





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 introduced the increase in torque to weight ratio in comparison to the previous generation. Innovative design of main bearing resulted in the unprecedented tilting stiffness, high precision of the output bearing, and modularity of design which allows for customized solutions. Further improvements introduced with G series has yielded further friction reduction in transmission mechanism, lower hysteresis and low settings of Lost Motion, especially in small sizes. Finally, new sizes of reducers have been introduced with G series in standard and hollowshaft design to broaden the 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 flange
Input shaft design	The input shaft is offered in the following versions: a) shaft with keyway b) based on special request
Installation and operation characteristics	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	•
	135	35, 97 , 135	G	19	•
	155	53, 109 , 133	G	19	•
	185	57 , 67 , 117 , 139	G	24	•
	225	55 , 69, 137	G	24	•

Note: An example of 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 show 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 9)	Lost motion	Hysteresis	Angular transmission error 6)	No-load starting torque (max.) 8)
	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 135	35	250	625	1 250	2 000	3 600	<1	<1	72	0.25
	97					4 200			42	0.11
	135					4 500			- ¹⁰⁾	- ¹⁰⁾
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

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- 1) Mean statistical value. For further information see chapter Torsion stiffness, Tilting stiffness.
- 2) Load at output speed 15 rpm and L₁₀ = 12 000 hrs.
- 3) Moment M_c value for F_a = 0. If F_a ≠ 0, see chapter 3.5.
- 4) Axial force F_{a,max} value for M_c = 0. If M_c ≠ 0 see chapter 3.5.
- 5) The parameter depends on the high precision reduction gear version.
- 6) The parameter depends on the version of the high precision reduction gear, ratio and lost motion.
- 7) The parameter values are informative. Exact value depends on the specific version of the high precision reduction gear.
- 8) Temperatures of the high precision reduction gear lower than 20°C will cause higher no-load starting or back driving torque.
- 9) Instantaneous speed peak that may occur within the working cycle.
- 10) For more information please contact the SPINEA® sales department.

Tab. 2.1c: G series rating table - continued

Size	Reduction ratio	Max. backdriving torque 8)	Torsional stiffness 50-100% T_r 1) 6)	Tilting stiffness 1) 5)	Rated moment 2) 3)	Allowable moment	Allowable radial force 2)	Allowable axial force 2) 4)	Input inertia 7)	Weight 7)
	i	[Nm]	k_t [Nm/arcmin]	M_t [Nm/arcmin]	M_c [Nm]	M_{cmax} [Nm]	F_{rR} [kN]	$F_{a,max}$ [kN]	I [10^{-4} kgm ²]	m [kg]
TS 75	41	5	8.1	70	87	174	1.8	5.7	0.019	0.95
	63	8	8.2							
	75	10	8.4							
TS 85	33	5	9.5	90	168	336	3.2	10.2	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	280	560	4	12.5	0.29	3.2
	69	30	31							
	123	42	32							
TS 135	35	10	42	420	500	1 000	5.8	18.1	0.67	4.7
	97	12	50							
	135	- ¹⁰⁾	53							
TS 155	53	50	85	900	820	1 640	8.3	26.1	0.96	7.4
	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	21.6
	69	80	300							
	137	230	308							

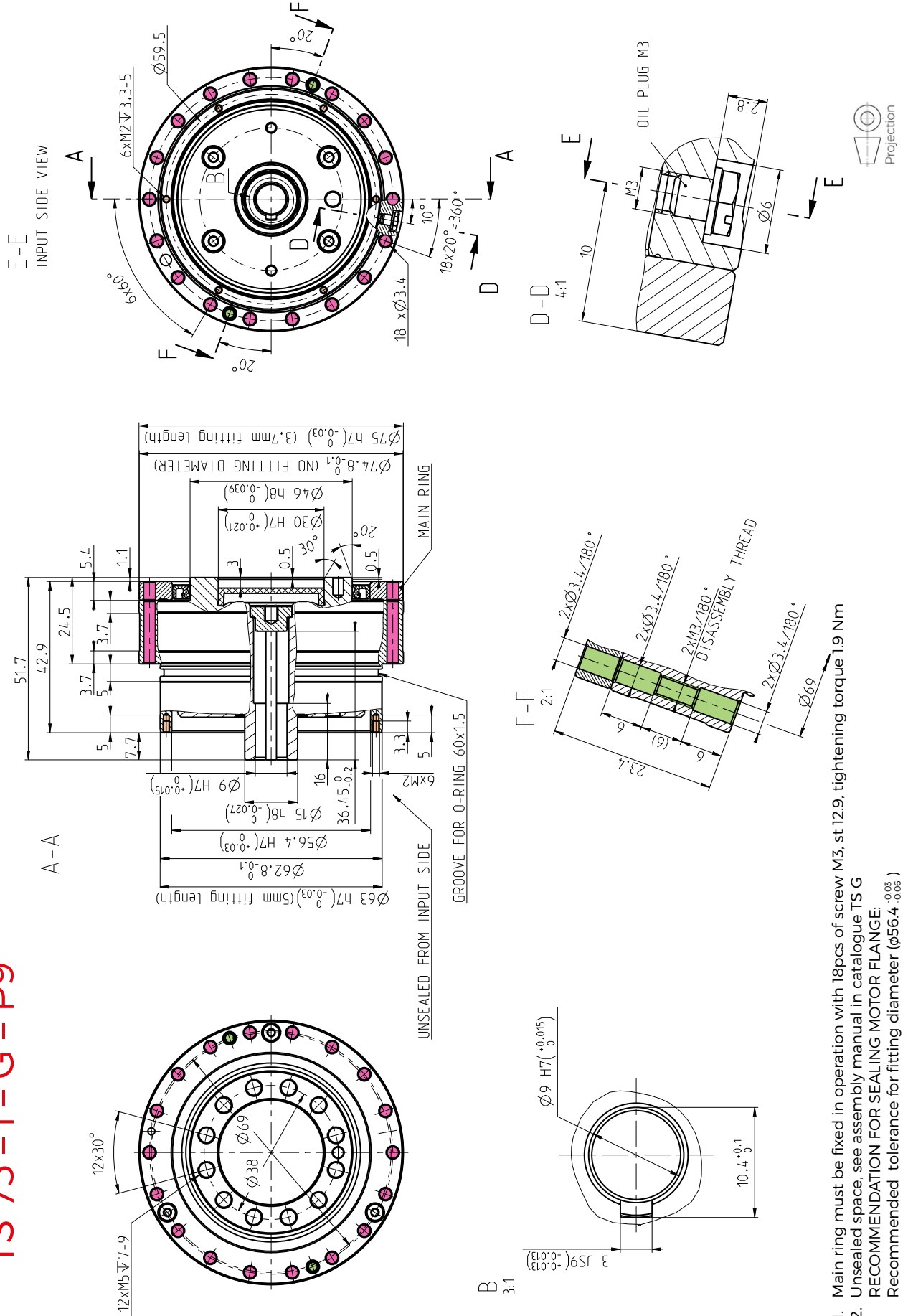
IMPORTANT NOTES:

- 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 an inverted variable.
- The continuous mode cycle (S1) should be consulted with the manufacturer.
- If the output speed in application is below than 0.1 rpm please consult with the manufacturer.
- The values in the table refer to nominal operating temperature.
- Please note the temperature on the gear case that should not exceed 60°C.

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

TS 75 - i - G - P9

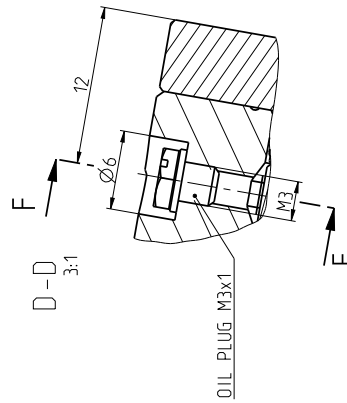
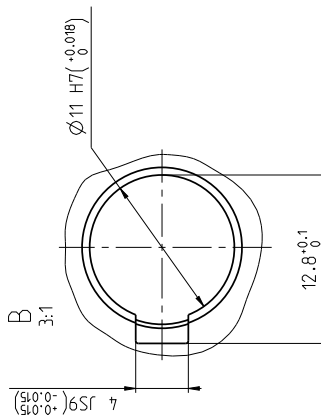
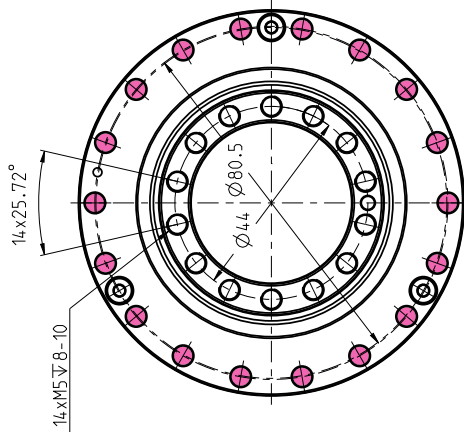
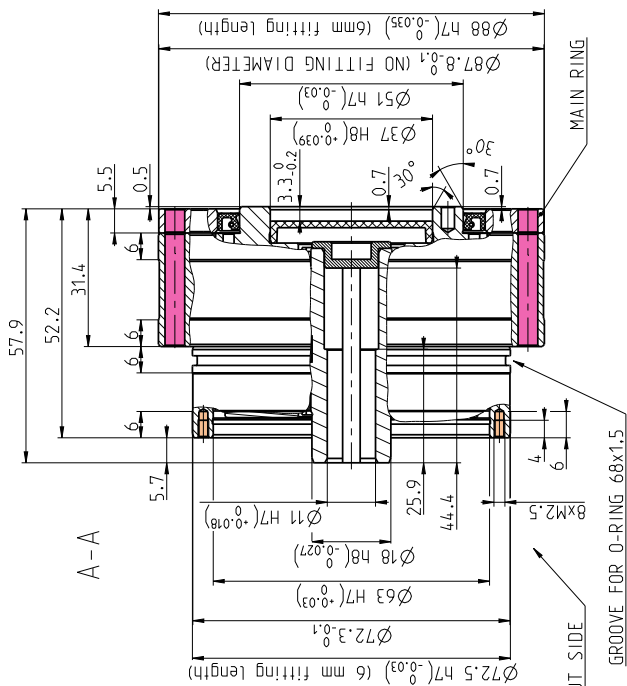
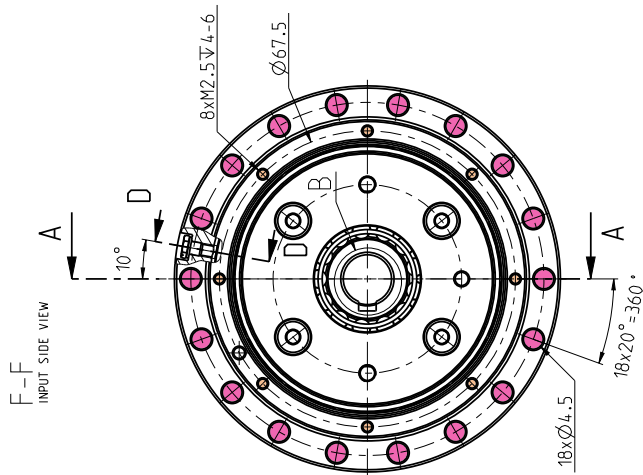
TS 75 - i - G - P9



1. Main ring must be fixed in operation with 18pcs of screw M3, st 12.9, tightening torque 1.9 Nm
2. Unsealed space, see assembly manual in catalogue TS G
RECOMMENDATION FOR SEALING MOTOR FLANGE:
 Recommended tolerance for fitting diameter (Ø56.4^{+0.03} -0.06)

