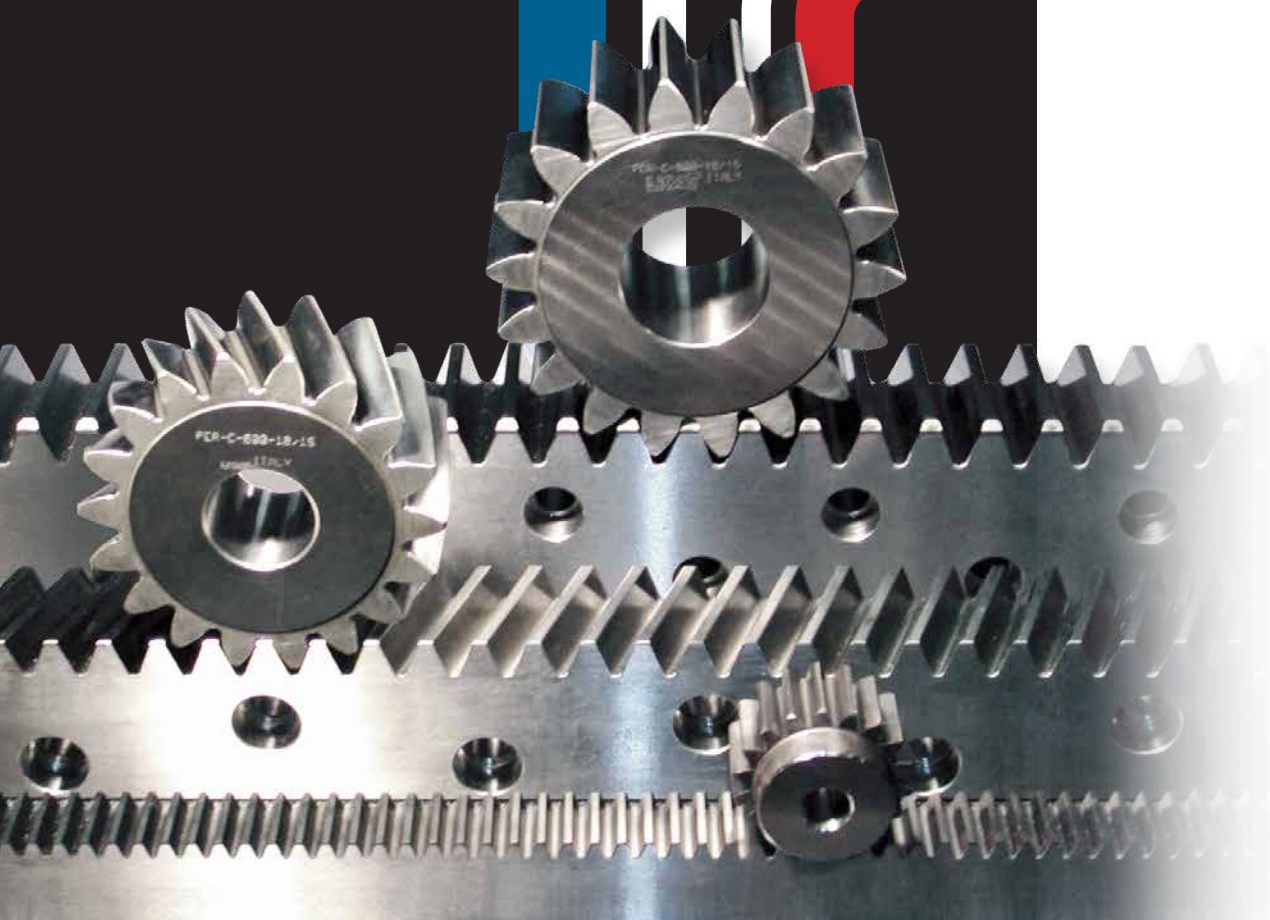


HIGH PRECISION LINEAR TRANSMISSION SYSTEMS



 **LICAT**
RACKS & GEARS

 **ROMANI**
COMPONENTS

**Technical
specifications
and dimensions**

2012 Edition

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HIGH PRECISION LINEAR TRANSMISSION SYSTEMS

DESCRIPTION AND CHARACTERISTICS

“LICAT” linear transmission systems have many uses and can also be adapted to Customers specific requirements.

In order to satisfy Customers requirements, LICAT can offer rack and pinion mechanisms in thirteen metric module sizes, made up of different materials, together with differing heat treatments, quality levels and surface finishing, to cover a range of liftable weights corresponding to over 36000 Kg on the rack axis.

In particular, the racks and pinions which undergo hardening heat treatment have quality finishing on both flat surfaces and on tooth profiles.

Tip-relief corrections guarantee excellent meshing smoothness.

In addition, toothing with module sizes 4, 5, 6,8,10 and 12, are made in the extra-high version and with full-fillet tooth base, i.e. with profiles which respectively make it possible to obtain contact ratios of around 2 and which considerably improves tooth fatigue resistance.

They are particularly suitable for ensuring smooth, silent and vibration-free motion transmission also under heavy loads.

In addition to the high contact ratios of the straight gears, the helical versions have an added coverage ratio which further increases the number of meshing teeth, thereby reducing surface stress and flexing stress of the teeth themselves.

The angle of the helical tooth (19° 31' 42'') has been designed to allow the use of these transmission systems for applications without linear encoders.

For grinding tooth profiles, LICAT has built and patented special, fast high precision grinding machines which guarantee excellent single and cumulative pitch, shapes and geometric tooth tolerances as required.

MATERIALS, HEAT TREATMENTS AND PRECISION PARAMETERS

Type A) Material UNI C45 (AISI-SAE 1045) hardened and tempered $R \geq 70 \text{ Kg/mm}^2$

This is used for making the standard range of racks and pinions.

This steel, with an average carbon percentage of 0.45, is used with an isothermal annealing heat treatment at 900° followed by hardening and tempering to guarantee an ultimate tensile strength of 70 Kg/mm².

No further surface hardening is carried out on the toothing, while the machining finish of the profile ensures a precision class 8 according to DIN 3962.

The flat surfaces are all finished ground with a surface roughness $\leq 0,8$, to guarantee perfect orthogonality.

This solution, which is particularly cost-effective, is suitable for applications with low performance levels and loads.

Type B) Material UNI C45 (AISI-SAE 1045) induction hardened and tempered HRC ≥ 52

This is used for making the intermediate range of racks and pinions and it is the same type of material as version “A”, but with a surface hardening treatment by high frequency induction hardening and tempering which ensures a surface hardness of the toothing of over 52 HRC.

The flat surfaces are all ground finished with surface roughness $\leq 0,8$, to guarantee perfect orthogonality.

The high precision of the toothing is ensured by grinding the profile with surface roughness $\leq 0,8$ in precision class 5 according to DIN 3962.

This solution makes it possible to obtain excellent performance levels in terms of liftable weights and movement speed with relatively low production costs.

Type C) Material UNI 18NiCrMo5 (AISI-SAE 4320) casehardened and tempered HRC 58-62

This is used for making the high performance range of racks and pinions.

This steel is fully alloyed, rich in Nickel, Chromium and Molybdenum and is used for casehardening and tempering heat treatment to 58-62 HRC for the whole profile of the toothing including the tooth base.

The flat surfaces are all adequately protected from the heat treatment to allow any drilling and/or boring operations during assembly.

They are accurately ground finished with surface roughness $\leq 0,8$, to guarantee perfect squareness.

The high precision of the toothing is ensured by grinding the contour with surface roughness $\leq 0,8$ in precision class 5 to DIN 3962 standards.

This solution, which combines a high quality material with excellent mechanical characteristics is the best currently and the best treatment available at present for power drive components and offers very high performance and safety characteristics.

The same material-heat treatment combination is used for making all the pinions shown in this catalogue.

The toothing profiles are corrected, crowned and accurately ground finished to precision class 6 under DIN 3962, surface roughness $\leq 0,8$ and tip-relief.

This allows for better specific friction distribution, with good contact between the teeth along the whole meshing area, higher contact and covering ratios, to giving longer life, smoothness and lack transmission noise under load, with considerably lower vibrations and stress at the e toothing base.

In addition, all the surface except the toothing is suitably protected from heat treatment to allow for any subsequent machining operations.

DIAGRAMS TO HELP WITH THE CHOICE OF RACK MODULE AND NUMBER OF PINION TEETH

The “DMD – DME” diagrams have been prepared for each type of toothing (straight and helical) and for each of the three versions of material (hardened and tempered, induction hardened and tempered or casehardened and tempered) described previously and which relate to the tangential force required (weight to be lifted or translated) and its linear speed to help your choice towards the most appropriate rack and pinion module.

Consequently, after making this choice the user will be able to decide the correct number of pinion teeth, along with the many others options offered in this catalogue, depending on the torque to be transmitted, the motor-reduction unit available, its rotation speed, etc.

For the calculation of these diagrams, appropriate static and dynamic safety coefficients have been used to guarantee appropriate flexibility at the base of the teeth and the specific Hertz pressure for the characteristics of the materials and the heat treatments used.

However, as these are theoretical data, they are valid only for mechanisms in ideal operating conditions, i.e. with no shocks or structural distortion and with the pinion bearing positioned adjacent to its toothing, with continuous lubrication and correct assembly.

On the basis of specific experience and the actual operating conditions foreseen, the user should then apply a safety coefficient of between 2 and 4 to these values.

Example of calculation no. 1:**INPUT data**

Mass to be lifted (P) = 500 daN
 Rack-pinion mechanism output (η) $\cong$ 0.95
 Linear speed (V) = 1 m/sec
 Gravity acceleration (g) = 9.81 m/sec²
 Acceleration (a) = 3 m/sec²
 Chosen safety coefficient (C) = 3

OUTPUT data

Real vertical tangential force (Fvr)

$$F_{vr} = \frac{P \cdot (g + a)}{10} \quad F_{vr} = \frac{500 \cdot (9,81 + 3)}{10} = 640,5 \text{ daN}$$

Virtual vertical tangential force (Fvv)

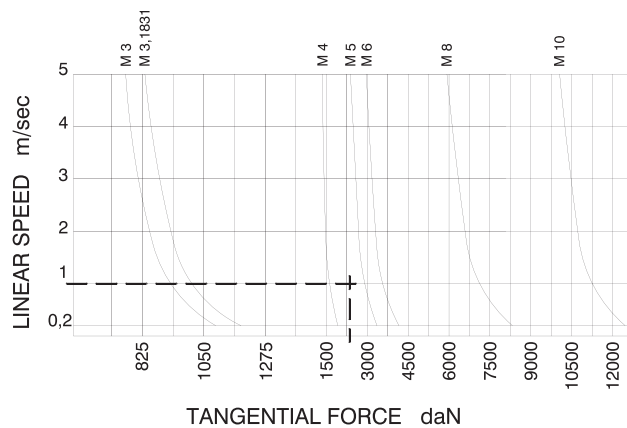
$$F_{vv} = F_{vr} \cdot C$$

$$F_{vv} = 640,5 \cdot 3 = 1921,5 \text{ daN}$$

The type and size of the rack and pinion mechanism necessary using the available materials and treatments is defined on the basis of the "DMD – DME" module choice diagrams:

Material chosen: induction hardened and tempered
 Type of tooth: straight tooth (β = 0)
 Module chosen (m): 5
 Declared tangential force (≥ Fvv): 2800 daN

MATERIAL: UNI C45 (AISI-SAE 1045) Hardened & Tempered HRC≥52



Supposing that a motor-reduction unit is available with the following specifications:

Torque on pinion (M) = 350 Nm Pinion speed (n) = 190 r.p.m,
the size of the pinion to be coupled to the rack is defined as follows:

Corresponding pitch diameter (dp)

$$dp = \frac{M \cdot 100 \cdot 2 \cdot \eta}{F_{vr}} \quad dp = \frac{350 \cdot 100 \cdot 2 \cdot 0,95}{640,5} = 103,83 \text{ mm}$$

Corresponding number of pinion teeth (Z)

Z = 20 teeth (available in table)

N. B.:

Should the user have any dimensional restraints (pinion clearance, distance between centres, etc.), it is possible to establish the correct number of teeth by using the characteristics of the chosen motor-reduction unit.

Supposing a pinion outside diameter of no more than 110 mm, the characteristics of the motor-reduction unit to be applied to the pinion are defined as follows:

Number of pinion teeth available in table (Z)

Z = 18

Corresponding pitch diameter (dp)

$$dp = 95,5$$

Torque on pinion (M)

$$M = \frac{dp \cdot F_{vr}}{2 \cdot 100 \cdot \eta} \quad M = \frac{95,5 \cdot 640,5}{2 \cdot 100 \cdot 0,95} = 322 \text{ Nm}$$

Pinion speed (n)

$$n = \frac{V \cdot 60 \cdot 1000}{Z \cdot m \cdot \pi} \quad n = \frac{1 \cdot 60000}{18 \cdot 5 \cdot \pi} = 212 \text{ r.p.m.}$$

Example of calculation no. 2:**INPUT data**

Mass to be moved (P) = 500 daN
 Rack-pinion mechanism output (η) $\cong$ 0.95
 Linear speed (V) = 1 m/sec
 Friction coefficient (μ) = 0.05
 Acceleration (a) = 3 m/sec²
 Chosen safety coefficient (C) = 3
 Gravity acceleration (g) = 9.81 m/sec²

OUTPUT data

Real horizontal tangential force (For)

$$F_{or} = \frac{P \cdot (g \cdot \mu + a)}{10} \quad F_{or} = \frac{500 \cdot (9,81 \cdot 0,05 + 3)}{10} = 174,5 \text{ daN}$$

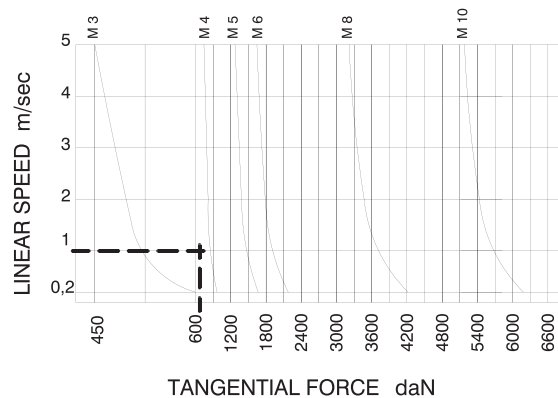
Virtual horizontal tangential force (Fov)

$$F_{ov} = F_{or} \cdot C \quad F_{ov} = 174,5 \cdot 3 = 523,5 \text{ daN}$$

The type and size of the rack and pinion necessary using the available materials and treatments is defined on the basis of the "DMD – DME" module choice diagrams:

Material chosen: hardened and tempered
 Type of tooth: helical tooth (β = 19°31'42")
 Module chosen (m): 4
 Declared tangential force (≥ Fov): 810 daN

MATERIAL: UNI C45 (AISI-SAE 1045) Hardened & Tempered



Supposing that a motor-reduction unit is available with the following specifications:

Torque on pinion (M) = 100 Nm Pinion speed (n) = 180 r.p.m,
the size of the pinion to be coupled to the rack is defined as follows:

Correct pitch diameter (dp)

$$dp = \frac{M \cdot 100 \cdot 2 \cdot \eta}{F_{or}}$$

$$dp = \frac{100 \cdot 100 \cdot 2 \cdot 0,95}{174,5} = 108,88 \text{ mm}$$

Corresponding number of pinion teeth (Z)

Z = 26 teeth (from table)



RACK WITH STRAIGHT TEETH

HARDENED & TEMPERED MATERIAL - WITHOUT HOLES

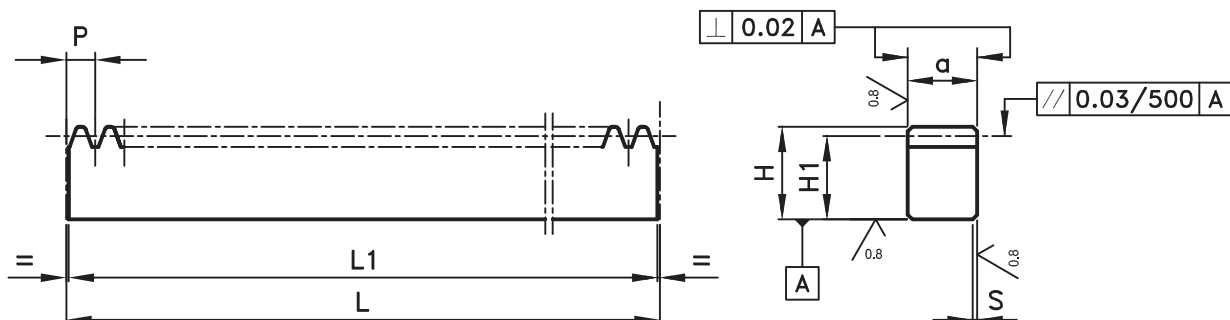
TABLE
CDF-A-SF

Revision:"01"

Material: UNI C45 (AISI - SAE 1045) - Quenched & tempered

Toothing accuracy: class 8 DIN 3962 - Tooth finishing $\sqrt{1.6}$ - Pressure angle: 20°

Pitch error: one pitch=0.01 mm, cumulative approx.=0.15 mm/m - Z=Number of teeth



Identifier code example : CDF - A - SF - 079/0500

Denomination	Module	P	Z	L	L1	H	H1	a	S	
079/0500	0,79577	2,5	200	500,00	499,5	25	24,20	-0.02 -0.07	10	1
079/1000			400	1000,00	999,5					
100/0500	1	3,14159	160	502,65	502,0	25	24,00	-0.02 -0.07	10	1
100/1000			320	1005,31	1004,5					
125/0500	1,25	3,92699	128	502,65	502,0	25	23,75	-0.02 -0.07	10	1
125/1000			255	1005,31	1004,5					
150/0500	1,5	4,71239	107	504,23	503,5	25	23,50	-0.02 -0.07	15	1
150/1000			214	1008,45	1008,0					
159/0500	1,59155	5,0	100	500,00	499,5	25	23,40	-0.02 -0.07	15	1
159/1000			200	1000,00	999,5					
200/0500	2	6,28318	80	502,65	502,0	30	28,00	-0.02 -0.07	20	2
200/1000			160	1005,31	1004,5					
250/0500	2,5	7,85398	64	502,65	502,0	30	27,50	-0.02 -0.07	20	2
250/1000			128	1005,31	1004,5					
300/0500	3	9,42478	54	508,94	508,0	40	37,00	-0.02 -0.07	30	2
300/1000			108	1017,88	1017,0					
318/0500	3,18310	10,0	50	500,00	499,5	40	36,82	-0.02 -0.07	30	2
318/1000			100	1000,00	999,5					
400/0500	4	12,56637	40	502,65	502,0	49,4	45,45	-0.02 -0.07	36	3
400/1000			80	1005,31	1004,5					
400/1500			120	1507,96	1507,0					
500/0500	5	15,70796	32	502,65	502,0	64,3	59,28	-0.02 -0.10	50	3
500/1000			64	1005,31	1004,5					
500/1500			96	1507,96	1507,0					
600/0500	6	18,84955	27	508,94	508,0	74,2	68,15	-0.02 -0.10	55	3
600/1000			54	1017,88	1017,0					
600/1500			81	1526,81	1526,0					
800/0500	8	25,13274	20	502,65	502,0	93,9	85,90	-0.02 -0.10	80	4
800/1000			40	1005,31	1004,5					
1000/0500	10	31,4159	16	502,65	502,0	103,6	93,60	-0.02 -0.07	100	4
1000/1000			32	1005,31	1004,5					
1200/0500	12	37,69911	15	565,49	565,0	123,4	111,35	-0.02 -0.07	120	4
1200/1000			30	1130,97	1129,0					



RACK WITH STRAIGHT TEETH

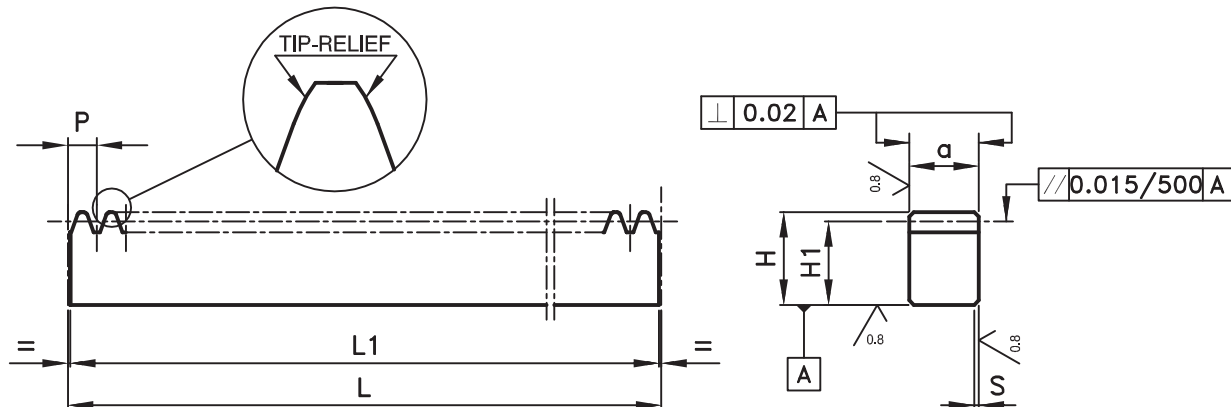
INDUCTION HARDENED & TEMPERED MATERIAL - WITHOUT HOLES

TABLE
CDR-B-SF
Revision:"01"

Material: UNI C45 (AISI-SAE 1045) - Induction hardened & tempered teeth HRC ≥ 52

Toothing accuracy: Module 0.79 - 8 class 5 DIN 3962
Module 10 - 12 class 6 DIN 3962 - Tooth finishing $\sqrt{0.8}$ - Pressure angle: 20°

Pitch error: Module 0.79 - 8 one pitch=0.003 mm, cumulative approx.=0.035 mm/m
Module 10 - 12 one pitch=0.005 mm, cumulative approx.=0.050 mm/m



Identifier code example : CDR - B - SF - 079/0500

Denomination	Module	P	Z	L	L1	H	H1	a	S	
079/0500	0,79577	2,5	200	500,00	499,5	25	24,20	-0.02 -0.05	10	1
079/1000			400	1000,00	999,5					
100/0500	1	3,14159	160	502,65	502,0	25	24,00	-0.02 -0.05	10	1
100/1000			320	1005,31	1004,5					
125/0500	1,25	3,92699	128	502,65	502,0	25	23,75	-0.02 -0.05	10	1
125/1000			255	1005,31	1004,5					
150/0500	1,5	4,71239	107	504,23	503,5	25	23,50	-0.02 -0.05	15	1
150/1000			214	1008,45	1008,0					
159/0500	1,59155	5,0	100	500,00	499,5	25	23,40	-0.02 -0.05	15	1
159/1000			200	1000,00	999,5					
200/0500	2	6,28318	80	502,65	502,0	30	28,00	-0.02 -0.05	20	2
200/1000			160	1005,31	1004,5					
250/0500	2,5	7,85398	64	502,65	502,0	30	27,50	-0.02 -0.05	20	2
250/1000			128	1005,31	1004,5					
300/0500	3	9,42478	54	508,94	508,0	40	37,00	-0.02 -0.05	30	2
300/1000			108	1017,88	1017,0					
318/0500	3,18310	10,0	50	500,00	499,5	40	36,82	-0.02 -0.05	30	2
318/1000			100	1000,00	999,5					
400/0500	4	12,56637	40	502,65	502,0	50	45,45	-0.02 -0.05	36	3
400/1000			80	1005,31	1004,5					
400/1500			120	1507,96	1507,0					
500/0500	5	15,70796	32	502,65	502,0	65	59,28	-0.02 -0.07	50	3
500/1000			64	1005,31	1004,5					
500/1500			96	1507,96	1507,0					
600/0500	6	18,84955	27	508,94	508,0	75	68,15	-0.02 -0.07	55	3
600/1000			54	1017,88	1017,0					
600/1500			81	1526,81	1526,0					
800/0500	8	25,13274	20	502,65	502,0	95	85,90	-0.02 -0.07	80	4
800/1000			40	1005,31	1004,5					
1000/0500	10	31,4159	16	502,65	502,0	105	93,60	-0.02 -0.07	100	4
1000/1000			32	1005,31	1004,5					
1200/0500	12	37,69911	15	565,49	565,0	125	111,35	-0.02 -0.07	120	4
1200/1000			30	1130,97	1129,0					



RACK WITH STRAIGHT TEETH

CASEHARDENED & TEMPERED MATERIAL - WITHOUT HOLES

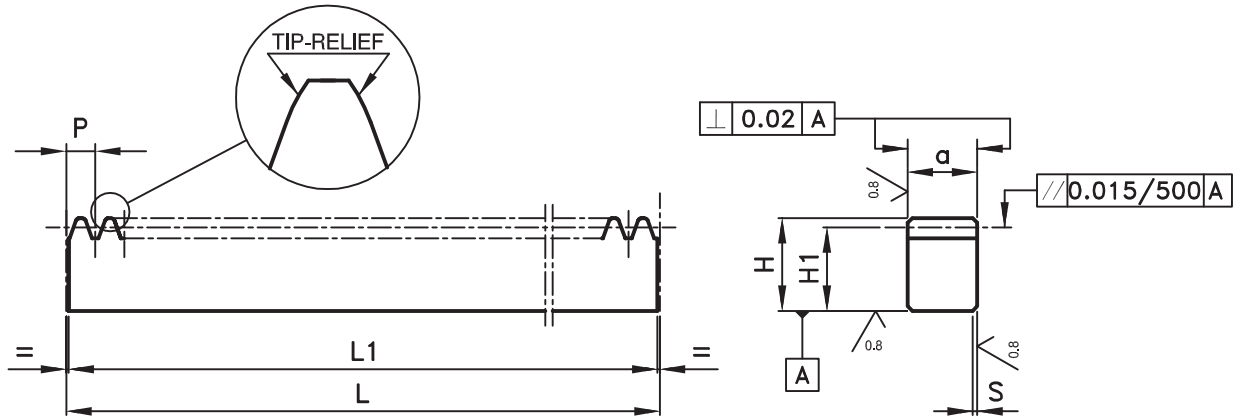
TABLE
CDR-C-SF

Revision:"01"

Material: UNI 18NiCrMo5 (AISI-SAE 4320) - Casehardened & tempered teeth HRC 58÷62

Toothing accuracy: Module 0.79 - 8 class 5 DIN 3962
Module 10 - 12 class 6 DIN 3962 - Tooth finishing $\sqrt{0.8}$ - Pressure angle: 20°

Pitch error: Module 0.79 - 8 one pitch=0.003 mm, cumulative approx.=0.035 mm/m
Module 10 - 12 one pitch=0.005 mm, cumulative approx.=0.050 mm/m



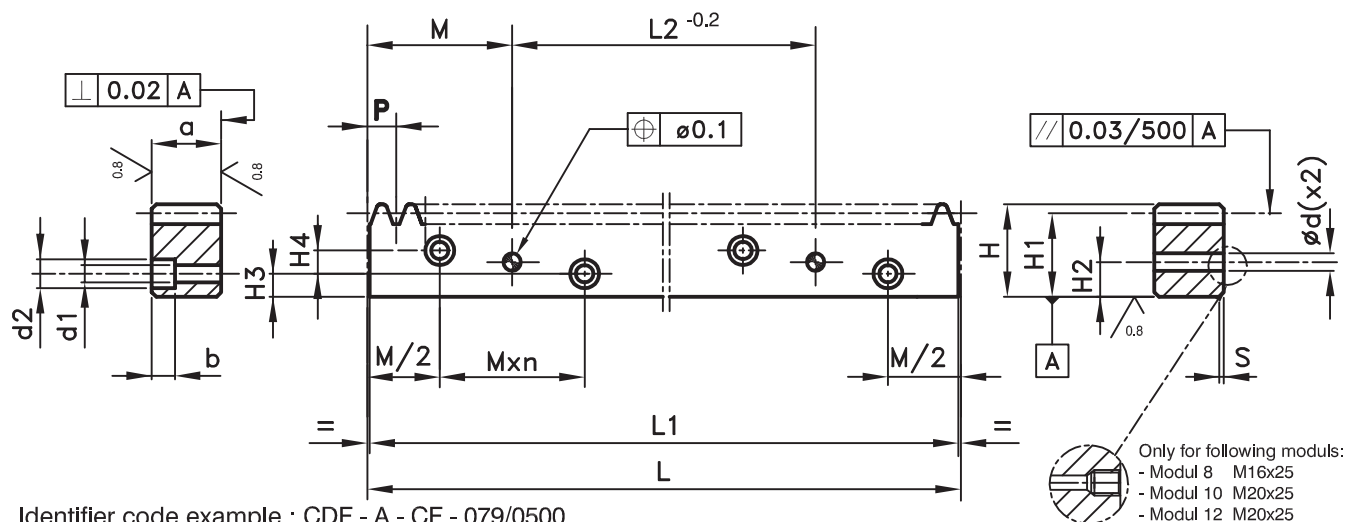
Identifier code example : CDR - C - SF - 079/0500

Denomination	Module	P	Z	L	L1	H	H1	a	S
079/0500	0,79577	2,5	200	500,00	499,5	25	24,20	-0.02 -0.05	10
079/1000			400	1000,00	999,5				
100/0500	1	3,14159	160	502,65	502,0	25	24,00	-0.02 -0.05	10
100/1000			320	1005,31	1004,5				
125/0500	1,25	3,92699	128	502,65	502,0	25	23,75	-0.02 -0.05	10
125/1000			255	1005,31	1004,5				
150/0500	1,5	4,71239	107	504,23	503,5	25	23,50	-0.02 -0.05	15
150/1000			214	1008,45	1008,0				
159/0500	1,59155	5,0	100	500,00	499,5	25	23,40	-0.02 -0.05	15
159/1000			200	1000,00	999,5				
200/0500	2	6,28318	80	502,65	502,0	30	28,00	-0.02 -0.05	20
200/1000			160	1005,31	1004,5				
250/0500	2,5	7,85398	64	502,65	502,0	30	27,50	-0.02 -0.05	20
250/1000			128	1005,31	1004,5				
300/0500	3	9,42478	54	508,94	508,0	40	37,00	-0.02 -0.05	30
300/1000			108	1017,88	1017,0				
318/0500	3,18310	10,0	50	500,00	499,5	40	36,82	-0.02 -0.05	30
318/1000			100	1000,00	999,5				
400/0500	4	12,56637	40	502,65	502,0	50	45,45	-0.02 -0.05	36
400/1000			80	1005,31	1004,5				
400/1500			120	1507,96	1507,0				
500/0500	5	15,70796	32	502,65	502,0	65	59,28	-0.02 -0.07	50
500/1000			64	1005,31	1004,5				
500/1500			96	1507,96	1507,0				
600/0500	6	18,84955	27	508,94	508,0	75	68,15	-0.02 -0.07	55
600/1000			54	1017,88	1017,0				
600/1500			81	1526,81	1526,0				
800/0500	8	25,13274	20	502,65	502,0	95	85,90	-0.02 -0.07	80
800/1000			40	1005,31	1004,5				
1000/0500	10	31,4159	16	502,65	502,0	105	93,60	-0.02 -0.07	100
1000/1000			32	1005,31	1004,5				
1200/0500	12	37,69911	15	565,49	565,0	125	111,35	-0.02 -0.07	120
1200/1000			30	1130,97	1129,0				

QUENCHED & TEMPERED MATERIAL - WITH HOLES

Revision:"03"

Pitch error: one pitch=0.01 mm, cumulative approx.=0.15 mm/m - Z=Number of teeth



Identifier code example : CDF - A - CF - 079/0500

Denomination	Module	P	Z	L	L1	L2	M	n	H	H1	H2	H3	H4	a	b	d	d1	d2	S	
079/0500	0,79577	2,5	200	500,00	499,5	375,00	62,50	7	25,0	24,20	10	8	4	10	6	4,7	6	10	1	
079/1000			400	1000,00	999,5	875,00		-0.02 -0.07												
100/0500	1	3,14159	160	502,65	502,0	376,99	62,83	7	25,0	24,00	10	8	4	10	6	4,7	6	10	1	
100/1000			320	1005,31	1004,5	879,65		-0.02 -0.07												
125/0500	1,25	3,92699	128	502,65	502,0	376,99	62,83	7	25,0	23,75	10	8	4	10	6	4,7	6	10	1	
125/1000			255	1005,31	1004,5	879,65		-0.02 -0.07												
150/0500	1,5	4,71239	107	504,23	503,5	378,17	63,03	7	25,0	23,50	10	8	4	15	7	5,7	7	11	1	
150/1000			214	1008,45	1008,0	882,39		-0.02 -0.07												
159/0500	1,59155	5,0	100	500,00	499,5	375,00	62,50	7	25,0	23,40	10	8	4	15	7	5,7	7	11	1	
159/1000			200	1000,00	999,5	875,00		-0.02 -0.07												
200/0500	2	6,28318	80	502,65	502,0	376,99	62,83	7	30,0	28,00	10	8	6	20	7	5,7	7	11	2	
200/1000			160	1005,31	1004,5	879,65		-0.02 -0.07												
250/0500	2,5	7,85398	64	502,65	502,0	376,99	62,83	7	30,0	27,50	10	8	6	20	7	5,7	7	11	2	
250/1000			128	1005,31	1004,5	879,65		-0.02 -0.07												
300/0500	3	9,42478	54	508,94	508,0	381,71	63,62	7	40,0	37,00	15	10	10	30	9	7,7	10	15	2	
300/1000			108	1017,88	1017,0	890,64		-0.02 -0.07												
318/0500	3,18310	10,0	50	500,00	499,5	375,00	62,50	7	40,0	36,82	15	10	10	30	9	7,7	10	15	2	
318/1000			100	1000,00	999,5	875,00		-0.02 -0.07												
400/0500	4	12,56637	40	502,65	502,0	376,99	62,83	7	49,4	45,45	20	12	11	36	11	9,7	12	18	3	
400/1000			80	1005,31	1004,5	879,65		15												-0.02 -0.07
400/1500			120	1507,96	1507,0	1382,30		23												
500/0500	5	15,70796	32	502,65	502,0	376,99	62,83	7	64,3	59,28	25	14	19	50	13	11,7	14	20	3	
500/1000			64	1005,31	1004,5	879,65		15												-0.02 -0.10
500/1500			96	1507,96	1507,0	1382,30		23												
600/0500	6	18,84955	27	508,94	508,0	381,71	63,62	7	74,2	68,15	30	17	20	55	17	11,7	18	26	3	
600/1000			54	1017,88	1017,0	890,64		15												-0.02 -0.10
600/1500			81	1526,81	1526,0	1399,57		23												
800/0500	8	25,13274	20	502,65	502,0	376,99	62,83	7	93,9	85,90	35	17	34	80	17	13,7	18	26	4	
800/1000			40	1005,31	1004,5	879,65		15												-0.02 -0.10
1000/0500	10	31,41592	16	502,65	502,0	301,59	100,53	4	103,6	93,60	40	24	31	100	25	15,5	22	33	4	
1000/1000			32	1005,31	1004,5	804,25		9												-0.02 -0.07
1200/0500	12	37,69911	15	565,49	565,0	339,29	113,10	4	123,4	111,35	48	30	36	120	25	19,5	22	33	4	
1200/1000			30	1130,97	1129,00	904,78		9												-0.02 -0.07



RACK WITH STRAIGHT TEETH

INDUCTION HARDENED & TEMPERED MATERIAL - WITH HOLES

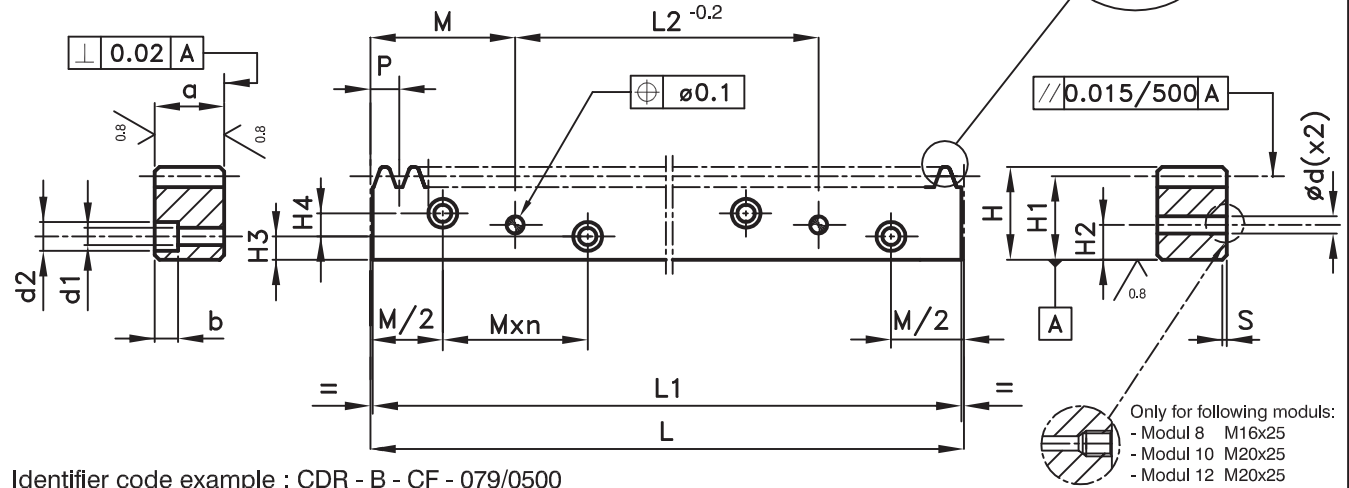
TABLE
CDR-B-CF

Revision:"03"

Material: UNI C45 (AISI-SAE 1045) - Induction hardened & tempered teeth HRC ≥ 52

Toothing accuracy: Module 0.79 - 8 class 5 DIN 3962
Module 10 - 12 class 6 DIN 3962 - Tooth finishing $\sqrt{0.8}$ - Pressure angle: 20°

Pitch error: Module 0.79 - 8 one pitch=0.003 mm, cumulative approx.=0.035 mm/m
Module 10 - 12 one pitch=0.005 mm, cumulative approx.=0.050 mm/m

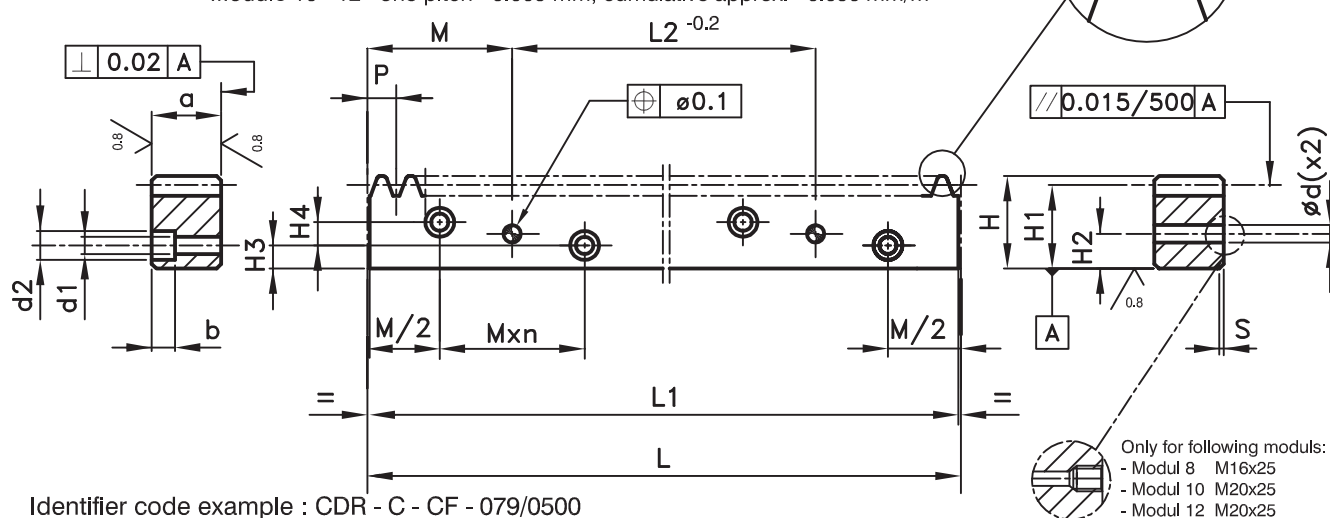


Denomination	Module	P	Z	L	L1	L2	M	n	H	H1	H2	H3	H4	a	b	d	d1	d2	S
079/0500	0.79577	2.5	200	500.00	499.5	375.00	62.50	7	25	24.20	10	8	4	10	6	4.7	6	10	1
079/1000			400	1000.00	999.5	875.00		15	25	-0.02 -0.05	10	8	4	10	6	4.7	6	10	1
100/0500	1	3.14159	160	502.65	502.0	376.99	62.83	7	25	24.00	10	8	4	10	6	4.7	6	10	1
100/1000			320	1005.31	1004.5	879.65		15	25	-0.02 -0.05	10	8	4	10	6	4.7	6	10	1
125/0500	1.25	3.92699	128	502.65	502.0	376.99	62.83	7	25	23.75	10	8	4	10	6	4.7	6	10	1
125/1000			255	1005.31	1004.5	879.65		15	25	-0.02 -0.05	10	8	4	10	6	4.7	6	10	1
150/0500	1.5	4.71239	107	504.23	503.5	378.17	63.03	7	25	23.50	10	8	4	15	7	5.7	7	11	1
150/1000			214	1008.45	1008.0	882.39		15	25	-0.02 -0.05	10	8	4	15	7	5.7	7	11	1
159/0500	1.59155	5.0	100	500.00	499.5	375.00	62.50	7	25	23.40	10	8	4	15	7	5.7	7	11	1
159/1000			200	1000.00	999.5	875.00		15	25	-0.02 -0.05	10	8	4	15	7	5.7	7	11	1
200/0500	2	6.28318	80	502.65	502.0	376.99	62.83	7	30	28.00	10	8	6	20	7	5.7	7	11	2
200/1000			160	1005.31	1004.5	879.65		15	30	-0.02 -0.05	10	8	6	20	7	5.7	7	11	2
250/0500	2.5	7.85398	64	502.65	502.0	376.99	62.83	7	30	27.50	10	8	6	20	7	5.7	7	11	2
250/1000			128	1005.31	1004.5	879.65		15	30	-0.02 -0.05	10	8	6	20	7	5.7	7	11	2
300/0500	3	9.42478	54	508.94	508.0	381.71	63.62	7	40	37.00	15	10	10	30	9	7.7	10	15	2
300/1000			108	1017.88	1017.0	890.64		15	40	-0.02 -0.05	15	10	10	30	9	7.7	10	15	2
318/0500	3.18310	10.0	50	500.00	499.5	375.00	62.50	7	40	36.82	15	10	10	30	9	7.7	10	15	2
318/1000			100	1000.00	999.5	875.00		15	40	-0.02 -0.05	15	10	10	30	9	7.7	10	15	2
400/0500	4	12.56637	40	502.65	502.0	376.99	62.83	7	50	45.45	20	12	11	36	11	9.7	12	18	3
400/1000			80	1005.31	1004.5	879.65		15	50	-0.02 -0.05	20	12	11	36	11	9.7	12	18	3
400/1500			120	1507.96	1507.0	1382.30		23	50	-0.02 -0.05	20	12	11	36	11	9.7	12	18	3
500/0500	5	15.70796	32	502.65	502.0	376.99	62.83	7	65	59.28	25	14	19	50	13	11.7	14	20	3
500/1000			64	1005.31	1004.5	879.65		15	65	-0.02 -0.07	25	14	19	50	13	11.7	14	20	3
500/1500			96	1507.96	1507.0	1382.30		23	65	-0.02 -0.07	25	14	19	50	13	11.7	14	20	3
600/0500	6	18.84955	27	508.94	508.0	381.71	63.62	7	75	68.15	30	17	20	55	17	11.7	18	26	3
600/1000			54	1017.88	1017.0	890.64		15	75	-0.02 -0.07	30	17	20	55	17	11.7	18	26	3
600/1500			81	1526.81	1526.0	1399.57		23	75	-0.02 -0.07	30	17	20	55	17	11.7	18	26	3
800/0500	8	25.13274	20	502.65	502.0	376.99	62.83	7	95	85.90	35	17	34	80	17	13.7	18	26	4
800/1000			40	1005.31	1004.5	879.65		15	95	-0.02 -0.07	35	17	34	80	17	13.7	18	26	4
1000/0500	10	31.41592	16	502.65	502.0	301.59	100.53	4	105	93.60	40	24	31	100	25	15.5	22	33	4
1000/1000			32	1005.31	1004.5	804.25		9	105	-0.02 -0.07	40	24	31	100	25	15.5	22	33	4
1200/0500	12	37.69911	15	565.49	565.0	339.29	113.10	4	125	111.35	48	30	36	120	25	19.5	22	33	4
1200/1000			30	1130.97	1129.00	904.78		9	125	-0.02 -0.07	48	30	36	120	25	19.5	22	33	4

TABLE
CDR-C-CF

Material: UNI 18NiCrMo5 (AISI - SAE 4320) - Casehardened & tempered teeth HRC 58÷62

Pitch error: Module 0.79 - 8 one pitch=0.003 mm, cumulative approx.=0.035 mm/m
Module 10 - 12 one pitch=0.005 mm, cumulative approx.=0.050 mm/m



Identifier code example : CDR - C - CF - 079/0500

Denomination	Module	P	Z	L	L1	L2	M	n	H	H1	H2	H3	H4	a	b	d	d1	d2	S
079/0500	0,79577	2,5	200	500,00	499,5	375,00	62,50	7	25	24,20	10	8	4	10	6	4,7	6	10	1
079/1000			15	-0,02 -0,05															
100/0500	1	3,14159	160	502,65	502,0	376,99	62,83	7	25	24,00	10	8	4	10	6	4,7	6	10	1
100/1000			15	-0,02 -0,05															
125/0500	1,25	3,92699	128	502,65	502,0	376,99	62,83	7	25	23,75	10	8	4	10	6	4,7	6	10	1
125/1000			15	-0,02 -0,05															
150/0500	1,5	4,71239	107	504,23	503,5	378,17	63,03	7	25	23,50	10	8	4	15	7	5,7	7	11	1
150/1000			15	-0,02 -0,05															
159/0500	1,59155	5,0	100	500,00	499,5	375,00	62,50	7	25	23,40	10	8	4	15	7	5,7	7	11	1
159/1000			15	-0,02 -0,05															
200/0500	2	6,28318	80	502,65	502,0	376,99	62,83	7	30	28,00	10	8	6	20	7	5,7	7	11	2
200/1000			15	-0,02 -0,05															
250/0500	2,5	7,85398	64	502,65	502,0	376,99	62,83	7	30	27,50	10	8	6	20	7	5,7	7	11	2
250/1000			15	-0,02 -0,05															
300/0500	3	9,42478	54	508,94	508,0	381,71	63,62	7	40	37,00	15	10	10	30	9	7,7	10	15	2
300/1000			15	-0,02 -0,05															
318/0500	3,18310	10,0	50	500,00	499,5	375,00	62,50	7	40	36,82	15	10	10	30	9	7,7	10	15	2
318/1000			15	-0,02 -0,05															
400/0500	4	12,56637	40	502,65	502,0	376,99	62,83	7	50	45,45	20	12	11	36	11	9,7	12	18	3
400/1000			15	-0,02 -0,05															
400/1500			23																
500/0500	5	15,70796	32	502,65	502,0	376,99	62,83	7	65	59,28	25	14	19	50	13	11,7	14	20	3
500/1000			15	-0,02 -0,07															
500/1500			23																
600/0500	6	18,84955	27	508,94	508,0	381,71	63,62	7	75	68,15	30	17	20	55	17	11,7	18	26	3
600/1000			15	-0,02 -0,07															
600/1500			23																
800/0500	8	25,13274	20	502,65	502,0	376,99	62,83	7	95	85,90	35	17	34	80	17	13,7	18	26	4
800/1000			15	-0,02 -0,07															
1000/0500	10	31.41592	16	502,65	502,0	301,59	100,53	4	105	93,60	40	24	31	100	25	15.5	22	33	4
1000/1000			9	-0,02 -0,07															
1200/0500	12	37.69911	15	565,49	565,0	339,29	113,10	4	125	111,35	48	30	36	120	25	19.5	22	33	4
1200/1000			9	-0,02 -0,07															



RACK WITH HELICAL TEETH

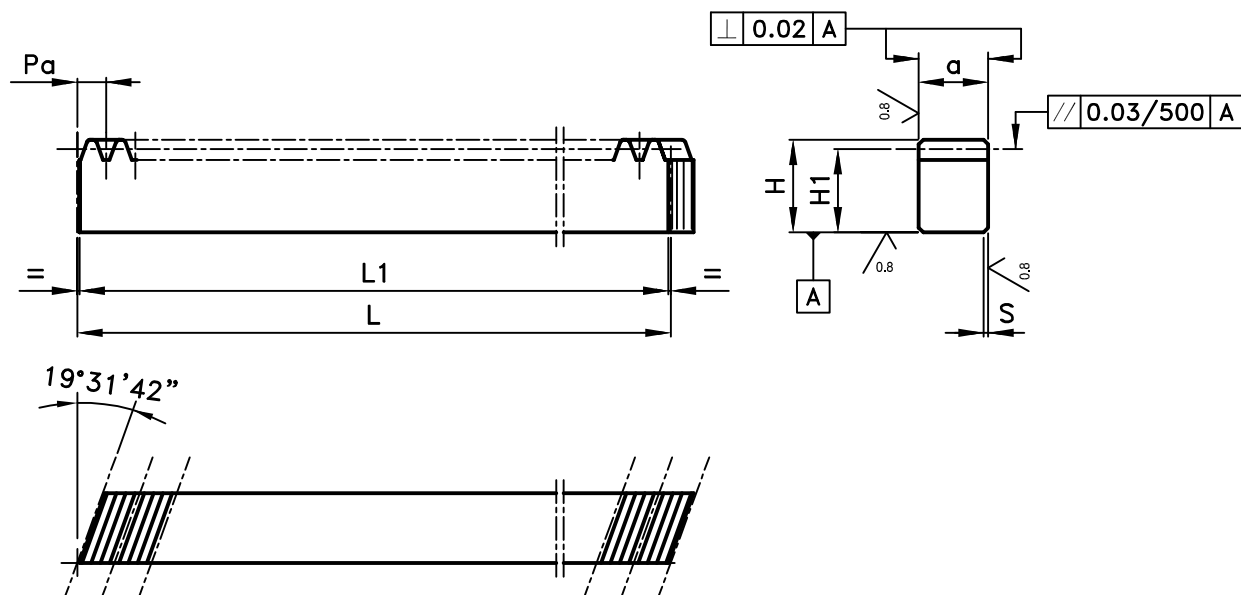
QUENCHED & TEMPERED MATERIAL - WITHOUT HOLES

TABLE
CEF-A-SF
Revision:"01"

Material: UNI C45 (AISI-SAE 1045) - Quenched & tempered

Toothing accuracy: class 8 DIN 3962 - Tooth finishing $\sqrt{1.6}$ - Pressure angle: 20°

Pitch error: one pitch=0.01 mm, cumulative approx.=0.15 mm/m - Z=Number of teeth



Identifier code example : CEF - A - SF - 100/0500

Denomination	Module	Pa	Z	L	L1	H	H1	a	S
100/0500	1	3,3333	150	500,00	499,5	25,0	24,00 -0.02 -0.07	10	1
100/1000			300	1000,00	999,5				
125/0500	1,25	4,1666	120	500,00	499,5	25,0	23,75 -0.02 -0.07	10	1
125/1000			240	1000,00	999,5				
150/0500	1,5	5,0000	100	500,00	499,5	25,0	23,50 -0.02 -0.07	15	1
150/1000			200	1000,00	999,5				
200/0500	2	6,6666	75	500,00	499,5	30,0	28,00 -0.02 -0.07	20	2
200/1000			150	1000,00	999,5				
250/0500	2,5	8,3333	60	500,00	499,5	30,0	27,50 -0.02 -0.07	20	2
250/1000			120	1000,00	999,5				
300/0500	3	10,0000	50	500,00	499,5	40,0	37,00 -0.02 -0.07	30	2
300/1000			100	1000,00	999,5				
400/0500	4	13,3333	38	506,67	506,0	49,4	45,45 -0.02 -0.07	36	3
400/1000			76	1013,33	1012,5				
400/1500			114	1520,00	1519,5				
500/0500	5	16,6666	30	500,00	499,5	64,3	59,28 -0.02 -0.10	50	3
500/1000			60	1000,00	999,5				
500/1500			90	1500,00	1499,5				
600/0500	6	20,0000	25	500,00	499,5	74,2	68,15 -0.02 -0.10	55	3
600/1000			50	1000,00	999,5				
600/1500			75	1500,00	1499,5				
800/0500	8	26,6666	19	506,67	506,0	93,9	85,90 -0.02 -0.10	80	4
800/1000			38	1013,33	1012,5				
1000/0500	10	33,3333	15	500,00	499,5	103,6	93,60 -0.02 -0.07	100	4
1000/1000			30	1000,00	999,5				
1200/0500	12	40,0000	15	600,00	599,00	123,4	111,35 -0.02 -0.07	120	4
1200/1000			30	1200,00	1198,00				



RACK WITH HELICAL TEETH

INDUCTION HARDENED & TEMPERED MATERIAL - WITHOUT HOLES

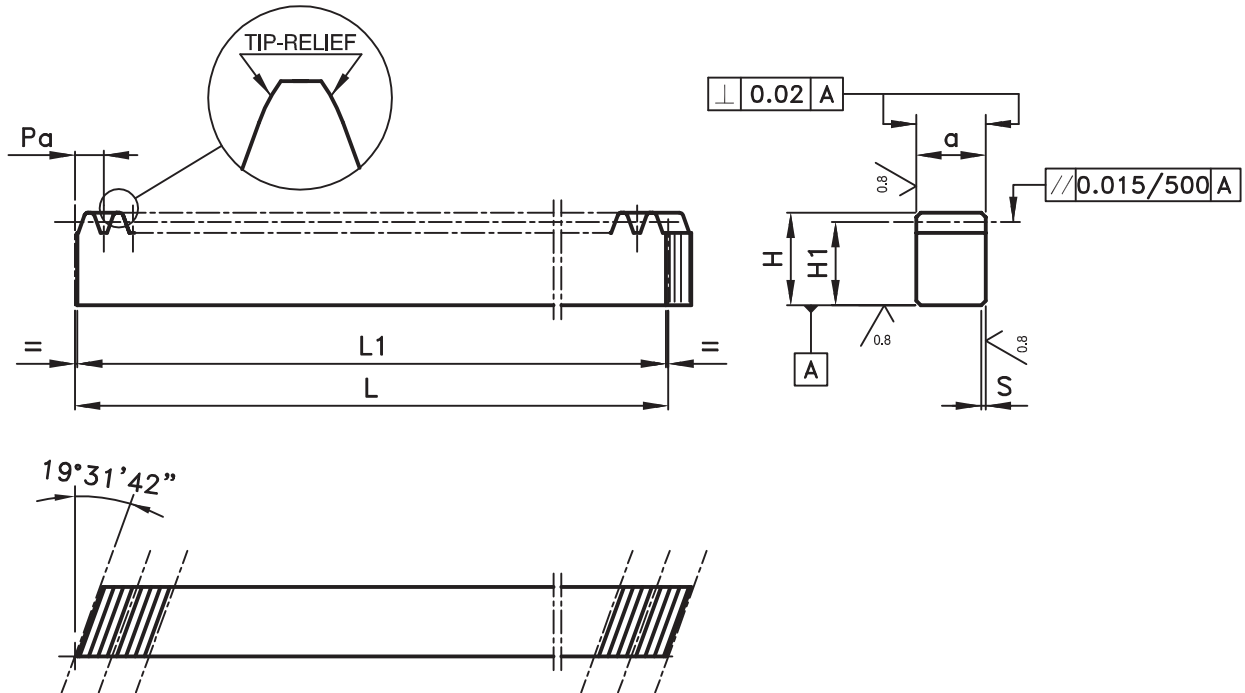
TABLE
CER-B-SF

Revision:"01"

Material: UNI C45 (AISI-SAE 1045) - Induction hardened & tempered teeth HRC ≥ 52

Tooth accuracy: Module 0,79 - 8 class 5 DIN 3962 - Tooth finishing $\sqrt{0.8}$ - Pressure angle: 20°
Module 10 - 12 class 6 DIN 3962

Pitch error: Module 0,79 - 8 one pitch=0.003 mm, cumulative approx.=0.035 mm/m
Module 10 - 12 one pitch=0.005 mm, cumulative approx.=0.050 mm/m



Identifier code example : CER - B - SF - 100/0500

Denomination	Module	Pa	Z	L	L1	H	H1	a	S
100/0500	1	3,3333	150	500,00	499,5	25	24,00 -0.02 -0.05	10	1
100/1000			300	1000,00	999,5				
125/0500	1,25	4,1666	120	500,00	499,5	25	23,75 -0.02 -0.05	10	1
125/1000			240	1000,00	999,5				
150/0500	1,5	5,0000	100	500,00	499,5	25	23,50 -0.02 -0.05	15	1
150/1000			200	1000,00	999,5				
200/0500	2	6,6666	75	500,00	499,5	30	28,00 -0.02 -0.05	20	2
200/1000			150	1000,00	999,5				
250/0500	2,5	8,3333	60	500,00	499,5	30	27,50 -0.02 -0.05	20	2
250/1000			120	1000,00	999,5				
300/0500	3	10,0000	50	500,00	499,5	40	37,00 -0.02 -0.05	30	2
300/1000			100	1000,00	999,5				
400/0500	4	13,3333	38	506,67	506,0	50	45,45 -0.02 -0.05	36	3
400/1000			76	1013,33	1012,5				
400/1500			114	1520,00	1519,5				
500/0500	5	16,6666	30	500,00	499,5	65	59,28 -0.02 -0.07	50	3
500/1000			60	1000,00	999,5				
500/1500			90	1500,00	1499,5				
600/0500	6	20,0000	25	500,00	499,5	75	68,15 -0.02 -0.07	55	3
600/1000			50	1000,00	999,5				
600/1500			75	1500,00	1499,5				
800/0500	8	26,6666	19	506,67	506,0	95	85,90 -0.02 -0.07	80	4
800/1000			38	1013,33	1012,5				
1000/0500	10	33,3333	15	500,00	499,5	105	93,60 -0.02 -0.07	100	4
1000/1000			30	1000,00	999,5				
1200/0500	12	40,0000	15	600,00	599,00	125	111,35 -0.02 -0.07	120	4
1200/1000			30	1200,00	1198,00				



RACK WITH HELICAL TEETH

CASEHARDENED & TEMPERED MATERIAL - WITHOUT HOLES

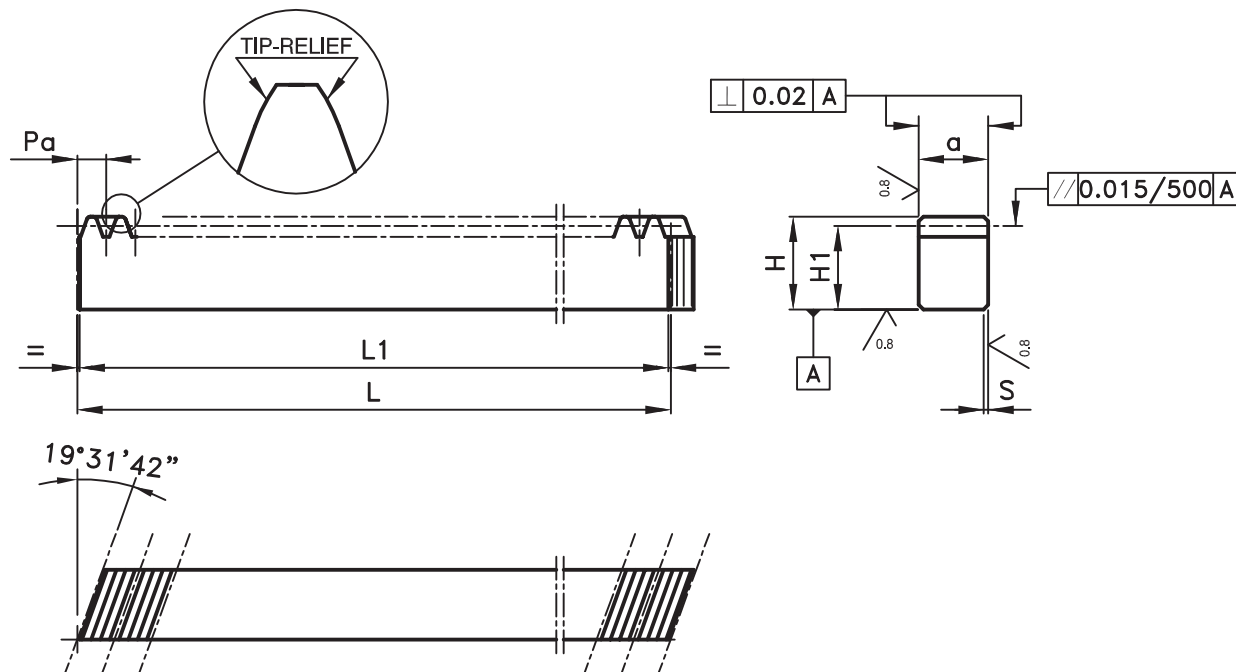
TABLE
CER-C-SF

Revision:"01"

