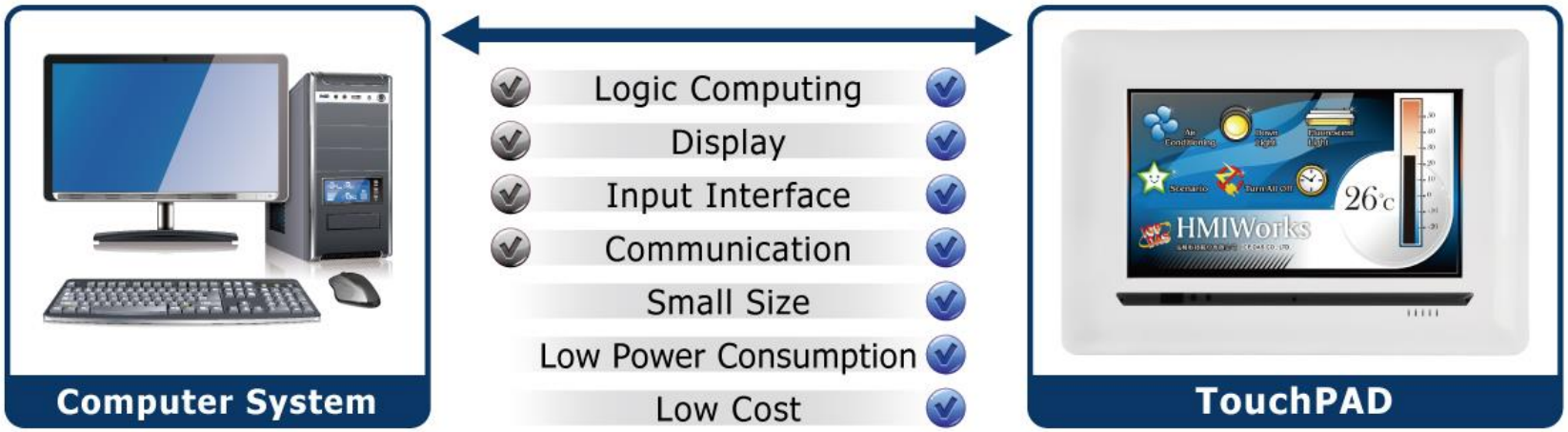
TouchPAD – Touch HMI Device



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ICP DAS TouchPAD touch HMI device is similar to a microcomputer that can be programmed according to customer's application requirements to replace some small controllers or computers. Small size, low power consumption, energy saving and carbon reduction, no additional cost for operating system and HMI software, and lower construction cost. The built-in 32-bit MCU can provide basic logic operation and control, and the dedicated and free HMIWorks can speed up the development of your control system. Support for C language and ladder program development, so that IT and PLC engineers can use it.

The TouchPAD screen has a minimum size of 2.8 inches (320x240) and a maximum size of 7 inches (800x480). The high-resolution screen can display detailed images with rich colors. The screen is equipped with touch function, and the operation is more intuitive and easier to use; without the use of external devices such as keyboard and mouse, which take up more space. Supports multi-page display and switching, can display more data and control options, and can group related content to keep the user interface clean and easy to use. The RS-232 / RS-485 and Ethernet communication interfaces can be connected to external IO modules, which can collect various device data and expand various control capabilities. Supports Modbus RTU, Modbus ASCII, Modbus TCP, DCON and MQTT communication protocols, bringing great convenience to system integration.

The following is an introduction of some TouchPAD applications to see how it can solve various problems in the field.

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CO2 Monitoring in Fruit Storage



The oxygen content in the air is about 21% and the carbon dioxide concentration is about 400 ppm. By reducing the oxygen content in the air and increasing the carbon dioxide concentration in the storage room, the ripening process of fruits and vegetables can be delayed, making them dormant and extending their shelf life. This is very useful for long-distance transportation or long-term storage of fruits and vegetables. However, the lack of oxygen or high concentration of carbon dioxide can be harmful to the human body, so if the air quality does not meet the safety standard, workers should not be allowed to enter.

The ICP DAS CL-252-E measures the concentration of oxygen and carbon dioxide in the air, as well as temperature and humidity, which are important reference data for the storage of fruits and vegetables. The ICP DAS TPD-283U-H collects the relevant data via RS-485 or Ethernet and displays the green value when it is safe and the red warning when it is dangerous. Each storage room can be operated independently or interconnected, and the compact TPD-283U-H takes up little space, making it ideal for installation outside each storage room.

Indoor CO2 Monitoring

Indoor air quality requires continuous monitoring and timely air conditioning, especially in crowded areas where relevant monitoring levels should be announced and crowd control should be implemented.

Public display of indoor carbon dioxide concentration levels will help raise public awareness of indoor air quality and encourage people to take action to improve the indoor environment, thereby maintaining health and improving quality of life. For example, classrooms, libraries, medical and social institutions, offices and conference halls, public transportation, exhibition rooms, shopping malls, cinemas, KTV and sports and fitness... etc. are all indoor public places where people tend to gather.



The ICP DAS TPD-703-64 has RS-232/RS-485 and Ethernet communication interfaces to collect data from central control systems or on-site air quality sensors. The 7" touch screen can display multiple pages to show more air quality information for the general public or for the site manager's reference for crowd control.

Laboratory Dust Concentration Monitoring



The laboratory has special requirements for dust concentration, temperature, and humidity (e.g., no or low dust, constant temperature, etc.) that must be controlled to avoid major effects on experimental results. If necessary, use a filtration system, ventilation system, or other dust control measures to maintain the cleanliness of the environment.

The ICP DAS DL-1020 can measure PM2.5, PM1, PM10, temperature, humidity, and dew point. Through RS-485 or Ethernet connection, the ICP DAS TPD-433-H can directly collect the relevant data and display it on the screen to present the air monitoring information. Compared with the desktop computer system, TPD-433-H is a more suitable and affordable solution.

