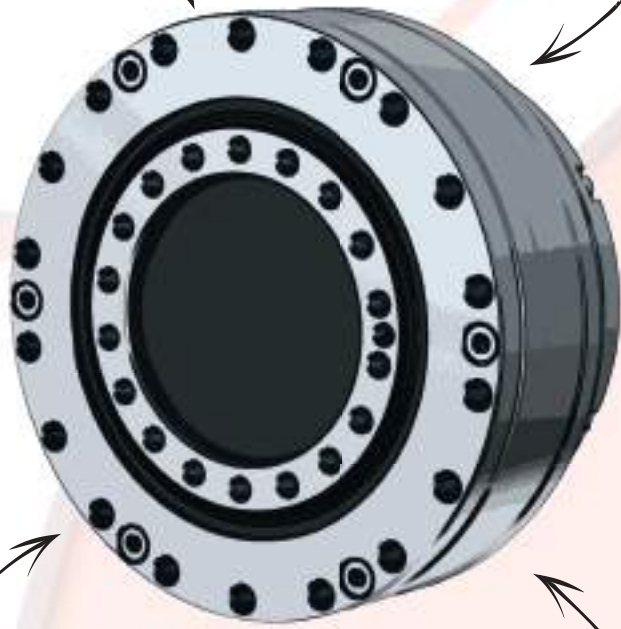




Friction under control

High precision output bearing



Robust design and overload capacity

High torque density



G series

EXCELLENCE IN PERFORMANCE

2.1 G SERIES



Advantages

- high tilting stiffness
- low friction
- high precision output bearing
- high torque density
- reduced lost motion settings
- high torque overload capacity

The **G series** a new generation of TwinSpin® high precision reduction gears with a new design of the main bearing and improved performance for the most demanding applications. G series brings increase in torque to weight ratio in comparison with the previous generation. Innovative design of main bearing reaches unprecedented tilting stiffness, high precision of the output bearing and modularity of design which allows customised solutions. Further improvements introduced with G series brings further friction reduction in transmission mechanism, lower hysteresis and low settings of Lost Motion, especially in small sizes. Finally with G series new sizes of reducers are introduced in standard and hollowshaft design to broaden portfolio and application range of TwinSpin® reducers.

Tab. 2.1a: G series features

Case	Through holes in case
Input flange connection	The shaft sealing / adapter flange is offered in the following versions: a) motor connection flange b) sealed input cover c) without a flange
Input shaft design	The input shaft is offered in the following versions: a) shaft with a keyway b) according to a special request
Installation and operation characteristics	A wider range of modular configurations

Tab. 2.1b: G series ordering specifications

TS - 225 - 55 - G - P24

Name	Size	Ratio	Series version	Shaft version	
				P (DIN 6885)	S
TS	75	41, 63 , 75	G	9	•
	85	33 , 63 , 79	G	11	•
	95	43, 73, 95	G	14	•
	115	43 , 69, 123	G	14	•
	155	53, 109 , 133	G	19	•
	185	57 , 67 , 117 , 139	G	24	•
	225	55 , 69, 137	G	24	•

Note: An example of an ordering code of a modified TwinSpin® G series reduction gear with a motor flange: TS225 - 55 - G - P24 - M235 - P231. The markings M235 and P231 for a specific modification are defined by the manufacturer.

Shaft version


P

Shaft with a keyway


S

Special shaft

Note: Drawings shows maximum possible size of key-way applicable in each size of TwinSpin® reducer.

Tab. 2.1c: G series rating table

Size	Reduction ratio	Rated output torque	Max. acceleration / deceleration torque	Maximum permissible torque at emergency / E-stop	Rated input speed	Maximum input speed 10)	Lost motion	Hysteresis	Angular transmission error 1) 7)	No-load starting torque (max.) 9)
	i	T_r [Nm]	T_{acc} [Nm]	T_{em} [Nm]	n_r [rpm]	n_{max} [rpm]	LM [arcmin]	H [arcmin]	ATE [arcsec]	[Nm]
TS 75	41	35	70	175	2 000	4 800	<1	<1	72	0.15
	63					5 000				0.1
	75					5 400				0.1
TS 85	33	75	150	375	2 000	4 400	<1	<1	72	0.25
	63					4 800				0.2
	79					5 000				0.2
TS 95	43	85	170	425	2 000	4 000	<1	<1	72	0.35
	73					4 500				0.3
	95					4 800				0.3
TS 115	43	173	346	865	2 000	4 200	<1	<1	60	0.5
	69					4 300				0.45
	123					4 800				0.4
TS 155	53	460	1 150	2 300	2 000	3 400	<1	<1	40	0.8
	109					3 800				0.6
	133					4 200				0.6
TS 185	57	780	1 950	3 900	2 000	3 500	<1	<1	30	1.4
	67					3 700				1.4
	117					4 300				1.2
	139					4 400				1.2
TS 225	55	1 270	3 175	6 350	2 000	3 200	<1	<1	30	1.8
	69					3 400				1.5
	137					4 000				1.4

RIGHT TO CHANGE WITHOUT PRIOR NOTICE RESERVED

- 1) Mean statistical value. For further information see chapter Torsional stiffness, Tilting stiffness.
- 2) Load at output speed 15 rpm and $L_{10} = 12\ 000$ hrs.
- 3) Moment M_c value for $F_a = 0$. If $F_a \neq 0$, see chapter 3.5.
- 4) Axial force $F_{a,max}$ value for $M_c = 0$. If $M_c \neq 0$ see chapter 3.5.
- 6) The parameter depends on the version of the high precision reduction gear.
- 7) The parameter depends on the version of the high precision reduction gear, ratio and lost motion.
- 8) The values of the parameters are informative. The exact value depends on the specific version of the high precision reduction gear.
- 9) Temperatures of the high precision reduction gear lower than 20°C will cause higher no-load starting or back driving torque.
- 10) Instantaneous speed peak that may occur within the working cycle.

