Photovoltaic/Wind Power Generation Power Control Function (<66kV) Technical Specifications

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Technical specification for Photovoltaic and wind power station output control function (less than 66kV)

<Contents>

1 Outline of Output Control System

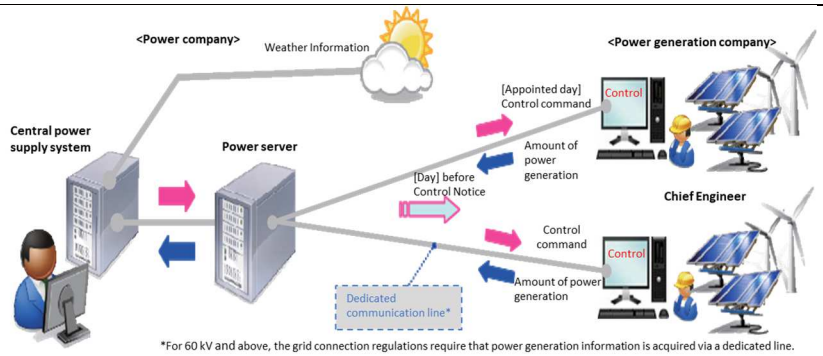
INVERTER with the output control function, etc. shall have a function for achieving the "output control system" proposed by the fourth system WG on February 17, 2015 and the seventeenth system WG on October 10, 2018. "INVERTER with output control function, etc." in this technical specification shall correspond to the control based on the output control schedules of ② to ④ in the Outline of Output Control Systems described later, and output by the dedicated line of ① The control shall be in accordance with the technical specifications applicable to the specified special high pressure (66kV or more).

<Requirements for Output Control System>

Viewpoint of system construction	Specific measures (main measures)
・Being able to reliably control output in consideration of cost and technology.	・ It is realistic to select a communication method considering the capacity of power generation facilities, and basically, the special high-voltage interconnection, etc., which has a large output scale, utilizes a dedicated line, and the high-voltage interconnection, which has a small output scale, utilizes an internet line. Establishment of a system, etc.
・Output control should be the minimum necessary for system stabilization.	・ In order to realize the minimum necessary output control, the specifications shall be such that fine-tuned control such as partial control and time control is possible. ・ Do not control the amount of surplus purchased for private consumption, etc.
・ To enable the Flexible Response to Future Situation Changes	・ A control system that can flexibly respond to the expansion of the amount of re-energy interconnection shall be adopted. ・ In the future, it will be possible to provide value-added services by distributors (aggregators) and others.
・ To ensure a stable power supply, To ensure necessary security	・ When using Internet lines, measures against threats such as unauthorized access and cyber-attacks are implemented. ・ Implementation of countermeasures against falsification of control data, time falsification, etc.
・ To make it as Common specifications applicable to all electric power companies	・ Based on discussions held by power producer associations, INVERTER manufacturers, and electric power companies, the technical specifications shall be shared nationwide.

Outline of Output Control System

① Output control by dedicated line

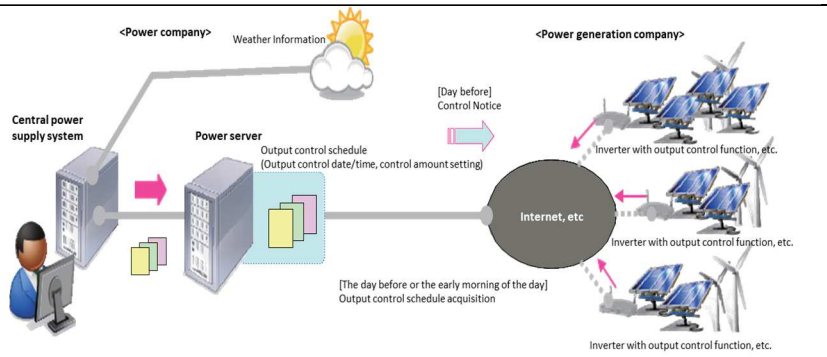


*For 60 kV and above, the grid connection regulations require that power generation information is acquired via a dedicated line.

1. The electric power company notifies the power generation company of the output control by the day before.
2. The electric power company transmits the output control command value to the business operator according to the actual supply and demand of the day.
3. The power generation operator automatically or manually adjusts the output according to the received output control command value.

○ By using a dedicated line for capturing power generation information, commands can be issued at any time, so real-time output control is possible according to actual demand and supply on the day.
○ The installation of a new dedicated line requires a large amount of cost (the cost of the power generation company), but the security from the outside is high.

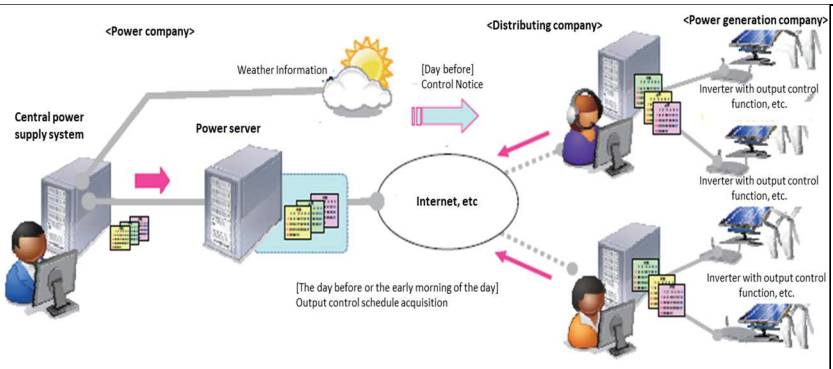
② Output control by rewriting the output control schedule



1. The electric power company notifies the power generation company of the output control by the day before.
2. The electric power company uploads the output control schedule on the server according to the supply and demand assumption of the day
3. Inverter gets power control schedule on power server and adjusts power

○ The frequency of output control instructions depends on the frequency of output schedule rewriting on the power server and the frequency of access from the INVERTER (Power Conditioner) (for the time being, it is assumed that it will be performed once a day).
○ In order to utilize existing communication technologies such as the Internet, the system is highly versatile and low-cost.
Security measures are required.
○ The INVERTER regularly accesses and controls the power server, so that the power generation company does not need to respond to the situation on a case-by-case basis.

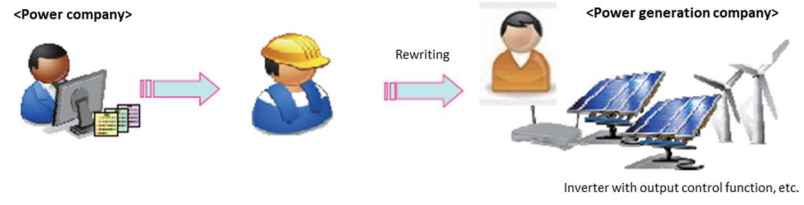
(3) Output control utilizing the distributing company Output control by rewriting the



1. The electric power company notifies the power generation company of the output control by the day before.
2. The electric power company transmits the output control command value to the business operator according to the actual supply and demand of the day.
3. Distributor manages and implements rewriting of PCS output control schedule of each power generator

○ The frequency of output control instructions is assumed to be once a day for the time being
○Since the existing communication technology such as the Internet is used, the system has high versatility and low cost, but security measures are required.
○ The distribution company centrally manages the INVERTER of the power generation company, so the power generation company does not have to deal with it each time.
○ It can be provided by the distribution company in combination with services such as maintenance.
○ It is necessary to sort out institutional issues as well, while conducting detailed examinations such as the positioning of distribution companies under the Electricity Business Law.

④ Fixed schedule output control



1. Electric power company creates output control calendar (sets output control schedule for one year)
2. The power generation company individually rewrites the acquired calendar locally (once/yearly update)

○ Output control can be performed even in places with no communication environment, but since the output control calendar is rewritten about once a year, the output control schedule is set in advance based on the supply and demand forecast up to one year ahead. Must be set
○ The accuracy of supply and demand forecast one year ahead is lower than the accuracy of supply and demand forecast the day before, so the control time may increase.

2 Configuration of Inverter with output control function, etc.

PCS with output control function, etc." is defined as an output controller consisting of a PCS that can obtain output control schedule information from a general transmission and distribution utility or distributor via the Internet and control power generation output, etc.*, and a wind turbine controller or monitoring and control equipment in a wind power generation facility.

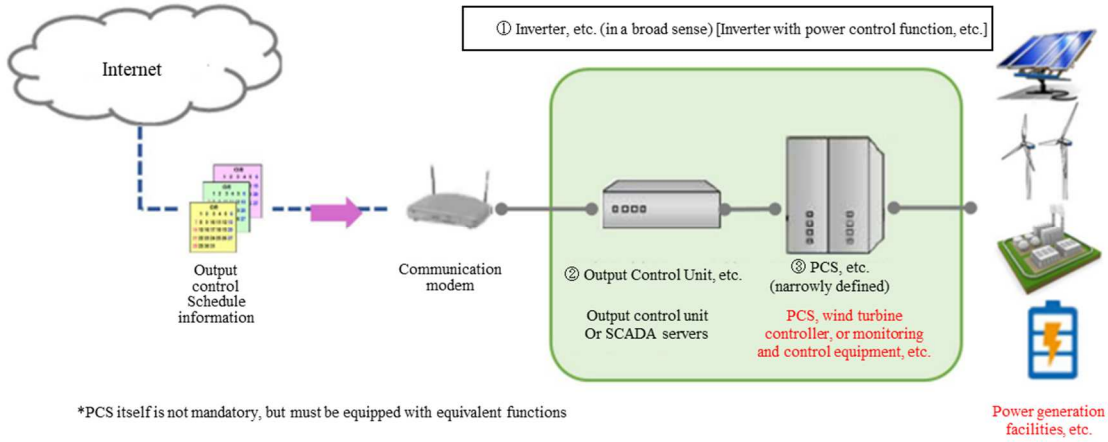
It is defined as an output-control device composed of SCADA and wind turbine controllers. Basically, "INVERTER with output control function, etc." is composed of "output control unit or SCADA servers (hereinafter referred to as "output control unit, etc.")", "INVERTER (in a narrowly defined) or windmill controllers (hereinafter referred to as "INVERTER, etc." (in a narrowly defined)".

The "output control unit or the like" is defined as a control device having a function of acquiring an output control schedule from the server and controlling "③ INVERTER or the like (in a narrowly defined)" based on the output control schedule.

"INVERTER, etc. (narrowly defined)" is defined as a device having a function to control the power generation output (upper limit value) by receiving output control information from "② output control unit, etc." in addition to the functions of conventional INVERTER or wind turbine controllers.

*Generation output, etc. in this specification refers to generation output and storage battery output (reverse power flow output from generation facilities, etc. to the grid).

<Configuration of INVERTER with power control function>



① INVERTER, etc. (in a broadly defined) INVERTER with power control function, etc.	It is defined as a device having a function of acquiring output control schedule information presented by an electric power company or a distributor and controlling power generation output according to the schedule. Basically, it consists of "② Output control unit etc." and "③ PCS etc. (narrowly defined)". (There is also a system that integrates the functions of ② and ③)
② Output control unit Etc.	It is defined as a control device that has the function of acquiring the output control schedule from the power server or the distributor server and controlling "③PCS, etc. (narrowly defined)" based on the output control schedule. Even if there is no external communication function, "③PCS etc. (narrowly defined)" is controlled by the fixed schedule stored in the unit.

