

# GIPAM3000 Remote communication Technical data

GIPAM3000 is equipped with a variety of remote communication functions as shown below and introduces specifications and methods of setting up for each type of communication in detail.

## 1. GIPAM3000 remote communication type

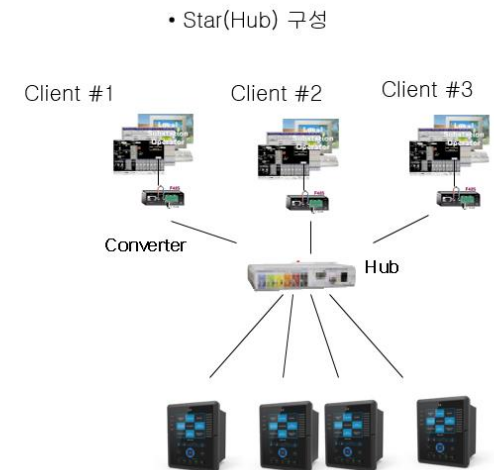
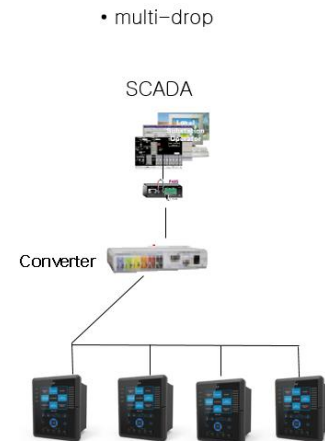
| Protocol/<br>Media | Serial (RS485) | Ethernet |       |
|--------------------|----------------|----------|-------|
|                    |                | LAN      | OPTIC |
| DNP                | O              | O        | O     |
| MODBUS             | O              | O        | O     |
| IEC61850           | X              | O        | O     |



## 2. Specification for each communication type

### 2.1 RS485(DNP3.0 , MODBUS-RTU)

- Operation mode : Differential mode( 2 wire)
- Distance : 1.2kM maximum
- Communication Wire : 2 wire , Twist cable
- Baud rate : 19600 ~ 38400bps
- Sending mode : Half-Duplex( 반파 전송 방식)
- Maximum in/out Voltage range :  $\pm 6V$



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## 2. Specification in communication Type

### 2.2 Ethernet (DNP-LAN,MODBUS-TCP)

#### 1) 10BASE-TX Ethernet

- Maximum sending Speed : 10Mbps
- Topology(installation) : Star
- Sending Media : UPT(Cat3,Cat5)
- Access control mode : CSMA/CD,  
Sending sign:B5/B5+MLT-3
- Maximum sending distance: 100M between HUB and IED

#### 3) 100BASE-FX Ethernet(optic)

- Maximum sending Speed : 100Mbps
- Topology(installation) : Star
- Sending Media
  - Wave length : 1300nm
  - Optic type : Multi-Mode Fiber
  - Fiber size : 62.5/125, 50/125um
  - Optic Connector Type : LC
- Maximum sending distance: 2kM per segmentation

#### 2) 100BASE-T Ethernet

- Maximum sending Speed : 100Mbps
- Topology(installation) : Star
- Sending Media : UPT(Cat5),STP(Level3)
- Access control mode : CSMA/CD,  
Sending sign:B5/B5+MLT-3
- Maximum sending distance: 100M between HUB and IED

#### 4) common

- Multi Client connection function : max. 3(a1)
- TIME sync from SNTP Server

(a1)

- Debugging is impossible when clients are 3.

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## 2. Specification in communication Type

### 2.3 IEC61850

#### 1) Characteristic

- Support Ethernet 100Base-T
- Certification about IEC61850 KEMA

#### 2) Major function

- Multi Client : Max. 5 client
- Report
- GOOSE
- Control
- Time sync with SNTP Server
- File sending

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3. Describe menu in each communication Type

3.1 MODBUS

1) MODBUS-RTU

| Properties              | Default | Setting range                                          | ETC     |
|-------------------------|---------|--------------------------------------------------------|---------|
| Address                 | 247     | 1 ~ 247                                                |         |
| Baud rate(bps)          | 9600    | 9600,19200,38400                                       |         |
| Parity bit              | NONE    | Even,Odd,None                                          |         |
| Floating point sequence | NOT USE | Use, Not Use                                           |         |
| Communication map type  | 3000FI  | 3000FI,<br>2000FIM,<br>2200FN/FZ,<br>2200DG,<br>2200IG | FI TYPE |
|                         | 3000T   | 3000T,<br>2000T,<br>2200T                              | T TYPE  |

The screenshot shows the MODBUS-RTU configuration menu. The menu items and their current values are:

- 주소 (Address): 247
- 통신속도 (Baud rate): 9600bps
- 패리티 (Parity): NONE
- 부동소수 순서변경 (Floating point sequence): NOT USE
- 모드버스 통신맵 (Communication map type): 3000FI

At the bottom, there is a label '기기설정 MODBUS-RTU' and two icons: a circular arrow and a home icon.

