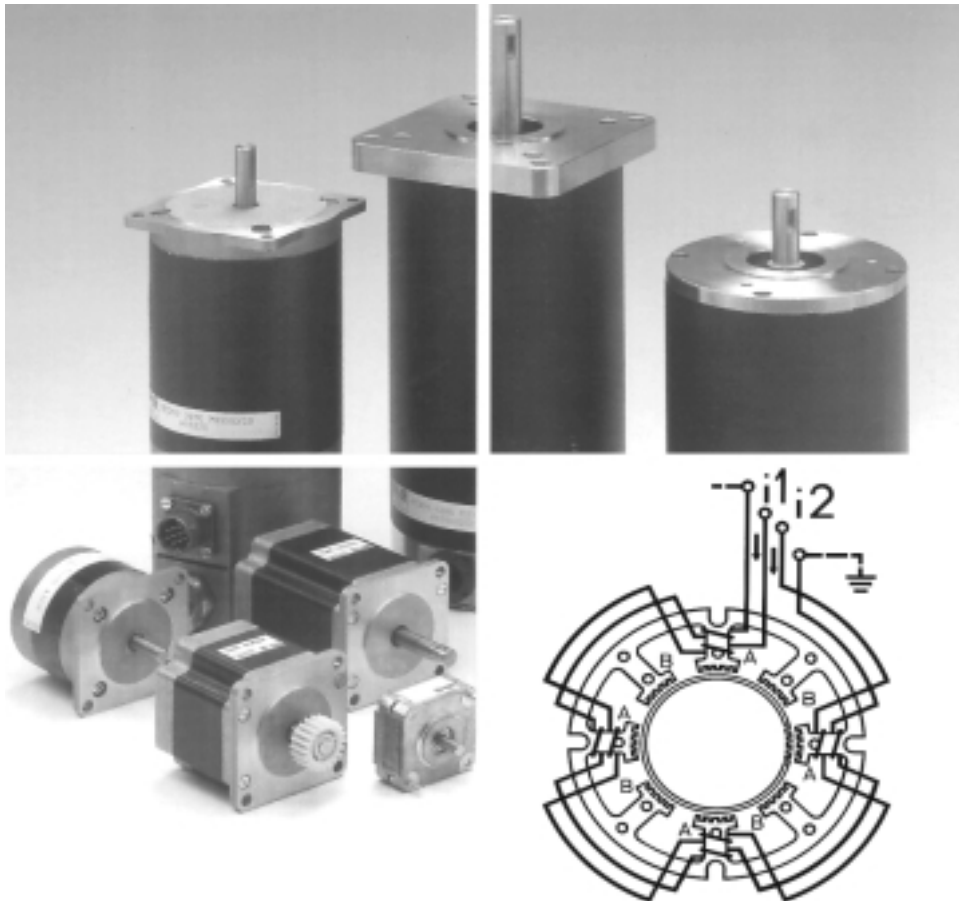


HYBRID STEPPING MOTORS

HY / HS / HN Series



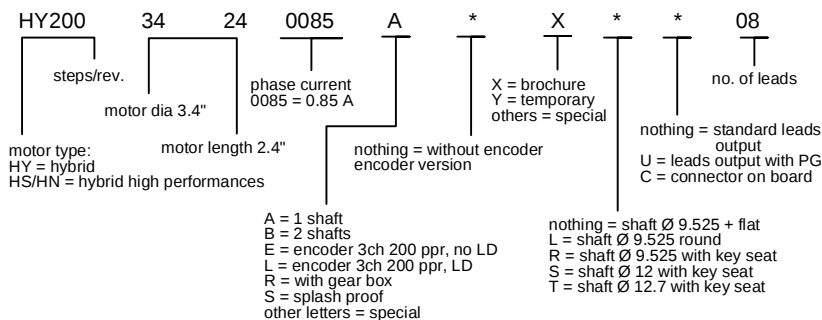
- Long Life
- Compact Design
- Bipolar / Unipolar Models

- Holding Torque up to 1425 Ncm
 - High Performances Series HS and HN
 - Several Options available (Encoders, Gearboxes, Cables, etc.)
-

The most important applications markets are:

- peripherals
- office automation
- telecommunication
- reprographic and printing machines
- tools machines
- industrial automation
- machines for wood working
- car instruments and servo controls
- sewing machines
- machines for textile and clothes sectors (knitting, shoe)
- machines for farm and food industries
- machines for packing and wrapping
- laboratory, measuring, electromedical instruments
- spot lights for amusement

STEPPING MOTORS DESCRIPTION KEY



Shaft extensions

All motors can be supplied with single or double ended shaft, as per customer's request.

Rotation

Stepping motors can run clockwise or counterclockwise, depending the commutation.

Insulation class: B

Operating temperature

Ambient operation temperature: -20° C to +40° C.

Number of leads

Standard stepping motors have 8 leads to be driven in bipolar or unipolar. If requested, motors with 4 or 6 leads can also be supplied.

Angular accuracy

Standard $\pm 5\%$, upon request $\pm 3\%$.

Angular accuracy is defined as the deviation from a theoretical position, in percentage of one step, after any number of steps.

Holding torque

The values of holding torque of the different models are indicated in the data sheets. Holding torque is measured with two phases supplied at the rated current

Specifications and approvals

The motors manufactured according to EN 60034-1: 1995-02. The motors with drive voltage higher than or equal to 120 V are suitable to be fitted on machines equipped with additional insulation, or, when the motor itself has the grounding through its clamping screws. Due to their peculiarity the stepping motors can't be always used at a continuous running at any speed. Should the motor be opened or tampered, its performances are no more guaranteed.



THE TECHNICAL SPECIFICATIONS MENTIONED IN THIS CATALOGUE ARE TYPICAL

The stepping motor is an electromechanical transducer that converts electrical pulses into programmable mechanical movements: it is both an actuator and a positioning device and it is driven by electronic drives. Stepping motors are divided into three different categories: **Variable Reluctance Motors**, **Permanent Magnet Motors** and **Hybrid Motors** they perform high torque, accuracy and speed.

Stepping motors, with some changes, can also be connected to the network and work as synchronous motors, as listed in AC synchronous motors catalogue. Stepping motors are very rugged and do not require maintenance as they have neither brushes and nor collector.

HYBRID MOTORS

HOLDING TORQUE

	UNIPOLAR (Ncm)	BIPOLAR (Ncm)
HY 100 1613	9	11÷13
HY 200 1607		8,7
HY 200 1713	11,2	13÷23,4
HY 200 1717		23,1÷24,6
HY 200 2215	25÷27	31÷34
HY 200 2220	52÷53	64÷69
HY 200 2226	87÷89	109÷114
HY 200 2240	111÷113	145÷148
HS 200 2216	37	47

HYBRID MOTORS

HOLDING TORQUE

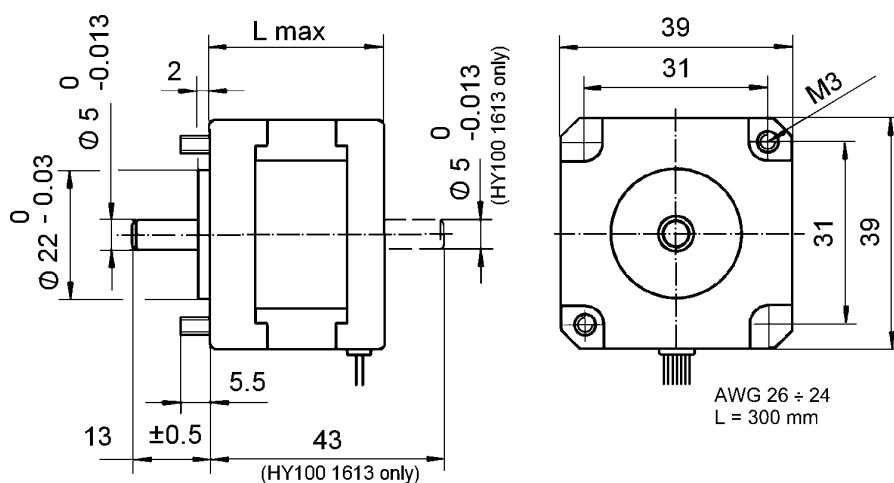
	UNIPOLAR (Ncm)	BIPOLAR (Ncm)
HS 200 2221	75	98
HS 200 2231	125	161÷163
HY 200 3424	116÷150	150÷193
HN 200 3426	230	280
HN 200 3438	380	480
HN 200 3451	620	760
HY 200 4247	377÷388	580÷597
HY 200 4266/4270	798÷830	990÷1270
HY 200 4288	1140	1425

NEW High Performances Stepping Motors HS and HN series

Its main feature is the torque / inertia ratio which places the product among the best ones available on the market.

