

PROFINET Communication Module
COM723-S
User manual
IM23H18-E

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Symbol Definition	
	WARNING: Indicates information that a potentially hazardous situation which, if not avoided, could result in serious injury or death.
	RISK OF ELECTRICAL SHOCK: Indicates information that Potential shock hazard where HAZARDOUS LIVE voltages greater than 30V RMS, 42.4V peak, or 60V DC may be accessible.
	ESD HAZARD: Indicates information that Danger of an electro-static discharge to which equipment may be sensitive. Observe precautions for handling electrostatic sensitive devices
	ATTENTION: Identifies information that requires special consideration.
	TIP: Identifies advice or hints for the user.

Safety & Caution Symbols

The following table lists Safety & Caution symbols used on equipments.

No.	Symbol	Description
1		Direct current (DC)
2		Alternating current (AC)
3		Ground (Earth) terminal
4		Protective earth (ground) terminal
5		Reference ground (Earth) terminal
6		Frame or chassis
7		Equipotentiality
8		On (power)
9		Off (power)
10		Caution, risk of electric shock
11		Caution, hot surface
12		Caution, risk of danger
13		Electrostatic sensitive devices (ESD)

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COM723-S User Manual

Section 1 Glossary

Abbreviation/ Terms	Description
PROFINET	PROFINET is an international and open field bus standard.
PN	Abbreviation for PROFINET.
GSDML	GSDML file is configuration file of PROFINET device.
DBM	DBM file is the final file of communication configuration software which provides to hardware.
PBC	PBC file is the engineering configuration file generated by communication configuration software.
PROFINET IO Controller	The control system(PLC, PC) can control automation tasks.
PROFINET IO Device	It generally refers to the field device, which controlled and monitored by the IO controller. An IO device may contain several modules or sub-modules.
NAP	It's short for network access point.
MRP	It's short for medium redundancy protocol.

Section 2 Overview

In PROFINET's specification, devices in the same network are divided into PROFINET IO controller and PROFINET IO devices. PROFINET IO controller can manage and initiate communication with PROFINET IO devices.

PROFINET communication module COM723-S (hereinafter referred to as COM723-S) works as the PROFINET IO controller interface device in control system, communicating with standard PROFINET IO devices as well as communicating with controller by the extended I/O bus (E-BUS), achieving the data interaction between SUPCON DCS system and heterogeneous system (measurement and control systems or intelligent equipment made by other factories). COM723-S also supports Siemens' Fetch/Write and S7Comm communication protocol, achieving the communication with Siemens' PLC system by multiple methods.

COM723-S module supports redundancy configuration.

COM723-S communication parameter's configuration can be completed by the sub-software PROFINET communication configuration software (PNCon). For detailed information, please refer to *PNCon Software User Manual*

Section 3 Network Architecture

COM723-S working as PROFINET network interface device, connecting with PROFINET IO devices and controller, its network architecture is shown in Figure 3-1.

