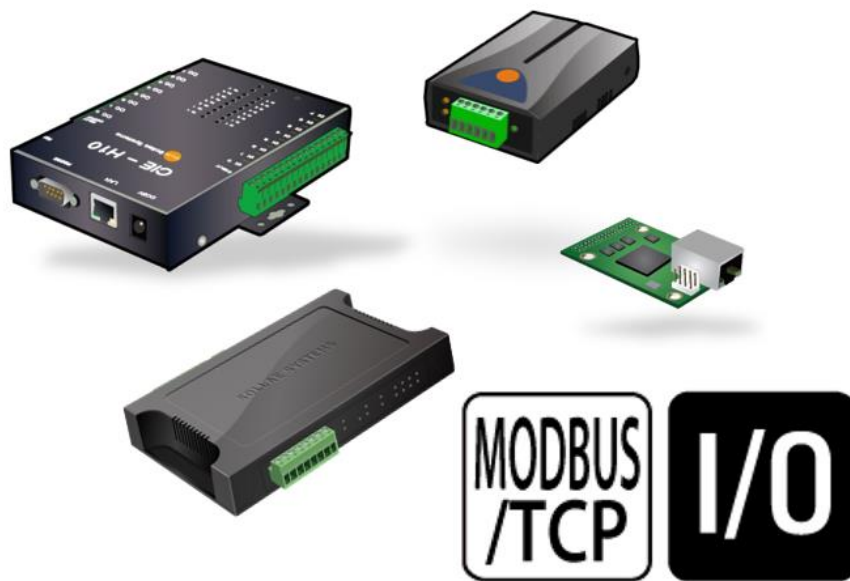


ezTCP Technical Documents

Remote Digital I/O Controller Applications

Version 1.3



⚠ *Caution: Specifications of this document may be changed without prior notice for improvement.*

Sollae Systems Co., Ltd.

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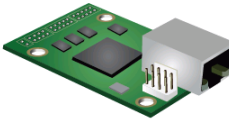



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1 Overview

The remote digital I/O controllers from Sollae Systems Co., Ltd. can be controlled via the Modbus/TCP protocol. Since this protocol operates in a client-server structure, one side can be set as the master and the other as the slave, allowing the network to be configured in a 1:1 or 1:N setup.

Table 1-1 I/O controllers

Product	Type	Number of Port			Multiple-connections (Max.)
		Digital		Analog	
		Input	Output	Input	
CIE-H10 	External	8	8	0	Support (8)
CIE-M10 	Modular	8	8	1	Support (8)
CIE-H12 	External	2	1	0	Support (8)
EZI-10 	External	1	1	0	NOT Support
CIE-H14 	External	4	4	0	Support (8)

☞ *CIE-H10 and CIE-M10 have the same number of digital input and output ports, so only the CIE-H10 was used in the system configuration diagram discussed in this document.*

2 System Configuration and Diagram

2.1 CIE-H10 and EZI-10 Configuration

You can connect up to 8 EZI-10 units to a single CIE-H10 using the multiple connection feature of the CIE-H10. In this setup, the CIE-H10 is configured as a slave, while each EZI-10 is set as a master.

Table 2-1 configuration

Product	CIE-H10(Slave)	EZI-10(Master)	Note
Number of Products	1	1 ~ 8	Up to 1:8

2.1.1 System Diagram

- Control of Masters' output ports

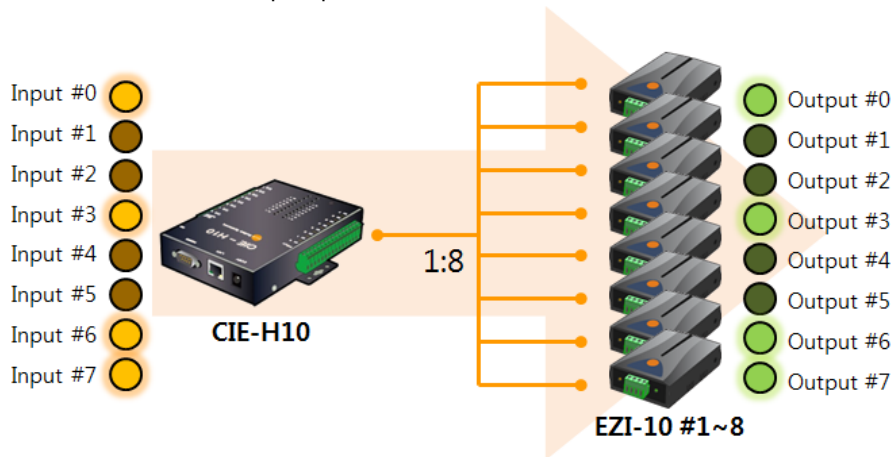


Figure 2-1 control of masters' output ports

- Control of Slave's output ports

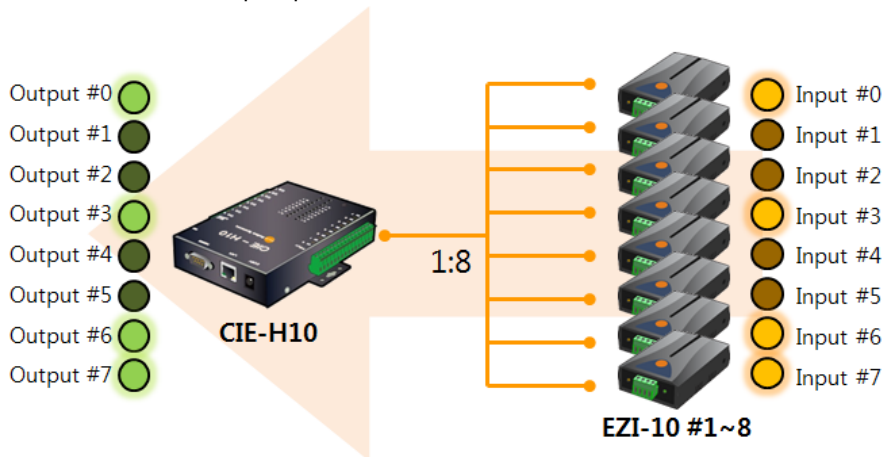


Figure 2-2 control of slave's output ports

2.1.2 Configuration Example

Table 2-2 configuration example (1)