2 Configuration of Inverter with output control function, etc.

	③ INVERTER, etc. (narrowly defined)	In addition to the functions of the conventional PCS or wind turbine controller, it is defined as a device that has the function of controlling the power generation output (upper limit value) by receiving output control information from "② Output control unit, etc."

※ INVERTER, etc. (in a narrowly defined) and the power control unit, etc. shall satisfy the specifications of INVERTER, etc. (in a broadly defined) even if the manufacturers are different.

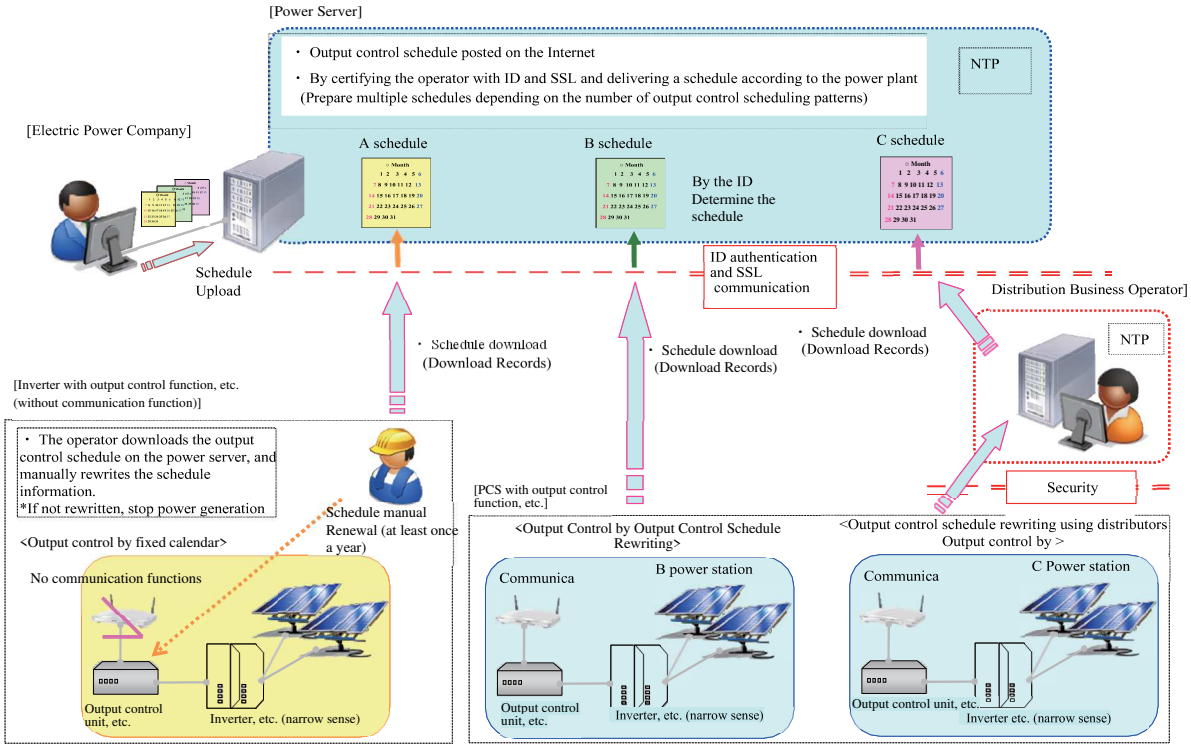
<Supplementary Description>

- INVERTER et al. (in a narrowly defined) assume that conventional INVERTER or turbine controllers without power control functions have functions and are not specified in this specification.

3　Output control schedule rewriting mechanism

"INVERTER with Output Control Function, etc." is a mechanism for automatically downloading "Output Control Schedule" posted on the Internet and performing output control of power generation facilities based on the schedule.

<Output control schedule rewriting mechanism>



<Supplementary Description>

- The "INVERTER with an output control function, etc." has a function of automatically downloading an "output control schedule" posted on the Internet by an electric power company or a distribution company, and performing output control of a power generation facility based on the schedule.
- Specifications for each type of output control system (P.3) are as follows. (excluding ①)

Category	Contents
② Power control schedule Rewriting control (center of the upper figure)	・ The "INVERTER with output control function, etc." directly accesses the power server and downloads the "output control schedule (fixed/updated)". ・ In principle, the power generation equipment is automatically controlled by PCS with output controller based on the downloaded output control schedule, but as a special exception, the power generation equipment can be controlled manually after receiving the output control schedule if the following conditions are met. <Conditions for permitting manual control in non-firm connections> I. Among power generation facilities under 66kV that are under 24-hour manned continuous monitoring (including remote monitoring), power generation facilities other than PCS interconnection with output control function using an Internet line

3 Output control schedule rewriting mechanism

	(*) shall be covered in principle. *Power generation facilities such as solar and wind power generation facilities that use PCS with output control function can be automatically controlled according to the output control schedule information. II. Distribution is not by telephone or e-mail, but by sending/receiving output control schedule information via Internet connection. (The content of transmission and reception shall be the same regardless of manual control, and a function to directly access the power server and download the "output control schedule (fixed or updated)" shall be provided.) III. The system operator guarantees reliable control by submitting an operation system chart for power generation facilities, etc. and by concluding an operation agreement, etc.
③ Rewriting control via distributor (right in the upper figure)	・ The distributor server downloads the "output control schedule (fixed/updated)" of the power plant managed by the distributor from the electric power company server. ・ "INVERTER with output control function" accesses the distribution provider's servers, Download Output Control Schedule (Fixed/Update).
④ Control by fixed schedule (left of the upper figure)	・ The power generation company (or service person) manually downloads the fixed schedule (annual setting) from the power server at least once a year and rewrites the fixed schedule in the output control unit or the like. ※ Updates because fixed schedules cannot take into account weather information, etc. The control condition is stricter than the schedule.

3.1 Time control and partial control

The number of output control days is 400 days (one year + α) based on the operation of the fixed schedule (manual periodic rewriting).

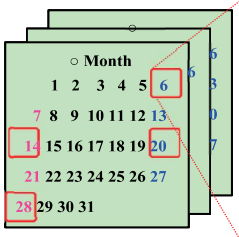
Output control setting of (1 month) is enabled.

Each day's power control schedule allows setting of 30 minute units and 1% rated power control values. This function corresponds to "uniform control" in which a uniform output control value (% value) is set to all businesses.

※ If the communication function is available, it can be updated at least every 30 minutes in the future.

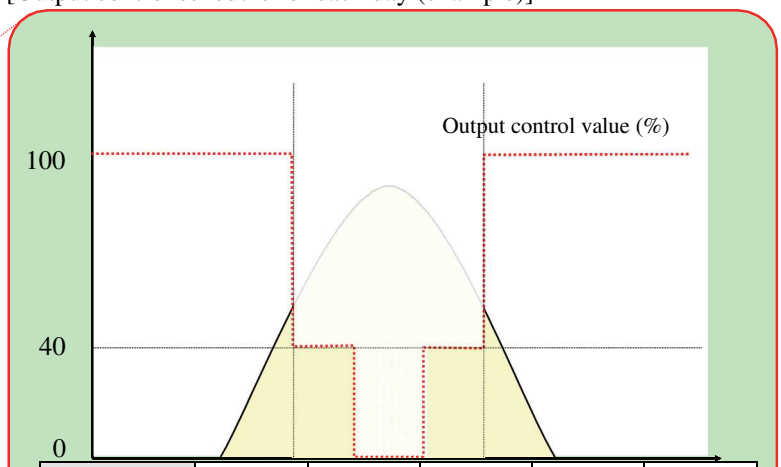
<Schedule Settings>

Output Control Schedule



※ Output control date up to 400 days ahead

[Output control schedule for each day (example)]



Time (hour)	0～9	9～11	11～13	13～15	15～24
Upper output limit (%)	100%	40%	0%	40%	100%

※ The output control schedule can be set in units of 30 minutes and 1% per minute.

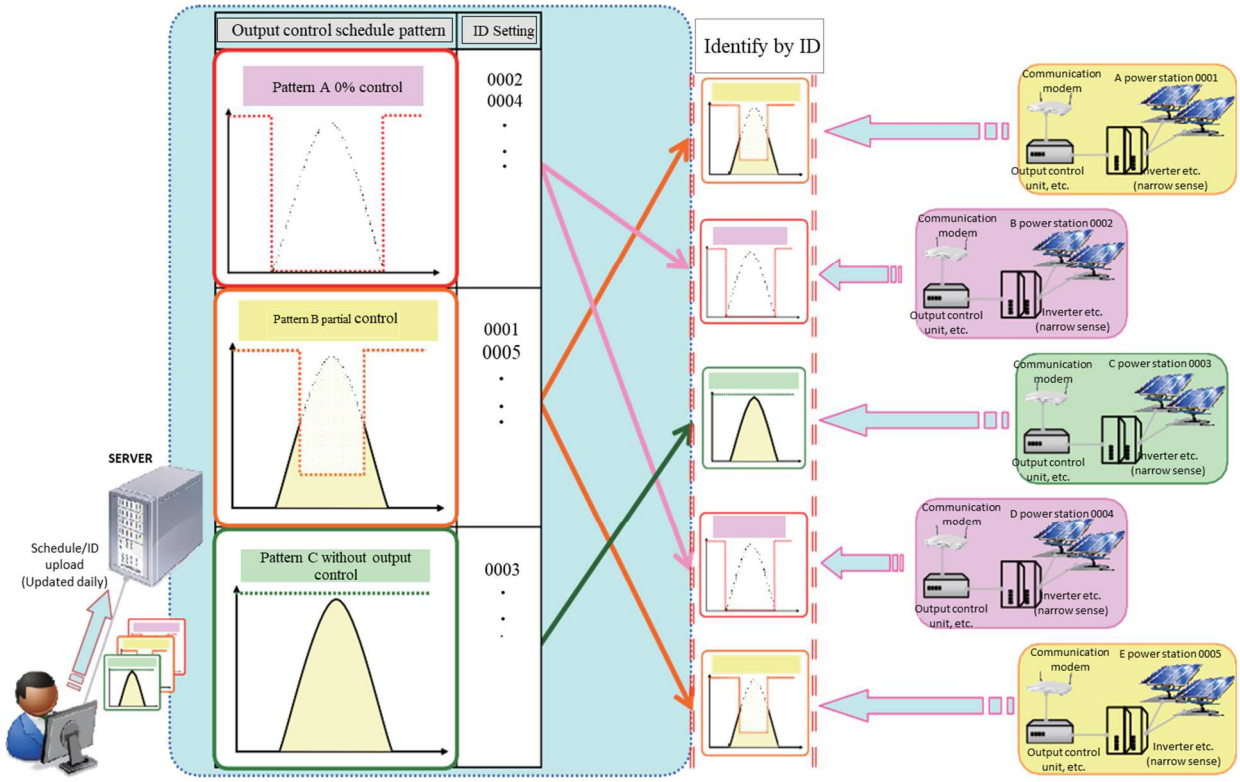
<Supplementary Description>

- Generators that do not have a communication function can register up to 400 days' worth of schedules because they regularly manually download fixed schedules (annual settings) and rewrite them locally.
- The operation will be such that the fixed schedule (annual setting) is downloaded and the update schedule (daily or hourly, etc.) is overwritten by the power producer with the communication function.
- Even when communication from a higher-level system is disabled, INVERTER with output control function and the like operate according to the newest schedule (fixed or updated schedule) held therein, thereby ensuring the operability of output control.