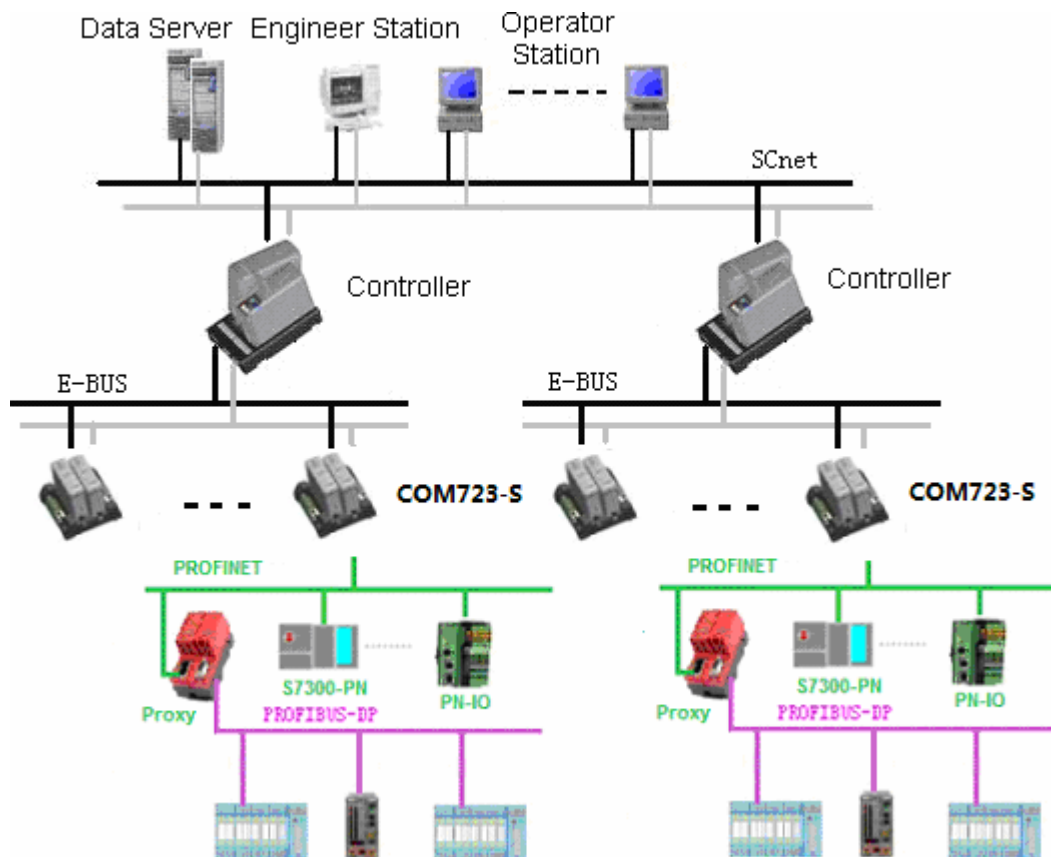


Figure 3-1 Architecture network equipped with COM723-S

Section 4 Performance Indexes

Power Supply Indexes

- Rated voltage: 24V
- Allowable voltage scope: $24V \pm 5\%$
- Consumption current: $< 200\text{mA}$

Environment Indexes

- Operating temperature: $(-20 \sim 70) ^\circ\text{C}$
- Storage temperature: $(-40 \sim 70) ^\circ\text{C}$
- Operating humidity: 10%RH ~90%RH, non-condensation
- Storage humidity: 5%RH ~95%RH, non-condensation

E-BUS Communication Indexes

- Interface: two-channel E-BUS interface.
- Communication rate: 10/100Mbps.

PROFINET Communication Indexes

- Communication Interface: 1 channel PROFINET interface.
- Supported communicate rate of PROFINET: 10/100Mbps.
- Input total data of all PN slave stations is no more than 3.5k bytes.
- Input data of single PN slave stations is no more than 512 bytes.
- Output total data of all PN slave stations is no more than 3.5k bytes.
- Output data of single PN slave stations is no more than 256 bytes.
- The maximum number of PN slaves supported by a communication module is 64, of which a maximum of 8 PLC devices are used to communicate with the Siemens Fetch/Write and S7Comm protocols.

Section 5 Hardware Instruction

5.1 Structural Diagram

The structural diagram of the panel COM723-S and the base MB704-S01 of PROFINET communication module is shown in Figure 5-1. One base is for one COM723-S, which can be installed in any slot. The interface on the same side with the slot should be used for wiring.

- There are 5 LED indicators on COM723-S for indicating the working status of the communication module. One VDE plug on the backside is used to connect with the socket on the base.
- MB704-S01 base has 2 slots (A and B), network address jumper wires, PROFINET network interface (NET(A)), communication status LED indicators, E-BUS network interface (E-BUSA and E-BUSB) and power wiring terminals.

A maximum of one non redundant COM723-S or one pair of redundant COM723-S can be installed on one base. When it is not redundant, COM723-S can be installed in any slot, but the same side network port connection should be used.