Variable	CIE-H10
IP Address	10.1.0.1
Master / Slave	Slave
Unit ID	1
Input Port Base Address	0
Output Port Base Address	8
Connection mode	Passive
Peer Address	N/A
Multiple Connection	8

Table 2-3 configuration example (2)

Variable	EZI-10 #1	EZI-10 #2	EZI-10 #3	EZI-10 #4
IP Address	10.2.0.1	10.2.0.2	10.2.0.3	10.2.0.4
Master / Slave	Master	Master	Master	Master
Unit ID	1	1	1	1
Input Port Base Address	0	1	2	3
Output Port Base Address	8	9	10	11
Control Method of Slave's Output Ports	FC 05	FC 05	FC 05	FC 05
Connection mode	Active	Active	Active	Active
Peer Address	10.1.0.1	10.1.0.1	10.1.0.1	10.1.0.1
Multiple Connection	N/A	N/A	N/A	N/A

Table 2-4 configuration example (3)

Variable	EZI-10 #5	EZI-10 #6	EZI-10 #7	EZI-10 #8
IP Address	10.2.0.5	10.2.0.6	10.2.0.7	10.2.0.8
Master / Slave	Master	Master	Master	Master
Unit ID	1	1	1	1
Input Port Base Address	4	5	6	7
Output Port Base Address	12	13	14	15
Control Method of Slave's Output Ports	FC 05	FC 05	FC 05	FC 05
Connection mode	Active	Active	Active	Active
Peer Address	10.1.0.1	10.1.0.1	10.1.0.1	10.1.0.1
Multiple Connection	N/A	N/A	N/A	N/A

☞ **N/A: Not Available**



2.2 CIE-H10 and CIE-H12 Configuration

Unlike the EZI-10, the CIE-H12 has only one output port but two input ports, so the maximum number of devices that can be connected when configuring with the CIE-H10 varies depending on the control method. For bidirectional control, up to 4 devices can be connected, while for unidirectional control (master -> slave), up to 8 devices can be connected.

Table 2-5 configuration

Product	CIE-H10(Slave)	CIE-H12(Master)	Note
Number of Products	1	1 ~ 4	Bidirectional control Up to 1:4
Number of Products	1	8	Unidirectional control Up to 1:8

2.2.1 System Diagram ① - Bidirectional Control

- Control of Masters' output ports

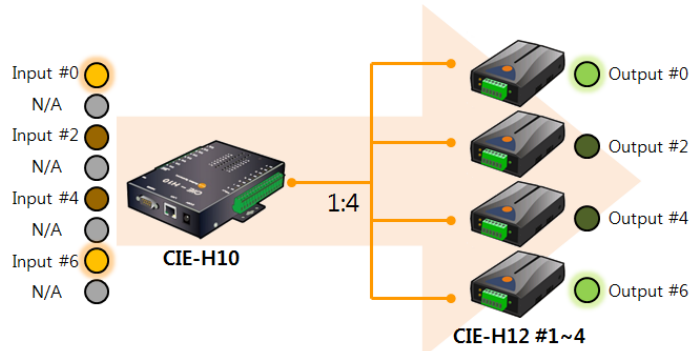


Figure 2-3 control of masters' output ports

- Control of Slave's output ports

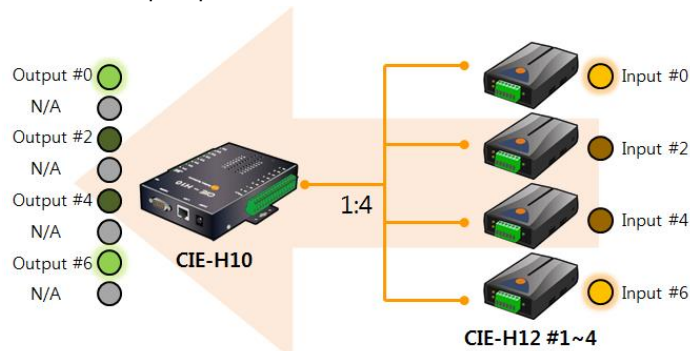


Figure 2-4 control of slave's output ports

☞ *The ports marked as N/A in the above system diagram can be used through methods other than Modbus/TCP, such as HTTP or Macro.*

2.2.2 Configuration Example ① - Bidirectional Control

Table 2-6 configuration example (1)

Variable	CIE-H10
IP Address	10.1.0.1
Master / Slave	Slave
Unit ID	1
Input Port Base Address	0
Output Port Base Address	8
Connection mode	Passive
Peer Address	N/A
Multiple Connection	8

Table 2-7 configuration example (2)

Variable	CIE-H12 #1	CIE-H12 #2	CIE-H12 #3	CIE-H12 #4
IP Address	10.2.0.1	10.2.0.2	10.2.0.3	10.2.0.4
Master / Slave	Master	Master	Master	Master
Unit ID	1	1	1	1
Input Port Base Address	0	2	4	6
Output Port Base Address	8	10	12	14
Control Method of Slave's Output Ports	FC 05	FC 05	FC 05	FC 05
Connection mode	Active	Active	Active	Active
Peer Address	10.1.0.1	10.1.0.1	10.1.0.1	10.1.0.1
Multiple Connection	N/A	N/A	N/A	N/A

2.2.3 System Diagram ② - Unidirectional Control

- Control of Masters' output ports

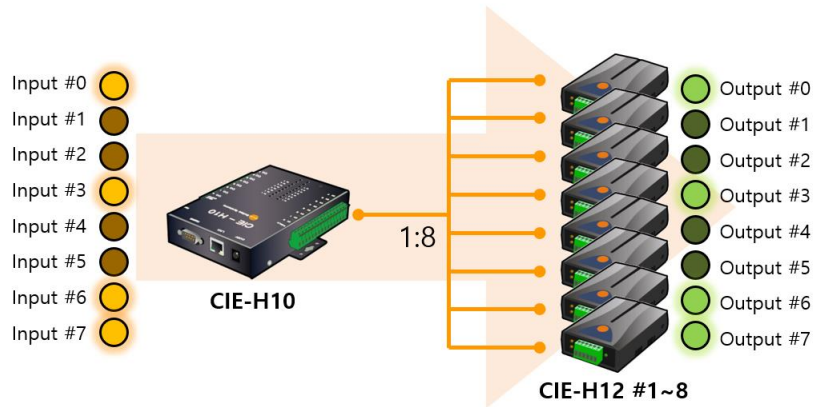


Figure 2-5 control of master's output ports

2.2.4 Configuration Example ② - Unidirectional Control

Table 2-8 configuration example (1)

