

DYNABOX® SELECTION

TECHNICAL SPECIFICATIONS

START/STOP SERVICE S5

CONTINUOUS SERVICE S1

- Calculate acceleration torque on gearbox output :

$$C2_{acc} = C1_{acc} \times i \times \eta \times F1 \times F2$$



F1 and F2 : correction factors as per following chart.

GEARBOX RUNNING TIME DURING 1 FULL CYCLE					
	10 %	30 %	50 %	70 %	90 %
F1	0,7	0,85	1	1,11	1,2

NUMBER OF STARTS PER HOUR				
	1000 to 2000	2000 to 3000	3000 to 5000	5000 to 10000
F2	1 to 1,35	1,35 to 1,45	1,45 to 1,6	1,6 to 1,9

Intermediates values
To be interpolated



- Select the gearbox size in the column **Torque S5** :

$$Torque S5 > C2_{acc}$$

- Calculate nominal torque on gearbox output

$$C2_{nom} = C1_{nom} \times i \times \eta$$



- Select the gearbox size in the column **Torque S1** :

$$Torque S1 > C2_{nom}$$

LEGEND

- C1acc** (N.m) : motor acceleration torque
- C1nom** (N.m) : nominal motor torque
- C2acc** (N.m) : gearbox output acceleration torque
- C2nom** (N.m) : Gearbox output nominal torque
- E-stop** (N.m) : gearbox output emergency torque (2 seconds duration maximum, applied a maximum of 25000 times over the gearbox life)
- C1f** (N.m) : starting input friction torque (without any load on output)
- N1** : maximum input RPM to be achieved during a full cycle (S5 service) or input nominal RPM (S1 service)
- i** : exact gear ratio
- Et** (N.m/minute) : Torsional stiffness on output
- ig** (kg.m²) : polar moment of inertia on input (to be added to coupling inertia, see page 10)
- η (%) : gearbox efficiency at considered input RPM
- Fr** (N) : permissible radial load on output shaft (applied at the middle of the shaft)
- Fa** (N) : permissible axial load on output shaft

