

# RF30 Series IO-Link RFID User Manual



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## Preface

### 1. Scope of this manual:

This manual applies to the ELCO RF30 series IO-Link RFID.

The information in this manual enables you to run the IO-Link RFID on Master as a distributed device.

### 2. Basic knowledge requirements

This manual presumes a general knowledge in the field of automation engineering and describes the components based on the data valid at the time of its release. ELCO reserves the right of including a product information for each new component, and for each component of a later version.

### 3. Guide:

This manual describes the hardware of the RF30 series IO-Link RFID module.

Covered topics are:

- Installation and wiring
- Commissioning and diagnostics
- Components
- Article numbers
- Technical specifications

### 4. Technical support:

Please contact your local ELCO representative or dial 400-608-4005 if you have any questions about the products described in this manual.

Additional information about ELCO products is available:

<https://www.elcoautomation.com/>

### 5. Disclaimer of liability:

We have reviewed the contents of this publication to ensure consistency with the hardware and software described. Since variance cannot be precluded entirely, we cannot guarantee full consistency. However, the information in this publication is reviewed regularly and any necessary corrections are included in subsequent editions.

## 1. Product overview

### 1.1 RF30 Series Introduction

The high-frequency RFID module with IO-Link functionality represents an innovative identification system featuring an IP67 protection rating. This product series employs a fully encapsulated design structure, enabling direct installation in industrial environments—including harsh working conditions where liquids, dust, and vibrations may be present.

### 1.2 Product Introduction




As an IO communication technology that enables IO connectivity from controllers to the lowest level of automation, IO-Link transmits information from sensors, actuators, and other devices to controllers via fieldbus networks through IO-Link masters. This realizes the informatization of equipment, improves work efficiency, and reduces production costs. The newly launched high-frequency RFID products supporting IO-Link communication by ELCO (serving as IO-Link slaves) do not require dedicated communication cables. They can achieve efficient communication with IO-Link master devices using traditional unshielded industrial cables (except in special environments).

For ELCO's RF30 series RFID products, read-write tags are mounted on objects that need to be identified, acting as mobile data storage units. The read-write heads adopt 13.56MHz high-frequency radio frequency (RF) technology to conduct bidirectional data exchange with the read-write tags. The collected data is transmitted to the interface module and then sent to the main controller using standard industrial bus protocols, thereby enabling the identification and tracking of objects. This series is an industrial-grade identification system solution.

### 1.3 Functional features

- Up to IP67 protection class
- Designed in accordance with the IO-Link v1.1 specification
- Supports COM3 communication rate
- Interface Type: Class-A
- Can connect to various types of IO-Link standard masters
- LED Status Display

### 1.4 Product Model List

Num	Product Model	Description	Picture
1	RF30-WR-C40H/LK	13.56 MHz, ISO 15693, COM3 (230.4 kBaud), IP67, 40 × 40 × 66 mm, Operating distance 0...80 mm	
2	RF30-WR-Q95H/LK	13.56 MHz, ISO 15693, COM3 (230.4 kBaud), IP67, 94 × 80 × 34 mm, Operating distance 0...120 mm	
3	RF30-WR-M30H/LK	13.56 MHz, ISO 15693, COM3 (230.4 kBaud), IP67, Ø30 × 46 mm, Non-flush, Operating distance 0...70 mm	

Num	Product Model	Description	Picture
4	RF30-WR-MF30H/LK	13.56 MHz, ISO 15693, COM3 (230.4 kBaud), IP67, Ø30 × 46 mm, Flush, Operating distance 0...60 mm	
5	RF30-TGH-ER30	EEPROM, 2528 bits, Ø30 × 3 mm, Black, PPS, Non-resistant metal	
6	RF30-TGH-ER30/16K	FRAM, 16000 bits, Ø30 × 3 mm, Black, PPS, Non-resistant metal	
7	RF30-TGH-MR30	EEPROM, 2528 bits, Ø30 × 3 mm, Black, PPS, Metal-resistant	
8	RF30-TGH-ER50	EEPROM, 2528 bits, Ø50 × 3 mm, Black, PPS, Non-resistant metal	
9	RF30-TGH-ER50/16K	FRAM, 16000 bits, Ø50 × 3 mm, Black, PPS, Non-resistant metal	
10	RF30-TGH-MR50	EEPROM, 2528 bits, Ø50 × 3 mm, Black, PPS, Metal-resistant	

## 2. Technical Characteristics

### 2.1 Read-Write Header Technical Characteristics



The RF30 series high-frequency IO-Link RFID can function as an IO-Link slave to connect with ELCO or other brands' IO-Link masters. It complies with the IO-Link v1.1 standard and supports the COM3 (230.4kbps) communication rate. ELCO's IO-Link protocol-based high-frequency RFID products support a maximum cable transmission distance of 20 meters, covering common deployment scenarios such as logistics lines and production line workstations. They are

compatible with proximity electronic tags that meet the ISO/IEC 15693 standard and feature an IP67 protection rating, ensuring strong environmental adaptability. These products can stably read tag data in logistics lines with high humidity, dust, or similar harsh conditions, and have become a preferred solution due to their stability and accuracy.

