Technical Data

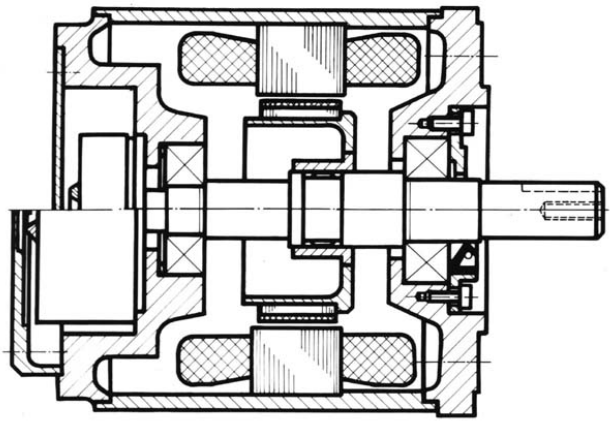
Brushless HiPerformance Actuator
SynchroDyn

HV ...-600 series

SyncroDyn-Servo Motors

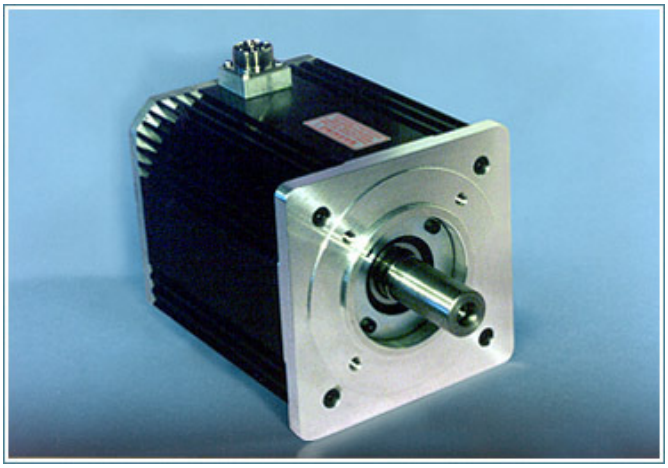
On function concept these motors are 3-phase AC Synchronous motors with an 8-pole permanent magnet rotor. The patented rotor is realised as a hollow cylinder. This unique design, together with the high coercive strength of the rare earth ($SmCo_5$) magnets gives the SynchroDyn servo motors outstanding features:

- *High performance density at a compact axial length*
- *High overload operating mode*
- *High continuous acceleration*
- *Zero cogging, even at an extremely low speed*
- *Small start up- and stopping times*
- *Position feedback of the rotor through the resolver*
- *Temperature-sensor included in winding*
- *With permanent magnet rotor, brushless, sinusoidal commutated*
- *Small electrical and mechanical time constant*
- *Precise linearity between current and torque*



Fail Safe Brake

For backlash free position hold of the motor shaft, the SnychroDyn servo motor are also available with built-in electromagnetic brake option on the mounting flange side. The brake will act as safety brake in the event of line failure. For opening, the brake must be connected at DC-voltage.



Like a conventional AC motor, the stator coil is supplied with sinusoidal, three-phase AC-current. At PWM control of the circulation frequently and the terminal voltage, the speed of the SynchroDyn servo motor can smoothly operate between zero speed and max. noload speed.

Standard Version

IP 54 protection (IEC 34-5), type A cooling (non ventilated), shaft run out tolerance class N, vibration class N (ISO 2373), insulation class F (IEC 34-7), PTC temperature sensor, shielded ball bearings lubricated for life, separate connectors for the motor and resolver, counter plugs included.

Options

On request, the following options and accessories are available:
Reduced vibration class, increased protection class, special flange, special output shaft, shorter axial length, class S cooling, turnable connector box.