REVERSIBILITY CLASSES

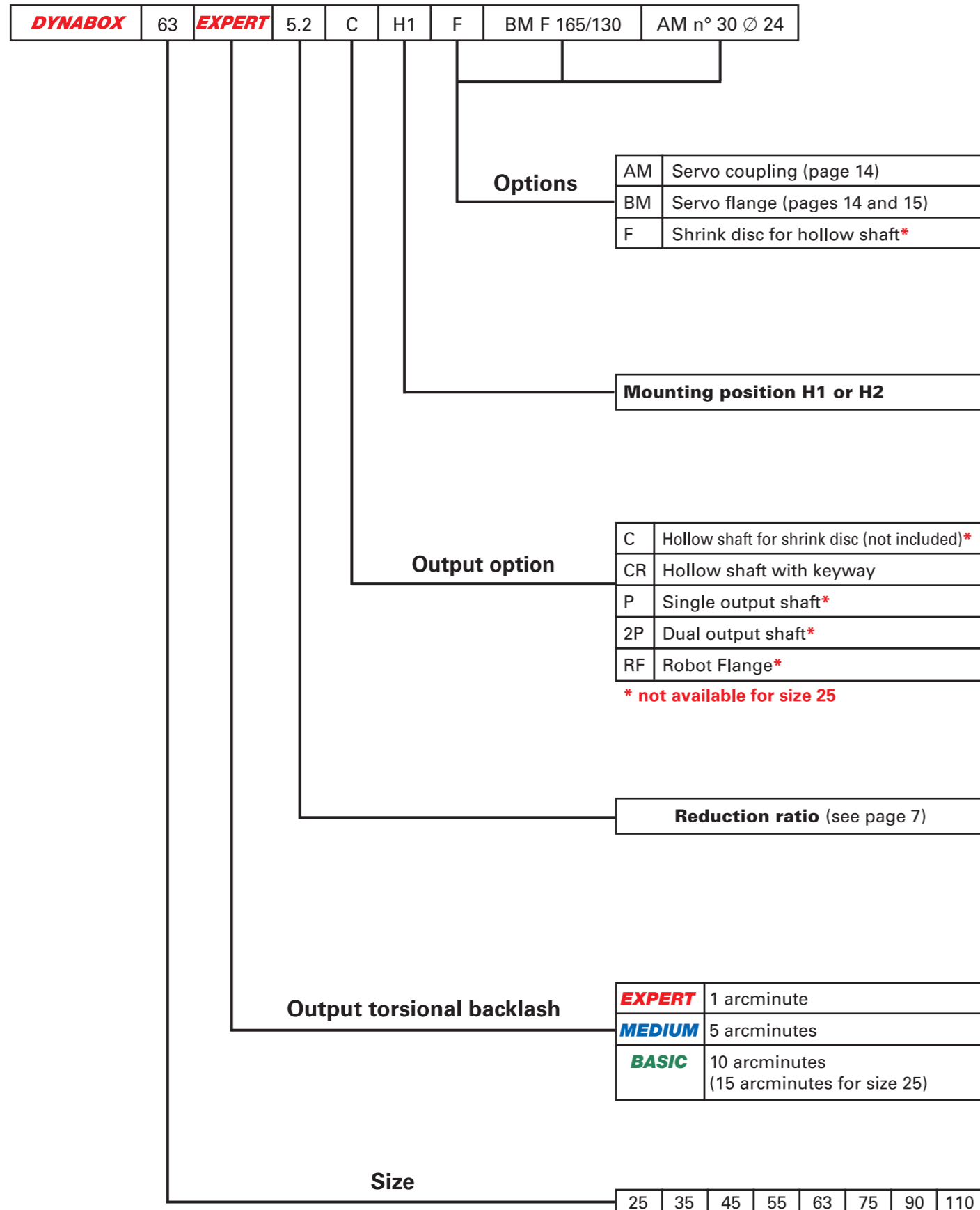
1	Total reversibility
2	Uncertain reversibility
3	Self-locking at N _i =0

Notes : self-locking units can become reversible under vibrations.
Indicated efficiency values are achieved after a 24 hours full load operation

