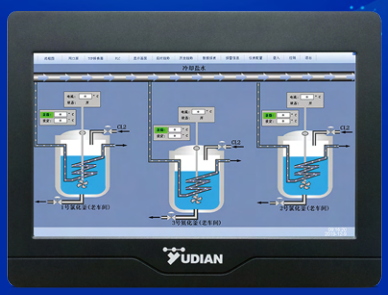
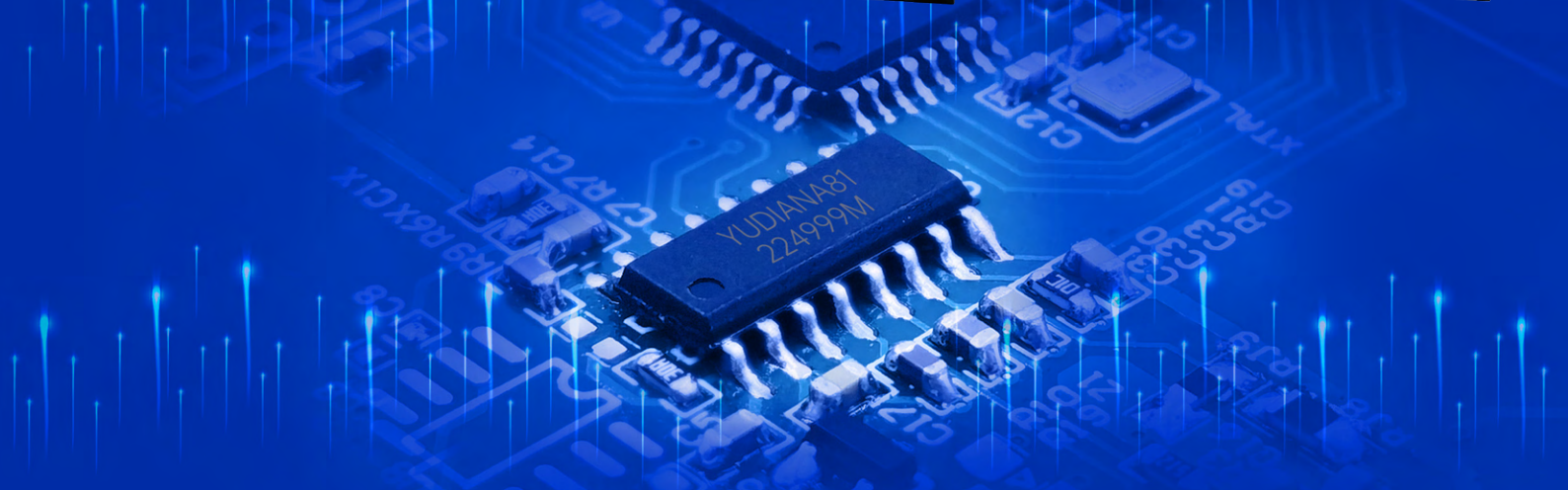
YUDIAN

AI-8
New Product Manual
2023

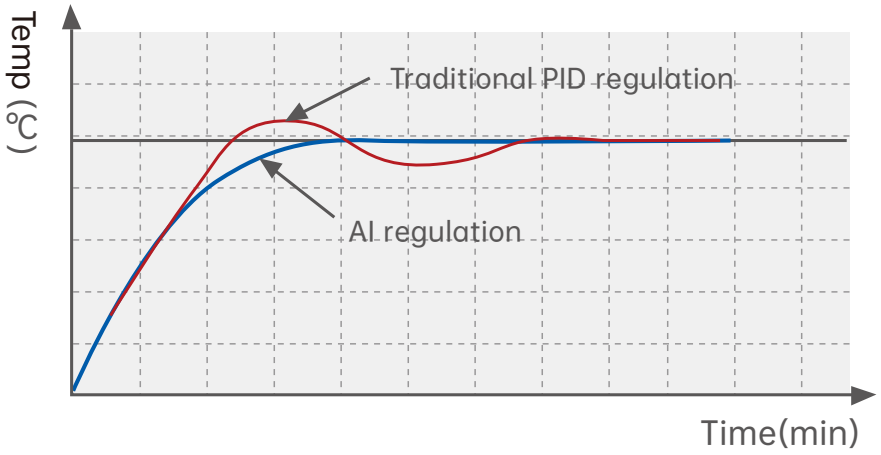




PID algorithm based on AI artificial intelligence technology can easily achieve accurate control

AI artificial intelligence regulation technology

- AI artificial intelligence technology can automatically identify different scenarios, such as changing the set value, pure delay, additional disturbance, furnace opening, unexpected power failure, etc., and simulate expert thinking to adjust the status of PID controller, so that it can achieve accurate control without overshoot and undershoot in a variety of different applications.

