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Distribución de componentes  
eléctricos y electrónicos

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HP60 planetary  
25 November 2008



**PARVALUX®**

[www.parvalux.com](http://www.parvalux.com)

# Product overview








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## DC brushless (PBL)

## DC permanent magnet (PM)

## AC induction (SD)

motors only	Type Code	Shaft Orientation	DC brushless (PBL)				DC permanent magnet (PM)				AC induction (SD)							
			Power (Watts)*		Speed (rpm)		Torque (Nm)**		Power (Watts)*		Speed (rpm)		Torque (Nm)**					
			Max	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max				
	PBL/PM/SD	In-line	440	4000	0.06	1.4	7.5	450	1500	5000	0.05	1.1	3.7	250	900	2800	0.025	1.3
<b>worm</b>																		
	S	90°	84	640 <sup>†</sup>	0.2	3.5	7.5	90	21	970	0.2	4.0	3.7	120	13	680	0.06	4.5
	M	90°	220	480 <sup>†</sup>	0.7	11.8	23	280	21	970	0.5	11.7	10	190	12	680	0.36	11.4
	L	90°	346	432 <sup>†</sup>	0.7	19.2	45	450	25	780	0.9	18.7	100	250	15	546	1.9	17
	LS	90°	346	432 <sup>†</sup>	0.7	19.2	45	450	25	780	0.9	18.7	100	250	15	546	1.9	17
	G	90°	440	240 <sup>†</sup>	6.6	50	80	450	20	240	4.6	45.1	-	-	-	-	-	-
<b>double worm</b>																		
	SS	90° / In-line	-	-	-	-	7.5	60	0.5	150	0.8	5.9	3.7	120	0.32	40	0.34	5.9
	MM	90° / In-line	-	-	-	-	23	60	0.3	59	5	11.8	8	190	0.5	30	1.1	11.8
<b>in-line double worm</b>																		
	SIW	In-line	136	102 <sup>†</sup>	2.5	11.3	7.5	90	1	235	0.6	11.3	8	60	1	164	0.4	11.3
	MIW	In-line	184	77 <sup>†</sup>	3.2	28	23	120	1	235	1.7	28	8	120	1	164	0.5	28
	LIW	In-line	new for 2009				33	200	1	108	4.7	45	35	190	1.1	75	4.3	45
<b>in-line spur</b>																		
	SIS	In-line	-	-	-	-	7.5	90	5	182	0.9	7.9	8	60	3	127	1.24	7.9
	MIS	In-line	-	-	-	-	33	200	15	623	1	37	35	120	14	436	1	45
	LIS	In-line	-	-	-	-	23	280	4	667	1	86	10	190	2.6	467	1	100
<b>worm spur</b>																		
	SWS	90°	52	67 <sup>†</sup>	3.6	11	7.5	60	1	101	1.5	11	25	25	1	71	1.9	11
	MWS	90°	134	98 <sup>†</sup>	3.3	45	7.5	90	1	149	1	45	60	60	0.65	106	1.1	45
	LWS	90°	184	80 <sup>†</sup>	3.4	100	23	450	0.4	80	4	100	190	190	0.22	90	1	100
	GWS	90°	184	44 <sup>†</sup>	19.4	250	60	450	0.5	71	16	250	250	250	0.4	50	2	250
<b>planetary</b>																		
	PG36	In-line	-	-	-	-	3.8	11	3	674	0.05	0.3	-	-	-	-	-	-
	HP42	In-line	new for 2009				new for 2009				-							
	PG45	In-line	-	-	-	-	11	14	5	863	0.1	10	-	-	-	-	-	-
	PG56	In-line	-	-	-	-	3.7	59	3	694	0.1	30	-	-	-	-	-	-
	HP60	In-line	220	1000	0.4	30	23	788	1	1000	0.52	30	-	-	-	-	-	-
	HP86	In-line	new for 2009				new for 2009				-							

Variable speed AC, DC series and DC shunt wound motor technologies also available; call for details.

### extras



tachogenerator



encoder



terminal box



brake



controller

[www.ermec.com](http://www.ermec.com)

\* Continuous rated power | \*\* Continuous output torque | <sup>†</sup> Other ratios available on request | <sup>‡</sup> 17mm diameter shaft available with ratios 115:1 and 56:1

:: geared motors ::

:: legendary reliability ::

:: totally customisable ::

## Standard options

fixing base (B)	shaft length (mm)	shaft dia. (mm)			shaft output			flange PCD (mm)			International standard flanges		
		single	double	hollow (H)	flat	keyway	custom	standard	optional (F)	3-point (3P)	IEC	NEMA	metric
-	-	○	○	-	-	-	-	●	-	-	○	○	○
-	29	8	8	-	●	○	○	41.3	-	42	-	-	-
○	52	12	12	8	○	●	○	47.6	80	50.8	-	-	-
○	51	15	15	15	○	●	○	57.1	100	72	-	-	-
-	51	25	25	15	○	●	○	-	-	-	-	-	-
-	75	25	25	15	○	●	○	-	-	-	-	-	-
-	29	8	8	-	●	○	○	41.3	-	42	-	-	-
○	52	12	12	8	○	●	○	47.6	80	50.8	-	-	-
●	29	9	-	-	●	○	○	41.3	-	-	-	-	-
●	52	12	-	-	○	●	○	47.6	-	-	-	-	-
●	51	15	-	-	○	●	○	57.1	-	-	-	-	-
●	25.5	10	-	-	●	○	○	41.3	77.2	-	-	-	-
●	51	14	-	-	○	●	○	48	-	-	-	-	-
●	51	15	-	-	○	●	○	70	-	-	-	-	-
●	32	10	10	-	●	○	○	-	-	-	-	-	-
●	51	14	14	-	○	●	○	48	-	-	-	-	-
●	51	15 <sup>†</sup>	15 <sup>†</sup>	-	○	●	○	70	-	-	-	-	-
●	76	25	25	15	○	●	○	75	-	-	-	-	-
-	20	10	-	-	●	○	○	28	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	27	10	-	-	○	●	○	35	-	-	-	-	-
-	28	12	-	-	○	●	○	45	-	-	-	-	-
-	30	15	-	-	○	●	○	45	-	-	○	○	○
-	-	-	-	-	-	-	-	-	-	-	-	-	-

Call for details of our other options and bespoke application solutions.



3-point fixing (3P)



optional flange (F)



hollow shaft (H)



fixing base (B)

KEY: ● as standard ○ optional

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E&OE (errors and omissions excepted); in line with our policy of continuous improvement all data is subject to change. All drawings and product representations enclosed herein are not to scale.

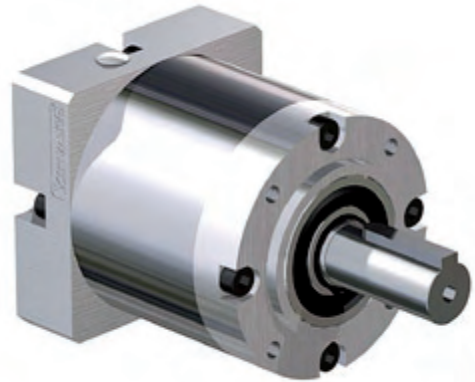
## engineering reliability into every product for over sixty years

Founded in 1947, as one of the UK's first manufacturers of small geared motors, Parvalux has built a tremendous reputation for offering one of the worlds most extensive and reliable ranges of customisable AC and DC geared motor units. Today, Parvalux continues to be a successful, privately-owned and run British business with distributors in 22 countries.



ISO 9001:2000 Certificate No. FM2171

# HP60 gearbox



stage 1 HP60 gearbox pictured with metric flange

TYPE	60mm cylinder planetary
OPERATING TEMPERATURE	-30°C to +120°C*
AMBIENT TEMPERATURE	-30°C to +40°C
PROTECTION	IP65
LUBRICATION	Grease lubricated for life
ROTATION DIRECTION	As input direction
RATED INPUT SPEED	4000 rpm
MAX INPUT SPEED	6000 rpm
PRESS FIT MAX FORCE	750 N
GEARS	Alloy steel or composite on request
INPUT FLANGE	Servo-coupling or direct-fit on request
SERVICEABLE LIFETIME	1,000 hours at full load at rated input speed, rising to 15,000+ hours for low-wear applications

Stages	Efficiency (%)	Continuous Torque (Nm)	Peak Torque (Nm)	Backlash (Arcmin)	Weight (kg)	Radial Load (N)	Axial Load (N)
1	≤97	5	10	≤20	1.02	250	75
2	≤94	15	25	≤30	1.25	400	125
3	≤91	30	40	≤40	1.54	550	175
4	≤88	30	40	≤50	1.78	725	225

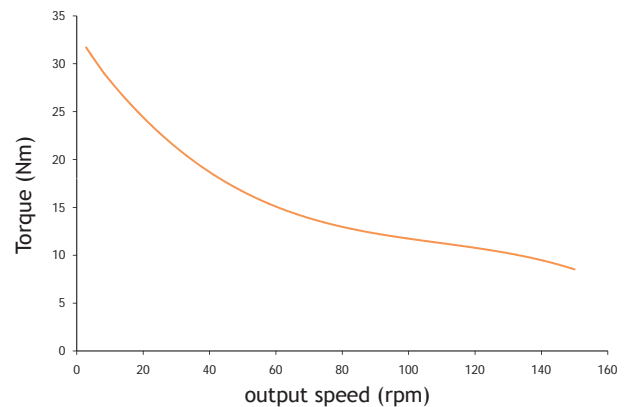
\* max. operating temp. +70°C for Delrin gears

## standard ratios

(other ratios available on request)

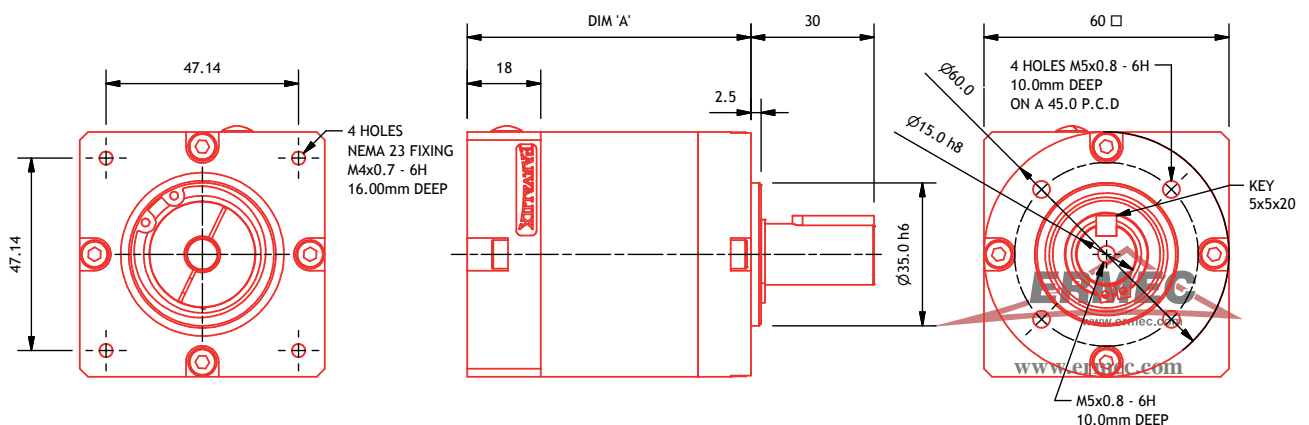
1 stage	2 stage	3 stage	4 stage
4	16	64	348
5 (4.75)	19	76	456
6	24	96	532
7	28	112	576
	36	133	684
	42	144	798
	49	168	931
		196	1026
		252	1296
		294	1512
		343	1764
			2058

## Torque/speed characteristics | 4000rpm at full load



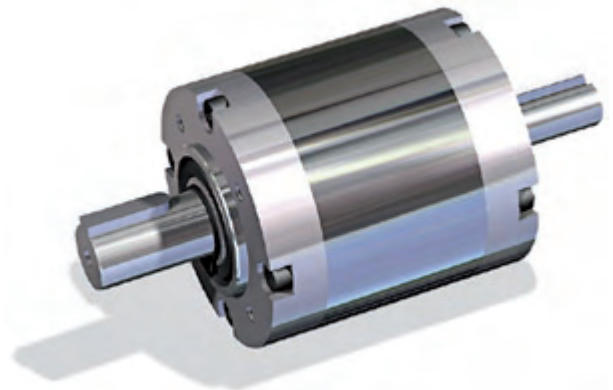
## Option: servo-coupling

Available with a standard clamped-segment servo-coupling to enable simple fitting and re-fitting to a motor. Permanently enables zero backlash at point of coupling. Standard motor shaft dimensions: 8mm dia. x 15mm long (from front fixing face of motor), location spigot must be less than 38.1mm. Other bore sizes available on request (max dia. 9.52mm).



