









Smart Pump Drive

Expert at constant pressure water supply

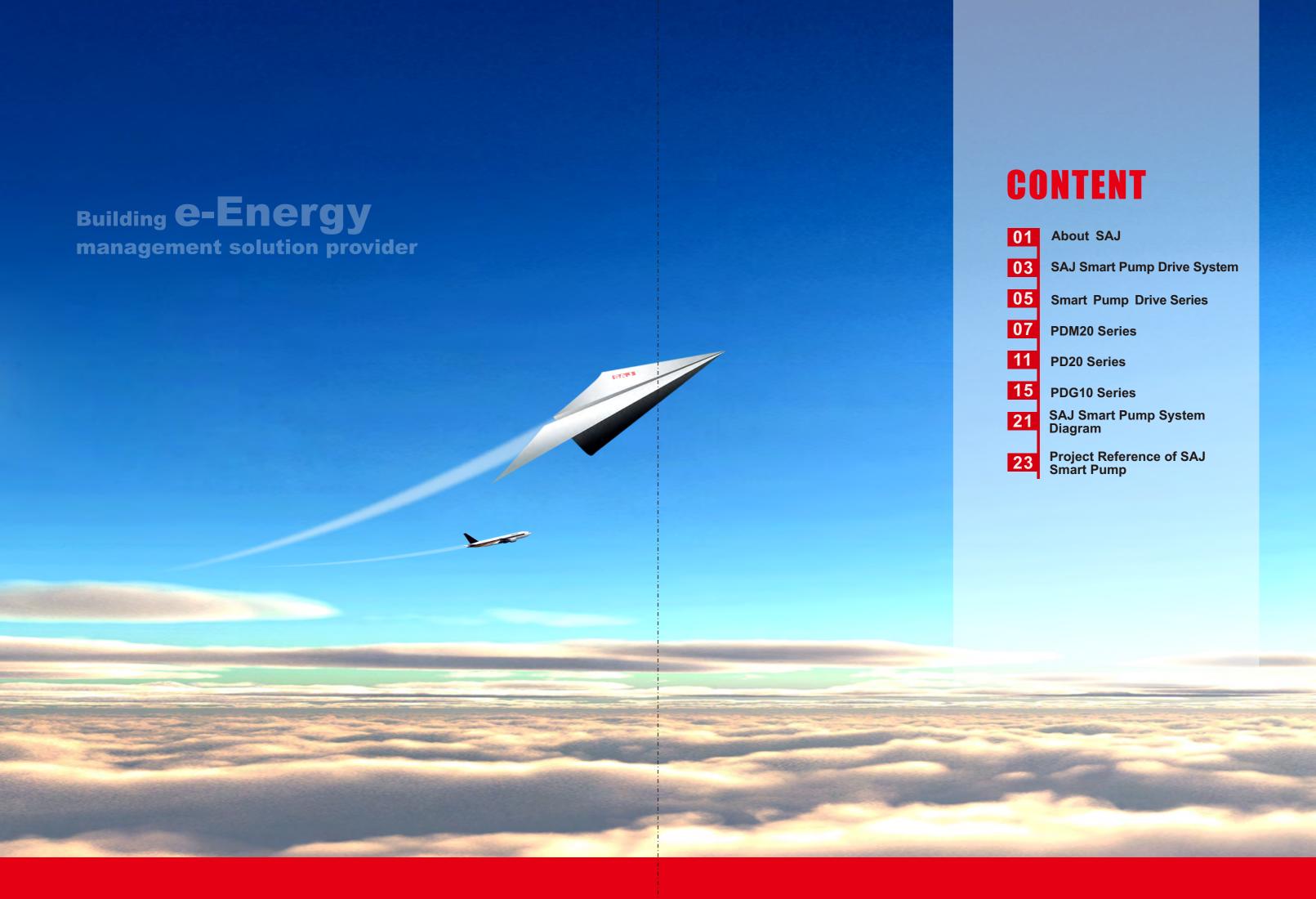
Guangzhou Sanjing Electric Co.,Ltd.

