

# FD67 QUICK START GUIDE

## PROFIBUS-DP



## FD67 Quickstart guide.

### Profibus-DP

The FD67 system consists of a Fieldbus node to which can be connected up to 16 Input / output modules via system communication cables.

Each system communication line can be connected to up to 4 I/O modules and can be a maximum 5 metres long.

This gives a total of 256 I/O connected to one node.

Up to 4 analogue I/O modules may be connected to each node.

### Assembly.

Mount the node in a convenient position and connect the required I/O modules using system cables. Connect the node power cable to a suitable 24v DC supply but do not turn power on yet.

The power cable connections are ...

Pin number	Function	Wire number & colour
Pin 1	0v	Black 1
Pin 2	0v	Black 2
Pin 3	PE	Green/Yellow
Pin 4	Sensor & Bus supply +24v	Black 3
Pin 5	Actuator supply +24v	Black 4

The I/O modules are connected to the node using system cables.

The maximum length of one system communication line is 5 metres with up to 4 I/O modules per line.

Analogue modules have to be fitted at the end of a line because they only have an incoming connector.

Terminating resistor plugs must be fitted in the outgoing system connector on each line ( except where analogue modules are fitted).

Remove the three screws from the node top cover and set the node address on the switches provided. Each node on a Profibus network requires a unique address. Addresses in the range 1-99 can be used.

The Fieldbus cable may be connected at this point.

Profibus M12 connections for field wireable connectors are

Pin 2 RxD/TxD-N A-Line (green)

Pin 4 RxD/TxD-P B-line (red)

Other pins are used for balance resistor supplies which are normally fitted inside a blanking terminating plug at the ends of Profibus segments

Replace the cover and apply power to the node (both sensor and actuator supplies) The LEDs on the I/O modules will flash and eventually stabilise with the 'Ua' LEDs on all modules GREEN and the Us LEDs on the I/O modules flashing GREEN. This is normal and indicates the pre-operational state which is before the configuration message is received from the PLC to set the I/O parameters, which have been chosen in the configuration software. The 'Ua' LEDs indicate that Actuator supply is present and above 18 volts. The flashing 'Us' LEDs indicate that data exchange is not taking place because the PLC is not connected or is in the stop mode. All '1' LEDs on M12 DIO modules will be RED because the default I/O configuration for these modules is diagnostics on pin 2 of the M12 connector and is indicating an open circuit. If "Desina" sensors with diagnostic functions have been fitted at this stage then the red indication may not be present.

The system is now ready for configuration.

### Configuration

For Siemens S7 PLC using Step7 software the process is as follows.

Run the Step7 software and start a new project as usual and enter the "Hardware configuration" screen.

Before an FD67 system can be configured the .GSD file needs to be loaded into the product catalogue. This has to be done before any components from the catalogue are used to configure a new PLC.

Open the menu item "Options - Install new GSD..." Set the path to the .GSD file and select the FD67 file NORG07E3.GSD

The FD67 entry should now appear in the catalogue section " Profibus DP, Additional field devices, IO , FD67 ".

Configure the basic PLC as usual selecting the parameters for the Profibus interface as required.

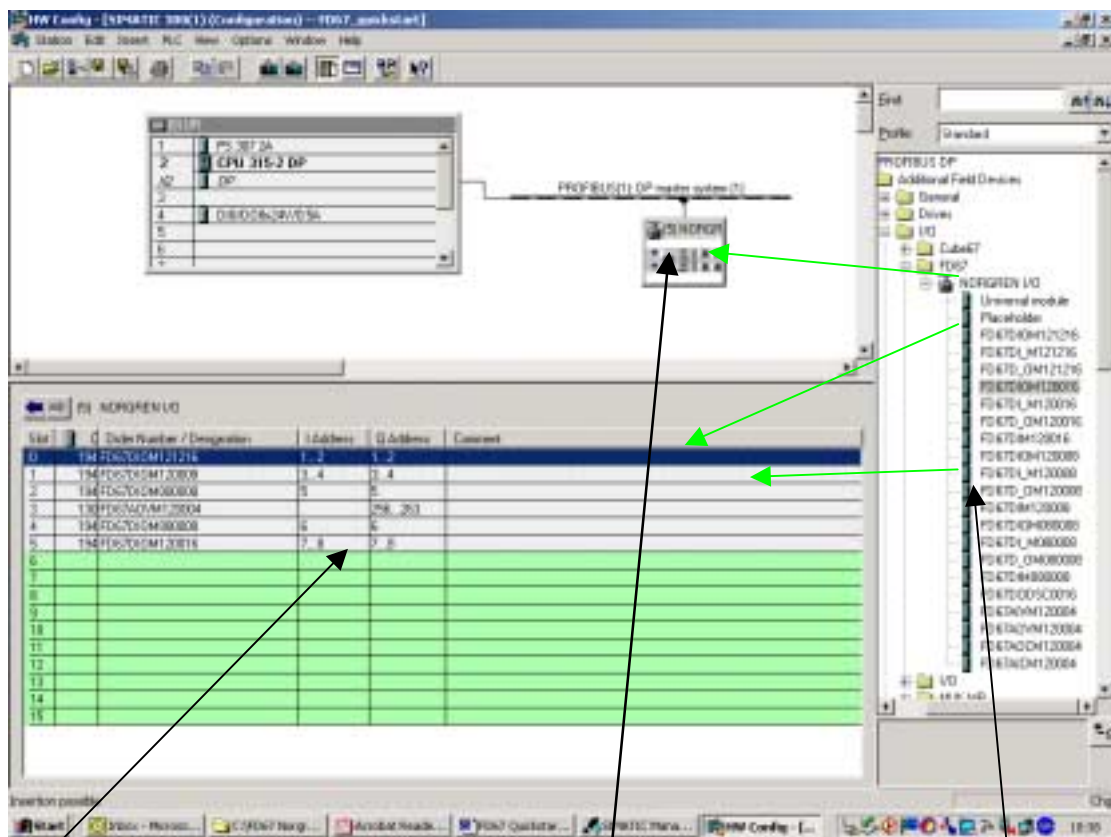
Drag & Drop the node part of the catalogue entry for FD67 (Norgren I/O ) to the bus line and enter the address set on the node address switches.

