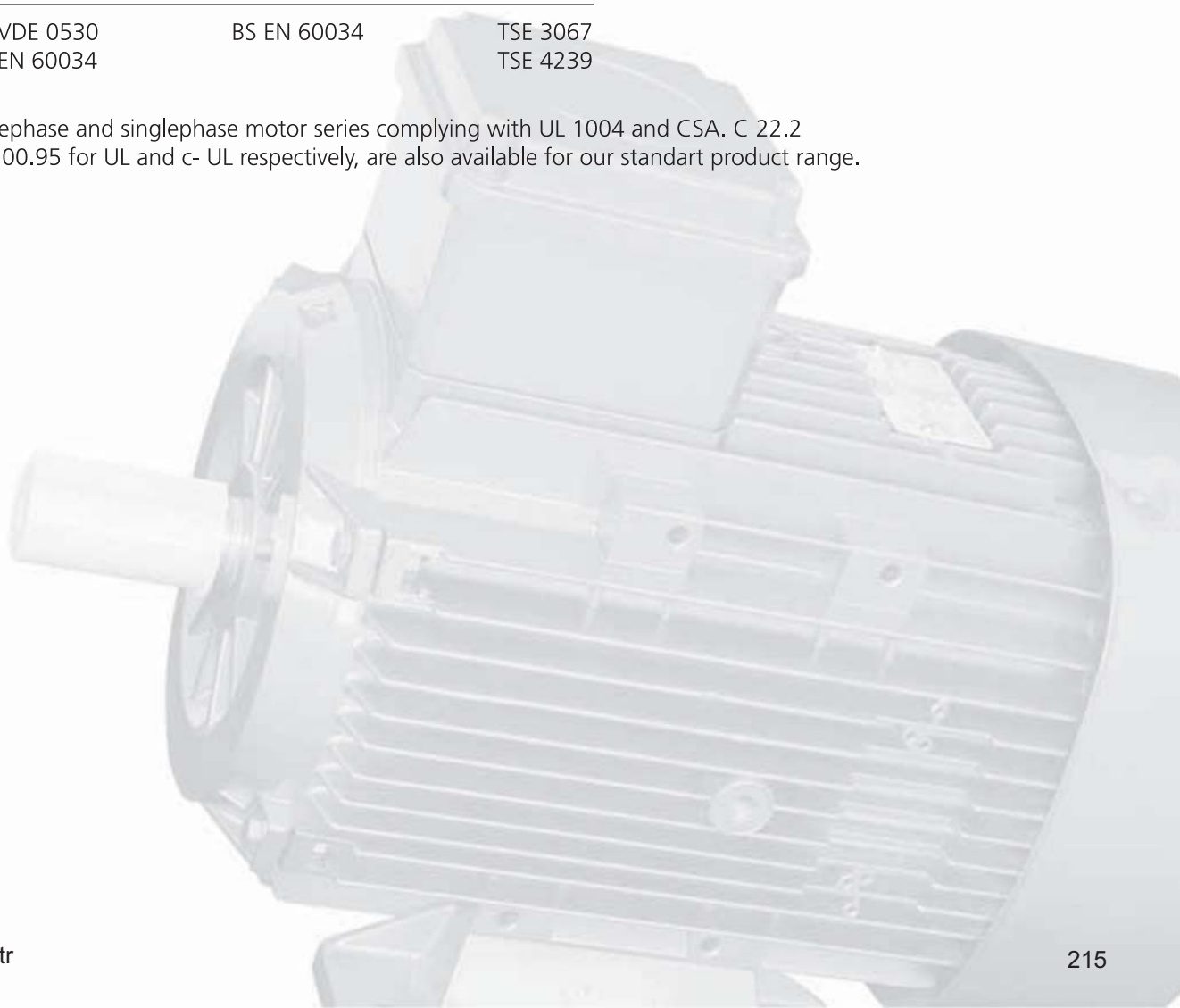
INTERNATIONAL STANDARDS

Electric motors are manufactured according to the international standards listed below:

IEC 60034-1	Rating and performance
IEC 60034-2	Methods for determining losses and efficiency
IEC 60034-5	Classification of degrees of protection
IEC 60034-6	Methods of cooling
IEC 60034-7	Symbols of construction and mounting arrangements
IEC 60034-8	Terminal markings and direction of rotation
IEC 60034-9	Noise limits
IEC 60034-11	Built-in thermal protection
IEC 60034-14	Vibration limits
IEC 60034-18-1	Functional evaluation of insulation systems
IEC 60038	Standart voltages
EN 50347	Dimensions and output for electrical machines
EN 55014-1 EN 61000-3-2 EN 61000-3-3	Electromagnetic compatibility

Germany	Great Britain	Turkey
DIN VDE 0530	BS EN 60034	TSE 3067
DIN EN 60034		TSE 4239

Threephase and singlephase motor series complying with UL 1004 and CSA. C 22.2 No 100.95 for UL and c- UL respectively, are also available for our standart product range.

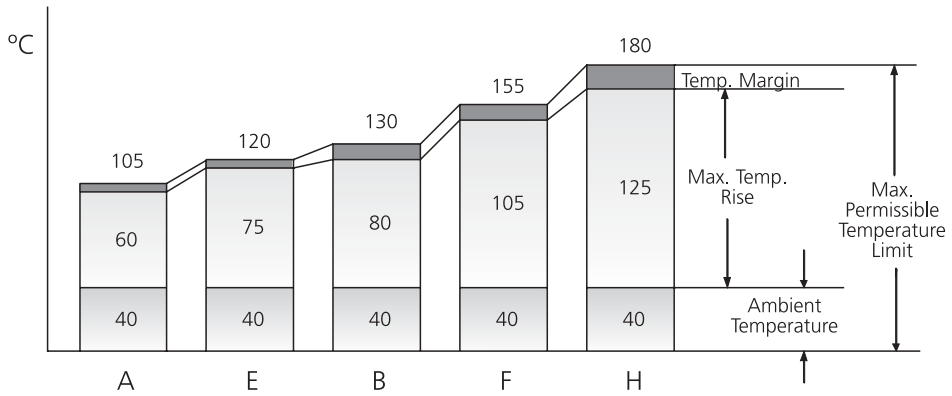


INSULATION CLASSIFICATION

Our standard motors have insulation class F while the temperature rise is for class B.
It means longer life of motors.

Under specified measuring conditions in accordance with IEC 60034-1 standard, insulation class F for an electric motor means that at ambient temperature of 40°C the temperature rise of its windings may be max. 105°C with the additional temperaturte margin of 10°C.

On customer's demand, we are able to make motors insulation class F with temperature rise for class F.



Insulation Class

DEGREE OF PROTECTION

According to IEC 60034-5 standard, electric motors are provided with IP code which determines the degree of protection ensured by the housing against access to dangerous parts, introducing foreign matter and/or water.

Our motors comply with IP55 protection class as standard.

X	Protection from introduction of solid foreign matter	Y	Protection against penetration of water and its harmful effects	IP XY
5	Protection against with live or moving parts inside the enclosure. Ingress of dust is not totally prevented, but dust does not enter in sufficient quantity to interfere with satisfactory operation of the motor	4	Water splashed against the motor from any direction will have no harmful effect.	IP 54
		5	Water projected by a nozzle against the motor from any direction will have no harmful effect.	IP 55

VIBRATION/BALANCING

All rotors are balanced dynamically with half key and this is indicated on the rating plate with letter H.

In accordance to IEC 60034-14, vibration level N is guaranteed for the standard motors. On customer demand, motors with reduced vibration level may also be produced.

Vibration in mm/s for the frame sizes

Vibration Grade	A	B
63-132	1,6	0,7
160-250	2,2	1,1

CONNECTIONS

The terminal plate is provided with 6 connection terminals, marked in accordance with 60034-8.

Frame Size	63-80	90-100	112	132-160	180	200	225-250
Cable Entry	M20	M25	M25	M32	M25	M32	M40
Number of Entries	1	1	2	2	2	2	2

TOLERANCES

According to IEC 60034-1, catalogue values are permitted to deviate from the real values as follows:

Speed (n)	$\Delta n = \pm 20\% (n_S - n_N)$ for $P_N > 1$ kW $\Delta n = \pm 30\% (n_S - n_N)$ for $P_N \leq 1$ kW
Efficiency % (η)	$\Delta\eta = -15\% (100 - \eta_N)$ for $P_N \leq 50$ kW $\Delta\eta = -10\% (100 - \eta_N)$ for $P_N > 50$ kW
Power Factor ($\cos\varphi$)	$\Delta \cos\varphi = -1/6 (1 - \cos\varphi)$
Locked Rotor Current (I_L/I_N)	$\Delta (I_L/I_N) = +20\% (I_L/I_N)$
Locked Rotor Torque (M_L/M_N)	min. $(M_L/M_N) = -15\% (M_L/M_N)$ max. $(M_L/M_N) = +25\% (M_L/M_N)$
Breakdown Torque (M_K/M_N)	$\Delta (M_K/M_N) = -10\% (M_K/M_N)$
Pull-up Torque (M_P/M_N)	$\Delta (M_P/M_N) = -15\% (M_P/M_N)$
Moment of Inertia (J) [kgm^2]	$\Delta J = \pm 10\% J$
Sound Pressure Level (LPA) [dB]	Δ LPA = +3 dB (A)

ENVIRONMENTAL CONDITIONS

Motors are designed to operate at altitudes up to 1000 m and ambient temperature up to 40°C. Rated output will change at the % ratios given below for different altitudes and ambient temperatures.

ALTITUDE		up to 1000 m	1500 m	2000 m	2500 m	3000 m	3500 m	4000 m
Insulation Class	B	100	97	94	90	86	82	77
	F	100	98	95	91	87	83	78

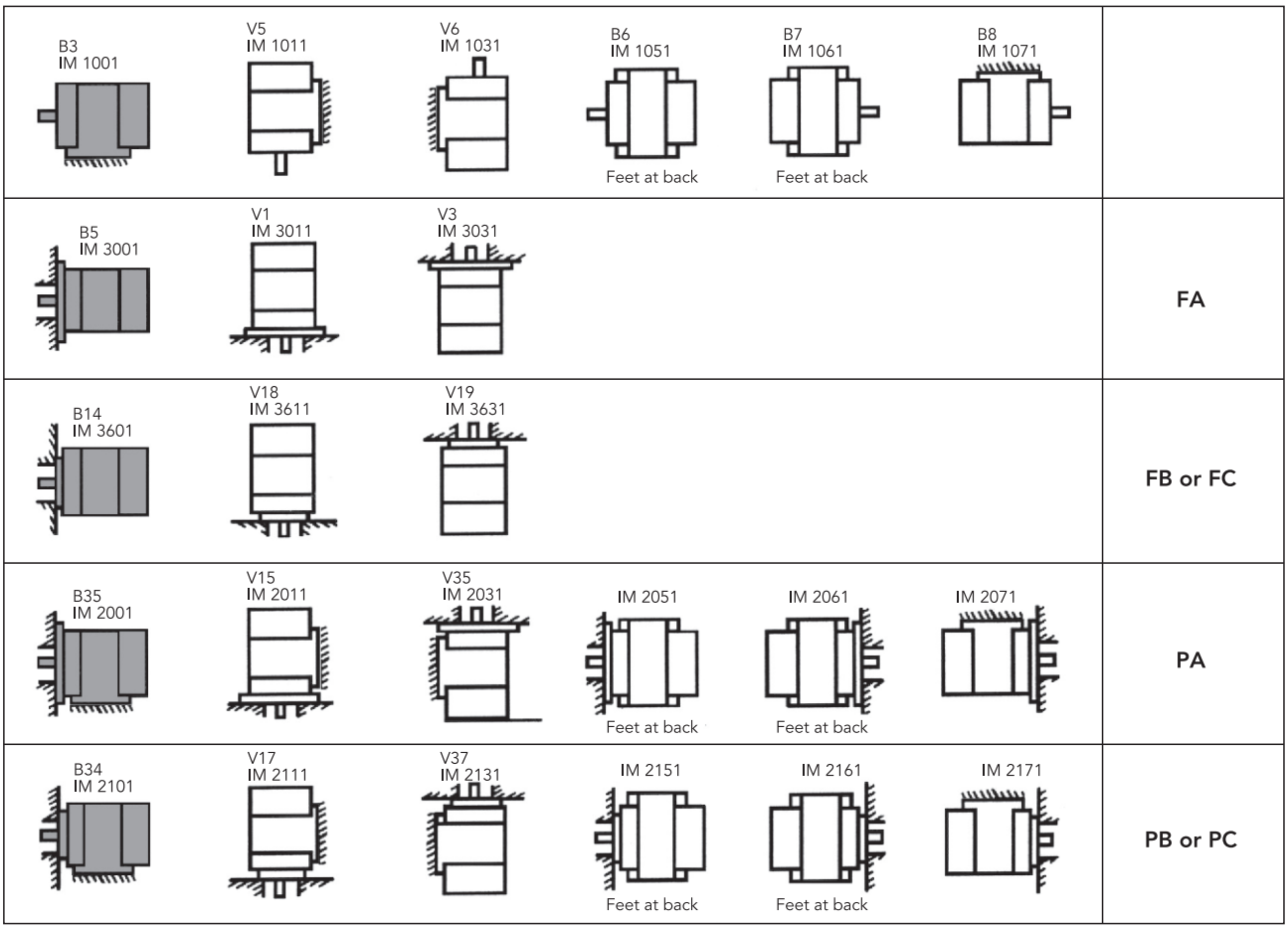
AMBIENT TEMPERATURE		30°C	35°C	40°C	45°C	50°C	55°C	60°C
Insulation Class	B	106	106	100	97	92	86	80
	F	105	102	100	97	93	87	82

MATERIALS

Frame	Housing	Fan	Fan Cover	Endshields	B5 Flange	B14 Flange
63	Aluminium	Plastic	Steel	Aluminium	Aluminium	Aluminium
71						
80						
90						
100						
112						
132						Cast Iron
160					Cast Iron	
180			Plastic [1]			
200						
225						
250						

[1] Steel fancover is optional.

