

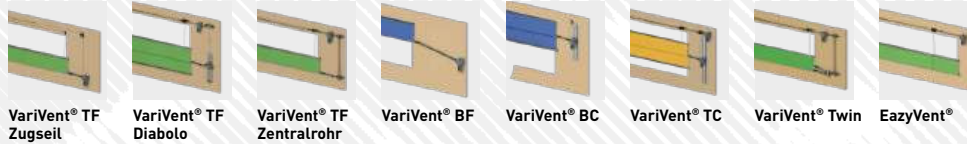


**PASSION  
TRUST  
RESPONSIBILITY  
SUCCESS.**



# Product matrix

## Systems



VariVent® TF Zugseil   VariVent® TF Diabolo   VariVent® TF Zentralrohr   VariVent® BF   VariVent® BC   VariVent® TC   VariVent® Twin   EazyVent®

## Power drives



EWA 50   EWA 52   EWA 12   EWA 14   EWA 16   LSC 40.10: LPR 02, LPR 04   PAR 06 PAR 10   EZW 64   RMA 20

## LockLogic®



SpeedLogic   TurboLogic   ESS 40

## Couplings



GKT 01   GKT 04   GKT 06   GKN 01 + 04 GKA 01 + 06   WRA 50 WRA 63   SKS 66 SKS 68   KKS 10 + 14 KKS 11 + 15   BKS 45

## Control units



LSR 35   LSR 25   WST 15   RST 65   EHS 01 EHS 02   TST 10 + 14 TST 20   EazyPower

## Manual drives



HZW 55   HZW 53   HZW 45   HZW 60   HWA 40 HWA 42   HWA 53   HKG 06

## Rack & pinion units



ZSG 15   ZSG 20   AZD 05   EZD 51 EZD 52   LZG 20   LZG 24   SZG 35

## Gear units

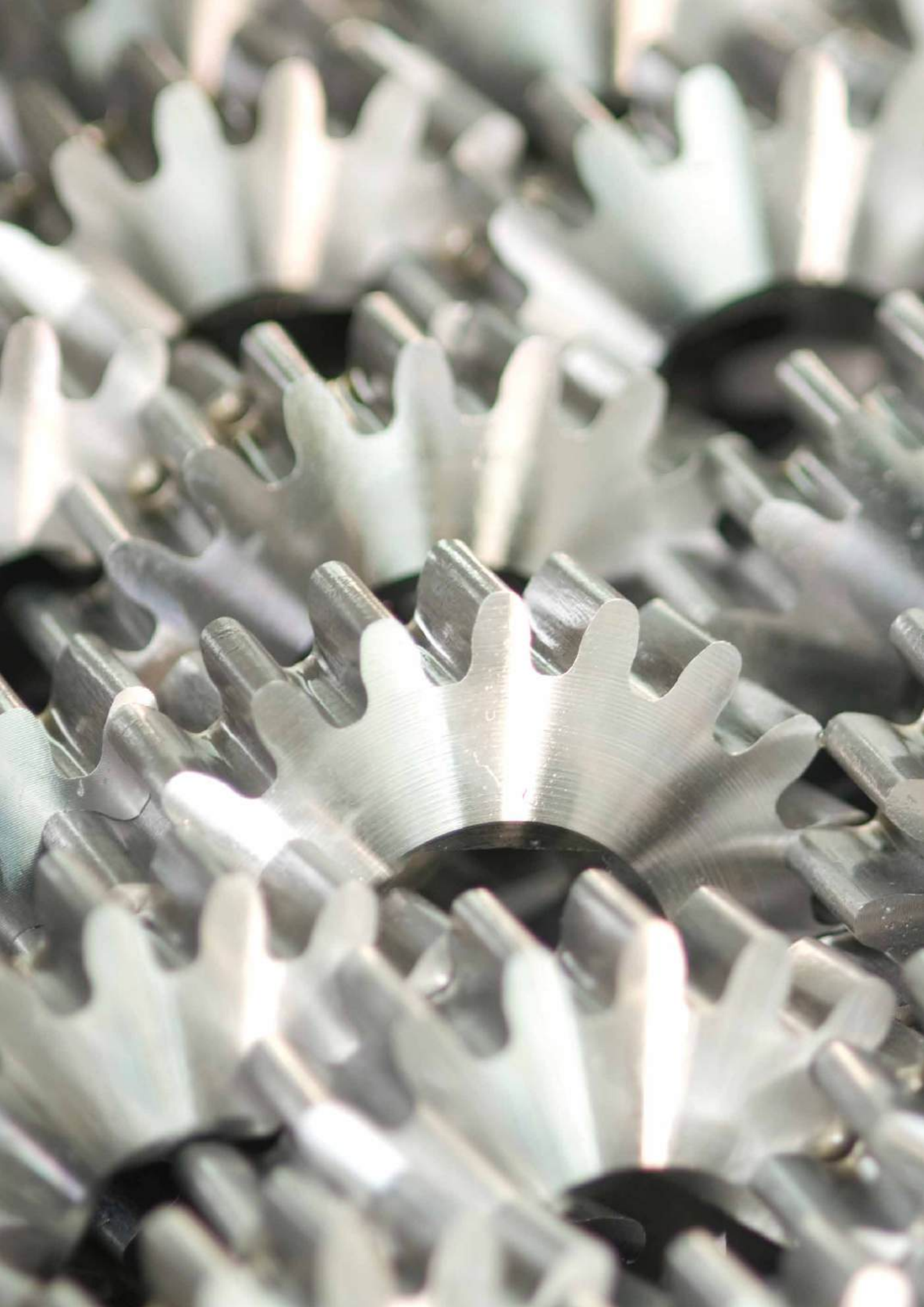


SGS 80   VRE 30   VRE 20 VRE 26   VRE 73 + 75 VRE 76   USG 10 USG 15   KGO 31 KGO 32   KRG 23

## Accessories



ALD 11 + 15 ELD 12 + 16   KLG 35   MPL 22 MPL 32   MPL 42 MPL 46   MPL 56 MPL 58   ATR 06   STR 12   STR 22   STR 41 + 43 STR 45   WR0 22 WRV 50   WRZ 01 WRZ 02   WRZ 10   WRZ 30   ARV 60   HKU 01 HKU 02   LUB 20 + 50 LUB 73







LOCK BEWEGT // LOCK MOVES

# Applications

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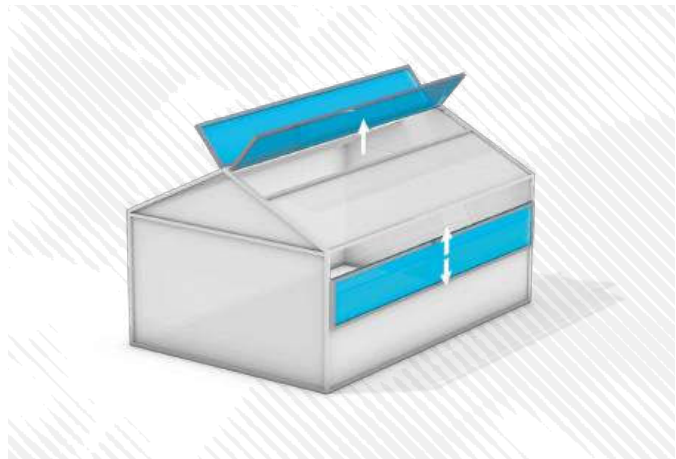
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# Ventilation types for continuous system

Here we illustrate different types of ventilation, of the kind found on buildings, animal sheds or greenhouses.

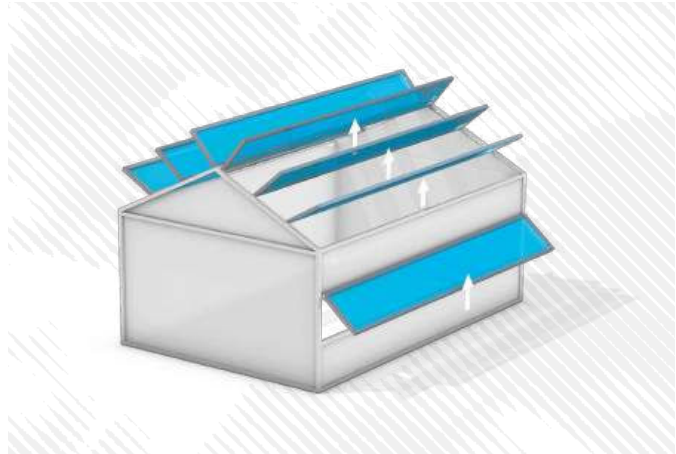
## Butterfly ventilation

- On industrial premises, buildings, sheds, greenhouses and similar constructions, one drive system can open up continuous ventilation down either side of the roof.
- With side ventilation, one drive unit opens a full-length raising-lowering ventilation system or one ventilation flap.
- Here you will find the ZSG, AZD and EZD ranges of rack & pinion units in operation.



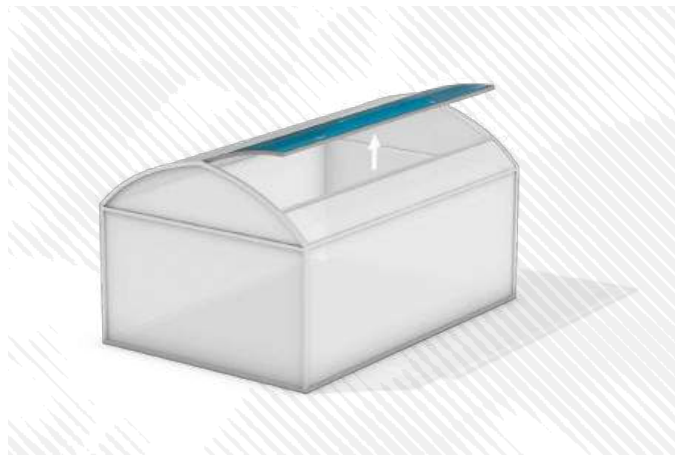
## Open-Roof ventilation

- Entire roof can be opened (Open-Roof type C), see page 4.
- With roof ventilation, a drive system opens full-length ventilation flaps down both sides of the roof. The drive unit powers several reversing gear units.
- With side ventilation, one drive opens full-length raising-lowering ventilation or a ventilation flap.
- These are typical applications for the ZSG, AZD and EZD ranges of rack drives.



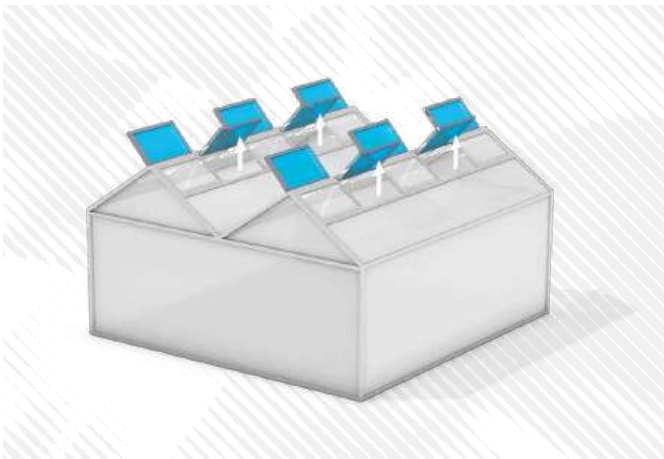
## Multitunnel ventilation

- With roof ventilation, one drive system opens a full-length ventilation flap.
- These are typical applications for the ZSG, AZD and EZD ranges of rack drives.
- By linking up reversible gear units in series, several tunnels ('multitunnels') can be operated.



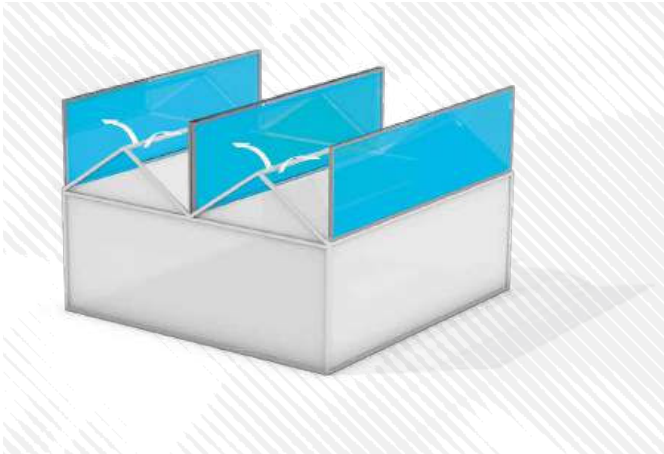
# Ventilation types for Venlo greenhouses

On this page, we illustrate special-purpose ventilation systems that are used for the Venlo design of Dutch greenhouse.



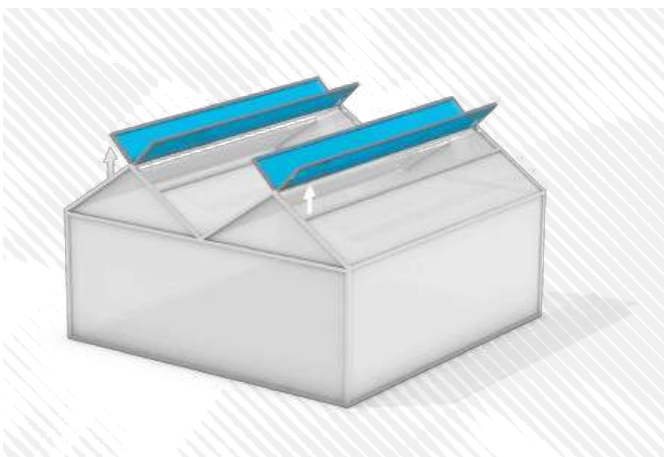
## Flaps ventilation

- Here one drive unit on each side of the roof opens several individual ventilation flaps down the primary longitudinal roof beam, as well as flaps in the adjacent sections.
- This is where you will find the LZG range of gear units in operation, in rail ventilation applications, and the UBL range at work in swing ventilation applications.



## Open-Roof ventilation

- Type A as a continuous system with central ventilation tube under the primary roof ridge: this is where the ZSG, AZD and EZD ranges of rack drives are used.
- Type B with push-rod system: this is where the LZG / UBL ranges of rack & pinion unit are used.
- Please note our notes for Open-Roof ventilation systems, see page 4.



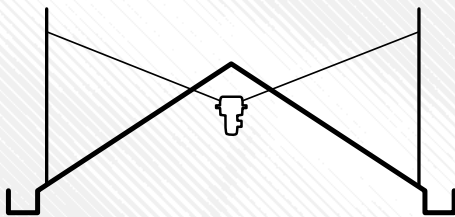
## Full-length ventilation

- On each side of the roof, a ventilation flap opens along the line of the primary roof ridge. A drive system opens several flaps on adjacent sections of the greenhouse.
- Here, systems are used with in top of the other as well as adjacent parallel push-rod systems with LZG / UBL rack & pinion units.

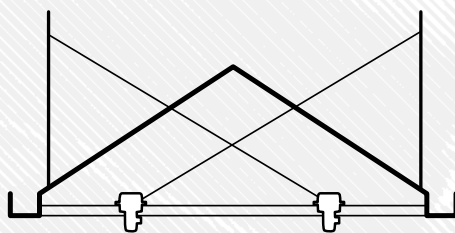
# Ventilation types for Open-Roof systems



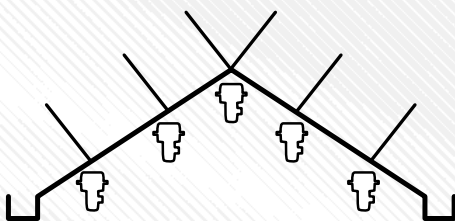
Example of Open-Roof ventilation with Type A



Type A



Type B



Type C

With Open-Roof systems, the roof can be opened almost completely to assure maximum ventilation. With our versatile selection of options for drive units and rack & pinion units, we are able to provide a solution to all Open-Roof variants. The mechanism can be a continuous system (Types A + C) or a push-rod system (Type B).

The distinguishing features of the three most commonly used type of Open-Roof ventilation system (Types A – C) are itemized below:

## Open-Roof ventilation – Type A as continuous system

- Drive provided by a ventilation shaft centrally arranged under primary roof ridge.
- Both sides of roof are moved simultaneously by one drive unit.
- EWA power drives are used with 1–9 rpm.
- In conjunction with the ZSG, AZD and EZD ranges of rack & pinion units, optimum closing times can be achieved.

## Open-Roof ventilation – Type B as push-rod system

- Drive delivered by a push-rod system arranged on the rail mountings (see Fig. on p. 18).
- Each side of the roof is moved by its own drive unit.
- The drive units employed are our high-speed EWA power drives, our tried and tested SpeedLogic or our TurboLogic systems.
- In conjunction with the LZG / UBL ranges of rack & pinion units, optimum closing speeds can be achieved.

## Open-Roof ventilation – Type C as continuous system

- Arrangement of full-length ventilation flaps, same principle as on wide-span greenhouses.
- The EWA power drive operating at 1–9 rpm is used here. In conjunction with our ZSG, AZD and EZD ranges of rack & pinion units, you obtain an optimum ventilation system.
- With our reversing gear units, several ventilation flaps can also be grouped together to form a system.



## Continuous system for roof ventilation



→ Continuous system for roof ventilation with ZSG gear unit.



→ Continuous roof ventilation system with AZD gear unit.

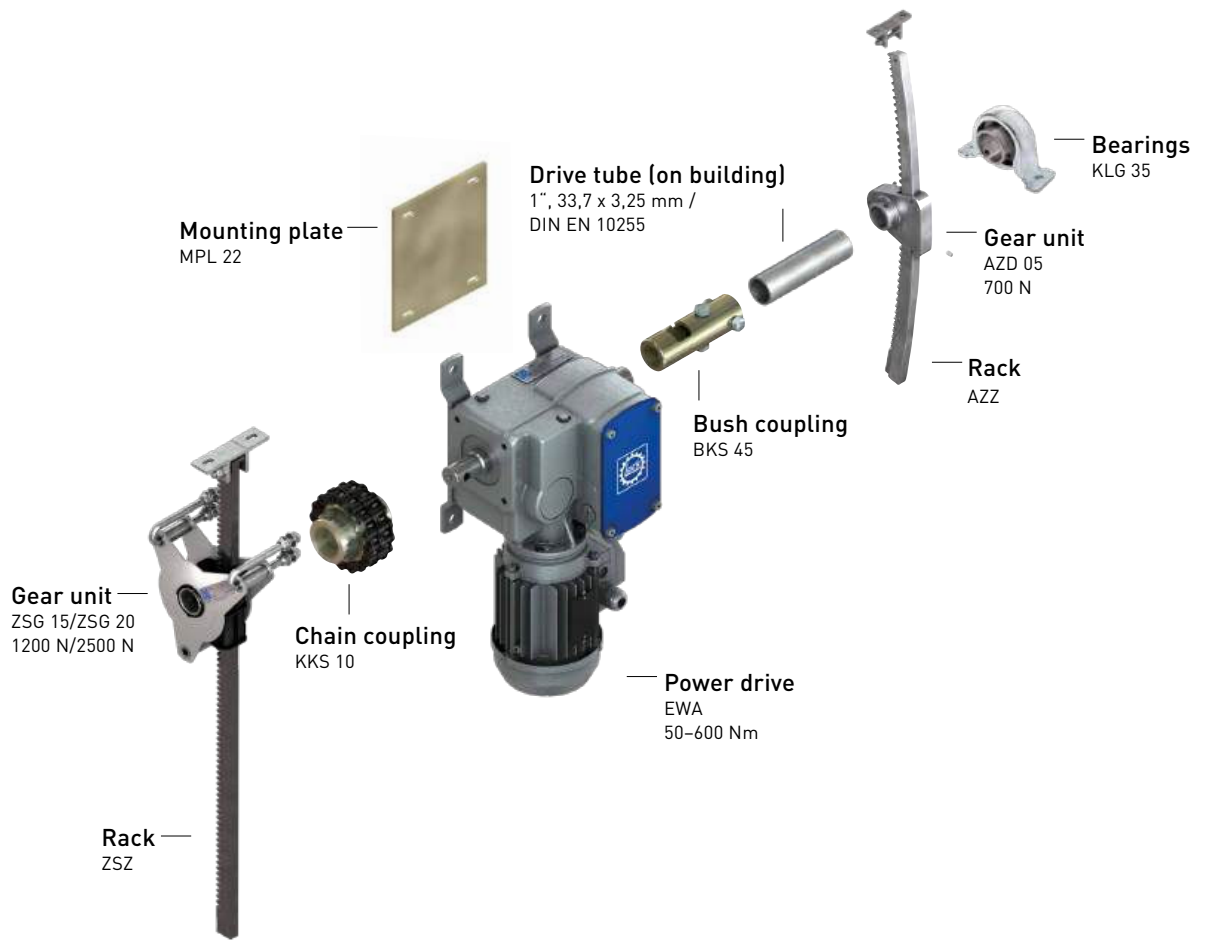
Ventilation flaps arranged in a line can be operated by a single drive unit. One or more racks are connected to the drive unit by a connecting shaft, a 1" tube compliant with DIN EN 10255. The racks pivot with the flap.

- Up to 600 Nm of drive power can be fed into the system.
- Strokes of up to 1800 mm and loadings of up to 2500 N per continuous rack, with longer strokes or higher loads available on request.
- Integrated swivel bearing with the ZSG range, with gear units mounted directly to the roof construction. The connecting shaft is guided through the gear unit.
- External swivel bearing on the AZD/EZD ranges.

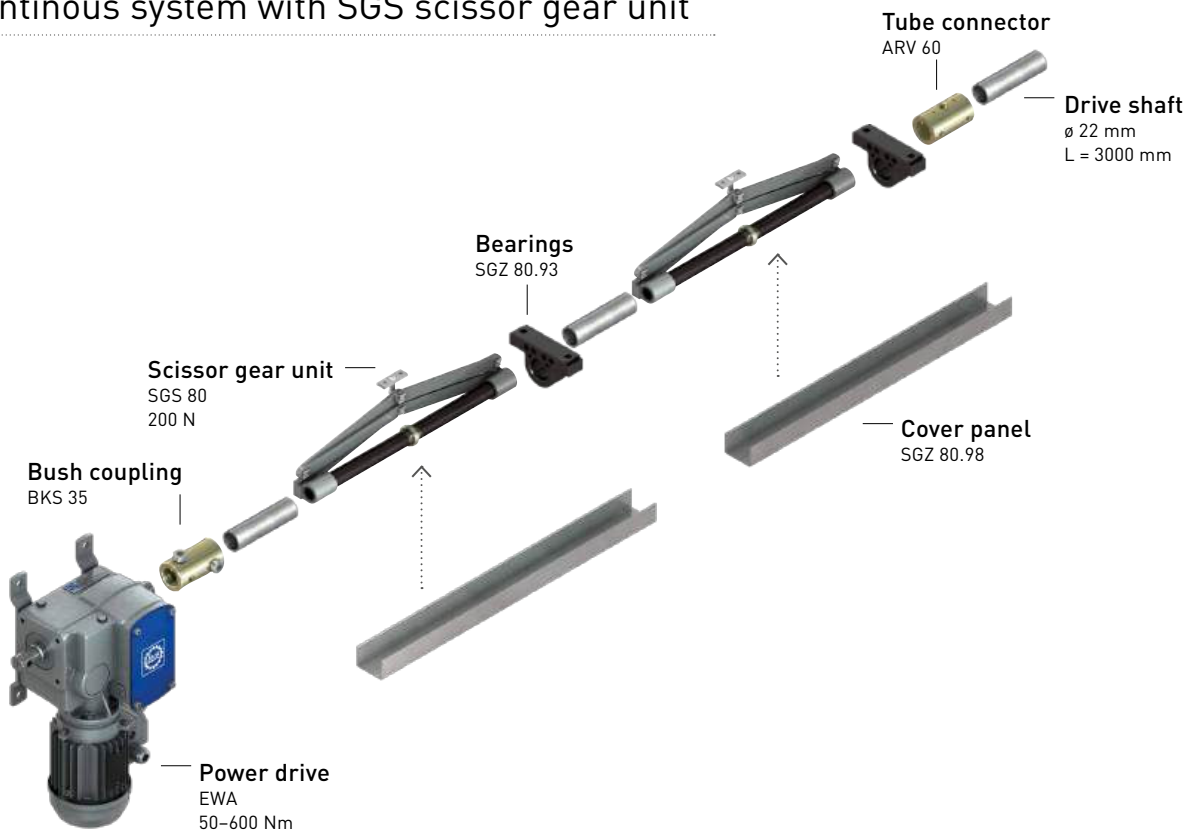
Alternatively with scissor gear unit SGS. For use when rack cannot be located in room, and for low load ratings (e.g. conservatories).



→ Take a look at the video animation on our website.



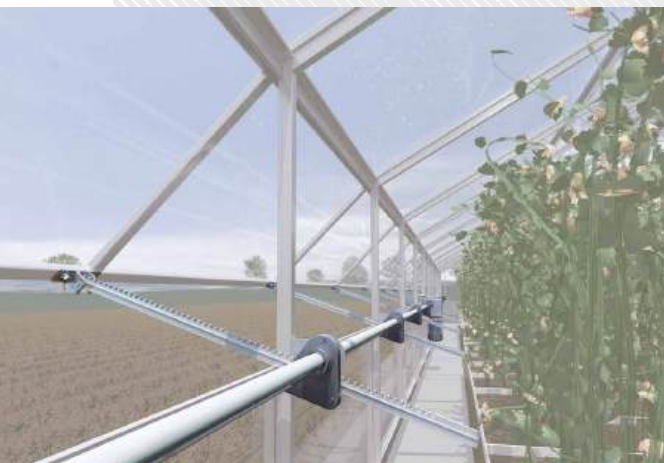
### Continuous system with SGS scissor gear unit



## Continuous system for side ventilation



→ Continuous system side ventilation with AZD gear unit, curved rack.



→ Continuous system side ventilation with AZD gear unit, straight rack.

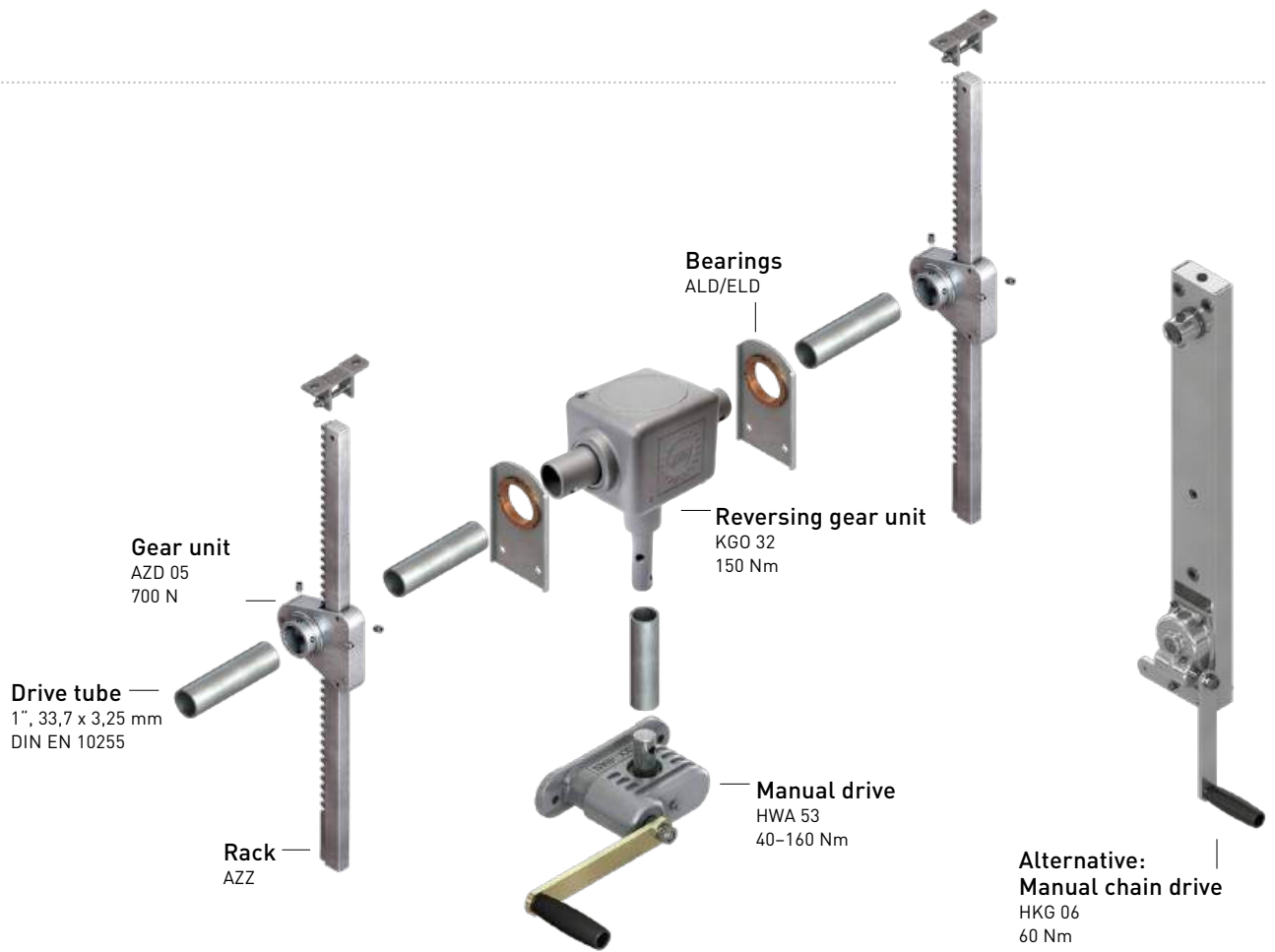


→ Take a look at the video animation on our website.

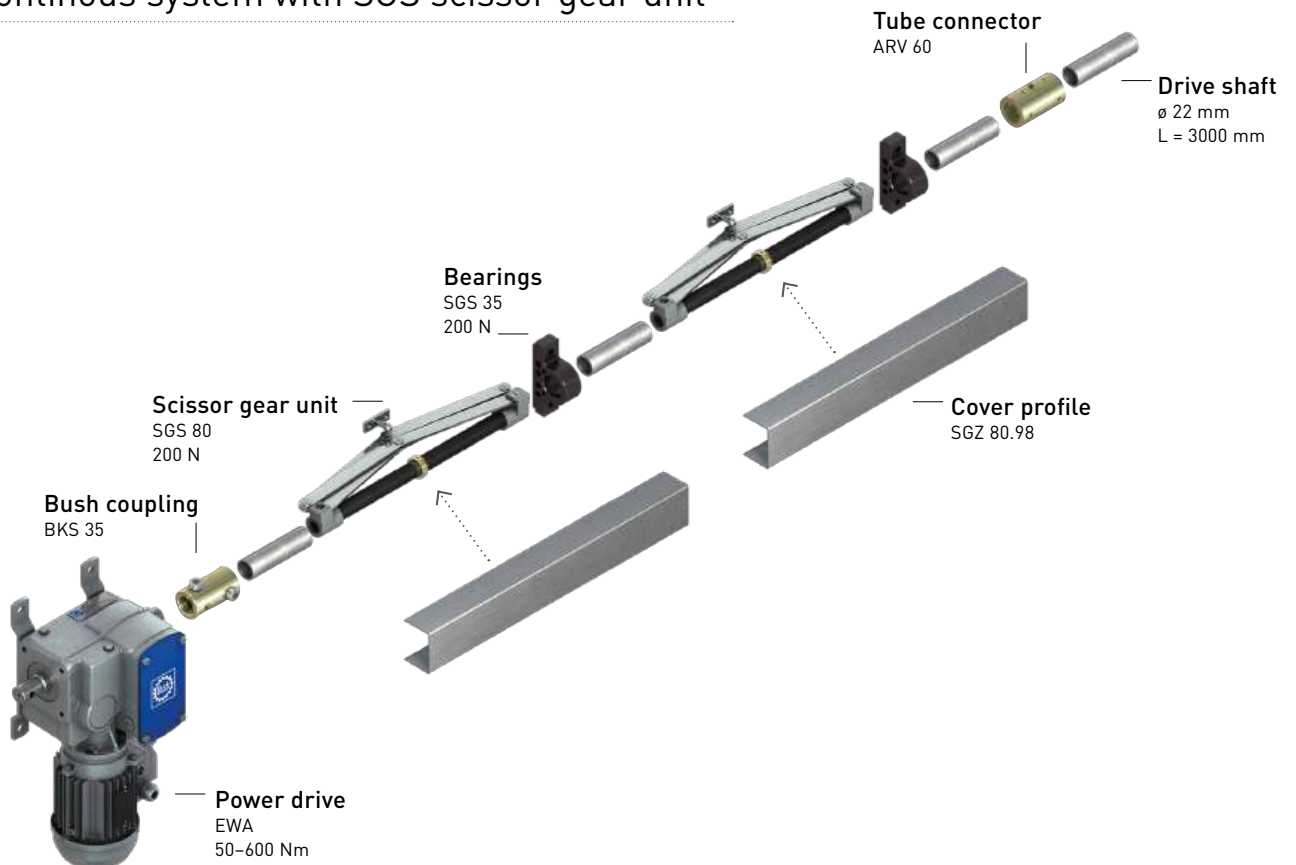
Ventilation flaps arranged in a line can be operated by a single drive unit. One or more racks are connected by the drive unit to a 1" tubular connection shaft compliant with DIN EN 10255. The racks pivot with the flap.

- Up to 600 Nm of input power can be introduced to the system.
- Strokes of up to 1800 mm and load ratings of up to 700 N per continuous rack, with longer strokes or higher load ratings available on request.
- External swivel bearing on the AZD/ EZD product ranges.

Alternatively with scissor gear unit SGS. For use when rack cannot be located in room, and for low load ratings (e.g. conservatories).



### Continuous system with SGS scissor gear unit



## Continuous system for side ventilation



→ Continuous system side ventilation with lowering flaps.




→ Continuous system side ventilation with lowering tarpaulin.

Ventilation systems with lowering flaps or tarpaulin can be operated with one drive unit. An EWA power drive or an HWA manual drive can be used.

- Actuation using EWA power drive or HWA manual drive. If ventilation shafts are located higher (HL → 1.50 m), with HKG manual chain drive.
- With STR cable drums or pulleys.



→ Take a look at the video animation on our website.



## Manfred Bausch // Engineering

“We offer you a complete drive solution for a vast array of requirements, e.g. we can bend racks for ventilation flaps individually to suit your wishes to prevent them from interfering when in closed position. With a CAD program, we can simulate the entire linear characteristics of the interference contour.”



## Continuous system group ventilation

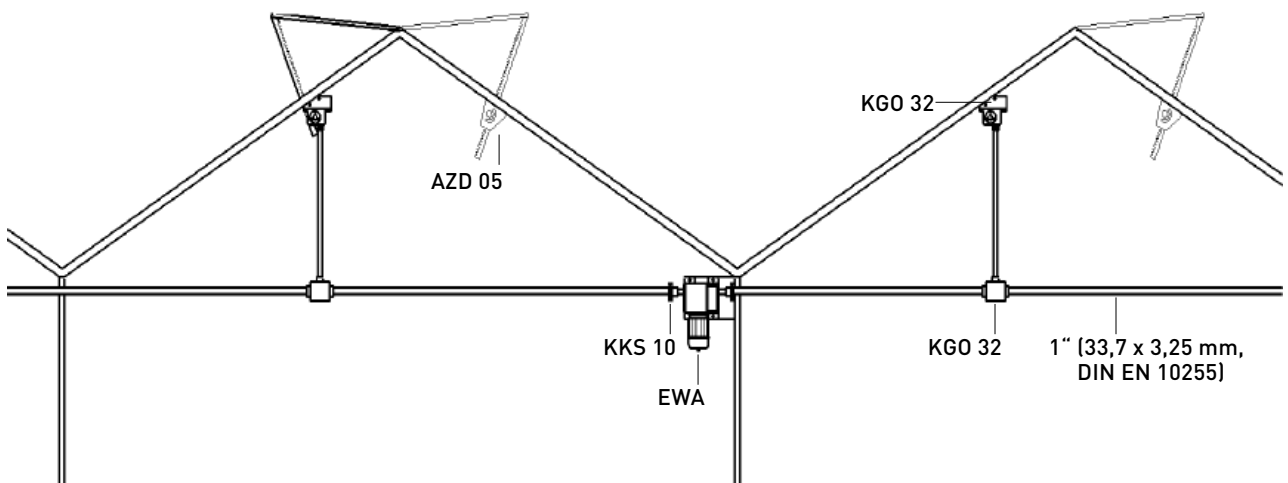
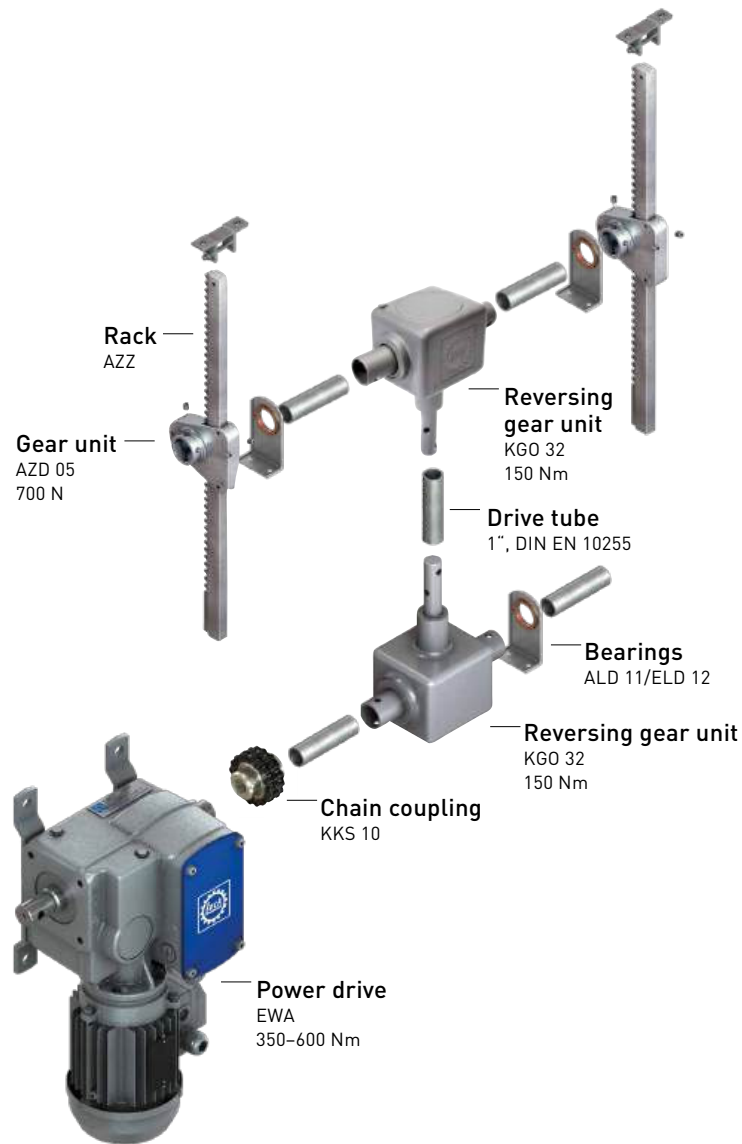


→ Continuous system group ventilation, several individual ventilation systems are grouped together with reversing gear units to form a unit with one power drive.

To ventilate multi-section greenhouses with EWA power drive and AZD / EZD racks. The KGO gear unit assures continuous connection of individual ventilation systems. Can be used in up to five sections of a greenhouse.

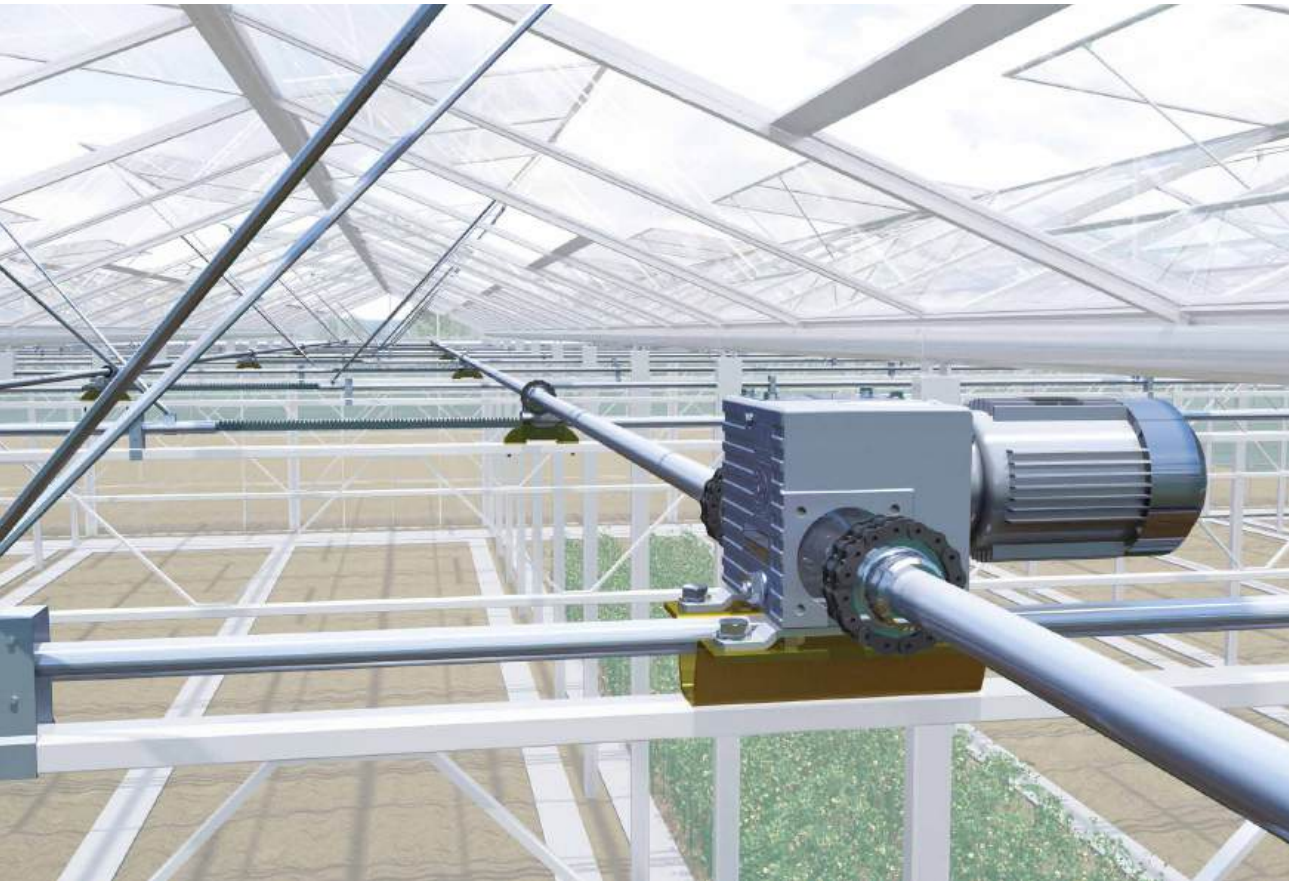
Up to 600 Nm of input power can be introduced to the system, i.e. up to 150 Nm per section.

- Strokes of up to 1800 mm and loadings of up to 700 N per continuous rack, with longer strokes or higher loads available on request.
- External swivel bearing with product ranges AZD / EZD, and the gear units are located close to the roof structure. They are held in position on the building by external bearings on the connecting shaft.



## Push-rod system for rail ventilation

### Rail mounting configuration

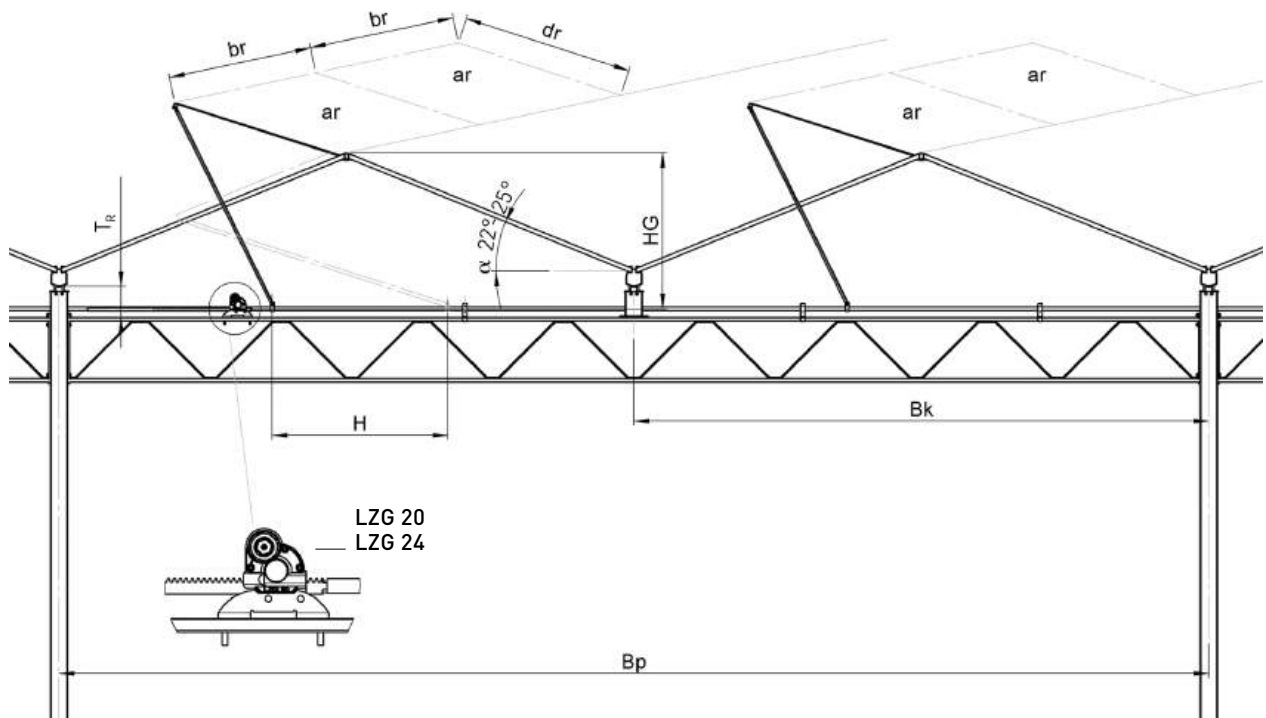
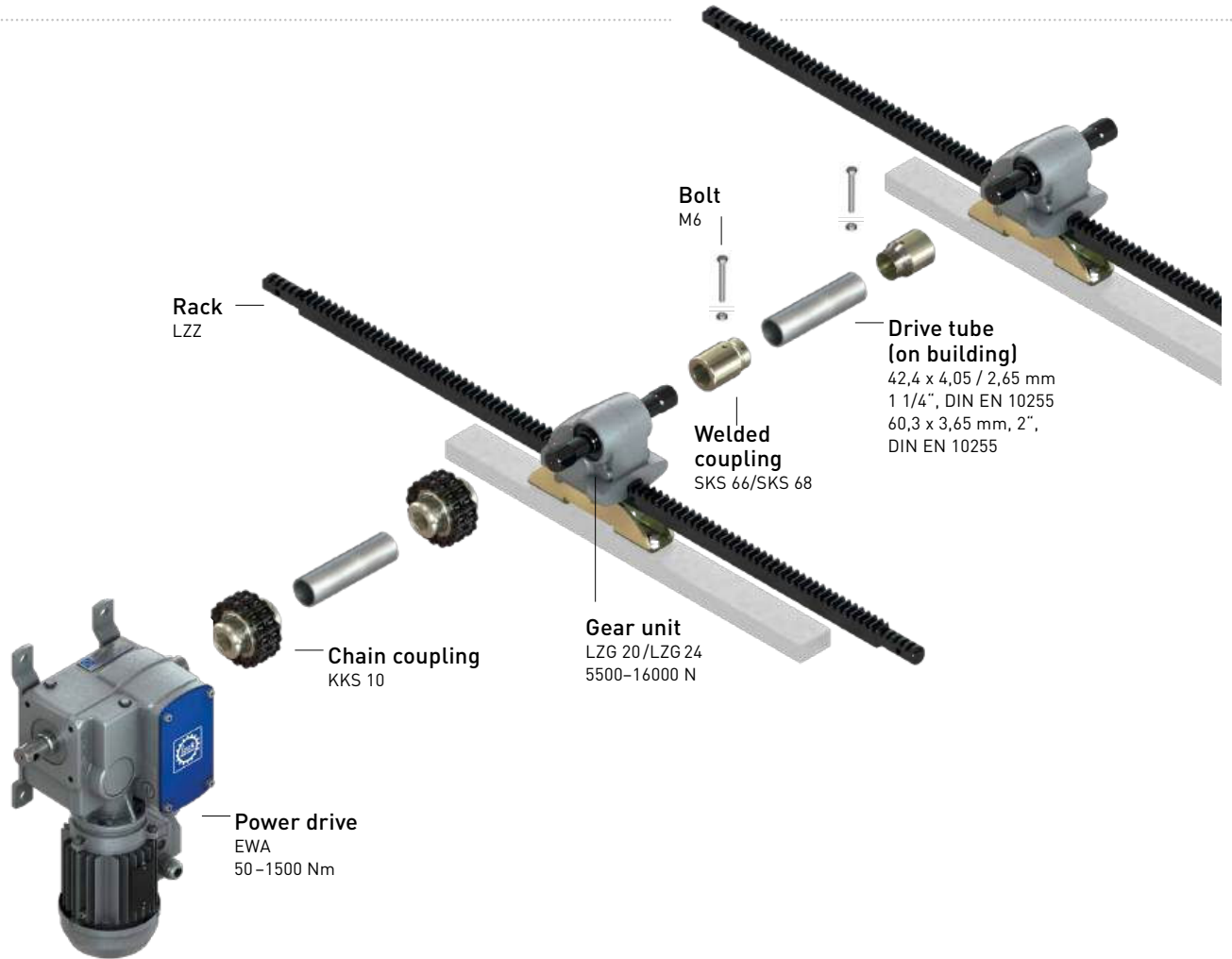


→ Rail ventilation with EWA power drive and LZG located on the rail mounting.

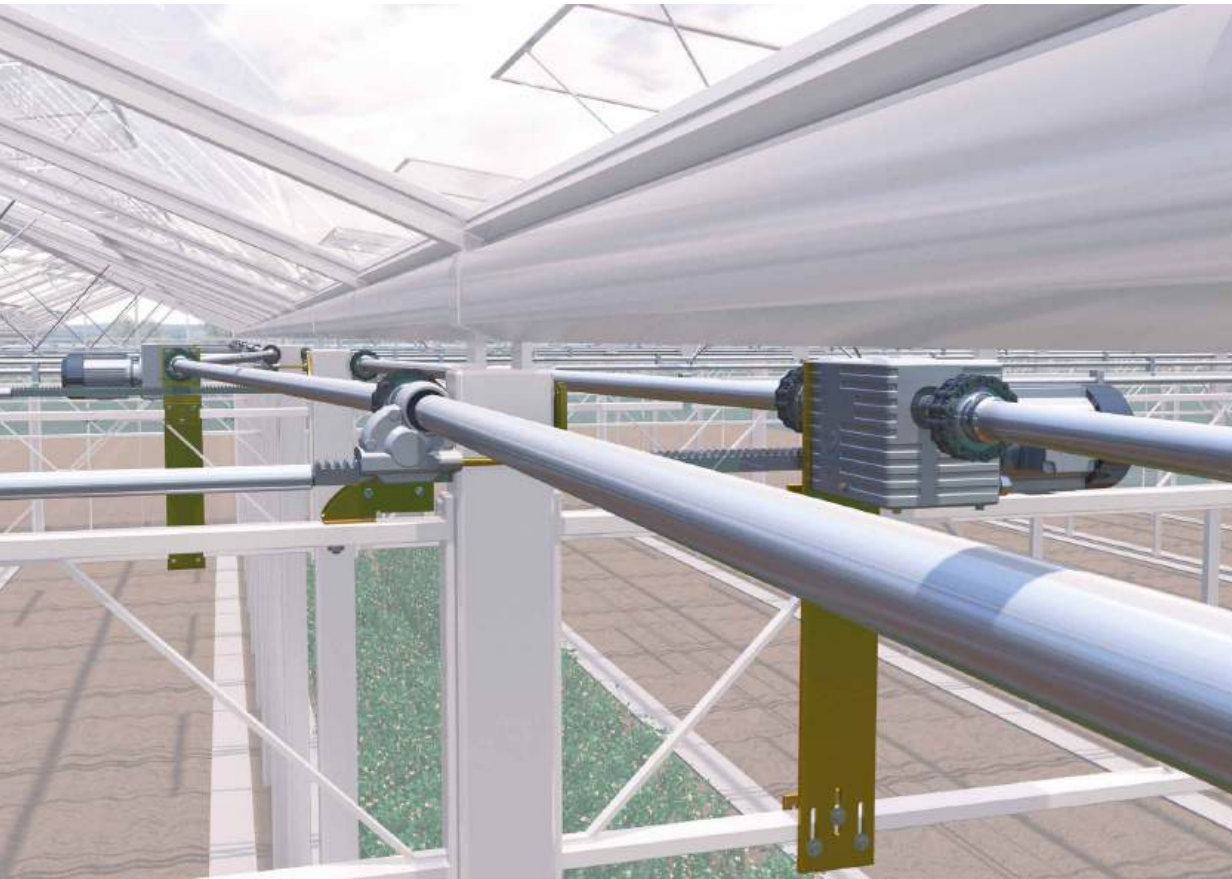
Ventilation flaps arranged across a surface area (several individual or one continuous flap) can be operated by one drive unit on each side. On the rail mountings, LZG gear units are connected to the drive unit by means of a connecting shaft (1 1/4" tube – 2" tube DIN EN 10255).

The racks move the pull-push rod along the rail mounting and the flap push bar are located on this rod. It is these push bar that actuate the flaps.

- Up to 40 flaps down the length of each rail mounting, depending on flaps weight.
- Up to 1500 Nm of drive power can be fed into the system.
- Load ratings of up to 16000 N per rack unit, and longer strokes or higher load ratings available on request.
- LZG gear units with various rack heights (Hzd).



## Push-rod system for rail ventilation Support mounting

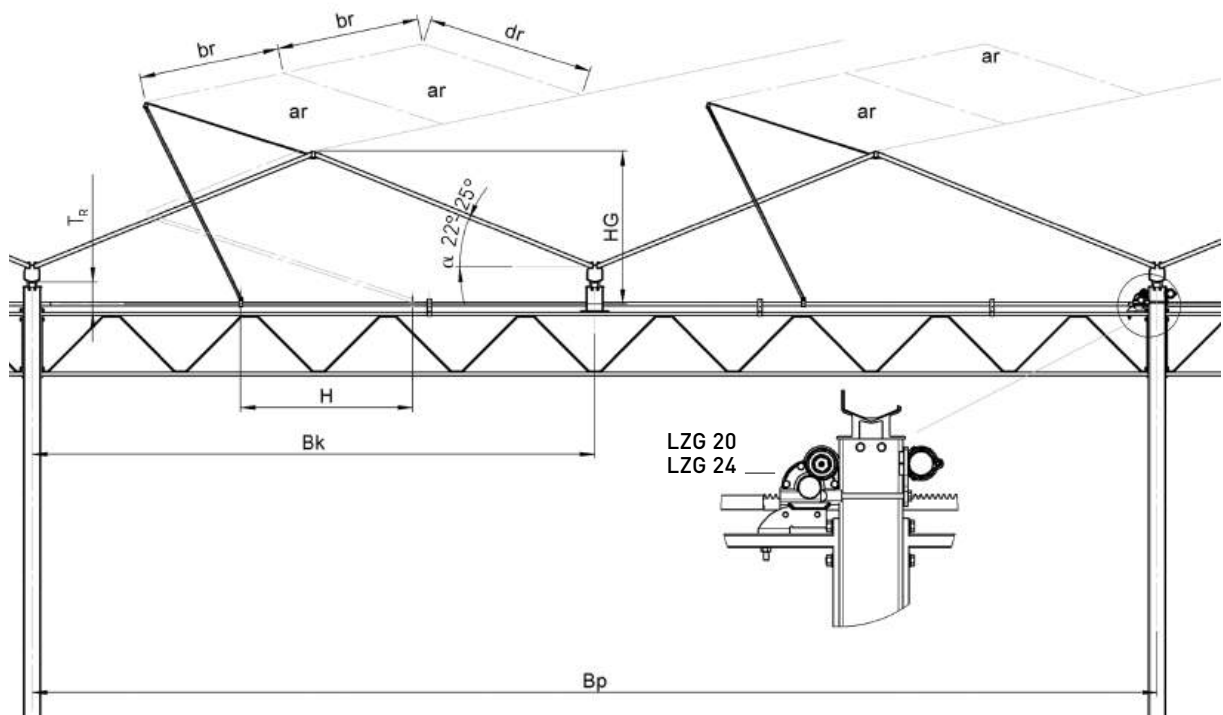
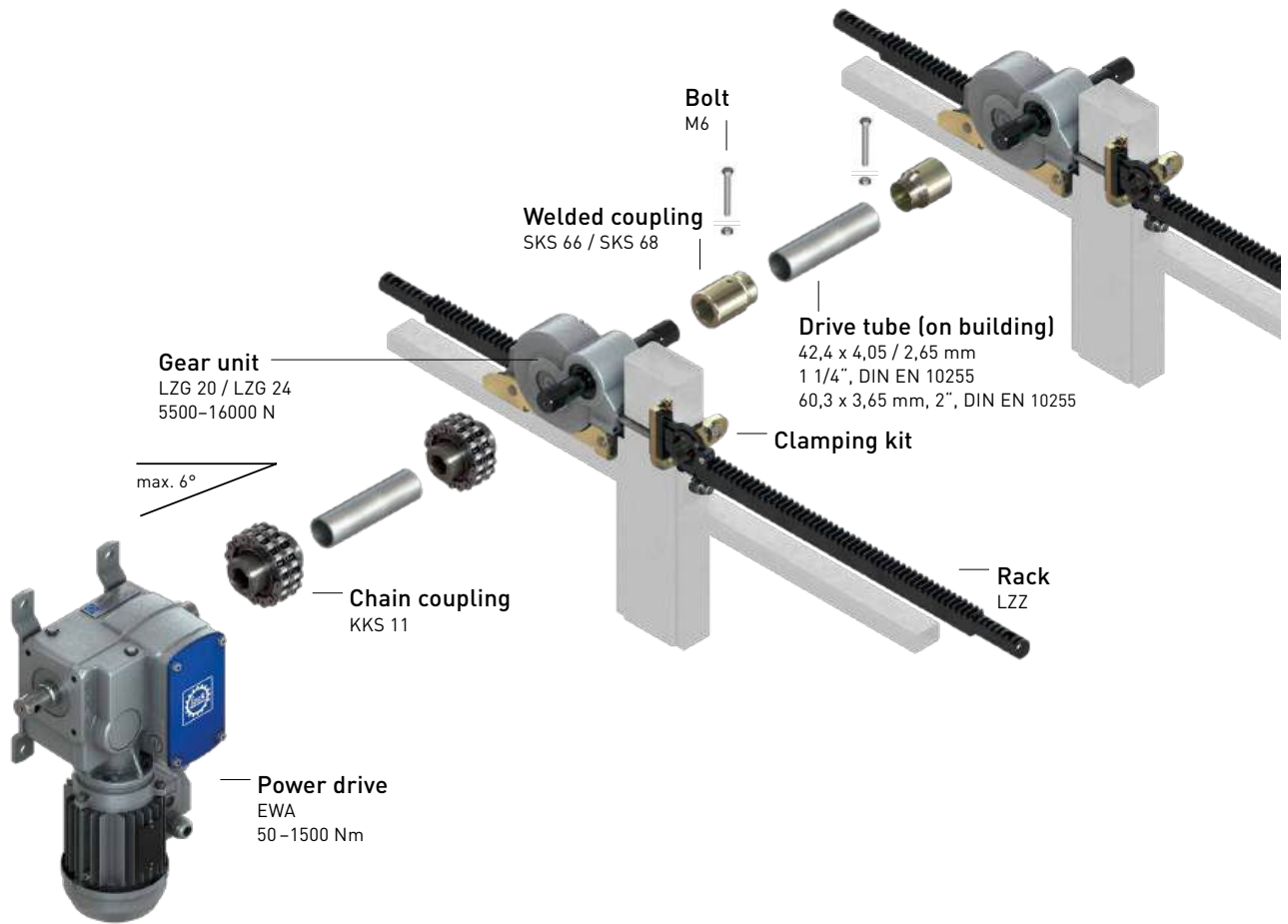


→ Rail ventilation with EWA power drive and LZG mounted on support.

Ventilation flaps arranged across a surface area (several individual or one continuous flaps) can be operated by one drive unit on each side. On the rail mountings, LZG gear units are connected to the drive unit by means of a connecting shaft (1 1/4" tube – 2" tube DIN EN 10255).

These racks move the pull-push rod along the length of the rail mounting to which the push bar on the flap are located. It is these push bar that actuate the flaps.

- Up to 40 flaps down the length of each rail mounting, depending on flaps weight.
- Up to 1500 Nm of drive power can be fed into the system.
- Load ratings of up to 16000 N per rack unit, and longer strokes or higher load ratings available on request.
- Available for all commonly used support dimensions and assembly kits.
- LZG gear unit with various rack strokes (Hzd).





# Selection tables for rail ventilation

## General notes

The following tables contain a sub-set of the roof systems available on the market. If you are unable on our tables to find the ventilation flaps or system dimensions you are planning to use in your project, we will be pleased to help you work out which types of LZG and EWA you require for an optimum drive system configuration.

In our applications table, you can establish whether your project needs our LZG 20 with 5500 N or 10000 N, or even the LZG 24 with 13000 N and 16000 N.

The torque required for the LZG is based on the linear load rating of the rack. Loadings applied by push bars are not taken into account here, and must be dissipated by the rail mounting on the building structure. The figures in these tables are non-binding.

## STANDARDS

The table calculations are based on the German greenhouse standard DIN EN 13031-1 : 2003-09 greenhouse dimensions and construction - part 1: Culture greenhouses. This was based on the German edition EN 13031 - 1 : 2001.

## BASICS

These tables can be used for projects involving the following dimensions:

- Greenhouse widths (flap width) of 3.20 to 4.80 m.
- The roof angle  $\alpha$  is 22°–25°.
- The glass thickness is 4 mm (10 kg/m<sup>2</sup>).
- The 'gutter height' up to top edge of rail mounting (Tr) is 150–180 mm.
- The rack height (Hzd) may be 11–60 mm.
- Calculation of the required stroke H presupposes that the opening angle of the window flaps is twice as large as the angle of roof inclination.
- An LZG needs approx. 70 Nm of input torque at a load of 10000 N.

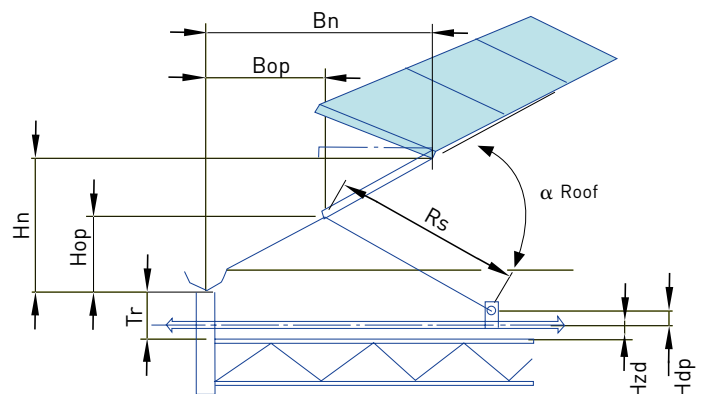
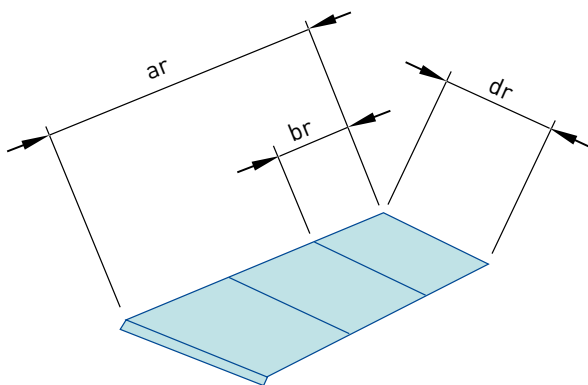
## INSECT PROTECTION

For applications with insect protection, the details for ventilation flaps reduce due to their increased weight. With insect protection weighing 1800 g per linear metre, the value for the flaps must be reduced as follows:

- With panel width of 3.20 m – 25 %
- For all other panel widths – 20 %

### Note:

- We are always delighted to advise you on configuration questions.



# Rail ventilation flap width 3.20 m

Individual pane widths br = 1000–1500 m

- Glass 4 mm
- Roof angle  $\alpha = 22^\circ\text{--}25^\circ$
- Gutter height  $Tr = 150\text{--}180$  mm
- Gable height, roof height  $H_g = 820\text{--}850$  mm
- Rack stroke = 650–670 mm
- Revolutions = 19.7–20.3 (PAR 06, Chapter 3)

Instructions: After choosing a pane dimension, you determine the maximum number of flaps per LZG rack. Then, based on the drive torque of the EWA power drive, you calculate the total number of possible flaps.

Panels		Flap				Number of flaps per LZG (line)				Number of flaps per EWA (surface)								
Number [units]	ar	Pane dimensions [mm]				LZG (N) rack & pinion unit				EWA power drives [Nm]								
		br	dr	dr	dr	5 500	10 000	13 000	16 000	50	90	150	250	350	450	600	900	1200
2	x	1000	x	825	34	40	–	–	45	81	135	225	315	405	540	810	1080	1350
3	x	1000	x	825	23	38	40	–	30	54	90	150	210	270	360	540	720	900
4	x	1000	x	825	17	31	40	–	23	41	68	113	158	203	270	405	540	675
2	x	1000	x	1000	25	38	40	–	33	59	99	164	230	296	394	591	788	985
3	x	1000	x	1000	17	30	39	–	22	39	66	109	153	197	262	393	524	655
4	x	1000	x	1000	12	23	30	37	16	30	49	82	115	148	197	296	394	493
2	x	1125	x	825	30	40	–	–	40	72	120	200	281	361	481	722	962	1203
3	x	1125	x	825	20	37	40	–	27	48	80	134	187	241	321	482	642	803
4	x	1125	x	825	15	28	36	–	20	36	60	100	140	180	240	360	480	600
2	x	1125	x	1000	22	38	40	–	29	53	88	146	204	263	350	525	700	875
3	x	1125	x	1000	15	27	35	–	19	35	58	97	136	175	233	350	466	583
4	x	1125	x	1000	11	20	26	32	15	26	44	73	102	131	175	263	350	438
2	x	1250	x	825	28	38	40	–	37	67	112	187	262	337	449	674	898	1123
3	x	1250	x	825	19	34	40	–	25	45	75	125	174	224	299	449	598	748
4	x	1250	x	825	14	26	34	–	19	34	56	93	131	168	224	336	448	560
2	x	1250	x	1000	21	38	40	–	27	49	82	137	192	247	329	494	658	823
3	x	1250	x	1000	14	25	33	40	18	33	55	92	128	165	220	330	440	550
4	x	1250	x	1000	10	19	25	30	14	25	41	68	96	123	164	246	328	410
2	x	1500	x	825	23	38	40	–	31	55	92	153	214	275	366	549	732	915
3	x	1500	x	825	15	28	36	–	20	36	61	101	142	182	243	365	486	608
2	x	1500	x	1000	17	31	40	–	22	40	67	111	156	200	267	401	534	668
3	x	1500	x	1000	11	20	26	32	15	27	45	74	104	134	178	267	356	445

The number of flaps in the tables is only intended as a guide. This number depends on assembly, mounting, current values etc.

# Rail ventilation flap width 4 m

Individual pane widths br = 1000–1670 m

- Glass 4 mm
- Roof angle  $\alpha = 22^\circ\text{--}25^\circ$
- Gutter height  $Tr = 150\text{--}180$  mm
- Gable height, roof height  $H_G = 980\text{--}1010$  mm
- Rack stroke = 780–800 mm
- Revolutions = 23,6–24,2 (PAR 06, Chapter 3)

Instructions: After choosing a pane dimension, you determine the maximum number of flaps per LZG rack. Then, based on the drive torque of the EWA power drive, you calculate the total number of possible flaps.

Panels		Flap			Number of flaps per LZG (line)				Number of flaps per EWA (surface)									
Number [units]	ar	Pane dimensions [mm]			LZG (N) rack & pinion unit				EWA power drives (Nm)									
		br	dr		5500	10000	13000	16000	50	90	150	250	350	450	600	900	1200	1500
4	x	1000	x	1000	14	25	32	–	19	33	56	93	130	167	223	335	446	558
2	x	1000	x	1200	20	30	39	–	27	49	82	137	192	247	329	494	658	823
3	x	1000	x	1200	13	25	32	39	18	33	55	92	128	165	220	330	440	550
4	x	1000	x	1200	10	18	23	28	14	25	41	68	96	123	164	246	328	410
4	x	1125	x	1000	12	22	28	34	16	30	49	82	115	148	197	296	394	493
2	x	1125	x	1200	18	30	39	–	24	44	73	122	170	219	292	438	584	730
3	x	1125	x	1200	12	22	28	34	16	29	49	81	113	146	194	291	388	485
4	x	1125	x	1200	9	16	21	26	12	22	37	61	85	110	146	219	292	365
4	x	1250	x	1000	11	20	26	32	15	27	45	75	104	134	179	269	358	448
2	x	1250	x	1200	16	30	39	–	22	39	66	109	153	197	262	393	524	655
3	x	1250	x	1200	11	20	26	32	15	26	44	73	102	131	175	263	350	438
4	x	1250	x	1200	8	15	20	25	11	20	33	55	76	98	131	197	262	328
2	x	1250	x	1400	12	23	34	–	17	31	51	85	119	153	204	306	408	510
3	x	1250	x	1400	8	15	22	27	11	20	34	56	79	101	135	203	270	338
4	x	1250	x	1400	6	11	14	17	9	15	26	43	60	77	102	153	204	255
3	x	1500	x	1000	12	22	28	34	17	30	50	83	117	150	200	300	400	500
2	x	1500	x	1200	13	25	32	39	18	33	55	92	129	166	221	332	442	553
3	x	1500	x	1200	9	16	21	26	12	22	37	61	86	110	147	221	294	368
2	x	1500	x	1400	10	19	25	31	14	25	42	70	99	127	169	254	338	423
3	x	1500	x	1400	7	12	16	20	9	17	28	47	65	84	112	168	224	280
1	x	1600	x	1400	20	30	39	–	27	48	80	133	186	239	319	479	638	798
2	x	1600	x	1400	10	18	23	28	13	24	40	67	93	120	160	240	320	400
3	x	1600	x	1400	6	12	16	20	9	16	27	44	62	80	106	159	212	265
1	x	1600	x	1500	17	30	39	–	23	42	70	117	163	210	280	420	560	700
2	x	1600	x	1500	8	16	21	26	12	21	35	58	82	105	140	210	280	350
3	x	1600	x	1500	5	10	13	16	8	14	23	39	54	70	93	140	186	233
1	x	1670	x	1400	18	30	39	–	21	38	64	106	149	191	255	383	510	638
2	x	1670	x	1400	9	17	22	27	11	19	32	53	75	96	128	192	256	320
1	x	1670	x	1500	16	30	39	–	19	34	56	94	131	169	225	338	450	563
2	x	1670	x	1500	8	15	19	23	9	17	28	47	66	85	113	170	226	283

The number of flaps in the tables is only intended as a guide. This number depends on assembly, mounting, current values etc.

# Rail ventilation flap width 4.27 m

Individual pane widths br = 1000–1250 mm

→ Table Part 1 of 2

- Glass 4 mm
- Roof angle  $\alpha = 22^\circ\text{--}25^\circ$
- Gutter height  $Tr = 150\text{--}180$  mm
- Gable height, roof height  $H_g = 1040\text{--}1070$  mm
- Rack stroke = 830–850 mm
- Revolutions = 25.2–25.8 (PAR 06, Chapter 3)

Instructions: After choosing a pane dimension, you determine the maximum number of flaps per LZG rack. Then, based on the drive torque of the EWA power drive, you calculate the total number of possible flaps.

Panels Number [units]		Flap			Number of flaps per LZG (line)				Number of flaps per EWA (surface)									
		Pane dimensions [mm]			LZG (N) rack & pinion unit				EWA power drives (Nm)									
		ar	br	dr	5500	10000	13000	16000	50	90	150	250	350	450	600	900	1200	1500
4	x	1000	x	1000	14	26	34	–	19	35	58	96	134	173	230	345	460	575
2	x	1000	x	1200	21	38	40	–	28	51	85	141	197	254	338	507	676	845
3	x	1000	x	1200	14	25	32	39	19	34	57	94	132	170	226	339	452	565
4	x	1000	x	1200	10	19	25	31	14	25	42	70	99	127	169	254	338	423
2	x	1000	x	1400	16	28	36	–	22	39	66	109	153	197	262	393	524	655
3	x	1000	x	1400	11	20	26	32	15	26	44	73	102	131	175	263	350	438
4	x	1000	x	1400	8	15	19	23	11	20	33	55	76	98	131	197	262	328
4	x	1125	x	1000	13	23	30	37	17	31	52	86	121	155	207	311	414	518
2	x	1125	x	1200	19	28	36	–	25	45	76	126	177	227	303	455	606	758
3	x	1125	x	1200	12	23	30	37	17	30	51	84	118	152	202	303	404	505
4	x	1125	x	1200	9	17	22	27	13	23	38	63	88	113	151	227	302	378
2	x	1125	x	1400	14	26	34	–	19	35	58	97	136	175	233	350	466	583
3	x	1125	x	1400	9	17	22	27	13	23	39	65	91	117	156	234	312	390
4	x	1125	x	1400	7	13	17	21	10	17	29	48	68	87	116	174	232	290
4	x	1250	x	1000	11	21	27	33	16	28	47	78	109	140	186	279	372	465
2	x	1250	x	1200	17	28	36	–	23	41	69	114	160	206	274	411	548	685
3	x	1250	x	1200	11	20	26	32	15	27	46	76	106	137	182	273	364	455
4	x	1250	x	1200	8	15	20	25	11	21	34	57	80	103	137	206	274	343
2	x	1250	x	1400	13	24	36	–	18	32	53	88	123	158	210	315	420	525
3	x	1250	x	1400	8	16	21	26	12	21	35	58	82	105	140	210	280	350
4	x	1250	x	1400	6	12	16	20	9	16	26	44	61	79	105	158	210	263
2	x	1250	x	1400	12	22	29	36	17	30	50	83	116	149	198	297	396	495
3	x	1250	x	1400	8	15	20	25	11	20	33	55	77	99	132	198	264	330
4	x	1250	x	1400	6	11	14	17	8	15	25	41	58	74	99	149	198	248

## Rail ventilation flap width 4.27 m

Individual pane widths br = 1500–1670 mm

→ Table Part 2 of 2

Panels Number [units]	Flap				Number of flaps per LZG (line)				Number of flaps per EWA (surface)									
	Pane dimensions [mm]				LZG (N) rack & pinion unit				EWA power drives (Nm)									
	ar		br	dr	5500	10000	13000	16000	50	90	150	250	350	450	600	900	1200	1500
2	x	1500	x	1200	14	26	24	30	19	34	57	95	132	170	227	341	454	568
3	x	1500	x	1200	9	17	22	27	13	23	38	63	88	113	151	227	302	378
2	x	1500	x	1400	11	20	26	32	15	27	45	74	104	134	178	267	356	445
3	x	1500	x	1400	7	13	17	21	10	18	30	49	69	89	118	177	236	295
2	x	1600	x	1200	13	24	31	38	18	33	54	90	127	163	217	326	434	543
3	x	1600	x	1200	9	16	21	26	12	22	36	60	84	108	144	216	288	360
1	x	1600	x	1400	20	28	36	–	27	49	82	137	191	246	328	492	656	820
2	x	1600	x	1400	10	18	23	28	14	25	41	68	96	123	164	246	328	410
3	x	1600	x	1400	6	12	16	20	9	16	27	45	64	82	109	164	218	273
1	x	1600	x	1500	18	28	36	44	24	44	73	122	171	220	293	440	586	733
2	x	1600	x	1500	9	16	21	26	12	22	37	61	86	110	147	221	294	368
3	x	1600	x	1500	6	11	14	17	8	15	24	40	57	73	97	146	194	243
1	x	1670	x	1400	19	28	36	–	26	47	79	131	184	236	315	473	630	788
2	x	1670	x	1400	9	18	23	28	13	24	39	65	92	118	157	236	314	393
3	x	1670	x	1400	6	12	16	20	9	16	26	44	61	79	105	158	210	263
1	x	1670	x	1500	17	28	36	–	23	42	70	117	163	210	280	420	560	700
2	x	1670	x	1500	8	16	21	26	12	21	35	58	82	105	140	210	280	350
3	x	1670	x	1500	5	10	13	16	8	14	23	39	54	70	93	140	186	233

The number of flaps in the tables is only intended as a guide. This number depends on assembly, mounting, current values etc.

# Rail ventilation flap width 4.80 m

Individual pane widths br = 1000–1250 mm

→ Table Part 1 of 2

- Glass 4 mm
- Roof inclined angle  $\alpha = 22^\circ\text{--}25^\circ$
- Gutter height  $Tr = 150\text{--}180$  mm
- Gable height, roof height  $H_g = 1000\text{--}1020$  mm
- Lifting rack = 1000–1020 mm
- Revolutions = 30.3–30.9 (PAR 06, Chapter 3)

Instructions: After choosing a pane dimension, you determine the maximum number of flaps per LZG rack. Then, based on the drive torque of the EWA power drive, you calculate the total number of possible flaps.

