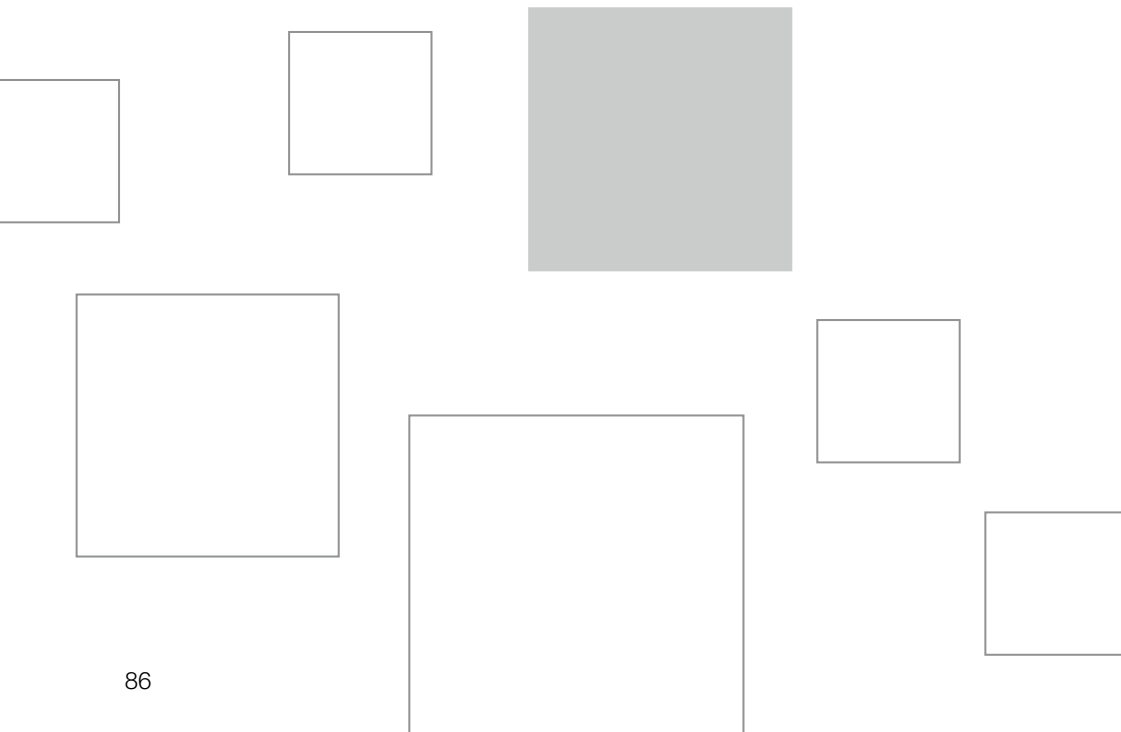


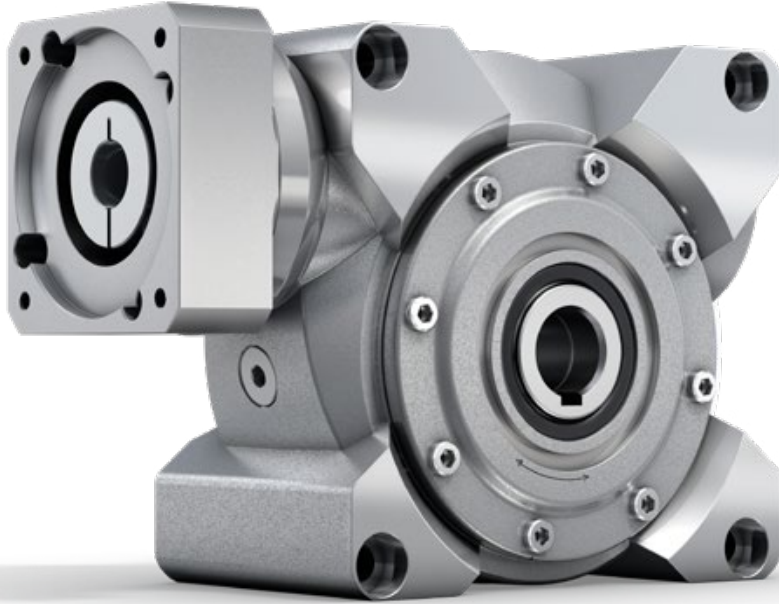
# alpha Basic Line

## WORM GEARBOXES CVH / CVS

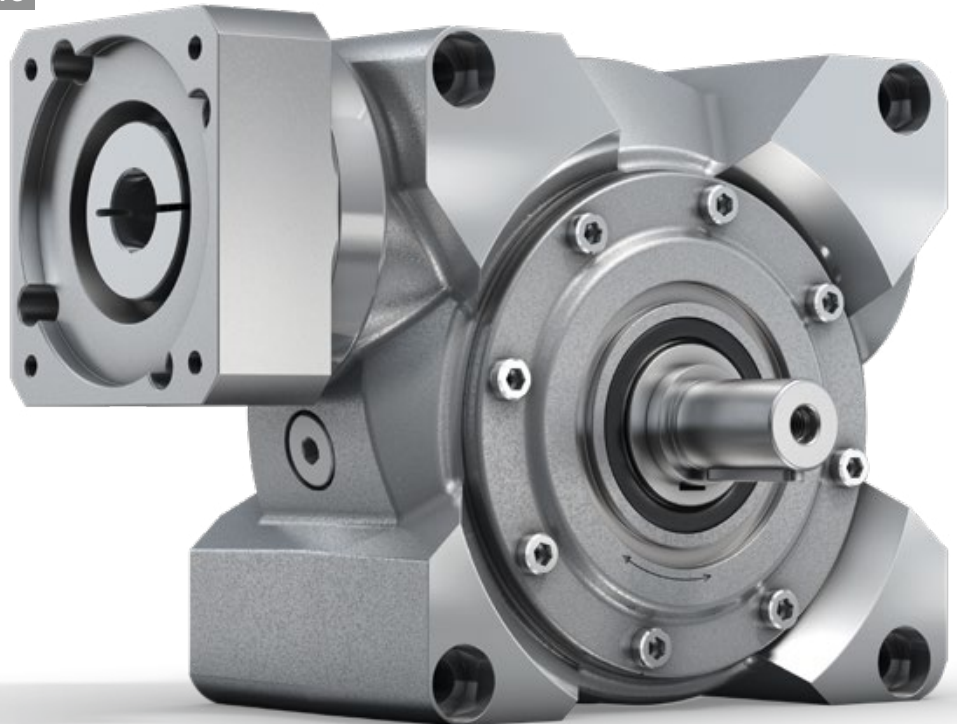
If the focus is on smooth running, smooth synchronization properties, and continuous operation, the V-Drive Basic is the right choice for you.



CVH



CVS



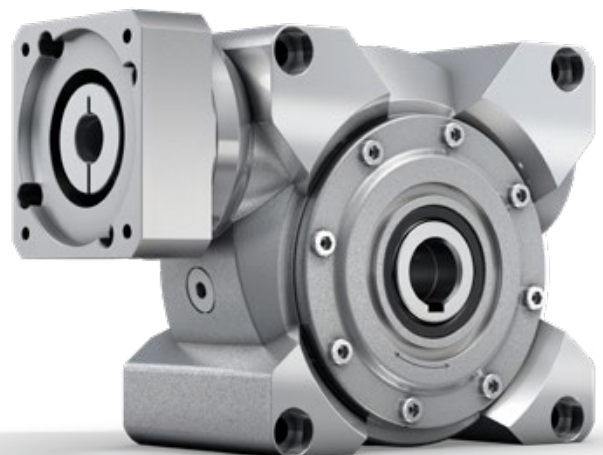
alpha Basic Line in action

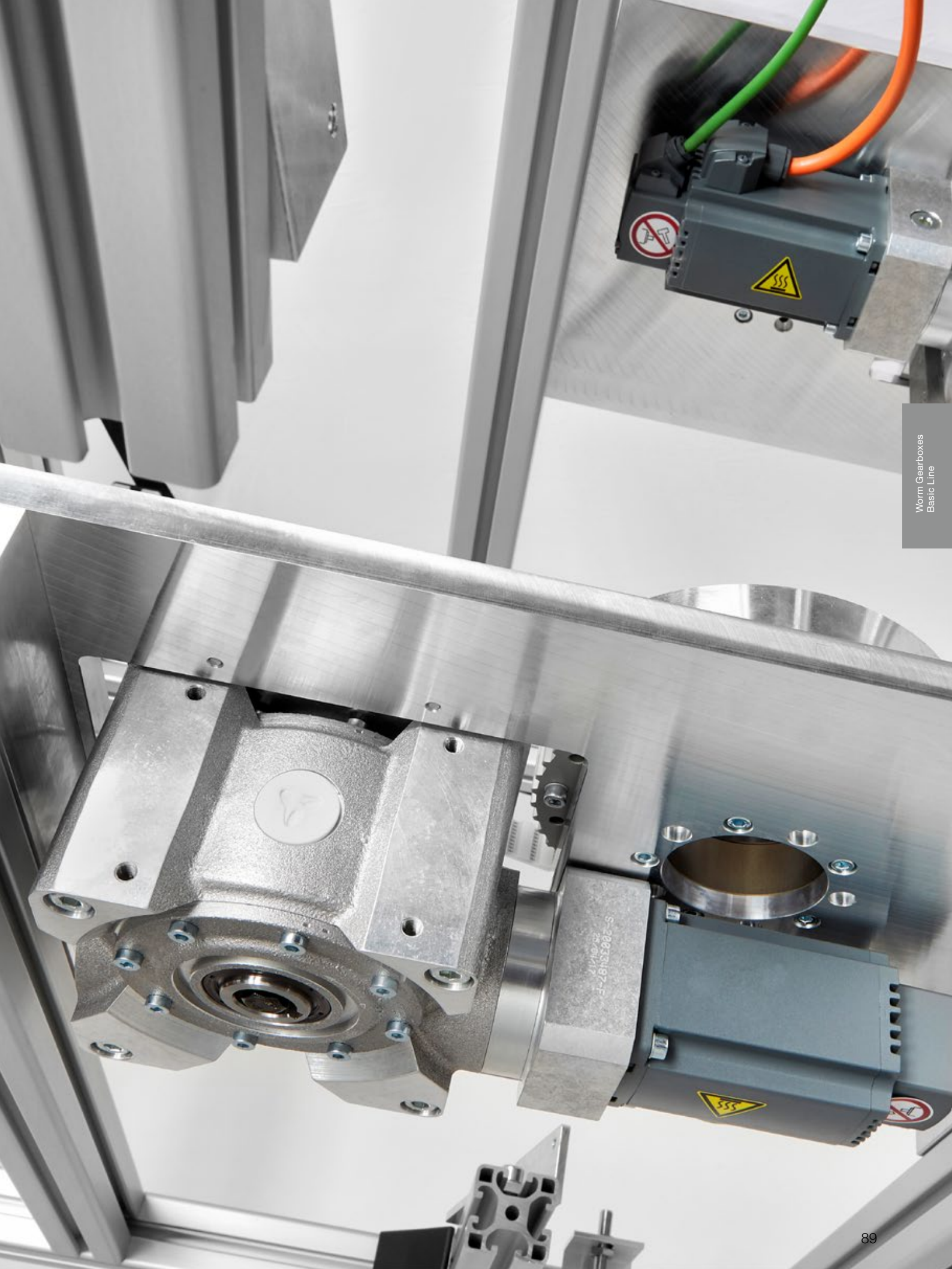
## COMPACT AND HIGH-PERFORMANCE WORM GEARBOX in electronics production

**When developing our customer's new rotary converter series, we had to meet three main objectives: offer the ability to dynamically adapt the conversion rate, minimize the cycle times, and improve the positioning accuracy.**

With the V-Drive Basic by WITTENSTEIN alpha, the decision was made in favor of a high-performance servo worm gearbox which can be perfectly integrated into the system thanks to its compact design form.

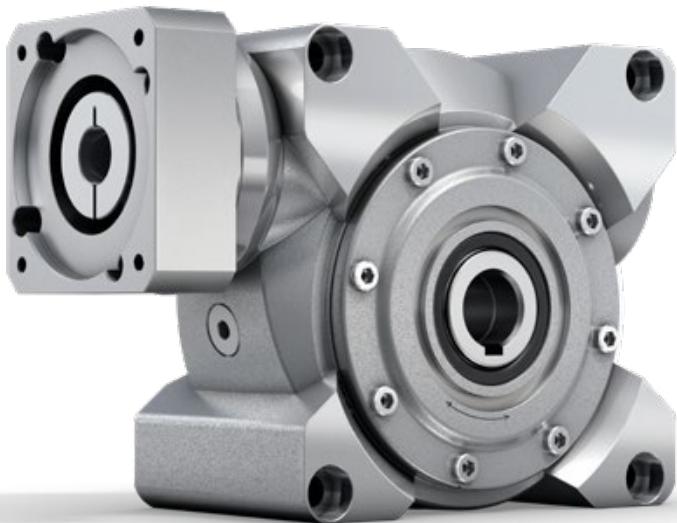
This is made possible by a newly developed involute gearing of the worm gear set, which delivers a significant improvement in positioning and repetition accuracy with increased efficiency and very good running characteristics compared to the other converters. This provides a reduction in cycle times and therefore an increase in throughput performance in the application for feeding workpiece carriers or masks into various assembly, production, and inspection processes.





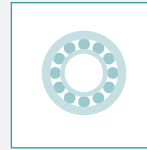
# CVH / CVS – We drive the Performance

CVH



The V-Drive Basic is characterized by a specially developed toothing that minimizes operating noise during S1 operation and offers enormous power. And all with a top price/performance ratio.

## PRODUCT HIGHLIGHTS



### Optimized output bearings

The V-Drive Basic features an optimized output bearing tailored to the most diverse areas of application. For increased requirements for the absorption of external forces, the reinforced bearing option is used.



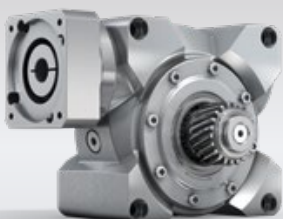
### Specially developed toothing

The operating noise during S1 operation has been minimized by means of a specially developed toothing featuring high torques, good synchronization, and very low operating noise.



### Top price/performance ratio

A top price/performance ratio is achieved with short delivery times and "made in Germany" quality.



CVS – worm gearbox with pinion



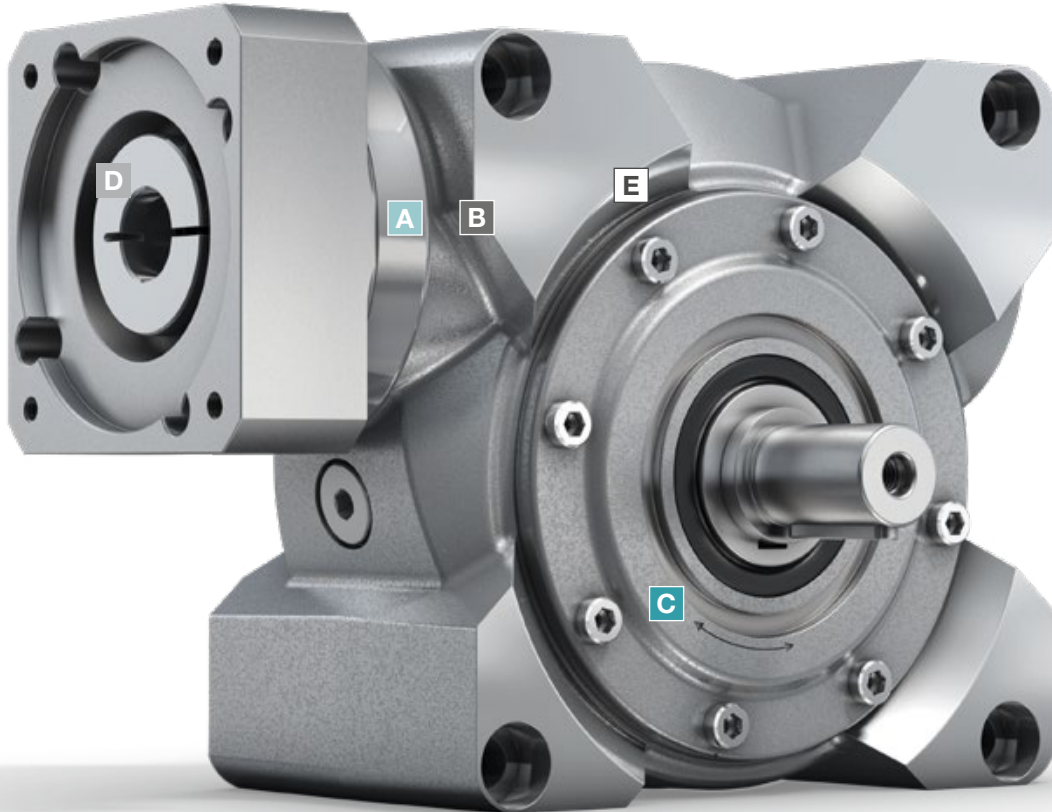
CVS – worm gearbox with elastomer coupling



**SIZING ASSISTANT**  
YOUR GEARBOX WITHIN SECONDS

Efficient gearbox sizing within seconds –  
online without login  
[www.sizing-assistant.com](http://www.sizing-assistant.com)

CVS



- A Radial shaft seal**
- Very long service life
  - Optimized for continuous operation

- B Input bearing**
- Bearing package to absorb axial and radial forces
  - Very well suited to high input speeds

- C Output bearing**
- Tailored to the most diverse areas of application

- D Metal bellows coupling**
- Completely backlash free
  - Lifetime durable and maintenance free
  - Easy assembly
  - Protects the motor through thermal linear expansion compensation

- E Toothing**
- Specially developed toothing, for high torques, good synchronization, and low operating noise

# CVH 040 MF 1-stage

			1-stage						
Ratio	<i>i</i>		7	10	16	28	40		
Max. torque <sup>a) b)</sup> (at $n_1 = 500$ rpm)	$T_{2a}$	Nm	68	76	78	82	76		
		in.lb	602	673	690	726	673		
Emergency stop torque <sup>a) b)</sup> (permitted 1000 times during the service life of the gearbox)	$T_{2Not}$	Nm	126	125	129	134	122		
		in.lb	1115	1106	1142	1186	1080		
Permitted average input speed <sup>d)</sup> (at 20 °C ambient temperature)	$n_{1N}$	rpm	4000						
Max. input speed	$n_{1Max}$	rpm	6000						
Mean no load running torque <sup>b)</sup> (at $n_1 = 3000$ rpm and 20 °C gearbox temperature)	$T_{012}$	Nm	0.7	0.6	0.5	0.4	0.4		
		in.lb	6.2	5.3	4.4	3.5	3.5		
Max. backlash	$j_t$	arcmin	≤ 15						
Torsional rigidity <sup>b)</sup>	$C_{t21}$	Nm/arcmin	3.5	3.5	3.5	3.5	3.5		
		in.lb/arcmin	31	31	31	31	31		
Max. axial force <sup>c)</sup> (Standard / HIGH FORCES)	$F_{2AMax}$	N	1200 / 3000						
		lb <sub>f</sub>	270 / 675						
Max. lateral force <sup>b)</sup> (Standard / HIGH FORCES)	$F_{2OMax}$	N	1000 / 2400						
		lb <sub>f</sub>	225 / 540						
Max. tilting moment (Standard / HIGH FORCES)	$M_{2KMax}$	Nm	97 / 205						
		in.lb	858 / 1814						
Efficiency at full load (at $n_1 = 500$ rpm)	$\eta$	%	89	87	81	72	66		
Service life	$L_n$	h	> 15000						
Weight (incl. standard adapter plate)	$m$	kg	4.5						
		lb <sub>m</sub>	10						
Operating noise (at reference ratio and reference speed – ratio-specific values available in cymex <sup>®</sup> )	$L_{PA}$	dB(A)	≤ 54						
Max. permitted housing temperature		°C	+90						
		°F	+194						
Ambient temperature		°C	-15 to +40						
		°F	+5 to +104						
Lubrication			Lubricated for life						
Direction of rotation			See drawing						
Protection class			IP 65						
Shrink disc (Standard Version)			SD 024x050 S2						
Max. torque (without axial force)	$T_{max}$	Nm	250						
		in.lb	2213						
Mass moment of inertia (relates to the drive) Clamping hub diameter [mm]	C	14	$J_1$	kgcm <sup>2</sup>	0.38	0.38	0.34	0.32	0.31
				10 <sup>-3</sup> in.lb.s <sup>2</sup>	0.34	0.34	0.30	0.28	0.27
	E	19	$J_1$	kgcm <sup>2</sup>	0.40	0.37	0.35	0.34	0.33
				10 <sup>-3</sup> in.lb.s <sup>2</sup>	0.35	0.33	0.31	0.30	0.29

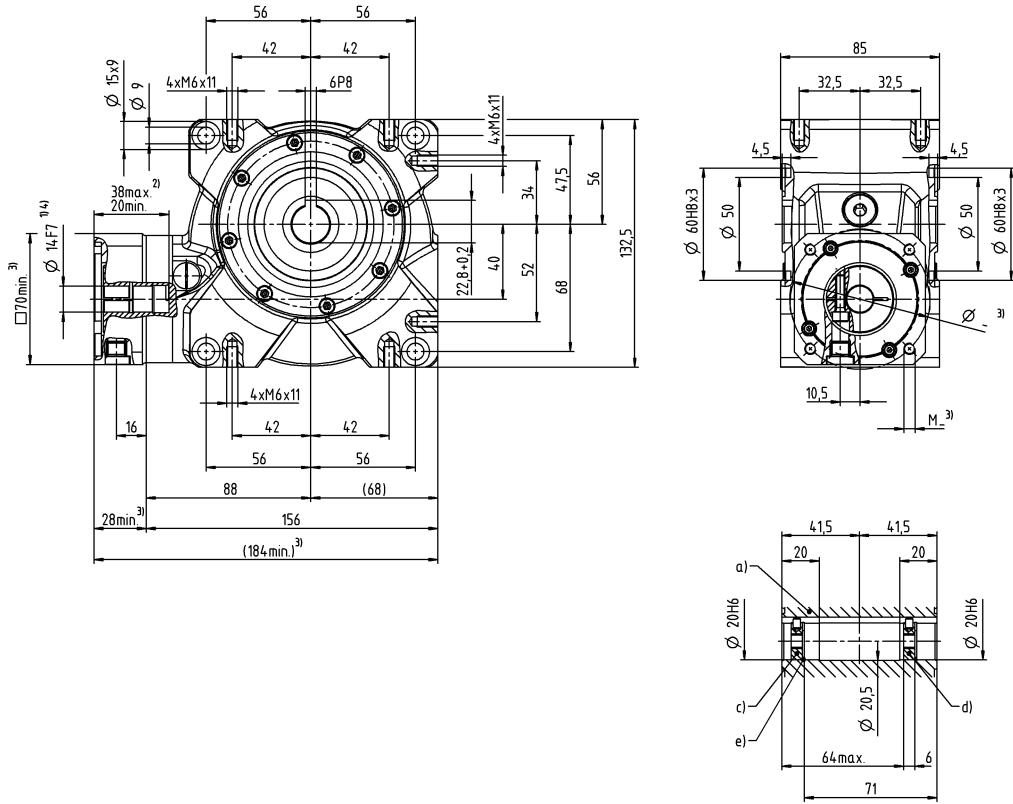
Please use our sizing software cymex<sup>®</sup> for a detailed sizing – [www.wittenstein-cymex.com](http://www.wittenstein-cymex.com)

- <sup>a)</sup> At max. 10 %  $F_{2OMax}$   
<sup>b)</sup> Valid for standard clamping hub diameter  
<sup>c)</sup> Refers to center of the output shaft or flange  
<sup>d)</sup> Please reduce input speed at higher ambient temperatures

Motor shaft diameter [mm]

1-stage

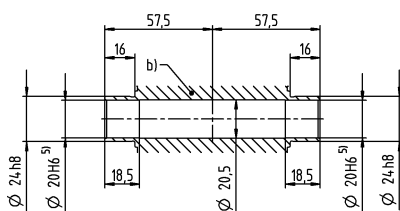
up to 14/19<sup>4)</sup> (C<sup>6)</sup>/E)  
clamping hub diameter



Worm Gearboxes  
Basic Line

### Other output variants

Hollow shaft interfaces on both sides



- a) Hollow shaft, keyed on both sides
- b) Hollow shaft interfaces on both sides
- c) End disc for screw M6 (on request)
- d) End disc as forcing washer for screw M8 (on request)
- e) Locking ring – DIN 472 (on request)

See technical data sheet for available clamping hub diameters (mass moment of inertia). Dimensions available on request.

Non-tolerated dimensions are nominal dimensions

- <sup>1)</sup> Check motor shaft fit
- <sup>2)</sup> Min./Max. permissible motor shaft length  
Longer motor shafts are adaptable, please contact us
- <sup>3)</sup> The dimensions depend on the motor
- <sup>4)</sup> Smaller motor shaft diameter is compensated by a bushing with a minimum thickness of 1 mm
- <sup>5)</sup> Tolerance h6 for mounted shaft
- <sup>6)</sup> Standard clamping hub diameter



			1-stage					
Ratio	<i>i</i>		7	10	16	28	40	
Max. torque <sup>a) b)</sup> (at $n_1 = 500$ rpm)	$T_{2a}$	Nm	125	127	131	140	116	
		in.lb	1106	1124	1159	1239	1027	
Emergency stop torque <sup>a) b)</sup> (permitted 1000 times during the service life of the gearbox)	$T_{2Not}$	Nm	242	242	250	262	236	
		in.lb	2142	2142	2213	2319	2089	
Permitted average input speed <sup>d)</sup> (at 20 °C ambient temperature)	$n_{1N}$	rpm	4000					
Max. input speed	$n_{1Max}$	rpm	6000					
Mean no load running torque <sup>b)</sup> (at $n_1 = 3000$ rpm and 20 °C gearbox temperature)	$T_{012}$	Nm	2.2	1.6	1.5	1.2	1.1	
		in.lb	19.5	14.2	13.3	10.6	9.7	
Max. backlash	$j_t$	arcmin	≤ 15					
Torsional rigidity <sup>b)</sup>	$C_{t21}$	Nm/arcmin	5.5	5.5	5.5	5.5	5.5	
		in.lb/arcmin	49	49	49	49	49	
Max. axial force <sup>c)</sup> (Standard / HIGH FORCES)	$F_{2AMax}$	N	1500 / 5000					
		lb <sub>f</sub>	337.5 / 1125					
Max. lateral force <sup>b)</sup> (Standard / HIGH FORCES)	$F_{2OMax}$	N	1200 / 3800					
		lb <sub>f</sub>	270 / 855					
Max. tilting moment (Standard / HIGH FORCES)	$M_{2KMMax}$	Nm	130 / 409					
		in.lb	1150 / 3620					
Efficiency at full load (at $n_1 = 500$ rpm)	$\eta$	%	89	85	80	70	63	
Service life	$L_h$	h	> 15000					
Weight (incl. standard adapter plate)	$m$	kg	8					
		lb <sub>m</sub>	18					
Operating noise (at reference ratio and reference speed – ratio-specific values available in cymex <sup>®</sup> )	$L_{PA}$	dB(A)	≤ 62					
Max. permitted housing temperature		°C	+90					
		°F	+194					
Ambient temperature		°C	-15 to +40					
		°F	+5 to +104					
Lubrication			Lubricated for life					
Direction of rotation			See drawing					
Protection class			IP 65					
Shrink disc (Standard Version)			SD 030x060 S2V					
Max. torque (without axial force)	$T_{max}$	Nm	550					
		in.lb	4868					
Mass moment of inertia (relates to the drive) Clamping hub diameter [mm]	E 19	$J_1$	kgcm <sup>2</sup>	1.22	1.17	1.06	1.05	1.01
			10 <sup>-3</sup> in.lb.s <sup>2</sup>	1.08	1.04	0.94	0.93	0.89

Please use our sizing software cymex<sup>®</sup> for a detailed sizing – [www.wittenstein-cymex.com](http://www.wittenstein-cymex.com)

<sup>a)</sup> At max. 10 %  $F_{2OMax}$

<sup>b)</sup> Valid for standard clamping hub diameter

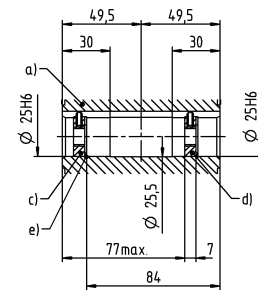
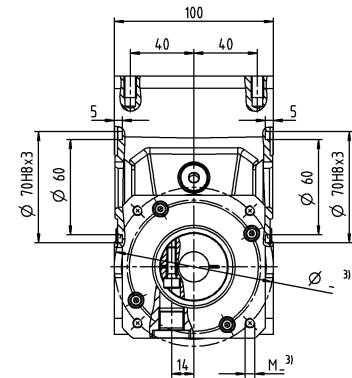
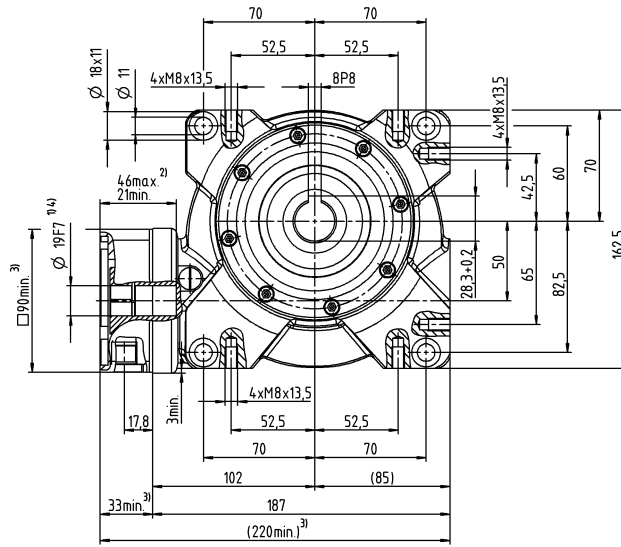
<sup>c)</sup> Refers to center of the output shaft or flange

<sup>d)</sup> Please reduce input speed at higher ambient temperatures

Motor shaft diameter [mm]

1-stage

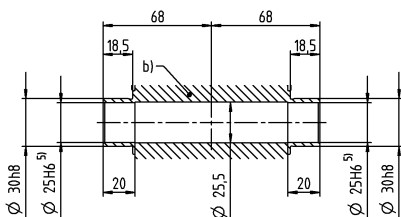
up to 19<sup>4)</sup> (E<sup>6)</sup>  
clamping hub diameter



Worm Gearboxes  
Basic Line

### Other output variants

Hollow shaft interfaces on both sides



- a) Hollow shaft, keyed on both sides
- b) Hollow shaft interfaces on both sides
- c) End disc for screw M10 (on request)
- d) End disc as forcing washer for screw M12 (on request)
- e) Locking ring – DIN 472 (on request)

See technical data sheet for available clamping hub diameters (mass moment of inertia). Dimensions available on request.

