DYNABOX® SELECTION

START/STOP SERVICE S5

- Calculate acceleration torque on gearbox output :

C2acc = C1acc x i x η x F1 x 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 > C2acc

CONTINUOUS SERVICE S1

- Calculate nominal torque on gearbox output

C2nom = C1nom x i x η

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

Torque S1 > C2nom

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 stifness 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 $N_1=0$

Note : Static self-locking only. Units can become reversible under vibrations..
For safety applications we advise to use a brake.
Efficiency values given for reference only and achieved after 24h hours full load operation.

TECHNICAL SPECIFICATIONS

N1		6000		4000			3000			2000			1000									
	i	Torque S5	η	Torque S1	Torque S5	η	Torque S1	Torque S5	η	Torque S1	Torque S5	η	Torque S1	Torque S5	η	E-stop	C1f	ig	Et	Reversibility class	Fr	Fa
DYNABOX 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
DYNABOX 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
DYNABOX 45	3.125:1	-	-	30	48	95	38	60	94	44	70	93	50	81	92	214	0,4	4,7 X 10^{-5}	9	1	5800	4000
	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	2	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	2	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
DYNABOX 55	3.125:1	-	-	52	83	94	56	89	94	74	118	93	95	152	92	307	0,6	1,1 X 10^{-4}	20	1	7000	4800
	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	2	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
DYNABOX 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	2	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	2	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
DYNABOX 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	2	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
DYNABOX 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
	10.25:1	391	95	273	478	94	314	528	93	383	627	92	488	781	90	1543	1,5	3,8 X 10^{-4}	75	1	15800	13000
	14.5:1	379	92	272	444	91	314	504	90	380	612	88	486	748	85	1543	1,5	3,2 X 10^{-4}	75	2	15800	13000
	19.5:1	429	91	318	506	90	367	584	88	431	685	87	544	865	84	1543	0,8	2,5 X 10^{-4}	75	2	15800	13000
	30:1	433	86	316	500	84	362	572	82	424	661	80	531	792	75	1543	0,8	2,6 X 10^{-4}	75	2	15800	13000
	45:1	454	83	343	538	80	385	599	79	441	674	76	546	811	71	1255	0,8	1,9 X 10^{-4}	75	3	15800	13000
	60:1	432	80	328	512	77	364	559	75	412	622	72	507	761	67	1230	0,5	1,7 X 10^{-4}	75	3	15800	13000
	90:1	394	74	298	459	70	332	505	68	372	562	64	460	667	59	1114	0,5	1 X 10^{-4}	75	3	15800	13000
DYNABOX 110	5.2:1	567	96	390	666	95	458	779	95	561	937	94	760	1239	92	2289	2	1,85 X 10^{-3}	120	1	21500	16000
	7.25:1	579	95	417	680	95	488	795	95	599	976	94	802	1307	92	2289	2	1,3 X 10^{-3}	120	1	21500	16000
	10.25:1	650	95	449	786	94	522	878	93	638	1047	92	827	1323	90	2289	2	8,5 X 10^{-4}	120	1	21500	16000
	14.5:1	630	93	450	720	92	519	830	91	630	1014	90	810	1247	87	2289	2	6,3 X 10^{-4}	120	2	21500	16000
	19.5:1	670	92	510	815	91	589	943	90	705	1121	88	893	1349	85	2289	1	4,6 X 10^{-4}	120	2	21500	16000
	30:1	790	88	597	955	87	688	1100	85	812	1299	83	1015	1512	79	2289	1	3,5 X 10^{-4}	120	2	21500	16000
	45:1	776	85	583	915	82	665	1037	80	765	1168	78	947	1411	73	2152	1	3,3 X 10^{-4}	120	3	21500	16000
	60:1	683	81	522	815	79	588	905	77	669	1030	73	826	1239	68	2094	0,8	3 X 10^{-4}	120	3	21500	16000
	90:1	645	75	497	765	72	557	847	70	625	944	66	778	1128	60	1941	0,8	1,7 X 10^{-4}	120	3	21500	16000

S1 service : over 2000 rpm, we recommend to use a cooling system.

SERVO GEARSETS ***DYNASET*** WITH ADJUSTABLE BACKLASH

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

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

MOUNTING

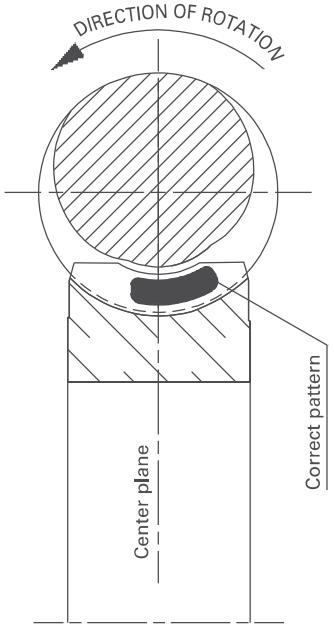
Wormshaft : housing and bearing design should allow an axial shifting, necessary for backlash adjustment. The total adjustment range is obtained with a permissible displacement equal to W, as per page 18.
It is recommended, whenever possible, to use our backlash adjustment device, which is delivered 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 ∅A 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) ∅S, 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 tapper 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

