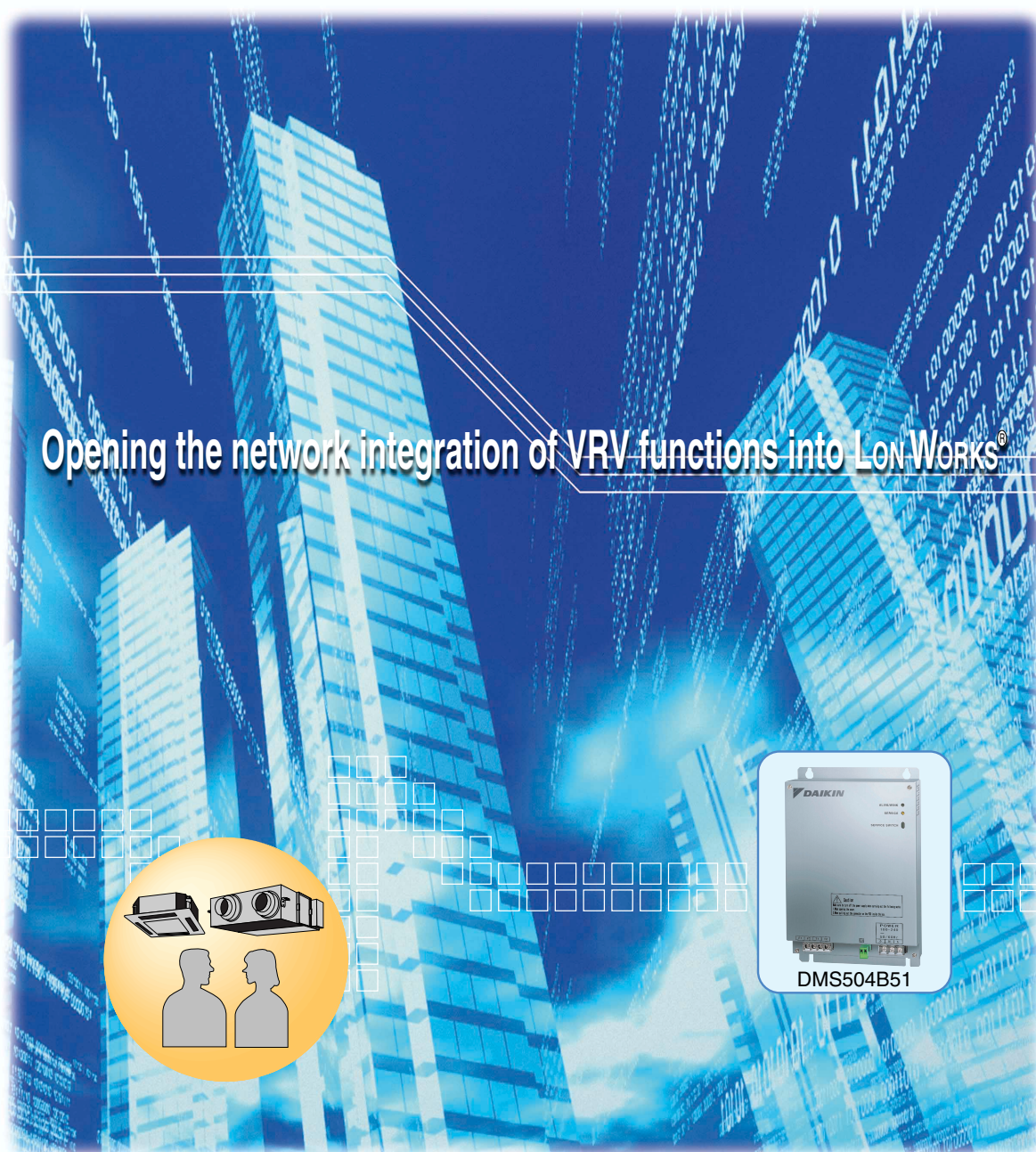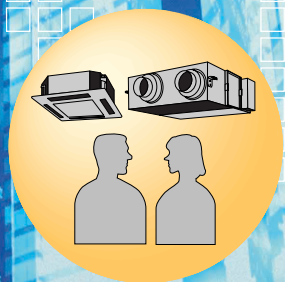**Si72 - 305**

# DAIKIN

# SERVICE MANUAL

# DMS-IF

Opening the network integration of VRV functions into LONWORKS®

DMS504B51

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# DAIKIN INDUSTRIES, LTD.

# Part 1
# Design Guide
# Product Specifications

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CA02A552

# 1. Introduction

This publication represents the specifications relating to the LonWorks Network functions and specifications used when Daikin's VRV or DIII-NET compatible A/C is hooked up to a LonWorks® Network.

# 2. System Configuration

This LON Gateway can be connected (hooked up) to a maximum of 64 indoor units in a group.
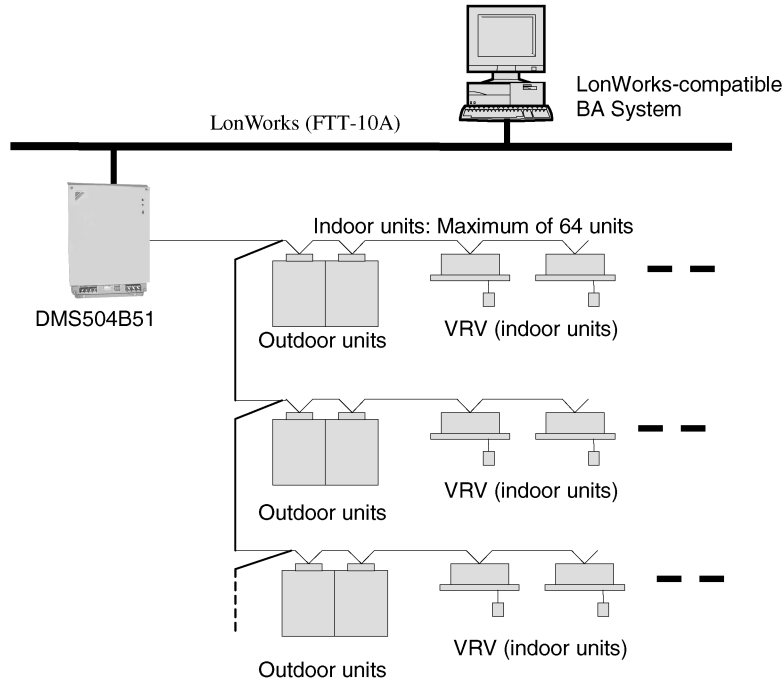


**Note:**
The LON Gateway functions as the interface for a building monitoring system and cannot be co-installed on the DIII-NET along with the following equipment/devices that have similar functions.

Master Station II (BACnet Gateway for overseas markets)
DDS
BIPS Station (i-Manager for overseas markets)
Adapter for remote control
Parallel interface

# 3. Overview of Functions

| | Function | Description |
|---|---|---|
| Controlling items | ON/OFF Command | Starts/stops air conditioner operation. |
| | Operation Mode Setting | Sets operation mode (heating/cooling/ventilation/auto). |
| | Temperature Setting | Sets room temperature. |
| | Airflow Rate Setting | Sets airflow rate. |
| | Filter Sign Reset | Resets filter sign. |
| | Forced Thermostat OFF Setting | Sets forced thermostat OFF. |
| | Remote ON/OFF Control Rejection | Sets whether permit/prohibit ON/OFF control rejection of the air conditioner with a hand-held remoter controller. |
| | Remote Operation Mode Control Rejection | Sets whether permit/prohibit operation mode control rejection of the air conditioner with a hand-held remote controller. |
| | Remote Temperature Setting Control Rejection | Sets whether permit/prohibit room temperature setting control rejection of the air conditioner with a hand-held remote controller. |
| | System Forced OFF Setting | Forcibly stops the air conditioner connected to the DIII-NET /Resets the Forced OFF setting. |
| | Sub Group Address Control Rejection Setting | Permits/prohibits controlling of the centralized device connected to the DIII-NET. |
| Monitoring items | ON/OFF Status Report | Monitors ON/OFF status of the air conditioner. |
| | Operation Mode Status Report | Monitors operation mode status (heating/cooling/ventilation) of the air conditioner. |
| | Temperature Setting Report | Monitors the set room temperature. |
| | Room Temperature Report | Monitors the room temperature. |
| | Airflow Rate Setting Report | Monitors the set airflow rate. |
| | Filter Sign Report | Checks limits of filter use and monitors if it has reached the limit. |
| | Error Status Report | Monitors error status of the air conditioners. |
| | Error Code Report | Displays the manufacturer-specified error codes if any errors occur. |
| | Thermostat Status Report | Monitors whether the air conditioner's thermostat is working. |
| | Forced Thermostat OFF Setting Status Report | Monitors the forced thermostat OFF status. |
| | Remote ON/OFF Operation Rejection Report | Monitors the status if the air conditioner is permitting/prohibiting remote ON/OFF control with a hand-held controller. |
| | Remote Control Operation Mode Setting Rejection Report | Monitors the status if the air conditioner is permitting/prohibiting remote control operation mode with a hand-held controller. |
| | Remote Control Temperature Setting Operation Rejection Report | Monitors the status if the air conditioner is permitting/prohibiting remote control temperature setting with a hand-held controller. |
| | System Forced OFF Setting Report | Monitors the status of the forced OFF setting of the air conditioner connected to the DIII-NET. |
| | Sub Group Address Control Operation Rejection Setting Report | Monitors the status if the air conditioner is permitting/prohibiting control of a centralized device connected to the DIII-NET. |
| | A/C Communication Status Report | Monitors the communication status (No Occupancy/ Communication normal/ Communication error) of the air conditioner. |

# 4. Applicable Models

| Function | Air Conditioners | | | | | |
|---|---|---|---|---|---|---|
| | VRV | Hi Sky Multi | Sky Air (Adapter for Sky Air) | Facility A/C (Centralized control adapter) | HRV | RA (General purpose adapter) |
| ON/OFF Operation and Monitoring | ○ | ○ | ○ | ○ | ○ | ○ |
| A/C Error Report | ○ | ○ | ○ | ○ | ○ | ○ |
| Room Temperature Monitoring | ○ | ○ | ○ | ○ | × | × |
| Temperature Setting and Monitoring | ○ | ○ | ○ | ○ | × | × |
| Operation Mode Setting and Monitoring (Note 3) | ○ | ○ | ○ | ○ | × | × |
| Remote Control Mode Setting and Monitoring | ○ | ○ | ○ | ○ | ○ | × |
| Filter Sign Monitoring and Reset | ○ | ○ | ○ | × | ○ | × |
| Thermostat Status Monitoring | ○ | ○ | ○ | × | × | × |
| Airflow Rate Setting and Monitoring | ○ | ○ | ○ | × | Δ(Only monitoring (Note 2) | × |
| Forced Thermostat OFF Setting and Monitoring | ○ (Note 1) | ○ | ○ | × | × | × |

**Note 1:**
When this is set from a remote controller, it is not reported to the upper system and, therefore, this setting cannot be monitored by the upper system.
**Note 2:**
The triangle mark denotes a function that is only available for some models.
**Note 3:**
Operation mode can be changed only on indoor units that allow a selection between heating and cooling.

# 5. Specifications of Devices

| Item | Specifications |
|---|---|
| Model | DMS504A1 |
| Demensions | 168 (W) × 260 (H) × 50 (D) mm |
| Weight | 1.5 kg |
| Power souce | Single phase AC100V 50/60Hz |
| Power consumption | Max. 5W |
| Operable temperature range | -10 to 50 °C |
| Storage temperature range | -20 to 60 °C |
| Humidity | Up to 95% (No condensation) |
| Installation | Mounted to indoor distribution board |
| LonWorks | FTT-10A (Free topology 78Kbps) |
| Contact input | Forced OFF × 1 (A/Cs en bloc) |

# 6. Hardware

## 6.1    Physical Appearance and Branch Connection



F1, F2 (DIII-NET)

T1, T2 (Forced OFF)

LON
(Connect to the screw
terminal using the cables
specified by Echelon.
Refer to the "FTT-10A Free
Topology Transceiver User's
Guide" by Echelon for
details."
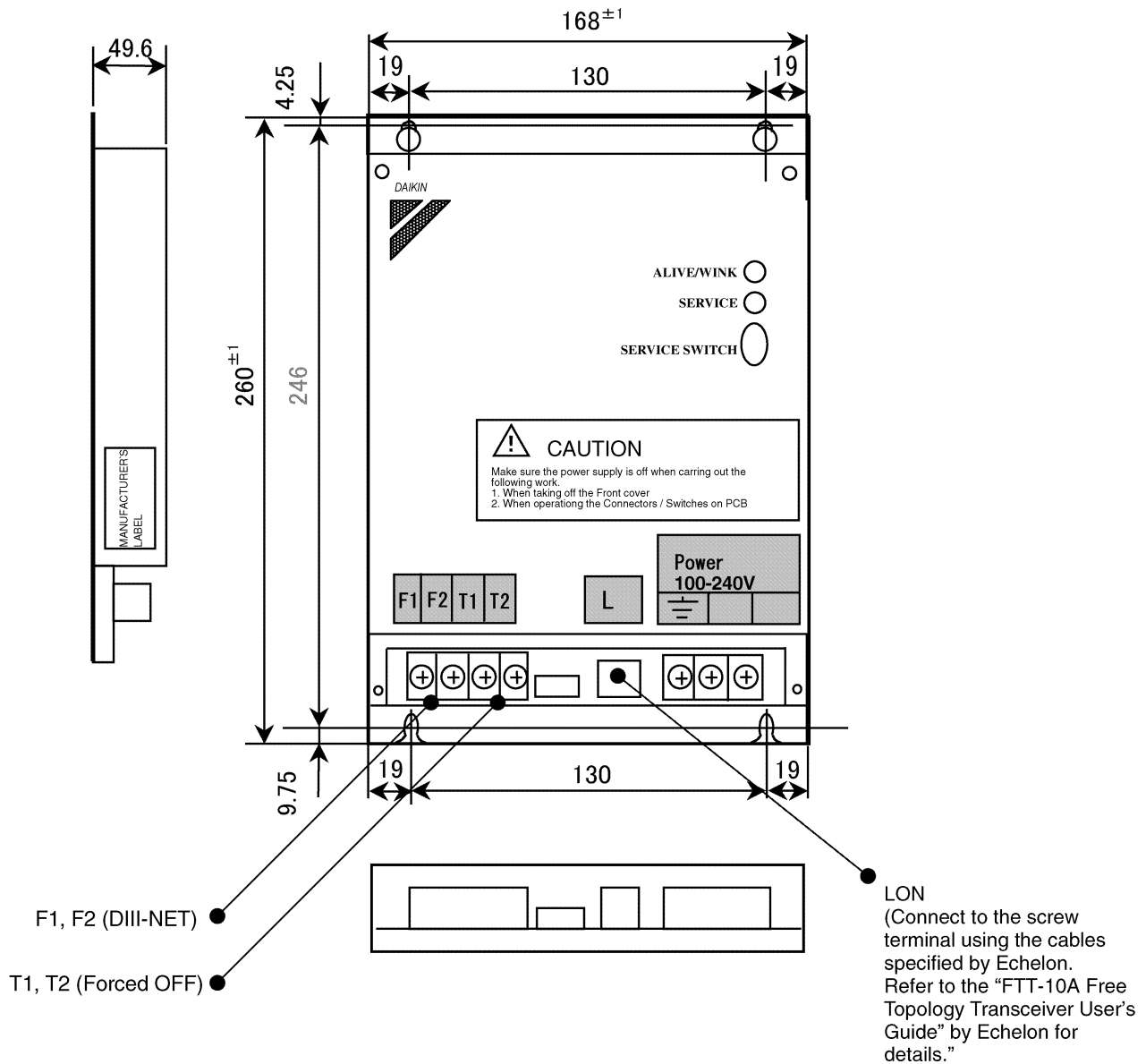
## 6.2    Definition of LED and Switch

**1. LED**

| | | | | |
|---|---|---|---|---|
| ALIVE/WINK | CPU normal monitor | Green | Normal | Blinking every 0.4 sec. |
| | | Red | WINK command reception | Blinking every 0.2 sec. |
| SERVICE | LON status | Yellow | Normal | Light off |
| | | | Unconfigurate state | Blinking every 0.5 sec. |
| | | | SERVICE SW on | Light on |
| | | | Error | Blinking/flashing every 0.84 sec. |

**2. Switch**

SERVICE SW        Neuron ID is sent upon pushing this switch.

# 7. Object Details

## 7.1 Node Objects
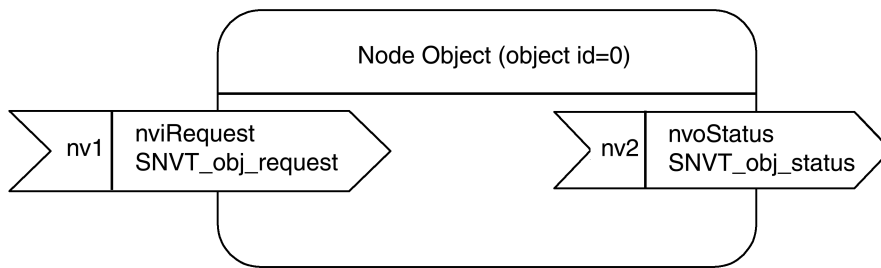


## 7.2 DIII-NET Common Objects
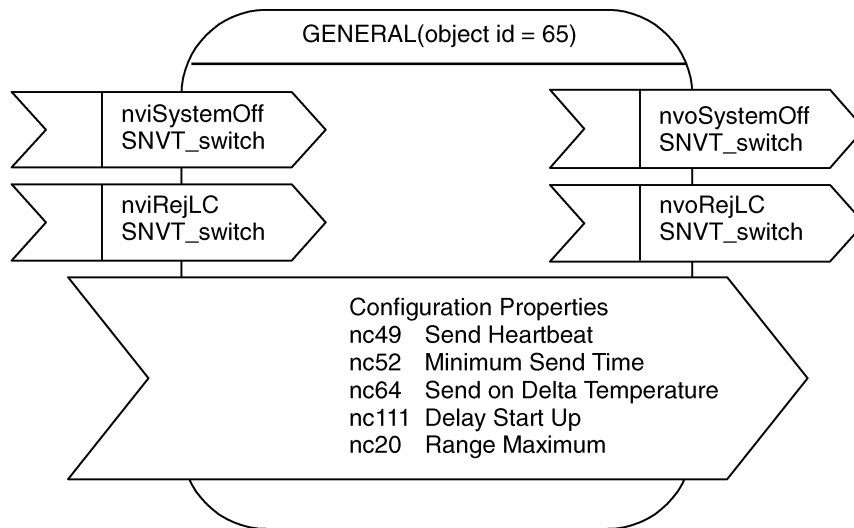
## 7.3 Air Conditioner Objects

It features objects for a group of 64 indoor units.
As shown below, the object name and the last "_nn" in the "nv Name" correspond with the DIII-NET location setting address.

| Indoor Unit Location Setting Address | A/C Object | nv Name (Example) |
|---|---|---|
| 1-00 - 1-15 | AC_01 - AC_16 | nviOnOff_01 - nviOnOff_16 |
| 2-00 - 2-15 | AC_17 - AC_32 | nviOnOff_17 - nviOnOff_32 |
| 3-00 - 3-15 | AC_33 - AC_48 | nviOnOff_33 - nviOnOff_48 |
| 4-00 - 4-15 | AC_49 - AC_64 | NviOnOff_49 - nviOnOff_64 |

AC_nn (object id = 1 – 64)

nviOnOff_nn
SNVT_switch

nviHeatCool_nn
SNVT_hvac_mode

nviSetpoint_nn
SNVT_temp_p

nviFanSpeed_nn
SNVT_switch

nviFSReset_nn
SNVT_switch

nviRejOnOff_nn
SNVT_switch

nviRejMode_nn
SNVT_switch

nviRejSetpoint_nn
SNVT_switch

nviThermoOff_nn
SNVT_switch

nvoOnOff_nn
SNVT_switch

nvoHeatCool_nn
SNVT_hvac_mode

nvoSetpoint_nn
SNVT_temp_p

nvoSpaceTemp_nn
SNVT_temp_p

nvoFanSpeed_nn
SNVT_switch

nvoFiltersign_nn
SNVT_switch

nvoFailure_nn
SNVT_switch

nvoErrStatus_nn
SNVT_count

nvoThermo_nn
SNVT_switch

nvoRejOnOff_nn
SNVT_switch

nvoRejMode_nn
SNVT_switch

nvoRejSetpoint_nn
SNVT_switch

nvoHvacExist_nn
SNVT_switch

nvoThermoOff_nn
SNVT_switch

# 8. Details of Network Variables

## 8.1 Node Objects

**1. Object Request Input (Node Request)**

network input SNVT_obj_request nviRequest;

Valid Range
object_id :          0 - 65                          0 = Node object, 1 - 64 = AC_01 - AC_64,
                                                     65 = GENERAL
                     Other than above               Invalid

object_request : RQ_NOEMAL              Returns the object to the normal condition
                 RQ_UPDATE_STATUS       Request for information regarding the object status
                 RQ_REPORT_MASK         Request for a report status bit mask
                 Other than above       Invalid

Default Value
object_id = 0, object_request = RQ_NORMAL

**2. Object Status Output (Object Status)**

network output SNVT_obj_status nvoStatus;

Valid Range
object_id :          0 - 65                          Returns Object IDs requested.
                     Other than above               Invalid

invalid_id :         0                               Represents that it is a valid ID.
                     1                               Represents that it is an invalid ID.

invalid_request : 0                                  Request for an object that is supported
                  1                                  Request for an object that is not supported

report_mask :        0                               It is not an RQ_REPORT_MASK request.
                     1                               Replies Support Bits in response to an
                                                     RQ_REPORT_MASK request

Transmission Timing
It is output when an Object Request is input.

Default Service Type
Acknowledged

## 8.2 DIII-NET Common Objects

**1. System Forced OFF Setting Input (System OFF)**

network input SNVT_switch nviSystemOff;

This input network variable is used to forcibly stop/reset all indoor units connected to the LON Gateway. This forced OFF status differs from the normal OFF state in that the units cannot be started up via a remote controller or any other centralized device. Moreover, even when the forced OFF setting is reset, the A/C system does not return to the operation status prior to the OFF setting, but remains in the OFF status.
This function cannot be used when a forced OFF sign is input to the LON Gateway's contact points (T1 and T2) that are used for forced OFF.

Valid Range

| Value | State | Indoor unit operation |
|---|---|---|
| Any (0 - 255) | 0 | Reset |
| 0 | 1 | Reset |
| 1 - 255 | 1 | Forced OFF |

Default Value
After turning the LON adapter ON, the value remains at "0" until the communication with air conditioners is established.

**2. Sub Group Address Control Operation Rejection Setting Input (Reject LC)**

network input SNVT_swicth nviRejLC;

This input network variable is used to permit/prohibit the operation of centralized devices on the DIII-NET.

Valid Range

| Value | State | Indoor unit operation |
|---|---|---|
| Any (0 - 255) | 0 | Permitted |
| 0 | 1 | Permitted |
| 1 - 255 | 1 | Prohibited |

Default Value
After turning the LON adapter ON, the value remains at "0" until updated.

**3. System Forced OFF Status Output (System Forced OFF State)**

network output SNVT_swicth nvoSystemOff;

This output network variable indicates whether the system on the DIII-NET for the LON Gateway is in a System Forced OFF state.

Valid Range

| Value | State | Indoor unit operation |
|-------|-------|----------------------|
| 0 | 0 | Normal state |
| 200 | 1 | Forced OFF state |

Transmission Timing
It is output when there is a change in the System Forced OFF status.

Update Interval
There is no function to regularly transmit the output variable.

Default Service Type
Acknowledged

**4. Sub Group Address Control Operation Rejection Setting Output (Reject LC State)**

network output SNVT_switch nvoRejLC;

This output network variable indicates whether the operation of centralized devices on the DIII-NET for the LON Gateway is permitted/prohibited.

Valid Range

| Value | State | Indoor unit operation |
|-------|-------|----------------------|
| 0 | 0 | Permitted |
| 200 | 1 | Prohibited |

Transmission Timing
It is output when there is a change in the Sub Group Address Control Operation Rejection status.

Update Interval
There is no function to regularly transmit the output variable.

Default Service Type
Acknowledged

## 8.3    A/C Objects (AC_01 to AC_64)

### 1.  ON/OFF Command Input (Start/Stop)

network input SNVT_switch nviOnOff_nn;

This input network variable is used to start/stop indoor units.

| Value | State | Indoor unit operation |
|---|---|---|
| Any (0 - 255) | 0 | OFF |
| 0 | 1 | OFF |
| 1 - 255 | 1 | ON |

Default Value
After turning the LON Gateway ON, the value and state remain at "0" until the communication with air conditioners is established.

### 2.  Operation Mode Setting Input (Operating Mode)

network input SNVT_hvac_mode nviHeatCool_nn;

This input network variable is used to set the operation mode of the indoor unit(s).
The operation mode is valid only for indoor units that allow a selection between cooling and heating modes.

Valid Range
HVAC_AUTO          : 0   = Auto
HVAC_HEAT          : 1   = Heating
HVAC_COOL          : 3   = Cooling
HVAC_FAN_ONLY   : 9   = Ventilation

Default Value
After turning the LON adapter ON, the value remains at "0" until the communication with air conditioners is established.

### 3.  Temperature Setting Input (Setpoint)

This input network variable is used to set the temperature for the indoor unit(s). The range at which temperatures can be set differs with respect to whether it is for cooling operation or heating operation. Therefore, please be sure to confirm the operation mode before setting the temperature.

Valid Range
When cooling    20 to 35°C
When heating    15 to 30°C
Temperature setting increments: 0.1°C

**Note:**
The range at which the temperature can be set may differ depending on the model of the indoor and outdoor units.
For details, please refer to the specifications of the air conditioners in use.

Default Value
After turning the LON adapter ON, the value remains at "0" until updated.

4. **Airflow Rate Setting Input (Fan Speed)**

network input SNVT_switch nviFanSpeed_nn;

This input network variable is used to set the airflow rate of the fan in the indoor unit(s).

Valid Range

| Value | State | Indoor unit operation |
|-------|-------|-----------------------|
| 1-100 | 1 | Weak |
| 101-255 | 1 | Strong |

Default Value
After turning the LON adapter ON, the value remains at "0" until the communication with air conditioners is established.

5. **Filter Sign Reset Input (Reset Filter Sign)**

network input SNVT_swicth nviFSReset_nn;

This input network variable is used to reset the filter sign when the filter sign on the indoor unit is malfunctioning.

Valid Range

| Value | State | Indoor unit operation |
|-------|-------|-----------------------|
| 0, 1 | Any (0 - 255) | Reset |

Default Value
After turning the LON adapter ON, the value remains at "0" until updated.

6. **Forced Thermostat OFF Setting Input (Forced Thermo OFF)**

network input SNVT_swicth nviThermoOff_nn;

This input network variable is used to forcibly set/reset an OFF setting for the indoor unit thermostat operation.

Valid Range

| Value | State | Indoor unit operation |
|-------|-------|-----------------------|
| Any (0 - 255) | 0 | Reset |
| 0 | 1 | Reset |
| 1 - 255 | 1 | OFF |

Default Value
After turning the LON adapter ON, the value remains at "0" until updated.

**7.  Remote Control ON/OFF Operation Rejection Input (Reject RM Start/Stop)**

network input SNVT_switch nviRejOnOff_nn;

This input network variable is used to set whether to permit/prohibit the ON/OFF operation of the indoor unit(s) from a remote controller.

Valid Range

| Value | State | Indoor unit operation |
|---|---|---|
| Any (0 - 255) | 0 | Permitted |
| 0 | 1 | Permitted |
| 1 - 255 | 1 | Prohibited |

Default Value
After turning the LON adapter ON, the value remains at "0" until the communication with air conditioners is established.

**8.  Remote Control Operation Mode Setting Rejection Input (Reject RM Mode)**

network input SNVT_swicth nviRejMode_nn;

This input network variable is used to permit/prohibit the setting of an indoor unit's operation mode from a remote controller.

Valid Range

| Value | State | Indoor unit operation |
|---|---|---|
| Any (0 - 255) | 0 | Permitted |
| 0 | 1 | Permitted |
| 1 - 255 | 1 | Prohibited |

Default Value
After turning the LON adapter ON, the value remains at "0" until updated.

**9.  Remote Control Temperature Setting Operation Rejection Input (Reject RM Setpoint)**

network input SNVT_swicth nviRejSetpoint_nn;

This input network variable is used to permit/prohibit the setting of an indoor unit's temperature value from a remote controller.

Valid Range

| Value | State | Indoor unit operation |
|---|---|---|
| Any (0 - 255) | 0 | Permitted |
| 0 | 1 | Permitted |
| 1 - 255 | 1 | Prohibited |

Default Value
After turning the LON adapter ON, the value remains at "0" until updated.

### 10.ON/OFF Status Output (OnOff State)

network output SNVT_switch nvoOnOff_nn;

This output network variable indicates the ON/OFF status of the indoor unit(s) at that time. However, it maintains an ON status if an error occurs in an air conditioner so that the system error reset can be conducted through an OFF command.

Valid Range

| Value | State | Indoor unit operation |
|---|---|---|
| 0 | 0 | OFF |
| 200 | 1 | ON |

After turning the LON adapter ON, the value and state remain at "0" until the communication with the MACSIV air conditioner is established.

Transmission Timing
It is output when there is a change in the ON/OFF status. It is also output when the ON/OFF status is changed by a remote controller or centralized device on the DIII-NET.

Update Interval
The value set at nciSndHrtBt takes effect.

Default Service Type
Acknowledged

### 11.Operation Mode Status Output (Operating Mode State)

network output SNVT_hvac_mode nvoHeatCool_nn;

This output network variable indicates the status of the indoor unit's operation mode.
When operation mode is set to "Auto", the output network returns the operation mode (either Heating, Cooling or Ventilation) at that time. If operation mode is set to "Dry" by a remote controller, it returns to "Cooling" mode.

Valid Range
HVAC_HEAT          : 1   = Heating
HVAC_COOL          : 3   = Cooling
HVAC_FAN_ONLY    : 9   = Ventilation

After turning the LON adapter ON, the value and state remain at "0" until the communication with the MACSIV air conditioner is established.

Transmission Timing
It is output when there is a change in the Operation Mode status. It is also output when the Operation Mode status is changed by a remote controller or centralized device on the DIII-NET.

Update Interval
There is no function to regularly transmit the output variable.

Default Service Type
Acknowledged.