Non-tolerated dimensions are nominal dimensions

- <sup>1)</sup> Check motor shaft fit
- <sup>2)</sup> Min./Max. permissible motor shaft length  
Longer motor shafts are adaptable, please contact us
- <sup>3)</sup> The dimensions depend on the motor
- <sup>4)</sup> Smaller motor shaft diameter is compensated by a bushing with a minimum thickness of 1 mm
- <sup>5)</sup> Tolerance h6 for mounted shaft
- <sup>6)</sup> Standard clamping hub diameter

			1-stage					
Ratio	<i>i</i>		7	10	16	28	40	
Max. torque <sup>a) b)</sup> (at $n_1 = 500$ rpm)	$T_{2a}$	Nm	265	270	280	301	282	
		in.lb	2345	2390	2478	2664	2496	
Emergency stop torque <sup>a) b)</sup> (permitted 1000 times during the service life of the gearbox)	$T_{2Not}$	Nm	484	491	494	518	447	
		in.lb	4283	4345	4372	4584	3956	
Permitted average input speed <sup>d)</sup> (at 20 °C ambient temperature)	$n_{1N}$	rpm	4000					
Max. input speed	$n_{1Max}$	rpm	4500					
Mean no load running torque <sup>b)</sup> (at $n_1 = 3000$ rpm and 20 °C gearbox temperature)	$T_{012}$	Nm	3.1	3	2.4	2.3	2.2	
		in.lb	27.4	26.6	21.2	20.4	19.5	
Max. backlash	$j_t$	arcmin	≤ 15					
Torsional rigidity <sup>b)</sup>	$C_{t21}$	Nm/arcmin	23	23	23	23	23	
		in.lb/arcmin	204	204	204	204	204	
Max. axial force <sup>c)</sup> (Standard / HIGH FORCES)	$F_{2AMax}$	N	2000 / 8250					
		lb <sub>f</sub>	450 / 1856					
Max. lateral force <sup>b)</sup> (Standard / HIGH FORCES)	$F_{2OMax}$	N	2000 / 6000					
		lb <sub>f</sub>	450 / 1350					
Max. tilting moment (Standard / HIGH FORCES)	$M_{2KMax}$	Nm	281 / 843					
		in.lb	2487 / 7461					
Efficiency at full load (at $n_1 = 500$ rpm)	$\eta$	%	90	87	82	73	67	
Service life	$L_n$	h	> 15000					
Weight (incl. standard adapter plate)	$m$	kg	13					
		lb <sub>m</sub>	29					
Operating noise (at reference ratio and reference speed – ratio-specific values available in cymex <sup>®</sup> )	$L_{PA}$	dB(A)	≤ 64					
Max. permitted housing temperature		°C	+90					
		°F	+194					
Ambient temperature		°C	-15 to +40					
		°F	+5 to +104					
Lubrication			Lubricated for life					
Direction of rotation			See drawing					
Protection class			IP 65					
Shrink disc (Standard Version)			SD 036x072 S2V					
Max. torque (without axial force)	$T_{max}$	Nm	640					
		in.lb	5664					
Mass moment of inertia (relates to the drive) Clamping hub diameter [mm]	H 28	$J_1$	kgcm <sup>2</sup>	3.75	3.61	3.52	3.48	3.36
			10 <sup>-3</sup> in.lb.s <sup>2</sup>	3.32	3.19	3.12	3.08	2.97

Please use our sizing software cymex<sup>®</sup> for a detailed sizing – [www.wittenstein-cymex.com](http://www.wittenstein-cymex.com)

<sup>a)</sup> At max. 10 %  $F_{2OMax}$

<sup>b)</sup> Valid for standard clamping hub diameter

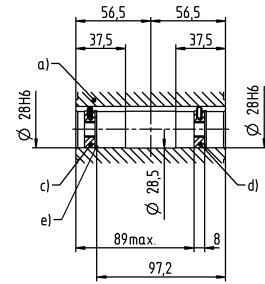
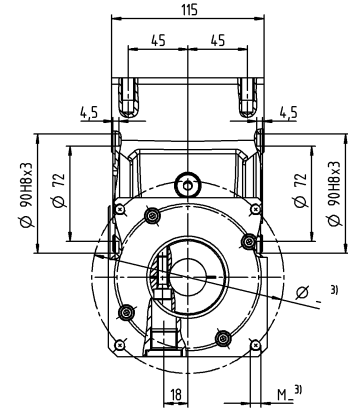
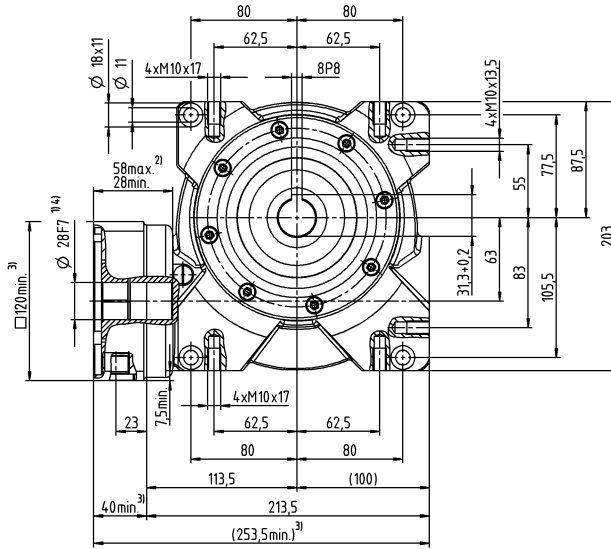
<sup>c)</sup> Refers to center of the output shaft or flange

<sup>d)</sup> Please reduce input speed at higher ambient temperatures

Motor shaft diameter [mm]

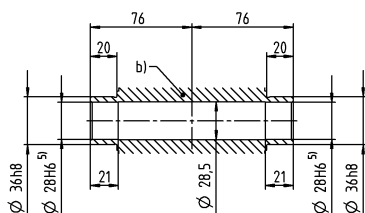
1-stage

up to 28<sup>4)</sup> (H)<sup>6)</sup>  
clamping hub diameter



### Other output variants

Hollow shaft interfaces on both sides



- a) Hollow shaft, keyed on both sides
- b) Hollow shaft interfaces on both sides
- c) End disc for screw M10 (on request)
- d) End disc as forcing washer for screw M12 (on request)
- e) Locking ring – DIN 472 (on request)

See technical data sheet for available clamping hub diameters (mass moment of inertia). Dimensions available on request.

Non-tolerated dimensions are nominal dimensions

- <sup>1)</sup> Check motor shaft fit
- <sup>2)</sup> Min./Max. permissible motor shaft length  
Longer motor shafts are adaptable, please contact us
- <sup>3)</sup> The dimensions depend on the motor
- <sup>4)</sup> Smaller motor shaft diameter is compensated by a bushing with a minimum thickness of 1 mm
- <sup>5)</sup> Tolerance h6 for mounted shaft
- <sup>6)</sup> Standard clamping hub diameter

			1-stage						
Ratio	<i>i</i>		7	10	16	28	40		
Max. torque <sup>a) b) e)</sup> (at $n_1 = 500$ rpm)	$T_{2a}$	Nm	68	76	78	82	76		
		in.lb	602	673	690	726	673		
Emergency stop torque <sup>a) b) e)</sup> (permitted 1000 times during the service life of the gearbox)	$T_{2Not}$	Nm	126	125	129	134	122		
		in.lb	1115	1106	1142	1186	1080		
Permitted average input speed <sup>d)</sup> (at 20 °C ambient temperature)	$n_{1N}$	rpm	4000						
Max. input speed	$n_{1Max}$	rpm	6000						
Mean no load running torque <sup>b)</sup> (at $n_1 = 3000$ rpm and 20 °C gearbox temperature)	$T_{012}$	Nm	0.7	0.6	0.5	0.4	0.4		
		in.lb	6.2	5.3	4.4	3.5	3.5		
Max. backlash	$j_t$	arcmin	≤ 15						
Torsional rigidity <sup>b)</sup>	$C_{t21}$	Nm/arcmin	3.5	3.5	3.5	3.5	3.5		
		in.lb/arcmin	31	31	31	31	31		
Max. axial force <sup>c)</sup> (Standard / HIGH FORCES)	$F_{2AMax}$	N	1200 / 3000						
		lb <sub>f</sub>	270 / 675						
Max. lateral force <sup>b)</sup> (Standard / HIGH FORCES)	$F_{2OMax}$	N	1000 / 2400						
		lb <sub>f</sub>	225 / 540						
Max. tilting moment (Standard / HIGH FORCES)	$M_{2KMax}$	Nm	97 / 205						
		in.lb	858 / 1814						
Efficiency at full load (at $n_1 = 500$ rpm)	$\eta$	%	89	87	81	72	66		
Service life	$L_h$	h	> 15000						
Weight (incl. standard adapter plate)	$m$	kg	4.5						
		lb <sub>m</sub>	10						
Operating noise (at reference ratio and reference speed – ratio-specific values available in cymex <sup>®</sup> )	$L_{PA}$	dB(A)	≤ 54						
Max. permitted housing temperature		°C	+90						
		°F	+194						
Ambient temperature		°C	-15 to +40						
		°F	+5 to +104						
Lubrication			Lubricated for life						
Direction of rotation			See drawing						
Protection class			IP 65						
Elastomer coupling (recommended product type – validate sizing with cymex <sup>®</sup> )			ELC - 00060B - 016.000 - X						
Bore diameter of coupling on the application side		mm	X = 016.000 - 032.000						
Mass moment of inertia (relates to the drive) Clamping hub diameter [mm]	C	14	$J_1$	kgcm <sup>2</sup>	0.38	0.38	0.34	0.32	0.31
				10 <sup>-3</sup> in.lb.s <sup>2</sup>	0.34	0.34	0.30	0.28	0.27
	E	19	$J_1$	kgcm <sup>2</sup>	0.40	0.37	0.35	0.34	0.33
				10 <sup>-3</sup> in.lb.s <sup>2</sup>	0.35	0.33	0.31	0.30	0.29

Please use our sizing software cymex<sup>®</sup> for a detailed sizing – [www.wittenstein-cymex.com](http://www.wittenstein-cymex.com)

- <sup>a)</sup> At max. 10 %  $F_{2OMax}$
- <sup>b)</sup> Valid for standard clamping hub diameter
- <sup>c)</sup> Refers to center of the output shaft or flange
- <sup>d)</sup> Please reduce input speed at higher ambient temperatures
- <sup>e)</sup> Valid for: Smooth shaft



			1-stage					
Ratio	$i$		7	10	16	28	40	
Max. torque <sup>a) b) e)</sup> (at $n_1 = 500$ rpm)	$T_{2a}$	Nm	125	127	131	140	116	
		in.lb	1106	1124	1159	1239	1027	
Emergency stop torque <sup>a) b) e)</sup> (permitted 1000 times during the service life of the gearbox)	$T_{2Not}$	Nm	242	242	250	262	236	
		in.lb	2142	2142	2213	2319	2089	
Permitted average input speed <sup>d)</sup> (at 20 °C ambient temperature)	$n_{1N}$	rpm	4000					
Max. input speed	$n_{1Max}$	rpm	6000					
Mean no load running torque <sup>b)</sup> (at $n_1 = 3000$ rpm and 20 °C gearbox temperature)	$T_{012}$	Nm	2.2	1.6	1.5	1.2	1.1	
		in.lb	19.5	14.2	13.3	10.6	9.7	
Max. backlash	$j_t$	arcmin	≤ 15					
Torsional rigidity <sup>b)</sup>	$C_{t21}$	Nm/arcmin	5.5	5.5	5.5	5.5	5.5	
		in.lb/arcmin	49	49	49	49	49	
Max. axial force <sup>c)</sup> (Standard / HIGH FORCES)	$F_{2AMax}$	N	1500 / 5000					
		lb <sub>f</sub>	337.5 / 1125					
Max. lateral force <sup>b)</sup> (Standard / HIGH FORCES)	$F_{2OMax}$	N	1200 / 3800					
		lb <sub>f</sub>	270 / 855					
Max. tilting moment (Standard / HIGH FORCES)	$M_{2KMax}$	Nm	130 / 409					
		in.lb	1150 / 3620					
Efficiency at full load (at $n_1 = 500$ rpm)	$\eta$	%	89	85	80	70	63	
Service life	$L_h$	h	> 15000					
Weight (incl. standard adapter plate)	$m$	kg	8					
		lb <sub>m</sub>	18					
Operating noise (at reference ratio and reference speed – ratio-specific values available in cymex <sup>®</sup> )	$L_{PA}$	dB(A)	≤ 62					
Max. permitted housing temperature		°C	+90					
		°F	+194					
Ambient temperature		°C	-15 to +40					
		°F	+5 to +104					
Lubrication			Lubricated for life					
Direction of rotation			See drawing					
Protection class			IP 65					
Elastomer coupling (recommended product type – validate sizing with cymex <sup>®</sup> )			ELC - 00150B - 022.000 - X					
Bore diameter of coupling on the application side		mm	X = 022.000 - 036.000					
Mass moment of inertia (relates to the drive) Clamping hub diameter [mm]	E 19	$J_1$	kgcm <sup>2</sup>	1.22	1.17	1.06	1.05	1.01
			10 <sup>-3</sup> in.lb.s <sup>2</sup>	1.08	1.04	0.94	0.93	0.89

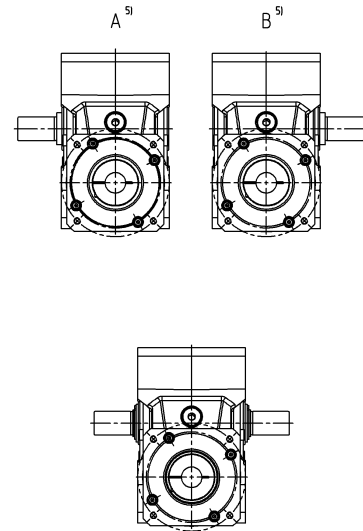
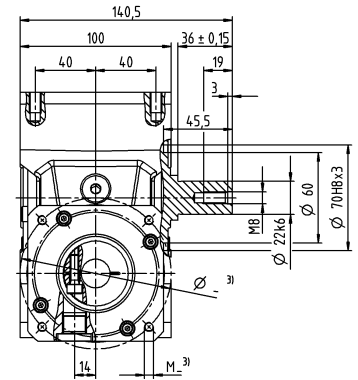
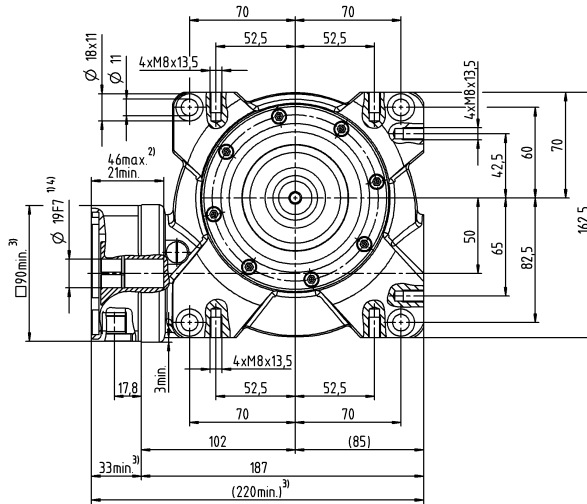
Please use our sizing software cymex<sup>®</sup> for a detailed sizing – [www.wittenstein-cymex.com](http://www.wittenstein-cymex.com)

- <sup>a)</sup> At max. 10 %  $F_{2OMax}$
- <sup>b)</sup> Valid for standard clamping hub diameter
- <sup>c)</sup> Refers to center of the output shaft or flange
- <sup>d)</sup> Please reduce input speed at higher ambient temperatures
- <sup>e)</sup> Valid for: Smooth shaft

Motor shaft diameter [mm]

1-stage

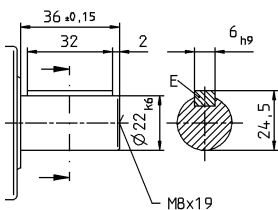
up to 19<sup>4)</sup> (E<sup>6)</sup>  
clamping hub diameter



Optional dual-shaft output. Drawings available on request.  
Involute gearing is not possible.

### Other output variants

Shaft with key



See technical data sheet for available clamping hub diameters  
(mass moment of inertia). Dimensions available on request.

Non-tolerated dimensions are nominal dimensions

<sup>1)</sup> Check motor shaft fit

<sup>2)</sup> Min./Max. permissible motor shaft length

Longer motor shafts are adaptable, please contact us

<sup>3)</sup> The dimensions depend on the motor

<sup>4)</sup> Smaller motor shaft diameter is compensated by a

bushing with a minimum thickness of 1 mm

<sup>5)</sup> Output side

<sup>6)</sup> Standard clamping hub diameter



			1-stage					
Ratio	<i>i</i>		7	10	16	28	40	
Max. torque <sup>a) b) e)</sup> (at $n_1 = 500$ rpm)	$T_{2a}$	Nm	265	270	280	301	282	
		in.lb	2345	2390	2478	2664	2496	
Emergency stop torque <sup>a) b) e)</sup> (permitted 1000 times during the service life of the gearbox)	$T_{2Not}$	Nm	484	491	494	518	447	
		in.lb	4283	4345	4372	4584	3956	
Permitted average input speed <sup>d)</sup> (at 20 °C ambient temperature)	$n_{1N}$	rpm	4000					
Max. input speed	$n_{1Max}$	rpm	4500					
Mean no load running torque <sup>b)</sup> (at $n_1 = 3000$ rpm and 20 °C gearbox temperature)	$T_{012}$	Nm	3.1	3	2.4	2.3	2.2	
		in.lb	27.4	26.6	21.2	20.4	19.5	
Max. backlash	$j_t$	arcmin	≤ 15					
Torsional rigidity <sup>b)</sup>	$C_{t21}$	Nm/arcmin	23	23	23	23	23	
		in.lb/arcmin	204	204	204	204	204	
Max. axial force <sup>c)</sup> (Standard / HIGH FORCES)	$F_{2AMax}$	N	2000 / 8250					
		lb <sub>f</sub>	450 / 1856					
Max. lateral force <sup>b)</sup> (Standard / HIGH FORCES)	$F_{2OMax}$	N	2000 / 6000					
		lb <sub>f</sub>	450 / 1350					
Max. tilting moment (Standard / HIGH FORCES)	$M_{2KMax}$	Nm	281 / 843					
		in.lb	2487 / 7461					
Efficiency at full load (at $n_1 = 500$ rpm)	$\eta$	%	90	87	82	73	67	
Service life	$L_n$	h	> 15000					
Weight (incl. standard adapter plate)	$m$	kg	13					
		lb <sub>m</sub>	29					
Operating noise (at reference ratio and reference speed – ratio-specific values available in cymex <sup>®</sup> )	$L_{PA}$	dB(A)	≤ 64					
Max. permitted housing temperature		°C	+90					
		°F	+194					
Ambient temperature		°C	-15 to +40					
		°F	+5 to +104					
Lubrication			Lubricated for life					
Direction of rotation			See drawing					
Protection class			IP 65					
Elastomer coupling (recommended product type – validate sizing with cymex <sup>®</sup> )			ELC - 00150B - 032.000 - X					
Bore diameter of coupling on the application side		mm	X = 032.000 - 036.000					
Mass moment of inertia (relates to the drive) Clamping hub diameter [mm]	H 28	$J_1$	kgcm <sup>2</sup>	3.75	3.61	3.52	3.48	3.36
			10 <sup>-3</sup> in.lb.s <sup>2</sup>	3.32	3.19	3.12	3.08	2.97

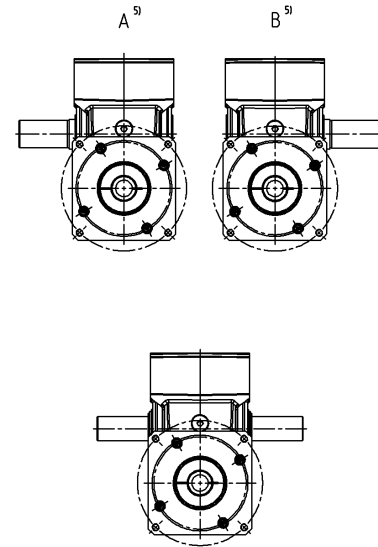
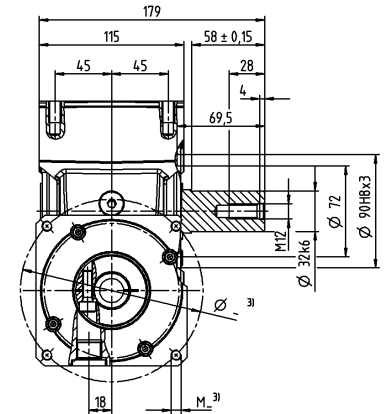
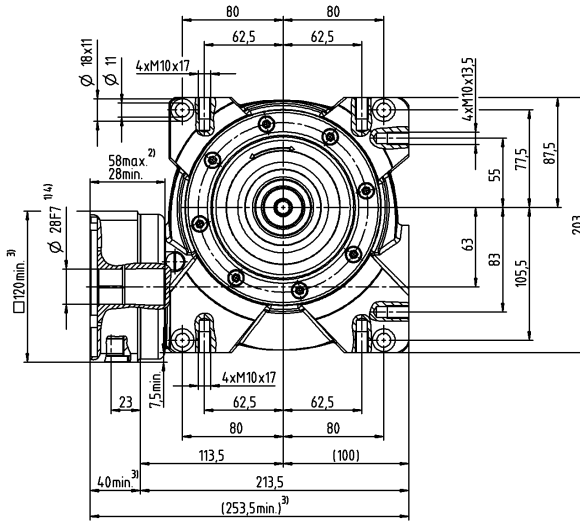
Please use our sizing software cymex<sup>®</sup> for a detailed sizing – [www.wittenstein-cymex.com](http://www.wittenstein-cymex.com)

- <sup>a)</sup> At max. 10 %  $F_{2OMax}$
- <sup>b)</sup> Valid for standard clamping hub diameter
- <sup>c)</sup> Refers to center of the output shaft or flange
- <sup>d)</sup> Please reduce input speed at higher ambient temperatures
- <sup>e)</sup> Valid for: Smooth shaft

Motor shaft diameter [mm]

1-stage

up to 28<sup>4)</sup> (H)<sup>6)</sup>  
clamping hub diameter



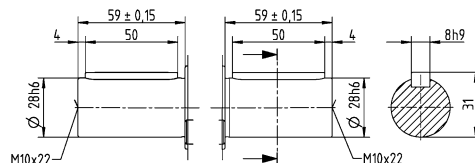
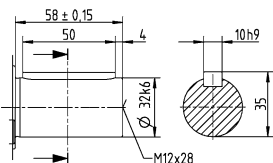
Worm Gearboxes  
Basic Line

Optional dual-shaft output. Drawings available on request.  
Involute gearing is not possible.

Other output variants

Shaft with key

Shaft with parallel key on both sides



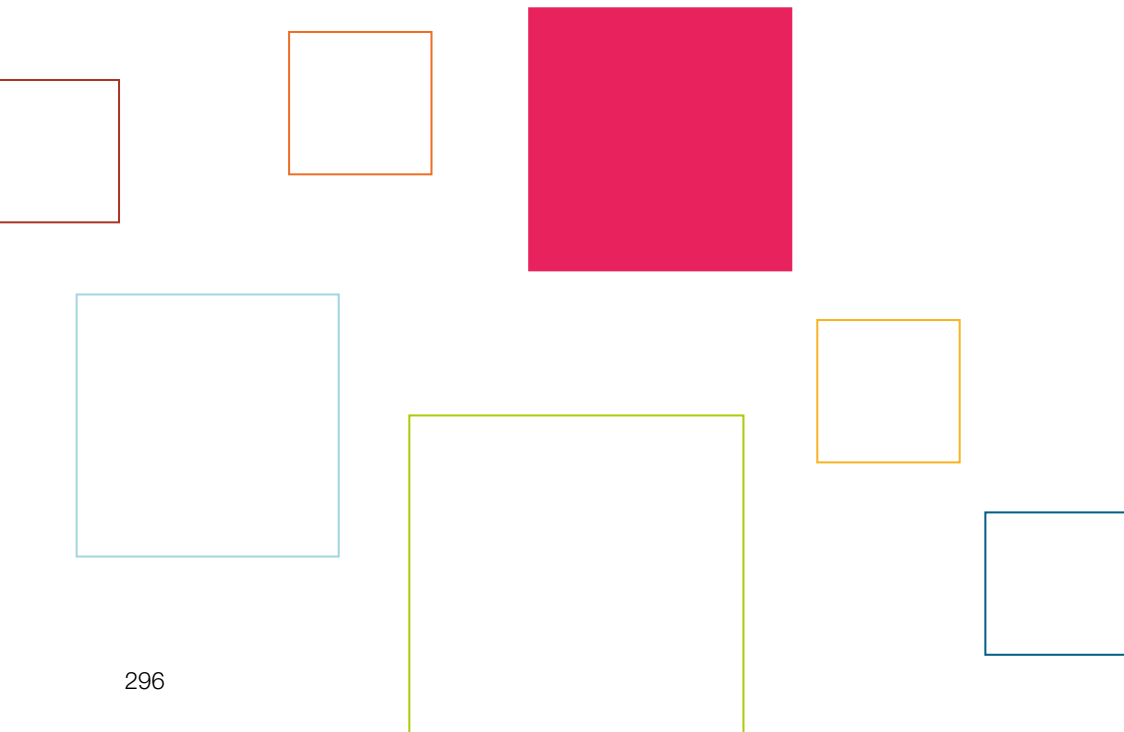
See technical data sheet for available clamping hub diameters  
(mass moment of inertia). Dimensions available on request.