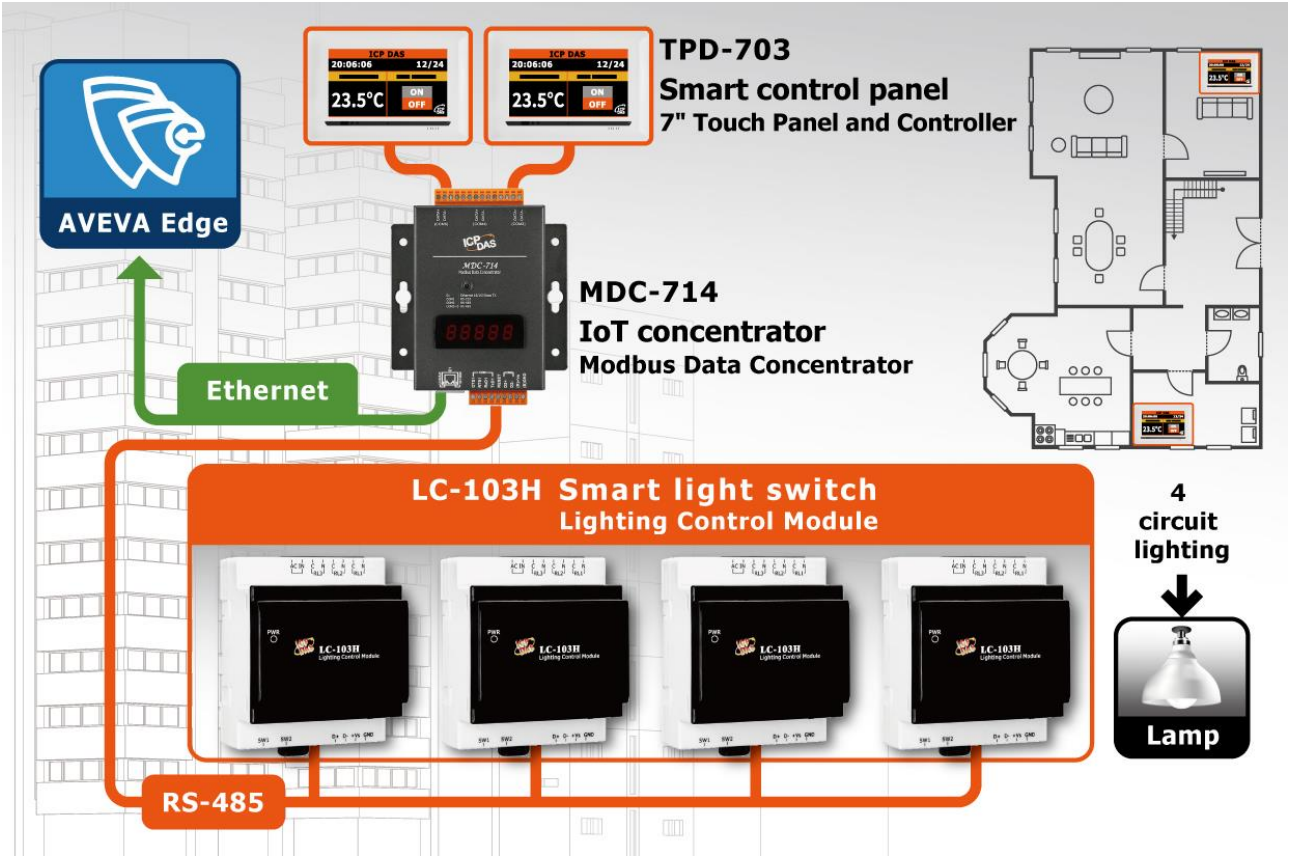
Showroom Lighting Control

ICP DAS TPD-283U-H can connect multiple LC-103H Lighting Control Modules via RS-485 for centralized control. The multi-style touch buttons can be displayed on the screen and the functions can be labeled with text, providing an intuitive user interface and avoiding the situation of hand-written functions with stickers next to the traditional buttons. The TPD-283U-H has an Ethernet function that can be used to connect to the host computer for system integration. The digital control system can be expanded in the future to include temperature/humidity monitoring and air-conditioning control, which is very flexible and expandable.



The ICP DAS LC-103H Lighting Control Module has 3 relay outputs (16A @ 250VAC, 16A @ 30VDC), each relay can control a group of lighting circuits. In addition to RS-485 remote control, it can also be connected to the local switch to easily achieve the dual switching function of physical and digital.