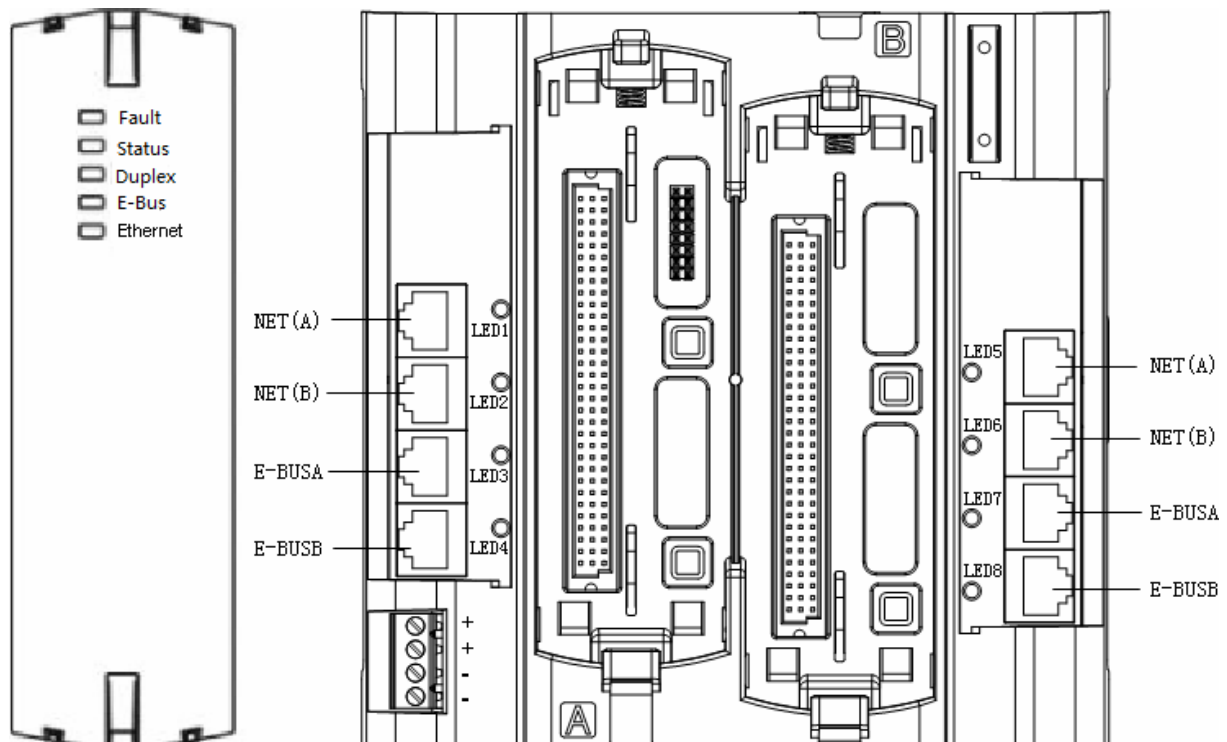


Figure 5-1 The structural diagram of PROFINET communication module panel COM723-S and the base MB704-S01

5.2 LED Indicators

The instructions of LED indicators of COM723-S are shown in Table 5-1.

Table 5-1 LED indicators of COM723-S module

Name	Status	Instruction	Treatment
Fault (Red)	Flash	Internal fault	If it continues flashing, change the module.
	OFF	Normal	-
Status (Green)	ON	Normal configuration	-
	Flash	Inconsistent configuration, configuration error or controller communication timeout	Make sure the connection with controller is normal and configuration is correct, then re-download.
Duplex (Green)	ON	Working module	-
E-BUS (Green)	ON	Normal	-
	Flash	Single E-Bus fault or Ethernet address conflict	Check network cable. Check address jumper and address configuration.
	OFF	Fault of two channel of E-Bus	Check network cable. Check the connection between controller and communication module.
Ethernet (Green)	ON	Normal, all PROFINET slaves configured are connected	-
	Flash (cycle is 1s)	Some slaves configured are not connected	Check PROFINET bus connection or slave status.
	OFF	No connection, all slaves are not connected	Check PROFINET bus connection.

The instructions of indicator status on two sides of base are shown as below.

Table 5-2 LED indicators of COM723-S' base

Name	Status	Instruction	Treatment
E-BUSA	ON	A side network connection of the module E-Bus is normal	-
	OFF	A side network connection of the module E-Bus is abnormal	Check if the connection between network wire and port is good, or if the network wire is normal.
E-BUSB	ON	B side network connection of the module E-Bus is normal	-
	OFF	B side network connection of the module E-Bus is abnormal	Check if the connection between network wire and port is good, or if the network wire is normal.
NET(A)	ON	PROFINET network connection is normal	-
	OFF	PROFINET network connection is abnormal	Check if the connection between network wire and port is good, or if the network wire is normal.

5.3 Jumper Wire Instruction

The group of jumper wires on the base are used to configure the node address of COM723-S in the E-BUS network.

The address code jumper wires on the base are marked with 1, 2, 4, 8 and 16 from top to bottom. After a short circuit by a mini jumper connector, the signal is ON. The relationship between jumper wires and the node addresses codes is shown in Table 5-3.

Table 5-3 COM723-S Address

16	8	4	2	1	Node Address
OFF	OFF	OFF	OFF	ON	1
OFF	OFF	OFF	ON	OFF	2
OFF	OFF	OFF	ON	ON	3
OFF	OFF	ON	OFF	OFF	4
OFF	OFF	ON	OFF	ON	5
OFF	OFF	ON	ON	OFF	6
OFF	OFF	ON	ON	ON	7
OFF	ON	OFF	OFF	OFF	8
...	...	...	...	...	...
ON	ON	ON	ON	ON	31

Address configuration rules:

- The address of COM723-S cannot be configured as 0.
- Under the same controller, the address of each node in E-BUS network (I/O connection module, communication module, etc.) cannot be duplicated.
- The node addresses must not exceed the maximum number of E-BUS network nodes supported by the controller. Please refer to the controller's user manual to confirm the specifications.

5.4 Selection and Installation of Bases

PROFINET communication module COM723-S should be used together with the base MB704-S01 fit for it.

Refer to *Control Station Hardware User Manual* to install or uninstall PROFINET communication module unit.

5.5 Wiring Instruction

This section mainly describes the wiring instructions for each network interfaces and power interfaces. The network interfaces on the left and right side are arranged symmetrically.

5.5.1 E-BUS Port

In Figure 5-1, two pairs of redundant E-BUS ports are respectively located on the right and left side on base MB704-S, with marker E-BUSA and E-BUSB.

- **E-BUSA:** E-Bus communication port A is connected to A# network of redundant network E-Bus.
- **E-BUSB:** E-Bus communication port B is connected to B# network of redundant network E-Bus.

A# and B# networks are connected by Ethernet switch respectively. The connection of E-Bus is shown in Figure 5-2.