Material: UNI 18NiCrMo5 (AISI-SAE 4320) - Casehardened & tempered teeth HRC 58÷62

Toothing accuracy: Module 0.79 - 8 class 5 DIN 3962 - Tooth finishing $\sqrt{0.8}$ - Pressure angle: 20°
Module 10 - 12 class 6 DIN 3962

Pitch error: Module 0.79 - 8 one pitch=0.003 mm, cumulative approx.=0.035 mm/m
Module 10 - 12 one pitch=0.005 mm, cumulative approx.=0.050 mm/m



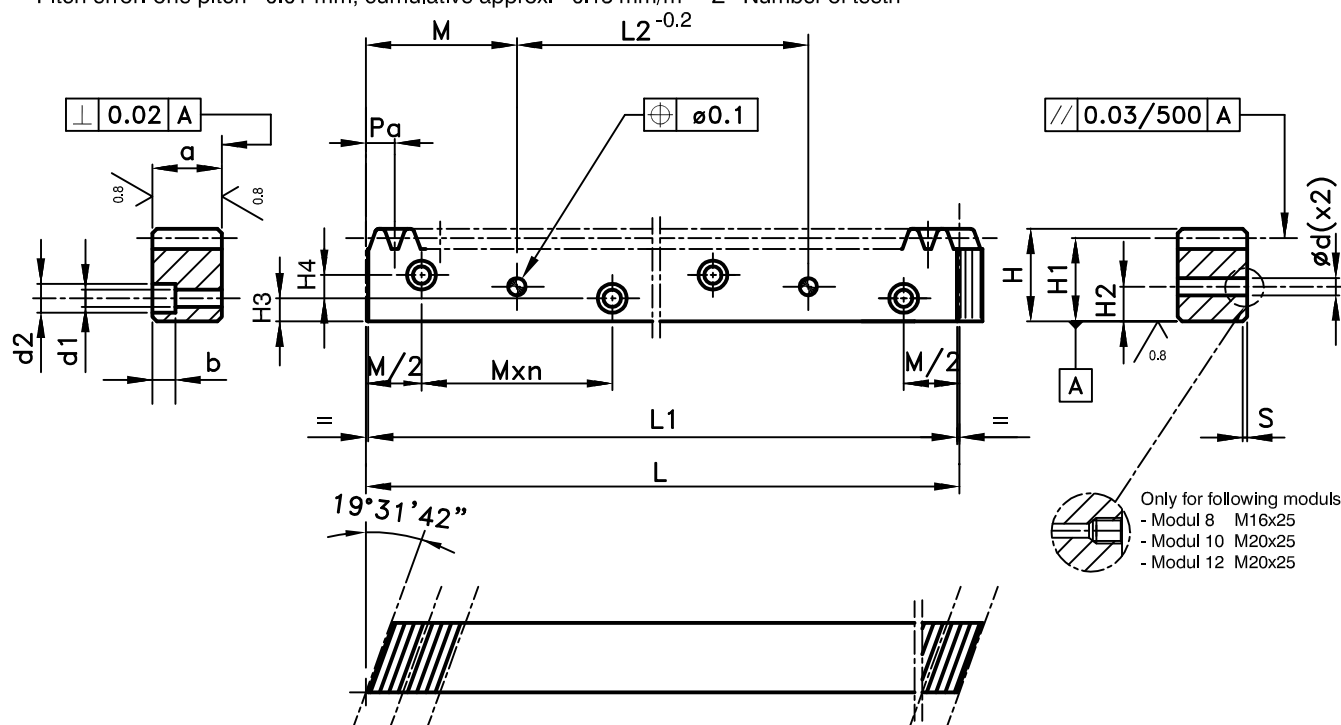
Identifier code example : CER - C - SF - 100/0500

Denomination	Module	Pa	Z	L	L1	H	H1	a	S
100/0500	1	3,3333	150	500,00	499,5	25	24,00	-0.02 -0.05	10
100/1000			300	1000,00	999,5				
125/0500	1,25	4,1666	120	500,00	499,5	25	23,75	-0.02 -0.05	10
125/1000			240	1000,00	999,5				
150/0500	1,5	5,0000	100	500,00	499,5	25	-0.02 -0.05	15	1
150/1000			200	1000,00	999,5				
200/0500	2	6,6666	75	500,00	499,5	30	28,00	-0.02 -0.05	20
200/1000			150	1000,00	999,5				
250/0500	2,5	8,3333	60	500,00	499,5	30	27,50	-0.02 -0.05	20
250/1000			120	1000,00	999,5				
300/0500	3	10,0000	50	500,00	499,5	40	37,00	-0.02 -0.05	30
300/1000			100	1000,00	999,5				
400/0500	4	13,3333	38	506,67	506,0	50	45,45	-0.02 -0.05	36
400/1000			76	1013,33	1012,5				
400/1500			114	1520,00	1519,5				
500/0500	5	16,6666	30	500,00	499,5	65	59,28	-0.02 -0.07	50
500/1000			60	1000,00	999,5				
500/1500			90	1500,00	1499,5				
600/0500	6	20,0000	25	500,00	499,5	75	68,15	-0.02 -0.07	55
600/1000			50	1000,00	999,5				
600/1500			75	1500,00	1499,5				
800/0500	8	26,6666	19	506,67	506,0	95	85,90	-0.02 -0.07	80
800/1000			38	1013,33	1012,5				
1000/0500	10	33,3333	15	500,00	499,5	105	93,60	-0.02 -0.07	100
1000/1000			30	1000,00	999,5				
1200/0500	12	40,0000	15	600,00	599,00	125	111,35	-0.02 -0.07	120
1200/1000			30	1200,00	1198,00				

QUENCHED & TEMPERED MATERIAL - WITH HOLES

Revision:"03"

Pitch error: one pitch=0.01 mm, cumulative approx.=0.15 mm/m - Z=Number of teeth



Identifier code example : CEF - A - CF - 100/0500

Denomination	Module	Pa	Z	L	L1	L2	M	n	H	H1	H2	H3	H4	a	b	d	d1	d2	S
100/0500	1	3,3333	150	500,00	499,5	333,34	83,33	5	25,0	24,00	10	8	4	10	6	4,7	6	10	1
100/1000			11	-0.02 -0.07															
125/0500	1,25	4,1666	120	500,00	499,5	333,34	83,33	5	25,0	23,75	10	8	4	10	6	4,7	6	10	1
125/1000			11	-0.02 -0.07															
150/0500	1,5	5,0000	100	500,00	499,5	333,34	83,33	5	25,0	23,50	10	8	4	15	7	5,7	7	11	1
150/1000			11	-0.02 -0.07															
200/0500	2	6,6666	75	500,00	499,5	333,34	83,33	5	30,0	28,00	10	8	6	20	7	5,7	7	11	2
200/1000			11	-0.02 -0.07															
250/0500	2,5	8,3333	60	500,00	499,5	333,34	83,33	5	30,0	27,50	10	8	6	20	7	5,7	7	11	2
250/1000			11	-0.02 -0.07															
300/0500	3	10,0000	50	500,00	499,5	333,34	83,33	5	40,0	37,00	15	10	10	30	9	7,7	10	15	2
300/1000			11	-0.02 -0.07															
400/0500	4	13,3333	38	506,67	506,0	337,79	84,44	5	49,4	45,45	20	12	11	36	11	9,7	12	18	3
400/1000			11	-0.02 -0.07															
400/1500			17																
500/0500	5	16,6666	30	500,00	499,5	333,34	83,33	5	64,3	59,28	25	14	19	50	13	11,7	14	20	3
500/1000			11	-0.02 -0.10															
500/1500			17																
600/0500	6	20,0000	25	500,00	499,5	333,34	83,33	5	74,2	68,15	30	17	20	55	17	11,7	18	26	3
600/1000			11	-0.02 -0.10															
600/1500			17																
800/0500	8	26,6666	19	506,67	506,0	337,79	84,44	5	93,9	85,90	35	17	34	80	17	13,7	18	26	4
800/1000			11	-0.02 -0.10															
1000/0500	10	33,3333	15		500,00	499,0	300,00	100,00	4	103,6	93,6	40	24	31	100	25	15,5	22	33
1000/1000			9	-0.02 -0.07															
1200/0500	12	40,0000	15		600,00	599,0	360,00	120,00	4	123,4	111,35	48	30	36	120	25	19,5	22	33
1200/1000			9	-0.02 -0.07															



RACK WITH HELICAL TEETH

INDUCTION HARDENED & TEMPERED MATERIAL - WITH HOLES

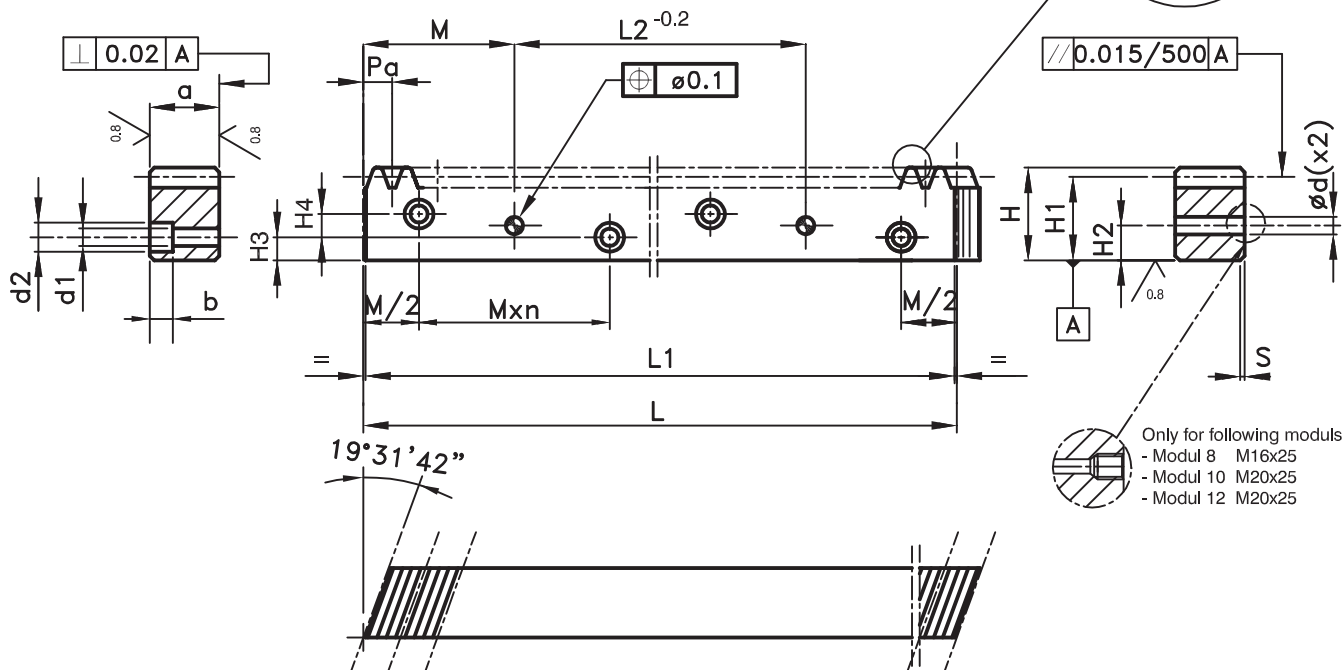
TABLE
CER-B-CF

Revision:"03"

Material: UNI C45 (AISI-SAE 1045) - Induction hardened & tempered teeth HRC ≥ 52

Toothing accuracy: Module 0.79 - 8 class 5 DIN 3962 - Tooth finishing $\checkmark^{0.8}$ - Pressure angle: 20°
Module 10 - 12 class 6 DIN 3962

Pitch error: Module 0.79 - 8 one pitch=0.003 mm, cumulative approx.=0.035 mm/m
Module 10 - 12 one pitch=0.005 mm, cumulative approx.=0.050 mm/m



Identifier code example : CER - B - CF - 100/0500

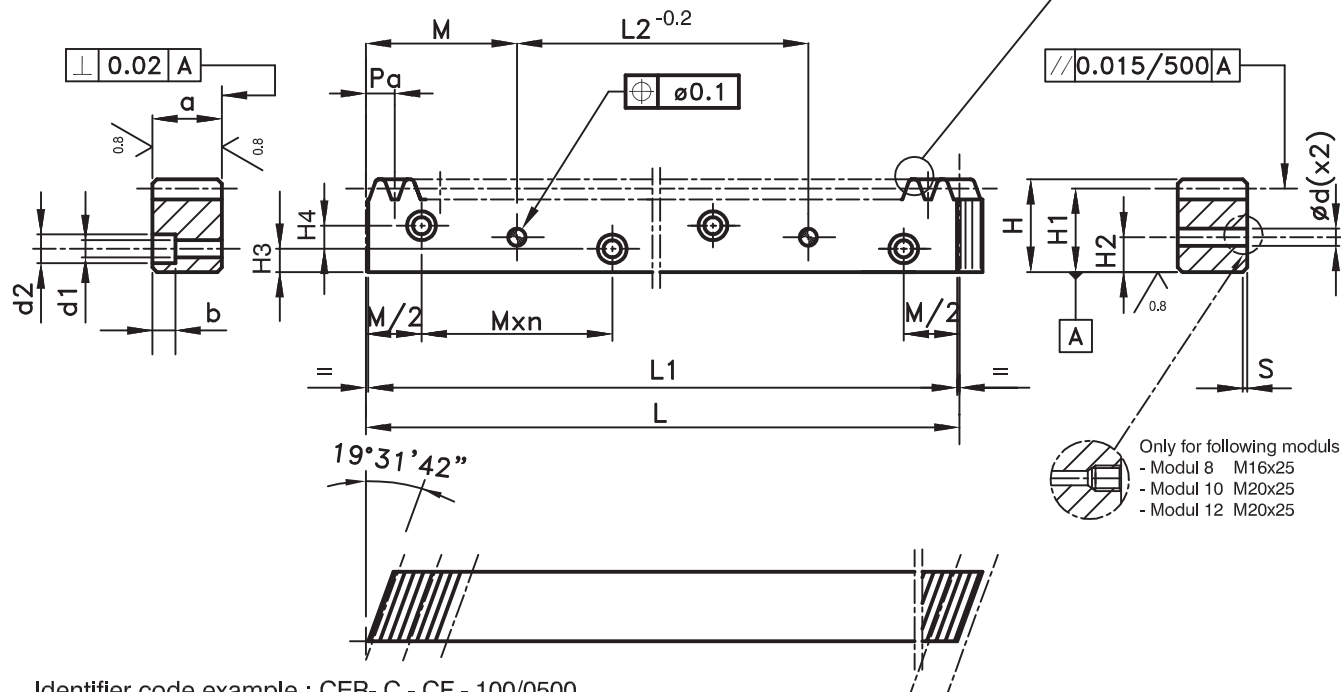
Denominazione	Modulo	Pa	Z	L	L1	L2	M	n	H	H1	H2	H3	H4	a	b	d	d1	d2	S
100/0500	1	3,3333	150	500,00	499,5	333,34	83,33	5	25	24,00	10	8	4	10	6	4,7	6	10	1
100/1000			300	1000,00	999,5	833,34		-0.02 -0.05											
125/0500	1,25	4,1666	120	500,00	499,5	333,34	83,33	5	25	23,75	10	8	4	10	6	4,7	6	10	1
125/1000			240	1000,00	999,5	833,34		-0.02 -0.05											
150/0500	1,5	5,0000	100	500,00	499,5	333,34	83,33	5	25	23,50	10	8	4	15	7	5,7	7	11	1
150/1000			200	1000,00	999,5	833,34		-0.02 -0.05											
200/0500	2	6,6666	75	500,00	499,5	333,34	83,33	5	30	28,00	10	8	6	20	7	5,7	7	11	2
200/1000			150	1000,00	999,5	833,34		-0.02 -0.05											
250/0500	2,5	8,3333	60	500,00	499,5	333,34	83,33	5	30	27,50	10	8	6	20	7	5,7	7	11	2
250/1000			120	1000,00	999,5	833,34		-0.02 -0.05											
300/0500	3	10,0000	50	500,00	499,5	333,34	83,33	5	40	37,00	15	10	10	30	9	7,7	10	15	2
300/1000			100	1000,00	999,5	833,34		-0.02 -0.05											
400/0500	4	13,3333	38	506,67	506,0	337,79	84,44	5	50	45,45	20	12	11	36	11	9,7	12	18	3
400/1000			76	1013,33	1012,5	844,45		-0.02 -0.05											
400/1500			114	1520,00	1519,5	1351,12		-0.02 -0.05											
500/0500	5	16,6666	30	500,00	499,5	333,34	83,33	5	65	59,28	25	14	19	50	13	11,7	14	20	3
500/1000			60	1000,00	999,5	833,34		-0.02 -0.07											
500/1500			90	1500,00	1499,5	1333,34		-0.02 -0.07											
600/0500	6	20,0000	25	500,00	499,5	333,34	83,33	5	75	68,15	30	17	20	55	17	11,7	18	26	3
600/1000			50	1000,00	999,5	833,34		-0.02 -0.07											
600/1500			75	1500,00	1499,5	1333,34		-0.02 -0.07											
800/0500	8	26,6666	19	506,67	506,0	337,79	84,44	5	95	85,9	35	17	34	80	17	13,7	18	26	4
800/1000			38	1013,33	1012,5	844,45		-0.02 -0.07											
1000/0500	10	33,3333	15	500,00	499,0	300,00	100,00	4	105	93,6	40	24	31	100	25	15,5	22	33	4
1000/1000			30	1000,00	999,0	800,00		-0.02 -0.07											
1200/0500	12	40,0000	15	600,00	599,0	360,00	120,00	4	125	111,35	48	30	36	120	25	19,5	22	33	4
1200/1000			30	1200,00	1198,0	960,00		-0.02 -0.07											

TABLE
CER-C-CF

Material: UNI 18NiCrMo5 (AISI-SAE 4320) - Casehardened & tempered teeth HRC 58÷62

Toothing accuracy: Module 0.79 - 8 class 5 DIN 3962 - Tooth finishing $\sqrt{0.8}$ - Pressure angle: 20°
Module 10 - 12 class 6 DIN 3962

Pitch error: Module 0.79 - 8 one pitch=0.003 mm, cumulative approx.=0.035 mm/m
Module 10 - 12 one pitch=0.005 mm, cumulative approx.=0.050 mm/m



Identifier code example : CER- C - CF - 100/0500

Denomination	Module	Pa	Z	L	L1	L2	M	n	H	H1	H2	H3	H4	a	b	d	d1	d2	S	
100/0500	1	3,3333	150	500,00	499,5	333,34	83,33	5	25	24,00 -0.02 -0.05	10	8	4	10	6	4,7	6	10	1	
100/1000			11	300	1000,00	999,5		833,34		10										
125/0500	1,25	4,1666	120	500,00	499,5	333,34	83,33	5	25	23,75 -0.02 -0.05	10	8	4	10	6	4,7	6	10	1	
125/1000			11	240	1000,00	999,5		833,34		10										
150/0500	1,5	5,0000	100	500,00	499,5	333,34	83,33	5	25	23,50 -0.02 -0.05	10	8	4	15	7	5,7	7	11	1	
150/1000			11	200	1000,00	999,5		833,34		10										
200/0500	2	6,6666	75	500,00	499,5	333,34	83,33	5	30	28,00 -0.02 -0.05	10	8	6	20	7	5,7	7	11	2	
200/1000			11	150	1000,00	999,5		833,34		10										
250/0500	2,5	8,3333	60	500,00	499,5	333,34	83,33	5	30	27,50 -0.02 -0.05	10	8	6	20	7	5,7	7	11	2	
250/1000			11	120	1000,00	999,5		833,34		10										
300/0500	3	10,0000	50	500,00	499,5	333,34	83,33	5	40	37,00 -0.02 -0.05	15	10	10	30	9	7,7	10	15	2	
300/1000			11	100	1000,00	999,5		833,34		10										
400/0500	4	13,3333	38	506,67	506,0	337,79	84,44	5	50	45,45 -0.02 -0.05	20	12	11	36	11	9,7	12	18	3	
400/1000			11	76	1013,33	1012,5		844,45												10
400/1500			17	114	1520,00	1519,5		1351,12												10
500/0500	5	16,6666	30	500,00	499,5	333,34	83,33	5	65	59,28 -0.02 -0.07	25	14	19	50	13	11,7	14	20	3	
500/1000			11	60	1000,00	999,5		833,34												10
500/1500			17	90	1500,00	1499,5		1333,34												10
600/0500	6	20,0000	25	500,00	499,5	333,34	83,33	5	75	68,15 -0.02 -0.07	30	17	20	55	17	11,7	18	26	3	
600/1000			11	50	1000,00	999,5		833,34												10
600/1500			17	75	1500,00	1499,5		1333,34												10
800/0500	8	26,6666	19	506,67	506,0	337,79	84,44	5	95	85,9 -0.02 -0.07	35	17	34	80	17	13,7	18	26	4	
800/1000			11	38	1013,33	1012,5		844,45												10
1000/0500	10	33,3333	15	500,00	499,0	300,00	100,00	4	105	93,6 -0.02 -0.07	40	24	31	100	25	15,5	22	33	4	
1000/1000			9	30	1000,00	999,00		800,00												10
1200/0500	12	40,0000	15	600,00	599,0	360,00	120,00	4	125	111,35 -0.02 -0.07	48	30	36	120	25	19,5	22	33	4	
1200/1000			9	30	1200,00	1198,0		960,00												10



PINION WITH STRAIGHT TEETH $m=0.79577$

CASEHARDENED & TEMPERED MATERIAL

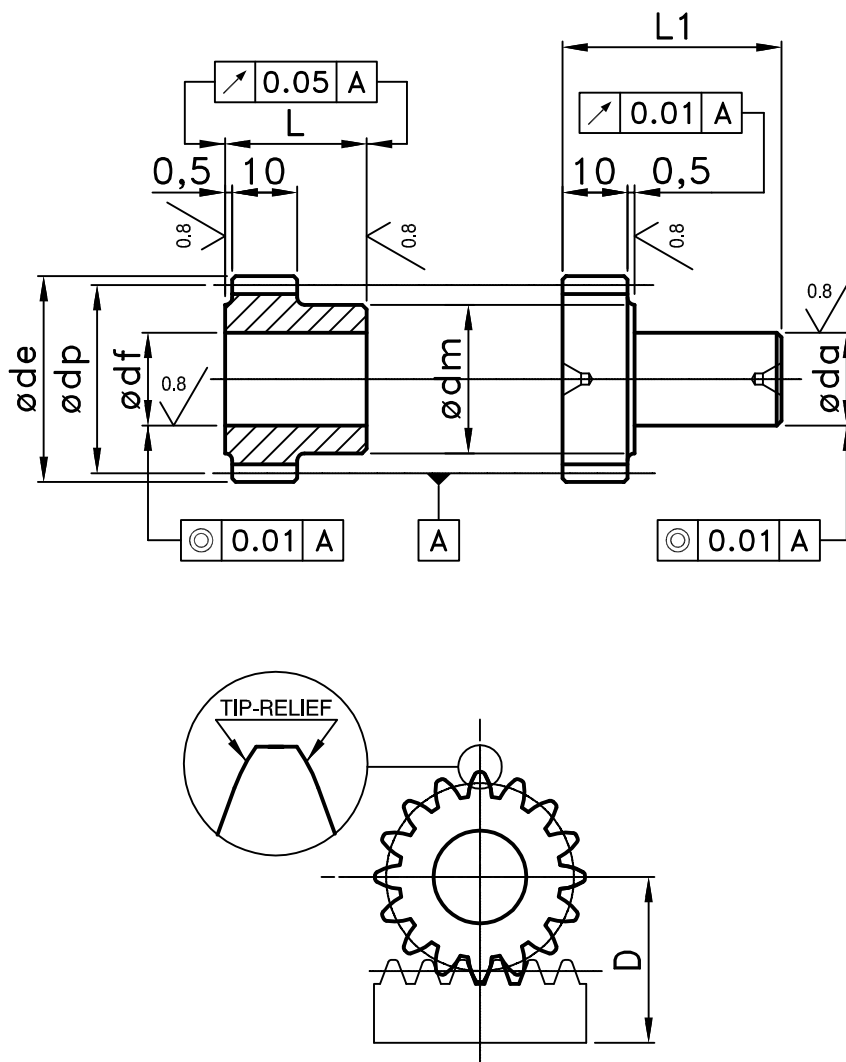
TABLE
PDR-C-079

Revision:"00"

Material: UNI 18NiCrMo5 (AISI-SAE 4320) - Casehardened & tempered teeth HRC 58÷62

Toothing accuracy: class 6 DIN 3962 - Tooth finishing $\sqrt{0.8}$ - Toothing with crowned profile - Pressure angle: 20°

m=Module - Z=Number of teeth - D=Assembly clearance - dp=Correct pitch diameter



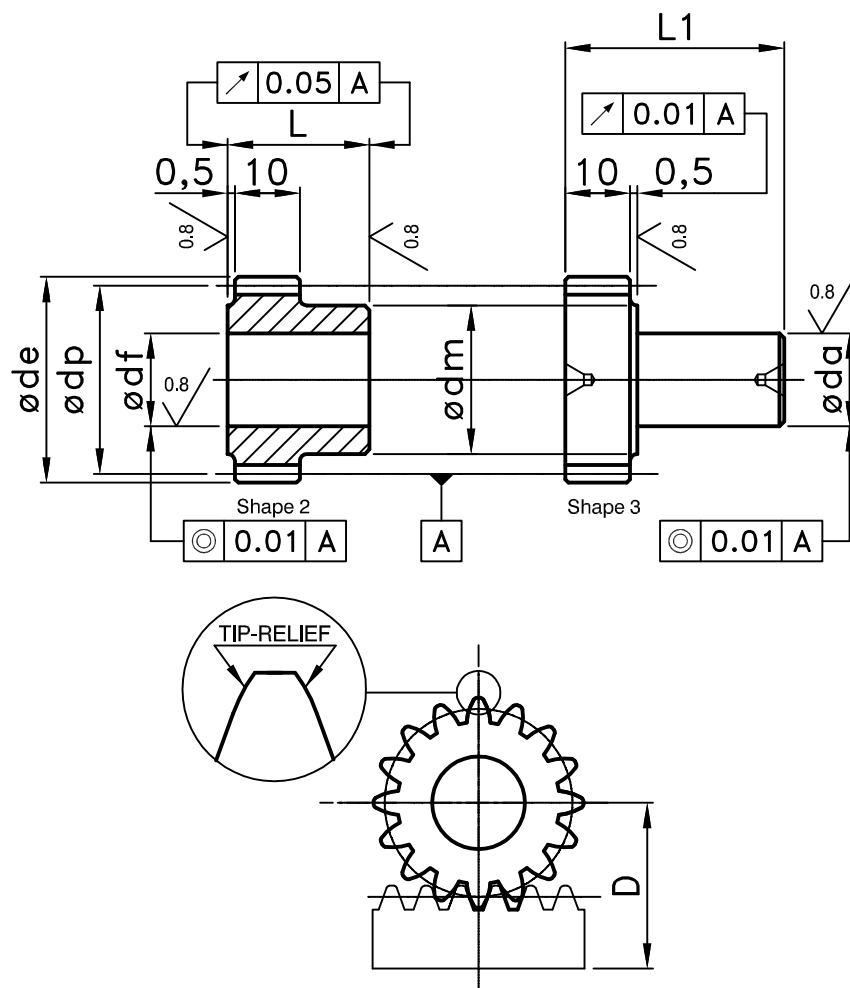
Identifier code example : PDR - C - 079 - 20/2

Denomination	Shape	Z	D $^{+0,02}_0$	dp	de	df H6	df max	dm	da h6	L	L1
20/2	2	20	32,63	16,71	18,3	6	8	14	8	20	40
20/3	3										
22/2	2	22	33,42	18,30	19,9	6	8	15	10	20	40
22/3	3										
24/2	2	24	34,22	19,89	21,5	6	8	17	10	20	40
24/3	3										
26/2	2	26	35,02	21,48	23,1	8	10	18	10	20	40
26/3	3										
28/2	2	28	35,81	23,08	24,7	8	12	20	12	20	50
28/3	3										
30/2	2	30	36,61	24,67	26,3	8	12	21	12	20	50
30/3	3										
36/2	2	36	39,00	29,44	31,0	10	16	26	14	22	50
36/3	3										
40/2	2	40	40,59	32,63	34,2	10	18	29	16	22	50
40/3	3										

CASEHARDENED & TEMPERED MATERIAL

Revision:"00"

m=Module - Z=Number of teeth - D=Assembly clearance - dp=Correct pitch diameter



Identifier code example : PDR - C - 100 - 18/2

Denomination	Shape	Z	D ^{+0,02} ₀	dp	de	df H6	df max	dm	da h6	L	L1
18/2	2	18	33,57	19	21	6	8	15	8	20	40
18/3	3										
20/2	2	20	34,57	21	23	6	8	17	10	20	40
20/3	3										
22/2	2	22	35,57	23	25	6	10	19	10	20	40
22/3	3										
24/2	2	24	36,57	25	27	8	12	21	12	20	50
24/3	3										
25/2	2	25	37,07	26	28	8	12	22	12	20	50
25/3	3										
27/2	2	27	38,07	28	30	10	15	24	12	20	50
27/3	3										
30/2	2	30	39,57	31	33	10	16	27	14	22	50
30/3	3										
32/2	2	32	40,57	33	35	10	18	29	16	22	50
32/3	3										
35/2	2	35	42,07	36	38	10	20	32	16	22	50
35/3	3										



PINION WITH STRAIGHT TEETH $m=1.25$

CASEHARDENED & TEMPERED MATERIAL

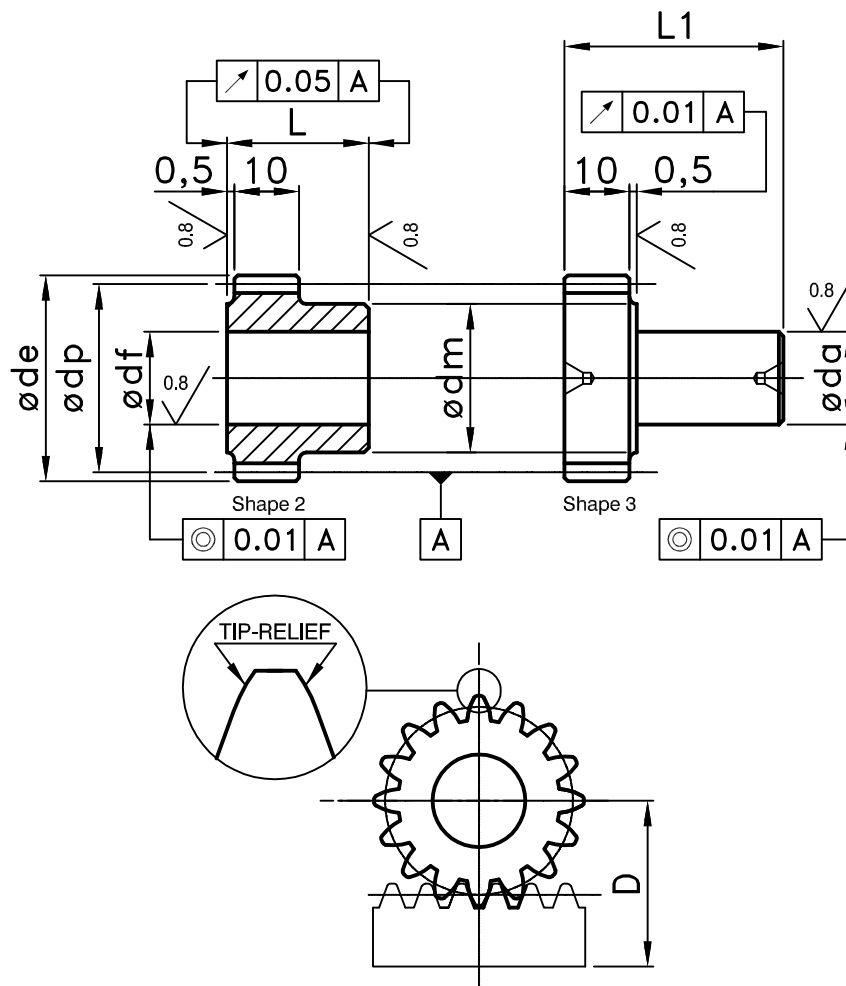
TABLE
PDR-C-125

Revision:"00"

Material: UNI 18NiCrMo5 (AISI-SAE 4320) - Casehardened & tempered teeth HRC 58÷62

Toothing accuracy: class 6 DIN 3962 - Tooth finishing $\sqrt{0.8}$ - Toothing with crowned profile - Pressure angle: 20°

m=Module - Z=Number of teeth - D=Assembly clearance - dp=Correct pitch diameter



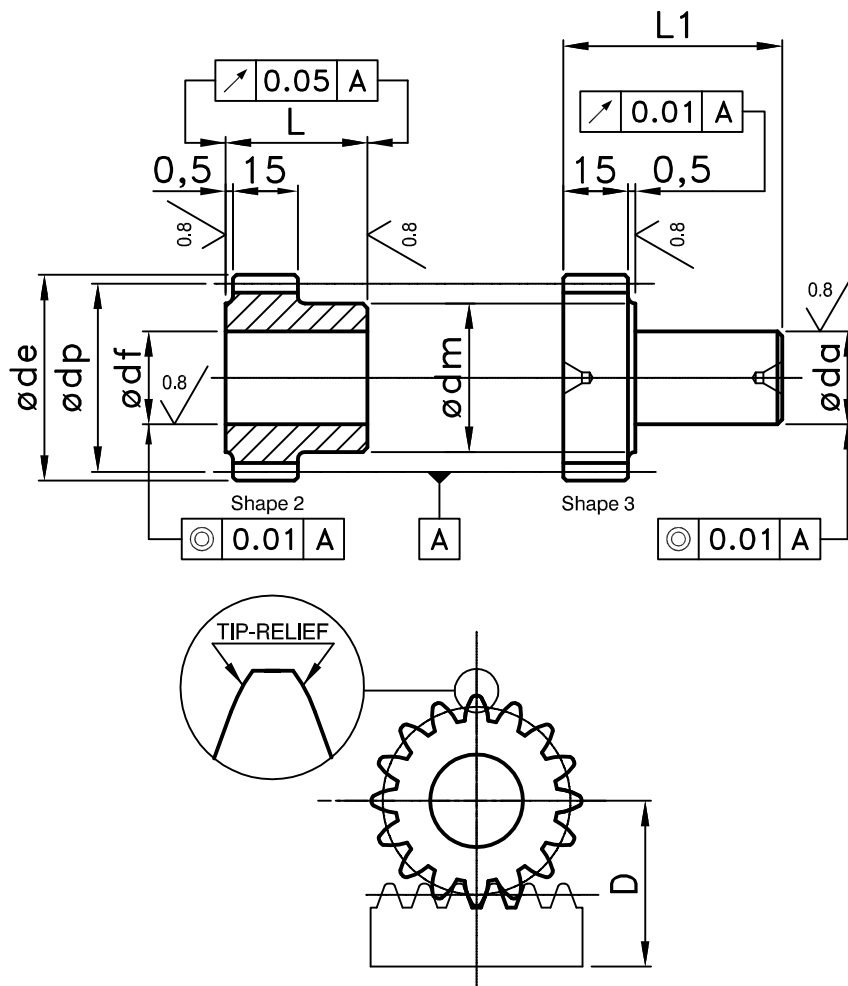
Identifier code example : PDR - C - 125 - 18/2

Denomination	Shape	Z	D ^{+0.02} ₀	dp	de	df H6	df max	dm	da h6	L	L1
18/2	2	18	35,70	23,75	26,2	8	10	19	10	20	40
18/3	3										
20/2	2	20	36,95	26,25	28,7	8	12	22	10	20	40
20/3	3										
22/2	2	22	38,20	28,75	31,2	10	15	24	12	20	45
22/3	3										
24/2	2	24	39,45	31,25	33,7	10	15	27	12	20	45
24/3	3										
25/2	2	25	40,07	32,50	35,0	10	17	28	14	20	50
25/3	3										
27/2	2	27	41,32	35,00	37,5	12	20	31	14	25	50
27/3	3										
30/2	2	30	43,20	38,75	41,2	12	22	34	16	25	55
30/3	3										
32/2	2	32	44,45	41,25	43,7	12	24	36	18	25	60
32/3	3										
35/2	2	35	46,32	45,00	47,5	15	26	40	20	25	60
35/3	3										

CASEHARDENED & TEMPERED MATERIAL

Revision:"00"

m=Module - Z=Number of teeth - D=Assembly clearance - dp=Correct pitch diameter



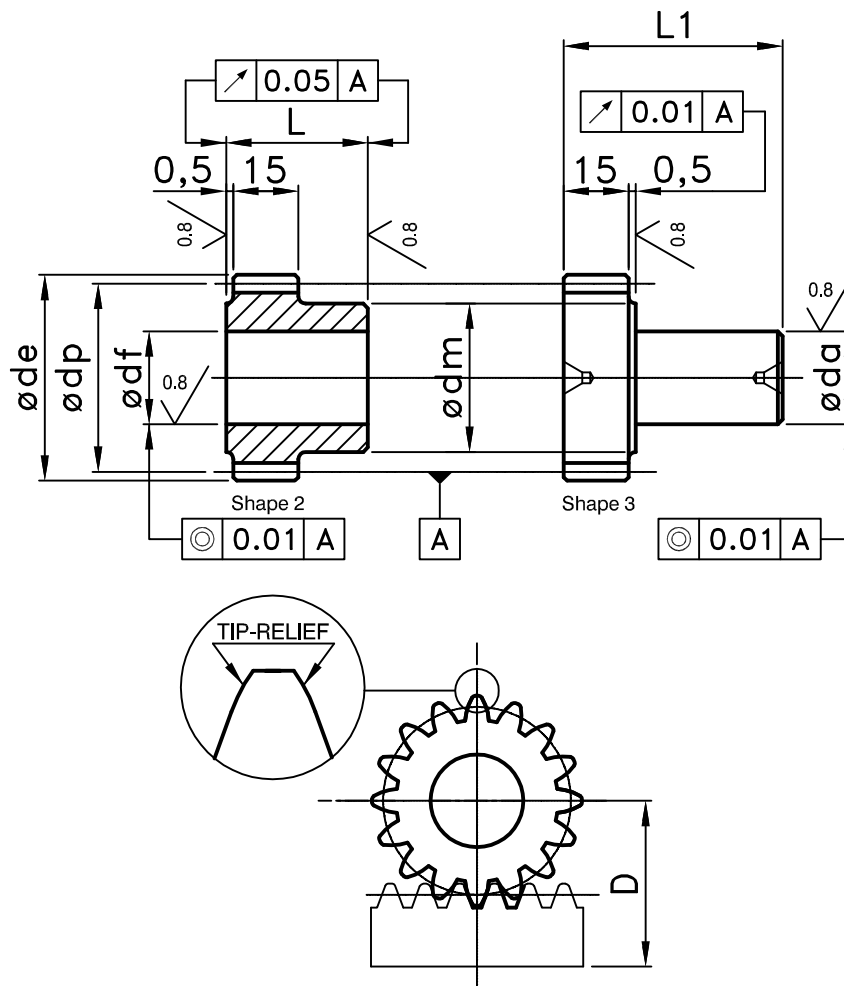
Identifier code example : PDR - C - 150 - 18/2

Denomination	Shape	Z	D ^{+0.02} ₀	dp	de	df H6	df max	dm	da h6	L	L1
18/2	2	18	37,82	28,5	31,5	10	14	24	14	28	60
18/3	3										
20/2	2	20	39,32	31,5	34,5	10	16	27	14	28	60
20/3	3										
22/2	2	22	40,82	34,5	37,5	10	18	30	16	28	60
22/3	3										
24/2	2	24	42,32	37,5	40,5	10	20	33	16	28	60
24/3	3										
25/2	2	25	43,07	39,0	42,0	10	20	34	18	28	60
25/3	3										
27/2	2	27	44,57	42,0	45,0	15	22	37	20	30	65
27/3	3										
30/2	2	30	46,82	46,5	49,5	15	26	42	20	30	65
30/3	3										
32/2	2	32	48,32	49,5	52,5	15	28	45	25	30	70
32/3	3										
35/2	2	35	50,57	54,0	57,0	15	30	49	25	30	70
35/3	3										

CASEHARDENED & TEMPERED MATERIAL

Revision:"00"

m=Module - Z=Number of teeth - D=Assembly clearance - dp=Correct pitch diameter



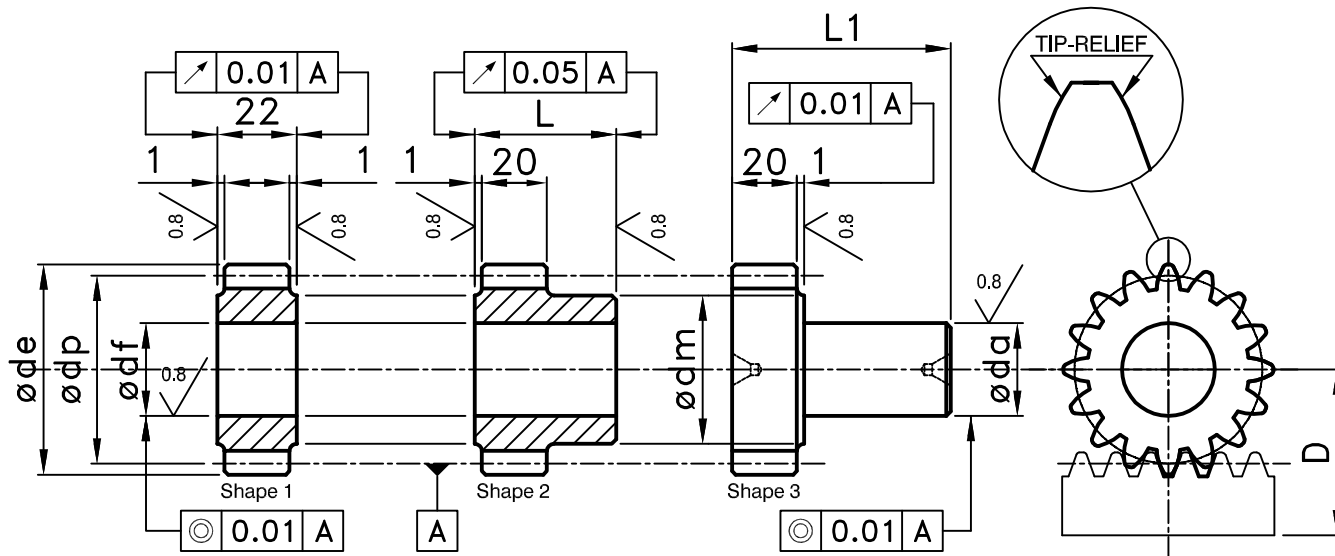
Identifier code example : PDR - C - 159 - 18/2

Denomination	Shape	Z	D ^{+0.02} ₀	dp	de	df H6	df max	dm	da h6	L	L1
18/2	2	18	38,60	30,24	33,4	10	14	24	14	28	60
18/3	3										
20/2	2	20	40,19	33,42	36,6	10	16	27	14	28	60
20/3	3										
22/2	2	22	41,78	36,61	39,8	10	18	30	16	28	60
22/3	3										
24/2	2	24	43,38	39,79	43,0	10	20	33	16	28	60
24/3	3										
25/2	2	25	44,17	41,38	44,6	10	20	34	18	28	60
25/3	3										
27/2	2	27	45,76	44,56	47,7	15	22	37	20	30	65
27/3	3										
30/2	2	30	48,15	49,34	52,5	15	26	42	20	30	65
30/3	3										
32/2	2	32	49,74	52,52	55,7	15	28	45	25	30	70
32/3	3										
35/2	2	35	52,13	57,30	60,5	15	30	49	25	30	70
35/3	3										

CASEHARDENED & TEMPERED MATERIAL

Revision:"00"

m=Module - Z=Number of teeth - D=Assembly clearance - dp=Correct pitch diameter



Identifier code example : PDR - C - 200 - 16/1

Denomination	Shape	Z	D ^{+0.02} ₀	dp	de	df H6	df max	dm	da h6	L	L1
16/1	1	16	45,10	34	38	12	15	28	20	35	65
16/2	2										
16/3	3										
18/1	1	18	47,10	38	42	15	18	30	20	35	65
18/2	2										
18/3	3										
20/1	1	20	49,10	42	46	15	22	35	25	35	75
20/2	2										
20/3	3										
21/1	1	21	50,10	44	48	15	24	37	25	35	75
21/2	2										
21/3	3										
22/1	1	22	51,10	46	50	15	26	39	25	35	75
22/2	2										
22/3	3										
24/1	1	24	53,10	50	54	15	30	42	25	40	75
24/2	2										
24/3	3										
25/1	1	25	54,10	52	56	15	32	44	25	40	75
25/2	2										
25/3	3										
26/1	1	26	55,10	54	58	15	34	48	28	40	85
26/2	2										
26/3	3										
28/1	1	28	57,10	58	62	15	35	50	28	40	85
28/2	2										
28/3	3										
30/1	1	30	59,10	62	66	15	38	54	30	40	85
30/2	2										
30/3	3										



PINION WITH STRAIGHT TEETH $m=2,5$

CASEHARDENED & TEMPERED MATERIAL

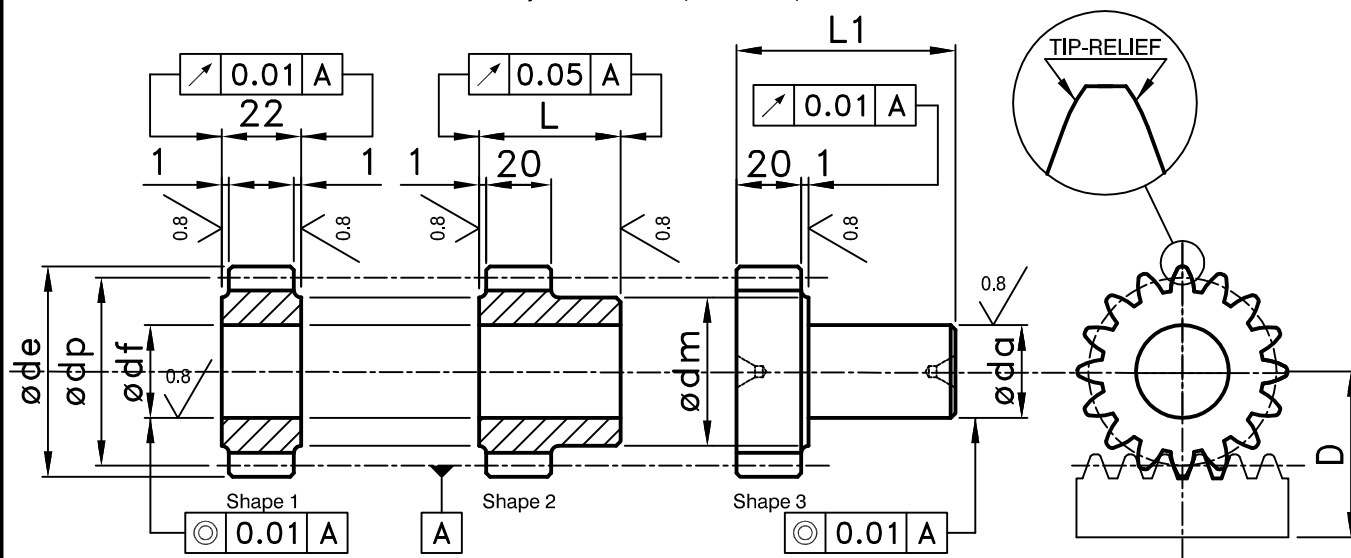
TABLE
PDR-C-250

Revision:"00"

Material: UNI 18NiCrMo5 (AISI-SAE 4320) - Casehardened & tempered teeth HRC 58÷62

Tooth accuracy: class 6 DIN 3962 - Tooth finishing ☒ - Tooth with crowned profile - Pressure angle: 20°

m=Module - Z=Number of teeth - D=Assembly clearance - dp=Correct pitch diameter



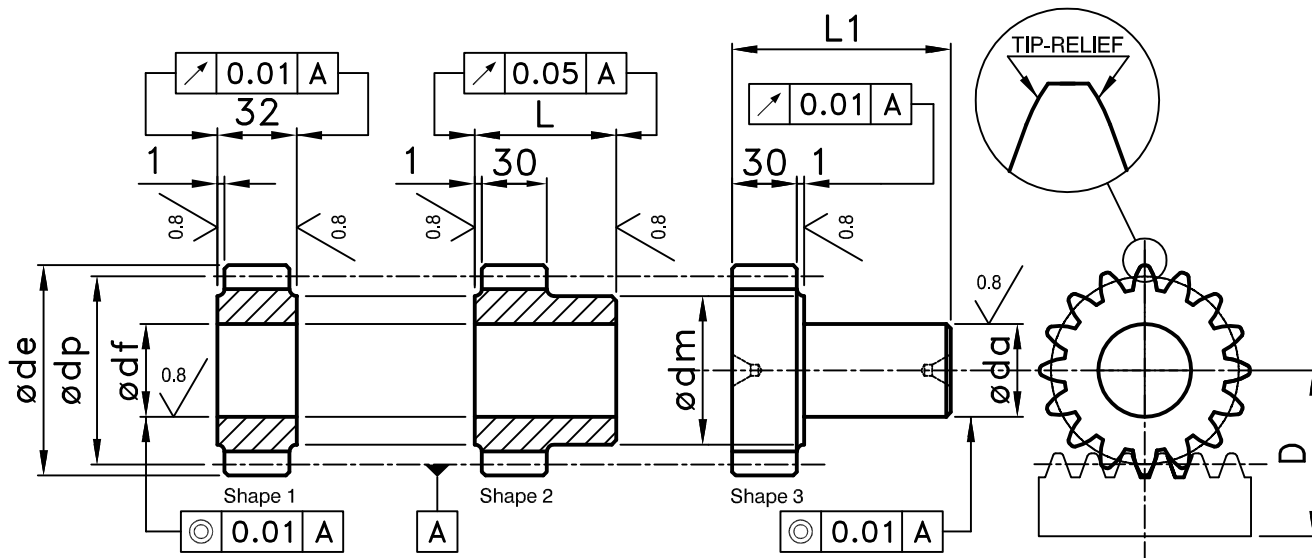
Identifier code example : PDR - C - 250 - 16/1

Denomination	Shape	Z	D ^{+0.02} ₀	dp	de	df H6	df max	dm	da h6	L	L1
16/1	1	16	48,90	42,5	47,5	15	18	35	20	35	75
16/2	2										
16/3	3										
18/1	1	18	51,40	47,5	52,5	15	22	40	20	35	75
18/2	2										
18/3	3										
20/1	1	20	53,90	52,5	57,5	15	27	45	25	35	85
20/2	2										
20/3	3										
21/1	1	21	55,15	55,0	60,0	15	30	46	25	35	85
21/2	2										
21/3	3										
22/1	1	22	56,40	57,5	62,5	15	32	49	25	35	85
22/2	2										
22/3	3										
24/1	1	24	58,90	62,5	67,5	15	37	54	30	40	90
24/2	2										
24/3	3										
25/1	1	25	60,15	65,0	70,0	15	40	57	30	40	90
25/2	2										
25/3	3										
26/1	1	26	61,40	67,5	72,5	15	40	59	30	40	90
26/2	2										
26/3	3										
28/1	1	28	63,90	72,5	77,5	15	45	63	35	40	95
28/2	2										
28/3	3										
30/1	1	30	66,40	77,5	82,5	15	45	69	35	40	95
30/2	2										
30/3	3										

CASEHARDENED & TEMPERED MATERIAL

Revision:"00"

m=Module - Z=Number of teeth - D=Assembly clearance - dp=Correct pitch diameter

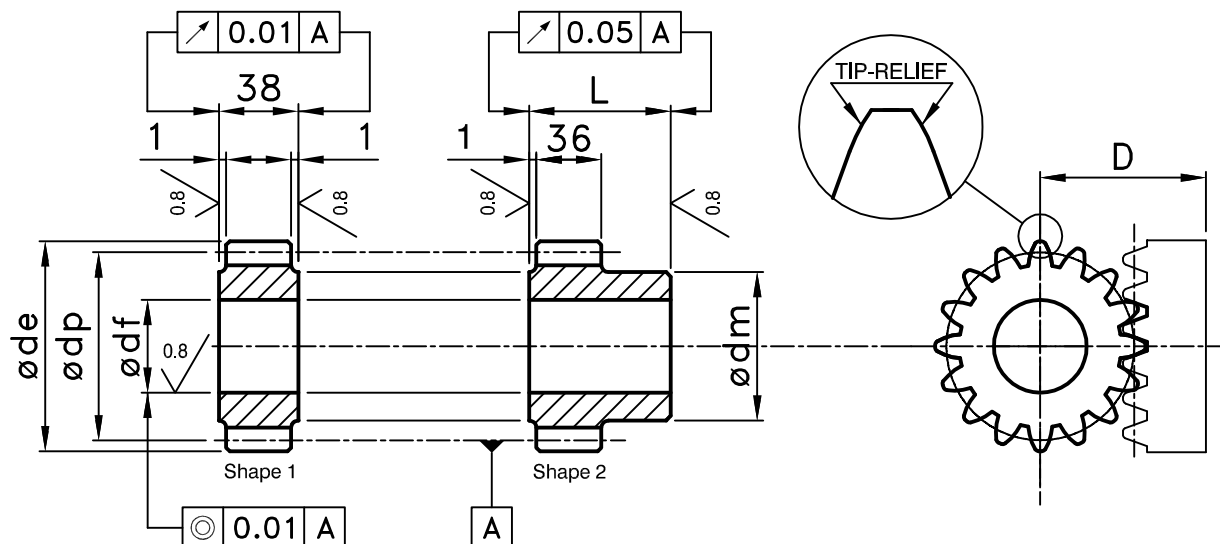


Denomination	Shape	Z	D ^{+0,02} ₀	dp	de	df H6	df max	dm	da h6	L	L1
18/1	1	18	65,72	57	63	25	27	47	30	45	100
18/2	2										
18/3	3										
20/1	1	20	68,72	63	69	25	32	54	30	45	100
20/2	2										
20/3	3										
21/1	1	21	70,22	66	72	25	36	56	30	45	100
21/2	2										
21/3	3										
22/1	1	22	71,72	69	75	25	38	60	35	50	110
22/2	2										
22/3	3										
24/1	1	24	74,72	75	81	25	45	65	40	50	110
24/2	2										
24/3	3										
25/1	1	25	76,22	78	84	25	48	68	40	50	110
25/2	2										
25/3	3										
26/1	1	26	77,72	81	87	25	50	72	45	50	120
26/2	2										
26/3	3										
28/1	1	28	80,72	87	93	25	52	78	45	50	120
28/2	2										
28/3	3										
30/1	1	30	83,72	93	99	25	55	84	50	50	130
30/2	2										
30/3	3										

CASEHARDENED & TEMPERED MATERIAL

Revision:"00"

m=Module - Z=Number of teeth - D=Assembly clearance - dp=Correct pitch diameter



FOR MESHING WITH RACK CDF-A-SF / CDF-A-CF

Denomination	Shape	Z	D $^{+0,02}_{0}$	dp	de	df H6	df max	dm	L
18/1 N	1	18	83,87	76,4	84,7	25	30	60	60
18/2 N	2								
20/1 N	1	20	87,87	84,4	92,7	25	40	70	60
20/2 N	2								
21/1 N	1	21	89,87	88,4	96,7	25	45	75	60
21/2 N	2								
22/1 N	1	22	91,87	92,4	100,7	25	45	80	60
22/2 N	2								
24/1 N	1	24	95,87	100,4	108,7	25	55	85	70
24/2 N	2								
26/1 N	1	26	99,87	108,4	116,7	25	60	95	70
26/2 N	2								

Denomination	Shape	Z	D $^{+0,02}_0$	dp	de	df H6	df max	dm	L
18/1S	1	18	83,87	76,4	85,0	25	30	60	60
18/2S	2								
20/1S	1	20	87,87	84,4	93,2	25	40	70	60
20/2S	2								
21/1S	1	21	89,87	88,4	97,3	25	45	75	60
21/2S	2								
22/1S	1	22	91,87	92,4	101,4	25	45	80	60
22/2S	2								
24/1S	1	24	95,87	100,4	109,4	25	55	85	70
24/2S	2								
26/1S	1	26	99,87	108,4	117,4	25	60	95	70
26/2S	2								



PINION WITH STRAIGHT TEETH $m=5$

CASEHARDENED & TEMPERED MATERIAL

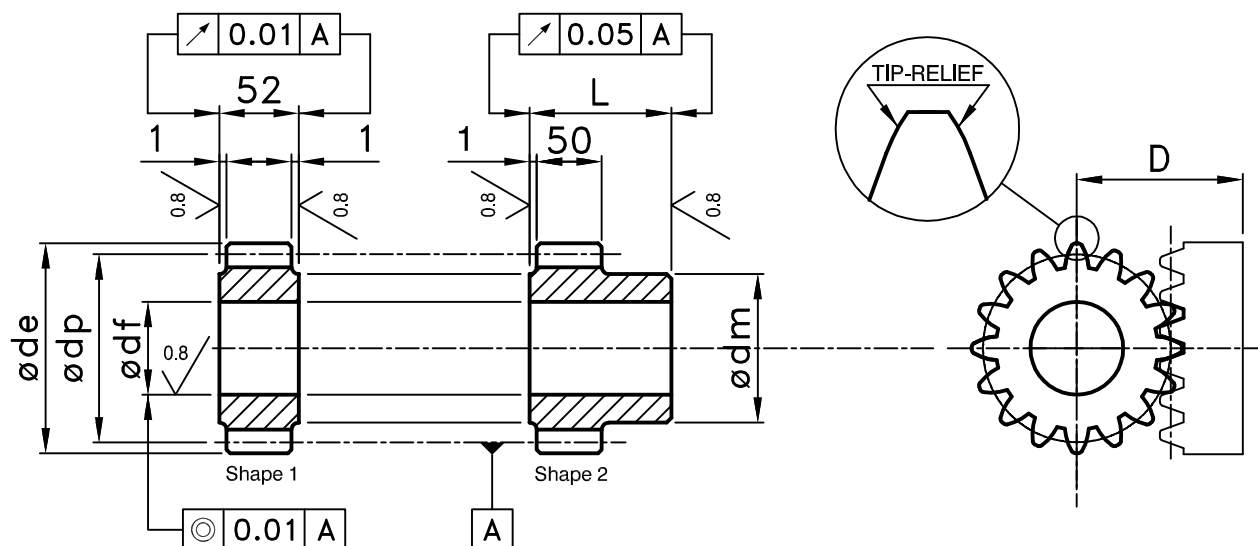
TABLE
PDR-C-500

Revision:"00"

