SINEE’s products and solutions (VFD)

Nov, 2016
Product category
Product category of SINEE

Motor Drive

Servo system

Electric Vehicle Drive
Motor drive series
EM100 mini series

EM500 open loop series

EM600 close loop and special series

EM700 high EMC level motor drive

EM100 mini series

A90 standard drive
**EM600 summary**

- EM600 High performance drive
  - Open loop (SVC), closed loop (FVC)
  - Applicable to induction or PM motor
  - Support major bus communication
  - **Compete against:**
    - Yaskawa A1000 etc.
  - Features: High performance, expandability, reliability, rich functions
EM600—High performance

- High performance, industrial leading technology
  - Speed regulation
    - V/F 1:50、SVC 1:200、FVC 1:1000
    - FVC: Stable speed accuracy ±0.3rpm (0.02%)
  - Loading capacity
    - V/F 1Hz/150%
    - SVC 0.25Hz/150%
    - FVC 0Hz/150%
  - Torque control accuracy
    - SVC 、FVC ±5% rated torque
Expandability

- Support 4 kinds of communication
  - Modbus-RTU (standard) (twisted pair, internet cable)
  - Profibus-DP (optional)
  - DeviceNet (optional)
  - CANopen (optional)
- Support 4 kinds of encoder (Optional PG cards)
  - OC, differential, UVW, rotary transformer
  - OC, differential PG cards have optional frequency diverting type.
- Support I/O expansion
EM600—High reliability

- High reliability
  - Built in DC reactor starts from 11kw
  - Three phase output current sampling, support ground short cut protection
  - Pulse by pulse current limiting avoids frequent trips
  - Supply (24V, 10V) has short cut and overload protection
  - EM600 has more than 30 protections
    - Short cut (drive short cut, braking resistance short cut), over current, over voltage, under voltage, input and output phase loss, drive over load, motor over load, motor over heating, drive over heating, feedback wire disruptions, load loss, motor over speed etc.
  - IPD management system
Main features VS competitors

- Built-in DC reactor:
  
  EM600, starts from 11kw
  - Yaskawa A1000 starting from 22kW (heavy duty)
  - Some other brand starting from 350kW

- Pulse by pulse current limiting avoids frequent trips
  - SINEE’s technology only.
EM600 applications

straight wire drawing machine

aluminium wire drawing machine

veneer peeling

www.sinee.cn
EM600 applications

- Pumping unit
- direct drive screw pump
- Banbury mixer for rubber
- toilet paper
EM100 mini series
EM500 open loop series
EM700 high EMC level motor drive
EM630 Hoist special series
A90 standard drive
**EM630 special drive for hoist**

- Prevent hook slips, in speed closed loop mode
  - **Zero servo**—Promptly sense the abnormal brake, bring down the cargo safely, avoid slip. (closed loop)
  - **Over speed protection**—Brake acts when the speed exceeds the maximum speed. (closed loop)
  - **Avoid falling**—when the speed command is different from the actual direction, brake acts. (closed loop)
  - **Brake control logic**—Brake engaged and disengaged at reasonable timings, reducing friction and improving safety
**EM630 widely used in**

- Tower crane: Hoist (closed loop), rotation (open loop), travelling (open loop)

- Builder lift (open loop)
  - Brake control logic and over zero torque holding function, enhance the comfort.

- Hopper hoist and belt conveying in concrete batching plate (open loop)
  - Brake control logic and dual motors switching

- Gantry crane and bridge crane (closed loop)
EM630 applications

- Overhead travelling crane
- Gantry crane
- Concrete batching plant
- Tower crane

www.sinee.cn
EM600 close loop and special series
EM700 high EMC level motor drive
EM500 open loop series
EM100 mini series
A90 standard drive
**EM700 summary**

- EM700: Higher EMC grade (IEC61800-3, C2)

  Based on EM600, substitute for European inverters such as VACON NXL, ABB ACS550 etc.

