Acrel®

LV Switcheoard Electrical Nodes Multi-channel Cloud IoT Wireless Temp. Monitoring

Wireless Temperature Monitoring, for LV switchboard/switchgear, IoT cloud & local temperature display & alarm, electrical nodes temp.

Ver. Date: Dec, 18th 2023

Acrel Co., Ltd.

No.253 Yulv Road, Jiading District, Shanghai, China



2023/12/18 Ver.

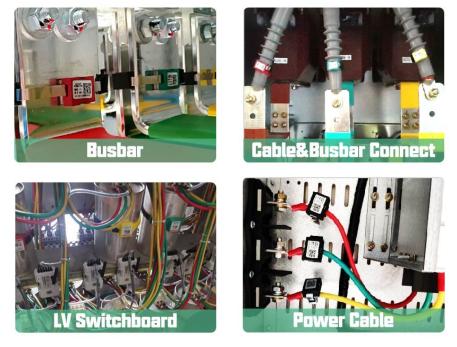


0. Application Scenario

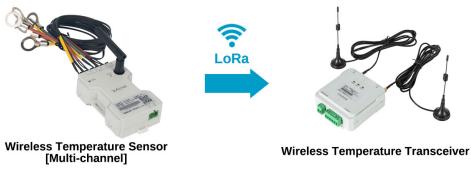
 (1) This multi-channel wiressless temperature monitoring solution was majorly designed for monitoring & alarming temperature of crucial electrical connection nodes in LV Switchboard or LV Switchgear like busbar, power cable, cable&busbar connection/joints and etc.
 (2) Such electrical connection nodes have the potential threat of fire hazard due to the aging of material, slackness of connection and etc. Thus a real-time temperature monitoring and alarm system will be necessary to prevent it from potential fire hazard causing by the rising of temperature.

(3) Solution here was major designed for both cloud & local temperature display and alarm. Distinguish from other Acrel wireless temperature monitoring soloution which has only local temperature display and alarm.

(4) Unlike the traditional wired temperature monitoring solution, wireless temperature monitoring solution make the connection between temperature sensor and temperature transceiver wireless. This will largely ease the installation and make the overall solution more flexible.



(1) Major Temperature Monitoring Nodes Showcase



(4) WIreless Connection for esasy installation



0. Solution Selection Logic

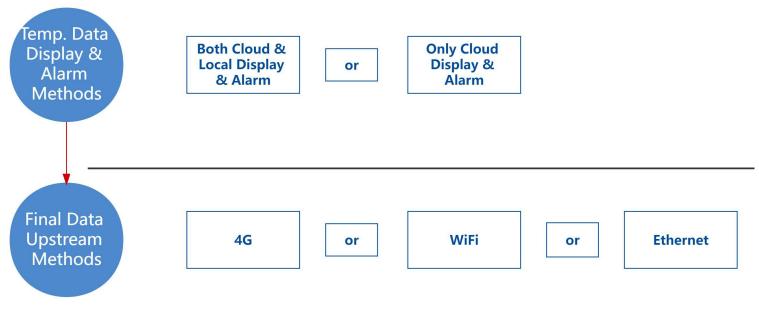
Judging by final data upstream methods which was decided by site network condition [4G, WiFi, Ethernet]. And request for temp. data display&alarm methods - either both Cloud& Local Temp. Display&Alarm or just only Cloud Temp. Display&Alarm. The standard solutions could be devided into 5 basic solutions [Cloud display&alarm here means computer or mobile accessed IoT system platform temperature for display and alarm]: (1) Multi-channel 4G IoT Cloud&Local Wireless Temperature Monitoring Solution [with both Cloud&Local Temp. Display&Alarm, 4G based]

(2) Multi-channel WiFi IoT Cloud&Local Wireless Temperature Monitoring Solution [with both Cloud&Local Temp. Display&Alarm, WiFi based]

(3) Multi-channel Ethernet IoT Cloud&Local Wireless Temperature Monitoring Solution [with both Cloud&Local Temp. Display&Alarm, Ethernet based]

(4) Multi-channel 4G IoT Cloud Wireless Temperature Monitoring Solution [with only Cloud Temp. Display&Alarm, 4G based]

(5) Multi-channel WiFi&Ethernet IoT Cloud Wireless Temperature Monitoring Solution [with only Cloud Temp. Display&Alarm, WiFi&Ethernet based]



(1) Solution Selection Logic



1. Scenario Preset [4G IoT Cloud&Local Wireless Temperature Monitoring Solution]

 (1) The target was to monitor and alarm the temperature of 5 switchgears deployed in a single room. Both IoT cloud & local display and alarm of temperature was requested.
 (2) Each switchgear require 6 temperature monitoring points for electrical connection nodes. Thus there will be 30 temperature monitoring points in total.

(3) The system voltage of switchgear will be 0.4kV. Network with stable 4G Comms.

1. Devices Deployment [4G IoT Cloud&Local Wireless Temperature Monitoring Solution]

Area #1 - LV Switchboard #1 ~ #5:

- 1* AWT200-1E4S-4GHW IoT Gateway [For further uploading the data from ATP007 to Acrel IoT Cloud System via 4G Comms.]

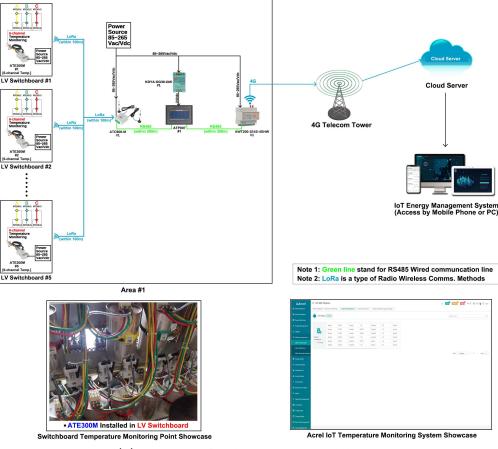
- 1* ATP007 Temperature Display Touchscreen [For local display and alarm for all temperature data and further upload the data to upstream IoT gateway]

- 1* ATC600-M Wireless Temperature Transciever [For collecting the temperature data from ATE300M wireless temp. sensors and further upload the data to ATP007]

- 5* ATE300M Multi-channel Wireless Temperature Sensor [For monitoring up to 6-channel temperature of electrical connection nodes and send the data to ATC600-M via LoRa wirelesss Comms.]

- 30* TPSNT503F415FAL1200 NTC Thermistor [Paired with ATE300M for temp. signal input]

- 1* KDYA-DG30-24K Power Supply Module [Paired with ATP007 for 85~265Vac/Vdc Power Supply input]



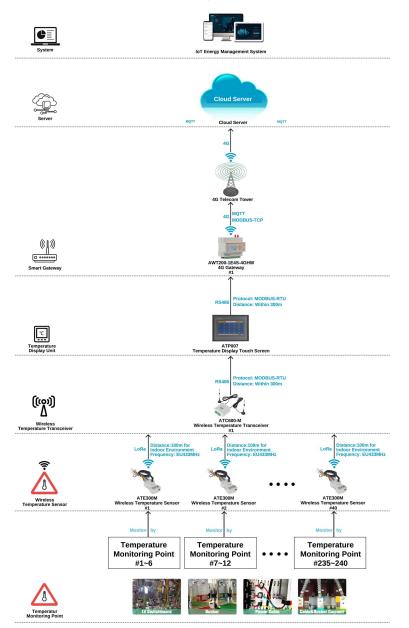
(1) Devices deployment plan Illustraton



1. Comms. Structure & Logic [4G IoT Cloud&Local Wireless Temperature Monitoring Solution]

(1) Between ATE300M wireless temperature sensor and ATC600-M wireless temperature transceiver, we are using a radio wireless communications called LoRa. The communication distance is within 100m [when in indoor environment and penetrate 1 layer of metal cover of switchgear]. The communication protocol is self defined protocol. [1 ATC600-M can support up to 240 pcs ATE300M if comms. distance allowed.]

(2) Between ATP007 smart touch screen and ATC600-M wierless temperature transceiver. and between ATP007 touch screen and AWT200-1E4S-4GHW IoT gateway, we are both using common RS485 communications based on MODBUS-RTU protocol. Although for this RS485 communication, it's wired comms. But normally these devices were always installed closedly to each other, so that remain the most part of communication structure still wireless. [1 pcs ATP007 can support and display the temp. data of up to 240 points]
(3) Between AWT200-1E4S-4GHW IoT gateway and Acrel IoT system, we are using 4G comms. methods based on either MQTT or MODBUS-TCP protocol.



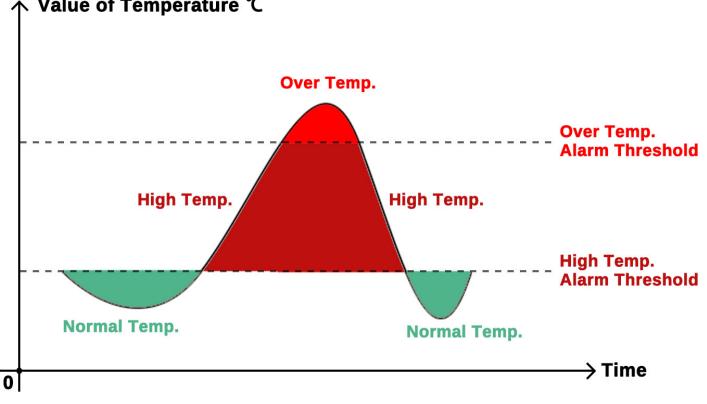
(1) Communication Structure



1. Local Device Temperature Alarm Function&Logic [4G IoT Cloud&Local Wireless Temperature **Monitoring Solution**]

ATP Seires Tempearture Display Devices support 2 types of major temperature alarm logic. When any of the below alarm logic was set and triggered, it will alarm the buzzer up. (1) High Temperature Alarm: When temperature of certain monitoring node was higher than a certain preset threshold value, this will twigger high temperature alarm. [Normally used as a pre-alarm for mentioning related person to take care of temperature rising issue in monitoring places]

(2) Over Temperature Alarm: Similar like high temperature alarm, but over temperature alarm normally will be preset a higher alarm threshold. [Normally used for alarming the related person that there are severe temperature rising issue happened and need to be solved immediately]



Value of Temperature ℃

(1&2) High&Over Temperature Alarm



1. Cloud IoT Platform Temperature Alarm Function&Logic [4G IoT Cloud&Local Wireless Temperature Monitoring Solution]

Once the temperature data was collected by Acrel IoT Cloud System Platform. We could also do the high/over temperature alarm rule setting on cloud system and receive the high/over temperature alarm warning information via WEB/APP/SMS/E-mail. [SMS/E-mail warning will be only supported when using buy-out service of Acrel IoT System.]