MOUNTING ARRANGEMENTS



BEARINGS

Standard motors are equipped with deep groove ball bearings with ZZ shields. 250 frame size motors have external lubrication.

Bearing & Seal Types

Frame	Bearing		Seal	
	Drive side	Nondrive side	Drive side	Nondrive side
63	6201-2Z	6201-2Z	12*22*7	12*22*7
71	6202-2Z	6202-2Z	15*24*5	15*24*5
80	6204-2Z	6204-2Z	20*30*7	20*30*7
90	6305-2Z	6205-2Z	25*40*7	25*40*7
100	6306-2Z	6205-2Z	30*47*7	25*40*7
112	6306-2Z	6206-2Z	30*47*7	30*47*7
132	6208-2Z	6208-2Z	40*62*10	40*62*10
160	6309-2Z	6309-2Z	45*72*10	45*72*10
180	6310-2Z	6310-2Z	50*80*10	50*80*10
200	6312-2Z	6312-2Z	60*90*10	60*90*10
225	6313-2Z	6313-2Z	65*100*13	65*100*13
250/2	6314	6313-2Z	70*112*12	65*100*13
250/4	6315	6313-2Z	75*112*12	65*100*13

PAINTING

Our standard range of motors are painted with a gray protective paint according to RAL 7031 (grey). Other color are also available upon customer requests.

FEET

For QSX types motors (63-132 Frames), feet can be mounted on three sides, permitting terminal box assembly on the desired side. For QU types (160-250 Frames), the feet are detachable and this feature provides flexibilty for different mounting types.

TERMINAL BOX

Motors frame size 63-160 have terminal boxes on top close to the drive end which can be turned 90°, so that conduits can be at each side. For the other frame sizes, it is on top and close to the drive end.

CONDENSATION HOLES

In the basic design, motors are supplied without holes. In case of customer requests, motors can be supplied with drain holes. Since these motors are provided with a special plug in the hole, the degree of protection remains IP 55.

MOTOR IDENTIFICATION SYMBOLS

QU FA 225 M 4 C-43 (Sample motor number)

QU	**Motor Type**	QU Type QSX Type QH Type QB Type QM Type	
FA	**Construction Type**		
---	with feet	B3,B6,B7,B8,V5,V6/V19	
FA	with A flange	B5,V1,V3	
FB	with B flange	B14,V18,V19	
FC	with C flange	B14,V18,V19	
FS	with special flange	-	
PA	with feet and A flange	B3/B5,V1/V5,V3/V6	
PB	with feet and B flange	B3/B14,V5/V18,V6/V19	
PC	with feet and C flange	B3/B14,V5/V18,V6/V19	
PS	with feet and special flange	-	
X	without feet; flange and/or end-shield	B9,V8,V9	
225	**Frame Size**		(Shaft height in millimeters)
M	**Motor Length**	S	Short
		M	Medium
		L	Long
4	**Number of Poles**		2,4,6,8 Poles
C	**Core Length**		(Does not affect outside dimensions)
		A	Short
		B	Medium
		C	Long
		D, CE	Extra Long
43	**Special Motor Number**		01 - ... - 99

VOLTAGE/60 Hz

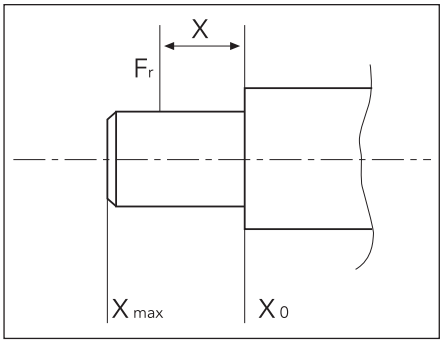
Motors are normally designed for 400V, 50 Hz. Other voltages and 60 Hz frequency are optional.
Our motors wound for 50 Hz can be operated on 60 Hz for the same output power.
The ratios given below indicate changes in the given parameters.

		60 Hz Application Coefficients of 50 Hz Motor						
50 Hz Voltage	60 Hz Application	Rated Speed	Rated Power	Rated Torque	Rated Current	Starting Torque	Breakdown Torque	Starting Current
230 V	230 V	1,2	1	0,83	1	0,83	0,83	0,83
230 V	265 V	1,2	1,15	0,96	1	0,96	0,96	0,96
400 V	400 V	1,2	1	0,83	1	0,70	0,83	0,83
400 V	460 V	1,2	1,15	0,96	1	0,95	0,98	0,97

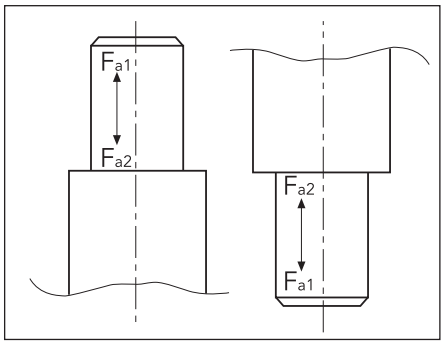
PERMISSIBLE LOADING ON THE SHAFTEND

FRAME SIZE	NUMBER OF POLES	Horizontal operation		Vertical operation	
		F_r(x=0) (kN)	F_r(x=max) (kN)	F_{a1}(x=0) (kN)	F_{a2}(x=max) (kN)
63	2	0,25	0,22	0,18	0,18
	4	0,29	0,25	0,21	0,21
	6	0,31	0,27	0,23	0,23
71	2	0,30	0,26	0,21	0,21
	4	0,35	0,29	0,25	0,25
	6	0,37	0,31	0,27	0,27
	8	0,38	0,32	0,28	0,28
80	2	0,54	0,45	0,38	0,38
	4	0,62	0,51	0,44	0,44
	6	0,66	0,54	0,48	0,48
	8	0,67	0,55	0,49	0,49
90	2	0,91	0,74	0,70	0,36
	4	0,99	0,80	0,77	0,40
	6	1,04	0,84	0,82	0,43
	8	1,03	0,83	0,80	0,43
100	2	1,21	0,96	0,91	0,36
	4	1,31	1,04	1,01	0,40
	6	1,38	1,09	1,07	0,43
	8	1,38	1,09	1,07	0,43
112	2	1,23	1,00	0,91	0,54
	4	1,33	1,09	1,01	0,60
	6	1,40	1,14	1,07	0,64
	8	1,40	1,14	1,07	0,61
132	2	1,22	0,98	0,86	0,86
	4	1,31	1,04	0,92	0,92
	6	1,34	1,08	0,95	0,95
	8	1,42	1,14	1,03	1,03
160	2	2,22	1,72	1,59	1,59
	4	2,34	1,82	1,71	1,71
	6	2,34	1,82	1.71	1,71
	8	2,48	1,92	1,83	1,83
180	2	2,68	2,12	1,94	1,94
	4	2,82	2,23	2,07	2,07
	6	2,93	2,31	2,17	2,17
	8	2,92	2,31	2,16	2,16
200	2	3,80	3,04	2,79	2,79
	4	3,95	3,16	2,93	2,93
	6	4,07	3,26	3,05	3,05
	8	3,95	3,16	2,93	2,93
225	2	4,45	3,65	3,25	3,25
	4	4,59	3,60	3,39	3,39
	6	4,73	3,71	3,52	3,52
	8	4,53	3,55	3,32	3,32
250	2	4,97	3,93	3,61	2,94
	4	5,78	4,57	4,26	3,15

Horizontal operation



Vertical operation



Calculations are based on 20.000h (L_{10aah}) bearing life time and the actual values will differ if radial and axial loads act at the same time. Mechanical strength of the endshields should also be considered for critical applications.
Value of force F_r acting on any point of the shaft end (between points X=max and X=0) may be calculated according to the following formula:

$$F_r = F_{x0} - \frac{x}{E}\,(F_{x0} - F_{xmax})[kN]$$

Where; F_{x0} - value of F_r force acting on the beginning of the shaft end
F_{xmax} - value of F_r force acting on the shaft end
E - length of the shaft end

PGR® Drive Technologies	MOTOR INQUIRY FORM

To	Nr	Date

Company Name & Address		
Contact Person	Name & Position	
	Tel	e-mail
	Fax	

Annual Quantity (pcs)	Lot Size/Month
Target Price	Requested Answer Date

☐ Threephase ☐ Singlephase ☐ Brakemotor ☐ Doublespeed

Motor Type	Drawing Nr

Mechanical				
	Frame Size			
	IP	Iso	Shaft ☐ Standard ☐ Special	
	Mounting		Flange Type	
	Color ☐ Ral _____	☐ Epoxy Primer	☐ Unpainted	
	Terminal-Box ☐ Top	☐ Leftside	☐ Rightside	Conduits
	Cable Outlet ☐	Cable Type	Length/Thickness	

Electrical			
	Output Power		
	Voltage/Frequency	Speed (rpm)	
	Duty Type S__	Connection	
	Protection ☐ PTC	☐ PTO	☐ Other _____

OTHER REQUIREMENTS:

Page __ of ___	☐ Please send this checklist per e-mail

THREE PHASE-QSX / QU / QH TYPES

- 63-250 frame size
- Up to 55 kW
- 2, 4, 6 and 8 poles

SINGLE PHASE-QM TYPE

- 63-90 frame size
- Up to 2,2 kW
- 2 and 4 poles

BRAKE MOTOR-QB TYPE

- 63-112 frame size
- Up to 4 kW
- 2, 4 and 6 poles

ELECTRICAL CHARACTERISTICS, AT 50 Hz

EFF 2

	MOTOR TYPE	RATED VALUES					STARTING VALUES				Mk/Mn	% η		Cos φ	J		Sound Pressure Level dBA *
		OUTPUT		SPEED	CURRENT	MOMENT	CURRENT I_A / I_N		TORQUE M_A / M_N								
		HP	kW	min $^{-1}$	A	Nm	⅄	△	⅄	△		3/4	4/4	4/4	kgm^2	kg	
	2 Pole 3000 min $^{-1}$																
230/400 V	QSX 63M2A	1/4	0,18	2800	0,51	0,62	4,20	-	2,3	-	2,4	63	64	0,80	0,00017	5	52
	QSX 63M2B	1/3	0,25	2800	0,66	0,86	4,20	-	2,2	-	2,3	66	67	0,82	0,00022	6	52
	QSX 71M2A	1/2	0,37	2800	0,93	1,27	4,30	-	2,0	-	2,4	67	68	0,84	0,00028	7	54
	QSX 71M2B	3/4	0,55	2820	1,32	1,87	5,00	-	2,2	-	2,5	69	71	0,85	0,00036	8	54
	QSX 80M2A	1,0	0,75	2840	1,70	2,53	5,20	-	2,2	-	2,6	72	74	0,86	0.00088	10	58
	QSX 80M2B	1,5	1,1	2850	2,40	3,69	6,00	-	2,6	-	2,9	75	77,3	0,86	0,00109	11	58
	QSX 90S2A	2	1,5	2860	3,20	5,01	6,50	-	2,6	-	3,1	78	79	0,86	0.00129	14	62
	QSX 90L2A	3	2,2	2860	4,50	7,35	7,00	-	2,7	-	3,3	80	81	0,87	0.00162	16	62
	QSX 100L2A	4	3	2890	6,10	9,91	7,50	-	2,9	-	3,6	81	82	0,87	0,00241	21	64
400/690 V	QSX 112M2A	5,5	4	2890	7,50	13,22	2,40	7,7	0,78	2,9	3,8	86	86	0,90	0.00394	29	67
	QSX 132S2A	7,5	5,5	2900	10,40	18,11	2,60	7,9	0,80	3	3,7	85,5	86,5	0,88	0,01123	34	70
	QSX 132S2C	10	7,5	2900	13,80	24,70	2,70	7,9	1,01	3,4	4,1	87	88	0,89	0,01424	41	70
	QSX 132M2A	15	11	2900	20,00	36,22	2,60	7,9	0,83	2,9	3,6	88	88,5	0,90	0,01596	55	70
	QU 160M2A	15	11	2900	19,60	36,23	2,25	6,9	0,79	2,5	3,5	89	90	0,90	0,02644	69	71
	QU 160M2B	20	15	2910	26,50	49,23	2,25	7	0,87	2,7	3,5	89,5	90,5	0,90	0,03317	76	71
	QU 160L2A	25	18,5	2920	32,20	60,51	2,25	7	0,80	2,6	3,5	90,5	91	0,91	0,04075	91	71
	QU 180M2A	30	22	2940	38,10	71,47	2,25	7	0,74	2,6	3,5	91	91,5	0,91	0,06193	114	77
	QU 200L2A	40	30	2945	53,00	97,12	2,26	7	0,71	2,4	3,5	92	92,5	0,88	0,11917	148	80
	QU 200L2B	50	37	2950	64,50	119,6	2,26	7	0,68	2,4	3,5	92	93	0,89	0,13885	167	80
	QU 225M2A	60	45	2955	79,00	145,4	2,26	7	0,69	2,3	3,5	92	93,5	0,88	0,19833	206	81
	QU 250M2A	75	55	2955	94,00	177,4	2,26	7	0,69	2,3	3,6	93	94	0,90	0,23505	235	81

