



GEAR-DRIVE SOLUTIONS

Standard or custom precision gearboxes
Standard or custom racks & pinions
Made-to-order precision gears

MIJNO
PRECISION GEARING



MIJNO (est. in France in 1919) conceives and manufactures precision gears (up to AGMA 14), ground racks (up to AGMA 12) and planetary gearboxes.

Our application assistance and manufacturing expertise have earned the trust of machine-tool, military, aerospace and nuclear industries.

We utilize the highest performance, newest generation equipment for the production and control of your transmission components. Our 120 machine-tools are used by 70 highly skilled workers that learn continuously the most innovative technologies.

We are certified ISO 9001, and manufacture according to LEAN MANUFACTURING principles.

Quality statement

Quality is inseparable from Mijno's way of thinking and performing. We focus on meeting or exceeding customer requirements while conforming to cost objectives. Customer service is a passion.

All Mijno Personnel, including management, are trained and committed to our Quality Management Policy. Continuous and dynamic improvement is an all-company mind-set nurtured by our CEO.

We are ISO 9001 v. 2000 certified. The customer audit requirement of the certification provides measurement of customer satisfaction levels and simultaneously enables discovery of new areas for improvement. Additionally, internal audit procedures evaluate performance associated with processes and assist in conceiving preventive actions to improve products and customer service. Our diligence frequently results in obtaining very high satisfaction scores, even with our most demanding customers.



Standard or custom we have your gear-drive solution



contents



P	4	6	7	8	9	10	12	18
	Translation packages	MRP	MNT	BDB	MRA	Single purpose gearboxes	Racks & pinions	Custom gears
Maximum Rated Torque*	12 000+ Nm	290 Nm	1 000 Nm	10 100 Nm	350 Nm	12 000+ Nm		
Minimum available Backlash	< 1 arc-min	< 8 arc-min	< 2 arc-min	< 1 arc-min	< 5 arc-min	< 1 arc-min		
Axial Strength	Defined according to your application or realized according to your drawings	6 000 N	18 000 N	35 000 N	5 000 N	Defined according to your application or realized according to your drawings		
Radial Strength		7 500 N	18 000 N	75 000 N	9 000 N			

1 Nm = 0.113 pound-inch / 1 N = 0.2248 pounds force

* The torque values shown for each size are maximums for their higher ratios – for lower ratios, torque ratings may be 50-90% less – for specific torque ratings vs. ratio, see our detailed. Characteristic (data) sheets for chosen sizes. The Characteristics / data sheets also contain additional data on reflected inertia, radial and axial loads, etc

Integrated power translation packages

As a leader in manufacturing racks, pinions and gearheads, MIJNO has extensive experience to share with you. Among our ranges of standard or custom racks and gearheads we very likely have products that will go well with your application. If we don't, then we can still design it and make it for you !

Our products can be assembled via a large variety of combinations ; however, some choices optimize the application. Just call us or send us an e-mail and we will suggest the best "packages" of gearhead, rack and pinion to optimize your machine. We only need to know your choice of motor, the acceleration, linear speed and strength you need, as well as your requirement for angular or linear precision - we'll do the rest !

We can securely fasten the rack pinion on a gearhead shaft upon request and deliver the whole set (gearbox, gear, racks that are guaranteed to work together).

The particularly quiet and precise running of gearbox-pinion-rack sets is ensured by:

- The use of precision ground teeth in our gearboxes according to DIN class 6 to 5 accuracy.
- Rack and pinions with ground teeth including a proprietary modification of the tooth profile

called "ROTAXE™", developed for high speed applications. This improves smoothness and reduces wear (more information on www.mijno.com). You'll hear the difference.

- « Zero backlash » racks and pinion systems.



Precision gearboxes standard features

Our expertise is gearing

- All our satellite gears are case hardened to 58-62 HRC and ground to class DIN 6 to 5 - AGMA 12 to 13.
- All our satellite gears feature MIJNO's exclusive Rotaxe® tooth profile modification. This reduces friction, increases lifetime and offers quiet operation.
- All key components are manufactured in house, under MIJNO's strict quality management.
- All bearings are oversized and purchased from the world's most reliable suppliers.
- All gears rotate on full-complement needle bearings instead of caged needle bearings for longer life and greater load capability.
- All our backlashes are guaranteed for rated gearhead life.
- All our torque ratings are conservative, calculated to provide the longest lifetime possible.

Lubrication

Gearhead Types lubricated with grease :

MRP 050 - 070 - 090 - 120 - 155 / MNT 065 / MSK / MRA 065

The above gearheads are delivered ready to mount onto your motor, lubricated with grease specifically chosen to ensure maximum performance. MIJNO installs a KLÜBER (brand) grease, which provides a nominal lifetime of 15,000 hours without grease change.

Gearhead Types lubricated with oil :

MNT 080 - 115 - 140 - 180 - 210 / MRA 080 - 115 - 140 - 180 (right angle section has grease) / BDB 085 - 120 - 145 - 180 - 250 - 300 - 330 - 365

The above gearheads are delivered ready to mount onto your motor, lubricated with a KLÜBER oil. This synthetic oil has been selected to optimally lubricate the gears, bearings and shaft seals. The oil contemplates a lifetime of 15000 to 30,000 hours.

Gearheads are oil lubricated for horizontal mounting position unless otherwise specified. Also on request, we can lubricate your gearhead for multi-position mounting.

General lubrication vs. life information :

The nominal lifetime of our gearheads generally depends on the duty cycles of the application. For an operating temperature above 90°C or under -20°C, special lubrication is recommended. For unusual environmental conditions (extreme temperatures, vacuum conditions, nuclear environment, food processing etc), please contact us.

VITON™ seals are employed in all gearboxes to resist heat and provide long life while preventing leakage.



Assembly to your motor is quickly accomplished by the integrated, self locating input pinion.

A two-screw clamping coupling secures it to the motor. Can be mounted to any motor appropriate for the gearhead torque ratings. The price includes most motor adapter flanges when needed. Unique flanges can be manufactured.

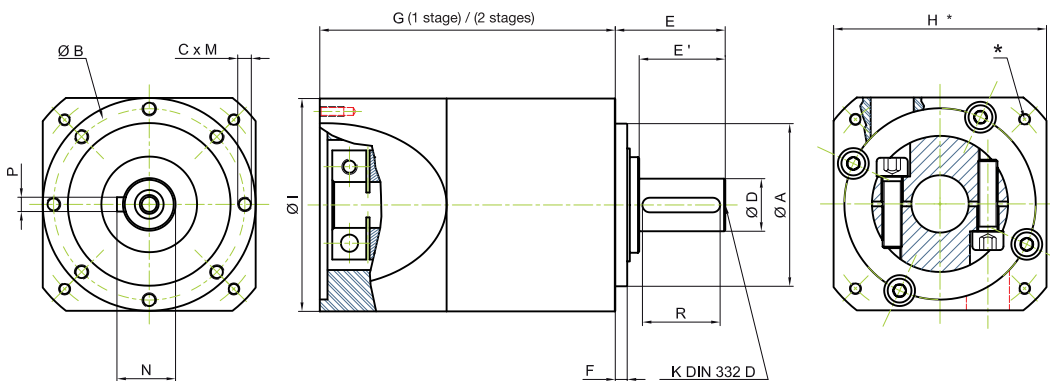
MRP LINE

Standard range dedicated to servo-applications requiring precision, robustness and economy.

- Satellite gears are cantilever supported on hardened and ground shafts
- Output shaft is supported by 2 ball bearings and is oversized in order to increase radial load capability and lifetime
- Backlash: from 15 to 8 arc-minutes
- Output end mounting face features 8 threaded holes
- Efficiency: from 91% to 96%*
- Up to 13 standard ratios* / custom ratios available
- Great choice of output interfaces (8 threaded mounting face holes & shaft hole)
- Easy 1 minute clamping onto any motor shaft (self-locating input flange)
- Standard case temperature range is -20°C to +90°C - Consult us for higher or lower temperature use
- Protection rated IP 54 standard
- Optional lubrication for food-processing or pharmaceutical industries
- Easy maintenance (every 15,000 hours)

Consult us if the solution you are looking for cannot be found in our regular catalog. Our design department can create a custom gearbox most adapted to your needs.

*depending upon ratio and size



	ØA		ØB		C	ØD		E		E'		ØH		G*	K	M		F		R		P		N	
	mm	in	mm	in		mm	in	mm	in	mm	in	mm	in			mm	in	mm	in	mm	in	mm	in	mm	in
MRP 050	35h6	1.378	44	1.732	M4	12k6	0.472	24.5	0.965	18	0.709	50	1.969	70/97	M4	8	0.31	4	0.16	16	0.63	4	0.16	13.5	0.53
MRP 070	52h6	2.047	62	2.441	M5	16k6	0.629	36	1.417	28	1.102	69	2.716	96/119	M5	10	0.39	5	0.20	25	0.98	5	0.20	18	0.71
MRP 090	68h6	2.677	80	3.149	M6	22k6	0.866	46	1.811	36	1.417	89	3.504	121/157	M8	12	0.47	5	0.20	32	1.26	6	0.24	24.5	0.96
MRP 120	90h6	3.543	108	4.252	M8	32k6	1.259	70	2.755	58	2.283	119	4.685	160/202	M12	15	0.59	6	0.24	50	1.97	10	0.39	35	1.38
MRP 155	120h6	4.724	140	5.511	M10	40k6	1.574	97	3.818	82	3.228	154	6.063	185/225	M16	20	0.79	8	0.31	60	2.36	12	0.47	43	1.69

* Depends upon No. of gear stages and motor dimensions.

