

# AxN Series Servo Drive

AxN系列伺服驱动器





## Company Profile

### 企业简介

宁波菲仕技术股份有限公司（简称：菲仕技术）成立于 2001 年，由民营控股、先进制造产业投资基金和宁波和丰创业投资有限公司等战略投资人参股，公司致力于以电驱动技术为核心的创新及产业化，为运动控制和能量转换领域提供系统产品和综合解决方案，经过多年的品牌沉淀，菲仕已成为一家集研发、生产、销售为一体，拥有国内外多家控股子公司的集团化创新型高科技企业。

Ningbo Physis Technology Co., Ltd. was founded in 2001, which is a private enterprise holding group company, invested by Advanced Manufacturing Fund and Ningbo Hefeng Venture Capital Co., Ltd. Physis always devotes to innovation and industrialization of electrical drive technology, provides servo products and solutions for the field of motion control & energy conversion. After years of brand development and accumulation, Physis became a collectivized & innovative high-tech enterprise, which collects together research and development (R&D), production and sale, has a numbers of domestic and overseas subsidiaries.

## R&D Team

### 研发团队

在智能制造全球化的趋势中，菲仕逐步落地国际化的战略布局，在欧洲成立了研发中心，与国内外专业科研机构、专家合作，进行定期交流和互动，以保持公司持续站立在伺服系统科技创新的最前沿，共同推进产业发展。经过多年的沉淀，顶尖人才的积累，菲仕在国内拥有省级工程技术中心、省级高新技术企业研究开发中心，并入选了国家工信部第一批专精特新“小巨人”企业！

2 个  
研发中心

3 个  
生产基地

200 +  
研发团队

300 +  
授权专利

In the globalization tendency of intelligent manufacture, Physis implements the strategic layout of the group internationalization gradually, builds the R&D center in Europe, communicate and interact regularly with the world-class scientific research institution & industry experts, which makes Physis hold on the lead of the servo system technology innovation and promote industrial development together! After years of development, accumulation of talents, Physis has provincial engineering & technology center and more than 200 people of R&D team. Until now, Physis has more than 300 patents.

菲仕研发的新一代高性能伺服驱动器，其额定电流输出能力覆盖 9A ~ 200A，支持 EtherCAT、CANopen 和 Modbus 等多种现场总线，支持多种主流编码器，非常适合搭建高性能伺服系统的应用场合。搭配菲仕永磁同步伺服电机，为纺织机械、印刷机械、包装机械、塑料机械、机器人、医疗生产设备、风力发电、光伏等伺服应用市场提供个性化高性能伺服解决方案。

AxN series servo drive is the new generation of high performance servo drive with rated current output capacity of 9A~200A, supports EtherCAT, CANopen and Modbus , supports a variety of mainstream encoders, and are suitable for applications that need high performance servo systems. Physis can provide personalized high performance servo solutions for textile machinery, printing machinery, packaging machinery, rubber plastic machinery, medical production equipment, wind power, photovoltaic and other industries.

#### 紧凑的外形尺寸

对比上一代产品，体积缩小 16% ~ 20%，重量减轻 25% ~ 35%

#### Compact Size

16% ~ 20% size reduction, 25% ~ 35% weight reduction, compare to predecessor

#### 内置可编程 PLC

更智能，方便脱离上位机运行

#### Built in Programmable PLC

Intelligent, can run independently without controller.

#### 可编程显示模块

抛弃传统数码管显示局限，自由定制显示内容

#### Programmable Display Module

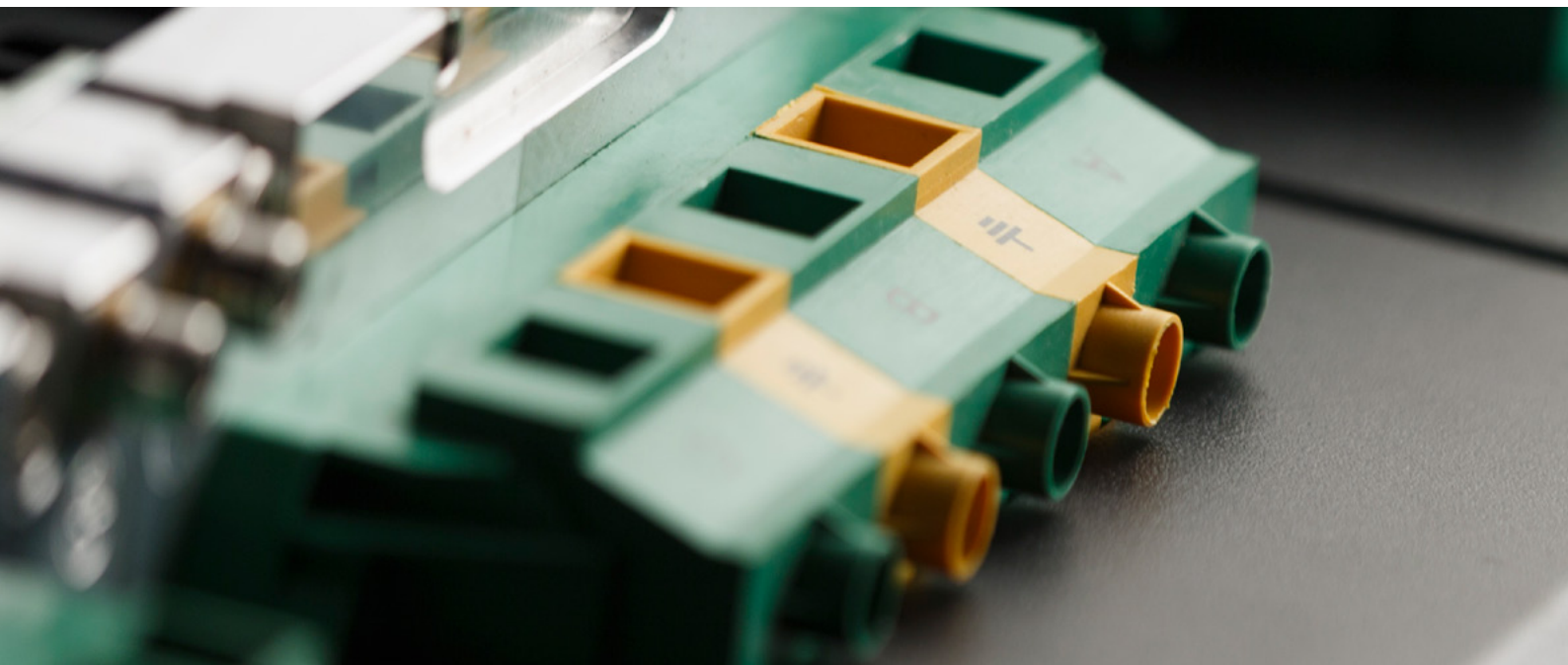
Customize display contents, abandon the limitation of traditional digital display.

#### 主流高速现场总线支持

EtherCAT、CANopen、Modbus

#### Main Stream High Speed Fieldbus

EtherCAT、CANOpen、Modbus



## 高速 I/O 端口    隔离 I/O 端口 ( 选配 )

4 路模拟输入	3 路模拟输入
2 路模拟输出	2 路模拟输出
8 路数字输入	8 路数字输入
4 路数字输出	2 路数字输出

## High Speed I/O    Insulated I/O (Optional)

4 Analog Inputs	3 Analog Inputs
2 Analog Outputs	2 Analog Outputs
8 Digital Inputs	8 Digital Inputs
4 Digital Outputs	2 Digital Outputs

## 丰富的位置传感器支持

正余弦编码器  
Endat 编码器  
增量编码器  
旋转变压器  
Hiperface 编码器  
Nikon 编码器  
Tamagawa 编码器

## Various Position Sensor Support

Sincos Encoder  
Endat Encoder  
Incremental Encoder with Hall  
Resolver  
Hiperface Encoder  
Nikon Encoder  
Tamagawa Encoder

## 齐全的 PC 软件

在线配置软件: Cockpit 3  
集成开发环境: LogicLab  
软件示波器: Softscope  
支持中英意三国语言

## Complete PC Software

Online configure and debug software: Cockpit 3  
Integrated development environment: LogicLab  
Software oscilloscope: Softscope  
Multi-language support: English, Chinese and Italian

## 灵活安装

支持柜内安装、穿墙安装和冷却板安装, 可使用内置风冷和外置水冷

## Flexible Installation

Support wall mounting, feed-through mounting and cold plate mounting, can use internal air cooling and external water cooling



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# Order Code 订货代码

AxN                      110.250    .4                      C0    0    0                      F                      00    00

输出电流：  
09.30, 16.30, 15.30, 22.44, 35.70,  
50.100, 70.140, 90.150, 110.200,  
110.250, 150.300, 200.400  
例：  
110.250  额定 110A / 峰值 250A

Output Current：  
09.30, 16.30, 15.30, 22.44, 35.70, 50.100,  
70.140, 90.150 110.200, 110.250, 150.300,  
200.400  
Example:  
110.250  Rated 110A / Peak 250A

主电源电压类型：  
150~380Vac  三相

Main Supply Voltage Type:  
150~380Vac  Three-Phase

处理器和通讯端口：  
F0: 120MIPS  $\mu$ C + EtherCAT 通讯端口  
C0: 80MIPS  $\mu$ C + 无 EtherCAT 通讯端口

Processor and Communication Port:  
F0: 120MIPS  $\mu$ C + EtherCAT Communication Port  
C0: 80MIPS  $\mu$ C + No EtherCAT Communication Port

制动单元：  
0: 内置

Brake Module:  
0: Built-in

客户自定义：  
00: 客户自定义要求预留

Customer Defined:  
00: Customer Defined  
Requirement Reservation

应用：  
00: 标准应用程序

Application:  
00: Standard Applications

散热：  
F: 风扇散热  
W: 水冷  
H: 油冷

Dissipate Heat:  
F: Fan Cooling  
W: Water Cooling  
H: Oil Cooling

I/O 端口：  
0: 标准 I/O 端口  
I: 标准 I/O 端口 + 扩展的隔离 I/O 端口

I/O port:  
0: Standard I / O ports  
I: Standard I / O Ports + Expansion Isolated I / O Ports