  Power size : 380V  0.75kW~75kW

  0.75kW~7.5kW
  Built in input filter, output magnetic ring

  11KW and above + External filter

www.sinee.cn
EM700 used in asphalt mixing station
EM600 close loop and special series
EM700 high EMC level motor drive
EM500 open loop series
EM100 mini series
A90 standard drive
EM500 summary

- EM500 Open loop vector drive
  - For general purpose industrial applications in open loop control mode like fan, pump etc.
  - Induction motor, PM motor
  - Major bus communication
  - Up to 630kW (normal duty)
  - Can replace different brands

- Product features
  - High performance, expandability, rich functions
EM500---High performance

- High performance—Industrial leading technology

  - Speed regulation
    - V/F 1:50, SVC 1:200
    - Stable speed precision: ±3rpm/0.2%
  - Load
    - V/F 1Hz/150%
    - SVC 0.25Hz/150%
  - Torque control accuracy
    - SVC ±5% rated torque
EM500 rapidly current and voltage control

- EM500 Excellent voltage and current control
- SVC, 0.1S acc/dec, 0~50Hz~0~50Hz switching

Green: RPM
Blue: Bus voltage
Red: Motor current
EM500---extendible

Expandability

- **Support 4 kinds of communication**
  - Modbus-RTU *(standard)*
  - Profibus-DP (optional card)
  - DeviceNet (optional card)
  - CANopen (optional card)

- **Support I/O expansion (optional card)**
EM500---High reliability

High reliability

• Built in DC reactor starting from 11kw
• Pulse by pulse current limiting avoids frequent trips
• Supply (24V, 10V) has short cut and overload protection
• EM600 has more than 30 protections
  • Short cut (drive short cut, braking resistance short cut), over current, over voltage, under voltage, input and output phase loss, drive over load, motor over load, motor over heating, drive over heating, feedback wire disruptions, load loss, motor over speed etc.

• IPD management system
**EM500 high power grid adaptability**

- EM500 built in DC reactor starting from 11kw
  - Reduce input current distortion, improve power factor
  - Dampen surge voltage from the mains supply, enhance reliability.
  - Built-in DC reactor is more safe than external DC reactor for the electric shock, reduce installation space.

**With DC reactor**
- Current distortion: 35%
- Power factor: 0.97

**Without DC reactor**
- Current distortion: 70%
- Power factor: 0.6
Smaller size

- The size of EM500 is on average smaller than the previous generation EM303B by 20%
- The size of 18.5kW reduced by 55%, 37kW by 40%
Major improvements VS EM303B

- A whole new design by industrial masters
- Support field bus and I/O expansion
- Rich functions, including tension control, compressor and water supply macros.
- Keypad more beautiful, easily operated.
- Built-in DC reactor starts from 11kw.
- Pulse by pulse current limiting, avoid frequent trips
- 1 high frequency pulse input/output, 2 relays output
- The size for part of capacity reduced significantly
- Applicable to induction motor and PM motor
- Maximum power size is up to 630kW(normal duty)
**EM500 applications**

- Blender
- Air compressor
- Fan and pump
- Extruding machine
- Mixing mill for rubber
EM600 close loop and special series
EM700 high EMC level motor drive
EM500 open loop series
EM100 mini series
A90 standard drive
EM100 summary – simple use

- Compact design, reliable design and easy operation, applicable to speed control for the simple industrial machineries such as fan, pump, conveyor belt, food machine, molding machine etc..
  - 1-phase 220V: 0.4kW~2.2kW
  - 3-phase 380V: 0.75kW~15kW
**EM100 main features**

- **High reliability**
  - IPD system
  - Strict internal test
  - Rich protection
  - More than 200,000 units sold

- **Cheap**
  - Economical
  - More competitive than other brands at the same price

- **Small size**
  - The size is less than EM303B, EM500 in the same capacity by about 50%
**EM100 applications**

- Wood machines
- Food package
- Drying machine
- Quartz production line
- Wire drawing machine
EM600 close loop and special series

EM700 high EMC level motor drive

EM500 open loop series

EM100 mini series

A90 standard drive
A90 Products positioning

- Suitable to air compressor, plastic extruding machine, fan, water pump
  - 340-460V 3 phase: 1.5A~304A (0.4kW~160kW)
  - 200-240V single phase: 2.8A~10A (0.4kW~2.2kW)
- It can also be used to simple industrial machinery adjusting speed and energy saving
- Driving induction motor and PMSM
- Support V/F control and open loop vector control
**A90 inverter features**

- High cost-effective
- Strict examination, high reliability
- Mini size, leading in industry
- Normal work under ambient $50^\circ$C, no need for derating
- Easy to use: built in air-compressor, fan, water pump, plastic extruding machine

**Application macro**

- Equipment keeping run as power supply interruption, arise continuous working ability of fan, water pump
- Special usage for constant pressure water supply including sleep and awake function
High reliability

■ New technology platform
  • Take 4th generation IGBT module, large margin derate design, Large redundant thermal design.