Performances

		MRP 050	MRP 070	MRP 090	MRP 120	MRP 155
Input speed - Rated/Max	rpm	4000 / 6000	4000 / 6000	3500 / 6000	3000 / 5000	2000 / 3500
Rated Output Torque	Nm	7	20	50	163	290
Accel Output Torque ¹⁾	Nm	12	32	80	255	400
Gear ratio (see i = below)	i	A			B	
Efficiency ²⁾ (1 stage/2 stage)	%			96 / 91		
Maximum Backlash	arc-mins		15 or 12		12, 10 or 8	
Rated Life ³⁾	h			15 000		
Operating Temperature Range	°C ; °F			-20 / +90 ; -4 / +194 - Higher range available		
Sound level	dB (A)	≤ 64	≤ 66	≤ 68	≤ 70	≤ 71

¹⁾ S5 (intermittent duty) service ²⁾ Gearhead efficiency at full load ³⁾ At rated input speed and rated output torque

RATIO GROUP A: 1 stage, i = 4 - 5 - 7 - 10

2 stages, i = 16 - 20 - 25 - 28 - 35 - 40 - 49 - 50 - 70 - 100

RATIO GROUP B: 1 stage, i = 3 - 4 - 5 - 7 - 10

2 stages, i = 12 - 15 - 16 - 20 - 21 - 25 - 28 - 35 - 40 - 49 - 50 - 70 - 100

Please inquire for any ratio not shown.

Detailed data sheets and 3D STEP drawings can be downloaded from www.mijno.com or emailed/faxed upon request.

The torque values shown for each size are maximums – for some ratios, torque ratings may be 50-90% less – please refer to detailed data sheet.

MNT LINE

Designed for rapid acceleration or frequently reversed loads.

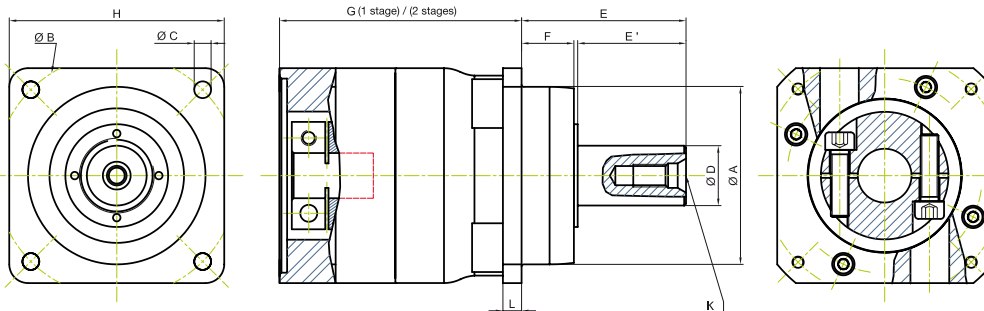
- Satellite gears are double-supported on hardened and ground shafts with full-complement needle bearings for increased torsional stiffness
- Output shaft is supported by 2 angular contact bearings for maximal radial and axial load acceptance
- Backlash from 8 to 1 arc-min max*
- 13 standard reduction ratios from 3 to 100 / custom ratios available
- ISO and DIN output interfaces
- Easy 1 minute clamping onto any motor shaft - Self-locating input flange
- Standard case temperature range is -20°C to $+90^{\circ}\text{C}$ - Consult us for higher or lower temperature use
- Protection rated IP 65 standard. IP-67 & 1500 psi water jets available
- Washdown stainless steel version available
- Optional lubricating grease for the food-processing industry
- Easy maintenance

Consult us if the solution you are looking for cannot be found in our regular catalog. Our design department can create a custom gearbox most adapted to your needs.

*depending upon ratio and size



Stainless steel version available



	ØA		ØB		C		ØD		E		E'		G*		K	H		L		F	
	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in		mm	in	mm	in	mm	in
MNT 065	60j6	2.362	75	2.953	5.5	0.217	16j6	0.630	48	1.89	28	1.10	84-107	3.31-4.21	M5	65	2.56	6	0.24	18	0.71
MNT 080	70j6	2.756	85	3.346	7	0.276	22j6	0.866	56	2.20	36	1.42	119-155	4.69-6.10	M8	83	3.27	7	0.28	18	0.71
MNT 115	95j6	3.740	130	5.118	9	0.354	32j6	1.260	88	3.46	58	2.28	130-171	5.12-6.73	M12	115	4.53	10	0.39	28	1.10
MNT 140	130j6	5.118	165	6.496	11	0.433	40j6	1.575	112	4.41	82	3.23	160-201	6.30-7.91	M16	140	5.51	12	0.47	27	1.06
MNT 180	160g6	6.299	215	8.465	13	0.512	55j6	2.165	112	4.41	82	3.23	230-275	9.05-10.83	M20	180	7.09	15	0.59	27	1.06
MNT 210	180g6	7.087	250	9.842	17	0.669	75k6	2.953	143	5.63	106	4.17	230-270	9.05-10.63	M20	210	8.27	17	0.567	35	1.38

* Depends upon No. of gear stages and motor dimensions.

Performances

		MNT 065	MNT 080	MNT 115	MNT 140	MNT 180	MNT 210	
Input speed - Rated/Max	rpm	4000 / 6000				2000 / 4000		
Rated Output Torque	Nm	35	86	270	450	700	1000	
Accel Output Torque ¹⁾	Nm	46	134	390	590	1000	1900	
Gear ratio (see i = below)	i	Group A			Group B			
Efficiency ²⁾ (1 stage/2 stage)	%	96 / 91			96 / 91			
Maximum Backlash	arc-mins	15 or 5		10 or 5 or 1			6 or 3 or 1	
Rated Life ³⁾	h	15 000						
Operating Temperature Range	°C ; °F	-20 / +90 ; -4 / +194 - Consult us for lower or higher temperature use						
Sound level	dB (A)	≤ 66	≤ 66	≤ 68	≤ 68	≤ 68	-	

¹⁾ S5 (intermittent duty) service ²⁾ Gearhead efficiency at full load ³⁾ At rated input speed and rated output torque

RATIO GROUP A: 1 stage, i = 3 - 4 - 5 - 7 - 10 2 stages, i = 16 - 20 - 25 - 35 - 50 - 70 - 100
 RATIO GROUP B: 1 stage, i = 3 - 4 - 5 - 7 - 10 2 stages, i = 16 - 20 - 25 - 35 - 50 - 70 - 100
 Please inquire for any ratio not shown.

Detailed data sheets and 3D STEP drawings can be downloaded from www.mijno.com or emailed/faxed upon request.

The torque values shown for each size are maximums – for some ratios, torque ratings may be 50-90% less – please refer to detailed data sheet.

BDB LINE

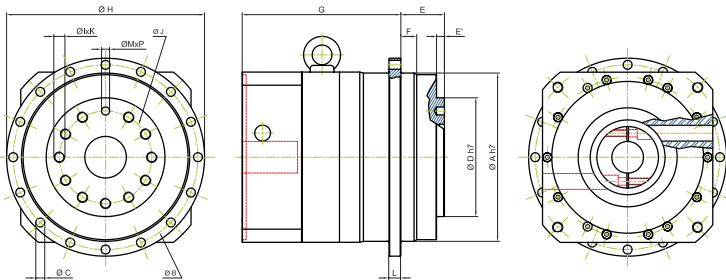
Heavy duty, very low backlash, high torsional stiffness for high torque servo applications

- Rotating output flange instead of traditional output shaft enables unique power transmission solutions. It is supported by 2 angular contact bearings or tapered roller bearings for maximal radial and axial load acceptance
- Satellite gears are double-supported on hardened and ground shafts with full complement needle bearings for increased torsional stiffness
- Very low backlash (5 to 1 arc-min max*)
- Up to 14 standard ratios from 3 to 220 / custom ratios available
- ISO or DIN output interface
- Easy 1 minute clamping onto motor shaft (self-locating input flange)
- Standard case temperature range is -20°C to +90°C - Consult us for higher or lower temperature use
- Protection rated IP 65 standard. IP-67 & 1500 psi water jets available
- Washdown stainless steel version available
- Optional lubricating grease for the food-processing industry
- Easy maintenance (every 15,000 hours)



Consult us if the solution you are looking for cannot be found in our regular catalog. Our design department can create a custom gearbox most adapted to your needs.

*depending upon ratio and size



BDB	ØA	ØB	ØH	ØC	D	E	E'	F	G*	I Depth	K	J	L	M depth	P								
	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm								
085	64h7	2.520	79	3.110	86	3.386	8 holes Ø4.5	40h7	1.575	19.5	0.768	3	0.118	7	0.28	50 - 75	1.968 - 2.953	7 holes M5 deep 7	31.5	1.240	4	0.157	Ø 5H7 deep 7
120	90h7	3.543	109	4.291	118	4.646	8 holes Ø5.5	63h7	2.480	30	1.181	6	0.236	10	0.393	75 - 113	2.952 - 4.449	7 holes M6 deep 10	50	1.968	8	0.315	Ø 6H7 deep 7
145	110h7	4.331	135	5.315	145	5.709	8 holes Ø5.5	80h7	3.150	29	1.142	6	0.236	10	0.393	75 - 115	3.031 - 4.527	11 holes M6 deep 10	63	2.480	8	0.315	Ø 6H7 deep 7
180	140h7	5.512	168	6.614	180	7.087	12 holes Ø6.5	100h7	3.937	38	1.496	6	0.236	14	0.551	135 - 165	5.315 - 6.496	11 holes M8 deep 15	80	3.150	10	0.394	Ø 8H7 deep 7
250	200h7	7.874	233	9.173	247	9.724	12 holes Ø9	160h7	6.299	50	1.968	8	0.315	15	0.590	150 - 230	5.906 - 9.055	11 holes M10 deep 20	125	4.921	12	0.472	Ø 10H7 deep 10
300	255h7	10.039	280	11.024	300	11.811	16 holes Ø13.5	180h7	7.087	66	2.598	12	0.472	20	0.787	190 - 245	7.480 - 9.646	11 holes M16 deep 25	140	5.512	18	0.702	Ø 12H7 deep 12
330	285h7	11.220	310	12.205	330	12.992	16 holes Ø13.5	200h7	7.874	75	2.952	15	0.590	20	0.787	200 - 290	7.874 - 11.417	11 holes M20 deep 30	160	6.299	20	0.787	Ø 14H7 deep 15
365	315h7	12.402	340	13.385	366	14.409	16 holes Ø13.5	220h7	8.661	75	2.952	15	0.590	20	0.787	248	9.763	11 holes M20 deep 30	180	7.086	20	0.787	Ø 16H7 deep 15

* Depends upon No. of gear stages and motor dimensions.