TS 85 - i - G - P11

TS 85 - i - G - P11

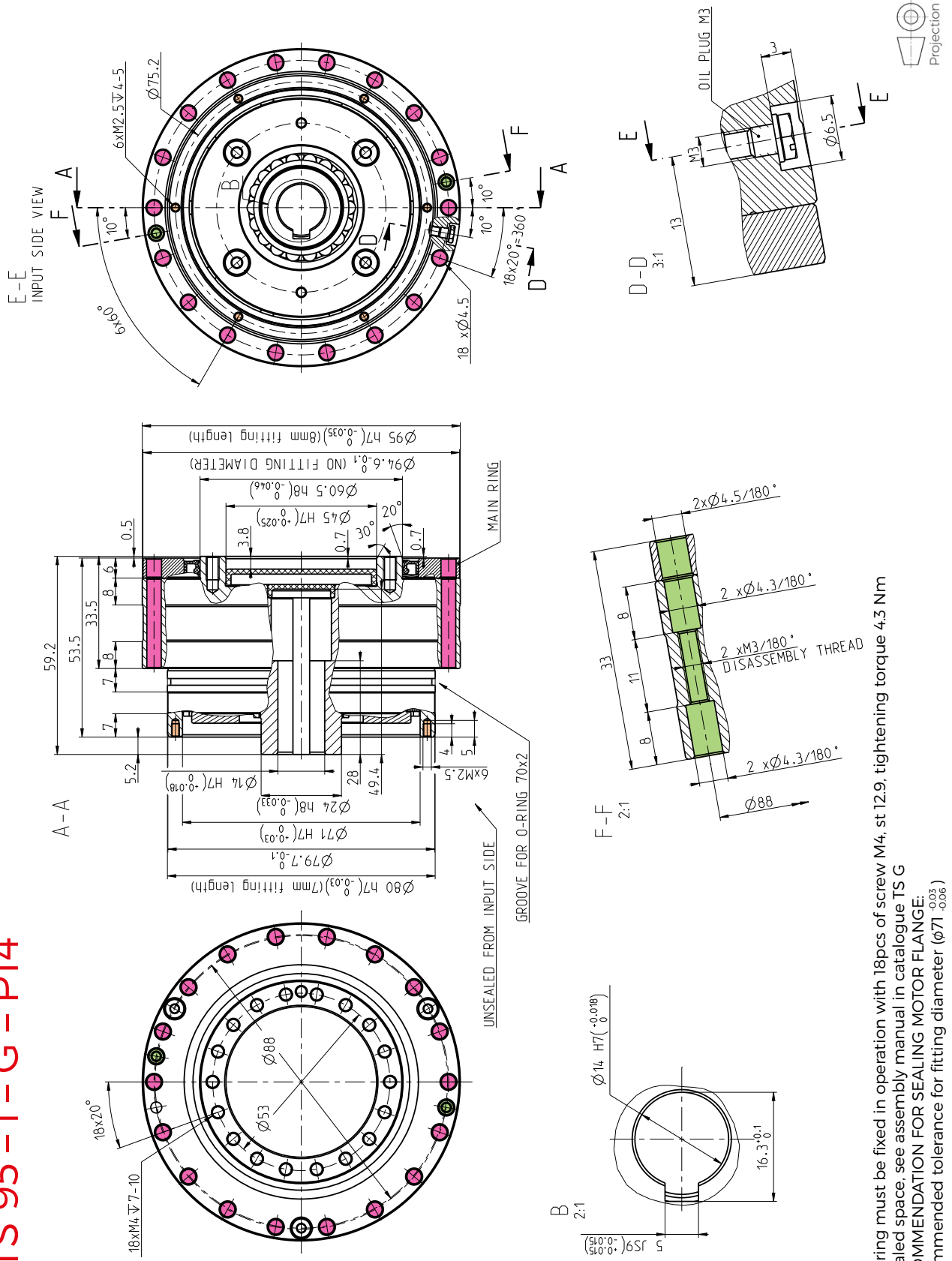


1. Main ring must be fixed in operation with 18pcs of screw M4, st 12.9, tightening torque 4.3 Nm
2. Unsealed space, see assembly manual in catalogue TS G
RECOMMENDATION FOR SEALING MOTOR FLANGE:
Recommended tolerance for fitting diameter (Ø63 -0.03)



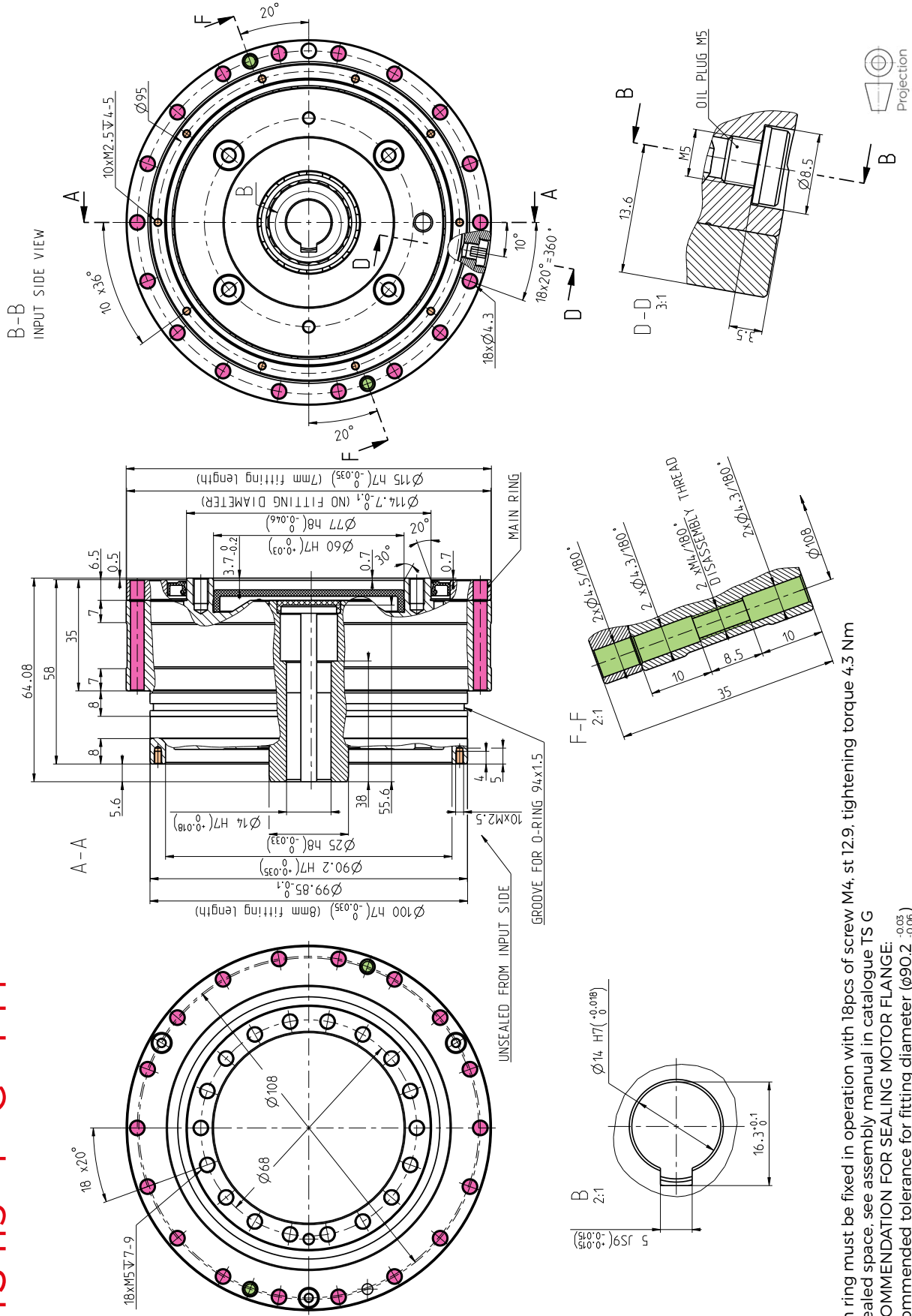
TS 95 - i - G - P14

TS 95 - i - G - P14



1. Main ring must be fixed in operation with 18pcs of screw M4, st 12.9, tightening torque 4.3 Nm
2. Unsealed space, see assembly manual in catalogue TS G
RECOMMENDATION FOR SEALING MOTOR FLANGE:
Recommended tolerance for fitting diameter ($\phi 71_{-0.06}^{+0.03}$)

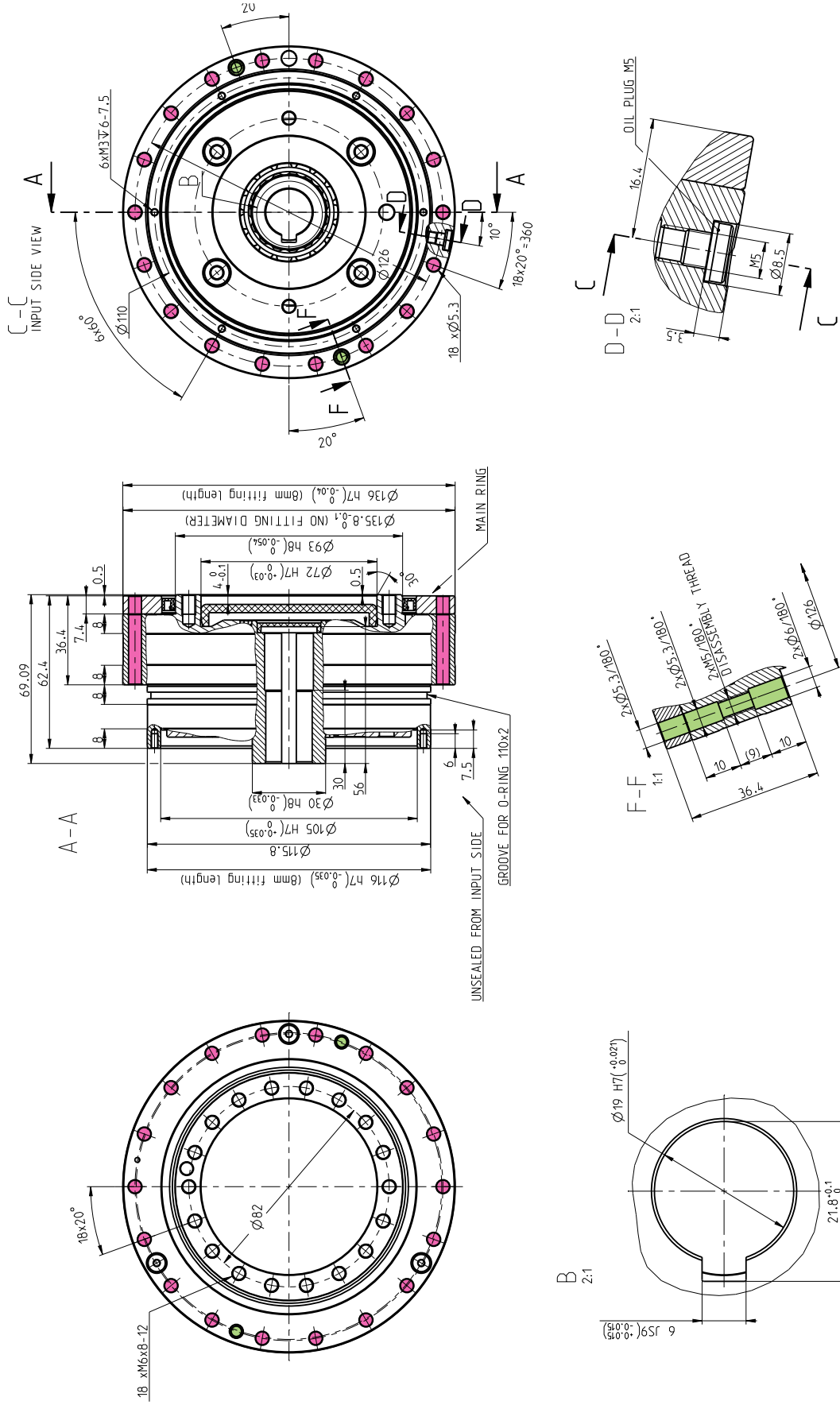
TS 115 - i - G - P14



1. Main ring must be fixed in operation with 18pcs of screw M4, st 12.9, tightening torque 4.3 Nm
2. Unsealed space, see assembly manual in catalogue TS G
RECOMMENDATION FOR SEALING MOTOR FLANGE:
Recommended tolerance for fitting diameter ($\phi 90.2$ $^{-0.03}$ $^{-0.06}$)