(1) High/Over Temperature Alarm: First we set the high/over temperature alarm rule on platform, then once the monitoring temperature was higher/lower than a certain preset threshold value, this will trigger the alarm and send the alarm warning information via assigned WEB/APP/SMS/E-mail.

| SI Acrel | ■ IoT EMS Platform | | | | | Q Low 99+ | Middle High | 🚥 🕸 🕸 👀 | B V |
|-----------------------------|---|-----------------------------|---|-----------|------------|------------|-------------|------------|---------------|
| 3% Basic Data Management | Main Dashboard Meter Status × Cabinet temperature × • Meter Alarm | Rules × | | | | | | | |
| User Management | + Add 2 Edit 🖻 Delete | IoT Project | | | | | | | |
| Project Management | Project name Regional location Energy type Par | | | | Condition1 | Threshold1 | Condition2 | Threshold2 | Trigger event |
| Gateway Management | | Add | | × | | | | | |
| Meter Management | | * Project name | IoT Project | v | | | | | |
| Region Management | | * Alarm types | Out-of-limit event | ~ | | | | | |
| Charge Plan | | | | | | | | | |
| Prepaid Meter Managemen | | * Circuit name | Cabinet temperature | ~ | | | | | |
| Device Model Management | | * Alarm level | High This field is required | ~ | | | | | |
| PV Settings | | * Event type | Overtemperature This field is required | ~ | | | | | |
| Parameters Management | | * Ele param | Temp1 | Y | | | | | |
| StreetLight | | * Alarm delay time (Minute) | This field is required 0 | | | | | | |
| inverterManagement | | Time period setting | • Full time period O Custom time ra | nge | | | | | |
| Energy Type | | * Condition1 | >= | ~ | | | | | |
| Project Topology | | * Threshold1 | 50 | | | | | | |
| Energy Topology | | | | | | | | | |
| Meter Alarm Rules | | Condition2 | | ~ | | | | | |
| Alarm Reminder | | Threshold2 | 80 | _ | | | | | |
| Hierarchical Alarm Settings | | | _ | | | | | | |
| Picture Management | | | | Ok Cancel | | | | | |
| Alias Configuration | | | | | | | | | |
| | | | | | | | | | |
| Transformer | | | | | | | Total 0 15/ | bage ~ < 1 | Go to 1 |
| Product Management | | | | | | | | | |

(1) Set the over/high temperature alarm rule

| 51 Acrel | 三 IoT EMS Platform Q Lon ²⁰⁰ Mdde ²⁰⁰ Hgg ⁰⁰ 本 段 品 光 幅 分 |
|------------------------------|--|
| Power Monitoring | Main Dathbard A Arm Information - |
| ℅ Prepaid Management ~ | Event type: Undervoltage Overvoltage Overv |
| 🖨 Lighting 🛛 👋 | Alam lowe: 16pt Mddle Low Working oder status Unteranted Disblanded Processed |
| Wireless Temperature ~ | Other options: Project name 🗸 - Choose 🗸 🖹 2022-01-01 ~ 2022-12-18 Detailed description |
| 📾 Energy Quality 🛛 👋 | Proprit PAIDeal Unitated Distributed Processed |
| ≉ Demand Analysis × | |
| Distributed PV | 2023-09-18 155500 Utitiwated E Gateway Id: 🕀 Device model: A1C600 🖾 Meter address: 👰 Circuit name: Temp & Hum |
| 🟙 Energy Analysis 🗸 | a zatewaj iz de vela ji za su de la prese molei. A Loui iz in Meter adress grundi name. Temp zi num Memorian Detailed description: Temp 2 is out of limit, settingfalue; <19, currentValue; 18.0, unit: "C |
| 🗑 Area Analysis 👋 | 2023-08-18 08:12:00 Untwated |
| 😫 Department Analysis 🗠 | La Gateway út 🖗 Device model: ATC650 🔛 Meter address: Q Circuit name. Temp & Hum otenesse: Detailed description: \$leketricEnkame) is out of limit, settingValue: \$(conditionEn), currentValue: 21.0, unit: \$(unit) |
| ₽ Alarms ^ | 2023-06-16 073800 Untrated |
| Alarm Information | A Gateway ist: O Device model: ATC600 El Meter address: @ Circuit name: Temp & Hum Detailed description: Temp2 is out of limit, setting/alue: >20, current/alue: >21.0, umit: ℃ |
| Alarm Handling | 2023-06-18-0658:00 (Untreated |
| V Operation Management | |
| 🕼 User Report 🛛 👋 | 2023-08-16 06/2900 (Unitable) |
| 🖎 Configuration 🗸 🗸 | a E Getreary is. © Device model: A70500 E Meter address: € Circuit name: Temp & Hum |
| 🖆 Storage Battery 👋 | Detailed description: Temp2 is out of limit, settingtalue: >20, currentValue: 21.0, unit: "C |
| 💥 Basic Data Management | 2023-08-18 0548:00 Untrauted E Gateway id: Device model: A1C650 E Meter address O Circuit name: Temp & Hum |
| ● System Setting ~ | e 25 Gateway ich © Device model: ATCR00 El Meter address © Circuit name. Temp & Hum untanouzz Detailed description: Temp 2 is out of limit, settingt/duie: §(conditionEn), current/blue: 21.0, unit: ℃ |
| 🕼 Log in Management 🗸 | 2023-08-18 0508:00 Universe |
| ittps://iot.acrel-eem.com/#/ | E Gateway is. Convice model: ATC600 Convice model: ATC600 Convice model: ATC6 |

(2) Receive and check alarm information



1. Hardware Devices Overview [4G IoT Cloud&Local Wireless Temperature Monitoring Solution]

Model 1: ATE300M Multi-channel Wireless

Temperature Sensor

- Temperature Measuring Range: -40 ~+140 [±1]
- Monitoring: Up to 6-channel Temperature
- Wireless Comms [Upstream]: LoRa Radio Comms.
- [433~510MHz, self-defined protocol] - LoRa Comms. Distance: within 100m [when in indoor
- environment, penetrate 1 layer of metal cover of switchboard/switchgear]
- Sampling Frequency: 1~240s
- Power Supply: 85~265Vac/Vdc
- Installation: DIN-rail/Strap-tied

Model 1: TPSNT503F415FAL1200 NTC Thermistor

- Temperature Measuring Range: -40 ~+140 [±1]
- Type: 2-wire NTC termistor
- Cable Length: 1.2m [0.5m optional, model will be TPSNT503F4150FAL500-03 NTC Thermistor]
- Probe Aperture Hole Size: 12mm [diameter]
- Application: paired with ATE300M for temperature signal input
- Installation: Strap-tied/Screw-fixed

Model 2: ATC600-M Wireless Temperature Transceiver

- Wireless Comms. [Downstream]: LoRa Radio Comms. [433~510MHz,self-defined protocol]
- LoRa Comms. Distance: within 100m [when in indoor environment, penetrate 1 layer of metal cover of switchboard/switchgear]
- Wired Comms. [Upstream]: 1-way RS485 [MODBUS-RTU protocol]
- Support: up to 240 pcs ATE300M Wireless
- Temperature Sensors based on LoRa
- Power Supply: 100~265Vac/Vdc
- Working Temperature: -20 ~+55
- Working Humidity: <=95%









1. Hardware Devices Overview [4G IoT Cloud&Local Wireless Temperature Monitoring Solution]

Model 4: ATP007 Temp. Display&Alarm Touch Screen

- Comms.: 2-way RS485 [one for upstream, one for downstream, MODBUS-RTU]; 1-way Ethernet [for upstream, MODBUS-TCP]

- Support: Display the temperature data of up to 240 pcs temperature monitoring points.

- Alarm: High-tempearture alarm, over-temperature alarm.
- Power Supply: 24Vdc [±10%]; consumption 15W
- Screen Size: 7 inchs [10 inchs option available, module ATP010]

Model 5: KDYA-DG30-24K Power Supply Module

- Application: paired with ATP007 for power supply

- Working Temperature: -10 ~+55

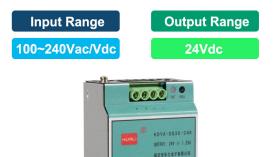
- Rated Input Range: 100~240Vac/Vdc

- Working Humidity: <=95%

- Rated Outpu Range: 24Vdc

input





CE ROHS

100~240VAC 0.64 5

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20322000033330



Model 6: AWT200-1E4S-4GHW IoT Smart Gateway

- Upstream Comms.: 4G&Ethernet Comms. [MQTT& MODBUS-TCP protocol]

- Downstream Comms.: 4-way RS485 [MODBUS-RTU protocol]
- Power Supply: 85~265Vac/Vdc
- Working Temperature: -20 ~+55
- Working Humidity: <=95%





1. Overall Model Selection&Quoation [4G IoT Cloud&Local Wireless Temperature Monitoring Solution]

(1) This Quotation doesn't include freight charge. To gain a complete quotation, please refer the actual quantity that you want to request for the actual order, once we receiving it. We will issue a Official Proforma Invoice with Acrel Stamps on it for later procedure.

| | | System Software | | | |
|--------------------------------|---|--|--|---|--|
| Name | 1.System support a | Description | System Price | (Choose Host month Fr | Remark t Service or Buy-out Service after 3- ee Trial of Cloud IoT System) |
| | been sent to cloud 2.Remote meter re 3.Provide IoT APP 4.Generate energy | server through 4G,WiFi or Ethernet. ading and data collection. for mobile phone side and IoT WEB for PC side. data report of daily, monthly and annually -yeay and period-on-period energy analysis. | \$0 (recommended in pilot pro \$xxx/Year (For 30 Poin (Price for Host Service 0 recommended in pilot pro | ts) \$xx to buy Ho Only, conn | 3-month Free Trail on't need to rent a cloud server)) sting Service for 1 monitoring points ected to the system 1 year on't need to rent a cloud server) |
| Acrel Cloud IoT Energy Manager | 5.Provide various a of the system and | alarm function to ensure a stable operation protect your property. e trial of system with full technical support | \$xxxx/Permanent (Limitless (Price for Buy-out Serv Only,recommended in late p | Points) 1-time charg ice permanent us | ing of \$xxxx for Buy-out Service of e (Limitless monitoring points and a erver need to be rent by users) |
| | | Cloud Server | | | |
| Name | | Description | Server Renting Price (For Reference Only | :) | Remark |
| Cloud Server | Cloud. 2.Users of Cloud I cloud server when System . And if the our Cloud IoT Syst rent on Amazon so | Id be rent on the cloud server provider like Amazon or Energy Management System only need to rent hey choose buy-out service of our Cloud IoT y are using hosting service or 3-month free trial of em, we will use our own cloud server which has been that users don't need to rent a cloud server. Cloud Server is only a reference price that we have oud. | According to Specs of Rente Server | bud server specs could support monitoings points connected to the system (Server: 8 core 16G System: windows server 2016) | |
| | | Smart IoT Gateway | | | |
| Overview Picture | USAGE&MODULE NAME | DESCRIPTION & SPECIFICATION | QUANTITY | FOB UNIT PRICE (US | SD) AMOUNT (USD) |
| | Smart Gateway AWT200-1E4S-4GHW | Upstream: 4G, Ethernet [MQTT, MODBUS, etc] Downstream: RS485 (MODBUS-RTU) Support: up 60-100 RS485 Devices within 400m using RS485 Wired Communication Adjustmert: Vin RJ45 or RS485 Port. Power Supply: 85~265Vac/Vdc (via power adpiter) HS Code: 6517699000 | 1 pcs | I | I |
| | Lo | cal Temperature Display&Alar | m Device | | |
| | Touch Screen ATP007 | Comms.: 2-way RS485 (MODBUS-RTU); 1-way Ethernet [MODBUS-TCP] Support: Up to 240 ATE series Transceiver. Auxiliary Power Supoply: 24Vdc HS Code: 8471609000 | 1 pcs | Γ | 1 |
| | Power Supply Module KDYA-DG30-24K | Application: Paired with ATP007Kt for 85~265Vac Power Supply Input Input: 85~265Vac Output: 24Vdc HS Code: 8504409999 | 1 pcs | T | T |
| | | Wireless Temperature Transe | ceiver | | |
| Overview Picture | USAGE&MODULE NAME | DESCRIPTION & SPECIFICATION | QUANTITY | FOB UNIT PRICE (US | SD) AMOUNT (USD) |
| | Temperature Transceiver ATC600-M | Upstream: RS485 (MODBUS-RTU) Downstream: LoRa (433-510 MHz) Support: Up to 240 AFE300M series wireless temperature sensors using LoRa communication. Power Supply: 100-2650/ HS Code: 9025191010 | 1 pcs | Γ | T |
| | | Wireless Temperature Sen | sor | | |
| Overview Picture | USAGE&MODULE NAME | DESCRIPTION & SPECIFICATION | QUANTITY | FOB UNIT PRICE (US | SD) AMOUNT (USD) |
| Sec. | Temperature Sensor ATE300M | Communication: LoRa Wireless (433~510MHz) Monitoring: Up to 6-channel Temperature Measuring Range: 40°~+140°C [via NTC Thermistor] Power Supply: 85~265Vac/Vdc HS Code: 9025191010 | 5 pcs | T | 1 |
| | NTC Thermistor TPSNT503F415FAL1200 | Temperature Measuring Range: -40°C -+140°C [±1°C] Type: 2-wire NTC termistor Cable Length: 1.2m Probe Aperture Hole Size: φ12mm [diameter] Installation: Strap-tied/Screw-fixed HS Code: 853400000 | 30 pcs | I | , |



2. Scenario Preset [WiFi IoT Cloud&Local Wireless Temperature Monitoring Solution]

(1) The target was to monitor and alarm the temperature of 5 switchgears deployed in a single room. Both IoT cloud & local display and alarm of temperature was requested. (2) Each switchgear require 6 temperature moniotoring points for electrical connection nodes. Thus there will be 30 temperature monitoring points in total.

(3) The system voltage of switchgear will be 0.4kV. Network with stable WiFi Comms.

2. Devices Deployment [WiFi IoT Cloud&Local Wireless Temperature Monitoring Solution]

Area #1 - LV Switchboard #1 ~ #5:

- 1* AWT200-1E4S-WiFi loT Gateway [For further uploading the data from ATP007 to Acrel IoT Cloud System via WiFi Comms.]