Variable	CIE-H10
IP Address	10.1.0.1
Master / Slave	Slave
Unit ID	1
Input Port Base Address	0
Output Port Base Address	8
Connection mode	Passive
Peer Address	N/A
Multiple Connection	8

Table 2-9 configuration example (2)

Variable	CIE-H12 #1	CIE-H12 #2	CIE-H12 #3	CIE-H12 #4
IP Address	10.2.0.1	10.2.0.2	10.2.0.3	10.2.0.4
Master / Slave	Master	Master	Master	Master
Unit ID	1	1	1	1
Input Port Base Address	0	1	2	3
Output Port Base Address	8	9	10	11
Control Method of Slave's Output Ports	FC 05	FC 05	FC 05	FC 05
Connection mode	Active	Active	Active	Active
Peer Address	10.1.0.1	10.1.0.1	10.1.0.1	10.1.0.1
Multiple Connection	N/A	N/A	N/A	N/A

Table 2-10 configuration example (3)

Variable	CIE-H12 #5	CIE-H12 #6	CIE-H12 #7	CIE-H12 #8
IP Address	10.2.0.5	10.2.0.6	10.2.0.7	10.2.0.8
Master / Slave	Master	Master	Master	Master
Unit ID	1	1	1	1
Input Port Base Address	4	5	6	7
Output Port Base Address	12	13	14	15
Control Method of Slave's Output Ports	FC 05	FC 05	FC 05	FC 05
Connection mode	Active	Active	Active	Active
Peer Address	10.1.0.1	10.1.0.1	10.1.0.1	10.1.0.1
Multiple Connection	N/A	N/A	N/A	N/A

2.3 CIE-H10 Configuration

A 1:N configuration can be achieved using only the CIE-H10. In this case, up to 8 CIE-H10 units configured as slaves can be connected to a CIE-H10 configured as the master.

Table 2-11 configuration

Product	CIE-H10(Master)	CIE-H10(Slave)	Note
Number of Products	1	1 ~ 8	Up to 1:8

2.3.1 System Diagram

- Control of Slaves' output ports

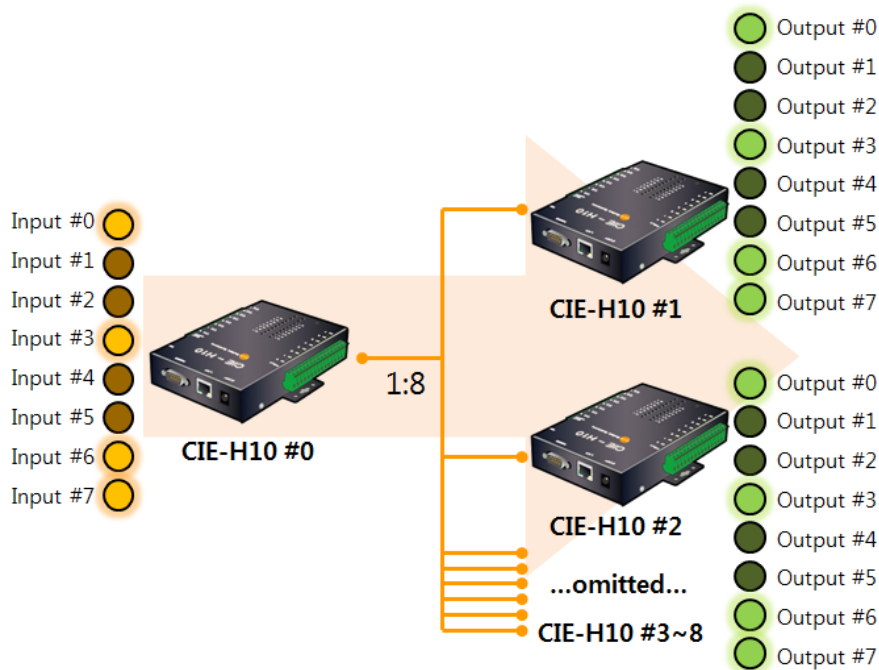


Figure 2-6 control of slaves' output ports

☞ *In the above system diagram, the output ports of all CIE-H10 units configured as slaves (#1~#8) are controlled together by the input port of the CIE-H10 configured as the master (#0).*

