Pro-face

Digital Human Machine Interface

# 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" information. 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.

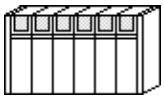
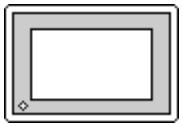
# 2.12 Koyo Electronics Industries

## 2.12.1 System Structure

The following describes the system structure for connecting the GP to Koyo Electronics Industries PLCs.

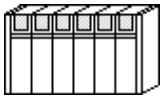
**Reference** *The Cable Diagrams mentioned in the following tables are listed in the section titled "**2.12.2 Cable Diagrams**".*

### ■ KOSTAC SG Series (using Link I/F)

| CPU | Link I/F | Cable Diagram | GP |
|---|---|---|---|
|  |  Upper Link Module |  |  |
| SG-8 | G01-DM | RS-232C (Cable Diagram 1)<br>RS-422 (Cable Diagram 2) | GP series |
| | CPU Unit Upper Link I/F *1 | RS-232C (Cable Diagram 1)<br>RS-422 (Cable Diagram 3) | |

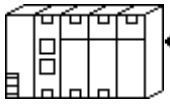
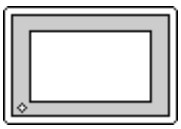
**1 Connect to the CPU module's generic communication port.*

### ■ KOSTAC SU Series (using Link I/F)

| CPU | Link I/F | Cable Diagram | GP |
|---|---|---|---|
|  |  Upper Link Module |  |  |
| SU-5 | U01-DM | RS-232C (Cable Diagram 1) | GP series |
| SU-6 | U01-DM | | |
| | CPU Unit Upper Link I/F *1 | | |
| SU-6B | CPU Unit Upper Link I/F *1 | RS-232C (Cable Diagram 1)<br>RS-422 (Cable Diagram 3) | |

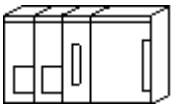
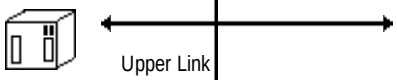
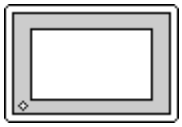
**1 Connect to the CPU module's generic communication port.*

## ■ KOSTAC SZ Series (using CPU unit Link I/F)

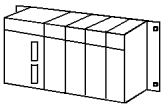
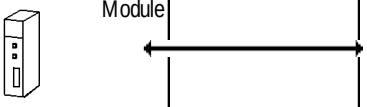
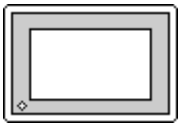
| CPU | Cable Diagram | GP |
|---|---|---|
|  |  |  |
| SZ-4 *1 | RS-232C (Cable Diagram 4) | GP series |

** 1 Connect to the CPU module's generic communication port.*

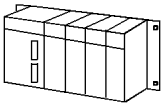
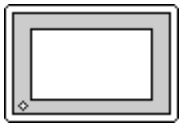
## ■ KOSTAC SR Series (using Upper Link I/F)

| CPU | Link I/F | Cable Diagram | GP |
|---|---|---|---|
|  |  Upper Link I/F | |  |
| SR-21<br>SR-22 | E-02DM-R1 | RS-422 (Cable Diagram 2) | GP series |

## ■ DL-405 Series (using Link I/F)

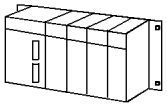
| CPU | Link I/F | Cable Diagram | GP |
|---|---|---|---|
|  |  Upper Link Module | |  |
| D4-430 | D4-DCM | RS-232C (Cable Diagram 1) | GP series |
| D4-440 | D4-DCM | | |
| | Link I/F on CPU unit | | |

## ■ DL-205 Series (using Link I/F on CPU unit)

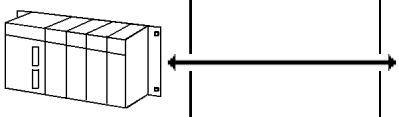
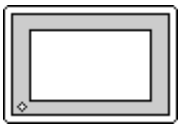
| CPU | Cable Diagram | GP |
|---|---|---|
|  |  |  |
| D2-240 *1 | RS-232C (Cable Diagram 5) | GP series |

** 1 Connect to the CPU module's generic communication port.*

## ■ DL-305 Series (using Link I/F on CPU unit)

| CPU | Link I/F | Cable Diagram | GP |
|---|---|---|---|
|  |  Upper Link I/F |  |  |
| D3-330 | D3-DCM | RS-422 (Cable Diagram 2) | GP |

## ■ Direct Logic 05 Series

| CPU | Cable Diagram | GP |
|---|---|---|
|  | |  |
| D0-05AA, D0-05AD<br>D0-05AR, D0-05DA<br>D0-05DD, D0-05DD-D<br>D0-05DR, D0-05DR-D | RS-232C<br>(Cable Diagram 6) | GP Series |