## 2.2 Hardware Parameters

### 2.2.1 RF30-WR-C40H/LK Parameters



#### ELECTRICAL DATA

<b>SUPPLY VOLTAGE</b>	18 ... 30 V DC	<b>CONNECTION TYPE</b>	M12x1-Male, 4-pin, A-coded
<b>CURRENT CONSUMPTION</b>	Max. 80 mA	<b>POWER CONSUMPTION</b>	Max. 2 W
<b>RF STANDARDS</b>	ISO 15693	<b>OPERATING FREQUENCY</b>	13.56 MHz
<b>ANTENNA TYPE</b>	Integrated antenna	<b>EMITTED POWER</b>	23 dBm
<b>OPERATING DISTANCE</b>	0 ... 80 mm (depends on the environment)	<b>DYNAMIC MODELS</b>	Supported by the IODD file
<b>IO-LINK TYPE</b>	Class-A	<b>IO-LINK COMMUNICATION RATES</b>	COM3 (230.4 kbps)
<b>IO-LINK VERSION</b>	IO-Link V1.1.3	<b>MIN. CYCLE TIME</b>	24 ms
<b>VENDER ID</b>	1181	<b>DEVICE ID</b>	16453928
<b>PROCESS DATA</b>	32 Byte	<b>DIAGNOSIS</b>	LED indicaton
<b>FUNCTION INDICATOR</b>			
• Power(PW)	Green LED		
• Communication(LK)	Green heartbeat LED		
• Tag Present(TAG)	Orange LED		
• Command(RW)	Green flickering LED		

#### FUNCTIONAL SAFETY

<b>MTTF</b>	488 years
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#### GENERAL DATA

<b>HOUSING MATERIAL</b>	PA66	<b>OPERATING TEMPERATURE</b>	-25 ... +70 °C
<b>PROTECTION</b>	IP67	<b>STORAGE TEMPERATURE</b>	-40 ... +85 °C
<b>INSTALLATION</b>	Metal-free (clear zone)	<b>DIMENSIONS</b>	40 × 40 × 66 mm
<b>WEIGHT</b>	107 g	<b>SHOCK RESISTANCE</b>	IEC 60068-2-27
<b>VIBRATION RESISTANCE</b>	IEC 60068-2-6		

## 2.2.2 RF30-WR-Q95H/LK Parameters



### ELECTRICAL DATA

<b>SUPPLY VOLTAGE</b>	18 ... 30 V DC	<b>CONNECTION TYPE</b>	M12x1, Male, 5 pin, A-coded
<b>CURRENT CONSUMPTION</b>	Max. 80 mA	<b>POWER CONSUMPTION</b>	Max. 2 W
<b>RF STANDARDS</b>	ISO 15693	<b>OPERATING FREQUENCY</b>	13.56 MHz
<b>ANTENNA TYPE</b>	Integrated antenna	<b>EMITTED POWER</b>	23 dBm
<b>OPERATING DISTANCE</b>	0 ... 120 mm (depends on the environment)	<b>DYNAMIC MODELS</b>	Supported by the IODD file
<b>IO-LINK TYPE</b>	Class-A	<b>IO-LINK COMMUNICATION RATES</b>	COM3 (230.4 kbps)
<b>IO-LINK VERSION</b>	IO-Link V1.1.3	<b>MIN. CYCLE TIME</b>	24 ms
<b>VENDER ID</b>	1181	<b>DEVICE ID</b>	16453927
<b>PROCESS DATA</b>	32 Byte	<b>DIAGNOSIS</b>	LED indicaton
<b>FUNCTION INDICATOR</b>			
• Power(PW)	Green LED		
• Communication(LK)	Green heartbeat LED		
• Tag Present(TAG)	Orange LED		
• Command(RW)	Green flickering LED		

### FUNCTIONAL SAFETY

<b>MTTF</b>	210 years
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### GENERAL DATA

<b>HOUSING MATERIAL</b>	PC + PBT	<b>OPERATING TEMPERATURE</b>	-25 ... +70 °C
<b>PROTECTION</b>	IP67	<b>STORAGE TEMPERATURE</b>	-40 ... +85 °C
<b>INSTALLATION</b>	Metal-free (clear zone)	<b>DIMENSIONS</b>	94 × 80 × 34 mm
<b>WEIGHT</b>	160 g	<b>SHOCK RESISTANCE</b>	IEC 60068-2-27
<b>VIBRATION RESISTANCE</b>	IEC 60068-2-6		

