Mechanical linear drive units

WIESEL™ *POWERLine*®, WIESEL™ *DYNALine*®, WIESEL™ *VARIOLine*™

WIESEL™ *POWERLine*® WM40

- Fully integrated miniaturized linear drive unit with linear ball guide, ball screw drive and sealing strip.

WIESEL™ *POWERLine*® WM60/80 ZRT NEW

- Fully integrated drive unit with tooth belt drive and linear bearing guide.
- Transmission of the feed force and handling of loads and load moments.

WIESEL™ *VARIOLine*™ NEW

- Fully integrated linear drive unit with ball screw and linear ball bearing guide and sealing strip.
- Transmission of the feed force and handling of loads through ram type piston.

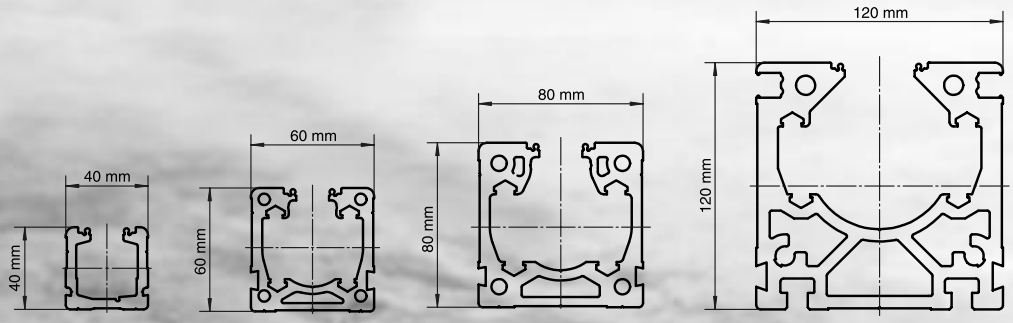
WIESEL™ *POWERLine*® WM60/80/120

- Fully integrated linear drive unit with ball screw and linear ball bearing guide and sealing strip.
- Transmission of the feed force and handling of loads and load moments.
- Size WM60/80-370 with short guide system. NEW

WIESEL™ *DYNALine*® WV60/80/120

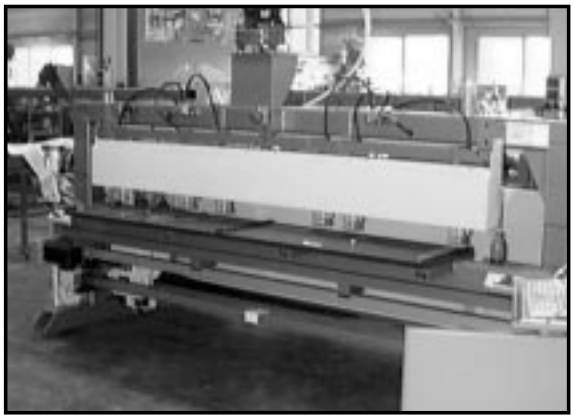
- Fully integrated feed axis with ball screw.
- Transmission of the feed force.
- Used in combination with external linear guides.

WIESEL™ *DYNALine*®, WIESEL™ *POWERLine*®, WIESEL™ *VARIOLine*™ profile sectional views

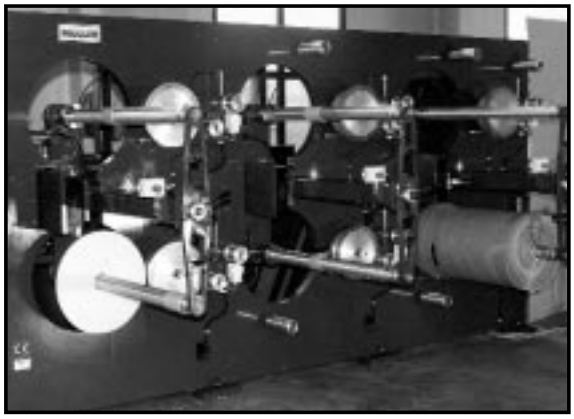


Tolerances of outer dimensions according to DIN 17615 part 3

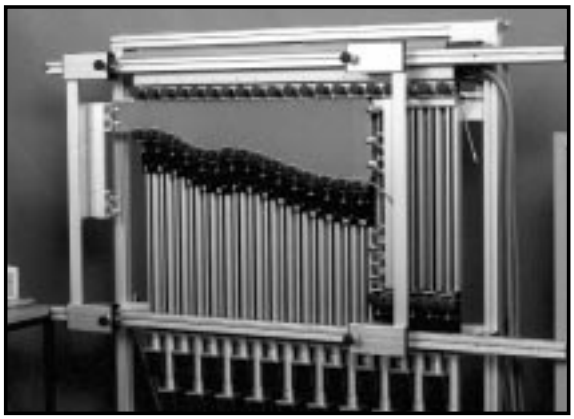
Applications for linear drive units



Partner for the woodworking industry
Drilling and doweling machine for the furniture industry with WIESEL™ *POWERLine*®.



Partner for the paper and sheeting industry
Equipment for rolling up plastic sheeting with WIESEL™ SLT.



Partner for measurement and test technology
Measuring and testing stand for medical compression stockings with WIESEL™ WO.

Partner for the plastics industry
Automatic screwing device for window fittings with WIESEL™ *SPEEDLine*®.

General technical data

WIESEL™ *POWERLine*®, *DYNALine*®, *VARIOLine*™, WO, SLT

Linear speeds
The linear speed achieved by a linear drive unit depends on the lead of the mechanical drive element and on the input rotational speed. The various linear speeds which can be achieved by the individual sizes are listed in the following table:

Drive element	Lead [mm]	n_{max} [rpm]	v_{max} [m/s]
TGT[1)]	4	1500	0.1
	8	1500	0.2
	12	1500	0.3
	16	1500	0.4
KGT[2)]	4	3000	0.2
	5	3000	0.25
	10	3000	0.5
	20	3000	1
	40	3000	2
	50	3000	2.5
VARIOLine™		3000	1.5
ZRT[3)]20ATL5	120	1250	2.5
ZRT[3)]25ATL10	170	882	2.5

1) TGT: Trapezoidal screw drive
2) KGT: Ball screw drive
3) ZRT: Toothed belt drive

Installed position
The linear drive units can be installed in almost any position, provided that all the forces and moments occurring remain below the maximum values for the axis concerned.

Security advice
The ball screw drives in all three sizes are generally *not self-locking*. It is therefore advisable to install suitable motors with holding brake, particularly if the linear drive unit is installed vertically. If the toothed belt breaks, the load is released. Therefore safety precautions have to be taken for applications which are critical with regard to security.

Maximum forces
All maximum forces and moments provided refer to the center/top of the power bridge. Load overlay at several coordinates: If compound loads occur, with force and moment components in more than one direction, the maximum permissible loads must be reduced to 60% of the specified maximum values. When forces and moments are overlaid in two or three coordinates, it is necessary to reduce the maximum permissible load to 60% of the maximum value.

Load ratings
See page 96

Duty cycle
In practice, the following values have been proven.