Indeed, thanks to a choice of new Neodymium magnetic material and internal mechanical geometry, it has been possible to obtain stepping motors that with identical overall dimensions deliver 100% higher torque compared to those built to the prior technology.

Of particular interest is to underline that HS and HN series stepping motors deliver their own characteristics with extremely low values of voltage and current ratings.



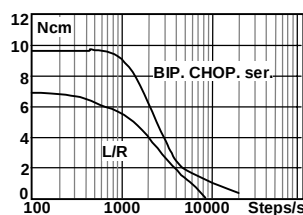
Specifications

		HY100 1613				HY200 1607
		0050 BX08	0075 AX04	0160 BX04	0095 BX04	0060 AX04
step angle		3,6°	3,6°	3,6°	3,6°	1,8°
step angle accuracy	%	5	5	5	5	5
rated phase current	A	0,5	0,75	1,6	0,95	0,6
phase resistance	Ω	7,2	4,4	1,2	4,9	6,6
phase inductance	mH	5,8	5,6	1,4	5,1	8,5
holding torque unipolar *	Ncm	9	-	-	-	-
holding torque bipolar *	Ncm	11	11,5	12	13**	8,7
detent torque	Ncm	1,6	1,6	1,6	1,6	1,0
rotor inertia	g cm ²	16	16	16	16	11
mass	Kg	0,2	0,2	0,2	0,2	0,15
max. length	mm	34,0	34,0	34,0	34,0	20,5
insulation class		B	B	B	B	B

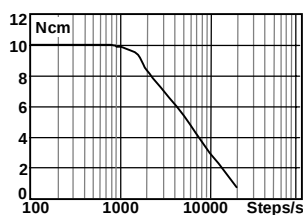
* two phases "ON"

** torque with duty cycle < 50%

HY100 1613 0050 BX08

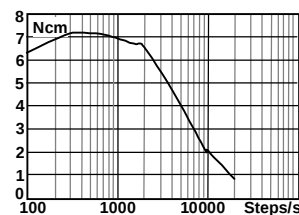
DRIVE: BIP.CHOP., SER., 36 V - 0.35 A/PH
DRIVE: UNIP.CHOP., L/R, 36 V - RS = 61 OHM

HY100 1613 0075 AX04



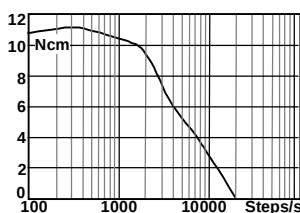
DRIVE: BIP.CHOP., 36 V - 0.75 A/PH

HY200 1607 0060 AX04



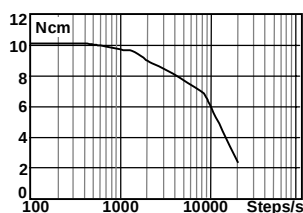
DRIVE: BIP.CHOP., 36 V - 0.6 A/PH

HY100 1613 0095 BX04

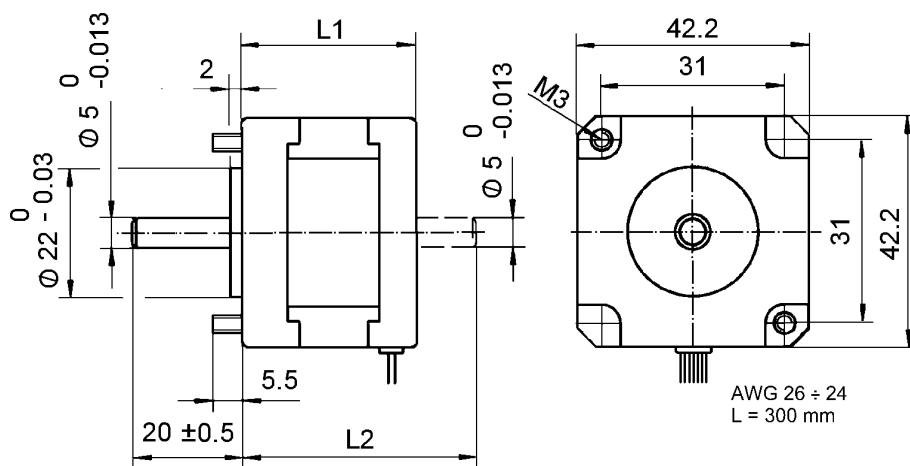


DRIVE: BIP.CHOP., 36 V - 0.95 A/PH

HY100 1613 0160 BX04



DRIVE: BIP.CHOP., 36 V - 1.6 A/PH



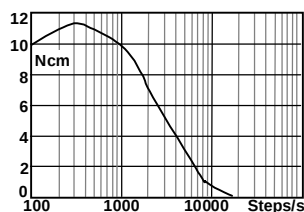
Specifications		HY200 1713				HY200 1717	HY200 1718	
		0040 BX06	0033 BX04	0150 AX04	0100 BS04***	0100 BC04	0090 BX04	0230 BX04
step angle		1,8°	1,8°	1,8°	1,8°	1,8°	1,8°	1,8°
step angle accuracy	%	5	5	5	5	5	5	5
rated phase current	A	0,4	0,33	1,5	1,0	1,0	0,9	2,3
phase resistance	Ω	15,6	23,9	1,0	5,6	4,6	4,2	0,72
phase inductance	mH	11,9	29,8	1,2	8,5	10,6	5,8	0,83
holding torque unipolar *	Ncm	11,2	-	-	-	-	-	-
holding torque bipolar *	Ncm	14,5	13,7	13,0	23,4**	23,1	29	29
detent torque	Ncm	1,7	1,7	1,7	1,7	1,7	4,5	4,5
rotor inertia	g cm ²	18	18	18	18	32	36	36
mass	Kg	0,2	0,2	0,2	0,2	0,3	0,3	0,3
length 1	mm	34	34	34	34	43	46	46
length 2	mm	45	45	45	45	54	57	57
insulation class		B	B	B	B	B	B	B

* two phases "ON"

