Shanghai Sigriner STEP Electric Co. Ltd

Shanghai Sigriner STEP Electric Co. Ltd
No. 1560 Siyi Road, Jiading District, Shanghai
Tel: 021 – 69926000
Fax: 021 – 69926010
Zip: 201801
Website: www.stepelectric.com/sigriner

Shanghai STEP Electric Co. Ltd
No. 289 Xinqin Road, Jiading District, Shanghai
Tel: 021 – 39126902
Fax: 021 – 39126607
Zip: 201802
Website: www.stepelectric.com

STEP Sigriner Elektronik GmbH
Martin-Moser-str. 15, 84503 Altoetting, Germany
Tel: 0049 – 8671 – 3096
Fax: 0049 – 8671 – 72476
Website: step-sigriner.com

HONG KONG International STEP Holdings Co., Ltd.
Unit AD, 9/F., Nathan Commercial Building, 430-436 Nathan Road, Kowloon, Hong Kong
Tel: 00852 – 27592938, 23327719, 27819038
Fax: 00852 – 27590662

Shanghai STEP Software Technology Co., Ltd.
No. 289 Xinqin Road, Jiading District, Shanghai
Tel: 021 – 39126902
Fax: 021 – 39126607
Zip: 201802

Shanghai STEP Elevator Components Co., Ltd.
No. 289 Xinqin Road, Jiading District, Shanghai
Tel: 021 – 39126902
Fax: 021 – 39126607
Zip: 201802

Shanghai STEP Electrical Wire & Cable Co. Ltd
No. 289 Xinqin Road, Jiading District, Shanghai
Tel: 021 – 39126902
Fax: 021 – 39126607
Zip: 201802

Beijing Office
Room 2303, Full Tower, No.9 East Third Ring Road,Chaoyang District, Beijing
Tel: 010-85911326
Fax: 010-85911338
Zip: 100020

Shanghai Office
No.1560 Siyi Road , Jiading district, Shanghai
Tel: 021-69926013
Fax: 021-69926011
Zip: 201801

Guangzhou Office
Rm.1506, Xinde Building, No. 246, Zhongshan No.4 Road, Guangzhou
Tel: 020 – 83635232, 83635425
Fax: 020 – 83635858
Zip: 510030

Chengdu Office
Rm.701, Wanxingyuan Building A, No.8 Lingshiguan Road, Wuhou District, Chengdu
Tel: 028 – 85232751, 85232752
Fax: 028 – 85237034
Zip: 610041

STEP®

Service hotline: 400-821-0325

STEP 201102

iAStar

AS160 Low-Voltage Drive for Pump and Fan V1.1

With Creative Science and Technology
You Will Find Such is The World

COMPANY CULTURE

STEP Spirit: Face the world; pursue the best, stay always ahead of the line.

STEP Value: Faith, innovation, excellence.

STEP Tenet: Customer satisfaction, employee pride, community benefit.

STEP Mission: Provide the best control, drive and energy-saving products for our customers.

STEP vision: To be an international high-tech enterprise in electric industry.

COMPANY INTRODUCTION

Shanghai Sigriner STEP Electric Co., Ltd is a subsidiary of Shanghai STEP Electric Corporation. Shanghai STEP Electric Corporation is an enterprise group and was founded in 1995, and the registered trademark is “STEP”. STEP Group mainly specializes in R&D, manufacture and sales of industrial control systems and drive products, owning 4 domestic companies and 2 overseas companies.

STEP came into the A-share market publicly on December 24, 2010 while the opening bell of Shenzhen Stock Exchange was sounded.

Stock: STEP; stock code: 002527

In 2006, Shanghai STEP Electric Corporation invested in and established the Shanghai Sigriner STEP Electric Co., Ltd, having a modern R&D and manufacture facility of drive product, with area of 30000 square meters, equipped with the first class test instruments and production equipments in the world. And advanced management systems and strict quality controls are implemented to make sure of providing clients with drive products and services of high quality.

The company owns various series of products, including high/low voltage fan/pump drive, high/low voltage vector drive, four-quadrant drive, elevator drive, common DC bus drive, integrated driving controller, energy regenerator, door drive, AC servo system, etc.

As utilization of the STEP global strategy, the products have been exported to over 30 countries and regions in Europe, North America, and Asia. In China, STEP has set up 18 agencies and liaison offices in Beijing, Shanghai, Guangzhou, etc., with sales of service covering the entire country.

STEP insists in the enterprise spirit: Face the world; pursue the best, stay always ahead of the line. It strives to provide the best control, drive and energy-saving products for our customers and desires to be an international high-tech enterprise in electric industry step by step.