**12.Temperature Setting Status Output (Setpoint State)**

network output SNVT_temp_p nvoSetpoint_nn;

This output network variable indicates the status of the temperature setting of the indoor unit(s) at that time.

Valid Range
When cooling            20 to 35°C
When heating            15 to 30°C
Temperature setting increments: 0.1°C

**Note:**
The range at which the temperature can be set may differ depending on the model of the indoor and outdoor units. For details, please refer to the specifications of the air conditioners in use.

Transmission Timing
It is output when there is a change in the room temperature setting status. It is also output when the temperature setting status is changed by a remote controller or centralized device on the DIII-NET.

Update Interval
There is no function to regularly transmit the output variable.

Default Service Type
Acknowledged

**13.Room Temperature Status Output (Space Temperature State)**

network output SNVT_temp_p nvoSpaceTemp_nn;

This output network variable indicates the temperature state of the indoor unit(s).
The temperature refers to either suction temperature or discharge temperature depending on the specific air conditioner model.

Valid Range
Output range              -10 to +50°C
Temperature setting increments: 0.1°C
In the event of a sensor error, the temperature will be displayed as "327.67°C (Invalid)".
After turning the LON adapter ON, the value and state remain at "0" until the communication with the indoor units is established.

Transmission Timing
It is output when there is a change in room temperature.

Update Interval
The value set at nciSndHrtBt takes effect.

Default Service Type
Acknowledged

### 14. Airflow Rate Setting Status Output (Fan Speed State)

network output SNVT_switch nvoFanSpeed_nn;

This output network variable indicates the status of the airflow rate setting for the indoor unit(s) at that time.

Valid Range

| Value | State | Indoor unit operation |
|-------|-------|----------------------|
| 100 | 1 | Weak |
| 200 | 1 | Strong |

**Note:**
A/C units with 3 or more speeds (airflow rate) are also roughly classified into either "Strong" or "Weak".

Transmission Timing
It is output when there is a change in the Airflow Rate Setting status. It is also output when the Airflow Rate Setting status is changed by a remote controller or centralized device on the DIII-NET.

Update Interval
There is no function to regularly transmit the output variable.

Default Service Type
Acknowledged

### 15. Filter Sign Status Output (Filter Sign State)

network output SNVT_switch nvoFiltersign_nn;

This output network variable indicates the status of the indoor unit's filter sign at the time.

Valid Range

| Value | State | Indoor unit operation |
|-------|-------|----------------------|
| 0 | 0 | No Filter Sign |
| 200 | 1 | Filter Sign |

Transmission Timing
It is output when there is a change in the Filter Sign status.

Update Interval
The value set at nciSndHrtBt takes effect.

Default Service Type
Acknowledged

16. **Error Status Output (Trip State)**

network output SNVT_switch nvoFailure_nn;

This output network variable indicates the error state of the indoor unit(s) at that time.
Even if one of the sub machines connected through a remote control group malfunctions, it is reported as an error in the main machine connected to the DIII-NET. Moreover, when sub machines in a remote control group are connected to the DIII-NET and either of them malfunctions, all of the indoor units within the remote control group are displayed as malfunctioning.

Valid Range

| Value | State | Indoor unit operation |
|-------|-------|-----------------------|
| 0 | 0 | Normal |
| 200 | 1 | Error |

Transmission Timing
It is output when there is a change in the error status.

Update Interval
The value set at nciSndHrtBt takes effect.

Default Service Type
Acknowledged

17. **Error Code Output (Malfunction Code)**

network output SNVT_counter nvoErrStatus_nn;

This output network variable indicates the details of error codes transmitted when an error occurs in an indoor unit.

Valid Range
0                        No Error
1-23114                  Error Code

**Note:**
These error codes are shown in a 2-character ASC decimal code specified by Daikin. The details are shown below.
Therefore, in order to understand an error code, after converting the output network variable to a hexadecimal, alter it into an ASCII code and then link the high and low bytes. Confirm the details of error codes obtained with Daikin's service divisions, or refer to the respective A/C service manual.

Transmission Timing
It is also output when there is a change in the error status if the A/C unit(s).

Update Interval
The value set at nciSndHrtBt takes effect.

Default Service Type
Acknowledged

### 18.Thermostat Status Output (Thermo State)

network output SNVT_switch nvoThermo_nn;

This output network variable indicates if the indoor unit is regulating the temperature (Thermo ON/OFF status).

Valid Range

| Value | State | Indoor unit operation |
|-------|-------|----------------------|
| 0 | 0 | Thermo OFF |
| 200 | 1 | Thermo ON |

Transmission Timing
It is output when there is a change in the Thermo ON/OFF status.

Update Interval
There is no function to regularly transmit the output variable.

Default Service Type
Acknowledged

### 19.Forced Thermostat OFF Setting Status Output (Forced Thermo OFF State)

network output SNVT_swicth nvoThermoOff_nn;

This output network variable indicates whether the Forced Thermo OFF Setting status is set or reset.

Valid Range

| Value | State | Indoor unit operation |
|-------|-------|----------------------|
| 0 | 0 | Reset |
| 200 | 1 | Set |

Transmission Timing
It is output when there is a change in the Thermo ON/OFF Setting status.

Update Interval
There is no function to regularly transmit the output variable.

Default Service Type
Acknowledged

**20. Remote Control ON/OFF Operation Rejection Output (Reject RM ON/OFF State)**

network output SNVT_switch nvoRejOnOff_nn;

This output network variable indicates whether the ON/OFF operation of the indoor unit(s) is permitted or prohibited from a remote controller.

Valid Range

| Value | State | Indoor unit operation |
|-------|-------|----------------------|
| 0 | 0 | Permitted |
| 200 | 1 | Prohibited |

Transmission Timing
It is output when there is a change in the Remote Control ON/OFF Operation Rejection status.

Update Interval
There is no function to regularly transmit the output variable.

Default Service Type
Acknowledged

**21. Remote Control Operation Mode Setting Rejection Output (Reject RM Mode State)**

network output SNVT_swicth nvoRejMode_nn;

This output network variable indicates whether a setting of operation mode of the indoor unit(s) is permitted or prohibited from a remote controller.

Valid Range

| Value | State | Indoor unit operation |
|-------|-------|----------------------|
| 0 | 0 | Permitted |
| 200 | 1 | Prohibited |

Transmission Timing
It is output when there is a change in the Remote Control Operation Mode Setting Rejection status.

Update Interval
There is no function to regularly transmit the output variable.

Default Service Type
Acknowledged

**22. Remote Control Temperature Setting Operation Rejection Output (Reject RM Setpoint State)**

network output SNVT_switch nvoRejSetpoint_nn;

This output network variable indicates whether the temperature setting operation for the indoor unit from a remote controller is permitted or prohibited.

Valid Range

| Value | State | Indoor unit operation |
|-------|-------|----------------------|
| 0 | 0 | Permitted |
| 200 | 1 | Prohibited |

Transmission Timing
It is output when there is a change in the Remote Control Temperature Setting Operation Rejection status.

Update Interval
There is no function to regularly transmit the output variable.

Default Service Type
Acknowledged.

**23. A/C Connection Status Output (Communication State)**

network output SNVT_swicth nvoHvacExist_nn;

This output network variable indicates whether the connection status of the A/C unit(s).

Valid Range

| Value | State | Indoor unit operation |
|-------|-------|----------------------|
| 0 | 1 | No connection |
| 1 | 1 | Normal connection |
| 2 | 1 | Communication error |

Transmission Timing
It is output when there is a change in the A/C Connection status.

Update Interval
The value set at nciSndHrtBt takes effect.

Default Service Type
Acknowledged

## 8.4    Configuration Properties

**1.  Transmission Interval Setting (Send Heartbeat)**

network input config SNVT_time_sec nciSndHrtBt;

These configuration properties are used to set the transmission interval between two consecutive output network variables. This interval is regulated by the value for the transmission limit, nciMaxRng.
Applicable network variables are as follows:
nvoOnOff_nn (ON/OFF Status Output)
nvoSpaceTemp_nn (Room Temperature Status Output)
nvoFiltersign_nn (Filter Sign Status Output)
nvoFailure_nn (Error Status Output)
nvoErrStatus_nn (Error Code Output)
nvoHvacExist_nn (A/C Connection Status Output)

Valid Range
0.0-1200.0 seconds
There is no regular transmission function if the value is 0.0 sec. However, communications with A/C units are conducted every 12 seconds so, even if transmission interval is set at less than 12 seconds, the value does not change.

Default Value
0.0 seconds (No regular transmission function)

**2.  Minimum Transmission Interval Setting (Minimum Send Time)**

network input config SNVT_time_sec nciMinOutTm;

These configuration properties are used to set the minimum transmission interval between two consecutive output network variables.
Applicable network variables are as follows:
nvoOnOff_nn (ON/OFF Status Output)
nvoHeatCool_nn (Operation Mode Status Output)
nvoSetpoint_nn (Temperature Setting Status Output)
nvoSpaceTemp_nn (Room Temperature Status Output)
nvoFanSpeed_nn (Airflow Rate Setting Status Output)
nvoFiltersign_nn (Filter Sign Status Output)
nvoFailure_nn (Error Status Output)
nvoErrStatus_nn (Error Code Output)
nvoThermo_nn (Thermostat Status Output)
nvoThermoOff_nn (Forced Thermostat OFF Status Output)
nvoRejOnOff_nn (Remote Control ON/OFF Operation Rejection Output)
nvoRejSetpoint_nn (Remote Control Operation Mode Operation Rejection Output)
nvoRejSetpoint_nn (Remote Control Temperature Setting Operation Rejection Output)
nvoSystemOff (System Forced OFF Status Output)
nvoRejLC (Sub Group Address Control Operation Rejection Status Output)
nvoHvacExist_nn (A/C Connection Status Output)

Valid Range
0.0-1200.0 seconds
There is no regular transmission function if the value is 0.0 sec.

Default Value
0.0 seconds (No minimum transmission interval control)

3. **Detect Minimum Temperature Change Setting (Send on Delta Temperature)**

   network input config SNVT_temp_p nciMinDelta;

   This configuration property represents an output network variable to be transmitted when there is a change in temperature that is greater than the specified value between two consecutive transmissions.
   Applicable network variables are as follows:
   nvoSpaceTemp_nn (Room Temperature Status Output)

   Valid Range
   0.10-10.00°C

   Default Value
   0.10°C

4. **Transmission Start Delay Time Setting (Delay Start up Time)**

   network input config SNVT_time_sec nciStartUpDly;

   These configuration properties are used to set the time lag between turning on the LON Gateway and starting the LON communications. This setting is useful for avoiding communication congestion when LON nodes on the network simultaneously start up.
   Applicable network variables are as follows:
   nvoOnOff_nn (ON/OFF Status Output)
   nvoHeatCool_nn (Operation Mode Status Output)
   nvoSetpoint_nn (Temperature Setting Status Output)
   nvoSpaceTemp_nn (Room Temperature Status Output)
   nvoFanSpeed_nn (Airflow Rate Setting Status Output)
   nvoFiltersign_nn (Filter Sign Status Output)
   nvoFailure_nn (Error Status Output)
   nvoErrStatus_nn (Error Code Output)
   nvoThermo_nn (Thermostat Status Output)
   nvoThermoOff_nn (Forced Thermostat OFF Status Output)
   nvoRejOnOff_nn (Remote Control ON/OFF Operation Rejection Output)
   nvoRejSetpoint_nn (Remote Control Operation Mode Setting Rejection Output)
   nvoRejSetpoint_nn (Remote Control Temperature Setting Rejection Output)
   nvoSystemOff (System Forced OFF Status Output)
   nvoRejLC (Sub Group Address Control Operation Rejection Status Output)
   nvoHvacExist_nn (A/C Connection Status Output)

   Valid Range
   60.0-1200.0 seconds
   There is no regular transmission function if the value is 0.0 sec.

   Default Value
   0.0 seconds (No minimum transmission interval control)

5. **Maximum Transmission Limit Setting (Range Maximum)**

   network input config SNVT_count nciMaxRng;

   These configuration properties represent output network variables and are used to set the number of messages transmitted per minute from the LON Gateway.
   Applicable network variables are as follows:
   nvoOnOff_nn (ON/OFF Status Output)
   nvoHeatCool_nn (Operation Mode Status Output)
   nvoSetpoint_nn (Temperature Setting Status Output)
   nvoSpaceTemp_nn (Room Temperature Status Output)
   nvoFanSpeed_nn (Airflow Rate Setting Status Output)
   nvoFiltersign_nn (Filter Sign Status Output)
   nvoFailure_nn (Error Status Output)
   nvoErrStatus_nn (Error Code Output)
   nvoThermo_nn (Thermostat Status Output)
   nvoThermoOff_nn (Forced Thermostat OFF Status Output)
   nvoRejOnOff_nn (Remote Control ON/OFF Operation Rejection Output)
   nvoRejSetpoint_nn (Remote Control Operation Mode Setting Rejection Output)
   nvoRejSetpoint_nn (Remote Control Temperature Setting Rejection Output)
   nvoSystemOff (System Forced OFF Status Output)
   nvoRejLC (Sub Group Address Control Operation Rejection Status Output)
   nvoHvacExist_nn (A/C Connection Status Output)

   Valid Range
   0-6000 messages/sec.
   No limitation in cases of 0.

   Default Value
   0 (No limit)

# 9. Precautions regarding XIF Files

## 9.1 File Name

DMS_IF01.XIF

## 9.2 Limitations with Version 3

Daikin's XIF file is written in the Version 3 format, and the default values for configuration properties (CP) are not written within the XIF file. Therefore, when using a LonMaker to add devices, be sure to conduct the procedures at the CP value of "Current values in device" and not that of "Default values in the XIF file".

## 9.3 Unused Network Variables

The network variables listed below do exist within our XIF file, but are not explained in these specifications. These are intended strictly for internal use and should not be used.
nvoWattmeter
nviSetTime
nvi SetNetDB
nvoSetNetDB

# 10. Notes for when Commissioning

## 10.1 Suspension of Message Transmission when Receiving Set Node Mode Online

The LON Gateway suspends spontaneous message transmission, such as reports of the bound output network variable changes and heartbeat, as well as responding to the Node Object, for one minute after receiving "Set Node Mode Online", a management message. However, it responds to other network management requests such as "poll" and "fetch". This function is a mechanism to prevent time out errors because of transmission of messages spontaneously issued by the LON Gateway when it comes online due to use of an installation tool such as the LonMaker during commissioning.

# 11. Reference Materials (Error Code Conversion Table)

| Error code | Value (Decimal) | Error code | Value (Decimal) | Error code | Value (Decimal) | Error code | Value (Decimal) | Error code | Value (Decimal) |
|---|---|---|---|---|---|---|---|---|---|
| A0 | 16688 | C0 | 17200 | E0 | 17712 | H0 | 18480 | F0 | 17968 |
| A1 | 16689 | C1 | 17201 | E1 | 17713 | H1 | 18481 | F1 | 17969 |
| A2 | 16690 | C2 | 17202 | E2 | 17714 | H2 | 18482 | F2 | 17970 |
| A3 | 16691 | C3 | 17203 | E3 | 17715 | H3 | 18483 | F3 | 17971 |
| A4 | 16692 | C4 | 17204 | E4 | 17716 | H4 | 18484 | F4 | 17972 |
| A5 | 16693 | C5 | 17205 | E5 | 17717 | H5 | 18485 | F5 | 17973 |
| A6 | 16694 | C6 | 17206 | E6 | 17718 | H6 | 18486 | F6 | 17974 |
| A7 | 16695 | C7 | 17207 | E7 | 17719 | H7 | 18487 | F7 | 17975 |
| A8 | 16696 | C8 | 17208 | E8 | 17720 | H8 | 18488 | F8 | 17976 |
| A9 | 16697 | C9 | 17209 | E9 | 17721 | H9 | 18489 | F9 | 17977 |
| AA | 16705 | CA | 17217 | EA | 17729 | HA | 18497 | FA | 17985 |
| AH | 16712 | CH | 17224 | EH | 17736 | HH | 18504 | FH | 17992 |
| AC | 16707 | CC | 17219 | EC | 17731 | HC | 18499 | FC | 17987 |
| AJ | 16714 | CJ | 17226 | EJ | 17738 | HJ | 18506 | FJ | 17994 |
| AE | 16709 | CE | 17221 | EE | 17733 | HE | 18501 | FE | 17989 |
| AF | 16710 | CF | 17222 | EF | 17734 | HF | 18502 | FF | 17990 |

| Error code | Value (Decimal) | Error code | Value (Decimal) | Error code | Value (Decimal) | Error code | Value (Decimal) | Error code | Value (Decimal) |
|---|---|---|---|---|---|---|---|---|---|
| J0 | 18992 | L0 | 19504 | P0 | 20528 | U0 | 21808 | M0 | 19760 |
| J1 | 18993 | L1 | 19505 | P1 | 20529 | U1 | 21809 | M1 | 19761 |
| J2 | 18994 | L2 | 19506 | P2 | 20530 | U2 | 21810 | M2 | 19762 |
| J3 | 18995 | L3 | 19507 | P3 | 20531 | U3 | 21811 | M3 | 19763 |
| J4 | 18996 | L4 | 19508 | P4 | 20532 | U4 | 21812 | M4 | 19764 |
| J5 | 18997 | L5 | 19509 | P5 | 20533 | U5 | 21813 | M5 | 19765 |
| J6 | 18998 | L6 | 19510 | P6 | 20534 | U6 | 21814 | M6 | 19766 |
| J7 | 18999 | L7 | 19511 | P7 | 20535 | U7 | 21815 | M7 | 19767 |
| J8 | 19000 | L8 | 19512 | P8 | 20536 | U8 | 21816 | M8 | 19768 |
| J9 | 19001 | L9 | 19513 | P9 | 20537 | U9 | 21817 | M9 | 19769 |
| JA | 19009 | LA | 19521 | PA | 20545 | UA | 21825 | MA | 19777 |
| JH | 19016 | LH | 19528 | PH | 20552 | UH | 21832 | MH | 19784 |
| JC | 19011 | LL | 19523 | PP | 20547 | UC | 21827 | MC | 19779 |
| JJ | 19018 | LJ | 19530 | PJ | 20554 | UJ | 21834 | MJ | 19786 |
| JE | 19013 | LE | 19525 | PP | 20549 | UE | 21829 | ME | 19781 |
| JF | 19014 | LF | 19526 | PF | 20550 | UF | 21830 | MF | 19782 |

| Error code | Value (Decimal) | Error code | Value (Decimal) | Error code | Value (Decimal) | Error code | Value (Decimal) |
|---|---|---|---|---|---|---|---|
| 30 | 13104 | 40 | 13360 | 50 | 13616 | 60 | 13872 |
| 31 | 13105 | 41 | 13361 | 51 | 13617 | 61 | 13873 |
| 32 | 13106 | 42 | 13362 | 52 | 13618 | 62 | 13874 |
| 33 | 13107 | 43 | 13363 | 53 | 13619 | 63 | 13875 |
| 34 | 13108 | 44 | 13364 | 54 | 13620 | 64 | 13876 |
| 35 | 13109 | 45 | 13365 | 55 | 13621 | 65 | 13877 |
| 36 | 13110 | 46 | 13366 | 56 | 13622 | 66 | 13878 |
| 37 | 13111 | 47 | 13367 | 57 | 13623 | 67 | 13879 |
| 38 | 13112 | 48 | 13368 | 58 | 13624 | 68 | 13880 |
| 39 | 13113 | 49 | 13369 | 59 | 13625 | 69 | 13881 |
| 3A | 13121 | 4A | 13377 | 5A | 13633 | 6A | 13889 |
| 3H | 13128 | 4H | 13384 | 5H | 13640 | 6H | 13896 |
| 3C | 13123 | 4C | 13379 | 5C | 13635 | 6C | 13891 |
| 3J | 13130 | 4J | 13386 | 5J | 13642 | 6J | 13898 |
| 3E | 13125 | 4E | 13381 | 5E | 13637 | 6E | 13893 |
| 3F | 13126 | 4F | 13382 | 5F | 13638 | 6F | 13894 |

# Part 2
# Control-related Design Keypoints

CBBA006

# 1. Introduction

This document provides a general introduction to the specifications for the DMS interface (DMS-IF) linking Daikin's A/C control line (DIII-NET) with the LONWORKS network. The LONWORKS network via the DMS-IF enables the monitoring and control of Daikin's VRV system.

 https://daikin-p.ru/catalog/vse-zapchasti-kondicionerov-daikin/zapchast-daikin-dms504b51

# 2. System Configuration

## 2.1 A/C Units to be Monitored and Controlled

- VRV indoor units (H and K types)
- HRV (This refers to systems that are connectable to the DIII-NET. However, only On/Off operation can be monitored.)
- Sky Air indoor units (Each indoor unit requires an adapter to connect to the Sky Air.
  In cases of Sky Air, only main units are monitored and controlled.)
- RA (Adapters for the DIII-NET are necessary. However, only On/Off operation can be monitored.)
- General purpose adapter (DTA103A1: Only On/Off status can be monitored.)
- Centralized control adapter

## 2.2 Number of A/C Units to be Monitored and Controlled

A maximum of 64 groups of indoor units connected to a DIII-NET via one DMS-IF are monitored and controlled. The indoor unit addresses from '1-00' to '4-15'correspond with the LON A/C numbers from 1 to 64 used in communications within the LON.
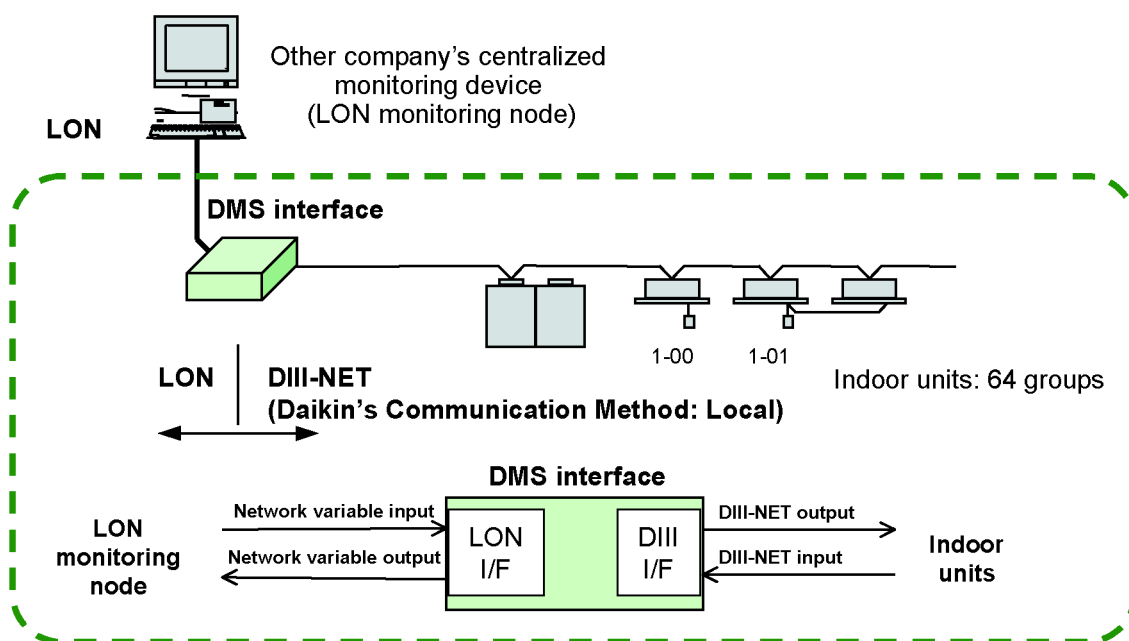


The above illustration was developed to provide a general image. The actual number of items controlled differs with respect to the number of indoor units connected. (The number increases/decreases according to the items being controlled.)

<Example> Control items: 20 ⟹ Number of units connected : 30
Control items: 10 ⟹ Number of units connected : 60
(20 acknowledged service items per second on a 30-second interval data collection cycle)
Control items: 600 items

The number of units to be connected is determined according to the number of items that must be controlled.

## 2.3 Location Address Setting and Combined Use of Other Centralized Devices

- DDS, D-BIPS, BACnet Gateway and DMSII cannot be installed/used together on the same DIII-NET.
- Only one DMS-IF can be installed on a DIII line.
- A Centralized Controller, intelligent Controller, ON/OFF Controller and Heat Storage Controller can be installed/used together.
  (The maximum number of groups that can be connected is 64, so there are restrictions on the number of centralized devices that can be connected.)
- A schedule timer cannot be installed/used together.
- The combined installation/use of a Centralized Controller and intelligent Controller is recommended to allow for independent centralized control if the LONWORKS system shuts down.

<Example>



Other company's centralized monitoring device (LON monitoring node)

DMS interface

Indoor units: 64 groups

A/C No. 1 2 3 15 16
DIII-NET address: 1-00 1-01 1-02 1-14 1-15

×: DDS
×: D-BIPS
×: BACnet G/W
×: Schedule timer

Ok: Centralized Controller
Ok: intelligent Controller
Ok: ON/OFF Controller
Ok: Heat Storage Controller

A/C No. 17 18 19 31 32
DIII-NET address: 2-00 2-01 2-02 2-14 2-15

A/C No. 33 34 35 47 48
DIII-NET address: 3-00 3-01 3-02 3-14 3-15

A/C No. 49 50 51 63 64
DIII-NET Address: 4-00 4-01 4-02 4-14 4-15

https://daikin-p.ru/catalog/vse-zapchasti-kondicionerov-daikin/zapchast-daikin-dms504b51

**Si72-305**

**Hardware**

# 3. Hardware

## 3.1 Schematic Diagram of the Hardware

**Power Source: 100 - 200 VAC**
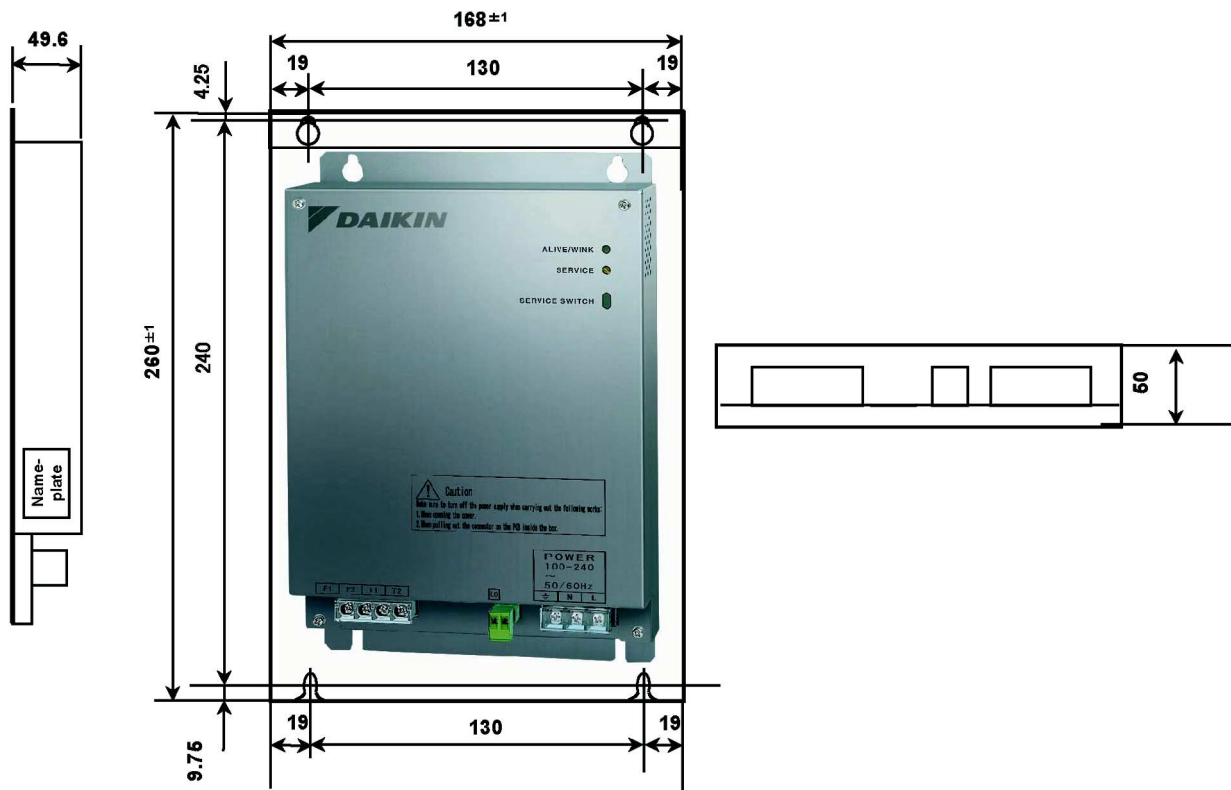Surge killers and noise filters are unnecessary.

<u>**\*See the official drawings for details.**</u>

Control-related Design Keypoints(CBBA006)

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# 4. Outline of Functions

## 4.1 Outline of Function Via LON

(A) A/C unit control
The commands directed for each A/C unit are received from the LON monitoring node and commands are sent to the respective A/C units: Individual Control
The commands directed for all the A/C units on the respective DIII line are received from the LON monitoring node and the functions are executed: Batch Control

(B) A/C unit status monitoring
The A/C unit status is communicated to the LON monitoring node in the form of LON network variables.

(C) Report of A/C unit status change
When the status of an A/C unit changes, the respective value is sent to the LON monitoring node in the form of LON network variables (when output network variables are bound)

## 4.2 Function of Contact Input

(A) System Forced Off
The forced Off contact input enables batch forced Off control from the disaster prevention panel or the like.

Precautions:
Input of the forced Off takes one of the following forms:
(1) Setting to 'nviSystemOff' from the LON monitoring node
(2) Short circuit of the T1 and T2 terminals (Please use the microcurrent contact.)

