

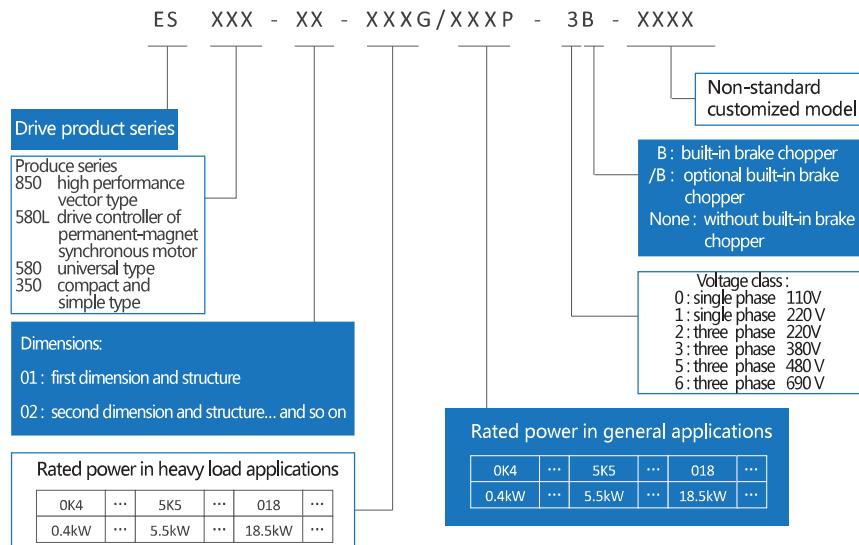
# Smart Drive /ESSeries Frequency Converter

## UniqueSmartDrive

Intelligent LCD control keyboard: The friendly human-machine interface displays key parameters relevant to running of the frequency converter and motor in real time.

- Intelligent fault diagnosis: It records extreme operation conditions of the frequency converter, including the maximum current, voltage and maximum temperature, which are easy for fault locating and exception analysis. It also records device load conditions for customers, which are convenient for customers to optimize electric drive schemes.
- Intelligent temperature monitoring: It detects the temperature at key points inside the machine and intelligently controls the temperature of the whole machine by using adaptive algorithms.
- Intelligent V/F curve setting: It automatically matches the most excellent performance parameters based on motor parameters, requiring no manual setting.
- Intelligent parameter setting for industry applications: Users only need to select an industry application, and the device automatically matches optimum parameters, eliminating tedious parameter setting.

## NamingRules



# ESSeries Frequency Converter

## Technical Data

Item	Specification and Technical Data
Main power connection	Input voltage U1      220...240V; 380...500V; 660V...690V; 220V/380V/660V±20%; signal/three-phase power
	Input frequency f1      50...60Hz ±5Hz
	Output voltage U2      0...U1 (V)(The maximum output voltage equals the input power voltage.)
	Output frequency f2      0-1000Hz (V/Fcontrol); 0-500Hz(vector control)
	Carrier frequency      2-12 KHz (The device can intelligently and automatically make optimal adjustment according to load characteristics and drive temperature.)
	Input voltage unbalance degree      Maximum: ±3% of rated inter-phase input voltage
	Efficiency      ~ 98% (when operating at rated power)
Basic functions	Maximum frequency      0-500Hz(vector control) 0-1000Hz (V/Fcontrol)
	Input frequency resolution      Digital setting: 1RPM Analog setting: 0.025% of maximum RPM
	Control mode      Open-loop V/F control Open-loop vector control (SVC)/close-loop vector control (FOC)
	Startup torque      200% @ 0.25Hz@ OpenLoop(open-loop control) 200% @0Hz@ CloseLoop(close-loop control)
	Speed range      1 : 200 @ OpenLoop(open-loop control) 1 : 3000 @ CloseLoop(close-loop control)
	Steady-speed precision      ±0.5% @ OpenLoop(open-loop control) ±0.01% @ CloseLoop(close-loop control)
	Overload capacity      Heavy load application: 60sat 150% rated current @40°C. The time depends on the drive temperature under other conditions. Light load application:60sat 110% rated current @40°C. The time depends on the drive temperature under other conditions.
	Torque boost      Automatic torque boost. Manual torque boost 0.1%-30%
	V/Fcurve      Intelligent adaptive
	V/Fseparation      Two methods : full separation, half separation
	Acceleration and deceleration curves      straight-line or S-curve acceleration and deceleration mode Two acceleration time values. The acceleration and deceleration time range : 0.0s-650.00s
	Simple PLCfunction      Achieve operation of up-to-16-stages speed(via built-in PLC or control terminals)
	Built-in PID      Conveniently achieve the process control close-loop control system
	Automatic voltage regulation (AVR)      When the grid voltage changes, the device automatically maintains constant output voltage.
Enhancements	Overvoltage and overcurrent stall control      The current and voltage are automatically limited during running to avoid jump faults due to frequent overcurrent and overvoltage
	Fast current limiting      Overcurrent faults are minimized to guarantee normal operation of the frequency converter.
	Torque limiting and control      The torque is automatically limited operating (to avoid frequent overcurrent jumping fault due to too large torque).
	Protection function      Output shortcircuit protection, input & output phase loss protection, overcurrent protection, overvoltage protection, undervoltage protection, overheat protection, overload protection, brake chopper overload protection, brake chopper shortcircuit protection, brake resistor overload protection
	Non-stop during transient interruption      Keep the frequency converter operating in a short time (by reducing feedback energy compensation voltage at the moment of power outage). The duration depends on the mechanical inertia of the load at that time.
	Timing control      Timing control function. The time range and precision is 0.0-6500.0(min).
	Switching multiple motors      Support switching among four groups of motor parameters.
	Bus communication      The standard configuration uses the built-in Modbus/CANopen communication, which can be extended to Profibus-DP bus communication.
Intelligent temperature control	Full cover system temperature testing, intelligent real-time IGBT chip temperature monitoring, and intelligent and optimized adjustment of the carrier and current based on drive temperature changes
	Type of encoders supported      Support differential encoders, collector open encoders, UVW encoders, rotary transformer encoders and Sin-Cos Encoders