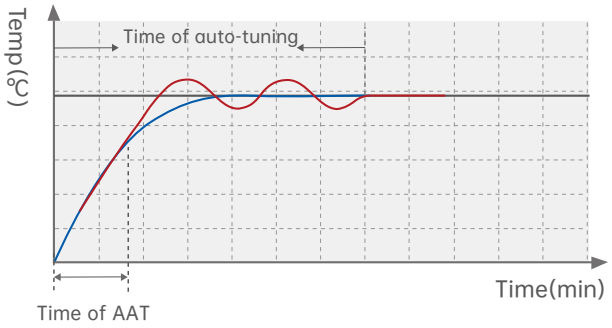


Precise Control of 0.01℃

- Under the condition that the external conditions meet the requirements, AI artificial intelligence regulation can achieve ultra-high precision temperature control of ± 0.01 ℃, ensuring the realization of control objectives and improving the overall control quality of the temperature control system.

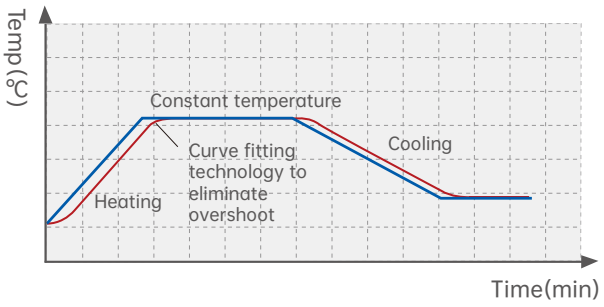
AAT advanced quick auto-tuning

- In addition to the classic AT auto-tuning, the AAT advanced quick auto-tuning can analyze the temperature rise curve and calculate the PID parameters upon power on and warming up of the instrument. No need to oscillate back and forth like the traditional AT, which greatly saves the equipment debugging time.



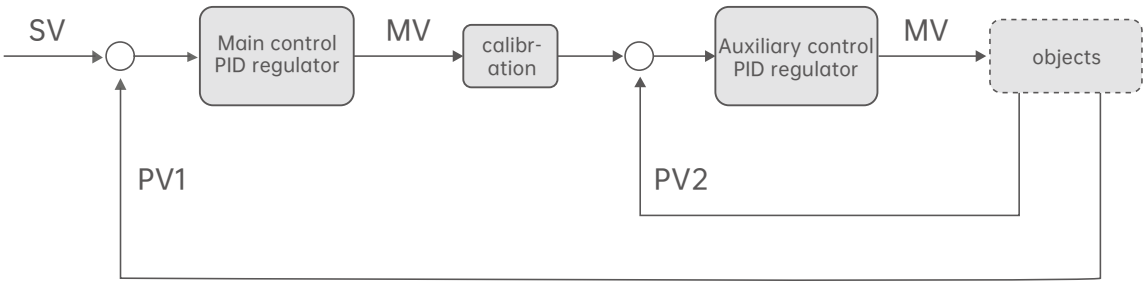
Powerful program control and curve fitting technology

- Programmed instruments can be controlled by multi-segment programs to achieve the rise/fall of any slope, or to jump (recycle), run, hold and stop through programming/operation, and allow the program to be edited at any time during operation; AI regulation algorithm with curve fitting function is adopted to obtain smooth curve control.
- 10 groups of 50 program steps can be backup. Multiple groups of steps can be selected.
- Two groups of PID parameter automatically switch over according to the magnitude of set point SV.



Intelligent regulation on temperature set by cascade

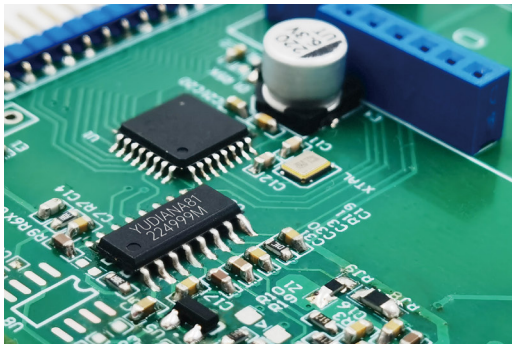
- The new single-loop instrument has two sets of inputs, which form a cascade control loop inside the instrument. The intelligent temperature regulation makes the commissioning of the cascade instrument as simple as that of the ordinary single-loop PID instrument, and the complex control object can also be easily handled.