Drive element:
For a trapezoidal screw the upper limit should be ≤ 30% per hour, linear ball guides allow duty cycles up to 100%. Extremely high loads in combination with high duty cycles can reduce the life.

Guidance element:
For a sliding guide the upper limit should be ≤ 30% per hour, linear ball guides allow duty cycles up to 100%.

Temperature
All series are designed for continuous operation at ambient temperatures up to 80° C (176° F). Temperatures up to 100° C (212° F) are also permitted for brief periods. The linear drive units are not suitable for operation at subzero temperatures.

Idle torques
The given values are means from a series of measurements. The effective values may differ in individual cases.

Straightness/torsion
The aluminum profiles are extruded sections which may display deviations in straightness and torsion due to their manufacturing process. The tolerance of these deviations is defined in DIN 17 615. The deviations found in Precision Technology USA, Inc. linear drive units corresponding to these limits are worst case, but are normally well below. In order to obtain the required guide accuracy, the linear drive unit must be aligned with the aid of leveling plates or clamped from a mounting surface machined with sufficient accuracy. This ensures that tolerances of at least 0.1 mm/1000 mm are achieved.

Cover strip
for WIESEL™ *POWERLine*®
WIESEL™ *DYNALine*®
WIESEL™ *VARIOLine*™
WIESEL™ SLT 10/15
Material: Polyamide 12

Characteristics:
- Resistant to alkaline solutions
- Conditionally resistant to acids
- Tough/rigid
- Abrasion-proof
- Little absorption of humidity
- Light resistant

Guide tube
All the components of a linear drive unit except the mechanical drive element are accommodated in a guide tube which is mounted either to the bottom of a driven WIESEL™ or is installed parallel to a driven WIESEL™. It takes higher loads and load moments. All WIESEL™ models are also available as guide tube (except WIESEL™ *DYNALine*®, *VARIOLine*™).

Stroke length
The stroke length specified in the order code represents the maximum possible linear displacement. Acceleration and deceleration paths must be taken into account when designing the system, together with any overrun required. Entering the safety zone leads to mechanical collisions and must be prevented with suitable safety measures (safety limit switch, software queries, etc.)

Repeatability
The repeatability is defined as the capability of a linear drive unit to repeatedly reach an actual position it has reached before under the same conditions. It refers to the average position variation according to VDI/DGQ 3441. The repeatability is influenced, among other things, by:
- Load
- Speed
- Deceleration/acceleration
- Direction of travel
- Temperature

Aggressive working environments
The mechanical drive and the guidance of the WIESEL™ are well protected against dirt by means of the patented cover strip. In cases of heavy dirt and dust particles, an additional bellow is recommended. Available upon request.

Maintenance
The mechanical components (ball screw drive and linear ball bearing guide) must be lubricated via the grease nipple on the power bridge with the aid of a grease gun after 400 hours of operation or at least every three months. On the WM40, one lubrication nipple is used to lubricate the linear guideway, while the second lubrication point supplies the ball screw drive with grease. The cover strip should also be lubricated at the same time in order to prevent premature wear. Grease: rolling bearing grease (original grease Fuchs Lubritec URETHYN E/M1).

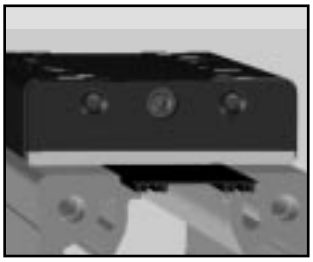
Tensioning of the toothed belt
The tensioning of the toothed belt can be adjusted with the aid of the tensioning screws on the guide casing which are intended for this. The linear units are delivered with optimal tension values in order to guarantee security and functionality. Changes in this adjustment must be carried out in service cases and by Precision Technology USA, Inc. service engineers.

WIESEL™ *POWER*Line®
with toothed belt drive

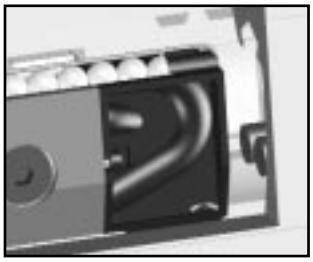
The best ideas make it simple for you.

The new WIESEL™ *POWER*Line® ZRT combines the high dynamics of the toothed belt drive with the powerful, fully integrated ball bearing guide of the *POWERLine*® system. The patented cover strip protects the guide system safely against dirt. The version 370 offers an attractive price reduction with its shorter guide system and the reduced length of the power bridge. So the *POWERLine*® ZRT brings higher dynamics to the tasks of engineering and handling.

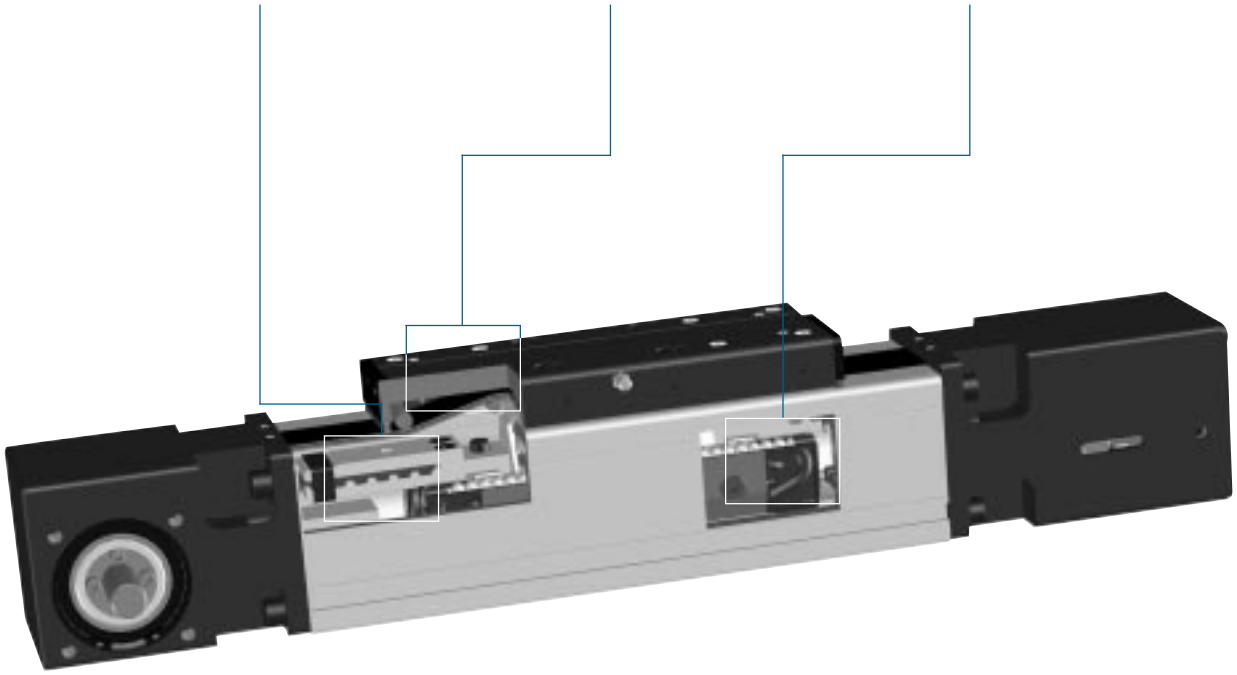
Toothed belt
The integrated toothed belt allows high dynamics and precision.