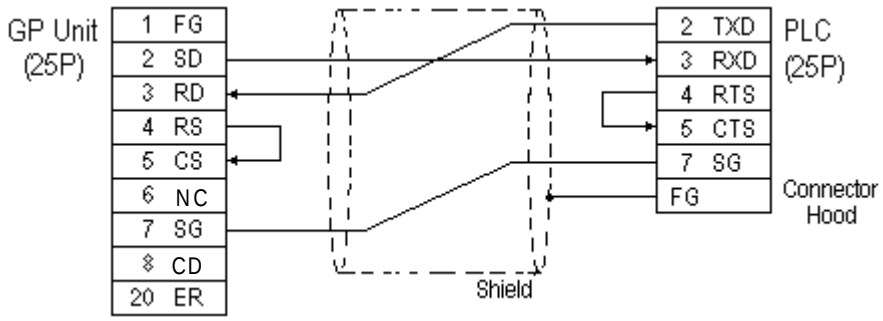
## 2.12.2 Cable Diagrams

The cable diagrams illustrated below and the cable diagrams recommended by Koyo Electronic Industries may differ, however, using these cables for your PLC operations will not cause any problems.


*Ground your PLC's FG terminal according to your country's applicable standard. For details, refer to the corresponding PLC manual.*

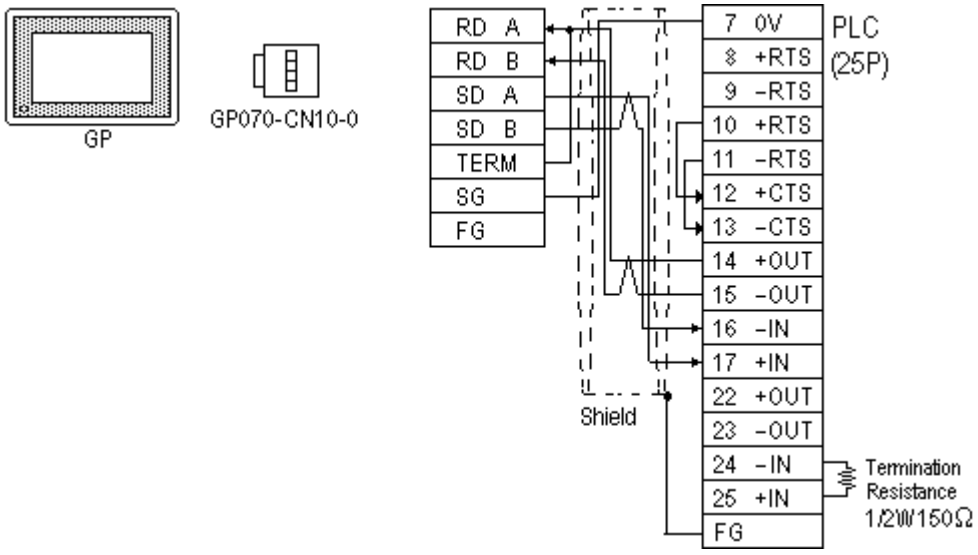

- ***Connect the FG line of the Shield cable to either the GP or PLC, depending on your environment. When using a* connector hood *and grounding the FG line, be sure to use an electrical conductor.***
- ***For the RS-232C connection, use a cable length less than 15m.***
- ***If a communications cable is used, it must be connected to the SG (signal ground).***
- ***For the RS-422 connection, use a cable length less than 600m.***

