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**ALS –
Electromechanical
Screw Rams**

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Electromechanical Screw Rams



The “ALS” Electromechanical Screw Ram is a universal drive system for a wide range of linear reciprocating motion applications. With a choice of 3 sizes, a modular design and the

- “ALS” compact version and
- “ALSR” cylinder version

it is possible to obtain the optimal design features to suit your specific requirements. The system is particularly ideal for single drive applications on linear motion projects, however...

Description of the product

The “ALS” consists of a fully encapsulated housing unit with a rugged axial and radial bearing arrangement and life-time lubrication. The housing is surface-treated and can be converted into a swiveling version by means of 2 pivots. The standard version has a self-locking acme screw with a load-carrying nut and a drive shaft for mounting a suitable gear motor. The “ALSR” version consists of the “ALS” standard version plus a fully enclosed shaft and piston structure, with the tubes protected against corrosion. Countless motor options are possible using a choice of mounting flanges or bell housings and couplings. A ball screw with various nut assemblies can also be used instead of the acme screw.

To complete the product, there is a large selection of accessories such as stroke limiting devices, anti-turn devices and a choice of head types.

Design features

- Maximal dynamic axial force of model size
25 = 25 kN, **50** = 50 kN, **100** = 100 kN
- Lifting speeds from 0.5 m/min to 10 m/min depending on the load and cyclic duration factor
- Self-locking and non-reversing
- Load holding and constant pressure at every stop position
- Mounting of every flange-fitting gear motor of solid or hollow shaft design
- High-grade grease and encapsulated design for life-time lubrication
- Standard or custom stroke lengths based on tables of buckling values and speeds
- Special screw diameters and pitches
- Large selection of accessories
- Standard stroke lengths “ALSR” for size
25 100/200/300/400/500 mm
50 200/400/600/800/1000 mm
100 300/600/900/1200/1500 mm
- or lengths to order
- Electronic synchronization of several individual drives
- Precision positioning

Use of “ALS” drives as cost-effective solutions, such as:

- Feed drives for horizontal or vertical stroke movements on machines and systems.
- Linear adjustment movements within automotive handling and automation systems and in building control systems.
- Drives in waterway lock systems and sewage plants, where the encapsulated “ALSR” version in particular protects the drive against contamination.
- The same feature, as a good advantage, can also be used in the food industry and for all outdoor applications.
- Applications in aerospace, crane building, the paper industry, etc.



Acme and ball screw versions

The acme screw version is used for low lifting speeds (up to approx. 3 m/min) and low cyclic duration factors (approx. 20%/1 hour) with a lubrication provisions. The ball screw version is used for very frequent linear movements, high lifting speeds and exceptional operating conditions.



Anti-turn device

An integrated anti-turn device can be provided with the shaft tube on the "ALSR" version if it is not included as a structural or design feature of the screw.



Choice of head types

The piston of the "ALSR" version can be equipped with a variety of head types. Plain heads, load plates, clevis heads and an articulated rod end according to DIN are available as standard (see dimension tables).



Inductive lift limit stop

If required, the "ALSR" can be equipped with an inductive lift limit stop. This picture shows an inductive proximity switch of programmable DC design (10-55 V – IP 67) as a plug-in component (cable with connector).