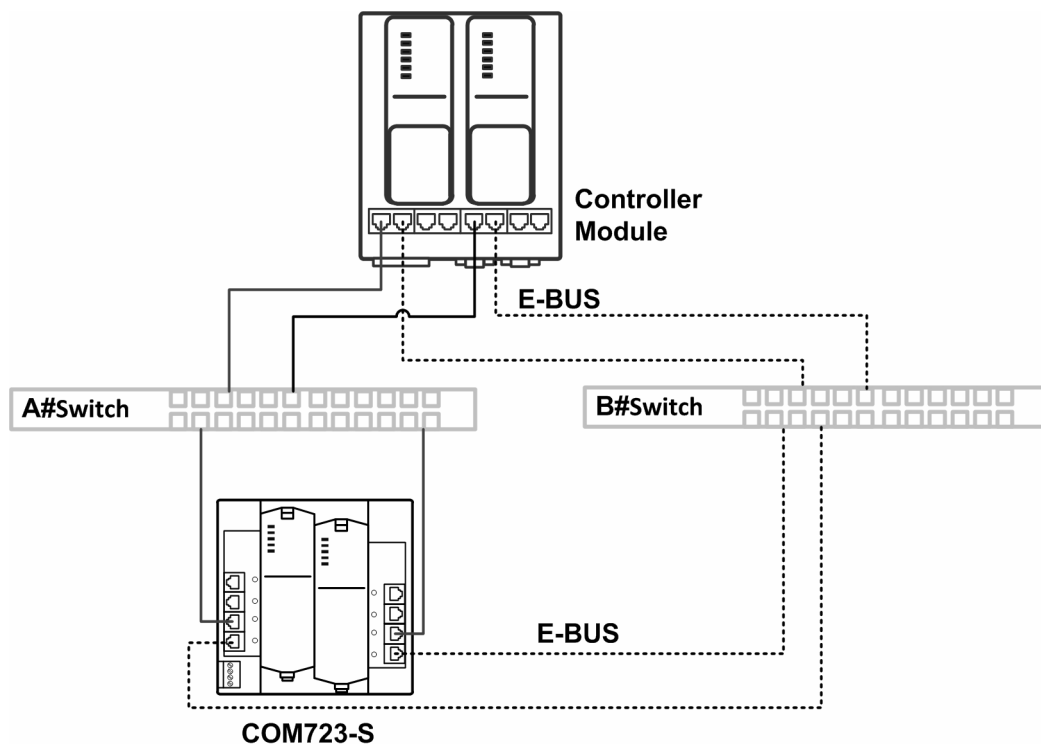


Figure 5-2 Wiring connection diagram of E-BUS

5.5.2 PROFINET Port

The network interface NET (A) on the left and right sides of base MB704-S01 are the PROFINET interface, respectively serving modules on the same side with itself for connecting PROFINET bus. Currently the NET(A) port is used and the NET(B) port is a reserved interface.

5.5.3 Power Supply Wiring Instruction

Base has power supply terminals on its surface. It also provides power to the rack.

- If MB704-S01 adopts the power-supplying mode without racks, the power supply terminals must access the power supply. Then modules can normally work.
- If it adopts the power-supplying mode by rack, then MB704-S01 cannot access the power supply. Refer to *Base User Manual* for details.

Section 6 Configuration Illustration

Basic acquisition of control system software is required for understanding this section.

In PROFINET communication, this communication module works as the PROFINET IO controller communicating with the PROFINET IO devices. You need to configure the device information and communication parameters, etc. by PNCon software.

Configuration workflow

The integrate PROFINET configuration workflow is shown in the figure below. For more details, please refer to *PNCon Software User Manual*.