## 2.2.3 RF30-WR-M30H/LK Parameters



### ELECTRICAL DATA

<b>SUPPLY VOLTAGE</b>	18 ... 30 V DC	<b>CONNECTION TYPE</b>	M12x1, Male, 4 pin, A-coded
<b>CURRENT CONSUMPTION</b>	Max. 80 mA	<b>POWER CONSUMPTION</b>	Max. 2 W
<b>RF STANDARDS</b>	ISO 15693	<b>OPERATING FREQUENCY</b>	13.56 MHz
<b>ANTENNA TYPE</b>	Integrated antenna	<b>EMITTED POWER</b>	23 dBm
<b>OPERATING DISTANCE</b>	0 ... 70 mm (depends on the environment)	<b>DYNAMIC MODELS</b>	Supported by the IODD file
<b>IO-LINK TYPE</b>	Class-A	<b>IO-LINK COMMUNICATION RATES</b>	COM3 (230.4 kbps)
<b>IO-LINK VERSION</b>	IO-Link V1.1.3	<b>MIN. CYCLE TIME</b>	24 ms
<b>VENDER ID</b>	1181	<b>DEVICE ID</b>	16453952
<b>PROCESS DATA</b>	32 Byte	<b>DIAGNOSIS</b>	LED indicaton
<b>FUNCTION INDICATOR</b>			
• Power	Green LED		
• Communication	Green heartbeat LED		
• Tag Present (TAG)	Orange LED		

### FUNCTIONAL SAFETY

<b>MTTF</b>	275 years
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### GENERAL DATA

<b>HOUSING MATERIAL</b>	Nickel-plated brass + PBT	<b>OPERATING TEMPERATURE</b>	-25 ... +70 °C
<b>PROTECTION</b>	IP67	<b>STORAGE TEMPERATURE</b>	-40 ... +85 °C
<b>INSTALLATION</b>	Metal-free (clear zone) On metal	<b>DIMENSIONS</b>	Ø 30 × 46 mm
<b>WEIGHT</b>	95 g	<b>SHOCK RESISTANCE</b>	IEC 60068-2-27
<b>VIBRATION RESISTANCE</b>	IEC 60068-2-6		

## 2.2.4 RF30-WR-MF30H/LK Parameters



### ELECTRICAL DATA

<b>SUPPLY VOLTAGE</b>	18 ... 30 V DC	<b>CONNECTION TYPE</b>	M12x1, Male, 4 pin, A-coded
<b>CURRENT CONSUMPTION</b>	Max. 80 mA	<b>POWER CONSUMPTION</b>	Max. 2 W
<b>RF STANDARDS</b>	ISO 15693	<b>OPERATING FREQUENCY</b>	13.56 MHz
<b>ANTENNA TYPE</b>	Integrated antenna	<b>EMITTED POWER</b>	23 dBm
<b>OPERATING DISTANCE</b>	0 ... 60 mm (depends on the environment)	<b>DYNAMIC MODELS</b>	Supported by the IODD file
<b>IO-LINK TYPE</b>	Class-A	<b>IO-LINK COMMUNICATION RATES</b>	COM3 (230.4 kbps)
<b>IO-LINK VERSION</b>	IO-Link V1.1.3	<b>MIN. CYCLE TIME</b>	24 ms
<b>VENDER ID</b>	1181	<b>DEVICE ID</b>	16453952
<b>PROCESS DATA</b>	32 Byte	<b>DIAGNOSIS</b>	LED indicaton
<b>FUNCTION INDICATOR</b>			
• Power (PW)	Green LED		
• Communication (LK)	Green heartbeat LED		
• Tag Present (TAG)	Orange LED		

### FUNCTIONAL SAFETY

<b>MTTF</b>	275 years
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### GENERAL DATA

<b>HOUSING MATERIAL</b>	Nickel-plated brass + PBT	<b>OPERATING TEMPERATURE</b>	-25 ... +70 °C
<b>PROTECTION</b>	IP67	<b>STORAGE TEMPERATURE</b>	-40 ... +85 °C
<b>INSTALLATION</b>	Metal-free (clear zone) Flush in metal	<b>DIMENSIONS</b>	∅ 30 × 46 mm
<b>WEIGHT</b>	100 g	<b>SHOCK RESISTANCE</b>	IEC 60068-2-27
<b>VIBRATION RESISTANCE</b>	IEC 60068-2-6		

## 2.3 Clear zone data & offset value

### 2.3.1 RF30-WR-C40H/LK & RF30-WR-C40

Data carriers Model		RF30-TGH-MR30			RF30-TGH-ER30			RF30-TGH-ER30/16K		
Data carriers distance to metal in mm (a)		>50	>0	>0	>50	>0	>0	>50	>0	>0
Data carriers clear zone in mm (b)		>200	>200	>0	>200	>200	>0	>200	>200	>0
Read-write distance		0 - 28	0-35	0-35	0 - 72			0 - 66		
<p>Installation note for data carriers</p>	Offset in mm at distance	0	±21	±44	±39	±70		±65		
	10	±20	±24	±19	±30			±33		
	20	±16	±24	±18	±35			±40		
	28	±4	±18	±8	±40			±41		
	35		±10	±2	±40			±43		
	50				±35			±38		
	60				±35			±23		
	68				±14			±2		
	72				±11					
	110									
120										