## 4.3 Control and Monitoring Items

Control and monitoring items are shown below: <span style="background:#9fe6c4">     </span> Items pertaining to the entire system

| | Function | Descriptions | Support |
|---|---|---|---|
| Control items *11 | ON/OFF Command | Start/stop of A/C operation | Yes |
| | Operation Mode Setting | Heating/Cooling/Ventilation/Auto     *1 | Yes |
| | Temperature Setting | Set room temperature     *2 | Yes |
| | Airflow Rate Setting | Set airflow rate     *3 | Yes |
| | Filter Sign Reset | Filter sign reset     *4 | Yes |
| | Forced Thermostat OFF Setting | Forced thermostat OFF | Yes |
| | Remote ON/OFF Control Rejection | Permission/prohibition of ON/OFF operation     *10 | Yes |
| | Remote Operation Mode Control Rejection | Permission/prohibition of operation mode change     *10 | Yes |
| | Remote Temperature Setting Control Rejection | Permission/prohibition of set temp. change     *10 | Yes |
| | System Forced OFF Setting | System Forced OFF command | Yes |
| | Sub Group Address Control Rejection Setting | Sub Group Address Control Rejection command | Yes |
| Monitoring Items | ON/OFF Status Report | ON/OFF status     *14 | Yes |
| | Operation Mode Status Report | Heating/Cooling/Ventilation     *5 | Yes |
| | Temperature Setting Report | Set room temperature     *2 | Yes |
| | Room Temperature Report | Room temperature     *2, *12 | Yes |
| | Airflow Rate Setting Report | Set airflow rate     *3 | Yes |
| | Filter Sign Report | Filter sign     *6 | Yes |
| | Error Status Report | Error status     *7,*15 | Yes |
| | Error Code Report | Error code     *7 | Yes |
| | Thermostat Status Report | Thermostat status | Yes |
| | Forced Thermostat OFF Setting Status Report | Forced thermostat OFF status | Yes |
| | Remote ON/OFF Operation Rejection Report | ON/OFF Operation Rejection Status     *10 | Yes |
| | Remote Operation Mode Setting Control Rejection Report | Operation Mode Setting Control Rejection status     *10 | Yes |
| | Remote Temperature Setting Control Rejection Report | Temperature Setting Control Rejection status     *10 | Yes |
| | System Forced OFF Setting Report | System Forced OFF Setting status (set or reset) | Yes |
| | Sub Group Address Control Operation Rejection Setting Report | Sub Group Address Control Operation Rejection Setting status (set or reset) | Yes |
| | A/C Communication Status Report | No Occupancy/ Communication normal/ Communication error     *13, *15 | Yes |

*1    Auto Mode settings directed for A/C units without a cooling/heating option will be read as a temperature control command. Therefore, the operation mode for these A/C units without the option are aligned with the operation mode for A/C units with the option.
*2    The set room temperature for outdoor air treating A/Cs is represented by either the set or measured value of discharged air. (Does not apply to some models.)
*3    Any airflow rates on the LON are classified either High or Low (only 2 speeds). In order to be used as DIII data, airflow rates of '4 or less' and '5 or more' are reread as 'Low' and 'High', respectively, for monitoring. In terms of commands, '1' is reread as 'Low' and '7' High.
*4    Reset commands to the A/C units are issued/sent to the items displayed at that moment (filter or element).
*5    The Auto Mode status cannot be monitored. 'Dry' operation is reported as cooling.
*6    The OR status value for the filter sign and element sign.
*7    An error is reported to the LON only when at or above abnormal levels. The error code is an ASCII 2 character and in an alarm form. Warning message is not reported.
*10  Even for A/C units without R/Cs, this appears as if a 'Rejection' setting has been conducted.
*11  The control commands sent to sub machines sub machines connected through a remote control group are ignored.
*12  In cases of A/C units that are not equipped with a temperature sensor, the room temperature is reported as either 0°C or INVALID (0x7fff). (The value may differ from the actual room temperature depending on the location of the sensor.)
*13  Communications errors are reported with novHvacExist_nn, nvoErrStatus_nn or nvoFailure_nn. Messages starting with nvo and ending with _nn maintain the latest value.
*14  When an error occurs, the A/C unit stays in 'operation' status until the OFF command is sent from the R/C or main central monitoring panel.
*15  U3 to U9 and UJ communication error messages are not sent within the first 5 minutes.

<Additional Explanation>
- When the airflow rate for the Sky Air is changed to 'Medium' with 'Airflow Rate Setting Report' , it is monitored as 'Low' (anything below 4) because the 'Medium' command from the R/C is '3'.
- The operation mode during Auto Mode is monitored as either cooling, heating or ventilation.
- In terms of Error Status and Error Code monitoring, no message is sent/reported when the malfunction/error does not impede operation. (swing flap malfunctions, etc.)
- With regard to '*10. Even for A/C units without R/Cs, this appears as if a 'Rejection' setting has been conducted' , it would be meaningless and unlikely that a message prohibiting R/C operation would be sent to a A/C units that does not feature an R/C. However, if the LON monitoring node were to refer to a value, it would read the message as 'Control Rejection' setting.
- Out of the 27 items listed on the previous page, 23 are individual items and 4 are items pertaining to the entire system. Be sure to determine the contents and number of control items based on the selection from the 23 individual items.

&lt;Rough Estimate of Number of Groups Connected &gt;

| Control and Monitoring Items n (individual groups) | Max. number of groups connected | Remarks |
|---|---|---|
| 23 items (All) | 26 groups | -One LON can monitor up to 600 items. -The maximum number of control and monitoring items is 23 per A/C unit. If the number of control and monitoring items per A/C unit is assumed as 'n', the number of A/C groups connectable would be: |
| 20 items | 30 groups | |
| 18 items | 33 groups | No. of A/C groups $\leq 600 \div n$ |
| 16 items | 37 groups | |
| 15 items | 40 groups | &lt;Note: The maximum No. of A/C groups is 64.&gt; |
| 12 items | 50 groups | |
| 10 items | 60 groups | |
| 9 items | 64 groups | |

(Assuming that acknowledged service is 20 items per second on a 30-second interval data collection cycle.)

- Acknowledged Service (possible communication volume): 20 items/second
  This is one of the performance features of a DMS-IF. It can process 20 items per second.
- 30-second interval data collection cycle
  This is the time interval whereby device data (status) is collected from the central monitoring panel. In this case, the data regarding the connected A/C units is collected in 30 seconds. This figure differs with respect to the specifications of the central monitoring panel.

- DMS-IF performance ...Acknowledged Service: 20 items/second (fixed value)
- Central Monitoring Panel performance...30-second data collection cycle
  20 items per second being collected for 30 seconds translates into a total of 600 control items.
      $T = 20 \times 30 = 600$ items
  Number of control items per group: Assuming the number of items per group is 23, the number of groups connectable is 26.
      $n = T \div$ (No. of control items per group) $= 600 \div 23 = 26$ groups

- DMS-IF performance ...Acknowledged Service: 20 items/second (fixed value)
- Central Monitoring Panel performance...60-second data collection cycle
  20 items per second being collected for 60 seconds translates into a total of 1,200 control items.
      $T = 20 \times 60 = 1,200$ items
  Number of control items per group: Assuming the number of items per group is 23, the number of groups connectable is 52
      $n = T \div$ (No. of control items per group) $= 1,200 \div 23 = 52$ groups

- DMS-IF performance ...Acknowledged Service: 20 items/second (fixed value)
- Central Monitoring Panel performance...120-second data collection cycle
  20 items per second being collected for 120 seconds translates into a total of 2,400 control items.
      $T = 20 \times 120 = 2,400$ items
  Number of control items per group: Assuming the number of items per group is 23, the number of groups connectable is 104
      $n = T \div$ (No. of control items per group) $= 2,400 \div 23 = 104$ groups $\Rightarrow$ <u>Maximum of 64 groups</u>

## 4.4 Setting/Monitoring Restrictions from LON according to A/C Unit Model/ Installation Method

- Operation mode changeover commands directed to A/C units without a cooling/heating option are ignored. If the same command is sent to A/C units with the option, the operation mode of subordinate A/C units (without the option) may be changed over even if there is no direct instruction.

- When A/C units without Auto Mode are set on Auto, the Auto Mode (message) is ignored and the temperature control mode at that moment is maintained.

- BS units are not handled in any special manner.

- When sub A/C unit within a remote control group have a location address, they are monitored as one A/C unit. However, all commands directed to these A/C units are ignored.

- Upon the occurrence of an error within a remote control group, the DMS-IF reports as follows:
  (1) In cases where only the main A/C units within a remote control group have location addresses:
  When any of the indoor units within the group malfunctions, the respective message is sent to the LON monitoring node in the form of the A/C number of the main A/C unit. In other words, if any of the A/C units within the group malfunctions, the message is output. However, the LON cannot recognize in which unit the error is occurring.

  (2) In cases where all the indoor units within an remote control group have location addresses:
  When any of the units within a group malfunctions, the corresponding message is sent to the LON monitoring node in the form of the A/C numbers of all main and sub A/C units within the group. In other words, if any one of the A/C units within the group malfunctions, the message is sent reporting all A/C numbers within the group; once again the LON cannot recognize in which unit the error is occurring.

  However, this can be confirmed on a hand-held remote controller.

- When the A/C units and HRV are being controlled as a remote control group, the HRV cannot be independently operated by the central monitoring panel.
  (If the independent operation command is sent to the HRV with a remote controller, the operation mode becomes 'ventilation'.)

# 5.  LON Communication Specifications

## 5.1  LonMark Template Profiles

There are no LonMark Template Profiles created by the LonMark Association for the VRV. Therefore, original specifications for the VRV have been created without using the LonMark Template Profiles. These original specifications conform to standard network variable types established by the JRAIA.

## 5.2  LonMark Certification

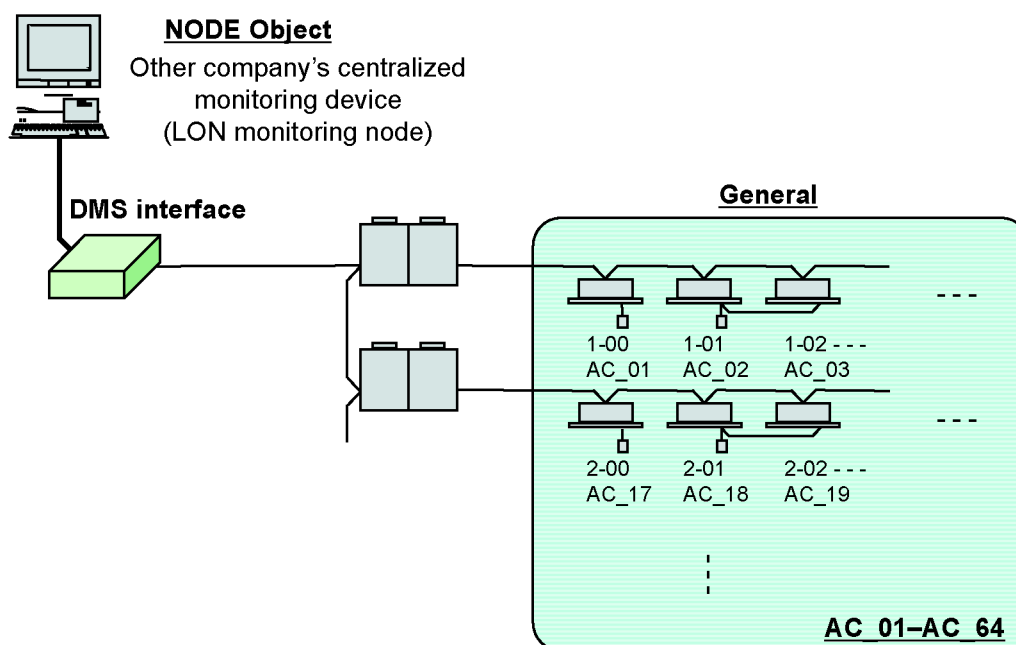The network variable types are original, so are not LonMark certified.

## 5.3  Object

There are 66 objects: **Node Object, General and A/C 01-A/C 64.**
The network variables regarding the
   - Node Object: Lon monitoring node
   - General: All A/C units in the DIII system
   - A/C 01-A/C 64: Each of the A/C units in the DIII system
are all provided around the DMS-IF.



## 5.4  Configuration Properties

(1) Minimum Send Time: Minimum Transmission Interval
   The bound output network variables will not be sent until the minimum transmission interval has passed even if there is a change in status value.
   (When status is monitored, data regarding each status change is not sent upon each change but at minimum transmission intervals.)

(2) Send Heartbeat: Heartbeat Transmission
   The bound output network variables will be sent to notify the system once the minimum transmission interval has passed even if there is no change in status value. The actual interval between transmitted messages will depend upon factors such as the transmission capacity of the DMS-IF and the network traffic status (the relative volume of messages on the network).
   The monitoring items to be sent are bound **On/Off Status Report, Room Temperature Report, Filter Sign Report, Error Status Report, Error Code Report and A/C Communication Status Report.**

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**LON Communication Specifications**                                      **Si72-305**

(3) Send on Delta Temperature: Detect Minimum Temperature Change
The bound output network variables will be sent to notify the system when there is a change in temperature that is greater than the above specified value between two consecutive transmissions.

(4) Delay Start Up: Transmission Start Delay Time after Start Up
The time lag between turning on the LON node and starting the LON communications. This setting is useful for avoiding communication congestion when LON nodes on the network simultaneously start up.

(5) Range Maximum: Maximum Transmission Limit
The number of messages transmitted from the DMS-IF will effectively controlled by the bound output network variables. It also specifies the number of messages to be sent per minute. This is used to limit the number of messages to be consecutively sent from the nodes when they are started up.

| Control items | | Values and meanings |
|---|---|---|
| Minimum Transmission Interval | sec. | 0 seconds and 1.0-1200.0 seconds<br>0: No control, Default Value: 0 |
| Heartbeat Transmission | sec. | 0 seconds and 10.0-1200.0<br>0: No control, Default Value: 0 |
| Detect Minimum Temperature Change | °C | Temp. (°C): 0.10-10.00, Default Value: 0.10 |
| Transmission Start Delay Time after Start Up | sec. | 60.0-1200.0, Default Value: 60.0 |
| Maximum Transmission Limit (messages/sec.) | -- | 0 and 1-6000, 0: No control, Default Value: 0 |

- Items to be transmitted are the following 6 items: **On/Off Status, Room Temperature, Filter Sign, Error Status, Error Code and A/C Communication Status.**
- The DMS-IF collects room temperature data every 12 seconds, so any heartbeat transmission set at a lower time interval will ultimately result in a 12-second transmission interval.

38                                                    Control-related Design Keypoints(CBBA006)

# 6. Monitoring and Control Restrictions

## 6.1 Restrictions Regarding the 'System Forced OFF' Function

- The LON monitoring nodes send a 'System Forced OFF' command to the DMS-IF.

All of the A/C units on the DIII-NET controlled by the DMS-IF stop operating.
  - A/C units cannot be operated from the hand-held remote controller.
  - A/C units cannot be operated from the centralized devices.

- The LON monitoring nodes send a message to deactivate the 'System Forced OFF' command to the DMS-IF.

The system still cannot be operated.

All of the A/C units on the DIII-NET controlled by the DMS-IF can be operated. (allow use of a remote controller)
  - A/C units can be operated from the hand-held remote controller. (status is not restored)
  - A/C units can be operated from the centralized devices. (status is not restored)

- When the System Forced OFF command is issued, the hand-held remote controller for the A/C units becomes 'Inoperable status'. However, the output message of Remote ON/OFF Operation Rejection Report is not sent to the LON monitoring nodes.
The System Forced OFF status is output as a **'System Forced OFF Setting Report'.**

- There is one System Forced OFF contact point per A/C control network (DIII-NET) line. Input in the DMS-IF is conducted either contact input or via the LON. Moreover, the centralized device for the System Forced OFF input point is set as the DIII main A/C unit.

- When the System Forced OFF Reset command and A/C Operation command from the LON monitoring nodes are sent at, more or less, the same time, the latter may not be properly sent to the A/C units. The entire A/C control network (DIII-NET) controlled by the DMS-IF becomes System Forced OFF reset status, so the operation command for the A/C units may be rejected. If the A/C Operation command is to be sent after deactivation (reset), it is recommended that it be issued after confirming that the System Forced OFF has actually been deactivated (reset).
**LON communications do not and cannot guarantee the startup order of processing when more than one status change are reported**.

## 6.2 Operation Mode Changeover Restrictions

- When the Operation Mode Changeover command and Temperature Setting command from the LON monitoring nodes are sent at, more or less, the same time, the latter may not be properly sent to the A/C units.
  <Example>
  1. Changeover command from cooling to heating
  2. Temperature Setting command in the heating mode: Change to 20 °C
  3. Completion of temperature setting at 20 °C in the heating mode



  1. Set temperature is changed first: Change to a 20°C in the cooling mode
  2. Changeover from cooling to heating
  3. Completion of temperature setting at the default value (initially set temperature) in the heating mode

  It is recommended that the commands to change the set temperature be issued after confirming the Operation Mode Changeover command has actually been sent and processed.

  **LON communications do not and cannot guarantee the startup order of processing when more than one status change are reported.**

## 6.3    LON Address Table Restrictions

- The entry numbers in the address tables used to bind the network variables are limited to a maximum of 15. This must be taken into consideration when using several parameters upon binding.

## 6.4    Suspension of Message Transmission when Receiving Set Node Mode Online

- The DMS-IF suspends spontaneous message transmission, such as reports of the bound output network variable changes and heartbeat, as well as responding to the Node Object, for one minute after receiving "Set Node Mode Online", a management message. However, it responds to other network management requests such as "poll" and "fetch". This function is a mechanism to prevent time out errors because of transmission of messages spontaneously issued by the DMS-IF when it comes online due to use of an installation tool such as the LonMaker during commissioning.

## 6.5    Group Binding Restrictions

- It is impossible to bind one of the LON monitoring node output network variables and more than one input network variable in the DMS-IF. For example, setting one of the output networks of the monitoring node at 'ON' cannot turn the A/C units in the 10 groups under the LON monitoring node 'ON'.
This restriction is based on the LON regulations.

## 6.6    Prohibition Time of Commands from LON (central monitoring panel) when Power is Restored after Power to A/C Units is Cut

- After restoration of electrical power that was cut to A/C units, commands must be sent from the LON (central monitoring panel) at least 5 or so minutes after the restoration. A/C communications are initialized for approximately 5 minutes upon power restoration and, thus, the A/C units will not receive any commands from the LON during this time period.
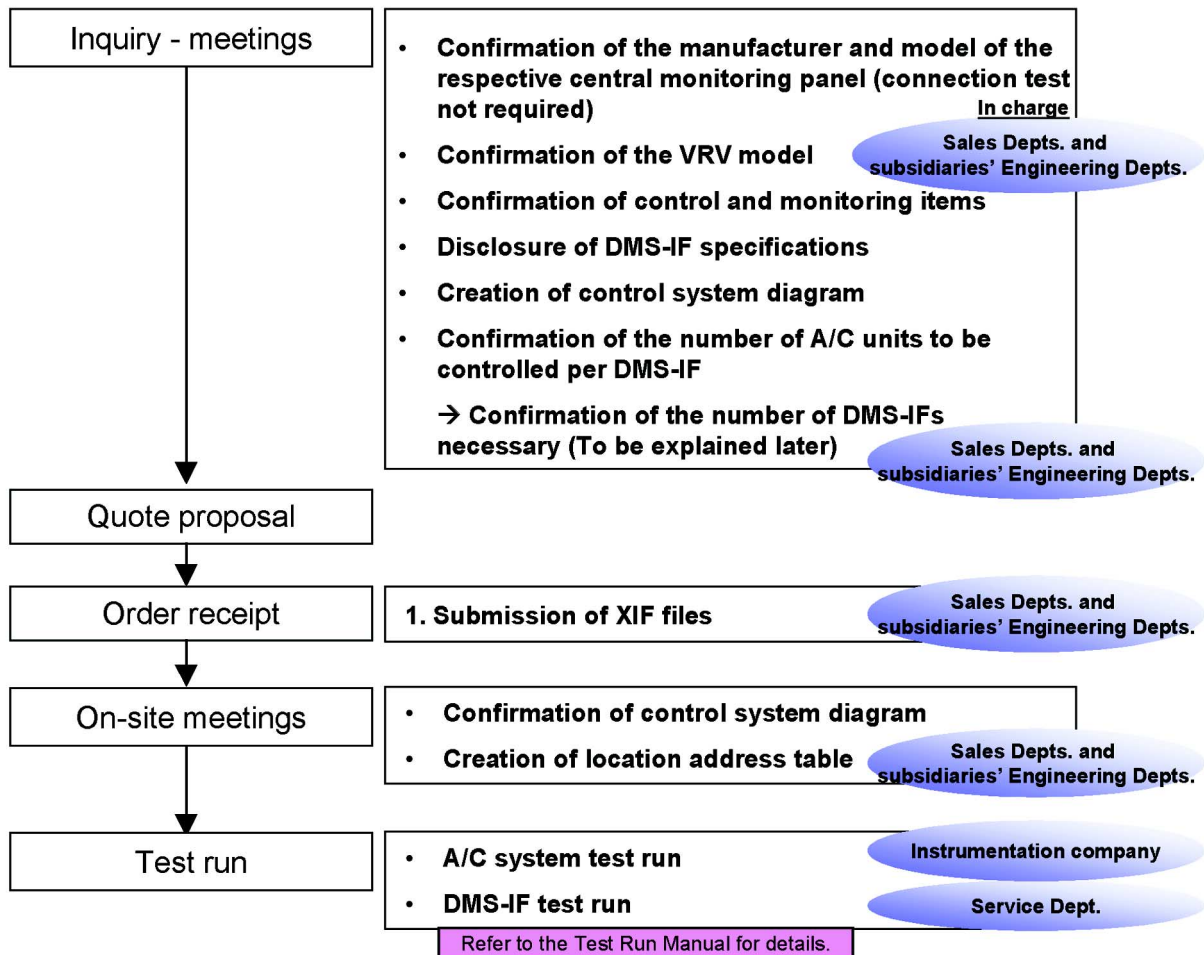
# Part 3
# Check Sheet for Control and Monitoring Items

# 1. Workflow

| Workflow |
|---|

| Inquiry - meetings | • **Confirmation of the manufacturer and model of the respective central monitoring panel (connection test not required)** |
|---|---|

**In charge**

Sales Depts. and subsidiaries' Engineering Depts.

- **Confirmation of the VRV model**
- **Confirmation of control and monitoring items**
- **Disclosure of DMS-IF specifications**
- **Creation of control system diagram**
- **Confirmation of the number of A/C units to be controlled per DMS-IF**

  **→ Confirmation of the number of DMS-IFs necessary (To be explained later)**

Sales Depts. and subsidiaries' Engineering Depts.

| Quote proposal |
|---|

| Order receipt | **1. Submission of XIF files** |
|---|---|

Sales Depts. and subsidiaries' Engineering Depts.

| On-site meetings | • **Confirmation of control system diagram** |
|---|---|

- **Creation of location address table**

Sales Depts. and subsidiaries' Engineering Depts.

| Test run | • **A/C system test run** |
|---|---|

- **DMS-IF test run**

Instrumentation company

Service Dept.

Refer to the Test Run Manual for details.

# 2.  Check Sheet for Control and Monitoring Items

**<Central monitoring panel specifications>**

- Manufacture: _____

- Model: _____
  Connection test not necessary.

  **The respective XIF file will be submitted based on your order.**

<Address to which the XIF file is sent>     It will be sent via e-mail.

- Company name: _____

- Department: _____

- Name: _____

- Phone: _____

- Fax: _____

- e-mail address: _____

Control and monitoring items are shown below:

 Items pertaining to the entire system

| | Function | Descriptions | Support | Needs |
|---|---|---|---|---|
| Control items *11 | ON/OFF Command | Start/stop of A/C operation | Yes | |
| | Operation Mode Setting | Heating/Cooling/Ventilation/Auto　　　*1 | Yes | |
| | Temperature Setting | Set room temperature　　　*2 | Yes | |
| | Airflow Rate Setting | Set airflow rate　　　*3 | Yes | |
| | Filter Sign Reset | Filter sign reset　　　*4 | Yes | |
| | Forced Thermostat OFF Setting | Forced thermostat OFF | Yes | |
| | Remote ON/OFF Control Rejection | Permission/prohibition of ON/OFF operation *10 | Yes | |
| | Remote Operation Mode Control Rejection | Permission/prohibition of operation mode change　*10 | Yes | |
| | Remote Temperature Setting Control Rejection | Permission/prohibition of set temp. change　*10 | Yes | |
| | System Forced OFF Setting | System Forced OFF command | Yes | |
| | Sub Group Address Control Rejection Setting | Sub Group Address Control Rejection command | Yes | |
| Monitoring Items | ON/OFF Status Report | ON/OFF status　　　*14 | Yes | |
| | Operation Mode Status Report | Heating/Cooling/Ventilation　　　*5 | Yes | |
| | Temperature Setting Report | Set room temperature　　　*2 | Yes | |
| | Room Temperature Report | Room temperature　　　*2, *12 | Yes | |
| | Airflow Rate Setting Report | Set airflow rate　　　*3 | Yes | |
| | Filter Sign Report | Filter sign　　　*6 | Yes | |
| | Error Status Report | Error status　　　*7,*15 | Yes | |
| | Error Code Report | Error code　　　*7 | Yes | |
| | Thermostat Status Report | Thermostat status | Yes | |
| | Forced Thermostat OFF Setting Status Report | Forced thermostat OFF status | Yes | |
| | Remote ON/OFF Operation Rejection Report | ON/OFF Operation Rejection Status　　　*10 | Yes | |
| | Remote Operation Mode Setting Control Rejection Report | Operation Mode Setting Control Rejection status　*10 | Yes | |
| | Remote Temperature Setting Control Rejection Report | Temperature Setting Control Rejection status　*10 | Yes | |
| | System Forced OFF Setting Report | System Forced OFF Setting status (set or reset) | Yes | |
| | Sub Group Address Control Operation Rejection Setting Report | Sub Group Address Control Operation Rejection Setting status (set or reset) | Yes | |
| | A/C Communication Status Report | No Occupancy/ Communication normal/ Communication error　　　*13, *15 | Yes | |

| | |
|---|---|
| Individual group | items |
| Entire system | items |

**Note: Refer to the 'Function List by Model' regarding items for each series.**

*1　Auto Mode settings directed for A/C units without a cooling/heating option will be read as a temperature control command. Therefore, the operation mode for these A/C units without the option are aligned with the operation mode for A/C units with the option.

*2　The set room temperature for outdoor air treating A/Cs is represented by either the set or measured value of discharged air. (Does not apply to some models.)

*3　Any airflow rates on the LON are classified either High or Low (only 2 speeds). In order to be used as DIII data, airflow rates of '4 or less' and '5 or more' are reread as 'Low' and 'High', respectively, for monitoring. In terms of commands, '1' is reread as 'Low' and '7' High.

*4　Reset commands to the A/C units are issued/sent to the items displayed at that moment (filter or element).

*5　The Auto Mode status cannot be monitored. 'Dry' operation is reported as cooling.

*6　The OR status value for the filter sign and element sign.

*7　An error is reported to the LON only when at or above abnormal levels. The error code is an ASCII 2 character and in an alarm form. Warning message is not reported.

*10　Even for a/c units without R/Cs, this appears as if a 'Rejection' setting has been conducted.

*11　The control commands sent to sub units sub units connected through a remote control group are ignored.

*12　In cases of units that are not equipped with a temperature sensor, the room temperature is reported as either $0°C$ or INVALID (0x7fff). (The value may differ from the actual room temperature depending on the location of the sensor.)

*13　Communications errors are reported with novHvacExist_nn, nvoErrStatus_nn or nvoFailure_nn. Messages starting with nvo and ending with _nn maintain the latest value.

*14　When an error occurs, the A/C unit stays in 'operation' status until the OFF command is sent from the R/C or main central monitoring panel.

*15　U3 to U9 and UJ communication error messages are not sent within the first 5 minutes.

<Rough Estimate of Number of Groups Connected >

| Control and Monitoring Items n (individual groups) | Max. number of groups connected | Remarks |
|---|---|---|
| 23 items (All) | 26 groups | -One LON can monitor up to 600 items.<br><br>-The maximum number of control and monitoring items is 23 per A/C unit. If the number of control and monitoring items per A/C unit is assumed as 'n', the number of A/C groups connectable would be: |
| 20 items | 30 groups | |
| 18 items | 33 groups | |
| 16 items | 37 groups | No. of A/C groups $\leq 600 \div n$ |
| 15 items | 40 groups | <Note: The maximum No. of A/C groups is 64.> |
| 12 items | 50 groups | |
| 10 items | 60 groups | |
| 9 items | 64 groups | |

(Assuming that acknowledged service is 20 items per second on a 30-second interval data collection cycle.)

- Acknowledged Service (possible communication volume): 20 items/second
  This is one of the performance features of a DMS-IF. It can process 20 items per second.
- 30-second interval data collection cycle
  This is the time interval whereby device data (status) is collected from the central monitoring panel.
  In this case, the data regarding the connected A/C units is collected in 30 seconds. This figure differs with respect to the specifications of the central monitoring panel.

- DMS-IF performance...Acknowledged service: 20 items per second (fixed value)

- Central Monitoring Panel performance...Data collection cycle interval:_____seconds
             (30 seconds when not specified.)