- Control of Master's output ports: OR

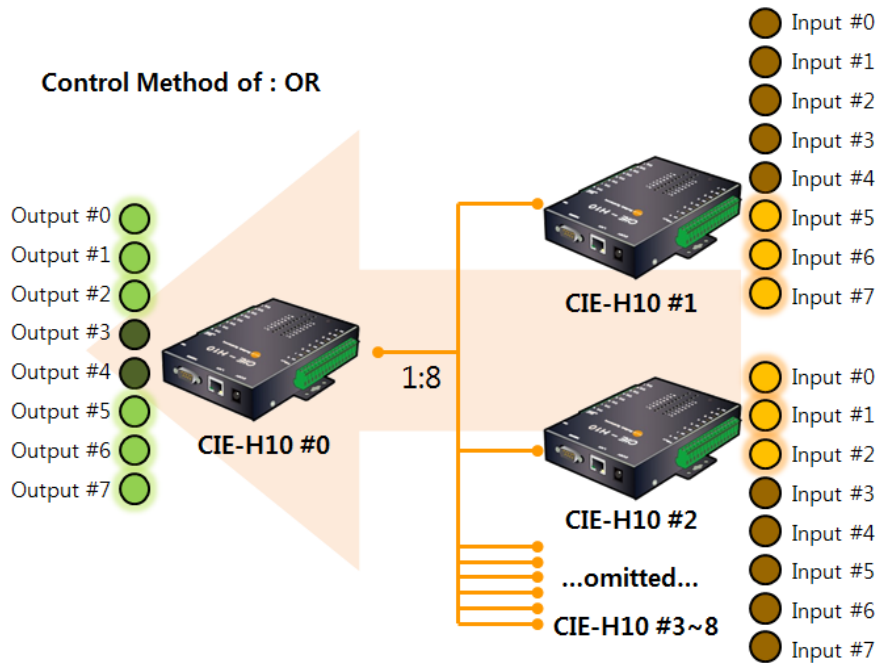


Figure 2-7 control of master's output ports 1

- Control of Master's output ports: AND

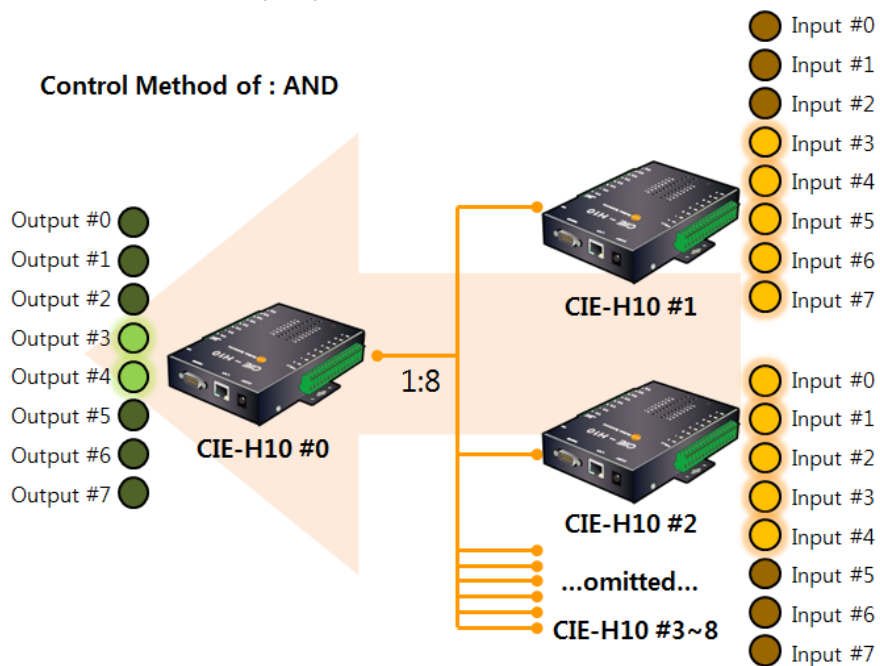


Figure 2-8 control of master's output ports 2

☞ *The output port of the CIE-H10 (#0), when configured as the master, operates differently depending on the 'Master Output Port Control Method,' as shown in the above system diagram.*

2.3.2 Configuration example

Table 2-12 configuration example (1)

Variable	CIE-H10 #0
IP Address	10.1.0.1
Master / Slave	Master
Unit ID	1
Input Port Base Address	0
Output Port Base Address	8
Control Method of Master's Output Ports	OR / AND
Connection mode	Passive
Peer Address	N/A
Multiple Connection	8

Table 2-13 configuration example (2)

Variable	CIE-H10 #1	CIE-H10 #2	CIE-H10 #3	CIE-H10 #4
IP Address	10.2.0.1	10.2.0.2	10.2.0.3	10.2.0.4
Master / Slave	Slave	Slave	Slave	Slave
Unit ID	1	1	1	1
Input Port Base Address	0	0	0	0
Output Port Base Address	8	8	8	8
Connection mode	Active	Active	Active	Active
Peer Address	10.1.0.1	10.1.0.1	10.1.0.1	10.1.0.1
Multiple Connection	N/A	N/A	N/A	N/A

Table 2-14 configuration example (3)

Variable	CIE-H10 #5	CIE-H10 #6	CIE-H10 #7	CIE-H10 #8
IP Address	10.2.0.5	10.2.0.6	10.2.0.7	10.2.0.8
Master / Slave	Slave	Slave	Slave	Slave
Unit ID	1	1	1	1
Input Port Base Address	0	0	0	0
Output Port Base Address	8	8	8	8
Connection mode	Active	Active	Active	Active
Peer Address	10.1.0.1	10.1.0.1	10.1.0.1	10.1.0.1
Multiple Connection	N/A	N/A	N/A	N/A

2.4 CIE-H12 and EZI-10 Configuration

The CIE-H12 has two input ports and supports multi-connection, allowing up to two EZI-10 units to be connected. However, it has the limitation of not fully supporting bidirectional control.

Table 2-15 configuration

Product	CIE-H12(Master)	EZI-10(Slave)	Note
Number of products	1	1 ~ 2	Up to 1:2

2.4.1 System Diagram

- Control of Slaves' output ports

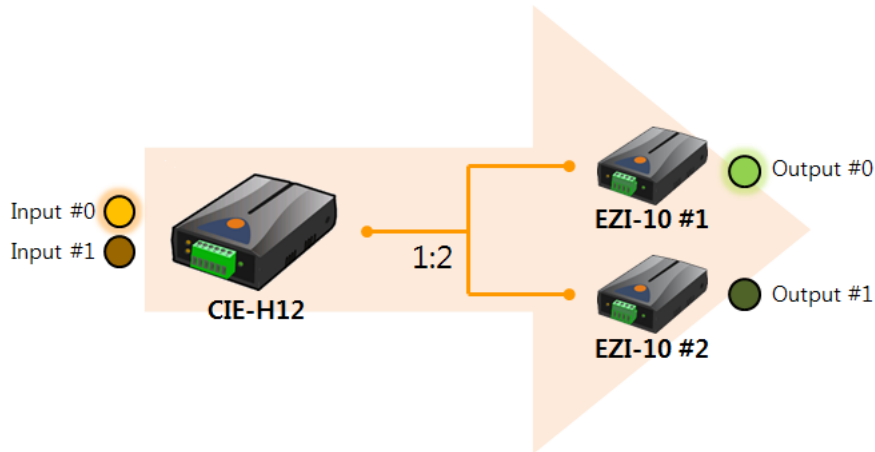


Figure 2-9 control of slaves' output ports

- Control of Master's output port

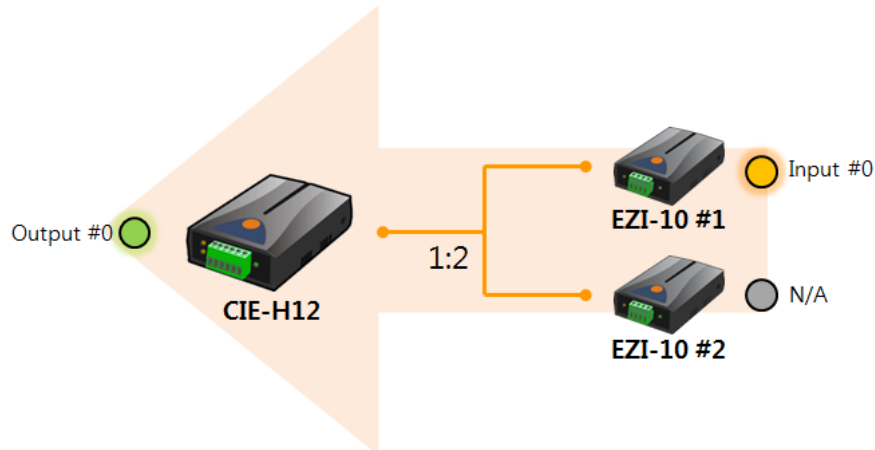


Figure 2-10 control of master's output port

☞ *In the above system diagram, the input port of EZI-10 #2 is unavailable.*

2.4.2 Configuration example

Table 2-16 configuration example (1)

