Electric swivel units

EKS, EGS, ERS - Series

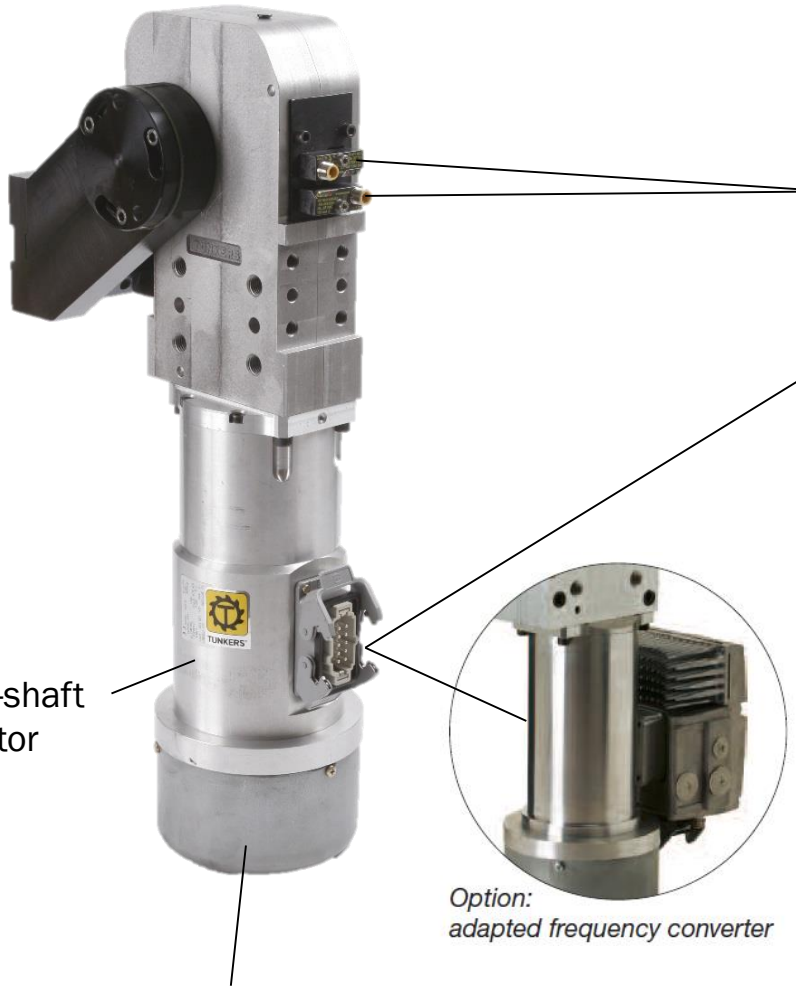
EKS – Swivel unit with electric drive

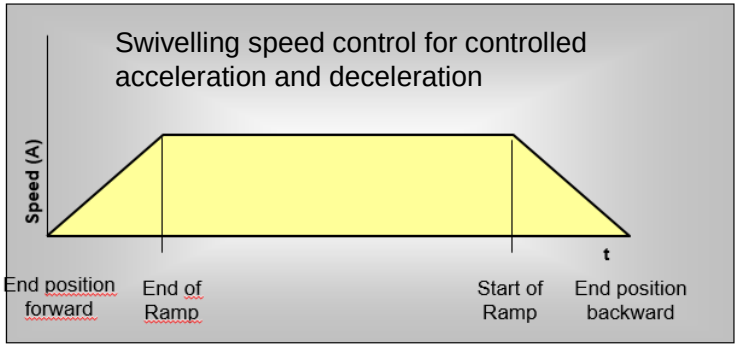
TÜNKERS
Erfindergeist serienmäßig.

➢ Characteristics:

- hollow-shaft motor actuating the swivel arm via a toggle mechanism by means of a recirculating ball screw.
- encapsulated structure made of high-strength aluminum material,
- drive shaft in needle-roller bearing with axial and radial bearing,
- maximum swivel angle of 135°
- electric brake for emergency stop and rest position
- end position sensing
- optional frequency converter for soft acceleration and deceleration process.

EKS - Assembling





EKS - Technical data

Type	Torque caused by load ML max. 0-120° (Nm)	Torque caused by horizontal forces MQ max. (Nm)	Swing time at max. 120° opening angle (s)	Weight (~ kg) (without swivel traverse)
EKS 100.6	180	380	2,35	52
EKS 160.6	320	1000	2,35	60
EKS 200.6	450	1000	2,35	78

Holding brake

Nominal voltage***	Rated current I G	On-time	Braking torque	Brake Fa. SEW Type
230 VAC	0,44A	100% ED	20Nm	BMG20

Comparison pneumatic to elektric swivel units
KS vs. EKS

1,5 years	Pneumatic swivel unit KS 160.5 BH	Electric swivel unit EKS 160.6	Comparison P with E
Investment	**7.492.000 €**	**6.788.000 €**	**-10,4%**
Operational cost	**245.654 €**	**33.908 €**	
Energy consumption	*2.233.216*	*308.250*	**-86,2%**
CO2-emission	*1.339.930*	*184.950*	
Sum operational+equipment costs	**7.737.654 €**	**6.821.908 €**	**-11,8%**

8 years	Pneumatic swivel unit KS 160.5 BH	Electric swivel unit EKS 160.6	Comparison P with E
Investment	**7.492.000 €**	**6.788.000 €**	**-10,4%**
Operational cost	**1.310.153 €**	**180.840 €**	
Energy consumption	*11.910.485*	*1.644.000*	**-86,2%**
CO2-emission	*7.146.291*	*986.400*	
Sum operational+equipment costs	**8.802.153 €**	**6.968.840 €**	**-20,8%**

Comparison pneumatic to elektric swivel units
KS vs. EKS

TÜNKERS Erfindergeist serienmäßig.

