



## TP+ High Precision Performance

Low-Backlash Planetary Gearheads  
TP+ and TP+ HIGH TORQUE®



alpha

a WITTENSTEIN AG company



## TP+ - the ultimate in precision

The compact TP, low-backlash planetary gearhead from **alpha** has long enjoyed a worldwide reputation for extreme precision and intelligent design.

The market considers **alpha** to have always had its finger on the pulse, eager to forge ahead with new and innovative developments. The performance of the TP has now been enhanced to an unprecedented level.

The new generation bears the name **TP+** – plus stands for the added precision in cyclic or continuous duty.

**TP+** is the outcome of a clear vision: to take the already outstanding TP gearhead and make it even more flexible, longer lasting, with more power and more dynamics in the tiniest possible space.

And because **alpha** is **alpha**, daunting challenges of this kind fire us up with enthusiasm time and time again. After all, it's our technology lead that assures you greater scope for greater creativity – and gives you that crucial market edge.



### The winning traits of TP<sup>+</sup>

TP<sup>+</sup> integrates all the familiar characteristics of the TP. Low backlash and high torsional stiffness are the key to TP<sup>+</sup>'s superior positioning accuracy, even in the micro range.

Yet the real distinguishing feature of our new gearhead generation is what we could term its “moment of glory” – up to 40% more torque than its predecessor. The innovative tooth design and the harmonious perfection of all components make the TP<sup>+</sup> truly revolutionary.

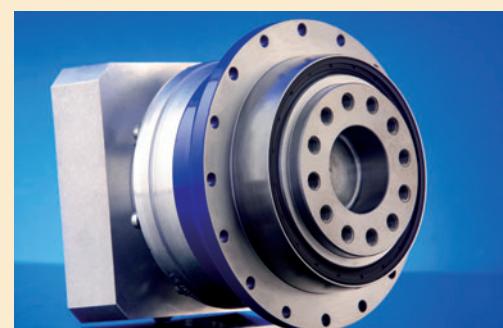
No matter which TP<sup>+</sup> variant you choose, this compact power pack is guaranteed to be quieter and smoother than its classic forerunner: it takes four TP<sup>+</sup> gearheads to produce the same amount of noise as the already quiet TP.

If your application demands maximum power density, our **TP<sup>+</sup> HIGH TORQUE** gearhead offers up to double the usual torque with almost no increase in installation space.

Inside TP<sup>+</sup> HIGH TORQUE hides the strength of a giant. It easily combines up to 100% additional torque in the reduction ratio range from  $i = 22$  to  $i = 220$  with unparalleled torsional stiffness.

TP<sup>+</sup> HIGH TORQUE also boasts up to 900% overload capacity and up to 110% more stiffness than TP<sup>+</sup>. The standard torsional backlash is less than one arcminute – and its uniformity is equally impressive.

**99.9% reliability is a compelling argument!**



## TP<sup>+</sup> - the embodiment of the **alpha** philosophy

### Higher power density

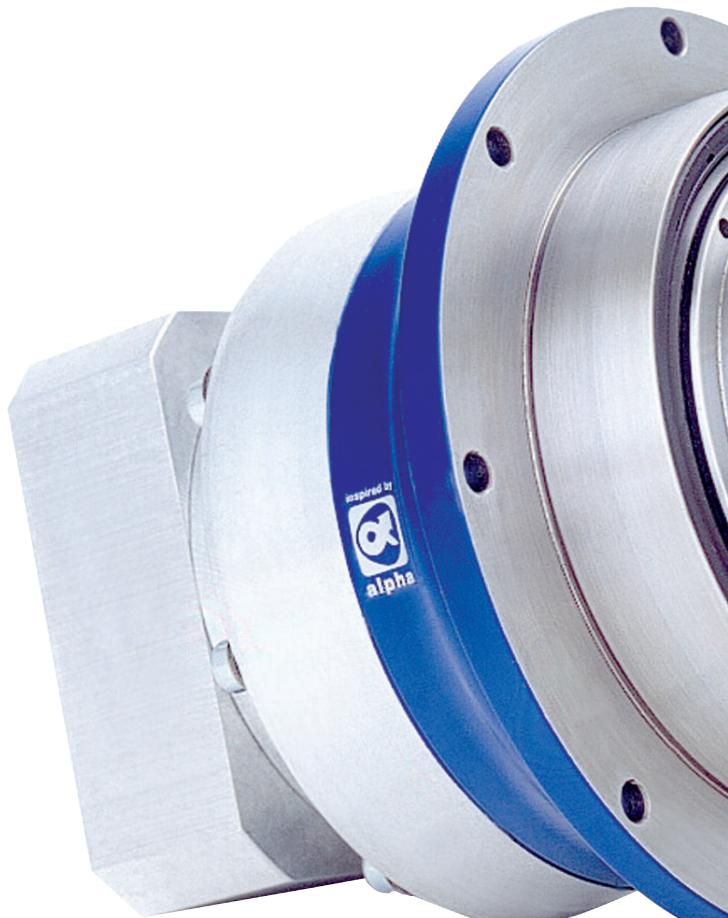
And the torque? Although the predecessor TP gearhead was a leading market performer, we have succeeded in increasing its torques by as much as 40 %. Pushing back limits – part of the alpha creed!

If your application demands even more torque, then **TP<sup>+</sup> HIGH TORQUE** is the ideal answer – it lets you transmit up to double the usual torque value with almost no increase in installation space.

Pushing back limits – part of the alpha creed

### Any mounting position

Whichever way you install it, your **TP<sup>+</sup>** always contains the same quantity of oil. It makes no difference to the **TP<sup>+</sup>** whether you mount it vertically or horizontally or with the output on top or on the bottom.



## Cutting edge innovations made by alpha

We have been developing, manufacturing and distributing low-backlash planetary gearheads, servo right-angled gearheads, complete drive units and planetary elevator machines with an integrated servo motor since 1984.

Profit from our comprehensive service package:

From individual components to complete systems, backed up by expert engineering services. A thousand employees worldwide are committed to our cause. alpha's home is in Germany – in Iggersheim on the Romantic Road in northern Baden-Württemberg.

alpha is a member of the **WITTENSTEIN AG** which has rightly established a name for itself with numerous innovations in industries such as aerospace and simulation, medical technology, elevator drives and Formula One racing.

**WITTENSTEIN** – being one with the future!

**Helical gearing delivers:**  
Smooth, quiet running

The TP<sup>+</sup> "whispers". The helical toothed TP<sup>+</sup> is 6 dB(A) quieter than the classic spur toothed TP. These features are possible by incorporating the latest research in tooth geometry and dynamics. And we certainly don't have to spell out the added value you get from 64 decibels instead of 70. What's more, the TP<sup>+</sup> reduces vibration to virtual imperceptibility for amazingly smooth running.

**Highest positioning accuracy**

Where the TP is synonymous with compact precision, TP<sup>+</sup> stands for compact maximum precision. Backlash has been successfully curtailed even further compared to the TP gearbox. Your application benefits from superior positioning accuracy.

Since positioning accuracy is influenced not only by torsional backlash but also by torsional stiffness, the very best results are achieved with the ultra-stiff TP<sup>+</sup> HIGH TORQUE. Its torsional stiffnesses exceed the already excellent values of the TP<sup>+</sup> by up to 110%.

**alpha benefits at a glance:**

**Record-breaking lifespan**

Extremely long service life resulting from intelligent design, latest synthetic lubrication technology, exclusive sealing technology, and incredibly strong output bearings.

**Motor mounting is almost foolproof**

Simple and reliable mounting in a single step.

**Top quality from alpha**

In-house development and manufacture of all products combined with a pioneering spirit and an insatiable urge to improve.

**alpha speedline®**

speedline delivery if your production process can't wait. Dispatch of your alpha gearheads from our factory is guaranteed in just 24 or optionally 48 hours.

Our speedline delivery service has been operating successfully throughout Europe since 2004.

**Leaders of the pack**

We are driven by a desire to enhance our customers' success with products and systems from alpha. We set benchmarks when it comes to precision, performance and durability. Our trailblazing technology gives our customers an edge in their respective market sectors. Place your trust in premium quality and total reliability from alpha. Choose world class engineering – the foundation for strong partnerships and added value that is passed on to your customers.



alpha



## TP<sup>+</sup> accelerates with the new **alpha speedline®**

**Quick, simple and transparent – put on speed with alpha speedline®**

Would you like to operate even more flexibly, translate your ideas into action more swiftly and take decisions at even shorter notice?

If so, then the alpha speedline® service is just what you're looking for. We promise to dispatch all gearheads in the standard SP<sup>+</sup>®, TP<sup>+</sup> and LP<sup>+</sup> series ex works at attractive terms in just 24 or 48 hours – in line with your specific requirements. Like all other alpha products, every speedline® order undergoes a 100% quality control. And thanks to our efficient logistics concept, the optimum route to your location is guaranteed.

In just 24 or 48 hours, your gearhead is ready in our factory. Now also anywhere in Europe.

## TP+ – the choice couldn't be simpler

The individual series are presented following on double pages: the left-hand pages are reserved for drawings and important dimensions, while the tables on the right list detailed technical data, clearly structured to show the MF (TP+) and MA (TP+ HIGH TORQUE®) versions, reduction ratios and key parameters.

Please don't hesitate to contact your personal alpha engineer at any time for competent advice and support.

Ask for the TP+ – the low-backlash planetary gearhead for maximum power.

Gearheads: Fast selection

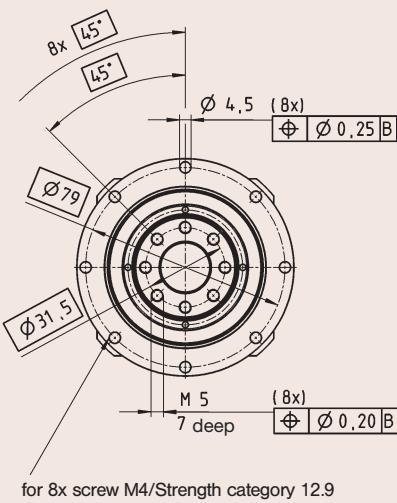
Size	004		010		025		050	
	MF <sup>+</sup>	MF <sup>+</sup>	MA <sup>+</sup>	MF <sup>+</sup>	MA <sup>+</sup>	MF <sup>+</sup>	MA <sup>+</sup>	MF <sup>+</sup>
Maximum acceleration torque	T <sub>2B</sub>	Nm	32-50	80-130	230	250-380	480-530	500-750
Nominal output torque	T <sub>2N</sub>	Nm	15-40	35-90	110-180	100-220	260-375	220-400
Emergency stop torque	T <sub>2NOT</sub>	Nm	100	250	525	625	1200	1000-1250
Maximum input speed	n <sub>1Max</sub>	min <sup>-1</sup>	6000	6000	6000	4500-6000	6000	4000-5000
Nominal input speed	n <sub>1N</sub>	min <sup>-1</sup>	3300 - 5500	2600-4500	4000-4500	2300-4200	3500-4000	1900-3900
Page			8 - 11	12 - 15	16 - 17	18 - 21	22 - 23	24 - 27
								28 - 29

Size	110		300		500			
	MF <sup>+</sup>	MA <sup>+</sup>	MF	MA	MF	MA		
Maximum acceleration torque	T <sub>2B</sub>	Nm	1300-2000	2000-3100	2800-3500	5300	4800-6000	10000
Nominal output torque	T <sub>2N</sub>	Nm	700-1250	1400-1750	1600-2200	3100	2900-3700	6000
Emergency stop torque	T <sub>2NOT</sub>	Nm	2750	6500	8750	13250	15000	25000
Maximum input speed	n <sub>1Max</sub>	min <sup>-1</sup>	3500-4000	4500	3000	3000	3000	3000
Nominal input speed	n <sub>1N</sub>	min <sup>-1</sup>	1400-3400	2500-3000	1600-2200	1500	1300-1800	1500
Page			30 - 33	34 - 35	38 - 39		40 - 41	

MF = Standard

MA = HIGH TORQUE®

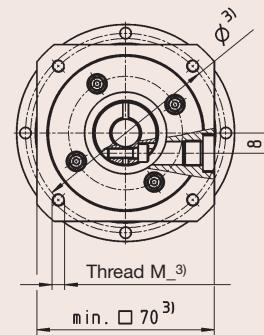
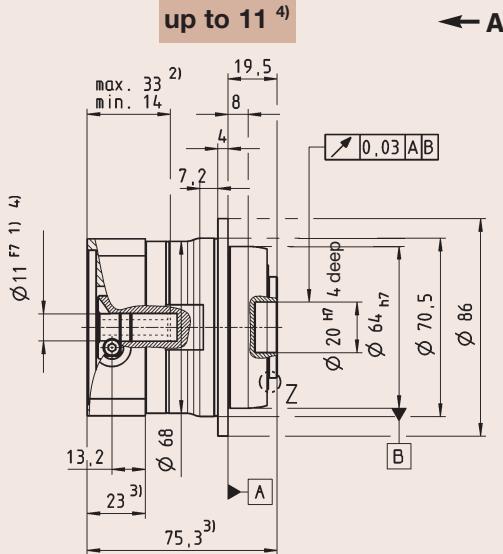
## View A



## Motor shaft diameter (mm)

## View B

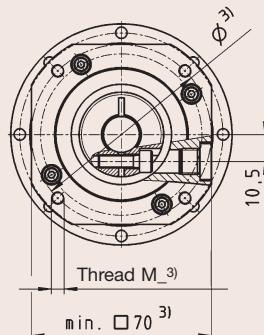
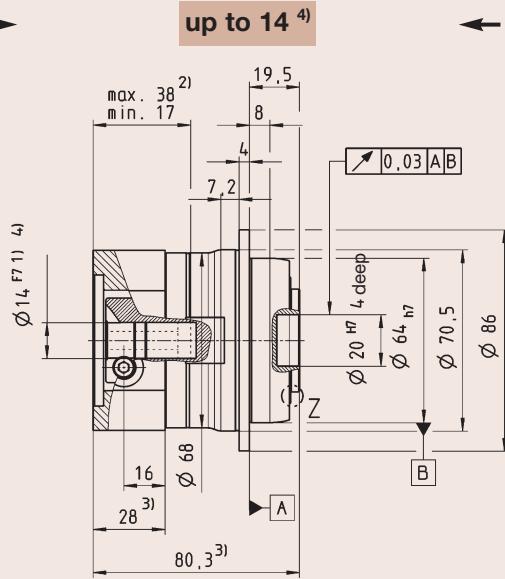
B →



B →

**up to 14<sup>4)</sup>**

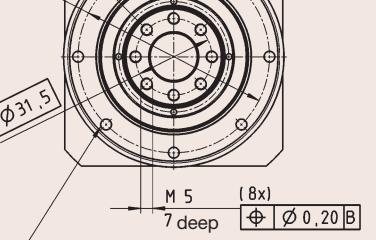
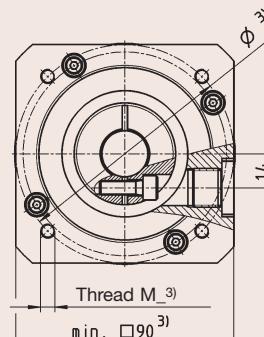
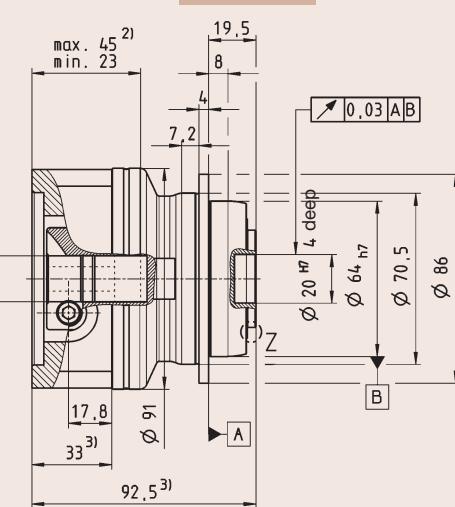
← A



B →

**up to 19<sup>4)</sup>**

← A

Dimensions without specified tolerances  $\pm 1$  mm.

1) Check motor shaft fit.

2) Min./max. permissible motor shaft length. Longer motor shaft is possible. Please call alpha.

3) The dimensions depend on the motor.

4) Smaller motor shaft diameter is compensated by a bushing with at least 1 mm thickness (see page 42).

5) Centering depth.

⚠ Motor mounting according to operating manual.

## Technical data TP+ 004 1-stage

		1-stage			
Ratio <sup>1)</sup>	i	4	5	7	10
Max. acceleration torque (Max. 1000 cycles per hour)	T <sub>2B</sub> Nm	50	50	50	35
Nominal output torque (n <sub>1</sub> = 3000 U/min) (Higher values possible if n <sub>1</sub> = 2000 rpm)	T <sub>2N</sub> Nm	28	28	28	18
Emergency stop torque (Permissible 1000 times during the lifespan of the gearhead)	T <sub>2Not</sub> Nm	100	100	100	100
Nominal input speed (At 20 °C ambient temperature) *	n <sub>1N</sub> min <sup>-1</sup>	3300	3300	4000	4000
Medial no-load running torque (n <sub>1</sub> = 3000 min <sup>-1</sup> ) (At 20 °C gearhead temperature) **	T <sub>012</sub> Nm	0,95	0,80	0,60	0,45
Max. input speed	n <sub>1Max</sub> min <sup>-1</sup>	6000	6000	6000	6000
Torsional backlash	j <sub>t</sub> arcmin		Standard ≤ 4 / Reduced ≤ 2		
Torsional rigidity	C <sub>121</sub> Nm/arcmin	-	11	10	9
Tilting rigidity	C <sub>2K</sub> Nm/arcmin		-		
Max. axial force ***	F <sub>2AMax</sub> N		1630		
Max. tilting moment	M <sub>2KMax</sub> Nm		110		
Efficiency at full load	η %		97		
Weight incl. adapter plate	m kg		1,4		
Noise level (n <sub>1</sub> = 3000 min <sup>-1</sup> ) ****	L <sub>PA</sub> dB(A)		≤ 58		
Max. permissible housing temperature	°C		+90		
Ambient temperature	°C		0 up to +40		
Lubrication			Lubricated for lifetime		
Paint			Blue RAL 5002		
Direction of rotation			Motor and gearhead same direction		
Type of protection			IP 65		
Mass moment of inertia (Referring to the drive)	J <sub>1</sub> kgcm <sup>2</sup>	11	0,18	0,15	0,12
Clamping hub diameter (mm)		14	0,26	0,23	0,20
		19	0,71	0,67	0,62
					0,63

1) Other reduction ratios are optionally available. Please contact alpha.

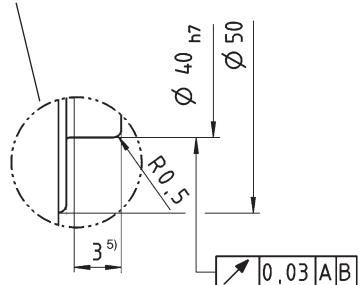
\* Please reduce the n<sub>1N</sub> speed at higher ambient temperatures.

\*\* Applies to 14 mm clamping hub diameter

\*\*\* Referred to the centre of the flange.

\*\*\*\* Measured at a reduction ratio i = 10 (without load).

Z: Detail



### Conversion table

1 mm	= 0.039 in
1 Nm	= 8.85 in.lb
1 kgcm <sup>2</sup>	= 8.85 x 10 <sup>-4</sup> in.lb.s <sup>2</sup>
1 N	= 0.225 lb <sub>f</sub>
1 kg	= 2.21 lb <sub>m</sub>



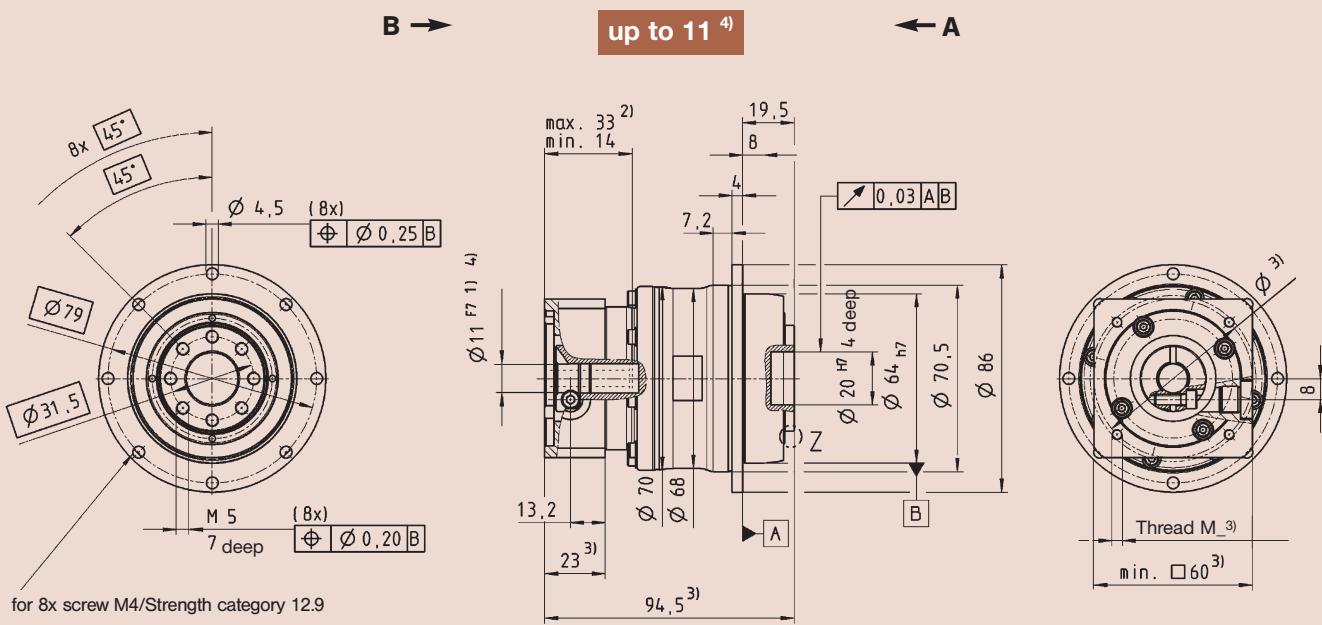
alpha

## View A

## Motor shaft diameter (mm)

## View B

TP+ 004 2-stage

Dimensions without specified tolerances  $\pm 1$  mm.