Patented cover strip
The patented, self-adjusting cover strip is a reliable protection from dirt.

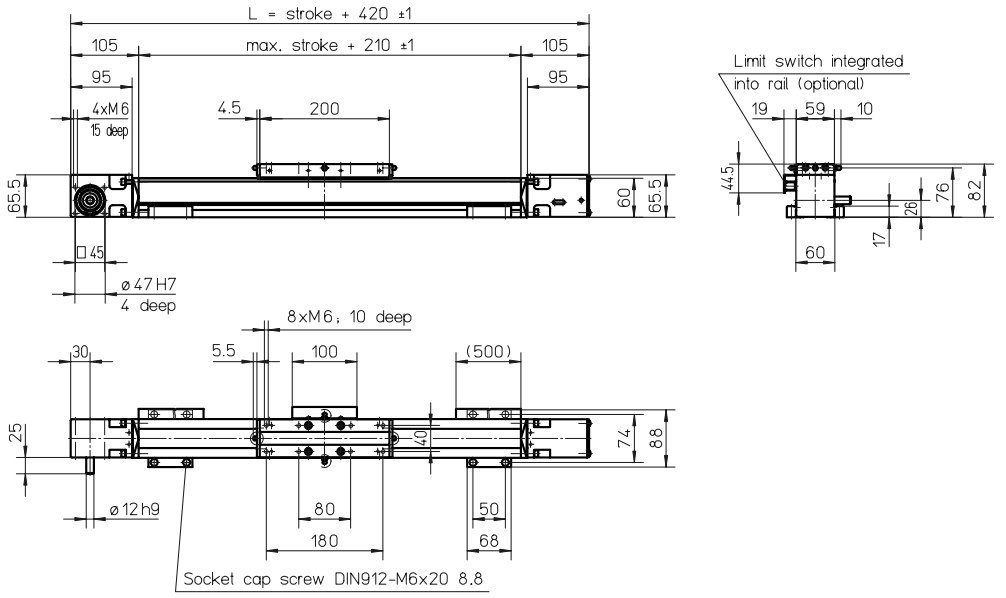


Integrated guide system
The integrated ball-bearing guide absorbs heavy forces and moments.



WIESEL™ *POWER*Line® WM60 – 370 ZRT

with toothed belt drive and integrated linear short ball-bearing guide system



○ Tapered lubricating nipple to DIN71412 AM6 on fixed-bearing side as standard feature

○ Can be changed over to one of the three alternative lubricating points by the customer

All figures shown in millimeters.

Technical data

Linear speed: . . . . . .max. 2.5 m/s
Repeatability: . . . . . .± 0.05 mm
Acceleration: . . . . . .max. 20 m/s²
Drive element: . . . . . .Toothed belt 20ATL5
Diameter: . . . . . .38.20 mm
Stroke per revolution: . . . . . .120 mm
Stroke length: . . . . . .4000 mm
Length of power bridge: . . . . . .200 mm
Geometrical moment of inertia: . . .ly 5.62 x 10^5 mm⁴
lz 5.94 x 10^5 mm⁴

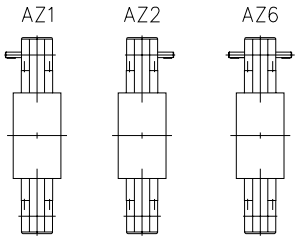
Weights
Basic unit with zero stroke: . . . . .4.30 kg
100 mm stroke: . . . . . .0.45 kg
Power bridge with carriage: . . . . .1.25 kg
Provided: . . . . . .4 pieces KAO mounting brackets

Idle torques [Nm]

Rotational speed [rpm]	M_{idle} [Nm]
150	1.6
600	2.5
1250	3.0

Execution of drive shafts

(Detailed description see pg 100)
Other executions on request.



Unit conversions

Length:
1 m=1000 mm=39.37 inches
1 inch=25.4 mm

Force:
1 N=0.225 lbf
1 lbf=4.45 N

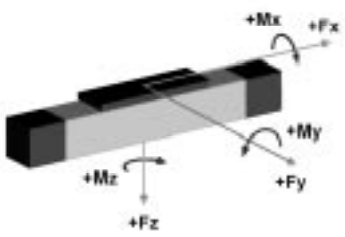
Moment of Force:
1 Nm=0.738 lb • ft=8.85 lb • inches
1 lb • ft=1.36 Nm

Geometrical moment of inertia:
1 m⁴=10^{12} mm⁴=2.4025 x 10^6 in⁴

Mass moment of inertia:
1 kg • m²=10^4 kg • cm²=0.738 lb • ft • s²

Mass:
1 kg=2.2 lb

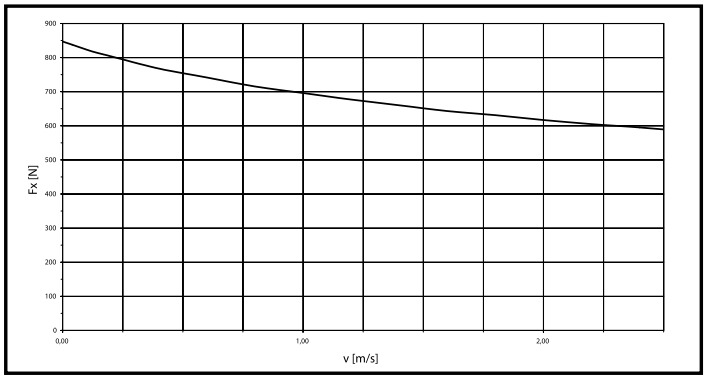
Loads and load moments



Load	dynam. [N]
Fx drive[1]	850
Fy	1400
+/- Fz	1400
Load moment	**dynam. [Nm]**
Mx	25
My[2]	50
Mz[2]	50