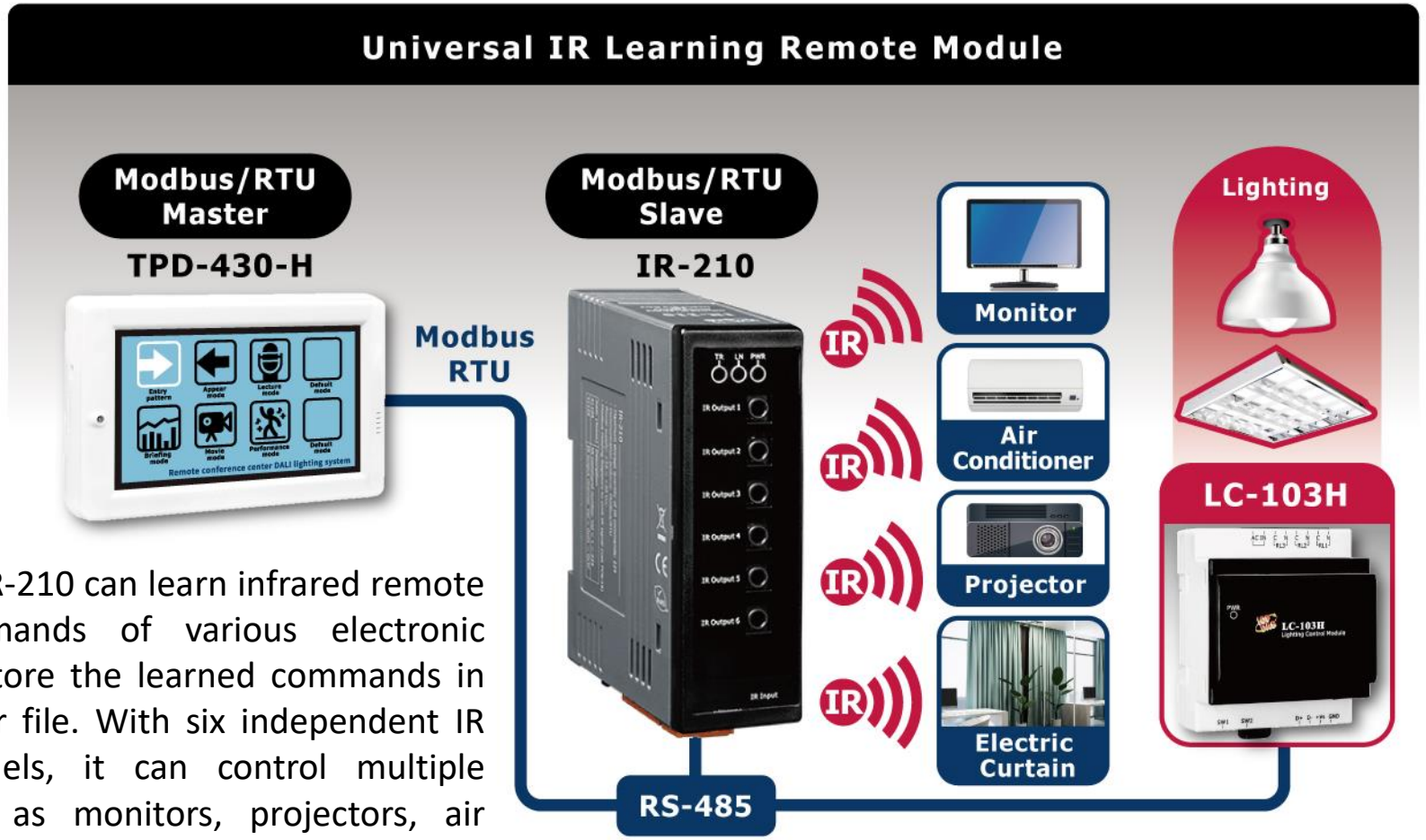
Central Control of Building Lighting



A building has several lighting systems, including office lights on each floor, public area lights, and LED lights on the exterior of the building. Previously, a timer was used in each area to turn the lights on at night and off during the day, but it was inconvenient and time-consuming for the maintenance staff to change the settings each season.

The ICP DAS LC-103H module supports three lighting control circuits that can be controlled both physically and digitally. The ICP DAS MDC-714 data concentrator connects multiple LC-103H modules and other I/O modules via RS-485, which can simplify centralized control of small areas by the host controller, reduce time spent on I/O control, and improve system performance. The ICP DAS TPD-703 connects to the MDC-714 via Ethernet or RS-485 and provides an intuitive lighting control interface for field personnel. AVEVA Edge HMI/SCADA software provides centralized scheduling capabilities to integrate each area's lighting system for remote control, eliminating the need for field personnel to inspect everywhere.

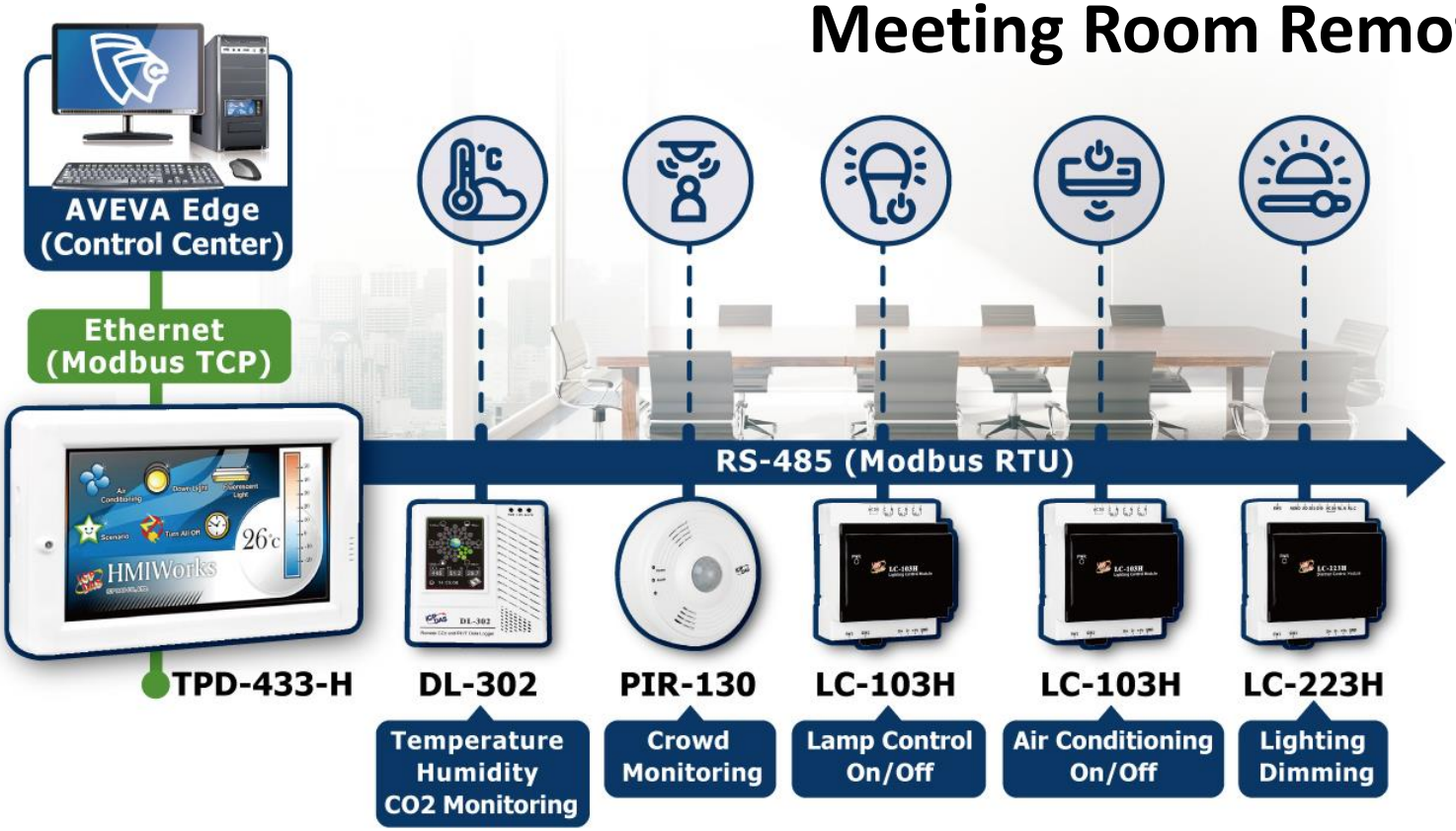
Conference Room Lighting Air-Conditioning Control



ICP DAS IR-210 can learn infrared remote control commands of various electronic devices and store the learned commands in the module or file. With six independent IR output channels, it can control multiple devices such as monitors, projectors, air conditioners, electric curtains, etc.

ICP DAS TPD-430-H connects the IR-210 via RS-485 and allows the IR output to control the operation of devices such as start/stop. The touch screen provides an intuitive user interface that can integrate various settings such as lighting, air conditioning, projector, etc. for centralized control. This eliminates the need to walk around the room looking for switches and the hassle of losing or not finding the handheld remote. You can create scenes, such as meeting mode, presentation mode, etc., and quickly change the settings of associated devices.