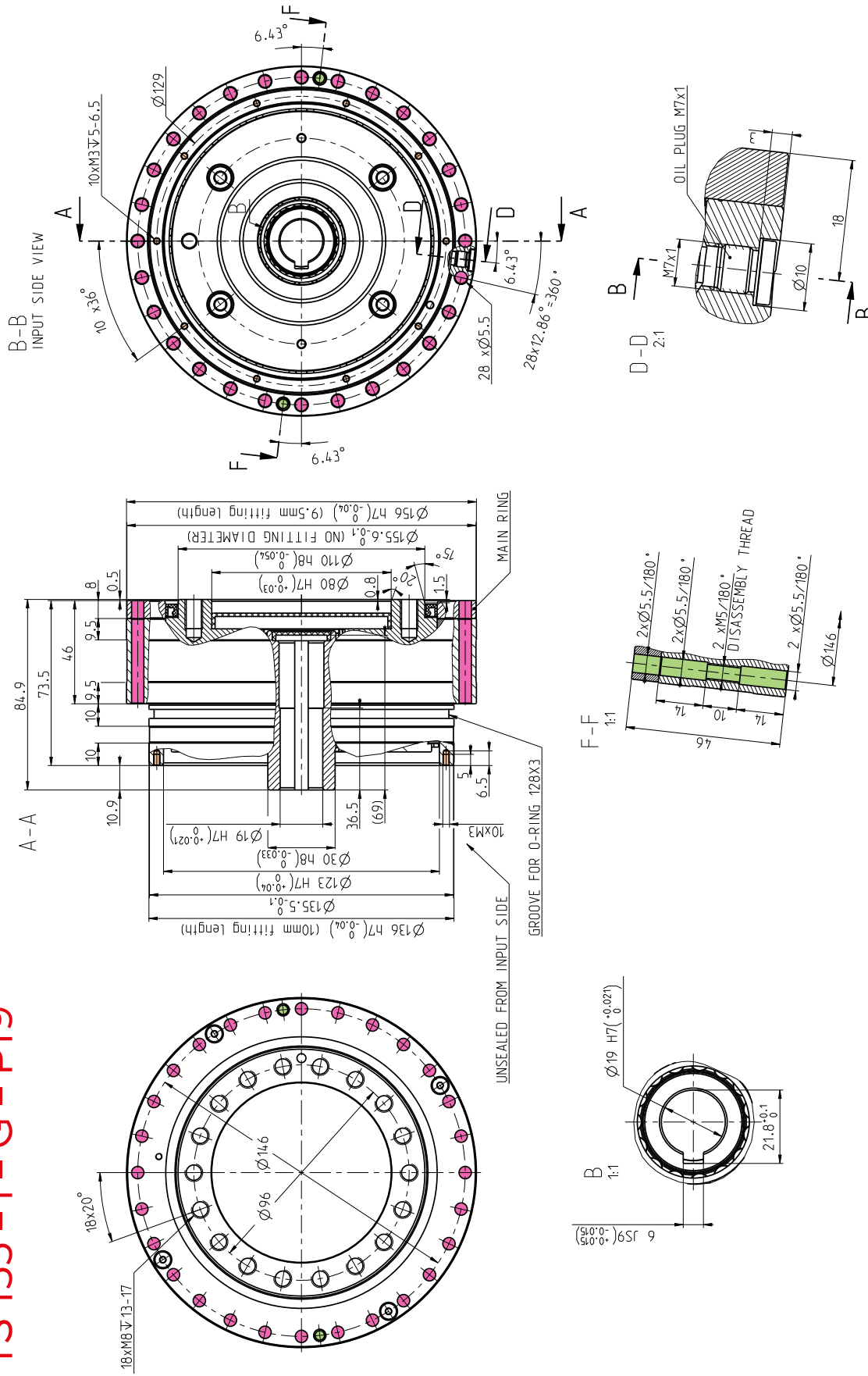
TS 135 - i - G - P19

TS 135 - i - G - P19



1. Main ring must be fixed in operation with 18pcs of screws M5, st 12.9, tightening torque 8.4 Nm
2. Unsealed space, see assembly manual in catalogue TS G
RECOMMENDATION FOR SEALING MOTOR FLANGE:
Recommended tolerance for fitting diameter (Ø105^{+0.03}_{-0.06})

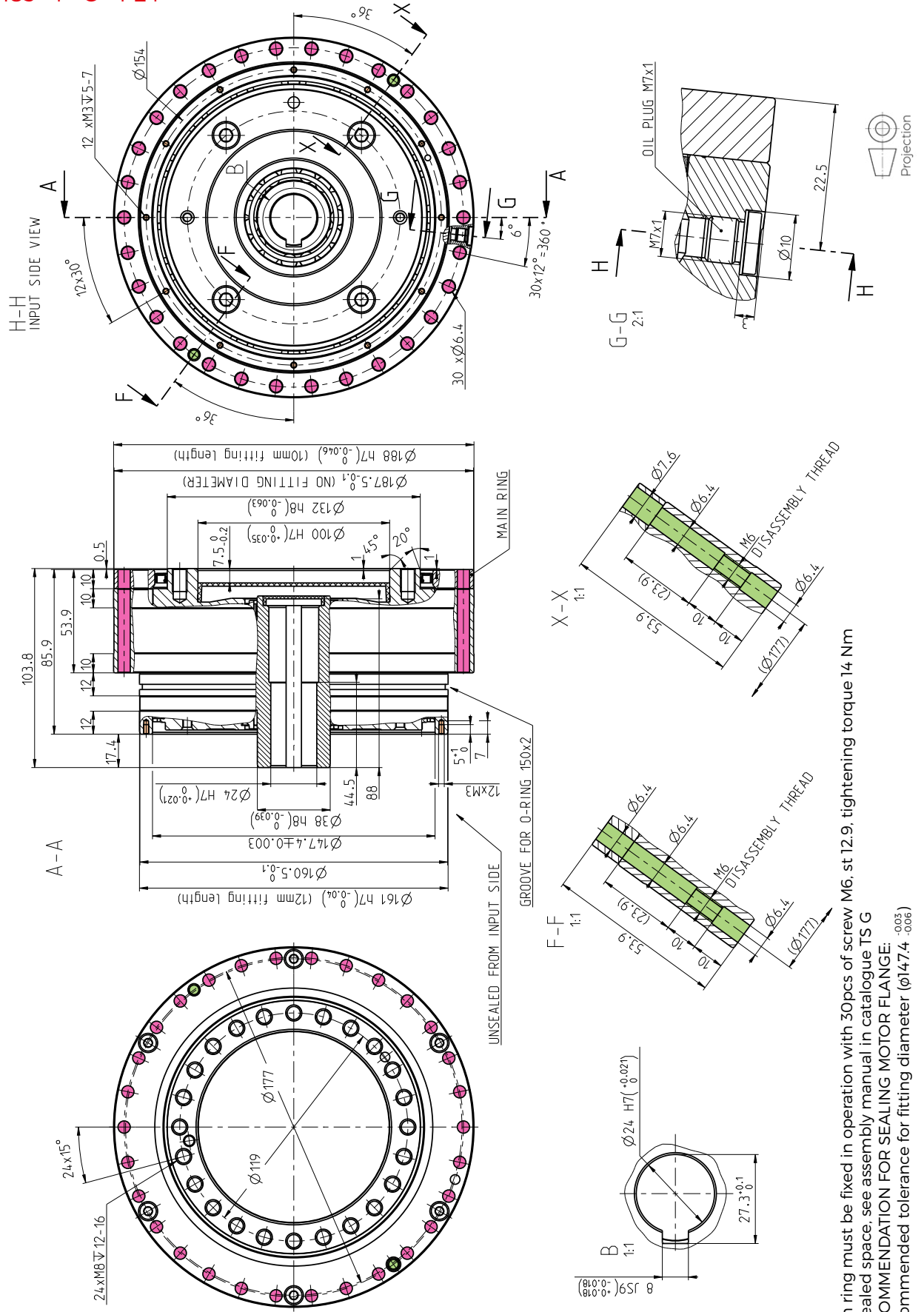
TS 155 - i - G - P19



1. Main ring must be fixed in operation with 28pcs of screw M5, st 12.9, tightening torque 8.4 Nm
2. Unsealed space, see assembly manual in catalogue TS G
RECOMMENDATION FOR SEALING MOTOR FLANGE:
 Recommended tolerance for fitting diameter ($\phi 123_{-0.06}^{+0.03}$)

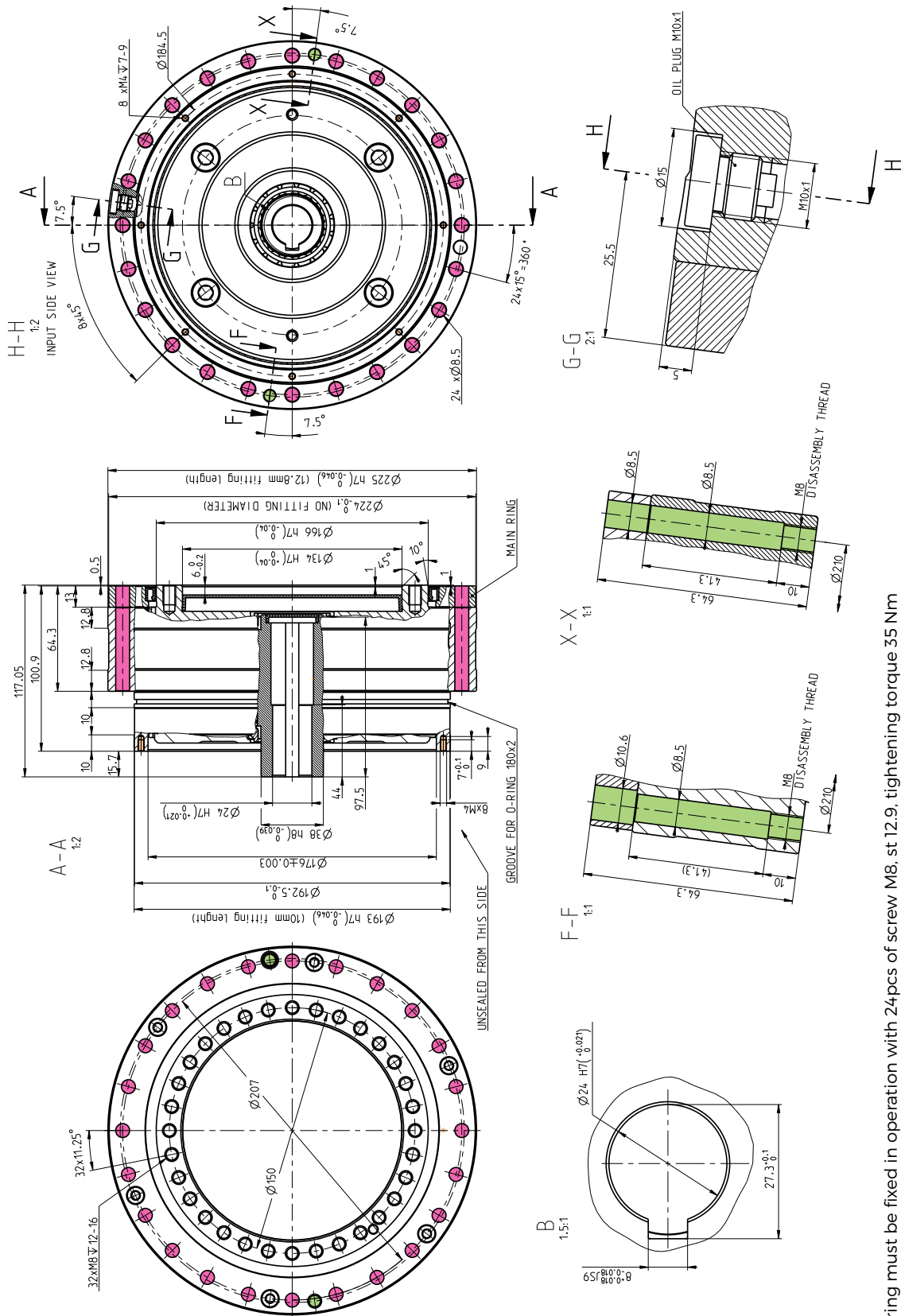
TS 185 - i - G - P24

TS 185 - i - G - P24



1. Main ring must be fixed in operation with 30pcs of screw M6, st 12.9, tightening torque 14 Nm
2. Unsealed space, see assembly manual in catalogue TS G
RECOMMENDATION FOR SEALING MOTOR FLANGE:
Recommended tolerance for fitting diameter ($\phi 147.4 -0.06$)