Up to 2 years of rigorous testing to create a new generation of more reliable products with higher performance

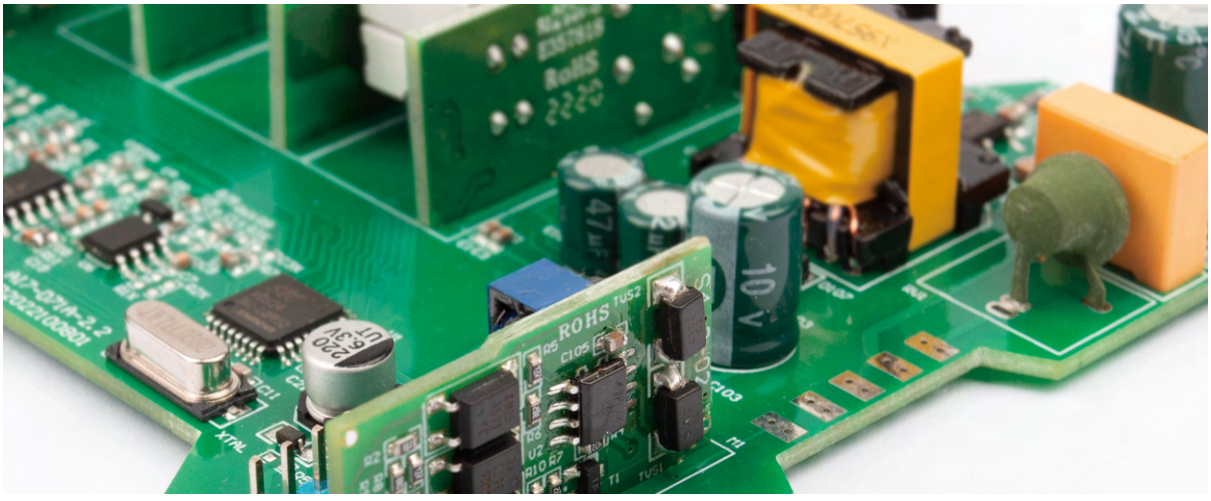
Performance monster by specialized A/D chipset

- Anti-inference and reliability are highly maximized by an integrated circuit design of previously multiple chips and peripheral circuits.
- Robust hardware performance is reached. The anti-inference is up to 120dB in working power frequency is 50Hz and 60Hz.
- Refresh rate of main input is rapid up to 60ms.The sample speed is selectable.
- The supply of smart chip is guaranteed to be stable due to own chipset technology. In 2022, our chipset supply was still stable and maintained the original price even in the period of global shortage of smart chips.



With high precision and low temperature drift, enables high efficiency and energy saving

- The accuracy of the products provided is 0.05~0.3℃, which fully meets the different accuracy requirements of customers; The new product adopts a low temperature drift resistance of 5~25ppm/℃ according to the different measurement accuracy, and the temperature drift of the process value is improved by more than 20% compared with our previous products of the same level
- Low-temperature drift can effectively improve the yield of products by customers in different seasons and climates, and reduce the energy consumption of products through precise control.
- Pt100 can be connected as optional external cold junction compensation to increase the measurement accuracy. The accuracy improvement is higher than connecting Cu50 previously.

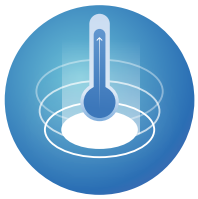


Strong anti-interference, high reliability and quality

Group pulse anti-interference improved to 6KV

- It has passed the environmental adaptability tests of static electricity, surge, group pulse, high temperature, high humidity, rapid temperature change, etc., and is suitable for various complex working conditions, with perfect anti-interference ability and measurement and control effect. Compared with our previous generation of products, the group pulse anti-interference test standard has been raised from 4KV to 6KV, meeting the normal working requirements under harsh industrial conditions.

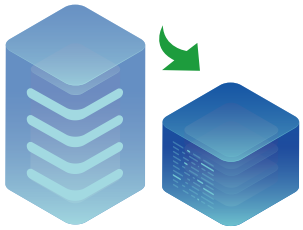
Wide working temperature range, better adaptability



Maximum temperature raised to above 120 ° C

- The ultimate temperature that the PCB main board (excluding the shell) can withstand has been raised from 85 ℃ of the previous generation to more than 120 ℃, surpassing the ordinary industrial products.

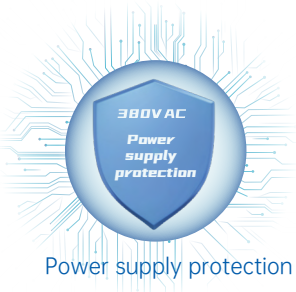
New low-power design reduces energy consumption by 50% under no-load condition



0.5-0.6w 0.2-0.3w

- Due to the use of variable-frequency switching power chips and low power consumption to reduce the frequency of switching power supply, as well as the combination of "fever" level components and the new generation of self-illuminated bright LED display, the load power consumption of the new instrument (including the measurement display and all other output to be stop status) without output is reduced from 0.5-0.6w to 0.2-0.3w.
- The panel size instrument with low energy consumption does not need to open a cooling hole, which reduces the impact of dust on the measurement accuracy and effectively improves the service life of the product.