## 代码示例：

AxN 110.250.4C000F0000

额定输出电流 110A, 峰值输出电流 250A, 三相 400V 交流供电, 80MIPS  $\mu$ C 处理器, 去除 EtherCAT 端口, 完整制动单元以及标准 I/O 端口, 风扇冷却, 搭载标准应用程序, 无客户自定义要求。

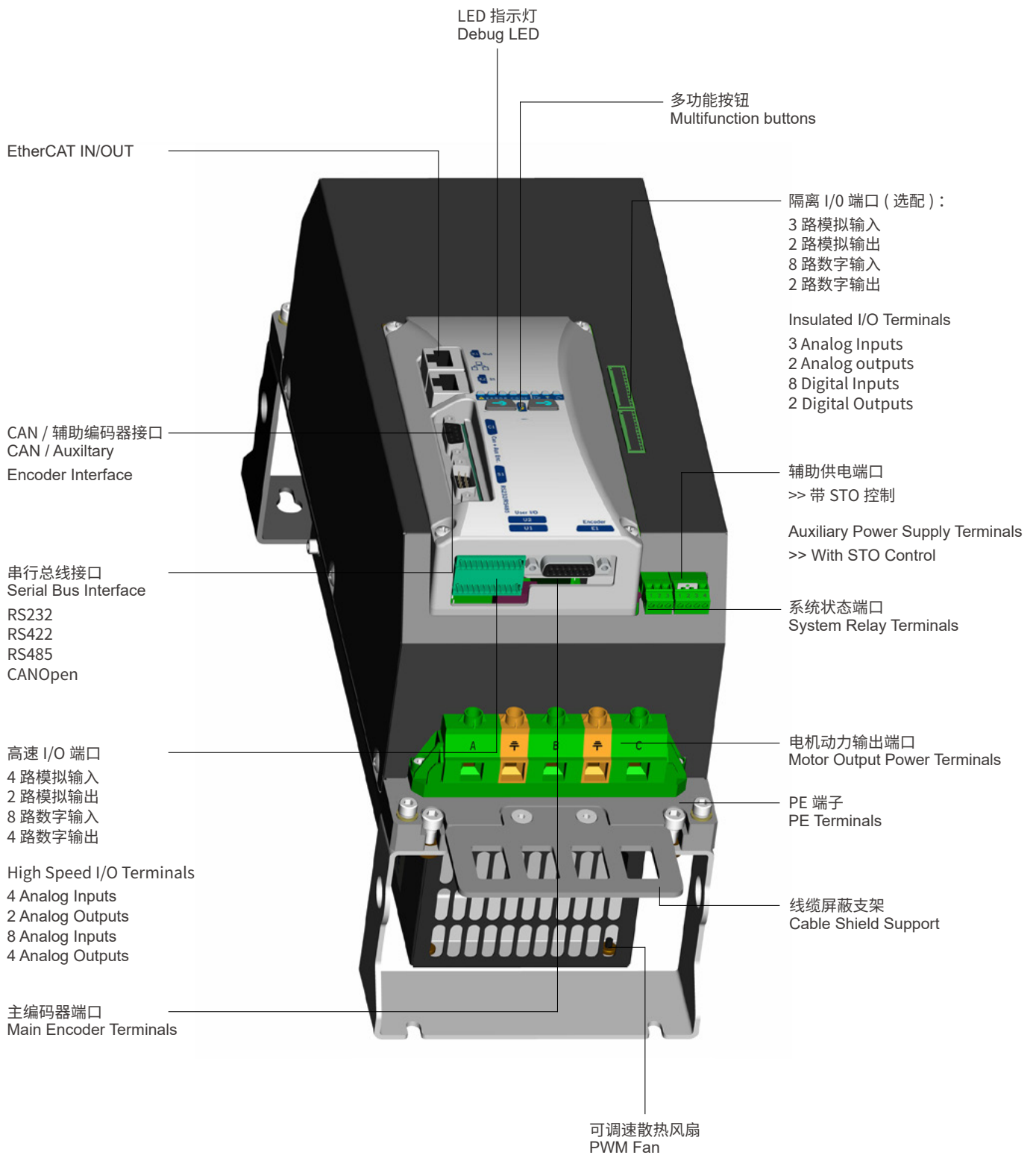
## Example Code:

AxN 110.250.4C000F0000

Rated output current 110A, peak current 250A, input voltage 400Vac, CPU 80MIPs  $\mu$ C, remove EtherCAT port, complete brake unit and standard I/O ports, fan cooled, standard application program, no customized requirements.

# Hardware Connections

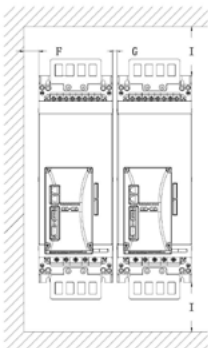
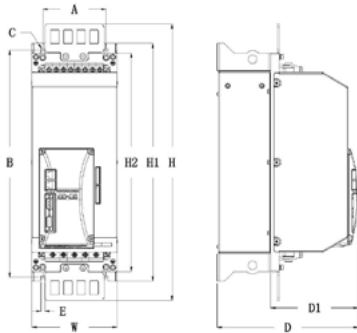
## 硬件接口展示



		Size1		Size2	Size3			Size4	Size5			Size6	
		09.20.4	16.30.4	15.30.4	22.44.4	35.70.4	50.100.4	70.140.4	90.150.4	110.200.4	110.250.4	150.300.4	200.400.4
额定输出电流 Rated Current Output		09A	16A	15A	22A	35A	50A	70A	90A	110A	110A	150A	200A
峰值输出电流 Peak Current Output		20A	30A	30A	44A	70A	100A	140A	150A	200A	250A	300A	400A
主电源 Main Power Supply		交流 三相 150 ~ 500Vac, 50/60Hz 150 ~ 500 Vac Three Phase											
		直流 0 ~ 800 Vdc											
辅助电源 Auxiliary Power Supply		电压 24V ± 15%											
		2A		2A		3A			6A		8A		8A
制动单元 Brake Module		内置 Built-in											
内部制动电阻 (阻值 / 功率) Internal Brake Resistor		30Ω/30W	18Ω/30W	18Ω/30W	12Ω/60W	7Ω/60W	5Ω/60W	3.5Ω/60W	3.5Ω/150W	3Ω/150W	3Ω/150W	3Ω/150W	-
外部制动电阻 (最小 / 最大值) External Brake Resistor (Min/Max)		19Ω/30Ω	18Ω/18.4Ω	18Ω/18.4Ω	9Ω/13.8Ω	6Ω/7.9Ω	4.5Ω/5.5Ω	2.1Ω/4Ω	2Ω/3.7Ω	2Ω/2.7Ω	2Ω/2.1Ω	2Ω/2.1Ω	1.6Ω/2.7Ω
通讯总线支持 Fieldbus Support		CANOpen, EtherCAT, Modbus											
位置传感器支持 Position Sensor Support		正弦弦编码器 (SinCos)、EnDat 编码器、增量编码器 (Incremental)、旋转变压器和 Hiperface 编码器 SinCos Encoder, EnDat Encoder, Digital Incremental with Hall, Resolver and Hiperface Encoder											
功能安全 Functional safety		STO: 安全转矩关断 符合 SIL3 IEC EN 61800-5-2:2016 STO: Safe Torque Off Complies with SILL3 IEC EN 61800-5-2:2016											
配置软件 Management Software		Physis Tools Suite											

## Dimensions

### 外形尺寸



		Size1		Size2	Size3			Size4	Size5			Size6	
		09.20.4	16.30.4	15.30.4	22.44.4	35.70.4	50.100.4	70.140.4	90.150.4	110.200.4	110.250.4	150.300.4	200.400.4
重量 Weight		2.5kg	6.9kg	6.9kg	8.8kg			13.1kg	26.8kg			30kg	
H		201.8		488			488		725			612	
W		96	96	150			200		286			350	
D		164.8		249						242.2			
H1		-		420			420		652			590	
H2		-		386			386		612			550	
D1		-		155						145			
A		66	60	111.6			158.6		210			310	
B		191		401			401		628			566	
C		5.5	5.5	6.5			6.5		8.5			8.5	
E		5.5	5.5	6.5			6.5		8.5			8.5	
F		≥30											
G		≥10											
I		≥100											

备注: 所有尺寸的单位均为毫米 (mm)  
Note: All dimensions are in millimeters (mm)