# HP60 speed reducer

TYPE	60mm cylinder planetary
OPERATING TEMPERATURE	-30°C to +120°C*
AMBIENT TEMPERATURE	-30°C to +40°C
PROTECTION	IP65
LUBRICATION	Grease lubricated for life
ROTATION DIRECTION	As input direction
RATED INPUT SPEED	4000 rpm
MAX INPUT SPEED	6000 rpm
PRESS FIT MAX FORCE	750 N
GEARS	Alloy steel or composite on request
INPUT/OUTPUT FLANGE	Parvalux, NEMA, metric, IEC B14, custom
SERVICEABLE LIFETIME	1,000 hours at full load at rated input speed, rising to 15,000+ hours for low-wear applications



stage 1 HP60 speed reducer pictured

Stages	Dimension 'A' (mm)	Efficiency (%)	Continuous Torque (Nm)	Peak Torque (Nm)	Backlash (Arcmin)	Weight (kg)	Radial Load (N)	Axial Load (N)
1	64	≤97	5	10	≤20	1.07	250	75
2	80.5	≤94	15	25	≤30	1.30	400	125
3	97	≤91	30	40	≤40	1.59	550	175
4	113.5	≤88	30	40	≤50	1.83	725	225

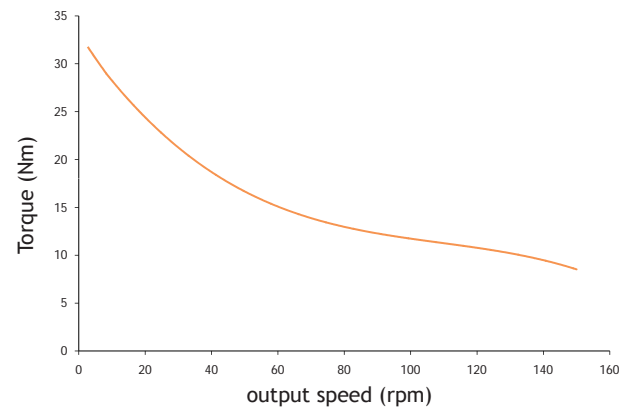
\* max. operating temp. +70°C for Delrin gears

## standard ratios

(other ratios available on request)

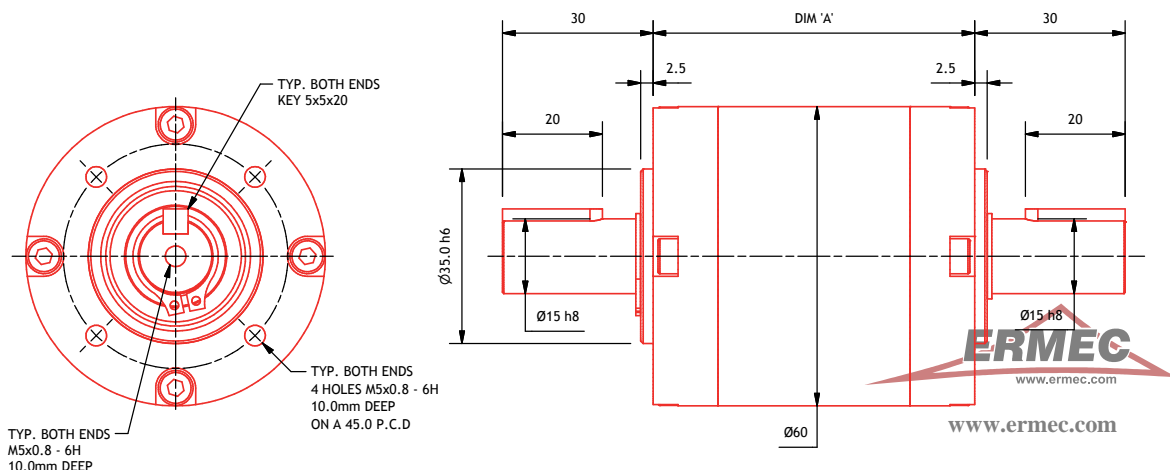
1 stage	2 stage	3 stage	4 stage
4	16	64	348
5 (4.75)	19	76	456
6	24	96	532
7	28	112	576
	36	133	684
	42	144	798
	49	168	931
		196	1026
		252	1296
		294	1512
		343	1764
			2058

## Torque/speed characteristics | 4000rpm at full load



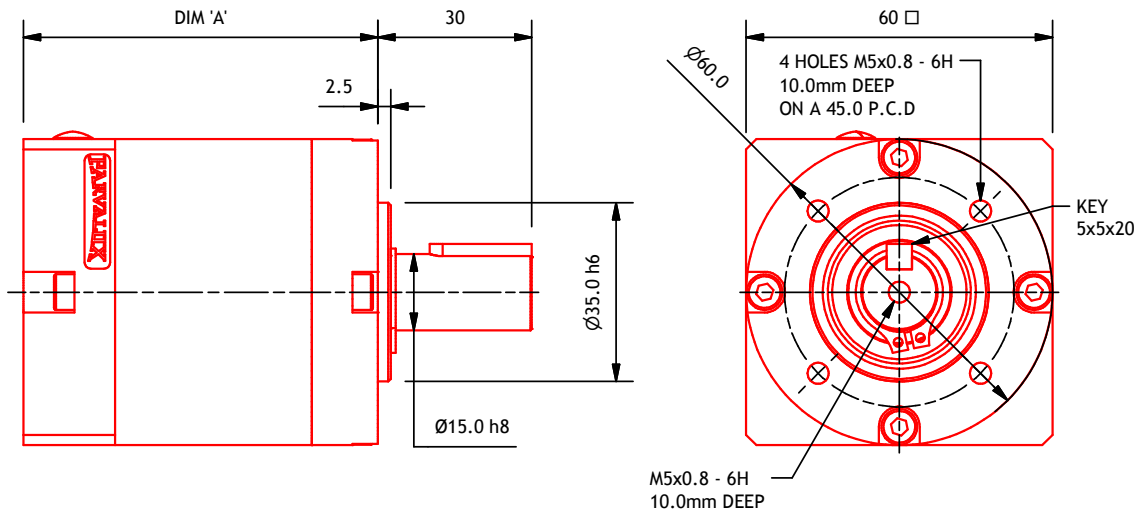
## Option: customised input/output flanges

Available with customised input/output flanges and fixing arrangements; Metric standard; NEMA square; IEC B14 (56mm, 63mm & 71mm) sizes and other standard and non-standard fixing arrangements.