3.3 Surplus purchase control

The output control schedule has a function of setting an ID for each power station and automatically discriminating on the schedule server side, thereby setting a schedule pattern (0% control, partial control) different for each power station. This function corresponds to "alternate control" in which a power plant to be controlled is specified each time.

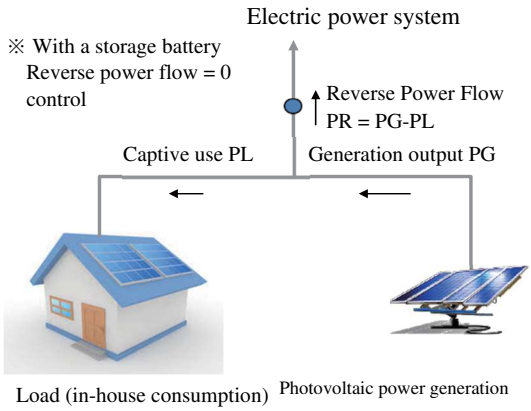
<Example of schedule determination by ID>



3.3 Surplus purchase control

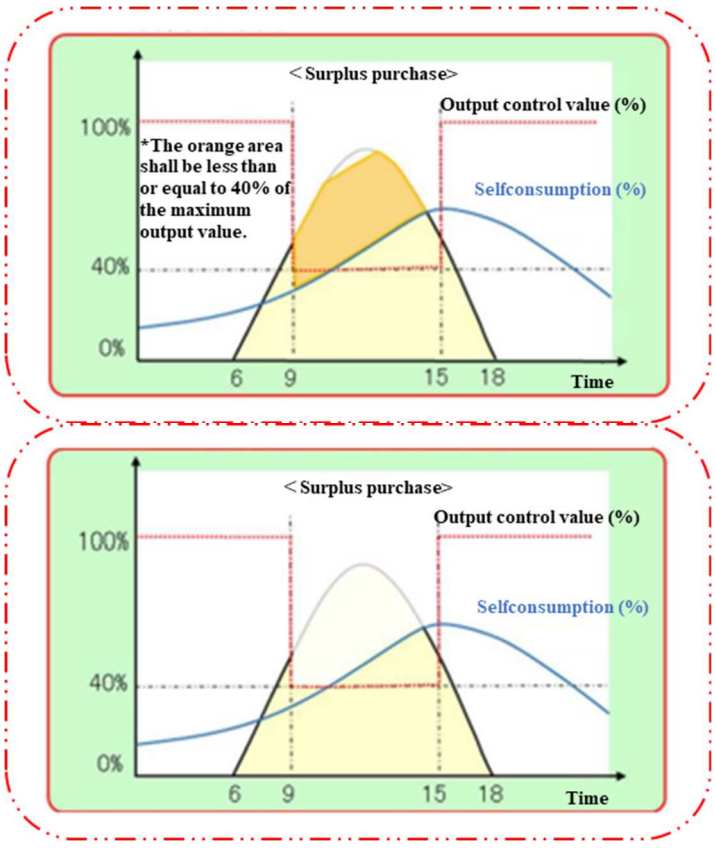
The basic concept is that, in the case of surplus power purchase, the portion for private consumption shall not be controlled in principle, and the control target shall be the output control value (output upper limit) [%] of the reverse power flow at the point of interconnection, and in addition to control to adjust the generation output, etc. between 0 and 100%, the specification shall enable control of the reverse power flow at the point of interconnection below the output control value (output upper limit) [%], or reverse power flow = 0 control. Or it shall be possible to control reverse power flow = 0*. This concept is not limited to residential use (less than 10 kW), and the same treatment shall apply to surplus purchase regardless of connection voltage, interconnection category, and installed capacity.

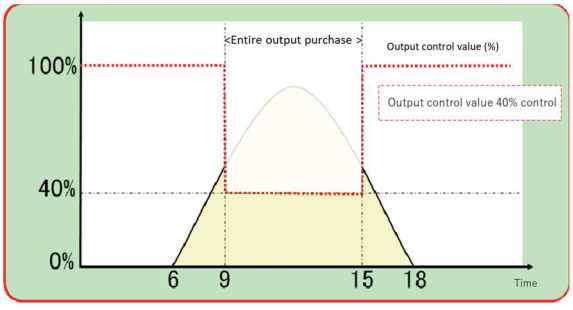
<surplus purchase control>



※ Control details of
reverse power flow = 0 control

- *PR > 0: Output decrease control up to the output upper limit*
- *PR ≦ 0: Output increase control until PR =0 converges*





※ When 40% output is controlled, the surplus purchase can be generated up to the amount of in-house consumption, but the upper limit of power generation output is 40% for all purchases.

3.3 Surplus purchase control

<Supplementary Description>

- The output control associated with grid constraints is organized as the output control value against the planned generation value at the point of interconnection. (Updated April 3, 2023 by Electric Power Wide-area Operational Promotion Organization, Rules for Connection and Use of Grid)　However, since power sources other than solar and wind power are organized as output control values in accordance with the above rules, the concept of output control values for solar and wind power is also unified based on the concept that the maximum power received = output control value at the point of interconnection. (Delivered as an upper limit of % with the maximum power received as 100%)
- Since the amount of reverse power flow should be less than or equal to the output control value (output upper limit) for the interconnection point, when PR > 0 during surplus purchase control, either (a) control of reverse power flow to less than the output control value (output upper limit) or (b) control of reverse power flow = 0 is allowed.

  Regardless of whether full or surplus purchase is made, control over the rated output may be made on the assumption that the output is less than the output control value (output upper limit) [%] for the point of interconnection, and in that case, if the output upper limit is less than the amount of self-consumption (PR≤0), the PCS side may control reverse power flow = 0.

4 Communication Security Concept of Output Control System

The security of the output control system is based on the following idea.

◆ The communication with the power server does not include important information such as personal information.

- In the output control schedule, the output control amount (output upper limit value, time) is specified.
- INVERTER with an output control function or the like has only the function of downloading the output control schedules and does not transmit important information such as personal information from INVERTER with an output control function or the like. (Excluding information necessary for operation, such as identification information such as ID settings

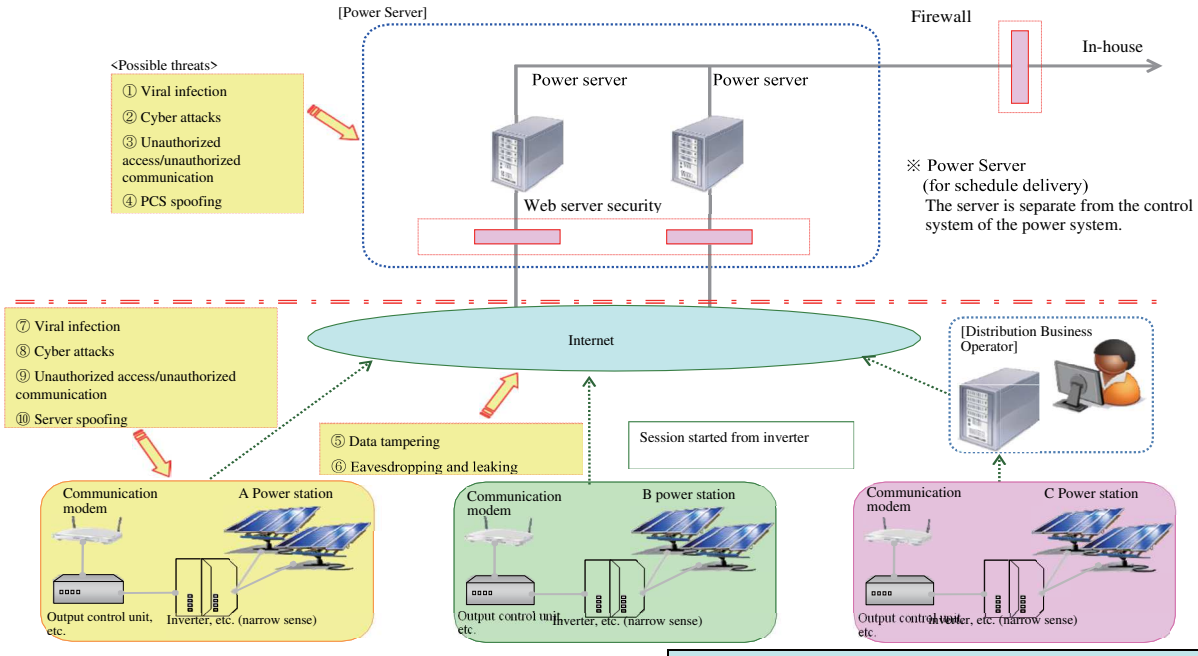
◆ Backing up the output control schedule (Annual setting + Partial rewrite function)

- By mutually checking the IDs between INVERTER with power control function and the power servers, erroneous reception of schedules by operators is prevented.
- In the event of a communication failure, the performance of the output control is ensured by setting the specification to control according to the preset latest schedule (setting up to 400 days) before the failure.

◆ Preventing external remote control such as INVERTER with power control function

- Schedule updating shall be performed by starting a session from INVERTER with power control function, etc., and shall not be performed from the outside, including electric power companies.
  (Response to schedule updates every 30 minutes minimum)

<Possible Threats and Countermeasures for Output Control Systems>



Possible threats	
Power server	① Viral infection ② Cyber attacks ③ Unauthorized access/unauthorized communication ④ PCS spoofing
During communication	⑤ Data tampering ⑥ Eavesdropping and leaking
PCS	⑦ Viral infection ⑧ Cyber attacks ⑨ Unauthorized access/unauthorized communication ⑩ Server spoofing

System measures	
Power server	・ Firewall ・ Double server, etc. ・ Scheduled backup ・ ID authentication (mutual confirmation with PCS)
During communication	・ Encryption via SSL communication ・ Do not include important information
PCS	・ Cannot start session from outside ・ Scheduled backup ・ Specifies the power server as the communication destination. ・ SSL communication

5 Technical specifications for Inverter, etc. (narrow sense)

The technical specifications of INVERTER, etc. (in a narrowly defined) shall be the same regardless of whether the communication function is enabled or disabled or whether the surplus or total volume is purchased. Details of each item are shown in 5.1 to 5.2.