## Technical Data

Item		Specification and Technical Data
I/O Input Output Interface	Command input mode	Control keyboard input, control terminal input, bus communication input, which can be switched mutually.
	Speed reference mode	Digital giving, analog voltage (current) giving, pulse giving, bus communication giving and PID giving, which are mutually switched.
	Input terminal (input)	<p>The followings are included in standard configuration :</p> <p>6 (F0) / 7 (F1 and above) digital input terminals, where,            DI6 (F0) DI7 (F1 and above) supports the maximum of 50 kHz high-speed pulse input.</p> <p>2 (F0) / 3 (F1 and above) analog input terminals (where, at least 2 supports 0-10V voltage input or 0-20 mA voltage input)</p> <p>The followings are extended as cards :</p> <p>5 digital input terminals</p> <p>2 analog input terminals, supporting input of -10V to +10V voltage</p>
	Output terminal (output)	<p>The followings are included in standard configuration:</p> <p>1 high-speed pulse output terminal (supporting 0-50 kHz square signal output )</p> <p>1 (F0) / 2 (F1 and above) digital output terminals</p> <p>1 (F0) / 2 (F1 and above) relay output terminals</p> <p>1 (F0) / 2 (F1 and above) analog output terminals (supporting 0-10V voltage output or 0- 20mA voltage output)</p> <p>The followings are extended as cards:</p> <p>3 digital output terminals</p> <p>3 relay output terminals</p> <p>3 analog output terminals, supporting 0-10V voltage output or 0-20mA voltage output</p>
Display and control	Man-machine interface	5-bit 8-shape digital tube (F0) , intelligent sealed LCD control keyboard (F1 and above)
	Parameters duplicating	Rapidly duplicating parameters via the LCD control keyboard
Application environment	Application site	Indoor, free of direct sunshine, dusts, corrosive gases, flammable gases, oil mist, water vapor, drip or salts
	Altitude	At 0-1000m ; When the altitude is 1000-4000m, the capacity is reduced by 1% as the altitude rises by 100m. (consult professionals for more accurate values)
	Operation ambient temperature	-10°C to +40°C (when the ambient temperature is 40°C-55°C, the drive is automatically derated to achieve self-protection)
	Relative humidity	Less than 95%RH. No droplets condensed (condensation)
	Sinusoidal vibration	(IEC 60068- 2/-6.TestFc) Max.0.1mm (5 to 13.2Hz) ; max.7m/S <sup>2</sup> (13.2 to 100 Hz) sinusoidal vibration (F0-F7) Max.0.1mm (10 to 57Hz) ; max.10m/S <sup>2</sup> (57 to 150 Hz) sinusoidal vibration (F8-F9)
	Impact	Not allowed (during operation); maximum 100m/S <sup>2</sup> , 11ms (during storage and transportation with packing)
	Free fall (Max.)	Not allowed (during operation); with packing : 100cm @F0-2,76cm @F0-4,46cm @F5-7,15cm @F8-9
	Storage & transportation temperature	-40°C to +70°C (-40 to +158°F)
Protection grade		IP20 (ULopen type), full closed design for small- and medium-power models. Top/Left and right sides can reach IP41 (the medium cavity with air vents on two sides for some F0** models)
Cooling mode		Forced air cooling of the interior fan. The air flows from bottom to top. Air-cooled radiator.
Application standard		IEC 61800-3 (2004), IEC 61800-5-1 (2007) ; GB12668 (see the nameplate for details).