Material: UNI 18NiCrMo5 (AISI-SAE 4320) - Casehardened & tempered teeth HRC 58÷62

Material: SAE 4140H (AISI SAE 4140) - Casehardened & tempered tooth HRC 58-62
Toothing accuracy: class 6 DIN 3962 - Tooth finishing $\sqrt{0.8}$ - Toothing with crowned profile - Pressure angle: 20°

m=Module - Z=Number of teeth - D=Assembly clearance - dp=Correct pitch diameter



Identifier code example : PDR - C - 500 - 18/1 N

FOR MESHING WITH RACK CDF-A-SF / CDF-A-CF

Denomination	Shape	Z	D $^{+0,02}_0$	dp	de	df H6	df max	dm	L
18/1 N	1	18	107,32	95,5	105,8	35	40	80	80
18/2 N	2								
20/1 N	1	20	112,32	105,5	115,8	35	50	90	80
20/2 N	2								
21/1 N	1	21	114,82	110,5	120,8	35	55	95	80
21/2 N	2								
22/1 N	1	22	117,32	115,5	125,8	35	60	100	80
22/2 N	2								
24/1 N	1	24	122,32	125,5	135,8	35	65	110	90
24/2 N	2								
26/1 N	1	26	127,32	135,5	145,8	35	75	120	90
26/2 N	2								

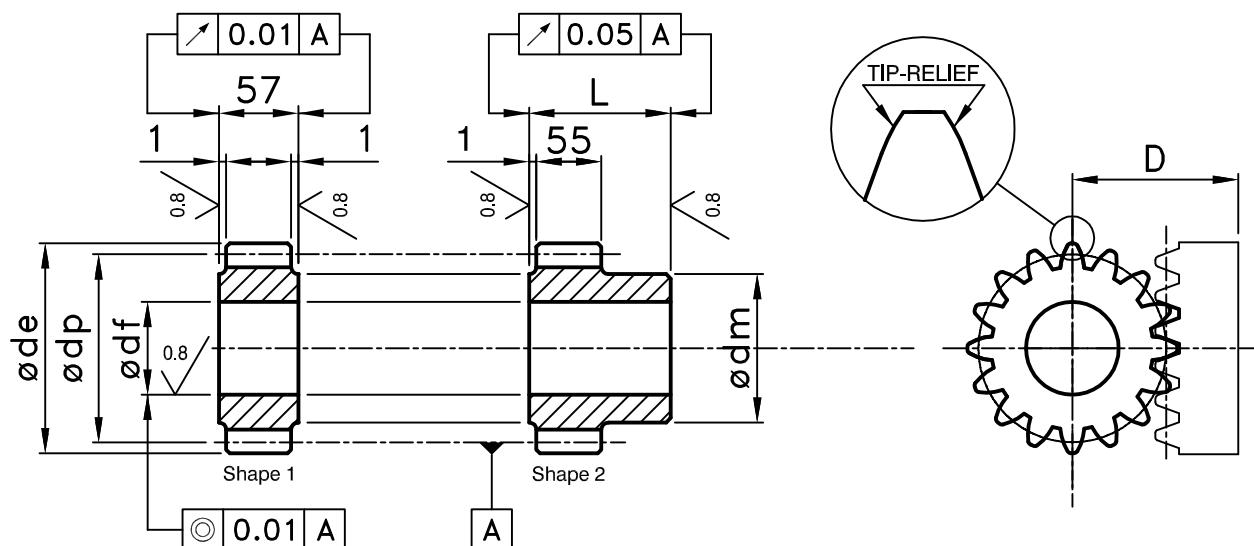
FOR MESHING WITH RACK CDR-B-SF / CDR-B-CF / CDR-C-SF / CDR-C-CF

Denomination	Shape	Z	D $^{+0.02}_0$	dp	de	df H6	df max	dm	L
18/1 S	1	18	107,32	95,5	106,3	35	40	80	80
18/2 S	2								
20/1 S	1	20	112,32	105,5	116,5	35	50	90	80
20/2 S	2								
21/1 S	1	21	114,82	110,5	121,6	35	55	95	80
21/2 S	2								
22/1 S	1	22	117,32	115,5	126,7	35	60	100	80
22/2 S	2								
24/1 S	1	24	122,32	125,5	136,7	35	65	110	90
24/2 S	2								
26/1 S	1	26	127,32	135,5	146,7	35	75	120	90
26/2 S	2								

CASEHARDENED & TEMPERED MATERIAL

Revision:"00"

m=Module - Z=Number of teeth - D=Assembly clearance - dp=Correct pitch diameter



FOR MESHING WITH RACK CDF-A-SF / CDF-A-CF

Denomination	Shape	Z	D $^{+0,02}_{0}$	dp	de	df H6	df max	dm	L
18/1 N	1	18	125,82	114,6	126,9	40	50	95	80
18/2 N	2								
20/1 N	1	20	131,82	126,6	138,9	40	60	105	80
20/2 N	2								
21/1 N	1	21	134,82	132,6	144,9	40	65	110	80
21/2 N	2								
22/1 N	1	22	137,82	138,6	150,9	40	70	120	95
22/2 N	2								
24/1 N	1	24	143,82	150,6	162,9	40	80	130	95
24/2 N	2								
26/1 N	1	26	149,82	162,6	174,9	40	90	140	95
26/2 N	2								

FOR MESHING WITH RACK CDR-B-SF / CDR-B-CF / CDR-C-SF / CDR-C-CF

Denomination	Shape	Z	D $^{+0.02}_0$	dp	de	df H6	df max	dm	L
18/1S	1	18	125,82	114,6	127,6	40	50	95	80
18/2S	2								
20/1S	1	20	131,82	126,6	139,9	40	60	105	80
20/2S	2								
21/1S	1	21	134,82	132,6	145,9	40	65	110	80
21/2S	2								
22/1S	1	22	137,82	138,6	151,9	40	70	120	95
22/2S	2								
24/1S	1	24	143,82	150,6	163,9	40	80	130	95
24/2S	2								
26/1S	1	26	149,82	162,6	175,9	40	90	140	95
26/2S	2								



PINION WITH STRAIGHT TEETH $m=8$

CASEHARDENED & TEMPERED MATERIAL

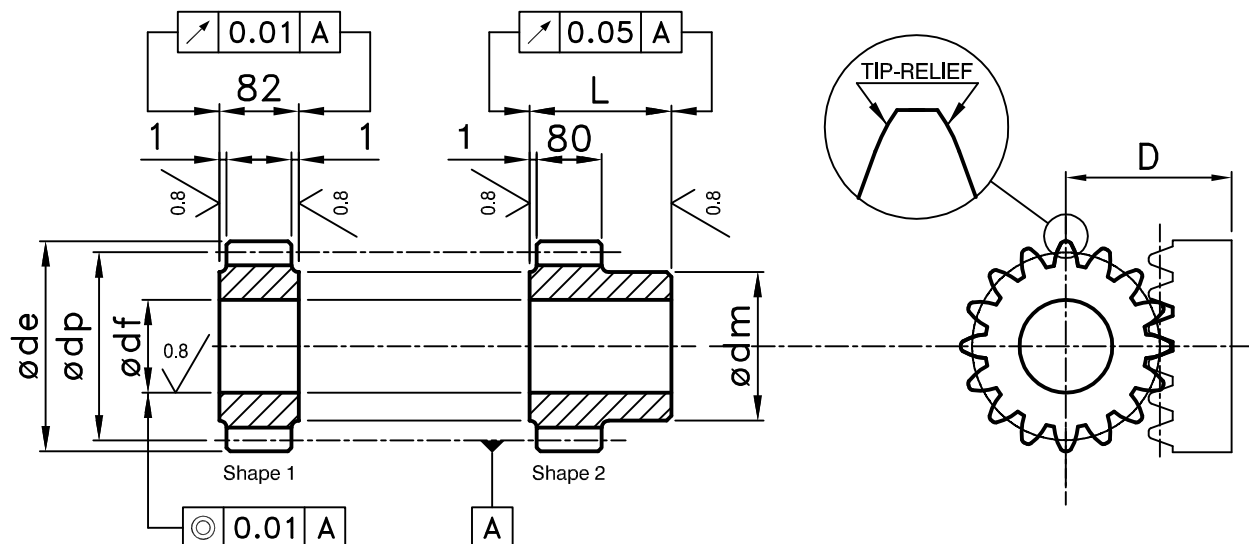
TABLE
PDR-C-800

Revision:"00"

Material: UNI 18NiCrMo5 (AISI-SAE 4320) - Casehardened & tempered teeth HRC 58÷62

Toothing accuracy: class 6 DIN 3962 - Tooth finishing $\sqrt{0.8}$ - Toothing with crowned profile - Pressure angle: 20°

m=Module - Z=Number of teeth - D=Assembly clearance - dp=Correct pitch diameter



Identifier code example : PDR - C - 800 - 18/1 N

Denomination	Shape	Z	D ^{+0.02} ₀	dp	de	df H6	df max	dm	L
18/1 N	1	18	162,74	152,8	169,1	60	70	125	110
18/2 N	2								
20/1 N	1	20	170,74	168,8	185,1	60	80	140	110
20/2 N	2								
21/1 N	1	21	174,74	176,8	193,1	60	90	150	110
21/2 N	2								
22/1 N	1	22	178,74	184,8	201,1	60	100	155	110
22/2 N	2								
24/1 N	1	24	186,74	200,8	217,1	60	110	170	120
24/2 N	2								
26/1 N	1	26	194,74	216,8	233,1	60	120	180	120
26/2 N	2								

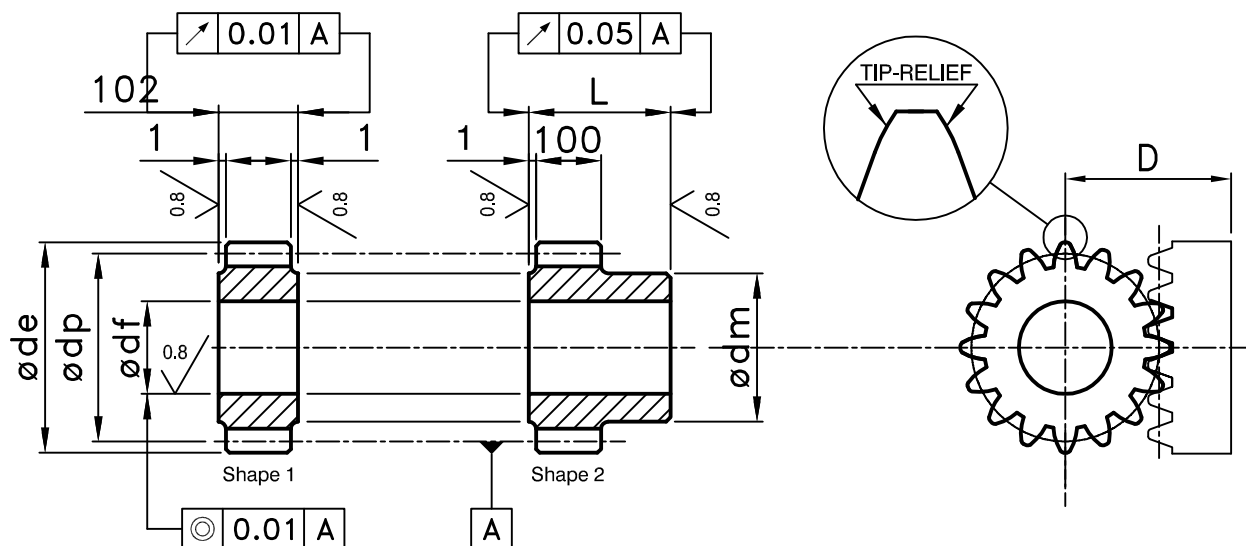
FOR MESHING WITH RACK CDR-B-SF / CDR-B-CF / CDR-C-SF / CDR-C-CF

Denomination	Shape	Z	D ^{+0,02} ₀	dp	de	df H6	df max	dm	L
18/1S	1	18	162,74	152,8	170,1	60	70	125	110
18/2S	2								
20/1S	1	20	170,74	168,8	186,6	60	80	140	110
20/2S	2								
21/1S	1	21	174,74	176,8	194,6	60	90	150	110
21/2S	2								
22/1S	1	22	178,74	184,8	202,6	60	100	155	110
22/2S	2								
24/1S	1	24	186,74	200,8	218,6	60	110	170	120
24/2S	2								
26/1S	1	26	194,74	216,8	234,6	60	120	180	120
26/2S	2								

CASEHARDENED & TEMPERED MATERIAL

Revision:"00"

m=Module - Z=Number of teeth - D=Assembly clearance - dp=Correct pitch diameter



Identifier code example : PDR - C - 1000 - 18/1 N

Denomination	Shape	Z	D $\begin{smallmatrix} +0,02 \\ 0 \end{smallmatrix}$	dp	de	df H6	df max	dm	L
18/1 N	1	18	189,68	191,00	211,3	60	70	125	110
18/2 N	2								
20/1 N	1	20	199,68	211,00	231,3	60	80	140	110
20/2 N	2								
21/1 N	1	21	204,68	221,00	241,3	60	90	150	110
21/2 N	2								
22/1 N	1	22	209,68	231,00	251,3	60	100	155	110
22/2 N	2								
24/1 N	1	24	219,68	251,00	271,3	60	110	170	120
24/2 N	2								

Denomination	Shape	Z	D $\overset{+0.02}{0}$	dp	de	df H6	df max	dm	L
18/1S	1	18	189,68	191,00	212,6	60	70	125	110
18/2S	2								
20/1S	1	20	199,68	211,00	233,2	60	80	140	110
20/2S	2								
21/1S	1	21	204,68	221,00	243,2	60	90	150	110
21/2S	2								
22/1S	1	22	209,68	231,00	253,2	60	100	155	110
22/2S	2								
24/1S	1	24	219,68	251,00	273,2	60	110	170	120
24/2S	2								



PINION WITH STRAIGHT TEETH $m=12$

CASEHARDENED & TEMPERED MATERIAL

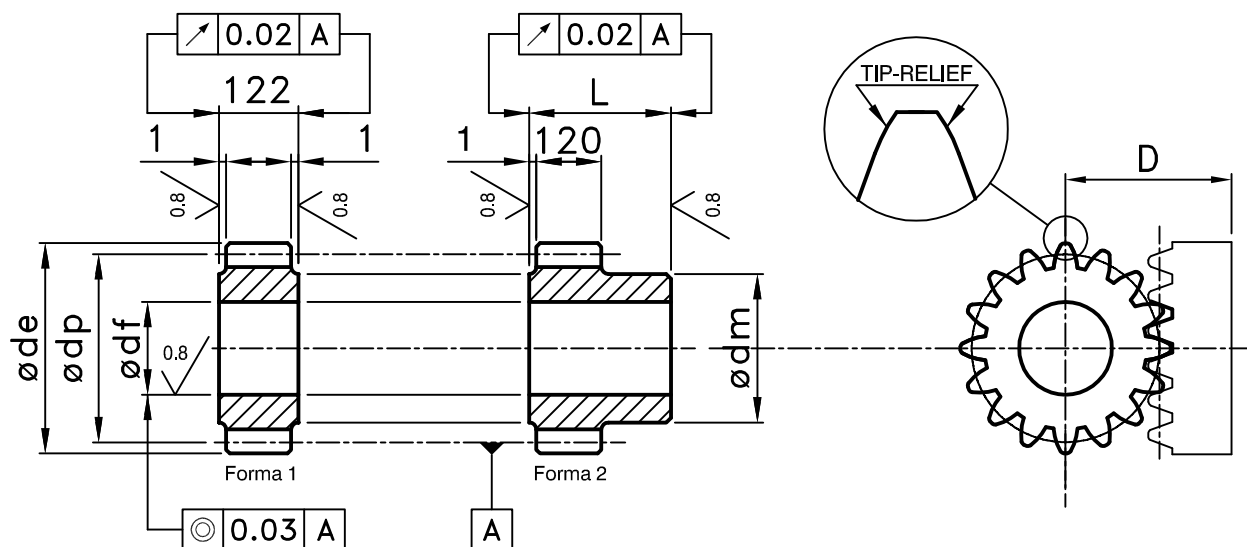
TABLE
PDR-C-1200

Revision:"00"

Material: UNI 18NiCrMo5 (AISI-SAE 4320) - Casehardened & tempered teeth HRC 58÷62

Toothing accuracy: class 6 DIN 3962 - Tooth finishing $\sqrt{0.8}$ - Toothing with crowned profile - Pressure angle: 20°

m=Module - Z=Number of teeth - D=Assembly clearance - dp=Correct pitch diameter



Identifier code example : PDR - C - 1200 - 18/1 N

FOR MESHING WITH RACK CDF-A-SF / CDF-A-CF

Denomination	Shape	Z	D $^{+0,02}_0$	dp	de	df H6	df max	dm	L
18/1 N	1	18	226,68	229,2	253,5	60	130	190	160
18/2 N	2								
20/1 N	1	20	238,68	253,2	277,5	60	140	210	160
20/2 N	2								
21/1 N	1	21	244,68	265,2	289,5	60	150	220	160
21/2 N	2								
22/1 N	1	22	250,68	277,2	301,5	60	160	230	170
22/2 N	2								

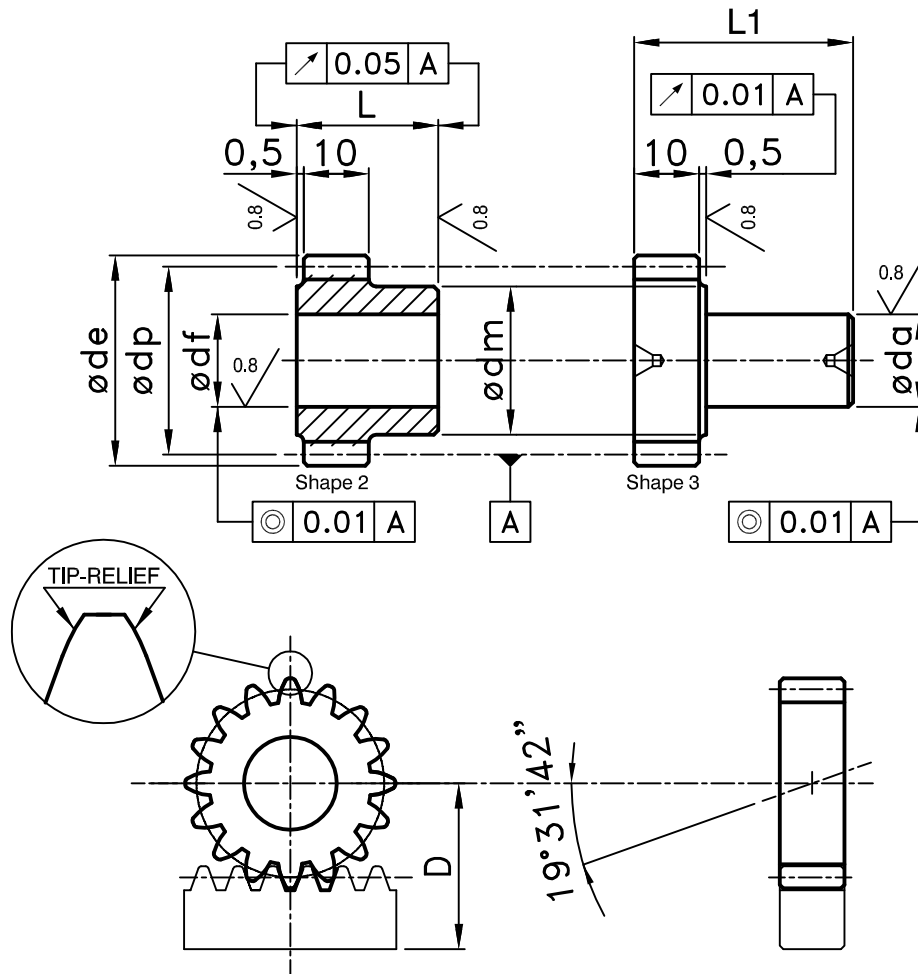
FOR MESHING WITH RACK CDR-B-SF / CDR-B-CF / CDR-C-SF / CDR-C-CF

Denomination	Shape	Z	$D \begin{smallmatrix} +0.02 \\ 0 \end{smallmatrix}$	dp	de	df H6	df max	dm	L
18/1S	1	18	226,68	229,2	255,2	60	130	190	160
18/2S	2								
20/1S	1	20	238,68	253,2	279,9	60	140	210	160
20/2S	2								
21/1S	1	21	244,68	265,2	291,9	60	150	220	160
21/2S	2								
22/1S	1	22	250,68	277,2	303,9	60	160	230	170
22/2S	2								

CASEHARDENED & TEMPERED MATERIAL

Revision:"00"

m=Module - Z=Number of teeth - D=Assembly clearance - Helical tooth angle: 19° 31' 42" left - Pressure angle: 20°



Denomination	Shape	Z	D $^{+0.02}_0$	dp	de	df H6	df max	dm	da h6	L	L1
18/2	2	18	34,12	20,10	22,1	6	8	15	8	20	40
18/3	3										
20/2	2	20	35,19	22,22	24,2	6	8	17	10	20	40
20/3	3										
22/2	2	22	36,25	24,34	26,3	6	10	19	10	20	40
22/3	3										
24/2	2	24	37,31	26,46	28,5	8	12	21	12	20	50
24/3	3										
25/2	2	25	37,84	27,52	29,5	8	12	22	12	20	50
25/3	3										
27/2	2	27	38,90	29,65	31,6	10	15	24	12	20	50
27/3	3										
30/2	2	30	40,49	32,83	34,8	10	16	27	14	22	50
30/3	3										
32/2	2	32	41,55	34,95	37,0	10	18	29	16	22	50
32/3	3										
35/2	2	35	43,14	38,14	40,1	10	20	32	16	22	50
35/3	3										



PINION WITH HELICAL TEETH $m=1,25$

CASEHARDENED & TEMPERED MATERIAL

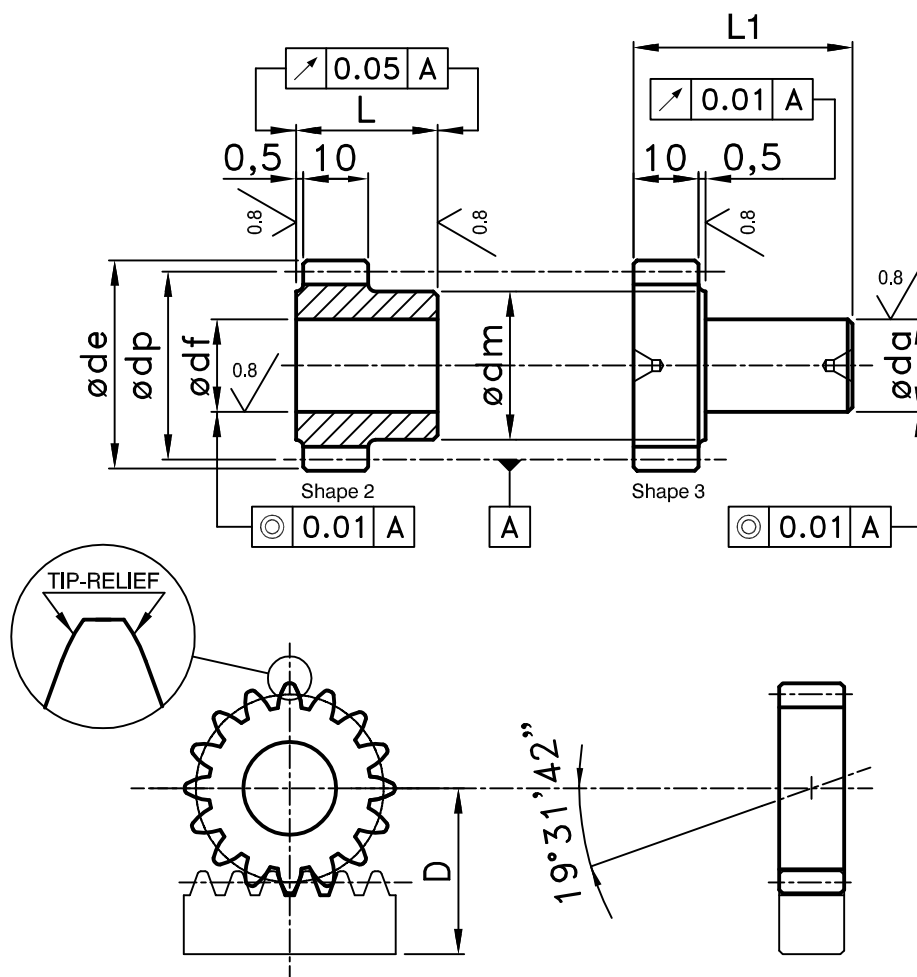
TABLE
PER-C-125

Revision:"00"

Material: UNI 18NiCrMo5 (AISI-SAE 4320) - Casehardened & tempered teeth HRC 58÷62

Toothing accuracy: class 6 DIN 3962 - Tooth finishing $\checkmark$ - Toothing with crowned profile - dp =Correct pitch diameter

m=Module - Z=Number of teeth - D=Assembly clearance - Helical tooth angle: 19° 31' 42" left - Pressure angle: 20°



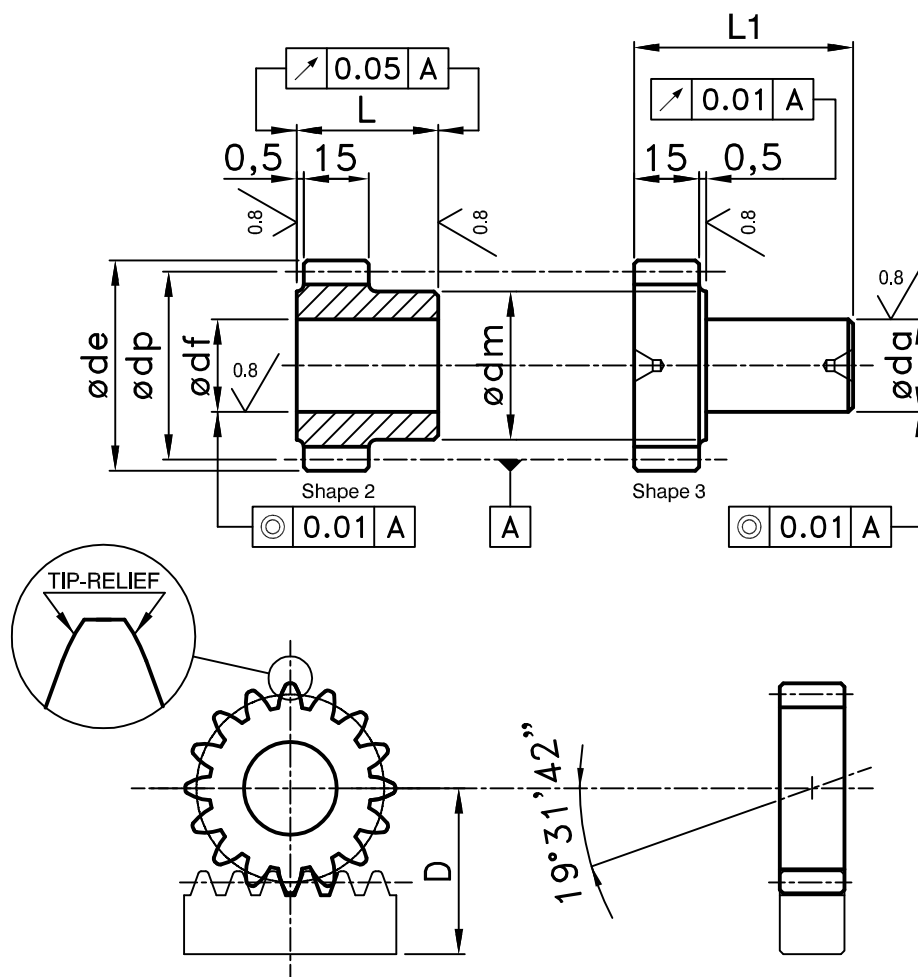
Identifier code example : PER - C - 125 - 18/2

Denomination	Shape	Z	D ^{+0.02} ₀	dp	de	df H6	df max	dm	da h6	L	L1
18/2	2	18	36,38	25,12	27,6	8	10	19	10	20	40
18/3	3										
20/2	2	20	37,71	27,77	30,3	8	12	22	10	20	40
20/3	3										
22/2	2	22	39,04	30,43	32,9	10	15	24	12	20	45
22/3	3										
24/2	2	24	40,36	33,08	35,6	10	15	27	12	20	45
24/3	3										
25/2	2	25	41,03	34,41	36,9	10	17	28	14	20	50
25/3	3										
27/2	2	27	42,35	37,06	39,6	12	20	31	14	25	50
27/3	3										
30/2	2	30	44,34	41,04	43,5	12	22	34	16	25	55
30/3	3										
32/2	2	32	45,67	43,70	46,2	12	24	36	18	25	60
32/3	3										
35/2	2	35	47,66	47,67	50,2	15	26	40	20	25	60
35/3	3										

CASEHARDENED & TEMPERED MATERIAL

Revision:"00"

m=Module - Z=Number of teeth - D=Assembly clearance - Helical tooth angle: 19° 31' 42" left - Pressure angle: 20°



Identifier code example : PER - C - 150 - 18/2

Denomination	Shape	Z	D ^{+0.02} ₀	dp	de	df H6	df max	dm	da h6	L	L1
18/2	2	18	38,65	30,15	33,1	10	14	24	14	28	60
18/3	3										
20/2	2	20	40,24	33,33	36,3	10	16	27	14	28	60
20/3	3										
22/2	2	22	41,83	36,51	39,5	10	18	30	16	28	60
22/3	3										
24/2	2	24	43,42	39,70	42,7	10	20	33	16	28	60
24/3	3										
25/2	2	25	44,22	41,29	44,3	10	20	34	18	28	60
25/3	3										
27/2	2	27	45,81	44,47	47,5	15	22	37	20	30	65
27/3	3										
30/2	2	30	48,20	49,25	52,2	15	26	42	20	30	65
30/3	3										
32/2	2	32	49,79	52,43	55,4	15	28	45	25	30	70
32/3	3										
35/2	2	35	52,18	57,20	60,2	15	30	49	25	30	70
35/3	3										



PINION WITH HELICAL TEETH $m=2$

CASEHARDENED & TEMPERED MATERIAL

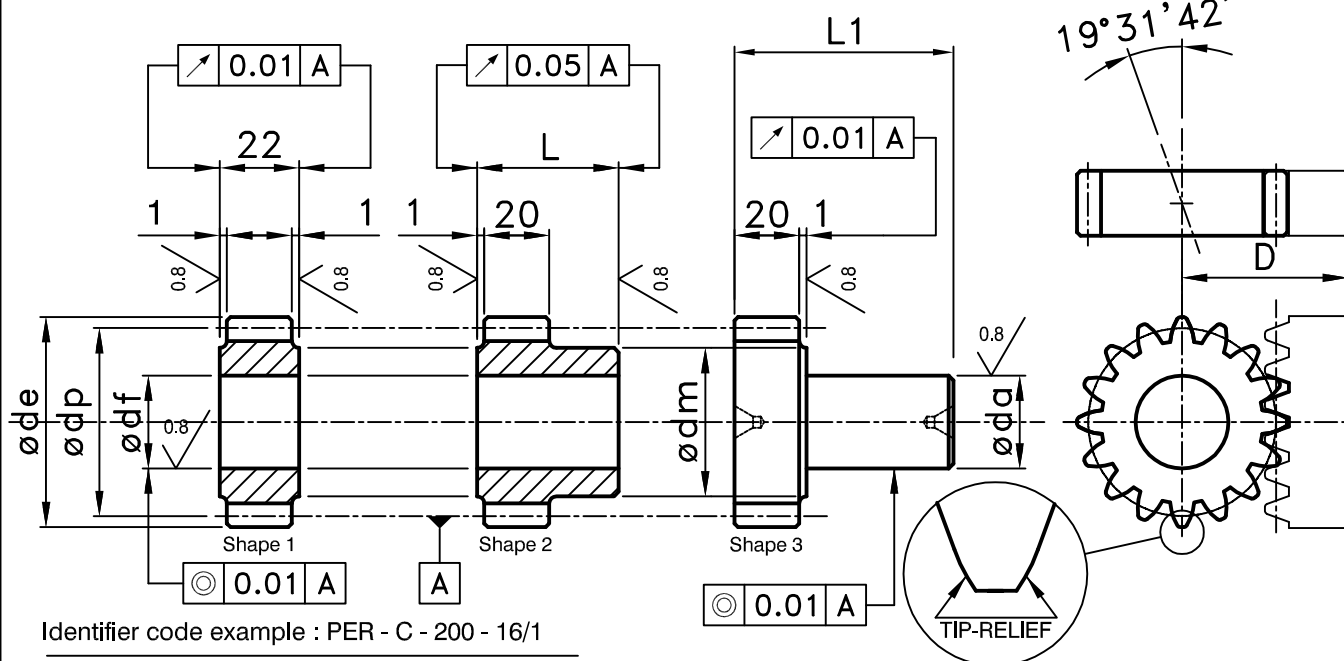
TABLE
PER-C-200

Revision:"00"

Material: UNI 18NiCrMo5 (AISI-SAE 4320) - Casehardened & tempered teeth HRC 58÷62

Tooth accuracy: class 6 DIN 3962 - Tooth finishing ☒ - Tothing with crowned profile - dp=Correct pitch diameter

m=Module - Z=Number of teeth - D=Assembly clearance - Helical tooth angle: 19° 31' 42" left - Pressure angle: 20° ..



Identifier code example : PER - C - 200 - 16/1

Denomination	Shape	Z	D ^{+0,02} ₀	dp	de	df H6	df max	dm	da h6	L	L1
16/1	1	16	46,08	35,95	40,0	12	15	28	20	35	65
16/2	2										
16/3	3										
18/1	1	18	48,20	40,20	44,2	15	18	30	20	35	65
18/2	2										
18/3	3										
20/1	1	20	50,32	44,44	48,4	15	22	35	25	35	75
20/2	2										
20/3	3										
21/1	1	21	51,38	46,56	50,6	15	24	37	25	35	75
21/2	2										
21/3	3										
22/1	1	22	52,45	48,68	52,7	15	26	39	25	35	75
22/2	2										
22/3	3										
24/1	1	24	54,57	52,93	56,9	15	30	42	25	40	75
24/2	2										
24/3	3										
25/1	1	25	55,63	55,05	59,1	15	32	44	25	40	75
25/2	2										
25/3	3										
26/1	1	26	56,69	57,17	61,2	15	34	48	28	40	85
26/2	2										
26/3	3										
28/1	1	28	58,81	61,42	65,4	15	35	50	28	40	85
28/2	2										
28/3	3										
30/1	1	30	60,93	65,66	69,7	15	38	54	30	40	85
30/2	2										
30/3	3										

CASEHARDENED & TEMPERED MATERIAL

Revision:"00"

Denomination	Shape	Z	D ^{+0.02} ₀	dp	de	df H6	df max	dm	da h6	L	L1
16/1	1	16	50,12	44,94	49,9	15	18	35	20	35	75
16/2	2										
16/3	3										
18/1	1	18	52,77	50,25	55,2	15	22	40	20	35	75
18/2	2										
18/3	3										
20/1	1	20	55,42	55,55	60,6	15	27	45	25	35	85
20/2	2										
20/3	3										
21/1	1	21	56,75	58,20	63,2	15	30	46	25	35	85
21/2	2										
21/3	3										
22/1	1	22	58,07	60,86	65,9	15	32	49	25	35	85
22/2	2										
22/3	3										
24/1	1	24	60,73	66,16	71,2	15	37	54	30	40	90
24/2	2										
24/3	3										
25/1	1	25	62,05	68,81	73,8	15	40	57	30	40	90
25/2	2										
25/3	3										
26/1	1	26	63,38	71,46	76,5	15	40	59	30	40	90
26/2	2										
26/3	3										
28/1	1	28	66,03	76,77	81,8	15	45	63	35	40	95
28/2	2										
28/3	3										
30/1	1	30	68,68	82,08	87,1	15	45	69	35	40	95
30/2	2										
30/3	3										



PINION WITH HELICAL TEETH $m=3$

CASEHARDENED & TEMPERED MATERIAL

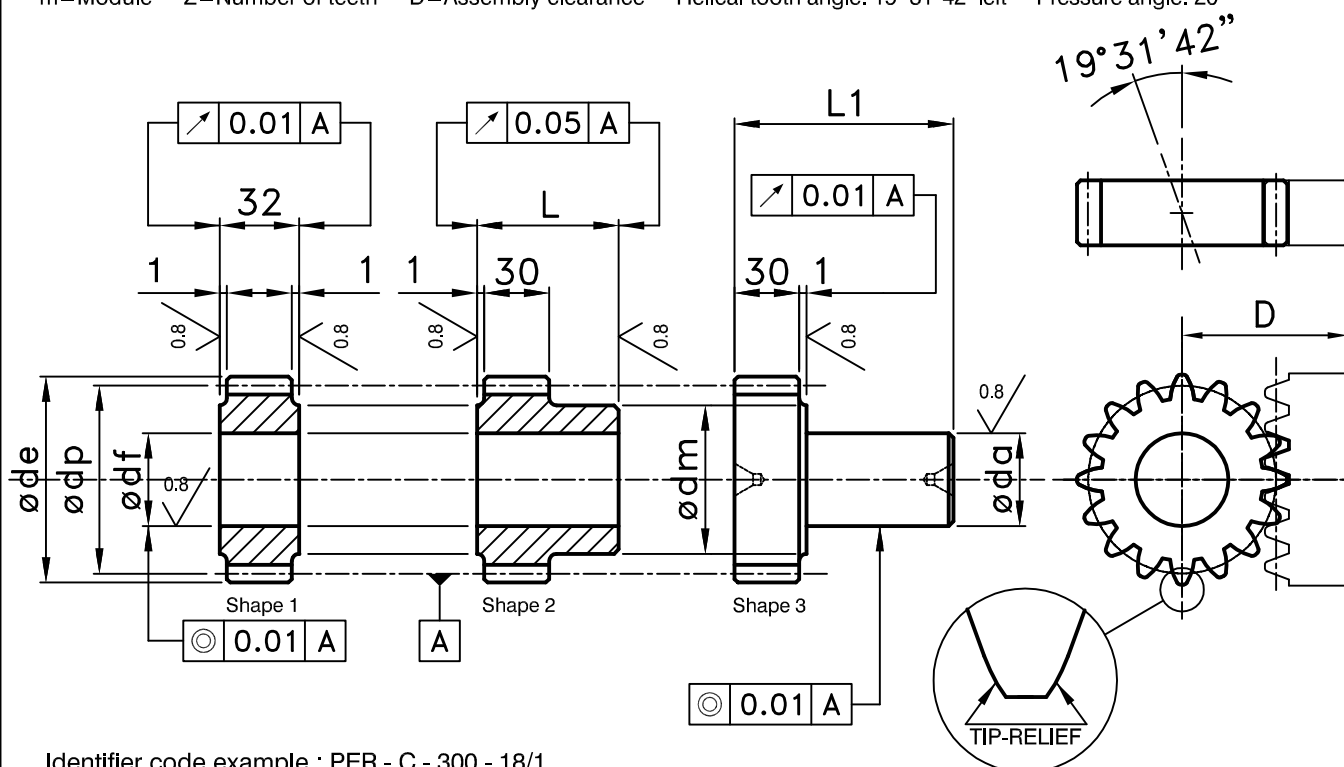
TABLE
PER-C-300

Revision:"00"

Material: UNI 18NiCrMo5 (AISI-SAE 4320) - Casehardened & tempered teeth HRC 58÷62

Tooth accuracy: class 6 DIN 3962 - Tooth finishing ✓ - Tooth with crowned profile - dp=Correct pitch diameter

m=Module - Z=Number of teeth - D=Assembly clearance - Helical tooth angle: 19° 31' 42" left - Pressure angle: 20°



Identifier code example : PER - C - 300 - 18/1

Denomination	Shape	Z	D $^{+0,02}_{0}$	dp	de	df H6	df max	dm	da h6	L	L1
18/1	1	18	67,37	60,30	66,3	25	27	47	30	45	100
18/2	2										
18/3	3										
20/1	1	20	70,55	66,66	72,7	25	32	54	30	45	100
20/2	2										
20/3	3										
21/1	1	21	72,14	69,84	75,8	25	36	56	30	45	100
21/2	2										
21/3	3										
22/1	1	22	73,73	73,03	79,0	25	38	60	35	50	110
22/2	2										
22/3	3										
24/1	1	24	76,92	79,40	85,4	25	45	65	40	50	110
24/2	2										
24/3	3										
25/1	1	25	78,51	82,58	88,6	25	48	68	40	50	110
25/2	2										
25/3	3										
26/1	1	26	80,10	85,76	91,8	25	50	72	45	50	120
26/2	2										
26/3	3										
28/1	1	28	83,28	92,13	98,1	25	52	78	45	50	120
28/2	2										
28/3	3										
30/1	1	30	86,47	98,50	104,5	25	55	84	50	50	130
30/2	2										
30/3	3										

CASEHARDENED & TEMPERED MATERIAL

Revision:"00"

m=Module - Z=Number of teeth - D=Assembly clearance - Helical tooth angle: 19° 31' 42" left - Pressure angle: 20°



Denomination	Shape	Z	D $\overset{+0.02}{0}$	dp	de	df H6	df max	dm	L
18/1 S	1	18	86,07	80,79	89,4	25	30	60	60
18/2 S	2								
20/1 S	1	20	90,31	89,28	98,1	25	40	70	60
20/2 S	2								
21/1 S	1	21	92,43	93,53	102,4	25	45	75	60
21/2 S	2								
22/1 S	1	22	94,56	97,77	106,8	25	45	80	60
22/2 S	2								
24/1 S	1	24	98,80	106,26	115,3	25	55	85	70
24/2 S	2								
26/1 S	1	26	103,04	114,75	123,7	25	60	95	70
26/2 S	2								



PINION WITH HELICAL TEETH $m=5$

CASEHARDENED & TEMPERED MATERIAL

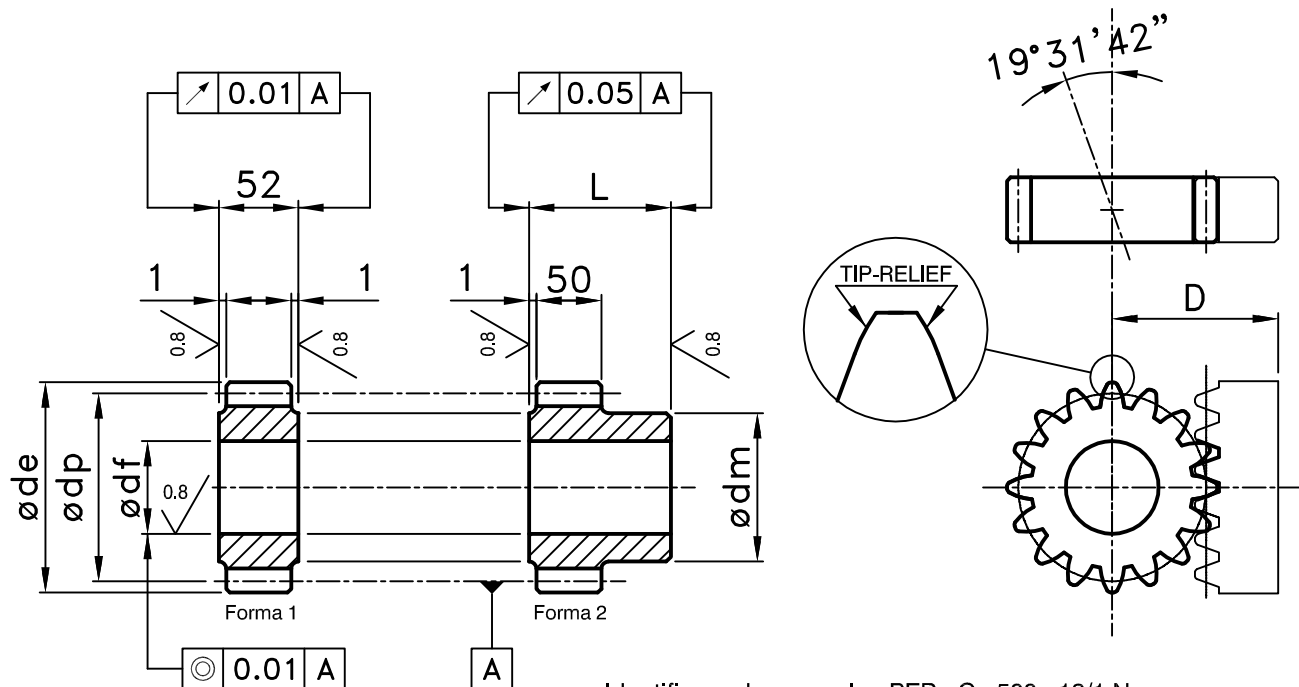
TABLE
PER-C-500

Revision:"00"

Material: UNI 18NiCrMo5 (AISI-SAE 4320) - Casehardened & tempered teeth HRC 58÷62

Tooth accuracy: class 6 DIN 3962 - Tooth finishing $\checkmark$ - Tothing with crowned profile - d_p =Correct pitch diameter

m=Module - Z=Number of teeth - D=Assembly clearance - Helical tooth angle: 19° 31' 42" left - Pressure angle: 20°



Identifier code example : PER - C - 500 - 18/1 N

FOR MESHING WITH RACK CEF-A-SF / CEF-A-CF

Denomination	Shape	Z	D $\begin{smallmatrix} +0,02 \\ 0 \end{smallmatrix}$	dp	de	df H6	df max	dm	L
18/1 N	1	18	110,07	101,00	111,3	35	40	80	80
18/2 N	2								
20/1 N	1	20	115,37	111,60	121,9	35	50	90	80
20/2 N	2								
21/1 N	1	21	118,03	116,91	127,2	35	55	95	80
21/2 N	2								
22/1 N	1	22	120,68	122,21	132,5	35	60	100	80
22/2 N	2								
24/1 N	1	24	125,98	132,82	143,1	35	65	110	90
24/2 N	2								
26/1 N	1	26	131,29	143,43	153,7	35	75	120	90
26/2 N	2								

FOR MESHING WITH RACK CER-B-SF / CER-B-CF / CER-C-SF / CER-C-CF

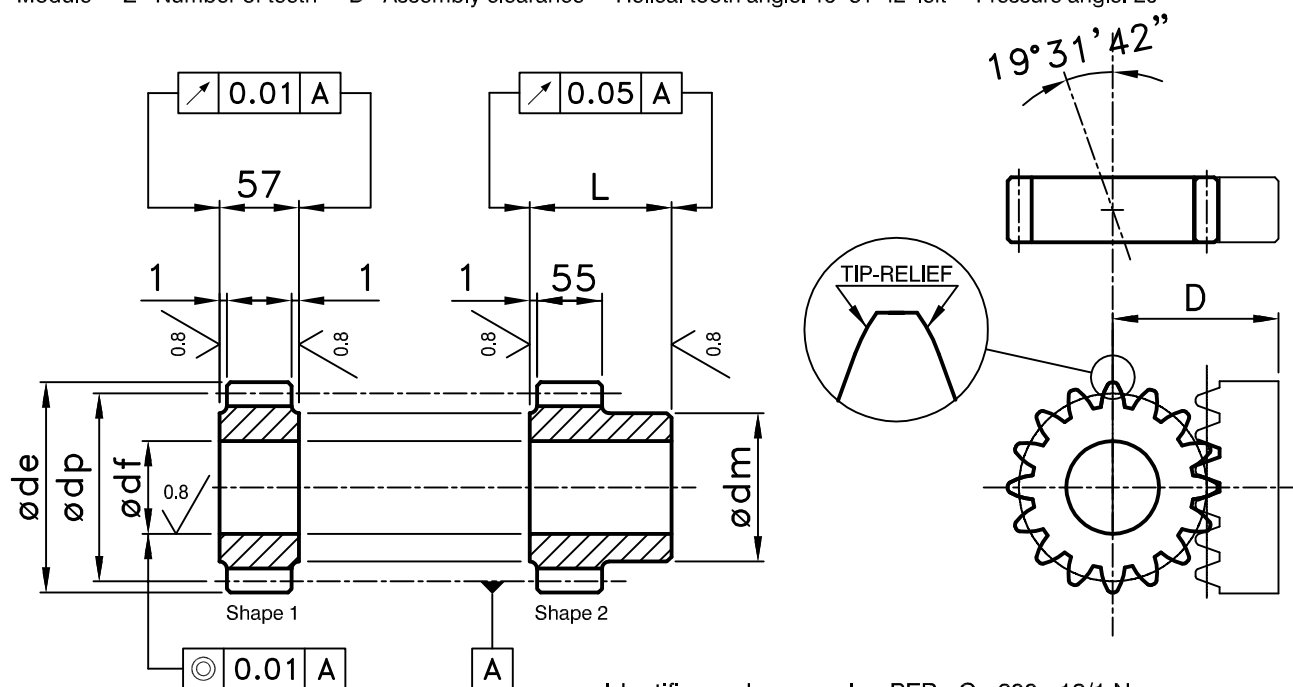
Denomination	Shape	Z	D $\begin{smallmatrix} +0,02 \\ 0 \end{smallmatrix}$	dp	de	df H6	df max	dm	L
18/1 S	1	18	110,07	101,00	111,8	35	40	80	80
18/2 S	2								
20/1 S	1	20	115,37	111,60	122,6	35	50	90	80
20/2 S	2								
21/1 S	1	21	118,03	116,91	128,0	35	55	95	80
21/2 S	2								
22/1 S	1	22	120,68	122,21	133,4	35	60	100	80
22/2 S	2								
24/1 S	1	24	125,98	132,82	144,0	35	65	110	90
24/2 S	2								
26/1 S	1	26	131,29	143,43	154,6	35	75	120	90
26/2 S	2								

CASEHARDENED & TEMPERED MATERIAL

TABLE
PER-C-600

Revision:"00"

m=Module - Z=Number of teeth - D=Assembly clearance - Helical tooth angle: 19° 31' 42" left - Pressure angle: 20°



Identifier code example : PER - C - 600 - 18/1 N

Denomination	Shape	Z	D ₀ ^{+0.02}	dp	de	df H6	df max	dm	L
18/1 N	1	18	129,11	121,19	133,5	40	50	95	80
18/2 N	2								
20/1 N	1	20	135,48	133,92	146,2	40	60	105	80
20/2 N	2								
21/1 N	1	21	138,66	140,3	152,6	40	65	110	80
21/2 N	2								
22/1 N	1	22	141,84	146,66	159,0	40	70	120	95
22/2 N	2								
24/1 N	1	24	148,21	159,39	171,7	40	80	130	95
24/2 N	2								
26/1 N	1	26	154,58	172,12	184,4	40	90	140	95
26/2 N	2								

Denomination	Shape	Z	D $\begin{smallmatrix} +0.02 \\ 0 \end{smallmatrix}$	dp	de	df H6	df max	dm	L
18/1 S	1	18	129,11	121,19	134,2	40	50	95	80
18/2 S	2								
20/1 S	1	20	135,48	133,92	147,2	40	60	105	80
20/2 S	2								
21/1 S	1	21	138,66	140,30	153,6	40	65	110	80
21/2 S	2								
22/1 S	1	22	141,84	146,66	160,0	40	70	120	95
22/2 S	2								
24/1 S	1	24	148,21	159,39	172,7	40	80	130	95
24/2 S	2								
26/1 S	1	26	154,58	172,12	185,4	40	90	140	95
26/2 S	2								



PINION WITH HELICAL TEETH $m=8$

CASEHARDENED & TEMPERED MATERIAL

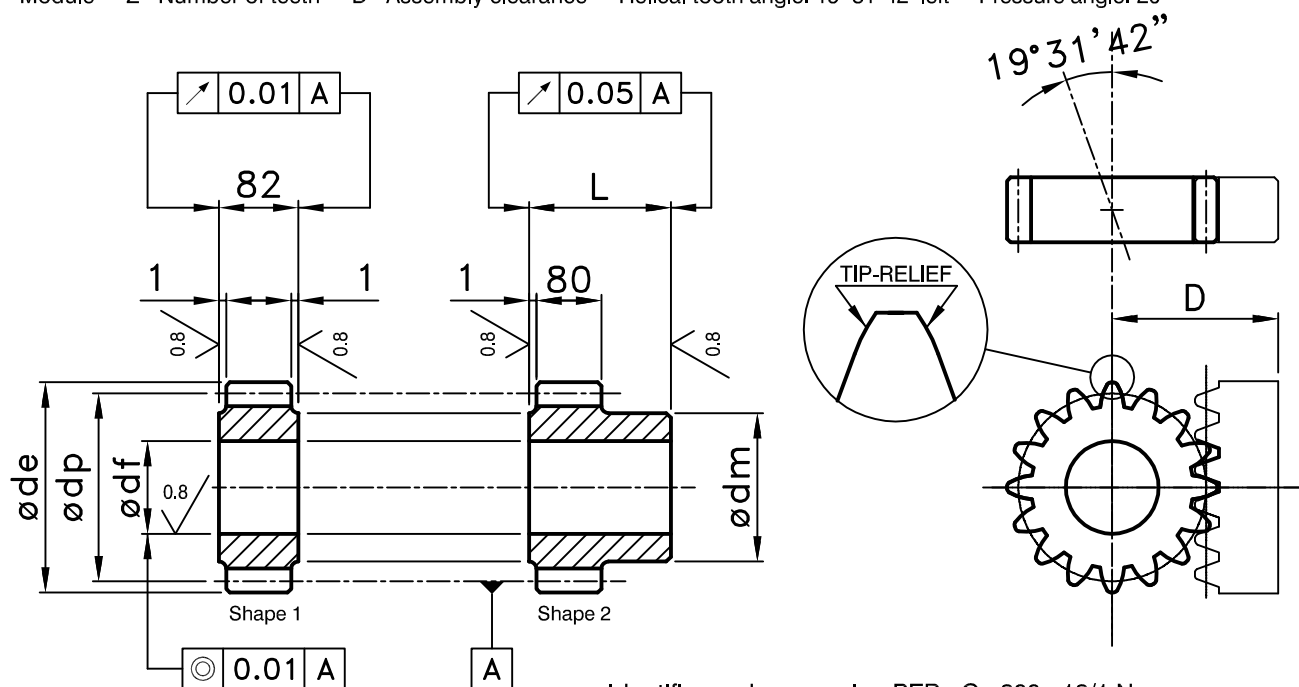
TABLE
PER-C-800

Revision:"00"

Material: UNI 18NiCrMo5 (AISI-SAE 4320) - Casehardened & tempered teeth HRC 58÷62

Toothing accuracy: class 6 DIN 3962 - Tooth finishing $\checkmark$ - Toothing with crowned profile - dp =Correct pitch diameter

m=Module - Z=Number of teeth - D=Assembly clearance - Helical tooth angle: 19° 31' 42" left - Pressure angle: 20°



Identifier code example : PER - C - 800 - 18/1 N

FOR MESHING WITH RACK CEF-A-SF / CEF-A-CF

Denomination	Shape	Z	D $^{+0,02}_0$	dp	de	df H6	df max	dm	L
18/1 N	1	18	167,13	161,59	177,9	60	70	125	110
18/2 N	2								
20/1 N	1	20	175,62	178,57	194,9	60	80	140	110
20/2 N	2								
21/1 N	1	21	179,87	187,05	203,4	60	90	150	110
21/2 N	2								
22/1 N	1	22	184,11	195,54	211,8	60	100	155	110
22/2 N	2								
24/1 N	1	24	192,60	212,52	228,8	60	110	170	120
24/2 N	2								
26/1 N	1	26	201,09	229,50	245,8	60	120	180	120
26/2 N	2								

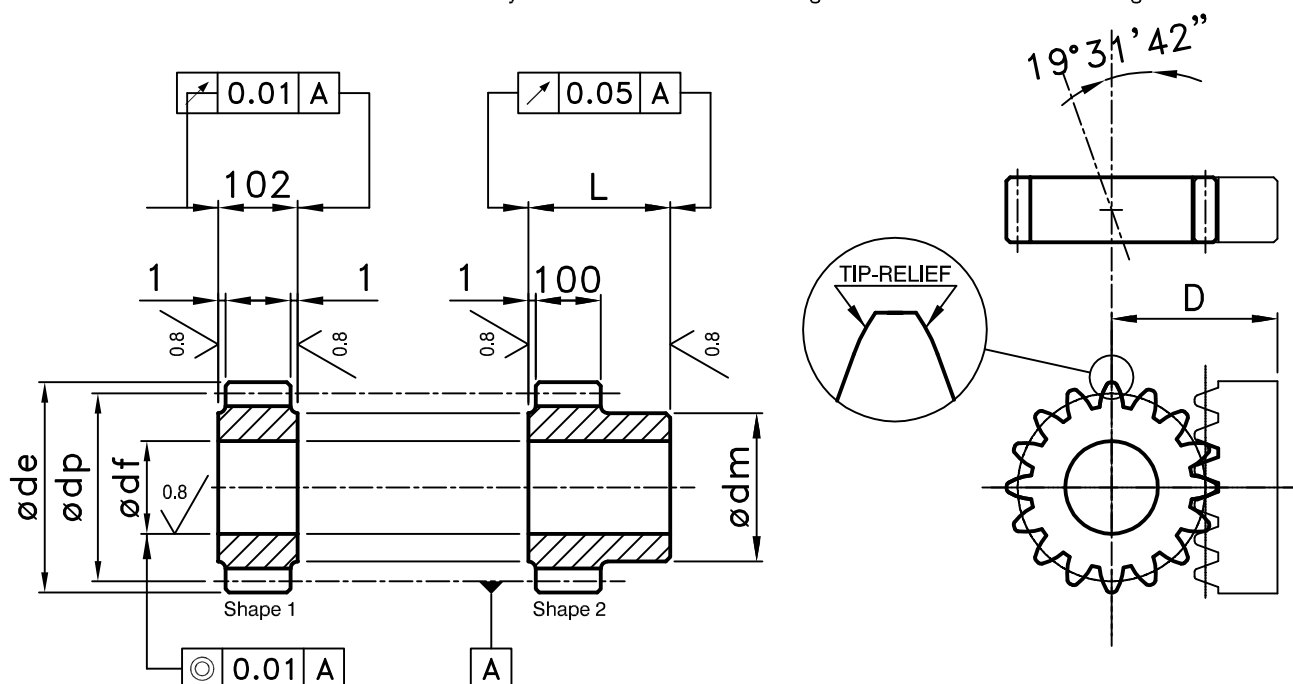
FOR MESHING WITH RACK CER-B-SF / CER-B-CF / CER-C-SF / CER-C-CF

Denomination	Shape	Z	D $^{+0,02}_0$	dp	de	df H6	df max	dm	L
18/1 S	1	18	167,13	161,59	178,9	60	70	125	110
18/2 S	2								
20/1 S	1	20	175,62	178,57	196,4	60	80	140	110
20/2 S	2								
21/1 S	1	21	179,87	187,05	204,9	60	90	150	110
21/2 S	2								
22/1 S	1	22	184,11	195,54	213,3	60	100	155	110
22/2 S	2								
24/1 S	1	24	192,60	212,52	230,3	60	110	170	120
24/2 S	2								
26/1 S	1	26	201,09	229,50	247,3	60	120	180	120
26/2 S	2								

CASEHARDENED & TEMPERED MATERIAL

Revision:"00"

m=Module - Z=Number of teeth - D=Assembly clearance - Helical tooth angle: 19° 31' 42" left - Pressure angle: 20°



Identifier code example : PER - C - 1000 - 18/1 N

Denomination	Shape	Z	D $^{+0,02}_0$	dp	de	df H6	df max	dm	L
18/1 N	1	18	195,18	201,99	222,3	60	70	125	110
18/2 N	2								
20/1 N	1	20	205,79	223,21	243,5	60	80	140	110
20/2 N	2								
21/1 N	1	21	211,09	233,82	254,1	60	90	150	110
21/2 N	2								
22/1 N	1	22	216,40	244,43	264,7	60	100	155	110
22/2 N	2								
24/1 N	1	24	227,00	265,65	285,9	60	110	170	120
24/2 N	2								