Item	Technical specifications for INVERTER, etc. (narrowly defined)
5.1 Partial control function	[Output Increase/Decrease] ◆ The output change time from 100 to 0% output (0 to 100% output) of the rated output of the PCS, etc. shall be adjustable between 5 and 10 minutes in 1-minute increments (error: ±5% (at room temperature)). The rate of change should be constant at 100%/ (5-10 minutes). ◆ Instead of changing the rate of change linearly, a method of controlling at a fixed step (ramp control) is also permitted. The control step should be 10% or less. (Control step) 5 minutes: 10%/30 seconds (minimum), 10 minutes: 10%/1 minutes (maximum) [Control Resolution] ◆ Control shall be performed in units of 1% of the rated output. (The accuracy shall be within ±5% of the rated output (at room temperature). In the case of surplus purchase, we may consult with the customer.) ◆ However, when there is no pitch control, etc., in the wind power generation facility and it is impossible to mechanically respond, if a control value other than the generator output 100% is received, the generator output shall be uniformly set to 0%. 【Other Matters】 In principle, the technical specifications listed above under "Output Increase/Decrease" and "Control Resolution" shall apply. However, if the technical specifications cannot be met due to the characteristics of the power generation equipment, etc., the following requirements shall apply. ・ The reverse power flow power at the interconnection point shall be operated below the output control value (output upper limit) [%] during the output control time period according to the last obtained schedule. ・ If operation according to the last obtained schedule is not possible because the output change rate cannot be met due to the characteristics of the generating facilities, etc., then prior control is also acceptable, provided that the reverse power flow at the interconnection point during the output control time period is kept below the output control value (output limit) [%]. Note, however, that the final output control amount delivered may change. ・ The rate of change may be subject to negotiation from the viewpoint of grid voltage adjustment and other factors.
5.2 Handling in case of failure	◆ Stop power generation within 5 minutes after INVERTER (broadly defined) internal communication becomes abnormal. However, at the time of resuming communication, it is possible to recover either automatically or manually.

5.1 Partial control function

5.1.1 Output increase/decrease

<Technical Specifications>

◆The output change time from 100 to 0% output (0 to 100% output) of the rated output of PCS, etc. shall be adjustable from 5 to 10 minutes in 1-minute increments. (Error margin is ±5% (at room temperature))

The rate of change should be constant at 100%/ (5-10 minutes).

◆ Instead of changing the rate of change linearly, a method of controlling at a fixed step (ramp control) is also permitted. The control step should be 10% or less.

(Control step) 5 minutes: 10%/30 seconds (minimum), 10 minutes: 10%/1 minutes (maximum)

*Note that in the case of storage batteries, 100% output is operation below the maximum discharge output value, and 0% output is operation below 0 discharge power, so that charging is not restricted even in the case of 0% output.

<Background of setting>

The response times of INVERTER, etc. (in a narrowly defined) to the output control information (power supply command and schedule information) of electric power companies should be as fast as possible in terms of supply and demand operation, but if a large number of power plants are simultaneously increased or decreased in output, a sudden increase or decrease may adversely affect the electric power system.

Therefore, considering the frequency control surface and the voltage adjustment surface, it was decided to have a function of setting the rate (= kW/time) to the output increase and decrease.

[Reason for selecting output change rate]

Frequency control	- Since the rate of change that can be accommodated differs depending on each area and supply-demand situation, it is difficult to set a uniform national standard value. - There is an electric power company that takes eight minutes to control 100% of → of existing photovoltaic power generation. Based on the above, the specification was set to be specified for each electric power company within 5 to 10 minutes.
Voltage regulation	- If the operating time limit (up to 200 seconds) of the voltage regulator (SVR) of the distribution line or more, It was judged that there was no problem.

<Supplementary Description>

- Even when the output rises (when the control is released), the large number of power plants may operate at the same time, affecting the power system. Therefore, control shall be performed by rate rather than by MPPT control.
- In the case of 0% command in INVERTER interconnection, after the control based on the rate is executed, it is also allowed to disconnect by "gate block" or "gate block + 1 place (2-point disconnection)" after the output reaches 0%.
- 100% control is synonymous with no output control.
- If required specifications cannot be satisfied due to INVERTER, etc. (narrowly defined), 100 → of maximum received power (contract capacity)

  At 0% output (0 → 100% output), a control signal from the output control unit to INVERTER (narrowly defined) can be used to satisfy the requirements. However, INVERTER, etc. (in a narrowly defined) shall be capable of operating within 5 minutes with respect to 100 → 0% output (0 → 100% output).

5.1.2 Control resolution

5.1.2 Control Resolution

<Technical Specifications>

- Control shall be in 1% increments of the rated output.
  Accuracy is within ±5% of rated output (at room temperature).
  In the case of surplus power purchase, the parties may discuss this matter.
- However, when there is no pitch control, etc., in the wind power generation facility and it is impossible to mechanically respond, if a control value other than the generator output 100% is received, the generator output shall be uniformly set to 0%.

<Background of setting>

It was decided that the burden on the cost of the power generation facility would not become excessive, while it responded to the detailed control so that unnecessary output control would not be carried out for the power generation enterprise.

It was also noted that in order to implement partial control in wind power generation facilities, it is necessary to mechanically control the rotational speed of the main body of the wind turbine by pitch control, etc., but there are cases where mechanical measures are impossible in small wind power generation facilities.

[Reasons for selecting control resolution]

Control resolution	- In order not to require unnecessary output control from power generation companies, it is necessary to make increments as fine as possible. However, since the resolution required for system operation is not clear, the units should be realizable in consideration of the impact of costs such as INVERTER with output control function. "1% unit of maximum received power (contracted capacity)"
Control accuracy	- Since the power generation output fluctuates in natural conditions, precision control is difficult. Therefore, the accuracy was set to be within ±5% of the maximum received power (contracted capacity) (normal temperature) based on the cost-related effects of INVERTER with output control function, etc. - However, even if mechanical measures cannot be taken at wind power generation facilities, to ensure the required amount of output control, the power generation output was uniformly set to 0%.

＜Supplementary Explanation＞

As described in 3.3 Surplus Power Purchase Control, the basic concept is that the target of surplus power purchase control is the output control value (output upper limit) [%] of reverse power flow at the point of interconnection.

In order to secure the necessary amount of output control even when there is a large discrepancy between the maximum power received and the rated output, we may discuss the criteria for accuracy, etc.

5.1.3 Miscellaneous Matters

- In principle, the technical specifications described in 5.1.1 Output Increase/Decrease and 5.1.2 Control Resolution shall be applied.
  If the technical specifications cannot be met due to the characteristics of the generating facility, etc., the following requirements shall apply.
  - The reverse power flow power at the interconnection point shall be operated below the output control value (output upper limit) [%] during the output control time period according to the last obtained schedule.

5.1.2 Control resolution

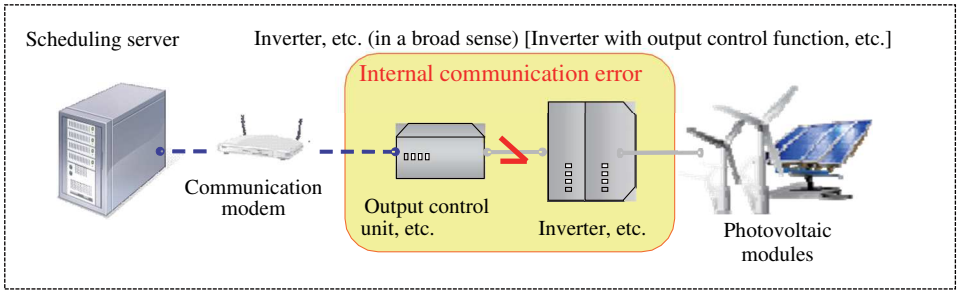
- If operation according to the last obtained schedule is not possible because the output change rate cannot be met due to the characteristics of the generating facilities, etc., then prior control is also acceptable, provided that the reverse power flow at the interconnection point during the output control time period is kept below the output control value (output limit) [%].
  Note, however, that the final output control amount delivered may change.
- The rate of change may be subject to negotiation from the viewpoint of grid voltage adjustment and other factors.

＜Background of establishment＞
The requirements for some power source types (hydro, biomass, geothermal), such as speed of change, control resolution, and accuracy, cannot be easily met due to the characteristics of power plants, etc., and were set from the perspectives of "reliable output control" and "unified response with other utilities (including solar power, wind power, and other power source types that have already been discussed and connected)" that are behind non-farm type connection.
Reference: 44th Grid WG, February 28, 2023

5.2 Handling in case of failure

<Technical Specifications>

◆ Stop power generation within 5 minutes after INVERTER (broadly defined) internal communication becomes abnormal. However, at the time of resuming communication, it is possible to recover either automatically or manually.



<Background of setting>

When an internal communication error occurs in a INVERTER, etc. (broadly defined) (*), the output control signal from the output control unit, etc. is not transmitted to INVERTER, etc. (narrowly defined), and the output control based on the schedule cannot be performed. Therefore, the power generation output must be stopped promptly considering the effect on the power system.

On the other hand, since internal communication abnormalities such as INVERTER (in the broadly defined) occur in units of facilities such as INVERTER (in the broadly defined), there is little possibility that many internal communication abnormalities occur at the same time, and the retry time until the communication succeeds must also be considered. Therefore, the specifications were made such that a time margin is provided before the output stop, rather than the immediate output stop.

※ It is assumed that the operator intentionally disconnects the communication line from the terminal so that the output is not controlled.

6 Technical specifications for inverter, etc. (in a broad sense)

The technical specifications of INVERTER, etc. (in a broadly defined) shall be the same regardless of whether the communication function is enabled or disabled. Details of each item are shown in 6.1 to 6.7.

<table>
<tr><th>Item</th><th>Technical specifications for INVERTER, etc. (broadly defined)</th></tr>
<tr><td>6.1
Communication frequency</td><td>◆ The output control schedule shall be renewable in a minimum of 30-minute increments.
◆ The update cycle (next access) shall be specified by the power server.</td></tr>
<tr><td>6.2
Control days</td><td>◆400 The output control amount for the day (1 year + α) × 48 points (24 hours/30 minutes) can be set.
◆ Specifications shall be such that schedule partial rewrite can be performed in an arbitrary period (e.g., day-by-day).</td></tr>
<tr><td>6.3
Time setting</td><td>
<table>
<tr><th>Item (clock)</th><th>Communication function is available.</th><th>No communication function</th></tr>
<tr><td>Countermeasures against clock falsification</td><td rowspan="3">Synchronizing with the clock information of the power server or the distributor server</td><td>・Time setting is time synchronization by NTP server or GPS,
Alternatively, it should be carried out by a service person such as the manufacturer.
・Manual adjustment of time after starting operation should be limited to within ±10 minutes per day (except when setting).</td></tr>
<tr><td>Measures to prevent loss of watches</td><td>・Make sure that the internal clock does not stop during a power failure
・If the clock (date) disappears, the generator should be stopped until the time is synchronized with the NTP server or GPS, or the service person such as the manufacturer resets the clock.</td></tr>
<tr><td>Accuracy of the watch</td><td>・The internal clock should be synchronized with a clock using a crystal oscillator, and the clock error should be within ±60 seconds/month (normal temperature).
・When updating the fixed schedule (more than once a year), correct the time and maintain the above accuracy.</td></tr>
</table>
</td></tr>
<tr><td>6.4
Reverse power flow prevention function</td><td>◆ The reverse power flow prevention accuracy shall be the detection level (+5% of the rated output or the larger of +150W) and the detection time limit (within 5 minutes).
◆ Output control 0% command
① In the surplus purchase, control is performed by setting the reverse power flow at the interconnection point to zero (self-consumption = power generation output) or by setting the generator output to 0%.
② In the case of purchasing all the units, the output of the generator is set to 0% in the case of output control (0%).</td></tr>
<tr><td>6.5
Conversion function to contract capacity</td><td>◆ The system shall have a function to input PV panel capacity and PCS capacity, and shall be equipped with a function to convert the output control amount from "contracted capacity-based" to "PCS capacity-based" and command the PCS, etc. (narrowly defined PCS).
◆ In addition, security must be ensured by providing a password for capacity input.</td></tr>
<tr><td>6.6
Handling in case of failure</td><td>◆ In the case of a communication failure from a host system, the specifications shall be such that the output can be controlled based on the latest output control schedule information before the failure.</td></tr>
</table>

Item	Technical specifications for INVERTER, etc. (broadly defined)
6.7 Recommended specifications	Although it is not an essential function for output control, it is recommended to add functions from the viewpoint of improving convenience for operators, etc. [Track Record of Power Generation Performance (Time Resolution)] ◆ The time resolution of the track record is 30 minutes. [Track Record of Power Generation Performance (Holding Period)] ◆ The retention period of the power generation record (in units of 30 minutes) of the main body of the output control unit, etc. shall be at least 3 months regardless of whether or not there is telecommunication. ◆ The data to be saved shall be ① the total amount purchased: the amount of electric power generated, ② the surplus purchase: the amount of electric power of reverse power flow at the interconnection point. [Operation display] ◆It is possible to separate "output stop due to occurrence of failure" and "normal output control". ◆ "Output control in progress" shall be displayed so that the normal operation during output control can be confirmed.