Motors are available with gearhead, rear shaft

Printed Motors

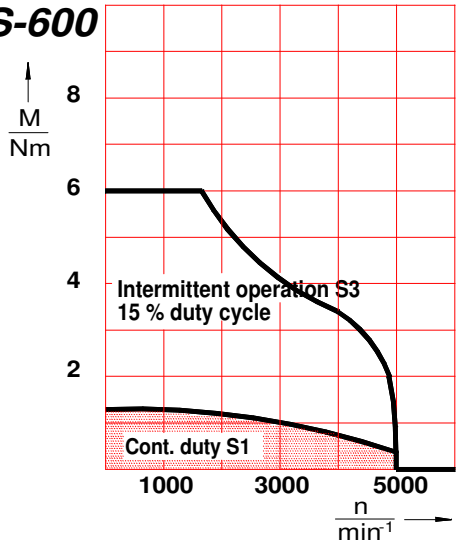
Characteristics

Rated Values [1]	Symbol	Unit	HV 10 S-600	HV 10 L-600	HV 13 S-600	HV 13 L-600	HV 16 S-600	HV 16 L-600
Nominal torque [2]	M_N	Nm	1	2	4	8	12	18
Nominal speed [2]	n_N	min^{-1}	3000	3000	3000	3000	3000	3000
Power output [2]	P_N	W	310	630	1250	2500	3750	5600
Nominal frequency	f_N	Hz	200	200	200	200	200	200
Terminal voltage [3]	U_N	V	306	318	318	314	314	308
Nominal current [2] [3]	I_N	A	1,2	1,9	3,6	6,7	9,2	13,4
Motor Performance								
Peak torque [5]	M_{max}	Nm	6	12	24	48	60	90
Max. peak torque [5]	I_{max}	A	7,2	11,4	21,6	40,5	46,0	66,0
Acceleration at peak torque	a_{max}	$10^3 rad/s^2$	65	73	36	40	18	20
Stall torque	M_0	Nm	1,3	2,5	5	10	15	20,5
Current at stall torque	I_0	A	1,6	2,4	4,5	8,4	11,4	14,7
Max. load speed	n_{max}	min^{-1}	5000	4500	4500	4000	4000	4000
Max. no load speed	n_0	min^{-1}	6000	5500	5000	5000	4500	4500
Intrinsic Motor Constants								
Torque constant [3]	k_T	Nm/A	0,87	1,03	1,11	1,17	1,14	1,29
Back EMF constant [3]	k_E	$V/10^3 min^{-1}$	52,7	62,2	67,4	70,7	70,3	78,3
Terminal resistance [4]	R_A	Ω	33,2	14,3	5,4	1,8	1,3	0,7
Armature inductance [4]	L_A	mH	30	21	14	10	7,4	5,2
Mechanical time constant	T_m	ms	5,1	2,9	3,2	2,2	3,3	2,8
Electrical time constant	T_e	ms	0,9	1,5	2,6	5,5	5,7	7,4
Inertia (rotor)	J	$kgcm^2$	0,86	1,64	6,56	11,75	32,4	45,2
Inertia (rotor and brake)	J	$kgcm^2$	1,01	1,79	8,26	13,45	39,2	52,0
Thermal Characteristics								
Thermal time constant [6]	T_{th}	min	25	25	30	30	35	35
Thermal resistance [6]	R_{th}	K/W	0,55	0,55	0,33	0,33	0,24	0,24
Temperature coeff. of back EMF	c_{th}	%/K	-0,04	-0,04	-0,04	-0,04	-0,04	-0,04
Max. cont. winding temperature	$t_{Wi\ max}$	°C	155	155	155	155	155	155
Physical Data								
Number of magnet poles	2p	pcs	8	8	8	8	8	8
Radial shaft load	F_R	N	400	400	500	500	600	600
Axial shaft load	F_A	N	200	200	250	250	400	400
Weight (mass)	m	kg	2,4	3,2	6,6	9,6	13,1	16,8
Weight with brake	m	kg	2,8	3,6	7,1	10,1	13,6	17,3

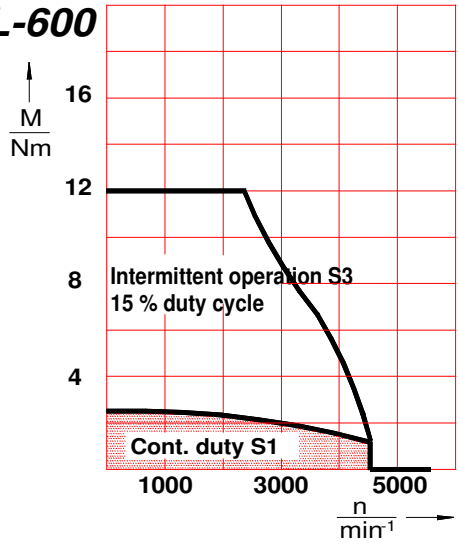
1) Motor TENV, protection IP 54, ambient temperature +40 °C, operation <1000 m above sea level.
2) Continuos operation S1 (IEC 34-7), housing temperature +80 °C
Motor can operate at all points of the torque-speed curve up to max. load speed.
3) RMS values, for sinusoidal current/voltage peak factor $\sqrt{2}$
4) Measured between two terminals; R_A at 25 °C; L_A at 10^3 Hz
5) Intermittent operation S3, IEC 34.7, 15% duty cycle, one time 10 s .
6) Based upon mounted motors, heat transfer from motor to equipment

