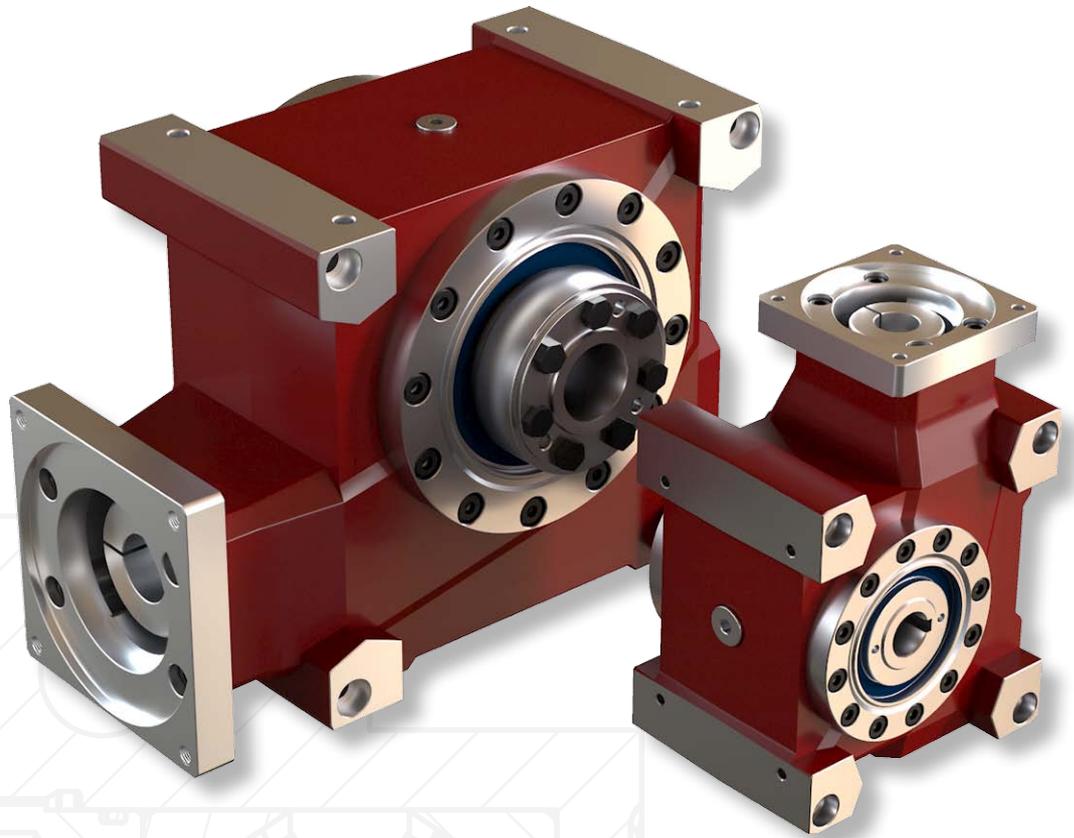


Servotak®

PRECISION GEARBOXES



MA

Right Angle Precision Gearboxes

Tabla de contenidos

Cutting Edge Mechanical Transmission Technology	3
Overview	4
Quick Selection	6
Two Use Cases, Two Bearing Types	7
High Efficiency? Always	8
Output Shaft Types	9
Technical Specifications	10
MA-040	10
MA-050	12
MA-063	14
MA-080	16
MA-100	18
Dimensions	20
Hollow Output Shaft with Keyway (1 stage)	20
Hollow Output Shaft with Keyway (2 stages)	22
Hollow Output Shaft with Shrink Disk (1 stage)	24
Hollow Output Shaft with Shrink Disk (2 stages)	26
Referencia de pedido	28

This is a translation of a document originally written in Spanish. This document has been created with utmost care, to present the information therein in a clear and concise manner. The Axis Automation SLU (from now on, "the company") shall not be held responsible for any error or typo. Technical specifications are subject to improvement without prior notice. Copying this catalogue is forbidden without the company's express consent. SERVOTAK is a registered trademark, owned by the company.

Cutting Edge Mechanical Transmission Technology

Servotak MA gearboxes employ the latest precision worm gear technology, thus offering the highest performance for motion control applications that demand the highest precision and repeatability.

Their unique tooth profile offers high power density, high torsional stiffness, stable backlash over the whole life of the gearbox, and excellent reliability. These characteristics make them ideal for any project in the fields of robotics, machine tools, packaging or any other machine with one or more synchronized axes at an incredibly affordable price.

MA gearboxes offer 3 important innovations: user adjustable backlash, two bearing configurations depending on the machine's duty cycle, and an integrated pressure compensation chamber that removes the need for vent plugs.

On top of the transmission ratios available for one stage gearboxes, there's a two stage configuration that allows for transmission ratios of up to 390:1.



Overview

Cutting Edge Tooth Profile

- Increased power and torque transmission
- High repeatability
- Stable backlash over the whole life of the gearbox
- High efficiency and reliability

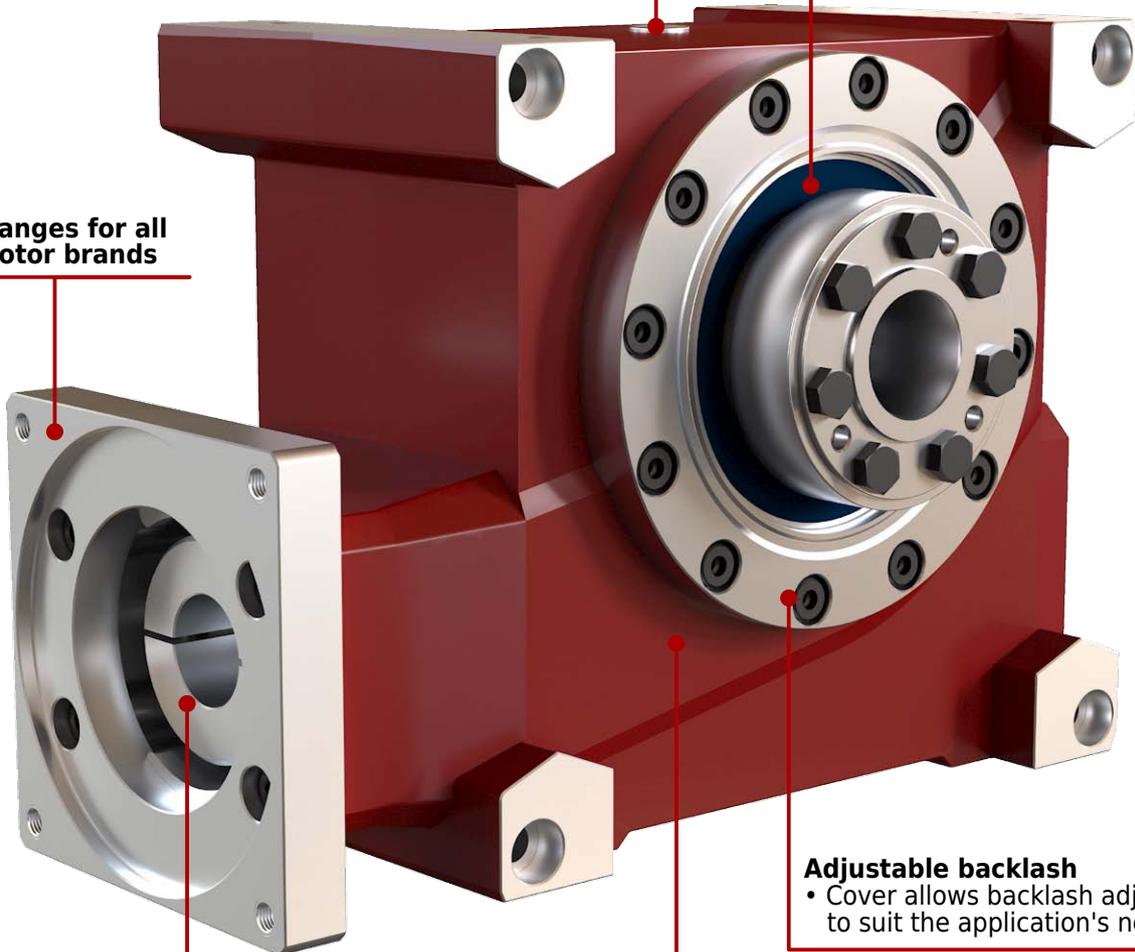
Completely oil tight

- Pressure compensation chamber that removes the need for vent plugs
- Oil leakage is impossible

Two output bearing options

- Tapered roller bearings for high radial loads: Robotics, Machine Tools, etc.
- Deep groove ball bearings: Machines that work continuous cycles

Input flanges for all servomotor brands



Backlash-free servo-coupling

- Axial compensation to protect the motor bearings
- Special servocoupling available for elevators and Z axis of machines