1) Check motor shaft fit.

2) Min./max. permissible motor shaft length. Longer motor shaft is possible. Please call alpha.

3) The dimensions depend on the motor.

4) Smaller motor shaft diameter is compensated by a bushing with at least 1 mm thickness (see page 42).

5) Centering depth.

Motor mounting according to operating manual.

## Technical data TP+ 004 2-stage

		2-stage												
Ratio <sup>1)</sup>	i	16	20	21	25	28	31	35	40	50	61	70	91	100
Max. acceleration torque (Max. 1000 cycles per hour)	T <sub>2B</sub> Nm	50	50	40	50	50	40	50	50	50	45	50	32	35
Nominal output torque (n <sub>1</sub> = 3000 U/min) (Higher values possible if n <sub>1</sub> = 2000 rpm)	T <sub>2N</sub> Nm	40	40	30	40	40	30	40	40	40	30	40	15	18
Emergency stop torque (Permissible 1000 times during the lifespan of the gearhead)	T <sub>2Not</sub> Nm	100	100	100	100	100	100	100	100	100	100	100	100	100
Nominal input speed (At 20 °C ambient temperature) *	n <sub>1N</sub> min <sup>-1</sup>	4000	4000	4000	4000	4000	4000	4000	4000	4800	5500	5500	5500	5500
Medial no-load running torque (n <sub>1</sub> =3000 min <sup>-1</sup> ) (At 20 °C gearhead temperature) **	T <sub>012</sub> Nm	0,55	0,45	0,45	0,45	0,35	0,35	0,30	0,25	0,25	0,20	0,20	0,20	0,20
Maximum input speed	n <sub>1Max</sub> min <sup>-1</sup>	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000
Torsional backlash	j <sub>t</sub> arcmin	Standard ≤ 4 / Reduced ≤ 2												
Torsional rigidity	C <sub>121</sub> Nm/arcmin	10												
Tilting rigidity	C <sub>2K</sub> Nm/arcmin	-												
Max. axial force ***	F <sub>2AMax</sub> N	1630												
Max. tilting moment	M <sub>2KMax</sub> Nm	110												
Efficiency at full load	η %	94												
Weight incl. adapter plate	m kg	1,5												
Noise level (n <sub>1</sub> =3000 min <sup>-1</sup> ) ****	L <sub>PA</sub> dB(A)	≤ 58												
Max. permissible housing temperature	°C	+90												
Ambient temperature	°C	0 up to +40												
Lubrication		Lubricated for lifetime												
Paint		Blue RAL 5002												
Direction of rotation		Motor and gearhead same direction												
Type of protection		IP 65												
Mass moment of inertia (Referring to the drive)	J <sub>1</sub> kgcm <sup>2</sup>	11	0,078	0,069	0,074	0,068	0,061	0,073	0,060	0,057	0,056	0,057	0,056	0,056
Clamping hub diameter (mm)		14	0,19	0,18	0,19	0,18	0,17	0,19	0,17	0,17	0,17	0,17	0,17	0,17

1) Other reduction ratios are optionally available. Please contact alpha.

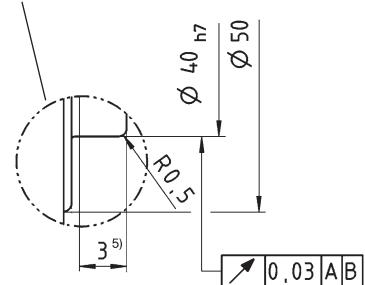
\* Please reduce the n<sub>1N</sub> speed at higher ambient temperatures.

\*\* Applies to 11 mm clamping hub diameter

\*\*\* Referred to the centre of the flange.

\*\*\*\* Measured at a reduction ratio i = 16 (without load).

Z: Details



### Conversion table

1 mm	= 0.039 in
1 Nm	= 8.85 in.lb
1 kgcm <sup>2</sup>	= 8.85 x 10 <sup>-4</sup> in.lb.s <sup>2</sup>
1 N	= 0.225 lb <sub>f</sub>
1 kg	= 2.21 lb <sub>m</sub>

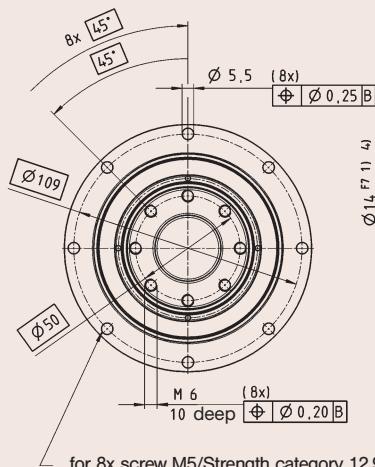


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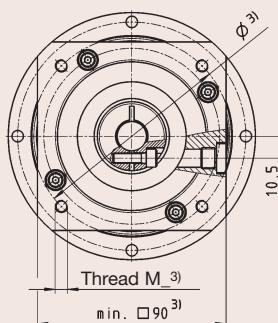
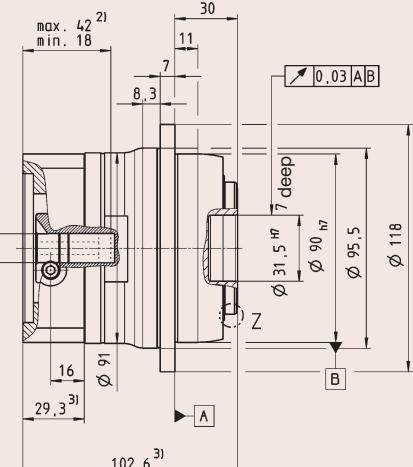
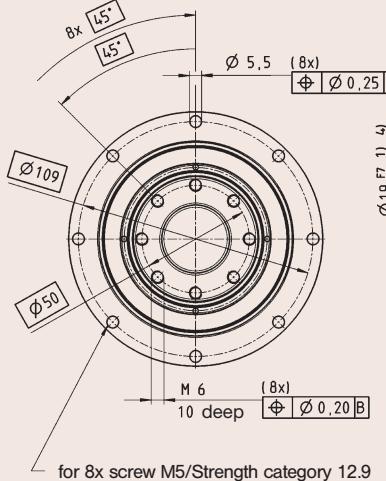
## View A

## Motor shaft diameter (mm)

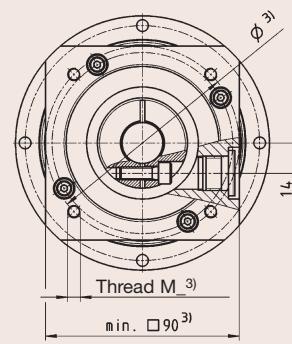
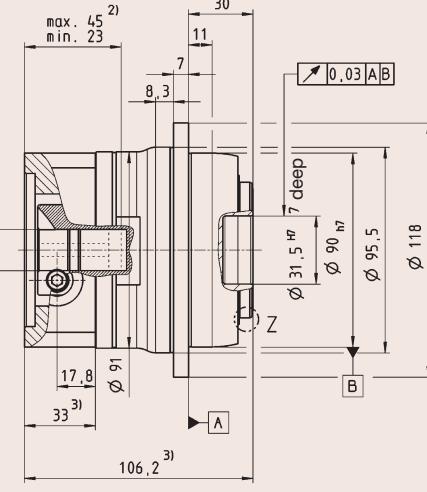
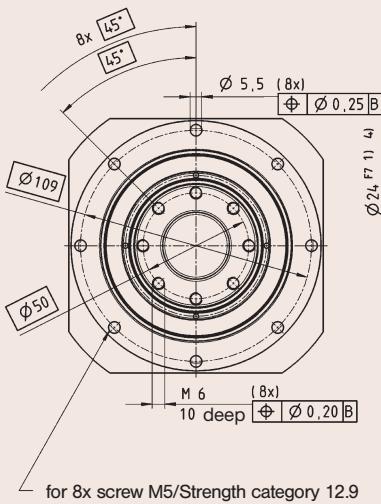
## View B

**B →****up to 14<sup>4)</sup>****← A**

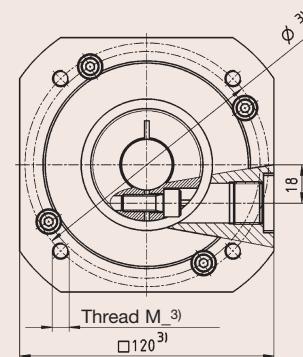
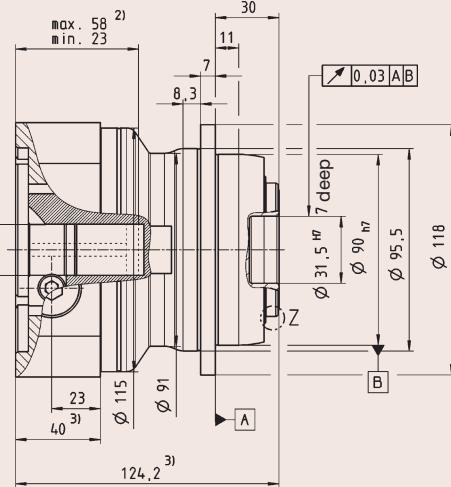
Ø 14 F7 11 4)

**B →****up to 19<sup>4)</sup>****← A**

Ø 19 F7 11 4)

**B →****up to 24<sup>4)</sup>****← A**

Ø 24 F7 11 4)

Dimensions without specified tolerances  $\pm 1$  mm.

- 1) Check motor shaft fit.
- 2) Min./max. permissible motor shaft length. Longer motor shaft is possible. Please call alpha.
- 3) The dimensions depend on the motor.
- 4) Smaller motor shaft diameter is compensated by a bushing with at least 1 mm thickness (see page 42).
- 5) Centering depth.

Motor mounting according to operating manual.

## Technical data TP+ 010 1-stage

	1-stage				
Ratio <sup>1)</sup>	i	4	5	7	10
Max. acceleration torque (Max. 1000 cycles per hour)	T <sub>2B</sub> Nm	130	130	130	100
Nominal output torque (n <sub>1</sub> = 3000 U/min) (Higher values possible if n <sub>1</sub> = 2000 rpm)	T <sub>2N</sub> Nm	75	75	75	60
Emergency stop torque (Permissible 1000 times during the lifespan of the gearhead)	T <sub>2Not</sub> Nm	250	250	250	250
Nominal input speed (At 20 °C ambient temperature) *	n <sub>1N</sub> min <sup>-1</sup>	2600	2900	3100	3100
Medial no-load running torque (n <sub>1</sub> =3000 min <sup>-1</sup> ) (At 20 °C gearhead temperature) **	T <sub>012</sub> Nm	1,6	1,3	1,0	0,7
Maximum input speed	n <sub>1Max</sub> min <sup>-1</sup>	6000	6000	6000	6000
Torsional backlash	j <sub>t</sub> arcmin		Standard ≤ 3 / Reduced ≤ 1		
Torsional rigidity	C <sub>t21</sub> Nm/arcmin	-	31	30	24
Tilting rigidity	C <sub>2K</sub> Nm/arcmin		225		
Max. axial force ***	F <sub>2AMax</sub> N		2150		
Max. tilting moment	M <sub>2KMax</sub> Nm		270		
Efficiency at full load	η %		97		
Weight incl. adapter plate	m kg		3,8		
Noise level (n <sub>1</sub> =3000 min <sup>-1</sup> ) ****	L <sub>PA</sub> dB(A)		≤ 60		
Max. permissible housing temperature	°C		+90		
Ambient temperature	°C		0 up to +40		
Lubrication			Lubricated for lifetime		
Paint			Blue RAL 5002		
Direction of rotation			Motor and gearhead same direction		
Type of protection			IP 65		
Mass moment of inertia (Referring to the drive)	J <sub>1</sub> kgcm <sup>2</sup>	14 19 24	0,83 1,08 2,64	0,67 0,92 2,49	0,53 0,77 2,35
Clamping hub diameter (mm)					0,46 0,70 2,27

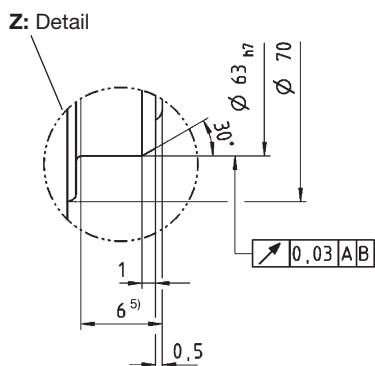
1) Other reduction ratios are optionally available. Please contact alpha.

\* Please reduce the n<sub>1N</sub> speed at higher ambient temperatures.

\*\* Applies to 19 mm clamping hub diameter

\*\*\* Referred to the centre of the flange.

\*\*\*\* Measured at a reduction ratio i = 10 (without load).



### Conversion table

1 mm	= 0.039 in
1 Nm	= 8.85 in.lb
1 kgcm <sup>2</sup>	= 8.85 x 10 <sup>-4</sup> in.lb.s <sup>2</sup>
1 N	= 0.225 lb <sub>f</sub>
1 kg	= 2.21 lb <sub>m</sub>

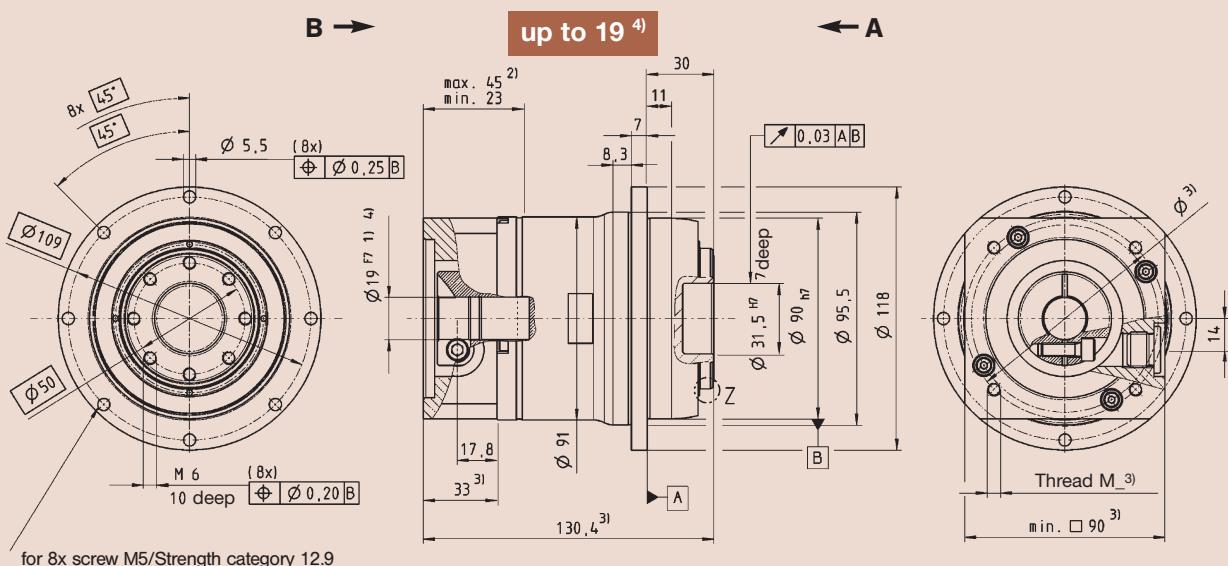
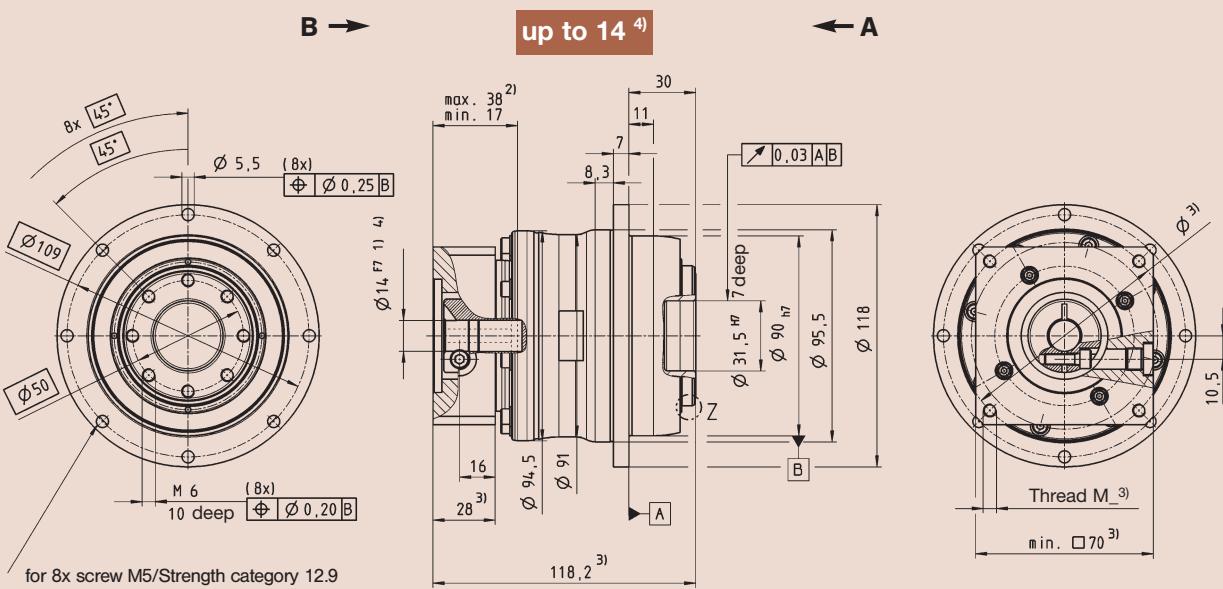
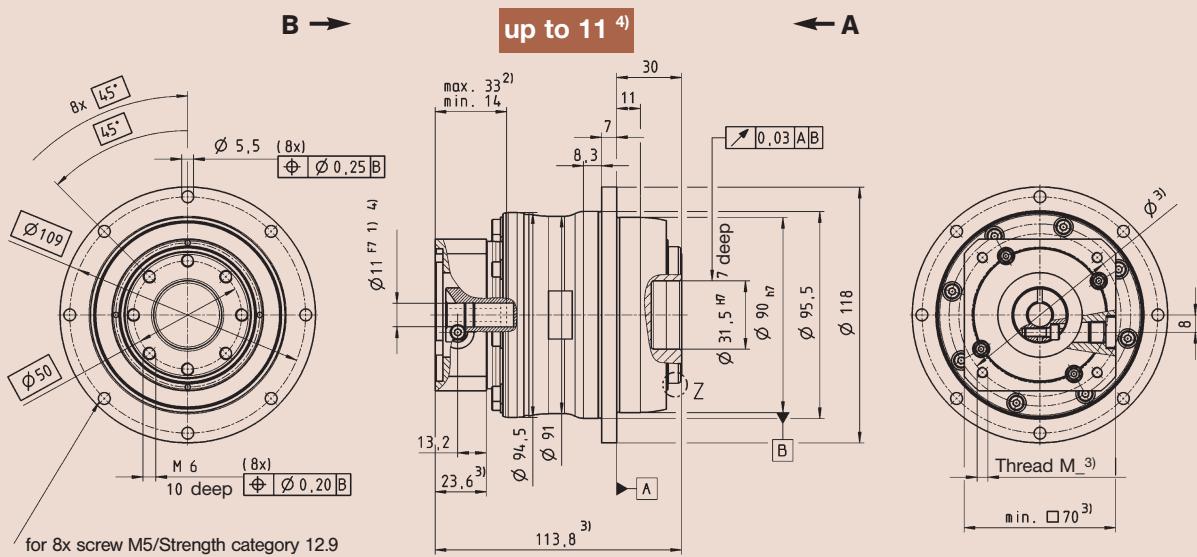


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## View A

## Motor shaft diameter (mm)

## View B



Dimensions without specified tolerances  $\pm 1$  mm.