135° opening angle	P	E	Pneumatic swivel KS 160.5 BH 135°		Electric swivel EKS 160.6	
			1 unit	1000 units	1 unit	1000 units
Energieverbrauch			[l]	[l]	[kWh]	[kWh]
Energieverbrauch (l bzw. kWh) (Zyklus) / Energy Consumption (l or kWh) (cycle)			44,00	44000,00	0,00082	0,8220
Energieverbrauch (0,13 kWh/m³) / Energy consumption (0,13 kWh/m³)	0,13		[kWh]	[kWh]	[kWh]	[kWh]
pro Tag (1.000 Zykl / Tag) / per day (1,000 cycles / day):	1000		5,96	5.955,24	0,82	822,00
pro 1,5 Jahr (375 Tage) / per 1,5 year (375 days):	375		2.233	2.233.216	308,25	308.250
Im Projekt (8 Jahre) / during the project term (8 years):	8		11.910	11.910.485	1.644	1.644.000
CO2-Emission (600 g/kWh) / CO2-emission (600 g/kWh)	600		[kg]	[kg]	[kg]	[kg]
pro 1,5 Jahr (375 Tage) / per 1,5 year (375 days):	375		1.340	1.339.930	185,0	184.950
Im Projekt (8 Jahre) / during the project term (8 years):	8		7.146	7.146.291	986	986.400
Betriebskosten (1,43 ct/m³ – 11 ct/kWh)	1,43	11	[€]	[€]	[€]	[€]
pro 1,5 Jahr (375 Tage) / per 1,5 year (375 days):	375		245,65 €	245.653,75 €	33,91 €	33.907,50 €
Im Projekt (x Jahre) / during the project term (x years):	8		1.310,15 €	1.310.153,34 €	180,84 €	180.840,00 €
Betriebsmittelkosten / equipment cost			[€]	[€]	[€]	[€]
Invest Spanner / cost clamp			6.993,00 €	6.993.000,00 €	6.317,00 €	6.317.000,00 €
Invest Ventilinsel - Schaltschrank für Schwenker / cost valve island - cartridge for swivel unit			499,00 €	499.000,00 €	471,00 €	471.000,00 €
Gesamte Investition			7.492,00 €	7.492.000,00 €	6.788,00 €	6.788.000,00 €
Summe Betriebskosten (1,5 Jahre) + Betriebsmittelkosten Sum operational costs (1,5 years) + equipment costs			**7.737,65 €**	**7.737.653,75 €**	**6.821,91 €**	**6.821.907,50 €**
Summe Betriebskosten (x Jahre) + Betriebsmittelkosten Sum operational costs (x years) + equipment costs			**8.802,15 €**	**8.802.153,34 €**	**6.968,84 €**	**6.968.840,00 €**

CO_2 emissions

Operational costs

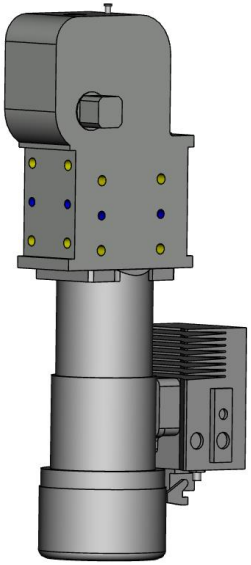
Investment

Sum costs

*For the test we used EKS 160.6 with load for 313 cycles

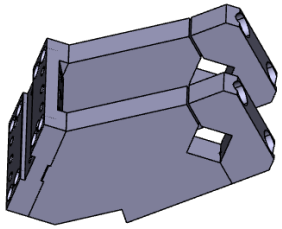
EKS - Ordering code

EKS… .6



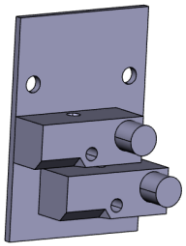
Swivel unit
EKS 160.6
size 100,160, 200
opening angle
max.135˚

A..



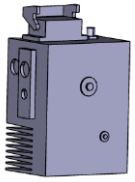
Swivel arm positions:
A01, standard
A03, swivel arm A01
mirrored

T12



Sensor catridge:
Inductive switch 24 V,
1 output with intergrated
LEDs

MS..



SEW Frequency converter
MS00, MS01,
MS04, MS11,
MS14

120˚

Opening angle:
EKS... .2 A01/A03: max. 135˚
EKS2... .2 A01: max. 105˚
EKS2….2 A03: max. 60˚