DYNABOX	N1	6000			4000			3000			2000			1000			E-stop	C1f	ig	Et	Reversibility class	Fr	Fa
		i	Torque S5	η	Torque S1	Torque S5	η	Torque S1	Torque S5	η	Torque S1	Torque S5	η	Torque S1	Torque S5	η							
25	5.2:1	11	89	8	13	88	9	15	87	11	18	86	14	23	84	46	0,03	2,2 X 10 ⁻⁶	2	1	1500	500	
	7.25:1	11	88	8	14	87	9	15	86	11	18	85	14	24	82	46	0,03	1,51 X 10 ⁻⁶	2	1	1500	500	
	10.25:1	11	87	8	13	86	8	14	85	11	18	84	14	23	81	46	0,03	1,15 X 10 ⁻⁶	2	1	1500	500	
	14.5:1	13	82	9	15	81	11	18	79	12	20	77	16	26	74	46	0,03	9,58 X 10 ⁻⁷	2	2	1500	500	
	19.5:1	13	80	9	15	78	11	18	76	12	20	74	16	26	70	46	0,03	8,67 X 10 ⁻⁷	2	2	1500	500	
	30:1	15	73	11	18	70	12	20	68	14	23	65	17	29	60	46	0,03	8 X 10 ⁻⁷	2	3	1500	500	
	45:1	15	67	11	18	64	11	19	62	14	23	59	17	28	53	42	0,03	7,77 X 10 ⁻⁷	2	3	1500	500	
60:1	14	62	10	16	59	11	19	56	13	21	53	15	25	48	35	0,03	7,6 X 10 ⁻⁷	2	3	1500	500		
35	5.2:1	23	94	16	27	93	18	31	92	22	36	91	29	48	89	96	0,3	7,4 X 10 ⁻⁶	5	1	3800	2800	
	7.25:1	23	92	17	28	91	19	32	90	23	37	89	30	48	86	96	0,3	5,6 X 10 ⁻⁶	5	1	3800	2800	
	10.25:1	24	90	17	29	89	20	34	88	23	39	87	30	51	81	96	0,3	5 X 10 ⁻⁶	5	1	3800	2800	
	14.5:1	27	87	19	31	85	22	35	83	26	41	81	33	52	77	96	0,3	4,4 X 10 ⁻⁶	5	2	3800	2800	
	19.5:1	28	84	20	32	82	22	35	80	26	42	78	33	50	73	96	0,2	4,2 X 10 ⁻⁶	5	2	3800	2800	
	30:1	30	77	23	37	74	25	40	72	29	46	69	36	58	63	96	0,2	4 X 10 ⁻⁶	5	3	3800	2800	
	45:1	30	71	23	36	68	25	40	65	28	45	61	35	56	56	87	0,2	3,9 X 10 ⁻⁶	5	3	3800	2800	
60:1	30	65	22	34	62	24	37	59	27	41	55	34	50	50	73	0,1	3,1 X 10 ⁻⁶	5	3	3800	2800		
90:1	28	57	21	32	53	23	35	50	26	39	46	32	46	41	72	0,1	2,31 X 10 ⁻⁶	5	3	3800	2800		
45	5.2:1	54	95	36	62	94	41	70	93	50	83	92	67	109	91	214	0,4	2,9 X 10 ⁻⁵	9	1	5800	4000	
	7.25:1	59	94	42	71	93	48	80	92	57	93	91	76	121	89	214	0,4	2,2 X 10 ⁻⁵	9	1	5800	4000	
	10.25:1	68	93	46	80	92	53	88	91	62	98	90	80	128	88	214	0,4	1,5 X 10 ⁻⁵	9	1	5800	4000	
	14.5:1	69	90	52	83	88	59	94	87	68	109	86	88	141	82	214	0,4	1,4 X 10 ⁻⁵	9	1	5800	4000	
	19.5:1	66	89	50	80	87	55	88	86	64	102	84	81	129	80	214	0,3	1 X 10 ⁻⁵	9	1	5800	4000	
	30:1	74	83	55	88	80	61	98	78	70	112	76	88	141	71	214	0,3	1 X 10 ⁻⁵	9	2	5800	4000	
	45:1	74	77	54	86	75	59	94	72	68	109	69	83	133	64	185	0,3	8,2 X 10 ⁻⁶	9	3	5800	4000	
60:1	69	73	50	78	70	55	86	68	62	97	64	75	116	59	170	0,2	7,3 X 10 ⁻⁶	9	3	5800	4000		
90:1	63	66	46	71	62	50	76	59	57	86	56	68	99	50	154	0,2	4,6 X 10 ⁻⁶	9	3	5800	4000		
55	5.2:1	85	95	60	103	94	68	116	94	82	137	93	111	181	91	307	0,6	7,5 X 10 ⁻⁵	20	1	7000	4800	
	7.25:1	88	94	65	111	93	74	125	92	90	147	91	118	188	89	307	0,6	5,3 X 10 ⁻⁵	20	1	7000	4800	