# ESSeries Frequency Converter

## Selection of ES850 Products

### 220V rated voltage

Model Code	Rated Value		General Load Application		Heavy Load Application		Noise Level	Heat Radiation	Air Volume	Dimension
	I <sub>N</sub> (A)	I <sub>max</sub> (A)	I <sub>Ld</sub> (A)	P <sub>Ld</sub> (kW)	I <sub>Hd</sub> (A)	P <sub>Hd</sub> (kW)				
ES850-01-0K4G/0K7P-1B <sup>3)</sup>	4.8	6	4.5	0.75	2.5	0.37	45	40	53	F1
ES850-01-0K7G/1K5P-1B <sup>3)</sup>	7.5	10	7	1.5	4.5	0.75	45	94	53	
ES850-01-1K5G/2K2P-1B <sup>3)</sup>	11	15	10	2.2	7	1.5	45	172	53	
ES850-01-2K2G-1B <sup>3)</sup>	15	20	-	-	10	2.2	45	232	53	

### 380V rated voltage

Model Code	Rated Value		General Load Application		Heavy Load Application		Noise Level	Heat Radiation	Air Volume	Dimension
	I <sub>N</sub> (A)	I <sub>max</sub> (A)	I <sub>Ld</sub> (A)	P <sub>Ld</sub> (kW)	I <sub>Hd</sub> (A)	P <sub>Hd</sub> (kW)				
ES850-01-0K7G/1K5P-3B	5.2	7	5	1.5	2.5	0.75	45	40	53	F1
ES850-01-1K5G/2K2P-3B	6.3	9	6	2.2	4.2	1.5	45	76	53	
ES850-01-2K2G/4K0P-3B	10.5	15	9.8	4	5.6	2.2	45	97	53	
ES850-01-4K0G/5K5P-3B	14	20	13.5	5.5	10.5	4	45	172	53	
ES850-01-5K5G/7K5P-3B	18.2	25	17.5	7.5	14.5	5.5	45	210	53	F2
ES850-02-7K5G/011P-3B	26	36	25	11	17.6	7.5	45	325	55	
ES850-02-011G-3B	28	35	26	15	25	11	45	420	55	
ES850-03-015G/018P-3B	41	57	38.6	18.5	35	15	57	550	145	
ES850-03-018G/022P-3B	48	67	46	22	41	18.5	57	660	145	F3
ES850-03-022G/030P-3B	63.5	89	61	30	48	22	57	890	145	
ES850-04-030G/037P-3/B	78	109	75	37	66	30	60	1114	290	
ES850-04-037G/045P-3/B	95	133	91	45	79	37	60	1140	290	
ES850-04-045G/055P-3/B	120	168	115	55	94	45	60	1200	290	F4
ES850-05-055G/075P-3/B	162	227	155	75	116	55	60	1440	350	
ES850-05-075G/090P-3/B	185	222	178	90	160	75	60	1940	350	
ES850-05-090G/110P-3/B	225	270	215	110	179	90	67	2200	570	
ES850-06-110G/132P-3	272	326	261	132	215	110	68	3300	685	F5
ES850-06-132G/160P-3	320	384	310	160	259	132	68	3850	685	
ES850-07-160G/200P-3	375	450	360	200	314	160	68	4100	720	
ES850-07-200G/220P-3	450	540	430	220	387	200	68	4600	720	
ES850-07-220G/250P-3	487	584	470	250	427	220	68	5100	720	F6
ES850-08-250G/280P-3	546	628	525	280	481	250	68	5782	1200	
ES850-08-280G/315P-3	624	718	600	315	550	280	68	6252	1200	
ES850-08-315G/355P-3	686	789	660	355	616	315	68	7866	1200	
ES850-09-355G/400P-3	760	874	730	400	671	355	68	9100	1300	F7
ES850-09-400G/450P-3	865	995	830	450	759	400	68	9900	1300	
ES850-09-450G/500P-3	950	1093	920	500	850	450	68	10500	1680	
ES850-09-500G/560P-3	1100	1265	1080	560	950	500	68	11500	1680	
ES850-09-560G/630P-3	1200	1380	1150	630	1060	560	68	12600	1680	F8
ES850-09-575G/660P-3	1300	1500	1250	660	1150	575	68	13600	1680	
ES850-09-600G/720P-3	1400	1650	1350	720	1250	600	68	14600	1680	
ES850-09-630G/780P-3	1500	1800	1450	780	1350	630	68	15600	1680	
ES850-09-660G/840P-3	1600	1950	1550	840	1450	660	68	16600	1680	F9