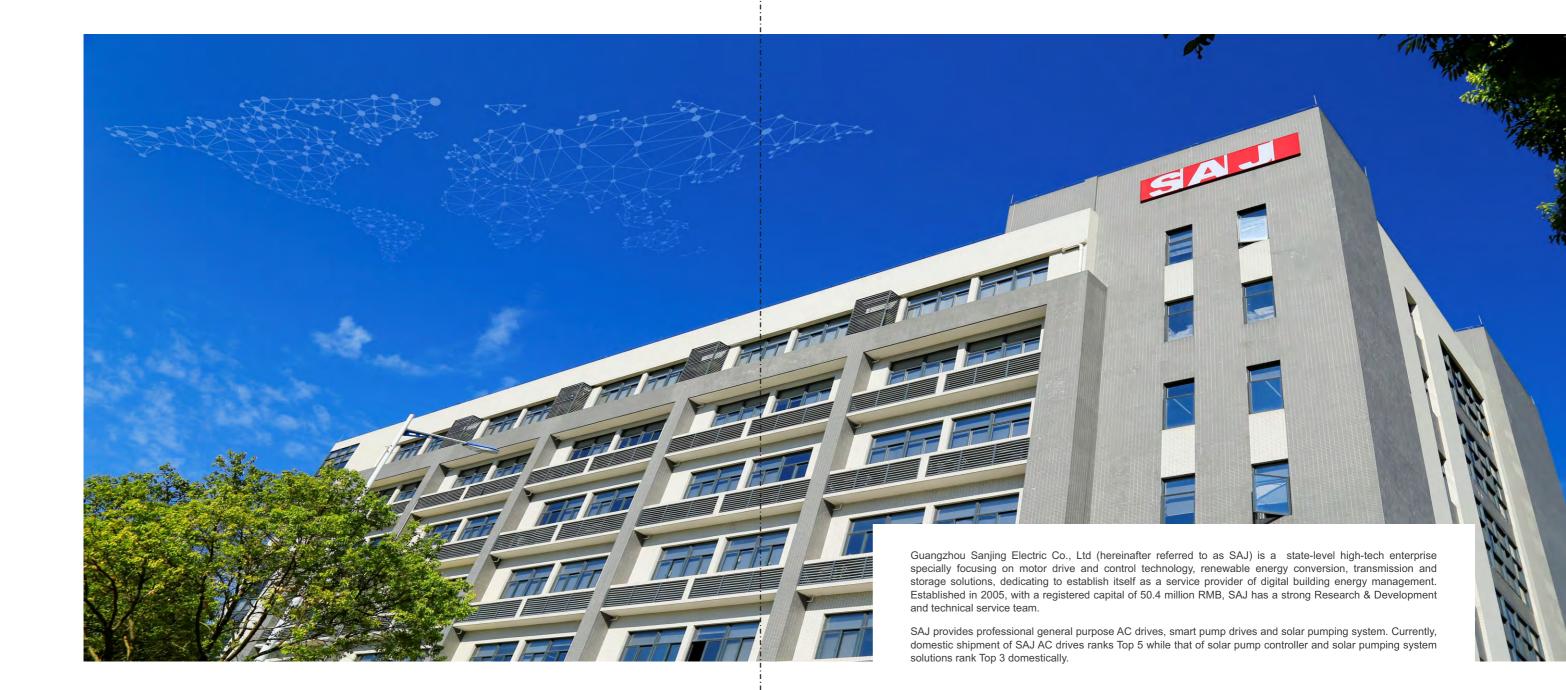
Add: SAJ Innovation Park, No.9, Lizhishan Road, Science City, Guangzhou High-tech Zone, Guangdong, P.R.China. Tel: 400-960-0112 Fax: 020-66608589 Website: www.saj-electric.com

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- Low voltage pump drive market Top 10 domestic brand
- The **most growing** brand in China automation industry
- Annual capacity: 500,000 sets of smart pump drives

Brand Strength

- 187 programs with Intellectual property rights
 (26 invention patents, 59 utility patents, 34 design patents,
 68 software copirights)
- Focusing on motor drive technology for 15 years

 (Mastering high performance vector control, motion control technology)

Core technology

- Carry out localization service strategy, more than 20 brance offices, more than 80 service stations
- Have provided 1,500,000+ motors drive and control solutions globally

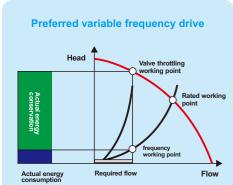
First-class service

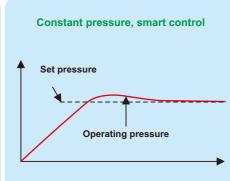
SAJ SMART PUMP DRIVE

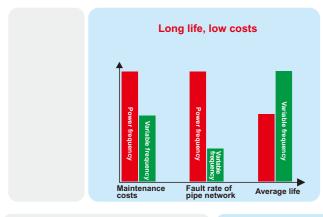
Overview of SAJ Smart Pump Drive

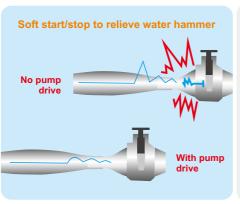
SAJ Smart Pump Drive (S.P.D) is a series of products for water systems which include water intake, water treatment, water distribution and wastewater recycling. Based on variable frequency technology, water systems with S.P.D are easy to keep constant pressure, saving energy and lowering water leakage during operation. Through ramping start and stop of pumps with S.P.D, cost of water systems is also reduced as the service life of pipe network and pumps becomes longer. Integrated with SAJ Smart Pump Control(S.P.C) which combines signal processing, pressure control, network link and special pump function together, SAJ Smart Pump Drive family can cover the requirements of different water systems, providing multiple installation choices and optional parts.