**Cable Diagram 1** (RS-232C)

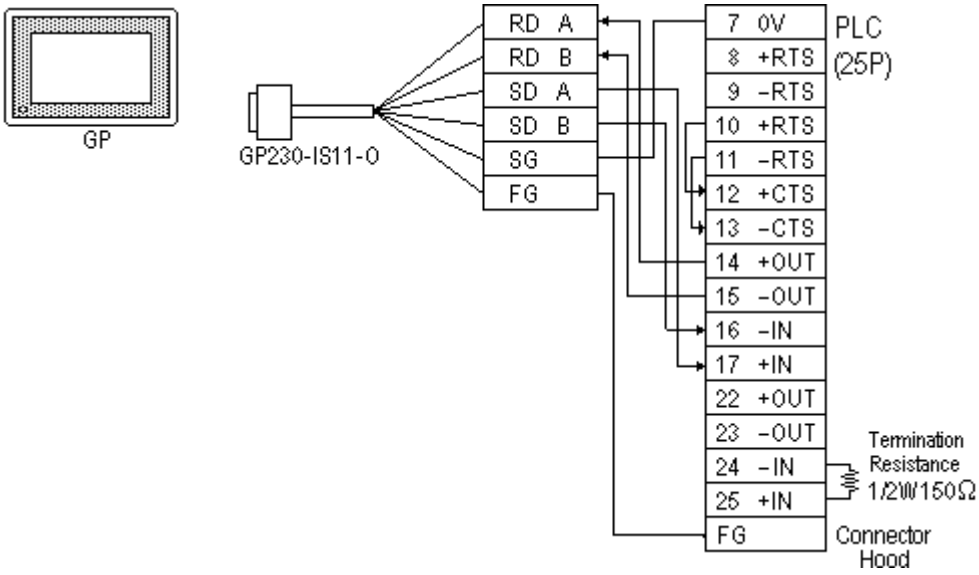



**Cable Diagram 2** (RS-422)

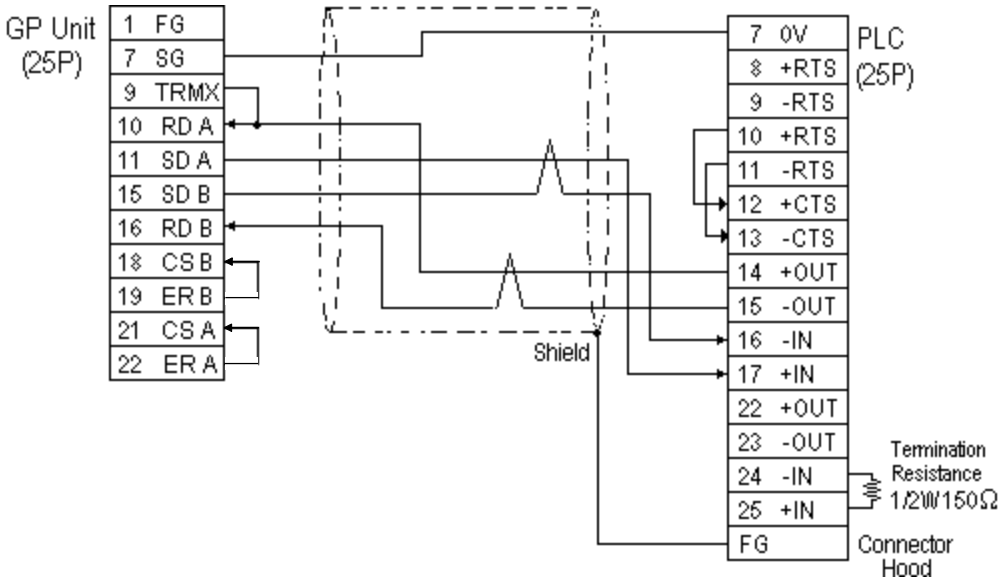
• When using Digital's RS-422 connector terminal adapter GP070-CN10-0




• When using Digital's RS-422 Cable, GP230-IS11-0



• When making your own cable connections

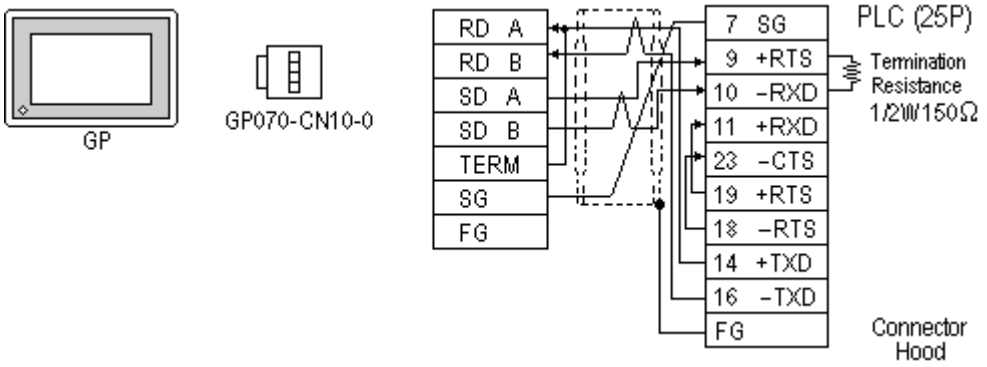



**Note:**

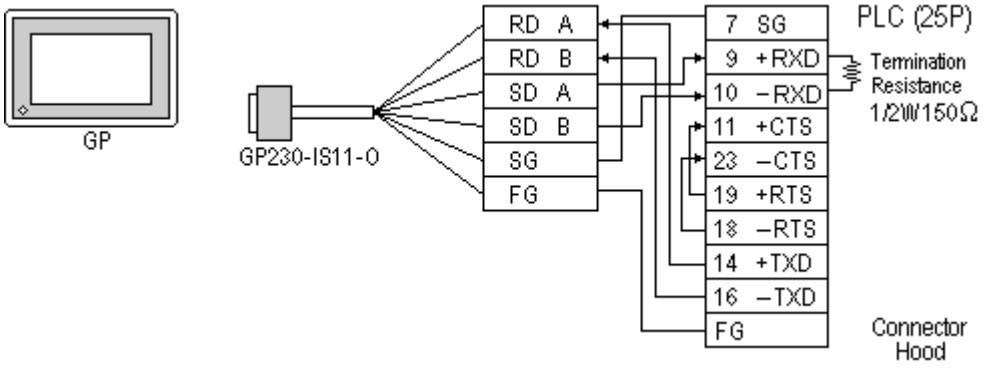
- **When making your own connections, we recommend using Hitachi Densen's CO-SPEV-SB(A)3P*0.3SQ cable.**
- **When connecting the #9 and #10 pins in the GP Serial I/F, a termination resistance of 100Ω is added between RDA and RDB.**
- **When using RS-422 connection, the cable length must not be any longer than 600 meters.**