Adjustable backlash

- Cover allows backlash adjustment to suit the application's needs

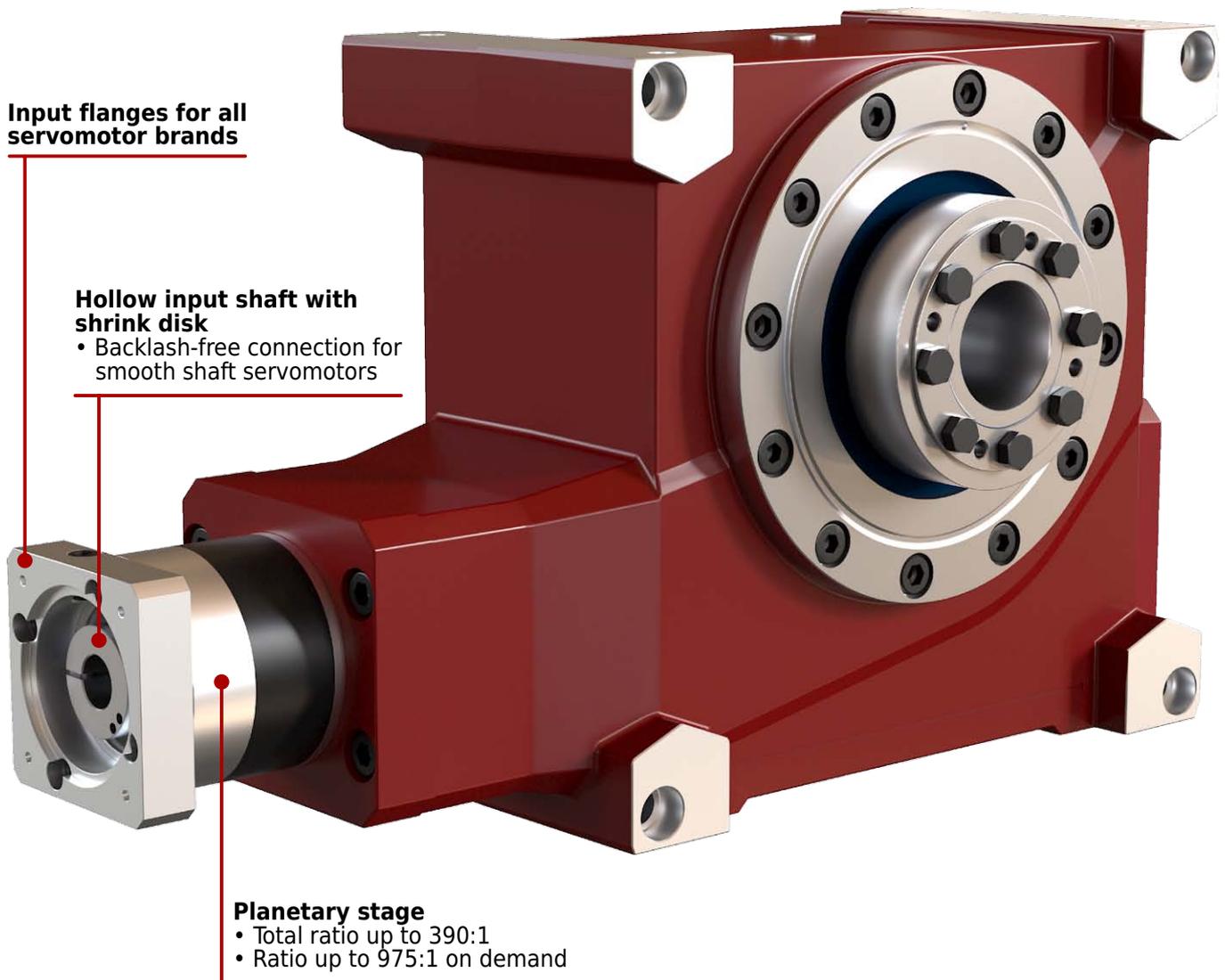
Two input bearings options

- Tapered roller bearing to absorb high axial and radial loads
- Angular contact ball bearings to allow for high input speeds

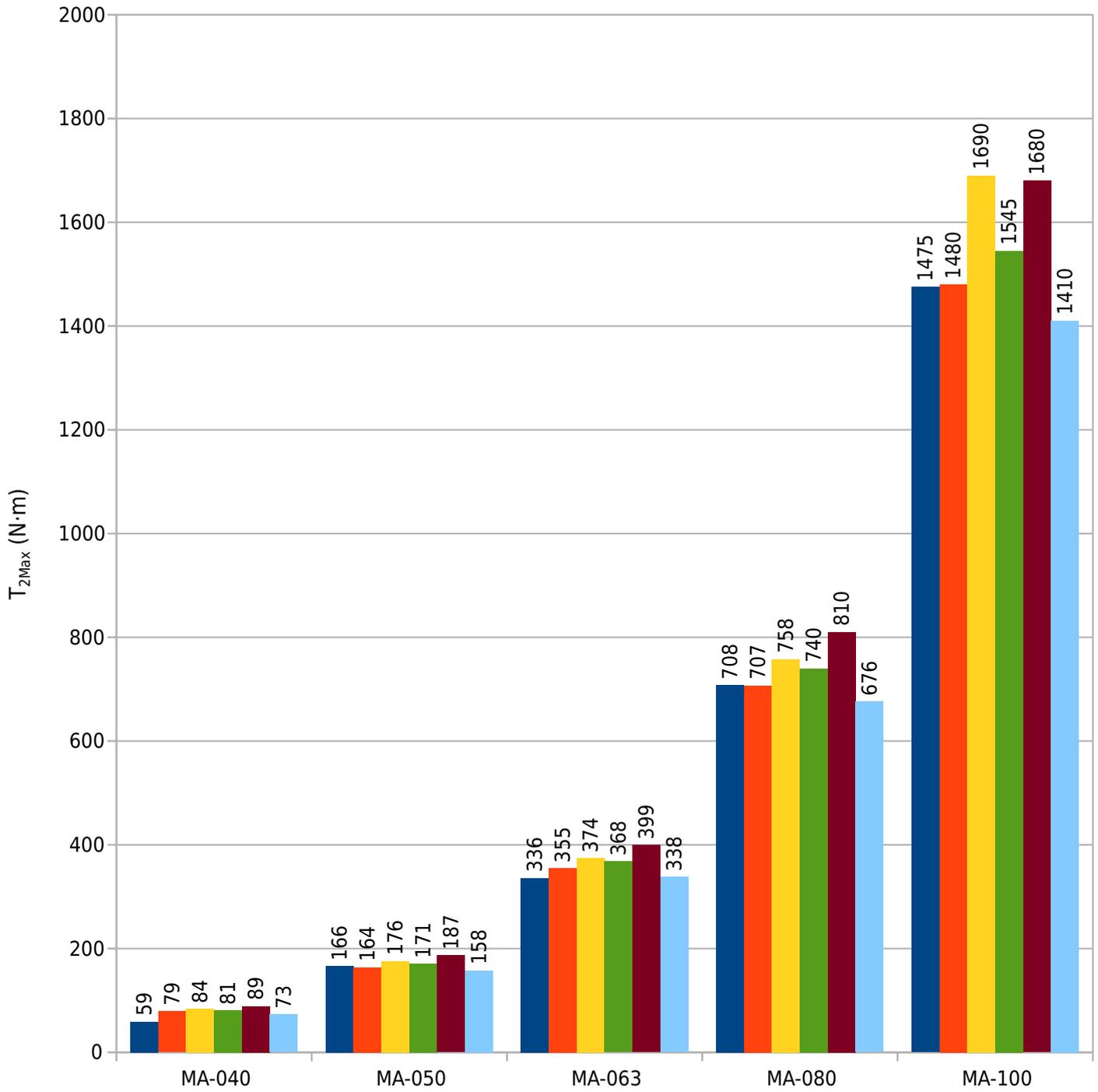
Greater torsional stiffness thanks to an oversized transmission

Suitable for food and pharma industries, NSF H1 certified

One version for all mounting positions



Quick Selection



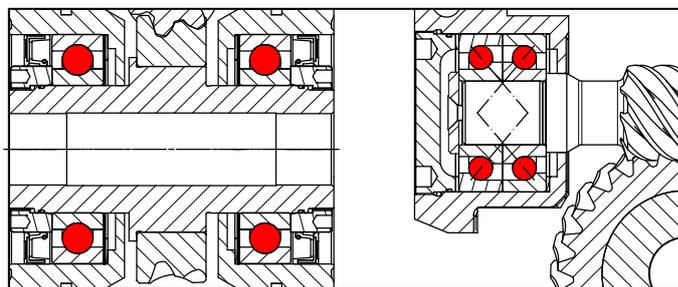
Transmission Ratio (1 stage MA gearbox)

■ 4:1 ■ 6,4:1 ■ 10:1 ■ 16:1 ■ 27:1 ■ 39:1

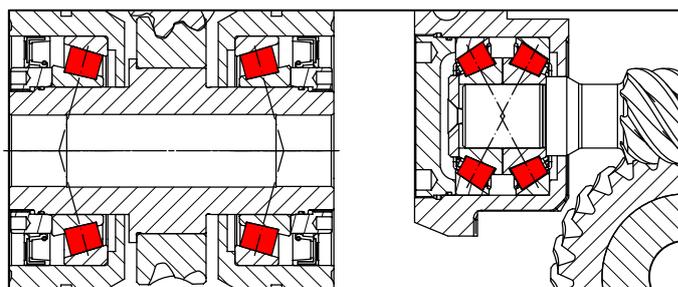
Two Use Cases, Two Bearing Types

MA gearboxes are built to handle two very different duty cycles. The customer must thus needs to select what bearing configuration suits the machine better:

- **Type B bearings:** For continuous duty cycles, MA gearboxes come with deep groove and 4 contact point ball bearings. This configuration is ideal for machines that require excellent synchronization on both speed and position: printers, presses, machines with multiple synchronized axes, etc. In this configuration, MA gearboxes work more efficiently, generating less waste heat and noise, and thus reduce electrical power consumption.