Performances

		BDB 085	BDB 120	BDB 145	BDB 180	BDB 250	BDB 300	BDB 330	BDB 365		
Input speed - Rated/Max	rpm	3000 / 6000	2000 / 4000						2000 / 3000		
Rated Output Torque	Nm	25	150	350	1000	1900	3500	7000	10 100		
Accel Output Torque ¹⁾	Nm	40	225	550	1500	3000	6000	10 000	12 100		
Gear ratio	i	Group A			Group B						
Efficiency 1/2/3 stages ²⁾	%	96 / 91			96 / 91 / 86						
Maximum Backlash	arc-mins	5 or 3			5, 3 or 1						3 or 1
Rated Life ³⁾	h	15 000									
Operating Temperature Range	°C ; °F	-20 / +90 ; -4 / +194 - Higher range available									
Sound level	dB (A)	≤ 63	≤ 64	≤ 64	≤ 65	≤ 65	≤ 66	≤ 68			

¹⁾ S5 (intermittent duty) service ²⁾ Gearhead efficiency at full load ³⁾ At rated input speed and rated output torque

RATIO GROUP A: 1 stage, i = 4 - 5,5 - 7 2 stages, i = 16 - 22 - 28 - 31

RATIO GROUP B: 1 stage, i = 4 - 5,5 - 7 2 stages, i = 16 - 22 - 28 - 31 3 stages, i = 40 - 60 - 66 - 88 - 91 - 110 - 154 - 220

Please inquire for any ratio not shown.

Detailed data sheets and 3D STEP drawings can be downloaded from www.mijno.com or emailed/faxed upon request.

The torque values shown for each size are maximums – for some ratios, torque ratings may be 50-90% less – please refer to detailed data sheet.

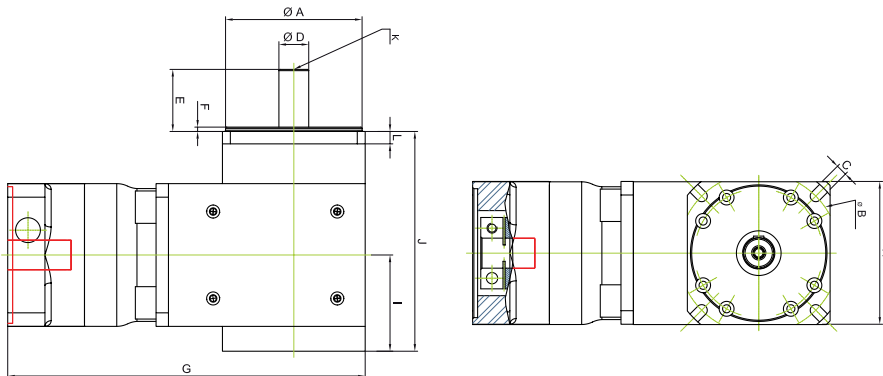
MRA LINE

Heavy duty, planetary to bevel, right-angle, servo gearbox

- Backlash: from 15 to 5 minutes*
- Hollow shaft, double shaft or quadri-shaft versions available
- Efficiency: from 91% to 96%*
- Up to 13 standard ratios* / custom ratios available
- High output torque versions available upon request
- Easy 1 minute clamping onto any motor shaft (self-locating input flange)
- Standard case temperature range is -20°C to $+90^{\circ}\text{C}$. Consult us for higher or lower temperature use
- IP 65 standard waterproofness. IP-67 & 1500 psi water jets available
- Washdown stainless steel version available
- Optional lubrication for food-processing or pharmaceutical industries
- Easy maintenance (every 15,000 hours)

Consult us if the solution you are looking for cannot be found in our regular catalog. Our design department can create a custom gearbox most adapted to your needs.

*Depending upon size and ratio



	ØA		ØB		C		ØD		E		J		G*		I		K	H		L		F	
	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	
MRA 065	60j6	2.360	75	2.953	5.5	0.217	16j6	0.630	30	1.18	125	4.72	174 - 196.5	6.85 - 7.74	49.5	1.95	M5	70	2.75	10	0.39	3.5	0.14
MRA 080	80j6	3.150	100	3.937	6.5	0.256	20j6	0.787	40	1.57	142	5.59	220 - 290	8.66 - 11.42	59	2.32	M6	83	3.27	9	0.35	3	0.12
MRA 115	110j6	4.331	130	5.118	9	0.354	24j6	0.945	50	1.97	182	6.79	278 - 361	10.94 - 14.21	77.5	3.05	M8	115	4.53	10	0.39	3.5	0.14
MRA 140	130j6	5.118	165	6.496	11	0.433	40j6	1.575	80	3.15	224	8.82	380 - 465	14.96 - 18.31	100	3.94	M16	140	5.51	15	0.59	3.5	0.14
MRA 180	160j6	6.299	215	8.465	13	0.512	55j6	2.165	96	3.78	278	10.9	465 - 595	18.31 - 23.42	114	4.49	M20	192	7.56	20	0.79	5	0.19

* Depends upon No. of gear stages and motor dimensions.

Performances

		MRA 065	MRA 080	MRA 115	MRA 140	MRA 180
Input speed - Rated/Max	rpm	4000 / 6000				2000 / 4000
Rated Output Torque	Nm	18	86	182	230	350
Accel Output Torque ¹⁾	Nm	36	134	250	400	600
Gear ratio (see i = below)	i	Group A		Group B		
Efficiency 1/2 stages ²⁾	%	96 / 91		96 / 91		
Maximum Backlash	arc-mins	15 or 5		15 or 5 or 3		
Rated Life ³⁾	h	15 000				
Operating Temperature Range	$^{\circ}\text{C}$; $^{\circ}\text{F}$	$-20 / +90$; $-4 / +194$ - Consult us for lower or higher temperature use				
Sound level	dB (A)	≤ 66		≤ 68		≤ 70

¹⁾ S5 (intermittent duty) service ²⁾ Gearhead efficiency at full load ³⁾ At rated input speed and rated output torque

RATIO GROUP A: 1stage, i = 3 - 4 - 5 - 7 - 10

2 stages, i = 16 - 20 - 25 - 35 - 70 - 100

RATIO GROUP B: 1stage, i = 3 - 4 - 5 - 7 - 10

2 stages, i = 16 - 20 - 25 - 35 - 50 - 70 - 100

Please inquire for any ratio not shown.

Detailed data sheets and 3D STEP drawings can be downloaded from www.mijno.com or emailed/faxed upon request.

The torque values shown for each size are maximums – for some ratios, torque ratings may be 50-90% less – please refer to detailed data sheet.

Single purpose gearboxes

If your preferred choice cannot be found in this catalog, our design department will define and create the custom gearbox most adapted to your needs. Our specialty is the production of technologically advanced gearing solutions for military, nuclear or high-end mechatronic applications. We manufacture all key gearbox components (gears, housings, shafts, flanges, planet carriers...) ourselves, utilizing the most precise and efficient equipment. Gear precision levels up to AGMA 14 requirements (DIN 4). We can employ the most advanced non-destructive inspection technologies (Nital tests, magnetoscopy, etc.) to provide full reports on any product we manufacture.

- Conception : from your specifications, or from your drawing
- Components either derive from our standard range (in order to optimize your costs) or are designed to meet your technical expectations. In other words, we can modify an existing design or create a 100% new product for you. All key components are manufactured by us
- Torque: up to 12,000 Nm (16,272 Lb-ft)
- In-Line, Parallel Shaft, or Right-Angle Geometry
- Various output configurations (solid shaft, flange or hollow-shaft)
- Down to 1 arc-min max backlash
- "Exotic" metals and hardening treatments when required
- Electronic components integration and testing
- From prototypes to middle-size production runs

Standard & custom racks and pinions



MIJNO has designed and manufactured precision racks since 1972 and has acquired an extensive knowledge to share with you. Based on this 35 years experience we have designed five ranges (categories) that offer proven, coherent, efficient solutions.

We have found the following 5 ranges to be popular with our customers.

RANGE & TYPICAL APPLICATION

FIRST: Precise translation of light loads.

CLASSIC: Fast and precise translations of light loads over several metres.

GOLD: Fast and precise translation of heavy loads over long distances.

PLATINIUM: High precision, silent and fast positioning of heavy loads over long distances, frequent reversals.

CARAT: Highest precision, silent and fast positioning of heavy loads over long distances.

However, if your preferred choice cannot be found in those ranges, do not hesitate to ask for your customized solution. Our R&D department will be happy to analyze your application and suggest the best option for it (steel, module, surface treatments, precision class, geometry...).

Our capabilities:

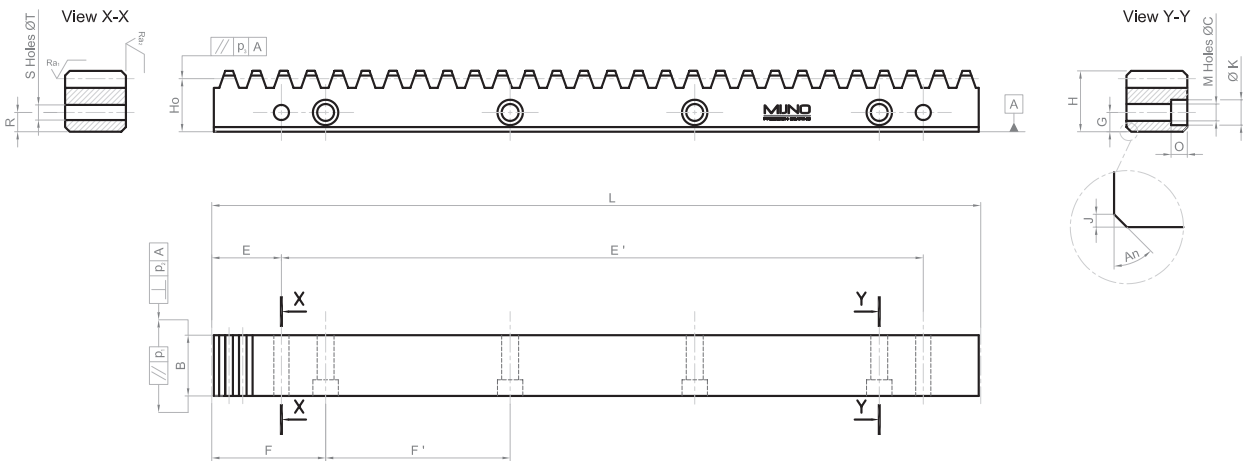
- Quantities from 1 to 1000 units.
- Large choice of steels, hardness, coatings, tests...
- Cutting and grinding from module 0.4 to module 12
- Length from 100 mm to 2100 mm (max width 300 mm)
- Precision class from DIN 8 down to DIN 4
- Round or square section, rough, milled or ground sides or diameters.
- Profiles and drilling performed on precise CNC equipment.