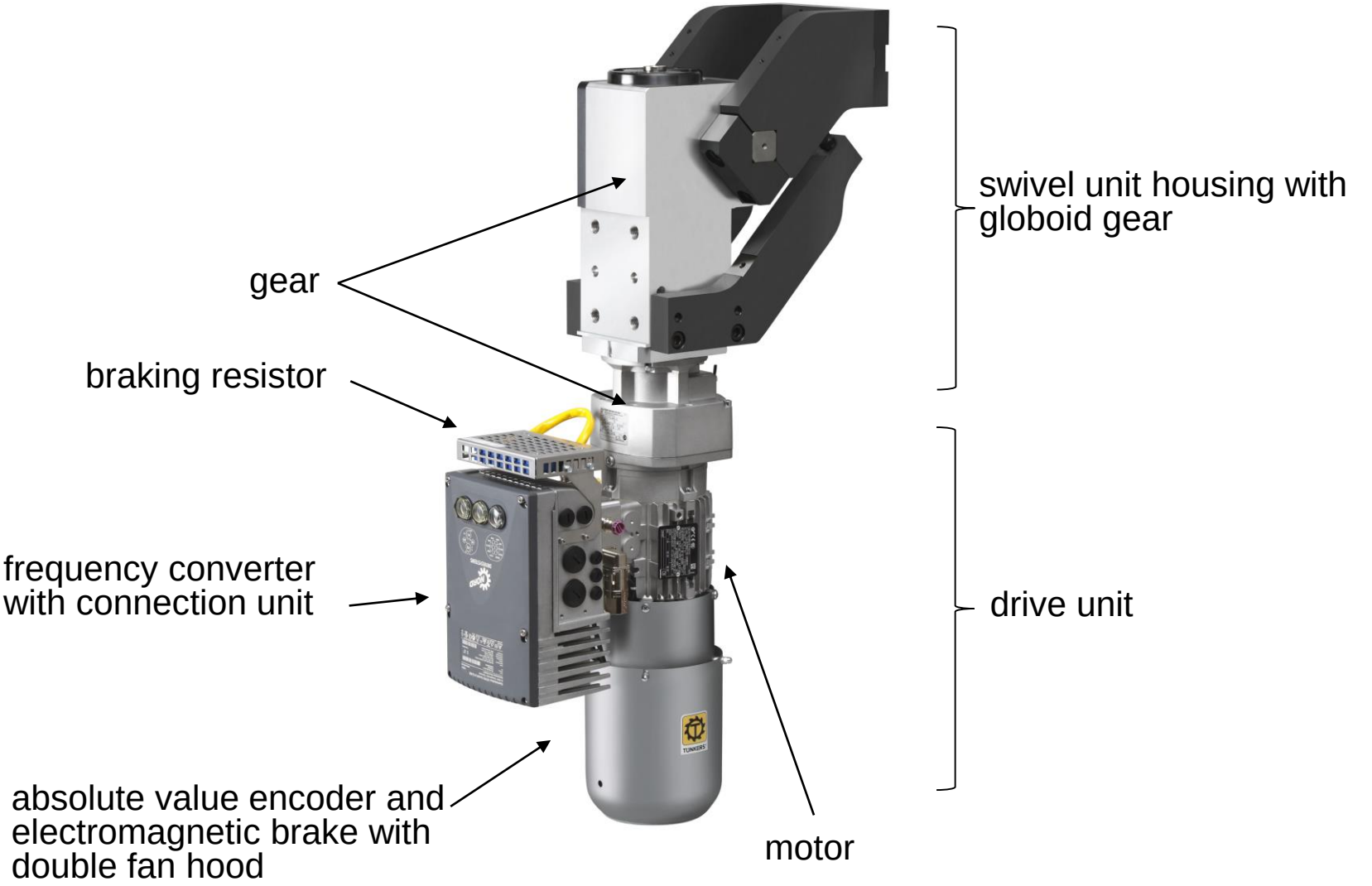
EGS – Elekctric Globoid Swivel unit

TÜNKERS
Erfindergeist serienmäßig.

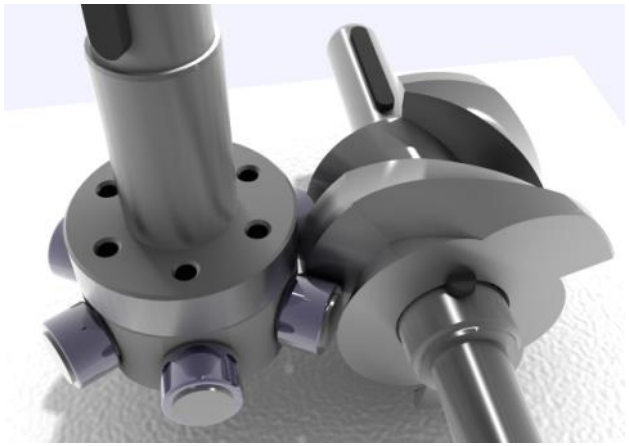
➢ Characteristics:

- Transmission of the swivel movement via a globoidal drive
- Utilization of EXPERT-TÜNKERS know-how of rotary tables and small gear boxes
- Power transmission via support rollers in needle bearings
- Cam mounted in eccentric bearing for backlash free drive bearing
- Compact design with compatible main dimensions to the TÜNKERS pneumatic series
- Integrated safety stop (STO) in the converter
- High emergency stop resistance
- Control via any established systems (Profibus, Profinet, etc.)
- Simple installation by using software modules
- 5 available motors (Tünkers, NORD, SEW, Lenze, Siemens)
- Service friendly due to pluggable drive and portable memory device that hosts the parameters

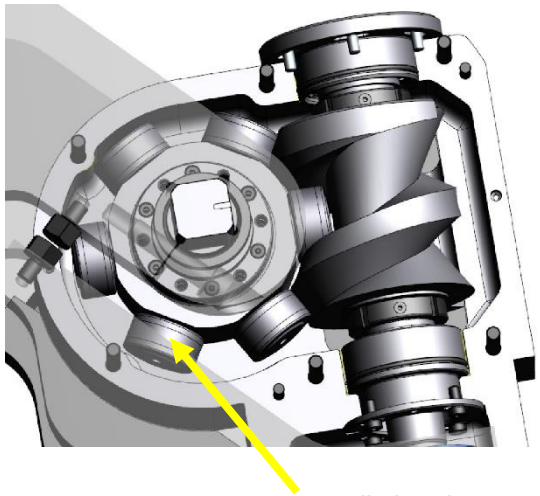
EGS - Assembling



EGS - Technical data



Approved basis: EXPERT-TÜNKERS globoidal drives



Needle bearing

	EGS 125	EGS 250	EGS 500
Torque	125 Nm	250 Nm	500 Nm
Lenght	710 mm	725 mm	743 mm
Weidth	167 mm	187 mm	216 mm
Depth	326 mm	363 mm	400,5 mm
Weight	27 kg	37kg	42 kg
max. pivot angle	> 360°	> 360°	> 360°

Comparison pneumatic to elektric swivel units
KS vs. EGS

1,5 years	Pneumatic swivel unit KS 200.5 BD	Electric swivel unit EGS 500	Comparison P with E
Investment	**8.272.000 €**	**9.155.000 €**	**+9,6%**
Operational cost	**449.429 €**	**22.646 €**	**-95,0%**
Energy consumption	*4.085.716*	*205.875*	
CO2-emission	*2.451.430*	*123.525*	
Sum operational+equipment costs	**8.721.429 €**	**9.177.646 €**	**+5,2%**

8 years	Pneumatic swivel unit KS 200.5 BD	Electric swivel unit EGS 500	Comparison P with E
Investment	**8.272.000 €**	**9.155.000 €**	**+9,6%**
Operational cost	**2.396.953 €**	**120.780 €**	**-95,0%**
Energy consumption	*21.790.485*	*1.098.000*	
CO2-emission	*13.074.291*	*658.800*	
Sum operational+equipment costs	**10.668.953 €**	**9.275.780 €**	**-13,1%**

Comparison pneumatic to elektric swivel units
KS vs. EGS

TÜNKERS
Erfindergeist serienmäßig.