### Cable Diagram 3 (RS-422)

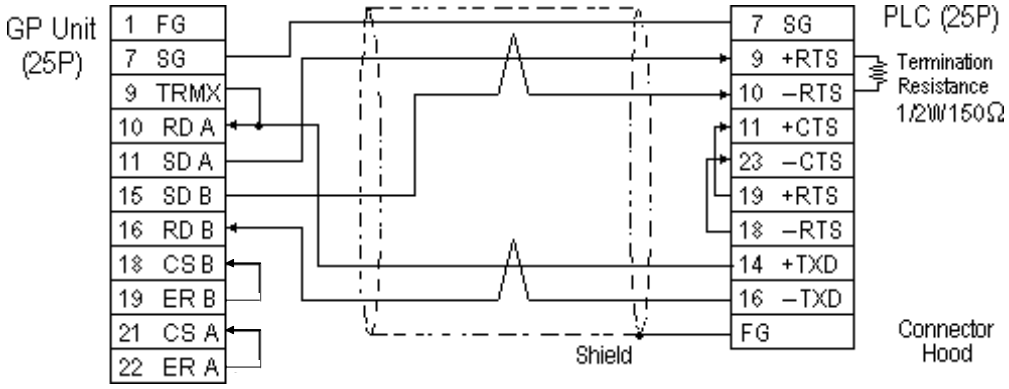
• When using Digital's RS-422 connector terminal adapter GP070-CN10-0




• When using Digital's RS-422 Cable, GP230-IS11-0



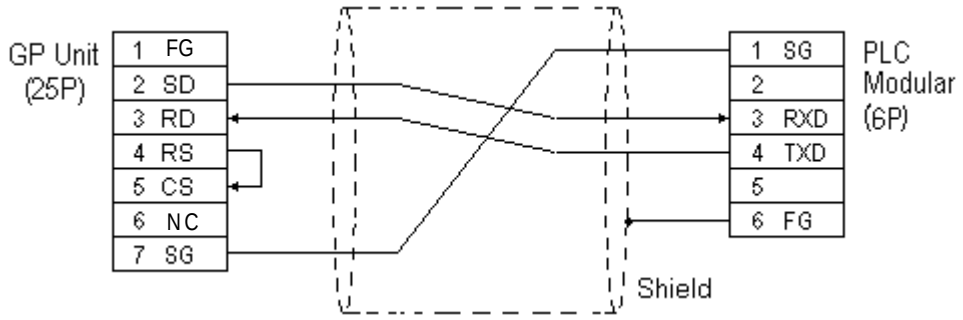
• When making your own cable connections




**Note:**

- **When making your own connections, we recommend using Hitachi Densen's CO-SPEV-SB(A)3P*0.3SQ cable.**
- **When connecting the #9 and #10 pins in the GP Serial I/F, a termination resistance of 100Ω is added between RDA and RDB.**
- **When using RS-422 connection, the cable length must not be any longer than 600 meters.**

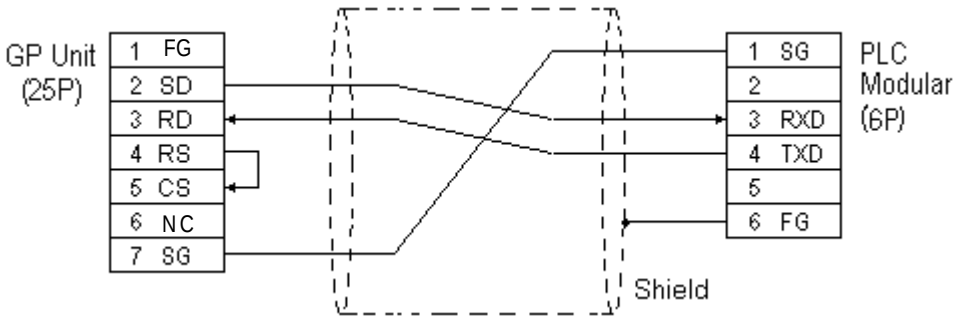
### Cable Diagram 4 (RS-232C)