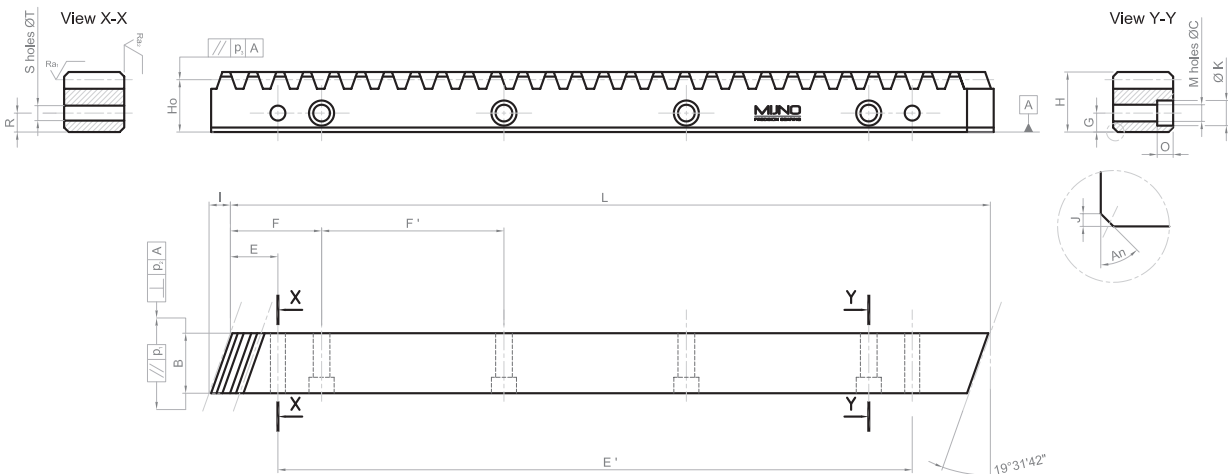


Rack grinding machine / Ground gears available on Platinum and Carat ranges.

Standard precision rack - straight teeth



Standard precision rack - helical teeth



FIRST RANGE

Economy range for precise translation of light loads.

Available modules

1, 1.5, 2, 3

Precision class	Steel	Tensile strength	Surface hardness	Teeth	Sides	//	⊥
DIN 8	C45	> 650 N / mm ²	20 HRC on teeth and sides	Cut	Rough	0.06 mm/m	-

Module	Diametral Pitch (DP)	Tooth-to-tooth pitch error	Cumulative pitch error per meter
1	25.4	± 0.016 mm	< 0.063 mm
1.5	16.9	± 0.016 mm	< 0.063 mm
2	12.7	± 0.016 mm	< 0.063 mm
3	8.5	± 0.016 mm	< 0.071 mm

How to order?

Please see the following examples:

- FIR-D-2-1000 for FIRST, straight teeth, module 2, length 1000 mm.
- FIR-H-1.5-500 for FIRST, helical teeth, module 1.5, length 500 mm.

		Module 1 B=15		Module 1 B=20		Module 2 B=20		Module 2 B=25		Module 3 B=30	
		Straight	Helical	Straight	Helical	Straight	Helical	Straight	Helical	Straight	Helical
21 teeth	Transmittable force (Ft) (N)	90	360	120	230	280	540	515	970	1490	2740
	Torque (T) (Nm)	0.9	4.0	1.3	2.6	4.4	9	11	22	47	92
	Axial strength (Fa) (N)	-	130	-	82	-	192	-	345	-	975
	Radial strength (Fr) (N)	35	140	44	90	100	210	190	375	540	1060
25 teeth	Transmittable force (Ft) (N)	140	260	180	340	425	810	770	1400	2180	4110
	Torque (T) (Nm)	1.8	3.4	2.3	4.5	8	16	19	35	80	165
	Axial strength (Fa) (N)	-	92	-	121	-	290	-	500	-	1460
	Radial strength (Fr) (N)	51	100	66	131	155	313	280	540	790	1590
30 teeth	Transmittable force (Ft) (N)	210	410	270	560	600	1150	1130	2020	3080	5880
	Torque (T) (Nm)	3.2	6.5	4.1	9	14	30	34	65	140	280
	Axial strength (Fa) (N)	-	145	-	200	-	410	-	715	-	2085
	Radial strength (Fr) (N)	76	160	100	220	220	450	410	780	1120	2270

Mod	tooth type	teeth	L	B	H	Ho	I	EE'	F	F'	R	S	T	M	G	O	C	K	J	An	Reference
1	Straight	159	499.51	15	14	13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	FIR- D- 1- 500
	Straight	318	999	15	14	13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	FIR- D- 1- 1000
	Helical 19°31'42"	150	500	15	14	13	5.32	-	-	-	-	-	-	-	-	-	-	-	-	-	FIR- D- 1- 500
	Helical 19°31'42"	300	1000	15	14	13	5.32	-	-	-	-	-	-	-	-	-	-	-	-	-	FIR- D- 1- 1000
	Straight	159	499.51	20	20	19	-	-	124.87	249.73	-	-	-	2	7.5	7	7	11	-	-	FIR- DL- 1- 500
	Straight	318	999	20	20	19	-	-	166.5	333	-	-	-	3	7.5	7	7	11	-	-	FIR- DL- 1- 1000
	Helical 19°31'42"	150	500	20	20	19	7.09	-	119.68	253.54	-	-	-	2	7.5	7	7	11	-	-	FIR- DL- 1- 500
	Helical 19°31'42"	300	1000	20	20	19	7.09	-	159.57	333.33	-	-	-	3	7.5	7	7	11	-	-	FIR- DL- 1- 1000
1.5	Straight	106	499.47	15	14	12.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	FIR- D- 1.5- 500
	Straight	212	999	15	14	12.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	FIR- D- 1.5- 1000
	Helical	100	500	15	14	12.5	5.32	-	-	-	-	-	-	-	-	-	-	-	-	-	FIR- H- 1.5- 500
	Helical	200	1000	15	14	12.5	5.32	-	-	-	-	-	-	-	-	-	-	-	-	-	FIR- H- 1.5- 1000
	Straight	106	499.47	20	20	18.5	-	-	124.87	249.73	-	-	-	2	7.5	7	7	11	-	-	FIR- DL- 1.5- 500
	Straight	212	999	20	20	18.5	-	-	166.5	333	-	-	-	3	7.5	7	7	11	-	-	FIR- DL- 1.5- 1000
	Helical	100	500	20	20	18.5	7.09	-	117.91	250	-	-	-	2	7.5	7	7	11	-	-	FIR- HL- 1.5- 500
	Helical	200	1000	20	20	18.5	7.09	-	159.57	333.33	-	-	-	3	7.5	7	7	11	-	-	FIR- HL- 1.5- 1000
2	Straight	79	496.36	20	20	18	-	-	124.09	248.18	-	-	-	2	7.5	7	7	11	-	-	FIR- D- 2- 500
	Straight	159	999	20	20	18	-	-	166.50	333	-	-	-	3	7.5	7	7	11	-	-	FIR- D- 2- 1000
	Helical	75	500	20	20	18	7.09	-	117.90	250	-	-	-	2	7.5	7	7	11	-	-	FIR- H- 2- 500
	Helical	150	1000	20	20	18	7.09	-	159.56	333.33	-	-	-	3	7.5	7	7	11	-	-	FIR- H- 2- 1000
	Straight	80	502.64	25	24	22	-	-	62.8	125.66	-	-	-	4	8	7	7	11	-	-	FIR- DL- 2- 500
	Straight	160	1005.28	25	24	22	-	-	62.8	125.66	-	-	-	8	8	7	7	11	-	-	FIR- DL- 2- 1000
	Helical 19°31'42"	75	500	25	24	22	8.86	-	62.5	125	-	-	-	4	8	7	7	11	-	-	FIR- HL- 2- 500
	Helical 19°31'42"	150	1000	25	24	22	8.86	-	62.5	125	-	-	-	8	8	7	7	11	-	-	FIR- HL- 2- 1000
3	Straight	54	508.9	30	29	26	-	-	63.62	127.23	-	-	-	4	9	9	10	15	-	-	FIR- D- 3- 500
	Straight	108	1017.9	30	29	26	-	-	63.62	127.23	-	-	-	8	9	9	10	15	-	-	FIR- D- 3- 1000
	Helical 19°31'42"	50	500	30	29	26	10.64	-	62.5	125	-	-	-	4	9	9	10	15	-	-	FIR- H- 3- 500
	Helical 19°31'42"	100	1000	30	29	26	10.64	-	62.5	125	-	-	-	8	9	9	10	15	-	-	FIR- H- 3- 1000

Module (tooth size): module is a metric pitch. Mod = 25.4 / DP (DP = Diametral Pitch)

Formulas

Beta = 19.52883333 decimal degrees = 0.3408345 radians = helix angle

D = Gear Pitch Diameter in mm = (Number of teeth x module) / cos Beta

For straight teeth, cos Beta = 1

Torque (Nm) = Ft (transmitted force in N) x D (pitch diameter in mm) / 2 x 1000

Axial strength = Fa = Transmitted force x tan Beta

Radial strength = Fr = transmitted force x tan 20° / cos Beta

1° = pi / 180 (radians) = 0.017453 radians

20° = 0.34907 radians = pressure angle of gearing

1 Nm = 0.113 pound-inch

1 N = 0.2248 pounds force

CLASSIC RANGE

Fast and precise translation of light loads over long distances.