Tab. 2.1c: G series rating table - continued

Size	Reduction ratio	Max. backdriving torque 9)	Torsional stiffness 50-100% T _r 1)	Moment stiffness 1)	Rated moment 2) 3)	Allowable moment	Allowable radial force 2)	Allowable axial force 2) 4)	Input inertia 8)	Weight 8)
	i	[Nm]	k _t [Nm/arcmin]	M _t [Nm/arcmin]	M _c [Nm]	M _{cmax} [Nm]	F _r [kN]	F _{a max} [kN]	I [10 ⁻⁴ kgm ²]	m [kg]
TS 75	41	5	8.1	70	95	190	1.8	6.4	0.019	0.95
	63	8	8.2							
	75	10	8.4							
TS 85	33	5	9.5	90	168	336	2.2	6.8	0.034	1.7
	63	15	10.8							
	79	20	10.8							
TS 95	43	20	15	120	205	410	3.5	11.1	0.14	1.9
	73	27	15.3							
	95	38	15.5							
TS 115	43	18	31	220	275	550	4	12.5	0.29	3.2
	69	30	31							
	123	42	32							
TS 155	53	50	85	900	820	1 640	8.3	26.1	0.96	8.3
	109	80	88							
	133	115	90							
TS 185	57	85	147	1 300	1 700	3 400	13.9	43	1.98	12.8
	67	90	148							
	117	120	150							
	139	135	152							
TS 225	55	60	258	2 300	2 190	4 380	15.2	47.4	3.2	22.4
	69	80	300							
	137	230	308							

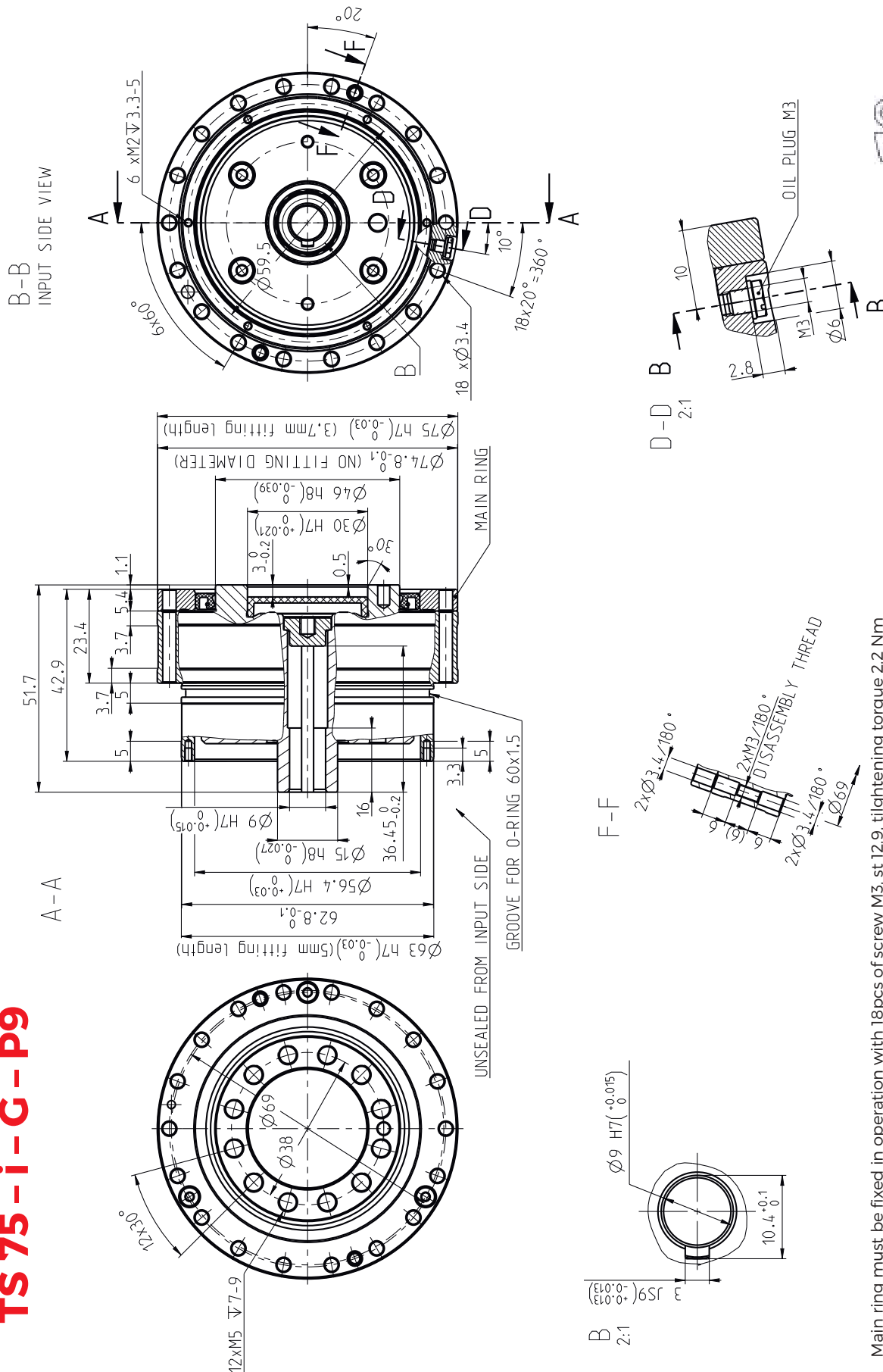
IMPORTANT NOTES:

- Load values in the table are valid for the nominal life of L₁₀ = 6 000 [Hrs].
- High precision reduction gears are preferred for intermittent cycles (S3-S8); the output speed in applications is inverted-variable.
- The continuous mode cycle (S1) is needed to be consulted with the manufacturer.
- If the output speed in application is less than 0.1 rpm please consult with the manufacturer.
- The values in the table refer to the nominal operating temperature.
- Please note the temperature on the gear case that should not exceed significantly 60°C degrees.

The ratios highlighted in bold are recommended by SPINEA as optimal versions in terms of price and delivery.