**Note:**

**The GP connection uses SZ-4's Port 2 (generic SIO port). Port 1 is the program communication port (Programming Console S-20P).**

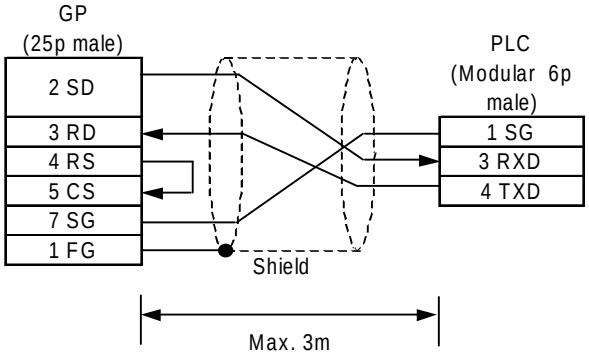
### Cable Diagram 5 (RS-232C)




**Note:**

**The GP connection uses D2-240's Port 2 (generic SIO port). Port 1 is the program communication port.**

**Cable Diagram 6** (RS-232C)




## 2.12.3 Supported Devices

The following describes the range of devices supported by the GP.

### ■ KOSTAC SG Series

Setup System Area here.

| Device | Bit Address | Word Address | Particulars | |
|---|---|---|---|---|
| Input Relay | I0000 ~ I1777 | R40400 ~ R40477 | oct8] | L/H |
| Output Relay | Q0000 ~ Q1777 | R40500 ~ R40577 | oct8] | |
| Control Relay | M0000 ~ M3777 | R40600 ~ R40777 | oct8] | |
| Stage | S0000 ~ S1777 | R41000 ~ R41077 | oct8] | |
| Link Relay (input) | GI0000 ~ GI3777 | R40000 ~ R40177 | oct8] | |
| Specified Transfer Relay (output) | GQ0000 ~ GQ3777 | R40200 ~ R40377 | oct8] | |
| Timer (contact) | T000 ~ T377 | R41100 ~ R41117 | oct8] | |
| Counter (contact) | C000 ~ C377 | R41140 ~ R41157 | oct8] | |
| Timer (elapsed time) | --- | R0000 ~ R0377 | oct8] | |
| Counter (elapsed value) | --- | R1000 ~ R1377 | oct8] | |
| Variable Memory 1 | --- | R400 ~ R777 | oct8] Bit15] | |
| Variable Memory 2 | --- | R1400 ~ R7377 | oct8] Bit15] | |
| Variable Memory 3 | --- | R10000 ~ R37777 | oct8] Bit15] | |

## ■ KOSTAC SU Series

Setup System Area here.

| Device | Bit Address | Word Address | Particulars | |
|---|---|---|---|---|
| Input Relay | I000 ~ I477 | R40400 ~ R40423 | oct8] | L/H |
| Output Relay | Q000 ~ Q477 | R40500 ~ R40523 | oct8] | |
| Control Relay | M0000 ~ M1777 | R40600 ~ R40677 | oct8] | |
| Stage | S0000 ~ S1777 | R41000 ~ R41077 | oct8] | |
| Link Relay/Link Input | GI0000 ~ GI1777 | R40000 ~ R40077 | oct8] | |
| Special Relay | SP000 ~ SP137<br>SP320 ~ SP717 | R41200 ~ R41205<br>R41215 ~ R41234 | oct8] *1 | |
| Timer (contact) | T000 ~ T377 | R41100 ~ R41117 | oct8] | |
| Counter (contact) | C000 ~ C177 | R41140 ~ R41157 | oct8] | |
| Timer (elapsed time) | --- | R0000 ~ R0377 | oct8] | |
| Counter (elapsed value) | --- | R1000 ~ R1177 | oct8] | |
| Data Register | --- | R1400 ~ R7377 | oct8] Bit15] | |
| Special Register | --- | R700 ~ R737<br>R7400 ~ R7777 | oct8] Bit15] *1 | |
| Expanded Register | --- | R10000 ~ R17777 | oct8] Bit15] *2 | |

** 1 Only the SU-6B will check connections (Only the SU-6B can use special registers R700 to R737), however it cannot write data.*

**2 Only the SU-6B can be used.*

## ■ KOSTAC SZ Series

Setup System Area here.

| Device | Bit Address | Word Address | Particulars | |
|---|---|---|---|---|
| Input Relay | I000 ~ I0477 | R40400 ~ R40423 | oct8] | L/H |
| Output Relay | Q0000 ~ Q0477 | R40500 ~ R40523 | oct8] | |
| Control Relay | M0000 ~ Q0377 | R40600 ~ R40617 | oct8] | |
| Stage | --- | R41000 ~ R41037 | oct8] | |
| Timer (contact) | T000 ~ T177 | R41100 ~ R41107 | oct8] | |
| Counter (contact) | C000 ~ C177 | R41140 ~ R41147 | oct8] | |
| Timer (elapsed time) | --- | R0000 ~ R0177 | oct8] | |
| Counter (elapsed value) | --- | R1000 ~ R1177 | oct8] | |
| Variable Memory 2 | --- | R2000 ~ R3777 | oct8] Bit15] | |