Meeting Room Remote Control

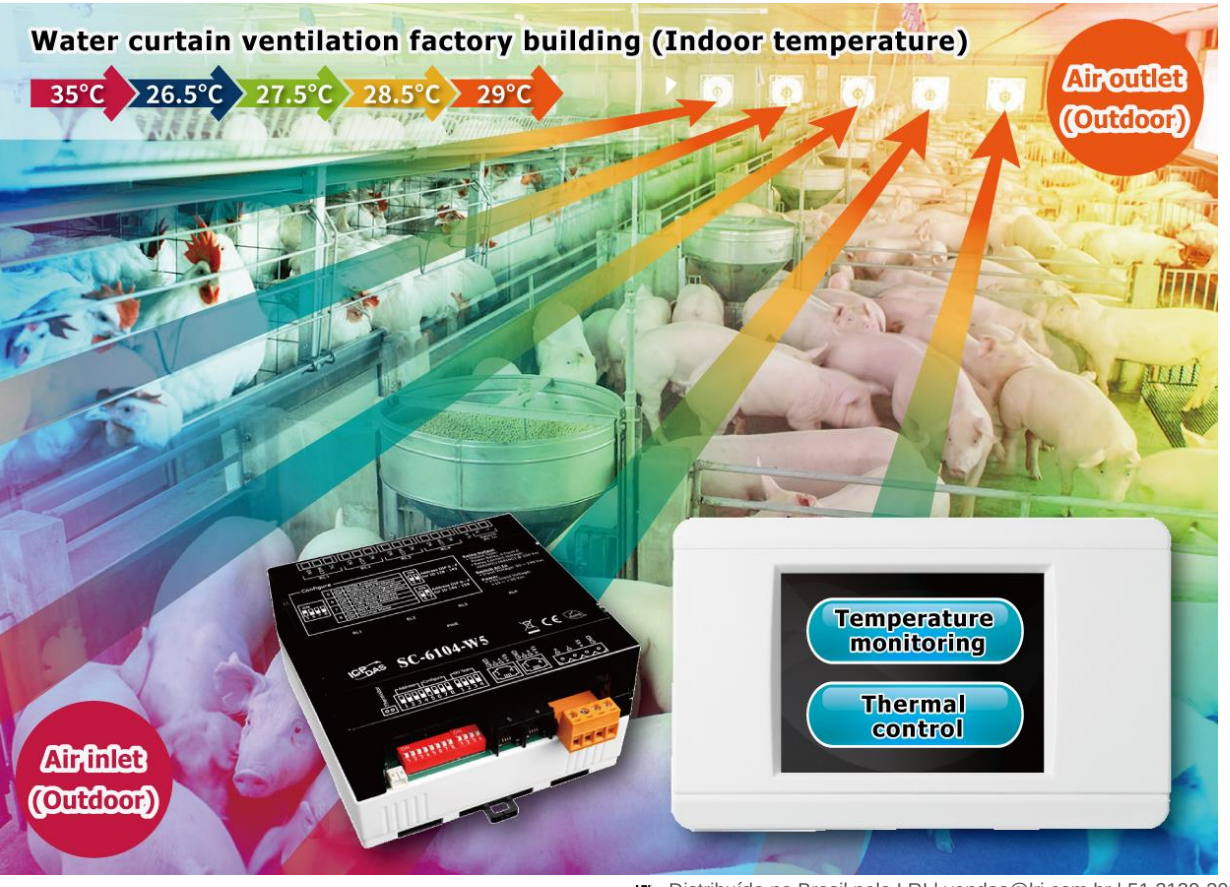


ICP DAS TPD-433-H can connect DL-302 / PIR-130 / LC-103H / LC-223H and other modules via RS-485 and Modbus RTU to collect data such as temperature and humidity, CO2 concentration and people flow, and control the corresponding lights and air conditioners. The touch screen can present relevant data and controls in a clear and concise manner, and can be set centrally, eliminating the need to search for switches all over the place. In addition to digital control, LC-103H/LC-223H can also be connected to a physical switch at the same time to easily achieve dual switching function. TPD-433-H can report relevant data to the remote AVEVA Edge central control system via Ethernet and Modbus TCP protocols, and the central control system can remotely turn off the lights and air conditioners in the conference room.

Heat Dissipation Control for Pig and Poultry House

Animal excrement contains a large amount of organic substances and microorganisms, which produce ammonia, carbon dioxide, hydrogen sulfide and other gases during the decomposition process. The high temperature in summer accelerates this process, leading to a rapid increase in the concentration of the above-mentioned substances in the air. This not only affects the health of the animals, the comfort and hygiene of the environment, but can also lead to corrosion problems with field equipment.

The high temperature environment can also lead to decreased immunity, susceptibility to disease, loss of appetite, and decreased digestive function in pigs and birds, which will affect growth rate, slow weight gain, reduce egg production, and even cause bad behavior such as mutual attacks. Timely adjustment of environmental temperature and humidity and replacement of fresh air are very important links.



ICP DAS SC-6104-W5 has 4 Form C relay outputs that can be connected to multiple fans, and there is also a temperature sensor to measure the ambient temperature. ICP DAS TPD-283U-H can collect the temperature data from SC-6104-W5 via RS-485 and display it on the screen, and when the temperature reaches the set upper limit, it will start the water cooling system and fan to help the pig or poultry house with instant cooling. TPD-283U-H supports Ethernet function, which can be further integrated with the host computer.