Panels		Flap			Number of flaps per LZG (line)				Number of flaps per EWA (surface)									
Number [units]	ar	Pane dimensions [mm]			LZG (N) rack & pinion unit				EWA power drives [Nm]									
		br	dr		5500	10000	13000	16000	50	90	150	250	350	450	600	900	1200	1500
2	x	1000	x	1200	22	40	40	–	30	55	91	152	213	274	365	548	730	913
3	x	1000	x	1200	15	25	32	39	20	36	61	101	142	182	243	365	486	608
4	x	1000	x	1200	11	20	26	32	15	27	46	76	106	137	182	273	364	455
2	x	1000	x	1400	17	30	32	39	24	42	71	118	165	212	283	425	566	708
3	x	1000	x	1400	11	21	27	33	16	28	47	78	110	141	188	282	376	470
4	x	1000	x	1400	8	16	21	26	12	21	35	59	82	106	141	212	282	353
4	x	1125	x	1000	13	25	32	39	18	33	55	91	128	164	219	329	438	548
2	x	1125	x	1200	20	36	40	–	27	49	82	136	191	245	327	491	654	818
3	x	1125	x	1200	13	24	31	38	18	33	54	90	127	163	217	326	434	543
4	x	1125	x	1200	10	18	23	28	14	24	41	68	95	122	163	245	326	408
2	x	1125	x	1400	15	25	32	39	21	38	63	105	146	188	251	377	502	628
3	x	1125	x	1400	10	19	25	31	14	25	42	70	97	125	167	251	334	418
4	x	1125	x	1400	7	14	18	22	10	19	31	52	73	94	125	188	250	313
4	x	1250	x	1000	12	22	28	34	16	30	49	82	115	148	197	296	394	493
2	x	1250	x	1200	18	32	40	–	25	44	74	123	172	221	294	441	588	735
3	x	1250	x	1200	12	22	28	34	16	30	49	82	115	148	197	296	394	493
4	x	1250	x	1200	9	16	21	26	12	22	37	61	86	110	147	221	294	368
2	x	1250	x	1400	14	25	32	39	19	34	57	95	132	170	227	341	454	568
3	x	1250	x	1400	9	17	22	27	13	23	38	63	88	113	151	227	302	378
4	x	1250	x	1400	7	13	17	21	9	17	28	47	66	85	113	170	226	283
2	x	1250	x	1500	12	23	30	37	17	30	50	84	117	151	201	302	402	503
3	x	1250	x	1500	8	15	20	25	11	20	34	56	78	101	134	201	268	335
4	x	1250	x	1500	6	11	15	18	8	15	25	42	58	75	100	150	200	250

# Rail ventilation flap width 4.80 m

Individual pane widths br = 1500–1670 mm

→ Table Part 2 of 2

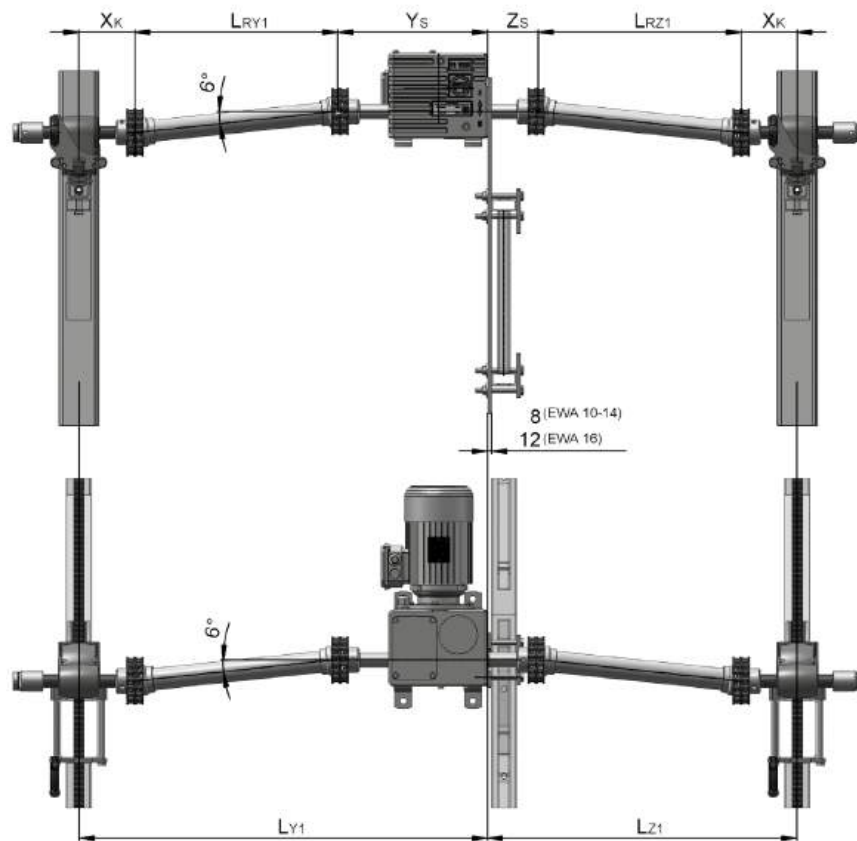
Flap		Number of flaps per LZG (line)				Number of flaps per EWA (surface)													
Panels Number [units]	Pane dimensions [mm]			LZG (N) rack & pinion unit				EWA power drives (Nm)											
	ar	br	dr	5500	10000	13000	16000	50	90	150	250	350	450	600	900	1200	1500		
2	x	1500	x	1200	15	25	32	39	21	37	62	103	145	186	248	372	496	620	
3	x	1500	x	1200	10	18	23	28	14	25	41	68	96	123	164	246	328	410	
2	x	1500	x	1400	11	21	27	33	16	28	47	78	110	141	188	282	376	470	
3	x	1500	x	1400	7	14	18	22	10	19	31	52	73	94	125	188	250	313	
2	x	1500	x	1500	10	19	25	31	14	25	42	70	99	127	169	254	338	423	
3	x	1500	x	1500	7	12	16	20	9	17	28	47	65	84	112	168	224	280	
2	x	1600	x	1200	19	34	40	–	26	47	78	129	181	233	310	465	620	775	
3	x	1600	x	1200	13	23	30	37	17	31	52	86	121	155	207	311	414	518	
2	x	1600	x	1400	14	25	32	39	19	35	58	97	135	174	232	348	464	580	
3	x	1600	x	1400	9	17	22	27	13	23	39	64	90	116	154	231	308	385	
2	x	1600	x	1400	11	20	26	32	15	27	45	74	104	134	178	267	356	445	
3	x	1600	x	1500	7	13	17	21	10	18	30	49	69	89	118	177	236	295	
1	x	1600	x	1500	19	34	40	–	26	47	79	131	184	236	315	473	630	788	
2	x	1600	x	1500	9	18	23	28	13	24	39	65	92	118	157	236	314	393	
3	x	1600	x	1500	6	12	16	20	9	16	26	44	61	79	105	158	210	263	
1	x	1670	x	1400	21	38	40	–	28	51	84	140	197	253	337	506	674	843	
2	x	1670	x	1400	10	19	25	31	14	25	42	70	99	127	169	254	338	423	
3	x	1670	x	1400	7	12	16	20	9	17	28	47	65	84	112	168	224	280	
1	x	1670	x	1500	18	32	40	–	25	45	76	126	176	227	302	453	604	755	
2	x	1670	x	1500	9	17	22	27	13	23	38	63	88	113	151	227	302	378	
3	x	1670	x	1500	6	11	14	17	8	15	25	42	58	75	100	150	200	250	

The number of flaps in the tables is only intended as a guide. This number depends on assembly, mounting, current values etc.

# Determining length of prefab tubes

Power drives	Side mounting $Z_s$ [mm]	Side mounting $Y_s$ [mm]	Foot mounting $Z_f$ [mm]
EWA 10	119,5	285,5	201,5
EWA 12	106,5	298,5	201,5
EWA 14	103,0	302,5	201,5
EWA 16	85,5	322,5	201,5

Rack & pinion units	Spacing $X_s$ [mm]	Spacing $X_k$ [mm]
LZG 20	70	114
LZG 24	90	134



## Tube – Type A:

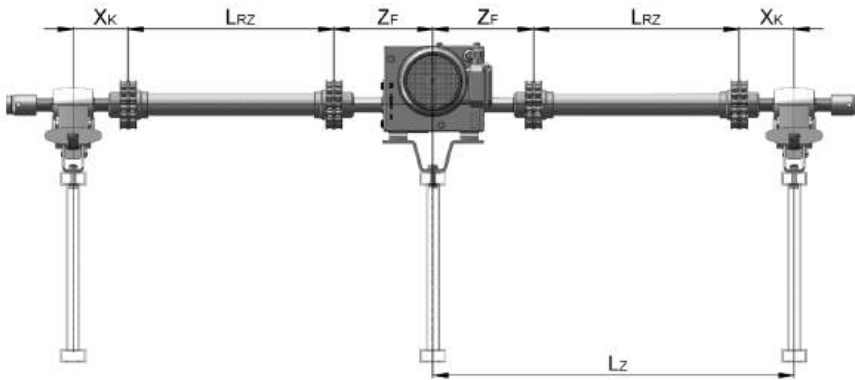
### Drive system with support mounting

- Connection between EWA and LZG with KKS 11 / KKS 15 for 1 1/4" + 2" tube
- Connecting LZG to LZG with tube type C, SKS 66 or SKS 68 for 1 1/4" and 2"
- Couplings for other tube dimensions available on request

→ Please contact us for the exact calculation of the prefab tubes.

$L_{RY1} / RZ1$  → Length of prefab tube for 0°  
 $X_k$  → Spacing of chain coupling  
 $L_{Y1}$  → Length on left side

$L_{Z1}$  → Length on right side  
 $Y_s / Z_s$  → Dimension to start of coupling B-side (see p.11 chap. 5)



$L_{RZ}$  → Length of prefab tube  
 $X_K$  → Spacing of chain coupling  
 $Z_F$  → Dimension to start of coupling B-side (see p.11 chap. 5)

→  $L_{RZ} = L_Z - Z_F - X_K$

**LZG 20**

LZ rail distance	LRZ length Prefab-tube with KKS
4000	3685
4500	4185
5000	4685

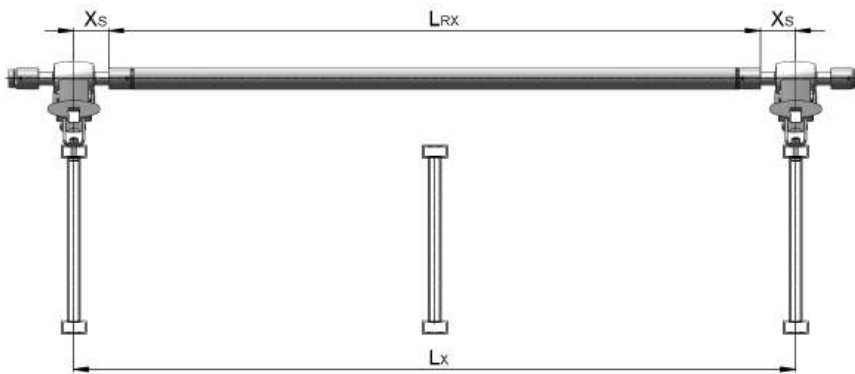
**Tube – Type B:**

**Drive system with rail mounting**

- Connection between EWA and LZG with KKS 10 / KKS 14 for 1 1/4" + 2" tube
- Connecting LZG to LZG with tube type C, SKS 66 or SKS 68 for 1 1/4" and 2"
- Couplings for other tube dimensions available on request

**LZG 24**

LZ rail distance	LRZ length Prefab-tube with KKS
4000	3665
4500	4165
5000	4665



$L_{RX}$  → Length of prefab tube  
 $X_S$  → Spacing of welded coupling  
 $L_X$  → Spacing of LZG to LZG

→  $L_{RX} = L_X - X_S - X_S$

**LZG 20**

LZ rail distance	LRX length Prefab-tube with SKS	LRX length Prefab-tube without SKS
4000	7860	7760
4500	8860	8760
5000	9860	9760

**Tube – Type C:**

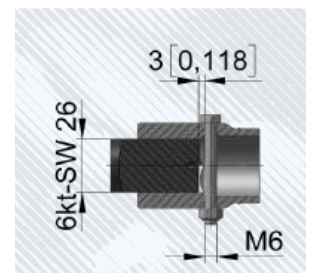
**LZG – LZG rack & pinion units**

- Connection with two LZG
- Connection of LZG to LZG with SKS 66 and SKS 68 for 1 1/4" / 2" tube
- Couplings for other tube dimensions available on request

**LZG 24**

LZ rail distance	LRX length Prefab-tube with SKS	LRX length Prefab-tube without SKS
4000	7820	7720
4500	8820	8720
5000	9820	9720

→ Our table of figures includes 3 mm of clearance between each shaft and the axial mounting of each coupling!



## Cable system for Venlo screening



→ Cable system in Venlo greenhouse mounted with EWA power drive and KSS couplings.

Drive system for screening where the EWA power unit is mounted with a retaining plate clamped to the support. This creates an optimum installation position for adjusting the limit switch position. Suitable for screening systems with rigidly mounted screening fabric as well as for systems with grinding blocks.

- Up to 13000 m<sup>2</sup> of screening surface area with just one drive unit.
- Up to 300 grinding blocks with just one drive unit.
- Up to 1500 Nm of drive power can be fed into the system.

# Maximum screening area

per EWA power drive



System A - Profile



System B - tube

- Cable coil  $\phi = 70$  mm
- Wire diameter  $d = 3$  mm
- Travel distance = 230,3 mm/n

- Weight of fabric  $G = 80$  g/m<sup>2</sup>
- Truss spacing  $L_F = 3,0 / 3,66 / 4,0 / 4,5 / 5,0$  m

## System A - Profile

Surface area [m <sup>2</sup> ]					Power drive	
$L_F = 3.0$ m 14 revolutions	$L_F = 3.66$ m 17 revolutions	$L_F = 4.0$ m 18 revolutions	$L_F = 4.5$ m 21 revolutions	$L_F = 5.0$ m 23 revolutions	Torque T [Nm]	Version
218	265	290	326	363	50	EWA 50
392	478	522	587	653	90	EWA 50
653	796	870	979	1088	150	EWA 50
1088	1327	1450	1631	1813	250	EWA 12
1740	2123	2320	2610	2900	350	EWA 14
2175	2654	2900	3263	3625	450	EWA 14
2828	3450	3770	4241	4712	600	EWA 14
4350	5307	5800	6525	7250	900	EWA 16
5655	6899	7540	8483	9425	1200	EWA 16
6960	8491	9280	10440	11600	1500	EWA 16
9280	11321	12373	13919	15466	2000	EWA 16

## System B - tube

Surface area [m <sup>2</sup> ]					Power drive	
$L_F = 3.0$ m 14 revolutions	$L_F = 3.66$ m 17 revolutions	$L_F = 4.0$ m 18 revolutions	$L_F = 4.5$ m 21 revolutions	$L_F = 5.0$ m 23 revolutions	Torque T [Nm]	Version
245	299	327	368	408	50	EWA 50
441	538	588	662	735	90	EWA 50
735	897	980	1103	1225	150	EWA 50
1225	1495	1633	1838	2042	250	EWA 12
1960	2391	2613	2940	3267	350	EWA 14
2450	2989	3267	3675	4083	450	EWA 14
3185	3886	4247	4778	5308	600	EWA 14
4900	5978	6533	7350	8167	900	EWA 16
6370	7771	8493	9555	10617	1200	EWA 16
7840	9565	10453	11760	13067	1500	EWA 16
10453	12753	13937	15679	17422	2000	EWA 16

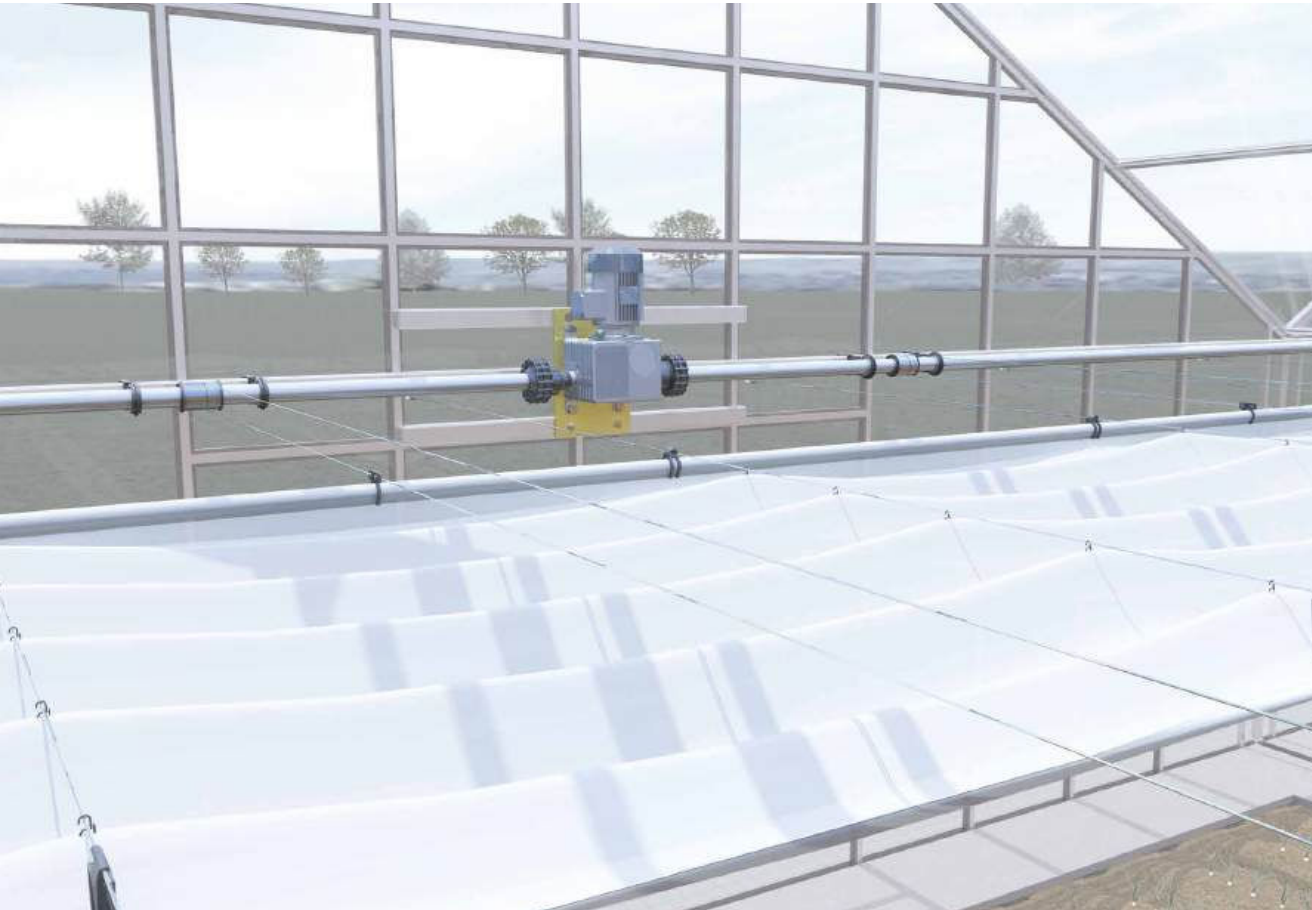
## Power/Block

Blocks [units]								Power drive	
3.0 kg	3.5 kg	4.0 kg	5.0 kg	6.0 kg	7.0 kg	9.0 kg	12.0 kg	Torque T [Nm]	Version
37	31	27	22	18	16	12	9	50	EWA 50
66	56	49	39	33	28	22	17	90	EWA 50
110	94	82	66	55	47	37	28	150	EWA 50
184	156	137	109	92	78	61	46	250	EWA 12
292	250	219	175	146	125	97	73	350	EWA 14
364	314	275	220	182	157	121	91	450	EWA 14
476	408	357	286	238	204	159	119	600	EWA 14
728	626	548	438	364	313	243	182	900	EWA 16
948	814	712	570	474	407	316	237	1200	EWA 16
1168	1002	877	701	584	501	389	292	1500	EWA 16
1557	1335	1169	934	778	668	518	390	2000	EWA 16

The figures on the table are only guide values. These are dependent on assembly, mounting, current values etc.

PAR 06, POTENTIOMETER → SEE CHAPTER 3

## Cable system for wide-span screening



→ Cable system in wide-span greenhouse mounted with EWA power drive and KKS couplings.

By mounting an EWA power drive on the gable, the resultant forces can be absorbed to an optimum extent. In addition, this creates a superlative installation position for adjusting the limit switch position.

- Surface areas of up to 3000 qm<sup>2</sup> can be screened with a single drive unit.
- 600 Nm input power can be directed into the system.

## Maximum screening area per EWA power drive

- Cable coil  $\phi = 72 / 80 / 100$  mm
- Wire diameter  $d = 3$  mm

- Weight of fabric  $G = 80$  g/m<sup>2</sup>
- Truss spacing  $L_F = 3,0 / 4,0 / 5,0$  m

Cable coil	Surface area [m <sup>2</sup> ]			Power drive	
	$L_F = 3,0$ m 10 revolutions	$L_F = 4,0$ m 13 revolutions	$L_F = 5,0$ m 19 revolutions	Torque T [Nm]	Version
$\phi = 72$ mm	190	252	-	50	EWA 50
	342	454	-	90	EWA 50
	570	757	-	150	EWA 50
	950	1262	-	250	EWA 12
	1330	1766	-	350	EWA 14
	1710	2272	-	450	EWA 14
	2280	3040	-	600	EWA 14
$\phi = 80$ mm	172	230	-	50	EWA 50
	310	414	-	90	EWA 50
	517	690	-	150	EWA 50
	862	1150	-	250	EWA 12
	1207	1610	-	350	EWA 14
	1552	2070	-	450	EWA 14
	2070	2760	-	600	EWA 14
$\phi = 100$ mm	137	182	254	50	EWA 50
	247	328	456	90	EWA 50
	412	547	761	150	EWA 50
	687	912	1268	250	EWA 12
	961	1277	1775	350	EWA 14
	1237	1648	2289	450	EWA 14

The figures on the table are only guide values. These are dependent on assembly, mounting, current values etc.

## Rack system for Venlo screening



→ Rack system in Venlo greenhouse with EWA power drive and KKp couplings. SZG gear unit for adjusting position of screening fabric.

Drive system for screening where the EWA power unit is mounted with a retaining plate clamped to the support. This creates an optimum installation position for adjusting the limit switch position. Suitable for screening systems with rigidly mounted screening fabric.

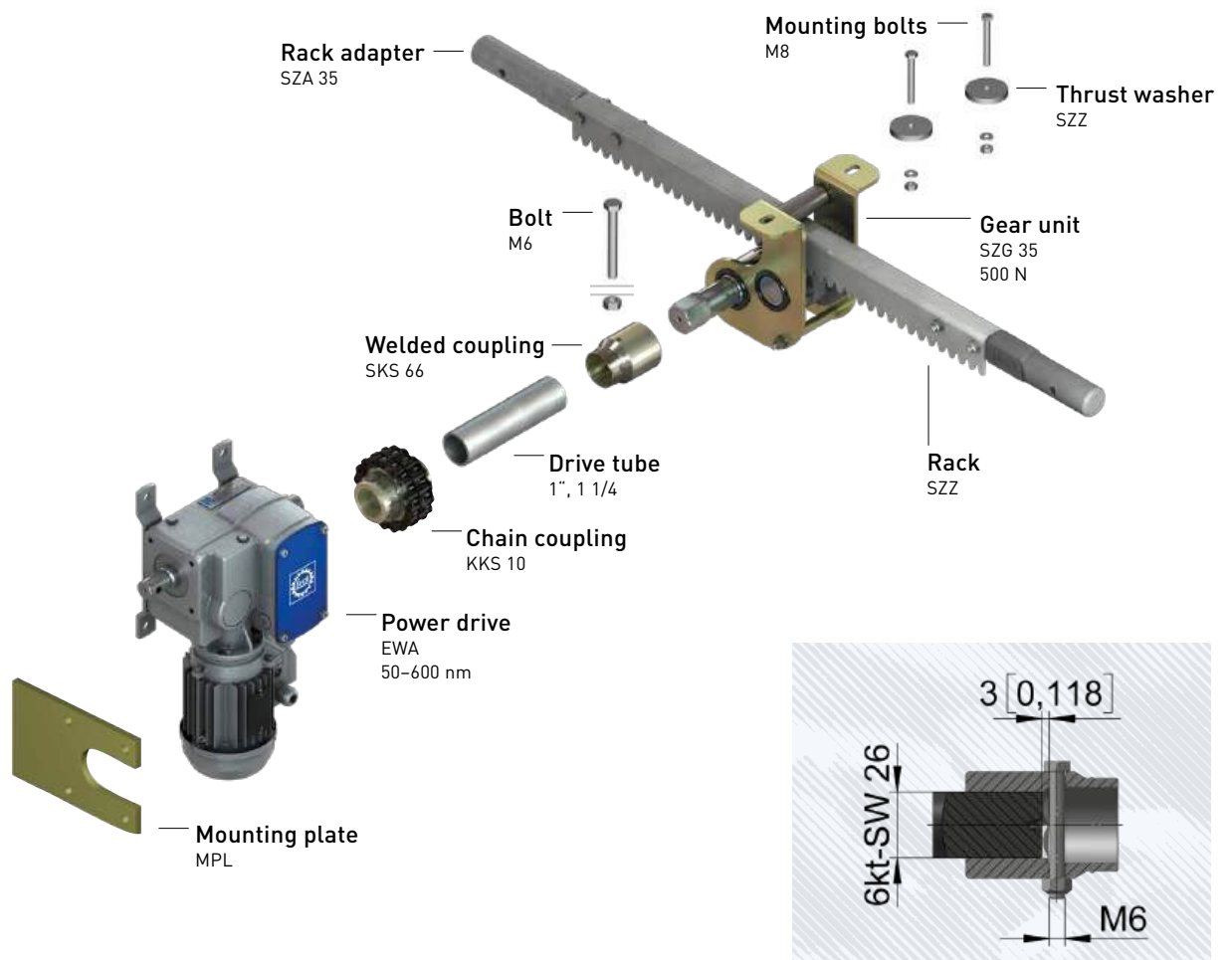
- Surface area of up to 10000 qm<sup>2</sup> for screening with a single drive unit.
- Up to 600 Nm of drive power can be fed into the system.

# Maximum screening area per EWA power drive

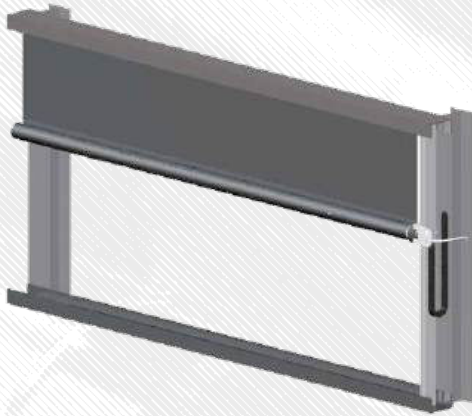
- Travel distance = 81.3 mm/n
- Weight of fabric G = 80 g/m<sup>2</sup>
- Truss spacing L<sub>F</sub> = 3,66 / 4,0 / 4,5 / 5,0 m

Surface area [m <sup>2</sup> ]				Power drive	
L <sub>F</sub> = 3,66 m 45 revolutions	L <sub>F</sub> = 4,0 m 49 revolutions	L <sub>F</sub> = 4,5 m 55 revolutions	L <sub>F</sub> = 5,0 m 62 revolutions	Torque T [Nm]	Version
714	801	835	865	50	EWA 50
1285	1441	1504	1558	90	EWA 50
2142	2402	2506	2596	150	EWA 50
3570	4003	4177	4327	250	EWA 12
4998	5604	5847	6058	350	EWA 14
6426	7205	7518	7789	450	EWA 14
8568	9607	10024	10385	600	EWA 14

The figures on the table are only guide values. These are dependent on assembly, mounting, current values etc.



## Single roll screening



- Single wrapped roll screen system for roof and partition walls.
- Space-saving by adapting drive shaft diameter to suit standard rolling tube.
- Max. ventilation height of 4 m with a rolling tube diameter of 50 mm, depending on type of fabric.
- Max. ventilation height of 5 m with a rolling tube diameter of 63 mm, depending on type of fabric.

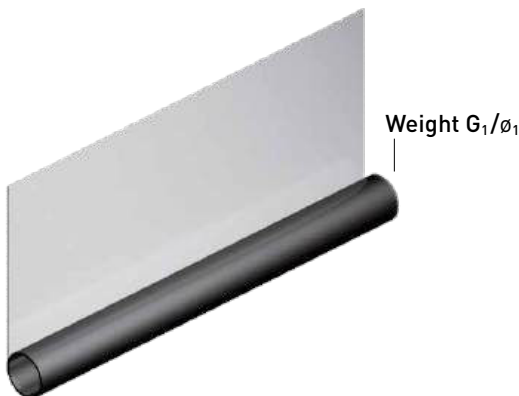
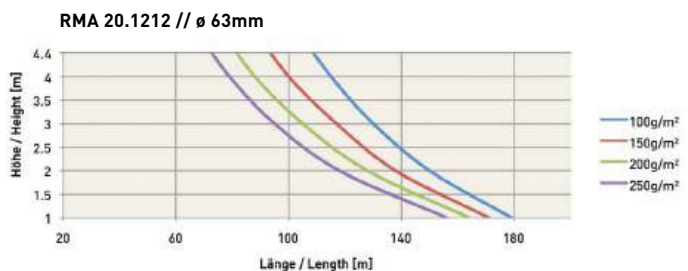
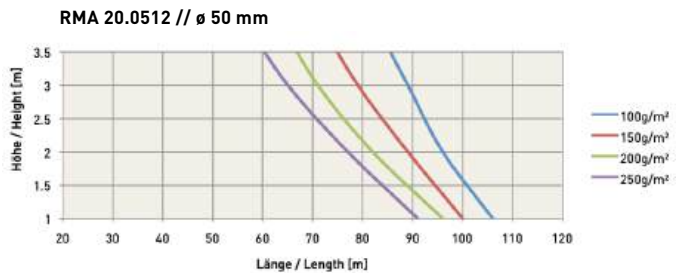
**Note:**

- We are always delighted to help you with technical advice because power ratings and service life are factors that depend heavily on the design of your application.

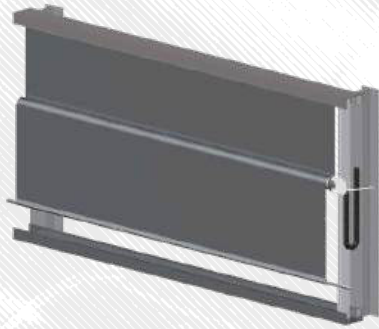
## Roller screen length / height

per RMA tube motor

- RMA 20.0512, 50 Nm, with rolling tube  $\phi$ , 50 mm,  $G_1 = 900\text{g/m}$
- RMA 20.1212, 120 Nm, with rolling tube  $\phi$ , 63 mm,  $G_1 = 900\text{g/m}$
- The figures on these diagrams are only intended as guide values. They are dependent on assembly, mounting, voltage level etc.



## Twin roll screening



- Double-rolled roller screen system for roof and partition walls.
- Space-saving through adapting drive shaft diameter to that of standard rolling tube.
- Central rolling tube for greater stability to wind pressure, reduced soiling of fabric and a combination of different types of fabric or sheeting.

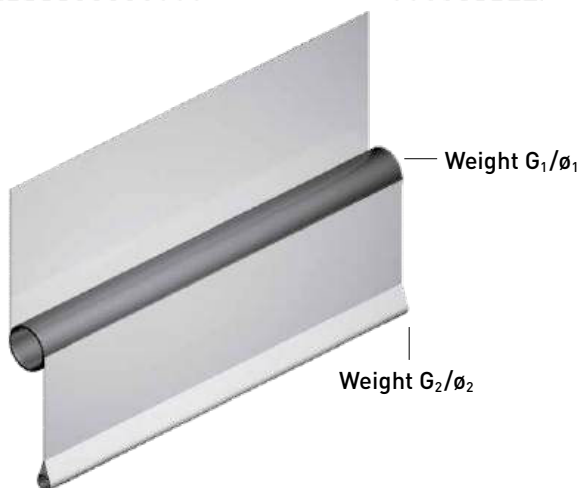
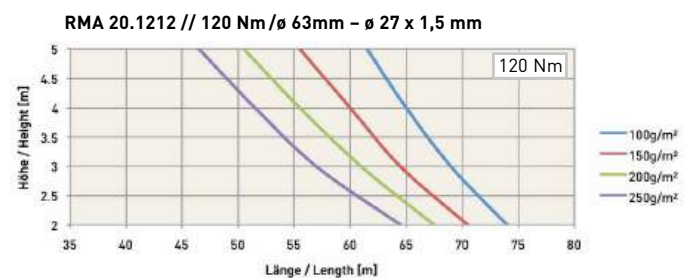
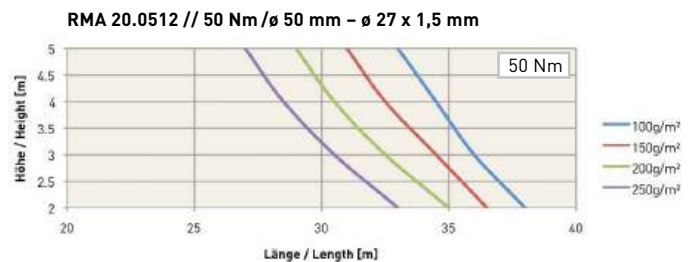
**Note:**

- We are always delighted to help you with technical advice because power ratings and service life are factors that depend heavily on the design of your application.

## Roller screen length / height

per RMA tube motor

- RMA 20.0512, 50 Nm with rolling tube  $\phi_1$  50 mm,  $G_1 = 900$  g/m
- RMA 20.1212, 120 Nm with rolling tube  $\phi_1$  63 mm,  $G_1 = 900$  g/m
- Reinforcement tube  $\phi_2$  27 x 1,5 mm,  $G_2 = 960$  g/m
- The figures on these diagrams are only intended as guide values. They are dependent on assembly, mounting, voltage level etc.







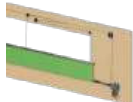

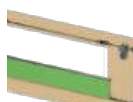


LOCK BEWEGT // LOCK MOVES

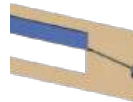
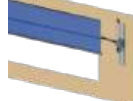
# Systems

**AVAILABLE ON  
REQUEST**

## VariVent® top-opening

VariVent® TF Pull wire		6
VariVent® TF Diabolo		8
VariVent® TF Central tube		10

## VariVent® bottom-opening

VariVent® BF		12
VariVent® BC		14

## VariVent® top/bottom-opening

VariVent® TC		16
VariVent® Twin		18

## EazyVent® top-opening

EazyVent®		20
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LOCK BEWEGT // LOCK MOVES

# Power drives

EWA // Power drives	2	EZW // Power racks	28
EWA 50	8	EZW 64	30
EWA 52	12	RMA // Tube motors	34
EWA 10	16	RMA 20	36
EWA 12	18		
EWA 14	20		
EWA 16	22		
LSC 40.10: LPR 02, LPR 04	25		
PAR 06	26		
PAR 10	27		



# EWA knows no compromises and displays no weaknesses



Lock EWA power drives are a dependable power source for every application. Slow-running with self-locking worm gear units and integrated limit switches or control unit, they perform their tasks for decades without requiring any maintenance work. As option A60 also for operation at low temperatures.

As a low-cost alternative, there are the HWA manual drives that are of course easy to retrofit as EWA power drives.

Lock drives can be used for far more than ventilation tasks. Much of what you have to lift and relocate you can make happen using drive units and accessories from Lock.

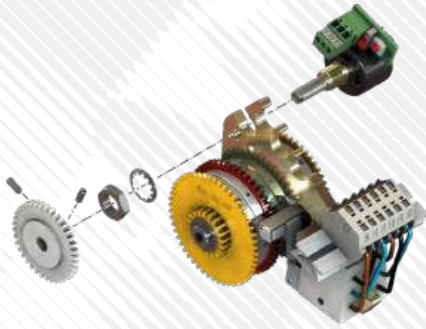
- Torque range of 50–2000 Nm.
- Speed range of 1–60 rpm.
- Integrated precision gear limit switch END 20 or integrated LSC 40 control unit.
- Dimensioning for decades of operational service.
- Self-locking worm gear units.
- Electric motors with optimized characteristics for 50 and 60 Hz.
- Turnkey status for single-phase motors.
- Optional PAR 06 potentiometer or PAR 10 multiturn-sensor pre-installed on END 20.
- Optional position sensor, analogue LPR 02 or digital LPR 04 on the LSC 40.
- Motors and microswitches on the END 20 for 60 Hz are cURus-certified (cURus = UL Recognized Component Mark, valid for the USA and Canada).



## EWA 16

With integrated limit switch (optionally available with an LSC 40.10 control unit).

## Position repeater PAR 10



- Programmable multiturn sensor to provide positional feedback.
- High resolution for very precise positioning, no jumps or system crashes.
- No mechanical limit stop and no mechanical wear.
- Pre-assembled or suitable for retrofitting to END 20 limit switches.
- „Elektronisches Poti“ austauschbar gegen PAR 06.
- Number of shaft rotations: 0.1 to 190 can be evaluated.
- Simple teaching in, using two buttons on the device, with status displayed by LED.
- Signal output 0 – 10 V analogue or 0 – 5 V.
- Power supply 16 – 30 V DC, same connection as PAR 06.

## Optional: LSC 40.10 control unit



- Absolute mechatronic limit switch system with integrated additional switches for AC or DC control voltage.
- Fast and simple setting without power connection, with familiar high level of reliability.

### Option:

- “Integrated position sensor” LPR with high resolution.
- Only one version for all rotational speeds – no additional components.
- No additional teach-in required.
- No mechanical limit stop / wear.
- Outputs with 0 – 10 V, 4 – 20 mA and incremental signal.

## The advantages of EWA

- Standard mounting dimensions.
- Compact shape.
- Uniform shaft length.
- Any installation position.
- Optional LockLogic®.
- Zero-maintenance.
- Selection of shaft types.
- Extremely quiet operation.
- A60 for use at low temperatures.
- Speedlogic frequency inverter.



**EWA 10**  
50-90 Nm



**EWA 50**  
50-150 Nm



**EWA 12**  
150-250 Nm



**EWA 14**  
350-600 Nm

# SELECTION

Lock always offers you a large number of types, variants and options to enable you to select the ideal solution for your application.

- Torques and speeds (see table).
- Shaft ends We 06, We 66, We 19.
- Low temperatures as A60 version (option).
- Special voltages 1~, 3~, DC.
- Types of mounting and mounting positions.
- END 20 switch elements, PAR 06, PAR 10.
- Optional LSC 40.10 control unit, LPR 02, LPR 04.

## Shaft ends



We 06

We 66

We 19

## Mounting



Base

Side

Base

## Switch elements



LSC 40.10

END 20

PAR 06

PAR 10

# MODULARITY

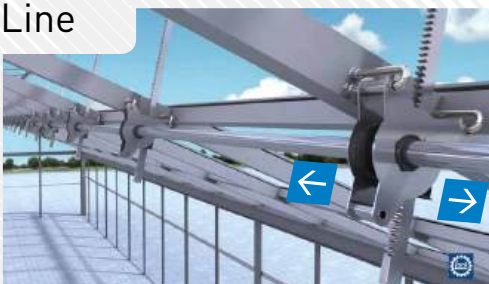
The broad and diverse product portfolio and the modularity of the drive units in conjunction with the gear units enable systems to be created that can move loads perfectly in a point-to-point, linear or surface way.

## Point



Example: A drive with a rack & pinion unit or a cable drum moves local spot loads.

## Line



Example of continuous ventilation: A drive unit lifts linear loads using shafts and rack & pinion units.

## Face



Example of greenhouse rail ventilation: One drive unit moves large surface areas using shafts, rack & pinion units and levers.

- Dynamic and static self-locking, even under extreme conditions.\*
- The details quoted for nominal load are minimum figures.
- High power reserves throughout the entire service life.
- Electric motors with optimized characteristics to suit every variant.
- Powerful single-phase motors, pre-wired ex-factory.

You can learn more about all of these points on the next pages.

\* All load details in the catalogue refer to dynamic self-locking.  
The values for static self-locking are much higher.

		EWA 50			EWA 10		EWA 12		EWA 14**			EWA 16				
		50 Nm	90 Nm	150 Nm	50 Nm	90 Nm	150 Nm	250 Nm	350 Nm	450 Nm	600 Nm	900 Nm	1200 Nm	1500 Nm	2000 Nm	
n [rpm] at 50 Hz	400 V 3~						1,6	1,6	1,6	1,6						
			2,6	2,6	2,6				3,2	3,2	3,2	3,2	2,4	2,4	2,4	2,4
			4,5	4,5	4,5	5,6	5,6		4,4	4,4	4,4	4,4	4,9	4,9	4,9	
	230 V 1~							1,6	1,6	1,6	1,6					
			2,6	2,6	2,6				3,1	3,2	3,2					
			4,5	4,5	4,5	5,9	5,9		4,3	4,4						
	380 V 3~															
			2,6	2,6	2,6				3,2		3,2					
			4,5	4,5	4,5				4,4		4,4					
n [rpm] at 60 Hz	120 V 1~						2,0	2,0								
			3,2	3,2	3,2				3,8							
	240 V 1~							2,0	2,0							
			3,2	3,2	3,2				3,8	3,8	3,8					
	208 V 3~ 480 V 3~							2,0	2,0							
			3,2	3,2	3,2				3,8	3,8	3,8	3,8			2,9	
	600 V 3~															
			5,4	5,4					5,3	5,2	5,2		5,8	5,8	5,8	
									3,8		3,8	3,8	2,9			
							5,3		5,2	5,2	5,8	5,8	5,8			

\*EWA 14 also available with 39 rpm / 250 Nm and 60 rpm / 200 Nm (without selfbraking)

# Everything you always wanted to know about the drives of the EWA 5 and 1 series!

## 1. Self-locking:

In all cases, a distinction is made with self-locking between static and dynamic self-locking. Static self-locking only works when stationary and can be cancelled by shaking or by vibration.

This is why our self-locking drive units always have dynamic self-locking (also called auto-braking). This occurs whenever an operating gear unit comes to a complete stop automatically, for example after the motor has been switched off. Like all self-locking gear units, our gear units cannot be operated in continuous basis.

## 2. Load details and service life:

Our nominal load details are minimum figures, not maximum figures, unlike the practice of many other manufacturers. That means that if we quote a torque rating of ,250 Nm', that means that the drive unit is capable of delivering this torque rating throughout its entire service life. This explains why our drive units are renowned for having high reserves of power.

On our in-house test benches, we test our units for 1000 operating hours at the nominal load quoted in the catalogue, over the specified engagement period. The drive units are designed for endurance loads depending on utilization level (actual torque levels applied), application, peak loads and engagement cycles.

## 3. Electric motors:

We do not use standard motors. Instead, we only use motors with optimized characteristics curves, and we optimize these for each version and for every variant. They are designed in such a way that voltage fluctuations of approx. +/- 5% can be contended with, even in the 60-Hz range.



### EWA 16

With integrated limit switch (optionally available with an LSC 40.10 control unit).

#### 4. Single-phase motors:

Single-phase motors are always wired by ourselves before they leave the factory, and are supplied with a long connection cable. That means that the electric motor is switched off directly by the limit switch. This greatly simplifies assembly and is less expensive, because there is no need for a reversible contactor control system. A test run can be conducted on location using manual push-button TST 10.

Having said that, single-phase motors must not be over-dimensioned. If they are operated at levels well below their nominal load rating, they are prone to heating up more, and this shortens their engagement period. The internal winding protection contact can be routed externally.

#### 5. Special voltages:

For 60 Hz we have always used special motors. We also always guarantee that the nominal load rating quoted is consistently achievable. This also applies to the other special voltage ratings. All special motors are optimized and tested before they are used on the test bench.

#### 6. 24 V DC motors:

Power drives EWA 10 and EWA 12 can be supplied with 24 V DC motors. A typical feature of DC motors is that current intake rises sharply as torque levels rise.

#### 7. Smoke & heat extraction systems:

Natural ventilation systems are often combined with smoke & heat extraction systems. With building-specific special constructions, no usability verification can be provided in accordance with DIN EN 121 Part 2.

Here, it is possible to apply for consent in individual cases from the construction authorities. Our drive units have been inspected by the Fraunhofer Institut in respect of 'usability' as defined in DIN 18232. Request the Fraunhofer certificate when needed.

#### 8. A60 option:

This option is suitable for use in protected outdoor environments because it has stainless steel output shafts and a special grade of thermally resistant oil for low temperatures. Separate installation conditions apply for use in outdoor environments (see chapter Service/operating instructions).

#### 9. Optional LSC 40 control unit:

Optional equipment available for the END 20 limit switch includes our power drives with the LSC 40.10. As standard, this includes the additional limit switch and can be extended to take LPR 02 analogue signals, or can be extended with the LPR 04 to take analogue and digital signals.

## EWA 50 // PowerDrive 50–150 Nm



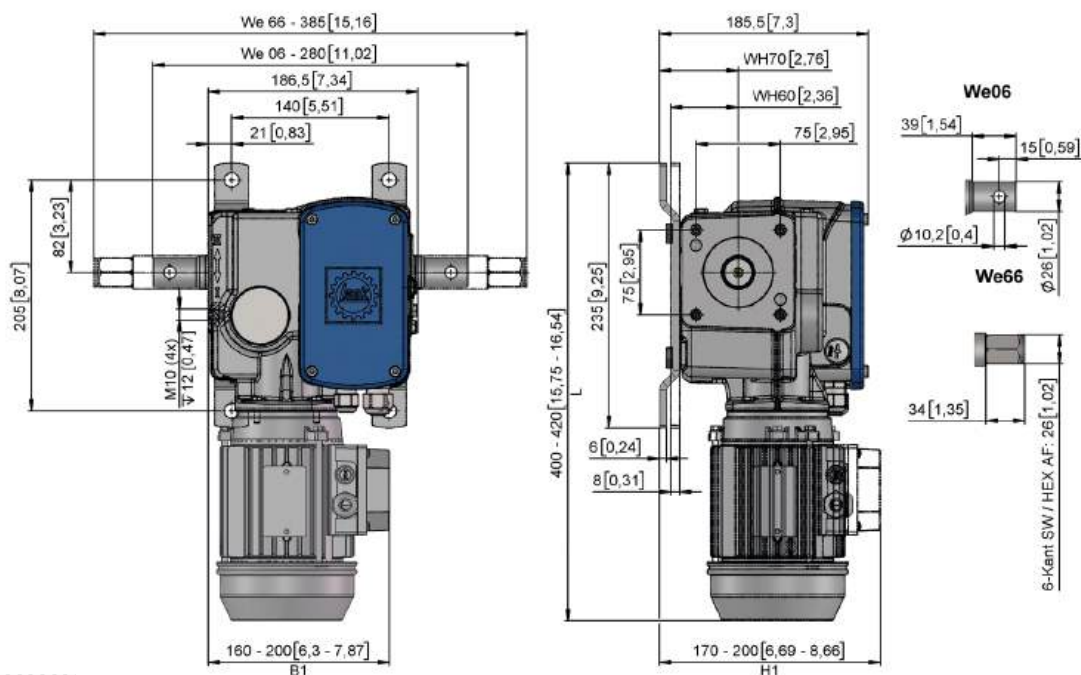
- Extremely quiet, self-locking double worm gear unit with integrated limit switch control and with long service life, zero maintenance.
- Universal assembly with standard mounting at back or on side left (symmetrical).
- Standard mounting with 70 mm center distance brackets or optional 60 mm.
- Limit switch control, including auxiliary limit switch, via control unit LSC 40 AC/DC. Optional mechanical limit switch END 20 for up to 580 shaft rotations.
- High quality motors available in a wide variety of voltages.
- Pre-wired single phase motors supplied with power cord and thermal overload protection.
- Ambient temperature  $-5\text{ °C}$  to  $+60\text{ °C}$ , A60 version for low temperature applications below  $-5\text{ °C}$ .
- Protection class IP55.
- Duty Cycle S3-40 %.
- Interchangeable with EWA 10/12.

### Options when using LSC 40.10:

- Position repeater LPR 02 for analog signal 0 – 10V or 4 – 20 mA, LPR 04 for digital signal (incremental).

### Options when using END 20:

- Auxiliary limit switch END 20.40
- Position repeater PAR 06 (potentiometer) or PAR 10 (0 – 10V).



mm [inch]

# EWA 50

50–150 Nm



Version	We 06	We 66	T [Nm]	n [1/min]	I [A]	P [kW]	m We 06 [kg]	m We 66 [kg]
	Type no.	Type no.						
<b>400 V 3~, 50 Hz</b>								
EWA 50.0503	12508.0503.12	12508.0503.32	50	2,6	0,40	0,19	18,4	19,1
EWA 50.0505	12508.0505.12	12508.0505.32	50	4,5	0,45	0,22	18,4	19,1
EWA 50.0903	12508.0903.12	12508.0903.32	90	2,6	0,45	0,23	18,4	19,1
EWA 50.0905	12508.0905.12	12508.0905.32	90	4,5	0,90	0,33	18,4	19,1
EWA 50.1503	12508.1503.12	12508.1503.32	150	2,6	0,90	0,39	18,4	19,1
EWA 50.1505	12508.1505.12	12508.1505.32	150	4,5	0,94	0,46	18,4	19,1
<b>230 V 1~, 50 Hz</b>								
EWA 50.0503	12508.0503.11	12508.0503.31	50	2,6	1,40	0,30	18,6	19,3
EWA 50.0505	12508.0505.11	12508.0505.31	50	4,5	1,50	0,32	18,6	19,3
EWA 50.0903	12508.0903.11	12508.0903.31	90	2,6	1,50	0,32	18,6	19,3
EWA 50.0905	12508.0905.11	12508.0905.31	90	4,5	1,70	0,38	19,4	20,1
EWA 50.1503	12508.1503.11	12508.1503.31	150	2,6	1,70	0,34	19,4	20,1
EWA 50.1505	12508.1505.11	12508.1505.31	150	4,5	2,80	0,62	19,5	20,2
<b>380 V 3~, 50 Hz, CCC</b>								
EWA 50.0503	–	12508.0503.3705	50	2,6	0,60	0,24	19,3	–
EWA 50.0505	–	12508.0505.3705	50	4,5	0,60	0,25	19,3	–
EWA 50.0903	–	12508.0903.3705	90	2,6	0,60	0,26	19,3	–
EWA 50.0905	–	12508.0905.3705	90	4,5	0,80	0,38	19,8	–
EWA 50.1503	–	12508.1503.3705	150	2,6	0,80	0,38	19,8	–
EWA 50.1505	–	12508.1505.3705	150	4,5	0,90	0,46	19,8	–



We 06							
Version	Type no.	T [Nm]	T [in.-lb]	n [1/min]	I [A]	P [kW]	m We 06 [kg]
<b>120 V 1~, 60 Hz, cURus Motor</b>							
EWA 50.0503	12508.0503.13	50	450	3,2	2,80	0,33	20,2
EWA 50.0505	12508.0505.13	50	450	5,4	2,90	0,34	20,2
EWA 50.0903	12508.0903.13	90	800	3,2	3,00	0,35	20,2
EWA 50.0905	12508.0905.13	90	800	5,4	3,70	0,44	20,4
EWA 50.1503	12508.1503.13	150	1300	3,2	3,60	0,43	20,4
<b>240 V 1~, 60 Hz, cURus Motor</b>							
EWA 50.0503	12508.0503.14	50	450	3,2	1,50	0,35	18,8
EWA 50.0505	12508.0505.14	50	450	5,4	1,60	0,37	18,8
EWA 50.0903	12508.0903.14	90	800	3,2	1,60	0,37	18,8
EWA 50.0905	12508.0905.14	90	800	5,4	2,00	0,46	20,2
EWA 50.1503	12508.1503.14	150	1300	3,2	2,00	0,46	20,2
<b>208 V 3~, 60 Hz, cURus Motor</b>							
EWA 50.0503	12508.0503.15	50	450	3,2	0,80	0,22	18,2
EWA 50.0505	12508.0505.15	50	450	5,4	1,00	0,26	18,8
EWA 50.0903	12508.0903.15	90	800	3,2	1,00	0,27	18,8
EWA 50.0905	12508.0905.15	90	800	5,4	1,20	0,34	18,8
EWA 50.1503	12508.1503.15	150	1300	3,2	1,20	0,33	18,8
<b>480 V 3~, 60 Hz, cURus Motor</b>							
EWA 50.0503	12508.0503.16	50	450	3,2	0,45	0,21	18,2
EWA 50.0505	12508.0505.16	50	450	5,4	0,50	0,24	18,2
EWA 50.0903	12508.0903.16	90	800	3,2	0,50	0,27	18,2
EWA 50.0905	12508.0905.16	90	800	5,4	0,70	0,33	18,8
EWA 50.1503	12508.1503.16	150	1300	3,2	0,70	0,34	18,8



Thomas Hildebrand //  
General Manager Sales Office USA

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"The North American market is of central significance to Lock. That is why we have our own subsidiary, a comprehensive inventory and skilled service staff on location. Premium service is a matter of course at Lock."



## EWA 52 // PowerDrive 250–600 Nm



- Extremely quiet, self-locking double worm gear unit with integrated limit switch and long service life, maintenance-free.
- Universal mounting thanks to standard rear or side mounting.
- End position switch-off via LSC 40 AC/DC control unit including additional limit switch. Additional limit switch. Optional precision gear limit switch END 20 for 580 shaft revolutions.
- Quality motors available for many main voltages.
- Single-phase motors pre-wired with connection cable and integrated winding protection contact.
- Ambient temperature  $-5^{\circ}\text{C}$  to  $+60^{\circ}\text{C}$ , option A60 for low temperature applications below  $-5^{\circ}\text{C}$ .
- Protection class IP 55.
- Duty cycle S3-40%.
- Installation compatible with EWA 14.

### Options when using LSC 40.10:

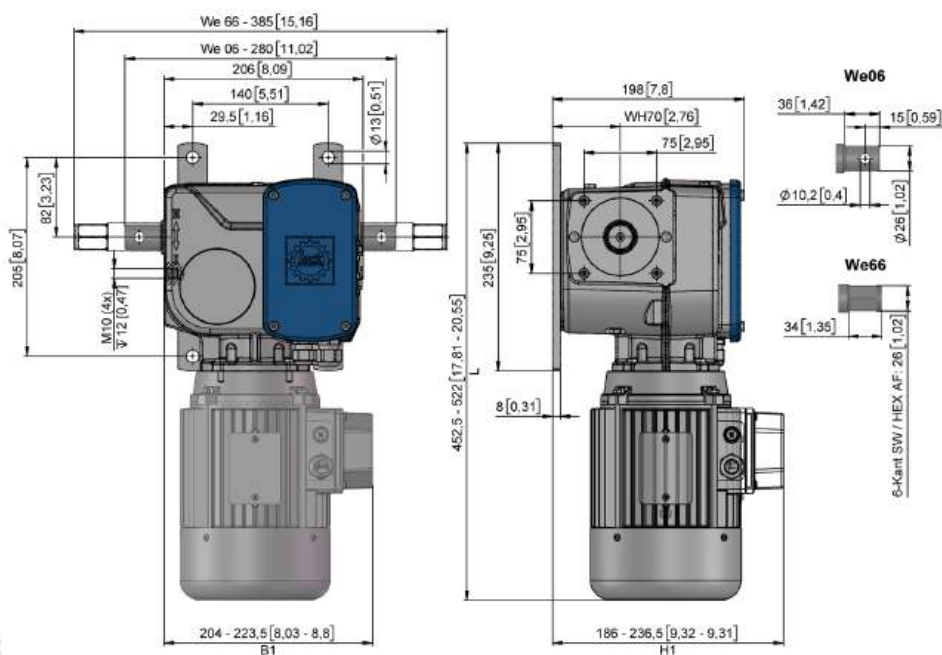
- Position indicator LPR 02 for analog signal 0-10 V or 4-20 mA, LPR 04 for digital signal (incremental).

### Options when using END 20:

- Additional limit switch END 20.40.
- Position indicator PAR 06 (potentiometer) or PAR 10 (0-10 V or 0-5 V).

### Options for pre-wired actuators:

- Connection cable with special coating for UL/CSA-compliant outdoor installation (North America).



mm [inch]

## EWA 52

250–600 Nm



Version	We 06	We 66	T [Nm]	n [1/min]	I [A]	P [kW]	m We 06 [kg]	m We 66 [kg]
	Type no.	Type no.						
<b>400 V, 3~, 50 Hz</b>								
EWA 52.1509	12528.1509.12	12528.1509.32	150	8,8	1,30	0,70	27	27,7
EWA 52.2501	12528.2501.12	12528.2501.32	250	1,6	1,00	0,43	27,7	28,4
EWA 52.2503	12528.2503.12	12528.2503.32	250	3,2	1,10	0,47	27,7	28,4
EWA 52.2505	12528.2505.12	12528.2505.32	250	4,4	1,20	0,52	27,7	28,4
EWA 52.2509	12528.2509.12	12528.2509.32	250	8,8	2,20	1,14	28,3	29
EWA 52.3503	12528.3503.12	12528.3503.32	350	3,2	1,50	0,86	27,7	28,4
EWA 52.3505	12528.3505.12	12528.3505.32	350	4,4	1,60	0,92	27,7	28,4
EWA 52.4501	12528.4501.12	12528.4501.32	450	1,6	1,10	0,47	27,7	28,4
EWA 52.4503	12528.4503.12	12528.4503.32	450	3,2	1,65	0,95	27,7	28,4
EWA 52.4505	12528.4505.12	12528.4505.32	450	4,4	1,80	1,04	27,7	28,4
EWA 52.4509	–	12528.4509.32	450	8,8	2,75	1,42	–	29
EWA 52.6003	–	12528.6003.32	600	3,2	1,80	1,04	–	28,4
EWA 52.6005	–	12528.6005.32	600	4,4	2,20	1,27	–	28,4
<b>230 V, 1~, 50 Hz</b>								
EWA 52.2501	12528.2501.11	12528.2501.31	250	1,6	2,90	0,64	28	28,7
EWA 52.2503	12528.2503.11	12528.2503.31	250	3,2	3,20	0,71	28	28,7
EWA 52.2505	12528.2505.11	12528.2505.31	250	4,4	3,50	0,77	28	28,7
EWA 52.3503	12528.3503.11	12528.3503.31	350	3,2	4,70	0,96	28,8	29,5
EWA 52.3505	12528.3505.11	12528.3505.31	350	4,4	5,00	1,02	28,8	29,5
EWA 52.4501	12528.4501.11	12528.4501.31	450	1,6	3,20	0,71	28,8	29,5
EWA 52.4503	12528.4503.11	12528.4503.31	450	3,2	4,90	1,00	28,8	29,5



Version	We 06	We 66	T [Nm]	T [in.-lb]	n [1/min]	I [A]	P [kW]	m We 06 [kg]	m We 66 [kg]	
	Type no.	Type no.								
<b>120 V, 1~, 60 Hz</b>										
EWA 52.2501	12528.2501.13	–	0250	2200	1,6	7,00	0,75	28,6	–	
EWA 52.2503	12528.2503.13	–	0250	2200	3,9	7,80	0,81	28,6	–	
<b>240 V, 1~, 60 Hz</b>										
EWA 52.2501	12528.2501.14	–	250	2200	2,0	3,4	0,78	28,8	–	
EWA 52.2503	12528.2503.14	–	0250	2200	3,8	3,80	0,87	28,8	–	
EWA 52.2505	12528.2505.14	–	0250	2200	4,4	4,25	0,97	28,8	–	
EWA 52.3503	12528.3503.14	12528.3503.34	0350	3100	3,8	4,70	1,07	28,8	29,5	
EWA 52.3505	–	12528.3505.34	0350	3100	5,2	4,85	1,14	–	29,5	
EWA 52.4503	12528.4503.14	12528.4503.34	0450	4000	3,8	4,85	1,14	28,8	29,5	
<b>208 V, 3~, 60 Hz</b>										
EWA 52.2501	12528.2501.15	–	250	2200	2,0	1,75	0,56	27,2	–	
EWA 52.2503	12528.2503.15	–	0250	2200	3,8	2,10	0,67	27,2	–	
EWA 52.2505	12528.2505.15	–	0250	2200	4,4	2,40	0,76	27,2	–	
EWA 52.3503	12528.3503.15	12528.3503.35	0350	3100	3,8	2,50	0,79	27,2	27,9	
EWA 52.3505	–	12528.3505.35	0350	3100	4,4	3,10	0,98	–	27,9	
EWA 52.4503	12528.4503.15	12528.4503.35	0450	4000	3,8	2,85	0,90	27,2	27,9	
EWA 52.4505	–	12528.4505.35	0450	4000	4,4	3,80	1,13	–	29,2	
EWA 52.6003	–	12528.6003.35	0600	5300	3,8	3,70	1,09	–	29,2	
<b>480 V, 3~, 60 Hz</b>										
EWA 52.2503	12528.2503.16	–	0250	2200	3,2	1,45	0,78	27,2	–	
EWA 52.2505	12528.2505.16	–	0250	2200	4,4	1,50	0,81	27,2	–	
EWA 52.3503	12528.3503.16	12528.3503.36	0350	3100	3,2	1,50	0,81	27,2	27,9	
EWA 52.3505	–	12528.3505.36	0350	3100	4,4	1,65	0,89	–	27,9	
EWA 52.4503	12528.4503.16	12528.4503.36	0450	4000	3,2	1,60	0,86	27,2	27,9	
EWA 52.4505	–	12528.4505.36	0450	4400	4,4	2,45	1,59	–	29,2	
EWA 52.6003	–	12528.6003.36	0600	5300	3,2	2,30	1,49	–	29,2	
EWA 52.6005	–	12528.6005.36	0600	5300	4,4	2,65	1,72	–	29,2	



## Jonas Wagner // Order Management

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"I am responsible for ensuring that our customers always receive their goods on the requested due date. In the last few years, we managed to maintain delivery rates and delivery capability at values above 98%."



## EWA 10 // Power drive 50–90 Nm



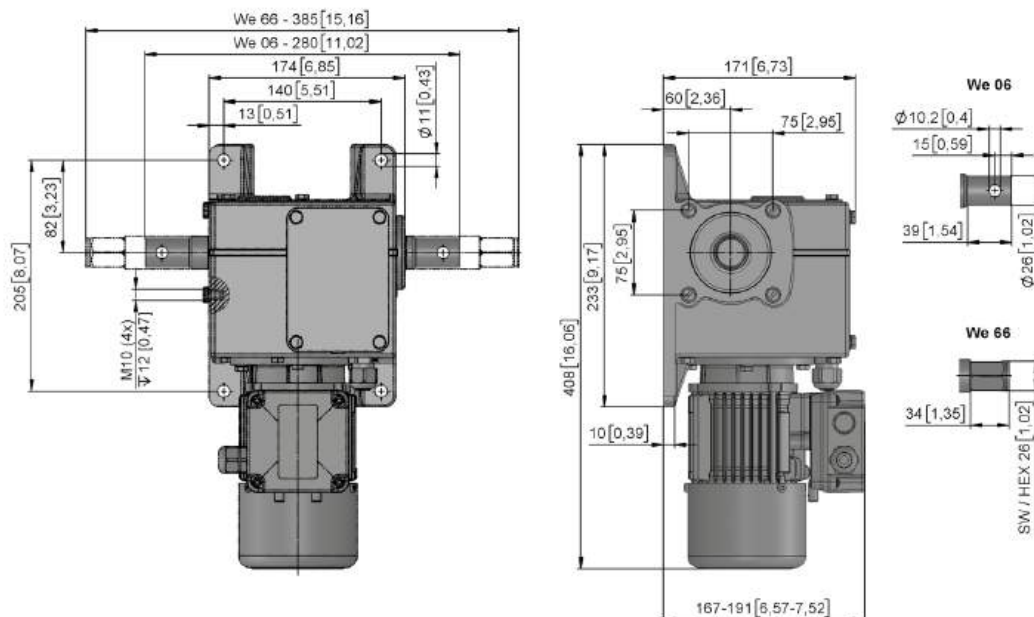
- Extremely quiet, self-locking worm gear units with long service life, zero-maintenance.
- Universal mounting with standard at back or optional on side left (symmetrical).
- Installed precision END 20 gear limit switch for 580 shaft revolutions (microswitch in cURus).
- Optional LSC 40.10 AC or DC control unit incl. additional limit switch. Wire up using a 7-core cable.
- Quality motors with multi-range voltage (IEC 38) for 50 Hz (400 V 3- // 230 V 1-). IP55, Th.Cl.F, S3-40 %.
- A coil protection contact is integrated in all single-phase motors. Turnkey with cable.
- Round shaft We 06, 90 Nm version also available with hex shaft We 66.

### Options when using the END 20.20:

- On 60 Hz versions, the END 20.40 additional limit switch is standard equipment.
- Additional limit switch END 20.40.
- Position sensor PAR 06 or PAR 10.

### Options when using LSC 40.10:

- LPR 02 position sensor for analogue signal, LPR 04 for digital signal.



mm [inch]

# EWA 10

50–90 Nm



Version	We 06	We 66	T [Nm]	n [1/min]	I [A]	P [kW]	m We 06 [kg]	m We 66 [kg]
	Type no.	Type no.						
<b>400 V 3~, 50 Hz</b>								
EWA 10.0505	12210.0505.06	-	50	5,6	0,6	0,24	15,7	-
EWA 10.0905	12210.0905.06	12210.0905.66	90	5,6	0,7	0,29	15,7	16,4
<b>230 V 1~, 50 Hz</b>								
EWA 10.0505	12210.0505.0620	-	50	5,9	1,30	0,28	18,4	-
EWA 10.0905	12210.0905.0620	12210.0905.6620	90	5,9	1,50	0,33	18,3	19,0
<b>24 VDC</b>								
EWA 10.0505	12210.0505.0640	-	35	4,2	4,00	0,10	16,5	-

## EWA 12 // Power drive

### 150–250 Nm



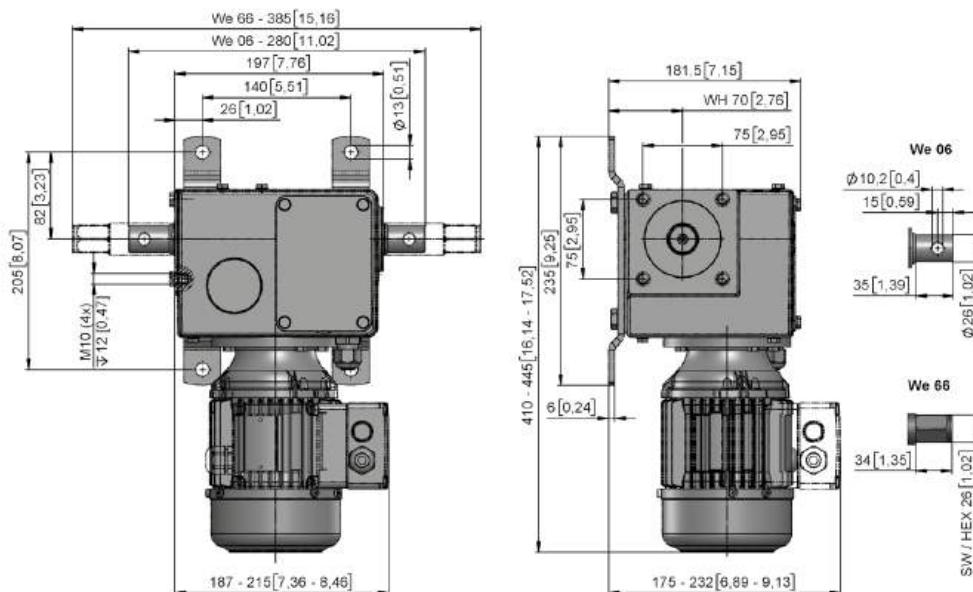
- Extremely quiet, self-locking double worm gear unit, long service life, zero maintenance.
- Universal mounting with standard at back or optional on side left (symmetrical)! Removable feet.
- Installed precision END 20 gear limit switch for 580 shaft revolutions (microswitch in cURus).
- Optional LSC 40.10 AC or DC control unit incl. additional limit switch. Wire up using a 7-core cable.
- Quality motors with multi-range voltage (IEC 38) for 50 Hz (400 V 3~ // 230 V 1~) and 60 Hz (208 V 3~ // 480 V 3~ as well as 120 V 1~ and 240 V 1~ in cURus). IP55, Th.Cl.F, S3-40 %.
- Coil protection contact integrated on all single-phase motors. Turnkey with cable.
- All versions available with hex shaft We 66 or round shaft We 06.

#### Options when using the END 20.20:

- On 60 Hz versions, the END 20.40 additional limit switch is standard equipment.
- Additional limit switch END 20.40.
- Position sensor PAR 06 or PAR 10.

#### Options when using LSC 40.10:

- LPR 02 position sensor for analogue signal, LPR 04 for digital signal.



mm [inch]



Version	We 06	We 66	T [Nm]	n [1/min]	I [A]	P [kW]	m We 06 [kg]	m We 66 [kg]
	Type no.	Type no.						
<b>24 VDC</b>								
EWA 12.0505	12212.0505.0640	–	50	4,4	7,50	0,18	19,6	–
EWA 12.0903	12212.0903.0640	–	90	3,2	8,50	0,20	19,5	–
EWA 12.1501	12212.1501.0640	–	150	1,6	9,40	0,23	19,5	–
EWA 12.2501	12212.2501.0640	–	250	1,6	11,00	0,26	19,5	–
<b>380 V 3~, 50 Hz CCC</b>								
EWA 12.2503	–	12212.2503.6647	250	3,2	1,0	0,38	–	21,1
EWA 12.2505	–	12212.2505.6647	250	4,4	1,1	0,49	–	20



Version	We 66	We 19	T [Nm]	T [in.-lb]	n [1/min]	I [A]	P [kW]	m We 06 [kg]	m We 66 [kg]
	Type no.	Type no.							
<b>600 V 3~, 60 Hz, cURus</b>									
EWA 12.2505		12212.2505.6668	250	2200	5,3	1,1	0,66		21,1

## EWA 14 // Power drive 350–600 Nm



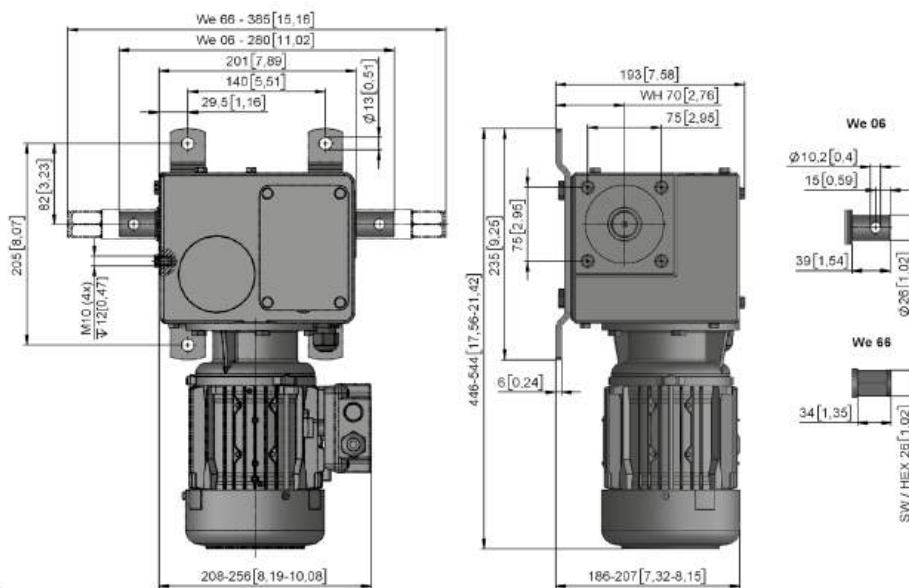
- Extremely quiet, self-locking double worm gear unit with long service life, maintenance-free. Fast version EWA 14.2539 and EWA 14.2060 without self-locking.
- Universal mounting with standard at back or optional on side left (symmetrical)! Removable feet.
- Installed precision END 20 gear limit switch for 580 shaft revolutions (microswitch in cURus).
- Optional LSC 40.10 AC or DC control unit incl. additional limit switch. Wire up using a 7-core cable.
- Quality motors, multi-range voltage (IEC 38) for 50 Hz (400 V 3~ // 230 V 1~) and 60 Hz (208 V 3~ // 480 V 3~ as well as 240 V 1~ in cURus). IP55, Th.Cl.F, S3-40%.
- Coil protection contact integrated on all single-phase motors. Turnkey with cable.
- Hex shaft We 66, up to 450 Nm also available with round We 06 shaft (then position drive unit centrally!).

### Options when using the END 20.20:

- On 60 Hz versions, the END 20.40 additional limit switch is standard equipment.
- Additional limit switch END 20.40.
- Position sensor PAR 06 or PAR 10.

### Options when using LSC 40.10:

- LPR 02 position sensor for analogue signal, LPR 04 for digital signal.



mm [inch]

## EWA 14

350–600 Nm





**We 06**  
WL 280 mm



**We 66**  
WL 385 mm

→ Tabelle Teil 1 von 2

Version	We 06	We 66	T [Nm]	n [1/min]	I [A]	P [kW]	m We 06 [kg]	m We 66 [kg]
	Type no.	Type no.						
<b>400 V 3~, 50 Hz – Keine Selbsthemmung</b>								
EWA 14.2539	–	12214.2539.66	250	39,0	4,30	2,44	–	35,0
EWA 14.2060	–	12214.2060.66	200	60	5,26	2,79	–	35,8
<b>230 V 1~, 50 Hz</b>								
EWA 14.2013	12214.2013.0625		200	13	6,35	2,45	27,8	
<b>380 V 3~, 50Hz CCC</b>								
EWA 14.4503	–	12214.4503.6647	450	3,2	1,4	0,63	–	26,3
EWA 14.4505	–	12214.4505.6647	450	4,4	1,6	0,72	–	26,5

## EWA 14

350–600 Nm





**We 06**  
WL 280 mm



**We 66**  
WL 385 mm

Version	We 06	We 66	T [Nm]	T [in.-lb]	n [1/min]	I [A]	P [kW]	m We 06 [kg]	m We 66 [kg]
	Type no.	Type no.							
<b>240 V 1~, 60 Hz, cURus</b>									
EWA 14.2013	12214.2013.0637		200	1800	13	5,7	2,32	27,8	
<b>600 V 3~, 60 Hz, cURus</b>									
EWA 14.4503	–	12214.4503.6668	450	4000	3,8	1,3	1,03	–	26,3
EWA 14.4505	–	12214.4505.6668	450	4000	5,2	1,4	1,11	–	26,3
EWA 14.6003	–	12214.6003.6668	600	5300	3,8	1,4	1,18	–	26,3
EWA 14.6005	–	12214.6005.6668	600	5300	5,2	1,7	1,43	–	27,6

# EWA 16 // Power drive

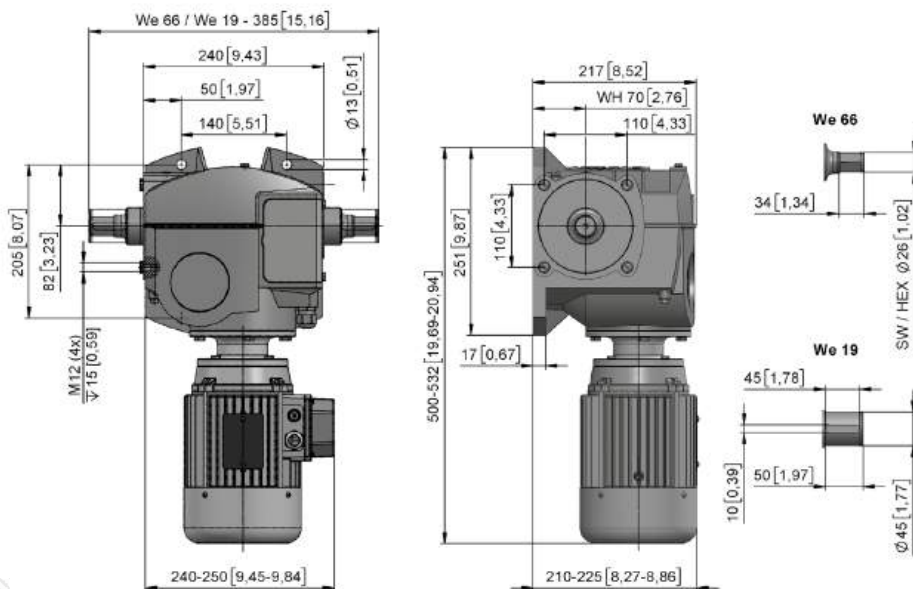
## 900–2000 Nm



- Extremely quiet, self-locking double worm gear unit with long service life, zero maintenance.
- Universal assembly with standard mounting at back or on side left (symmetrical)!
- Installed precision END 20 gear limit switch for 395 shaft revolutions (microswitch in cURus). END 20.40 auxiliary limit switch fitted as standard!
- Quality motors, multi-range voltage (IEC 38) for 50 Hz (400 V 3) and 60 Hz (208 V 3- // 480 V 3- in cURus). IP55, Th.Cl.F, S3-40%.
- We 19 key spring shaft, up to 1200 Nm also with We 66 hex shaft (then place the drive in the center of the system, decrease of torque must be equal at both shaft ends).