# AxN Size 1

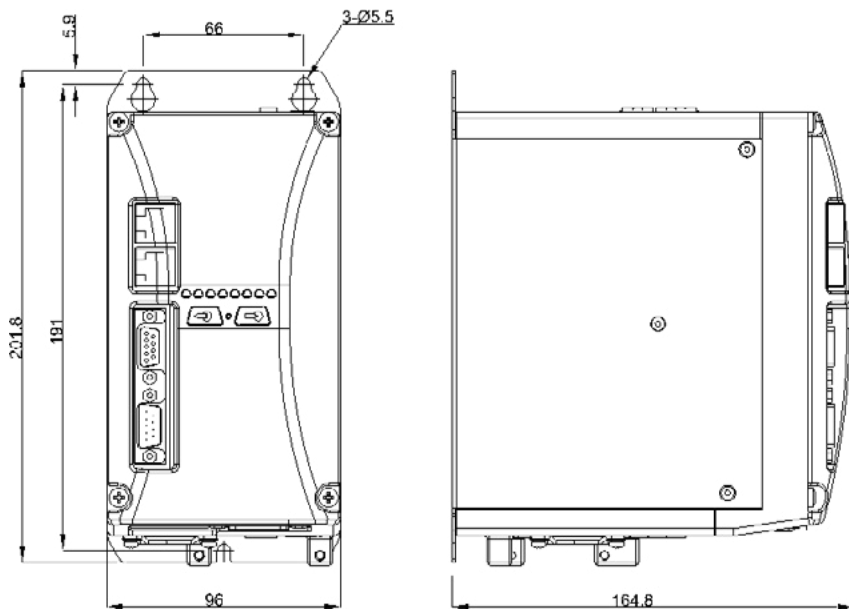
技术参数 Technical Specifications	符号 Symbol	AxN 09.20.4	AxN 16.30.4	单位 Units
主电源供电电压 Power Supply Voltage	$V_{in}$	150 ~ 500		Vac
		0 ~ 800		Vdc
辅助电源供电电压 Auxiliary Supply Voltage	$V_{aux}$	24V ± 15% / 2A	24V ± 15% / 3A	Vdc
输出频率 Output Frequency	f	0 ~ 1200		Hz
额定输出电流, $S1^{(1)}$ Current Output, $S1^{(1)}$	$I_n$	9	16	Arms
峰值输出电流 <sup>(1)</sup> Peak Current <sup>(1)</sup>	$I_p$	20	30	Arms
总功率损耗 <sup>(2)</sup> Power Losses Total <sup>(2)</sup>	$P_l$	200	200	W
最大输出电压 Maximum Output Voltage	$V_{out}$	$V_{in} \times 0.95$		Vac
PWM 频率 <sup>(3)</sup> PWM Frequency <sup>(3)</sup>	$f_{PWM}$	4 / 8 / 16		kHz
额定输出功率时的效率 <sup>(1)</sup> Efficiency at Nominal Power <sup>(1)</sup>	---	97.9	97.9	%
输入波形因数 (满负载) Input form Factor(Full Load)	---	0.9		Vac
最大制动电流 Maximum Braking Current	---	100% 峰值电流 ( $I_p$ ) 100% of $I_p$ (Peak Current)		---
散热 Cooling	---	40 x 40 x 20 风扇 x1 1 fan 40 x 40 x 20		---
风扇流量 Flow Rate	---	25.2		m <sup>3</sup> / hour
尺寸 (HxDxW) Dimensions (HxDxW)	---	201.8 x 164.8 x 96		mm

<sup>(1)</sup> $V_{in}=380Vac$ ,  $V_{out}=V_{in} \times 0.95$ , 环境温度为 40°C, PWM 控制频率为 8kHz; /  $V_{in}=380Vac$ ,  $V_{out}=V_{in} \times 0.95$ ,  $T_{amb}=40^{\circ}C$ , Comm.Freq.8kHz;

<sup>(2)</sup> 包含输入整流部分的损耗; / Including input rectifier losses;

<sup>(3)</sup> 为了使输出电流保持在额定, 电机零速时 PWM 频率会自动降低。 / PWM frequency will automatically decrease at zero speed, in order to keep nominal current output.

## 外形尺寸 Overall Dimensions



## 电机位置反馈选项 Motor Feedback Options

主编码器 (500kHz) Main Encoder (500kHz)	5 通道正弦编码器 (SinCos encoder), 2 个绝对值通道、2 个增量通道和 1 个零位通道 SinCos encoder 5 channels (2 absolute analog tracks/2 incremental analog tracks/index)
	增量编码器 (Incremental encoder), 1Vpp 或长线驱动 Incremental encoder (1 Vpp or Different Line Driver)
	无传感器模式 (无电机位置反馈信号) Sensorless algorithm (w/o feedback)
	EnDat 系列编码器, 支持 EnDat 1.0 - 2.2 协议 (系统默认编码器) EnDat serial encoder 1.0 to 2.2 (default)
	旋转变压器 Resolver
辅助编码器 Secondary Encoder	Hiperface 系列编码器 Hiperface encoder
	无换向信号通道的数字增量编码器 (500kHz) Incremental digital encoder without commutation tracks (500kHz)
	EnDat 系列编码器 EnDat serial encoder

## 可编程信号输入 Programmable Inputs Signals

2 路差分 / 4 路单端模拟信号输入 2 differential / 4 single ended analog inputs	$\pm 10V$ (1mV) / $R_{in} = 10k\Omega$
8 路数字信号输入 8 digital inputs	20 - 30V / 对地 $R_{in} = 6.6k\Omega$ 20 - 30V / $R_{in} = 6.6k\Omega$ to GND
2 路隔离的模拟信号输入 (选配) 2 insulated analog inputs (optional)	$\pm 10V$ (1mV)
8 路隔离的数字信号输入 (选配) 8 insulated analog inputs (optional)	5mA, 最大电压 24Vdc 5mA, 24Vdc max

## 可编程信号输出 Programmable Outputs Signals

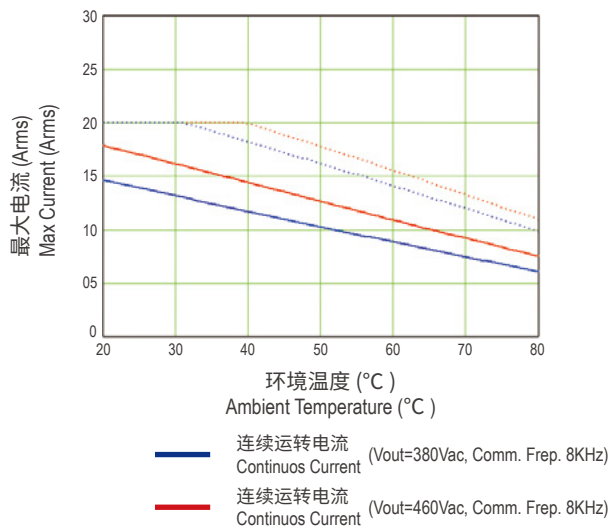
2 路模拟信号输出 2 analog outputs	0-10V (1mV) FS (30mA)
4 路数字信号输出 4 digital outputs	PNP 集电极开路 24V (100mA) PNP open collector 24V (100mA)
1 路继电器输出 1 watch dog relay	2A / 30Vdc, 0.25A / 250Vac 常开 (N.O.) / 常闭 (N.C.) 针脚 2A / 30Vdc, 0.25A / 250Vac, NO/NC contacts
2 路隔离的模拟信号输出 (选配) 2 insulated analog outputs (optional)	$\pm 10V$ (1mV) FS (30mA)
2 路隔离的数字信号输出 (选配) 2 insulated digital outputs (optional)	开关量, 9-28V / 2A On.off switch, 9-28V / 2A

## 硬件配置 Hardware Configuration

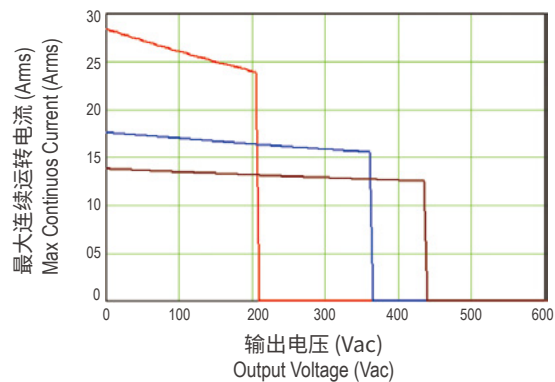
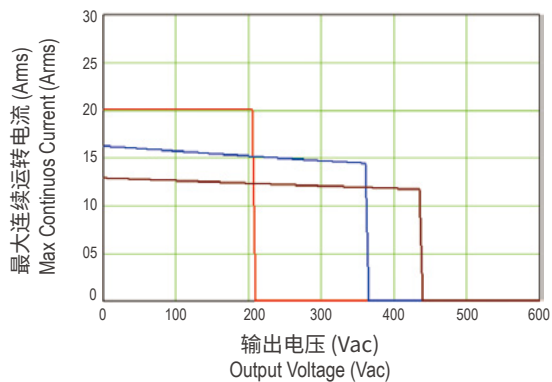
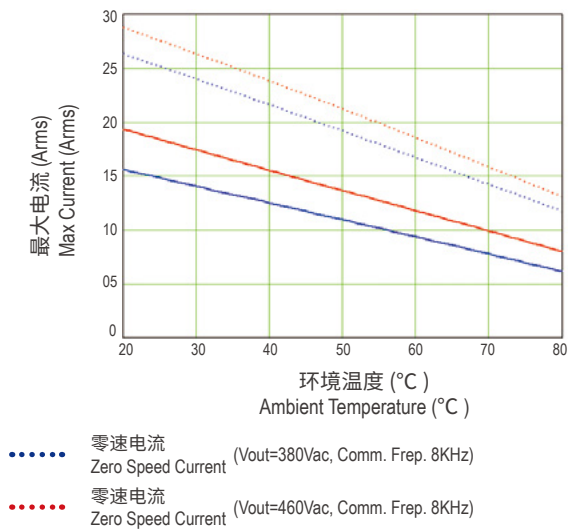
处理器 Processor Speed	80MIPS $\mu$ C + FPGA / 120MIPS $\mu$ C + FPGA 增强版 80MIPS $\mu$ C + FPGA / 120MIPS $\mu$ C + FPGA Extreme Version	可选 Optional
工作频率 Task Frequency	电流环采样频率 Current / drive monitoring	1MHz
	位置环 / 速度环频率 Position / speed loop	8kHz
	PLC 快速任务扫描频率 PLC fast task	8kHz
	PLC 慢速任务扫描频率 PLC slow task	15.625Hz to 1 kHz (可配置) 15.625 Hz to 1 kHz (user-programmable)
位置模式可用 Position Loop Mode Available	目标位置寄存器位宽 Target position register	32 or 64 bits
	全数字 Id / Iq 控制 Full digital control Id/Iq	最高可达 16kHz updated 16 kHz