	4 Pole 1500 min $^{-1}$																
220/380 V	QSX 63M4A	1/6	0,12	1365	0,50	0,84	2,8	-	2,0	-	2,3	53	56	0,62	0,00020	5	41
	QSX 63M4B	1/4	0,18	1380	0,70	1,25	3,2	-	2,2	-	2,4	57	60	0,62	0,00025	5,6	41
	QSX 71M4A	1/3	0,25	1390	0,80	1,72	3,5	-	2,2	-	2,4	63	65	0,69	0,00071	7	45
	QSX 71M4B	1/2	0,37	1390	1,12	2,55	4,0	-	2,3	-	2,6	68	69	0,69	0,00095	8	45
	QSX 80M4A	3/4	0,55	1400	1,50	3,76	4,0	-	2,1	-	2,3	71	72	0,74	0,00168	9,5	49
	QSX 80M4B	1,0	0,75	1400	1,96	5,12	4,2	-	2,1	-	2,2	73	74	0,75	0,00205	10,5	49
	QSX 90S4A	1,5	1,1	1410	2,70	7,45	5,4	-	2,6	-	3,1	77	77,5	0,76	0,00243	13	54
	QSX 90L4A	2,0	1,5	1420	3,50	10,09	5,5	-	2,7	-	3,2	80	80	0,77	0,00322	15	54
	QSX 100L4A	3,0	2,2	1430	4,80	14,69	5,7	-	2,8	-	3,0	82	82	0,80	0,00398	21	56
	QSX 100L4B	4,0	3,0	1425	6,50	20,10	5,8	-	2,9	-	3,2	82	83	0,80	0,00471	24	56
400/690 V	QSX 112M4B	5,5	4,0	1445	8,60	26,43	2,3	6,8	0,69	2,6	3,2	84	85	0,79	0,00933	31	58
	QSX 132S4C	7,5	5,5	1450	11,1	36,22	2,1	6,7	0,81	2,8	3,1	87	87	0,82	0,02111	39	61
	QSX 132M4B	10,0	7,5	1450	15,5	49,39	1,5	5,5	0,83	2,9	3,1	87	87	0,80	002763	60	61
	QU 160M4B	15,0	11	1450	21,5	72,45	2,1	6,5	0,71	2,5	3,0	88,5	89,5	0,83	0,05547	76	63
	QU 160L4A	20,0	15	1455	29	98,45	2,1	6,5	0,74	2,6	3,1	89,5	90	0,83	0,06922	90	63
	QU 180M4B	25,0	18,5	1455	34,9	121,4	2,1	6,5	0,71	2,6	3,0	90	91	0,84	0,11220	119	69
	QU 180L4B	30,0	22	1455	40,8	144,4	2,1	6.5	0,74	2,5	3,0	90,5	91,5	0,85	0,12773	127	69
	QU 200L4C	40,0	30	1460	54,6	196,2	2,1	7	0,68	2,3	3,0	91,5	92	0,86	0,25035	176	70
	QU 225S4A	50,0	37	1470	67,1	240,4	2,1	7	0,74	2,5	3,0	92	92,5	0,86	0,36429	223	71
	QU 225M4C	60,0	45	1470	82	292,3	2,1	7	0,74	2,5	3,0	92	93	0,85	0,43513	260	71
	QU 250M4C	75,0	55	1470	100	356,1	2,1	7	0,73	2,6	3,0	93	93,5	0,85	0,46270	280	71

* The Sound Pressure Level measurements are taken 1 meter away from the motor.
* Tolerance + 3 dB(A)
* The 2 and 4 pole motors in the 1,1 kw to 55 kw output range correspond with the EU "EFF2" efficiency classification.

THREE PHASE - QSX TYPES

EFF2

ELECTRICAL CHARACTERISTICS, AT 50 Hz

	MOTOR TYPE	RATED VALUES					STARTING VALUES				Mk/Mn	% η		Cos φ	J		Sound Pressure Level dBA *
		OUTPUT		SPEED	CURRENT	MOMENT	CURRENT I_A / I_N		TORQUE M_A / M_N								
		HP	kW	min $^{-1}$	A	Nm	⅄	△	⅄	△		3/4	4/4	4/4	kgm^2	kg	
	6 Pole 1000 min $^{-1}$																
220/380 V	QSX 71M6A	1/4	0,18	900	0,78	1,91	3,0	-	2,2	-	2,4	55	58	0,57	0,00068	6	42
	QSX 71M6B	1/3	0,25	910	0,90	2,63	3,1	-	2,2	-	2,4	61	63	0,64	0,00090	8	42
	QSX 80M6A	1/2	0,37	920	1,25	3,84	3,3	-	2,1	-	2,4	65	67	0,64	0,00160	10	49
	QSX 80M6B	3/4	0,55	920	1,80	5,71	3,2	-	2,1	-	2,5	68	70	0,63	0,00196	11	49
	QSX 90S6A	1,0	0,75	925	2,10	7,74	3,8	-	2,0	-	2,2	70	71	0,73	0,00225	13	51
	QSX 90L6B	1,5	1,10	930	3,0	11,29	4,2	-	2,2	-	2,4	72	73	0,72	0,00328	17	51
	QSX 100L6A	2,0	1,50	935	4,10	15,32	4,0	-	2,0	-	2,2	73	74	0,71	0,00463	20	53
	QSX 112M6A	3,0	2,20	950	5,40	22,11	4,7	-	2,1	-	2,5	80	80	0,74	0,00916	29	58
400/690 V	QSX 132S6B	4,0	3,0	955	7,00	30,00	1,81	5,7	0,63	2	2,5	80	81	0,76	0,02070	36	62
	QSX 132M6A	5,5	4,0	960	9,00	39,79	1,84	5,8	0,7	2,2	2,6	81	82	0,78	0,02070	53	62
	QSX 132M6B	7,5	5,5	960	12,30	54,71	1,76	5,5	0,67	2,1	2,6	83	84	0,77	0,02709	58	62
	QU 160M6B	10,0	7,5	960	17,0	74,61	1,90	6	0,69	2,1	3,2	85,5	86	0,74	0,05641	76	63
	QU 160L6B	15,0	11,0	960	24,3	109,5	1,89	6	0,72	2,2	3,0	86	87	0,75	0,07040	94	63
	QU 180L6A	20,0	15,0	965	30	148,5	1,91	6	0,62	2	2,8	87	89	0,81	0,18369	115	63
	QU 200L6B	25,0	18,5	970	36	182,2	1,90	6	0,6	1,85	2,7	88	90	0,82	0,27088	155	64
	QU 200L6C	30,0	22,0	970	43	216,6	1,85	6	0,6	1,85	2,7	89	90,5	0,82	0,31281	165	64
	QU 225M6B	40,0	30,0	975	57	294	1,85	6	0.,57	1,8	2,5	90	91	0,83	0,49334	221	65

	8 Pole 750 min $^{-1}$																
220/380 V	QSX 80M8A	1/4	0,18	650	0,90	2,55	2,20	-	1,50	-	1,7	52	54	0,53	0,00168	10	44
	QSX 80M8B	1/3	0,25	675	1,15	2,55	2,20	-	1,50	-	1,7	55	57	0,55	0,00205	11	44
	QSX 90S8A	1/2	0,37	695	1,50	5,1	2,90	-	1,90	-	2,3	60	62	0,57	0,00243	12	49
	QSX 90L8A	3/4	0,55	690	2,00	7,61	3,00	-	1,90	-	2,2	64	65	0,61	0,00322	15	49
	QSX 100L8A	1,0	0,75	695	2,60	10,30	3,60	-	1,80	-	2,3	70	70,5	0,59	0,00398	19	49
	QSX 100L8B	1,5	1,1	690	3,4	15,22	3,60	-	1,80	-	2,2	73	73	0,64	0,00471	21	49
	QSX 112M8A	2,0	1,5	700	4,5	20,46	3,70	-	1,90	-	2,3	74	74	0,65	0,00933	28	54
	QSX 132S8B	3,0	2,2	710	6,0	29,59	1,27	4	0,60	1,7	2,2	75	77	0,69	0,02111	36	58
	QSX 132M8A	4,0	3,0	710	7,9	40,35	1,40	4,5	0,60	1,7	2,2	77	79	0,69	0,02763	52	58
400/690 V	QU 160M8A	5,5	4,0	720	10,5	53,1	1,75	5,0	0,61	1,80	2,2	82	83	0,66	0.,05641	65	60
	QU 160M8B	7,5	5,5	720	14,5	73	1,74	5,0	0,61	1,80	2,2	82,5	83,5	0,66	0,05641	74	60
	QU 160L8A	10,0	7,5	720	19	99,5	1,74	5.,0	0,62	1,90	2,2	83	84	0,68	0,07040	85	60
	QU 180L8B	15,0	11,0	720	24,6	146	1,75	5,5	0,65	2,10	2,6	85	87	0.,74	0,12773	122	60
	QU 200L8C	20,0	15,0	725	31.0	197,6	1,74	5,5	0,68	2,20	2,8	87	89	0,78	0,25035	169	61
	QU 225S8A	25,0	18,5	725	37,5	244	1,75	5,5	0,62	2,00	2,5	88	90	0,79	0,36429	224	61
	QU 225M8C	30,0	22,0	725	45,0	290	1,74	5.,5	0,66	2,10	2,6	89	90	0,78	0,43513	256	61

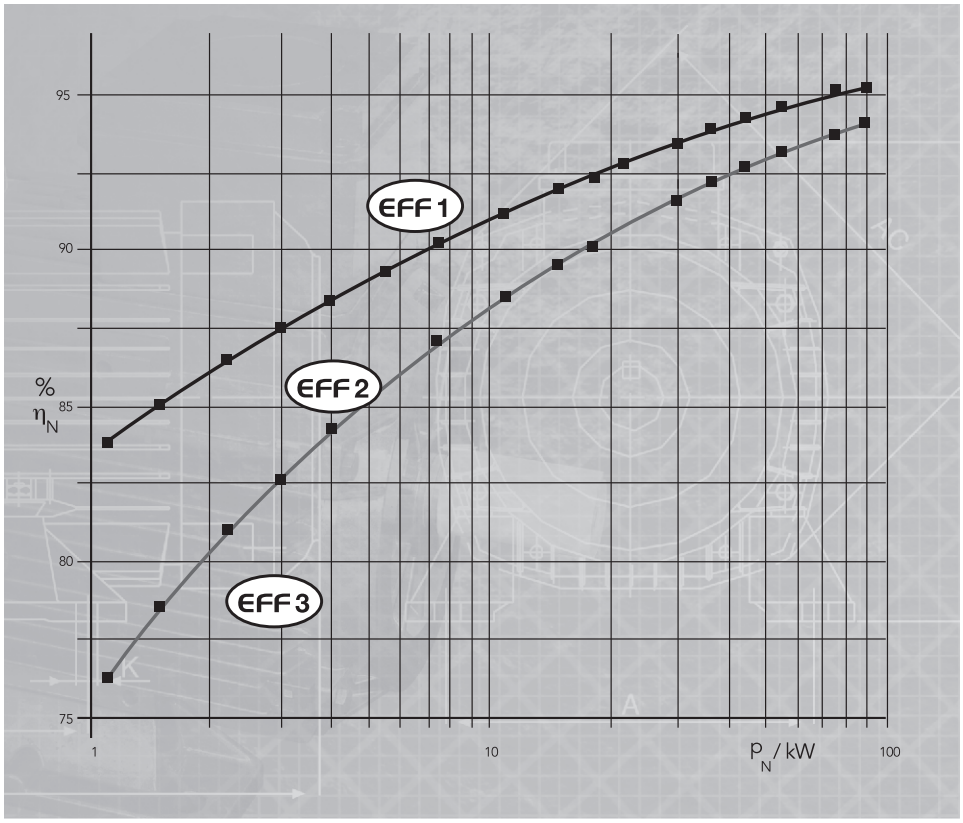
* The Sound Pressure Level measurements are taken 1 meter away from the motor.
* Tolerance + 3 dB(A)

EFFICIENCY LEVELS

Electrical drive systems play a key role in saving energy and in protection of the environment. These systems also account for two thirds of industrial power consumption.