** torque with duty cycle < 50%

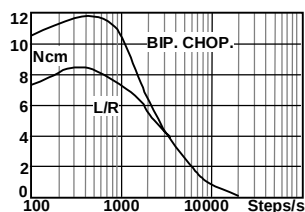
*** special flange. see options page

HY200 1713 0033 BX04

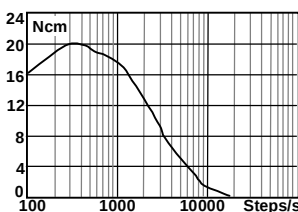


DRIVE: BIP.CHOP., 36 V - 0.33 A/PH

HY200 1713 0040 BX06

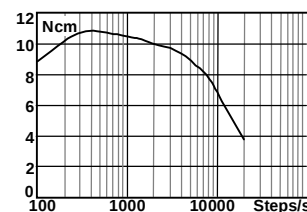
DRIVE: BIP.CHOP., SER., 36 V - 0.29 A/PH
DRIVE: UNIP. L/R, 36 V, RS = 70 OHM

HY200 1713 0100 BS04



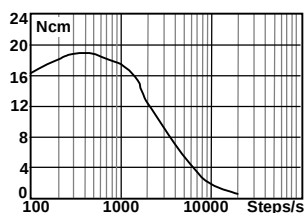
DRIVE: BIP.CHOP., 36 V - 1 A/PH

HY200 1713 0150 AX04



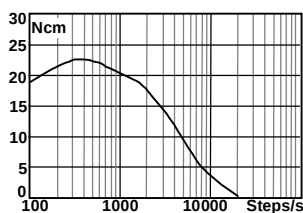
DRIVE: BIP.CHOP., 36 V - 1.5 A/PH

HY200 1717 0100 BC04



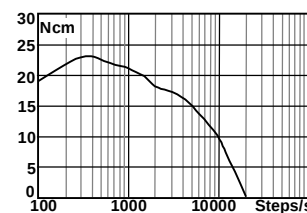
DRIVE: BIP.CHOP., 36 V - 1 A/PH

HY200 1718 0090 BX04

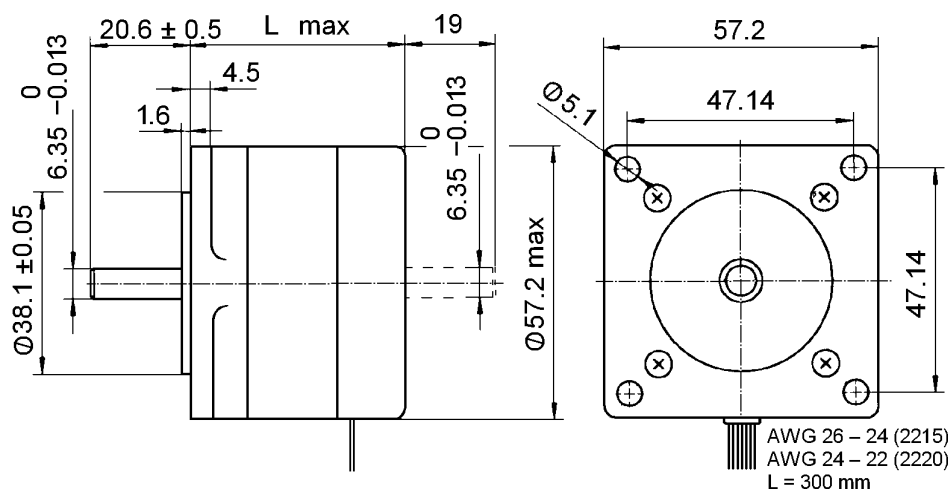
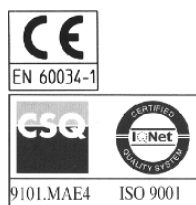


DRIVE: BIP.CHOP., 36 V - 0.9 A/PH

HY200 1718 0230 BX04



DRIVE: BIP.CHOP., 36 V - 2.3 A/PH

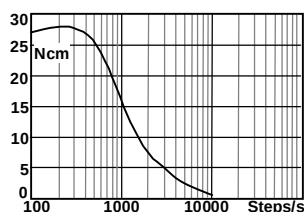


Specifications

		HY200 2215				HY200 2220		
		0150 AX08 0150 BX08	0100 AX08 0100 BX08	0033 AX04 0033 BX04	0220 AX04 0220 BX04	0044 AX08 0044 BX08	0100 AX08 0100 BX08	0210 AX08 0210 BX08
step angle		1,8°	1,8°	1,8°	1,8°	1,8°	1,8°	1,8°
step angle accuracy	%	5	5	5	5	5	5	5
rated phase current	A	1,5	1,0	0,33	2,2	0,44	1,0	2,1
phase resistance	Ω	1,5	3,4	33,8	0,7	23	5	1,1
phase inductance	mH	1,5	3,8	54,6	1,2	39,2	8	1,7
holding torque unipolar *	Ncm	25	27	-	-	52	53	52
holding torque bipolar *	Ncm	33	34	32	31	65	69	64
detent torque	Ncm	3,4	3,4	3,4	3,4	5,3	5,3	5,3
rotor inertia	g cm^2	56	56	56	56	124	124	124
mass	Kg	0,34	0,34	0,34	0,34	0,5	0,5	0,5
max. length	mm	40	40	40	40	52	52	52
max. applicable voltage	V	75	75	75	75	75	75	75
insulation class		B	B	B	B	B	B	B

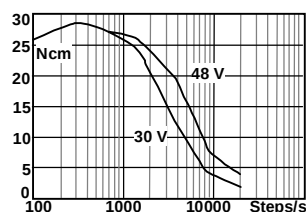
* two phases "ON"

HY200 2215 0033 AX04



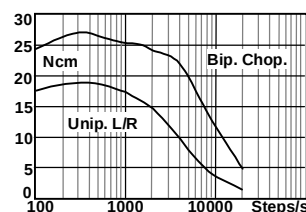
DRIVE: BIP.CHOP., 36 V - 0.33 A/PH

HY200 2215 0100 AX08

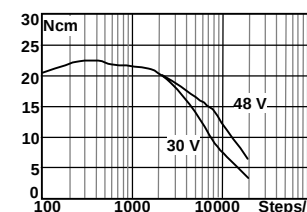


DRIVE: BIP.CHOP. PAR., 1.5 A/PH

HY200 2215 0150 AX08

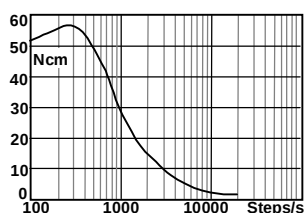
DRIVE: BIP.CHOP. PAR., 48 V - 2.2 A/PH
DRIVE: UNIP. L/R, 36 V, RS = 22 OHM

HY200 2215 0220 AX04



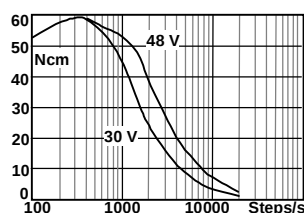
DRIVE: BIP.CHOP., 2.2 A/PH

HY200 2220 0044 AX08



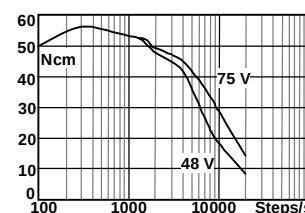
DRIVE: BIP.CHOP. PAR., 36 V - 0.62 A/PH

HY200 2220 0100 AX08

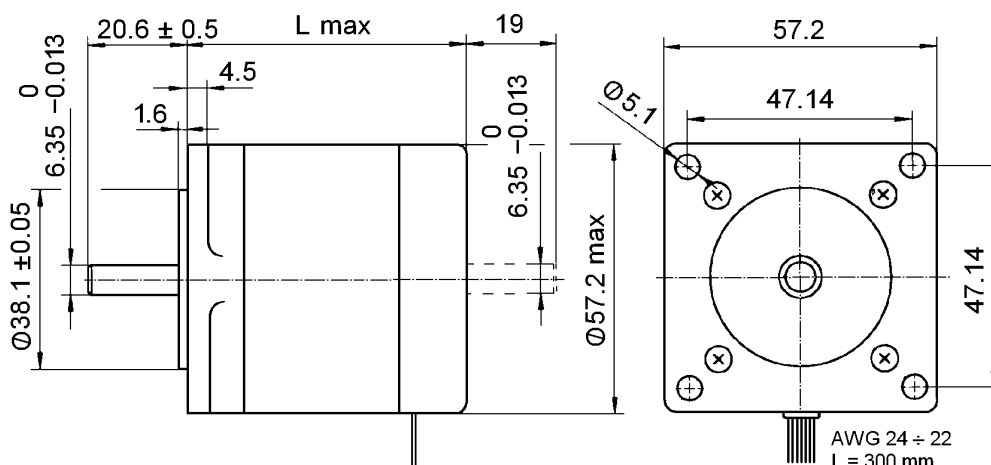
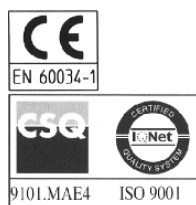