# 驱动器运行区间 Drive Operational Area

## AxN 09.20.4



## AxN 16.60.4



# AxN Size 2

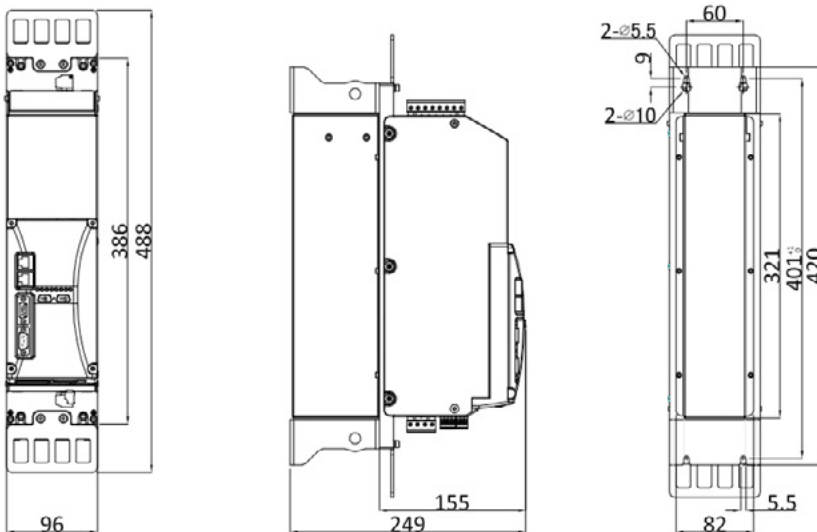
技术参数 Technical Specifications	符号 Symbol	AxN 15.30.4	单位 Units
主电源供电电压 Power Supply Voltage	$V_{in}$	150 ~ 500	Vac
		0 ~ 800	Vdc
辅助电源供电电压 Auxiliary Supply Voltage	$V_{aux}$	24V $\pm$ 15% / 2A	Vdc
输出频率 Output Frequency	f	0 ~ 1200	Hz
额定输出电流, $S1^{(1)}$ Current Output, $S1^{(1)}$	$I_n$	15	Arms
峰值输出电流 <sup>(1)</sup> Peak Current <sup>(1)</sup>	$I_p$	30	Arms
总功率损耗 <sup>(2)</sup> Power Losses Total <sup>(2)</sup>	$P_l$	200	W
最大输出电压 Maximum Output Voltage	$V_{out}$	$V_{in} \times 0.95$	Vac
PWM 频率 <sup>(3)</sup> PWM Frequency <sup>(3)</sup>	$f_{pwm}$	4 / 8 / 16	kHz
额定输出功率时的效率 <sup>(1)</sup> Efficiency at Nominal Power <sup>(1)</sup>	---	97.9	%
输入波形因数 (满负载) Input form Factor(Full Load)	---	0.9	Vac
最大制动电流 Maximum Braking Current	---	100% 峰值电流 ( $I_p$ ) 100% of $I_p$ (Peak Current)	---
散热 Cooling	---	60 x 60 x32 风扇 x1 1 fan 60 x 60 x32	---
风扇流量 Flow Rate	---	70	m <sup>3</sup> / hour
尺寸 (HxDxW) Dimensions (HxDxW)	---	420 x 249 x 96	mm

<sup>(1)</sup>  $V_{in}=380Vac$ ,  $V_{out}=V_{in} \times 0.95$ , 环境温度为 40°C, PWM 控制频率为 8kHz; /  $V_{in}=380Vac$ ,  $V_{out}=V_{in} \times 0.95$ ,  $T_{amb}=40^\circ C$ , Comm.Freq.8kHz;

<sup>(2)</sup> 包含输入整流部分的损耗; / Including input rectifier losses;

<sup>(3)</sup> 为了使输出电流保持在额定, 电机零速时 PWM 频率会自动降低。 / PWM frequency will automatically decrease at zero speed, in order to keep nominal current output.

## 外形尺寸 Overall Dimensions



## 电机位置反馈选项 Motor Feedback Options

主编码器 (500kHz) Main Encoder (500kHz)	5 通道正弦编码器 (SinCos encoder), 2 个绝对值通道、2 个增量通道和 1 个零位通道 SinCos encoder 5 channels (2 absolute analog tracks/2 incremental analog tracks/index)
	增量编码器 (Incremental encoder), 1Vpp 或长线驱动 Incremental encoder (1 Vpp or Different Line Driver)
	无传感器模式 (无电机位置反馈信号) Sensorless algorithm (w/o feedback)
	EnDat 系列编码器, 支持 EnDat 1.0 - 2.2 协议 (系统默认编码器) EnDat serial encoder 1.0 to 2.2 (default)
	旋转变压器 Resolver
辅助编码器 Secondary Encoder	Hiperface 系列编码器 Hiperface encoder
	无换向信号通道的数字增量编码器 (500kHz) Incremental digital encoder without commutation tracks (500kHz)
	EnDat 系列编码器 EnDat serial encoder

## 可编程信号输入 Programmable Inputs Signals

2 路差分 / 4 路单端模拟信号输入 2 differential / 4 single ended analog inputs	$\pm 10V$ (1mV) / $R_{in} = 10k\Omega$
8 路数字信号输入 8 digital inputs	20 - 30V / 对地 $R_{in} = 6.6k\Omega$ 20 - 30V / $R_{in} = 6.6k\Omega$ to GND
2 路隔离的模拟信号输入 (选配) 2 insulated analog inputs (optional)	$\pm 10V$ (1mV)
8 路隔离的数字信号输入 (选配) 8 insulated analog inputs (optional)	5mA, 最大电压 24Vdc 5mA, 24Vdc max

## 可编程信号输出 Programmable Outputs Signals

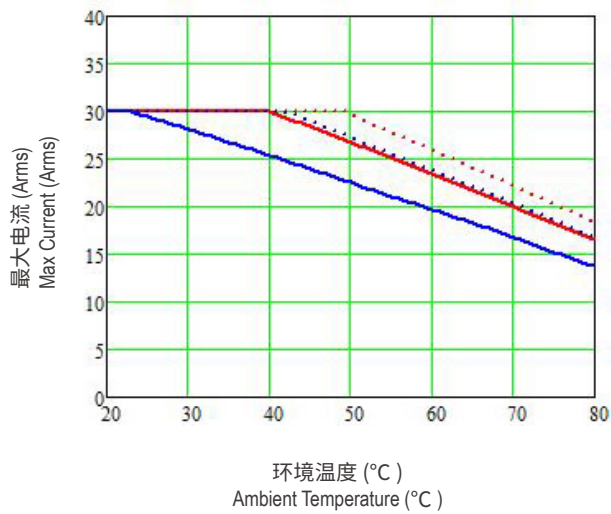
2 路模拟信号输出 2 analog outputs	0-10V (1mV) FS (30mA)
4 路数字信号输出 4 digital outputs	PNP 集电极开路 24V (100mA) PNP open collector 24V (100mA)
1 路继电器输出 1 watch dog relay	2A / 30Vdc, 0.25A / 250Vac 常开 (N.O.) / 常闭 (N.C.) 针脚 2A / 30Vdc, 0.25A / 250Vac, NO/NC contacts
2 路隔离的模拟信号输出 (选配) 2 insulated analog outputs (optional)	$\pm 10V$ (1mV) FS (30mA)
2 路隔离的数字信号输出 (选配) 2 insulated digital outputs (optional)	开关量, 9-28V / 2A On.off switch, 9-28V / 2A

## 硬件配置 Hardware Configuration

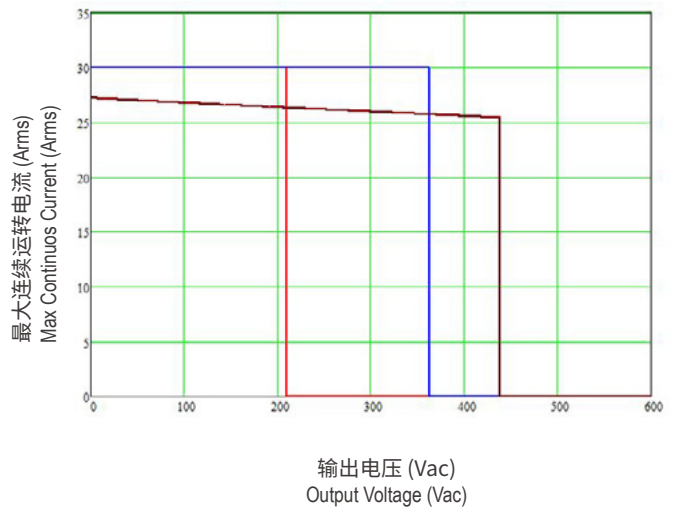
处理器 Processor Speed	80MIPS $\mu$ C + FPGA / 120MIPS $\mu$ C + FPGA 增强版 80MIPS $\mu$ C + FPGA / 120MIPS $\mu$ C + FPGA Extreme Version	可选 Optional
工作频率 Task Frequency	电流环采样频率 Current / drive monitoring	1MHz
	位置环 / 速度环频率 Position / speed loop	8kHz
	PLC 快速任务扫描频率 PLC fast task	8kHz
	PLC 慢速任务扫描频率 PLC slow task	15.625Hz to 1 kHz (可配置) 15.625 Hz to 1 kHz (user-programmable)
位置模式可用 Position Loop Mode Available	目标位置寄存器位宽 Target position register	32 or 64 bits
	全数字 Id / Iq 控制 Full digital control Id/Iq	最高可达 16kHz updated 16 kHz

驱动器运行区间  
Drive Operational Area

AxN 15.30.4



- 连续运转电流 (Vout=380Vac, Comm. Freq. 8KHz)  
Continuos Current (Vout=380Vac, Comm. Freq. 8KHz)
- 连续运转电流 (Vout=460Vac, Comm. Freq. 8KHz)  
Continuos Current (Vout=460Vac, Comm. Freq. 8KHz)
- ..... 零速电流 (Vout=380Vac, Comm. Freq. 8KHz)  
Zero Speed Current (Vout=380Vac, Comm. Freq. 8KHz)
- ..... 零速电流 (Vout=460Vac, Comm. Freq. 8KHz)  
Zero Speed Current (Vout=460Vac, Comm. Freq. 8KHz)