135° opening angle	P	E	Pneumatic swivel KS 200.5 BD 135°		Electric swivel EGS 500 *	
			1 unit	1000 units	1 unit	1000 units
Energieverbrauch			[l]	[l]	[kWh]	[kWh]
Energieverbrauch (l bzw. kWh) (Zyklus) / Energy Consumption (l or kWh) (cycle)			82,00	82000,00	0,00055	0,5490
Energieverbrauch (0,13 kWh/m³) / Energy consumption (0,13 kWh/m³)	0,13		[kWh]	[kWh]	[kWh]	[kWh]
pro Tag (1.000 Zykl / Tag) / per day (1,000 cycles / day):	1000		10,90	10.895,24	0,55	549,00
pro 1,5 Jahr (375 Tage) / per 1,5 year (375 days):	375		4.086	4.085.716	205,88	205.875
Im Projekt (8 Jahre) / during the project term (8 years):	8		21.790	21.790.485	1.098	1.098.000
CO2-Emission (600 g/kWh) / CO2-emission (600 g/kWh)	600		[kg]	[kg]	[kg]	[kg]
pro 1,5 Jahr (375 Tage) / per 1,5 year (375 days):	375		2.451	2.451.430	123,5	123.525
Im Projekt (8 Jahre) / during the project term (8 years):	8		13.074	13.074.291	659	658.800
Betriebskosten (1,43 ct/m³ – 11 ct/kWh)	1,43	11	[€]	[€]	[€]	[€]
pro 1,5 Jahr (375 Tage) / per 1,5 year (375 days):	375		449,43 €	449.428,75 €	22,65 €	22.646,25 €
Im Projekt (x Jahre) / during the project term (x years):	8		2.396,95 €	2.396.953,34 €	120,78 €	120.780,00 €
Betriebsmittelkosten / equipment cost			[€]	[€]	[€]	[€]
Invest Spanner / cost clamp			7.773,00 €	7.773.000,00 €	8.684,00 €	8.684.000,00 €
Invest Ventilinsel - Schaltschrank für Schwenker / cost valve island - cartridge for swivel unit			499,00 €	499.000,00 €	471,00 €	471.000,00 €
Gesamte Investition			8.272,00 €	8.272.000,00 €	9.155,00 €	9.155.000,00 €
Summe Betriebskosten (1,5 Jahre) + Betriebsmittelkosten Sum operational costs (1,5 years) + equipment costs			**8.721,43 €**	**8.721.428,75 €**	**9.177,65 €**	**9.177.646,25 €**
Summe Betriebskosten (x Jahre) + Betriebsmittelkosten Sum operational costs (x years) + equipment costs			**10.668,95 €**	**10.668.953,34 €**	**9.275,78 €**	**9.275.780,00 €**

CO_2 emissions

Operational costs

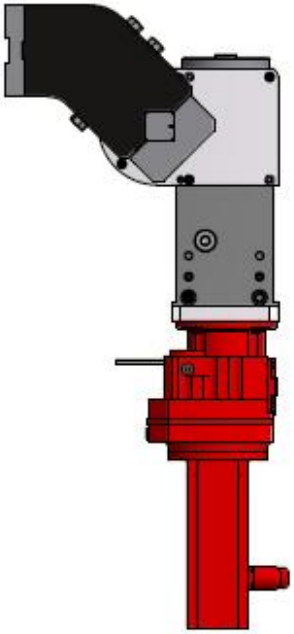
Investment

Sum costs

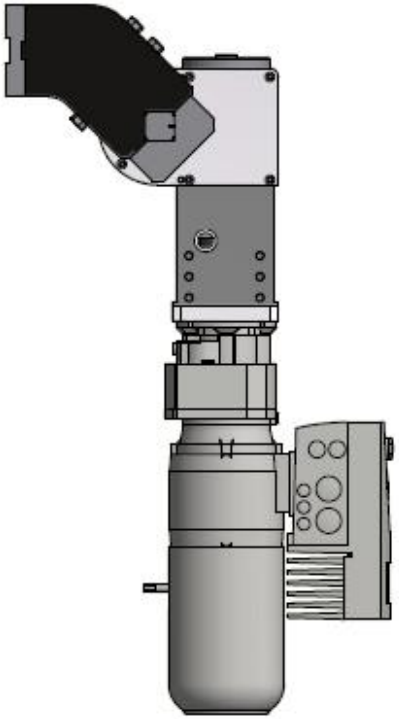
*For the test we used EGS 500 S A03 T80 with SEW motor with load 500Nm for 125 cycles