- Non-tolerated dimensions are nominal dimensions
- <sup>1)</sup> Check motor shaft fit
- <sup>2)</sup> Min./Max. permissible motor shaft length  
Longer motor shafts are adaptable, please contact us
- <sup>3)</sup> The dimensions depend on the motor
- <sup>4)</sup> Smaller motor shaft diameter is compensated by a  
bushing with a minimum thickness of 1 mm
- <sup>5)</sup> Output side
- <sup>6)</sup> Standard clamping hub diameter

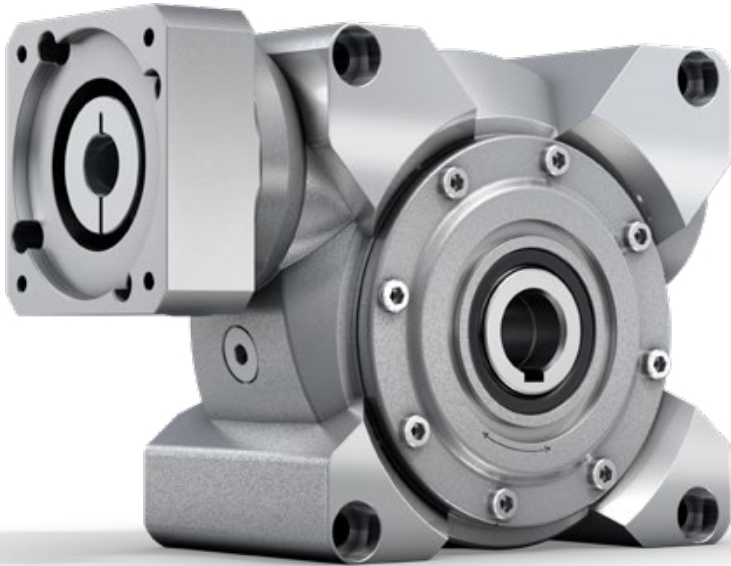
# alpha Value Line

## WORM GEARBOXES NVH / NVS

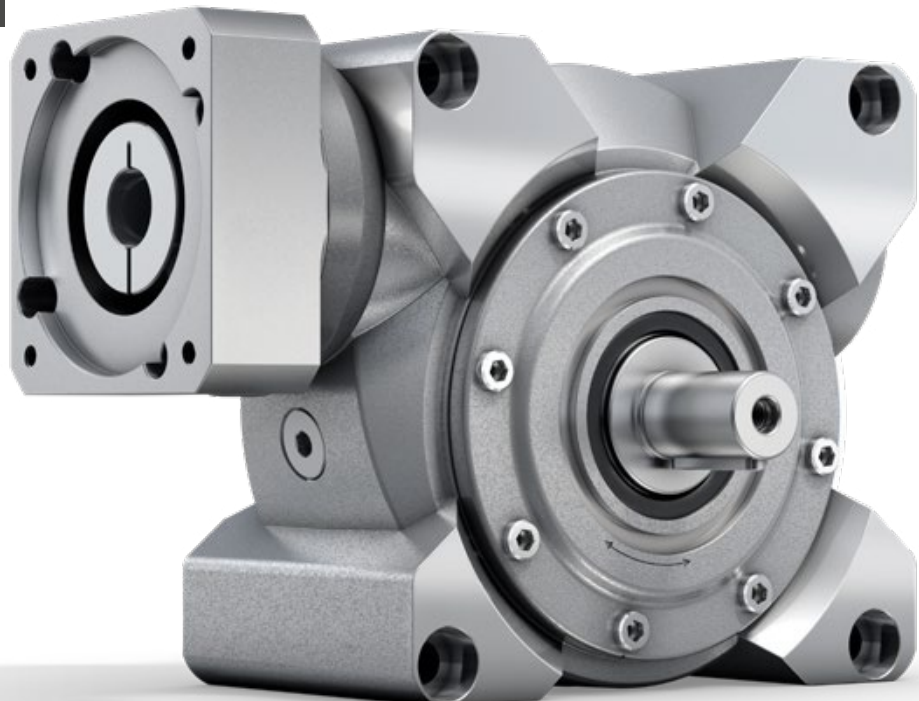
This product line is characterized by high power density, medium backlash over the entire service life, and supreme running smoothness. The gearboxes are also ideal for use in continuous operation thanks to their low temperature development.




NVH



NVS





Worm Gearboxes  
Value Line

 [www.famcocorp.com](http://www.famcocorp.com)

 E-mail: [info@famcocorp.com](mailto:info@famcocorp.com)

 @famco\_group

 Tel: ۰۲۱-۴۸۰۰۰۰۴۹

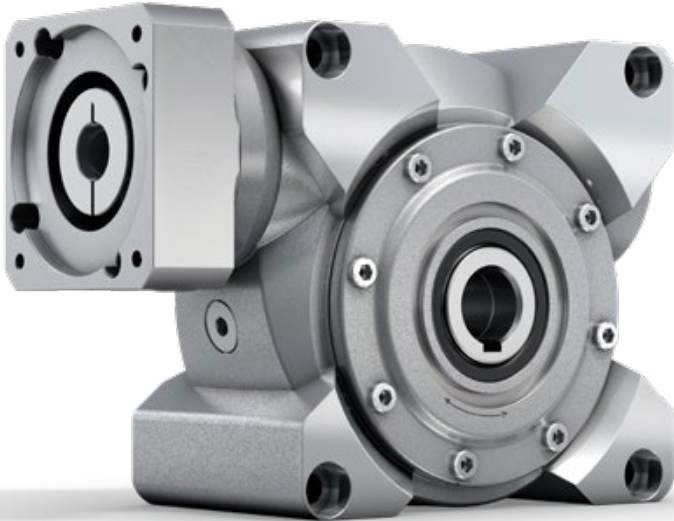
 Fax: ۰۲۱-۴۴۹۹۴۶۴۲

تهران، کیلومتر ۲۱ بزرگراه لشگری (جاده مخصوص کرج)

روبروی پالایشگاه نفت پارس، پلاک ۱۲

# NVH / NVS – We drive the Performance

NVH



The servo worm gearboxes with hollow shaft and output shaft impress with high power density combined with medium backlash. The V-Drive Value are especially suitable for economical applications in continuous operation.

## PRODUCT HIGHLIGHTS



### Strong performance

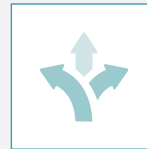
The V-Drive Value convinces with a strong performance in economical standard applications in cyclic and continuous operation.

High power density is achieved with medium backlash over the entire service life.



### No stick-slip effect

The stick-slip effect is not an issue in applications with the V-Drive Value thanks to the perfected hollow-flank toothing.



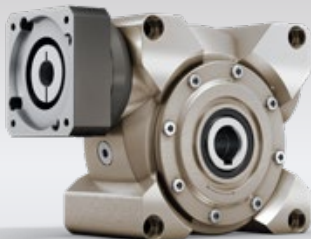
### High flexibility

In addition to the hollow shaft and shaft output shapes, the worm gearboxes are also available in a corrosion-resistant design.

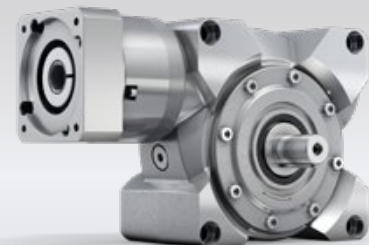


### Constant low backlash

Constant low backlash over the entire service life affords consistent high quality with high positioning accuracy.

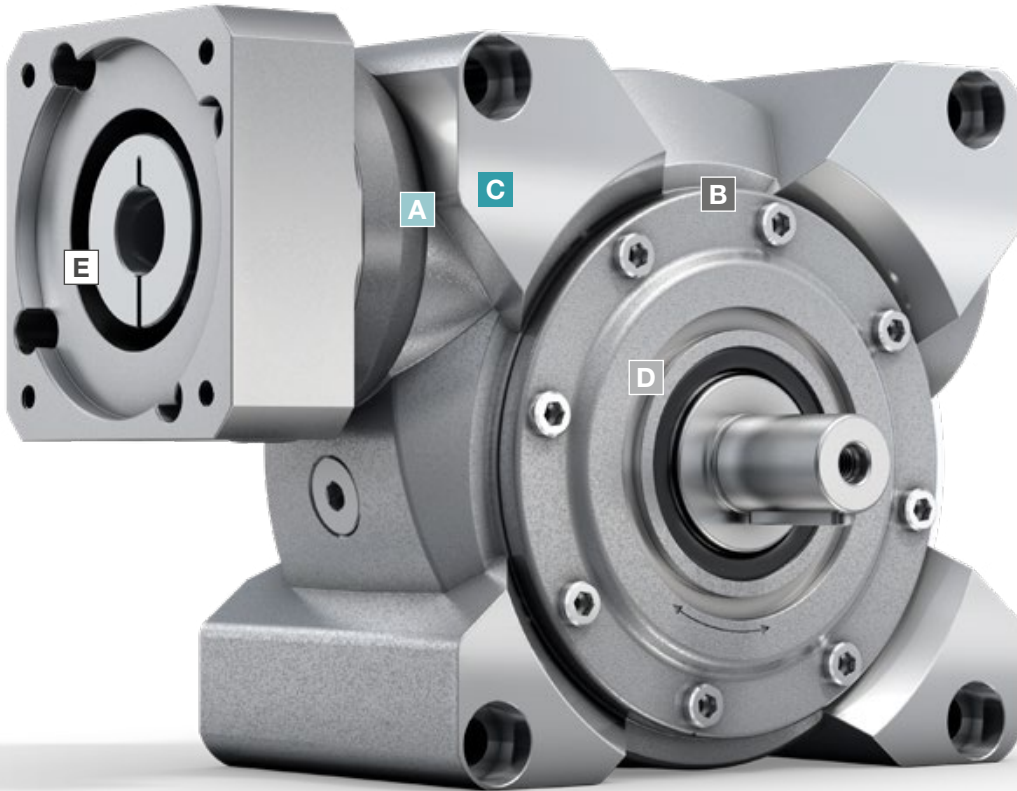


NVH – worm gearbox in corrosion-resistant design



NVS – worm gearbox with integrated planetary input stage

NVS



**A Radial shaft seal**

- Very long service life
- Optimized for continuous operation

**B Hollow-flank toothing**

- Medium torsional backlash accuracy over the entire service life
- High efficiency
- High power density

**C Input bearing**

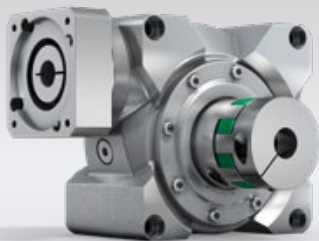
- Bearing package to absorb axial and radial forces
- Very well suited to high input speeds

**D Output bearing**

- High overload capacity to absorb axial and radial forces

**E Metal bellows coupling**

- Completely backlash free
- Lifetime durable and maintenance free
- Easy assembly
- Protects the motor through thermal linear expansion compensation



NVS – worm gearbox with elastomer coupling ELC



NVS – worm gearbox with rack and pinion

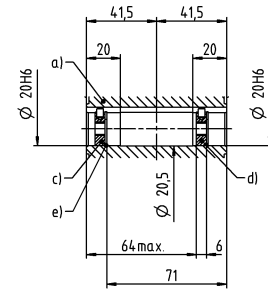
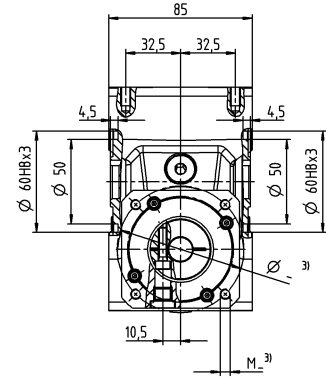
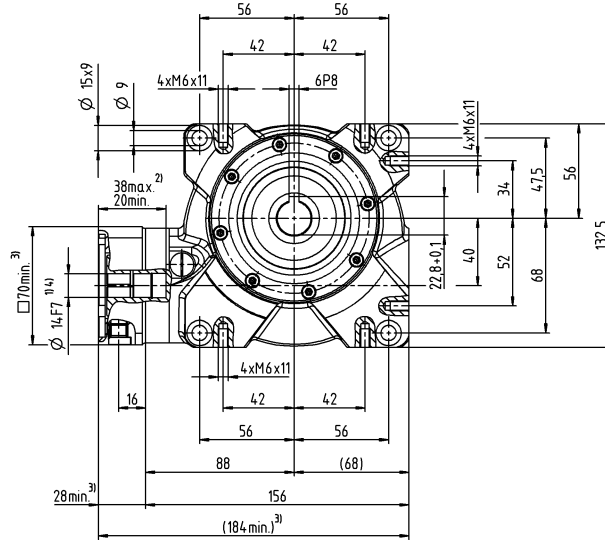
			1-stage						2-stage								
Ratio	<i>i</i>		4	7	10	16	28	40	50	70	100	140	200	280	400		
Max. torque <sup>a) b)</sup> (at $n_1 = 500$ rpm)	$T_{2a}$	Nm	74	82	91	94	98	91	91	82	91	98	91	98	91		
		in.lb	655	726	805	832	867	805	805	726	805	867	805	867	805		
Emergency stop torque <sup>a) b)</sup> (permitted 1000 times during the service life of the gearbox)	$T_{2Not}$	Nm	118	126	125	129	134	122	125	126	125	134	122	134	122		
		in.lb	1044	1115	1106	1142	1186	1080	1106	1115	1106	1186	1080	1186	1080		
Permitted average input speed <sup>d)</sup> (at 20 °C ambient temperature)	$n_{1N}$	rpm	4000						4400								
Max. input speed	$n_{1Max}$	rpm	6000														
Mean no load running torque <sup>b)</sup> (at $n_1 = 3000$ rpm and 20 °C gearbox temperature)	$T_{012}$	Nm	0.8	0.7	0.6	0.5	0.4	0.4	0.4	0.2	0.2	0.4	0.4	0.3	0.2		
		in.lb	7.1	6.2	5.3	4.4	3.5	3.5	3.5	1.8	1.8	3.5	3.5	2.7	1.8		
Max. backlash	$j_t$	arcmin	≤ 6						≤ 7								
Torsional rigidity <sup>b)</sup>	$C_{t21}$	Nm/arcmin	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5		
		in.lb/arcmin	40	40	40	40	40	40	40	40	40	40	40	40	40		
Max. axial force <sup>c)</sup>	$F_{2AMax}$	N	3000														
		lb <sub>f</sub>	675														
Max. lateral force <sup>b)</sup>	$F_{2OMax}$	N	2400														
		lb <sub>f</sub>	540														
Max. tilting moment	$M_{2KMax}$	Nm	205														
		in.lb	1814														
Efficiency at full load (at $n_1 = 500$ rpm)	$\eta$	%	93	90	88	82	73	67	86	88	86	71	65	71	65		
Service life	$L_n$	h	> 20000														
Weight (incl. standard adapter plate)	$m$	kg	5						5.6								
		lb <sub>m</sub>	11.1						12								
Operating noise (at reference ratio and reference speed – ratio-specific values available in cymex <sup>®</sup> )	$L_{PA}$	dB(A)	< 54						< 58								
Max. permitted housing temperature		°C	+90														
		°F	+194														
Ambient temperature		°C	-15 to +40														
		°F	+5 to +104														
Lubrication			Lubricated for life														
Direction of rotation			See drawing														
Protection class			IP 65														
Shrink disc (Standard Version)			SD 024x050 S2														
Max. torque (without axial force)	$T_{max}$	Nm	250														
		in.lb	2213														
Mass moment of inertia (relates to the drive)	C	14	$J_1$	kgcm <sup>2</sup>	0.53	0.38	0.35	0.32	0.32	0.32	0.25	0.28	0.24	0.23	0.19	0.18	0.18
				10 <sup>-3</sup> in.lb.s <sup>2</sup>	0.47	0.34	0.31	0.28	0.28	0.34	0.22	0.25	0.21	0.2	0.17	0.16	0.16
Clamping hub diameter [mm]	E	19	$J_1$	kgcm <sup>2</sup>	0.55	0.41	0.38	0.35	0.34	0.33	0.4	0.4	0.36	0.34	0.3	0.3	0.3
				10 <sup>-3</sup> in.lb.s <sup>2</sup>	0.49	0.36	0.34	0.31	0.3	0.29	0.35	0.35	0.32	0.30	0.27	0.27	0.27

Please use our sizing software cymex<sup>®</sup> for a detailed sizing – [www.wittenstein-cymex.com](http://www.wittenstein-cymex.com)

- <sup>a)</sup> At max. 10 %  $F_{2OMax}$
- <sup>b)</sup> Valid for standard clamping hub diameter
- <sup>c)</sup> Refers to center of the output shaft or flange
- <sup>d)</sup> Please reduce input speed at higher ambient temperatures

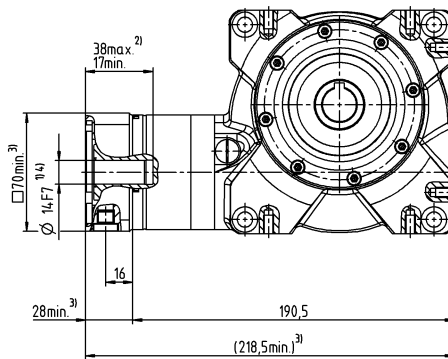
# 1-stage

up to 14/19<sup>4)</sup> (C<sup>6)</sup>/E)  
clamping hub diameter



# 2-stage

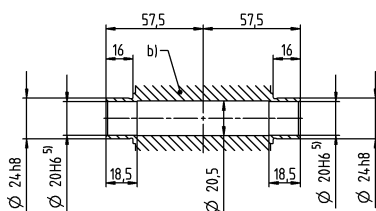
up to 14/19<sup>4)</sup> (C<sup>6)</sup>/E)  
clamping hub diameter



Motor shaft diameter [mm]

## Other output variants

Hollow shaft interfaces on both sides



- a) Hollow shaft, keyed on both sides
- b) Hollow shaft interfaces on both sides
- c) End disc for screw M6 (on request)
- d) End disc as forcing washer for screw M8 (on request)
- e) Locking ring – DIN 472 (on request)

See technical data sheet for available clamping hub diameters (mass moment of inertia). Dimensions available on request.

Non-tolerated dimensions are nominal dimensions

- <sup>1)</sup> Check motor shaft fit
- <sup>2)</sup> Min./Max. permissible motor shaft length  
Longer motor shafts are adaptable, please contact us
- <sup>3)</sup> The dimensions depend on the motor
- <sup>4)</sup> Smaller motor shaft diameter is compensated by a bushing with a minimum thickness of 1 mm
- <sup>5)</sup> Tolerance h6 for mounted shaft
- <sup>6)</sup> Standard clamping hub diameter



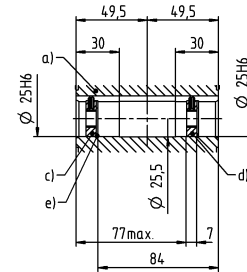
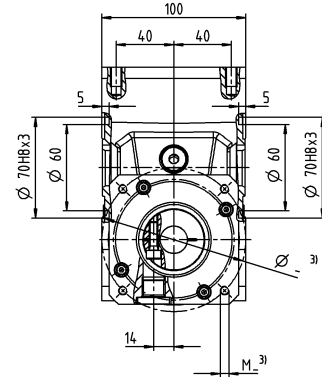
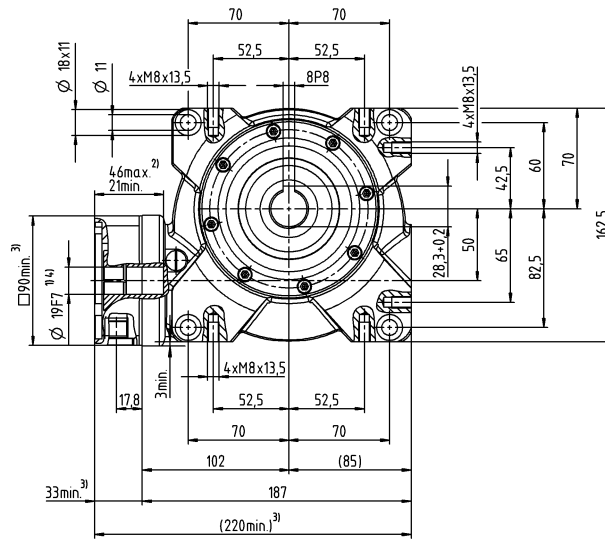
			1-stage						2-stage								
Ratio	$i$		4	7	10	16	28	40	50	70	100	140	200	280	400		
Max. torque <sup>a) b)</sup> (at $n_1 = 500$ rpm)	$T_{2a}$	Nm	130	150	153	157	167	141	153	150	153	167	141	167	141		
		in.lb	1151	1328	1354	1389	1478	1248	1354	1328	1354	1478	1248	1478	1248		
Emergency stop torque <sup>a) b)</sup> (permitted 1000 times during the service life of the gearbox)	$T_{2Not}$	Nm	230	242	242	250	262	236	242	242	242	262	236	262	236		
		in.lb	2036	2142	2142	2213	2319	2089	2142	2142	2142	2319	2089	2319	2089		
Permitted average input speed <sup>d)</sup> (at 20 °C ambient temperature)	$n_{1N}$	rpm	4000						3500								
Max. input speed	$n_{1Max}$	rpm	6000														
Mean no load running torque <sup>b)</sup> (at $n_1 = 3000$ rpm and 20 °C gearbox temperature)	$T_{012}$	Nm	2.3	2.2	1.6	1.5	1.2	1.1	0.7	0.5	0.4	0.6	0.6	0.4	0.4		
		in.lb	20.4	19.5	14.2	13.3	10.6	9.7	6.2	4.4	3.5	5.3	5.3	3.5	3.5		
Max. backlash	$j_t$	arcmin	≤ 6						≤ 7								
Torsional rigidity <sup>b)</sup>	$C_{t21}$	Nm/arcmin	8	8	8	8	8	8	8	8	8	8	8	8	8		
		in.lb/arcmin	71	71	71	71	71	71	71	71	71	71	71	71	71		
Max. axial force <sup>c)</sup>	$F_{2AMax}$	N	5000														
		lb <sub>f</sub>	1125														
Max. lateral force <sup>b)</sup>	$F_{2OMax}$	N	3800														
		lb <sub>f</sub>	855														
Max. tilting moment	$M_{2KMax}$	Nm	409														
		in.lb	3620														
Efficiency at full load (at $n_1 = 500$ rpm)	$\eta$	%	92	89	86	82	72	64	84	87	84	70	62	70	62		
Service life	$L_n$	h	> 20000														
Weight (incl. standard adapter plate)	$m$	kg	8						8.7								
		lb <sub>m</sub>	17.7						19								
Operating noise (at reference ratio and reference speed – ratio-specific values available in cymex <sup>®</sup> )	$L_{PA}$	dB(A)	≤ 62														
Max. permitted housing temperature		°C	+90														
		°F	+194														
Ambient temperature		°C	-15 to +40														
		°F	+5 to +104														
Lubrication			Lubricated for life														
Direction of rotation			See drawing														
Protection class			IP 65														
Shrink disc (Standard Version)			SD 030x060 S2V														
Max. torque (without axial force)	$T_{max}$	Nm	550														
		in.lb	4868														
Mass moment of inertia (relates to the drive)	C	14	$J_1$	kgcm <sup>2</sup>	-	-	-	-	-	-	0.8	0.8	0.8	0.7	0.7	0.7	0.7
				10 <sup>-3</sup> in.lb.s <sup>2</sup>	-	-	-	-	-	-	0.71	0.71	0.71	0.62	0.62	0.62	0.62
Clamping hub diameter [mm]	E	19	$J_1$	kgcm <sup>2</sup>	1.47	1.21	1.12	1.03	1	1.05	1.2	1.3	1.2	1.1	1.1	1.1	1.1
				10 <sup>-3</sup> in.lb.s <sup>2</sup>	1.3	1.07	0.99	0.91	0.89	0.93	1.06	1.15	1.06	0.97	0.97	0.97	0.97

Please use our sizing software cymex<sup>®</sup> for a detailed sizing – [www.wittenstein-cymex.com](http://www.wittenstein-cymex.com)

- <sup>a)</sup> At max. 10 %  $F_{2OMax}$
- <sup>b)</sup> Valid for standard clamping hub diameter
- <sup>c)</sup> Refers to center of the output shaft or flange
- <sup>d)</sup> Please reduce input speed at higher ambient temperatures

# 1-stage

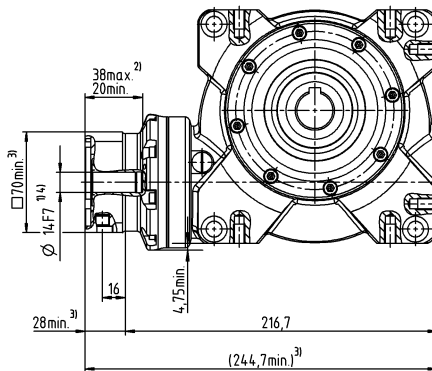
up to 19<sup>4)</sup> (E<sup>6)</sup>  
clamping hub  
diameter



Motor shaft diameter [mm]

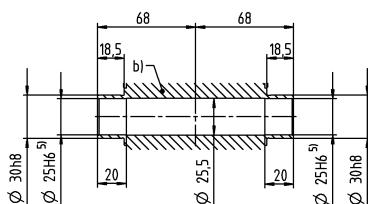
# 2-stage

up to 14/19<sup>4)</sup> (C<sup>6)</sup>/E  
clamping hub  
diameter



## Other output variants

Hollow shaft interfaces on both sides



- a) Hollow shaft, keyed on both sides
- b) Hollow shaft interfaces on both sides
- c) End disc for screw M10 (on request)
- d) End disc as forcing washer for screw M12 (on request)
- e) Locking ring – DIN 472 (on request)

See technical data sheet for available clamping hub diameters (mass moment of inertia). Dimensions available on request.

Non-tolerated dimensions are nominal dimensions

- <sup>1)</sup> Check motor shaft fit
- <sup>2)</sup> Min./Max. permissible motor shaft length  
Longer motor shafts are adaptable, please contact us
- <sup>3)</sup> The dimensions depend on the motor
- <sup>4)</sup> Smaller motor shaft diameter is compensated by a bushing with a minimum thickness of 1 mm
- <sup>5)</sup> Tolerance h6 for mounted shaft
- <sup>6)</sup> Standard clamping hub diameter

			1-stage						2-stage								
Ratio	<i>i</i>		4	7	10	16	28	40	50	70	100	140	200	280	400		
Max. torque <sup>a) b)</sup> (at $n_1 = 500$ rpm)	$T_{2a}$	Nm	250	303	319	331	365	321	319	303	319	365	321	365	321		
		in.lb	2213	2682	2823	2929	3230	2841	2823	2682	2823	3230	2841	3230	2841		
Emergency stop torque <sup>a) b)</sup> (permitted 1000 times during the service life of the gearbox)	$T_{2Not}$	Nm	460	484	491	494	518	447	491	484	494	518	447	518	447		
		in.lb	4071	4283	4345	4372	4584	3956	4345	4283	4372	4584	3956	4584	3956		
Permitted average input speed <sup>d)</sup> (at 20 °C ambient temperature)	$n_{1N}$	rpm	4000						3100								
Max. input speed	$n_{1Max}$	rpm	4500														
Mean no load running torque <sup>b)</sup> (at $n_1 = 3000$ rpm and 20 °C gearbox temperature)	$T_{012}$	Nm	4.2	3.1	3	2.4	2.3	2.2	1.2	0.7	0.7	1.1	1.1	0.8	0.6		
		in.lb	37.2	27.4	26.6	21.2	20.4	19.5	10.6	6.2	6.2	9.7	9.7	7.1	5.3		
Max. backlash	$j_t$	arcmin	≤ 6						≤ 7								
Torsional rigidity <sup>b)</sup>	$C_{t21}$	Nm/arcmin	28	28	28	28	28	28	28	28	28	28	28	28	28		
		in.lb/arcmin	248	248	248	248	248	248	248	248	248	248	248	248	248		
Max. axial force <sup>c)</sup>	$F_{2AMax}$	N	8250														
		lb <sub>f</sub>	1856														
Max. lateral force <sup>b)</sup>	$F_{2OMax}$	N	6000														
		lb <sub>f</sub>	1350														
Max. tilting moment	$M_{2KMax}$	Nm	843														
		in.lb	7461														
Efficiency at full load (at $n_1 = 500$ rpm)	$\eta$	%	93	91	88	83	74	68	86	89	86	72	66	72	66		
Service life	$L_n$	h	> 20000														
Weight (incl. standard adapter plate)	$m$	kg	13						13.7								
		lb <sub>m</sub>	28.7						30								
Operating noise (at reference ratio and reference speed – ratio-specific values available in cymex <sup>®</sup> )	$L_{PA}$	dB(A)	≤ 64														
Max. permitted housing temperature		°C	+90														
		°F	+194														
Ambient temperature		°C	-15 to +40														
		°F	+5 to +104														
Lubrication			Lubricated for life														
Direction of rotation			See drawing														
Protection class			IP 65														
Shrink disc (Standard Version)			SD 036x072 S2V														
Max. torque (without axial force)	$T_{max}$	Nm	640														
		in.lb	5664														
Mass moment of inertia (relates to the drive) Clamping hub diameter [mm]	E	19	$J_1$	kgcm <sup>2</sup>	-	-	-	-	-	-	2.6	2.8	2.5	2.4	2.4	2.4	2.3
				10 <sup>-3</sup> in.lb.s <sup>2</sup>	-	-	-	-	-	-	2.3	2.48	2.21	2.12	2.12	2.12	2.04
	G	24	$J_1$	kgcm <sup>2</sup>	-	-	-	-	-	-	4.1	4.3	4.1	4	4	3.9	3.9
				10 <sup>-3</sup> in.lb.s <sup>2</sup>	-	-	-	-	-	-	3.63	3.81	3.63	3.54	3.54	3.45	3.45
H	28	$J_1$	kgcm <sup>2</sup>	4.8	3.89	3.65	3.56	3.52	3.47	-	-	-	-	-	-	-	
			10 <sup>-3</sup> in.lb.s <sup>2</sup>	4.25	3.44	3.23	3.15	3.12	3.07	-	-	-	-	-	-	-	

Please use our sizing software cymex<sup>®</sup> for a detailed sizing – [www.wittenstein-cymex.com](http://www.wittenstein-cymex.com)

<sup>a)</sup> At max. 10 %  $F_{2OMax}$

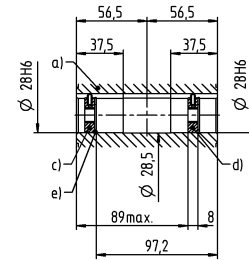
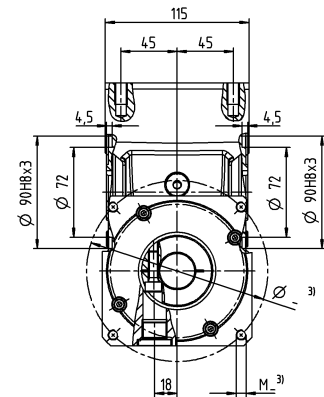
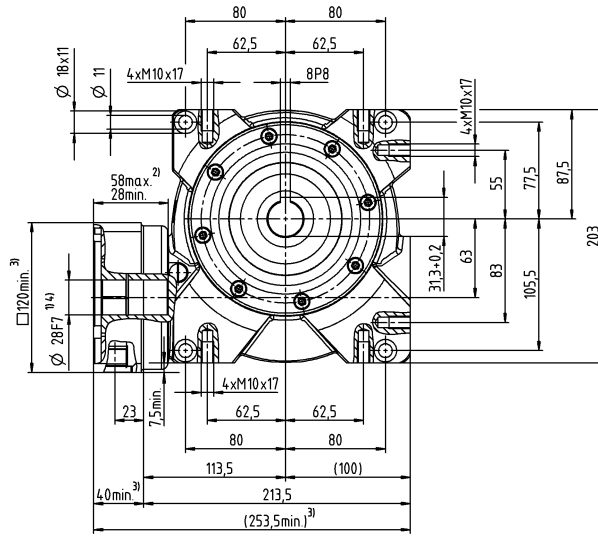
<sup>b)</sup> Valid for standard clamping hub diameter

<sup>c)</sup> Refers to center of the output shaft or flange

<sup>d)</sup> Please reduce input speed at higher ambient temperatures

# 1-stage

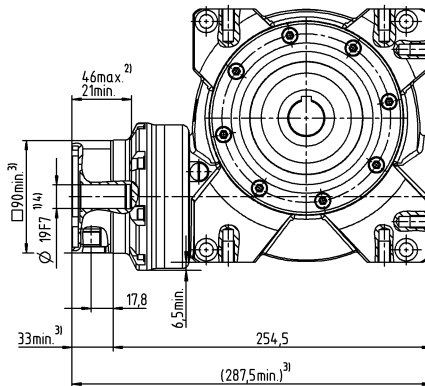
up to 28<sup>4)</sup> (H)<sup>6)</sup>  
clamping hub  
diameter



Motor shaft diameter [mm]

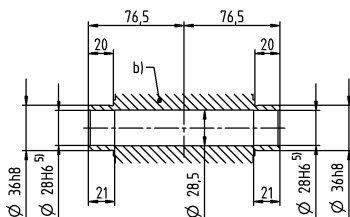
# 2-stage

up to 19/24<sup>4)</sup> (E<sup>6)</sup>/G)  
clamping hub  
diameter



## Other output variants

Hollow shaft interfaces on both sides



- a) Hollow shaft, keyed on both sides
- b) Hollow shaft interfaces on both sides
- c) End disc for screw M10 (on request)
- d) End disc as forcing washer for screw M12 (on request)
- e) Locking ring – DIN 472 (on request)

See technical data sheet for available clamping hub diameters (mass moment of inertia). Dimensions available on request.