■ Advantages of SAJ Smart Pump Drive













■ Contrast of three common pump drive water supply control ways







Contracting items	SAJ smart pump drive	PLC+variable frequency control	Multi-pump controller+VFD		
Contrasting items	Difficulty of realization/effect	Difficulty of realization/effect	Difficulty of realization/effect		
Speed regulation energy saving control	Easy	Difficult	Medium		
Wiring of electrical control	Easy	Difficult	Difficult Poor effect		
Anti-interference, long term reliability	Good effect	Poor effect			
Composition	Brief	Complicated	Complicated		
Customization	Easy Customizing	Often rework by PLC programmer	Hard customizing		
Expansion capability	Easy	Difficult	medium Difficult		
Installation&debugging	Convenient	Difficult			
Parameter setting	Easy operation	Difficult	medium		
Maintenance costs	Maintenance costs Low		medium		

Smart Control, Smart Drive

SAJ, as a leading brand in domestic water industry, elaborately builds and creates a potent force in smart pump drives. With industry segmentation, three kinds of products possessed distinctive features and remarkable functions, which creates better values for clients and users.



Field 1: Single pump constant pressure control in home application

PDM20 Series Smart Mini Pump Drive



Field 2: Small&medium high accuracy timing control and monitoring water supply system

PD20 Series Smart Pro Pump Drive

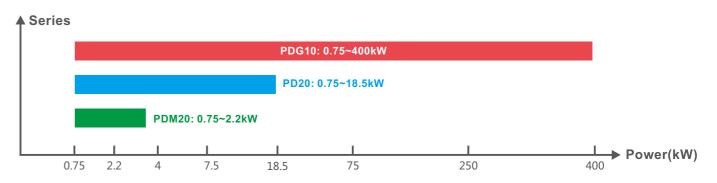


Field 3: Industrial& civilian pumps and fluid control

PDG10 Series Smart Effi Pump Drive



■ Series Chart of Pump Drives



■ Smart Pump Drive Selection Guide

	PDG10	PD20	PDM20		
Structure	Standard IP20	Backpack, IP65	Backpack,IP65		
Size at the same power	Large	Smaller	Smallest		
Power range	0.75~400kW	0.75~18. 5kW	0.75~2.2kW		
Installation	Cabinet or wall mounted	Cabinet or wall mounted Backpack installation			
Function	Stand alone/Multi Pump Smart Link, optimized water supply protection	Upper monitor, Multi-Pump Smart Link+real time clock, fuller functions and water supply protection	Single pump application with dedicated functions of water supply		
Expansion card	Dual RS485 communication	RS485 communication extension card	None		
Applications	Single pump application/ multi-pump (host and auxiliary pumps)combination	Single pump application/multi-pump (host and auxiliary pumps) combination/timing control, high adaptation to environment	Small single pump constant pressure water supply equipment		



PDM20 SERIES

Power range: single phase input and three phase output: 0. 75-2. 2kW







Delicate design

▶ Streamline surface design ▶ Hidden fan design, beautiful



Better applicability

- ▶ Pressure boost& stabilization, restarting at power on, water shortage protection, self-recovery
- ▶ One-key pressure setting, rapid parameter view
- ▶ Single phase 220VAC input, easy application



High reliability

- ▶IP65, dust and water proof
- ▶ Special cooling passage, good heat dissipation
- ▶ Controlled fan design, long lifespan



Perfectly match small three-phase horizontal booster pump

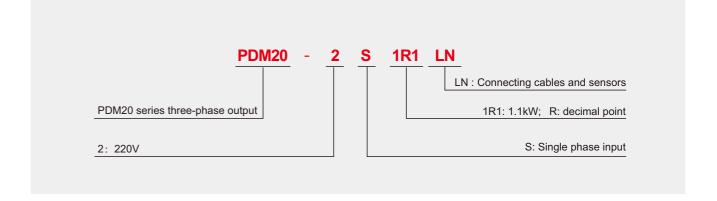
- ▶ Design of household appliances pump drive
- ▶ Installed directly to motor, no need of control cabinet