Order Code see page 100

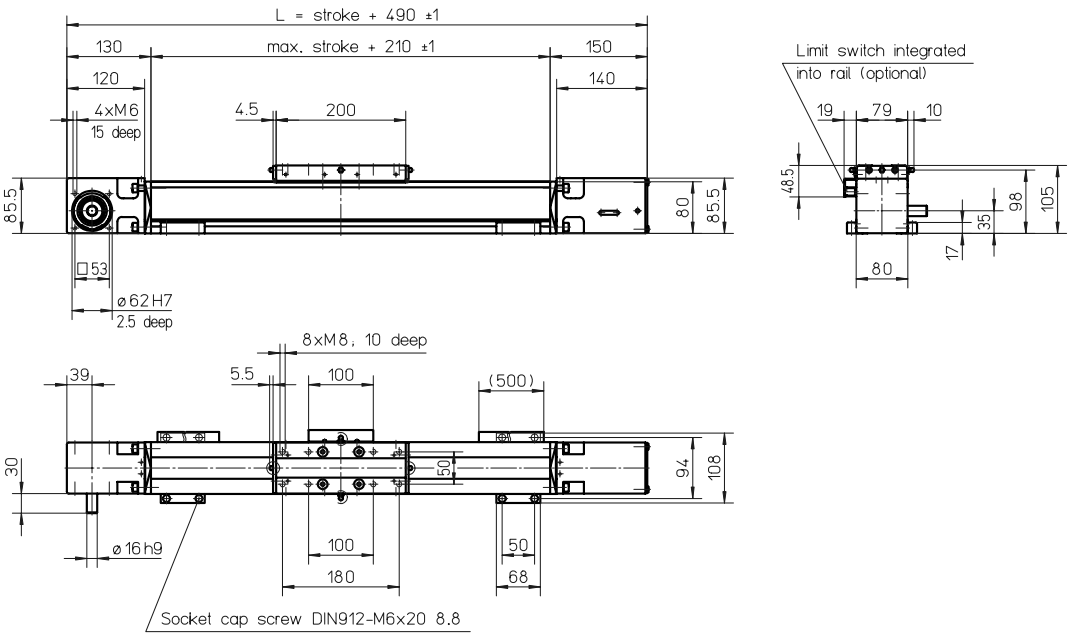
F_x over the linear speed



1) Depending on the speed, see respective chart.
2) Increase of the admissible values by the use of a long power bridge or additional free-sliding power bridge (pages 62 and 63).

WIESEL™ *POWER*Line® WM80 – 370 ZRT

with toothed belt drive and integrated linear short ball-bearing guide system



○ Tapered lubricating nipple to DIN71412 AM6 on fixed-bearing side as standard feature
○ Can be changed over to one of the three alternative lubricating points by the customer

All figures shown in millimeters.

Technical data

Linear speed: . . . . . .max. 2.5 m/s
Repeatability: . . . . . .± 0.05 mm
Acceleration: . . . . . .max. 20 m/s²
Drive element: . . . . . .Toothed belt 25AT10
Diameter: . . . . . .54.11 mm
Stroke per revolution: . . . . . .170 mm
Stroke length: . . . . . .5500 mm
Length of power bridge: . . . . . .200 mm
Geometrical moment of inertia: . . .ly 1.89 x 10^6 mm⁴
lz 1.97 x 10^6 mm⁴

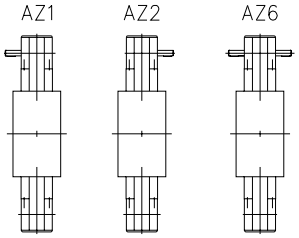
Weights
Basic unit with zero stroke: . . . . .9.20 kg
100 mm stroke: . . . . . .0.80 kg
Power bridge with carriage: . . . . .2.10 kg
Provided: . . . . . .4 pieces KAO mounting brackets

Idle torques [Nm]

Rotational speed [rpm]	M_{idle} [Nm]
150	4.0
450	5.4
885	6.2

Execution of drive shafts

(Detailed description see pg 100)
Other executions on request.



Unit conversions

Length:
1 m=1000 mm=39.37 inches
1 inch=25.4 mm

Force:
1 N=0.225 lbf
1 lbf=4.45 N

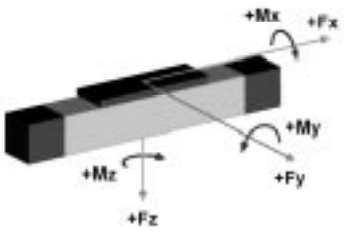
Moment of Force:
1 Nm=0.738 lb • ft=8.85 lb • inches
1 lb • ft=1.36 Nm

Geometrical moment of inertia:
1 m⁴=10^{12} mm⁴=2.4025 x 10^6 in⁴

Mass moment of inertia:
1 kg • m²=10^4 kg • cm²=0.738 lb • ft • s²

Mass:
1 kg=2.2 lb

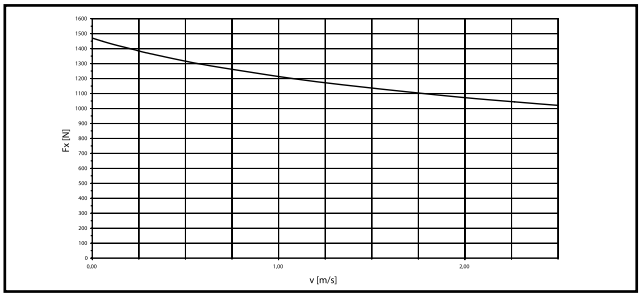
Loads and load moments



Load	dynam. [N]
Fx drive[1]	1470
Fy	2100
+/- Fz	2100
Load moment	**dynam. [Nm]**
Mx	68
My[2]	135
Mz[2]	135

Order Code see page 100

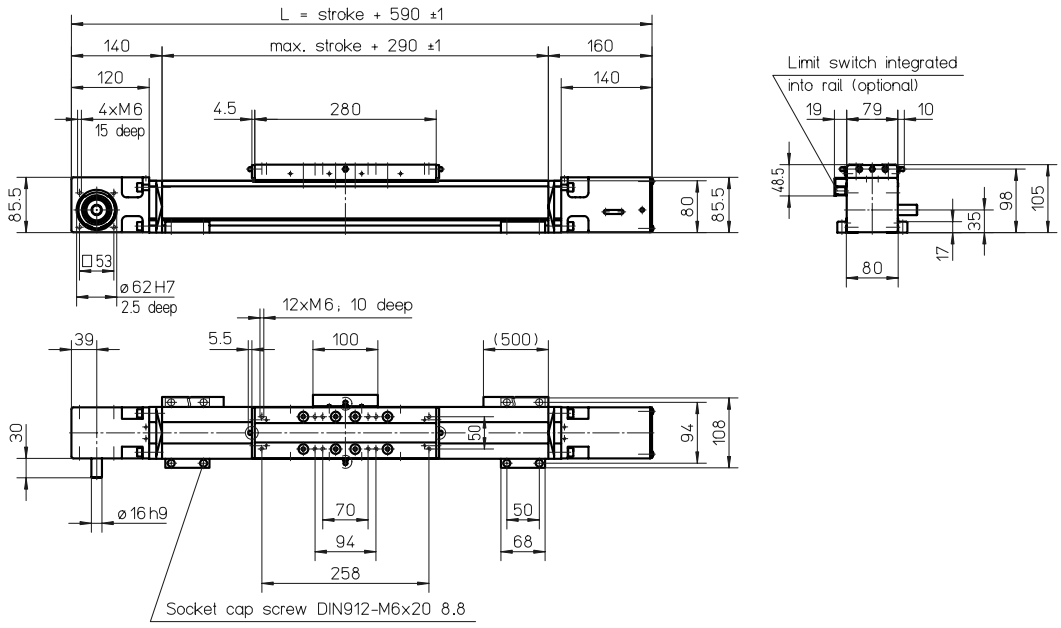
F_x over the linear speed



1) Depending on the speed, see respective chart.
2) Increase of the admissible values by the use of a long power bridge or additional free-sliding power bridge (pages 62 and 63).

WIESEL™ *POWER*Line® WM80 ZRT

with toothed belt drive and integrated linear ball-bearing guide



○ Tapered lubricating nipple to DIN71412 AM6 on fixed-bearing side as standard feature

○ Can be changed over to one of the three alternative lubricating points by the customer

All figures shown in millimeters.