- 连续运转电流 (Vout=220Vac, Comm. Freq. 8KHz)  
Continuos Current (Vout=220Vac, Comm. Freq. 8KHz)
- 连续运转电流 (Vout=380Vac, Comm. Freq. 8KHz)  
Continuos Current (Vout=380Vac, Comm. Freq. 8KHz)
- ..... 连续运转电流 (Vout=460Vac, Comm. Freq. 8KHz)  
Continuos Current (Vout=460Vac, Comm. Freq. 8KHz)





# AxN Size 3

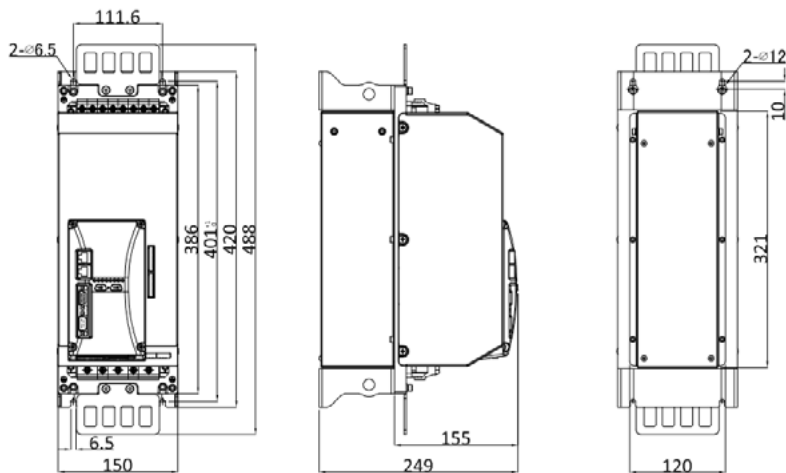
技术参数 Technical Specifications	符号 Symbol	AxN 22.44.4	AxN 35.70.4	AxN 50.100.4	单位 Units
主电源供电电压 Power Supply Voltage	$V_{in}$	150 ~ 500			Vac
		0 ~ 800			Vdc
辅助电源供电电压 Auxiliary Supply Voltage	$V_{aux}$	24V $\pm$ 15% / 3A			Vdc
输出频率 Output Frequency	f	0 ~ 1200			Hz
额定输出电流, $S1^{(1)}$ Current Output, $S1^{(1)}$	$I_n$	22	35	50	Arms
峰值输出电流 <sup>(1)</sup> Peak Current <sup>(1)</sup>	$I_p$	44	70	100	Arms
总功率损耗 <sup>(2)</sup> Power Losses Total <sup>(2)</sup>	$P_l$	280	400	590	W
最大输出电压 Maximum Output Voltage	$V_{out}$	$V_{in} \times 0.95$			Vac
PWM 频率 <sup>(3)</sup> PWM Frequency <sup>(3)</sup>	$f_{PWM}$	4 / 8 / 16			kHz
额定输出功率时的效率 <sup>(1)</sup> Efficiency at Nominal Power <sup>(1)</sup>	---	98	98.2	98.1	%
输入波形因数 (满负载) Input form Factor(Full Load)	---	0.9			Vac
最大制动电流 Maximum Braking Current	---	100% 峰值电流 ( $I_p$ ) 100% of $I_p$ (Peak Current)			---
散热 Cooling	---	80 x 80 x38 可调速风扇 x1 1 PWM fan 80 x 80 x38			---
风扇流量 Flow Rate	---	136			m <sup>3</sup> / hour
尺寸 (HxDxW) Dimensions (HxDxW)	---	488 x 249 x 150			mm

<sup>(1)</sup> $V_{in}=380Vac$ ,  $V_{out}=V_{in} \times 0.95$ , 环境温度为 40°C, PWM 控制频率为 8kHz; /  $V_{in}=380Vac$ ,  $V_{out}=V_{in} \times 0.95$ ,  $T_{amb}=40^\circ C$ , Comm.Freq.8kHz;

<sup>(2)</sup> 包含输入整流部分的损耗; / Including input rectifier losses;

<sup>(3)</sup> 为了使输出电流保持在额定, 电机零速时 PWM 频率会自动降低。/ PWM frequency will automatically decrease at zero speed, in order to keep nominal current output.

## 外形尺寸 Overall Dimensions



## 电机位置反馈选项 Motor Feedback Options

主编码器 (500kHz) Main Encoder (500kHz)	5 通道正弦编码器 (SinCos encoder), 2 个绝对值通道、2 个增量通道和 1 个零位通道 SinCos encoder 5 channels (2 absolute analog tracks/2 incremental analog tracks/index)
	增量编码器 (Incremental encoder), 1Vpp 或长线驱动 Incremental encoder (1 Vpp or Different Line Driver)
	无传感器模式 (无电机位置反馈信号) Sensorless algorithm (w/o feedback)
	EnDat 系列编码器, 支持 EnDat 1.0 - 2.2 协议 (系统默认编码器) EnDat serial encoder 1.0 to 2.2 (default)
	旋转变压器 Resolver
	Hiperface 系列编码器 Hiperface encoder
辅助编码器 Secondary Encoder	无换向信号通道的数字增量编码器 (500kHz) Incremental digital encoder without commutation tracks (500kHz)
	EnDat 系列编码器 EnDat serial encoder

## 可编程信号输入 Programmable Inputs Signals

2 路差分 / 4 路单端模拟信号输入 2 differential / 4 single ended analog inputs	$\pm 10V$ (1mV) / $R_{in} = 10k\Omega$
8 路数字信号输入 8 digital inputs	20 - 30V / 对地 $R_{in} = 6.6k\Omega$ 20 - 30V / $R_{in} = 6.6k\Omega$ to GND
2 路隔离的模拟信号输入 (选配) 2 insulated analog inputs (optional)	$\pm 10V$ (1mV)
8 路隔离的数字信号输入 (选配) 8 insulated analog inputs (optional)	5mA, 最大电压 24Vdc 5mA, 24Vdc max

## 可编程信号输出 Programmable Outputs Signals

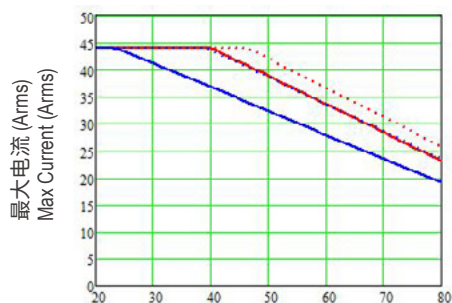
2 路模拟信号输出 2 analog outputs	0-10V (1mV) FS (30mA)
4 路数字信号输出 4 digital outputs	PNP 集电极开路 24V (100mA) PNP open collector 24V (100mA)
1 路继电器输出 1 watch dog relay	2A / 30Vdc, 0.25A / 250Vac 常开 (N.O.) / 常闭 (N.C.) 针脚 2A / 30Vdc, 0.25A / 250Vac, NO/NC contacts
2 路隔离的模拟信号输出 (选配) 2 insulated analog outputs (optional)	$\pm 10V$ (1mV) FS (30mA)
2 路隔离的数字信号输出 (选配) 2 insulated digital outputs (optional)	开关量, 9-28V / 2A On.off switch, 9-28V / 2A

## 硬件配置 Hardware Configuration

处理器 Processor Speed	80MIPS $\mu$ C + FPGA / 120MIPS $\mu$ C + FPGA 增强版 80MIPS $\mu$ C + FPGA / 120MIPS $\mu$ C + FPGA Extreme Version	可选 Optional
工作频率 Task Frequency	电流环采样频率 Current / drive monitoring	1MHz
	位置环 / 速度环频率 Position / speed loop	8kHz
	PLC 快速任务扫描频率 PLC fast task	8kHz
	PLC 慢速任务扫描频率 PLC slow task	15.625Hz to 1 kHz (可配置) 15.625 Hz to 1 kHz (user-programmable)
位置模式可用 Position Loop Mode Available	目标位置寄存器位宽 Target position register	32 or 64 bits
	全数字 Id / Iq 控制 Full digital control Id/Iq	最高可达 16kHz updated 16 kHz

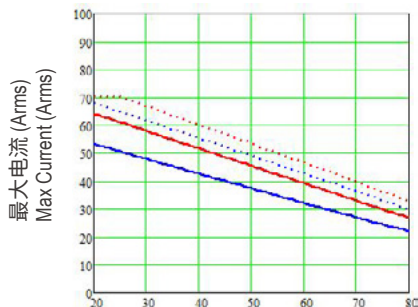
# 驱动器运行区间 Drive Operational Area

AxN 22.44.4



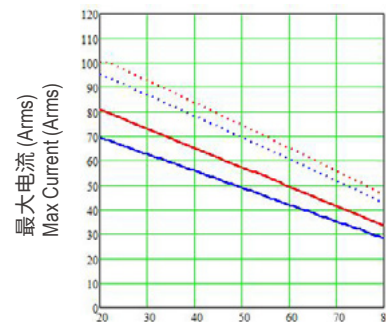
环境温度 (°C)  
Ambient Temperature (°C)

AxN 35.70.4



环境温度 (°C)  
Ambient Temperature (°C)

AxN 50.100.4



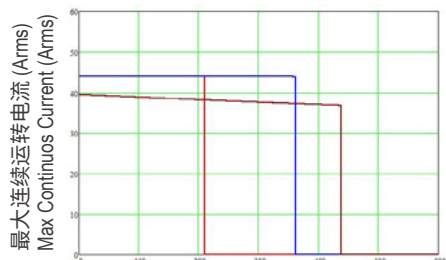
环境温度 (°C)  
Ambient Temperature (°C)

— 连续运转电流 (Vout=380Vac, Comm. Freq. 8KHz)  
Continuos Current

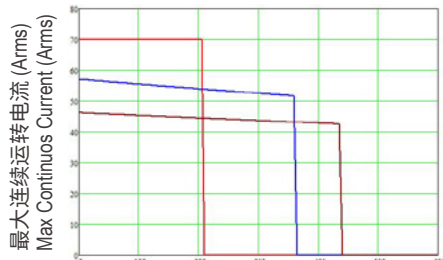
— 连续运转电流 (Vout=460Vac, Comm. Freq. 8KHz)  
Continuos Current