**Options:**

- On 60 Hz versions, the END 20.40 additional limit switch is standard equipment.
- Additional limit switch END 20.40.
- Position sensor PAR 06 or PAR 10.



mm [inch]

# EWA 16

900–2000 Nm



Version	We 66	We 19	T [Nm]	n [1/min]	I [A]	P [kW]	m We 66 [kg]	m We 19 [kg]
	Type no.	Type no.						
<b>400 V 3~, 50 Hz</b>								
EWA 16.9003	12216.9003.6601	–	900	2,4	1,70	0,87	41,7	–
EWA 16.9005	12216.9005.6601	–	900	4,9	2,90	1,81	42,3	–
EWA 16.9203	12216.9203.6601	12216.9203.1901	1200	2,4	2,50	1,35	42,1	42,8
EWA 16.9205	12216.9205.6601	12216.9205.1901	1200	4,9	4,90	2,31	46,3	47,0
EWA 16.9503	–	12216.9503.1901	1500	2,4	2,80	1,61	–	46,0
EWA 16.9505	–	12216.9505.1901	1500	4,9	5,20	2,74	–	47,0
EWA 16.9703	–	12216.9703.1901	2000	2,4	3,70	2,23	–	49,9

Version	We 66	We 19	T [Nm]	T [in.-lb]	n [1/min]	I [A]	P [kW]	m We 66 [kg]	m We 19 [kg]
	Type no.	Type no.							
<b>208 V 3~, 60 Hz, cURus</b>									
EWA 16.9005	12216.9005.6611	–	900	8000	5,8	6,50	2,06	44,9	–
EWA 16.9205	12216.9205.6611	12216.9205.1911	1200	10600	5,8	7,90	2,59	44,9	45,6
<b>480 V 3~, 60 Hz, cURus</b>									
EWA 16.9003	12216.9003.6616	–	900	8000	2,9	2,10	1,19	41,9	–
EWA 16.9005	12216.9005.6616	–	900	8000	5,8	4,60	2,29	44,9	–
EWA 16.9205	12216.9205.6616	12216.9205.1916	1200	10600	5,8	5,00	2,70	44,9	45,6
EWA 16.9505	–	12216.9505.1916	1500	13300	5,8	5,20	3,03	–	45,6
<b>600 V 3~, 60 Hz, cURus</b>									
EWA 16.9003	12216.9003.6668	–	900	8000	2,9	1,3	1,07	–	41,9
EWA 16.9005	12216.9005.6668	–	900	8000	5,8	3,9	2,11	–	44,9
EWA 16.9205	12216.9205.6668	12216.9205.1968	900	8000	5,8	4,2	2,66	44,9	45,6
EWA 16.9505	–	12216.9505.1968	900	8000	5,8	4,6	3,25	–	45,6



## Steffen Rehm // Housing Team

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„When manufacturing our products, we focus on achieving ultimate precision and optimum processes. Our high level of vertically integrated production enables us to achieve the premium quality Lock is renowned for within our own company.“

## LPR 02, LPR 04 // Position sensors



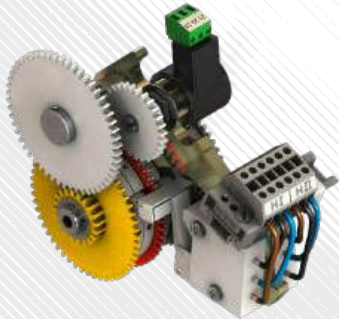
- Optional in the LSC 40.10, an integrated, high-resolution position sensor.
- One version for all rotational speeds – without additional components.
- No additional teach-in is required.
- Output signal scaled automatically between H1 and H2.
- No mechanical limit stop / wear.
- Supply voltage 24 V DC.
- LPR 02: analogue outputs with 0 – 10 V, 4 – 20 mA.
- LPR 04: analogue outputs with 0 – 10 V, 4 – 20 mA and digital output with incremental A/B track.

**Notice:**

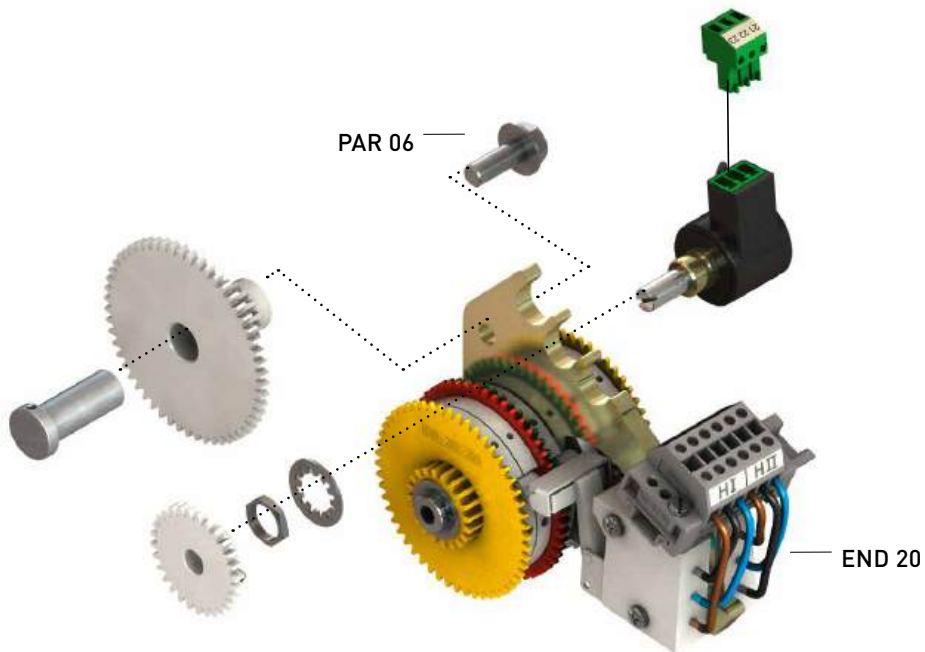
Please select the LPR option when ordering your EWA because retro-fitting is a costly proposition.

Version	Type no.	Analogue output signal	Digital output signal / level
LPR 02	36102.0101.0001	0 – 10 V / 4 – 20 mA	–
LPR 04	36104.0101.0001	0 – 10 V / 4 – 20 mA	Incremental A/B track / 12 V

## PAR 06 // Position repeater



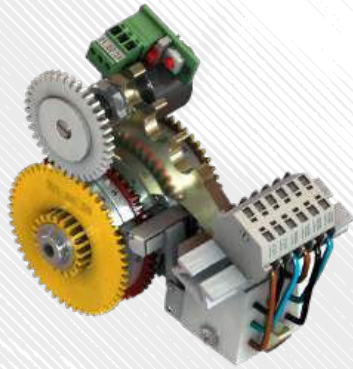
- Position repeater for EWA power drives and EZW power racks for repeating position of drive unit to the feedback control system (comprising potentiometer and potentiometer gears).
- Position repeater available mounted on END 20 limit switch. Also suitable for retro-fitting.
- Simple to install thanks to plug-in miniature terminal strips.
- A potentiometer and potentiometer gears (20, 28 or 37 teeth) facilitate feedback control of output shaft from 0.5–85 revolutions on EWA 10/12/14 and EWA 50 as well as 0.5–57 revolutions on EWA 16.



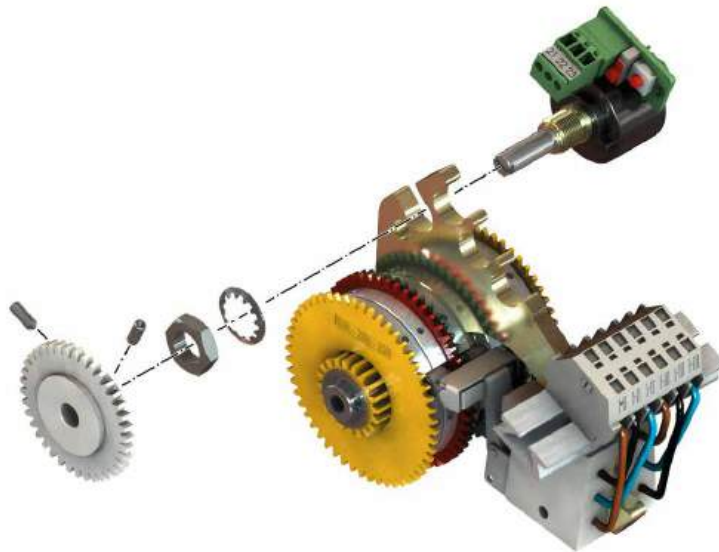
→ Choose a potentiometer in relation to the type of EWA unit and the required number of shaft revolutions.  
 Please note: The table values indicate the maximum number of shaft revolutions on the drive unit based on the potentiometer range.

EWA 10/12/14/ 50	EWA 16	Potentiometer i	Gear Number of teeth	Version	Resistance 5000 Ω	Resistance 10000 Ω
Shaft revolution	Shaft revolution				Type no.	Type no.
1,3	0,9	1:1	20	PAR 06.0390	–	30806.0390.1020
4,0	2,6	3:1	20	PAR 06.0370	30806.0370.0520	30806.0370.1020
6,7	4,5	5:1	20	PAR 06.0360	30806.0360.0520	30806.0360.1020
13,5	9,1	10:1	20	PAR 06.0330	30806.0330.0520	30806.0330.1020
19,3	13,0	3:1	28	PAR 06.0370	30806.0370.0528	30806.0370.1028
25,5	17,3	3:1	37	PAR 06.0370	30806.0370.0537	30806.0370.1037
32,2	21,8	5:1	28	PAR 06.0360	30806.0360.0528	30806.0360.1028
42,6	28,9	5:1	37	PAR 06.0360	30806.0360.0537	30806.0360.1037
64,5	43,7	10:1	28	PAR 06.0330	30806.0330.0528	30806.0330.1028
85,4	57,9	10:1	37	PAR 06.0330	30806.0330.0537	30806.0330.1037

## PAR 10 // Position Repeater



- Programmable multiturn sensor to provide positional feedback for Power Drives EWA and Power Racks EZW
- Pre-assembled or retrofit for limit switch END 20
- „Electronical Pot meter“ replaceable against PAR 06
- Number of shaft rotations 0.1 to 190 can be evaluated
- One version for all rotational speeds, with no intermediate gearbox
- Simple teaching in, using two buttons on the device, with status displayed by LED
- Signal output 0–10 V analogue (invertible). New: 0–5 V.
- Power supply 16–30 V DC // same connection as PAR 06
- No mechanical limit stop and no mechanical wear
- Ambient temperature range -40°C to +85°C
- High resolution for very precise positioning, no signal jumps



Version	Type no.	Type no. Potentiometer	EWA 10/12/14	EWA 16	Output signal
			Shaft revolution	Shaft revolution	
PAR 10.0310	30810.0310.0037	30851.1020.0001	195	132	0–10 V
PAR 10.0305	30810.0305.0037	30851.1020.0002	195	132	0–5 V

# EZW – The original

Robust, zero-maintenance, uncomplicated:  
The cost-effective and reliable alternative to hydraulic and pneumatic solutions.

Originally developed for ventilation applications in greenhouses, and built very robustly indeed, this drive unit is resistant to extremely dirty environments, high humidity levels and severe temperature fluctuations.

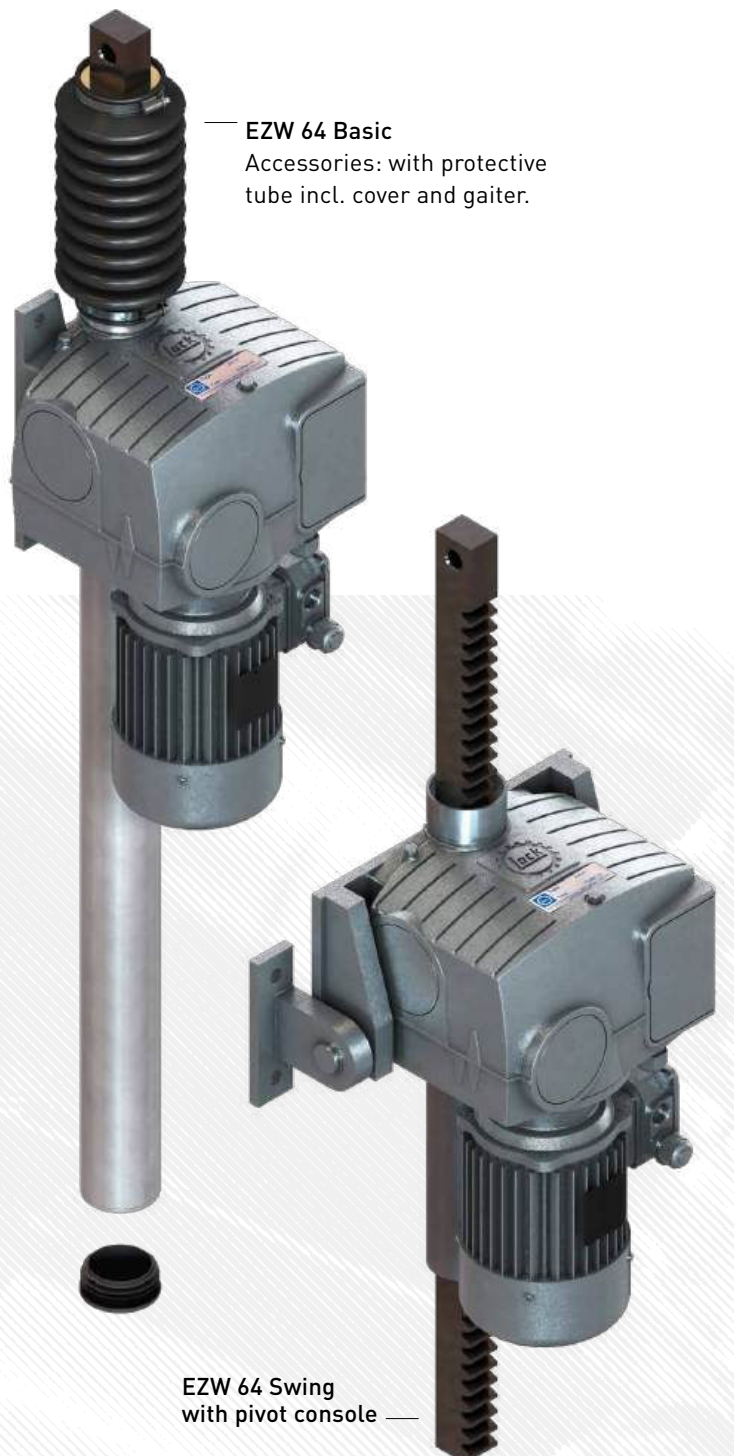
For many years, they have been in service in the harshest of industrial environments: malting houses, cement processing machinery, industrial furnaces and in the broadest range of other applications conceivable where local spot loads have to be moved safely and reliably.

## Performance features:

- 5000–20000 N loading for traction and compression
- 600–1200 mm rack stroke
- Dynamic self-locking
- Integrated limit switches

## Options/Accessories:

- Extended rack lengths
- PAR 06, PAR 10 position repeater
- Special voltages on request
- Rack guard
- Swing-Version with pivot console
- Rack and pinion lubricator



**EZW 64 Basic**

Accessories: with protective tube incl. cover and gaiter.

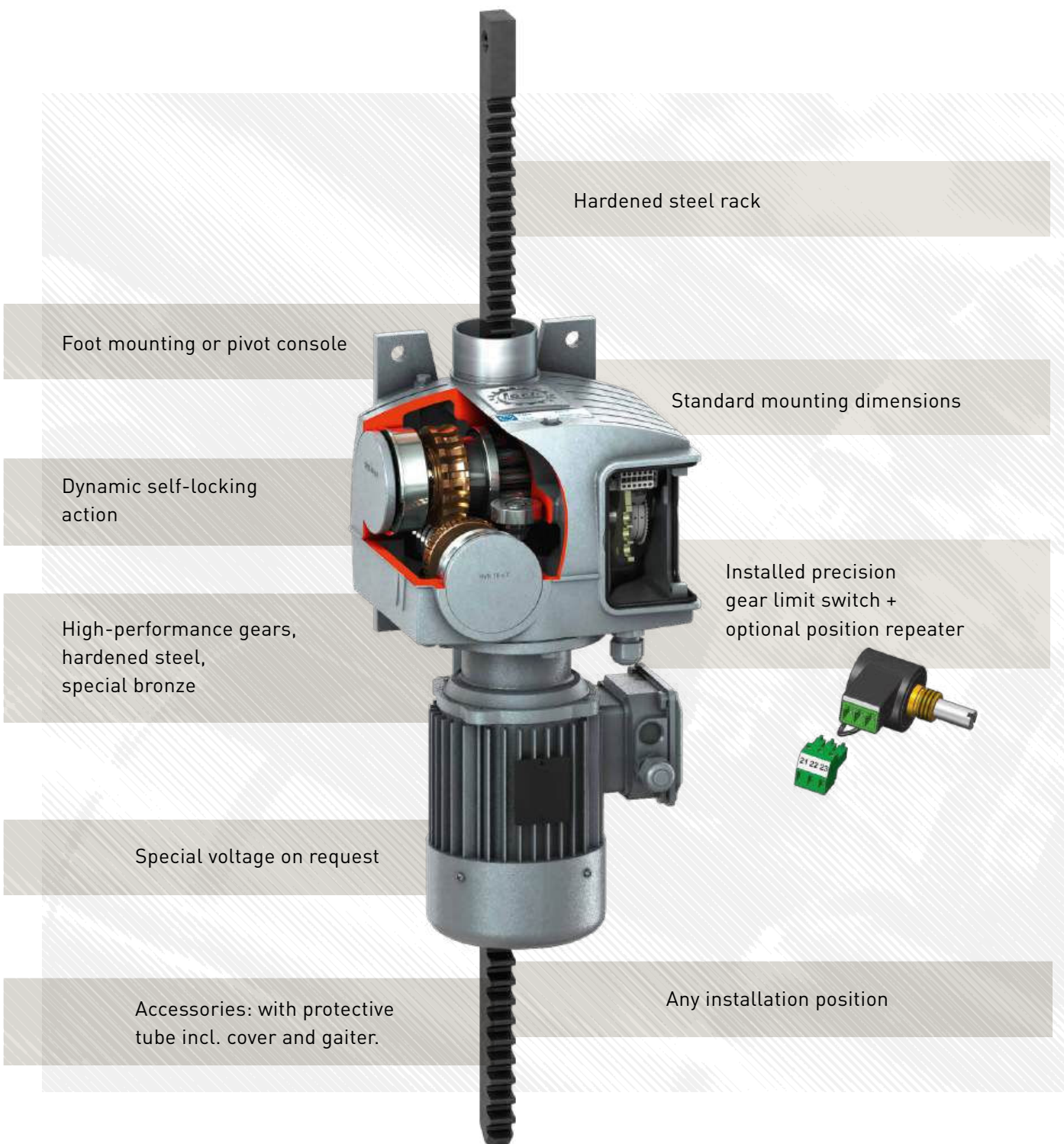
**EZW 64 Swing**  
with pivot console

## Michael Diesch // Product Design

“Since 1959 we have been manufacturing EZW power racks and we are the only manufacturer in the world of this kind of unit. Many of our EZW units have been in service for more than 30 years under the harshest of operating conditions.”



# Robust from more than 100 years of experience



Hardened steel rack

Foot mounting or pivot console

Standard mounting dimensions

Dynamic self-locking action

Installed precision gear limit switch + optional position repeater

High-performance gears, hardened steel, special bronze

Special voltage on request

Accessories: with protective tube incl. cover and gaiter.

Any installation position



## EZW 64 // Power racks

### 5000–20000 N

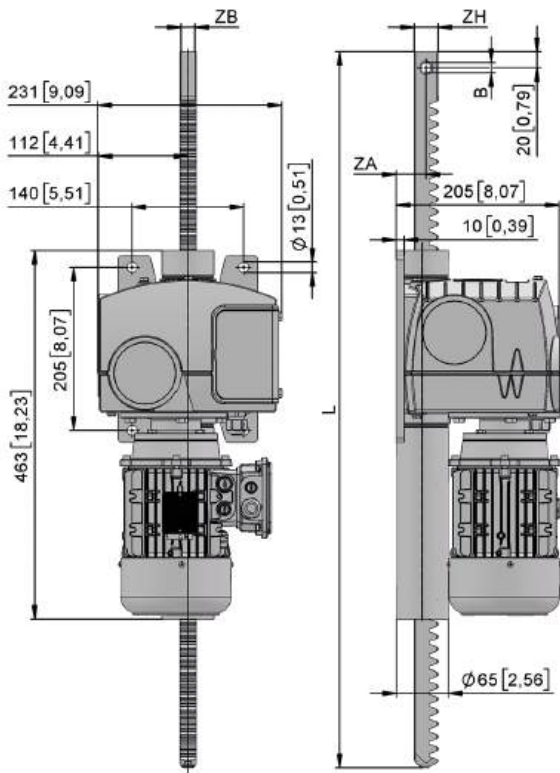


- Adjusting drive suitable for traction and compression loadings. Cast iron housing with self-locking double worm gear unit and gear rack.
- Installed precision END 20 gear limit switch (microswitch in cURus), infinitely variable.
- Quality motors, multi-range voltage [IEC 38] for 50 Hz (400 V 3~/230 V 1~). IP 55, TH.CL.F, S3 - 40 %, special motors on request.
- Standard stroke lengths H = 600 mm, = 800 mm, =1000 mm, = 1200 mm, etc.. Above stroke length 1500 mm (EZW 64.05), resp. 1700 mm (EZW 64.10 and EZW 64.20) pls. note reduced compression force.
- Suitable temperature range from -5 to +60°C.
- Emergency operation possible by using power screwdriver in case of power failure.
- Protective tube with cover and gaiter available as accessory.

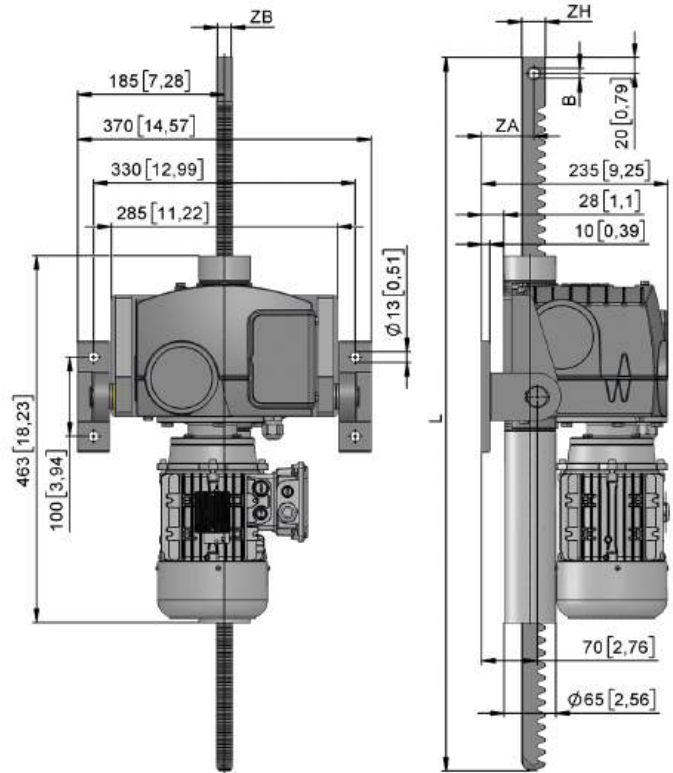
#### Option:

- Torque-free pivot console (EZW 64 Swing) for pivoting movements.
- END 20.40 auxiliary limit switch.
- PAR 06 or PAR 10 position repeater.
- Version A60 for outdoor use and temperatures down to -15°C.
- Version for 30000N load capacity and stroke speed of 250mm/min available on request.
- For replacement with old EZW 35-37 drives a baseplate with identical hole pattern is available.

EZW 64 Basic

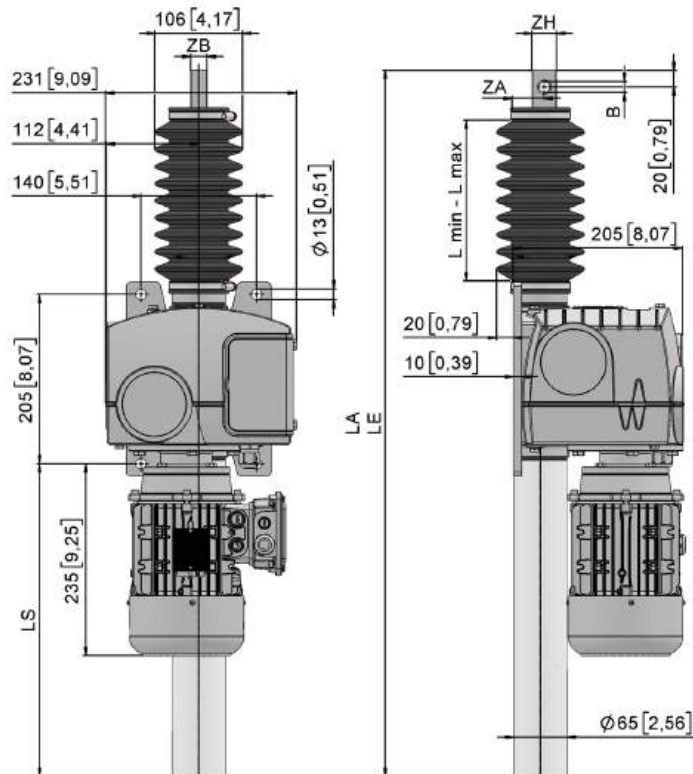


EZW 64 Swing



Accessories:

EZW 64 with protective tube incl. cover and gaiter.



mm [inch]

# EZW 64 // Drive unit

## 5000–20000 N



EZW 64 Basic



EZW 64 Swing

→ Table Part 1 of 3

Version	Basic		Swing		F [N]	v [mm/min]	I [A]	P [kW]	ZA Basic [mm]	ZA Swing [mm]	m Basic [kg]	m Swing [kg]
	Type no.	Type no.	Type no.	Type no.								
<b>400 V 3~, 50 Hz</b>												
EZW 64.0502	11264.0502.10	11264.0502.20			5000	250	1,1	0,63	38,0	66,0	32,2	36,8
EZW 64.0504	11264.0504.10	11264.0504.20			5000	450	1,2	0,69	38,0	66,0	32,2	36,8
EZW 64.0506	11264.0506.10	11264.0506.20			5000	600	1,3	0,75	38,0	66,0	32,3	36,9
EZW 64.1002	11264.1002.10	11264.1002.20			10000	250	1,2	0,69	35,0	63,0	32,2	36,8
EZW 64.1004	11264.1004.10	11264.1004.20			10000	450	1,3	0,75	35,0	63,0	32,2	36,8
EZW 64.1006	11264.1006.10	11264.1006.20			10000	600	1,4	0,81	35,0	63,0	32,3	36,9
EZW 64.2002	11264.2002.10	11264.2002.20			20000	250	1,3	0,75	33,0	61,0	32,2	36,8
EZW 64.2004	11264.2004.10	11264.2004.20			20000	450	1,6	0,92	33,0	61,0	32,2	36,8
EZW 64.2006	11264.2006.10	11264.2006.20			20000	600	1,8	1,04	33,0	61,0	32,3	36,9
<b>230 V 1~, 50 Hz</b>												
EZW 64.0502	11264.0502.1020	11264.0502.2020			5000	250	2,6	0,57	38,0	66,0	33,3	37,9
EZW 64.0504	11264.0504.1020	11264.0504.2020			5000	450	2,7	0,60	38,0	66,0	33,3	37,9
EZW 64.0506	11264.0506.1020	11264.0506.2020			5000	600	2,9	0,64	38,0	66,0	33,4	38,0
EZW 64.1002	11264.1002.1020	11264.1002.2020			10000	250	2,8	0,62	35,0	63,0	33,3	37,9
EZW 64.1004	11264.1004.1020	11264.1004.2020			10000	450	3,1	0,68	35,0	63,0	33,3	37,9
EZW 64.1006	11264.1006.1020	11264.1006.2020			10000	600	3,3	0,73	35,0	63,0	33,4	38,0
EZW 64.2002	11264.2002.1020	11264.2002.2020			20000	250	3,3	0,73	33,0	61,0	33,3	37,9

# EZZ 64 // Racks

## 5000–20000 N



→ Table Part 2 of 3

Version	Type no.	H [mm]	L [mm]	ZH [mm]	ZB [mm]	B [mm]	m [kg]
<b>5000 N</b>							
EZZ 64.0506	11264.0597.06	600	900	30	20	13,0	3,5
EZZ 64.0508	11264.0597.08	800	1100	30	20	13,0	4,3
EZZ 64.0510	11264.0597.10	1000	1300	30	20	13,0	5,1
EZZ 64.0512	11264.0597.12	1200	1500	30	20	13,0	5,8
<b>10000 N</b>							
EZZ 64.1006	11264.1097.06	600	900	35	25	16,5	5,2
EZZ 64.1008	11264.1097.08	800	1100	35	25	16,5	6,4
EZZ 64.1010	11264.1097.10	1000	1300	35	25	16,5	7,5
EZZ 64.1012	11264.1097.12	1200	1500	35	25	16,5	8,7
<b>20000 N</b>							
EZZ 64.2006	11264.2097.06	600	900	40	30	16,5	7,3
EZZ 64.2008	11264.2097.08	800	1100	40	30	16,5	8,9
EZZ 64.2010	11264.2097.10	1000	1300	40	30	16,5	10,5
EZZ 64.2012	11264.2097.12	1200	1500	40	30	16,5	12,2

# Accessories



EZZ 64.9810

→ Table Part 3 of 3

Version	Type no.	H [mm]	LS [mm]	LA [mm]	LE [mm]	Info	m [kg]
EZZ 64.9810	11264.9810.0003	600	700	1550	950	Protective tube with cover	0,9
EZZ 64.9810	11264.9810.0004	800	900	1950	1150	Protective tube with cover	1,2
EZZ 64.9810	11264.9810.0005	1000	1100	2350	1350	Protective tube with cover	1,5
EZZ 64.9810	11264.9810.0006	1200	1300	2750	1550	Protective tube with cover	1,8

# Accessories



EZZ 64.9820

→ Table Part 3 of 3

Version	Type no.	L min / L max [mm]	Info	m [kg]
<b>For 5000 N rack</b>				
EZZ 64.9820	11264.9820.0001	200-1000	Gaiter	1,1
EZZ 64.9820	11264.9820.0002	280-1450	Gaiter	1,5
<b>For 10000 N rack</b>				
EZZ 64.9821	11264.9821.0001	200-1000	Gaiter	1,1
EZZ 64.9821	11264.9821.0002	280-1450	Gaiter	1,5
<b>For 20000 N rack</b>				
EZZ 64.9822	11264.9822.0001	200-1000	Gaiter	1,1
EZZ 64.9822	11264.9822.0002	280-1450	Gaiter	1,5

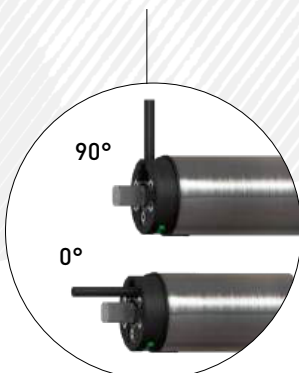
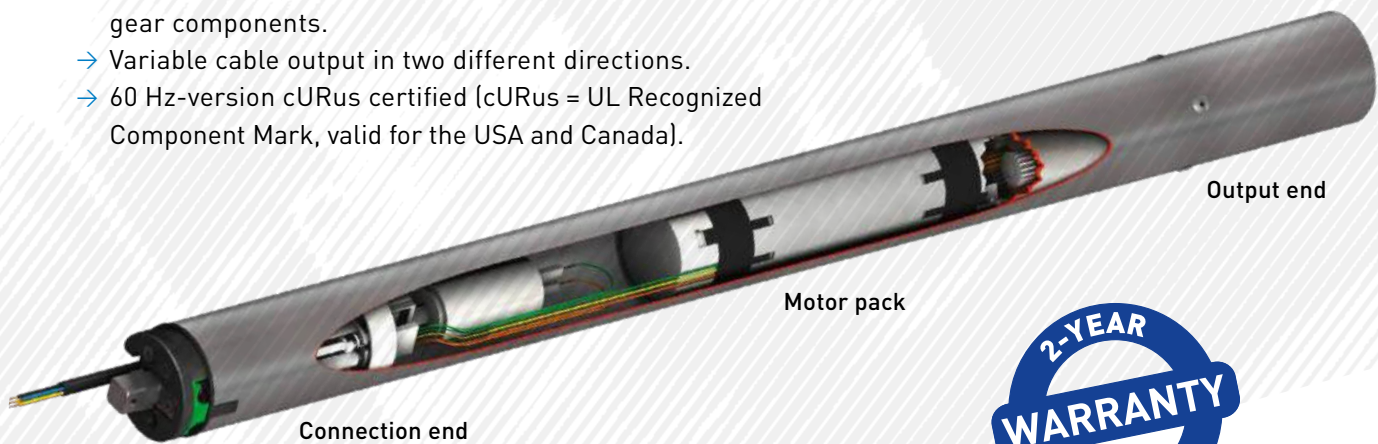
# RMA 20 – Steel teeth

## The long-life tube motor



The RMA 20 tube motor: Thanks to a steel gear unit and a fully-developed motor pack, this delivers great reliability and long service life.

- Torques of 50 Nm and 120 Nm.
- 2 years of warranty, Made in Germany.
- Compact design with zero-maintenance and quiet-running gear components.
- Variable cable output in two different directions.
- 60 Hz-version cURus certified (cURus = UL Recognized Component Mark, valid for the USA and Canada).



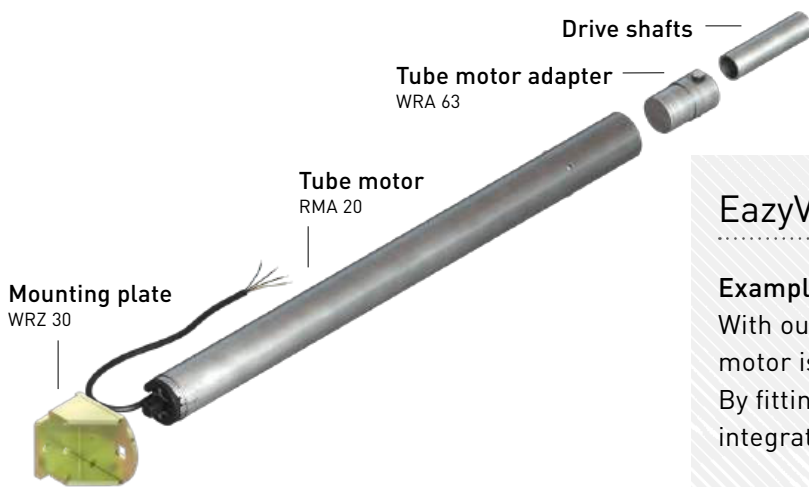
### Patrick Niederer // R & D

“We see our tube motors between a manual drive HWA and an power drive EWA. Depending on the application and environmental conditions, the tube motor represents the ideal solution. Please ask us in advance for technical advice.”



## We did not invent the tube motor, but we did turn it into a Lock product

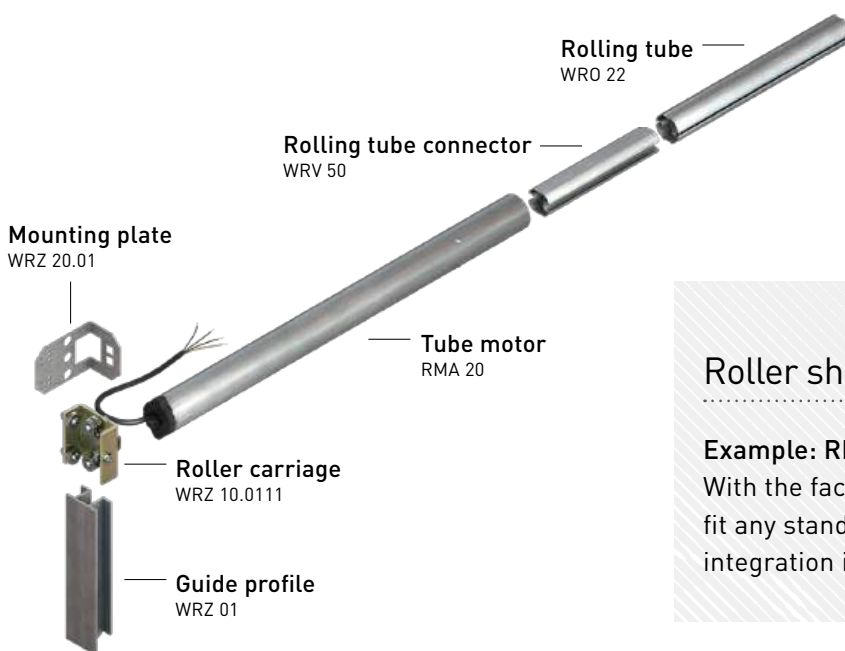
The RMA 20 is used to drive roller sheeting systems such as internal shading, partition walls or rolling systems.



### EazyVent®

**Example: RMA 20, 120 Nm**

With our low-cost rolling system, our RMA 20 tube motor is an interesting alternative form of drive. By fitting various adapters, the RMA 20 can be integrated flexibly in the system.



### Roller sheeting

**Example: RMA 20, 50 Nm**

With the factory-fitted aluminium tube, it is easy to fit any standard 50 mm or 63 mm winding tubes: integration in the rolling system is an easy task.

# RMA 20 // Tube motor

## 50–120 Nm

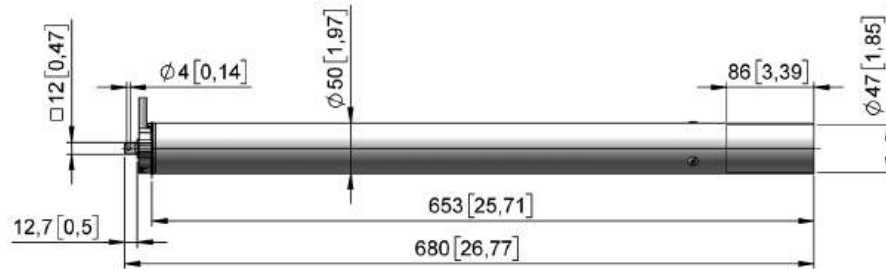


- Robust tube motor for driving roller sheeting systems such as for internal shading, partition walls or rolling systems.
- Compact design with zero-maintenance and low-noise steel gear units.
- Operating mode S2 4 min. type of protection IP 44.
- Asynchronous motor with installed mechanical precision limit switch for 22 revolutions.
- With aluminium tube 50 x 1.5 / 63 x 1.5 mm for connection by coupling to a 50 / 63 mm rolling tube.
- Shaft journal 12 x 12 / 16 x 16 mm with cotter pin for connection to guidance system.
- High-quality 4 m length of connection cable, UV-resistant.

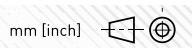
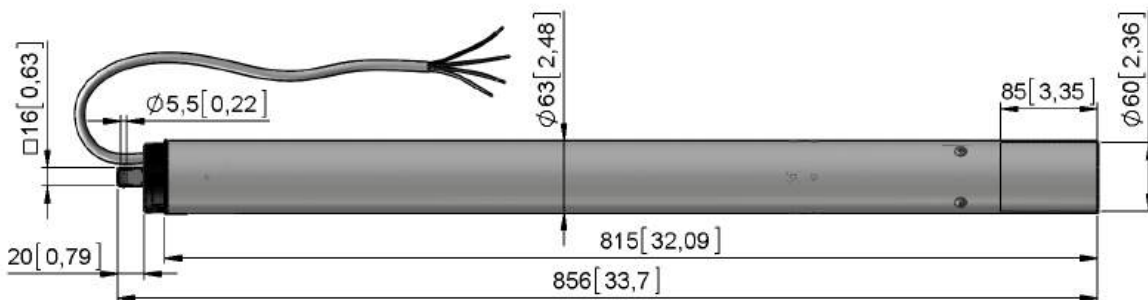
**Note:**

- We are always pleased to provide you with technical advice because performance and service life depend very much on the design of your application. Please refer to Chapters 1 and 2 for typical applications.
- The tube motor needs to be protected against water ingress.

**RMA 20.05**  
50 Nm



**RMA 20.12**  
120 Nm



## RMA 20

50–120 Nm



RMA 20.05



RMA 20.12

Version	Type no.	T [Nm]	n [1/min]	I [A]	m [kg]
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### 230 V 1~, 50 Hz

RMA 20.0512	17220.0512.50	50	12,0	1,5	4,2
RMA 20.1212	17220.1212.63	120	11,0	1,9	6,8

Version	Type no.	T [Nm]	T [in.-lb]	n [rpm]	I [A]	m [kg]
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### 120 V 1~, 60 Hz

RMA 20.0512	17220.0512.5030	50	450	12,0	2,3	4,3
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## Accessories



Version	Type no.	Info
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### Connection end (guide end)

WRZ 01**	81801.01.xx	Guide profile // L = 2.00–6.00 m // aluminium
WRZ 10.0111	81810.0111	Roller carriage for RMA 20.05
WRZ 10.0122	81810.0122	Roller carriage for RMA 20.12

WRZ 20.5011	81820.5011	Cable guide chain
WRZ 20.9102	81820.9102	Start clip (not illustrated)
WRZ 20.9111	81820.9111	End clip (not illustrated)
WRZ 20.0111	81820.0111	Mounting plate for RMA 20.05
WRZ 20.0112	81820.0112	Mounting plate for RMA 20.12

WRZ 30.0105	81830.0105	Mounting plate for stationary assembly RMA 20.05
WRZ 30.0112	81830.0112	Mounting plate for stationary assembly RMA 20.12

### Output side (tube side)

WRA 50.0222	20998.5002.22	Tube motor adapter for RMA 20.05 and tube $\varnothing$ 22 x 2 mm
WRA 50.0232	20998.5002.32	Tube motor adapter for RMA 20.05 and tube $\varnothing$ 32 x 1.5 mm
WRA 50.0234	20998.5002.34	Tube motor adapter for RMA 20.05 and tube 1"
WRA 63.0222	20998.6302.22	Tube motor adapter for RMA 20.12 and tube $\varnothing$ 22 x 2 mm
WRA 63.0232	20998.6302.32	Tube motor adapter for RMA 20.12 and tube $\varnothing$ 32 x 1.5 mm
WRA 63.0234	20998.6302.34	Tube motor adapter for RMA 20.12 and tube 1"

WRO 22.5015	81622.5015.1050	Roller tube // $\varnothing$ 50 x 1.5 mm // L = 5.00 m, aluminium
WRV 50.2246	81650.2246.2004	Roller tube connector // $\varnothing$ 50 mm roller tube
WRV 50.2260	81650.2260.2010	Roller tube connector // $\varnothing$ 63 mm roller tube

→ Detailed Information and dimensional drawings, see Accessories, Chapter 10







LOCK BEWEGT // LOCK MOVES

# LockLogic®

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## Intelligent drive solutions 2

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SpeedLogic



4

TurboLogic



6

## Limit switch system

---

ESS 40



8

# LockLogic®: proven mechanism and innovative electronics



## The advantages of LockLogic®

- High levels of functional and operational safety.
- Saving in wiring.
- Integrated drive solutions with decentralised intelligence.
- Saving with a separate reversible contactor control unit.
- Soft-start and precise overload disengagement/cutout.
- Combination of frequency inverter and mechanical limit switch.
- Open interface.
- Variable speeds for fast movement.
- Tried and tested in practice.

## Open slowly – closing pronto: TurboLogic!

Using the EWA 75 in conjunction with the ESS 40 limit switch system, closing times of less than two minutes can be achieved, specifically in push-rod ventilation systems in open-roof and Venlo glass structures! This unit delivers up to 35 revolutions per minute and torque ratings of up to 1200 Nm. With the Luv/Lee option, the system can move into a rain setting while retaining full operational reliability and safety.



## Frank Lock // CEO

“As a pioneer in the ventilation and screening sector, we are committed to the topic of innovation in all areas. The connection or interface between mechanical and electronic systems occupies a central position here. This is a great challenge because of the particular conditions governing animal shed and horticultural construction environments.”



## Open slowly– close fast: SpeedLogic!

SpeedLogic drives are suitable for situations where drive units close at up to three times normal speed on all kinds of ventilation and screening applications.

The combination of EWA 10–EWA16 power drive and SPL frequency inverter makes speeds of up to 15 revolutions per minute (rpm) possible – pre-configured in stages in a user-friendly manner. The frequency inverter makes it possible to dispense with the need for a reversing contactor control unit.

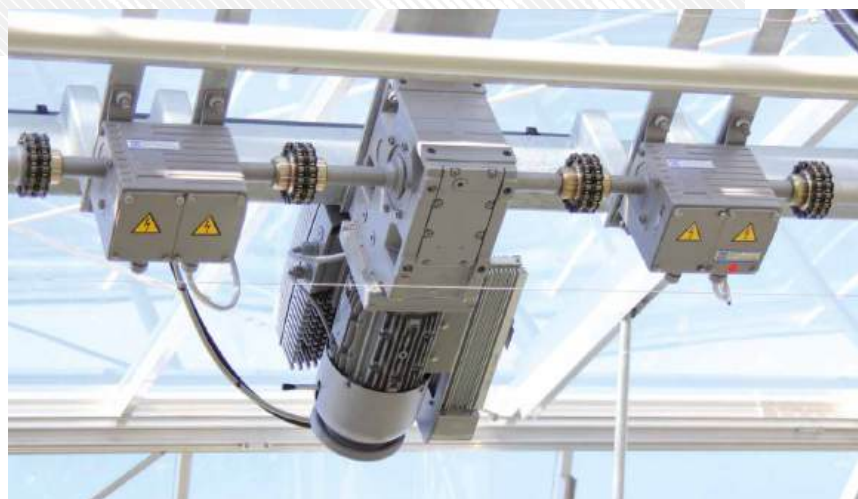


Example:  
EWA 12 + SPL 60



## Shifting positions simply and safely: ESS 40

The electromechanical ESS 40 switch system can be used in the TurboLogic combination and as a stand-alone limit switch system or position switch – Thanks to tried and tested Lock END 20 gear limit switches, a safe and reliable process!



# SpeedLogic SPL 30

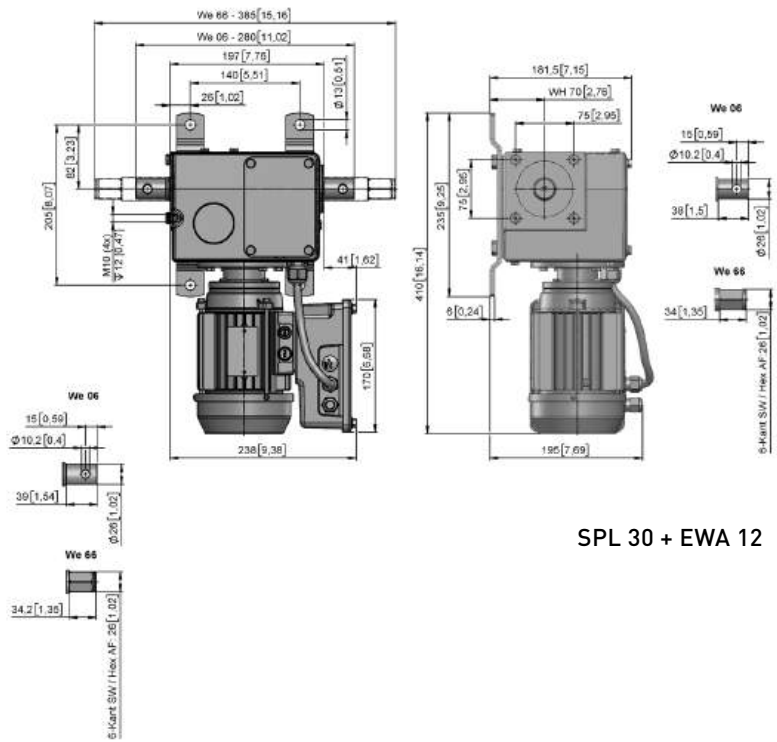
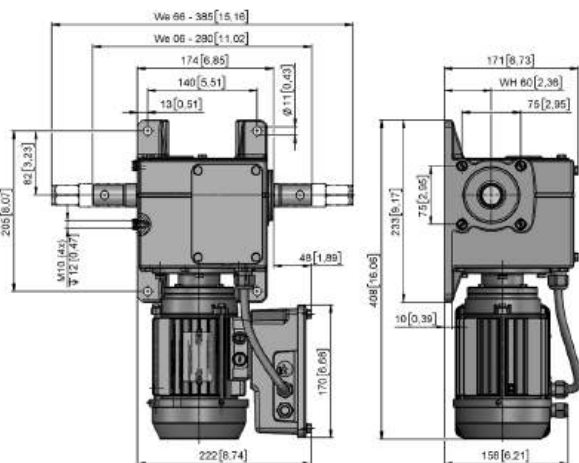


- SPL 30 surface-mounted frequency inverter for EWA 10-EWA 12.
- Allows for 2 speeds, up to 15 rpm.
- Special parameterization adapted to EWA 10 & EWA 12.
- Single-phase supply 230V/50Hz, 240V/60Hz and 120V/60Hz available.
- Integrated end position switch-off.
- Connection based on "plug & play principle".

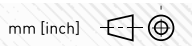
**Note:**

- Different options for parameterization depending on the feed.
- Significantly reduces the power drive variants required.
- Customer and application specific solutions available.
- Experts available for support.
- UL/CSA certified connection cable for outdoor use in North America.
- Torque cut-off via motor measurement.

SPL 30 + EWA 10



SPL 30 + EWA 12



# SpeedLogic

## EWA 10-EWA 12



Version	We 06	We 66	Info	m [kg]
	Art.Nr.	Art.Nr.		
<b>230 V, 50 Hz 1~ // 120 V, 60 Hz 1~ // 240 V, 60 Hz 1~</b>				
EWA 10.0905	12210.0905.0656	12210.0905.6656	Please select SPZ configuration parameters from our table.	19
EWA 12.2501	12212.2501.0656	12212.2501.6656		19,4
EWA 12.2506	12212.2506.0656	12212.2506.6656	You need other values? Our experts will be happy to advise you	20,8
EWA 12.2509	12212.2509.0656	12212.2509.6656		21,9

EWA Version	SPZ Version	Short text	T [Nm]	n1 50 Hz [1/min]	n2 50 Hz [1/min]	I [A]
<b>230 V, 50 Hz</b>						
EWA 10.0905	37030.0101.0001	SPZ 30 EWA 10.0905+11rpm 90Nm	90	11,0	11,0	3,2
EWA 10.0905	37030.0101.0003	SPZ 30 EWA 10.0905+3,6 rpm 90Nm	90	3,6	3,6	1,4
EWA 12.2506	37030.0201.0007	SPZ 30 EWA 12.2506+3,5 rpm 250Nm	250	3,5	3,5	3,2
<b>240 V, 60 Hz</b>						
EWA 10.0905	37030.0100.0002	SPZ 30 EWA 10.0905+15 rpm 90Nm	90	15,0	15,0	3,1
EWA 10.0905	37030.0101.0004	SPZ 30 EWA 10.0905+4,6 rpm 90Nm	90	4,6	4,6	1,5
EWA 12.2506	37030.0201.0006	SPZ 30 EWA 12.2506+4,0 rpm 250Nm	250	4,0	4,0	3,2
<b>120 V, 60 Hz</b>						
EWA 10.0905	37030.0101.0002	SPZ 30 EWA 10.0905+4,6 rpm 90Nm	90	4,6	4,6	2,9
EWA 12.2506	37030.0201.0002	SPZ 30 EWA 12.2506+3,0 rpm 50Nm	50	3,0	3,0	2,4
EWA 12.2506	37030.0201.0003	SPZ 30 EWA 12.2506+3,0 rpm 90Nm	90	3,0	3,0	2,8
EWA 12.2506	37030.0201.0004	SPZ 30 EWA 12.2506+2,0 rpm 150Nm	150	2,0	2,0	3,3
EWA 12.2501	37030.0201.0005	SPZ 30 EWA 12.2501+1,0 rpm 250Nm	250	1,0	1,0	2,9

# SpeedLogic

## SPL 60



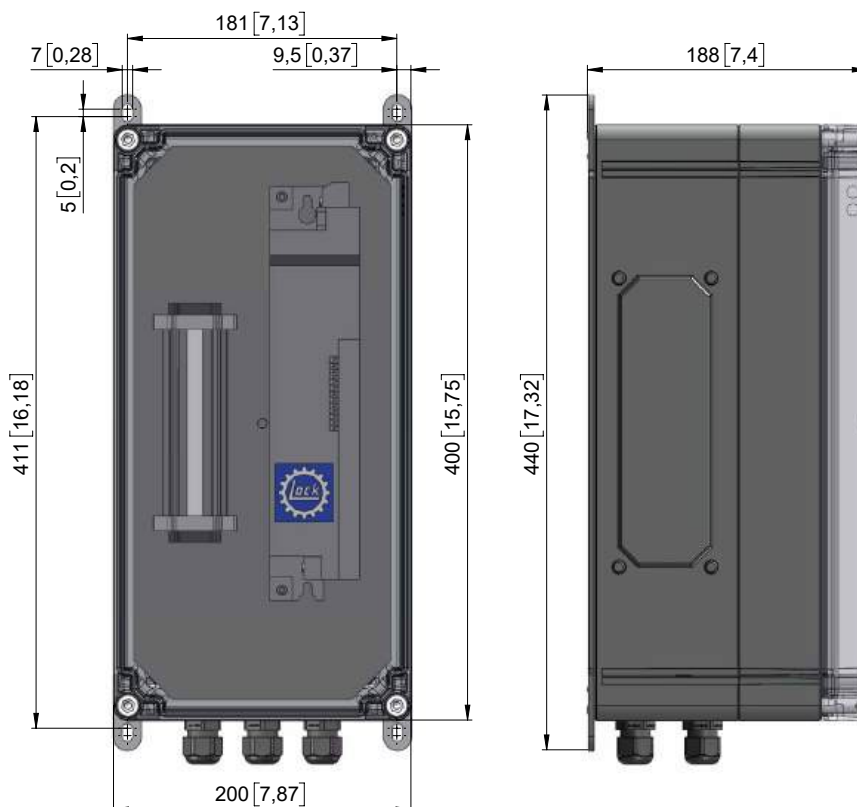
- SPL 60, the external frequency inverter for EWA 12–EWA 16. Two pre-configured speeds of up to 15 rpm – when placing an order, please quote the desired speeds as shown in the table. In an ISO housing with clear-view cover.
- Specific configuration of parameters to suit every type of EWA 12–EWA 16. The 3~ standard motors are designed for operation with a frequency inverter. On the terminal board, the motor must be wired up in a three-point manner.
- Activation via switch contacts 0/1. Fast closing speed.
- SPL 60 with single-phase power supply of 230 V/50 Hz or 240 V/60 Hz, no reversible contactor required, motor protection integrated. Multi-range voltage of 170–264 V, 45–65 Hz, ED = 30%, IP 55, ISO-F, UL/CSA.
- Plug-in memory module for simple service.
- On drives running at 15 rpm, the high-speed signal must be interrupted before the limit point is reached, either by the activation system or by means of an external limit switch (optional).

### Option:

- SPL 60.9801 Diagnostic keypad

### Hinweis:

- SPL 60 is also available for power rack winch EZW 64. Please contact us for details.



mm [inch]

## SpeedLogic SPL 60



Version	Type no.	Info	m [kg]
230 V/50 Hz 1~, 240 V/60 Hz 1~			
SPL 60.2023	37060.2023.1000	Please select SPZ configuration parameters from our table	4,6

## SpeedLogic EWA 10–EWA 16



EWA 12

+

SPZ  
configuration

EWA			SPZ				
Version	EWA Type no.	T [Nm]	n1 50 Hz [1/min]	n2 50 Hz [1/min]	I 50 Hz [A]	SPZ version	SPZ Type no.
<b>EWA 12, 400 V 3~, 50 Hz</b>							
EWA 12.2506	12212.2506.xx	250	3,2	8,8	4,3	SPZ 60.0206	37060.0200.0006
EWA 12.2509	12212.2509.xx	250	4,4	14,5	4,4	SPZ 60.0202	37060.0200.0002
<b>EWA 14, 400 V 3~, 50 Hz</b>							
EWA 14.3506	12214.3506.xx	350	3,2	8,8	4,5	SPZ 60.0304	37060.0300.0004
EWA 14.3509	12214.3509.xx	350	4,4	14,5	3,8	SPZ 60.0306	37060.0300.0006
EWA 14.4506	12214.4506.xx	450	3,2	8,8	3,6	SPZ 60.0307	37060.0300.0007
EWA 14.4509	12214.4509.xx	450	4,4	14,5	4,6	SPZ 60.0303	37060.0300.0003
		450	4,4	8,8	4,6	SPZ 60.0302	37060.0300.0002
EWA 14.6006	12214.6006.xx	600	3,2	8,8	4,6	SPZ 60.0301	37060.0300.0001
		600	4,4	8,8	4,7	SPZ 60.0308	37060.0300.0008
<b>EWA 16, 400 V 3~, 50 Hz</b>							
EWA 16.9005	12216.9005.xx	900	2,4	7,0	5,2	SPZ 60.0401	37060.0400.0001

→ xx = end of shaft and/or version, see chapter 3

→ SPL 60 with other speeds on request

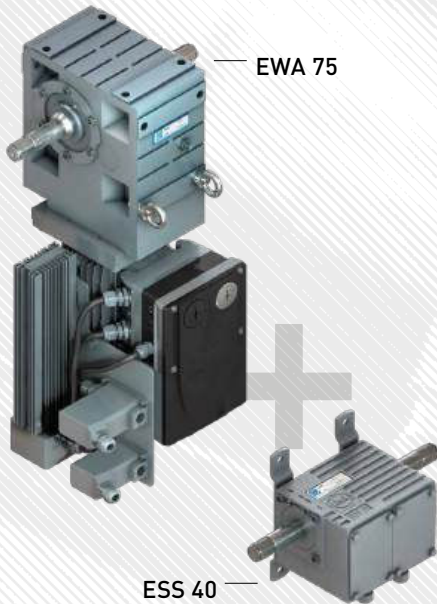
→ Data for 480 V/60 Hz on request

## Accessories



Version	Type no.	Info	m [kg]
SPL 60.9801	37060.9801.0001	Diagnostic keypad	0,1

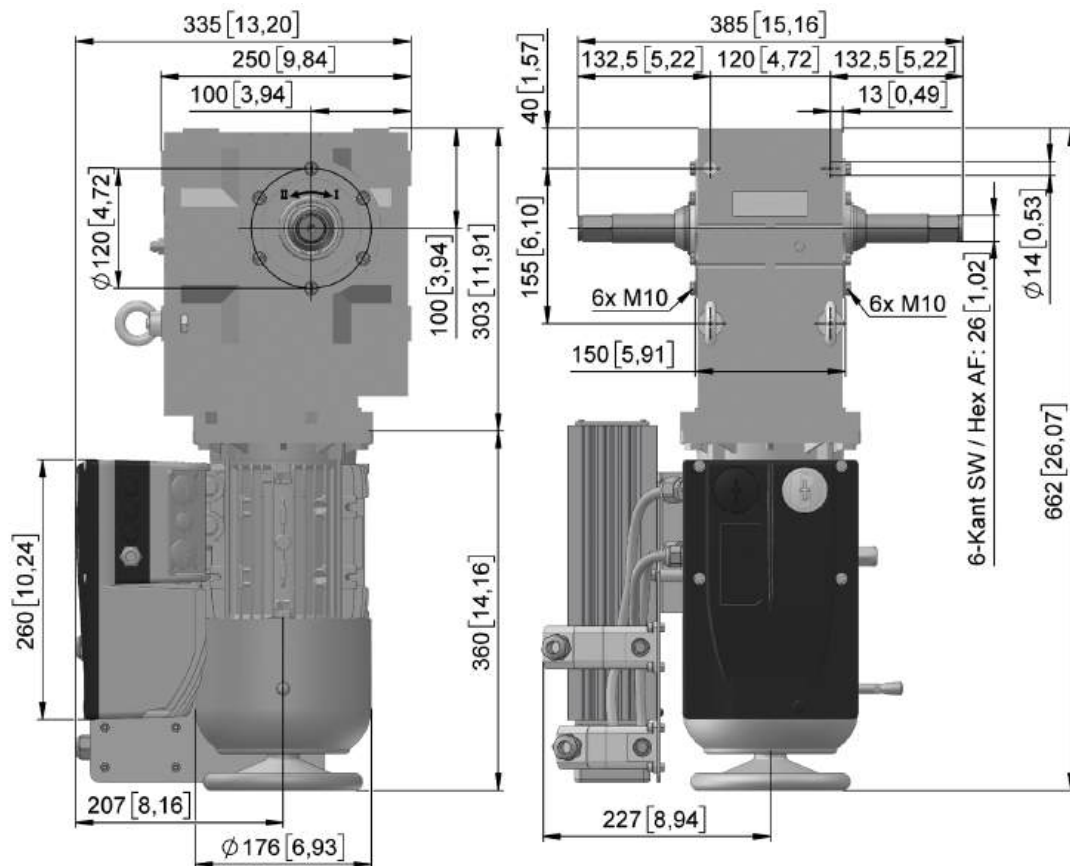
## TurboLogic



- Special drive EWA 75 for torque ratings of up to 1200 Nm with motor-integrated high-performance frequency inverter for high adjustment speeds. For the ventilation of greenhouses, in particular convertible structures or group ventilation systems.
- Specialist application: roller building.
- With frequency inverter, large speed range of 9 to 35 rpm at full torque of up to 1200 Nm is possible. Integrated Soft Start and Soft Stop to protect the entire system.
- External limit switch system ESS 40 with control unit LSC 40 or END 20 gear limit switch for end positions/slow travel/normal travel.
- As an option with position feedback PAR 06/PAR 10 for END 20. Expansion to „Luv/Lee“ option by second limit switch box ESS 40 for further intermediate positions.
- Activation by means of 1/0 switch contacts (potential-free) at control voltage of 24 V from FU. External DC 24 V activation is possible. Three-phase power supply. ED = 60%, IP 55, ISO-F. No reversible contactor required!
- Standard colour RAL 7037.
- US version with 480 V/60 Hz and CURus available on request.

### Option:

- LAZ 90.30 manual control unit.



mm [inch]

## TurboLogic

### EWA 75



Version	Type no.	T [Nm]	n1 [1/min]	n2 [1/min]	P [kW]	I [A]	m [kg]
400 V 3~, 50 Hz							
EWA 75.9030	12175.9030.6630	900	9,0	30,0	2,70	6,30	71,0
EWA 75.9223	12175.9223.6630	1200	9,0	23,0	2,70	6,30	71,0

## TurboLogic

### ESS 40



Version	Type no.	END 20.20	END 20.40	Info
ESS 40.0266	33040.0266.2071	1 x	–	2 switch points
ESS 40.0466	33040.0466.2071	2 x	–	4 switch points
ESS 40.0466	33040.0466.2072	1 x	1 x	4 switch points, including 2 with additional switch

→ More extensive product information on p. 12

## Accessories

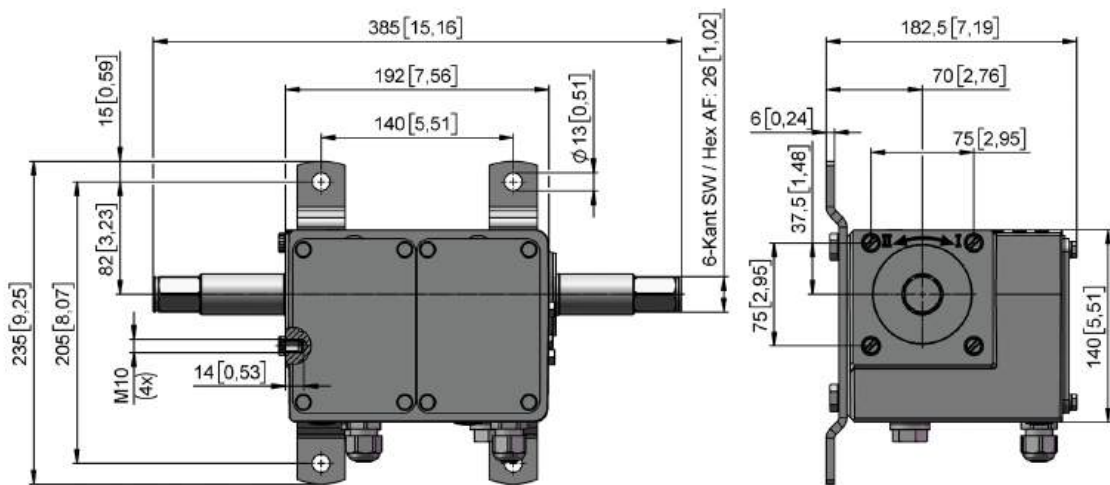


Version	Type no.	Info	m [kg]
EWA 75.9801	12175.9801.01	Hand control unit	1,6

# ESS 40 // Switch system



- Electromechanical switch system for disengagement or querying of several settings through the control unit LSC 40. Alternatively by combination of the proven Lock gear limit switch system END 20.20 and END 20.40.
- Limit switch system in IP 55 cast housing, same installation dimensions as EWA, same shaft ends, same couplings.
- With a limit switch system, four positions can be set, of which two positions can be secured by additional switches.
- For the „Luv/Lee“ convertible application, an additional ESS 40 is required in the „Luv/Lee“ version (2 x LSC 40.10 or END 20.20).
- The switching principle with the END 20 gear limit switches enables switch points to be overridden without any problem. At the same time, the position relative to the switching point can be queried – NO/ NC (German patent 10351613).
- Position sensor PAR 06 (potentiometer) or PAR 10 can be retrofitted.
- Simple and precise setting of the switch points.



mm [inch]

Version	Type no.	Art.Nr. Expansion	Limit switch/control unit	Info
<b>LSC 40</b>				
ESS 40.0266	33040.0466.4001	-	1 x LSC 40.10 DC	2 switch points
		33040.9801.4001	2 x LSC 40.10 DC	4 switch points incl. LPR04
<b>END 20</b>				
ESS 40.0266	33040.0266.2071	-	1 x END 20.20	2 switch points
ESS 40.0466	33040.0466.2071	-	2 x END 20.20	4 switch points
ESS 40.0466	33040.0466.2072	-	1 x END 20.20 & 1 x END 20.40	4 switch points, of which 2 with additional switch!








LOCK BEWEGT // LOCK MOVES

# Couplings

## GKT // Telescopic couplings

GKT 01		2
GKT 04		3
GKT 06		4

## GKN // Articulated couplings

GKN 01, GKN 04		5
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## GKA // Adapters

GKA 01, GKA 06		6
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## WRA // Tube motor adapter

WRA 50, WRA 63		7
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## SKS // Weld couplings

SKS 66, SKS 68		9
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## KKS // Chain couplings

KKS 10, KKS 14		10
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KKS 11, KKS 15		12
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## BKS // Bush couplings

BKS 45		14
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# GKT 01 // Telescopic coupling



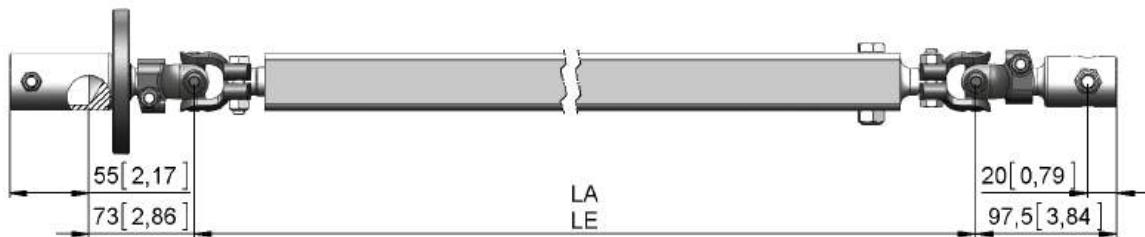
- Telescopic coupling for transmission of drive torques on smaller VariVent® winding systems.
- For use with variable axial offset between output shaft of power drive/ manual drive and winding shaft.
- Smooth and quiet length adjustment with high-performance rollers, 40 x 40 mm rectangular aluminium tube with 2 steel universal joints, plastic spacer cylinder to assure correct distance away from building.
- Version '32' with external adapter for 32 x 1.5 mm steel winding tube // Version '47' with internal adapter for 50 x 1.5 mm aluminium winding tube.
- All parts stainless, i.e. non-rusting, and developed for use in outside environments.
- For detailed information about the VariVent® winding systems, please refer to Chapter 2 'Systems'.

**Note:**

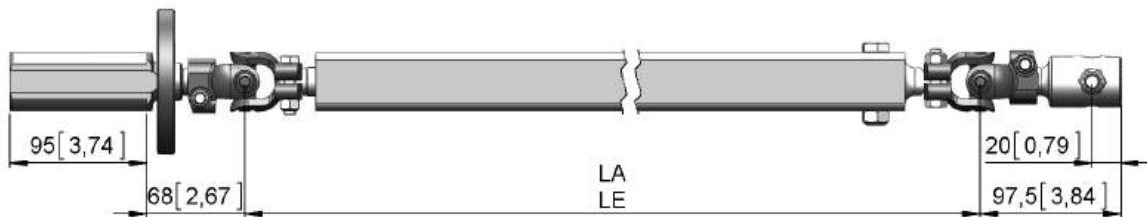
- Connection four corner tube to joint as sparepart available (20998.0104.35, without picture.).



## GKT 01.1332



## GKT 01.1347



mm [inch]

Version	Adapter 32	Adapter 47	HL [m]	LA [mm]	LE [mm]	Tube ø [mm]	m [kg]
	Type no.	Type no.					
GKT 01.1332	20940.0113.32	-	1,30	1285	1095	32 x 1,5	4,0
GKT 01.1832	20940.0118.32	-	1,80	1760	1500	32 x 1,5	4,7
GKT 01.0447	-	20940.0104.4721	0,45	430	380	50 x 1,5	2,5
GKT 01.1347	-	20940.0113.4721	1,30	1285	1095	50 x 1,5	4,0
GKT 01.1847	-	20940.0118.4721	1,80	1760	1500	50 x 1,5	4,7

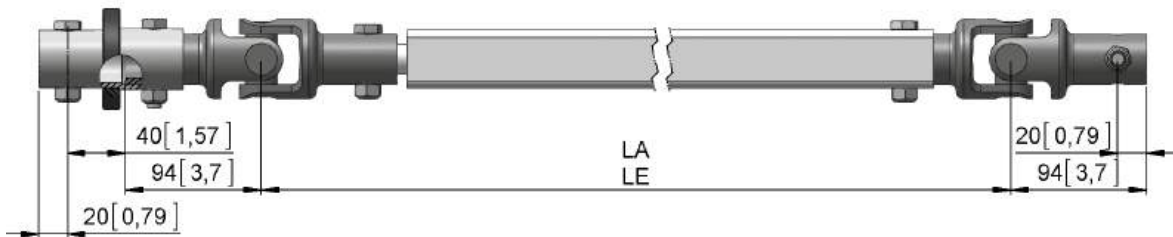
# GKT 04 // Telescopic coupling



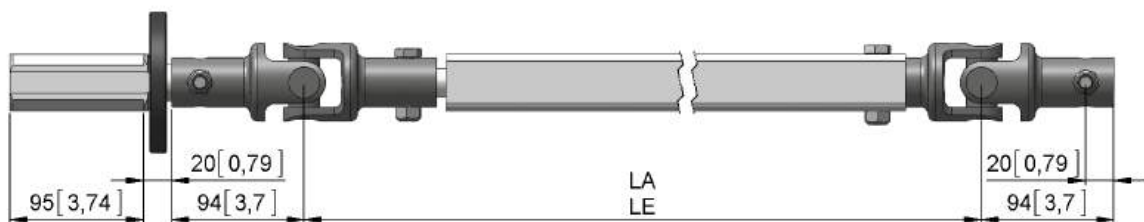
- Telescopic coupling for transmission of drive torques on big VariVent® winding systems.
- For use with variable axial offset between output shaft of power drive/ manual drive and winding shaft.
- Smooth and quiet length adjustment with high-performance rollers, 40 x 40 mm rectangular aluminium tube with 2 steel universal joints, plastic spacer cylinder to assure correct distance away from building.
- Version '32' with external adapter for 32 x 1.5 mm steel winding tube // Version '47' with internal adapter for 50 x 1.5 mm aluminium winding tube.
- All parts stainless, i.e. non-rusting.
- For detailed information about the VariVent® winding systems, please refer to Chapter 2 'Systems'.



## GKT 04.2332



## GKT 04.2347

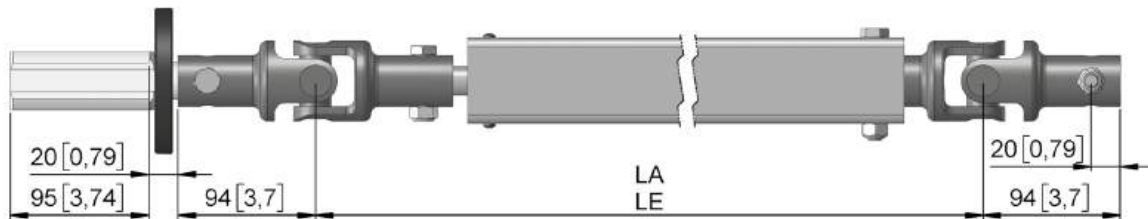


Version	Adapter 32	Adapter 47	HL [m]	LA [mm]	LE [mm]	Tube ø [mm]	m [kg]
	Type no.	Type no.					
GKT 04.2332	20942.0123.32	-	2,30	2000	1550	32 x 1,5	6,0
GKT 04.2732	20942.0127.32	-	2,70	2400	1950	32 x 1,5	6,6
GKT 04.3632	20942.0136.32	-	3,60	2900	2000	32 x 1,5	8,0
GKT 04.0447	-	20942.0104.4721	0,40	485	435	50 x 1,5	3,9
GKT 04.2347	-	20942.0123.4721	2,30	2000	1550	50 x 1,5	6,6
GKT 04.2747	-	20942.0127.4721	2,70	2400	1950	50 x 1,5	6,8

# GKT 06 // Telescopic coupling



- Telescopic coupling for transmission of drive torques on very big VariVent® winding systems.
- For use with variable axial offset between output shaft of power drive/ manual drive and winding shaft.
- Smooth and quiet length adjustment with high-performance rollers, 60 x 60 mm rectangular aluminium tube with 2 steel universal joints, plastic spacer cylinder to assure correct distance away from building.
- Version '47' with internal adapter for 50 x 1.5 mm aluminium winding tube.
- All parts stainless, i.e. non-rusting.
- For detailed information about the VariVent® winding systems, please refer to Chapter 2 'Systems'.



mm [inch]

Version	Adapter 47	HL [m]	LA [mm]	LE [mm]	Tube ø	m [kg]
	Type no.					
GKT 06.0647	20943.0106.4721	0,60	640	550	50 x 1,5 mm	5,2
GKT 06.2347	20943.0123.4721	2,30	2070	1550	50 x 1,5 mm	8,8

## GKN 01, GKN 04 // Articulated couplings



GKN 01



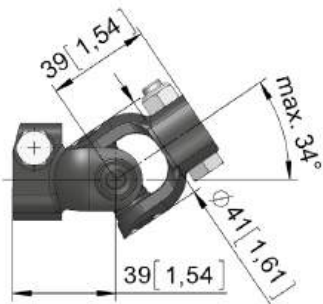
GKN 04

- Universal joint for transmission of drive torques from power and manual drives with inclined output on driven shaft.
- Steel GKN articulated coupling with corrosion protection, needle bearing and seal ring.
- The maximum deflection angle of 34° / 50° must not be exceeded while in operation.

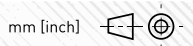
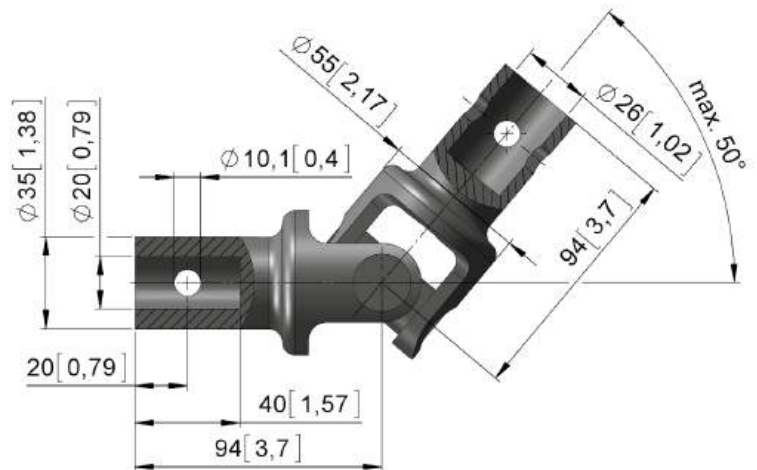
**Note:**

- When using two universal joints in series, assure proper adjustment of universal joint (deflection) error through mirror-symmetry during installation!