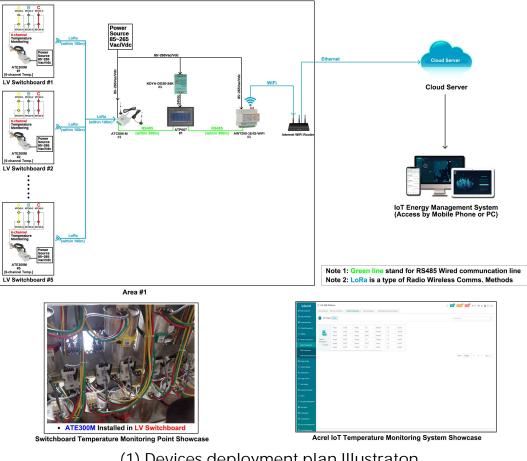
- 1* ATP007 Temperature Display Touchscreen [For local display and alarm of all temperature data and further upload the data to upstream IoT gateway]

- 1* ATC600-M Wireless Temperature Transciever [For collecting the temperature data from ATE300M wireless temp. sensors and further upload the data to ATP007]

- 5* ATE300M Multi-channel Wireless Temperature Sensor [For monitoring up to 6-channel temperature of electrical connection nodes and send the data to ATC600-M via LoRa wirelesss Comms.]

- 30* TPSNT503F415FAL1200 NTC Thermistor [Paired with ATE300M for temp. signal input]

- 1* KDYA-DG30-24K Power Supply Module [Paired with ATP007 for 85~265Vac/Vdc Power Supply input]

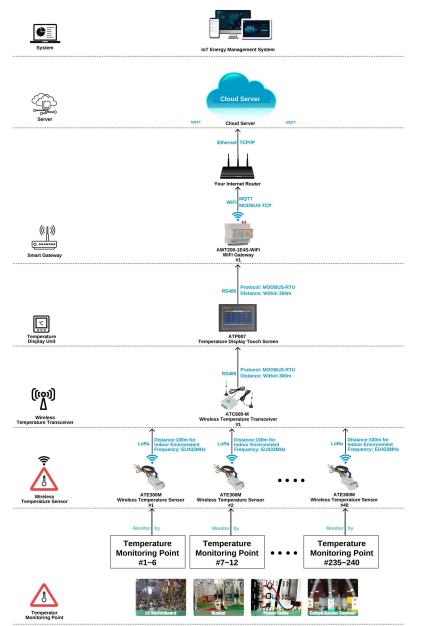




2. Comms. Structure & Logic [WiFi IoT Cloud&Local Wireless Temperature Monitoring Solution]

(1) Between ATE300M wireless temperature sensor and ATC600-M wireless temperature transceiver, we are using a radio wireless communications called LoRa. The communication distance is within 100m [when in indoor environment and penetrate 1 layer of metal cover of switchgear]. The communication protocol is self defined protocol. [1 ATC600-M can support up to 240 pcs ATE300M if comms. distance allowed.]

(2) Between ATP007 smart touch screen and ATC600-M wierless temperature transceiver. and between ATP007 touch screen and AWT200-1E4S-WiFi IoT gateway, we are both using common RS485 communications based on MODBUS-RTU protocol. Although for this RS485 communication, it's wired comms. But normally these devices were always installed closedly to each other, so that remain the most part of communication structure still wireless. [1 pcs ATP007 can support and display the temp. data of up to 240 points]
(3) Between AWT200-1E4S-WIFi IoT gateway and Acrel IoT system, we are using WiFi comms. methods based on either MQTT or MODBUS-TCP protocol.



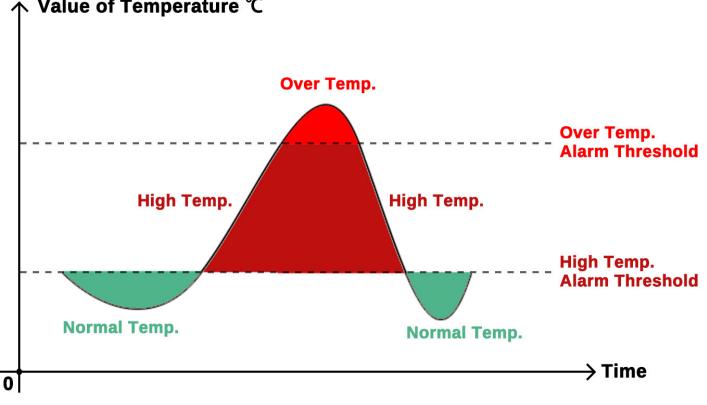
(1) Communication Structure



2. Local Device Temperature Alarm Function&Logic [WiFi IoT Cloud&Local Wireless Temperature **Monitoring Solution**]

ATP Seires Tempearture Display Devices support 2 types of major temperature alarm logic. When any of the below alarm logic was set and triggered, it will alarm the buzzer up. (1) High Temperature Alarm: When temperature of certain monitoring node was higher than a certain preset threshold value, this will twigger high temperature alarm. [Normally used as a pre-alarm for mentioning related person to take care of temperature rising issue in monitoring places]

(2) Over Temperature Alarm: Similar like high temperature alarm, but over temperature alarm normally will be preset a higher alarm threshold. [Normally used for alarming the related person that there are severe temperature rising issue happened and need to be solved immediately]



Value of Temperature ℃

(1&2) High&Over Temperature Alarm



2. Cloud IoT Platform Temperature Alarm Function&Logic [WiFi IoT Cloud&Local Wireless Temperature Monitoring Solution]

Once the temperature data was collected by Acrel IoT Cloud System Platform. We could also do the high/over temperature alarm rule setting on cloud system and receive the high/over temperature alarm warning information via WEB/APP/SMS/E-mail. [SMS/E-mail warning will be only supported when using buy-out service of Acrel IoT System.]

(1) High/Over Temperature Alarm: First we set the high/over temperature alarm rule on platform, then once the monitoring temperature was higher/lower than a certain preset threshold value, this will trigger the alarm and send the alarm warning information via assigned WEB/APP/SMS/E-mail.

| Sacrel 🖬 | ■ IoT EMS Platform | | | | | Q Low 99+ | Middle High | 💴 🕁 🔐 🔐 👀 | 5 V |
|-----------------------------|---|-----------------------------|---------------------------------------|--------|------------|------------|--------------|------------|---------------|
| | Main Dashboard Meter Status × Cabinet temperature × • Meter Alarm | Rules × | | | | | | | |
| | + Add 2 Edit E Delete | IoT Project | | | | | | | |
| | Project name Regional location Energy type Pa | ra | | _ | Condition1 | Threshold1 | Condition2 | Threshold2 | Trigger event |
| | | Add | | × | | | | | |
| | | * Project name | IoT Project | ~ | | | | | |
| | | * Alarm types | Out-of-limit event | ~ | | | | | |
| | | * Circuit name | Cabinet temperature | ~ | | | | | |
| Prepaid Meter Managemen | | | | × | | | | | |
| Device Model Management | | * Alarm level | High This field is required | | | | | | |
| | | * Event type | Overtemperature | ~ | | | | | |
| | | | This field is required | | | | | | |
| | | * Ele param | Temp1 This field is required | ~ | | | | | |
| | | * Alarm delay time (Minute) | 0 | | | | | | |
| | | Time period setting | • Full time period O Custom time rang | je – | | | | | |
| | | * Condition1 | >= | ~ | | | | | |
| | | * Threshold1 | 50 | | | | | | |
| Energy Topology | | Condition2 | >= | ~ | | | | | |
| Meter Alarm Rules | | Threshold2 | 80 | | | | | | |
| | | | | | | | | | |
| Hierarchical Alarm Settings | | | O | Cancel | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | Total 0 15/j | iage 🗸 🤇 1 | Go to 1 |

(1) Set the over/high temperature alarm rule

| Acrel | 토 IoT EMS Platform Q 🚺 🐨 Made 🖤 High 🖤 여 🗟 😦 🖏 🎲 👘 |
|------------------------------|--|
| 🕢 Power Monitoring 👋 | Main Dashboard A Aarm Information - |
| ℅ Prepaid Management ~ | Event type: Undervoltage Overvoltage Overvoltage Overvoltage Overvoltage Overvoltage Overvoltage Reidual Current Overlamperature Fault Smole Electric arc Short circuit Blackout Lowtemperature Common Offline OTHER Ratio |
| 🗅 Lighting 🛛 👋 | Alarm level: High Middle Low Working order status: Untreated Distributed Processed |
| Wireless Temperature ~ | Other options: Froject name V - Choose V 🖾 2022-01-01 ~ 2022-12-18 Detailed description Q Sourch 🕄 Reset |
| 🕲 Energy Quality 🛛 👋 | Ø Export Ø AlDeat |
| ≉ Demand Analysis 👋 | |
| 🏶 Distributed PV 🛛 🐣 | 2023-08-18 18:5500 Ummatude Circuit name: Temp & Hum |
| 💼 Energy Analysis 👋 | Mumputer Detailed description: Temp2 is out of limit, settingValue: <19, currentValue: 18.0, unit: *C |
| 🗑 Area Analysis 👋 | 2023-08-18 0812:00 Universed |
| Department Analysis ~ | E Gateway kd. 🗇 Device model: ATC600 🔛 Meter address. 🕸 Circuit name: Temp & Hum Detailed description: SplectricEnName) is out of limit, settingValue: S(conditionEn), currentValue: 21.0, unit: S(unit) |
| 🗘 Alarms 🔷 | 2023-00-18 0738:00 [Utereted] |
| Alarm Information | 👔 🖾 Gateway id: 👘 Device model: ATC600 🖸 Meter address: 👘 Circuit name: Temp & Hum |
| Alarm Dispatch | Detailed description: Temp2 is out of limit, settingValue: >20, currentValue: 21.0, unit: °C |
| Alarm Handling | 2023-08-18 065800 Umrenned |
| VA Operation Management | Detailed description: Temp2 is out of limit, setting/talue: >20, current/value: 21.0, unit: *C |
| 🕼 User Report 🛛 🗸 | 2023-08-18 06:29:00 Unmanted |
| Configuration V | Z Gotevay ict O Device model: ATC600 |
| 🚺 Storage Battery 👋 | 2023-08-18 05:46:00 [Uttratke] |
| 💥 Basic Data Management | E Gabeevy id: O Device model: ATC000 El Meter address: C Circuit name: Temp & Hum |
| System Setting ~ | Detailed description: Temp2 is out of limit, settingNalue: \$(conditionEn), currentValue: 21.0, unit: °C |
| 😰 Log In Management \vee | 2023-08-18 05:08:00 Universe |
| https://iot.acrel-eem.com/#/ | 🗴 🔟 🖾 Gateway id: 📅 Device model: ATC500 🛛 🖾 Meter address: 🔹 💿 Circuit name: Temp & Hum |

(2) Receive and check alarm information



Author: Loki Elfin E-mail: loki@acrel.cn Website: www.acrel-electric.fr

2. Hardware Devices Overview [WiFi IoT Cloud&Local Wireless Temperature Monitoring Solution]

Model 1: ATE300M Multi-channel Wireless Temperature Sensor

- Temperature Measuring Range: -40 ~+140 [±1]
- Monitoring: Up to 6-channel Temperature
- Wireless Comms [Upstream]: LoRa Radio Comms. [433~510MHz, self-defined protocol]
- LoRa Comms. Distance: within 100m [when in indoor environment, penetrate 1 layer of metal cover of
- switchboard/switchgear]
- Sampling Frequency: 1~240s
- Power Supply: 85~265Vac/Vdc
- Installation: DIN-rail/Strap-tied

Model 1: TPSNT503F415FAL1200 NTC Thermistor

- Temperature Measuring Range: -40 ~+140 [±1]
- Type: 2-wire NTC termistor
- Cable Length: 1.2m [0.5m optional, model will be TPSNT503F4150FAL500-03 NTC Thermistor]
- Probe Aperture Hole Size: 12mm [diameter]
- Application: paired with ATE300M for temperature signal input
- Installation: Strap-tied/Screw-fixed

Model 2: ATC600-M Wireless Temperature Transceiver

- Wireless Comms. [Downstream]: LoRa Radio Comms. [433~510MHz,self-defined protocol]
- LoRa Comms. Distance: within 100m [when in indoor environment, penetrate 1 layer of metal cover of switchboard/switchgear]
- Wired Comms. [Upstream]: 1-way RS485 [MODBUS-RTU protocol]
- Support: up to 240 pcs ATE300M Wireless
- Temperature Sensors based on LoRa
- Power Supply: 100~265Vac/Vdc
- Working Temperature: -20 ~+55
- Working Humidity: <=95%









2. Hardware Devices Overview [WiFi IoT Cloud&Local Wireless Temperature Monitoring Solution]

Model 4: ATP007 Temp. Display&Alarm Touch Screen

- Comms.: 2-way RS485 [one for upstream, one for downstream, MODBUS-RTU]; 1-way Ethernet [for upstream, MODBUS-TCP]

- Support: Display the temperature data of up to 240 pcs temperature monitoring points.