1) Check motor shaft fit.

2) Min./max. permissible motor shaft length. Longer motor shaft is possible. Please call alpha.

3) The dimensions depend on the motor.

4) Smaller motor shaft diameter is compensated by a bushing with at least 1 mm thickness (see page 42).

5) Centering depth.

Motor mounting according to operating manual.

## Technical data TP+ 010 2-stage

		2-stage												
Ratio <sup>1)</sup>	i	16	20	21	25	28	31	35	40	50	61	70	91	100
Max. acceleration torque (Max. 1000 cycles per hour)	T <sub>2B</sub> Nm	130	130	100	130	130	110	130	130	130	110	130	80	100
Nominal output torque (n <sub>1</sub> = 3000 U/min) (Higher values possible if n <sub>1</sub> = 2000 rpm)	T <sub>2N</sub> Nm	90	90	80	90	90	70	90	80	90	70	90	35	60
Emergency stop torque (Permissible 1000 times during the lifespan of the gearhead)	T <sub>2Not</sub> Nm	250	250	250	250	250	250	250	250	250	250	250	250	250
Nominal input speed (At 20 °C ambient temperature) *	n <sub>1N</sub> min <sup>-1</sup>	3500	3500	3500	3500	3500	3500	3500	3500	3800	4500	4500	4500	4500
Medial no-load running torque (n <sub>1</sub> =3000 min <sup>-1</sup> ) (At 20 °C gearhead temperature) **	T <sub>012</sub> Nm	0,90	0,75	0,70	0,65	0,55	0,50	0,50	0,40	0,35	0,35	0,35	0,30	0,30
Maximum input speed	n <sub>1Max</sub> min <sup>-1</sup>	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000
Torsional backlash	j <sub>t</sub> arcmin	Standard ≤ 3 / Reduced ≤ 1												
Torsional rigidity	C <sub>121</sub> Nm/arcmin	33										21	-	
Tilting rigidity	C <sub>2K</sub> Nm/arcmin	225												
Max. axial force ***	F <sub>2AMax</sub> N	2150												
Max. tilting moment	M <sub>2KMax</sub> Nm	270												
Efficiency at full load	η %	94												
Weight incl. adapter plate	m kg	3,6												
Noise level (n <sub>1</sub> =3000 min <sup>-1</sup> ) ****	L <sub>PA</sub> dB(A)	≤ 62												
Max. permissible housing temperature	°C	+90												
Ambient temperature	°C	0 up to +40												
Lubrication		Lubricated for lifetime												
Paint		Blue RAL 5002												
Direction of rotation		Motor and gearhead same direction												
Type of protection		IP 65												
Mass moment of inertia (Referring to the drive)	J <sub>1</sub> kgcm <sup>2</sup>	11	0,18	0,13	0,14	0,13	0,11	0,14	0,11	0,10	0,10	0,10	0,10	0,10
Clamping hub diameter (mm)		14	0,26	0,22	0,23	0,21	0,19	0,22	0,19	0,18	0,18	0,18	0,18	0,18
		19	0,70	0,66	0,67	0,66	0,62	0,67	0,62	0,62	0,63	0,62	0,62	0,62

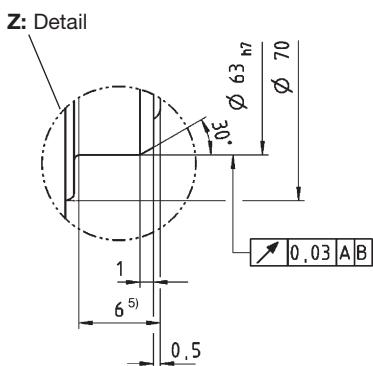
1) Other reduction ratios are optionally available. Please contact alpha.

\* Please reduce the n<sub>1N</sub> speed at higher ambient temperatures.

\*\* Applies to 14 mm clamping hub diameter

\*\*\* Referred to the centre of the flange.

\*\*\*\* Measured at a reduction ratio i = 16 (without load).



### Conversion table

1 mm	= 0,039 in
1 Nm	= 8,85 in.lb
1 kgcm <sup>2</sup>	= 8,85 x 10 <sup>-4</sup> in.lb.s <sup>2</sup>
1 N	= 0,225 lb <sub>f</sub>
1 kg	= 2,21 lb <sub>m</sub>



alpha

## View A

## Motor shaft diameter (mm)

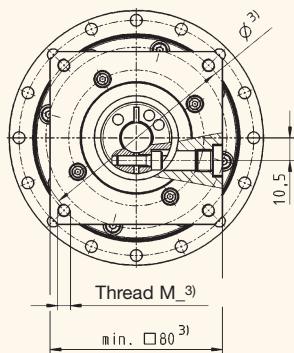
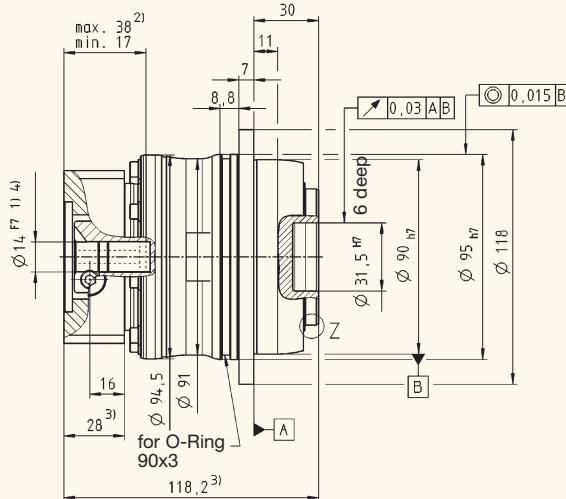
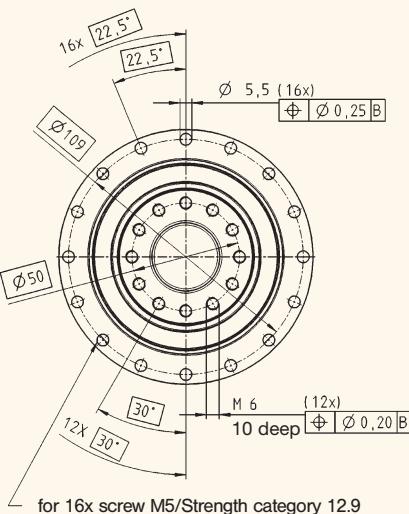
## View B

2-stage

B →

up to 14<sup>4)</sup>

← A



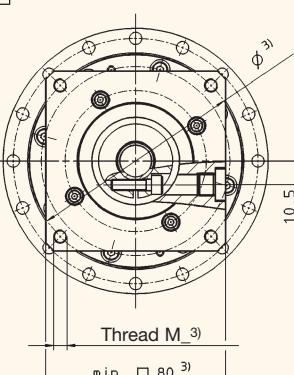
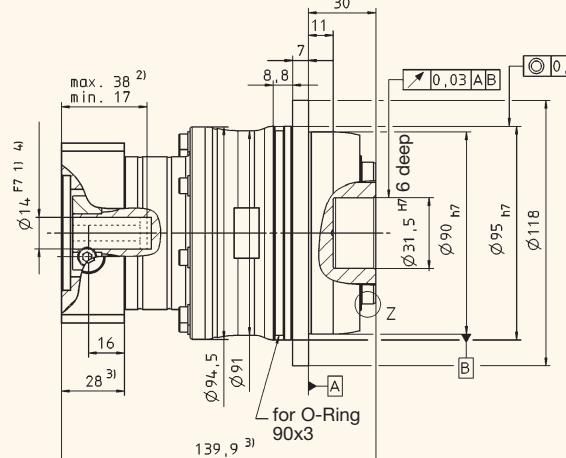
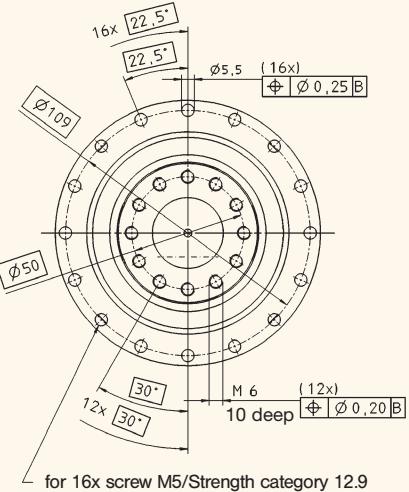
for 16x screw M5/Strength category 12.9

3-stage

B →

up to 14<sup>4)</sup>

← A



for 16x screw M5/Strength category 12.9

Dimensions without specified tolerances  $\pm 1$  mm.

1) Check motor shaft fit.

2) Min./max. permissible motor shaft length. Longer motor shaft is possible. Please call alpha.

3) The dimensions depend on the motor.

4) Smaller motor shaft diameter is compensated by a bushing with at least 1 mm thickness (see page 42).

5) Centering depth.

⚠ Motor mounting according to operating manual.

## Technical data TP+ 010 HIGH TORQUE®

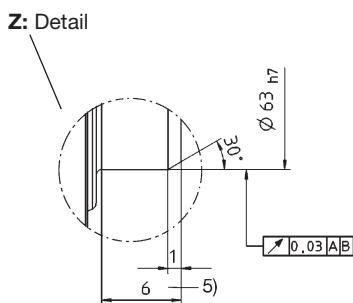
		2-stage				3-stage			
Ratio	i	22	27,5	38,5	55	88	110	154	220
Max. acceleration torque (Max. 1000 cycles per hour)	T <sub>2B</sub> Nm	230	230	230	230	230	230	230	230
Nominal output torque (n <sub>1</sub> =3000 min <sup>-1</sup> ) (Higher values possible if n <sub>1</sub> = 2000 rpm)	T <sub>2N</sub> Nm	150	150	180	110	180	180	180	180
Emergency stop torque (Permissible 1000 times during the lifespan of the gearhead)	T <sub>2Not</sub> Nm	525	525	525	525	525	525	525	525
Nominal input speed (At 20 °C ambient temperature) *	n <sub>1IN</sub> min <sup>-1</sup>	4000	4000	4000	4000	4500	4500	4500	4500
Medial no-load running torque (n <sub>1</sub> =3000 min <sup>-1</sup> ) (At 20 °C gearhead temperature) **	T <sub>012</sub> Nm	0,42	-	-	-	-	0,23	-	-
Maximum input speed	n <sub>1Max</sub> min <sup>-1</sup>	6000	6000	6000	6000	6000	6000	6000	6000
Torsional backlash	j <sub>t</sub> arcmin	$\leq 1$				$\leq 1$			
Torsional rigidity	C <sub>121</sub> Nm/arcmin	43	-	-	-	-	43	-	-
Tilting rigidity	C <sub>2K</sub> Nm/arcmin	225				225			
Max. axial force ***	F <sub>2AMax</sub> N	2150				2150			
Max. tilting moment (at 100 min <sup>-1</sup> on the output)	M <sub>2KMax</sub> Nm	400				400			
Efficiency at full load (at T <sub>2B</sub> and n <sub>1</sub> =3000 min <sup>-1</sup> )	$\eta$ %	$\leq 94$				$\leq 92$			
Weight incl. adapter plate	m kg	3,2				3,6			
Noise level (n <sub>1</sub> =3000 min <sup>-1</sup> ) ****	L <sub>PA</sub> dB(A)	$\leq 60$				$\leq 60$			
Max. permissible housing temperature	°C	+90							
Ambient temperature	°C	0 up to +40							
Lubrication		Lubricated for lifetime							
Paint		Blue RAL 5002							
Direction of rotation		Motor and gearhead same direction							
Type of protection		IP 65							
Mass moment of inertia (Referring to the drive)	J <sub>1</sub> kgcm <sup>2</sup>	14	0,21	0,18	0,16	0,14	0,16	0,15	0,14
Clamping hub diameter (mm)		19	0,52	0,50	0,47	0,46	-	-	-

\* Please reduce the n<sub>1IN</sub> speed at higher ambient temperatures.

\*\* Applies to 14 mm clamping hub diameter

\*\*\* Referred to the centre of the flange.

\*\*\*\* Measured at a reduction ratio i = 22 and i = 110 (without load).



### Conversion table

1 mm	= 0.039 in
1 Nm	= 8.85 in.lb
1 kgcm <sup>2</sup>	= $8.85 \times 10^{-4}$ in.lb.s <sup>2</sup>
1 N	= 0.225 lb <sub>f</sub>
1 kg	= 2.21 lb <sub>m</sub>

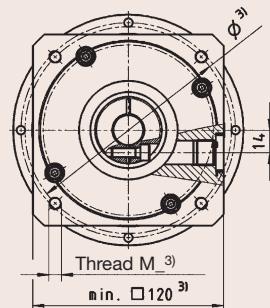
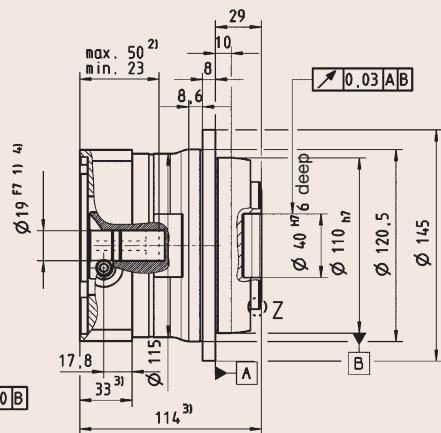
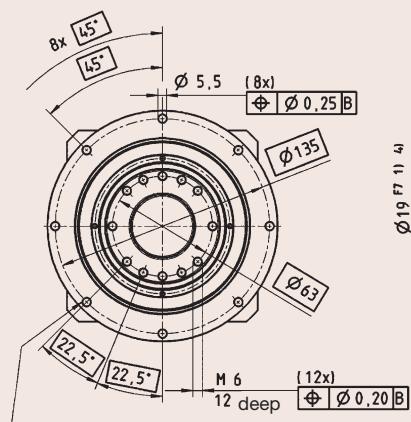


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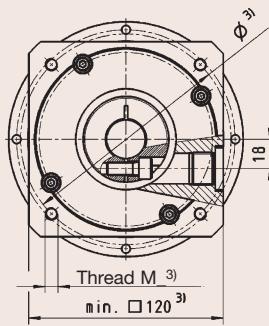
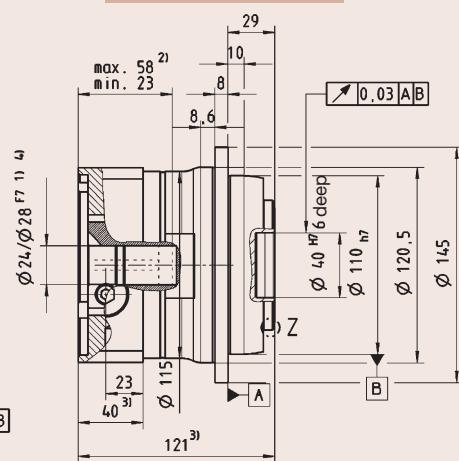
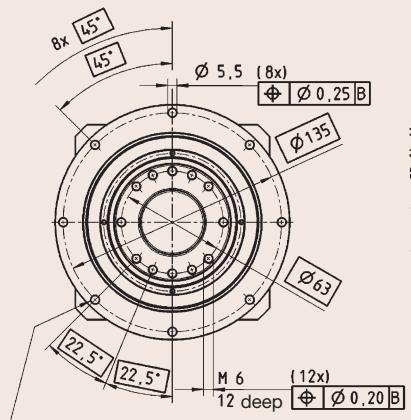
## View A

## Motor shaft diameter (mm)

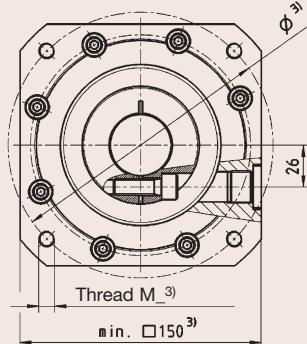
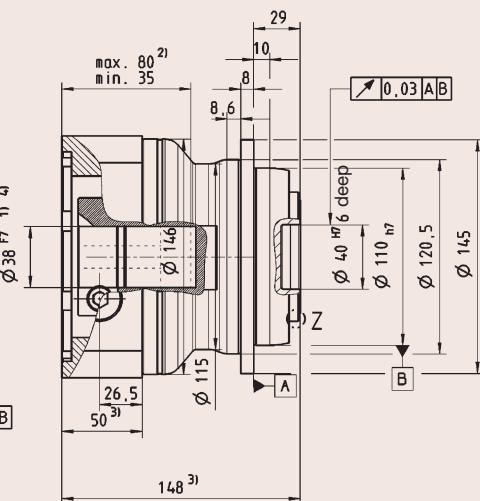
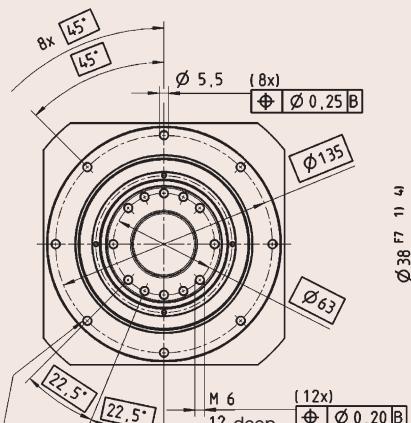
## View B

**B →****up to 19<sup>4)</sup>****← A**

for 8x screw M5/Strength category 12.9

**B →****up to 24 und 28<sup>4)</sup>****← A**

for 8x screw M5/Strength category 12.9

**B →****up to 38<sup>4)</sup>****← A**

for 8x screw M5/Strength category 12.9

Dimensions without specified tolerances  $\pm 1$  mm.

1) Check motor shaft fit.

2) Min./max. permissible motor shaft length. Longer motor shaft is possible. Please call alpha.

3) The dimensions depend on the motor.

4) Smaller motor shaft diameter is compensated by a bushing with at least 1 mm thickness (see page 42).

5) Centering depth.

⚠ Motor mounting according to operating manual.

## Technical data TP+ 025 1-stage

		1-stage			
Ratio <sup>1)</sup>	i	4	5	7	10
Max. acceleration torque (Max. 1000 cycles per hour)	T <sub>2B</sub> Nm	350	380	330	265
Nominal output torque (n <sub>1</sub> = 3000 U/min) (Higher values possible if n <sub>1</sub> = 2000 rpm)	T <sub>2N</sub> Nm	170	170	170	120
Emergency stop torque (Permissible 1000 times during the lifespan of the gearhead)	T <sub>2Not</sub> Nm	625	625	625	625
Nominal input speed (At 20 °C ambient temperature) *	n <sub>1N</sub> min <sup>-1</sup>	2300	2500	2500	2500
Medial no-load running torque (n <sub>1</sub> = 3000 min <sup>-1</sup> ) (At 20 °C gearhead temperature) **	T <sub>012</sub> Nm	3,3	2,7	2,0	1,4
Maximum input speed	n <sub>1Max</sub> min <sup>-1</sup>	4500	4500	4500	4500
Torsional backlash	j <sub>t</sub> arcmin		Standard ≤ 3 / Reduced ≤ 1		
Torsional rigidity	C <sub>121</sub> Nm/arcmin	66	86	75	60
Tilting rigidity	C <sub>2K</sub> Nm/arcmin		550		
Max. axial force ***	F <sub>2AMax</sub> N		4150		
Max. tilting moment	M <sub>2KMax</sub> Nm		440		
Efficiency at full load	η %		97		
Weight incl. adapter plate	m kg		6,5		
Noise level (n <sub>1</sub> = 3000 min <sup>-1</sup> ) ****	L <sub>PA</sub> dB(A)		≤ 64		
Max. permissible housing temperature	°C		+90		
Ambient temperature	°C		0 up to +40		
Lubrication		Lubricated for lifetime			
Paint		Blue RAL 5002			
Direction of rotation		Motor and gearhead same direction			
Type of protection		IP 65			
		19	2,89	2,33	1,89
Mass moment of inertia (Referring to the drive)	J <sub>1</sub> kgcm <sup>2</sup>	24	3,71	3,15	2,77
Clamping hub diameter (mm)		28	3,60	3,05	2,66
		38	10,6	10,1	9,52
					9,24

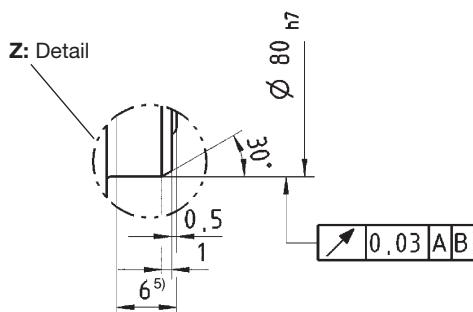
1) Other reduction ratios are optionally available. Please contact alpha.