AS160
Low-Voltage
Drive for Pump
and Fan

CONTENTS

PRODUCT INTRODUCTION

AS160 low-voltage drive for pump and fan is the latest product of Shanghai Sigriner STEP Electric Co., Ltd, designed for the pump, water supply and ventilation markets in China, applicable to the variable speed drive of pumps and fans. (According to the load characteristics of pumps, owning functions of constant pressure water supply, sleep control, multi-pump switch, rotating speed track, flexible application, easy operation.)`

AS160 drive adopts outstanding control performance as international high-end drives, but also integrates with application characteristics in China, to further strengthen the reliability of the product and environmental adaptability as well as customized and industrialized design, which better meet a wide range of drive applications, such as fan, mixer and drive belt.

AS160
Low-Voltage Drive for Pump and Fan

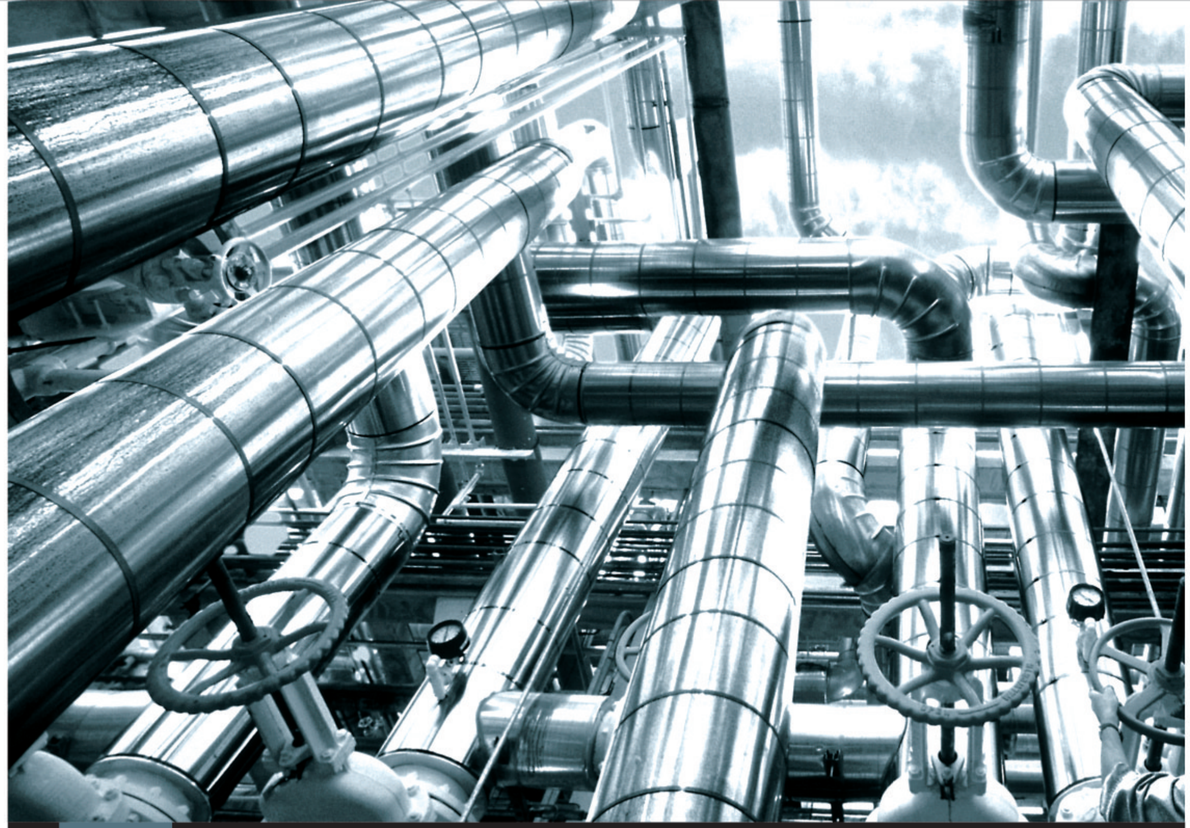
PRODUCT TRAIT

Features on drive technology

- User password setting, effectively improving the safety of system operation
- Torque boost, increasing the load capacity of motor start
- New PWM dead time compensation and dynamic carrier modulation technique, effectively reducing the noise of motor
- Low inductance bus technique, excessively improving the safety of module
- Multiple frequencies setting means, satisfying the multivariate field demands
- Automatic slip compensation, abating the affects on rotating speed of motor by change in load
- Special PID control, convenient to realize process control
- Hopping frequency control, effectively avoiding the resonance point of mechanical load
- Rotating speed track restart, smooth starting of motor in rotation
- Automatic voltage adjustment, keeping the output voltage constant when the grid voltage changes

Design reliability

- Independent air duct design
- Compact structure design
- Three-proofing design of whole machine
- Wide voltage range design
- Power on self test function
- Perfect terminal protection
- Overheat pre-alarm protection
- All-around protection of whole machine
- High-precision current detection and protection
- All-around switching power supply protection