## ■ KOSTAC SR Series

Setup System Area here.

| Device | Bit Address | Word Address | Particulars | |
|---|---|---|---|---|
| Input/Output | 000 ~ 157<br>700 ~ 767 | R000 ~ R014<br>R070 | OCT8 | L/H |
| Control Relay | 160 ~ 377<br>770 ~ 777 | R016 ~ R036<br>R076 | OCT8 | |
| Shift Register | 400 ~ 577 | R040 ~ R056 | OCT8 | |
| Timer/Counter (contact) | 600 ~ 677 | R060 ~ R066 | OCT8 | |
| Timer/Counter (elapsed value) | --- | R600 ~ R677 | OCT8 | |
| Data Register | --- | R400 ~ R577 | OCT8 Bit15 ÷2 | |

**Cannot perform only bit write operations. Use byte units to perform bit write operations, where all other bits besides the selected bit, are cleared to 0.**

## ■ DL-405 Series

Setup System Area here.

| Device | Bit Address | Word Address | Particulars | |
|---|---|---|---|---|
| Input Relay | X000 ~ X477 | V40400 ~ V40423 | OCT8 | L/H |
| Output Relay | Y000 ~ Y477 | V40500 ~ V40523 | OCT8 | |
| Internal Relay | C0000 ~ C1777 | V40600 ~ V40677 | OCT8 | |
| Stage | S0000 ~ S1777 | V41000 ~ V41077 | OCT8 | |
| Link Relay/Link Input | GX0000 ~ GX1777 | V40000 ~ V40077 | OCT8 | |
| Special Relay | SP000 ~ SP137<br>SP320 ~ SP717 | V41200 ~ V41205<br>V41215 ~ V41234 | OCT8 | |
| Timer (contact) | T000 ~ T377 | V41100 ~ V41117 | OCT8 | |
| Counter (contact) | CT000 ~ CT177 | V41140 ~ V41147 | OCT8 | |
| Timer (elapsed time) | --- | V0000 ~ V0377 | OCT8 | |
| Counter (elapsed value) | --- | V1000 ~ V1177 | OCT8 | |
| Data Register | --- | V1400 ~ V7377 | OCT8 Bit15 | |
| Special Register | --- | V7400 ~ V7777 | OCT8 Bit15 | |

## ■ DL-205 Series

Setup System Area here.

| Device | Bit Address | Word Address | Particulars | |
|---|---|---|---|---|
| Input Relay | X0000 ~ X0477 | V40400 ~ V40423 | OCT8 | L/H |
| Output Relay | Y0000 ~ Y0477 | V40500 ~ V40523 | OCT8 | |
| Control Relay | C0000 ~ C0377 | V40600 ~ V40617 | OCT8 | |
| Stage | --- | V41000 ~ V41037 | OCT8 | |
| Timer (contact) | T000 ~ 177 | V41100 ~ V41107 | OCT8 | |
| Counter (contact) | CT000 ~ CT177 | V41140 ~ V41147 | OCT8 | |
| Timer (elapsed time) | --- | V0000 ~ V0177 | OCT8 | |
| Counter (elapsed value) | --- | V1000 ~ V1177 | OCT8 | |
| Variable Memory 2 | --- | V2000 ~ V3777 | OCT8 Bit 15 | |

## ■ DL-305 Series

Setup System Area here.

| Device | Bit Address | Word Address | Particulars | |
|---|---|---|---|---|
| Input/Output | 000 ~ 157<br>700 ~ 767 | V000 ~ V014<br>V070 | OCT8 | L/H |
| Control Relay | 160 ~ 377<br>770 ~ 777 | V016 ~ V036<br>V076 | OCT8 | |
| Shift Register | 400 ~ 577 | V040 ~ V056 | OCT8 | |
| Timer/Counter (contact) | 600 ~ 677 | V060 ~ V066 | OCT8 | |
| Timer/Counter (elapsed value) | --- | V600 ~ V677 | OCT8 | |
| Data Register | --- | V400 ~ V577 | OCT8 Bit 15 ÷2 | |