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## 3. Describe menu in each communication Type

### 3.1 MODBUS

#### 2) MODBUS TCP(Ethernet)

| Properties              | Default         | Setting range             | ETC                              |
|-------------------------|-----------------|---------------------------|----------------------------------|
| IP 주address             | 192.168.0.33    | 1.0.0.0 ~ 223.255.255.255 |                                  |
| Subnet mask             | 255.255.255.0   | 255.0.0.0 ~ 255.255.255.0 |                                  |
| Gateway                 | 192.168.0.1     | 1.0.0.0 ~ 223.255.255.255 | Use in case dividing network     |
| Time Setting mode       | MASTER          | SNTP, Master, None        |                                  |
| SNTP server IP add.     | 255.255.255.255 | 1.0.0.0 ~ 223.255.255.255 | SNTP time sync                   |
| MAX IDLE TIME           | 30Sec           | 10 ~ 60                   | Time to disconnect Communication |
| Floating point sequence | Not use         | Use, Not Use              |                                  |
| RSTP Priority           | 32768           | 0~61440                   | Step:31768, no use               |
| Communication map type  | 3000FI          | 3000F, 2000FIM            | FI TYPE                          |
|                         | 3000T           | 3000T, 2000T, 2200T       | T TYPE                           |

MODBUS-TCP

IP 주소  
192.168.0.33

서브넷 마스크  
255.255.255.0

게이트웨이  
192.168.0.1

시간 입력  
MASTER

SNTP 서버 IP 주소  
223.255.255.255

MAX IDLE TIME  
30sec

기기설정  
MODBUS-TCP

MODBUS-TCP

부동소수 순서변경  
NOT USE

RSTP 우선순위  
32768

모드버스 통신맵  
3000FI

기기설정  
MODBUS-TCP

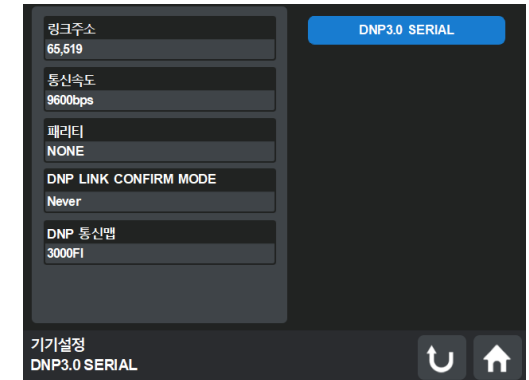
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## 3. Describe menu in each communication Type

### 3.2 DNP

#### 1) DNP3.0 Serial

| Properties             | Default | Setting range                   | ETC     |
|------------------------|---------|---------------------------------|---------|
| Link address           | 65,519  | 1~65,519                        |         |
| Baud rate(bps)         | 9600    | 9600,19200,38400                |         |
| Parity bit             | NONE    | Even,Odd,None                   |         |
| DNP LINK CONFIRM MODE  | Never   | Never,Sometimes,Always          |         |
| Communication map type | 3000FI  | 3000FI,<br>2000FIM,<br>2200FNFZ | FI TYPE |
|                        | 3000T   | 3000T,<br>2000T,<br>2200T       | T TYPE  |
| Data bit               | 8       |                                 | fixed   |
| Stop bit               | 1       |                                 | fixed   |
| Flow control           | -       |                                 | fixed   |



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3. Describe menu in each communication Type

3.2 DNP

2) DNP3.0 TCP(Ethernet)

| Properties             | Default         | Setting range             | ETC                              |
|------------------------|-----------------|---------------------------|----------------------------------|
| Link address           | 65,519          | 1~65,519                  |                                  |
| IP address             | 192.168.0.33    | 1.0.0.0 ~ 223.255.255.255 |                                  |
| Subnet mask            | 255.255.255.0   | 255.0.0.0 ~ 255.255.255.0 |                                  |
| Gate way               | 192.168.0.1     | 1.0.0.0 ~ 223.255.255.255 | Use in case dividing network     |
| Time setting mode      | MASTER          | SNTP, Master, None        |                                  |
| SNTP server IP add.    | 255.255.255.255 | 1.0.0.0 ~ 223.255.255.255 | SNTP time sync                   |
| MAX IDLE TIME          | 30Sec           | 10 ~ 60                   | Time to disconnect Communication |
| DNP LINK CONFIRM MODE  | Never           | Never,Sometimes,Always    |                                  |
| RSTP Priority          | 32768           | 0~61440                   | Step:31768, no use               |
| Communication map type | 3000FI          | 3000F                     | FI TYPE                          |
|                        | 3000T           | 3000T                     | T TYPE                           |