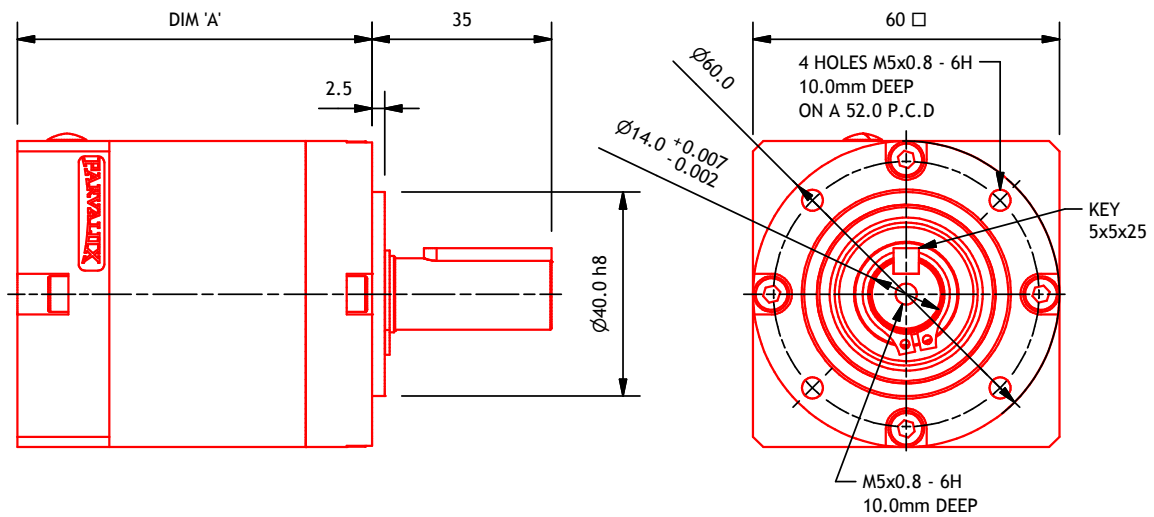


# HP60 flange options 1

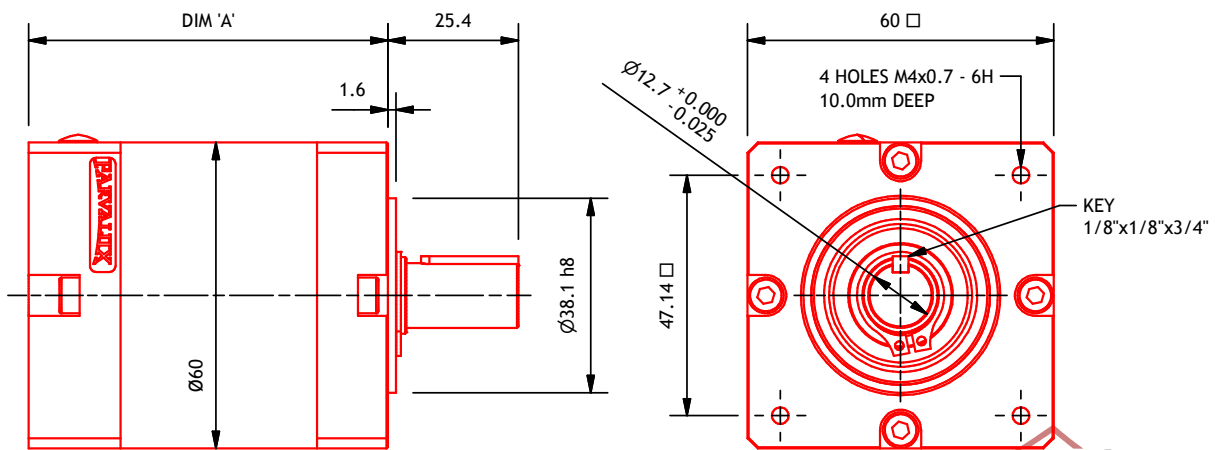
Parvalux standard flange/mount



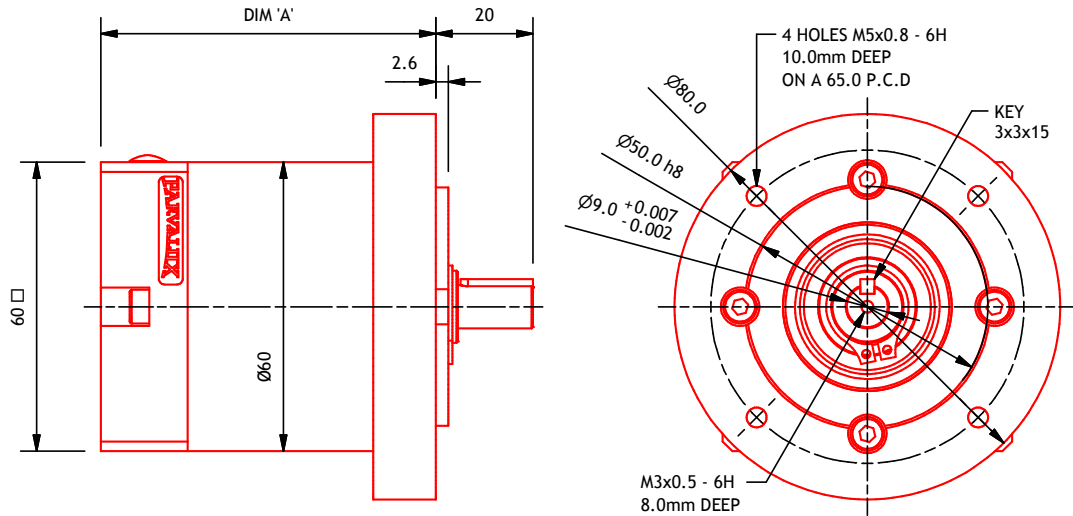
Metric flange/mount



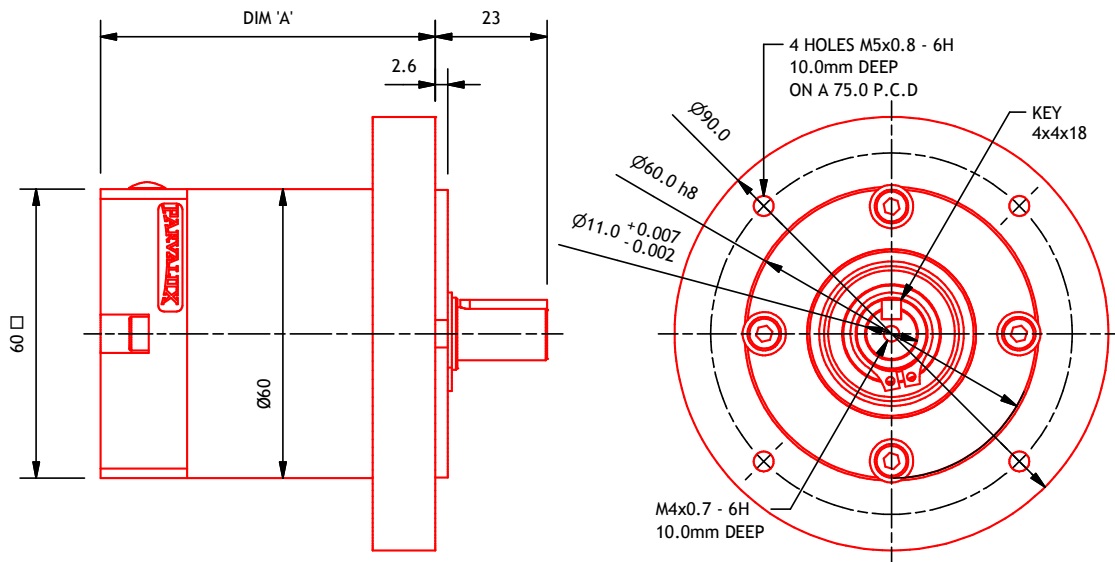
NEMA standard flange/mount



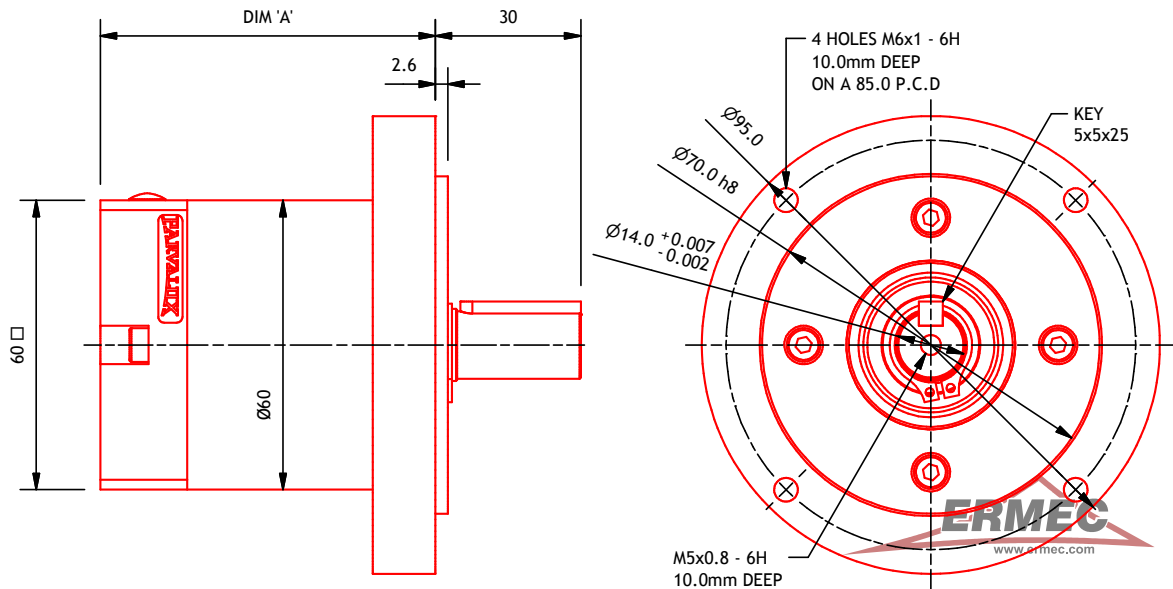
IEC (M56) standard flange/mount



IEC (M63) standard flange/mount



IEC (M71) standard flange/mount



# PM1HP60

MOTOR	Permanent magnet DC motor
PROTECTION	IP22
GEARBOX	Planetary HP60 (Protection IP65)
MOTOR POWER	45 - 200 Watts
SPEED	1 - 1000 rpm
VOLTAGE	12V - 220V DC available range
WEIGHT	3.13kg (ST1); 3.36kg (ST2); 3.65kg (ST3); 3.89kg (ST4)*
RADIAL LOAD	250N (ST1); 400N (ST2); 550N (ST3); 725N (ST4)*
AXIAL LOAD	75N (ST1); 125N (ST2); 175N (ST3); 225N (ST4)*
EXTRAS	See page 36 of 2009 permanent magnet catalogue

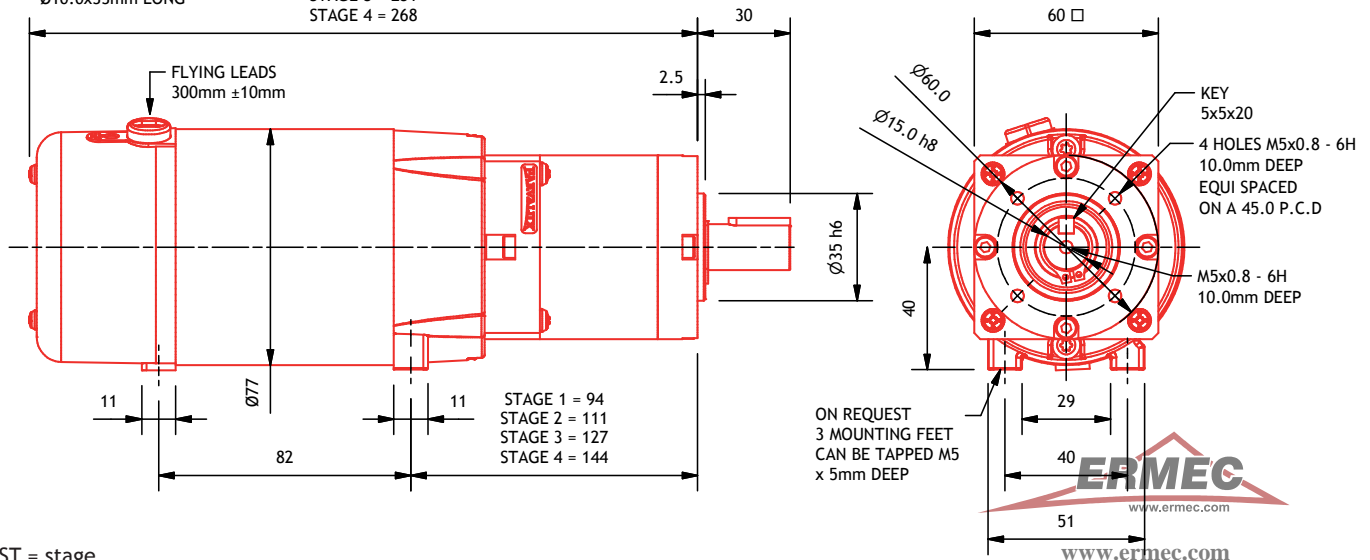


stage 1 HP60 gearbox pictured

Gear Ratio	Number of stages	MOTOR SPEED (rpm)				TORQUE (Nm)		
		1500	2000	3000	4000	CONTINUOUS	1 HOUR	15 MINUTE
		OUTPUT SPEED (rpm)						
4	1	375	500	750	1000	1.1	1.3	1.8
5	1	316	421	632	842	1.3	1.6	2.2
6	1	250	333	500	667	1.6	2	2.7
7	1	214	286	429	571	1.9	2.3	3.2
16	2	94	125	188	250	4.1	5	5.8
24	2	63	83	125	167	6.2	7.6	8.1
28	2	54	71	107	143	7.2	8.8	9.1
36	2	42	56	83	111	9.3	10.9	10.9
49	2	31	41	61	82	12.6	13.3	13.3
64	3	23	31	47	63	15.1	15.6	15.6
96	3	16	21	31	42	18.4	19.1	19.1
112	3	13	18	27	36	19.6	20	20
144	3	10	14	21	28	21	23	23
196	3	8	10	15	20	24	25	25
252	3	6	8	12	16	25	27	27
384	4	3.9	5.2	7.8	10	27	29	29
532	4	2.8	3.8	5.6	7.5	28	30	30
684	4	2.2	2.9	4.4	5.8	29	31	31
1026	4	1.5	1.9	2.9	3.9	30	32	32
1512	4	1	1.3	2	2.6	30	33	33

OPTIONAL SHAFT AT LEAD END  
Ø10.0x33mm LONG

STAGE 1 = 218  
STAGE 2 = 235  
STAGE 3 = 251  
STAGE 4 = 268



\*ST = stage

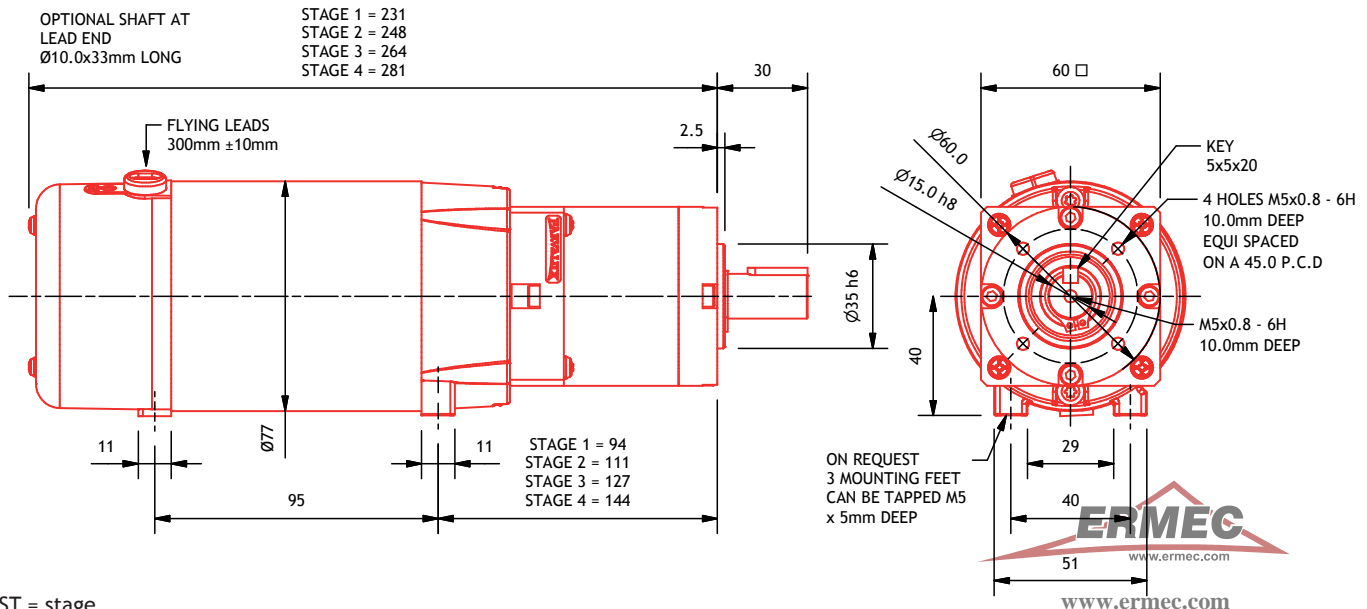
# PM2HP60

MOTOR	Permanent magnet DC motor
PROTECTION	IP22
GEARBOX	Planetary HP60 (Protection IP65)
MOTOR POWER	60 - 265 Watts
SPEED	1 - 1000 rpm
VOLTAGE	12V - 220V DC available range
WEIGHT	3.48kg (ST1); 3.71kg (ST2); 4.00kg (ST3); 4.24kg (ST4)*
RADIAL LOAD	250N (ST1); 400N (ST2); 550N (ST3); 725N (ST4)*
AXIAL LOAD	75N (ST1); 125N (ST2); 175N (ST3); 225N (ST4)*
EXTRAS	See page 36 of 2009 permanent magnet catalogue



stage 1 HP60 gearbox pictured

Gear Ratio	Number of stages	MOTOR SPEED (rpm)				TORQUE (Nm)		
		1500	2000	3000	4000	CONTINUOUS	1 HOUR	15 MINUTE
		OUTPUT SPEED (rpm)						
4	1	375	500	750	1000	1.5	1.8	2.4
5	1	300	400	600	800	1.7	2.2	2.9
6	1	250	333	500	667	2.2	2.7	3.6
7	1	214	286	429	571	2.5	3.2	4.2
16	2	94	125	188	250	5.5	5.8	5.8
24	2	63	83	125	167	8	8.1	8.1
28	2	54	71	107	143	9	9.1	9.1
36	2	42	56	83	111	10.7	10.9	10.9
49	2	31	41	61	82	13	13.3	13.3
64	3	23	31	47	63	15.1	15.6	15.6
96	3	16	21	31	42	18.4	19.1	19.1
112	3	13	18	27	36	19.6	20	20
144	3	10	14	21	28	21	23	23
196	3	8	10	15	20	24	25	25
252	3	6	8	12	16	25	27	27
384	4	3.9	5.2	7.8	10	27	29	29
532	4	2.8	3.8	5.6	7.5	28	30	30
684	4	2.2	2.9	4.4	5.8	29	31	31
1026	4	1.5	1.9	2.9	3.9	30	32	32
1512	4	1	1.3	2	2.6	30	33	33