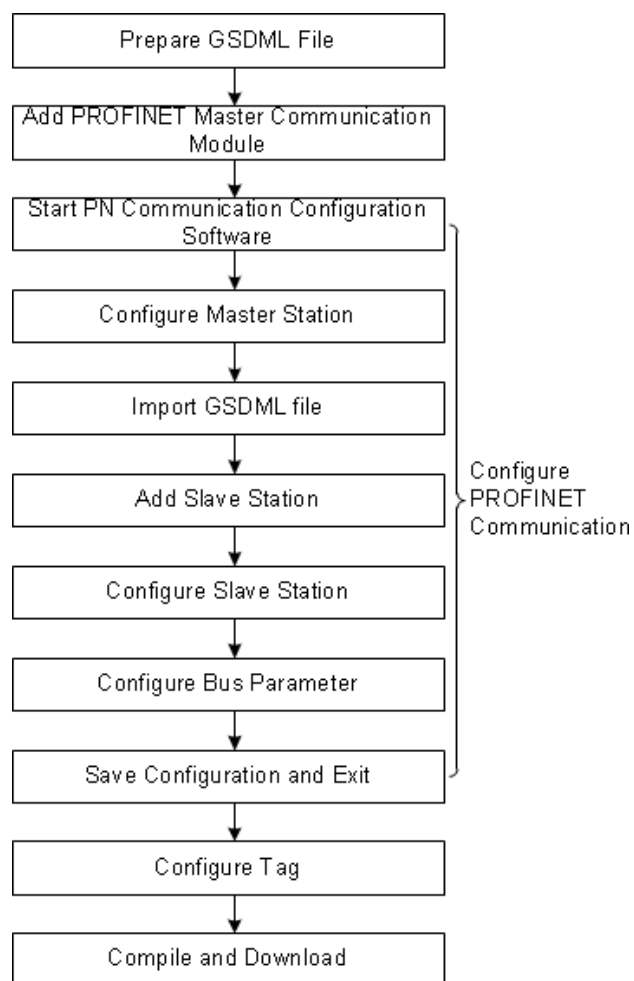


Figure 6-1 Configuration workflow

Section 7 Application Notes

- Check if the address jumper wire is correct before power-up of the module to avoid address conflict in the network.
- If the address of the module needs to be changed, address jumper wire should be redone and the module should be executed with cold start.
- When using hub or switch for cascade, it is prohibited to connect the hub and switch in a same I/O expansion bus.

Section 8 Appendix A-PROFINET Redundancy

Application Examples

This section describes several PROFINET network topologies and device requirements for redundant COM723-S.

There are two redundancy concepts in PROFINET: system redundancy SR and medium redundancy MRP. Their functions are independent of each other and do not conflict. They can be applied to the same PROFINET IO network at the same time.

COM723-S supports S2 redundancy mode and R1 redundancy mode in system redundancy SR; It can also be connected to MRP ring network through MRP switch.

8.1 S2 Redundant Mode Application Examples

In S2 redundancy mode, PROFINET IO device (slave) has only one PROFINET interface. However, one PROFINET interface can have one or more Ethernet interfaces with its own switch function, and the common Ethernet interface with two own switch functions, such as Siemens ET200SP.

As shown in Figure 8-1, the redundant COM723-S modules are connected to the same PROFINET network. IO devices with two Ethernet interfaces can be connected in daisy chain or switch; An IO device with one Ethernet interface can only be connected to the switch. Switches can use conventional Ethernet switches. If there is an IO device with two Ethernet interface and no switch in field, the field network connection can be as shown in the right figure below.

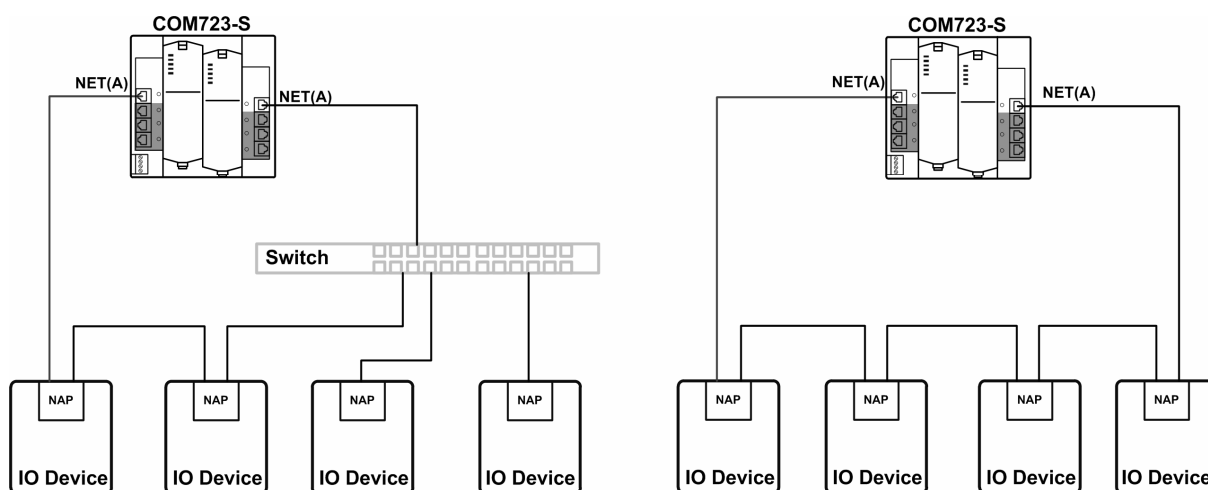


Figure 8-1 Network of S2 redundant model network mode

8.2 R1 Redundant Mode Application Examples

In R1 redundant mode, PROFINET IO device (slave station) must have two independent PROFINET interfaces (one for each pair of redundant modules). Similarly, one PROFINET interface can have one or more Ethernet interfaces with switch function.

As shown in Figure 8-2, two mutually redundant COM723-S modules are respectively connected to two independent PROFINET networks. PROFINET IO devices (slave station) can access these two independent PROFINET networks at the same time. The redundancy of PROFINET IO controller (master station) and PROFINET IO device (slave station) are realized.