\* Please reduce the n<sub>1N</sub> speed at higher ambient temperatures.

\*\* Applies to 24 and 28 mm clamping hub diameter

\*\*\* Referred to the centre of the flange.

\*\*\*\* Measured at a reduction ratio i = 10 (without load).



### Conversion table

1 mm	= 0.039 in
1 Nm	= 8.85 in.lb
1 kgcm <sup>2</sup>	= 8.85 x 10 <sup>-4</sup> in.lb.s <sup>2</sup>
1 N	= 0.225 lb <sub>f</sub>
1 kg	= 2.21 lb <sub>m</sub>

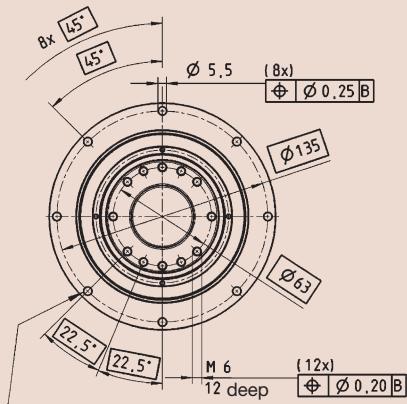


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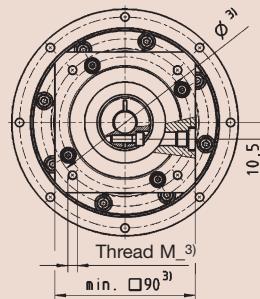
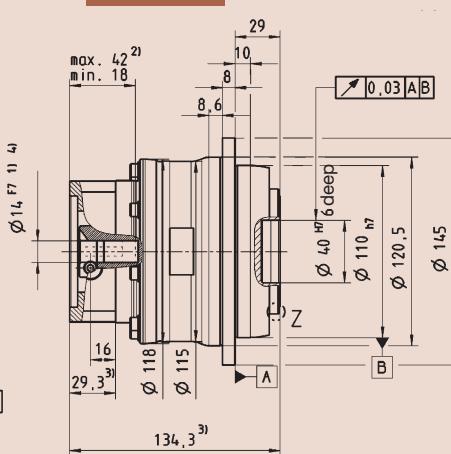
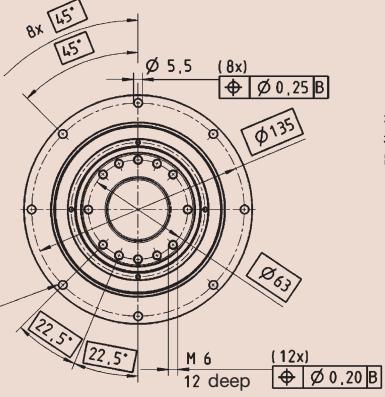
## View A

## Motor shaft diameter (mm)

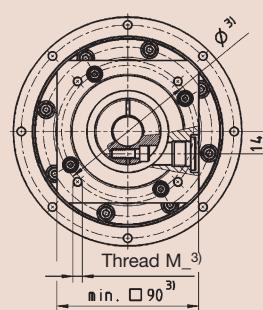
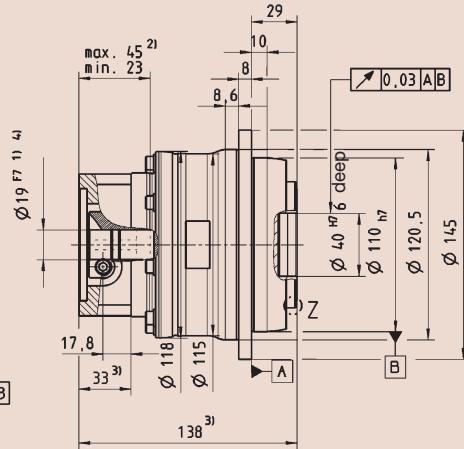
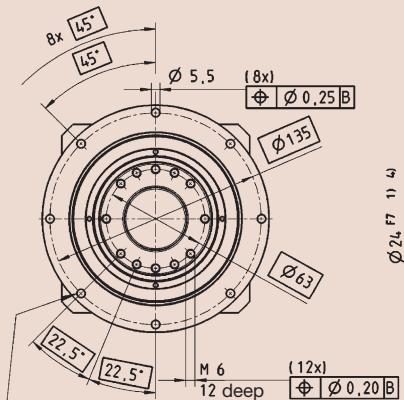
## View B

**B →****up to 14<sup>4)</sup>****← A**

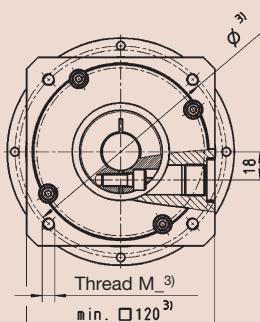
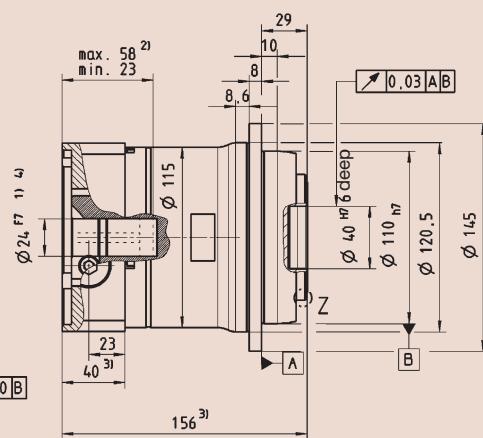
for 8x screw M5/Strength category 12.9

**B →****up to 19<sup>4)</sup>****← A**

for 8x screw M5/Strength category 12.9

**B →****up to 24<sup>4)</sup>****← A**

for 8x screw M5/Strength category 12.9

Dimensions without specified tolerances  $\pm 1$  mm.

1) Check motor shaft fit.

2) Min./max. permissible motor shaft length. Longer motor shaft is possible. Please call alpha.

3) The dimensions depend on the motor.

4) Smaller motor shaft diameter is compensated by a bushing with at least 1 mm thickness (see page 42).

5) Centering depth.

⚠ Motor mounting according to operating manual.

## Technical data TP+ 025 2-stage

		2-stage													
Ratio <sup>1)</sup>	i	16	20	21	25	28	31	35	40	50	61	70	91	100	
Max. acceleration torque (Max. 1000 cycles per hour)	T <sub>2B</sub> Nm	350	350	300	380	350	300	380	350	380	280	330	250	265	
Nominal output torque (n <sub>1</sub> = 3000 U/min) (Higher values possible if n <sub>1</sub> = 2000 rpm)	T <sub>2N</sub> Nm	200	210	170	200	210	190	220	200	220	170	200	100	120	
Emergency stop torque (Permissible 1000 times during the lifespan of the gearhead)	T <sub>2Not</sub> Nm	625	625	625	625	625	625	625	625	625	625	625	625	625	
Nominal input speed (At 20 °C ambient temperature) *	n <sub>1N</sub> min <sup>-1</sup>	2800	2800	2800	2800	2800	2800	2800	2800	3100	3500	3500	4200	4200	
Medial no-load running torque (n <sub>1</sub> =3000 min <sup>-1</sup> ) (At 20 °C gearhead temperature) **	T <sub>012</sub> Nm	1,8	1,5	1,4	1,4	1,1	1,1	1,0	0,8	0,8	0,7	0,7	0,6	0,6	
Maximum input speed	n <sub>1Max</sub> min <sup>-1</sup>	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	
Torsional backlash	j <sub>t</sub> arcmin	Standard ≤ 3 / Reduced ≤ 1													
Torsional rigidity	C <sub>121</sub> Nm/arcmin	75	-	80	-	-	54	80	75	80	-	70	55	60	
Tilting rigidity	C <sub>2K</sub> Nm/arcmin	550													
Max. axial force ***	F <sub>2AMax</sub> N	4150													
Max. tilting moment	M <sub>2KMax</sub> Nm	440													
Efficiency at full load	η %	94													
Weight incl. adapter plate	m kg	6,7													
Noise level (n <sub>1</sub> =3000 min <sup>-1</sup> ) ****	L <sub>PA</sub> dB(A)	≤ 64													
Max. permissible housing temperature	°C	+90													
Ambient temperature	°C	0 up to +40													
Lubrication		Lubricated for lifetime													
Paint		Blue RAL 5002													
Direction of rotation		Motor and gearhead same direction													
Type of protection		IP 65													
Mass moment of inertia (Referring to the drive)	J <sub>1</sub> kgcm <sup>2</sup>	14	0,68	0,58	0,62	0,56	0,48	0,63	0,48	0,43	0,43	0,44	0,43	0,43	0,42
Clamping hub diameter (mm)		19	0,93	0,83	0,87	0,81	0,72	0,88	0,71	0,68	0,68	0,69	0,67	0,68	0,67
		24	2,49	2,39	2,43	2,38	2,30	2,44	2,29	2,25	2,25	2,26	2,24	2,25	2,24

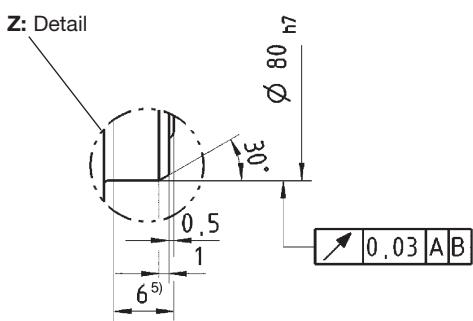
1) Other reduction ratios are optionally available. Please contact alpha.

\* Please reduce the n<sub>1N</sub> speed at higher ambient temperatures.

\*\* Applies to 19 mm clamping hub diameter

\*\*\* Referred to the centre of the flange.

\*\*\*\* Measured at a reduction ratio i = 16 (without load).



### Conversion table

1 mm	= 0.039 in
1 Nm	= 8.85 in.lb
1 kgcm <sup>2</sup>	= 8.85 x 10 <sup>-4</sup> in.lb.s <sup>2</sup>
1 N	= 0.225 lb <sub>f</sub>
1 kg	= 2.21 lb <sub>m</sub>



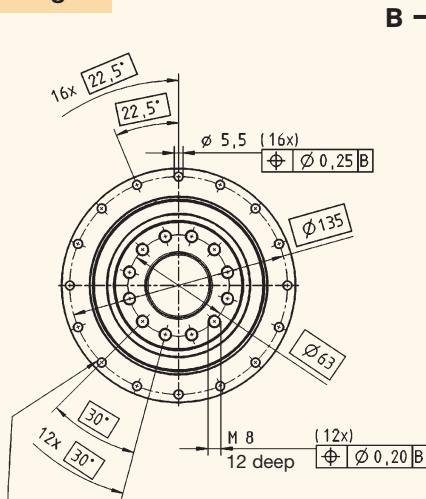
alpha

## View A

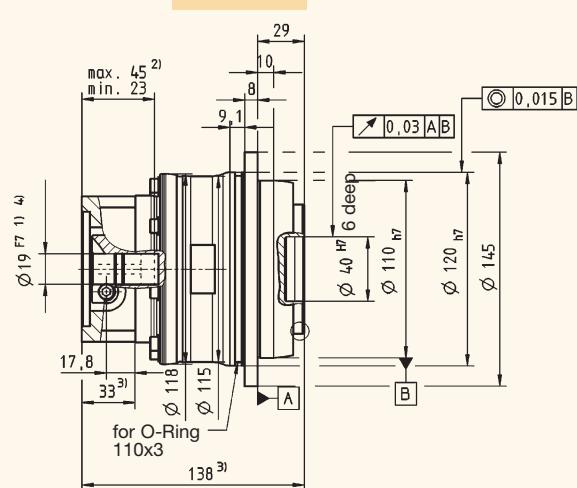
## Motor shaft diameter (mm)

## View B

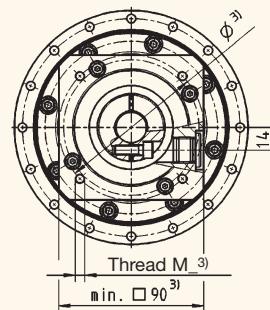
2-stage



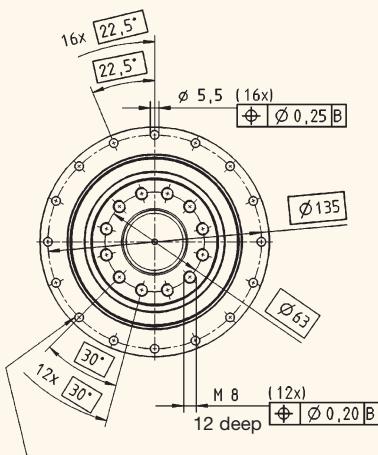
B →

up to 19<sup>4)</sup>

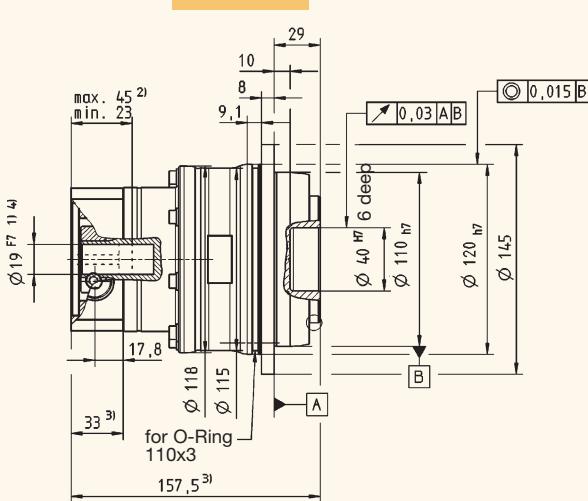
← A



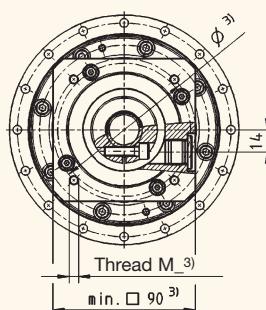
3-stage



B →

up to 19<sup>4)</sup>

← A



Dimensions without specified tolerances ±1 mm.

- 1) Check motor shaft fit.
- 2) Min./max. permissible motor shaft length. Longer motor shaft is possible. Please call alpha.
- 3) The dimensions depend on the motor.
- 4) Smaller motor shaft diameter is compensated by a bushing with at least 1 mm thickness (see page 42).
- 5) Centering depth.

Motor mounting according to operating manual.

## Technical data TP+ 025 HIGH TORQUE®

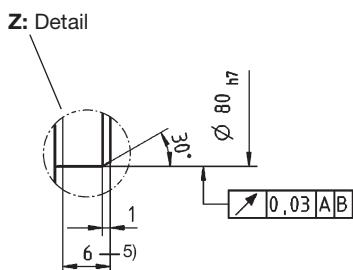
		2-stage				3-stage					
Ratio	i	22	27,5	38,5	55	66	88	110	154	220	
Max. acceleration torque (Max. 1000 cycles per hour)	T <sub>2B</sub> Nm	530	530	530	530	480	480	480	480	480	
Nominal output torque (n <sub>1</sub> =3000 min <sup>-1</sup> ) (Higher values possible if n <sub>1</sub> = 2000 rpm)	T <sub>2N</sub> Nm	320	350	375	375	260	260	260	260	260	
Emergency stop torque (Permissible 1000 times during the lifespan of the gearhead)	T <sub>2Not</sub> Nm	1200	1200	1200	1200	1200	1200	1200	1200	1200	
Nominal input speed (At 20 °C ambient temperature) *	n <sub>1N</sub> min <sup>-1</sup>	3500	3500	3500	3500	4000	4000	4000	4000	4000	
Medial no-load running torque (n <sub>1</sub> =3000 min <sup>-1</sup> ) (At 20 °C gearhead temperature) **	T <sub>012</sub> Nm	1,0	-	-	-	-	-	0,5	-	-	
Maximum input speed	n <sub>1Max</sub> min <sup>-1</sup>	6000	6000	6000	6000	6000	6000	6000	6000	6000	
Torsional backlash	j <sub>t</sub> arcmin	≤ 1				≤ 1					
Torsional rigidity	C <sub>121</sub> Nm/arcmin	100	-	-	-	-	-	95	-	-	
Tilting rigidity	C <sub>2K</sub> Nm/arcmin	413				413					
Max. axial force ***	F <sub>2AMax</sub> N	4150				4150					
Max. tilting moment (at 100 min <sup>-1</sup> on the output)	M <sub>2KMax</sub> Nm	550				550					
Efficiency at full load (at T <sub>2B</sub> and n <sub>1</sub> =3000 min <sup>-1</sup> )	η %	≤ 94				≤ 92					
Weight incl. adapter plate	m kg	5,6				6,1					
Noise level (n <sub>1</sub> =3000 min <sup>-1</sup> ) ****	L <sub>PA</sub> dB(A)	≤ 62				≤ 62					
Max. permissible housing temperature	°C	+90									
Ambient temperature	°C	0 up to +40									
Lubrication		Lubricated for lifetime									
Paint		Blue RAL 5002									
Direction of rotation		Motor and gearhead same direction									
Type of protection		IP 65									
Mass moment of inertia (Referring to the drive)	J <sub>1</sub> kgcm <sup>2</sup>	19	0,87	0,70	0,60	0,55	0,63	0,56	0,53	0,51	0,50
Clamping hub diameter (mm)		24	2,39	2,22	2,12	2,07	-	-	-	-	-

\* Please reduce the n<sub>1N</sub> speed at higher ambient temperatures.

\*\* Applies to 19 mm clamping hub diameter

\*\*\* Referred to the centre of the flange.

\*\*\*\* Measured at a reduction ratio i = 22 and i = 110 (without load).



### Conversion table

1 mm	= 0.039 in
1 Nm	= 8.85 in.lb
1 kgcm <sup>2</sup>	= 8.85 x 10 <sup>-4</sup> in.lb.s <sup>2</sup>
1 N	= 0.225 lb <sub>f</sub>
1 kg	= 2.21 lb <sub>m</sub>

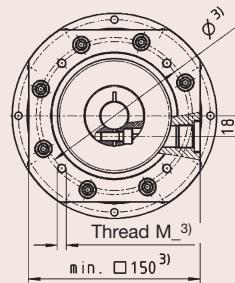
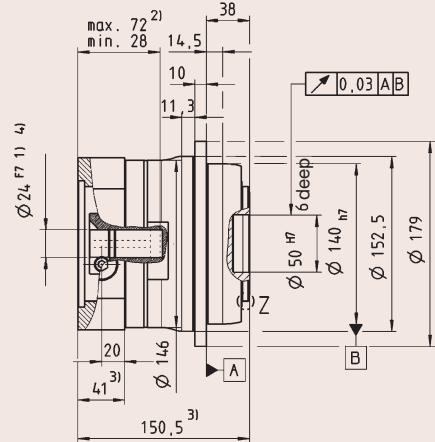
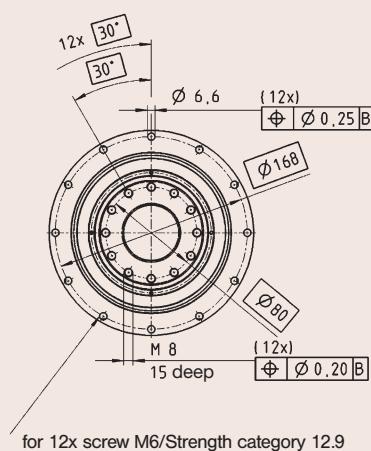
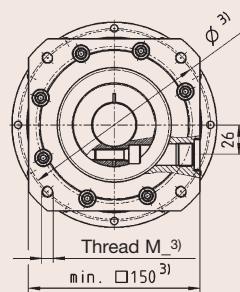
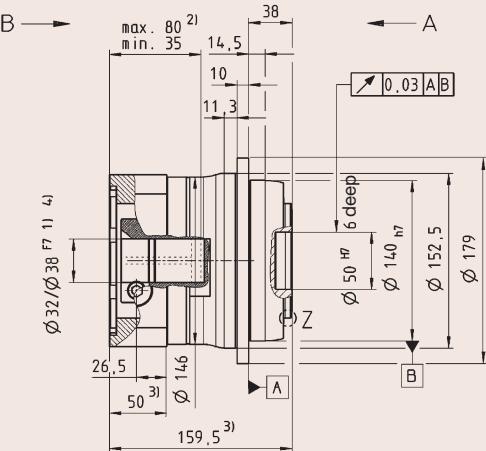
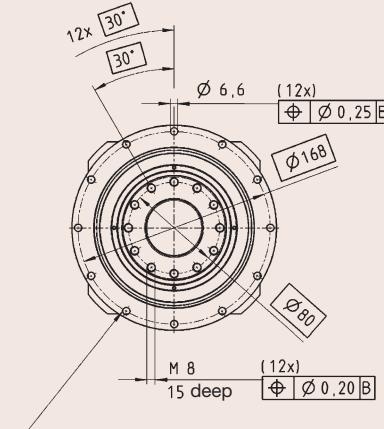
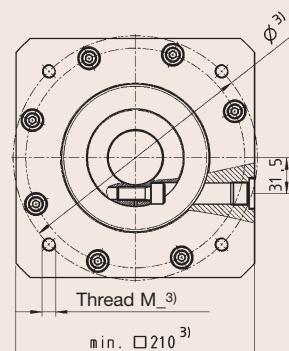
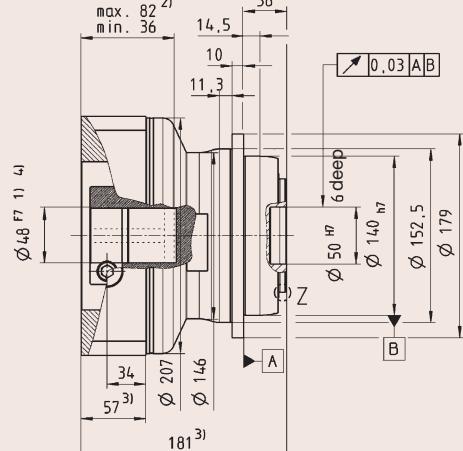
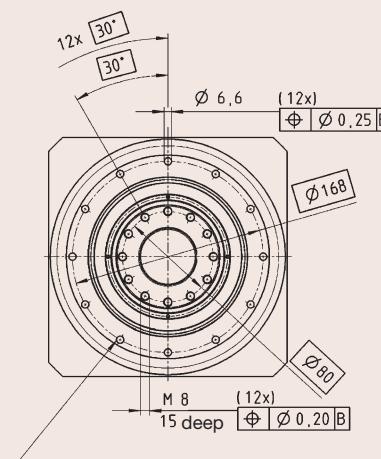


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## View A

## Motor shaft diameter (mm)

## View B

**B →****up to 24<sup>4)</sup>****← A****B →****up to 32 und 38<sup>4)</sup>****← A****B →****up to 48<sup>4)</sup>****← A**

Dimensions without specified tolerances  $\pm 1$  mm.