..... 零速电流 (Vout=380Vac, Comm. Freq. 8KHz)  
Zero Speed Current

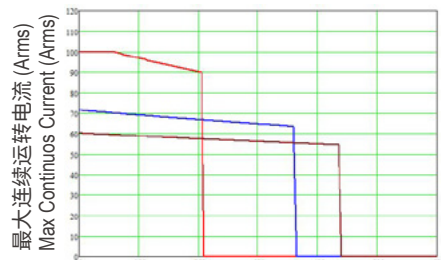
..... 零速电流 (Vout=460Vac, Comm. Freq. 8KHz)  
Zero Speed Current



输出电压 (Vac)  
Output Voltage (Vac)



输出电压 (Vac)  
Output Voltage (Vac)



输出电压 (Vac)  
Output Voltage (Vac)

— 连续运转电流 (Vout=220Vac, Comm. Freq. 8KHz)  
Continuos Current

— 连续运转电流 (Vout=380Vac, Comm. Freq. 8KHz)  
Continuos Current

— 连续运转电流 (Vout=460Vac, Comm. Freq. 8KHz)  
Continuos Current



# AxN Size 4

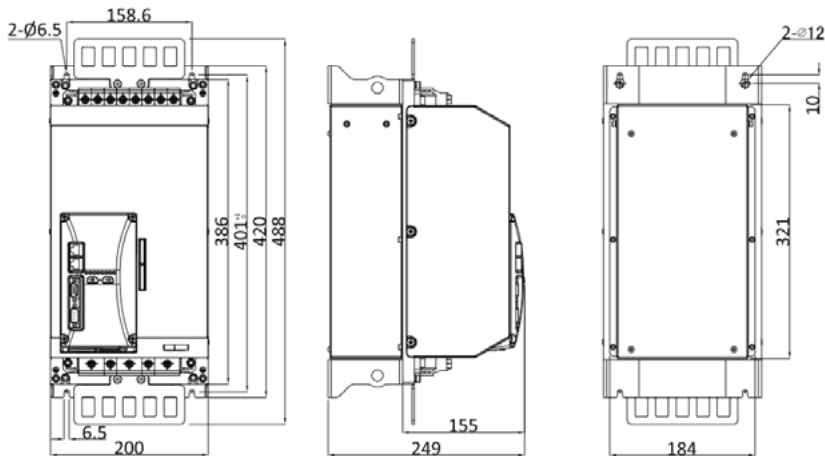
技术参数 Technical Specifications	符号 Symbol	AxN 70.140.4	单位 Units
主电源供电电压 Power Supply Voltage	$V_{in}$	150 ~ 500	Vac
		0 ~ 800	Vdc
辅助电源供电电压 Auxiliary Supply Voltage	$V_{aux}$	24V $\pm$ 15% / 2A	Vdc
输出频率 Output Frequency	f	0 ~ 1200	Hz
额定输出电流, $S1^{(1)}$ Current Output, $S1^{(1)}$	$I_n$	70	Arms
峰值输出电流 <sup>(1)</sup> Peak Current <sup>(1)</sup>	$I_p$	140	Arms
总功率损耗 <sup>(2)</sup> Power Losses Total <sup>(2)</sup>	$P_l$	870	W
最大输出电压 Maximum Output Voltage	$V_{out}$	$V_{in} \times 0.95$	Vac
PWM 频率 <sup>(3)</sup> PWM Frequency <sup>(3)</sup>	$f_{pwm}$	4 / 8 / 16	kHz
额定输出功率时的效率 <sup>(1)</sup> Efficiency at Nominal Power <sup>(1)</sup>	---	98.1	%
输入波形因数 (满负载) Input form Factor(Full Load)	---	0.9	Vac
最大制动电流 Maximum Braking Current	---	100% 峰值电流 ( $I_p$ ) 100% of $I_p$ (Peak Current)	---
散热 Cooling	---	80 x 80 x38 可调速风扇 x2 2 PWM fan 80 x 80 x38	---
风扇流量 Flow Rate	---	110 x2	m <sup>3</sup> / hour
尺寸 (HxDxW) Dimensions (HxDxW)	---	420 x 249 x 200	mm

<sup>(1)</sup> $V_{in}=380Vac$ ,  $V_{out}=V_{in} \times 0.95$ , 环境温度为 40°C, PWM 控制频率为 8kHz; /  $V_{in}=380Vac$ ,  $V_{out}=V_{in} \times 0.95$ ,  $T_{amb}=40^\circ C$ , Comm.Freq.8kHz;

<sup>(2)</sup> 包含输入整流部分的损耗; / Including input rectifier losses;

<sup>(3)</sup> 为了使输出电流保持在额定, 电机零速时 PWM 频率会自动降低。 / PWM frequency will aytomatically decrease at zero speed, in order to keep nominal current output.

## 外形尺寸 Overall Dimensions



## 电机位置反馈选项 Motor Feedback Options

主编码器 (500kHz) Main Encoder (500kHz)	5 通道正弦编码器 (SinCos encoder), 2 个绝对值通道、2 个增量通道和 1 个零位通道 SinCos encoder 5 channels (2 absolute analog tracks/2 incremental analog tracks/index)
	增量编码器 (Incremental encoder), 1Vpp 或长线驱动 Incremental encoder (1 Vpp or Different Line Driver)
	无传感器模式 (无电机位置反馈信号) Sensorless algorithm (w/o feedback)
	EnDat 系列编码器, 支持 EnDat 1.0 - 2.2 协议 (系统默认编码器) EnDat serial encoder 1.0 to 2.2 (default)
	旋转变压器 Resolver
	Hiperface 系列编码器 Hiperface encoder
辅助编码器 Secondary Encoder	无换向信号通道的数字增量编码器 (500kHz) Incremental digital encoder without commutation tracks (500kHz)
	EnDat 系列编码器 EnDat serial encoder

## 可编程信号输入 Programmable Inputs Signals

2 路差分 / 4 路单端模拟信号输入 2 differential / 4 single ended analog inputs	$\pm 10V$ (1mV) / $R_{in} = 10k\Omega$
8 路数字信号输入 8 digital inputs	20 - 30V / 对地 $R_{in} = 6.6k\Omega$ 20 - 30V / $R_{in} = 6.6k\Omega$ to GND
2 路隔离的模拟信号输入 (选配) 2 insulated analog inputs (optional)	$\pm 10V$ (1mV)
8 路隔离的数字信号输入 (选配) 8 insulated analog inputs (optional)	5mA, 最大电压 24Vdc 5mA, 24Vdc max

## 可编程信号输出 Programmable Outputs Signals

2 路模拟信号输出 2 analog outputs	0-10V (1mV) FS (30mA)
4 路数字信号输出 4 digital outputs	PNP 集电极开路 24V (100mA) PNP open collector 24V (100mA)
1 路继电器输出 1 watch dog relay	2A / 30Vdc, 0.25A / 250Vac 常开 (N.O.) / 常闭 (N.C.) 针脚 2A / 30Vdc, 0.25A / 250Vac, NO/NC contacts
2 路隔离的模拟信号输出 (选配) 2 insulated analog outputs (optional)	$\pm 10V$ (1mV) FS (30mA)
2 路隔离的数字信号输出 (选配) 2 insulated digital outputs (optional)	开关量, 9-28V / 2A On.off switch, 9-28V / 2A

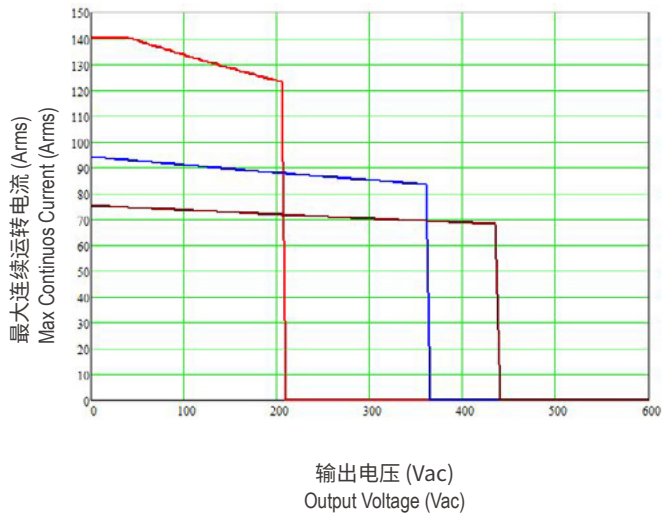
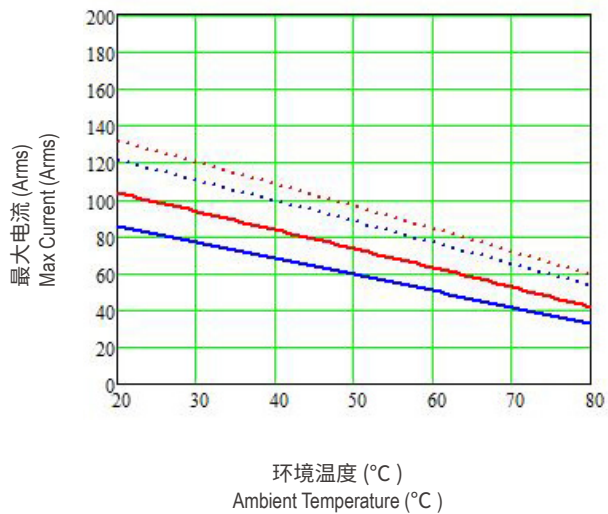
## 硬件配置 Hardware Configuration