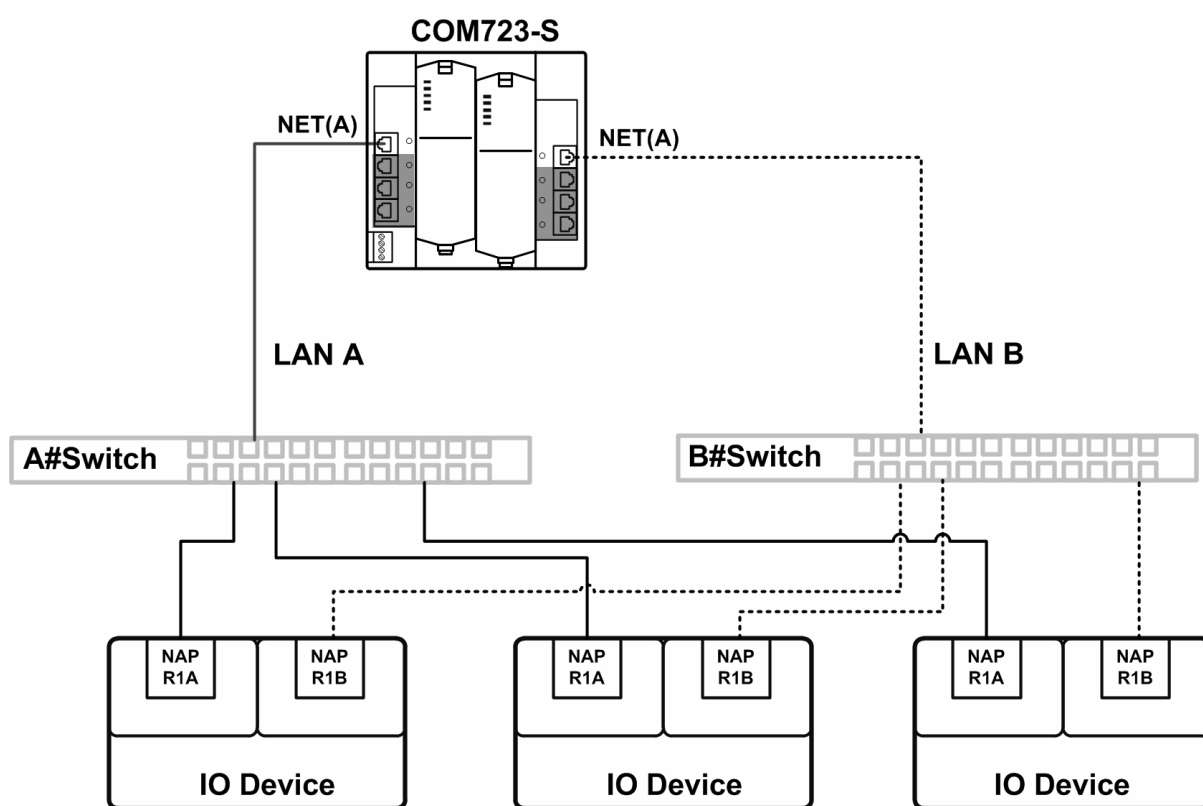


Figure 8-2 R1 Redundant Mode Network

8.3 S2 Redundant Mode+MRP Ring Network Redundancy

Application Examples

When adopting the network architecture in this section, PROFINET IO device (slave station) not only needs to meet the requirements of “S2 redundancy mode application example”, but also must support MRP protocol. PROFINET IO controller COM723-S itself does not support MRP ring network redundancy, so MRP switching mechanism must be used to build the ring network. It is recommended to use MRP ring network switch which supports PROFINET, such as Siemens XC-208.

As shown in Figure 8-3, in general, P1 and P2 of Siemens MRP switch are ring network ports by default. MRP ring protocol can run inside MPR ring1 and MRP ring2. Ring3 is only a physical ring network, so MRP ring network protocol cannot run inside ring3.

In the topology as shown in the figure, if there is any network fault (such as network cable disconnection) in MRP ring 1, MRP ring 2 and ring 3, the normal operation of the whole PROFINET network isn't be affected.