	10.25:1	102	92	76	132	90	87	145	89	103	165	88	133	206	85	307	0,6	4,5 X 10 ⁻⁵	20	1	7000	4800	
	14.5:1	96	90	71	115	88	82	133	87	96	155	85	123	190	82	307	0,6	3,8 X 10 ⁻⁵	20	1	7000	4800	
	19.5:1	101	88	77	123	87	87	139	85	101	162	83	128	205	80	307	0,4	3,1 X 10 ⁻⁵	20	2	7000	4800	
	30:1	107	82	83	130	80	94	148	78	109	169	75	136	202	70	307	0,4	3,4 X 10 ⁻⁵	20	2	7000	4800	
	45:1	110	77	83	130	74	93	145	72	106	163	69	131	202	63	307	0,4	2,8 X 10 ⁻⁵	20	3	7000	4800	
60:1	110	73	82	128	69	91	141	67	103	158	63	126	194	58	286	0,3	2,6 X 10 ⁻⁵	20	3	7000	4800		
90:1	102	65	76	117	62	82	125	59	94	142	55	113	164	49	263	0,3	1,2 X 10 ⁻⁵	20	3	7000	4800		
63	5.2:1	128	95	90	153	95	105	179	94	126	210	93	169	275	91	497	0,8	1,6 X 10 ⁻⁴	36	1	8800	8500	
	7.25:1	123	95	91	155	94	103	174	93	125	206	92	165	264	90	497	0,8	9 X 10 ⁻⁵	36	1	8800	8500	
	10.25:1	134	94	103	169	93	118	194	92	141	231	91	181	290	89	497	0,8	8 X 10 ⁻⁵	36	1	8800	8500	
	14.5:1	146	91	110	179	90	128	207	89	149	240	87	191	293	84	497	0,8	6,9 X 10 ⁻⁵	36	1	8800	8500	
	19.5:1	155	90	119	190	88	135	215	87	156	250	85	199	318	82	497	0,5	5,5 X 10 ⁻⁵	36	1	8800	8500	
	30:1	179	84	138	218	82	155	245	80	179	281	78	223	335	73	497	0,5	5,9 X 10 ⁻⁵	36	2	8800	8500	
	45:1	163	80	123	193	77	137	214	75	156	239	72	193	287	67	403	0,5	5 X 10 ⁻⁵	36	3	8800	8500	
60:1	162	76	121	189	73	134	205	71	151	233	67	186	288	62	404	0,4	4,7 X 10 ⁻⁵	36	3	8800	8500		
90:1	149	68	110	169	65	121	184	63	137	207	59	166	241	53	368	0,4	3,2 X 10 ⁻⁵	36	3	8800	8500		
75	5.2:1	213	96	147	252	95	174	296	94	209	349	94	282	459	92	834	1	3,7 X 10 ⁻⁴	50	1	10500	10500	
	7.25:1	190	95	139	236	94	161	270	93	196	321	92	256	409	90	834	1	2,5 X 10 ⁻⁴	50	1	10500	10500	
	10.25:1	187	94	146	234	93	168	269	92	204	326	91	261	418	88	834	1	2,2 X 10 ⁻⁴	50	1	10500	10500	
	14.5:1	237	91	170	276	90	195	315	88	234	376	87	298	460	84	834	1	1,9 X 10 ⁻⁴	50	1	10500	10500	
	19.5:1	228	89	168	270	88	194	310	87	227	362	85	288	434	81	834	0,6	1,5 X 10 ⁻⁴	50	2	10500	10500	
	30:1	252	86	186	294	84	212	334	82	248	386	80	309	460	75	834	0,6	1,6 X 10 ⁻⁴	50	2	10500	10500	
	45:1	243	79	190	299	76	212	331	74	244	383	71	301	472	65	718	0,6	1,4 X 10 ⁻⁴	50	3	10500	10500	
60:1	225	75	175	272	72	195	300	69	221	334	66	272	395	60	657	0,5	1,3 X 10 ⁻⁴	50	3	10500	10500		
90:1	218	68	167	257	64	184	280	62	209	316	57	255	370	52	625	0,5	8 X 10 ⁻⁵	50	3	10500	10500		
90	5.2:1	332	96	227	387	95	271	460	95	327	546	94	445	725	92	1543	1,5	8,5 X 10 ⁻⁴	75	1	15800	13000	
	7.25:1	376	95	263	460	95	306	490	95	373	597	94	490	784	92	1543	1,5	6 X 10 ⁻⁴	75	1	15800	13000</	