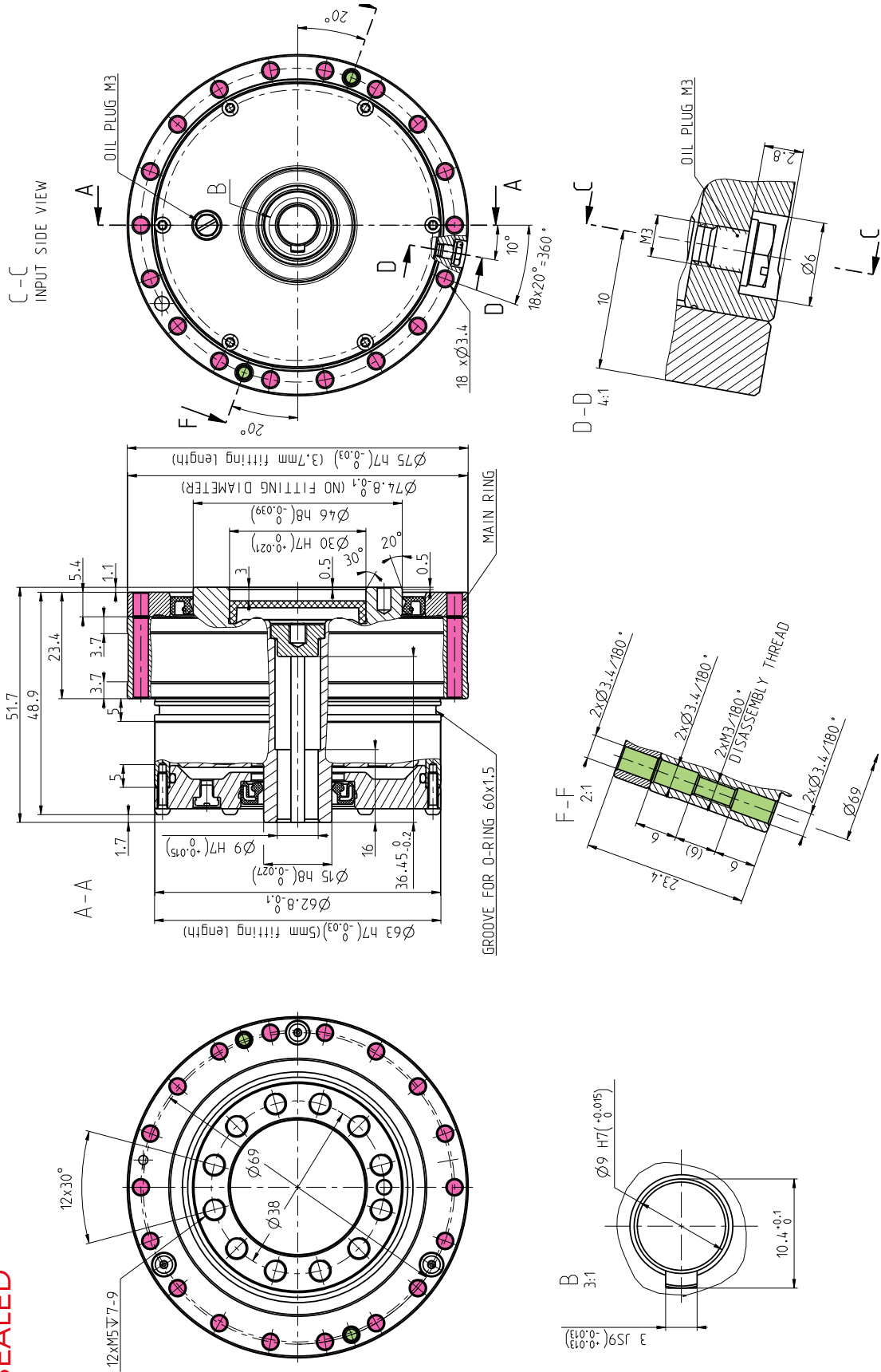
TS 225 - i - G - P24



1. Main ring must be fixed in operation with 24 pcs of screw M8, st 12.9, tightening torque 35 Nm
2. Unsealed space, see assembly manual in catalogue TS G
RECOMMENDATION FOR SEALING MOTOR FLANGE:
 Recommended tolerance for fitting diameter ($\phi 147.4 \text{ } ^{-0.06}$)