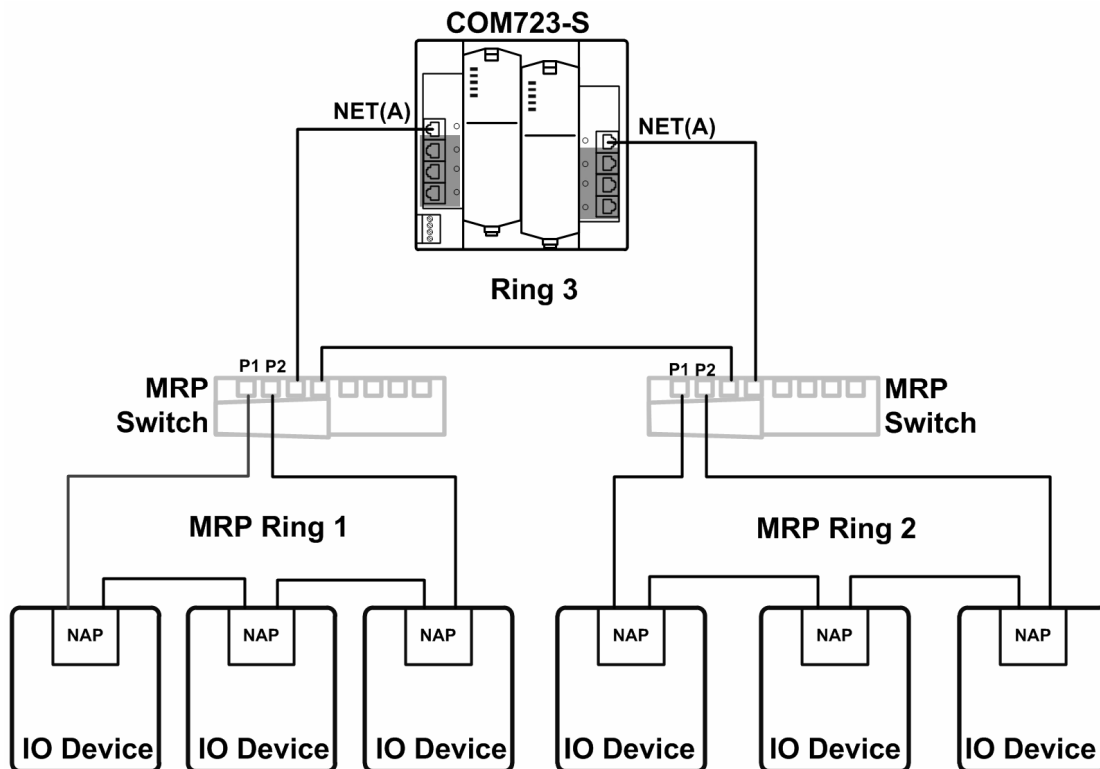


Figure 8-3 S2 Redundant mode+MRP Ring network topology 1

As shown in Figure 8-4, critical PROFINET IO devices and MRP switches are within an MRP ring network. Non-critical PROFINET IO devices or PROFINET IO devices with only one Ethernet port are connected to regular ports of the MRP switches.

In the topology as shown in the figure, if there is any network fault (such as network cable disconnection) in MRP Ring 1 and Ring 2, the normal operation of the whole PROFINET network will not be affected. Any failure of an MRP switch does not affect the normal operation of critical PROFINET IO devices.

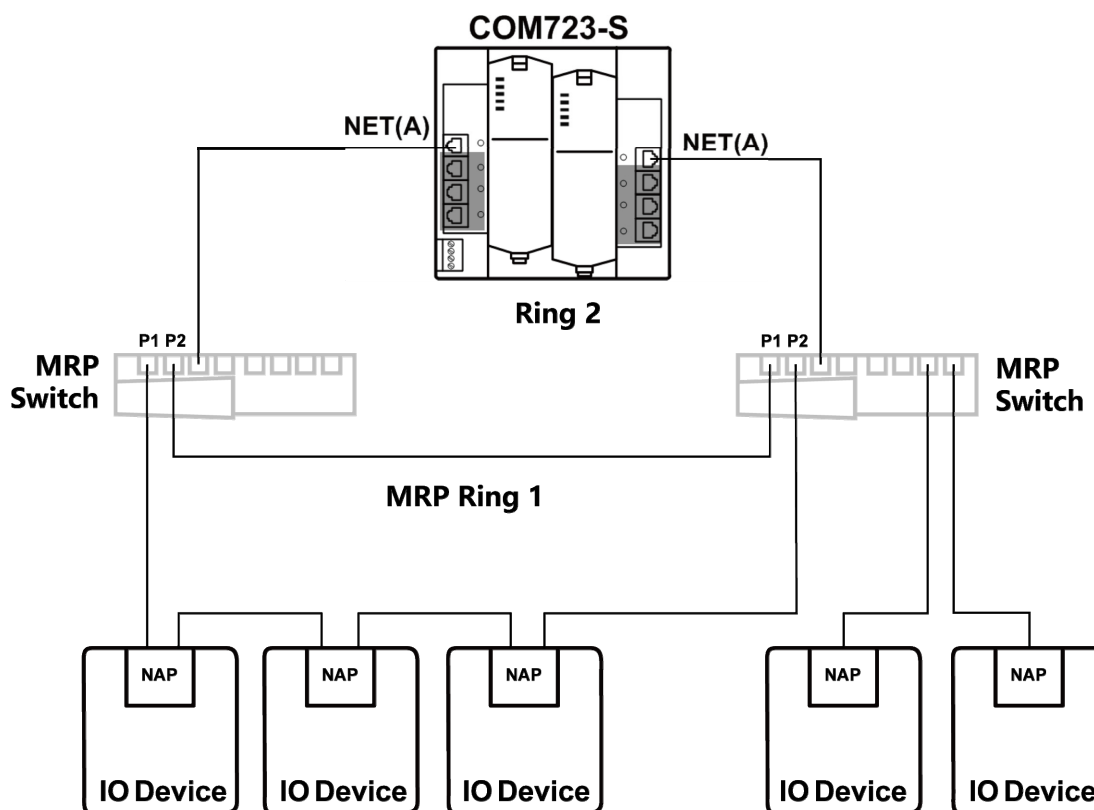


Figure 8-4 S2 Redundant mode+MRP Ring network topology 2

8.4 R1 Redundant Mode+MRP Ring Network Redundancy

Application Examples

When adopting the network architecture in this section, PROFINET IO device (slave station) not only needs to meet the requirements of “R1 redundancy mode application example”, but also must support MRP protocol. PROFINET IO controller COM723-S itself does not support MRP ring network redundancy, so MRP switching mechanism must be used to build the ring network. It is recommended to use Siemens MRP ring network switch, such as XC-208.