■ Technical Data

	Control mode	V/F control
Con	Start torque	1Hz 100%
trol c	Speed regulation range	1:20
hara	Speed-holding precision	±1.0%
Control characteristic	Overload capability	120% rated current for 60s, 150% rated current for 1s
stic	V/F curve	Linear
	Acceleration/deceleration curve	Linear; time range: 0.1-3600s
	Start frequency	1~10Hz
Inpu	Input voltage	Single-phase 220V±15%
Input/output	Input frequency range	50/60Hz, fluctuation range: ±5%
tput	Output voltage	Three-phase 0-rated input voltage
	Output frequency	0~50/60Hz
≓ Pe	Programmable digital input	2 digital input
Peripheral interface	Programmable analog input	Al1:0-10V/4-20mA, selected by function parameters
eral	Analog power	+5V-+24V adjustable power, set voltage by function code setting
	Command running channel	operation panel and digital terminals
Basic	Frequency source	Digital setting, PID setting
tun	Integrated PID	Realize closed loop control system
Basic functions	AVR	When grid voltage changes, it keeps output voltage constant automatically. By default, it doesn't work at deceleration.
S	Stall control	Automatically limit current and voltage at running period to prevent tripping caused by frequent overcurrent/over voltage.
	LED display, setting	Display pressure, voltage, programmable, rapid pressure setting, parameter hidden function
	Automatic energy-saving running	Decrease output voltage automatically at light load to save energy.
Pump	Password setting	4-bit password can be set with non-zero numbers. Exit password setting interface and the password will be valid after 1 minute.
ତ୍ର	Parameter lock	Define whether the parameter is locked in running or stopped state in case of misoperation.
ontrol	Constant pressure control	PID adjustment, PID feedback of break detection, PID sleeping and wakeup
<u>~</u>	Self-starting at power on	Optional self-starting at power on, adjustable starting delay
	Anti-freezing	Anti-freezing running option: frequency, time, cycle
	Water leakage inspection	Optimize sleeping control by water leakage inspection
Wat pr	High pressure alarm	Detect feedback pressure to protect pipe network
Water supply protection	Low pressure alarm	Detect feedback pressure to protect pipe network and pumps
ion	Water shortage protection	Multiple detection modes output pressure, frequency, current; auto reset and restart
e b	Altitude	Lower than 1000m, service in derated capacity above 1000m. Derate 1% capacity every 100m increase in height.
Application environment	Environmental temperature	-10 °C ~+40 °C , service in derated capacity for 40 °C ~50 °C . Derate 4% capacity every 1 °C increase in temperature.
catio	Vibration	<9.8m/S2(1.0G)
ă ă	Storage temperature	-40°C~+70°C

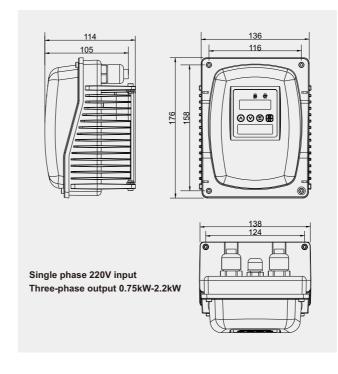
■ Model Number Description



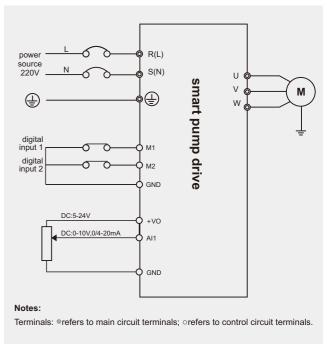
■ Selection Guide

voltage class	kW	НР	rated input current(A)	rated output current(A)	series		2: 220V S: single- phase	adaptive motor power	LN wiring version
	0.75	1	9	4.5	PDM20	-	28	R75	LN
single phase 220VAC	1.1	1.5	11	5.5	PDM20	-	28	1R1	LN
±15%	1.5	2	14	7	PDM20	-	28	1R5	LN
	2.2	3	20	10	PDM20	-	28	2R2	LN

■ Outline Dimensions



■ Wiring Diagram



PD20 SERIES

Power range: single phase input and three phase output: 0.75-2.2kW; three phase input and three phase output: 0.75-18.5kW

PD20 Series Smart Pro Pump Drive

PD20 series pump drive is a brand new generation high end smart all-in-one high protection product developed independently by SAJ. Dust and water proof, it can be installed on junction box of pump motor in various brands. Various kinds of sensor signal can be connected in. The system is easy to operate with good reliability, low noise, superior performance. Equipped with dual independent RS485 interface and RTC, it can realize multipump(main and host drive) control. When the main drive controls host drives with RS485, it can also communicate with other smart devices or upper machine by the other RS485.









Designed by international standard certification

▶ CE certification, supporting export



Supper high protection

- ► Excellent dust and water proof effect
- ▶ Light and stable



Appearance design concept derived from Europe

- ▶ Elaborate design, good quality
- ▶ Precise manufacture, realible



Full water supply function

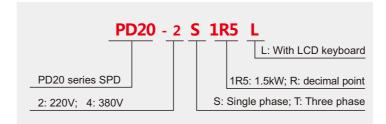
- ➤ Dual 485, suitable for monitoring +multi-connection
- ► RTC function,timing edition of applications
- ► Fully improve dedicated functions of pumps