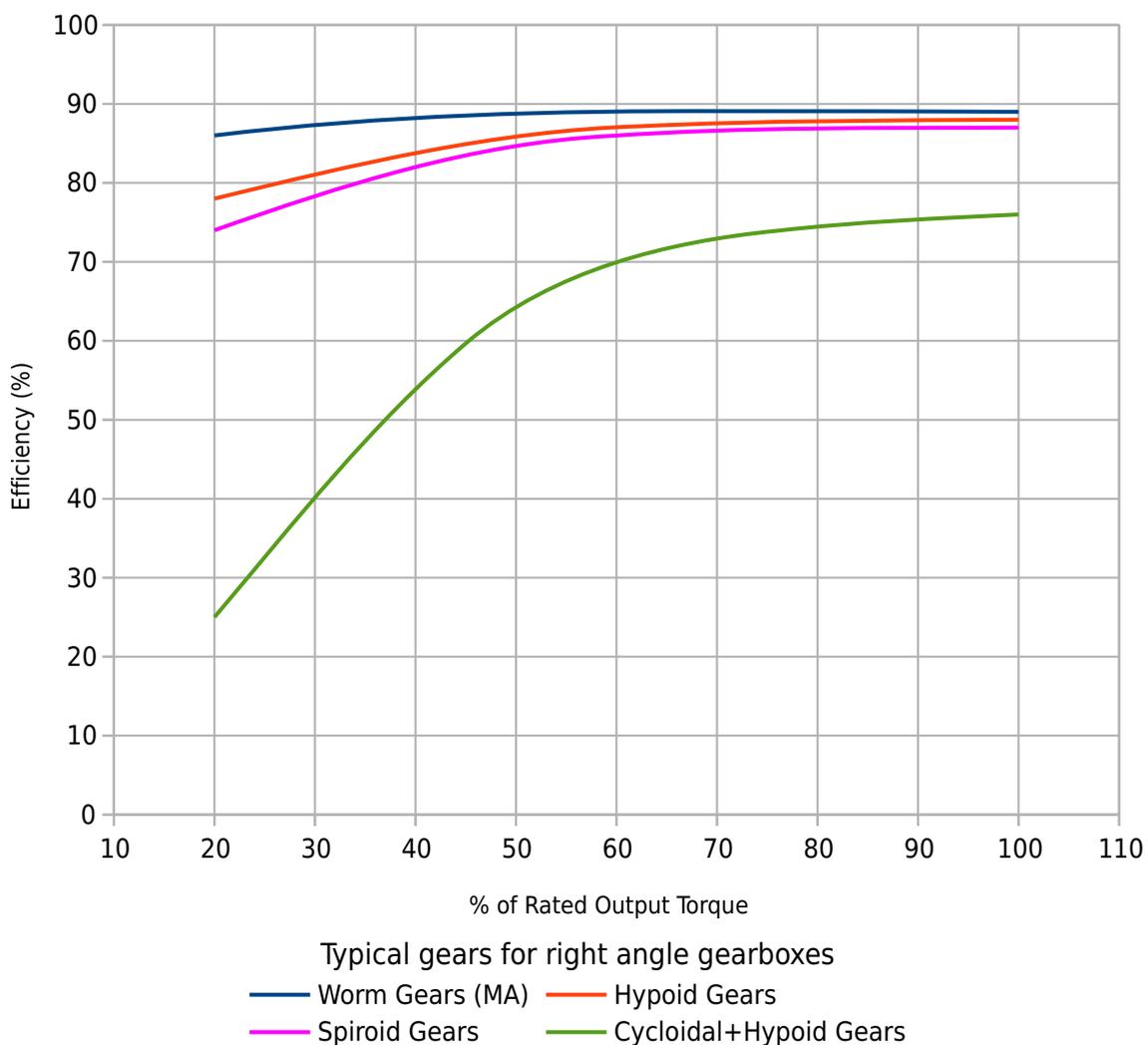


- **Type C bearings:** For intermittent duty cycles, MA gearboxes come with tapered roller bearings on the output shaft. This configuration brings a much higher rigidity and much greater radial load capacity. It's recommended for robotics, machine tools, packaging machines, machines with high number of cycles per minute, etc.



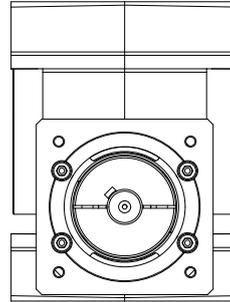
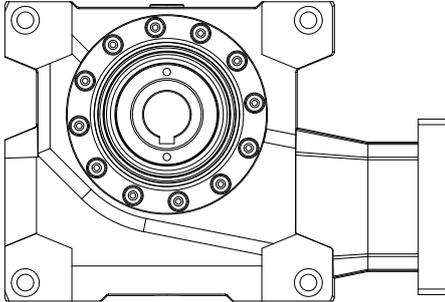
High Efficiency? Always

In motion control applications, it's common to apply medium or medium/high safety factors to protect the gearbox. This criterion forces the gearbox to operate at loads well under its the rated torque. However, this creates an issue: the rated efficiency found in the catalogue is only true at full load, and goes down as diminishes. It is not so for MA gearboxes. This diagram shows some example efficiencies as a function of the output load.



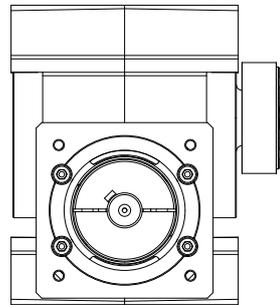
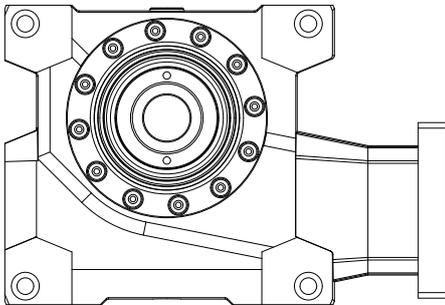
Output Shaft Types

Output Shaft with Keyway



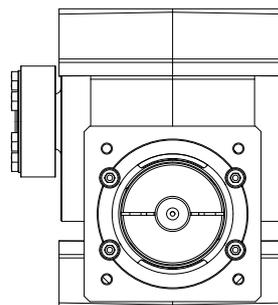
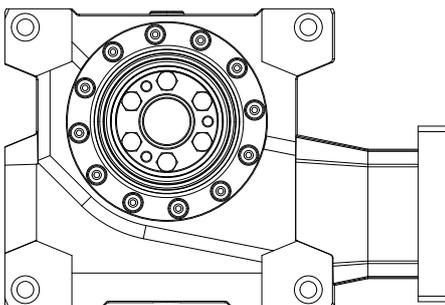
H

Output Shaft with Shrink Disk on Side 5



HS5

Output Shaft with Shrink Disk on Side 6



HS6

Technical Specifications

MA-040

MA-040-M1 (1 stage)			Transmission ratio					
			4	6,4	10	16	27	39
Maximum Acceleration Torque	T_{2max}	[N·m]	59	79	84	81	89	73
S1 Rated Torque ⁽¹⁾	T_{2S1}	[N·m]	66	82	87	84	95	73
Constant Backlash Torque ⁽²⁾	T_{2c}	[N·m]	37	48	52	53	61	43
Emergency Stop Torque	T_{2E}	[N·m]	179	195	212	203	238	164
Maximum Input Speed	n_{1max}	[rpm]	8000	8000	8000	8000	8000	8000
Standard Backlash	$\Delta\phi$	[arcmin]	<6	<6	<6	<6	<6	<6
Reduced Backlash	$\Delta\phi$	[arcmin]	<3	<3	<3	<3	<3	<3
Torsional Stiffness	C	[N·m/arcmin]	5	5	5	5	5	5
Efficiency in S1 duty cycle and under full load	η	[%]	95	94	91	86	80	72
Moment of Inertia ⁽³⁾		[kg·cm ²]	0,8	0,6	0,5	0,5	0,5	0,4
Design Life		[hours]	>20000					
Maximum Housing Temperature	T	[°C]	90					
Environmental Conditions	T_a	[°C]	-15 to +40					
Lubrication			Synthetic Oil					
Protection degree			IP-65					
Mounting Position			Any					
Mass ⁽⁴⁾	m	[kg]	5,6 - 6,8					

(1) For an cycle average input speed $n_1=1500$ rpm and without considering thermal limits. Only for this size are torque values in S1 service greater than acceleration torque values. It's a design consideration to ensure that backlash remains under control in intermittent cycles.