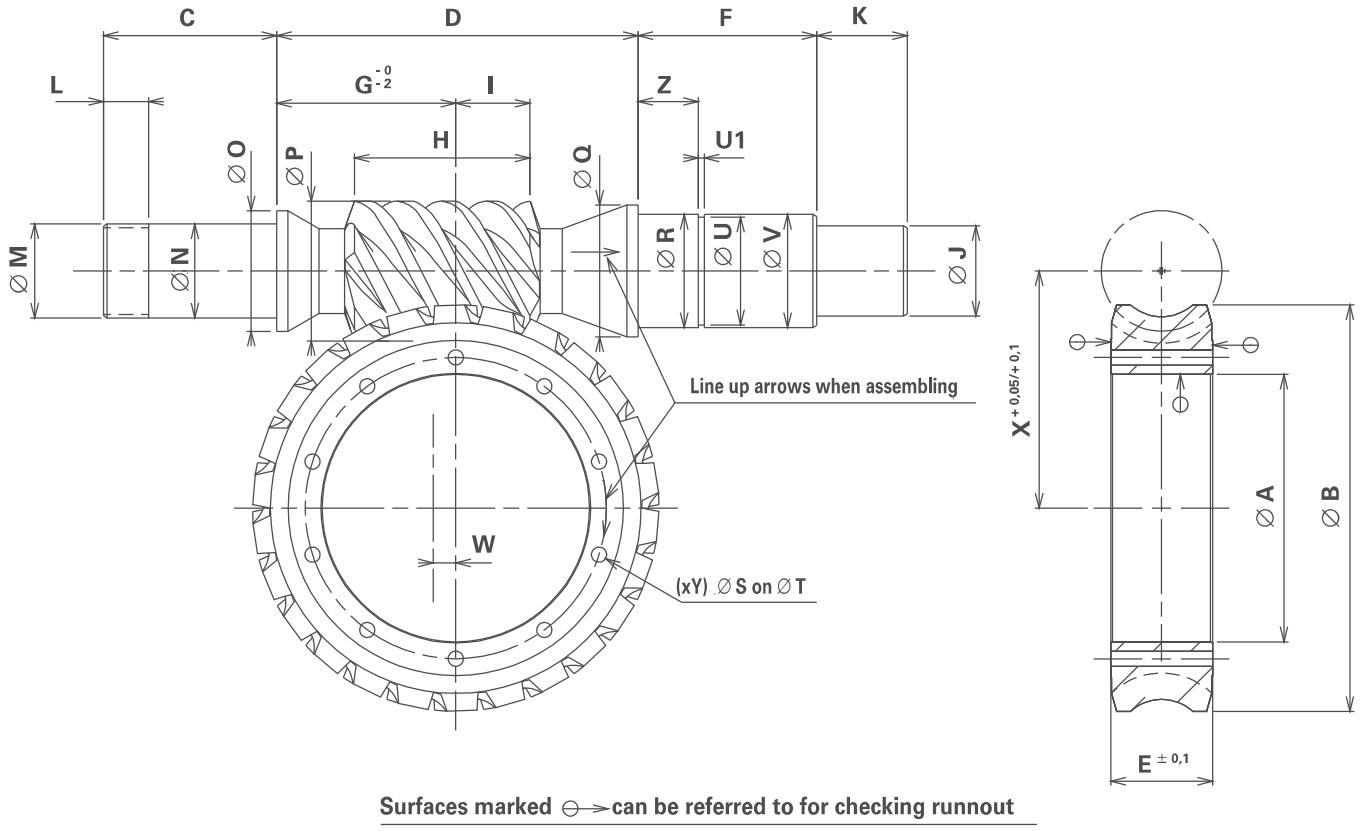
The accuracy of our servo gearsets ***DYNASET*** allows them to be set to less than 1 arcminute of backlash, without any efficiency or torque capacity losses (it is assumed than custom machined parts and mounting are correct).

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.

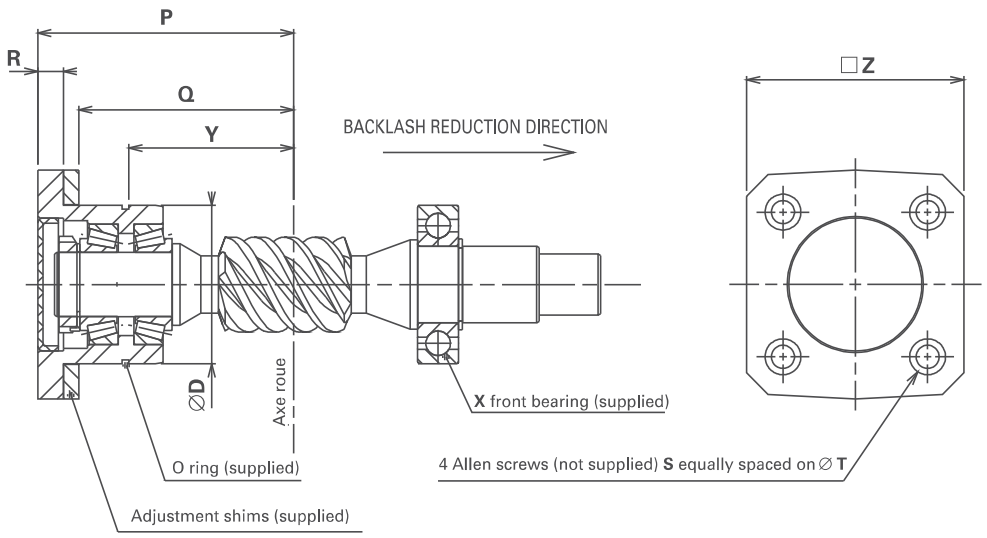
SERVO GEARSET DYNASET



Surfaces marked ⊖→ can be referred to for checking runnout

DYNASET	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 (j6)	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



DYNASET	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.**

DYNASET	63	90	ADJ

Option — **Backlash adj. device** (see page 19)

Reduction ratio (see page 7)

Size — 35 | 45 | 55 | 63 | 75 | 90 | 110