



PM IE4 MOTOR HPF RANGE

DESIGN

- IPM Design - Interior Permanent Magnets
- Cost efficient Design - No rare earth magnets - Stable price structure
- Controlled by standard drives - Sensorless or closed loop speed control
- Innovative high flux density rotor design for high torque density
- Available with encoder/resolver or in sensorless execution
- Available as stand-alone motor (HPF) or as motor/drive integrated (HPI)

PERFORMANCE

- Energy efficiency according to IE4
- Increased inertia, low cogging torque for stable high speed control
- Improved performance for HVAC applications
- Frame size reductions and weight savings up to 40%

TARGET APPLICATIONS

- Water Pumps
- Fans, Heating and Air Conditioning
- Cooling and Air Compressors
- Blowers

PM IE4-IE5 MOTOR HPS RANGE

DESIGN

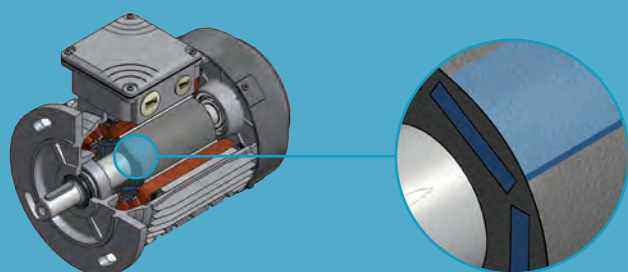
- SMPM Design - Surface Mounted Permanent Magnets
- High flux rare earth magnets
- Controlled by standard drives - Sensorless or closed loop speed control
- Magnets shape and placement carefully optimized for higher performance
- Available with encoder/resolver or in sensorless execution
- Available as stand-alone motor (HPS) or as motor/drive integrated (HPI)

PERFORMANCE

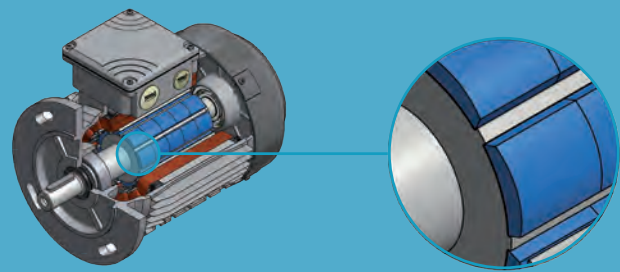
- Energy efficiency according to IE4-IE5
- High performance due to low inertia, high peak torque
- Designed for light Servo and higher performance applications
- Frame size reductions and weight savings up to 50%

TARGET APPLICATIONS

- HVAC and cost efficient light Servo Applications
- Conveyors, Material Handling
- Air Compressors
- Vacuum Pumps



IPM DESIGN
INTERIOR PERMANENT MAGNETS



SMPM DESIGN
SURFACE MOUNTED PERMANENT MAGNETS

PM MOTORS' AWARDS



2013 European New Product Innovation Leadership Award:
Electric Motors for Heating Ventilation Air Conditioning (HVAC) Applications
by Frost & Sullivan



2014 AHR EXPO
Innovation Awards:
Green Building Category



ADI Index Design 2012:
Best Italian design in manufacturing



ENERGY EFFICIENCY

The highest efficiency today
while developing a better tomorrow.

EFFICIENCY STANDARD

Efficiencies are harmonized to the International Standard IEC 60034-30-2:2016 that extends the efficiency levels to Super Premium Efficiency IE4 and IE5

IE4 REFERENCE LIMIT				
Output kW	Rated speed within 600 to 900 /min	Rated speed within 901 to 1200 /min	Rated speed within 1201 to 1800 /min	Rated speed within 1801 to 6000 /min
0.12	62.3	64.9	69.8	66.5
0.18	67.2	70.1	74.7	70.8
0.2	68.4	71.4	75.8	71.9
0.25	70.8	74.1	77.9	74.3
0.37	74.3	78	81.1	78.1
0.4	74.9	78.7	81.7	78.9
0.55	77	80.9	83.9	81.5
0.75	78.4	82.7	85.7	83.5
1.1	80.8	84.5	87.2	85.2
1.5	82.6	85.9	88.2	86.5
2.2	84.5	87.4	89.5	88
3	85.9	88.6	90.4	89.1
4	87.1	89.5	91.1	90
5.5	88.3	90.5	91.9	90.9
7.5	89.3	91.3	92.6	91.7
11	90.4	92.3	93.3	92.6
15	91.2	92.9	93.9	93.3
18.5	91.7	93.4	94.2	93.7
22	92.1	93.7	94.5	94
30	92.7	94.2	94.9	94.5
37	93.1	94.5	95.2	94.8
45	93.4	94.8	95.4	95
55	93.7	95.1	95.7	95.3
75	94.2	95.4	96	95.6
90	94.4	95.6	96.1	95.8
110	94.7	95.8	96.3	96
132	94.9	96	96.4	96.2