Denomination	Shape	Z	D $\overset{+0.02}{0}$	dp	de	df H6	df max	dm	L
18/1 S	1	18	195,18	201,99	223,60	60	70	125	110
18/2 S	2								
20/1 S	1	20	205,79	223,21	245,40	60	80	140	110
20/2 S	2								
21/1 S	1	21	211,09	233,82	256,00	60	90	150	110
21/2 S	2								
22/1 S	1	22	216,40	244,43	266,60	60	100	155	110
22/2 S	2								
24/1 S	1	24	227,00	265,65	287,80	60	110	170	120
24/2 S	2								



PINION WITH HELICAL TEETH $m=12$

CASEHARDENED & TEMPERED MATERIAL

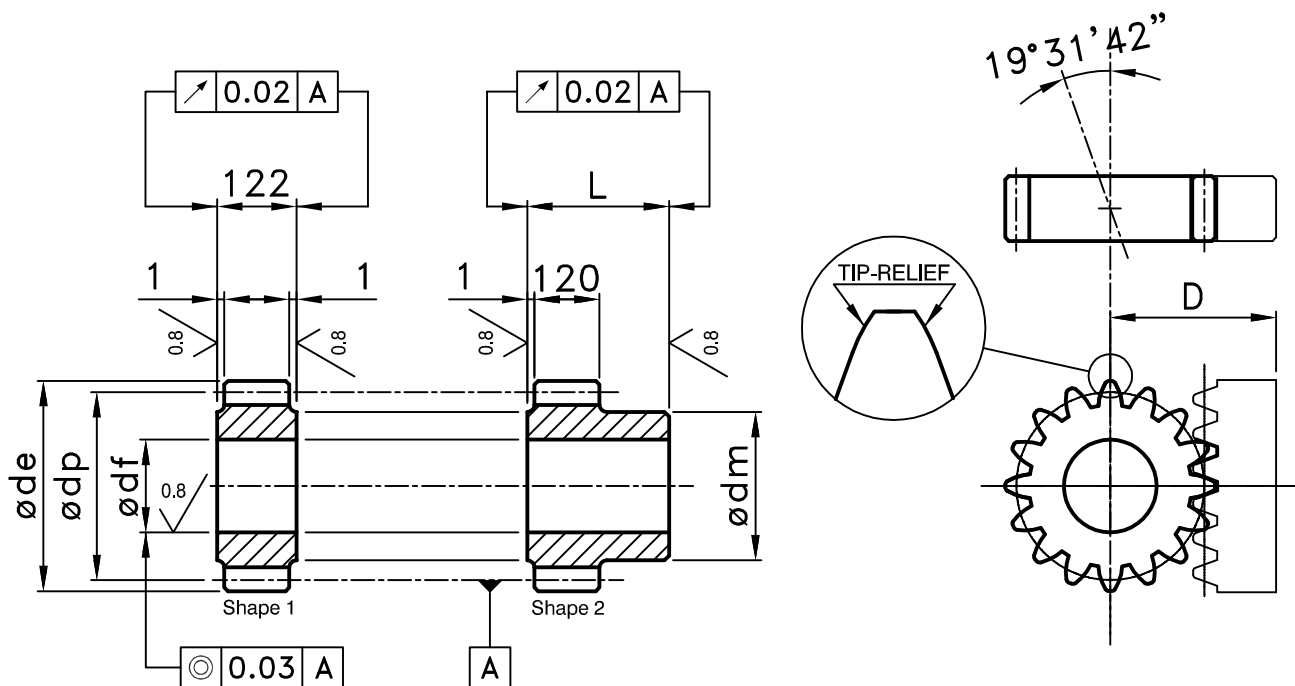
TABLE
PER-C-1200

Revision:"00"

Material: UNI 18NiCrMo5 (AISI-SAE 4320) - Casehardened & tempered teeth HRC 58÷62

Toothing accuracy: class 6 DIN 3962 - Tooth finishing $\sqrt{0.8}$ - Toothing with crowned profile - dp =Correct pitch diameter

m=Module - Z=Number of teeth - D=Assembly clearance - Helical tooth angle: 19° 31' 42" left - Pressure angle: 20°



Identifier code example : PER - C - 1200 - 18/1 N

FOR MESHING WITH RACK CEF-A-SF / CEF-A-CF

Denomination	Shape	Z	D $\begin{smallmatrix} +0,02 \\ 0 \end{smallmatrix}$	dp	de	df H6	df max	dm	L
18/1 N	1	18	233,27	242,38	266,68	60	130	190	160
18/2 N	2								
20/1 N	1	20	246,00	267,85	292,15	60	140	210	160
20/2 N	2								
21/1 N	1	21	252,37	280,58	304,88	60	150	220	160
21/2 N	2								
22/1 N	1	22	258,74	293,31	317,61	60	160	230	170
22/2 N	2								

FOR MESHING WITH RACK CER-B-SF / CER-B-CF / CER-C-SF / CER-C-CF

Denomination	Shape	Z	D $^{+0.02}_0$	dp	de	df H6	df max	dm	L
18/1 S	1	18	233,27	242,38	268,38	60	130	190	160
18/2 S	2								
20/1 S	1	20	246,00	267,85	294,55	60	140	210	160
20/2 S	2								
21/1 S	1	21	252,37	280,58	307,28	60	150	220	160
21/2 S	2								
22/1 S	1	22	258,74	293,31	320,01	60	160	230	170
22/2 S	2								



PINION WITH STRAIGHT TEETH TYPE PH

CASEHARDENED & TEMPERED MATERIAL

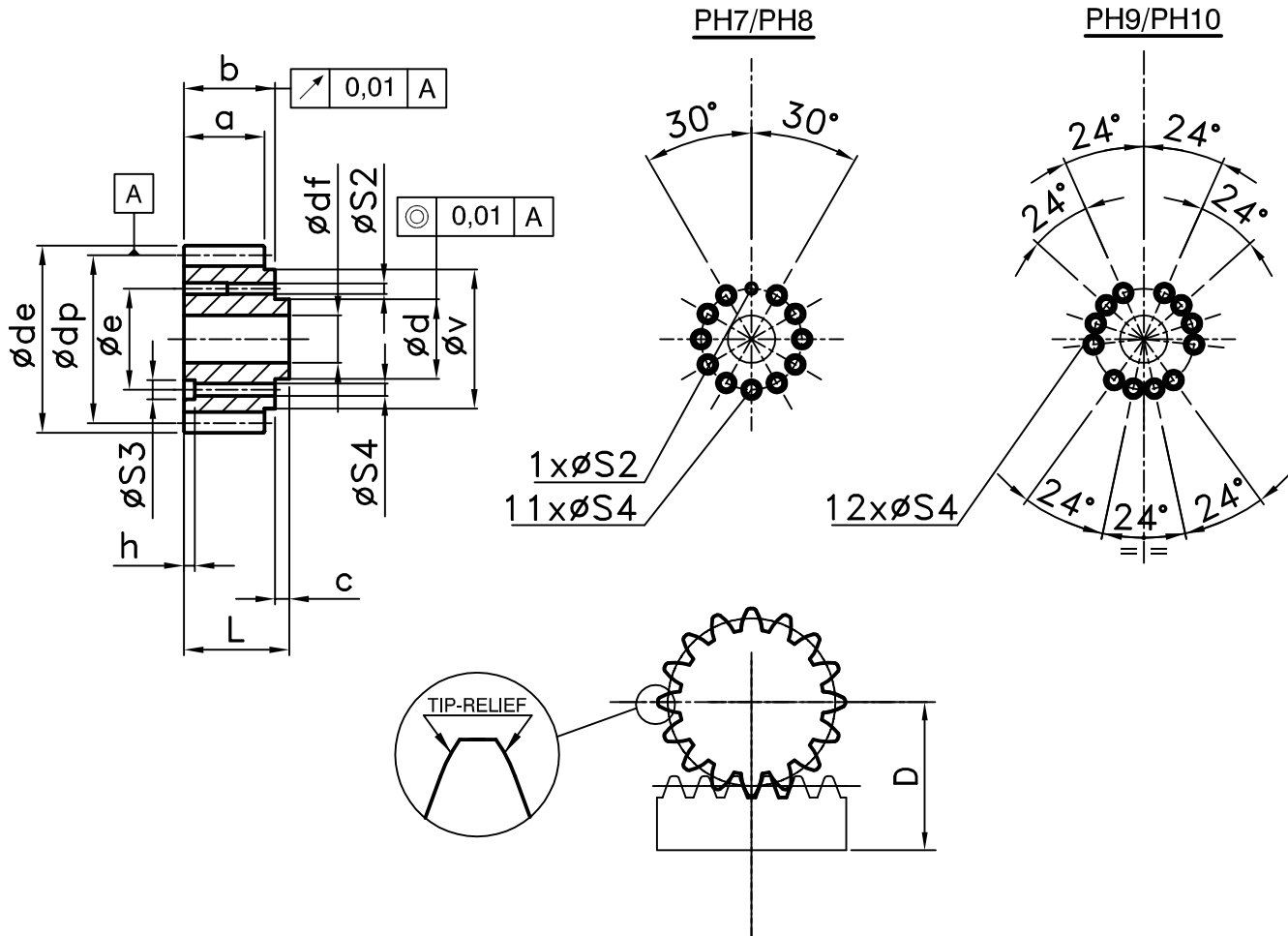
TABLE
PDR-C-PH

Revision:"00"

Material: UNI 18NiCrMo5 (AISI-SAE 4320) - Casehardened & tempered teeth HRC 58÷62

Toothing accuracy: class 6 DIN 3962 - Tooth finishing $\sqrt{0.8}$ - Toothing with crowned profile - Pressure angle: 20°

m=Module - Z=Number of teeth - D=Assembly clearance - dp=Correct pitch diameter



Identifier code example : PDR - C - PH7 - 400 - 30

FOR MESHING WITH RACK CDR-B-SF / CDR-B-CF / CDR-C-SF / CDR-C-CF

Denomination	m	Z	D ₀ ^{+0,02}	dp	de	df	d _{0,03} ^{-0,01}	e	v	a	b	c	L	S2 ^{H7}	S3	S4	h
7 - 400 - 30	4	30	107,87	124,4	133,4	30	50	80	100	36	40	5	45	8	15	9	7
7 - 500 - 24	5	24	122,32	125,5	136,7	30	50	80	100	50	55	5	60	8	15	9	7
8 - 600 - 30	6	30	161,82	186,6	199,8	40	80	125	160	55	60	7	67	10	18	11	11
9 - 800 - 28	8	28	202,74	232,8	250,6	50	90	140	180	80	88	10	98	-	26	18	15
10 - 1000 - 25	10	25	224,68	261,0	283,2	50	95	160	200	100	108	8	116	-	33	22	26
10 - 1200 - 21	12	21	244,68	265,2	291,9	50	95	160	200	120	128	8	136	-	33	22	26

REMARKS: - Customized dimension available on request

- Technical performances following related planetary gear units data
- Please use screws of grade 12.9 for assembly only



PINION WITH HELICAL TEETH TYPE PH

CASEHARDENED & TEMPERED MATERIAL

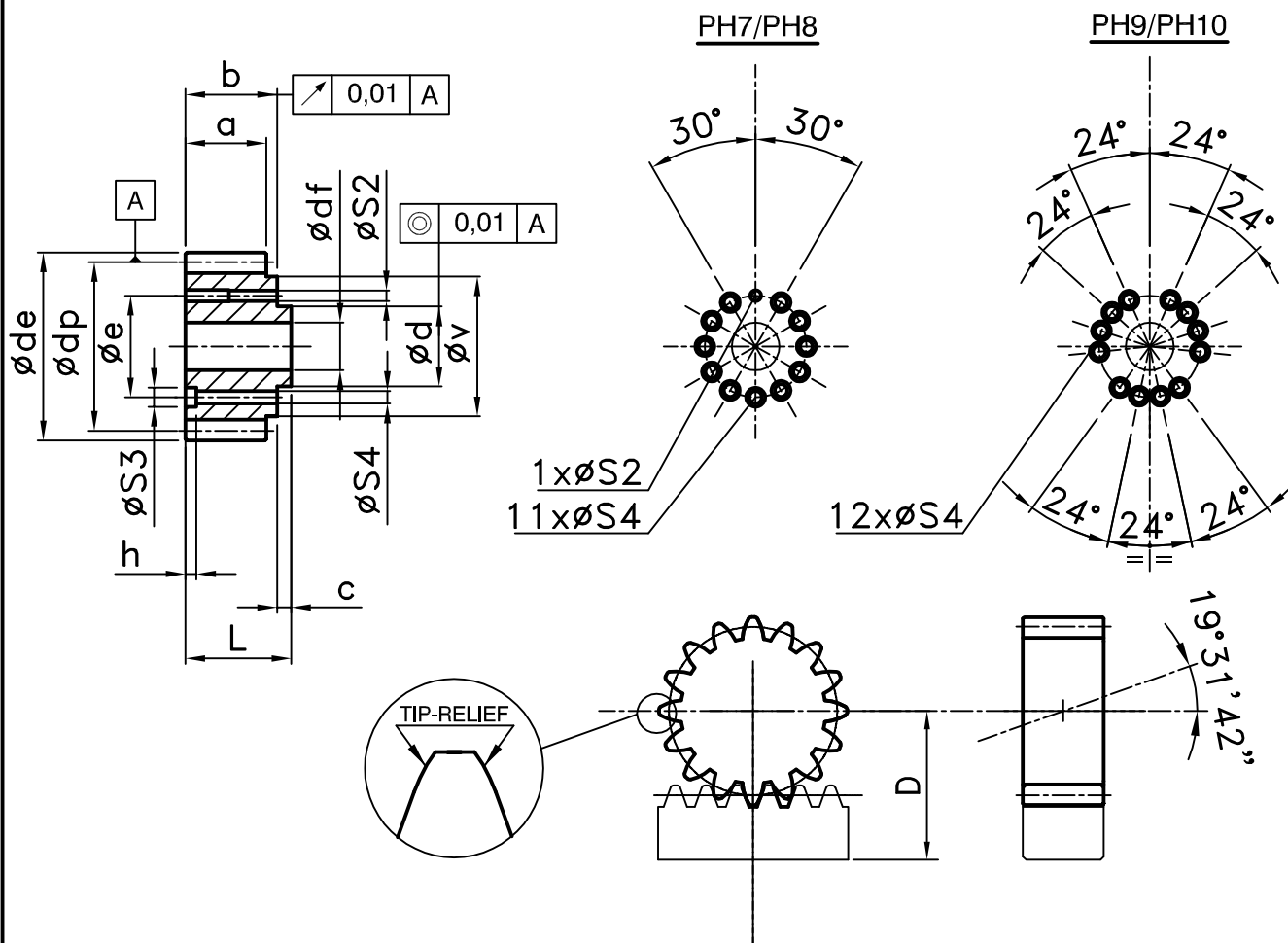
TABLE
PER-C-PH

Revision:"00"

Material: UNI 18NiCrMo5 (AISI-SAE 4320) - Casehardened & tempered teeth HRC 58÷62

Toothing accuracy: class 6 DIN 3962 - Tooth finishing $\checkmark$ - Toothing with crowned profile - dp =Correct pitch diameter

m=Module - Z=Number of teeth - D=Assembly clearance - Helical tooth angle: 19° 31' 42" left - Pressure angle: 20°



Identifier code example : PER - C - PH7 - 400 - 28

FOR MESHING WITH RACK CER-B-SF / CER-B-CF / CER-C-SF / CER-C-CF

Denomination	m	Z	D ₀ ^{+0,02}	dp	de	df	d _{-0,03} ^{-0,01}	e	v	a	b	c	L	S2 ^{H7}	S3	S4	h
7 - 400 - 28	4	28	107,31	123,3	132,3	30	50	80	100	36	40	5	45	8	15	9	7
7 - 500 - 22	5	22	120,68	122,2	133,4	30	50	80	100	50	55	5	60	8	15	9	7
8 - 600 - 28	6	28	161,22	185,4	198,7	40	80	125	160	55	60	7	67	10	18	11	11
9 - 800 - 26	8	26	201,09	229,5	247,3	50	90	140	180	80	88	10	98	-	26	18	15
10 - 1000 - 23	10	23	221,71	255,0	277,2	50	95	160	200	100	108	8	116	-	33	22	26
10 - 1200 - 20	12	20	246,00	267,8	294,5	50	95	160	200	120	128	8	136	-	33	22	26

REMARKS: - Customized dimension available on request

- Technical performances following related planetary gear units data
- Please use screws of grade 12.9 for assembly only



PINION WITH STRAIGHT TEETH TYPE PHQ

CASEHARDENED & TEMPERED MATERIAL

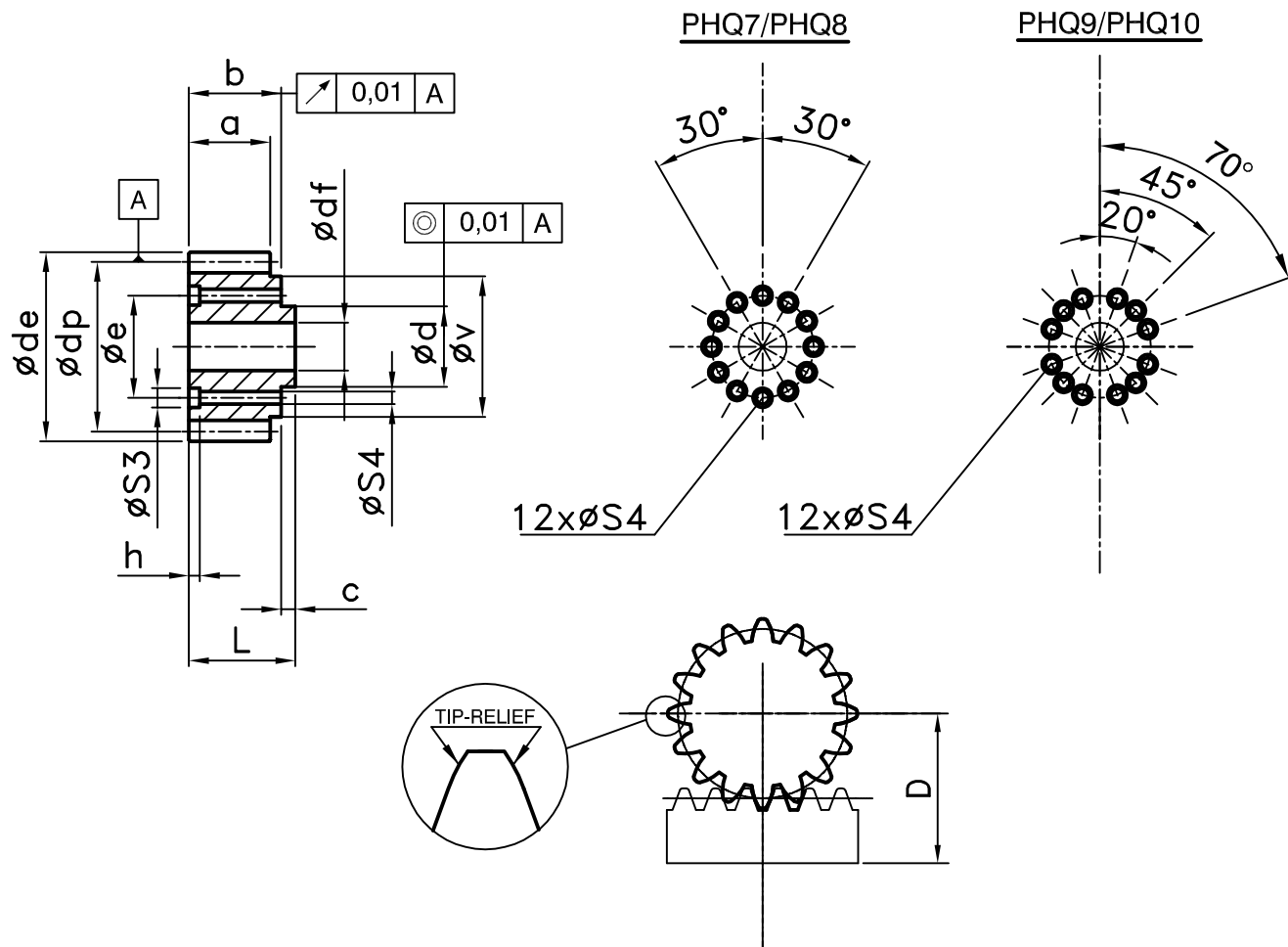
TABLE
PDR-C-PHQ

Revision:"01"

Material: UNI 18NiCrMo5 (AISI-SAE 4320) - Casehardened & tempered teeth HRC 58÷62

Tooth accuracy: class 6 DIN 3962 - Tooth finishing $\sqrt{0.8}$ - Tooth with crowned profile - Pressure angle: 20°

m=Module - Z=Number of teeth - D=Assembly clearance - dp=Correct pitch diameter



Identifier code example : PDR - C - PHQ7 - 400 - 30

FOR MESHING WITH RACK CDR-B-SF / CDR-B-CF / CDR-C-SF / CDR-C-CF

Denomination	m	Z	D $\begin{smallmatrix} +0.02 \\ 0 \end{smallmatrix}$	dp	de	df	d $\begin{smallmatrix} -0.01 \\ -0.03 \end{smallmatrix}$	e	v	a	b	c	L	S3	S4	h
7 - 400 - 30	4	30	107,87	124,4	133,4	30	50	80	100	36	40	5	45	18	11	9
7 - 500 - 24	5	24	122,32	125,5	136,7	30	50	80	100	50	55	5	60	18	11	9
8 - 600 - 30	6	30	161,82	186,6	199,8	40	80	125	160	55	60	7	67	20	13	10
9 - 800 - 28	8	28	202,74	232,8	250,6	50	90	145	180	80	88	10	98	33	22	24
10 - 1000 - 25	10	25	224,68	261,0	283,2	50	95	166	200	100	108	8	116	39	26	31
10 - 1200 - 21	12	21	244,68	265,2	291,9	50	95	166	200	120	128	8	136	39	26	31

REMARKS: - Customized dimension available on request

- Technical performances following related planetary gear units data

- Please use screws of grade 12.9 for assembly only



PINION WITH HELICAL TEETH TYPE PHQ

CASEHARDENED & TEMPERED MATERIAL

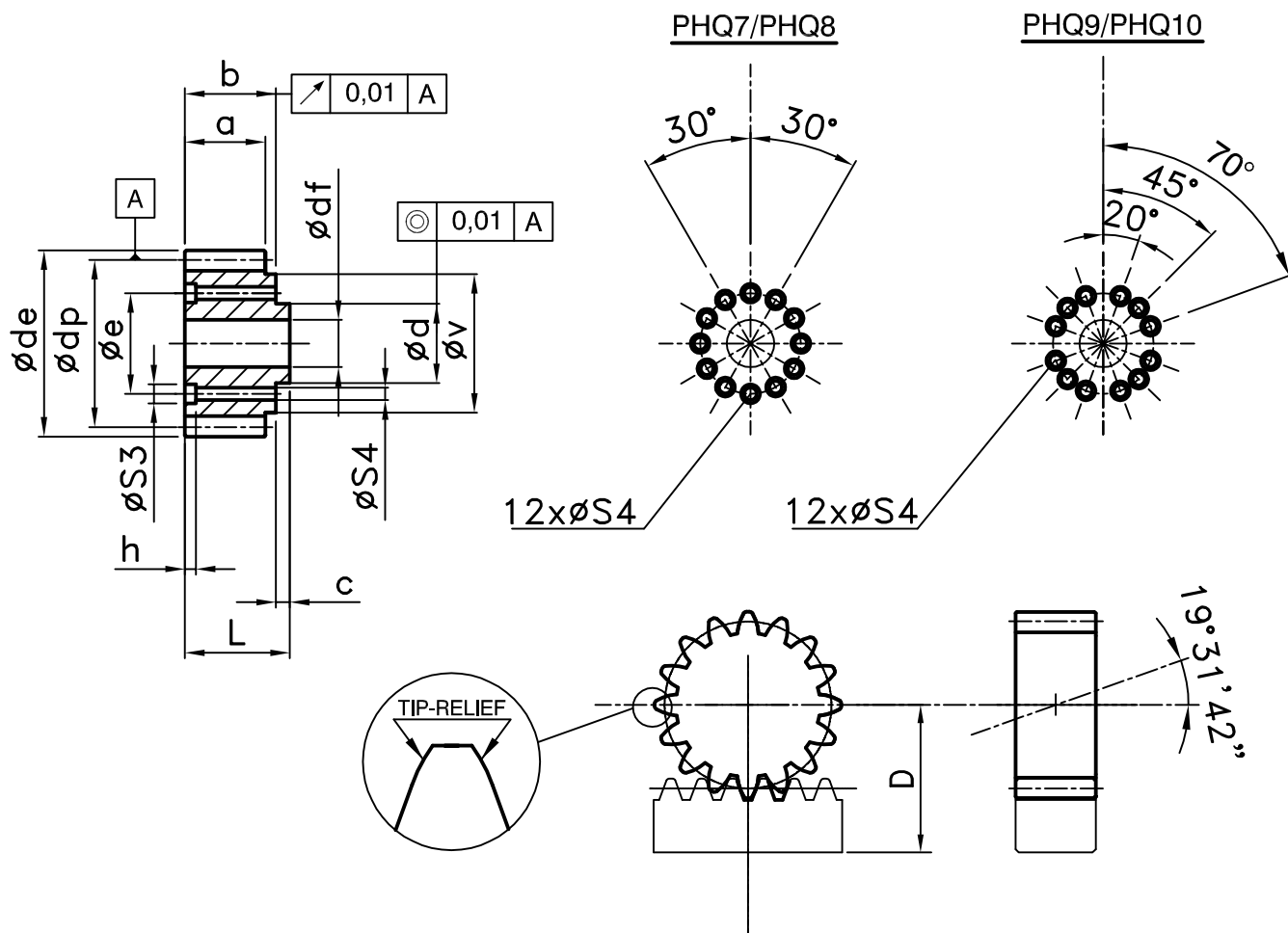
TABLE
PER-C-PHQ

Revision:"00"

Material: UNI 18NiCrMo5 (AISI-SAE 4320) - Casehardened & tempered teeth HRC 58÷62

Tooth accuracy: class 6 DIN 3962 - Tooth finishing $\sqrt{0,8}$ - Tooth with crowned profile - dp =Correct pitch diameter

m =Module - Z =Number of teeth - D =Assembly clearance - Helical tooth angle: $19^\circ 31' 42''$ left - Pressure angle: 20°



Identifier code example : PER - C - PHQ7 - 400 - 28

FOR MESHING WITH RACK CER-B-SF / CER-B-CF / CER-C-SF / CER-C-CF

Denomination	m	Z	$D \begin{smallmatrix} +0,02 \\ 0 \end{smallmatrix}$	dp	de	df	$d \begin{smallmatrix} -0,01 \\ -0,03 \end{smallmatrix}$	e	v	a	b	c	L	S3	S4	h
7 - 400 - 28	4	28	107,31	123,3	132,3	30	50	80	100	36	40	5	45	18	11	9
7 - 500 - 22	5	22	120,68	122,2	133,4	30	50	80	100	50	55	5	60	18	11	9
8 - 600 - 28	6	28	161,22	185,4	198,7	40	80	125	160	55	60	7	67	20	13	10
9 - 800 - 26	8	26	201,09	229,5	247,3	50	90	145	180	80	88	10	98	33	22	24
10 - 1000 - 23	10	23	221,71	255,0	277,2	50	95	166	200	100	108	8	116	39	26	31
10 - 1200 - 20	12	20	246,00	267,8	294,5	50	95	166	200	120	128	8	136	39	26	31

REMARKS: - Customized dimension available on request

- Technical performances following related planetary gear units data

- Please use screws of grade 12.9 for assembly only

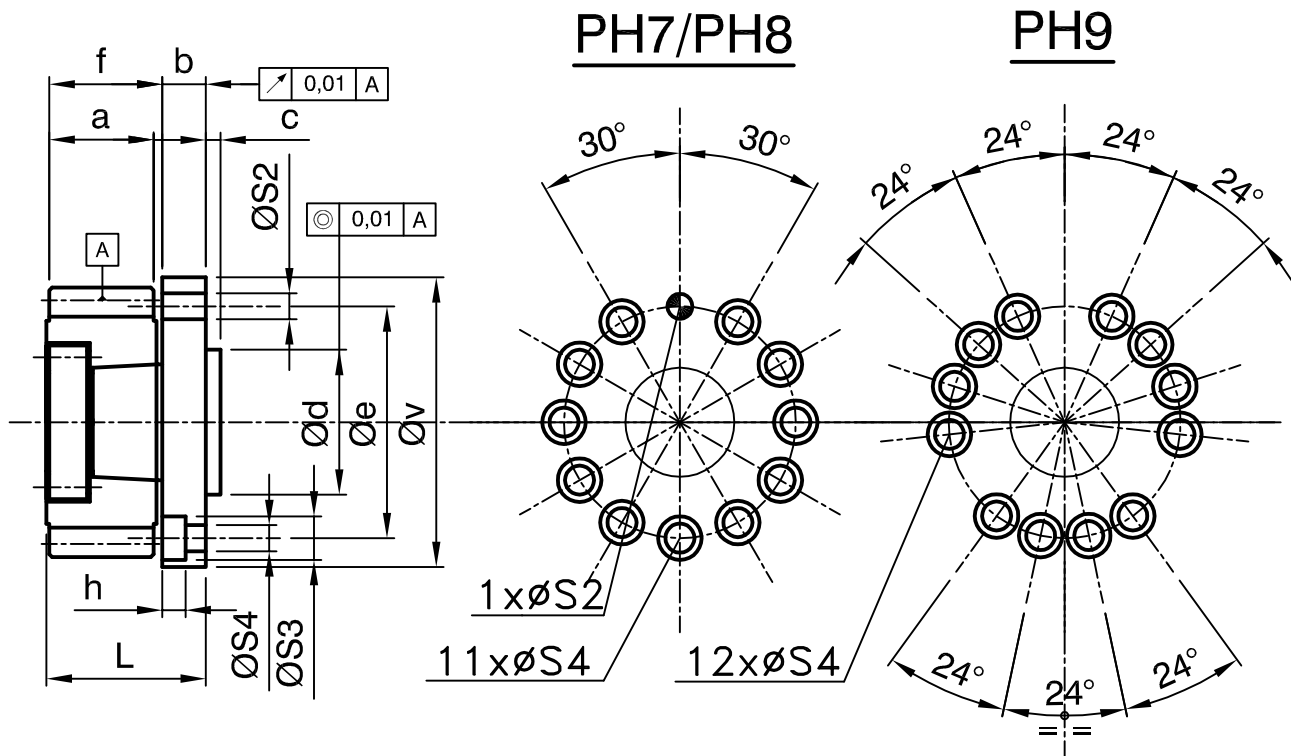


PINION WITH ADAPTER TYPE PH

CASEHARDENED & TEMPERED MATERIAL

TABLE
PFA-PH

Revision:"00"



Identifier code example for pinion with straight teeth $m=4$ - $Z=18$: PFA-PH7-4 / PDR-C-400-18/1S

Identifier code example for pinion with helical teeth $m=4$ - $Z=18$: PFA-PH7-4 / PER-C-400-18/1S

FOR MESHING WITH RACK

CDR-B-SF / CDR-B-CF / CDR-C-SF / CDR-C-CF
CER-B-SF / CER-B-CF / CER-C-SF / CER-C-CF

Denomination	module	d ^{H6}	e	v	a	b	c	f	L	S2 ^{H7}	S3	S4	h
PFA-PH7-4 / PINION TYPE	4	50	80	100	36	15	5	39	55	8	15	9	8
PFA-PH7-5 / PINION TYPE	5	50	80	100	50	15	5	53	69	8	15	9	8
PFA-PH8-6 / PINION TYPE	6	80	125	160	55	20	7	58	79	10	18	11	10
PFA-PH9-8 / PINION TYPE	8	90	140	180	80	25	10	83	109	-	26	18	16

PINION TYPE FOR	< Z > FOR STRAIGHT TEETH TYPE PDR	< Z > FOR HELICAL TEETH TYPE PER
PFA-PH7-4	18 - 20 - 21 - 22 - 24 - 26 (see table PDR-C-400)	18 - 20 - 21 - 22 - 24 - 26 (see table PER-C-400)
PFA-PH7-5	18 - 20 - 21 - 22 (see table PDR-C-500)	18 - 20 - 21 (see table PER-C-500)
PFA-PH8-6	18 - 20 - 21 - 22 - 24 - 26 (see table PDR-C-600)	18 - 20 - 21 - 22 - 24 - 26 (see table PER-C-600)
PFA-PH9-8	18 - 20 - 21 - 22 - 24 - 26 (see table PDR-C-800)	18 - 20 - 21 - 22 - 24 (see table PER-C-800)

REMARKS: - Customized dimension available on request
 - Technical performances following related planetary gear units data
 - Please use screws of grade 12.9 for assembly only

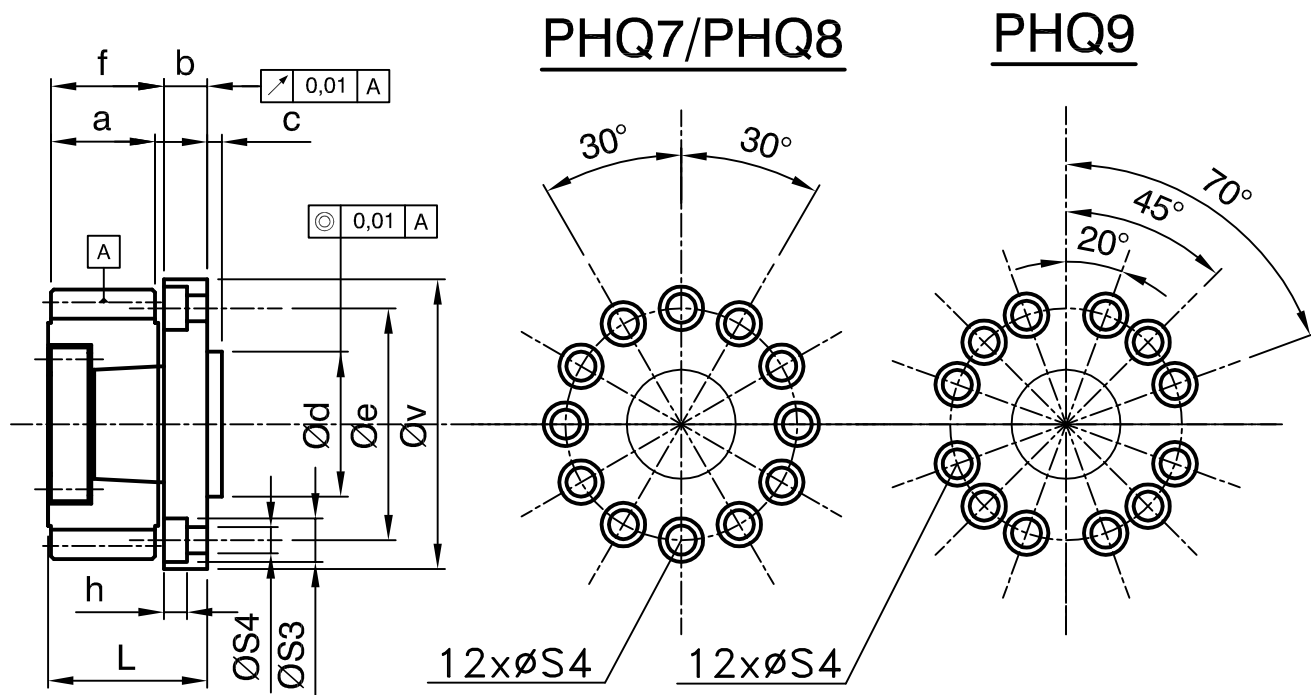


PINION WITH ADAPTER TYPE PHQ

CASEHARDENED & TEMPERED MATERIAL

TABLE
PFA-PHQ

Revision:"00"



Identifier code example for pinion with straight teeth $m=4$ - $Z=18$: PFA-PHQ7-4 / PDR-C-400-18/1S

Identifier code example for pinion with helical teeth $m=4$ - $Z=18$: PFA-PHQ7-4 / PER-C-400-18/1S

FOR MESHING WITH RACK $\left\{ \begin{array}{l} \text{CDR-B-SF / CDR-B-CF / CDR-C-SF / CDR-C-CF} \\ \text{CER-B-SF / CER-B-CF / CER-C-SF / CER-C-CF} \end{array} \right.$

Denomination	module	d^{H6}	e	v	a	b	c	f	L	S3	S4	h
PFA-PHQ7-4 / PINION TYPE	4	50	80	100	36	18	5	39	58	18	11	10
PFA-PHQ7-5 / PINION TYPE	5	50	80	100	50	18	5	53	72	18	11	10
PFA-PHQ8-6 / PINION TYPE	6	80	125	160	55	24	7	58	83	20	13	12
PFA-PHQ9-8 / PINION TYPE	8	90	145	180	80	34	10	83	118	33	22	20

PINION TYPE FOR	< Z > FOR STRAIGHT TEETH TYPE PDR	< Z > FOR HELICAL TEETH TYPE PER
PFA-PHQ7-4	18 - 20 - 21 - 22 - 24 - 26 (see table PDR-C-400)	18 - 20 - 21 - 22 - 24 - 26 (see table PER-C-400)
PFA-PHQ7-5	18 - 20 - 21 - 22 (see table PDR-C-500)	18 - 20 - 21 (see table PER-C-500)
PFA-PHQ8-6	18 - 20 - 21 - 22 - 24 - 26 (see table PDR-C-600)	18 - 20 - 21 - 22 - 24 - 26 (see table PER-C-600)
PFA-PHQ9-8	18 - 20 - 21 - 22 - 24 - 26 (see table PDR-C-800)	18 - 20 - 21 - 22 - 24 (see table PER-C-800)

REMARKS: - Customized dimension available on request
 - Technical performances following related planetary gear units data
 - Please use screws of grade 12.9 for assembly only

	STRAIGHT ASSEMBLY RACK		TABLE			
	INDUCTION HARDENED & TEMPERED MATERIAL		CLB-CDR			
				Revision:"00"		
Material: UNI C45 (AISI-SAE 1045) - Induction hardened & tempered teeth HRC ≥ 52 Toothing accuracy: class 5 DIN 3962 - Tooth finishing $\sqrt{0.8}$ - Pressure angle: 20° Pitch error: one pitch=0.003 mm, cumulative approx.=0.035 mm/m - Z=Number of teeth						
Technical drawing of the straight assembly rack. The side view shows a rack with length L and pressure angle Pa. The end view shows the rack profile with addendum a, total height H, dedendum S, and a surface texture symbol of 0.01/500 A. Fillet radii of 0.8 are indicated at the transitions.						
Identifier code example : CLB - CDR - 800						
Denomination	Module	Pa	L	a	H	S
CLB - CDR - 079	0,79577	2,5	100	10	10	1
CLB - CDR - 100	1	3,14159	100	10	10	1
CLB - CDR - 125	1,25	3,92699	100	10	10	1
CLB - CDR - 150	1,50	4,71239	100	10	10	1
CLB - CDR - 159	1,59155	5,0	100	10	15	1
CLB - CDR - 200	2	6,28318	150	20	20	2
CLB - CDR - 250	2,50	7,85398	150	20	20	2
CLB - CDR - 300	3	9,42478	150	30	30	2
CLB - CDR - 318	3,18310	10,0	150	30	30	2
CLB - CDR - 400	4	12,56637	200	30	30	3
CLB - CDR - 500	5	15,70796	200	50	50	3
CLB - CDR - 600	6	18,84955	200	50	50	3
CLB - CDR - 800	8	25,13274	250	80	50	4
CLB - CDR - 1000	10	31,41592	250	100	50	4
CLB - CDR - 1200	12	37,69911	300	120	70	4



HELICAL ASSEMBLY RACK

INDUCTION HARDENED & TEMPERED MATERIAL

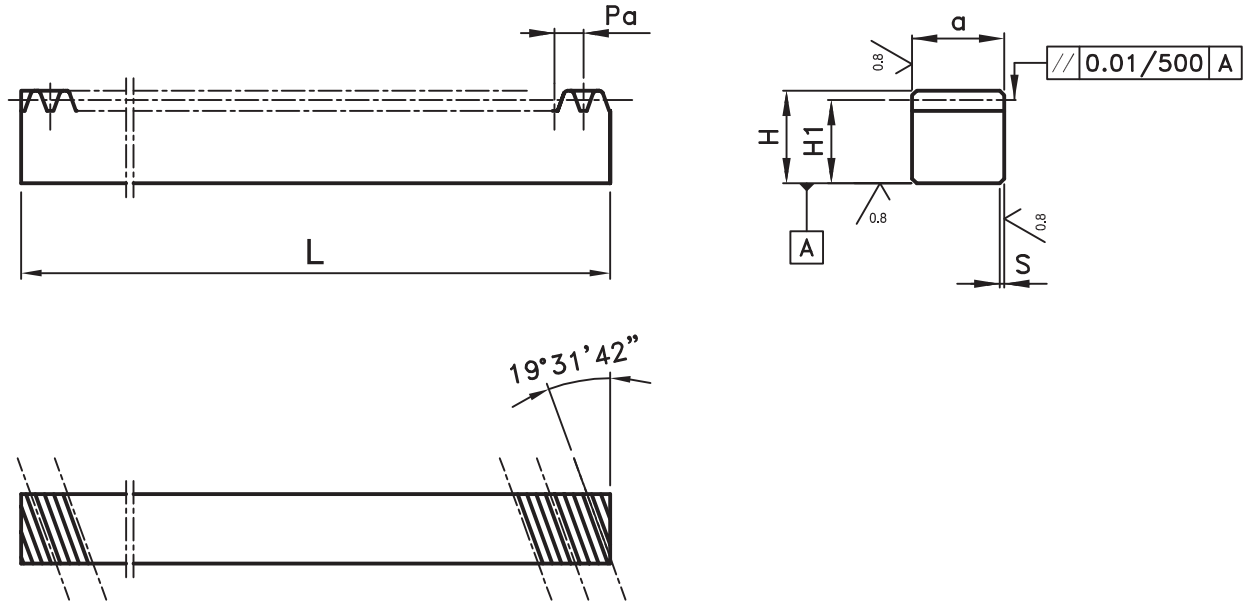
TABLE
CLB-CER

Revision:"00"

Material: UNI C45 (AISI-SAE 1045) - Induction hardened & tempered teeth HRC ≥ 52

Toothing accuracy: class 5 DIN 3962 - Tooth finishing $\sqrt{0.8}$ - Pressure angle: 20°

Pitch error: one pitch=0.003 mm, cumulative approx.=0.035 mm/m - Z=Number of teeth



Identifier code example : CLB - CER - 800

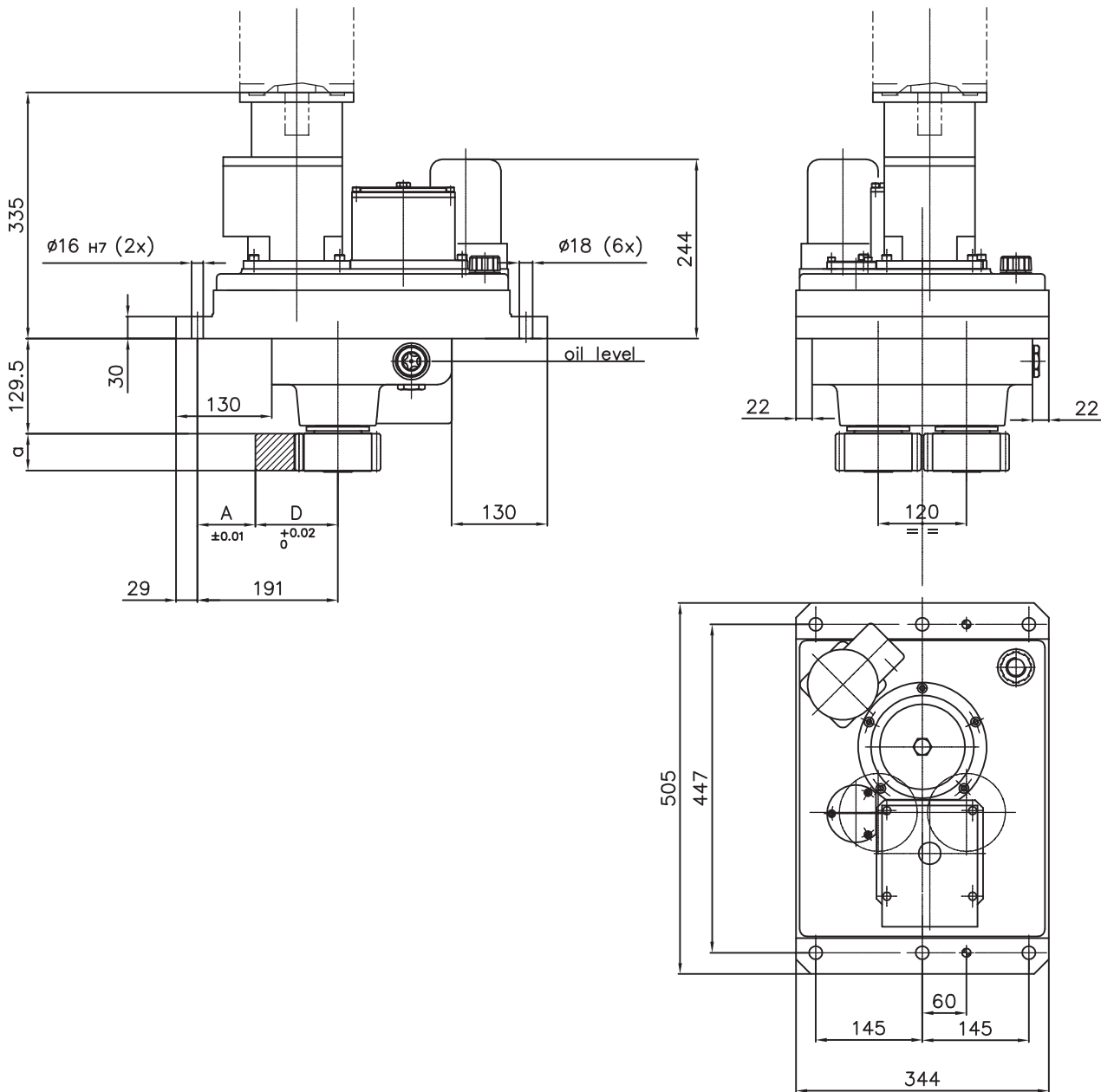
Denomination	Module	Pa	L	a	H	S
CLB - CER - 100	1	3,3333	100	10	10	1
CLB - CER - 125	1,25	4,1666	100	10	10	1
CLB - CER - 150	1,50	5,0000	100	10	15	1
CLB - CER - 200	2	6,6666	150	20	20	2
CLB - CER - 250	2,50	8,3333	150	20	20	2
CLB - CER - 300	3	10,0000	150	30	30	2
CLB - CER - 400	4	13,3333	200	30	30	3
CLB - CER - 500	5	16,6666	200	50	50	3
CLB - CER - 600	6	20,0000	200	50	50	3
CLB - CER - 800	8	26,6666	250	80	50	4
CLB - CER - 1000	10	33,3333	250	100	50	4
CLB - CER - 1200	12	40,0000	300	120	70	4



ZERO BACKLASH GEARBOX LIGHT SERIES
VERTICAL MOTOR
INSIDE LUBRICATION

TABLE
MCCA

Revision:"01"



Module	Denomination	f	v	t	i	Z	D	A	a	r
4	MCCA-401-DM	700	12	5	68	22 D	91,87	99,13	36	1
	MCCA-401-DV	700	18	7	45					
	MCCA-401-EM	700	12	5	68	20 E	90,31	100,69		
	MCCA-401-EV	700	18	7	45					
5	MCCA-501-DM	1000	12	7	80	20 D	112,32	78,68	50	
	MCCA-501-DV	1000	18	10	53					
	MCCA-501-EM	1000	12	7	80	18 E	110,07	80,93		
	MCCA-501-EV	1000	18	10	53					

f [daN] = tangential force tooth/rack
v [m/1'] = max speed to rack
t [Nm] = input torque motor 3000 r.p.m.
i = total ratio
r = size reducer

Z = number teeth pignon
D = straight teeth (PDR-C-XXX-XX/1X)
E = helical teeth (PER-C-XXX-XX/1X)

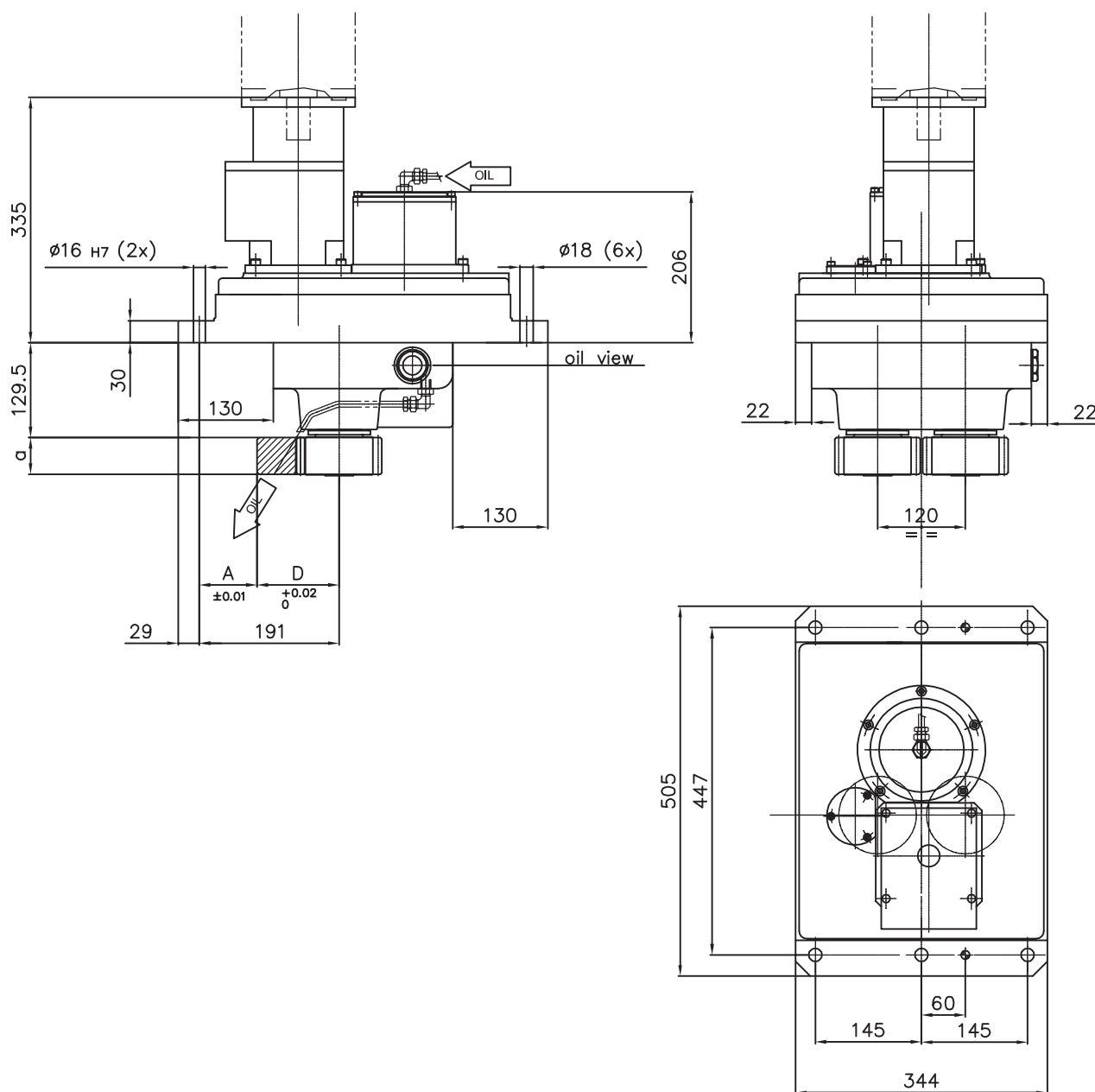


ZERO BACKLASH GEARBOX LIGHT SERIES

VERTICAL MOTOR OUTSIDE LUBRICATION

TABLE MCCB

Revision:"01"



Module	Denomination	f	v	t	i	Z	D	A	a	r
4	MCCB-401-DM	700	12	5	68	22 D	91,87	99,13	36	1
	MCCB-401-DV	700	18	7	45					
	MCCB-401-EM	700	12	5	68	20 E	90,31	100,69		
	MCCB-401-EV	700	18	7	45					
5	MCCB-501-DM	1000	12	7	80	20 D	112,32	78,68	50	
	MCCB-501-DV	1000	18	10	53					
	MCCB-501-EM	1000	12	7	80	18 E	110,07	80,93		
	MCCB-501-EV	1000	18	10	53					

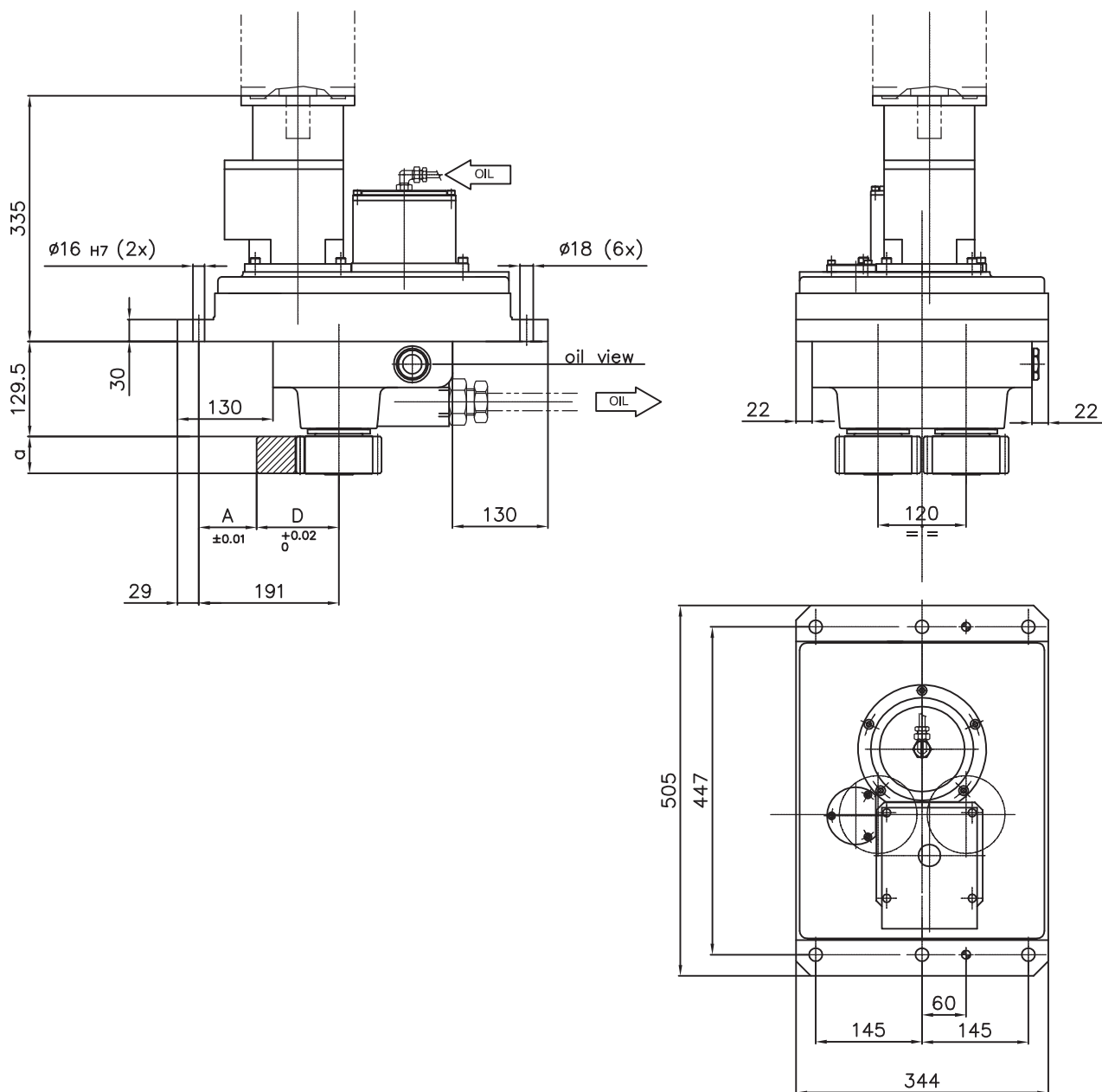
f [daN] = tangential force tooth/rack
v [m/1'] = max speed to rack
t [Nm] = input torque motor 3000 r.p.m.
i = total ratio
r = size reducer

Z = number teeth pignon
D = straight teeth (PDR-C-XXX-XX/1X)
E = helical teeth (PER-C-XXX-XX/1X)



ZERO BACKLASH GEARBOX LIGHT SERIES
VERTICAL MOTOR
RECIRCULATING LUBRICATION

TABLE
MCCC
Revision:"01"



Module	Denomination	f	v	t	i	Z	D	A	a	r
4	MCCC-401-DM	700	12	5	68	22 D	91,87	99,13	36	1
	MCCC-401-DV	700	18	7	45					
	MCCC-401-EM	700	12	5	68	20 E	90,31	100,69		
	MCCC-401-EV	700	18	7	45					
5	MCCC-501-DM	1000	12	7	80	20 D	112,32	78,68	50	
	MCCC-501-DV	1000	18	10	53					
	MCCC-501-EM	1000	12	7	80	18 E	110,07	80.93		
	MCCC-501-EV	1000	18	10	53					

f [daN] = tangential force tooth/rack
v [m/1'] = max speed to rack
t [Nm] = input torque motor 3000 r.p.m.
i = total ratio
r = size reducer

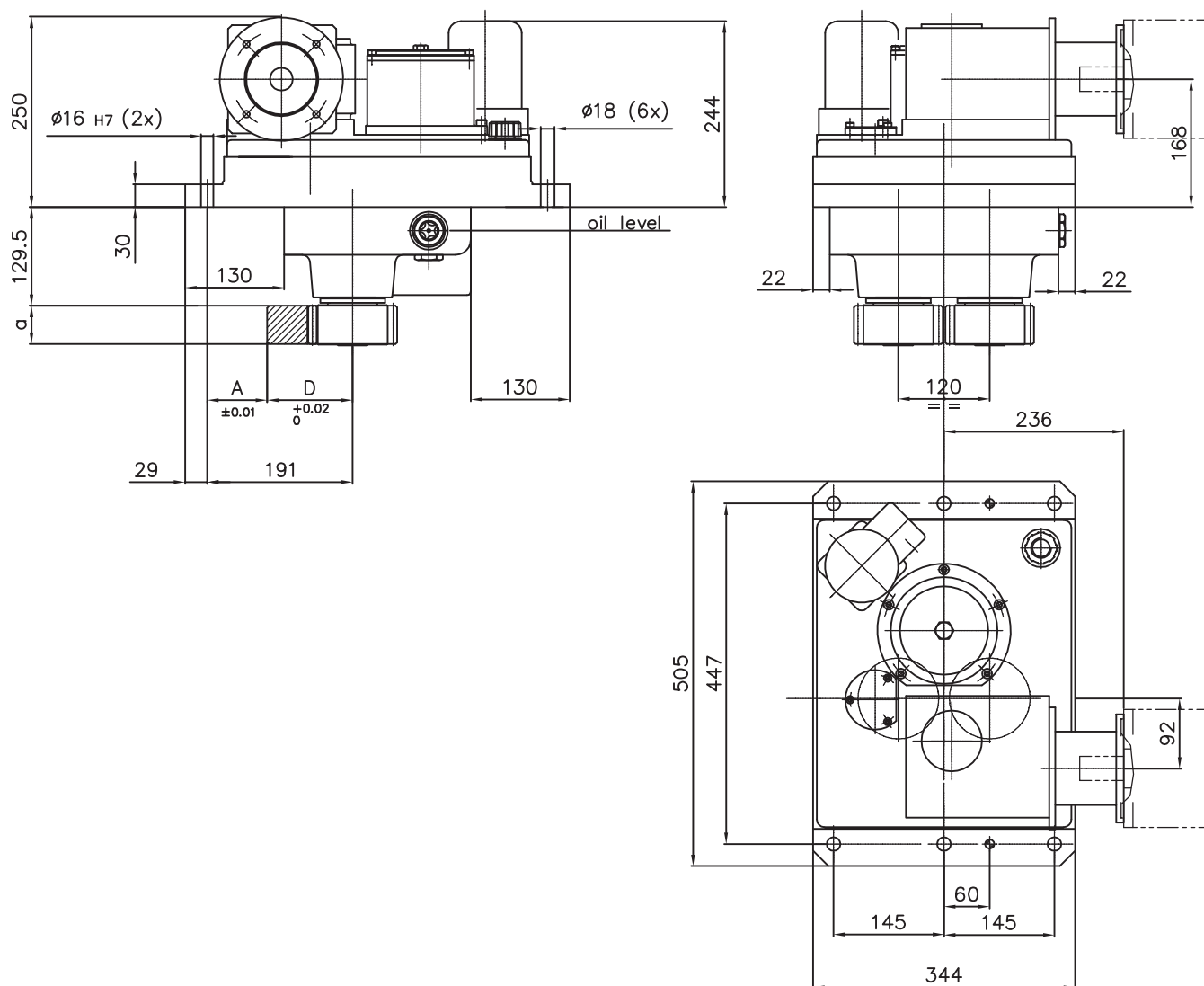
Z = number teeth pignon
D = straight teeth (PDR-C-XXX-XX/1X)
E = helical teeth (PER-C-XXX-XX/1X)