As shown in Figure 8-5, LAN A and LAN B are independent networks, usually set to different IP address segments (for example, LAN A segment is 192.168.0. X, LAN B segment is 192.168.1. X).

In the topology shown in the figure, except that a single network fault does not affect the normal operation of PROFINET network, when a single NAP fault or a single switch fault occurs in PROFINET IO device, it does not affect the normal operation of PROFINET network.

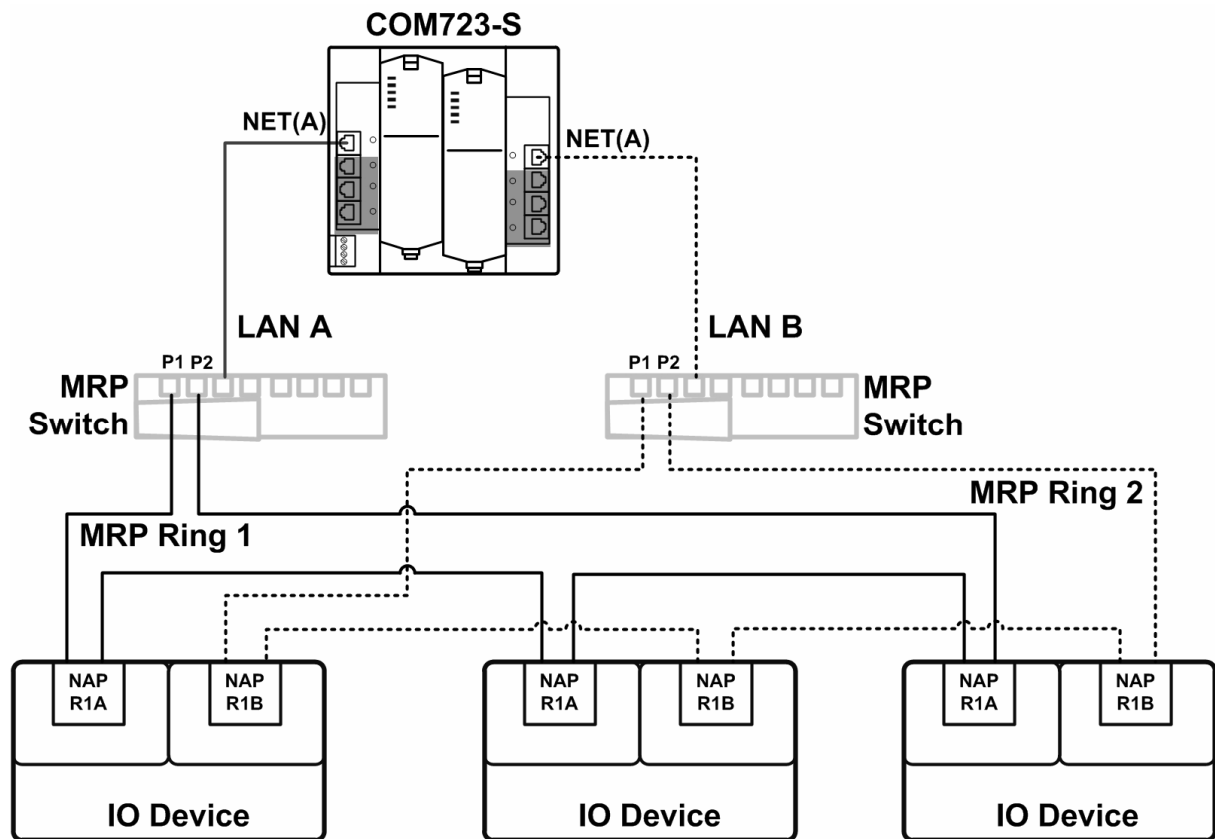


Figure 8-5 R1 Redundant mode+ MRP ring network redundant topology

Section 9 Revision

Table 9-1 Retrofit list of the version

Document Version	Applicable Module Model	Remarks
V1.0 (20201110)	COM723-S11 V10.11.00 and above MB704-S01 V10.00.00 and above VisualField V4.20.00.01 and above	The first edition
V1.1 (20210610)	COM723-S11 V10.11.00 and above MB704-S01 V10.00.00 and above VisualField V4.20.00.01 and above	Modify the redundancy illustration of bases Complete E-BUS wiring diagram Add appendix A
V1.2 (20220519)	COM723-S11 V10.11.00 and above MB704-S01 V10.00.00 and above VisualField V4.20.00.01 and above	Made some corrections.
V1.3 (20230628)	COM723-S11 V10.11.00 and above MB704-S01 V10.00.00 and above VisualField V4.20.00.01 and above	Added Figure 8-4 in S2+MRP redundant ring topology.