### 660V/690V rated voltage

Model Code	Rated Value		General Load Application		Heavy Load Application		Noise Level	Heat Radiation	Air Volume	Dimension
	I <sub>N</sub> (A)	I <sub>max</sub> (A)	I <sub>Ld</sub> (A)	P <sub>Ld</sub> (kW)	I <sub>Hd</sub> (A)	P <sub>Hd</sub> (kW)				
ES850-04-015G/018P-6	22	44	21	18.5	18	15	57	550	290	F4
ES850-04-018G/022P-6	26	54	25	22	22	18.5	57	660	290	
ES850-04-022G/030P-6	35	64	33	30	27	22	57	890	290	
ES850-04-030G/037P-6	44	70	41	37	35	30	60	1114	290	
ES850-04-037G/045P-6	49	71	48	45	45	37	60	1140	290	F5
ES850-04-045G/055P-6	61	104	58	55	52	45	60	1200	290	
ES850-04-055G/075P-6	80	124	80	75	65	55	60	1440	290	
ES850-05-075G/090P-6	98	168	93	90	86	75	60	1940	350	
ES850-05-090G/110P-6	119	198	113	110	100	90	67	2200	350	F6
ES850-05-110G/132P-6	142	200	142	132	121	110	68	3300	350	
ES850-05-132G/160P-6	175	220	165	160	150	132	68	3850	350	
ES850-06-160G/200P-6	220	240	215	200	175	160	68	4100	720	
ES850-06-200G/220P-6	271	320	245	220	220	200	68	4600	720	F7
ES850-06-220G/250P-6	290	350	265	250	250	220	68	5100	720	
ES850-07-250G/280P-6	300	360	295	280	270	250	68	5782	1000	
ES850-07-280G/315P-6	330	360	325	315	300	280	68	6252	1000	
ES850-07-315G/355P-6	370	480	360	355	330	315	68	7866	1000	

## Selection of ES580 Products

### 220V rated voltage

Model Code	Rated Value		General Load Application		Heavy Load Application		Noise Level	Heat Radiation	Air Volume	Dimension
	I <sub>N</sub> (A)	I <sub>max</sub> (A)	I <sub>ld</sub> (A)	P <sub>ld</sub> (kW)	I <sub>Hd</sub> (A)	P <sub>Hd</sub> (kW)				
ES580-01-0K4G/0K7P-1B <sup>1)</sup>	4.8	6	4.5	0.75	2.5	0.37	45	40	53	F1
ES580-01-0K7G/1K5P-1B <sup>1)</sup>	7.5	10	7	1.5	4.5	0.75	45	94	53	
ES580-01-1K5G/2K2P-1B <sup>1)</sup>	11	15	10	2.2	7	1.5	45	172	53	
ES580-01-2K2G-1B <sup>1)</sup>	15	20	-	-	10	2.2	45	232	53	