ZERO BACKLASH GEARBOX LIGHT SERIES
HORIZONTAL MOTOR
INSIDE LUBRICATION

TABLE
MCKA

Revision:"01"



Module	Denomination	f	v	t	i	Z	D	A	a	r
4	MCKA-401DM	700	12	5	68	22 D	91,87	99,13	36	1
	MCKA-401-DV	700	18	7	45					
	MCKA-401-EM	700	12	5	68	20 E	90,31	100,69		
	MCKA-401-EV	700	18	7	45					
5	MCKA-501-DM	1000	12	7	80	20 D	112,32	78,68	50	
	MCKA-501-DV	1000	18	10	53					
	MCKA-501-EM	1000	12	7	80	18 E	110,07	80,93		
	MCKA-501-EV	1000	18	10	53					

f [daN] = tangential force tooth/rack
v [m/1'] = max speed to rack
t [Nm] = input torque motor 3000 r.p.m.
i = total ratio
r = size reducer

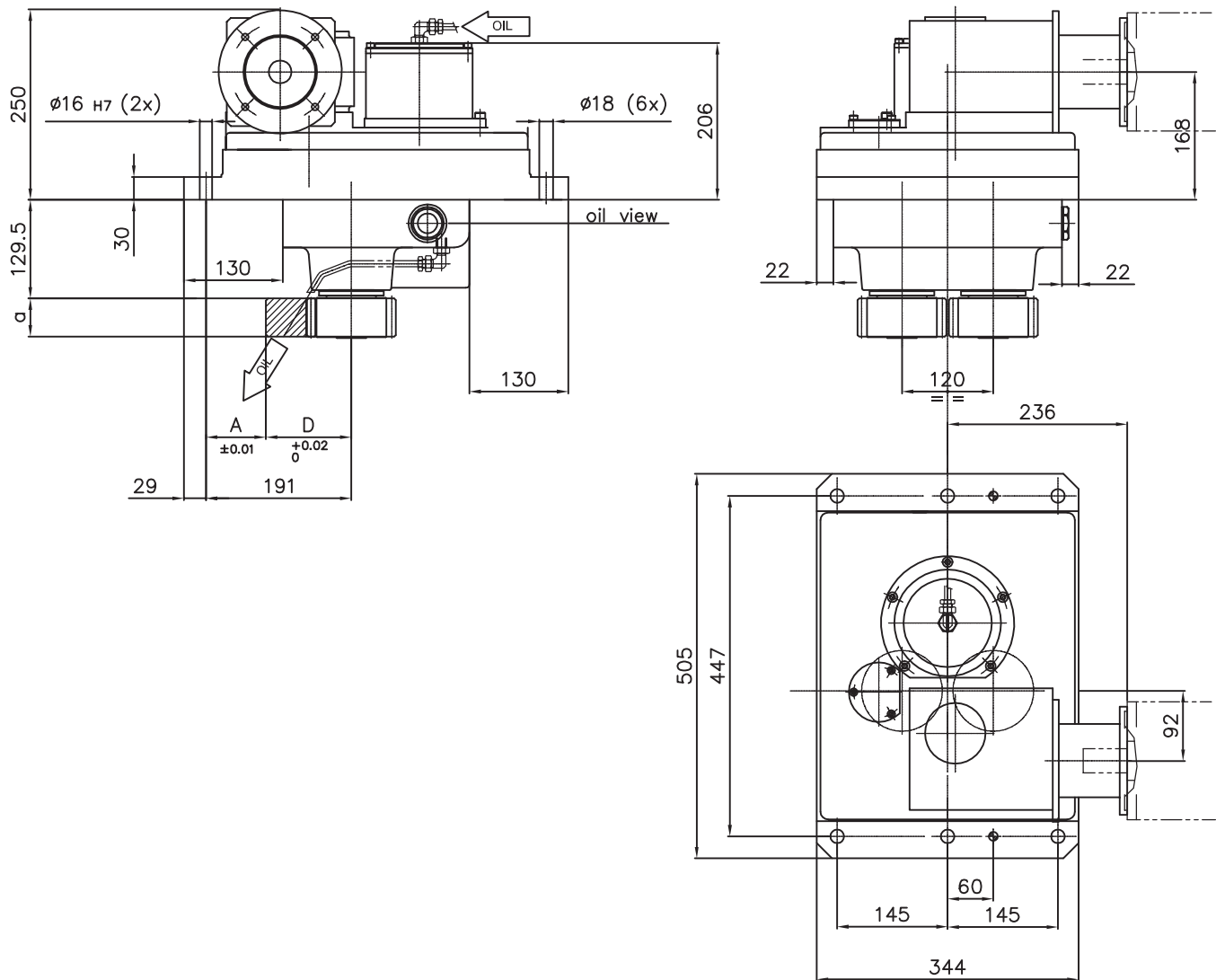
Z = number teeth pignon
D = straight teeth (PDR-C-XXX-XX/1X)
E = helical teeth (PER-C-XXX-XX/1X)



ZERO BACKLASH GEARBOX LIGHT SERIES
HORIZONTAL MOTOR
OUTSIDE LUBRICATION

TABLE
MCKB

Revision:"01"

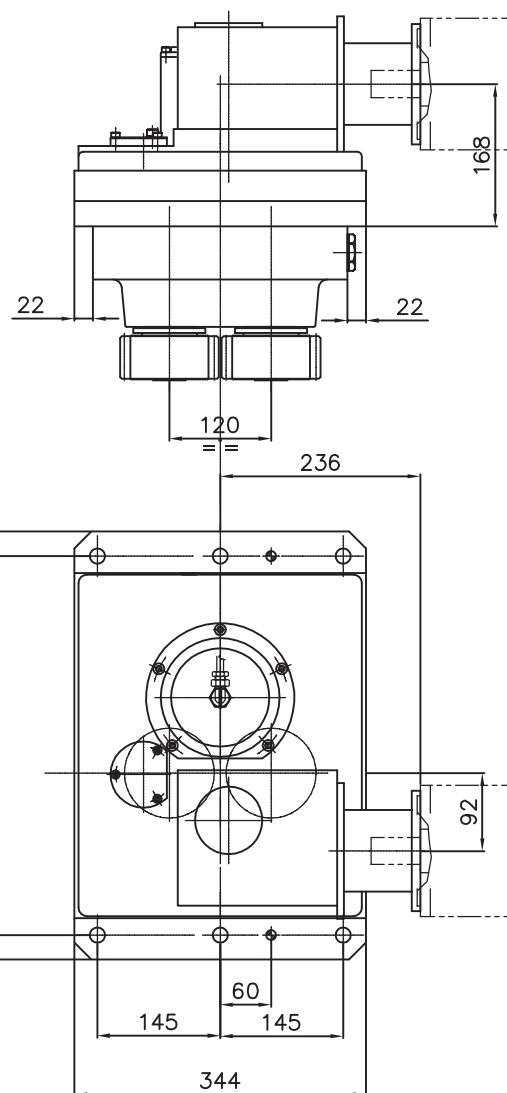


Module	Denomination	f	v	t	i	Z	D	A	a	r
4	MCKB-401-DM	700	12	5	68	22 D	91,87	99,13	36	1
	MCKB-401-DV	700	18	7	45					
	MCKB-401-EM	700	12	5	68	20 E	90,31	100,69		
	MCKB-401-EV	700	18	7	45					
5	MCKB-501-DM	1000	12	7	80	20 D	112,32	78,68	50	
	MCKB-501-DV	1000	18	10	53					
	MCKB-501-EM	1000	12	7	80	18 E	110,07	80,93		
	MCKB-501-EV	1000	18	10	53					

f [daN] = tangential force tooth/rack
v [m/1'] = max speed to rack
t [Nm] = input torque motor 3000 r.p.m.
i = total ratio
r = size reducer

Z = number teeth pignon
D = straight teeth (PDR-C-XXX-XX/1X)
E = helical teeth (PER-C-XXX-XX/1X)

TABLE
MCKC



Module	Denomination	f	v	t	i	Z	D	A	a	r
4	MCKC-401-DM	700	12	5	68	22 D	91,87	99,13	36	1
	MCKC-401-DV	700	18	7	45					
	MCKC-401-EM	700	12	5	68	20 E	90,31	100,69		
	MCKC-401-EV	700	18	7	45					
5	MCKC-501-DM	1000	12	7	80	20 D	112,32	78,68	50	
	MCKC-501-DV	1000	18	10	53					
	MCKC-501-EM	1000	12	7	80	18 E	110,07	80,93		
	MCKC-501-EV	1000	18	10	53					

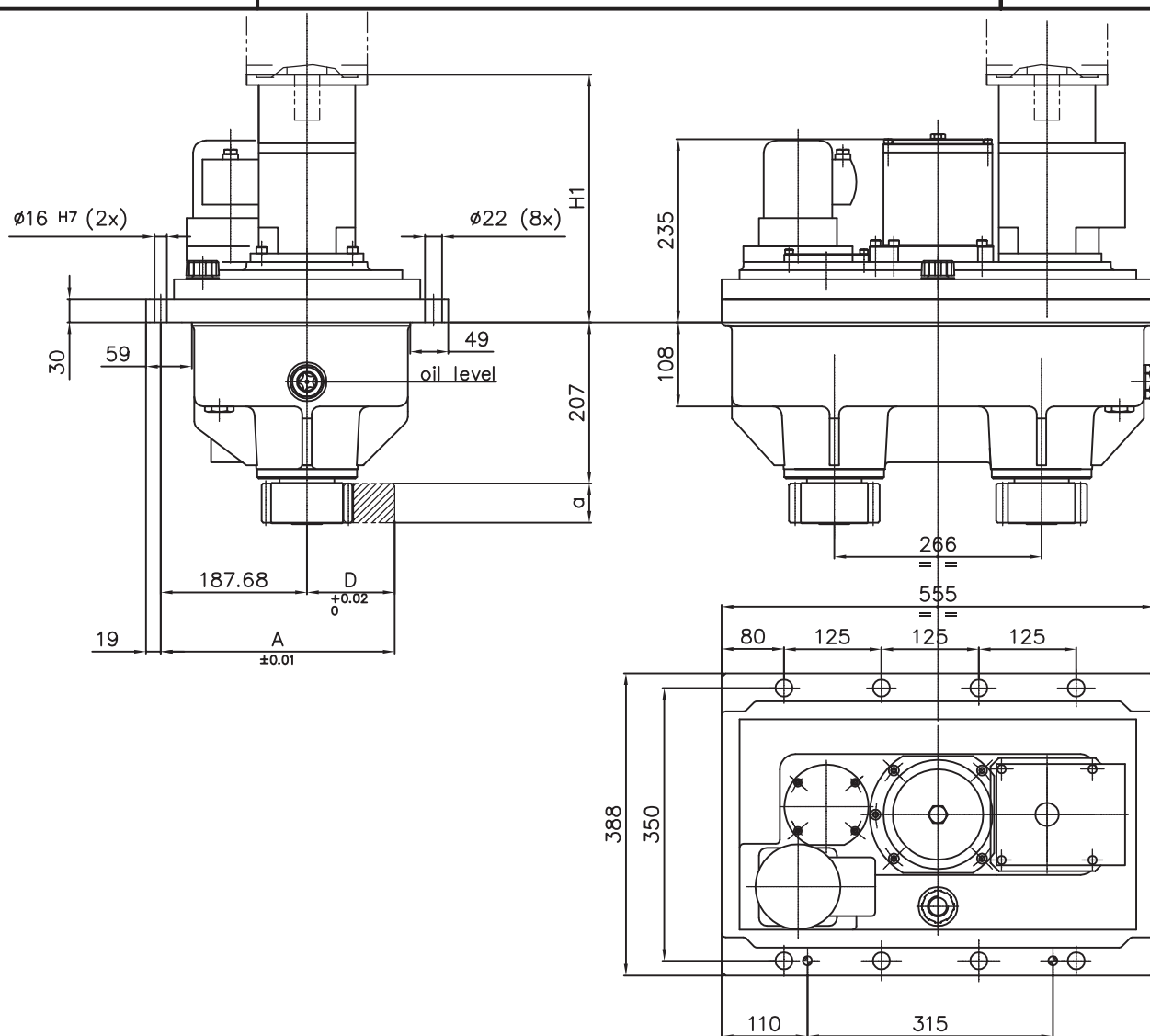
Z = number teeth pignon
D = straight teeth (PDR-C-XXX-XX/1X)
E = helical teeth (PER-C-XXX-XX/1X)



ZERO BACKLASH GEARBOX LIGHT SERIES

VERTICAL MOTOR INSIDE LUBRICATION

TABLE
MTCA
Revision: "00"



Module	Denomination	f	v	t	i	Z	D	A	a	H1	r		
5	MTCA-502-DM	1600	12	10	80	20 D	112,32	300	50	337	2		
	MTCA-502-DV	1600	18	15	53								
	MTCA-502-EM	1600	12	10	80	18 E	110,07	297,75					
	MTCA-502-EV	1600	18	15	53								
6	MTCA-602-DL	1600	8	7	145	20 D	131,82	319,50	55			380	3
	MTCA-602-DM	1600	12	10	97								
	MTCA-602-DV	1600	18	15	65								
	MTCA-602-EL	1600	8	7	145	18 E	129,11	316,79					
	MTCA-602-EM	1600	12	10	97								
	MTCA-602-EV	1600	18	15	65								
	MTCA-603-DL	3200	8	15	145	20 D	131,82	319,50					
	MTCA-603-DM	3000	12	20	97								
	MTCA-603-EL	3200	8	15	145	18 E	129,11	316,79					
	MTCA-603-EM	3000	12	20	97								

f [daN] = tangential force tooth/rack
v [m/1'] = max speed to rack
t [Nm] = input torque motor 3000 r.p.m.
i = total ratio
r = size reducer

Z = number teeth pignon
D = straight teeth (PDR-C-XXX-XX/1X)
E = helical teeth (PER-C-XXX-XX/1X)

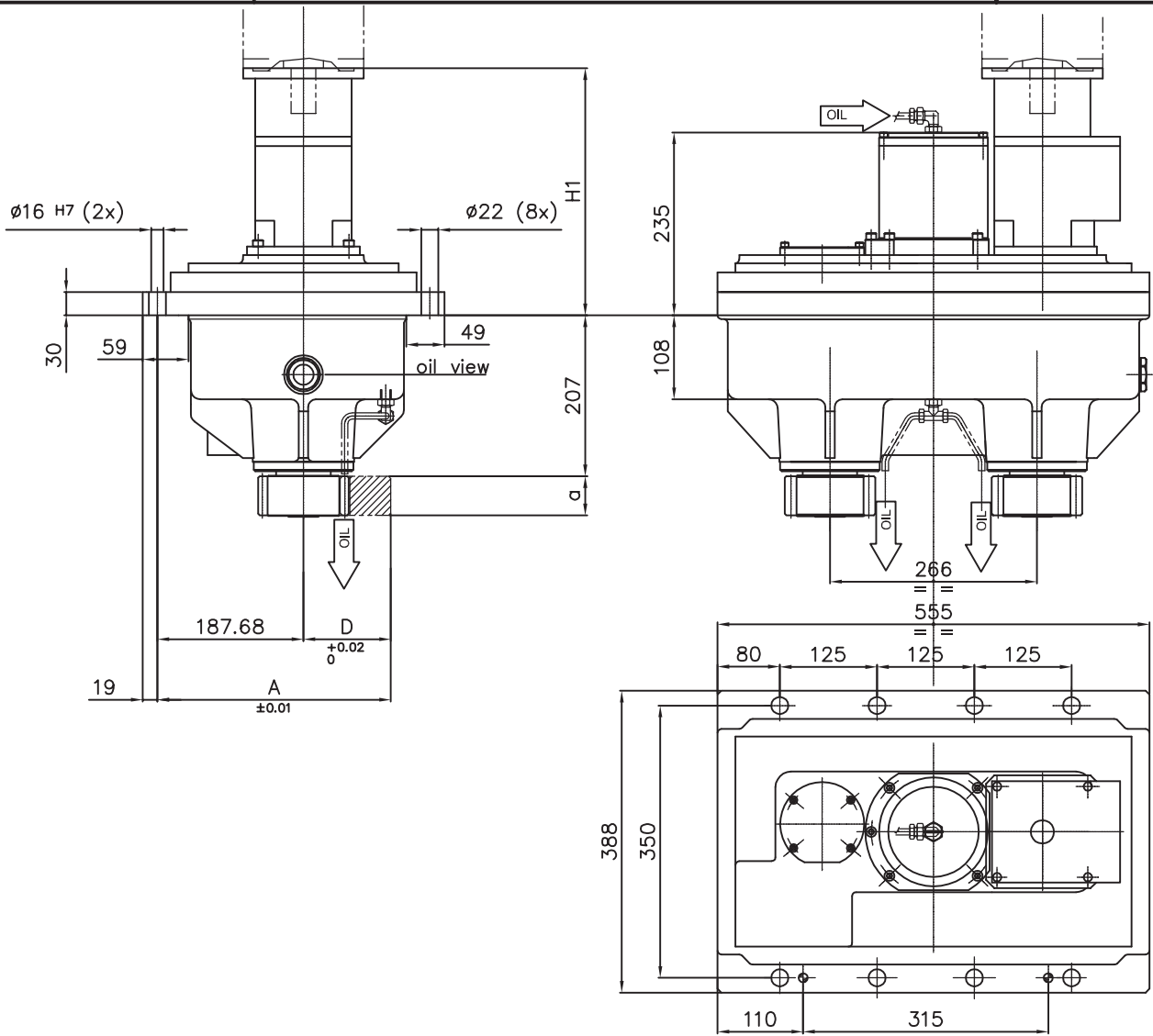


ZERO BACKLASH GEARBOX LIGHT SERIES

VERTICAL MOTOR OUTSIDE LUBRICATION

TABLE
MTCB

Revision:"00"



Module	Denomination	f	v	t	i	Z	D	A	a	H1	r
5	MTCB-502-DM	1600	12	10	80	20 D	112,32	300	50		
	MTCB-502-DV	1600	18	15	53						
	MTCB-502-EM	1600	12	10	80	18 E	110,07	297,75			
	MTCB-502-EV	1600	18	15	53						
6	MTCB-602-DL	1600	8	7	145	20 D	131,82	319,50	55	337	2
	MTCB-602-DM	1600	12	10	97						
	MTCB-602-DV	1600	18	15	65						
	MTCB-602-EL	1600	8	7	145	18 E	129,11	316,79			
	MTCB-602-EM	1600	12	10	97						
	MTCB-602-EV	1600	18	15	65						
	MTCB-603-DL	3200	8	15	145	20 D	131,82	319,50		380	3
	MTCB-603-DM	3000	12	20	97						
	MTCB-603-EL	3200	8	15	145	18 E	129,11	316,79			
	MTCB-603-EM	3000	12	20	97						

f [daN] = tangential force tooth/rack
v [m/1'] = max speed to rack
t [Nm] = input torque motor 3000 r.p.m.
i = total ratio
r = size reducer

Z = number teeth pignon
D = straight teeth (PDR-C-XXX-XX/1X)
E = helical teeth (PER-C-XXX-XX/1X)



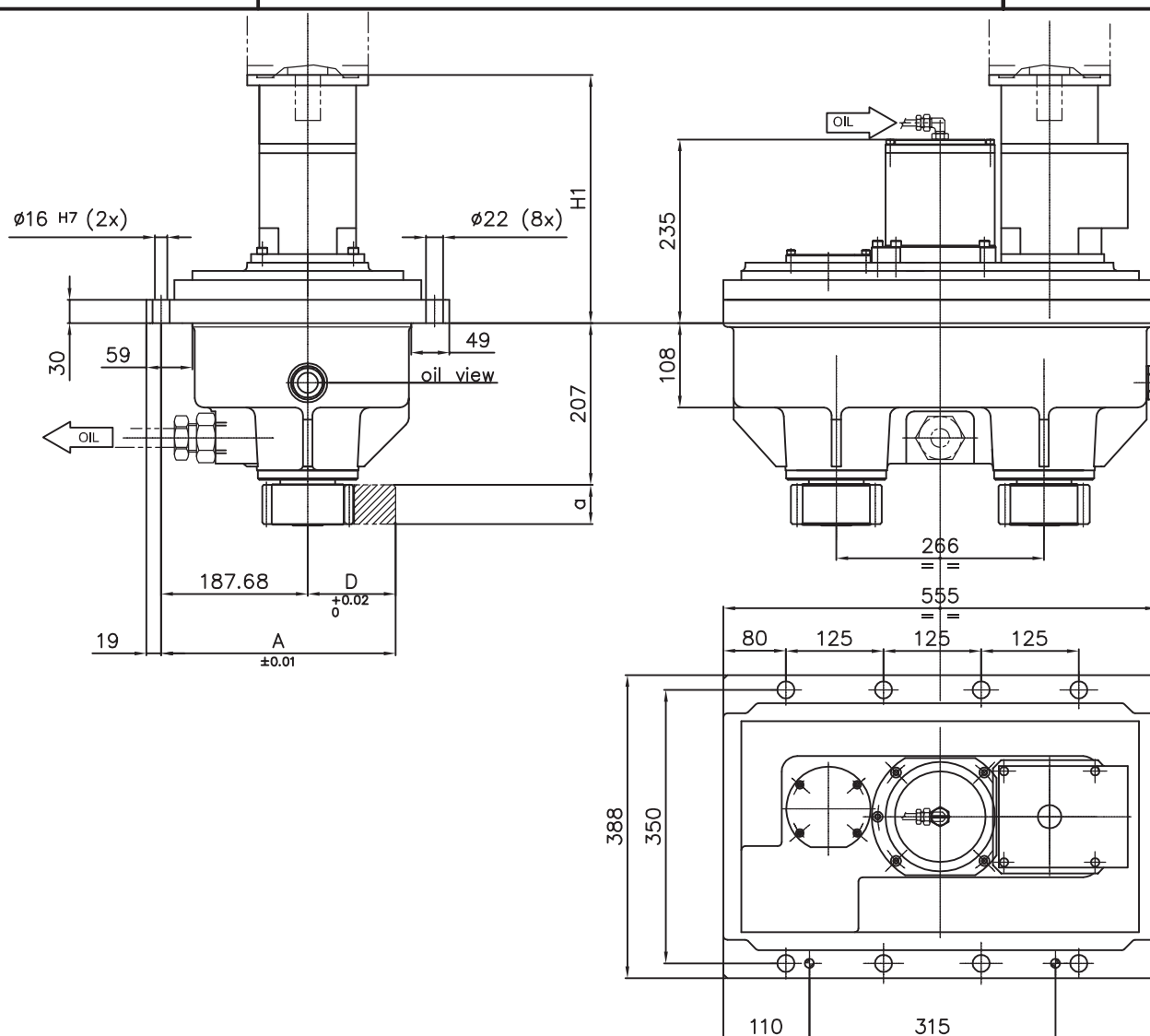
ZERO BACKLASH GEARBOX LIGHT SERIES

VERTICAL MOTOR

RECIRCULATING LUBRICATION

TABLE MTCC

Revision:"00"



Module	Denomination	f	v	t	i	Z	D	A	a	H1	r
5	MTCC-502-DM	1600	12	10	80	20 D	112,32	300	50		
	MTCC-502-DV	1600	18	15	53						
	MTCC-502-EM	1600	12	10	80	18 E	110,07	297,75			
	MTCC-502-EV	1600	18	15	53						
6	MTCC-602-DL	1600	8	7	145	20 D	131,82	319,50	55	337	2
	MTCC-602-DM	1600	12	10	97						
	MTCC-602-DV	1600	18	15	65						
	MTCC-602-EL	1600	8	7	145	18 E	129,11	316,79			
	MTCC-602-EM	1600	12	10	97						
	MTCC-602-EV	1600	18	15	65						
	MTCC-603-DL	3200	8	15	145	20 D	131,82	319,50		380	3
	MTCC-603-DM	3000	12	20	97						
	MTCC-603-EL	3200	8	15	145						
	MTCC-603-EM	3000	12	20	97						

f [daN] = tangential force tooth/rack
 v [m/1'] = max speed to rack
 t [Nm] = input torque motor 3000 r.p.m.
 i = total ratio
 r = size reducer

Z = number teeth pignon
 D = straight teeth (PDR-C-XXX-XX/1X)
 E = helical teeth (PER-C-XXX-XX/1X)

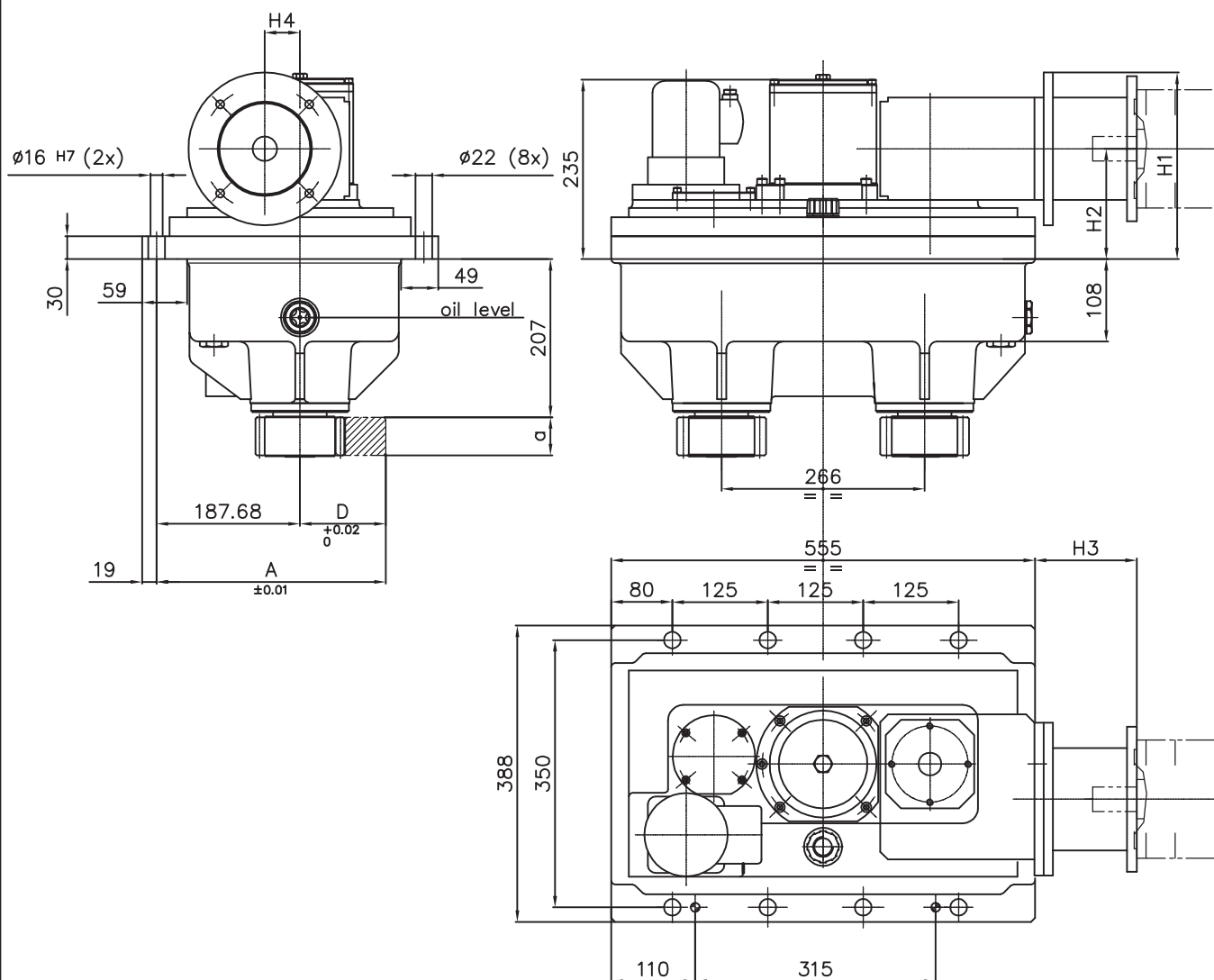


ZERO BACKLASH GEARBOX LIGHT SERIES

HORIZONTAL MOTOR INSIDE LUBRICATION

TABLE MTKA

Revision:"00"



Module	Denomination	f	v	t	i	Z	D	A	a	H1	H2	H3	H4	r					
5	MTKA-502-DM	1600	12	10	80	20 D	112,32	300	50	245	145	135	46	2					
	MTKA-502-DV	1600	18	15	53														
	MTKA-502-EM	1600	12	10	80	18 E	110,07	297,75											
	MTKA-502-EV	1600	18	15	53														
6	MTKA-602-DL	1600	8	7	145	20 D	131,82	319,50	55						250	150	155	52	3
	MTKA-602-DM	1600	12	10	97														
	MTKA-602-DV	1600	18	15	65														
	MTKA-602-EL	1600	8	7	145	18 E	129,11	316,79											
	MTKA-602-EM	1600	12	10	97														
	MTKA-602-EV	1600	18	15	65														
	MTKA-603-DL	3200	8	15	145	20 D	131,82	319,50											
	MTKA-603-DM	3000	12	20	97														
	MTKA-603-EL	3200	8	15	145					18 E	129,11	316,79							
	MTKA-603-EM	3000	12	20	97														

f [daN] = tangential force tooth/rack
v [m/1'] = max speed to rack
t [Nm] = input torque motor 3000 r.p.m.
i = total ratio
r = size reducer

Z = number teeth pignon
D = straight teeth (PDR-C-XXX-XX/1X)
E = helical teeth (PER-C-XXX-XX/1X)

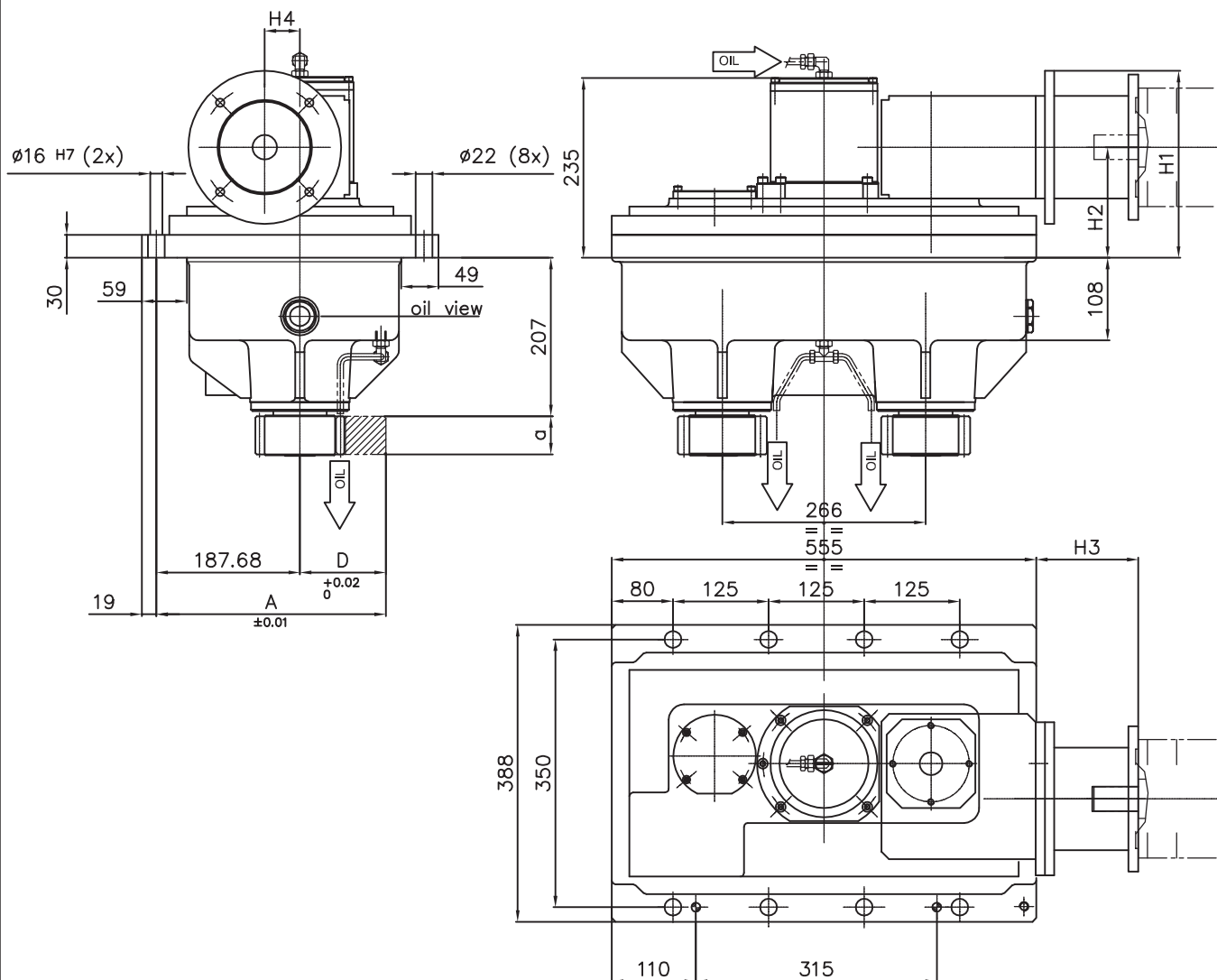


ZERO BACKLASH GEARBOX LIGHT SERIES

HORIZONTAL MOTOR OUTSIDE LUBRICATION

TABLE MTKB

Revision:"00"



Module	Denomination	f	v	t	i	Z	D	A	a	H1	H2	H3	H4	r					
5	MTKB-502-DM	1600	12	10	80	20 D	112,32	300	50	245	145	135	46	2					
	MTKB-502-DV	1600	18	15	53														
	MTKB-502-EM	1600	12	10	80	18 E	110,07	297,75											
	MTKB-502-EV	1600	18	15	53														
6	MTKB-602-DL	1600	8	7	145	20 D	131,82	319,50	55						250	150	155	52	3
	MTKB-602-DM	1600	12	10	97														
	MTKB-602-DV	1600	18	15	65														
	MTKB-602-EL	1600	8	7	145	18 E	129,11	316,79											
	MTKB-602-EM	1600	12	10	97														
	MTKB-602-EV	1600	18	15	65														
	MTKB-603-DL	3200	8	15	145	20 D	131,82	319,50	250	150	155	52	3						
	MTKB-603-DM	3000	12	20	97														
	MTKB-603-EL	3200	8	15	145														
	MTKB-603-EM	3000	12	20	97	18 E	129,11	316,79											

f [daN] = tangential force tooth/rack
v [m/1'] = max speed to rack
t [Nm] = input torque motor 3000 r.p.m.
i = total ratio
r = size reducer

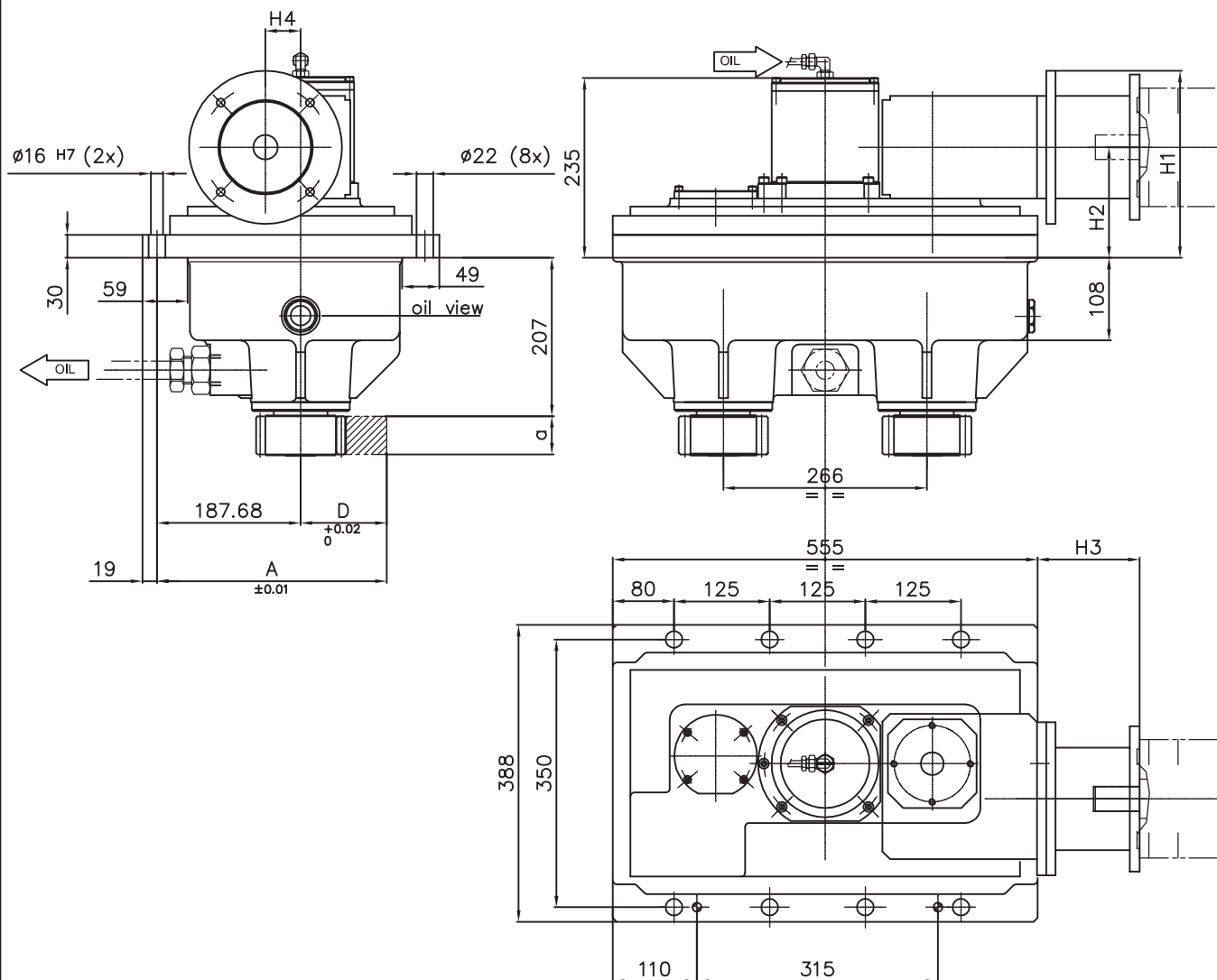
Z = number teeth pignon
D = straight teeth (PDR-C-XXX-XX/1X)
E = helical teeth (PER-C-XXX-XX/1X)



ZERO BACKLASH GEARBOX LIGHT SERIES
HORIZONTAL MOTOR
RECIRCULATING LUBRICATION

TABLE
MTKC

Revision:"00"



Module	Denomination	f	v	t	i	Z	D	A	a	H1	H2	H3	H4	r					
5	MTKC-502-DM	1600	12	10	80	20 D	112,32	300	50	245	145	135	46	2					
	MTKC-502-DV	1600	18	15	53														
	MTKC-502-EM	1600	12	10	80	18 E	110,07	297,75											
	MTKC-502-EV	1600	18	15	53														
6	MTKC-602-DL	1600	8	7	145	20 D	131,82	319,50	55						250	150	155	52	3
	MTKC-602-DM	1600	12	10	97														
	MTKC-602-DV	1600	18	15	65														
	MTKC-602-EL	1600	8	7	145	18 E	129,11	316,79											
	MTKC-602-EM	1600	12	10	97														
	MTKC-602-EV	1600	18	15	65														
	MTKC-603-DL	3200	8	15	145	20 D	131,82	319,50	250	150	155	52	3						
	MTKC-603-DM	3000	12	20	97														
	MTKC-603-EL	3200	8	15	145									18 E	129,11	316,79			
	MTKC-603-EM	3000	12	20	97														

f [daN] = tangential force tooth/rack
v [m/1'] = max speed to rack
t [Nm] = input torque motor 3000 r.p.m.
i = total ratio
r = size reducer

Z = number teeth pignon
D = straight teeth (PDR-C-XXX-XX/1X)
E = helical teeth (PER-C-XXX-XX/1X)

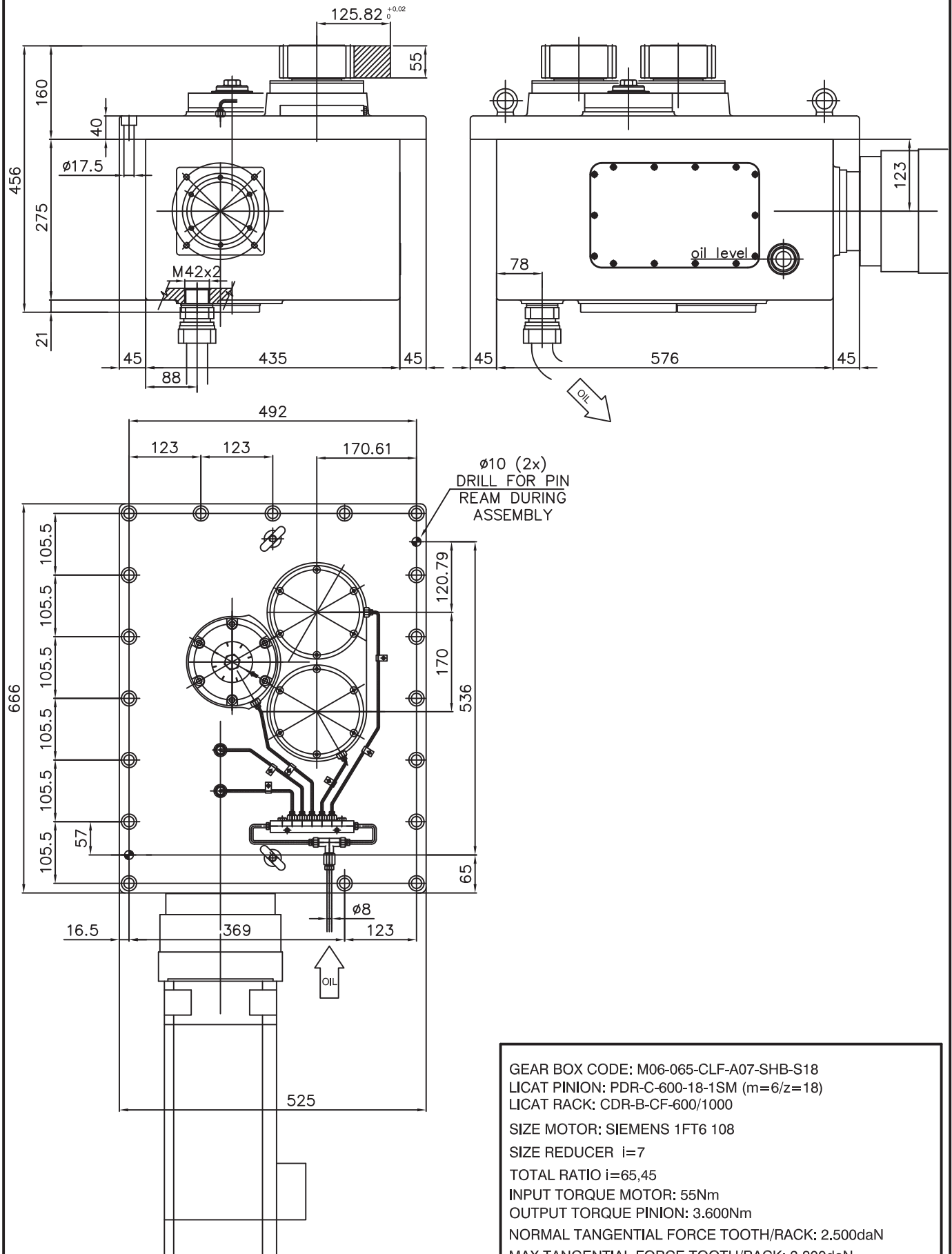


ZERO BACKLASH GEARBOX FOR HEAVY DUTY
HORIZONTAL MOTOR
RECIRCULATING LUBRICATION

TABLE
10015

Revision:"02"

MOBILE SERVICE SCREW VERSION



GEAR BOX CODE: M06-065-CLF-A07-SHB-S18
 LICAT PINION: PDR-C-600-18-1SM ($m=6/z=18$)
 LICAT RACK: CDR-B-CF-600/1000
 SIZE MOTOR: SIEMENS 1FT6 108
 SIZE REDUCER $i=7$
 TOTAL RATIO $i=65,45$
 INPUT TORQUE MOTOR: 55Nm
 OUTPUT TORQUE PINION: 3.600Nm
 NORMAL TANGENTIAL FORCE TOOTH/RACK: 2.500daN
 MAX TANGENTIAL FORCE TOOTH/RACK: 3.800daN
 MAX SPEED MOTOR: 2000rpm
 MAX SPEED TO RACK: 11m/1'

TABLE
10016

Technical drawing of a mechanical assembly, showing two views: a top view and a side view.

Top View Dimensions:

- Overall width: 910
- Overall height: 500
- Internal width segments: 25, 172, 172, 172, 172, 172
- Internal height segments: 145, 265, 265, 109, 81, 59, 109, 379
- Oil level indicator: 77, 60, 60
- Bottom width segments: 50, 477.67, 167.13^{+0.02/0}, 50
- Bottom width segments: 810, 40, 40

Side View Dimensions:

- Overall height: 472
- Overall width: 630
- Internal height segments: 210, 30, 220, 230
- Internal width segments: 276.5, 669.8
- Bottom width segments: 665

Note: ø16 (2x) DRILL FOR PIN REAM DURING ASSEMBLY

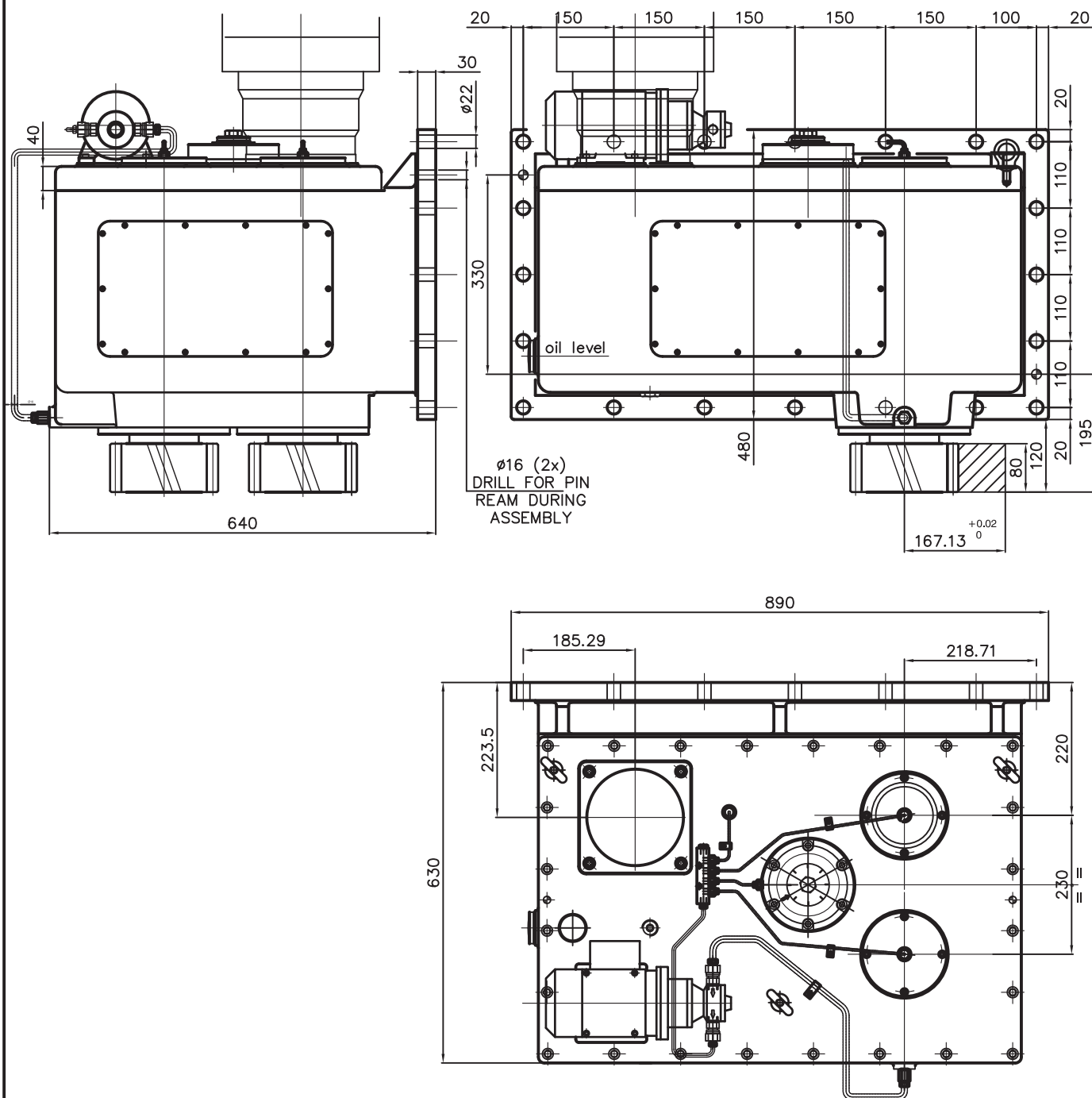
GEAR BOX CODE: M08-082-BRW-S05-XHL-H18
LICAT PINION: PER-C-800-18-1SM ($m=8/z=18$)
LICAT RACK: CER-B-CF-800/1000
SIZE MOTOR: FAGOR FXM77/V type B
SIZE REDUCER $i=5$
TOTAL RATIO $i=82,6$
INPUT TORQUE MOTOR: 74Nm
OUTPUT TORQUE PINION: 6.100Nm
NORMAL TANGENTIAL FORCE TOOTH/RACK: 7.500daN
MAX TANGENTIAL FORCE TOOTH/RACK: 9.500daN
MAX SPEED MOTOR: 2000rpm
MAX SPEED TO RACK: 12,5m/1'



ZERO BACKLASH GEARBOX FOR HEAVY DUTY
 VERTICAL MOTOR
 INSIDE LUBRICATION

TABLE
10017

Revision:"02"



GEAR BOX CODE: M08-060-BLW-S05-SVL-H18 (right)
 LICAT PINION: PER-C-800-18-1SM ($m=8/z=18$)
 LICAT RACK: CER-B-CF-800/1000
 SIZE MOTOR: SIEMENS 1FT6 136
 SIZE REDUCER $i=5$
 TOTAL RATIO $i=59,37$
 INPUT TORQUE MOTOR: 74Nm
 OUTPUT TORQUE PINION: 4.400Nm
 NORMAL TANGENTIAL FORCE TOOTH/RACK: 6.500daN
 MAX TANGENTIAL FORCE TOOTH/RACK: 10.000daN
 MAX SPEED MOTOR: 2000rpm
 MAX SPEED TO RACK: 17m/1'



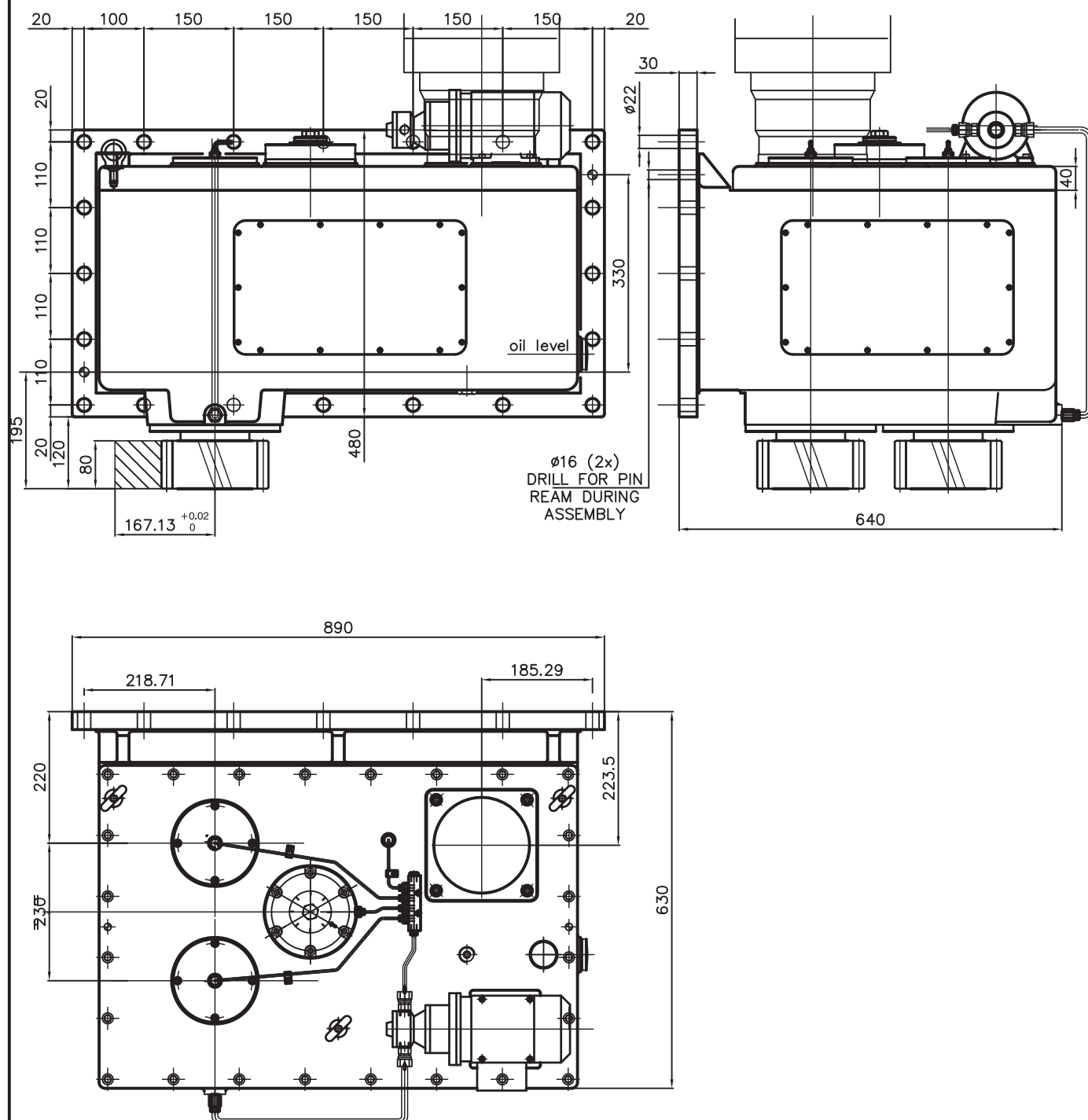
ZERO BACKLASH GEARBOX FOR HEAVY DUTY

VERTICAL MOTOR

INSIDE LUBRICATION

TABLE
10018

Revision:"02"



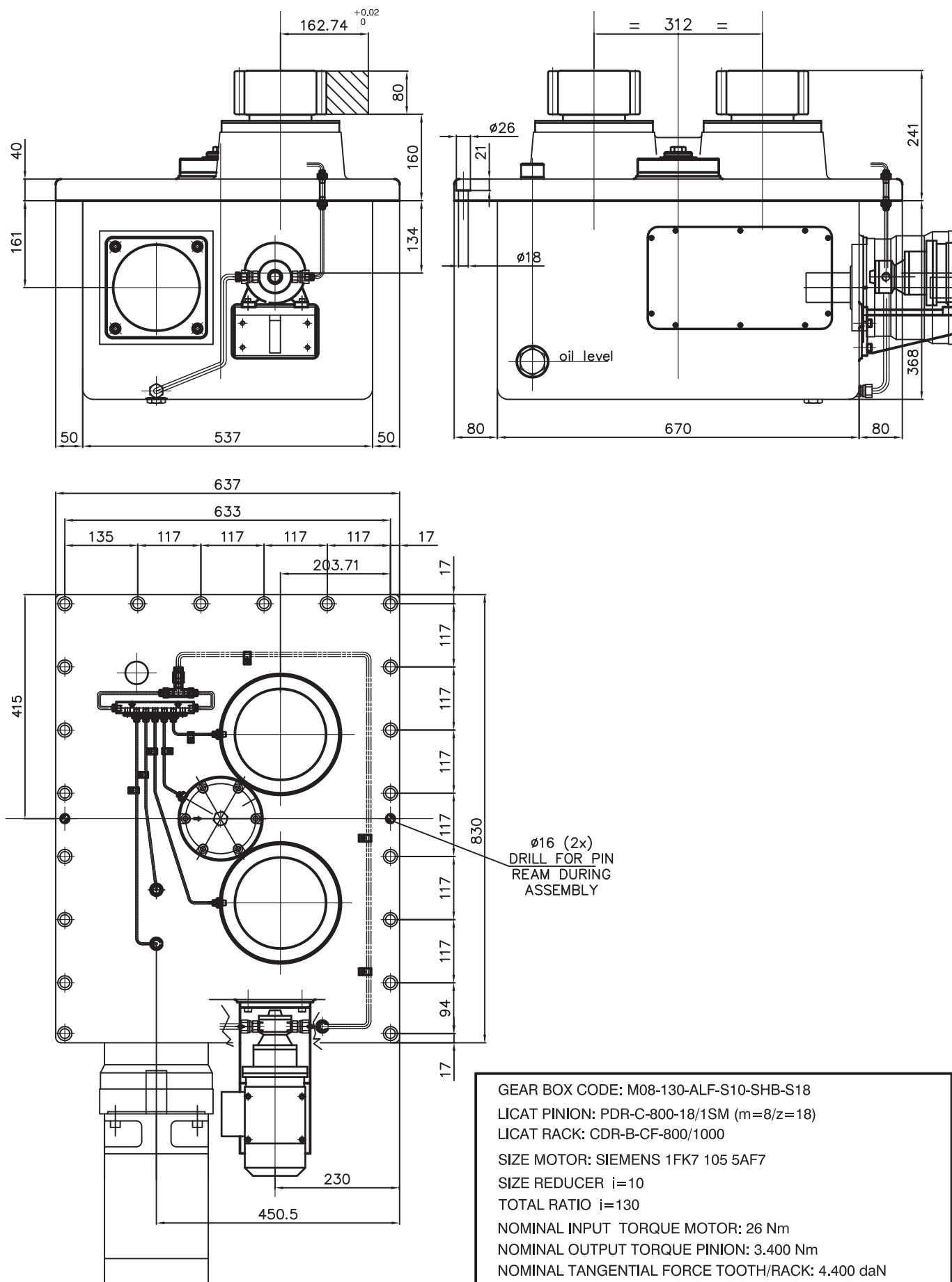
GEAR BOX CODE: M08-060-BRW-S05-SVR-H18 (left)
 LICAT PINION: PER-C-800-18-1SM ($m=8/z=18$)
 LICAT RACK: CER-B-CF-800/1000
 SIZE MOTOR: SIEMENS 1FT6 136
 SIZE REDUCER $i=5$
 TOTAL RATIO $i=59,37$
 INPUT TORQUE MOTOR: 74Nm
 OUTPUT TORQUE PINION: 4.400Nm
 NORMAL TANGENTIAL FORCE TOOTH/RACK: 6.500daN
 MAX TANGENTIAL FORCE TOOTH/RACK: 10.000daN
 MAX SPEED MOTOR: 2000rpm
 MAX SPEED TO RACK: 17m/1'