HOW TO ORDER

Use following codification to order your **DYNABOX**.



SERVO GEARSETS **DYNASET** WITH ADJUSTABLE BACKLASH

When **DYNABOX** servo gearheads cannot be used, the **DYNASET** servo gearsets, to be mounted in customised housing, are an interesting alternative.

Their performance are comparable to complete reducers, assuming following recommendations :

MOUNTING

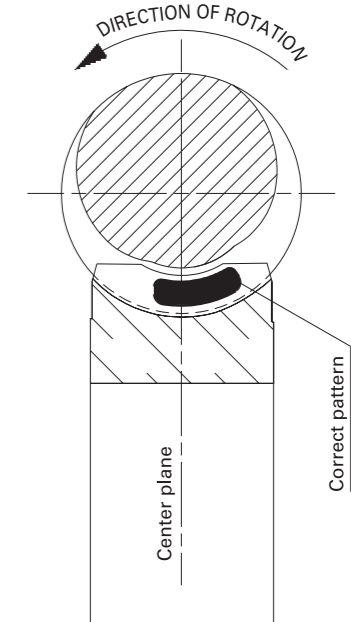
Wormshaft : housing and bearing design should allow an axial shifting, necessary for backlash adjustment. The total adjustment range is obtained with a permissible displacement equal to W, as per page 18. It is recommended, whenever possible, to use our backlash adjustment device, which is delivered preset (see page 19). **The front ball bearing (see page 19) must be engaged on the shaft after the complete gear assembly, and before the backlash adjustment operation.**

Wheel ring : Arrows shown on wormshaft and wheel ring must be lined up during assembly (see page 18). As the bore ØA tolerance is H6, it is recommended to grind the shaft with a tolerance k5. This will eliminate any runnout between the wheel ring and the shaft. In order to facilitate the connection between the 2 parts, heat the wheel ring up to 50°C.

After cooling, check that the wheel ring is no buckled, by applying a dial indicator on its face, while rotating the shaft.

Then, finish the pins bores ((xY) ØS, see page 18) of the 2 assembled parts, as they are delivered pre-bored only. Otherwise, screws can be also used.

It is recommended to use taper roller bearings on output shaft, in order to allow an axial displacement of the wheel, during the mounting operations, to center the gear correctly. The contact pattern can be checked with Prussian blue or any similar product. A good pattern should be located slightly on the right side of the wheel tooth flanks (on both sides). It is normal to have no contact on the left side of the flanks. This gap is necessary for a good oil film forming. See sketch below.



LUBRICATION

The best gear performances in terms of efficiency, life, temperature, will be achieved with a polyglycol lubricant such as MOBIL GLYGOYLE 30 or equivalent. The ratings shown on page 7 can be considered only if this kind of

lubricant is used. Before use, check that the inner paint of the housing is compatible (Epoxy paints can be used). Otherwise, use MOBIL SHC 634 or equivalent.

