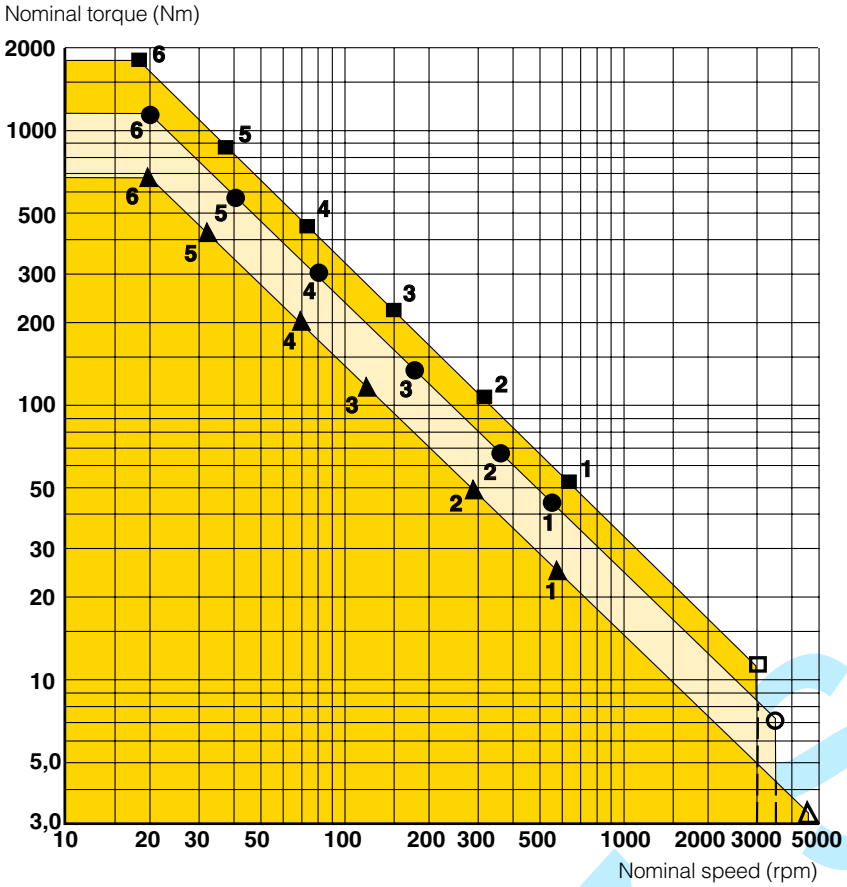
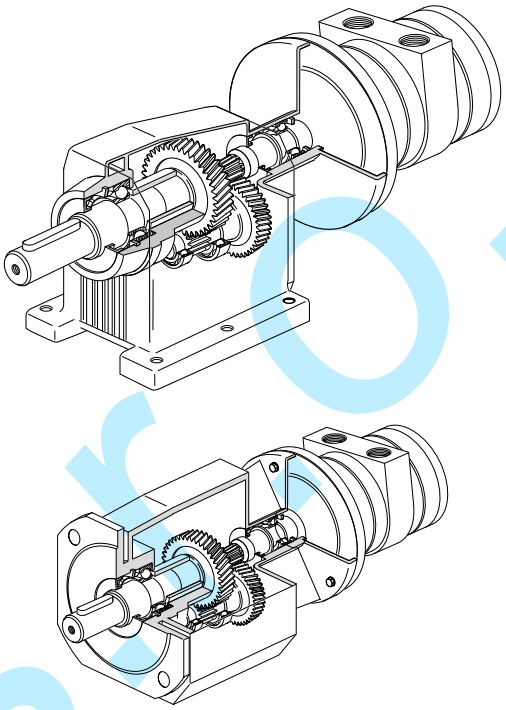
Choice of an air motor with helical gear





Helical gears are characterised by high efficiency. Several reduction stages permit relatively high gear ratios. Central output shaft and simple installation with flange or foot.

Oil-bath gearboxes mean that the installation position must be decided in advance. The installation position determines the volume of oil in the gearbox and location of oil filling and drain plugs.

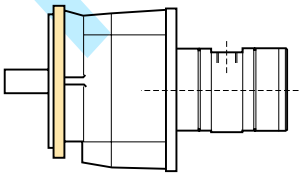
- High efficiency
- Simple flange or foot installation
- Relatively low price

– Installation position must be chosen in advance
– Higher weight than planetary or worm drive gears.

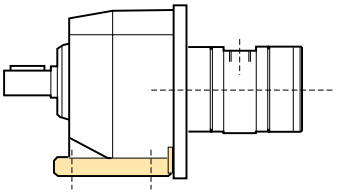
Air motors in diagram above

△	P1V-A160A0900
▲1	P1V-A160•0066••, Choose installation below
▲2	P1V-A160•0032••, Choose installation below
▲3	P1V-A160•0014••, Choose installation below
▲4	P1V-A160•0008••, Choose installation below
▲5	P1V-A160•0004••, Choose installation below
▲6	P1V-A160•0003••, Choose installation below
○	P1V-A260A0700
●1	P1V-A260•0080••, Choose installation below
●2	P1V-A260•0052••, Choose installation below
●3	P1V-A260•0025••, Choose installation below
●4	P1V-A260•0011••, Choose installation below
●5	P1V-A260•0006••, Choose installation below
●6	P1V-A260•0003••, Choose installation below
□	P1V-A360A0600
■1	P1V-A360•0105••, Choose installation below
■2	P1V-A360•0052••, Choose installation below
■3	P1V-A360•0025••, Choose installation below
■4	P1V-A360•0013••, Choose installation below
■5	P1V-A360•0006••, Choose installation below
■6	P1V-A360•0003••, Choose installation below

