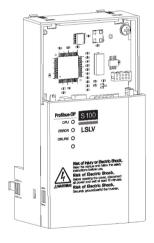The right choice for the ultimate yield!

LS ELECTRIC strives to maximize your profits in gratitude for choosing us as your partner.

# Profibus–DP Module
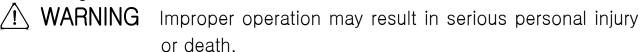
LSLV-S100 series          **User's Manual**



⚠ **Safety Instructions**

- Read this manual carefully before installing, wiring, operating, servicing or inspecting this equipment.
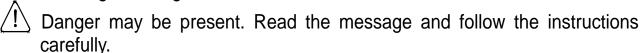- Keep this manual within easy reach for quick reference.

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Thank you for using our **S100 Profibus-DP Communication module**

| Safety PRECAUTIONS |
|---|

● Always follow safety instructions to prevent accidents and potential hazards from occurring.

● Safety precautions are classified into "WARNING" and "CAUTION" and their meanings are as follows:

⚠ WARNING   Improper operation may result in serious personal injury or death.

⚠ CAUTION    Improper operation may result in slight to medium personal injury or property damage

● The indicated illustrations on the product and in the manual have the following meanings.

⚠ Danger may be present. Read the message and follow the instructions carefully.

⚡ Particular attention should be paid because danger of an electric shock may be present.

● Keep operating instructions handy for quick reference.

● Read the operating instructions carefully to fully understand the functions of the S100 series and to use it properly.

| ⚠ CAUTION |
|---|

● **Be cautious, when handling the CMOS components of the communication module.**
Static may lead to malfunctioning of the product.

● **Turn off the inverter power, when changing the communication cable.**
Otherwise, you may damage the module or a communication error may occur.

● **Make sure to insert the Communication module connector to the inverter precisely.**
Otherwise, you may damage the module or a communication error may occur.

● **Check the parameter unit before setting up the parameter.**
Otherwise, a communication error may occur.

# Table of Contents

# Chapter 1. Introduction

This Profibus-DP communication module allows the LSLV-S100 inverter to be connected to Profibus network.
This module does not support IP66 products.

## 1.1 What is Profibus-DP Communication Module?

A controlling and monitoring of inverter can be controlled by PLC sequence program or a Profibus Master Module.
It helps the installation cost reduced since multiple inverters are implemented by a communication line. In addition, the wiring is so simple that the installation time will be reduced and the maintenance will be improved. Factory automation can be also easily operated by Mixed-used development of auxiliary devices of PLC and other control systems such as PC for controlling the inverter.

## 1.2 Components

This product is consisting of these kinds of parts
- Profibus-DP Communication Module(CPDP-S100):   1 ea
- Profibus-DP Communication Module Manual: 1 ea
- Brass Bar(M3xL23): 1 ea
- Brass Bar(M3xL17.3): 1 ea
- Fixed Screw(M3xL8): 1 ea
- Profibus connector: 1 ea

## 1.3 Product Identification

Two kinds of Profibus-DP module are available and those can be identified by product name on a name plate. Consistent data module needs to be used only in a consistent data network. If a standard module and a consistent data module are in a same network, data communication doesn't work properly.
- LSLV-S100 Profibus-DP Module: Standard type
- LSLV-S100 Profibus-DP Module(Consistent Data): Dedicated for Consistent data network

# Chapter 2.  Profibus-DP Communication Module

## 2.1 Technical Specification of Profibus-DP Communication

| Device Type | Profibus DP Slave |
|---|---|
| Auto Baud rate Detect | Supported |
| Synchronization Mode | Supported |
| Freeze Mode | Supported |
| Max. Input Length | 8 words |
| Max. Output Length | 8 words |
| Baud rate Support | 9.6K, 19.2K, 93.75K, 187.5K, 500K, 1.5M, 3M, 6M, 12M |
| Modular Station | Supported |
| Max. Module | 2 |
| Max. Connectable Number of Nodes | Max. 32 nodes without repeater (including master module) |
| LED | 3 LEDs (ONLINE, ERR, and CPU) |
| Communication Connector | 9Pin D-sub |