GKN 01



GKN 04



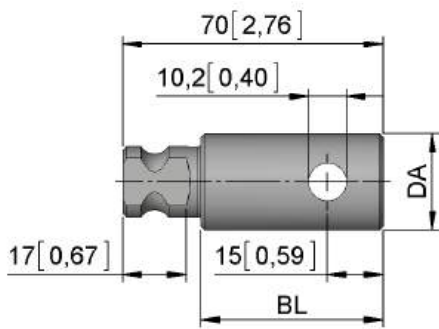
Version	Type no.	T max [Nm]	m [kg]
GKN 01.2121	20810.0100	70	0,3
GKN 04.2620	20820.2620	120	1,1

# GKA 01, GKA 06 // Adapters

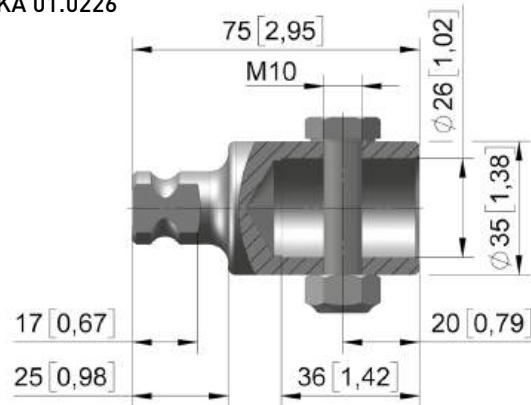


- GKA adapter for locating drive tubes and winding tubes on GKN articulated couplings or on GKT telescopic couplings.
- GKA 01 suitable for GKT 01. GKA 06 suitable for GKT 04 and GKT 06.
- GKA adapter in conjunction with ATR 06.5403 or GKT telescopic coupling.
- Aluminium or steel, galvanised.
- GKA 01.0226 and GKA 01.0232 including bolts.

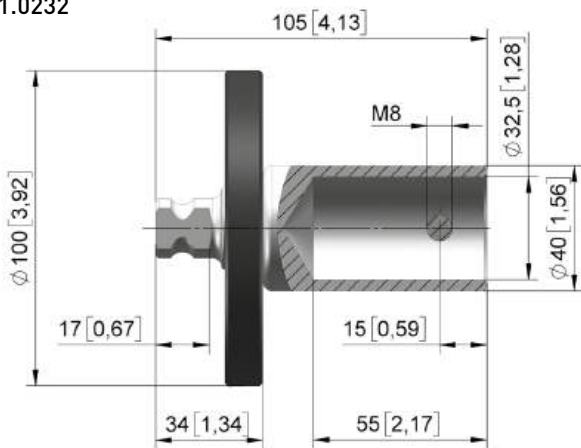
GKA 01.01



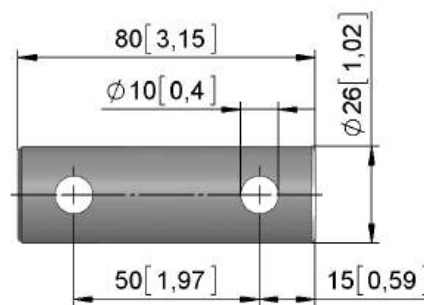
GKA 01.0226



GKA 01.0232



GKA 06.0680



mm [inch]

Version	Type no.	T max [Nm]	DA [mm]	BL [mm]	Tube ø [mm]	m [kg]
GKA 01.0126	20998.0101.2610	70	26,0	51	1"	0,2
GKA 01.0137	20998.0101.37	70	36,5	39	42,4 x 2,65	0,3
GKA 01.0226	20998.0102.26	70	-	-	26	0,3
GKA 01.0232	20998.0102.32	70	-	-	32 x 1,50	0,2
GKA 06.0680	20998.0606.80	120	-	-	1"	0,3

## WRA 50, WRA 63 // Tube motor adapter

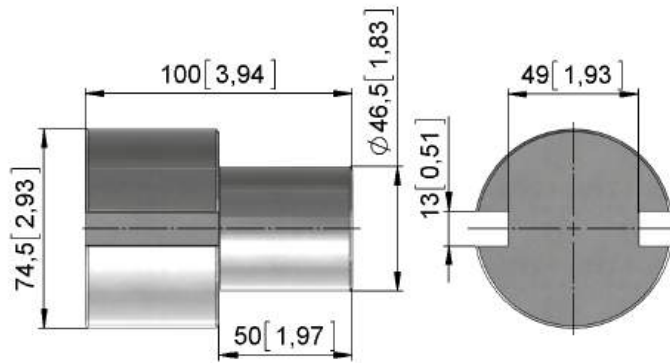


- Tube motor adapter as connection from RMA to winding shaft and/or drive shaft.
- WRA 50 for connection of RMA 20.05 with the winding shaft.
- WRA 63 for connection of RMA 20.12 with the winding shaft.
- Delivery incl. screws and lock nuts.

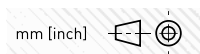
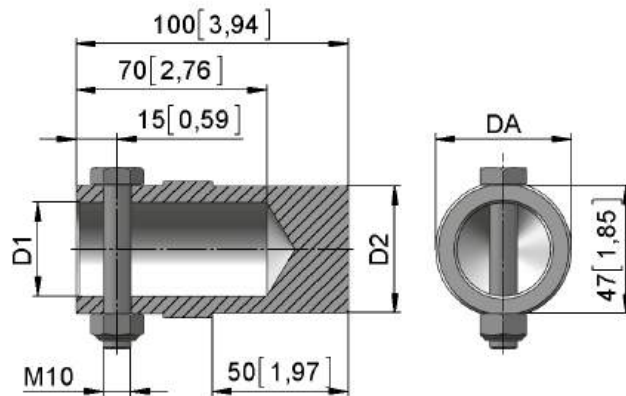
**Note:**

- The adapters are riveted to the side of the tube motor.
- WRA 50.0175 is riveted to tube motor and winding shaft.

**WRA 50.01**



**WRA 50.02 // WRA 63.02**



Version	Type no.	D1 [mm]	D2 [mm]	DA [mm]	Info	m [kg]
WRA 50.0175	20998.5001.75	-	-	-	RMA 20.05 // Tube ø 78 x 1,5 mm	0,8
WRA 50.0222	20998.5002.22	22,5	46,5	50	RMA 20.05 // Tube ø 22 x 2 mm	0,5
WRA 50.0232	20998.5002.32	32,5	46,5	50	RMA 20.05 // Tube ø 32 x 1,5 mm	0,4
WRA 50.0234	20998.5002.34	34,5	46,5	50	RMA 20.05 // Tube 1"	0,4
WRA 63.0222	20998.6302.22	22,5	59,5	63	RMA 20.12 // Tube ø 22 x 2 mm	0,7
WRA 63.0232	20998.6302.32	32,5	59,5	63	RMA 20.12 // Tube ø 32 x 1,5 mm	0,7
WRA 63.0234	20998.6302.34	34,5	59,5	63	RMA 20.12 // Tube 1"	0,7



# SKS 66, SKS 68 // Weld couplings



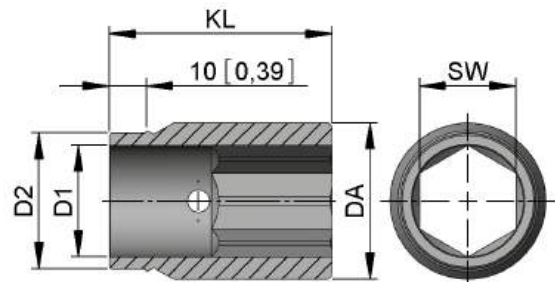
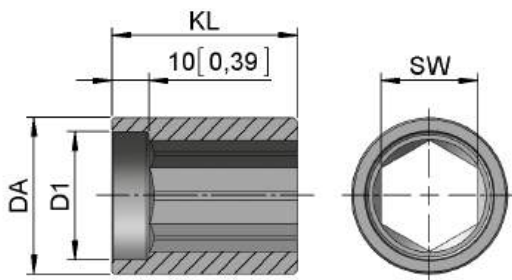
- Coupling without angle adjustment with one-sided axial mounting to transmit drive torques between gear units, e.g. LZG, SZG.
- SKS 66.50 centring tube, outer diameter (OD), SKS 66.6036 // SKS 68 centring tube inner diameter (ID)
- The coupling is welded to the ends of adapter tubes on the building and is then pushed onto the end of the gear unit shaft.
- Coupling made of weldable steel, untreated (i.e. unpainted), Version SKS 66.6036, galvanised.

**Note:**

- Adapter tube and SKS must be aligned flush. Weld together using fixture, plan in scope for approx. 3 mm of expansion between coupling and gear unit shaft.

SKS 66.50

SKS 66.6036 // SKS 68



mm [inch]

Version	We 66	We 68	T max [Nm]	SW [mm]	D1 [mm]	D2 [mm]	DA [mm]	KL [mm]	Tube ø [mm]	m [kg]
	Type no.	Type no.								
SKS 66.5034	20166.4250.34	-	300	26	34,5	-	42	50	1"	0,3
SKS 66.6036	20266.4260.3601	-	450	26	30,0	36,5	42	60	5/4"	0,3
SKS 68.6537	-	20268.6065.3771	600	30	34,5	36,5	42	65	5/4"	0,5
SKS 68.6552	-	20268.6065.52	750	30	35,0	52,0	60	65	2"	0,9

→ Used for LZG 24

# KKS 10, KKS 14 // Chain coupling 1° angle adjustment

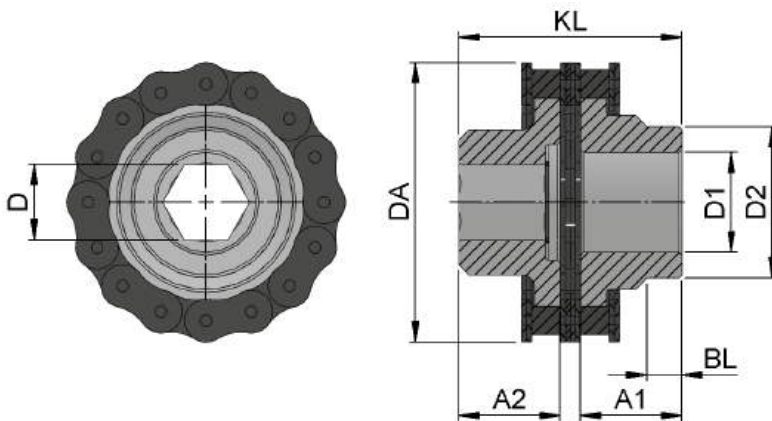


- Coupling with 1° angle adjustment and axial mounting to transmit torques from power drives to adapter tubes.
- KKS 10 for welding to tube, KKS 14 for screw-mounting.
- It is possible to remove the drive unit after the chain has been taken off.
- The 2 rows of chain links permit small alignment errors of up to 1° between drive and adapter shaft.
- Steel coupling, weldable, milled, weld hub with bore or collar for welding, or plug-in hub with bores for screw-mounting to adapter tube.
- Axial mounting with circlip, except for shaft We 68.
- Can be used for speeds of up to 30 rpm.

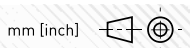
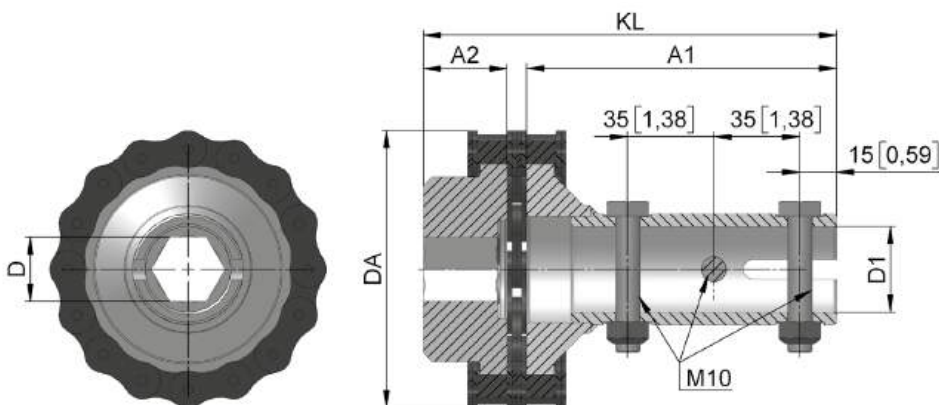
**Note:**

- Pay careful attention to permitted torque for the adapter tube. If necessary, use tube with larger wall thickness, e.g. 1", DIN 2441 33.7 x 4.05 mm.

## KKS 10



## KKS 14



# KKS 10, KKS 14

1° angle adjustment



→ Please note: 'Version' only applies to complete KKS. If required, A/B sides can also be ordered separately by quoting their respective order number(s).

Shaft We 66																
KKS complete																
Version	Type no.	Type no. A side	Type no. B side	T max [Nm]	D [mm]	D1 [mm]	D2 [mm]	A1 [mm]	A2 [mm]	BL [mm]	DA [mm]	KL [mm]	Tube ø [mm]	Chain	m complete [kg]	
KKS 10.6634	20610.6681.34	20610.9181.66	20610.9581.34	600	26	34,5	52,0	35	35	12	96	77	1";2"	5/8"x16	1,6	
KKS 10.6643	20610.6681.43	20610.9181.66	20610.9581.43	600	26	43,0	52,0	35	35	12	96	77	5/4";2"	5/8"x16	1,5	
KKS 14.6634	20614.6681.34	20614.9181.66	20614.9581.34	300	26	34,5	-	91	35	-	96	134	1"	5/8"x16	1,6	
KKS 14.6698	20614.6698.34	20614.9191.66	20614.9591.34	450	26	34,5	-	126	35	-	114	168	1"	3/4"x16	3,0	

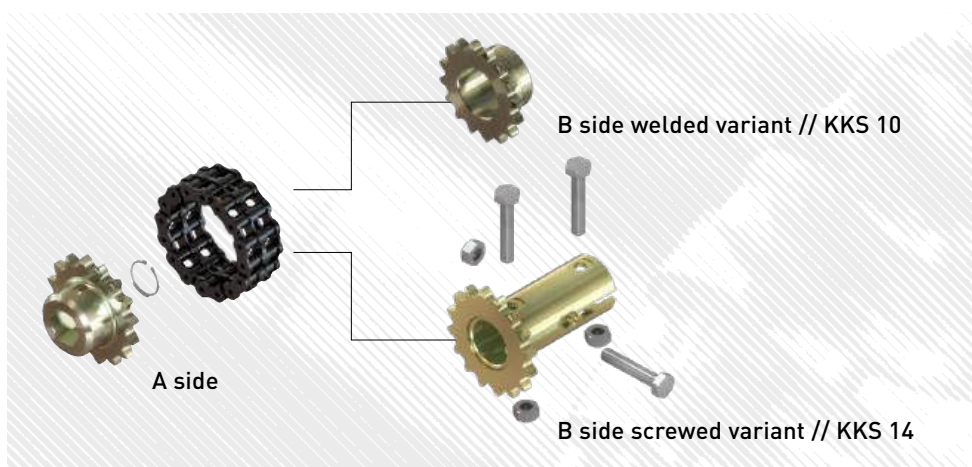
→ Used for EWA 10-EWA 16 1200 Nm, LZG 20

Shaft We 68																
KKS complete																
Version	Type no.	Type no. A side	Type no. B side	T max [Nm]	D [mm]	D1 [mm]	D2 [mm]	A1 [mm]	A2 [mm]	BL [mm]	DA [mm]	KL [mm]	Tube ø [mm]	Chain	m complete [kg]	
KKS 10.6843	20610.6898.43	20610.9191.68	20610.9591.43	750	30	43,0	52,0	26	35	3	114	70	5/4";2"	3/4"x16	2,5	

→ Used for LZG 24

Shaft We 19																
KKS complete																
Version	Type no.	Type no. A side	Type no. B side	T max [Nm]	D [mm]	D1 [mm]	D2 [mm]	A1 [mm]	A2 [mm]	BL [mm]	DA [mm]	KL [mm]	Tube ø [mm]	Chain	m complete [kg]	
KKS 10.1934	20610.1998.34	20610.9191.19	20610.9591.34	750	45	34,5	41,3	26	50	3	114	85,5	1";1 1/2"	3/4"x16	2,6	
KKS 10.1943	20610.1998.43	20610.9191.19	20610.9591.43	750	45	43,0	52,0	26	50	3	114	85,5	5/4";2"	3/4"x16	2,6	
KKS 10.1961	20610.1998.61	20610.9191.19	20610.9591.61	1.000	45	61,0	75,0	26	50	3	114	85,5	2";t=4,5	3/4"x16	2,5	

→ Used for EWA 16 1200 Nm + 1500 Nm



Option: A side available in components (sprocket wheel, chain).

# KKS 11, KKS 15 // Chain coupling

## 6° angle adjustment

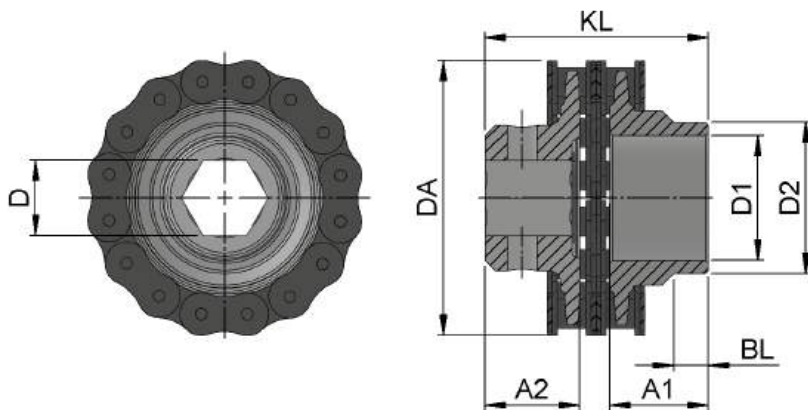


- Coupling with 6° angle adjustment and axial mounting to transmit torques from power drives to adapter tubes.
- KKS 11 for welding to the tube, KKS 15 for screw-mounting.
- It is possible to remove the drive after disconnecting the chain.
- The 2 rows of chain links permit larger alignment errors of up to 6° between drive and adapter shaft.
- Steel coupling, weldable, milled, weld hub with bore or collar for welding to output tube.
- Axial mounting with circlip, except for We 68.
- Can be used for speeds of up to 30 rpm.

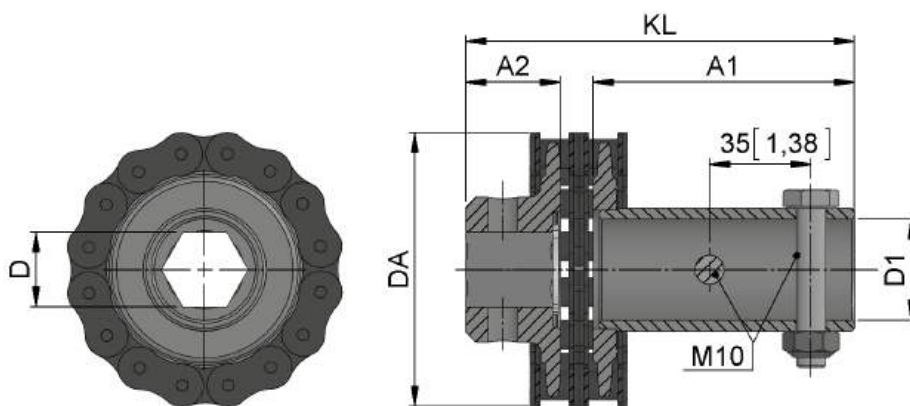
**Note:**

- Note permitted torque for adapter tube. If necessary, use tube with greater wall thickness, e.g. 1", DIN 2441 33.7 x 4.05 mm.

**KKS 11**



**KKS 15**



mm [inch]

# KKS 11, KKS 15

6° angle adjustment



KKS 11

KKS 15

→ Please note: 'Version' only applies to complete KKS. If required, A/B sides can also be ordered separately by quoting their respective order number(s).

### Shaft We 66

#### KKS complete

Version	Type no.	Type no. A side	Type no. B side	T max [Nm]	D [mm]	D1 [mm]	D2 [mm]	A1 [mm]	A2 [mm]	BL [mm]	DA [mm]	KL [mm]	Tube ø [mm]	Chain	m complete [kg]
KKS 11.6643	20611.6681.43	20611.9181.66	20611.9581.43	300	26	43,0	52,0	34	33	12	96	77,0	5/4";2"	5/8"x16	1,6
KKS 11.6643	20611.6698.43	20611.9191.66	20611.9591.43	450	26	43,0	52,0	26	34	3	114	70,0	5/4";2"	3/4"x16	2,5

KKS 15.6634	20615.6681.34	20611.9181.66	20615.9581.34	300	26	34,5	-	91	33	-	96	134,0	1"	5/8"x16	1,5
KKS 15.6643	20615.6681.43	20611.9181.66	20615.9581.43	300	26	43,0	-	91	33	-	96	134,0	5/4"	5/8"x16	1,5

→ Used for EWA 10–EWA 16 1200 Nm, LZG 20

### Shaft We 68

#### KKS complete

Version	Type no.	Type no. A side	Type no. B side	T max [Nm]	D [mm]	D1 [mm]	D2 [mm]	A1 [mm]	A2 [mm]	BL [mm]	DA [mm]	KL [mm]	Tube ø [mm]	Chain	m complete [kg]
KKS 11.6843	20611.6898.43	20611.9191.68	20611.9591.43	450	30	43,0	52,0	26	35	3	114	70,0	5/4";2"	3/4"x16	2,5
KKS 11.6846	20611.6899.46	20611.9192.68	20611.9592.46	750	30	30,0	45,5	33	33	3	120	86,0	Ø51 t=2,25	1"x12	3,5
KKS 11.6849	20611.6899.49	20611.9192.68	20611.9592.49	750	30	49,0	-	33	33	-	120	86,0	1½"	1"x12	3,5
KKS 11.6852	20611.6899.52	20611.9192.68	20611.9592.52	750	30	-	52,0	33	33	3	120	86,0	2"	1"x12	3,5

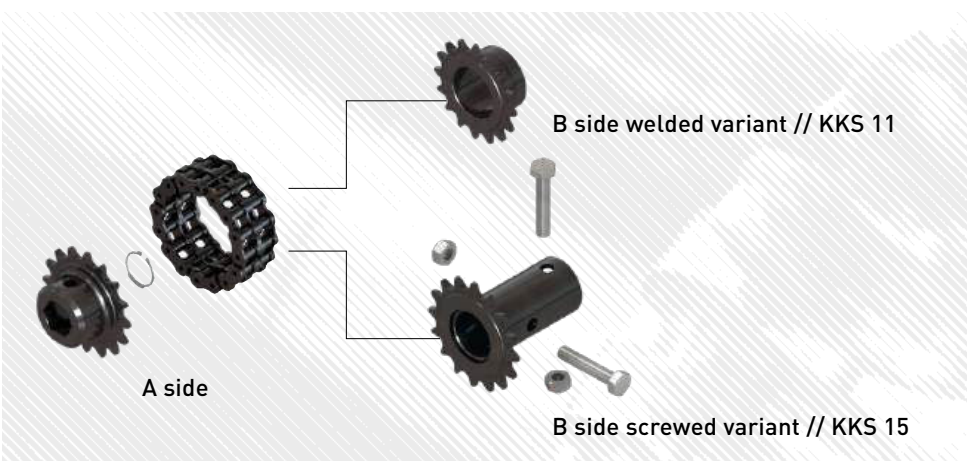
→ Used for LZG 24

### Shaft We 19

#### KKS complete

Version	Type no.	Type no. A side	Type no. B side	T max [Nm]	D [mm]	D1 [mm]	D2 [mm]	A1 [mm]	A2 [mm]	BL [mm]	DA [mm]	KL [mm]	Tube ø [mm]	Chain	m complete [kg]
KKS 11.1943	20611.1998.43	20611.9191.19	20611.9591.43	450	45	43,0	52,0	26	50	3	114	85,5	5/4";2"	3/4"x16	2,5
KKS 11.1946	20611.1999.46	20611.9192.19	20611.9592.46	750	45	30,0	45,5	33	50	3	120	101,0	Ø51 t=2,25	1"x12	3,7
KKS 11.1949	20611.1999.49	20611.9192.19	20611.9592.49	750	45	49,0	-	33	50	-	120	101,0	1½"	1"x12	3,7
KKS 11.1952	20611.1999.52	20611.9192.19	20611.9592.52	750	45	-	52,0	33	50	3	120	101,0	2"	1"x12	3,75

→ Used for EWA 16 1200 Nm + 1500 Nm



B side welded variant // KKS 11

A side

B side screwed variant // KKS 15

Option: A side available in components (sprocket wheel, chain).

# BKS 45 // Bush coupling

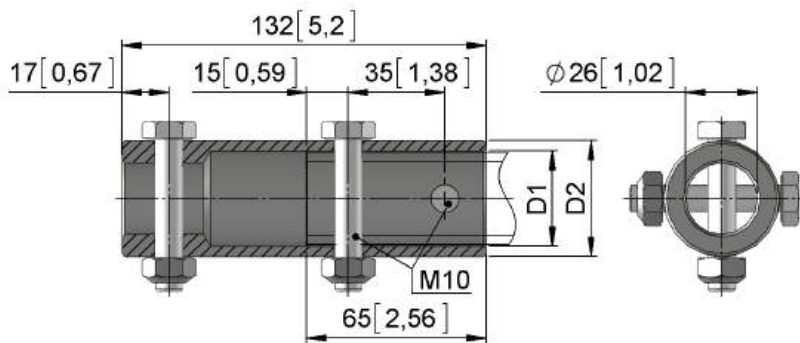


- Coupling without angle adjustment with axial mounting to transmit torques from power drives and manual drives to 1" and 5/4" adapter tubes.
- BKS 45.06 for round shaft We 06, axially secured by transverse screw. BKS 45.66 for hexagonal shaft We 66, axially secured by retaining ring (i.e. circlip).
- Galvanised steel coupling, two bores for M10 screws to secure the adapter tube, supplied as a complete unit with screws and retaining ring (i.e. circlip).

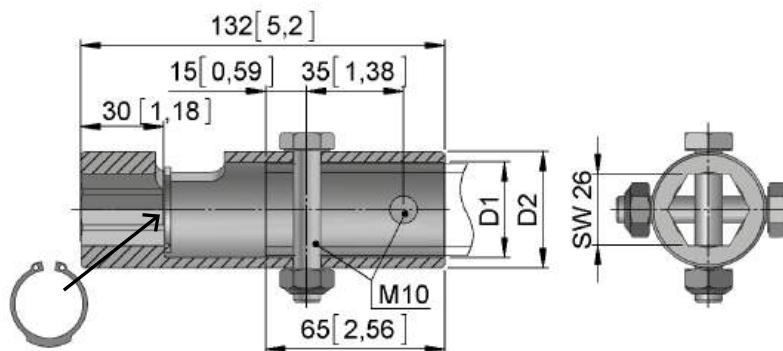
**Note:**

- Possible to remove drive unit after unfastening the axial shaft retainers. For this, comply with maximum insertion depth of 65 mm for the adapter tube!

## BKS 45.06



## BKS 45.66



mm [inch]

Version	We 06	We 66	T max [Nm]	D1 [mm]	D2 [mm]	Tube ø [mm]	m [kg]
	Type no.	Type no.					
BKS 45.0634	20745.0601.34	-	200	34,5	42	1"	0,6
BKS 45.6634	-	20745.6621.3430	300	34,5	42	1"	0,6
BKS 45.0643	20745.0601.43	-	200	43,0	52	5/4"	1,0
BKS 45.6643	-	20745.6621.4330	300	43,0	52	5/4"	1,0





LOCK BEWEGT // LOCK MOVES

# Control units

---

## LSR // Ventilation controller

---

LSR 35



2

LSR 25



3

## WST/RST // Sensors

---

WST 15



4

RST 65



5

## EHS // Reversible contactor control units

---

EHS 01, EHS 02



6

## TST // Switches

---

TST 14, TST 10, TST 20



7

## EazyPower // Self-sufficient energy

---

EazyPower



8

# LSR 35 // Ventilation controller



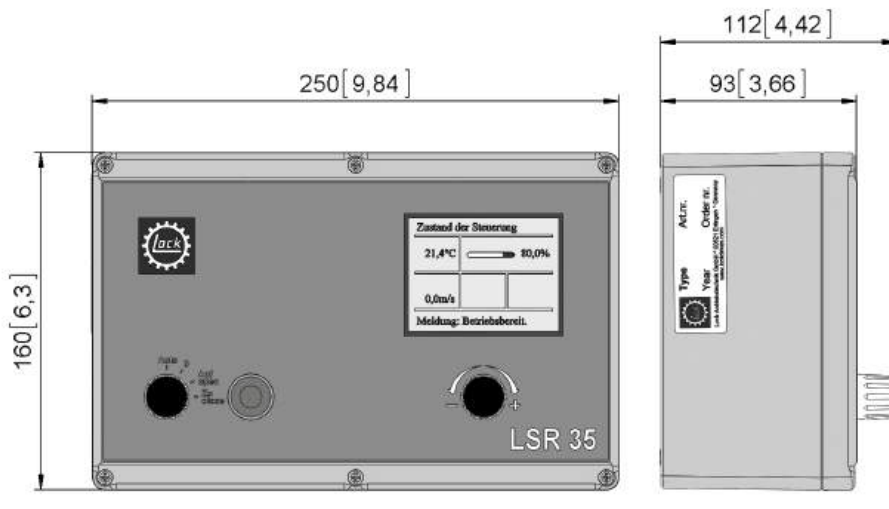
- Temperature-dependent ventilation controller
- Complies with all current safety standards. PL=C in conjunction with emergency stop switch (accessories).
- Scope for connection of a wind and a rain sensor.
- One temperature for a 230 V 1~ drive unit can be connected to directly.
- Simple to operate using a big color display.
- Independent runtime recording, minimum opening and maximum opening of side A and B possible.
- Desired temperature value adjustable from -20°C to +60°C.
- Cycle times, wait times and hysteresis are adjustable.
- Plastic housing incl. temperature sensor.
- 'Vibrate' function protects the unit against freezing in sub-zero conditions.
- Override of manual cycling action is possible.
- Integrated counter for operating hours.

**Options:**

- Windspeed sensor WST 15 (page 4).
- Rain sensor RST 65 (page 5).

**Tip:**

- Advice from our climate experts.



Version	Type no.	U [V]	m [kg]
LSR 35.1001	30235.1023.0101	230 V	1,0

## Accessories



Version	Type no.	Info	m [kg]
TST 25.1001	30925.1001.0101	Emergency stop switch	0,2

# LSR 25 // Ventilation controller



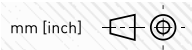
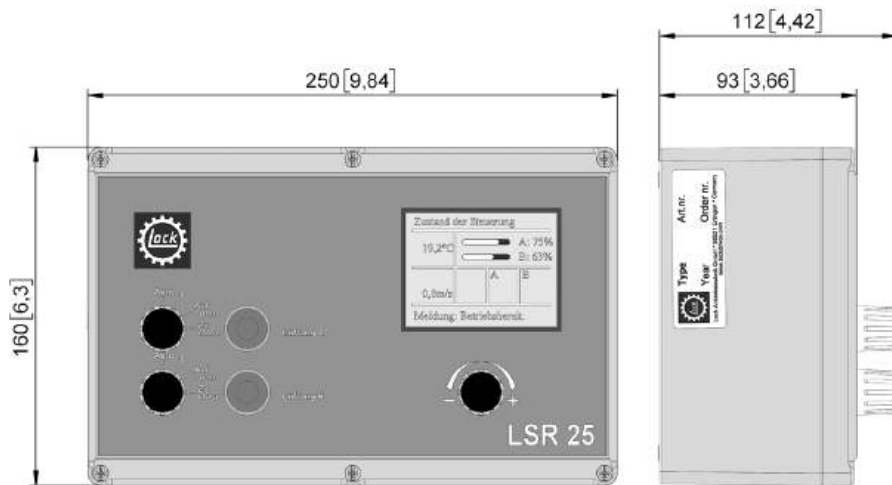
- Temperature-dependent ventilation controller
- Integrated switch-indexing function for strong wind conditions.
- Independent settings for recording operating hours are possible for drives A and B.
- Option for connecting up a wind sensor and a rain sensor.
- One temperature for two 230 V 1~ drives – connectable directly.
- Easy to operate using a big colour monitor.
- Independent runtime recording, minimum opening and maximum opening of side A and B possible.
- Temperature setpoint value can be set between -20°C and +60°C.
- Ability to set indexing and interval times as well as hysteresis.
- Plastic housing, including a temperature sensor.
- “Vibration function” to prevent unit from freezing solid.
- Possible to override manual indexing function.
- Integrated counter for operating hours.
- Integrated emergency stop circuit (an accessory).

**Options:**

- Wind sensor WST 15 (page 4).
- Rain sensor RST 65 (page 5).

**Tip:**

- Advice from our climate experts.



Version	Type no.	U [V]	m [kg]
LSR 25.1001	30225.1023.0101	230	1,0

## Accessories



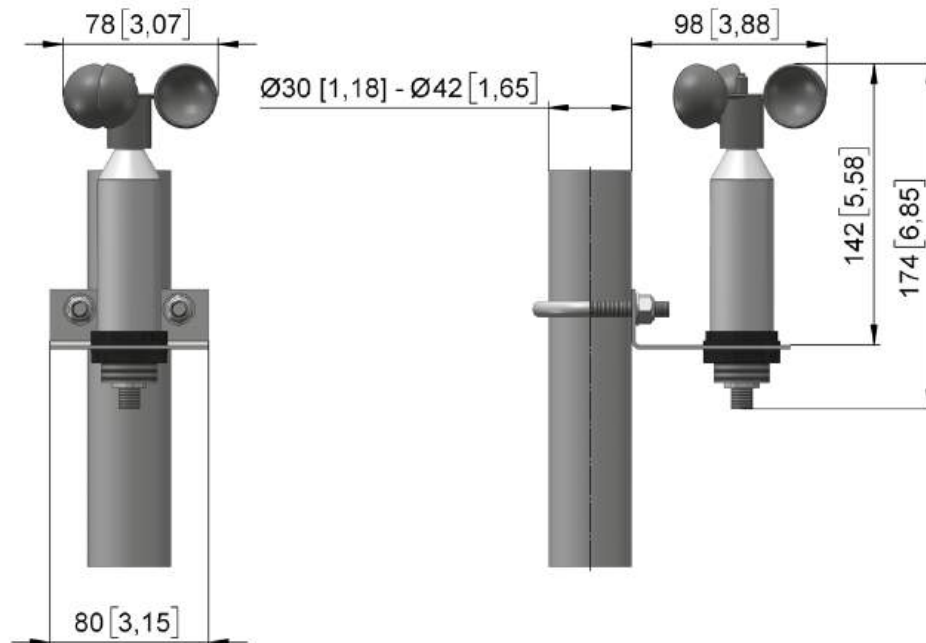
Version	Type no.	Info	m [kg]
TST 25.1001	30925.1001.0101	Emergency stop switch	0,2

## WST 15 // Wind sensor



WST 15  
Wind sensor

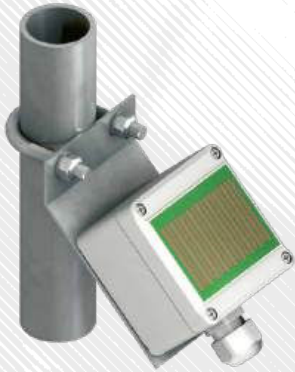
- Wind sensor with 5 m cable for connection to ventilation controllers LSR 25 and LSR 35.
- The integrated heating also guarantees functionality in snow and ice.
- Easy to install with plug-in connection and signal cable.
- Scope of delivery: wind sensor with mounting bracket and stirrup bolt (without tube).



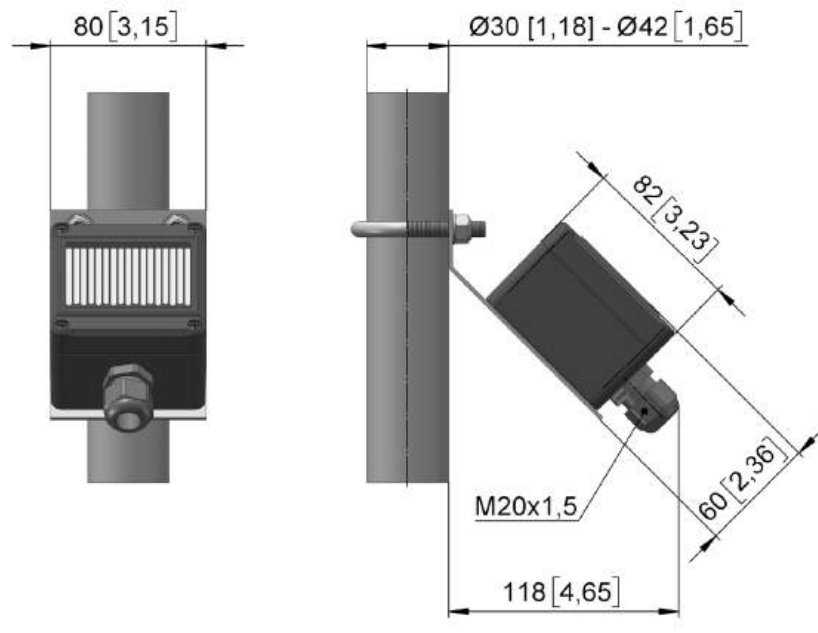
mm [inch]

Version	Type no.	U [V]	m [kg]
WST 15.1002	30515.1002.0101	24	0,6

## RST 65 // Rain sensor



- Rain sensor for automatic closing of ventilation systems during rain or snow.
- The electronic sensor plate with integrated heating guarantees precise regulation.
- Potential-free switch contacts.
- Turnkey condition with 5 m cable (power line and signal line). Enables simple and quick assembly.
- The rain sensor can be used on LSR ventilation controllers or on EHS reversible contactor control units.
- Scope of delivery: rain sensor with retaining bracket and stirrup bolt (without tube).



mm [inch]

Version	Type no.	U [V]	m [kg]
RST 65.1023	30665.1023.0101	230	0,8

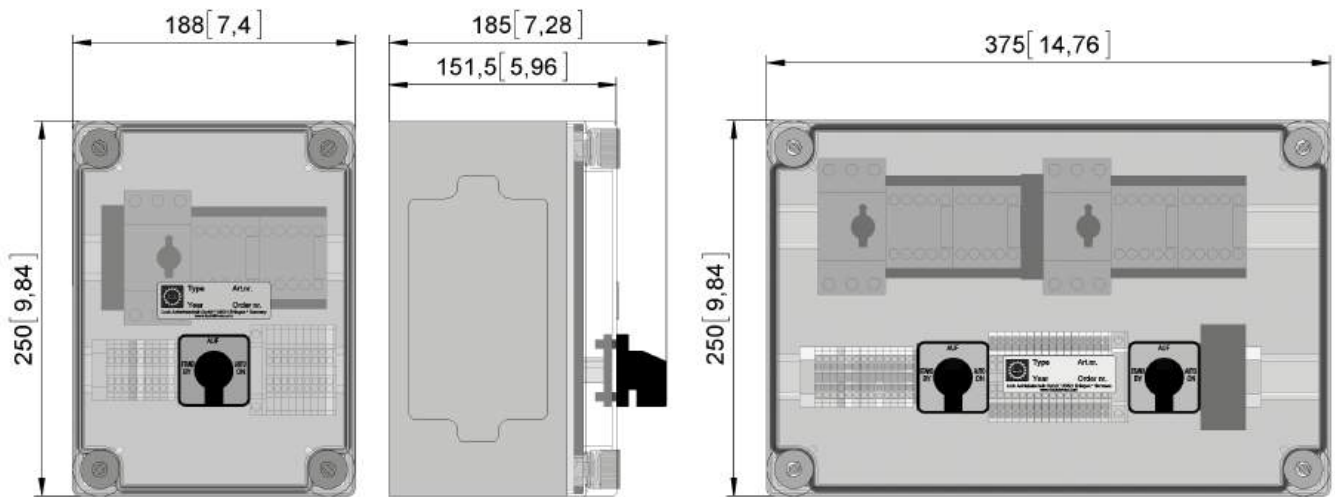
## EHS 01, EHS 02 // Reversible contactor control units



- Basic control unit for switching 400 V 3- drives on and off.
- In conjunction with ventilation controller, LSR automation option.
- IP 54 plastic housing with transparent cover, reversible contactor, motor protection switch and terminal strip for limit switches and ventilation controllers.
- Adjustment switch (Open, Closed, Automatic, Standby).
- Equipped as standard with relays for RST rain sensor and wind monitoring system (no longer featured in catalogue – available on request).
- Deadman switch function or surface switch for remote control available on request.

EHS 01

EHS 02



mm [inch]

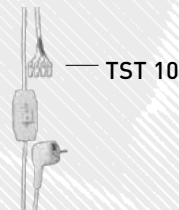
Version	Type no.	Motors	I [A]	m [kg]
EHS 01.4006	30110.0140.06	1	0,45–0,63	2,7
EHS 01.4010	30110.0140.10	1	0,70–1,00	2,7
EHS 01.4016	30110.0140.16	1	1,10–1,60	2,7
EHS 01.4025	30110.0140.25	1	1,80–2,50	2,7
EHS 02.4006	30110.0240.06	2	0,45–0,63	5,0
EHS 02.4010	30110.0240.10	2	0,70–1,00	5,0
EHS 02.4016	30110.0240.16	2	1,10–1,60	5,0
EHS 02.4025	30110.0240.25	2	1,80–2,50	5,0

# TST 14, TST 10, TST 20 // Switches



### TST 14 switch

- Basic control unit for switching 230 V 1~ drives on and off, with logic function for VariVent® TC System. Automation in conjunction with LSR 20 or LSR 35 ventilation controller.
- Operation by pushbuttons (deadman). It can be choose between Manual or Automatic switch.
- IP 54 plastic housing with cable screw connections.



### TST 10 switch

- To simplify the mounting of 230 V 1~ drives and for setting the limit switches. Is dismantled again after assembly.
- With mains connector and terminal contact strip.
- Both directions of rotation can be operated using just one switch.

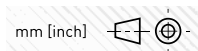
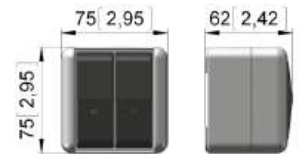
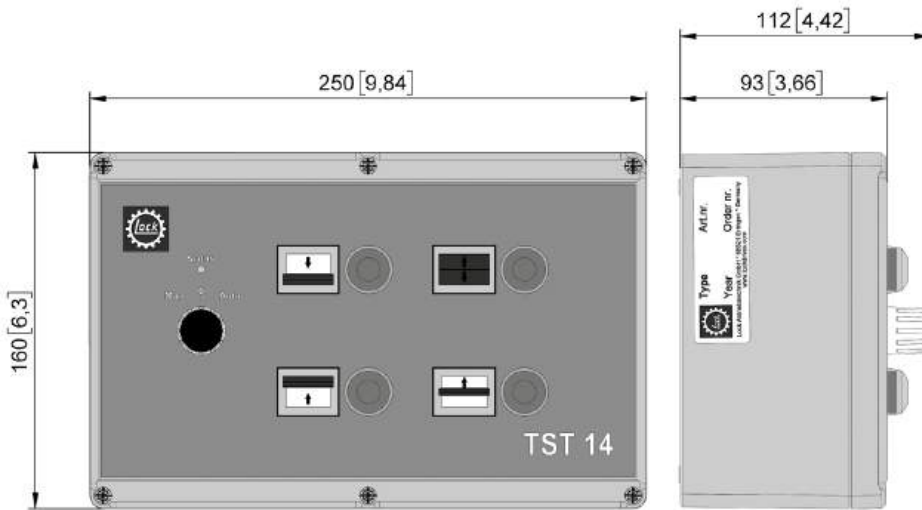


### TST 20 switch

- For simple activation of 230 V 1~ drives. Suitable for a wet room.
- Buttons mechanically interlocked (deadman).

TST 14

TST 20



Version	Type no.	U [V]	m [kg]
TST 14.1001	30914.1001.0101	230	1,1
TST 10.1001	30910.1001.0101	230	0,4
TST 20.1001	30920.1001.0101	230	0,2

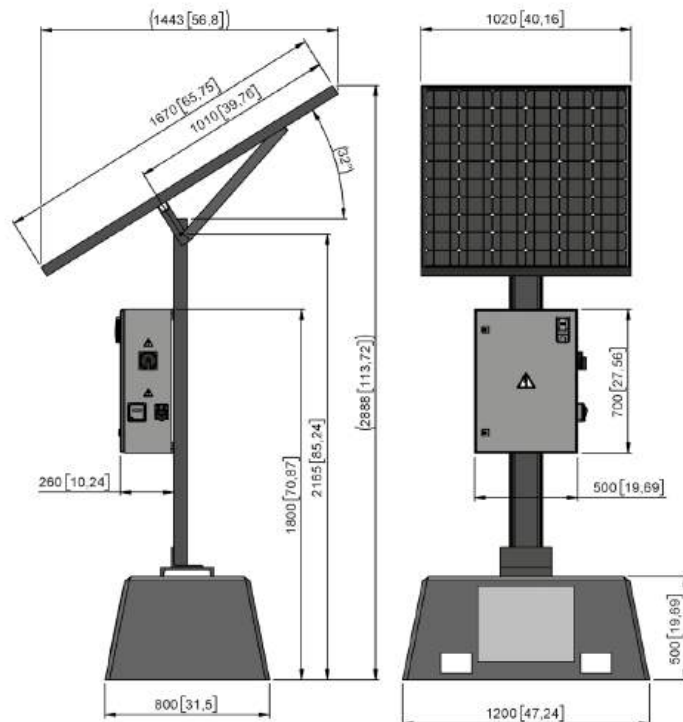
# EazyPower // Self-sufficient energy supply



- With EazyPower, Lock has developed a mobile energy supply independent of the infrastructure.
- No maintenance costs and installation within a few minutes distinguish this type of energy storage system.
- The module supplies enough energy in any sunny location to supply single-phase consumers up to 1,600 W via a 230 V socket.
- When the storage is charged, the capacity is 2 kWh.
- Protection class IP44.

**Note:**

- Delivery in single components:
  - Base with holder and control cabinet.
  - Solar module.
- Commissioning test according to DIN EN 60204 required.



mm [inch]

Version	Type no.	U [V]	F [Hz]	P* [kW]	P Peak [kW]	I [A]	m [kg]
EPO 10.2310	32110.2310.0001	230	50	1,6	4	8	950

\* At 25 °C.





LOCK BEWEGT // LOCK MOVES

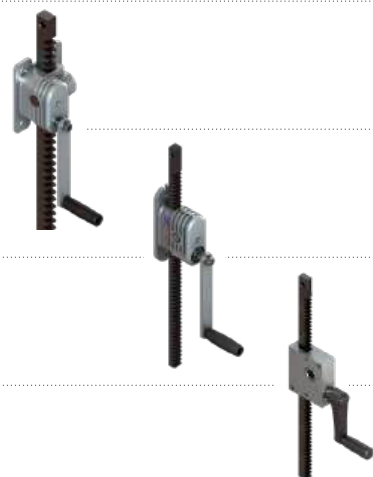
# Manual drives

## HZW // Manual rack drives 2

HZW 55 4

HZW 53 10

HZW 45 14



## HWA // Manual drives

HWA 40, HWA 42 16

HWA 53 18



## HKG // Manual chain drive

HKG 06 22



# HZW, HWA and HKG – more power than permitted!

In its 170 years of experience, Lock has achieved the optimum level of synergy between materials and manufacturing processes to create robust, self-locking gear units.

A complete product family assures an optimum selection of gear units for loads of up to 12000 N or torques up to 160 Nm.



HZW 45

HZW 53

HZW 55



HWA 40/42

HWA 53

HKG 06

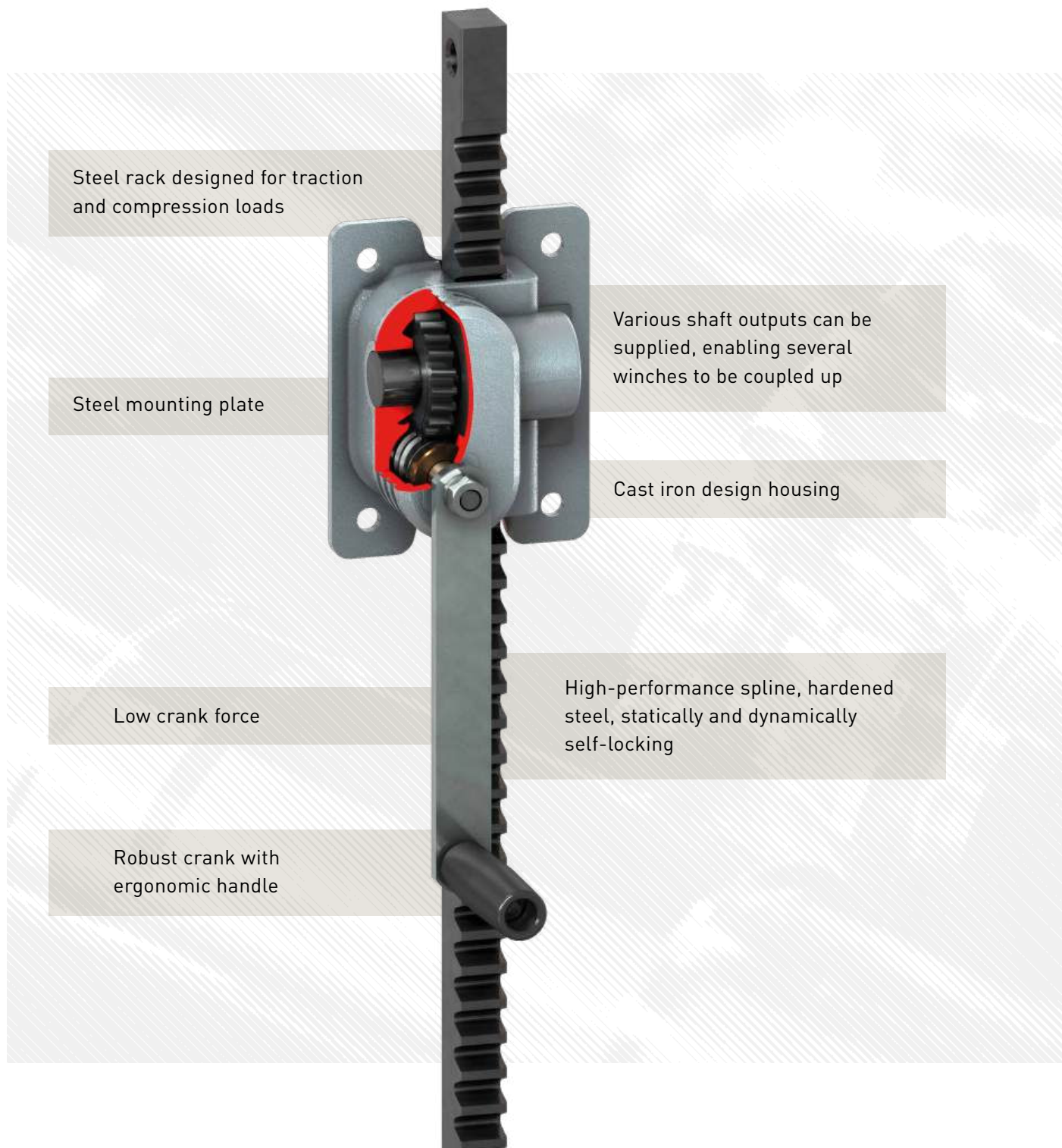
With the HZW in conjunction with the rack drive and rack gear geometry developed in-house is a product unrivalled to this day.

## Special features – HZW:

- For raising and lowering slides, conveyor systems, work benches and much more.
- Hardened gear unit components for ultimate loads.
- Loadable in tension and compression.
- Coupled with other HZW units, also suitable for linear or surface area loads.
- Operation with one drive system possible according to assembly and operating instructions.

# When we write 12000 N on a unit, you can count on having 12000 N!

---



## HZW 55 // Manual rack winch 12000 N




- Manual rack winches for raising, lowering, adjusting and securing components, devices, machines and ventilation systems.
- Compact design ideal for small installation spaces.
- Smooth action, self-locking worm gear drives.
- Cast housing, milled worm gear unit, gearbox components made of steel, partially hardened, robust precision design.
- Loadable in tension and compression.
- Standard stroke lengths of 600–1400 mm. Additional stroke possible in increments of 200 mm. From stroke length of 1500 mm, note reduced compression force.

### Versions:

- HZW 55.1210: Like standard, but lateral shaft outputs to drive version HZW 55.1211 (without self-locking action, stroke = 75mm/n) synchronously. Total load 12000 N, connection with 1" tube DIN EN 10255.
- HZW 55.1220: like standard, but shaft with rear output to drive version HZW 55.1222 synchronously. If more than two racks are needed in one line, the HZW 55.1221 can be employed. Instead of a crank, it has two round shaft ends. Total load 12000 N, connection with 3/4" tube DIN EN 10255.
- If several racks are needed to distribute the loads across a surface area, there are versions HZW 55.1212 and HZW 55.1213, see illustration showing this combination.

### Options:

- Folding handle, galvanised version (see Chapter 10). [Not for the ATEX version.]
- Rack guard.
- ATEX Version:  II 3 G Ex h IIB T3 Gc (gas)  
II 3 D Ex h IIIB T200°C Dc (dust)

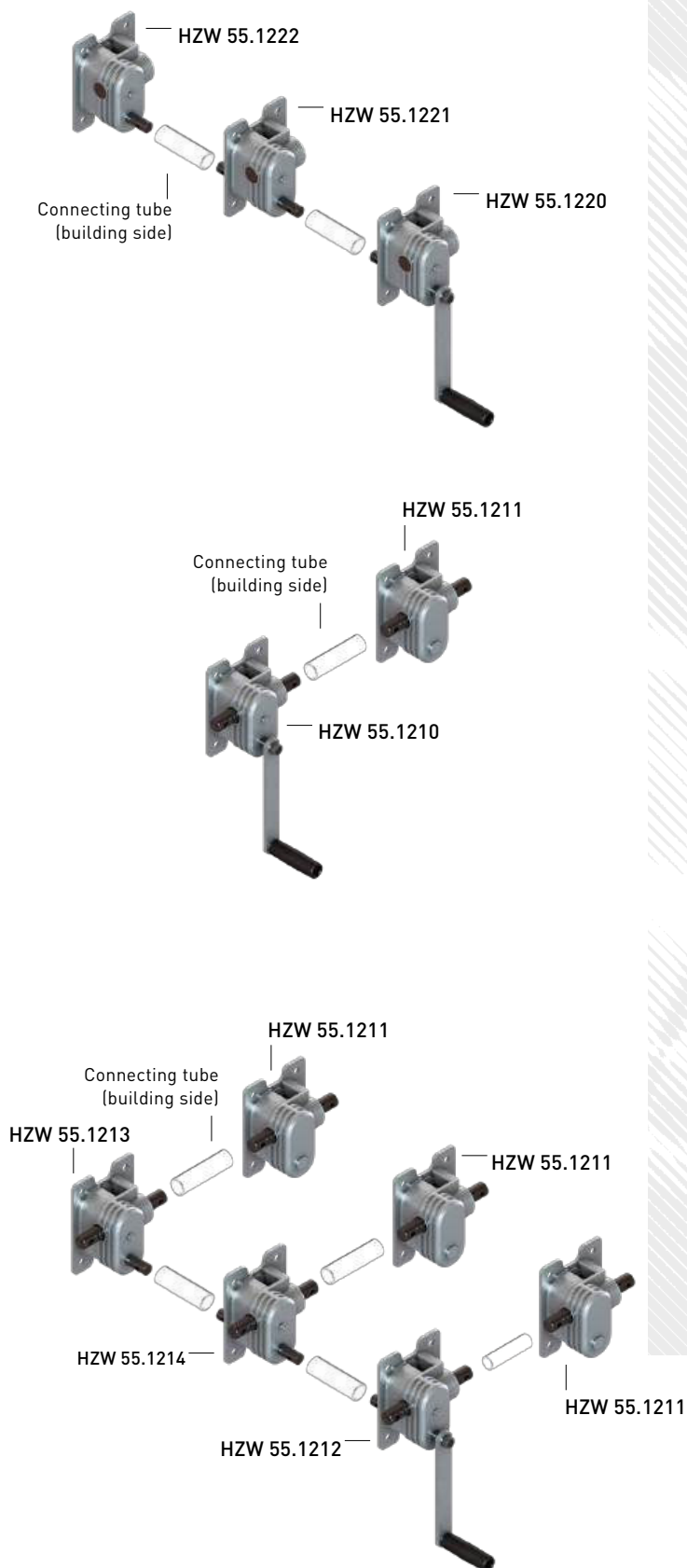


— HKU 01.2020  
Not for the ATEX  
version.



— HKU 01.2010  
Not for the ATEX  
version.

# HZW 55 combinations



- On systems with several racks in line to the crank axis
- Self-locking action in every gear unit
- 18 kg crank force with a total load of 12000 N
- Connection to 1"tube on building side



- On systems with several racks in line at 90° to the crank axis
- Self-locking action only gear unit with crank
- 18 kg crank force at a maximum total load of 12000 N
- Connection to 1"tube on building side



- On systems with several racks across a surface area
- Self-locking action in all gear units in the crank axis
- 18 kg crank force with a total load of 12000 N
- Connection to 1"tube and 1"tube

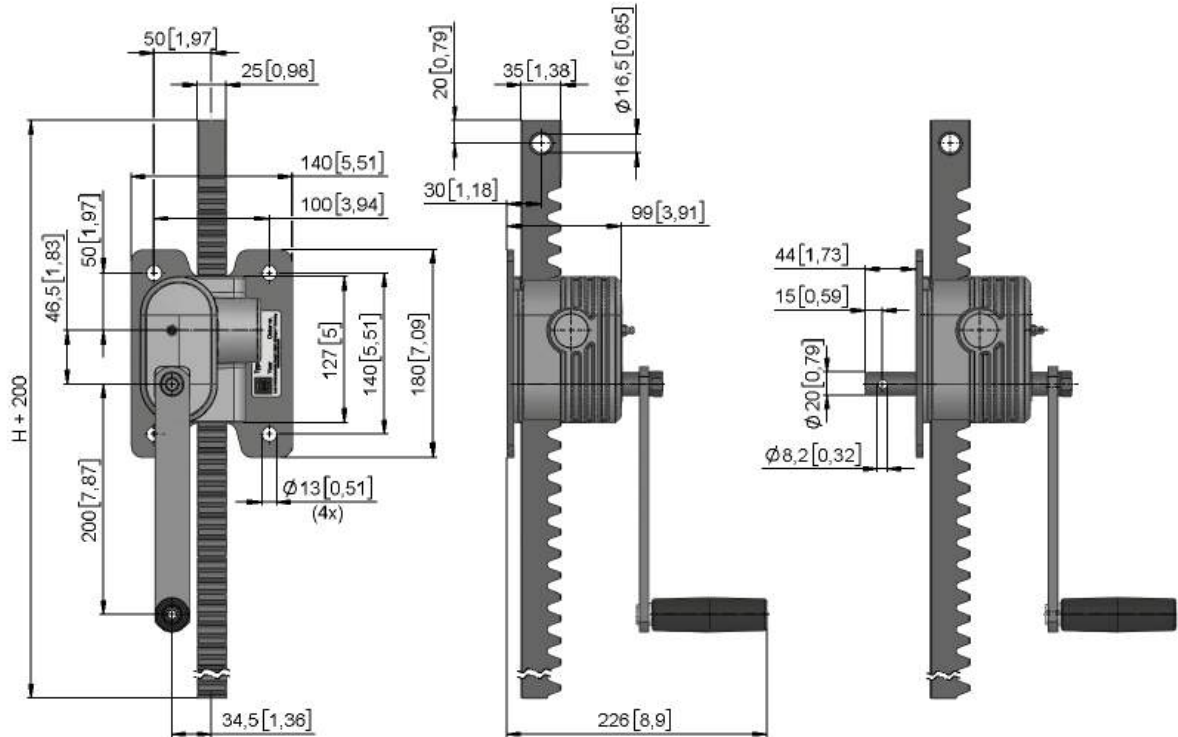
→ ATEX version only available as single drive.

## with crank

### HZW 55.1201

### HZW 55.1220

→ Attention: Additional potential equalization required for ATEX version.

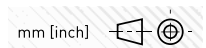
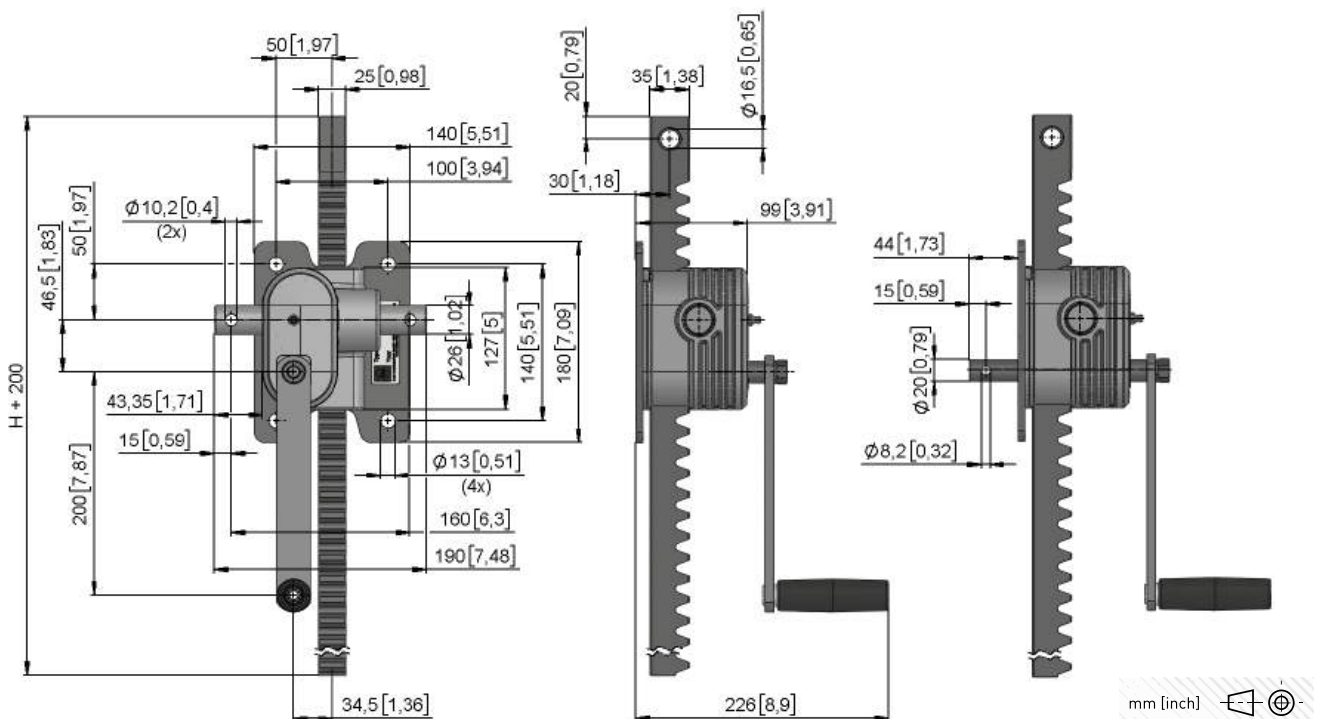


## with crank and right through shaft

### HZW 55.1210

### HZW 55.1212

→ Attention: Not available as ATEX version.

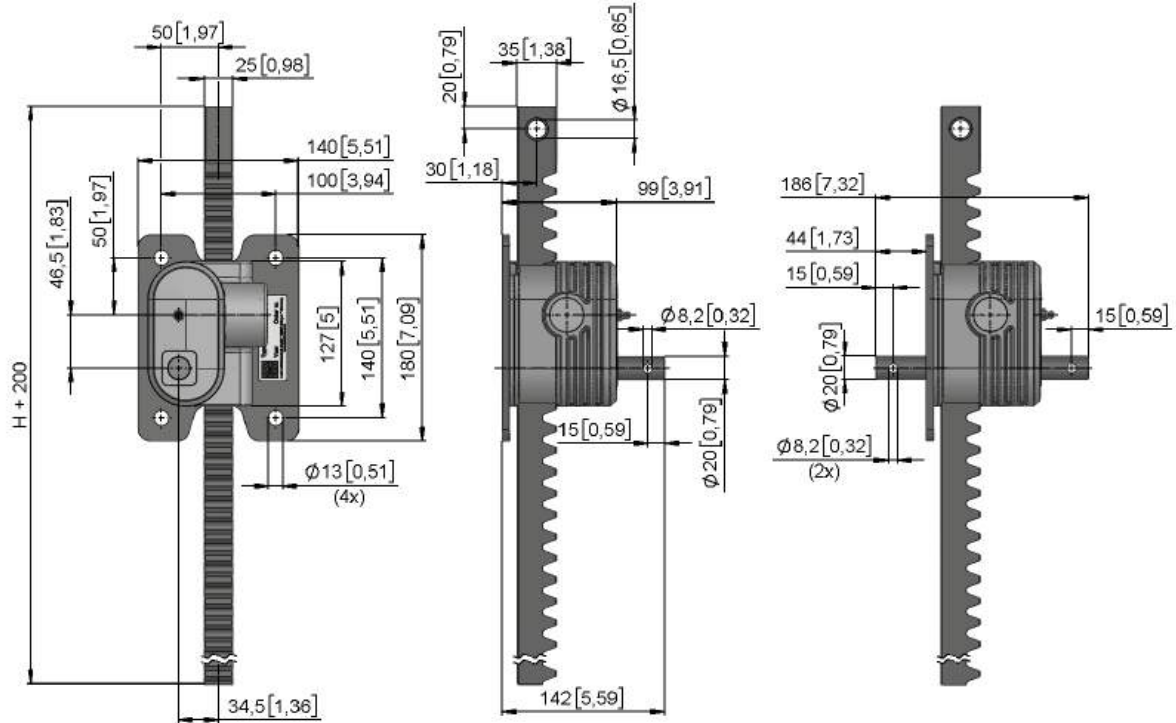


# without crank

HZW 55.1222

HZW 55.1221

→ Attention: Not available as ATEX version.



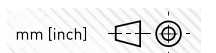
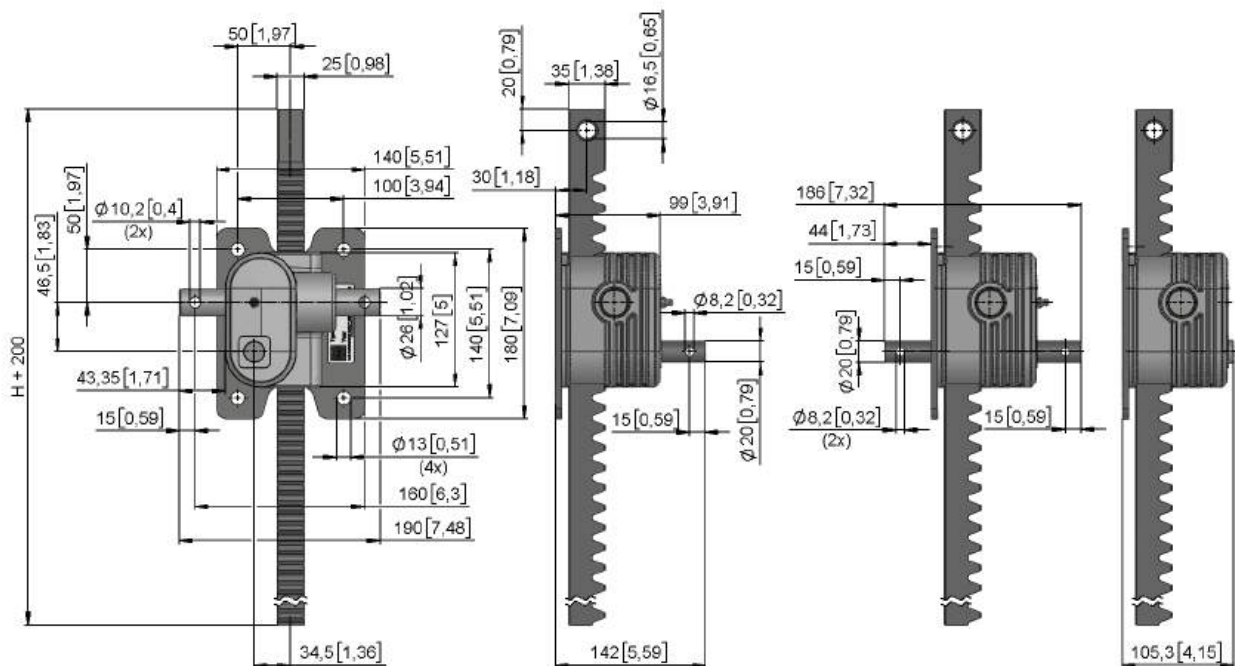
# without crank and right through shaft

HZW 55.1213

HZW 55.1214

HZW 55.1211

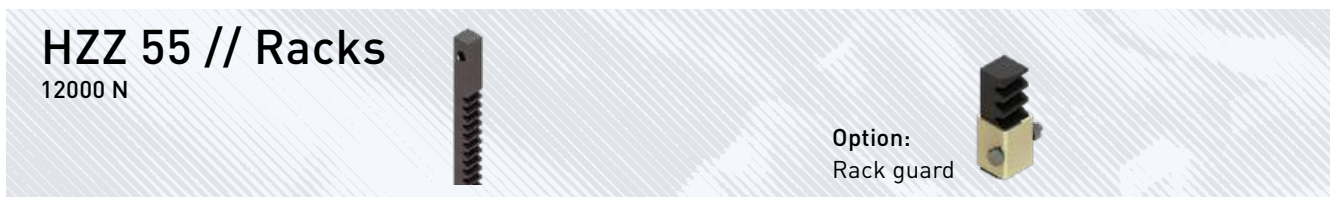
→ Attention: Not available as ATEX version.



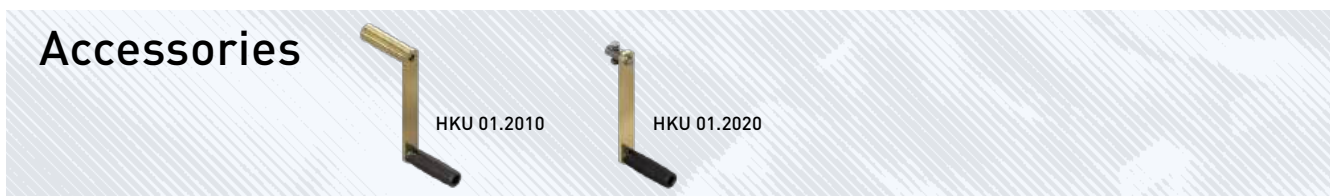


Version	Type no.	F [N]	H <sub>k</sub> [mm/n]	F <sub>H</sub> [N]	m [kg]
HZW 55.1201	51355.1201.00	12000	3,6	180	4,8
HZW 55.1210	51355.1210.00	12000	3,6	180	5,1
HZW 55.1211	51355.1211.00	12000	75,4	-	3,0
HZW 55.1212	51355.1212.00	12000	3,6	180	4,9
HZW 55.1213	51355.1213.00	12000	3,6	180	4,2
HZW 55.1214	51355.1214.00	12000	3,6	180	4,4
HZW 55.1220	51355.1220.00	12000	3,6	180	5,0
HZW 55.1221	51355.1221.00	12000	3,6	180	4,5
HZW 55.1222	51355.1222.00	12000	3,6	180	4,3
HZW 55.1201 EX	51355.1201.0080	10000	3,6	180	4,8

→ Note: Rack is supplied loose!



Version	Type no.	F [N]	H [mm]	L [mm]	m [kg]
HZZ 55.1206	51355.1297.06	12000	600	800	4,1
HZZ 55.1208	51355.1297.08	12000	800	1000	5,2
HZZ 55.1210	51355.1297.10	12000	1000	1200	6,5
HZZ 55.1212	51355.1297.12	12000	1200	1400	7,6
HZZ 55.1214	51355.1297.14	12000	1400	1600	8,8
<b>Option</b>					
HZZ 55.1298	51355.1297.9801	-	-	-	0,1



Version	Type no.	KL [m]	Info	m [kg]
HKU 01.2010	82301.2010.0001	200	Crank	0,8
HKU 01.2020	82301.2020.0001	200	Crank	0,6



# HZW 53 // Manual rack winch

## 3000–6000 N



- Manual rack winches for raising, lowering, adjusting and securing components, devices, machines and ventilation systems.
- Smooth action, self-locking worm gear drives.
- Cast housing, milled worm gear drive, gearbox components made of steel, partially hardened, robust precision design.
- Loadable in tension and compression.
- Standard stroke lengths 400–1400 mm. Additional stroke possible in increments of 200 mm. From stroke length of 1100 mm (HZW 53.03), or 1300 mm (HZW 53.06) note reduced compression force.

**Versions:**


- HZW 53.0310 // HZW 53.0610: like standard version but with lateral shaft outputs to drive version HZW 53.0311 // HZW 53.0611 (not self-locking, maximum total load 3000 N // 6000 N. Connection with 3/4" tube, DIN EN 10255.

HZW 53.0310  
 HZW 53.0610  
 ATEX HZW 53.0601

HZW 53.0311  
 HZW 53.0611



**Options:**

- Folding handle, galvanised version (see chapter 10). (Not for the ATEX version.)
- Rack guard.
- ATEX Version:  II 3 G Ex h IIB T4 Gc  
 II 3 D Ex h IIIB T135°C Dc



— HKU 01.2020  
 Not for the ATEX version.

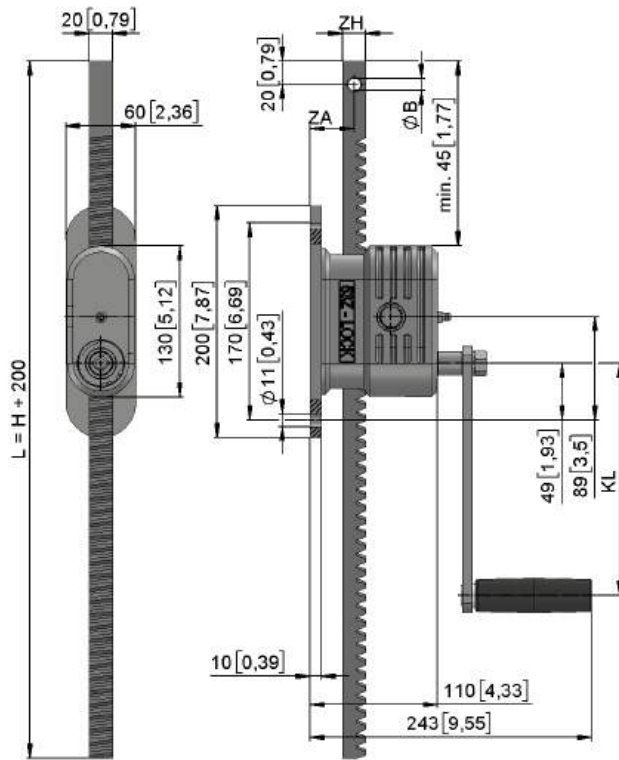


— HKU 01.2010  
 Not for the ATEX version.



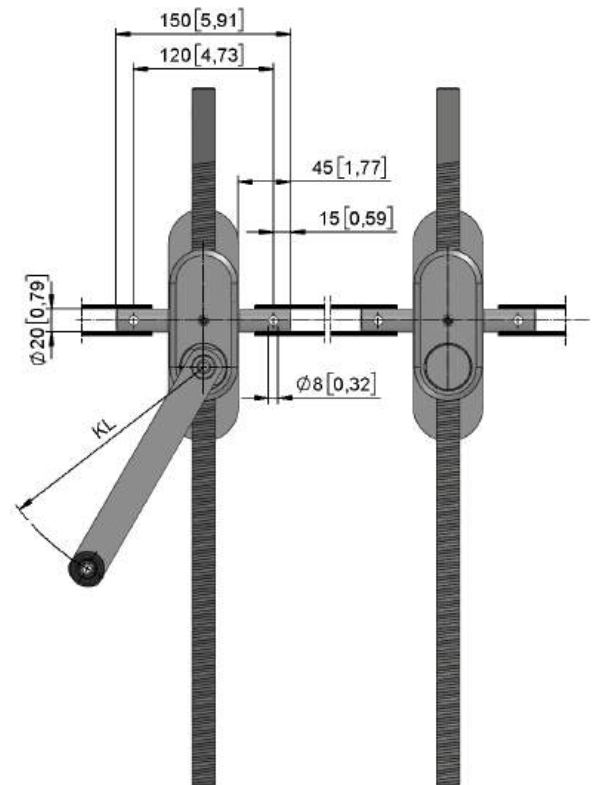
**HZW 53.0301 // HZW 53.0601**

→ **Attention:** Additional potential equalization required for ATEX version.



**HZW 53.0310 // HZW 53.0311  
HZW 53.0610 // HZW 53.0611**

→ **Attention:** Not available as ATEX version.



mm [inch]

**HZW 53 // Gear unit**

3000–6000 N



Version	Type no.	F [N]	H <sub>k</sub> [mm/n]	F <sub>H</sub> [N]	KL [mm]	ZA [mm]	m [kg]
HZW 53.0301	51153.0301.00	3000	11	110	200	38	4,0
HZW 53.0601	51153.0601.00	6000	11	180	250	35	4,2
HZW 53.0310	51153.0310.00	3000	11	110	200	38	4,0
HZW 53.0311	51153.0311.00	3000	154	–	–	38	3,5
HZW 53.0610	51153.0610.00	6000	11	180	250	35	4,2
HZW 53.0611	51153.0611.00	6000	154	–	–	35	3,5
HZW 53.0601 Ex	51153.0601.0080	6000	11	180	250	35	4,2

## HZZ 53 // Racks

3000–6000 N

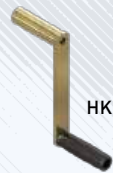


Option:  
Rack guard



Version	Type no.	F [N]	ZH [mm]	H [mm]	L [mm]	B [mm]	m [kg]
HZZ 53.0304	51153.0397.04	3000	20	400	600	11	1,5
HZZ 53.0306	51153.0397.06	3000	20	600	800	11	2,0
HZZ 53.0308	51153.0397.08	3000	20	800	1000	11	2,5
HZZ 53.0310	51153.0397.10	3000	20	1000	1200	11	3,0
HZZ 53.0312	51153.0397.12	2000	20	1200	1400	11	3,5
HZZ 53.0314	51153.0397.14	1500	20	1400	1600	11	4,0
<b>Option</b>							
HZZ 53.0398	51153.0397.9801	-	-	-	-	-	0,1
HZZ 53.0698	51153.0697.9801	-	-	-	-	-	0,1

## Accessories



HKU 01.2010



HKU 01.2020

Version	Type no.	KL [m]	Info	m [kg]
HKU 01.2010	82301.2010.0001	200	Crank	0,8
HKU 01.2020	82301.2020.0001	200	Crank	0,6



# HZW 45 // Manual rack winch 1000 N



- Manual rack winches for raising, lowering, adjusting and securing components, devices, machines and ventilation systems.
- Compact design ideal for small installation spaces.
- Smooth action, self-locking worm gear drives.
- Aluminium housing, milled gearbox components made of steel, wearing parts hardened, robust precision design.
- Loadable in tension and compression.
- Standard stroke length 200–800 mm. Other stroke lengths on request.