TS 75 - i - G - P9
SEALED

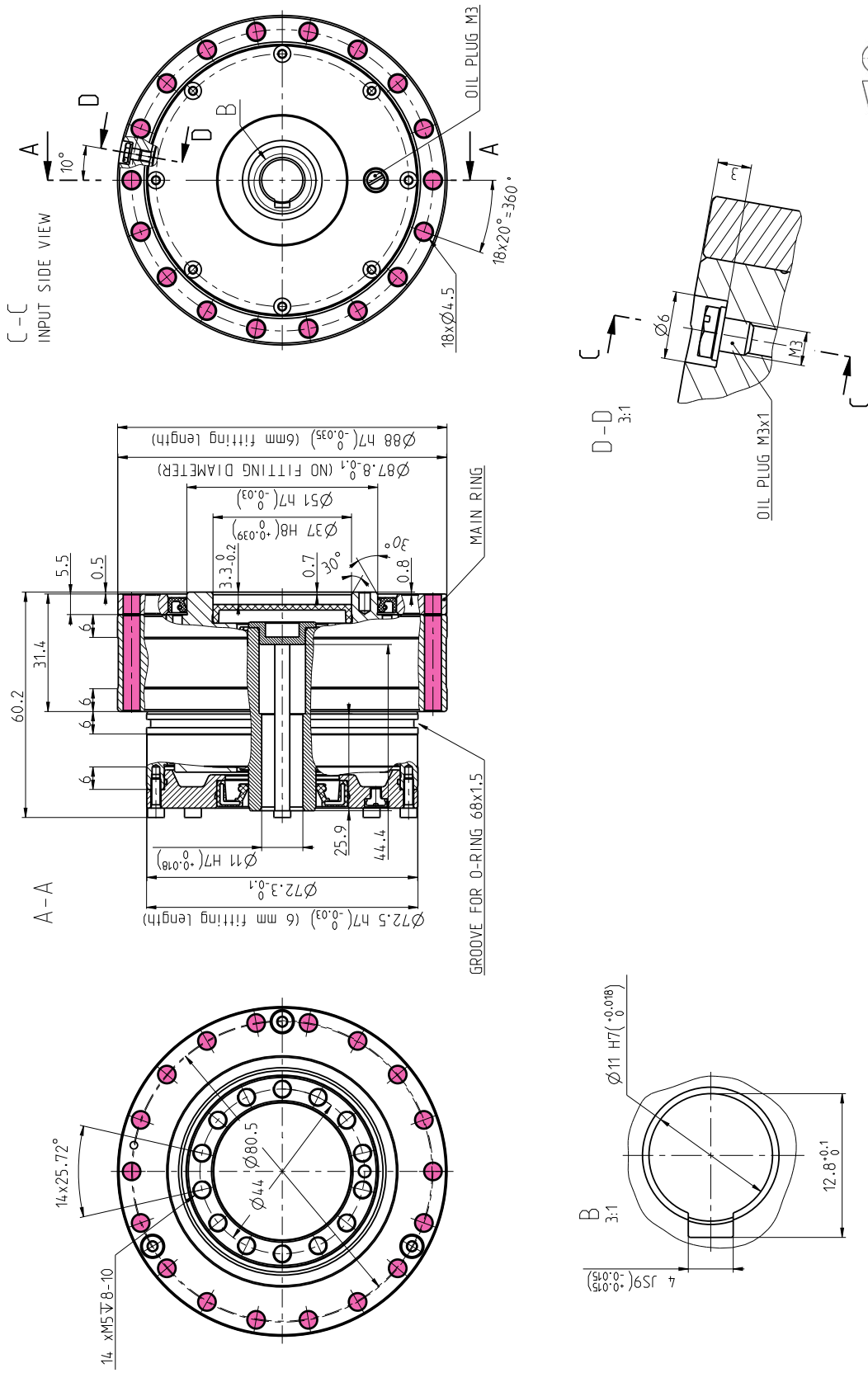
TS 75 - i - G - P9
SEALED



1. Main ring must be fixed in operation with 18pcs of screw M3, st 12.9, tightening torque 1.9 Nm

TS 85 - i - G - P11
SEALED

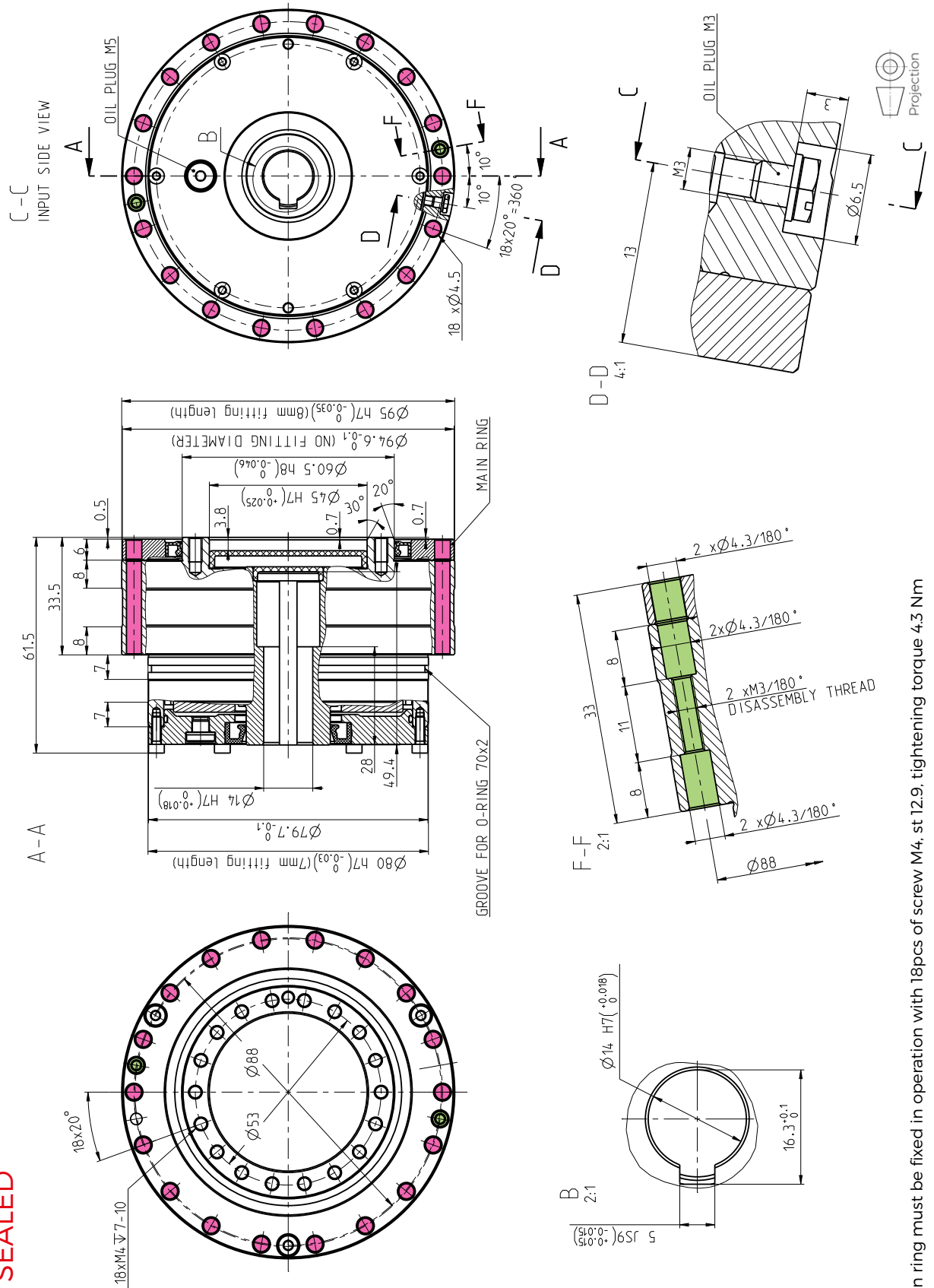
TS 85 - i - G - P11
SEALED



1. Main ring must be fixed in operation with 18pcs of screw M4, st 12.9, tightening torque 4.3 Nm

TS 95 - i - G - P14
SEALED

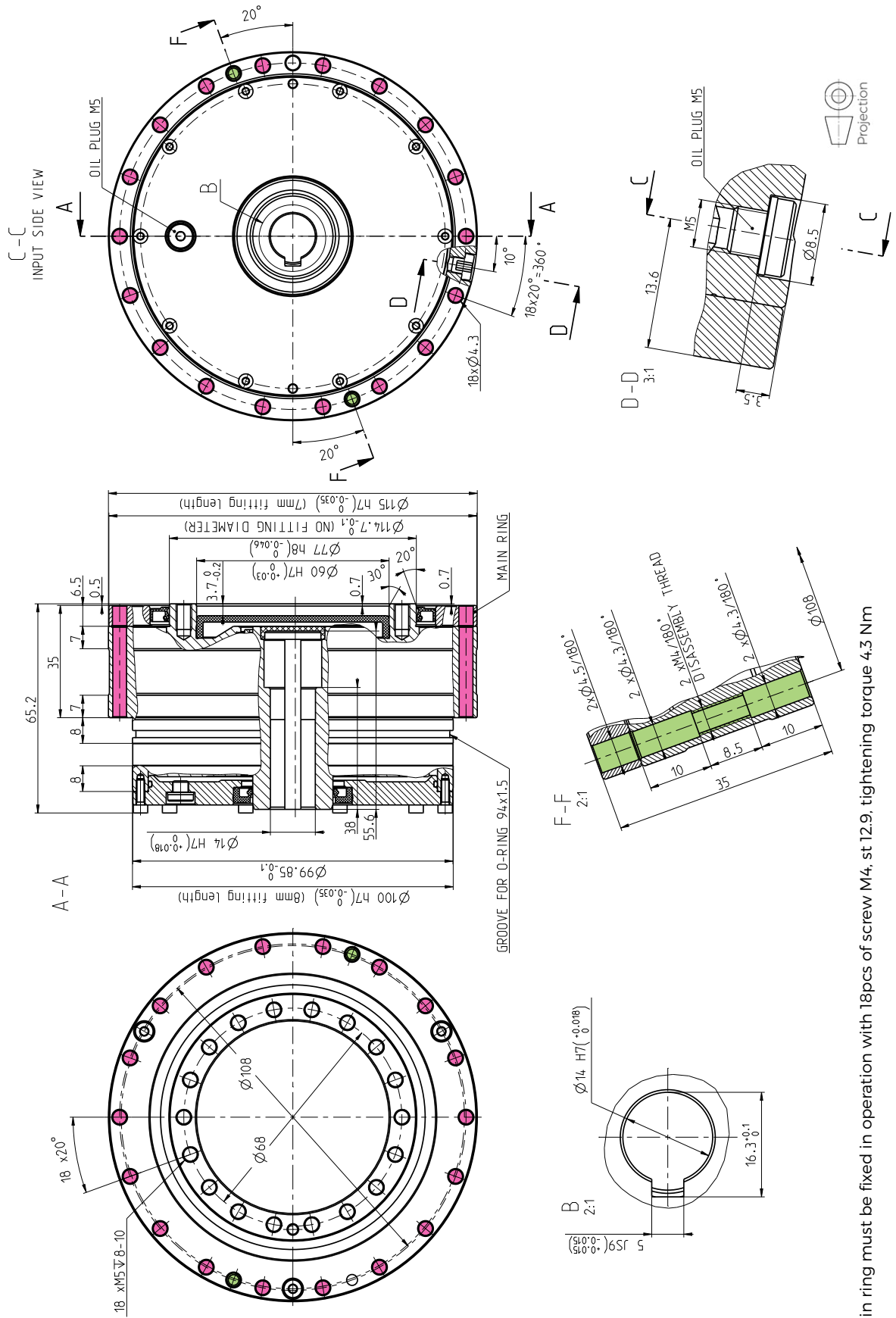
TS 95 - i - G - P14
SEALED



1. Main ring must be fixed in operation with 18pcs of screw M4, st 12.9, tightening torque 4.3 Nm

TS 115 - i - G - P14
SEALED

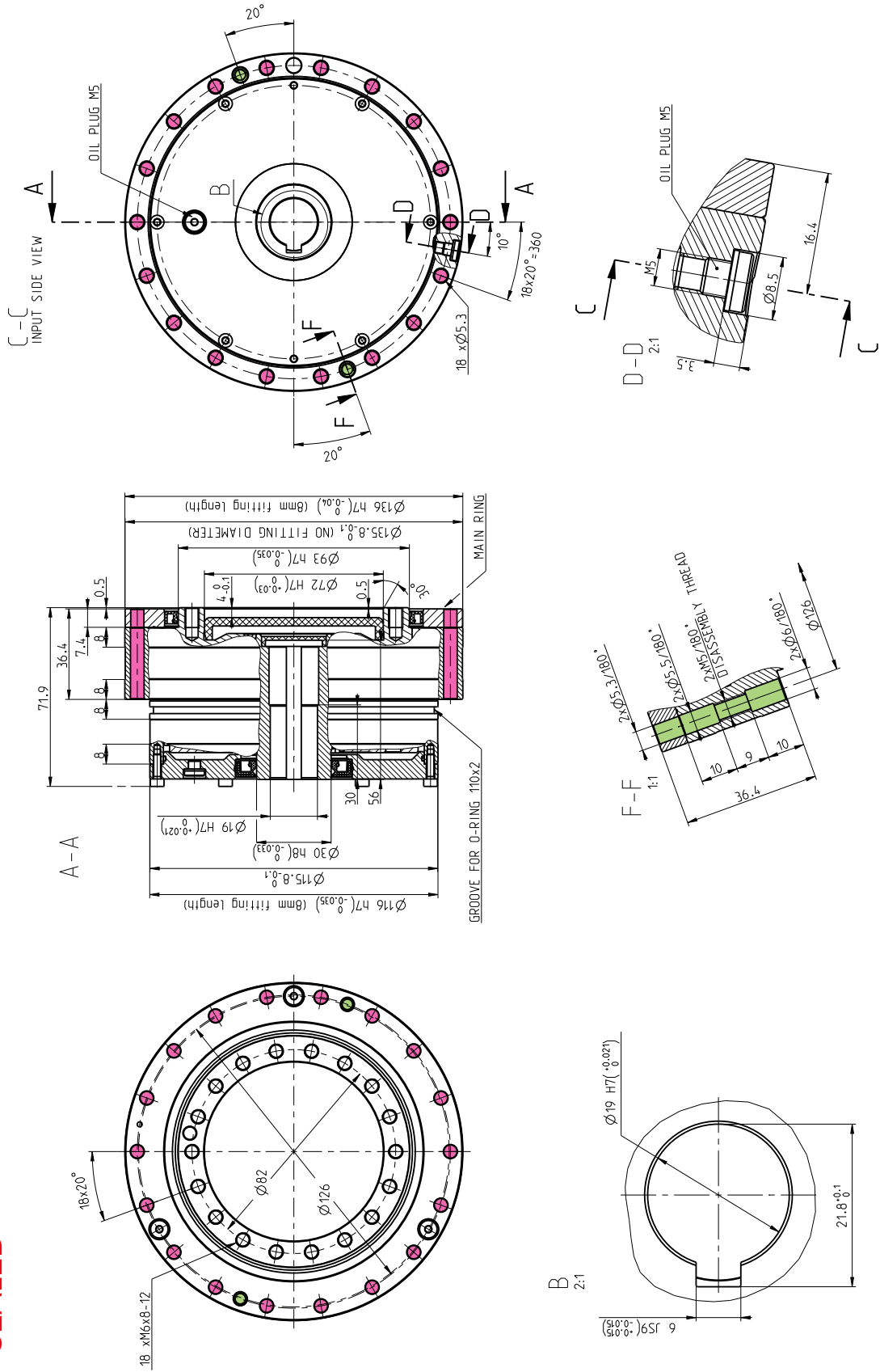
TS 115 - i - G - P14
SEALED



1. Main ring must be fixed in operation with 18pcs of screw M4, st 12.9, tightening torque 4.3 Nm

TS 135 - i - G - P19
SEALED

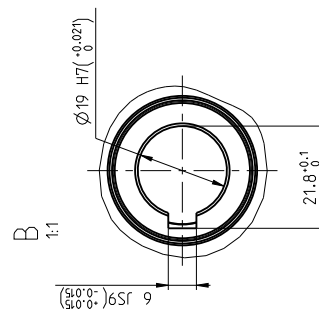
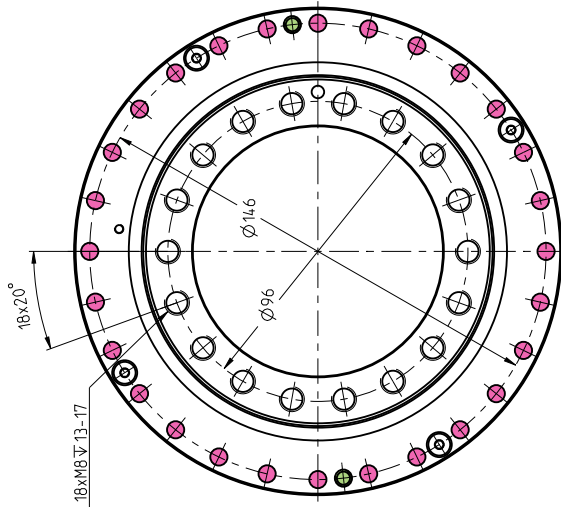
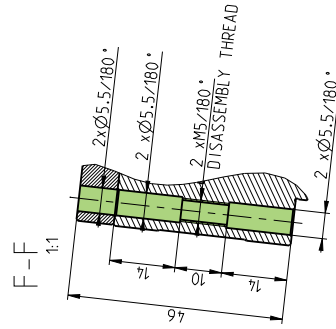
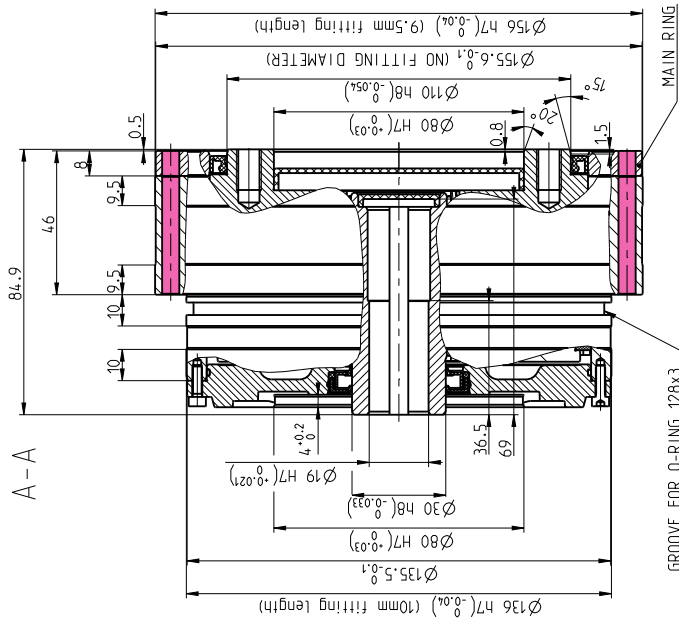
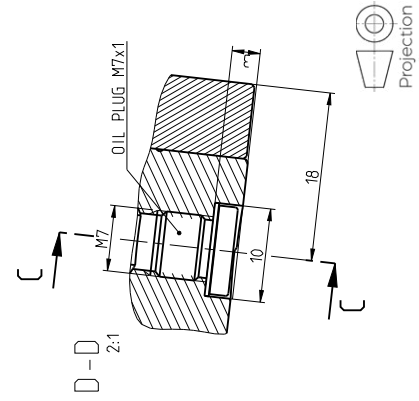
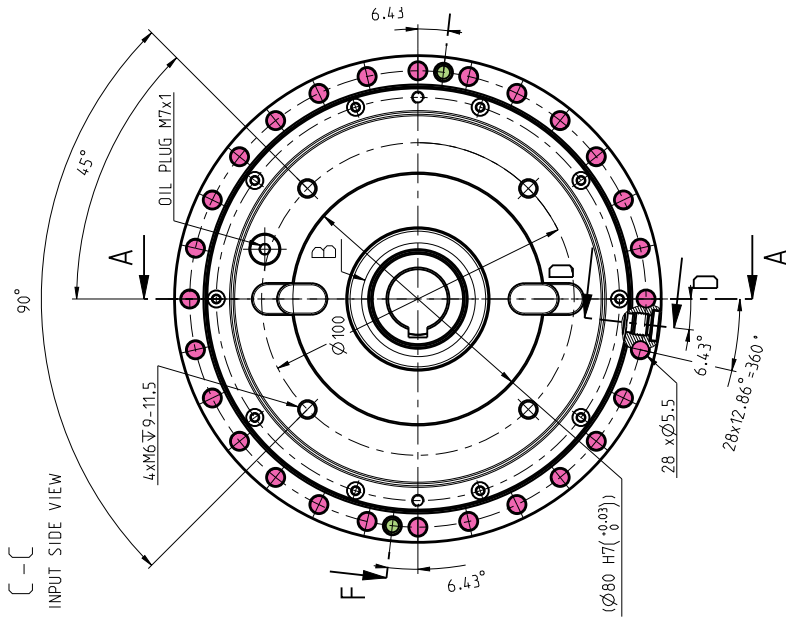
TS 135 - i - G - P19
SEALED