■ Technical Data

		NIE zankol
င္ပ	Control mode	V/F control
ontro	Start torque	1Hz 100%
Control characteristic	Speed regulation range	1:20
nara	speed-holding precision	±1.0%
cter	Overload capability	120% rated current for 60s, 150% rated current for 1s
istic	V/F curve	Linear, squared curve
<u>"</u>	Acceleration/deceleration time	Range: 0.1-800s
ᇙ	Input voltage	220V/380V±15%
out/o and	Input frequency range	50/60Hz, fluctuation range: ±5%
Input/output and I/O	Output voltage	0-rated input voltage
듔	Output frequency	0~50/60Hz
	Programmable digital input	2 digital input
Pe	Communication interfaces	Equipped with one isolated RS485, and one extended Rs4885
Peripheral interface	Programmable analog input	Dual circuit, it can be set as voltage or current input by setting parameters; input voltage range0-10V; input current range 0/4-20mA
in in	Analog power	4-13,+24V dual power
terfa	Relay output	1 output, programmable
асе	Open collector output	1 output, programmable
	Analog output	Reserved
	Command running channel	Four kinds of channels: 1. operation panel 2. control terminal 3.serial communication port, choose 1 and 2 for host drive and 3 for auxiliaries 4. pressure of water inlet
	Internal clock	LCD keyboard built-in RTC
	Integrated PID	Advanced PID arithmetic to realize closed loop control system
Basic functions	Host and auxiliary drive connection	Extensible dual RS485 design, One drive in the system can be host and controls auxiliaries (5 at most) to work by communication mode. Host sends PID feedback to auxiliaries and monitors status of auxiliaries in real time. If failure occurs, the auxiliary will be skipped. The host can control auxiliaries and communicate with upper computer through the extended RS485 at the same time.
tion	AVR	When grid voltage changes, it keeps output voltage constant automatically. By default, it doesn't work at deceleration.
U)	Stall control	Automatically limit current and voltage at running period to prevent tripping caused by frequent overcurrent/over voltage.
	Password setting	4-bit password can be set with non-zero numbers. Exit password setting interface and the password will be valid after 1 minute.
	Parameter lock	Define whether the parameter is locked in running or stopped state in case of misoperation.
P	Automatic energy-saving running	Decrease output voltage automatically at light load to save energy.
dmr	Constant pressure control	PID adjustment, PID feedback of break detection, PID sleeping and wakeup
Pump control	Self-starting at power on	Optional self-starting at power on, adjustable starting delay
tr <u>ol</u>	Anti-freezing	Anti-freezing running frequency, time and cycle
	Water leakage inspection	Optimize sleeping control by water leakage inspection
<	High pressure alarm	Detect feedback pressure to protect pipe network
Vate	Low pressure alarm	Detect feedback pressure to protect pipe network and pumps
Water supply protection	Water shortage protection	Multiple water shortage protection detection modes (including no sensor mode)Controller detects that pipe network pressure is lower than water shortage pressure, system stops working automatically. After set period, it restarts automatically for specified times. If pressure restores to normal, system works normally. Otherwise, system stops automatically in case of idle running of pump and prolongs pump lifetime in maximum.
e A	Installation environment	Installation environment should have be without direct sunlight, dust, corrosive gas, inflammable gas, oil mist, steam, water drop
hvir	Altitude	Lower than 1000m, service in derated capacity above 1000m. Derate 1% capacity every 100m increase in height.
icati onm	Environmental temperature	-10 ℃~+40 ℃, service in derated capacity for 40 ℃~50 ℃. Derate 4% capacity every 1 ℂ increase in temperature.
Application environment	Vibration	<5.9m/S2(0.6G)
	Storage temperature	-40°C ~+70°C

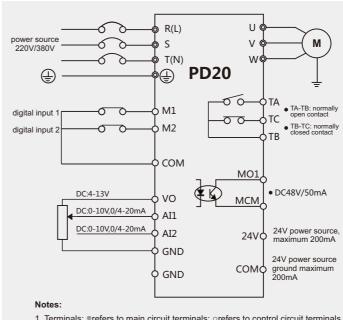
■ Model Number Description



■ Selection Guide

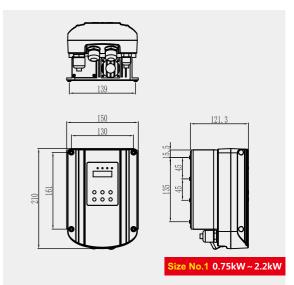
Voltage class	kW	НР	Rated input current (A)	Rated output current (A)	Size No.	Series		2:220V 4:380V	T: three- phase S: single- phase	Adaptiv motor power
Single	0.75	1	8.2	4.5	1	PD20	-	2	S	R75
phase 220VAC	1.5	2	14.2	7	1	PD20	-	2	S	1R5
±15%	2.2	3	23	10	1	PD20	-	2	S	2R2
	0.75	1	3.4	2.5	1	PD20	-	4	T	R75
	1.5	2	5	3.7	1	PD20	-	4	Т	1R5
	2.2	3	5.8	5	1	PD20	-	4	Т	2R2
Three	4	5	10	9	2	PD20	-	4	Т	004
phase 380VAC	5.5	7	15	13	2	PD20	-	4	Т	5R5
±15%	7.5	10	20	17	2	PD20	-	4	Т	7R5
	11	15.0	26	25	3	PD20	-	4	Т	011
	15	20.4	35	32	3	PD20	-	4	Т	015
	18.5	25.2	38	37	3	PD20	-	4	T	18R5