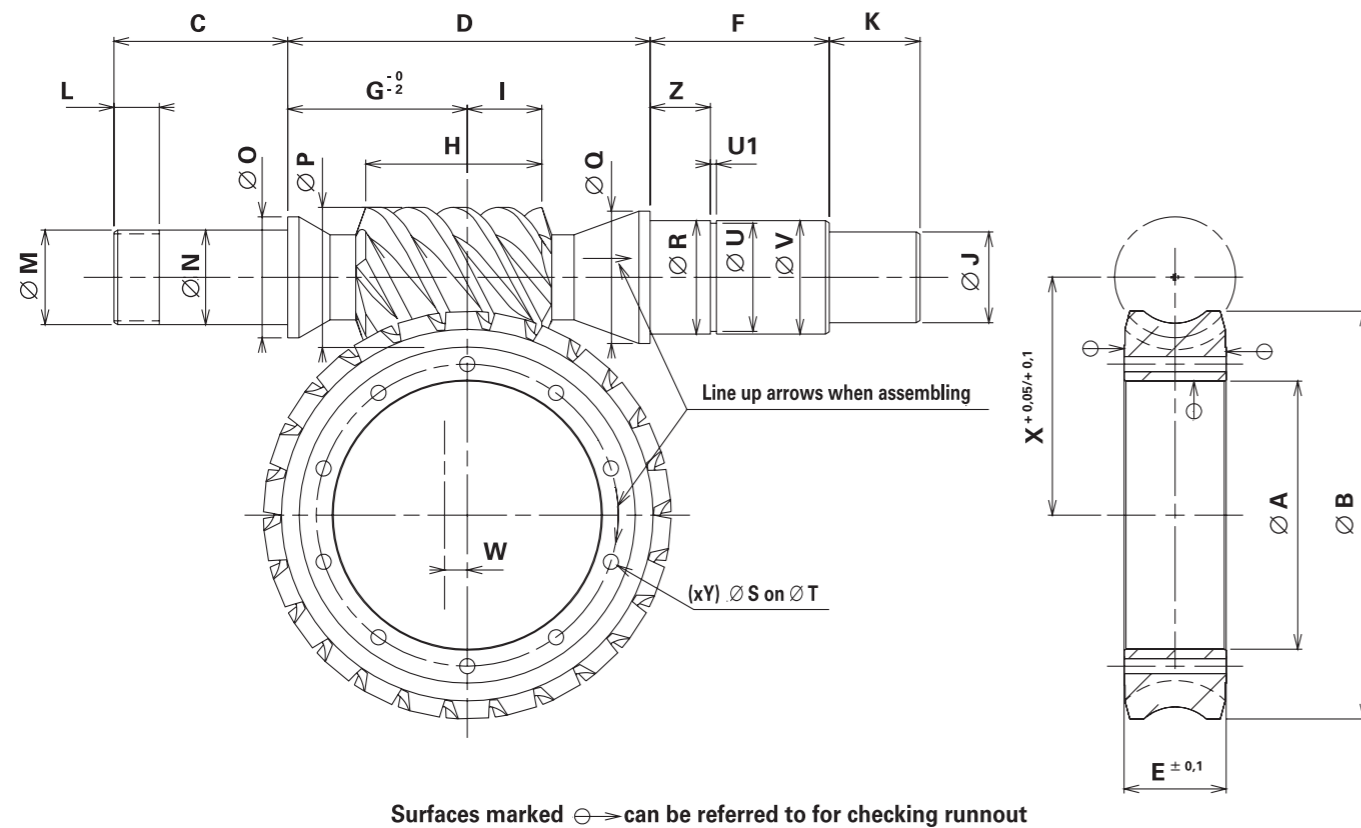
BACKLASH ADJUSTMENT

The accuracy of our servo gearsets **DYNASET** allows them to be set to less than 1 arcminute of backlash, without any efficiency or torque capacity losses (it is assumed than custom machined parts and mounting are correct).

If our backlash adjustment device is used, simply remove some shims (delivered) between the bearing bush and

the housing, until the desired backlash value is obtained. For high speed applications, a backlash between 0,5 to 1 arcminute is recommended. For very intermittent applications (rotary tables or milling heads of CNC machines for ex.), a backlash down to zero is tolerated, as soon as the no load input torque does not vary more than ± 30 % around the average value.