6.1 Communication frequency

<Technical Specifications>

◆ The output control schedule shall be renewable in a minimum of 30-minute increments.

◆ The update cycle (next access) shall be specified by the power server.

<Background of setting>

30 The specification was made to be able to cope with the update of the schedule in the minute unit.

In addition, since there are periods during which output control is unnecessary depending on the season, it is not fixed to the schedule distribution every 30 minutes, and a function of designating the next access date and time from the electric power company is provided.

<Supplementary Description>

- The actual communication frequency (update cycle of the output control schedule) is presented by the power company considering the feasibility of supply and demand operation, the processing capacity of the schedule server, etc.

6.2 Control days

<Technical Specifications>

- ◆ 400 The output control value for the day (1 year + α) × 48 points (24 hours/30 minutes) can be set.
- ◆ Specifications shall be such that schedule partial rewrite can be performed in an arbitrary period (e.g., day-by-day).

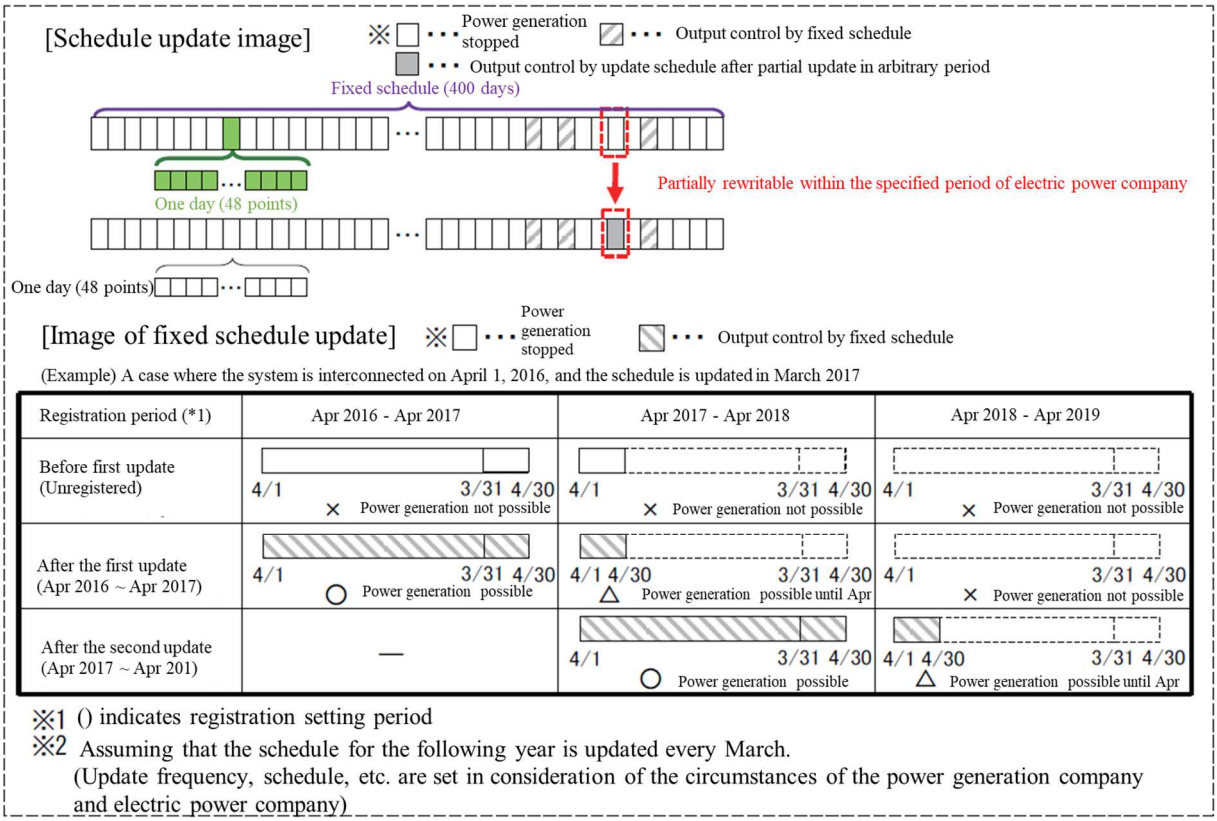
<Background of setting>

It is possible to update the schedule in 30-minute increments in the future and to change the fixed schedule in the field.

The specification was made so that the tolerance for the new (at least once a year) could be about 1 month. In addition, in order to smoothly perform output control in accordance with the supply-demand situation, the specification is made such that partial schedule update is possible in the power presentation period.

<Update image of output control schedule>

<Image of updating output control schedule>



(Example) A case where the system is interconnected on April 1, 2016, and the schedule is updated in March 2017

Registration period (*1)	Apr 2016 - Apr 2017	Apr 2017 - Apr 2018	Apr 2018 - Apr 2019
Before first update (Unregistered)	4/1 3/31 4/30 × Power generation not possible	4/1 3/31 4/30 × Power generation not possible	4/1 3/31 4/30 × Power generation not possible
After the first update (Apr 2016 ~ Apr 2017)	4/1 3/31 4/30 ○ Power generation possible	4/1 4/30 3/31 4/30 △ Power generation possible until Apr	4/1 3/31 4/30 × Power generation not possible
After the second update (Apr 2017 ~ Apr 201)	—	4/1 3/31 4/30 ○ Power generation possible	4/1 4/30 3/31 4/30 △ Power generation possible until Apr

※1 () indicates registration setting period

※2 Assuming that the schedule for the following year is updated every March.
(Update frequency, schedule, etc. are set in consideration of the circumstances of the power generation company and electric power company)

6.3 Time setting

<Technical Specifications>

Item (clock)	Communication function is available.	No communication function
Countermeasures against clock falsification	Synchronizing with the clock information of the power server or the distributor server	・ Setting of the time shall be performed by time synchronization by NTP server, GPS, etc., or by service personnel of manufacturers, etc. ・ Manual time adjustment after start of operation ±10 per day Restrict within minutes (excluding when set)
Measures to prevent loss of watches		・ The specifications shall be such that the internal clock will not be lost in the event of a power failure. ・ If the watch (date) disappears, the generator shall be stopped until time synchronization by NTP-server, GPS, etc. or resetting by service personnel of the manufacturer, etc.
Accuracy of the watch		・ The internal clock shall be synchronized with the clock by the crystal oscillator, etc., and the clock error shall be within ±60 seconds/month (normal temperature). ・ The time is supplemented when the fixed schedule is updated (once or more per year). Correct and maintain the above precision.

<Background of setting>

- Since the output control schedule specifies the control value in units of 30 minutes, the effect of internal time shift and time tampering is very large, and therefore the specification is made to synchronize the time with the server in principle.
- There was a opinion that synchronization with the standard time by GPS, etc. should be required even in the case of "no communication function," but installation in a place where there is no communication environment, such as mountainous areas, is assumed, and it is assumed that time synchronization by GPS is difficult depending on the installation location, and GPS clock function may become excessively costly, so the specification was also accepted for time adjustment by service personnel such as manufacturers.

6.4 Reverse power flow prevention function

<Technical Specifications>

◆ The reverse power flow prevention accuracy shall be the detection level (+5% of the rated output or the larger of +150W) and the detection time limit (within 5 minutes).

◆ Output control 0% command

① In the surplus purchase, control is performed by setting the reverse power flow at the interconnection point to zero (self-consumption = power generation output) or by setting the generator output to 0%.

② In the case of purchasing all the units, the output of the generator is set to 0% in the case of output control (0%).

<Background of setting>

Regarding the surplus purchase, since it is impossible to determine the output control up to the power generation output for in-house consumption, a function to set the reverse power flow to zero (in-house consumption = power generation output at the interconnection point) was adopted.

In setting the function (detection level, detection time period), the following points were considered and decided.

[Reason for selecting reverse current detection function]

Detection level	- The output power was set to +5% of the rated output power by matching the detection level of the conventional RPR. - For small-capacity INVERTER (less than 3kW), the accuracy required for 3kW, which has a large number of units shipped, is obtained because the absolute value of the error is small and it is technically difficult to maintain accuracy (3kW× 5%=150 W) was used as the lower limit of the absolute value.
Detection time period	- Since the duration of the reverse current should be as short as possible for the system operation, the output change time of 5.1.1 output increase/decrease (5 to 10 minutes) was matched, and the lower limit value of 5 minutes or less was set. - In terms of cost, the accuracy of existing trading sensors is approximately 1 to 2 minutes. It is also considered that the reverse power flow can be stopped.

<Supplementary Description>

- The detection level was set in the reverse flow direction (+5%) in order to prevent reverse flow. However, the target is not to exceed-10% in the forward flow direction.
- Reverse power prevention test using general rules for test methods for system interconnection protection devices, etc., such as multiple DC input systems

/Equipment for which an anti-backcharge test is required shall take precedence over the general test conditions.

6.5 Conversion function to contract capacity

<Technical Specifications>

- The system shall have a function to input the capacity of PV panels, etc. and PCS capacity, and shall be equipped with a function to convert the output control amount from "contracted capacity-based" to "PCS capacity-based" and command the PCS, etc. (narrowly defined PCS).
- Ensure security by providing a password for capacity entry.