DRIVE: BIP.CHOP. PAR., 1.5 A/PH

HY200 2220 0210 AX08



DRIVE: BIP.CHOP. PAR., 3 A/PH

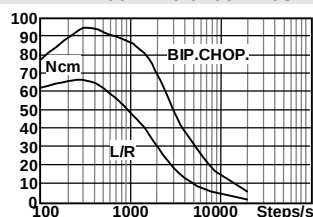


Specifications

		HY200 2226				HY200 2240	
		0160 AX08 0160 BX08	0190 AX08 0190 BX08	0250 AX04 0250 BX04	0470 AX08 0470 BX08	0290 AX08 0290 BX08	0460 AX08 0460 BX08
step angle		1,8°	1,8°	1,8°	1,8°	1,8°	1,8°
step angle accuracy	%	5	5	5	5	5	5
rated phase current	A	1,6	1,9	2,5	4,7	2,9	4,6
phase resistance	Ω	2,6	1,8	1,1	0,33	1,2	0,5
phase inductance	mH	4,7	3,3	4,0	0,5	2,4	0,9
holding torque unipolar *	Ncm	87	89	-	87	113	111
holding torque bipolar *	Ncm	109	113	114	109	148	145
detent torque	Ncm	8,5	8,5	8,5	8,5	10	10
rotor inertia	g cm ²	200	200	200	200	330	330
mass	Kg	0,7	0,7	0,7	0,7	1,2	1,2
max. length	mm	67	67	67	67	103	103
max. applicable voltage	V	75	75	75	75	75	75
insulation class		B	B	B	B	B	B

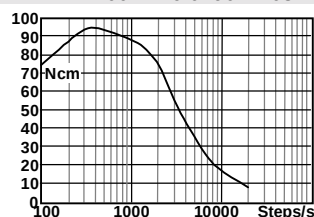
* two phases "ON"

HY200 2226 0160 AX08



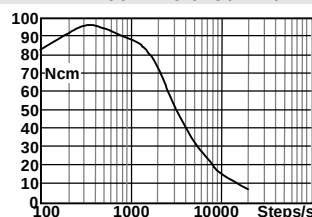
DRIVE: BIP.CHOP., PAR., 48 V - 2.3 A/PH
 DRIVE: UNIP. L/R, 36 V, RS = 18 OHM

HY200 2226 0190 AX08



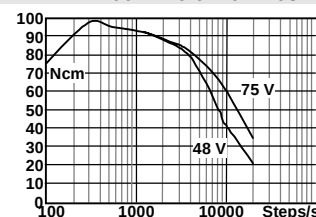
DRIVE: BIP.CHOP.PAR., 48 V - 2.7 A/PH

HY200 2226 0250 AX04



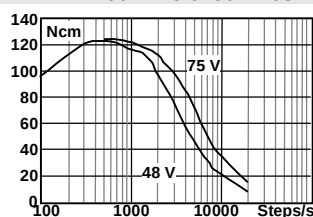
DRIVE: BIP.CHOP., 48 V - 2.5 A/PH

HY200 2226 0470 AX08



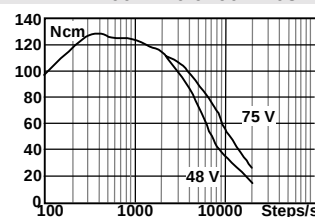
DRIVE: BIP.CHOP. PAR., 6.7 A/PH

HY200 2240 0290 AX08

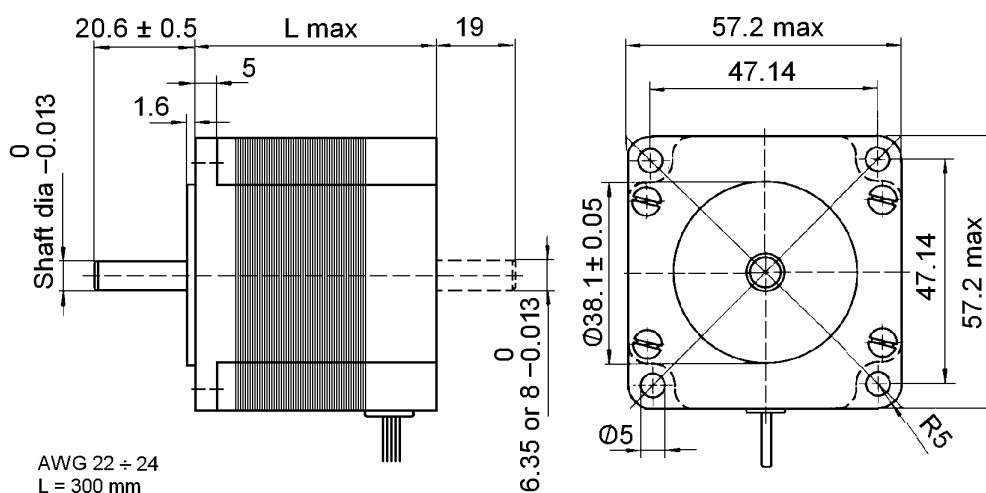
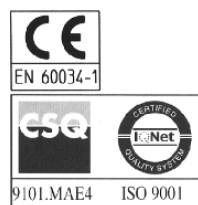