- 1) Check motor shaft fit.
- 2) Min./max. permissible motor shaft length. Longer motor shaft is possible. Please call alpha.
- 3) The dimensions depend on the motor.
- 4) Smaller motor shaft diameter is compensated by a bushing with at least 1 mm thickness (see page 42).
- 5) Centering depth.

Motor mounting according to operating manual.

## Technical data TP+ 050 1-stage

	1-stage				
Ratio <sup>1)</sup>	i	4	5	7	10
Max. acceleration torque (Max. 1000 cycles per hour)	T <sub>2B</sub> Nm	700	700	700	540
Nominal output torque (n <sub>1</sub> = 3000 U/min) (Higher values possible if n <sub>1</sub> = 2000 rpm)	T <sub>2N</sub> Nm	370	370	370	240
Emergency stop torque (Permissible 1000 times during the lifespan of the gearhead)	T <sub>2Not</sub> Nm	1250	1250	1250	1250
Nominal input speed (At 20 °C ambient temperature) *	n <sub>1N</sub> min <sup>-1</sup>	1900	2000	2500	2500
Medial no-load running torque (n <sub>1</sub> = 3000 min <sup>-1</sup> ) (At 20 °C gearhead temperature) **	T <sub>012</sub> Nm	8,1	6,6	4,8	3,5
Maximum input speed	n <sub>1Max</sub> min <sup>-1</sup>	4000	4000	4000	4000
Torsional backlash	j <sub>t</sub> arcmin		Standard ≤ 3 / Reduced ≤ 1		
Torsional rigidity	C <sub>121</sub> Nm/arcmin	-	174	149	123
Tilting rigidity	C <sub>2K</sub> Nm/arcmin		560		
Max. axial force ***	F <sub>2AMax</sub> N		6130		
Max. tilting moment	M <sub>2KMax</sub> Nm		1335		
Efficiency at full load	η	%		97	
Weight incl. adapter plate	m kg		14,0		
Noise level (n <sub>1</sub> = 3000 min <sup>-1</sup> ) ****	L <sub>PA</sub> dB(A)		≤ 66		
Max. permissible housing temperature	°C		+90		
Ambient temperature	°C		0 up to +40		
Lubrication			Lubricated for lifetime		
Paint			Blue RAL 5002		
Direction of rotation			Motor and gearhead same direction		
Type of protection			IP 65		
		24	10,0	8,4	6,9
Mass moment of inertia (Referring to the drive)	J <sub>1</sub> kgcm <sup>2</sup>	32	14,3	12,7	11,2
Clamping hub diameter (mm)		38	14,0	12,4	10,9
		48	28,7	27,1	25,1
					24,3

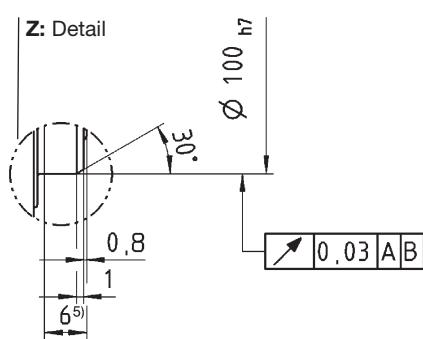
1) Other reduction ratios are optionally available. Please contact alpha.

\* Please reduce the n<sub>1N</sub> speed at higher ambient temperatures.

\*\* Applies to 32 and 38 mm clamping hub diameter

\*\*\* Referred to the centre of the flange.

\*\*\*\* Measured at a reduction ratio i = 10 (without load).



### Conversion table

1 mm	= 0.039 in
1 Nm	= 8.85 in.lb
1 kgcm <sup>2</sup>	= 8.85 x 10 <sup>-4</sup> in.lb.s <sup>2</sup>
1 N	= 0.225 lb <sub>f</sub>
1 kg	= 2.21 lb <sub>m</sub>

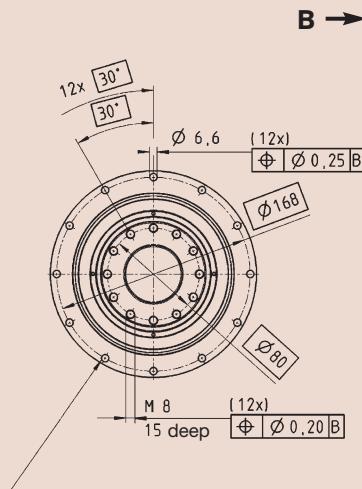


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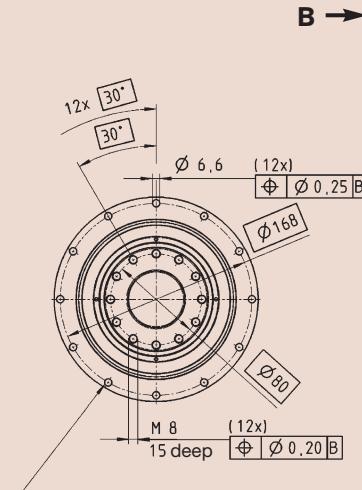
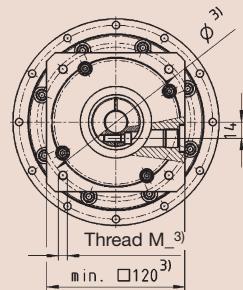
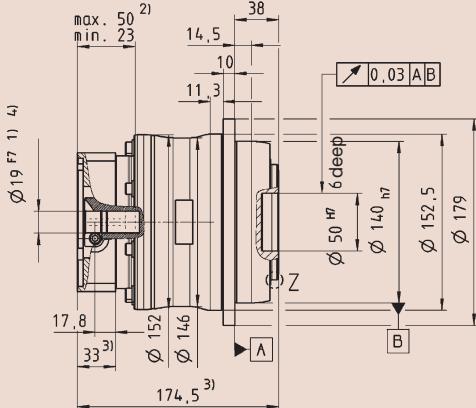
## View A

## Motor shaft diameter (mm)

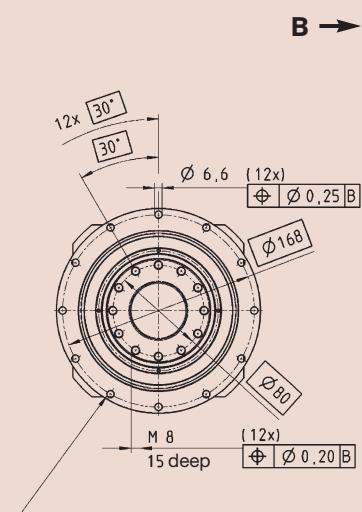
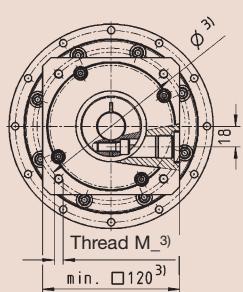
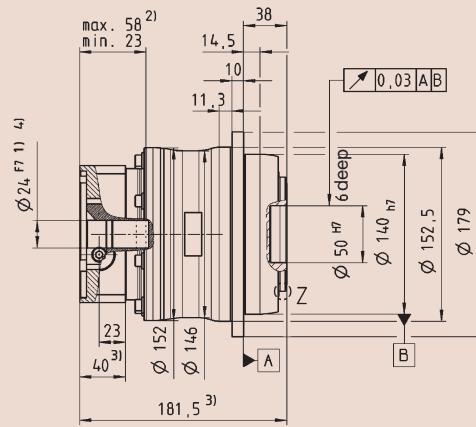
## View B



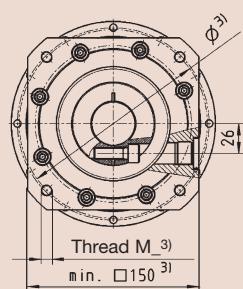
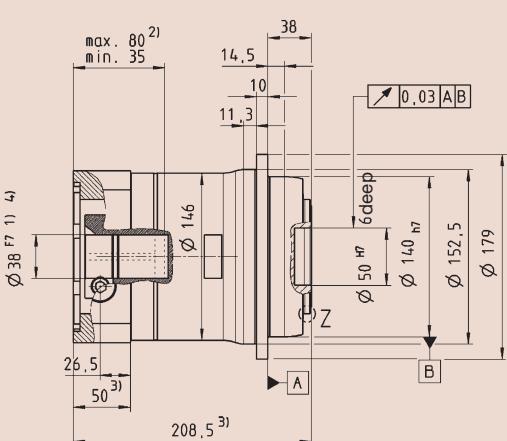
for 12x screw M6/Strength category 12.9

up to 19<sup>4)</sup>

for 12x screw M6/Strength category 12.9

up to 24<sup>4)</sup>

for 12x screw M6/Strength category 12.9

up to 38<sup>4)</sup>Dimensions without specified tolerances  $\pm 1$  mm.

1) Check motor shaft fit.

2) Min./max. permissible motor shaft length. Longer motor shaft is possible. Please call alpha.

3) The dimensions depend on the motor.

4) Smaller motor shaft diameter is compensated by a bushing with at least 1 mm thickness (see page 42).

5) Centering depth.

Motor mounting according to operating manual.

## Technical data TP+ 050 2-stage

		2-stage													
Ratio <sup>1)</sup>	i	16	20	21	25	28	31	35	40	50	61	70	91	100	
Max. acceleration torque (Max. 1000 cycles per hour)	T <sub>2B</sub> Nm	750	750	600	750	750	620	750	750	750	550	700	500	540	
Nominal output torque (n <sub>1</sub> = 3000 U/min) (Higher values possible if n <sub>1</sub> = 2000 rpm)	T <sub>2N</sub> Nm	400	400	350	400	400	400	400	400	400	350	400	220	240	
Emergency stop torque (Permissible 1000 times during the lifespan of the gearhead)	T <sub>2Not</sub> Nm	1250	1250	1250	1250	1250	1250	1250	1250	1250	1250	1250	1250	1250	
Nominal input speed (At 20 °C ambient temperature) *	n <sub>1N</sub> min <sup>-1</sup>	2900	2900	2900	2900	2900	2900	2900	2900	3200	3200	3200	3900	3900	
Medial no-load running torque (n <sub>1</sub> = 3000 min <sup>-1</sup> ) (At 20 °C gearhead temperature) **	T <sub>012</sub> Nm	4,2	3,4	3,3	3,1	2,5	2,4	2,3	1,8	1,7	1,5	1,5	1,4	1,3	
Maximum input speed	n <sub>1Max</sub> min <sup>-1</sup>	5000	5000	5000	5000	5000	5000	5000	5000	5000	5000	5000	5000	5000	
Torsional backlash	j <sub>t</sub> arcmin	Standard ≤ 3 / Reduced ≤ 1													
Torsional rigidity	C <sub>121</sub> Nm/arcmin	170	175	-	180	180	-	180	170	180	123	-	100	125	
Tilting rigidity	C <sub>2K</sub> Nm/arcmin	560													
Max. axial force ***	F <sub>2AMax</sub> N	6130													
Max. tilting moment	M <sub>2KMax</sub> Nm	1335													
Efficiency at full load	η %	94													
Weight incl. adapter plate	m kg	14,1													
Noise level (n <sub>1</sub> = 3000 min <sup>-1</sup> ) ****	L <sub>PA</sub> dB(A)	≤ 70													
Max. permissible housing temperature	°C	+90													
Ambient temperature	°C	0 up to +40													
Lubrication		Lubricated for lifetime													
Paint		Blue RAL 5002													
Direction of rotation		Motor and gearhead same direction													
Type of protection		IP 65													
Mass moment of inertia (Referring to the drive)	J <sub>1</sub> kgcm <sup>2</sup>	19	2,65	2,41	2,56	2,15	1,81	2,46	1,80	1,58	1,57	1,62	1,56	1,59	1,56
Clamping hub diameter (mm)		24	3,47	3,24	3,38	2,97	2,69	3,28	2,68	2,41	2,41	2,46	2,40	2,43	2,39
		38	10,4	10,2	10,3	9,88	9,44	10,2	9,43	9,21	9,20	9,25	9,19	9,22	9,19

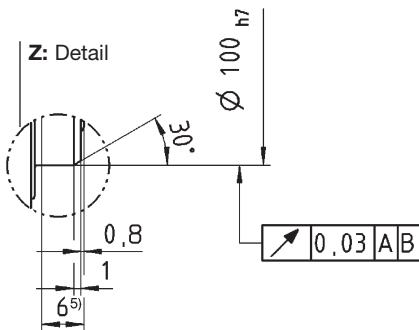
1) Other reduction ratios are optionally available. Please contact alpha.

\* Please reduce the n<sub>1N</sub> speed at higher ambient temperatures.

\*\* Applies to 24 mm clamping hub diameter

\*\*\* Referred to the centre of the flange.

\*\*\*\* Measured at a reduction ratio i = 16 (without load).



### Conversion table

1 mm	= 0.039 in
1 Nm	= 8.85 in.lb
1 kgcm <sup>2</sup>	= 8.85 x 10 <sup>-4</sup> in.lb.s <sup>2</sup>
1 N	= 0.225 lb <sub>f</sub>
1 kg	= 2.21 lb <sub>m</sub>



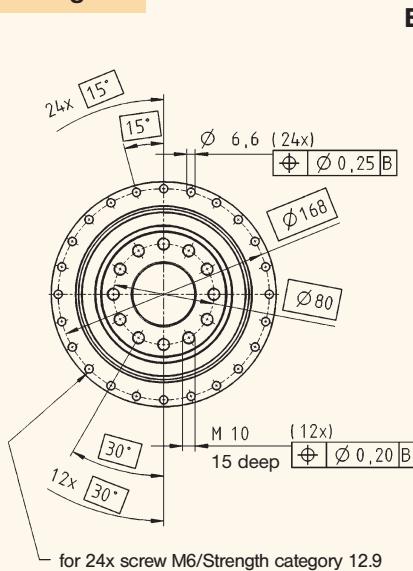
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## View A

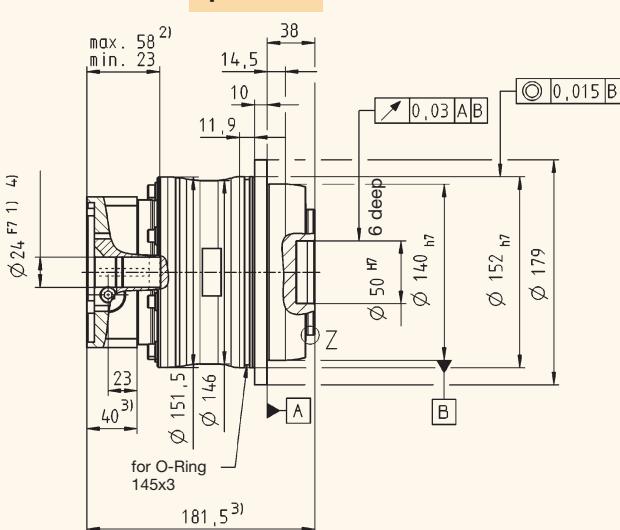
## Motor shaft diameter (mm)

## View B

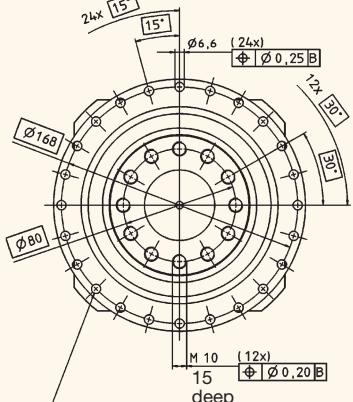
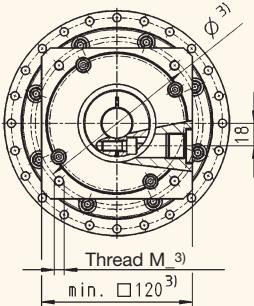
## 2-stage



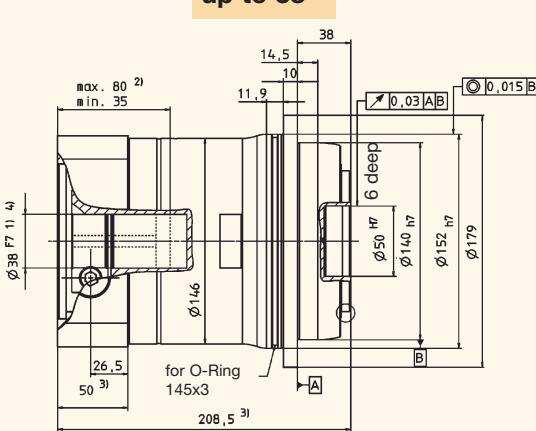
B →

up to 24<sup>4)</sup>

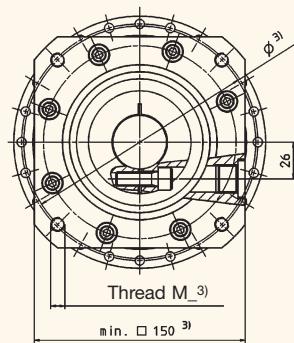
← A



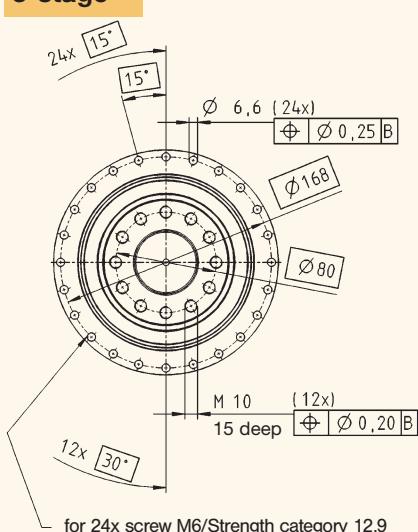
B →

up to 38<sup>4)</sup>

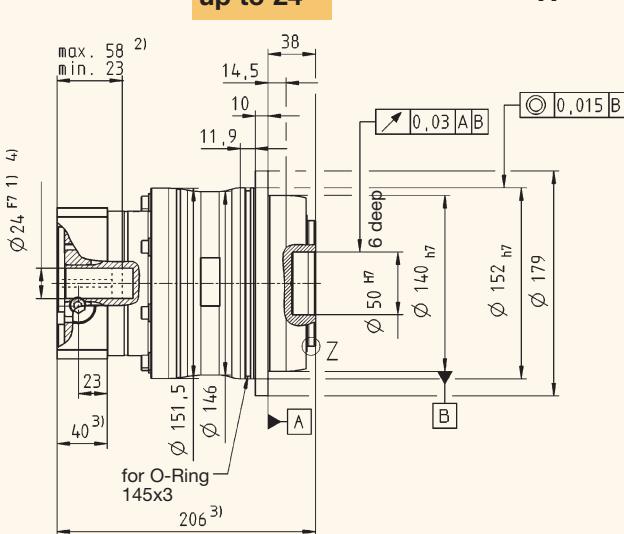
← A



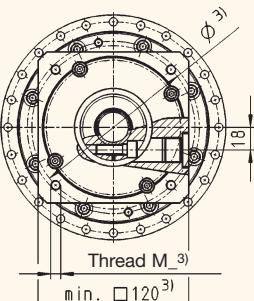
## 3-stage



B →

up to 24<sup>4)</sup>

← A



Dimensions without specified tolerances ±1 mm.