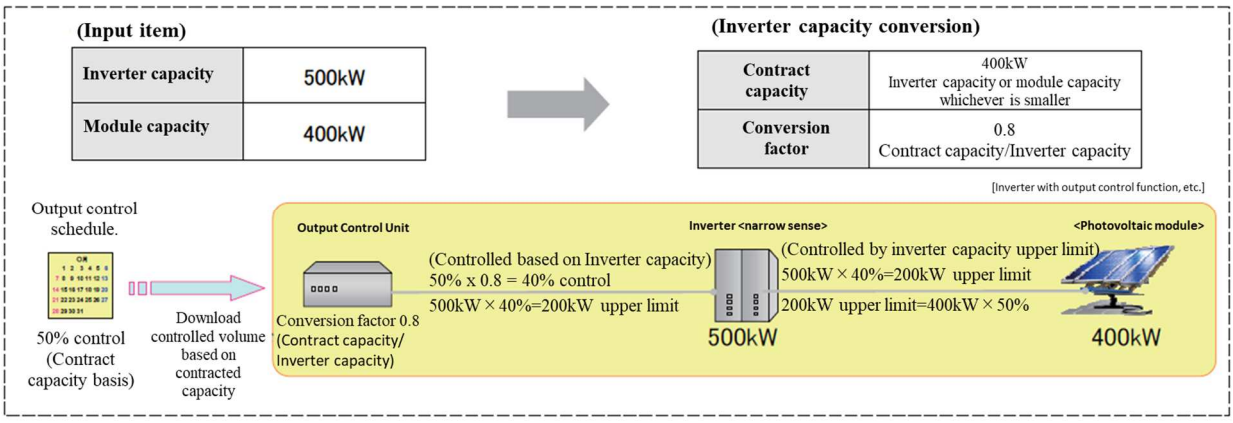
<Background of setting>

If the capacity of panels, etc. is less than the capacity of PCS, PCS, etc. (broadly defined) cannot recognize that the contracted capacity = the capacity of panels, etc., and appropriate output control according to the contracted capacity cannot be implemented. For this reason, it was decided to equip the PCS, etc. (broadly defined PCS) with a function that enables it to calculate the contracted capacity from the panel capacity and PCS capacity.

(Example) When the maximum received power (contracted capacity) 400kW (panel capacity: 400kW < INVERTER capacity: 500 kW) and the output control quantity is 50%

(Positive) Maximum allowable amount of power generation after output control: 200 kW (contracted capacity x 50%)

(Erroneous) Upper limit of power generation capacity after power control: 250kW (INVERTER capacity × 50%)



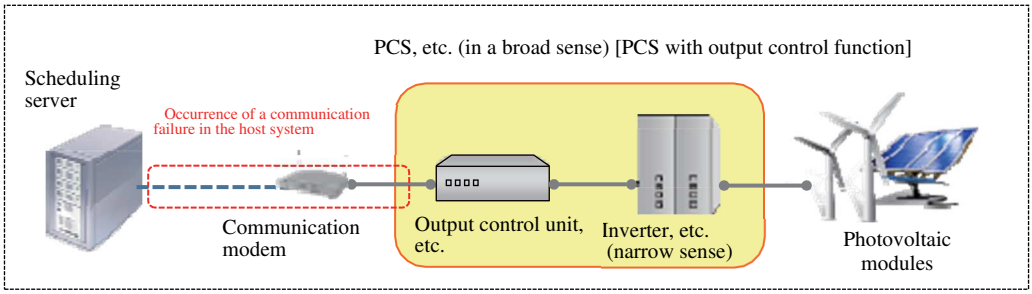
<Supplementary Description>

- This function is based on the operation set by the serviceman of the manufacturer, etc., only when "INVERTER Capacity not equal to Contract Capacity".

6.6 Handling in case of failure

<Technical Specifications>

◆ In the case of a communication failure from a host system, the specifications shall be such that the output can be controlled based on the latest output control schedule information before the failure.



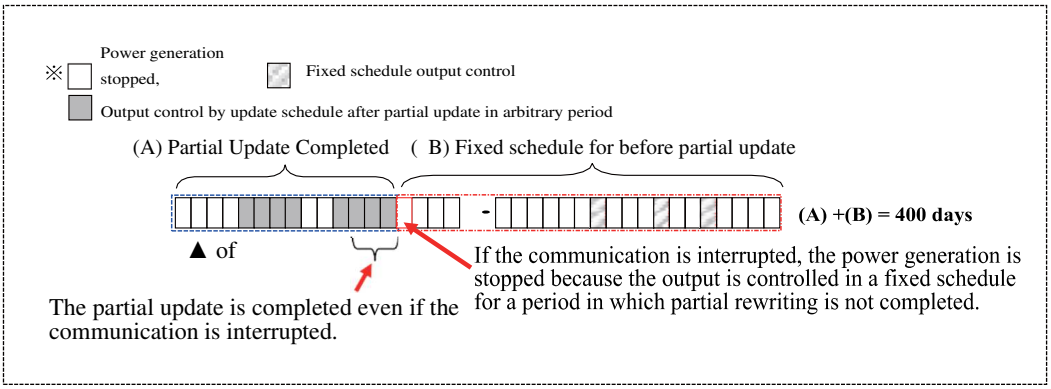
<Background of setting>

The upper-layer communication system (electric power company, distributor, etc.) has a schedule in the output control unit, etc.

～ Even when the communication between the output control units, etc. is interrupted (*), the output can be controlled by the already acquired schedule including the fixed schedule.

※ In addition to communication failures, intentionally pulling out communication lines to avoid output control is also assumed.

<Output control image during communication interruption>



6.7 Recommended specifications

This section presents specifications recommending the addition of functions from the viewpoint of improving convenience for operators, etc., although these functions are not essential for output control.

6.7.1 Track record of power generation (time resolution)

<Technical Specifications (Recommended)>

- ◆ The time resolution of the track record is 30 minutes.

<Background of setting>

It is desirable that the time resolution of the track record of power generation results be as small as possible, but the smaller it is, the larger the data storage capacity may lead to cost increase. Therefore, the time resolution was designed to match the measured value (30-minute value).

6.7.2 Track record of power generation (retention period)

<Technical Specifications (Recommended)>

◆ The retention period of the power generation record (in units of 30 minutes) of the main body of the output control unit, etc. shall be at least 3 months regardless of whether or not there is telecommunication.

◆ The data to be saved shall be ① the total amount purchased: the amount of electric power generated, ② the surplus purchase: the amount of electric power of reverse power flow at the interconnection point.

<Background of setting>

The retention period of the track record of the power generation record was set to the minimum period necessary for checking the track record because the longer the period, the more the storage capacity of the data becomes necessary, which may lead to an increase in cost. The subject data were based on the type of purchase.

[Reason for Selection of Retention Period]

Retention period	・ The period required for track record verification was assumed from the following total. ① 1 month of the sales measurement acquisition period ② One month for the electric power company to judge the quality of output control ③ One month during which the power producer submits a truck record to the utility
Object data	- The data storage location shall be based on the output control unit regardless of the fixed or updated scheduling method, and the data storage shall be in the form of purchased data (total amount or remainder). Specifications were made according to the surplus.

<Supplementary Description>

- Storage of the output control unit or the like in a unit other than the main body (e.g., storage of backup data separately in a server or the like) is not required.
- Even in the case of the fixed schedule system, it is desirable to store the power in the output control unit, etc. because it is sometimes required to submit the power generation record for the control status check from the electric power.

6.7.3 Operation display

<Technical Specifications (Recommended)>

◆ It is possible to separate "output stop due to occurrence of failure" and "normal output control".

◆ "Output control in progress" shall be displayed so that the normal operation during output control can be confirmed.

<Background of setting>

"Operation display means/operation display method" basically depends on the manufacturer's

design, but it is a specification that can reduce the risk of market trouble.

<Supplementary Description>

- Consideration shall also be given to "not to be mistaken for failure" and "to be able to control voltage rise and to separate from other suppressing factors."

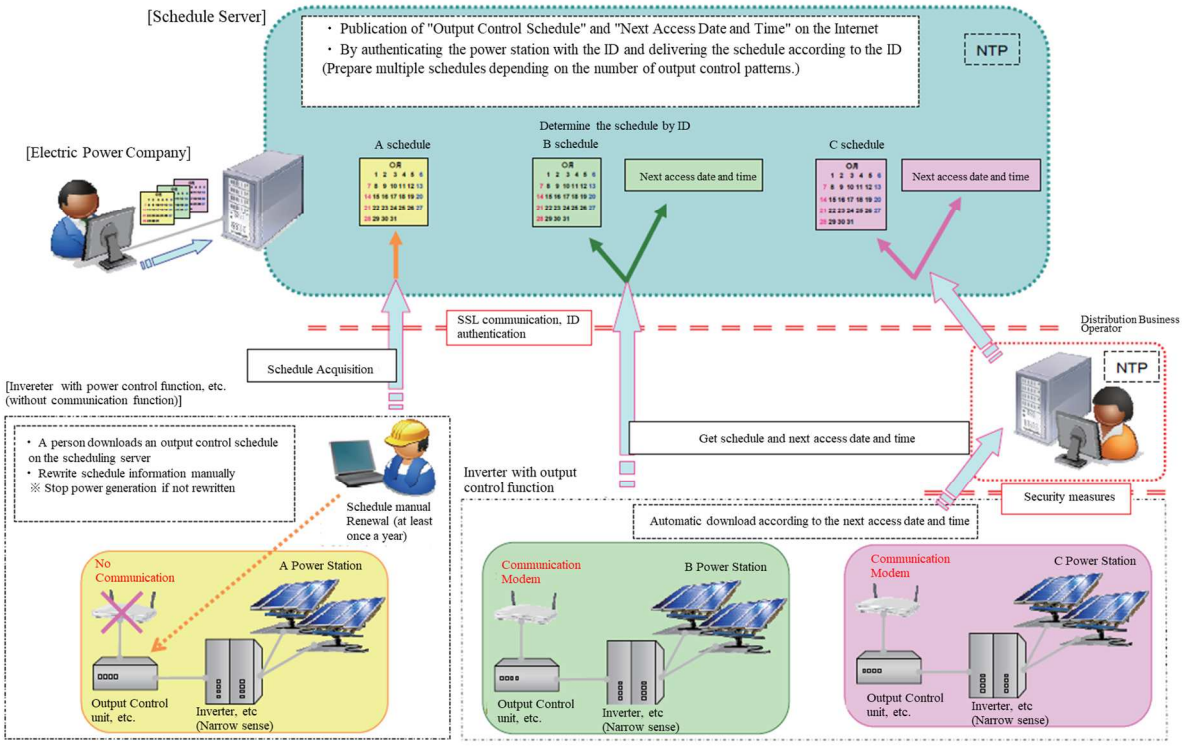
7 Communication specifications such as inverter with output control function

The communication specifications are shown in 7.1 to 7.8.

The basic functions are as described in "3 Mechanism for Rewriting Output Control Schedule". Specific items related to communication specifications are specified in this section.

<Output control schedule rewriting mechanism>

<Schedule rewrite method with or without communication function>



7 Communication specifications such as inverter with output control function

With or without communication function	Schedule Type	Rewriting method	Frequency of rewriting	Notice of the timing of the rewriting
Communication function "ON" (Central and right of the upper figure)	Update Fixed *1	Automatic download by communication Same as above	Update on a case-by-case basis (Responding to updates every 30 minutes at minimum) Update at least once a year	"Next access date and time" Fixed schedule Renewal flag"*3 count up
Communication function "No" (Upper figure, left)	Fixed	Manufacturers' services Manual rewriting by SMAN	Updating ※2 at least once a year	Consider notification via website, etc.