Technical data

Linear speed: . . . . . .max. 2.5 m/s
Repeatability: . . . . . .± 0.05 mm
Acceleration: . . . . . .max. 20 m/s²
Drive element: . . . . . .Toothed belt 25AT10
Diameter: . . . . . .54.11 mm
Stroke per revolution: . . . . . .170 mm
Stroke length: . . . . . .5400 mm
Length of power bridge: . . . . . .280 or 450 mm
Geometrical moment of inertia: . . .ly 1.89 x 10^6 mm^4
lz 1.97 x 10^6 mm^4

Weights
Basic unit with zero stroke: . . . . .11.20 kg
100 mm stroke: . . . . . .0.80 kg
Power bridge with carriage: . . . . .3.40 kg
Provided: . . . . . .4 pieces KAO mounting brackets

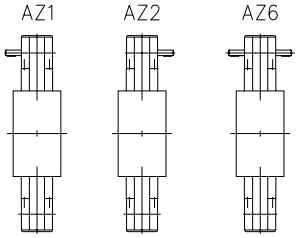
Idle torques [Nm]

Rotational speed [rpm]	M_{idle} [Nm]
150	*)
450	*)
885	*)

*) values in determination

Execution of drive shafts

(Detailed description see pg 100)
Other executions on request.



Unit conversions

Length:
1 m=1000 mm=39.37 inches
1 inch=25.4 mm

Force:
1 N=0.225 lbf
1 lbf=4.45 N

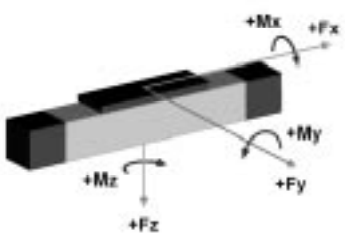
Moment of Force:
1 Nm=0.738 lb • ft=8.85 lb • inches
1 lb • ft=1.36 Nm

Geometrical moment of inertia:
1 m^4=10^{12} mm^4=2.4025 x 10^6 in^4

Mass moment of inertia:
1 kg • m^2=10^4 kg • cm^2=0.738 lb • ft • s^2

Mass:
1 kg=2.2 lb

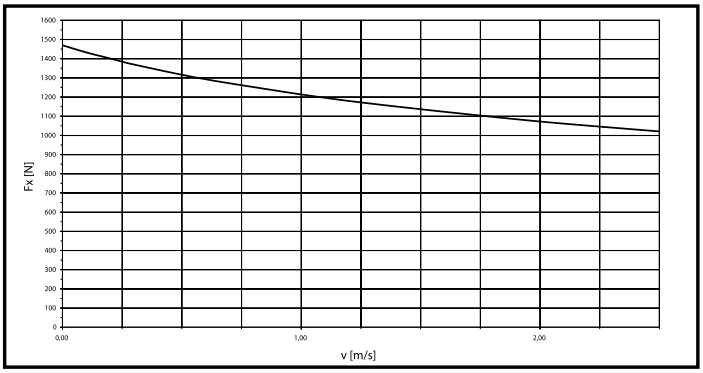
Loads and load moments



Load	dynam. [N]
Fx drive[1]	1470
Fy	3000
+/- Fz	3000
Load moment	**dynam. [Nm]**
Mx	150
My[2]	300
Mz[2]	300

Order Code see page 100

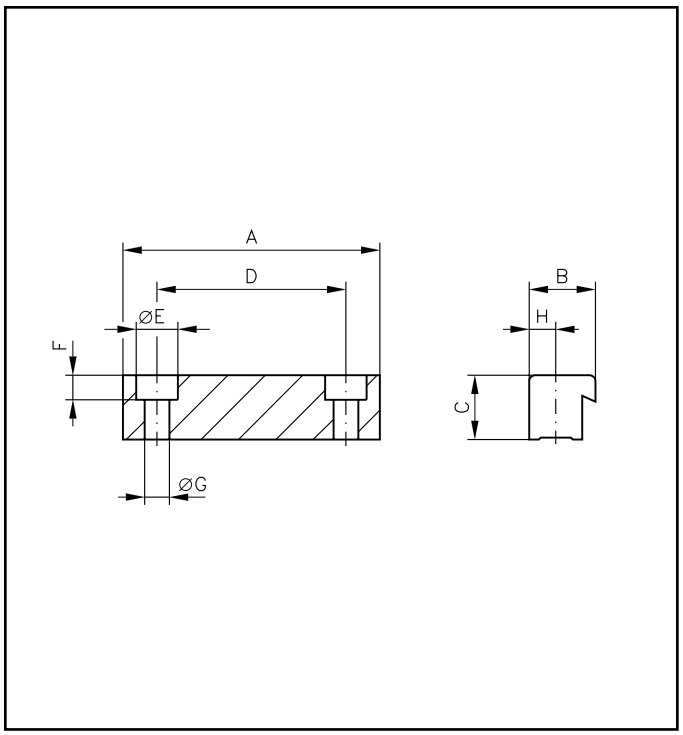
F_x over the linear speed



1) Depending on the speed, see respective chart.
2) Increase of the admissible values by the use of a long power bridge or additional free-sliding power bridge (pages 62 and 63).

Accessories for WIESEL™ *POWER*Line®

Mounting brackets



KAO Mounting brackets
The WIESEL™ unit is secured to mounting surface by means of the KAO mounting brackets which are inserted in the grooves provided in the sides of the tubular aluminum profile and screwed onto the mounting surface with the aid of socket head cap screws. The number of mounting brackets required depends on the load and overall length of the WIESEL™ unit. This is shown in the diagrams. Increasing side forces reduces the distance between supports. **Each unit is provided with 4 pieces KAO Mounting brackets.**

Maximum torque of mounting screws

Size	Moment [Nm]
WM40	7.3–12
WM/WV60	7.3–12
WM/WV80	7.3–12
WM/WV120	17–30

KAO System brackets
Only needed for WH40. With multi-coordinate arrangements of several WIESEL™ units, this can be used to mount a WIESEL™ directly to the power bridge of a unit positioned immediately below.

	Dimension [mm]							
Size	A	B	C	D	ø E	F	ø G	H
WM40	54	16	10	40	10	5.7	5.5	7
WM/WV60	54	17.5	17	50	11	6.5	6.6	7
WM/WV80	68	17.5	17	50	11	6.5	6.6	7
WM/WV120	80	25	18	50	15	8.5	9	10
WM40 System KAO	40	16	10	26	10	5.7	5.5	7
WM60 System KAO	58	17.5	17	40	11	6.5	6.6	7

Note: It is advisable to secure the linear drive unit at intervals of at least 750 mm. This ensures that all the permissible loads can be absorbed without significantly deforming the tubular aluminum profile.