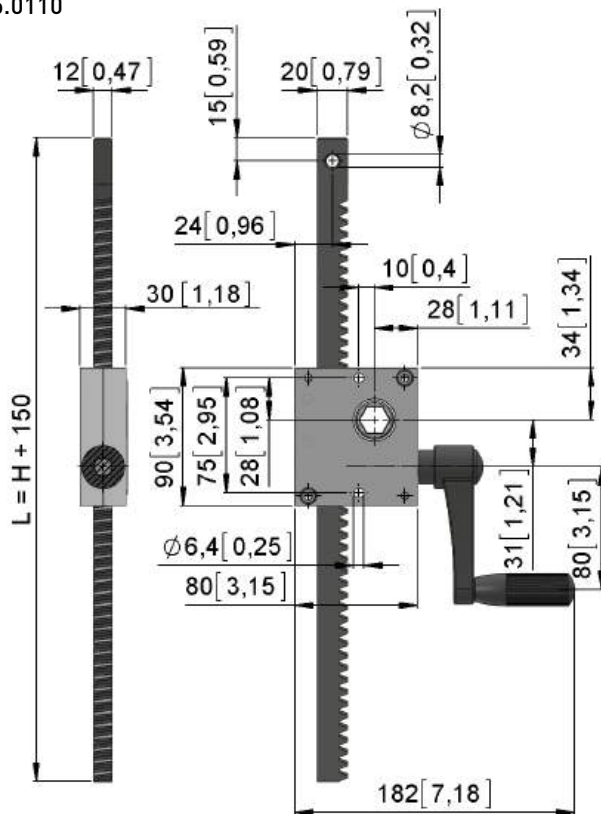
**Versions:**

- HZW 45.0111: can be driven synchronously with HZW 45.0110 Version HZW 45.0111 (without self-locking action). Total load 1000 N, connection with hex profile, waf 17.

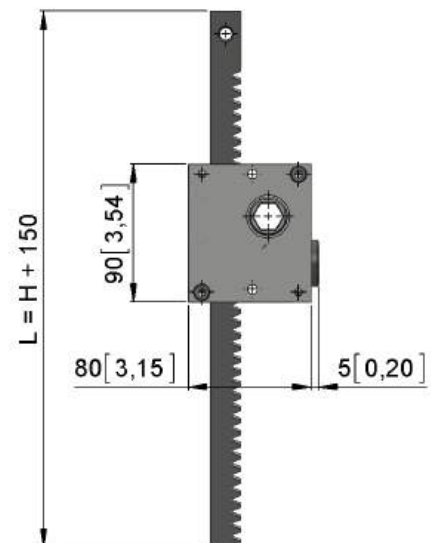
**Option:**

- Rack guard.

HZW 45.0110



HZW 45.0111



## HZW 45 // Gear unit

1000 N



Version	Type no.	F [N]	H <sub>k</sub> [mm/n]	F <sub>H</sub> [N]	m [kg]
HZW 45.0110	51145.0110.00	1000	7,85	75	1,4
HZW 45.0111	51145.0111.00	1000	117,8	-	1,2

## HZZ 45 // Racks

1000 N



Option:  
Rack guard



Version	Type no.	F [N]	H [mm]	L [mm]	m [kg]
HZZ 45.0102	51145.0197.02	1000	200	350	0,7
HZZ 45.0104	51145.0197.04	1000	400	550	0,9
HZZ 45.0106	51145.0197.06	1000	600	750	1,2
HZZ 45.0108	51145.0197.08	1000	800	950	1,5

### Option

Version	Type no.	F [N]	H [mm]	L [mm]	m [kg]
HZZ 45.0198	51145.0197.9801	-	-	-	0,1

## HZW 60 // Rack and pinion wall jack DIN 7355

### 15–100 kN



- FIN 7355 compliant rack-and-pinion jacks designed for wall mounting.
- They are suitable for positioning slides, conveyors, work tables, etc.
- Operating temperature permanently -20 °C (-4 °F) to 60 °C (140 °F) (operating temperature static up to 90 °C/194 °F)

#### With danger alert

- The gear units are not self-locking.
- The holding torque is achieved by the transmission and locking the crank system.
- The application must be secured by a secondary method (e.g. staking) for protection in the event of failure of the holding force.
- A connection to the supporting structure must be evaluated/designed by the customer.

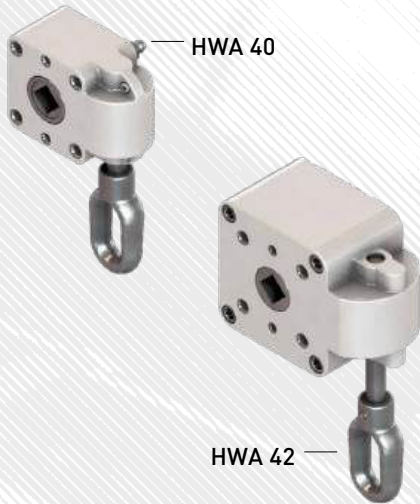
#### Direction of force of gear unit/winch

- Due to asymmetrical gearing, the standard version may only be loaded in one direction (compression or tension).
- The installation position of the winch must be observed during assembly.
- A maximum of 5 % of the crank force is permitted against the direction of force.
- Also available for compression and tension with symmetric toothing and pressure roller safety crank.
- The pressure roller safety crank can also be mounted on a steel winch with asymmetrical toothing.
- The advantage is that the crank is quiet and cannot come loose under vibration (e.g. container lid on a truck).
- All cranks are galvanized without painting.

Type	Load [kN]	Stroke [mm/n]	Crank force [N]
HZW 60.15	15	14,0	280
HZW 60.30	30	9,0	280
HZW 60.50	50	4,5	280
HZW 60.100	100	3,2	400

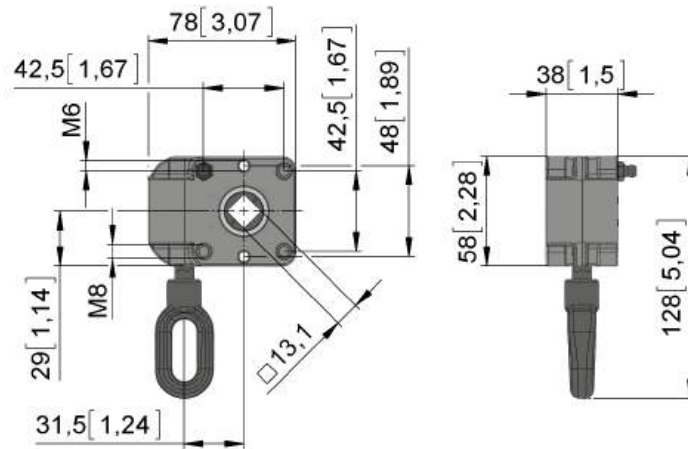


# HWA 40, HWA 42 // Manual drive 20–27 Nm

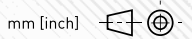
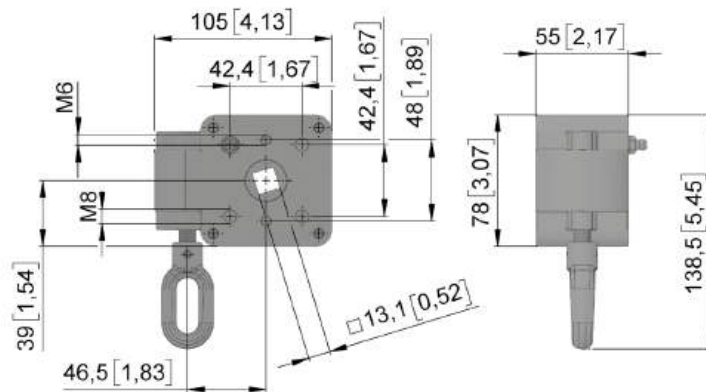


- Manual drive for simple applications such as small rolling systems, panels, ventilation flaps and a great deal more.
- With awning crank, also for systems above normal height of manual reach.
- Self-locking worm gear unit housing made of painted aluminium.
- Special version for use in greenhouse and animal shed construction with grease nipple.

## HWA 40



## HWA 42



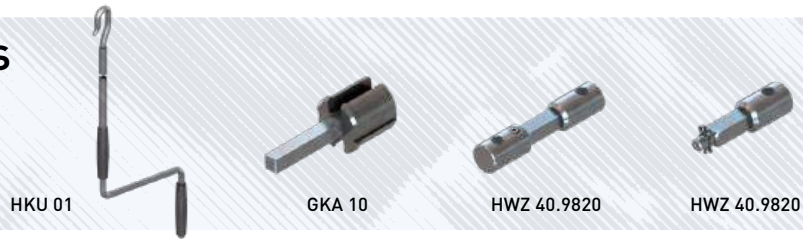
# HWA 40, HWA 42

20–27 Nm



Version	Type no.	T [Nm]	i	FH [N]	m [kg]
HWA 40.1002	52040.1002.7401	20	7:1	40	0,6
HWA 42.1003	52042.1003.7401	27	13:1	30	1,3

## Accessories

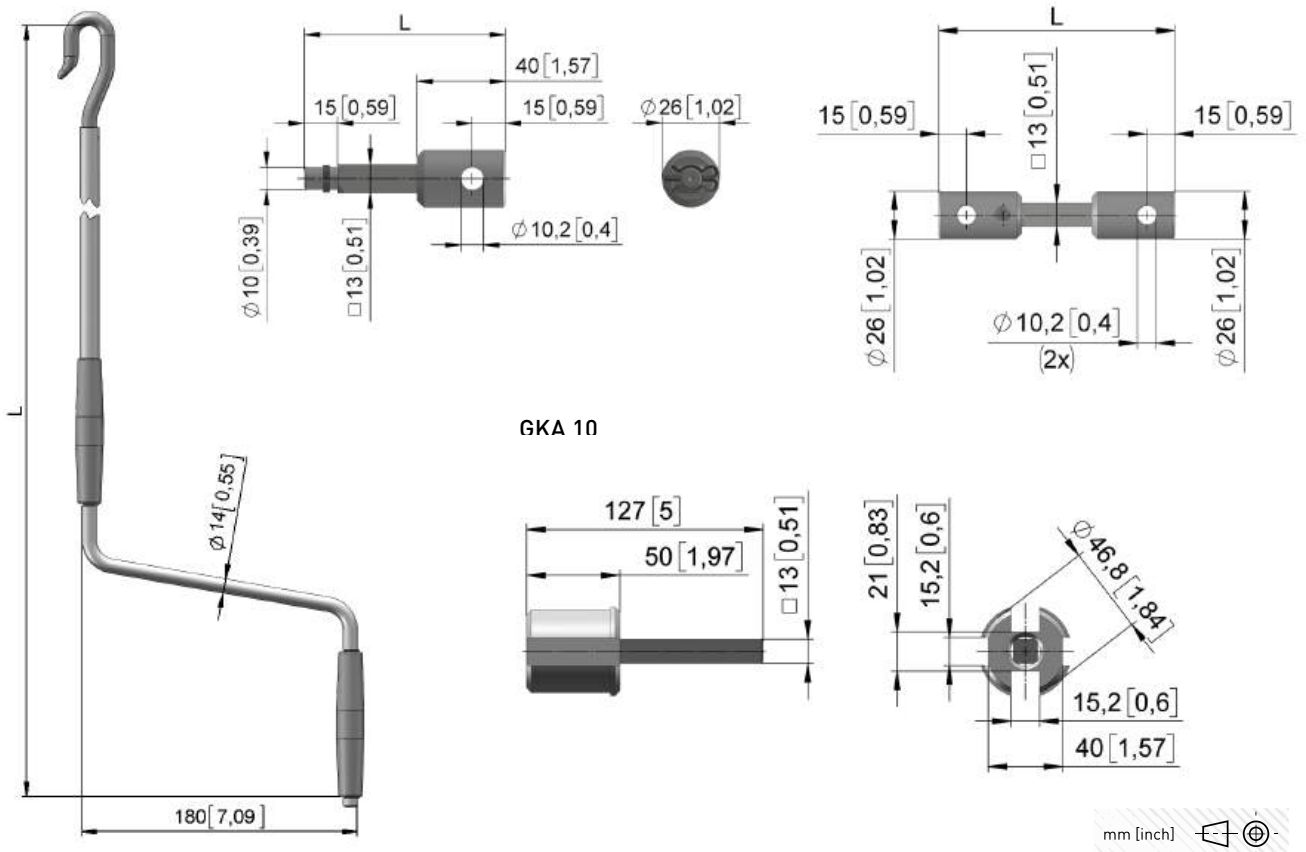


Version	Type no.	KL [mm]	Info	m [kg]
GKA 10.0147	20998.1001.4714	-	-	0,3
HWZ 40.9820	52040.9820.0601	-	one-sided	0,1
HWZ 40.9820	52040.9820.0606	-	both sided	0,1
HKU 01.0830	82301.0830.0001	800	-	0,4
HKU 01.1030	82301.1030.0001	1000	-	0,4
HKU 01.1230	82301.1230.0001	1200	-	0,5

HKU 01

HWZ 40.9820

HWZ 40.9820



## HWA 53 // Manual drives 40–160 Nm

HWA 53.05



- Robust manual drives with shaft outputs on both sides. We 06 available in four different versions.
- Cast housing, milled, self-locking worm gear unit.
- Gearbox units made of hardened steel.

→ HWA 53.05 with hand crank HKU 01/HKU 02 (see Chapter [10](#)).

HWA 53.08



- HWA 53.08 with sprocket wheel, chain guide and round steel hand chain HKU 96 (DIN 766,  $\varnothing 5 \times 18.5 \times 17$  mm), galvanised, in various lengths (to be ordered separately).

- HWA 53.10 for long cranks (tube on structure side) with mounting turned through 90°, for optimum adjustment to suit actuation height. **Note:** Torque reduced!
- Delivery incl. joint, grip sleeve and crank.

HWA 53.20



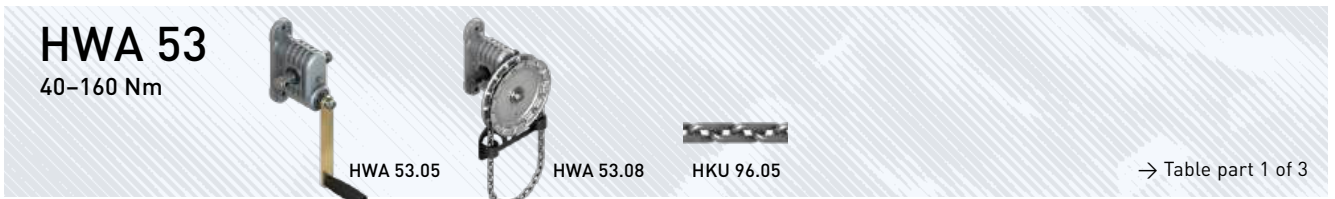
- HWA 53.20 with round drive shaft for extended crank. Tube for extension on building structure.

HWA 53.10



### Option:

- Hand crank with folding handle (see Chapter [10](#)).

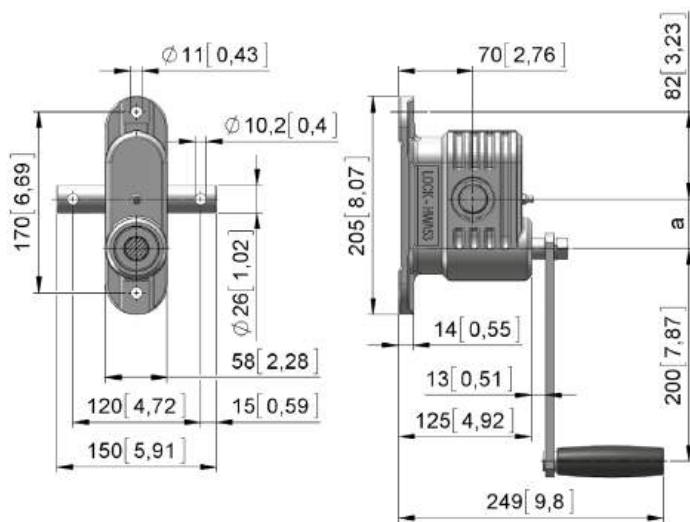


Version	Type no.	T [Nm]	i	F <sub>H</sub> [N]	a [mm]	m [kg]
<b>HWA 53.05</b>						
HWA 53.0504	52105.0401.06	40	9 : 1	90	40,0	4,6
HWA 53.0508	52105.0801.06	80	14 : 1	150	40,0	4,6
HWA 53.0512	52105.1201.06	120	18 : 1	130	46,5	4,8
HWA 53.0516	52105.1601.06	160	22 : 1	150	46,5	4,8

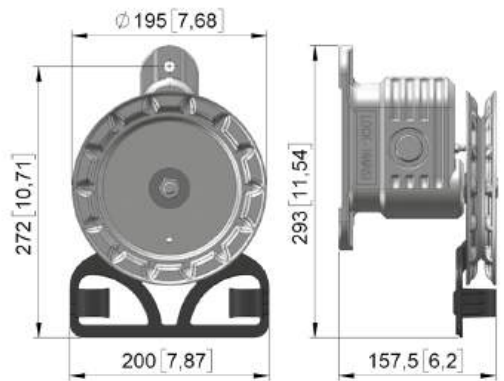
<b>HWA 53.08</b>						
HWA 53.0804	52108.0401.06	40	9 : 1	225	40,0	4,7
HWA 53.0808	52108.0801.06	80	14 : 1	360	40,0	4,7
HWA 53.0812	52108.1201.06	120	18 : 1	315	46,5	4,9
HWA 53.0816	52108.1601.06	160	22 : 1	455	46,5	4,9

Version	Type no.	HK [ca. m]	LK [m]	Info	m [kg]
HKU 96.0502	82396.6605.02	1,50	2,00	Round steel hand chain	1,0
HKU 96.0504	82396.6605.04	2,50	4,00	Round steel hand chain	2,0
HKU 96.0506	82396.6605.06	3,50	6,00	Round steel hand chain	3,0
HKU 96.0507	82396.6605.07	4,20	7,50	Round steel hand chain	3,8
HKU 96.0509	82396.6605.09	5,00	9,00	Round steel hand chain	4,5

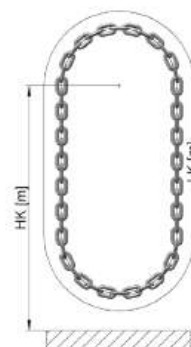
**HWA 53.05**



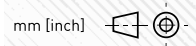
**HWA 53.08**



→ Order chain separately!



**HKU 96.05**  
Round steel hand chain



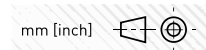
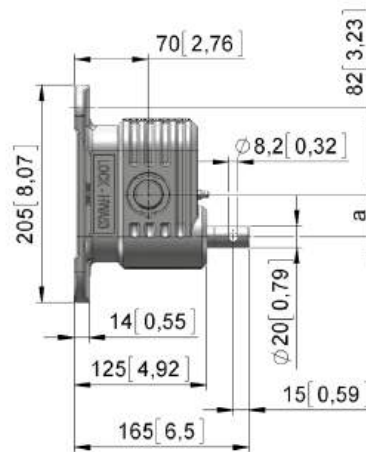
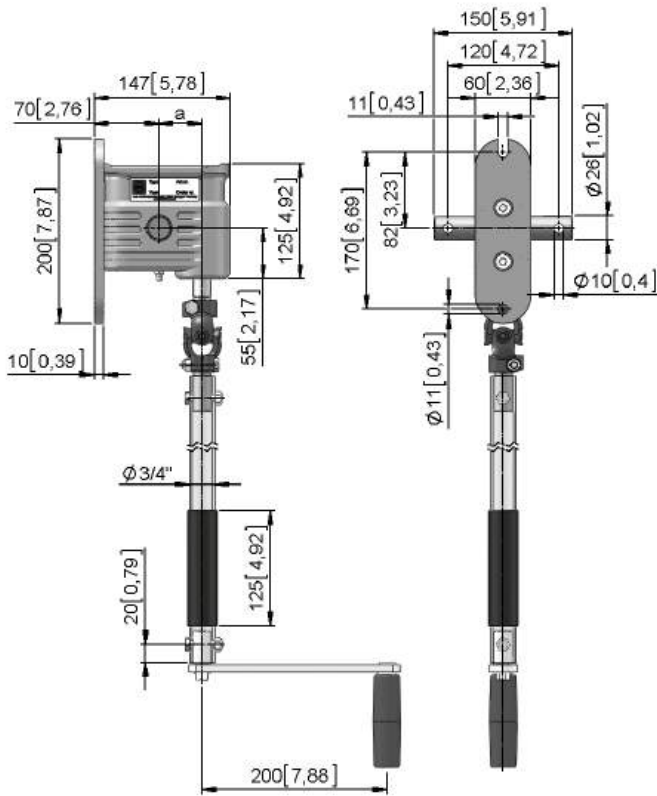


→ Table part 2 of 3

Version	Type no.	T [Nm]	i	F <sub>H</sub> [N]	a [mm]	m [kg]
<b>HWA 53.10</b>						
HWA 53.1012	52110.1201.06	90	18 : 1	130	46,5	4,8
HWA 53.1016	52110.1601.06	120	22 : 1	150	46,5	4,8
<b>HWA 53.20</b>						
HWA 53.2004	52120.0401.06	40	9 : 1	-	40,0	4,1
HWA 53.2008	52120.0801.06	80	14 : 1	-	40,0	4,1
HWA 53.2012	52120.1201.06	120	18 : 1	-	46,5	4,3
HWA 53.2016	52120.1601.06	160	22 : 1	-	46,5	4,3

**HWA 53.10**

**HWA 53.20**



# Accessories



HKU 96.0116



MPL 75.2246

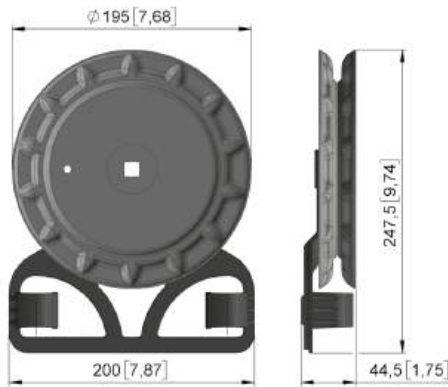


HKU 01.2020

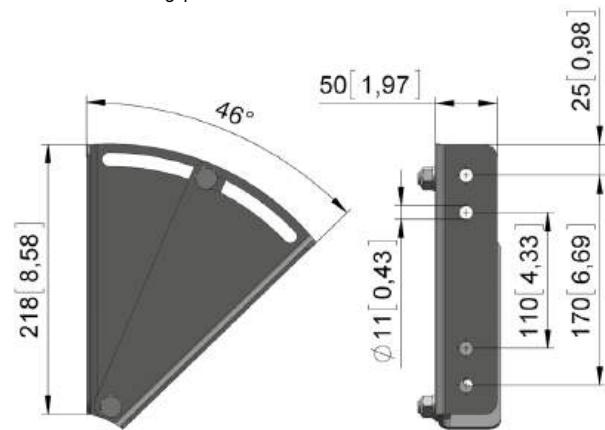
→ Table part 3 of 3

Version	Type no.	KL [m]	Info	m [kg]
HKU 96.0116	82396.0101.16	-	Manual sprocket wheel	0,8
MPL 75.2246	82575.2246.01	-	Mounting plate	1,2
HKU 01.2020	82301.2020.0001	200	Crank	0,6

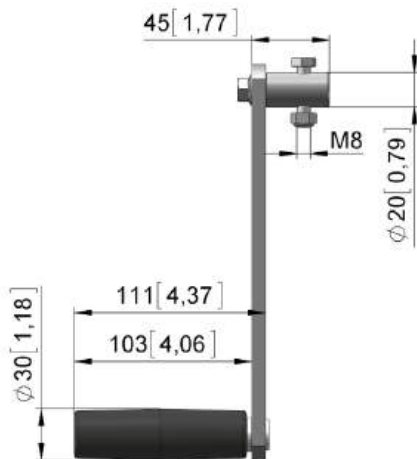
**HKU 96.0116**  
Manual sprocket wheel



**MPL 75.2246**  
Mounting plate



**HKU 01.2020**  
Crank



mm [inch]

## HKG 06 // Manual chain drive 60 Nm



— HKG 06.50

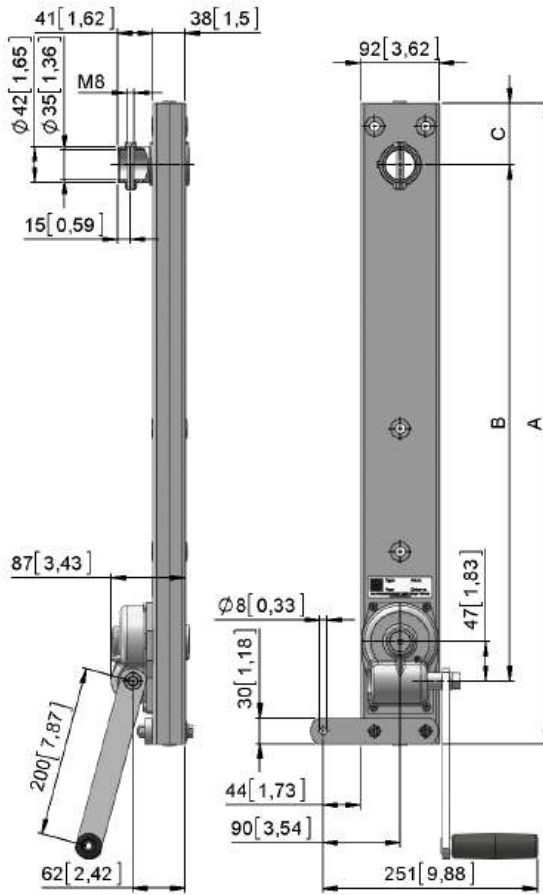


— HKG 06.51

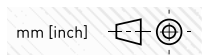
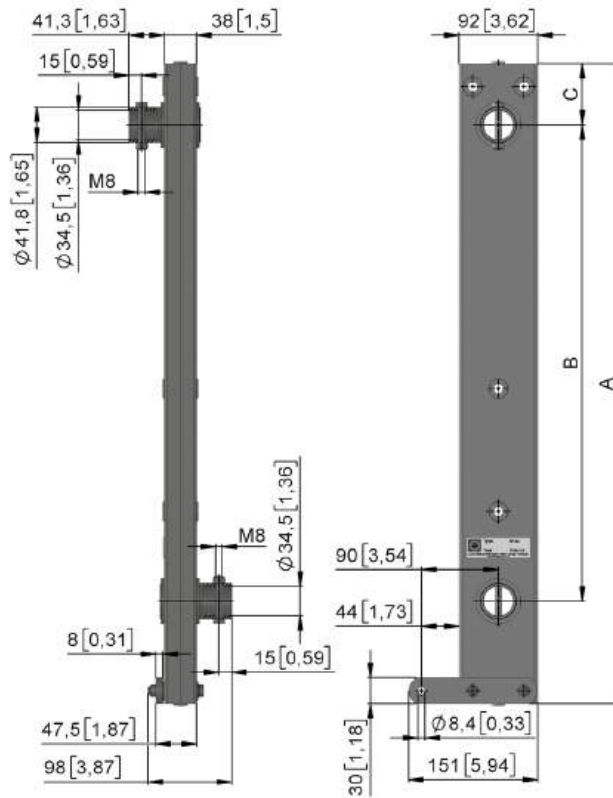
- Manual drive for actuation of overhead drive shafts, e.g. for side ventilation in greenhouses, up to 60 metres in length.
- Gear unit with self-locking worm gear unit and worm roller chain. Galvanised. Easy mounting with just two screws.
- Version with 1 retaining bracket and output shaft to guide through a 1" ventilation tube + M 8 x 50 screw.
- For tube 1", 33.7 x 3.25 mm, DIN EN 10255.
- Reduction 16 : 1 and 8 : 1.
- As chain gear unit with two hollow shaft 1 : 1 without selfbreaking.
- **Option:**
- Crank with folding handle (see Chapter [10](#)).

Version	Type no.	A [mm]	B [mm]	T [Nm]	i	F <sub>H</sub> [N]	C [mm]	m [kg]
HKG 06.5007	52160.0650.07	750	604	60	16 : 1	95	72	7,8
HKG 06.5107	52160.0651.07	750	608	60	1 : 1	–	72	5,1
HKG 06.5010	52160.0650.10	1000	858	60	16 : 1	95	68	9,2
HKG 06.5110	52160.0651.10	1000	862	60	1 : 1	–	68	6,5
HKG 06.5012	52160.0650.12	1250	1112	60	16 : 1	95	64	10,6
HKG 06.5015	52160.0650.15	1500	1366	60	16 : 1	95	60	12,0
HKG 06.5017	52160.0650.17	1750	1607	60	16 : 1	95	69	13,4
HKG 06.5115	52160.0651.15	1500	1320	60	1 : 1	–	60	9,2
HKG 06.5815	52160.0458.15	1500	1366	40	8 : 1	130	60	10,8

HKG 06.50



HKG 06.51









LOCK BEWEGT // LOCK MOVES

# Rack & pinion units

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## ZSG/AZD/EZD // Rack & pinion units → pivotable 2

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ZSG 15, ZSG 20 4

AZD 05 8

EZD 51, 52 12

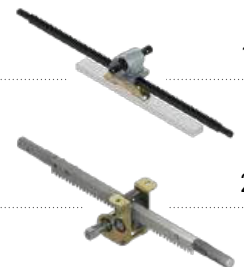


## LZG/SZG // Rack & pinion units → linear 14

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LZG 20, LZG 24 16

SZG 35 28



# EZD, ZSG and AZD – the unbeatable trio

Unique two piece design or cost effective one piece

Rack made of galvanized steel

Racks either straight or curved

EZD 51  
EZD 52  
500 N

The strengths lie in power, choice and modularity, and this is also true of the family of pivotable rack & pinion units EZD, ZSG and AZD.

With a great selection of power drives and rack & pinion units, an optimum quality right down the entire driveline is guaranteed. That delivers bottom line benefits, and over the longer term, it also reduces service costs.

The EZD and AZD ranges feature external drive tube bearings for lower load ratings up to 700 N. Also available with curved racks for specialist applications.

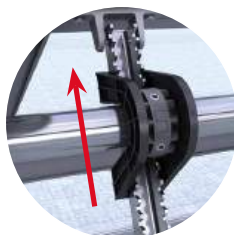
The ZSG range tackles heavy load ratings of up to 2500 N with an integrated pivot bearing, something no other manufacturer can offer. This saves time and effort during installation and lubrication work.



1. Fit the pinion



2. Snap the housing



3. Push the rack



Housing and rack made of corrosion-resistant aluminium

Racks either straight or curved

Rack and housing pivot-mounted on external drive tube bearings

Optional rack protection

AZD 05  
700 N

AZZ 60

Steel housing

Rack pivot-mounted inside housing

ZSG 15  
1200 N

Gear components made of hardened steel

ZSG 20  
2500 N

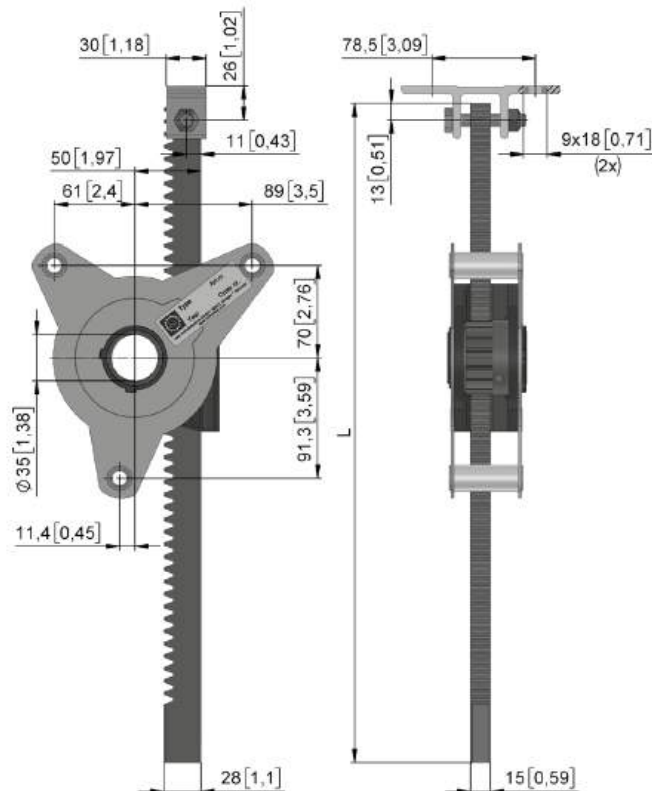
## ZSG 15 // Rack & pinion units 1200 N



- Compact rack & pinion units to actuate heavy panels. Ideal for assembly-friendly problem-solving!
- Typical applications: Ventilation in wide-span greenhouses (double-glazing with just one gear rack per girder division), large primary or secondary roof ridges in animal shed construction.
- Steel housing with rack guide made of special anti-friction material, rack pivotable through 55°. Drive pinion for 1" tube is also mounting for drive tube. No further bearings required!
- Window bracket in scope of supply.
- Rack and pinion made of steel.
- Stroke lengths of 600–1800 mm. Special lengths on request.
- Fast assembly with clamping ring and safety screws.
- Rack grease LUB 20 in scope of supply.
- U-bracket accessory for length compensation in 175 mm lengths.

### Note:

- Tighten down U-bracket nut to 80 Nm!
- Tighten down clamping ring screws to 15 Nm.



mm [inch]

## ZSG 15 // Gear unit

1200 N



Version	Type no.	F [N]	v [mm/n]	r [mm]	m [kg]
ZSG 15.1201	61515.1201.00	1200	151	24	1,4

## ZSZ 15 // Rack

1200 N

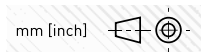
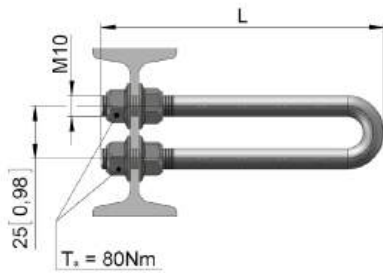


Version	Type no.	F [N]	H [mm]	L [mm]	m [kg]
ZSZ 15.0665	61515.1297.0665	1200	600	800	2,8
ZSZ 15.0865	61515.1297.0865	1200	800	1000	3,5
ZSZ 15.1065	61515.1297.1065	1200	1000	1200	4,2
ZSZ 15.1265	61515.1297.1265	1200	1200	1400	4,8
ZSZ 15.1465	61515.1297.1465	1200	1400	1600	5,5
ZSZ 15.1665	61515.1297.1665	1200	1600	1800	6,2
ZSZ 15.1865	61515.1297.1865	1200	1800	2000	6,9

## Accessories



Version	Type no.	Info	m [kg]
ZSG 15.9802	61515.1298.0201	U-bracket // L = 175 mm	0,3



## ZSG 20 // Rack & pinion units 2500 N



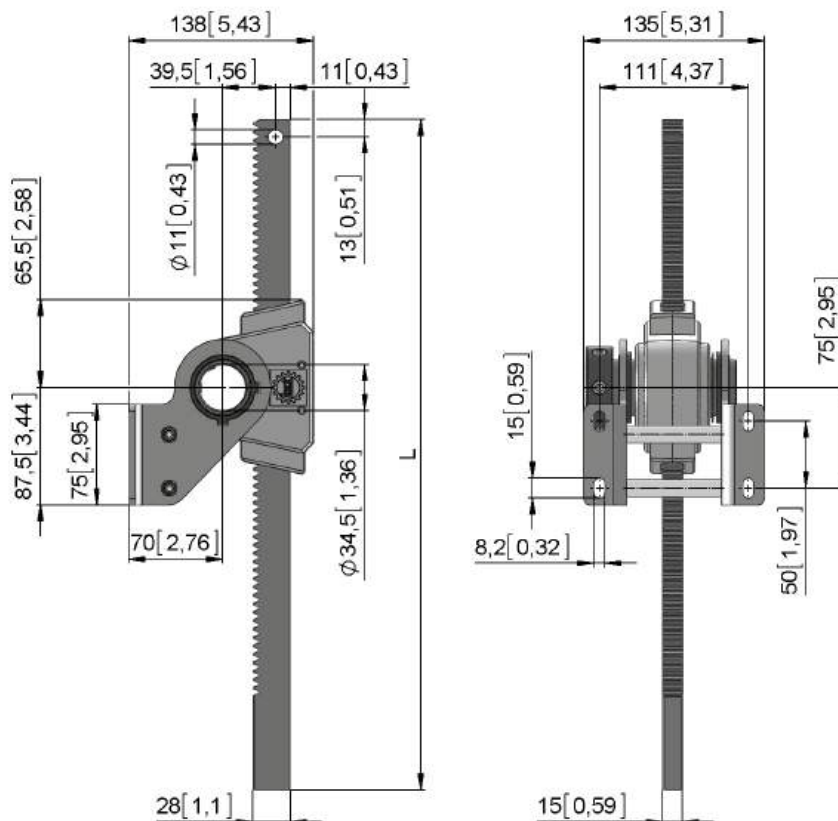
- Rack & pinion units with up to 2500 N traction or compression force with integrated bearing for drive tube. Also available as ZSG 75 with 7500 N.
- Suitable for use in smoke & heat extraction systems. Function and operational integrity levels in the event of a smoke or heat incident subject to individual agreement.
- Perfect synchronization through the mechanical interconnection of several drive elements.
- High power reserves for strong and long-lasting suction and wind loadings.
- Rack and pinion made of hardened steel. Aluminium housing. Rack pivotable through up to 190°.
- Stroke lengths of 600-1800 mm (from stroke length of 1800 mm, note reduced compression force). Special lengths and special consoles on request.
- Rack grease LUB 20 in scope of supply.

### Option:

- Window bracket to connect rack to panel on request.

### Note:

- Tighten down clamping ring screws to 25 Nm.



mm [inch]

## ZSG 20 // Gear unit

### 2500 N



Version	Type no.	F [N]	v [mm/n]	r [mm]	m [kg]
ZSG 20.4200	61404.2542.00	2500	157	25	2,1

## ZSZ 20 // Rack

### 2000–2500 N



Version	Type no.	F [N]	H [mm]	L [mm]	m [kg]
ZSZ 20.4206	61404.2597.06	2500	600	800	2,4
ZSZ 20.4208	61404.2597.08	2500	800	1000	3,0
ZSZ 20.4210	61404.2597.10	2500	1000	1200	3,6
ZSZ 20.4212	61404.2597.12	2500	1200	1400	4,2
ZSZ 20.4214	61404.2597.14	2500	1400	1600	4,8
ZSZ 20.4216	61404.2597.16	2500	1600	1800	5,4
ZSZ 20.4218	61404.2597.18	2000	1800	2000	6,0

# AZD 05 // Rack & pinion units

## 700 N



- Rack & pinion units for actuation of medium-duty panels.
- Typical applications: Ventilation in wide-span greenhouses with single glazing, or in polytunnel, primary or secondary roof ridges in animal shed construction.
- Rack available in straight or curved version. With curved rack, less space required for pivoting (e.g. for side ventilation or shading).
- Various lengths of aluminium rack, window brackets for securing panels in scope of supply.
- Mounting on 1" drive tube (DIN EN 10255: 33.7 x 3.25 mm or DIN 2441: 33.7 x 4.05 mm) with four compression screws.
- Rack grease LUB 20 in scope of supply.

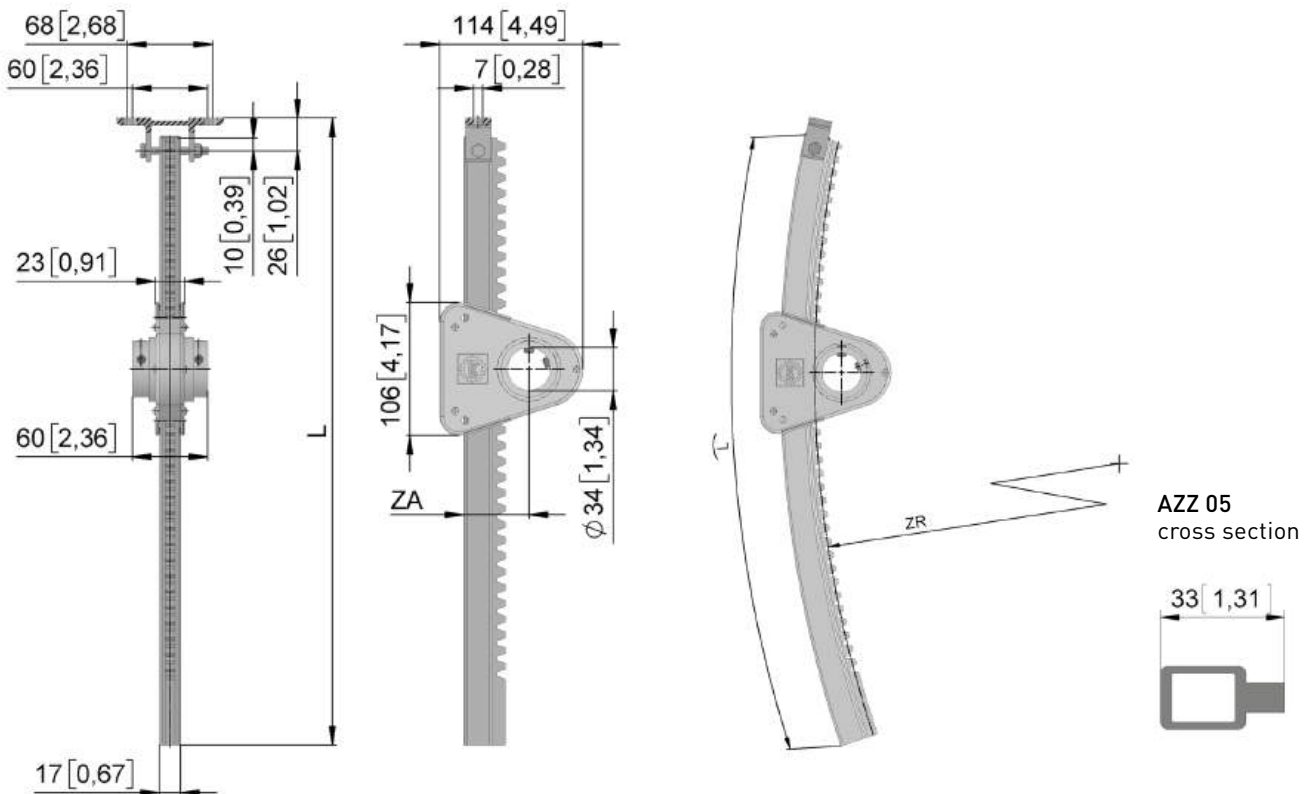
**Option:**

- Rack guard AZZ 60 for straight rack when required for insect protection (separation of good bugs / pests), grease guard or finger guard (people in nip range).

**Note:**

- Tighten down clamping ring screws to 8 Nm.

### AZD 05



mm [inch]

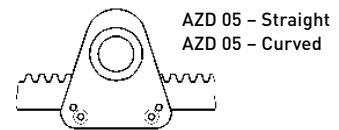
## AZD 05 // Gear unit

700 N



AZD 05

Version	Type no.	F [N]	v [mm/n]	r [mm]	ZA [mm]	m [kg]
<b>Straight</b>						
AZD 05.0253	61405.0502.53	700	126	20	52	0,4
<b>Curved</b>						
AZD 05.1253	61405.0512.53	600	126	20	52	0,4



## AZZ 05 // Racks

700 N



AZD 05



AZD 05

Version	Type no.	H [mm]	L [mm]	ZR [mm]	m [kg]
<b>700 N // Straight</b>					
AZZ 05.0208	61405.0502.6508	610	800	-	0,5
AZZ 05.0210	61405.0502.6510	810	1000	-	0,6
AZZ 05.0212	61405.0502.6512	1010	1200	-	0,7
AZZ 05.0214	61405.0502.6514	1210	1400	-	0,9
AZZ 05.0216	61405.0502.6516	1410	1600	-	1,1
<b>600 N // Curved</b>					
AZZ 05.1208	61405.0512.6508	610	800	1500	0,5
AZZ 05.1210	61405.0512.6510	810	1000	1500	0,6
AZZ 05.1212	61405.0512.6512	1010	1200	1500	0,7
AZZ 05.1214	61405.0512.6514	1210	1400	1500	0,9
AZZ 05.1216	61405.0512.6516	1410	1600	1500	1,1

# AZD 15 // Gear units

600 N



AZD 15

Version	Type no.	F [N]	v [mm/n]	r [mm]	ZA [mm]	m [kg]
<b>straight</b>						
AZD 15.0253	61405.1502.53	600	126	20	52	0,6
<b>curved</b>						
AZD 15.1253	61405.1512.53	600	126	20	52	0,6

- **Note:** For repair or replacement of AZD. Split housing, so no need to remove the drive tube! Compatible with AZZ racks.
- Please use split repair bearing if bearing replacement is required. Bearing ALD 19 – see Accessories, Chapter 10.

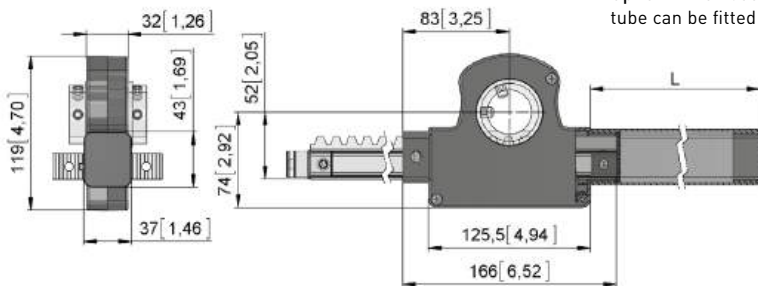
# Accessories



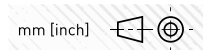
AZZ 60

Version	Type no.	Info	L [mm]	m [kg]
AZZ 60.0501	81860.0501.0001	Protective housing // For AZD 05 – Straight. Suitable protective tube - see below.	-	0,1
AZZ 60.0504	81860.0501.0004	Protective tube // For stroke H = 410 mm	470	0,5
AZZ 60.0505	81860.0501.0005	Protective tube // For stroke H = 610 mm	670	0,8
AZZ 60.0506	81860.0501.0006	Protective tube // For stroke H = 810 mm	870	0,5
AZZ 60.0507	81860.0501.0007	Protective tube // For stroke H = 1010 mm	1070	1,2
AZZ 60.0508	81860.0501.0008	Protective tube // For stroke H = 1210 mm	1270	1,5
AZZ 60.0509	81860.0501.0009	Protective tube // For stroke H = 1310 mm	1370	0,8
AZZ 60.0510	81860.0501.0010	Protective tube // For stroke H = 1410 mm	1470	1,9

## AZZ 60.0501



**Option:** When used as insect protection, a second protective tube can be fitted to opposite side on request!



## Simone Böttle // Customer Management

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"Customer satisfaction is our central key indicator. We were able to improve this last year to 96.5 %. Please continue to support us by letting us know your honest and constructive opinion."



# EZD 51, EZD 52 // Rack & pinion units 500 N



- Rack & pinion units for actuation of lightweight panels.
- Split steel rack & pinion units in revolutionary new design for roof or side vents in all kinds of greenhouses, e.g. open roof houses.
- Interlocking two-piece steel pinion. Push-to-lock plastic housing works as bearing and sliding block for rack.
- Racks available in various lengths, straight or curved. Made from galvanized steel, 3 mm wall thickness. Load 500 N = 115 lbf.
- Quicker installation due to unique design.
- Quicker replacement without disassembly of drive shaft.
- Compatible with standard steel rack + pinion.
- Also available as EZD 51 in cost effective one-piece design.
- Also available as 5/4".

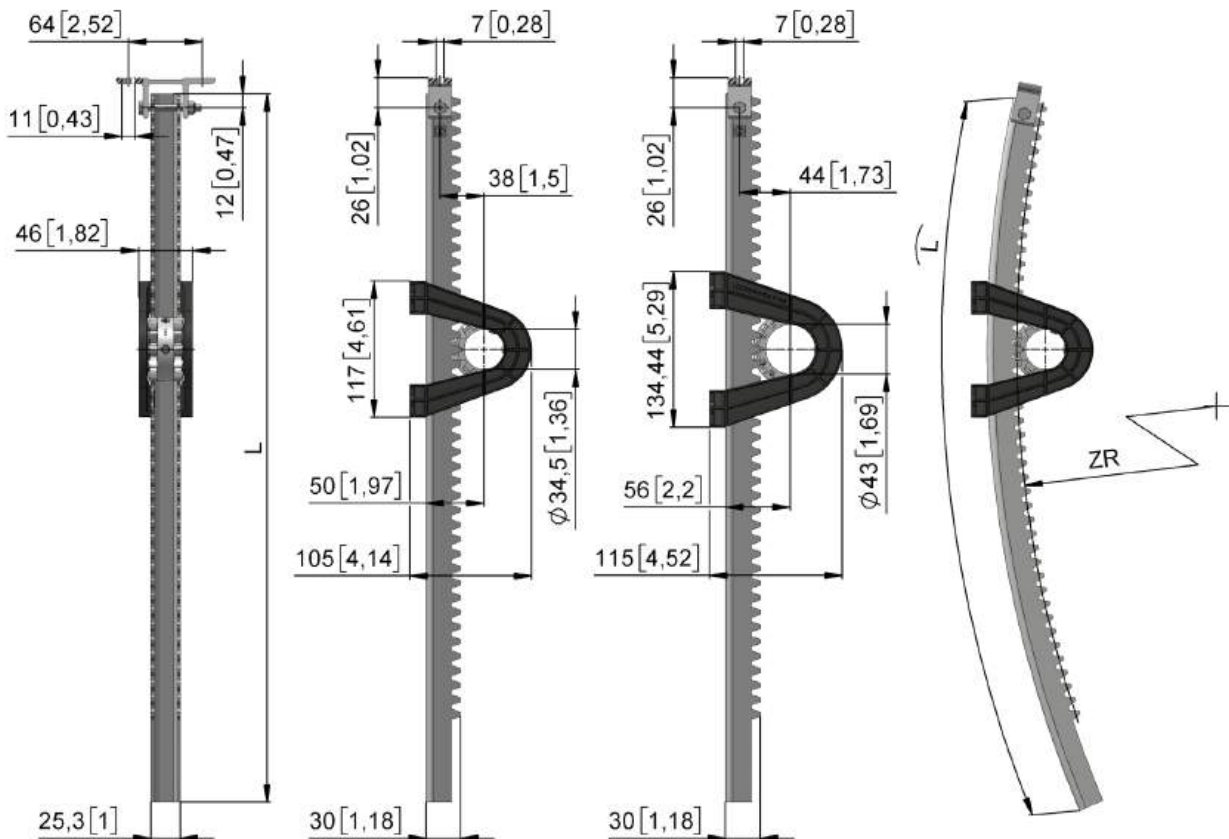
**Note:**

- Gear unit suitable for straight as well as curved racks.
- Tighten down clamping ring screws to 12 Nm.
- Patent pending!
- Take a look at the video animation on our website.



**Drive tube 1"**  
(Outer diameter  
33,7 mm [1.315"])

**Drive tube 5/4"**  
(Outer diameter  
42,4 mm [1.66"])



## EZD 51 // Gear unit

500 N // one-piece pinion



Version	Type no.	F [N]	v [mm/n]	r [mm]	m [kg]	ø tube [mm]
EZD 51.0501	61551.0501.00	500	138	22	0,4	1"

## EZD 52 // Gear unit

500 N // two-piece pinion



Version	Type no.	F [N]	v [mm/n]	r [mm]	m [kg]	ø tube [mm]
EZD 52.0501	61552.0501.00	500	138	22	0,4	1"
EZD 52.0502	61552.0502.00	500	176	28	0,4	5/4"

## EZZ // Racks

500 N // for EZD 51 and EZD 52



Version	Type no.	H [mm]	L [mm]	ZR [mm]	m [kg]
<b>500 N // Straight</b>					
EZZ 55.0210	61407.5502.6510	850	1050	-	1,6
EZZ 55.0212	61407.5502.6512	1050	1250	-	2,0
EZZ 55.0214	61407.5502.6514	1250	1450	-	2,2
EZZ 55.0216	61407.5502.6516	1450	1650	-	2,6
EZZ 55.0218	61407.5502.6518	1650	1850	-	2,9
EZZ 55.0220	61407.5502.6520	1850	2050	-	3,2
<b>500 N // Curved</b>					
EZZ 55.1210	61407.5512.6510	850	1050	1000	1,6
EZZ 55.1212	61407.5512.6512	1050	1250	1000	2,0
EZZ 55.1214	61407.5512.6514	1250	1450	1000	2,2
EZZ 55.1216	61407.5512.6516	1450	1650	1000	2,6

# LZG – reliable for all applications

LZG 20 and LZG 24 have the same reduction ratio and can therefore also be used in combination with one another.

Modular solutions possible for all Venlo greenhouses.

Universal rack & pinion units without self-locking, intended for high load ratings.

LZG 24  
13000-16000 N

LZG 20  
5500-10000 N



We can offer you our LZG family of linear rack & pinion units for adjustment of panels, slides or actuating elements, e.g. for ventilation on buildings, large sheds and greenhouses.

A broad range is available from 5500–16000 N. Driven by EWA 10–EWA 16 power drives, this constitutes an unbeatable combination of quality and safety.

# Numerical code

Gear unit **61420.1005.00** Without rack 

Version

LZG 20 = **61420.**  
LZG 24 = **61424.**

Force

5500 N = **05**  
10000 N = **10**  
13000 N = **13**  
16000 N = **16**

Type of installation

Hzd rack height	Mounting on supports	Rail mounting
60 mm	<b>1</b>	<b>2</b>
40 mm	<b>3</b>	<b>4</b>
11,5 mm	-	<b>6</b>
200 mm	<b>7</b>	-

Support width B

alle = **0**  
50 mm = **5**  
60 mm = **6**  
70 mm = **7**  
80 mm = **8**

Rack **61420.8005.1213** 

Force

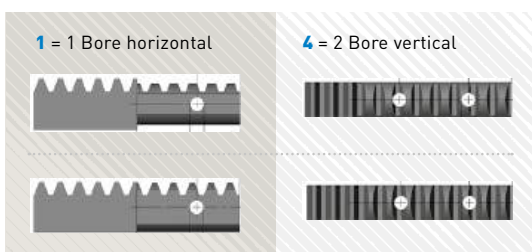
5500 N = **05**  
10000 N = **10**  
13000 N = **13**  
16000 N = **16**

Length

1100 mm = **11**  
1250 mm = **12**  
1400 mm = **14**  
1550 mm = **15**

Bore

Connection to thrust rod



Head diameter 23,3 mm  
Designation of Type no. = **3**

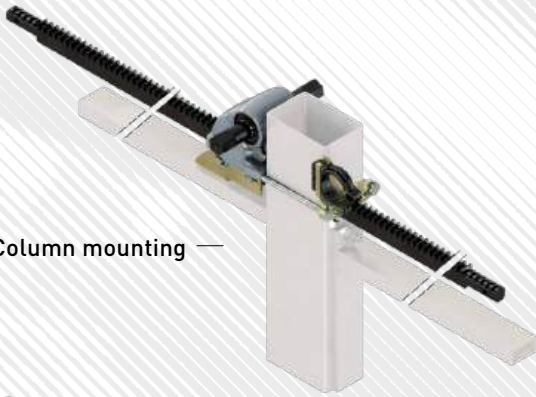
Head diameter 27,5 mm  
Designation of Type no. = **7**

Head diameter 28,3 mm  
Designation of Type no. = **8**

# LZG 20 // Rack & pinion units

## 5500–10000 N

Column mounting



Rail mounting

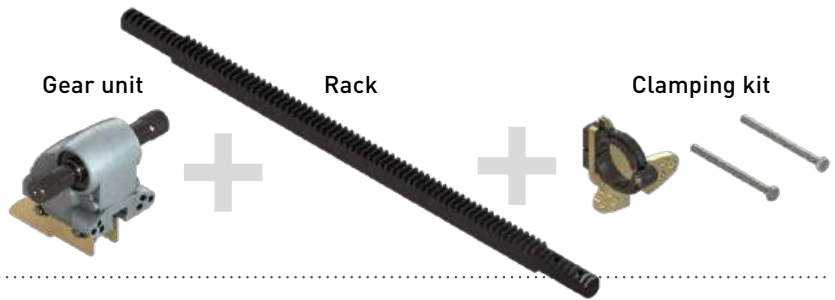


- Extremely robust top-quality universal rack & pinion units with a very compact design. When mounted to support, cause absolutely minimal shading because input shaft is below the gutter.
- Universal application for spacing of push-pull tube above beam of 40, 60 or 60/200 mm as well as C-section 11.5 mm.
- The support version is easy to install by clamping to the support – support dimensions 80, 100, 120 or 140 mm x 50, 60 or 80 mm are possible. Please indicate support dimensions on order!
- Stable cast housing with ball bearings for quiet operation. Gear components of high-tempered steel, 10000 N version with additional hardening.
- Hex shaft for ease of assembly of prefab tubes, low levels of torsion and clearance. Robust input shaft for the transmission of high torque levels. Securing on the beam with two bolts (by customer).
- Rack made of milled steel (25 x 35 mm / 30 x 40 mm) with integrated connection for 27/32 mm push-pull tube.
- Standard colour DB 701 (platinum grey).
- The rack is delivered pre-greased.

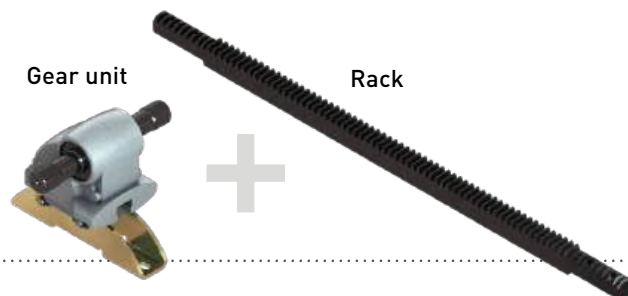
**Note:**

- Weld couplings SKS including bolts must be orderd separately.

Column mounting module

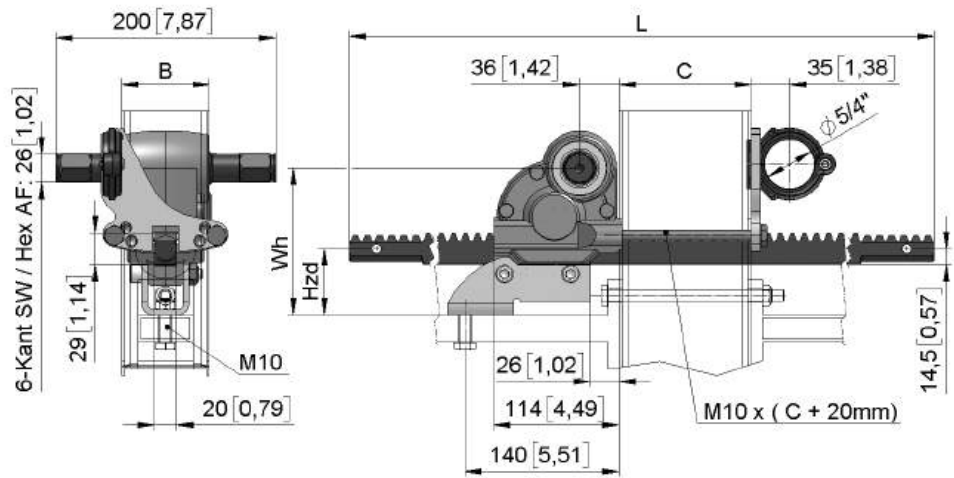


Rail mounting module

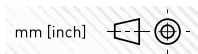
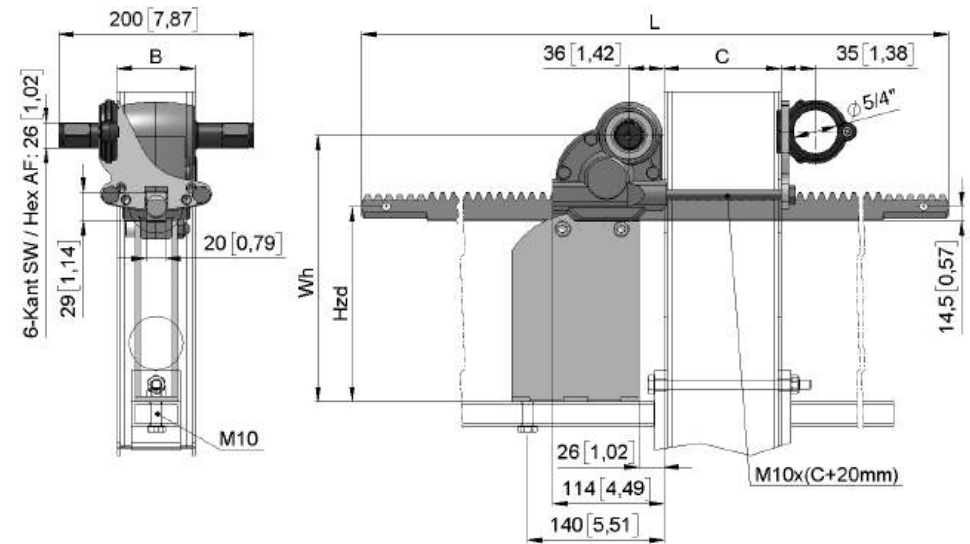


# LZG 20 → Column mounting

LZG 20.10 / 20.30  
 Column mounting  
 C-section 60 mm, 40 mm



LZG 20.70  
 Column mounting  
 C-section 200 mm



## LZG 20 // Gear unit

Column mounting



Version	5500 N		10000 N		v [mm/n]	Hzd [mm]	Wh [mm]	5500 N		10000 N	
	Type no.	Type no.	Type no.	Type no.				T1 [Nm]	m [kg]		
LZG 20.10	61420.1B05.00	61420.1B10.00	33	60	133	37	64	5,3			
LZG 20.30	61420.3B05.00	61420.3B10.00	33	40	113	37	64	5,3			
LZG 20.70	61420.7B05.00	61420.7B10.00	33	200	273	37	64	6,9			

→ **Note:** B = column width  
 To determine B, please refer to page 15.

# Clamping kit

Column mounting



LZZ 20.9802  
Tube guide



LZZ 20.9862  
Retaining screws

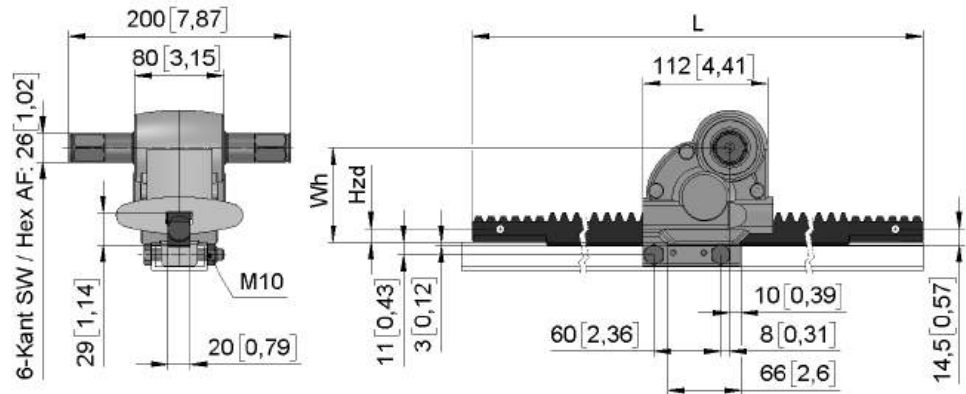
Version	Type no.	C [mm]	L [mm]	D [mm]	m [kg]
LZZ 20.9802	61420.9802.01	-	-	5/4"	0,3
LZZ 20.9862	61420.9862.1002	80	100	M 10	0,2
LZZ 20.9862	61420.9862.1202	100	120	M 10	0,2
LZZ 20.9862	61420.9862.1402	120	140	M 10	0,2
LZZ 20.9862	61420.9862.1602	140	160	M 10	0,2
LZZ 20.9862	61420.9862.1802	160	180	M 10	0,2
LZZ 20.9862	61420.9862.2002	180	200	M 10	0,2

→ Select support mounting rack on p. 20

## LZG 20 → Endgable mounting

### LZG 20.60

Gable mounting // C-section 11 mm



mm [inch]

# LZG 20 // Gear unit

Gable mounting



LZG 20.60

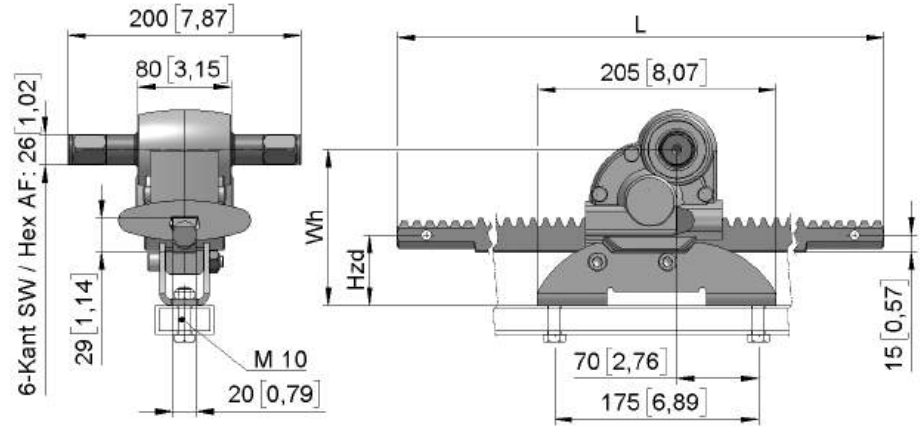
Version	5500 N		10000 N		v [mm/n]	Hzd [mm]	Wh [mm]	5500 N		10000 N		m [kg]
	Type no.	Type no.	Type no.	Type no.				T1 [Nm]	T1 [Nm]			
LZG 20.60	61420.6005.00	61420.6010.00	33	11	85	37	64	5,0				

→ Select rack for complete endgable mounting on p. 20

## LZG 20 → rail mounting

LZG 20.20 // LZG 20.40

Rail mounting // 60 mm, 40 m



mm [inch]

## LZG 20 // Gear unit rail mounting



LZG 20.20



LZG 20.40

Version	5500 N		10000 N		v [mm/n]	Hzd [mm]	Wh [mm]	5500 N		10000 N		m [kg]
	Type no.	Type no.	Type no.	Type no.				T1 [Nm]	T1 [Nm]			
LZG 20.20	61420.2005.00	61420.2010.00	33	60	133	37	64	5,0				
LZG 20.40	61420.4005.00	61420.4010.00	33	40	113	37	64	5,0				

→ Select rack for complete rail mounting on p. 20

## LZZ 20 // Rack

### Support and rail mounting



Version	1 horizontal bore	2 vertical bores	F [N]	H [mm]	L [mm]	m [kg]
	Type no.	Type no.				
<b>Head ø 23,3 mm</b>						
LZZ 20.0511	61420.8005.1113	61420.8005.1143	5500	800	1100	4,2
LZZ 20.0512	61420.8005.1213	61420.8005.1243	5500	950	1250	4,8
LZZ 20.0514	61420.8005.1413	61420.8005.1443	5500	1100	1400	5,4
LZZ 20.0515	61420.8005.1513	61420.8005.1543	5500	1250	1550	5,9
LZZ 20.1011	61420.8010.1113	61420.8010.1143	10000	800	1100	4,2
LZZ 20.1012	61420.8010.1213	61420.8010.1243	10000	950	1250	4,8
LZZ 20.1014	61420.8010.1413	61420.8010.1443	10000	1100	1400	5,4
LZZ 20.1015	61420.8010.1513	61420.8010.1543	10000	1250	1550	5,9
<b>Head ø 27,5 mm</b>						
LZZ 20.0511	61420.8005.1117	61420.8005.1147	5500	800	1100	4,2
LZZ 20.0512	61420.8005.1217	61420.8005.1247	5500	950	1250	4,8
LZZ 20.0514	61420.8005.1417	61420.8005.1447	5500	1100	1400	5,4
LZZ 20.0515	61420.8005.1517	61420.8005.1547	5500	1250	1550	5,9
LZZ 20.1011	61420.8010.1117	61420.8010.1147	10000	800	1100	4,2
LZZ 20.1012	61420.8010.1217	61420.8010.1247	10000	950	1250	4,8
LZZ 20.1014	61420.8010.1417	61420.8010.1447	10000	1100	1400	5,4
LZZ 20.1015	61420.8010.1517	61420.8010.1547	10000	1250	1550	5,9
<b>Head ø 28,3 mm</b>						
LZZ 20.0511	61420.8005.1118	61420.8005.1148	5500	800	1100	4,2
LZZ 20.0512	61420.8005.1218	61420.8005.1248	5500	950	1250	4,8
LZZ 20.0514	61420.8005.1418	61420.8005.1448	5500	1100	1400	5,4
LZZ 20.0515	61420.8005.1518	61420.8005.1548	5500	1250	1550	5,9
LZZ 20.1011	61420.8010.1118	61420.8010.1148	10000	800	1100	4,2
LZZ 20.1012	61420.8010.1218	61420.8010.1248	10000	950	1250	4,8
LZZ 20.1014	61420.8010.1418	61420.8010.1448	10000	1100	1400	5,4
LZZ 20.1015	61420.8010.1518	61420.8010.1548	10000	1250	1550	5,9

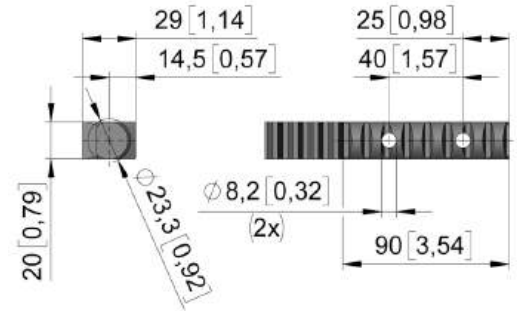
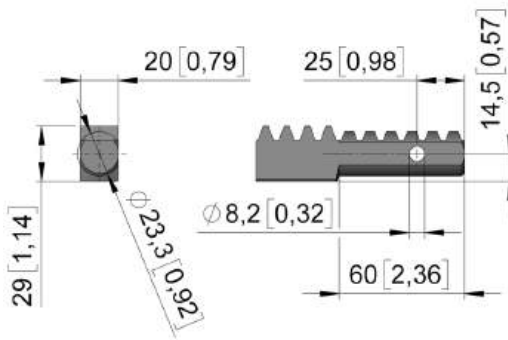
→ Determining the optimum length of rack, see p. 22

# LZG 20 → Rack head

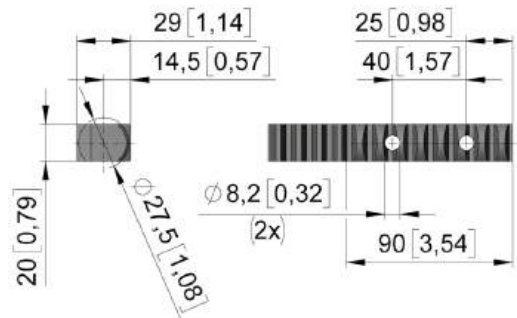
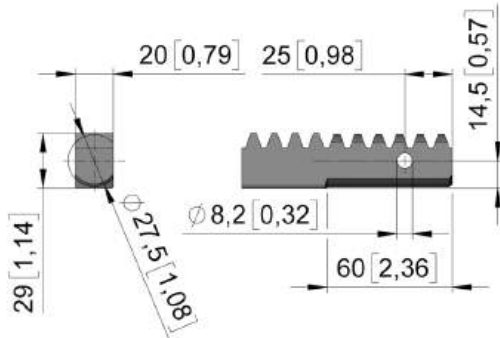
1 horizontal bore

2 vertical bores

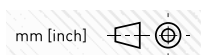
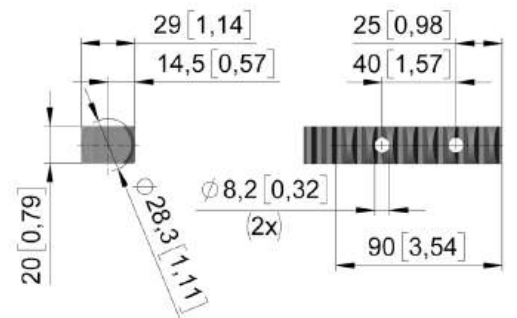
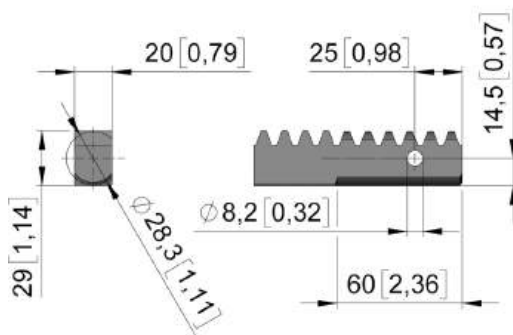
ø 23,3 mm



ø 27,5 mm

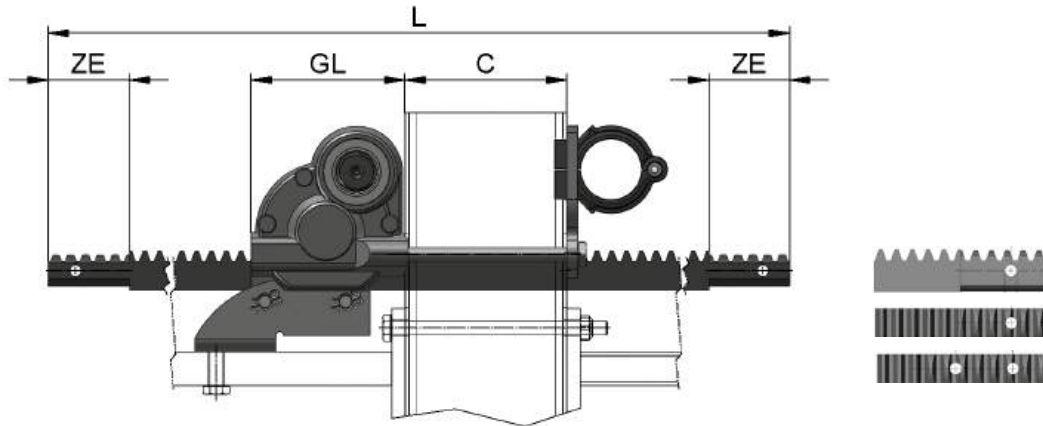


ø 28,3 mm



# Determining length of rack on LZG 20/LZG 24 rail ventilation

Column mounting:



## → Selection procedure and sample calculation:

Use this procedure to determine the input values for the calculation formula.

Own input values  
Result on the table

Required stroke H [mm]:	900	Required force F [N]:	10000
Support dimension C [mm]:	140	Rack head, number of bores:	2

Support dimension C [mm]	Installation space C <sub>E</sub> [mm]
100	120
120	140
140	160
160	180

→ With rail mounting, installation space C<sub>E</sub> = 0

F [N]	Gear unit	GL [mm]
5500	LZG 20	114
10000	LZG 20	114
13000	LZG 24	245
16000	LZG 24	245

Bores [number]	2 x ZE [mm]
1	120
2	180

Installation space C <sub>E</sub> [mm] =	160	Gear unit width GL [mm] =	114	2 x ZE [mm] =	180
--	-----	---------------------------	-----	---------------	-----

## → Calculation formula and sample calculation:

Use this formula to calculate the required rack length, then select a rack that is just slightly longer than and closest to that dimension. You can also reduce the stroke and then take a slightly shorter rack. Select the item no. depending on the head diameter of the rack (23,3 mm, 27,5 mm oder 28,3 mm).

$$H \text{ [mm]} + C_E \text{ [mm]} + GL \text{ [mm]} + 2 \times ZE \text{ [mm]} = L \text{ [mm]}$$

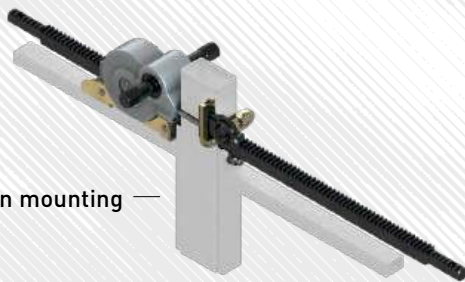
$$900 \text{ mm} + 160 \text{ mm} + 114 \text{ mm} + 180 \text{ mm} = 1354 \text{ mm}$$

→ Head diameter 23.3 mm // Length 1400 mm  
= Rack LZZ 61420.8010.1443

# LZG 24 // Rack & pinion units

## 13000–16000 N

Column mounting —



Rail mounting —

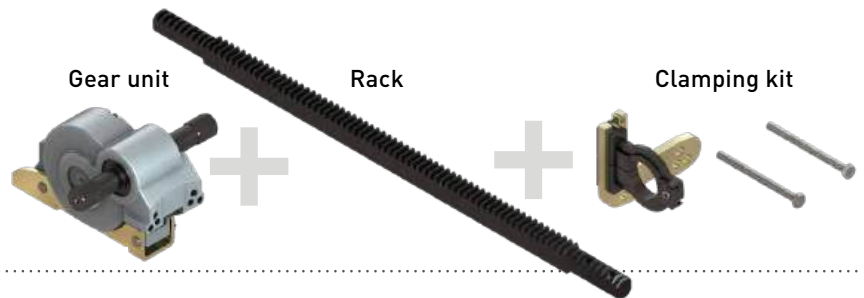


- Extremely robust top-quality universal rack & pinion units with a very compact design. When mounted to support, cause absolutely minimal shading because input shaft is below the gutter.
- Universal application for spacing of push-pull tube above beam of 40, 60 or 60/200 mm.
- The support version is easy to install by clamping to the support – support dimensions 80, 100, 120 or 140 mm x 50, 60 or 80 mm are possible. Please indicate support dimensions on order!
- Stable cast housing with ball bearings for quiet operation. Gear components made of highly tempered, hardened steel.
- 30 mm hex shaft for ease of assembly of prefab tubes, low levels of torsion and clearance. Robust input shaft (up to 750 Nm) for the transmission of high torque levels. Securing on the beam with two bolts (by customer) with strength 8.8.
- Rack made of milled steel (13000 N with 25 x 35 mm / 16000 N with 30x40 mm) with integrated connection for push-pull tube.
- Standard colour DB 701 (platinum grey).
- The rack is delivered pre-greased.

