



# Smart Thermostat

WT201 & WT211

Payload Protocol (JSON)

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# Chapter 1. Preface

## Overview

This guide describes the uplink data packet and downlink commands (JSON format) supported by the device when using the [codec](#) provided by Milesight. It is intended for most users to integrate with third-party platforms.


This document does not describe physical installation, HVAC wiring, and configuration steps in detail. Please use it together with the related documents.

## Related Document

Document	Description
WT201 & WT211 User Guide	Provides introductions, compatibility check, wirings, installation and configuration steps.
WT201 & WT211 BACnet Object List	Lists the BACnet objects exposed through a Milesight gateway with the BACnet feature enabled.
WT201 & WT211 Payload Protocol (HEX)	Provides the raw HEX payload format for uplink data and downlink commands.

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## Revision History

Release Date	Version	Revision Content
Jan. 17, 2025	V2.0	Initial version based on hardware v2.x:

Release Date	Version	Revision Content
		<ol style="list-style-type: none"> <li>1. Change room card switch input type and name;</li> <li>2. Add D2D data receiving feature;</li> <li>3. Add compressor and auxiliary heat linkage feature;</li> <li>4. Add Temperature Control Mode Enable and Target Temperature Resolution feature;</li> <li>5. Add dual target temperature mode under Auto mode;</li> <li>6. Add downlink feature: Temporary unlock, W2/Y2 auxiliary mode, Relay change report, Send humidity data.</li> <li>7. Add schedule type: Occupied, Unoccupied, ECO.</li> <li>8. Update the definition of O/B;</li> <li>9. Update compressor protection to system protection;</li> <li>10. Add temperature control mode and target temperature tolerance in the schedule.</li> </ol>
May 20, 2025	V2.1	Add downlink command to enable/disable screen display
May 31, 2026	V2.2	<ol style="list-style-type: none"> <li>1. Add data source to periodic report;</li> <li>2. Support reporting data source alarm when timeout;</li> <li>3. Add custom temperature control stages;</li> <li>4. Add occupancy mode parameters, central target temperatures and adjustment tolerances;</li> <li>5. Add unilateral tolerance;</li> <li>6. Add timezone offset;</li> <li>7. Add offline unlock;</li> <li>8. Add downlink commands: switch data source, child lock enable/disable, screen time display enable/disable, time mode, time-zone index, etc.</li> </ol>

# Chapter 2. Uplink Data

This chapter describes the uplink packets reported by the device.

## Basic Information Packet

After joining the network, the device reports a packet containing the basic device information. Example:

```
{
  "device_status": "on",
  "firmware_version": "v1.5",
  "hardware_version": "v2.1",
  "ipso_version": "v0.1", //Protocol version
  "lorawan_class": {
    "type": "Class C"
  },
  "reset_event": "reset", //Report after reset
  "sn": "6791d19604050005",
  "temperature_control_support_mode": {
    "auto": "disable",
    "cool": "disable",
    "em_heat": "disable",
    "heat": "enable"
  },
  "temperature_control_support_status": {
    "stage_1_cool": "disable",
    "stage_1_heat": "enable",
    "stage_2_cool": "disable",
    "stage_2_heat": "disable",
    "stage_3_cool": "disable",
    "stage_3_heat": "disable",
    "stage_4_heat": "disable",
    "stage_5_heat": "disable"
  },
  "tsl_version": "v1.0",
  "wires": {
    "aux": "off",
    "di": "off",
    "e": "on",
```

```

"gh": "on",
"gl": "off",
"ob": "off",
"pek": "off",
"w1": "on",
"w2": "on",
"y1": "on",
"y2": "on"
}
}

```

## Periodic Data Packet

The device reports a data packet at a configured reporting interval.

Periodic packet example when control permission is Thermostat:

```

{
  "ambient_temperature": 27.2, //Unit: °C
  "celsius_ambient_temperature": 27.2,
  "curr_temperature_humidity_source": "embedded",
  "current_temperature_control_mode": {
    "mode": "heat",
    "status": "standby"
  },
  "system_status": "on",
  "fahrenheit_ambient_temperature": 81,
  "fan_mode_setting": {
    "mode": "circulate",
    "status": "on"
  },
  "humidity": 57, //Unit: %RH
  "plan_type": "not executed",
  "target_temperature": 17.2
}

```

Periodic packet example when control permission is Remote Control:

```

{
  "ambient_temperature": 27.3, //Unit: °C

```

```

"celsius_ambient_temperature": 27.3,
"system_status": "on",
"fahrenheit_ambient_temperature": 81.1,
"humidity": 34, //Unit: %RH
"enabled_relay": "Y1" //Enabled relay name
}

```

## Alarm Packet

The device reports the following types of alarm packets.

Temperature alarm example:

```

{
  "temperature": 27.6, //Unit: °C
  "temperature_alarm": "threshold alarm"
}

```

Target temperature range alarm example: report when receiving a target temperature outside the regulation range.

```

{
  "target_temperature_range_alarm": [
    {
      "max": 18.8, //Max. regulation value, unit: °C
      "min": 10, //Min. regulation value, unit: °C
      "target_temperature": 3.6, //Invalid target temperature value, unit: °C
      "temperature_control_mode": "heat"
    }
  ]
}

```

Data source alarm example: report when temperature data is not received before the timeout and the data source is switched.

```

{
  "source_alarm": {
    "source": "embedded"
  }
}

```

## Status Change Packet

The device reports a packet when a parameter is changed.