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Intelligent Irrigation

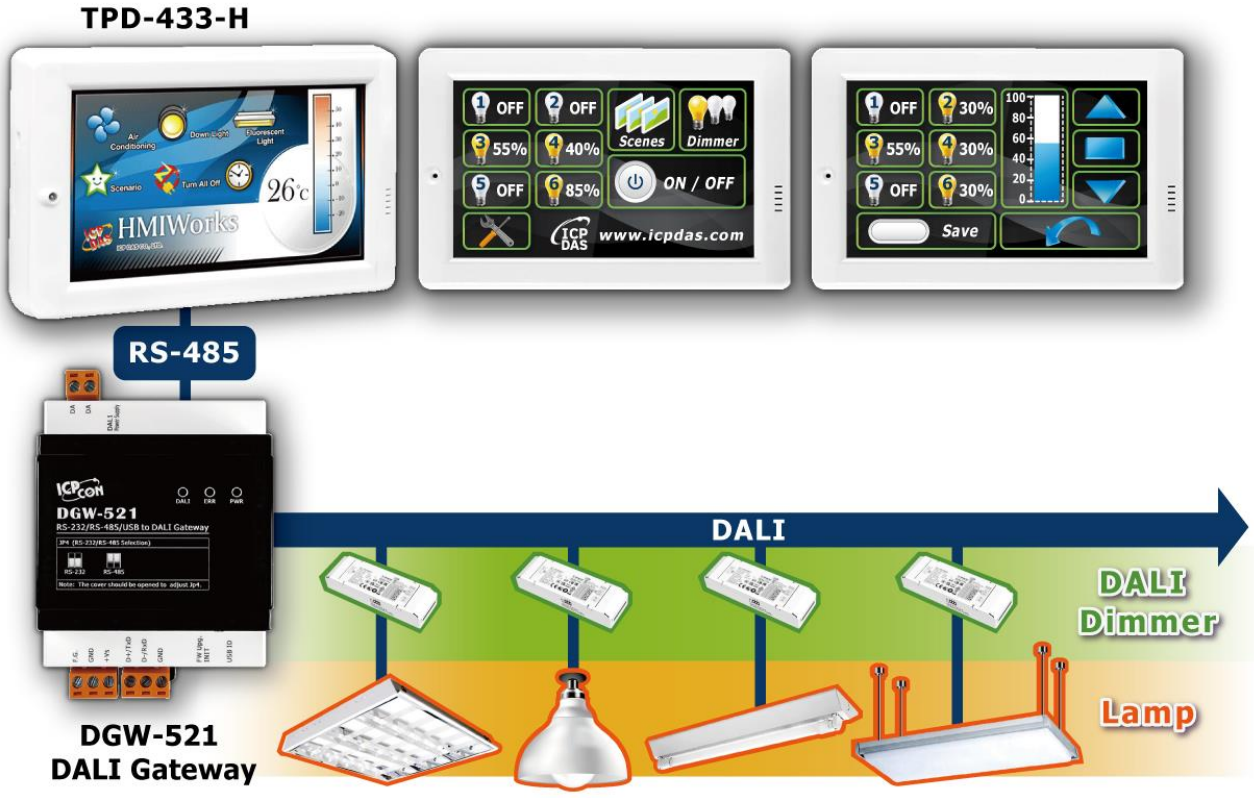


Environmental temperature and humidity are important factors that affect crop yield and quality. Traditional manual or timed irrigation systems are very inconvenient. Sometimes the amount of irrigation is insufficient and the yield is affected, and sometimes excessive water resources are wasted. Especially during the occasional foehn, which has the temperature rises sharply above 35°C and the humidity falls sharply below 40%, causing rapid dehydration and wilting of the plants, which is even more stressful for the farmers.

The ICP DAS VPD-173X-64 can be used as the core of a small intelligent irrigation control system. It can integrate the ICP DAS DL-100TM485S module to collect temperature and humidity. According to the data, it can immediately start irrigation to cool down the high temperature to reduce crop damage. On rainy days, irrigation can be reduced or stopped to conserve water resources.

ICP DAS M-7000 has a variety of I/O interfaces that can be used to control solenoid valves, switches, etc., which is convenient for connecting various irrigation equipment. The touch screen of VPD-173X-64 can display data such as temperature and humidity, and set temperature and humidity conditions, regular watering time, etc. The intuitive user interface makes it easy for farmers to learn new systems. The intelligent system can irrigate timely and accurately, saving farmers a lot of manpower and time going to and from the field.

DALI Dimmer Control



The ICP DAS DGW-521 supports Modbus RTU and DALI protocol conversion and can power DALI devices directly over the two-wire DALI bus, eliminating the need for a separate power supply. The DALI side adopts non-polar two-wire wiring (digital signal and power supply are shared), which avoids the trouble of burning out devices due to wrong wiring of positive and negative poles; the wiring length can reach 300 meters.

TPD-433-H connects to DGW-521 via RS-485 and uses Modbus RTU communication. Provides an intuitive touch screen as a setting interface, allowing users to easily switch DALI lamps or adjust brightness. Supports multi-page display switching so that more dimmers and options can be easily integrated.

The traditional 0-10V analog signal dimming method has problems such as deviation or jump due to signal interference and voltage instability. Digital DALI can provide 255 levels of fine and stable dimming, which can be controlled individually, in groups or broadcast. With the support of custom scene mode, the lighting brightness of each area can be pre-configured and the scene can be switched with a single command.

Multi-Room Air-Conditioning Centralized Control



The air conditioner produced by a famous manufacturer can be upgraded with an RS-485 communication module to provide the operating status of the air conditioner, room temperature and related data. In addition to controlling the start/stop/temperature setting/operation mode of the air conditioner with the handheld remote control, it is also possible to set related parameters via RS-485.

ICP DAS TPD-432F-H is connected to the above multiple air conditioners via RS-485. The touch screen can display the relevant data and provide a interface for centralized control. People can check the air-conditioning status of each room from the living room. Before going to bed or taking the children to the study room, they can turn on the air conditioner in the room earlier, or turn off all the air conditioners before going out, avoiding the trouble of patrolling rooms on different floors.