Data carriers Model		RF30-TGH-MR50			RF30-TGH-ER50			RF30-TGH-ER50/16K		
Data carriers distance to metal in mm (a)		>50	>0	>0	>50	>0	>0	>50	>0	>0
Data carriers clear zone in mm (b)		>200	>200	>0	>200	>200	>0	>200	>200	>0
Read-write distance		0 - 35	0 - 53	0 - 39	0 - 98			0 - 92		
<p>Installation note for data carriers</p>	Offset in mm at distance	0	±42	±50	±45	±87		±80		
	10	±27	±19	±19	±45	±83		±75		
	20	±25	±21	±17	±70			±39		
	30	±15	±21	±13	±45			±44		
	35	±4	±19	±3	±47			±46		
	39		±18	±1	±49			±46		
	53		±2		±49			±46		
	80				±40			±31		
	92				±24			±2		
	98				±4					
120										

## 2.3.2 RF30-WR-Q95H/LK & RF30-WR-Q95H

Data carriers Model		RF30-TGH-MR30			RF30-TGH-ER30			RF30-TGH-ER30/16K		
Data carriers distance to metal in mm (a)		>50	>0	>0	>50	>0	>0	>50	>0	>0
Data carriers clear zone in mm (b)		>200	>200	>0	>200	>200	>0	>200	>200	>0
Read-write distance		0 - 37	0 - 42	3 - 42	0 - 100			0 - 95		
<p>Installation note for data carriers</p>	Offset in mm at distance	0	±53	±57		±92		±92		
		3	±50	±59	±60	±90		±90		
		10	±30	±59	±60	±89		±90		
		20	±26	±31	±32	±42		±85		
		30	±18	±31	±30	±49		±49		
		37	±4	±18	±15	±54		±49		
		42		±15	±11	±52		±51		
		70				±50		±51		
		95				±8		±16		
		100				±3				
	120									

Data carriers Model		RF30-TGH-MR50			RF30-TGH-ER50			RF30-TGH-ER50/16K		
Data carriers distance to metal in mm (a)		>50	>0	>0	>50	>0	>0	>50	>0	>0
Data carriers clear zone in mm (b)		>200	>200	>0	>200	>200	>0	>200	>200	>0
Read-write distance		0 - 45	0 - 70	0 - 55	0 - 134			0 - 125		
<p>Installation note for data carriers</p>	Offset in mm at distance	0	±70	±66	±60	±121		±112		
		10	±42	±72	±65	±118		±112		
		20	±40	±67	±30	±116		±114		
		30	±42	±35	±30	±59		±53		
		40	±25	±35	±25	±65		±58		
		45	±33	±31	±5	±66		±61		
		55		±29	±3	±70		±64		
		70		±7		±72		±64		
		100				±65		±53		
		125				±34		±14		
	134				±9					

## 2.3.3 RF30-WR-MF30H/LK & RF30-WR-MF30H

Data carriers Model		RF30-TGH-MR30			RF30-TGH-ER30			RF30-TGH-ER30/16K		
Data carriers distance to metal in mm (a)		>50	>0	>0	>50	>0	>0	>50	>0	>0
Data carriers clear zone in mm (b)		>200	>200	>0	>200	>200	>0	>200	>200	>0
Read-write distance		0 - 15	0 - 30	0 - 30	0 - 45			0 - 45		
<p>Installation note for data carriers</p>	Offset in m at distance	0	±15	±26	±27	±42		±38		
	10	±12	±14	±12	±20			±18		
	15	±5	±13	±12	±21			±21		
	20		±13	±12	±24			±21		
	30		±2	±3	±23			±19		
	45				±4			±4		
	60									
	80									
	100									
	110									
	120									

Data carriers Model		RF30-TGH-MR50			RF30-TGH-ER50			RF30-TGH-ER50/16K		
Data carriers distance to metal in mm (a)		>50	>0	>0	>50	>0	>0	>50	>0	>0
Data carriers clear zone in mm (b)		>200	>200	>0	>200	>200	>0	>200	>200	>0
Read-write distance		0 - 21	0 - 36	0 - 31	0 - 60			0 - 56		
<p>Installation note for data carriers</p>	Offset in mm at distance	0	±21	±34	±17	±50		±47		
	10	±16	±17	±19	±19	±50		±46		
	21	±2	±16	±16	±26	±26		±26		
	31		±12	±3	±28	±28		±28		
	36		±3		±29	±29		±26		
	50				±24	±24		±19		
	56				±18	±18		±7		
	60				±7	±7				
	100									
	110									
	120									