Data is collected 20 items per second for_____seconds. Therefore, the total number of control items is calculated in a following manner:

    $T = 20 \times$_____$=$_____items

If the number of control items per group is_____, the number of groups connectable is:

    $n = T \div$ (No. of control items per group) $=$_____$\div$_____$=$_____groups
                                         <Maximum of 64 groups>

# Part 4
# Open Network Glossary

CB03A004

# 1. Open Network Glossary

| Term | Explanation |
|---|---|
| ANSI | American National Standards Institute |
| ASHRAE | American Society of Heating, Refrigeration and Air-Conditioning Engineers, Inc. |
| BACnet | Building Automation Control Network |
| BAS | Building Automation System |
| BMS | Building Management System<br>Refers to a system for building management (management of electricity charges, equipment and the like). BASs are configured within BMSs.<br><br>Well known BMS manufacturers in Japan include NEC, YBS, YJ, Fujitsu, Panasonic and Oki. |
| DIII-NET | Refers to Daikin Industries original communication network for A/C communications. (closed network) |
| Echelon | The U.S. company that developed the LON. |
| HIM | Human Interface Module<br>A device that incorporates the concept of the standard BAS protocol supported by the Institute of Electrical Installation Engineers of Japan (IEIEJ). It enables the setting of parameters for status display, control and monitoring of building equipment. It refers to a human interface device that performs On/Off operations and the like. |
| Icont | Intelligent Controller<br>A device that incorporates the concept of the standard BAS protocol supported by the IEIEJ. It is a control device that is connected to either the building equipment or devices targeted for control via an interface. It refers to a device that can support functions of independent monitoring, control and the like. |
| I/O | INPUT/OUTPUT<br>Examples: Di (Digital input), Do (Digital output), Ai (Analog input), Ao (Analog output) |
| LON | Local Operating Network<br>Refers to an intelligent distributed control network developed by the U.S. company, Echelon. |
| LONMAKER | Refers to the Echelon-developed tool (software) that allows installation commissioning (addressing), variable binding, variable browsing (monitoring) and the like. |
| LONMARK | The logo for products manufactured according to the guidelines established by the LONMARK Association. |
| LONMARK | Refers to the LONMARK Interoperability Association.<br>The LONMARK Association is a nonprofit organization established to promote the use of LONWORKS. It consists of some 350 companies from all over the world, including 19 from Japan.<br>The LONMARK Association was formed in order to create standard specifications for connection to LONs between different vendors (companies). |
| LONTALK | Refers to the protocol used in LONs. |
| LONWORKS | The generic term used to refer to the hardware, software, protocol and the like used to design, configure and manage/service LONs. |

| Term | Explanation |
|---|---|
| NI | The acronym for Network Integrator.<br>In the narrow sense, NI is the term used to refer to companies that have signed an NI contract with ECHELON. In the broad sense, NI is the generic term used to refer to companies and engineers that configure LONWORKS system networks proposed by ECHELON. The work of an NI is included in that of an SI (system integrator) or SE (system engineer) in the case of computer systems. In LONWORKS systems, the work of an NI involves network topology and network. |
| NI companies in Japan | Obayashi Corporation<br>Takasago Thermal Engineering Co., Ltd.<br>DAI-DAN Co., Ltd.<br>NTT DATA Corporation<br>Hitachi Plant Engineering & Construction Co., Ltd.<br>Shimizu Corporation<br>Yukoukeisou Co., Ltd.<br>Chiyoda Keiso Co., Ltd.<br>System instrumentation Co., Ltd.<br>Hibiya Engineering, Ltd.<br>Shinryo Corporation<br>Mita Engineering Co., Ltd.<br>Taikisha Ltd.<br>Creight Co., Ltd.<br>Kyowa Exeo Corporation<br> As of August 2001 |
| nvi | Network Variable Input |
| nvo | Network Variable Output |
| SE | System Engineer<br>System Engineer (SE) is a generic term used in the computer industry to refer to engineers who install computers and communications devices for end-users. System engineers also generally confirm proper operation of OS (operating software) and AS (application software) after set up. These capabilities are, of course, necessary in the case of a BAS, but unlike the so-called computer systems, the SE must also determine necessary specifications in order for vendors to manufacture systems that can effectively realize functions and achieve desired performance levels detailed on the provided drawings. In addition, appropriate instruction to and/or coordination between related parties, such as departments that design and create hardware and software, according to the pertinent process as well as the promotion of smooth system configurations are also responsibilities of the SE. |
| SI | System Integrator<br>System Integrator (SI) is a generic term used in the computer industry to refer not only to the work of selecting hardware and software suited to configured computer systems, setting up networks and altering software to accompany the systems to be installed but also to the companies/engineers who perform the work. BASs, including building management systems, represent a type of computer system, so the responsibilities of an SI are the same. In addition, the responsibilities of the SI also include: a thorough understanding of functions and features of the targeted electric equipment, A/C system and the like; coordination between hardware, software and network designs provided by a multiple number of vendors; and smooth configuring of systems to meet the objectives within a predetermined cost in cooperation with design supervisors and BA orderers. |
| SNVT | Standard Network Variable Types<br>Refers to the variables used to control A/C units within LONs. These variables have been established by the The Japan Refrigeration and Air Conditioning Industry Association (JRAIA) and are the standard variables in Japan.<br>They are the equivalent of codes for control and monitoring items that enable interoperability in LONs. (Predefined objects) |
| TCP-IP | Transmission Control Protocol/Internet Protocol<br>TCP-IP is a standard protocol supported in all OS such as UNIX, an OS used in mid- to large-sized computers, Windows and Mac.<br>TCP-IP was designed by an organization associated with the U.S. Department of Defense to allow for communications between computers through another route even if a part or parts of a network were destroyed. |

| Term | Explanation |
|---|---|
| UNVT | User-defined Network Variable Types<br>Refer to the variables used to control A/C units within LONs. They are determined according to specific projects (buildings, etc.) and, thus, are usually not used. |
| XIF File | Refers to a file comprised of data containing network variables for LON nodes. The company manufacturing the node (in this case, Daikin) creates the file and submits it to the NI upon receipt of an order for a system. |
| Architecture | Refers to the overall design concept of the computer from hardware to software.<br>It is a systematic layout detailing the connection between the communications network and the devices in an open network. |
| Ethernet | Refers to the name of and standard pertaining to a LAN product developed by Xerox.<br>Jointly developed by Xerox, DEC and Intel in 1980, Ethernet is the LAN used within BASs. |
| Interoperability | Refers to the coordinated interlinking between related devices. An example of this is the control of lighting, A/C, TV and the like with one R/C. If each of the respective companies involved uses a different protocol, then they have to disclose their protocols and carry out discussions on several occasions to coordinate efforts, which leads to an increase in costs. However, an open network essentially obviates such a situation and allows machines manufactured by different companies to operate together without any problems. For example, if A company's sensor breaks down, then it is possible to buy and install a product manufactured by B company that will readily operate (interconnectivity). Different devices are, thus, able to communicate and link up with each other. |
| Open Network | Refers to a network in which machines with different specifications are able to communicate with each other. |
| Object | Monitoring items and data.<br>Refers to something that regulates the operation of the object to be controlled.<br>The equivalent of a LON's SNVT or BACnet's object. |
| IEIEJ | Institute of Electrical Installation Engineers of Japan |
| IEIEJ Specifications | Refers to the specifications established by the institute that determines them for the Japanese version of the BACnet. (The international specifications must be certified, however, by ASRAE.)<br><br>The IEIEJ Specifications feature functions added onto the BACnet according to demand in the Japanese market. Related discussions are currently being held with ASHRAE. The points of discussion are as follows:<br>1. Measurement: The data type used to calculate electric energy, heat and the like. This is absolutely necessary in energy management.<br><br>2. Power demand: The method of determining the contract demand with electric power companies differs with respect to the country. Accordingly, it is necessary in Japan to interpret the average electric power used over 30 minutes as the maximum electricity demand.<br><br>3. Common data dissemination methods: Due to the common adoption of comprehensive monitoring systems in Japan, it is necessary to have a system by which large volumes of disaster-related data can be efficiently transmitted. This point has not been considered in the BACnet.<br><br>4. Collective objects: Devices that support several forms of data should be managed on a per device basis. This will be proposed by the Japanese side (IEIEJ). |

| Term | Explanation |
|---|---|
| Closed Network | Refers to a system configured by only one manufacturer that does not allow access by other manufacturers. DIII-NET is one such example. |
| Gateway | Refers to a device that translates the different communication codes sent between central monitoring panels and A/C units to enable mutual communication.<br>It is used when more than one network is connected.<br>DMS-IF and the Master Station are two such examples. |
| Commission | The work conducted when the central monitoring panel is connected to a gateway.<br>Specifically, the data within the gateway is sent to the central monitoring panel for data confirmation.<br>Refers to installation of settings in the node after the communication content is set via binding. |
| Configuration Property | Refers to parameters related to the behavior of the LON nodes. Configuration properties are set for the respective nodes by an NI when the network is being installed. They are assigned to the nodes' nonvolatile memory. Unlike network variables, configuration properties represent semi-fixed variable values. |
| General | Refers to the term 'general' used when conducting general or batch control. When controlling an entire system, control is not conducted on each particular A/C unit, but on a generalized basis (all of the A/C units together). |
| Single Vendor | Refers to a situation involving only one vendor or manufacturer. |
| Selecting | When a control station (central monitoring panel) sends data to a tributary station (DMS II or DMS-IF), a message is first sent to the latter to check if the data can be received. The data is then sent upon receipt of an affirmative response from the tributary station (indicating that the data can be received). |
| Communication Traffic Volume | Refers to the traffic volume determined according to the number of nodes and network variables and the frequency of communication between these two. |
| Topology | Refers to the connection arrangement within a network. Equivalent to the wiring method in DIII-NET. Star and bus are some examples of topologies. |
| Neuron Chip | Refers to a LON chip. It is the interface used to access the LON. |
| Network Variable | The unit in which data are sent/received in communication between nodes. There are two types: network variable input (nvi) and network variable output (nvo). |
| Node | Refers to the devices connected by cable to the LON.<br>In other words, it refers to the devices to be controlled by the LON or BACnet.<br>VRV, valves and sensors are some examples. |

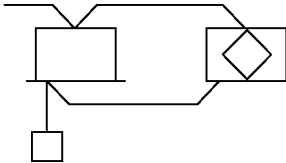| Term | Explanation |
|---|---|
| Binding | Refers to the logical connecting between the network variables that the user wishes to communicate.<br>It is a setting that enables communication of nvo from one device/machine and nvi from another. This is a job usually handled by an NI. |
| Bind | Refers to one of the activities included in a test run. Specifically, the logical address is appropriated and allocated. |
| Heartbeat | Refers to a function that cyclically communicates values of specific network variables.<br><br>Even if a main monitoring node does not request the data (does not confirm the status of the A/C unit), the machine itself will automatically send the values. It allows the user to conclude that the node is operating normally while this value is being sent. |
| Free Topology | Refers to a branched free-type connection arrangement within a network.<br>Daikin's DMS-IF only supports free topology. |
| Broadcast | Refers to the simultaneous transmission of a message to all the devices connected in a system.<br>Messages involved in the communication between devices connected within a network are simultaneously sent to all the devices within the network. |
| Protocol | The agreed rules and regulations used in communication between different computer programs.<br>When the protocol differs, two computer programs are unable to comprehend each other (communicate). |
| Property | Refers to each of the elements comprising an object. |
| Profile | In terms of a LON, the following are examples of items that are determined for each function of the respective nodes in the LON:<br> - Network variable type<br> - Meaning of the network variable (function)<br> - Range and meaning of the network variable value (function).<br>Standardizing these ensures interconnectivity.<br>However, a LON is not configured for VRVs or PAs, so profiles for such A/C systems must be created by each manufacturer in accordance with the respective network variable regulations. (Due to the fact that the profiles differ with respect to the manufacturer, profiles such as those for VRVs and PAs are not certified by LONMARK. However, because they conform with regulations, they can be treated as open networks by disclosing the network variables. |
| Vendor | The seller or manufacturer |
| Polling | When the control station does not have the necessary data (the central monitoring panel does not have any commands), it sends requests at regular intervals to each tributary station asking whether it has any data transmission requests (data that the tributary station would like to communicate to the control station). The control station sequentially gives each of the tributary stations request transmission rights, allowing them to send the respective data. |
| Multi-vendor | Refers to various machine/device manufacturers. The term 'multi-vendor environment' is also often used. |
| Unicast | Refers to the sending of messages only to specified devices.<br><br>Specifically, it is the sending of messages between devices connected in a network on a one-to-one basis. |
| Router | Refers to a device used for connections between different networks.<br>A router forwards data packets between networks. In an internal (in-company) LAN, it is used to connect the LANs installed on a per floor basis. Meanwhile, a dialup router is used to connect the Internet with a LAN. Routers are also used for connections between an Ethernet and LON, for example, in the field of open protocols used for building control. |

# Part 5
# LON (DMS-IF)
# Q&A

# 1. LON (DMS-IF) Q&A

| No. | Q | A |
|-----|---|---|
| 1 | Is the number of indoor units that can be connected to one DMS-IF 64? | A maximum of 64 groups can be connected to it. |
| 2 | When a group is being operated via a remote controller, does the sub machine require an address as in the case of fee management? | No, an address is not necessary for sub machines. |
| 3 | What centralized devices can be built onto the system? | Ve-up Controller<br><br>Centralized Management Controller<br>ON/OFF Controller<br>Heat Storage Controller |
| 4 | How are T1 and T2 connected? | With microcurrents (minute electric currents). |
| 5 | Are surge killers and noise filters necessary for the power supply? | No, they are not because they are already on board. |
| 6 | What does the term 'Sub Group Address Control...' in the specifications mean? | It refers to centralized devices other than the DMS-IF. In other words, it pertains to 'secondary centralized devices'. |
| 7 | Is the '30-second data collection cycle' predetermined? | This cycle is the manner in which Daikin addresses the issue in cases of absence of an NI (network integrator). However, if an NI is present, network design will be requested of the NI regardless of the cycle.<br><br>We have never observed an NI in any of the projects we have handled to date. There have been system designers (central monitoring panel manufacturers), but no NIs. |
| 8 | Is the maximum number of points that the DMS-IF can control 600? | The number of points that the DMS-IF can control has been calculated as follows:<br>Acknowledged Service: 20 points/second<br>Data Collection Cycle: 30 seconds<br>Number of control points = 20 x 30 = 600<br>Consider the Acknowledged Service to be the processing capability of the DMS-IF. If an NI is present, the NI would determine the data collection cycle, so it is not limited to 30 seconds. In cases when an NI is not present, the number of items is assumed as 600 based upon a 30-second cycle. |
| 9 | What is the LonMaker? | It is an Echelon-designed software that enables binding and the like. |
| 10 | What can the DMS-IF control for other models including RA? | Please refer to the list of functions by model. |

| 11 | Addresses are required for sub machines within R/C groups when a fee management unit is used together with the DMS-IF. In such cases, are the sub machines included within the total of 600 control points? | It is necessary to limit the number of A/C groups to 64 or less. However, if the main central monitoring panel does not control nor monitor (no binding), the sub machines can be excluded when calculating communications traffic volume (600 = control points X number of groups). |
|---|---|---|
| 12 | The following displays control with a LON via an R/C-aided interlocked control system between an indoor unit and a HRV.<br><br>Between indoor units and the HRV: Controllable items between the LON and the HRV when the system is operated via an R/C are as follows:<br><br>From the LON to the HRV<br><br><br>From the HRV to the LON | Independent operation: No<br>Airflow rate changeover: No<br>Operation mode changeover: No<br>Filter reset: Yes<br>Start/Stop: Start/Stop operation and status report on an interlocking basis.<br>Error message transmission: Yes<br>Error code transmission: Yes (Unit numbers are not transmitted.)<br>Filter sign transmission: Yes<br>Other transmissions: Only Start/Stop/Error messages: Yes<br>(Operation mode and airflow rate: No) |
| 13 | What about the issue of the Node Object, General Object and Independent Object? | Thinking is centered about the DMS-IF. Observation reveals that the central monitoring panel is connected to the DMS-IF. This represents the Node Object. 64 groups of indoor units are also connected and altogether referred to as the General Object. Each of the 64 groups is referred to as Independent Objects. Therefore, the DMS-IF has 66 objects. Subtracting the Node and General objects leaves us with the 64 objects as represented by the 64 groups. |
| 14 | How does a System Forced Off work? | Either the LON monitoring node (central monitoring panel) issues an 'nviSystemoff' message to the General Node or the DMS-IF's 'T1/T2' is manually input. Either option may be chosen. |

| 15 | Can heat storage operation be controlled by the LON? | No, it cannot. The LON is bound to the indoor unit groups. Heat storage is a command sent to outdoor units, so this is not possible with the LON. |
|---|---|---|
| 16 | When a centralized controller is used along with the LON, can the 'Operation code' of the centralized controller be used? | When a DMS-IF is being used, the 'Operation code' of a centralized controller cannot be used. |
| 17 | What is the relationship between the DIII-NET addresses and the LON A/C numbers? | If a location address setting is lacking, it is also necessary to leave the LON A/C number out. |
| | | DIII-NET      LON<br>1-00            1<br>1-01            2<br>1-02            3<br>1-03            4<br>1-04            5<br>1-05            6<br>2-00            17 <--<br>2-01            18<br>2-02            19<br>2-02            20 |
| 18 | If the 'Auto' command is transmitted to an A/C unit that has no Auto mode, what mode does the indoor unit actually go into? | The indoor unit ignores the command. It maintains the actual temperature control mode. |
| 19 | What is displayed on the LON when the airflow rate on the Sky Air is set at 'Medium'? | The LON displays airflow rates of either 'High' or 'Low'. If the value on the DIII-NET is 4 or less, then the display is 'Low'. Anything 5 or more results in a display of 'High'. The 'Medium' setting on the R/C is equivalent to a 3, so the display on the LON would be 'Low'. |
| 20 | What is displayed on the LON when the R/C is set to 'Auto'? | It displays the actual operation mode. (Cooling/Heating/Fan) |
| 21 | What occurs when a 'Remote Control Rejection (On/Off Operation, Operation Mode Setting, Temperature Setting)' message is bound to machines without R/Cs? | The bind would be meaningless. If the LON Monitoring Node (central monitoring panel) attempts to display the status value, 'Setting Prohibited' would be read. |
| 22 | Does an error occur when particular functions not supported in machines are bound to the machines? For example, does an error occur when an airflow rate setting variable is bound to a machine that does not support an airflow rate setting? | No, an error does not occur. Even if an input network variable (input NV) corresponding to a function not supported in an indoor unit is bound, an error will not occur upon binding. DMS-IF NVs exist regardless of the type of indoor unit(s) connected, so errors do not occur when binding. |
| 23 | When an error does not occur in such cases (as mentioned above), does some type of error occur when actual instructions are issued? | No, an error does not occur. |
| 24 | What about commands concerning functions not supported by indoor units? | Input/output NVs corresponding to functions that are not supported by indoor units are not bound.<br><br>Values assigned to input/output NVs corresponding to functions that are not supported by indoor units are ignored.<br><br>Values of output NVs corresponding to functions that are not supported by indoor units are not guaranteed. |

| 25 | What is 'Error Status Report'? | When an indoor unit malfunctions, it is merely reported as an error. |
|---|---|---|
| 26 | What is 'Error Code Report'? | When an indoor unit malfunctions, the respective 'Error Code' is reported. |
| 27 | Do both 'Error Status Report' and 'Error Code Report' have to be bound? | Not necessarily. Only 'Error Status Report' or only 'Error Code Report' can be bound. |
| 28 | Are 'Filter Sign' and 'A/C Communications Status' included in the 'Error Status Report'? | A/C Communications Status' is. The error code is 'UE'. 'Filter Sign' is not included. |
| 29 | Why is 'A/C Communications Status' bound? | Based on abnormalities in the 'A/C Communications Status', a breakdown in communications between the A/C units and the LON due to a power failure can be immediately detected. |
| 30 | Are there any error codes that are not included in the 'Error Status Report' or 'Error Code Report'? | An error code for the 'Alarm' level is not reported to the central monitoring panel. (Example: A7 (Vane motor error) = Swing flap has ceased to function properly, yet this does not adversely affect cooling operation.) |
| 31 | What is the display on the LON when a malfunction occurs? | The LON displays either 'Operation' or 'Error'. |
| 32 | The latest command/setting issued by either the central monitoring panel or R/C that takes priority include:<br>1. On/Off Command<br>2. Operation Mode Setting<br>3. Temperature Setting, and<br>4. Airflow Rate Setting.<br>However, when the NVI cycle transmission (including the above items) is conducted from the central monitoring panel, the following problem could occur. Have countermeasures been taken?<br><br>Example: After the temperature has been set at 26°C with the central monitoring panel, it is changed to 24°C with the R/C. When the cycle transmission from the central monitoring panel is (subsequently) conducted at 26°C, the subsequent setting of 26°C takes precedence. This effectively invalidates any R/C operation. | Yes, it could occur so we advise you not to conduct cycle transmission with regard to NVIs. |
| 33 | What procedure should be taken to conduct a test run? | Conduct a test run of the local system (DIII-NET) beforehand. Use a PC to conduct a LON test run, turning the system On and Off from the PC. |

| 34 | A malfunction was intentionally created during the test run in order to check the working order of 'Error Status Report'. However, the report was not transmitted. Does this indicate a problem with the DMS-IF? | There are error codes that are not immediately reported to the LON (mask codes). From U3 to U9 and UJ (communications errors) allow the system to automatically restore itself to proper working order and, hence, do not transmit any messages of the like. It is reported, however, if the abnormality continues for 5 minutes. (The abnormality is displayed on the DIII-NET, which includes the R/C and centralized devices, but the report to the LON is delayed for 5 minutes.) |
|---|---|---|
| 35 | What happens when the receipt of the NVs of the DMS-IF are cut off because the central monitoring panel has shut down? | Central monitoring panel shutdowns do not affect the DMS-IF. Such a shutdown would only make operation from a central monitoring panel impossible. |
| 36 | What happens if electricity is running to the DMS-IF, but the indoor units are not receiving power? | This would result in an A/C communications error. |
| 37 | What happens if electricity is running to the DMS-IF, but the outdoor units are not receiving power? | This would result in an indoor/outdoor unit transmission error. |
| 38 | How long does the backup last when electricity to the DMS-IF is cut? | With a charge of 24 hours, it can last approximately one month. Be sure to put 'SW1' to ON during the test run. |
| 39 | After power is restored, is there anything to be done to the DMS-IF? | No, nothing is required. |
| 40 | What precautions must be taken when power is restored after a failure? | 1. Handling when power is restored after a failure<br><br>After power has been restored to the outdoor and indoor units, a certain amount of time is required for initialization of transmission to outdoor and indoor units. Therefore, it is recommended that the restoration command be issued at least 5 minutes after electrical service has been restored to both the outdoor and indoor units. 'Start Command' issued during initialization will be ignored.<br><br>There is no message sent once electrical service has been restored to A/C units.<br><br>2. Operation when electrical service has been restored<br><br>The input NV (network variables sent from the central monitoring panel to the A/C units) in the DMS-IF return to the default values (=0) after restoration. The command value that has been transmitted to the A/C units before the electricity is cut is collected by the A/C units after restoration of service and reflected in the output NVs (network variables sent from A/C units to central monitoring panel).<br><br>In terms of input NVs, the final command value sent from the main monitoring node on the LON is maintained when the DMS-IF is in normal operation. However, once power is cut, the default value is used until the next command value is transmitted after power is restored.<br><br>If the command value that was issued immediately prior to the power failure has already been transmitted to the A/C units before the electricity was cut, then the value is collected from the A/C units after power is restored and reflected in the output NV (not the input NV).<br><br>Therefore, the R/C display and the input NV value will not correspond immediately after power is restored.<br><br>This not only occurs after restoration of electrical service, but also when the R/C is used.<br><br>The output NV data is collected from the A/C units after restoration of electrical service and the status value is displayed in the output NV. Bound output NV data is notified as a status change.<br><br>*With regard to a 'System Forced OFF' command, the normal status is returned after restoration of electrical service even if a 'System Forced OFF status' exists before the power failure (the status prior to the power failure is not maintained). |

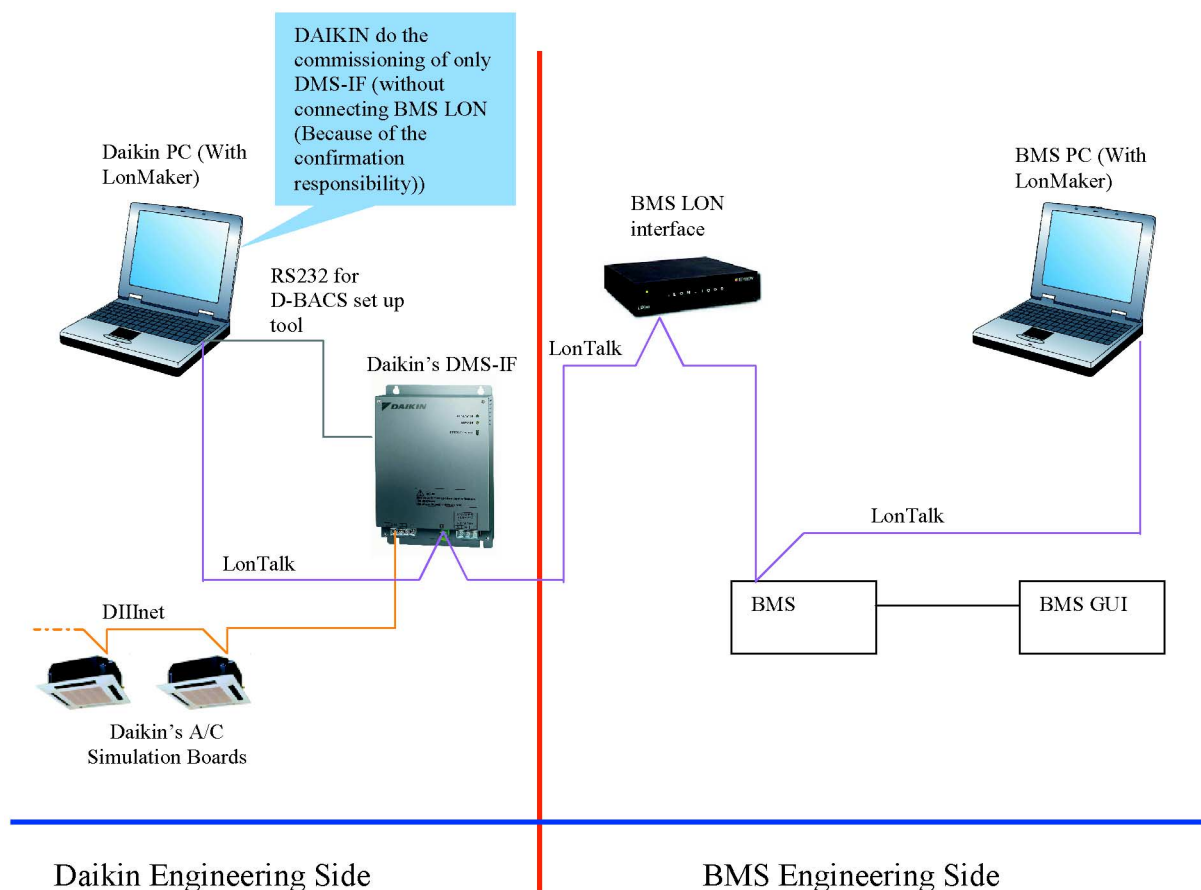| 40 | | 3. Items of note |
|---|---|---|
| | | Attention should be heeded towards the following control commands: 'Forced Thermostat OFF Setting' 'Remote ON/OFF Control Rejection' 'Remote Operation Mode Control Rejection' 'Remote Temperature Setting Control Rejection' 'System Forced OFF Setting' |
| | | When the following commands have been sent to the A/C units through the DMS-IF at the time of power failure: |
| | | 'Forced Thermostat OFF Setting' 'Remote ON/OFF Control Rejection' 'Remote Operation Mode Control Rejection' 'Remote Temperature Setting Control Rejection' OR when the A/C units are set at the following through the DMS-IF at the time of power failure: 'System Forced OFF Setting' |
| | | (A) In the event **a centralized controller is being used in addition to the DMS-IF and the electricity continues to run through the device,** the A/C units continue to be controlled via the following commands during the power failure and after power/ electricity being restored: |
| | | 'Forced Thermostat OFF Setting' 'Remote ON/OFF Control Rejection' 'Remote Operation Mode Control Rejection' 'Remote Temperature Setting Control Rejection' |
| | | Meanwhile, 'System Forced OFF Setting' is being reset. |
| | | (B) In the event **a centralized controller is not being used in addition to the DMS-IF or electricity to the centralized controller is also cut,** all of the following commands are reset while the electrical service is down: |
| | | 'Forced Thermostat OFF Setting' 'Remote ON/OFF Control Rejection' 'Remote Operation Mode Control Rejection' 'Remote Temperature Setting Control Rejection' 'System Forced OFF Setting' |
| | | After the electrical service has been restored, only the following commands are set: |
| | | 'Remote ON/OFF Control Rejection' 'Remote Operation Mode Control Rejection' 'Remote Temperature Setting Control Rejection' |

# Part 6
# Daikin's LON Binding Agreement

# 1.   Daikin's LON Binding Agreement

1.   **JMT -** (Joint Matching Test) This is necessary for every independent BMS maker. In the case that the BMS has updated their system by either software or hardware changes after a JMT has been carried out a following JMT will be required.

2.   **Binding -** BMS maker to carry out binding. This is NOT to be done by Daikin since it is directly related to the BMS side. All LON royalties need to be paid to Echelon by BMS maker for each LON engineered. Binding is the virtual engineering between the BMS and the BMS LON interface.

3.   **DMS-IF D-BACS setup-tool -** Use of Daikin's DMS-IF D-BACS setup-tool for confirming the operation/state of connected A/C units prior to connection with the BMS system.

4.   **Commission -** First step, only using DMS-IF, without connecting BMS. This is to be carried out by Daikin engineering staff with the use of the LonMaker tool. The equipment will be provided by DIL for the duration of testing. Second Step (Binding) is connecting with the BMS. This is to be carried out by BMS maker or NI (Network Integrator). This binding is done with the LonMaker tool.

DAIKIN do the commissioning of only DMS-IF (without connecting BMS LON (Because of the confirmation responsibility))

Daikin PC (With LonMaker)

RS232 for D-BACS set up tool

Daikin's DMS-IF

BMS LON interface

BMS PC (With LonMaker)

LonTalk

LonTalk

LonTalk

LonTalk

DIIInet

BMS

BMS GUI

Daikin's A/C Simulation Boards

Daikin Engineering Side                          BMS Engineering Side

# Part 7
# DMS-IF Commissioning
# Manual
# MODEL:DMS504B51

# Foreword

Before using DMS-IF, it is necessary to commission before starting normal operations.

■ Preparation of test

[What to be prepared]

   (1)  PC:  1 unit
   (2)  RS232C Cross cable: 1 (same as the one used for i-Touch controller)
   (3)  VT terminal emulation software (Hyperterminal, Tera Term, etc.): One set

# 1. Procedure for Commissioning

The procedure for commissioning DMS-IF is shown below:

> **Make sure that the battery switch is turned ON (see the figure in P.76).**
>
> **If it is OFF, turn it ON. (see the installation manual)**

---

**The work to be carried out by
the service department**

Set the service PC

⬇

Connect the service PC and start

⬇

Confirm the operation

---
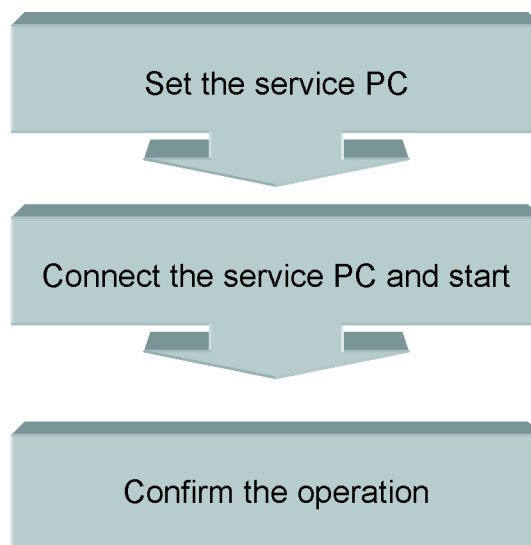
**The work to be carried out by
Network Integrator (NI)**

Note: This is not a work to be carried out by
the service department.