DRIVE: BIP.CHOP. PAR., 4.1 A/PH

HY200 2240 0460 AX08

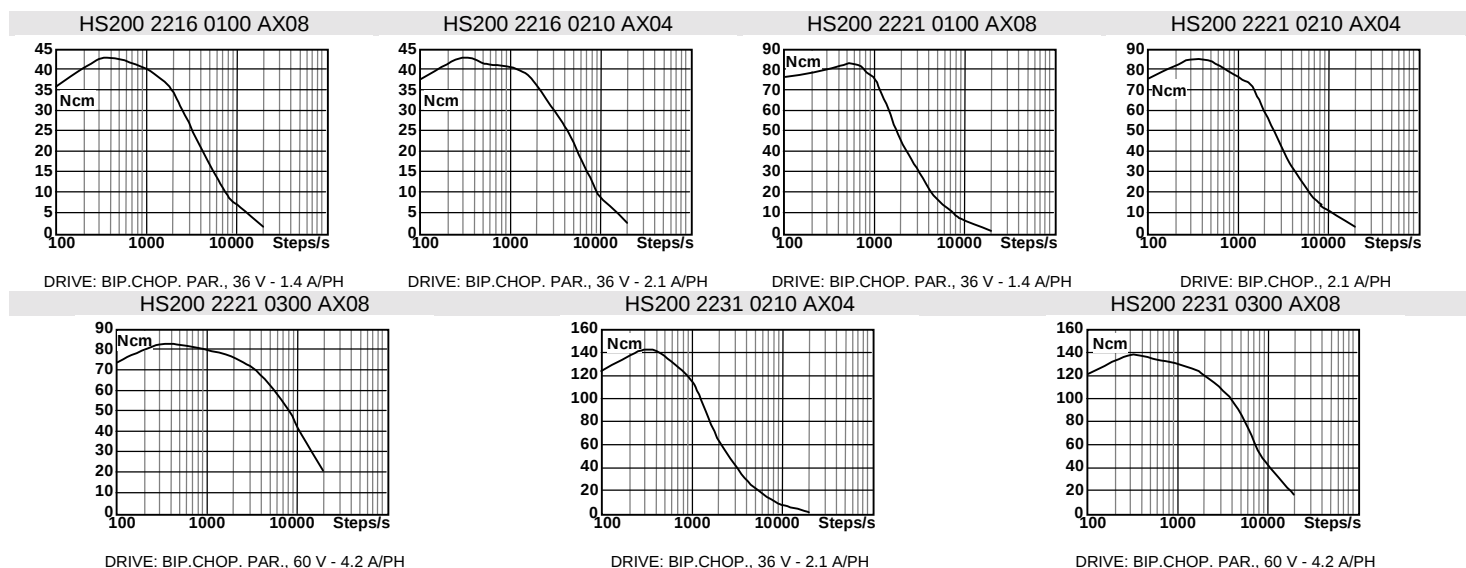


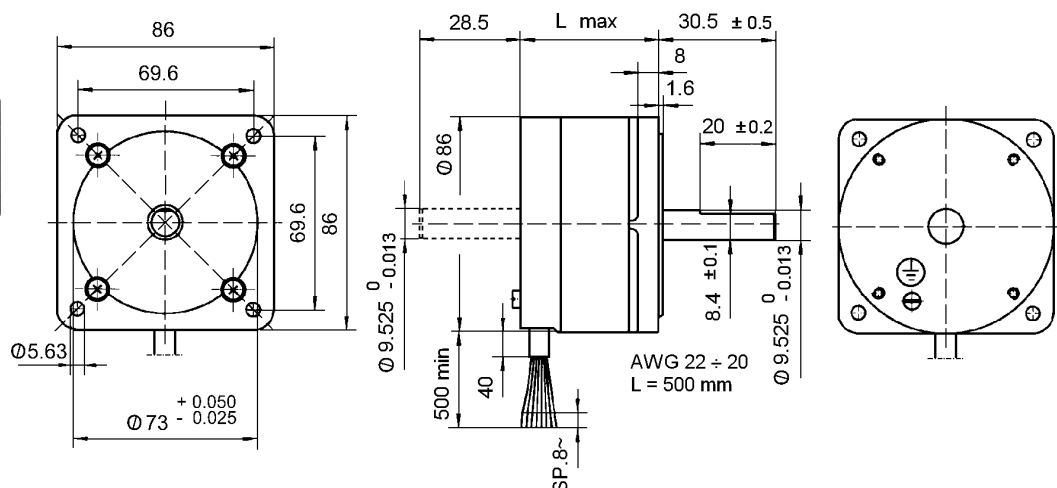
DRIVE: BIP.CHOP. PAR., 6.5 A/PH



Specifications	HS200 2216				HS200 2221			HS200 2231	
	0100 AX08	0210 AX08	0100 BX08	0210 BX08	0100 AX08	0210 AX04	0300 AX08	0210 AX04	0300 AX08
step angle	1,8°	1,8°	1,8°	1,8°	1,8°	1,8°	1,8°	1,8°	1,8°
step angle accuracy	%	5	5	5	5	5	5	5	5
rated phase current	A	1	2,1	2,1	1	2,1	3	2,1	3
phase resistance	Ω	4,6	1	1	6,2	1,4	0,7	2	1,1
phase inductance	mH	4,6	2,1	2,1	8,8	3,9	0,9	6,5	1,7
holding torque unipolar *	Ncm	37	-	-	75	-	75	-	125
holding torque bipolar *	Ncm	47	47,5	47,5	98	98	98	161	163
detent torque	Ncm	2,1	2,1	2,1	4	4	4	6,8	6,8
rotor inertia	g cm ²	77	77	77	220	220	220	340	340
mass	Kg	0,5	0,5	0,5	0,7	0,7	0,7	1,0	1,0
max. length	mm	41	41	41	55	55	55	78,5	78,5
shaft dia	mm	6,35	6,35	6,35	6,35	6,35	6,35	8	8
max. applicable voltage	V	75	75	75	75	75	75	75	75
insulation class	B	B	B	B	B	B	B	B	B

* two phases "ON"





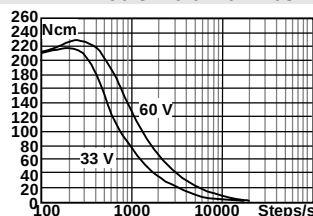
Specifications

		HN200 3426				HN200 3438		HN200 3451	
		0140 AX08 0140 BX08	0280 AX08 0280 BX08	0430 AX08 0430 BX08		0280 AX08 0280 BX08	0430 AX08 0430 BX08	0350 AX08 0350 BX08	0640 AX08 0640 BX08
step angle		1,8°	1,8°	1,8°		1,8°	1,8°	1,8°	1,8°
step angle accuracy	%	5	5	5		5	5	5	5
rated phase current	A	1.4	2,8	4,3		2,8	4,3	3,5	6,4
phase resistance	Ω	5	1,3	0,55		1,7	0,75	1,5	0,5
phase inductance	mH	21	5,1	2,1		7,7	3,5	8,5	2,5
holding torque unipolar *	Ncm	230	230	230		380	380	620	620
holding torque bipolar *	Ncm	280	280	280		480	480	760	760
detent torque	Ncm	8,5	8,5	8,5		13	13	23	23
rotor inertia	g cm ²	660	660	660		1200	1200	1800	1800
theoretical acceleration	rad/s ²	42000	42000	42000		40000	40000	42000	42000
mass	Kg	1,6	1,6	1,6		2,4	2,4	3,6	3,6
max. applicable voltage	V	90	90	90		90	90	140	140
length	mm	67	67	67		94	94	125	125
insulation class		B	B	B		B	B	B	B
protection class		IP 55 (1)	IP 55 (1)	IP 55 (1)		IP 55 (1)	IP 55 (1)	IP 55 (1)	IP 55 (1)

* two phases "ON"

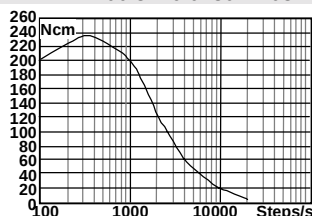
(1) for versions SX - EX - LX

HN200 3426 0140 AX08



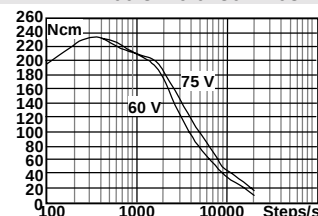
DRIVE: BIP.CHOP. PAR., 2 A/PH

HN200 3426 0280 AX08



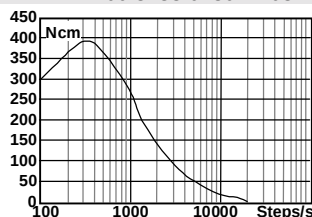
DRIVE: BIP.CHOP. PAR., 60 V - 4 A/PH

HN200 3426 0430 AX08



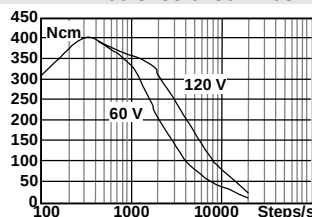
DRIVE: BIP.CHOP. PAR., 6 A/PH

HN200 3438 0280 AX08



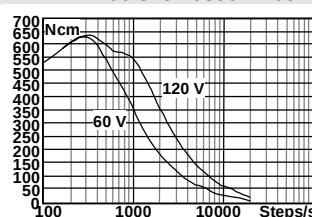
DRIVE: BIP.CHOP. PAR., 60 V - 4 A/PH

HN200 3438 0430 AX08



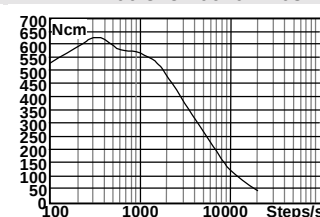
DRIVE: BIP.CHOP. PAR., 6 A/PH

HN200 3451 0350 AX08

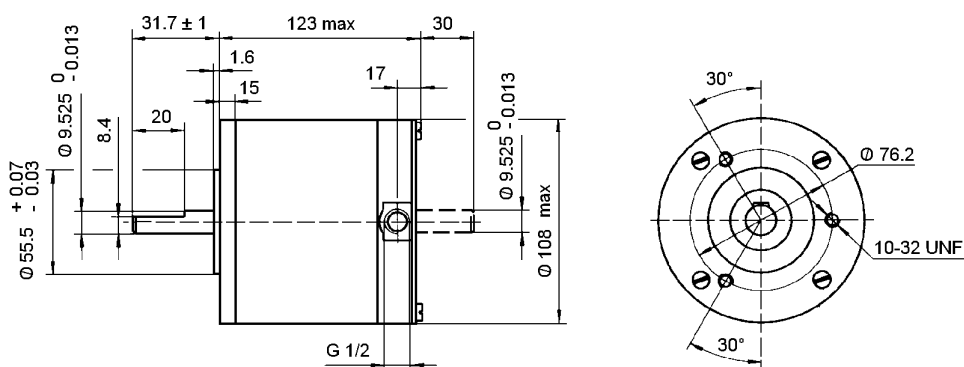
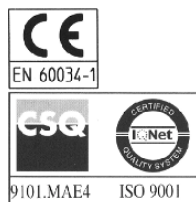