\*ST = stage

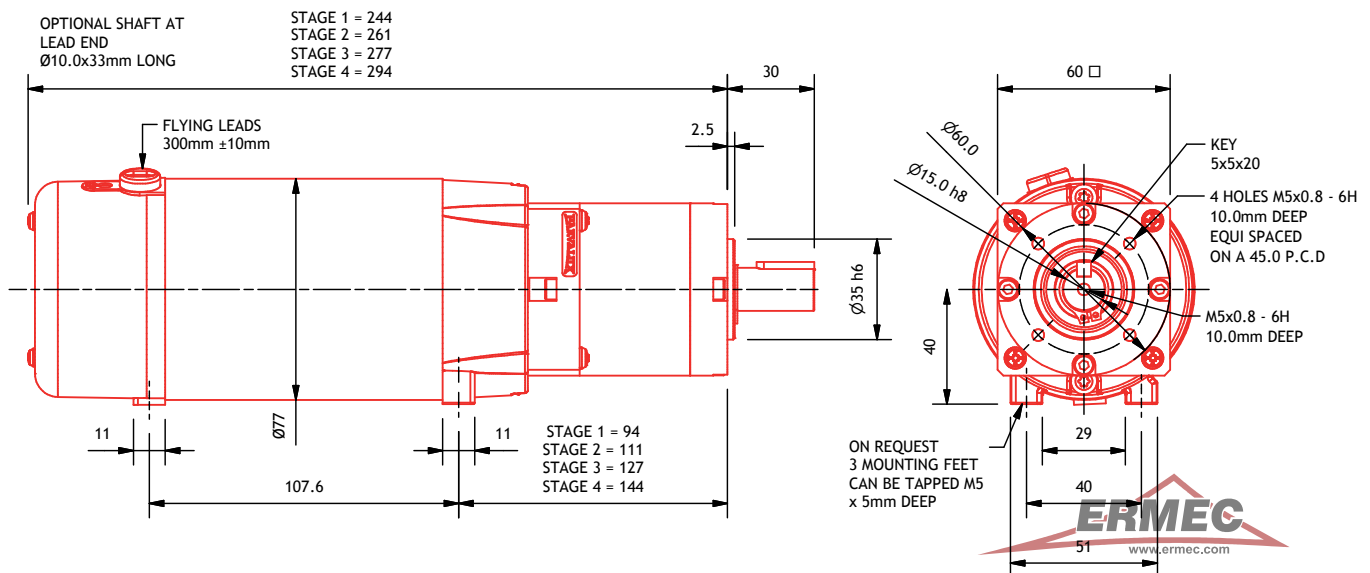
# PM6HP60

MOTOR	Permanent magnet DC motor
PROTECTION	IP22
GEARBOX	Planetary HP60 (Protection IP65)
MOTOR POWER	75 - 330 Watts
SPEED	1 - 1000 rpm
VOLTAGE	12V - 220V DC available range
WEIGHT	3.67kg (ST1); 3.90kg (ST2); 4.19kg (ST3); 4.43kg (ST4)*
RADIAL LOAD	250N (ST1); 400N (ST2); 550N (ST3); 725N (ST4)*
AXIAL LOAD	75N (ST1); 125N (ST2); 175N (ST3); 225N (ST4)*
EXTRAS	See page 36 of 2009 permanent magnet catalogue



stage 1 HP60 gearbox pictured

Gear Ratio	Number of stages	MOTOR SPEED (rpm)				TORQUE (Nm)		
		1500	2000	3000	4000	CONTINUOUS	1 HOUR	15 MINUTE
		OUTPUT SPEED (rpm)						
4	1	375	500	750	1000	1.8	2.2	3
5	1	300	400	600	800	2.2	2.6	3.5
6	1	250	333	500	667	2.7	3.3	4.4
7	1	214	286	429	571	3.2	3.8	5
16	2	94	125	188	250	5.8	5.8	5.8
24	2	63	83	125	167	8	8.1	8.1
28	2	54	71	107	143	9	9.1	9.1
36	2	42	56	83	111	10.7	10.9	10.9
49	2	31	41	61	82	13	13.3	13.3
64	3	23	31	47	63	15.1	15.6	15.6
96	3	16	21	31	42	18.4	19.1	19.1
112	3	13	18	27	36	19.6	20	20
144	3	10	14	21	28	21	23	23
196	3	8	10	15	20	24	25	25
252	3	6	8	12	16	25	27	27
384	4	3.9	5.2	7.8	10	27	29	29
532	4	2.8	3.8	5.6	7.5	28	30	30
684	4	2.2	2.9	4.4	5.8	29	31	31
1026	4	1.5	1.9	2.9	3.9	30	32	32
1512	4	1	1.3	2	2.6	30	33	33



\*ST = stage

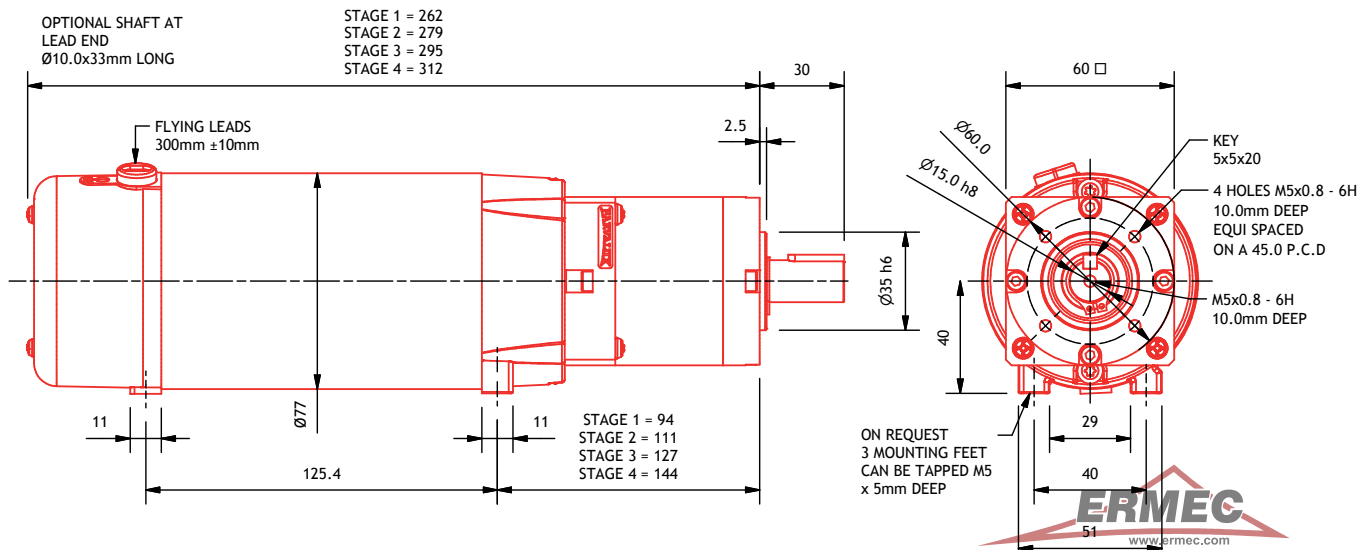
# PM60HP60

MOTOR	Permanent magnet DC motor
PROTECTION	IP22
GEARBOX	Planetary HP60 (Protection IP65)
MOTOR POWER	105 - 460 Watts
SPEED	1 - 1000 rpm
VOLTAGE	12V - 220V DC available range
WEIGHT	3.92kg (ST1); 4.15kg (ST2); 4.44kg (ST3); 4.68kg (ST4)*
RADIAL LOAD	250N (ST1); 400N (ST2); 550N (ST3); 725N (ST4)*
AXIAL LOAD	75N (ST1); 125N (ST2); 175N (ST3); 225N (ST4)*
EXTRAS	See page 36 of 2009 permanent magnet catalogue



stage 1 HP60 gearbox pictured

Gear Ratio	Number of stages	MOTOR SPEED (rpm)				TORQUE (Nm)		
		1500	2000	3000	4000	CONTINUOUS	1 HOUR	15 MINUTE
		OUTPUT SPEED (rpm)						
4	1	375	500	750	1000	2.5	3.1	4.2
5	1	300	400	600	800	3	3.7	5
6	1	250	333	500	667	3.8	4.6	5
7	1	214	286	429	571	4.4	5	5
16	2	94	125	188	250	5.8	5.8	5.8
24	2	63	83	125	167	8	8.1	8.1
28	2	54	71	107	143	9	9.1	9.1
36	2	42	56	83	111	10.7	10.9	10.9
49	2	31	41	61	82	13	13.3	13.3
64	3	23	31	47	63	15.1	15.6	15.6
96	3	16	21	31	42	18.4	19.1	19.1
112	3	13	18	27	36	19.6	20	20
144	3	10	14	21	28	21	23	23
196	3	8	10	15	20	24	25	25
252	3	6	8	12	16	25	27	27
384	4	3.9	5.2	7.8	10	27	29	29
532	4	2.8	3.8	5.6	7.5	28	30	30
684	4	2.2	2.9	4.4	5.8	29	31	31
1026	4	1.5	1.9	2.9	3.9	30	32	32
1512	4	1	1.3	2	2.6	30	33	33



\*ST = stage

# PM10HP60

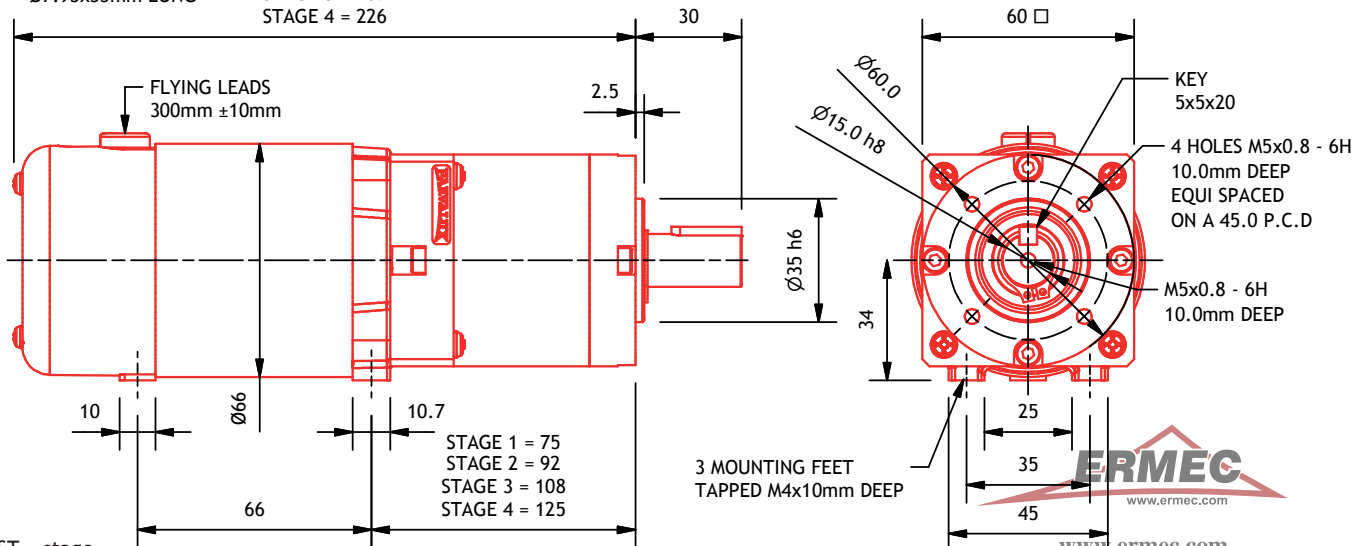
MOTOR	Permanent magnet DC motor
PROTECTION	IP54
GEARBOX	Planetary HP60 (Protection IP65)
MOTOR POWER	23 - 100 Watts
SPEED	0.6 - 1000 rpm
VOLTAGE	12V - 220V DC available range
WEIGHT	2.14kg (ST1); 2.37kg (ST2); 2.66kg (ST3); 2.90kg (ST4)*
RADIAL LOAD	250N (ST1); 400N (ST2); 550N (ST3); 725N (ST4)*
AXIAL LOAD	75N (ST1); 125N (ST2); 175N (ST3); 225N (ST4)*
EXTRAS	See page 36 of 2009 permanent magnet catalogue



stage 1 HP60 gearbox pictured

Gear Ratio	Number of stages	MOTOR SPEED (rpm)				TORQUE (Nm)		
		1500	2000	3000	4000	CONTINUOUS	1 HOUR	15 MINUTE
		OUTPUT SPEED (rpm)						
4	1	375	500	750	1000	0.5	0.7	0.8
5	1	316	421	632	842	0.6	0.8	1
6	1	250	333	500	667	0.8	1	1.3
7	1	214	286	429	571	1	1.2	1.5
16	2	94	125	188	250	2.1	2.5	3.2
24	2	63	83	125	167	3.1	3.8	4.8
28	2	54	71	107	143	3.6	4.4	5.6
36	2	42	56	83	111	4.6	5.7	7.2
49	2	31	41	61	82	6.3	7.7	9.8
64	3	23	31	47	63	7.8	9.5	12.1
96	3	16	21	31	42	11.7	14.3	18.2
112	3	13	18	27	36	13.6	16.7	20
144	3	10	14	21	28	17.5	21	23
196	3	8	10	15	20	24	25	25
252	3	6	8	12	16	25	27	27
384	4	3.9	5.2	7.8	10	27	29	29
532	4	2.8	3.8	5.6	7.5	28	30	30
684	4	2.2	2.9	4.4	5.8	29	31	31
1026	4	1.5	1.9	2.9	3.9	30	32	32
1512	4	1	1.3	2	2.6	30	33	33

