# Pro-face

# Device/PLC Connection Manuals

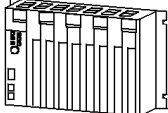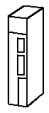## About the Device/PLC Connection Manuals

Prior to reading these manuals and setting up your device, be sure to read the "Important: Prior to reading the Device/PLC Connection manual" inf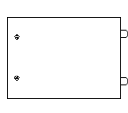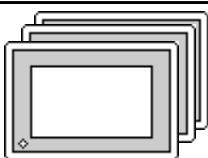ormation. Also, be sure to download the "Preface for Trademark Rights, List of Units Supported, How to Read Manuals and Documentation Conventions" PDF file. Furthermore, be sure to keep all manual-related data in a safe, easy-to-find location.

# 11.2 Slave I/O

## 11.2.1 System Structure

The following table shows the system structure for connecting the GP to Siemens PLCs and PCs.

| CPU | Link I/F | Cable Diagram | Recommended Cables | Link I/F | GP |
|---|---|---|---|---|---|
|  |  |  | |  |  |
| CPU413-2DP | Phoenix Contact IBS S7-400 DSC/I-T | (Cable Diagram 1) | Phoenix Contact IBS RBC 2M *1-KONFEX-T | Interbus Slave Module (GP070-IB41) | GP Series *2 |
| Various PCs | Phoenix Contact IBS PC ISA SC/I-T | (Cable Diagram 1) | | | |

*1 2M indicates the length of the cable as 2 meters. 5M indicates a length of 5 meters etc.

*2 The following tables list the GPs that can be connected and used with Interbus.

| Series Name | | Product Name | Unit |
|---|---|---|---|
| GP70 Series | GP-470 Series | GP-470E | |
| | GP-570 Series | GP-570S | |
| | | GP-570T | |
| | | GP-57JS | |
| | | GP-570VM | |
| | GP-571 Series | GP-571T | |
| | GP-675 Series | GP-675S | |
| | | GP-675T | |
| GP77R Series | GP-477R Series | GP-477RE | |
| | GP-577R Series | GP-577RS | Interbus Slave Module |
| | | GP-577RT | (GP070-IB41) *1 |
| GP2000 Series | GP-2500 Series | GP-2500L | |
| | | GP-2500S | |
| | | GP-2500T | |
| | GP-2501 Series | GP-2501L | |
| | | GP-2501S | |
| | | GP-2501T | |
| | GP-2600 Series | GP-2600T | |
| | GP-2601 Series | GP-2601T | |

*1 When using GP2000 Series units, a bus conversion unit (PSL-CONV00) is required.