AS160
Low-Voltage Drive for Pump and Fan

PRODUCT TRAIT

Special for pump

- Diverse VF curve, particularly applicable to load with variable torque, such as pump
- PID given feedback, unit display, simple and visualized, mutual switching between two operation commands
- No need of PLC or water supply controller to realize general water supply
- Support two kinds of water supply modes, namely fixed variable frequency pump and circulating variable frequency pump
- Conventional pump, sleep pump, drainage pump and firefighting pump configured flexibly, 7 pumps control at utmost
- 8-section time-pressure setting to apply the changing demand for water supply pressure
- 16-section pressure given by combination of input terminals
- Support the flexible sleep mode, automatically start small sleep pump under the sleep condition, satisfy the pressure demand for sleep system, exit sleep mode automatically after meeting sleep wake-up conditions, and stop small pump sleeping
- Timing control in turn, equalize the working time of all pumps, prevent pump rusting effectively and avoid one pump operating always
- Water level control of sump by monitoring and controlling the water level
- Detect the water level of incoming pool, and control and regulate the given pressure of governor pump automatically
- Have overpressure and underpressure alarm function, and support fault automatic reset and restart
- Random panel may be mounted on the cabinet door externally

OPERATION METHOD

Mutual switching between two sets of operation commands

Operation command 1 or 2:

Digital signals given by operation panel

Analog/digital given

- Analog A0/A1 terminals: -10 V ~ +10 V or 0 ~ 20 mA
- Digital Xi terminals: multi-step frequency, voltage given
- Pulse DI0/DI1 terminals: 0 ~ 50 kHz

Modbus communication mode given (Profibus DP optional)

Performance function given

Multiple input/ouput modes integrated

2-way analog inputs / 2-way analog outputs

- Analog input filtering time may be set, strengthening anti-interference ability
- Analog input curve has an independent multi-step correction function

8 –way digital inputs / 2-way digital outputs, 4 relay outputs

- Standard 16-speed setting, 23-speed operation may be set at the utmost

Provide independent high-speed pulse input and output ports for high-speed pulse cascade connection

Two sets of frequency commands

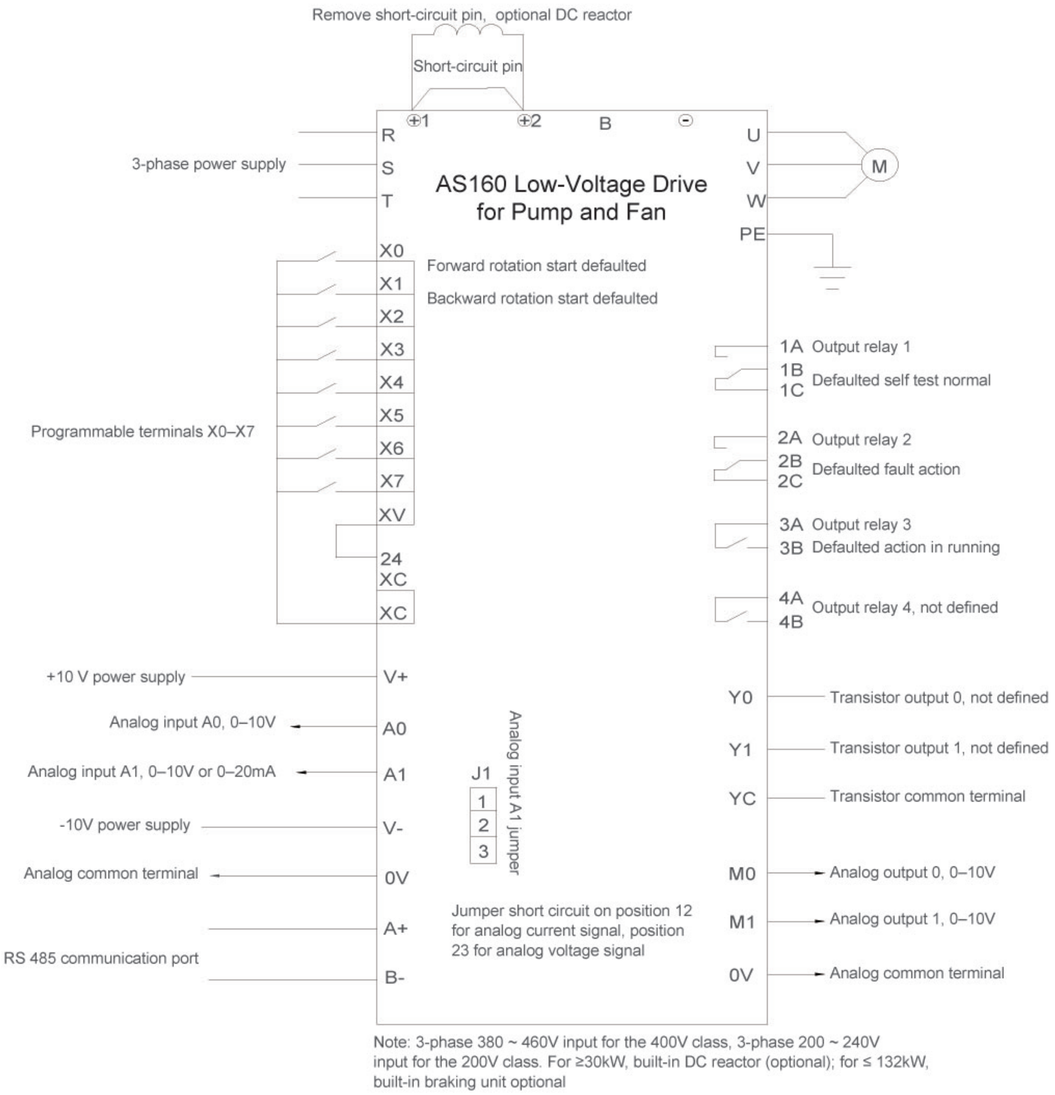
Speed command 1 or 2:

- Panel given speed
- A0 given speed
- A1 given speed
- A0+A1 given speed
- A0-A1 given speed
- UPDN given speed
- Communication given speed
- PID given speed

STANDARD WIRING DIAGRAM

Terminal wiring diagram

For digital input terminals, 2 wiring methods apply according to source logic PNP and sink logic NPN. Sink wiring is defaulted, short circuit for 24 and XV. Source wiring is used, short circuit for XC and XV.



Note: 3-phase 380 ~ 460V input for the 400V class, 3-phase 200 ~ 240V input for the 200V class. For ≥30kW, built-in DC reactor (optional); for ≤ 132kW, built-in braking unit optional

Control circuit terminal functions

1A	1B	1C	3A	3B
2A	2B	2C	4A	4B

Y1	YC	24	XV	X1	X3	X5	X7	XC	0V	0V	A0	A1
Y0	XC	XC	X0	X2	X4	X6	A+	B-	M0	M1	V+	V-

Type	Terminal symbols	Function description	Specifications
Terminal 485	A+	Positive end of 485 differential signal	Baud rate: 4800/9600/19200/38400/57600 bps Up to 32 sets of equipment can be paralleled, if the number exceeds 32 relay shall be used. Maximum distance:500m(adopt standard twisted shielding cable)
	B–	Negative end of 485 differential signal	
Digital input	24	+24V	24V±10%; maximum load: 200mA, with overload and short circuit protection
	X0 ~ X7	Multi-functional input terminals	Input specification: 24VDC, 5mA Frequency range: 0 ~ 200Hz Voltage range:24±20%
	XV	+24V ground	Interior isolated from GND
	XC	Multi-function input common terminal	Interior isolated from GND
Digital output	Y0~Y1	Open collector output terminals	Voltage range: 24V±20%, maximum input current: 50mA
	YC	Open collector output common terminal	Interior isolated from GND
Analog input	V+	Analog input reference voltage	+15V, Interior isolated from COM Maximum output current: 20mA, with short circuit and overload protection
	V–	Analog input reference voltage	-15V, interior isolated from COM Maximum output current: 20mA, with short circuit and overload protection
	A0	Analog voltage input	-10V ~ 10V: input impedance 20kΩ，maximum input voltage: 15V, resolution: 12 bits (0.025%)
	A1	Analog voltage input	
	A1	Analog current input	0 ~ 20mA: input impedance 500Ω，maximum input current: 30mA, resolution: 12 bits (0.025%)
	0V	Analog input ground	Interior isolated from COM
Analog output	M0	Analog output 1	0 ~ 20mA: permissible output impedance 200 ~ 500Ω 0 ~ 10V：permissible output impedance ≥ 10kΩ Output accuracy: 2%, resolution: 10bits (0.1%), with short-circuit protection 0 ~ 20mA or 0 ~ 10V analog input is selected through jumpers
	M1	Analog output 2	
	0V	Analog output ground	Interior isolated from COM
Relay output	1A/1B/1C	Relay output	1A/1B, 2A/2B, 3A/3B, 4A/4B normally open Contact capacity: 250VAC/5A, 30VDC/5A Minimum action current: 10mA Actuation time: 10ms below
	2A/2B/2C	Relay output	
	3A/3B	Relay output	
	4A/4B	Relay output	

AS160
Low-Voltage Drive for Pump and Fan

STANDARD WIRING DIAGRAM

Main circuit terminal functions

⊕1	⊕2	B	⊖	R/L1	S/L2	T/L3	U/T1	V/T2	W/T3
OPTION				POWER			MOTOR		

⏚ ⏚

Terminal symbols	Name and function
R/L1、S/L2、T/L3	3-phase AC input terminal
⊕1、⊕2/B1 or ⊕1、⊕2	DC reactor terminal, copper bar short connection when delivery
⊕2/B1、B2 or B1、B2	Braking resistor connection terminal
⊕2/B1、⊖ or ⊕2、⊖	DC power input terminal: external braking unit DC input terminal
U/T1、V/T2、W/T3	3-phase AC output terminal
⏚	Grounding terminal PE