Variable	CIE-H12
IP Address	10.1.0.1
Master / Slave	Master
Unit ID	1
Input Port Base Address	0
Output Port Base Address	8
Control Method of Master's Output Ports	OR / AND
Connection mode	Passive
Peer Address	N/A
Multiple Connection	8

Table 2-17 configuration example (2)

Variable	EZI-10 #1	EZI-10 #2
IP Address	10.2.0.1	10.2.0.2
Master / Slave	Slave	Slave
Unit ID	1	1
Input Port Base Address	0	1
Output Port Base Address	8	9
Connection mode	Active	Active
Peer Address	10.1.0.1	10.1.0.1
Multiple Connection	N/A	N/A

2.5 CIE-H12 Configuration

A 1:N configuration can be achieved using only the CIE-H12. In this case, up to 8 CIE-H12 units configured as slaves can be connected to a CIE-H12 configured as the master.

Table 2-18 configuration

Product	CIE-H12(Master)	CIE-H12(Slave)	Note
Number of Products	1	1 ~ 8	Up to 1:8

2.5.1 System Diagram

- Control of Slave's output ports (#0 input port – dry contact)

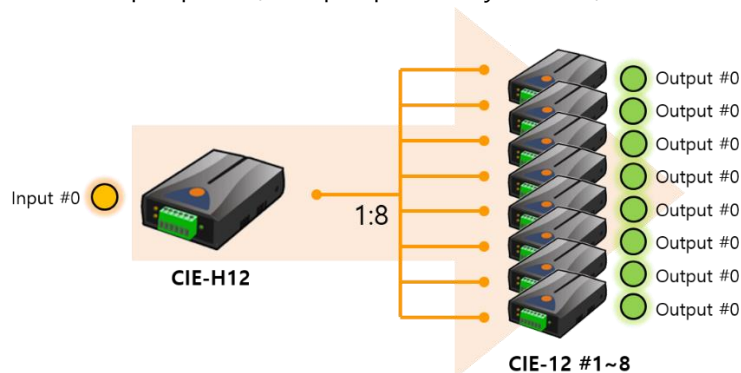


Figure 2-11 Control of Slave's output ports (dry contact input)

☞ *In the above system diagram, the output ports of all CIE-H12 units configured as slaves (#1~#8) are controlled together by the input port #0 of the CIE-H12 configured as the master.*

- Control of Slave's output ports (#1 input port – wet contact)

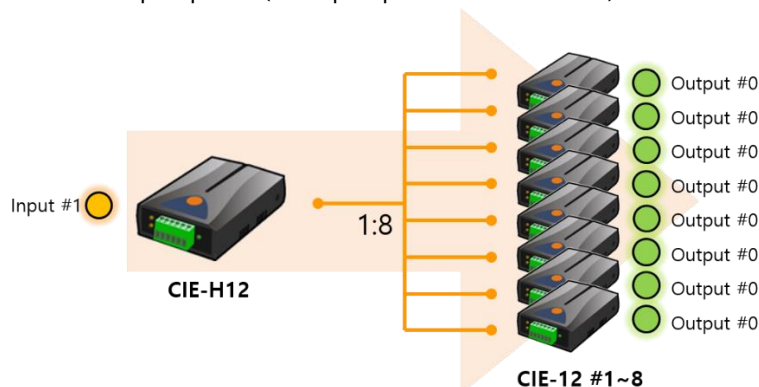


Figure 2-12 Control of Slave's output ports (wet contact input)

☞ *In the above system diagram, the output ports of all CIE-H12 units configured as slaves (#1~#8) are controlled together by the input port #1 of the CIE-H12 configured as the master.*

2.5.2 Configuration example

- Control of Slaves' output ports – Input #0 dry contact

Table 2-19 configuration example (1)

Variable	CIE-H12 #0
IP Address	10.1.0.1
Master / Slave	Master
Unit ID	1
Input Port Base Address	0
Output Port Base Address	8
Control Method of Slave's Output Ports	FC 05
Control Method of Master's Output Ports	OR / AND
Connection mode	Passive
Peer Address	N/A
Multiple Connection	8

Table 2-20 configuration example (2)

Variable	CIE-H12 #1	CIE-H12 #2	CIE-H12 #3	CIE-H12 #4
IP Address	10.2.0.1	10.2.0.2	10.2.0.3	10.2.0.4
Master / Slave	Slave	Slave	Slave	Slave
Unit ID	1	1	1	1
Input Port Base Address	0	0	0	0
Output Port Base Address	8	8	8	8
Connection mode	Active	Active	Active	Active
Peer Address	10.1.0.1	10.1.0.1	10.1.0.1	10.1.0.1
Multiple Connection	N/A	N/A	N/A	N/A

Table 2-21 configuration example (3)

Variable	CIE-H12 #5	CIE-H12 #6	CIE-H12 #7	CIE-H12 #8
IP Address	10.2.0.5	10.2.0.6	10.2.0.7	10.2.0.8
Master / Slave	Slave	Slave	Slave	Slave
Unit ID	1	1	1	1
Input Port Base Address	0	0	0	0
Output Port Base Address	8	8	8	8
Connection mode	Active	Active	Active	Active
Peer Address	10.1.0.1	10.1.0.1	10.1.0.1	10.1.0.1
Multiple Connection	N/A	N/A	N/A	N/A

- Control of Slaves' output ports – Input #1 wet contact

Table 2-22 configuration example (1)