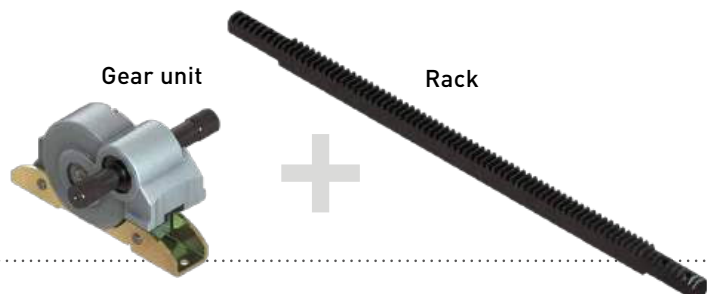
**Note:**

- Weld couplings SKS including bolts must be orderd separately.

Column mounting module

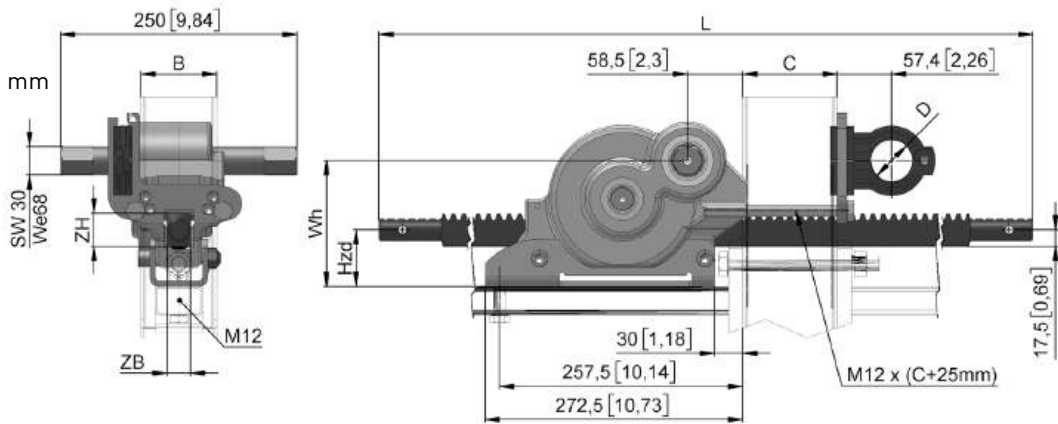


Rail mounting module

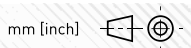
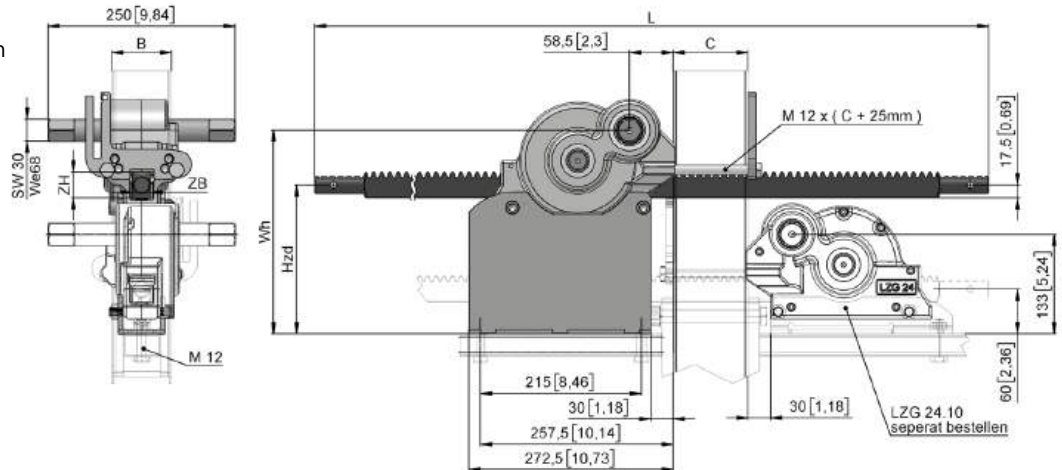


# LZG 24 → Support mounting

**LZG 24.10 // 24.30**  
Support mounting  
C-section 60 mm, 40 mm



**LZG 24.70**  
Support mounting // 200 mm



Version	13000 N		16000 N		v [mm/n]	Hzd [mm]	Wh [mm]	13000 N		16000 N	
	Type no.	Type no.	Type no.	Type no.				T1 [Nm]	m [kg]		
LZG 24.10	61424.1B13.00	61424.1B16.00			33	60	133	77	95	12,0	
LZG 24.30	61424.3B13.00	61424.3B16.00			33	40	113	77	95	12,0	
LZG 24.70	61424.7B13.00	61424.7B16.00			33	200	273	77	95	14,5	

→ **Note:** B = column width  
To determine B, please refer to page 15.

## Clamping kit

Support mounting



LZZ 24.9802  
Tube guide



LZZ 24.9862  
Retaining screws

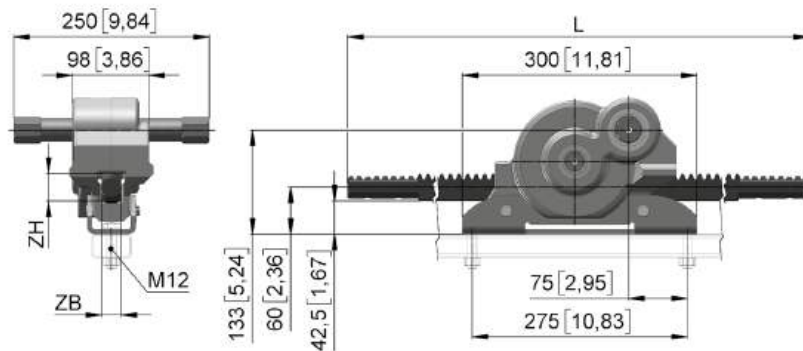
Version	Type no.	C [mm]	D [mm]	L [mm]	m [kg]
LZZ 24.9802	61424.9802.01	-	5/4"	-	0,5
LZZ 24.9802	61424.9802.02	-	2"	-	0,5
LZZ 24.9862	61424.9862.1102	80	M 12	110	0,2
LZZ 24.9862	61424.9862.1302	100	M 12	130	0,2
LZZ 24.9862	61424.9862.1502	120	M 12	150	0,4
LZZ 24.9862	61424.9862.1702	140	M 12	170	0,4
LZZ 24.9862	61424.9862.1902	160	M 12	190	0,4

→ Select support mounting rack on p. 27

## LZG 24 → Rail mounting

### LZG 24.20

Rail mounting // 60 mm



mm [inch]

## LZG 24

Rail mounting



LZG 24.20

Version	13000 N		v [mm/n]	Hzd [mm]	Wh [mm]	13000 N		16000 N		m [kg]
	Type no.	Type no.				T1 [Nm]	T1 [Nm]			
LZG 24.20	61424.2013.00	61424.2016.00	33	60	133	77	95			12,0

# LZZ 24 // Rack

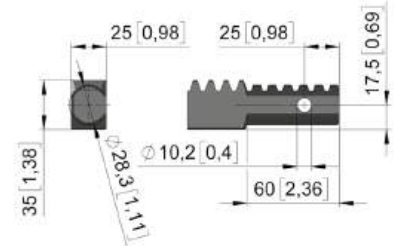


Version	1 horizontal bores	2 vertical	F [N]	H [mm]	L [mm]	m [kg]
	Art.Nr.	Art.Nr.				
<b>Head ø 23,3 mm</b>						
LZZ 24.1312	–	61424.8013.1243	13000	800	1250	6,7
LZZ 24.1314	–	61424.8013.1443	13000	1000	1450	7,8
LZZ 24.1316	–	61424.8013.1643	13000	1200	1650	9,7
LZZ 24.1318	–	61424.8013.1843	13000	1400	1850	11,0
LZZ 24.1320	–	61424.8013.2043	13000	1600	2050	12,2
LZZ 24.1322	–	61424.8013.2243	13000	1800	2250	13,4
LZZ 24.1324	–	61424.8013.2443	13000	2000	2450	14,6
LZZ 24.1612	–	61424.8016.1243	16000	800	1250	9,9
LZZ 24.1614	–	61424.8016.1443	16000	1000	1450	11,5
LZZ 24.1616	–	61424.8016.1643	16000	1200	1650	13,9
LZZ 24.1618	–	61424.8016.1843	16000	1400	1850	15,7
LZZ 24.1620	–	61424.8016.2043	16000	1600	2050	17,4
LZZ 24.1622	–	61424.8016.2243	16000	1800	2250	17,8
LZZ 24.1624	–	61424.8016.2443	16000	2000	2450	19,5
<b>Head ø 27,5 mm</b>						
LZZ 24.1312	–	61424.8013.1247	13000	800	1250	6,7
LZZ 24.1314	–	61424.8013.1447	13000	1000	1450	7,8
LZZ 24.1316	–	61424.8013.1647	13000	1200	1650	9,7
LZZ 24.1318	–	61424.8013.1847	13000	1400	1850	11,0
LZZ 24.1320	–	61424.8013.2047	13000	1600	2050	12,2
LZZ 24.1322	–	61424.8013.2247	13000	1800	2250	13,4
LZZ 24.1324	–	61424.8013.2447	13000	2000	2450	14,6
LZZ 24.1612	–	61424.8016.1247	16000	800	1250	9,9
LZZ 24.1614	–	61424.8016.1447	16000	1000	1450	11,5
LZZ 24.1616	–	61424.8016.1647	16000	1200	1650	13,9
LZZ 24.1618	–	61424.8016.1847	16000	1400	1850	15,7
LZZ 24.1620	–	61424.8016.2047	16000	1600	2050	17,4
LZZ 24.1622	–	61424.8016.2247	16000	1800	2250	17,8
LZZ 24.1624	–	61424.8016.2447	16000	2000	2450	19,5
<b>Head ø 28,3 mm</b>						
LZZ 24.1312	61424.8013.1218	61424.8013.1248	13000	800	1250	6,7
LZZ 24.1314	61424.8013.1418	61424.8013.1448	13000	1000	1450	7,8
LZZ 24.1316	61424.8013.1618	61424.8013.1648	13000	1200	1650	9,7
LZZ 24.1318	61424.8013.1818	61424.8013.1848	13000	1400	1850	11,0
LZZ 24.1320	61424.8013.2018	61424.8013.2048	13000	1600	2050	12,2
LZZ 24.1322	61424.8013.2218	61424.8013.2248	13000	1800	2250	13,4
LZZ 24.1324	61424.8013.2418	61424.8013.2448	13000	2000	2450	14,6
LZZ 24.1612	61424.8016.1218	61424.8016.1248	16000	800	1250	9,9
LZZ 24.1614	61424.8016.1418	61424.8016.1448	16000	1000	1450	11,5
LZZ 24.1616	61424.8016.1618	61424.8016.1648	16000	1200	1650	13,9
LZZ 24.1618	61424.8016.1818	61424.8016.1848	16000	1400	1850	15,7
LZZ 24.1620	61424.8016.2018	61424.8016.2048	16000	1600	2050	17,4
LZZ 24.1622	61424.8016.2218	61424.8016.2248	16000	1800	2250	17,8
LZZ 24.1624	61424.8016.2418	61424.8016.2448	16000	2000	2450	19,5

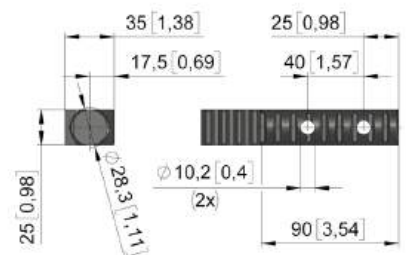
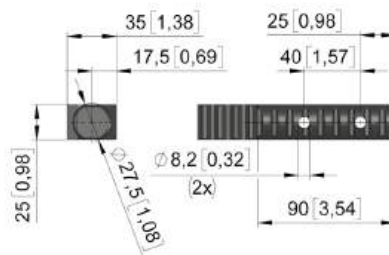
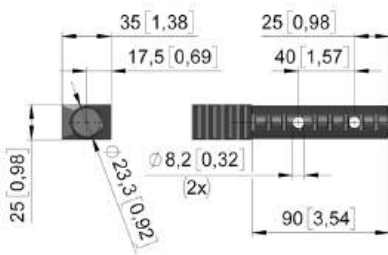
# LZG 24 → Rack head

13.000 N

Ø 28,3 mm  
1 horizontal bore

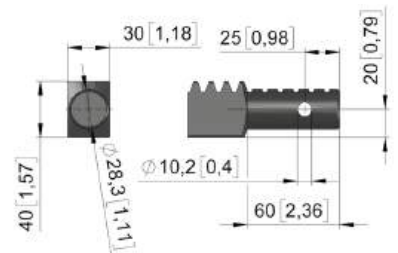


Ø23,3 mm // 27,5 mm // 28,3 mm  
2 vertical bores

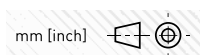
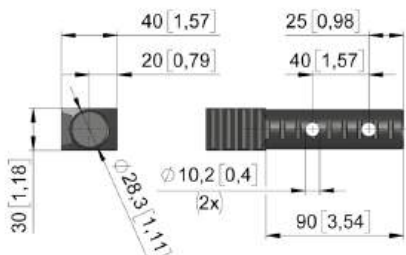
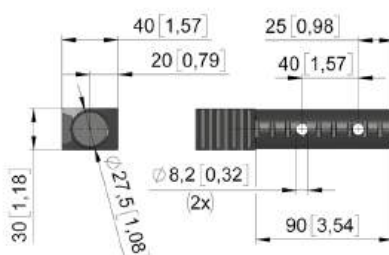
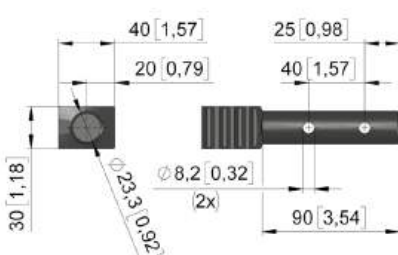


16.000 N

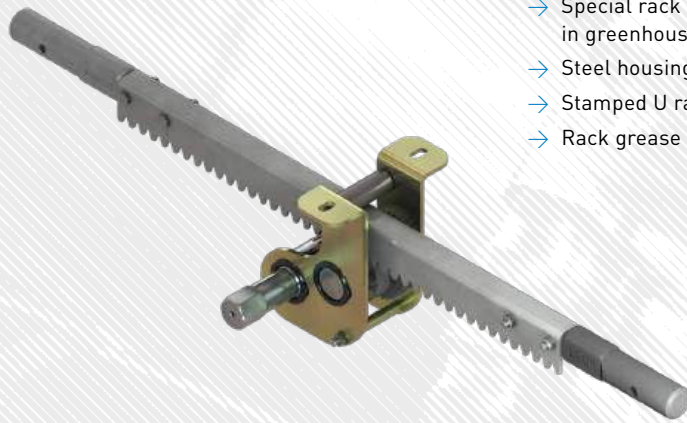
Ø 28,3 mm  
1 horizontal bore



Ø23,3 mm // 27,5 mm // 28,3 mm  
2 vertical bores



## SZG 35 // Rack & pinion units 500 N



- Special rack & pinion units for actuation of shading or energy screens in greenhouses.
- Steel housing. All pinions and gears made of steel.
- Stamped U rack made of steel, sendzimir galvanized.
- Rack grease LUB 73 in scope of supply.

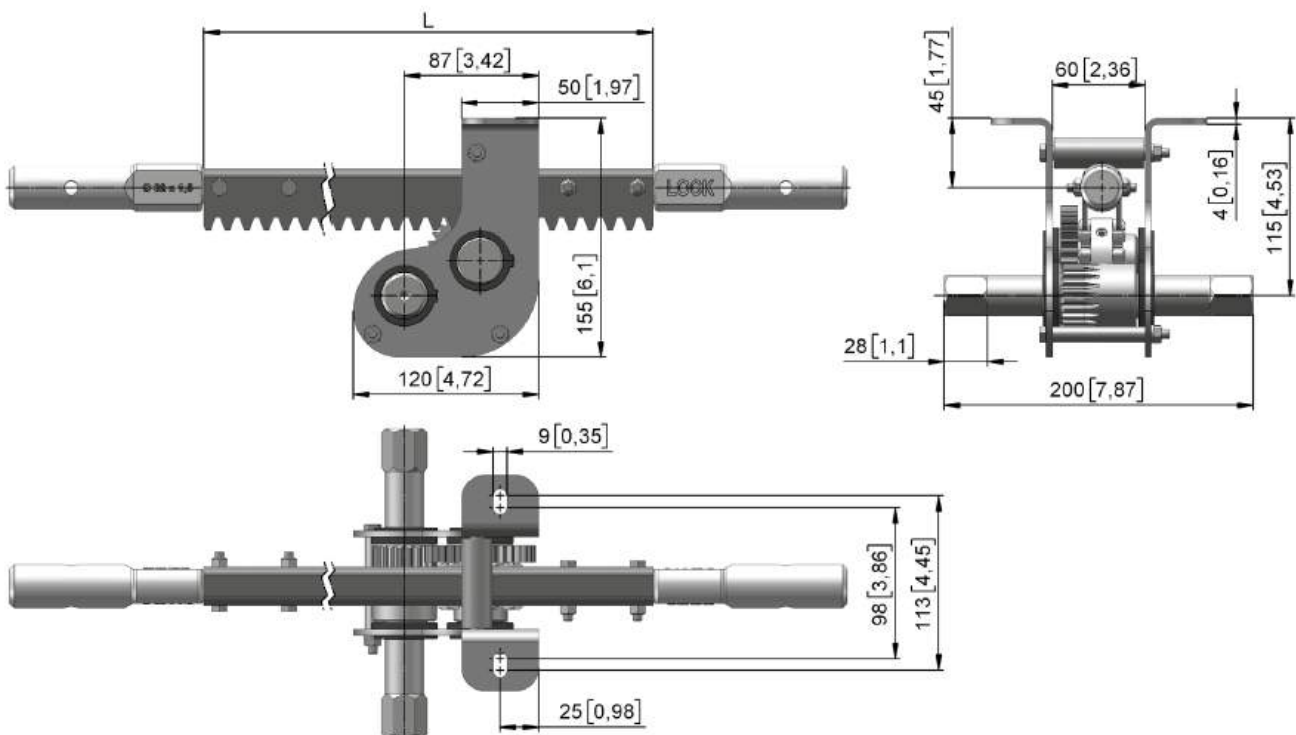
**Option:**

- SZG 35.0551 with housing lugs on one side, folded 'to left'.

**Note:**

- Weld couplings SKS including bolts must be orderd separately.

### SZG 35.0502



mm [inch]



## SZG 35 // Gear unit



SZG 35.0502

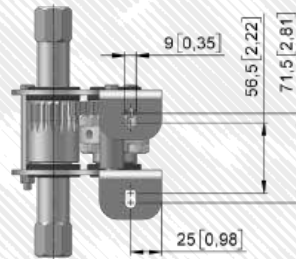
Version	Type no.	F1 [N]	F2* [N]	v [mm/n]	i	T1 [Nm]	m [kg]
SZG 35.0502	61435.0552.0002	500	1850	81	1,7 : 1	9	3,0

**Option**

SZG 35.0501	61435.0551.0002	500	1850	81	1,7 : 1	9	3,0
-------------	-----------------	-----	------	----	---------	---	-----

\* F2 is the maximum value at short time overload e.g. if the shading fabric fritters

**Option:**  
SZG 35.0501 // Gear unit



mm [inch]

## SZZ 35 // Rack



SZZ 35

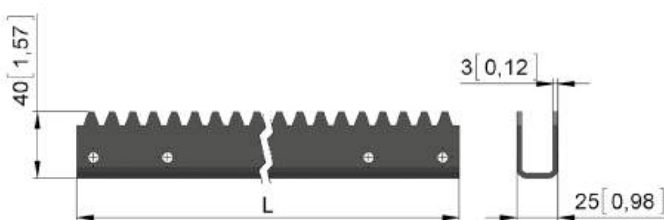
SZA 35.05

SZZ 35.4308

Version	Type no.	F [N]	L <sub>F</sub> [m]	L [mm]	m [kg]
SZZ 35.0530	61435.0555.30	500	3,0	2941	5,9
SZZ 35.0532	61435.0555.32	500	3,2	3142	6,0
SZZ 35.0536	61435.0555.36	500	3,7	3594	7,2
SZZ 35.0540	61435.0555.40	500	4,0	3946	7,9
SZZ 35.0545	61435.0555.45	500	4,5	4448	8,8
SZZ 35.0549	61435.0555.49	500	5,0	4939	10,0

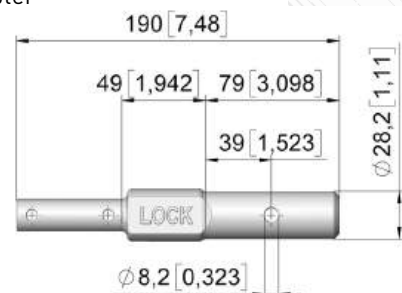
Version	Type no.	D [mm]	B [mm]	Info	m [kg]
SZA 35.0532	61435.0558.3201	28,2	31,0	Adapter for tube $\varnothing$ 32 x 1,5 mm, with bolts	0,3
SZZ 35.4308	61435.9801.43	-	-	Thrust washer // $\varnothing$ 43 x 6 mm	0,1

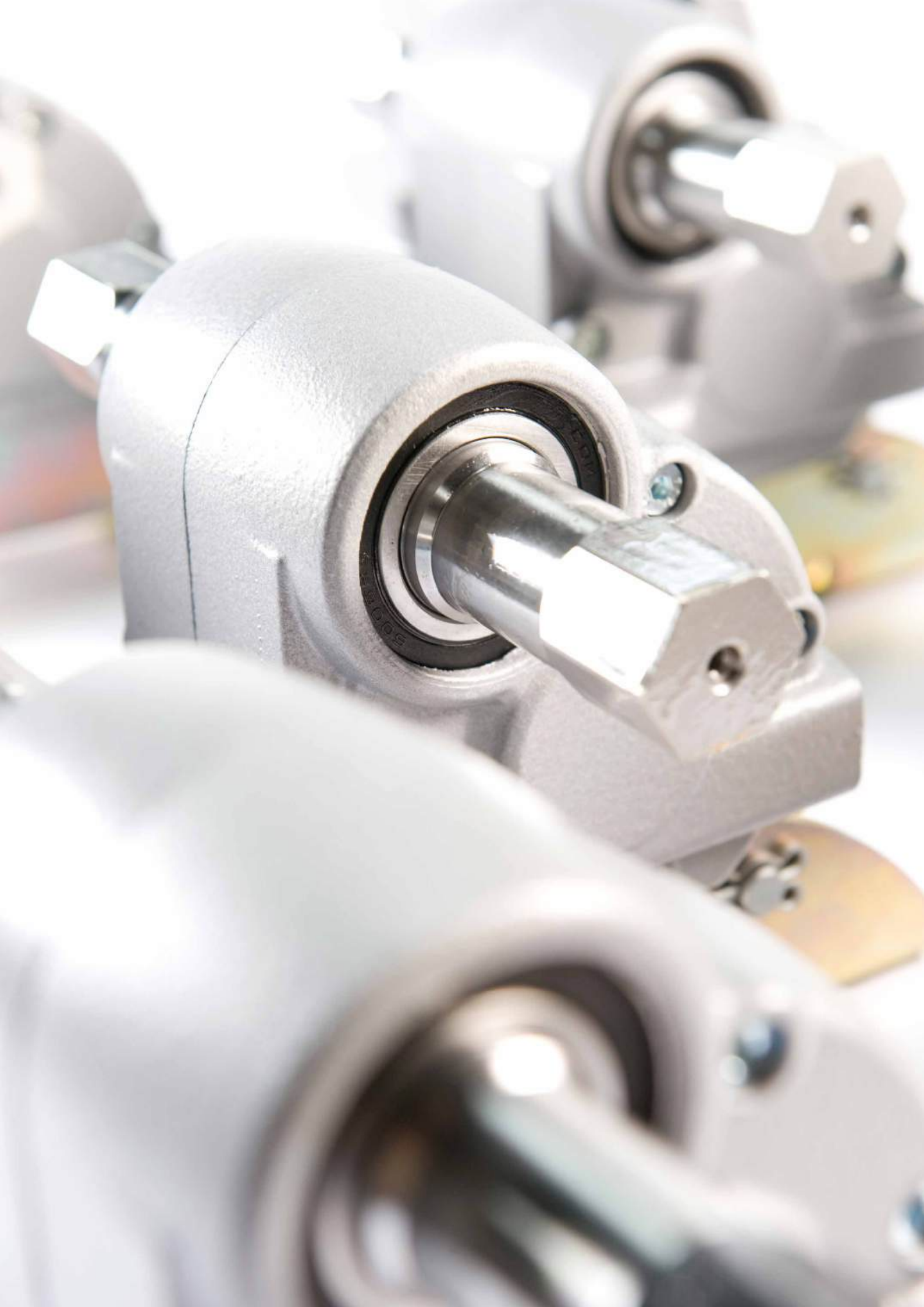
**SZZ 35.05**



**SZA 35.0532 Adapter**

mm [inch]









LOCK BEWEGT // LOCK MOVES

# Gear units

## SGS // Scissor gear units

SGS 80



2

## VRE // Worm gear units

VRE 30



4

VRE 20, VRE 26



5

VRE 73, VRE 75, VRE 76



6

## USG/KGO/KRG // Deflection gear units

USG 10



8

USG 15



9

KGO 31, KGO 32



10

KRG 23



12

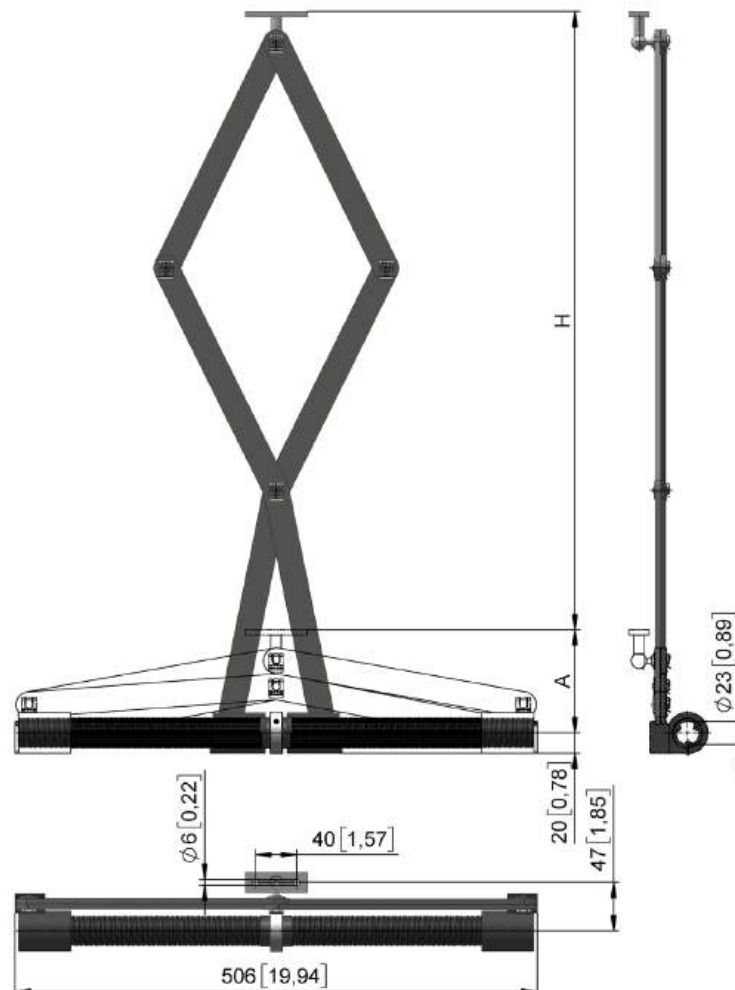
## SGS 80 // Scissor gear units

### 200 N



- Self-locking scissor gear units for activation of ventilation flaps in winter gardens, conservatories, office buildings or glazed buildings.
- No activation elements, e.g. racks, protruding into the building, therefore easy installation of internal shade systems.
- Complete set consists of scissor gear, fastening bracket for window flaps and drive shaft bearing. Assembly on drive shaft  $\varnothing$  22 mm with 3 set bolts.
- Scissor gear made of stainless steel, spindle made of special plastic.
- Drive torque for each scissor gear unit 8 Nm.

See application for in-line ventilation → Chapter 1



mm [inch]

# SGS 80

200 N



Version	Type no.	F [N]	H [mm]	v [mm/n]	A [mm]	Info	m [kg]
SGS 80.0206	62080.0201.06	200	600	26	100	Set incl. 1 x drive shaft bearing	1,9
SGS 80.0209	62080.0201.09	200	950	26	126	Set incl. 1 x drive shaft bearing	2,9

## Accessories



SGZ 80.9802



SGZ 80.9803



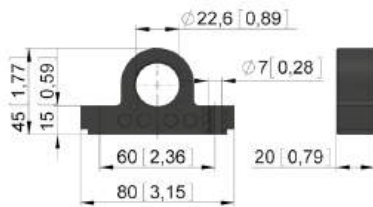
BKS 35.0622



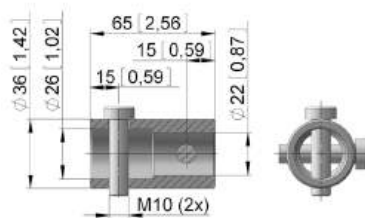
ARV 60.1034

Version	Type no.	Info	m [kg]
SGZ 80.9801	62080.9801.01	Drive shaft // L = 3000 mm, ø 22 mm	3,1
SGZ 80.9802	62080.9802.01	Cover profile // L = 3000 mm // W = 83.5 mm // H = 55 mm	2,9
SGZ 80.9803	62080.9803.01	Drive shaft bearing	0,1
BKS 35.0622	20735.0665.22	Bush coupling	0,3
ARV 60.1034	81660.1034.2206	Tube coupling	0,2

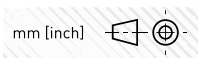
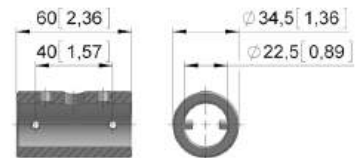
**SGZ 80.98**  
Drive shaft bearing



**BKS 35.06**  
Bush coupling



**ARV 60.10**  
Tube coupling



# VRE 30 // Worm gear unit

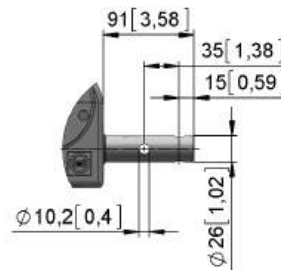
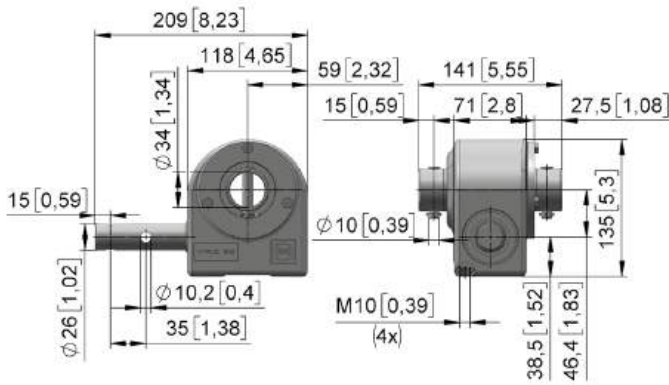
## 200 Nm



- Compact worm gear unit for actuation of raising and lowering applications in system construction.
- For distribution of forces in conjunction with self-locking shaft drives and rack gear units.
- Extremely robust and sealed cast housing.
- Zero-maintenance achieved through lifetime lubrication.
- Drive shaft 26 mm for 1" tube, one or both sides.
- Driven via 34.5 m quill shaft for 1" tube.

VRE 30.01

VRE 30.02  
2. Shaft end



mm [inch]

Version	Type no.	T [Nm]	i	T input [Nm]	m [kg]
<b>cw direction of rotation</b>					
VRE 30.0101	62130.0101.0001	200	18:1	28	4,5
VRE 30.0201	62130.0201.0001	200	18:1	28	4,8
<b>ccw direction of rotation</b>					
VRE 30.0102	62130.0102.0001	200	18:1	28	4,5
VRE 30.0202	62130.0202.0001	200	18:1	28	4,8

# VRE 20, VRE 26 // Worm gear unit 200–400 Nm



- Self-locking worm gear unit to actuate raising and lowering applications in greenhouses, buildings and animal sheds, in system construction.
- For distribution of forces in conjunction with shaft drives EWA/HWA and rack drives.
- Virtually maintenance-free through special lubricant in gearbox.
- Drive (shaft A) and output (shaft B) with We 06 (roughly 26 mm) with 1" tube directly or with We 63 (hex waf 23 mm) and We 66 (hex, waf 26 mm) with coupling.

**Option:**

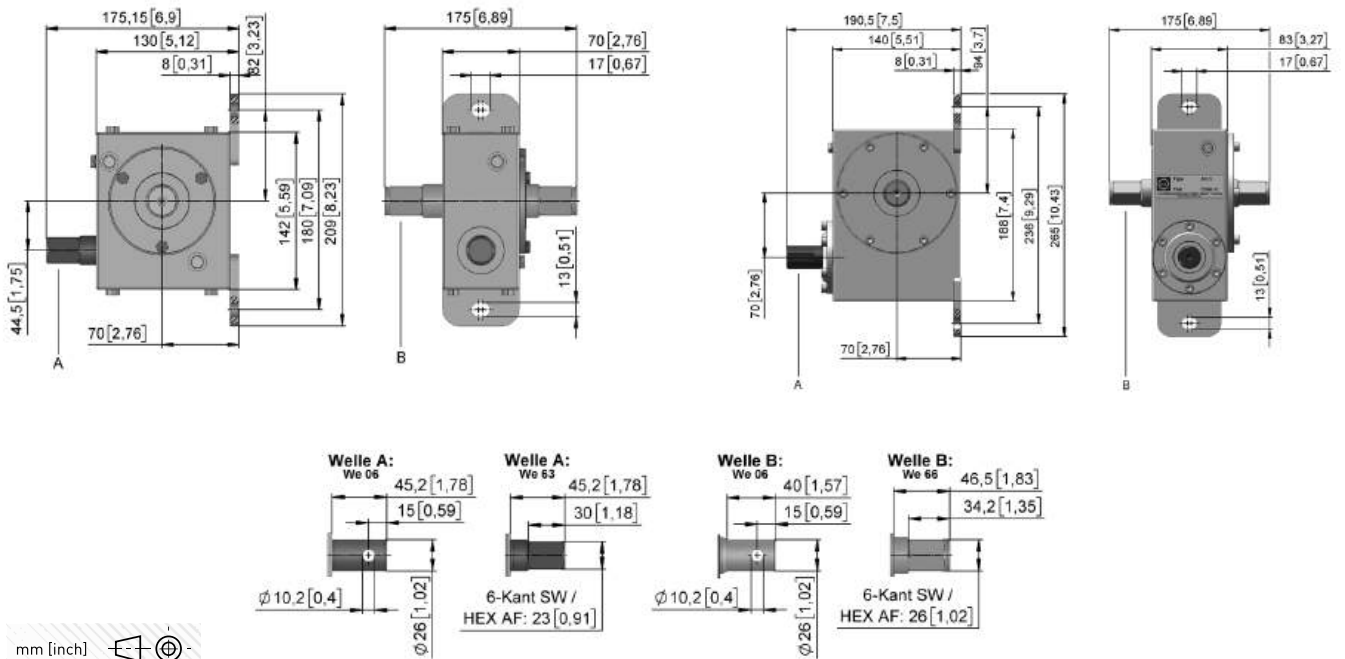
- VRE 20 also available as VRE 22 with continuous worm gear unit.

**Drive torque below nominal torque:**

- VRE 20: max. 40 Nm.
- VRE 26: max. 50 Nm.

VRE 20

VRE 26



Version	Type no.	T [Nm]	i	T input [Nm]	Shaft A	Shaft B	m [kg]
VRE 20.2001	62120.2001.0101	200	21:1	40	We 06	We 06	6,0
VRE 20.2001	62120.2001.0201	200	21:1	40	We 06	We 66	6,0
VRE 20.2001	62120.2001.0401	200	21:1	40	We 63	We 66	6,0
VRE 26.4001	62126.4001.0401	400	31:1	48	We 63	We 66	11,5
VRE 26.6366	62126.5531.6366	550	31:1	62	We 63	We 66	11,5

# VRE 73, VRE 75, VRE 76 // Worm gear unit

## 50–250 Nm



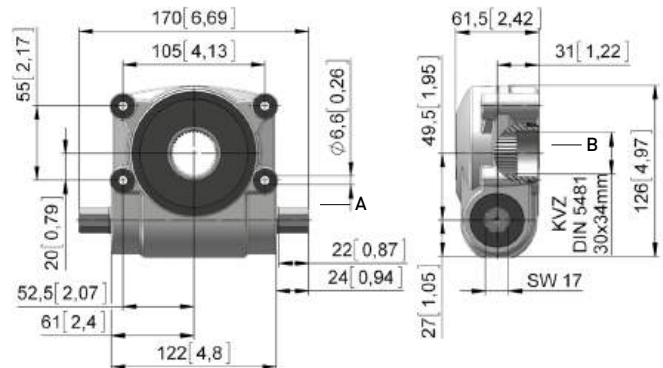
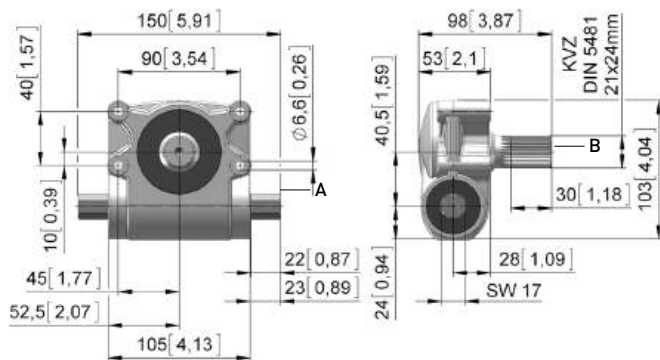
- Extremely robust, self-locking worm gear unit for ultra-precise and very slow actuation of elements, e.g. sun protection panels on facades, adjustment units in mechanical engineering.
- All externally routed gearbox components made of stainless steel, absolutely zero-maintenance.
- Minimal backlash. Quality ball bearing for extremely quiet operation.
- Robust aluminium housing, completely sealed.
- Drive (shaft A) with hex waf 17 and output (shaft B) with precision multi-tooth.

**Note:**

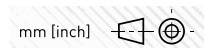
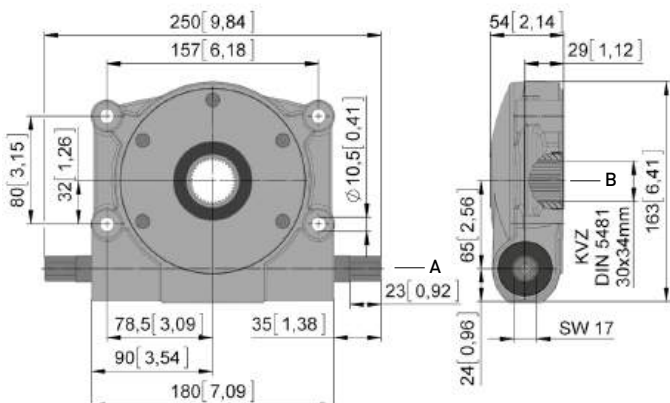
- T dyn. duration: continuous dynamic load-bearing properties.
- T dyn. short: intermittent/short-term dynamic load-bearing properties.
- T static: static load-bearing capacity up to 1200 Nm.

VRE 73

VRE 75



VRE 76



# VRE 73, VRE 75, VRE 76

50–250 Nm



VRE 73.0938



VRE 75.1550



VRE 76.2550

Version	Type no.	T <sub>dyn. duration</sub> [Nm]	T <sub>dyn. intermit.</sub> [Nm]	T <sub>stat.</sub> [Nm]	T <sub>input duration</sub> [Nm]	i	Info	m [kg]
VRE 73.0938	62173.0938.9071	50	90	150	6	38:1	Splined shaft 21 x 24 mm	2,0
VRE 75.1550	62175.1550.9074	120	150	450	10	50:1	Splined hub 30 x 34 mm	2,5
VRE 76.2550	62176.2550.9083	200	250	1200	20	50:1	Splined hub 30 x 34 mm	4,0

## Accessories



VRZ 76.9801



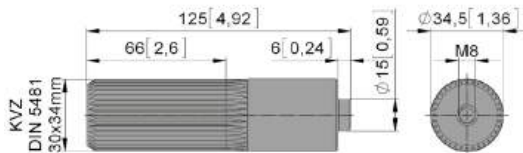
VRZ 76.9802



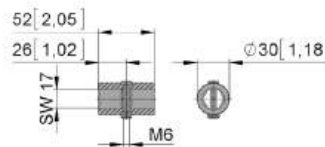
LZZ 46.3314

Version	Type no.	Info	m [kg]
VRZ 76.9801	62176.9801.3402	Journal	0,8
VRZ 76.9802	62176.9802.1701	Coupling	0,2
LZZ 46.3314	87102.3314.20	Coupling	0,1

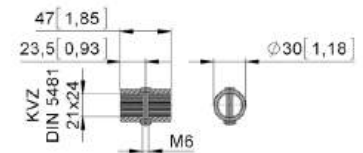
**VRZ 76.9801**  
Journal



**VRZ 76.9802**  
Coupling



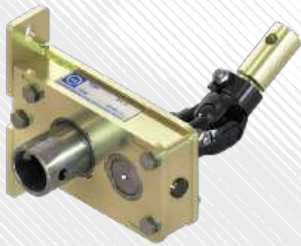
**LZZ 46.3314**  
Coupling



mm [inch]

# USG 10 // Deflection gear unit

## 70 Nm



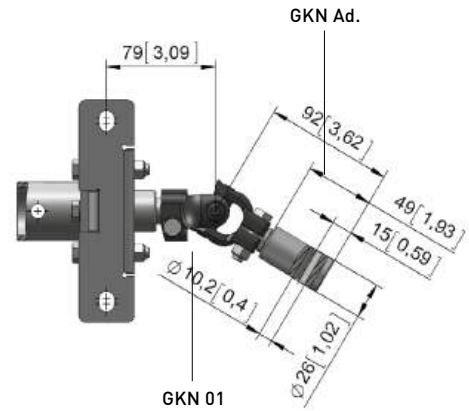
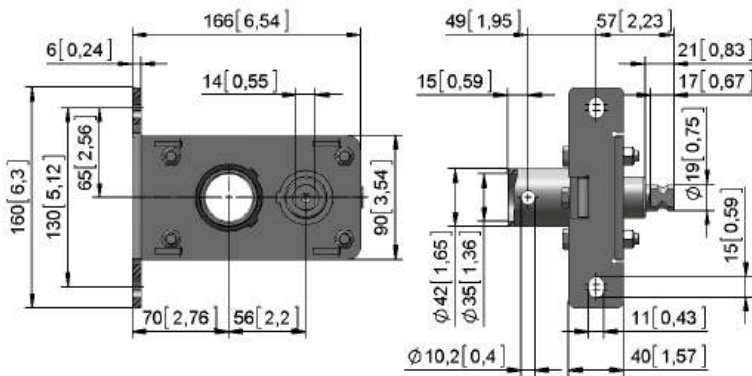
- Deflection gear unit for actuation of ventilation shafts on multi-section greenhouses, as a deflection gear unit between a central drive shaft and a VRE worm gear unit in the roof ridge.
- Shaft output pointing upwards, up to max. 34°.
- Steel housing with spur gear unit, hardened.
- Quill shaft to guide around the 1" central drive tube.
- Any direction of load and installation, max. speed 40 rpm.

**Note:**

- When using different connecting tubes, please ask for the appropriate adapter.

**USG 10**  
Without joint

**USG 10.26**  
With GKN // Articulated coupling and adapter



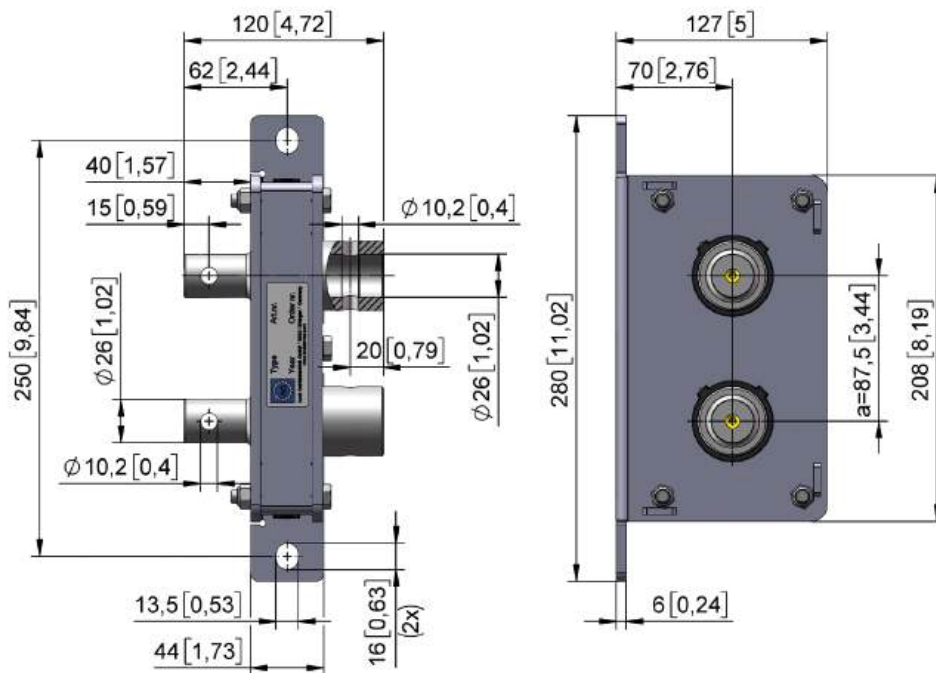
mm [inch]

Version	Type no.	T output [Nm]	T input [Nm]	i	Info	m [kg]
USG 10.0070	62410.0511.00	70	82	1:1	Without articulated coupling + adapter	3,0
USG 10.2670	62410.0511.26	70	82	1:1	With articulated coupling + adapter	3,6

## USG 15 // Deflection gear unit 150 Nm



- Deflection gear for the synchronisation of two winding shafts.
- Maintenance free.
- GKT compatible without additional adapter.
- Simple wall mounting.



mm [inch]

Version	Type no.	Tmax output [Nm]	N1 max [U/min]	i	m [kg]
USG 15.1501	62415.1511.0111	150	5	1:1	6,24

# KGO 31 // Deflection gear unit

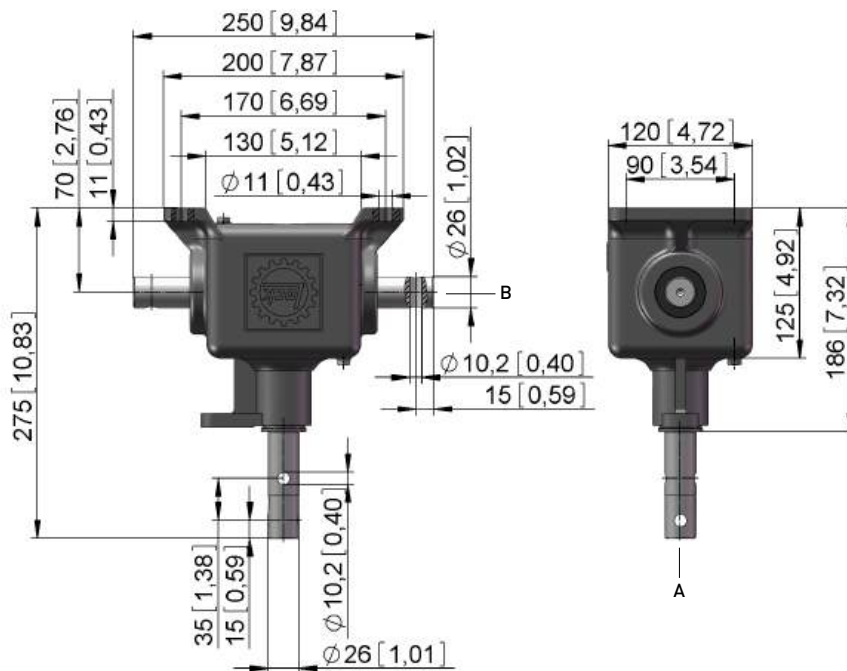
## 150 Nm



- 90° deflection gear unit for actuation of ventilation shafts in greenhouses, buildings and animal sheds, in system construction for distribution of forces; in conjunction with out self-locking shaft drives.
- Cast housing with crown gear and spur gear made of steel (similar to bevel gear). Housing sealed.
- Shaft A: We 07 (ø 26 mm) for 1" tube. Shaft B: We 06 (ø 26 mm) for 1" tube.
- Drive speed max. 40 rpm.

**Note:**

- All shafts are equally well suited for use as input or as output shafts.



mm [inch]

Version	Type no.	T output [Nm]	T input [Nm]	i	n1 max [1/min]	m [kg]
KGO 31.1115	62510.1115.06	150	210	1:1	40	8,1

# KGO 32 // Deflection gear unit

## 150 Nm



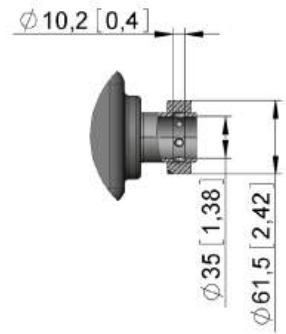
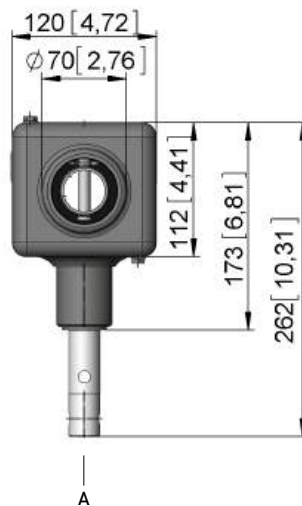
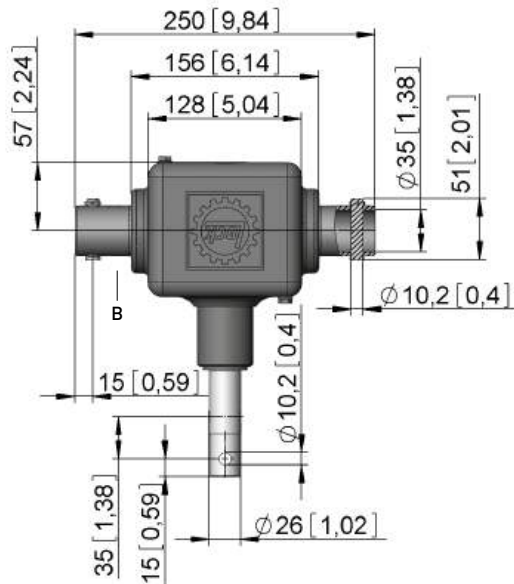
- 90° deflection gear unit for actuation of ventilation shafts in greenhouses, buildings and animal sheds, in system construction for distribution of forces; in conjunction with out self-locking shaft drives.
- Cast housing with crown gear and spur gear made of steel (similar to bevel gear). Housing sealed.
- Shaft A: We 07 (ø 26 mm) for 1" tube. Shaft B: We 06 quill shaft (ø 35 mm) for 1" tube.
- For simple connection with drive tube without the need for drilling, we recommend version KGO 32 with clamping ring.
- Input speed max. 40 rpm.
- Operating mode S3-40 %.

**Note:**

- Tighten clamping ring screw down to 25 Nm!
- All shafts are equally well suited for use as input or as output shafts.

KGO 32  
incl. 2 bolts

KGO 32  
incl. clamping ring



mm [inch]

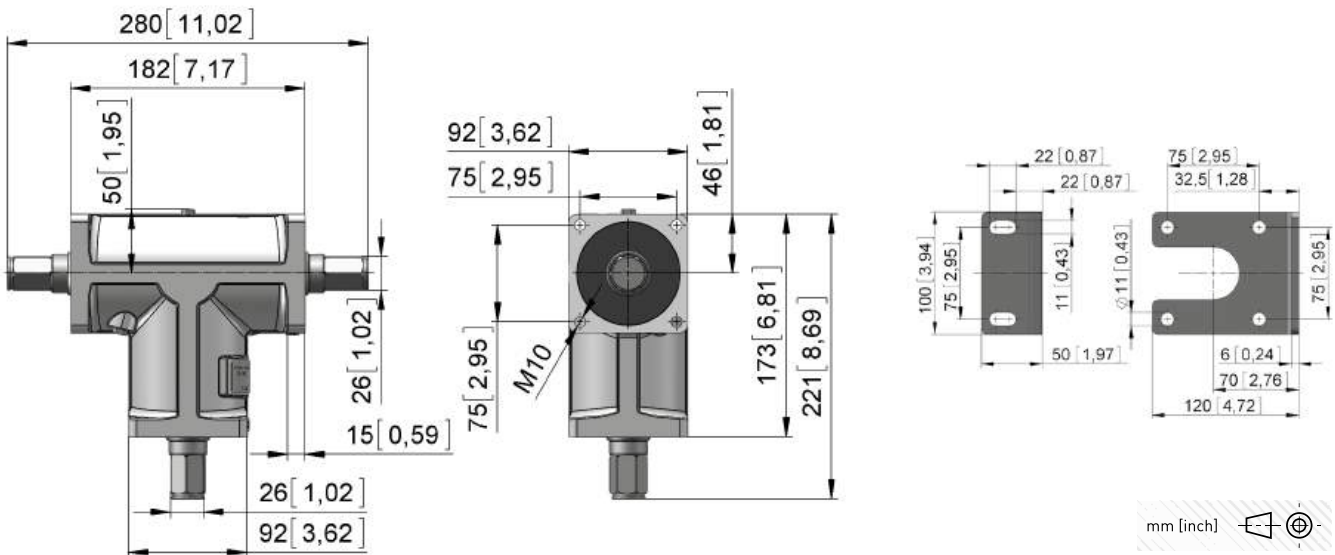
Version	Type no.	T output [Nm]	T input [Nm]	i	Info	m [kg]
KGO 32.1115	62512.1115.7301	150	210	1:1	incl. bolts	7,6
KGO 32.1115	62512.1115.7320	150	210	1:1	incl. clamping ring	8,2

# KRG 23 // Deflection gear unit

## 350 Nm



- Powerful 90° bevel gear with high efficiency rating.
- Installation dimensions adapted to suit our EWA power drives.
- Cast housing with bevel gears made of hardened steel, not self-locking, housing sealed.
- Input shaft and output shaft WE 66 (hex waf 66).
- Assembly angle MPL in every 90° position with scope for installing leg facing outwards or inwards.
- Input speed, max. 40 rpm.
- All shafts are equally well suited for use as input or as output shafts.



Version	Type no.	T output [Nm]	T input [Nm]	i	m [kg]
KRG 23.1140	62523.1140.66	350	370	1:1	7,7

## Accessories



Version	Type no.	Info	m [kg]
MPL 56.1012	82556.1012.11	Assembly bracket incl. 4 screws	0,7





LOCK BEWEGT // LOCK MOVES

# Accessories

## ALD/ELD/KLG // Drive tube bearings

ALD 11, ALD 15, ELD 12, ELD 16



2

KLG 35



3

## MPL // Mounting plates

MPL 22, MPL 32



4

MPL 42, MPL 46



5

MPL 56, MPL 58



7

## ATR/STR // Cable drums

ATR 06



8

STR 12



10

STR 22



12

STR 41, STR 43, STR 45



14

## WRO/WRV/WRZ // Rolling systems

WRO 22, WRV 50



16

WRZ 20



17

WRZ 01, WRZ 02



18

WRZ 10



19

WRZ 30



20

## ARV // Tube connector

ARV 60



21

## HKU // Hand cranks

HKU 01, HKU 02



22

## LUB // Lubricants

LUB 50, LUB 73, LUB 20



23

# ALD, ELD // Bearings



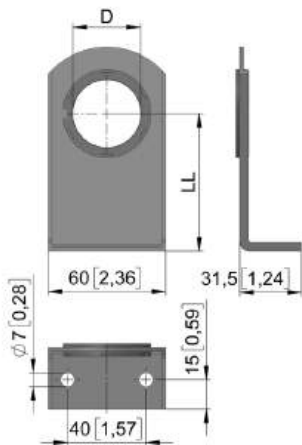
- Drive tube bearings for use with light loads, e.g. in combination with rack gear units AZD and EZD.
- ALD bearing (aluminium plate) and ELD (steel plate) with bronze ring.
- For mounting of 1" tube and 5/4"-tube, DIN EN 10255.
- Load 70 kg / bearing.
- Other bearings on request.

**Note:**

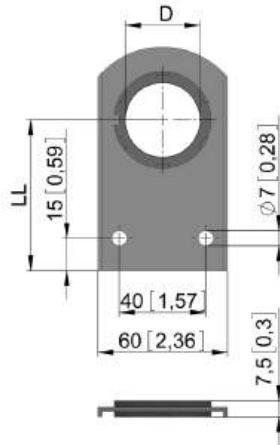
- Bearing ALD 19 with split plastic bearing for retrospective mounting or repair.

For AZD and EZD → See Chapter 8

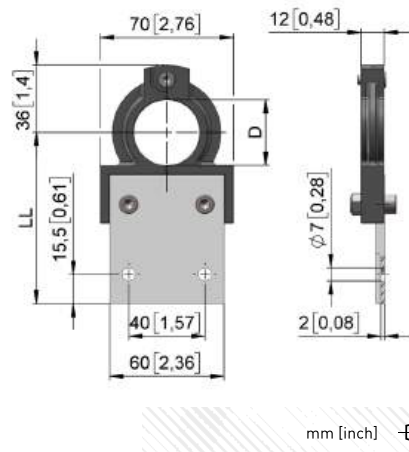
ALD 11 // ELD 12



ALD 15 // ELD 16



ALD 19



mm [inch]

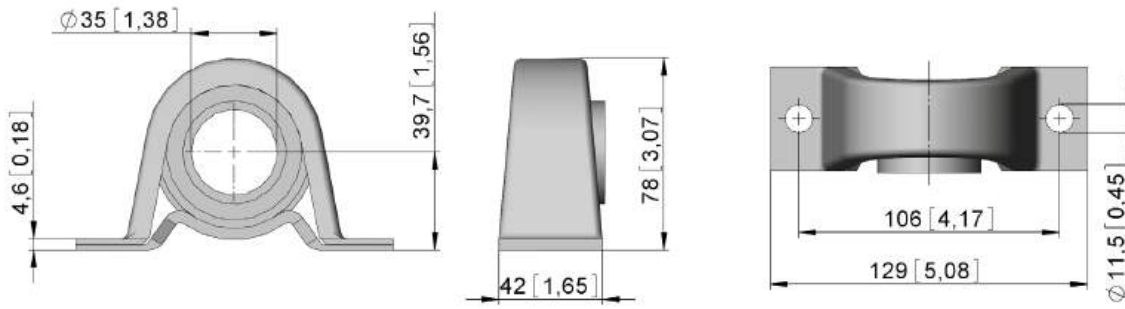
D = 1"-Rohr		D = 5/4"-Rohr		LL [mm]	Info	m [kg]
Version	Type no.	Version	Type no.			
ALD 11.9807	61405.9811.07			70	Aluminum angled	0,1
ALD 11.9809	61405.9811.09			90	Aluminum angled	0,1
ALD 11.9812	61405.9811.12			120	Aluminum angled	0,1
ALD 15.9807	61405.9815.07			70	Aluminum straight	0,1
ALD 15.9809	61405.9815.09			90	Aluminum straight	0,1
ALD 15.9812	61405.9815.12			120	Aluminum straight	0,1
ALD 19.9809	61405.9819.09	ALD 19.9809	61405.9819.0902	90	Aluminum straight, bearing split	0,1
ELD 12.9807	61405.9812.0703			70	Steel angled	0,2
ELD 12.9809	61405.9812.0903	ELD 12.9859	61405.9812.5903	90	Steel angled	0,2
ELD 12.9812	61405.9812.1203			120	Steel angled	0,2
		ELD 16.9856	61405.9816.56	60	Steel straight	0,2
ELD 16.9807	61405.9816.0703			70	Steel straight	0,2
ELD 16.9809	61405.9816.0903	ELD 16.9859	61405.9816.59	90	Steel straight	0,2
		ELD 16.9860	61405.9816.61	110	Steel straight	0,3
ELD 16.9812	61405.9816.1203			120	Steel straight	0,3
		ELD 16.9863	61405.9816.63	135	Steel straight	0,3
ELD 16.66		ELD 16.9866	61405.9816.66	160	Steel straight	0,3

## KLG 35 // Bearings

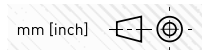
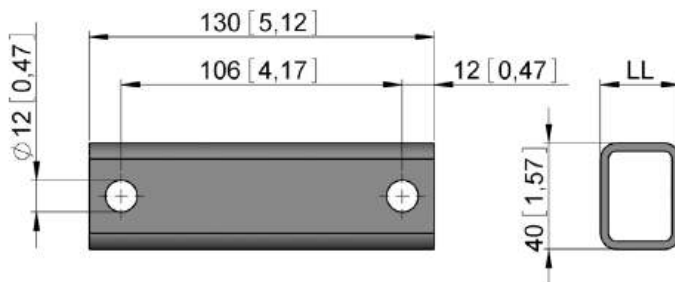


- Drive tube bearings with zero-maintenance ball bearing for mounting of 1" tube, DIN 2440 / 2441  $\varnothing$  33.7 mm.
- For use with heavy loads.
- Supports for various shaft heights.

### KLG 35.9839

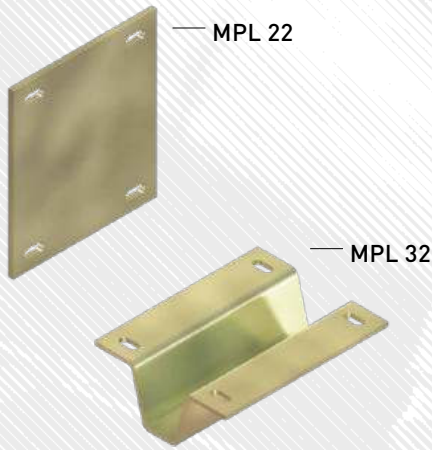


### Support KLG 35.9820 // KLG 35.9830



Version	Type no.	Info	m [kg]
KLG 35.9839	61405.9820.39	Drive tube bearing	0,6
KLG 35.9820	61405.9820.9802	Support // LL = 20 mm for shaft height 60 mm	0,3
KLG 35.9830	61405.9820.9803	Support // LL = 30 mm for shaft height 70 mm	0,4

# MPL 22, MPL 32 // Mounting plates

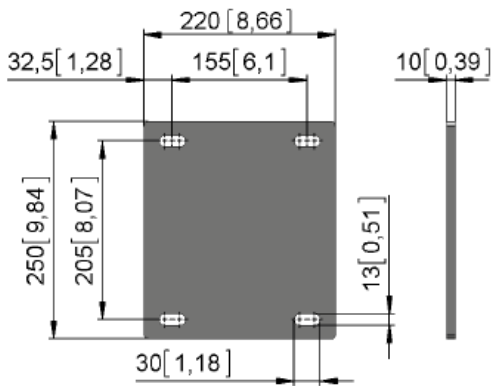


→ Mounting plates for securing bases of EWA and EZW units, for welding or bolting to beams or supports.

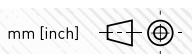
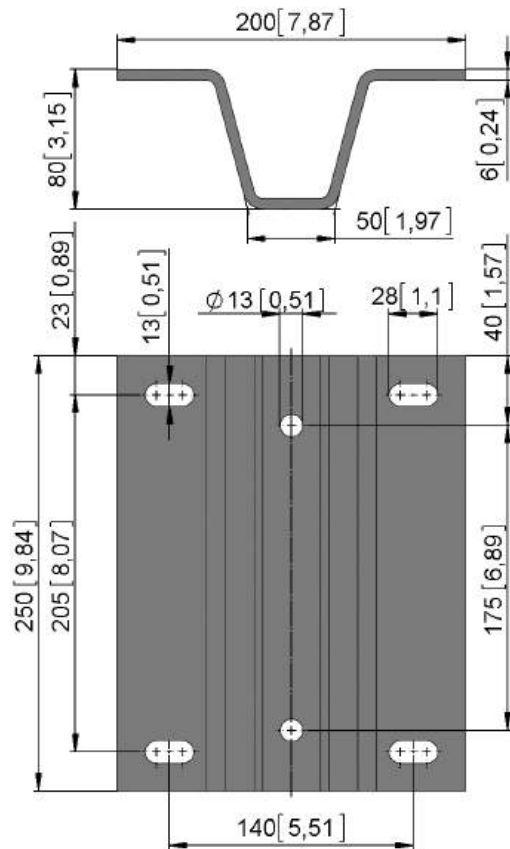
**Note:**

→ The holes needed for bolting in mounting plate MPL 22 must be drilled additionally.

MPL 22

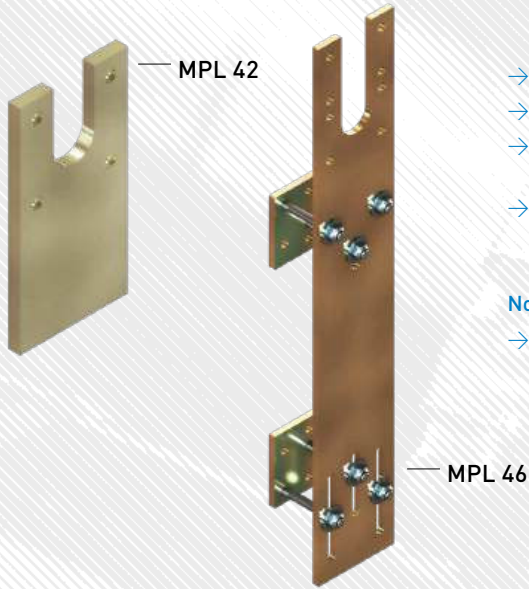


MPL 32



Version	Type no.	Info	m [kg]
MPL 22.2225	82422.2225.0201	EWA 10/12/14/16, EZW 64	3,3
MPL 32.1210	82532.1210.0111	EWA 10/12/14/16	3,6

# MPL 42, MPL 46 // Mounting plates

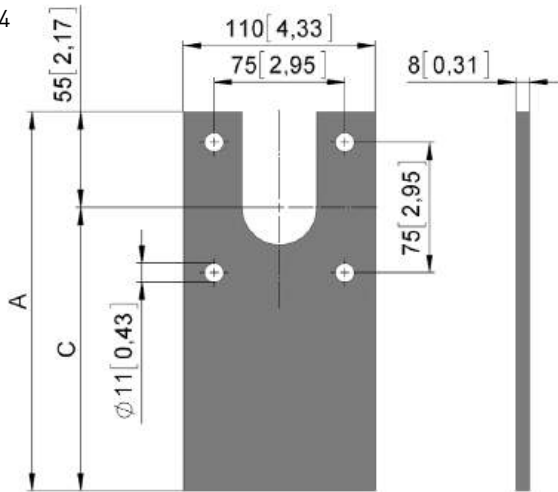


- Mounting plate for transverse mounting of EWA units.
- MPL 42 for welding or bolting to beams or supports.
- MPL 46 for clamping to rail mountings, e.g. in Venlo structures. Variable for use with various rail mounting dimensions.
- Due to the clamping function, no additional drilling is required for the MPL 46.

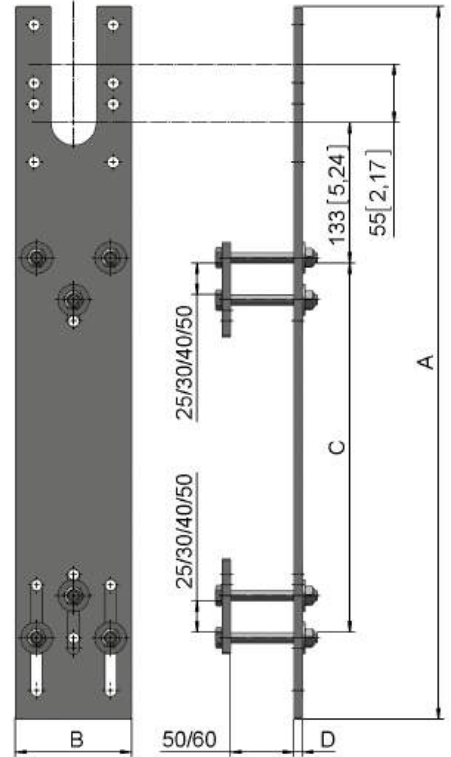
**Note:**

- The holes needed for bolting in mounting plate MPL 42 must be drilled additionally.

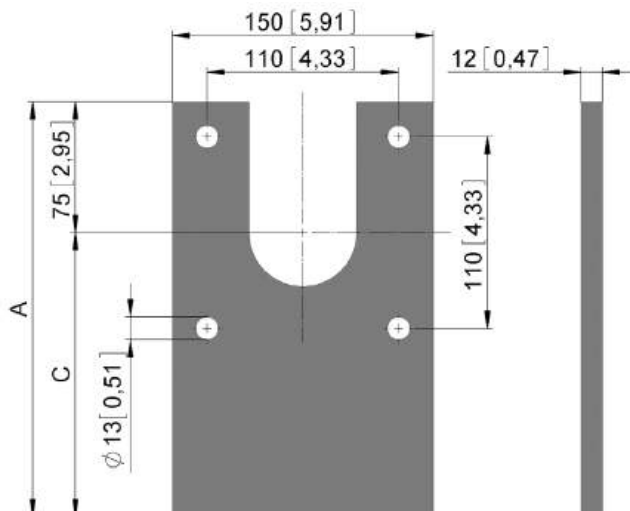
**MPL 42**  
for EWA 10 – EWA 14



**MPL 46**  
for EWA 10 – EWA 16



**MPL 42**  
for EWA 16



mm [inch]

## MPL 42



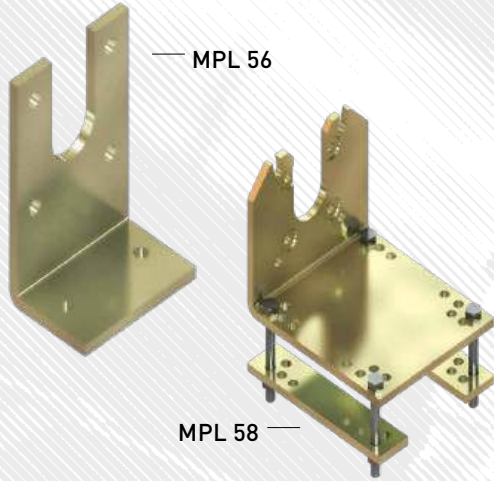
Version	Type no.	A [mm]	C [mm]	m [kg]
<b>EWA 10/12/14</b>				
MPL 42.1121	82442.1101.2104	218	163	1,2
MPL 42.1158	82442.1101.5804	584	529	3,9
MPL 42.1165	82442.1101.6504	645	590	5,1
<b>EWA 16</b>				
MPL 42.1523	82442.1502.2304	238	163	2,9
MPL 42.1578	82442.1502.7804	785	710	12,5

## MPL 46



Version	Type no.	A [mm]	B [mm]	C [mm]	D [mm]	m [kg]
<b>EWA 10/12/14</b>						
MPL 46.1167	82546.1102.0001	675	110	350-399	8	6,0
MPL 46.1172	82546.1102.0002	725	110	400-449	8	6,2
MPL 46.1177	82546.1102.0003	775	110	450-499	8	6,5
MPL 46.1182	82546.1102.0004	825	110	500-549	8	6,7
MPL 46.1187	82546.1102.0005	875	110	550-599	8	7,0
MPL 46.1192	82546.1102.0006	925	110	600-649	8	7,2
MPL 46.1197	82546.1102.0007	975	110	650-699	8	7,4
MPL 46.1102	82546.1102.0008	1025	110	700-749	8	7,7
<b>EWA 16</b>						
MPL 46.1572	82546.1502.0001	720	150	350-399	12	10,2
MPL 46.1577	82546.1502.0002	770	150	400-449	12	10,6
MPL 46.1582	82546.1502.0003	820	150	450-499	12	11,7
MPL 46.1587	82546.1502.0004	870	150	500-549	12	12,4
MPL 46.1592	82546.1502.0005	920	150	550-599	12	13,1
MPL 46.1597	82546.1502.0006	970	150	600-649	12	13,8
MPL 46.1502	82546.1502.0007	1020	150	650-699	12	14,5
MPL 46.1507	82546.1502.0008	1070	150	700-749	12	15,2

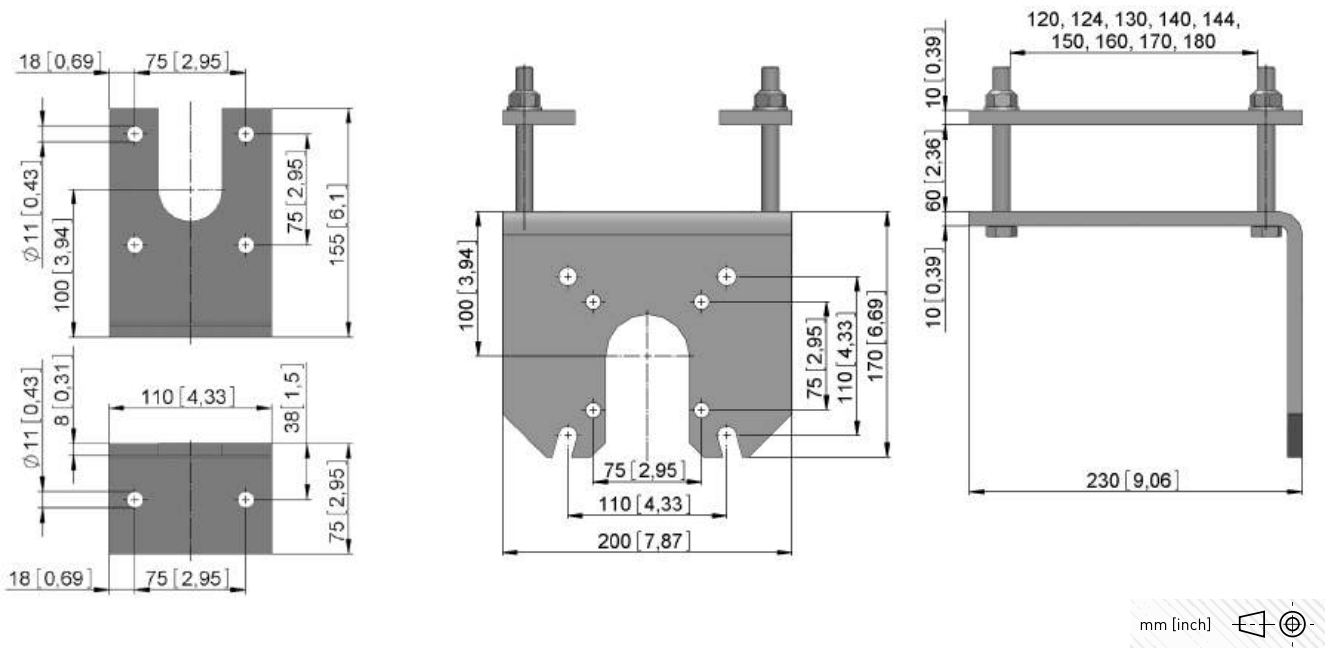
# MPL 56, MPL 58 // Mounting plates



- Angled mounting plates for transverse mounting of EWA.
- MPL 56 for welding or bolting to beams or supports.
- MPL 58 for clamping to supports, e.g. in Venlo structures, variable for use with various support dimensions.
- Due to the clamping function, no additional drilling is required for the MPL 58.