TECHNICAL SPECIFICATION

Input	Rated voltage	380V ~ 460V (-15% ~ +10%), 3-phase power supply 220 ~ 240V optional 3-phase power supply
	Rated frequency	50/60Hz
	Allowable voltage range	Voltage unbalancedness ≤3%; allowable frequency fluctuation: ±5%
	Voltage dips	For 3-phase AC 380V ~ 460V power supply, when the input voltage＜AC 300V, under-voltage protection after 15 ms
Output	Voltage（V）	Three-phase 0 to rated input voltage
	Frequency range	V/F control: 0.00 ~ 300.00 Hz
	Overload capacity	120%, 1 min， 150% 3s
	Efficiency (full load)	7.5 kW and below ≥ 93%; 45 kW and below ≥ 95%; 55 kW and above ≥ 97%
	Precision of output frequency	± 0.01% (digital instruction -10 ~ +45 ℃) ± 0.01% (analog instruction 25 ~ 10 ℃)
Digital input/output	Digital input	8-way, 24 VDC high/low level set effectively. Input function may be defined
	Pulse frequency input	2-way, maximum input frequency: 0 ~ 50 kHz
	Open collector output	2-way, output function may be defined
	Relay output	4-way, Normally open and close,:contact capacity: resistive, 5 A 250 VAC or 5 A 30 VDC; output function may be defined
	Pulse frequency output	1-way, 0 ~ 50 kHz open collector pulse square signal output, programmable
Analog input/output	Analog voltage input	2-way, -10 ~ +10 VDC or 0 ~ +10 VDC, precision 0.1%
	Analog current input	1-way, 0 ~ 20 mA, precision 0.1%
	Analog voltage output	2-way, -10 ~ +10 VDC, precision 0.1%
	Potentiometer voltage	Provide + 10 VDC power supply for setting speed of potentiometer (maximum 25 mA)
Control characteristics	Carrier frequency	2 ~ 16 k(Hz); carrier frequency may be adjusted automatically according to the load characteristic
	Frequency setting resolution	0.01 Hz (digital instruction) ±0.06 Hz/120 Hz (analog instruction 11bit + unsigned)
	Operation command channel	Operation panel given, control terminal given, communication given
	Multiple Frequency Reference Modes	Operation panel reference, digital/analog terminals, communication mode reference, performance function reference.
	Torque boost	Automatic torque boost; manual torque boost
	V/F curve	User-defined V/F curve, linear V/F curve and 5 kinds of drop torque characteristic curves
	Automatic voltage regulation (AVR)	Regulate the duty ratio of output PWM signal automatically according to fluctuation of bus voltage so as to relieve the effect on the output voltage fluctuation by fluctuation of grid voltage
	Instantaneous power-down disposal	At the time of instantaneous power-down, control by bus voltage to realize uninterrupted operation
	DC braking capacity	Braking current: 0.0 ~ 150.0% rated current

Unique functions	Parameter copy function	The standard operation panel can realize the parameter upload, download and display the copy progress. The user can select the uploaded forbidden function to avoid parameters be overwriten.
	Process PID	For closed-loop control of process
	Common DC bus	Common DC bus power supply for all series multiple drives The full series can realize common DC bus supply for several drives.
	Power on self test	Realizing the power-up auto-detection of internal and peripheral circuits, including motor grounding, abnormal +10V power supply output, abnormal analog input, and disconnection.
Motor protection	Rotor locking	
	Motor overload	
	Motor overheat (PTC)	
	Speed limit	
	Torque limit	

Drive protection	Output current limit	
	Torque limit	
	Drive overload	
	IGBT's overload	
	Input power undervoltage/overvoltage	
	DC bus undervoltage/overvoltage	
	IGBT overheat	
	Radiator overheat	
	Power fault	
	+10V power output abnormity	
	Analog input signal loss (loss of speed reference value)	
	Abnormal communication	
Others	Cooling type	Forced air cooling
	Installation method	In cabinet
	Certification	CE

Environmental conditions	Location	Install vertically in a well ventilated electrical cabinet; horizontal or other installation method is not permitted. The cooling medium is air. Install in an environment without exposure to direct sunlight, dust, corrosive gas, inflammable gas, oil mist, steam and water drop.
	Ambient temp.	–10 ~ +40℃
	Temperature derating	＞40℃, for each 1℃ rise, rated output current reduces 1%, 50℃ at utmost
	Altitude	1000m
	Height derating	＞1000 m, for each 100m lift, rated output current reduces 1% (3000m at utmost)
	Ambient humidity	5 ~ 95%, no condensation
	Vibration	3.5m/s², 2 ~ 9Hz; 10m/s², 9 ~ 120Hz;
	Storage temp.	–40 ~ +70℃
	Degree of protection	IP00、IP20