■ Independent air duct
  • Independent air duct design can effectively prevent dust from entering the inverter to cause short circuit. Then, enhance inverter reliability;
  • Effectively reduce the temperature rise and ensure reliable and stable operation of the inverter by using the cooling fan with big capacity and long life

■ Thermal simulation design
  • High efficiency and accurate thermal simulation platform software ensure whole inverter’s thermal reliability
  • The thermal design is tested scientifically, high accuracy, quick efficiency and good stability
High reliability

- All-sided protection
  - All series have output short circuit protection, output over current protection, DC bus over voltage protection, DC bus low voltage protection, inverter over temperature protection, inverter overload protection, motor overload protection, external 24VDC short circuit protection etc.
  - According to the severity of the fault type, to set up alarm in advance, fault stop or continuous running. Convenient daily maintenance

- Automatic conformal coating
  - Automatic conformal coating machine, spraying whole PCBA to improve environmental adaptation

- Meet CE approval
  - Products meet EU《New methods of technical coordination and standardization》instruction requirement
Small size to save machine’s working area ASAP

- Comparing to EM303B, A90 size decrease by 48% averagely, maximum by 67%
- No need to worry more about the size when replacement
**Small size to save operation space**

4kW for example
Comparing to competitor’s inverter, with smaller size

<table>
<thead>
<tr>
<th>Company</th>
<th>Mini series</th>
<th>volume</th>
<th>Decrease proportion</th>
</tr>
</thead>
<tbody>
<tr>
<td>SINEE</td>
<td>A90</td>
<td>2.08</td>
<td>-</td>
</tr>
<tr>
<td>Firm A</td>
<td>XX310</td>
<td>4.46</td>
<td>53%</td>
</tr>
<tr>
<td>Firm B</td>
<td>XX70E</td>
<td>2.59</td>
<td>20%</td>
</tr>
<tr>
<td>Firm C</td>
<td>X2400</td>
<td>2.62</td>
<td>21%</td>
</tr>
</tbody>
</table>
Normal operation under ambient 50℃, no need to use on derating.

Note: At ambient 50℃, please remove top cover to keep cooling down the inverter!
**Type selection principle** - according to load type (heavy duty or normal duty), rated current and overload capacity to select suitable inverter.

- Air compressor, plastic extruding machine belong to heavy duty, fans, water pump belong to normal duty.

**Power Range**

- **Single 220V**: 2.8A~10A (0.4kW~2.2kW)
- **Three phase 380-460V**: 1.5A~304A (0.4kW~160kW)
**Products accessories**

- Extension keypad (optional)
  - A90 Standard LED keypad not detachable
  - Optional external keypad
  - Both keypad can work together

- Braking unit (Optional)
  - For inverter above 45A, external braking unit BR100 is available.
Inverter application case
EM610 lamination machine application
EM610 Steel rolling mill equipment allocation

S辊钢带矫直机

钢筋冷轧机
EM610 Jig dyeing machine application
EM610  Drawing machine and Coating machine

拉丝机收线 Drawing machine to roll wire

涂布机 Coating machine
Inline drawing machine solution diagram
Inline drawing machine application on site
Sinee inverter in construction lifting industry application history

- Since 2009, Sinee lift inverter has been applied in building lifting industry for 9 years.

EM630 lifting special inverter

EM330A
First generation special lifting inverter

EM330D
Second generation special lifting inverter

EM330C
Integrated inverter

EM630C
Integrated inverter

www.sinnee.cn
EM630.EM630C Building hoist application
EM630 Tower crane application
Portal crane and bridge crane application

门式起重机 portal crane

行车 travelling crane
EM500.EM580C Air compressor
EM500、EM580C空压机应用
EM600 Machine tool spindle parked application
EM318C application

- EM318C onsite, Foshan, Guangdong.