ZERO BACKLASH GEARBOX FOR HEAVY DUTY **HORIZONTAL MOTOR** **INSIDE LUBRICATION**

TABLE
10019

Revision: "00"



GEAR BOX CODE: M08-130-ALF-S10-SHB-S18

LICAT PINION: PDR-C-800-18/1SM ($m=8/z=18$)

LICAT RACK: CDR-B-CF-800/1000

SIZE MOTOR: SIEMENS 1FK7 105 5AF7

SIZE REDUCER $i=10$

TOTAL RATIO $i=130$

NOMINAL INPUT TORQUE MOTOR: 26 Nm

NOMINAL OUTPUT TORQUE PINION: 3.400 Nm

NOMINAL TANGENTIAL FORCE TOOTH/RACK: 4.400 daN

MAX TANGENTIAL FORCE TOOTH/RACK: 7.100 daN

MAX SPEED MOTOR: 3000rpm

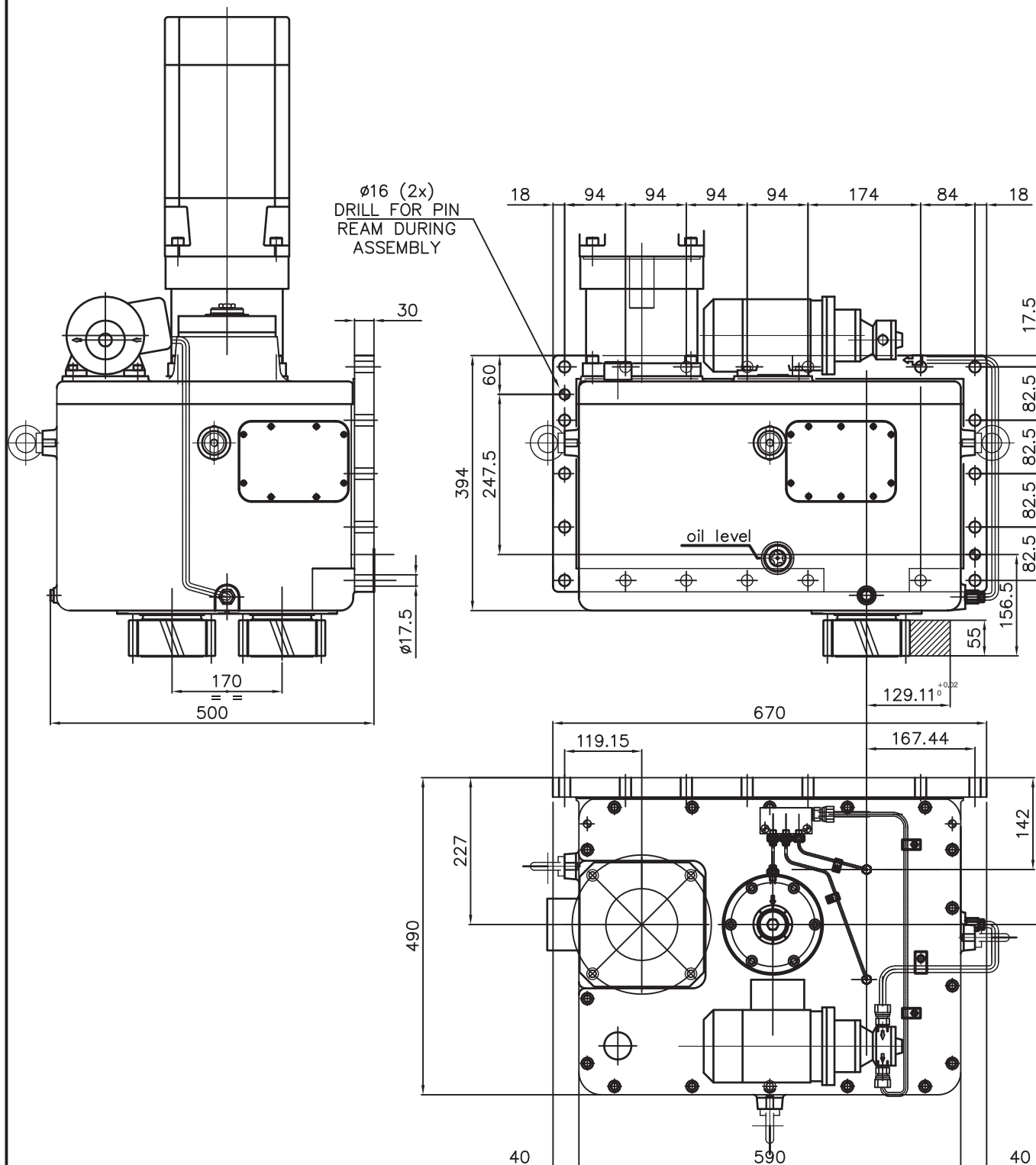
MAX SPEED TO RACK: 11m/1'



ZERO BACKLASH GEARBOX FOR HEAVY DUTY

VERTICAL MOTOR INSIDE LUBRICATION

TABLE
10020
Revision:"03"



GEAR BOX CODE: M06-037-BLW-S07-SVL-H18

LICAT PINION: PER-C-600-18-1SM (m=6/z=18)

LICAT RACK: CER-B-CF-600/1000

SIZE MOTOR: SIEMENS 1FT6 105

SIZE REDUCER i=7

TOTAL RATIO i=37,1

NOMINAL INPUT TORQUE MOTOR: 38Nm

NOMINAL OUTPUT TORQUE PINION: 1.400Nm

NORMAL TANGENTIAL FORCE TOOTH/RACK: 3.300daN

MAX TANGENTIAL FORCE TOOTH/RACK: 5.000daN

MAX SPEED MOTOR: 2000rpm

MAX SPEED TO RACK: 20,5m/1'

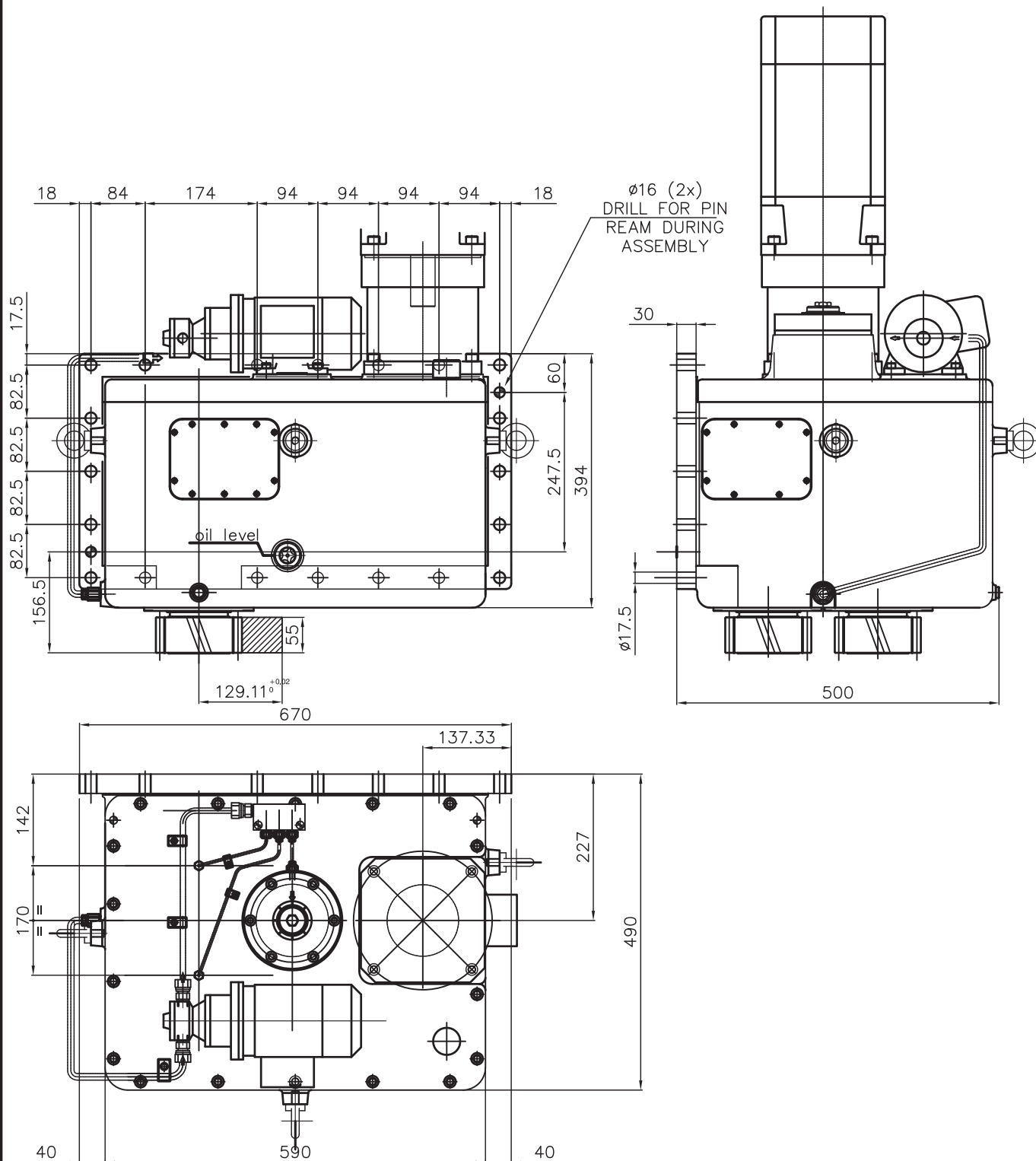


ZERO BACKLASH GEARBOX FOR HEAVY DUTY

VERTICAL MOTOR INSIDE LUBRICATION

TABLE
10021

Revision:"03"



GEAR BOX CODE: M06-037-BLW-S07-SVR-H18

LICAT PINION: PER-C-600-18-1SM ($m=6/z=18$)

LICAT RACK: CER-B-CF-600/1000

SIZE MOTOR: SIEMENS 1FT6 105

SIZE REDUCER $i=7$

TOTAL RATIO $i=37,1$

NOMINAL INPUT TORQUE MOTOR: 38Nm

NOMINAL OUTPUT TORQUE PINION: 1.400Nm

NORMAL TANGENTIAL FORCE TOOTH/RACK: 3.300daN

MAX TANGENTIAL FORCE TOOTH/RACK: 5.000daN

MAX SPEED MOTOR: 2000rpm

MAX SPEED TO RACK: 20,5m/1'



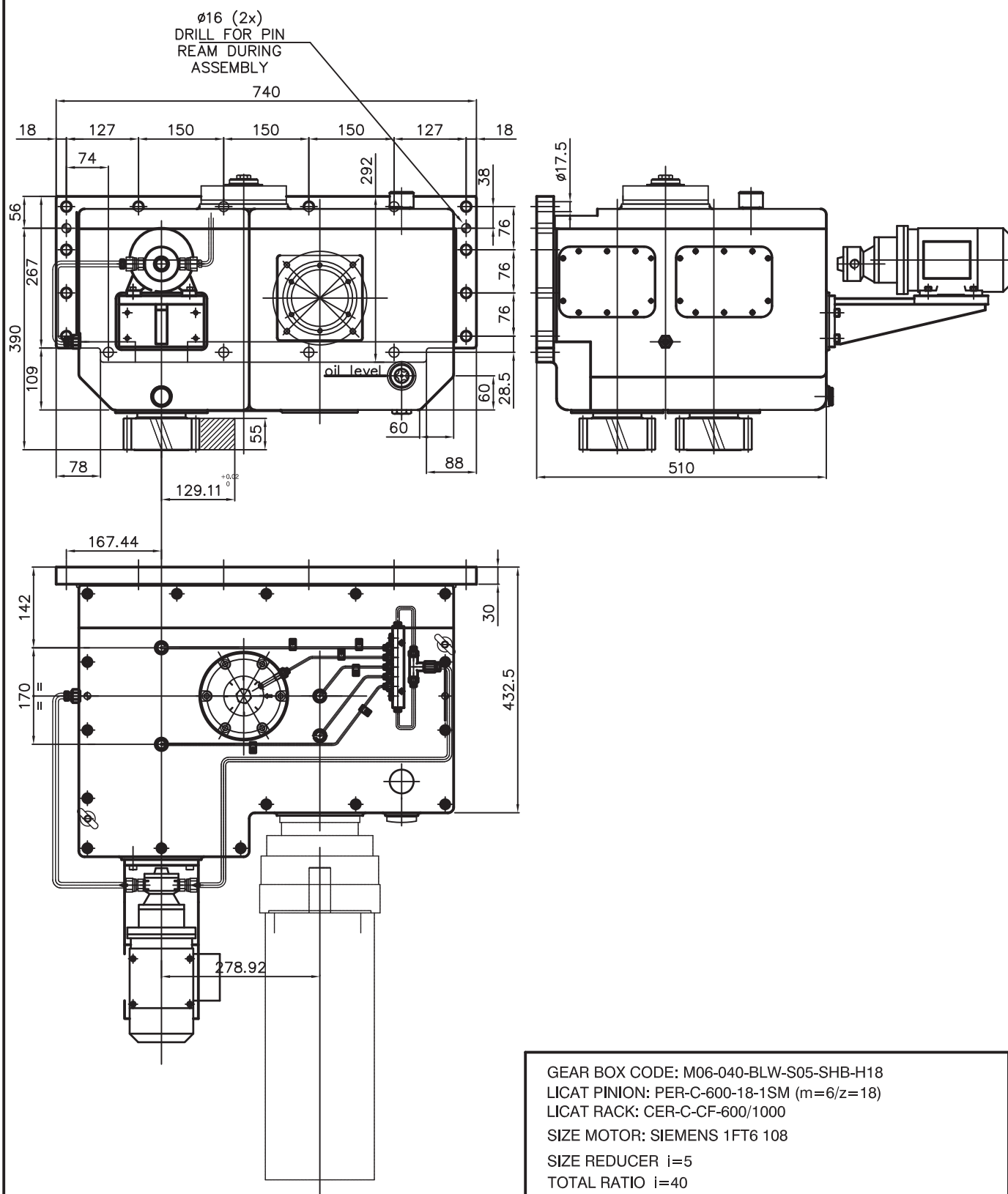
ZERO BACKLASH GEARBOX FOR HEAVY DUTY

HORIZONTAL MOTOR

INSIDE LUBRICATION

TABLE
10022

Revision:"02"



GEAR BOX CODE: M06-040-BLW-S05-SHB-H18

LICAT PINION: PER-C-600-18-1SM ($m=6/z=18$)

LICAT RACK: CER-C-CF-600/1000

SIZE MOTOR: SIEMENS 1FT6 108

SIZE REDUCER $i=5$

TOTAL RATIO $i=40$

INPUT TORQUE MOTOR: 55Nm

OUTPUT TORQUE PINION: 2.200Nm

NORMAL TANGENTIAL FORCE TOOTH/RACK: 5.500daN

MAX TANGENTIAL FORCE TOOTH/RACK: 8.000daN

MAX SPEED MOTOR: 2000rpm

MAX SPEED TO RACK: 19m/1'



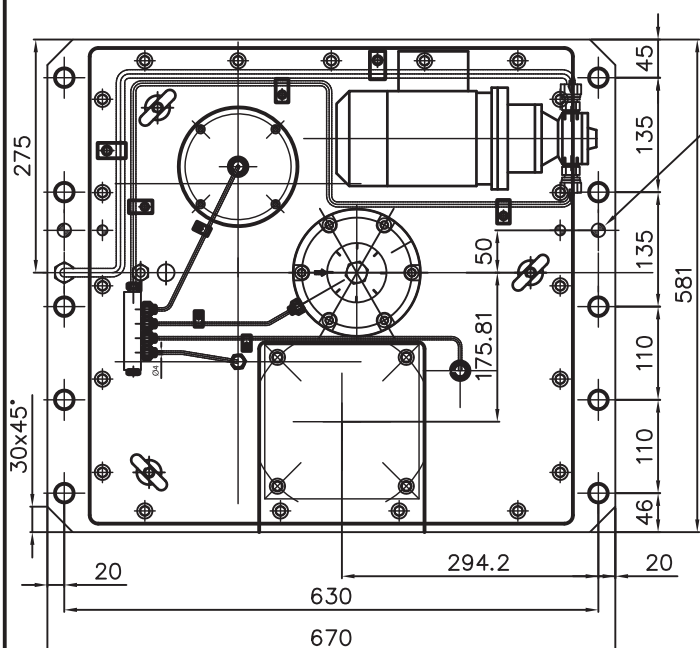
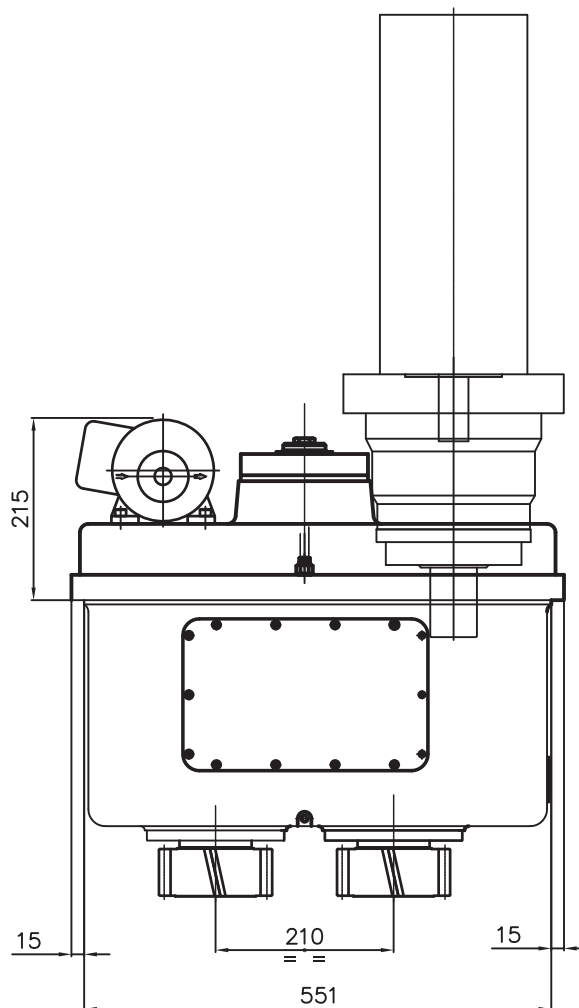
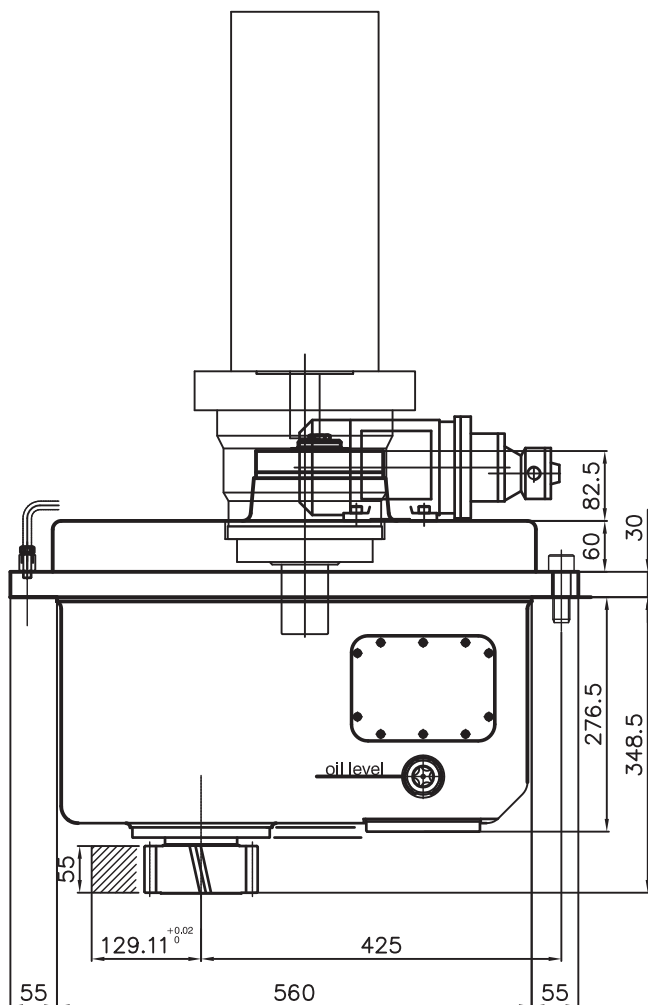
ZERO BACKLASH GEARBOX FOR HEAVY DUTY

VERTICAL MOTOR

INSIDE LUBRICATION

TABLE
10023

Revision:"02"



GEAR BOX CODE: M06-100-BRF-S10-FVB-H18
 LICAT PINION: PER-C-600-18-1SM ($m=6/z=18$)
 LICAT RACK: CER-B-CF-600/1000
 SIZE MOTOR: FANUC MODEL ALPHA 40 i
 SIZE REDUCER $i=10$
 TOTAL RATIO $i=100$
 NOMINAL INPUT TORQUE MOTOR: 40Nm
 NOMINAL OUTPUT TORQUE PINION: 4.000Nm
 NORMAL TANGENTIAL FORCE TOOTH/RACK: 3.300daN
 MAX TANGENTIAL FORCE TOOTH/RACK: 5.000daN
 MAX SPEED MOTOR: 3000rpm
 MAX SPEED TO RACK: 11,4m/1'



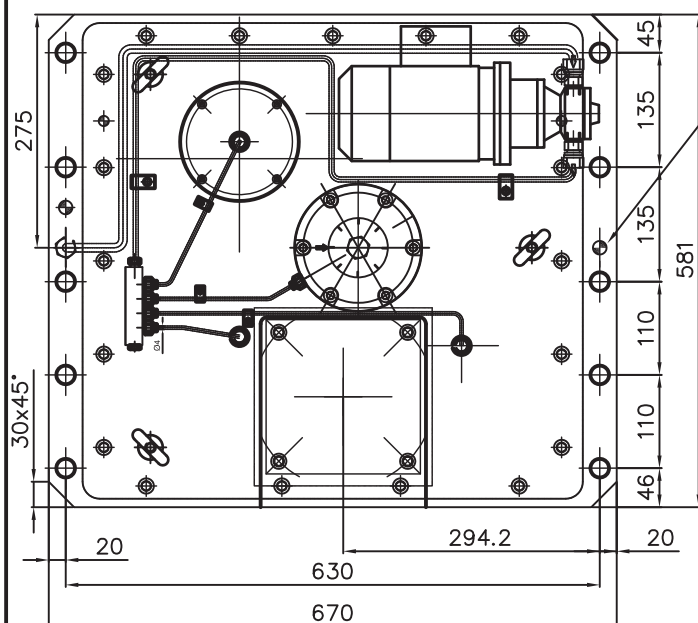
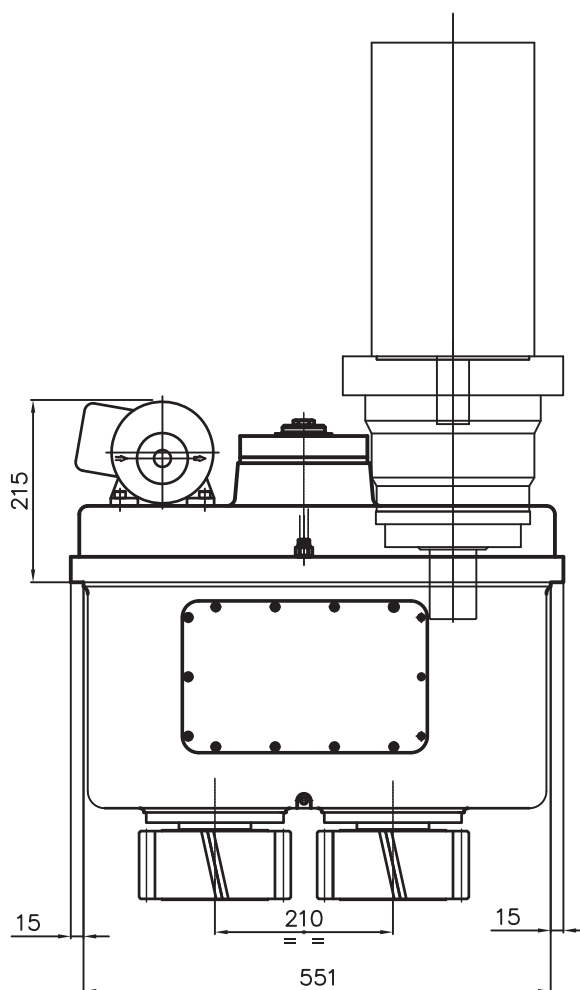
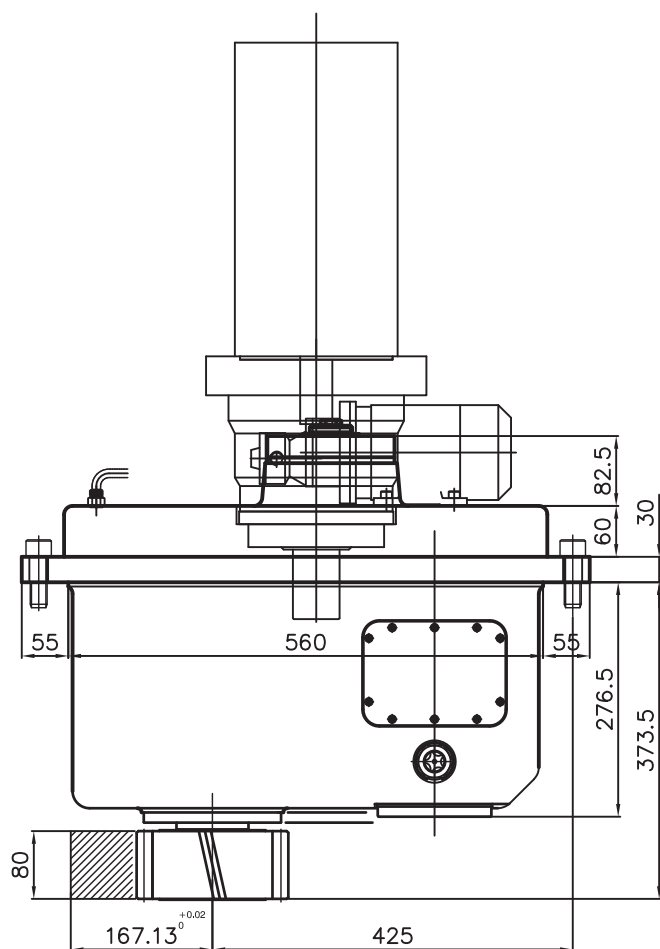
ZERO BACKLASH GEARBOX FOR HEAVY DUTY

VERTICAL MOTOR

INSIDE LUBRICATION

TABLE
10024

Revision:"02"



Ø12 (2x)
DRILL FOR PIN
REAM DURING
ASSEMBLY

GEAR BOX CODE: M08-100-BRF-S10-SVB-H18
LICAT PINION: PER-C-800-18-1SM ($m=8/z=18$)
LICAT RACK: CER-B-CF-800/1000
SIZE MOTOR: SIEMENS 1FT6 105
SIZE REDUCER $i=10$
TOTAL RATIO $i=100$
NOMINAL INPUT TORQUE MOTOR: 40Nm
NOMINAL OUTPUT TORQUE PINION: 4.000Nm
NORMAL TANGENTIAL FORCE TOOTH/RACK: 6.500daN
MAX TANGENTIAL FORCE TOOTH/RACK: 10.000daN
MAX SPEED MOTOR: 2000rpm
MAX SPEED TO RACK: 10m/1'

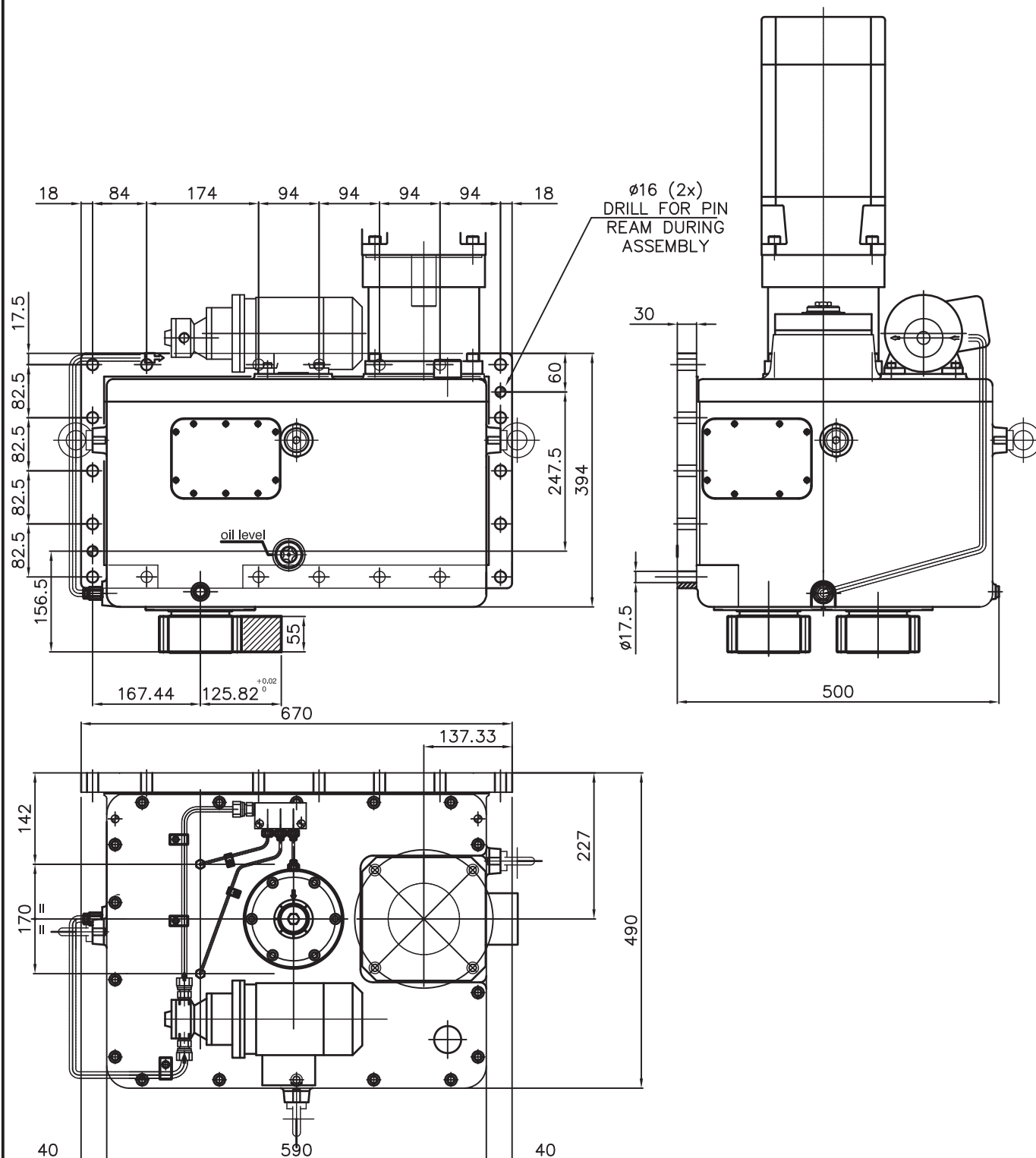


ZERO BACKLASH GEARBOX FOR HEAVY DUTY

VERTICAL MOTOR
INSIDE LUBRICATION

TABLE
10025

Revision:"02"



GEAR BOX CODE: M06-037-BLW-S07-SVR-S18
 LICAT PINION: PDR-C-600-18-1SM ($m=6/z=18$)
 LICAT RACK: CDR-B-CF-600/1000
 SIZE MOTOR: SIEMENS 1FT6 105
 SIZE REDUCER $i=7$
 TOTAL RATIO $i=37,1$
 NOMINAL INPUT TORQUE MOTOR: 38Nm
 NOMINAL OUTPUT TORQUE PINION: 1.400Nm
 NORMAL TANGENTIAL FORCE TOOTH/RACK: 2.500daN
 MAX TANGENTIAL FORCE TOOTH/RACK: 3.800daN
 MAX SPEED MOTOR: 2000rpm
 MAX SPEED TO RACK: 20m/1'

GEAR BOX CODE: M06-065-CLF-A07-SHB-S18
LICAT PINION: PDR-C-600-18-1SM ($m=6/z=18$)
LICAT RACK: CDR-B-CF-600/1000
SIZE MOTOR: SIEMENS 1FT6 108
SIZE REDUCER $i=7$
TOTAL RATIO $i=65,45$
INPUT TORQUE MOTOR: 55Nm
OUTPUT TORQUE PINION: 3.600Nm
NORMAL TANGENTIAL FORCE TOOTH/RACK: 2.500daN
MAX TANGENTIAL FORCE TOOTH/RACK: 3.800daN
MAX SPEED MOTOR: 2000rpm
MAX SPEED TO RACK: 11m/1'

TABLE
10027
Revision:"01"

Technical drawing of a gear box assembly showing three views: front, side, and top. The drawing includes various dimensions and specifications for the assembly.

Dimensions (mm):

- Overall width: 492
- Overall height: 666
- Motor width: 123
- Gear box width: 170.61
- Motor height: 160
- Gear box height: 123
- Motor pinion diameter: 125.82
- Motor pinion pitch diameter: 125.82
- Motor pinion addendum: 13
- Motor pinion dedendum: 55
- Motor pinion throat radius: 40
- Motor pinion hole diameter: 17.5
- Motor pinion hole position: 21
- Motor pinion hole diameter: 45
- Motor pinion hole position: 45
- Motor pinion hole diameter: 88
- Motor pinion hole position: 435
- Motor pinion hole diameter: 45
- Motor pinion hole position: 45
- Motor pinion hole diameter: 78
- Motor pinion hole position: 576
- Motor pinion hole diameter: 45
- Motor pinion hole position: 45
- Motor pinion hole diameter: 123
- Motor pinion hole position: 123
- Motor pinion hole diameter: 170.61
- Motor pinion hole position: 170.61
- Motor pinion hole diameter: 120.79
- Motor pinion hole position: 120.79
- Motor pinion hole diameter: 170
- Motor pinion hole position: 170
- Motor pinion hole diameter: 536
- Motor pinion hole position: 536
- Motor pinion hole diameter: 65
- Motor pinion hole position: 65
- Motor pinion hole diameter: 16.5
- Motor pinion hole position: 16.5
- Motor pinion hole diameter: 369
- Motor pinion hole position: 369
- Motor pinion hole diameter: 123
- Motor pinion hole position: 123
- Motor pinion hole diameter: 164.91
- Motor pinion hole position: 164.91
- Motor pinion hole diameter: 525
- Motor pinion hole position: 525

Notes:

- Ø10 (2x) DRILL FOR PIN REAM DURING ASSEMBLY
- OIL

Specifications:

- GEAR BOX CODE: M06-065-CRF-A07-SHB-S18
- LICAT PINION: PDR-C-600-18-1SM ($m=6/z=18$)
- LICAT RACK: CDR-B-CF-600/1000
- SIZE MOTOR: SIEMENS 1FT6 108
- SIZE REDUCER $i=7$
- TOTAL RATIO $i=65,45$
- INPUT TORQUE MOTOR: 55Nm
- OUTPUT TORQUE PINION: 3.600Nm
- NORMAL TANGENTIAL FORCE TOOTH/RACK: 2.500daN
- MAX TANGENTIAL FORCE TOOTH/RACK: 3.800daN

GEAR BOX CODE: M06-065-CRF-A07-SHB-S18
LICAT PINION: PDR-C-600-18-1SM ($m=6/z=18$)
LICAT RACK: CDR-B-CF-600/1000
SIZE MOTOR: SIEMENS 1FT6 108
SIZE REDUCER $i=7$
TOTAL RATIO $i=65,45$
INPUT TORQUE MOTOR: 55Nm
OUTPUT TORQUE PINION: 3.600Nm
NORMAL TANGENTIAL FORCE TOOTH/RACK: 2.500daN
MAX TANGENTIAL FORCE TOOTH/RACK: 3.800daN
MAX SPEED MOTOR: 2000rpm
MAX SPEED TO RACK: 11m/1'



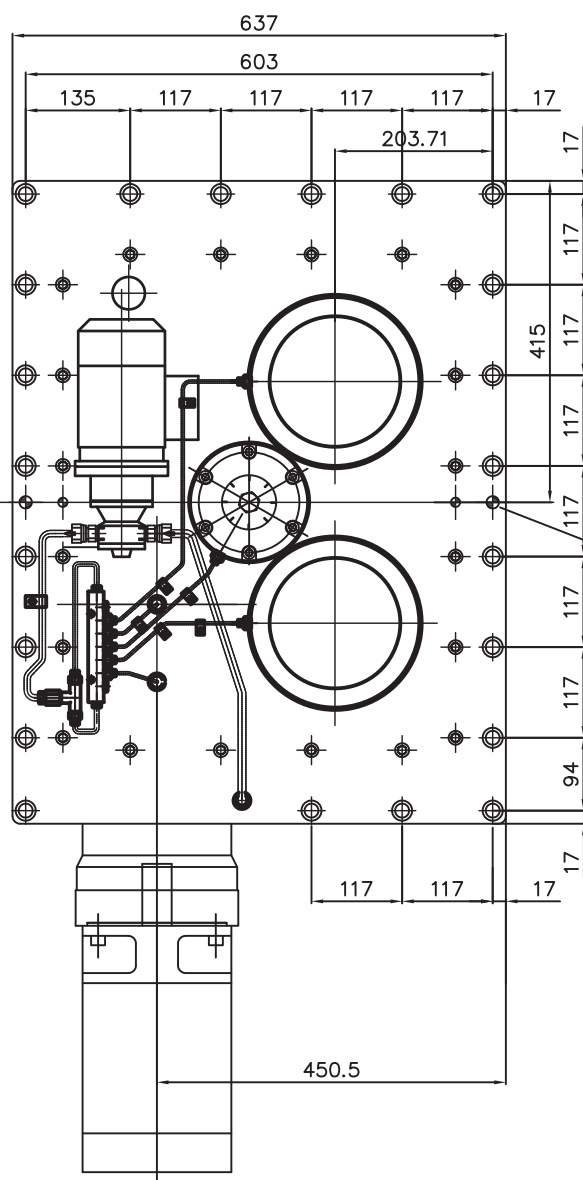
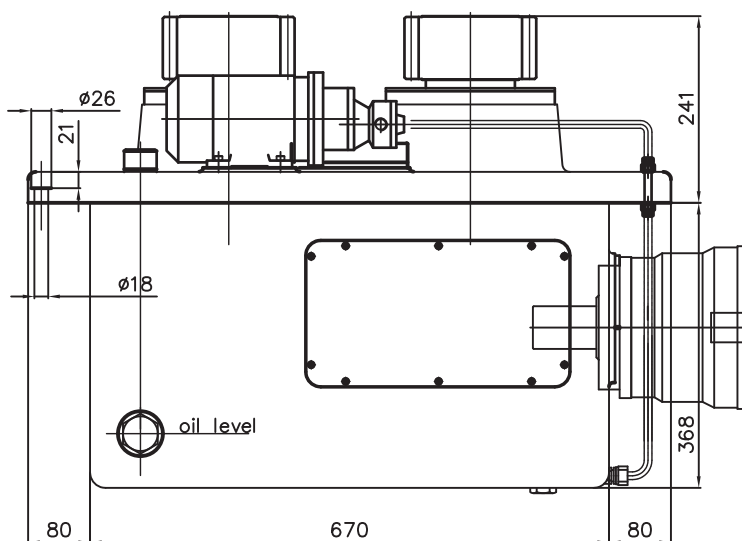
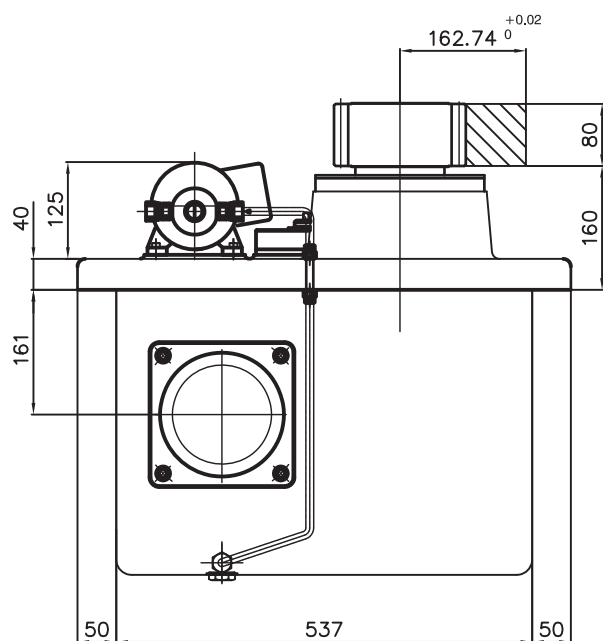
ZERO BACKLASH GEARBOX FOR HEAVY DUTY

HORIZONTAL MOTOR

INSIDE LUBRICATION

TABLE
10028

Revision:"00"



Ø12 (2x)
DRILL FOR PIN
REAM DURING
ASSEMBLY

GEAR BOX CODE: M08-130-ALF-S10-SHB-S18
LICAT PINION: PDR-C-800-18/1SM ($m=8/z=18$)
LICAT RACK: CDR-B-CF-800/1000
SIZE MOTOR: SIEMENS 1FK7 105 5AF7
SIZE REDUCER $i=10$
TOTAL RATIO $i=130$
NOMINAL INPUT TORQUE MOTOR: 26 Nm
NOMINAL OUTPUT TORQUE PINION: 3.400 Nm
NOMINAL TANGENTIAL FORCE TOOTH/RACK: 4.400 daN
MAX TANGENTIAL FORCE TOOTH/RACK: 7.100 daN
MAX SPEED MOTOR: 3000rpm
MAX SPEED TO RACK: 11m/1'



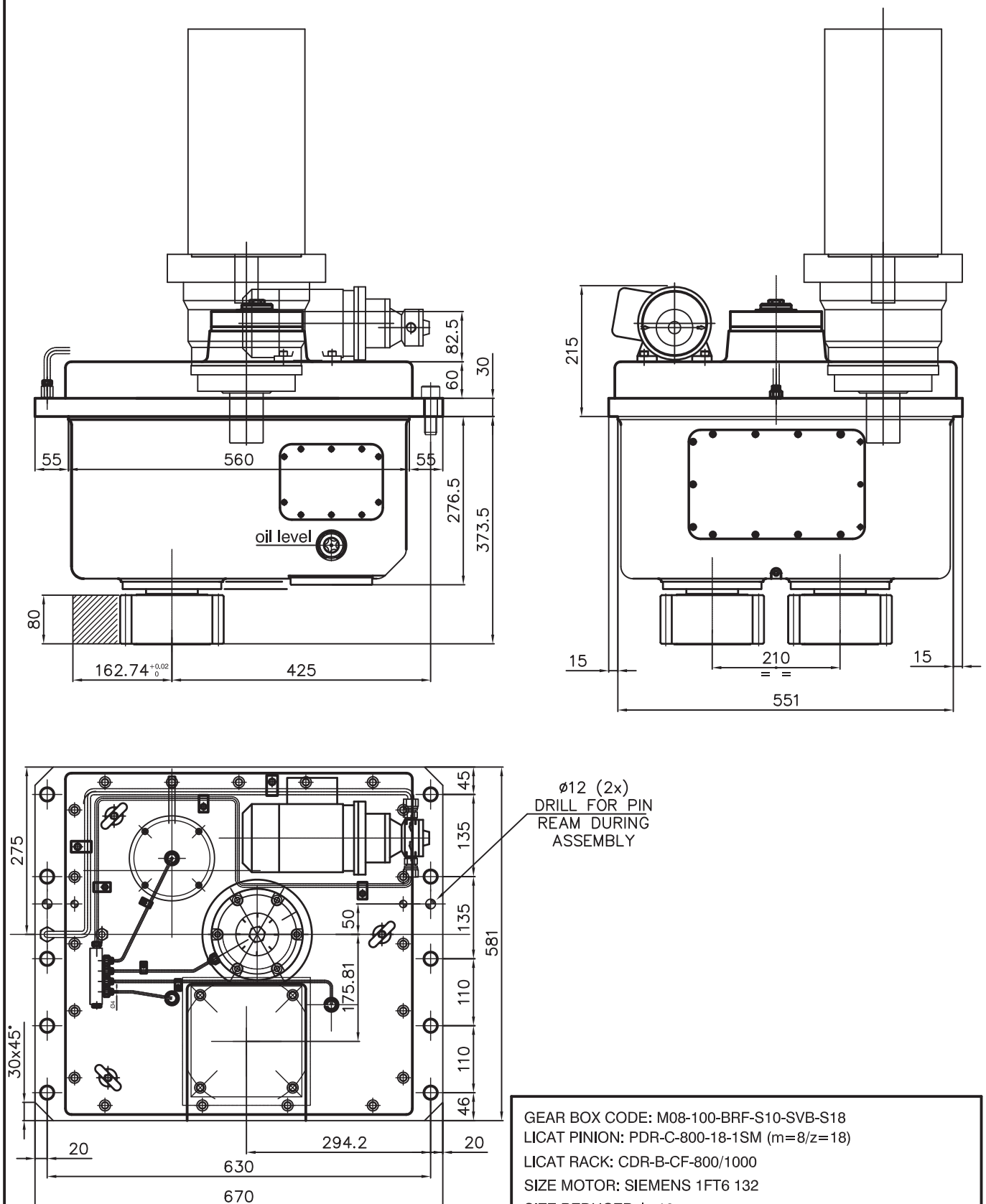
ZERO BACKLASH GEARBOX FOR HEAVY DUTY

VERTICAL MOTOR

INSIDE LUBRICATION

TABLE
10029

Revision:"02"



GEAR BOX CODE: M08-100-BRF-S10-SVB-S18
 LICAT PINION: PDR-C-800-18-1SM ($m=8/z=18$)
 LICAT RACK: CDR-B-CF-800/1000
 SIZE MOTOR: SIEMENS 1FT6 132
 SIZE REDUCER $i=10$
 TOTAL RATIO $i=100$
 NOMINAL INPUT TORQUE MOTOR: 55Nm
 NOMINAL OUTPUT TORQUE PINION: 3.400Nm
 NORMAL TANGENTIAL FORCE TOOTH/RACK: 4.400daN
 MAX TANGENTIAL FORCE TOOTH/RACK: 7.100daN
 MAX SPEED MOTOR: 2000rpm
 MAX SPEED TO RACK: 10m/1'

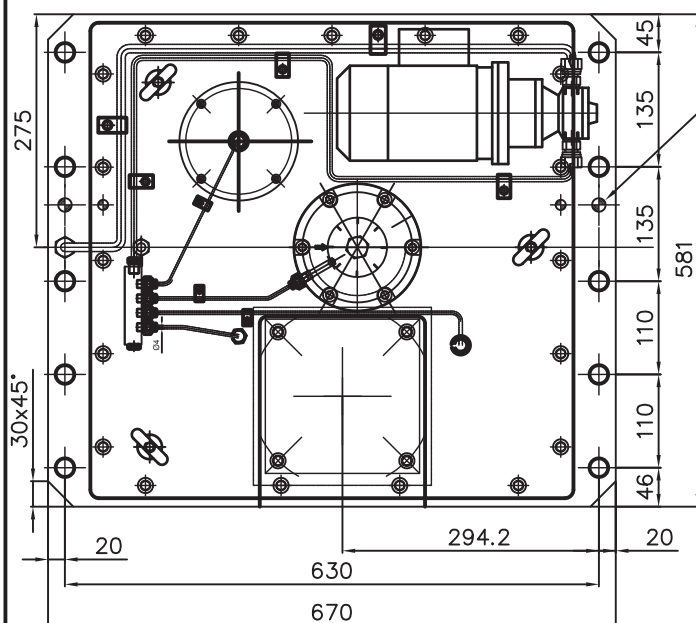
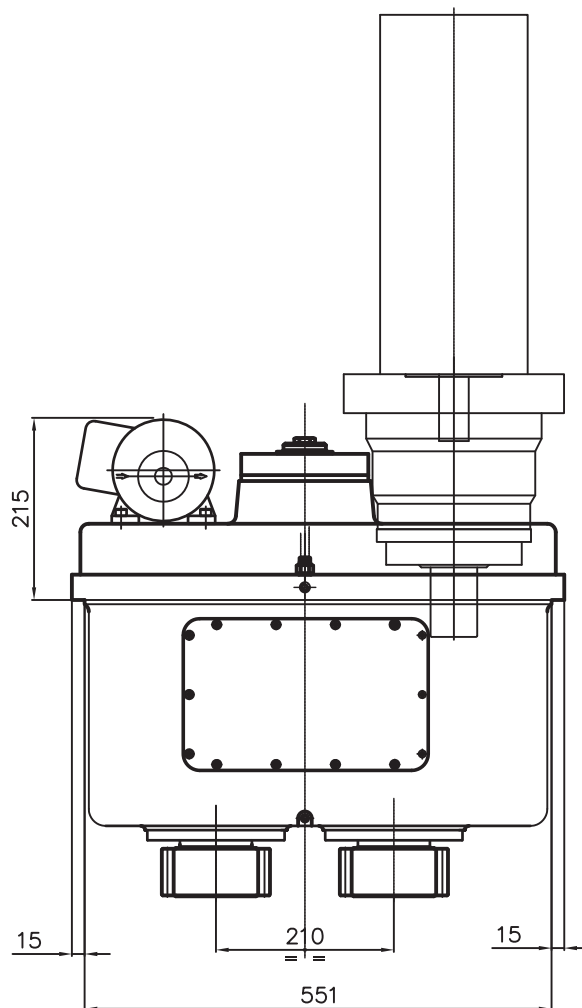
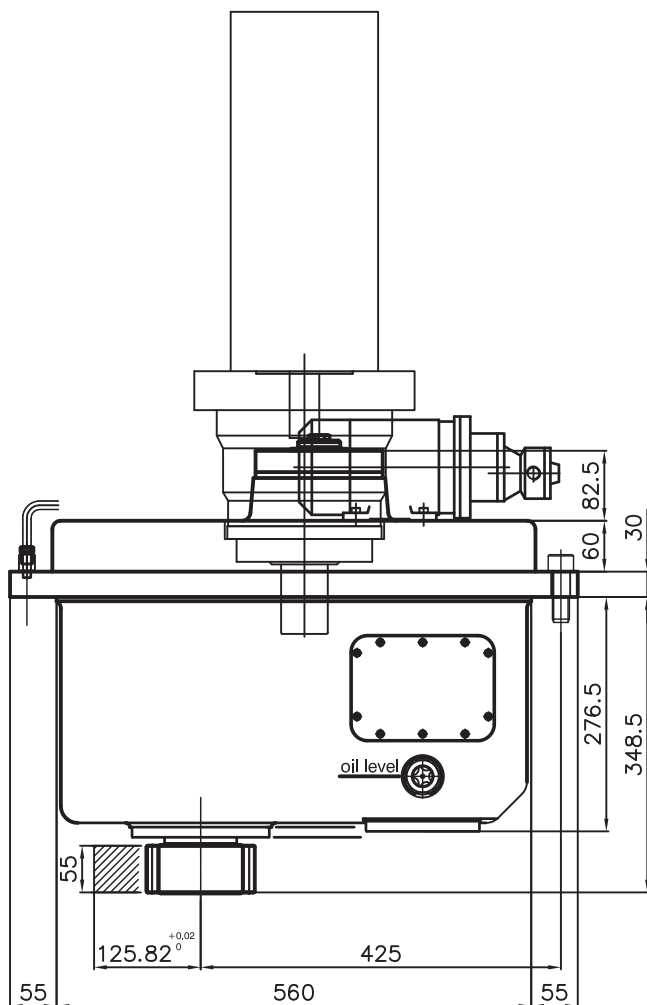


ZERO BACKLASH GEARBOX FOR HEAVY DUTY

VERTICAL MOTOR

INSIDE LUBRICATION

TABLE
10030
Revision:"03"



ø12 (2x)
DRILL FOR PIN
REAM DURING
ASSEMBLY

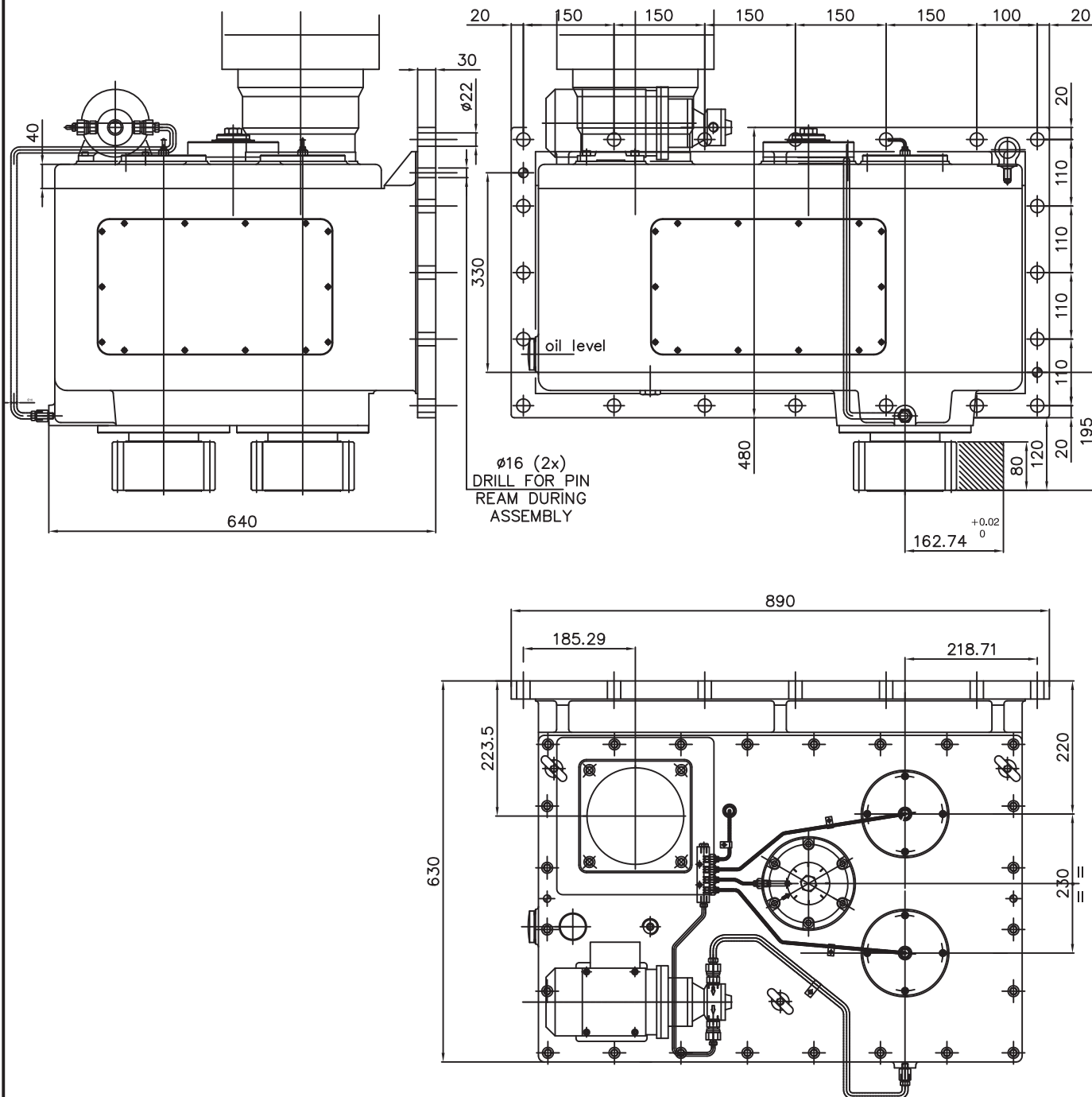
GEAR BOX CODE: M06-100-BRF-S10-FVB-S18
LICAT PINION: PDR-C-600-18-1SM ($m=6/z=18$)
LICAT RACK: CDR-B-CF-600/1000
SIZE MOTOR: FANUC MODEL ALPHA 40i
SIZE REDUCER $i=10$
TOTAL RATIO $i=100$
NOMINAL INPUT TORQUE MOTOR: 40Nm
NOMINAL OUTPUT TORQUE PINION: 4.000Nm
NORMAL TANGENTIAL FORCE TOOTH/RACK: 2.500daN
MAX TANGENTIAL FORCE TOOTH/RACK: 3.800daN
MAX SPEED MOTOR: 3000rpm
MAX SPEED TO RACK: 11,4m/1'



ZERO BACKLASH GEARBOX FOR HEAVY DUTY VERTICAL MOTOR INSIDE LUBRICATION

TABLE
10031

Revision:"01"



GEAR BOX CODE: M08-060-BLW-S05-SVL-S18
LICAT PINION: PDR-C-800-18-1SM ($m=8/z=18$)
LICAT RACK: CDR-B-CF-800/1000
SIZE MOTOR: SIEMENS 1FT6 136
SIZE REDUCER $i=5$
TOTAL RATIO $i=59,37$
INPUT TORQUE MOTOR: 74Nm
OUTPUT TORQUE PINION: 4.400Nm
NORMAL TANGENTIAL FORCE TOOTH/RACK: 5.500daN
MAX TANGENTIAL FORCE TOOTH/RACK: 8.500daN
MAX SPEED MOTOR: 2000rpm
MAX SPEED TO RACK: 17m/1'