CEMEP has introduced a classification of electrical motors with General Directorate for Energy within the EC. For this purpose three-phase motors with power outputs between 1,1 and 90 kW are divided into three zones, namely "Efficiency Classes".

The meeting of the required limits will be guaranteed by the manufacturer in their Manufacturer's Statement.



What will the high-efficiency motors benefit to the user?

- *Energy saving*
- *Reduction in energy costs*
- *Easily replacement of existing drives*
- *Protection of environment*

The art of designing higher efficiencies is to obtain an optimum between the losses and the operating characteristics requirements. This leads to use of more copper in the stator winding and of more aluminium in the rotor injection or a longer core in the stator and rotor design. Additional improvements incur higher costs which can certainly be justified according to particular application.

The marking appears on the nameplate and in the manufacturers documentation. Only European manufacturers who have entered the agreement are entitled to use the licensed logos.
Arçelik is an approved manufacturer in accordance with this agreement and produce high efficiency motors.

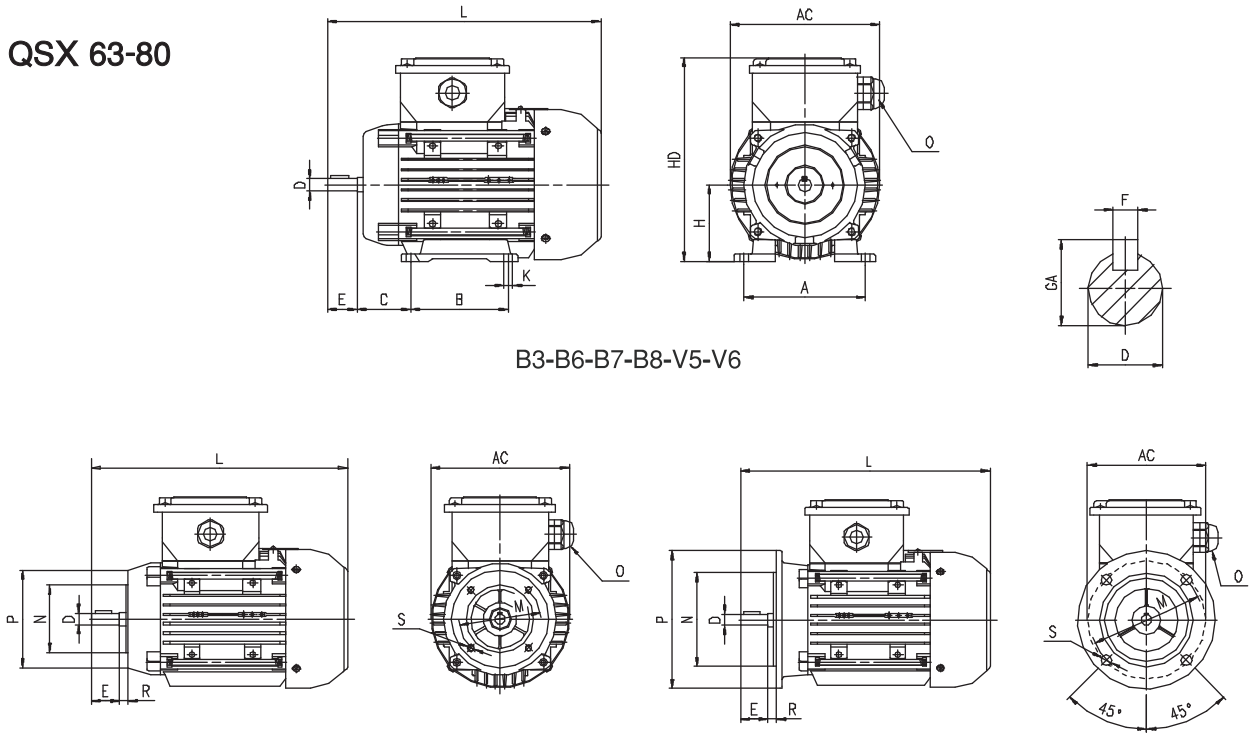
	MOTOR TYPE	RATED VALUES					STARTING VALUES		Mk/Mn	% η		Cos φ	J		Sound Pressure Level dBA *
		OUTPUT		SPEED	CURRENT	MOMENT	CURRENT I_A / I_N	TORQUE M_A / M_N							
		HP	kW	min $^{-1}$	A	Nm	⅄ △	⅄ △		3/4	4/4	4/4	kgm^2	kg	
	2 Pole 3000 min $^{-1}$														
230/400 V	QH 80M2D	1,5	1,1	2880	2,4	3,65	8,1	4,0	4,3	82,2	82,9	0.81	0.00150	13	58
230/400 V	QH 90L2C	2	1,5	2900	3,1	4,94	8,2	3,8	4,3	84,4	85,2	0,83	0,00182	17	61
230/400 V	QH 90L2D	3	2,2	2900	4,4	7,24	8,3	3,9	4,4	85,0	85,7	0,84	0,00182	18	61
230/400 V	QH 100L2D	4	3	2920	5,8	9,81	9,6	4,3	5,1	85,9	86,8	0,86	0,00335	27	63
400/690 V	QH 112M2C	5,5	4	2890	7,5	13,22	7,5	3,1	3,7	86,5	87,6	0,88	0,00489	34	66
400/690 V	QH 132S2C	7,5	5,5	2920	10,1	17,99	9,0	3,5	3,9	88,3	88,6	0,89	0,01424	41	69
400/690 V	QH 132M2A	10	7,5	2920	13,5	24,53	9,0	3,6	4,0	89,0	89,5	0,90	0,01596	55	69
400/690 V	QH 160M2A	15	11,O	2930	19,8	35,85	8,0	2,80	3,5	90,3	90,8	0,88	0,02644	69	71
400/690 V	QH 160M2B	20	15,0	2940	26,2	48,7	8,8	3,5	4,0	91,5	92,0	0,90	0,03317	77	71
400/690 V	QH 160L2A	25	18,5	2930	32,0	60,3	8,2	3,3	3,9	92,5	92,2	0,91	0,04075	92	71
400/690 V	QH 180M2A	30	22	2945	37,5	71,3	7,5	2,6	3,6	92,8	93,0	0,91	0,06193	115	77
400/690 V	QH 200L2A	40	30	2950	52,5	97,1	7,6	2,1	3,6	93,2	93,5	0,88	0,11917	148	80
400/690 V	QH 200L2B	50	37	2955	64,9	119,6	8,0	2,5	4,2	93,6	94,0	0,88	0,13885	168	80
400/690 V	QH 225M2A	60	45	2960	78,0	145,2	7,0	2,4	3,2	93,7	94,3	0,88	0,19833	206	81
400/690 V	QH 250M2A	75	55	2960	93,4	177,4	7,4	2,3	3,4	94,4	94,5	0,90	0,23505	235	81

	4 Pole 1500 min $^{-1}$														
230/400 V	QH 90L4C	1,5	1,1	1430	2,6	7,35	7,0	3,2	3,7	82,9	83,9	0,73	0,00365	18	50
230/400 V	QH 90L4D	2	1,5	1430	3,4	10,03	7,3	3,5	4,0	84,0	85,0	0,76	0,00365	18	50
230/400 V	QH 100L4C	3	2,2	1440	4,8	14,59	8,0	4,1	4,4	86,0	86,6	0,77	0,00545	26	53
230/400 V	QH 100L4D	4	3	1440	6,3	19,90	7,6	3,8	4,2	86,6	87,4	0,79	0,00581	29	53
400/690 V	QH 112M4D	5,5	4	1450	8,3	26,34	8,6	3,2	4,3	87,1	88,3	0,79	0,01123	35	53
400/690 V	QH 132M4B	7,5	5,5	1450	11,0	36,22	8,7	3,2	4,3	88,6	89,3	0,81	0,02763	60	61
400/690 V	QH 132M4C	10	7,5	1450	14,7	49,40	9,5	3,2	4,5	87,6	90,2	0,82	0,02980	67	61
400/690 V	QH 160M4B	15	11	1460	21,5	71,95	8,0	2,9	3,9	91,2	91,5	0,81	0,05547	77	63
400/690 V	QH 160L4A	20	15	1455	28,5	98,45	8,0	2,7	3,5	91,8	92,0	0,83	0,06922	90	63
400/690 V	QH 180M4B	25	18,5	1465	35,0	120,6	9,0	3,2	3,4	92,0	92,5	0,82	0,11220	120	69
400/690 V	QH 180L4B 30	30	22	1465	42,0	143,4	8,5	2,8	3,9	92,5	93,0	0,81	0,12773	127	69
400/690 V	QH 200L4C	40	30	1465	53,5	195,6	7,0	2,3	3,2	94,2	94,0	0,86	0,25035	176	70
400/690 V	QH 225S4A	50	37	1470	67,8	240,4	7,9	3,2	3,3	94,7	94,5	0,83	0,36429	223	71
400/690 V	QH 225M4C	60	45	1470	81,0	292,3	7,3	3,0	3,5	95,1	95,0	0,84	0,43513	260	71
400/690 V	QH 250M4C	75	55	1475	96,2	356,1	7,5	3,0	3,50	95,2	95,3	0,87	0,46270	280	71

* The Sound Pressure Level measurements are taken 1 meter away from the motor.
* Tolerance + 3 dB(A)

DIMENSIONS

QSX 63-80



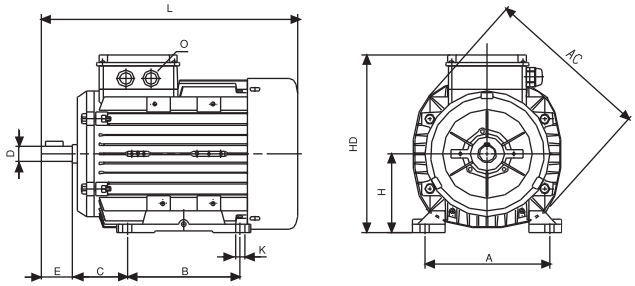
		Main Dimensions			Foot Mounted Motors						Shaft				Bearing		Seal		Flange						
Frame[4] Size	No. Of Poles	AC	L	O	B	A	H	HD	K	C	D[1]	E	GA	F[3]	Drive Side	Non Drive Side	Drive Side	Non Drive Side[5]	Mounting Type	Flange Type	P	N[2]	M	R	S
63 M	2...4	123	219.5	1*M20	80	100	63	174	7	40	11	23	12.5	4	6201-2Z	6201-2Z	12*22*7	12*22*7	B5	FA	140	95	115	0	10
																			B14	FB	120	80	100	0	M6
																			B14	FC	90	60	75	0	M5
71 M	2...6	138	252.5	1*M20	90	112	71	190	7	45	14	30	16.0	5	6202-2Z	6202-2Z	15*24*5	15*24*5	B5	FA	160	110	130	0	10
																			B14	FB	140	95	115	0	M8
																			B14	FC	105	70	85	0	M6
80 M	2...8	158	283.5	1*M20	100	125	80	207	10	50	19	40	21.5	6	6204-2Z	6204-2Z	20*30*7	20*30*7	B5	FA	200	130	165	0	12
																			B14	FB	160	110	130	0	M8
																			B14	FC	120	80	100	0	M6

Dimensions are in mm

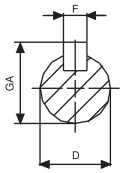
[1] Tolerance DIN EN 50347 "j6"
[2] Tolerance DIN EN 50347 "j6"
[3] According to DIN 6885
[4] Lifting bolt is mounted from frame size 112 on
[5] IP55