Non-tolerated dimensions are nominal dimensions

- <sup>1)</sup> Check motor shaft fit
- <sup>2)</sup> Min. /Max. permissible motor shaft length  
Longer motor shafts are adaptable, please contact us
- <sup>3)</sup> The dimensions depend on the motor
- <sup>4)</sup> Smaller motor shaft diameter is compensated by a bushing with a minimum thickness of 1 mm
- <sup>5)</sup> Tolerance h6 for mounted shaft
- <sup>6)</sup> Standard clamping hub diameter

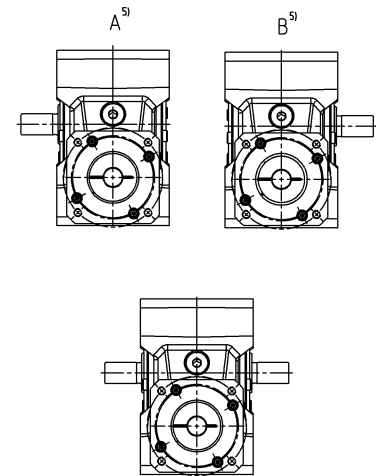
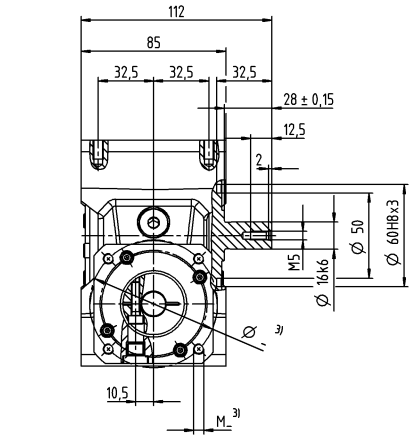
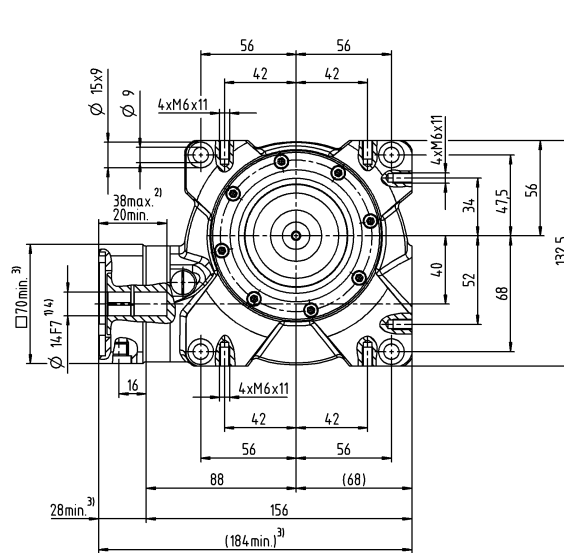
Ratio	i		1-stage						2-stage								
			4	7	10	16	28	40	50	70	100	140	200	280	400		
Max. torque <sup>a) b) e)</sup> (at $n_1 = 500$ rpm)	$T_{2a}$	Nm	63	73	87	89	96	84	91	82	91	98	91	98	91		
		in.lb	558	646	770	788	850	743	805	726	805	867	805	867	805		
Emergency stop torque <sup>a) b) e)</sup> (permitted 1000 times during the service life of the gearbox)	$T_{2Not}$	Nm	118	126	125	129	134	122	125	126	125	134	122	134	122		
		in.lb	1044	1115	1106	1142	1186	1080	1106	1115	1106	1186	1080	1186	1080		
Permitted average input speed <sup>d)</sup> (at 20 °C ambient temperature)	$n_{1N}$	rpm	4000						4400								
Max. input speed	$n_{1Max}$	rpm	6000														
Mean no load running torque <sup>b)</sup> (at $n_1 = 3000$ rpm and 20 °C gearbox temperature)	$T_{012}$	Nm	0.8	0.7	0.6	0.5	0.4	0.4	0.4	0.2	0.2	0.4	0.4	0.3	0.2		
		in.lb	7.1	6.2	5.3	4.4	3.5	3.5	3.5	1.8	1.8	3.5	3.5	2.7	1.8		
Max. backlash	$j_t$	arcmin	≤ 6						≤ 7								
Torsional rigidity <sup>b)</sup>	$C_{t21}$	Nm/arcmin	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5		
		in.lb/arcmin	40	40	40	40	40	40	40	40	40	40	40	40	40		
Max. axial force <sup>c)</sup>	$F_{2AMax}$	N	3000														
		lb <sub>f</sub>	675														
Max. lateral force <sup>b)</sup>	$F_{2OMax}$	N	2400														
		lb <sub>f</sub>	540														
Max. tilting moment	$M_{2KMax}$	Nm	205														
		in.lb	1814														
Efficiency at full load (at $n_1 = 500$ rpm)	$\eta$	%	93	90	88	82	73	67	86	88	86	71	65	71	65		
Service life	$L_n$	h	> 20000														
Weight (incl. standard adapter plate)	m	kg	5						5.6								
		lb <sub>m</sub>	11.1														
Operating noise (at reference ratio and reference speed – ratio-specific values available in cymex <sup>®</sup> )	$L_{PA}$	dB(A)	≤ 54						≤ 58								
Max. permitted housing temperature		°C	+90														
		°F	+194														
Ambient temperature		°C	-15 to +40														
		°F	+5 to +104														
Lubrication			Lubricated for life														
Direction of rotation			See drawing														
Protection class			IP 65														
Elastomer coupling (recommended product type – validate sizing with cymex <sup>®</sup> )			ELC - 00060B - 016.000 - X														
Bore diameter of coupling on the application side		mm	X = 016.000 - 032.000														
Mass moment of inertia (relates to the drive)	C	14	$J_1$	kgcm <sup>2</sup>	0.53	0.38	0.35	0.33	0.32	0.32	0.25	0.28	0.24	0.23	0.19	0.18	0.18
				10 <sup>-3</sup> in.lb.s <sup>2</sup>	0.47	0.34	0.31	0.29	0.28	0.22	0.25	0.21	0.2	0.17	0.16	0.16	
Clamping hub diameter [mm]	E	19	$J_1$	kgcm <sup>2</sup>	0.55	0.41	0.38	0.35	0.34	0.34	0.36	0.4	0.36	0.34	0.3	0.3	0.3
				10 <sup>-3</sup> in.lb.s <sup>2</sup>	0.49	0.36	0.34	0.31	0.3	0.3	0.32	0.35	0.32	0.3	0.27	0.27	0.27

Please use our sizing software cymex<sup>®</sup> for a detailed sizing – [www.wittenstein-cymex.com](http://www.wittenstein-cymex.com)

- <sup>a)</sup> At max. 10 %  $F_{2OMax}$
- <sup>b)</sup> Valid for standard clamping hub diameter
- <sup>c)</sup> Refers to center of the output shaft or flange
- <sup>d)</sup> Please reduce input speed at higher ambient temperatures
- <sup>e)</sup> Valid for: Smooth shaft

# 1-stage

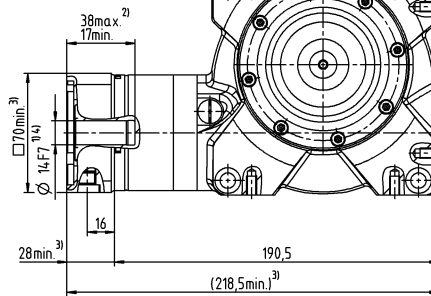
up to 14/19<sup>4)</sup> (C<sup>6)</sup>/E)  
clamping hub diameter



Motor shaft diameter [mm]

# 2-stage

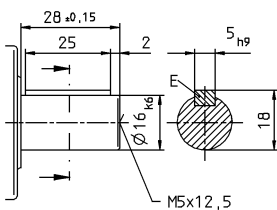
up to 14/19<sup>4)</sup> (C<sup>6)</sup>/E)  
clamping hub diameter



Optional dual-shaft output. Drawings available on request.  
Involute gearing is not possible.

## Other output variants

Shaft with key



See technical data sheet for available clamping hub diameters (mass moment of inertia). Dimensions available on request.

Non-tolerated dimensions are nominal dimensions

- <sup>1)</sup> Check motor shaft fit
- <sup>2)</sup> Min./Max. permissible motor shaft length  
Longer motor shafts are adaptable, please contact us
- <sup>3)</sup> The dimensions depend on the motor
- <sup>4)</sup> Smaller motor shaft diameter is compensated by a bushing with a minimum thickness of 1 mm
- <sup>5)</sup> Output side
- <sup>6)</sup> Standard clamping hub diameter

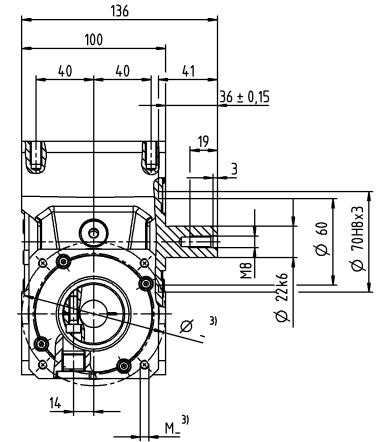
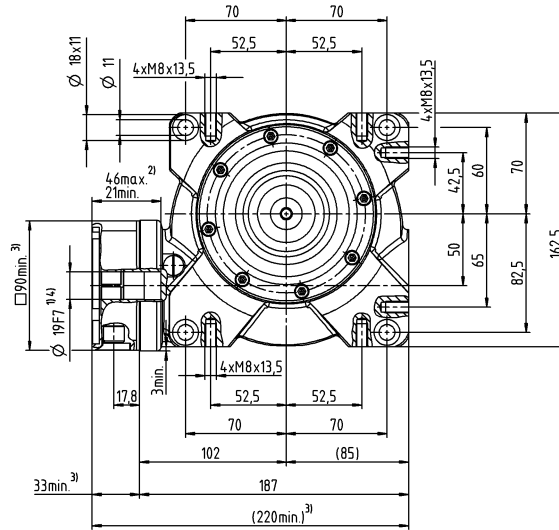
Ratio	i		1-stage						2-stage								
			4	7	10	16	28	40	50	70	100	140	200	280	400		
Max. torque <sup>a) b) e)</sup> (at n <sub>r</sub> = 500 rpm)	T <sub>2a</sub>	Nm	130	150	153	157	167	141	153	150	153	167	141	167	141		
		in.lb	1151	1328	1354	1389	1478	1248	1354	1328	1354	1478	1248	1478	1248		
Emergency stop torque <sup>a) b) e)</sup> (permitted 1000 times during the service life of the gearbox)	T <sub>2Not</sub>	Nm	230	242	242	250	262	236	242	242	242	262	236	262	236		
		in.lb	2036	2142	2142	2213	2319	2089	2142	2142	2142	2319	2089	2319	2089		
Permitted average input speed <sup>d)</sup> (at 20 °C ambient temperature)	n <sub>1N</sub>	rpm	4000						3500								
Max. input speed	n <sub>1Max</sub>	rpm	6000														
Mean no load running torque <sup>b)</sup> (at n <sub>r</sub> = 3000 rpm and 20 °C gearbox temperature)	T <sub>012</sub>	Nm	2.3	2.2	1.6	1.5	1.2	1.1	0.7	0.5	0.4	0.6	0.6	0.4	0.4		
		in.lb	20.4	19.5	14.2	13.3	10.6	9.7	6.2	4.4	3.5	5.3	5.3	3.5	3.5		
Max. backlash	j <sub>t</sub>	arcmin	≤ 6						≤ 7								
Torsional rigidity <sup>b)</sup>	C <sub>t21</sub>	Nm/arcmin	8	8	8	8	8	8	8	8	8	8	8	8	8		
		in.lb/arcmin	71	71	71	71	71	71	71	71	71	71	71	71	71		
Max. axial force <sup>c)</sup>	F <sub>2AMax</sub>	N	5000														
		lb <sub>f</sub>	1125														
Max. lateral force <sup>b)</sup>	F <sub>2OMax</sub>	N	3800														
		lb <sub>f</sub>	855														
Max. tilting moment	M <sub>2KMax</sub>	Nm	409														
		in.lb	3620														
Efficiency at full load (at n <sub>r</sub> = 500 rpm)	η	%	92	89	86	82	72	64	84	87	84	70	62	70	62		
Service life	L <sub>n</sub>	h	> 20000														
Weight (incl. standard adapter plate)	m	kg	8						8.7								
		lb <sub>m</sub>	17.7						19								
Operating noise (at reference ratio and reference speed – ratio-specific values available in cymex <sup>®</sup> )	L <sub>PA</sub>	dB(A)	≤ 62														
Max. permitted housing temperature		°C	+90														
		°F	+194														
Ambient temperature		°C	-15 to +40														
		°F	+5 to +104														
Lubrication			Lubricated for life														
Direction of rotation			See drawing														
Protection class			IP 65														
Elastomer coupling (recommended product type – validate sizing with cymex <sup>®</sup> )			ELC - 00150B - 022.000 - X														
Bore diameter of coupling on the application side		mm	X = 022.000 - 036.000														
Mass moment of inertia (relates to the drive)	C	14	J <sub>1</sub>	kgcm <sup>2</sup>	-	-	-	-	-	-	0.8	0.8	0.8	0.7	0.7	0.7	0.7
				10 <sup>-3</sup> in.lb.s <sup>2</sup>	-	-	-	-	-	-	0.71	0.71	0.71	0.62	0.62	0.62	0.62
Clamping hub diameter [mm]	E	19	J <sub>1</sub>	kgcm <sup>2</sup>	1.47	1.21	1.12	1.03	1	1.05	1.2	1.3	1.2	1.1	1.1	1.1	1.1
				10 <sup>-3</sup> in.lb.s <sup>2</sup>	1.3	1.07	0.99	0.91	0.89	0.93	1.06	1.15	1.06	0.97	0.97	0.97	0.97

Please use our sizing software cymex<sup>®</sup> for a detailed sizing – [www.wittenstein-cymex.com](http://www.wittenstein-cymex.com)

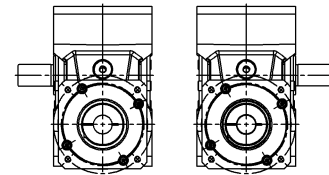
- <sup>a)</sup> At max. 10 % F<sub>20Max</sub>
- <sup>b)</sup> Valid for standard clamping hub diameter
- <sup>c)</sup> Refers to center of the output shaft or flange
- <sup>d)</sup> Please reduce input speed at higher ambient temperatures
- <sup>e)</sup> Valid for: Smooth shaft

# 1-stage

up to 19<sup>4)</sup> (E<sup>6)</sup>  
clamping hub  
diameter

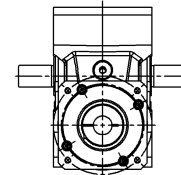
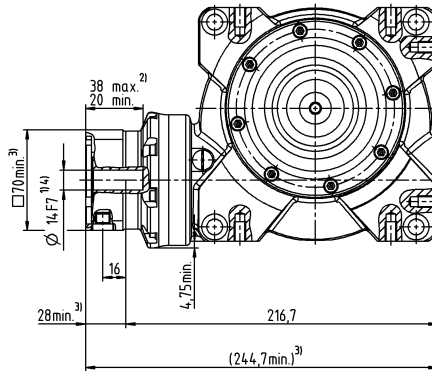


A<sup>5)</sup> B<sup>5)</sup>



# 2-stage

up to 14/19<sup>4)</sup> (C<sup>6)</sup>/E  
clamping hub  
diameter



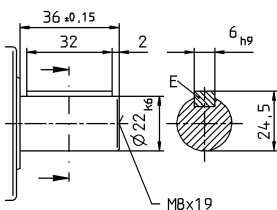
Motor shaft diameter [mm]

Optional dual-shaft output. Drawings available on request.  
Involute gearing is not possible.

Worm Gearboxes  
Value Line

## Other output variants

Shaft with key



See technical data sheet for available clamping hub diameters  
(mass moment of inertia). Dimensions available on request.

Non-tolerated dimensions are nominal dimensions

- <sup>1)</sup> Check motor shaft fit
- <sup>2)</sup> Min./Max. permissible motor shaft length  
Longer motor shafts are adaptable, please contact us
- <sup>3)</sup> The dimensions depend on the motor
- <sup>4)</sup> Smaller motor shaft diameter is compensated by a  
bushing with a minimum thickness of 1 mm
- <sup>5)</sup> Output side
- <sup>6)</sup> Standard clamping hub diameter



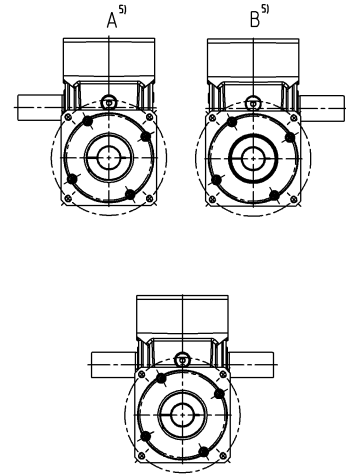
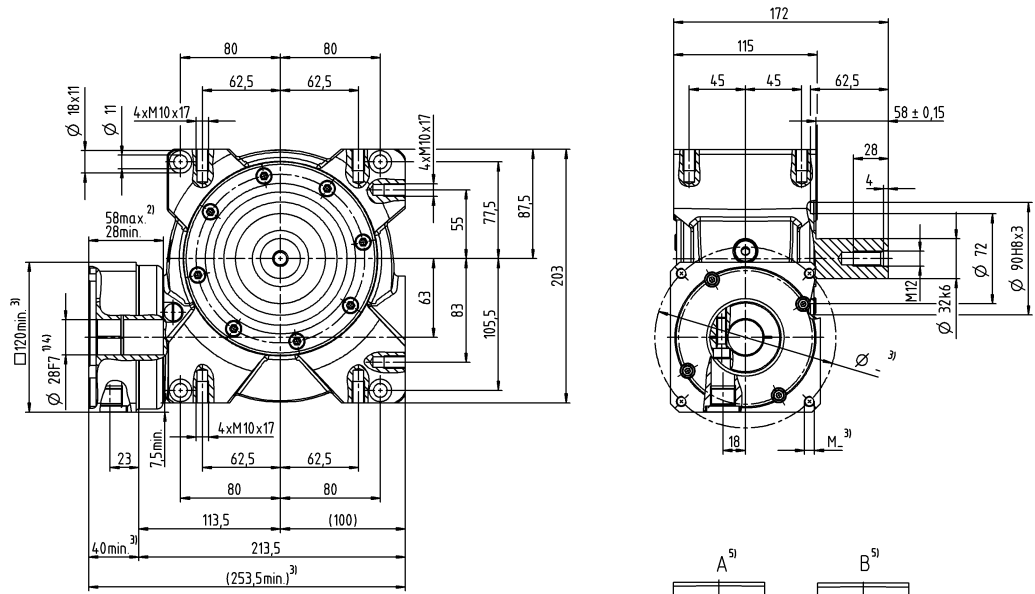
			1-stage						2-stage								
Ratio	<i>i</i>		4	7	10	16	28	40	50	70	100	140	200	280	400		
Max. torque <sup>a) b) e)</sup> (at $n_1 = 500$ rpm)	$T_{2a}$	Nm	250	303	319	331	365	321	319	303	319	365	321	365	321		
		in.lb	2213	2682	2823	2929	3230	2841	2823	2682	2823	3230	2841	3230	2841		
Emergency stop torque <sup>a) b) e)</sup> (permitted 1000 times during the service life of the gearbox)	$T_{2Not}$	Nm	460	484	491	494	518	447	491	484	494	518	447	518	447		
		in.lb	4071	4283	4345	4372	4584	3956	4345	4283	4372	4584	3956	4584	3956		
Permitted average input speed <sup>d)</sup> (at 20 °C ambient temperature)	$n_{1N}$	rpm	4000						3100								
Max. input speed	$n_{1Max}$	rpm	4500														
Mean no load running torque <sup>b)</sup> (at $n_1 = 3000$ rpm and 20 °C gearbox temperature)	$T_{012}$	Nm	4.2	3.1	3	2.4	2.3	2.2	1.2	0.7	0.7	1.1	1.1	0.8	0.6		
		in.lb	37.2	27.4	26.6	21.2	20.4	19.5	10.6	6.2	6.2	9.7	9.7	7.1	5.3		
Max. backlash	$j_t$	arcmin	≤ 6						≤ 7								
Torsional rigidity <sup>b)</sup>	$C_{t21}$	Nm/arcmin	28	28	28	28	28	28	28	28	28	28	28	28	28		
		in.lb/arcmin	248	248	248	248	248	248	248	248	248	248	248	248	248		
Max. axial force <sup>c)</sup>	$F_{2AMax}$	N	8250														
		lb <sub>f</sub>	1856														
Max. lateral force <sup>b)</sup>	$F_{2OMax}$	N	6000														
		lb <sub>f</sub>	1350														
Max. tilting moment	$M_{2KMax}$	Nm	843														
		in.lb	7461														
Efficiency at full load (at $n_1 = 500$ rpm)	$\eta$	%	93	91	88	83	74	68	86	89	86	72	66	72	66		
Service life	$L_n$	h	> 20000														
Weight (incl. standard adapter plate)	$m$	kg	13						13.7								
		lb <sub>m</sub>	28.7						30								
Operating noise (at reference ratio and reference speed – ratio-specific values available in cymex <sup>®</sup> )	$L_{PA}$	dB(A)	≤ 64														
Max. permitted housing temperature		°C	+90														
		°F	+194														
Ambient temperature		°C	-15 to +40														
		°F	+5 to +104														
Lubrication			Lubricated for life														
Direction of rotation			See drawing														
Protection class			IP 65														
Elastomer coupling (recommended product type – validate sizing with cymex <sup>®</sup> )			ELC - 00300B - 032.000 - X														
Bore diameter of coupling on the application side		mm	X = 032.000 - 045.000														
Mass moment of inertia (relates to the drive)	E	19	$J_1$	kgcm <sup>2</sup>	-	-	-	-	-	-	2.6	2.8	2.50	2.4	2.4	2.4	2.3
				10 <sup>-3</sup> in.lb.s <sup>2</sup>	-	-	-	-	-	-	2.3	2.48	2.21	2.12	2.12	2.12	2.04
	G	24	$J_1$	kgcm <sup>2</sup>	-	-	-	-	-	-	4.1	4.3	4.1	4	4	3.9	3.9
				10 <sup>-3</sup> in.lb.s <sup>2</sup>	-	-	-	-	-	-	3.63	3.81	3.63	3.54	3.54	3.45	3.45
Clamping hub diameter [mm]	H	28	$J_1$	kgcm <sup>2</sup>	4.8	3.89	3.65	3.56	3.52	3.47	-	-	-	-	-	-	-
				10 <sup>-3</sup> in.lb.s <sup>2</sup>	4.25	3.44	3.23	3.15	3.12	3.07	-	-	-	-	-	-	-

Please use our sizing software cymex<sup>®</sup> for a detailed sizing – [www.wittenstein-cymex.com](http://www.wittenstein-cymex.com)

- <sup>a)</sup> At max. 10 %  $F_{2OMax}$
- <sup>b)</sup> Valid for standard clamping hub diameter
- <sup>c)</sup> Refers to center of the output shaft or flange
- <sup>d)</sup> Please reduce input speed at higher ambient temperatures
- <sup>e)</sup> Valid for: Smooth shaft

# 1-stage

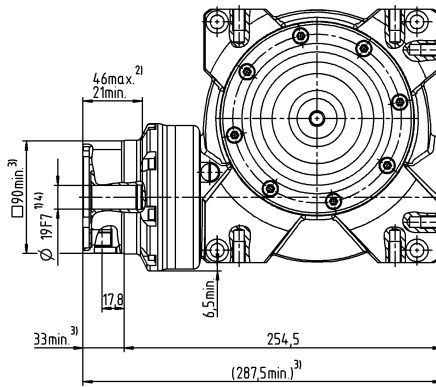
up to 28<sup>4)</sup> (H)<sup>6)</sup>  
clamping hub  
diameter



Motor shaft diameter [mm]

# 2-stage

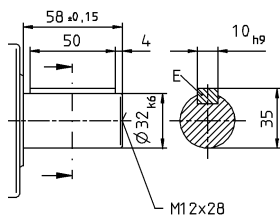
up to 19/24<sup>4)</sup> (E<sup>6)</sup>/G)  
clamping hub  
diameter



Optional dual-shaft output. Drawings available on request.  
Involute gearing is not possible.

## Other output variants

Shaft with key

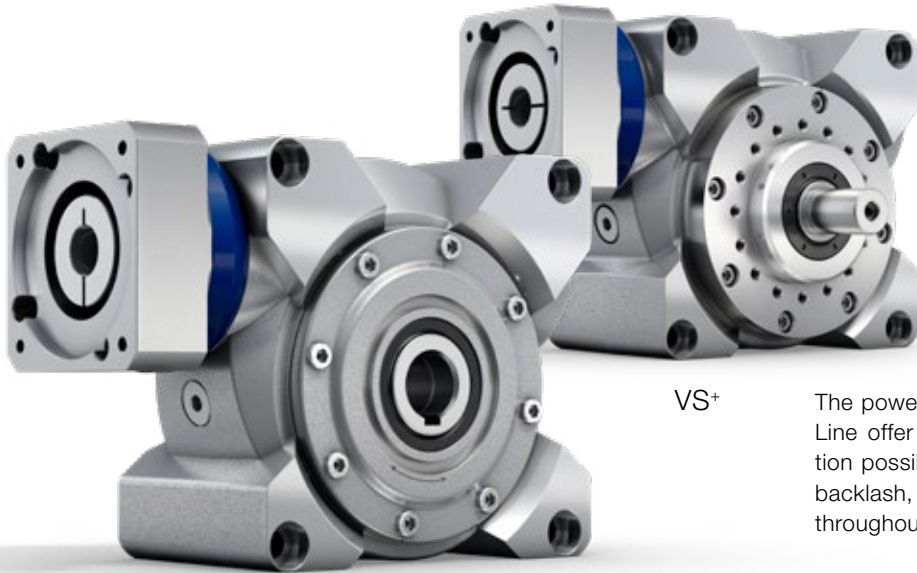


See technical data sheet for available clamping hub diameters (mass moment of inertia). Dimensions available on request.