EGS - Available motors

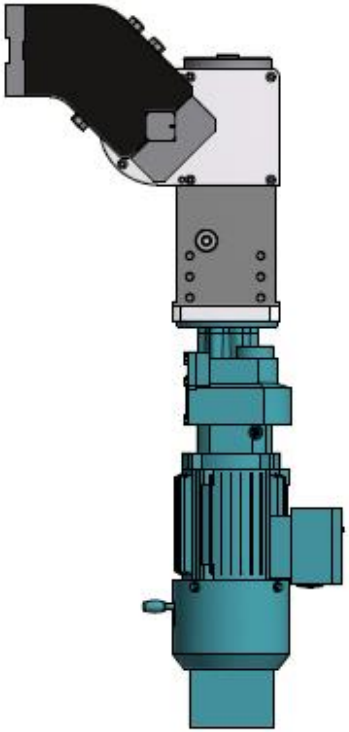
M03-Motor SEW



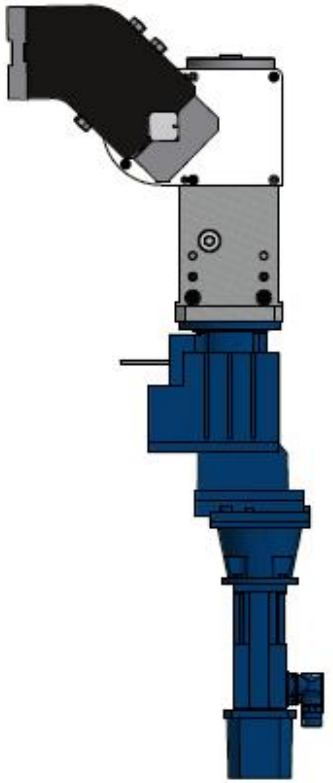
M01 - Motor Tünkers
M02 - Motor Nord



M04 - Motor Siemens

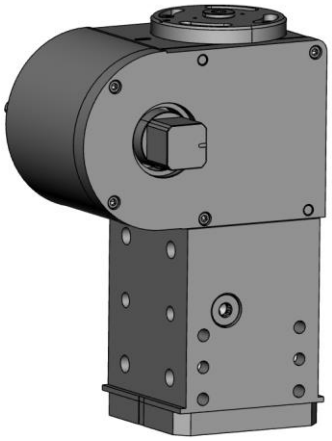


M07 - Motor Lenze



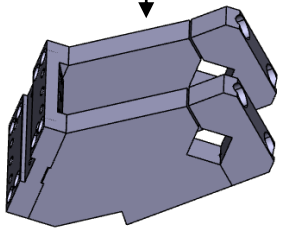
EGS - Ordering code

EGS…



Swivel unit
EGS 250
Size 125, 250, 500

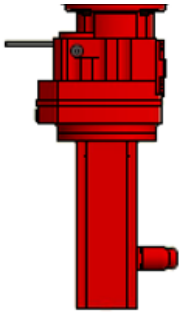
A01



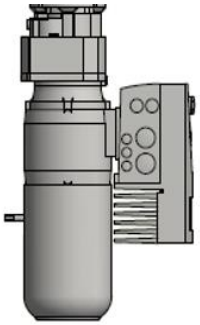
Swivel arm positions:
A01, standard
A03, swivel arm A01 mirrored

Opening angle:
no arm: >360˚
ERS... A01/A03: max. 180˚
ERS2... A01: max. 120˚
ERS2… A03: max. 90˚