Drag & Drop the correct I/O modules from the catalogue to the 16-slot table which appears in the bottom part of the screen.

There are two methods of doing this – the simple method is to start at I/O port 0 of the node and add the first I/O module connected on that line followed by the second etc until all the modules connected to that line are entered in the table. I/O modules connected to port 1 are added next followed by ports 2 & 3. If less than 4 modules are connected to a port then the table will not be full but that does not matter – the important point is that the I/O modules are added to the table in the order that they are connected on the system lines from the node.

The second method is to formally add the modules in the correct place in the table using “placeholders” for missing modules. Placeholders before a module may be used to allow for future expansion. Placeholders can be used with the “simple” method to also allow for future expansion. If a module is to be inserted later then placeholders can be replaced with working modules. When the simple method is used modules can still be inserted but modules after the insertion point will have to be moved down the table to make room for the inserted module – I/O addresses are not changed.

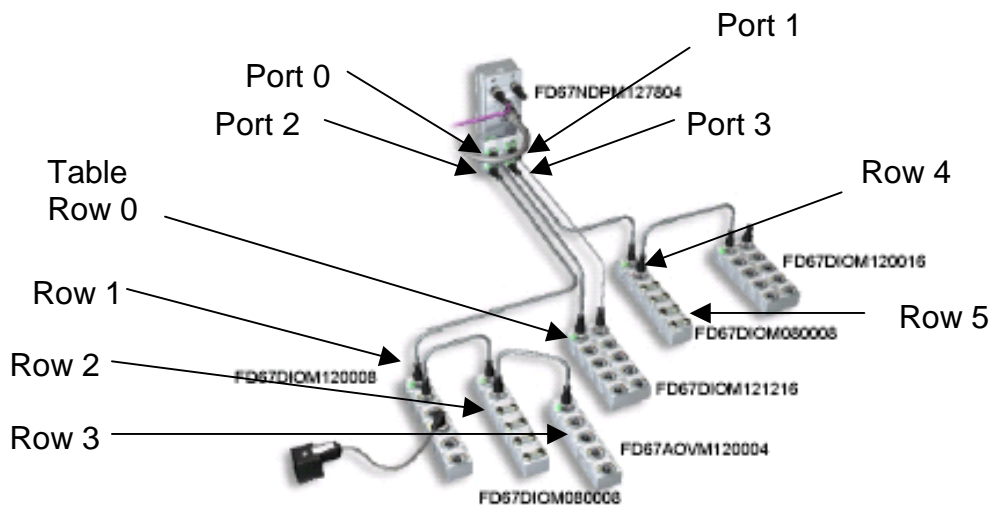
PLC I/O for each module is selected automatically by the Siemens configuration screen in exactly the same way that the PLC I/O is set. The system choice may be changed by selecting the module entry in the table and changing the Q & I byte values.