Non-tolerated dimensions are nominal dimensions

- <sup>1)</sup> Check motor shaft fit
- <sup>2)</sup> Min./Max. permissible motor shaft length  
Longer motor shafts are adaptable, please contact us
- <sup>3)</sup> The dimensions depend on the motor
- <sup>4)</sup> Smaller motor shaft diameter is compensated by a bushing with a minimum thickness of 1 mm
- <sup>5)</sup> Output side
- <sup>6)</sup> Standard clamping hub diameter

## VH+ / VS+ / VT+ – Precision worm gearboxes



VS+

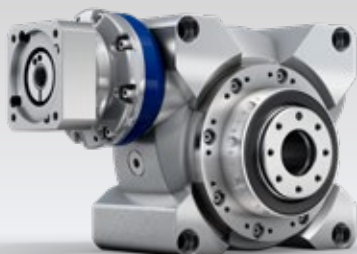
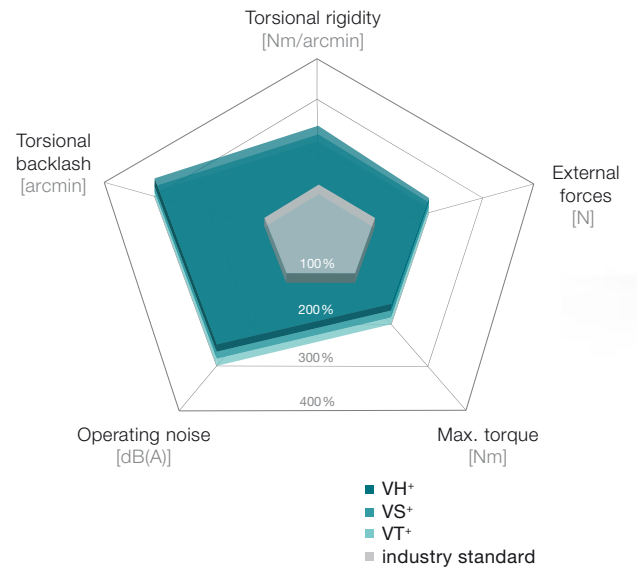
The powerful V-Drive worm gears of the alpha Advanced Line offer flexible output shapes and countless application possibilities. With high-quality toothing and constant backlash, the gearboxes remain exceptionally efficient throughout their entire service life.

VH+

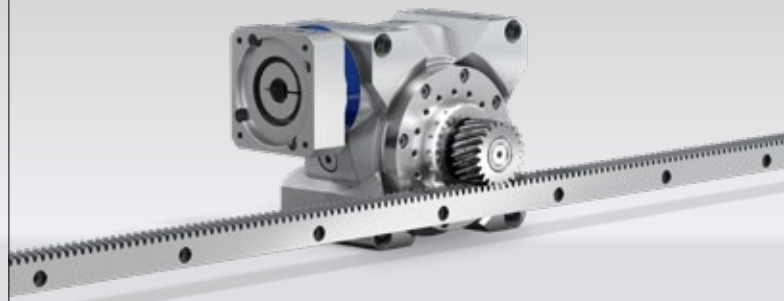
V-Drive Advanced compared to the industry standard

**Product highlights**

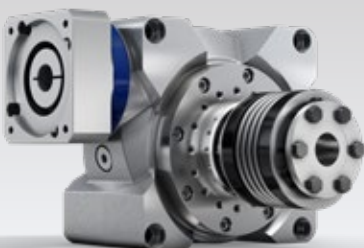
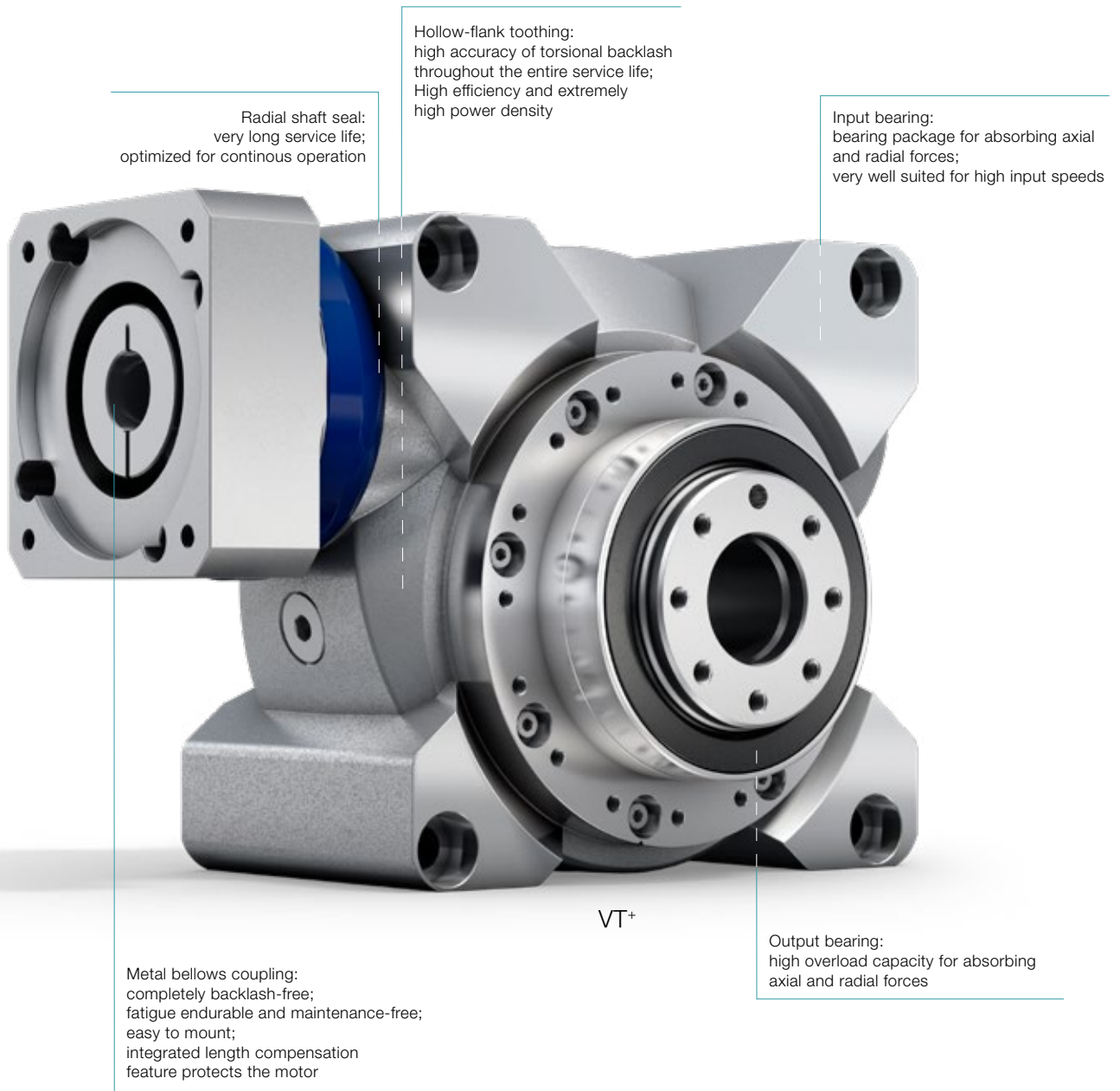
- Max. torsional backlash [arcmin]** ≤ 3 (Standard) / ≤ 2 (Reduced)
- Constant, low torsional backlash** consistently high quality and high positioning accuracy guaranteed throughout its lifespan
- No stick-slip effect** owing to the enhanced hollow-flank teeth
- Optimally sized output bearing** for absorbing high axial and radial forces in cyclic or continuous operation
- Hollow-flank teeth** with high overload capacity owing to the low specific tooth pressure



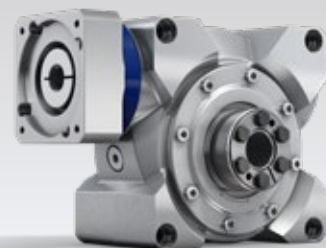
VT+ with integrated planetary input stage for higher ratios



VS+ in linear system



VS+ with metal bellows coupling BC3



VH+ with shrink disk

# VH+ 040 MF 1-/2-stage

			1-stage						2-stage								
Ratio	<i>i</i>		4	7	10	16	28	40	50	70	100	140	200	280	400		
Max. torque <sup>a) b)</sup> (at $n_1 = 500$ rpm)	$T_{2a}$	Nm	74	82	98	101	106	98	98	82	98	106	98	106	98		
		in.lb	655	726	867	894	938	867	867	726	867	938	867	938	867		
Torque for constant backlash (over the lifetime)	$T_{2Servo}$	Nm	17	24	25	26	29	25	25	24	25	29	25	29	25		
		in.lb	150	212	221	230	257	221	221	212	221	257	221	257	221		
Emergency stop torque <sup>a) b)</sup> (permitted 1000 times during the service life of the gearbox)	$T_{2Not}$	Nm	118	126	125	129	134	122	125	126	125	134	122	134	122		
		in.lb	1044	1115	1106	1142	1186	1080	1106	1115	1106	1186	1080	1186	1080		
Permitted average input speed (at 20 °C ambient temperature) <sup>d)</sup>	$n_{1N}$	rpm	4000						4400								
Max. input speed	$n_{1Max}$	rpm	6000														
Mean no load running torque <sup>b)</sup> (at $n_1 = 3000$ rpm and 20 °C gearbox temperature)	$T_{012}$	Nm	0.8	0.7	0.6	0.5	0.4	0.4	0.4	0.2	0.2	0.4	0.4	0.3	0.2		
		in.lb	7.1	6.2	5.3	4.4	3.5	3.5	3.5	1.8	1.8	3.5	3.5	2.7	1.8		
Max. backlash	$j_1$	arcmin	Standard $\leq 3$ / Reduced $\leq 2$						Standard $\leq 4$ / Reduced $\leq 3$								
Torsional rigidity <sup>b)</sup>	$C_{121}$	Nm/arcmin	4.5						5								
		in.lb/arcmin	40						40								
Max. axial force <sup>c)</sup>	$F_{2AMax}$	N	3000						3000								
		lb <sub>f</sub>	675						675								
Max. lateral force <sup>c)</sup>	$F_{2QMax}$	N	2400						2400								
		lb <sub>f</sub>	540						540								
Max. tilting moment	$M_{2KMax}$	Nm	205						205								
		in.lb	1814						1814								
Efficiency at full load (at $n_1 = 500$ rpm)	$\eta$	%	93	90	88	82	73	67	86	88	86	71	65	71	65		
Service life	$L_h$	h	> 20000														
Weight (incl. standard adapter plate)	$m$	kg	5.0						5.6								
		lb <sub>m</sub>	11.1						12.0								
Operating noise (at reference ratio and reference speed – ratio-specific values available in cymex <sup>®</sup> )	$L_{PA}$	dB(A)	$\leq 54$						$\leq 58$								
Max. permitted housing temperature	$F$	°C	+90														
		F	194														
Ambient temperature	$F$	°C	-15 to +40														
		F	5 to 104														
Lubrication			Lubricated for life														
Direction of rotation			In- and output same direction														
Protection class			IP 65														
Shrink disc (Standard version)			SD 024x050 S2														
Max. torque (without axial force)	$T_{max}$	Nm	250														
Mass moment of inertia (relates to the drive) Clamping hub diameter [mm]	C	14	$J_1$	kgcm <sup>2</sup>	0.52	0.38	0.34	0.32	0.32	0.31	0.25	0.28	0.24	0.23	0.19	0.18	0.18
				10 <sup>-3</sup> in.lb.s <sup>2</sup>	0.46	0.34	0.30	0.28	0.28	0.27	0.22	0.25	0.21	0.20	0.17	0.16	0.16
	E	19	$J_1$	kgcm <sup>2</sup>	0.54	0.40	0.37	0.35	0.34	0.33	0.36	0.40	0.36	0.34	0.30	0.30	0.30
				10 <sup>-3</sup> in.lb.s <sup>2</sup>	0.48	0.35	0.33	0.31	0.30	0.29	0.32	0.35	0.32	0.30	0.27	0.27	0.27

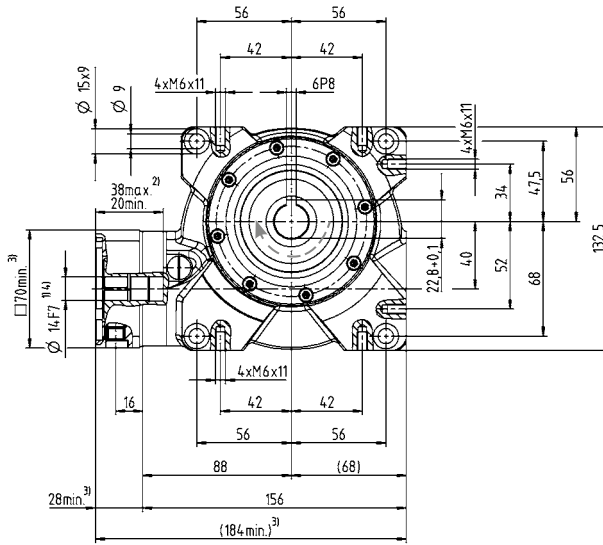
Please use our sizing software cymex<sup>®</sup> for a detailed sizing – [www.wittenstein-cymex.com](http://www.wittenstein-cymex.com)  
Please contact us for optimum sizing at S1 conditions (Continuous operation).

<sup>a)</sup> At max. 10 %  $F_{2QMax}$   
<sup>b)</sup> Valid for standard clamping hub diameter  
<sup>c)</sup> Refers to center of the output shaft or flange  
<sup>d)</sup> Please reduce input speed at higher ambient temperatures

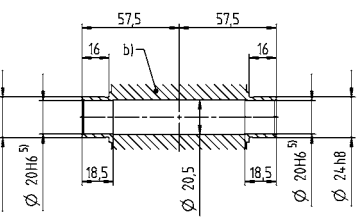
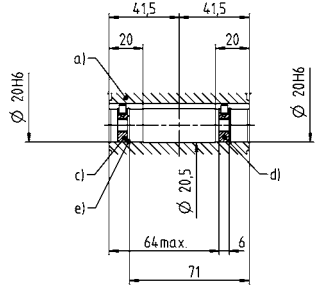
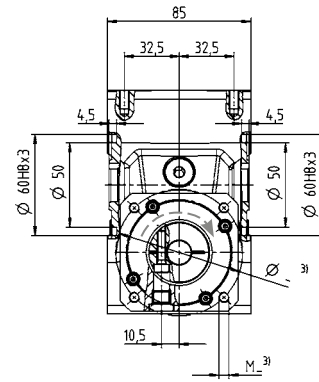
View A

# 1-stage

up to 14/19<sup>4)</sup>  
(C<sup>6)</sup>/E) clamping  
hub diameter

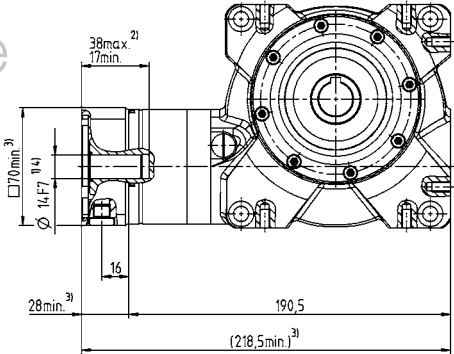


← A



# 2-stage

up to 14/19<sup>4)</sup>  
(C<sup>6)</sup>/E) clamping  
hub diameter



Motor shaft diameter [mm]

- a) Hollow shaft, keywayed
- b) Hollow shaft, smooth
- c) End disc for screw M6
- d) End disc as forcing washer for screw M8
- e) Locking ring – DIN 472

See technical data sheet for available clamping hub diameters (mass moment of inertia). Dimensions available on request.

- Non-tolerated dimensions are nominal dimensions
- <sup>1)</sup> Check motor shaft fit.
- <sup>2)</sup> Min. / Max. permissible motor shaft length.  
Longer motor shafts are adaptable, please contact us.
- <sup>3)</sup> The dimensions depend on the motor.
- <sup>4)</sup> Smaller motor shaft diameter is compensated by a bushing with a minimum thickness of 1 mm.
- <sup>5)</sup> Tolerance h6 for mounted shaft.
- <sup>6)</sup> Standard clamping hub diameter

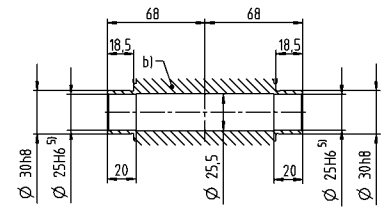
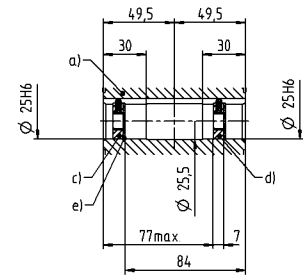
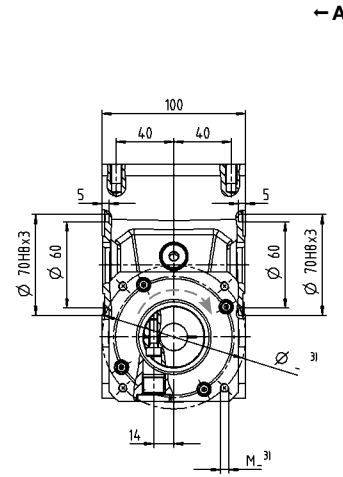
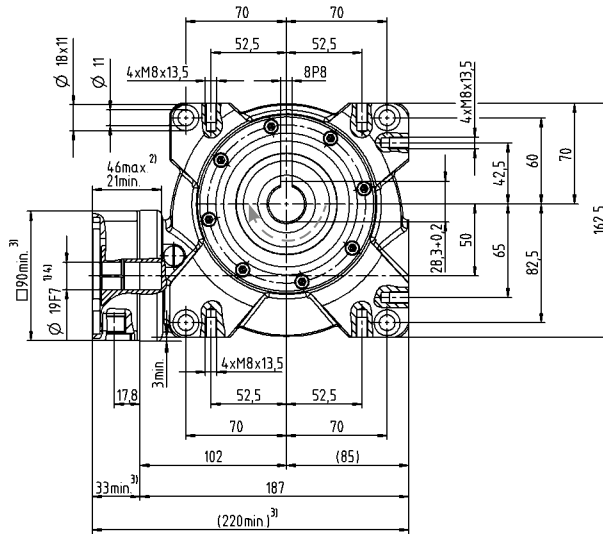
			1-stage						2-stage								
Ratio	<i>i</i>		4	7	10	16	28	40	50	70	100	140	200	280	400		
Max. torque <sup>a) b)</sup> (at $n_1 = 500$ rpm)	$T_{2a}$	Nm	165	180	182	193	204	183	182	180	182	204	183	204	183		
		in.lb	1460	1593	1611	1708	1805	1620	1611	1593	1611	1805	1620	1805	1620		
Torque for constant backlash (over the lifetime)	$T_{2Servo}$	Nm	54	71	74	81	90	74	74	71	74	90	74	90	74		
		in.lb	478	628	655	717	797	655	655	628	655	797	655	797	655		
Emergency stop torque <sup>a) b)</sup> (permitted 1000 times during the service life of the gearbox)	$T_{2Not}$	Nm	230	242	242	250	262	236	242	242	242	262	236	262	236		
		in.lb	2036	2142	2142	2213	2319	2089	2142	2142	2142	2319	2089	2319	2089		
Permitted average input speed (at 20 °C ambient temperature) <sup>d)</sup>	$n_{1N}$	rpm	4000						3500								
Max. input speed	$n_{1Max}$	rpm	6000														
Mean no load running torque <sup>b)</sup> (at $n_1 = 3000$ rpm and 20 °C gearbox temperature)	$T_{012}$	Nm	2.3	2.2	1.6	1.5	1.2	1.1	0.7	0.5	0.4	0.6	0.6	0.4	0.4		
		in.lb	20.4	19.5	14.2	13.3	10.6	9.7	6.2	4.4	3.5	5.3	5.3	3.5	3.5		
Max. backlash	$j_1$	arcmin	Standard $\leq 3$ / Reduced $\leq 2$						Standard $\leq 4$ / Reduced $\leq 3$								
Torsional rigidity <sup>b)</sup>	$C_{121}$	Nm/arcmin	8														
		in.lb/arcmin	71														
Max. axial force <sup>c)</sup>	$F_{2AMax}$	N	5000														
		lb <sub>f</sub>	1125														
Max. lateral force <sup>c)</sup>	$F_{2QMax}$	N	3800														
		lb <sub>f</sub>	855														
Max. tilting moment	$M_{2KMax}$	Nm	409														
		in.lb	3620														
Efficiency at full load (at $n_1 = 500$ rpm)	$\eta$	%	92	89	86	82	72	64	84	87	84	70	62	70	62		
Service life	$L_h$	h	> 20000														
Weight (incl. standard adapter plate)	$m$	kg	8.0						8.7								
		lb <sub>m</sub>	17.7						19.0								
Operating noise (at reference ratio and reference speed – ratio-specific values available in cymex <sup>®</sup> )	$L_{FA}$	dB(A)	$\leq 62$														
Max. permitted housing temperature	$F$	°C	+90														
		F	194														
Ambient temperature	$F$	°C	-15 to +40														
		F	5 to 104														
Lubrication			Lubricated for life														
Direction of rotation			In- and output same direction														
Protection class			IP 65														
Shrink disc (Standard version)			SD 030x060 S2V														
Max. torque (without axial force)	$T_{max}$	Nm	550														
Mass moment of inertia (relates to the drive) Clamping hub diameter [mm]	C	14	$J_1$	kgcm <sup>2</sup>	-	-	-	-	-	-	0.80	0.80	0.80	0.70	0.70	0.70	0.70
				10 <sup>-3</sup> in.lb.s <sup>2</sup>	-	-	-	-	-	-	0.71	0.71	0.71	0.62	0.62	0.62	0.62
	E	19	$J_1$	kgcm <sup>2</sup>	1.50	1.21	1.12	1.03	1.00	1.05	1.20	1.30	1.20	1.10	1.10	1.10	1.10
				10 <sup>-3</sup> in.lb.s <sup>2</sup>	1.33	1.07	0.99	0.91	0.89	0.93	1.06	1.15	1.06	0.97	0.97	0.97	0.97
	G	24	$J_1$	kgcm <sup>2</sup>	1.6	1.32	1.23	1.14	1.11	1.15	-	-	-	-	-	-	-
				10 <sup>-3</sup> in.lb.s <sup>2</sup>	1.4	1.2	1.1	1.0	0.98	1.0	-	-	-	-	-	-	-

Please use our sizing software cymex<sup>®</sup> for a detailed sizing – [www.wittenstein-cymex.com](http://www.wittenstein-cymex.com)  
Please contact us for optimum sizing at S1 conditions (Continuous operation).

<sup>a)</sup> At max. 10 %  $F_{2QMax}$   
<sup>b)</sup> Valid for standard Clamping hub diameter  
<sup>c)</sup> Refers to center of the output shaft or flange  
<sup>d)</sup> Please reduce input speed at higher ambient temperatures

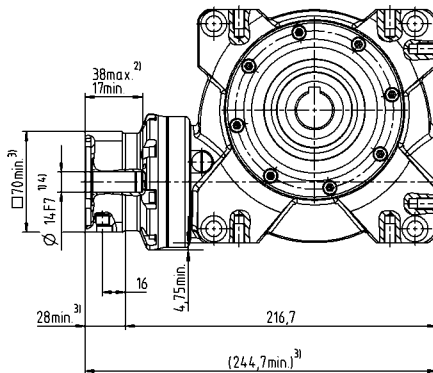
# 1-stage

up to 19/24<sup>4)</sup>  
(E<sup>6)</sup>/G) clamping  
hub diameter



# 2-stage

up to 14/19<sup>4)</sup>  
(C<sup>6)</sup>/E) clamping  
hub diameter



Motor shaft diameter [mm]

Worm gearboxes

VH+

- a) Hollow shaft, keywayed
- b) Hollow shaft, smooth
- c) End disc for screw M10
- d) End disc as forcing washer for screw M12
- e) Locking ring - DIN 472

See technical data sheet for available clamping hub diameters (mass moment of inertia). Dimensions available on request.

Non-tolerated dimensions are nominal dimensions

- <sup>1)</sup> Check motor shaft fit.
- <sup>2)</sup> Min. / Max. permissible motor shaft length.  
Longer motor shafts are adaptable, please contact us.
- <sup>3)</sup> The dimensions depend on the motor.
- <sup>4)</sup> Smaller motor shaft diameter is compensated by a bushing with a minimum thickness of 1 mm.
- <sup>5)</sup> Tolerance h6 for mounted shaft.
- <sup>6)</sup> Standard clamping hub diameter



			1-stage						2-stage								
Ratio	<i>i</i>		4	7	10	16	28	40	50	70	100	140	200	280	400		
Max. torque <sup>a) b)</sup> (at $n_1 = 500$ rpm)	$T_{2a}$	Nm	319	353	364	372	392	363	364	353	364	392	363	392	363		
		in.lb	2823	3124	3221	3292	3469	3213	3221	3124	3221	3469	3213	3469	3213		
Torque for constant backlash (over the lifetime)	$T_{2Servo}$	Nm	198	210	225	221	229	226	225	210	225	229	226	229	226		
		in.lb	1752	1859	1991	1956	2027	2000	1991	1859	1991	2027	2000	2027	2000		
Emergency stop torque <sup>a) b)</sup> (permitted 1000 times during the service life of the gearbox)	$T_{2Not}$	Nm	460	484	491	494	518	447	491	484	494	518	447	518	447		
		in.lb	4071	4283	4345	4372	4584	3956	4345	4283	4372	4584	3956	4584	3956		
Permitted average input speed (at 20 °C ambient temperature) <sup>d)</sup>	$n_{1N}$	rpm	4000						3100								
Max. input speed	$n_{1Max}$	rpm	4500														
Mean no load running torque <sup>b)</sup> (at $n_1 = 3000$ rpm and 20 °C gearbox temperature)	$T_{012}$	Nm	4.2	3.1	3	2.4	2.3	2.2	1.2	0.7	0.7	1.1	1.1	0.8	0.6		
		in.lb	37.2	27.4	26.6	21.2	20.4	19.5	10.6	6.2	6.2	9.7	9.7	7.1	5.3		
Max. backlash	$j_1$	arcmin	Standard $\leq 3$ / Reduced $\leq 2$						Standard $\leq 4$ / Reduced $\leq 3$								
Torsional rigidity <sup>b)</sup>	$C_{121}$	Nm/arcmin	28														
		in.lb/arcmin	248														
Max. axial force <sup>c)</sup>	$F_{2AMax}$	N	8250														
		lb <sub>f</sub>	1856														
Max. lateral force <sup>c)</sup>	$F_{2QMax}$	N	6000														
		lb <sub>f</sub>	1350														
Max. tilting moment	$M_{2KMax}$	Nm	843														
		in.lb	7461														
Efficiency at full load (at $n_1 = 500$ rpm)	$\eta$	%	93	91	88	83	74	68	86	89	86	72	66	72	66		
Service life	$L_h$	h	> 20000														
Weight (incl. standard adapter plate)	$m$	kg	13.0						13.7								
		lb <sub>m</sub>	28.7						30.0								
Operating noise (at reference ratio and reference speed – ratio-specific values available in cymex <sup>®</sup> )	$L_{FA}$	dB(A)	$\leq 64$														
Max. permitted housing temperature	$F$	°C	+90														
		F	194														
Ambient temperature	$F$	°C	-15 to +40														
		F	5 to 104														
Lubrication			Lubricated for life														
Direction of rotation			In- and output same direction														
Protection class			IP 65														
Shrink disc (Standard version)			SD 036x072 S2V														
Max. torque (without axial force)	$T_{max}$	Nm	640														
Mass moment of inertia (relates to the drive) Clamping hub diameter [mm]	E	19	$J_1$	kgcm <sup>2</sup>	-	-	-	-	-	-	2.60	2.80	2.50	2.40	2.40	2.40	2.30
				10 <sup>-3</sup> in.lb.s <sup>2</sup>	-	-	-	-	-	-	2.30	2.48	2.21	2.12	2.12	2.12	2.04
	G	24	$J_1$	kgcm <sup>2</sup>	-	-	-	-	-	-	4.10	4.30	4.10	4.00	4.00	3.90	3.90
				10 <sup>-3</sup> in.lb.s <sup>2</sup>	-	-	-	-	-	-	3.63	3.81	3.63	3.54	3.54	3.45	3.45
	H	28	$J_1$	kgcm <sup>2</sup>	4.80	3.89	3.65	3.56	3.52	3.47	-	-	-	-	-	-	-
				10 <sup>-3</sup> in.lb.s <sup>2</sup>	4.25	3.44	3.23	3.15	3.12	3.07	-	-	-	-	-	-	-

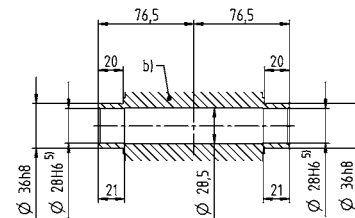
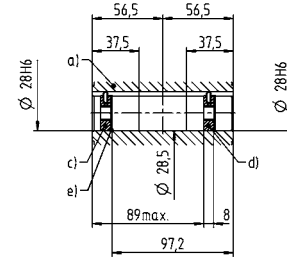
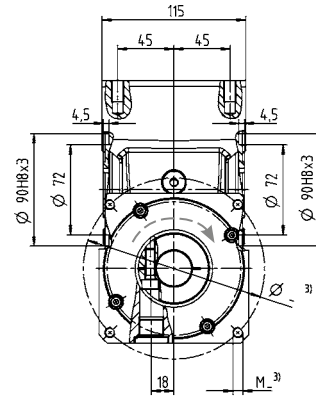
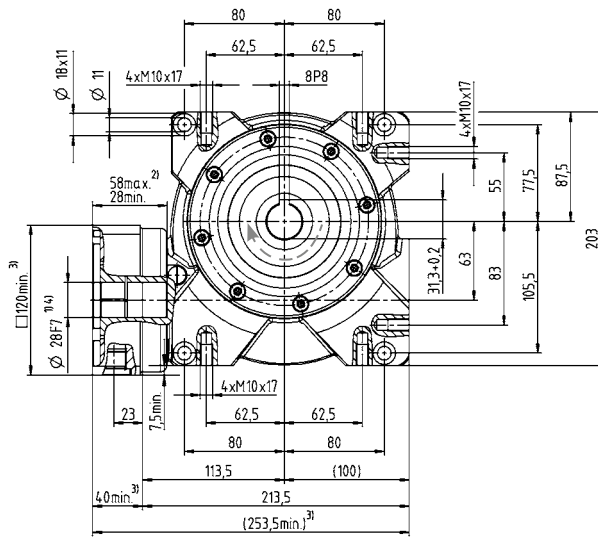
Please use our sizing software cymex<sup>®</sup> for a detailed sizing – [www.wittenstein-cymex.com](http://www.wittenstein-cymex.com)  
Please contact us for optimum sizing at S1 conditions (Continuous operation).