Speed-torque characteristics

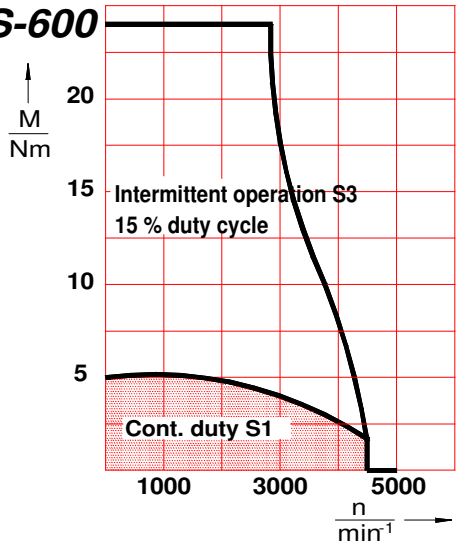
HV 10 S-600



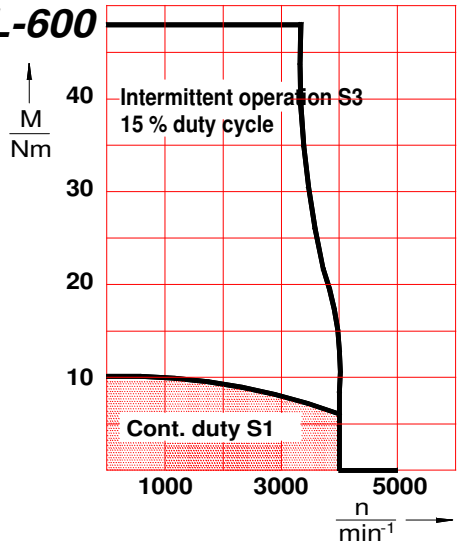
HV 10 L-600



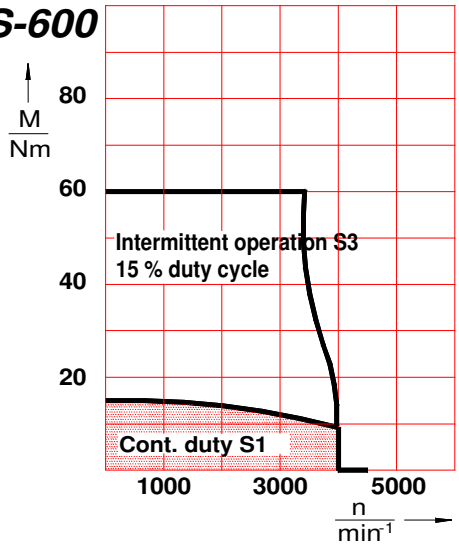
HV 13 S-600



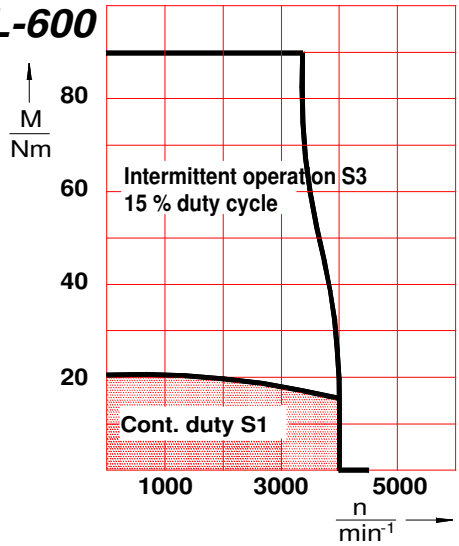
HV 13 L-600



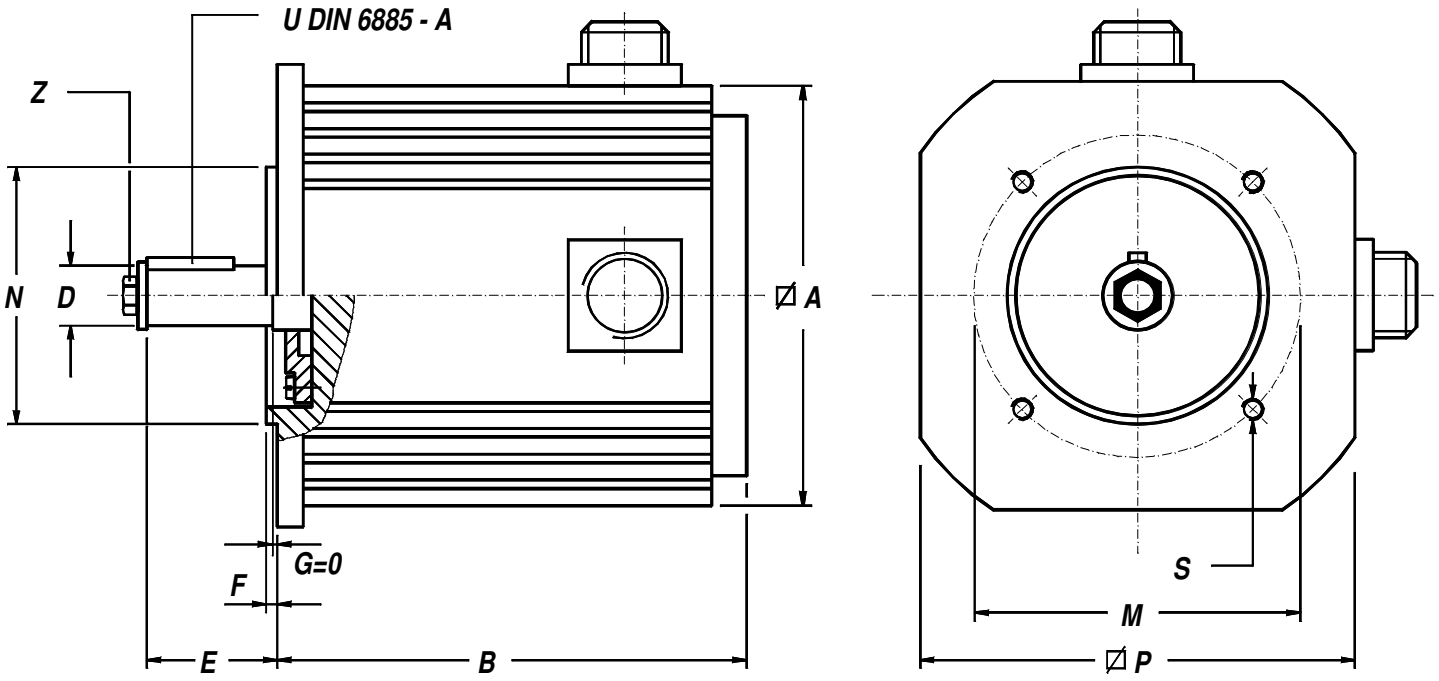
HV 16 S-600



HV 16 L-600



Outline Drawings
HV... 600 series



Motor	A	B	D	E	F	M	N	P	S	U	Z
HV 10 S-600	98	108	14^{j6}	30	2,5	75	60^{j6}	100	M5x8	5x5x20	M5x12
HV 10 L-600	98	128	14^{j6}	30	2,5	75	60^{j6}	100	M5x8	5x5x20	M5x12
HV 13 S-600	128	162	24^{j6}	50	3	100	80^{j6}	130	M6x10	8x7x32	M8x20
HV 13 L-600	128	198	24^{j6}	50	3	100	80^{j6}	130	M6x10	8x7x32	M8x20
HV 16 S-600	158	198	28^{j6}	57	3	115	95^{j6}	160	M8x10	8x7x32	M8x20
HV 16 L-600	158	277	28^{j6}	60	3	115	95^{j6}	160	M8x10	8x7x32	M8x20

Outline dimensions in mm, shaftend and mounting flange according to IEC 72

Order Code Key

H x - H xx xx - M xx

Mounting, protection
O = B14 (IEC 34 T7), IP 54, standard outline
N = B5 (IEC 34 T7), IP 54, standard outline
I = motor with gearhead, on request
K = customer specifications

Size (dimension P in cm)
10 = HV 10 ...
13 = HV 13 ...
16 = HV 16 ...

Electrical options
0 = standard ratings
1 = DC bus 540 V, UN = 3000 min-1
2 = DC bus 310 V, UN = 4000 min-1
...
9 = special windings

Resolver
1 = without resolver
2 = 2-pol transmitter
3 = 8-pole transmitter
…
9 = other variants

Fail safe brake
0 = without brake
1 = permanent magnet brake
...
9 = other brakes

Stack options
1 = length "long"
2 = length "short"
...
9 = special length

How to order:

SynchroDyn servo motor, B14 flange, IP 54 protection, outline dimensions and ratings in standard, with fail safe brake,
2-pole Transmitter resolver:

H0-H1302-M12.

All specifications subject to change without notice

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