IE5 REFERENCE LIMIT				
Output kW	Rated speed within 600 to 900 /min	Rated speed within 901 to 1200 /min	Rated speed within 1201 to 1800 /min	Rated speed within 1801 to 6000 /min
0.12	67.4	69.8	74.3	71.4
0.18	71.9	74.6	78.7	75.2
0.2	73	75.7	79.6	76.2
0.25	75.2	78.1	81.5	78.3
0.37	78.4	81.6	84.3	81.7
0.4	78.9	82.2	84.8	82.3
0.55	80.6	84.2	86.7	84.6
0.75	82	85.7	88.2	86.3
1.1	84	87.2	89.5	87.8
1.5	85.5	88.4	90.4	88.9
2.2	87.2	89.7	91.4	90.2
3	88.4	90.6	92.1	91.1
4	89.4	91.4	92.8	91.8
5.5	90.4	92.2	93.4	92.6
7.5	91.3	92.9	94	93.3
11	92.2	93.7	94.6	94
15	92.9	94.3	95.1	94.5
18.5	93.3	94.6	95.3	94.9
22	93.6	94.9	95.5	95.1
30	94.1	95.3	95.9	95.5
37	94.4	95.6	96.1	95.8
45	94.7	95.8	96.3	96
55	94.9	96	96.5	96.2
75	95.3	96.3	96.7	96.5
90	95.5	96.5	96.9	96.6
110	95.7	96.6	97	96.8
132	95.9	96.8	97.1	96.9



DRIVE SPECIFICATIONS

MAIN SUPPLY

Supply frequency	50 / 60Hz
Supply voltage	3 x 380/480V ± 10% - three-phase 1 x 200/240V ± 10% - single-phase

OUTPUT RATINGS

Output rated current	100% continuously @ 40°C
Overload capacity	150% for 60 sec 175% for 2 sec

DIGITAL INPUT

Programmable digital input	4
Voltage level	0-24VDC (user selectable npn/pnp)

ANALOG INPUT

Programmable analog voltage input	1
Voltage level	0:10VDC
Programmable analog current input	1
Current range	0:20mA

BUS COMMUNICATION

RS485 or CANbus	for cascade mode serial communication CANopen
RS485	
CANbus	

RELAY OUTPUT

Programmable relay output

PROGRAMMING

Keypad	Yes
PC	Yes

CONTROL SPECIFICATION

Frequency range	up to 400Hz
Control method	Sensorless AC Vector Control
Max PWM frequency	16KHz

EXTERNALS

Enclosure	IP55
Max operating ambient temperature (Full load)	0 - 40°C
Storage ambient temperature	÷ 25°C - 60°C

COMPLIANCE WITH STANDARDS

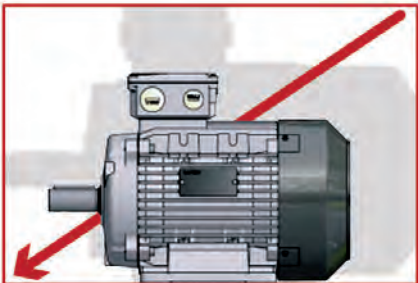
EN 61800-3:2004	Adjustable speed electrical power drive systems. EMC requirements
IEC 61800-5-1	Adjustable speed electrical drive systems - part 5-1: safety requirements - electrical, thermal and energy
EN 60204-1	Safety of machinery - electrical EMC equipment of machines - part 1: general rules