DRIVE: BIP.CHOP. PAR., 5 A/PH

HN200 3451 0640 AX08



DRIVE: BIP.CHOP. PAR., 120 V - 9 A/PH

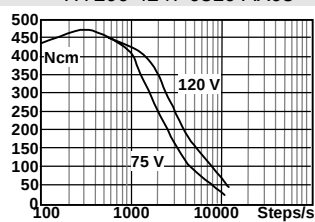


Specifications

	HY200 4247		
	0310 AX08 0310 BX08	0800 AX08 0800 BX08	
step angle	1,8°	1,8°	
step angle accuracy	%	5	
rated phase current	A	3,1	8,0
phase resistance	Ω	1,3	0,20
phase inductance	mH	6,8	1,5
holding torque unipolar *	Ncm	477	488
holding torque bipolar *	Ncm	580	597
detent torque	Ncm	41	41
rotor inertia	g cm ²	2800	2800
mass	Kg	4,6	4,6
max. length	mm	123	123
max. applicable voltage	V	140	140
insulation class	B	B	

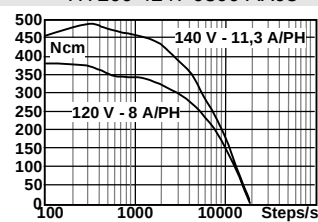
* two phases "ON"

HY200 4247 0310 AX08

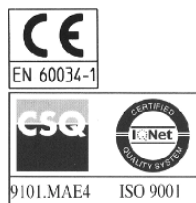
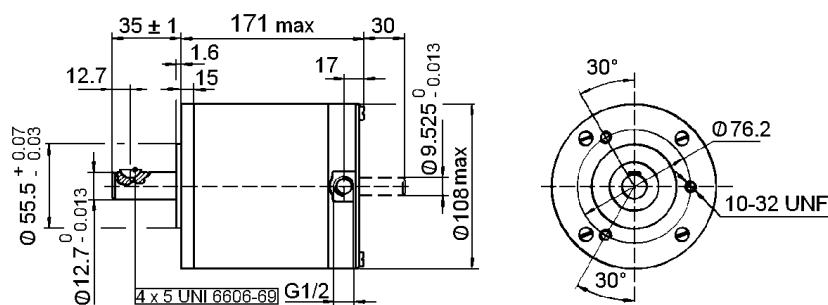
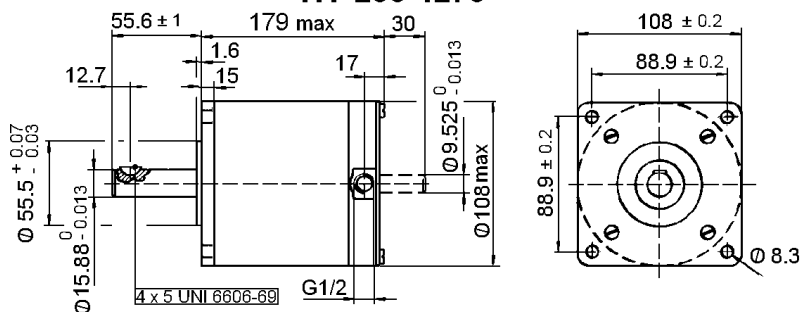


DRIVE: BIP.CHOP. PAR., 4.5 A/PH

HY200 4247 0800 AX08



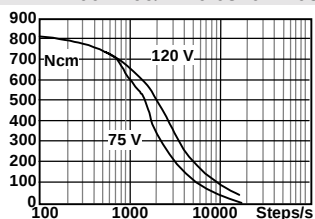
DRIVE: BIP.CHOP. PAR.

**HY 200 4266****HY 200 4270****Specifications**

		HY200 4266/4270		
		0340 AX08	0710 AX08	0900 AX08
		0340 BX08	0710 BX08	0900 BX08
step angle		1,8°	1,8°	1,8°
step angle accuracy	%	5	5	5
rated phase current	A	3,4	7,1	9,0
phase resistance	Ω	1,1	0,30	0,34
phase inductance	mH	6,3	2,0	2,7
holding torque unipolar *	Ncm	798	830	1024
holding torque bipolar *	Ncm	990	1030	1270
detent torque	Ncm	70	70	70
rotor inertia	g cm ²	5500	5500	5500
mass	Kg	7,3	7,3	7,3
max. applicable voltage	V	140	140	140
insulation class		B	B	B

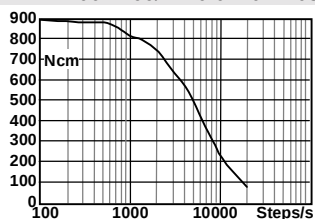
* two phases "ON"

HY200 4266/4270 0340 AX08



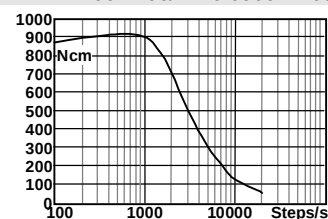
DRIVE: BIP.CHOP. PAR., 4.8 A/PH

HY200 4266/4270 0710 AX08

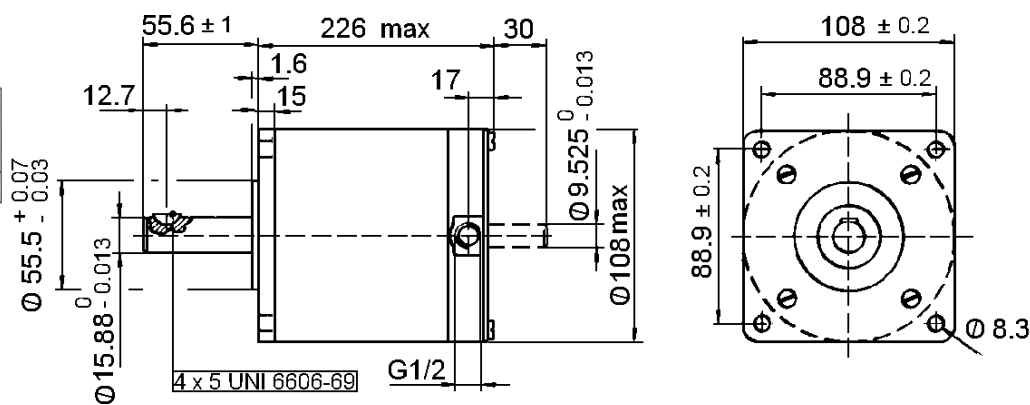
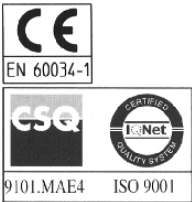


DRIVE: BIP.CHOP. PAR., 140 V - 10 A/PH

HY200 4266/4270 0900 AX08



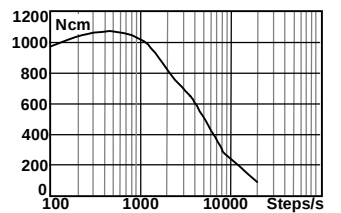
DRIVE: BIP.CHOP. PAR., 140 V - 12 A/PH



Specifications		HY200 4288
		0890 AX08
		0890 BX08
step angle		1,8°
step angle accuracy	%	5
rated phase current	A	8,9
phase resistance	Ω	0,31
phase inductance	mH	2,3
holding torque unipolar *	Ncm	1140
holding torque bipolar *	Ncm	1425
detent torque	Ncm	65
rotor inertia	g cm ²	8300
mass	Kg	10,5
max. applicable voltage	V	140
insulation class		B

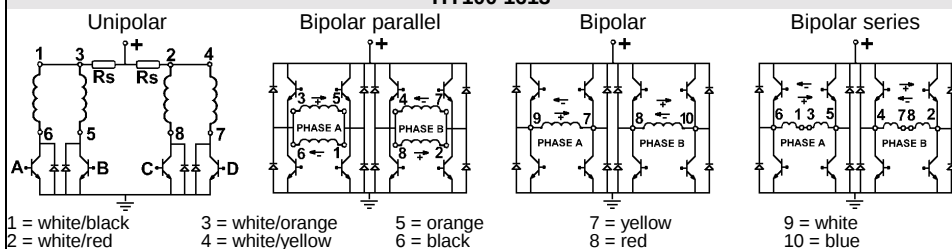
* two phases "ON"