Binding work

---
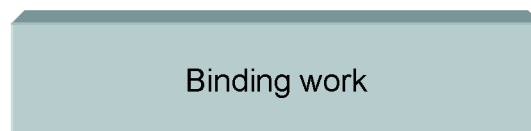
# 2. Setting the Service PC

## 2.1 Communication Specification

| | |
|---|---|
| Communication interface | RS232C |
| Transmission speed | 9600bps |
| Synchronization system | Start-Stop synchronization |
| Communication control procedure | |
| Transmission code | 8 bit + Non-parity + 1 Stop-bit |
| Connector | D-SUB  9 pin  Female -Female |

## 2.2 RS232C Cable Donnceting Diagram

Use the cables shown below:

**Service PC side**
D-SUB   9 pin female

**LON Gateway side**
D-SUB   9 pin female

| Service PC | | | LON Gateway | |
|---|---|---|---|---|
| DCD | 1 | 1 | DCD | |
| RD | 2 | 2 | RD | |
| SD | 3 | 3 | SD | |
| DTR | 4 | 4 | DTR | |
| SG | 5 | 5 | SG | |
| DSR | 6 | 6 | DSR | |
| RTS | 7 | 7 | RTS | |
| CTS | 8 | 8 | CTS | |
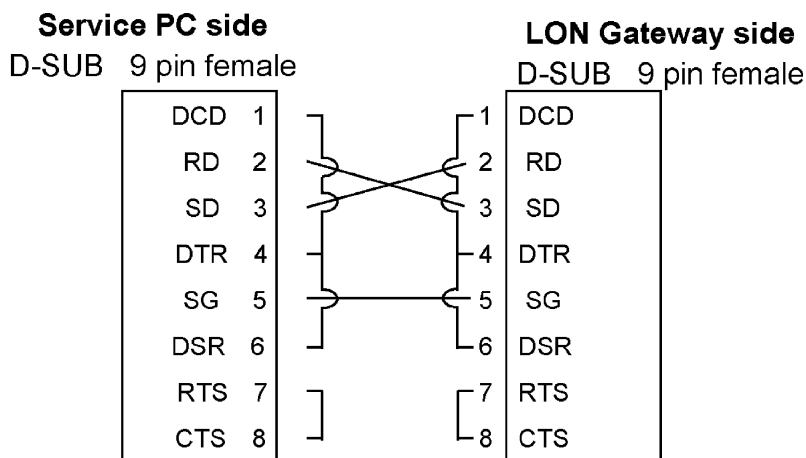
[For reference]
To be used for commissioning of i-Touch Controller
The cable RS232C is usable.

(Example of usable communication cable)
Sanwa Supply Ltd.
Cable RS232C
KRS-403XF-07K
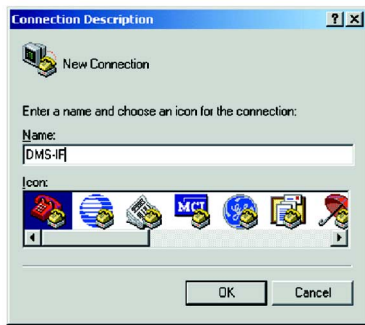Cross cable  0.75 mm,

## 2.3    Hyperterminal (VT Terminal Emulation) Setting

(1)  Select [Start]–[Program]–[Accessory]–[Communication]–[Hyperterminal].
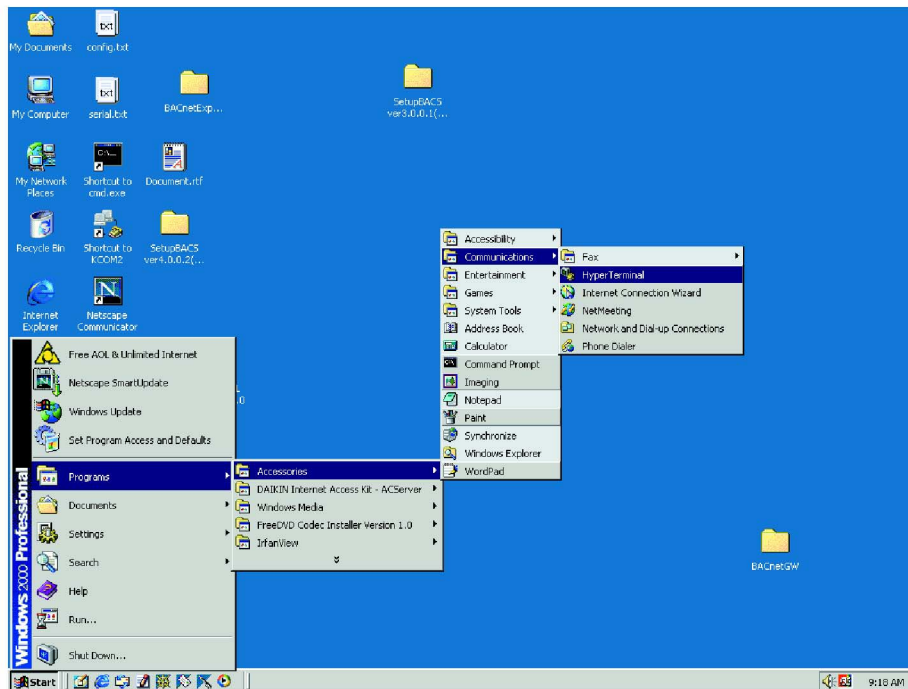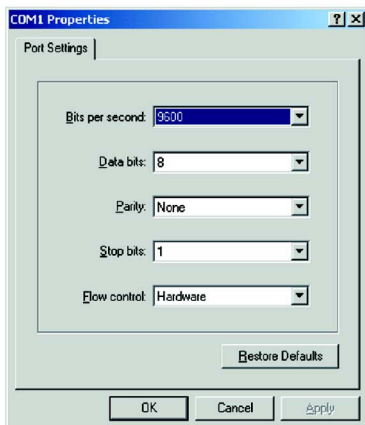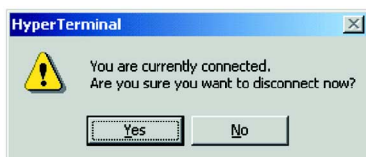


(2) The following displays.

(3) Enter DMS-IF.

(4) Set the connection method to "Direct to Com1"and press the key OK.
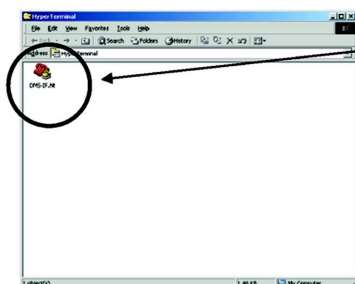
(5) Set the port as shown left and press the key OK

  bit/sec      : 9600
  data bit     : 8
  parity       : none
  stop bit     : 1
  flow control : hardware

(6) When the HyperTerminal ends, select "Yes"

(7) Double-click the icon [DMS-IF]

    The next start is OK by just double-clicking the icon [DMS-IF].

# 3.  Connection to Service PC and Start

## 3.1    Wiring

Connect as shown below.

[Caution]

1.  Make sure to cut off the power supply to the equipment before opening the upper cover.

2.  Make sure to connect the service PC before turning on the power supply to the equipment.

3.  Do not touch the control PCB except for the connectors, since the PCB might be damaged by static electricity.

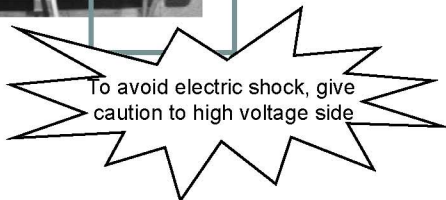4.  To avoid electric shock, do not touch the high voltage side.

DMS-IF (CN7)
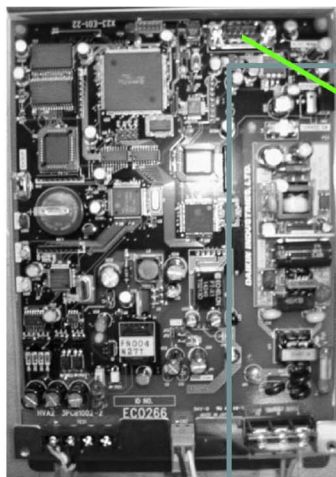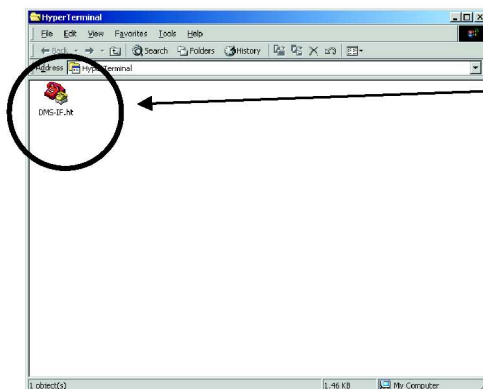
Cross cable RS232C (9pin female-9pin female)

To avoid electric shock, give caution to high voltage side

PC (VT terminal emulation software is necessary.)

## 3.2    Starting Hyperterminal

(1)  Select [Start]–[Program]–[Accessory]–[Communication]–Hyperterminal].

(1)  Double-click the icon [DMS-IF].

https://daikin-p.ru/catalog/vse-zapchasti-kondicionerov-daikin/zapchast-daikin-dms504b51

# 4. Operation Check

Carry out ON/OFF operation of each connected indoor unit and check if each indoor unit operates or stops as instructed. If it does, the unit is normal.

[Check point]

1. Check if ON/OFF of all the connected indoor units can be operated from DMS-IF or not.
   By carrying out this check, it is possible to check if the centralized addresses of the indoor units are correctly set or not.

Service PC

LON Gateway body

Outdoor unit

Outdoor unit

Indoor unit
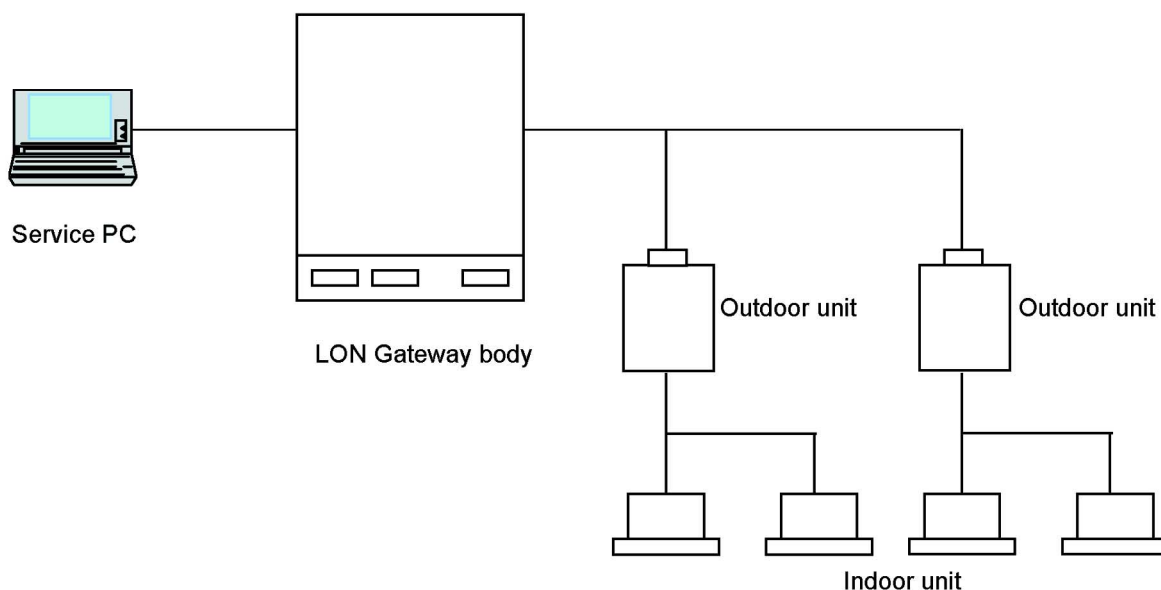
**Caution**: If the ON/OFF operation of the air condtioner is carried out by the service PC and if this air conditioner is to be monitored by the service PC, the monitoring must be initiated one minute or more after the ON/OFF operation. It is because the DMS-IF retains the instructed value for one minute after the ON/OFF operation and then responds. After one minute elapses, it responds to the actual operating conditions collected through the D3 network.

## 4.1 Check the Status of DIII Network

After the hyperterminal rises, press any key.
If the key is pressed, prompt **LONGW>** appears.

(If the key H is pressed, it indicates command help.)

```
LONGW>  (Press C DIII-NET check)
LONGW>  (C)heck D3-NET Interface

        OK :  D3 Master/Slave setting
        OK :  D3 Address setting
        OK :  D3 Pole detection (photo coupler)

        Indication when master duplication error occurs
            Error MA : Duplicate D3 master
                Correct the Master/Slave connector and
                Restart LON Gateway

        Indication when D3 address duplication occurs
            Error MC : Duplicate D3 address
                Correct the address and
                Restart LON Gateway

        Indication when D3 polar decision error occurs
                                        (photo coupler error)
            Error M1 :  D3 Pole Error
                Check the photo coupler

LONGW>
```

(1) Enter C
(2) Confirm that the results are all OK

Note) In case of NG, see the left

## 4.2 Indoor Unit Operation

```
LONGW>  (Press S AC ON/OFF command)

LONGW>   (S)et AC : ON or OFF

Which AC do you wish to set? [1-64]  Enter  13(+Enter)

Enter 1 (ON) or 0 (OFF) for AC13  Enter  1 (+Enter)

Set 1 AC13 ON   Complete  (No.1 unit operation command)
```

(1) Enter S

(2) Enter the indoor unit No. you wish to ON/OFF

(3) Enter "1" for ON
Enter "0" for OFF

(4) Confirm that the designated unit operates ON and OFF as indicated.

(5) Carry out the above work to all the connected units.

[Caution]
The relation between the indoor unit No. to be entered and the centralized address is as follows:

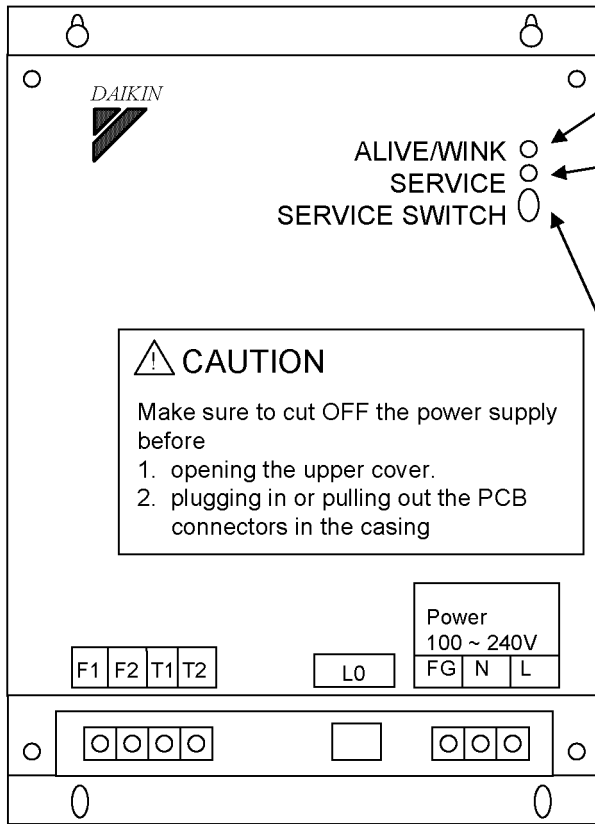| Indoor unit No. | Centralized address | Indoor unit No. | Centralized address |
|---|---|---|---|
| 1 | 1-00 | 33 | 3-00 |
| … | … | … | … |
| 16 | 1-15 | 48 | 3-15 |
| 17 | 2-00 | 49 | 4-00 |
| … | … | … | … |
| 32 | 2-15 | 64 | 4-15 |

# 5. Binding Work

This work is to be carried out by NI and not by the service department.

[Outline]
The binding work is a work to set what kind of equipment is connected to LONWORKS network.

# 6. LED Indication



ALIVE/WINK LED
MICROCOMPUTER NORMAL LED
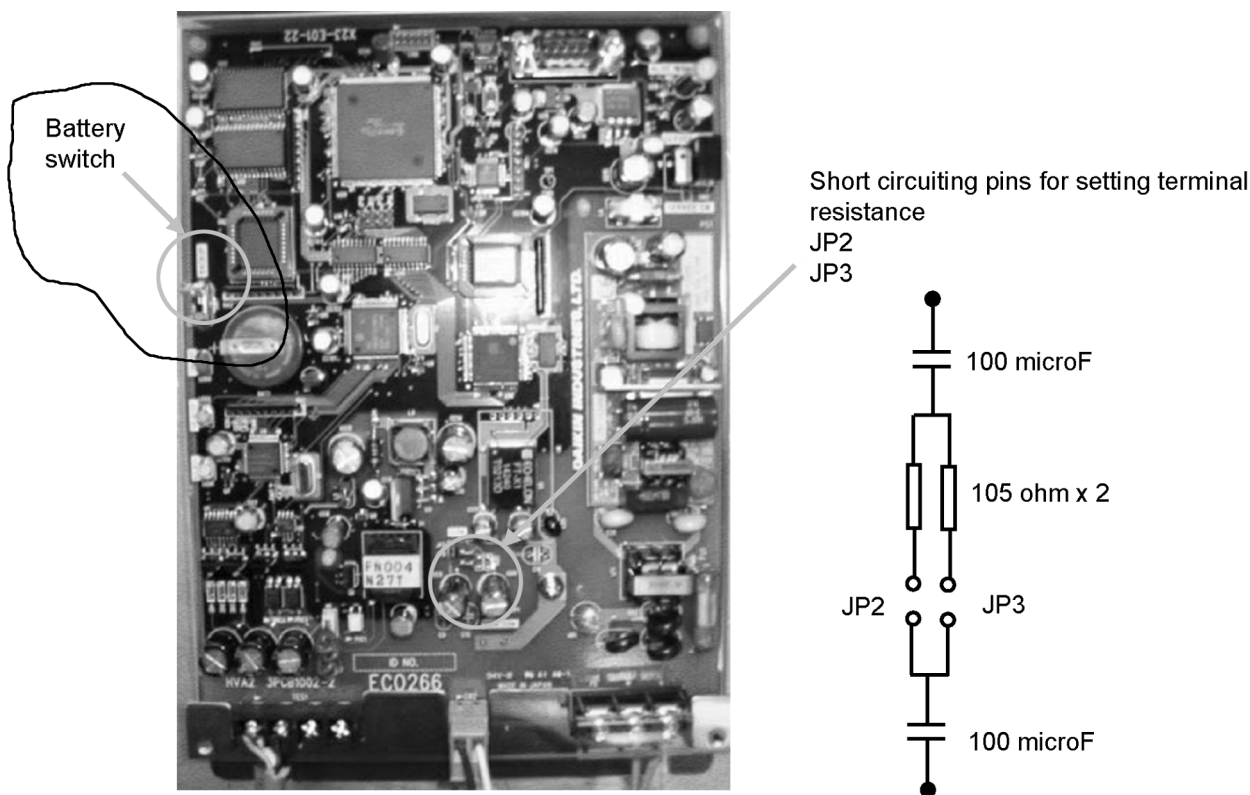When in normal operation, it flashes in 0.4 sec cycles

SERVICE LED

| LED | Details |
| --- | --- |
| OFF | During normal operation |
| Flashes | The bind data set by NI has disappeared due to some reason. Note) NI needs to redo the bind work. |
| OFF | While the service switch is being pushed, it flashes. (if let go, LED turns OFF. Even if the switch is not being pushed, if LED turns ON, the body is malfunctioning. Note) Replace the body. |

When NI carries out the binding work, this switch must be pushed.
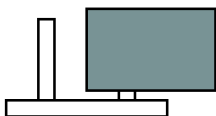
# 7. Terminal Resistance

This setting is to be carried out only when it is requested by NI.
When no request is made, it is not required to carry out the setting.

Battery switch

Short circuiting pins for setting terminal resistance
JP2
JP3

100 microF

105 ohm x 2

JP2          JP3

100 microF

— Terminal resistance circuit —

## 7.1 How to Set Terminal Resistance

The status of short circuiting socket without terminal resistance (the status when shipped out of the factory)

The status of short circuiting socket with terminal resistance
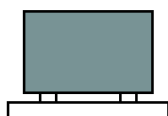
Note) If the terminal resistance is 105 ohms,
set the short circuiting socket only to JP2 as shown left.

Note) If the terminal resistance is 52.5 ohms,
set the short circuiting socket to both JP2 and JP3 as shown left.

# 8.  Appendix 1 Service PC Command Function

(1) Check the D3 NET status:  C command
   Indicate the 3 kinds of status values related to D3 NET which are detected when the power supply is turned ON or when restarted.
   * D3 master duplication error
   * D3 address duplication (existence of equipment having centralized address 0x04 as same as DMS-IF)
   * D3 polar decision error (photo coupler error)

(2) AC ON-OFF command :  S command
   After designating the AC No. [1-64], issue ON or OFF command.

(3) Monitor the ON-OFF status of AC :  G command
   After designating the AC No. [1-64],  indicate the current  ON-OFF status.

(4) DMS-IF restart command : R command
   Restart DMS-1F.

(5) Indication of Neuron ID : N command
    Indicate the ID of mounted Neuron Chip.

(6) Indication of  Version No. : V command
   Indicate the software version No.

(7) Indication of Log : L command
   Indicate the Log of past 31 cases which software recorded.

(8) Indication of Help : H command
   Indicate the command list.

☆ Examples of operation

```
LONGW> (H)elp with commands        Press H  Command list
  H -- (H)elp with commands.
  C -- (C)heck D3-NET Interface.
  S -- (S)et AC : ON or OFF.
  G -- (G)et AC Status : ON or OFF.
  R -- (R)estart LON Gateway.
  N -- Print (N)euron ID.
  V -- Print (V)ersion Number.
  L -- Print (L)ogs.
LONGW> (C)heck D3-NET Interface    Press C  Check the D3 NET status
    OK : D3 Master/Slave setting.
    OK : D3 address setting.
    OK : D3 Pole detection (photo coupler).

    ┌─────────────────────────────────────────────┐
    │   Indication of Master duplication error      │
    │      Error MA : Duplicate D3 master.          │
    │         Correct the Master/Slave connector    │
    │         and Restart LON Gateway.              │
    │   Indication of D3 address duplication error  │
    │      Error MC : Duplicate D3 address.         │
    │         Correct the address                   │
    │         and Restart LON Gateway.              │
    │   Indication of D3 polar decision error (photo coupler error) │
    │      Error M1 : D3 Pole Error.                │
    │         Check the photo coupler.              │
    └─────────────────────────────────────────────┘
LONGW>
```

☆Operation example (continued)

LONGW> (R)estart LON Gateway    *Press R*  Restart DMS- IF
    Are you sure to restart LON Gateway? Hit Y or [N]:Y    *Press Y*
    Again, Restart LON Gateway, OK? Hit Y or [N]:    *Press Y* again

    DMS-IF restarts at this point

---

Indication of cancellation while processing

LONGW> (R)estart LON Gateway
    Are you sure to restart LON Gateway? Hit Y or [N]:N
Not restart LON Gateway.
LONGW> (R)estart LON Gateway
    Are you sure to restart LON Gateway? Hit Y or [N]:Y
    Again, Restart LON Gateway, OK? Hit Y or [N]:N
Not restart LON Gateway.
LONGW>

---

LONGW> (S)et AC : ON or OFF    *Press S* AC ON-OFF command
Which AC do you wish to set? [1-64]   Enter :*13 (+Enter)*
Enter 1(ON) or 0(OFF) for AC13   Enter :*1 (+Enter)*
set AC13 ON  Complete   (No.13 Operation command)
LONGW> (G)et AC Status : ON or OFF    *Press G*  Monitoring of AC status
Which AC do you wish to see? [1-64]   Enter :*13 (+Enter)*
AC 13 is ON  state
LONGW> Print (N)euron ID    *Press N* Indication of NeuronID
    NID is 0:a2:3:36:1:0
LONGW> Print (V)ersion Number    *Press V* Indication of version
    Ver.is 1.00
LONGW> Print (L)ogs    *Press L* Indication of Log
 0Day 00:00:00 from Start:  Info : LON Gateway Started OK
 0Day 00:08:03 from Start:  Info : Restarted by Service Man

      ⋮    (Indication of 31 cases)

NO DATA
Running time is    98Day 12:34:21 from Start    (Elapsed time from the latest restart)
LONGW>

☆The list of recorded sentences in LOG

---

Information
"Info : LON Gateway Started OK"          Start LON Gateway
"Info : Restarted by Service Man"         DMS-IF is restarted by serviceman PC
"Info : Found MIP reset"                      NeuronChip is initiated from LON network
"Info : miRESET Sent OK"                     Initiated NeuronChip
"Info : miFLUSH_CANCEL Sent OK"                Started NeuronChip
"Info : Reopened network driver"           Reopened LON i/f

Error information
"Error MA : Duplicate D3 master."         D3 Master duplication error
"Error MC : Duplicate D3 address."        D3 Address duplication (0x04) error
"Error M1 : D3 Pole Error."               D3 Pole judgement error (photo coupler error)
"Error : D3 Send Timeout."                D3 Transmission of time out error
"Error : D3 Send buffer Full."            D3 Transmission of buffer full error
"Error : H8Comm: Packet length Error"       D3 There is an error in receiving packet size
"Error : NvCP on BBRAM. Checksum Error"     There was an error in configuration parameter on nonvolatile memory
"Error : NvConfig on BBRAM. Checksum Error"  There was an error in bind information on nonvolatile memory
"Error : LDBUF Overflow"                  Lon->D3 notification overflowed from buffer
"Error : Could not reopen network driver"  Could not reopen LON i/f

# 9. Check List

| Test No. | Items | Indication of results | Decision | Criteria |
|---|---|---|---|---|
| | • **Check the DIII NET status**<br><br>  • Issue C command.  No error in indication is acceptable<br><br>• **Confirm AC ON-OFF**<br><br>  • Issue AC operation command (S command) and operate the corresponding indoor unit<br><br>  Note) To be carried out by each connected indoor unit. | | | All indication shall be OK<br><br><br>Confirm with all the indoor units |

# 10. Troubleshooting

| No. | Items | Check point | Measures |
|---|---|---|---|
| 1 | SERVICE LED flashes | Is the backup battery effective switch turned ON? | Information on settings related to LONWORKS network has disappeared. After setting the switch to effective, request NI to redo the binding work. |
| 2 | SERVICE LED lights up | – | It is a failure of hardware. Replace the body. |
| 3 | While checking the DIII NET status, the following error was indicated. | | |
| | Error MA : Duplicate D3 master. | Master duplication error<br><br>It occurs when used together with the other centralized equipment. There are multiple units of centralized equipment with connectors for setting centralized masters. | As for the equipment with connectors for setting the centralized master, the number allowed to exist on the DIII NET is no more than one. Remove all the connectors except for DMS-IF for setting the centralized masters from the centralized equipment (It is necessary to reset the power supply of all the centralized equipment) Note) If the centralized equipment with a function to calculate the power rates (such as iController) is used together, set this equipment to become the centralized master. |
| | Error MC : Duplicate D3 address. | D3 address duplication error<br><br>Are multiple DMS-IF mounted on DIII NET? Is Masterstation2 mounted on DIII NET? | The equipment shown left cannot be used together.<br><br>Confirm which equipment can be used together for centralization. |
| | Error M1 : D3 Pole Error. | D3 Pole decision error | It is an error of control PCB. Replace the body. |

# Part 8
# Instructions on How to Use
# LonMaker Ver 3.1

# 1. Instructions on How to Use LonMaker Ver 3.1

This describes how to use LON Maker
1. Creating New Network
2. Commissioning
3. How to finish and to use created networks

## 1.1 Creating New Network

After opening the Lon Maker stand-up you will see the following display. From here click "New Network".
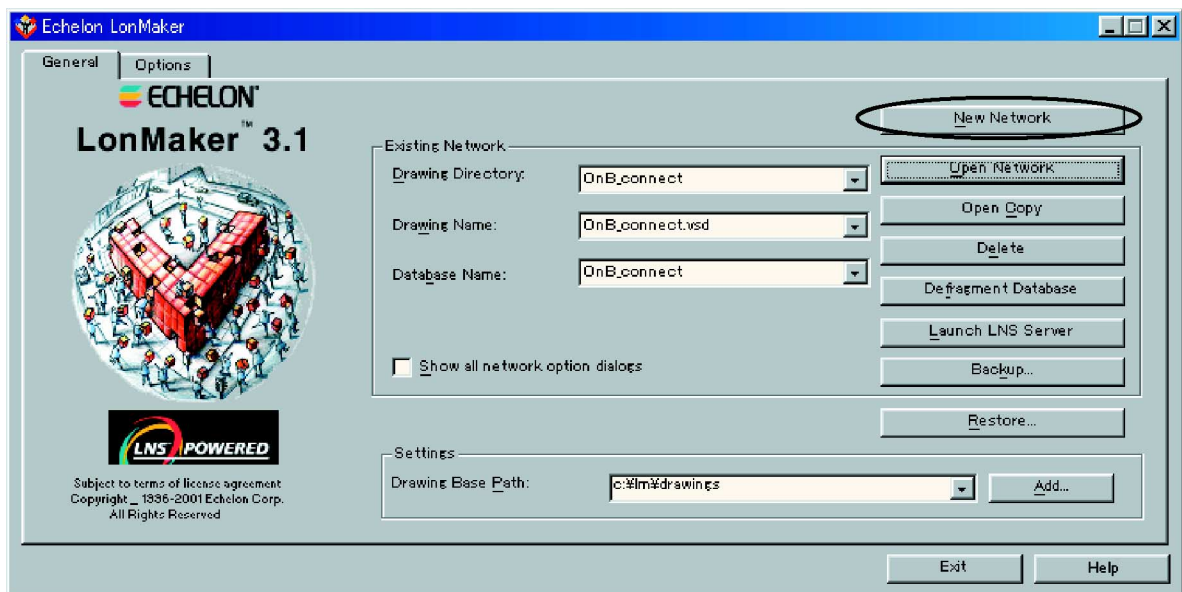