EFFICIENCY @ 3000RPM

Rated Output [kW]	IEC Motor frame	HP Motor frame	IE3 (IEC 60034-30)	HPS Efficiency [%]	IE3 + FC	HPI Efficiency [%]
0.75	80	71	80.7	89.7	77.5	85.5
1.1			82.7	90.5	79.4	86.9
1.5			84.2	91.2	80.8	87.4
2.2	90	90	85.9	91.4	82.5	87.7
3			87.1	92.1	83.6	88.4
4	100	112	88.1	92.6	84.6	88.9
5.5	112		89.2	93.1	85.6	89.4
7.5	132		90.1	93.7	86.5	90.0
11	160	132	91.2	94.1	87.5	90.3
15			91.9	94.2	88.2	90.5
18.5			92.4	94.6	88.7	90.8
22	180		92.7	94.9	89.0	91.1
30	200		93.3	95.0	89.6	91.2

REDUCTION OF WEIGHT & DIMENSIONS

AC motor
size 112



HPS motor
size 90

Weight AC Motor

Size 112 - 5.5 kW - 34 Kg

Size 132 - 7.5 kW - 53 Kg

Weight HPS Motor

Size 90 - 5.5 kW - 16 Kg

Size 112 - 7.5 kW - 26 Kg

HPS - STAND ALONE MOTOR 1500 MIN⁻¹*

* For rated speeds 1800 - 3000 - 3600 - 4500 rpm, please refer to the catalogue

VALUES @ 400V

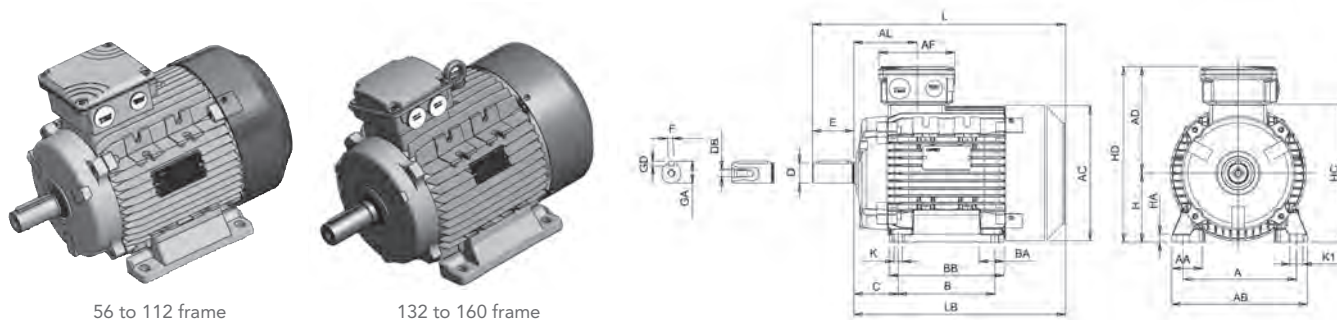
IE4

TEMPERATURE RISE TO CLASS B

Type	Size	Rated speed n 1/min	Rated power P _n kW	Rated torque M _n Nm	Peak torque M _{pk} Nm	Voltage constant K _e Vs	Torque constant K _t Nm/A	BEMF at rated speed E _n Vrs	Rated current I _n Arms	Efficiency HPS η %	Weight Kg
1500 min ⁻¹											
HPS 56 1500 4	56	1500	0.18	1.2	3.4	1.73	3	272	0.4	72.0%	2.8
HPS 56 1500 5	56	1500	0.25	1.6	4.8	1.73	3	272	0.5	75.4%	3.0
HPS 56 1500 8	56	1500	0.37	2.4	7.1	1.73	3	272	0.8	78.9%	3.2
HPS71 1500 12	71	1500	0.55	3.5	10.5	1.73	3	272	1.2	86.0%	4.8
HPS71 1500 16	71	1500	0.75	4.8	14.4	1.73	3	272	1.6	87.0%	5.4
HPS71 1500 23	71	1500	1.1	7.0	21.0	1.73	3	272	2.3	87.8%	6.2
HPS71 1500 32	71	1500	1.5	9.6	28.8	1.73	3	272	3.2	88.5%	7.0
HPS90 1500 32	S-L	1500	1.5	9.6	28.7	1.73	3	272	3.2	91.0%	10.0
HPS90 1500 47	S-L	1500	2.2	14.0	42.0	1.73	3	272	4.7	91.5%	12.0
HPS90 1500 64	S-L	1500	3.0	19.1	57.3	1.73	3	272	6.4	92.0%	14.0
HPS90 1500 85	S-L	1500	4.0	25.5	76.4	1.73	3	272	8.5	92.3%	17.0
HPS112 1500 85	M	1500	4.0	25.5	76.4	1.73	3	272	8.5	92.4%	23.0
HPS112 1500 117	M	1500	5.5	35.0	105.1	1.73	3	272	11.7	92.5%	26.0
HPS112 1500 159	M	1500	7.5	47.8	143.3	1.73	3	272	15.9	93.1%	30.0
HPS112 1500 195	M	1500	9.2	58.6	175.8	1.73	3	272	19.5	93.0%	33.0
HPS132 1500 233	XL	1500	11.0	70.0	210.1	1.73	3	272	23.3	94.0%	51.0
HPS132 1500 318	XXL	1500	15.0	95.5	286.5	1.73	3	272	31.8	94.4%	58.0
HPS132 1500 393	XXL	1500	18.5	117.8	353.4	1.73	3	272	39.3	94.8%	65.0
HPS160 1500 233	M	1500	11	70	175	1.73	3.0	272	23.3	93.3%	70
HPS160 1500 318	M	1500	15	95	239	1.73	3.0	272	31.8	93.9%	75
HPS160 1500 393	M	1500	18.5	118	294	1.73	3.0	272	39.3	94.2%	85
HPS160 1500 467	L	1500	22	140	350	1.73	3.0	272	46.7	94.5%	95
HPS160 1500 637	L	1500	30	191	477	1.73	3.0	272	63.7	94.9%	115