**Note:**
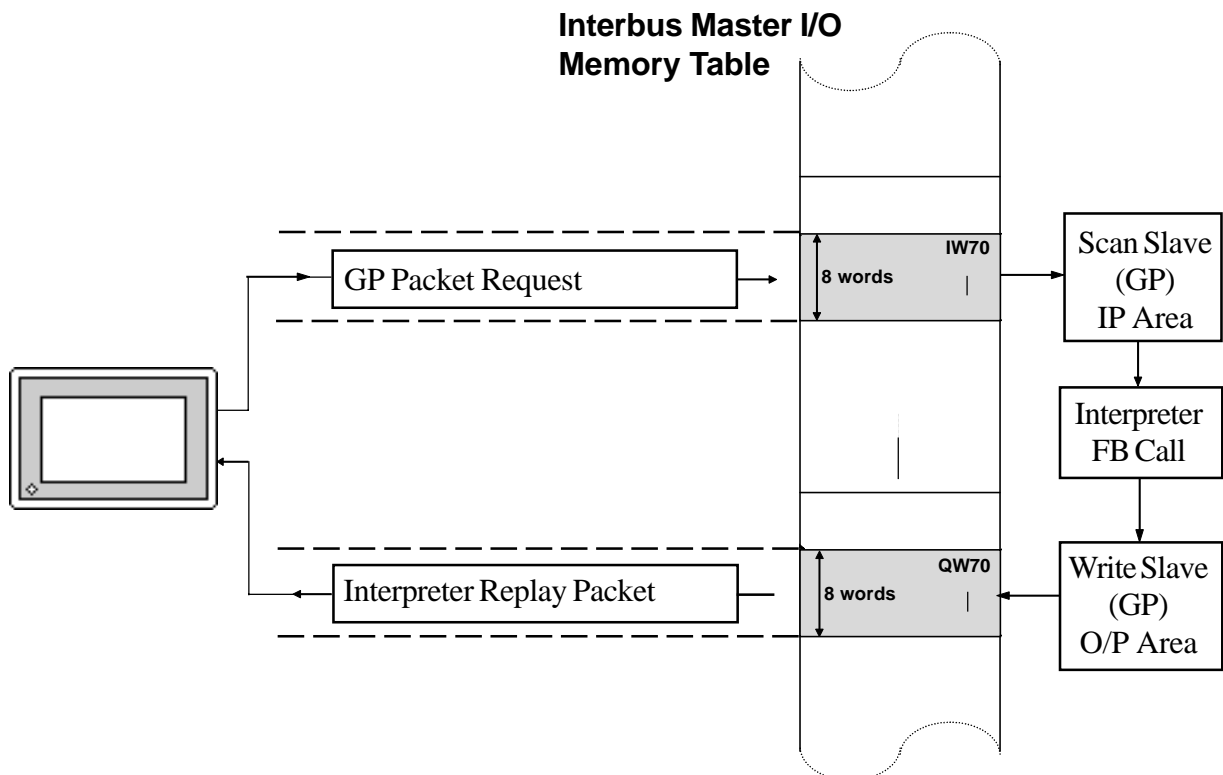- **The GP is used is a slave unit.**

■ Direct I/O Mode

When communicating via Interbus in "Direct I/O" mode, the GP communicates with an Interbus master in a very simple manner. An area of memory is mapped from the GP's LS area into the Interbus master's input area and an area of the Interbus master's output is mapped into the GP's LS area. This is demonstrated in the following diagram example (Input & Output size 8 Words).