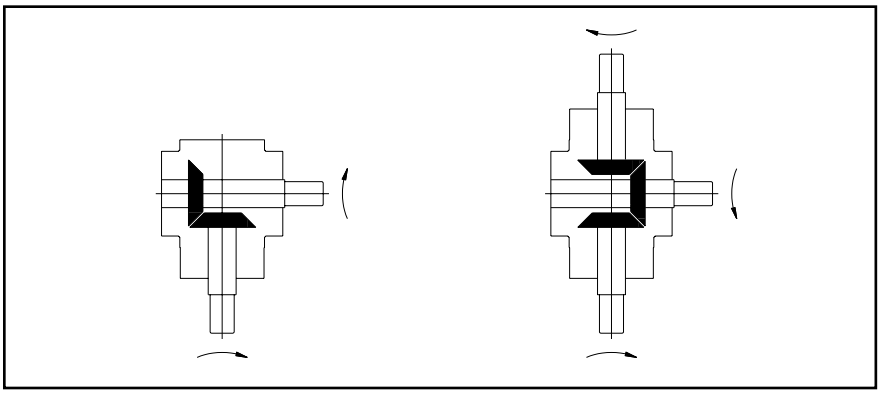
Unit conversions

Order Code see page 100

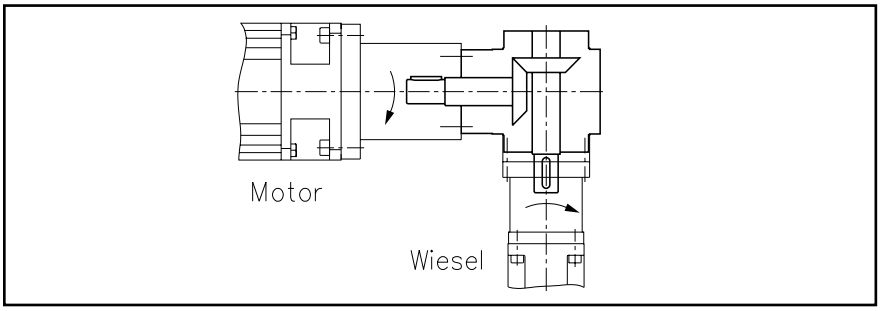
Length:	1 m=1000 mm=39.37 inches 1 inch=25.4 mm	**Geometrical moment of inertia:**	1 $m^4=10^{12}$ $mm^4=2.4025 \times 10^6$ in^4
Force:	1 N=0.225 lbf 1 lbf=4.45 N	**Mass moment of inertia:**	1 kg • $m^2=10^4$ kg • $cm^2=0.738$ lb • ft • s^2
Moment of Force:	1 Nm=0.738 lb • ft=8.85 lb • inches 1 lb • ft=1.36 Nm	**Mass:**	1 kg=2.2 lb

Accessories for WIESEL™ *POWER*Line®

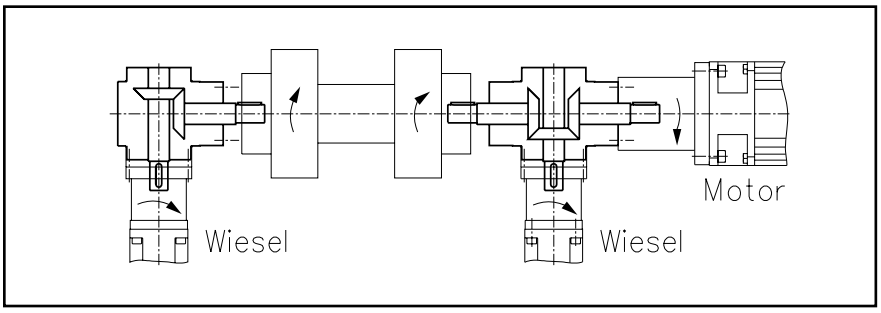
Bevel gearbox



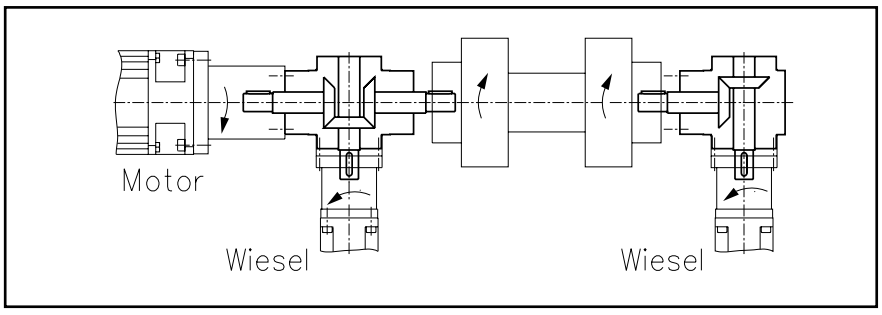
KRG Bevel gearbox
Bevel gearboxes are used to install a motor at right angles to the linear drive unit or to operate two linear drive units in parallel.



Direction of rotation



Direction of rotation – Motor right

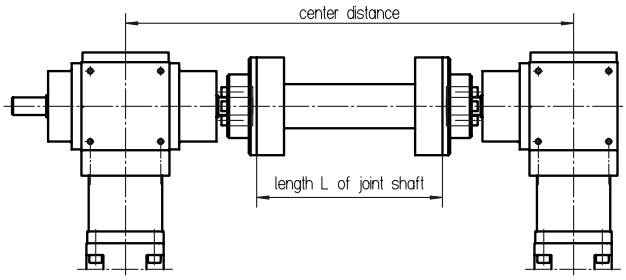


Direction of rotation – Motor left

Accessories for WIESEL™ *POWER*Line®, *DYNA*Line®

Universal joint shaft

Calculation of the overall length as a function of the center distance
All 4 models (size 40, 60, 80 and 120)



WM40-VL0 GX1 with DKWN-tensioner L=AA-210
WM/WV60-VL1 Ba53/VL1 Ba40 GX2 with two DKWN-tensioners L=AA-255
WM/WV80-VL1 Ba53/VL1 Ba40 GX4 with two DKWN-tensioners L=AA-259
WM/WV120-VL2 Ba53/VL2 Ba40 GX8 with two DKWN-tensioners L=AA-353

Dimensions AA for execution with groove on request.

GX Universal joint shaft

The GX universal joint shaft connects two WIESEL™ units with ball screw drive and top-mounted bevel gearboxes in parallel. The universal joint shaft transmits the torque from one WIESEL™ to another. Long connecting shafts should be supported over their length. The required pillow blocks are available on request.

Universal joint shaft GZ:
upon request - for high claims on quiet running and speed (center part with essentric ring).