- Alarm: High-tempearture alarm, over-temperature alarm.

- Power Supply: 24Vdc [±10%]; consumption 15W

- Screen Size: 7 inchs [10 inchs option available, module ATP010]

Model 5: KDYA-DG30-24K Power Supply Module

- Application: paired with ATP007 for power supply

- Working Temperature: -10 ~+55

- Rated Input Range: 100~240Vac/Vdc

- Working Humidity: <=95%

- Rated Outpu Range: 24Vdc

input



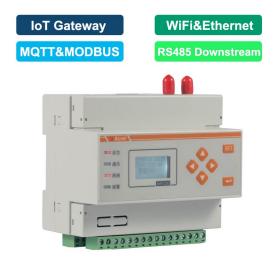


保定市华力电子有限公司

CE ROHS

100~240VAC 0.6A 100~240VDC 0.35A

000



Model 6: AWT200-1E4S-WiFi IoT Smart Gateway

- Upstream Comms.: WiFi&Ethernet Comms. [MQTT& MODBUS-TCP protocol]

- Downstream Comms.: 4-way RS485 [MODBUS-RTU protocol]

- Power Supply: 85~265Vac/Vdc
- Working Temperature: -20 ~+55
- Working Humidity: <=95%



2. Model Selection&Quoation [WiFi IoT Cloud&Local Wireless Temperature Monitoring Solution]

(1) This Quotation doesn't include freight charge. To gain a complete quotation, please refer the actual quantity that you want to request for the actual order, once we receiving it. We will issue a Official Proforma Invoice with Acrel Stamps on it for later procedure.

| | | System Software | | | |
|-------------------------------|---|--|--|--|--|
| Name | | Description | System Price | | Remark vice or Buy-out Service after 3- |
| | been sent to clow 2.Remote meter 3.Provide IoT AP 4.Generate energ | all the meters across the country whose data has d server through 4G.WFI or Ethernet. eading and data collection. P for mobile phone side and IoT WEB for PC side. y data report of daily, monthly and annually n-yeay and period-on-period energy analysis. | \$0 (recommended in pilot pro \$xxx/Year (For 30 Poin (Price for Host Service 0 recommended in pilot pro | bjtect) (Users don't n (Users don't n ts) \$xx to buy Hosting Dnly, connecte | rial of Cloud IoT System) month Free Trail eed to rent a cloud server)) Service for 1 monitoring points d to the system 1 year leed to rent a cloud server) |
| Acrel Cloud IoT Energy Manage | 5.Provide various of the system and | alarm function to ensure a stable operation I protect your property. ree trial of system with full technical support | \$xxxx/Permanent (Limitless (Price for Buy-out Serv Only,recommended in late p | Points) 1-time charging o ice permanent use (Li | f \$xxxx for Buy-out Service of mitless monitoring points and a need to be rent by users) |
| | | Cloud Server | | | |
| Name | Description Server Renting Price (For Reference Only) | | | | Remark |
| Cloud Server | Cloud. 2.Users of Cloud cloud server when System. And if th our Cloud IoT Sy rent on Amazon s 3.The quotation o | 2. Users of Cloud IoT Energy Management System only need to rent cloud server when they choose buy-out service of our Cloud IoT System. And if they are using hosting service or 3-month free trial of our Cloud IoT System, we will use our own cloud server which has been are to American the triangement of the server when the server when the server are the triangement of the server server. | | like Amazon need to rent ud IoT hich has been rever. According to Specs of Rented Cloud Server Server Operation Sur- | |
| | | Smart loT Gateway | | | |
| Overview Picture | USAGE&MODULE NAME | DESCRIPTION & SPECIFICATION | QUANTITY | FOB UNIT PRICE (USD) | AMOUNT (USD) |
| | Smart Gateway AWT200-1E4S-WIFi | Upstream: WiFi, Ethemet [MQTT, MODBUS, etc] Downstream: RS485 (MODBUS-RTU) Support: up to 80-100 Energy Meters within 400m using RS485 Wired Communication Adjustment: Via RJ45 or RS485 Port. Power Suppy: 12-24Vdc (Default) HS Code: 8517699000 | 1 pcs | 1 | 1 |
| | Lo | ocal Temperature Display&Alar | m Device | | |
| | Touch Screen ATP007 | Comms.: 2-way RS485 (MODBUS-RTU); 1-way Ethernet (MODBUS-TCP) Support: Up 240 ATE series Transceiver. Auxiliary Power Supply: 24Vdc HS Code: 8471609000 | 1 pcs | 1 | I |
| | Power Supply Module KDYA-DG30-24K | Application: Paired with ATP007Kt for 85-265Vac Power Supply Input Input: 85-255Vac Output: 24Vdc HS Code: 8504409999 | pcs | I | I |
| | | Wireless Temperature Trans | ceiver | | |
| Overview Picture | USAGE&MODULE NAME | DESCRIPTION & SPECIFICATION | QUANTITY | FOB UNIT PRICE (USD) | AMOUNT (USD) |
| | Temperature Transceiver ATC600-M | Upstream: RS485 (MODBUS-RTU) Downstream: LoRa (433-510 MHz) Support: Up to 240 ATE300M series wireless temperature sensors using LoRa communication. Power Supply: 100-265Vac HS Code: 9025191010 | 1 pcs | 1 | 1 |
| | | Wireless Temperature Sen | sor | | |
| Overview Picture | USAGE&MODULE NAME | DESCRIPTION & SPECIFICATION | QUANTITY | FOB UNIT PRICE (USD) | AMOUNT (USD) |
| | Temperature Sensor ATE300M | Communication: LoRa Wireless (433~510MHz) Monitoring: Up to 6-channel Temperature Measuring Range: -40°C~+140°C [via NTC Thermistor] Power Supply: 85~265Vac/Vdc HS Code: 9025191010 | 5 pcs | 1 | 1 |
| | NTC Thermistor TPSNT503F415FAL1200 | Temperature Measuring Range: -40°C ~+140°C [±1°C] Type: 2-wire NTC termistor Cable Length: 1.2m Probe Aperture Hole Size: of2mm [diameter] Installation: Strap-tied/Screw-fixed HS Code: 8533400000 | 30 pcs | I | I |



3. Scenario Preset [Ethernet IoT Cloud&Local Wireless Temperature Monitoring Solution]

 (1) The target was to monitor and alarm the temperature of 5 switchgears deployed in a single room. Both IoT cloud & local display and alarm of temperature was requested.
 (2) Each switchgear require 6 temperature monitoring points for electrical connection nodes. Thus there will be 30 temperature monitoring points in total.

(3) System voltage of switchgear will be 0.4kV. Network with stable Ethernet Comms.

3. Devices Deployment [Ethernet IoT Cloud&Local Wireless Temperature Monitoring Solution]

Area #1 - LV Switchboard #1 ~ #5:

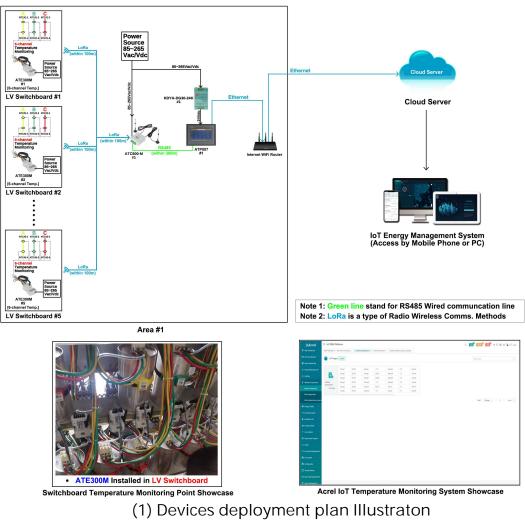
- 1* ATP007 Temperature Display Touchscreen [For local display and alarm for all temperature data and further upload the data to Acrel Cloud IoT System via Ethernet]

- 1* ATC600-M Wireless Temperature Transciever [For collecting the temperature data from ATE300M wireless temp. sensors and further upload the data to ATP007]

- 5* ATE300M Multi-channel Wireless Temperature Sensor [For monitoring up to 6-channel temperature of electrical connection nodes and send the data to ATC600-M via LoRa wirelesss Comms.]

- 30* TPSNT503F415FAL1200 NTC Thermistor [Paired with ATE300M for temp. signal input]

- 1* KDYA-DG30-24K Power Supply Module [Paired with ATP007 for 85~265Vac/Vdc Power Supply input]

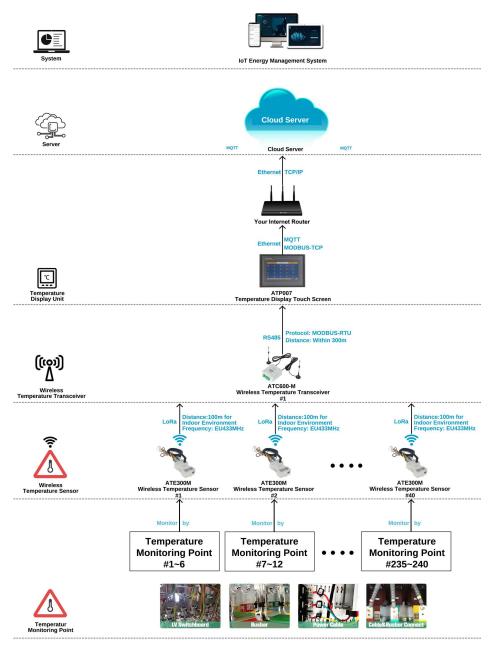




3. Comms. Structure & Logic [Ethernet IoT Cloud&Local Wireless Temperature Monitoring Solution]

(1) Between ATE300M wireless temperature sensor and ATC600-M wireless temperature transceiver, we are using a radio wireless communications called LoRa. The communication distance is within 100m [when in indoor environment and penetrate 1 layer of metal cover of switchgear]. The communication protocol is self defined protocol. [1 ATC600-M can support up to 240 pcs ATE300M if comms. distance allowed.]

(2) Between ATP007 smart touch screen and ATC600-M wierless temperature transceiver. We are using common RS485 communications based on MODBUS-RTU protocol. Although for this RS485 communication, it's wired comms. But normally these devices were always installed closedly to each other, so that remain the most part of communication structure still wireless. [1 pcs ATP007 can support and display the temp. data of up to 240 points]
(3) Between ATP007 smart touch screen and Acrel IoT system, we are using Ethernet comms. methods based on either MOTT or MODBUS-TCP protocol.



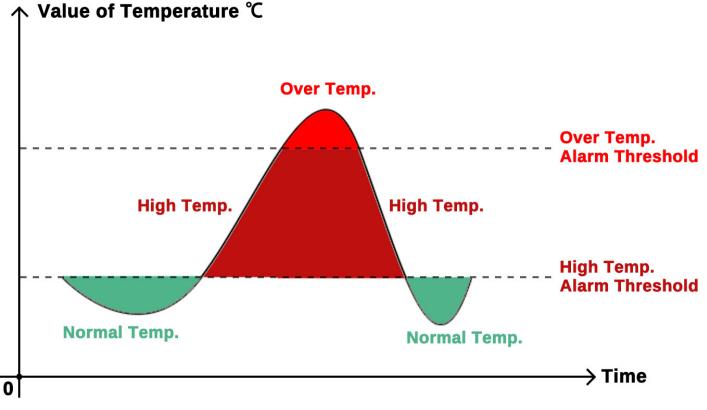
(1) Communication Structure



3. Local Device Temperature Alarm Function&Logic [Ethernet IoT Cloud&Local Wireless Temperature Monitoring Solution]

ATP Seires Tempearture Display Devices support 2 types of major temperature alarm logic. When any of the below alarm logic was set and triggered, it will alarm the buzzer up. (1) High Temperature Alarm: When temperature of certain monitoring node was higher than a certain preset threshold value, this will twigger high temperature alarm. [Normally used as a pre-alarm for mentioning related person to take care of temperature rising issue in monitoring places]

(2) Over Temperature Alarm: Similar like high temperature alarm, but over temperature alarm normally will be preset a higher alarm threshold. [Normally used for alarming the related person that there are severe temperature rising issue happened and need to be solved immediately]



(1&2) High&Over Temperature Alarm



3. Cloud IoT Platform Temperature Alarm Function&Logic [Ethernet IoT Cloud&Local Wireless Temperature Monitoring Solution]

Once the temperature data was collected by Acrel IoT Cloud System Platform. We could also do the high/over temperature alarm rule setting on cloud system and receive the high/over temperature alarm warning information via WEB/APP/SMS/E-mail. [SMS/E-mail warning will be only supported when using buy-out service of Acrel IoT System.]