**Interbus Master I/O
Memory Table**                    **GP LS AREA**
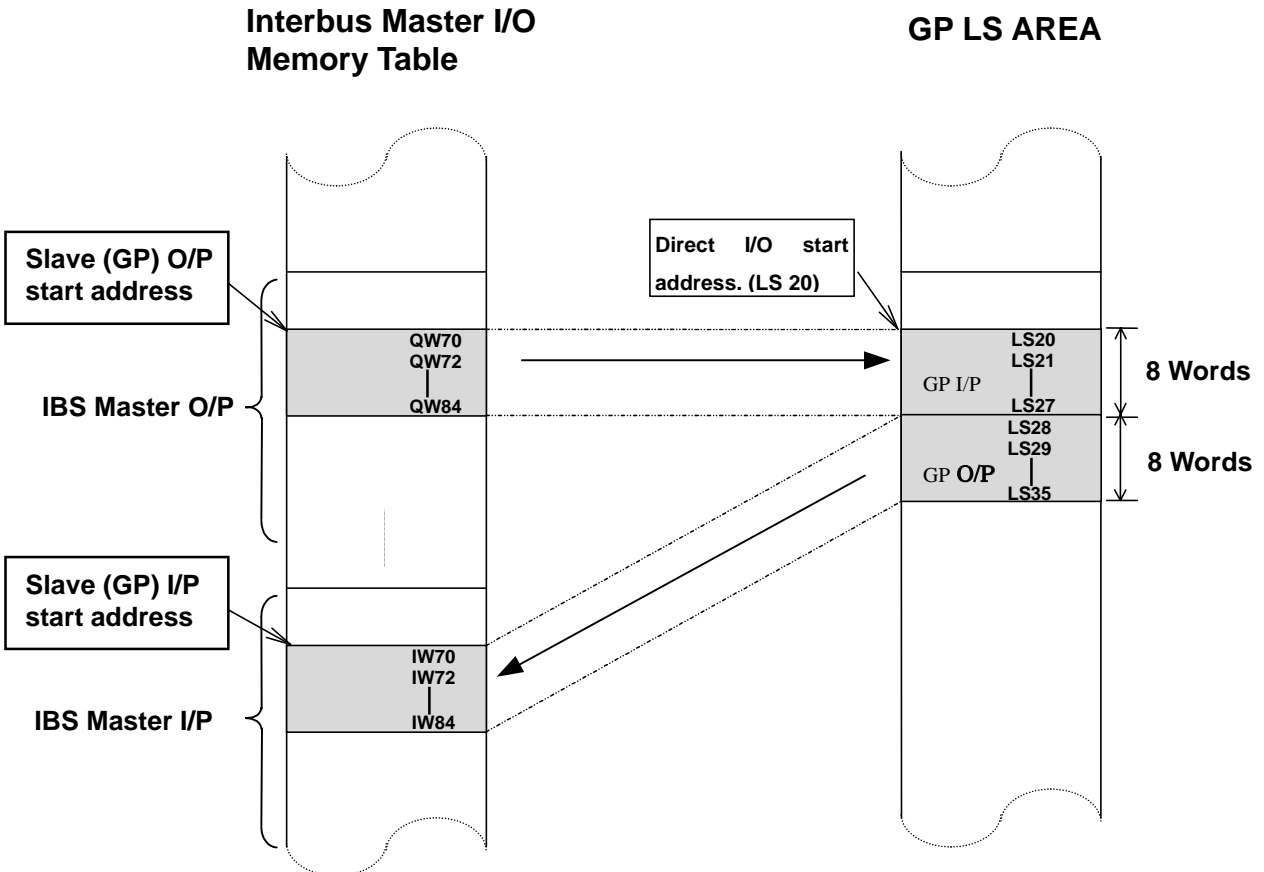


The GP Slave Input and Output start addresses and sizes (IW40 and QW20 in the above example) have to be configured using the Interbus Master's configuration software. Please refer to the Interbus Master's documentation for instructions on how to make these settings.

## ■ Packet Transfer Mode

When communicating via Interbus in "Packet Transfer" mode, the GP acts as a "Logical Master", i.e. it can request to read and write any data areas in the PLC as if it was a master. In this mode an "Interpreter Function Block" is required in the PLC. In this mode the GP uses a fixed input and output area size (16 bytes or 8 words) of the PLCs I/O memory Table. The GP transmits commands ( read or write requests ) based on its outputs. The PLC's interpreter function block scans this input area and performs the requested action, then places the result on the output area. See the diagram below for an explanation.

**Interbus Master I/O
Memory Table**

GP Packet Request

IW70

8 words

Scan Slave
(GP)
IP Area

Interpreter
FB Call

Interpreter Replay Packet

QW70

8 words

Write Slave
(GP)
O/P Area

The GP Slave Input and Output start addresses and sizes (IW256 and QW 256 in the previous example) have to be configured using the Interbus Master's configuration software. Please refer to the Interbus Master's documentation for instructions on how to create these settings. Currently a function block exists only for the S7-400 PLC. This should be called from OB1 of the Step 7 Program. Please refer to the following example for how to call this.