**MPL 56**  
for EWA 10–EWA 14

**MPL 58**  
for EWA 10–EWA 16



Version	Type no.	Info	m [kg]
MPL 56.1114	82556.1115.11	EWA 10/12/14	1,3
MPL 58.2009	82558.2017.0971	EWA 10/12/14/16, only angle plate	5,2
MPL 58.2011	82558.2017.11	EWA 10/12/14/16	8,1

## ATR 06 // Cable drums



→ Cable drums and belt drum for power drives and manual drives with output shaft We 06 (ø 26 mm, with transverse bore), with screw M 10 for mounting on shaft.

→ Cable diameter  $D \varnothing = 4.0\text{--}6.0$  mm ( $F = \text{max. } 5000$  N).

→ ATR 06.5403 can be used on left as well as right sides of drive unit.

→ Belt width  $B = 50$  mm ( $F = \text{max. } 5000$  N).

→ Other cable drums on request.

### Note:

→ Cable not included in scope of supply.

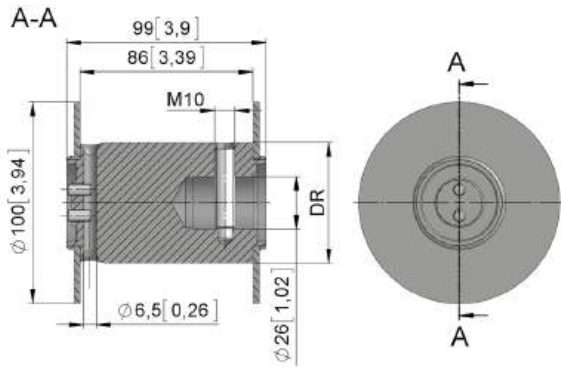
→ Detail H without two safety windings.

Version	Type no.	DR [mm]	DIN 3069 D $\varnothing$ [mm]	H1 [m]	H2 [m]	Rolling method	m [kg]
ATR 06.6001	81006.6001.01	60	5-6	2,3	5,7	smooth	2,1
ATR 06.5401	81006.5401.01	54	4-5	2,6	6,2	smooth	0,7
ATR 06.5410	81006.5401.10	54	-	-	-	smooth	0,7
ATR 06.9201	81006.9201.01	120	6	3,5	-	smooth	2,5
ATR 06.6002	81006.6002.01	61	5	2,4	6,0	grooved/left	2,3
ATR 06.6003	81006.6003.01	61	5	2,4	6,0	grooved/right	2,3
ATR 06.5403	81006.5403.02	54	5	2,8	6,9	grooved/left	0,9

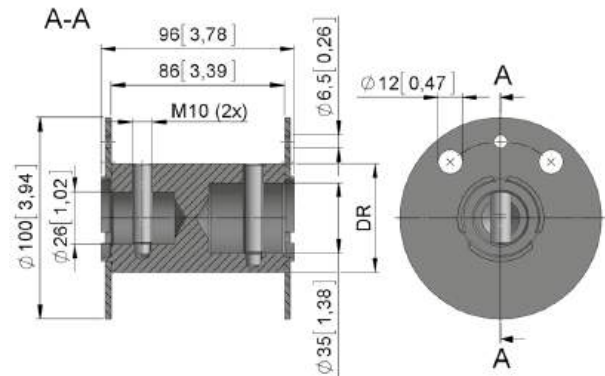
  

Version	Type no.	B [mm]	L [mm]	m [kg]
GBA 20.5010	81520.5010.0110	50	1000	0,2
GBA 20.5025	81520.5010.0125	50	2500	0,3

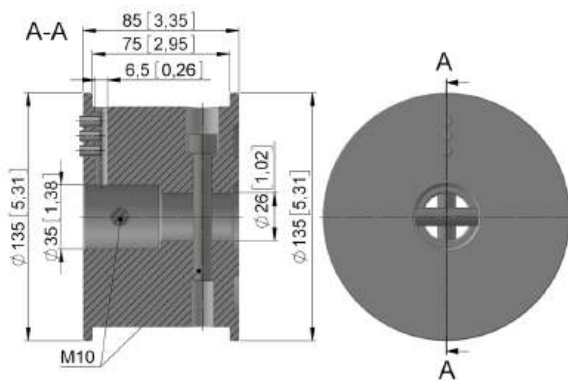
ATR 06.6001



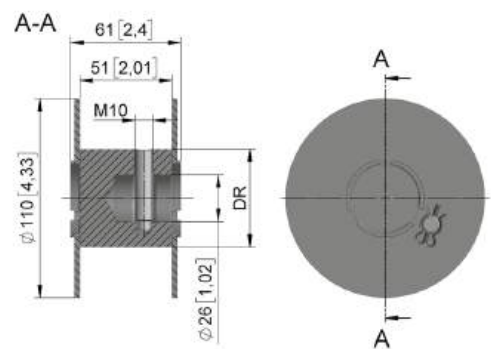
ATR 06.5401



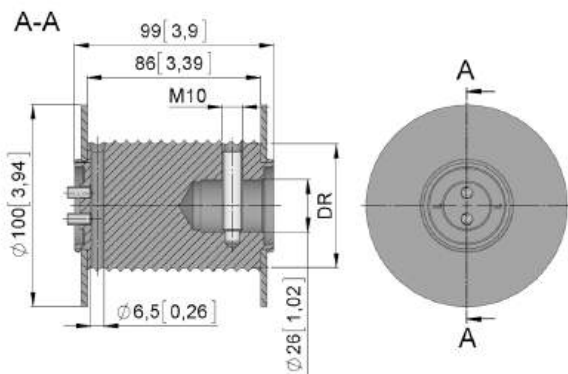
ATR 06.9201



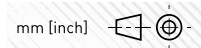
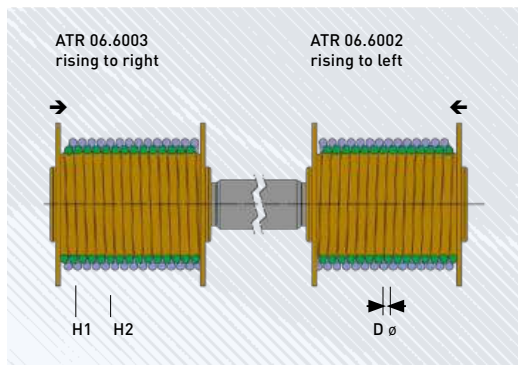
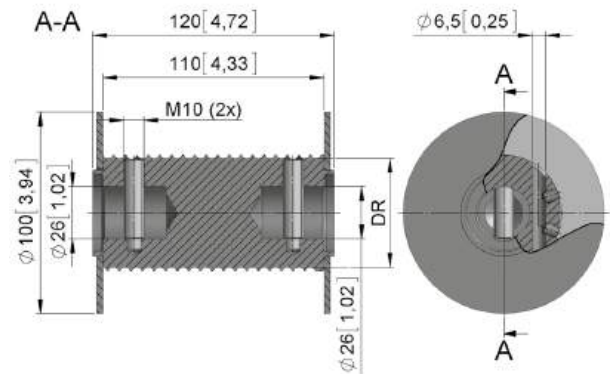
ATR 06.5410



ATR 06.6002 // ATR 06.6003



ATR 06.5403



## STR 12 // Cable drums



STR 12.5401

STR 12.5410



STR 12.7401

STR 12.7410



STR 12.9201

STR 12.9210



STR 12.9101

### STR 12.54 // STR 12.92:

- Plastic cable drums for mounting to 1" tube for VariVent® systems, lifting window and similar items.
- Drum in two sections for ease and speed of assembly.
- With patented clamping fixtures, no further drilling required!
- For cable diameters of up to 4 mm.
- Version xx10 always with pre-mounted wire cable. Process for controlled winding of cable during assembly has been submitted for utility patent application.

### STR 12.74 // tapered cable drum for VariVent® TFS:

- For single-rolled TFS systems with a ventilation height of up to 3.5 m.
- Only a small winding tube offset ( $\pm 5 - 10$  cm).
- Only a small base is needed, which delivers a bigger cross section for ventilation with eaves at the same height.
- Flexible range of applications: Depending on which area of the tapered drum is used, the winding offset for different thicknesses of sheeting can be optimised.
- Easy to install with tried and tested gripper clamps.

### STR 12.91 // Cable drum for EazyVent®:

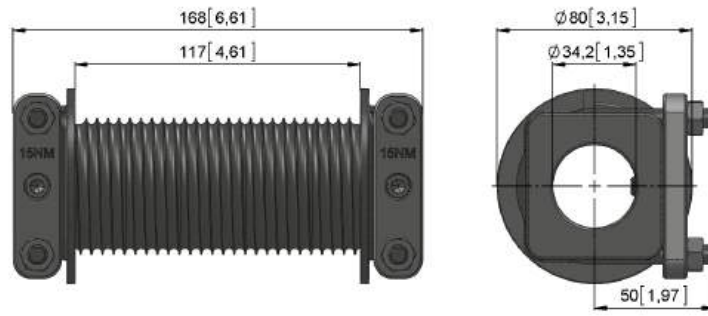
- Smooth cable drum made of two plastic half-shells ( $\varnothing 110$  mm).
- Included in scope of supply: Two screws and two lock nuts.
- Only suitable for plastic cables.
- Special groove present for safety winding.

### Note:

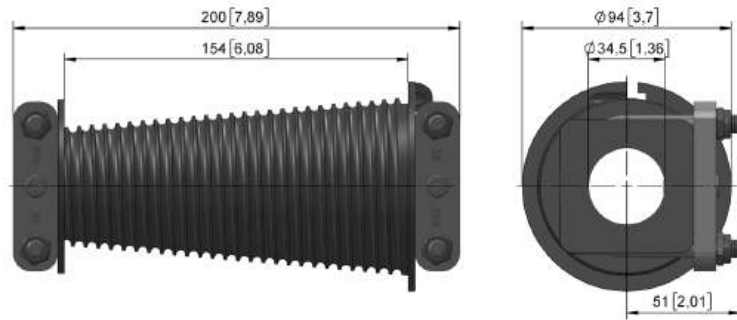
- Indication H without two safety windings.
- Per drum max. 150 kg.

Version	Type no.	DR [mm]	DIN 3069 D $\varnothing$ [mm]	H [m]	Info	m [kg]
STR 12.5401	81412.5401.10	54	3-4	4,1	-	0,6
STR 12.5410	81412.5410.40	54	3	4,1	With pre-mounted wire cable	1,0
STR 12.7401	81412.7401.15	49-74	3-4	3,8	-	0,6
STR 12.7410	81412.7410.40	49-74	3	3,8	With pre-mounted wire cable	1,3
STR 12.9201	81412.9201.09	120	3-4	5,8	-	0,8
STR 12.9210	81412.9210.60	120	3	5,8	With pre-mounted wire cable	1,3
<b>EazyVent®</b>						
STR 12.9101	81412.9101.13	110	4	-	-	0,7

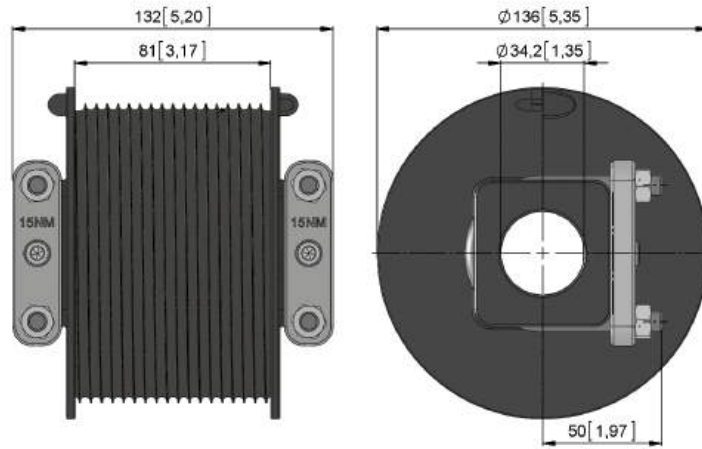
STR 12.5401



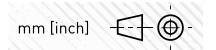
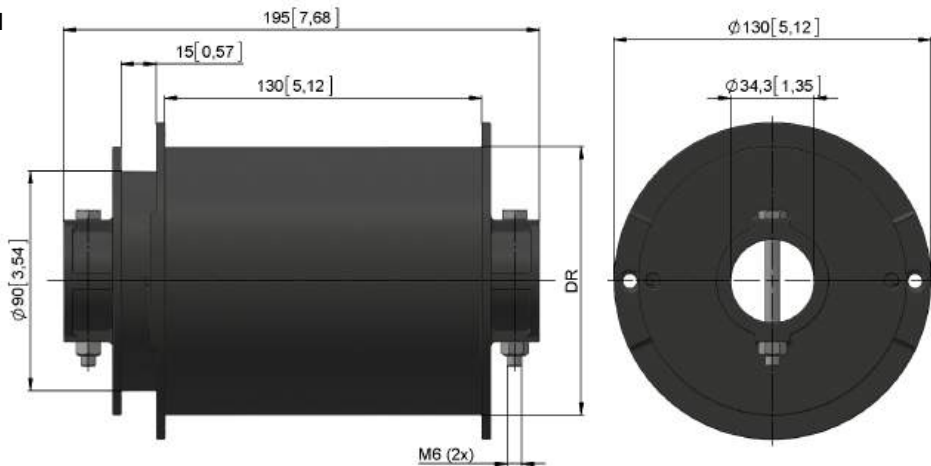
STR 12.7401



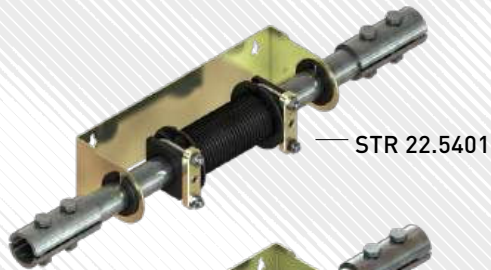
STR 12.9201



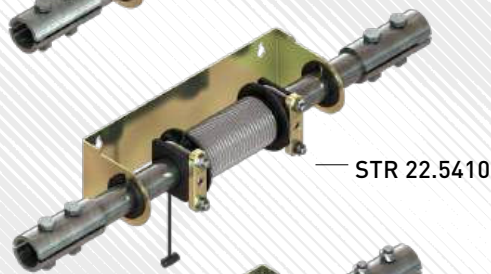
STR 12.9101



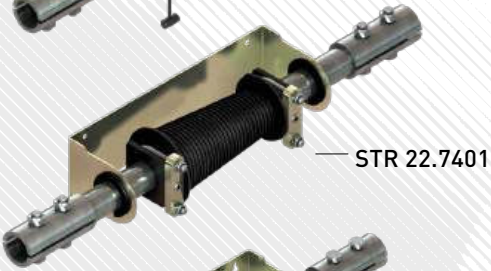
## STR 22 // Cable drum units



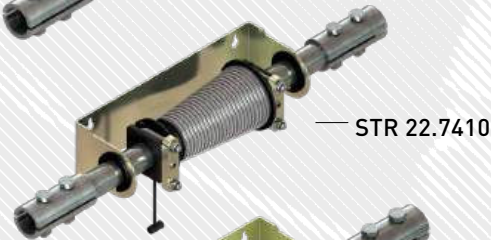
STR 22.5401



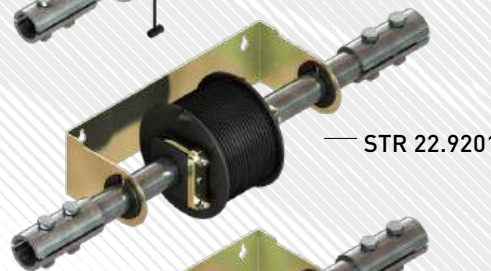
STR 22.5410



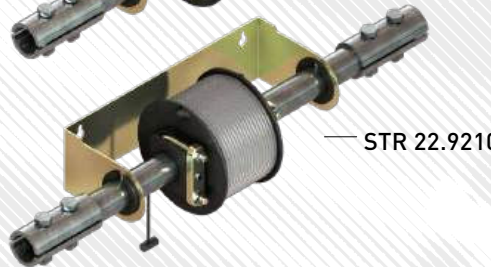
STR 22.7401



STR 22.7410



STR 22.9201



STR 22.9210

### STR 22.54 // STR 22.92:

- Plastic cable drums with mounting console for the VariVent® systems or lifting windows.
- Drums with patented clamping fixture, no further drilling required!
- With 4 half-shell connectors, incl. screws and lock nuts.
- For simple and quick assembly without sawing and drilling, with pre-drilled 1" tubes.
- For cable diameters of up to 4 mm.
- Version xx10 always with pre-mounted wire cable. Process for controlled winding of cable during assembly has been submitted for utility patent application.

### STR 22.74:

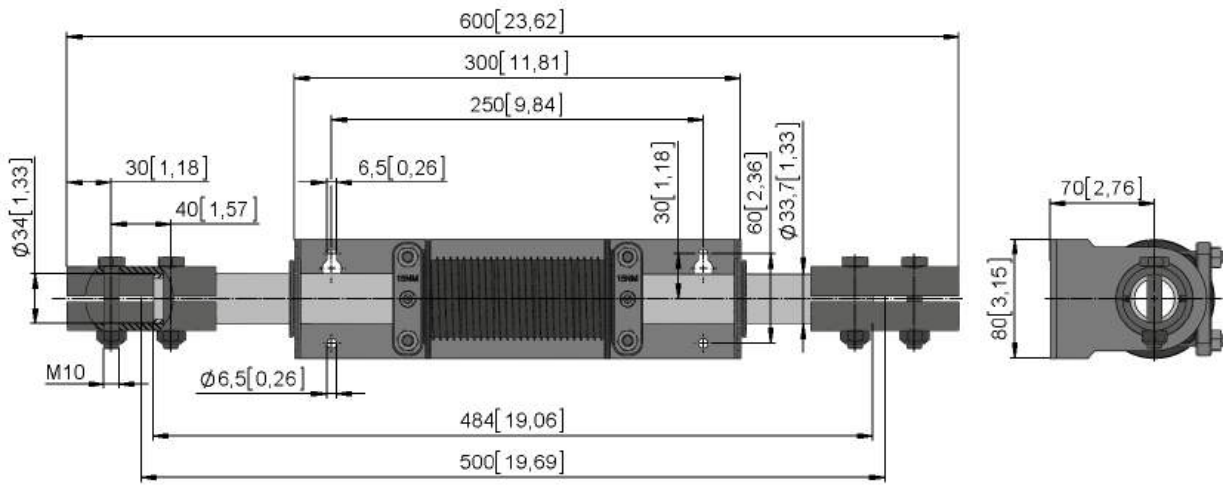
- For single-rolled TFS systems with a ventilation height of up to 3.5 m.
- Only a small winding tube offset ( $\pm 5 - 10$  cm).
- Only a small base is needed, which delivers a bigger cross section for ventilation with eaves at the same height.
- Flexible range of applications: Depending on which area of the tapered drum is used, the winding offset for different thicknesses of sheeting can be optimised.
- Easy to install with tried and tested gripper clamps.

### Note:

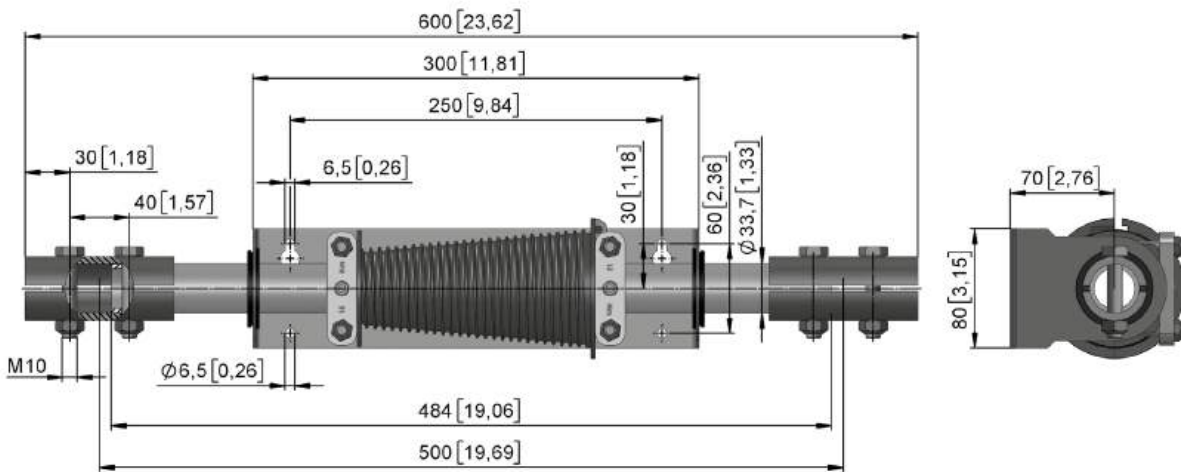
- Indication H without two safety windings.

Version	Type no.	DR [mm]	DIN 3069 D $\phi$ [mm]	LL [mm]	H [m]	Info	m [kg]
STR 22.5401	81422.5401.10	54	3-4	70	4,1	-	3,2
STR 22.5410	81422.5410.40	54	3	70	4,1	With pre-mounted wire cable	3,7
STR 22.7401	81422.7401.15	49-74	3-4	70	3,8	-	3,7
STR 22.7410	81422.7410.40	49-74	3	70	3,8	With pre-mounted wire cable	4,4
STR 22.9201	81422.9201.09	120	3-4	90	5,8	-	3,4
STR 22.9210	81422.9210.60	120	3	90	5,8	With pre-mounted wire cable	4,0

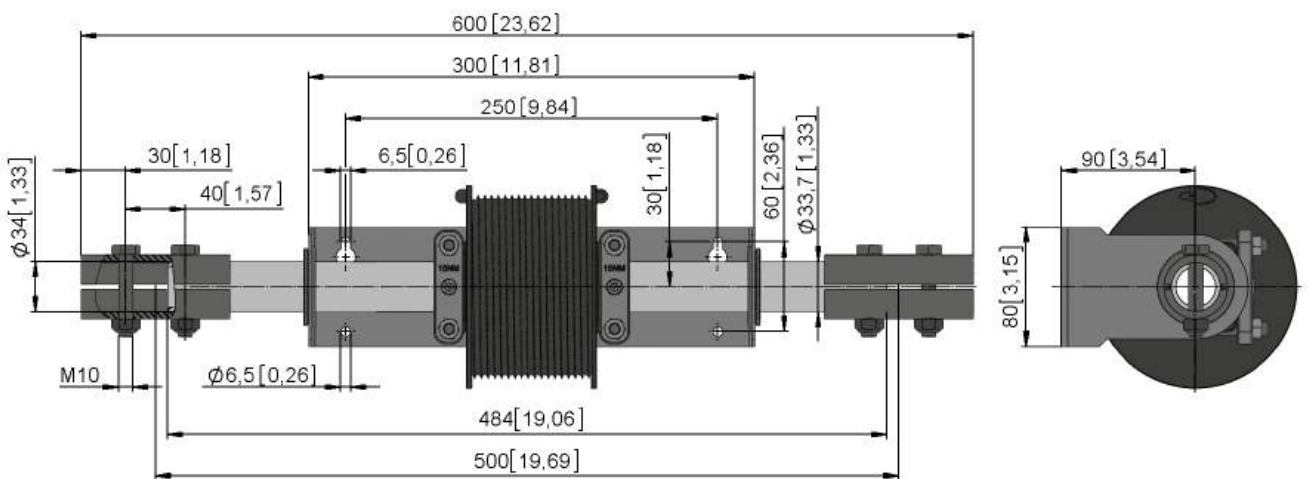
STR 22.54



STR 22.74

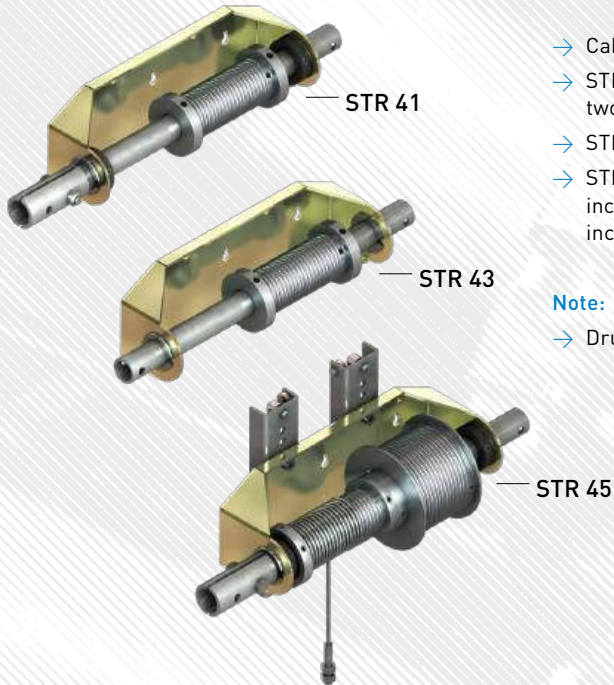


STR 22.92



mm [inch]

## STR 41, STR 43, STR 45 // Cable drum units

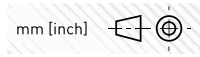
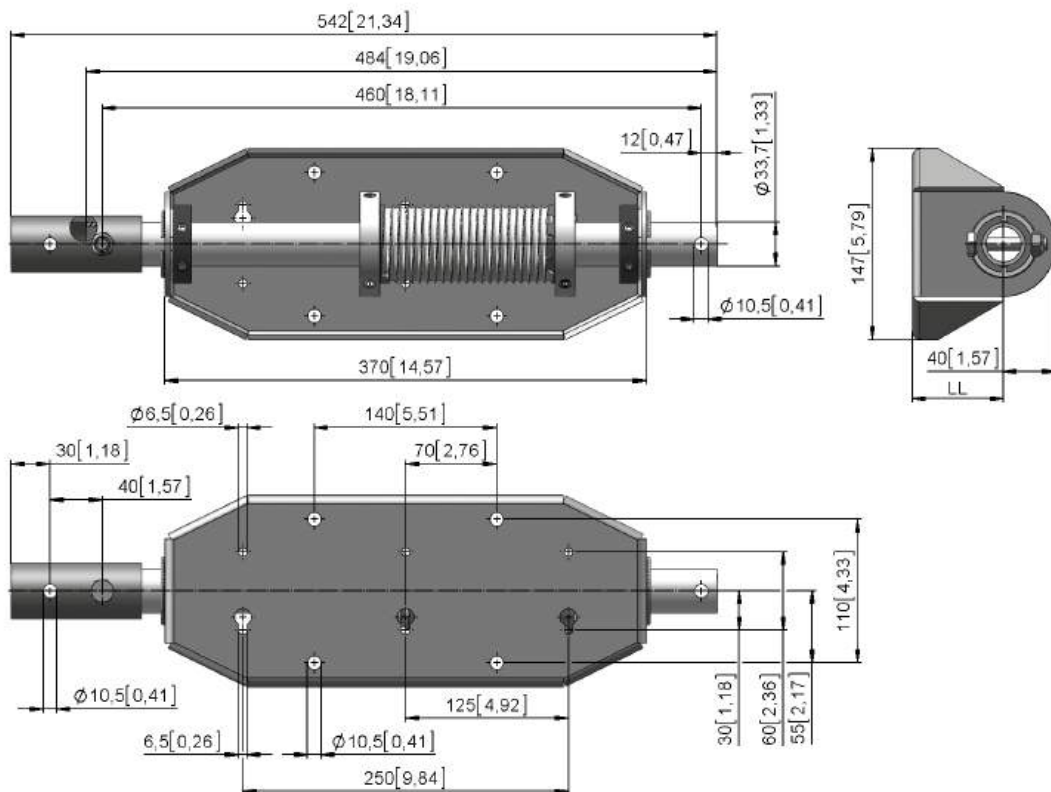


- Cable drum consoles for the VariVent® TF Diabolo system.
- STR 41 (70 mm) cable drum console for simple winding action with two half-shell connectors, incl. screws and lock nuts.
- STR 43 (90 mm) upper cable drum console for double winding.
- STR 45 (90 mm) lower cable drum console for double winding incl. roller carriage and wire cable with two half-shell connectors, incl. screws and lock nuts.

**Note:**

- Drum 54 mm for 1"-tube is available separately, loads up to 5000 N.

### STR 41.5502

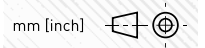
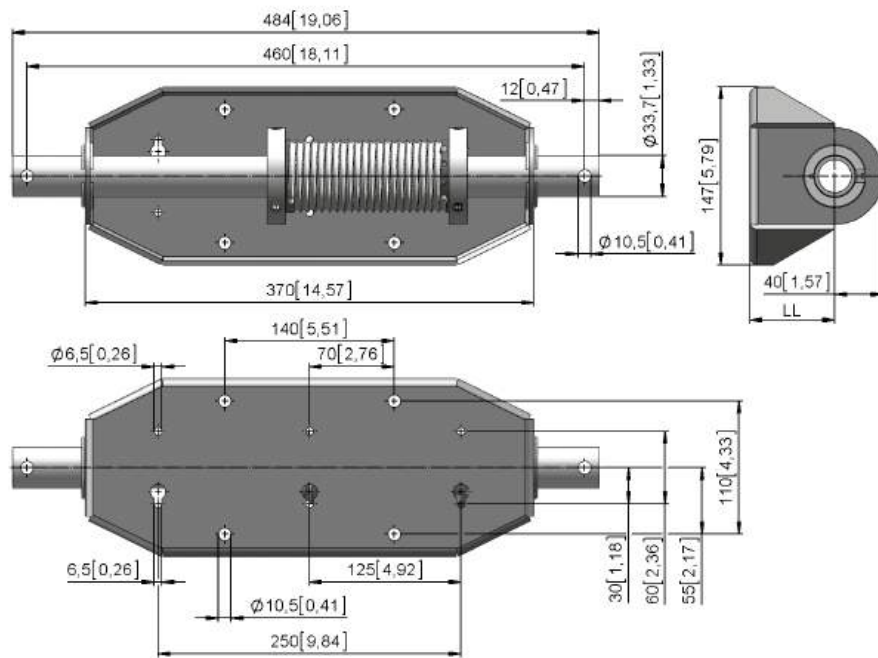


# STR 41, STR 43, STR 45

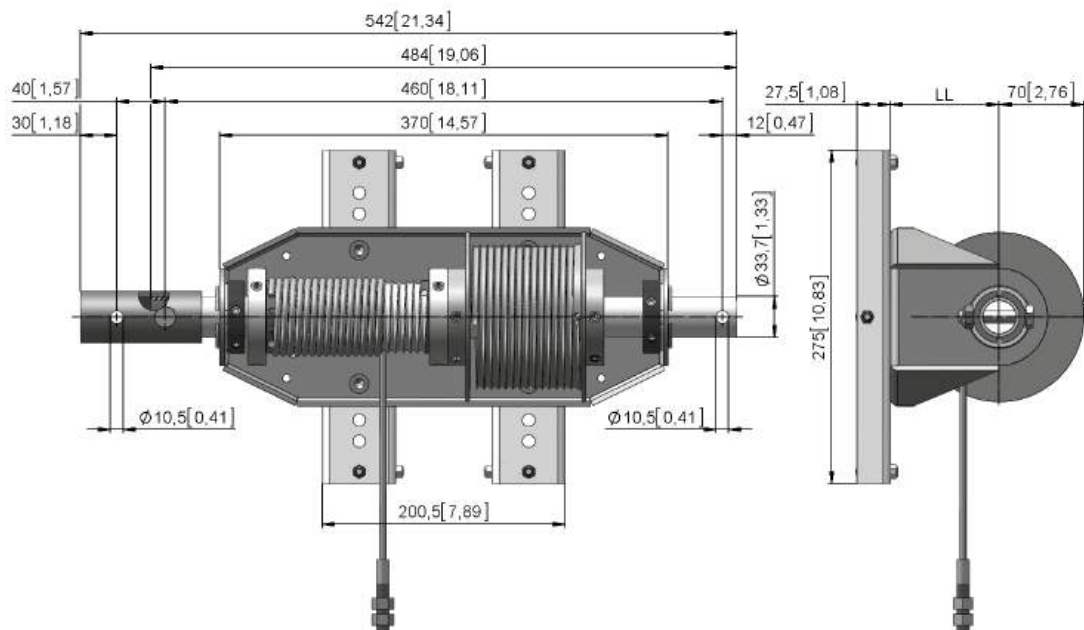


Version	Type no.	DIN 3060 ø [mm]	LL [mm]	Rolling method	Info	m [kg]
STR 41.5501	81441.5501.10	5	70	grooved/left	-	4,5
STR 41.5502	81441.5502.10	5	70	grooved/left	Incl. clamping rings, GKT connectors	5,0
STR 43.5501	81443.5501.10	5	90	grooved/left	-	4,7
STR 45.9501	81445.9501.10	5	90	grooved/left	Incl. clamping rings, GKT connectors, roller carriage, DST	10,8

## STR 43.5501 // STR 41.5501



## STR 45.9501

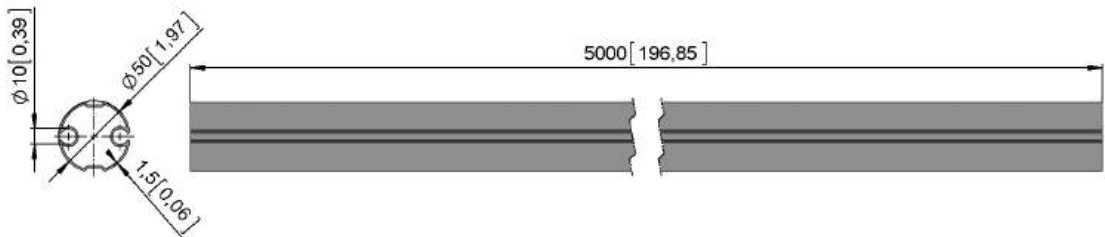


# WRO 22, WRV 50 // Roller tube, roller tube connector



- Roller tubes and roller tube connector for use e.g. with VariVent®.
- WRO 22.5015: Aluminium roller tube  $\varnothing$  50 mm with key groove  $\varnothing$  10 mm on both sides, also suitable for RMA tube motors.
- WRV 50.2246: Roller tube connector for roller tube  $\varnothing$  50 mm.
- WRV 50.2260: Roller tube connector for roller tube  $\varnothing$  63 mm on RMA 20.1212.

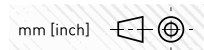
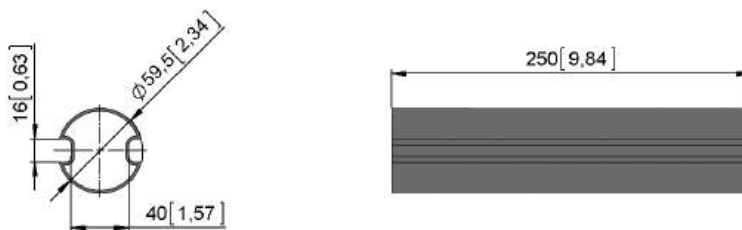
WRO 22.5015



WRV 50.2246



WRV 50.2260



Version	Type no.	L [mm]	m [kg]
WRO 22.5015	81622.5015.1050	5000	4,3
WRV 50.2246	81650.2246.2004	385	0,2
WRV 50.2260	81650.2260.2010	250	0,3

# WRZ 20 // Cable guide chain, mounting plates RMA

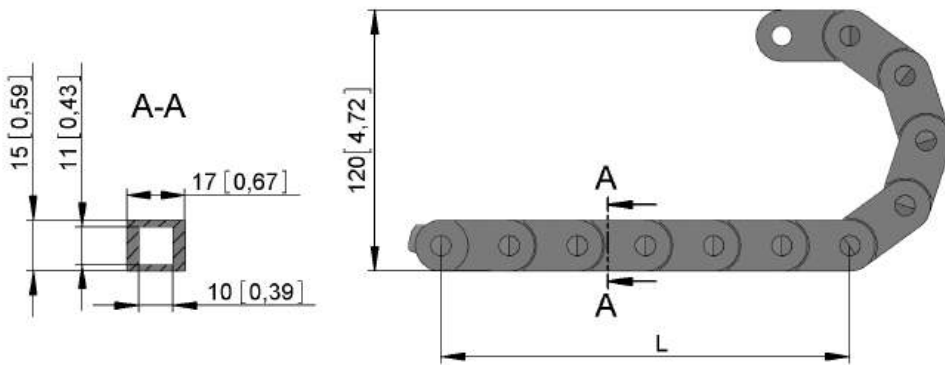


- Cable guide chain and mounting plates for use on VariVent® (climbing drive) and/or tube motor.
- WRZ 20.5010 cable guide chain to protect connection cable on drive unit.
- Mounting plate on cable guide chain WRZ 20.0111 and WRZ 20.0112.
- Start clip WRZ 20.9101 and end clip WRZ 20.9110 for cable guide chain.

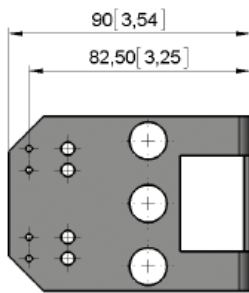


- Note:**
- Start clip WRZ 20.9102 is delivered alternatively with fixing plate for fixing at roller carriage WRZ (without picture).

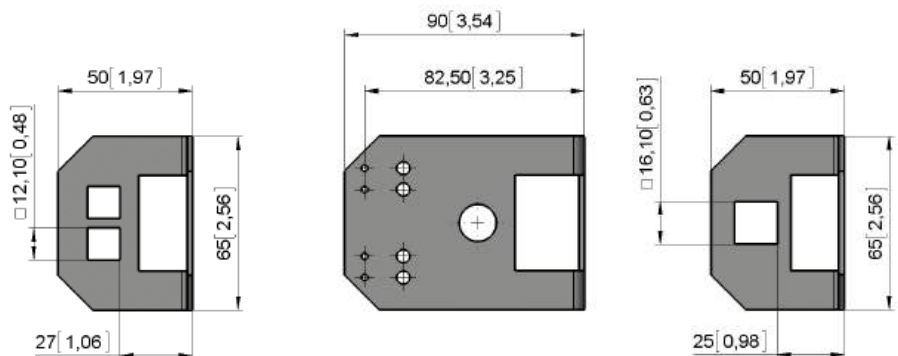
## WRZ 20.5011



## WRZ 20.0111



## WRZ 20.0112



mm [inch]

Version	Type no.	Info	m [kg]
WRZ 20.5011	81820.5011	L = 1000 mm	0,2
WRZ 20.9102	81820.9102	Start clip	0,1
WRZ 20.9102	81820.9102.0001	Start clip with fixing plate	0,1
WRZ 20.9111	81820.9111	End clip	0,1
WRZ 20.0111	81820.0111	For RMA 20.0512	0,1
WRZ 20.0112	81820.0112	For RMA 20.1212	0,1

## WRZ 01, WRZ 02 // Guide profile



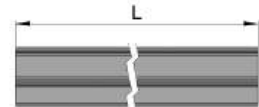
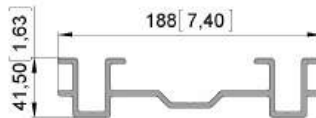
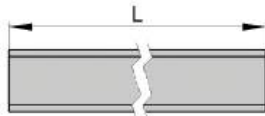
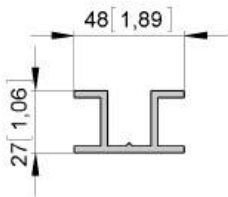
- Guide profiles for use on VariVent® (climbing drive), tube motor and end guide.
- WRZ 01 aluminium guide profile for VariVent® TFD end guide, and on RMA tube motors as roller carriage and end guide.
- WRZ 02 guide profile for roller carriage on climbing drives for VariVent® systems.
- Simple and precise mounting is possible.

**Option:**

- WRZ 02.91: galvanised clamping plate for VariVent® TF Diabolo, incl. screws and lock nuts.

WRZ 01

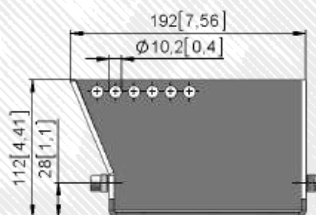
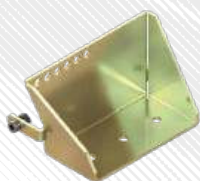
WRZ 02



mm [inch]

Version	Type no.	L [mm]	m [kg]
WRZ 01.0120	81801.0120	2000	2,2
WRZ 01.0130	81801.0130	3000	3,4
WRZ 01.0140	81801.0140	4000	4,5
WRZ 01.0150	81801.0150	5000	5,6
WRZ 02.0220	81801.0220	2000	7,4
WRZ 02.0230	81801.0230	3000	11,1
WRZ 02.0240	81801.0240	4000	14,8
WRZ 02.0250	81801.0250	5000	18,4
<b>Option</b>			
WRZ 02.9101	81801.0291.01	-	1,3

**Option:**  
TF Diabolo clamping plate



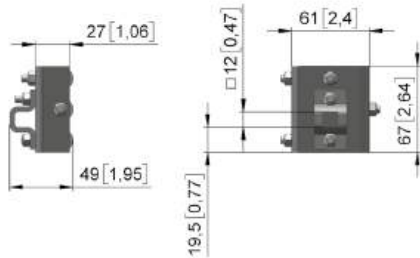
mm [inch]

# WRZ 10 // Roller carriage

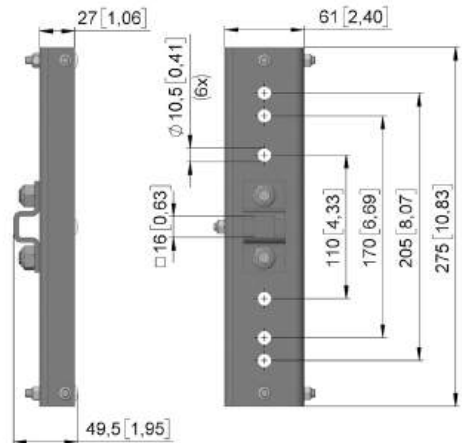


- Roller carriage for use on VariVent® (climbing drive), tube motor and end guide in combination with guide profile WRZ 01 and/or WRZ 02.
- Roller carriage WRZ 10.0111 for tube motor RMA 20.0512.
- Roller carriage WRZ 10.0122 for tube motor RMA 20.1212.
- Roller carriage WRZ 10.0120 to guide EWA drive unit on VariVent® TC/BC, incl. two screws.
- WRZ 10.4020: End guide for VariVent® TFD, is supplied already mounted on roller carriage WRZ 10.0120.

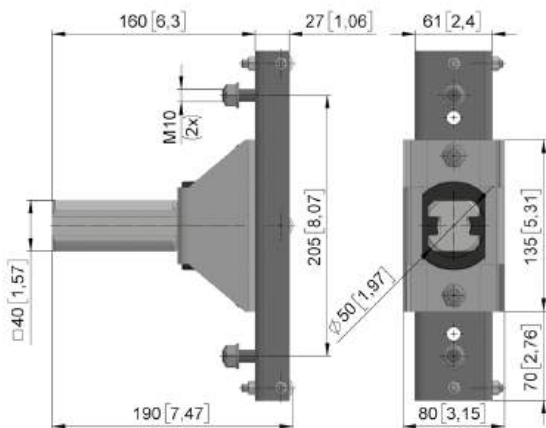
WRZ 10.0111



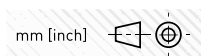
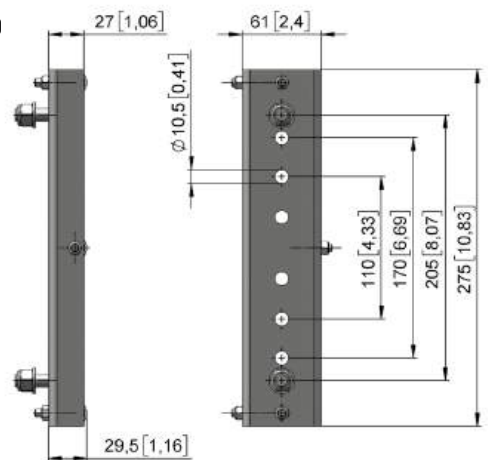
WRZ 10.0122



WRZ 10.4020



WRZ 10.0120



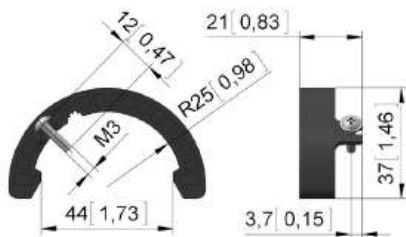
Version	Type no.	m [kg]
WRZ 10.0111	81810.0111	0,4
WRZ 10.0120	81810.0120	1,0
WRZ 10.0122	81810.0122	1,1
WRZ 10.4020	81810.4020.4721	1,8

# WRZ 30 // Cable clamps EazyVent®, mounting plates RMA

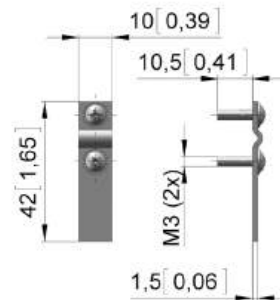


- Cable clamps and mounting plate for use on EazyVent®.
- WRZ 30.1005: Cable clamp in the form of a plastic clip incl. self-cutting screw for ease of assembly on WR0.
- WRZ 30.1505: Cable clamp galvanised, made of steel with two self-tapping screws to secure start and end of cable.
- WRZ 30.0105 and WRZ 30.0112 galvanised mounting plates for tube motor.

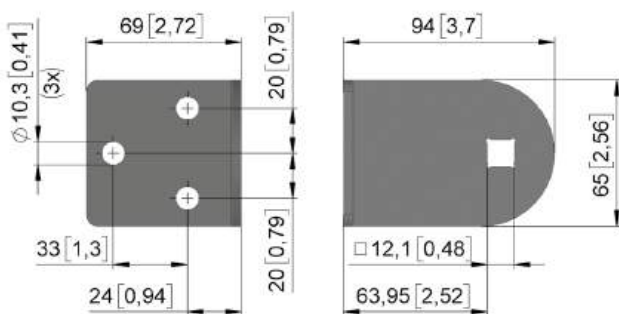
WRZ 30.10



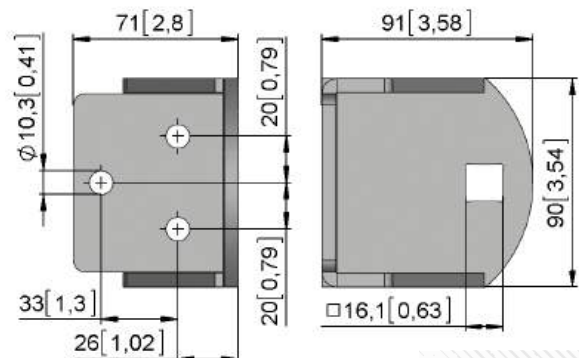
WRZ 30.15



WRZ 30.0105



WRZ 30.0112



mm [inch]

Version	Type no.	Info	m [kg]
WRZ 30.1005	81830.1005	Cable clamp for EazyVent®	0,1
WRZ 30.1505	81830.1505	Cable clamp for EazyVent®	0,1
WRZ 30.0105	81830.0105	Mounting plate for RMA 20.0512	0,3
WRZ 30.0112	81830.0112	Mounting plate for RMA 20.1212	0,8

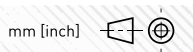
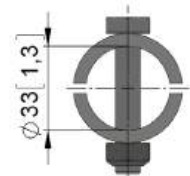
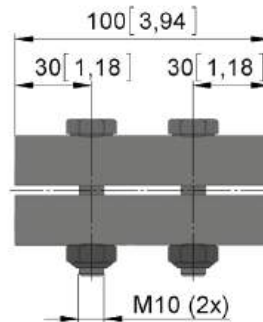
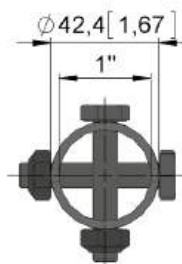
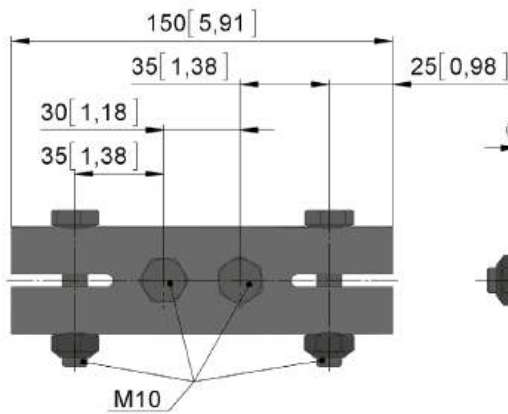
# ARV 60 // Tube connector



- Tube connector for positive connection torque transmission to 1" tube.
- ARV 60.1042: one-part tube connector with screws and lock nuts.
- ARV 60.1044: galvanised half shells with screws and lock nuts.

ARV 60.1042

ARV 60.1044



Version	Type no.	Info	m [kg]
ARV 60.1042	81660.1042.3415	Tube connector // Incl. 4 screws and lock nuts	0,6
ARV 60.1044	81660.1044.3410	Tube connector // Incl. 2 screws and lock nuts	1,0

# HKU 01, HKU 02 // Hand cranks

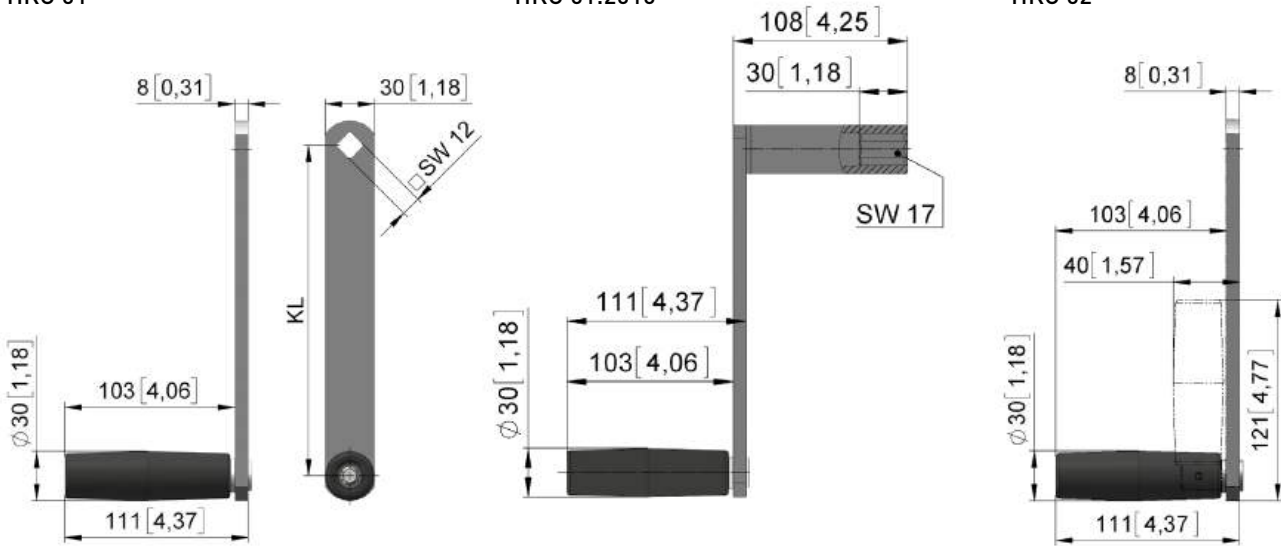


- Crank for actuation of our manual drives.
- HKU 01/HKU 02: Galvanised hand crank with rigid or folding plastic handle for HZW and HWA.
- HKU 01.2010: Plug-in hand crank for manual drives HZW/HKG for hexagonal shaft We 61 with rigid handle.

HKU 01

HKU 01.2010

HKU 02



mm [inch]

Version	Type no.	Kl [mm]	m [kg]
HKU 01.2001	82301.2001.0001	200	0,5
HKU 01.2501	82301.2501.0001	250	0,5
HKU 01.3001	82301.3001.0001	300	0,6
HKU 01.2010	82301.2010.0001	200	0,8
HKU 02.2001	82302.2001.0001	200	0,5
HKU 02.2501	82302.2501.0001	250	0,6
HKU 02.3001	82302.3001.0001	300	0,6

# LUB // Lubricants

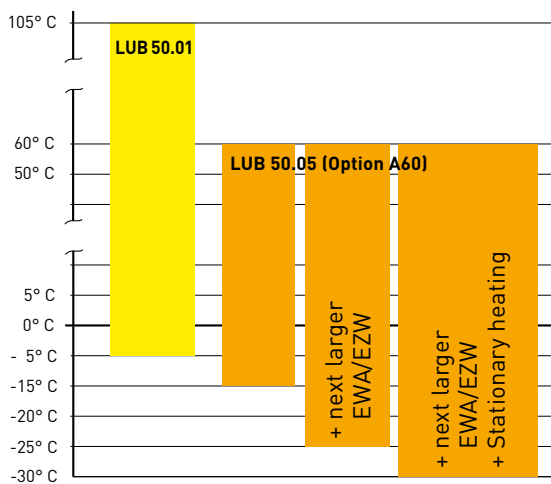


- Special lubricants for use with our drive units, gear units and racks.
- **Note:** In all cases, the power supply must be isolated before starting any maintenance work. All details in the assembly manual must be followed.

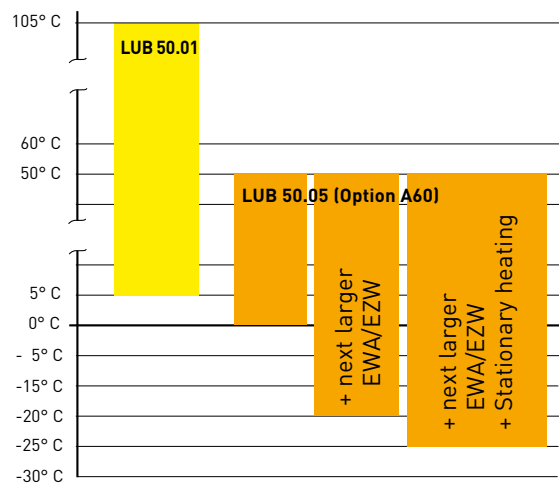
**Note:**

- The use of this lubricant, approved for our products, extends their service life substantially and is fundamental to our products operating without technical problems.

**EWA 1/3/5 rpm  
EZW 250/450/600 mm/min**

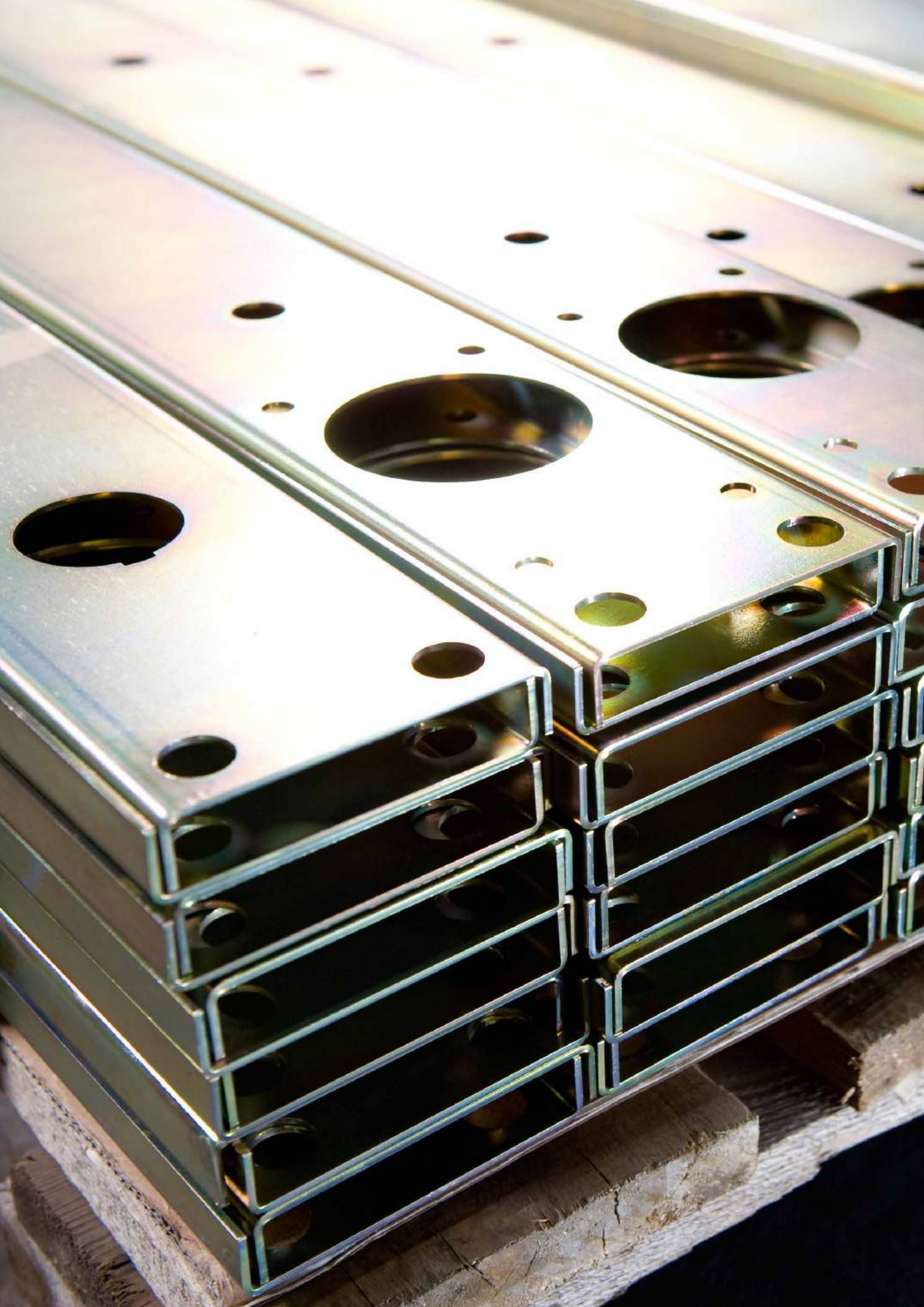


**EWA 6/9 rpm  
EZW 1200/1850 mm/min**



→ The temperature range for Option A60 can be enlarged downwards by selecting the next most powerful EWA/EZW and/or in addition using stationary heating in the electric motor. We will be pleased to help you to choose.

Version	Type no.	Info	Temperature [°C]	m [kg]
<b>Gear oil for EWA</b>				
LUB 50.0101	82150.0101	EWA 10–EWA 16, EZW 64	see graphic	1,30
LUB 50.0501	82150.0501	EWA 10–EWA 16, EZW 64 Option A60	see graphic	1,30
<b>Rack grease</b>				
LUB 73.2006	82120.2006	EZZ, UBL, LZZ, SZG, HZZ	-5 /+60	15,0
LUB 73.2011	82120.2011	EZZ, UBL, LZZ, SZG, HZZ	-5 /+60	0,05
LUB 73.2030	82120.2030	EZZ, UBL, LZZ, SZG, HZZ	-5 /+60	0,40
LUB 20.3002	82120.3002	ZSZ, AZZ, EZZ, SZZ	-5 /+60	1,00
LUB 20.3012	82120.3012	ZSZ, AZZ, EZZ, SZZ	-5 /+60	0,10







LOCK BEWEGT // LOCK MOVES

# Service

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Service procedure 2

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Tips and tricks 3

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## Assembly

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EWA 4

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KKS 5

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## Setting

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END 20 // Limit switch systems 6

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PAR 06 // Position repeater 8

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Circuit diagram 9

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LSC 40.10 // Control unit 13

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Circuit diagram 15

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## Maintenance

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Racks 18

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# Service procedure

## Contacting us

- You might need some advice about our product portfolio, or perhaps wish to raise a complaint?
- Our Service team is there for you on:
  - Service Hotline : +49 7371 9508-22
  - e-mail: [service@lockdrives.com](mailto:service@lockdrives.com)
  - WhatsApp: +49 7371 9508-22
- You can contact us at these times:
  - Monday – Thursday: 8 a.m. to 5 p.m.
  - Friday: 8 a.m. to 2 p.m.
- Outside these contact hours, a member of our Service team can be contacted on our



### Emergency Hotline: +49 7371 9508-22.

Lock may levy a discretionary fixed-rate charge for use of our Emergency Hotline.

## Registration of your EWA

### Why register it?

- 10-year Lock quality guarantee. \*
- Faster response and prompt help for Service-related cases.
- Shorter processing times for Service-related cases.
- Your equipment is covered by Lock's preventive quality assurance scheme.
- Upgrades to the control unit are quick, easy and inexpensive to perform.

\* see warranty terms & conditions  
<https://www.lockdrives.com/en/agb>

## How do you register?

### By phone:

- Ring this number: +49 7371 9508-512

### Or by WhatsApp:

- Save the Lock Servicehotline-number as a contact
- Photograph the completed registration form
- send the photo + your location by WhatsApp to +49 7371 9508-22

### Or by email:

- Photograph the completed registration form
- send the photo to [registration@lockdrives.com](mailto:registration@lockdrives.com)

### Or over the Internet:

- At [www.lockdrives.com/registration](http://www.lockdrives.com/registration) you can find the online form.

### Or by QR code:

- Scan the QR code to get to the online form.

### Or directly when you place an order:

- When you place an order, provide us with your project address.



## Rebecca Miehle // Customer Management Services

"We assure our customers of a fast response and processing time for complaints and service enquiries."

E-Mail: [service@lockdrives.com](mailto:service@lockdrives.com)

Hotline: +49 7371 9508-22



# Tips and tricks

## EWA 50 / EWA 10 – 16 / EZW 64

### Drive not running:

- Check power supply directly on drive unit.
- Check limit switch setting and adjust if necessary.
- Check motor connection: Tighten down contacts.
- Check motor protection switch, check setting (refer to type plate for nominal current).
- On drives with single-phase motors, the temperature monitoring function (WSK) on the motor may have responded / tripped: Give the motor time to cool down.

### Run across the limit position:

- Check rotational field.
- Check that actuator rings are firmly seated and that limit switches are set correctly.
- Check electrical switch function of switches HI and HII, and if necessary also for additional switches SI and SII.
- Limit switch roller must not be tilted, see assembly instructions.
- Check switch function of control unit.
- You will find an END 20 animation on our homepage.

### Oil loss

- Check assembly position of bleed screw. See p. 4.

## RMA 20

### Drive only rotates in one direction

- Line N swapped with line L.
- WSK coil protection contact activated (standby mode) (see operating instructions).

## LSR 20 / 25 / 35

### No temperature reading on display panel

- Check power supply at ventilation controller.
- Check fuses.
- Check temperature sensor (see operating instructions).
- Temperature sensor connected?

### Position of ventilation does not match parameter in operating menu 1

- Check run-time recording function, and run it if necessary (see operating instructions).

### Ventilation fails to open completely

- Check Max. limit position.

### Ventilation fails to close completely during rainfall

- Check Min. limit position.

### Ventilation fails to close during rainfall

- Check rain sensor.

For other faults, refer to operating instructions.

## LSR 05

### No temperature reading on display panel

- Check power supply at ventilation controller.
- Check fuses.
- Check temperature sensor (see operating instructions).
- Temperature sensor connected?

### Ventilation fails to close during rainfall

- Check rain sensor.

## Rack and pinion units and gear units

- Use the special lubricant specified by the manufacturer.
- Depending on application, lubricate rack at least once a year.
- Tightening torque see operating instructions.

All the work described must be carried out by skilled and trained personnel. Skilled and trained personnel' are people whose education, experience and training (e.g. installation fitters certified by Lock) as well as knowledge of applicable standards and stipulations, work safety specifications and on-site conditions at the company authorize them to be responsible for the safety of the system, to carry out the activities required in each case and, in that process, to identify and to be able to prevent potential hazards.

## Viktor Schopf // Hotline and customer service

“Here, we list the most frequently asked questions (FAQs) that arise on our Service Hotline and during our training courses. We can provide you with training courses on request. And are always delighted to advise you: Tel. no. +49 7371 9508-22.”



## Assembly of EWA 10–EWA 16 // Power drives

Please note the procedure for mounting the gearbox breather.

- 1 You will find the bleed screw (M6 x 10 with 2 mm axial bore) in the rubber gasket under the limit switch cover.
- 2 Establish location of bleed screw on illustration, based on installation position.
- 3 Replace located screw with bleed screw (M6 x 10 with 2 mm axial bore). Reuse existing copper seal.
- 4 Insert replaced screw back in rubber gasket on limit switch compartment.

**Note:**

- For an active water application (e.g. cleaning with high pressure cleaner) our power drives are not intended (see instructions) and must be sufficiently protected (e.g. by a cover)
- Please refer to operating instructions for assembly positions and gearbox breather on the EZW 64.

Our EWA power drives all have the protection class IP 55 according to DIN EN 60529.

That means they:

- Are protected against dust in harmful quantities.
- Have a complete protection against accidental contact.
- Are protected against water jets from any angle.

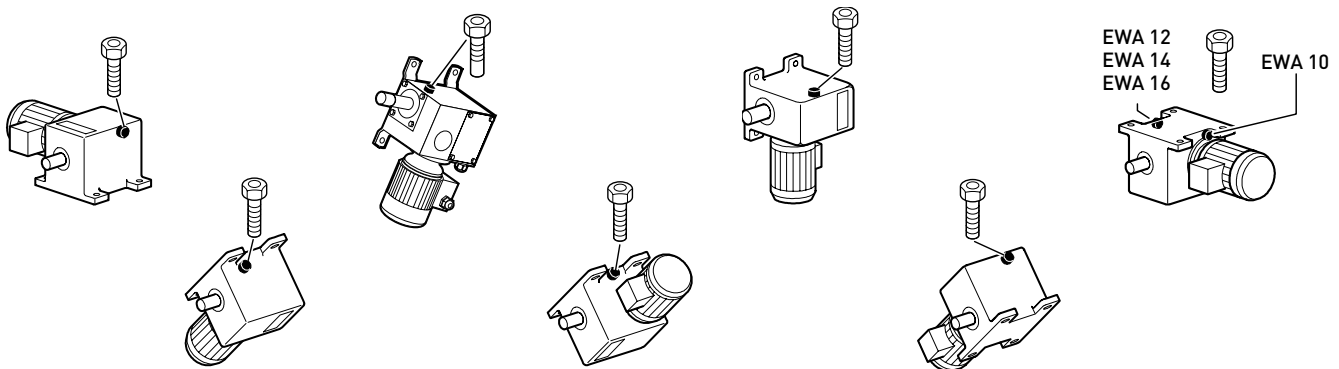
For outdoor use, we recommend the use of the A60 option. This enables long-term functional reliability in protected outdoor areas. Protected outdoor area includes a cover for the electric actuators to keep out splashing water or direct sprinkling (see also instructions).

### Martin Möhrle // Customer Service

“Our EWA power drives can be installed in any desired position. Make the most of this facility to design yourself the perfect drive solution!”

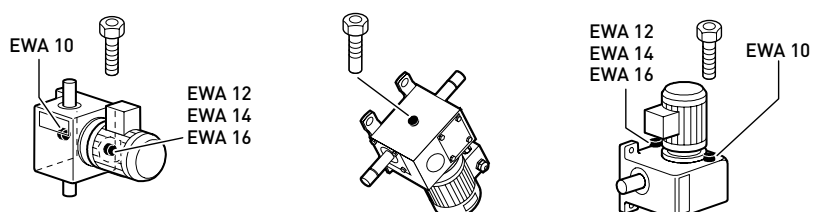


## Installation position & venting position EWA 10-16



## Installation position (only on request) & venting position EWA 10-16

In these installation positions the drives must be protected against water application (e.g. by a cover)

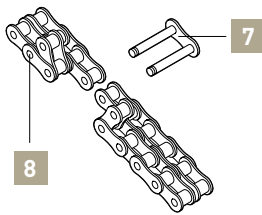


# KKS assembly // Chain coupling

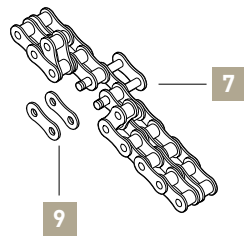


**Assembly A:**

- Rotate coupling halves 1 and 6 until teeth 2 and 5 are arranged identically. Fit retaining ring 3 to end of shaft drive.
- Place double chain 4 around teeth on coupling halves 2 and 5 with ends of chain arranged at top.



**Assembly B**



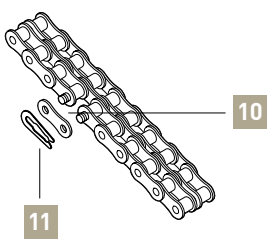
**Assembly C**

**Assembly B:**

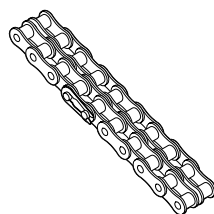
- Fold up end links 8 on the second chain.
- Insert connecting link 7 through end links of the first chain.

**Assembly C:**

- Insert two connecting plates 9 to connecting link.
- Fold end links 8 back down again.
- Insert connecting link 7 right through.



**Assembly D**



**Assembly B-D**

**Assembly D:**

- Slide on connecting plate 10 and engage spring connection 11 in recesses in connecting link 7.

**Maintenance:** Apply light coat of lube oil to chain on an annual basis. Remove surplus oil.

# END 20.20, END 20.40 // Limit switch systems

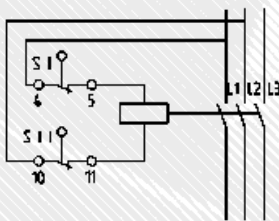
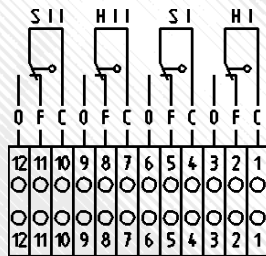
HI (direction of switch rotation I)

HII (direction of switch rotation II)

SI (direction of auxiliary switch rotation I)

SII (direction of auxiliary switch rotation II)

Auxiliary contactor (Emergency Stop switched status)



- Very precise differential gear limit switch for 580 (EWA 10– EWA 14 / EZW 64) and/or 395 (EWA 16) shaft rotations. Through direct meshing of indexing gears in the output shaft, even after many years of operation, the disengagement points do not change.
- High-quality, watertight, precision limit switches guarantee perfect operation, even under the most extreme of conditions.
- Integrated terminal strip for limit switches. Installation of a position repeated with optional plug-in terminal connector.
- Fine setting of disengagement point possible by virtue of big reduction ratio.
- Gold contacts are standard for all voltages.

**Option:**

- END 20.40 auxiliary limit switch that engages Emergency Stop whenever the contactor fails, using an auxiliary contactor mounted on the structure.

→ Video animation on the web at [www.lockdrives.com](http://www.lockdrives.com) or:



## Setting

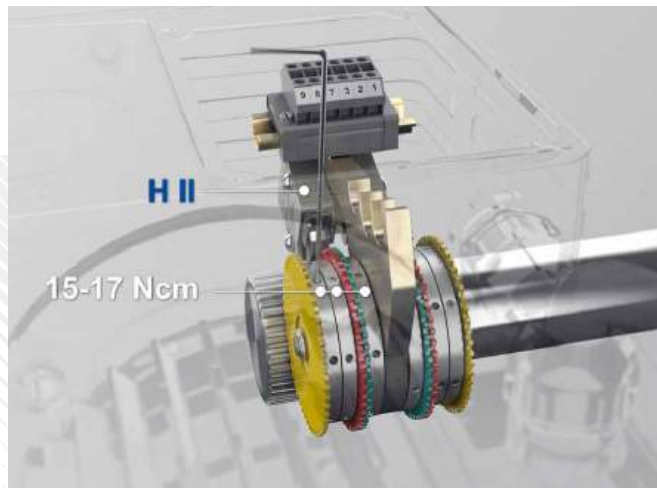


**1** Unscrew, remove and store limit switch cover with gasket.

→ The following switch functions are specified: Switch HI turns off direction of rotation I, while switch HII turns off direction of rotation II.

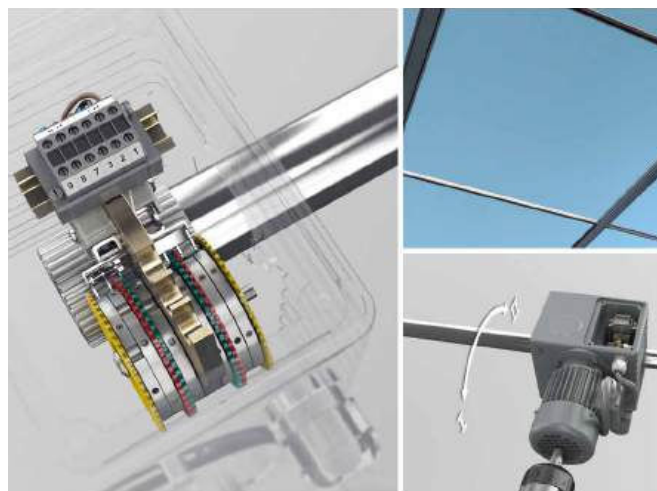
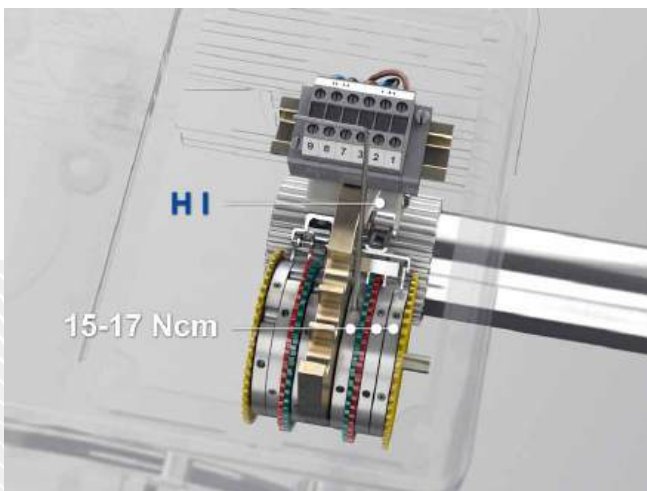


**2** Turn drive on motor shaft using drill and move hex head bit into limit position. During this process, observe direction of rotation of output shaft and compare to arrow showing direction of rotation.



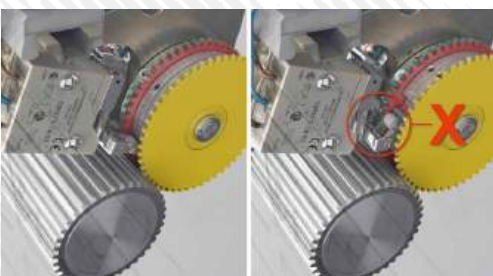
**3** Turn the three actuator rings on the limit switch in the direction of rotation determined until the limit switch roller engages untilted in the indexing groove. If the three indexing grooves are arranged in line, the three screws in the actuator rings will also be arranged in line with one another.

**4** Tighten screws in actuator rings using waf 1.5 hex wrench. An appropriate torque wrench (15-17 Ncm) is available as a Lock accessory.



**5** Turn drive into its other limit position in accordance with Step 2. Also turn the three actuator rings on the other limit switch as described in Step 3. Tighten down screws in the actuator rings in accordance with Step 4.

**6** Test run: Open once, then close once. Close limit switch compartment properly again.



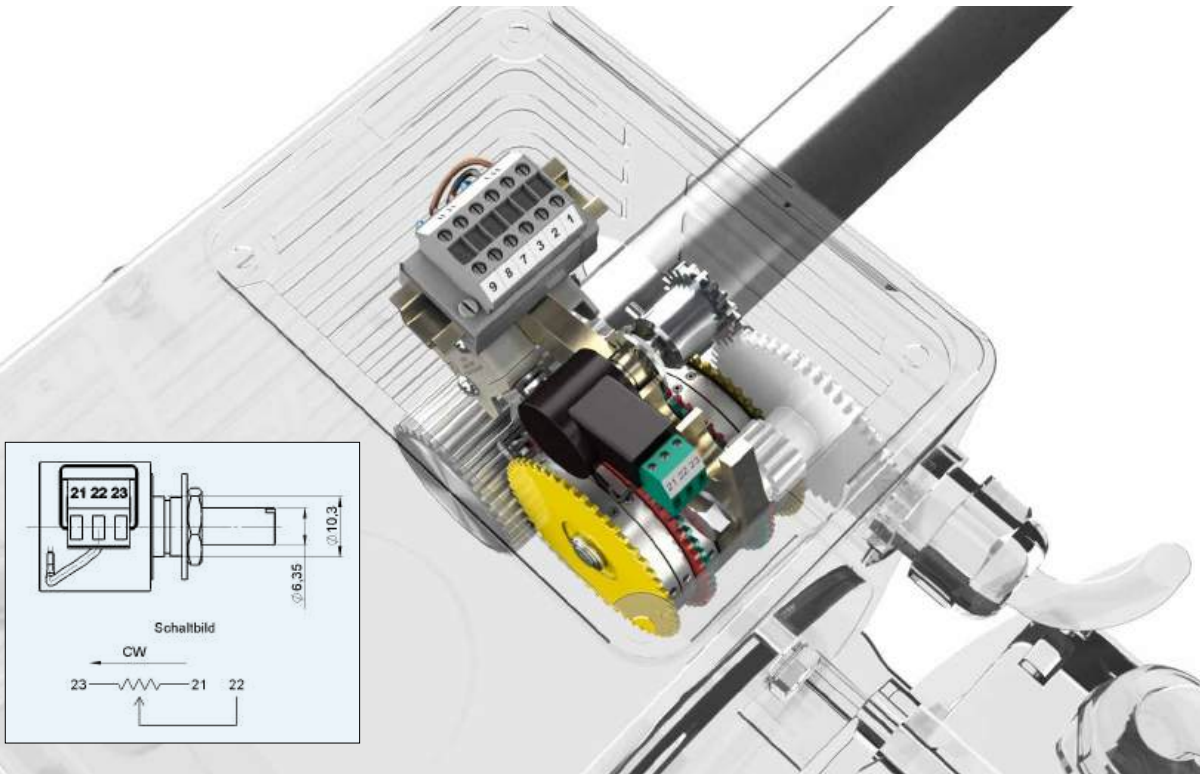
→ X=Override limit switch, tilted condition

**Note:**

→ On version with END 20.40, auxiliary switches SI and SII can also be set by setting main switch HI and HII.