1. Control permission change report example:

```
{  
  "control_permission": "thermostat"  
}
```

2. Wiring Setting change report example:

```
{  
  "temperature_control_support_mode": {  
    "auto": "disable",  
    "cool": "enable",  
    "em_heat": "disable",  
    "heat": "disable"  
  },  
  "temperature_control_support_status": {  
    "stage_1_cool": "enable",  
    "stage_1_heat": "disable",  
    "stage_2_cool": "enable",  
    "stage_2_heat": "disable",  
    "stage_3_cool": "disable",  
    "stage_3_heat": "disable",  
    "stage_4_heat": "disable",  
    "stage_5_heat": "disable"  
  },  
  "wires": {  
    "aux": "off",  
    "di": "on",  
    "e": "off",  
    "gh": "on",  
    "gl": "off",  
    "ob": "off",  
    "pek": "off",  
    "w1": "off",  
    "w2": "off",  
    "y1": "on",  
  }  
}
```

```

"y2": "on"
}
}

```

3. A periodic report is sent when any of the following parameters change:
  - Target Temperature
  - Temperature Control Mode
  - Fan Mode
  - System Status
  - Relay Status under Remote Control permission
4. Relay status change report under thermostat control permission

When [Relay Change Report](#) is enabled, the device will send this report whenever the relay status changes.

Example:

```

{
  "enabled_relay": "Y1"
}

```

## Historical Data Packet

The device will report historical periodic reports when:

- Report at data retransmission interval when data retransmission is triggered;
- Report at data query report interval when sending history query commands.

Example:

```

{
  "history": [
    {
      "fan_mode": "auto",
      "fan_status": "standby",
      "humidity": 39, //Unit: %RH
      "system_status": "on",
      "target_temperature": 27.7, //Target temperature or Cooling target temperature (dual target), Unit: °C
      "target_temperature_2": 20.7, //Heating target temperature (dual target), Unit: °C
      "temperature": 24.6, //Unit: °C
      "temperature_control_mode": "cool",

```

```
"temperature_control_status": "standby",  
"timestamp": 1697445600 //Unit: s  
}  
]  
}
```

# Chapter 3. Downlink Commands

Downlink commands can be used for remote control of the device through a network server.



**Note:**

The examples in this guide are JSON-like examples with inline comments for explanation. Remove all comments before sending commands if strict JSON format is required.

## Downlink Commands for Network Parameters

This section describes the downlink commands for network settings.

### Multicast Group Enable/Disable

Name	Example
multicast_group_config	<p>Enable group 1 and 3.</p> <pre data-bbox="500 919 1421 1289">{   "multicast_group_config": {     "group1_enable": "enable",     "group2_enable": "disable",     "group3_enable": "enable",     "group4_enable": "disable"   } }</pre> <p>Disable group 1.</p> <pre data-bbox="500 1356 1421 1583">{   "multicast_group_config": {     "group1_enable": "disable"   } }</pre>

### Configure Milesight D2D Parameters

Name	Example
d2d_master_ids	Add/delete a D2D data sending device.

Name	Example
	<pre data-bbox="451 289 1057 632"> {   "d2d_master_ids": [     {       "id": 1, //Range: 1-5       "dev_eui": "24e1241234567890" //Dev EUI, all 0 means delete     }   ] } </pre>
<p data-bbox="228 947 391 1066">d2d_master_-, enable, d2d_-, slave_enable</p>	<p data-bbox="435 678 699 709">Enable D2D controller.</p> <pre data-bbox="451 737 748 856"> {   "d2d_master_enable": "enable" } </pre> <p data-bbox="435 888 662 919">Disable D2D agent.</p> <pre data-bbox="451 947 740 1066"> {   "d2d_slave_enable": "disable" } </pre> <p data-bbox="435 1098 878 1129">Enable D2D controller and D2D agent.</p> <pre data-bbox="451 1157 756 1318"> {   "d2d_master_enable": "enable",   "d2d_slave_enable": "enable" } </pre>
<p data-bbox="248 1581 370 1654">d2d_mas- ter_config</p>	<p data-bbox="435 1371 1360 1444">D2D controller setting: Enable to send a control command ff01 when switching schedule to Wake.</p> <pre data-bbox="451 1472 1170 1864"> {   "d2d_master_config": [     {       "plan_type": "wake", //wake, away, home, sleep, occupied, unoccupied, eco       "enable": "enable",       "d2d_cmd": "ff01", //Hex control command       "lora_uplink_enable": "enable",       "time_enable": "enable", //Invalid       "time": 0 //Invalid     }   ] } </pre>