*Note:*  • **In this example the GP uses input address IW70 and output address QW70. It is also necessary to use 3 bytes of PLC internal memory. In this example, Marker bytes ( MB ) 103, 104 and 105 are used.**

```
OB1: MAIN BLOCK
 ???

Network 1 : GP-PROFIBUS/INTERBUS INTERPRETER CALL

IP/OP_ADDR:  First I/O byte addresses of GP panel like configured in S7 HW CONFIG
             in decimal format
ERR_BYTE:    Interpreter error due to bad data format
             Byte 0: Bad device type (DB,M,I,O)
             Byte 1: Bad Data Block Address (word address over range)
             Byte 2: Attempt to write to a input
             Byte 3: Unknow Data block operations
             Byte 4: Interpreter general error
TEMP_OUT     Output byte 0 previous scan value
             Byte 6:
             Byte 7:


   CALL   FC    99
     IP_ADDR   := 70              // GP First input byte address
     OP_ADDR   := 70              // GP First input byte address
     ERR_BYTE  := 103             // Interpreter error byte (see comment)
     TEMP_OUT  := 104             // First output byte buffer for extended addressing
     GP_STATUS := 105             // Profibus new data request checking (see comment)
```

*Note:*  • **The Interpreter Function Block can be found in the example S7-400 PLC project  is contained on the GP-PRO/PBIII for Windows CD-ROM which (folder name is "FIELDBUS"). This was created with version 3.2 of the Step 7 Software. Please follow the instration instructions in the README.TXT file on how to install this.**

### 11.2.2 Cable Diagrams

The cable diagrams shown below and the cable diagrams recommended by Phoenix Contact may differ. Using these cables for your PLC, however, will not cause any problems.

**Cable Diagram 1**
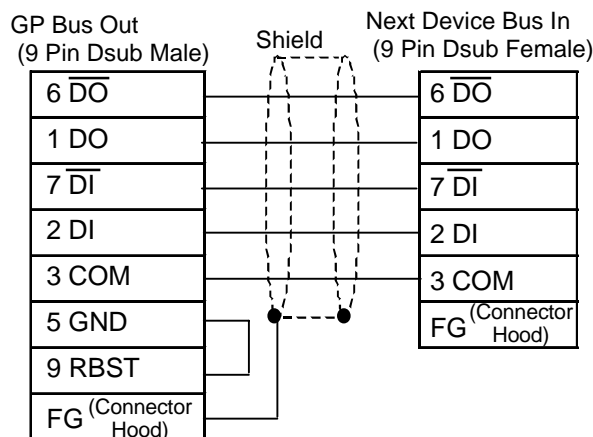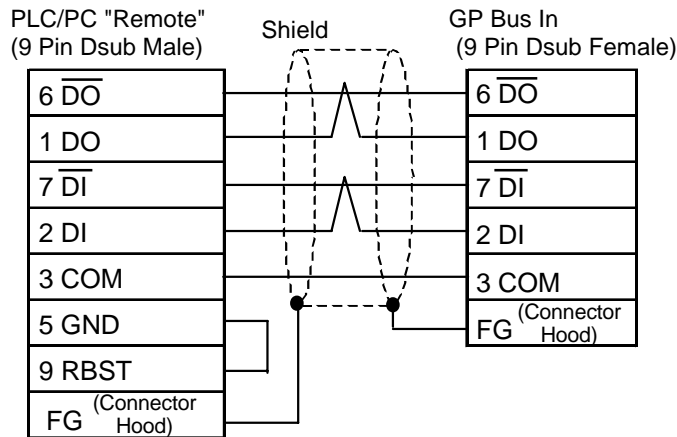




▼ **Reference** ◢ *For details, refer to Digital's* **GP70 Series Interbus I/F Unit Users Manual***.*

### 11.2.3 Supported Devices

■ Direct I/O Mode

|  | Word Address | Particulars | Default |
|---|---|---|---|
| **Input Area size (Word)** | 0~10 | Read Only | 0 |
| **Output Area size (Word)** | 0~10 |  | 0 |
| **Direct I/O Start Address** | LS0020~LS1999 |  | LS20 |

The System Area (LS0 to LS19) and Reading Area settings cannot be used for PLC communications. Only LS Area's User's Area (LS20 to LS1999) can be used for communication. The maximum Input & Output Size is 10 Words (20 bytes) each.