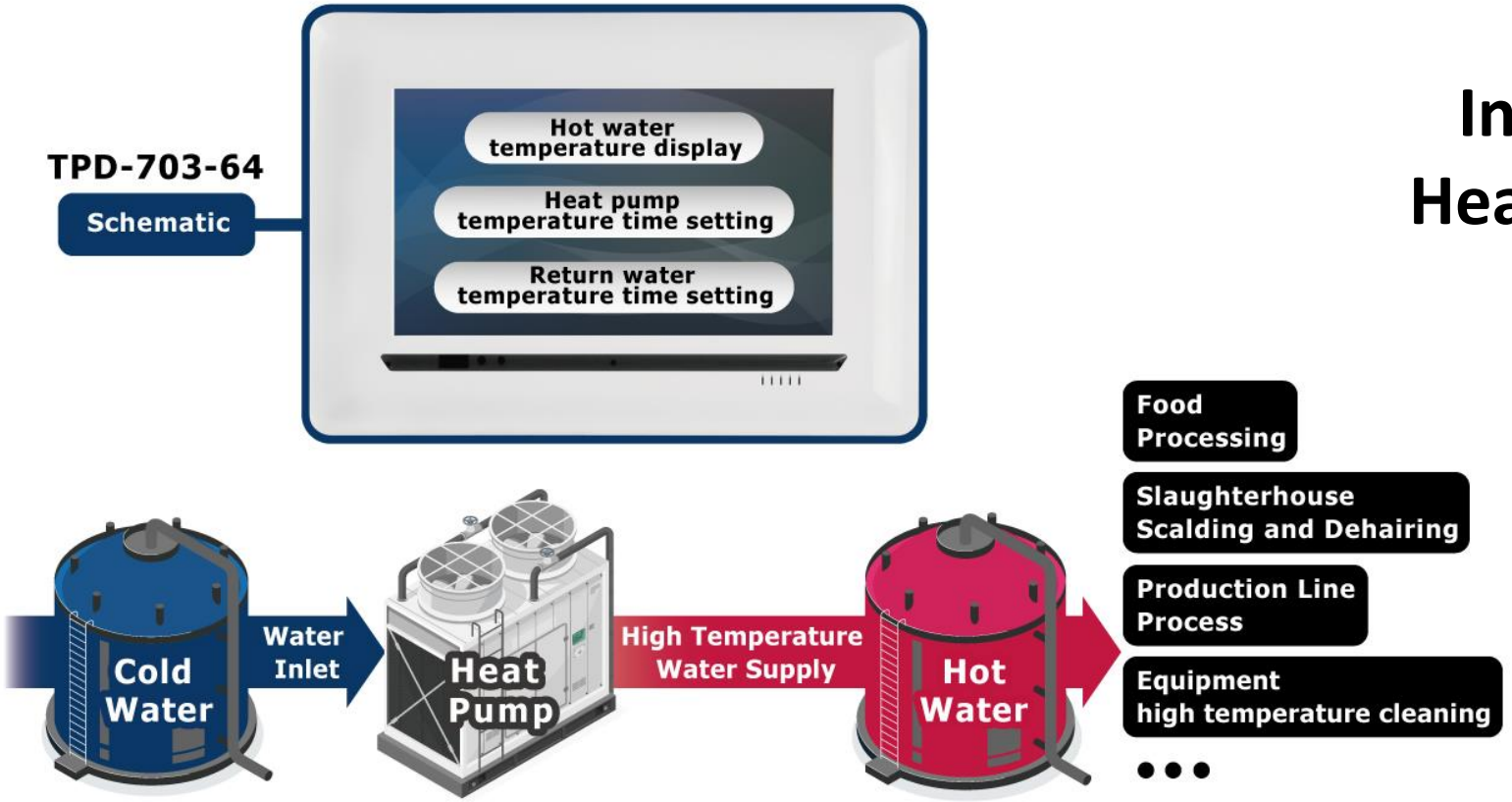
Large Industrial Ceiling Fan Control



Large industrial ceiling fans can provide effective air circulation and ventilation, reducing the temperature of facilities such as warehouses or factories. Provides cleaner indoor air quality, evenly distributes air, and reduces temperature differences throughout a warehouse or factory space. Reduce the number of vertical fans on the floor that take up too much work space and eliminate cluttered floor wiring that can cause employees to trip, etc. Compared to air conditioning, large ceiling fans are less expensive to operate and can save significant energy and associated costs.

The ICP DAS TPD-283U-H can be connected to the servomotor of the industrial ceiling fan via RS-485 and provides an intuitive touch screen interface for the user to set the operation mode of the fan, including: forward, reverse, speed up, speed down, start, stop, save settings and other functions. The screen can also display information such as the running status of the servomotor, fault codes and service calls. Its compact size makes it easy to find a place to mount on a column or wall near a ceiling fan. The Ethernet interface can be used for advanced integration with the central control system.

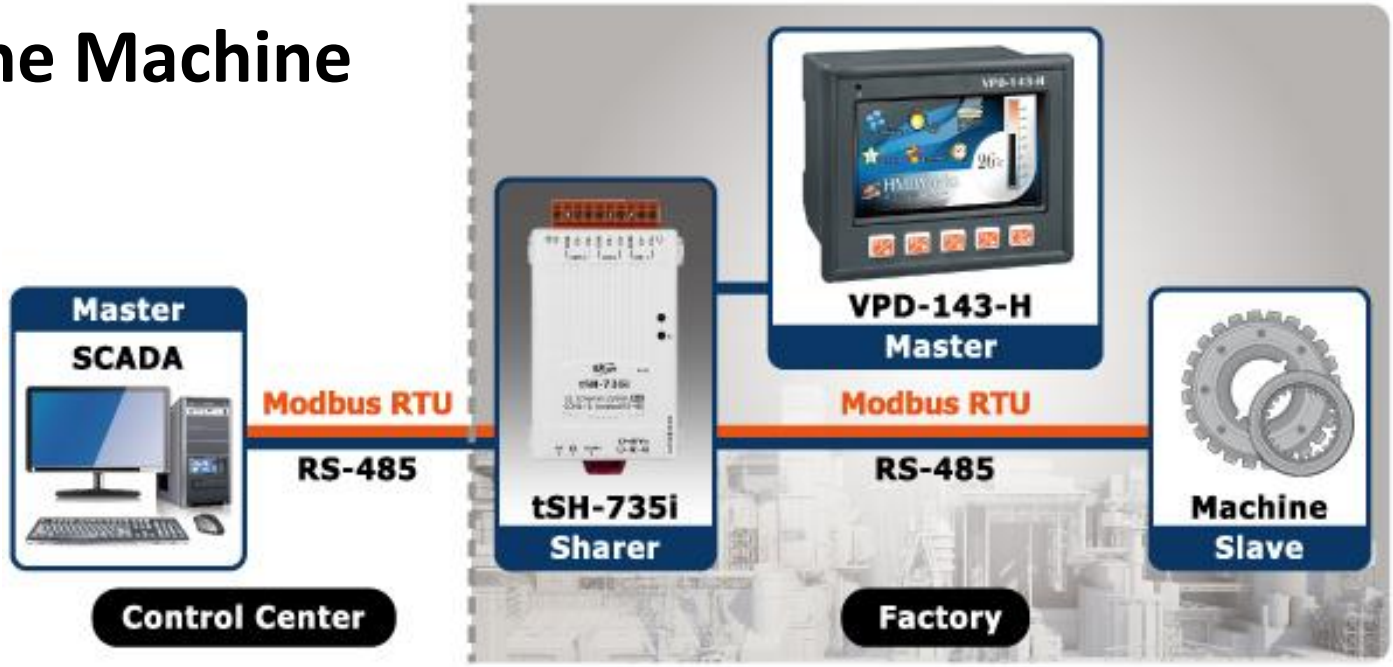
Industrial Heat Pump Control



The heat pump is like an energy amplifier, through the refrigerant to absorb external heat (water, air, sun), input electricity to the heat pump to allow the compressor to work on the refrigerant to produce higher heat energy, and then through the heat exchange to warm up the cold water. It can save the use of fuel and reduce carbon dioxide emission. The cold air is discharged while the heat pump is running and can be directed to the room to reduce part of the air conditioning load. The waste heat from the air conditioner can also be directed to the heat pump to recover the heat source for reuse, making full use of each system.

The ICP DAS TPD-703-64 has RS-232/RS-485 for connection to the heat pump controller for data collection, and the touch screen allows engineers to configure relevant parameters in the field. The Ethernet interface can be connected to the host computer for central system integration, and heat pump parameters can be set remotely from the monitoring center.