(2) For the whole service life of the gearbox.

(3) Depends on the motor shaft diameter and the output shaft type. Value as seen by the motor

(4) Depends on input flange type and output shaft type

MA-040-M2 (2 stages)			Transmission ratio						
			50	80	100	160	195	273	390
Maximum Acceleration Torque	T_{2max}	[N·m]	84	81	84	81	73	73	73
S1 Rated Torque ⁽¹⁾	T_{2S1}	[N·m]	87	84	87	84	73	73	73
Constant Backlash Torque ⁽²⁾	T_{2c}	[N·m]	52	53	52	53	43	43	43
Emergency Stop Torque	T_{2E}	[N·m]	212	203	212	203	164	164	164
Maximum Input Speed	n_{1max}	[rpm]	5000	5000	6000	6000	5000	6000	6000
Standard Backlash	$\Delta\phi$	[arcmin]	<6,8	<6,5	<6,8	<6,3	<6,2	<6,2	<6,2
Reduced Backlash	$\Delta\phi$	[arcmin]	<3,8	<3,5	<3,8	<3,3	<3,2	<3,2	<3,2
Torsional Stiffness	C	[N·m/arcmin]	5	5	5	5	5	5	5
Efficiency in S1 duty cycle and under full load	η	[%]	88	83	88	83	70	70	70
Moment of Inertia ⁽³⁾		[kg·cm ²]	0,33	0,33	0,31	0,31	0,33	0,31	0,30
Design Life		[hours]	>25000						
Maximum Housing Temperature	T	[°C]	90						
Environmental Conditions	T_a	[°C]	-15 to +40						
Lubrication			Synthetic Oil/Grease						
Protection degree			IP-65						
Mounting Position			Any						
Mass ⁽⁴⁾	m	[kg]	7,1 - 8,3						

(1) For an cycle average input speed $n_1=1500$ rpm and without considering thermal limits. Only for this size are torque values in S1 service greater than acceleration torque values. It's a design consideration to ensure that backlash remains under control in intermittent cycles.

(2) For the whole service life of the gearbox.

(3) Depends on the motor shaft diameter and the output shaft type. Value as seen by the motor

(4) Depends on input flange type and output shaft type

MA-050

MA-050-M1 (1 stage)			Transmission ratio					
			4	6,4	10	16	27	39
Maximum Acceleration Torque	T_{2max}	[N·m]	166	164	176	171	187	158
S1 Rated Torque ⁽¹⁾	T_{2S1}	[N·m]	120	130	168	177	187	159
Constant Backlash Torque ⁽²⁾	T_{2c}	[N·m]	110	120	129	125	137	115
Emergency Stop Torque	T_{2E}	[N·m]	357	374	420	399	471	315
Maximum Input Speed	n_{1max}	[rpm]	7000	7000	7000	7000	7000	7000
Standard Backlash	$\Delta\phi$	[arcmin]	<6	<6	<6	<6	<6	<6
Reduced Backlash	$\Delta\phi$	[arcmin]	<3	<3	<3	<3	<3	<3
Torsional Stiffness	C	[N·m/arcmin]	9	9	9	9	9	9
Efficiency in S1 duty cycle and under full load	η	[%]	96	95	92	88	81	76
Moment of Inertia ⁽³⁾		[kg·cm ²]	2,5	2,0	1,8	1,7	1,7	1,6
Design Life		[hours]	>20000					
Maximum Housing Temperature	T	[°C]	90					
Environmental Conditions	T_a	[°C]	-15 to +40					
Lubrication			Synthetic Oil					
Protection degree			IP-65					
Mounting Position			Any					
Mass ⁽⁴⁾	m	[kg]	8,5 - 11,2					

(1) For an cycle average input speed $n_1=1500$ rpm and without considering thermal limits.

(2) For the whole service life of the gearbox.

(3) Depends on the motor shaft diameter and the output shaft type. Value as seen by the motor

(4) Depends on input flange type and output shaft type

MA-050-M2 (2 stages)			Transmission ratio						
			50	80	100	160	195	273	390
Maximum Acceleration Torque	T_{2max}	[N·m]	176	171	176	171	158	158	158
S1 Rated Torque ⁽¹⁾	T_{2S1}	[N·m]	168	177	168	177	159	159	159
Constant Backlash Torque ⁽²⁾	T_{2c}	[N·m]	129	125	129	125	115	115	115
Emergency Stop Torque	T_{2E}	[N·m]	420	399	420	399	315	315	315
Maximum Input Speed	n_{1max}	[rpm]	5000	5000	6000	6000	5000	6000	6000
Standard Backlash	$\Delta\phi$	[arcmin]	<6,8	<6,5	<6,8	<6,3	<6,2	<6,2	<6,2
Reduced Backlash	$\Delta\phi$	[arcmin]	<3,8	<3,5	<3,8	<3,3	<3,2	<3,2	<3,2
Torsional Stiffness	C	[N·m/arcmin]	9	9	9	9	9	9	9
Efficiency in S1 duty cycle and under full load	η	[%]	89	85	89	85	74	74	74
Moment of Inertia ⁽³⁾		[kg·cm ²]	0,38	0,38	0,32	0,32	0,37	0,33	0,32
Design Life		[hours]	>25000						
Maximum Housing Temperature	T	[°C]	90						
Environmental Conditions	T_a	[°C]	-15 to +40						
Lubrication			Synthetic Oil/Grease						
Protection degree			IP-65						
Mounting Position			Any						
Mass ⁽⁴⁾	m	[kg]	10 - 12,7						

(1) For an cycle average input speed $n_1=1500$ rpm and without considering thermal limits.

(2) For the whole service life of the gearbox.

(3) Depends on the motor shaft diameter and the output shaft type. Value as seen by the motor

(4) Depends on input flange type and output shaft type

MA-063

MA-063-M1 (1 stage)			Transmission ratio					
			4	6,4	10	16	27	39
Maximum Acceleration Torque	T_{2max}	[N·m]	336	355	374	368	399	338
S1 Rated Torque ⁽¹⁾	T_{2S1}	[N·m]	194	249	295	380	415	405
Constant Backlash Torque ⁽²⁾	T_{2c}	[N·m]	257	265	279	274	297	247
Emergency Stop Torque	T_{2E}	[N·m]	951	999	1100	1073	1100	788
Maximum Input Speed	n_{1max}	[rpm]	5500	5500	5500	5500	5500	5500
Standard Backlash	$\Delta\phi$	[arcmin]	<6	<6	<6	<6	<6	<6
Reduced Backlash	$\Delta\phi$	[arcmin]	<2	<2	<2	<2	<2	<2
Torsional Stiffness	C	[N·m/arcmin]	31	31	31	31	31	31
Efficiency in S1 duty cycle and under full load	η	[%]	96	96	93	90	84	79
Moment of Inertia ⁽³⁾		[kg·cm ²]	6,4	5,0	4,5	4,3	4,3	4,1
Design Life		[hours]	>20000					
Maximum Housing Temperature	T	[°C]	90					
Environmental Conditions	T_a	[°C]	-15 to +40					
Lubrication			Synthetic Oil					
Protection degree			IP-65					
Mounting Position			Any					
Mass ⁽⁴⁾	m	[kg]	14,9 - 18,3					

(1) For an cycle average input speed $n_1=1500$ rpm and without considering thermal limits.

(2) For the whole service life of the gearbox.

(3) Depends on the motor shaft diameter and the output shaft type. Value as seen by the motor

(4) Depends on input flange type and output shaft type

MA-063-M2 (2 stages)			Transmission ratio						
			50	80	100	160	195	273	390
Maximum Acceleration Torque	T_{2max}	[N·m]	374	368	374	368	338	338	338
S1 Rated Torque ⁽¹⁾	T_{2S1}	[N·m]	295	380	295	380	405	405	405
Constant Backlash Torque ⁽²⁾	T_{2c}	[N·m]	279	274	279	274	247	247	247
Emergency Stop Torque	T_{2E}	[N·m]	1100	1073	1100	1073	788	788	788
Maximum Input Speed	n_{1max}	[rpm]	7000	7000	7000	7000	7000	7000	7000
Standard Backlash	$\Delta\phi$	[arcmin]	<6,8	<6,5	<6,8	<6,3	<6,2	<6,2	<6,2
Reduced Backlash	$\Delta\phi$	[arcmin]	<2,8	<2,5	<2,8	<2,3	<2,2	<2,2	<2,2
Torsional Stiffness	C	[N·m/arcmin]	31	31	31	31	31	31	31
Efficiency in S1 duty cycle and under full load	η	[%]	90	87	90	87	77	77	77
Moment of Inertia ⁽³⁾		[kg·cm ²]	0,80	0,79	0,57	0,57	0,79	0,63	0,57
Design Life		[hours]	>25000						
Maximum Housing Temperature	T	[°C]	90						
Environmental Conditions	T_a	[°C]	-15 to +40						
Lubrication			Synthetic Oil/Grease						
Protection degree			IP-65						
Mounting Position			Any						
Mass ⁽⁴⁾	m	[kg]	19,3 - 22,7						

(1) For an cycle average input speed $n_1=1500$ rpm and without considering thermal limits.