TS 75 - i - G - P9

TS 75 - i - G - P9

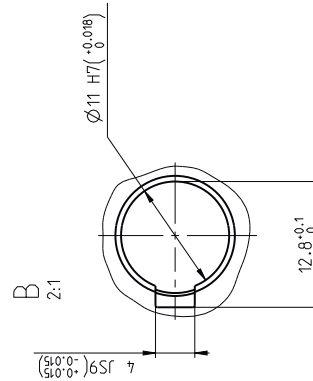
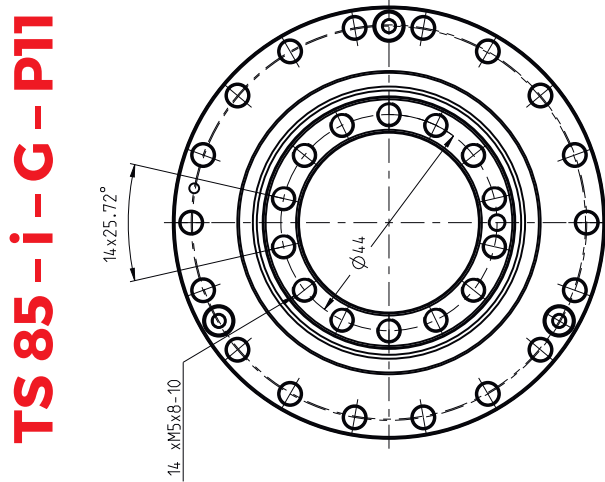
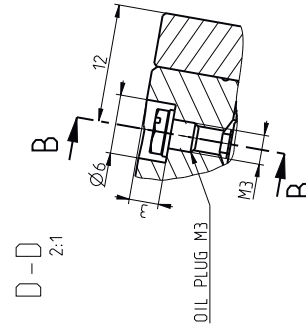
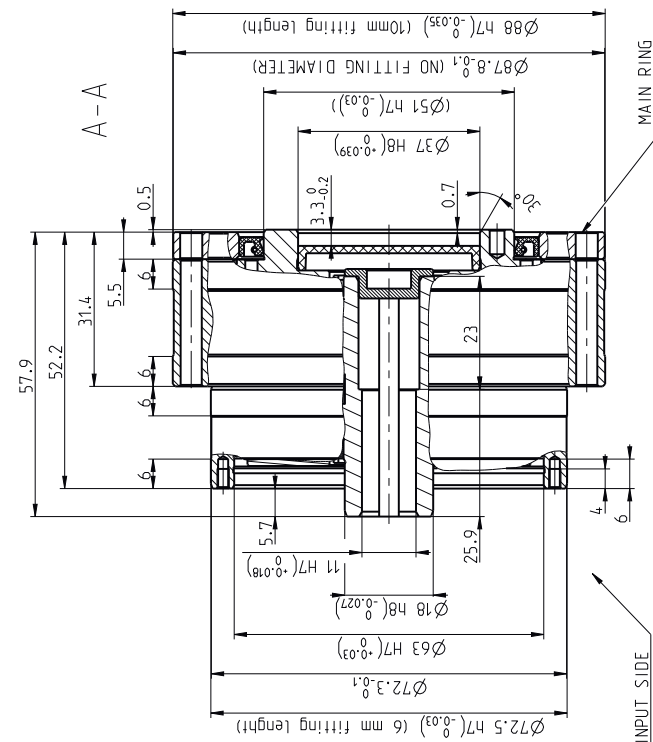
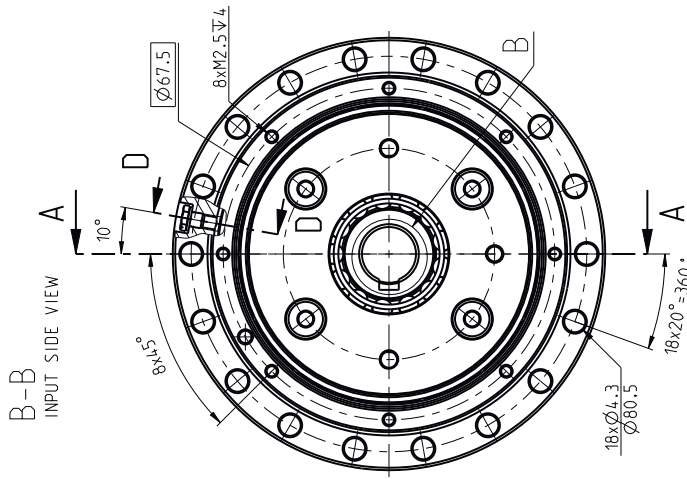


1. Main ring must be fixed in operation with 18pcs of screw M3, st 12.9, tightening torque 2.2 Nm
 2. Unsealed space, see assembly manual in catalogue TS G
- RECOMMENDATION FOR SEALING MOTOR FLANGE:**
 Recommended tolerance for fitting diameter ($\phi 56.4_{-0.03}^{+0.06}$)



TS 85 - i - G - P11

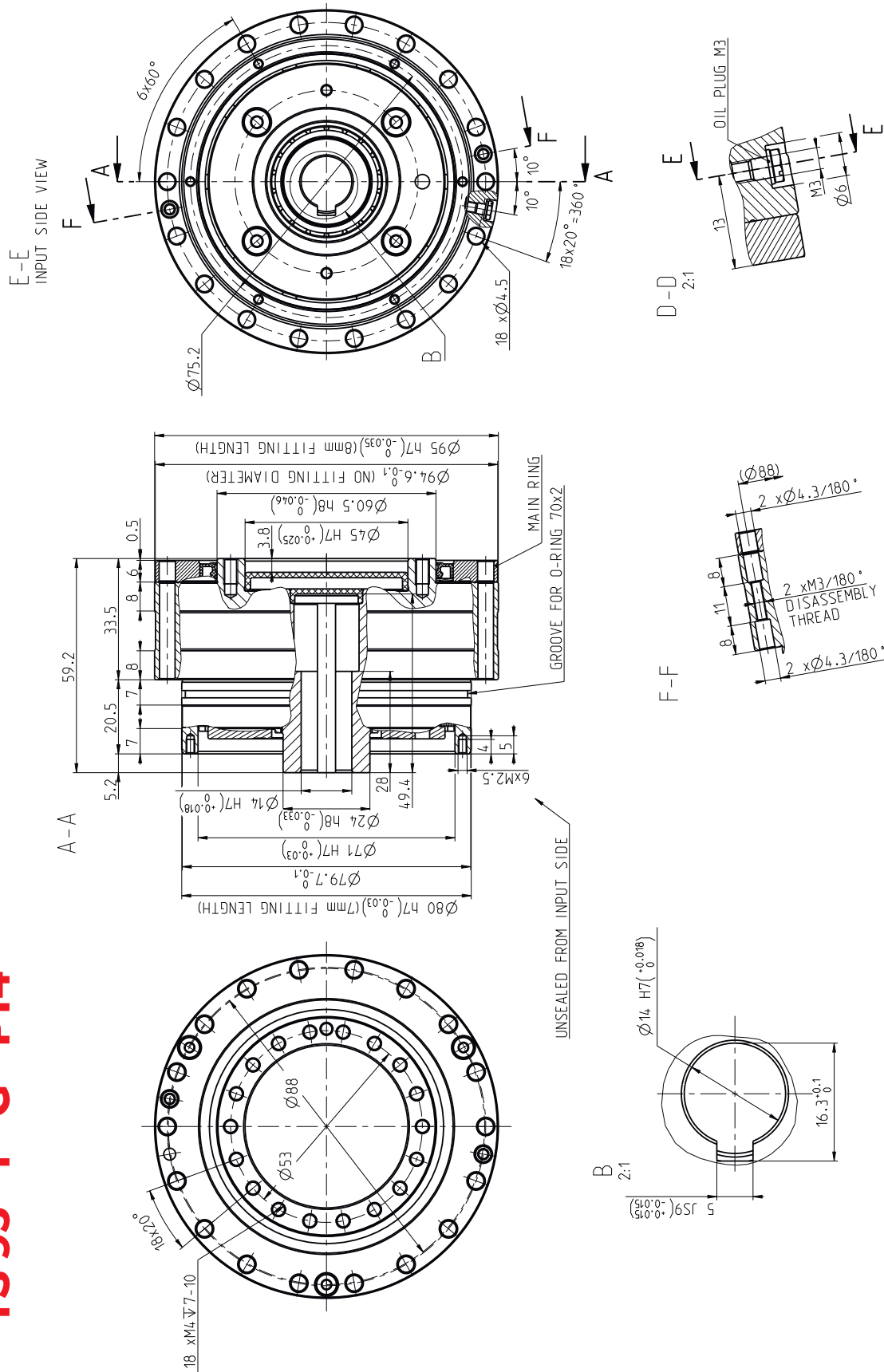
G series



1. Main ring must be fixed in operation with 18 pcs of screw M4, st 12.9, tilting torque 5 Nm
2. Unsealed space, see assembly manual in catalogue TS G
RECOMMENDATION FOR SEALING MOTOR FLANGE:
 Recommended tolerance for fitting diameter ($\phi 63_{-0.03}^{+0.06}$)