I/O Bytes allocated to modules

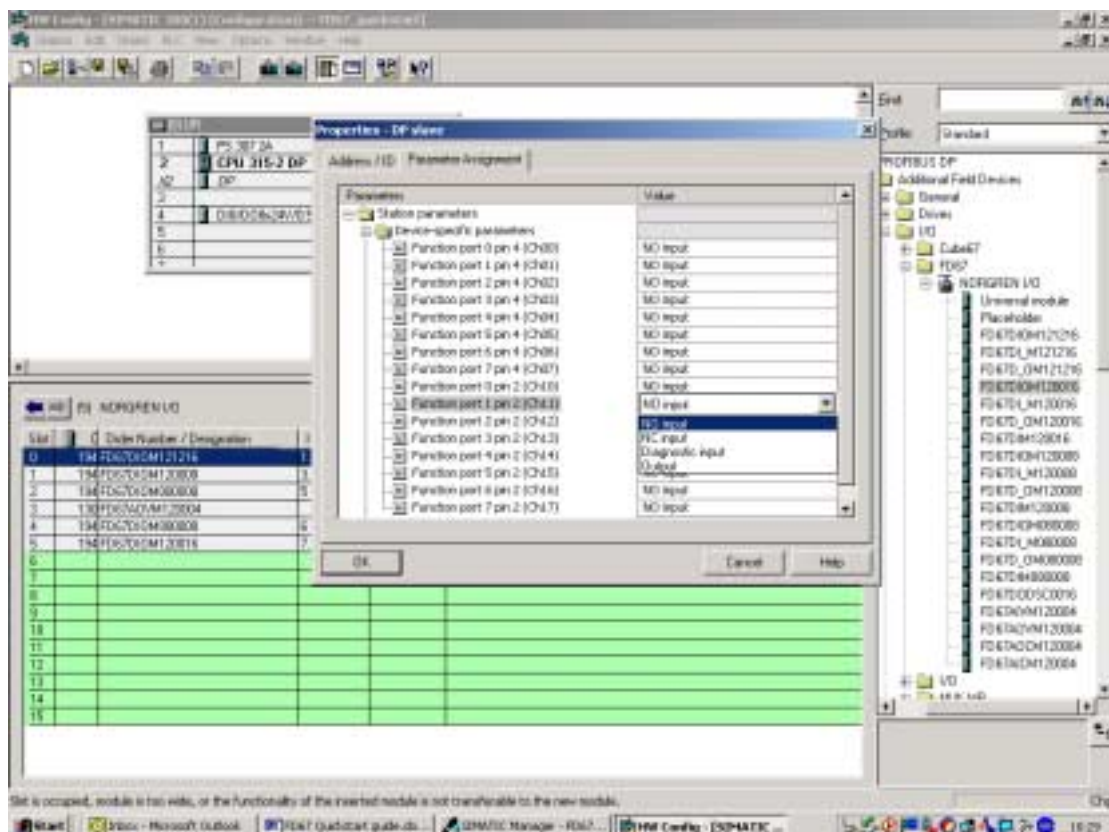
Node

Drag & Drop I/O modules from catalogue into table



In the above example, node port 1 is used to supply extra actuator power to the FD67DIOM121216 module connected to port 0

When the I/O modules have been added to the table they may be opened by double-clicking to set the required parameters. Open the parameter file and use the drop-down menus to set each module function pin to NO or NC input, Output or diagnostic input. Unwanted diagnostic features may be disabled at this stage. The process is repeated for all FD67 nodes and then the configuration is downloaded to the PLC.



When the PLC is started it will send a configuration message to the node to set the required parameters. When this happens the LEDs on the I/O modules may change to reflect the new I/O functions.

Any problems with configuration can be checked within the Siemens diagnostic system.

### I/O layout

Each DIO module occupies an equal number of Input and Output bytes.

DIM modules only occupy Input bytes. If a DIO module is required to be all Inputs or all Outputs then a preconfigured entry may be chosen from the catalogue. D\_O or DI\_

This entry only allocates Input or Output bytes as required and the module configuration box only allows selection of relevant parameters.

Each 16 I/O M12 module occupies 2 bytes Inputs and 2 bytes Outputs.

All pins marked 0-7 (pin 4) will be in the lower byte and all pins marked 10-17 (pin 2) will be in the upper byte.

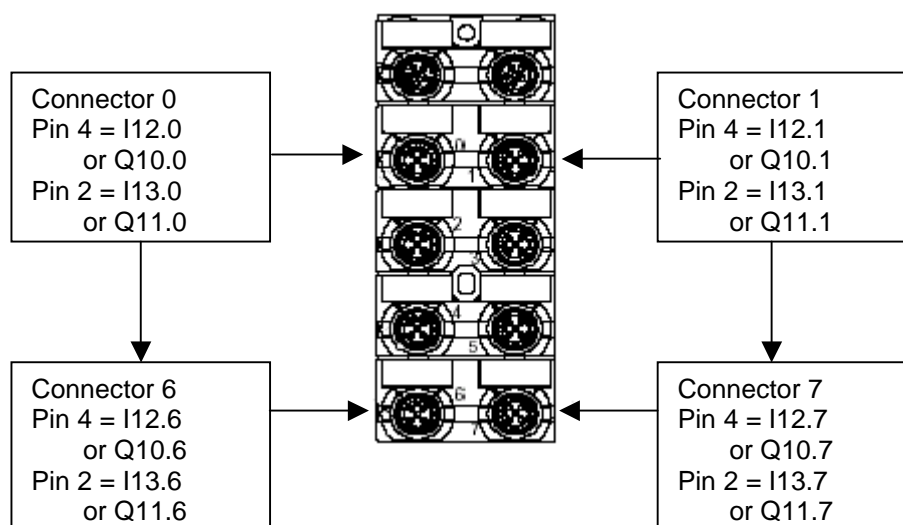
Each 8 I/O M12 module also occupies 2 byte inputs and 2 byte Outputs. Pins marked 0-3 (pin 4) will be in the lower byte and pins marked 10-13 (pin 2) will be in the upper byte. Bits 4-7 and 14-17 are allocated but not used.