## 2.3.4 RF30-WR-M30H/LK & RF30-WR-M30H

Data carriers Model		RF30-TGH-MR30			RF30-TGH-ER30			RF30-TGH-ER30/16K		
Data carriers distance to metal in mm (a)		>50	>0	>0	>50	>0	>0	>50	>0	>0
Data carriers clear zone in mm (b)		>200	>200	>0	>200	>200	>0	>200	>200	>0
Read-write distance		0 - 30	0 - 37	0 - 38	0 - 65			0 - 62		
<p>Installation note for data carriers</p>	Offset in m at distance	0	±31	±27	±27	±55		±56		
	10	±21	±15	±15	±15	±25		±19		
	20	±19	±16	±16	±16	±30		±24		
	30	±3	±13	±13	±13	±35		±26		
	38		±3	±2	±2	±35		±26		
	50					±30		±22		
	60					±16		±8		
	62					±12		±2		
	65					±3				
	110									
	120									

Data carriers Model		RF30-TGH-MR50			RF30-TGH-ER50			RF30-TGH-ER50/16K		
Data carriers distance to metal in mm (a)		>50	>0	>0	>50	>0	>0	>50	>0	>0
Data carriers clear zone in mm (b)		>200	>200	>0	>200	>200	>0	>200	>200	>0
Read-write distance		0 - 36	0 - 51	0 - 38	0 - 86			0 - 79		
<p>Installation note for data carriers</p>	Offset in mm at distance	0	±29	±41	±19	±74		±64		
	10	±26	±26	±49	±20	±71		±61		
	20	±24	±24	±24	±18	±33		±29		
	30	±21	±21	±24	±14	±40		±33		
	36	±10	±10	±22	±1	±44		±35		
	38			±6	±1	±43		±35		
	50					±43		±35		
	60					±41		±30		
	70					±36		±25		
	79					±30		±4		
	86					±10				

## 2.4 LED Indication

RF30-WR-C40H/LK RF30-WR-Q95H/LK	PW	Power Indicator Light
	LK	IO-Link Communication Status Indicator Light
	TAG	Tag Detection Position Indicator Light
	RW	Read/Write Command Indicator Light
RF30-WR-M30H/LK RF30-WR-MF30H/LK	GREEN	Normal Power Supply
	YELLOW	Tag Detected in Position
	GREEN FLICKERING	Normal IO-Link Communication

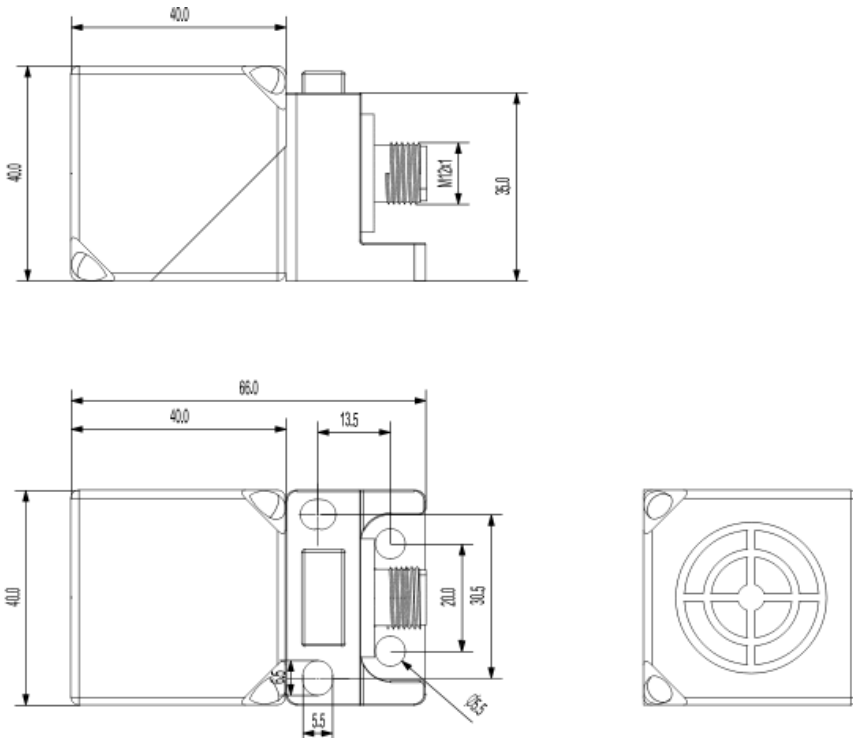
## 2.5 Conventional System Layout Diagram