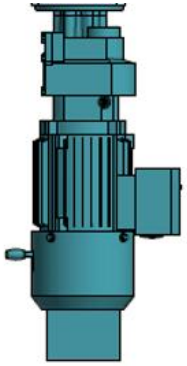
Motor



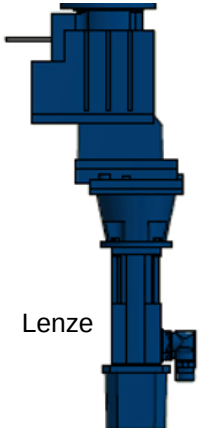
SEW



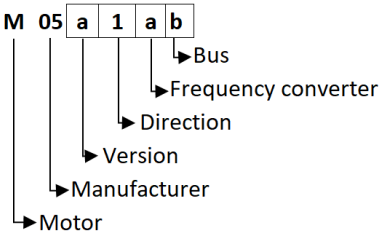
Tünkers/NORD



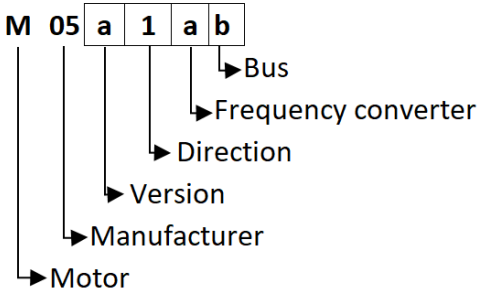
Siemens



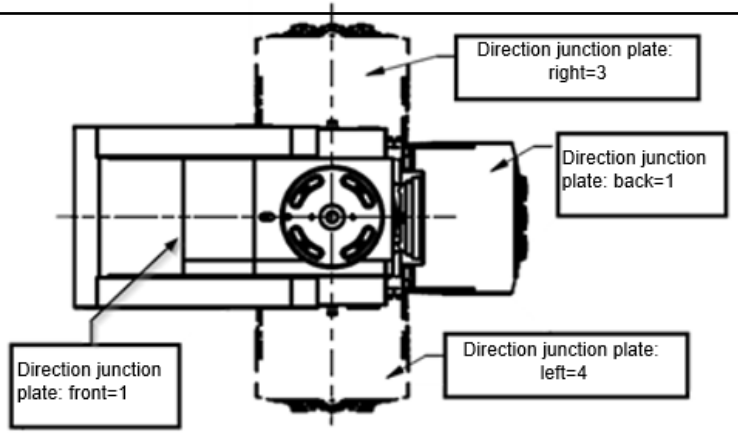
Lenze



EGS - Motor ordering code



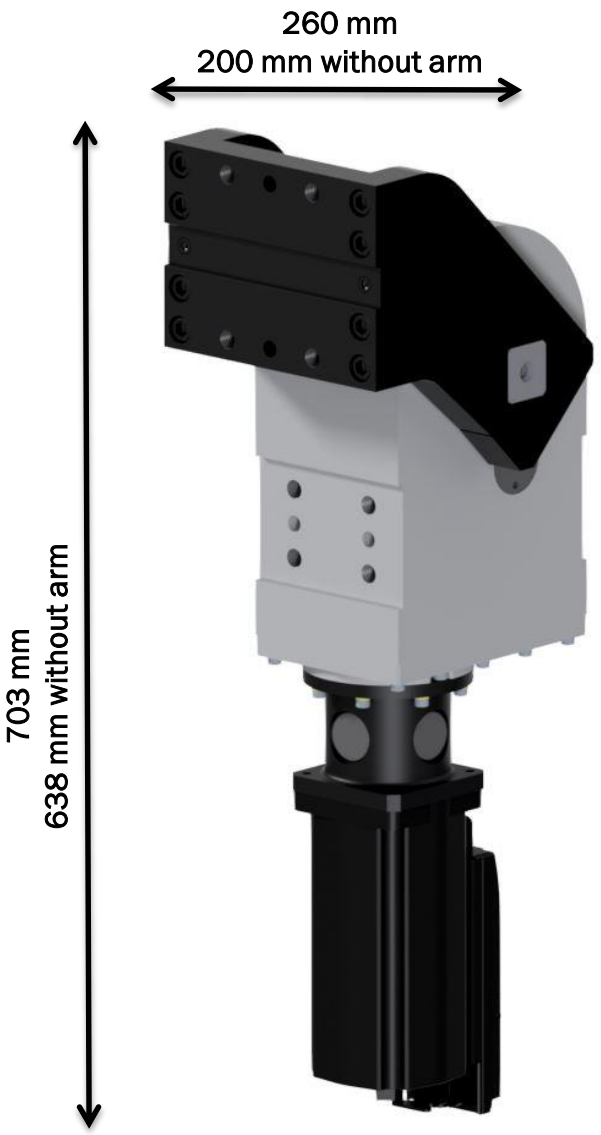
Manufacturer	Version	Direction Junction plate	Freq. Converter	Bus
00 no motor	a Standard	1 back	a without	a without
01 Tünkers	b	2 front	b installed	b Profinet
02 Nord	c	3 right	c remote workst.	c Ethernet/IP
03 SEW	d	4 left	d control cabinet	d Profibus
04 Siemens	e		e connected	e Devicenet
05 -----	f			f EtherCAT
06 -----	g			
07 Lenze	h			



ERS - Electrical gear set swivel unit

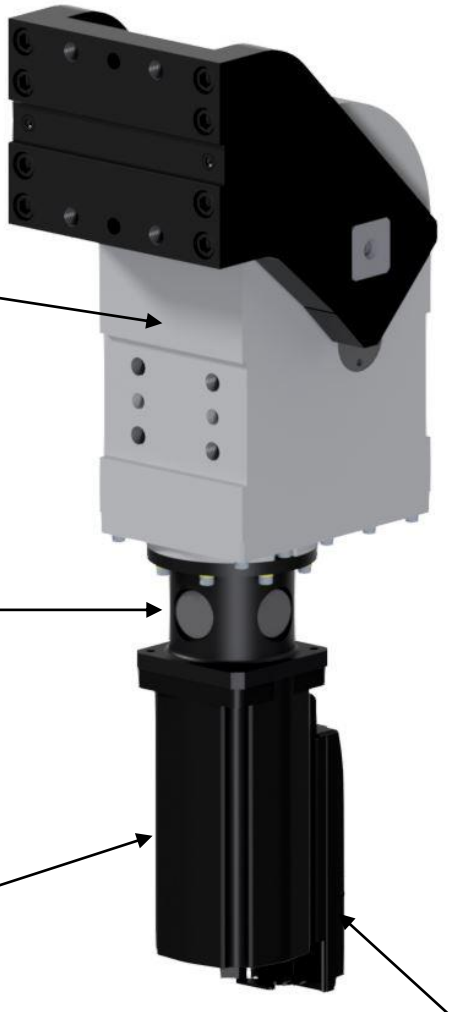
Characteristics:

- Electric dump unit in compact design
- Mechanical connections compatible with the pneumatic series
- Max. output torque 500 Nm
- Step angle of 135° moved in three seconds
- Decentralized control unit without cabinets
- Every mounting orientation possible
- Protection system IP65
- Integrated safety stop (STO) in the converter
- High emergency stop resistance
- Simple installation by using software modules
- Service friendly due to pluggable drive and portable memory device that hosts the parameters



ERS 500 M05
(Schneider)

ERS - Assembling



ERS - Technical data

Type	Max. permitted load torque ML max. (Nm)	Swivel time per 180° (s)
ERS 250	250	4
ERS 500	500	4

Motor data

Type	Motor-M_0 at n_B	Max. Torque	Nominal rotation speed	Nominal voltage	Protection system	Brake torque
ERS 500 **M03**	5,3 Nm	21,4 Nm	3000 U/min	400 V	IP65	24V / 7,1 Nm
ERS 500 **M05**	2,5 Nm	9,6 Nm	3000 U/min	250-700 V	IP54	5,5 Nm
ERS 500 **M06**	3,7 Nm	9,6 Nm	3400 U/min	350 V	IP65	24V / 6 Nm

Comparison pneumatic to elektric swivel units
KS vs. ERS

TÜNKERS
Erfindergeist serienmäßig.

1,5 years	Pneumatic swivel unit KS 200.5 BH	Electric swivel unit ERS 500	Comparison P with E
Investment	**8.272.000 €**	**8.971.000 €**	**+7,8%**
Operational cost	**449.429 €**	**34.238 €**	
Energy consumption	*4.085.716*	*311.250*	**-92,4%**
CO2-emission	*2.451.430*	*186.750*	
Sum operational+equipment costs	**8.721.429 €**	**9.005.238 €**	**+3,3%**

8 years	Pneumatic swivel unit KS 200.5 BH	Electric swivel unit ERS 500	Comparison P with E
Investment	**8.272.000 €**	**8.971.000 €**	**+7,8%**
Operational cost	**2.396.953 €**	**182.600 €**	
Energy consumption	*21.790.485*	*1.660.000*	**-92,4%**
CO2-emission	*13.074.291*	*996.000*	
Sum operational+equipment costs	**10.668.953 €**	**9.153.600 €**	**-14,2%**

Comparison pneumatic to elektric swivel units
KS vs. ERS

TÜNKERS
Erfindergeist serienmäßig.