(2) For the whole service life of the gearbox.

(3) Depends on the motor shaft diameter and the output shaft type. Value as seen by the motor

(4) Depends on input flange type and output shaft type

MA-080

MA-080-M1 (1 stage)			Transmission ratio					
			4	6,4	10	16	27	39
Maximum Acceleration Torque	T_{2max}	[N·m]	708	707	758	740	810	676
S1 Rated Torque ⁽¹⁾	T_{2S1}	[N·m]	415	495	608	613	612	630
Constant Backlash Torque ⁽²⁾	T_{2c}	[N·m]	520	517	555	541	592	495
Emergency Stop Torque	T_{2E}	[N·m]	1395	1464	1641	1567	1860	1305
Maximum Input Speed	n_{1max}	[rpm]	4500	4500	4500	4500	4500	4500
Standard Backlash	$\Delta\phi$	[arcmin]	<6	<6	<6	<6	<6	<6
Reduced Backlash	$\Delta\phi$	[arcmin]	<2	<2	<2	<2	<2	<2
Torsional Stiffness	C	[N·m/arcmin]	86	86	86	86	86	86
Efficiency in S1 duty cycle and under full load	η	[%]	97	96	95	92	87	82
Moment of Inertia ⁽³⁾		[kg·cm ²]	12,4	8,4	6,8	6,2	6,0	5,6
Design Life		[hours]	>20000					
Maximum Housing Temperature	T	[°C]	90					
Environmental Conditions	T_a	[°C]	-15 to +40					
Lubrication			Synthetic Oil					
Protection degree			IP-65					
Mounting Position			Any					
Mass ⁽⁴⁾	m	[kg]	22,5 - 27,1					

(1) For an cycle average input speed $n_1=1500$ rpm and without considering thermal limits.

(2) For the whole service life of the gearbox.

(3) Depends on the motor shaft diameter and the output shaft type. Value as seen by the motor

(4) Depends on input flange type and output shaft type

MA-080-M2 (2 stages)			Transmission ratio						
			50	80	100	160	195	273	390
Maximum Acceleration Torque	T_{2max}	[N·m]	758	740	758	740	676	676	676
S1 Rated Torque ⁽¹⁾	T_{2S1}	[N·m]	608	613	608	613	630	630	630
Constant Backlash Torque ⁽²⁾	T_{2c}	[N·m]	555	541	555	541	495	495	495
Emergency Stop Torque	T_{2E}	[N·m]	1641	1567	1641	1567	1305	1305	1305
Maximum Input Speed	n_{1max}	[rpm]	7000	7000	7000	7000	7000	7000	7000
Standard Backlash	$\Delta\phi$	[arcmin]	<6,8	<6,5	<6,8	<6,3	<6,2	<6,2	<6,2
Reduced Backlash	$\Delta\phi$	[arcmin]	<2,8	<2,5	<2,8	<2,3	<2,2	<2,2	<2,2
Torsional Stiffness	C	[N·m/arcmin]	86	86	86	86	86	86	86
Efficiency in S1 duty cycle and under full load	η	[%]	92	89	92	89	80	80	80
Moment of Inertia ⁽³⁾		[kg·cm ²]	0,89	0,86	0,60	0,68	0,84	0,67	0,59
Design Life		[hours]	>25000						
Maximum Housing Temperature	T	[°C]	90						
Environmental Conditions	T_a	[°C]	-15 to +40						
Lubrication			Synthetic Oil/Grease						
Protection degree			IP-65						
Mounting Position			Any						
Mass ⁽⁴⁾	m	[kg]	27 - 31,5						

(1) For an cycle average input speed $n_1=1500$ rpm and without considering thermal limits.

(2) For the whole service life of the gearbox.

(3) Depends on the motor shaft diameter and the output shaft type. Value as seen by the motor

(4) Depends on input flange type and output shaft type

MA-100

MA-100-M1 (1 stage)			Transmission ratio					
			4	6,4	10	16	27	39
Maximum Acceleration Torque	T_{2max}	[N·m]	1475	1480	1690	1545	1680	1410
S1 Rated Torque ⁽¹⁾	T_{2S1}	[N·m]	700	870	1100	1250	1120	1150
Constant Backlash Torque ⁽²⁾	T_{2c}	[N·m]	1083	1085	1443	1130	1230	1030
Emergency Stop Torque	T_{2E}	[N·m]	3000	3600	3800	4200	3800	3653
Maximum Input Speed	n_{1max}	[rpm]	3600	3600	3600	3600	3600	3600
Standard Backlash	$\Delta\phi$	[arcmin]	<6	<6	<6	<6	<6	<6
Reduced Backlash	$\Delta\phi$	[arcmin]	<2	<2	<2	<2	<2	<2
Torsional Stiffness	C	[N·m/arcmin]	168	168	168	168	168	168
Efficiency in S1 duty cycle and under full load	η	[%]	97	96	94	91	84	80
Moment of Inertia ⁽³⁾		[kg·cm ²]	36,5	25,0	20,7	18,7	18,3	17,3
Design Life		[hours]	>20000					
Maximum Housing Temperature	T	[°C]	90					
Environmental Conditions	T_a	[°C]	-15 to +40					
Lubrication			Synthetic Oil					
Protection degree			IP-65					
Mounting Position			Any					
Mass ⁽⁴⁾	m	[kg]	36,7 - 47					

(1) For an cycle average input speed $n_1=1500$ rpm and without considering thermal limits.

(2) For the whole service life of the gearbox.

(3) Depends on the motor shaft diameter and the output shaft type. Value as seen by the motor

(4) Depends on input flange type and output shaft type

MA-100-M2 (2 stages)			Transmission ratio						
			50	80	100	160	195	273	390
Maximum Acceleration Torque	T_{2max}	[N·m]	1690	1545	1690	1545	1410	1410	1410
S1 Rated Torque ⁽¹⁾	T_{2S1}	[N·m]	1100	1250	1100	1250	1150	1150	1150
Constant Backlash Torque ⁽²⁾	T_{2c}	[N·m]	1443	1130	1443	1130	1030	1030	1030
Emergency Stop Torque	T_{2E}	[N·m]	3800	4200	3800	4200	3653	3653	3653
Maximum Input Speed	n_{1max}	[rpm]	4500	4500	4500	4500	4500	4500	4500
Standard Backlash	$\Delta\phi$	[arcmin]	<6,8	<6,5	<6,8	<6,3	<6,2	<6,2	<6,2
Reduced Backlash	$\Delta\phi$	[arcmin]	<2,8	<2,5	<2,8	<2,3	<2,2	<2,2	<2,2
Torsional Stiffness	C	[N·m/arcmin]	168	168	168	168	168	168	168
Efficiency in S1 duty cycle and under full load	η	[%]	91	88	91	88	78	78	78
Moment of Inertia ⁽³⁾		[kg·cm ²]	2,96	2,74	2,54	2,32	1,31	0,90	0,70
Design Life		[hours]	>25000						
Maximum Housing Temperature	T	[°C]	90						
Environmental Conditions	T_a	[°C]	-15 to +40						
Lubrication			Synthetic Oil						
Protection degree			IP-65						
Mounting Position			Any						
Mass ⁽⁴⁾	m	[kg]	44,7 - 55						

(1) For an cycle average input speed $n_1=1500$ rpm and without considering thermal limits.

(2) For the whole service life of the gearbox.