OPTIONAL SHAFT AT LEAD END  
 Ø7.93x33mm LONG  
 STAGE 1 = 176  
 STAGE 2 = 193  
 STAGE 3 = 209  
 STAGE 4 = 226



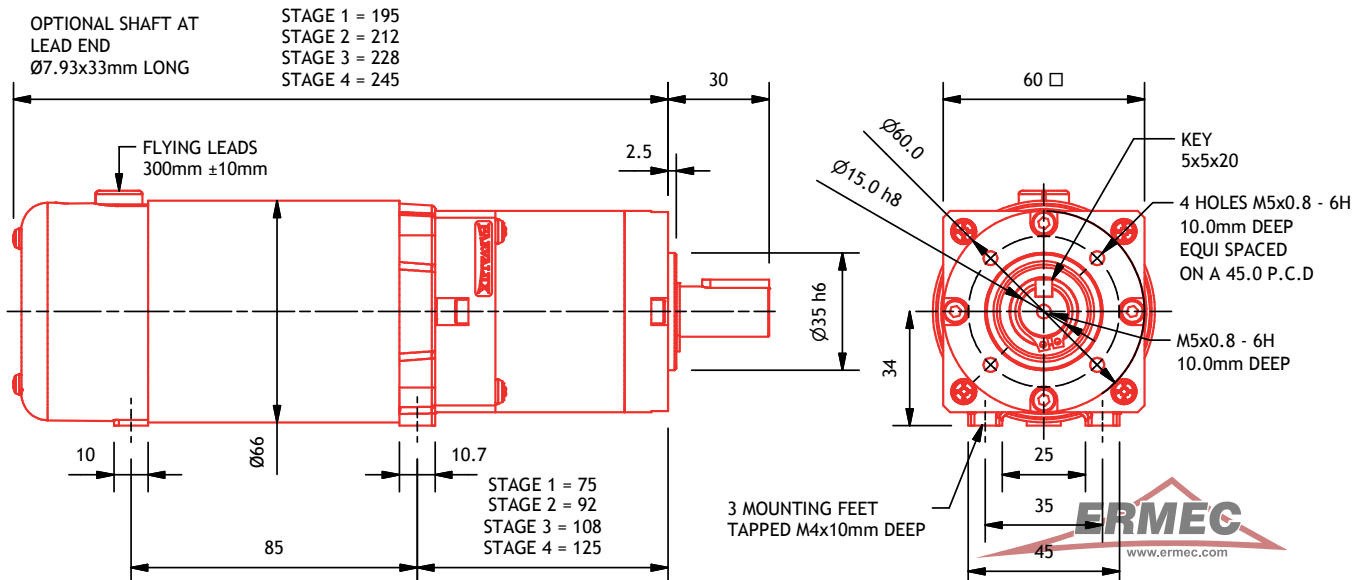
# PM11HP60

MOTOR	Permanent magnet DC motor
PROTECTION	IP54
GEARBOX	Planetary HP60 (Protection IP65)
MOTOR POWER	33 - 130 Watts
SPEED	1 - 1000 rpm
VOLTAGE	12V - 220V DC available range
WEIGHT	2.60kg (ST1); 2.83kg (ST2); 3.12kg (ST3); 3.36kg (ST4)*
RADIAL LOAD	250N (ST1); 400N (ST2); 550N (ST3); 725N (ST4)*
AXIAL LOAD	75N (ST1); 125N (ST2); 175N (ST3); 225N (ST4)*
EXTRAS	See page 36 of 2009 permanent magnet catalogue



stage 1 HP60 gearbox pictured

Gear Ratio	Number of stages	MOTOR SPEED (rpm)				TORQUE (Nm)		
		1500	2000	3000	4000	CONTINUOUS	1 HOUR	15 MINUTE
		OUTPUT SPEED (rpm)						
4	1	375	500	750	1000	0.8	1	1.2
5	1	300	400	600	800	0.9	1.1	1.4
6	1	250	333	500	667	1.2	1.5	1.8
7	1	214	286	429	571	1.4	1.7	2.1
16	2	94	125	188	250	3	3.7	4.6
24	2	63	83	125	167	4.5	5.5	6.9
28	2	54	71	107	143	5.2	6.4	8
36	2	42	56	83	111	6.7	8.3	10.3
49	2	31	41	61	82	9.1	11.2	13.3
64	3	23	31	47	63	11.3	13.9	15.6
96	3	16	21	31	42	16.9	19.1	19.1
112	3	13	18	27	36	19.6	20	20
144	3	10	14	21	28	21	23	23
196	3	8	10	15	20	24	25	25
252	3	6	8	12	16	25	27	27
384	4	3.9	5.2	7.8	10	27	29	29
532	4	2.8	3.8	5.6	7.5	28	30	30
684	4	2.2	2.9	4.4	5.8	29	31	31
1026	4	1.5	1.9	2.9	3.9	30	32	32
1512	4	1	1.3	2	2.6	30	33	33



\*ST = stage

# PM3HP60

MOTOR	Permanent magnet DC motor
PROTECTION	IP54
GEARBOX	Planetary HP60 (Protection IP65)
MOTOR POWER	33 - 150 Watts
SPEED	1 - 1000 rpm
VOLTAGE	12V - 220V DC available range
WEIGHT	3.13kg (ST1); 3.36kg (ST2); 3.65kg (ST3); 3.89kg (ST4)*
RADIAL LOAD	250N (ST1); 400N (ST2); 550N (ST3); 725N (ST4)*
AXIAL LOAD	75N (ST1); 125N (ST2); 175N (ST3); 225N (ST4)*
EXTRAS	See page 36 of 2009 permanent magnet catalogue

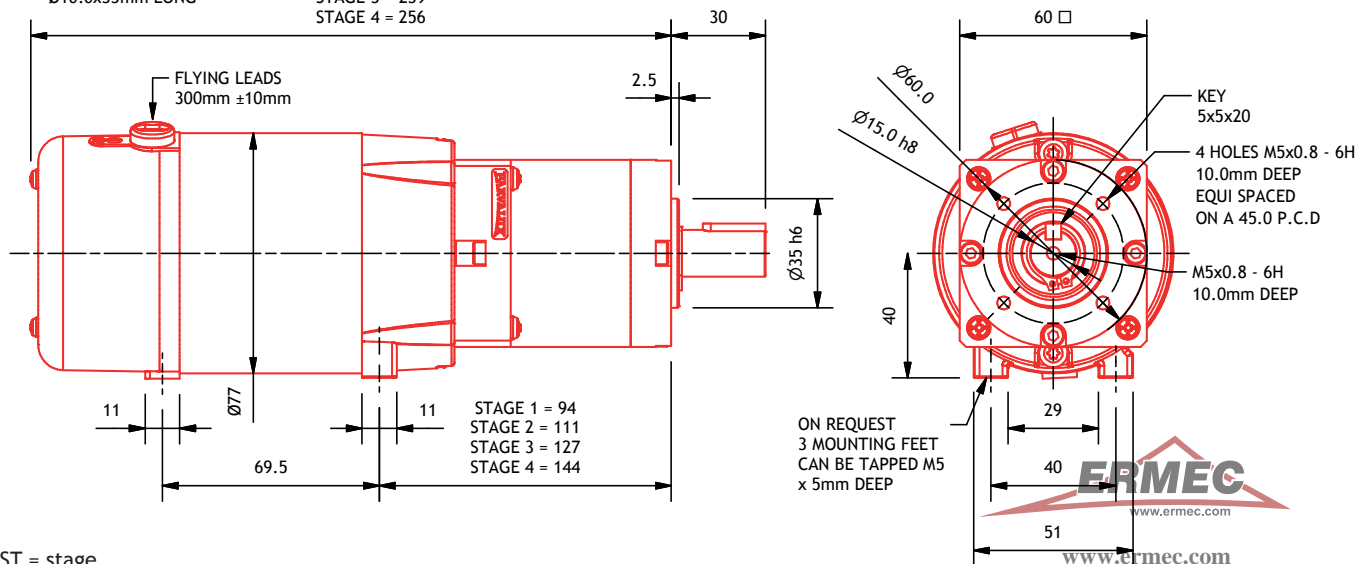


stage 1 HP60 gearbox pictured

Gear Ratio	Number of stages	MOTOR SPEED (rpm)				TORQUE (Nm)		
		1500	2000	3000	4000	CONTINUOUS	1 HOUR	15 MINUTE
		OUTPUT SPEED (rpm)						
4	1	375	500	750	1000	0.8	1.1	1.5
5	1	300	400	600	800	1	1.3	1.7
6	1	250	333	500	667	1.2	1.6	2.2
7	1	214	286	429	571	1.4	1.9	2.5
16	2	94	125	188	250	3.1	4.1	5.5
24	2	63	83	125	167	4.7	6.2	8.1
28	2	54	71	107	143	5.5	7.2	9.1
36	2	42	56	83	111	7	9.3	10.9
49	2	31	41	61	82	9.5	12.6	13.3
64	3	23	31	47	63	11.8	15.6	15.6
96	3	16	21	31	42	17.7	19.1	19.1
112	3	13	18	27	36	19.6	20	20
144	3	10	14	21	28	21	23	23
196	3	8	10	15	20	24	25	25
252	3	6	8	12	16	25	27	27
384	4	3.9	5.2	7.8	10	27	29	29
532	4	2.8	3.8	5.6	7.5	28	30	30
684	4	2.2	2.9	4.4	5.8	29	31	31
1026	4	1.5	1.9	2.9	3.9	30	32	32
1512	4	1	1.3	2	2.6	30	33	33

OPTIONAL SHAFT AT LEAD END Ø10.0x33mm LONG

STAGE 1 = 206  
STAGE 2 = 223  
STAGE 3 = 239  
STAGE 4 = 256



\*ST = stage

# PM4HP60

MOTOR	Permanent magnet DC motor
PROTECTION	IP54
GEARBOX	Planetary HP60 (Protection IP65)
MOTOR POWER	45 - 200 Watts
SPEED	1 - 1000 rpm
VOLTAGE	12V - 220V DC available range
WEIGHT	3.48kg (ST1); 3.71kg (ST2); 4.00kg (ST3); 4.24kg (ST4)*
RADIAL LOAD	250N (ST1); 400N (ST2); 550N (ST3); 725N (ST4)*
AXIAL LOAD	75N (ST1); 125N (ST2); 175N (ST3); 225N (ST4)*
EXTRAS	See page 36 of 2009 permanent magnet catalogue

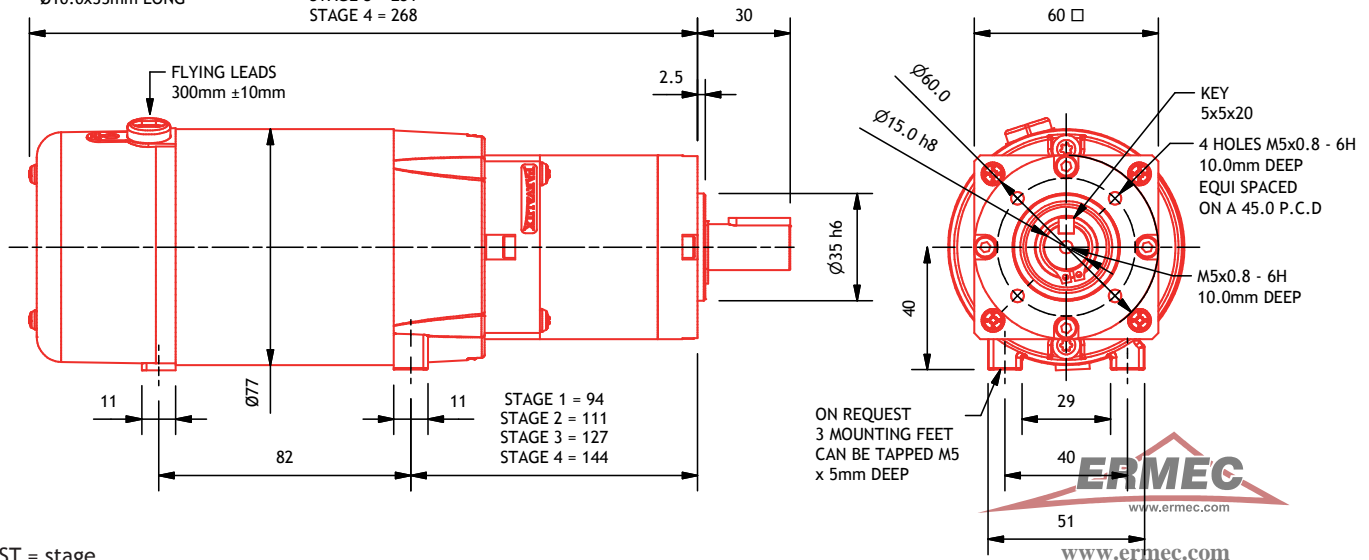


stage 1 HP60 gearbox pictured

Gear Ratio	Number of stages	MOTOR SPEED (rpm)				TORQUE (Nm)		
		1500	2000	3000	4000	CONTINUOUS	1 HOUR	15 MINUTE
		OUTPUT SPEED (rpm)						
4	1	375	500	750	1000	1.1	1.5	1.9
5	1	300	400	600	800	1.3	1.7	2.3
6	1	250	333	500	667	1.6	2.2	2.9
7	1	214	286	429	571	1.9	2.5	3.4
16	2	94	125	188	250	4.1	5.5	5.8
24	2	63	83	125	167	6.2	8.1	8.1
28	2	54	71	107	143	7.2	9.1	9.1
36	2	42	56	83	111	9.3	10.9	10.9
49	2	31	41	61	82	12.6	13.3	13.3
64	3	23	31	47	63	15.1	15.6	15.6
96	3	16	21	31	42	18.4	19.1	19.1
112	3	13	18	27	36	19.6	20	20
144	3	10	14	21	28	21	23	23
196	3	8	10	15	20	24	25	25
252	3	6	8	12	16	25	27	27
384	4	3.9	5.2	7.8	10	27	29	29
532	4	2.8	3.8	5.6	7.5	28	30	30
684	4	2.2	2.9	4.4	5.8	29	31	31
1026	4	1.5	1.9	2.9	3.9	30	32	32
1512	4	1	1.3	2	2.6	30	33	33