## ■ Direct Logic 05 Series

| Device | Bit Address | Word Address | Particulars | |
|---|---|---|---|---|
| Input Relay | I0000 ~ I0377 | R40400 ~ R40417 | *1 | L/H |
| Output Relay | Q0000 ~ Q0377 | R40500 ~ R40517 | *1 | |
| Internal Relay | M0000 ~ M0777 | R40600 ~ R40637 | *1 | |
| Stage | S0000 ~ S0377 | R41000 ~ R41017 | *1 | |
| Special Relay | SP0000 ~ SP0777 | R41200 ~ R41237 | *1 | |
| Timer (status bit) | T000 ~ T177 | R41100 ~ R41147 | *1 | |
| Counter (status bit) | C000 ~ C177 | R41140 ~ R41147 | *1 | |
| Timer (elapsed time) | --- | R0000 ~ R0177 | *1 | |
| Counter (calculate) | --- | R1000 ~ R1177 | *1 | |
| V-Memory | --- | R1200 ~ R7377 | *1 *3 | |
| V-Memory (non-volatile) | --- | R7400 ~ R7577 | *1 *2 | |
| System Parameter | --- | R7600 ~ R7777 | *1 *2 | |

**1 Octal data address.*

**2 Bit-type address.*

**3 R1200 to R1377 cannot be designated using bits. (R1400 - R7377 can.)*

## 2.12.4 Environment Setup

The following tables list Digital's recommended PLC and GP communication settings.

### ■ KOSTAC SG Series (using Upper Link I/F)

| GP Setup | | Upper Link Module Setup | |
|---|---|---|---|
| Baud Rate | 19200 bps | Baud Rate | 19200 bps |
| Data Length | 8 bits | --- | |
| Stop Bit | 1 bit | --- | |
| Parity Bit | Odd | Parity Bit | Odd |
| Data Flow Control | ER Control | --- | |
| Communication Format (RS-232C) | RS-232C | --- | |
| Communication Format (RS-422) | 4-wire type | --- | |
| --- | | Master/Slave Setup | Slave |
| --- | | Transfer Mode | Hex |
| Unit No. | 1 | Station Number | 1 |

### ■ KOSTAC SG Series (using General SIO Port)

| GP Setup | | Generic SIO Port Setup | |
|---|---|---|---|
| Baud Rate | 19200 bps (fixed) | Baud Rate | 19200 bps (fixed) |
| Data Length | 8 bits (fixed) | Data Length | 8 bits (fixed) |
| Stop Bit | 1 bit (fixed) | Stop Bit | 1 bit (fixed) |
| Parity Bit | Odd (fixed) | Parity Bit | Odd (fixed) |
| Data Flow Control | ER Control | --- | |
| Communication Format (RS-232C) | RS-232C | Communication Format (RS-232C) | Dipswitch 1 (CCM SIO Port) is ON |
| Communication Format (RS-422) | 4-wire type | Communication Format (RS-422) | Dipswitch 4 (CCM SIO Port) is Off |
| --- | | Transfer Mode *1 | Hex |
| Unit No. | 1 | CCM Number *1 | 1 |

**1 Turn Dip Switch 2 (CCM Station No.) OFF, and run Transfer mode and CCM Station Number setup with the programmer. Communication will not occur when Dip Switch 2 is ON and the transfer Mode is not designated as Hex.*

### ■ KOSTAC SU Series (using Upper Link I/F)

| GP Setup | | Generic Link Module Setup | |
|---|---|---|---|
| Baud Rate | 19200 bps | Baud Rate | 19200 bps |
| Data Length | 8 bits (fixed) | --- | |
| Stop Bit | 1 bit (fixed) | --- | |
| Parity Bit | Odd | Parity Bit | Odd |
| Data Flow Control | ER Control | --- | |
| Communication Format | RS-232C | --- | |
| Unit No. | 1 | Station Number | 1 |

## ■ KOSTAC SU Series (using General SIO Port)

| GP Setup | | Generic SIO Port Setup | |
|---|---|---|---|
| Baud Rate | 19200 bps | Baud Rate | 19200 bps |
| Data Length | 8 bits (fixed) | --- | |
| Stop Bit | 1 bit (fixed) | --- | |
| Parity Bit | Odd | Parity Bit | Odd |
| Data Flow Control | ER Control | --- | |
| Communication Format (RS-232C) | RS-232C | --- | |
| Communication Format (RS-422) | 4-wire type | --- | |
| --- | | Data Format *1 | Hex |
| Unit No. | 1 | Station Number | 1 |

*1 *Turn* Dip Switch 2 *(CCM Station No.) OFF, and run Transfer mode and CCM Station Number setup with the programmer. Communication will not occur when Dip Switch 2 is ON and the transfer Mode is* not *designated as Hex.*

## ■ KOSTAC SZ Series

| GP Setup | | Generic SIO Port Setup | |
|---|---|---|---|
| Baud Rate | 9600 bps | Baud Rate | 9600 bps |
| Data Length | 8 bits | Data Length | 8 bits |
| Stop Bit | 1 bit | Stop Bit | 1 bit |
| Parity Bit | Odd | Parity Bit | Odd |
| Data Flow Control | ER Control | --- | |
| Communication Format | RS-232C | --- | |
| --- | | Data Format *1 | Hex |
| Unit No. | 1 | Station Number | 1 |