Available modules

1, 1.5, 2, 3, 4, 5, 6, 8, 10

Precision class	Steel	Tensile strength	Surface hardness	Teeth	Sides	//	⊥
DIN 7	C45	> 650 N / mm ²	20 HRC on teeth and sides	Cut	Milled (Ra=3.2) ⁽¹⁾	0.05 mm/m	0.05 mm

⁽¹⁾ Ra= surface finish spec

How to order?

Please see the following examples:

- CLA-D-2-1000 for CLASSIC, straight teeth, module 2, length 1000 mm.
- CLA-H-1.5-500 for CLASSIC, helical teeth, module 1.5, length 500 mm.

Module	Diametral Pitch (DP)	Tooth-to-tooth pitch error	Cumulative pitch error per meter
1	25.4	± 0.011 mm	< 0.045 mm
1.5	16.9	± 0.011 mm	< 0.045 mm
2	12.7	± 0.011 mm	< 0.045 mm
3	8.5	± 0.012 mm	< 0.050 mm
4	6.4	± 0.014 mm	< 0.056 mm
5	5.0	± 0.014 mm	< 0.056 mm
6	4.2	± 0.014 mm	< 0.056 mm
8	3.2	± 0.016 mm	< 0.063 mm
10	2.5	± 0.016 mm	< 0.063 mm

		Module 1		Module 1.5		Module 2		Module 3		Module 4		Module 5		Module 6		Module 8		Module 10	
		Straight	Helical	Straight	Helical	Straight	Helical	Straight	Helical	Straight	Helical	Straight	Helical	Straight	Helical	Straight	Helical	Straight	Helical
21 teeth	Transmittable force (Ft) (N)	90	360	280	540	515	970	1490	2740	3515	6500	6530	12140	11185	19620	24140	39930	41240	67960
	Torque (T) (Nm)	0.9	4.0	4.4	9	11	22	47	92	150	290	343	675	700	1310	2025	3550	4300	7600
	Axial strength (Fa) (N)	-	130	-	190	-	345	-	975	-	2300	-	4306	-	6959	-	14162	-	24104
	Radial strength (Fr) (N)	35	140	100	210	190	375	540	1060	1280	2510	2380	4700	4070	7580	8790	15400	15000	26300
25 teeth	Transmittable force (Ft) (N)	140	260	425	810	770	1400	2180	4110	5130	9090	9260	16360	15000	25600	31730	51520	53900	86570
	Torque (T) (Nm)	1.8	3.4	8	16	19	35	80	165	260	480	580	1085	1125	2037	3173	5466	6738	11500
	Axial strength (Fa) (N)	-	92	-	290	-	500	-	1460	-	3225	-	5800	-	9080	-	18273	-	30700
	Radial strength (Fr) (N)	51	100	155	315	280	540	790	1590	1870	3510	3370	6320	5500	9900	11600	19900	19600	33400
30 teeth	Transmittable force (Ft) (N)	210	410	600	1150	1130	2020	3080	5880	7100	12490	12580	21570	20280	34010	42060	66730	70960	110290
	Torque (T) (Nm)	3.2	6.5	14	27	34	65	140	280	425	795	945	1715	1825	3250	5050	8500	10650	17600
	Axial strength (Fa) (N)	-	145	-	410	-	715	-	2085	-	4430	-	7650	-	12100	-	23700	-	39100
	Radial strength (Fr) (N)	76	160	220	445	410	780	1120	2270	2600	4825	4600	8330	7390	13200	15300	25770	25850	42600

GOLD RANGE

Fast and precise translation of heavy loads over long distances.

Available modules

1, 1.5, 2, 3, 4, 5, 6, 8, 10

Precision class	Steel	Tensile strength	Surface hardness	Teeth	Sides	//	⊥
DIN 7	Pre-treated 40CMD8	>1000 N / mm ²	34HRC on teeth and sides	Cut	Ground (Ra=0.8) ⁽¹⁾	0.04 mm/m	0.03 mm

⁽¹⁾ Ra= surface finish spec

How to order?

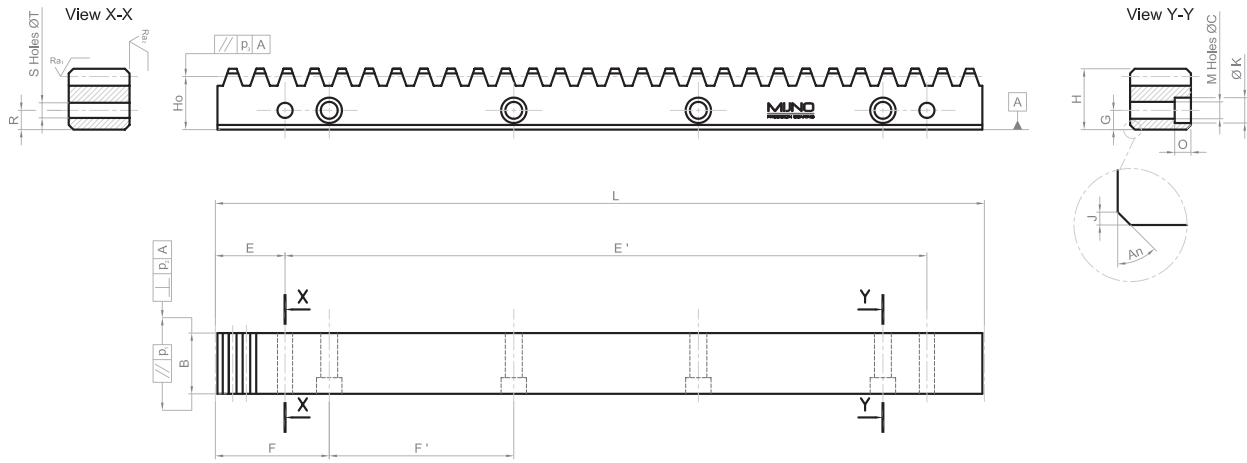
Please see the following examples:

- GOL-D-2-1000 for GOLD, straight teeth, module 2, length 1000 mm.
- GOL-H-1.5-500 for GOLD, helical teeth, module 1.5, length 500 mm.

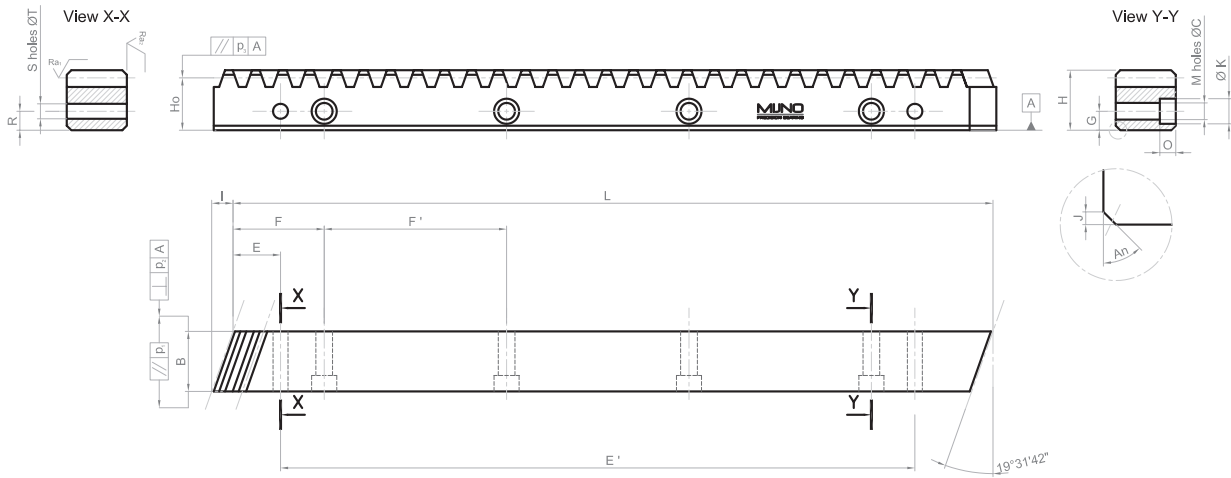
Module	Diametral Pitch (DP)	Tooth-to-tooth pitch error	Cumulative pitch error (entire rack)
1	25.4	± 0.011 mm	< 0.045 mm
1.5	16.9	± 0.011 mm	< 0.045 mm
2	12.7	± 0.011 mm	< 0.045 mm
3	8.5	± 0.012 mm	< 0.050 mm
4	6.4	± 0.014 mm	< 0.056 mm
5	5.1	± 0.014 mm	< 0.056 mm
6	4.2	± 0.014 mm	< 0.056 mm
8	3.2	± 0.016 mm	< 0.063 mm
10	2.5	± 0.016 mm	< 0.063 mm

		Module 1		Module 1.5		Module 2		Module 3		Module 4		Module 5		Module 6		Module 8		Module 10	
		Straight	Helical	Straight	Helical	Straight	Helical	Straight	Helical	Straight	Helical	Straight	Helical	Straight	Helical	Straight	Helical	Straight	Helical
21 teeth	Transmittable force (Ft) (N)	280	530	820	1460	1360	2620	3770	6850	8230	14080	14360	24040	23200	37750	47170	73200	80770	123160
	Torque (T) (Nm)	2.9	6	13	25	30	60	120	230	350	650	760	1340	1460	2525	3960	6550	8480	13700
	Axial strength (Fa) (N)	-	190	-	520	-	930	-	2430	-	5000	-	8500	-	13400	-	26000	-	43700
	Radial strength (Fr) (N)	102	205	298	564	495	1012	1372	2645	2995	5437	5227	9284	8444	14600	17200	28300	29400	47500
25 teeth	Transmittable force (Ft) (N)	430	780	1180	2170	1950	3760	5260	9140	11200	18400	19360	31470	30100	47850	61200	93100	102500	153000
	Torque (T) (Nm)	5.4	10.3	22	43	50	100	200	365	560	1000	1200	2100	2300	3800	6150	9900	12800	20500
	Axial strength (Fa) (N)	-	277	-	770	-	1350	-	3250	-	6525	-	11200	-	16900	-	33000	-	54500
	Radial strength (Fr) (N)	160	300	430	840	710	1450	1920	3530	4080	7010	7050	12150	11000	18500	22300	36000	37300	59200
30 teeth	Transmittable force (Ft) (N)	620	1160	1580	3070	2890	5160	7100	12100	14900	24100	25400	40000	40000	58000	79000	101000	128000	156000
	Torque (T) (Nm)	9.3	18.5	36	73	87	165	320	600	900	1500	1900	3200	3600	5500	9500	12900	19200	24800
	Axial strength (Fa) (N)	-	411	-	1100	-	1850	-	4300	-	8600	-	14250	-	20600	-	36000	-	55400
	Radial strength (Fr) (N)	225	450	575	1200	1050	2000	2600	4700	5500	9300	9250	15500	14700	22400	28700	39000	46600	60300