HY200 4288 0890 AX08

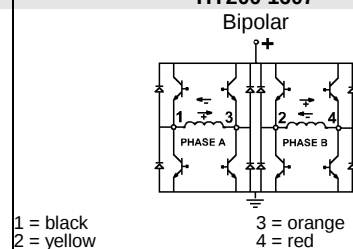


DRIVE: BIP.CHOP. PAR., 140 V - 12 A/PH

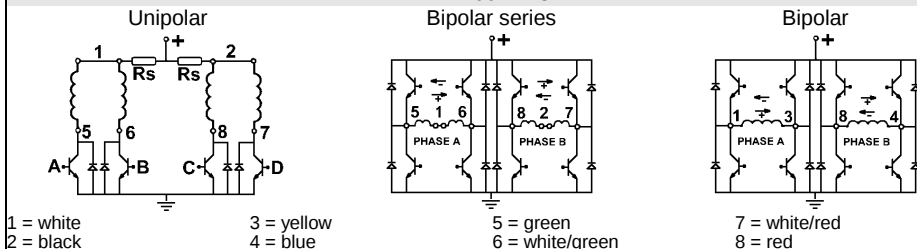
HY100 1613



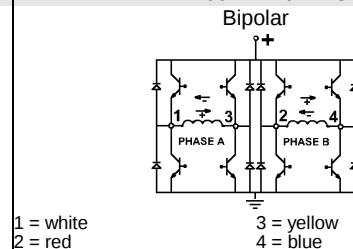
HY200 1607



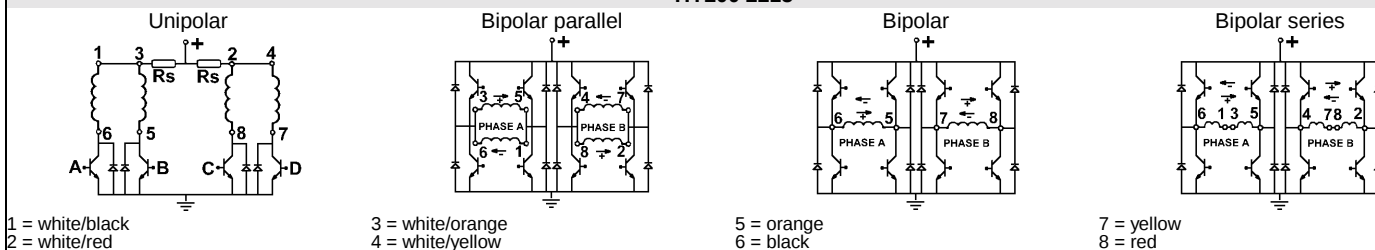
HY200 1713



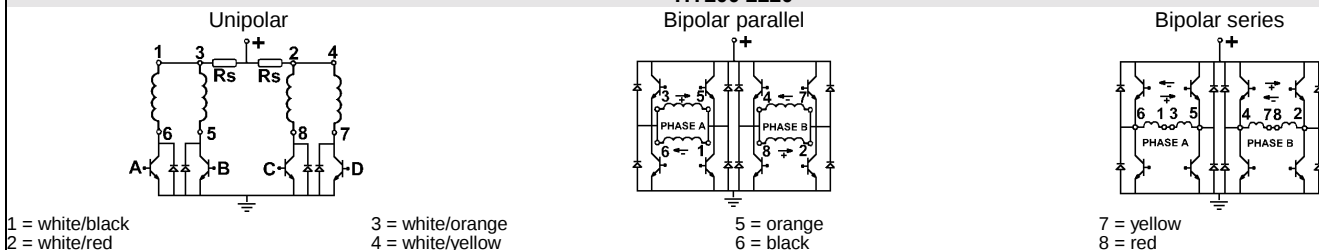
HY200 1717 / 1718



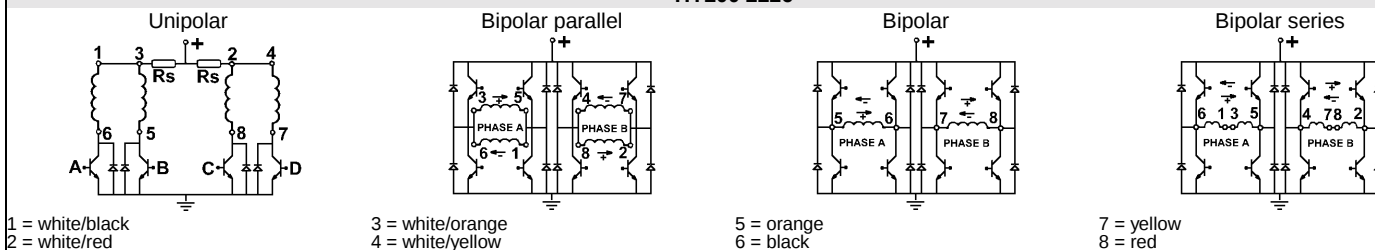
HY200 2215



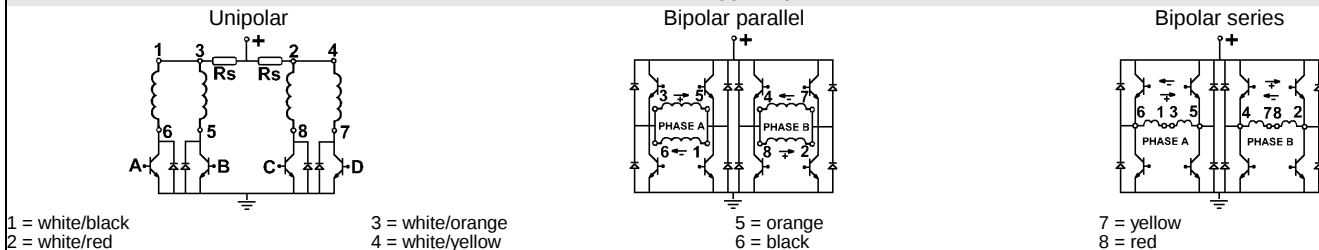
HY200 2220



HY200 2226

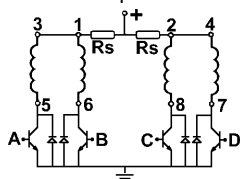


HY200 2240



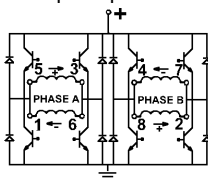
HS200 2216

Unipolar



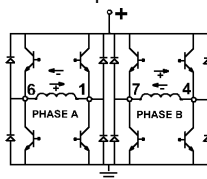
1 = white/brown
2 = white/yellow

Bipolar parallel



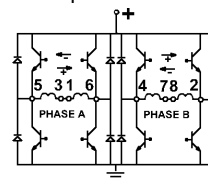
3 = white/orange
4 = white/red

Bipolar



5 = orange
6 = brown

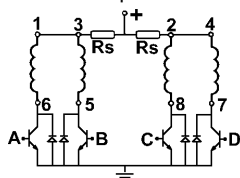
Bipolar series



7 = red
8 = yellow

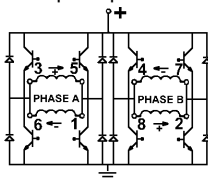
HS200 2221

Unipolar



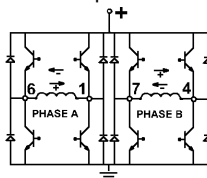
1 = white/brown
2 = white/yellow

Bipolar parallel



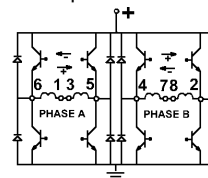
3 = white/orange
4 = white/red

Bipolar



5 = orange
6 = brown

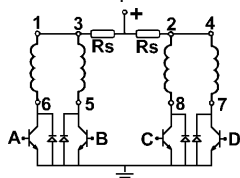
Bipolar series



7 = red
8 = yellow

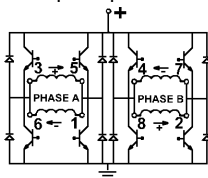
HS200 2231

Unipolar



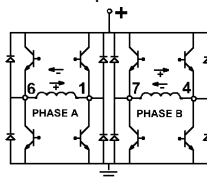
1 = white/brown
2 = white/yellow

Bipolar parallel



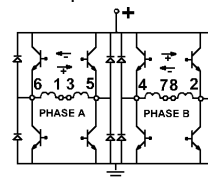
3 = white/orange
4 = white/red

Bipolar



5 = orange
6 = brown

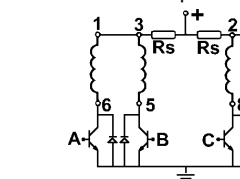
Bipolar series



7 = red
8 = yellow

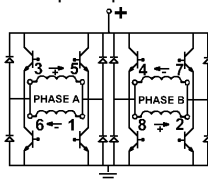
HY200 3424

Unipolar



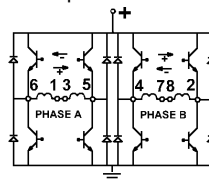
1 = white/black
2 = white/red

Bipolar parallel



3 = white/orange
4 = white/yellow

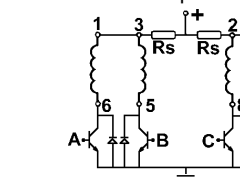
Bipolar series