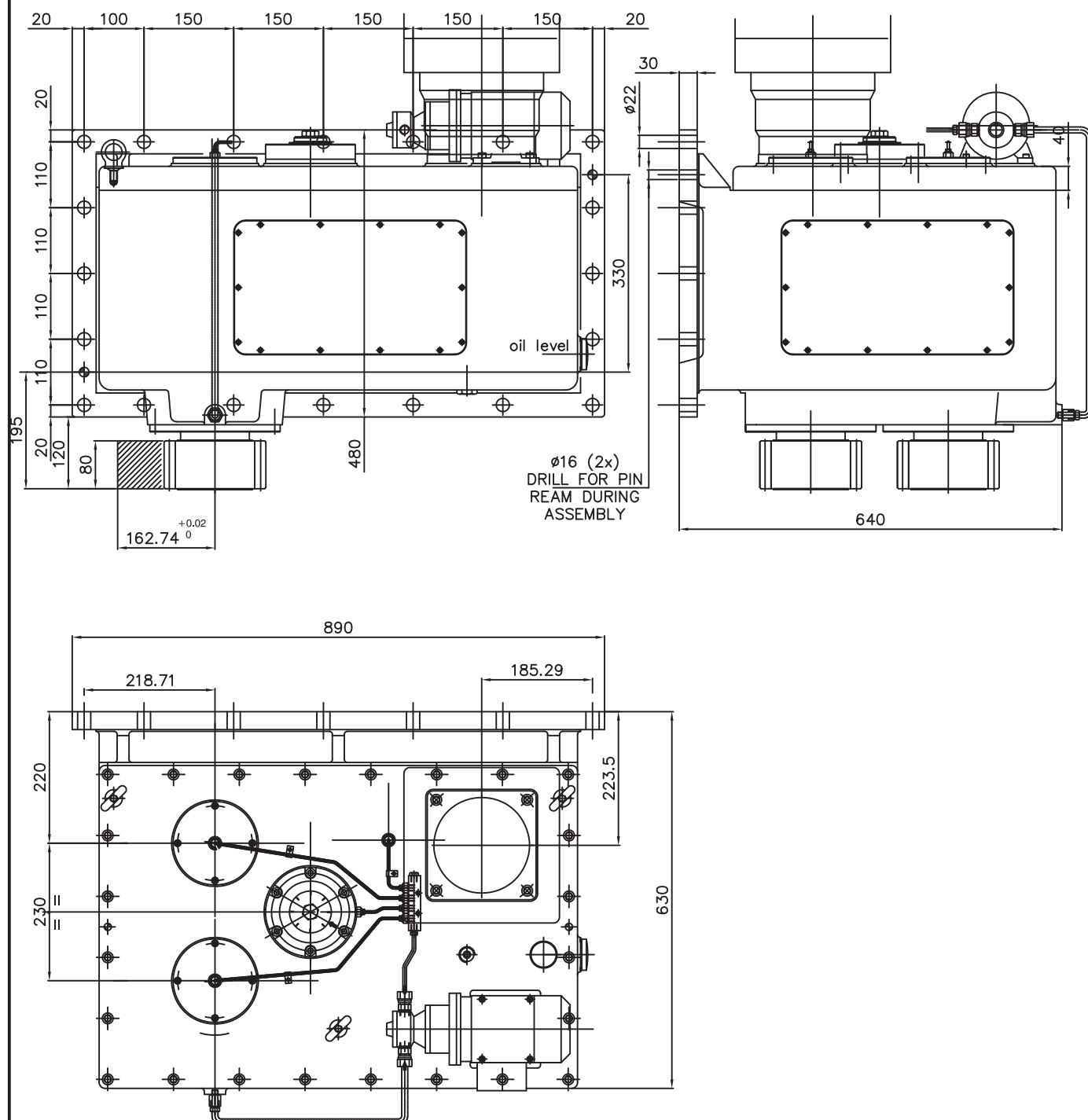
ZERO BACKLASH GEARBOX FOR HEAVY DUTY

VERTICAL MOTOR

INSIDE LUBRICATION

TABLE
10032

Revision:"01"



GEAR BOX CODE: M08-060-BRW-S05-SVR-S18
 LICAT PINION: PDR-C-800-18-1SM ($m=8/z=18$)
 LICAT RACK: CDR-B-CF-800/1000
 SIZE MOTOR: SIEMENS 1FT6 136
 SIZE REDUCER $i=5$
 TOTAL RATIO $i=59,37$
 INPUT TORQUE MOTOR: 74Nm
 OUTPUT TORQUE PINION: 4.400Nm
 NORMAL TANGENTIAL FORCE TOOTH/RACK: 5.500daN
 MAX TANGENTIAL FORCE TOOTH/RACK: 8.500daN
 MAX SPEED MOTOR: 2000rpm
 MAX SPEED TO RACK: 17m/1'

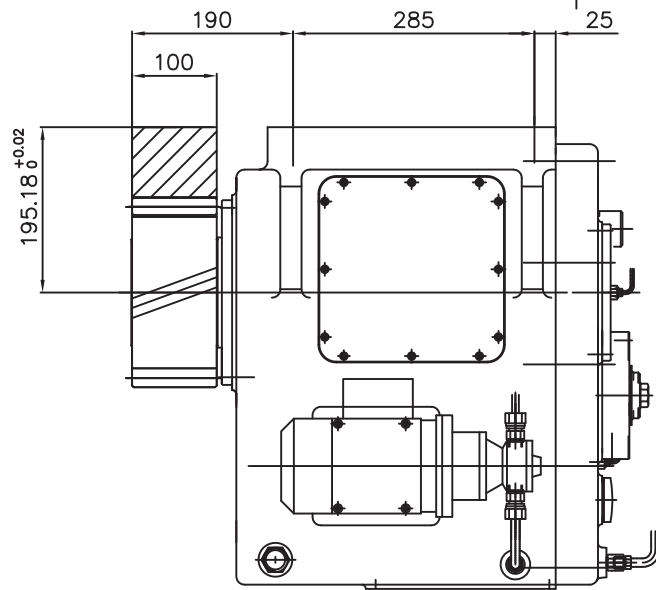
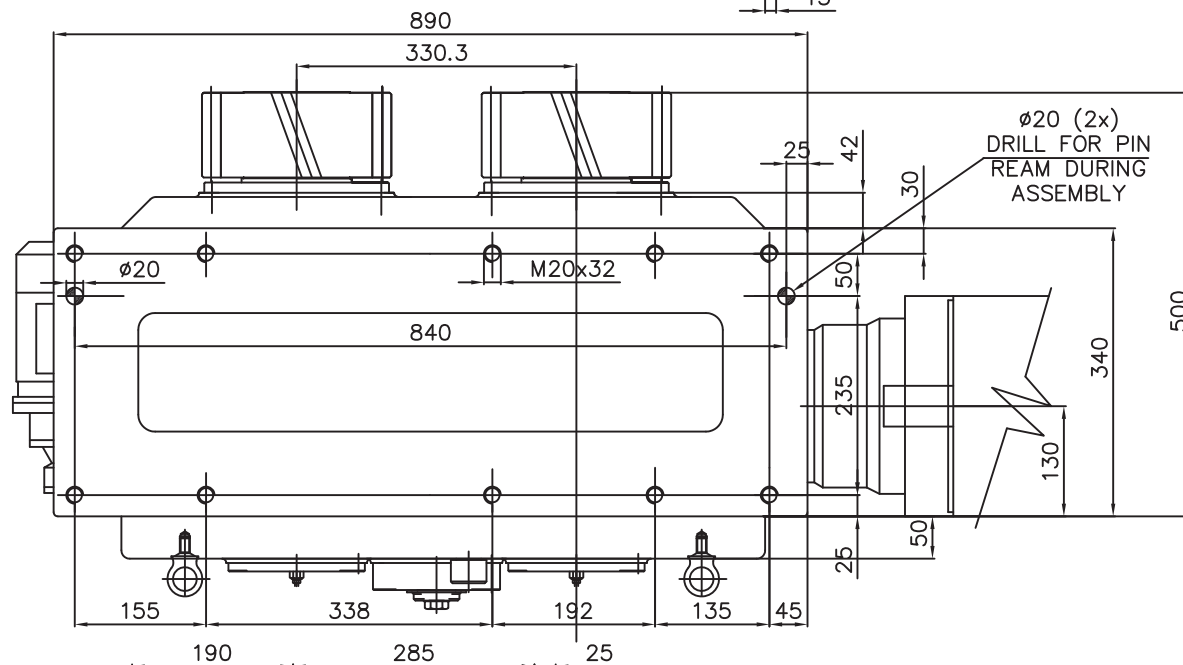
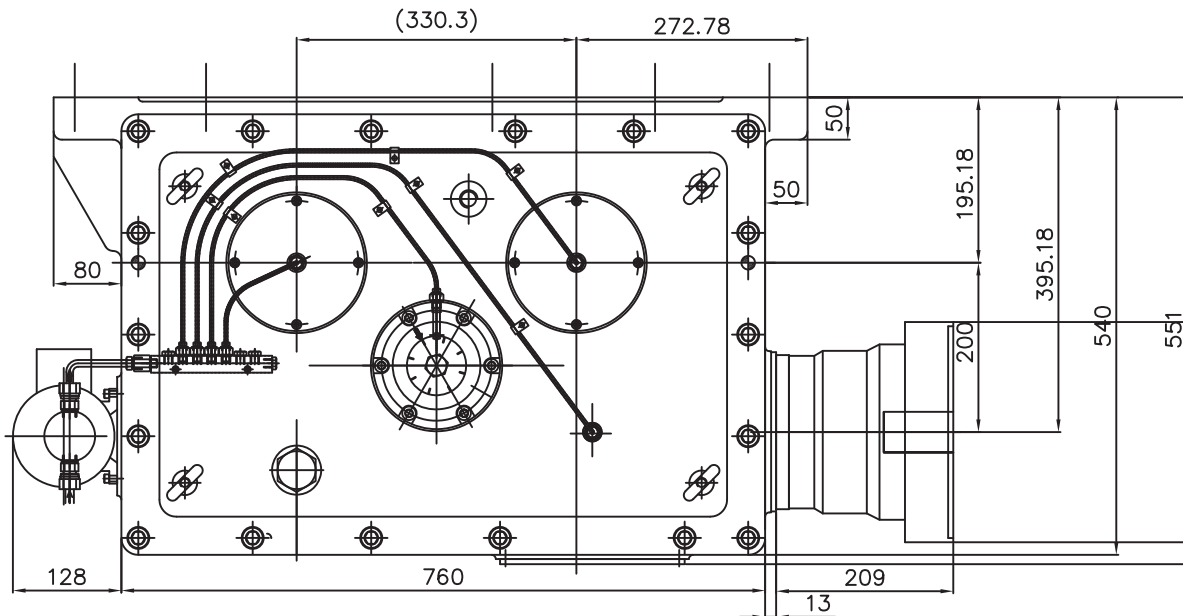


ZERO BACKLASH GEARBOX FOR HEAVY DUTY

HORIZONTAL MOTOR
INSIDE LUBRICATION

TABLE
10033

Revision:"00"



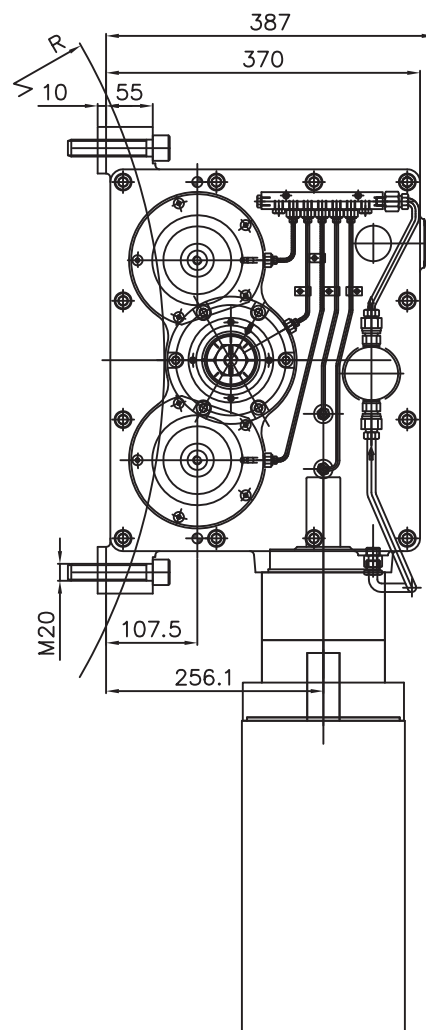
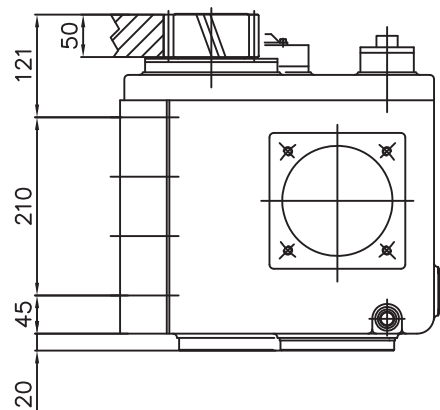
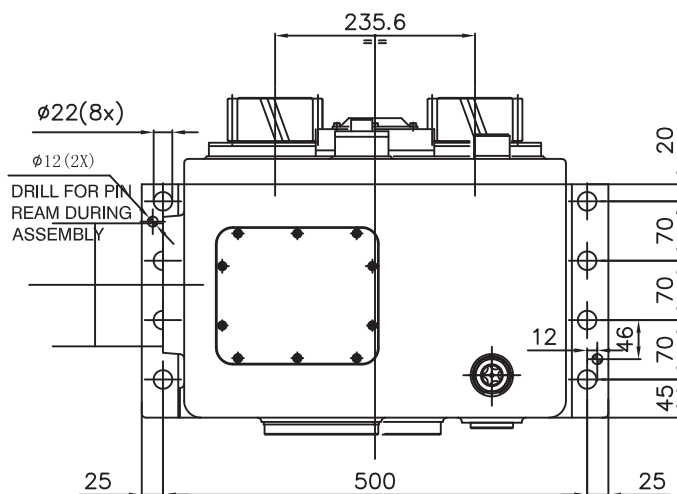
GEAR BOX CODE: M10-112-BRW-S07-SHR-H18
LICAT PINION: PER-C-1000-18-1SM ($m=10/z=18$)
LICAT RACK: CER-B-CF-1000/1000
SIZE MOTOR: SIEMENS 1FT6 136
SIZE REDUCER $i=7$
TOTAL RATIO $i=112$
INPUT TORQUE MOTOR: 88Nm
OUTPUT TORQUE PINION: 9.785Nm
NORMAL TANGENTIAL FORCE TOOTH/RACK: 9.800daN
MAX TANGENTIAL FORCE TOOTH/RACK: 15.200daN
MAX SPEED MOTOR: 1500rpm
MAX SPEED TO RACK: 8m/1'



ZERO BACKLASH GEARBOX FOR ROTARY TABLE
HORIZONTAL MOTOR
INSIDE LUBRICATION

TABLE
10034

Revision:"00"



GEAR BOX CODE: M05-060-ARW-S10-SHR-S18
LICAT PINION: PER-C-500-18-1SM ($m=5/z=18$)
SIZE MOTOR: SIEMENS 1FT6 105
SIZE REDUCER $i=10$
TOTAL RATIO $i=60,2$
INPUT TORQUE MOTOR: 38Nm
OUTPUT TORQUE PINION: 2.280Nm
MAX SPEED MOTOR: 2000rpm
MAX SPEED PINION: 33,2rpm

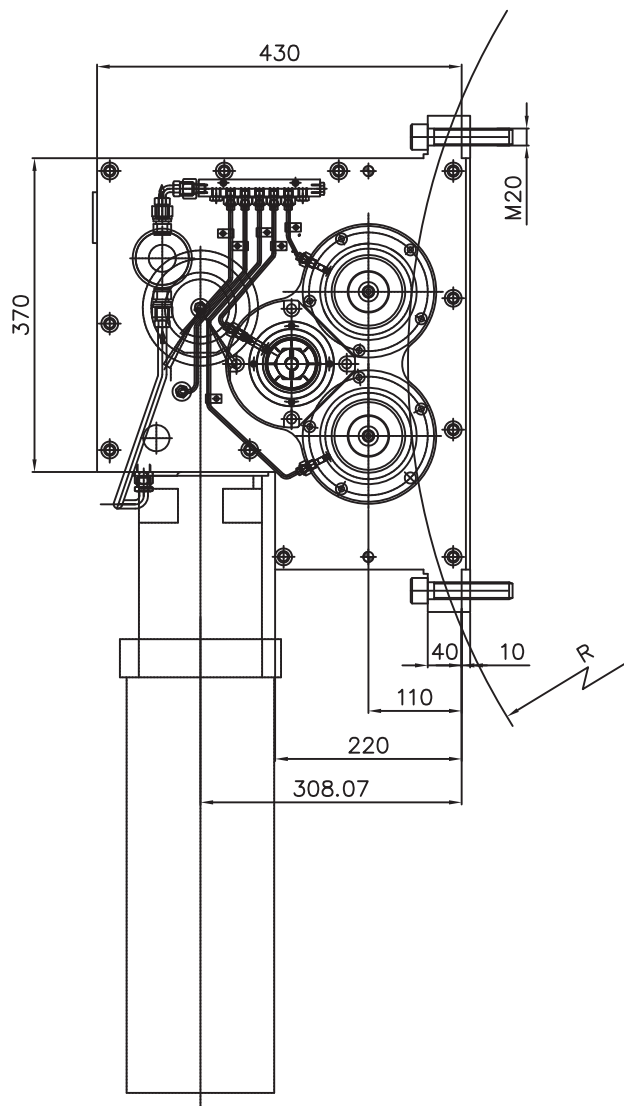
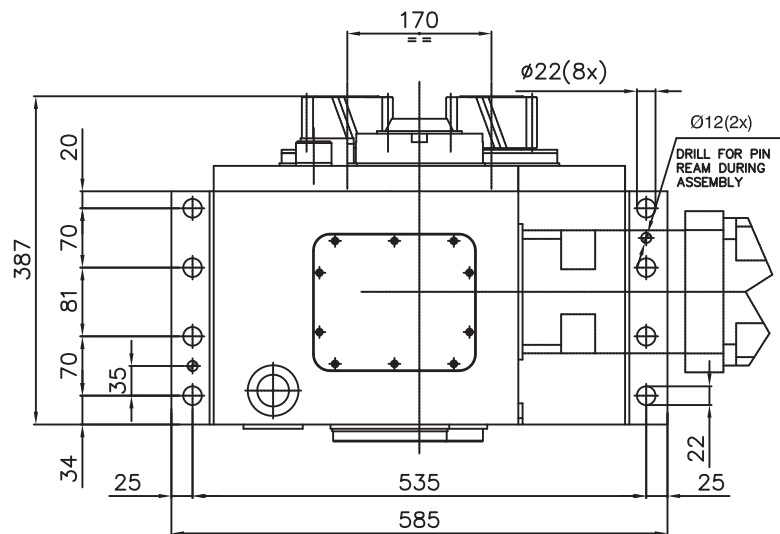
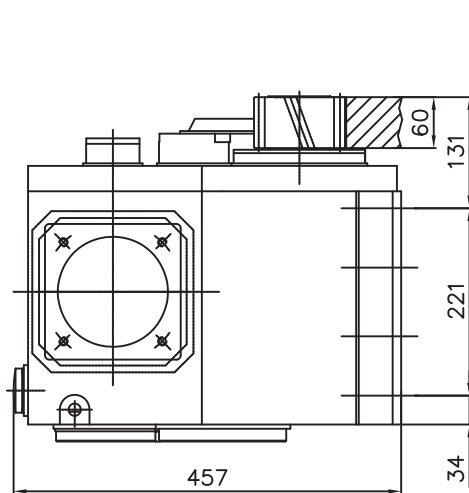


ZERO BACKLASH GEARBOX FOR ROTARY TABLE

HORIZONTAL MOTOR
INSIDE LUBRICATION

TABLE
10035

Revision:"00"



GEAR BOX CODE: M06-094-ARW-S16-FHL-H16

LICAT PINION: PER-C-600-16-M (EXTRA HIGH)

($m=6/z=16$)

SIZE MOTOR: FANUC α 40/3000i with fan

SIZE REDUCER $i=16$

TOTAL RATIO $i=93,96$

INPUT TORQUE MOTOR: 53Nm

OUTPUT TORQUE PINION: 4.980Nm

MAX SPEED MOTOR: 3000rpm

MAX SPEED PINION: 31,93rpm

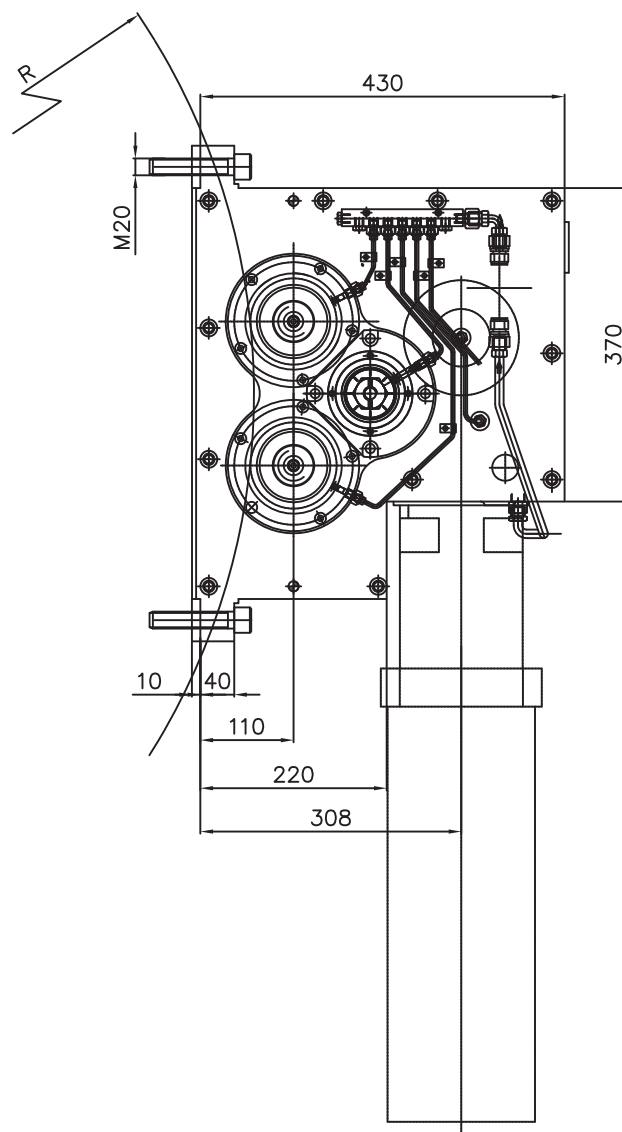
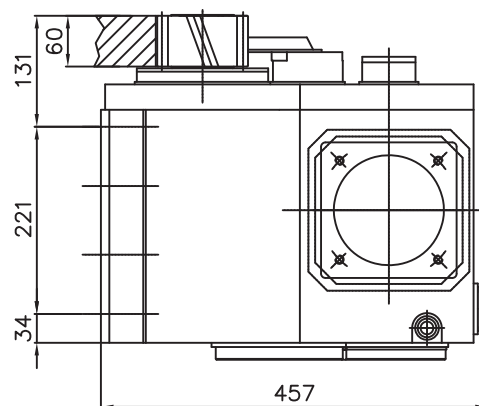
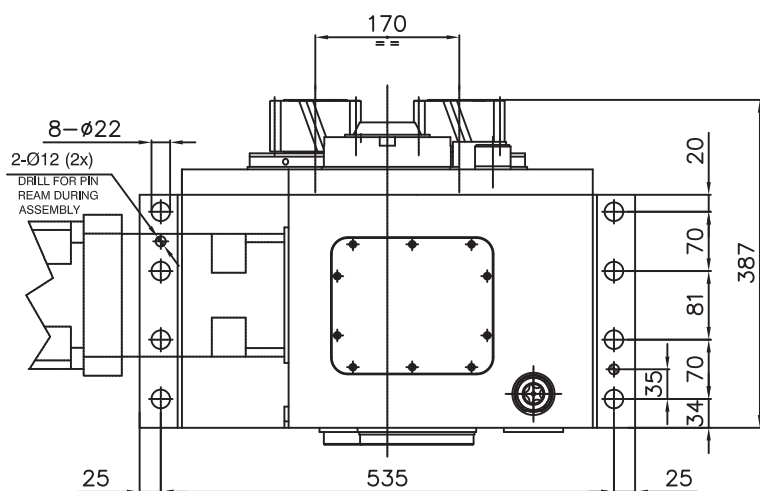


ZERO BACKLASH GEARBOX FOR ROTARY TABLE

HORIZONTAL MOTOR
INSIDE LUBRICATION

TABLE
10036

Revision:"00"



GEAR BOX CODE: M06-094-ARW-S16-FHL-H16

LICAT PINION: PER-C-600-16-M (EXTRA HIGH)

($m=6/z=16$)

SIZE MOTOR: FANUC α 40/3000i with fan

SIZE REDUCER $i=16$

TOTAL RATIO $i=93,96$

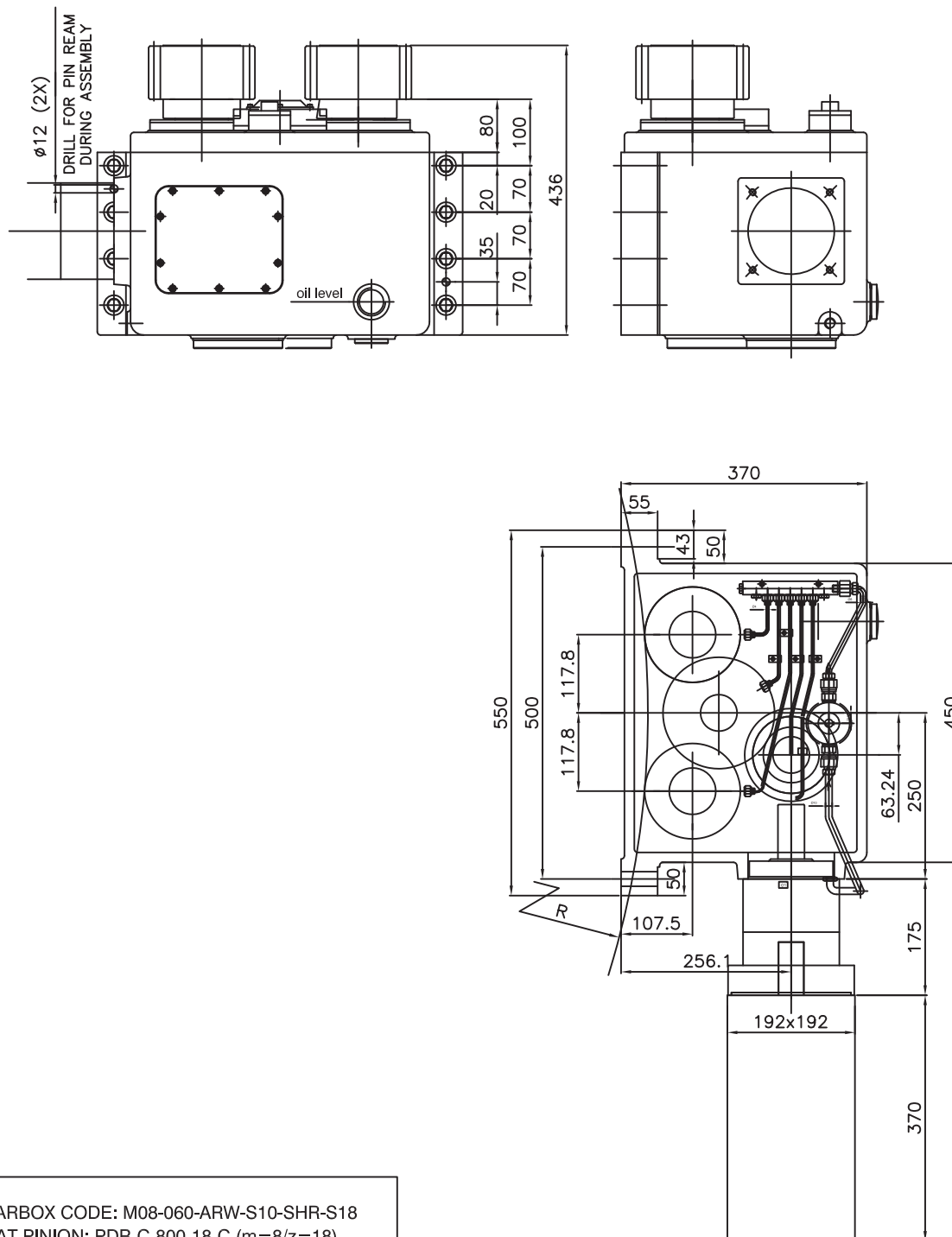
INPUT TORQUE MOTOR: 53Nm

OUTPUT TORQUE PINION: 4.980Nm

MAX SPEED MOTOR: 3000rpm

MAX SPEED PINION: 31,93rpm

TABLE
10046
Revision: "00"

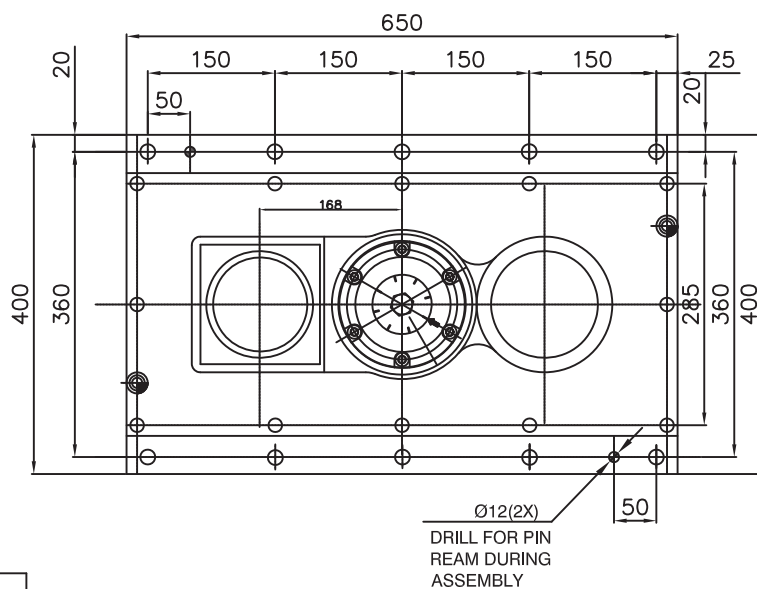
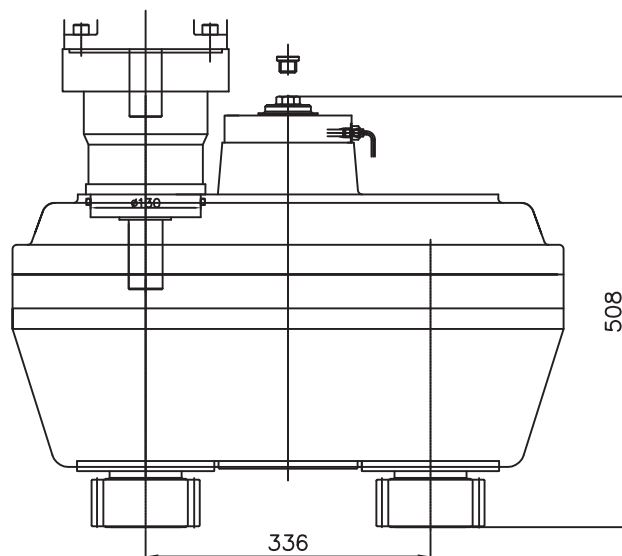
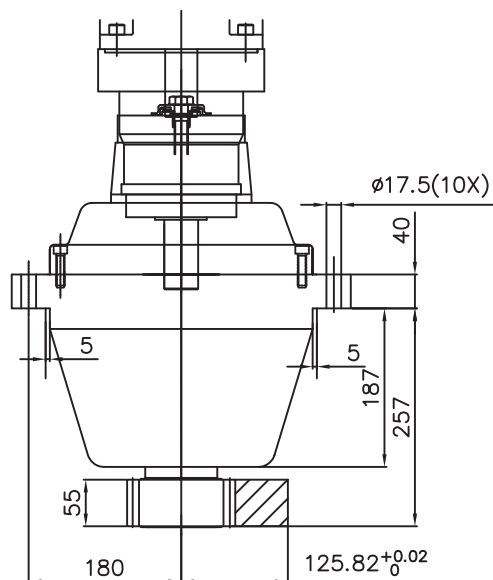


GEARBOX CODE: M08-060-ARW-S10-SHR-S18
LICAT PINION: PDR-C-800-18-C ($m=8/z=18$)
SIZE CODE: SIEMENS 1FT6 108
SIZE REDUCER: $i=10$
TOTAL RATIO: $i=60,2$
INPUT TORQUE MOTOR: 55Nm
OUTPUT TORQUE PINION: 3.300Nm
NORMAL TANGENTIAL FORCE TOOTH: 6.000 daN
MAX TANGENTIAL FORCE TOOTH: 9.000 daN
MAX SPEED MOTOR: 2000rpm
MAX SPEED TO GEARWHEEL: 33,2rpm



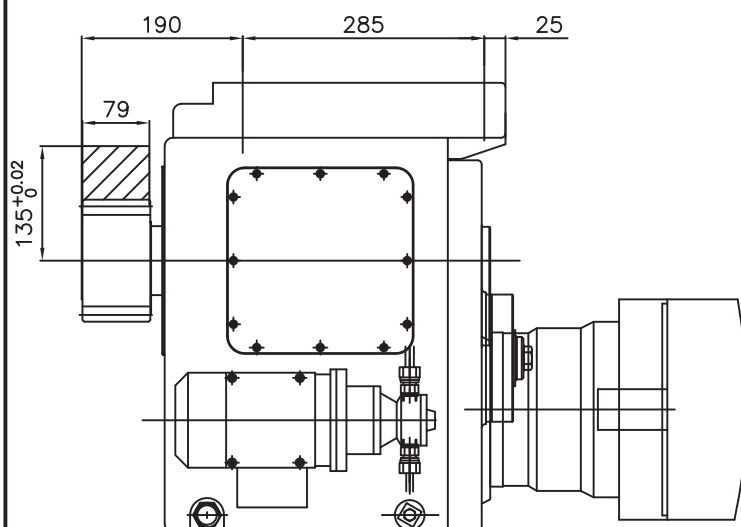
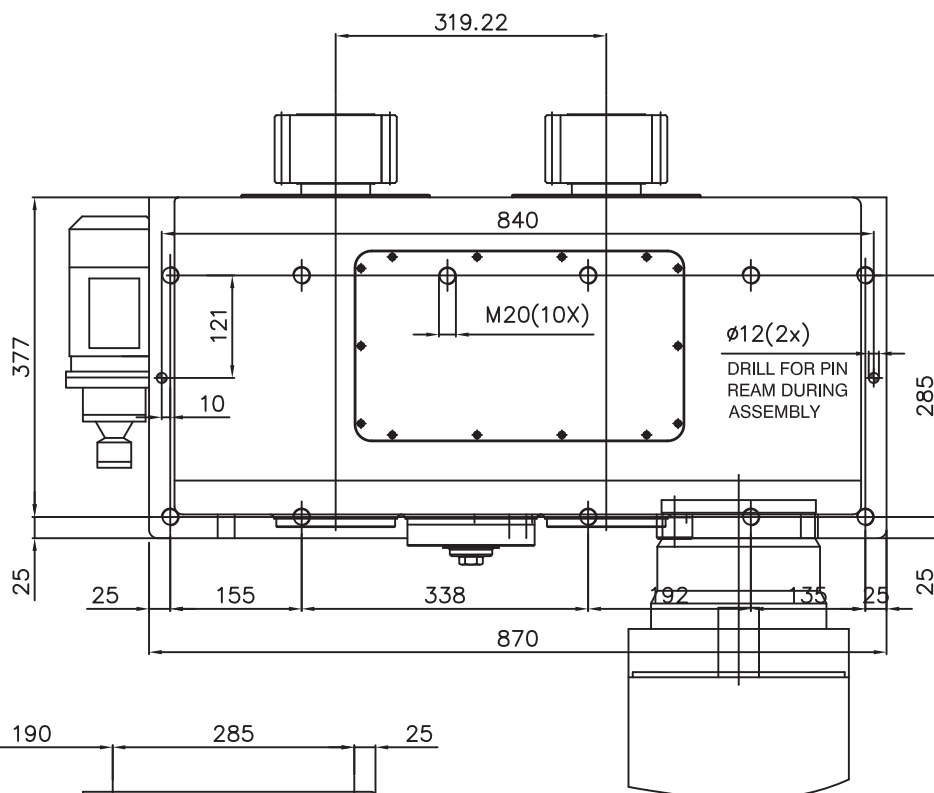
ZERO BACKLASH GEARBOX FOR HEAVY DUTY
 VERTICAL MOTOR
 OUTSIDE LUBRICATION

TABLE
10037
 Revision:"00"



GEARBOX CODE: M06-065-DLF-S16-SVB-S18
 LICAT PINION: PDR-C-600-18/1SM ($m=6/z=18$)
 LICAT RACK: CDR-B-CF-600/1000
 SIZE MOTOR: SIEMENS 1FT6 105
 SIZE REDUCER $i=16$
 TOTAL RATIO $i=64,86$
 INPUT TORQUE : 38 Nm
 OUTPUT TORQUE: 2.400 Nm
 NORMAL TANGENTIAL FORCE TOOTH/RACK: 4.000daN
 MAX TANGENTIAL FORCE TOOTH/RACK: 4.300 daN
 MAX SPEED MOTOR: 2000rpm
 MAX SPEED TO RACK: 10,5m/min

TABLE
10038



MAX SPEED TO RACK: 9,7m/min

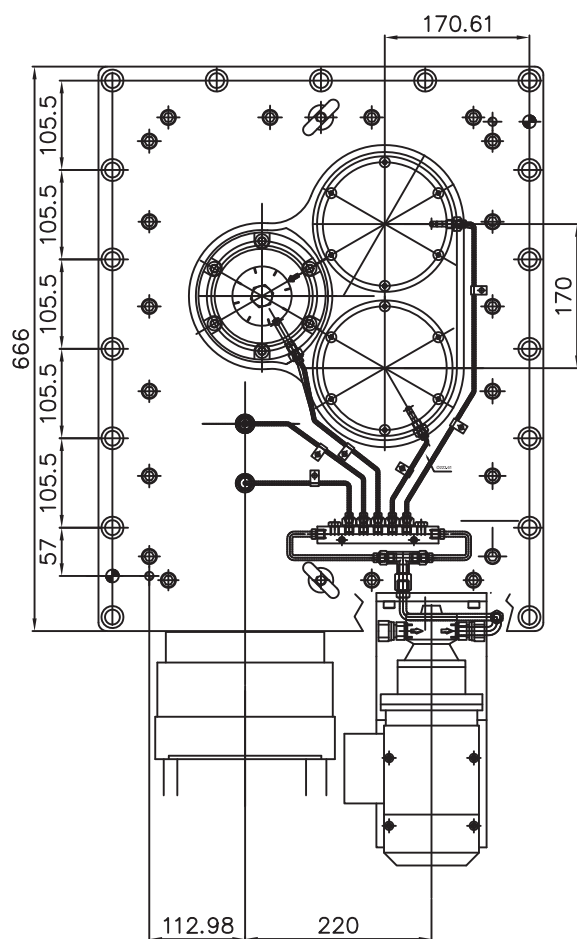
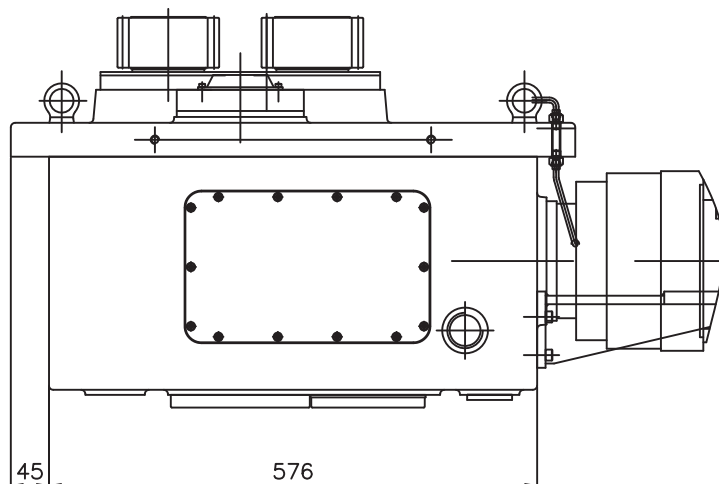
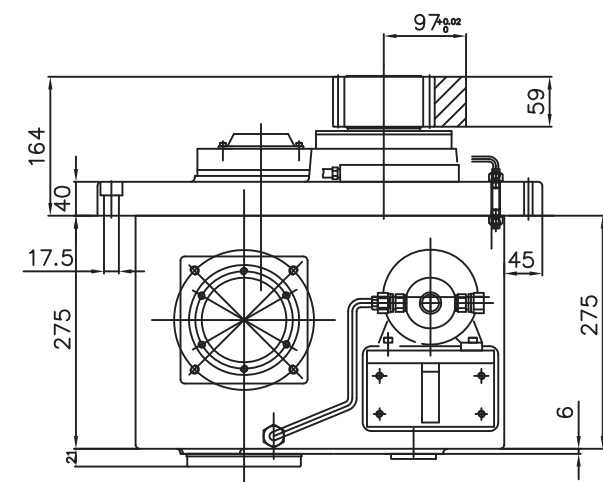


ZERO BACKLASH GEARBOX FOR HEAVY DUTY

HORIZONTAL MOTOR
INSIDE LUBRICATION

TABLE
10039

Revision:"00"

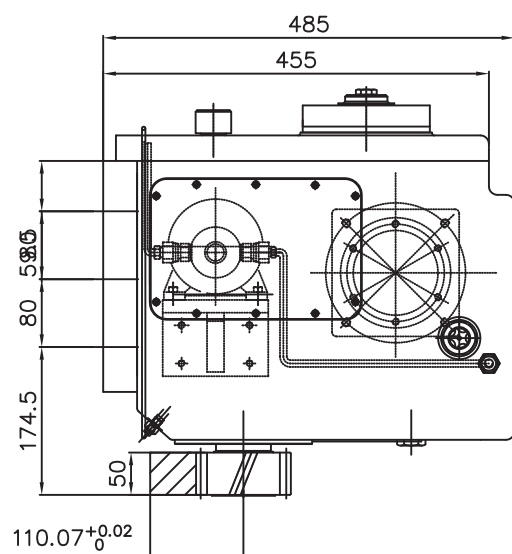
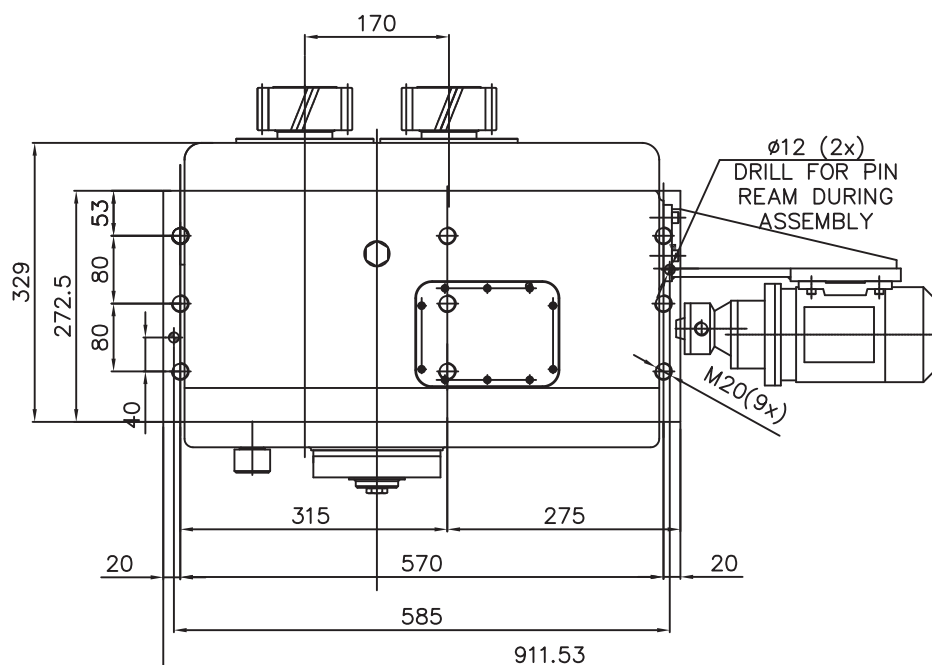
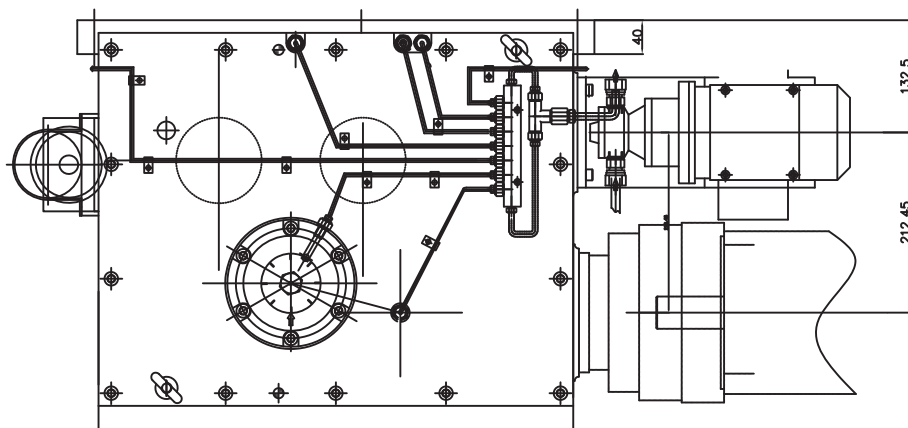


GEARBOX CODE: M06-065-ALF-A07-SHB-S18W
 LICAT PINION: PDR-C-600-18/1SM-C ($m=6/z=18$)
 LICAT RACK: WDR-B-CF-600/1000
 SIZE MOTOR: SIEMENS 1FT6 105
 SIZE REDUCER $i=7$
 TOTAL RATIO $i=65,45$
 INPUT TORQUE : 38 Nm
 OUTPUT TORQUE: 2.480 Nm
 NORMAL TANGENTIAL FORCE TOOTH/RACK: 4.124daN
 MAX TANGENTIAL FORCE TOOTH/RACK: 4.300 daN
 MAX SPEED MOTOR: 2000rpm
 MAX SPEED TO RACK: 11m/min



ZERO BACKLASH GEARBOX FOR HEAVY DUTY **HORIZONTAL MOTOR** **INSIDE LUBRICATION**

TABLE
10040
 Revision:"00"



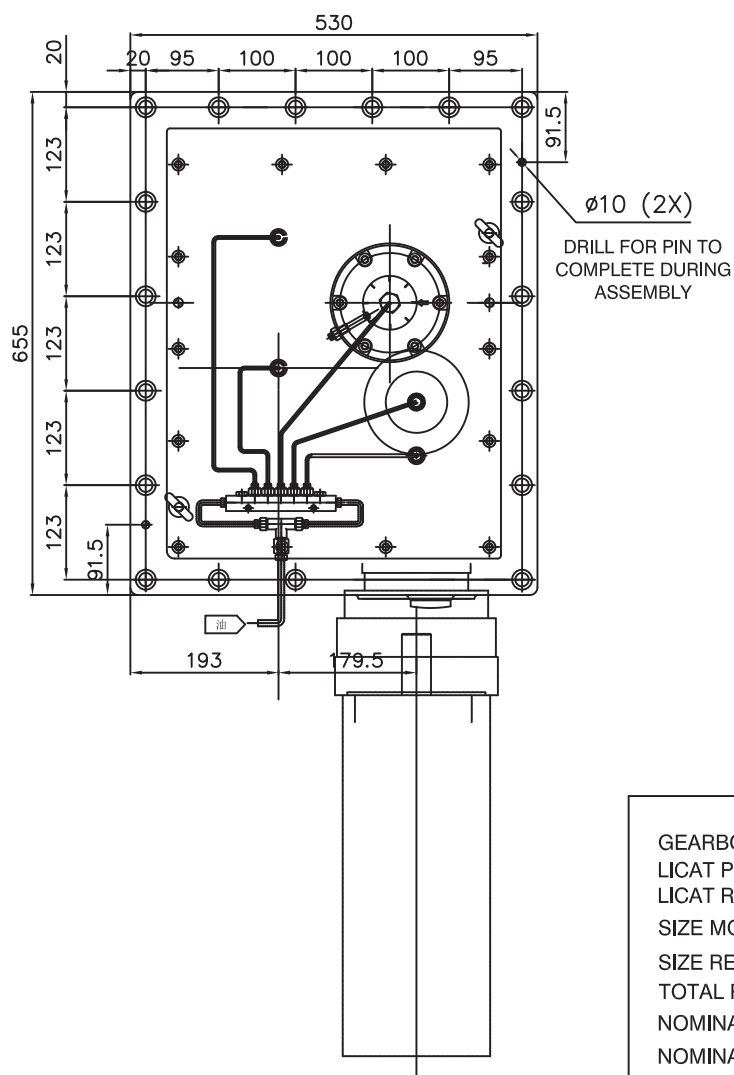
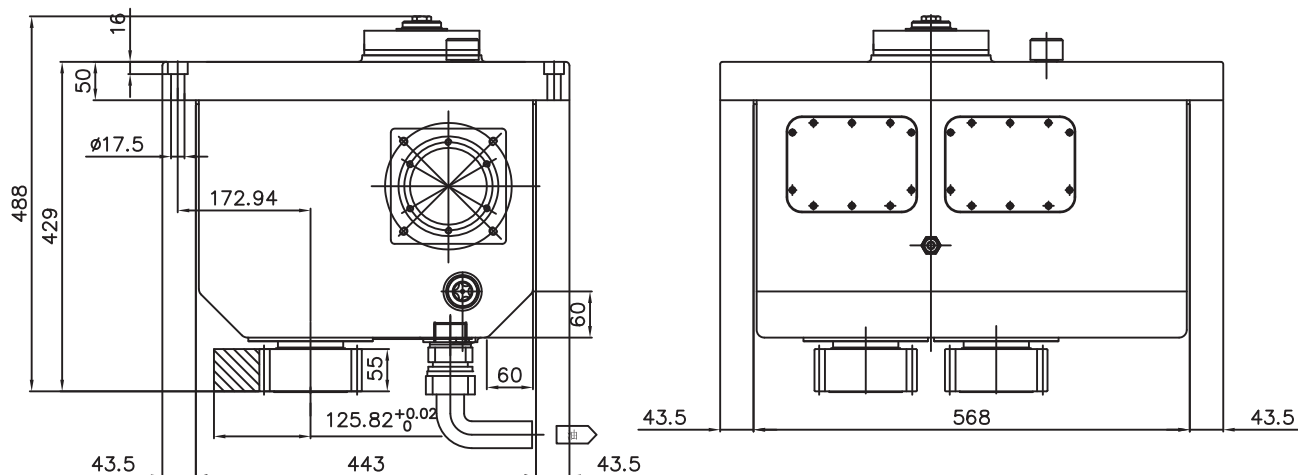
GEARBOX CODE: M05-064-ARF-S08-SHR-H18
 LICAT PINION: PER-C-500-18/1SM ($m=5/z=18$)
 LICAT RACK: CER-C-CF-500/1000
 SIZE MOTOR: SIEMENS 1FT6 108
 SIZE REDUCER $i=8$
 TOTAL RATIO $i=64$
 INPUT TORQUE : 55 Nm
 OUTPUT TORQUE: 2.200 Nm
 NORMAL TANGENTIAL FORCE TOOTH/RACK : 3.600daN
 MAX TANGENTIAL FORCE TOOTH/RACK : 5.000 daN
 MAX SPEED MOTOR: 2000rpm
 MAX SPEED TO RACK: 19m/min



ZERO BACKLASH GEARBOX FOR HEAVY DUTY
HORIZONTAL MOTOR
RECIRCULATING LUBRICATION

TABLE
10041

Revision: "00"



GEARBOX CODE: M06-080-DRF-S10-SHB-S18
 LICAT PINION: PDR-C-600-18-1SM ($m=6/z=18$)
 LICAT RACK: CDR-B-CF-600/1000
 SIZE MOTOR: SIEMENS 1FT6 108
 SIZE REDUCER $i=10$
 TOTAL RATIO $i=80$
 NOMINAL INPUT TORQUE MOTOR: 55Nm
 NOMINAL OUTPUT TORQUE PINION: 4.400Nm
 NORMAL TANGENTIAL FORCE TOOTH/RACK: 3.300daN
 MAX TANGENTIAL FORCE TOOTH/RACK: 5.000daN
 MAX SPEED MOTOR: 2000rpm
 MAX SPEED TO RACK: 8,9 m/min

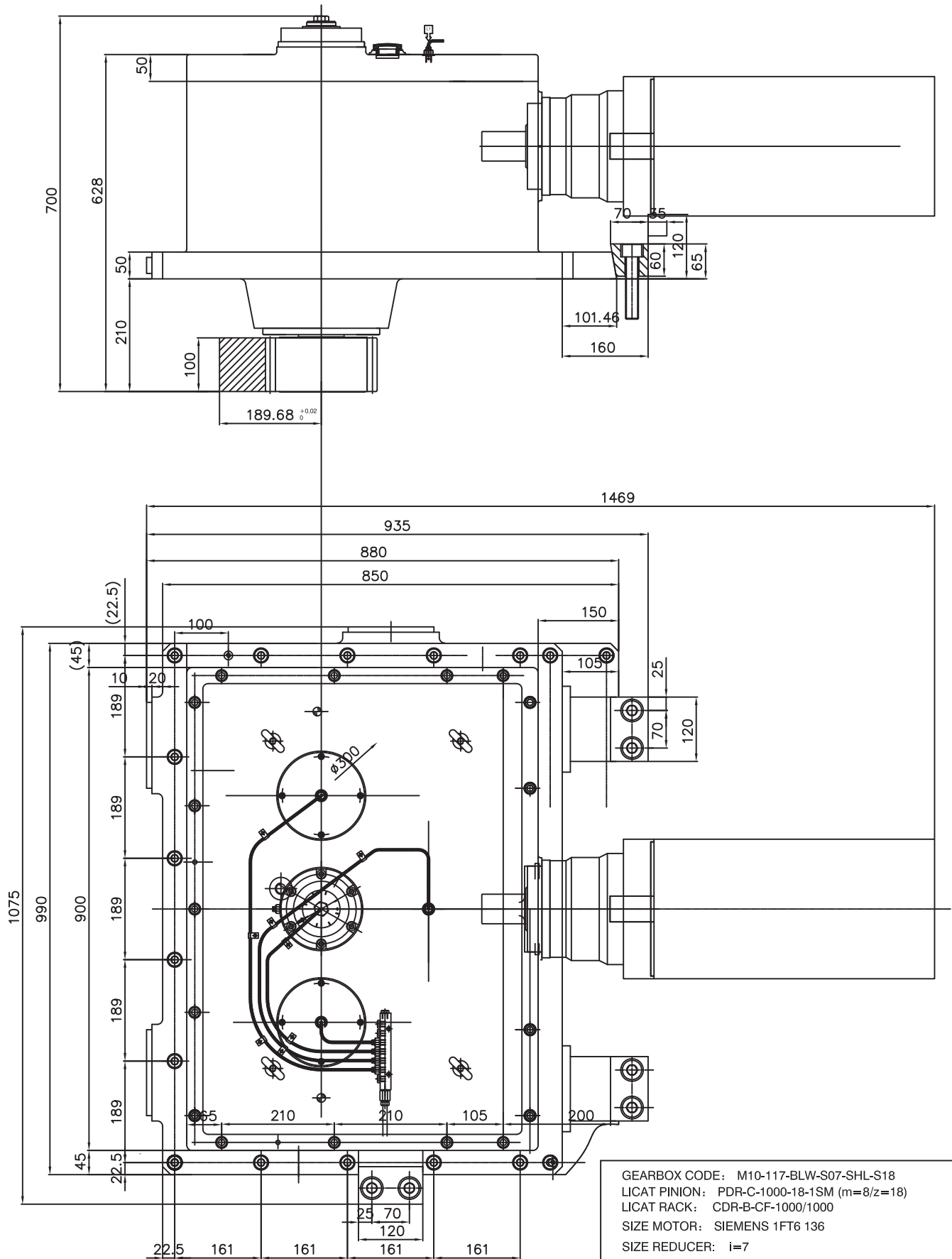


ZERO BACKLASH GEARBOX FOR HEAVY DUTY

HORIZONTAL MOTOR
INSIDE LUBRICATION

TABLE
10042

Revision: "00"



GEARBOX CODE: M10-117-BLW-S07-SHL-S18
 LICAT PINION: PDR-C-1000-18-1SM ($m=8/z=18$)
 LICAT RACK: CDR-B-CF-1000/1000
 SIZE MOTOR: SIEMENS 1FT6 136
 SIZE REDUCER: $i=7$
 TOTAL RATIO: $i=117$
 NOMINAL INPUT TORQUE MOTOR: 88Nm
 NOMINAL OUTPUT TORQUE PINION: 10.300Nm
 NORMAL TANGENTIAL FORCE TOOTH/RACK: 11.200daN
 MAX TANGENTIAL FORCE TOOTH/RACK: 12.500daN
 MAX SPEED MOTOR: 2000rpm
 MAX SPEED TO RACK: 9,7 m/min

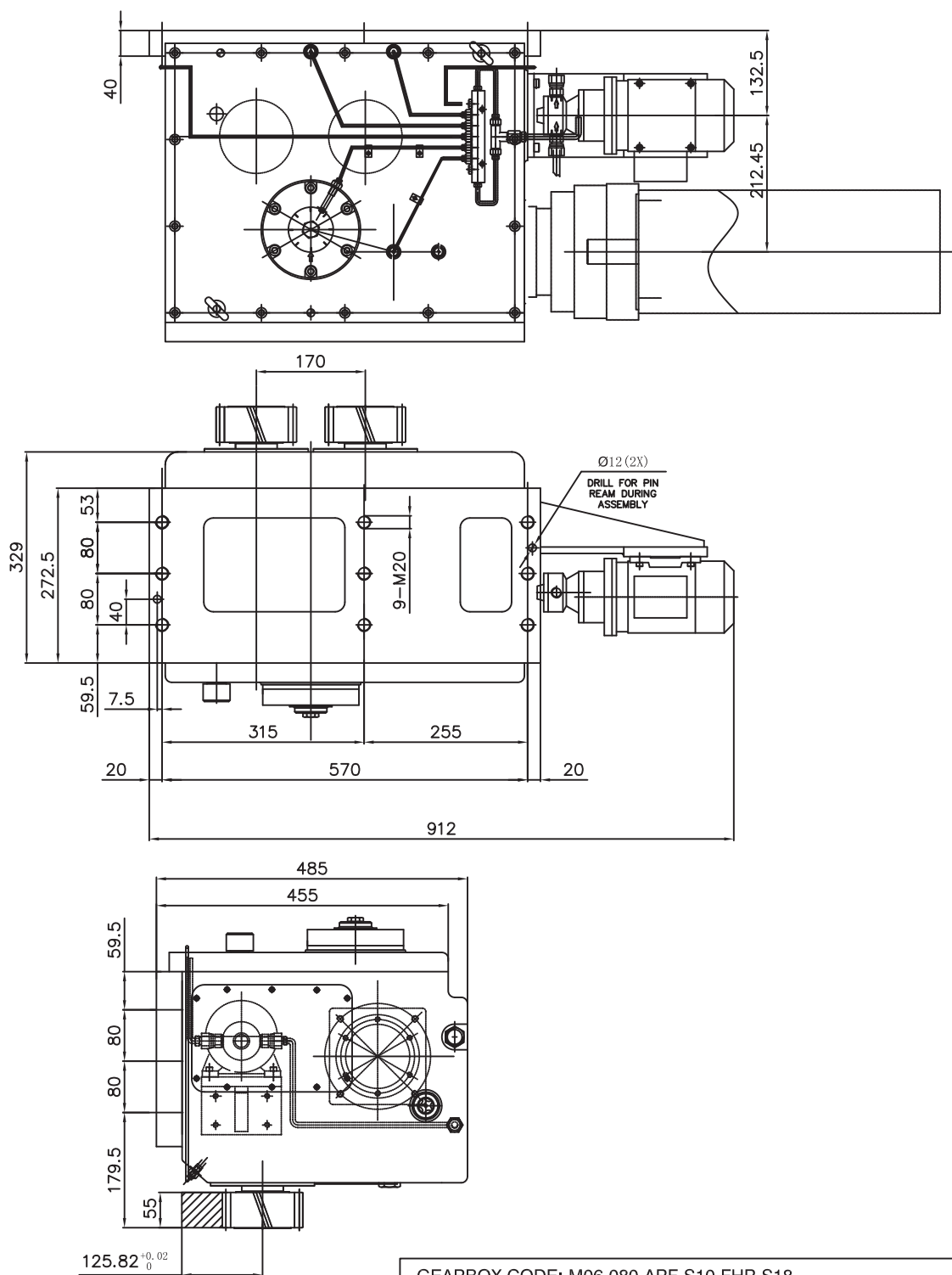


ZERO BACKLASH GEARBOX FOR HEAVY DUTY

HORIZONTAL MOTOR
INSIDE LUBRICATION

TABLE
10043

Revision: "00"



GEARBOX CODE: M06-080-ARF-S10-FHR-S18
 LICAT PINION: PDR-C-600-18-1SM ($m=6/z=18$)
 LICAT RACK: CDR-B -CF-600/1000
 SIZE MOTOR: FAUNC 40/3000i
 SIZE REDUCER: $i=10$
 TOTAL RATIO: $i=80$
 NOMINAL INPUT TORQUE MOTOR: 40Nm
 NOMINAL OUTPUT TORQUE PINION: 3.200Nm
 NORMAL TANGENTIAL FORCE TOOTH/RACK: 2.500daN
 MAX TANGENTIAL FORCE TOOTH/RACK: 3.800daN
 MAX SPEED MOTOR: 3000rpm
 MAX SPEED TO RACK: 11,2m/min

TABLE
10044

Technical drawing of a mechanical assembly, showing two views: a top view and a side view.