**Table 1 Technical Data**

## 2.2 Layout of Profibus-DP Communication Module
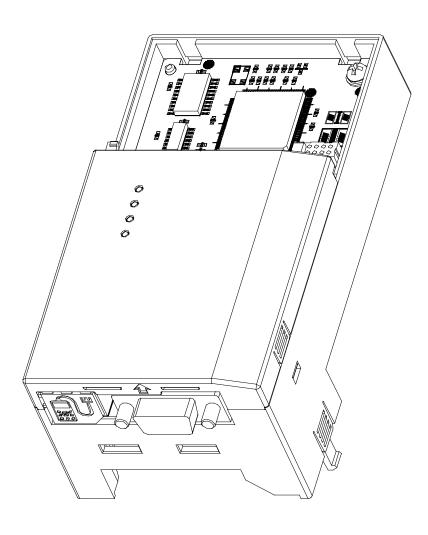


**Figure 1 Profibus-DP Communication Module**

## 2.3 General Specification of Profibus-DP Connector
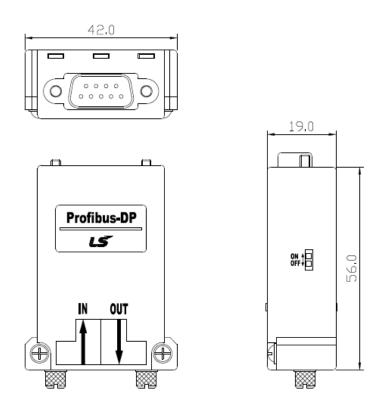
**Figure 2 Profibus Connector**

| PROFIBUS Connector | Pin | Signal | Description |
|---|---|---|---|
| | 1 | None | None |
| | 2 | M24 | 24V output GND |
| | 3 | RxD/TxD-P | Transmitter/Receiver data Plus |
| | 4 | CTRL-P | Control signal for a repeater |
| | 5 | DGND | Signal GND |
| | 6 | VP | 5V for terminating resistance |
| | 7 | P24 | 24V output Plus |
| | 8 | RxD/TxD-N | Transmitter/Receiver data Negative |
| | 9 | CTRL-N | Control signal for a repeater |

note) The product only provides No.3, 5, 6 and 8 signals.
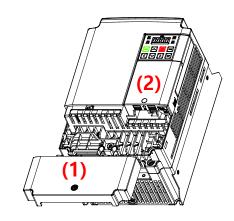
**Table 2 Signal Description**

## 2.4 Installation
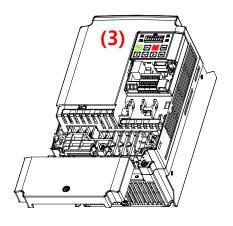
Warning) Connect a communication network after the power supply is off.　If Profibus-DP communication module is removed or installed, the power supply should be switched off. Otherwise, the S100 inverter will be damaged entirely.
Take off Profibus-DP communication module from the product after the power supply is totally discharged.
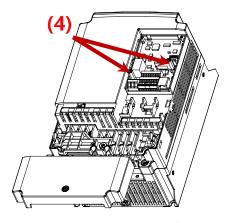
■ Unfasten the front cover fixing bolt
　to remove the front　cover and
　remove I/O cover((1), (2)) from
　a dedicated inverter
　for communication.
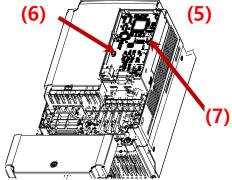
■ Remove the keypad (3).
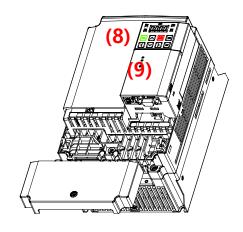
■ Unfasten a screw from
　I/O board and
　fasten the prepared
　brass bar(4).
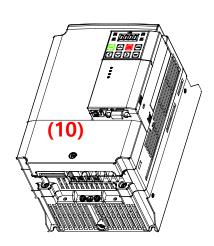
■ Mount Profibus-DP communication Module
and fasten the removed screw(6)
and the included screw(7).

**(6)**        **(5)**

**(7)**

■ Install the keypad (8) at first and
the communication module
cover(9) in order.

**(8)**

**(9)**

■ Install the front cover(10) again
And installation is completed.