### 380V rated voltage

Model Code	Rated Value		General Load Application		Heavy Load Application		Noise Level	Heat Radiation	Air Volume	Dimension
	I <sub>N</sub> (A)	I <sub>max</sub> (A)	I <sub>ld</sub> (A)	P <sub>ld</sub> (kW)	I <sub>Hd</sub> (A)	P <sub>Hd</sub> (kW)				
ES580-01-0K7G/1K5P-3B	5.2	7	5	1.5	2.5	0.75	45	40	53	F1
ES580-01-1K5G/2K2P-3B	6.3	9	6	2.2	4.2	1.5	45	76	53	
ES580-01-2K2G/4K0P-3B	10.5	15	9.8	4	5.6	2.2	45	97	53	
ES580-01-4K0G/5K5P-3B	14	20	13.5	5.5	10.5	4	45	172	53	
ES580-01-5K5G/7K5P-3B	18.2	25	17.5	7.5	14.5	5.5	45	210	53	F2
ES580-02-7K5G/011P-3B	26	36	25	11	17.6	7.5	45	325	55	
ES580-02-011G-3B	28	35	26	15	25	11	45	420	55	
ES580-03-015G/018P-3B	41	57	38.6	18.5	35	15	57	550	145	
ES580-03-018G/022P-3B	48	67	46	22	41	18.5	57	660	145	F3
ES580-03-022G/030P-3B	63.5	89	61	30	48	22	57	890	145	
ES580-04-030G/037P-3/B	78	109	75	37	66	30	60	1114	290	
ES580-04-037G/045P-3/B	95	133	91	45	79	37	60	1140	290	
ES580-04-045G/055P-3/B	120	168	115	55	94	45	60	1200	290	
ES580-05-055G/075P-3/B	162	227	155	75	116	55	60	1440	350	F5
ES580-05-075G/090P-3/B	185	222	178	90	160	75	60	1940	350	
ES580-05-090G/110P-3/B	225	270	215	110	179	90	67	2200	570	
ES580-06-110G/132P-3	272	326	261	132	215	110	68	3300	685	
ES580-06-132G/160P-3	320	384	310	160	259	132	68	3850	685	F6
ES580-07-160G/200P-3	375	450	360	200	314	160	68	4100	720	
ES580-07-200G/220P-3	450	540	430	220	387	200	68	4600	720	
ES580-07-220G/250P-3	487	584	470	250	427	220	68	5100	720	
ES580-08-250G/280P-3	546	628	525	280	481	250	68	5782	1200	F8
ES580-08-280G/315P-3	624	718	600	315	550	280	68	6252	1200	
ES580-08-315G/355P-3	686	789	660	355	616	315	68	7866	1200	
ES580-09-355G/400P-3	760	874	730	400	671	355	68	9100	1300	
ES580-09-400G/450P-3	865	995	830	450	759	400	68	9900	1300	F9
ES580-09-450G/500P-3	950	1093	920	500	850	450	68	10500	1680	
ES580-09-500G/560P-3	1100	1265	1080	560	950	500	68	11500	1680	
ES580-09-560G/630P-3	1200	1380	1150	630	1060	560	68	12600	1680	

### 660V/690V rated voltage

Model Code	Rated Value		General Load Application		Heavy Load Application		Noise Level	Heat Radiation	Air Volume	Dimension
	I <sub>N</sub> (A)	I <sub>max</sub> (A)	I <sub>ld</sub> (A)	P <sub>ld</sub> (kW)	I <sub>Hd</sub> (A)	P <sub>Hd</sub> (kW)				
ES580-04-015G/018P-6	22	44	21	18.5	18	15	57	550	290	F4
ES580-04-018G/022P-6	26	54	25	22	22	18.5	57	660	290	
ES580-04-022G/030P-6	35	64	33	30	27	22	57	890	290	
ES580-04-030G/037P-6	44	70	41	37	35	30	60	1114	290	
ES580-04-037G/045P-6	49	71	48	45	45	37	60	1140	290	F5
ES580-04-045G/055P-6	61	104	58	55	52	45	60	1200	290	
ES580-04-055G/075P-6	80	124	80	75	65	55	60	1440	290	
ES580-05-075G/090P-6	98	168	93	90	86	75	60	1940	350	
ES580-05-090G/110P-6	119	198	113	110	100	90	67	2200	350	F6
ES580-05-110G/132P-6	142	200	142	132	121	110	68	3300	350	
ES580-05-132G/160P-6	175	220	165	160	150	132	68	3850	350	
ES580-06-160G/200P-6	220	240	215	200	175	160	68	4100	720	
ES580-06-200G/220P-6	271	320	245	220	220	200	68	4600	720	F7
ES580-06-220G/250P-6	290	350	265	250	250	220	68	5100	720	
ES580-07-250G/280P-6	300	360	295	280	270	250	68	5782	1000	
ES580-07-280G/315P-6	330	360	325	315	300	280	68	6252	1000	
ES580-07-315G/355P-6	370	480	360	355	330	315	68	7866	1000	