处理器 Processor Speed	80MIPS $\mu$ C + FPGA / 120MIPS $\mu$ C + FPGA 增强版 80MIPS $\mu$ C + FPGA / 120MIPS $\mu$ C + FPGA Extreme Version	可选 Optional
工作频率 Task Frequency	电流环采样频率 Current / drive monitoring	1MHz
	位置环 / 速度环频率 Position / speed loop	8kHz
	PLC 快速任务扫描频率 PLC fast task	8kHz
	PLC 慢速任务扫描频率 PLC slow task	15.625Hz to 1 kHz (可配置) 15.625 Hz to 1 kHz (user-programmable)
位置模式可用 Position Loop Mode Available	目标位置寄存器位宽 Target position register	32 or 64 bits
	全数字 Id / Iq 控制 Full digital control Id/Iq	最高可达 16kHz updated 16 kHz



驱动器运行区间  
Drive Operational Area

AxN 70.140.4



- 连续运转电流 (Vout=380Vac, Comm. Freq. 8KHz)  
Continuos Current
- 连续运转电流 (Vout=460Vac, Comm. Freq. 8KHz)  
Continuos Current
- ..... 零速电流 (Vout=380Vac, Comm. Freq. 8KHz)  
Zero Speed Current
- ..... 零速电流 (Vout=460Vac, Comm. Freq. 8KHz)  
Zero Speed Current

- 连续运转电流 (Vout=220Vac, Comm. Freq. 8KHz)  
Continuos Current
- 连续运转电流 (Vout=380Vac, Comm. Freq. 8KHz)  
Continuos Current
- 连续运转电流 (Vout=460Vac, Comm. Freq. 8KHz)  
Continuos Current





# AxN Size 5

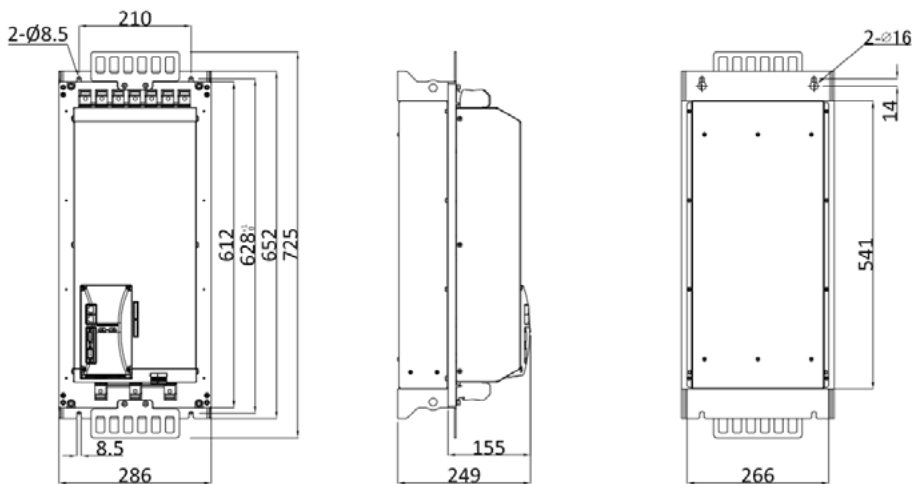
技术参数 Technical Specifications	符号 Symbol	AxN 90.150.4	AxN 110.200.4	AxN 110.250.4	AxN 150.300.4	单位 Units
主电源供电电压 Power Supply Voltage	$V_{in}$	150 ~ 500				Vac
		0 ~ 800				Vdc
辅助电源供电电压 Auxiliary Supply Voltage	$V_{aux}$	24V $\pm$ 15% / 3A				Vdc
输出频率 Output Frequency	f	0 ~ 1200				Hz
额定输出电流, $S1^{(1)}$ Current Output, $S1^{(1)}$	$I_n$	90	110	110	150	Arms
峰值输出电流 <sup>(1)</sup> Peak Current <sup>(1)</sup>	$I_p$	150	200	250	300	Arms
总功率损耗 <sup>(2)</sup> Power Losses Total <sup>(2)</sup>	$P_l$	1050	1280	1300	1772	W
最大输出电压 Maximum Output Voltage	$V_{out}$	$V_{in} \times 0.95$				Vac
PWM 频率 <sup>(3)</sup> PWM Frequency <sup>(3)</sup>	$f_{PWM}$	4 / 8 / 16				kHz
额定输出功率时的效率 <sup>(1)</sup> Efficiency at Nominal Power <sup>(1)</sup>	---	98.2	98.2	97.1	97.1	%
输入波形因数 (满负载) Input form Factor(Full Load)	---	0.9				Vac
最大制动电流 Maximum Braking Current	---	100% 峰值电流 ( $I_p$ ) 100% of $I_p$ (Peak Current)				---
散热 Cooling	---	80 x 80 x38 可调速风扇 x3 3 PWM fan 80 x 80 x38				---
风扇流量 Flow Rate	---	110 x3				m <sup>3</sup> / hour
尺寸 (HxDxW) Dimensions (HxDxW)	---	725 x 249 x 286				mm

<sup>(1)</sup>  $V_{in}=380Vac$ ,  $V_{out}=V_{in} \times 0.95$ , 环境温度为 40°C, PWM 控制频率为 8kHz; /  $V_{in}=380Vac$ ,  $V_{out}=V_{in} \times 0.95$ ,  $T_{amb}=40^\circ C$ , Comm.Freq.8kHz;

<sup>(2)</sup> 包含输入整流部分的损耗; / Including input rectifier losses;

<sup>(3)</sup> 为了使输出电流保持在额定, 电机零速时 PWM 频率会自动降低。 / PWM frequency will automatically decrease at zero speed, in order to keep nominal current output.

## 外形尺寸 Overall Dimensions



## 电机位置反馈选项 Motor Feedback Options

主编码器 (500kHz) Main Encoder (500kHz)	5 通道正弦编码器 (SinCos encoder), 2 个绝对值通道、2 个增量通道和 1 个零位通道 SinCos encoder 5 channels (2 absolute analog tracks/2 incremental analog tracks/index)
	增量编码器 (Incremental encoder), 1Vpp 或长线驱动 Incremental encoder (1 Vpp or Different Line Driver)
	无传感器模式 (无电机位置反馈信号) Sensorless algorithm (w/o feedback)
	EnDat 系列编码器, 支持 EnDat 1.0 - 2.2 协议 (系统默认编码器) EnDat serial encoder 1.0 to 2.2 (default)
	旋转变压器 Resolver
辅助编码器 Secondary Encoder	Hiperface 系列编码器 Hiperface encoder
	无换向信号通道的数字增量编码器 (500kHz) Incremental digital encoder without commutation tracks (500kHz)
	EnDat 系列编码器 EnDat serial encoder

## 可编程信号输入 Programmable Inputs Signals

2 路差分 / 4 路单端模拟信号输入 2 differential / 4 single ended analog inputs	$\pm 10V$ (1mV) / $R_{in} = 10k\Omega$
8 路数字信号输入 8 digital inputs	20 - 30V / 对地 $R_{in} = 6.6k\Omega$ 20 - 30V / $R_{in} = 6.6k\Omega$ to GND
2 路隔离的模拟信号输入 (选配) 2 insulated analog inputs (optional)	$\pm 10V$ (1mV)
8 路隔离的数字信号输入 (选配) 8 insulated analog inputs (optional)	5mA, 最大电压 24Vdc 5mA, 24Vdc max

## 可编程信号输出 Programmable Outputs Signals

2 路模拟信号输出 2 analog outputs	0-10V (1mV) FS (30mA)
4 路数字信号输出 4 digital outputs	PNP 集电极开路 24V (100mA) PNP open collector 24V (100mA)
1 路继电器输出 1 watch dog relay	2A / 30Vdc, 0.25A / 250Vac 常开 (N.O.) / 常闭 (N.C.) 针脚 2A / 30Vdc, 0.25A / 250Vac, NO/NC contacts
2 路隔离的模拟信号输出 (选配) 2 insulated analog outputs (optional)	$\pm 10V$ (1mV) FS (30mA)
2 路隔离的数字信号输出 (选配) 2 insulated digital outputs (optional)	开关量, 9-28V / 2A On.off switch, 9-28V / 2A

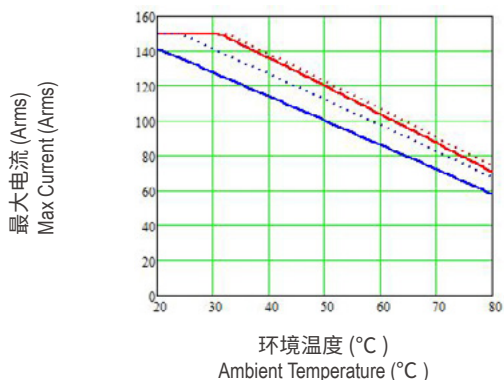
## 硬件配置 Hardware Configuration

处理器 Processor Speed	80MIPS $\mu$ C + FPGA / 120MIPS $\mu$ C + FPGA 增强版 80MIPS $\mu$ C + FPGA / 120MIPS $\mu$ C + FPGA Extreme Version	可选 Optional
工作频率 Task Frequency	电流环采样频率 Current / drive monitoring	1MHz
	位置环 / 速度环频率 Position / speed loop	8kHz
	PLC 快速任务扫描频率 PLC fast task	8kHz
	PLC 慢速任务扫描频率 PLC slow task	15.625Hz to 1 kHz (可配置) 15.625 Hz to 1 kHz (user-programmable)
位置模式可用 Position Loop Mode Available	目标位置寄存器位宽 Target position register	32 or 64 bits
	全数字 Id / Iq 控制 Full digital control Id/Iq	最高可达 16kHz updated 16 kHz