**(10)**

## 2.5 Network Cable Specifications

| Classification | Description | |
|---|---|---|
| AWG | 22 | |
| Conductor Material | BC-Bare Copper | |
| Insulation Material | PE-Polyethylene | |
| Insulation Tension | 0.035 inch | |
| Inner Shield Material | Aluminum Foil-Polyester, Tape/Braid Shield | |
| Electrostatic Capacity | 8500pF/ft | |
| Specific Impedance | 150Ω | |
| Total number of Conductors | 2 Core | |

**Table 3 Network Cable Specifications**

## 2.6 Maximum Distance according to the Baud rate

The total BUS length of a network configuration is differed according to the baud rate. The communication quality is not guaranteed when the total distance exceeds the total BUS length limit as below.

| Baud rate | Max. Segment Length | Max. Extension Distance |
|---|---|---|
| 12 Mbps | 1,000 m / 3,278 feet | 10,000 m / 32,786 feet |
| 6 Mbps | 1,000 m / 3,278 feet | 10,000 m / 32,786 feet |
| 3 Mbps | 1,000 m / 3,278 feet | 10,000 m / 32,786 feet |
| 1.5 Mbps | 1,000 m / 3,278 feet | 10,000 m / 32,786 feet |
| 500 kbps | 400 m / 1,311 feet | 4,000 m / 13,114 feet |
| 187.5 kbps | 200 m / 655 feet | 2,000 m / 6,557 feet |
| 93.75 kbps | 100 m / 327 feet | 1,000 m / 3,278 feet |
| 19.2 kbps | 100 m / 327 feet | 1,000 m / 3,278 feet |
| 9.6 kbps | 100 m / 327 feet | 1,000 m / 3,278 feet |

**Table 4 Maximum Distance according to the Baudrate**

# Chapter 3. Status Diagnosis and LED Indication

## 3.1 LED display feature

The profibus DP Module has 3 kinds of LEDs, referring to the below table colored by LEDs for troubleshooting and diagnostics.
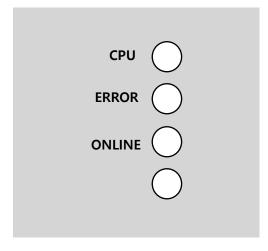


**Figure 3 LED display**

| LED | Color | Description |
|---|---|---|
| CPU | Green | LED turns "Blink" when the communication module is installed on the inverter and the power is generated. |
| ERR | Red | LED turns "Blink" if there is something wrong in the Profibus-DP communication module. |
| ONLINE | Green | LED always turns "On" when Profibus-DP communication module is on-line status. |

**Table 5 LED Indication**

## 3.2 LED information & Troubleshooting

| LED | LED Status | Module Status | Cause | Troubleshooting |
|---|---|---|---|---|
| CPU | OFF | Failure in power supply | Power supply unplugged or contact failure between the inverter and Profibus-DP module. | Check power supply. Check the inverter's malfunction. Check the connection between Profibus-DP module and the connector of inverter. |
| | Blinking every second | Normal | Normal operation | - |
| ERR | OFF | Normal | Normal operation | - |
| | Blinking every second (with CPU LED together) | The communication is interrupted. | The communication is not available between the inverter and the communication module. | Check inverter's malfunction. Check the connection between Profibus-DP module and the connector of inverter. |

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| | | | | |
|---|---|---|---|---|
| | Blinking every second (contrary to CPU LED) | CONFIG ERROR | Master's configuration Data is different from Profibus-DP module's configuration. | Check the configuration data set on Master and the internal configuration data at the inverter. |
| ON-LINE | OFF | Off-Line | Master doesn't work for communication in the network. | Start the communication from Master. |
| | | | The connection of connector has a problem. | Check the connection between the pin number of connector and the termination resistor. |
| | | | There is no master in the network. | It can be possible there is no designated master or master has a problem. |
| | | | Wrong setting of station ID | Check if the station ID set in the designated Profibus communicatio |

| | | | | |
|---|---|---|---|---|
| | | | | n module is the same as the station ID set from the keypad of inverter in Configuration tool and station ID is unique in the network. |
| | | | Network Configuration Fault | Check if it exceeds the length limit of segment. Check if the connections with Segment are over 32 stations including a repeater. Check if the connections with network are over 126 stations including repeater. |
| | ON | On-Line | Network, Station, Parameterization and Configuration are normal | - |