Name	Example
	<pre data-bbox="451 268 487 388"> } ] } </pre>
d2d_slave_config	<p data-bbox="435 436 1419 468">D2D agent setting 1: Add a rule to switch system on after receiving command 0000.</p> <pre data-bbox="451 489 893 1060"> {   "d2d_slave_config": [     {       "id": 1, //Command ID, range: 0-15       "enable": "enable",       "d2d_cmd": "0000", //Hex control command       "action": {         "action_type": "power", //system status         "system_status": "on" //on,off       }     }   ] } </pre> <p data-bbox="435 1098 1370 1171">D2D agent setting 2: Add a rule to switch to Away schedule after receiving command 0000.</p> <pre data-bbox="451 1192 1177 1764"> {   "d2d_slave_config": [     {       "id": 1, //Command ID, range: 0-15       "enable": "enable",       "d2d_cmd": "0000", //Hex control command       "action": {         "action_type": "plan", //Schedule type         "plan_type": "away" //wake, away, home, sleep, occupied, unoccupied, eco       }     }   ] } </pre>

## Downlink Commands for Temperature Control Parameters

This section describes the downlink commands for temperature control related parameters.

### Configure Data Source

Name	Example
temperature_source_config	<p>Data source is LNS and timeout is 10 minutes.</p> <pre data-bbox="451 548 1425 827"> {   "temperature_source_config": {     "source": "lora", //disable (=embedded, default),lora,d2d     "timeout": 10 //Timeout, unit: min, range: 3-60, default: 10   } } </pre>
temperature_humidity_source	<p>Data source is D2D.</p> <pre data-bbox="451 911 1425 1142"> {   "temperature_humidity_source":{     "mode":"d2d" //embedded, lora, d2d   } } </pre>
offline_control_mode	<p>When not receiving <b>temperature</b> data for data source timeout, switch to internal sensors.</p> <pre data-bbox="451 1268 1425 1415"> {   "offline_control_mode": "thermostat" //keep (default), thermostat, off(disable control) } </pre>
temperature	<p>Send external sensor temperature value when the data source is LNS.</p> <pre data-bbox="451 1499 1425 1646"> {   "temperature": 25 //Unit: °C, resolution: 0.1 } </pre>
humidity	<p>Send external sensor humidity value when the data source is LNS.</p> <pre data-bbox="451 1730 1425 1856"> {   "humidity": 50 //Unit: %RH, range: 0-100, resolution: 0.5 } </pre>

## Configure Control Permission

Name	Example
control_permission	<p>The control permission is Thermostat.</p> <pre>{   "control_permission": "thermostat" //thermostat,remote control }</pre>

## Configure System Status

Name	Example
temperature_control_enable	<p>Turn on the system.</p> <pre>{   "temperature_control_enable": "enable" //disable, enable }</pre>

## Configure Remote Control Parameters

When control permission is Remote Control, the device supports the following configurations.

Name	Example
wires_relay_config	<p>Y1, W1, E, O/B is connected, and others are disconnected.</p> <pre>{   "wires_relay_config": {     "y1": "on",     "y2_g1": "off",     "w1": "on",     "w2_aux": "off",     "e": "on",     "g": "off",     "ob": "on"   } }</pre>
offline_control_mode	<p>If the device is offline, switch to Thermostat control permission.</p>

Name	Example
	<pre data-bbox="479 283 1398 409"> {   "offline_control_mode": "thermostat" //keep (default), thermostat, off(disable control) } </pre>

## Downlink Commands for Thermostat Parameters

This section describes the downlink commands when control permission is **Thermostat**.


### Configure Installation Parameters

Name	Example
wires	<p data-bbox="495 781 852 808">Enable Y1, O/B, W1, E, PEK, Y2.</p> <pre data-bbox="506 840 1409 1501"> {   "wires": {     "y1": "on",     "gh": "off",     "ob": "on",     "w1": "on",     "e": "on",     "di": "off",     "pek": "on",     "w2": "off", //Either W2 or AUX     "aux": "off",     "y2": "on", //Either Y2 or GL     "g": "off"   } } </pre>
reversing_valve	<p data-bbox="495 1543 1079 1570">The O/B reversing valve is set to Energize on heat.</p> <pre data-bbox="506 1602 1409 1816"> {   "reversing_valve": {     "mode": "energize on heat" //energize on heat,energize on cool(default)   } } </pre>
	<p data-bbox="495 1858 1039 1885">Fan control during heating is Furnace or Boiler.</p>

Name	Example
fan_control_during_heating	<pre>{   "fan_control_during_heating": "furnace/boiler" //furnace/boiler, thermostat }</pre>
compressor_aux_combine_enable	<p>Enable Compressor and Auxiliary Heat Linkage.</p> <pre>{   "compressor_aux_combine_enable": "enable" //disable(default), enable }</pre>
freeze_protection_config	<p>Enable Freeze Protection and the protection temperature is 1°C.</p> <pre>{   "freeze_protection_config": {     "enable": "enable", //disable(default), enable     "temperature": 1 //Unit: °C, range: 1-5, default: 3   } }</pre>
system_protect_config	<p>Enable System Protection and the minimum running duration is 10 minutes.</p> <pre>{   "system_protect_config": {     "enable": "enable", //disable(default), enable     "duration": 10 //Unit: min, range: 1-60, default: 5   } }</pre>
aux_control_config	<p>Enable Y2 auxiliary mode only.</p> <pre>{   "aux_control_config": {     "y2_enable": "enable" //disable(default), enable   } }</pre> <p>Enable Y2 and W2 auxiliary mode.</p> <pre>{   "aux_control_config": {</pre>