1. Main ring must be fixed in operation with 18pcs of screw M5, st 12.9, tightening torque 8.4 Nm

TS 155 - i - G - P19
SEALED

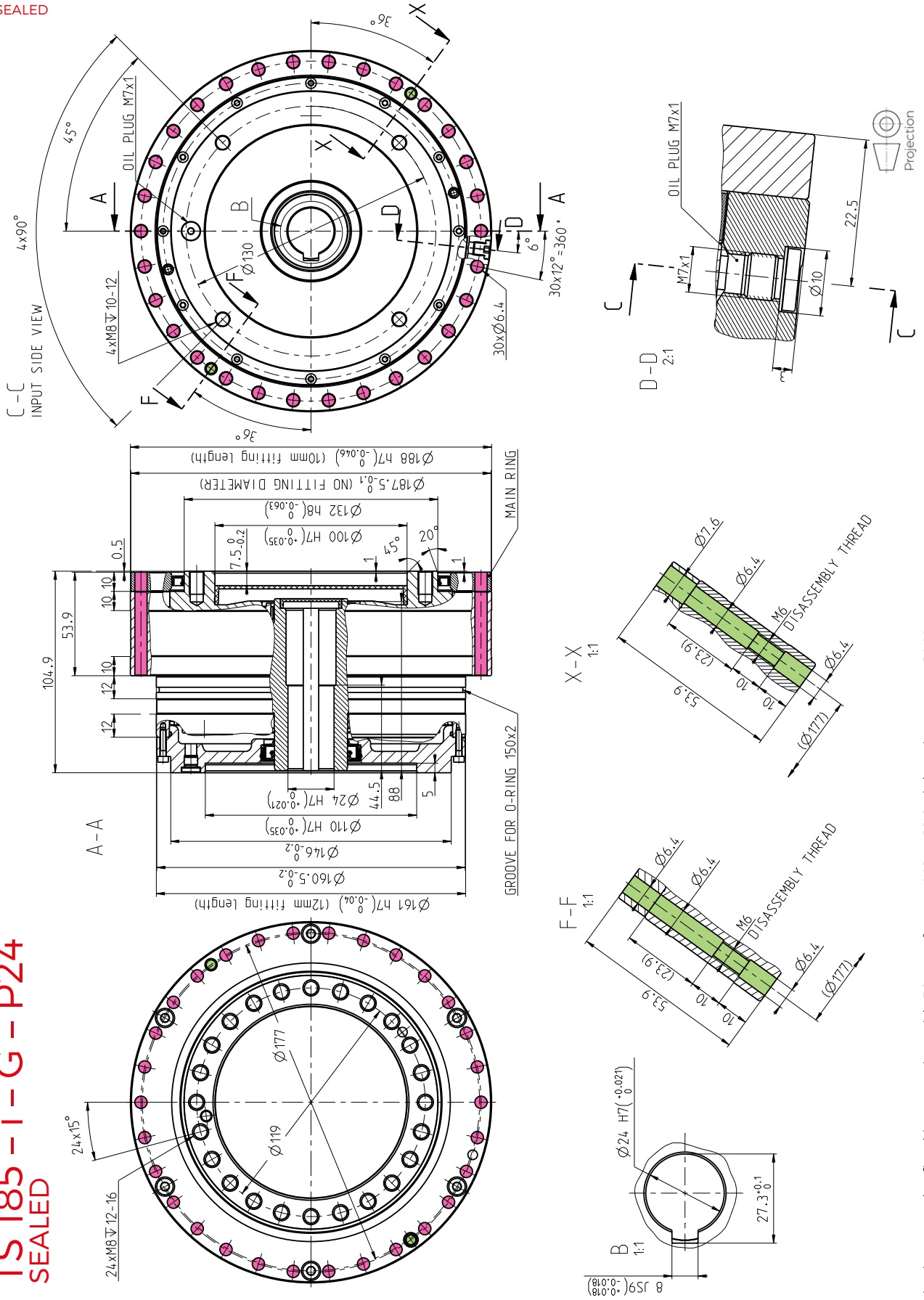
TS 155 - i - G - P19
SEALED



1. Main ring must be fixed in operation with 28pcs of screw M5, st 12.9, tightening torque 8.4 Nm

TS 185 - i - G - P24
SEALED

TS 185 - i - G - P24
SEALED

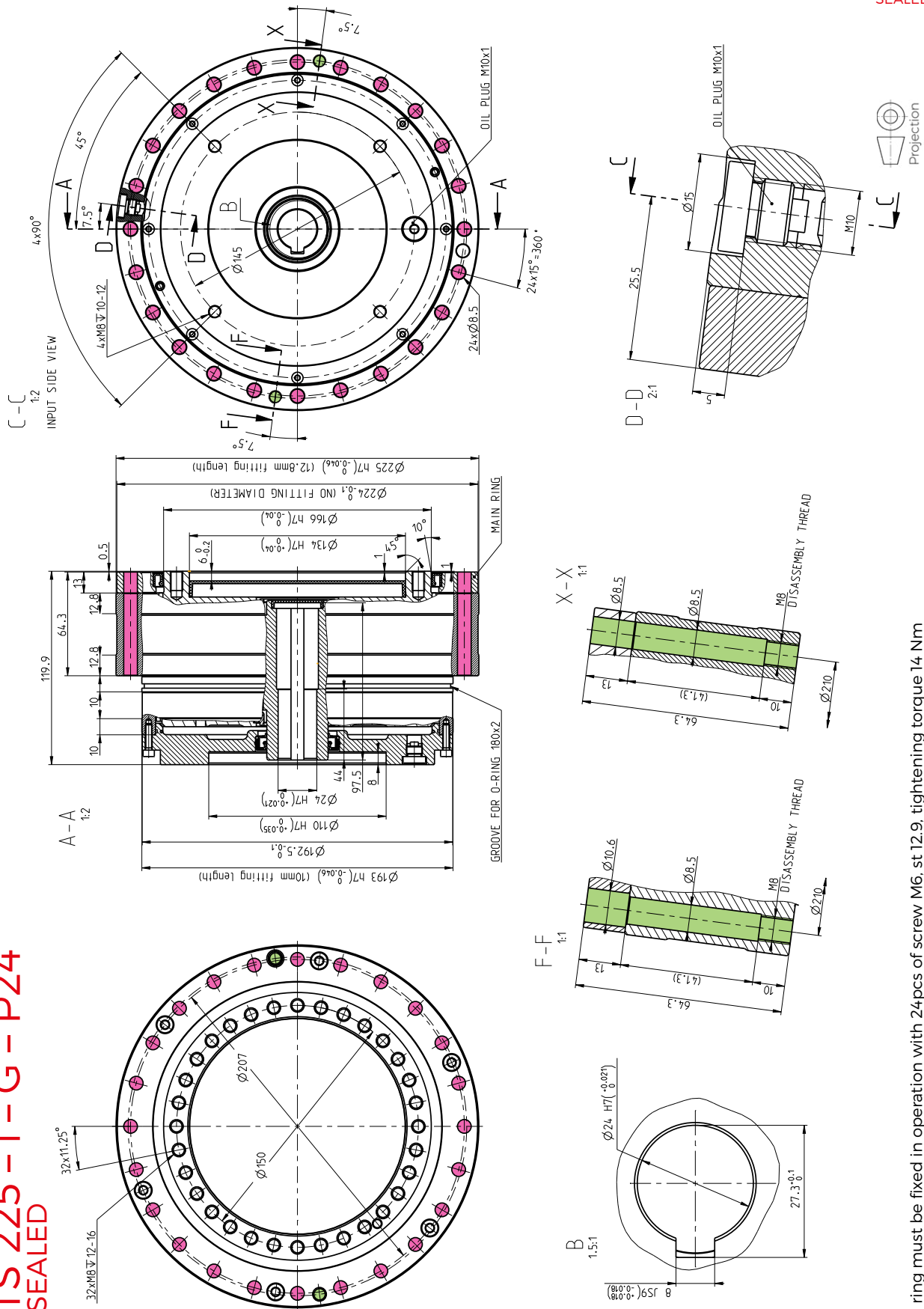


1. Main ring must be fixed in operation with 30pcs of screw M6, st 12.9, tightening torque 14 Nm

TS 225 - i - G - P24
SEALED

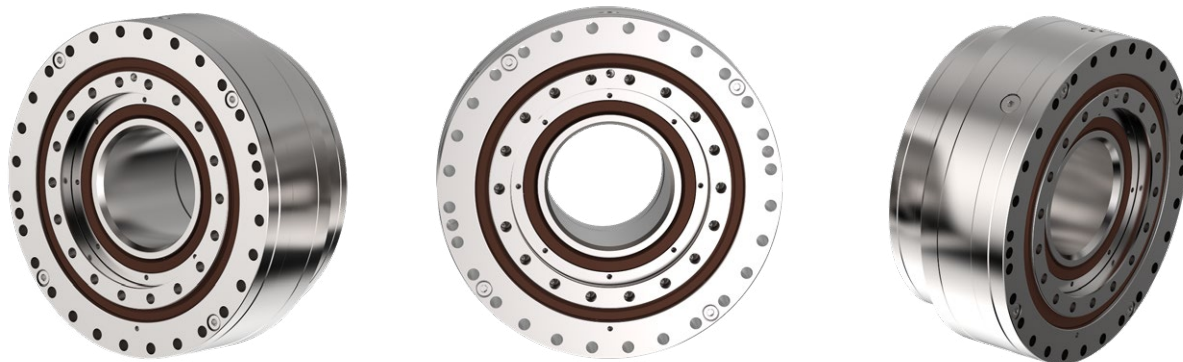
G series

TS 225 - i - G - P24
SEALED



1. Main ring must be fixed in operation with 24pcs of screw M6, st 12.9, tightening torque 14 Nm

2.2 GH SERIES



Tab. 2.2a: GH series rating table

Size	Reduction ratio	Shaft inside diameter	Rated output torque	Max. acceleration / deceleration torque	Maximum permissible torque at emergency / E-stop	Rated input speed	Maximum input speed 9)	Lost motion	Hysteresis	Angular transmission error 6)	No-load starting torque (max. 8)
	i	d	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	21	41	82	205	2 000	3 800	<1	<1	72	0.6
	85						4 500				0.4
TS 115	55	35	130	260	650	2 000	2 500	<1	<1	60	0.6
	123						3 500				0.5
TS 125	49	32	180	450	900	2 000	2 400	<1	<1	60	1.5
	99						3 800				1.3
TS 155	53	55	260	650	1 300	2 000	2 600	<1	<1	30	1.4
	109						3 200				1
TS 245	51	70	1 125	2 800	5 600	1 500	2 100	<1	<1	25	2.5
TS 285	55	90	1 700	4 250	8 500	1 500	2 300	<1	<1	50	6.8
	125						2 500				5.8

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- 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.
- 5) The parameter depends on the high precision reduction gear version.
- 6) The parameter depends on the version of the high precision reduction gear, ratio and lost motion.
- 7) The parameter values are informative. Exact value depends on the specific version of the high precision reduction gear.
- 8) Temperatures of the high precision reduction gear lower than 20°C will cause higher no-load starting or back driving torque.
- 9) Instantaneous speed peak that may occur within the working cycle.
- 10) For more information please contact the SPINEA® sales department.