TS 95 - i - G - P14

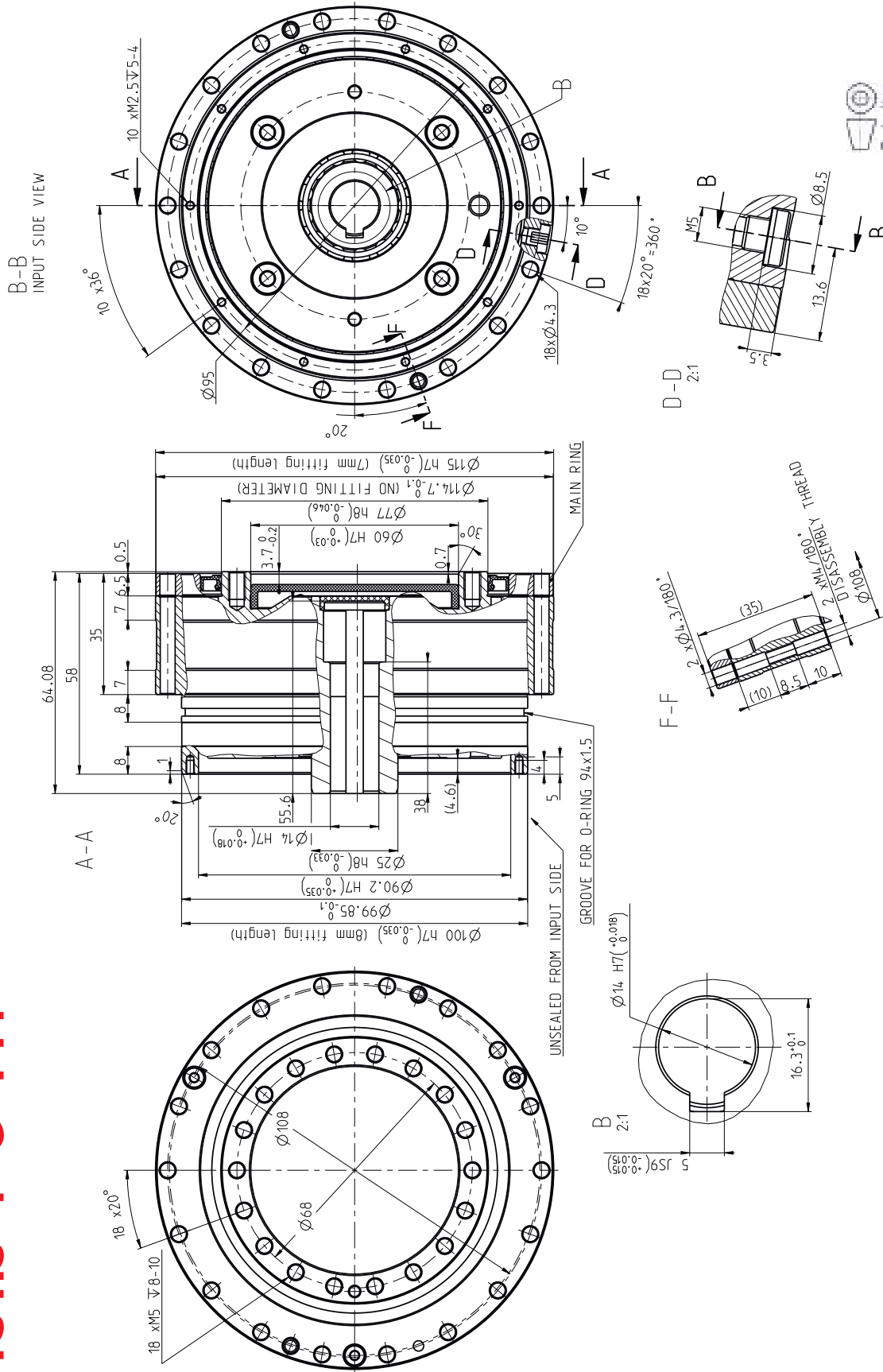
TS 95 - i - G - P14



1. Main ring must be fixed in operation with 18 pcs of screw M4, st 12.9, tilting torque 5 Nm
 2. Unsealed space, see assembly manual in catalogue TS G
- RECOMMENDATION FOR SEALING MOTOR FLANGE:**
 Recommended tolerance for fitting diameter ($\phi 71_{-0.003}^{+0.008}$)