135° opening angle	P	E	Pneumatic swivel KS 200 BH 135°		Electric swivel ERS 500	
			1 unit	1000 units	1 unit	1000 units
Energieverbrauch			[l]	[l]	[kWh]	[kWh]
Energieverbrauch (l bzw. kWh) (Zyklus) / Energy Consumption (l or kWh) (cycle)			82,00	82000,00	0,00083	0,8300
Energieverbrauch (0,13 kWh/m³) / Energy consumption (0,13 kWh/m³)	0,13		[kWh]	[kWh]	[kWh]	[kWh]
pro Tag (1.000 Zykl / Tag) / per day (1,000 cycles / day):	1000		10,90	10.895,24	0,83	830,00
pro 1,5 Jahr (375 Tage) / per 1,5 year (375 days):	375		4.086	4.085.716	311,25	311.250
Im Projekt (8 Jahre) / during the project term (8 years):	8		21.790	21.790.485	1.660	1.660.000
CO2-Emission (600 g/kWh) / CO2-emission (600 g/kWh)	600		[kg]	[kg]	[kg]	[kg]
pro 1,5 Jahr (375 Tage) / per 1,5 year (375 days):	375		2.451	2.451.430	186,8	186.750
Im Projekt (8 Jahre) / during the project term (8 years):	8		13.074	13.074.291	996	996.000
Betriebskosten (1,43 ct/m³ – 11 ct/kWh)	1,43	11	[€]	[€]	[€]	[€]
pro 1,5 Jahr (375 Tage) / per 1,5 year (375 days):	375		449,43 €	449.428,75 €	34,24 €	34.237,50 €
Im Projekt (x Jahre) / during the project term (x years):	8		2.396,95 €	2.396.953,34 €	182,60 €	182.600,00 €
Betriebsmittelkosten / equipment cost			[€]	[€]	[€]	[€]
Invest Spanner / cost clamp			7.773,00 €	7.773.000,00 €	8.500,00 €	8.500.000,00 €
Invest Ventilinsel - Schaltschrank für Schwenker / cost valve island - cartridge for swivel unit			499,00 €	499.000,00 €	471,00 €	471.000,00 €
Gesamte Investition			8.272,00 €	8.272.000,00 €	8.971,00 €	8.971.000,00 €
Summe Betriebskosten (1,5 Jahre) + Betriebsmittelkosten Sum operational costs (1,5 years) + equipment costs			**8.721,43 €**	**8.721.428,75 €**	**9.005,24 €**	**9.005.237,50 €**
Summe Betriebskosten (x Jahre) + Betriebsmittelkosten Sum operational costs (x years) + equipment costs			**10.668,95 €**	**10.668.953,34 €**	**9.153,60 €**	**9.153.600,00 €**