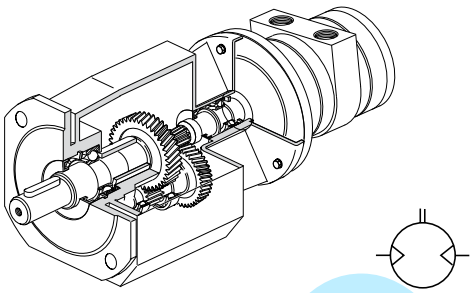
Installation, flange mounting



Installation, foot mounting



NOTE! **All technical data are based on a working pressure of 6 bar and with oil.**
Speed tolerance accuracy is -+10%.



D: Reversible motor with helical gear, flange mounting

Max power kW	Max speed* rpm	Nominal speed rpm	Nominal torque Nm	Min start torque Nm	Max permanent torque** Nm	Air consumption at max power l/s	Connection	Min pipe ID inlet/ outlet mm	Weight Kg	Order code
Series P1V-A160										
1,600	660	590	24	36	45	32	G1/2	15	9,8	**P1V-A160D0066••**
1,600	320	280	50	75	140	32	G1/2	15	11,5	**P1V-A160D0032••**
1,600	140	120	113	171	280	32	G1/2	15	14,4	**P1V-A160D0014••**
1,600	80	70	197	299	560	32	G1/2	15	31,7	**P1V-A160D0008••**
1,600	37	33	413	626	1000	32	G1/2	15	49,2	**P1V-A160D0004••**
1,600	21	18	716	1084	1600	32	G1/2	15	67,2	**P1V-A160D0003••**
Series P1V-A260										
2,600	800	565	42	64	42	60	G3/4	19	14,9	**P1V-A260D0080••**
2,600	520	365	65	100	115	60	G3/4	19	16,1	**P1V-A260D0052••**
2,600	250	175	135	210	235	60	G3/4	19	19,0	**P1V-A260D0025••**
2,600	110	80	302	468	500	60	G3/4	19	36,4	**P1V-A260D0011••**
2,600	55	40	614	951	1000	60	G3/4	19	54,9	**P1V-A260D0006••**
2,600	30	20	990	1530	1600	60	G3/4	19	68,9	**P1V-A260D0003••**
Series P1V-A360										
3,600	1050	625	52	78	80	97	G1	25	24,6	**P1V-A360D0105••**
3,600	520	310	105	155	175	97	G1	25	24,6	**P1V-A360D0052••**
3,600	250	150	216	320	385	97	G1	25	45,0	**P1V-A360D0025••**
3,600	125	74	441	652	795	97	G1	25	63,5	**P1V-A360D0013••**
3,600	60	36	888	1312	1600	97	G1	25	77,5	**P1V-A360D0006••**
3,600	30	18	1800	2670	4000	97	G1	25	151,5	**P1V-A360D0003••**

* maximum admissible speed (idling)

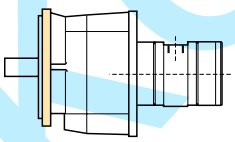
** Max gear box torque for a permanent load

Note!
•• specify installation position in the order code as in the illustrations below.
Example: P1V-A160D0066B5

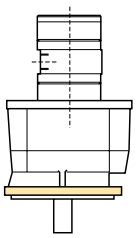
Note: Oil-bath gearboxes mean that the installation position must be decided in advance. The installation position determines the volume of oil in the gearbox and location of oil filling and drain plugs.