Comprehensive power protection to ensure safety



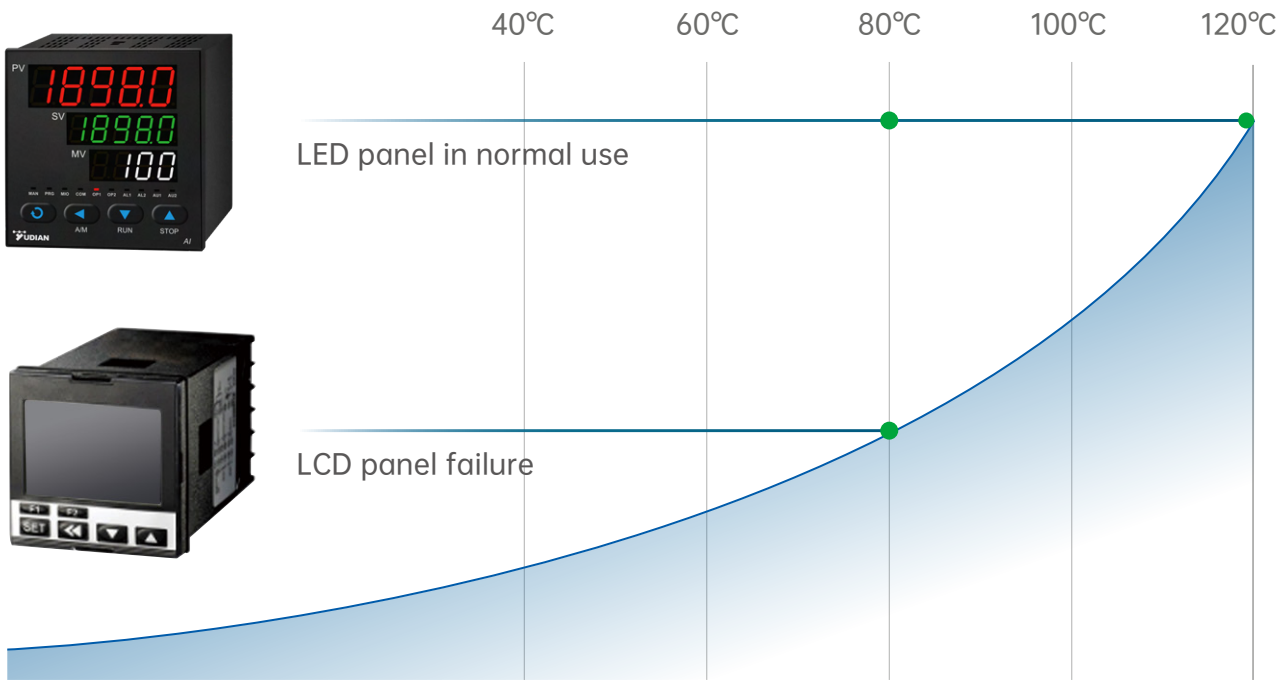
Power supply protection

- The power input terminal is provided with conventional lightning protection and surge protection, so that the instrument will not be damaged if the 380VAC power supply is wrongly connected for a long time; If the grid is under voltage, It also has the instantaneous power failure protection function. When the starting voltage is as low as 50VAC, the grid can still work for more than 0.5 seconds after the instantaneous power failure.

New self-luminescent energy-saving display with rich colors and comfortable appearance

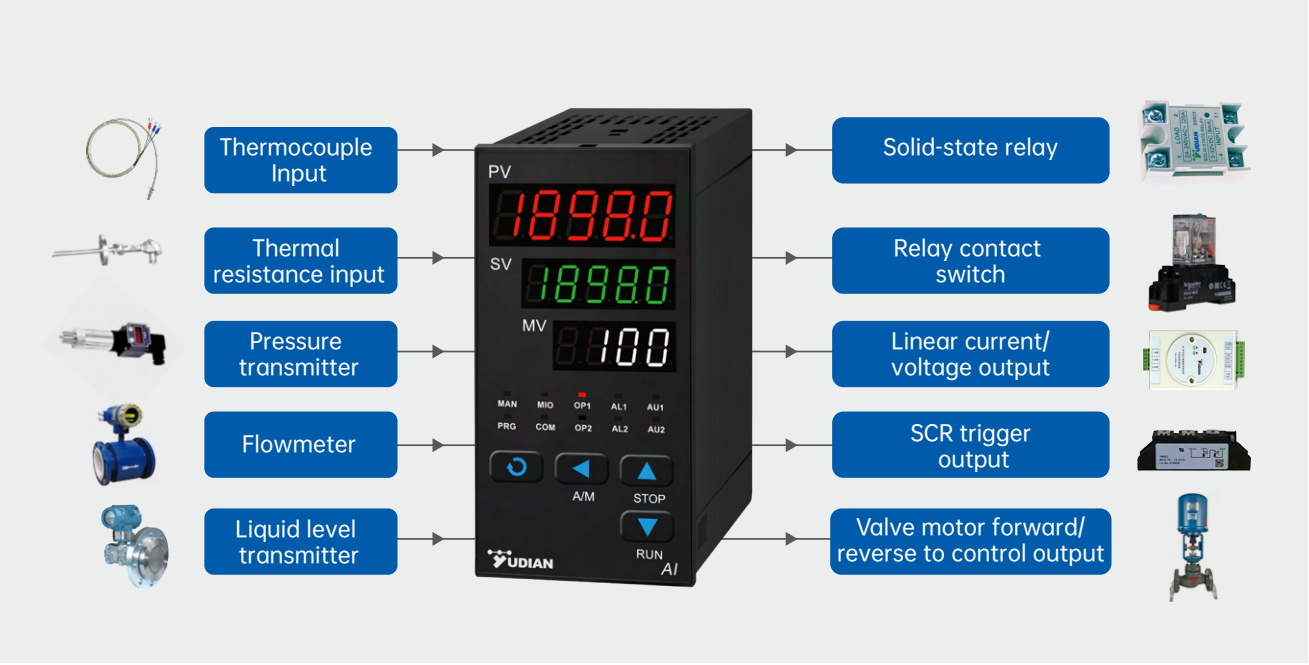
- Self-luminous LED display panel is selected, with advantages of long service life, high temperature resistance and no visual angle.