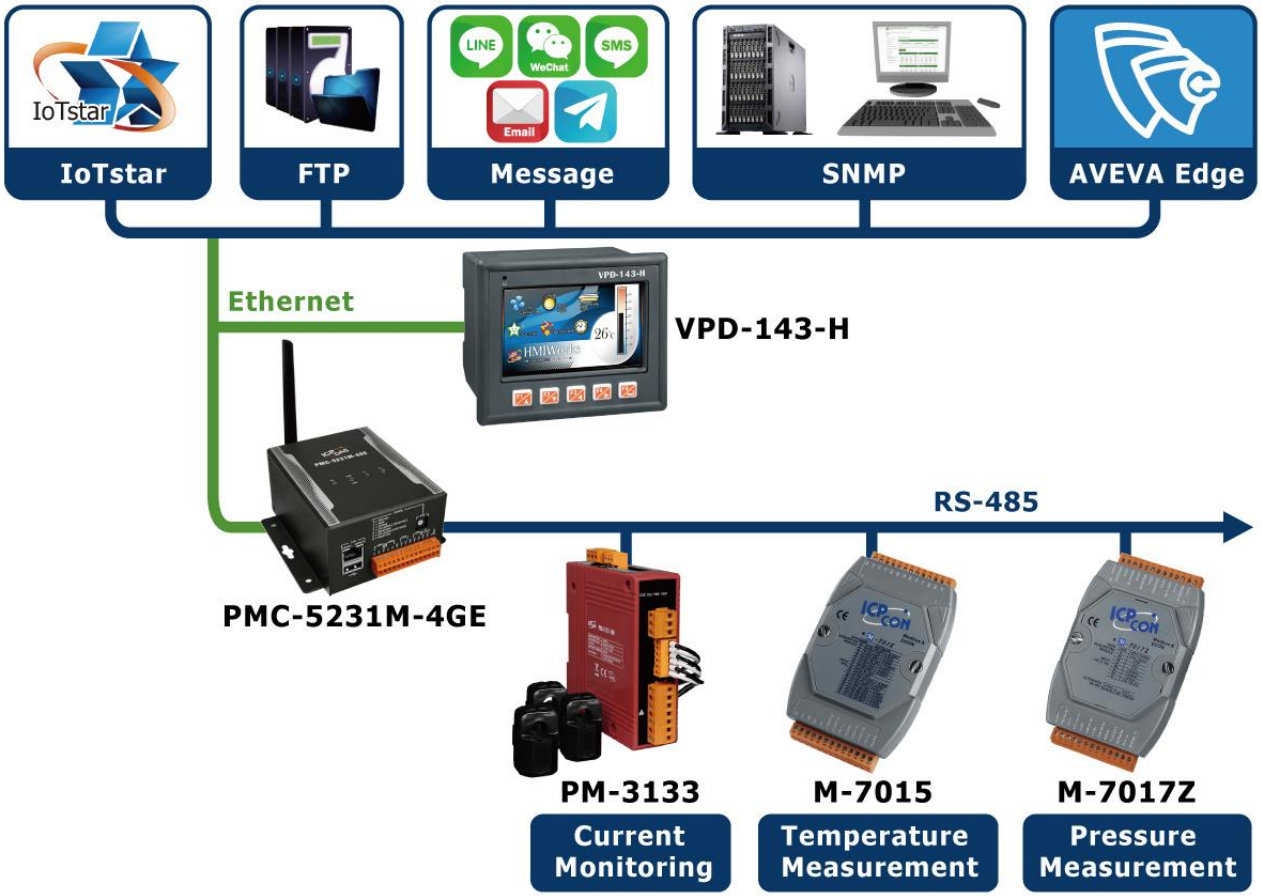
Add HMI to the Machine



The original architecture is a remote SCADA (Supervisory Control and Data Acquisition) system connected to the machine at the factory via RS-485 for monitoring and setting. With the introduction of tSH-735i and VPD-143-H, the original remote SCADA system can still work with the machines, and the field personnel can also check and adjust the parameters of the machines in the factory to improve the efficiency of the field work.

The ICP DAS tSH-735i serial port sharer connects two masters on two ports and Modbus RTU slaves on the other port, transforming the original one-to-one communication architecture into a two-to-one architecture. It also supports Modbus RTU/ASCII protocol conversion, baud rate conversion, Modbus ID filtering and conversion, etc. for better integration of your system. ICP DAS VPD-143-H has IP65 waterproof panel, which is suitable for factory production line. The touch screen provides an intuitive interface for setting machine parameters, reducing the learning curve for field personnel.