Click "Enable Macros"
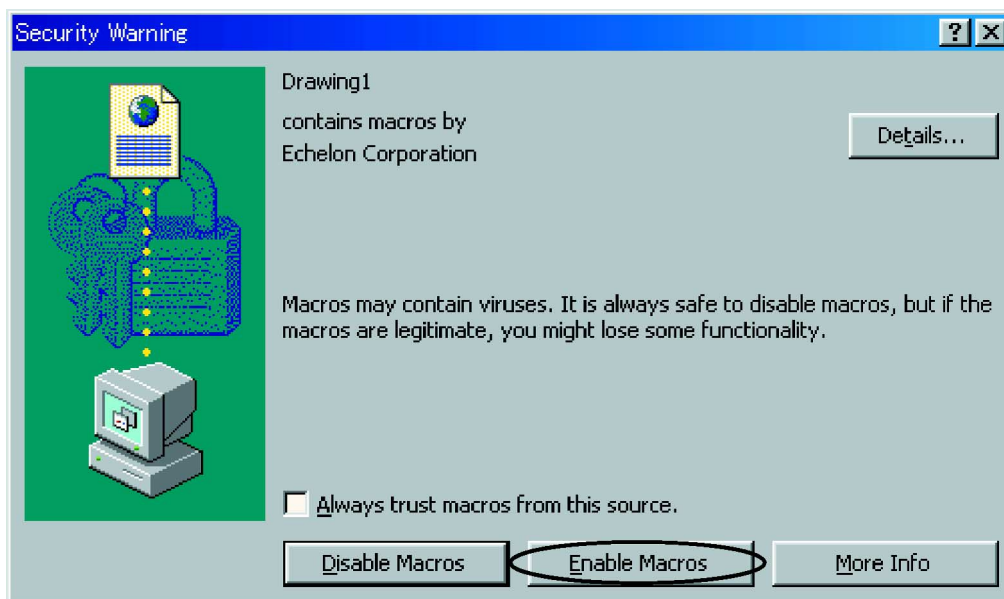
Input the name in "Network Name" and click next.
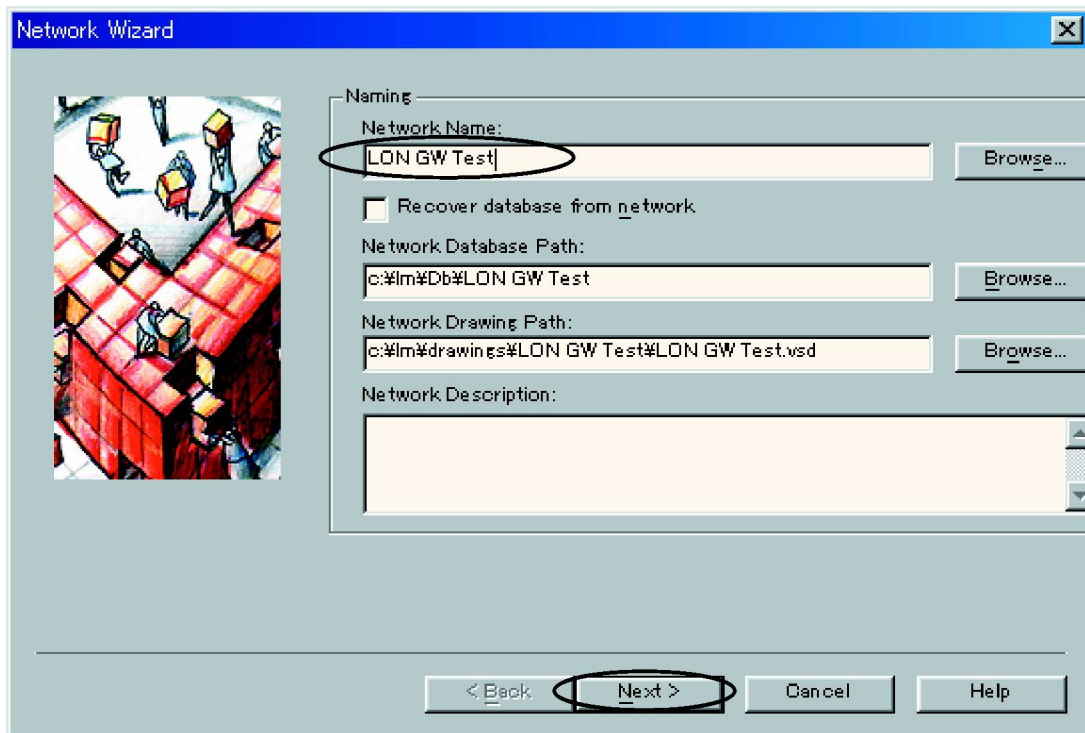


Check the "Network Attached" box, select Network Interface name (such as PCC-10 and the like) and click "Next" button.
If you skip this prompt next time, please check the "Skip this prompt when re-opening this drawing" box.
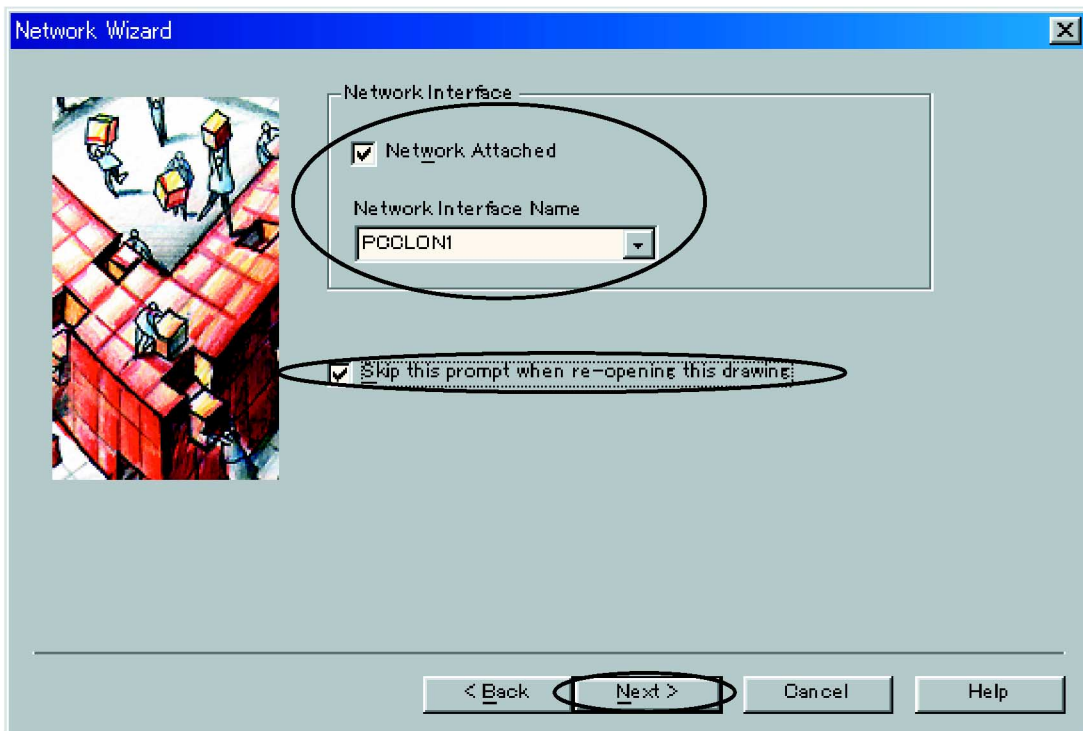
Make sure the Onnet is checked for management Mode and click "Next" button. Check "Skip this prompt when re-opening this drawing, if you skip this prompt next time.
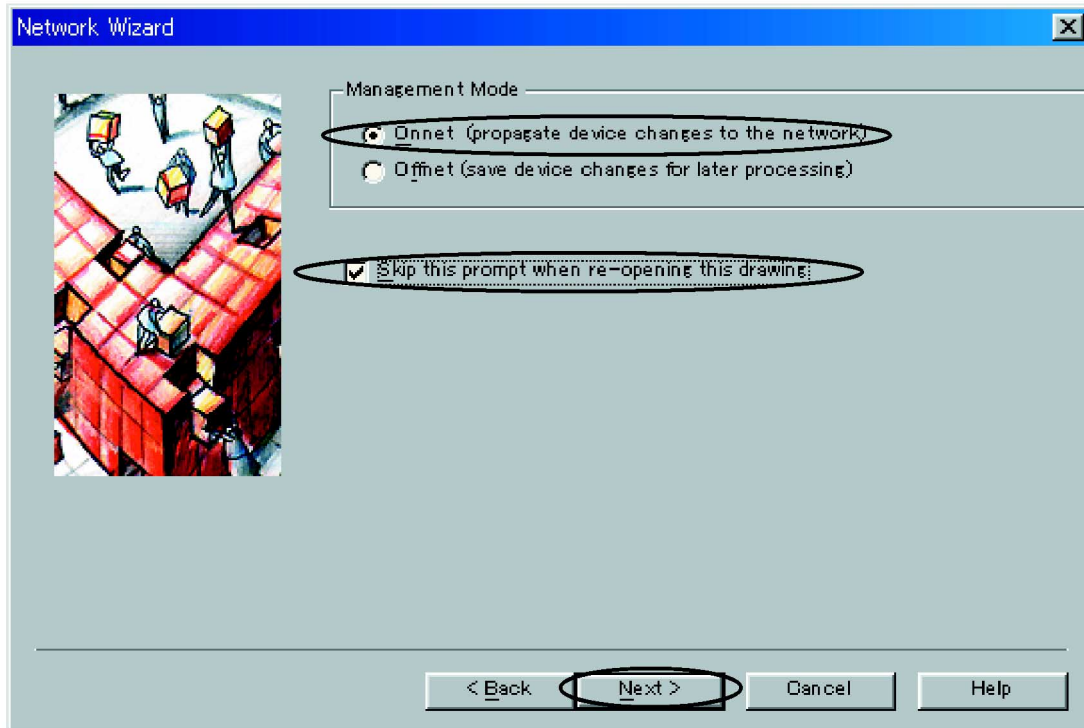


Make sure that these items are in "To be registered" and click "Finish" Button
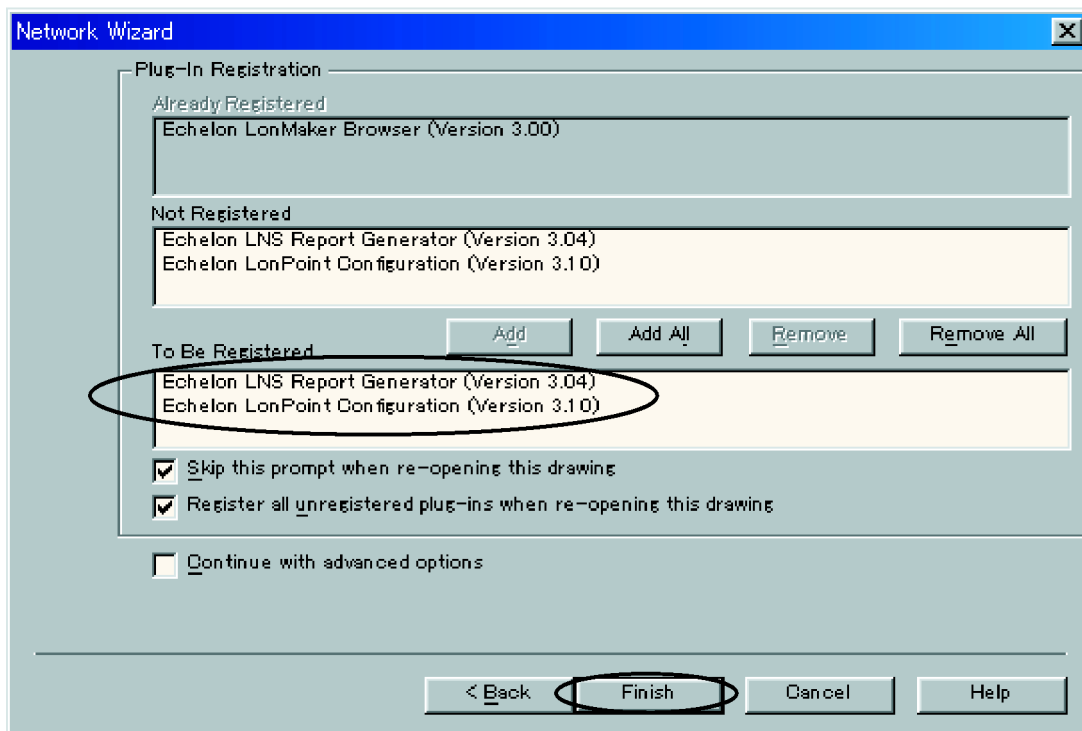
After a few minutes the new network will be created and the following window displayed.
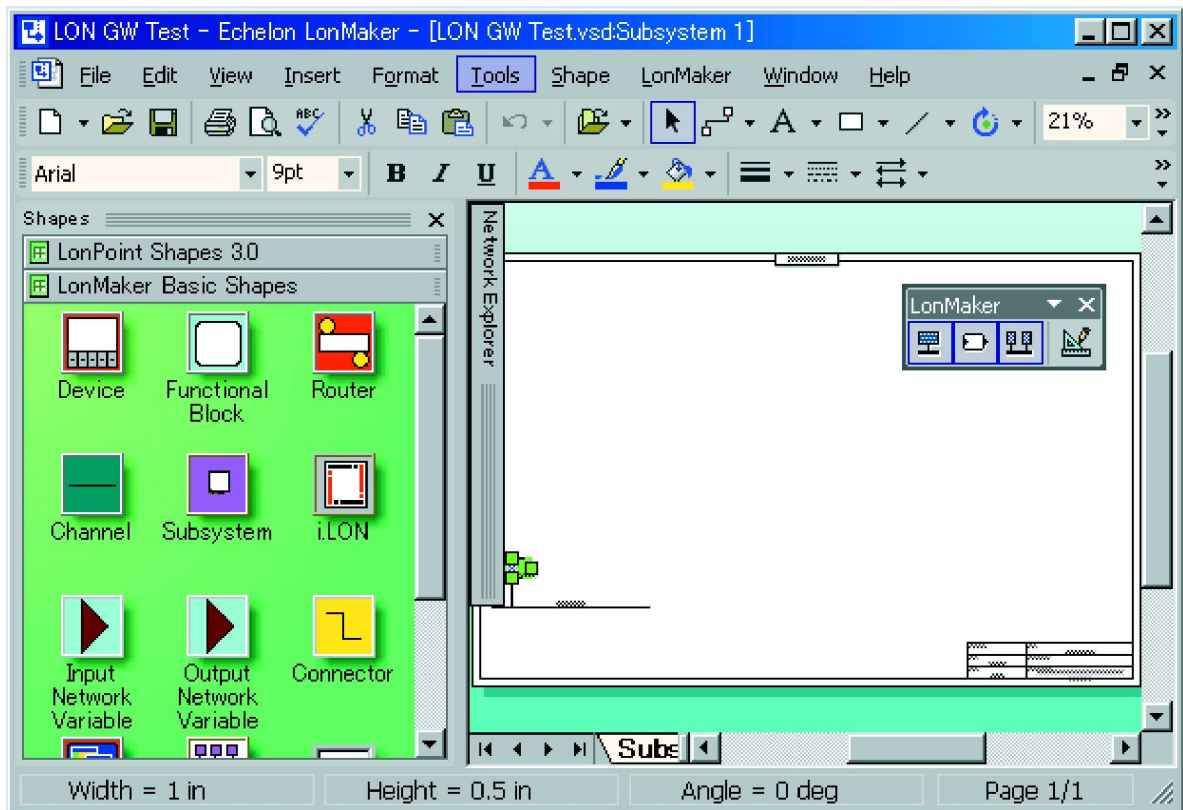


## 1.2    Commissioning

Drag "Device" from "Lon Maker Basic Shapes" and drop the right graph, then the "Device Name" input is displayed. Input the name when binding without actual equipment ("Commissioning device" is not checked). In this case check it and  click "Next".
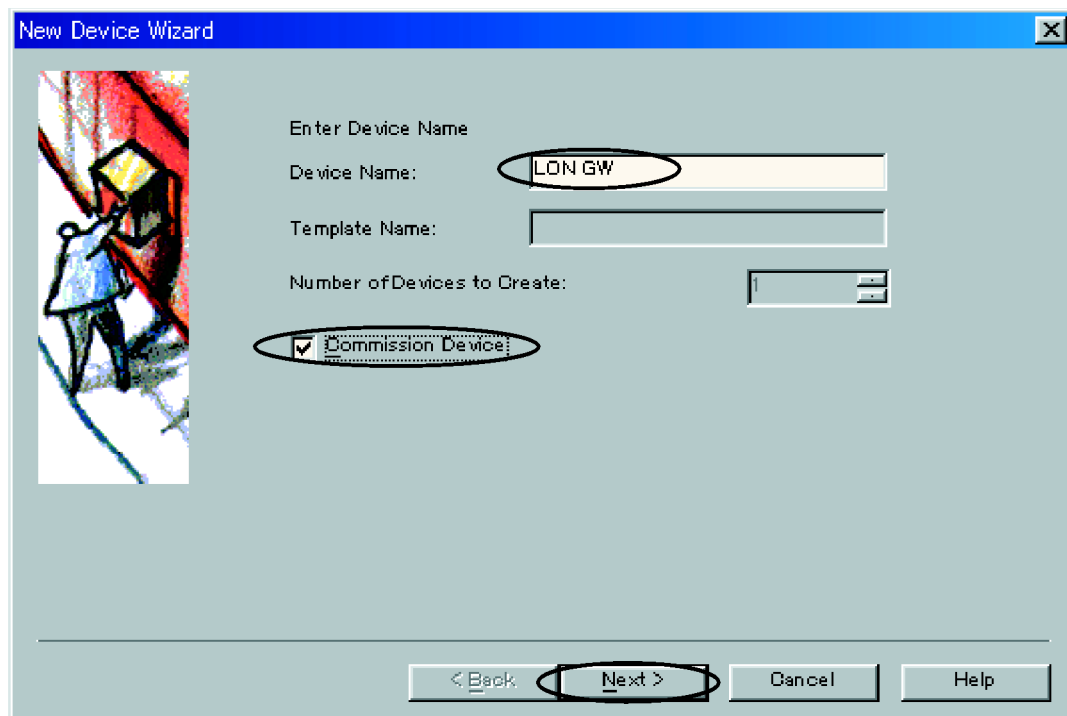
Select "Load XIF" from External Interface Definition and click "Next".
When Upload from Device is selected it is possible to upload the same data as XIF file from the LON device.
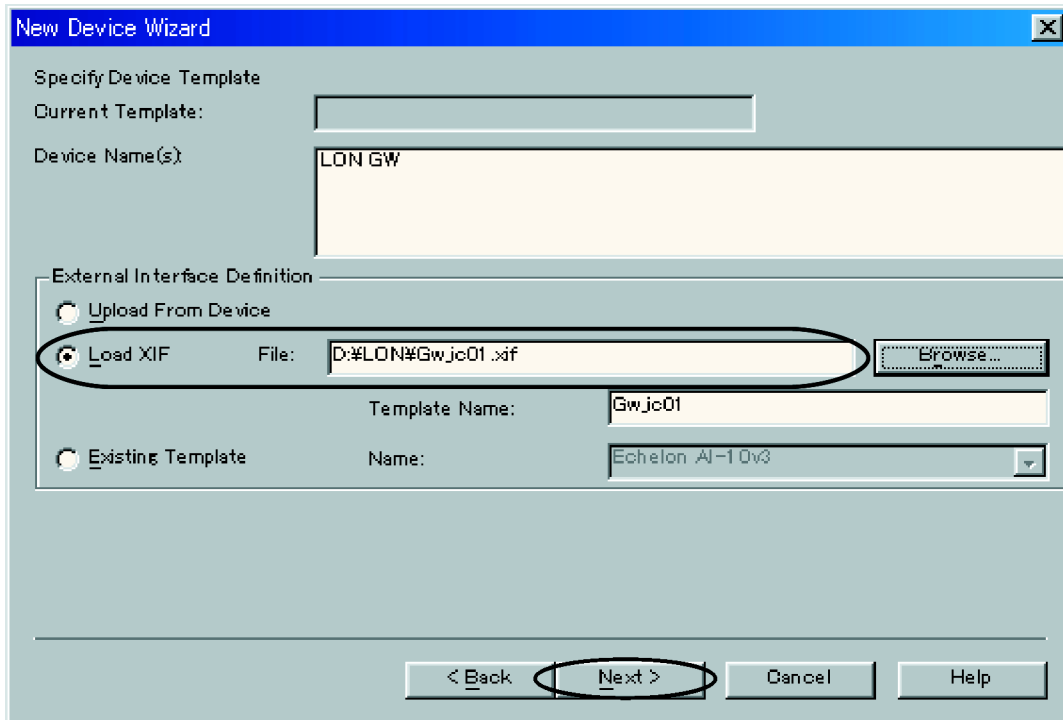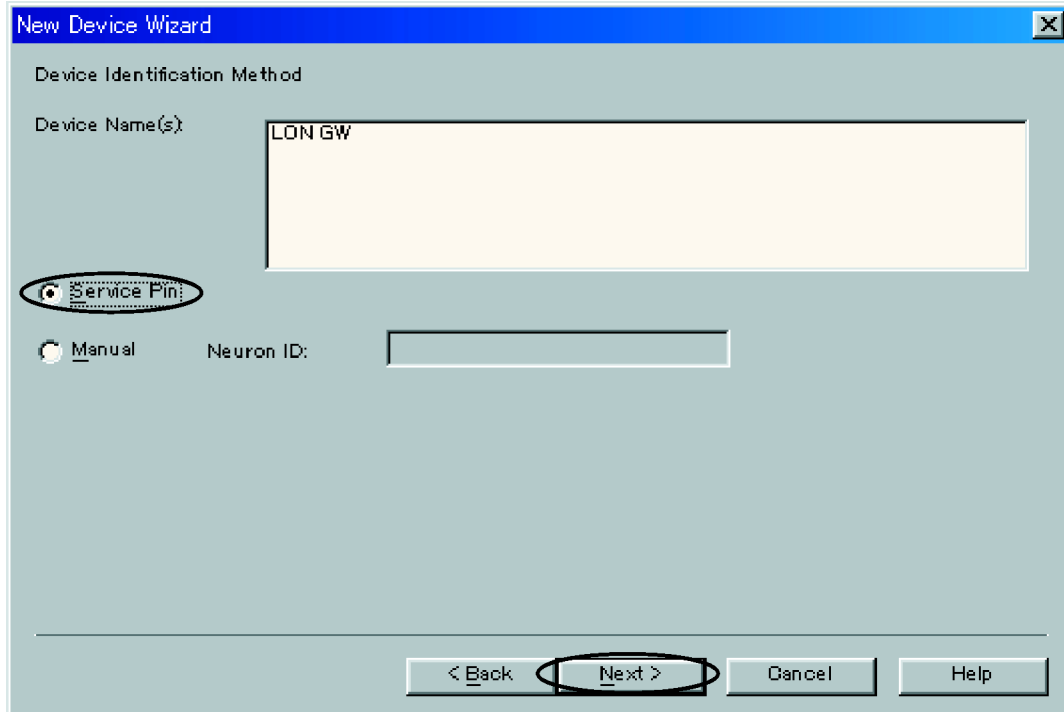


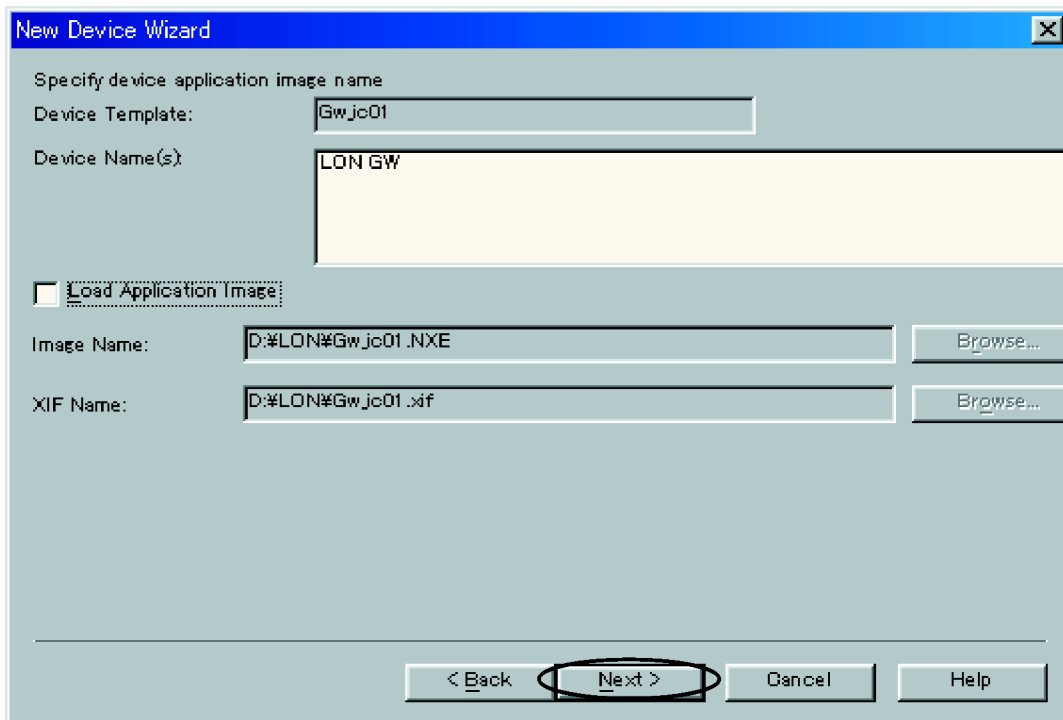Confirm the following and click "Next".
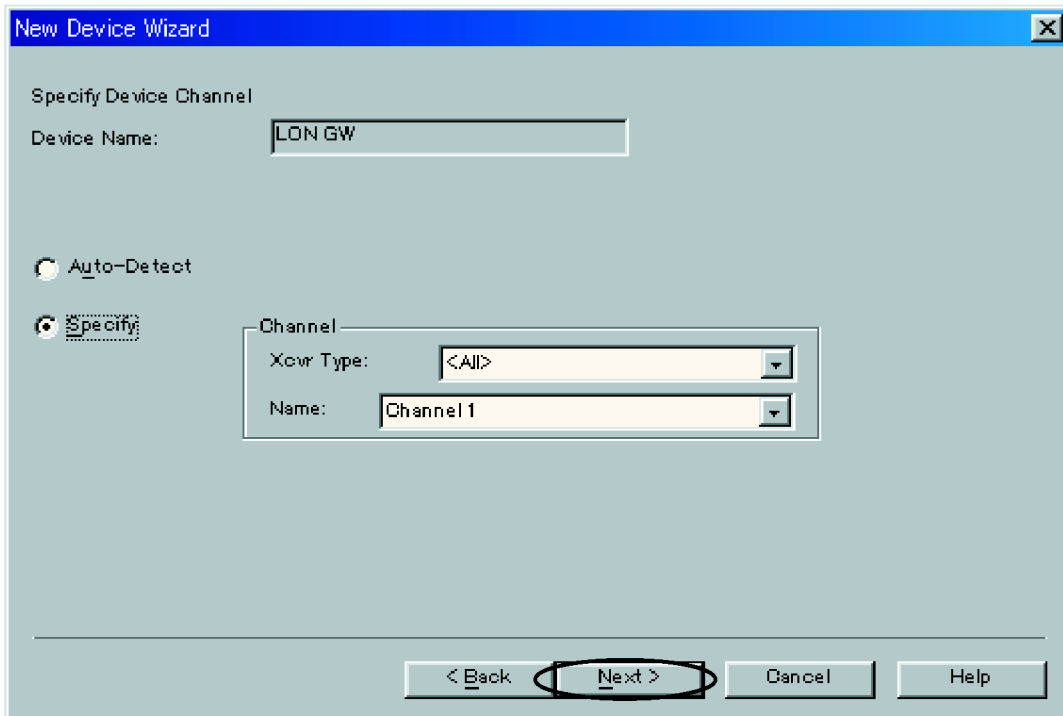
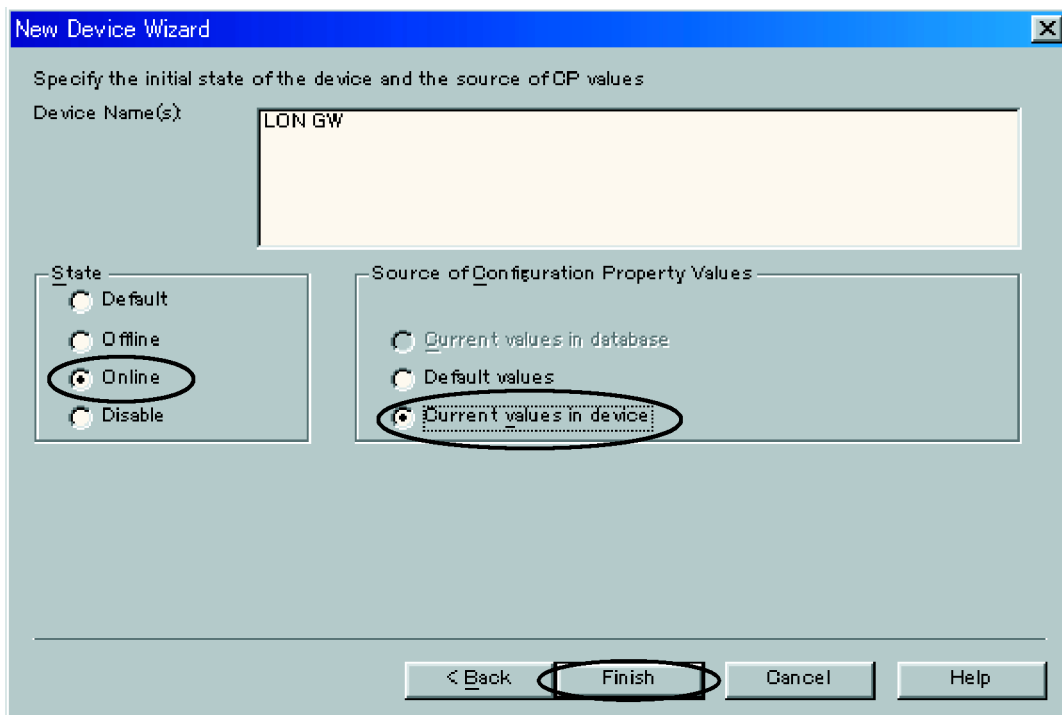Confirm the following and click "Next".
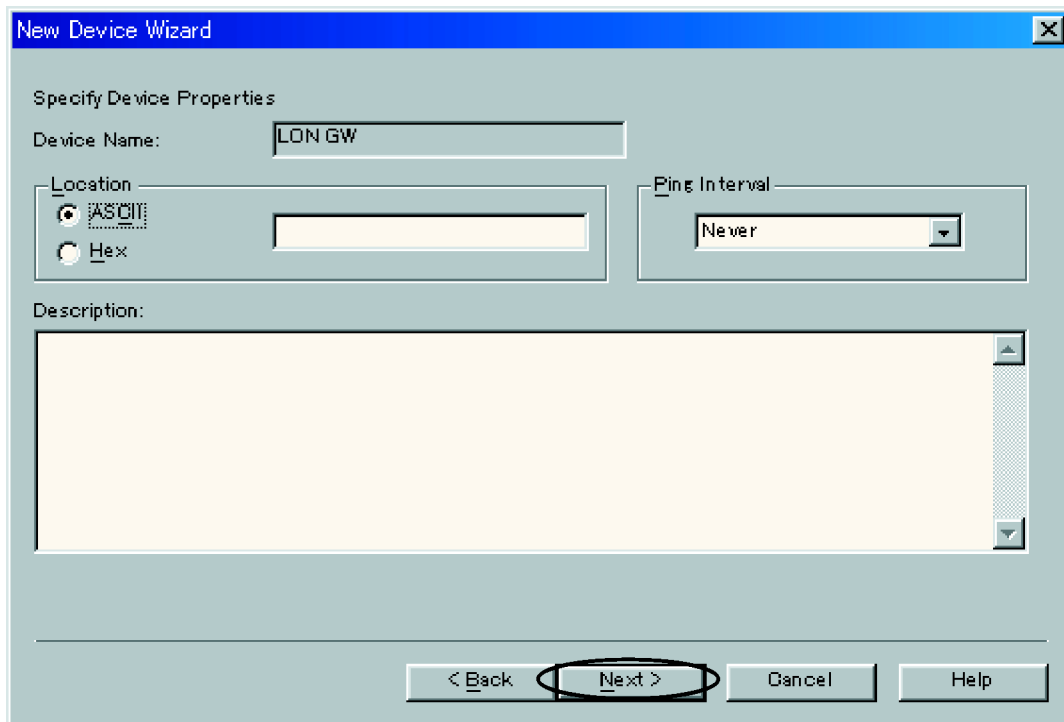


Select "Service Pin" and click "Next". When manual is selected, it is possible to input the Neuron ID manually.