<sup>a)</sup> At max. 10 %  $F_{2QMax}$   
<sup>b)</sup> Valid for standard clamping hub diameter  
<sup>c)</sup> Refers to center of the output shaft or flange  
<sup>d)</sup> Please reduce input speed at higher ambient temperatures

View A

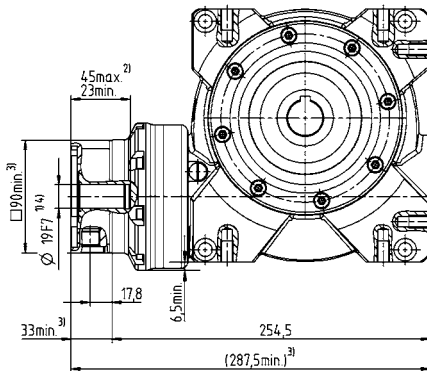
# 1-stage

up to 28<sup>4)</sup> (H)<sup>6)</sup>  
clamping hub diameter



# 2-stage

up to 19/24<sup>4)</sup>  
(E<sup>6)</sup>/G) clamping  
hub diameter



Motor shaft diameter [mm]

- a) Hollow shaft, keywayed
- b) Hollow shaft, smooth
- c) End disc for screw M10
- d) End disc as forcing washer for screw M12
- e) Locking ring - DIN 472

See technical data sheet for available clamping hub diameters (mass moment of inertia). Dimensions available on request.

Non-tolerated dimensions are nominal dimensions

- <sup>1)</sup> Check motor shaft fit.
- <sup>2)</sup> Min. / Max. permissible motor shaft length.  
Longer motor shafts are adaptable, please contact us.
- <sup>3)</sup> The dimensions depend on the motor.
- <sup>4)</sup> Smaller motor shaft diameter is compensated by a bushing with a minimum thickness of 1 mm.
- <sup>5)</sup> Tolerance h6 for mounted shaft.
- <sup>6)</sup> Standard clamping hub diameter

			1-stage						2-stage							
Ratio	<i>i</i>		4	7	10	16	28	40	50	70	100	140	200	280	400	
Max. torque <sup>a) b)</sup> (at $n_1 = 500$ rpm)	$T_{2a}$	Nm	578	646	672	702	785	676	672	646	672	785	676	785	676	
		in.lb	5115	5717	5947	6213	6947	5983	5947	5717	5947	6947	5983	6947	5983	
Torque for constant backlash (over the lifetime)	$T_{2Servo}$	Nm	469	601	613	677	764	631	613	601	613	764	631	764	631	
		in.lb	4151	5319	5425	5991	6761	5584	5425	5319	5425	6761	5584	6761	5584	
Emergency stop torque <sup>a) b)</sup> (permitted 1000 times during the service life of the gearbox)	$T_{2Not}$	Nm	938	993	963	1005	1064	941	963	993	963	1064	941	1064	941	
		in.lb	8301	8788	8523	8894	9416	8328	8523	8788	8523	9416	8328	9416	8328	
Permitted average input speed (at 20 °C ambient temperature) <sup>d)</sup>	$n_{1N}$	rpm	3500						2900							
Max. input speed	$n_{1Max}$	rpm	4000						4500							
Mean no load running torque <sup>b)</sup> (at $n_1 = 3000$ rpm and 20 °C gearbox temperature)	$T_{012}$	Nm	7.2	7.1	6.5	5	4.8	4.5	2.8	1.6	1.5	2.4	2.4	1.8	1.3	
		in.lb	63.7	62.8	57.5	44.3	42.5	39.8	24.8	14.2	13.3	21.2	21.2	15.9	11.5	
Max. backlash	$j_1$	arcmin	Standard $\leq 3$ / Reduced $\leq 2$						Standard $\leq 4$ / Reduced $\leq 3$							
Torsional rigidity <sup>b)</sup>	$C_{121}$	Nm/arcmin	78													
		in.lb/arcmin	690													
Max. axial force <sup>c)</sup>	$F_{2AMax}$	N	13900													
		lb <sub>f</sub>	3128													
Max. lateral force <sup>c)</sup>	$F_{2QMax}$	N	9000													
		lb <sub>f</sub>	2025													
Max. tilting moment	$M_{2KMax}$	Nm	1544													
		in.lb	13664													
Efficiency at full load (at $n_1 = 500$ rpm)	$\eta$	%	94	92	89	86	77	70	87	90	87	75	68	75	68	
Service life	$L_h$	h	> 20000													
Weight (incl. standard adapter plate)	$m$	kg	27.0						29.5							
		lb <sub>m</sub>	59.7						68.0							
Operating noise (at reference ratio and reference speed – ratio-specific values available in cymex <sup>®</sup> )	$L_{FA}$	dB(A)	$\leq 66$						$\leq 68$							
Max. permitted housing temperature		°C	+90													
		F	194													
Ambient temperature		°C	-15 to +40													
		F	5 to 104													
Lubrication			Lubricated for life													
Direction of rotation			In- and output same direction													
Protection class			IP 65													
Shrink disc (Standard version)			SD 050x090 S2V													
Max. torque (without axial force)	$T_{max}$	Nm	1400													
Mass moment of inertia (relates to the drive)	G 24	$J_1$	kgcm <sup>2</sup>	-	-	-	-	-	-	10.40	10.10	10.10	8.80	9.50	9.40	9.30
			10 <sup>-3</sup> in.lb.s <sup>2</sup>	-	-	-	-	-	-	9.20	8.94	8.94	7.79	8.41	8.32	8.23
Clamping hub diameter [mm]	K 38	$J_1$	kgcm <sup>2</sup>	20.30	16.75	16.79	15.37	15.26	15.90	17.30	17.00	17.10	15.80	16.40	16.30	16.20
			10 <sup>-3</sup> in.lb.s <sup>2</sup>	17.97	14.82	14.86	13.60	13.51	14.07	15.31	15.05	15.13	13.98	14.51	14.43	14.34

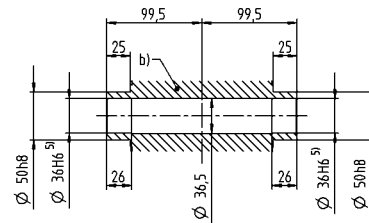
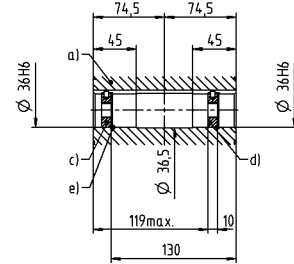
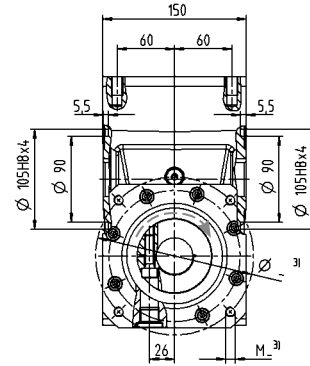
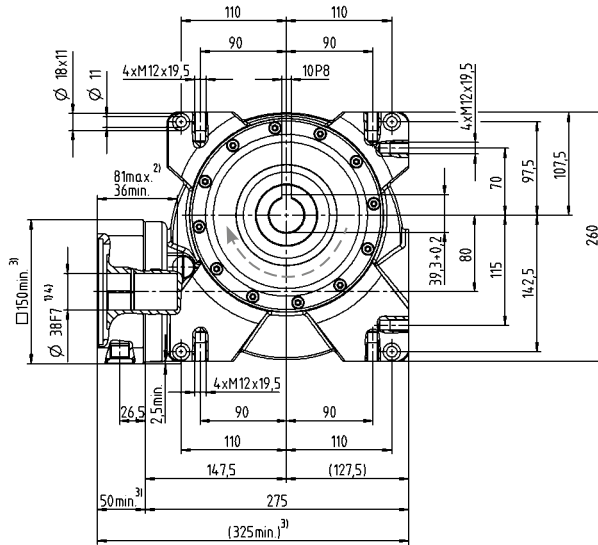
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Please contact us for optimum sizing at S1 conditions (Continuous operation).

<sup>a)</sup> At max. 10 %  $F_{2QMax}$   
<sup>b)</sup> Valid for standard Clamping hub diameter  
<sup>c)</sup> Refers to center of the output shaft or flange  
<sup>d)</sup> Please reduce input speed at higher ambient temperatures

View A

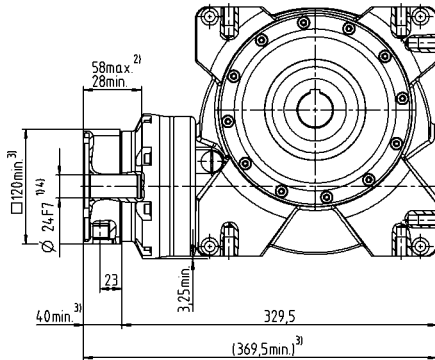
# 1-stage

up to 38<sup>4)</sup> (K)<sup>6)</sup>  
clamping hub diameter



# 2-stage

up to 24/38<sup>4)</sup>  
(G<sup>6)</sup>/K) clamping  
hub diameter



Motor shaft diameter [mm]

← A

Worm gearboxes

VH+

- a) Hollow shaft, keywayed
- b) Hollow shaft, smooth
- c) End disc for screw M12
- d) End disc as forcing washer for screw M16
- e) Locking ring – DIN 472

See technical data sheet for available clamping hub diameters (mass moment of inertia). Dimensions available on request.

Non-tolerated dimensions are nominal dimensions

- <sup>1)</sup> Check motor shaft fit.
- <sup>2)</sup> Min. / Max. permissible motor shaft length.  
Longer motor shafts are adaptable, please contact us.
- <sup>3)</sup> The dimensions depend on the motor.
- <sup>4)</sup> Smaller motor shaft diameter is compensated by a bushing with a minimum thickness of 1 mm.
- <sup>5)</sup> Tolerance h6 for mounted shaft.
- <sup>6)</sup> Standard clamping hub diameter

			1-stage							2-stage							
Ratio	<i>i</i>		4	7	10	16	28	40	50	70	100	140	200	280	400		
Max. torque <sup>a) b)</sup> (at $n_1 = 500$ rpm)	$T_{2a}$	Nm	1184	1336	1377	1392	1505	1376	1377	1336	1377	1505	1376	1505	1376		
		in.lb	10478	11824	12186	12319	13319	12178	12186	11825	12186	13319	12178	13319	12178		
Torque for constant backlash (over the lifetime)	$T_{2Servo}$	Nm	1155	1304	1343	1359	1469	1343	1343	1304	1343	1469	1343	1469	1343		
		in.lb	10222	11540	11886	12027	13001	11886	11886	11541	11886	13001	11886	13001	11886		
Emergency stop torque <sup>a) b)</sup> (permitted 1000 times during the service life of the gearbox)	$T_{2Not}$	Nm	1819	1932	1940	1955	2073	1856	1940	1940	1940	2073	1856	2073	1856		
		in.lb	16098	17098	17169	17302	18346	16426	17169	17169	17169	18346	16426	18346	16426		
Permitted average input speed (at 20 °C ambient temperature) <sup>d)</sup>	$n_{1N}$	rpm	3000							2700							
Max. input speed	$n_{1Max}$	rpm	3500							4000							
Mean no load running torque <sup>b)</sup> (at $n_1 = 3000$ rpm and 20 °C gearbox temperature)	$T_{012}$	Nm	12.2	10.5	9.8	9.1	8.2	7.2	4.1	2.3	2.2	3.8	3.6	2.6	2		
		in.lb	108.0	92.9	86.7	80.5	72.6	63.7	36.3	20.4	19.5	33.6	31.9	23.0	17.7		
Max. backlash	$j_1$	arcmin	Standard $\leq 3$ / Reduced $\leq 2$							Standard $\leq 4$ / Reduced $\leq 3$							
Torsional rigidity <sup>b)</sup>	$C_{121}$	Nm/arcmin	153							153							
		in.lb/arcmin	1354							1354							
Max. axial force <sup>c)</sup>	$F_{2AMax}$	N	19500							19500							
		lb <sub>f</sub>	4388							4388							
Max. lateral force <sup>c)</sup>	$F_{2QMax}$	N	14000							14000							
		lb <sub>f</sub>	3150							3150							
Max. tilting moment	$M_{2KMax}$	Nm	3059							3059							
		in.lb	27072							27072							
Efficiency at full load (at $n_1 = 500$ rpm)	$\eta$	%	95	93	91	87	80	76	89	89	89	78	74	78	74		
Service life	$L_h$	h	> 20000														
Weight (incl. standard adapter plate)	$m$	kg	51.0							53.6							
		lb <sub>m</sub>	112.7							118.0							
Operating noise (at reference ratio and reference speed – ratio-specific values available in cymex <sup>®</sup> )	$L_{FA}$	dB(A)	$\leq 70$														
Max. permitted housing temperature		°C	+90														
		F	194														
Ambient temperature		°C	-15 to +40														
		F	5 to 104														
Lubrication			Lubricated for life														
Direction of rotation			In- and output same direction														
Protection class			IP 65														
Shrink disc (Standard version)			SD 062x110 S2V														
Max. torque (without axial force)	$T_{max}$	Nm	2300														
Mass moment of inertia (relates to the drive)	K	38	$J_1$	kgcm <sup>2</sup>	-	-	-	-	-	-	31.70	33.00	31.10	30.10	30.40	30.00	29.80
				10 <sup>-3</sup> in.lb.s <sup>2</sup>	-	-	-	-	-	-	28.05	29.21	27.52	26.64	26.90	26.55	26.37
Clamping hub diameter [mm]	M	48	$J_1$	kgcm <sup>2</sup>	50.25	40.70	38.77	39.62	37.15	37.47	46.40	47.70	45.80	44.80	45.10	44.70	44.50
				10 <sup>-3</sup> in.lb.s <sup>2</sup>	44.47	36.02	34.31	35.06	32.88	33.16	41.06	42.21	40.53	39.65	39.91	39.56	39.38

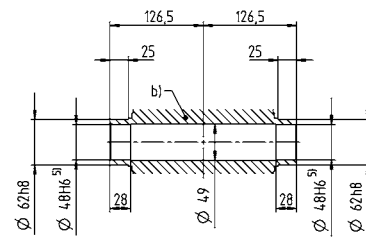
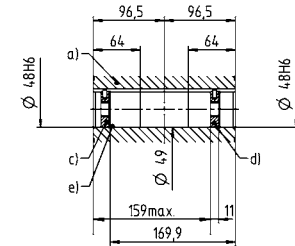
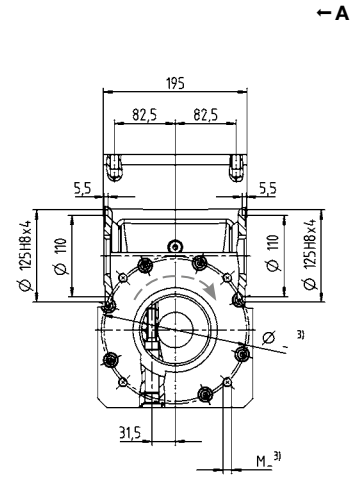
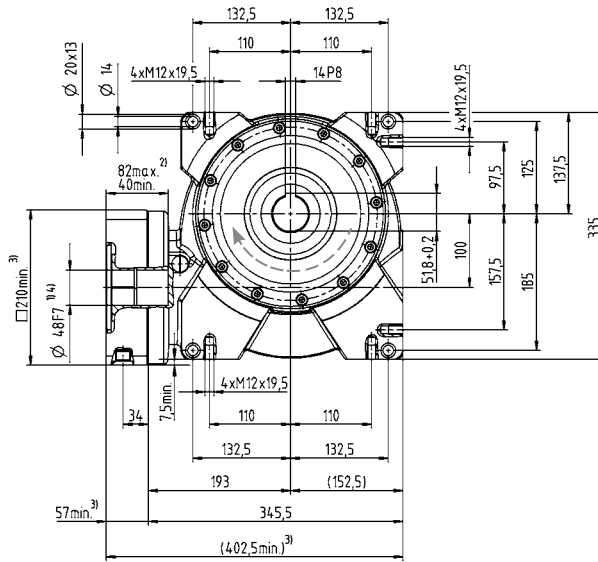
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Please contact us for optimum sizing at S1 conditions (Continuous operation).

<sup>a)</sup> At max. 10 %  $F_{2QMax}$   
<sup>b)</sup> Valid for standard Clamping hub diameter  
<sup>c)</sup> Refers to center of the output shaft or flange  
<sup>d)</sup> Please reduce input speed at higher ambient temperatures

View A

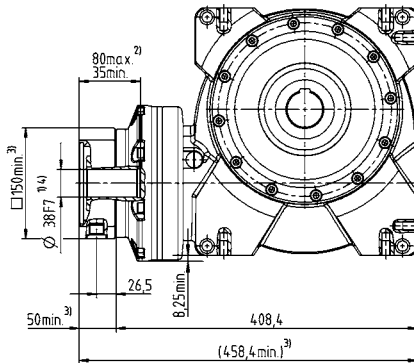
# 1-stage

up to 48<sup>4)</sup> (M)<sup>6)</sup>  
clamping hub diameter



# 2-stage

up to 38 / 48<sup>4)</sup>  
(K<sup>6)</sup> / M) clamping  
hub diameter



Motor shaft diameter [mm]

← A

Worm gearboxes

VH+

- a) Hollow shaft, keywayed
- b) Hollow shaft, smooth
- c) End disc for screw M16
- d) End disc as forcing washer for screw M20
- e) Locking ring – DIN 472

See technical data sheet for available clamping hub diameters (mass moment of inertia). Dimensions available on request.

Non-tolerated dimensions are nominal dimensions

- <sup>1)</sup> Check motor shaft fit.
- <sup>2)</sup> Min. / Max. permissible motor shaft length.  
Longer motor shafts are adaptable, please contact us.
- <sup>3)</sup> The dimensions depend on the motor.
- <sup>4)</sup> Smaller motor shaft diameter is compensated by a bushing with a minimum thickness of 1 mm.
- <sup>5)</sup> Tolerance h6 for mounted shaft.
- <sup>6)</sup> Standard clamping hub diameter

			1-stage						2-stage								
Ratio	<i>i</i>		4	7	10	16	28	40	50	70	100	140	200	280	400		
Max. torque <sup>a) b) e)</sup> (at $n_1 = 500$ rpm)	$T_{2a}$	Nm	165	180	182	193	204	183	182	180	182	204	183	204	183		
		in.lb	1460	1593	1611	1708	1805	1620	1611	1593	1611	1805	1620	1805	1620		
Torque for constant backlash (over the lifetime)	$T_{2Servo}$	Nm	54	71	74	81	90	74	74	71	74	90	74	90	74		
		in.lb	478	628	655	717	797	655	655	628	655	797	655	797	655		
Emergency stop torque <sup>a) b) e)</sup> (permitted 1000 times during the service life of the gearbox)	$T_{2Not}$	Nm	230	242	242	250	262	236	242	242	242	262	236	262	236		
		in.lb	2036	2142	2142	2213	2319	2089	2142	2142	2142	2319	2089	2319	2089		
Permitted average input speed (at 20 °C ambient temperature) <sup>d)</sup>	$n_{1N}$	rpm	4000						3500								
Max. input speed	$n_{1Max}$	rpm	6000														
Mean no load running torque <sup>b)</sup> (at $n_1 = 3000$ rpm and 20 °C gearbox temperature)	$T_{012}$	Nm	2.3	2.2	1.6	1.5	1.2	1.1	0.7	0.5	0.4	0.6	0.6	0.4	0.4		
		in.lb	20.4	19.5	14.2	13.3	10.6	9.7	6.2	4.4	3.5	5.3	5.3	3.5	3.5		
Max. backlash	$j_i$	arcmin	Standard $\leq 3$ / Reduced $\leq 2$						Standard $\leq 4$ / Reduced $\leq 3$								
Torsional rigidity <sup>b)</sup>	$C_{121}$	Nm/arcmin	8														
		in.lb/arcmin	71														
Max. axial force <sup>c)</sup>	$F_{2AMax}$	N	5000														
		lb <sub>f</sub>	1125														
Max. lateral force <sup>c)</sup>	$F_{2QMax}$	N	3800														
		lb <sub>f</sub>	855														
Max. tilting moment	$M_{2KMax}$	Nm	409														
		in.lb	3620														
Efficiency at full load (at $n_1 = 500$ rpm)	$\eta$	%	92	89	86	82	72	64	84	87	84	70	62	70	62		
Service life	$L_h$	h	> 20000														
Weight (incl. standard adapter plate)	$m$	kg	9.0						9.7								
		lb <sub>m</sub>	19.9						21.0								
Operating noise (at reference ratio and reference speed – ratio-specific values available in cymex <sup>®</sup> )	$L_{FA}$	dB(A)	$\leq 62$														
Max. permitted housing temperature	$F$	°C	+90														
		F	194														
Ambient temperature	$F$	°C	-15 to +40														
		F	5 to 104														
Lubrication			Lubricated for life														
Direction of rotation			In- and output same direction														
Protection class			IP 65														
Metal bellows coupling (recommended product type – validate sizing with cymex <sup>®</sup> )			BC3 - 00200A - 022.000 - X														
Bore diameter of coupling on the application side		mm	X = 015.000 - 044.000														
Mass moment of inertia (relates to the drive) Clamping hub diameter [mm]	C	14	$J_1$	kgcm <sup>2</sup>	-	-	-	-	-	-	0.80	0.80	0.80	0.70	0.70	0.70	0.70
				10 <sup>-3</sup> in.lb.s <sup>2</sup>	-	-	-	-	-	-	0.71	0.71	0.71	0.62	0.62	0.62	0.62
	E	19	$J_1$	kgcm <sup>2</sup>	1.50	1.21	1.12	1.03	1.00	1.05	1.20	1.30	1.20	1.10	1.10	1.10	1.10
				10 <sup>-3</sup> in.lb.s <sup>2</sup>	1.33	1.07	0.99	0.91	0.89	0.93	1.06	1.15	1.06	0.97	0.97	0.97	0.97
	G	24	$J_1$	kgcm <sup>2</sup>	1.6	1.32	1.23	1.14	1.11	1.15	-	-	-	-	-	-	-
				10 <sup>-3</sup> in.lb.s <sup>2</sup>	1.4	1.2	1.1	1.0	0.98	1.0	-	-	-	-	-	-	-

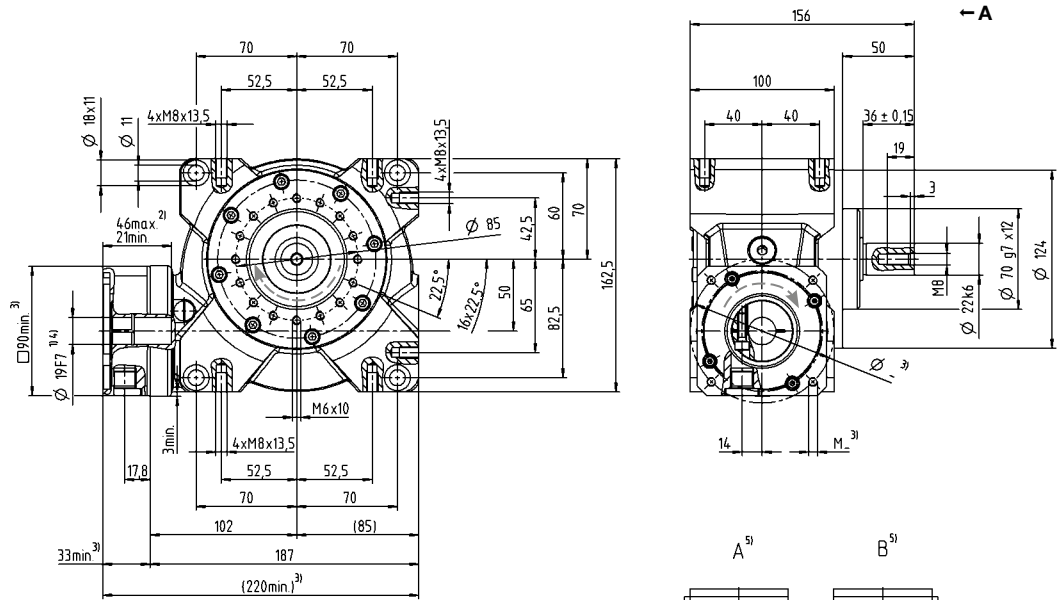
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Please contact us for optimum sizing at S1 conditions (Continuous operation).

<sup>a)</sup> At max. 10 %  $F_{2QMax}$   
<sup>b)</sup> Valid for standard clamping hub diameter  
<sup>c)</sup> Refers to center of the output shaft or flange  
<sup>d)</sup> Please reduce input speed at higher ambient temperatures  
<sup>e)</sup> Smooth shaft

View A

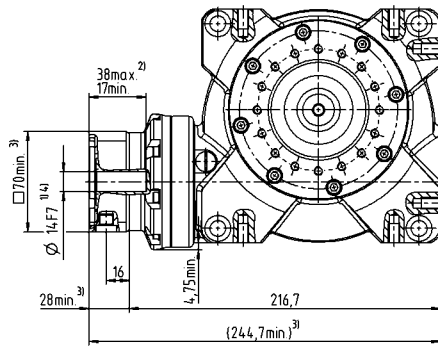
# 1-stage

up to 19/24<sup>4)</sup>  
(E<sup>6)</sup>/G) clamping  
hub diameter

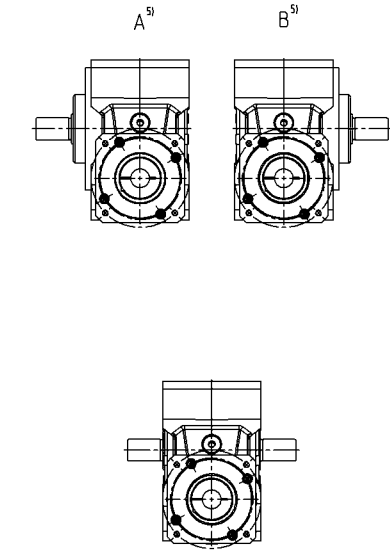


# 2-stage

up to 14/19<sup>4)</sup>  
(C<sup>6)</sup>/E) clamping  
hub diameter



Motor shaft diameter [mm]



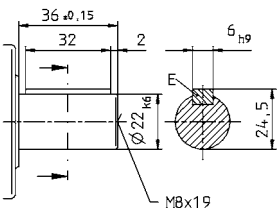
Optional dual-shaft output. Drawings available upon request.  
Involute gearing is not possible.

Worm gearboxes

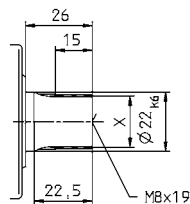
VS+

## Other output variants

Shaft with key



Spined shaft (DIN 5480)



See technical data sheet for available clamping hub diameters  
(mass moment of inertia). Dimensions available on request.

Non-tolerated dimensions are nominal dimensions

<sup>1)</sup> Check motor shaft fit.

<sup>2)</sup> Min./Max. permissible motor shaft length.

Longer motor shafts are adaptable, please contact us.

<sup>3)</sup> The dimensions depend on the motor.

<sup>4)</sup> Smaller motor shaft diameter is compensated by a  
bushing with a minimum thickness of 1 mm.