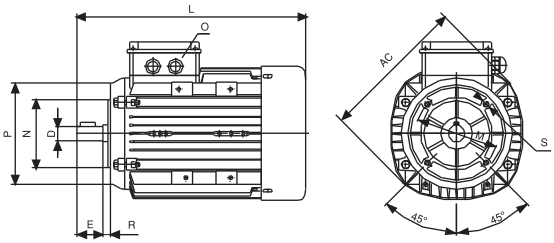
DIMENSIONS

QSX /QH 90-132

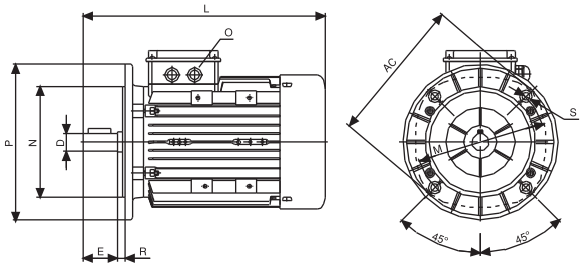


B3-B6-B7-B8-V5-V6





B14-V18-V19



B5-V1-V3

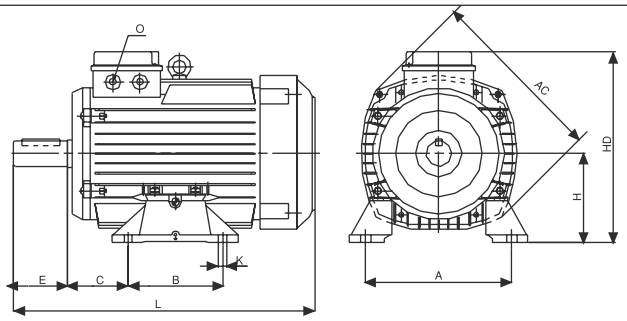
		Main Dimensions			Foot Mounted Motors						Shaft				Bearing		Seal		Flange						
Frame[4] Size	No. Of Poles	AC	L	O	B	A	H	HD	K	C	D[1]	E	GA	F[3]	Drive Side	Non Drive Side	Drive Side	Non Drive Side[5]	Mounting Type	Flange Type	P	N[2]	M	R	S
90 S/L	2...8	193	316.5	1*M25	100 125	140	90	241	10	56	24	50	27	8	6305-2Z	6205-2Z	25*40*7	25*40*7	B5	FA	200	130	165	0	12
																			B14	FB	160	110	130	0	M8
																			B14	FC	140	95	115	0	M8
100 L	2...8	217	352.0	1*M25	140	160	100	260	12	63	28	60	31	8	6306-2Z	6205-2Z	30*47*7	25*40*7	B5	FA	250	180	215	0	15
																			B14	FB	200	130	165	0	M10
																			B14	FC	160	110	130	0	M8
112 M	2...8	232	395.5	2*M25	140	190	112	280	12	70	28	60	31	8	6306-2Z	6206-2Z	30*47*7	30*47*7	B5	FA	250	180	215	0	15
																			B14	FB	200	130	165	0	M10
																			B14	FC	160	110	130	0	M8
132 S/M	2...8	279	475.5	2*M32	140 178	216	132	311	12	89	38	80	41	10	6208-2Z	6208-2Z	40*62*10	40*62*10	B5	FA	300	230	265	0	15
																			B14	FC	200	130	165	0	M10

Dimensions are in mm

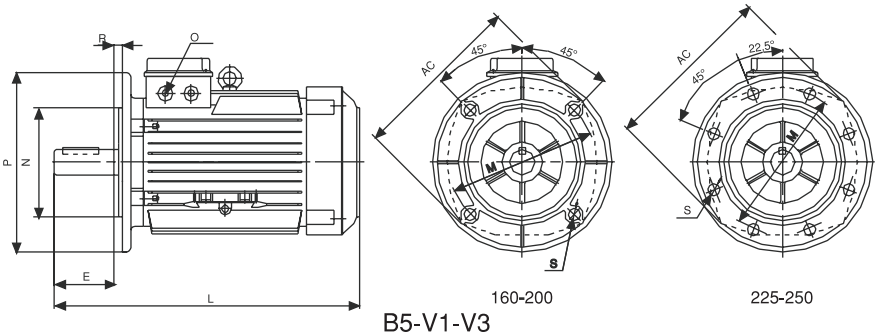
[1] Tolerance DIN EN 50347 "j6" up to ϕ28mm, "k6" above ϕ28mm
[2] Tolerance DIN EN 50347 "j6"
[3] According to DIN 6885
[4] Lifting bolt is mounted from frame size 112 on
[5] IP55

DIMENSIONS

QU/QH 160-250



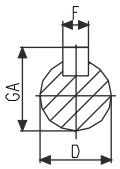
B3-B6-B7-B8-V5-V6



160-200

225-250

B5-V1-V3



		Main Dimensions			Foot Mounted Motors						Shaft				Bearing		Seal		Flange						
Frame[4] Size	No. Of Poles	AC	L	O	B	A	H	HD	K	C	D[1]	E	GA	F[3]	Drive Side	Non Drive Side	Drive Side	Non Drive Side[5]	Mounting Type	Flange Type	P	N[2]	M	R	S
160 M	2...8	323	586	2*M32	210	254	160	360	15	108	42	110	45.0	12	6309-2Z	6309-2Z	45*72*10	45*72*10	B5	FA	350	250	300	0	19
160 L	2...8	323	586	2*M32	254	254	160	360	15	108	42	110	45.0	12	6309-2Z	6309-2Z	45*72*10	45*72*10	B5	FA	350	250	300	0	19
180 M	2...8	370	629	2*M25	241	279	180	387	15	121	48	110	51.5	14	6310-2Z	6310-2Z	50*80*10	50*80*10	B5	FA	350	250	300	0	19
180 L	2...8	370	629	2*M25	279	279	180	387	15	121	48	110	51.5	14	6310-2Z	6310-2Z	50*80*10	50*80*10	B5	FA	350	250	300	0	19
200 L	2...8	415	665	2*M32	305	318	200	435	19	133	55	110	59.0	16	6312-2Z	6312-2Z	60*90*10	60*90*10	B5	FA	400	300	350	0	19
225 S	2 4...8	456	735 765	2*M40	286	356	225	485	19	149	55 60	110 140	59 64	16 18	6313-2Z	6313-2Z	65*100*13	65*100*13	B5	FA	450	350	400	0	19
225 M	2 4...8	456	735 765	2*M40	311	356	225	485	19	149	55 60	110 140	59 64	16 18	6313-2Z	6313-2Z	65*100*13	65*100*13	B5	FA	450	350	400	0	19
250	2	456	784	2*M40	349	406	250	510	24	168	60	140	64.0	18	6314[6]	6313-2Z	70*112*12	65*100*13	B5	FA	550	450	500	0	19
250	4	456	784	2*M40	349	406	250	510	24	168	65	140	69.0	18	6315[6]	6313-2Z	75*112*12	65*100*13	B5	FA	550	450	500	0	19

Dimensions are in mm

[1] Tolerance DIN EN 50347 "k6" up to ϕ48mm, "m6" above ϕ48mm
[2] Tolerance DIN EN 50347 "j6" up to ϕ250mm, "h6" above ϕ250mm
[3] According to DIN 6885
[4] Lifting bolt is mounted from frame size 112 on
[5] IP55
[6] External Lubrication

A. Mechanical

The motors are single phase totally enclosed, fan cooled with squirrel cage rotors in frame sizes IEC 63 to 90.

Construction Types
Foot mounted, flange-mounted and foot mounted with flange types are available for the above frame sizes.

Protection
The standard degree of protection is IP 55.

Bearings
Standard motors are equipped with ZZ deep groove ball bearings.

Shaft End
Motor shafts have tapped hole in the drive end according to DIN 6885-6888. Motors are delivered with keys.

Fan
Fans are made of durable synthetic material and the construction allows rotation in both directions.

Paint
Standard motors are painted in grey (RAL 7031)

B. Construction Details

Stator Frame
Motor frames are manufactured by high pressure die casting of aluminum alloy which is light, resistant to corrosion and mechanical shocks, also have excellent thermal conductivity.

Feet
Motor feet can be mounted on three sides, permitting terminal box assembly on the desired side.

Endshields
Endshields are made of aluminium. Fan covers are made of sheet steel.

Terminal Box
QM types have terminal boxes on top close to the drive end.

Capacitors
Motors use run capacitors.

C. Electrical Properties

Voltage and Frequency
The motors are normally designed for 230 V, 50 Hz. Other voltages and 60 Hz frequency is available.

Technical Data
The technical data given in the tables are valid for the following conditions;

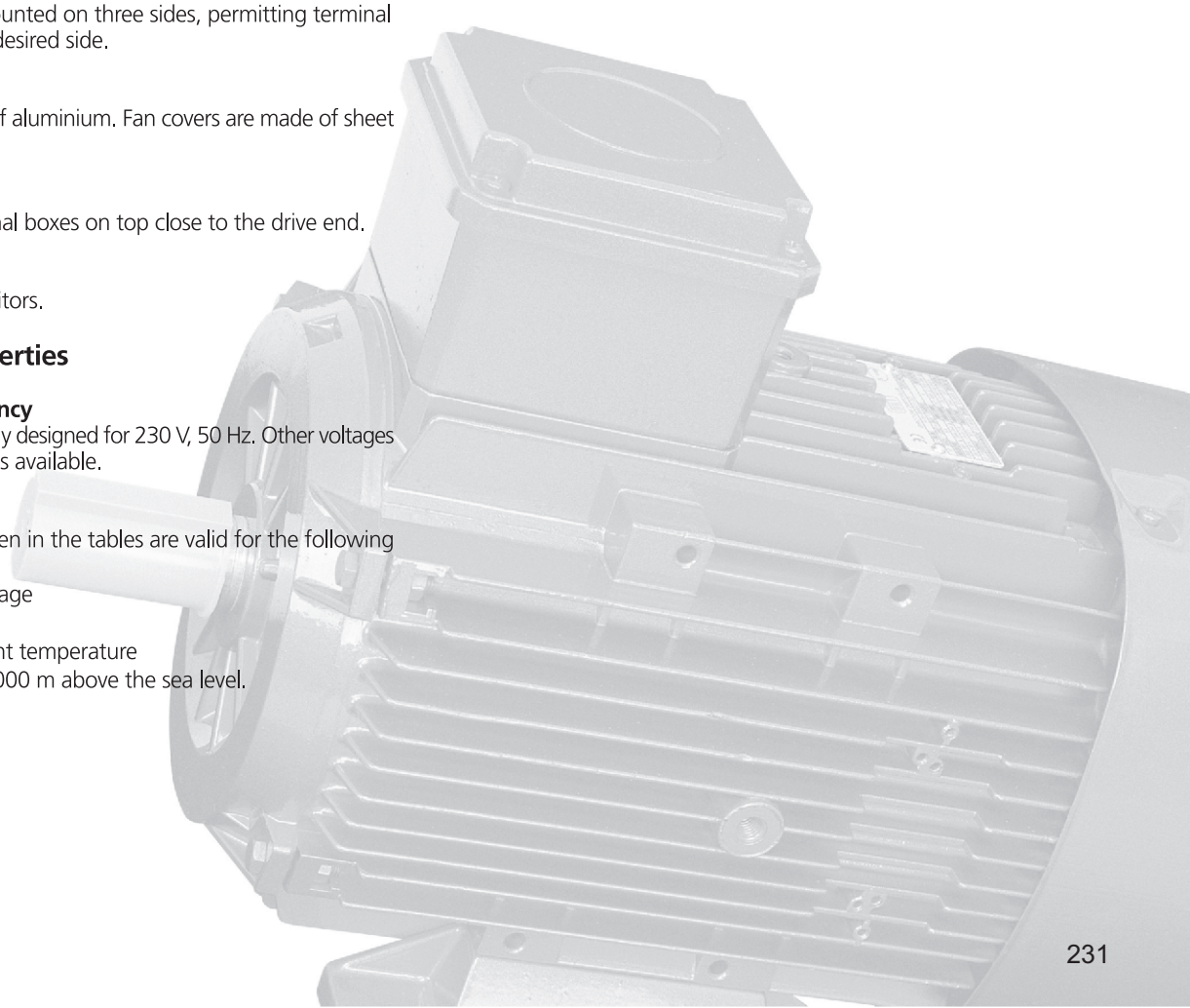
- 230 V supply voltage
- 50 Hz frequency
- Max 40°C ambient temperature
- Altitudes up to 1000 m above the sea level.

Insulation Class
The standard insulation class is F. For 40 °C ambient temperature, the maximum temperature rise is 100 Kelvin.