D: Installation positions, helical gear, flange mounting

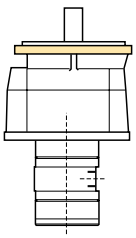
B5



V1

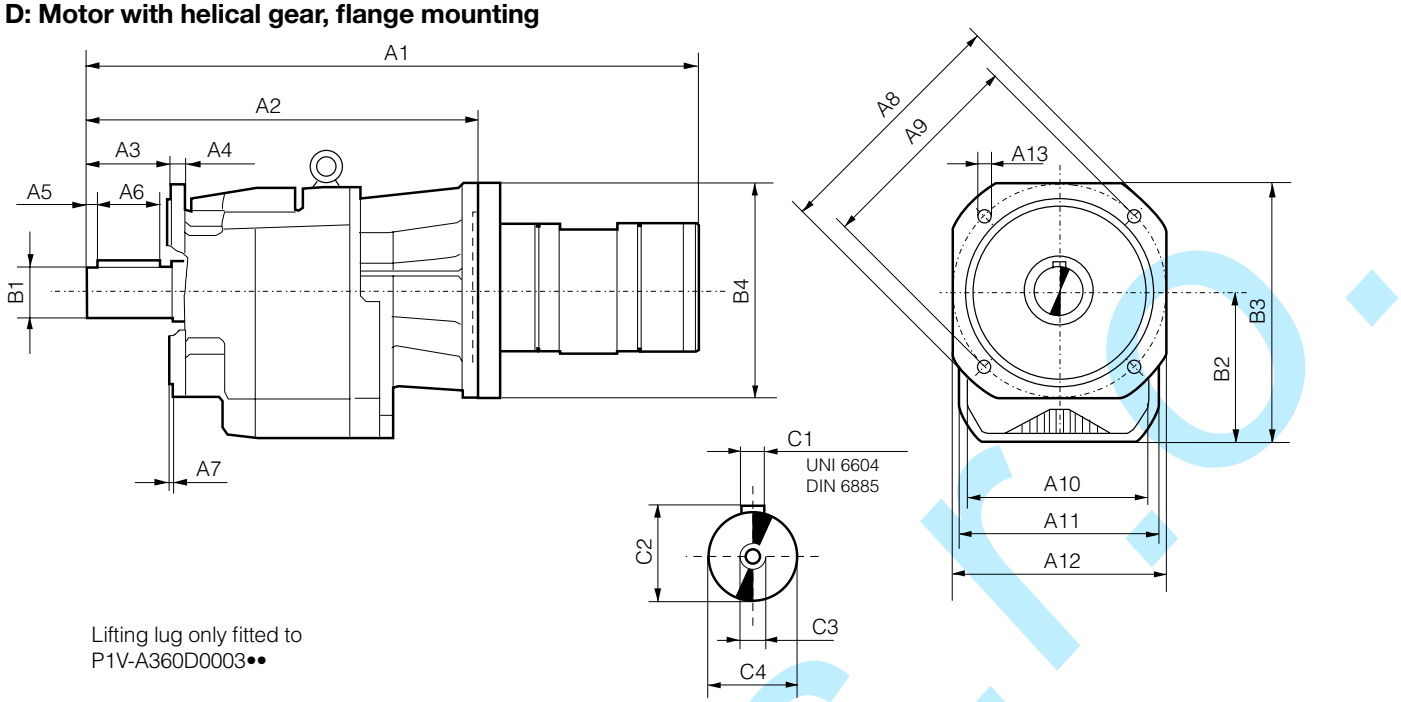


V3



Dimensions (mm)

D: Motor with helical gear, flange mounting



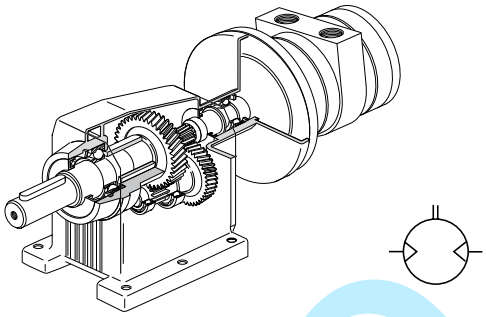
Lifting lug only fitted to
P1V-A360D0003••

Order code	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	A12	A13	B1	B2	B3
P1V-A160D0066••	370,5	244	40	8	5	30	3,0	140	115	95f7	95	105	9,5	20	82	138,0
P1V-A160D0032••	399,5	273	50	10	5	40	3,5	160	130	110f7	110	135	9,5	25	92	159,5
P1V-A160D0014••	433,5	307	60	12	5	50	3,5	200	165	130f7	130	150	11,5	30	108	183,0
P1V-A160D0008••	463,5	337	70	13	5	60	4,0	250	215	180 f7	155	210	14,0	35	128	233,0
P1V-A160D0004••	559,5	433	80	16	5	70	5,0	300	265	230 f7	185	260	14,0	40	152	282,0
P1V-A160D0003••	601,5	475	100	16	5	90	5,0	300	265	230 f7	210	260	14,0	50	190	320,0
P1V-A260D0080••	423,0	264	40	8	5	30	3,0	140	115	95f7	95	105	9,5	20	82	138,0
P1V-A260D0052••	451,0	292	50	10	5	40	3,5	160	130	110f7	110	135	9,5	25	92	159,5
P1V-A260D0025••	486,0	327	60	12	5	50	3,5	200	165	130f7	130	150	11,5	30	108	183,0
P1V-A260D0011••	515,0	356	70	13	5	60	4,0	250	215	180 f7	155	210	14,0	35	128	233,0
P1V-A260D0006••	612,0	453	80	16	5	70	5,0	300	265	230 f7	185	260	14,0	40	152	282,0
P1V-A260D0003••	634,0	475	100	16	5	90	5,0	300	265	230 f7	210	260	14,0	50	190	320,0
P1V-A360D0105••	458,0	292	50	10	5	40	3,5	160	130	110f7	110	135	9,5	25	92	159,5
P1V-A360D0052••	458,0	292	50	10	5	40	3,5	160	130	110f7	110	135	9,5	25	92	159,5
P1V-A360D0025••	521,0	356	70	13	5	60	4,0	250	215	180 f7	155	210	14,0	35	128	233,0
P1V-A360D0013••	547,0	382	80	16	5	70	5,0	300	265	230 f7	185	260	14,0	40	152	282,0
P1V-A360D0006••	640,0	475	100	16	5	90	5,0	300	265	230 f7	210	260	14,0	50	190	320,0
P1V-A360D0003••	699,0	534	140	20	15	110	5,0	400	350	300 f7	320	350	18,0	80	247	424,0