(3) Depends on the motor shaft diameter and the output shaft type. Value as seen by the motor

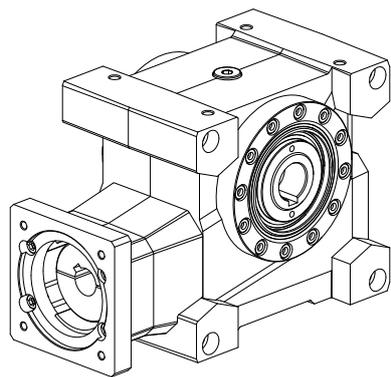
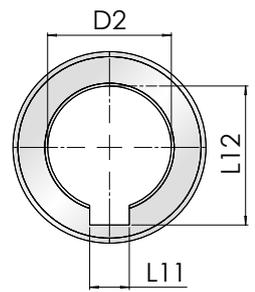
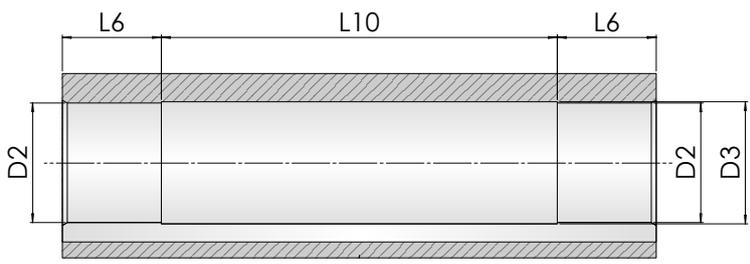
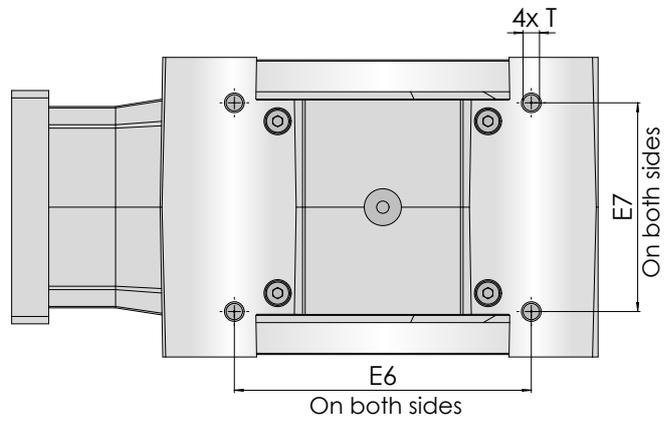
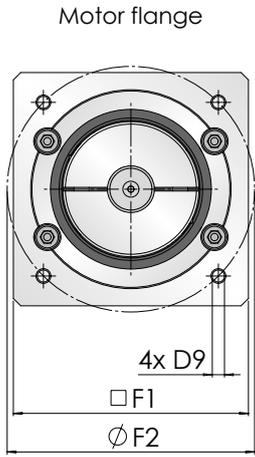
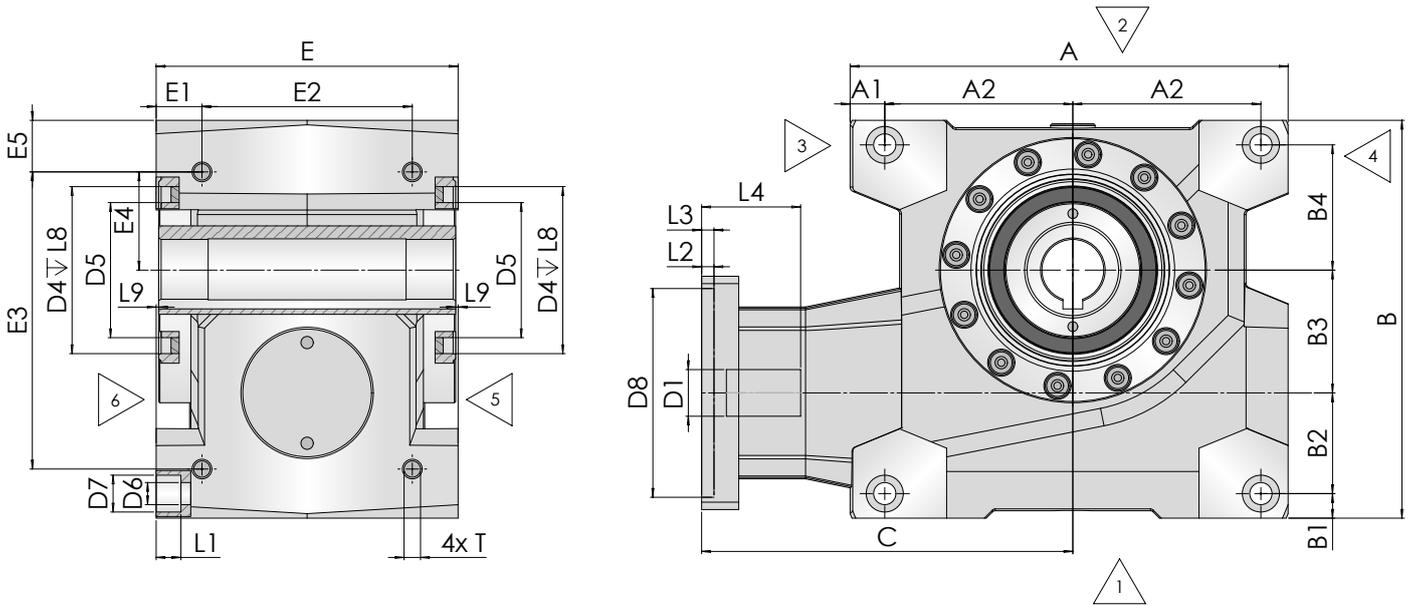
(4) Depends on input flange type and output shaft type

Dimensions

Hollow Output Shaft with Keyway (1 stage)

	040	050	063	080	100
A	157	177	214	252	309
A1	12,5	14	15,5	14,5	16
A2	67,5	76	93	113	140
B	141	162	197	232	287
B1	9,5	10	14	12	13
B2	35,5	41	43	50	62
B3	40	50	63	80	100
B4	46,5	51	65	79	100
C	Depends on the motor				
D1	Depends on the motor				
D2*	20H6	25H6	28H6	36H6	48H6
D3	20,5	25,5	28,5	36,5	48,5
D4	62H8	68H8	90H8	110H8	125H8
D5	48	55	65	75	95
D6	9	9	11	11	14
D7	15	15	18	18	20
D8	Depends on the motor				
D9	Depends on the motor				
E	110	122	128	160	172
E1	17,5	18,5	24	20	26
E2	75	85	80	120	120
E3	102	121	145	185	232
E4	36	40	52,5	66	85
E5	20	21	24,5	24	27
E6	108	120	160	195	250
E7	75	85	80	120	135
F1	Depends on the motor				
F2	Depends on the motor				
L1	10	10	11	11	13
L2	Depends on the motor				
L3	Depends on the motor				
L4	Depends on the motor				
L6	15	20	22,50	30	30
L8	5	5	5	5	5
L9	1	1,5	0,75	1	1
L10	78	80	81,50	98	110
L11	6P9	8P9	8P9	10P9	14P9
L12	22,80	28,30	31,30	39,30	51,80
T	M6x12	M8x16	M10x20	M10x20	M12x24

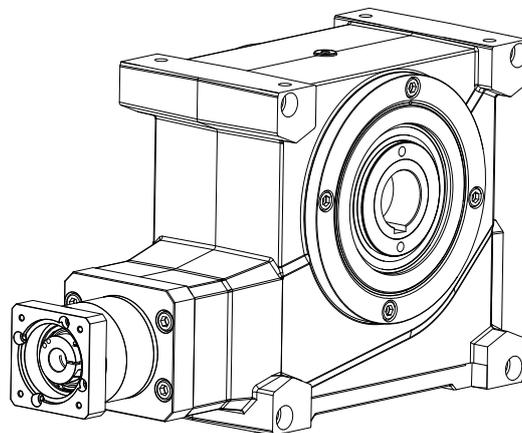
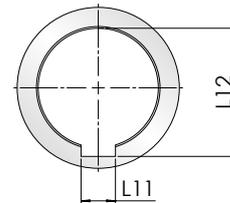
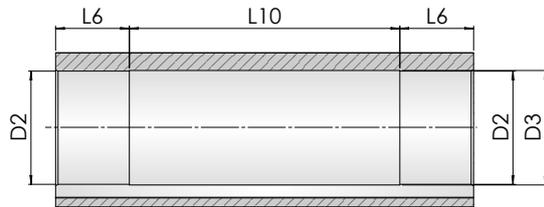
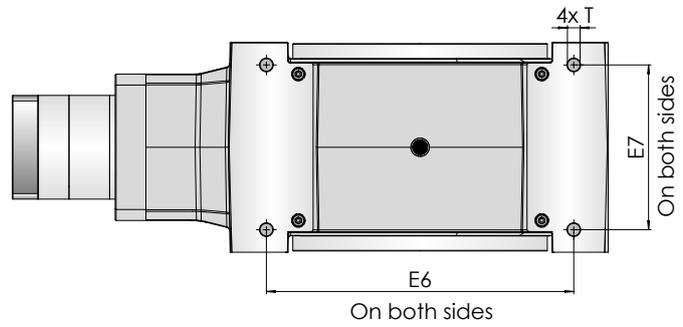
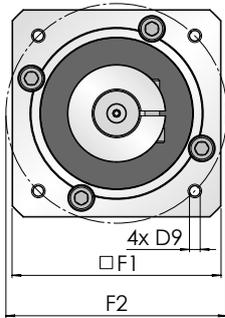
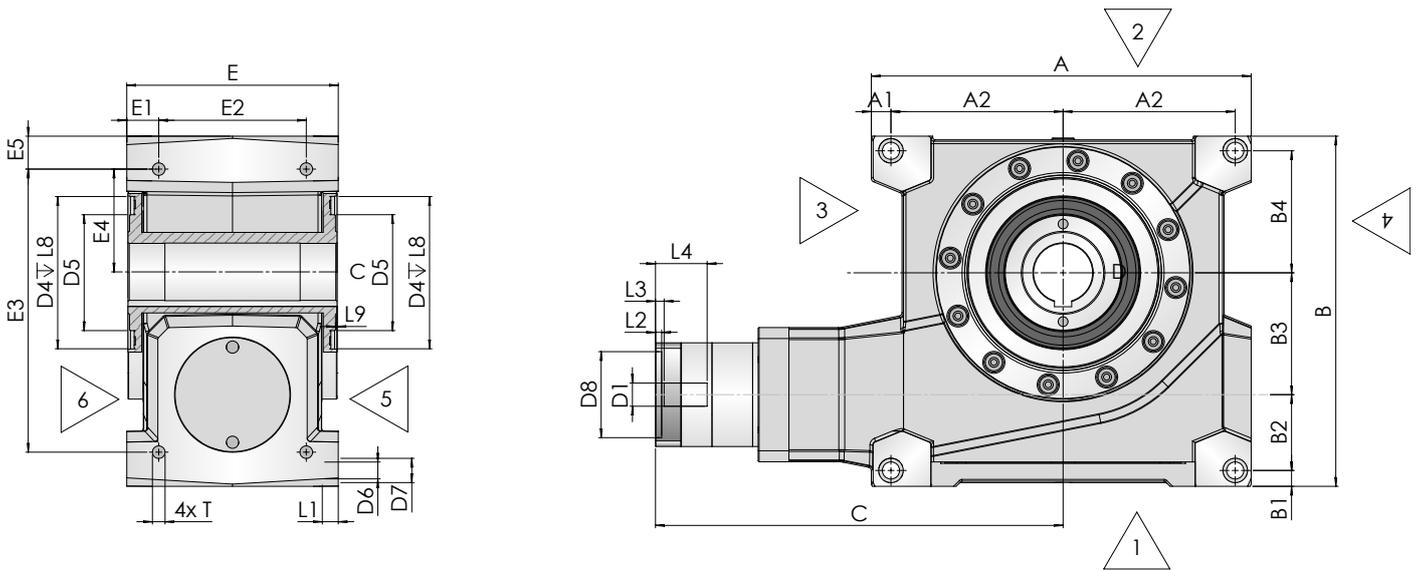
* Recommended tolerance for the male shaft: h6