(1) High/Over Temperature Alarm: First we set the high/over temperature alarm rule on platform, then once the monitoring temperature was higher/lower than a certain preset threshold value, this will trigger the alarm and send the alarm warning information via assigned WEB/APP/SMS/E-mail.

| S Acrel | IoT EMS Platform | | | | | | Q Low | Middle High | 🔊 🐟 🕾 🖾 👀 | B 17 |
|-----------------------------|----------------------------------|------------------------------------|-----------------------------|---------------------------------|-----------|------------|-------------|--------------|------------|---------------------|
| | Main Dashboard Meter Status × Ca | abinet temperature × • Meter Alarm | Rules × | | | | | | | |
| | + Add 🖉 Edit 🖻 Delete | | IoT Project | | | | | | | |
| | Project name Regional | l location Energy type Par | 1 | | | Condition1 | Threshold 1 | Condition2 | Threshold2 | Trigger event |
| | | | Add | | × | | | | | |
| | | | * Project name | IoT Project | ~ | | | | | |
| | | | * Alarm types | Out-of-limit event | ~ | | | | | |
| | | | * Circuit name | Cabinet temperature | ~ | | | | | |
| Prepaid Meter Managemen | | | | | × | | | | | |
| Device Model Management | | | * Alarm level | High This field is required | | | | | | |
| | | | * Event type | Overtemperature | ~ | | | | | |
| | | | | This field is required | | | | | | |
| | | | * Ele param | Temp1 | Y | | | | | |
| | | | * Alarm delay time (Minute) | This field is required 0 | | | | | | |
| | | | Time period setting | • Full time period Ocustom time | range | | | | | |
| | | | * Condition1 | >= | ~ | | | | | |
| | | | * Threshold1 | 50 | | | | | | |
| | | | Condition2 | >= | ~ | | | | | |
| Meter Alarm Rules | | | Threshold2 | 80 | | | | | | |
| | | | | | | | | | | |
| Hierarchical Alarm Settings | | | | | Ok Cancel | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | total 0 15/p | age 1 | Go to 1 |
| | | | | | | | | | | |

(1) Set the over/high temperature alarm rule

| S Acrel | E loT EMS Platform Q 100 ⁰⁰⁰ Lot 200 ⁰⁰ Hog ⁰⁰⁰ 40 回 出 幅 分 100 ⁰⁰⁰ |
|-----------------------------|---|
| Power Monitoring | Main Dashboard Alarm Information - |
| ℅ Prepaid Management ~ | Event type: Undervoltage Overvoltage Overvoltage Overvoltage Overvoltage Overvoltage Overvoltage Residual Current Overland Money Residual Current Overland Current Fault Smoke Electric arc Short circuit Blackout Lowtemperature Common Offline OTHER Ratio |
| 🖕 Lighting 🛛 👻 | Alaminevet: 16gh Mádda Low Working order status: Unteranted Distributed Processed |
| Wireless Temperature ~ | Other options: [Fright name 🗠] - [Choose 🗠] 🖾 2022-01-01 - 2022-72-18 [Detailed description] 🧐 React |
| 🗐 Energy Quality 🛛 🗸 | Ø Eroott Ø AlDeal |
| ≉ Demand Analysis ~ | |
| 🏶 Distributed PV 🛛 🐣 | 2023-09-18 165500 Utiterated E Gateway Id: 🖶 Device model: ATC600 🖂 Meteradoress: 🕲 Circuit name: Temo & Hum |
| 💼 Energy Analysis 👋 | E Gateway id: |
| 🕆 Area Analysis 🛛 🗸 | 2023-08-18 0812:00 Utreated |
| Department Analysis ~ | |
| D Alarms | 2023-06-18 073800 [Utruthe] |
| Alarm Information | Concept of Links of the second of the s |
| Alarm Dispatch | |
| Alarm Handling | 2021 06-110 005000 Umweet Details It Gateway id: Device model: ATC600 El Meter address: It Circuit name: Temp & Hum |
| 🕼 User Report 🛛 🗸 | 2023-08-18 06-2900 Untwated |
| S Configuration ~ | A 🖾 Gatoway dz 🔂 Device model: ATC600 🖂 Meter address: 🛛 🕑 Circuit name. Temp & Hum |
| İ Storage Battery 🗸 🗸 | Detailed description: Temp2 is out of limit, settingHalue: >20, currentValue: 21.0, unit: ¹ C |
| 💥 Basic Data Management | 2022-08-18 0548:00 Untrusted Device model: ATC650 El Meter address: © Circuit name: Temp & Hum |
| System Setting ~ | E Gateway id: G Device model: ATC600 EM Mete address: Ø Circuit name: Temp & Hum womput Detailed description: Temp2 is out of limit, setting/dule: \$(conditionEn), current/blue: 21.0, unit: "C |
| 🕼 Log In Management 🗸 | 2023 06-18 05:08:00 Utervane |
| ttps://iot.acrel-eem.com/#/ | E Gateway Id. Orvice model: ATC680 E Meter address |

(2) Receive and check alarm information



Author: Loki Elfin E-mail: loki@acrel.cn Website: www.acrel-electric.fr

3. Hardware Devices Overview [Ethernet IoT Cloud&Local Wireless Temperature Monitoring Solution]

Model 1: ATE300M Multi-channel Wireless Temperature Sensor

- Temperature Measuring Range: -40 ~+140 [±1]
- Monitoring: Up to 6-channel Temperature
- Wireless Comms [Upstream]: LoRa Radio Comms. [433~510MHz, self-defined protocol]
- LoRa Comms. Distance: within 100m [when in indoor environment, penetrate 1 layer of metal cover of
- switchboard/switchgear]
- Sampling Frequency: 1~240s
- Power Supply: 85~265Vac/Vdc
- Installation: DIN-rail/Strap-tied

Model 1: TPSNT503F415FAL1200 NTC Thermistor

- Temperature Measuring Range: -40 ~+140 [±1]
- Type: 2-wire NTC termistor
- Cable Length: 1.2m [0.5m optional, model will be TPSNT503F4150FAL500-03 NTC Thermistor]
- Probe Aperture Hole Size: 12mm [diameter]
- Application: paired with ATE300M for temperature signal input
- Installation: Strap-tied/Screw-fixed

Model 2: ATC600-M Wireless Temperature Transceiver

- Wireless Comms. [Downstream]: LoRa Radio Comms. [433~510MHz,self-defined protocol]
- LoRa Comms. Distance: within 100m [when in indoor environment, penetrate 1 layer of metal cover of switchboard/switchgear]
- Wired Comms. [Upstream]: 1-way RS485 [MODBUS-RTU protocol]
- Support: up to 240 pcs ATE300M Wireless
- Temperature Sensors based on LoRa
- Power Supply: 100~265Vac/Vdc
- Working Temperature: -20 ~+55
- Working Humidity: <=95%









3. Hardware Devices Overview [Ethernet IoT Cloud&Local Wireless Temperature Monitoring Solution]

Model 4: ATP007 Temp. Display&Alarm Touch Screen

- Comms.: 2-way RS485 [one for upstream, one for downstream, MODBUS-RTU]; 1-way Ethernet [for upstream, MODBUS-TCP]

- Support: Display the temperature data of up to 240 pcs temperature monitoring points.

- Alarm: High-tempearture alarm, over-temperature alarm.

- Power Supply: 24Vdc [±10%]; consumption 15W

- Screen Size: 7 inchs [10 inchs option available, module ATP010]
- Working Temperature: -10 ~+55
- Working Humidity: <=95%





Model 5: KDYA-DG30-24K Power Supply Module

- Rated Input Range: 100~240Vac/Vdc
- Rated Outpu Range: 24Vdc

- Application: paired with ATP007 for power supply input





3. Model Selection&Quoation [Ethernet IoT Cloud&Local Wireless Temperature Monitoring Solution]

(1) This Quotation doesn't include freight charge. To gain a complete quotation, please refer the actual quantity that you want to request for the actual order, once we receiving it. We will issue a Official Proforma Invoice with Acrel Stamps on it for later procedure.

| | | | System Software | | | | |
|--|----------|---|---|---|--|---|---|
| Name | | | Description | System Price | | Remark (Choose Host Service or Buy-out Service a month Free Trial of Cloud IoT System | |
| | | been sent to cloud | System support all the meters across the country whose data has een sent to cloud server through 4G,WiFi or Ethernet . | | \$0 (recommended in pilot projtect) | | onth Free Trail ed to rent a cloud server)) |
| | | 3.Provide IoT APP | ading and data collection. for mobile phone side and IoT WEB for PC side. data report of daily, monthly and annually | \$xxx/Year (For 30 Poir (Price for Host Service) | nts) | \$xx to buy Hosting | Service for 1 monitoring poin to the system 1 year |
| | | period with year-or 5.Provide various a | -yeay and period-on-period energy analysis. alarm function to ensure a stable operation | recommended in pilot pro | ojtect) | (Users don't need to rent a cloud ser | |
| Acrel Cloud IoT Energy Management System 6.Offer 3-m | | | protect your property. e trial of system with full technical support or pilot project. | (Price for Buy-out Sen Only,recommended in late | /ice | permanent use (Lin | need to be rent by users) |
| | | | Cloud Server | | | | |
| Name | | | Description | Server Renting Price (For Reference Only | | | Remark |
| | | 1.Cloud Server cou Cloud. | Id be rent on the cloud server provider like Amazon | (| / | | |
| Cloud Server | | 2.Users of Cloud I cloud server when System . And if the our Cloud IoT Syst rent on Amazon so 3.The quotation of | of Energy Management System only need to rent hey choose buy-out service of our Cloud IoT y are using hosting service or 3-month free trial of em, we will use our own cloud server which has been that users don't need to rent a cloud server. Cloud Server is only a reference price that we have | According to Specs of Rent Server | ed Cloud | Cloud Below cloud server specs could supp 1000-2000 monitoings points connected system (Server: 8 core 16G Operation System: windows server 2 | |
| | | rent on Amazon Cl | cal Temperature Display&Alar | m Device | | | |
| | | | 1 | | | | |
| | | Screen P007 | Comms.: 2-way RS485 (MODBUS-RTU); 1-way Ethernet [MODBUS-TCP] Support: Up to 240 ATE series Transceiver. Auxiliary Power Suppoly: 24Vdc HS Code: 8471609000 | 1 pcs | | 1 | 1 |
| | | oply Module IG30-24K | Application: Paired with ATP007Kt for 85~265Vac Power Supply Input Input: 85~265Vac Output: 24Vdc HS Code: 8504409999 | 1 pcs | 1 pcs / | | 1 |
| | 1 | | Wireless Temperature Trans | ceiver | | | |
| Overview Picture | USAGE&MO | DULE NAME | DESCRIPTION & SPECIFICATION | QUANTITY | FOB U | INIT PRICE (USD) | AMOUNT (USD) |
| | | e Transceiver 600-M | Upstream: RS485 (MODBUS-RTU) Downstream: LoRa (433-510 MHz) Support: Up to 240 ATE300M series wireless temperature sensors using LoRa communication. Power Supply: 100-265Vac HS Code: 9025191010 | 1 pcs | I | | Ĭ |
| | | | Wireless Temperature Sen | sor | | | |
| Overview Picture | USAGE&MO | DULE NAME | DESCRIPTION & SPECIFICATION | QUANTITY | FOB U | INIT PRICE (USD) | AMOUNT (USD) |
| | | ure Sensor 300M | Communication: LoRa Wireless (433~510MHz) Monitoring: Up to 6-channel Temperature Measuring Range: -40°C~+140°C [via NTC Thermistor] Power Supply: 85~265Vac/Vdc HS Code: 9025191010 | 5 pcs | | I | 7 |
| | | ermistor -415FAL1200 | Temperature Measuring Range: -40℃~+140℃ [±1℃] Type: 2-wire NTC termistor Cable Length: 1.2m Probe Aperture Hole Size: φ12mm [diameter] Installation: Strap-tied/Screw-fixed HS Code: 853400000 | 30 pcs | | 7 | 1 |



4. Scenario Preset [4G IoT Cloud Wireless Temperature Monitoring Solution]

(1) The target was to monitor and alarm the temperature of 5 switchgears deployed in a single room. Only IoT cloud display and alarm of temperature was requested.
(2) Each switchgear require 6 temperature monitoring points for electrical connection nodes. Thus there will be 30 temperature monitoring points in total.