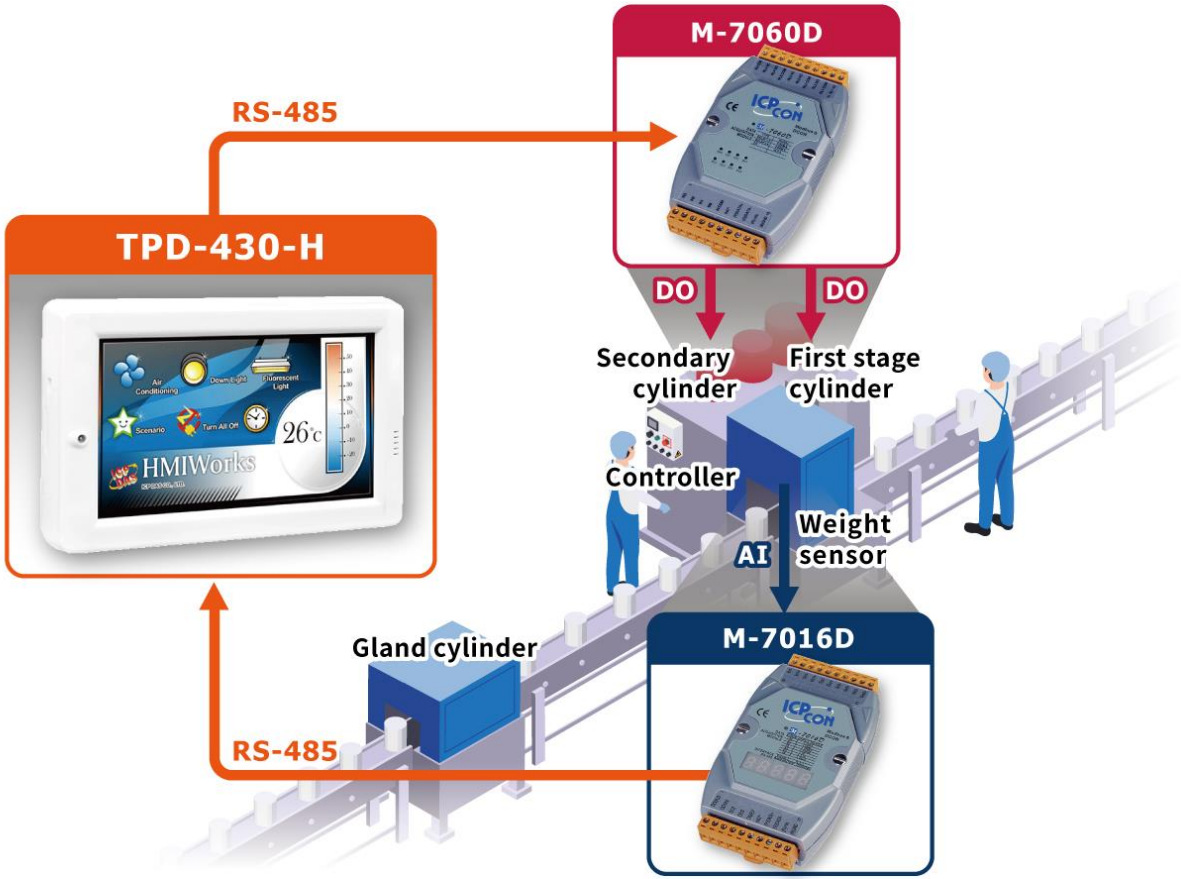
Machine Monitoring



The field converts vibration, magnetic field induction, dynamic balance and other signals into voltage or current, and uses ICP DAS M-7000 series modules to measure voltage, current and temperature data. Use the PM-3133 series module to monitor machine power consumption for energy management, cost control and early troubleshooting.

Use the ICP DAS PMC-5231M-4GE (Power Meter Concentrator) to collect relevant data and upload it to the back-end management platform for data statistics and analysis. The data is published on the web via AVEVA Edge, and supervisors can connect using a web browser or mobile phone to check the status of the equipment. Use the VPD-143-H to display machine information so that field personnel can better understand the operation of the machine.

Quantitative Automatic Filling

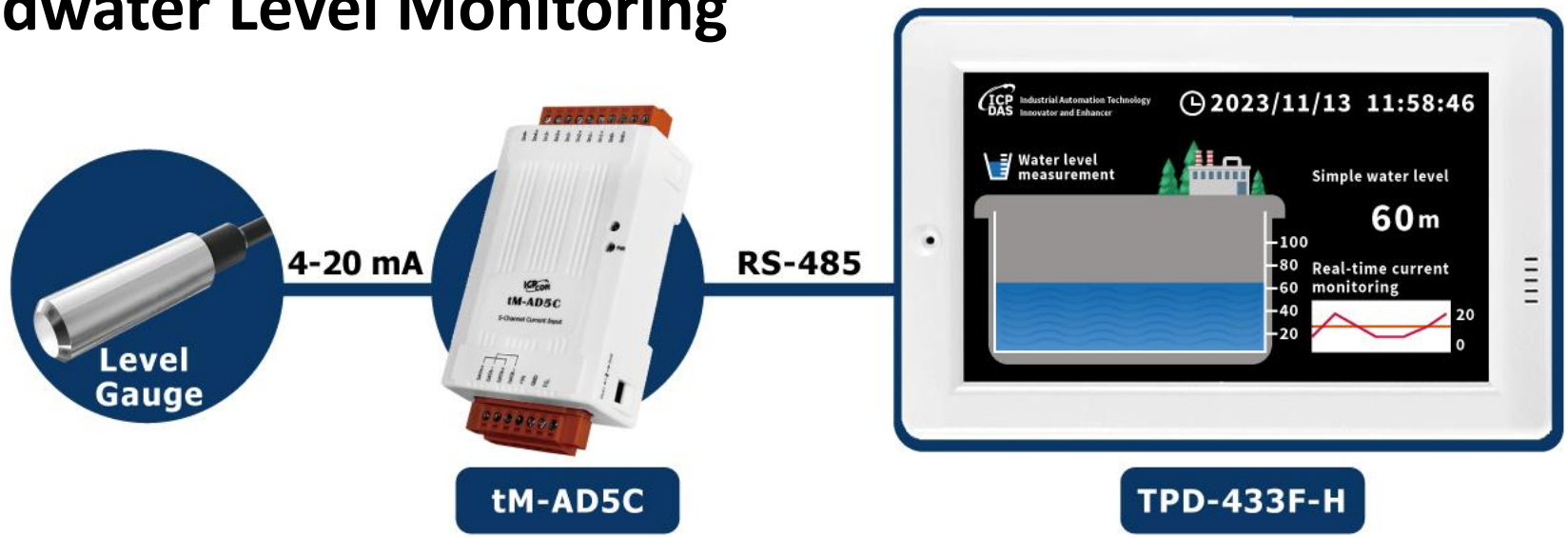


Using TPD-430-H as the main controller, the touch screen allows the operator to set the system parameters such as: empty and full drum weight value, primary and secondary cylinder off value...etc. The weight sensor output value is read by the M-7016D, and the TPD-430-H is used to filter the small jump value and determine the start/stop of the filling operation based on this weight data.

The M-7060D controls the switching action of the primary cylinder (high flow output) and the secondary cylinder (low flow output). When the fill weight reaches the first level, the TPD-430-H shuts down the primary cylinder to reduce the fill speed. When the fill weight reaches the second level, the secondary cylinder is closed to stop filling. The filling flow rate is faster and then slower, which can reduce the fill weight error and improve accuracy.

Automatic filling can save manpower and increase the speed of operation, avoid the overflow of material due to staff negligence, avoid the waste of material, and protect the safety of operators.

Groundwater Level Monitoring



Excessive pumping of groundwater can cause ecological and environmental problems, such as lowering of groundwater levels, stratigraphic subsidence, geological instability, or damage to vegetation. Excessive pumping of underground hot springs can result in adverse effects such as changes in the concentration of minerals and dissolved substances in the water, deterioration of water quality, and lower temperature. Water resources are state-owned and require proper monitoring and regulation to ensure their sustainable use and protect the environment. Water resource monitoring includes water level, flow, temperature, chemical analysis of hot spring water... and many other methods.

The submersible level gauge is a kind of pressure sensor, and the current output of 4-20 mA is commonly used to indicate the water level. The ICP DAS tM-AD5C can measure the current value, convert the corresponding water level via the TPD-433F-H, and then display and upload the data to the central control system. Hot spring operators can use flow meters or water meters to monitor the amount of hot spring water they draw to avoid over-use penalties.

Epilogue

The VPD series has a separate space inside for the optional XVBoard to expand its DI/DO/AI/AO functions. The panel is equipped with 5 physical rubber buttons, which are very useful for fine-tuning machines by blind operation (without looking at the screen), or for quickly switching between specific pages.

TouchPAD is a good solution to meet the need for local data display or setup. Although the traditional computer system can do the same thing, the TouchPAD is definitely a better choice because of its intuitive touch interface, compact size, low power consumption, low cost, and easy integration.

For more information, please visit the ICP DAS website.

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