HPS FRAME SIZE 56 - 71 - 90 - 112 - 132 - 160 IM B3*

* For mounting arrangements IM B5 - IM B14, please refer to the catalogue



IEC	H	A	B	C	K ¹⁾	AB	BB	AD ²⁾	HD ²⁾	AC	HC	HA
56	56	90	71	36	6	107	86	92	148	110	109	8
71	71	112	90	45	8	135	108	114	185	142	142	9
90S	90	140	100	56	10	170	150	148	238	177	181	11
90L	90	140	125	56	10	170	150	148	238	177	181	11
112M	112	190	140	70	12.5	220	176	171	283	225	226	15
112XL	112	190	140	70	12.5	220	176	171	283	225	226	15
132M	132	216	178	89	12	256	218	195	327	248	261	17
132XL	132	216	178	89	12	256	218	195	327	248	261	17
132XXL	132	216	178	89	12	256	218	195	327	248	261	17
160M	160	254	210	108	14	320	270	238	398	317	316	23
160L	160	254	254	108	14	320	310	238	398	317	316	23

IEC	K1	L	LB	AL	AF	BA	AA	D	E	F	GD	GA	DB ³⁾
56	9	188	168	61	93	27	27	14	30	5	5	16	M5
71	17	245	215	75	93	22	30	19	40	6	6	22	M6
90S	15	317	267	85	110	28/53	37	24	50	8	7	27	M8
90L	15	317	267	85	110	28/53	37	24	50	8	7	27	M8
112M	19	388	328	92	110	46	48	28	60	8	7	31	M10
112XL	19	410	350	92	110	46	48	28	60	8	7	31	M10
132M	20	485	405	122	133	45	59	38	80	10	8	41	M12
132XL	20	505	425	122	133	45	59	38	80	10	8	41	M12
132XXL	20	556	476	122	133	45	59	38	80	10	8	41	M12
160M	18	608	498	146	150	65	76	42*	110	12*	8*	45*	M16
160L	18	652	542	168	150	65	76	48	110	14	9	51.5	M16