D. Special Constructions

The following special contruction features are available upon request;

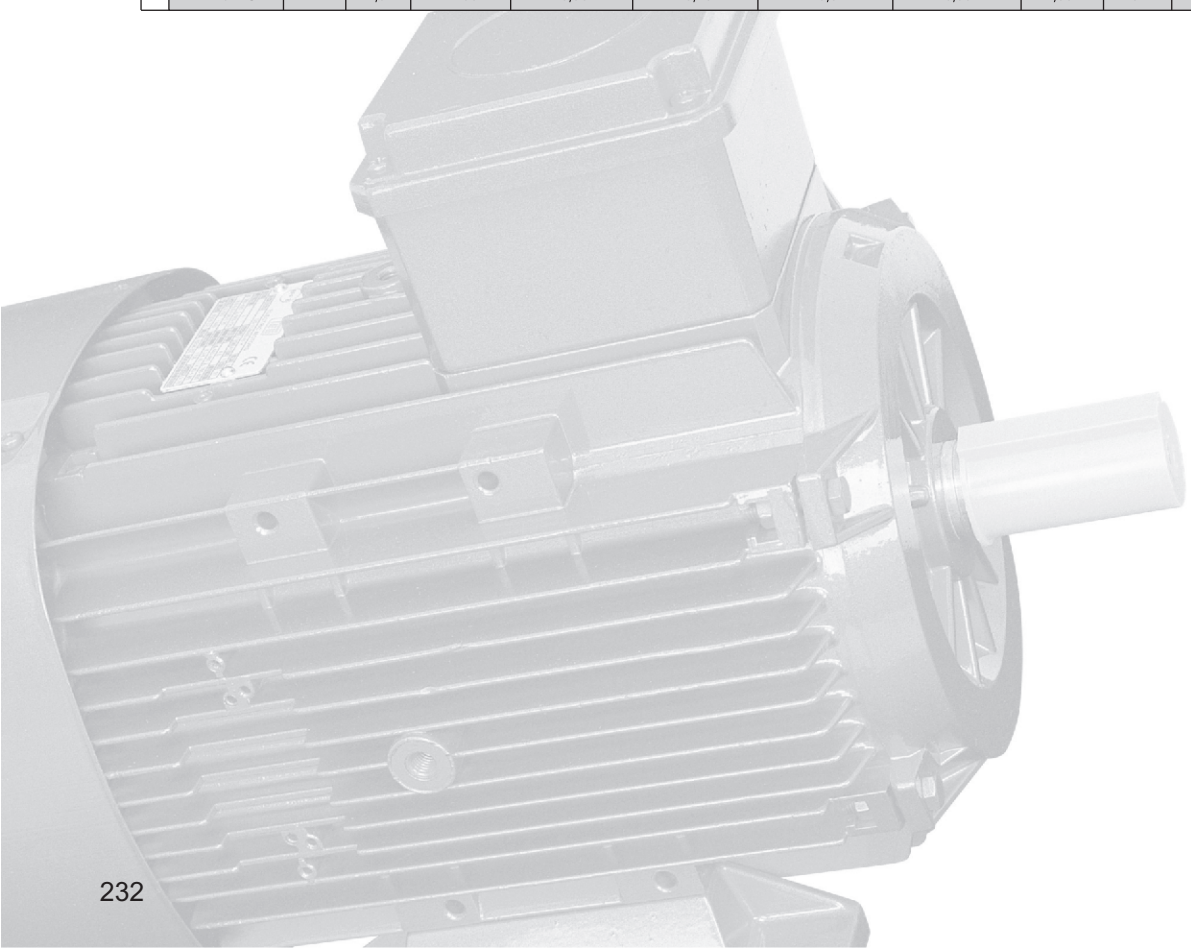
- Special shaft end and second shaft extension.
- Special flanges
- Other voltages and 60 Hz frequency
- Fixed bearing
- Condensation drainage
- Other colors



ELECTRICAL CHARACTERISTICS, AT 50 Hz

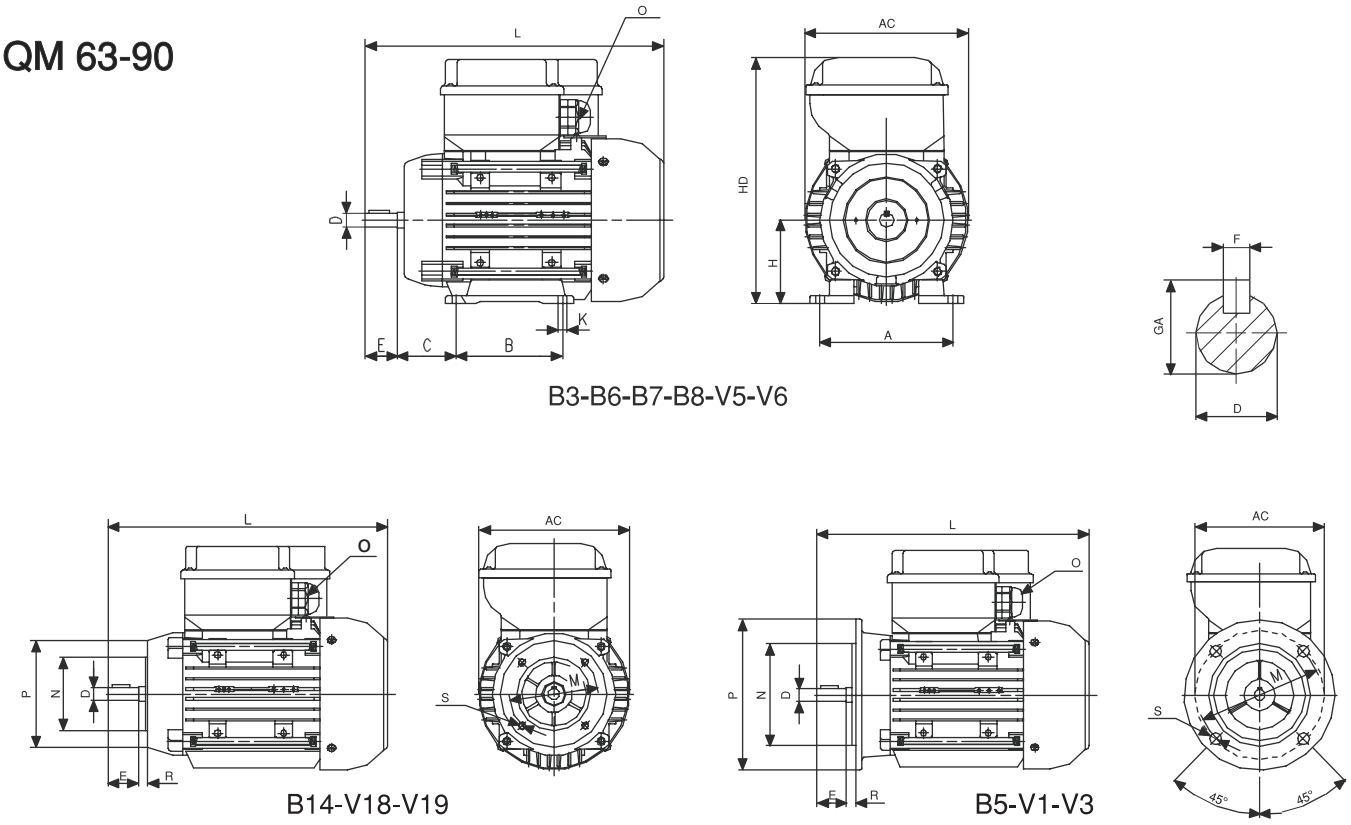
	MOTOR TYPE	RATED VALUES					STARTING VALUES							
		OUTPUT		SPEED	CURRENT In 230V	MOMENT	CURRENT	TORQUE	Mk/Mn	% η	Cos φ	Capacitor mF	J	
		HP	kW	min -1	A	Nm	I_A / I_N	M_A / M_N					kgm²	kg
	2 Pole 3000 min -1													
220 V	QM 63M2B	1/3	0,25	2800	2,30	0,85	4,0	0,50	1,80	58	0,81	8	0,00021	6
220 V	QM 63M2C	1/2	0,37	2800	2,80	1,26	4,0	0,50	1,70	61	0,94	15	0,00026	7
220 V	QM 63M2D	3/4	0,55	2800	3,95	1,88	4,5	0,50	2,20	62	0,98	18	0,00030	7,5
220 V	QM 71M2A	1/3	0.25	2780	1,85	0,86	5,0	0,70	2,20	63	0,93	12,5	0,00028	7
220 V	QM 71M2B	1/2	0,37	2780	2,60	1,27	5,0	0,70	2,20	66	0,94	18	0,00035	8
220 V	QM 71M2C	3/4	0,55	2780	4,10	1,89	5,0	0,70	2,20	67	0,87	20	0,00040	9
220 V	QM 71M2D	1	0,75	2780	4,80	2,56	5,0	0,50	2,20	72	0,94	25	0,00051	9
220 V	QM 80M2A	3/4	0,55	2800	3,95	1,88	4,0	0,80	2,10	64	0,95	20	0,00092	10
220 V	QM 80M2B	1	0,75	2800	4,95	2,56	4,0	0,70	2,10	68	0,97	25	0,00107	11
220 V	QM 80M2C	1,5	1,1	2800	7,60	3,75	5,0	0,65	2,00	69	0,91	30	0,00126	12
220 V	QM 90S2A	1,5	1,1	2800	7,60	3,75	5,0	0,65	2,10	72	0,87	30	0,00119	14
220 V	QM 90L2A	2	1,5	2810	10,0	5,10	5,0	0,65	2,15	74	0,88	40	0,00152	16
220 V	QM 90L2C	3	2,2	2750	14,5	7,64	5,0	0,55	2,10	73	0,90	50	0,00172	17

	4 Pole 1500 min -1													
220 V	QM 71M4A	1/4	0,18	1390	1,50	1,24	3,5	0,70	1,90	55	0,95	12,5	0,00071	7
220 V	QM 71M4B	1/3	0,25	1390	2,00	1,72	4,0	0,70	2,00	59	0,92	15	0,00095	8
220 V	QM 71M4C	1/2	0,37	1390	2,75	2,54	4,0	0,65	1,55	64	0,91	20	0,00107	10
220 V	QM 80M4A	1/2	0,37	1390	2,80	2,54	4,0	0,70	1,55	68	0,84	20	0,00167	11
220 V	QM 80M4B	3/4	0,55	1390	3,80	3,78	4,0	0,65	1,55	69	0,91	25	0,00204	12
220 V	QM 80M4C	1	0,75	1370	5,00	5,23	3,2	0,65	1,55	69	0,95	30	0,00229	13
220 V	QM 90S4A	1	0,75	1400	5,50	5,12	5,0	0,60	1,80	69	0,86	30	0,00238	15
220 V	QM 90L4A	1,5	1,1	1400	8,00	7,50	5,0	0,60	1,80	69	0,87	40	0,00309	16
220 V	QM 90L4C	2	1,5	1400	10,50	10,23	5,0	0,55	1,60	69	0,90	50	0,00351	17



DIMENSIONS

QM 63-90



			Main Dimensions			Foot Mounted Motors						Shaft				Bearing		Seal		Flange						
Frame[4] Size	Frame[4] Size	No. Of Poles	AC	L	O	B	A	H	HD	K	C	D[1]	E	GA	F[3]	Drive Side	Non Drive Side	Drive Side	Non Drive Side[5]	Mounting Type	Flange Type	P	N[2]	M	R	S
QM63M2B	63 M	2	123	219,5	1*M20	80	100	63	182	7	40	11	23	12.5	4	6201-2Z	6201-2Z	12*22*7	12*22*7	B5	FA	140	95	115	0	10
																				B14	FB	120	80	100	0	M6
																				B14	FC	90	60	75	0	M5
QM63M2C QM63M2D	63 M	2	123	233,5	1*M20	80	100	63	182	7	40	11	23	12.5	4	6201-2Z	6201-2Z	12*22*7	12*22*7	B5	FA	140	95	115	0	10
																				B14	FB	120	80	100	0	M6
																				B14	FC	90	60	75	0	M5
QM71M2A QM71M2B QM71M2C QM71M4A QM71M4B QM71M4C	71 M	2...4	138	252,5	1*M20	90	112	71	198	7	45	14	30	16.0	5	6202-2Z	6202-2Z	15*24*5	15*24*5	B5	FA	160	110	130	0	10
																				B14	FB	140	95	115	0	M8
																				B14	FC	105	70	85	0	M6
QM71M2D	71 M	2	138	262,5	1*M20	90	112	71	198	7	45	14	30	16.0	5	6202-2Z	6202-2Z	15*24*5	15*24*5	B5	FA	160	110	130	0	10
																				B14	FB	140	95	115	0	M8
																				B14	FC	105	70	85	0	M6
80 M	80 M	2...4	158	283,5	1*M20	100	125	80	215	10	50	19	40	21.5	6	6204-2Z	6204-2Z	20*30*7	20*30*7	B5	FA	200	130	165	0	12
																				B14	FB	160	110	130	0	M8
																				B14	FC	120	80	100	0	M6
90 S/L	90 S/L	2...4	193	316,5	1*M20	100 125	140	90	241	10	56	24	50	27	8	6305-2Z	6205-2Z	25*40*7	25*40*7	B5	FA	200	130	165	0	12
																				B14	FB	160	110	130	0	M8
																				B14	FC	140	95	115	0	M8

Dimensions are in mm

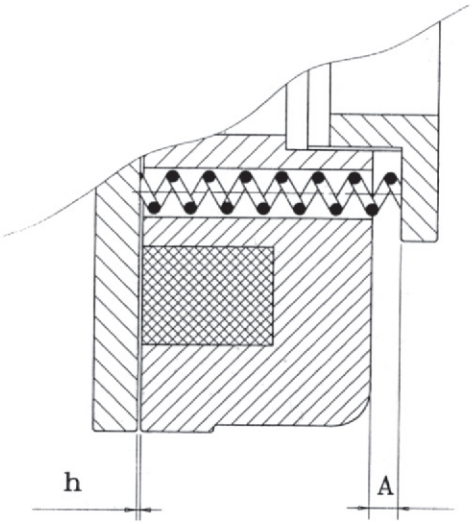
[1] Tolerance DIN EN 50347 "j6"
[2] Tolerance DIN EN 50347 "j6"
[3] According to DIN 6885
[4] Lifting bolt is mounted from frame size 112 on
[5] IP55

Mechanical and electrical properties are the same as QSX type motors.
Nondrive endshields are made of cast-iron.
Drive endshields are made of aluminium.