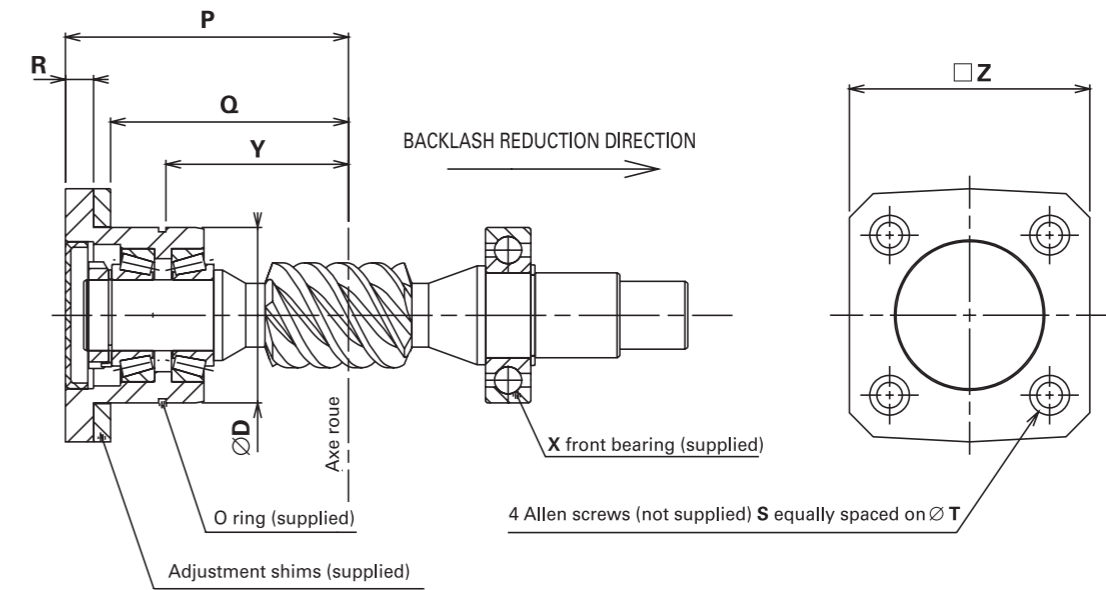
SERVO GEARSET *DYNASET*



Surfaces marked \oplus can be referred to for checking runnout

<i>DYNASET</i>	35	45	55	63	75	90	110
A (H6)	32	47	52	71	82	103	136
B Maxi	55	78	92	108	124,5	157,4	191,4
C	33	38	43	46	52	57	60
D	63,5	80	85	97	126,5	144	173
E	14	19	28	27	32	38	40
F	30,5	40	46	46,5	53,5	57,5	56
G	32	40	42	47,5	63	70	82
H Maxi	31	37,6	43,7	49,7	54,7	67,5	75,5
I Maxi	13,5	17,3	20,5	23,4	26,3	33,2	36,1
J (h6)	12	15	18	20	24	28	32
K	17	20	22	24	28	28	36
L	8	9	10	11	13	14	15
M	M15 x 1,00	M17 x 1,00	M20 x 1,00	M25 x 1,50	M 30 x 1,50	M35 x 1,50	M40 x 1,50
N (k6)	15	17	20	25	30	35	40
O	20	24	26	32	37	42	47
P Maxi	24,7	26,5	32,5	37,1	44,2	50,8	56,5
Q	24	30	30	35	42	42	47
R (k6)	20	25	25	30	35	35	40
S	3,5	4	4	4	5	6	8
T	38	54,5	60	79	91	113	148
U	19	23,9	23,9	28,6	33	33	37,5
U1	1,3	1,3	1,3	1,6	1,6	1,6	1,85
V (h11)	20	25	25	30	35	35	40
W	5	5	5	6	6	6	6
X	35	45	55	63	75	90	110
Y	4	6	8	10	10	10	10
Z	8	12	15	16	17	17	18

BACKLASH ADJUSTMENT DEVICE FOR *DYNASET*



<i>DYNASET</i>	35	45	55	63	75	90	110
D	42	47	52	62	72	72	80
Y Maxi	43,5	54	58	65	84	94	110
Y Mini	38,5	49	53	59	78	88	104
P Maxi	69	83	91	100	121	131,5	150
P Mini	64	78	86	94	115	125,5	144
Q	55	67,5	75	84	104	114,5	132
R	9	10,5	10	10	11	11	12
S	M6	M6	M8	M8	M10	M10	M10
T	55	65	66	80	90	100	100
Z	58	75	75	95	95	115	115
X	16004	6005	6205	6206	6207	6207	6208

The backlash adjustment device is delivered mounted and preset.

Bearings are factory preloaded.

Backlash adjustment is operated with shims located between the housing and the bearing bush.

HOW TO ORDER

Use following codification to order your *DYNASET*.