1) Check motor shaft fit.

2) Min./max. permissible motor shaft length. Longer motor shaft is possible. Please call alpha.

3) The dimensions depend on the motor.

4) Smaller motor shaft diameter is compensated by a bushing with at least 1 mm thickness (see page 42).

5) Centering depth.

△ Motor mounting according to operating manual.

## Technical data TP+ 050 HIGH TORQUE®

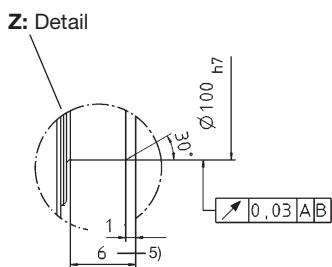
		2-stage				3-stage				
Ratio	i	22	27,5	38,5	55	66	88	110	154	220
Max. acceleration torque (Max. 1000 cycles per hour)	T <sub>2B</sub> Nm	950	950	950	950	950	950	950	950	950
Nominal output torque (n <sub>1</sub> =3000 min <sup>-1</sup> ) (Higher values possible if n <sub>1</sub> = 2000 rpm)	T <sub>2N</sub> Nm	575	600	650	675	675	675	675	675	675
Emergency stop torque (Permissible 1000 times during the lifespan of the gearhead)	T <sub>2Not</sub> Nm	2375	2375	2375	2375	2375	2375	2375	2375	2375
Nominal input speed (At 20 °C ambient temperature) *	n <sub>1N</sub> min <sup>-1</sup>	3000	3000	3000	3000	3500	3500	3500	3500	3500
Medial no-load running torque (n <sub>1</sub> =3000 min <sup>-1</sup> ) (At 20 °C gearhead temperature) **	T <sub>012</sub> Nm	2,7	-	-	-	-	-	1,1	-	-
Maximum input speed	n <sub>1Max</sub> min <sup>-1</sup>	5000	5000	5000	5000	5000	5000	5000	5000	5000
Torsional backlash	j <sub>t</sub> arcmin	≤ 1				≤ 1				
Torsional rigidity	C <sub>121</sub> Nm/arcmin	220	-	-	-	-	-	200	-	-
Tilting rigidity	C <sub>2K</sub> Nm/arcmin	560				560				
Max. axial force ***	F <sub>2AMax</sub> N	6130				6130				
Max. tilting moment (at 100 min <sup>-1</sup> on the output)	M <sub>2KMax</sub> Nm	1335				1335				
Efficiency at full load (at T <sub>2B</sub> and n <sub>1</sub> =3000 min <sup>-1</sup> )	η %	≤ 94				≤ 92				
Weight incl. adapter plate	m kg	12,5				13,4				
Noise level (n <sub>1</sub> =3000 min <sup>-1</sup> ) ****	L <sub>PA</sub> dB(A)	≤ 64				≤ 64				
Max. permissible housing temperature	°C	+90								
Ambient temperature	°C	0 up to +40								
Lubrication		Lubricated for lifetime								
Paint		Blue RAL 5002								
Direction of rotation		Motor and gearhead same direction								
Type of protection		IP 65								
Mass moment of inertia (Referring to the drive)	J <sub>1</sub> kgcm <sup>2</sup>	24	3,8	3,3	3,0	2,8	2,6	2,4	2,2	2,1
Clamping hub diameter (mm)		38	10,7	10,3	9,9	9,7	-	-	-	-

\* Please reduce the n<sub>1N</sub> speed at higher ambient temperatures.

\*\* Applies to 24 mm clamping hub diameter

\*\*\* Referred to the centre of the flange.

\*\*\*\* Measured at a reduction ratio i = 22 and i = 110 (without load).



### Conversion table

1 mm	= 0.039 in
1 Nm	= 8.85 in.lb
1 kgcm <sup>2</sup>	= 8.85 x 10 <sup>-4</sup> in.lb.s <sup>2</sup>
1 N	= 0.225 lb <sub>f</sub>
1 kg	= 2.21 lb <sub>m</sub>

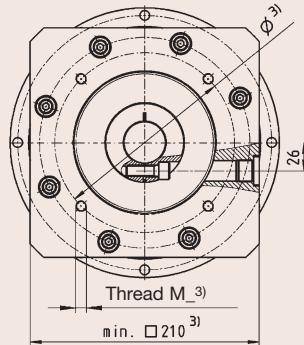
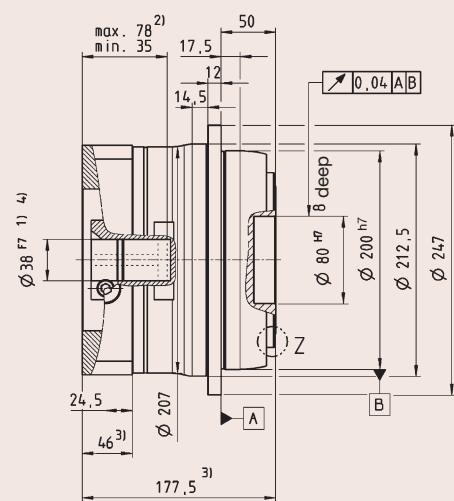
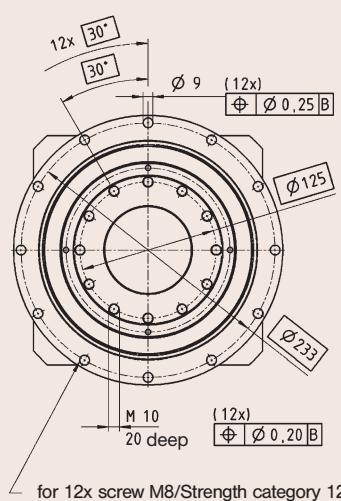
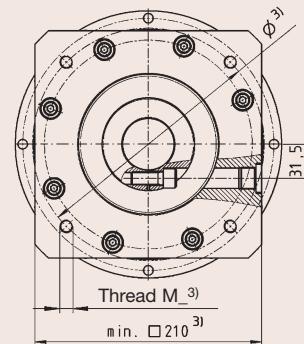
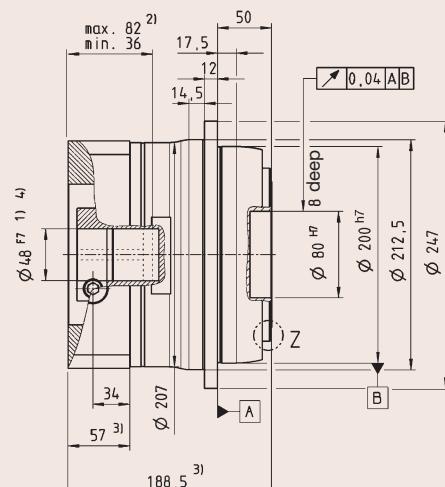
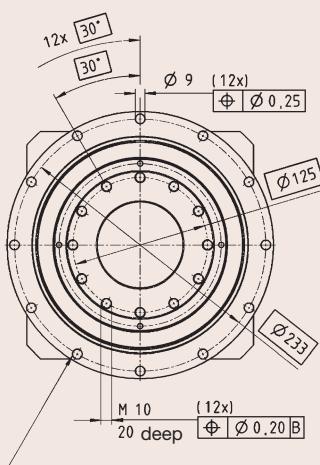


alpha

## View A

## Motor shaft diameter (mm)

## View B

**B →****up to 38<sup>4)</sup>****← A****B →****up to 48<sup>4)</sup>****← A**

Dimensions without specified tolerances ±1 mm.

1) Check motor shaft fit.

2) Min./max. permissible motor shaft length. Longer motor shaft is possible. Please call alpha.

3) The dimensions depend on the motor.

4) Smaller motor shaft diameter is compensated by a bushing with at least 1 mm thickness (see page 42).

5) Centering depth.

Motor mounting according to operating manual.

## Technical data TP+ 110 1-stage

		1-stage			
Ratio <sup>1)</sup>	i	4	5	7	10
Max. acceleration torque (Max. 1000 cycles per hour)	T <sub>2B</sub> Nm	1600	1600	1600	1400
Nominal output torque (n <sub>1</sub> = 3000 U/min) (Higher values possible if n <sub>1</sub> = 2000 rpm)	T <sub>2N</sub> Nm	700	750	750	750
Emergency stop torque (Permissible 1000 times during the lifespan of the gearhead)	T <sub>2Not</sub> Nm	2750	2750	2750	2750
Nominal input speed (At 20 °C ambient temperature) *	n <sub>1N</sub> min <sup>-1</sup>	1400	1500	2000	2000
Medial no-load running torque (n <sub>1</sub> = 3000 min <sup>-1</sup> ) (At 20 °C gearhead temperature) **	T <sub>012</sub> Nm	15,6	12,7	9,4	7,0
Maximum input speed	n <sub>1Max</sub> min <sup>-1</sup>	3500	3500	3500	3500
Torsional backlash	j <sub>t</sub> arcmin		Standard ≤ 3 / Reduced ≤ 1		
Torsional rigidity	C <sub>121</sub> Nm/arcmin	-	619	520	480
Tilting rigidity	C <sub>2K</sub> Nm/arcmin			1452	
Max. axial force ***	F <sub>2AMax</sub> N			10050	
Max. tilting moment	M <sub>2KMax</sub> Nm			3280	
Efficiency at full load	η %			97	
Weight incl. adapter plate	m kg			30,0	
Noise level (n <sub>1</sub> = 3000 min <sup>-1</sup> ) ****	L <sub>PA</sub> dB(A)			≤ 70	
Max. permissible housing temperature	°C			+90	
Ambient temperature	°C			0 up to +40	
Lubrication				Lubricated for lifetime	
Paint				Blue RAL 5002	
Direction of rotation				Motor and gearhead same direction	
Type of protection				IP 65	
Mass moment of inertia (Referring to the drive)	J <sub>1</sub> kgcm <sup>2</sup>	38	46,3	36,4	27,6
Clamping hub diameter (mm)		48	52,4	42,5	33,5
					22,8
					28,7

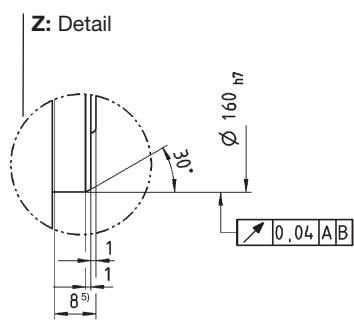
1) Other reduction ratios are optionally available. Please contact alpha.

\* Please reduce the n<sub>1N</sub> speed at higher ambient temperatures.

\*\* Applies to 48 mm clamping hub diameter

\*\*\* Referred to the centre of the flange.

\*\*\*\* Measured at a reduction ratio i = 10 (without load).



### Conversion table

1 mm	= 0.039 in
1 Nm	= 8.85 in.lb
1 kgcm <sup>2</sup>	= 8.85 x 10 <sup>-4</sup> in.lb.s <sup>2</sup>
1 N	= 0.225 lb <sub>f</sub>
1 kg	= 2.21 lb <sub>m</sub>

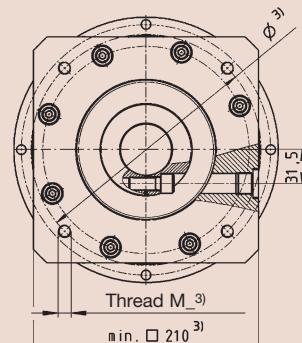
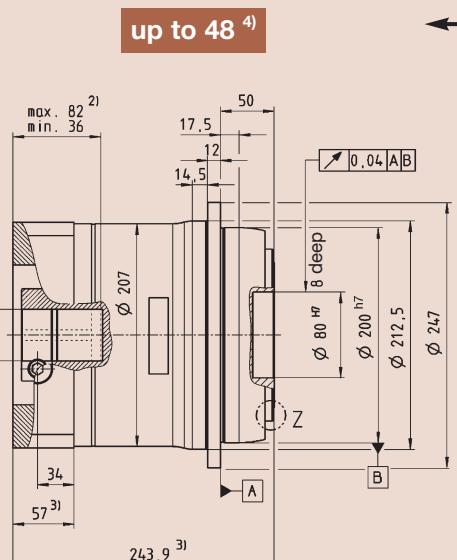
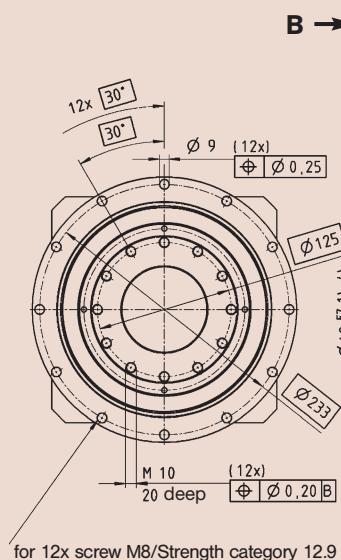
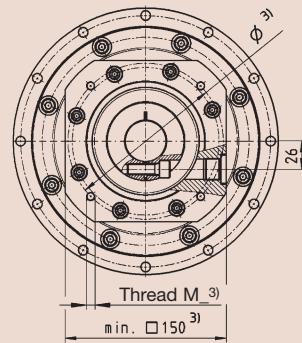
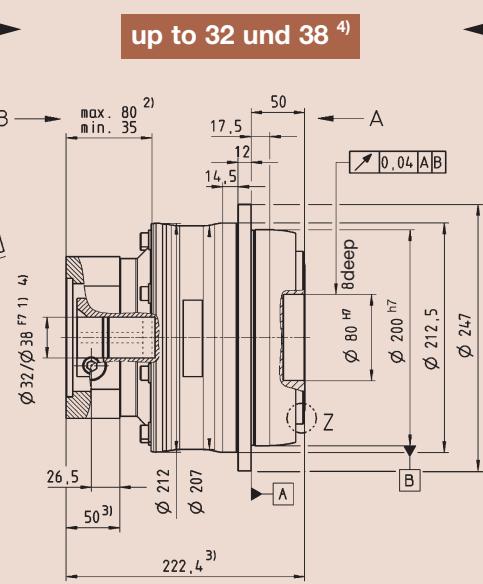
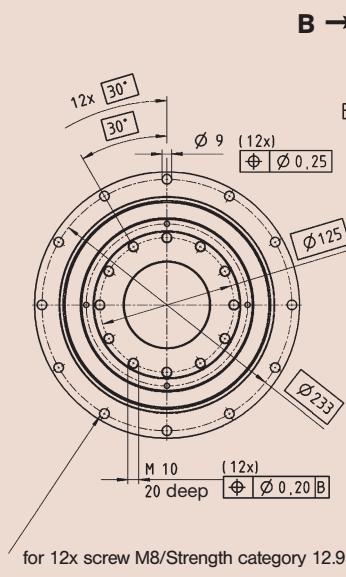
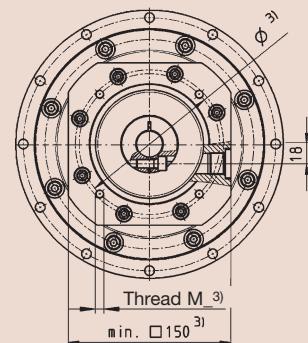
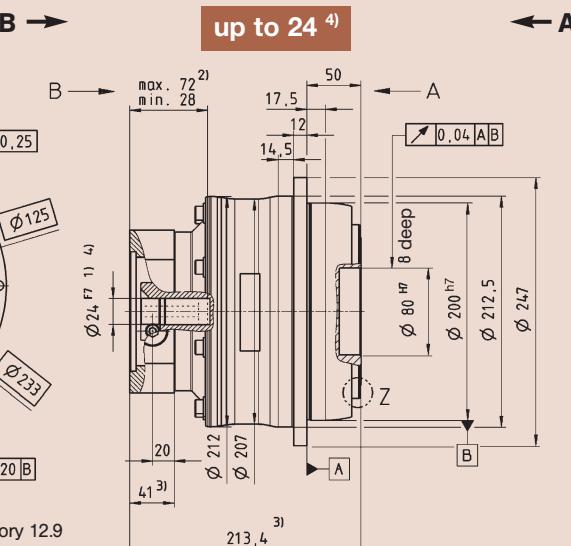
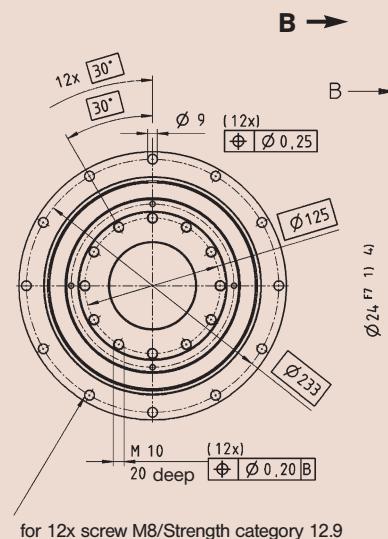


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## View A

## Motor shaft diameter (mm)

## View B



Dimensions without specified tolerances  $\pm 1$  mm.

1) Check motor shaft fit.

2) Min./max. permissible motor shaft length. Longer motor shaft is possible. Please call alpha.

3) The dimensions depend on the motor.

4) Smaller motor shaft diameter is compensated by a bushing with at least 1 mm thickness (see page 42).

5) Centering depth.

Motor mounting according to operating manual.

## Technical data TP+ 110 2-stage

		2-stage													
Ratio <sup>1)</sup>	i	16	20	21	25	28	31	35	40	50	61	70	91	100	
Max. acceleration torque (Max. 1000 cycles per hour)	T <sub>2B</sub> Nm	1600	1600	1400	1600	1600	1600	1600	1600	1600	1400	1600	1300	1400	
Nominal output torque (n <sub>1</sub> = 3000 U/min) (Higher values possible if n <sub>1</sub> = 2000 rpm)	T <sub>2N</sub> Nm	980	980	850	1050	1050	1250	1250	850	1050	1100	900	700	800	
Emergency stop torque (Permissible 1000 times during the lifespan of the gearhead)	T <sub>2Not</sub> Nm	2750	2750	2750	2750	2750	2750	2750	2750	2750	2750	2750	2750	2750	
Nominal input speed (At 20 °C ambient temperature) *	n <sub>1N</sub> min <sup>-1</sup>	2500	2500	2500	2500	2500	2500	2500	2500	2900	3200	3200	3400	3400	
Medial no-load running torque (n <sub>1</sub> = 3000 min <sup>-1</sup> ) (At 20 °C gearhead temperature) **	T <sub>012</sub> Nm	6,9	5,6	5,5	5,0	4,1	3,9	3,7	3,0	2,7	2,5	2,4	2,2	2,2	
Maximum input speed	n <sub>1Max</sub> min <sup>-1</sup>	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	
Torsional backlash	j <sub>t</sub> arcmin	Standard ≤ 3 / Reduced ≤ 1													
Torsional rigidity	C <sub>121</sub> Nm/arcmin	-													
Tilting rigidity	C <sub>2K</sub> Nm/arcmin	1452													
Max. axial force ***	F <sub>2AMax</sub> N	10050													
Max. tilting moment	M <sub>2KMax</sub> Nm	3280													
Efficiency at full load	η %	94													
Weight incl. adapter plate	m kg	34,0													
Noise level (n <sub>1</sub> = 3000 min <sup>-1</sup> ) ****	L <sub>PA</sub> dB(A)	≤ 72													
Max. permissible housing temperature	°C	+90													
Ambient temperature	°C	0 up to +40													
Lubrication		Lubricated for lifetime													
Paint		Blue RAL 5002													
Direction of rotation		Motor and gearhead same direction													
Type of protection		IP 65													
Mass moment of inertia (Referring to the drive)	J <sub>1</sub> kgcm <sup>2</sup>	24	9,56	8,10	8,91	7,92	6,73	8,58	6,64	5,96	5,92	6,06	5,88	5,95	5,85
		32	13,9	12,4	13,2	12,2	11,1	12,9	11,0	10,3	10,3	10,4	10,2	10,3	10,2
Clamping hub diameter (mm)		38	13,6	12,1	12,9	11,9	10,8	12,6	10,7	10,0	10,0	10,1	9,93	10,0	9,91
		48	28,3	26,8	27,6	26,6	25,0	27,3	24,9	24,2	24,2	24,3	24,1	24,2	24,1

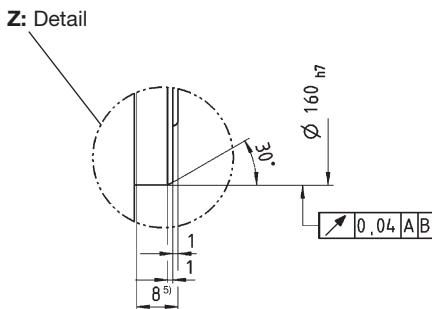
1) Other reduction ratios are optionally available. Please contact alpha.