Confirm the following and click "Next" button.

Select "Online" from "State" and "Current values in device" from "Source of configuration on property values", then click the "Finish" button.

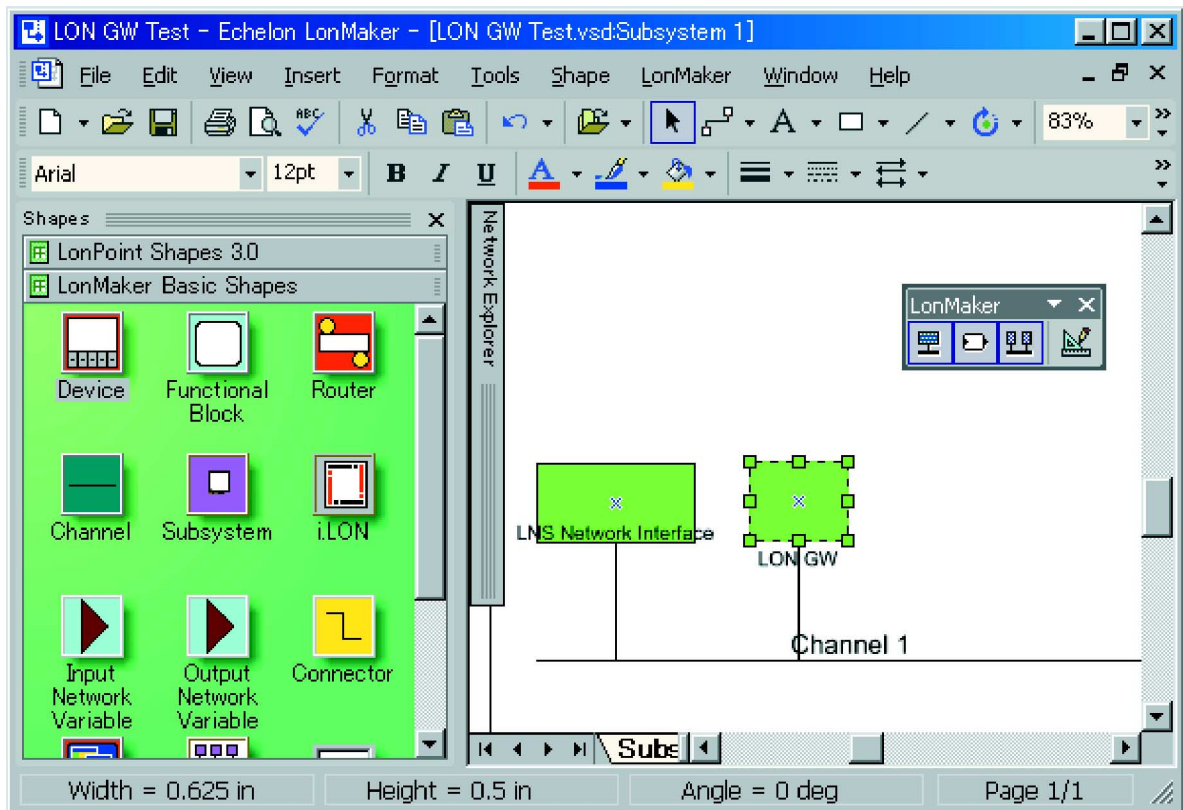When the prompt below is displayed, press service switch on LON Gateway.



The service switch is shown as blow.



During commissioning, the following prompt is displayed. (Message varies upon situation)
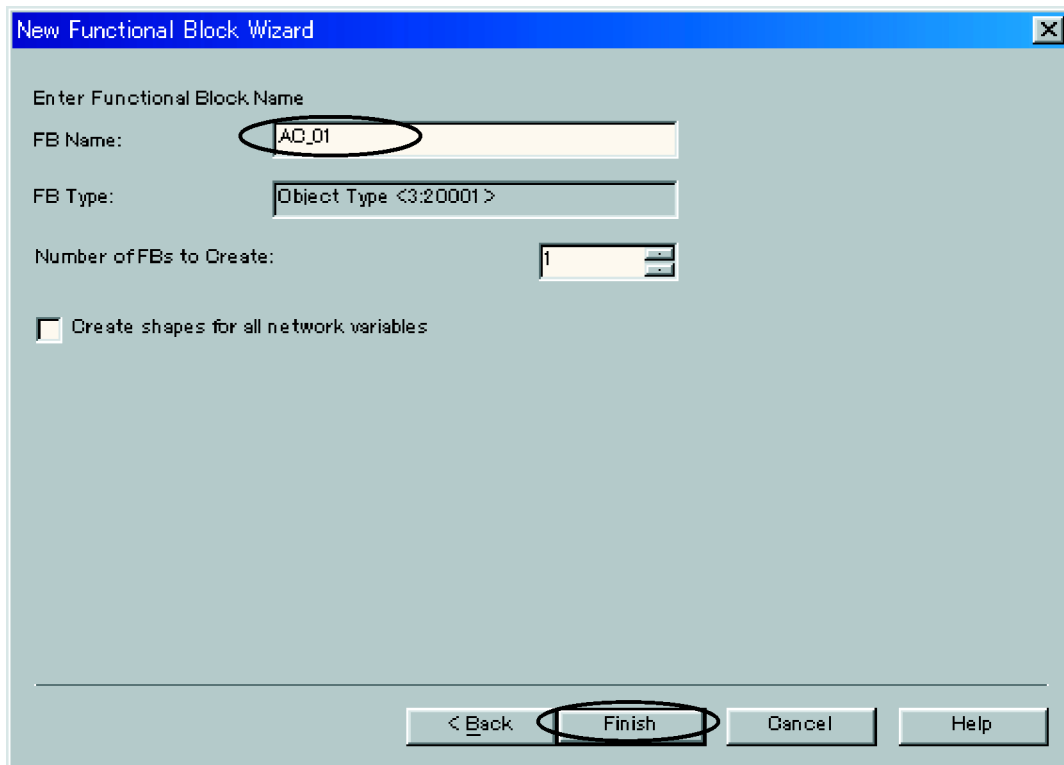
After commissioning, the commissioned node is displayed on the screen.



Drag the "Function Block" from Lon Maker Shapes" and drop it on the right graph. Then the following prompt is displayed. Select Device Name and choose LON GW, then select Function Block Name and choose "AC_01" and click "Next" button.
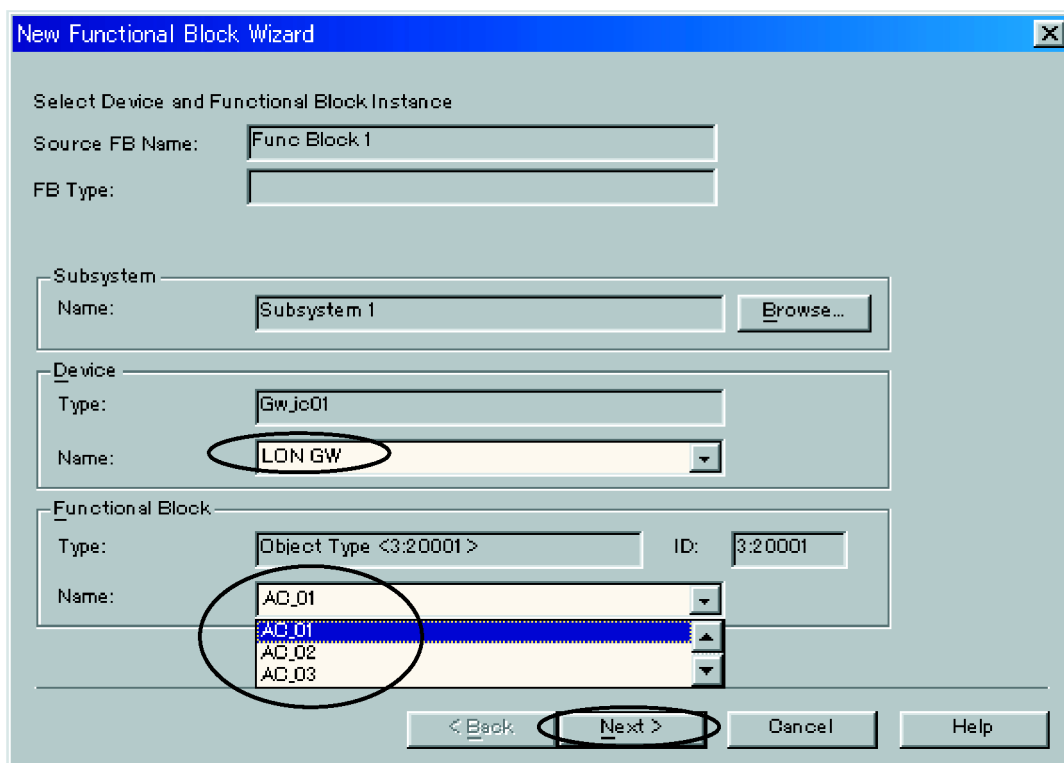
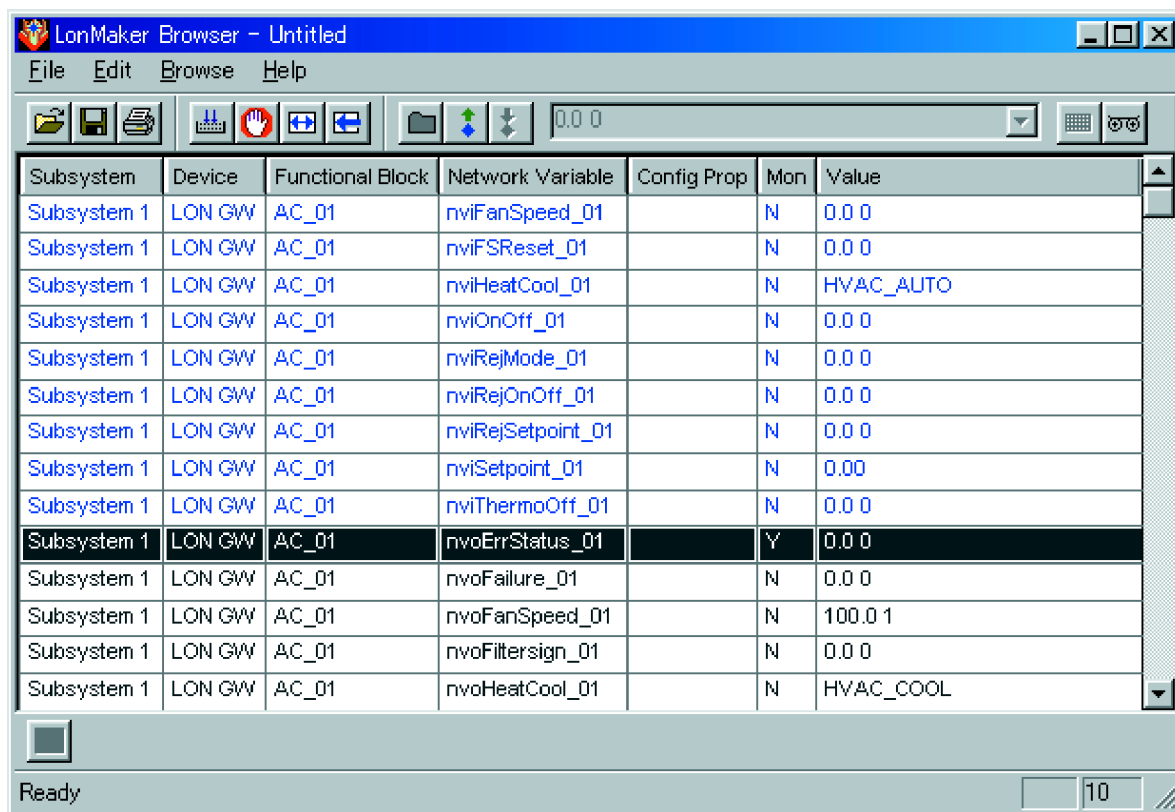Input the name and click "Finish" button.



The "Function Block" is displayed on the following screen.
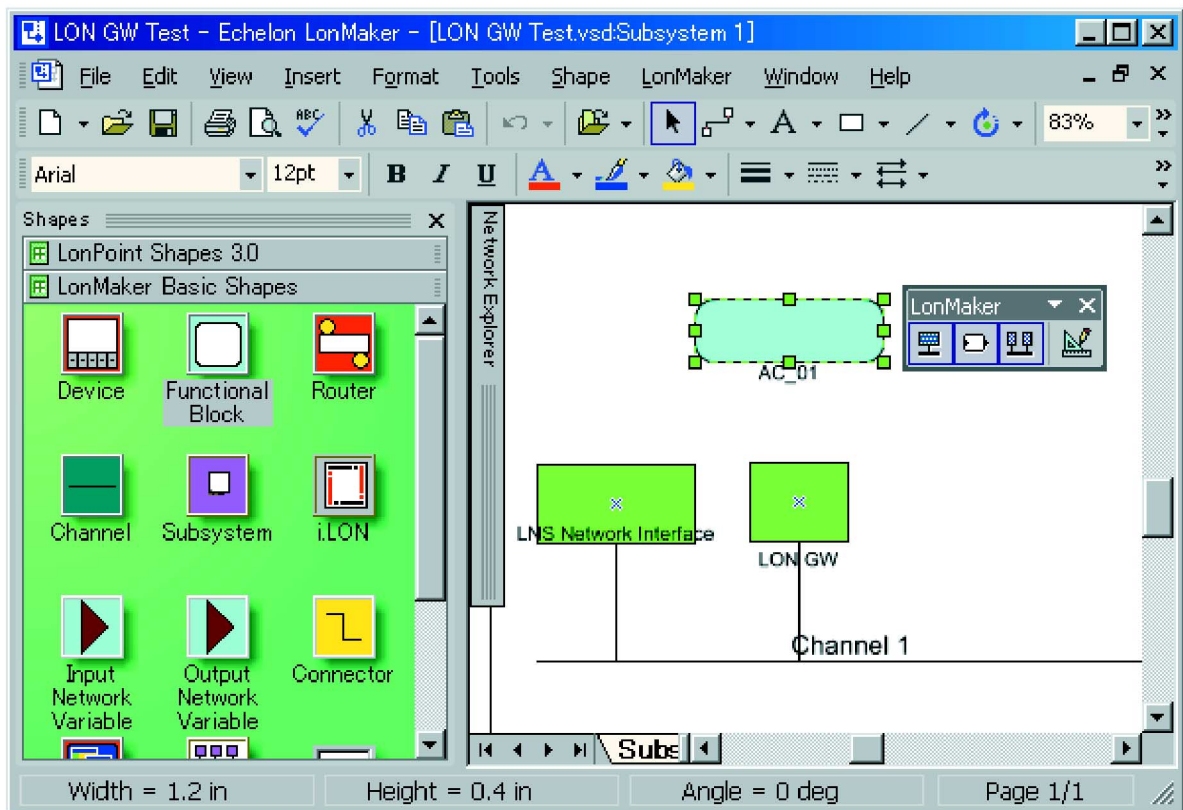
Right click on "Function Block" and select "Browse ...". The following window opens and network variables of its AC_01 objects are displayed.
Select "Monitor All on " from the menu browse and all values of all network variables can be monitored.

Similarly select "Monitor all off" from menu browse, and then monitoring all network variables is stopped. When you monitor one value of network variable, you can then click the corresponding network variable and press Ctrl+M. Network variable is displayed as "Y" in Mon.

LonMaker Browser – Untitled

File  Edit  Browse  Help

| Subsystem | Device | Functional Block | Network Variable | Config Prop | Mon | Value |
|---|---|---|---|---|---|---|
| Subsystem 1 | LON GW | AC_01 | nviFanSpeed_01 | | N | 0.0 0 |
| Subsystem 1 | LON GW | AC_01 | nviFSReset_01 | | N | 0.0 0 |
| Subsystem 1 | LON GW | AC_01 | nviHeatCool_01 | | N | HVAC_AUTO |
| Subsystem 1 | LON GW | AC_01 | nviOnOff_01 | | N | 0.0 0 |
| Subsystem 1 | LON GW | AC_01 | nviRejMode_01 | | N | 0.0 0 |
| Subsystem 1 | LON GW | AC_01 | nviRejOnOff_01 | | N | 0.0 0 |
| Subsystem 1 | LON GW | AC_01 | nviRejSetpoint_01 | | N | 0.0 0 |
| Subsystem 1 | LON GW | AC_01 | nviSetpoint_01 | | N | 0.00 |
| Subsystem 1 | LON GW | AC_01 | nviThermoOff_01 | | N | 0.0 0 |
| Subsystem 1 | LON GW | AC_01 | nvoErrStatus_01 | | Y | 0.0 0 |
| Subsystem 1 | LON GW | AC_01 | nvoFailure_01 | | N | 0.0 0 |
| Subsystem 1 | LON GW | AC_01 | nvoFanSpeed_01 | | N | 100.0 1 |
| Subsystem 1 | LON GW | AC_01 | nvoFiltersign_01 | | N | 0.0 0 |
| Subsystem 1 | LON GW | AC_01 | nvoHeatCool_01 | | N | HVAC_COOL |

Ready                                                                   10

## 1.3    Closing and Using the Created Network

Closing Lon Maker is carried the same as for Windows application.
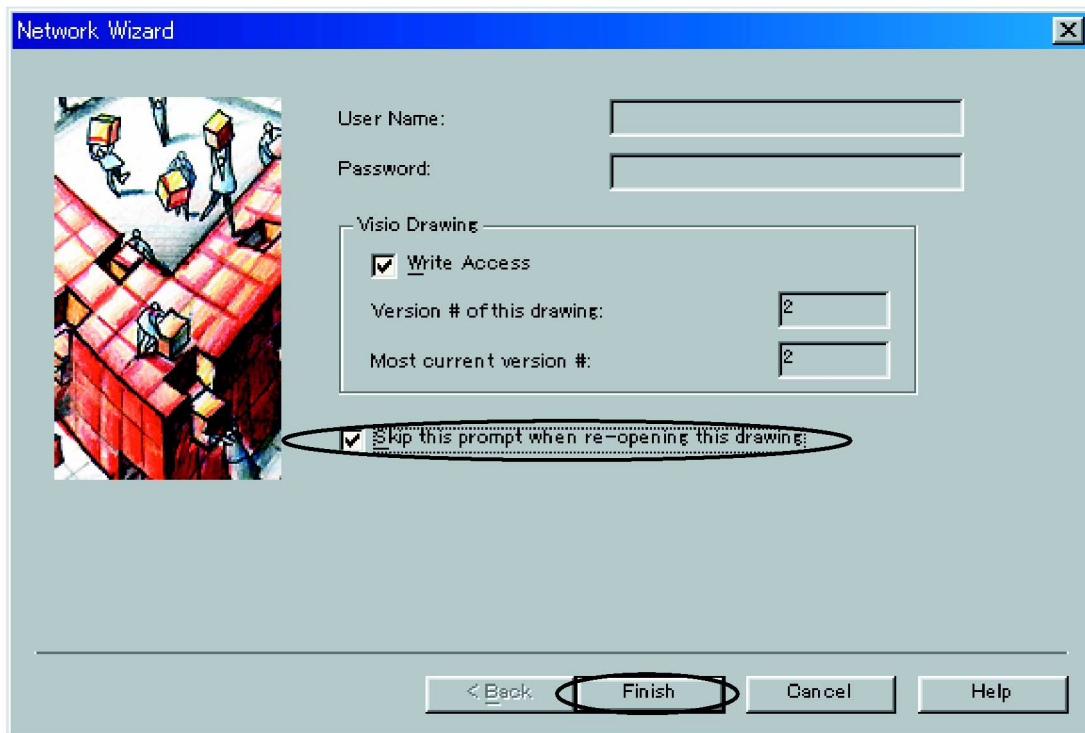In order to use created network, run Lon Maker, select created network form existing network and click open network.
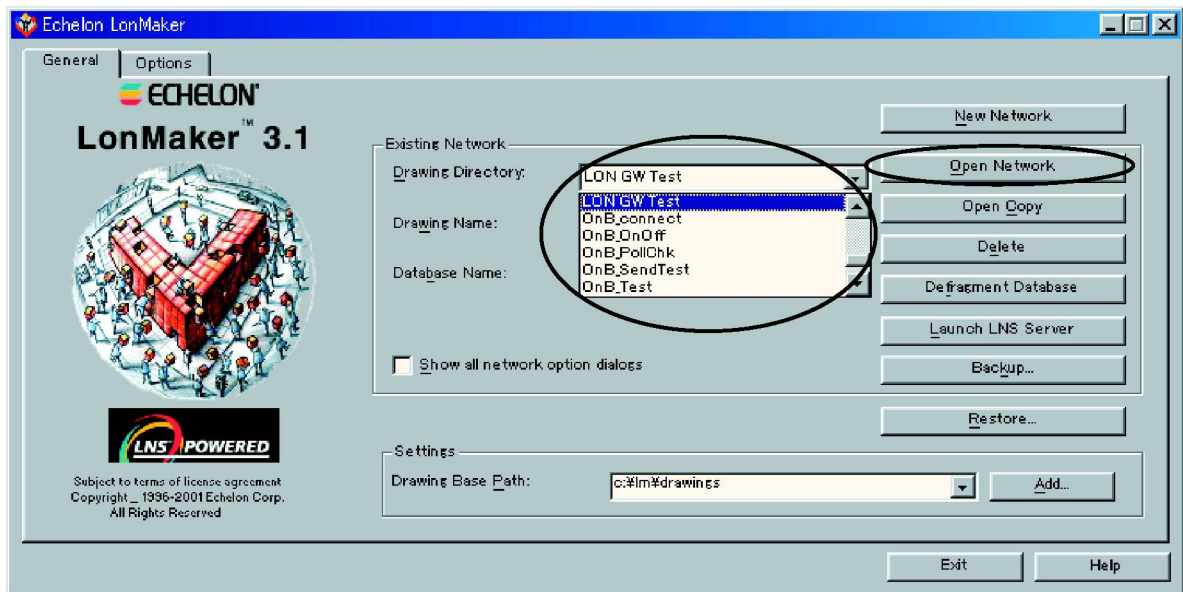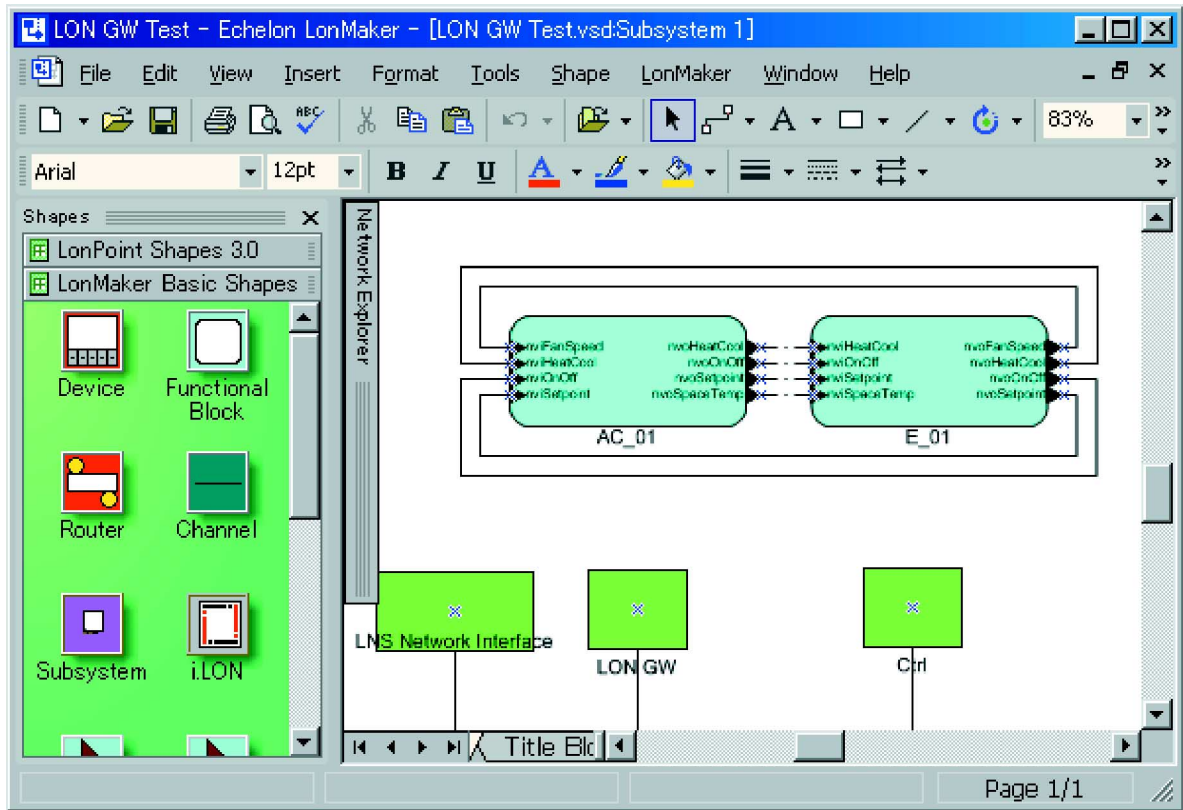
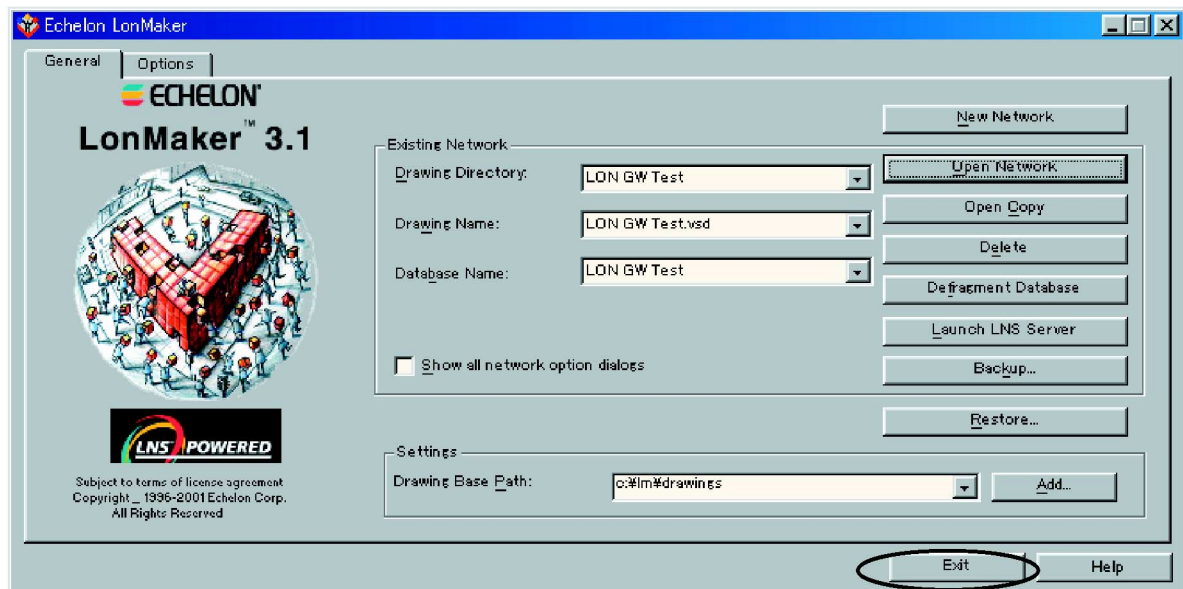Click "Enable macros" Button.
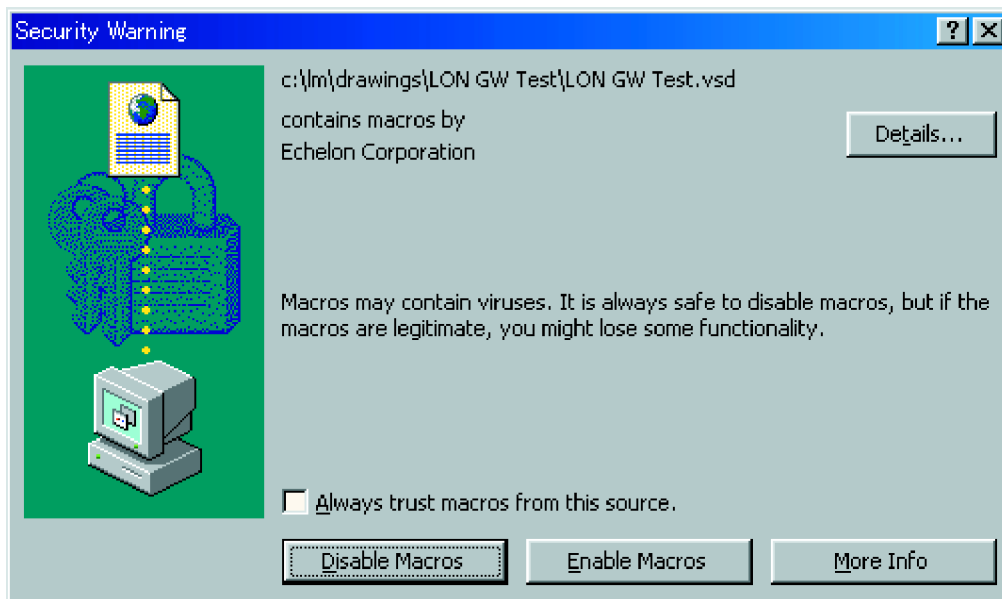


Click "Finish" when you see this prompt. Check "Skip this prompt when re-opening this drawing."