Each 8 I/O M8 module occupies 1 byte Inputs and 1 byte outputs.

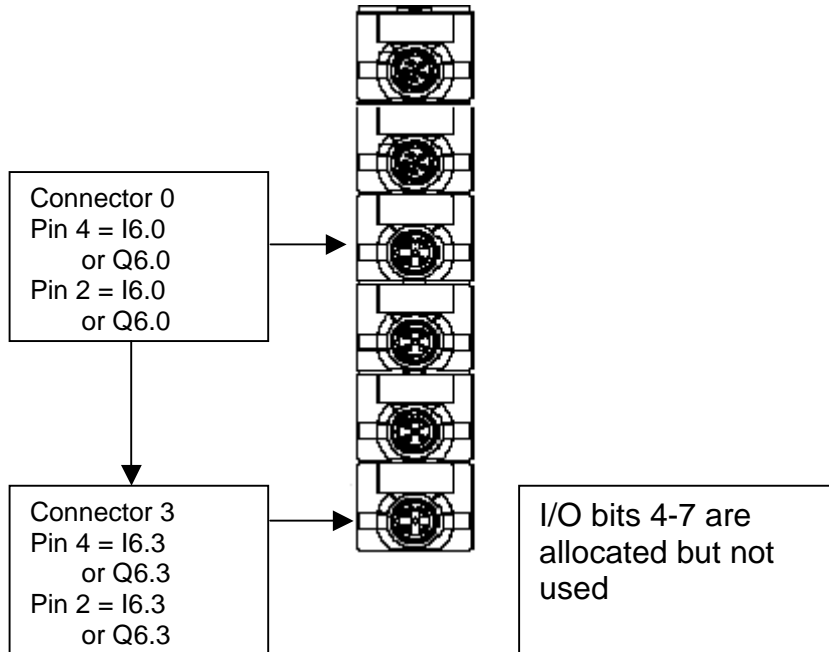
Preconfigured DIO or DIM modules operate in the same manner but only occupy Input or Output bytes.

I/O addresses for an FD67DIOM100016 module mapped to QB10 and IB12 in a Siemens S7 PLC

Each pin can be configured as an Input or Output



I/O addresses for an FD67DIOM120008 module napped to QB6 and IB6 in a Siemens S7 PLC  
 Each pin can be configured as an Input or Output



## Basic diagnostics using LEDs

### Node

#### Bus Run LED

Green flashing

No address or invalid address set ( 1-99 valid)

*Check address switch settings*

The set address is already used

*Check address allocation*

Not connected to master- Line broken or switched out

*Check line and connections – also check 9-pin*

*D-sub connectors with resistor switches – if switch is ON then outgoing line is switched off*

Wrong termination of Profibus segment

*Check termination at both ends of segments*

Allowable spur line lengths wrong for selected baud rate

*Check that all spur lines are within the specification for the baud rate used*

Profibus segment too large ( 32 devices max)

*Check bus layout*

## Cfg - F LED

Red

Profibus configuration or parameterisation error – Actual configuration different to the configuration in PLC

*Check that the actual configuration is the same as selected in the PLC hardware configuration part of the PLC configuration software*

Error in internal system connection

*Check that all system cable connectors are tight and there is no damage to system cables*

See FD67 manual section 7.5.1 for full details of fault indication and solutions.

## **I/O modules**

### Us LED (Sensor voltage & system operation)

Green Working correctly

Flashing green No data exchange ( normal at start)

*Check system cables*

Off No sensor supplies ( <12v)

*Check power supply connections & system cables*

Red Sensor supply undervoltage ( <18v)

*Check power supply connections & system cables*

### Ua LED (Actuator voltage)

Green Working correctly

Off No actuator supply

*Check power supply connections & system cables*

Red Actuator supply undervoltage

*Check power supply connections & system cables*

See FD67 manual section 7.2 for full details of I/O module LED diagnostics.