*1 *Turn* Dip Switch 2 *(CCM Station No.) OFF, and run Transfer mode and CCM Station Number setup with the programmer. Communication will not occur when Dip Switch 2 is ON and the transfer Mode is* not *designated as Hex.*

## ■ KOSTAC SR Series

| GP Setup | | CPU Module Setup | |
|---|---|---|---|
| Baud Rate | 19200 bps | Baud Rate | 19200 bps |
| Data Length | 8 bits | --- | |
| Stop Bit | 1 bit | --- | |
| Parity Bit | None | Parity Bit | None |
| Data Flow Control | ER Control | --- | |
| Communication Format | 4-line | --- | |
| --- | | Tum Around Relay | No delay |
| --- | | Power Up Mode | RUN mode |
| --- | | Transmission Mode | Hex |
| Unit No. | 1 | Station Number | 1 |

## ■ DL405 Series (using Upper Link I/F)

| GP Setup | | Upper Link Module Setup | |
|---|---|---|---|
| Baud Rate | 19200 bps | Baud Rate | 19200 bps |
| Data Length | 8 bits (fixed) | --- | |
| Stop Bit | 1 bit (fixed) | --- | |
| Parity Bit | Odd | Parity Bit | Odd |
| Data Flow Control | ER Control | --- | |
| Communication Format | RS-232C | --- | |
| Unit No. | 1 | Station Number | 1 |

## ■ DL-405 Series (using General SIO Port)

| GP Setup | | Generic SIO Port Setup | |
|---|---|---|---|
| Baud Rate | 19200 bps | Baud Rate | 19200 bps |
| Data Length | 8 bits (fixed) | --- | |
| Stop Bit | 1 bit (fixed) | --- | |
| Parity Bit | Odd | Parity Bit | Odd |
| Data Flow Control | ER Control | --- | |
| Communication Format (RS-232C) | RS-232C | --- | |
| Communication Format (RS-422) | 4-wire type | --- | |
| --- | | Data Format *1 | Hex |
| Unit No. | 1 | Station Number | 1 |

*1 *Turn* Dip Switch 2 *(CCM Station No.) OFF, and run Transfer mode and CCM Station Number setup with the programmer. Communication will not occur when Dip Switch 2 is ON and the transfer Mode is* not *designated as Hex.*

## ■ DL-205 Series

| GP Setup | | Generic SIO Port Setup | |
|---|---|---|---|
| Baud Rate | 9600 bps | Baud Rate | 9600 bps |
| Data Length | 8 bits | Data Length | 8 bits |
| Stop Bit | 1 bit | Stop Bit | 1 bit |
| Parity Bit | Odd | Parity Bit | Odd |
| Data Flow Control | ER Control | --- | |
| Communication Format | RS-232C | --- | |
| --- | | Data Format *1 | Hex |
| Unit No. | 1 | Station Number | 1 |

*1 *Turn* Dip Switch 2 *(CCM Station No.) OFF, and run Transfer mode and CCM Station Number setup with the programmer. Communication will not occur when Dip Switch 2 is ON and the transfer Mode is* not *designated as Hex.*

## ■ DL-305 Series

| GP Setup | | CPU Module Setup | |
|---|---|---|---|
| Baud Rate | 19200 bps | Baud Rate | 19200 bps |
| Data Length | 8 bits | --- | |
| Stop Bit | 1 bit | --- | |
| Parity Bit | None | Parity Bit | None |
| Data Flow Control | ER Control | --- | |
| Communication Format | 4-wire type | --- | |
| --- | | Turn Around Relay | No delay |
| --- | | Power Up Mode | RUN mode |
| --- | | Data Format *1 | Hex |
| Unit No. | 1 | Station Number | 1 |

**1 Turn* Dip Switch 2 *(CCM Station No.) OFF, and run Transfer mode and CCM Station Number setup with the programmer. Communication will not occur when Dip Switch 2 is ON and the transfer Mode is* not *designated as Hex.*

## ■ Direct Logic 05 Series

| GP Setup | | CPU Module Setup | |
|---|---|---|---|
| Baud Rate | 19200 bps | Baud Rate | 19200 bps |
| Data Length | 8 bits | Data Length | 8 bits |
| Stop Bit | 1 bit | Stop Bit | 1 bit |
| Parity Bit | odd | Parity Bit | odd |
| Data Flow Control | ER Control | --- | |
| Communication Format | RS-232C | --- | |
| --- | | Protocol | CCM2 (CCM Net) |
| --- | | Data Transfer Mode | HEX |
| Unit No. | 1 | Station Number | 1 |

**1 The Baud Rate setting is for PORT2 only. PORT1 is fixed at 9600bps.*