링크주소  
65,519

IP 주소  
192.168.0.33

서브넷마스크  
255.255.255.0

게이트웨이  
192.168.0.1

시간 입력  
MASTER

SNTP 서버 IP 주소  
223.255.255.255

기기설정  
DNP3.0 TCP

MAX IDLE TIME  
30sec

DNP LINK CONFIRM MODE  
Never

RSTP 우선순위  
32768

DNP 통신맵  
3000FI

기기설정  
DNP3.0 TCP

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3. Describe menu in each communication Type

3.3 IEC61850 TCP(Ethernet)

| Properties             | Default         | Setting range             | ETC                              |
|------------------------|-----------------|---------------------------|----------------------------------|
| IP address             | 192.168.0.33    | 1.0.0.0 ~ 223.255.255.255 |                                  |
| Subnet mask            | 255.255.255.0   | 255.0.0.0 ~ 255.255.255.0 |                                  |
| Gate way               | 192.168.0.1     | 1.0.0.0 ~ 223.255.255.255 | Use in case dividing network     |
| Time setting mode      | SNTP            | SNTP, None                |                                  |
| SNTP server IP add.    | 255.255.255.255 | 1.0.0.0 ~ 223.255.255.255 | SNTP time sync                   |
| TCP KEEP ALIVE TIME(S) | 60              | 10 ~ 60                   | Time to disconnect Communication |
| DNP LINK CONFIRM MODE  | Never           | Never,Sometimes,Always    |                                  |
| RSTP Priority          | 32768           | 0~61440                   | Step:31768, no use               |

The image displays two screenshots of the IEC61850 configuration interface. The top screenshot shows the '기기설정' (Device Settings) menu with the following fields: IP 주소 (192.168.0.33), 서브넷마스크 (255.255.255.0), 게이트웨이 (192.168.0.1), 시간 입력 (SNTP), SNTP 서버 IP 주소 (223.255.255.255), and TCP KEEP ALIVE TIME (60sec). The bottom screenshot shows the 'RSTP 우선순위' (RSTP Priority) field set to 32768. Both screenshots include a blue 'IEC61850' button and navigation icons at the bottom.

# Attached 1. Redundancy Remote communication

GIPAM3000 supports multiple clients (Ethernet: up to 3, 61850: up to 5), enabling redundancy as shown below. However, Ring structure is not possible because RSTP is not possible.

1. Redundant implementation method #1 : Client configures in one direction

- Caution point

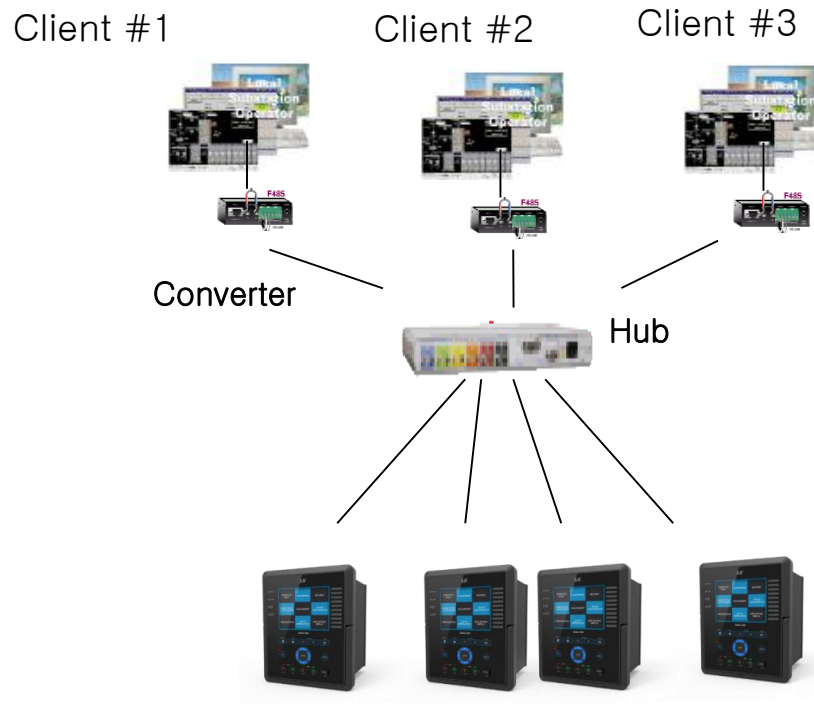
- 1) Only one of the two A and B PORTs is used.

- 2) Do not mix A and B for each product.