**Table 6 Diagnostics according to LED Status**

# Chapter 4. Inverter Parameter

## 4.1 Profibus-DP Communication Parameter List

| Code Number | The name of Parameter | Initial Value | Range | Definition |
|---|---|---|---|---|
| CM-06 | FBus S/W Ver | - | - | Indicate the version of Profibus-DP communication module. |
| CM-07 | FBus ID | 1 | 1 ~ 125 | Set up the station of Profibus-DP module. |
| CM-09 | FBus Led | - | - | Show the ON/OFF data of the LED on Profibus-DP communication module. |
| CM-30 | ParaStatus Num | 3 | 0~8 | Set up the Status number for use. |
| CM-31 | Para Status-1 | 0x000A | 0~0xFFFF | |
| CM-32 | Para Status-2 | 0x000E | 0~0xFFFF | |
| CM-33 | Para Status-3 | 0x000F | 0~0xFFFF | Set up Status address which will be read by Master. |
| CM-34 | Para Status-4 | 0x0000 | 0~0xFFFF | |
| CM-35 | Para Status-5 | 0x0000 | 0~0xFFFF | |
| CM-36 | Para Status-6 | 0x0000 | 0~0xFFFF | |
| CM-37 | Para Status-7 | 0x0000 | 0~0xFFFF | |
| CM-38 | Para Status-8 | 0x0000 | 0~0xFFFF | |
| CM-50 | Para Ctrl Num | 2 | 0~8 | Set up Control number for use. |
| CM-51 | Para Control-1 | 0x0005 | 0~0xFFFF | |
| CM-52 | Para Control-2 | 0x0006 | 0~0xFFFF | |
| CM-53 | Para Control-3 | 0x0000 | 0~0xFFFF | Set up control address controlled by Profibus DP Master. |
| CM-54 | Para Control-4 | 0x0000 | 0~0xFFFF | |
| CM-55 | Para Control-5 | 0x0000 | 0~0xFFFF | |
| CM-56 | Para Control-6 | 0x0000 | 0~0xFFFF | |
| CM-57 | Para Control-7 | 0x0000 | 0~0xFFFF | |

| Code Number | The name of Parameter | Initial Value | Range | Definition |
|---|---|---|---|---|
| CM-58 | Para Control-8 | 0x0000 | 0~0xFFFF | |
| CM-68 | FBus Swap Sel | 0 | 0~1 | 0 : No<br>1 : Yes |
| CM-94 | Comm Update | 0 | 0:NO<br>1:YES | Update keypad parameters relating to communication. |

**Table 7 Inverter Parameters**

## 4.2 Description of Profibus-DP Communication Parameters

### 4.2.1 Version of Communication module

It displays the version of Profibus-DP module installed on the inverter.

### 4.2.2 Station ID setting

| CM-07 | FBus ID |
|---|---|
| CM-94 | Comm Update |
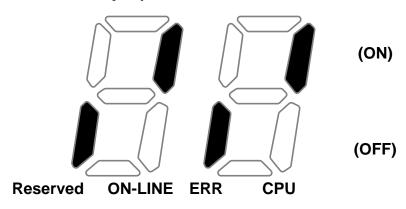
The parameter sets the value of Station ID at Profibus-DP module. Station ID can be set up within the range of 1~125 and it cannot be duplicated to write. It needs to check if the settled Station ID is not equal to other Station ID in network.
If the value of Station ID is changed, set 'CM-94(Comm Update)' to '1' to apply the changed value of Station ID to Profibus-DP Communication module.

## 4.2.3 LED indication for communication status

Profibus-DP communication module has 3 LEDs, ONLINE, ERR, and CPU on the keypad in order from left to right. It indicates communication status by LED's On/Off.

**(CM-05 Status Example)**



| Reserved | ON-LINE (GREEN) | ERR (RED) | CPU (GREEN) |
|:---:|:---:|:---:|:---:|
| OFF | ON | OFF | ON |

### 4.2.4 The number of Para Status setting

| CM-30 | The number of Para Status setting |
|---|---|
| CM-31 ~ CM-38 | Para Status1~Status8 setting |
| CM-94 | Comm Update |

This parameter determines how much status information will be sent to Master by an inverter through Profibus-DP communication.
It can be set from 0 to 8. Para Status has to be set as the number of Para Status (From CM-31 to CM-38 as preset number).
For example, If CM-30 is set to '3', Para Status should be set from CM-31 to CM-33. If CM-30 is set to '6', Para Status should be set from CM-31 to CM-36.
If the number of Para status is changed, set 'CM-94(Comm Update)' to '1' to apply the changed number of Para Status to Profibus-DP Communication module.

## 4.2.5 Para Status 1~8

| CM-30 | Number of Para Status setting |
|---|---|
| CM-31 ~ CM-38 | Para Status1~Status8 setting |

It determines that what status information will be sent to Master through Profibus-DP communication.

Para Status 1~8 are set in the form of inverter address. They set up the address for the common inverter area and the inverter keypad parameter. If the keypad parameter address is written, it will be saved in the form of 0x1000 + ('Group number' x 0x100) + ('Code number').

For example, if DI Status of No. 90 at n Group are set to Para Status-1, it should be set to 0x155A.