Brake Specifications
DC electromagnetic brakes with a safety-design are used in brake motors. Different brake voltages are available upon request.

Working Principle
When the supply fails, the springs make the armature plate press the brake disk and then motor automatically starts braking. When the brake being supplied, electromagnet pulls the armature plate then both the brake-disk and motor shaft are set free.

Brake Disk
Asbestos-free brake material is used with long-life friction rings.



Air-Gap
Ideal air-gap values "h" are given in the table on the right-hand side. The maximum acceptable air-gap value can be 0,7 mm. If this value exceeded, the brake's performance will vary.

Switching Times
The switching times are given in the table. These values are subject to change according to load characteristics.

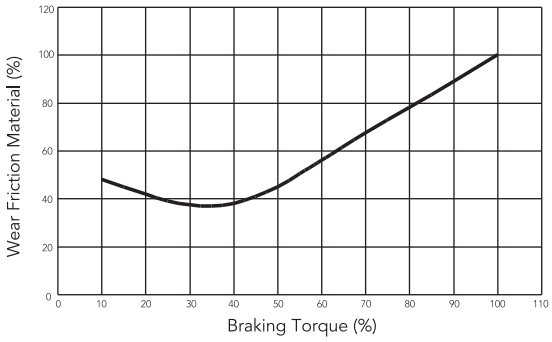
Rectifier Bridge
Half wave rectifier is used as standard in motors. By using fast type rectifier, it is possible to get fast switch on times which is shown on the table.
The 24V DC brake motors are supplied without rectifier.

Special Constructions
The following special construction class features are possible upon request;

- Special shaft end
- Special flanges
- Different type bearings
- Fixed bearing
- Different voltages and 60 Hz frequency
- Condensation drainage
- External lubrication system
- Special paint or other colors
- AC or DC type electromagnetic brake

Braking Torque
Braking torque can be adjusted by ring. In the table shown below, you will find the distance "A" in order to obtain the braking torque requested. The variation in the wear of friction material which is subject to change in braking torque is given below.

Type	Distance between Adjusting-ring and Electromagnet: "A" (in mm)									
	9	8	7	6	5	4	3	2	1	"A"
QB 63	-	-	-	0.3	0.1	1.7	2.4	3.1	3.8	4.5
QB 71	-	-	-	-	0.8	2.2	3.7	5.1	6.6	8
QB 80	-	-	-	-	0.1	32	5.4	7.6	9.8	12
QB 90	-	-	-	-	-	1.6	5.2	8.8	12.4	16
QB 100	3.5	7.0	14.5	14.0	17.5	21.0	24.5	28.0	31.5	35
QB 112	-	4.0	11.0	18.0	25.0	32.0	39.0	46.0	53.0	60
	Braking Torque Value (Nm)									Max. Torque (Nm)



Type	QB63	QB71	QB80	QB90	QB100	QB112
Ideal Air-Gap (mm)	0.2	0.2	0.2	0.2	0.3	0.3

Type	Normal Switch-off time ms	Normal Switch-on time ms	Fast Switch-on time ms
QB63	10	45	20
QB71	15	50	30
QB80	15	55	30
QB90	15	65	40
QB100	20	75	45
QB112	25	180	85

BRAKE MOTOR - QB TYPE

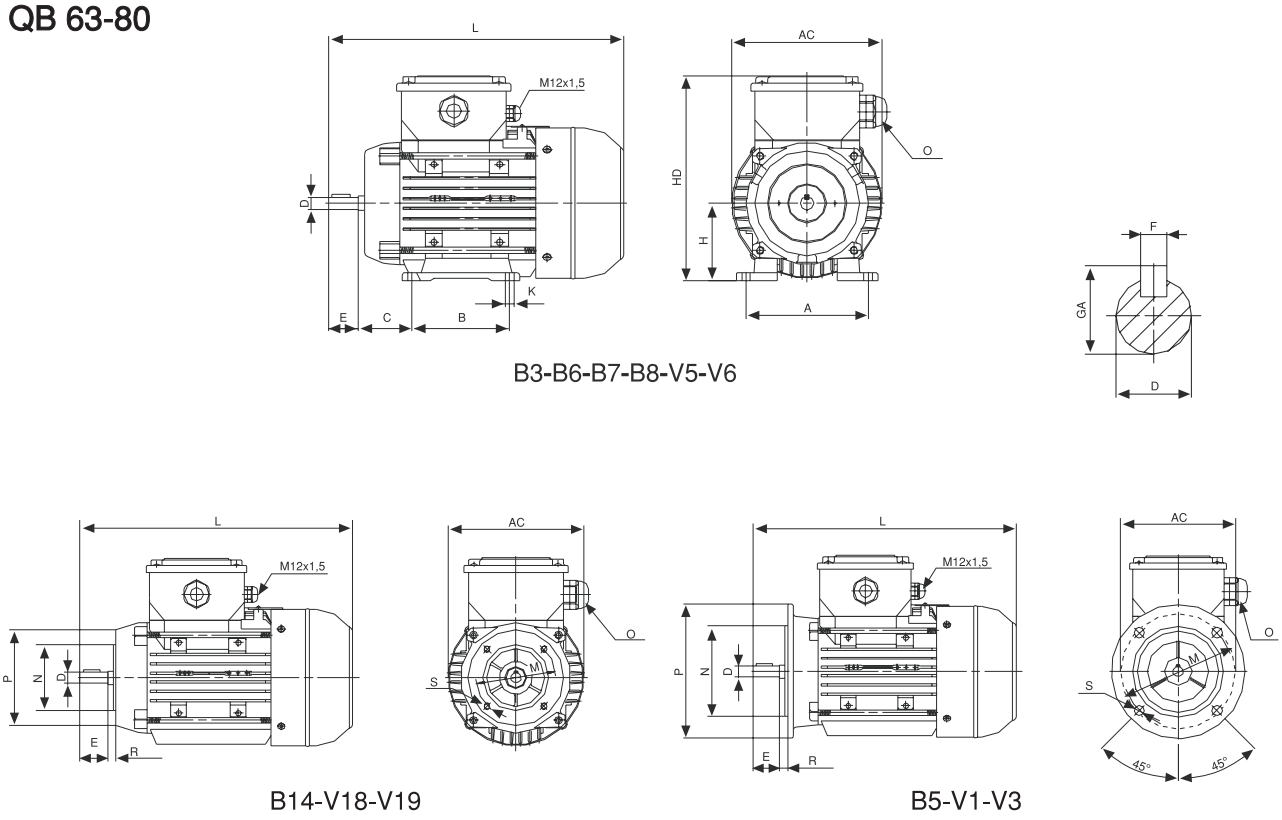
ELECTRICAL CHARACTERISTICS, AT 50 Hz

	MOTOR TYPE	RATED VALUES					STARTING VALUES				Mk/Mn	% η		Cos φ	BRAKE Max. Torque	J	Sound pressure Level dBA
		OUTPUT		SPEED	CURRENT	MOMENT	CURRENT I_A / I_N		TORQUE M_A / M_N								
		HP	kW	min $^{-1}$	A	Nm	⅄	△	⅄	△		3/4	4/4	4/4	Nm	kgm^2	
	2 Pole 3000 min $^{-1}$																
230/400 V	QB 63M2A	1/4	0,18	2800	0,51	0,62	4,20	-	2,3	-	2,4	63	64	0,80	4,5	0,00017	52
230/400 V	QB 63M2B	1/3	0,25	2800	0,66	0,86	4,20	-	2,2	-	2,3	66	67	0,82	4,5	0,00022	52
230/400 V	QB 71M2A	1/2	0,37	2800	0.,93	1,27	4,30	-	2,0	-	2,4	67	68	0,84	8	0,00028	54
230/400 V	QB 71M2B	3/4	0,55	2820	1,32	1,87	5,00	-	2,2	-	2,5	69	71	0,85	8	0,00036	54
230/400 V	QB 80M2A	1,0	0,75	2840	1,70	2,53	5,20	-	2,2	-	2,6	72	74	0,86	12	0,00088	58
230/400 V	QB 80M2B	1,5	1,1	2850	2,40	3,69	6,00	-	2,6	-	2,9	75	77,3	0,86	12	0,00109	58
230/400 V	QB 90S2A	2	1,5	2850	3,20	5,02	5,50	-	2,7	-	2,9	78,5	79,5	0,85	16	0,00130	62
230/400 V	QB 90L2A	3	2,2	2850	4,5	7,37	5,90	-	2,8	-	3,0	80	82,0	0,86	16	0,00164	62
230/400 V	QB 100L2A	4	3	2880	6	9,95	6,20	-	2,8	-	3,2	82	83,5	0,86	35	0,00243	64
400/690 V	QB 112M2A	5,5	4	2890	7,5	13,21	2,00	6,3	0,75	2,8	3,2	84	85,3	0,90	60	0,00399	67
	4 Pole 1500 min $^{-1}$																
230/400 V	QB 63M4A	1/6	0,12	1365	0,50	0,84	2,8	-	2,0	-	2,3	53	56	0,62	4,5	0,00020	41
230/400 V	QB 63M4B	1/4	0,18	1380	0,70	1,25	3,2	-	2,2	-	2,4	57	60	0,62	4,5	0,00025	41
230/400 V	QB 71M4A	1/3	0,25	1390	0,80	1,72	3,5	-	2,2	-	2,4	63	65	0,69	8	0,00072	45
230/400 V	QB 71M4B	1/2	0,37	1390	1,12	2,55	4,0	-	2,3	-	2,6	68	69	0,69	8	0,00096	45
230/400 V	QB 80M4A	3/4	0,55	1400	1,50	3,76	4,0	-	2,1	-	2,3	71	72	0,74	12	0,00168	49
230/400 V	QB 80M4B	1,0	0,75	1400	1,96	5,12	4,2	-	2,1	-	2,2	73	74	0,75	12	0,00206	49
230/400 V	QB 90S4A	1,5	1,1	1410	2,65	7,45	5,0	-	2,4	-	2,5	76	77,0	0,78	16	0,00245	54
230/400 V	QB 90L4A	2,0	1,5	1415	3,53	10,16	5,0	-	2,4	-	2,7	79,0	80,0	0,77	16	0,00324	54
230/400 V	QB 100L4A	3,0	2,2	1420	4,80	14,79	5,2	-	2,5	-	2,7	81	82	0,81	35	0,00400	56
230/400 V	QB 100L4B	4,0	3,0	1430	6,40	20,04	5,3	-	2,5	-	2,7	82	83	0,82	35	0,00474	56
400/690 V	QB 112M4B	5,5	4,0	1445	8,50	26,44	1,9	5,7	0,69	2,6	3,0	84	85	0,80	60	0,00938	58
	6 Pole 1000 min $^{-1}$																
230/400 V	QB 71M6A	1/4	0,18	900	0,78	1,91	3,0	-	2,2	-	2,4	55	58	0,57	8	0,00068	42
230/400 V	QB 71M6B	1/3	0,25	910	0,90	2,63	3,1	-	2,2	-	2,4	61	63	0,64	8	0,00090	42
230/400 V	QB 80M6A	1/2	0,37	920	1,25	3,84	3,3	-	2,1	-	2,4	65	67	0,64	12	0,00160	49
230/400 V	QB 80M6B	3/4	0,55	920	1,80	5,71	3,2	-	2,1	-	2,5	68	70	0,63	12	0,00196	49
230/400 V	QB 90S6A	1.0	0,75	925	2,20	7,75	3,5	-	1,9	-	2,0	71	72	0,68	16	0,00257	51
230/400 V	QB 90L6B	1,5	1,10	935	3,10	11,24	4,0	-	2,0	-	2,2	73	74	0,69	16	0,00330	51
230/400 V	QB 100L6A	2,0	1,50	940	4,10	15,24	4,2	-	2,1	-	2,5	79	75	0,70	35	0,00465	53
230/400 V	QB 112M6A	3,0	2,20	950	5,4	22,12	5,2	-	2,1	-	2,5	79	79	0,74	60	0,00921	58

* The 2 and 4 pole in the 1,1 kw to 55 kw output range correspond with the EU "EFF2" efficiency classification.