Technical data

Size	M1[1]	M2[2]	m1[3]	m2[4]	J1[5]	J2[6]	M_A[7]
GX1	10	21	0.47	1.05	2.68	2.15	1.2
GX2	30	60	1.06	1.42	13.8	5.29	9.7
GX4	60	75	2.31	1.61	21.4	7.63	16.5
GX8	120	200	3.55	2.16	78	18.58	16.5

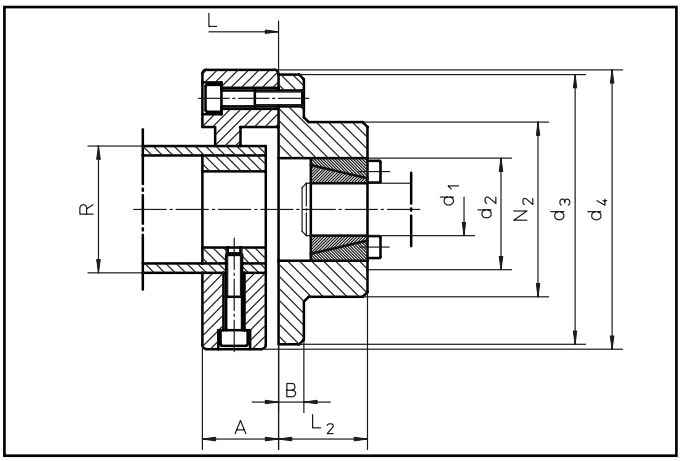
1) Transmittable torque [Nm]
2) Max. torque on the tensioning element [Nm]
3) Weight without middle part [kg]
4) Weight of middle part [kg/m]
5) Mass inertia of the two connectors [kgcm²]
6) Mass inertia of the shaft [kgcm²/m]
7) Starting torque of the tensioning screws of the DKWN tensioning element [Nm]

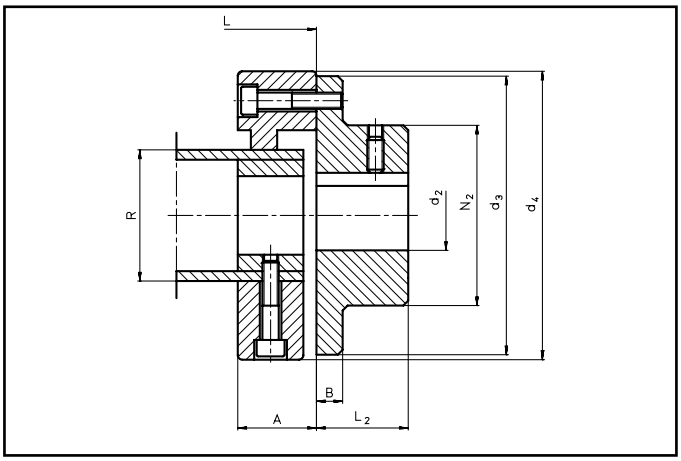
Execution with tensioner (standard feature)

Size	Dimensions [mm]								
	A	B	d_1	d_2	d_3	d_4	L_2	N_2	R
GX1	24	7	8	18	56	56	24	36	30
GX2	24	8	16	32	85	88	28	55	40
GX4	28	8	20	38	100	100	30	65	45
GX8	32	10	25	47	120	125	42	80	60

Execution with groove (on request)

Size	Dimensions [mm]								
	A	B	$d_{2min.}$	$d_{2max.}$	d_3	d_4	L_2	N_2	R
GX1	24	7	10	25	56	56	24	36	30
GX2	24	8	14	38	85	88	28	55	40
GX4	28	8	16	45	100	100	30	65	45
GX8	32	10	20	55	120	125	42	80	60





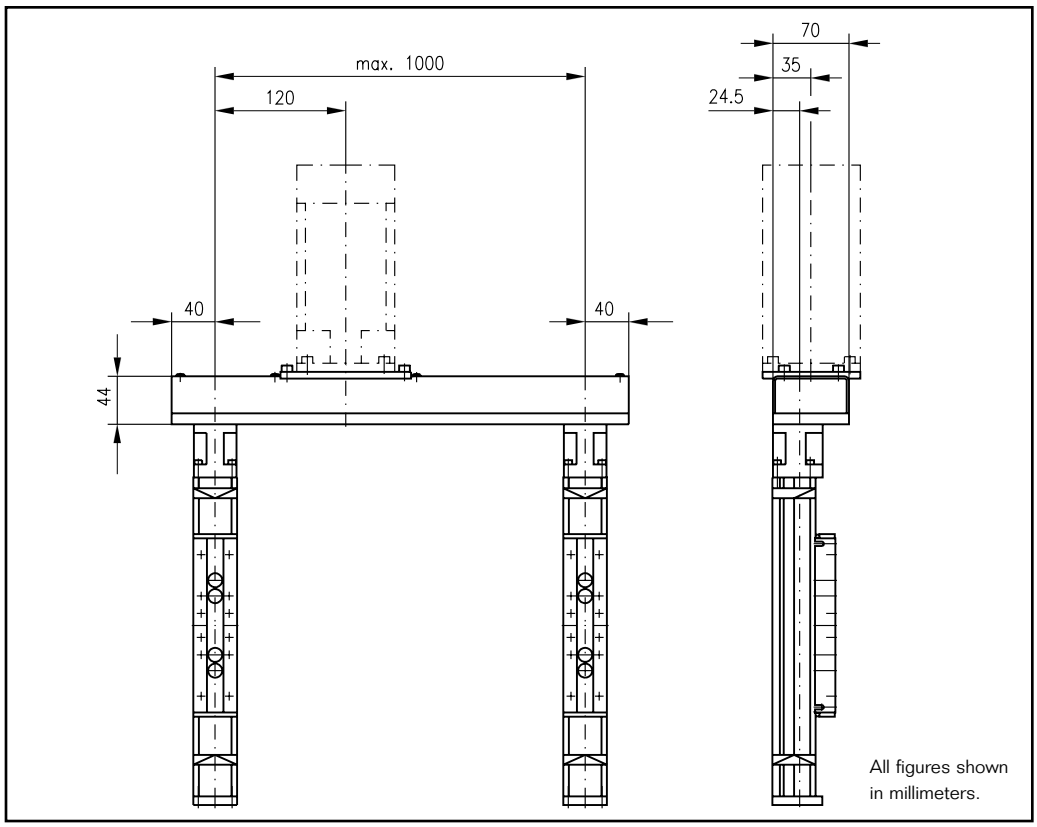
Unit conversions

Order Code see page 100

Length:	1 m=1000 mm=39.37 inches 1 inch=25.4 mm	**Geometrical moment of inertia:**	1 $m^4=10^{12}$ $mm^4=2.4025 \times 10^6$ in^4
Force:	1 N=0.225 lbf 1 lbf=4.45 N	**Mass moment of inertia:**	1 kg • $m^2=10^4$ kg • $cm^2=0.738$ lb • ft • s^2
Moment of Force:	1 Nm=0.738 lb • ft=8.85 lb • inches 1 lb • ft=1.36 Nm	**Mass:**	1 kg=2.2 lb

Accessories for WIESEL™ *POWER*Line®

Parallel belt drive



PRT40 Parallel belt drive system for WM40
Two WIESEL™ are connected by a parallel belt drive (PRT) to one motor.