Name	Example
	<pre> "y2_enable": "enable", //disable(default), enable "w2_enable": "enable" //disable(default), enable } </pre>


Custom Temperature Control Stage Setting:

Name	Example
custom_wiring_mode	<p>Enable custom temperature control stage.</p> <pre> {   "custom_wiring_mode": "enable" //disable(default), enable } </pre>
heating_stage1	Set stage-1 heat as Y1+Y2.
heating_stage2	<div style="background-color: #e0f2f1; padding: 10px; border-radius: 5px;"> <p> <b>Note:</b></p> <ul style="list-style-type: none"> <li>E is only working with EM heat.</li> <li>If the lower stage is not configured, the higher stage command will be invalid.</li> </ul> </div>
heating_stage3	
heating_stage4	
heating_stage5	
emergency_heating	
cooling_stage1	<pre> {   "heating_stage1": {     "wire": "Y1+Y2" //disable, Y1, Y2, W1, W2(AUX), Y1+Y2, Y1+Y2+W1, Y1+Y2+W1+W2(AUX), Y1+W1, Y1+W1+W2(AUX), W1+W2(AUX), E   } } </pre>
cooling_stage2	
cooling_stage3	

### Configure Temperature Control Basic Parameters

The device provide multiple kinds of commands for easy configuration.

Name	Example
temperature_control_enable_setting	<p>Enable to switch control mode from Heat and Cool.</p> <pre data-bbox="440 327 1419 562"> {   "temperature_control_enable_setting": {     "mode": "heat/cool" //heat/em heat/cool/auto, heat/cool/auto, heat, cool, heat/cool   } } </pre>
current_temperature_control_mode	<p>Switch temperature control mode to Auto.</p> <pre data-bbox="440 642 1419 877"> {   "current_temperature_control_mode": {     "mode": "auto" //heat, cool, em heat, auto   } } </pre>
target_temperature	<p>Target temperature of Cool mode is 25°C.</p> <div data-bbox="431 978 1419 1108" style="background-color: #e0f2f1; padding: 10px; border-radius: 5px;">  <b>Note:</b> This will not switch the temperature control mode. </div> <pre data-bbox="440 1136 1419 1325"> {   "temperature_control_mode": "cool", //heat,em heat,cool,auto,auto heat, auto cool   "target_temperature": 21.6 //Unit: °C, range: 5-35 } </pre>
system_status + temperature_control_mode + target_temperature	<p>System status is on, temperature control mode is Cool, target temperature is 25°C.</p> <pre data-bbox="440 1409 1419 1633"> {   "system_status": "on", //on, off   "temperature_control_mode": "cool", //heat, em heat, cool, auto   "target_temperature": 25 //Unit: °C, range: 5-35 } </pre>
target_temperature_resolution	<p>Target temperature resolution is 0.5.</p> <pre data-bbox="440 1724 1419 1864"> {   "target_temperature_resolution": 0.5 //0.5, 1 } </pre>

Name	Example
target_temperature_dual_enable	<p>When temperature control mode is Auto, the target temperature mode is Dual Target.</p> <pre data-bbox="440 369 1419 516"> {   "target_temperature_dual_enable": "enable" //disable (Single target), enable (Dual target) } </pre>
temperature_tolerance	<p>Single target tolerance setting: Target temperature tolerance is 1°C, temperature control tolerance is 1°C.</p> <pre data-bbox="440 642 1419 919"> {   "temperature_tolerance": {     "target_temperature_tolerance": 1, //Unit: °C, range: 0.1-5, default: 1     "auto_temperature_tolerance": 1 //Unit: °C, range: 0.5-10, default: 2   } } </pre>
double_point_target_tolerance	<p>Under Auto-Dual Target mode, heating temperature tolerance is 1°C.</p> <pre data-bbox="440 1003 1419 1369"> {   "double_point_target_tolerance": [     {       "mode": "heat", //heat, cool       "tolerance": 1 //Unit: °C, range: 0.1-5, default: 2     }   ] } </pre>
target_temperature_range_config	<p>Cool mode target temperature range is 15 - 30°C.</p> <div data-bbox="435 1474 1419 1604" style="background-color: #e0f2f7; padding: 10px; border-radius: 5px;">  <b>Note:</b> Max. range value - Min. range value &gt;1 </div> <pre data-bbox="440 1629 1419 1852"> {   "target_temperature_range_config": {     "temperature_control_mode": "cool", //heat, em heat, cool, auto     "min": 15, //Unit: °C, range: 5-35     "max": 30 //Unit: °C, range: 5-35   } } </pre>

Name	Example
	<pre data-bbox="446 273 462 346">} }</pre>

### Configure Occupancy Mode Parameters

Name	Example
occupancy_mode	<p data-bbox="565 556 1006 588">Switch occupancy mode to Occupied.</p> <pre data-bbox="576 619 1128 829">{   "occupancy_mode": {     "mode": "occupied" //off (default), occupied, unoccupied   } }</pre>
occupied_delay	<p data-bbox="565 871 1404 945">The occupancy mode will switch from Occupied to Unoccupied after 60 minutes.</p> <pre data-bbox="576 976 1112 1186">{   "occupied_delay": {     "time": 60 //Unit: min, range: 1-60, default: 255=disable   } }</pre>