OPTIONAL SHAFT AT LEAD END  
Ø10.0x33mm LONG

STAGE 1 = 218  
STAGE 2 = 235  
STAGE 3 = 251  
STAGE 4 = 268



\*ST = stage

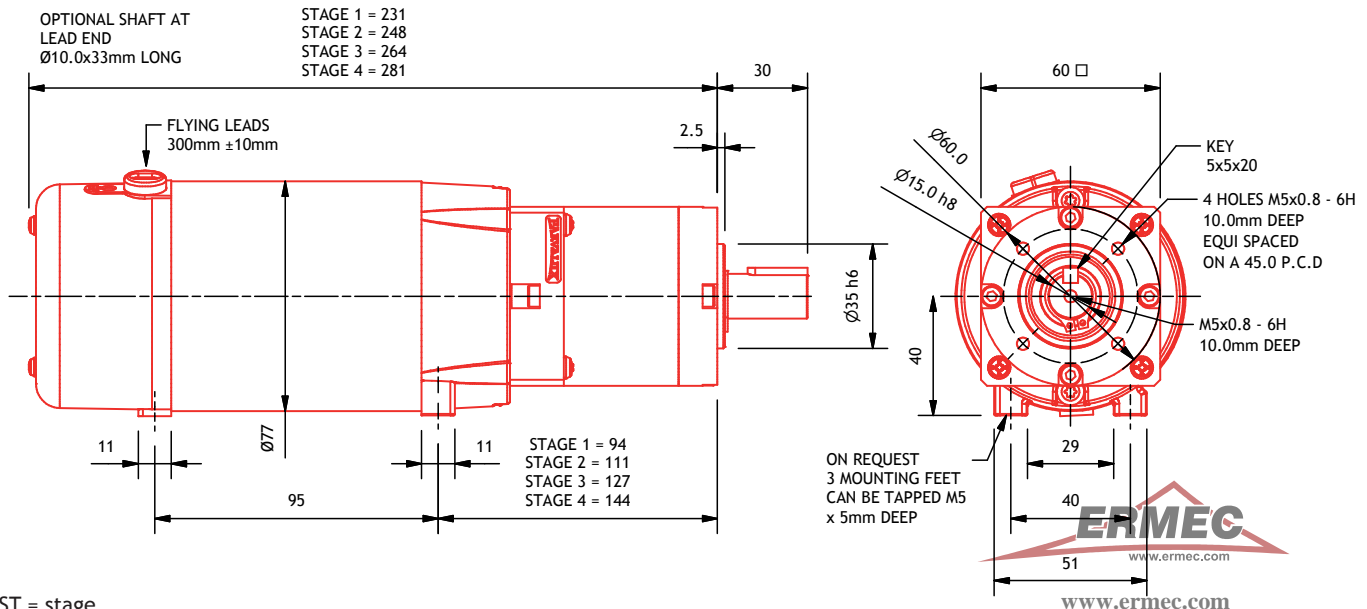
# PM5HP60

MOTOR	Permanent magnet DC motor
PROTECTION	IP54
GEARBOX	Planetary HP60 (Protection IP65)
MOTOR POWER	60 - 250 Watts
SPEED	1 - 1000 rpm
VOLTAGE	12V - 220V DC available range
WEIGHT	3.67kg (ST1); 3.90kg (ST2); 4.19kg (ST3); 4.43kg (ST4)*
RADIAL LOAD	250N (ST1); 400N (ST2); 550N (ST3); 725N (ST4)*
AXIAL LOAD	75N (ST1); 125N (ST2); 175N (ST3); 225N (ST4)*
EXTRAS	See page 36 of 2009 permanent magnet catalogue



stage 1 HP60 gearbox pictured

Gear Ratio	Number of stages	MOTOR SPEED (rpm)				TORQUE (Nm)		
		1500	2000	3000	4000	CONTINUOUS	1 HOUR	15 MINUTE
		OUTPUT SPEED (rpm)						
4	1	375	500	750	1000	1.5	1.8	2.4
5	1	300	400	600	800	1.7	2.2	2.9
6	1	250	333	500	667	2.2	2.7	3.6
7	1	214	286	429	571	2.5	3.2	4.2
16	2	94	125	188	250	5.5	5.8	5.8
24	2	63	83	125	167	8	8.1	8.1
28	2	54	71	107	143	9	9.1	9.1
36	2	42	56	83	111	10.7	10.9	10.9
49	2	31	41	61	82	13	13.3	13.3
64	3	23	31	47	63	15.1	15.6	15.6
96	3	16	21	31	42	18.4	19.1	19.1
112	3	13	18	27	36	19.6	20	20
144	3	10	14	21	28	21	23	23
196	3	8	10	15	20	24	25	25
252	3	6	8	12	16	25	27	27
384	4	3.9	5.2	7.8	10	27	29	29
532	4	2.8	3.8	5.6	7.5	28	30	30
684	4	2.2	2.9	4.4	5.8	29	31	31
1026	4	1.5	1.9	2.9	3.9	30	32	32
1512	4	1	1.3	2	2.6	30	33	33



\*ST = stage

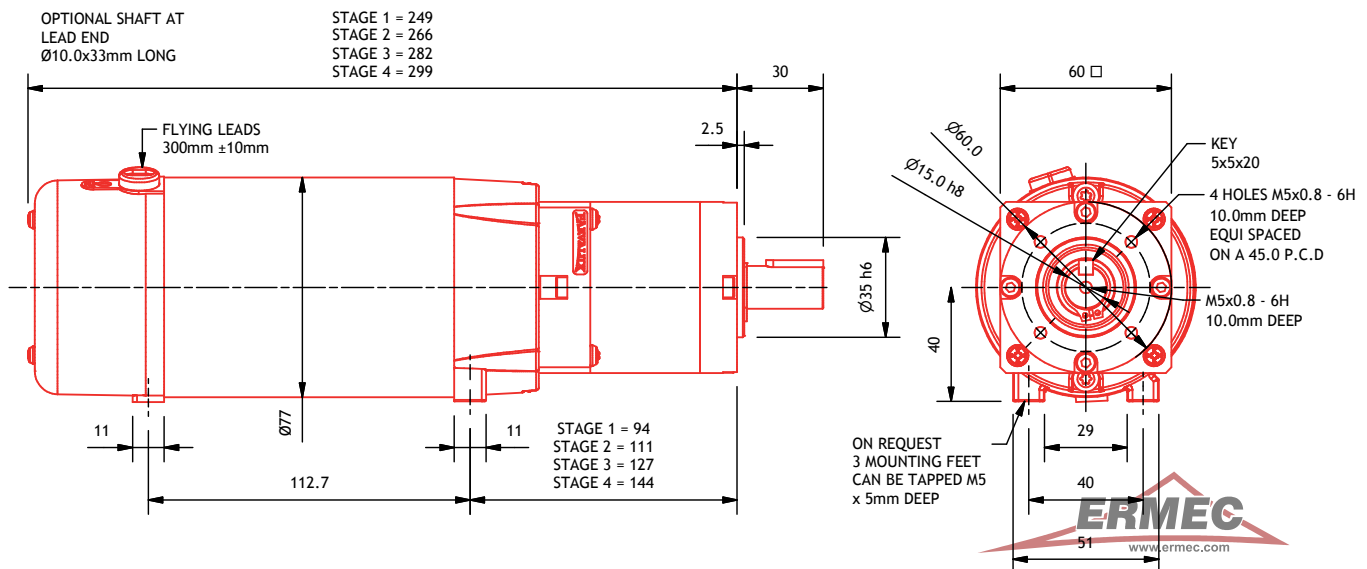
# PM50HP60

MOTOR	Permanent magnet DC motor
PROTECTION	IP54
GEARBOX	Planetary HP60 (Protection IP65)
MOTOR POWER	80 - 375 Watts
SPEED	1 - 1000 rpm
VOLTAGE	12V - 220V DC available range
WEIGHT	3.92kg (ST1); 4.15kg (ST2); 4.44kg (ST3); 4.68kg (ST4)*
RADIAL LOAD	250N (ST1); 400N (ST2); 550N (ST3); 725N (ST4)*
AXIAL LOAD	75N (ST1); 125N (ST2); 175N (ST3); 225N (ST4)*
EXTRAS	See page 36 of 2009 permanent magnet catalogue



stage 1 HP60 gearbox pictured

Gear Ratio	Number of stages	MOTOR SPEED (rpm)				TORQUE (Nm)		
		1500	2000	3000	4000	CONTINUOUS	1 HOUR	15 MINUTE
		OUTPUT SPEED (rpm)						
4	1	375	500	750	1000	1.9	2.4	3.4
5	1	300	400	600	800	2.2	2.9	4
6	1	250	333	500	667	2.8	3.6	5
7	1	214	286	429	571	3.3	4.2	5
16	2	94	125	188	250	5.8	5.8	5.8
24	2	63	83	125	167	8	8.1	8.1
28	2	54	71	107	143	9	9.1	9.1
36	2	42	56	83	111	10.7	10.9	10.9
49	2	31	41	61	82	13	13.3	13.3
64	3	23	31	47	63	15.1	15.6	15.6
96	3	16	21	31	42	18.4	19.1	19.1
112	3	13	18	27	36	19.6	20	20
144	3	10	14	21	28	21	23	23
196	3	8	10	15	20	24	25	25
252	3	6	8	12	16	25	27	27
384	4	3.9	5.2	7.8	10	27	29	29
532	4	2.8	3.8	5.6	7.5	28	30	30
684	4	2.2	2.9	4.4	5.8	29	31	31
1026	4	1.5	1.9	2.9	3.9	30	32	32
1512	4	1	1.3	2	2.6	30	33	33



\*ST = stage

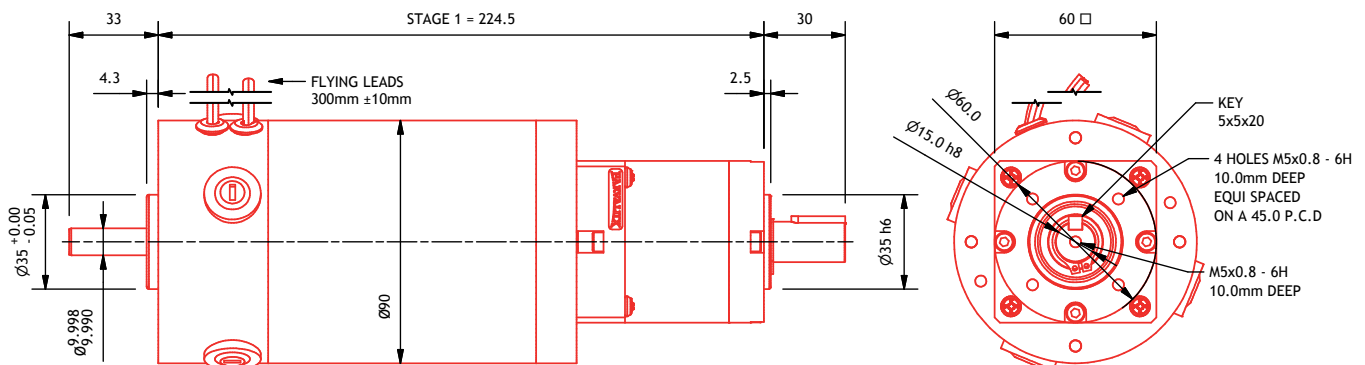
# PM90HP60

MOTOR	Permanent magnet DC motor
PROTECTION	IP54
GEARBOX	Planetary HP60 (Protection IP65)
MOTOR POWER	113 - 525 Watts
SPEED	1 - 1000 rpm
VOLTAGE	12V, 24V, 36V or 48V DC
WEIGHT	4.52kg (ST1); 4.75kg (ST2); 5.04kg (ST3); 5.28kg (ST4)*
RADIAL LOAD	250N (ST1); 400N (ST2); 550N (ST3); 725N (ST4)*
AXIAL LOAD	75N (ST1); 125N (ST2); 175N (ST3); 225N (ST4)*
EXTRAS	See page 36 of 2009 permanent magnet catalogue



stage 1 HP60 gearbox pictured

Gear Ratio	Number of stages	MOTOR SPEED (rpm)				TORQUE (Nm)		
		1500	2000	3000	4000	CONTINUOUS	1 HOUR	15 MINUTE
		OUTPUT SPEED (rpm)						
4	1	375	500	750	1000	2.7	3.4	4.8
5	1	300	400	600	800	3.2	4	5
6	1	250	333	500	667	4.1	5	5
7	1	214	286	429	571	4.8	5	5
16	2	94	125	188	250	5.8	5.8	5.8
24	2	63	83	125	167	8	8.1	8.1
28	2	54	71	107	143	9	9.1	9.1
36	2	42	56	83	111	10.7	10.9	10.9
49	2	31	41	61	82	13	13.3	13.3
64	3	23	31	47	63	15.1	15.6	15.6
96	3	16	21	31	42	18.4	19.1	19.1
112	3	13	18	27	36	19.6	20	20
144	3	10	14	21	28	21	23	23
196	3	8	10	15	20	24	25	25
252	3	6	8	12	16	25	27	27
384	4	3.9	5.2	7.8	10	27	29	29
532	4	2.8	3.8	5.6	7.5	28	30	30
684	4	2.2	2.9	4.4	5.8	29	31	31
1026	4	1.5	1.9	2.9	3.9	30	32	32
1512	4	1	1.3	2	2.6	30	33	33