(3) The system voltage of switchgear will be 0.4kV. Network with stable 4G Comms.

4. Devices Deployment [4G IoT Cloud Wireless Temperature Monitoring Solution]

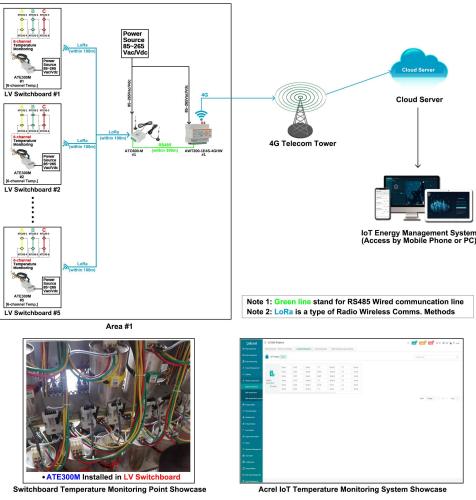
Area #1 - LV Switchboard #1 ~ #5:

- 1* AWT200-1E4S-4GHW IoT Gateway [For further uploading the data from ATC600-M to Acrel IoT Cloud System via 4G Comms.]

- 1* ATC600-M Wireless Temperature Transciever [For collecting temperature data from ATE300M wireless temp. sensors and further uploading data to AWT200-1E4S-4GHW]
 - 5* ATE300M Multi-channel Wireless Temperature Sensor [For monitoring up to 6-channel temperature of electrical connection nodes and send the data to ATC600-M via LoRa wirelesss Comms.]

- 30* TPSNT503F415FAL1200 NTC Thermistor [Paired with ATE300M for temp. signal input]
 - 1* KDYA-DG30-24K Power Supply Module [Paired with ATP007 for 85~265Vac/Vdc Power

Supply input]



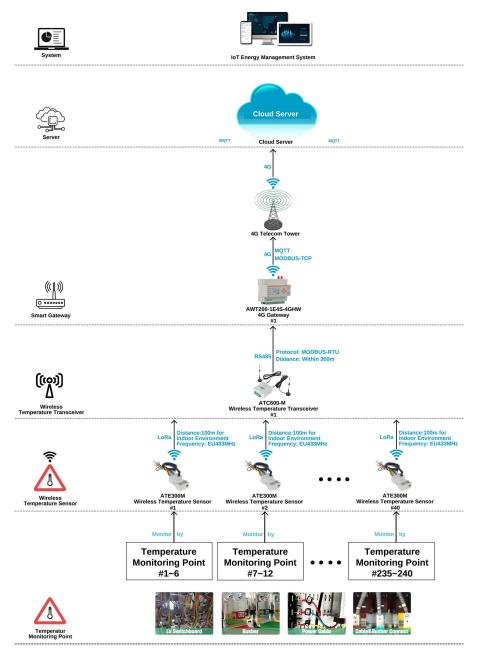
(1) Devices deployment plan Illustraton



4. Comms. Structure & Logic [4G IoT Cloud Wireless Temperature Monitoring Solution]

(1) Between ATE300M wireless temperature sensor and ATC600-M wireless temperature transceiver, we are using a radio wireless communications called LoRa. The communication distance is within 100m [when in indoor environment and penetrate 1 layer of metal cover of switchgear]. The communication protocol is self defined protocol. [1 ATC600-M can support up to 240 pcs ATE300M if comms. distance allowed.]

(2) Between ATP007 touch screen and AWT200-1E4S-4GHW IoT gateway, we are using common RS485 communications based on MODBUS-RTU protocol. Although for this RS485 communication, it's wired comms. But normally these devices were always installed closedly to each other, so that remain the most part of communication structure still wireless. [1 pcs ATP007 can support and display the temp. data of up to 240 points]
(3) Between AWT200-1E4S-4GHW IoT gateway and Acrel IoT system, we are using 4G comms. methods based on either MQTT or MODBUS-TCP protocol.



(1) Communication Structure



4. Cloud IoT Platform Temperature Alarm Function&Logic [4G IoT Cloud Wireless Temperature Monitoring Solution]

Once the temperature data was collected by Acrel IoT Cloud System Platform. We could also do the high/over temperature alarm rule setting on cloud system and receive the high/over temperature alarm warning information via WEB/APP/SMS/E-mail. [SMS/E-mail warning will be only supported when using buy-out service of Acrel IoT System.]

(1) High/Over Temperature Alarm: First we set the high/over temperature alarm rule on platform, then once the monitoring temperature was higher/lower than a certain preset threshold value, this will trigger the alarm and send the alarm warning information via assigned WEB/APP/SMS/E-mail.

| SI Acrel | ■ IoT EMS Platform | | | | | Q Low 99+ | Middle High | 🏧 🕸 🔐 🔛 🗱 | 9 V |
|-----------------------------|---|-----------------------------|---|-----------|------------|------------|--------------|------------|---------------|
| 2% Basic Data Management | Main Dashboard Meter Status × Cabinet temperature × • Meter Alarm R | tules × | | | | | | | |
| User Management | + Add 🖉 Edit 😰 Delete | IoT Project | | | | | | | |
| Project Management | Project name Regional location Energy type Para | | | | Condition1 | Threshold1 | Condition2 | Threshold2 | Trigger event |
| Gateway Management | | Add | | × | | | | | |
| Meter Management | | * Project name | IoT Project | v | | | | | |
| Region Management | | ^ Alarm types | Out-of-limit event | ~ | | | | | |
| Charge Plan | | | | | | | | | |
| Prepaid Meter Managemen | | * Circuit name | Cabinet temperature | ~ | | | | | |
| Device Model Management | | * Alarm level | High This field is required | ~ | | | | | |
| PV Settings | | * Event type | Overtemperature This field is required | ~ | | | | | |
| Parameters Management | | * Ele param | Temp1 | Y | | | | | |
| StreetLight | | * Alarm delay time (Minute) | This field is required 0 | | | | | | |
| inverterManagement. | | Time period setting | • Full time period O Custom time | range | | | | | |
| Energy Type | | * Condition1 | >= | ~ | | | | | |
| Project Topology | | * Threshold1 | | | | | | | |
| Energy Topology | | | | | | | | | |
| Meter Alarm Rules | | Condition2 | | ~ | | | | | |
| Alarm Reminder | | Threshold2 | 80 | | | | | | |
| Hierarchical Alarm Settings | | | | | | | | | |
| Picture Management | | | | Ok Cancel | | | | | |
| Alias Configuration | | | | | | | | | |
| Transformer | | | | | | | | | |
| | | | | | | | Total 0 15/j | page 🗸 🤇 1 | Go to 1 |
| Product Management | | | | | | | | | |

(1) Set the over/high temperature alarm rule

| Sa Acrel | 트 IoT EMS Platform Q 🛄 🐨 Made 🖤 Made 🐨 🖼 😤 😚 🚥 |
|-----------------------------|---|
| 🖪 Power Monitoring 👋 | Main Deshboard A Alarm Information - |
| A Prepaid Management∀ | Event type: Undervoltage Overvoltage Overvoltage Overvoltage Overvoltage Overvoltage Overvoltage Overvoltage Residual Current Overleanperature Fault Smoke Electric arc Short circuit Blackout Londemperature Common Offline OTHER Ratio |
| 🗅 Lighting 🛛 👻 | Alarm level: High Middle Low Working order status: Untreated Distributed Processed |
| Wireless Temperature ~ | Other options: Project name 🗸 - Choose 🗸 🖹 2022-01-01 ~ 2022-12-18 Detailed description Q Search 2 Read |
| 🕮 Energy Quality 👋 | Ø Export Ø AlDeal Distributed Distributed Processed |
| ≫ Demand Analysis 🍸 | |
| Distributed PV * | Image: State (1) Uternated 5000000000000000000000000000000000000 |
| 🕍 Energy Analysis 👋 | nonmountal Debailed description: Temp2 is out of limit, setting/blue: <19, current/blue: 180, unit: "C |
| 🕅 Area Analysis 🛛 🗡 | 2023-06-18 OB12:00 Untreated |
| 😫 Department Analysis 🐃 | E Gateway Id: Concut name: Temp & Hum Concut name: Temp & H |
| Ω Alarms ^ | 2023-06-18 073800 (Unterted |
| Alarm Information | A II Gateway id: Device model: A10600 🖻 Meter address: 🕑 Circuit name. Temp & Hum |
| Alarm Dispatch | Detailed description: Temp2 is out of limit, setting/dolue: >20, current/blue: 21.0, unit: "C |
| Alarm Handling | 2023-08-19 065800 Untreame Device model: ATC600 El Meter address: © Circuit name: Temo & Hum |
| Operation Management | As satisway id: Deliver model: Al (460) Ed. Meter address U Circuit name: Temp & Hum enamoust Detailed description: Temp2 is out of limit, settingValue: >20, currentValue: 21.0, unit: *C |
| 🕼 User Report 🛛 👋 | 2023-08-18 062900 Unreated |
| S Configuration Y | 👔 🔯 Gatoway id: 👘 Device model: ATC600 🛛 Meter address: 🔮 Circuit name: Temp & Hum rinnepsize: Detailed description: Temp 2 is out of limit, setting/alue: >20, current/alue: 21.0, unit: "C |
| İ Storage Battery 🗠 | 2003-06-18 05:48:00 (Unstante) (B. Details |
| 💥 Basic Data Management | E Gateway Id: Chicke model: ATC600 El Meter address: |
| System Setting ~ | utimiseuz. Detailed description: Temp2 is out of limit, settingValue: \$(conditionEn), currentValue: 21.0, unit: °C |
| 😰 Log In Management 👻 | 2023-08-18 05:08:00 Untreated |
| ttps://iot.acrel-eem.com/#/ | A 🖾 Gateway ki: 💮 Device model: ATCSC0 🖾 Meter address: 💿 Circuit name: Temp & Hum |

(2) Receive and check alarm information



Author: Loki Elfin E-mail: loki@acrel.cn Website: www.acrel-electric.fr

4. Hardware Devices Overview [4G IoT Cloud Wireless Temperature Monitoring Solution]

Model 1: ATE300M Multi-channel Wireless Temperature Sensor

- Temperature Measuring Range: -40 ~+140 [±1]
- Monitoring: Up to 6-channel Temperature
- Wireless Comms [Upstream]: LoRa Radio Comms. [433~510MHz, self-defined protocol]
- LoRa Comms. Distance: within 100m [when in indoor environment, penetrate 1 layer of metal cover of
- switchboard/switchgear]
- Sampling Frequency: 1~240s
- Power Supply: 85~265Vac/Vdc
- Installation: DIN-rail/Strap-tied

Model 1: TPSNT503F415FAL1200 NTC Thermistor

- Temperature Measuring Range: -40 ~+140 [±1]
- Type: 2-wire NTC termistor
- Cable Length: 1.2m [0.5m optional, model will be TPSNT503F4150FAL500-03 NTC Thermistor]
- Probe Aperture Hole Size: 12mm [diameter]
- Application: paired with ATE300M for temperature signal input
- Installation: Strap-tied/Screw-fixed

Model 2: ATC600-M Wireless Temperature Transceiver

- Wireless Comms. [Downstream]: LoRa Radio Comms. [433~510MHz,self-defined protocol]
- LoRa Comms. Distance: within 100m [when in indoor environment, penetrate 1 layer of metal cover of switchboard/switchgear]
- Wired Comms. [Upstream]: 1-way RS485 [MODBUS-RTU protocol]
- Support: up to 240 pcs ATE300M Wireless
- Temperature Sensors based on LoRa
- Power Supply: 100~265Vac/Vdc
- Working Temperature: -20 ~+55
- Working Humidity: <=95%