Order code	B4	C1	C2	C3	C4
P1V-A160D0066••	160	6x6x30	22,5	M8x19	20 h6
P1V-A160D0032••	160	8x7x40	28,0	M8x19	25 h6
P1V-A160D0014••	160	8x7x50	33,0	M10x22	30 h6
P1V-A160D0008••	160	10x8x60	38,0	M10x22	35 h6
P1V-A160D0004••	160	12x8x70	43,0	M12x28	40 h6
P1V-A160D0003••	160	14x9x90	53,5	M16x36	50 h6
P1V-A260D0080••	200	6x6x30	22,5	M8x19	20 h6
P1V-A260D0052••	200	8x7x40	28,0	M8x19	25 h6
P1V-A260D0025••	200	8x7x50	33,0	M10x22	30 h6
P1V-A260D0011••	200	10x8x60	38,0	M10x22	35 h6
P1V-A260D0006••	200	12x8x70	43,0	M12x28	40 h6
P1V-A260D0003••	200	14x9x90	53,5	M16x36	50 h6
P1V-A360D0105••	200	8x7x40	28,0	M8x19	25 h6
P1V-A360D0052••	200	8x7x40	28,0	M8x19	25 h6
P1V-A360D0025••	200	10x8x60	38,0	M10x22	35 h6
P1V-A360D0013••	200	12x8x70	43,0	M12x28	40 h6
P1V-A360D0006••	200	14x9x90	53,5	M16x36	50 h6
P1V-A360D0003••	200	22x14x110	85,0	M20x42	80 h6

••: see previous page for installation positions

NOTE! All technical data are based on a working pressure of 6 bar and with oil.
Speed tolerance accuracy is -+10%.



E: Reversible motor with helical gear, foot mounting

Max power kW	Max speed* rpm	Nominal speed rpm	Nominal torque Nm	Min start torque Nm	Max permanent torque** Nm	Air consumption at max power l/s	Connection	Min pipe ID inlet/ outlet mm	Weight Kg	Order code
Series P1V-A160										
1,600	660	590	24	36	45	32	G1/2	15	9,8	**P1V-A160E0066••**
1,600	320	280	50	75	140	32	G1/2	15	11,5	**P1V-A160E0032••**
1,600	140	120	113	171	280	32	G1/2	15	14,4	**P1V-A160E0014••**
1,600	80	70	197	299	560	32	G1/2	15	31,7	**P1V-A160E0008••**
1,600	37	33	413	626	1000	32	G1/2	15	49,2	**P1V-A160E0004••**
1,600	21	18	716	1084	1600	32	G1/2	15	67,2	**P1V-A160E0003••**
Series P1V-A260										
2,600	800	565	42	64	42	60	G3/4	19	14,9	**P1V-A260E0080••**
2,600	520	365	65	100	115	60	G3/4	19	16,1	**P1V-A260E0052••**
2,600	250	175	135	210	235	60	G3/4	19	19,0	**P1V-A260E0025••**
2,600	110	80	302	468	500	60	G3/4	19	36,4	**P1V-A260E0011••**
2,600	55	40	614	951	1000	60	G3/4	19	54,9	**P1V-A260E0006••**
2,600	30	20	990	1530	1600	60	G3/4	19	68,9	**P1V-A260E0003••**
Series P1V-A360										
3,600	1050	625	52	78	80	97	G1	25	24,6	**P1V-A360E0105••**
3,600	520	310	105	155	175	97	G1	25	24,6	**P1V-A360E0052••**
3,600	250	150	216	320	385	97	G1	25	45,0	**P1V-A360E0025••**
3,600	125	74	441	652	795	97	G1	25	63,5	**P1V-A360E0013••**
3,600	62	36	868	1312	1600	97	G1	25	77,5	**P1V-A360E0006••**
3,600	30	18	1800	2670	4000	97	G1	25	151,5	**P1V-A360E0003••**

* maximum admissible speed (idling)

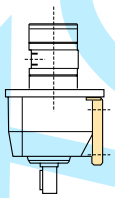
** Max gear box torque for a permanent load

Note!
•• specify installation position in the order code as in the illustrations below.
Example: P1V-A160E0066V5

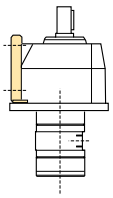
Note: Oil-bath gearboxes mean that the installation position must be decided in advance. The installation position determines the volume of oil in the gearbox and location of oil filling and drain plugs.