Hollow Output Shaft with Keyway (2 stages)

	040	050	063	080	100
A	157	177	214	252	309
A1	12,5	14	15,5	14,5	16
A2	67,5	76	93	113	140
B	141	162	197	232	287
B1	9,5	10	14	12	13
B2	35,5	41	43	50	62
B3	40	50	63	80	100
B4	46,5	51	65	79	100
C	Depends on the motor				
D1	Depends on the motor				
D2*	20H6	25H6	28H6	36H6	48H6
D3	20,5	25,5	28,5	36,5	48,5
D4	62H8	68H8	90H8	110H8	125H8
D5	48	55	65	75	95
D6	9	9	11	11	14
D7	15	15	18	18	20
D8	Depends on the motor				
D9	Depends on the motor				
E	110	122	128	160	172
E1	17,5	18,5	24	20	26
E2	75	85	80	120	120
E3	102	121	145	185	232
E4	36	40	52,5	66	85
E5	20	21	24,5	24	27
E6	108	120	160	195	250
E7	75	85	80	120	135
F1	Depends on the motor				
F2	Depends on the motor				
L1	10	10	11	11	13
L2	Depends on the motor				
L3	Depends on the motor				
L4	Depends on the motor				
L6	15	20	22,50	30	30
L8	5	5	5	5	5
L9	1	1,5	0,75	1	1
L10	78	80	81,50	98	110
L11	6P9	8P9	8P9	10P9	14P9
L12	22,80	28,30	31,30	39,30	51,80
T	M6x12	M8x16	M10x20	M10x20	M12x24

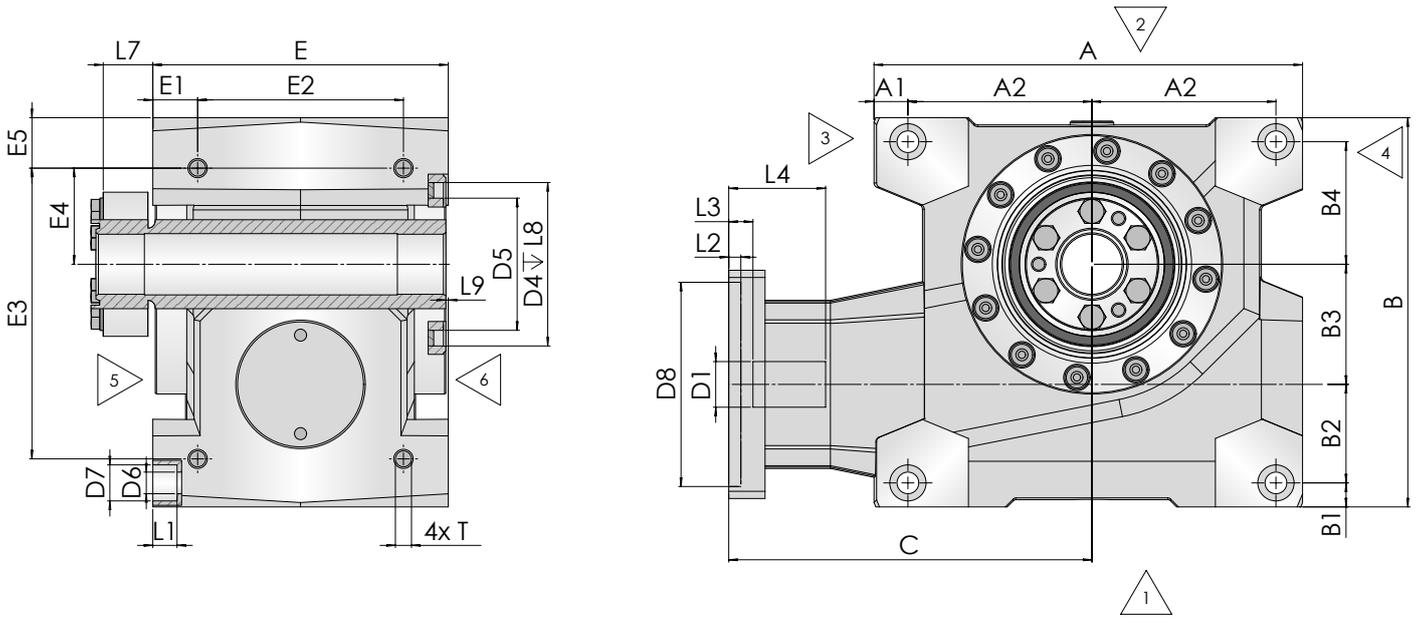
* Recommended tolerance for the male shaft: h6



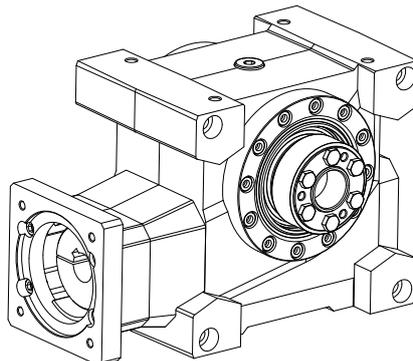
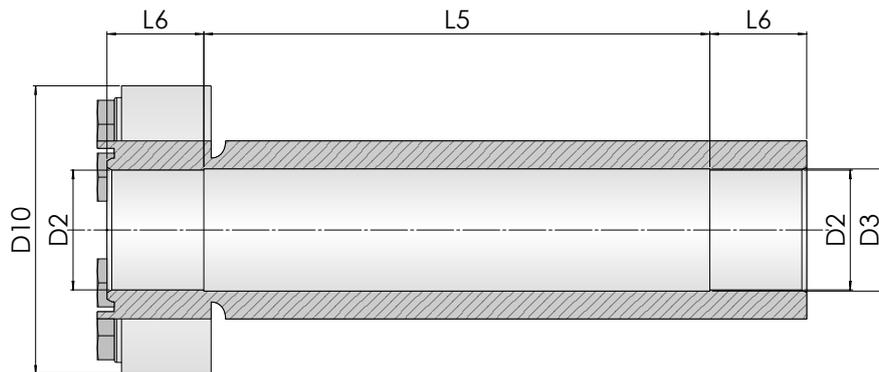
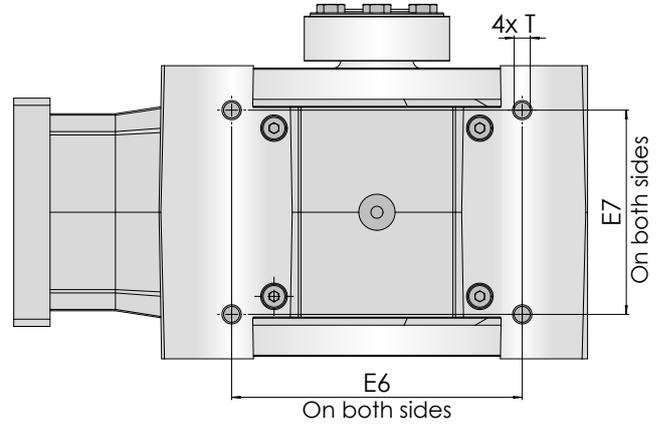
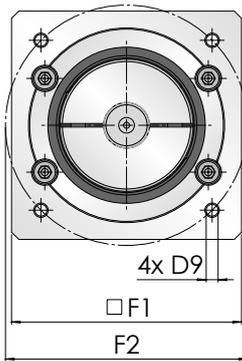
Hollow Output Shaft with Shrink Disk (1 stage)