- The LED display panel can withstand high temperature to above 120 ℃; Compared with LCD products, it is more suitable for high temperature environment. The commonly used LCD module can work normally only when the temperature is below 70 ℃. Even for the ultra-wide temperature LCD screen, the maximum temperature can only be 80 ℃. When the limit temperature is exceeded, the LCD screen will fail. In addition, the service life of LED display is at least 10 years and its display effect remains unchanged, which is far superior to the ordinary LCD display.



Rich input and output modules for customers to configure personalized instruments

- The new modular and platform-based technology makes the power consumption of the module lower; In addition to the classic pluggable module, smaller welding module are introduced to give customers more choices.
- The instrument can select a variety of input and output modules, including thermocouple/thermal resistance input, voltage and current input, relay output, SSR drive voltage output, linear current output, as well as phase modulation trigger output, valve motor control and valve position feedback, which can support almost all common input and output modules in industrial sites.



- The new multiple output modes enable instruments of some models to support 4 groups of SSR outputs that can independently regulate the power amplitude or 2 groups of linear current outputs, meeting the need to control multiple groups of actuators through one output of the instrument.

The minimum installation width of a new multi-loop temperature controller can be as narrow as 3.8mm

- The 4~6 channel temperature controller installed with DIN guide rail in the width of 22.5mm is designed according to the European industrial standard housing. The installation width of its single control circuit can be reduced to 3.8mm, greatly saving the installation space.

Installation forms and specifications to meet various on-site requirements

- Provide various panels, including industrial panel mounted instruments such as 80*160mm and 160*80mm, which are special in the market, and ensure timely and stable supply. Users are allowed to choose four-digit or five-digit display panel, two-row or three-row screens, with or without light bar, and color TFT touch screen LCD display.
- The large-scale touch-screen recording instrument integrates display control, data recording, network interconnection, English and Chinese interface and other functions; It uses an industrial touch screen, which is 9 inches large but only 38 mm thick. Least installation space is required.

A type-96x96mm

A2 type-96x96mm

A5 type-96x96mm

A9 type-96x96mm

B type-160x80mm

C3 type-80x160mm

D type-72x72mm

D21/D61/D62 type-48x48mm

D5 type-22.5x100mm

D7 type-22.5x100mm

E type-48x96mm

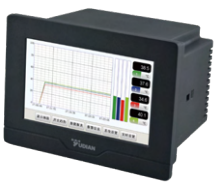
E2 type-48x96mm

E3 type-48x96mm

E5 type-48x96mm

E9 type-48x96mm

F type-96x48mm



5 inches

7 inches

9 inches

New AI-8 series single-loop artificial intelligence regulator/temperature controller

Based on the new generation of modularization and platform, the instruments have powerful functions and can be widely used in semiconductor, new energy and other industries.

- Provide customers with products with measurement accuracy of level 0.05~0.3, with a free warranty of 2~10 years.
- The PID algorithm of the new generation AI artificial intelligence enables the instrument to accurately control without overshoot and undershoot even in the case of large delay and extra disturbance.
- Provide customers with modular and platform-based structure, multiple input and output modules, including relay, SSR, linear current, phase modulation trigger output, valve motor control and valve feedback, which gives customers a high degree of freedom of choice.
- Temperature range - 10~+60 ℃, and the limit test temperature of PCB main board (excluding the housing)is as high as 120 ℃.
- It has multiple functions, such as cascade control, program control, heating and cooling double output, manual and automatic undisturbed switching, external setting, external event input, input multipoint correction, temperature rise and fall rate limit, high temperature furnace multi-section curve heating power limit, soft start, transmission, alarm, etc.
- -Single channel / two channel external event input, program start/stop (button method, switch of set point SP1/SP2, switch of group 1 and 2 of PID parameters, switch of direct/reverse action (PID parameters are switched simultaneously, switch of manual / automatic control, run/stop (I/O method.
- Heater burnout alarm is available with corresponding function module and panel selection with current transformer (CT measurement alarm, CT current display and etc.
- Multiple alarm functions, including upper limit/lower limit, positive deviation/negative deviation, interval alarm and power-on deviation alarm exemption.
- Support AIBUS and MODBUS protocols.
- Provide various dimensions of panel mounted instruments and rail mounted instruments as well as display panels, adopt self-illumination display with LED low energy consumption, beautiful appearance, long life, and high temperature resistance, regardless of angle.
- The modules with its own isolated power supply is equipped to provide a comprehensive solution to the input and output signal isolation.
- The communication delay is less than 10ms, and high-speed communication and connection with TCP industrial Internet meet the needs of large systems.