\*ST = stage



# PBL60-78HP60

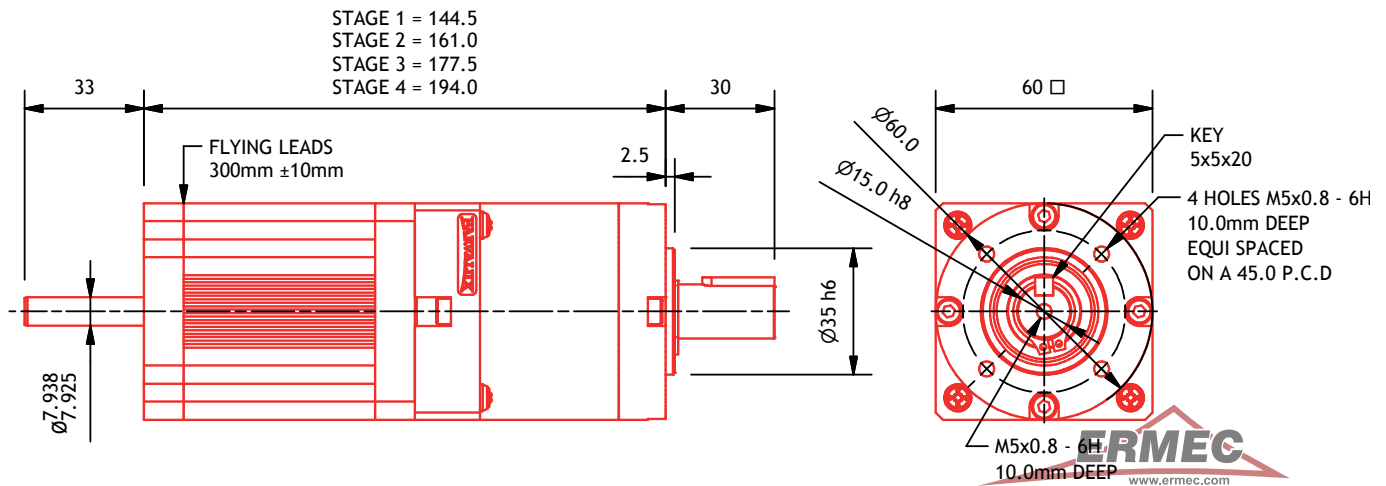
MOTOR	Brushless DC motor
PROTECTION	IP54
GEARBOX	Planetary HP60 (Protection IP65)
MOTOR POWER	17 - 46 Watts
SPEED*	1 - 1000 rpm
VOLTAGE	24V DC
WEIGHT	1.72kg (ST1); 1.95kg (ST2); 2.24kg (ST3); 2.48kg (ST4)* (plus an additional 0.20kg with IE model)
CONTROLLER	N (or integral with IE model)
EXTRAS	See page 18 of 2009 DC brushless catalogue



stage 1 HP60 gearbox pictured

\*input speed variable up to 4000 rpm

Gear Ratio	Number of stages	MOTOR POWER (W)				TORQUE (Nm)		
		17	23	35	46	CONTINUOUS up to 4000 rpm	PEAK up to 2500 rpm	15 MINUTE up to 3500 rpm
		MOTOR SPEED (rpm)						
		1500	2000	3000	4000			
		OUTPUT SPEED (rpm)						
4	1	375	500	750	1000	0.4	0.8	0.5
5	1	316	421	632	842	0.5	1	0.6
6	1	250	333	500	667	0.6	1.3	0.8
7	1	214	286	429	571	0.7	1.5	0.9
16	2	94	125	188	250	1.6	3.2	2
24	2	63	83	125	167	2.4	4.8	3
28	2	54	71	107	143	2.8	5.5	3.5
36	2	42	56	83	111	3.6	7.1	4.5
49	2	31	41	61	82	4.9	9.7	6.2
64	3	23	31	47	63	6	12	7.6
96	3	15.6	21	31	42	9	18	11.4
112	3	13.4	17.9	27	36	10.5	21	13.3
144	3	10.4	13.9	21	28	13.5	26	17.1
196	3	7.7	10.2	15.3	20	18.3	28	23
252	3	6	7.9	11.9	15.9	24	29	27
384	4	3.9	5.2	7.8	10.4	27	31	30
532	4	2.8	3.8	5.6	7.5	28	32	31
684	4	2.2	2.9	4.4	5.8	29	33	32
1026	4	1.5	1.9	2.9	3.9	30	33	33
1512	4	1	1.3	2	2.6	30	34	33



\*ST = stage

# PBL60-98HP60

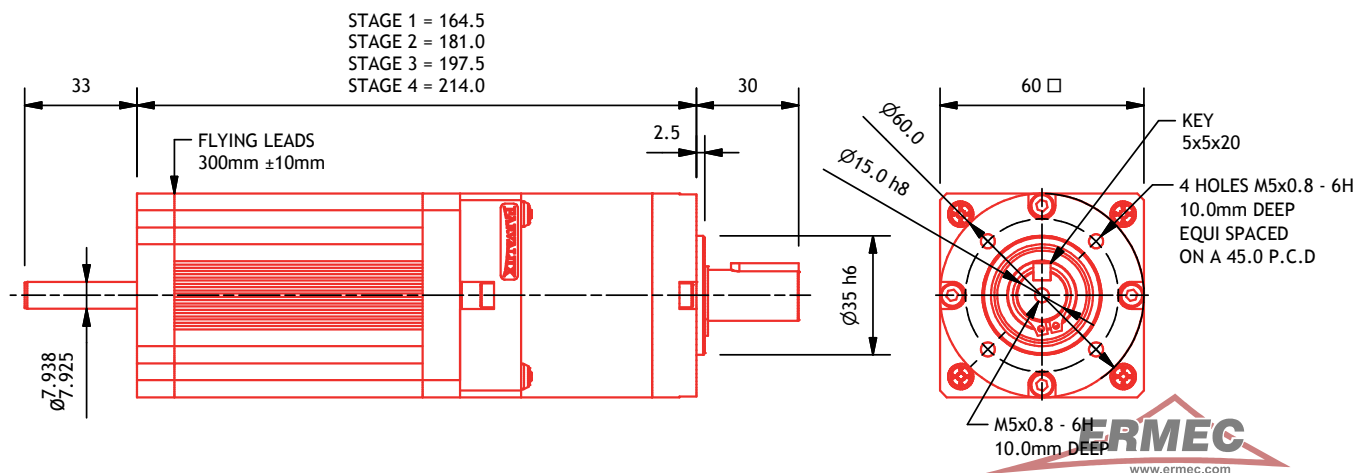
MOTOR	Brushless DC motor
PROTECTION	IP54
GEARBOX	Planetary HP60 (Protection IP65)
MOTOR POWER	35 - 92 Watts
SPEED*	1 - 1000 rpm
VOLTAGE	24V DC
WEIGHT	2.02kg (ST1); 2.25kg (ST2); 2.54kg (ST3); 2.78kg (ST4)* (plus an additional 0.20kg with IE model)
CONTROLLER	N (or integral with IE model)
EXTRAS	See page 18 of 2009 DC brushless catalogue



\*input speed variable up to 4000 rpm

stage 1 HP60 gearbox pictured

Gear Ratio	Number of stages	MOTOR SPEED (rpm)				TORQUE (Nm)		
		1500	2000	3000	4000	CONTINUOUS up to 4000 rpm	PEAK up to 2500 rpm	15 MINUTE up to 3500 rpm
		OUTPUT SPEED (rpm)						
4	1	375	500	750	1000	0.8	1.7	1.1
5	1	316	421	632	842	1	2	1.3
6	1	250	333	500	667	1.3	2.5	1.6
7	1	214	286	429	571	1.5	2.9	1.9
16	2	94	125	188	250	3.2	6.3	4
24	2	63	83	125	167	4.8	9.5	6
28	2	54	71	107	143	5.5	11.1	7.1
36	2	42	56	83	111	7.1	14.3	9.1
49	2	31	41	61	82	9.7	17.3	12.3
64	3	23	31	47	63	12	19.6	15.2
96	3	15.6	21	31	42	18	23	20
112	3	13.4	17.9	27	36	19.6	24	22
144	3	10.4	13.9	21	28	21	26	24
196	3	7.7	10.2	15.3	20	24	28	26
252	3	6	7.9	11.9	15.9	25	29	27
384	4	3.9	5.2	7.8	10.4	27	31	30
532	4	2.8	3.8	5.6	7.5	28	32	31
684	4	2.2	2.9	4.4	5.8	29	33	32
1026	4	1.5	1.9	2.9	3.9	30	33	33
1512	4	1	1.3	2	2.6	30	34	33



\*ST = stage

# PBL60-118HP60

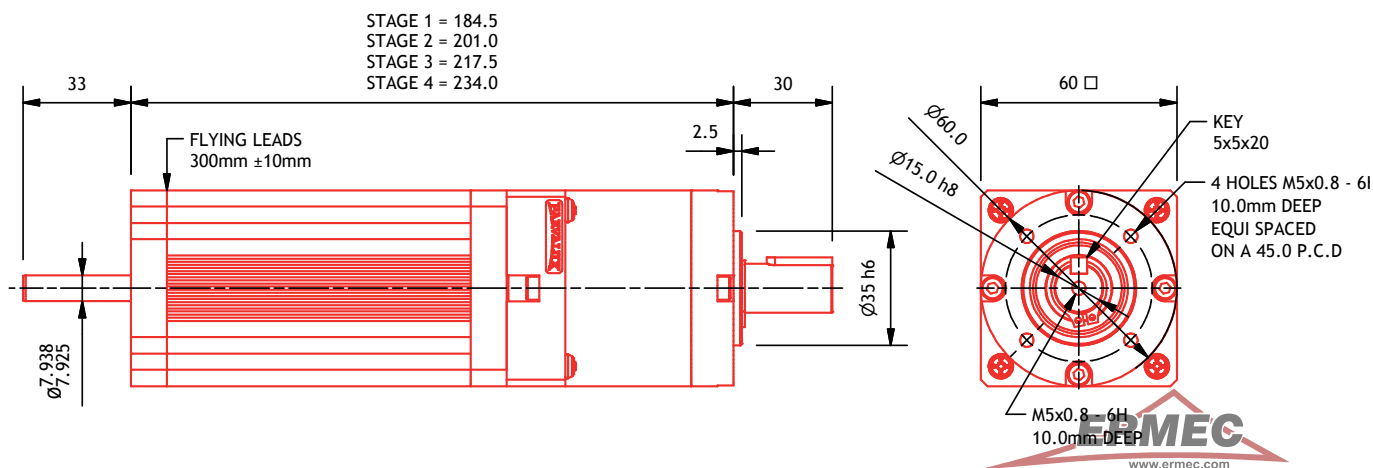
MOTOR	Brushless DC motor
PROTECTION	IP54
GEARBOX	Planetary HP60 (Protection IP65)
MOTOR POWER	50 - 134 Watts
SPEED*	1 - 1000 rpm
VOLTAGE	24V DC
WEIGHT	2.32kg (ST1); 2.55kg (ST2); 2.84kg (ST3); 3.08kg (ST4)* (plus an additional 0.20kg with IE model)
CONTROLLER	B (or integral with IE model)
EXTRAS	See page 18 of 2009 DC brushless catalogue



stage 1 HP60 gearbox pictured

\*input speed variable up to 4000 rpm

Gear Ratio	Number of stages	MOTOR SPEED (rpm)				CONTINUOUS up to 4000 rpm	TORQUE (Nm)	
		50	67	101	134		PEAK up to 2500 rpm	15 MINUTE up to 3500 rpm
		OUTPUT SPEED (rpm)						
4	1	375	500	750	1000	1.2	2.4	1.5
5	1	316	421	632	842	1.4	2.9	1.8
6	1	250	333	500	667	1.8	3.6	2.3
7	1	214	286	429	571	2.1	4.3	2.7
16	2	94	125	188	250	4.6	8.5	5.8
24	2	63	83	125	167	6.9	11.4	8.6
28	2	54	71	107	143	8.1	12.6	10
36	2	42	56	83	111	10.4	14.7	11.9
49	2	31	41	61	82	13	17.3	14.4
64	3	23	31	47	63	15.1	19.6	16.7
96	3	15.6	21	31	42	18.4	23	20
112	3	13.4	17.9	27	36	19.6	24	22
144	3	10.4	13.9	21	28	21	26	24
196	3	7.7	10.2	15.3	20	24	28	26
252	3	6	7.9	11.9	15.9	25	29	27
384	4	3.9	5.2	7.8	10.4	27	31	30
532	4	2.8	3.8	5.6	7.5	28	32	31
684	4	2.2	2.9	4.4	5.8	29	33	32
1026	4	1.5	1.9	2.9	3.9	30	33	33
1512	4	1	1.3	2	2.6	30	34	33