1) Clearance hole for screw

2) Maximum dimension

3) Centering holes in shaft extensions to DIN 332 part 2

* For type HPS160M 18.5 kW, please refer to HPS160L

HPI - INTEGRAL DRIVE 3000 MIN⁻¹*

* For rated speeds 1500 - 1800 - 3600 - 4500 rpm, please refer to the catalogue

VALUES @ 400V

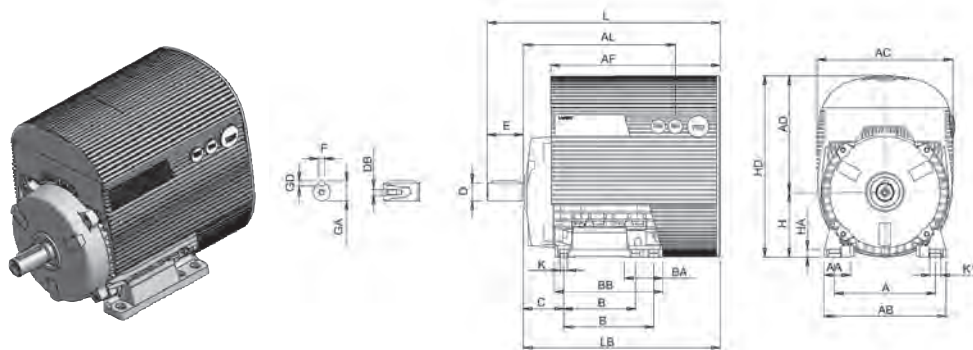
TEMPERATURE RISE TO CLASS B

Type	Rated speed	Rated power	Rated torque	Peak torque	Motor Rated current	Motor Peak current	Efficiency HPI	Rated input current 380 Vac	Rated input current 480 Vac	Torque constant	Weight HPI
	n 1/min	P _n kW	M _n Nm	M _{pk} Nm	I _n Arms	I _{pk} Arms	η %	I _{in} Arms	I _{in} Arms	K _t Nm/A	Kg
3000 min⁻¹											
HPI71 3000 16*	3000	0.75	2.4	3.6	1.6	2.4	85.5%	1.7	1.3	1.5	7.3
HPI71 3000 23*	3000	1.1	3.5	5.3	2.3	3.5	86.9%	2.4	1.9	1.5	7.9
HPI71 3000 32*	3000	1.5	4.8	7.2	3.2	4.8	87.4%	3.3	2.6	1.5	8.5
HPI71 3000 47*	3000	2.2	7.0	10.5	4.7	7.0	87.7%	4.8	3.8	1.5	9.1
HPI90 3000 47	3000	2.2	7.0	10.5	4.7	7.0	86.9%	4.8	3.8	1.5	13.5
HPI90 3000 64	3000	3.0	9.6	14.4	6.4	9.6	88.4%	6.4	5.1	1.5	15.5
HPI90 3000 85	3000	4.0	12.7	19.1	8.5	12.7	88.9%	8.5	6.8	1.5	17.5
HPI90 3000 117	3000	5.5	17.5	26.3	11.7	17.5	89.4%	11.7	9.3	1.5	19.5
HPI112 3000 117	3000	5.5	17.5	26.3	11.7	17.5	88.4%	11.9	9.4	1.5	28.5
HPI112 3000 159	3000	7.5	23.9	35.9	15.9	23.9	90.0%	15.9	12.5	1.5	31.5
HPI112 3000 233	3000	11.0	35.0	52.5	23.3	35.0	90.3%	23.2	18.4	1.5	35.5
HPI112 3000 318	3000	15.0	47.8	71.7	31.8	47.8	90.5%	31.5	25.0	1.5	38.5
HPI132 3000 318	3000	15.0	47.8	71.7	31.8	47.8	90.2%	32.1	25.4	1.5	57.5
HPI132 3000 393	3000	18.5	58.9	88.4	39.3	58.9	90.8%	38.8	30.7	1.5	64.5
HPI132 3000 467	3000	22.0	70.0	105.0	46.7	70.0	91.1%	46.1	36.5	1.5	71.5

* HPI 71 Series is available also as single-phase design @ 230 V. For values @ 230 V, please contact us.

HPI FRAME SIZE 71 - 90 - 112 - 132 IM B3*

* For mounting arrangements IM B5 - IM B14, please refer to the catalogue



IEC	H	A	B	C	K ¹⁾	AB	BB	AD ²⁾	HD ²⁾	AC	HA
71 ⁴⁾	71	112	90	45	7	144	109	160	231	170	9
90S	90	140	100	56	10	170	150	183	273	196	11
90L	90	140	125	56	10	170	150	183	273	196	11
112	112	190	140	70	12.5	220	176	230	340	246	15
132 ⁴⁾	132	216	178	89	12	256	218	243	375	280	17

IEC	K1	L	LB	AL	AF	BA	AA	D	E	F	GD	GA	DB ³⁾
71 ⁴⁾	17	266	250	200	200	22	30	19	40	6	6	22	M6
90S	15	369	319	254	280	28/53	37	24	50	8	7	27	M8
90L	15	369	319	254	280	28/53	37	24	50	8	7	27	M8
112	19	457	397	332	350	46	48	28	60	8	7	31	M10
132 ⁴⁾	20	545	465	380	415	45	59	38	80	10	8	41	M12

1) Clearance hole for screw 2) Maximum dimension 3) Centering holes in shaft extensions to DIN 332 part 2 4) Not binding dimensions, please contact us for more information.