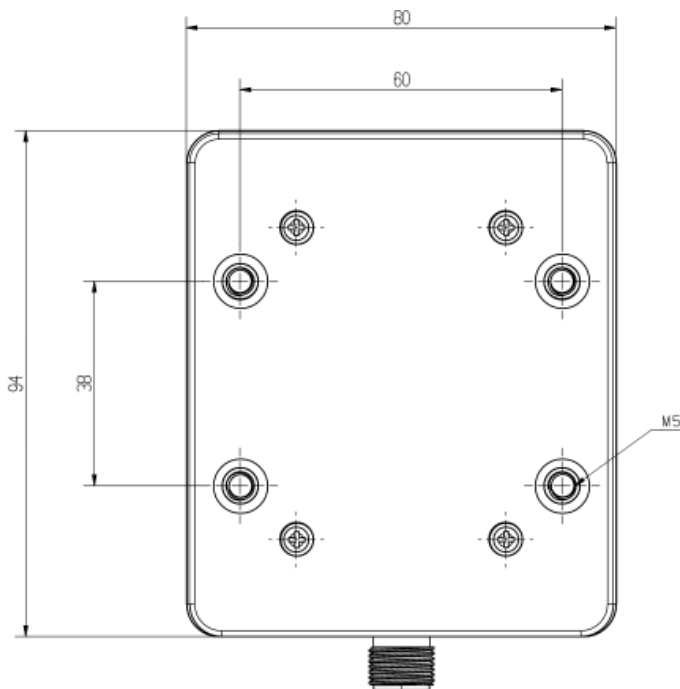
## 3. Installation and Wiring

### 3.1 Installation Dimension Drawing

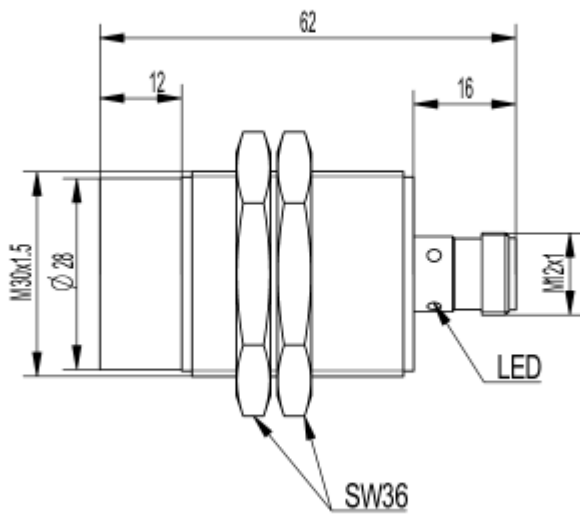
#### 3.3.1 RF30-WR-C40H/LK Dimension Drawing



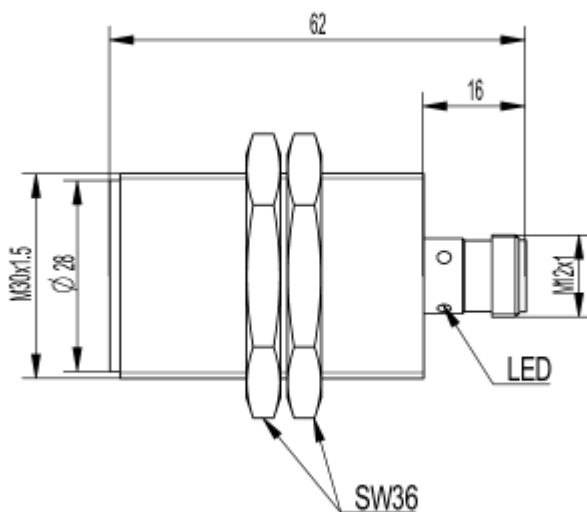
#### 3.3.2 RF30-WR-Q95H/LK Dimension Drawing



## 3.3.3 RF30-WR-M30H/LK Dimension Drawing



## 3.3.4 RF30-WR-MF30H/LK Dimension Drawing

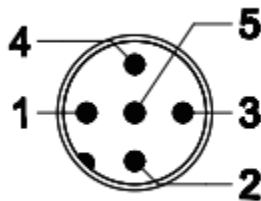


## 3.2 RFID Wiring Guide

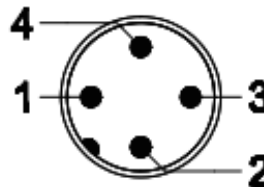
Please perform connection operations in accordance with basic electrical specifications. For the safety of personnel and equipment, we recommend disconnecting the power supply before conducting wiring operations.

All IO-Link protocol RFID devices are connected via standard 5-pin M12 or 4-pin M12 connectors.

### 1) IO-Link Interface Connector View(M12, Male)



M12,5-PIN, Male



M12,4-PIN, Male

### 2) IO-Link Interface Connector View(M12, Male)

InterfacePortNumber	5-PIN	4-PIN
1	Power Supply 24V+	Power Supply 24V+
2	-	-
3	Power Supply GND	Power Supply GND
4	IO-Link	IO-Link
5	PE	-

## 4. Configuration and Debugging

### 4.1 Process Data Address Assignment

This section mainly introduces the process data assignment of RFID products, including the definition of control words and the meanings represented by error codes.