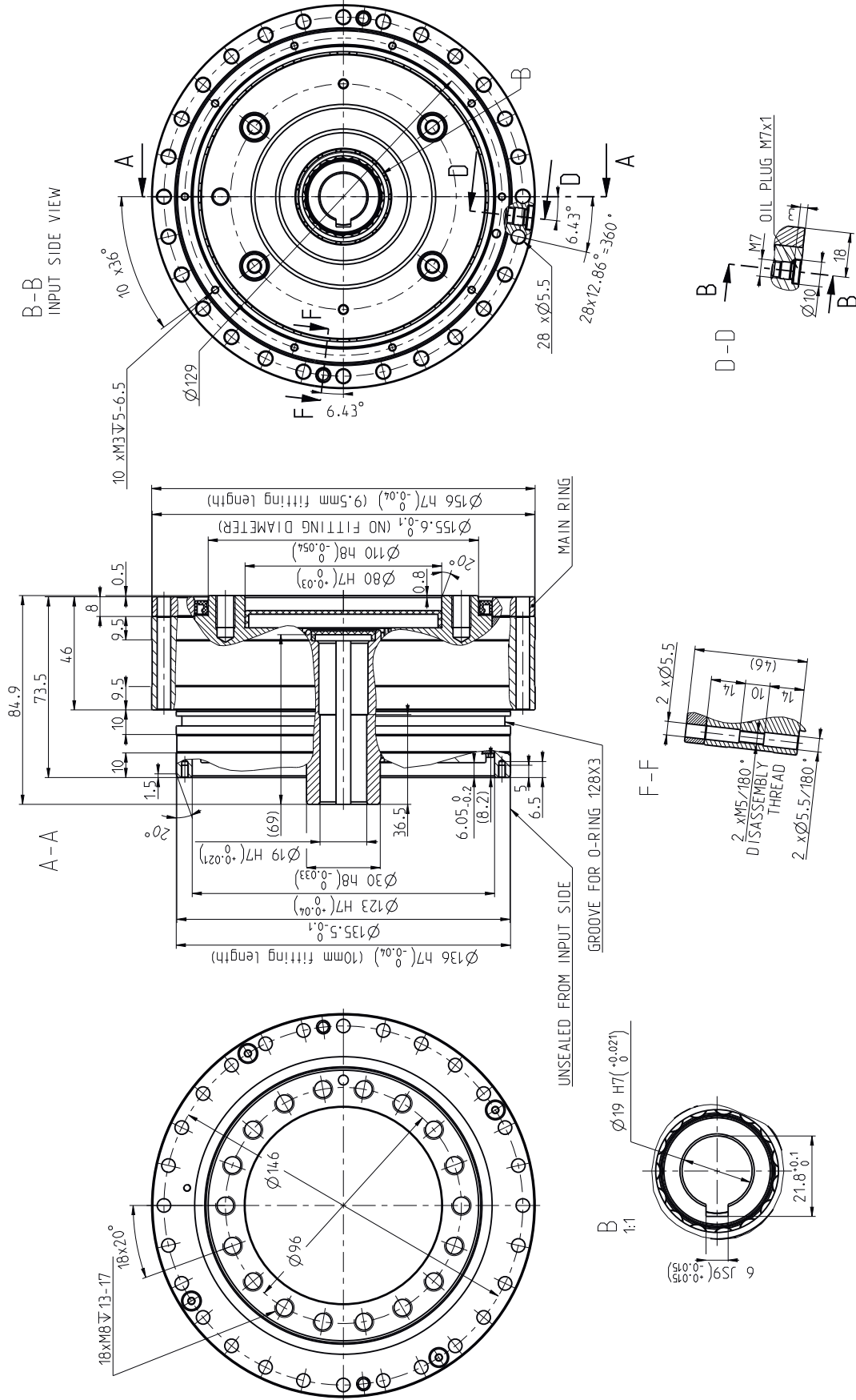
TS 115-i-G-P14



1. Main ring must be fixed in operation with 18 pcs of screw M4, st 12.9, tightening torque 5 Nm
 2. Unsealed space, see assembly manual in catalogue TS G
- RECOMMENDATION FOR SEALING MOTOR FLANGE:**
 Recommended tolerance for fitting diameter ($\phi 90.2$ $\frac{-0.05}{-0.06}$)

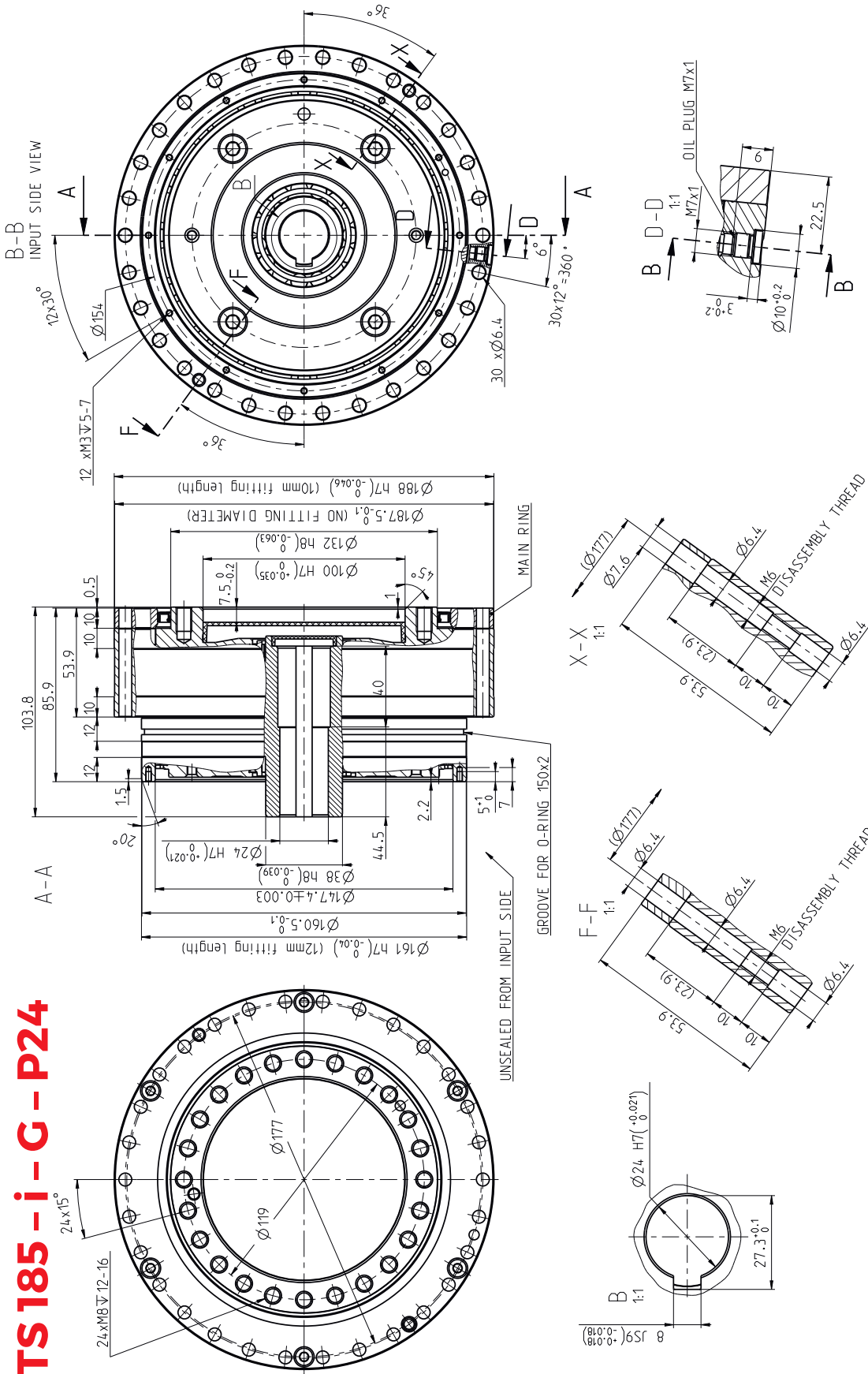
TS 155 - i - G - P19

TS 155 - i - G - P19



1. Main ring must be fixed in operation with 28pcs of screw M5, st 12.9, tightening torque 8 Nm
 2. Unsealed space, see assembly manual in catalogue TS G
- RECOMMENDATION FOR SEALING MOTOR FLANGE:**
 Recommended tolerance for fitting diameter (φ123 ^{-0.03}/_{-0.06})