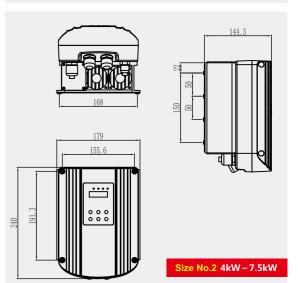
■ Wiring Diagram

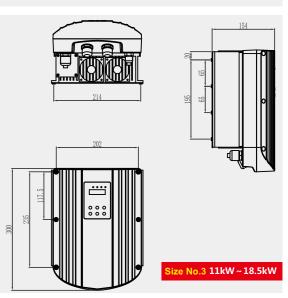


- 1. Terminals: ${\tt @refers}$ to main circuit terminals; ${\tt orefers}$ to control circuit terminals.
- 2. When selected control voltage is 220V, connect terminals R and T.
- 3. Do not break the keyboard cable when unplugging it.

■ Outline Dimensions







PDG10 SERIES

Power range: single phase input and three phase output: 0.75-2.2kW; three phase input and three phase output: 0.75-400kW

PDG10 Series Smart Effi Pump Drive

PDG10 series wall mounted (cabinet) pump dedicated drives are smart all-in-one water supply products developed independently by SAJ. It is installed in the electric control cabinet and can be connected to many kinds of sensor signals such as pressure sensors, transmissible pressure gauges and pressure switches. The system is easy to operate and cost effective with high reliability and low noise. Each pump is equipped with a pump drive, which can realize multi-pump(host and auxiliary pumps) linked operation.



Two-way communication extension performance

- ➤ Standard dual RS485 interface for On-line monitoring purpose
- ► Standard dual relay, one drive two rotation
- Standard dual analog, current voltage change at will

Multi-Pump Smart Link, easy setting

- ▶ Only a network cable is needed to combine multiple pumps.
- ▶ One key setting to realize multipump linkage constant pressure water supply



- supply system
- Secondary booster water supply systemWater treatment, water
- circulation system

 ▶ Air conditioning cold water and



Dedicated water supply function

- ➤ Single-point/multipoint pressure detection, more precise and energy saving
- ▶ Dedicated control: dormancy, water leakage, automatic running recovery
- ➤ Dedicated protection: water shortage, antifreezing, alarm at high and low pressure

Wide applicability

- ► General product design
- ▶ Wide power range 0.75-400kW
- ▶ Stable and reliable
- ▶ Panel control function, apply to fan and water pump

■ Technical Data

Con	Starting torque	0.5Hz 100%
Control characteristic	Speed adjustable range	1:100
hara	speed-holding precision	±1.0%
cteri	Overload capability	150% rated current for 60s; 180% rated current for 1s
stic	Acceleration/deceleration time	Range: 0.01 ~ 360s
	Start frequency	0.01 ~ 10.00Hz
Inp	Input voltage	220V/380V±15%
Input/output	Input frequency range	50/60Hz, fluctuation range: ±5%
tput	Output voltage	0 ~ rated input voltage
	Output frequency	0 ~ 50/60Hz
	Programmable digital input	6 ways of digital terminal input
peripheral interface	Programmable analog input	Al1: $0/4 \sim 20$ mA; To switching $0\sim 10$ V by setting parameters Al2: $0/4 \sim 20$ mA; To switching $0\sim 10$ V by setting parameters
eral i	Relay output	2 way of output, programmable
nterf	Open-collector output	1 way of output, programmable
ace	Analog output	Reserved
	Command running channel	Three kinds of channels: 1. operation panel 2. control terminal 3.serial communication port, choose 1 and 2 for host drive and 3 for auxiliaries
	Multi-Pump Smart Link	One drive in the system can be host and controls auxiliaries(4 at most) to work by communication mode. Host sends PID feedback to auxiliaries and monitors status of auxiliaries in real time. If failure occurs, the auxiliary will be skipped.
	Integrated PID	Advanced PID arithmetic to realize closed loop control system
В	AVR	When grid voltage changes, it keeps output voltage constant automatically. By default, it doesn't work at deceleration.
asic f	Stall control	Automatically limit current and voltage at running period to prevent tripping caused by frequent overcurrent/overvoltage.
Basic functions	Water shortage protection	Controller detects that pipe network pressure is lower than water shortage pressure, system stops working automatically. After set period, it restarts automatically for specified times. If pressure restores to normal, system works normally. Otherwise, system stops automatically in case of idle running of pump and prolongs pump lifetime in maximum.
	High pressure alarm	When pressure exceeds set pressure, it stops automatically to prevent pipe network from high pressure.
	Automatic energy- saving running	Decrease output voltage automatically at light load to save energy.
	Password setting	4-bit password can be set with non-zero numbers. Exit password setting interface and the password will be valid after 1 minute.
	Parameter lock	Define whether the parameter is locked in running or stopped state in case of misoperation.
App	Installation environment	Installation environment should have be without direct sunlight, dust, corrosive gas, inflammable gas, oil mist, steam, water drop
lication	Altitude	Lower than 1000m, service in derated capacity above 1000m. Derate 1% capacity every 100m increase in height.
Application environment	Environmental temperature	-10 $^\circ\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!$
nme	Humidity	≤95%RH, no water condensation
큺	Vibration	< 5.9m / S2(0.6G)