When Occupancy Mode is Occupied:

Name	Example
occupied_cooling_setpoint	<p data-bbox="594 1396 1079 1428">The cooling target temperature is 21.6°C.</p> <pre data-bbox="605 1459 1144 1585">{   "occupied_cooling_setpoint": 21.6 //Unit: °C, range: 5-35 }</pre>
occupied_heating_setpoint	<p data-bbox="594 1623 1055 1654">The heating target temperature is 19°C.</p> <pre data-bbox="605 1686 1128 1812">{   "occupied_heating_setpoint": 19 //Unit: °C, range: 5-35 }</pre>

Name	Example
occupied_cooling_setpoint_tolerance	<p>The cooling target temperature tolerance is 2°C.</p> <pre data-bbox="609 331 1421 472"> {   "occupied_cooling_setpoint_tolerance": 2 //Unit: °C, range: 0.1-5, default: 1 } </pre>
occupied_heating_setpoint_tolerance	<p>The heating target temperature tolerance is 2°C.</p> <pre data-bbox="609 560 1421 701"> {   "occupied_heating_setpoint_tolerance": 2 //Unit: °C, range: 0.1-5, default: 1 } </pre>
target_deadband	<p>The deadband value is 2°C.</p> <pre data-bbox="609 789 1421 930"> {   "target_deadband": 2 //Unit: °C, range: 1-10, default: 5 } </pre>

When Occupancy Mode is Unoccupied:

Name	Example
unoccupied_cooling_setpoint	<p>The cooling target temperature is 21.6°C.</p> <pre data-bbox="609 1171 1421 1312"> {   "unoccupied_cooling_setpoint": 21.6 //Unit: °C, range: 5-35 } </pre>
unoccupied_heating_setpoint	<p>The heating target temperature is 19°C.</p> <pre data-bbox="609 1400 1421 1541"> {   "unoccupied_heating_setpoint": 19 //Unit: °C, range: 5-35 } </pre>
unoccupied_cooling_setpoint_tolerance	<p>The cooling target temperature tolerance is 2°C.</p> <pre data-bbox="609 1629 1421 1770"> {   "unoccupied_cooling_setpoint_tolerance": 2 //Unit: °C, range: 0.1-5, default: 1 } </pre>
unoccupied_heating_setpoint_tolerance	<p>The heating target temperature tolerance is 2°C.</p>

Name	Example
	<pre data-bbox="613 289 1409 407">{   "unoccupied_heating_setpoint_tolerance": 2 //Unit: °C, range: 0.1-5, default: 1 }</pre>
target_deadband	<p data-bbox="597 457 915 485">The deadband value is 2°C.</p> <pre data-bbox="613 514 1122 632">{   "target_deadband": 2 //Unit: °C, range: 1-10, default: 5 }</pre>

When Occupancy Mode is Unoccupied or Occupied, the thermostat supports configuring central temperature as the target temperature, and adjustment tolerance to define the regulation range (=central temperature +/- adjustment tolerance). This is mainly used for BACnet downlink.

Name	Example
center_cool_temp	<p data-bbox="597 930 1097 957">The cooling central temperature is 21.6°C.</p> <pre data-bbox="613 987 1073 1104">{   "center_cool_temp": 21.6 //Unit: °C, range: 5-35 }</pre>
center_heat_temp	<p data-bbox="597 1161 1078 1188">The heating central temperature is 19°C.</p> <pre data-bbox="613 1218 1057 1335">{   "center_heat_temp": 19 //Unit: °C, range: 5-35 }</pre>
cooling_adjust_tolerance	<p data-bbox="597 1392 1019 1419">The cooling adjust tolerance is 5°C.</p> <pre data-bbox="613 1449 1122 1566">{   "cooling_adjust_tolerance": 5 //Unit: °C, range: 0.5-16 }</pre>
heating_adjust_tolerance	<p data-bbox="597 1623 1019 1650">The heating adjust tolerance is 5°C.</p> <pre data-bbox="613 1659 1122 1776">{   "heating_adjust_tolerance": 5 //Unit: °C, range: 0.5-16 }</pre>

## Configure Unilateral Tolerance

Name	Example
unilateral_tolerance	Enable unilateral tolerance. <pre data-bbox="560 401 1398 527"> {   "unilateral_tolerance": "enable" //disable(default), enable }</pre>

## Configure Fan Mode Parameters


Name	Example
fan_mode	Fan mode is Auto. <pre data-bbox="451 789 1398 1020"> {   "fan_mode_setting": {     "mode": "auto" //auto (default), always on, circulate   } }</pre>
fan_execute_time	When fan mode is Circulate, the operation time is 10 minutes. <pre data-bbox="451 1110 1398 1257"> {   "fan_execute_time": 10 //Unit: min/h, range: 5-55, default: 30 }</pre>
fan_delay_config	Enable Fan Delay, the delay time is 300s. <pre data-bbox="451 1335 1398 1608"> {   "fan_delay_config": {     "enable": "enable", //disable(default), enable     "delay_time": 300 //Unit: s, range: 1-3600, default: 60   } }</pre>
fan_dehumidify	Enable fan Regulate Humidity and the regulate interval is 10 minutes. <pre data-bbox="451 1698 1398 1873"> {   "fan_dehumidify": {     "enable": "enable", //disable(default), enable     "execute_time": 10 //Unit: min/h, range: 5-55, default: 30   } }</pre>