Top View Dimensions:

- Overall width: 910
- Overall height: 810
- Internal width segments: 172, 172, 172, 172, 172
- Internal height segments: 145, 265, 265, 109, 81, 59, 109, 379
- Bottom segments: 644.8, 162.74^{+0.03}₀
- Left side segments: 77, 60, 60
- Right side segments: 40, 80
- Bottom flange: 50

Side View Dimensions:

- Overall width: 669.8
- Overall height: 472
- Internal width segments: 276.5, 210
- Internal height segments: 630, 220, 230
- Bottom flange: 30

Notes:

- ø16 (2x) DRILL FOR PIN REAM DURING ASSEMBLY
- oil level

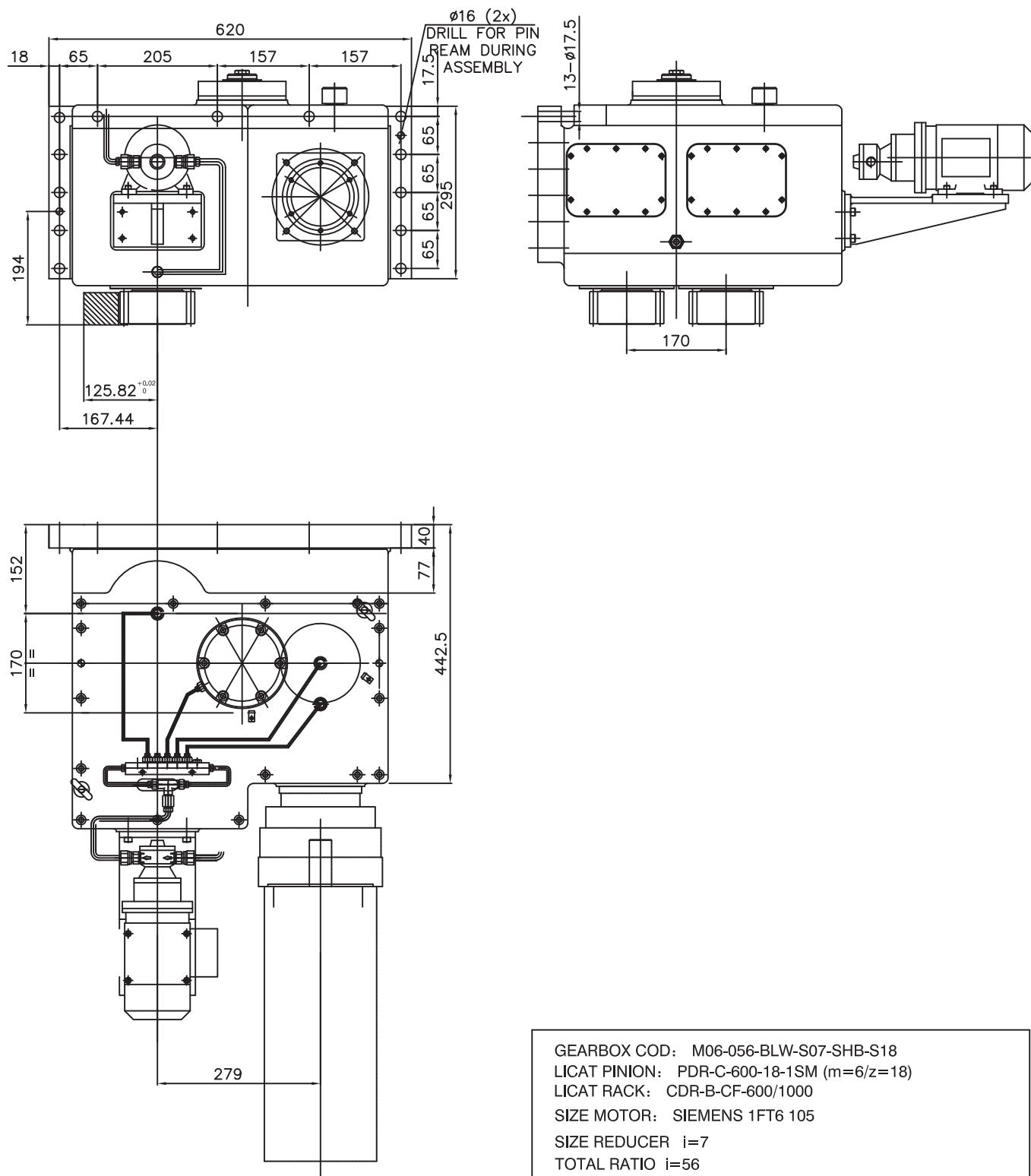
GEARBOX COD: M08-082-BLW-S05-SVL-S18
LICAT PINION: PDR-C-800-18-1SM ($m=8/z=18$)
LICAT RACK: CDR-B-CF-800/1000
SIZE MOTOR: SIEMENS 1FT6 136
SIZE REDUCER: $i=5$
TOTAL RATIO: $i=82,6$
NOMINAL INPUT TORQUE MOTOR: 74Nm
NOMINAL OUTPUT TORQUE PINION: 6.100Nm
NORMAL TANGENTIAL FORCE TOOTH/RACK: 7.500daN
MAX TANGENTIAL FORCE TOOTH/RACK: 10.000daN
MAX SPEED MOTOR: 2000rpm
MAX SPEED TO RACK: 10,9m/min



ZERO BACKLASH GEARBOX FOR HEAVY DUTY HORIZONTAL MOTOR INSIDE LUBRICATION

TABLE
10045

Revision: "00"



GEARBOX COD: M06-056-BLW-S07-SHB-S18
LICAT PINION: PDR-C-600-18-1SM ($m=6/z=18$)
LICAT RACK: CDR-B-CF-600/1000
SIZE MOTOR: SIEMENS 1FT6 105
SIZE REDUCER $i=7$
TOTAL RATIO $i=56$
NOMINAL INPUT TORQUE MOTOR: 38Nm
NOMINAL OUTPUT TORQUE PINION: 2.100Nm
NORMAL TANGENTIAL FORCE TOOTH/RACK: 3.800daN
MAX TANGENTIAL FORCE TOOTH/RACK: 4.300daN
MAX SPEED MOTOR: 2000rpm
MAX SPEED TO RACK: 12m/min



APPLICATION AND BENEFITS

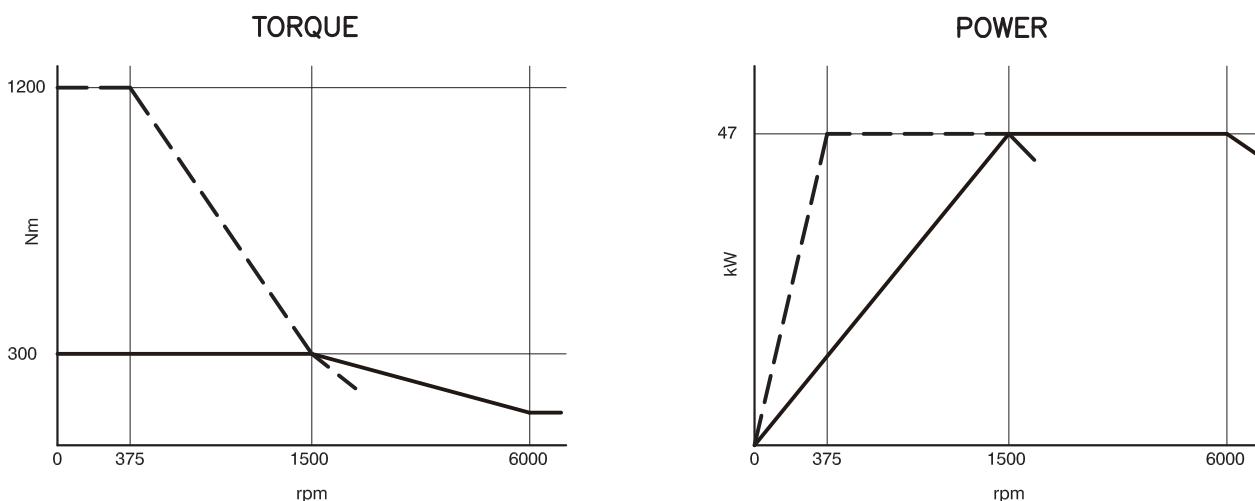
LICAT, with its strong record in innovation and production of power transmission units and gearboxes, is proud to present to machine tool manufacturers, the new POWERBOX, with a configuration ideal for widely used applications.

The universal machine tool (turning machines, milling and gantry machines, cnc machines), is designed for working with materials of different hardness and strength. Brushless AC motors give constant power for slow speed ranges.

Our POWERBOX applications, offer constant power for tools with two different speed ranges:

- 1) fast speed drive – ratio $i = 1$
- 2) slow speed drive – ratio $i \neq 1$

EXAMPLE TORQUE POWER CURVES FOR 47kW MOTOR WITH LICAT-POWERBOX $i=1,00$ – $i=4,00$



1) — — — Motor –POWERBOX assembly in $i=4,00$

2) ——— Motor –POWERBOX assembly in $i=1,00$
or motor without POWERBOX

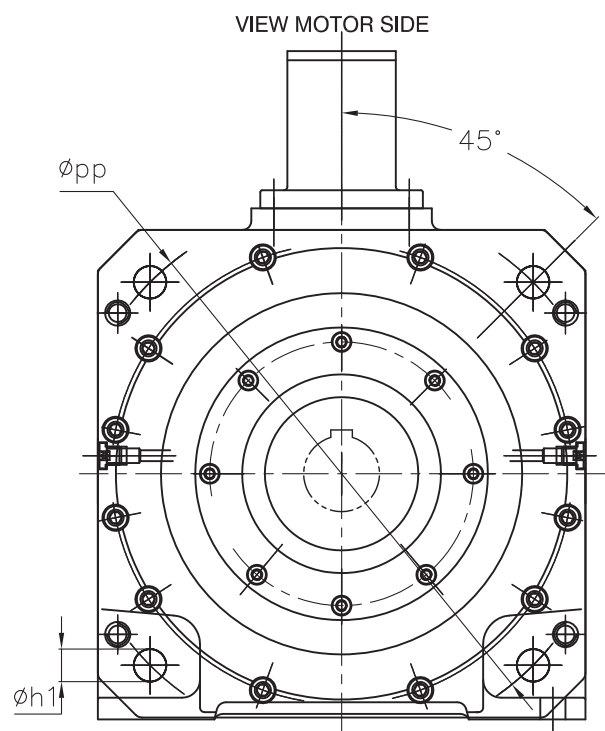
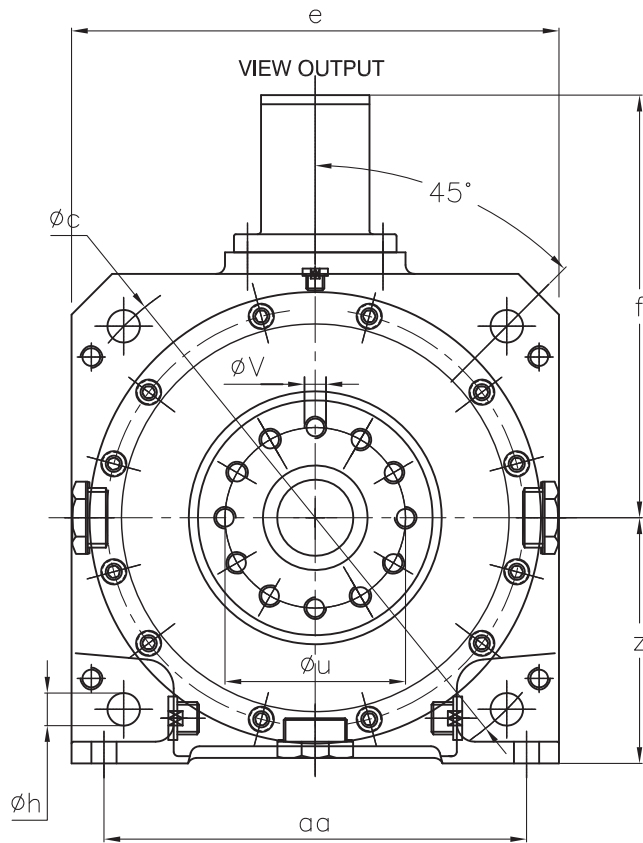
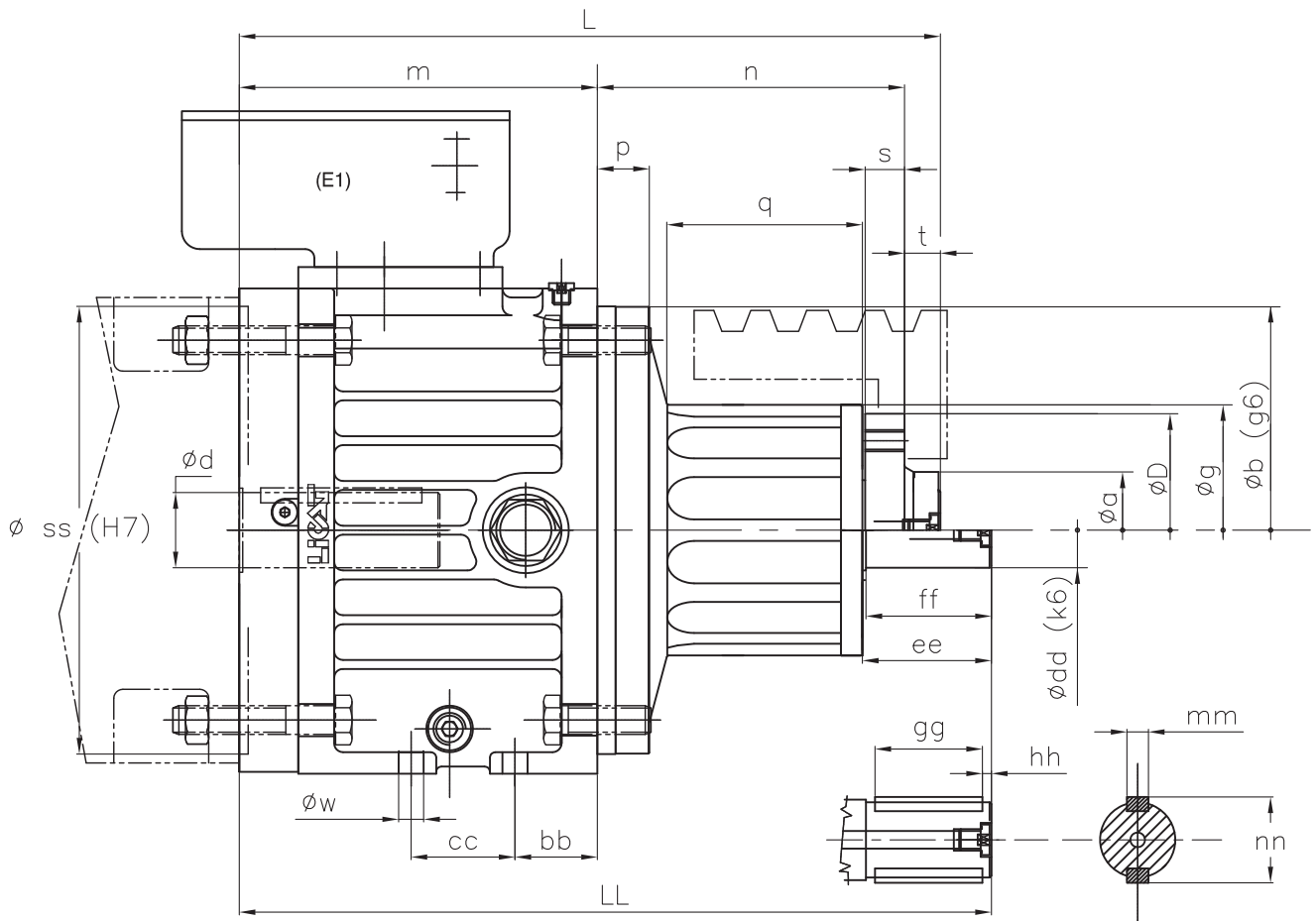


POWERBOX ®

TWO-SPEED GEAR BOX 250 & 300 SERIES

TABLE
LCG
REVISION "01"

ORDERING DRAWING





POWERBOX[®]

TWO-SPEED GEAR BOX 250 & 300 SERIES

TABLE
LCG

REVISION "O1"

TECHNICAL SPECIFICATIONS

DIMENSIONS	CODE	LCG 250		LCG 300	
	d	42	55	55	60
	SS	250	230	300	300
	pp	300	265	350	350
	h1	18	15	18	19
	b	250		250	
	c	300		350	
	h	18		18	
	z	136		164	
	e	270		318	
	f	234		254	
	aa	234		290	
	bb	46		46	
	cc	58		58	
	w	14		14	
	D	118		130	
	a	58		65	
	g	120		140	
	u	100		100	
	v	M12 (12x)		M12 (12x)	
	dd	42		55	
	ee	72		112	
	ff	70		110	
	gg	60		90	
	hh	5		10	
	mm	12		16	
	nn	48		63	
	L	391.5		391.5	
	m	200		200	
	n	171.5		171.5	
	p	29		29	
	q	106.5		109	
	s	22		22	
	t	20		20	
	LL	420		460	

PERFORMANCES				
SIZE/RATIO	RATIO i	OUTPUT TORQUE (Nm)	NOMINAL POWER (Kw)	MAX INPUT SPEED (rpm)
LCG 250/316	1,00 3,16	250 790	39	6300*
LCG 250/400	1,00 4,00	250 1000		
LCG 250/550	1,00 5,50	250 1375		
LCG 300/316	1,00 3,16	300 950	47	
LCG 300/400	1,00 4,00	300 1200		
LCG 300/550	1,00 5,50	250 1375		

* ONLY FOR OIL COOLER

INSTALLATION POSITION	
xx = 01	xx = 02

ELECTRICAL CONNECTION FOR SHIFT UNIT (E1)	STANDARD RECIRCULATING LUBRICATION (V1/B5)	STANDARD RECIRCULATING LUBRICATION (V3)
V = 24 Volt W = 24 Watt A = 1 Ampère	OIL FLOW 1,0 l/min OIL PRESS. 1,5 bar	OIL FLOW 1,5 l/min OIL PRESS. 1,5 bar



POWERBOX®

TWO-SPEED GEAR BOX 250 & 300 SERIES

TABLE
LCG

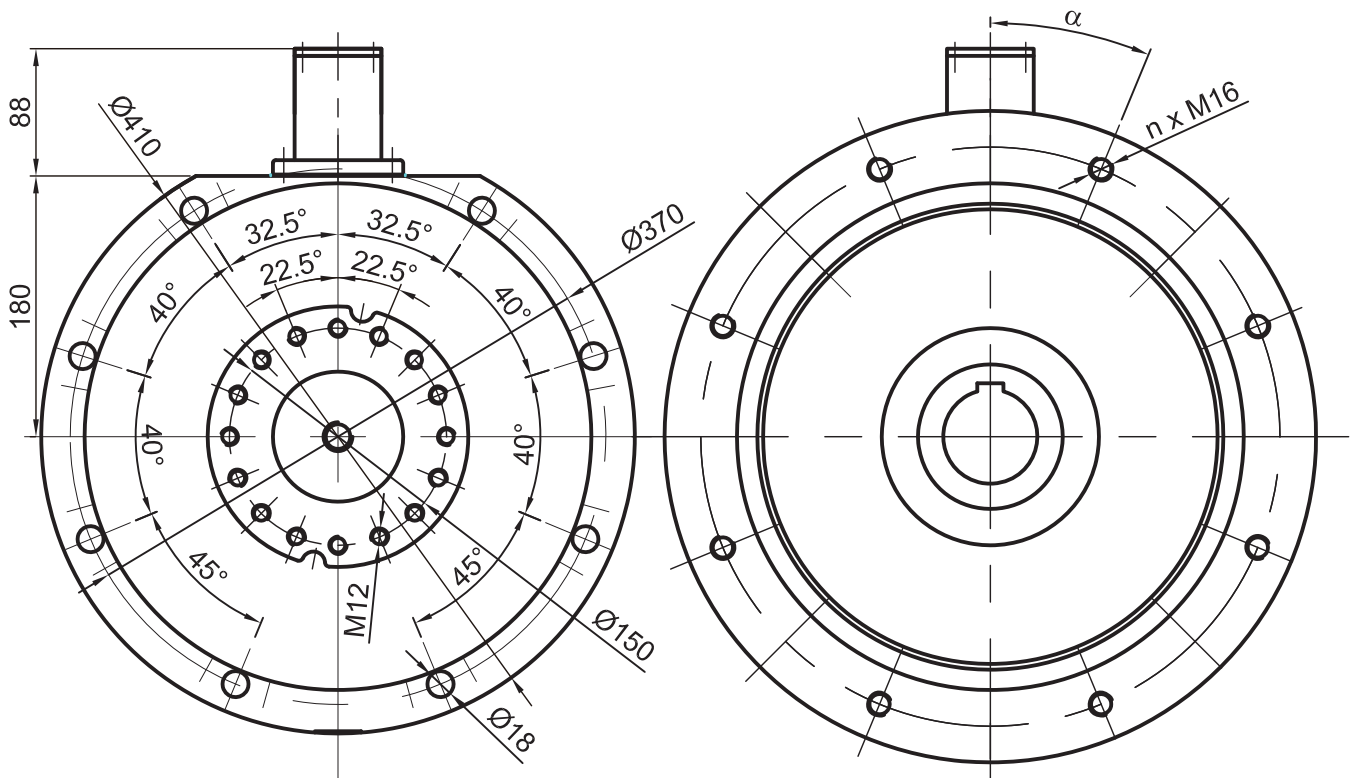
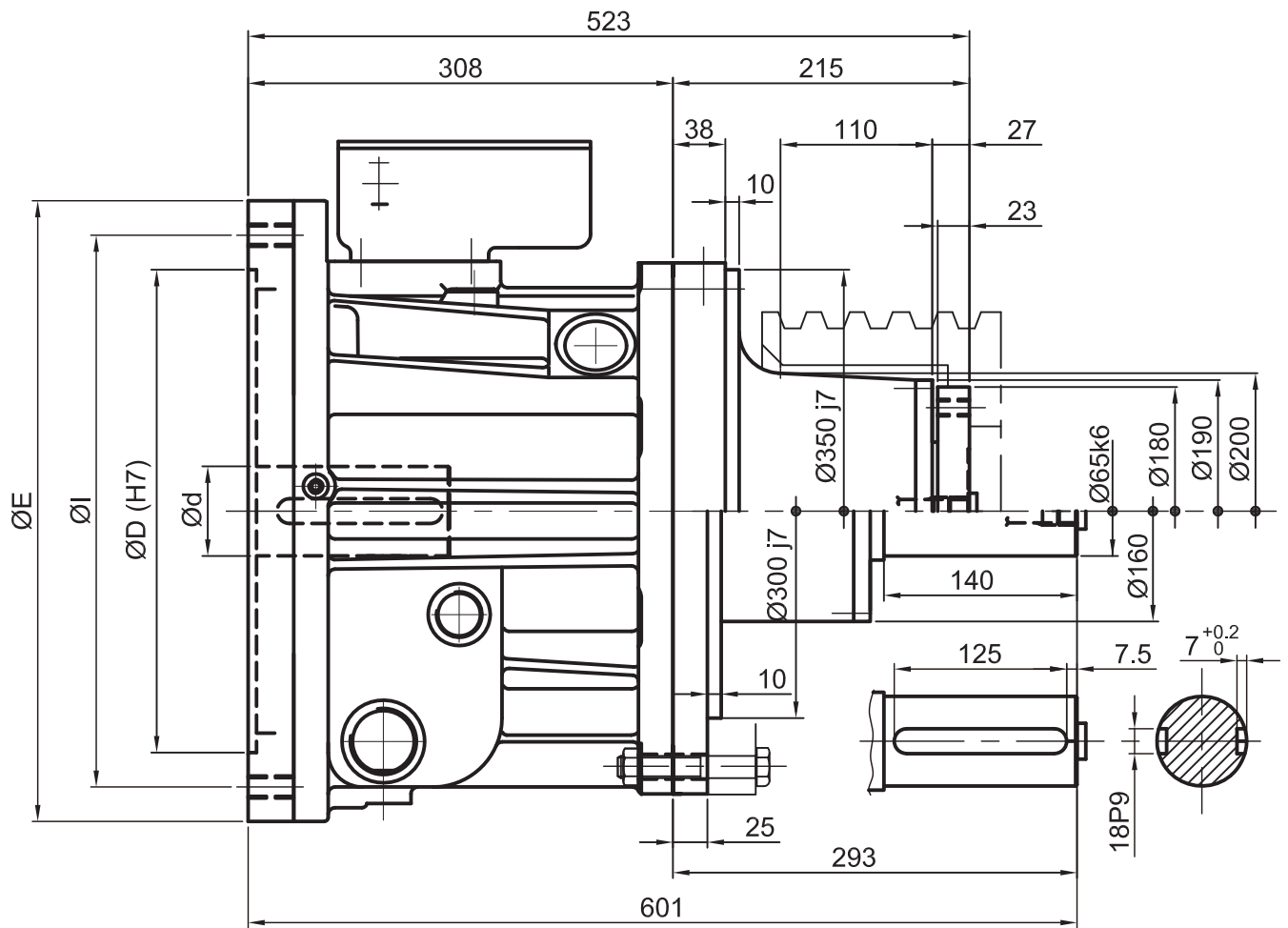
REVISION "01"

ORDERING NUMBERS MAP

LCG- XXX / XXX / XX / X / XX / XXX / XXXX / X

SIZE	-----	250								
		300								
RATIO	1:3,16	316								
	1:4	400								
	1:5,5	550								
POSITION	V1/B5	01								
	V3	02								
MOTOR BALANCING	FULL KEY	P								
	HALF KEY	M								
MOTOR SHAFT DIAMETER "dd"		42								
		48								
		55								
		60								
MOTOR MATCH DIAMETER "ss"		230								
		250								
		300								
SHAFT DIAMETER OUTPUT WITH KEY		42CC								
SHAFT DIAMETER OUTPUT WITHOUT KEY		42SC								
FLANGE DIAMETER OUTPUT		0118								
SHAFT DIAMETER OUTPUT WITH KEY		55CC								
SHAFT DIAMETER OUTPUT WITHOUT KEY		55SC								
FLANGE DIAMETER OUTPUT		0130								
CYLINDRICAL ROLLER		R								
ANGULAR-CONTACT BALL BEARINGS		O								

ORDERING DRAWING



VIEW OUTPUT

VIEW MOTOR SIDE



POWERBOX[®]

TWO-SPEED GEAR BOX 800 SERIES

TABLE
LCG

REVISION "00"

TECHNICAL SPECIFICATIONS

PERFORMANCES				
SIZE/RATIO	RATIO i	OUTPUT TORQUE (Nm)	NOMINAL POWER (Kw)	MAX INPUT SPEED (rpm)
LCG 800/318	1,00 3,18	800 2540	84	5000
LCG 800/400	1,00 4,00	800 3200		

SIZE	CODE	DIMENSIONS		
LCG 800	d	60	65	75
	D	300	350	450
	I	350	400	500
	E	450	450	550
	n	4	8	8
	α	45°	22°30'	22°30'

INSTALLATION POSITION	
xx = 01	xx = 02

ELECTRICAL CONNECTION FOR SHIFT UNIT (E1)	STANDARD RECIRCULATING LUBRICATION (V1/B5)	STANDARD RECIRCULATING LUBRICATION (V3)
V = 24 Volt W = 24 Watt A = 1 Ampère	OIL FLOW 1,0 l/min OIL PRESS. 1,5 bar	OIL FLOW 1,5 l/min OIL PRESS. 1,5 bar



ORDERING NUMBERS MAP

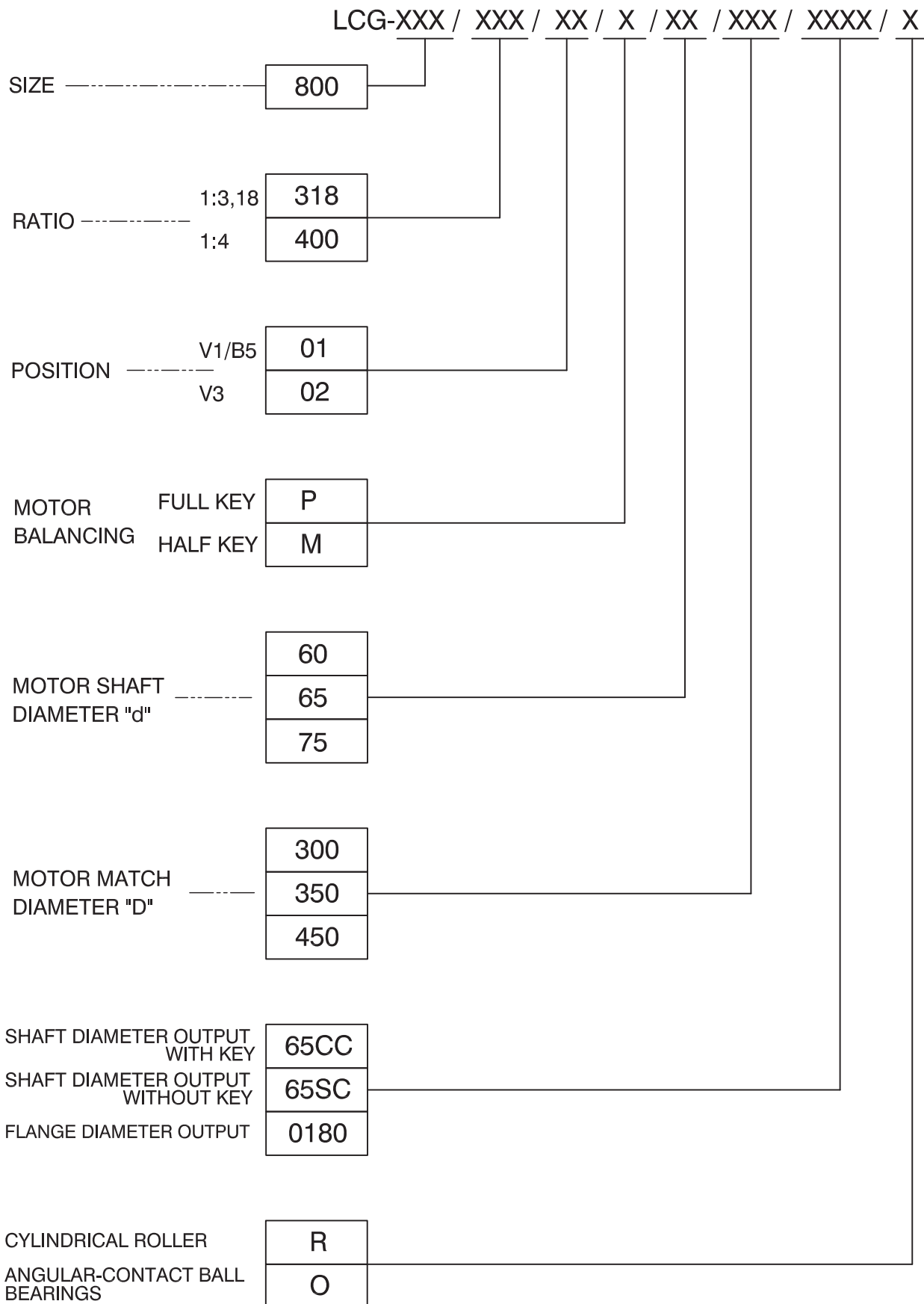
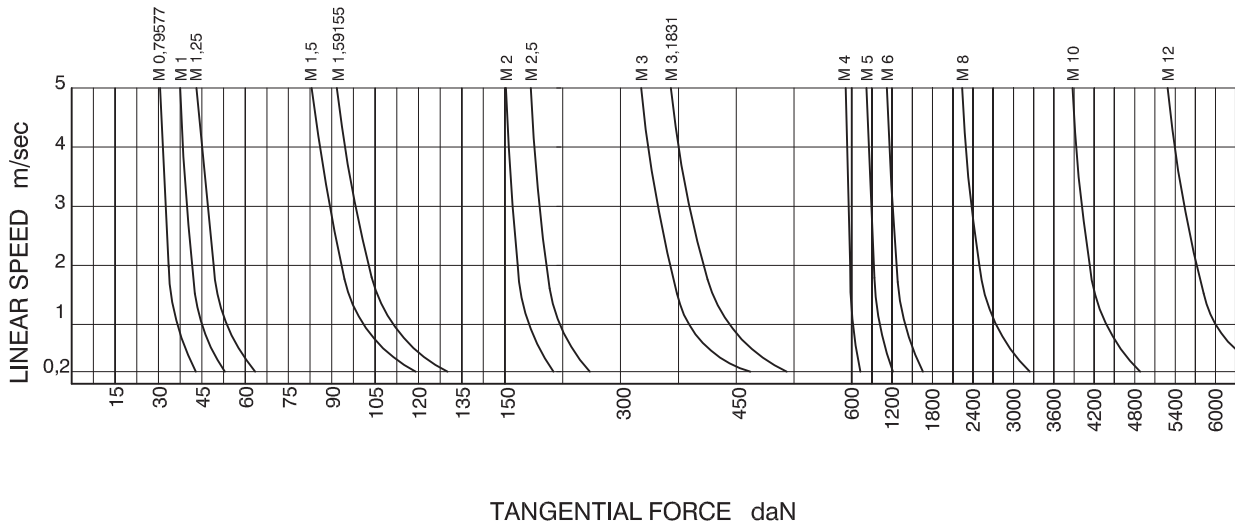




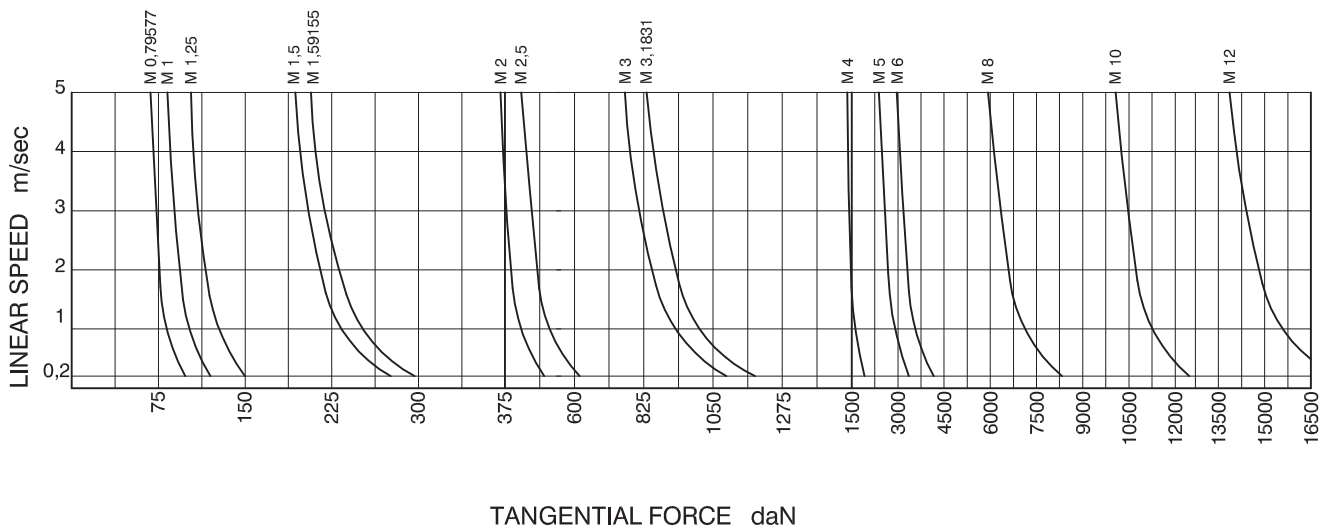
DIAGRAM FOR SELECTING STRAIGHT TOOTHING MODULE

TABLE
DMD

MATERIAL : UNI C45 (AISI-SAE 1045) Quenched & tempered - Type A



MATERIALE : UNI C45 (AISI-SAE 1045) Induction hardened & tempered teeth HRC ≥ 52 - Type B



MATERIAL : UNI 18NiCrMo5 (AISI-SAE 4320) Casehardened & tempered teeth HRC 58÷62 - Type C

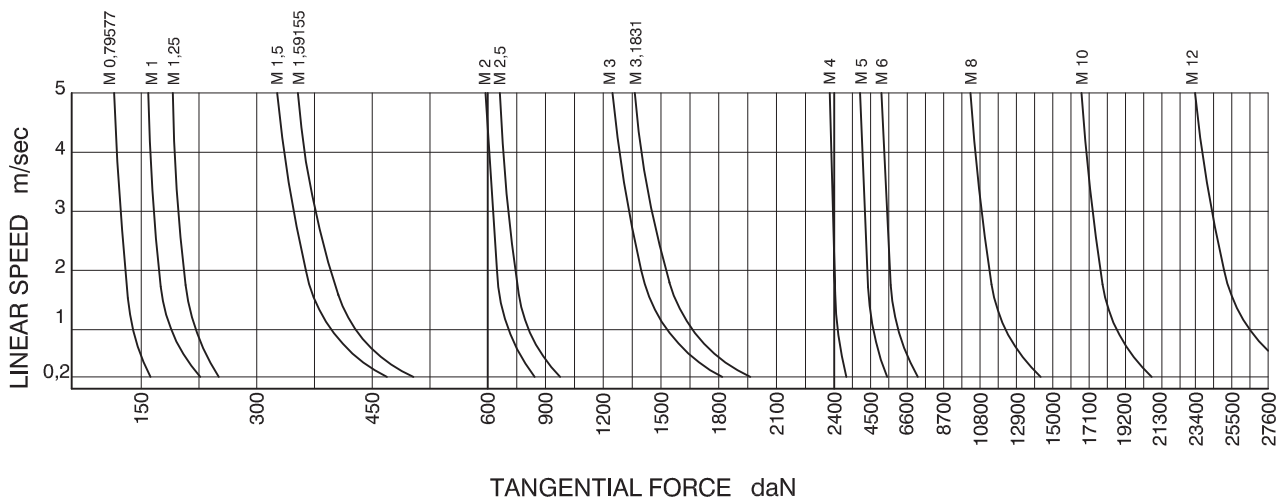
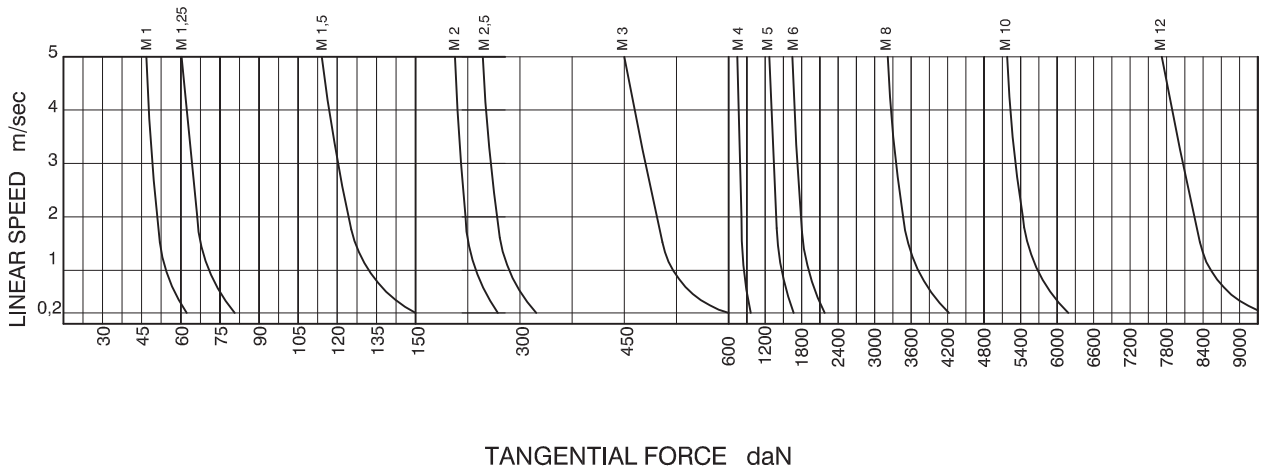




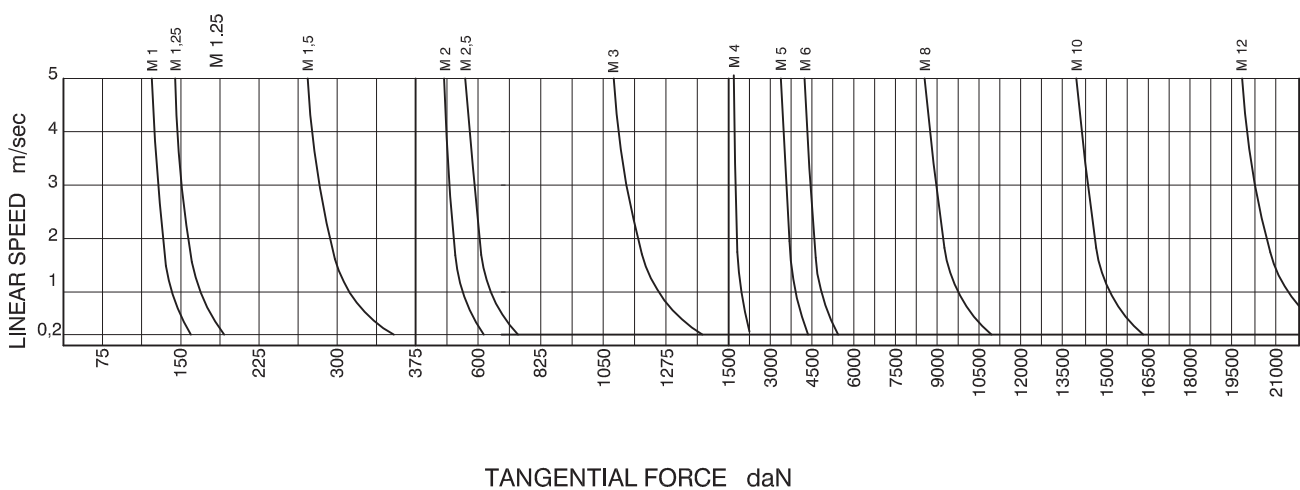
DIAGRAM FOR SELECTING HELICAL TOOTHING MODULE

TABLE
DME

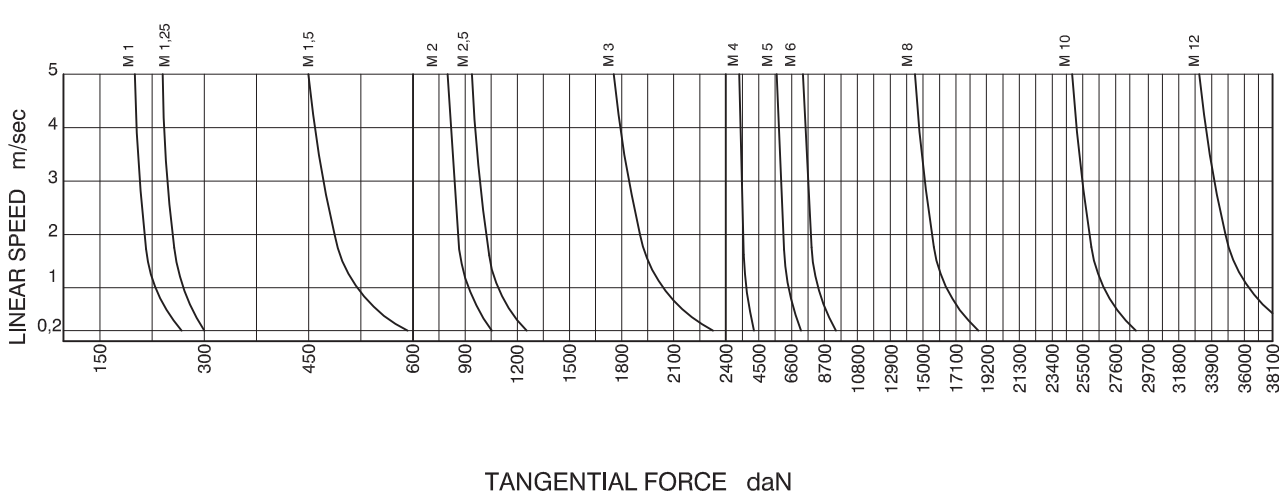
MATERIAL : UNI C45 (AISI-SAE 1045) Quenched & tempered - Type A



MATERIALE : UNI C45 (AISI-SAE 1045) Induction hardened & tempered teeth HRC ≥ 52 - Type B



MATERIAL : UNI 18NiCrMo5 (AISI-SAE 4320) Casehardened & tempered teeth HRC 58÷62 - Type C

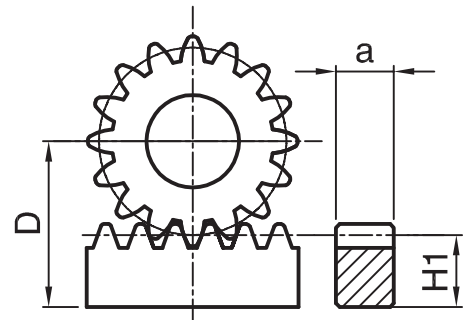


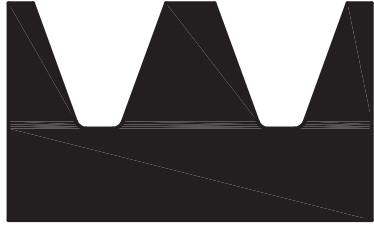
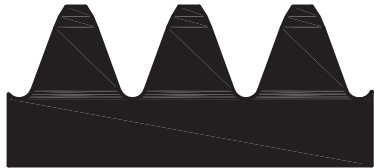
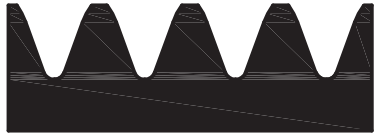


EXAMPLE OF SIZE COMPARISON WITH EQUAL PERFORMANCE RATING

INPUT DATA

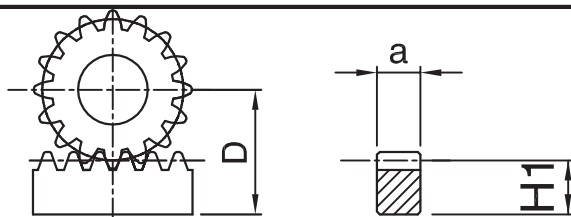
- REQUIRED TANGENTIAL FORCE : 640 daN
- SAFETY COEFFICIENT : 3,5
- CORRECT TANGENTIAL FORCE : 2240 daN
- LINEAR SPEED : 1 m/sec
- TOOTHING : STRAIGHT
- PINION : Z=20
- ACCELERATION : $A=3 \text{ m/sec}^2$



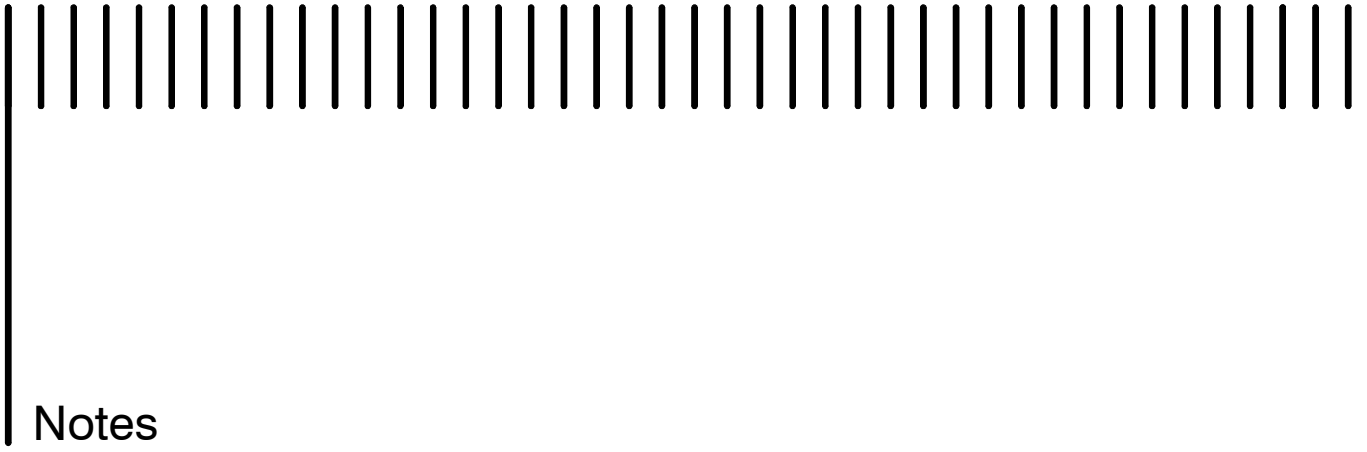
Type	Material	Module	a	H1	D	Pinion r.p.m.	Max Torque on pinion Nm	Max. tangential force daN	Rack teeth
A	Hardened & tempered	8	80	85,90	170,74	120	2230	2790	
B	Induction hardened & tempered	5	50	59,28	112,32	190	1400	2800	
C	Casehardened & tempered	4	36	45,45	87,87	240	1080	2700	

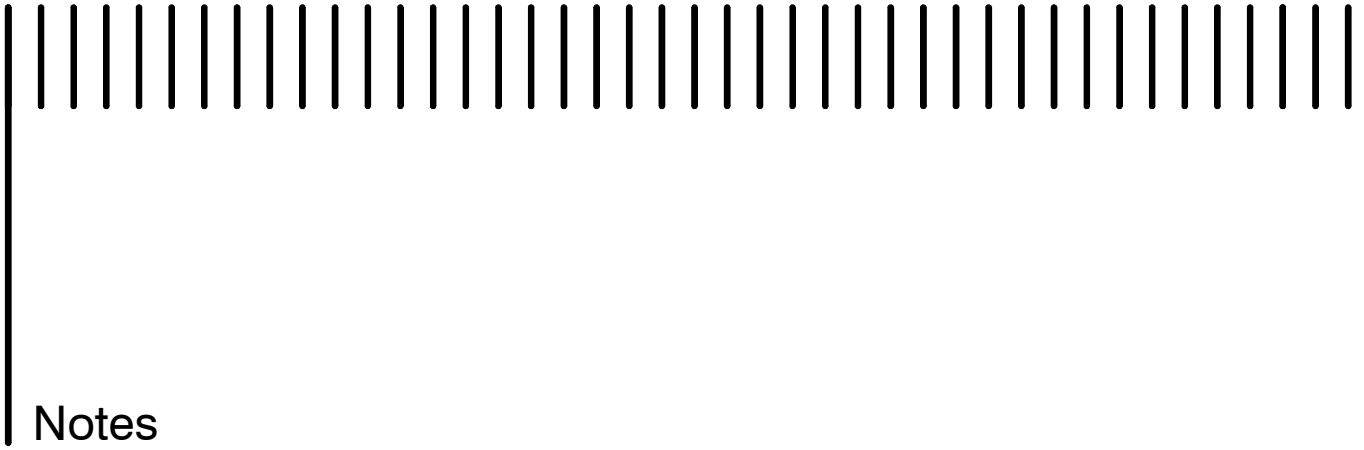


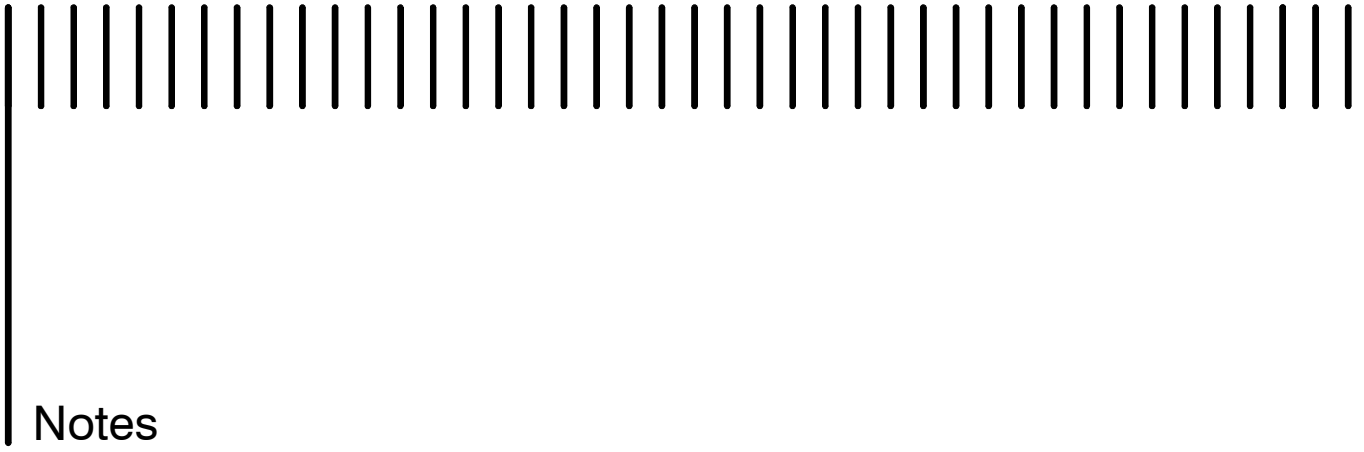
SUMMARY TABLE OF PERFORMANCE LEVELS FOR PINION $Z = 20$ SPEED = 1m/sec

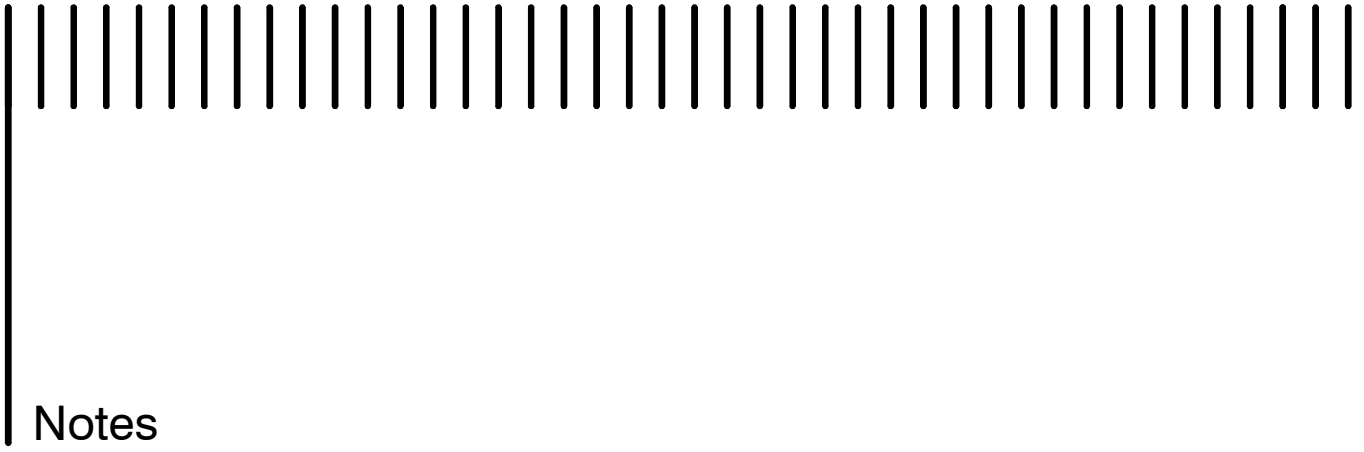


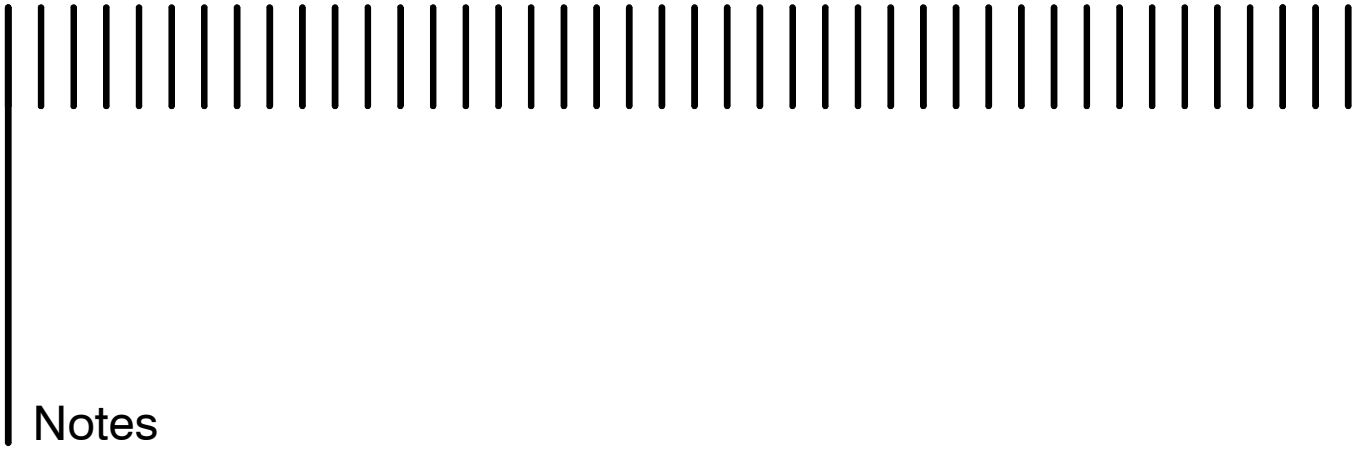
Toothings	Module	a	H1	D	r.p.m. Pinion	Type A		Type B		Type C	
						Quenched & tempered		Induction hardened & tempered		Casehardened & tempered	
						Torque on pinion Nm	Tangential force daN	Torque on pinion Nm	Tangential force daN	Torque on pinion Nm	Tangential force daN
Straight version	0,79577	10	24,20	32,63	1200	2,8	35	6,5	80	11	140
	1	10	24,00	34,57	960	4,4	45	10,5	105	17,5	175
	1,25	10	23,75	36,95	760	7	55	16,5	130	27,5	220
	1,5	15	23,50	39,32	640	15	100	35	230	59	390
	1,59155	15	23,41	40,19	600	17	110	40	250	67	420
	2	20	28,00	49,10	480	35	175	83	415	140	700
	2,5	20	27,50	53,90	380	55	220	130	520	220	880
	3	30	37,00	68,72	320	118	390	280	930	470	1570
	3,18310	30	36,82	70,46	300	130	410	315	990	530	1670
	4	36	45,45	87,87	240	250	630	640	1600	1080	2700
	5	50	59,28	112,32	190	550	1100	1400	2800	2360	4720
	6	55	68,15	131,82	160	865	1440	2210	3680	3730	6220
	8	80	85,90	170,74	120	2230	2790	5730	7160	9680	12100
	10	100	93,60	199,68	95	4360	4360	11200	11200	18900	18900
	12	120	111,35	238,68	80	7200	6000	18800	15700	31800	26500
Helical version	1	10	24,00	35,18	900	6	55	14	130	24	230
	1,25	10	23,75	37,71	720	9	70	21	160	36	270
	1,5	15	23,50	40,24	600	20,5	130	490	310	82,5	520
	2	20	28,00	50,32	450	49	230	115	540	195	920
	2,5	20	27,50	55,42	360	73	275	170	640	290	1090
	3	30	37,00	70,55	300	163	510	385	1210	650	2040
	4	36	45,45	90,31	230	345	810	900	2120	1520	3580
	5	50	59,28	115,37	180	760	1430	2010	3790	3400	6400
	6	55	68,15	135,48	150	1180	1850	3110	4890	5260	8260
	8	80	85,90	175,62	110	3100	3650	8270	9740	13980	16470
	10	100	93,60	205,79	90	6020	5670	16150	15200	27300	25700
	12	120	111,35	246,00	75	10800	8500	27400	21500	46500	36500















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