- 3) Number of Clients must not exceed

( Ethernet: 3 clients , 61850 : 5 clients)

- Star(Hub) Structure #1



# Attached 1. Redundancy Remote communication

1. 2. Redundant implementation method #2 : Client configures in two directions

- Caution point

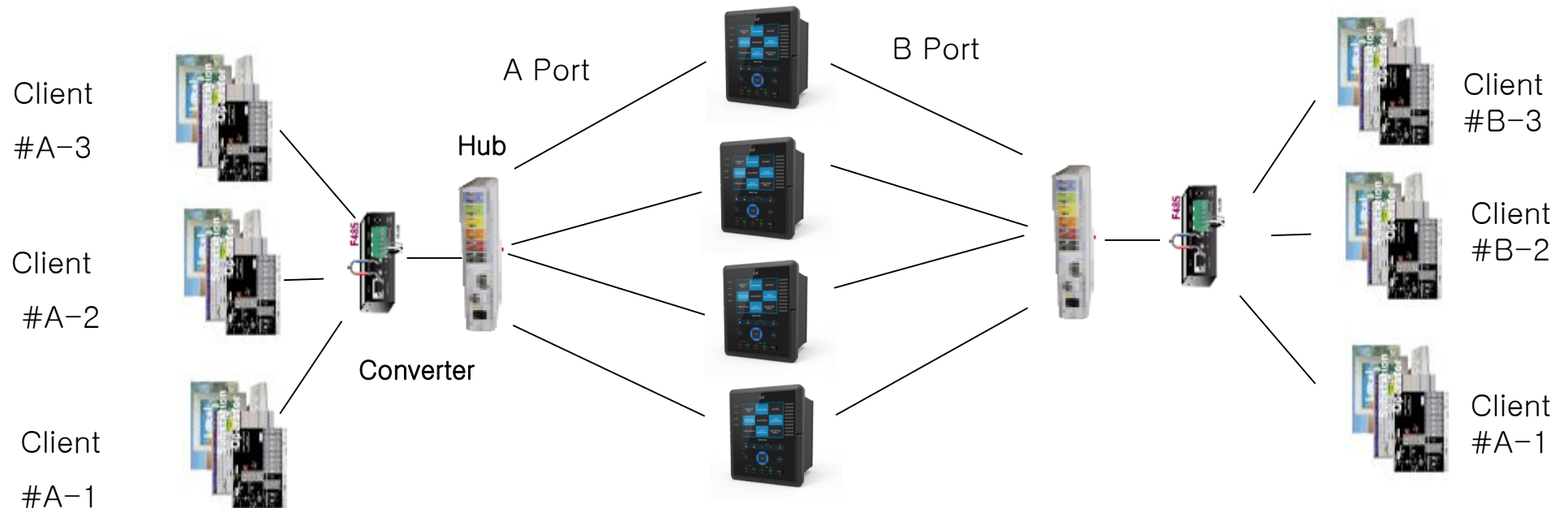
1) Only one of the two A and B PORTs is used.

2) Do not mix A and B for each product.

3) Number of Clients must not exceed

( Ethernet: 3 clients , 61850 : 5 clients)

- Star(Hub) Structure #2



# Attached 2. Time sync method for IDE in Ethernet

In case of GIPAM3000 Ethernet products, Time synchronization with communication is possible through SNTP server and there is a Time sync mode

A detailed description of this is discussed and the differences from IRIG-B are discussed.

## 1. GIPAM3000 Ethernet Product time sync. Method

| Communication type (Ethernet) | Setting | In Detail                                            | ETC                                |
|-------------------------------|---------|------------------------------------------------------|------------------------------------|
| MODBUS, DNP                   | SNTP    | From the device to the SNTP server Request time sync |                                    |
|                               | MASTER  | Broadcast from SCADA to device Time sync             | General SCADA Broad casting method |
|                               | NONE    | Don't time sync.                                     |                                    |
| IEC61850                      | SNTP    | From the device to the SNTP server Request time sync |                                    |
|                               | NONE    | Don't time sync.                                     |                                    |

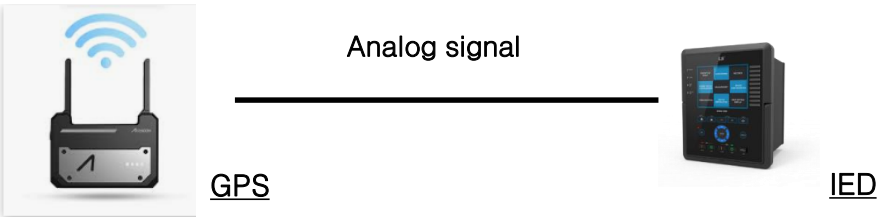
[Details for time sync.](#)



## 2. Time sync. Differences between IRIG-B and SNTP Servers

- 1) IRIG-B : Time sync. via GPS Receiver on IED by Directly Receiving Analog Signals from GPS Antenna
- 2) SNTP : After SNTP server receives analog signals from GPS antennas and Convert analog to digital , time sync to IED

\* GPS time sync.



\* SNTP time sync.