E: Installation positions, helical gear, foot mounting

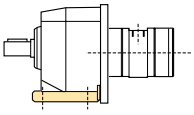
V5



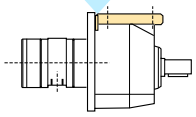
V6



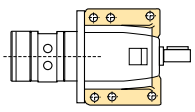
B3



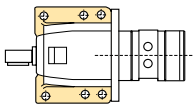
B8



B7

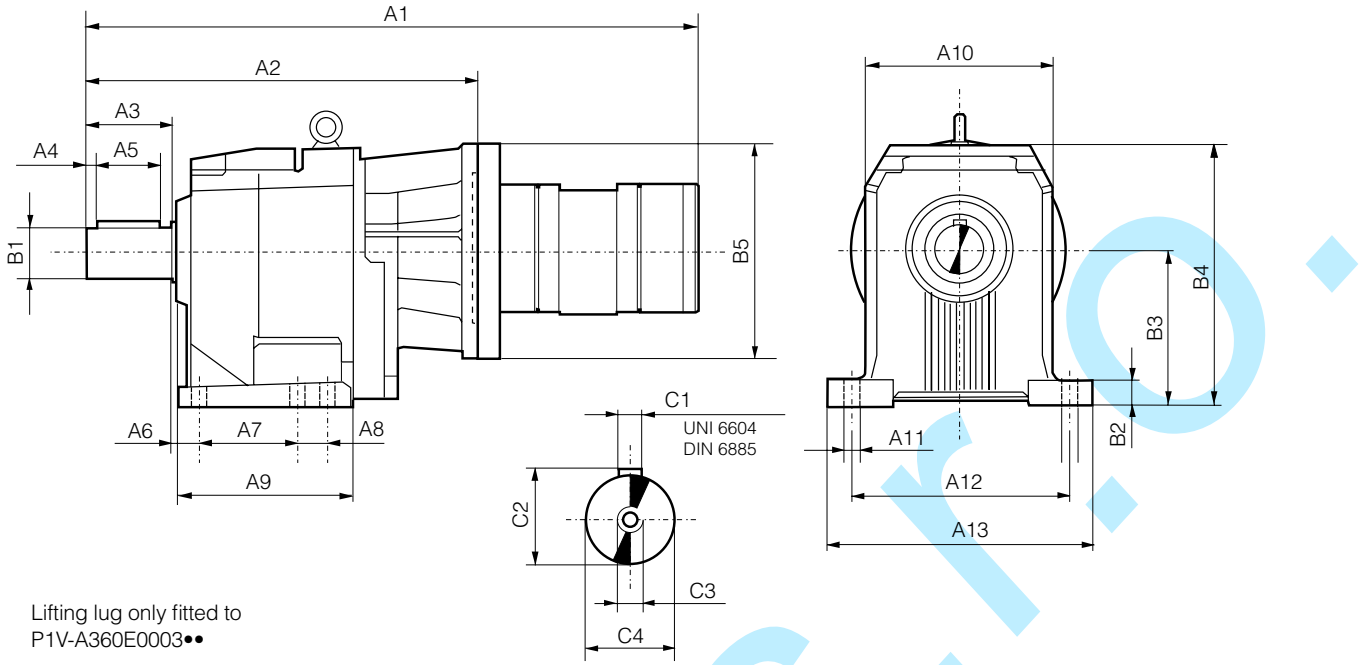


B6



Dimensions (mm)

E: Motor with helical gear, foot mounting



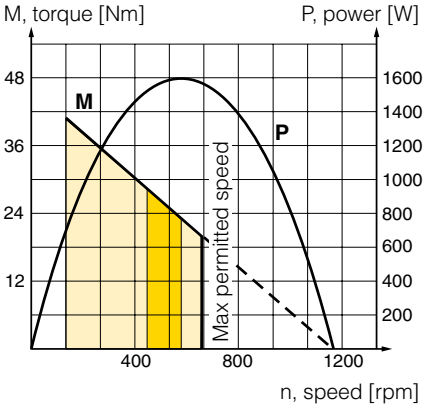
Lifting lug only fitted to P1V-A360E0003••

Order code	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	A12	A13	B1	B2	B3
P1V-A160E0066••	370,5	244	40	5	30	18	50	37,0	107,0	95	9	110	130	20	15	85
P1V-A160E0032••	399,5	273	50	5	40	18	60	47,5	137,0	110	11	130	155	25	17	100
P1V-A160E0014••	433,5	307	60	5	50	18	70	60,0	156,0	130	11	160	190	30	20	110
P1V-A160E0008••	463,5	337	70	5	60	20	105	44,5	185,5	155	14	180	216	35	18	130
P1V-A160E0004••	559,5	433	80	5	70	25	110	46,0	200,0	185	18	225	270	40	22	155
P1V-A160E0003••	601,5	475	100	5	90	25	145	35,0	222,0	210	18	250	300	50	25	195
P1V-A260E0080••	413,0	244	40	5	30	18	50	37,0	107,0	95	9	110	130	20	15	85
P1V-A260E0052••	451,0	292	50	5	40	18	60	47,5	137,0	110	11	130	155	25	17	100
P1V-A260E0025••	486,0	327	60	5	50	18	70	60,0	156,0	130	11	160	190	30	20	110
P1V-A260E0011••	515,0	356	70	5	60	20	105	44,5	185,5	155	14	180	216	35	18	130
P1V-A260E0006••	612,0	453	80	5	70	25	110	46,0	200,0	185	18	225	270	40	22	155
P1V-A260E0003••	654,0	495	100	5	90	25	145	35,0	222,0	210	18	250	300	50	25	195
P1V-A360E0105••	457,0	292	50	5	40	18	60	47,5	137,0	110	11	130	155	25	17	100
P1V-A360E0052••	457,0	292	50	5	40	18	60	47,5	137,0	110	11	130	155	25	17	100
P1V-A360E0025••	521,0	356	70	5	60	20	105	44,5	185,5	155	14	180	216	35	18	130
P1V-A360E0013••	547,0	382	80	5	70	25	110	46,0	200,0	185	18	225	270	40	22	155
P1V-A360E0006••	660,0	495	100	5	90	25	145	35,0	222,0	210	18	250	300	50	25	195
P1V-A360E0003••	699,0	534	140	15	110	33	210	—	277,0	320	26	370	440	80	35	250