Tab. 2.2a: GH series rating table - continued

Size	Reduction ratio	Max. backdriving torque 8)	Torsional stiffness 50-100% T_r 1) 6)	Tilting stiffness 1) 5)	Rated moment 2) 3)	Allowable moment	Allowable radial force 2)	Allowable axial force 2) 4)	Input inertia 7)	Weight 7)
	i	[Nm]	k_t [Nm/arcmin]	M_t [Nm/arcmin]	M_c [Nm]	M_{cmax} [Nm]	F_{rr} [kN]	$F_{a,max}$ [kN]	I [10^{-4} kgm ²]	m [kg]
TS 85	47	25	9.5	85	115	230	2	6.4	0.29	1.3
	85	36	9.7							
TS 115	55	42	21	200	280	560	4	12.5	0.65	2.9
	123	91	25							
TS 125	49	40	28	280	445	890	5.7	17.7	1.06	3.7
	99	95	29							
TS 155	53	-10)	67	900	820	1 640	8	26	5.6	6.9
	109		69							
TS 245	51	160	285	4 000	2 600	5 200	16	50	26	28.5
TS 285	55	360	405	6 500	5 670	11 300	30	93	80	35.5
	125	1 200	460							

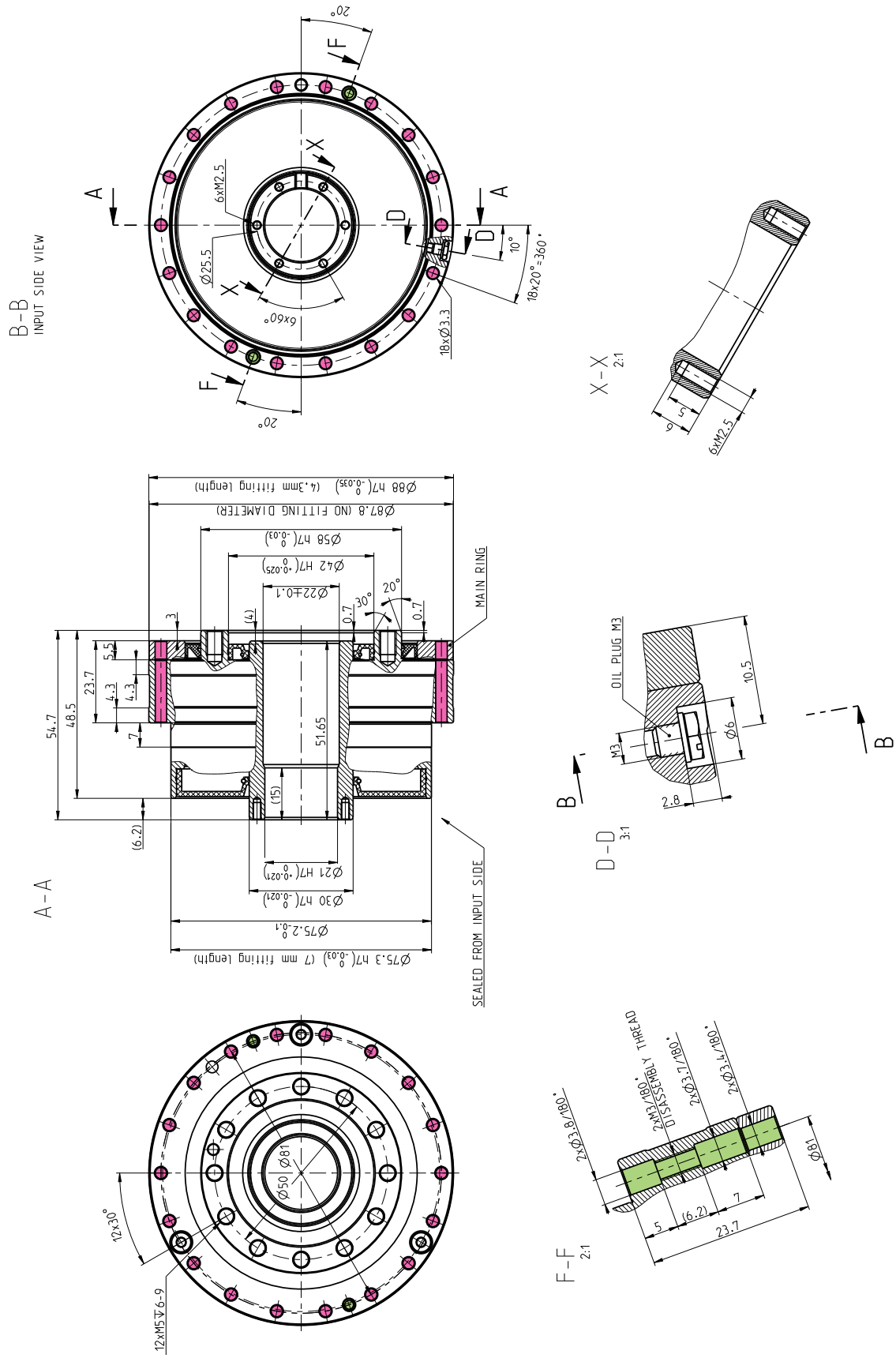
IMPORTANT NOTES:

- 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 an inverted variable.
- The continuous mode cycle (S1) should be consulted with the manufacturer.
- If the output speed in application is below 0.1 rpm please consult with the manufacturer.
- The values in the table refer to nominal operating temperature.
- Please note the temperature on the gear case that should not exceed 60°C.