Standard precision rack - straight teeth



Standard precision rack – helical teeth



Mod	Tooth type	Number of teeth	L	B	H	Ho	I	E	E'	F	F'	R	S	T	M	G	O	C	K	J	An	Ref.			
1	Straight	160	502.65	15	15	14	-	-	-	-	-	-	-	-	-	-	-	-	-	1	45°	XYZ*	D	1	500
	Straight	320	1005.3	15	15	14	-	-	-	-	-	-	-	-	-	-	-	-	-	1	45°	XYZ*	D	1	1000
	Helical 19°31'42"	150	500	15	15	14	-	-	-	-	-	-	-	-	-	-	-	-	-	1	45°	XYZ*	H	1	500
	Helical 19°31'42"	300	1000	15	15	14	-	-	-	-	-	-	-	-	-	-	-	-	-	1	45°	XYZ*	H	1	1000
1.5	Straight	107	504.23	20	20	19	-	-	-	-	-	-	-	-	-	-	-	-	-	1	45°	XYZ*	D	1.5	500
	Straight	214	1008.45	20	20	19	-	-	-	-	-	-	-	-	-	-	-	-	-	1	45°	XYZ*	D	1.5	1000
	Helical 19°31'42"	100	500	20	20	19	-	-	-	-	-	-	-	-	-	-	-	-	-	1	45°	XYZ*	H	1.5	500
	Helical 19°31'42"	200	1000	20	20	19	-	-	-	-	-	-	-	-	-	-	-	-	-	1	45°	XYZ*	H	1.5	1000
2	Straight	80	502.66	24	24	22	-	31.3	440.1	62.8	125.7	8	2	5.7	4	8	7	7	11	2	45°	XYZ*	D	2	500
	Straight	160	1005.3	24	24	22	-	31.3	942.7	62.8	125.7	8	2	5.7	8	8	7	7	11	2	45°	XYZ*	D	2	1000
	Helical 19°31'42"	75	500	24	24	22	8.51	31.7	436.6	62.5	125	8	2	5.7	4	8	7	7	11	2	45°	XYZ*	H	2	500
	Helical 19°31'42"	150	1000	24	24	22	8.51	31.7	936.6	62.5	125	8	2	5.7	8	8	7	7	11	2	45°	XYZ*	H	2	1000
3	Straight	54	508.94	29	29	26	-	34.4	440.1	63.6	127.2	9	2	7.7	4	9	9	10	15	2	45°	XYZ*	D	3	500
	Straight	108	1017.9	29	29	26	-	34.4	949.1	63.6	127.2	9	2	7.7	8	9	9	10	15	2	45°	XYZ*	D	3	1000
	Helical 19°31'42"	50	500	29	29	26	10.29	35	430	62.5	125	9	2	7.7	4	9	9	10	15	2	45°	XYZ*	H	3	500
	Helical 19°31'42"	100	1000	29	29	26	10.29	35	930	62.5	125	9	2	7.7	8	9	9	10	15	2	45°	XYZ*	H	3	1000
4	Straight	40	502.7	39	39	35	-	37.5	427.7	62.8	125.7	12	2	7.7	4	12	9	10	15	2	45°	XYZ*	D	4	500
	Straight	80	1005.3	39	39	35	-	37.5	930.3	62.8	125.7	12	2	7.7	8	12	9	10	15	2	45°	XYZ*	D	4	1000
	Helical 19°31'42"	38	506.67	39	39	35	13.83	33.3	433	62.5	125	12	2	7.7	4	12	9	10	15	2	45°	XYZ*	H	4	500
	Helical 19°31'42"	75	1000	39	39	35	13.83	33.3	933.4	62.5	125	12	2	7.7	8	12	9	10	15	2	45°	XYZ*	H	4	1000
5	Straight	32	502.6	49	49	44	-	30.1	442.4	62.8	125.7	12	2	11.7	4	12	13	14	20	2	45°	XYZ*	D	5	500
	Straight	64	1005.3	49	49	44	-	30.1	945	62.8	125.7	12	2	11.7	8	12	13	14	20	2	45°	XYZ*	D	5	1000
	Helical 19°31'42"	30	500	49	49	44	17.38	37.5	425	62.5	125	12	2	11.7	4	12	13	14	20	2	45°	XYZ*	H	5	500
	Helical 19°31'42"	60	1000	49	49	44	17.38	37.5	925	62.5	125	12	2	11.7	8	12	13	14	20	2	45°	XYZ*	H	5	1000
6	Straight	27	508.9	59	59	53	-	31.4	446.1	63.6	127.2	16	2	15.7	4	16	17	18	26	2	45°	XYZ*	D	6	500
	Straight	54	1017.8	59	59	53	-	31.4	955	63.6	127.2	16	2	15.7	8	16	17	18	26	2	45°	XYZ*	D	6	1000
	Helical 19°31'42"	25	500	59	59	53	20.93	37.5	425	62.5	125	16	2	15.7	4	16	17	18	26	2	45°	XYZ*	H	6	500
	Helical 19°31'42"	50	1000	59	59	53	20.93	37.5	925	62.5	125	16	2	15.7	8	16	17	18	26	2	45°	XYZ*	H	6	1000
8	Straight	20	502.65	79	79	71	-	26.6	449.45	62.8	125.7	25	2	19.7	4	25	21	22	33	2	45°	XYZ*	D	8	500
	Straight	40	1005.3	79	79	71	-	26.6	952	62.8	125.7	25	2	19.7	8	25	21	22	33	2	45°	XYZ*	D	8	1000
	Helical 19°31'42"	18	480	79	79	71	28.02	120	240	60	120	25	2	19.7	4	25	21	22	33	2	45°	XYZ*	H	8	500
	Helical 19°31'42"	36	960	79	79	71	28.02	120	720	60	120	25	2	19.7	8	25	21	22	33	2	45°	XYZ*	H	8	1000
10	Straight	16	502.65	99	99	89	-	125.66	-	62.83	125.7	32	2	19.7	4	32	32	33	48	2	45°	XYZ*	D	10	500
	Straight	32	1005.3	99	99	89	-	125.66	753.96	62.83	125.7	32	2	19.7	8	32	32	33	48	2	45°	XYZ*	D	10	1000
	Helical 19°31'42"	15	500	99	99	89	35.11	125	-	62.5	125	32	2	19.7	4	32	32	33	48	2	45°	XYZ*	H	10	500
	Helical 19°31'42"	30	1000	99	99	89	35.11	125	750	62.5	125	32	2	19.7	8	32	32	33	48	2	45°	XYZ*	H	10	1000

* references of the CLASSIC range start with CLA; references of the GOLD range start with GOL
 Module (tooth size): module is a metric pitch. Mod = 25.4 / DP (DP = Diametral Pitch)

PLATINIUM RANGE

Heavy duty, precise and fast positioning of heavy loads.

Available modules

5, 6, 8

Precision class	Steel	Tensile strength	Surface hardness	Teeth	Sides	//	⊥
DIN 6	Induction-hardened C45	> 650 N / mm ²	50->55 HRC on teeth	Ground Rotaxe®	Ground (Ra=0.8) ⁽¹⁾	0.02 mm/m	0.02 mm

*Proprietary modification of tooth profile for quietness - does not compromise interchangeability with the standard tooth profiles.

⁽¹⁾ Ra= surface finish spec

Mod	Diametral Pitch (DP)	Tooth-to-tooth pitch error	Cumulative pitch error per meter
5	5.1	± 0.010 mm	< 0.040 mm
6	4.2	± 0.010 mm	< 0.040 mm
8	3.2	± 0.011 mm	< 0.040 mm

		Module 5		Module 6		Module 8	
		Straight	Helical	Straight	Helical	Straight	Helical
21 teeth	Transmittable force (Ft) (N)	30820	38740	44800	55500	78300	97000
	Torque (T) (Nm)	1600	2200	2800	3700	6600	8700
	Axial strength (Fa) (N)	-	13800	-	19700	-	34500
	Radial strength (Fr) (N)	11200	15000	16300	21500	28500	37500
25 teeth	Transmittable force (Ft) (N)	32300	39900	46500	57000	81300	99800
	Torque (T) (Nm)	2000	2650	3500	4500	8100	10600
	Axial strength (Fa) (N)	-	14100	-	20200	-	35500
	Radial strength (Fr) (N)	11800	15400	16900	22000	29600	38500
30 teeth	Transmittable force (Ft) (N)	33000	40500	47800	58000	83600	102000
	Torque (T) (Nm)	2500	3200	4300	5550	10000	13000
	Axial strength (Fa) (N)	-	14400	-	20600	-	36000
	Radial strength (Fr) (N)	12000	15700	17400	22400	30500	39300

How to order?

Please see the following examples:

- PLA-D-8-1000 for platinum, straight teeth, module 8, length 1000 mm.
- PLA-H-6-1000 for platinum, helical teeth, module 6, length 1000 mm.

CARAT RANGE

Highest precision, silent and fast positioning of heavy loads.

Available modules

1, 1.5, 2, 3, 4, 5, 6, 8, 10

Precision class	Steel	Tensile strength	Surface hardness	Teeth	Sides	//	⊥
DIN 5	Pre-treated 40CMD8	>1000 N / mm ²	34HRC on teeth and sides	Ground Rotaxe®*	Ground (Ra=0.8) ⁽¹⁾	0.02 mm/m	0.015 mm

*Proprietary modification of tooth profile for quietness - does not compromise interchangeability with the standard tooth profiles.