AI-7 series multi-channel measuring and controling instruments

Bearing a number of core technologies and adopting domestic high-quality chips, after two years of strict testing, it provides customers with products with higher technology and lower prices.

- PID control with 4~6 channels AI technology can effectively save costs and installation space.
- High-precision low temperature drift elements are selected, with measurement accuracy of grade 0.15~0.3, and free warranty period of 2~8 years.
- D71 guide rail mounting shell whose width is only 22.5mm is adopted.
- Grounded thermocouple and 2-wire RTD, 2n+1 RTD, 3-wire RTD (limited to 4 channels or thermocouple input which is weakly isolated from each other (dedicated to the scenarios of multiple inputs with grounded negative pole of thermocouple and sheath wall. The increased fluctuation of displayed numbers in the application of multi-channel inputs can be avoided. are supported.
- With ultra-low energy consumption design, no need to worry about heating during intensive installation.
- Four slots, two of which are used for 6-channel SSR output or 4-channel current output (common negative terminal, and the other two can be used for alarm relay output and various RS485 communication.
- It supports AIBUS protocol and MODBUS protocol, and allows to plug and unplug terminals in communication and power supply, greatly reducing wiring workload; It is convenient to install it with TCP communication controller of the same D71 size to support industrial Internet connection.
- Positive/negative control of heating or cooling.
- ON-OFF mode is used as multi-channel data collector and alarm.

AI-9 Series Modular Multi-channel AI Smart Temperature Controller/Process Regulator

Based on the installation design of DIN rail and bottom bus terminal, the modular slave instrument can be easily plugged and replaced. Maximum 32 measurement and control slave units are supported in a modular block.

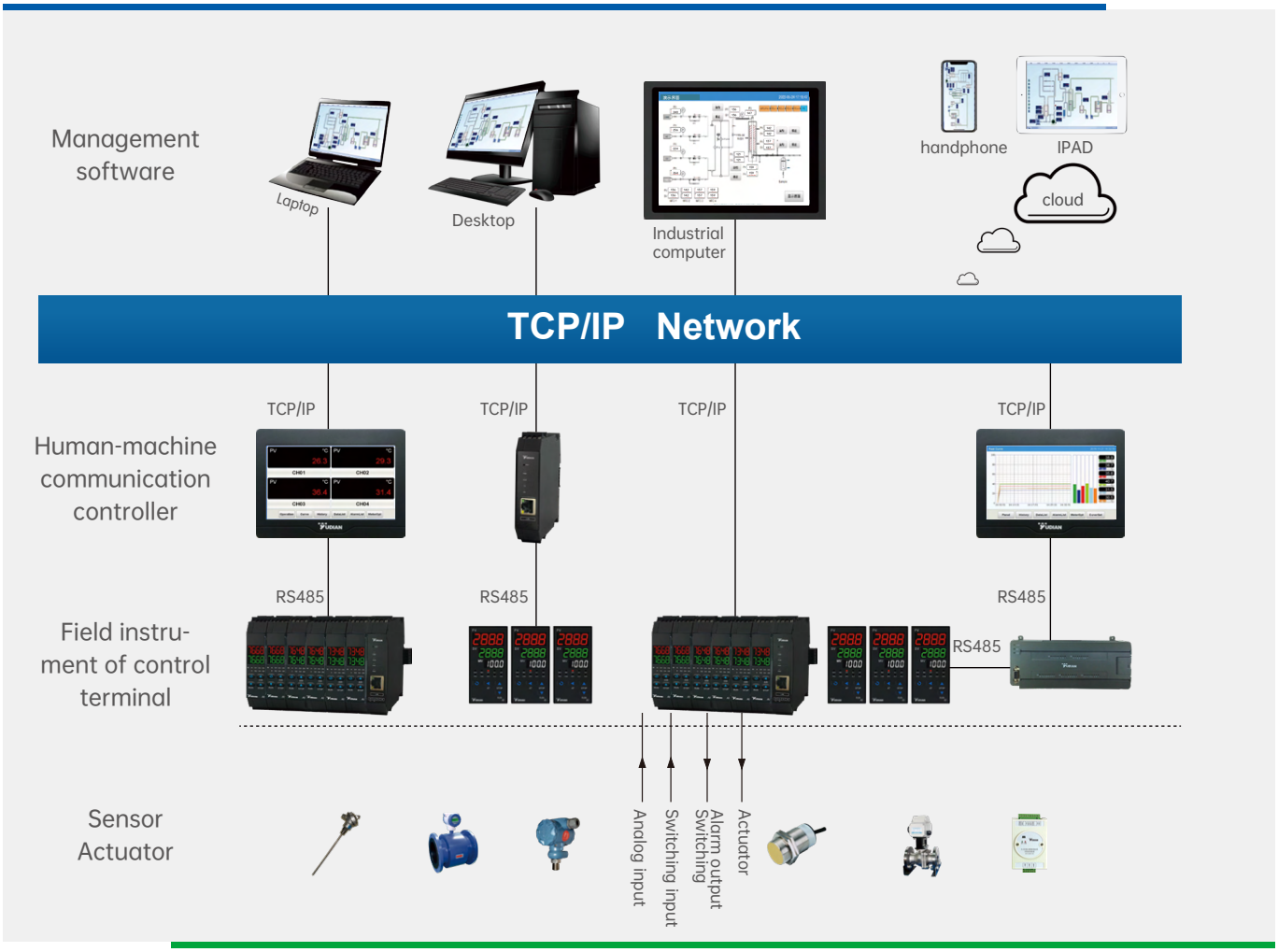
- Maximum 192 channels of set temperature, pressure or flow data collection or control supported. Maximum 32 channels of high performance temperature control (program control, valve servo control, high-speed sampling and etc) are supported. 32 channels of complex cascade temperature control (2-in 1-out for each channel) is supported
- Advanced AI artificial intelligent PID control algorithm without over-shooting nor under-shooting.
- Low power consumption at 0.2~0.3W for each instrument is idle at no output condition.
- Complex control function with collaboration among different channels can be implemented without master device due to the programmed communication device
- Flexible communication methods are allowed. MODBUS-TCP, MODBUS-RS485 and EtherCAT are supported.
- Multiple measurement accuracy from class 0.05 to class 0.3 are available to provide high cost efficiency.