7 = yellow
8 = red

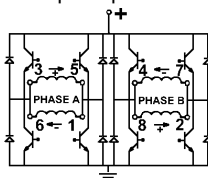
HN200 34xx

Unipolar



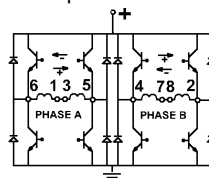
1 = white/black
2 = white/red

Bipolar parallel



3 = white/orange
4 = white/yellow

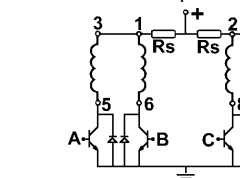
Bipolar series



7 = yellow
8 = red

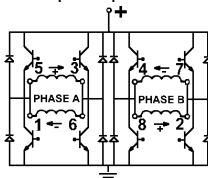
HY200 4247

Unipolar



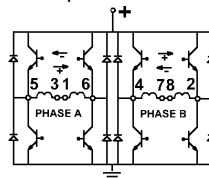
1 = white/black
2 = white/red

Bipolar parallel



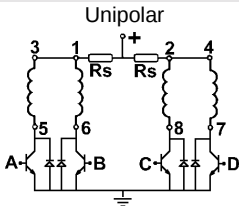
3 = white/orange
4 = white/yellow

Bipolar series



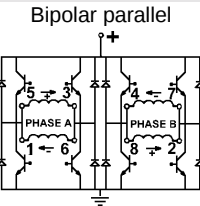
7 = yellow
8 = red

HY200 4266 / 4270

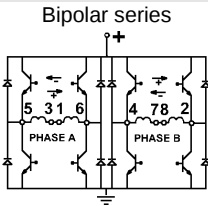


1 = white/black
2 = white/red

3 = white/orange
4 = white/yellow

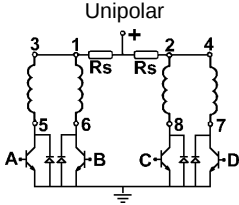


5 = orange
6 = black



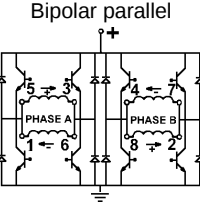
7 = yellow
8 = red

HY200 4288

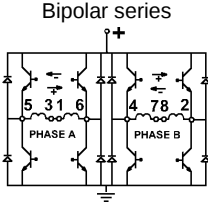


1 = white/black
2 = white/red

3 = white/orange
4 = white/yellow



5 = orange
6 = black



7 = yellow
8 = red

Drive Sequence

UNIPOLAR

HALF STEP PHASES				
STEP	A	B	C	D
1	+	0	0	+
2	+	0	0	0
3	+	0	+	0
4	0	0	+	0
5	0	+	+	0
6	0	+	0	0
7	0	+	0	+
8	0	0	0	+
1	+	0	0	+

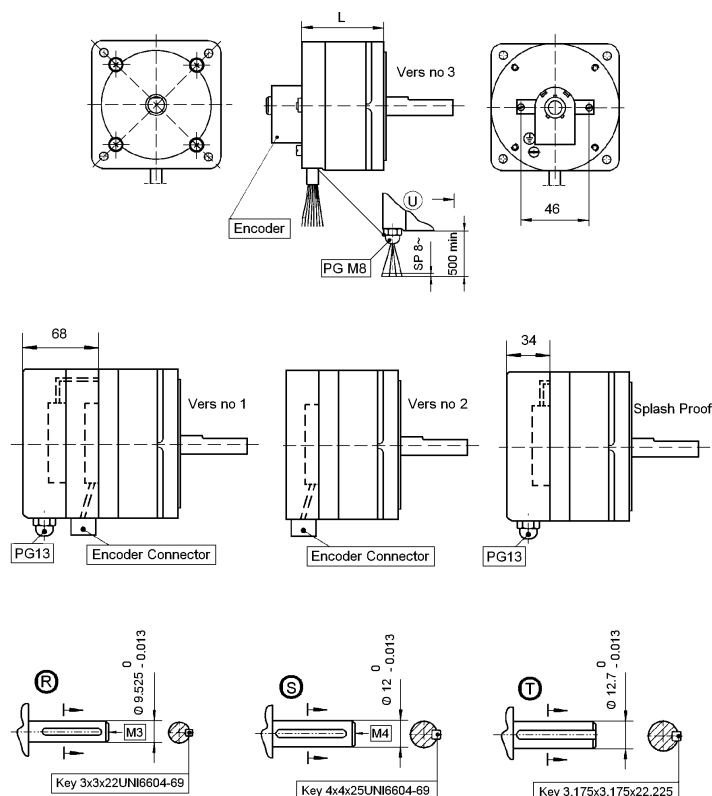
FULL STEP PHASES				
STEP	A	B	C	D
1	+	0	0	+
2	+	0	+	0
3	0	+	+	0
4	0	+	0	+
1	+	0	0	+

BIPOLAR

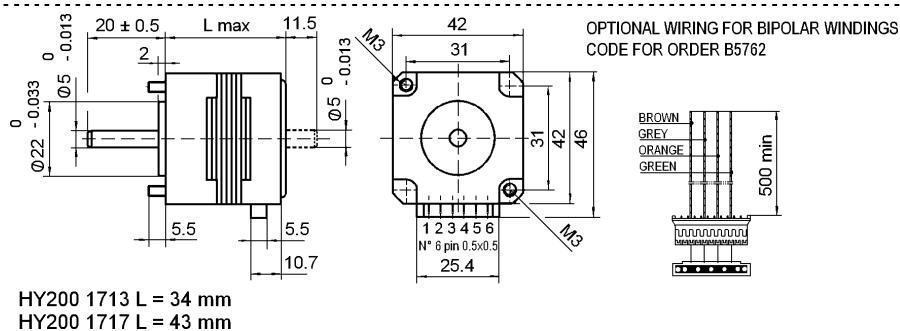
HALF STEP PHASES		
STEP	A	B
1	+	+
2	0	+
3	-	+
4	-	0
5	-	-
6	0	-
7	+	-
8	+	0
1	+	+

FULL STEP PHASES		
STEP	A	B
1	+	-
2	+	+
3	-	+
4	-	-
1	+	-

Clockwise rotation with motor seen from the flange side



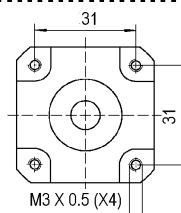
HN200 34xx



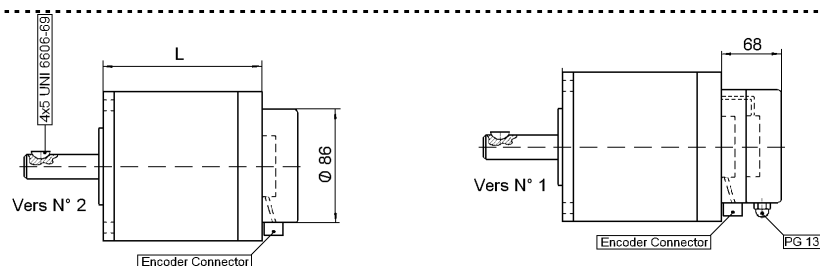
HY200 1713 L = 34 mm
HY200 1717 L = 43 mm

HY200 17xx

FLANGE WITH SCREWED HOLES
SCREWING DEPTH 4.5 mm



HY200 1713 0100 BS04



HY200 42xx