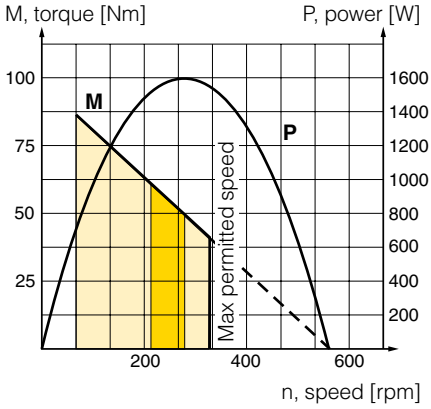
Order code	B4	B5	C1	C2	C3	C4
P1V-A160E0066••	141	160	6x6x30	22,5	M8x19	20 h6
P1V-A160E0032••	166	160	8x7x40	28,0	M8x19	25 h6
P1V-A160E0014••	181	160	8x7x50	33,0	M10x22	30 h6
P1V-A160E0008••	223	160	10x8x60	38,0	M10x22	35 h6
P1V-A160E0004••	278	160	12x8x70	43,0	M12x28	40 h6
P1V-A160E0003••	316	160	14x9x90	53,5	M16x36	50 h6
P1V-A260E0080••	141	200	6x6x30	22,5	M8x19	20 h6
P1V-A260E0052••	166	200	8x7x40	28,0	M8x19	25 h6
P1V-A260E0025••	181	200	8x7x50	33,0	M10x22	30 h6
P1V-A260E0011••	223	200	10x8x60	38,0	M10x22	35 h6
P1V-A260E0006••	278	200	12x8x70	43,0	M12x28	40 h6
P1V-A260E0003••	316	200	14x9x90	53,5	M16x36	50 h6
P1V-A360E0105••	166	200	8x7x40	28,0	M8x19	25 h6
P1V-A360E0052••	166	200	8x7x40	28,0	M8x19	25 h6
P1V-A360E0025••	223	200	10x8x60	38,0	M10x22	35 h6
P1V-A360E0013••	278	200	12x8x70	43,0	M12x28	40 h6
P1V-A360E0006••	316	200	14x9x90	53,5	M16x36	50 h6
P1V-A360E0003••	420	200	22x14x110	85,0	M20x42	80 h6