MODEL-SELECTION AND ORDERING

Product series model

AS160 4 T 0200

Special for fan and pump

Code	Voltage class
2	200V class
4	400V class

Code	Phase number
T	3 phase

Code	Applicable motor power	Code	Applicable motor power
02P2	2.2 kW	0045	45 kW
0003	3 kW	0055	55 kW
0004	4 kW	0075	75 kW
05P5	5.5 kW	0090	90 kW
07P5	7.5 kW	0110	110kW
0011	11 kW	0132	132kW
0015	15 kW	0160	160kW
18P5	18.5kW	0200	200kW
0022	22 kW		
0037	37 kW		

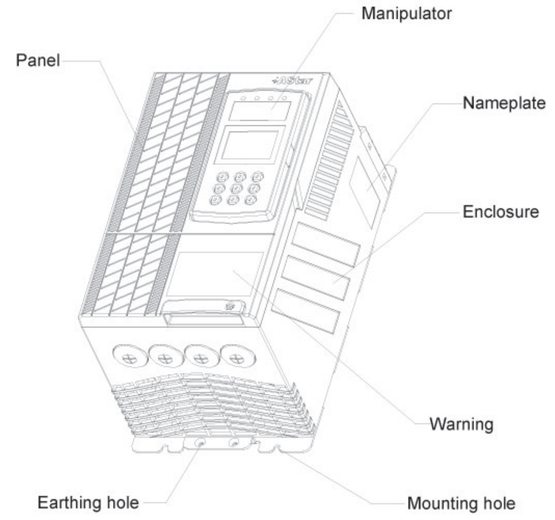
AS160
Low-Voltage Drive for Pump and Fan

Product series description

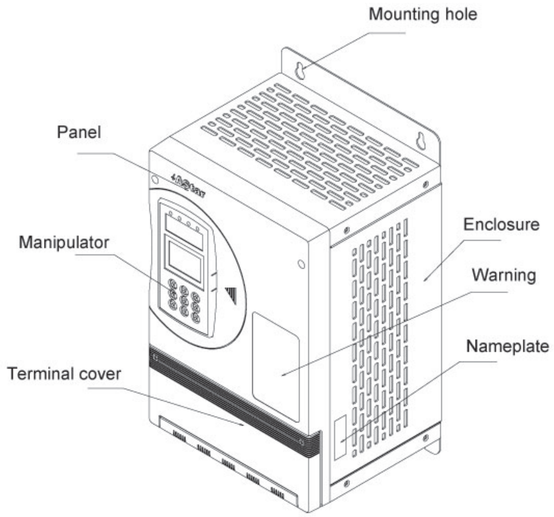
Rated input	Drive model	Rated output current (A)	Applicable motor (kW)	Overload 120% 1min(A)
200~240V	**AS160** 2T02P2	9	2.2	14
	AS160 2T03P7	14	3.7	22
	AS160 2T05P5	22	5.5	34
	AS160 2T07P5	32	7.5	48
380~460V	**AS160** 4T02P2	5	2.2	6
	AS160 4T0003	7	3	8.5
	AS160 4T0004	9	4	11
	AS160 4T05P5	11	5.5	13
	AS160 4T0011	22	11	26
	AS160 4T0015	30	15	36
	AS160 4T18P5	36	18.5	43
	AS160 4T0022	44	22	53
	AS160 4T0030	57	30	68
	AS160 4T0037	72	37	86
	AS160 4T0045	90	45	108
	AS160 4T0055	112	55	134
	AS160 4T0075	150	75	180
	AS160 4T0090	176	90	211
	AS160 4T0110	210	110	252
	AS160 4T0132	250	132	300
	AS160 4T0160	302	160	362
	AS160 4T0200	352	200	423
	AS160 4T0220	385	220	462
	AS160 4T0280	520	280	780
	AS160 4T0315	585	315	877
	AS160 4T0355	650	355	975
	AS160 4T0400	740	400	1110

Note: as to the higher power and voltage class of 4-pole standard AC motor (1500 r/min), please contact STEP Corporation. Be sure to check the motor nameplate to ensure selected drive compatible with the motor.