Variable	CIE-H12 #0
IP Address	10.1.0.1
Master / Slave	Master
Unit ID	1
Input Port Base Address	0
Output Port Base Address	8
Control Method of Slave's Output Ports	FC 05
Control Method of Master's Output Ports	OR / AND
Connection mode	Passive
Peer Address	N/A
Multiple Connection	8

Table 2-23 configuration example (2)

Variable	CIE-H12 #1	CIE-H12 #2	CIE-H12 #3	CIE-H12 #4
IP Address	10.2.0.1	10.2.0.2	10.2.0.3	10.2.0.4
Master / Slave	Slave	Slave	Slave	Slave
Unit ID	1	1	1	1
Input Port Base Address	1	1	1	1
Output Port Base Address	9	9	9	9
Connection mode	Active	Active	Active	Active
Peer Address	10.1.0.1	10.1.0.1	10.1.0.1	10.1.0.1
Multiple Connection	N/A	N/A	N/A	N/A

Table 2-24 configuration example (3)

Variable	CIE-H12 #5	CIE-H12 #6	CIE-H12 #7	CIE-H12 #8
IP Address	10.2.0.5	10.2.0.6	10.2.0.7	10.2.0.8
Master / Slave	Slave	Slave	Slave	Slave
Unit ID	1	1	1	1
Input Port Base Address	1	1	1	1
Output Port Base Address	9	9	9	9
Connection mode	Active	Active	Active	Active
Peer Address	10.1.0.1	10.1.0.1	10.1.0.1	10.1.0.1
Multiple Connection	N/A	N/A	N/A	N/A

2.6 CIE-H14 and EZI-10 Configuration

You can connect up to 4 EZI-10 units to a single CIE-H14 using the multiple connection feature of the CIE-H14. In this setup, the CIE-H14 is configured as a slave, while each EZI-10 is set as a master.

Table 2-25 configuration

Product	CIE-H14(Slave)	EZI-10(Master)	Note
Number of Products	1	1 ~ 4	Up to 1:4

2.6.1 System Diagram

- Control of Masters' output ports

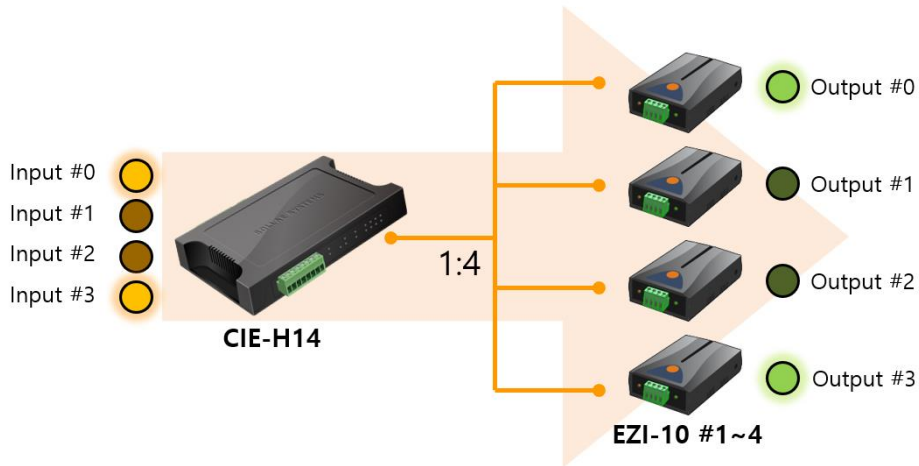


Figure 2-13 control of masters' output ports

- Control of Slave's output ports

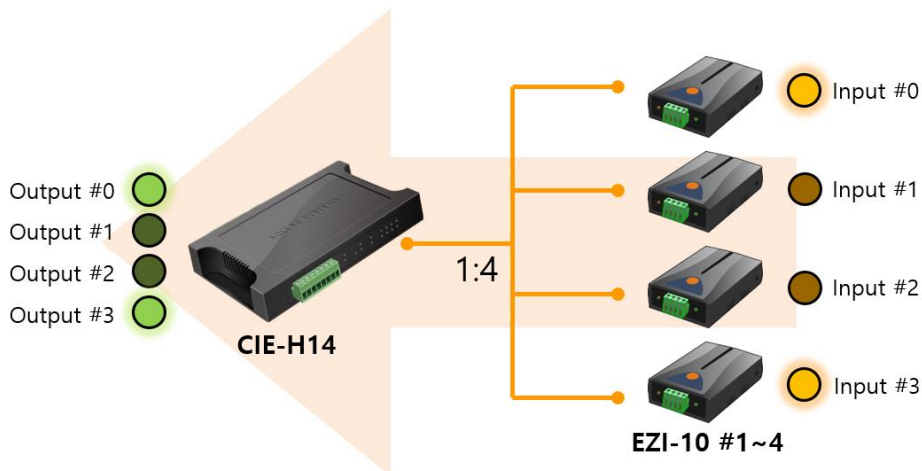


Figure 2-14 control of slave's output ports

2.6.2 Configuration Example

Table 2-26 configuration example (1)

Variable	CIE-H14
IP Address	10.1.0.1
Master / Slave	Slave
Unit ID	1
Input Port Base Address	0
Output Port Base Address	8
Connection mode	Passive
Peer Address	N/A
Multiple Connection	8

Table 2-27 configuration example (2)

Variable	EZI-10 #1	EZI-10 #2	EZI-10 #3	EZI-10 #4
IP Address	10.2.0.1	10.2.0.2	10.2.0.3	10.2.0.4
Master / Slave	Master	Master	Master	Master
Unit ID	1	1	1	1
Input Port Base Address	0	1	2	3
Output Port Base Address	8	9	10	11
Control Method of Slave's Output Ports	FC 05	FC 05	FC 05	FC 05
Connection mode	Active	Active	Active	Active
Peer Address	10.1.0.1	10.1.0.1	10.1.0.1	10.1.0.1
Multiple Connection	N/A	N/A	N/A	N/A

2.7 CIE-H14 and CIE-H12 Configuration

Unlike the EZI-10, the CIE-H12 has only one output port but two input ports, so the maximum number of devices that can be connected when configuring with the CIE-H14 varies depending on the control method. For bidirectional control, up to 2 devices can be connected, while for unidirectional control (master -> slave), up to 4 devices can be connected.