\* Please reduce the n<sub>1N</sub> speed at higher ambient temperatures.

\*\* Applies to 32 and 38 mm clamping hub diameter

\*\*\* Referred to the centre of the flange.

\*\*\*\* Measured at a reduction ratio i = 16 (without load).



### Conversion table

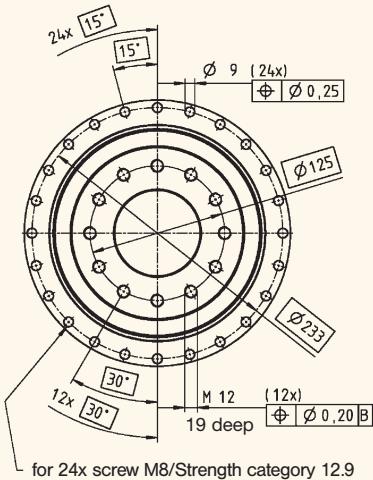
1 mm	= 0.039 in
1 Nm	= 8.85 in.lb
1 kgcm <sup>2</sup>	= 8.85 x 10 <sup>-4</sup> in.lb.s <sup>2</sup>
1 N	= 0.225 lb <sub>f</sub>
1 kg	= 2.21 lb <sub>m</sub>



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## View A

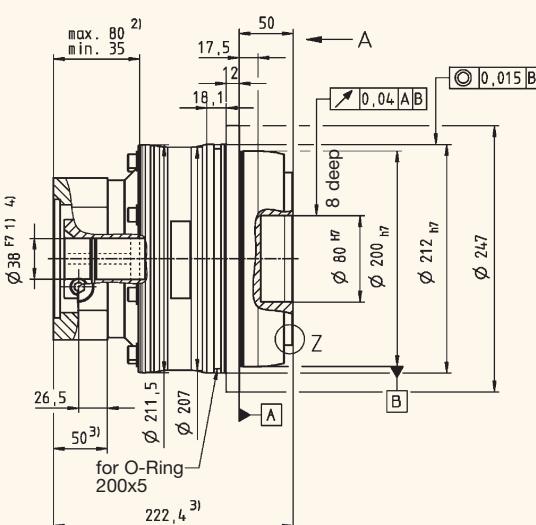
2-stage



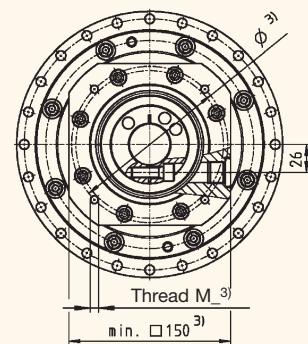
## Motor shaft diameter (mm)

## View B

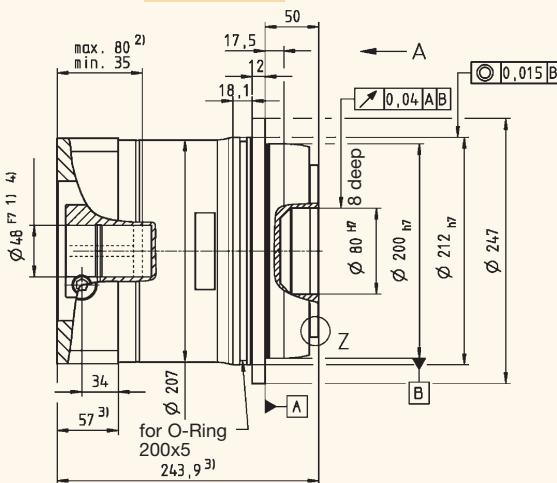
B →

up to 38<sup>4)</sup>

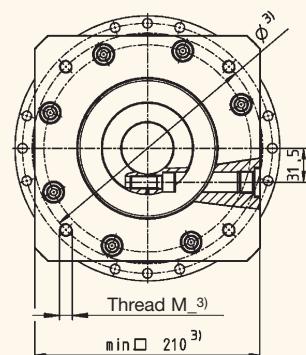
← A



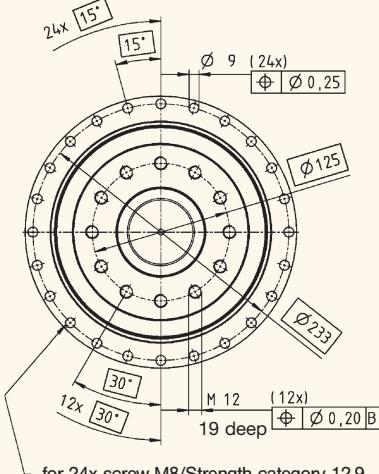
B →

up to 48<sup>4)</sup>

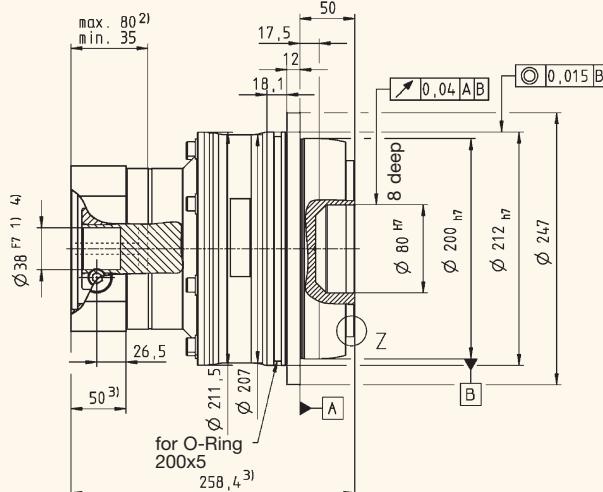
← A



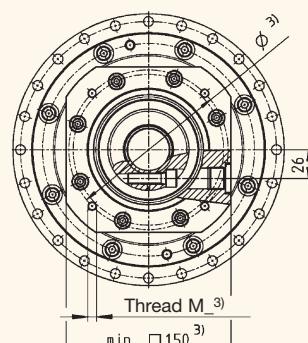
3-stage



B →

up to 38<sup>4)</sup>

← A

Dimensions without specified tolerances  $\pm 1$  mm.

1) Check motor shaft fit.

2) Min./max. permissible motor shaft length. Longer motor shaft is possible. Please call alpha.

3) The dimensions depend on the motor.

4) Smaller motor shaft diameter is compensated by a bushing with at least 1 mm thickness (see page 42).

5) Centering depth.

Motor mounting according to operating manual.

## Technical data TP+ 110 HIGH TORQUE®

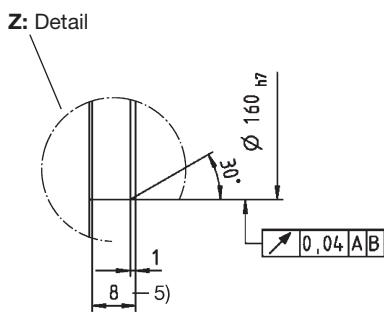
		2-stage				3-stage				
Ratio	i	22	27,5	38,5	55	66	88	110	154	220
Max. acceleration torque (Max. 1000 cycles per hour)	T <sub>2B</sub> Nm	3100	3100	3100	2000	2600	2600	2600	2600	2600
Nominal output torque (n <sub>1</sub> =3000 min <sup>-1</sup> ) (Higher values possible if n <sub>1</sub> = 2000 rpm)	T <sub>2N</sub> Nm	1570	1600	1650	1400	1600	1750	1750	1750	1750
Emergency stop torque (Permissible 1000 times during the lifespan of the gearhead)	T <sub>2Not</sub> Nm	6500	6500	6500	6500	6500	6500	6500	6500	6500
Nominal input speed (At 20 °C ambient temperature) *	n <sub>1N</sub> min <sup>-1</sup>	2500	2500	2500	2500	3000	3000	3000	3000	3000
Medial no-load running torque (n <sub>1</sub> =3000 min <sup>-1</sup> ) (At 20 °C gearhead temperature) **	T <sub>012</sub> Nm	6,5	-	-	-	-	3,3	2,5	-	-
Maximum input speed	n <sub>1Max</sub> min <sup>-1</sup>	4500	4500	4500	4500	4500	4500	4500	4500	4500
Max. Torsional backlash	j <sub>t</sub> arcmin	≤ 1				≤ 1				
Torsional rigidity	C <sub>121</sub> Nm/arcmin	730	-	-	-	-	-	680	-	-
Tilting rigidity	C <sub>2K</sub> Nm/arcmin	1452				1452				
Max. axial force ***	F <sub>2AMax</sub> N	10050				10050				
Max. tilting moment (at 100 min <sup>-1</sup> on the output) M <sub>2KMax</sub> Nm		3280				3280				
Efficiency at full load (at T <sub>2B</sub> and n <sub>1</sub> =3000 min <sup>-1</sup> )	η %	≤ 94				≤ 92				
Weight incl. adapter plate	m kg	33,1				35,4				
Noise level (n <sub>1</sub> =3000 min <sup>-1</sup> ) ****	L <sub>PA</sub> dB(A)	≤ 66				≤ 66				
Max. permissible housing temperature	°C	+90								
Ambient temperature	°C	0 up to +40								
Lubrication		Lubricated for lifetime								
Paint		Blue RAL 5002								
Direction of rotation		Motor and gearhead same direction								
Type of protection		IP 65								
Mass moment of inertia (Referring to the drive)	J <sub>1</sub> kgcm <sup>2</sup>	38	16,6	15,2	13,9	13,1	13,8	10,2	9,8	9,5
Clamping hub diameter (mm)		48	31,4	29,9	28,7	28,0	-	-	-	-

\* Please reduce the n<sub>1N</sub> speed at higher ambient temperatures.

\*\* Applies to 38 mm clamping hub diameter

\*\*\* Referred to the centre of the flange.

\*\*\*\* Measured at a reduction ratio i = 22 and i = 110 (without load).

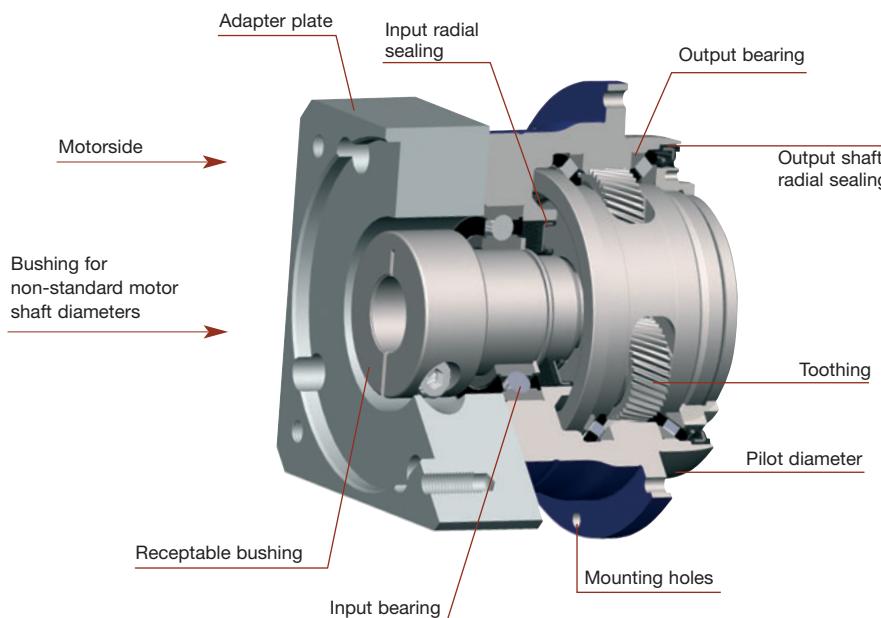


### Conversion table

1 mm	= 0.039 in
1 Nm	= 8.85 in.lb
1 kgcm <sup>2</sup>	= 8.85 x 10 <sup>-4</sup> in.lb.s <sup>2</sup>
1 N	= 0.225 lb <sub>f</sub>
1 kg	= 2.21 lb <sub>m</sub>



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## Symbols and Index

Symbol	Unit	Designation
c	Nm/arcmin	Rigidity
F	N	Force
i	-	Ratio
j	arcmin	Backlash
J	kgcm <sup>2</sup>	Mass moment of inertia
L	h	Service life
M	Nm	Moment
n	rpm	Speed
η	%	Efficiency
T	Nm	Torque

## Index

1	Input
2	Output
A/a	Axial
B/b	Acceleration
h	Hours
K/k	Tilt
m	Mean
Max/max	Maximum
Mot	Motor
N	Nominal
Not/not	Emergency stop
0	No-load running
R/r	Radial
t	Torsional

capital letters      Permissible values  
small letters      Actual values

## Quick Selection

The following chart can be used to quickly select a gearhead. However, for best results, we recommend that you utilise the gearhead selection charts in the **alpha Technical Basics** catalogue (can be downloaded from [www.alphagetriebe.com](http://www.alphagetriebe.com)) or use alpha's **cymex®** servo/gearhead sizing software to design your drive train.

<b>Cyclic operation S5</b> Number of cycles $\leq$ 1000/hour	<ol style="list-style-type: none"> <li>Using servomotor characteristic data, determine the maximum motor acceleration torque: <math>T_{\text{MaxMot}}</math> [Nm]</li> <li>Determine maximum acceleration torque at the gearhead output: <math>T_{2b}</math> [Nm] <math display="block">T_{2b} = T_{\text{MaxMot}} \cdot i \text{ (ratio)}</math></li> <li>Compare the maximum acceleration torque just calculated with the permissible acceleration torque (<math>T_{2B}</math>) for the selected gearhead. Requirement: <math>T_{2b} \leq T_{2B}</math> If not, choose another gear reducer.</li> </ol>	<ol style="list-style-type: none"> <li>Verify that the clamping hub diameter (table on page 42) is OK for the selected servomotor.</li> <li>Compare the motor shaft length, <math>L_{\text{Mot}}</math> (mm), with the min. and max. clamping hub depth in the dimensional sketches.</li> </ol>
<b>Continuous operation S1</b>	In case of continuous running applications, please contact alpha	

\* General guidelines for most applications. Contact alpha if assistance is needed for special cases.

# TP 300/500

## from the classic series

### “Compact Precision”

Superior positioning accuracy resulting from low torsional backlash and high torsional stiffness.

Simple, patented motor mounting with integrated thermal length compensation.

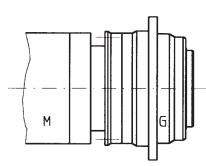
Ideally suited to highly dynamic cyclic S5 operation due to the intelligent design.

Minimum backlash  $\leq 3$  arcmin achieved using precision ground gearing without shimming.

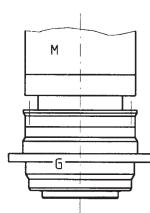
Any installation position due to lubrication with synthetic oil.



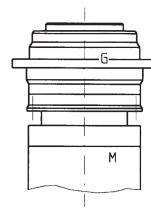
#### Mounting Position



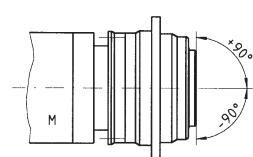
B5 - horizontal



V1 - vertical  
with output shaft  
facing downwards

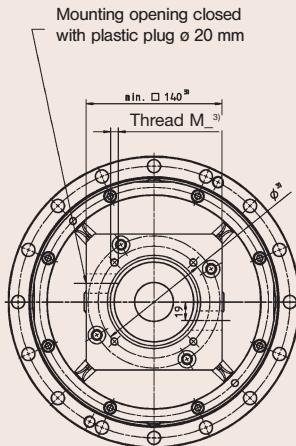
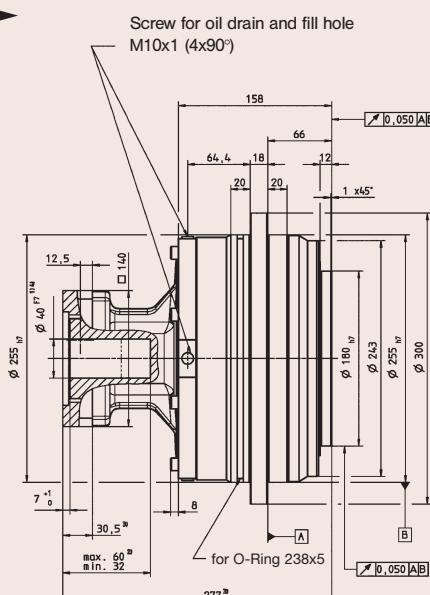
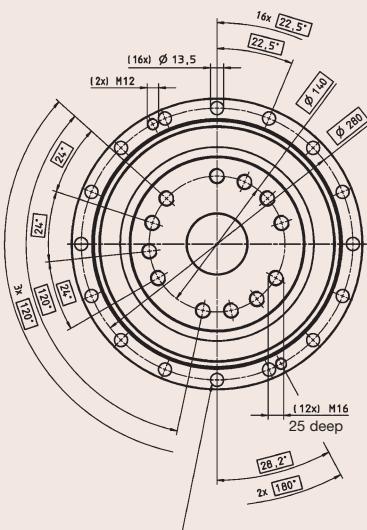


V3 - vertical  
with output shaft  
facing upwards



S - can be  
pivoted  $\pm 90^\circ$  from  
the horizontal

M = Motor  
G = Gearhead

**View A****B →****← A****View B**

for 16x screw M12/Strength category 12.9

Dimensions without specified tolerances  $\pm 1$  mm.

- 1) Check motor shaft fit.
- 2) Min./max. permissible motor shaft length. Longer motor shaft is possible. Please call alpha.
- 3) The dimensions depend on the motor.
- 4) Smaller motor shaft diameter is compensated by a bushing with at least 1 mm thickness (see page 42).

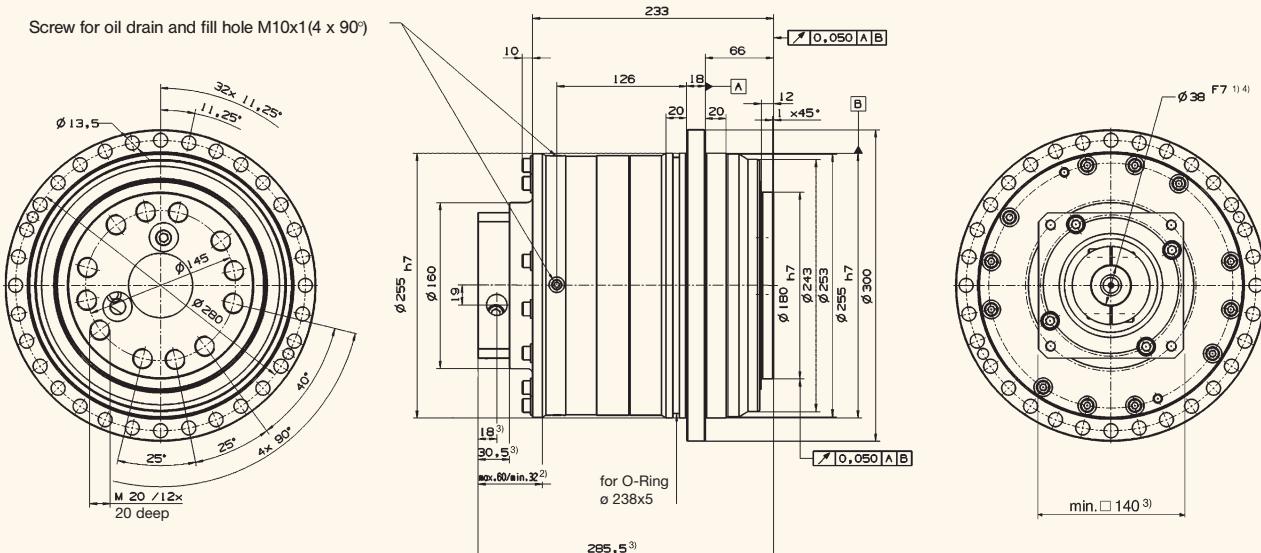
Motor mounting according to operating manual.