••: see previous page for installation positions

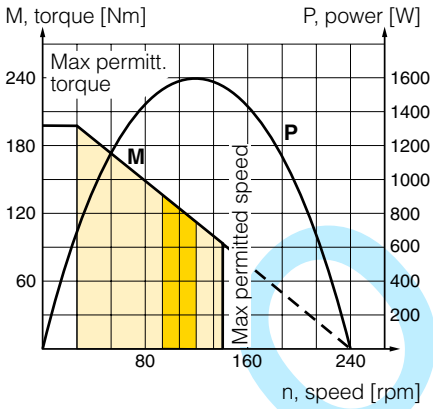
P1V-A160D0066••
P1V-A160E0066••



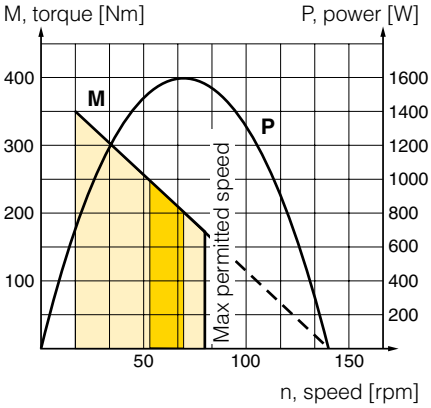
P1V-A160D0032••
P1V-A160E0032••



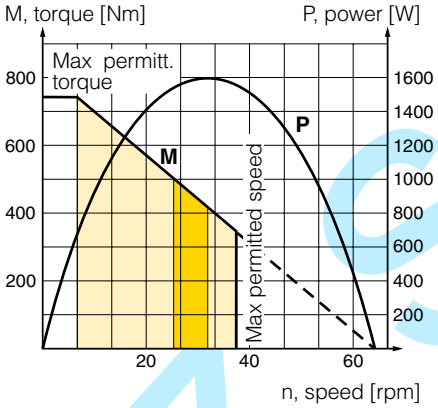
P1V-A160D0014••
P1V-A160E0014••



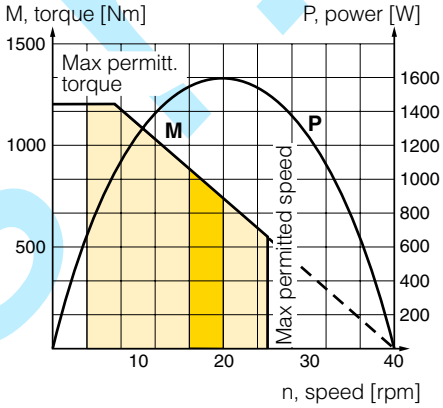
P1V-A160D0008••
P1V-A160E0008••



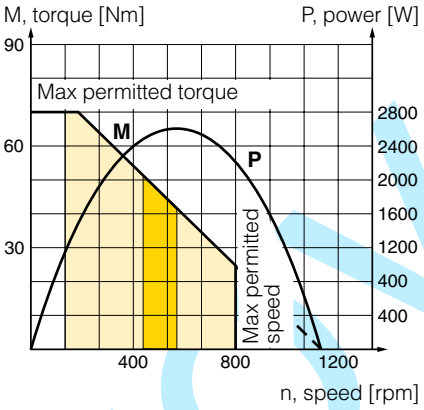
P1V-A160D0004••
P1V-A160E0004••



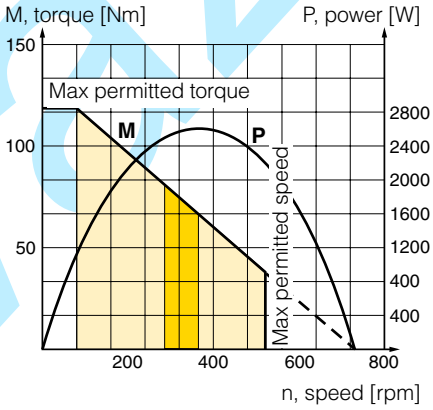
P1V-A160D0003••
P1V-A160E0003••



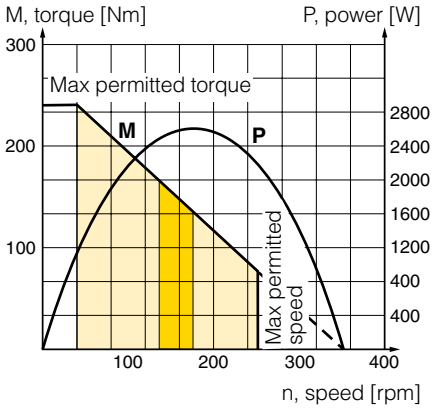
P1V-A260D0080••
P1V-A260E0080••



P1V-A260D0052••
P1V-A260E0052••



P1V-A260D0025••
P1V-A260E0025••

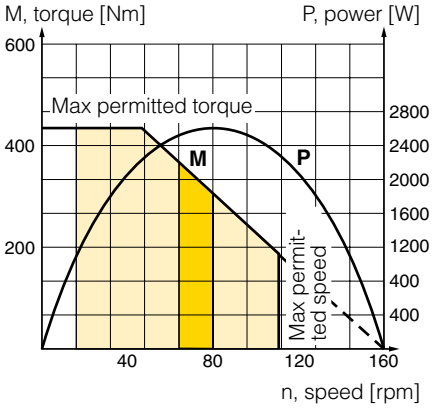


Possible working range of motor.

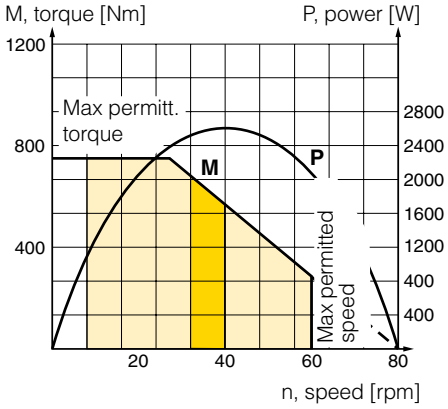
Optimum working range of motor.