Name	Example
	<pre> } } </pre>

### Temperature Control Stage Switch

Name	Example
<p>temperature_level_up_down_delta</p>	<p><math>\Delta T1</math> is 1°C , <math>\Delta T2</math> is 2°C. (<math>\Delta T2</math> must be greater than <math>\Delta T1</math>).</p> <pre> {   "temperature_level_up_down_delta": {     "delta_1": 1, //Unit: unit: °C, range: 1-10, default: 3     "delta_2": 2 //Unit: unit: °C, range: 1-10, default: 5   } } </pre>
<p>temperature_up_down_enable</p>	<p>Enable setforward and setback.</p> <pre> {   "temperature_up_down_enable": {     "forward_enable": "enable", //disable, enable(default)     "backward_enable": "enable", //disable, enable(default)   } } </pre>
<p>level_switch_settings</p>	<p>Stage-up switch: When the ambient temperature does not change 1 °C for 10 minutes, switch to a higher heating stage.</p> <pre> {   "level_switch_settings": [     {       "type": "heat", //heat, cool       "time": 10, //Unit: min, range: 1-10, default: 5       "change_value": 1 //Unit: unit: °C, range: 1-10, default: 1     }   ] } </pre>

## Configure Temp. Control and Dehumidify

Name	Example
humidity_range	<p>Target humidity range: 20-80%RH.</p> <div style="background-color: #e0f2f1; padding: 10px; border-radius: 5px;">  <b>Note:</b> Max. range value &gt; Min. range value         </div> <pre data-bbox="537 573 899 835"> {   "humidity_range": {     "min": 20, //Unit: %RH, range: 0-100     "max": 80 //Unit: %RH, range: 0-100   } } </pre>
temperature_dehumidify	<p>Enable Temp. Control and Dehumidify and the tolerance is 2°C.</p> <pre data-bbox="537 934 1101 1197"> {   "temperature_dehumidify": {     "enable": "enable", //disable(default), enable     "temperature_tolerance": 2 //Unit: °C, range: 1-5, default: 1   } } </pre>

## Configure Schedule Parameters

Name	Example
plan_type	<p>Switch schedule type to Wake.</p> <pre data-bbox="537 1465 1224 1591"> {   "plan_type": "wake" //wake, away, home, sleep, occupied, unoccupied, eco } </pre>
single_temperature_plan_config	<p>Under single target mode, a Wake plan setting is as below.</p> <pre data-bbox="537 1696 1198 1862"> {   "single_temperature_plan_config": [     {       "type": "wake", //wake, away, home, sleep, occupied, unoccupied, eco     }   ] } </pre>

Name	Example
	<pre> "temperature_control_mode": "cool", //heat,em heat,cool,auto "fan_mode": "auto", //auto, on ,circulate "target_temperature": 20, //Unit: °C, range: 5-35, default: 17 "target_temperature_tolerance": 1, //Unit: °C,range: 0.1-5, default: 2 "temperature_control_tolerance": 1 //Unit: °C,range: 0.5-10, default: 5 } ] } </pre>
<p>dual_tempera- ture_plan_config</p>	<p>Under Auto-Dual Target mode, a Wake plan setting is as below.</p> <pre> { "dual_temperature_plan_config": [ { "type": "wake", //wake, away, home, sleep, occupied, unoccupied, eco "temperature_control_mode": "cool", //heat,em heat,cool,auto "fan_mode": "auto", //auto, on ,circulate "heat_target_temperature": 16, //Unit: °C, range: 5-35, default: 17 "heat_temperature_tolerance": 1, //Unit: °C, range: 1-5, default: 2 "cool_target_temperature": 20, //Unit: °C, range: 5-35, default: 17 "cool_temperature_tolerance": 1 //Unit: °C, range: 1-5, default: 2 } ] } </pre>
<p>plan_schedule</p>	<p>Add a time period for Wake type: Enable this time, the repeat day is Monday, Wednesday, Friday and Sunday, the time is 4:00.</p> <pre> { "plan_schedule": [ { "plan_type": "wake", //wake, away, home, sleep, occupied, unoccupied, eco "id": 1, //Range: 1-16 "enable": "enable", //disable, enable "week_recycle": { //Repeat day "monday": "enable", "tuesday": "disable", "wednesday": "enable", </pre>

Name	Example
	<pre> "thursday": "disable", "friday": "enable", "saturday": "disable", "sunday": "enable" }, "time": 240 //Unit: min, range: 0-1439 } ] } </pre>
<p>plan_schedule_enable_config</p>	<p>Disable all time periods of ECO schedule.</p> <pre> { "plan_schedule_enable_config": { "eco": "disable", //disable, enable } } </pre> <p>Enable all time periods of ECO schedule and disable others.</p> <pre> { "plan_schedule_enable_config": { "wake": "disable", "away": "disable", "home": "disable", "sleep": "disable", "occupied": "disable", "vacant": "disable", "eco": "enable" } } </pre>

### Relay Change Report

Enable or disable to report relay status when changing.