## PAR 06 // Position repeater

### EWA 10–EWA 16 / EZW 64



- The position repeated is pre-installed ex-factory (option). For retrofits, refer to operating instructions EWA 10–EWA 16 / EZW 64. You will find the selection table at PAR → See Chapter 3.
- **Note:** Before setting the position repeater, set the limit switch.
- 1. Move drive unit into a limit position. A limit switch must be actuated.
- 2. Establish direction of rotation of gear by briefly starting up and running the drive unit. Then move drive unit back into its limit position.
- 3. Turn potentiometer into its limit position using the secured gear, in the previously determined direction of rotation.
- 4. Release M3 screws again using a waf 1.5 hex wrench.
- 5. Move gear on potentiometer shaft so that teeth mesh in gear and tighten down both M3 screws to 50 Ncm using a waf 1.5 hex wrench.
- 6. Conduct a test run on the drive unit. While doing so, compare direction of rotation of output shaft and control signal to ensure that there is a match.
- 7. Use voltmeter to check for correct setting and function of position repeater.
- 8. Close limit switch compartment again properly using limit switch cover and gasket.
- **Note:** None of the cables and wires must make contact with the gears.

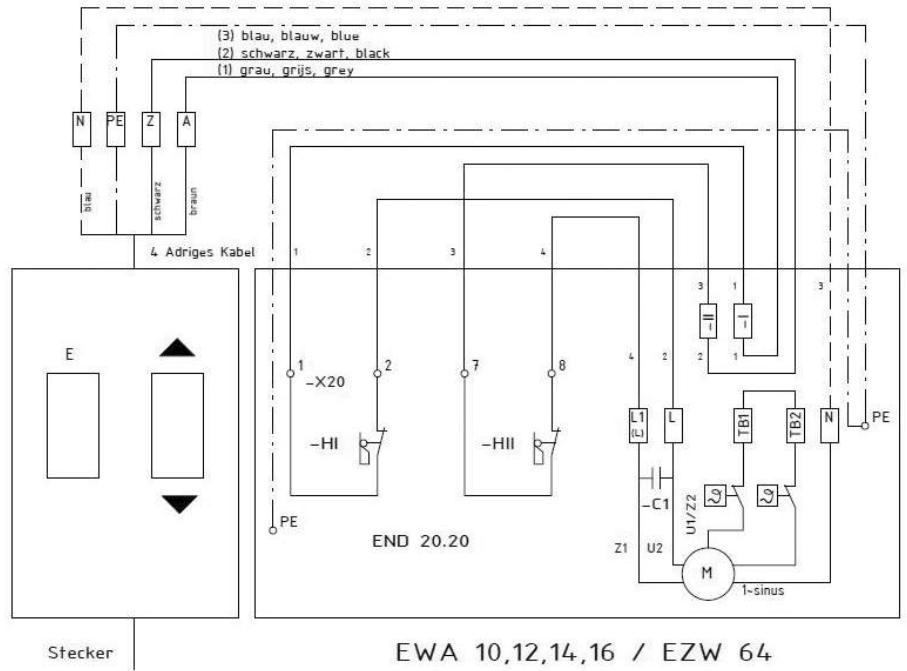
#### Note:

- Rotate the gears and/or the shaft in the opposite direction of rotation to the output shaft.

# EWA, power drive + TST, switch // Circuit diagram, END 20.20 230 V 1~

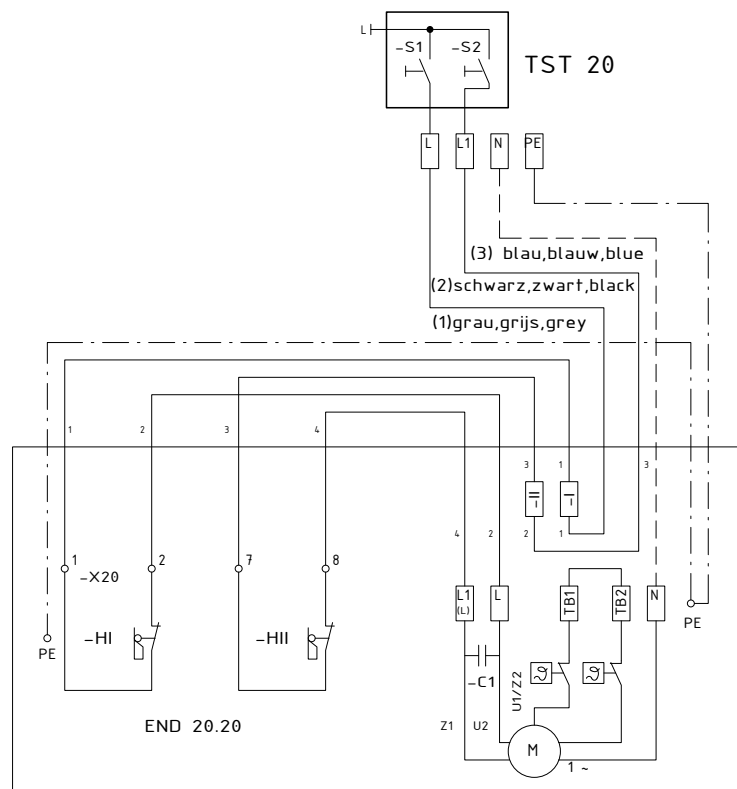
## TST 10 + EWA / EZW

- EWA direction of rotation I (L/grey)
- EWA direction of rotation II (L1/black)
- EZW direction of movement I (L/grey)
- EZW direction of movement II (L1/black)



## TST 20 + EWA / EZW

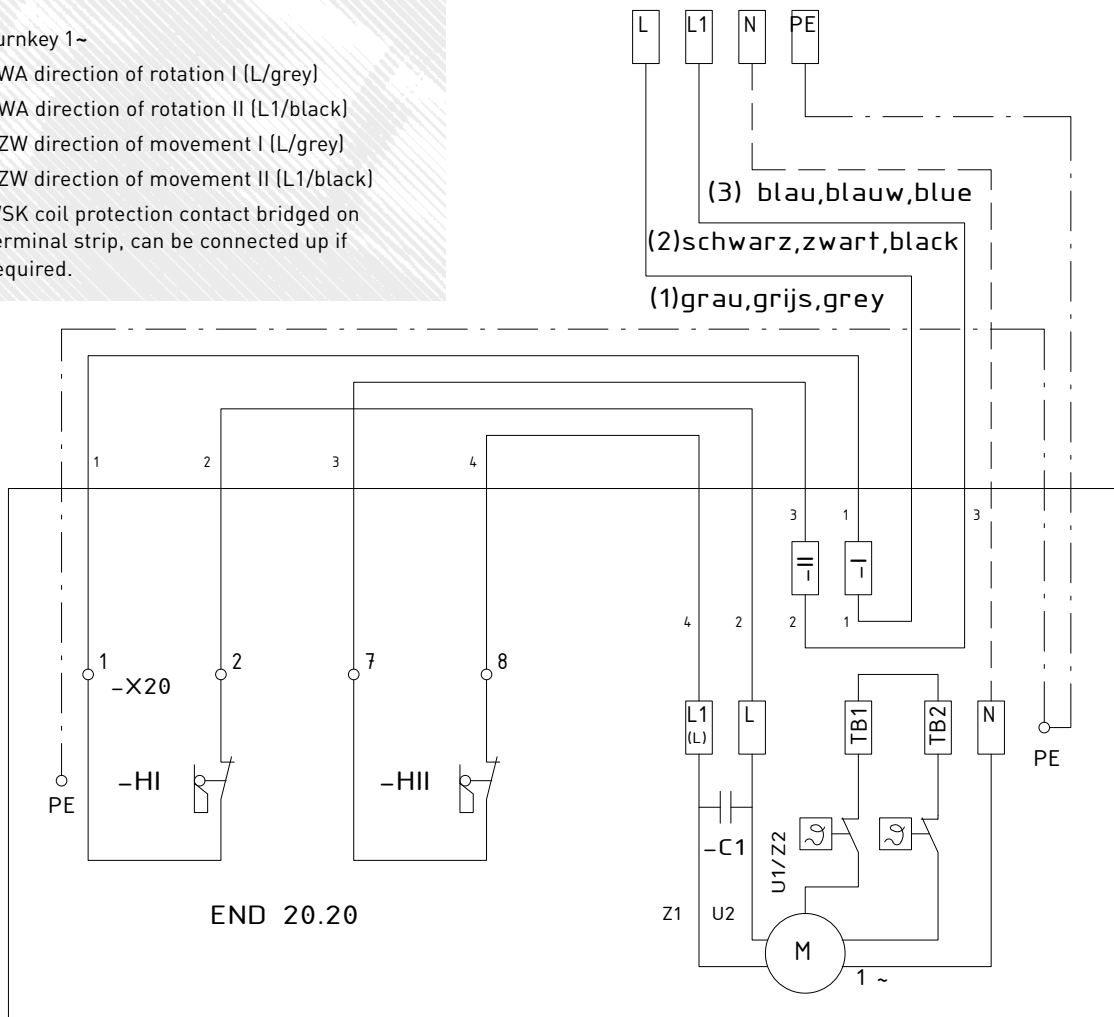
- EWA direction of rotation I (L/grey)
- EWA direction of rotation II (L1/black)
- EZW direction of movement I (L/grey)
- EZW direction of movement II (L1/black)



# EWA, EZW power drive // Circuit diagram, END 20.20 230 V 1~

## EWA 10–EWA 16 / EZW

- Turnkey 1~
- EWA direction of rotation I (L/grey)
- EWA direction of rotation II (L1/black)
- EZW direction of movement I (L/grey)
- EZW direction of movement II (L1/black)
- WSK coil protection contact bridged on terminal strip, can be connected up if required.

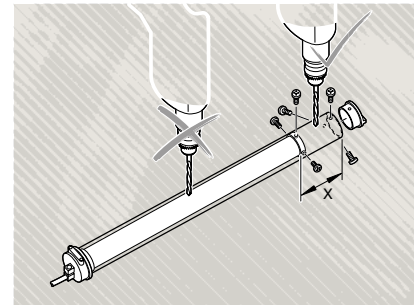
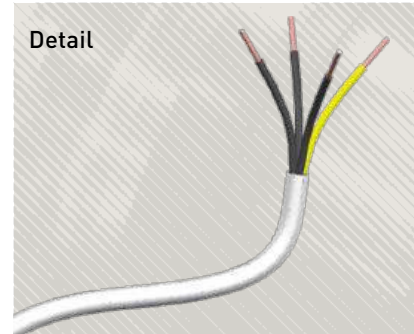


EWA 10,12,14,16 / EZW 64



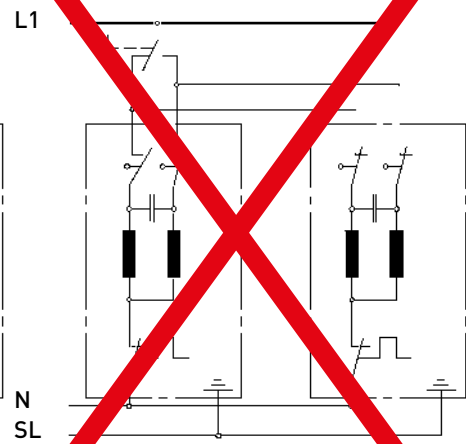
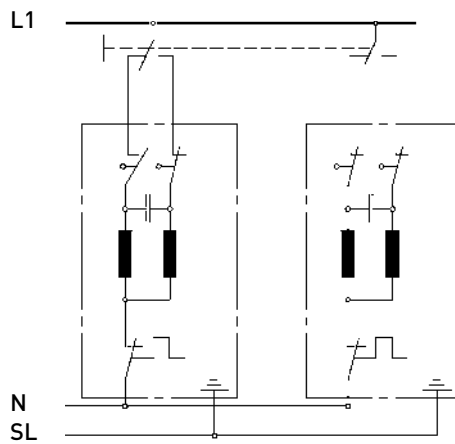
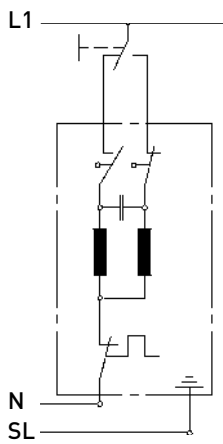
# RMA, tube motor // Circuit diagram

230 V 1~ / 120 V 1~



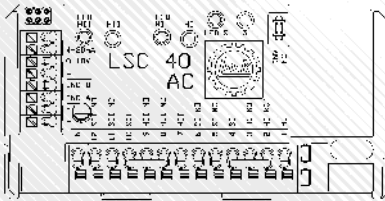
When doing this, note dimension X:

RMA 20.0512/20.1212:  
X = 85 mm/3,35 inch

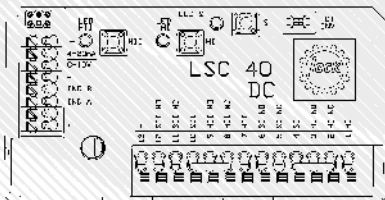


# LSC 40.10 // Control unit

230 VAC version



24 VDC version



- High-precision mechatronic control unit with integrated limit stop disengagement and integrated additional switches.
- High-quality, reliable disengagement at limit positions.
- !!! AC and DC versions !!!
- Precise, fast and simple adjustment without connection to a power supply.

**Option:**

- Integrated LPR position sensor.

**Notices:**

- Please select the LPR option when ordering your EWA because retro-fitting is a costly proposition.
- The control unit is only suitable for protecting the equipment. It must not be used for personal protection purposes.
- **When placing an order, pay particular attention to the correct choice of AC/DC variant.**
- For operation, you need to have a 7-core cable.
- Video animation on the web at [www.lockdrives.com](http://www.lockdrives.com) or:



**Legend:**

- LPR..... Lock Position Return
- AC..... Alternating Current (e.g. 230V)
- DC..... Direct Current (e.g. 24V)
- NO..... Normally Open
- NC..... Normally Closed

- HI..... Switch direction of rotation I
  - HII..... Switch direction of rotation II
  - SI..... Additional switch direction of rotation I
  - SII..... Additional switch direction of rotation II
- The direction of rotation I, II is indicated on the EWA (see control unit setting figure step 3)

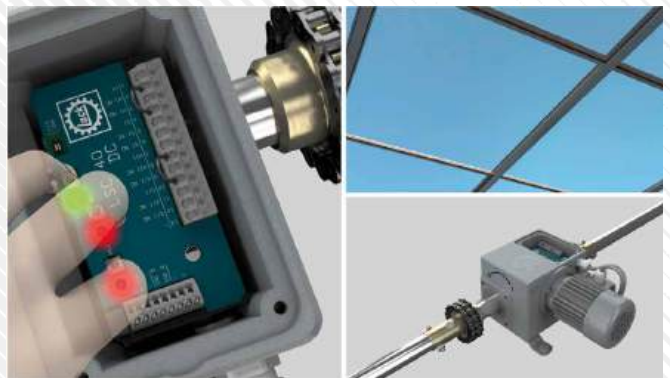
## Setting

Before you start setting the monitoring unit, please read the enclosed instructions through carefully and pay attention to the safety information.

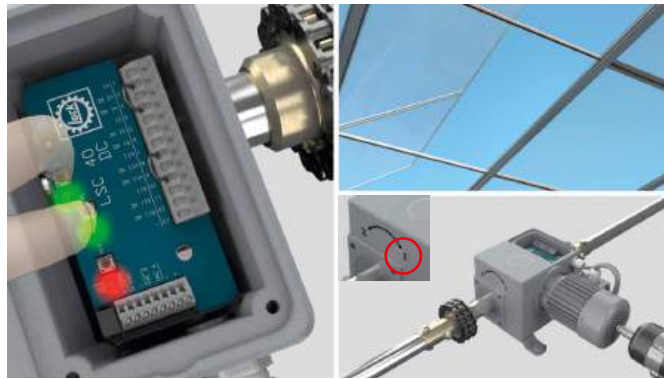


- 1** Screw on the limit switch cover with gasket and store it safely.

- The following switch functions are specified: LEDs HI and HII light up red. Switch HI switches off direction of rotation I. Switch HII switches off direction of rotation II.

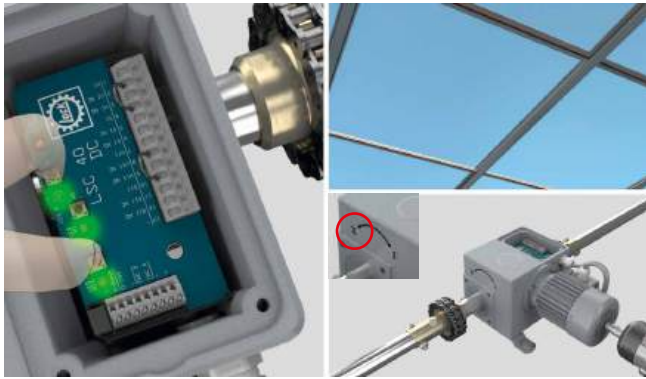


- 2** Reset the setting.  
At the same time, press and hold down buttons S, HI and HII until LEDs HI and HII light up red.

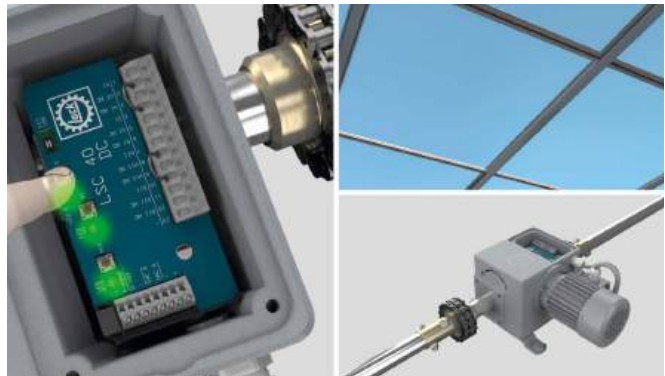


**3** Adjust the limit stops by attaching a drill fitted with the attached hex-head bit to the motor shaft.

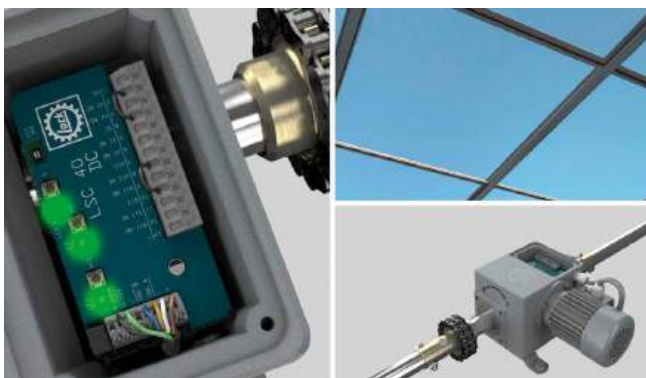
**4** Use the drill to rotate the shaft in direction of rotation 'I' until you have reached the desired limit position (see direction of rotation arrow on housing beside the output shaft). It is also possible to start with the limit position for 'HII' (see Step 5). Once the desired limit position has been reached, save limit position 'HI'. To do this, hold down button 'S' and also press button 'HI' until LED 'HI' changes from red to green.



**5** Once the limit position for 'HI' has been set, rotate the drive in the opposite direction, as described above, into limit position 'II' (see direction of rotation arrow beside the output shaft). Once the desired limit position has been reached, you can save limit position 'HII'. To do this, press and hold down the 'S' button while also pressing the 'HII' button until LED 'HII' changes from red to green.



**6** Then check whether the limit positions have been set. To do this, press the 'S' button: All three LEDs (LED 'HI' / LED 'HII' / LED 'S') must light up green. If they do not, repeat the setting procedure for limit positions, as described above.

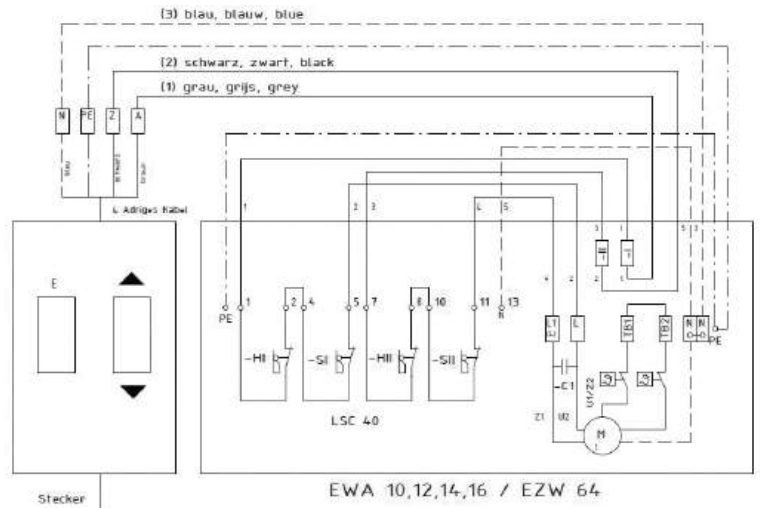


**7** Connect up the drive to the power supply unit. Fit the cover and the rubber gasket using the 4 screws and the 4 copper washers provided. Then connect up the electrical power supply and start up the unit (test run) in accordance with the instructions in the EWA Operating Manual (Electrical connection, Chapter 6 ff. and Initial start-up, Chapter 6.5)

# EWA, power drive + TST, switch // Circuit diagram, LSC 40 230 V 1~

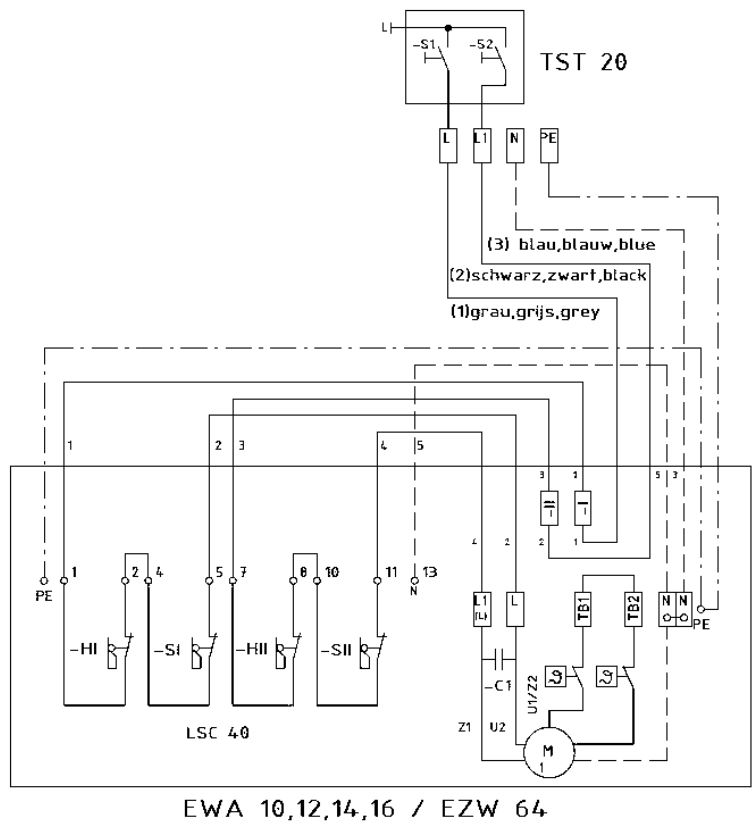
## TST 10 + EWA / EZW

- EWA Direction of rotation I (L/grey)
- EWA Direction of rotation II (L1/black)
- EZW Direction of movement I (L/grey)
- EZW Direction of movement II (L1/black)



## TST 20 + EWA / EZW

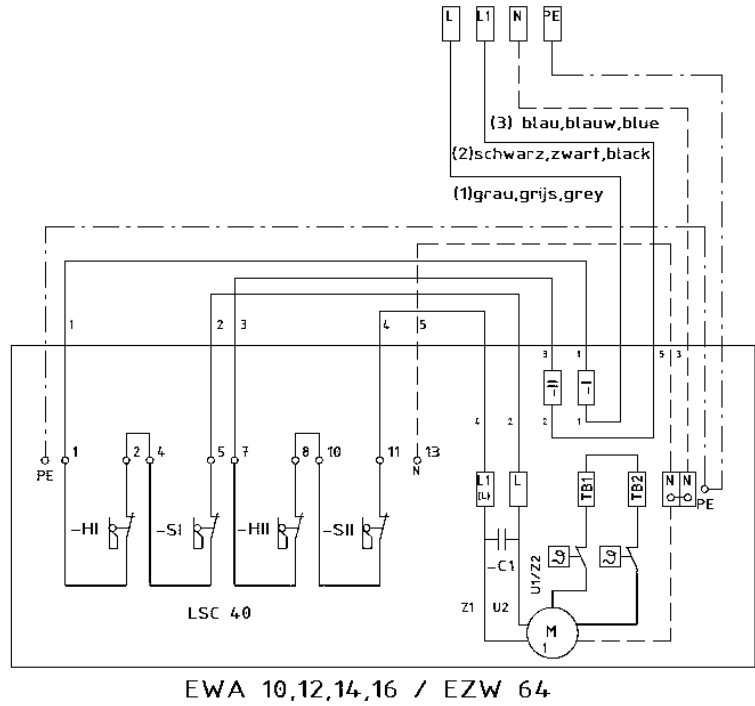
- EWA Direction of rotation I (L/grey)
- EWA Direction of rotation II (L1/black)
- EZW Direction of movement I (L/grey)
- EZW Direction of movement II (L1/black)



# EWA, EZW power drive // Circuit diagram, LSC 40 230 V 1 ~

## EWA / EZW

- EWA Direction of rotation I (L/grey)
- EWA Direction of rotation II (L1/black)
- EZW Direction of movement I (L/grey)
- EZW Direction of movement II (L1/black)

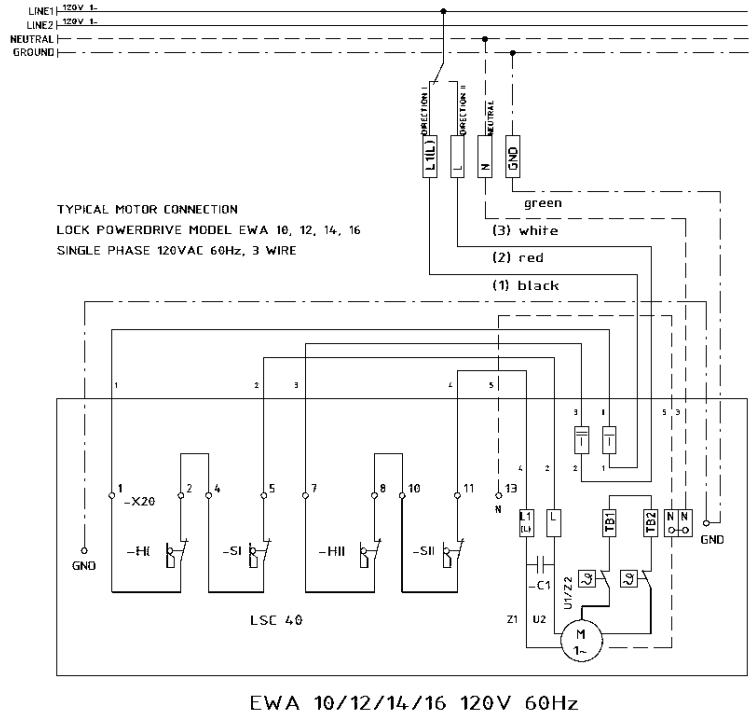


# EWA, EZW power drive // Circuit diagram, LSC 40

## 120 V 1 ~ / 240 V 1 ~

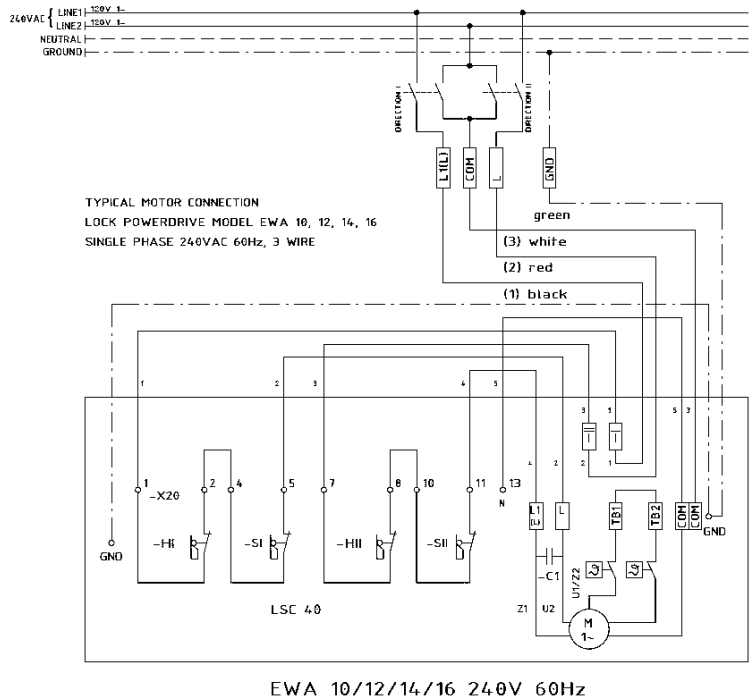
### EWA, EZW power drive 120 V 1 ~

- EWA Direction of rotation I (L/black)
- EWA Direction of rotation II (L1/red)



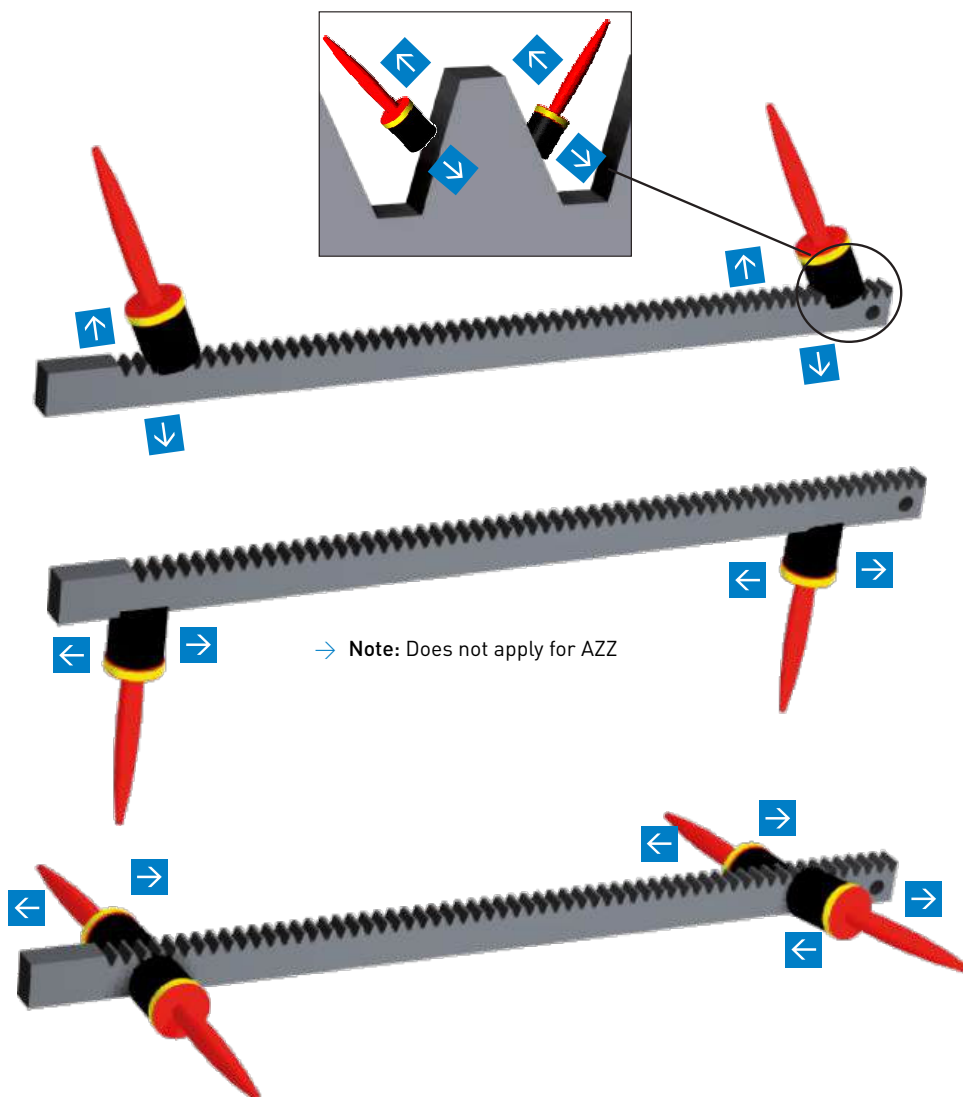
### EWA, EZW power drive 240 V 1 ~

- EWA Direction of rotation I (L/black)
- EWA Direction of rotation II (L1/red)



# Racks // Maintenance

- The use of these special lubricants substantially extends the service life of your equipment see **Chapter 10 Accessories**.
- **Note:** In all cases, disconnect / isolate the power supply before starting any maintenance work.
- All indications in the operating instructions must be followed.
- **Note:** Grease rack at least once a year using special grade of Lock grease.



Version	Type no.	Rack grease for:	m [kg]
LUB 73.2006	82120.2006	EZZ 64, UBL, LZZ, HZZ	15,0
LUB 73.2011	82120.2011	EZZ 64, UBL, LZZ, HZZ	0,1
LUB 73.2030	82120.2030	EZZ 64, UBL, LZZ, HZZ	0,4
LUB 20.3002	82120.3002	ZSZ, AZZ, EZZ 55, SZZ	1,0
LUB 20.3012	82120.3012	ZSZ, AZZ, EZZ 55, SZZ	0,1





LOCK BEWEGT // LOCK MOVES

# Information

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## Information

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Abbreviations // Units 2

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Conversion factors 3

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Terms & Conditions of Business 4

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# Abbreviations // Units

Abbreviation	Unit	Designation
B	[m]	Width
B <sub>I</sub>	[m]	Rack lever arm
B <sub>K</sub>	[m]	Panel width
B <sub>P</sub>	[m]	Support width
B <sub>L</sub>	[m]	Width of ventilation wing
D <sub>∅</sub>	[m]	Cable diameter
DC	[A]	DC current
DR	[mm]	Drum diameter
DIN		Deutsches Inst. für Normung
ED	[%]	Engagement period
f	[Hz]	Frequency
F	[N]	Force
F <sub>e</sub>	[mm], [-]	Pane size
F <sub>1</sub>	[N]	Force per unit
F <sub>D</sub>	[N]	Compression force
F <sub>H</sub>	[N]	Manual crank force
F <sub>S</sub>	[kg]	Cable force
F <sub>Z</sub>	[N]	Tensile force
G	[kg/m <sup>2</sup> ]	Density
G <sub>G</sub>	[kg/m <sup>2</sup> ]	Glass weight
G <sub>R</sub>	[kg/m <sup>2</sup> ]	Frame weight
G <sub>S</sub>	[kg/m <sup>2</sup> ]	Snow weight
G <sub>W</sub>	[kg/m <sup>2</sup> ]	Wind load
H	[mm], [m]	Stroke
H <sub>G</sub>	[mm]	Gable height, roof height
H <sub>K</sub>	[mm/n]	Stroke per crank revolution
H <sub>L</sub>	[mm]	Ventilation height
H <sub>T</sub>	[mm]	Gutter spacing
H <sub>W</sub>	[mm/n]	Stroke per shaft revolution
i	[-]	Gear unit ratio
I	[A]	Current strength
IP	[-]	Type of protection

Unit	Long form
[A]	Ampere
[Hz]	Hertz
[kg]	Kilogram
[kW]	Kilowatt
[m]	Metre
[m <sup>2</sup> ]	Square meter
[1/min], [rpm]	Revolutions per minute
[mm]	Millimetre

Abbreviation	Unit	Designation
K	[-]	Factor (allowance)
K <sub>B</sub>	[-]	Actuation factor
K <sub>S</sub>	[-]	Safety factor
K <sub>R</sub>	[-]	Friction factor
K <sub>W</sub>	[-]	Engagement angle factor
L	[m]	Length
L <sub>L</sub>	[m]	Ventilation length
L <sub>F</sub>	[-], [m]	Length of binder field
m	[kg]	Dimensions, weight
n	[1/min], [rpm]	Revolutions per min
n max	[1/min], [rpm]	Max. speed
P	[kW]	Performance
r	[mm]	Pinion radius
R	[Ω]	Electrical resistance
SH	[-]	Self-locking action
SW	[mm]	Width across flats
T	[Nm]	Torque
T1	[Nm]	Input torque per unit
T max	[Nm]	Max. torque (per side)
U	[V]	Voltage
v	[mm/min]	Stroke speed
V	[l]	Volume
We **		Shaft type
Z	[-]	Number of teeth
ZMh	[mm]	Additional rack stroke
α	[°]	Roof angle, roof inclination
β	[°]	Opening angle
γ	[°]	Angle of attack
φ	[°], [mm]	Torsion, stroke difference
~	[-]	Number of phases (electric motor)
1 ~	[-]	Single-phase motor (AC)
3 ~	[-]	Three-phase motor (3-phase AC)

Unit	Long form
[mm/n]	Millimetres per revolution
[N]	Newton
[Nm]	Newton metre
[s]	Second
[V]	Volt
[Ω]	Ohm
["]	Inch
[°]	Degree

## Conversion factors

SI (metric) units → Inch-Pound units				
Measure	From SI (metric) unit	To Inch-Pound unit	Multiply by	Exact factor
Area	cm <sup>2</sup>	in. <sup>2</sup>	0.155 000 304	–
Area	m <sup>2</sup>	ft <sup>2</sup>	10.763 910	–
Area	ha	acre	2.471 044	–
Force, thrust, drag	N	lbf	0.224 808 9	–
Length	km	mile	0.621 371 2	–
Length	m	yd	1.093 613	–
Length	m	ft	3.280 84	–
Length	cm	in.	0.393 701	–
Length	mm	in.	0.039 370 1	–
Mass	kg	lb	2.204 62	–
Mass	g	oz	0.035 374	–
Mass per area	kg/m <sup>2</sup>	lb/ft <sup>2</sup>	0.204 816	–
Mass per length	kg/m	lb/ft	0.671 969	–
Torque	Nm	lbf·in. (= in.-lb)	8.850 748	–
Torque	Nm	lbf·ft	0.737 562	–
Power	kW	hp (550 ft·lbf/s)	1.341 022	–
Temperature	°C	°F	$t [°F] = t [°C] * 1.8 + 32$	✓
Volume	m <sup>3</sup>	ft <sup>3</sup>	35.314 667	–
Volume	L	gal	0.264 172	–

Inch-Pound units → SI (metric) units				
Measure	From Inch-Pound unit	To SI (metric) unit	Multiply by	Exact factor
Area	in. <sup>2</sup>	cm <sup>2</sup>	6.451 6	✓
Area	ft <sup>2</sup>	m <sup>2</sup>	0.092 903 04	✓
Area	acre	ha	0.404 687 3	–
Force, thrust, drag	lbf	N	4.448 222	–
Length	mile	km	1.609 344	✓
Length	yd	m	0.914 4	–
Length	ft	m	0.304 8	✓
Length	in.	cm	2,54	✓
Length	in.	mm	25,4	✓
Mass	lb	kg	0.453 592 4	–
Mass	oz	g	28.349 52	–
Mass per area	lb/ft <sup>2</sup>	kg/m <sup>2</sup>	4.882 428	–
Mass per length	lb/ft	kg/m	1.488 164	–
Torque	lbf·in. (= in.-lb)	Nm	0.112 984 8	–
Torque	lbf·ft	Nm	1.355 818	–
Power	hp (550 ft·lbf/s)	kW	0.745 699 9	–
Temperature	°F	°C	$t [°C] = (t [°F] - 32) / 1.8$	✓
Volume	ft <sup>3</sup>	m <sup>3</sup>	0.028 316 85	–
Volume	gal	L	3.785 412	–

# General terms of supply and payment

**Delivery and payment terms & conditions of Lock Antriebs-technik GmbH, Ertingen/Germany, valid for companies placing orders with their head office locations inside the European Union or Switzerland**

## § 1 – Scope, form

- 1.1. These general terms and conditions of sale apply to all business transactions with our customers („Purchasers“). These general terms & conditions of sale only apply if the purchaser is a businessman (section 14, German Civil Code [BGB]), a legal person under public law or a special fund under public law.
- 1.2. In particular, these general terms & conditions of sale apply to contracts relating to the sale and/or delivery of movable items („Goods“) irrespective of whether we manufacture those goods ourselves or purchase them from sub-contractors (sections 433, 651 of the German Civil Code [BGB]). Unless otherwise agreed, these general terms & conditions of sale apply at the time the purchaser places an order in accordance with the currently valid version of the general agreement, i.e. the one most recently communicated to him in text format, as well as to future contracts of the same nature without the need for us to refer to them in each individual case.
- 1.3. Our general terms & conditions of sale apply without exception. Deviating, opposing or supplementary general terms & conditions of business of the purchaser shall only become part of the contract and applicable if we have expressly consented to them. This requirement for consent applies in all cases, for example even if we execute a delivery to the purchaser without reservation and in full knowledge of the general terms & conditions of business of the purchaser.
- 1.4. Individual agreements made in isolated cases with the purchaser (including subsidiary agreements, supplements and amendments) always take precedence over these general terms & conditions of sale. For the content of agreements of this nature, subject to counterevidence, a written contract and/or our written confirmation is authoritative.
- 1.5. Significant legal explanations and announcements by the purchaser in relation to the contract (e.g. the setting of deadlines, notification of defects, withdrawal from contract or reduction), must be submitted in written or in text form (e.g. letter, e-mail, fax). Legislative formal requirements and other forms of verification, in particular in relation to doubts raised about the legitimacy of the declaring party are not affected.
- 1.6. References to the applicability of legislative stipulations shall only be for the purposes of clarification. Even without clarification of this nature, the legal stipulations shall therefore apply, unless these are amended or expressly excluded in these general terms & conditions of sale.

## § 2 – Conclusion of contract

- 2.1. Our quotations are without obligation and are subject to change without notice. This also applies if we have provided the purchaser with catalogues, technical documentation (including drawings, diagrams, calculations, computations, references to DIN standards), other product descriptions or documents - including in electronic form - to which we retain title and copyright.
- 2.2. The ordering of goods by the purchaser is viewed as a contractually binding offer. Unless something else arises from the order, we are entitled to accept this contractual offer within 3 weeks of its arrival with us.
- 2.3. Acceptance can either be announced in writing (e.g. in the form of an order confirmation) or by delivery of the goods to the purchaser.

## § 3 – Delivery lead time and arrears over delivery

- 3.1. The delivery lead time is agreed on an individual basis and/or is announced by us when the order is accepted. If this is not the case, the delivery lead time is then approximately 3 weeks from the date of conclusion of contract.
- 3.2. In cases where we are unable to meet delivery commitments for reasons over which we have no control (non-availability of service), we shall inform the purchaser to this effect immediately and, at the same time, shall notify the purchaser of the anticipated new delivery date. If the service is still not available within the new delivery lead time, we are entitled to withdraw from the contract either wholly or in part. In such cases, we would immediately reimburse the purchaser for any payment that may already have been made against this. An example of non-availability of a service in this context applies in particular to late deliveries to ourselves by our suppliers, in cases where we have concluded a congruent hedging transaction, where neither we nor our suppliers are responsible or in individual cases where we are not obliged to source materials.
- 3.3. The onset of a delay in delivery is defined in legislative provisions. In all cases, a reminder must be obtained from the purchaser. If we go into arrears over delivery, the purchaser is entitled to demand compensation for this delay on the basis of liquidated damages. For every completed calendar week, those shall amount to 0.5%, but not more than a maximum of 5% of the value of the goods delivered in arrears. We are at liberty to prove that no damage occurred whatsoever, or that any damage that may have occurred was far less serious than the lump-sum claim can justify.
- 3.4. This does not affect the rights of the purchaser in accordance with Section 8 of these general terms and conditions of sale nor our legal rights, in particular in cases that exclude any obligation to provide indemnification (e.g. impossibility of providing the service or unacceptability of the service and/or its subsequent performance).

## § 4 – Delivery, transfer of risk, inspection and approval, default of acceptance

- 4.1. Goods are supplied ex-stock, regardless of where the place of delivery and of any subsequent performance required may be. On demand and at the expense of the buyer, the goods may be dispatched to a different destination (sale by delivery to a place other than the place of performance). Unless otherwise agreed, we are entitled to determine the type of shipping (in particular the transport company, dispatch route, packaging) ourselves.
- 4.2. The risk of accidental loss and of incidental deterioration of the goods is transferred by no later than the handover to the purchaser. However, in relation to a sale by delivery to a place other than the place of performance, the risk of accidental loss and of incidental deterioration of the goods is transferred and the risk of late delivery passes to the freight forwarder, the haulage contractor or any other defined person or institution appointed to expedite the goods. In cases where inspection and approval

has been agreed, this is the defining point for the transfer of risk. The legislative stipulations of the German law applicable to works and services (Werkvertragsrecht) shall apply accordingly. Transfer and/or inspection and approval apply in the same way if the purchaser is in arrears over acceptance of goods.

- 4.3. If the purchaser falls into arrears over acceptance of goods, or fails to participate in a joint action or if our delivery is delayed for other reasons for which the purchaser is responsible, we are entitled to demand compensation for any damages including additional expenditure we may incur (e.g. storage costs). For this, we apply a lump-sum compensation figure amounting to EUR 50.00 per calendar day, beginning with the delivery due date or - if no due date has been defined - with notification of readiness to dispatch the goods.
- 4.4. Verification of more extensive damages and our legal claims (in particular the reimbursement of additional expenditure, commensurate compensation, termination) remain unaffected; however, the lump-sum figure shall be added to any more extensive financial claims. The purchaser is at liberty to prove that no damage occurred whatsoever, or that any damage that may have occurred was far less serious than the lump-sum claim can justify.

## § 5 – Prices and payment terms

- 5.1. Unless otherwise agreed in individual cases, our current prices apply at the time of conclusion of contract, and apply ex-stock, plus VAT at the currently applicable rate.
- 5.2. In relation to a sale by delivery to a place other than the place of performance (Section 4 (1)), the purchaser must pay the transport costs ex-stock and the costs of any transport insurance cover that the purchaser may wish to take out. Except in individual cases where we bill for the transport costs actually incurred, a lump-sum figure for transport (which does not include the cost of transport insurance) amounting to 12 % of the net value of the goods is deemed to have been agreed. The purchaser must meet the cost of any customs duties, fees, taxes and other government deductions.
- 5.3. The purchase price is due and must be paid within 14 days of the invoice issue date and delivery and/or inspection and acceptance of the goods. We are however entitled at any time, even in the context of an ongoing business relationship, not to deliver goods until payment has been made in advance, either in full or in part. We shall declare any such proviso by no later than the date of order confirmation.
- 5.4. When the aforementioned payment period elapses, the purchaser is then in arrears. Interest at the legally applicable rate of interest shall be charged to the purchase price for the duration of the period of arrears. We reserve the right to claim for more extensive damages as a result of any payment arrears. Our entitlement to interest counting from the due date is not affected in relation to our dealings with merchants (Section 353 HGB).
- 5.5. The purchaser is only entitled to rights to set-off and to rights of retention in cases where his claim is upheld in a court of law or is undisputed. With regard to defects in delivery, the opposing rights of the purchaser, in particular those defined in Section 7 clause 2 of these general terms & conditions of sale shall not be affected.
- 5.6. If it becomes evident after conclusion of contract (e.g. filing for bankruptcy) that our claim for payment of the purchase price is in jeopardy due to an inability to pay on the part of the purchaser, we are entitled in accordance with the legal stipulations governing the right to refuse performance and - where applicable after setting a period of notice - to withdraw from the contract (Section 321 BGB). With regard to contracts for the manufacture of unwarranted items (bespoke production), we can announce our withdrawal from contract immediately; this does not affect the legislative provisions governing the expendable nature of the deadline.

## § 6 – Retention of title

- 6.1. Until such time as all accounts receivable and contingent liabilities are paid from the purchase contract and from an ongoing business relationship (secured receivables), we reserve the right to retain title to the goods sold.
- 6.2. Until full and final payment has been received in respect of the secured receivables relating to the goods covered by our retention of title, the goods cannot be pledged to third parties nor can they be entailed as collateral. The purchaser is required to notify us immediately and in writing if he has filed for bankruptcy or of any accesses by third parties (e.g. garnishments) to the goods belonging to us.
- 6.3. In the event of contractually non-compliant conduct on the part of the purchaser, in particular with regard to non-payment of the purchase price due, we are entitled, in accordance with legislative provisions, to withdraw from the contract and/or to demand return of the goods to which we still retain title. Demanding the return of goods does not signify a simultaneous declaration to withdraw from the contract; we are instead only entitled to demand return of the goods, and to reserve the right to withdraw from the contract. Should the purchaser fail to pay the purchase price due, we can only apply these rights if we previously and unsuccessfully set the purchaser an appropriate period of time to make payment, or legally expendable in accordance with legislative provisions.
- 6.4. Until this right is revoked, the purchaser is entitled in the course of normal business and in accordance with (c) below to sell the goods over which title is retained to others, and/or to process them. In such cases, the following provisions apply.
  - (a) The retention of title extends to the processing, mixing or linking of our goods in downstream products, up to their full value, where we are considered to be the manufacturer of those goods. If our title to goods remains current after processing, mixing or linking with the goods of third parties, we obtain co-ownership to an amount proportional to the invoice value of the processed, mixed or connected goods. Furthermore, the same applies to the resultant product as for all goods supplied on the basis of retained title.
  - (b) In accordance with the previous paragraph, and by way of collateral, the purchaser shall assign to us wholly or to the value of any co-ownership portion we may hold that arises from the onward sale or the goods or products and corresponding receivables due from third parties. We accept this assignment. The obligations of the purchased name in para. 2 also apply in relation to the receivables assigned.
  - (c) The purchaser, along with ourselves, remains entitled to obtain payment against any such receivable. We pledge to the purchaser that we shall not call in the receivable provided that the purchaser meets his payment obligations to us, that there is no impairment to his level of performance and that we do not apply our rights to retention of title in accordance with Para. 3. If this case should arise, we can demand that the purchaser notifies us of the receivables assigned and of their debtors, provides us with all details needed for us to call them in, releases the applicable documents and notifies the debtors (third parties) of this assignment of title. Furthermore, we are entitled in such cases to revoke the entitlement of the purchaser to sell and process the goods over which title is retained.
  - (d) If the achievable value of these securities exceeds the value of our receivables by more than 10%, we shall release collateral of our choice when called upon to do so by the purchaser.

## § 7 – Defect claims from the purchaser

- 7.1. Legislative stipulations apply to the rights of the purchaser in relation to material and legal defects (including incorrect delivery, short delivery, unprofessional assembly or inaccurate assembly/installation instructions), unless otherwise stipulated in the following text. The special stipulations governing final delivery of unprocessed goods to a consumer remain unaffected in all cases, even if they are then processed further by that consumer (supplier redress in accordance with Section 478 BGB). Claims resulting from supplier recourse are exempted if the defective goods were further processed by the purchaser or by a different businessman. e.g. through installation in a different product.
- 7.2. The basis of our liability for defects is founded primarily upon the agreement made in relation to the properties of the goods. All product descriptions that form part of an individual contract (in particular in catalogues or on the homepage of our website) and that are in the public domain are considered as an agreement in relation to the properties of the goods.
- 7.3. If agreement has not been reached about these properties, an evaluation based on the legislative ruling should determine whether a defect does or does not exist (Section 434 (1) pages 2 and 3 BGB). However, we accept no liability in relation to any public statements that the manufacturer or other third parties may make (e.g. advertising statements).
- 7.4. The defect-related claims of the purchaser presuppose that the purchaser has fulfilled his legal duties to investigate, notify and reject defects (Sections 377, 381 HGB). In the event of a defect being detected at the time of delivery, an inspection or at some later point in time, we must be notified immediately and in writing. In all cases, visible defects must be notified to us in writing within (numeral) working days of delivery, and concealed defects discovered in a subsequent inspection must be notified to us within the same number of days of their discovery. If the purchaser fails to carry out a proper inspection and/or to report defects correctly, we cannot be held legally liable for any defect not reported to us, and/or not reported in a timely or a proper manner.
- 7.5. If the item supplied is defective, we can first choose whether to engage in subsequent performance to remedy the defect (rectification of defects) or to deliver an item that is free of defects (replacement delivery). We retain our right, subject to the legislative prerequisites, to refuse to engage in subsequent performance.
- 7.6. We are entitled to make any subsequent performance owed by ourselves dependent upon the purchaser paying the purchase price that is due. However, the purchaser is entitled to retain a proportion of the purchase price that is commensurate with the impact on value of the defect.
- 7.7. The purchaser is obliged to accord us the time and opportunity we need to deliver the subsequent performance we owe, in particular by providing us for inspection purposes with the goods that are deemed to be defective. In the case of replacement delivery, the purchaser is obliged by legislative provisions to return the defective item to us. Subsequent performance

does not include removal of the defective item, nor reinstallation, if we were not originally obliged to perform the installation work.

- 7.8. The expenditure required for inspection and subsequent performance, especially the costs of transport, travel, labour and materials as well as any costs for removal and installation shall be borne by or be reimbursed by ourselves in accordance with legislative stipulations if a defect is actually found to exist. Failing this, we can demand reimbursement of costs incurred by ourselves as a result of receiving an unwarranted demand for remedial action (in particular the costs of inspection and transport), unless the absence of a defect was not detectable to the purchaser.
- 7.9. In urgent cases, e.g. if operational safety is jeopardised, or to prevent disproportionate levels of damage, the purchaser has the right to remedy the defect himself and to demand from us reimbursement of the expenditure required in objective terms. We must be notified immediately, and preferably in advance, of any personal initiative of this nature. The right to carry out work on this personal initiative basis does not apply if we might be entitled to refuse to carry out subsequent performance ourselves in accordance with legislative stipulations.
- 7.10. If subsequent performance has failed, or if an appropriate period of time for subsequent performance to be carried out by the purchaser has elapsed without success, or if it can be waived in accordance with legislative stipulations, the purchaser can withdraw from the purchase contract, or can reduce the purchase price. However, the presence of a minor defect does not constitute legitimate grounds for withdrawing from a contract.
- 7.11. Claims by the purchaser for compensation and/or the reimbursement of unnecessary expenditure also only apply in relation to defects in accordance with Section 8 and are otherwise excluded.
- 7.12. The statutory warranty period of 12 months applies to all of our products.

## § 8 – Other forms of liability

- 8.1. Unless nothing else emerges from these general terms & conditions of sale, and this includes the following provisions, we are liable in accordance with legislative stipulations for any violation of contractual and extra-contractual obligations.
- 8.2. We are liable to pay compensation - arising from whichever legal ground - on the basis of fault-based liability in relation to deliberate intent and gross negligence. In relation to simple negligence, and subject to a less stringent scale of liability, we are liable in accordance with legislative stipulations (e.g. for exercising due diligence in our own affairs), but only in respect of
  - (a) damages arising from injury to life, limb or health,
  - (b) damages arising from a not insignificant violation of an important contractual obligation (an obligation which can only be satisfied through fulfilment of proper execution of the contract and where the other party to contract can trust and depend upon the responsible party to contract complying with this at all times); in such cases, our liability is however restricted to replacement of the item when the damage was predictable and typical.
- 8.3. The restrictions on liability arising from Para. 2 also apply to violations of obligations by or in favour of people for whose conduct we are responsible in accordance with legislative stipulations. These do not apply if we wilfully fail to disclose a defect or have accepted a guarantee for the properties of goods and are liable under product liability legislation in respect of claims by the purchaser.
- 8.4. The purchaser can only withdraw from or terminate this contract in relation to the violation of an obligation that does not take the form of a defect if we are responsible for that violation of an obligation. The purchaser has no free right of termination (in particular in accordance with Sections 651, 649 BGB). In all other respects, legislative prerequisites and legal consequences apply.

## § 9 – Statute of limitations

- 9.1. At variance from Section 438 (1) no. 3 BGB the general statute of limitations applicable to claims arising from material and legal defects is one year from the date of delivery. In cases where an acceptance test has been agreed, the statute of limitations applies from the date of that acceptance test.
- 9.2. However, if the goods take the form of a built structure or an object that was typically used for a built structure and that caused it to develop defects (building material), the statute of limitations is defined by legislation as 5 years from the date of delivery (Section 438 (1) no. 2 BGB). Further legislative special regulations for the statute of limitation also remain unaffected (in particular Section 438 (1) no. 1, para. 3, Sections 444, 445b BGB).
- 9.3. The aforementioned statutes of limitation for the German Law on the Sale of Goods (Kaufrecht) also apply to contractual and extra-contractual compensation claims from the purchaser that are founded upon a defect in the goods, unless the application of a regular legal statute of limitations (Sections 195, 199 BGB) in individual cases would give rise to a shorter statute of limitations. However, compensation claims made by the purchaser in accordance with Section 8 (2) sentence 1 and sentence 2(a) as well as in accordance with product liability legislation shall lapse exclusively in line with the statutes of limitation defined in applicable legislation.

## § 10 – Place of execution, court of jurisdiction and applicable law, language of contract

- 10.1. The place of execution for all obligations arising from this contract is our head office location.
- 10.2. If the purchaser is a businessman, a legal entity under public law or a special fund under public law, then the court of jurisdiction for any disputes that may arise, including actions on a bill of exchange, is the one responsible at the head office location of our company. However, we are also entitled to take legal action in the court responsible for the head office location of the purchaser.
- 10.3. The United Nations Convention on the International Sale of Goods (CISG) dated 11.04.1980 (CISG) is not applicable here.
- 10.4. The application of German Law is agreed between ourselves and the purchaser, with the exception of Section 10 (3) and this exempts any conflict that might exist with legal provisions from other legislatures. However, the prerequisites and effects of the retention of title agreed in clause 6 are subject to the law at the storage location of the item(s) involved, provided that the choice of law favouring German Law is inadmissible or ineffective.
- 10.5. German is the language of this contract. In cases where the meaning of the German text may differ from a foreign language translation of the text of this contract, or where terms & conditions of delivery and payment might vary, the meaning of the German text shall take precedence.

## § 11 – Binding nature of this contract

- 11.1. The contract also remains binding in cases where individual points of its terms & conditions or individual figures in the terms & conditions of delivery may become legally ineffective. The gap caused by elimination of an ineffective provision must be filled in a manner fully reflecting the original aim and spirit of the contract.

Dated: 08/2019

# General terms of supply and payment

## Delivery and payment terms & conditions of Lock Antriebstechnik GmbH, Ertingen/Germany, valid for customers placing orders with their head office location outside the European Union or Switzerland

### § 1 – Scope, form

- 1.1. These terms and conditions of sale apply to all business transactions with our customers („Purchasers“). These general terms & conditions of sale only apply if the purchaser is a businessman (section 14, BGB), a legal person under public law or a special fund under public law.
- 1.2. In particular, these terms & conditions of purchase apply to contracts relating to the sale and/or delivery of movable items („Goods“) irrespective of whether we manufacture those goods ourselves or purchase them from sub-contractors (sections 433, 651 of the German Civil Code [BGB]). Unless otherwise agreed, these general terms & conditions of sale apply at the time the purchaser places an order in accordance with the currently valid version of the general agreement, i.e. the one most recently communicated to him in text format, as well as to future contracts of the same nature without the need for us to refer to them in each individual case.
- 1.3. Our general terms & conditions of sale apply without exception. Deviating, opposing or supplementary general terms & conditions of business of the purchaser shall only become part of the contract and applicable if we have expressly consented to them. This requirement for consent applies in all cases. This requirement for consent applies in all cases, for example even if we execute a delivery to the purchaser without reservation and in full knowledge of the general terms & conditions of business of the purchaser.
- 1.4. Individual agreements made in isolated cases with the purchaser (including subsidiary agreements, supplements and amendments) always take precedence over these general terms & conditions of sale. For the content of agreements of this nature, subject to counterevidence, a written contract and/or our written confirmation is authoritative.
- 1.5. Significant legal explanations and announcements by the purchaser in relation to the contract (e.g. the setting of deadlines, notification of defects, withdrawal from contract or reduction), must be submitted in written or in text form (e.g. letter, e-mail, fax). Legislative formal requirements and other forms of verification, in particular in relation to doubts raised about the legitimacy of the declaring party are not affected.
- 1.6. References to the applicability of legislative stipulations shall only be for the purposes of clarification. Even without clarification of this nature, the legal stipulations shall therefore apply, unless these are amended or expressly excluded in these general terms & conditions of sale.

### § 2 – Conclusion of contract

- 2.1. Our quotations are without obligation and are subject to change without notice. This also applies if we have provided the purchaser with catalogues, technical documentation (including drawings, diagrams, calculations, computations, references to DIN standards), other product descriptions or documents – including in electronic form – to which we retain title and copyright.
- 2.2. The ordering of goods by the purchaser is viewed as a contractually binding offer. Unless something else arises from the order, we are entitled to accept this contractual offer within 3 weeks of its arrival with us.
- 2.3. Acceptance can either be announced in writing (e.g. in the form of an order confirmation) or by delivery of the goods to the purchaser.

### § 3 – Delivery lead time and arrears over delivery

- 3.1. The delivery lead time is agreed on an individual basis and/or is announced by us when the order is accepted. If this is not the case, the delivery lead time is then approximately 3 weeks from the date of conclusion of contract.
- 3.2. In cases where we are unable to meet delivery commitments for reasons over which we have no control (non-availability of service), we shall inform the purchaser to this effect immediately and, at the same time, shall notify the purchaser of the anticipated new delivery date. If the service is also not available within the new delivery lead time, we are entitled to withdraw from the contract wholly or in part. In such cases, we would then immediately reimburse any reciprocal action provided by the purchaser. An example of non-availability of a service in this context applies in particular to late deliveries to ourselves by our suppliers, in cases where we have concluded a congruent hedging transaction, where neither we nor our suppliers are culpable or in isolated cases where we are not obliged to source materials.
- 3.3. The onset of our arrears in delivery is defined in accordance with legislative provisions. In all cases, a reminder must be obtained from the purchaser. If we go into arrears over delivery, the purchaser is entitled to demand compensation for this delay on the basis of liquidated damages. For every completed calendar week, those shall amount to 0.5%, but not more than a maximum of 5% of the value of the goods delivered in arrears. We are at liberty to prove that no damage occurred whatsoever, or that any damage that may have occurred was far less serious than the lump-sum claim can justify.
- 3.4. This does not affect the rights of the purchaser in accordance with Section 8 of these general terms and conditions of sale nor our legal rights, in particular in cases that exclude any obligation to provide indemnification (e.g. impossibility of providing the service or unacceptability of the service and/or its subsequent performance).

### § 4 – Delivery, transfer of risk, inspection and approval, default of acceptance

- 4.1. Goods are supplied ex-stock, regardless of where the place of delivery and of any subsequent performance required may be. On demand and at the expense of the buyer, the goods may be dispatched to a different destination (sale by delivery to a place other than the place of performance). Unless otherwise agreed, we are entitled to determine the type of shipping (in particular the transport company, dispatch route, packaging) ourselves.
- 4.2. The risk of accidental loss and of incidental deterioration of the goods is transferred by no later than the handover to the purchaser. However, in relation to a sale by delivery to a place other than the place of performance, the risk of accidental loss and of incidental deterioration of the goods is transferred and the risk of late delivery passes to the freight forwarder,

the haulage contractor or any other defined person or institution appointed to expedite the goods. In cases where inspection and approval has been agreed, this is the defining point for the transfer of risk. The legislative stipulations of the German law applicable to works and services [Werkvertragsrecht] shall apply accordingly. Transfer and/or inspection and approval apply in the same way if the purchaser is in arrears over acceptance of goods.

- 4.3. If the purchaser falls into arrears over acceptance of goods, or fails to participate in a joint action or if our delivery is delayed for other reasons for which the purchaser is responsible, we are entitled to demand compensation for any damages including additional expenditure we may incur (e.g. storage costs). For this, we apply a lump-sum compensation figure amounting to EUR 50.00 per calendar day, beginning with the delivery due date or - if no due date has been defined - with notification of readiness to dispatch the goods.
- 4.4. Verification of more extensive damages and our legal claims (in particular the reimbursement of additional expenditure, commensurate compensation, termination) remain unaffected; however, the lump-sum figure shall be added to any more extensive financial claims. The purchaser is at liberty to prove that no damage occurred whatsoever, or that any damage that may have occurred was far less serious than the lump-sum claim can justify.

## § 5 – Section 5 Prices and payment terms

- 5.1. Unless otherwise agreed in individual cases, our current prices apply at the time of conclusion of contract, and apply ex-stock, plus VAT at the currently applicable rate.
- 5.2. In relation to a sale by delivery to a place other than the place of performance (Section 4 (1)), the purchaser must pay the transport costs ex-stock and the costs of any transport insurance cover that the purchaser may wish to take out. Except in individual cases where we bill for the transport costs actually incurred, a lump-sum figure for transport (which does not include the cost of transport insurance) amounting to 12 % of the net value of the goods is deemed to have been agreed. The purchaser must meet the cost of any customs duties, fees, taxes and other government deductions.
- 5.3. The purchase price is due and must be paid within 14 days of the invoice issue date and delivery and/or inspection and acceptance of the goods. We are however entitled at any time, even in the context of an ongoing business relationship, not to deliver goods until payment has been made in advance, either in full or in part. We shall declare any such proviso by no later than the date of order confirmation.
- 5.4. When the aforementioned payment period elapses, the purchaser is then in arrears. Interest at the legally applicable rate of interest shall be charged to the purchase price for the duration of the period of arrears. We reserve the right to claim for more extensive damages as a result of any payment arrears. Our entitlement to interest counting from the due date is not affected in relation to our dealings with merchants (Section 353 HGB).

- 5.5. The purchaser is only entitled to rights to set-off and to rights of retention in cases where his claim is upheld in a court of law or is undisputed. With regard to defects in delivery, the opposing rights of the purchaser, in particular those defined in Section 7 (6) clause 2 of these general terms & conditions of sale shall not be affected.
- 5.6. If it becomes evident after conclusion of contract (e.g. filing for bankruptcy) that our claim for payment of the purchase price is in jeopardy due to an inability to pay on the part of the purchaser, we are entitled in accordance with the legal stipulations governing the right to refuse performance and - where applicable after setting a period of notice - to withdraw from the contract (Section 321 BGB). With regard to contracts for the manufacture of unwarranted items (bespoke production), we can announce our withdrawal from contract immediately; this does not affect the legislative provisions governing the expendable nature of the deadline.

## § 6 – Retention of title

- 6.1. Until such time as all accounts receivable and contingent liabilities are paid from the purchase contract and from an ongoing business relationship (secured receivables), we reserve the right to retain title to the goods sold.
- 6.2. Until full and final payment has been received in respect of the secured receivables relating to the goods covered by our retention of title, the goods cannot be pledged to third parties nor can they be entailed as collateral. The purchaser is required to notify us immediately and in writing if he has filed for bankruptcy or of any accesses by third parties (e.g. garnishments) to the goods belonging to us.
- 6.3. In the event of contractually non-compliant conduct on the part of the purchaser, in particular with regard to non-payment of the purchase price due, we are entitled, in accordance with legislative provisions, to withdraw from the contract and/or to demand return of the goods to which we still retain title. Demanding the return of goods does not signify a simultaneous declaration to withdraw from the contract; we are instead only entitled to demand return of the goods, and to reserve the right to withdraw from the contract. Should the purchaser fail to pay the purchase price due, we can only apply these rights if we previously and unsuccessfully set the purchaser an appropriate period of time to make payment, or legally expendable in accordance with legislative provisions.
- 6.4. Until this right is revoked, the purchaser is entitled in the course of normal business and in accordance with (c) below to sell the goods over which title is retained to others, and/or to process them. In such cases, the following provisions apply.
- (a) The retention of title extends to the processing, mixing or connection of our goods in downstream products, up to their full value, where we are deemed to be the manufacturer of those goods. If our title to goods remains current after processing, mixing or connection with the goods of third parties, we obtain co-ownership to an amount proportional to the invoice value of the processed, mixed or connected goods. Furthermore, the same applies to the resultant product as for all goods supplied on the basis of retained title.
- (b) In accordance with the previous paragraph, and by way of collateral, the purchaser shall assign to us wholly or to the value of any co-ownership portion we may hold that arises from the onward sale or the goods or products and corresponding receivables due from third parties. We accept this assignment. The obligations of the purchased name in para. 2 also apply in relation to the receivables assigned.
- (c) The purchaser, along with ourselves, remains entitled to obtain payment against any such receivable. We pledge to the purchaser that we shall not call in the receivable provided that the purchaser meets his payment obligations to us, that there is no impairment to his level of performance and that we do not apply our rights to retention of title in accordance with Para. 3. If this case should arise, we can demand that the purchaser notifies us of the receivables assigned and of their debtors, provides us with all details needed for us to call them in, releases the applicable documents and notifies the debtors (third parties) of this assignment of title. Furthermore, we are entitled in such cases to revoke the entitlement of the purchaser to sell and process the goods over which title is retained.

- (d) If the achievable value of these securities exceeds the value of our receivables by more than 10%, we shall release collateral of our choice when called upon to do so by the purchaser.

## § 7 – Defect claims from the purchaser

- 7.1. Legislative stipulations apply to the rights of the purchaser in relation to material and legal defects (including incorrect delivery, short delivery, unprofessional assembly or inaccurate assembly/installation instructions), unless otherwise stipulated in the following text. The special stipulations governing final delivery of unprocessed goods to a consumer remain unaffected in all cases, even if they are then processed further by that consumer (supplier redress in accordance with Section 478 BGB). Our claims resulting from supplier recourse also apply if the goods were further processed before they were sold to another consumer by us or by one of our customers, e.g. through installation in a different product.
- 7.2. The basis of our liability for defects is founded primarily upon the agreement made in relation to the properties of the goods. All product descriptions that form part of an individual contract (in particular in catalogues or on the homepage of our website) and that are in the public domain are considered as an agreement in relation to the properties of the goods.
- 7.3. (3) If agreement has not been reached about these properties, an evaluation based on the legislative ruling should determine whether a defect does or does not exist (Section 434 (1) pages 2 and 3 BGB). However, we accept no liability in relation to any public statements that the manufacturer or other third parties may make (e.g. advertising statements).
- 7.4. The defect-related claims of the purchaser presuppose that the purchaser has fulfilled his legal duties to investigate, notify and reject defects (Sections 377, 381 HGB). In the event of a defect being detected at the time of delivery, an inspection or at some later point in time, we must be notified immediately and in writing. In all cases, visible defects must be notified to us in writing within (numeral) working days of delivery, and concealed defects discovered in a subsequent inspection must be notified to us within the same number of days of their discovery. If the purchaser fails to carry out a proper inspection and/or to report defects correctly, we cannot be held legally liable for any defect not reported to us, and/or not reported in a timely or a proper manner.
- 7.5. If the item supplied is defective, we can first choose whether to engage in subsequent performance to remedy the defect (rectification of defects) or to deliver an item that is free of defects (replacement delivery). We retain our right, subject to the legislative prerequisites, to refuse to engage in subsequent performance.
- 7.6. We are entitled to make any subsequent performance owed by ourselves dependent upon the purchaser paying the purchase price that is due. However, the purchaser is entitled to retain a proportion of the purchase price that is commensurate with the impact on value of the defect.
- 7.7. The purchaser is obliged to accord us the time and opportunity we need to deliver the subsequent performance we owe, in particular by providing us for inspection purposes with the goods that are deemed to be defective. In the case of replacement

delivery, the purchaser is obliged by legislative provisions to return the defective item to us. Subsequent performance does not include removal of the defective item, nor reinstallation, if we were not originally obliged to perform the installation work.

- 7.8. The expenditure required for inspection and subsequent performance, especially the costs of transport, travel, labour and materials as well as any costs for removal and installation shall be borne by or be reimbursed by ourselves in accordance with legislative stipulations if a defect is actually found to exist. Failing this, we can demand reimbursement of costs incurred by ourselves as a result of receiving an unwarranted demand for remedial action (in particular the costs of inspection and transport), unless the absence of a defect was not detectable to the purchaser.
- 7.9. In urgent cases, e.g. if operational safety is jeopardised, or to prevent disproportionate levels of damage, the purchaser has the right to remedy the defect himself and to demand from us reimbursement of the expenditure required in objective terms. We must be notified immediately, and preferably in advance, of any personal initiative of this nature. The right to carry out work on this personal initiative basis does not apply if we might be entitled to refuse to carry out subsequent performance ourselves in accordance with legislative stipulations.
- 7.10. If subsequent performance has failed, or if an appropriate period of time for subsequent performance to be carried out by the purchaser has elapsed without success, or if it can be waived in accordance with legislative stipulations, the purchaser can withdraw from the purchase contract, or can reduce the purchase price. However, the presence of a minor defect does not constitute legitimate grounds for withdrawing from a contract.
- 7.11. Claims by the purchaser for compensation and/or the reimbursement of unnecessary expenditure also only apply in relation to defects in accordance with Section 8 and are otherwise excluded.
- 7.12. The statutory warranty period of 12 months applies to all of our products.

## § 8 – Other forms of liability

- 8.1. Unless nothing else emerges from these general terms & conditions of sale, and this includes the following provisions, we are liable in accordance with legislative stipulations for any violation of contractual and extra-contractual obligations.
- 8.2. We are liable to pay compensation – arising from whichever legal ground – on the basis of fault-based liability in relation to deliberate intent and gross negligence. In relation to simple negligence, and subject to a less stringent scale of liability, we are liable in accordance with legislative stipulations (e.g. for exercising due diligence in our own affairs), but only in respect of
- (a) damages arising from injury to life, limb or health,
  - (b) damages arising from a not insignificant violation of an important contractual obligation [an obligation which can only be satisfied through fulfilment of proper execution of the contract and where the other party to contract can trust and depend upon the responsible party to contract complying with this at all times]; in such cases, our liability is however restricted to replacement of the item when the damage was predictable and typical.
- 8.3. The restrictions on liability arising from Para. 2 also apply to violations of obligations by or in favour of people for whose conduct we are responsible in accordance with legislative stipulations. These do not apply if we wilfully fail to disclose a defect or have accepted a guarantee for the properties of goods and are liable under product liability legislation in respect of claims by the purchaser.
- 8.4. The purchaser can only withdraw from or terminate this contract in relation to the violation of an obligation that does not take the form of a defect if we are responsible for that violation of an obligation. The purchaser has no free right of termination (in particular in accordance with Sections 651, 649 BGB). In all other respects, legislative prerequisites and legal consequences apply.

## § 9 – Section 9 Statute of limitations

- 9.1. At variance from Section 438 (1) no. 3 BGB the general statute of limitations applicable to claims arising from material and legal defects is one year from the date of delivery. In cases where an acceptance test has been agreed, the statute of limitations applies from the date of that acceptance test.
- 9.2. However, if the goods take the form of a built structure or an object that was typically used for a built structure and that caused it to develop defects (building material), the statute of limitations is defined by legislation as 5 years from the date of delivery (Section 438 (1) no. 2 BGB). Further legislative special regulations for the statute of limitation also remain unaffected (in particular Section 438 (1) no. 1, para. 3, Sections 444, 445b BGB).
- 9.3. The aforementioned statutes of limitation for the German Law on the Sale of Goods (Kaufrecht) also apply to contractual and extra-contractual compensation claims from the purchaser that are founded upon a defect in the goods, unless the application of a regular legal statute of limitations (Sections 195, 199 BGB) in individual cases would give rise to a shorter statute of limitations. However, compensation claims made by the purchaser in accordance with Section 8 (2) sentence 1 and sentence 2(a) as well as in accordance with product liability legislation shall lapse exclusively in line with the statutes of limitation defined in applicable legislation.

## § 10 – Place of execution, court of jurisdiction and applicable law, language of contract

- 10.1. The place of execution for all obligations arising from this contract is our head office location.
- 10.2. The United Nations Convention on the International Sale of Goods (CISG) dated 11.04.1980 (CISG) is not applicable here.
- 10.3. The application of German Law is agreed between ourselves and the customer, with the exception of Section 10 (3) and this exempts any conflict that might exist with legal provisions from other legislatures. However, the prerequisites and effects of the retention of title agreed in Section 6 are subject to the law at the storage location of the item(s) involved, provided that the choice of law favouring German Law is inadmissible or ineffective.
- 10.4. German is the language of this contract. In cases where the meaning of the German text may differ from a foreign language translation of the text of this contract, or where contractual and performance-related terms & conditions might vary, the meaning of the German text shall take precedence.

## § 11 – Binding nature of this contract

- 11.1. The contract also remains binding in cases where individual points of its terms & conditions or individual figures in the terms & conditions of delivery may become legally ineffective. The gap caused by elimination of an ineffective provision must be filled in a manner fully reflecting the original aim and spirit of the contract.

## § 12 – Agreement about the court of jurisdiction

- 12.1. All disputes or claims that arise from or in connection with this contract, including disputes about its validity, infringement, dissolution or its being rendered null and void shall be settled in accordance with German Law before the District Court (Landgericht) in Ulm.
- 12.2. German Law applies, which exempts the UN Convention on the International Sale of Goods and any legal conflicts associated with the provisions of a different legislature.

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