Table 2-28 configuration

Product	CIE-H14(Slave)	CIE-H12(Master)	Note
Number of Products	1	1 ~ 2	Bidirectional control Up to 1:2
Number of Products	1	4	Unidirectional control Up to 1:4

2.7.1 System Diagram ① - Bidirectional Control

- Control of Masters' output ports

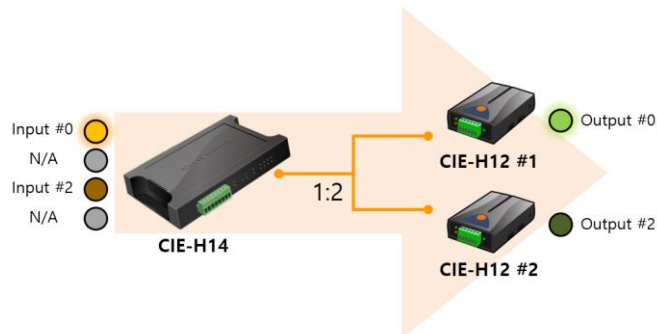


Figure 2-15 control of masters' output ports

- Control of Slave's output ports

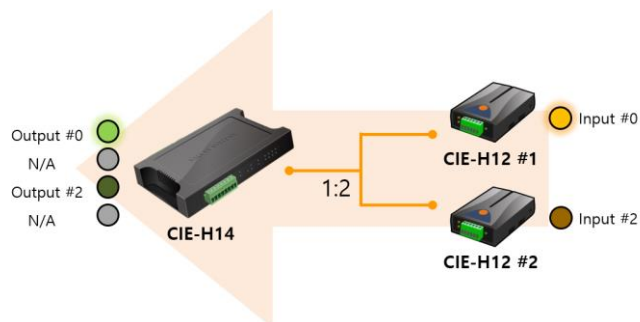


Figure 2-16 control of slave's output ports

☞ *The ports marked as N/A in the above system diagram can be used through methods other than Modbus/TCP, such as HTTP or Macro.*

2.7.2 Configuration Example ① - Bidirectional Control

Table 2-29 configuration example (1)

Variable	CIE-H14
IP Address	10.1.0.1
Master / Slave	Slave
Unit ID	1
Input Port Base Address	0
Output Port Base Address	8
Connection mode	Passive
Peer Address	N/A
Multiple Connection	8

Table 2-30 configuration example (2)

Variable	CIE-H12 #1	CIE-H12 #2
IP Address	10.2.0.1	10.2.0.2
Master / Slave	Master	Master
Unit ID	1	1
Input Port Base Address	0	2
Output Port Base Address	8	10
Control Method of Slave's Output Ports	FC 05	FC 05
Connection mode	Active	Active
Peer Address	10.1.0.1	10.1.0.1
Multiple Connection	N/A	N/A

2.7.3 System Diagram ② - Unidirectional Control

- Control of Master's output ports

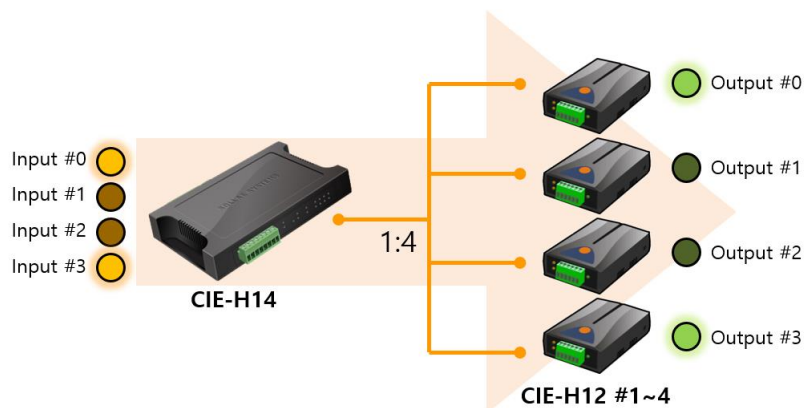


Figure 2-17 control of master's output ports

2.7.4 Configuration Example ② - Unidirectional Control

Table 2-31 configuration example (1)

Variable	CIE-H14
IP Address	10.1.0.1
Master / Slave	Slave
Unit ID	1
Input Port Base Address	0
Output Port Base Address	8
Connection mode	Passive
Peer Address	N/A
Multiple Connection	8

Table 2-32 configuration example (2)

Variable	CIE-H12 #1	CIE-H12 #2	CIE-H12 #3	CIE-H12 #4
IP Address	10.2.0.1	10.2.0.2	10.2.0.3	10.2.0.4
Master / Slave	Master	Master	Master	Master
Unit ID	1	1	1	1
Input Port Base Address	0	1	2	3
Output Port Base Address	8	9	10	11
Control Method of Slave's Output Ports	FC 05	FC 05	FC 05	FC 05
Connection mode	Active	Active	Active	Active
Peer Address	10.1.0.1	10.1.0.1	10.1.0.1	10.1.0.1
Multiple Connection	N/A	N/A	N/A	N/A

2.8 CIE-H14 Configuration

A 1:N configuration can be achieved using only the CIE-H14. In this case, up to 4 CIE-H14 units configured as slaves can be connected to a CIE-H14 configured as the master.