# ES Series Frequency Converter

## 660V/690V rated voltage

Model Code	Rated Value		General Load Application		Heavy Load Application		Noise Level	Heat Radiation	Air Volume	Dimension
	I <sub>N</sub> (A)	I <sub>max</sub> (A)	I <sub>ld</sub> (A)	P <sub>ld</sub> (kW)	I <sub>Hd</sub> (A)	P <sub>Hd</sub> (kW)				
ES580-08-355G/400P-6	430	520	420	400	385	355	68	9100	1300	F8 <sup>2)</sup>
ES580-08-400G/450P-6	470	655	455	450	430	400	68	9900	1300	
ES580-08-450G/500P-6	522	700	505	500	470	450	68	10500	1300	
ES580-08-500G/560P-6	590	800	571	560	555	500	68	11500	1300	
ES580-08-560G/630P-6	721	820	710	630	600	560	68	12600	1300	
ES580-09-630G/800P-6	900	1350	880	800	680	630	68	16000	1680	F9 <sup>2)</sup>
ES580-09-800G/1100P-6	1160	1750	1115	1100	900	800	68	20000	1680	
ES580-09-1100G/1250P-6	1250	2000	1250	1250	1114	1100	68	26000	1680	F10 <sup>4)</sup>
ES580-09-1250G/1400P-6	1350	2200	1400	1400	1250	1250	68	32000	1680	

## Selection of ES350 Products

### 220V rated voltage

Model Code	Rated Value		General Load Application		Heavy Load Application		Noise Level	Heat Radiation	Air Volume	Dimension
	I <sub>N</sub> (A)	I <sub>max</sub> (A)	I <sub>ld</sub> (A)	P <sub>ld</sub> (kW)	I <sub>Hd</sub> (A)	P <sub>Hd</sub> (kW)				
ES350-F0-0K4G/0K7P-1B	4.8	6	4.5	0.75	2.5	0.37	40	40	25	F0 <sup>*3)</sup>
ES350-F0-0K7G/1K5P-1B	7.5	10	7	1.5	4.5	0.75	40	65	25	
ES350-F0-1K5G/2K2P-1B	9	11.5	8.5	2.2	7	1.5	40	80	25	
ES350-F0-2K2G-1B	10	12	-	-	9	2.2	40	92	25	

### 380V rated voltage

Model Code	Rated Value		General Load Application		Heavy Load Application		Noise Level	Heat Radiation	Air Volume	Dimension
	I <sub>N</sub> (A)	I <sub>max</sub> (A)	I <sub>ld</sub> (A)	P <sub>ld</sub> (kW)	I <sub>Hd</sub> (A)	P <sub>Hd</sub> (kW)				
ES350-F0-0K7G/1K5P-3B	5.2	6	5	1.5	2.5	0.75	40	40	25	F0 <sup>*3)</sup>
ES350-F0-1K5G/2K2P-3B	6.3	7.5	6	2.2	4	1.5	40	76	25	
ES350-F0-2K2G/4K0P-3B	9.5	11	9	4	5	2.2	40	97	25	
ES350-F0-4K0G-3B	10	12	-	-	8	4	40	125	25	

G-constant torque load application, P-square torque load application, - indicate that the item is not supported.Rated value

IN Continuous and available rated current without load at 40°C

IMAX Maximum output current.Ten seconds are allowable at startup. Under other circumstances, the time depends on temperature

General load application:

ILD Continuous rated output current of P converter s at ≤ 40°C. The overload current value is allowed to reach 120% of ILD in 1 minute out of every five minutes. The time depends on the drive temperature under other circumstances.

PLD Typical motor power in the light load application.

Heavy load application:

IHD Continuous rated output current of G converters at ≤ 40°C. The overload current value is allowed to reach 150% of IHDI in 1 minute out of every five minutes. The time depends on the drive temperature under other circumstances.

PHD Typical motor power in the heavy load application.

1)=The 220V series models need to be consulted to confirm inventory and supply cycle

2)=Contains 6 vein or 12 pulse rectifier power circuit, the specific order before please consult our company representative.

3)=\* represent independent closed air duct structure, \*\* represent independent closed air duct with cooling hole structure, - represent this item not supported.

4)=Manufacturers need to consult before ordering

## Installation Dimensions