#### 4.1.1 Output Data Buffer(using 32 bytes as an example)

Subaddress	Bit No.							
	7	6	5	4	3	2	1	0
0x00 - 1st bit string		TI	KA			GR		AV
0x01	Command designator or data							
0x02	Start address (low byte) or data							
0x03	Start address (high byte) or data							
0x04	Number of bytes (low byte) or data							
0x05	Number of bytes (high byte) or data							
0x06	Data							
0x07	Data							
0x08	Data							
.....	Data							
0x1F(Last byte) - 2nd bit string		TI	KA			GR		AV

#### 4.1.2 Definition of Output Control Word and Buffer(using 32 bytes as an example)

Subaddress	Bit name	Meaning	Function description
0x00 - 1st bit string	TI	Toggle bit	A state change during a job indicates that the controller is ready to receive additional data made available by the read/write device.
	KA	Head on/off	1 = Head off (read/write head switched off) 0 = Head on (read/write head in operation)
	GR	Basic state	1 = Software reset - causes the BIS to switch to the ground state 0 = Normal operation
	AV	Job	1 = New job pending 0 = No new job or job no longer pending
0x01		Command designator	0x00 = No command 0x01 = Read data carrier 0x02 = Write data carrier
		or data	Data that is to be written on the data carrier
0x02		Start address Low byte	Low byte of the start address on the data carrier for the current job
		or data	Data that is to be written on the data carrier
0x03		Start address High byte	High byte of the start address on the data carrier for the current job
		or data	Data that is to be written on the data carrier
0x04		No. of bytes Low byte	Low byte of the data length for the current job
		or data	Data that is to be written on the data carrier
0x05		No. of bytes High byte	High byte of the data length for the current job
		or data	Data that is to be written on the data carrier
0x06...0x1E		Data	Data that is to be written on the data carrier

0x1F- 2nd bit string	TI, KA, GR, AV		If 1st and 2nd bit strings agree, valid commands or data are present.
----------------------	----------------	--	---

### 4.1.3 Input Data Buffer (using 32 bytes as an example)

Subaddress	Bit No.							
	7	6	5	4	3	2	1	0
0x00 - 1st bit string	BB	HF	TO		AF	AE	AA	CP
0x01	Error code or data or high-byte version							
0x02	Data or low-byte version							
0x03	Data							
0x04	Data							
0x05	Data							
0x06	Data							
0x07	Data							
0x08	Data							
.....	Data							
0x1F(Last byte) - 2nd bit string	BB	HF	TO		AF	AE	AA	CP

### 4.1.4 Definition of Input Status and Buffer

Subaddress	Bit name	Meaning	Function description
0x00 - 1st bit string	BB	Power	1 = Device is ready
			0 = Device is in ground state
	HF	Head Failure	1 = Head is turned off
			0 = Head is turned on
	TO	Toggle bit	A state change during a job indicates that the read/ write device is ready to transfer other data
	AF	Job error	1 = Job incorrectly processed
			0 = Job processed without errors
AE	Job end	1 = Job processed without errors	
		0 = No job or job running	
AA	Job accepted	1 = The job was detected and accepted. Is being processed.	
		0 = No job active	
CP	Codetag Present	1 = Data carrier is in the read range of the read/write head	
		0 = No data carrier in read range	
0x01		Error code	Error number is entered if the job was incorrectly processed or canceled. Only valid with AF bit!
			0x00 = No error
			0x01 = No data carrier in read/write range
			0x02 = Error during reading
			0x03 = Data carrier was removed from the read range of the head during reading
			0x04 = Error during writing
0x05 = Data carrier was removed from the write range of the read/write head during writing.			

			0x07 = AV-bit is set but command designator is invalid or missing. Or: number of bytes is 0x00
			0x0E = The CRC on the data carrier does not agree with the calculated CRC for the read data.
			0x0F = 1st and 2nd bit string of the output buffer do not agree.
			0x20 = Addressing of the job lies outside of the memory range of the data carrier
			0x21 = Calls up a function that is not possible with the current data carrier.
		or data	Data which was read from the data carrier
		or SW version	High byte of the software version
0x02		Data	Data which was read from the data carrier
		or SW version	Low byte of the software version
0x06...0x1E		Data	Data that is to be written on the data carrier
0x1F- 2nd bit string	BB, HF, TO, AF, AE, AA, CP		Valid data is present if the 1st and 2nd bit strings match

## 4.2 Protocol Interaction Example

### 4.2.1 Example 1. Reaction to Tag Present = no and new data carrier in the read range:

Command from controller		RFID	
Process output buffer:		Process input buffer:	
0x00	GR, KA, AV = 0	0x00	Set CP
0x1F	GR, KA, AV = 0	0x1F	Set CP

### 4.2.2 Example 2. Data carrier no longer in detection range of the read/write head:

Command from controller		RFID	
Process output buffer:		Process input buffer:	
0x00	GR, KA, AV = 0	0x00	Delete CP
0x1F	GR, KA, AV = 0	0x1F	Delete CP