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

TS 85 - i - GH - H21

TS 85 - i - GH - H21

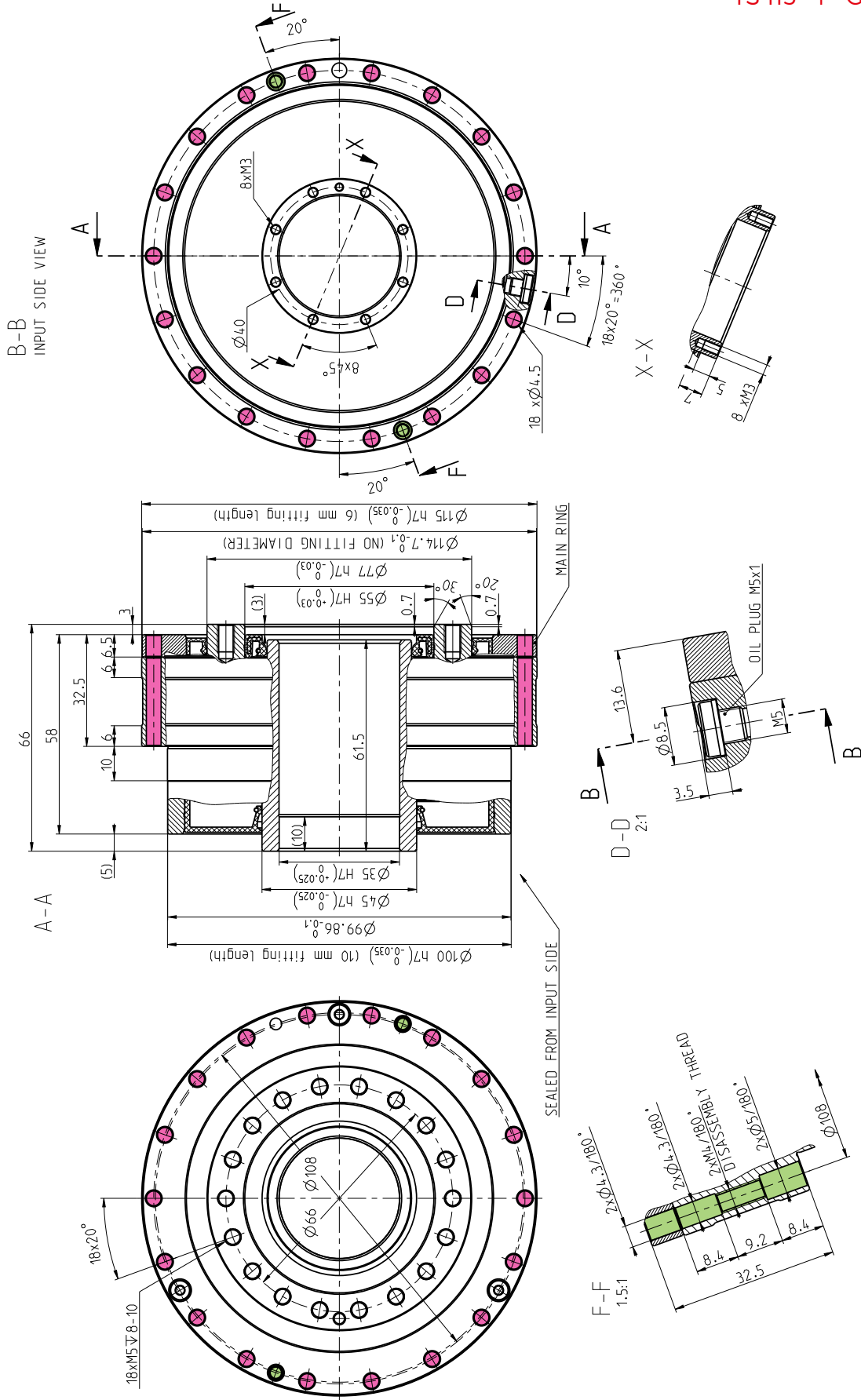


1. Main ring must be fixed in operation with 18pcs of screw M3, st 12.9, tightening torque 1.9 Nm

TS 115 - i - GH - H35

G series

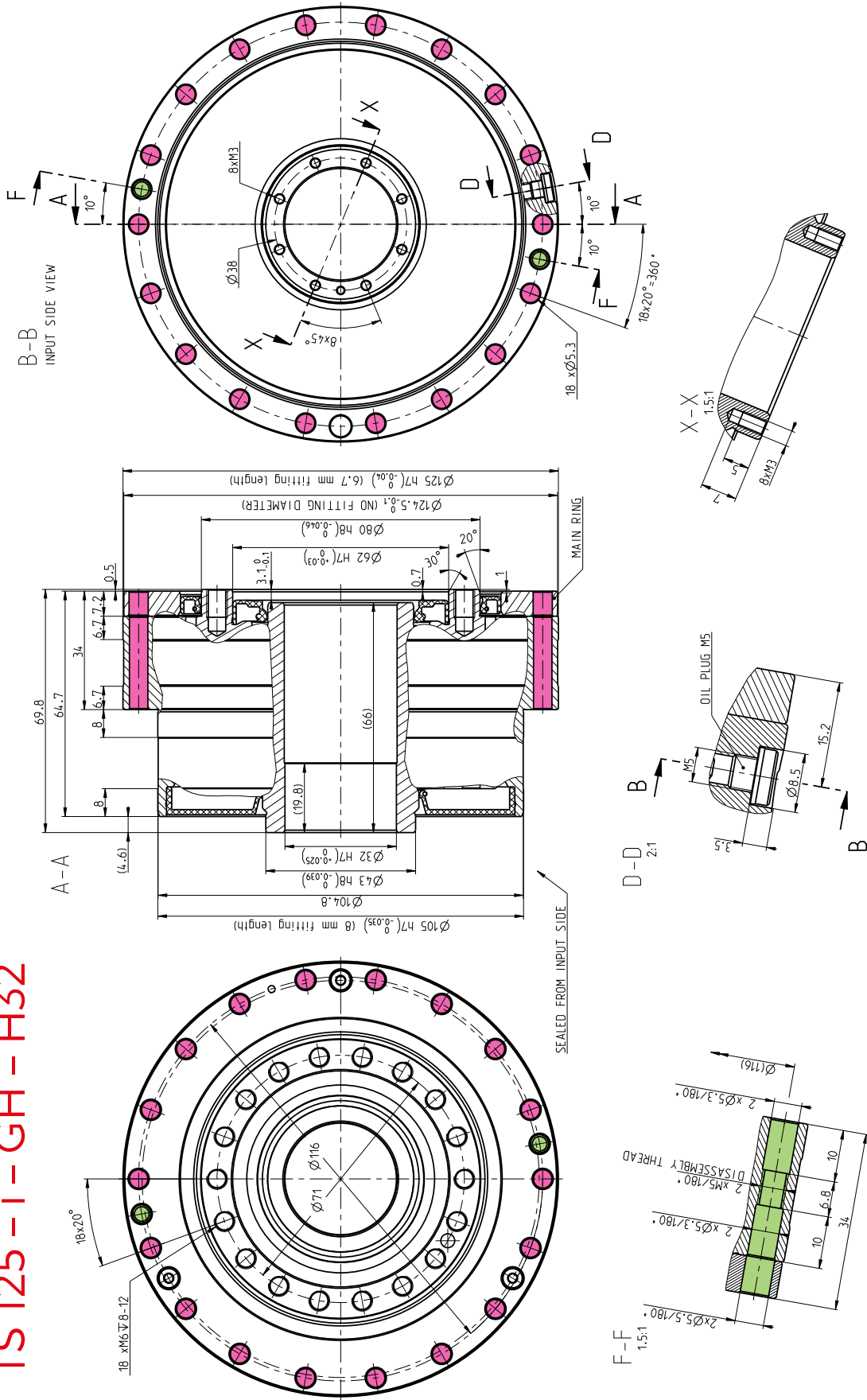
TS 115 - i - GH - H35



1. Main ring must be fixed in operation with 18pcs of screw M4, st 12.9, tightening torque 4.3 Nm

TS 125 - i - GH - H32

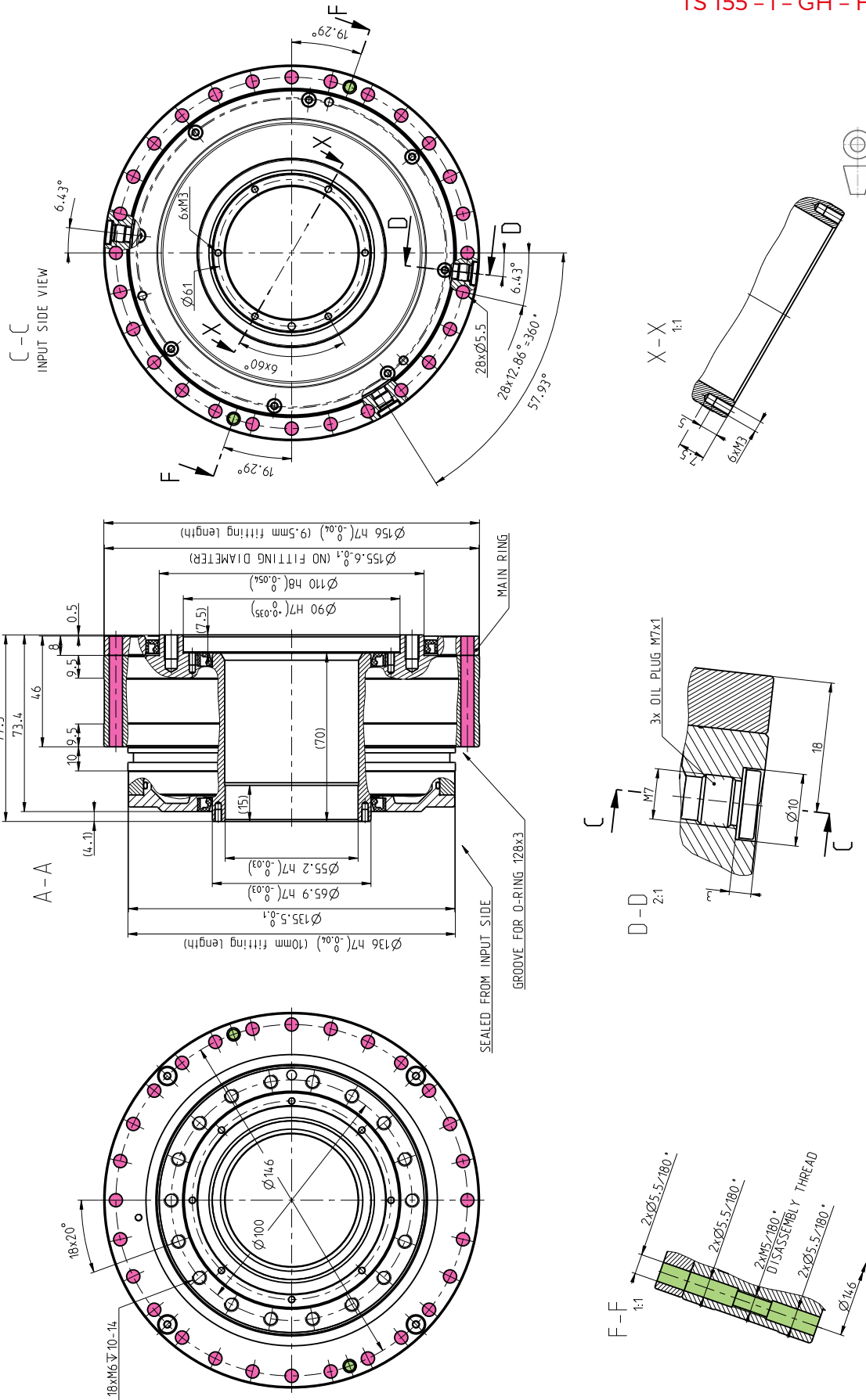
TS 125 - i - GH - H32



1. Main ring must be fixed in operation with 18pcs of screw M5. st 12.9. tightening torque 8.4 Nm

TS 155 - i - GH - H55

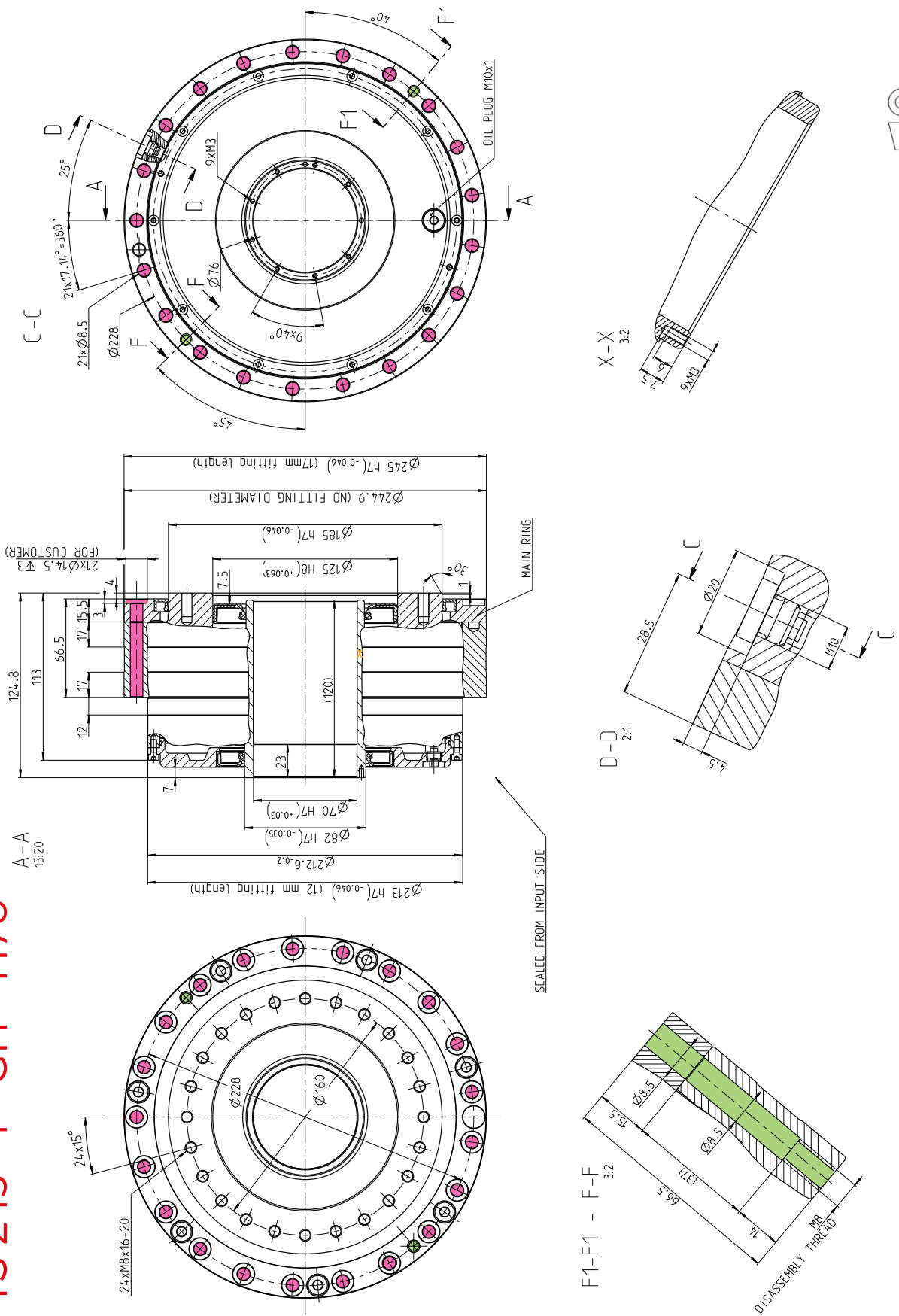
TS 155 - i - GH - H55



1. Main ring must be fixed in operation with 28pcs of screw M5, st 12.9, tightening torque 8.4 Nm

TS 245 - i - GH - H70

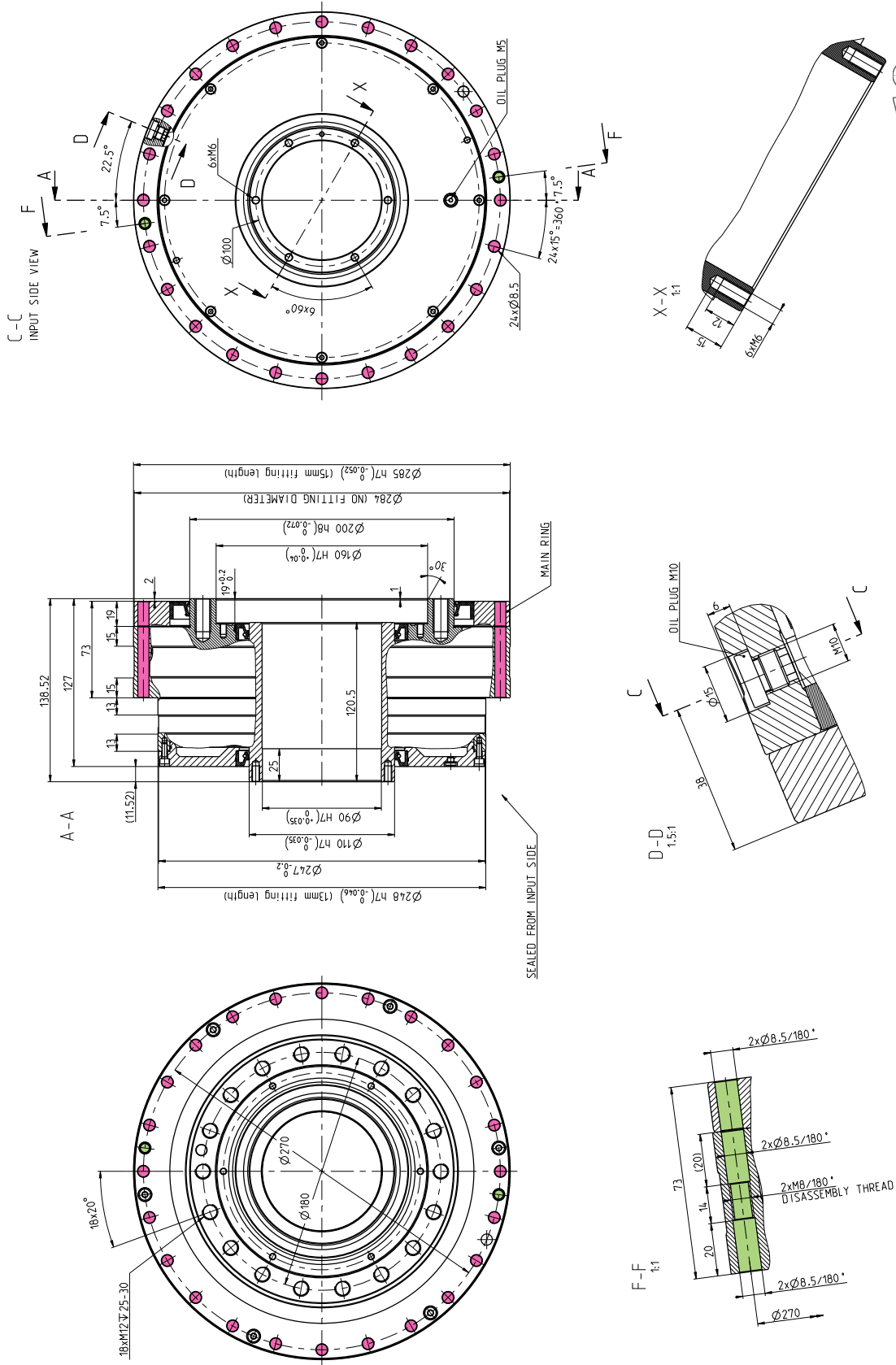
TS 245 - i - GH - H70



1. Main ring must be fixed in operation with 21pcs of screw M8, st 12.9, tightening torque 35 Nm

TS 285 - i - GH - H90

TS 285 - i - GH - H90



1. Main ring must be fixed in operation with 24pcs of screw M8, st 12.9, tightening torque 35 Nm