※1 In order to guarantee the feasibility and fairness of supply-demand operations during communication disruptions, a fixed schedule (annual setting) is set in advance as a backup schedule and partially overwritten with an update schedule.

※2 Local setting by service personnel of manufacturers, etc. is necessary, but local response may become physically difficult due to concentration of time, heavy snowfall, etc. Therefore, the electric power company updates the fixed schedule (additional distribution) at least twice a year so that the operator can respond with sufficient time.

※3 This flag is used to recognize that the fixed schedule has been updated and is included in the update schedule data.

<Configure/Issue ID>

- Since the power station ID needs to be an ID that does not overlap between power companies, the "receiving point identification number" (22 digits), which is a unique identification number, is used for each power station.
- In order to prevent registration errors, service personnel of manufacturers, etc. may download schedules for multiple providers when the communication function is disabled, in the file name and file
  Grant an ID.
- When installing a plurality of INVERTER with communication function, etc. at the same power station, the branch number shall be used to enable identification.
- The plant data (ID + branch number + checksum) shall be output by machine and issued to the operator in writing.

<Supplementary Description>

- The scheduling information does not include important information such as personal information, and is directed to a mechanism in which a password is not set.
- The schedule data shall be in a binary format with a checksum so that it cannot be easily rewritten by the operator.
  ※ Since the schedule distribution is only a "means of output control instruction" from the electric power company, there is a possibility that avoidance of output control by malicious intention of the operator cannot be prevented. For this reason, when a business operator avoids output control in bad faith (including falsification of schedule, etc.), consider how to operate the system, including penal provisions such as cancellation of contract based on laws and regulations.
- The fixed schedule acquisition in the case of "no communication function" is performed by downloading the fixed schedule to an electronic medium in an environment with a communication function and registering (updating) the fixed schedule to an output control unit or the like in the field.

7.1 Data configuration for fixed schedules

The data structure of the fixed schedule specifies an arbitrary date and time and the number of rewrite data, up to 400 days x

48 Control value (output %) data of points (19,200 points).

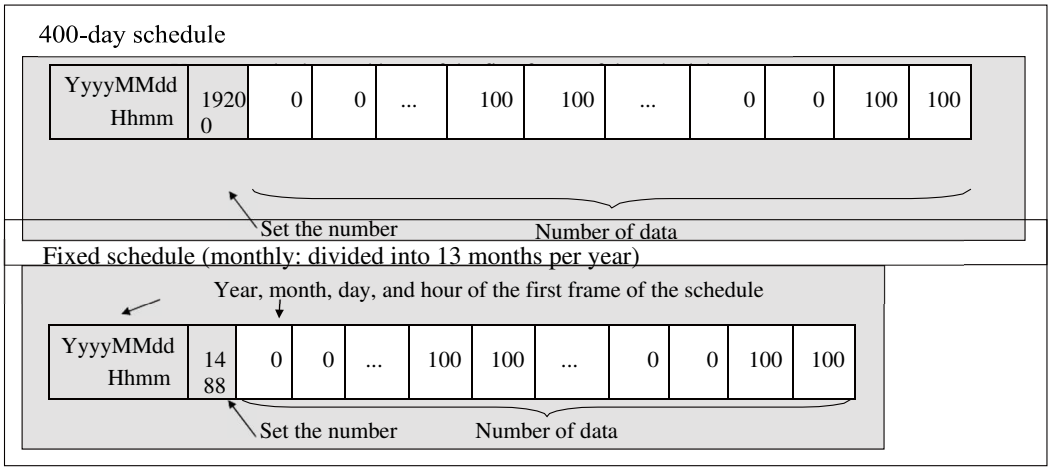
In order to improve operational convenience, data divided into monthly units is posted on the server in addition to data for 400 days (13 months).

<Data Structure of Fixed Schedule>

Fixed schedule (All) 400 days × 48 points (=19,200 points)

(Monthly) 31st day × 48 points (= 1488* points) 13 months' worth

(The output control schedule is specified in units of 30 minutes and rated output control value in units of 1%).



※ Change depending on the number of days per month (30 days: 1440, 29 days: 1392, 28 days: 1344)

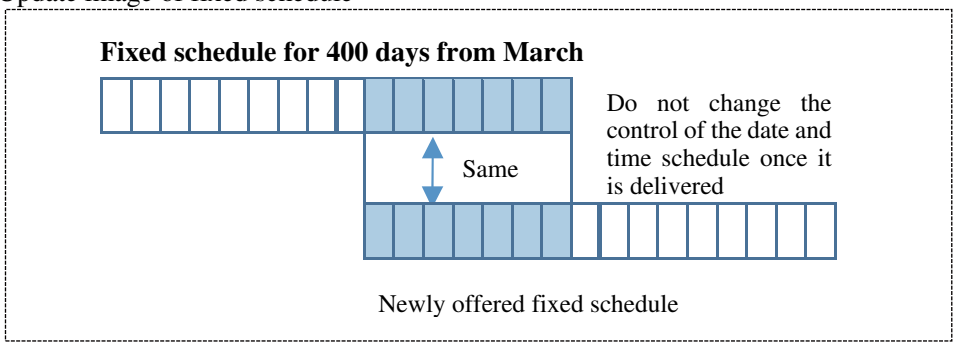
<Supplementary Description>

- The basic method is to download fixed schedules on a yearly basis. However, by reducing the amount of communication and downloading them separately, operation convenience may be improved. Therefore, it was decided that the fixed calendar can be obtained on a year-by-year basis and on a month-by-month basis (however, the control values on the same date and time are the same on a month-by-month basis and on a year-by-year basis).

7.2 Fixed schedule delivery timing

- The fixed schedule update is notified by counting up the "fixed schedule update flag" to be delivered along with the update schedule from the schedule server.
  ※ Consider notification via website, etc. to businesses with "no communication function"
- The acquisition time of the fixed schedule when the communication function is available shall be set by INVERTER based on the acquisition of "21 o'clock to 4 o'clock" which is less likely to overlap with the delivery of the update schedule.
  (Except for reacquisition due to loss of data)
- Provision of a fixed schedule from an electric power company shall be made at least twice a year, and the control value of the fixed schedule at the date and time of delivery shall not be changed.

<Update image of fixed schedule>



<Supplementary Description>

- The fixed schedule update in the case of "no communication function" requires local setting by the service personnel of the manufacturer, etc. However, there is a possibility that local response may become physically difficult due to concentration of time or heavy snowfall, etc., so the electric power company updates the fixed schedule (additional distribution) at least twice a year so that the service personnel of the manufacturer, etc. can respond with sufficient margin.
- Since the fixed schedule assumes that a service person such as a manufacturer sets the fixed schedule approximately once a year in the case of "no communication function", the control value of the fixed schedule delivered once does not change so as not to be controlled differently among businesses depending on the date and time of acquisition of the schedule.
  ※ However, INVERTER, etc. (broadly defined) do not require a function to restrict overwriting of fixed schedules.

7.3 Data structure of the update schedule

The data structure of the update schedule shall be the control value (output%) data of up to 7 days × 48 points (336 points) specifying an arbitrary date and time and the number of rewrite data, and shall be distributed together with the "fixed schedule update flag" for notifying that the fixed schedule has been updated and the "next access date and time" which is the access specification date and time from the client to the server.

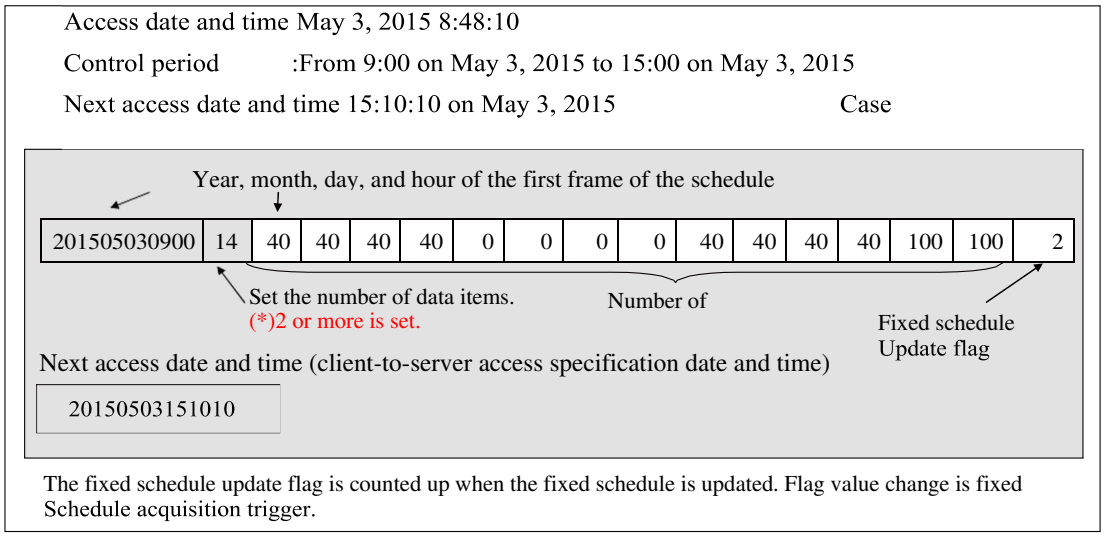
<Data Structure of Update Schedule>

Update schedule

Time period following access date/time - arbitrary time period (*)

(Provided up to 30 minutes ahead, considering retries in case of access errors)

(The output control schedule is specified in units of 30 minutes per hour and rated output control value is specified in units of 1%).



<Supplementary Description>

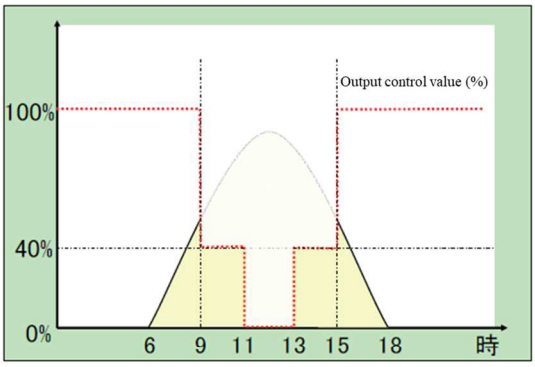
- Since the control value of the past time is data unnecessary for the control, and the past control value is rewritten to cause inconsistency with the output control result, the data of the time zone subsequent to the time zone of the access time is distributed.
- When an update schedule for the same frame is obtained multiple times, it is overwritten with the last obtained value.
- The server controls the next access date and time in order to avoid concentrated access to the server.
- Retry in the case of failed server access is set to "+30 minutes after the access date and time" to distribute access at the time of retry.
- The fixed schedule update flag counts up when the fixed schedule is updated, and returns to 0 when it reaches 9.

7.4 Delivery Timing of Update Schedule

The update schedule shall be acquired by accessing the "next access date and time" specified by the server by INVERTER with the output control function.

<Relationship between Daily Output Control Schedule (Example) and Schedule Bulletin>

・ Update the output control value of the day by schedule distribution. The output control schedule can be set in units of 30 minutes and 1% per minute.