AIFCS configuration software

Taking AI series instruments as the lower computer and multi-function communication controller for communication, combined with computers and AIFCS configuration software, an intelligent distributed control system with the advantages of centralized operation, risk dispersion, simple wiring, good reliability and high performance/price ratio can be formed.

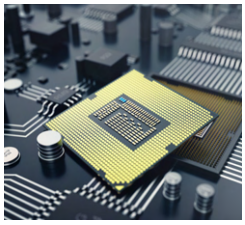
- Supports cross-platform operation and multiple communication protocols, such as Yudian's AIBUS and MODBUS, Siemens S7 series, Mitsubishi FX series, OPCDA, MQTT, etc.
- User-friendly with visual development, unlimited free configuration, rich animation and graphic controls (in Chinese only).
- Support multiple alarm modes, such as SMS, email, enterprise WeChat, etc.
- With AI-MODBUS and AIMODBUS-TCP, large, medium and small computer control systems can be easily formed.
- With high scalability, easily connect with MES and the system.
- The B/S structure is used for the network version. Instead of installing additional software,the client only needs to open the browser and directly enter the IP+slot.
- The network version supports up to seven clients at the same time.

Intelligent high-precision measurement, control and energysaving technology based on industrial Internet



- With high-speed communication technology and communication delay<10mS, easily build a large industrial Internet intelligent control system with thousands of control loops.
- Field instruments, communication controllers and configuration software can be programmed, and complex control systems such as cascade, feedforward, ratio and uniformity can be built according to customers' industrial needs.
- Low-temperature drift and high-precision measurement and control technology can effectively improve the qualification rate and production efficiency of customers' products, as well as reducing energy consumption.
- The on-site RS485 communication bus has the capability of long-distance data transmission of several kilometers.
- Based on the communication controller, a variety of network connection modes including TCP can be realized.
- The number of write in communication is not be less than 2 billion. The memory unit will not be damaged due to too many parameter inputs.
- Support a variety of field industrial communication protocols and can customize various functions according to customer requirements.
- The configuration software supports browsing through intranet browser and internet as cloud.

Widely applied to various industries, scientific research and experiments



Semiconductor industry

The semiconductor industry needs accurate, reliable and stable control of temperature. Our high-performance instruments solve the complex cascade control problem and can be applied to the diffusion furnace, oxidation furnace, annealing furnace, PECVD furnace and other equipment in the industry to improve production efficiency and product yield.

Lithium battery industry

The lithium battery industry is the most promising industry in the dual-carbon era. Our instruments can be widely used in the coating, winding, laminating, forming, baking and other processes in the lithium battery manufacturing process to improve the product quality of customers and reduce energy consumption.