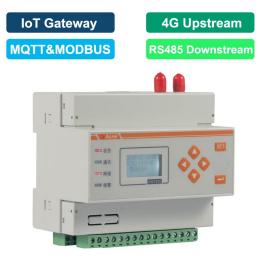
4. Hardware Devices Overview [4G IoT Cloud Wireless Temperature Monitoring Solution]

Model 4: AWT200-1E4S-4GHW IoT Smart Gateway

- Upstream Comms.: 4G&Ethernet Comms. [MQTT& MODBUS-TCP protocol]

- Downstream Comms.: 4-way RS485 [MODBUS-RTU protocol]

- Power Supply: 85~265Vac/Vdc
- Working Temperature: -20 ~+55
- Working Humidity: <=95%





4. Model Selection&Quoation [4G IoT Cloud Wireless Temperature Monitoring Solution]

(1) This Quotation doesn't include freight charge. To gain a complete quotation, please refer the actual quantity that you want to request for the actual order, once we receiving it. We will issue a Official Proforma Invoice with Acrel Stamps on it for later procedure.

| | | | • | · · · | | | |
|---|--|---------------------------------|--|---|-------|--|--------------|
| | | | System Software | | | | |
| Name | | | Description | System Price | | Remark (Choose Host Service or Buy-out Service af month Free Trial of Cloud IoT System | |
| | · | been sent to cloud s | II the meters across the country whose data has server through 4G,WiFi or Ethernet . ading and data collection. | \$0 (recommended in pilot projtect) | | 3-month Free Trail (Users don't need to rent a cloud server)) | |
| 3.Provide IoT APP 4.Generate energy of | | | for mobile phone side and IoT WEB for PC side. data report of daily, monthly and annually yeay and period-on-period energy analysis. | \$xxx/Year (For 30 Poir (Price for Host Service) recommended in pilot pro | Only, | \$xx to buy Hosting Service for 1 monitoring po connected to the system 1 year (Users don't need to rent a cloud server) | |
| of the system and p | | | larm function to ensure a stable operation rotect your property. e trial of system with full technical support or pilot project. | \$xxxx/Permanent (Limitless (Price for Buy-out Sen Only,recommended in late | vice |) 1-time charging of \$xxxx for Buy-out Servi permanent use (Limitless monitoring points | |
| | | | Cloud Server | | | 1 | |
| Name | | | Description | Server Renting Price (For Reference Only | | | Remark |
| Cloud Server Cloud Server | Cloud. 2.Users of Cloud I cloud Server when t System. And if the our Cloud IoT Syst rent on Amazon so 3. The question of the | | Id be rent on the cloud server provider like Amazon T Energy Management System only need to rent hey choose buy-out service of our Cloud IoT are using hosting service or 3-month free trial of em, we will use our own cloud server which has been that users don't need to rent a cloud server. Cloud Server is only a reference price that we have oud. | According to Specs of Rented Cloud | | d Cloud 1000-2000 monitoings points conne system (Server: 8 core 16G Operation System: windows serv | |
| | | | Smart IoT Gateway | | | | |
| Overview Picture | USAGE&MC | DDULE NAME | DESCRIPTION & SPECIFICATION | QUANTITY | FOB U | NIT PRICE (USD) | AMOUNT (USD) |
| | | Gateway IE4S-4GHW | Upstream: 4G, Ethernet [MQTT, MODBUS, etc] Downstream: R5485 (MODBUS-RTU) Support: up to 80~100 RS485 Devices within 400m using RS485 Wired Communication Adjustment: Via RJ45 or RS485 Port. Power Supply: 85~265Vac/Vdc (via power adpter) HS Code: 8517699000 | 1 pcs | T | | 1 |
| | | | Wireless Temperature Trans | ceiver | | | |
| Overview Picture | USAGE&MC | DULE NAME | DESCRIPTION & SPECIFICATION | QUANTITY | FOB U | NIT PRICE (USD) | AMOUNT (USD) |
| | | re Transceiver :600-M | Upstream: RS485 (MODBUS-RTU) Downstream: LoRa (433-510 MHz) Support: Up to 240 ATE300M series wireless temperature sensors using LoRa communication. Power Supply: 100~265Vac HS Code: 9025191010 | 1 pcs | | 1 | 1 |
| | | | Wireless Temperature Sen | sor | | | |
| Overview Picture | USAGE&MC | DDULE NAME | DESCRIPTION & SPECIFICATION | QUANTITY | FOB U | NIT PRICE (USD) | AMOUNT (USD) |
| | Temperature Sensor ATE300M | | Communication: LoRa Wireless (433~510MHz) Monitoring: Up to 6-channel Temperature Measuring Range: -40°C++140°C [via NTC Thermistor] Power Supply: 85~265Vac/Vdc HS Code: 9025191010 | 5 pcs | I | | 1 |
| | | hermistor F415FAL1200 | Temperature Measuring Range: -40℃~+140℃ [±1℃] Type: 2-wire NTC termistor Cable Length: 1.2m Probe Aperture Hole Size: φ12mm [diameter] Installation: Strap-tied/Screw-fixed HS Code: 853340000 | 30 pcs | | 1 | I |



5. Scenario Preset [WiFi&Ethernet IoT Cloud Wireless Temperature Monitoring Solution]

(1) The target was to monitor and alarm the temperature of 5 switchgears deployed in a single room. Only IoT cloud display and alarm of temperature was requested.

(2) Each switchgear require 6 temperature moniotoring points for electrical connection nodes. Thus there will be 30 temperature monitoring points in total.

(3) The system voltage of switchgear will be 0.4kV. Network with WiFi or Ethernet.

5. Devices Deployment [WiFi&Ethernet IoT Cloud Wireless Temperature Monitoring Solution]

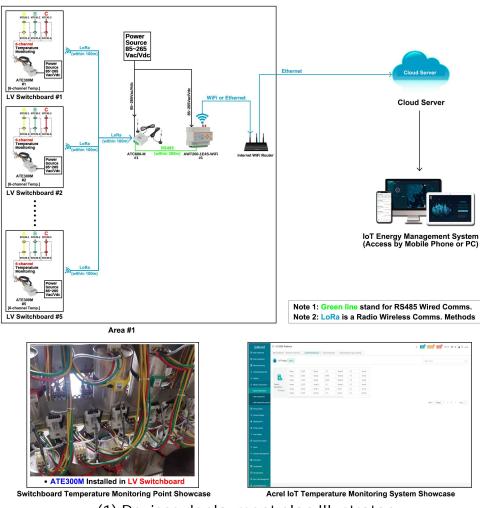
Area #1 - LV Switchboard #1 ~ #5:

- 1* AWT200-1E4S-WiFi IoT Gateway [For further uploading the data from ATC600-M to Acrel IoT Cloud System via WiFi or Ethernet Comms.]

- 1* ATC600-M Wireless Temperature Transciever [For collecting temperature data from ATE300M wireless temp. sensors and further uploading data to AWT200-1E4S-WiFi]

- 5* ATE300M Multi-channel Wireless Temperature Sensor [For monitoring up to 6-channel temperature of electrical connection nodes and send the data to ATC600-M via LoRa wirelesss Comms.]

- 30* TPSNT503F415FAL1200 NTC Thermistor [Paired with ATE300M for temp. signal input]
 - 1* KDYA-DG30-24K Power Supply Module [Paired with ATP007 for 85~265Vac/Vdc Power Supply input]



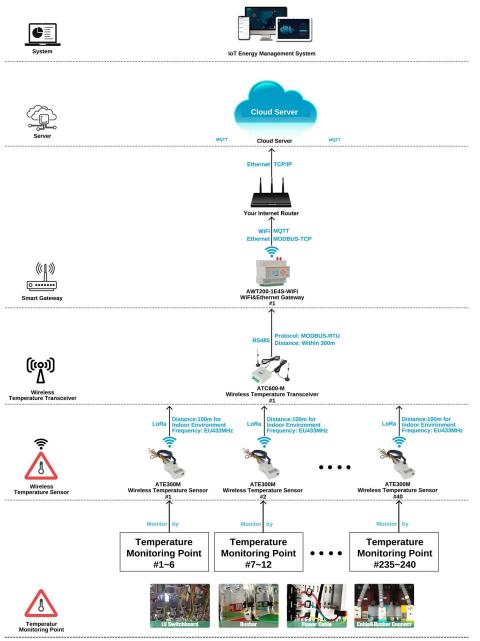
(1) Devices deployment plan Illustraton



5. Comms. Structure & Logic [WiFi&Ethernet IoT Cloud Wireless Temperature Monitoring Solution]

(1) Between ATE300M wireless temperature sensor and ATC600-M wireless temperature transceiver, we are using a radio wireless communications called LoRa. The communication distance is within 100m [when in indoor environment and penetrate 1 layer of metal cover of switchgear]. The communication protocol is self defined protocol. [1 ATC600-M can support up to 240 pcs ATE300M if comms. distance allowed.]

(2) Between ATP007 touch screen and AWT200-1E4S-WiFi IoT gateway, we are using common RS485 communications based on MODBUS-RTU protocol. Although for this RS485 communication, it's wired comms. But normally these devices were always installed closely to each other, so that remain the most part of communication structure still wireless. [1 pcs ATP007 can support and display the temp. data of up to 240 points]
(3) Between AWT200-1E4S-WiFi IoT gateway and Acrel IoT system, we are using either WiFi or Ethernet comms. methods based on either MQTT or MODBUS-TCP protocol.



(1) Communication Structure



5. Cloud IoT Platform Temperature Alarm Function&Logic [WiFi&Ethernet IoT Cloud Wireless Temperature Monitoring Solution]

Once the temperature data was collected by Acrel IoT Cloud System Platform. We could also do the high/over temperature alarm rule setting on cloud system and receive the high/over temperature alarm warning information via WEB/APP/SMS/E-mail. [SMS/E-mail warning will be only supported when using buy-out service of Acrel IoT System.]

(1) High/Over Temperature Alarm: First we set the high/over temperature alarm rule on platform, then once the monitoring temperature was higher/lower than a certain preset threshold value, this will trigger the alarm and send the alarm warning information via assigned WEB/APP/SMS/E-mail.

| Si Acrel | IoT EMS Platform | | | | | Q Low 99+ | Middle High | 🏧 🕸 🕄 🔤 👀 | 5 V |
|-----------------------------|--|-----------------------------|---------------------------------|--------------|------------|------------|-------------|------------|---------------|
| 3% Basic Data Management | Main Dashboard Meter Status × Cabinet temperature × • Meter Alar | n Rules 👒 | | | | | | | |
| User Management | + Add 2 Edit E Delete | IoT Project | | | | | | | |
| Project Management | Project name Regional location Energy type Project name | ara | | | Condition1 | Threshold1 | Condition2 | Threshold2 | Trigger event |
| Gateway Management | | Add | | × | | | | | |
| Meter Management | | * Project name | IoT Project | ~ | | | | | |
| Region Management | | * Alarm types | Out-of-limit event | ~ | | | | | |
| Charge Plan | | * Circuit name | Cabinet temperature | ~ | | | | | |
| Prepaid Meter Managemen | | | | × 1 | | | | | |
| Device Model Management | | * Alarm level | High This field is required | ~ | | | | | |
| PV Settings | | * Event type | Overtemperature | ~ | | | | | |
| | | * Ele param | This field is required Temp1 | ~ | | | | | |
| Parameters Management | | | This field is required | | | | | | |
| StreetLight | | * Alarm delay time (Minute) | 0 | | | | | | |
| inverterManagement | | Time period setting | Full time period Custor | n time range | | | | | |
| Energy Type | | * Condition1 | >= | ~ | | | | | |
| Project Topology | | * Threshold1 | 50 | | | | | | |
| Energy Topology | | Condition2 | >= | ~ | | | | | |
| Meter Alarm Rules | | Threshold2 | 80 | | | | | | |
| Alarm Reminder | | | | | | | | | |
| Hierarchical Alarm Settings | | | | Ok Cancel | | | | | |
| Picture Management | | | | | | | | | |
| Alias Configuration | | | | | | | | | |
| Transformer | | | | | | | | | |
| Product Management | | | | | | | Total 0 15/ | page V (1 | Go to 1 |