\*ST = stage

# PBL60-138HP60

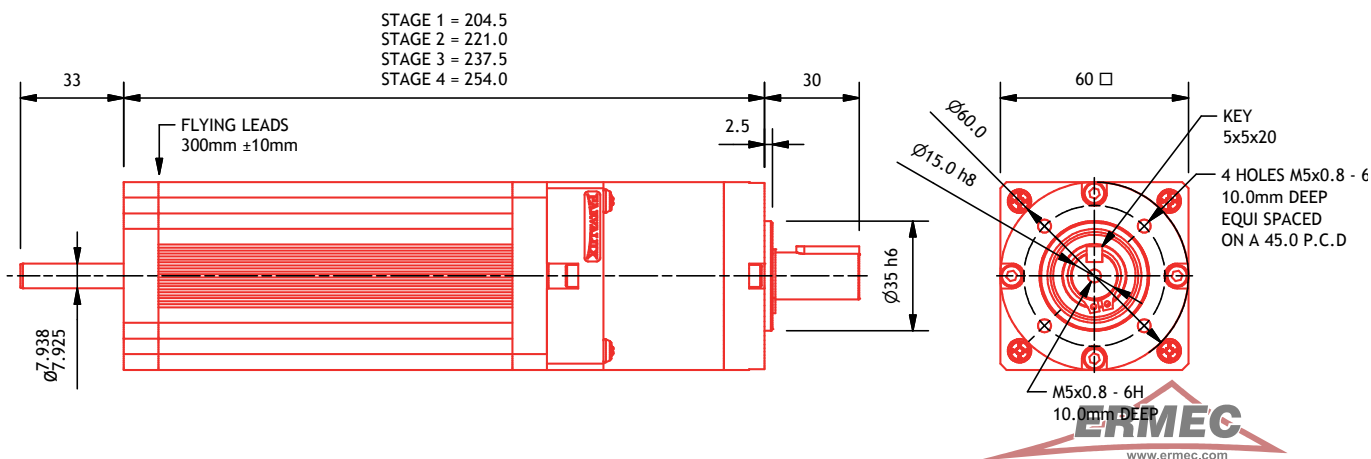
MOTOR	Brushless DC motor
PROTECTION	IP54
GEARBOX	Planetary HP60 (Protection IP65)
MOTOR POWER	69 - 184 Watts
SPEED*	1 - 1000 rpm
VOLTAGE	24V DC (or 48V DC with IE model)
WEIGHT	2.62kg (ST1); 2.85kg (ST2); 3.14kg (ST3); 3.38kg (ST4)* (plus an additional 0.20kg with IE model)
CONTROLLER	B (or integral with IE model)
EXTRAS	See page 18 of 2009 DC brushless catalogue



\*input speed variable up to 4000 rpm

stage 1 HP60 gearbox pictured

Gear Ratio	Number of stages	Motor Power Cont (W)				TORQUE (Nm)		
		69	92	138	184	CONTINUOUS up to 4000 rpm	PEAK up to 2500 rpm	15 MINUTE up to 3500 rpm
		MOTOR SPEED (rpm)						
		1500	2000	3000	4000			
		OUTPUT SPEED (rpm)						
4	1	375	500	750	1000	1.7	3.3	2.1
5	1	316	421	632	842	2	4	2.5
6	1	250	333	500	667	2.5	5	3.1
7	1	214	286	429	571	2.9	5	3.7
16	2	94	125	188	250	5.8	8.5	6.5
24	2	63	83	125	167	8	11.4	8.9
28	2	54	71	107	143	9	12.6	10
36	2	42	56	83	111	10.7	14.7	11.9
49	2	31	41	61	82	13	17.3	14.4
64	3	23	31	47	63	15.1	19.6	16.7
96	3	15.6	21	31	42	18.4	23	20
112	3	13.4	17.9	27	36	19.6	24	22
144	3	10.4	13.9	21	28	21	26	24
196	3	7.7	10.2	15.3	20	24	28	26
252	3	6	7.9	11.9	15.9	25	29	27
384	4	3.9	5.2	7.8	10.4	27	31	30
532	4	2.8	3.8	5.6	7.5	28	32	31
684	4	2.2	2.9	4.4	5.8	29	33	32
1026	4	1.5	1.9	2.9	3.9	30	33	33
1512	4	1	1.3	2	2.6	30	34	33



\*ST = stage

# PBL86-91HP60 24V

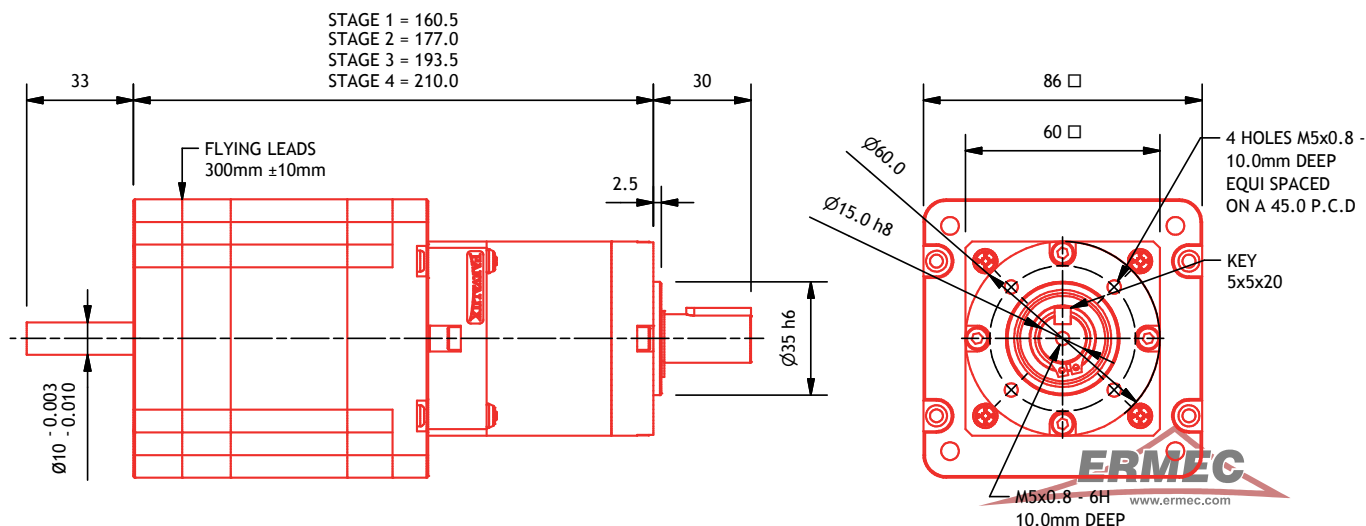
MOTOR Brushless DC motor  
 PROTECTION IP54  
 GEARBOX Planetary HP60 (Protection IP65)  
 MOTOR POWER 110 - 220 Watts  
 SPEED\* 1 - 750 rpm  
 VOLTAGE 24V DC  
 WEIGHT 6.02kg (ST1); 6.25kg (ST2); 6.54kg (ST3); 6.78kg (ST4)\*  
 CONTROLLER 50B  
 EXTRAS See page 18 of 2009 DC brushless catalogue



stage 1 HP60 gearbox pictured

\*input speed variable up to 4000 rpm

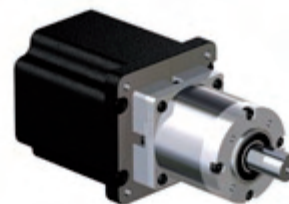
Gear Ratio	Number of stages	MOTOR SPEED (rpm)			TORQUE (Nm)		
		1500	2000	3000	CONTINUOUS up to 3000 rpm	PEAK up to 2500 rpm	15 MINUTE up to 3000 rpm
		OUTPUT SPEED (rpm)					
4	1	375	500	750	2.7	5	3.4
5	1	316	421	632	3.2	5	4.1
6	1	250	333	500	4	5	5
7	1	214	286	429	4.7	5	5
16	2	94	125	188	7.3	8.5	7.4
24	2	63	83	125	9.9	11.4	10
28	2	54	71	107	11	12.6	11.1
36	2	42	56	83	12.8	14.7	13.1
49	2	31	41	61	15	17.3	15.7
64	3	23	31	47	17.4	19.6	18.1
96	3	15.6	21	31	21	23	22
112	3	13.4	17.9	27	22	24	23
144	3	10.4	13.9	21	23	26	25
196	3	7.7	10.2	15.3	25	28	27
252	3	6	7.9	11.9	26	29	28
384	4	3.9	5.2	7.8	28	31	30
532	4	2.8	3.8	5.6	29	32	31
684	4	2.2	2.9	4.4	30	33	32
1026	4	1.5	1.9	2.9	30	33	33
1512	4	1	1.3	2	30	34	34



\*ST = stage

# PBL86-91HP60 48V

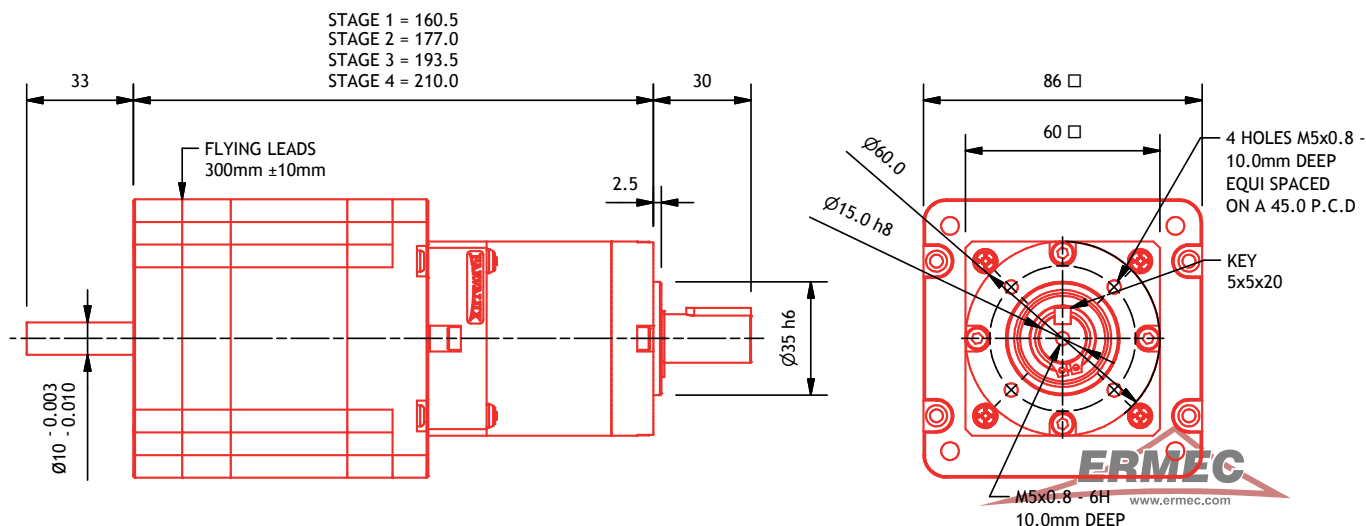
**MOTOR** Brushless DC motor  
**PROTECTION** IP54  
**GEARBOX** Planetary HP60 (Protection IP65)  
**MOTOR POWER** 110 - 220 Watts  
**SPEED\*** 1 - 750 rpm  
**VOLTAGE** 48V DC  
**WEIGHT** 9.02kg (ST1); 9.25kg (ST2); 9.54kg (ST3); 9.78kg (ST4)\*  
**CONTROLLER** 50B  
**EXTRAS** See page 18 of 2009 DC brushless catalogue



\*input speed variable up to 4000 rpm

stage 1 HP60 gearbox pictured

Gear Ratio	Number of stages	MOTOR SPEED (rpm)			TORQUE (Nm)		
		1500	2000	3000	CONTINUOUS up to 3000 rpm	PEAK up to 2500 rpm	15 MINUTE up to 3000 rpm
		OUTPUT SPEED (rpm)					
4	1	375	500	750	2.7	3.8	3
5	1	316	421	632	3.2	4.5	3.6
6	1	250	333	500	4	5	4.6
7	1	214	286	429	4.7	5	5
16	2	94	125	188	7.3	8.5	7.4
24	2	63	83	125	9.9	11.4	10
28	2	54	71	107	11	12.6	11.1
36	2	42	56	83	12.8	14.7	13.1
49	2	31	41	61	15	17.3	15.7
64	3	23	31	47	17.4	19.6	18.1
96	3	15.6	21	31	21	23	22
112	3	13.4	17.9	27	22	24	23
144	3	10.4	13.9	21	23	26	25
196	3	7.7	10.2	15.3	25	28	27
252	3	6	7.9	11.9	26	29	28
384	4	3.9	5.2	7.8	28	31	30
532	4	2.8	3.8	5.6	29	32	31
684	4	2.2	2.9	4.4	30	33	32
1026	4	1.5	1.9	2.9	30	33	33
1512	4	1	1.3	2	30	34	34



\*ST = stage

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