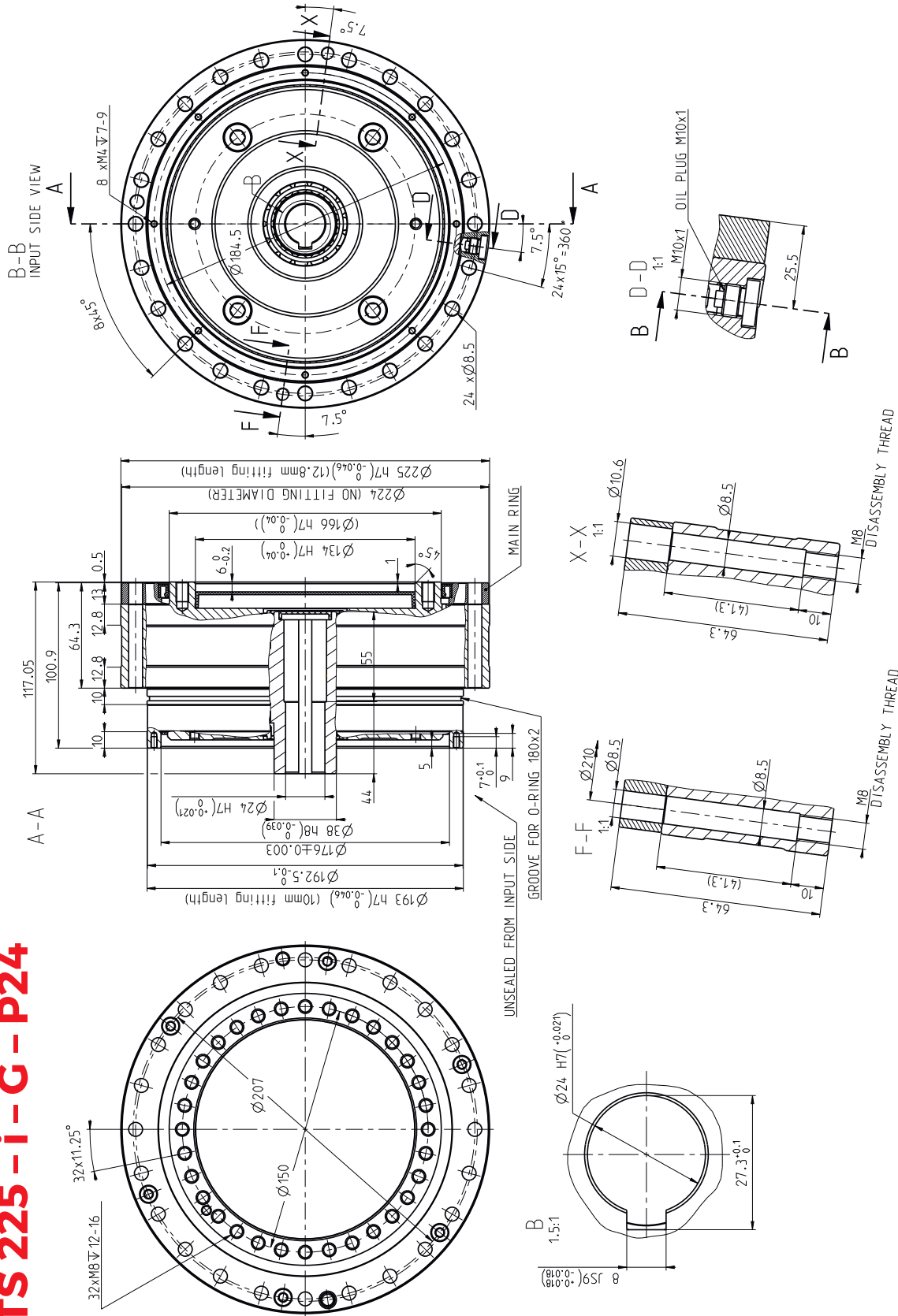
1. Main ring must be fixed in operation with 30pcs of screw M6, st 12.9, tightening torque 17 Nm
2. Unsealed space, see assembly manual in catalogue TS G
RECOMMENDATION FOR SEALING MOTOR FLANGE:
Recommended tolerance for fitting diameter ($\phi 147.4_{-0.05}^{+0.03}$)

TS 185 - i - G - P24

TS 225 - i - G - P24



TS 225 - i - G - P24



1. Main ring must be fixed in operation with 24pcs of screw M8, st 12.9, tightening torque 42 Nm
 2. Unsealed space, see assembly manual in catalogue TS G
- RECOMMENDATION FOR SEALING MOTOR FLANGE:**
 Recommended tolerance for fitting diameter (Ø176^{+0.003}_{-0.006})



2.2 GH SERIES



Tab. 2.1d: GH series rating table

Size	Reduction ratio	Rated output torque	Max. acceleration / deceleration torque	Maximum permissible torque at emergency / E-stop	Rated input speed	Maximum input speed (10)	Lost motion	Hysteresis	Angular transmission error (1) 7)	No-load starting torque (max) 9)
	i	T_r [Nm]	T_{acc} [Nm]	T_{em} [Nm]	n_r [rpm]	n_{max} [rpm]	LM [arcmin]	H [arcmin]	ATE [arcsec]	[Nm]
TS 85	47	41	82	205	2 000	3 800	<1	<1	72	0.6
	85					4 500				0.4
TS 115	55	130	260	650	2 000	2 500	<1	<1	60	0.6
	123					3 500				0.5
TS 125	49	180	450	900	2 000	2 400	<1	<1	60	1.5
	99					3 800				1.3

RIGHT TO CHANGE WITHOUT PRIOR NOTICE RESERVED

- 1) Mean statistical value. For further information see chapter Torsional stiffness, Tilting stiffness.
- 2) Load at output speed 15 rpm and $L_{10} = 12\ 000$ hrs.
- 3) Moment M_c value for $F_a = 0$. If $F_a \neq 0$, see chapter 3.5.
- 4) Axial force $F_{a,max}$ value for $M_c = 0$. If $M_c \neq 0$ see chapter 3.5.
- 6) The parameter depends on the version of the high precision reduction gear.
- 7) The parameter depends on the version of the high precision reduction gear, ratio and lost motion.
- 8) The values of the parameters are informative. The exact value depends on the specific version of the high precision reduction gear.
- 9) Temperatures of the high precision reduction gear lower than 20°C will cause higher no-load starting or back driving torque.
- 10) Instantaneous speed peak that may occur within the working cycle.