Previously saved network is displayed.

To close and finish click on "Exit".

# Part 9
# Installation Manual
# (DMS504B51)

# 1. Installation Manual

## 1.1 DMS504B51

Please carefully read the "Safety Precautions" as follows and install the controller as instructed.

● The precautions given herein are classified as " ! WARNING" and " ! CAUTION". However, particular precautions which, unless they are observed in installing that could result in death and serious injury are identified by "! WARNING". Needless to say even other precautions which are not identified by "! CAUTION" could lead to a serious accident unless they are observed. Therefore, please do not fail to observe these precautions.

● After completion of the installation, please conduct a test run on the controller to check that it is free from any fault and in addition simultaneously instruct the user how to operate and maintain it correctly (in accordance with the Operation Manual). Furthermore, request the user to keep this manual together with the Operation Manual for future reference.

### ⚠ WARNING

The installation work must be requested by the dealer.
Installation by user himself could cause electric shock, fire, etc.

Install correctly in accordance with this installation manual.
Incorrect installation, if any, may cause electric shock, fire, etc.

Installing; don not fail to use the accessories and specific parts which are supplied together with the indoor unit.
Failure to observe this instruction may cause electric shock, fire, etc.

Perform correctly the electric wiring connection using the specified cables and firmly clamp each terminal connector to prevent cable load from being transferred thereto.
Unstable and improper cable connecting and clamping could cause overheat, fire, etc.

### ⚠ CAUTION

Grounding.
Do not connect the grounding wire to any of gas pipes, city water pipes, lightning rods, or telephone grounding wire. Imperfect grounding would cause electric shock.
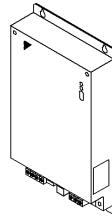
Avoid installing at the following locations.
1. Cuisine and other place where the controller is inevitably exposed to mineral oil, scattered oil or steam. Installing at such places could cause deterioration of the resin parts, corrosion or short circuit.
2. Where corrosive gases such as sulfur dioxide generate inevitably.
3. Where a machine as generates electromagnetic waves. Installing at such a place could cause trouble of the control line and failure of normal air-conditioning operation.
4. Where leak of combustible gas is forecast and place where volatile ignitable gases such as thinner, gasoline, etc. are handled.
   Should such gas leak and accumulate around the devices, could cause igniting.
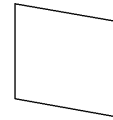SETTING THE BACPUP BATTERY SWITCH.

# 1 Components

The following parts are attached to this unit.
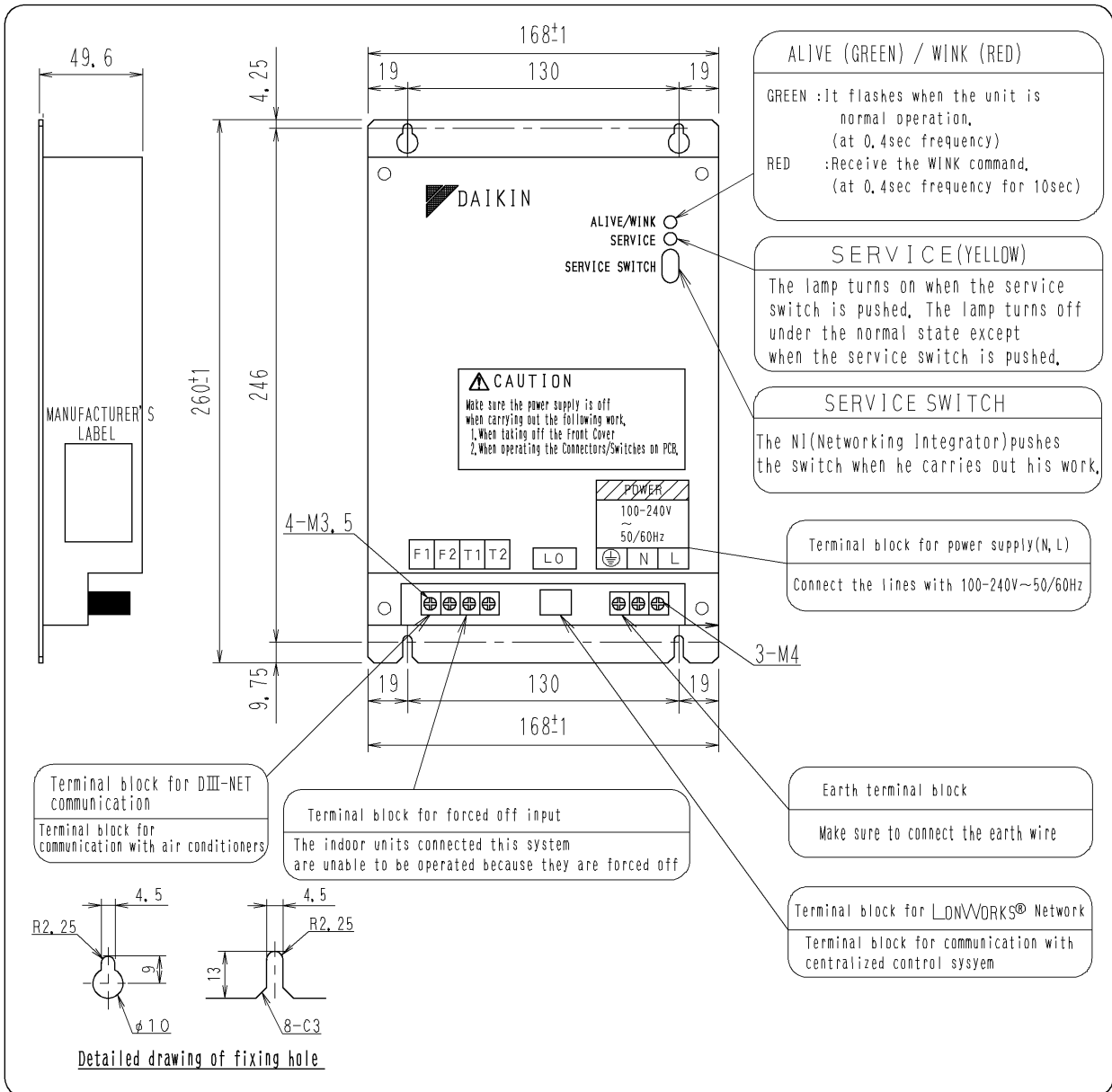Make sure to check them before installation.

DMS-IF
DMS504B51

INSTALLATION MANUAL

# 2 Names and functions of each part

49.6

4.25

168±1

19    130    19

DAIKIN

ALIVE/WINK
SERVICE
SERVICE SWITCH

**ALIVE (GREEN) / WINK (RED)**

GREEN : It flashes when the unit is normal operation.
(at 0.4sec frequency)
RED : Receive the WINK command.
(at 0.4sec frequency for 10sec)

**SERVICE (YELLOW)**

The lamp turns on when the service switch is pushed. The lamp turns off under the normal state except when the service switch is pushed.

**SERVICE SWITCH**

The NI(Networking Integrator)pushes the switch when he carries out his work.

260±1

246

MANUFACTURER'S LABEL

⚠ CAUTION
Make sure the power supply is off when carrying out the following work.
1. When taking off the Front Cover
2. When operating the Connectors/Switches on PCB.

POWER
100-240V
~
50/60Hz

4-M3.5

F1 F2 T1 T2    LO    N L

**Terminal block for power supply(N, L)**

Connect the lines with 100-240V~50/60Hz

9.75

19    130    19

168±1

3-M4

**Terminal block for DIII-NET communication**

Terminal block for communication with air conditioners

**Terminal block for forced off input**

The indoor units connected this system are unable to be operated because they are forced off

**Earth terminal block**

Make sure to connect the earth wire

4.5    4.5

R2.25    R2.25

9    13

φ10    8-C3

Detailed drawing of fixing hole

**Terminal block for LONWORKS® Network**

Terminal block for communication with centralized control sysyem

## ❸ Installation

● Make sure to install the unit on the inside of the inaccessible and lockable (or needed to use exclusive tools to open) electrical component box installed indoors where the effect of electromagnetic wave or dust can be avoided.
The minimum depth required for installation is 80mm

● Keep the minimum amount of space indicated in the below drawing from walls, and between units when installed in series.

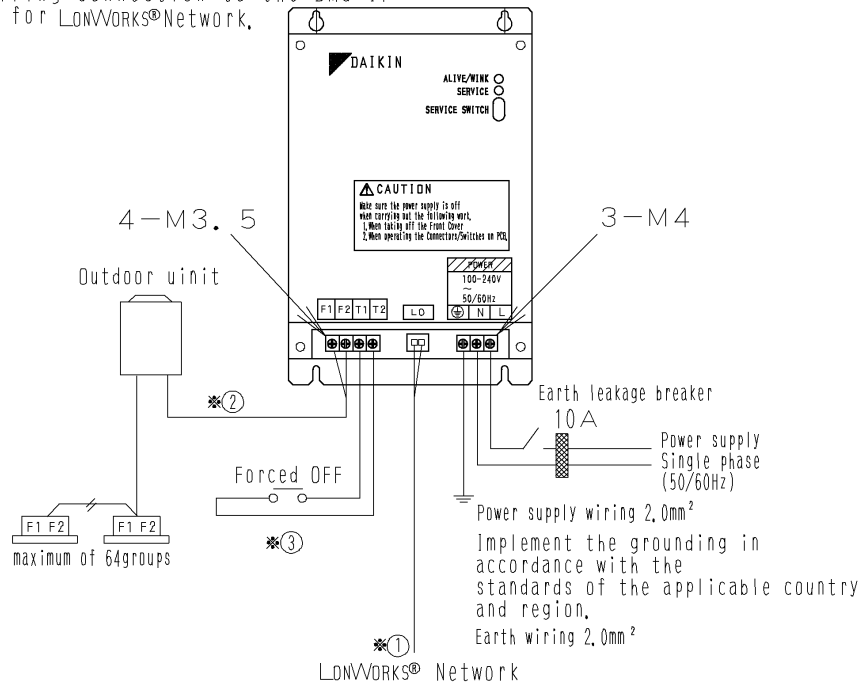● For installation direction follow the drawing shown below.

UP
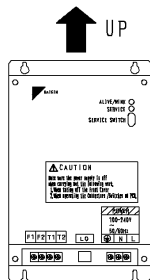
Make sure to install the unit vertically. Do not install the unit horizontally, because it may cause malfunction.

| 1)Electrical rating | (1)Rated voltage and frequency : Single phase AC100~240V 50/60Hz |
|---|---|
| | (2)Rated power consumption : maximum 5W |
| 2)Conditions | (1)Power supply fluctuation : ±10% |
| | (2)Ambient temperatyre : -10~+50℃ |
| | (3)Ambient humidity : 0~95% (Sweating is not acceptablle) |
| | (4)Preservation : -20~+60℃ |
| 3) Performance : Insulation resistance : 50MΩ or more by DC500 megohmmeter | |
| 4)Mass : 1.5Kg | |
| 5)Colour of the unit : stainless steel sus304-NO.4 | |

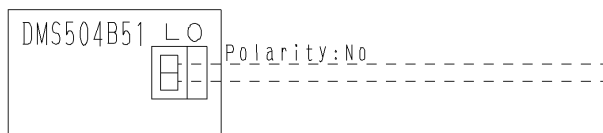Fix the DMS-IF firmly with the installation screws(M4)
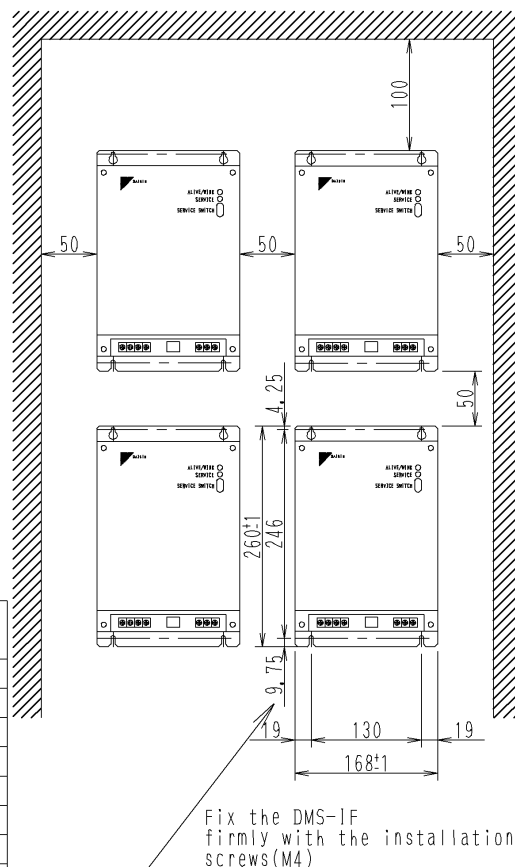
## ④ Electric Wiring Connection

● Use a round crimp terminal with reinforcing sleeve for safety wiring connection to the DMS-IF except the terminal for LᴏɴWᴏʀᴋs®Network.
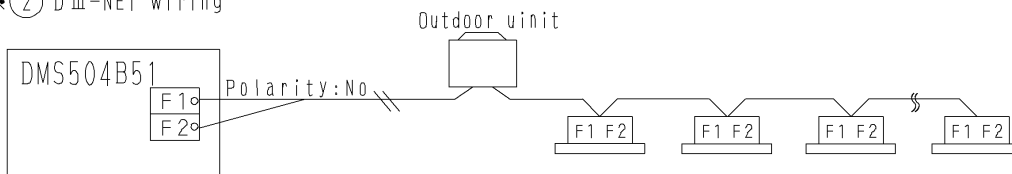


4-M3.5

3-M4

Outdoor uinit

F1 F2 T1 T2    LO    N L

※②

Forced OFF

F1 F2    F1 F2
maximum of 64groups

※③

※①

LᴏɴWᴏʀᴋs® Network

Earth leakage breaker
10A
Power supply
Single phase
(50/60Hz)
Power supply wiring 2.0mm²
Implement the grounding in accordance with the standards of the applicable country and region.
Earth wiring 2.0mm²

⚠CAUTION
Make sure the power supply is off when carrying out the following work.
1.When taking off the Front Cover
2.When operating the Connectors/Switches on PCB.

POWER
100-240V
50/60Hz

ALIVE/WINK
SERVICE
SERVICE SWITCH

DAIKIN

## ⑤ Wiring specification

▣ Everything relating with field wiring must be supplied in the field.

※① LᴏɴWᴏʀᴋs® Network communication wiring
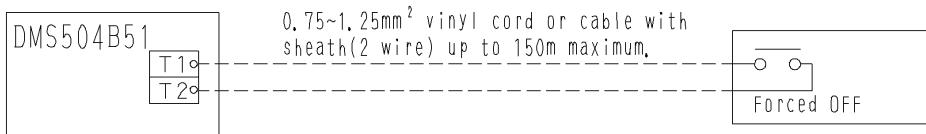Use the dedicated line for the LᴏɴWᴏʀᴋs®Network.

DMS504B51   LO

Polarity:No

※② DⅢ-NET wiring

Outdoor uinit

DMS504B51

F1
F2

Polarity:No

F1 F2    F1 F2    F1 F2    F1 F2

1. Do not use multicore cables with three or more cores.
2. Use wires of sizes between 0.75mm² and 1.25mm²
3. Wire length:Max 1000m

4. Do not bind the wire for DⅢ-NET
5. Wirings for DⅢ-NET must be isolated from the power lines.
6. Terminal contact size:M3.5

※③ Forced OFF

DMS504B51

| T1 |
| T2 |

0.75~1.25mm$^2$ vinyl cord or cable with
sheath(2 wire) up to 150m maximum.

Forced OFF

Cautions for wiring
When Forced OFF INPUT is kept on, the indoor units connected this system
are unable to be operated because they are Forced OFF.

1. Use a no voltage contact.
2. Use a contact which can guarantee minimum application load DC16V and 10mA.
3. Do not use multicore cables with three or more cores.
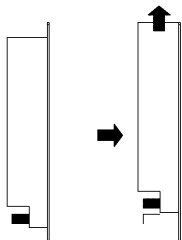4. Wirings must be isolated from the power lines.
5. Terminal contact size:M3.5.

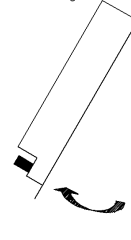## ❻ Names and functions of P.C.B ASSY

① How to open the cover
• Remove the 4 screws as shown
  in the drawing below
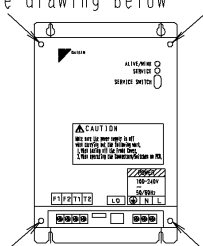
• Slide the cover upward

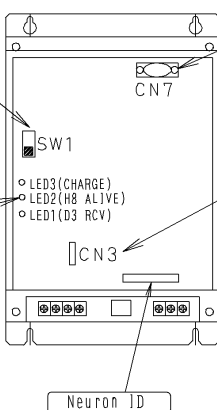• Lift the cover to the front as shown
  in the drawing

② Names and functions of P.C.B ASSY

Backup battery switch
• **Turn ON** the switch to bring
  the backup battery effective.
  This mark ■ shows the swtich
  position when DMS-IF is shipped
  out of the factory

CN7

Connector for service PC
• This connector is to be connected to the PC
  when commissioning is carried out
  by a service person

ON
OFF    SW1

Connector for setting the master
of centalized control
• The connector must be permanetly connected
  (The connector is connected when shipped
  out of the factory.
  Do not pull out the connector)

LED display
LED3 turns on during the
  battery is charged. Even after
  the battery is completely charged,
  the lamp slightly turns on.
LED2 flashes
  (at 0.4sec frequency)
  when the CPU for DⅢ-Net
  communication is normal.
LED1 flashes
  when receiving data
  by DⅢ-Net communication.

○ LED3(CHARGE)
○ LED2(H8 AL1VE)
○ LED1(D3 RCV)

▯CN3

Neuron ID

Since the control substrate is weak to static electricity,
do not touch the parts on the substrate.
Make sure to dischange static electricity
from human body before starting the work.
(Static electricity can be discharged by touching
the sheet metal of the control panel which is earthed)

**7** 「 DⅢ-NET master 」 setting

Make sure to connect the unit with 「 DⅢ-NET master 」

**8** Setting the backup battery switch

When shipped out of the factory, the backup battery switch is turned off
(the battery is ineffective).
**Turn ON** the switch for backup of set data such as the information
regarding the network variables at power failure.
・Guaranteed hours of power failure. One month (31days)
・The lithium battery is used and is rechargeable.
 After the power is restored it is necessary to continuously electrify the battery
 for approximately one day until the it is completely charged.
 (The battery is completely charged when shipped out from the factory.)

**9** Setting group No. for centralized control

Turn ON the power to the DMS-IF Following the below procedure,
set the group numbers for the indoor units connected to the DⅢ-NET.
This group number is set for each indoor unit system.
(When not using the remote controller,
 the remote controller is to be connected just for making settings
 but must be disconnected when finished.)

Group No.        Mode No.
Field set mode
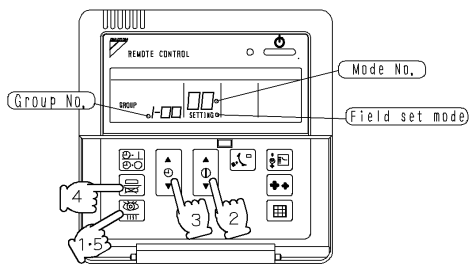
| Pre-para-tions | ● | Check no troubles exist with installation and wiring before turning ON the power. |
| | ● | Turn ON the power to the indoor unit and DMS-IF Setting is not possible with the power OFF. |

● Nothing is wrong with the equipment if '88' is
displayed when power is turned ON. This may
happen and the unit may not respond to
operation, but the situation should last only a
moment.

| 1 | Hold down ⊚TEST for 4 seconds or more to enter the field set mode. |
| 2 | Press Ⓘ and set the mode NO. to '00' |

| 3 | Press ⏱ and set the group No. Group No. increases in the order of 1-00, 1-01 ... 1-15, 2-00,... 4-15 Set the group No. when "GROUP" on the liquid crystal display is flashing. Press the ⊠ button to initiate flashing of "GROUP" on the liquid crystal display. |
| 4 | Press ⊠ to set the group No. |
| 5 | Press ⊚TEST .This will return the system to the normal mode. |

・For details on making
 settings from the
 simplified remote
 controller, refer to the
 instruction manual
 of the unit.

・For details on making
 settings of the group No.
 of the Ventiaire or
 adapters (wiring adapter
 for other air conditioners,
 etc.), refer to the instruction
 manual of the said unit.

# Part 10
# Troubleshooting

# 1.   Troubleshooting

## 1.1   Alive/Wink Green LED Does Not Blink.
## Alive/Wink Green LED Blinks, However, H8 Alive LED Does Not.

**Trouble Contents**      ■ Alive/Wink Green LED does not blink.
                          ■ Alive/Wink Green LED blinks, however, H8 Alive LED does not.

**Supposed Causes**       ■ Power is not supplied.
                          ■ The power supply voltage is less than rated voltage.

**Troubleshooting**

⚠ **Caution**   Be sure to turn off power switch before connect or disconnect connector,
                or parts damage may be occurred.

```
        ┌─────────────┐
        │ Power is not │    NO
        │  supplied.   ├──────────────────────────►  Turn on the power supply.
        └──────┬──────┘
            YES │
                │
        ┌───────▼──────┐
        │     The      │
        │ power supply  │   YES
        │voltage is less├──────────────────────────►  Measure the power supply voltage to
        │ than rated    │                              check that it is in the range of rated
        │  voltage.    │                              voltage.
        └──────────────┘
```
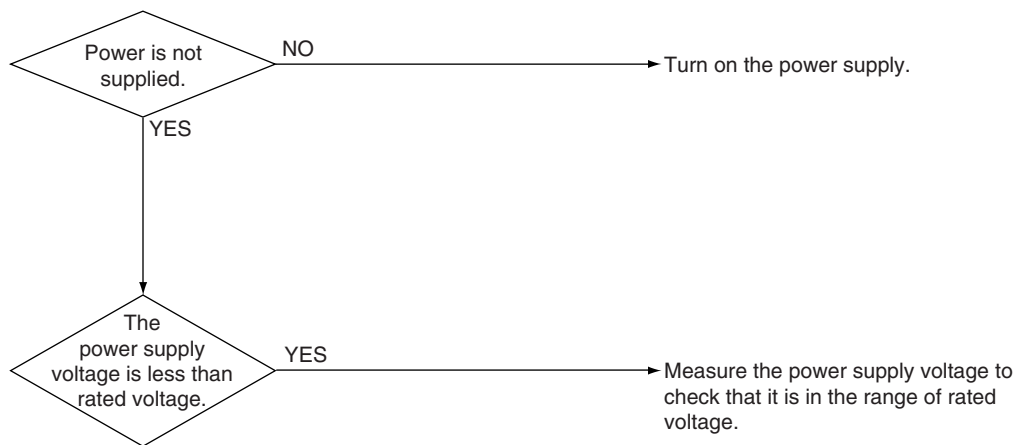
## 1.2 Communication with the Central Monitoring Panel Can Not be Established. The Service LED Blinks or Lights Up.

**Trouble Contents**
- Communication with the central monitoring panel can not be established.
- The service LED blinks or lights up.

**Supposed Causes**
- Backup switch is not turned on.
- Excessively high level noise has been imposed.
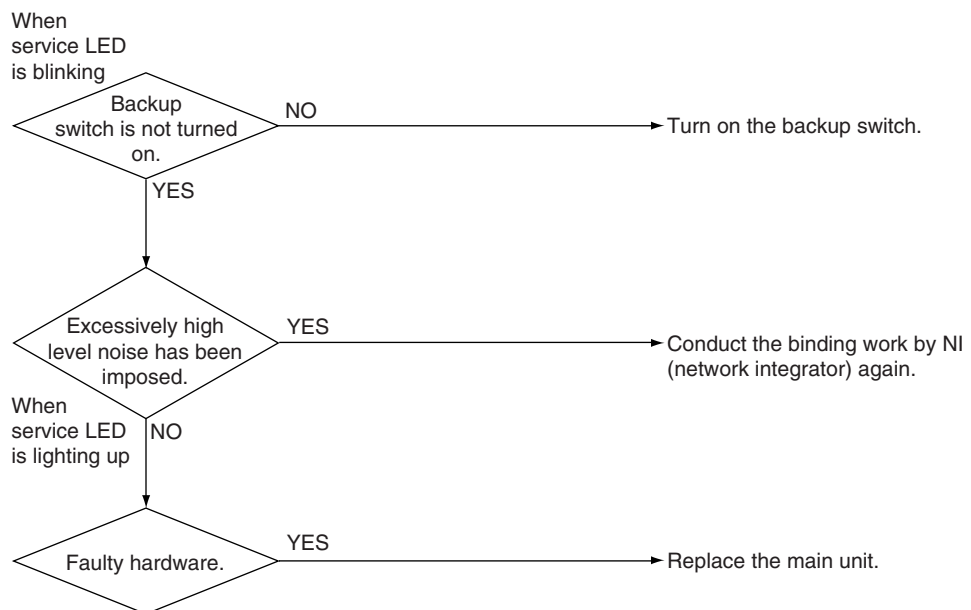- Faulty hardware.

**Troubleshooting**

⚠ **Caution**   Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.

When service LED is blinking

Backup switch is not turned on. — NO → Turn on the backup switch.

YES ↓

Excessively high level noise has been imposed. — YES → Conduct the binding work by NI (network integrator) again.

When service LED is lighting up — NO ↓

Faulty hardware. — YES → Replace the main unit.

## 1.3 Alarm Indication (Error MA, MC, M1) is Displayed During Checking DIII - Net Condition

**Trouble Contents**
During checking DIII-NET condition with test-run tool (Hypernaminal), the following alarm indication is displayed.
- Error MA: Duplicate D3 master
- Error MC: Duplicate D3 address.
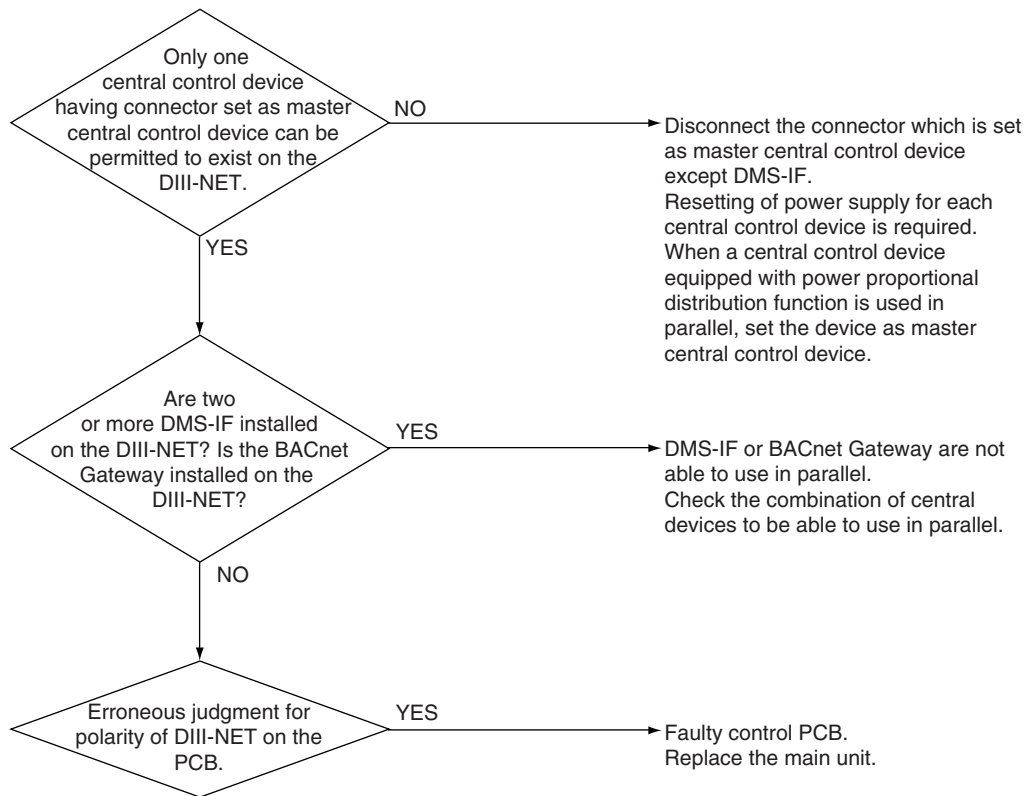- Error M1: D3 pole error

**Supposed Causes**
- Duplicated master error
  In case of the unit used with other central control devices, two or more central control devices having connector which is set as master central control device are existing.
- D3 address is duplicated.
  Are two or more DMS-IF installed on the DIII-NET, or is the BACnet Gateway not installed?
- Erroneous DIII-NET polarity judgment

**Troubleshooting**

⚠ **Caution**  Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.

Only one central control device having connector set as master central control device can be permitted to exist on the DIII-NET.

→ NO → Disconnect the connector which is set as master central control device except DMS-IF.
Resetting of power supply for each central control device is required.
When a central control device equipped with power proportional distribution function is used in parallel, set the device as master central control device.

YES

Are two or more DMS-IF installed on the DIII-NET? Is the BACnet Gateway installed on the DIII-NET?

→ YES → DMS-IF or BACnet Gateway are not able to use in parallel.
Check the combination of central devices to be able to use in parallel.

NO

Erroneous judgment for polarity of DIII-NET on the PCB.

→ YES → Faulty control PCB.
Replace the main unit.

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● For further improvement, specifications or designs are subject to change without prior notice.

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