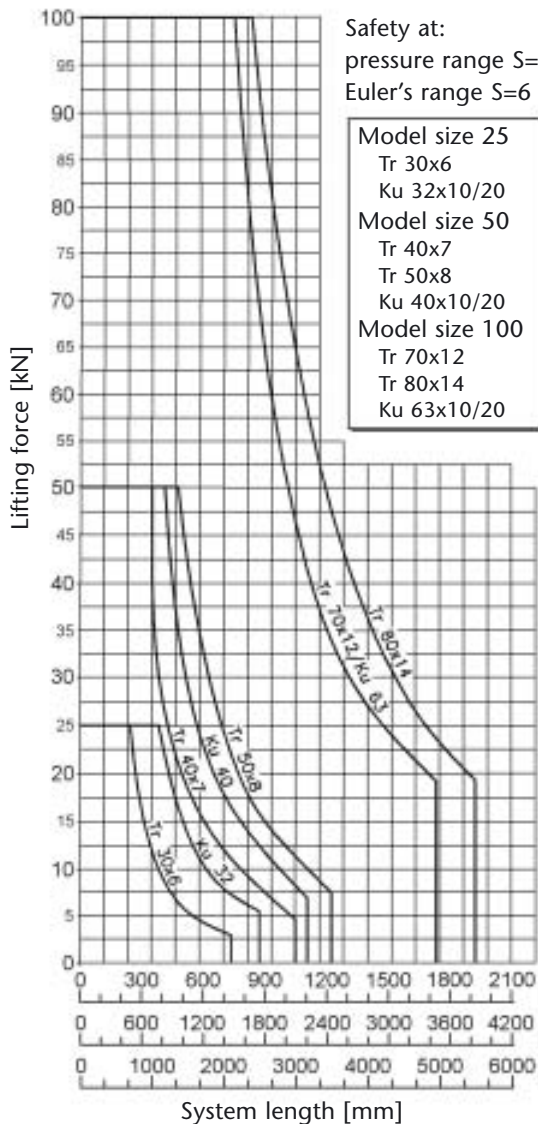
"ALS" version

Various mounting flanges are available to allow the "ALS" to be equipped with a variety of different gear motors.

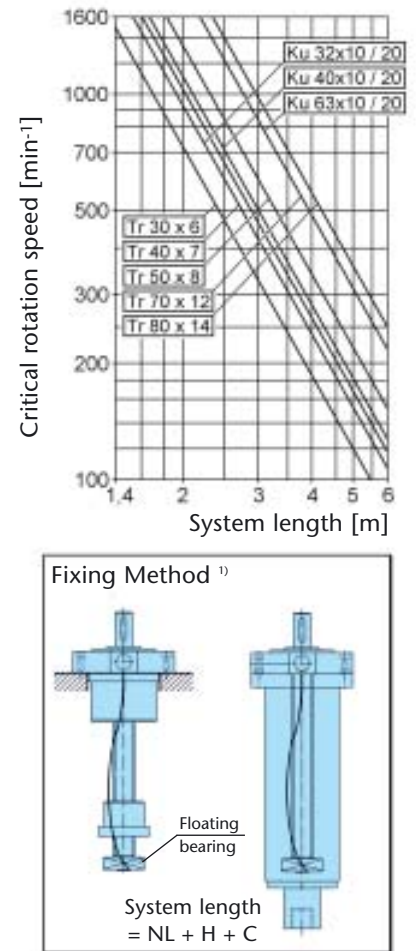
ALS – Electromechanical Screw Rams

Selection table:		Acme screw					Ball screw		
Model size ALS – ALSR		25	50		100		25	50	100
Tensile / compressive force	[kN]	25	50		100		25	50	100
Screw		Tr 30x6	Tr 40x7	Tr 50x8	Tr 70x12	Tr 80x14	Ku 32x10 / 20	Ku 40x10 / 20	Ku 63x10 / 20
Static load capacity	[kN]	98	173		300		99 / 50	170 / 85	300 / 219
Dynamic load capacity	[kN]	46,5	88		137		44 / 27,5	79 / 48	163 / 75
Stroke per revolution	[mm/rev]	6	7	8	12	14	10 / 20	10 / 20	10 / 20
Max. drive power at 20°C Ambient temp. and 20% c.d.f./hour	[kW]	0,75	1,5		3		see performance data tables [A restriction does not exist based on Duty Cycle (% Duty Cycle/hour)]		
Max. drive power at 20°C Ambient temp. and 10% c.d.f./hour	[kW]	1,1	2,2		4				
Overall efficiency	[%]	33,9	31,0	29,2	30,6	31,0	75,0	75,0	75,0
Torque-power-speed at 20% c.d.f./hour and 20°C		see performance data tables					see performance data tables		
Torque at the drive shaft		see performance data tables					see performance data tables		
Max. perm. screw length under compr. load	[mm]	see buckling diagram					see buckling diagram		
Max. perm. screw length	[mm]	see speed diagram					see speed diagram		
Housing material		"steel" "burnished"					"steel" "burnished"		
Basic weight	[kg]	10	25		35		10	25	35
Extra weight of ALS per 100 mm stroke	[kg]	0,5	0,8	1,2	2,5	3,0	0,5	1,0	2,5
Extra weight of ALSR per 100 mm stroke	[kg]	2,2	4,0	4,5	9,0	9,5	2,2	4,2	9,0