⁽¹⁾ Ra= surface finish spec

How to order?

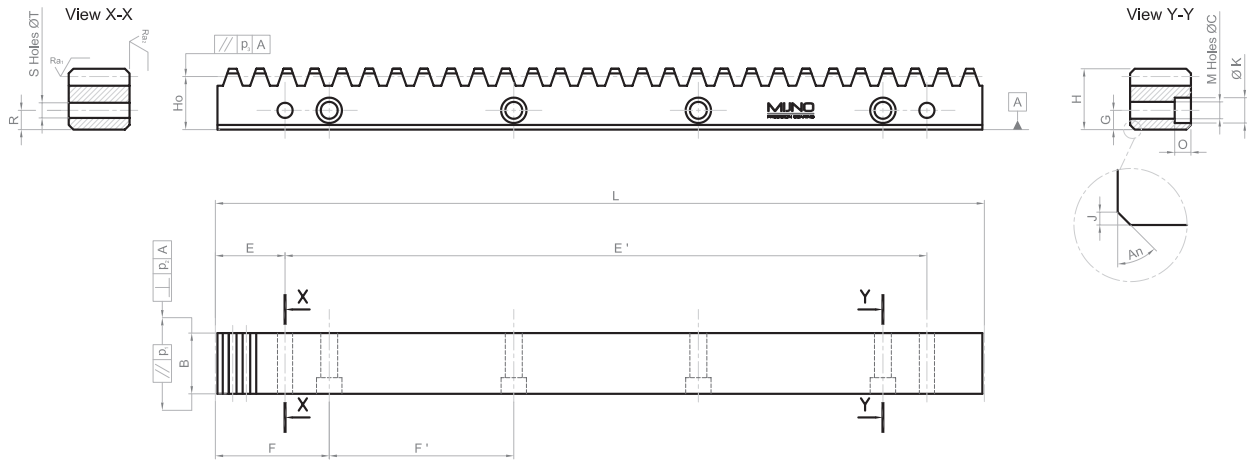
Please see the following examples:

- CAR-D-2-1000 for CARAT, straight teeth, module 2, length 1000 mm.
- CAR-H-1.5-500 for CARAT, helical teeth, module 1.5, length 500 mm.

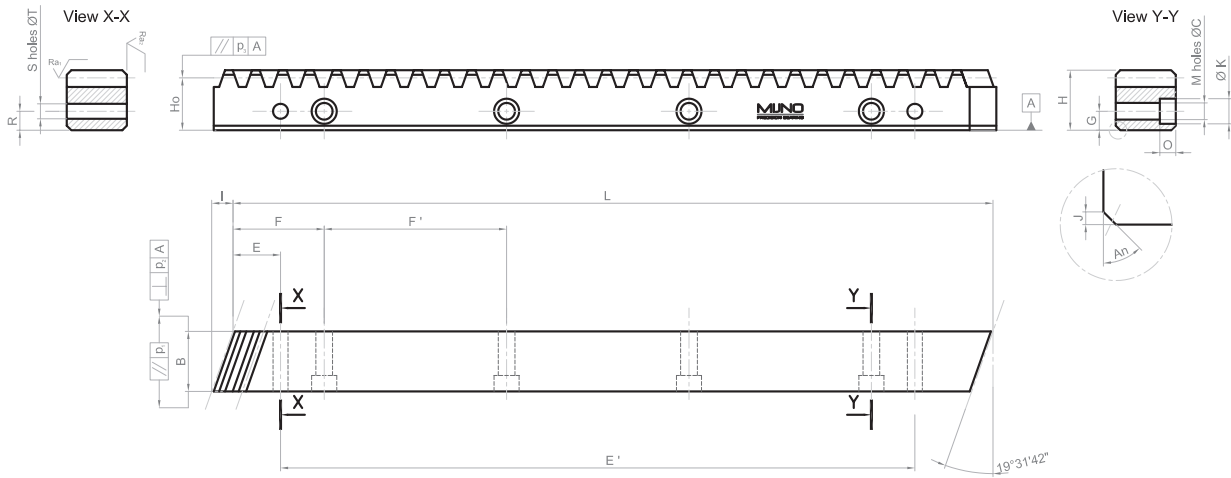
Mod	Diametral Pitch (DP)	tooth-to-tooth pitch error	Cumulative pitch error per meter
1	25.4	± 0.006 mm	< 0.025 mm
1.5	16.9	± 0.006 mm	< 0.025 mm
2	12.7	± 0.006 mm	< 0.025 mm
3	8.5	± 0.006 mm	< 0.025 mm
4	6.4	± 0.007 mm	< 0.028 mm
5	5.1	± 0.007 mm	< 0.028 mm
6	4.2	± 0.007 mm	< 0.028 mm
8	3.2	± 0.008 mm	< 0.028 mm
10	2.5	± 0.008 mm	< 0.028 mm

		Module 1		Module 1.5		Module 2		Module 3		Module 4		Module 5		Module 6		Module 8		Module 10	
		Straight	Helical	Straight	Helical	Straight	Helical	Straight	Helical	Straight	Helical	Straight	Helical	Straight	Helical	Straight	Helical	Straight	Helical
21 teeth	Transmittable force (Ft) (N)	280	530	820	1460	1360	2620	3770	6850	8230	14080	14360	24040	23200	37750	47170	73200	80770	123160
	Torque (T) (Nm)	2.9	6	13	25	30	60	120	230	350	650	760	1340	1460	2525	3960	6550	8480	13700
	Axial strength (Fa) (N)	-	190	-	520	-	930	-	2430	-	5000	-	8500	-	13400	-	26000	-	43700
	Radial strength (Fr) (N)	102	205	298	564	495	1012	1372	2645	2995	5437	5227	9284	8444	14600	17200	28300	29400	47500
25 teeth	Transmittable force (Ft) (N)	430	780	1180	2170	1950	3760	5260	9140	11200	18400	19360	31470	30100	47850	61200	93100	102500	153000
	Torque (T) (Nm)	5.4	10.3	22	43	50	100	200	365	560	1000	1200	2100	2300	3800	6150	9900	12800	20500
	Axial strength (Fa) (N)	-	277	-	770	-	1350	-	3250	-	6525	-	11200	-	16900	-	33000	-	54500
	Radial strength (Fr) (N)	160	300	430	840	710	1450	1920	3530	4080	7010	7050	12150	11000	18500	22300	36000	37300	59200
30 teeth	Transmittable force (Ft) (N)	620	1160	1580	3070	2890	5160	7100	12100	14900	24100	25400	40000	40000	58000	79000	101000	128000	156000
	Torque (T) (Nm)	9.3	18.5	36	73	87	165	320	600	900	1500	1900	3200	3600	5500	9500	12900	19200	24800
	Axial strength (Fa) (N)	-	411	-	1100	-	1850	-	4300	-	8600	-	14250	-	20600	-	36000	-	55400
	Radial strength (Fr) (N)	225	450	575	1200	1050	2000	2600	4700	5500	9300	9250	15500	14700	22400	28700	39000	46600	60300