0x1000 + 0x05 x 0x100 + 0x5A(Dec 90) = 0x155A

| Group | Group Number |
|---|---|
| dr Group | 1 |
| bA Group | 2 |
| Ad Group | 3 |
| Cn Group | 4 |
| In Group | 5 |
| OU Group | 6 |
| CM Group | 7 |
| AP Group | 8 |
| (Reserved) | 9 |
| (Reserved) | 10 |
| PRT Group | 11 |
| M2 Group | 12 |

## 4.2.6 Number of Para Control setting

| CM-50 | Number of Para Control setting |
|---|---|
| CM-51 ~ CM-58 | Para Control 1 ~ Control 8 setting |
| CM-94 | Comm Update |

It determines that how much control information will be sent to inverter by Master through Profibus-DP communication.

It can be set up within the range of 0 to 8. Para Control has to be set as the number of Para Control. (From CM-51 to CM-58 as preset number)

For example, If CM-50 is set to '2', Para Control should be set from CM-51 to CM-52. If CM-50 is set to '5', Para Control should be set from CM-51 to CM-55.

If the number of Para status is changed, set 'CM-99(Comm Update)' to '1' to apply the changed number of Para Control to Profibus-DP communication module.

## 4.2.7 Para Control 1~8

| | |
|---|---|
| CM-50 | Number of Para Control setting |
| CM-51 ~ CM-58 | Para Control 1~Control 8 setting |

It determines that what control information will be sent to inverter through Profibus-DP communication.

Para Control 1 ~ 8 are set in the form of inverter address.

They set up the address for the common inverter area and the inverter keypad parameter. If the keypad parameter address is written, it will be saved in the form of 0x1000 + ('Group number' x 0x100) + ('Code number').

For example, if Acc Time of No.3 at dr Group is set to Para Control-1, it has to be set to 0x1103.

0x01 x 0x1000 + 0x01 x 0x100 + 0x03 (Dec 3) = 0x1103

| Group | Group Number |
|---|---|
| dr Group | 1 |
| bA Group | 2 |
| Ad Group | 3 |
| Cn Group | 4 |
| In Group | 5 |
| OU Group | 6 |
| CM Group | 7 |
| AP Group | 8 |
| Reserved | 9 |
| Reserved | 10 |
| PRT Group | 11 |
| M2 Group | 12 |

## 4.2.8 Comm Update

| | |
|---|---|
| CM-07 | Station ID setting |
| CM-30 | The number of Para Status setting |
| CM-50 | The number of Para Control setting |
| CM-94 | Comm Update |

After changing Station ID, the number of Para Status and the number of Para Control, set the Comm Update to '1'.
The changed values will be applied to Profibus-DP communication module after setting Comm Update to '1'.

## 4.2.9 Profibus Bit Swap

Inverter data is word, which is sent divided into byte at the time of data transmission.

At this time, whether transmitting to MSB-LSB or to LSB-MSB will be elected. Initial value is MSB-LSB.

| | Setting Value | Location on the KeyPad |
|---|---|---|
| FBus Swap Sel | 0 : No<br>1 : Yes | COM Group - 68 |

# Chapter 5. GSD File (Electronic Data Sheets)

GSD file contains the information of Profibus-DP communication module. The profibus configuration software needs GSD file.
You can download GSD file from technical support on
LS ELECTRIC website.
(https://www.lselectric.co.kr)

# Warranty

| Maker | LS ELECTRIC Co., Ltd. | | Installation (Start-up) Date | |
|---|---|---|---|---|
| Model No. | CPDP-S100 | | Warranty Period | |
| Customer Information | Name | | | |
| | Address | | | |
| | Tel. | | | |
| Sales Office (Distributor) | Name | | | |
| | Address | | | |
| | Tel. | | | |

Warranty period is 12 months after installation or 18 months after manufactured when the installation date is unidentified. However, the guarantee term may vary on the sales term.

## IN-WARRANTY service information

If the defective part has been identified under normal and proper use within the guarantee term, contact your local authorized LS distributor or LS Service center.

## OUT-OF WARRANTY service information

The guarantee will not apply in the following cases, even if the guarantee term has not expired.
- Damage was caused by misuse, negligence or accident.
- Damage was caused by abnormal voltage and peripheral devices malfunction (failure).
- Damage was caused by an earthquake, fire, flooding, lightning, or other natural calamities.
- When LS nameplate is not attached.
- When the warranty period has expired.

**Revision History**

| No | Date | Edition | Changes |
|---|---|---|---|
| 1 | 2012.05 | First Release | |
| 2 | 2015.07 | 2nd Edition | Image changed |
| | | | |