Table 2-33 configuration

Product	CIE-H14(Master)	CIE-H14(Slave)	Note
Number of Products	1	1 ~ 4	Up to 1:4

2.8.1 System Diagram

- Control of Slaves' output ports

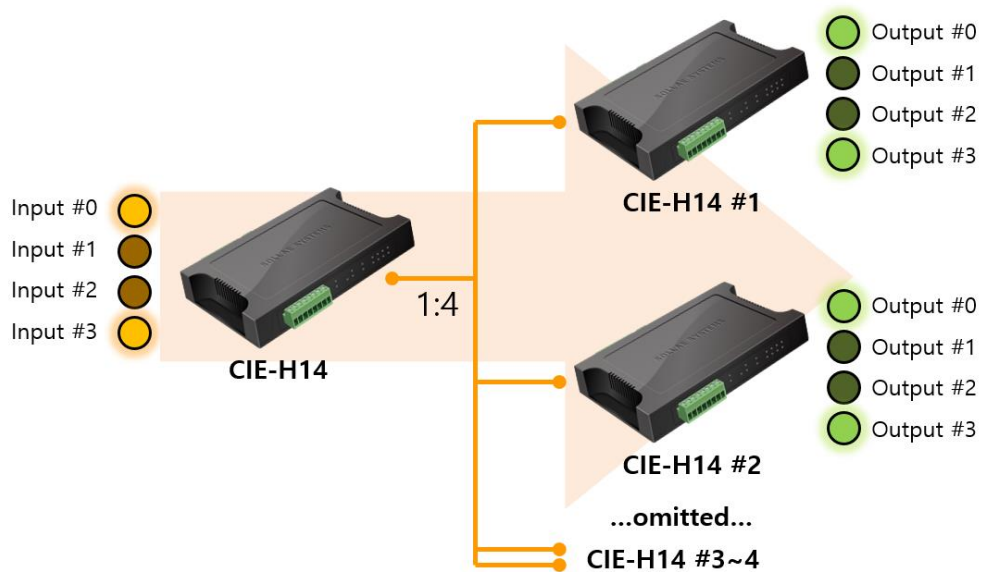


Figure 2-18 control of slaves' output ports

In the above system diagram, the output ports of all CIE-H14 units configured as slaves (#1~#4) are controlled together by the input port of the CIE-H14 configured as the master.

- Control of Master's output ports: OR

Control Method of : OR

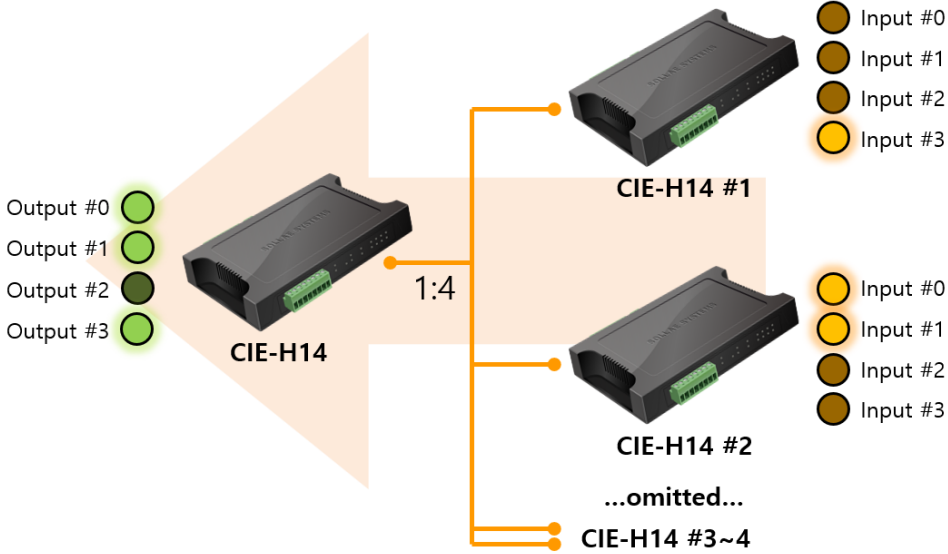


Figure 2-19 control of master's output ports 1

- Control of Master's output ports: AND

Control Method of : AND

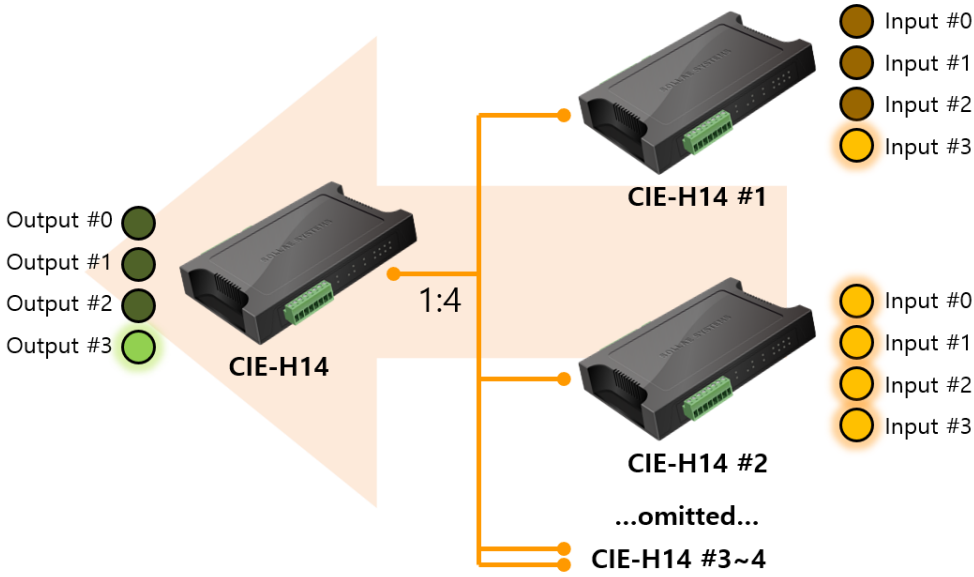


Figure 2-20 control of master's output ports 2

☞ *The output port of the CIE-H14, when configured as the master, operates differently depending on the 'Master Output Port Control Method,' as shown in the above system diagram.*

2.8.2 Configuration example

Table 2-34 configuration example (1)

Variable	CIE-H14
IP Address	10.1.0.1
Master / Slave	Master
Unit ID	1
Input Port Base Address	0
Output Port Base Address	8
Control Method of Master's Output Ports	OR / AND
Connection mode	Passive
Peer Address	N/A
Multiple Connection	8

Table 2-35 configuration example (2)

Variable	CIE-H14 #1	CIE-H14 #2	CIE-H14 #3	CIE-H14 #4
IP Address	10.2.0.1	10.2.0.2	10.2.0.3	10.2.0.4
Master / Slave	Slave	Slave	Slave	Slave
Unit ID	1	1	1	1
Input Port Base Address	0	0	0	0
Output Port Base Address	8	8	8	8
Connection mode	Active	Active	Active	Active
Peer Address	10.1.0.1	10.1.0.1	10.1.0.1	10.1.0.1
Multiple Connection	N/A	N/A	N/A	N/A

3 Revision History

Date	Version	Description	Author
2011.08.23	1.0	○ Initial release	Roy Lee
2017.10.19	1.1	○ Add Chapter 2.5 'Combinations of CIE-H12'	Sara Lee
2021.07.22	1.2	○ Modify Chapter 2.5	Sara Lee
2024.09.20	1.3	○ CIE-H14 added	Jack Kim