<sup>5)</sup> Output side

<sup>6)</sup> Standard clamping hub diameter



			1-stage						2-stage							
Ratio	<i>i</i>		4	7	10	16	28	40	50	70	100	140	200	280	400	
Max. torque <sup>a) b) e)</sup> (at $n_1 = 500$ rpm)	$T_{2a}$	Nm	319	353	364	372	392	363	364	353	364	392	363	392	363	
		in.lb	2823	3124	3221	3292	3469	3213	3221	3124	3221	3469	3213	3469	3213	
Torque for constant backlash (over the lifetime)	$T_{2Servo}$	Nm	198	210	225	221	229	226	225	210	225	229	226	229	226	
		in.lb	1752	1859	1991	1956	2027	2000	1991	1859	1991	2027	2000	2027	2000	
Emergency stop torque <sup>a) b) e)</sup> (permitted 1000 times during the service life of the gearbox)	$T_{2Not}$	Nm	460	484	491	494	518	447	491	484	494	518	447	518	447	
		in.lb	4071	4283	4345	4372	4584	3956	4345	4283	4372	4584	3956	4584	3956	
Permitted average input speed (at 20 °C ambient temperature) <sup>d)</sup>	$n_{1N}$	rpm	4000						3100							
Max. input speed	$n_{1Max}$	rpm	4500													
Mean no load running torque <sup>b)</sup> (at $n_1 = 3000$ rpm and 20 °C gearbox temperature)	$T_{012}$	Nm	4.2	3.1	3	2.4	2.3	2.2	1.2	0.7	0.7	1.1	1.1	0.8	0.6	
		in.lb	37.2	27.4	26.6	21.2	20.4	19.5	10.6	6.2	6.2	9.7	9.7	7.1	5.3	
Max. backlash	$j_1$	arcmin	Standard $\leq 3$ / Reduced $\leq 2$						Standard $\leq 4$ / Reduced $\leq 3$							
Torsional rigidity <sup>b)</sup>	$C_{121}$	Nm/arcmin	28													
		in.lb/arcmin	248													
Max. axial force <sup>c)</sup>	$F_{2AMax}$	N	8250													
		lb <sub>f</sub>	1856													
Max. lateral force <sup>c)</sup>	$F_{2QMax}$	N	6000													
		lb <sub>f</sub>	1350													
Max. tilting moment	$M_{2KMax}$	Nm	843													
		in.lb	7461													
Efficiency at full load (at $n_1 = 500$ rpm)	$\eta$	%	93	91	88	83	74	68	86	89	86	72	66	72	66	
Service life	$L_h$	h	> 20000													
Weight (incl. standard adapter plate)	$m$	kg	16.0						16.7							
		lb <sub>m</sub>	35.4						37.0							
Operating noise (at reference ratio and reference speed – ratio-specific values available in cymex <sup>®</sup> )	$L_{FA}$	dB(A)	$\leq 64$													
Max. permitted housing temperature	$F$	°C	+90													
		F	194													
Ambient temperature	$F$	°C	-15 to +40													
		F	5 to 104													
Lubrication			Lubricated for life													
Direction of rotation			In- and output same direction													
Protection class			IP 65													
Metal bellows coupling (recommended product type – validate sizing with cymex <sup>®</sup> )			BC3 - 00500A - 032.000 - X													
Bore diameter of coupling on the application side		mm	X = 024.000 - 056.000													
Mass moment of inertia (relates to the drive) Clamping hub diameter [mm]	E 19	$J_1$	kgcm <sup>2</sup>	-	-	-	-	-	-	2.60	2.80	2.50	2.40	2.40	2.40	
			10 <sup>-3</sup> in.lb.s <sup>2</sup>	-	-	-	-	-	-	-	2.30	2.48	2.21	2.12	2.12	2.12
	G 24	$J_1$	kgcm <sup>2</sup>	-	-	-	-	-	-	4.10	4.30	4.10	4.00	4.00	3.90	3.90
			10 <sup>-3</sup> in.lb.s <sup>2</sup>	-	-	-	-	-	-	-	3.63	3.81	3.63	3.54	3.54	3.45
	H 28	$J_1$	kgcm <sup>2</sup>	4.80	3.89	3.65	3.56	3.52	3.47	-	-	-	-	-	-	-
			10 <sup>-3</sup> in.lb.s <sup>2</sup>	4.25	3.44	3.23	3.15	3.12	3.07	-	-	-	-	-	-	-

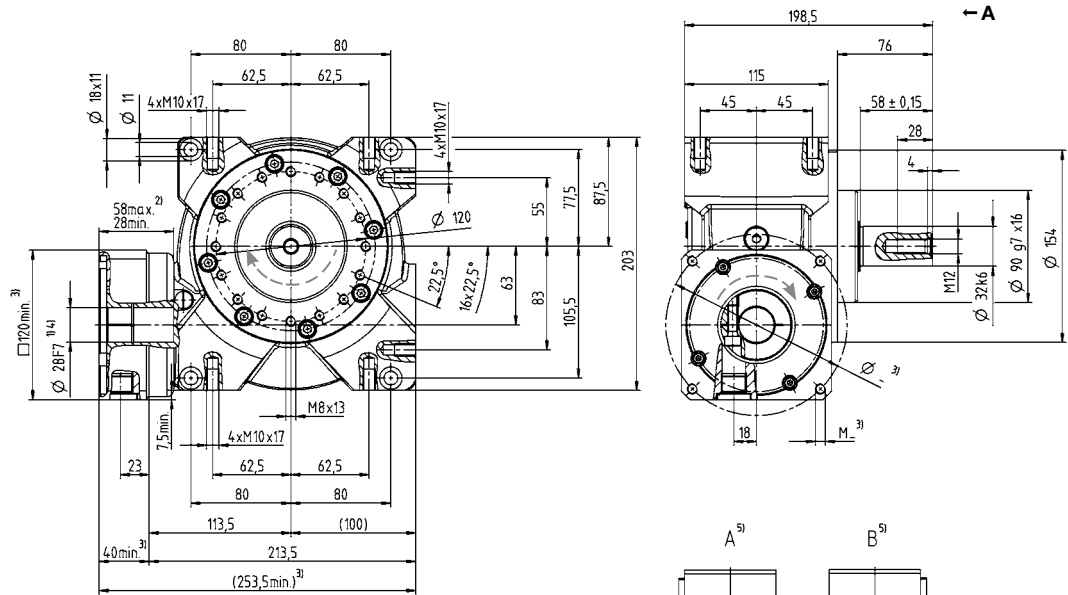
Please use our sizing software cymex<sup>®</sup> for a detailed sizing – [www.wittenstein-cymex.com](http://www.wittenstein-cymex.com)  
Please contact us for optimum sizing at S1 conditions (Continuous operation).

<sup>a)</sup> At max. 10 %  $F_{2QMax}$   
<sup>b)</sup> Valid for standard clamping hub diameter  
<sup>c)</sup> Refers to center of the output shaft or flange  
<sup>d)</sup> Please reduce input speed at higher ambient temperatures  
<sup>e)</sup> Smooth shaft

View A

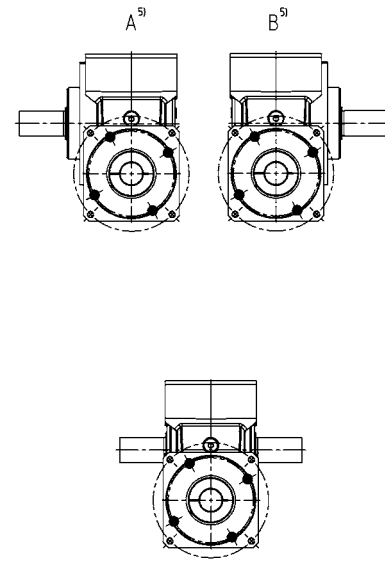
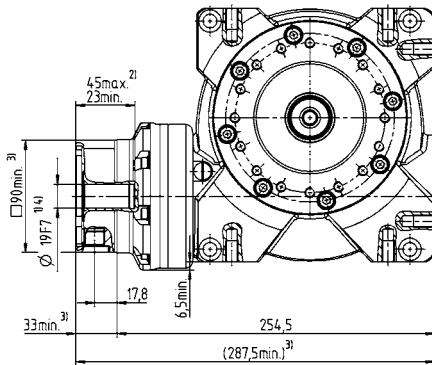
# 1-stage

up to 28<sup>4)</sup> (H)<sup>6)</sup>  
clamping hub diameter



# 2-stage

up to 19/24<sup>4)</sup> (E<sup>6)</sup>/G)  
clamping hub diameter

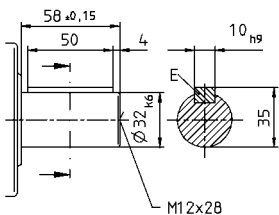


Optional dual-shaft output. Drawings available upon request.  
Involute gearing is not possible.

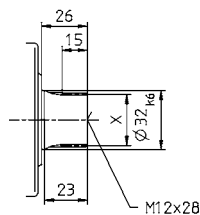
Motor shaft diameter [mm]

## Other output variants

Shaft with key



Splined shaft (DIN 5480)



See technical data sheet for available clamping hub diameters (mass moment of inertia). Dimensions available on request.

Non-tolerated dimensions are nominal dimensions

- <sup>1)</sup> Check motor shaft fit.
- <sup>2)</sup> Min./Max. permissible motor shaft length.  
Longer motor shafts are adaptable, please contact us.
- <sup>3)</sup> The dimensions depend on the motor.
- <sup>4)</sup> Smaller motor shaft diameter is compensated by a bushing with a minimum thickness of 1 mm.
- <sup>5)</sup> Output side
- <sup>6)</sup> Standard clamping hub diameter

Worm gearboxes

VS+

			1-stage						2-stage								
Ratio	<i>i</i>		4	7	10	16	28	40	50	70	100	140	200	280	400		
Max. torque <sup>a) b) e)</sup> (at $n_1 = 500$ rpm)	$T_{2a}$	Nm	578	646	672	702	785	676	672	646	672	785	676	785	676		
		in.lb	5115	5717	5947	6213	6947	5983	5947	5717	5947	6947	5983	6947	5983		
Torque for constant backlash (over the lifetime)	$T_{2Servo}$	Nm	469	601	613	677	764	631	613	601	613	764	631	764	631		
		in.lb	4151	5319	5425	5991	6761	5584	5425	5319	5425	6761	5584	6761	5584		
Emergency stop torque <sup>a) b) e)</sup> (permitted 1000 times during the service life of the gearbox)	$T_{2Not}$	Nm	938	993	963	1005	1064	941	963	993	963	1064	941	1064	941		
		in.lb	8301	8788	8523	8894	9416	8328	8523	8788	8523	9416	8328	9416	8328		
Permitted average input speed (at 20 °C ambient temperature) <sup>d)</sup>	$n_{1N}$	rpm	3500						2900								
Max. input speed	$n_{1Max}$	rpm	4000						4500								
Mean no load running torque <sup>b)</sup> (at $n_1 = 3000$ rpm and 20 °C gearbox temperature)	$T_{012}$	Nm	7.2	7.1	6.5	5	4.8	4.5	2.8	1.6	1.5	2.4	2.4	1.8	1.3		
		in.lb	63.7	62.8	57.5	44.3	42.5	39.8	24.8	14.2	13.3	21.2	21.2	15.9	11.5		
Max. backlash	$j_i$	arcmin	Standard $\leq 3$ / Reduced $\leq 2$						Standard $\leq 4$ / Reduced $\leq 3$								
Torsional rigidity <sup>b)</sup>	$C_{121}$	Nm/arcmin	78						78								
		in.lb/arcmin	690						690								
Max. axial force <sup>c)</sup>	$F_{2AMax}$	N	13900						13900								
		lb <sub>f</sub>	3128						3128								
Max. lateral force <sup>c)</sup>	$F_{2QMax}$	N	9000						9000								
		lb <sub>f</sub>	2025						2025								
Max. tilting moment	$M_{2KMax}$	Nm	1544						1544								
		in.lb	13664						13664								
Efficiency at full load (at $n_1 = 500$ rpm)	$\eta$	%	94	92	89	86	77	70	87	90	87	75	68	75	68		
Service life	$L_h$	h	> 20000														
Weight (incl. standard adapter plate)	$m$	kg	33.0						35.5								
		lb <sub>m</sub>	72.9						78.0								
Operating noise (at reference ratio and reference speed – ratio-specific values available in cymex <sup>®</sup> )	$L_{FA}$	dB(A)	$\leq 66$						$\leq 68$								
Max. permitted housing temperature		°C	+90						+90								
		F	194						194								
Ambient temperature		°C	-15 to +40						-15 to +40								
		F	5 to 104						5 to 104								
Lubrication			Lubricated for life														
Direction of rotation			In- and output same direction														
Protection class			IP 65														
Metal bellows coupling (recommended product type – validate sizing with cymex <sup>®</sup> )			BC3 - 00800A - 040.000 - X														
Bore diameter of coupling on the application side		mm	X = 030.000 - 060.000														
Mass moment of inertia (relates to the drive)	G	24	$J_1$	kgcm <sup>2</sup>	-	-	-	-	-	-	10.40	10.10	10.10	8.80	9.50	9.40	9.30
				10 <sup>-3</sup> in.lb.s <sup>2</sup>	-	-	-	-	-	9.20	8.94	8.94	7.79	8.41	8.32	8.23	
Clamping hub diameter [mm]	K	38	$J_1$	kgcm <sup>2</sup>	20.30	16.56	16.69	15.33	15.24	15.90	17.30	17.00	17.10	15.80	16.40	16.30	16.20
				10 <sup>-3</sup> in.lb.s <sup>2</sup>	17.97	14.66	14.77	13.57	13.49	14.07	15.31	15.05	15.13	13.98	14.51	14.43	14.34

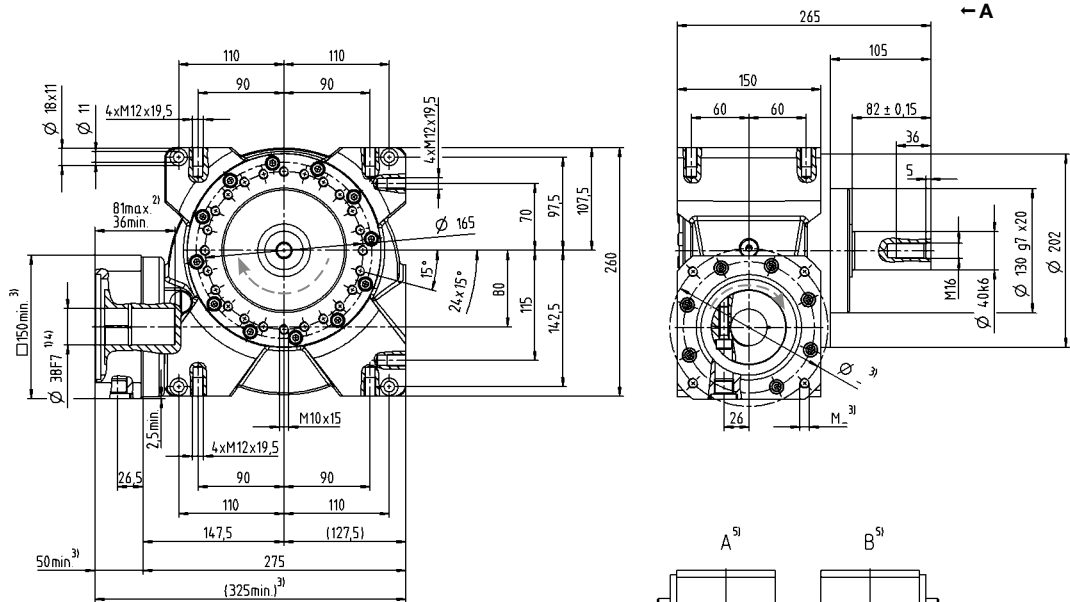
Please use our sizing software cymex<sup>®</sup> for a detailed sizing – [www.wittenstein-cymex.com](http://www.wittenstein-cymex.com)  
Please contact us for optimum sizing at S1 conditions (Continuous operation).

<sup>a)</sup> At max. 10 %  $F_{2QMax}$   
<sup>b)</sup> Valid for standard Clamping hub diameter  
<sup>c)</sup> Refers to center of the output shaft or flange  
<sup>d)</sup> Please reduce input speed at higher ambient temperatures  
<sup>e)</sup> Smooth shaft

View A

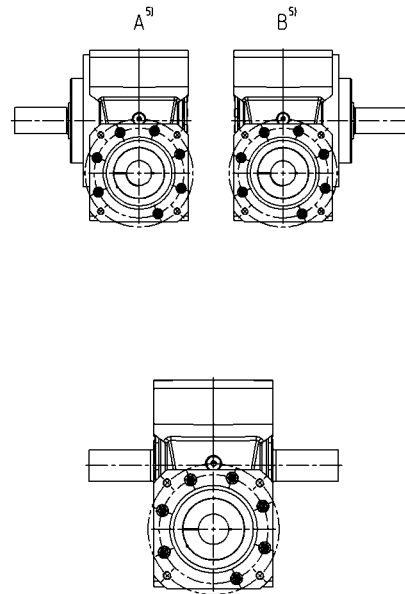
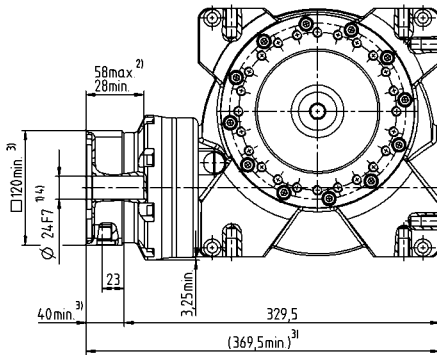
# 1-stage

up to 38<sup>4)</sup> (K)<sup>6)</sup>  
clamping hub diameter



# 2-stage

up to 24/38<sup>4)</sup>  
(G<sup>6)</sup>/K) clamping hub diameter



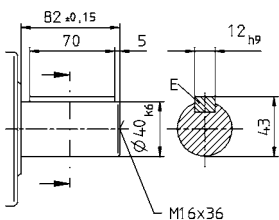
Optional dual-shaft output. Drawings available upon request.  
Involute gearing is not possible.

Motor shaft diameter [mm]

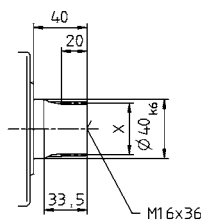
Worm gearboxes

## Other output variants

Shaft with key



Spined shaft (DIN 5480)



See technical data sheet for available clamping hub diameters (mass moment of inertia). Dimensions available on request.

Non-tolerated dimensions are nominal dimensions

<sup>1)</sup> Check motor shaft fit.

<sup>2)</sup> Min./Max. permissible motor shaft length.

Longer motor shafts are adaptable, please contact us.

<sup>3)</sup> The dimensions depend on the motor.

<sup>4)</sup> Smaller motor shaft diameter is compensated by a bushing with a minimum thickness of 1 mm.

<sup>5)</sup> Output side

<sup>6)</sup> Standard clamping hub diameter

VS+

			1-stage						2-stage								
Ratio	<i>i</i>		4	7	10	16	28	40	50	70	100	140	200	280	400		
Max. torque <sup>a) b) e)</sup> (at $n_1 = 500$ rpm)	$T_{2a}$	Nm	1184	1336	1377	1392	1505	1376	1377	1336	1377	1505	1376	1505	1376		
		in.lb	10478	11824	12186	12319	13319	12178	12186	11825	12186	13319	12178	13319	12178		
Torque for constant backlash (over the lifetime)	$T_{2Servo}$	Nm	1155	1304	1343	1359	1469	1343	1343	1304	1343	1469	1343	1469	1343		
		in.lb	10222	11540	11886	12027	13001	11886	11886	11541	11886	13001	11886	13001	11886		
Emergency stop torque <sup>a) b) e)</sup> (permitted 1000 times during the service life of the gearbox)	$T_{2Not}$	Nm	1819	1932	1940	1955	2073	1856	1940	1940	1940	2073	1856	2073	1856		
		in.lb	16098	17098	17169	17302	18346	16426	17169	17169	17169	18346	16426	18346	16426		
Permitted average input speed (at 20 °C ambient temperature) <sup>d)</sup>	$n_{1N}$	rpm	3000						2700								
Max. input speed	$n_{1Max}$	rpm	3500						4000								
Mean no load running torque <sup>b)</sup> (at $n_1 = 3000$ rpm and 20 °C gearbox temperature)	$T_{012}$	Nm	12.2	10.5	9.8	9.1	8.2	7.2	4.1	2.3	2.2	3.8	3.6	2.6	2		
		in.lb	108.0	92.9	86.7	80.5	72.6	63.7	36.3	20.4	19.5	33.6	31.9	23.0	17.7		
Max. backlash	$j_i$	arcmin	Standard $\leq 3$ / Reduced $\leq 2$						Standard $\leq 4$ / Reduced $\leq 3$								
Torsional rigidity <sup>b)</sup>	$C_{121}$	Nm/arcmin							153								
		in.lb/arcmin							1354								
Max. axial force <sup>c)</sup>	$F_{2AMax}$	N							19500								
		lb <sub>f</sub>							4388								
Max. lateral force <sup>c)</sup>	$F_{2QMax}$	N							14000								
		lb <sub>f</sub>							3150								
Max. tilting moment	$M_{2KMax}$	Nm							3059								
		in.lb							27072								
Efficiency at full load (at $n_1 = 500$ rpm)	$\eta$	%	95	93	91	87	80	76	89	89	89	78	74	78	74		
Service life	$L_h$	h	> 20000														
Weight (incl. standard adapter plate)	$m$	kg	62.0						64.6								
		lb <sub>m</sub>	137.0						143.0								
Operating noise (at reference ratio and reference speed – ratio-specific values available in cymex <sup>®</sup> )	$L_{FA}$	dB(A)	$\leq 70$														
Max. permitted housing temperature	$F$	°C	+90														
		F	194														
Ambient temperature	$F$	°C	-15 to +40														
		F	5 to 104														
Lubrication			Lubricated for life														
Direction of rotation			In- and output same direction														
Protection class			IP 65														
Metal bellows coupling (recommended product type – validate sizing with cymex <sup>®</sup> )			BC3 - 01500A - 055.000 - X														
Bore diameter of coupling on the application side		mm	X = 035.000 - 070.000														
Mass moment of inertia (relates to the drive)	K	38	$J_1$	kgcm <sup>2</sup>	-	-	-	-	-	-	31.70	33.00	31.10	30.10	30.40	30.00	29.80
				10 <sup>-3</sup> in.lb.s <sup>2</sup>	-	-	-	-	-	-	28.05	29.21	27.52	26.64	26.90	26.55	26.37
Clamping hub diameter [mm]	M	48	$J_1$	kgcm <sup>2</sup>	50.02	40.63	38.73	39.60	37.14	37.47	46.40	47.70	45.80	44.80	45.10	44.70	44.50
				10 <sup>-3</sup> in.lb.s <sup>2</sup>	44.27	35.96	34.28	35.05	32.87	33.16	41.06	42.21	40.53	39.65	39.91	39.56	39.38

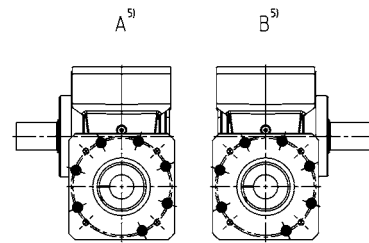
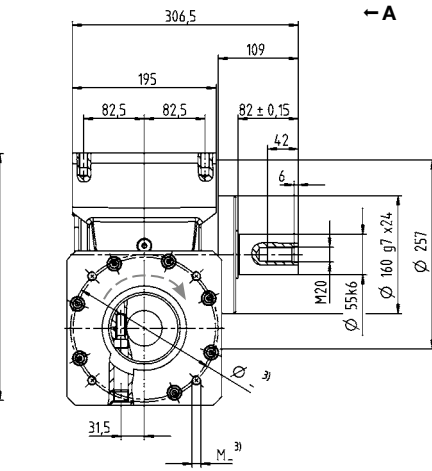
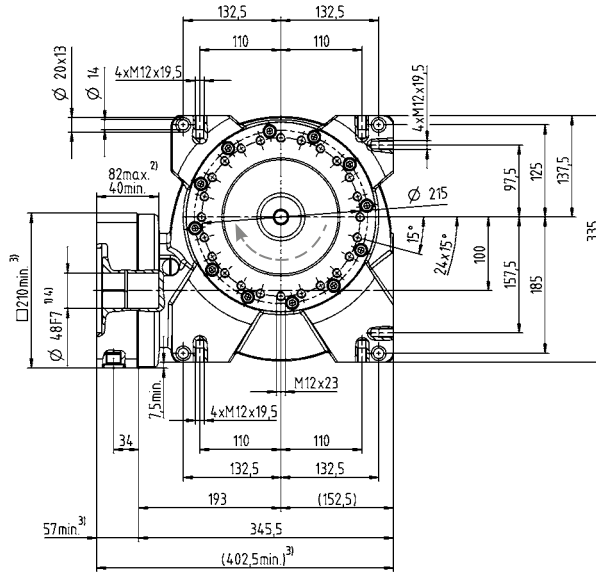
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Please contact us for optimum sizing at S1 conditions (Continuous operation).

<sup>a)</sup> At max. 10 %  $F_{2QMax}$   
<sup>b)</sup> Valid for standard clamping hub diameter  
<sup>c)</sup> Refers to center of the output shaft or flange  
<sup>d)</sup> Please reduce input speed at higher ambient temperatures  
<sup>e)</sup> Smooth shaft

View A

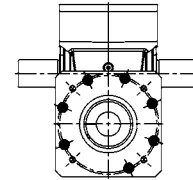
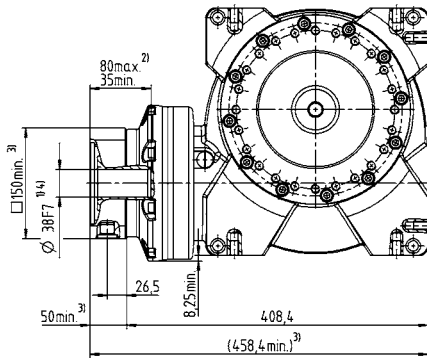
# 1-stage

up to 48<sup>4)</sup> (M<sup>6)</sup>  
clamping hub diameter



# 2-stage

up to 38/48<sup>4)</sup>  
(K<sup>6)</sup>/M clamping hub diameter



Optional dual-shaft output. Drawings available upon request.  
Involute gearing is not possible.

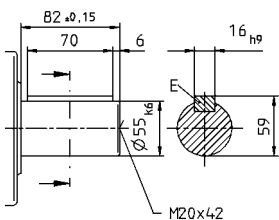
Motor shaft diameter [mm]

Worm gearboxes

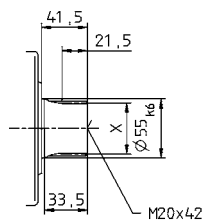
VS+

## Other output variants

Shaft with key



Splined shaft (DIN 5480)



See technical data sheet for available clamping hub diameters (mass moment of inertia). Dimensions available on request.

Non-tolerated dimensions are nominal dimensions

<sup>1)</sup> Check motor shaft fit.

<sup>2)</sup> Min./Max. permissible motor shaft length.

Longer motor shafts are adaptable, please contact us.

<sup>3)</sup> The dimensions depend on the motor.

<sup>4)</sup> Smaller motor shaft diameter is compensated by a bushing with a minimum thickness of 1 mm.