DIMENSIONS

QB 63-80

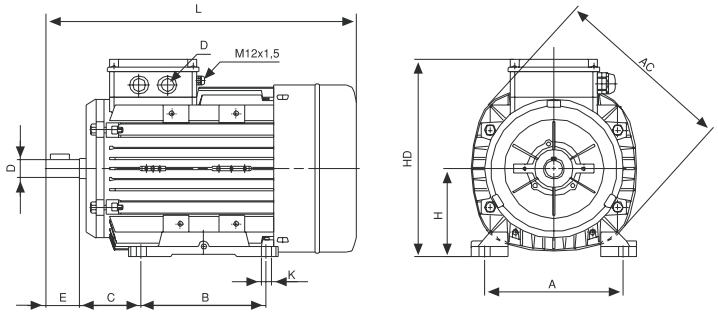


		Main Dimensions			Foot Mounted Motors						Shaft				Bearing		Seal		Flange						
Frame[4] Size	No. Of Poles	AC	L	O	B	A	H	HD	K	C	D[1]	E	GA	F[3]	Drive Side	Non Drive Side	Drive Side	Non Drive Side[5]	Mounting Type	Flange Type	P	N[2]	M	R	S
63 M	2...8	123	278,5	1*M20	80	100	63	174	7	40	11	23	12,5	4	6201-2Z	6201-2Z	12*22*7	12*22*7	B5	FA	140	95	115	0	10
																			B14	FB	120	80	100	0	M6
																			B14	FC	90	60	75	0	M5
71 M	2...8	138	314,5	1*M20	90	112	71	190	7	45	14	30	16,0	5	6202-2Z	6202-2Z	15*24*5	15*24*5	B5	FA	160	110	130	0	10
																			B14	FB	140	95	115	0	M8
																			B14	FC	105	70	85	0	M6
80 M	2...8	158	347,5	1*M20	100	125	80	207	10	50	19	40	21.5	6	6204-2Z	6204-2Z	20*30*7	20*30*7	B5	FA	200	130	165	0	12
																			B14	FB	160	110	130	0	M8
																			B14	FC	120	80	100	0	M6

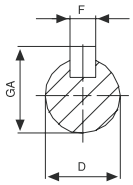
Dimensions are in mm

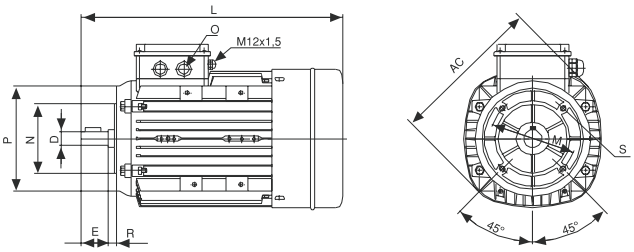
1) Tolerance DIN EN 50347 "j6" up to ϕ28mm, "k6" above ϕ28mm
2) Tolerance DIN EN 50347 "j6"
3) According to DIN 6885
4) Lifting bolt is mounted from frame size 112 on
5) Optional

QB 90-112

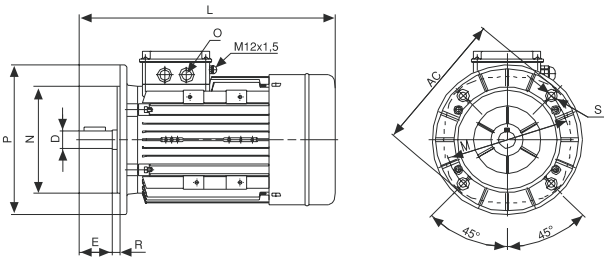


B3-B6-B7-B8-V5-V6





B14-V18-V19



B5-V1-V3

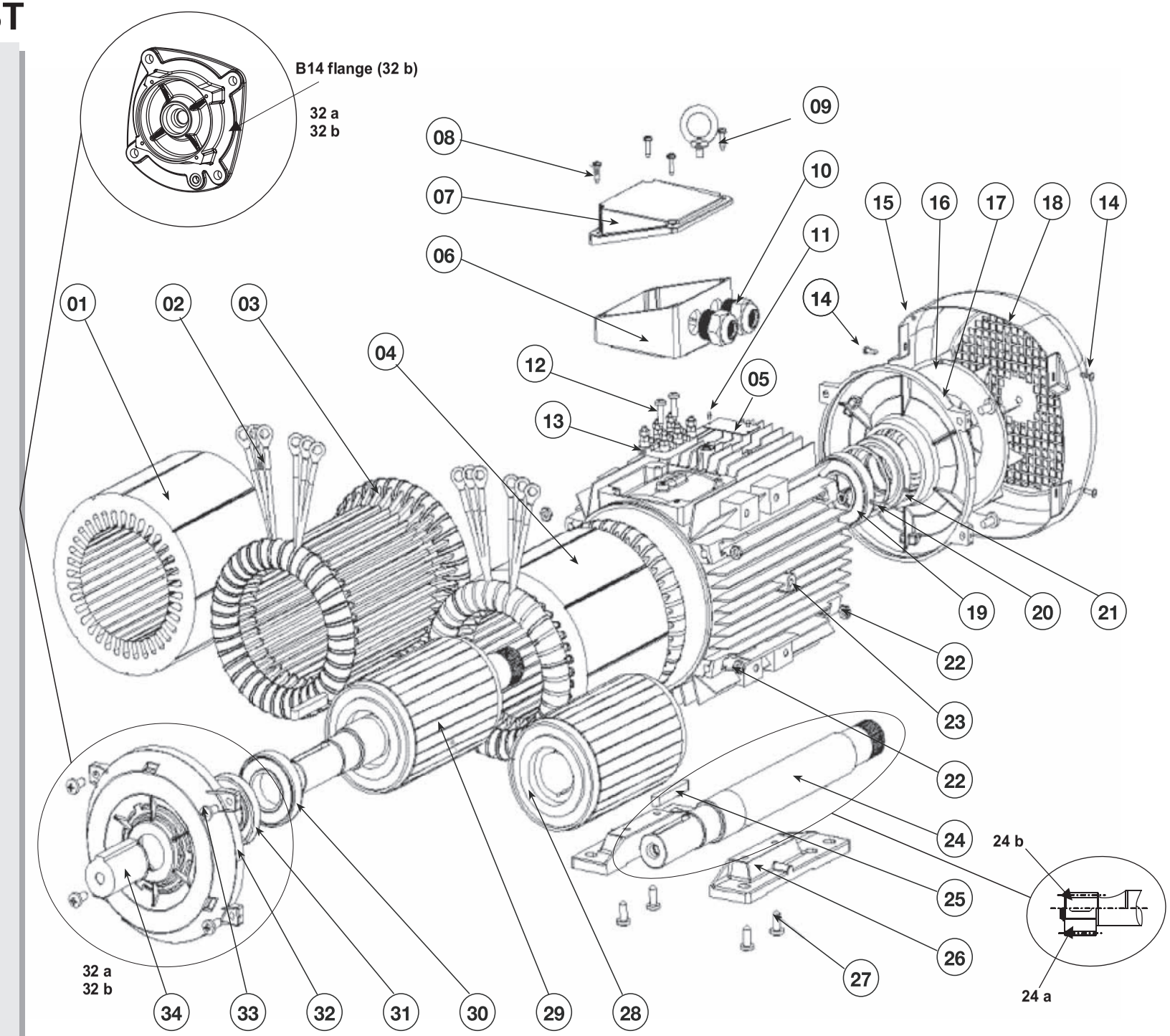
		Main Dimensions			Foot Mounted Motors						Shaft				Bearing		Seal		Flange						
Frame[4] Size	No. Of Poles	AC	L	O	B	A	H	HD	K	C	D[1]	E	GA	F[3]	Drive Side	Non Drive Side	Drive Side	Non Drive Side[5]	Mounting Type	Flange Type	P	N[2]	M	R	S
90 S/L	2...8	193	385,5	1*M25	100 125	140	90	241	10	56	24	50	27	8	6305-2Z	6205-2Z	25*40*7	25*40*7	B5	FA	200	130	165	0	12
																			B14	FB	160	110	130	0	M8
																			B14	FC	140	95	115	0	M8
100 L	2...8	217	432,0	1*M25	140	160	100	260	12	63	28	60	31	8	6306-2Z	6205-2Z	30*47*7	25*40*7	B5	FA	250	180	215	0	15
																			B14	FB	200	130	165	0	M10
																			B14	FC	160	110	130	0	M8
112 M	2...8	232	475,5	2*M25	140	190	112	280	12	70	28	60	31	8	6306-2Z	6206-2Z	30*47*7	30*47*7	B5	FA	250	180	215	0	15
																			B14	FB	200	130	165	0	M10
																			B14	FC	160	110	130	0	M8

Dimensions are in mm

[1] Tolerance DIN EN 50347 "j6" up to ϕ28mm, "k6" above ϕ28mm
[2] Tolerance DIN EN 50347 "j6"
[3] According to DIN 6885
[4] Lifting bolt is mounted from frame size 112 on
[5] Optional

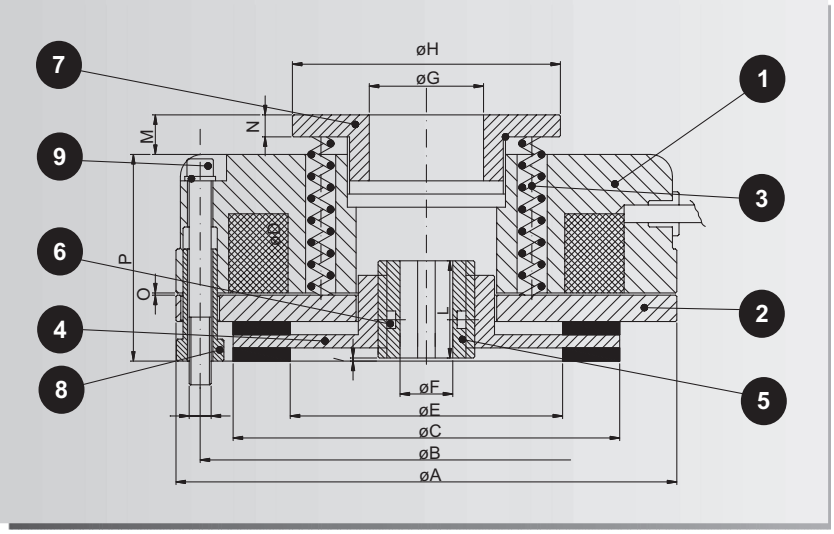
MOTOR PARTS LIST

1. Stator core
2. Lead cables
3. Winding
4. Wound stator
5. Nameplate
6. Terminal box
7. Terminal box cover
8. Terminal box screws
9. Eyebolt
10. Conduits
11. Rivets
12. Terminal screws
13. Terminal plate
14. Fan cover screws
15. Fan cover
16. Fan
17. Nondrive-endshield
18. Endshield screws
19. Ballbearing (nondrive-side)
20. Bearing shim
21. Seal ring (nondrive-side)
22. Nut
23. Housing
24. Shaft
24 a Drive Shaft (plain)
24 b Drive Shaft (gearcut)
25. Key
26. Foot
27. Foot screws
28. Rotor
29. Rotor-shaft group
30. Ballbearing (drive-side)
31. Seal ring (drive-side)
32. Drive endshield (B3 Flange)
32 a B5 Flange
32 b B14 flange
33. Endshield screws (drive-side)
34. Shaft cover



BRAKE PART LIST AND PROPERTIES

1 Electromagnet
2 Armature plate
3 Torque springs
4 Disc
5 Splined hub
6 O-ring
7 Adjuster ring
8 Adjuster nuts
9 Fixing screws



Tipo Brake Model	K1	K2	K3	K4	K5	K6	K7	K7/D	K8	K8/D	K9	K9/D	K9/T
Static Braking Torque (Nm)	5	12	16	20	40	60	90	180	200	400	300	600	900
Max Speed of the motor (rpm)	3000	3000	3000	3000	3000	3000	3000	3000	1500	1500	1500	1500	1500
Input Power (W)	15	20	25	30	45	50	55	55	60	60	65	65	65
Max noisiness (≤dB-A)	68	69	68	69	70	70	70	70	70	69	69	69	70
Weight (Kg.)	1,1	1,85	2,55	2,84	4,8	7	12	15	14,3	18	23	28	34
A	84	104	114	124	148	159	189	189	218	218	248	248	248
B	72	90	103	112	132	145	170	170	196	196	230	230	230
C	61	77	88	98	119	128	151	151	176	176	204	204	204
D	3XM4	3xM5	3xM5	3xM6	3xM6	3xM8	3xM8	3xM8	6xM10	6xM10	6xM10	6xM10	9xM10
E	35	44	62	69	79	80	90	90	103	103	132	132	132
Tollerance hole till size K3 H7, others +0,01/-0,01 F	10-11 12	11-14 15	11-15	14-25	24-25 28	25-30 34	25-30 34	25 H40 34 H60	24-34	34 H60 48	44-45 48	44-45 48	44-45 48-50
G	20	26	26	42	60	60	60	60	60	60	60	60	60
H	50	61	61	79	104	104	104	104	104	104	104	104	104
I	1,5	1,5	1,5	1,5	1,5	1,5	1,5	1,5	1,5	1,5	1,5	1,5	1,5
L	18	20	20	20	25	30	30	60	40	60	40	60	80
M (max)	9	9	9	9,5	18	16	14	14	18	18	18	18	18
N	4	4	4	5,5	8	8	8	8	8	8	8	8	8
O	0,2	0,2	0,2	0,2	0,3	0,3	0,3	0,3	0,3	0,4	0,4	0,4	0,4÷0,5
P	38,5	41,5	47	46,5	64	69,5	79	101,5	78	98	80	105	130

Note

- The brake before running in, the static braking torque value could change by +20% from the reported value.