Traditional electric furnace industry

The traditional electric furnace industry is a major industry in which our instruments are widely used, such as annealing furnace, carbon tube resistance furnace, tempering furnace, heat treatment furnace and crystal growth furnace.

Metallurgical industry

Metallurgy needs to use multiple physical parameters to control. Our instruments can be widely used, such as aluminum foil production, oxidation furnace production, metallurgical performance testing, etc.

Machinery industry

Our instruments are widely used in the machinery industry to accurately control multiple temperature zones, such as shoe machines, underwear machines, foaming machines, cable extruders, film blowers, bottle blowers, etc.

Chemical industry

Our AI intelligent instruments are widely used in many processes of this industry, such as Classics Projector, Petroleum Products Distillation Tester, Condensate Recovery System, Resin Production, Lithium Battery Coating Production Line, etc.

Widely applied to various industries, scientific research and experiments

Agricultural Cultivation

With the development of science and technology, agricultural cultivation has become more and more automatic and intelligent, which can completely get rid of the dependence on nature. Our products play an important role in it.

Cement Products

As a traditional industry, cement products includes cement production and maintenance; our instruments can be used for this industry as well as high-speed rail maintenance.

Environment Protection

Energy conservation and emission reduction is the theme of these years, and is also an essential choice for harmonious society and sustainable development. Our instruments are widely used in many fields.

Pharmaceutical industry

Pharmaceutical industry needs to accurately measure and control various parameters; Our paperless recorder, DCS monitoring system, AI artificial intelligence regulator and flow totalizer can be widely used.

VAC Industry

For comfort and energy saving, the HVAC industry needs to accurately control the flow, temperature, pressure and other parameters. Our AIDCS monitoring system, paperless recorder and PID regulator can be widely used.

General Control

We have rich product lines, high-performance artificial intelligent temperature controller, and products such as patrol inspection instrument, flow totalizer, PLC, paperless recorder, DCS control system, etc. Therefore, accurate measurement and control of the whole process can be realized.

Yudian ——
Professional Supplier of High-end Intelligent Instruments

Independent R&D and innovation have won manyhonors

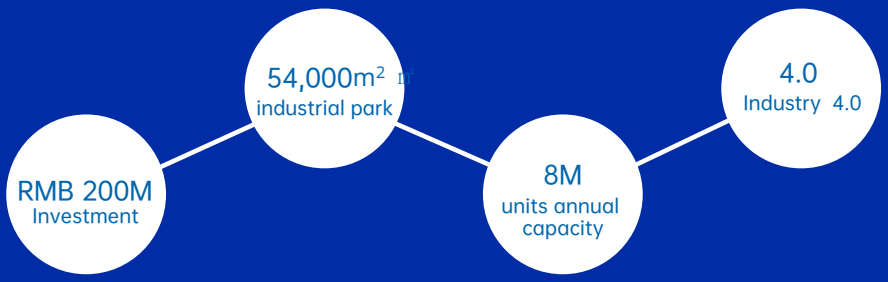
- Yudian has not only been rated as "**National Key Software Enterprise**" and "**Specialized and Special New**" SMEs in Fujian Province, but also won the titles of "**National High-tech Enterprise**" and "**Xiamen Taxpayer Star Enterprise**" for many consecutive years, and even elected as the chairman unit of display control instrument of China Instrument Industry Association in 2014. Our products have passed RoHS, UL, CE and other professional standards certification, and listed in the "**National Key New Product Plan**". Its high-end products have achieved the international advanced level. At the same time, Yudian actively participated in the formulation of national standards. In addition to participating in the drafting of dozens of national standards such as Internet of Things transmitters and embedded controllers, it also presided over the drafting of **Analog Signal Regulators for Industrial Process Control Systems** and **Attribute List for Electronic Data Exchange of Temperature Measuring Equipment.**

Obtained technical certification of multiple independent patents Actively participate in the formulation of national standards

Yudian ——
Professional Supplier of High-end Intelligent Instruments

- At present, Yudian is the leading enterprise of intelligent regulators and temperature controllers in China, which has a self-built high-tech factory building of 10,000m² and an annual capacity of 1.6 million intelligent instruments. Its market share in China is far ahead. In order to meet the needs of development, we invested RMB 200 million to build an intelligent manufacturing industrial park with a building area of 54,000m². The main building has been successfully completed. The annual capacity will exceed 8 million units and supply to to the global market.

- The new factory is built according to industrial standard 4.0 and industrial Internet requirements. With digitalization as its core, it not only uses the leading technologies in the fields of intelligence, digitalization and the Internet of Things, but also employs advanced manufacturing management system and manufacturing process flow to quickly and accurately carry out personalized and large-scale customized production in a real-time and online manner, and implements strict quality control standards, realizing the "flexibility, automation, interconnection and intelligence" of instrument production, which makes the instruments from Yudian become the embodiment of high quality, customizes safer, more reliable and more stable automatic, digital and intelligent products for customers, and enables China's manufacturing industry to upgrade with high quality.



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