Product series model



AS160 4T07P5 and below power class



AS160 4T0011 and above power class

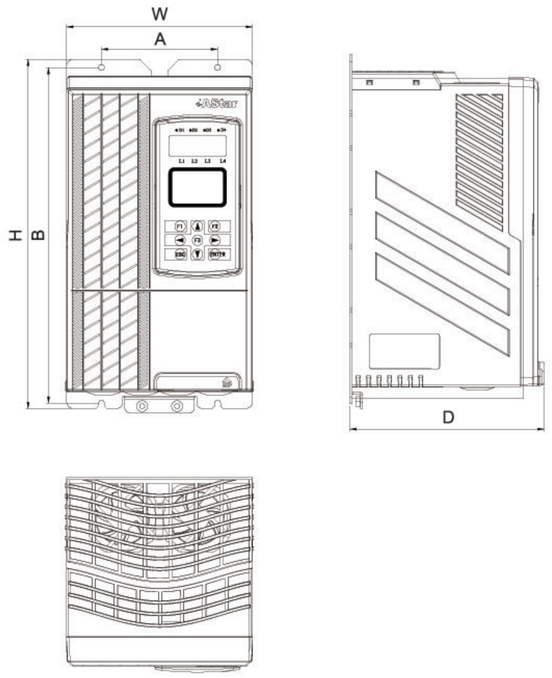
Installation dimension

Drive model	A (mm)	B (mm)	H (mm)	W (mm)	D (mm)	Installation aperture Φ(mm)	Installation Bolt	Nut	washer	Fastening torque (Nm)	Weight (kg)
AS160 2T02P2	100	288	300	160	166	5.0	4M4	4M4	4Φ4	3	4
AS160 2T03P7											
AS160 2T05P5											
AS160 2T07P5											
AS160 4T02P2											
AS160 4T0003											
AS160 4T0004											
AS160 4T05P5											
AS160 4T07P5											
AS160 4T0011	165.5	357	379	232	182	7.0	4M6	4M6	4Φ6	3	8
AS160 4T0015											
AS160 4T18P5	165.5	392	414	232	182						10.3
AS160 4T0022											
AS160 4T0030											
AS160 4T0037	165.5	511	533	305	240						23
AS160 4T0045	200	512	530	330	290	10	4M8	4M8	4Φ8	4	31
AS160 4T0055	200	587	610	330	310						42
AS160 4T0075						10	4M10	4M10	4Φ10	4	42
AS160 4T0090	200	707	730	430	330						50
AS160 4T00110	343	715	745	465	330						55
AS160 4T0132											60
AS160 4T0160	370	855	890	540	370	12	4M13	4M12	4Φ12	4	80
AS160 4T0200											88

AS160
Low-Voltage Drive for Pump and Fan

MODEL-SELECTION AND ORDERING

Take AS160 4T07P5 and below power class for example

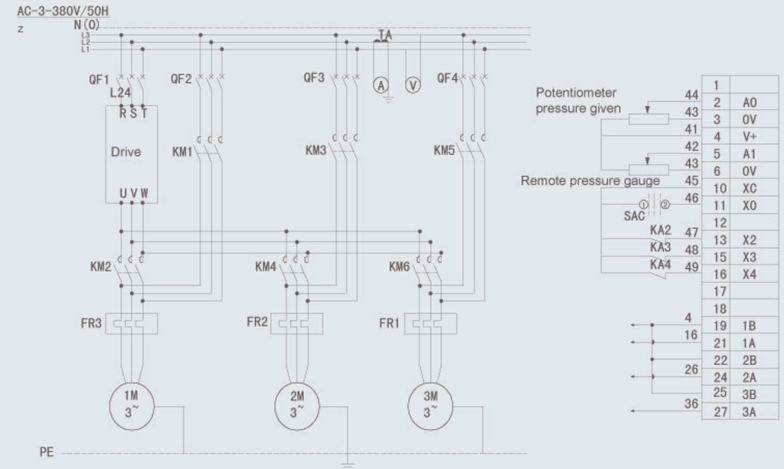


WATER SUPPLY

Circulating soft starting

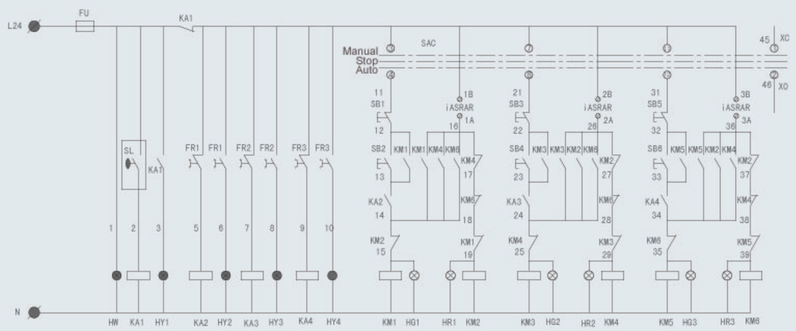
Operating principle:

in auto mode, the drive starts, 1A1B closes, KM2 actuates, 1# pump runs by variable frequency, the drive output reaches to startup frequency, 1A1B opens after startup delay, the drive stops output immediately, 1A1B closes again after 2A2B closes, the drive reruns, then 1# pump runs by power frequency and 2# pump runs by variable frequency, and pumps are added by analogy. When the output frequency drops down to stop frequency, switch off the pump run firstly by power frequency after stop delay. Thermal relay overload signal accesses to input terminal, and switch off this pump from the circulating soft starting logic while overloading.