Standard precision rack - straight teeth



Standard precision rack – helical teeth



Mod	Tooth type	Number of teeth	L	B	H	Ho	I	E	E'	F	F'	R	S	T	M	G	O	C	K	J	An	Ref.			
1	Straight	160	502.65	15	15	14	-	-	-	-	-	-	-	-	-	-	-	-	-	1	45°	XYZ*	D	1	500
	Straight	320	1005.3	15	15	14	-	-	-	-	-	-	-	-	-	-	-	-	-	1	45°	XYZ*	D	1	1000
	Helical 19°31'42"	150	500	15	15	14	-	-	-	-	-	-	-	-	-	-	-	-	-	1	45°	XYZ*	H	1	500
	Helical 19°31'42"	300	1000	15	15	14	-	-	-	-	-	-	-	-	-	-	-	-	-	1	45°	XYZ*	H	1	1000
1.5	Straight	107	504.23	20	20	19	-	-	-	-	-	-	-	-	-	-	-	-	-	1	45°	XYZ*	D	1.5	500
	Straight	214	1008.45	20	20	19	-	-	-	-	-	-	-	-	-	-	-	-	-	1	45°	XYZ*	D	1.5	1000
	Helical 19°31'42"	100	500	20	20	19	-	-	-	-	-	-	-	-	-	-	-	-	-	1	45°	XYZ*	H	1.5	500
	Helical 19°31'42"	200	1000	20	20	19	-	-	-	-	-	-	-	-	-	-	-	-	-	1	45°	XYZ*	H	1.5	1000
2	Straight	80	502.66	24	24	22	-	31.3	440.1	62.8	125.7	8	2	5.7	4	8	7	7	11	2	45°	XYZ*	D	2	500
	Straight	160	1005.3	24	24	22	-	31.3	942.7	62.8	125.7	8	2	5.7	8	8	7	7	11	2	45°	XYZ*	D	2	1000
	Helical 19°31'42"	75	500	24	24	22	8.51	31.7	436.6	62.5	125	8	2	5.7	4	8	7	7	11	2	45°	XYZ*	H	2	500
	Helical 19°31'42"	150	1000	24	24	22	8.51	31.7	936.6	62.5	125	8	2	5.7	8	8	7	7	11	2	45°	XYZ*	H	2	1000
3	Straight	54	508.94	29	29	26	-	34.4	440.1	63.6	127.2	9	2	7.7	4	9	9	10	15	2	45°	XYZ*	D	3	500
	Straight	108	1017.9	29	29	26	-	34.4	949.1	63.6	127.2	9	2	7.7	8	9	9	10	15	2	45°	XYZ*	D	3	1000
	Helical 19°31'42"	50	500	29	29	26	10.29	35	430	62.5	125	9	2	7.7	4	9	9	10	15	2	45°	XYZ*	H	3	500
	Helical 19°31'42"	100	1000	29	29	26	10.29	35	930	62.5	125	9	2	7.7	8	9	9	10	15	2	45°	XYZ*	H	3	1000
4	Straight	40	502.7	39	39	35	-	37.5	427.7	62.8	125.7	12	2	7.7	4	12	9	10	15	2	45°	XYZ*	D	4	500
	Straight	80	1005.3	39	39	35	-	37.5	930.3	62.8	125.7	12	2	7.7	8	12	9	10	15	2	45°	XYZ*	D	4	1000
	Helical 19°31'42"	38	506.67	39	39	35	13.83	33.3	433	62.5	125	12	2	7.7	4	12	9	10	15	2	45°	XYZ*	H	4	500
	Helical 19°31'42"	75	1000	39	39	35	13.83	33.3	933.4	62.5	125	12	2	7.7	8	12	9	10	15	2	45°	XYZ*	H	4	1000
5	Straight	32	502.6	49	49	44	-	30.1	442.4	62.8	125.7	12	2	11.7	4	12	13	14	20	2	45°	XYZ*	D	5	500
	Straight	64	1005.3	49	49	44	-	30.1	945	62.8	125.7	12	2	11.7	8	12	13	14	20	2	45°	XYZ*	D	5	1000
	Helical 19°31'42"	30	500	49	49	44	17.38	37.5	425	62.5	125	12	2	11.7	4	12	13	14	20	2	45°	XYZ*	H	5	500
	Helical 19°31'42"	60	1000	49	49	44	17.38	37.5	925	62.5	125	12	2	11.7	8	12	13	14	20	2	45°	XYZ*	H	5	1000
6	Straight	27	508.9	59	59	53	-	31.4	446.1	63.6	127.2	16	2	15.7	4	16	17	18	26	2	45°	XYZ*	D	6	500
	Straight	54	1017.8	59	59	53	-	31.4	955	63.6	127.2	16	2	15.7	8	16	17	18	26	2	45°	XYZ*	D	6	1000
	Helical 19°31'42"	25	500	59	59	53	20.93	37.5	425	62.5	125	16	2	15.7	4	16	17	18	26	2	45°	XYZ*	H	6	500
	Helical 19°31'42"	50	1000	59	59	53	20.93	37.5	925	62.5	125	16	2	15.7	8	16	17	18	26	2	45°	XYZ*	H	6	1000
8	Straight	20	502.65	79	79	71	-	26.6	449.45	62.8	125.7	25	2	19.7	4	25	21	22	33	2	45°	XYZ*	D	8	500
	Straight	40	1005.3	79	79	71	-	26.6	952	62.8	125.7	25	2	19.7	8	25	21	22	33	2	45°	XYZ*	D	8	1000
	Helical 19°31'42"	18	480	79	79	71	28.02	120	240	60	120	25	2	19.7	4	25	21	22	33	2	45°	XYZ*	H	8	500
	Helical 19°31'42"	36	960	79	79	71	28.02	120	720	60	120	25	2	19.7	8	25	21	22	33	2	45°	XYZ*	H	8	1000
10	Straight	16	502.65	99	99	89	-	125.66	-	62.83	125.7	32	2	19.7	4	32	32	33	48	2	45°	XYZ*	D	10	500
	Straight	32	1005.3	99	99	89	-	125.66	753.96	62.83	125.7	32	2	19.7	8	32	32	33	48	2	45°	XYZ*	D	10	1000
	Helical 19°31'42"	15	500	99	99	89	35.11	125	-	62.5	125	32	2	19.7	4	32	32	33	48	2	45°	XYZ*	H	10	500
	Helical 19°31'42"	30	1000	99	99	89	35.11	125	750	62.5	125	32	2	19.7	8	32	32	33	48	2	45°	XYZ*	H	10	1000

* References of the CARAT range start with CAR ; references of the PLATINIUM range start with PLA
 Module (tooth size): module is a metric pitch. Mod = 25.4 / DP (DP = Diametral Pitch)

One of our many areas of expertise is the production of middle-size annual quantities of precision gears for the defense, aerospace or machine-tool industries according to customer drawings or specifications.

Our knowledgeable methods department continually searches for innovations in tools, machines, treatments and processes. It is supported by a large variety of 120 company owned machine-tools. The different machines enable us to perform, in house, all manufacture of complex profiles requiring a high level of precision. Our production is organized in strategic task groups, each of them masters a specific core-competency (turning, CNC, gear tooth cutting, grinding, etc.). Many of our machines are connected to our CAM system, ensuring the repeatability of our quality by direct integration of your drawing into our system.

We are located in the heart of a "high-tech" manufacturing region. We regularly invest in local subcontractors to benefit from their expertise (heat treatment, surface treatments, CNC...). We consider that their technology is an asset in our quest for unique know-how and problem solving for our customers.

We employ most nondestructive inspection technologies (nital tests, eliquation, magnetoscopy...). Dimensional inspection of gear tooth profiles is performed in a Höfler/Zeiss gear inspection center running on the latest inspection software available. These techniques enable us to provide you with detailed reports on every aspect of the parts we manufacture.



Gears

For over 90 years we have refined an extensive knowledge of defining manufacturing processes most appropriate to your gear's complexity. As a result, upon delivery, your part will conform the "first time" to specifications.

● INTERNAL TEETH

Precision class down to ISO 6 / DIN 6 / AGMA 12



BEVEL GEARS

Mod 0.5 to 10

Dia from 20 mm to 500 mm

● Precision class Down to ISO 6 / DIN 6 / AGMA 12



CYLINDRICAL GEARS

Mod 0.4 to 10

Dia. 5 mm to 500 mm

Precision class down to ISO

● 4 / DIN 4 / AGMA 14

● SPLINED SHAFTS

Max. length = 2000 mm

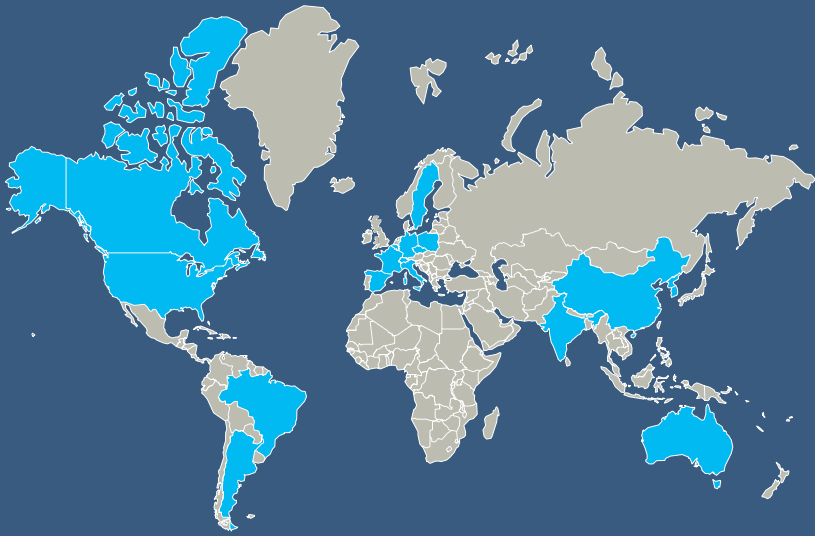
Max. dia = 200 mm

Max weight = 400 Kg



● WORM AND WORM WHEEL

● Module 0.4 to 8



All our products are available world-wide through our distribution network; do not hesitate to contact us at mijno@mijno.com to know your nearest contact person.

MIJNO

PRECISION GEARING

HOME OFFICE

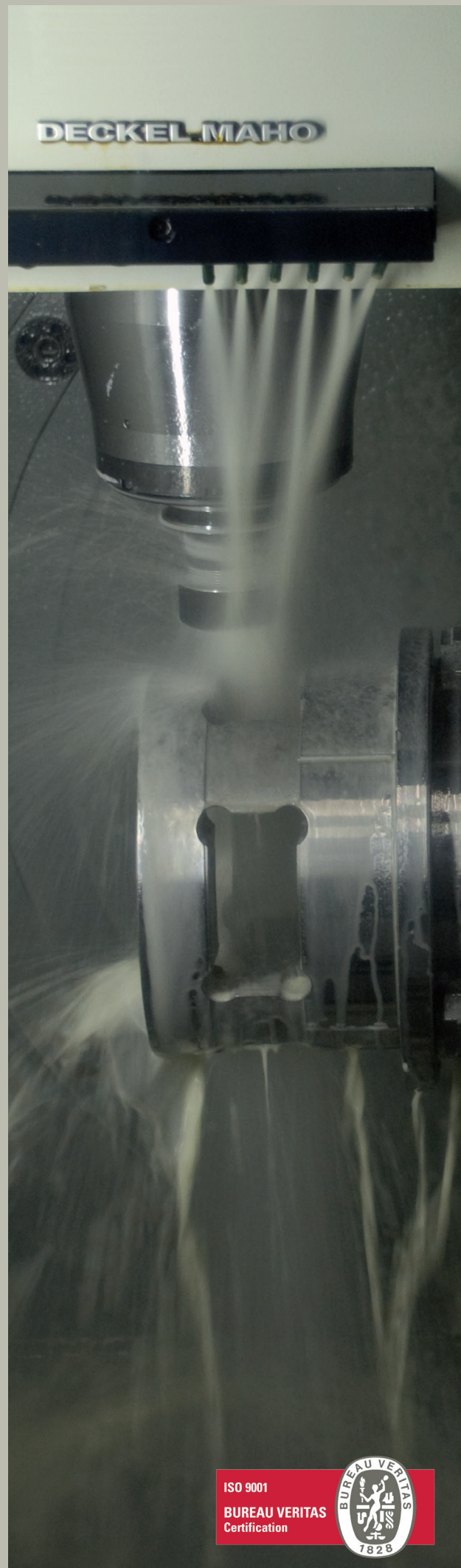
MIJNO PRECISION GEARING

17 rue de la Talaudière - BP 10003
42001 Saint-Étienne cedex
FRANCE
Tél. +33 (0)4 77 42 82 05
Fax +33 (0)4 77 37 74 44
mijno@mijno.com

MIJNO-USA

531 Juniper Lane
Windsor, CA 95492
USA
Cell : (1) 707-321-4447
v.marlowe@mijno-usa.com
www.mijno-usa.com

www.mijno.com



ISO 9001

BUREAU VERITAS
Certification