<sup>5)</sup> Output side

<sup>6)</sup> Standard clamping hub diameter

			1-stage						2-stage								
Ratio	<i>i</i>		4	7	10	16	28	40	50	70	100	140	200	280	400		
Max. torque <sup>a) b)</sup> (at $n_1 = 500$ rpm)	$T_{2a}$	Nm	165	180	182	193	204	183	182	180	182	204	183	204	183		
		in.lb	1460	1593	1611	1708	1805	1620	1611	1593	1611	1805	1620	1805	1620		
Torque for constant backlash (over the lifetime)	$T_{2Servo}$	Nm	54	71	74	81	90	74	74	71	74	90	74	90	74		
		in.lb	478	628	655	717	797	655	655	628	655	797	655	797	655		
Emergency stop torque <sup>a) b)</sup> (permitted 1000 times during the service life of the gearbox)	$T_{2Not}$	Nm	230	242	242	250	262	236	242	242	242	262	236	262	236		
		in.lb	2036	2142	2142	2213	2319	2089	2142	2142	2142	2319	2089	2319	2089		
Permitted average input speed (at 20 °C ambient temperature) <sup>d)</sup>	$n_{1N}$	rpm	4000						3500								
Max. input speed	$n_{1Max}$	rpm	6000														
Mean no load running torque <sup>b)</sup> (at $n_1 = 3000$ rpm and 20 °C gearbox temperature)	$T_{012}$	Nm	2.3	2.2	1.6	1.5	1.2	1.1	0.7	0.5	0.4	0.6	0.6	0.4	0.4		
		in.lb	20.4	19.5	14.2	13.3	10.6	9.7	6.2	4.4	3.5	5.3	5.3	3.5	3.5		
Max. backlash	$j_i$	arcmin	Standard $\leq 3$ / Reduced $\leq 2$						Standard $\leq 4$ / Reduced $\leq 3$								
Torsional rigidity <sup>b)</sup>	$C_{121}$	Nm/arcmin	17						8								
		in.lb/arcmin	150						71								
Max. axial force <sup>c)</sup>	$F_{2AMax}$	N	5000						5000								
		lb <sub>f</sub>	1125						1125								
Max. tilting moment	$M_{2KMax}$	Nm	409						409								
		in.lb	3620						3620								
Efficiency at full load (at $n_1 = 500$ rpm)	$\eta$	%	92	89	86	82	72	64	84	87	84	70	62	70	62		
Tilting rigidity	$C_{2K}$	Nm/arcmin	504						504								
		in.lb/arcmin	4460						4460								
Service life	$L_h$	h	> 20000														
Weight (incl. standard adapter plate)	$m$	kg	9.0						9.5								
		lb <sub>m</sub>	19.9						21.0								
Operating noise (at reference ratio and reference speed – ratio-specific values available in cymex <sup>®</sup> )	$L_{FA}$	dB(A)	$\leq 62$														
Max. permitted housing temperature	$F$	°C	+90						+90								
		F	194						194								
Ambient temperature	$F$	°C	-15 to +40						-15 to +40								
		F	5 to 104						5 to 104								
Lubrication			Lubricated for life														
Direction of rotation			In- and output same direction														
Protection class			IP 65														
Metal bellows coupling (recommended product type – validate sizing with cymex <sup>®</sup> )			BCT-00060AAX-050.000														
Bore diameter of coupling on the application side		mm	X = 014.000 - 035.000														
Mass moment of inertia (relates to the drive) Clamping hub diameter [mm]	C	14	$J_i$	kgcm <sup>2</sup>	-	-	-	-	-	-	0.80	0.80	0.80	0.70	0.70	0.70	0.70
				10 <sup>-3</sup> in.lb.s <sup>2</sup>	-	-	-	-	-	-	0.71	0.71	0.71	0.62	0.62	0.62	0.62
	E	19	$J_i$	kgcm <sup>2</sup>	1.50	1.21	1.12	1.03	1.00	1.05	1.20	1.30	1.20	1.10	1.10	1.10	1.10
				10 <sup>-3</sup> in.lb.s <sup>2</sup>	1.33	1.07	0.99	0.91	0.89	0.93	1.06	1.15	1.06	0.97	0.97	0.97	0.97
G	24	$J_i$	kgcm <sup>2</sup>	1.6	1.32	1.23	1.14	1.11	1.15	-	-	-	-	-	-	-	
			10 <sup>-3</sup> in.lb.s <sup>2</sup>	1.4	1.2	1.1	1.0	0.98	1.0	-	-	-	-	-	-	-	

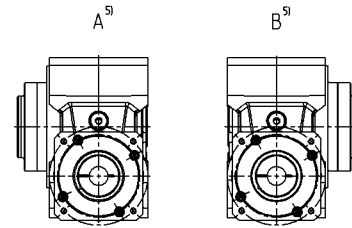
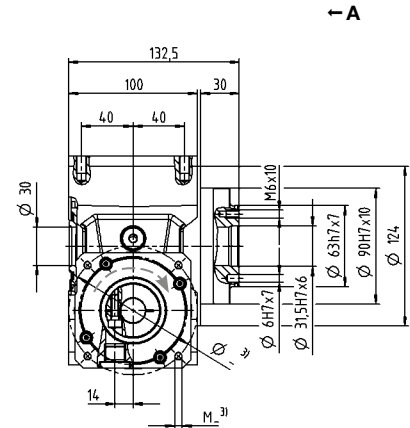
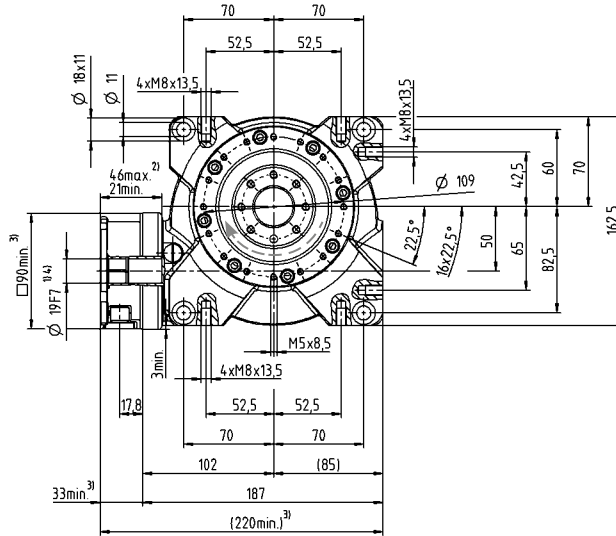
Please use our sizing software cymex<sup>®</sup> for a detailed sizing – [www.wittenstein-cymex.com](http://www.wittenstein-cymex.com)  
Please contact us for optimum sizing at S1 conditions (Continuous operation).

<sup>a)</sup> At max. 10 %  $M_{2KMax}$   
<sup>b)</sup> Valid for standard clamping hub diameter  
<sup>c)</sup> Refers to center of the output shaft or flange  
<sup>d)</sup> Please reduce input speed at higher ambient temperatures

View A

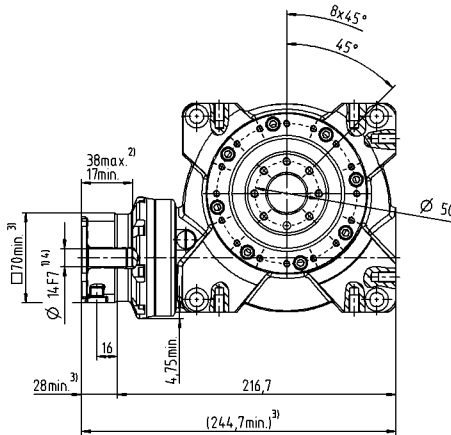
# 1-stage

up to 19/24<sup>4)</sup>  
(E<sup>6)</sup>/G) clamping  
hub diameter



# 2-stage

up to 14/19<sup>4)</sup>  
(C<sup>6)</sup>/E) clamping  
hub diameter



Motor shaft diameter [mm]

Worm gearboxes

See technical data sheet for available clamping hub diameters (mass moment of inertia). Dimensions available on request.

Non-tolerated dimensions are nominal dimensions

<sup>1)</sup> Check motor shaft fit.

<sup>2)</sup> Min. / Max. permissible motor shaft length.

Longer motor shafts are adaptable, please contact us.

<sup>3)</sup> The dimensions depend on the motor.

<sup>4)</sup> Smaller motor shaft diameter is compensated by a bushing with a minimum thickness of 1 mm.

<sup>5)</sup> Output side

<sup>6)</sup> Standard clamping hub diameter



			1-stage						2-stage								
Ratio	<i>i</i>		4	7	10	16	28	40	50	70	100	140	200	280	400		
Max. torque <sup>a) b)</sup> (at $n_1 = 500$ rpm)	$T_{2a}$	Nm	319	353	364	372	392	363	364	353	364	392	363	392	363		
		in.lb	2823	3124	3221	3292	3469	3213	3221	3124	3221	3469	3213	3469	3213		
Torque for constant backlash (over the lifetime)	$T_{2Servo}$	Nm	198	210	225	221	229	226	225	210	225	229	226	229	226		
		in.lb	1752	1859	1991	1956	2027	2000	1991	1859	1991	2027	2000	2027	2000		
Emergency stop torque <sup>a) b)</sup> (permitted 1000 times during the service life of the gearbox)	$T_{2Not}$	Nm	460	484	491	494	518	447	491	484	494	518	447	518	447		
		in.lb	4071	4283	4345	4372	4584	3956	4345	4283	4372	4584	3956	4584	3956		
Permitted average input speed (at 20 °C ambient temperature) <sup>d)</sup>	$n_{1N}$	rpm	4000						3100								
Max. input speed	$n_{1Max}$	rpm	4500														
Mean no load running torque <sup>b)</sup> (at $n_1 = 3000$ rpm and 20 °C gearbox temperature)	$T_{012}$	Nm	4.2	3.1	3	2.4	2.3	2.2	1.2	0.7	0.7	1.1	1.1	0.8	0.6		
		in.lb	37.2	27.4	26.6	21.2	20.4	19.5	10.6	6.2	6.2	9.7	9.7	7.1	5.3		
Max. backlash	$j_i$	arcmin	Standard $\leq 3$ / Reduced $\leq 2$						Standard $\leq 4$ / Reduced $\leq 3$								
Torsional rigidity <sup>b)</sup>	$C_{121}$	Nm/arcmin	50						28								
		in.lb/arcmin	443						248								
Max. axial force <sup>c)</sup>	$F_{2AMax}$	N	8250														
		lb <sub>f</sub>	1856														
Max. tilting moment	$M_{2KMax}$	Nm	843														
		in.lb	7461														
Efficiency at full load (at $n_1 = 500$ rpm)	$\eta$	%	93	91	88	83	74	68	86	89	86	72	66	72	66		
Tilting rigidity	$C_{2K}$	Nm/arcmin	603														
		in.lb/arcmin	5337														
Service life	$L_h$	h	> 20000														
Weight (incl. standard adapter plate)	$m$	kg	15.0						15.2								
		lb <sub>m</sub>	33						34.0								
Operating noise (at reference ratio and reference speed – ratio-specific values available in cymex <sup>®</sup> )	$L_{FA}$	dB(A)	$\leq 64$														
Max. permitted housing temperature		°C	+90														
		F	194														
Ambient temperature		°C	-15 to +40														
		F	5 to 104														
Lubrication			Lubricated for life														
Direction of rotation			In- and output same direction														
Protection class			IP 65														
Metal bellows coupling (recommended product type – validate sizing with cymex <sup>®</sup> )			BCT-00150AAX-063.000														
Bore diameter of coupling on the application side		mm	X = 019.000 - 042.000														
Mass moment of inertia (relates to the drive) Clamping hub diameter [mm]	E	19	$J_1$	kgcm <sup>2</sup>	-	-	-	-	-	-	2.60	2.80	2.50	2.40	2.40	2.40	2.30
				10 <sup>-3</sup> in.lb.s <sup>2</sup>	-	-	-	-	-	-	2.30	2.48	2.21	2.12	2.12	2.12	2.04
	G	24	$J_1$	kgcm <sup>2</sup>	-	-	-	-	-	-	4.10	4.30	4.10	4.00	4.00	3.90	3.90
				10 <sup>-3</sup> in.lb.s <sup>2</sup>	-	-	-	-	-	-	3.63	3.81	3.63	3.54	3.54	3.45	3.45
H	28	$J_1$	kgcm <sup>2</sup>	4.80	3.89	3.65	3.56	3.52	3.47	-	-	-	-	-	-	-	
			10 <sup>-3</sup> in.lb.s <sup>2</sup>	4.25	3.44	3.23	3.15	3.12	3.07	-	-	-	-	-	-	-	

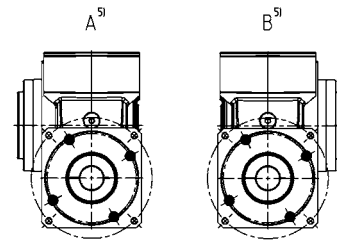
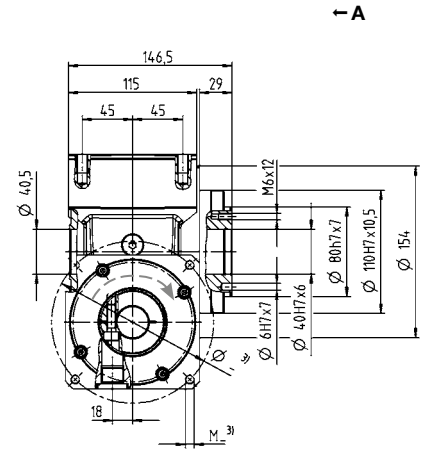
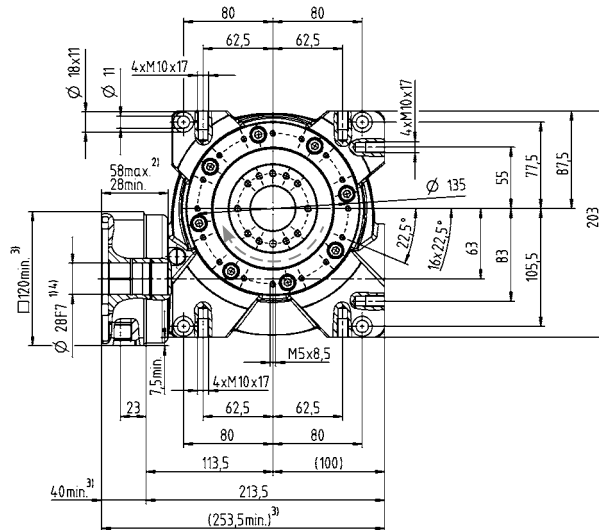
Please use our sizing software cymex<sup>®</sup> for a detailed sizing – [www.wittenstein-cymex.com](http://www.wittenstein-cymex.com)  
Please contact us for optimum sizing at S1 conditions (Continuous operation).

<sup>a)</sup> At max. 10 %  $M_{2KMax}$   
<sup>b)</sup> Valid for standard clamping hub diameter  
<sup>c)</sup> Refers to center of the output shaft or flange  
<sup>d)</sup> Please reduce input speed at higher ambient temperatures

View A

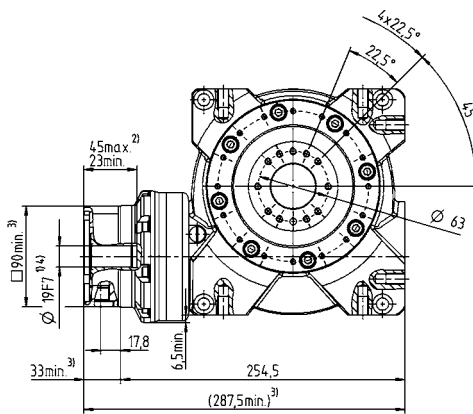
# 1-stage

up to 28<sup>4)</sup> (H)<sup>6)</sup>  
clamping hub diameter



# 2-stage

up to 19/24<sup>4)</sup>  
(E<sup>6)</sup>/G) clamping  
hub diameter



Motor shaft diameter [mm]

Worm gearboxes

See technical data sheet for available clamping hub diameters (mass moment of inertia). Dimensions available on request.

Non-tolerated dimensions are nominal dimensions

<sup>1)</sup> Check motor shaft fit.

<sup>2)</sup> Min. / Max. permissible motor shaft length.

Longer motor shafts are adaptable, please contact us.

<sup>3)</sup> The dimensions depend on the motor.

<sup>4)</sup> Smaller motor shaft diameter is compensated by a bushing with a minimum thickness of 1 mm.

<sup>5)</sup> Output side

<sup>6)</sup> Standard clamping hub diameter

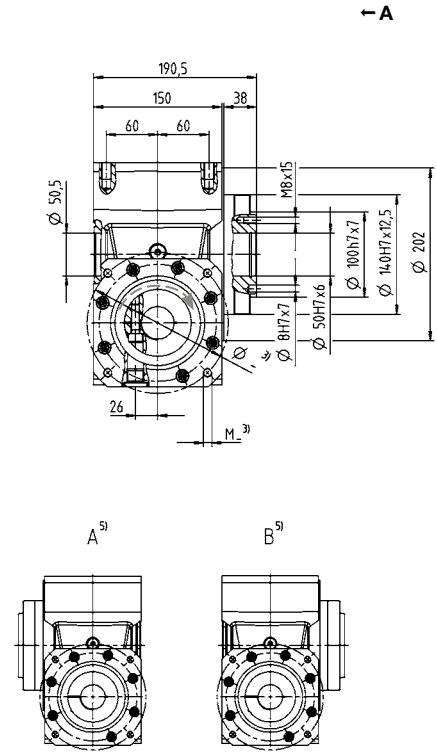
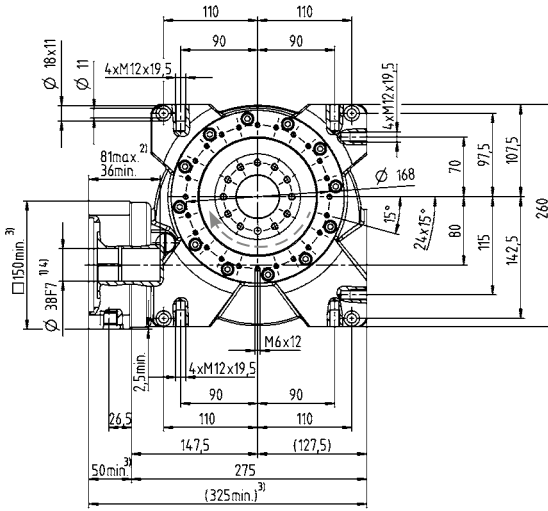
			1-stage						2-stage								
Ratio	<i>i</i>		4	7	10	16	28	40	50	70	100	140	200	280	400		
Max. torque <sup>a) b)</sup> (at $n_1 = 500$ rpm)	$T_{2a}$	Nm	578	646	672	702	785	676	672	646	672	785	676	785	676		
		in.lb	5115	5717	5947	6213	6947	5983	5947	5717	5947	6947	5983	6947	5983		
Torque for constant backlash (over the lifetime)	$T_{2Servo}$	Nm	469	601	613	677	764	631	613	601	613	764	631	764	631		
		in.lb	4151	5319	5425	5991	6761	5584	5425	5319	5425	6761	5584	6761	5584		
Emergency stop torque <sup>a) b)</sup> (permitted 1000 times during the service life of the gearbox)	$T_{2Not}$	Nm	938	993	963	1005	1064	941	963	993	963	1064	941	1064	941		
		in.lb	8301	8788	8523	8894	9416	8328	8523	8788	8523	9416	8328	9416	8328		
Permitted average input speed (at 20 °C ambient temperature) <sup>d)</sup>	$n_{1N}$	rpm	3500						2900								
Max. input speed	$n_{1Max}$	rpm	4000						4500								
Mean no load running torque <sup>b)</sup> (at $n_1 = 3000$ rpm and 20 °C gearbox temperature)	$T_{012}$	Nm	7.2	7.1	6.5	5	4.8	4.5	2.8	1.6	1.5	2.4	2.4	1.8	1.3		
		in.lb	63.7	62.8	57.5	44.3	42.5	39.8	24.8	14.2	13.3	21.2	21.2	15.9	11.5		
Max. backlash	$j_i$	arcmin	Standard $\leq 3$ / Reduced $\leq 2$						Standard $\leq 4$ / Reduced $\leq 3$								
Torsional rigidity <sup>b)</sup>	$C_{121}$	Nm/arcmin	113						78								
		in.lb/arcmin	1000						690								
Max. axial force <sup>c)</sup>	$F_{2AMax}$	N	13900						13900								
		lb <sub>f</sub>	3128						3128								
Max. tilting moment	$M_{2KMax}$	Nm	1544						1544								
		in.lb	13664						13664								
Efficiency at full load (at $n_1 = 500$ rpm)	$\eta$	%	94	92	89	86	77	70	87	90	87	75	68	75	68		
Tilting rigidity	$C_{2K}$	Nm/arcmin	1178						1178								
		in.lb/arcmin	10425						10425								
Service life	$L_h$	h	> 20000						> 20000								
Weight (incl. standard adapter plate)	$m$	kg	32.0						33.5								
		lb <sub>m</sub>	70.7						74.0								
Operating noise (at reference ratio and reference speed – ratio-specific values available in cymex <sup>®</sup> )	$L_{FA}$	dB(A)	$\leq 66$						$\leq 68$								
Max. permitted housing temperature		°C	+90						+90								
		F	194						194								
Ambient temperature		°C	-15 to +40						-15 to +40								
		F	5 to 104						5 to 104								
Lubrication			Lubricated for life						Lubricated for life								
Direction of rotation			In- and output same direction						In- and output same direction								
Protection class			IP 65						IP 65								
Metal bellows coupling (recommended product type – validate sizing with cymex <sup>®</sup> )			BCT-00300AAX-080.000						BCT-00300AAX-080.000								
Bore diameter of coupling on the application side		mm	X = 024.000 - 060.000						X = 024.000 - 060.000								
Mass moment of inertia (relates to the drive) Clamping hub diameter [mm]	G	24	$J_1$	kgcm <sup>2</sup>	-	-	-	-	-	-	10.40	10.10	10.10	8.80	9.50	9.40	9.30
				10 <sup>-3</sup> in.lb.s <sup>2</sup>	-	-	-	-	-	-	9.20	8.94	8.94	7.79	8.41	8.32	8.23
	K	38	$J_1$	kgcm <sup>2</sup>	20.30	16.56	16.69	15.33	15.24	15.90	17.30	17.00	17.10	15.80	16.40	16.30	16.20
				10 <sup>-3</sup> in.lb.s <sup>2</sup>	17.97	14.66	14.77	13.57	13.49	14.07	15.31	15.05	15.13	13.98	14.51	14.43	14.34

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Please contact us for optimum sizing at S1 conditions (Continuous operation).

<sup>a)</sup> At max. 10 %  $M_{2KMax}$   
<sup>b)</sup> Valid for standard clamping hub diameter  
<sup>c)</sup> Refers to center of the output shaft or flange  
<sup>d)</sup> Please reduce input speed at higher ambient temperatures

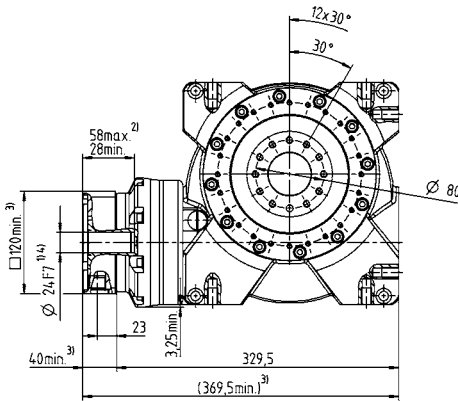
# 1-stage

up to 38<sup>4)</sup> (K)<sup>6)</sup>  
clamping hub diameter



# 2-stage

up to 24/38<sup>4)</sup>  
(G<sup>6)</sup>/K) clamping  
hub diameter



Motor shaft diameter [mm]

Worm gearboxes

See technical data sheet for available clamping hub diameters (mass moment of inertia). Dimensions available on request.

Non-tolerated dimensions are nominal dimensions

<sup>1)</sup> Check motor shaft fit.

<sup>2)</sup> Min. / Max. permissible motor shaft length.

Longer motor shafts are adaptable, please contact us.

<sup>3)</sup> The dimensions depend on the motor.

<sup>4)</sup> Smaller motor shaft diameter is compensated by a bushing with a minimum thickness of 1 mm.

<sup>5)</sup> Output side

<sup>6)</sup> Standard clamping hub diameter

			1-stage						2-stage								
Ratio	<i>i</i>		4	7	10	16	28	40	50	70	100	140	200	280	400		
Max. torque <sup>a) b)</sup> (at $n_1 = 500$ rpm)	$T_{2a}$	Nm	1184	1336	1377	1392	1505	1376	1377	1336	1377	1505	1376	1505	1376		
		in.lb	10478	11824	12186	12319	13319	12178	12186	11825	12186	13319	12178	13319	12178		
Torque for constant backlash (over the lifetime)	$T_{2Servo}$	Nm	1155	1304	1343	1359	1469	1343	1343	1304	1343	1469	1343	1469	1343		
		in.lb	10222	11540	11886	12027	13001	11886	11886	11541	11886	13001	11886	13001	11886		
Emergency stop torque <sup>a) b)</sup> (permitted 1000 times during the service life of the gearbox)	$T_{2Not}$	Nm	1819	1932	1940	1955	2073	1856	1940	1940	1940	2073	1856	2073	1856		
		in.lb	16098	17098	17169	17302	18346	16426	17169	17169	17169	18346	16426	18346	16426		
Permitted average input speed (at 20 °C ambient temperature) <sup>d)</sup>	$n_{1N}$	rpm	3000						2700								
Max. input speed	$n_{1Max}$	rpm	3500						4000								
Mean no load running torque <sup>b)</sup> (at $n_1 = 3000$ rpm and 20 °C gearbox temperature)	$T_{012}$	Nm	12.2	10.5	9.8	9.1	8.2	7.2	4.1	2.3	2.2	3.8	3.6	2.6	2		
		in.lb	108.0	92.9	86.7	80.5	72.6	63.7	36.3	20.4	19.5	33.6	31.9	23.0	17.7		
Max. backlash	$j_i$	arcmin	Standard $\leq 3$ / Reduced $\leq 2$						Standard $\leq 4$ / Reduced $\leq 3$								
Torsional rigidity <sup>b)</sup>	$C_{121}$	Nm/arcmin	213						153								
		in.lb/arcmin	1885						1354								
Max. axial force <sup>c)</sup>	$F_{2AMax}$	N	19500														
		lb <sub>f</sub>	4388														
Max. tilting moment	$M_{2KMax}$	Nm	3059														
		in.lb	27072														
Efficiency at full load (at $n_1 = 500$ rpm)	$\eta$	%	95	93	91	87	80	76	89	89	89	78	74	78	74		
Tilting rigidity	$C_{2K}$	Nm/arcmin	2309														
		in.lb/arcmin	20435														
Service life	$L_h$	h	> 20000														
Weight (incl. standard adapter plate)	$m$	kg	63.0						64.6								
		lb <sub>m</sub>	139.0						143.0								
Operating noise (at reference ratio and reference speed – ratio-specific values available in cymex <sup>®</sup> )	$L_{FA}$	dB(A)	$\leq 70$														
Max. permitted housing temperature		°C	+90														
		F	194														
Ambient temperature		°C	-15 to +40														
		F	5 to 104														
Lubrication			Lubricated for life														
Direction of rotation			In- and output same direction														
Protection class			IP 65														
Metal bellows coupling (recommended product type – validate sizing with cymex <sup>®</sup> )			BCT-01500AAX-125.000														
Bore diameter of coupling on the application side		mm	X = 050.000 - 080.000														
Mass moment of inertia (relates to the drive) Clamping hub diameter [mm]	K	38	$J_1$	kgcm <sup>2</sup>	-	-	-	-	-	31.70	33.00	31.10	30.10	30.40	30.00	29.80	
				10 <sup>-3</sup> in.lb.s <sup>2</sup>	-	-	-	-	-	28.05	29.21	27.52	26.64	26.90	26.55	26.37	
	M	48	$J_1$	kgcm <sup>2</sup>	50.02	40.63	38.73	39.60	37.14	37.47	46.40	47.70	45.80	44.80	45.10	44.70	44.50
				10 <sup>-3</sup> in.lb.s <sup>2</sup>	44.27	35.96	34.28	35.05	32.87	33.16	41.06	42.21	40.53	39.65	39.91	39.56	39.38

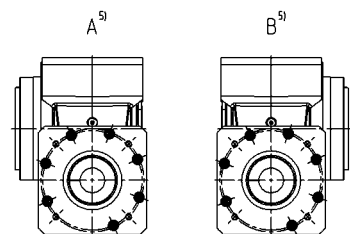
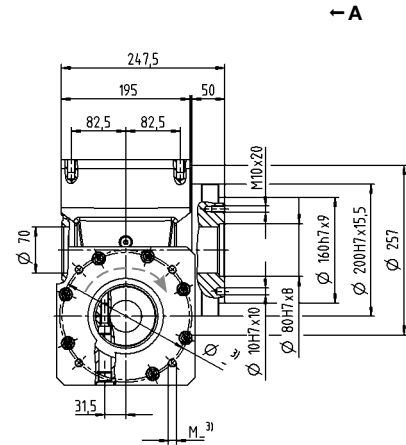
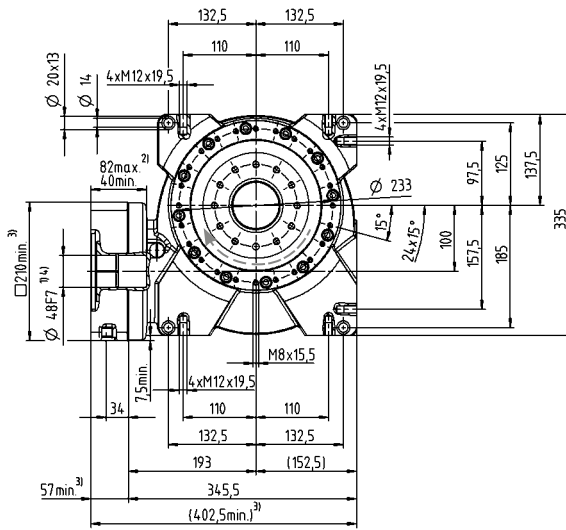
Please use our sizing software cymex<sup>®</sup> for a detailed sizing – [www.wittenstein-cymex.com](http://www.wittenstein-cymex.com)  
Please contact us for optimum sizing at S1 conditions (Continuous operation).

<sup>a)</sup> At max. 10 %  $M_{2KMax}$   
<sup>b)</sup> Valid for standard clamping hub diameter  
<sup>c)</sup> Refers to center of the output shaft or flange  
<sup>d)</sup> Please reduce input speed at higher ambient temperatures

View A

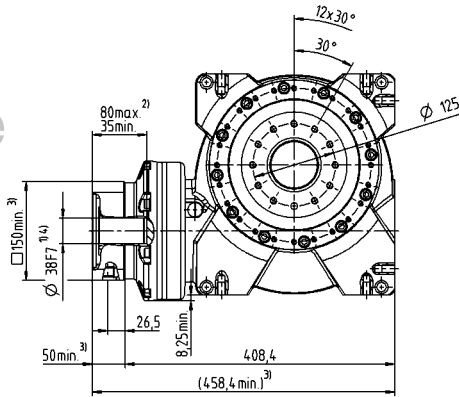
# 1-stage

up to 48<sup>4)</sup> (M<sup>6)</sup>  
clamping hub diameter



# 2-stage

up to 38 / 48<sup>4)</sup>  
(K<sup>6)</sup> / M) clamping hub diameter



Motor shaft diameter [mm]

Worm gearboxes

See technical data sheet for available clamping hub diameters (mass moment of inertia). Dimensions available on request.

Non-tolerated dimensions are nominal dimensions

<sup>1)</sup> Check motor shaft fit.

<sup>2)</sup> Min. / Max. permissible motor shaft length.

Longer motor shafts are adaptable, please contact us.

<sup>3)</sup> The dimensions depend on the motor.

<sup>4)</sup> Smaller motor shaft diameter is compensated by a bushing with a minimum thickness of 1 mm.

<sup>5)</sup> Output side

<sup>6)</sup> Standard clamping hub diameter