Application:
- Parallel, wide guides with drive
- Basis for multi-coordinate systems
- Stops slidable in parallel

Technical data

Type	M_{max} [Nm]
PRT40	4.4

Unit conversions

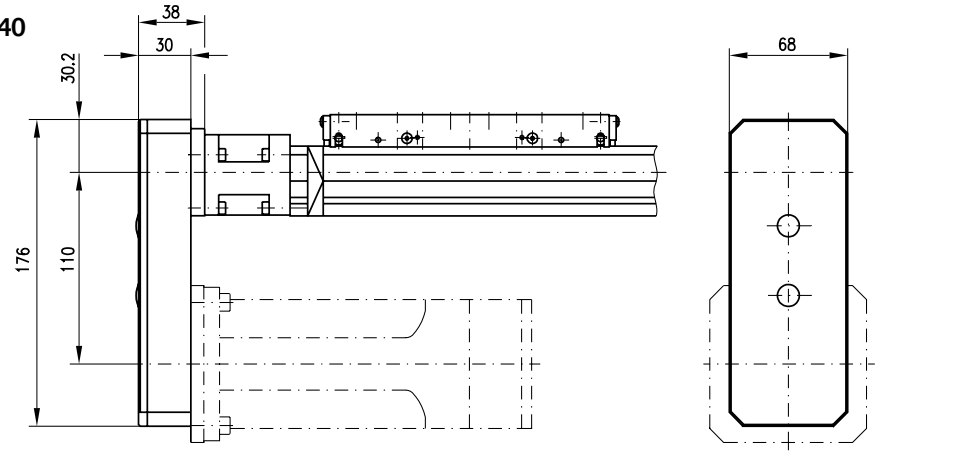
Order Code see page 100

Length:	1 m=1000 mm=39.37 inches 1 inch=25.4 mm	**Geometrical moment of inertia:**	1 $m^4=10^{12}$ $mm^4=2.4025 \times 10^6$ in^4
Force:	1 N=0.225 lbf 1 lbf=4.45 N	**Mass moment of inertia:**	1 kg • $m^2=10^4$ kg • $cm^2=0.738$ lb • ft • s^2
Moment of Force:	1 Nm=0.738 lb • ft=8.85 lb • inches 1 lb • ft=1.36 Nm	**Mass:**	1 kg=2.2 lb

Accessories for WIESEL™ *POWER*Line®, *DYNA*Line®

Timing belt drive

RT40



All figures shown in millimeters.

RT Belt drive

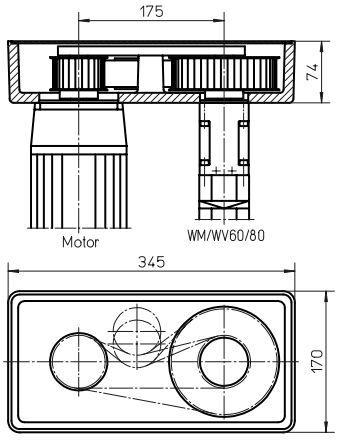
The RT 40/60/80 belt drive is a transmission designed to minimize the overall length. The RT housing (which is both belt guard and motor support) can be mounted in positions offset by 90°. The drive is provided via standard tooth belt drives.

Transmission ratios of i = 1 : 1 and i = 2 : 1 are possible. (RT 40 only i = 1:1)

Technical data

Size	M_{max} [Nm]	n_{max} input [rpm]	M_{idle} [Nm]	Efficiency η	Mass inertia J [kgcm²] 1 : 1	Weight [kg] 1 : 1
RT40	1.75	3000	app. 0.3	0.8	0.25	0.62

RT60/80



All figures shown in millimeters.

Technical data

Size	M_{max} [Nm]	n_{max} input [rpm]	M_{idle} [Nm]	Efficiency η	Mass inertia J [kgcm²] 1 : 1	Mass inertia J [kgcm²] 2 : 1	Weight [kg] 1 : 1	Weight [kg] 2 : 1
RT60	15	3000	app. 0.7	0.85	4.38	10.11	5.6	7.1
RT80	30	3000	app. 0.7	0.85	4.65	10.38	5.5	7.0

M_{max} = Maximum torque at the output shaft [Nm]
n_{max} = Maximum input speed [rpm]
M_{idle} = Idle torque [Nm]
J = Mass inertia referred to input shaft [kgcm²]

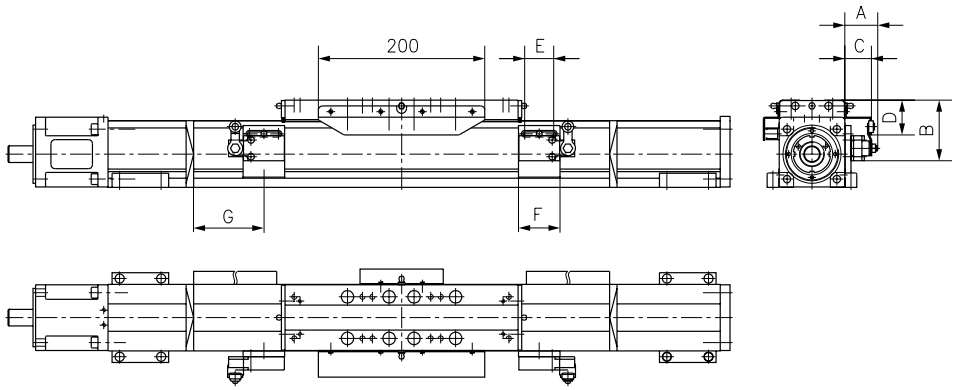
Unit conversions

Order Code see page 100

Length:	1 m=1000 mm=39.37 inches 1 inch=25.4 mm	**Geometrical moment of inertia:**	1 $m^4=10^{12}$ $mm^4=2.4025 \times 10^6$ in^4
Force:	1 N=0.225 lbf 1 lbf=4.45 N	**Mass moment of inertia:**	1 kg • $m^2=10^4$ kg • $cm^2=0.738$ lb • ft • s^2
Moment of Force:	1 Nm=0.738 lb • ft=8.85 lb • inches 1 lb • ft=1.36 Nm	**Mass:**	1 kg=2.2 lb

Accessories for WIESEL™ *POWERLine*®, *DYNA*Line®

Mechanical limit switches



All figures shown in millimeters.

ES Mechanical limit switches
Mechanical limit switches must be used wherever people may be jeopardized if the electric drive does not cut out. They are fitted in the groove which also accommodates the KAO mounting brackets in the aluminum profile and can be adjusted by means of the oblong hole provided.

Technical data
CAM-actuated mechanical limit switch XCM-B516 with roller lever.

Dual-circuit NC + NO

NC contact forcibly opened in accordance with DIN EN 60 204
Type of protection: IP 67
Max. perm. starting speed: 1.5 m/s

Size	Dimensions [mm]							
	A	B	C	D	E	F	G for WM	G for WV
WM/WV60	40	70	32	38	35	50	94	64
WM/WV80	40	73	32	42	35	50	104	64
WM/WV120	40	90	32	58	35	50	119	84

Note: Fixing of the linear unit by means of the KAO mounting brackets is not possible in the area of the base plates of the mechanical limit switches.

Unit conversions

Order Code see page 100

Length:	1 m=1000 mm=39.37 inches 1 inch=25.4 mm	**Geometrical moment of inertia:**	1 $m^4=10^{12}$ $mm^4=2.4025 \times 10^6$ in^4
Force:	1 N=0.225 lbf 1 lbf=4.45 N	**Mass moment of inertia:**	1 kg • $m^2=10^4$ kg • $cm^2=0.738$ lb • ft • s^2
Moment of Force:	1 Nm=0.738 lb • ft=8.85 lb • inches 1 lb • ft=1.36 Nm	**Mass:**	1 kg=2.2 lb