**Technical data TP 300**

Ratio	i	2-stage		
		31	61	91
Max. acceleration torque (Max. 1000 cycles per hour)	T <sub>2B</sub> Nm	3500	2800	2800
Nominal output torque	T <sub>2N</sub> Nm	2200	1600	1600
Emergency stop torque (Permissible 1000 times during the lifespan of the gearhead)	T <sub>2Not</sub> Nm	8750	8750	8750
Nominal input speed (At 20 °C ambient temperature)*	n <sub>1N</sub> min <sup>-1</sup>	1600	1900	2200
Maximum input speed	n <sub>1Max</sub> min <sup>-1</sup>	3000	3000	3000
Torsional backlash	j <sub>t</sub> arcmin		≤ 3	
Torsional rigidity	C <sub>121</sub> Nm/arcmin		560	
Tilting rigidity (i = 31)	C <sub>2K</sub> Nm/arcmin		5560	
Max. axial force **	F <sub>2AMax</sub> N		33 000	
Max. tilting moment	M <sub>2KMax</sub> Nm		5900	
Efficiency at full load	η %		≥ 93	
Weight incl. adapter plate	m kg		55,0	
Noise level (n <sub>1</sub> =3000 min <sup>-1</sup> )	L <sub>PA</sub> dB(A)		≤ 67	
Max. permissible housing temperature	°C		+90	
Ambient temperature	°C		-10 up to +40	
Lubrication			Synthetic oil	
Paint			Blue RAL 5002	
Mounting position		Please advise with order		
Type of protection		IP 64		
Mass moment of inertia (Referring to the drive)	J <sub>1</sub> kgcm <sup>2</sup>	35	15,0	12,2
Clamping hub diameter (mm)				12,0

\* For higher ambient temperature, reduce nominal input speed n<sub>1N</sub>.

\*\* In reference to the centre of the output shaft.

**View A****B →****← A****View B**

Dimensions without specified tolerances  $\pm 1$  mm.

- 1) Check motor shaft fit.
- 2) Min./max. permissible motor shaft length. Longer motor shaft is possible. Please call alpha.
- 3) The dimensions depend on the motor.
- 4) Smaller motor shaft diameter is compensated by a bushing with at least 1 mm thickness (see page 42).

Motor mounting according to operating manual.

### Technical data **TP 300 HIGH TORQUE®**

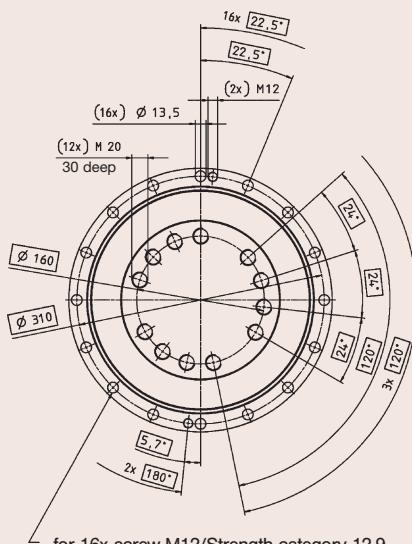
		<b>2-stage</b>	<b>3-stage</b>
<b>Ratio</b>	<b>i</b>	<b>22</b>	<b>66/88/110/154/220</b>
Max. acceleration torque (Max. 1000 cycles per hour)	T <sub>2B</sub> Nm	5300	5300
Nominal output torque	T <sub>2N</sub> Nm	3100	3100
Emergency stop torque (Permissible 1000 times during the lifespan of the gearhead)	T <sub>2Not</sub> Nm	13250	13250
Nominal input speed (At 20 °C ambient temperature) *	n <sub>1N</sub> min <sup>-1</sup>	1500	1500
Maximum input speed	n <sub>1Max</sub> min <sup>-1</sup>	3000	3000
Torsional backlash	j <sub>t</sub> arcmin		$\leq 3$
Torsional rigidity	C <sub>121</sub> Nm/arcmin		840
Tilting rigidity	C <sub>2K</sub> Nm/arcmin		5560
Max. axial force **	F <sub>2AMax</sub> N		33000
Max. tilting moment	M <sub>2KMax</sub> Nm		5900
Efficiency at full load (bei T <sub>2B</sub> und n <sub>1</sub> = 3000 min <sup>-1</sup> )	$\eta$ %		93
Weight incl. adapter plate	m kg		77
Noise level (n <sub>1</sub> =3000 min <sup>-1</sup> )	L <sub>PA</sub> dB(A)		$\leq 69$
Max. permissible housing temperature	°C		+90
Ambient temperature	°C		0 up to +40
Lubrication			Synthetic oil
Paint			Blue RAL 5002
Mounting position			Please advise with order
Type of protection			IP 64
Mass moment of inertia (Referring to the drive)	J <sub>1</sub> kgcm <sup>2</sup>	38	14,80
Clamping hub diameter (mm)			13,8 / 11,0 / 10,0 / 8,9 / 8,4

#### Conversion table

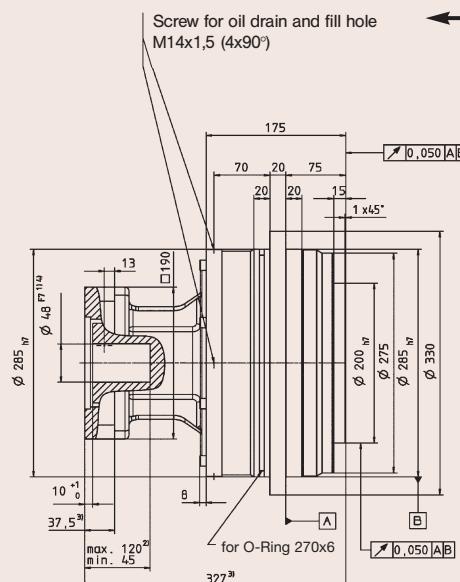
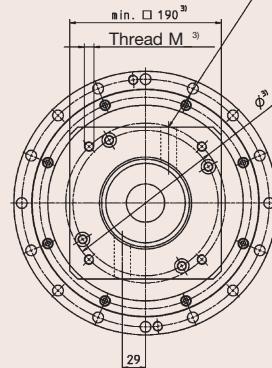
1 mm	= 0.039 in
1 Nm	= 8.85 in.lb
1 kgcm <sup>2</sup>	= $8.85 \times 10^{-4}$ in.lb.s <sup>2</sup>
1 N	= 0.225 lb <sub>f</sub>
1 kg	= 2.21 lb <sub>m</sub>

\* For higher ambient temperature, reduce nominal input speed n<sub>1N</sub>.

\*\* In reference to the centre of the output shaft.

**View A**

for 16x screw M12/Strength category 12.9

**B →****← A****View B**Mounting opening closed  
with plastic plug ø 20 mm

Dimensions without specified tolerances ±1 mm.

- 1) Check motor shaft fit.
- 2) Min./max. permissible motor shaft length. Longer motor shaft is possible. Please call alpha.
- 3) The dimensions depend on the motor.
- 4) Smaller motor shaft diameter is compensated by a bushing with at least 1 mm thickness (see page 42).

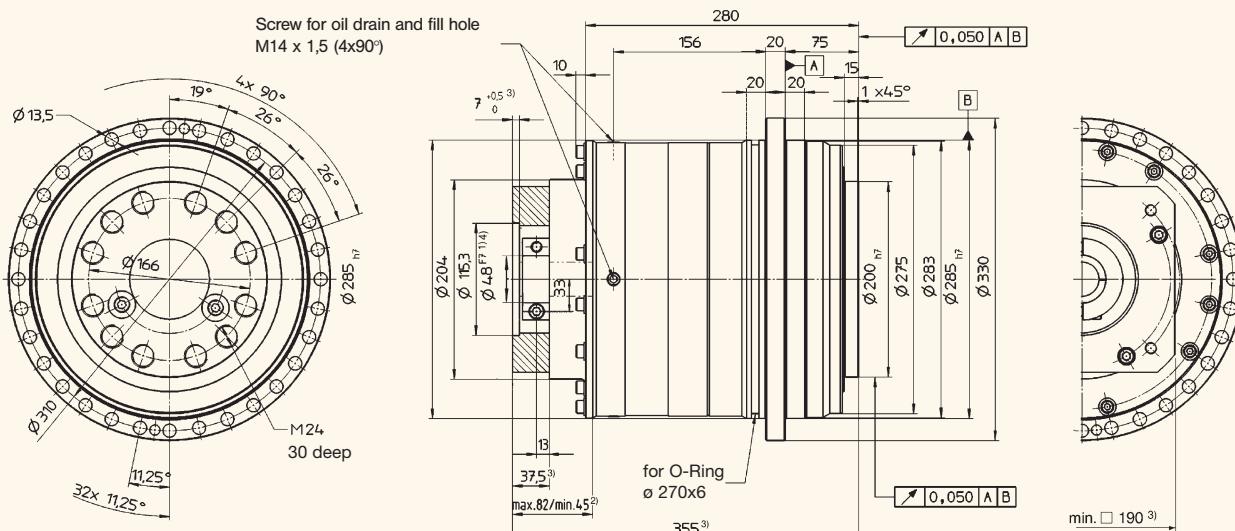
⚠ Motor mounting according to operating manual.

**Technical data TP 500**

Ratio	i	2-stage		
		31	61	91
Max. acceleration torque (Max. 1000 cycles per hour)	T <sub>2B</sub> Nm	6000	4800	4800
Nominal output torque	T <sub>2N</sub> Nm	3700	2900	2900
Emergency stop torque (Permissible 1000 times during the lifespan of the gearhead)	T <sub>2Not</sub> Nm	15000	15000	15000
Nominal input speed (At 20 °C ambient temperature) *	n <sub>1N</sub> min <sup>-1</sup>	1300	1500	1800
Maximum input speed	n <sub>1Max</sub> min <sup>-1</sup>	3000	3000	3000
Torsional backlash	j <sub>t</sub> arcmin		≤ 3	
Torsional rigidity	C <sub>121</sub> Nm/arcmin		736	
Tilting rigidity (i = 31)	C <sub>2K</sub> Nm/arcmin		9480	
Max. axial force **	F <sub>2AMax</sub> N		50 000	
Max. tilting moment	M <sub>2KMax</sub> Nm		8800	
Efficiency at full load	η %		≥ 93	
Weight incl. adapter plate	m kg		85,0	
Noise level (n <sub>1</sub> =3000 min <sup>-1</sup> )	L <sub>PA</sub> dB(A)		≤ 69	
Max. permissible housing temperature	°C		+90	
Ambient temperature	°C		-10 up to +40	
Lubrication			Synthetic oil	
Paint			Blue RAL 5002	
Mounting position			Please advise with order	
Type of protection			IP 64	
Mass moment of inertia (Referring to the drive)	J <sub>1</sub> kgcm <sup>2</sup>	48	43,6	37,1
Clamping hub diameter (mm)				36,7

\* For higher ambient temperature, reduce nominal input speed n<sub>1N</sub>.

\*\* In reference to the centre of the output shaft.

**View A****B →****← A****View B**Dimensions without specified tolerances  $\pm 1 \text{ mm}$ .

- 1) Check motor shaft fit.
- 2) Min./max. permissible motor shaft length. Longer motor shaft is possible. Please call alpha.
- 3) The dimensions depend on the motor.
- 4) Smaller motor shaft diameter is compensated by a bushing with at least 1 mm thickness (see page 42).

Motor mounting according to operating manual.

### Technical data **TP 500 HIGH TORQUE®**

		<b>2-stage</b>	<b>3-stage</b>
<b>Ratio</b>	<b>i</b>	22	66/88/110/154/220
Max. acceleration torque (Max. 1000 cycles per hour)	$T_{2B}$ Nm	10000	10000
Nominal output torque	$T_{2N}$ Nm	6000	6000
Emergency stop torque (Permissible 1000 times during the lifespan of the gearbox)	$T_{2Not}$ Nm	25000	25000
Nominal input speed (At 20 °C ambient temperature) *	$n_{1N}$ min <sup>-1</sup>	1500	1500
Maximum input speed	$n_{1Max}$ min <sup>-1</sup>	3000	3000
Torsional backlash	$j_1$ arcmin		$\leq 3$
Torsional rigidity	$C_{121}$ Nm/arcmin		1100
Tilting rigidity	$C_{2K}$ Nm/arcmin		9480
Max. axial force **	$F_{2AMax}$ N		50 000
Max. tilting moment	$M_{2KMax}$ Nm		8800
Efficiency at full load (at $T_{2B}$ and $n_1 = 3000 \text{ min}^{-1}$ )	$\eta$ %		93
Weight incl. adapter plate	m kg		105
Noise level ( $n_1=3000 \text{ min}^{-1}$ )	$L_{PA}$ dB(A)		$\leq 69$
Max. permissible housing temperature	°C		+90
Ambient temperature	°C		0 up to +40
Lubrication			Synthetic oil
Paint			Blue RAL 5002
Mounting position			Please advise with order
Type of protection			IP 64
Mass moment of inertia (Referring to the drive)	$J_1$ kgcm <sup>2</sup>	48	47,5
Clamping hub diameter (mm)			50,2 / 38,5 / 31,9 / 26,2 / 23,2

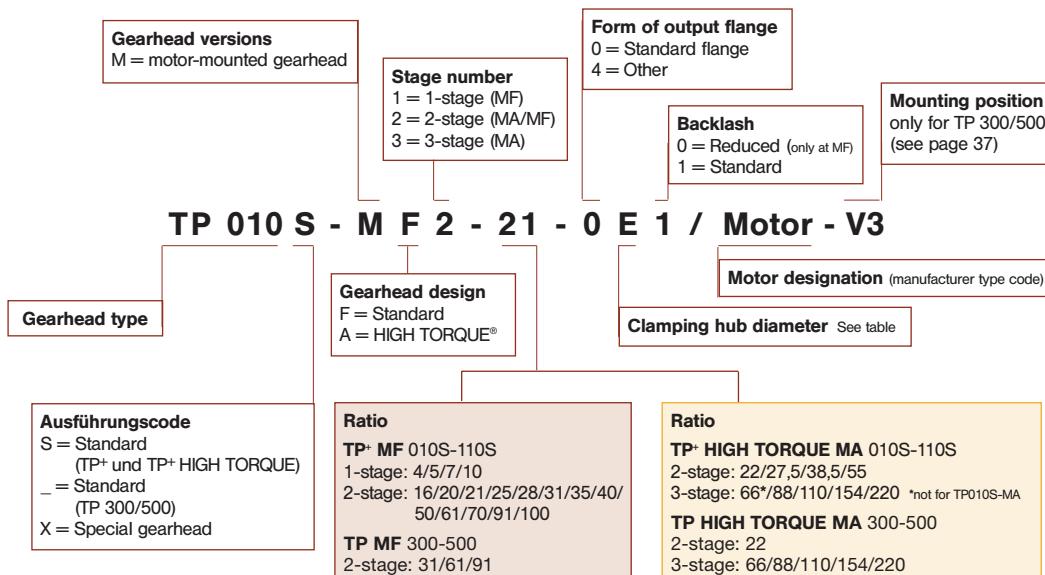
### Conversion table

1 mm	= 0.039 in
1 Nm	= 8.85 in.lb
1 kgcm <sup>2</sup>	= $8.85 \times 10^{-4}$ in.lb.s <sup>2</sup>
1 N	= 0.225 lb <sub>f</sub>
1 kg	= 2.21 lb <sub>m</sub>

\* For higher ambient temperature, reduce nominal input speed  $n_{1N}$ .

\*\* In reference to the centre of the output shaft.

## Ordering Key



Clamping hub diameter TP+

Gearhead stages	004		010		025		050		110		300		500			
	1 / 2	MF	1 / 2	MF	2 / 3	MF	1 / 2	MF	2 / 3	MF	MA	2	MF	2 / 3	MF	MA
Motor shaft ø (mm)*	11	B / B	- / B	-	- / -	-	-	-	-	-	-	-	-	-	-	-
	14	C / C	C / C	C / C	- / C	-	-	-	-	-	-	-	-	-	-	-
	19	E / +	E / E	E / +	E / E	E / E	- / E	-	-	-	-	-	-	-	-	-
	24	+	G / +	+	G / G	G / +	G / G	G / G	- / G	-	-	-	-	-	-	-
	28	+	+	+	H / +	+	- / -	- / +	- / -	-	-	-	-	-	-	-
	32	+	+	+	- / +	+	I / -	- / +	- / I	-	-	-	-	-	-	-
	35	+	+	+	- / +	+	- / -	- / +	- / -	-	1	-	-	-	-	-
	38	+	+	+	K / +	+	K / K	K / +	K / K	K / K	+ 1	-	-	-	-	-
	48	+	+	+	+	+	M / +	+	M / M	M / +	+ 1	1	1	1	1	1

- Select next larger diameter

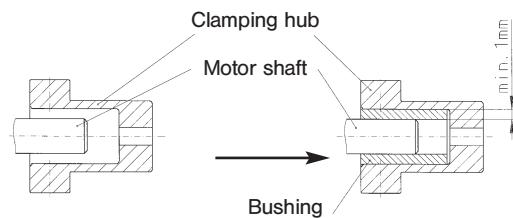
+ Select next larger gearhead

\* If your motor shaft diameter is not listed, add 2 mm to diameter and select next higher size.

## Bushing

If the diameters of the motor shaft and the clamping hub do not match, a bushing is used.

Minimum wall thickness of the bushing is 1 mm.



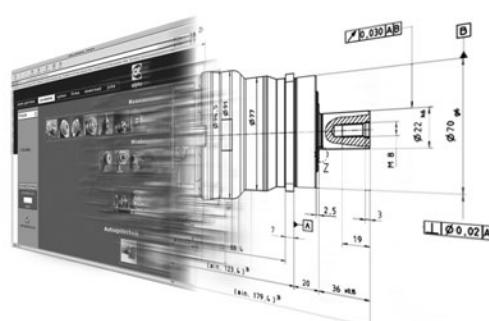
alpha's **cymex®** calculation software makes it easier than ever to size the most complex drive trains with just a few mouse clicks.

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### **SP® & SP+ HIGH SPEED® – The NEW Generation**

Low-backlash planetary gear reducers with output shaft.  
SP+ HIGH SPEED best qualified for highest speed in continuous operation.  
Torsional backlash  $\leq 1$  arcmin.  
Acceleration torque up to 4500 Nm.



### **LP+ & LPB+ – Value Line Economic and multi-talented**

Low-backlash gear reducers with output shaft for economical servo applications.  
Torsional backlash  $\leq 8$  arcmin.  
Acceleration torque up to 450 Nm.  
Optional available as LPB+, with geared pulley mount.



### **alphira® – the basic precision**

low backlash / low friction / alpha quality  
For stepper and basic servo applications.  
Acceleration torque up to 200 Nm.



### **Rack & Pinion System**

**PRECISION SYSTEM** – For exacting dynamics and precision requirements in high-end applications  
**SMART SYSTEM** – For flexible mounting with more degrees of freedom in mid-range applications  
**ECONOMY SYSTEM** – For standard linear tasks in economy applications



### **Hypoid Gearhead**

Right-angle gearhead of highest precision and compactness. Torsional backlash  $\leq 4$  arcmin.  
Acceleration torque up to 640 Nm.  
Output shaft variations:  
SK+: smooth, keywayed, involute tooth to DIN 5480  
TK+: flange  
HG+: hollow shaft



### **Hypoid Planetary Gearhead**

Right-angle planetary gearhead of highest precision and power density.  
Torsional backlash  $\leq 2$  arcmin.  
Acceleration torque up to 1600 Nm.  
Output shaft variations:  
SPK+: smooth, keywayed, involute tooth to DIN 5480  
TPK+: flange



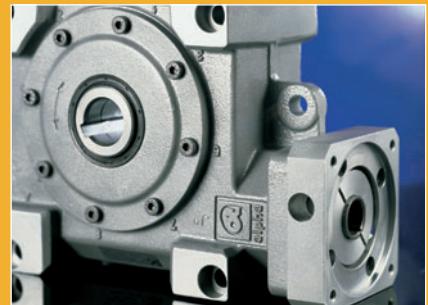
### **TPM & TPMA - Servoactuators**

Ultra-compact and highly precise brushless gear motors featuring high dynamics, high torsional stiffness and a torsional backlash of just  $\leq 1$  arcmin. Acceleration torque up to 2600 Nm.  
Up to 60 % shorter overall length and much lower weight than conventional servomotor-gearhead designs.



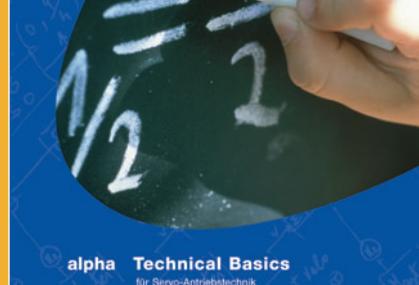
### **Coupling – TL / BC / EC**

Patented, backlash-free, compact and torsionally stiff metal bellows and safety couplings. Acceleration torque up to 10,000 Nm  
Disengagement in 1 – 3 ms  
Belt tension 100 – 12.000 N.  
Self-adjusting



### **V - Drive®**

Right-angle gearhead – short and compact.  
Torsional backlash  $\leq 3$  arcmin.  
Acceleration torque up to 1469 Nm.  
Options output:  
VDS: smooth, keywayed, involute tooth to DIN 5480  
VDT: flange  
VDH: hollow shaft, smooth or keywayed



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