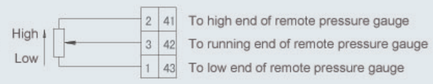


L1	L2	L3	N(0)	1U	1V	1W	2U	2V	2W	3U	3V	3W	1	2	41	42	43
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Power incoming line				1# pump outgoing line			2# pump outgoing line			3# pump outgoing line			Liquid level control		Remote pressure gauge		

Power indication	Water shortage and indication	1# overload indication	2# overload indication	3# overload indication	1# power frequency and indication	1# variable frequency and indication	2# power frequency and indication	2# variable frequency and indication	3# power frequency and indication	3# variable frequency and indication



Wiring schematic of remote pressure gauge

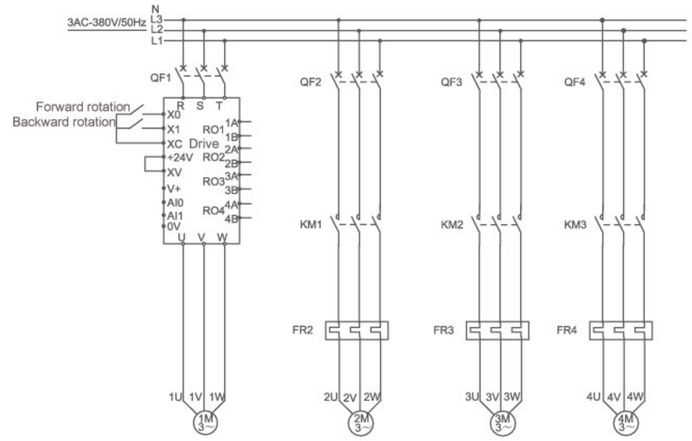


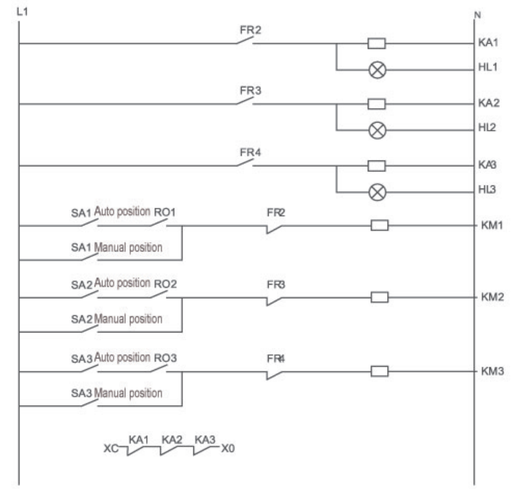
One main several auxiliary

One main pump, with a great capacity, runs by variable frequency; several auxiliary pumps, with relatively small capacity, powred directly by power frequency supply, but other startup and stop are controlled by the drive.

Operating principle:

Main pump is controlled by the drive. When the output frequency reaches to the startup frequency, switch on the relay after delay, start one small pump; if the pressure is not sufficient, the output frequency reaches to the startup frequency again, start another small pump, and the rest may be deduced by analogy. When the pressure exceeds, the frequency reduces to stop frequency, switch off the relay after relay, and stop the small pumps.
Duration of load balance. When the operating time of pump expires and there is idle pump, switch to the idle pump automatically.





SERVICE COMMITMENT

When you contact products of Sigriner STEP for the first time, you will find their differences. Our experts own rich experiences and may help you select drives applicable to your process. From the initial technical specifications to production, delivery and installation, we will comply with all your requirements.

Sigriner STEP's services and supports are not only limited to telephone assistance. At different stages of installation, startup, maintenance and troubleshooting, our representatives will provide technical services and supports for you for 24 hours per day, 7 days per week.

Range of our services

- Round-the-clock service 24 / 7 /365
- Preventive maintenance
- Training
- Spares sales
- Product renewal
- Upgrading
- Maintenance and replacement
- Professional services (harmonic analysis, power supply quality research, electrical system application, remote diagnosis, etc.)

Our commitment

Sigriner STEP is honorable to its reputation in long-term product services (including high-voltage drive). We commit to provide supports in the whole service life. However long the service life of product is, we shall never give up our responsibilities in product services and will ensure your full satisfaction. To prolong the service life of drivers and strengthen their functions, Sigriner STEP upgrades their programs ceaselessly to make you have opportunity for enjoying the newly upgraded technologies.

Convenient local services

Because of our long-term field service for all customers, we own numerous professional service personnel. Each one of our service representatives receives all-around special training.

AFTER-SALES SERVICE NETWORK

Domestic service network

Domestic market

5 agencies

14 liaison offices

Agencies

Beijing, Shanghai, Guangzhou, Wuhan, Jinan

Liaison offices

Dalian, Shenyang, Tianjin, Shijiazhuang, Zhengzhou, Chongqing, Xi'an, Hangzhou, Wuxi, Nanxun, Wujiang, Changsha, Shenzhen, Fuzhou, etc.

Oversea network

Oversea companies

Germany, Hong Kong

Overseas sales

Germany, England, Denmark, Scotland, Canada, Japan, Brazil, Chile, Singapore, Australia, India, Pakistan, Turkey, Saudi Arabia, Korea, Hong Kong, Macao, Taiwan, etc.