*Note:*
- **Only the LS Area's User Area (from LS20 to LS1999) is used for this communication.**

- **The System Area (from LS0 to LS19) and Reading Area settings cannot be used for the PLC communication.**

- **The System Data Area's contents will become programless.**

■ **Packet Transfer Mode**

☐ Setup System Area here.

|  | Bit Address | Word Address | Note |
|---|---|---|---|
| **Data Block** | — | DB2W00000-DB60W65534 | *1*2 |
| **Input Relay** | I000000-I655357 | IW00000-IW65534 | *3*4 |
| **Output Repay** | O000000-O655357 | OW00000-OW65534 | *3 |
| **Internal Memory** | M000000-M655357 | MW00000-MW65534 | *3 |

*1 The Data Block Memory to be used in the GP-PRO/PBIII for Windows must be configured in the PLC first. Please confirm that all addresses to be accessed already exist in the PLC.*

*2 The address format for Data Block Memory is according to Siemens S7 conventions. This is word ( 16 bit ) addressing of Byte addresses so only even addresses are valid    e.g. DB2W0050 represents Data Block 2, Word 50.*

*3 The address format for these devices is according to Siemens S7 conventions. For bit addressing the last digit represents the bit position, e.g. I0164 represents byte 16, bit number 4. For word addressing only even byte addresses can be used.*

*4 Input relays cannot be written to by the GP.*

*Note:*
- **The Interpreter Function Block can be found in an example S7-400 PLC project that is contained on the GP-PRO/PBIII for Windows CD-ROM in the folder "FIELDBUS". This was created with version 3.2 of the Step 7 Software. Please follow the instructions in the README.TXT file on how to install this.**

### 11.2.4 ► Environment Setup

There are no communication parameters to be set up on the GP side of the Interbus Connection. The Master PLC/PC automatically assigns node addresses to each slave on the network and the baud rate is fixed at 500 Kbps.

| | GP | PLC/Interbus Master |
|---|---|---|
| **Transmission speed** | 500 Kbps (fixed) | 500 Kbps (fixed) |
| **Node No.** | Automatically Configured | Automatically Configured |

The GP's OFFLINE screen used to enter these communication settings is shown below. The settings on this screen govern the manner in which the GP communicates via Interbus, i.e. the communication data type (Direct I/O or Packet Transfer) and for Direct I/O; the addresses in the GP's internal memory where data will be read and written from, and the sizes of these blocks of data. These settings can be also made from the GP setup menu in GP-PRO/PBIII for Windows software. For Packet Transfer please set the Input and Output Area Size via this menu.

◆ **From the initial OFFLINE menu screen:**
   1) Select [INITIALIZE] to call up the initial settings screen.
   2) Select the [SET UP OPERATION SURROUNDINGS] menu item (screen below appears).
   3) Configure the environment settings to suit your particular requirements. (Ex. Communication Data Type, Input/Output Area Size, etc.)

```
SET UP OPERATION SURROUNDINGS


     SYSTEM DATA AREA  START DATA BLOCK [   0010   ]


                     START DATA WORD [   000   ]


     SYSTEM AREA READING AREA SIZE (0 - 256)[ 0 ]


     COMMUNICATION DATA TYPE            DIRECT I/O  PACKET


     DIRECT I/O START ADDRESS           [  LS0020  ]


              INPUT AREA SIZE        [   8   ]


              OUTPUT AREA SIZE       [   8   ]

```

The input and output area sizes used here must match those set up in the Interbus Master's configuration for the GP slave. Please refer to the Interbus Master's documentation. For Packet Transfer Mode, the input and output size are fixed at 16 bytes.

**11.2.5   Error Code**

The following list shows the error codes for the Device Net connection. These error codes will appear as "PLC COM.ERROR (02:**)" on the bottom left on the GP screen. (** stands for an error code.)

| Error Code | Details | Status |
|---|---|---|
| 14 | No reply from Interbus H/W module | Unit is not properly installed, or unit failure |
| 16 | Interbus Not online | Configuration error |