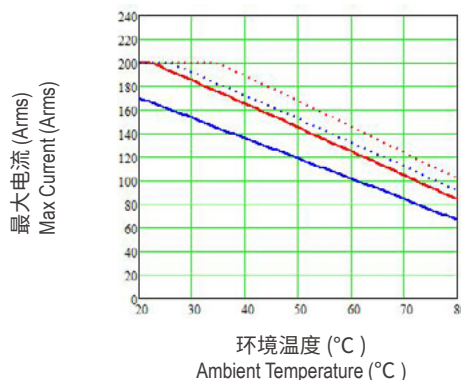
# 驱动器运行区间 Drive Operational Area

## AxN 90.150.4

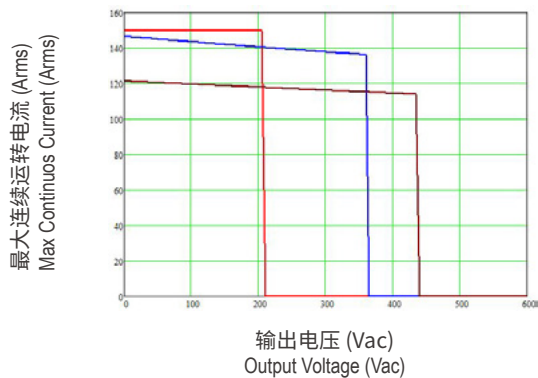


— 连续运转电流 (Vout=380Vac, Comm. Freq. 8KHz)  
 Continuos Current  
— 连续运转电流 (Vout=460Vac, Comm. Freq. 8KHz)  
 Continuos Current

## AxN 110.200.4



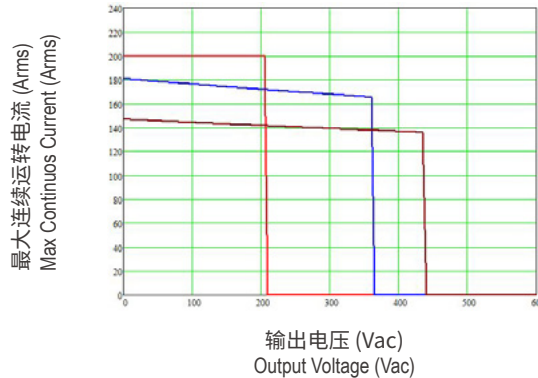
●●●● 零速电流 (Vout=380Vac, Comm. Freq. 8KHz)  
 Zero Speed Current  
●●●● 零速电流 (Vout=460Vac, Comm. Freq. 8KHz)  
 Zero Speed Current



— 连续运转电流 (Vout=220Vac, Comm. Freq. 8KHz)  
 Continuos Current

— 连续运转电流 (Vout=380Vac, Comm. Freq. 8KHz)  
 Continuos Current

— 连续运转电流 (Vout=460Vac, Comm. Freq. 8KHz)  
 Continuos Current



# AxN Size 6

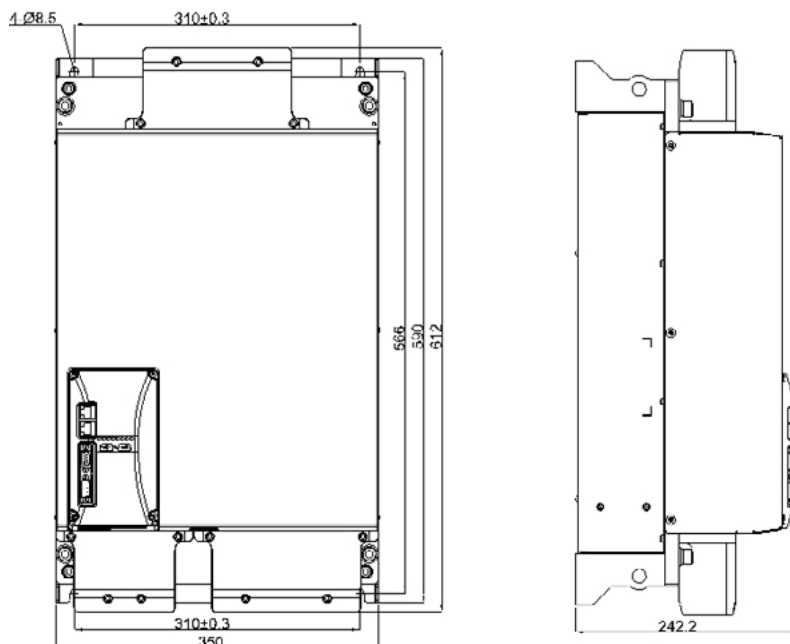
技术参数 Technical Specifications	符号 Symbol	AxN 200.400.4	单位 Units
主电源供电电压 Power Supply Voltage	$V_{in}$	150 ~ 500	Vac
		0 ~ 800	Vdc
辅助电源供电电压 Auxiliary Supply Voltage	$V_{aux}$	24V $\pm$ 15% / 8A	Vdc
输出频率 Output Frequency	f	0 ~ 1200	Hz
额定输出电流, $S1^{(1)}$ Current Output, $S1^{(1)}$	$I_n$	200	Arms
峰值输出电流 <sup>(1)</sup> Peak Current <sup>(1)</sup>	$I_p$	400	Arms
总功率损耗 <sup>(2)</sup> Power Losses Total <sup>(2)</sup>	$P_l$	3280	W
最大输出电压 Maximum Output Voltage	$V_{out}$	$V_{in} \times 0.95$	Vac
PWM 频率 <sup>(3)</sup> PWM Frequency <sup>(3)</sup>	$f_{pwm}$	4 / 8 / 16	kHz
额定输出功率时的效率 <sup>(1)</sup> Efficiency at Nominal Power <sup>(1)</sup>	---	97.1	%
输入波形因数 (满负载) Input form Factor(Full Load)	---	0.9	Vac
最大制动电流 Maximum Braking Current	---	100% 峰值电流 ( $I_p$ ) 100% of $I_p$ (Peak Current)	---
散热 Cooling	---	80 x 80 x 38 风扇 x3 3 fan 80 x 80 x 38	---
风扇流量 Flow Rate	---	234 x 3	m <sup>3</sup> / hour
尺寸 (HxDxW) Dimensions (HxDxW)	---	612 x 350 x 242.2	mm

<sup>(1)</sup> $V_{in}=380Vac$ ,  $V_{out}=V_{in} \times 0.95$ , 环境温度为 40°C, PWM 控制频率为 8kHz; /  $V_{in}=380Vac$ ,  $V_{out}=V_{in} \times 0.95$ ,  $T_{amb}=40^\circ C$ , Comm.Freq.8kHz;

<sup>(2)</sup> 包含输入整流部分的损耗; / Including input rectifier losses;

<sup>(3)</sup> 为了使输出电流保持在额定, 电机零速时 PWM 频率会自动降低。 / PWM frequency will automatically decrease at zero speed, in order to keep nominal current output.

## 外形尺寸 Overall Dimensions



## 电机位置反馈选项 Motor Feedback Options

主编码器 (500kHz) Main Encoder (500kHz)	5 通道正弦编码器 (SinCos encoder), 2 个绝对值通道、2 个增量通道和 1 个零位通道 SinCos encoder 5 channels (2 absolute analog tracks/2 incremental analog tracks/index)
	增量编码器 (Incremental encoder), 1Vpp 或长线驱动 Incremental encoder (1 Vpp or Different Line Driver)
	无传感器模式 (无电机位置反馈信号) Sensorless algorithm (w/o feedback)
	EnDat 系列编码器, 支持 EnDat 1.0 - 2.2 协议 (系统默认编码器) EnDat serial encoder 1.0 to 2.2 (default)
	旋转变压器 Resolver
	Hiperface 系列编码器 Hiperface encoder
辅助编码器 Secondary Encoder	无换向信号通道的数字增量编码器 (500kHz) Incremental digital encoder without commutation tracks (500kHz)
	EnDat 系列编码器 EnDat serial encoder

## 可编程信号输入 Programmable Inputs Signals

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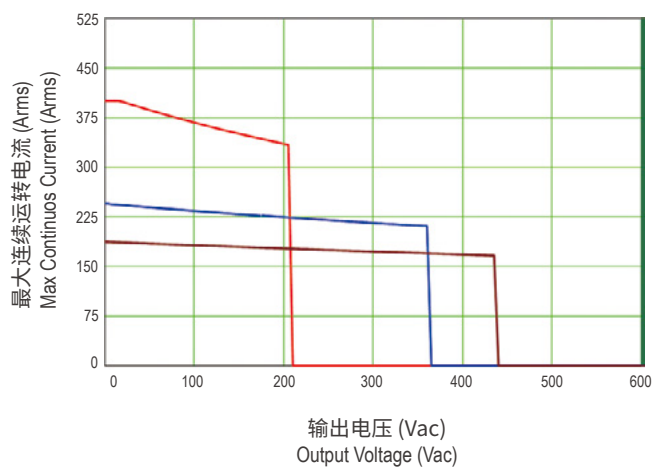
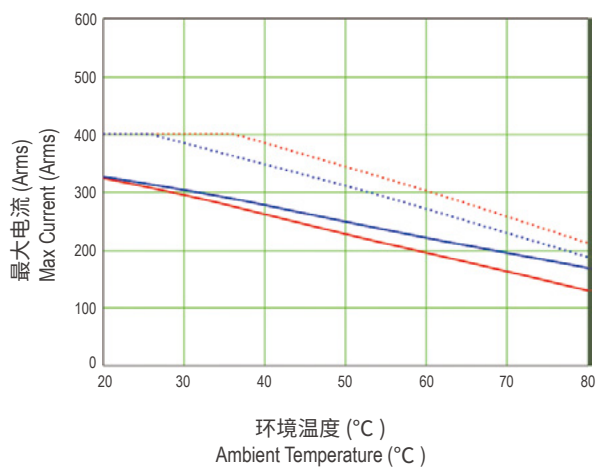
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# 驱动器运行区间 Drive Operational Area

AxN 200.400.4



- 连续运转电流 (Vout=380Vac, Comm. Freq. 8KHz)
- 连续运转电流 (Vout=460Vac, Comm. Freq. 8KHz)
- ..... 零速电流 (Vout=380Vac, Comm. Freq. 8KHz)
- ..... 零速电流 (Vout=460Vac, Comm. Freq. 8KHz)

- 连续运转电流 (Vout=220Vac, Comm. Freq. 8KHz)
- 连续运转电流 (Vout=380Vac, Comm. Freq. 8KHz)
- 连续运转电流 (Vout=460Vac, Comm. Freq. 8KHz)





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