■ Model Number Description

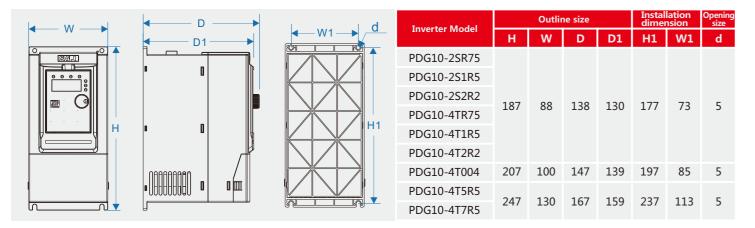


Selection Guide

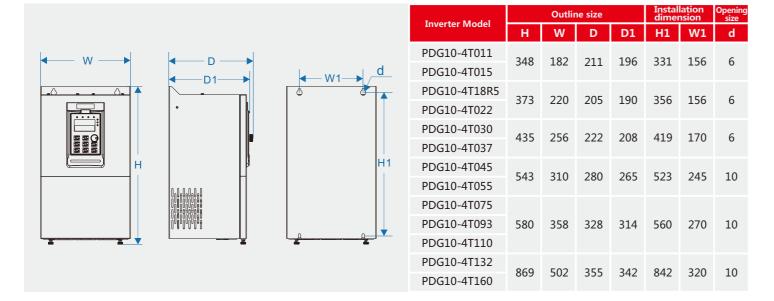
Voltage	Power		Rated intput	Rated output	Struc -ture	Series	Version	2:220V	S:single -phase	Adaptive motor
grade	kW	HP	current(A)	current(A)	No.	No.	VCISION	4:380V	T: three -phase	power
Single	0.75	1	8.2	4.5	1	PDG	10	2	S	R75
phase 220VAC	1.5	2	14.2	7	1	PDG	10	2	S	1R5
±15%	2.2	3	23	10	1	PDG	10	2	S	2R2
	0.75	1	3.4	2.5	1	PDG	10	4	T	R75
	1.5	2	5.0	3.8	1	PDG	10	4	T	1R5
	2.2	3	5.8	5.1	1	PDG	10	4	T	2R2
	4	5	10.5	9	2	PDG	10	4	T	4
	5.5	7.5	14.6	13	3	PDG	10	4	T	5R5
	7.5	10	20.5	17	3	PDG	10	4	T	7R5
	11	15	26	25	4	PDG	10	4	T	11
	15	20	35	32	4	PDG	10	4	Т	15
	18.5	25	38.5	37	5	PDG	10	4	T	18R5
	22	30	46.5	45	5	PDG	10	4	T	22
	30	40	62	60	6	PDG	10	4	T	30
	37	50	76	75	6	PDG	10	4	T	37
Three phase	45	60	923	91	7	PDG	10	4	T	45
380VAC ±15%	55	70	113	112	7	PDG	10	4	T	55
	75	100	157	150	8	PDG	10	4	T	75
	93	125	180	170	8	PDG	10	4	T	93
	110	150	214	210	8	PDG	10	4	T	110
	132	180	256	253	9	PDG	10	4	T	132
	160	220	307	304	9	PDG	10	4	T	160
	200	275	385	377	10	PDG	10	4	T	200
	220	300	430	426	10	PDG	10	4	T	220
	250	340	468	465	10	PDG	10	4	Т	250
	280	380	525	520	10	PDG	10	4	Т	280
	315	430	590	585	11	PDG	10	4	Т	315
	355	480	665	650	11	PDG	10	4	Т	355
	400	545	785	725	11	PDG	10	4	Т	400

■ Dimensions(mm)