Tab. 2.1d: GH series rating table - continued

Size	Reduction ratio	Max. backdriving torque 9)	Torsional stiffness 50-100% T_r 1)	Moment stiffness 1)	Rated moment 2) 3)	Allowable moment	Allowable radial force 2)	Allowable axial force 2) 4)	Input inertia 8)	Weight 8)
	i	[Nm]	k_t [Nm/arcmin]	M_t [Nm/arcmin]	M_c [Nm]	M_{cmax} [Nm]	F_r [kN]	$F_{a,max}$ [kN]	I [10^{-4} kgm ²]	m [kg]
TS 85	47	25	9.5	85	110	220	2	6	0.29	1.3
	85	36	9.7							
TS 115	55	42	21	200	275	550	4	12.5	0.65	2.9
	123	91	25							
TS 125	49	40	28	280	440	880	4.4	13.8	1.06	3.6
	99	95	29							

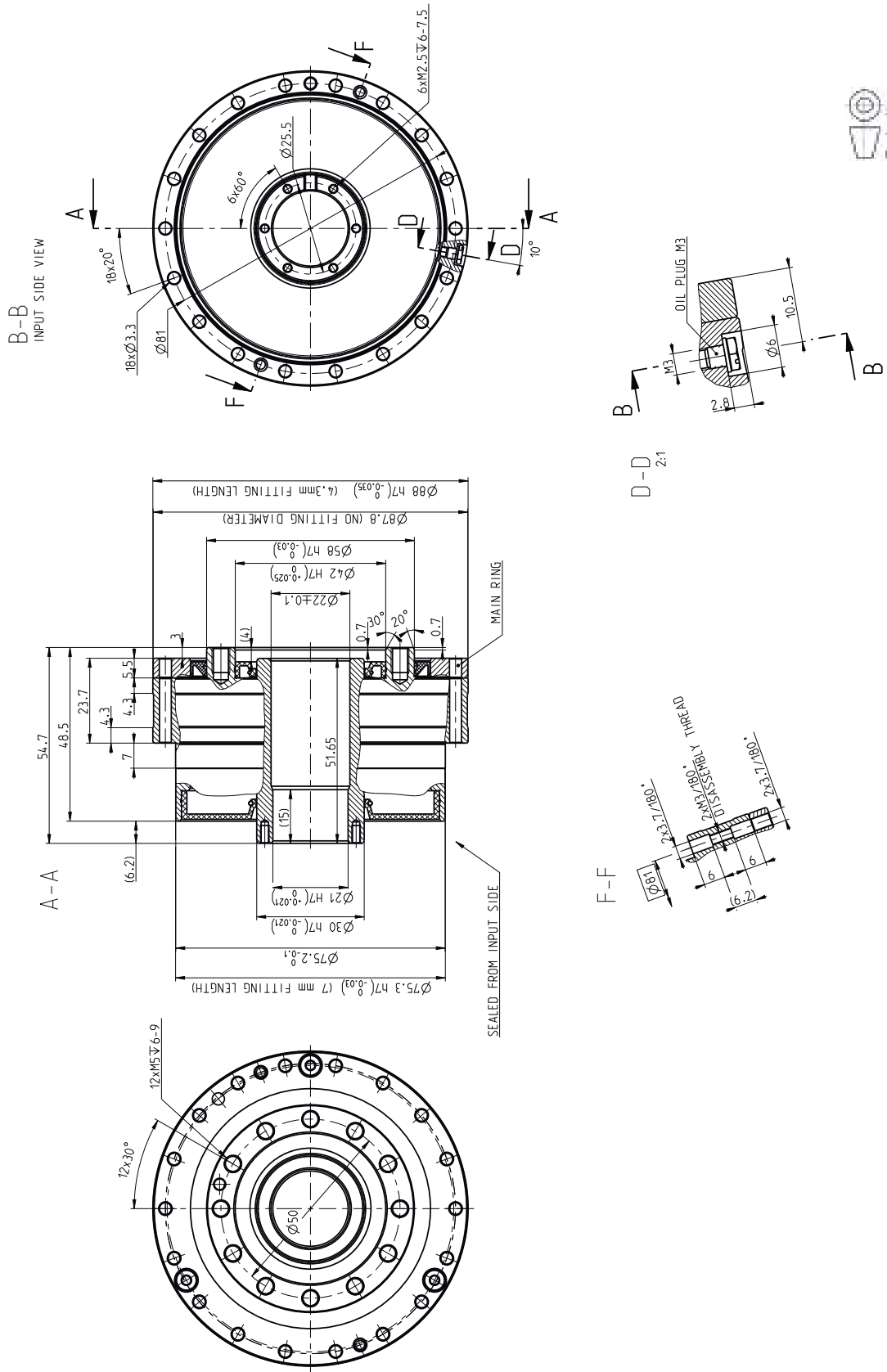
IMPORTANT NOTES:

- Load values in the table are valid for the nominal life of $L_{10} = 6\,000$ [Hrs].
- High precision reduction gears are preferred for intermittent cycles (S3-S8); the output speed in applications is inverted-variable.
- The continuous mode cycle (S1) is needed to be consulted with the manufacturer.
- If the output speed in application is less than 0.1 rpm please consult with the manufacturer.
- The values in the table refer to the nominal operating temperature.
- Please note the temperature on the gear case that should not exceed significantly 60°C degrees.

The ratios highlighted in bold are recommended by SPINEA as optimal versions in terms of price and delivery.