	040	050	063	080	100
A	157	177	214	252	309
A1	12,5	14	15,5	14,5	16
A2	67,5	76	93	113	140
B	141	162	197	232	287
B1	9,5	10	14	12	13
B2	35,5	41	43	50	62
B3	40	50	63	80	100
B4	46,5	51	65	79	100
C	Depends on the motor				
D1	Depends on the motor				
D2*	20H6	25H6	28H6	36H6	48H6
D3	20,5	25,5	28,5	36,5	48,5
D4	62H8	68H8	90H8	110H8	125H8
D5	48	55	65	75	95
D6	9	9	11	11	14
D7	15	15	18	18	20
D8	Depends on the motor				
D9	Depends on the motor				
D10	50	60	72	90	110
E	110	122	128	160	172
E1	17,5	18,5	24	20	26
E2	75	85	80	120	120
E3	102	121	145	185	232
E4	36	40	52,5	66	85
E5	20	21	24,5	24	27
E6	108	120	160	195	250
E7	75	85	80	120	135
F1	Depends on the motor				
F2	Depends on the motor				
L1	10	10	11	11	13
L2	Depends on the motor				
L3	Depends on the motor				
L4	Depends on the motor				
L5	100,5	104	110,5	128	143
L6	15	20	22,50	30	30
L7	18,25	22,5	24	24,75	28
L8	5	5	5	5	5
L9	1	1,5	0,75	1	1
T	M6x12	M8x16	M10x20	M10x20	M12x24

* Recommended tolerance for the male shaft: h6



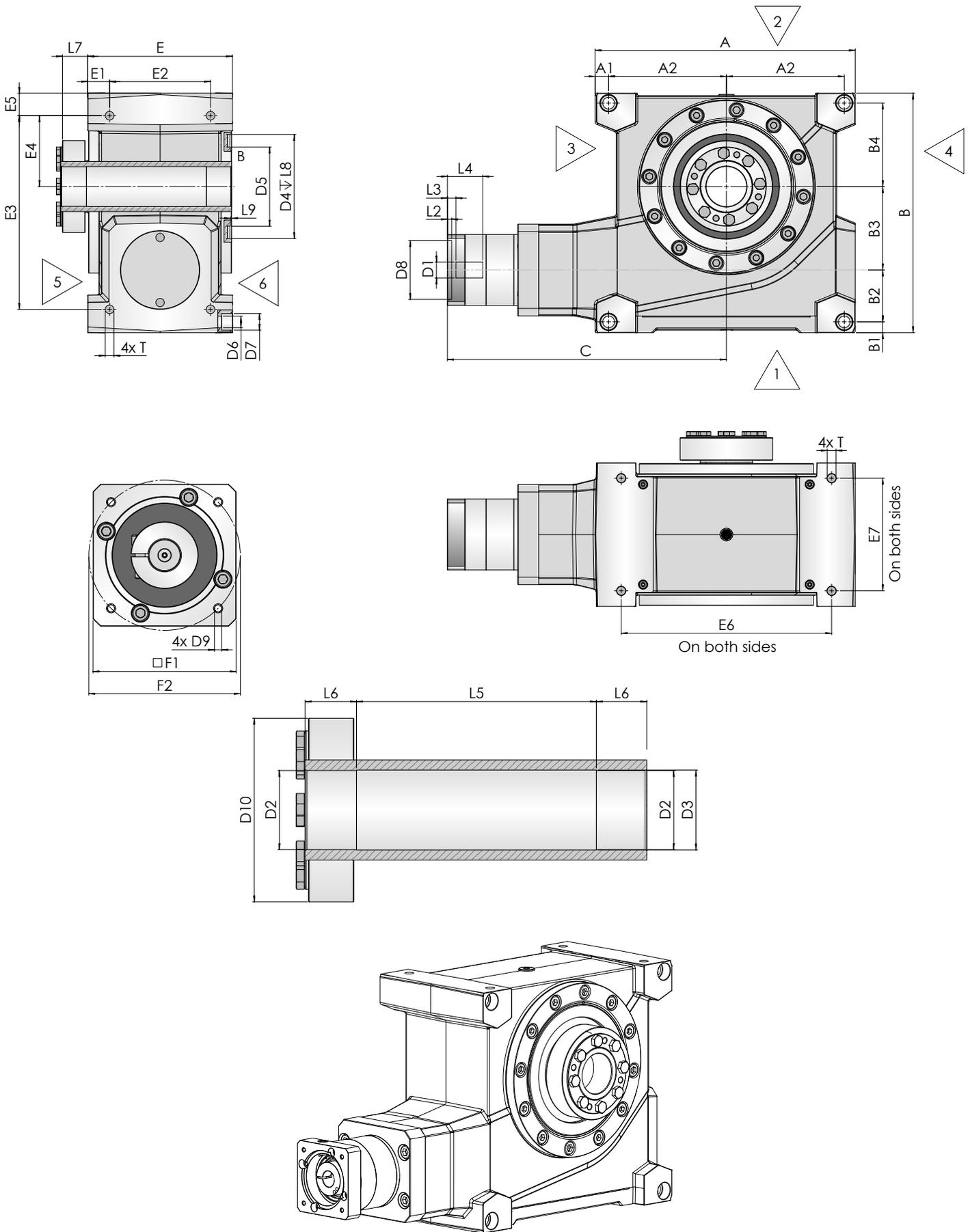
Motor flange



Hollow Output Shaft with Shrink Disk (2 stages)

	040	050	063	080	100
A	157	177	214	252	309
A1	12,5	14	15,5	14,5	16
A2	67,5	76	93	113	140
B	141	162	197	232	287
B1	9,5	10	14	12	13
B2	35,5	41	43	50	62
B3	40	50	63	80	100
B4	46,5	51	65	79	100
C	Depends on the motor				
D1	Depends on the motor				
D2*	20H6	25H6	28H6	36H6	48H6
D3	20,5	25,5	28,5	36,5	48,5
D4	62H8	68H8	90H8	110H8	125H8
D5	48	55	65	75	95
D6	9	9	11	11	14
D7	15	15	18	18	20
D8	Depends on the motor				
D9	Depends on the motor				
D10	50	60	72	90	110
E	110	122	128	160	172
E1	17,5	18,5	24	20	26
E2	75	85	80	120	120
E3	102	121	145	185	232
E4	36	40	52,5	66	85
E5	20	21	24,5	24	27
E6	108	120	160	195	250
E7	75	85	80	120	135
F1	Depends on the motor				
F2	Depends on the motor				
L1	10	10	11	11	13
L2	Depends on the motor				
L3	Depends on the motor				
L4	Depends on the motor				
L5	100,5	104	110,5	128	143
L6	15	20	22,50	30	30
L7	18,25	22,5	24	24,75	28
L8	5	5	5	5	5
L9	1	1,5	0,75	1	1
T	M6x12	M8x16	M10x20	M10x20	M12x24

* Recommended tolerance for the male shaft: h6



Order Reference for MA Gearboxes

MA - 040 - M1 - HS6 - S - 6.4 - C - (00) - 060 / 75 - M06 - 14 - 30 - 030 - 030

Gearbox series
MA For servomotor

Gearbox Size
40, 50, 63, 80, 100

Nº de etapas
M1 1 stage
M2 2 stages

Output Shaft
H Hollow shaft with keyway
HS5 Smooth hollow output shaft with shrink disc on side 5
HS6 Smooth hollow output shaft with shrink disc on side 6

Precision class
S Standard backlash
R Reduced Backlash

Ratio
See Catalog

Bearing Configuration
B Ball bearings
C Tapered roller bearings

Special options (If none is applicable, ommit all digits)

1st digit: ATEX certification

0 Not ATEX certified
1-3 ATEX certified

2nd digit: Custom model

0 Standard model
X Custom model

LB - Motor Pilot Flange Diameter (mm)

LA - Fixing Holes P.C.D. (mm)

LZ - Size of the screw threads at the gearbox input flange

S - Motor Shaft Diameter (mm)

LR - Maximum allowable motor shaft length (mm)

LE - Maximum allowable motor pilot flange height (×0.1 mm)

LN - Maximum allowable motor shaft shoulder height (×0.1 mm)