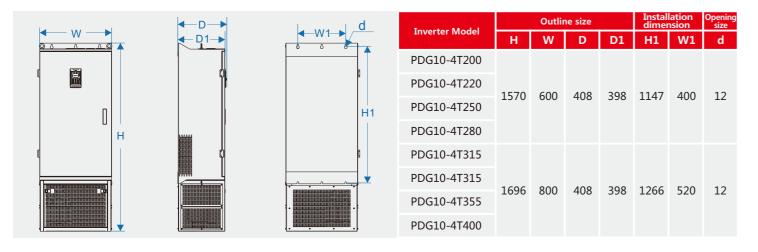
0.75kW-7.5kW dimensions



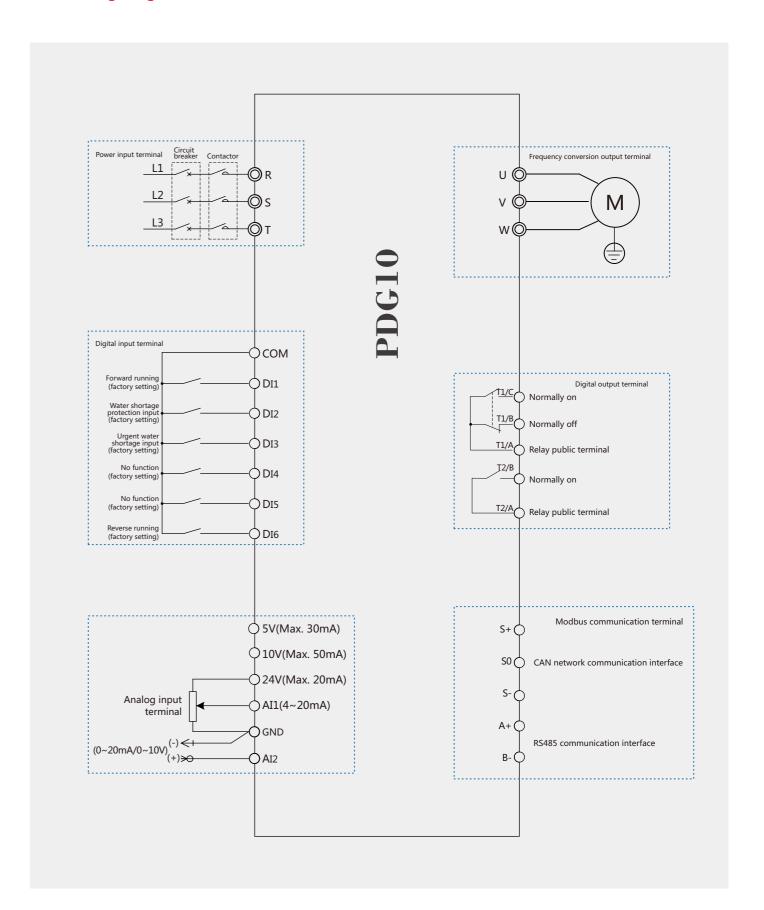
11kW-160kW dimensions



200kW-400kW dimensions



■ Wiring Diagram

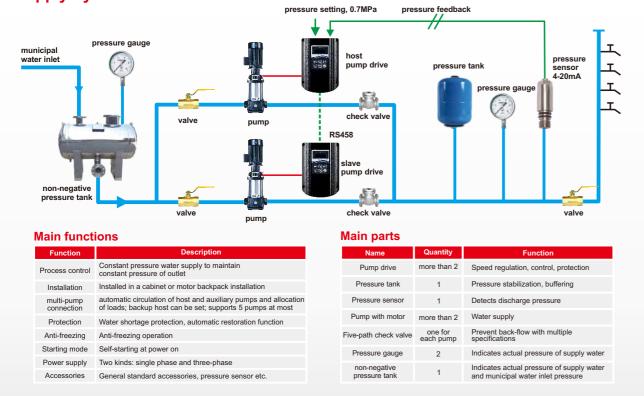


SAJ SMART PUMP SYSTEM DIAGRAM

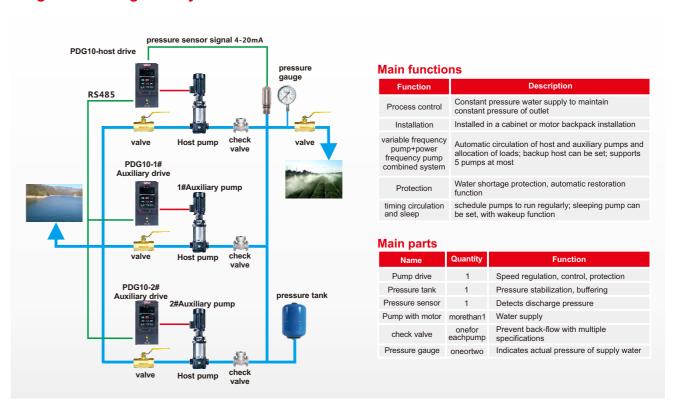
■ Single Pump Pressure Boost Unit



■ Multi-pump Smart Link Non-negative Pressure Variable Frequency Constant Water Supply System



■ Agriculture Irrigation System



■ Applications of Smart Pump Drive



PROJECT REFERENCE OF SAJ SMART PUMP DRIVE