(1) Set the over/high temperature alarm rule

| Sa Acrel | 트 IoT EMS Platform Q 🛄 🐨 Made 🖤 🛤 🛱 🖼 😭 🗰 |
|-----------------------------|---|
| 🖪 Power Monitoring 👋 | Main Destaboard Adam Information × |
| ℅ Prepaid Management ~ | Event type: Undervoltage Overvoltage Overvoltage Overvoltage Overvoltage Overvoltage Overvoltage Overvoltage Residual Current Overlangerature Fault Smoke Electric arc Short circuit Blackout Lontemperature Common Offline OTHER Ratio |
| 🗅 Lighting 🛛 👻 | Alarm level: High Middle Low Working order status: Untreated Distributed Processed |
| Wireless Temperature ~ | Other options: Project name 🗸 - Choose 🗸 🖹 2022-01-01 ~ 2022-12-18 Detailed description |
| 🕮 Energy Quality 🛛 👋 | Export |
| ≫ Demand Analysis 🍸 | |
| Distributed PV * | 2023-08-19 165500 Ummande E Gateway /c |
| 🕍 Energy Analysis 👋 | nonmountal Detailed description: Temp2 is out of limit, setting/blue: <19, current/blue: 180, unit: °C |
| 🕅 Area Analysis 🛛 🗡 | 2023-08-16 081200 Untrented |
| 😫 Department Analysis 🐃 | E Gateway id: Go Device model: ATC650 Meter address Octouit name: Temp & Hum description: \$letechticEnName] is out of limit, settingValue: \$(conditionEn), currentValue: 210, unit: \$(unit) |
| Ω Alarms ^ | 2023-06-16 073800 (Untruthe) |
| Alarm Information | A III Gateway dz 🔂 Device model: ATC600 🔛 Meter address: 🔍 Circuit name: Temp & Hum |
| Alarm Dispatch | Detailed description: Temp2 is out of limit, settingValue: >20, currentValue: 21.0, unit: "C |
| Alarm Handling | 2023-08-18 0558:00 Untreame |
| Operation Management | As Sativasy ich By Denice model: A (C4)/0 By Meter addres: Dirucuit name: Temp & Hum entanouse: Detailed description: Temp2 is out of limit, settingvalue: >20, currentValue: 210, unit: "C |
| 🕼 User Report 🛛 👋 | 2023-06-18 0622900 Untreated |
| S Configuration Y | 👔 🔯 Gatoway id: 📅 Davice model: ATC600 🔄 Meter address: 🔮 Circuit name: Temp & Hum onnovaz: Detailed description: Temp2 is out of limit, settingValue: >20, currentValue: 21.0, unit: °C |
| İ Storage Battery 🗠 | 2023-06-18 05-4800 [Ummarke] |
| 💥 Basic Data Management | El Cateva i da Cateva i d |
| System Setting ~ | utimolazi Detailed description: Temp2 is out of limit, settingValue: \$(conditionEn), currentValue: 21.0, unit: °C |
| 😰 Log In Management 👻 | 2023-08-18 0508:00 Universe |
| ttps://iot.acrel-eem.com/#/ | Z Gateway ki: 🕀 Device model: ATC600 🗵 Meter address: D Circuit name: Temp & Hum |

(2) Receive and check alarm information



5. Hardware Devices Overview [WiFi&Ethernet IoT Cloud Wireless Temperature Monitoring Solution]

Model 1: ATE300M Multi-channel Wireless Temperature Sensor

- Temperature Measuring Range: -40 ~+140 [±1]
- Monitoring: Up to 6-channel Temperature
- Wireless Comms [Upstream]: LoRa Radio Comms. [433~510MHz, self-defined protocol]
- LoRa Comms. Distance: within 100m [when in indoor environment, penetrate 1 layer of metal cover of
- switchboard/switchgear]
- Sampling Frequency: 1~240s
- Power Supply: 85~265Vac/Vdc
- Installation: DIN-rail/Strap-tied

Model 1: TPSNT503F415FAL1200 NTC Thermistor

- Temperature Measuring Range: -40 ~+140 [±1]
- Type: 2-wire NTC termistor
- Cable Length: 1.2m [0.5m optional, model will be TPSNT503F4150FAL500-03 NTC Thermistor]
- Probe Aperture Hole Size: 12mm [diameter]
- Application: paired with ATE300M for temperature signal input
- Installation: Strap-tied/Screw-fixed

Model 2: ATC600-M Wireless Temperature Transceiver

- Wireless Comms. [Downstream]: LoRa Radio Comms. [433~510MHz,self-defined protocol]
- LoRa Comms. Distance: within 100m [when in indoor environment, penetrate 1 layer of metal cover of switchboard/switchgear]
- Wired Comms. [Upstream]: 1-way RS485 [MODBUS-RTU protocol]
- Support: up to 240 pcs ATE300M Wireless
- Temperature Sensors based on LoRa
- Power Supply: 100~265Vac/Vdc
- Working Temperature: -20 ~+55
- Working Humidity: <=95%









5. Hardware Devices Overview [WiFi&Ethernet IoT Cloud Wireless Temperature Monitoring Solution]

Model 4: AWT200-1E4S-WiFi IoT Smart Gateway

- Upstream Comms.: WiFi&Ethernet Comms. [MQTT& MODBUS-TCP protocol]

- Downstream Comms.: 4-way RS485 [MODBUS-RTU protocol]

- Power Supply: 85~265Vac/Vdc

- Working Temperature: -20 ~+55
- Working Humidity: <=95%





5. Model Selection&Quoation [WiFi&Ethernet IoT Cloud Wireless Temperature Monitoring Solution]

(1) This Quotation doesn't include freight charge. To gain a complete quotation, please refer the actual quantity that you want to request for the actual order, once we receiving it. We will issue a Official Proforma Invoice with Acrel Stamps on it for later procedure.

| | | | | • | | | | | |
|--|-------------------------------------|---|--|---|--|---|--|--|--|
| | | | System Software | | | | | | |
| Name | | | Description | System Price | | Remark (Choose Host Service or Buy-out Service after 3- month Free Trial of Cloud IoT System) | | | |
| been se | | been sent to cloud s | .System support all the meters across the country whose data has een sent to cloud server through 4G,WiFi or Ethernet . .Remote meter reading and data collection. | | \$0 (recommended in pilot projtect) | | 3-month Free Trail (Users don't need to rent a cloud server)) | | |
| | | 3.Provide IoT APP for mobile phone side and IoT WEB for PC side. 4.Generate energy data report of daily, monthly and annually period with year-on-yeay and period-on-period energy analysis. | | \$xxx/Year (For 30 Points) (Price for Host Service Only, recommended in pilot projtect) | | \$xx to buy Hosting Service for 1 monitoring points connected to the system 1 year (Users don't need to rent a cloud server) | | | |
| Acrel Cloud IoT Energy Management System | | 5.Provide various a of the system and p | larm function to ensure a stable operation rotect your property. e trial of system with full technical support | \$xxxx/Permanent (Limitless Points) (Price for Buy-out Service Only,recommended in late projtect) | | 1-time charging of \$xxxx for Buy-out Service of permanent use (Limitless monitoring points and a cloud server need to be rent by users) | | | |
| | | | Cloud Server | | | | | | |
| Name | | | Description | Server Renting Price | | | Remark | | |
| | | | ld be rent on the cloud server provider like Amazon | (For Reference Only) | | | | | |
| Cloud Server Cloud Server | | Cloud. 2.Users of Cloud IoT Energy Management System only need to rent cloud server when they choose buy-out service of our Cloud IoT System . And if they are using hosting service or 3-month free trial of our Cloud IoT System, we will use our own cloud server which has been rent on Amazon so that users don't need to rent a cloud server. 3.The quotation of Cloud Server is only a reference price that we have rent on Amazon Cloud. | | According to Specs of Rented Cloud Server | | Below cloud server specs could support 1000~2000 monitoings points connected to the system (Server: 8 core 16G Operation System: windows server 2016) | | | |
| | | | Smart IoT Gateway | | | | | | |
| Overview Picture | USAGE&MC | DULE NAME | DESCRIPTION & SPECIFICATION | QUANTITY | FOB UNIT PRICE (USD) | | AMOUNT (USD) | | |
| | | Gateway IE4S-4GHW | Upstream: 4G, Ethemet [MQTT, MODBUS, etc] Downstream: R5485 (MODBUS-RTU) Support: up to 80~100 RS485 Devices within 400m using RS485 Wired Communication Adjustment: Via RJ45 or RS485 Port. Power Supply: 85~265Vac/Vdc (via power adpter) HS Code: 8517699000 | 1 pcs | Ţ | | Ţ | | |
| | | | Wireless Temperature Transe | ceiver | | | | | |
| Overview Picture | USAGE&MC | DULE NAME | DESCRIPTION & SPECIFICATION | QUANTITY | FOB UNIT PRICE (USD) | | AMOUNT (USD) | | |
| | Temperature Transceiver ATC600-M | | Upstream: RS485 (MODBUS-RTU) Downstream: LoRa (433-510 MHz) Support: Up to 240 ATE300M series wireless temperature sensors using LoRa communication. Power Supply: 100~265Vac HS Code: 9025191010 | 1 pcs | I | | I | | |
| | | | Wireless Temperature Sen | sor | | | | | |
| Overview Picture | iew Picture USAGE&MODULE NAME | | DESCRIPTION & SPECIFICATION | QUANTITY FOB UNIT PRICE (U | | INIT PRICE (USD) | AMOUNT (USD) | | |
| | Temperature Sensor ATE300M | | Communication: LoRa Wireless (433~510MHz) Monitoring: Up to 6-channel Temperature Measuring Range: 40°C~+140°C [via NTC Thermistor] Power Supply: 85~265Vac/Vdc HS Code: 9025191010 | 5 pcs | 1 | | I | | |
| NTC Thermistor TPSNT503F415FAL1200 | | Temperature Measuring Range: -40℃~+140℃ [±1℃] Type: 2-wire NTC termistor Cable Length: 1.2m Probe Aperture Hole Size: φ12mm [diameter] Installation: Strap-tied/Screw-fixed HS Code: 8533400000 | 30 pcs | 1 | | I | | | |

35



5. Project Sample #1 - Italy Enel Green Power Project

(1) Project Overview:

- Customer: SEL S.P.A [Switchgear Complete set factory]
- · Country: Italy

 Project Aim: Integrate Acrel wireless temperature monitoring devices with switchgear s produced by SEL S.P.A for adding satety feature to their switchgear products.

Project Amount: About 400.000 USD



(1) Customer: SEL S.P.A [Switchgear Complete set factory]

GFSK Wireless Temperature Transceiver and Display Unit



Wireless Temperature Sensor

(1) Project Aim: Switchgear Wireless **Temperature Monitoring**

(2) Applied Product Combination:

- ARTM-P30-400 Wireless Temperature Transceiver and Display Unit

[For collecting, displaying and alarming for all temperature data collected from ATE400] - ATE400 Wireless Temperature Sensor

[For monitoring the temperature of electrical connection nodes and send the data to ARTM -P30-400 via GFSK wirelesss Comms.]



(2) Site Installation Picture



Wireless Temperature Monitoring Solution [Local Display]

Author: Loki Elfin E-mail: loki@acrel.cn Website: www.acrel-electric.fr

5. Project Sample #2 - Vietnam Lotte Mart Project

(1) Project Overview:

- Customer: V.T.E.C.H Electrical Technology Co., Ltd , EPC [Party A]
- · Country: Vietnam
- **Project Aim**: Client use Acrel complete Cloud Wireless Temperature Monitoring Solution for monitoring and alarming electric cabinet in Lotte Mart to ensure electricity safety.
- Project Amount: About 100.000 USD



(1) Customer: V.T.E.C.H Electrical Technology Co., Ltd , EPC [Party A]

(2) Applied Product Combination:

- AWT100-CEHW Ethernet IoT Gateway
- AWT100-POW Power Supply Module
- ATC600-C Wireless Temperature Transceiver
- ATE400 Wireless Temperature Sensor

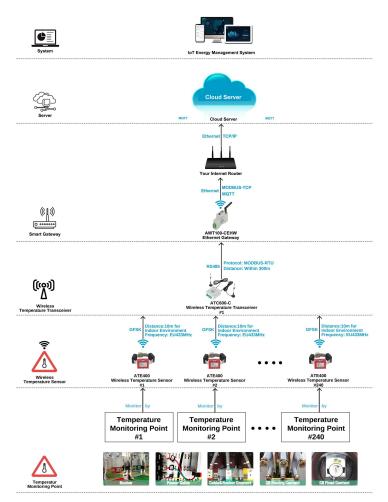


Wireless Temperature Sensor



Wireless Temperature Transceiver

(1) Project Aim: Online IoT based Wireless Temperature Monitoring&Alarming



(2) Site Picture Gallery

(2) Solution Overall Structure