Buckling diagram:



Speed diagram:



Selection and Sizing

- Look in the selection table for the maximal permissible tensile/compressive forces to narrow down the choice of model size
- For the compressive force: Check the screw size in the buckling diagram (allow for the Euler's case) With screw lengths > 1400 mm: Check the screw size in the speed diagram (allow for the fixing method)
- Determine the model size by comparing with the performance data tables (allow for the stroke load, speed and cyclic duty factor)
- Check the service life of the bearing and ball screw (use the calculation formula)

Calculation formula:

- Drive power:

$$P_{\text{erf}} = \frac{F_{\text{adyn}} \cdot v}{60 \cdot \eta} \text{ [kW]}$$

- Service life:

$$L_h = \frac{1 \cdot 10^6}{60 \cdot n} \cdot \left(\frac{C_{\text{dyn}}}{F_{\text{adyn}}} \right)^3 \text{ [Hours]}$$

F_{adyn} = stroke load [kN]

v = lifting speed [m/min]

η = overall efficiency

n = input speed [min⁻¹]

C_{dyn} = dynamic load capacity [kN]



Performance data tables:

All the performance data are based on the dynamic stroke force and a cyclic duty factor of 20%/hour or 30%/10 minutes at 20°C ambient temperature. **ALS-ALSR with Acme screw:** In the gray-shaded areas, the screw/nut assembly will overheat. **ALS-ALSR with Ball screw:** In the gray-shaded areas, the life cycle will be reduced to under 500 hours. Our warranty does not cover this range.

Performance data table ALS 25 – ALSR 25 with Acme screw 30x6:

Speed n [min ⁻¹]	Lifting Speed Tr 30x6 [m/min]		25 kN		20 kN		15 kN		10 kN		5 kN	
	Nm	kW	Nm	kW	Nm	kW	Nm	kW	Nm	kW	Nm	kW
700	4,20		70	5,2	56	4,1	42	3,1	28	2,1	14	1,0
500	3,00		70	3,7	56	2,9	42	2,2	28	1,5	14	0,7
300	1,80		70	2,2	56	1,8	42	1,3	28	0,9	14	0,4
100	0,60		70	0,7	56	0,6	42	0,4	28	0,3	14	0,1
50	0,30		70	0,4	56	0,3	42	0,2	28	0,1	19	0,1

Performance data table ALS 25 – ALSR 25 with Ball screw 32x10 / 20:

Speed n [min ⁻¹]	Lifting Speed Ku 32x10 Ku 32x20 [m/min]		25 kN		20 kN		15 kN		10 kN		5 kN	
	Nm	kW	Nm	kW	Nm	kW	Nm	kW	Nm	kW	Nm	kW
700	7,00	14,00	53	3,9	106	7,8	42	3,1	85	6,2	32	2,3
500	5,00	10,00	53	2,8	106	5,6	42	2,2	85	4,4	32	1,7
300	3,00	6,00	53	1,7	106	3,3	42	1,3	85	2,7	32	1,0
100	1,00	2,00	53	0,6	106	1,1	42	0,4	85	0,9	32	0,3
50	0,50	1,00	53	0,3	106	0,6	42	0,2	85	0,4	32	0,2

Performance data table ALS 50 – ALSR 50 with Acme screw 40x7 / Acme screw 50x8:

Speed n [min ⁻¹]	Lifting Speed Tr 40x7 Tr 50x8 [m/min]		50 kN		40 kN		30 kN		25 kN		20 kN		10 kN	
	Nm	kW	Nm	kW	Nm	kW	Nm	kW	Nm	kW	Nm	kW	Nm	kW
500	3,50	4,00	180	9,4	218	11,4	144	7,5	174	9,1	108	5,6	131	6,8
400	2,80	3,20	180	7,5	218	9,1	144	6,0	174	7,3	108	4,5	131	5,5
300	2,10	2,40	180	5,6	218	6,8	144	4,5	174	5,5	108	3,4	131	4,1
100	0,70	0,80	180	1,9	218	2,3	144	1,5	174	1,8	108	1,1	131	1,4
50	0,35	0,40	180	0,9	218	1,1	144	0,8	174	0,9	108	0,6	131	0,7

Performance data table ALS 50 – ALSR 50 with Ball screw 40x10 / Ball screw 40x20:

Speed n [min ⁻¹]	Lifting Speed Ku 40x10 Ku 40x20 [m/min]		50 kN		40 kN		30 kN		25 kN		20 kN		10 kN	
	Nm	kW	Nm	kW	Nm	kW	Nm	kW	Nm	kW	Nm	kW	Nm	kW
450	4,50	9,00	106	5,0	212	10,0	85	4,0	170	8,0	64	3,0	127	6,0
350	3,50	7,00	106	3,9	212	7,8	85	3,1	170	6,2	64	2,3	127	4,7
200	2,00	4,00	106	2,2	212	4,4	85	1,8	170	3,6	64	1,3	127	2,7
100	1,00	2,00	106	1,1	212	2,2	85	0,9	170	1,8	64	0,7	127	1,3
50	0,50	1,00	106	0,6	212	1,1	85	0,4	170	0,9	64	0,3	127	0,7

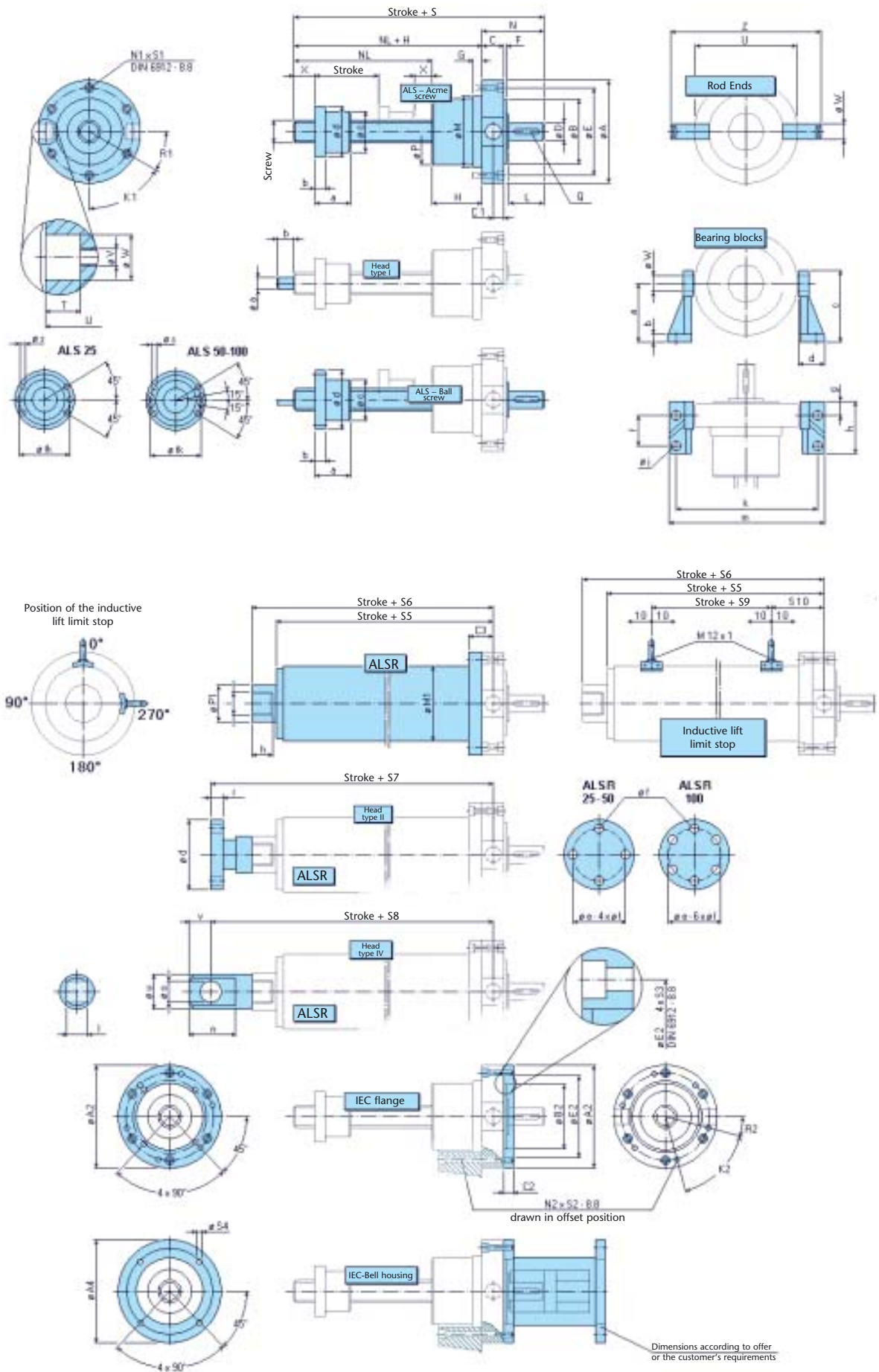
Performance data table ALS 100 – ALSR 100 with Acme screw 70x12 / Acme screw 80x14:

Speed n [min ⁻¹]	Lifting Speed Tr 70x12 Tr 80x14 [m/min]		100 kN		80 kN		60 kN		50 kN		40 kN		20 kN		10 kN	
	Nm	kW	Nm	kW	Nm	kW	Nm	kW	Nm	kW	Nm	kW	Nm	kW	Nm	kW
225	2,70	3,15	624	14,7	719	16,9	499	11,8	575	13,5	375	8,8	431	10,2	312	7,4
200	2,40	2,80	624	13,1	719	15,1	499	10,5	575	12,0	375	7,8	431	9,0	312	6,5
160	1,92	2,24	624	10,5	719	12,0	499	8,4	575	9,6	375	6,3	431	7,2	312	5,2
80	0,96	1,12	624	5,2	719	6,0	499	4,2	575	4,8	375	3,1	431	3,6	312	2,6
40	0,48	0,56	624	2,6	719	3,0	499	2,1	575	2,4	375	1,6	431	1,8	312	1,3

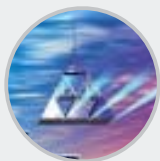
Performance data table ALS 100 – ALSR 100 with Ball screw 63x10 / Ball screw 63x20:

Speed n [min ⁻¹]	Lifting Speed Ku 63x10 Ku 63x20 [m/min]		100 kN		80 kN		60 kN		50 kN		40 kN		20 kN		10 kN	
	Nm	kW	Nm	kW	Nm	kW	Nm	kW	Nm	kW	Nm	kW	Nm	kW	Nm	kW
225	2,25	4,50	212	5,0	424	10,0	170	4,0	340	8,0	127	3,0	255	6,0	106	2,5
200	2,00	4,00	212	4,4	424	8,9	170	3,6	340	7,1	127	2,7	255	5,3	106	2,2
160	1,60	3,20	212	3,6	424	7,1	170	2,8	340	5,7	127	2,1	255	4,3	106	1,8
80	0,80	1,60	212	1,8	424	3,6	170	1,4	340	2,8	127	1,1	255	2,1	106	0,9
40	0,40	0,80	212	0,9	424	1,8	170	0,7	340	1,4	127	0,5	255	1,1	106	0,4