Name	Example
wires_relay_change_report_enable	Enable relay change report. <pre data-bbox="570 327 1417 457"> {   "wires_relay_change_report_enable": "enable" //disable(default), enable } </pre>

## Downlink Commands for Auxiliary Features

This section describes the downlink commands for the auxiliary features.

### Configure General Parameters

Name	Example
reboot	Reboot: <pre data-bbox="396 884 1417 1014"> {   "reboot": "yes" } </pre>
report_interval	Set reporting interval as 20 minutes. <pre data-bbox="396 1110 1417 1325"> {   "reporting_interval_settings": {     "time": 20 //Unit: min, range: 1-1440, default: 10   } } </pre>
collection_interval	Set collection interval as 30s. <pre data-bbox="396 1430 1417 1560"> {   "collection_interval": 30 //Unit: s, range: 10-60, default: 30 } </pre>
temperature_unit	Set temperature unit as °F. <pre data-bbox="396 1661 1417 1770"> {   "temperature_unit": {     "unit": "fahrenheit" //celsius, fahrenheit(default)   } } </pre>

Name	Example
	<pre data-bbox="402 275 423 344">} }</pre>

### Configure Time Parameters

Name	Example
synchronize_time	<p data-bbox="412 558 659 590">Sync time from LNS:</p> <pre data-bbox="428 617 672 737">{   "synchronize_time": 255 }</pre>
time_zone	<p data-bbox="412 787 740 819">Set the time zone as UTC-4.</p> <pre data-bbox="428 846 639 966">{   "time_zone": "UTC-4" }</pre>
timezone_index	<p data-bbox="412 1016 740 1047">Set the time zone as UTC-4.</p> <pre data-bbox="428 1075 639 1278">{   "timezone_index": {     "timezone": "UTC-4"   } }</pre>
dst_config	<p data-bbox="412 1329 1373 1404">Enable DST, start time is March 2nd Sunday 2:00, end time is January 4th Monday 3:00, bias is 60 minutes.</p> <pre data-bbox="428 1432 867 1864">{   "dst_config": {     "enable": "enable", //disable(default), enable     "offset": 60, //Unit: min, range: 1-120     "start_month": 3, //Range: 1-12     "start_week_num": 2, //Range: 1-5     "start_week_day": 7, //Range: 1-7     "start_time": 120, //Unit: min, range: 0-1439     "end_month": 1, //Range: 1-12     "end_week_num": 4, //Range: 1-5   } }</pre>


Name	Example
	<pre>"end_week_day": 1, //Range: 1-7 "end_time": 180 //Unit: min, range: 0-1439 } }</pre>
timezone_offset	<p>Set the time zone offset as -300 minutes.</p> <pre>{ "timezone_offset": -300 //Range: -1440 - 1440, Unit: min, default: 0 }</pre>

### Configure Screen Parameters

Name	Example
screen_display_mode	<p>Disable schedule plan display.</p> <pre>{ "screen_display_mode": "without plan show" //on(default), without plan show, disable all }</pre>
screen_time_enable	<p>Disable time display.</p> <pre>{ "screen_time_enable": "disable" //disable, enable (default) }</pre>
time_format	<p>Set time mode as 24-Hour Clock.</p> <pre>{ "time_format": { "mode": "24 Hour" //12 Hour (AM-PM) (default), 24 Hour } }</pre>

### Configure Child Lock Parameters

Name	Example
child_lock_config	Child Lock: enable the lock of temperature +/-.

Name	Example
	<pre data-bbox="451 289 1052 718"> {   "child_lock_config": {     "power_button": "disable", //System On/Off lock     "up_button": "enable", //Temperature+ lock     "down_button": "enable", //Temperature- lock     "fan_button": "disable", //Fan mode lock     "mode_button": "disable", //Temperature control mode lock     "reset_button": "disable" //Reboot&amp;Reset lock   } } </pre>
<p data-bbox="235 829 389 903">children_ locks_enable</p>	<p data-bbox="438 766 738 798">Enable child lock feature.</p> <pre data-bbox="451 829 1036 949"> {   "children_locks_enable": "enable" //disable(default), enable } </pre>
<p data-bbox="227 1344 397 1375">unlock_config</p>	<p data-bbox="438 997 1412 1071">Temporary unlock: Press temperature +/- buttons together to release the child lock for 10 minutes.</p> <div data-bbox="451 1113 1412 1228" style="background-color: #e0f2f1; padding: 10px; border-radius: 5px;"> <p data-bbox="454 1123 495 1165"> <b>Note:</b> At least 2 buttons must be enabled.</p> </div> <pre data-bbox="451 1270 1258 1705"> {   "unlock_config": {     "time": 10, //Unlock time, range: 1-65535, unit: s     "power_button": "disable", //System On/Off button     "temperature_up_button": "enable", //Temperature+ button     "temperature_down_button": "enable", //Temperature- button     "fan_mode_button": "disable", //Fan mode button     "temperature_control_mode_button": "disable" //Temperature control mode button   } } </pre>
<p data-bbox="251 1774 373 1806">heartbeat</p>	<p data-bbox="438 1753 1396 1827">Send the heartbeat packet to device to check connectivity. Each heartbeat should send a different number from the last one.</p>