Time of day	0～9	9～11	11～13	13～15	15～24
Output upper limit (%)	100%	40%	0%	40%	100%

※flag
Count up when you update the fixed schedule.
Fixed schedule acquisition trigger

Access time	Output control schedule					Next access date	flag*
2015/5/3 8:20:00	20150503 0830	3	100	40	40	2015/5/3 9:20:00	3
2015/5/3 9:20:00	20150503 0930	3	40	40	40	2015/5/3 10:20:00	3
2015/5/3 10:20:00	20150503 1030	3	40	0	0	2015/5/3 11:20:00	3
2015/5/3 11:20:00	20150503 1130	3	0	0	0	2015/5/3 12:20:00	3
2015/5/3 12:20:00	20150503 1230	3	0	40	40	2015/5/3 13:20:00	3
2015/5/3 13:20:00	20150503 1330	3	40	40	40	2015/5/3 14:20:00	3
2015/5/3 14:20:00	20150503 1430	3	40	100	100	2015/5/3 15:20:00	3

<Supplementary Description>

- Operation when communication is disabled shall be as follows.

  ① In the case of a communication error, a retry is performed 30 minutes after the next access date and time specified by the power. (Reella - Continue to retry again after another 30 minutes.

  ② Until the retry succeeds, control is performed according to the acquired latest schedule (update or fixed schedule).

- The server manages the control results (control instructions) with the download results of the update schedule and grasps the number of hours of output control from the control values of the update schedule.

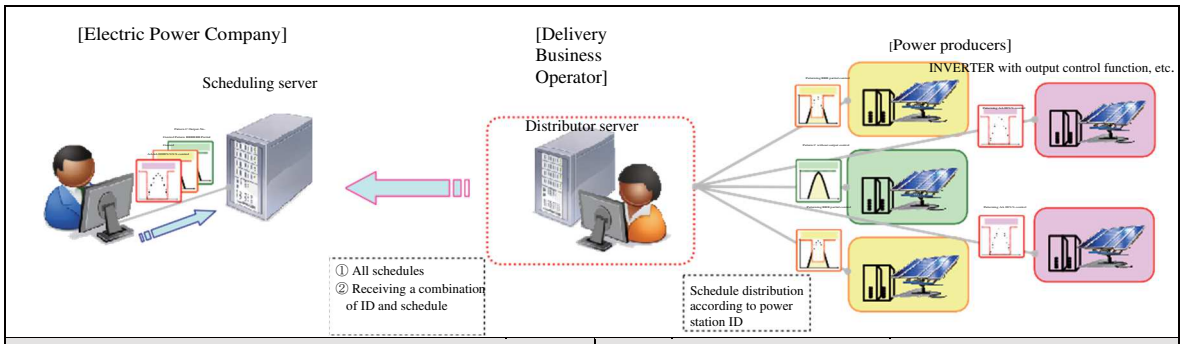
  ※ The fixed schedule control in "with communication function" is an operation limited to the case of a device failure or the like, and therefore is not managed by the server.

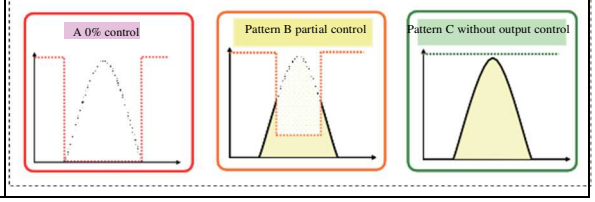
7.5 Capabilities of the provider server

The distribution company receives the output control schedule from the electric power company on behalf of the electric power company and rewrites the output control schedule such as INVERTER with the output control function of the electric power company.

Therefore, the distribution company server has a basic function of receiving the combination information of the output control schedule (fixed schedule, updated schedule) of the power generation company belonging to the distribution company and the power station ID, and distributing the output control schedule to INVERTER with the output control function of the specified power station.

<Functions of Distributor Server>



Capabilities of the provider server	Schedule pattern
[Receive schedule from electric power company] ① and ② are received from the scheduling server. ① All schedule information ② Combined plant ID and schedule information [Schedule Distribution to Power Generators] Delivery of schedule according to combination of power plant ID and schedule designated by electric power company	The output control is assumed to be implemented by three patterns: 0% control, partial control, and no partial control. However, the supply-demand operation differs for each electric power company and for each remote island where the mainland and the electric power system are not interconnected. 

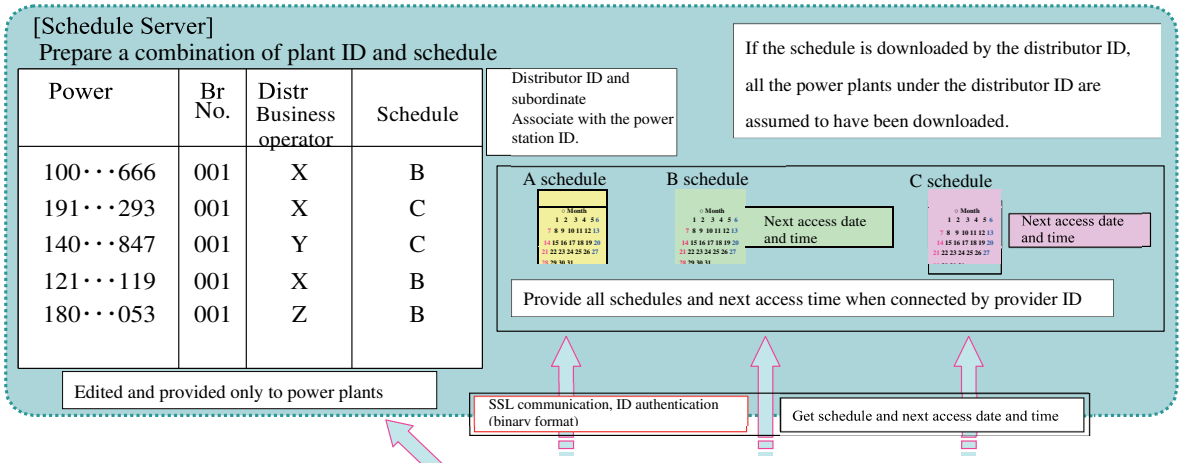
<Supplementary Description>

- The output control assumes "uniform control" in which partial control of the same control pattern is performed to all the control target persons by limiting to the required time, and "alternating control" in which only the operator necessary for the minimum output control is controlled by 0% by alternation.
- The fixed schedule is one type, but there is a possibility of an increase because supply and demand management differ for each electric power company and for each remote island that is not connected to the mainland.
- 360 Since there is a possibility that a different schedule may be set for the output control in units of time, there is a possibility that the schedule pattern increases.

7.6 Data linkage specifications between the distributor and the scheduling server

The distributor accesses the schedule server by using the distributor ID to collectively acquire all the schedules and a combination of the power station ID and the schedule under the control of the distributor.

<Data Linking Specifications with Distributors (Draft)>



	X distributor	Y distributor	Z distributor
Provider ID	X123456789	Y135792468	Z246813579
Power plant ID (Receiving Point Identification Number) + branch number	100･･･666 001 191･･･293 001 121･･･119 001	141･･･582 001 140･･･847 001	**180･･･053 001** 110･･･289 001 161･･･948 001

<Supplementary explanation>

・Distributor downloads the calendar information and ID of the power plant to which they belong at once, and manages the power side as having downloaded all power plants.

・The power station ID is a 26-digit number including the power receiving point identification number (22 digits) + branch number (3 digits) + checksum (1 digit), and manages belonging to the distributor within the schedule server. ..

Power receiving point identification number: 1st and 2nd digits Power transmission and distribution company code 3rd digit High/low voltage classification ・The timing of data acquisition of "power station ID and schedule combination" takes into account the data transfer processing time from the distributor to the power station However, it is basically the acquisition timing immediately after the data is posted.

(Example) If the data acquisition period is 10:00 to 10:30, 10:00:01 etc.

-In case of a communication error of the distribution company, it is possible to retry immediately.

* It is considered that there are several dozen distributors and there is no problem of concentrated access to the server, so it was decided to access immediately.

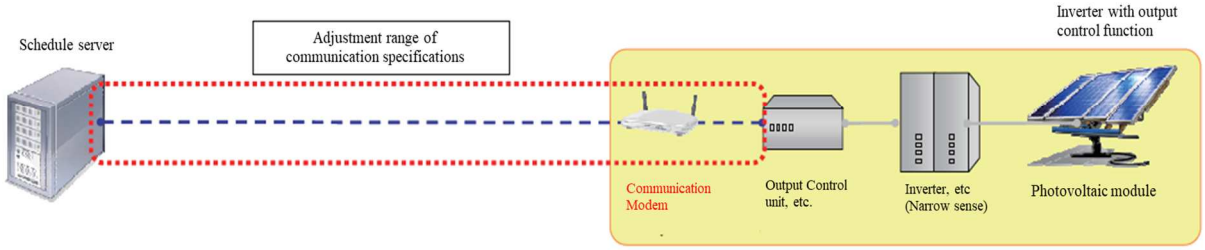
-Switching the distribution destination from the distribution company to the electric power company will be changed according to the procedure for the electric power company.

In addition, if the delivery company server fails, the fixed schedule will be entered, and automatic switching to the power company server is not allowed.

7.7 Basic configuration of communication

Communication between INVERTER with the output control function and the server is specified in the transmission specifications separately.

<Proposed communication specifications>



7.8 Data sent to and received from the schedule server

The following data can be acquired by requesting data from the server.

[Cases where the Distribution Business Operator is not routed]

Acquired data	Requests from INVERTER with Output Control Function, etc. to Servers
Fixed schedule	Fixed schedule (13 months, month specified)
Update schedule for the plant ID	Update schedule
Time (NTP servers)	Time setting (NTP)

※ When requesting data, "plant ID" is added to confirm the schedule, and "MAC address" is added to ascertain the status of the schedule acquisition.

[Case of distributors]

Acquired data	Requests from INVERTER with Output Control Function, etc. to Servers
All schedules	Requested by provider ID
Power Plant ID and Schedule under Distribution Operator Combination of L	
Time (NTP servers)	Time setting (NTP)

※ Add "Distributor ID" when requesting data

<http request and response>

Since there are several schedules, the schedule to be acquired is specified by a request from a INVERTER with output control function, etc.

Http request (PCS with power control function, etc.)	Http response
Power plant ID + branch number + checksum (22 digits + 4 digits) MAC address Schedule category (4-digit number) (In the case of a distributor, only distributor ID)	Send a file with a checksum added to the corresponding schedule in binary format

Schedule Classification

Code	Content	Remarks
999_	Fixed annual schedule	The last digit indicates the count-up of the update schedule. Match the number to be printed and specify which fixed schedule you want to get
1501 1512	2015 Annual schedule for January 2015 Schedule for December of the year	Fixed schedule to be acquired by specifying the year and month Specify the
0000	Update schedule	
8888	For ID registration confirmation	Checking the ID registration status to the server (Schedule) No reply, and the registration status is returned.)

7.8 Data sent to and received from the schedule server

<Supplementary Description>

- The MAC address is assigned to the header so that the server side can check for errors such as incorrect registration of power plant IDs during on-site work for PCSs with output control functions, etc.
- Although there is a function to randomize MAC addresses, this function should be turned off because turning it on may make it impossible to identify devices, and because the power server will issue a MAC address mismatch warning for output control devices on each access, which will adversely affect system operation.