TS 85 - i - GH - H25

TS 85 - i - GH - H25

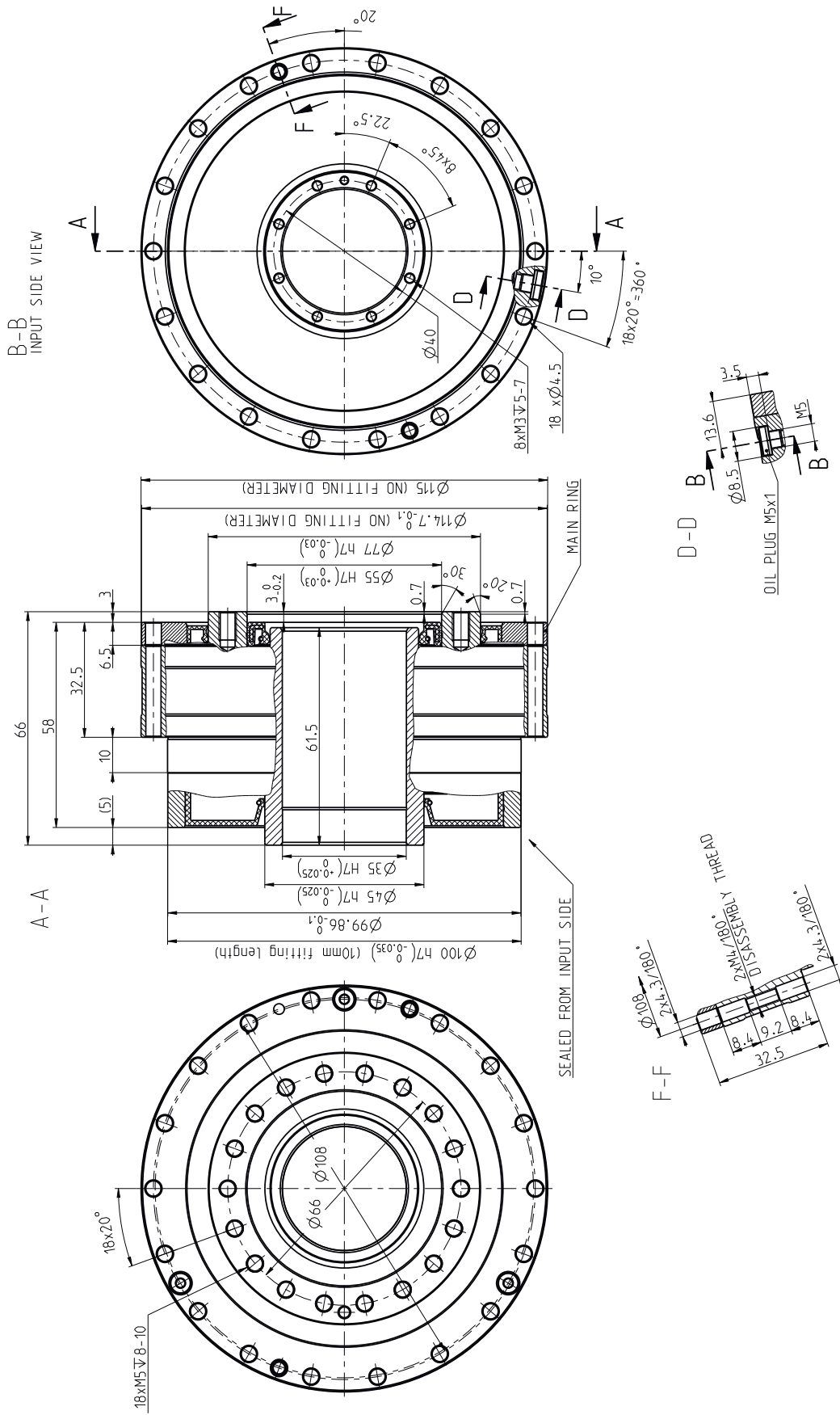


1. Main ring must be fixed in operation with 18pcs of screw M3, st 12.9, tightening torque 1.8 Nm

TS 115 - i - GH - H35

G series

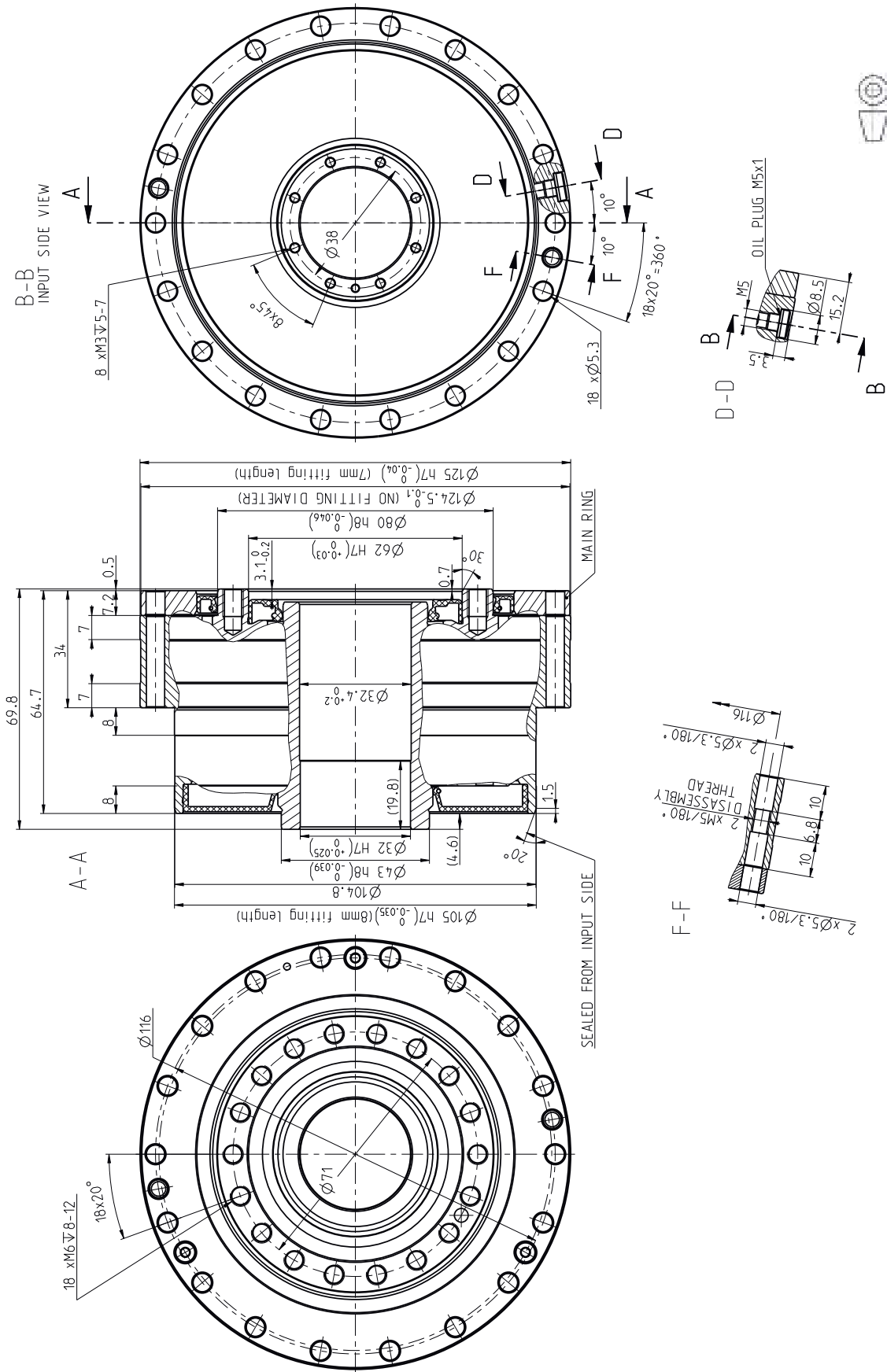
TS 115 - i - GH - H35



1. Main ring must be fixed in operation with 18pcs of screw M3, st 12.9, tightening torque 5 Nm

TS 125 - i - GH - H32

TS 125 - i - GH - H32



1. Main ring must be fixed in operation with 18pcs of screw M5, st 12.9, tightening torque 8 Nm