CO_2 emissions

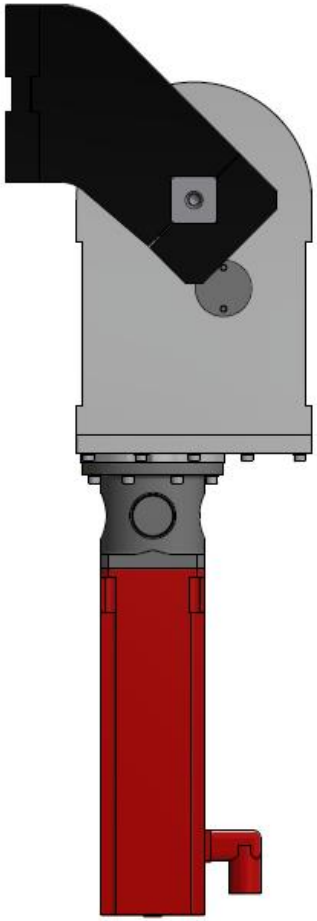
Operational costs

Investment

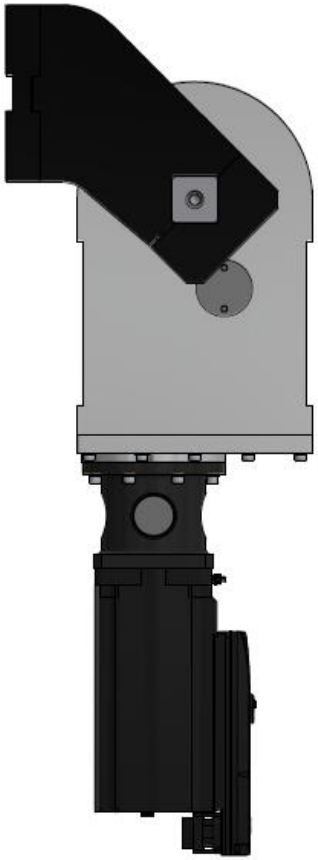
Sum costs

ERS 500 - Available motors

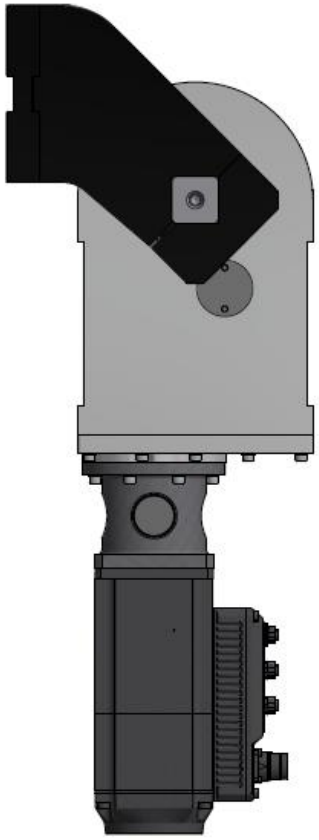
ERS 500 M03...
SEW motor



ERS 500 M05...
Schneider motor

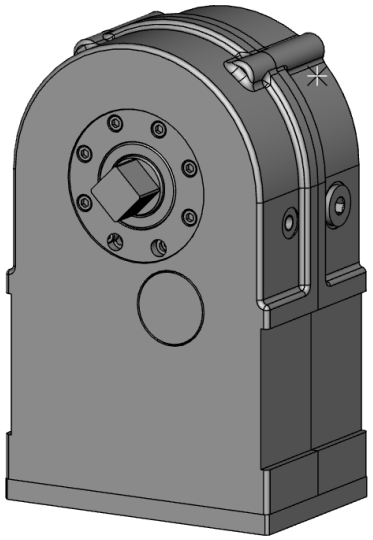


ERS 500 M06...
AMK motor



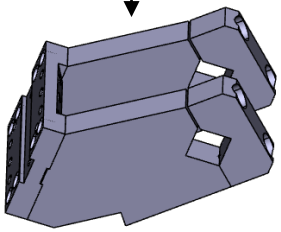
ERS - Ordering code

ERS…



Swivel unit
ERS 500
Size 250, 500

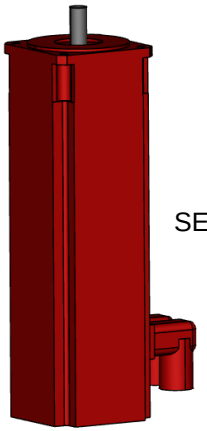
A01



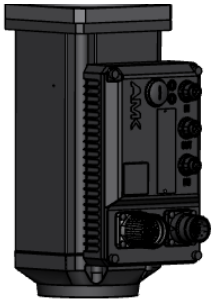
Swivel arm positions:
A01, standard
A03, swivel arm A01 mirrored

Opening angle:
no arm: >360°
ERS... A01/A03: max. 180°
ERS2... A01: max. 120°
ERS2… A03: max. 90°

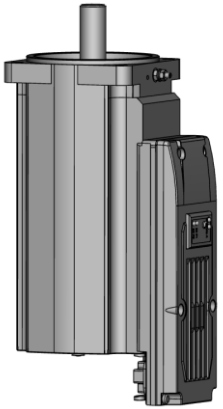
M..



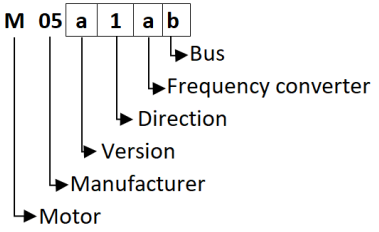
SEW



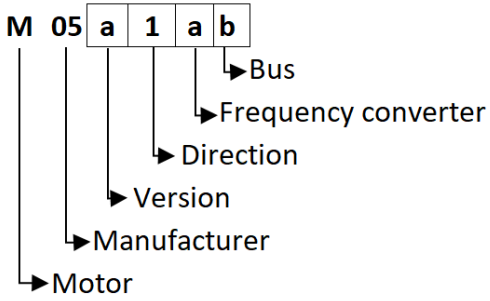
AMK



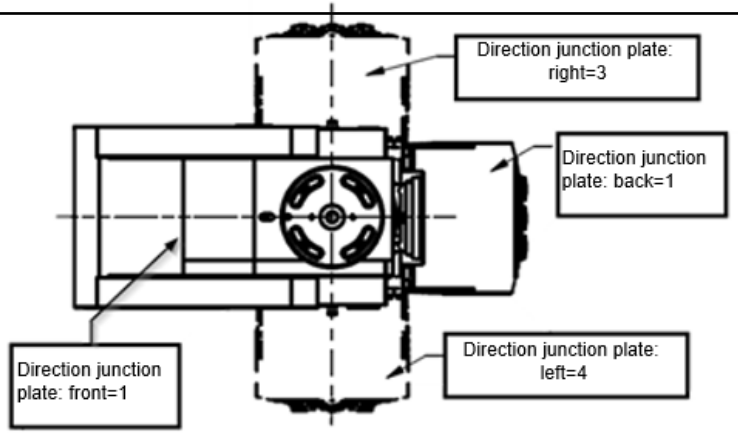
Schneider



ERS - Motor ordering code



Manufacturer	Version	Direction Junction plate	Freq. Converter	Bus
00 no motor	a Standard	1 back	a without	a without
01 ----	b	2 front	b installed	b Profinet
02 ----	c	3 right	c remote workst.	c Ethernet/IP
03 SEW	d	4 left	d control cabinet	d Profibus
04 ----	e		e connected	e Devicenet
05 Schneider	f			f EtherCAT
06 AMK	g			
07 ----	h			



Comparison of electric swivel units

TÜNKERS
Erfindergeist serienmäßig.

EKS	EGS	ERS
- Hollow shaft motor	+ Servo drive	+ Servo drive
• Motor brake	+ Motor brake (double brake possible)	• Motor brake
+ Toggle lock mechanism	• Globoidal index drive	+ Gear set
• Opening angle max. 135˚		+ Opening angle >360˚
- Position only in end position	+ Opening angle >360˚	+ Several working positions
• Max. output torque= 450 Nm	+ Several working positions	+ Max. output torque 500 Nm
	+ Max. output torque 500 Nm	
	+ Variety of motors (5 versions, expandable)	+ Variety of motors (3 versions, expandable)
- Defined Motor type	+ Replaceable motor	+ Replaceable motor
+ Exchangeable to KS series	- Motor orientation must be clarified	+ Free motor orientation
+ Swivel arm compatible to the KS series		+ Compact
		+ Pivot point in the middle
- Discontinued model		→ **Tünkers tip**

References

EKS	EGS	ERS
Series • BMW PL2 / E88 • BMW PL 6 / 7 • BMW PL7 / F15 • BMW V8.0 • Daimler C/A238 • Daimler MB-VS20 ATG TI • Fiat Magnetto • Porsche PO 623/G2 • Skoda SK26X Fabia • VOLVO SPA V54X • VOLVO SPA V526 • VOLVO XC 90 • VW 378/376 • VW 276 Overall 168 units (90 at Volvo)	**Series** • Porsche with SEW motor (2x since 2014) **Test** • Audi with SEW motor • Magna with Siemens motor • Ford with Tünkers motor (Double brake) • Daimler with Lenze motor	**Series** **Test** • BMW with AMK motor • VW with Schneider motor (but SEW is released for series)

TÜNKERS Erfindergeist serienmäßig.

Thank you for your attention

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