ALS – Electromechanical Screw Rams



Screw	ALS 25 - ALSR 25			ALS 50 - ALSR 50			ALS 100 - ALSR 100				
	Acme screw	Ball screw		Acme screw	Ball screw		Acme screw	Ball screw			
	Tr 30x6	Ku 32x10	Ku 32x20	Tr 40x7	Tr 50x8	Ku 40x10	Ku 40x20	Tr 70x12	Tr 80x14	Ku 63x10	Ku 63x20
ø A		145				175				250	
ø B ^{H7}		95				110				180	
C		34				38				52	
C 1		17				19				26	
C 3		40				47				61	
ø D _{j6}		25				30				40	
ø E ± 0,2		125				155				215	
F		3				4				5	
G		13				15				25	
H		63				85				111	
h		35				63				54	
i		M 42x2				M 60x2				M 95x3	
K 1		45°				60°				45°	
K 2		90°				60°				90°	
L		50				60				90	
ø M ₁₇		90				115				150	
ø M 1		100				130				170	
N		88				106				150	
N 1		8				6				8	
N 2		4				6				6	
NL	Stroke + 85	Stroke+130	Stroke+170	Stroke + 120	Stroke+216	Stroke+151		Stroke + 205	Stroke+198	Stroke+238	
ø P		89,5				114				149	
ø P 1		50				70				110	
Q		8 x 7 x 40				8 x 7 x 50				12 x 8 x 80	
R 1		22,5°				30°				22,5°	
R 2		45°				15°				45°	
S	236	281	321	311	342	407		466	459	499	
S 1		M 8 - DIN 912 - 8.8				M 8 - DIN 912 - 8.8				M 12 - DIN 912 - 8.8	
S 2		M 8 - 8.8				M 8 - 8.8				M 12 - 8.8	
S 5		276				336				486	
S 6		298				374				514	
S 7		343				429				569	
S 8		343				439				601	
S 9		55				73				170	
S 10		100				124				171	
T		23				25				42	
U		140 ^{-0,3}				170 ^{-0,3}				240 ^{-0,4}	
V		M 6				M 8				M 10	
ø W ^{H7}		20				25				35	
X	20	40	60	30	50	70		40	50	70	
Load Nut											
a	45	50	50	60	76	51		125	98	98	
b	15		12	18		14		30		20	
ø c	50 ^{h9}		50 ^{g6}	70 ^{h9}		63 ^{g6}		120 ^{h9}		95 ^{g6}	
ø d	80		80	87		93		155		135	
ø tk	- / -		65	- / -		78		- / -		115	
ø s	- / -		9	- / -		9		- / -		13,5	
Head Type I											
ø a		20 _{j6}				30 _{j6}				50 _{k6}	
b		30				50				60	
Head Type II											
ø d		98				122				182	
ø e		75				85				135	
ø f		14				17				26	
r		12				18				25	
Head Type IV											
l ^{-0,2}		30				40				75	
n		50				70				120	
ø o ^{H7}		25				35				60	
u		50				65				110	
v		25				35				60	
Rod Ends											
Z		209				257				340	
Bearing blocks											
a		80				100				140	
b		12				20				25	
c		100				125				170	
d		60				75				100	
f		60				95				130	
g		20				25				30	
h		100				140				200	
ø j		17				21				25	
k		237				277				377	
m		267				327				447	
IEC -flange											
ø A 2		150				175				250	
ø B 2 ^{H7}		110				110				180	
C 2		12				17				25	
ø E 2 ± 0,2		130				130				215	
S 3		M 8 - DIN 6912 - 8.8				M 8 - DIN 6912 - 8.8				M 8 - DIN 6912 - 8.8	



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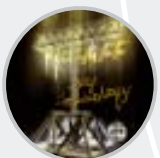
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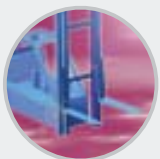
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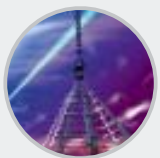


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