Higher speeds = more vane wear
Lower speeds with high torque = more gearbox wear

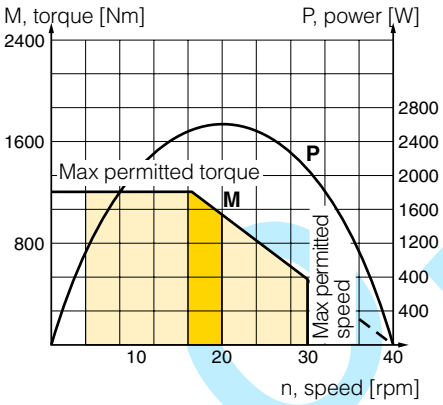
P1V-A260D0011••
P1V-A260E0011••



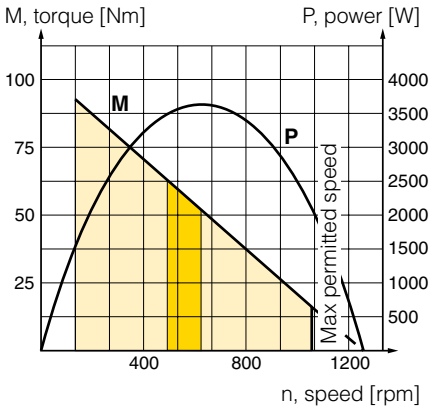
P1V-A260D0006••
P1V-A260E0006••



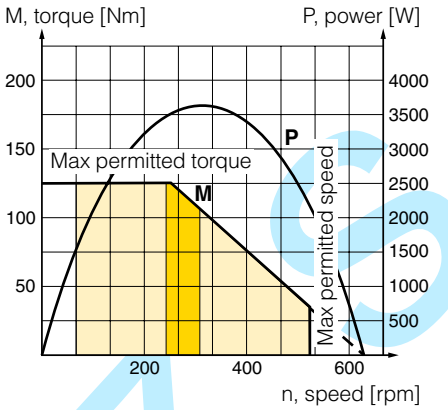
P1V-A260D0003••
P1V-A260E0003••



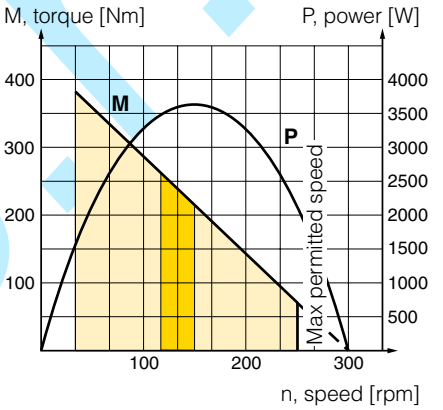
P1V-A360D0105••
P1V-A360E0105••



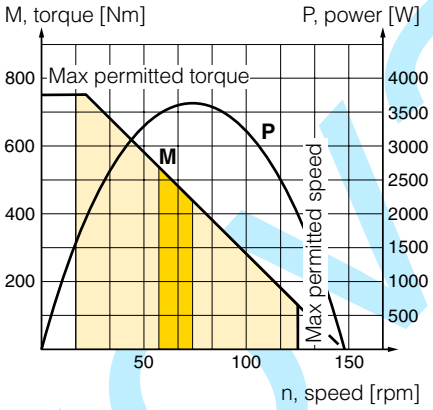
P1V-A360D0052••
P1V-A360E0052••



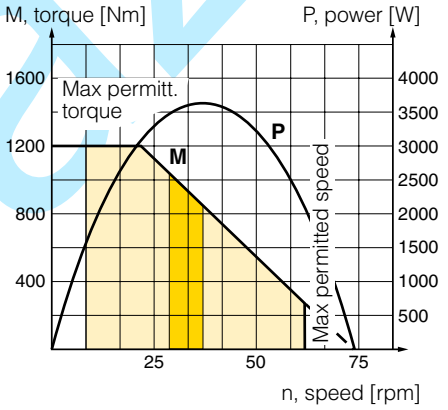
P1V-A360D0025••
P1V-A360E0025••



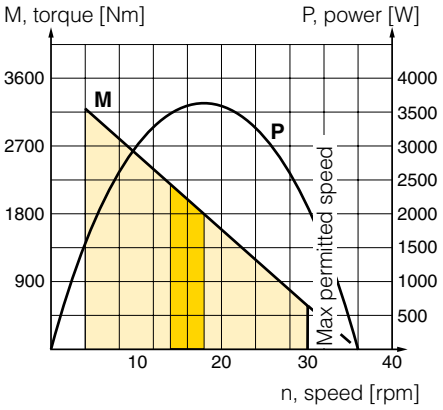
P1V-A360D0013••
P1V-A360E0013••



P1V-A360D0006••
P1V-A360E0006••



P1V-A360D0003••
P1V-A360E0003••



Possible working range of motor.

Optimum working range of motor.

Higher speeds = more vane wear
Lower speeds with high torque = more gearbox wear

Permitted shaft loadings

Radial forces

Depending on the application, the drive shaft of the gearbox can be subjected to various radial forces, which can be calculated as follows:

$F_{rad} = 2000 \times M \times K_r / d$

F_{rad}	Radial force (N)
M	Torque (Nm)
d	Diameter of wheel, pulley, sprocket or gear wheel (mm)
Kr = 1	Sprocket constant
Kr = 1.25	Gear wheel constant
Kr = 1.5 - 2.5	Vee-belt pulley constant

Depending on the point of application of the force (please refer to the adjacent figure), the following two cases are found:

a. The force is applied to the centre of the output shaft, as in figure 3. This value can be read off on the table below, where consideration must be given to the following:

$F_{radc} \leq F_{rt}$

b. The force is applied at a distance x, as in figure 4. This value can be calculated as follows:

$F_{radx} = F_{rt} \times a / (b + X)$ $\quad L/2 < X < c$

F_{rt}	Permissible radial force on centre of output-shaft (N)
a	Gear constant
b	Gear constant
c	Gear constant
X	Distance from shoulder on shaft to point of application of force (mm)

All values are found in the table below.
The following should be considered, however:

$F_{radc} \leq F_{radx}$

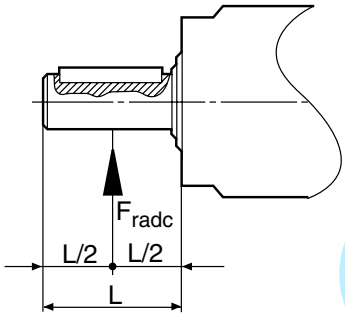


Fig. 3: Force applied at centre of shaft

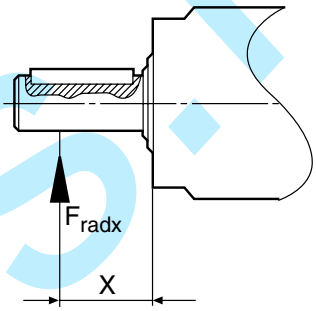


Fig. 4: Force applied at distance X

Axial forces

The maximum permissible axial force can be calculated as follows:

$F_{ax} = F_{rt} \times 0,2$

Motor	a	b	c	F_{rt} N
P1V-A160•0066••	46,0	26,0	450	1130
P1V-A160•0032••	54,5	29,5	550	2480
P1V-A160•0014••	60,5	30,5	750	4710
P1V-A160•0008••	69,0	34,0	850	6620
P1V-A160•0004••	80,5	40,5	900	10000
P1V-A160•0003••	98,5	48,5	1000	16000
P1V-A260•0080••	46,0	26,0	450	660
P1V-A260•0052••	54,5	29,5	550	2110
P1V-A260•0025••	60,5	30,5	750	3850
P1V-A260•0011••	69,0	34,0	850	5660
P1V-A260•0006••	80,5	40,5	900	10000
P1V-A260•0003••	98,5	48,5	1000	16000
P1V-A360•0105••	54,5	29,5	550	1640
P1V-A360•0052••	54,5	29,5	550	2110
P1V-A360•0025••	69,0	34,0	850	4280
P1V-A360•0013••	80,5	40,5	900	6890
P1V-A360•0006••	98,5	48,5	1000	16000
P1V-A360•0003••	131,0	61,0	1500	35000

- • Motor with helical gear (functions D and E)
- •• Installation position, optional