Name	Example
	<pre data-bbox="451 285 743 407">{   "heartbeat": 0 //Range: 0-255 }</pre>
offline_timeout	<p data-bbox="438 453 1377 529">When the device does not receive the heartbeat packet for the timeout, the child lock will be released.</p> <pre data-bbox="451 554 987 768">{   "offline_timeout": {     "time": 60 //Range: 1-60, unit: min, default: 255=disable   } }</pre>

### Configure Data Storage & Retransmission

Name	Example
history_enable	<p data-bbox="490 978 734 1012">Enable data storage.</p> <pre data-bbox="503 1037 997 1159">{   "history_enable": "enable" //disable(default), enable }</pre>
retransmit_enable	<p data-bbox="490 1205 821 1239">Enable data retransmission.</p> <pre data-bbox="503 1264 1029 1386">{   "retransmit_enable": "enable" //disable(default), enable }</pre>
retransmit_interval	<p data-bbox="490 1432 984 1465">The data retransmission interval is 1200s.</p> <pre data-bbox="503 1491 1117 1612">{   "retransmit_interval": 1200 //Unit: s, range: 30-1200, default: 600 }</pre>
resend_interval	<p data-bbox="490 1659 1065 1692">The historical data query report interval is 1200s.</p> <pre data-bbox="503 1717 1075 1839">{   "resend_interval": 1200 //Unit: s, range: 30-1200, default: 60 }</pre>

## Configure Calibration Parameters

Name	Example
temperature_calibration_settings	<p>Enable temperature calibration and set the calibration value as -0.3°C.</p> <pre data-bbox="553 401 1419 674"> {   "temperature_calibration_settings": {     "enable": "enable", //disable(default), enable     "calibration_value": 25 //Unit: °C, range: -60-60   } } </pre>
humidity_calibration_settings	<p>Enable humidity calibration and set the calibration value as -0.3%RH.</p> <pre data-bbox="553 764 1419 1037"> {   "humidity_calibration_settings": {     "enable": "enable", //disable(default), enable     "calibration_value": -0.3 //Unit: %RH, range: -100-100   } } </pre>

## Configure Temperature Threshold Parameters

Name	Example
temperature_alarm_config	<p>Enable temperature threshold to send alarm when the temperature is below 10°C.</p> <pre data-bbox="509 1331 1419 1745"> {   "temperature_alarm_config": {     "alarm_type": "temperature threshold",     "condition": "below", //disable, below, above, between, outside     "threshold_min": 10, //Min. threshold, unit: °C, range: -20-60     "threshold_max": 20, //Max. threshold, unit: °C, range: -20-60     "continue_time": 10 //Invalid   } } </pre>
	<p>Enable Persistent Low Temperature threshold to send alarm when temperature is below the target temperature by 10°C and last for 10 minutes.</p>

Name	Example
	<pre data-bbox="511 283 1169 682"> {   "temperature_alarm_config": {     "alarm_type": "continuous low temperature",     "condition": "below",     "threshold_min": 10, //Difference value, unit: °C, range: 1-10     "threshold_max": 0, //Invalid     "continue_time": 600 //Duration, unit: s, range: 0-3600, default: 3600   } } </pre> <p data-bbox="495 724 1396 798">Enable Persistent High Temperature threshold to send alarm when temperature is above the target temperature by 10°C and last for 10 minutes.</p> <pre data-bbox="511 829 1169 1228"> {   "temperature_alarm_config": {     "alarm_type": "continuous high temperature",     "condition": "above",     "threshold_min": 0, //Invalid     "threshold_max": 10, //Difference value, unit: °C, range: 1-10     "continue_time": 600 //Duration, unit: s, range: 0-3600, default: 3600   } } </pre>

### Configure Room Card Parameters

Name	Example
card_config	<p data-bbox="376 1459 982 1491">Enable room card settings, action is System on/off.</p> <pre data-bbox="389 1522 1161 1816"> {   "card_config": {     "enable": "enable", //disable(default), enable     "action_type": "power", //power (System on/off), plan (Insert an event)     "invert": "no" //no (Low level is insert card,default), yes (High level is insert card)   } } </pre>

Name	Example
	<p>Enable room card settings, action is Insert an event, insert card event is Wake, remove card event is Away.</p> <pre data-bbox="386 363 1406 772"> {   "card_config": {     "enable": "enable", //disable(default), enable     "action_type": "plan", //power (System on/off), plan (Insert an event)     "in_plan_type": "wake", //Insert event,wake, away, home (default), sleep, occupied, unoccupied, eco     "out_plan_type": "away", //Remove event,wake, away (default), home, sleep, occupied, unoccupied, eco     "invert": "no" //no (Low level is insert card,default), yes (High level is insert card)   } } </pre>

## Downlink Commands for Query

This section describes the downlink command for querying the device data.

### Query Current Data

Name	Example
report_status	<p>Query periodic data packet.</p> <pre data-bbox="326 1203 1406 1331"> {   "report_status": "periodic" //plan, periodic,target_temperature_range } </pre>

## Chapter 4. Services

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