### 4.2.3 Example 3. Reaction to Tag Present = serial number and new data carrier in the read range:

Command from controller		RFID	
Process output buffer:		Process input buffer:	
0x00	GR, KA, AV = 0	0x00	Set CP
0x1F	GR, KA, AV = 0	0x01...0x1E	UID
		0x1F	Set CP

## 4.2.4 Example 4. Read 64 bytes starting at data carrier address 10:

- 1) Process subaddresses in the order shown:

Command from controller	
0x01	Command designator 0x01
0x02	Start address 0x0A
0x03	Start address 0x00
0x04	No. of bytes 0x40
0x05	No. of bytes 0x00
0x00/0x1F	Set AV

- 2) Process input buffer:

RFID	
0x01...0x1E	Enter the first 30 bytes of data
0x00/0x1F	Set AA and AE

- 3) Wait here, until AA and AE are set. Copy received data, process subaddresses of the input buffer:

Command from controller	
0x00/0x1F	Invert T1

- 4) Process subaddresses of the input buffer:

RFID	
0x01...0x1E	Enter the second 30 bytes of data
0x00/0x1F	Invert T0

- 5) Copy received data, process subaddresses of the input buffer:

Command from controller	
0x00/0x1F	Invert T1

- 6) Process subaddresses of the input buffer:

RFID	
0x01...0x04	Enter last byte of data
0x05...0x1E	0x00 (empty)
0x00/0x1F	Invert T0

- 7) Copy received bytes, process subaddresses of the input buffer:

Command from controller	
0x00/0x1F	Delete AV

- 8) Process subaddresses of the input buffer:

RFID	
0x00/0x1F	Delete AF and AA

## 4.2.5 Example 5. Write 64 bytes starting at data carrier address 20:

- 1) Process subaddresses in the order shown:

Command from controller	
0x01	Command designator 0x02
0x02	Start address 0x14
0x03	Start address 0x00
0x04	No. of bytes 0x40
0x05	No. of bytes 0x00
0x00/0x1F	Set AV

- 2) Process input buffer:

RFID	
0x00/0x1F	Set AA

- 3) Process subaddresses:

Command from controller	
0x01...0x1E	Enter the first 30 bytes of data
0x00/0x1F	Invert TI

- 4) Copy received data, process subaddresses of the input buffer:

RFID	
0x00/0x1F	Invert TO

- 5) Process subaddresses:

Command from controller	
0x01...0x1E	Enter the second 30 bytes of data
0x00/0x1F	Invert TI

- 6) Copy received data, process subaddresses of the input buffer:

RFID	
0x00/0x1F	Invert TO

- 7) Process subaddresses:

Command from controller	
0x01...0x03	Enter the remaining 4 bytes of data
0x00/0x1F	Invert TI

- 8) Copy received data, process subaddresses of the input buffer:

RFID	
0x00/0x1F	Set AE

- 9) Process subaddresses:

Command from controller	
0x00/0x1F	Delete AV

- 10) Process subaddresses:

RFID	
0x00/0x1F	Delete AA and AE

## 4.2.6 Example 6. Read 30 bytes starting at address 10 with read error:

- 1) Process subaddresses in the order shown:

Command from controller	
0x01	Command designator 0x01
0x02	Start address 0x0A
0x03	Start address 0x00
0x04	No. of bytes 0x1E
0x05	No. of bytes 0x00
0x00/0x1F	Set AV

- 2) Process input buffer:

RFID	
0x00/0x1F	Set AA
0x01	Enter error number
0x00/0x1F	Set AF

- 3) Evaluate error number and process subaddresses of the output buffer:

Command from controller	
0x00/0x1F	Delete AV

- 4) Process subaddresses of the input buffer:

RFID	
0x00/0x1F	Delete AF and AA

### 4.3 RFID Standard Function Block of the Program

ELCO has developed standard logic control function blocks or library programs for PLCs of different brands and platforms. Currently, it has improved and covered multiple mainstream PLC environments, including those of ELCO, Siemens, OMRON, AB, MITSUBISHI, etc.

#### 4.3.1 Introduction to Function Block Pins

The following table indicates the description and triggering method of the function block pins, using Siemens as an example. Due to differences in programming languages across different PLCs, there may be slight variations in the presentation format. Please refer to the actual provided documents for accuracy.

	Pins_name	Data Type	Description
	i_init	BOOL	The reader/writer head initialization needs to be set once in case of program abnormal interruption or first power-on.
	i_start	BOOL	Start = 1 starts a job. This signal must be set until the O_end output goes to 0. The function is done when O_end or Fault is set again.
	i_reset	BOOL	Function Block Restart: Only resets internal variables of the function block
	i_dyn	BOOL	This function is not yet available; keep the default value as "0".
	i_ct_type	BOOL	This function is not yet available; keep the default value as "0".
	i_order	WORD	Command Type: 1 = Read Operation, 2 = Write Operation
	i_head	BYTE	This function is not yet available; keep the default value as "0".
	i_io_start	INT	The starting IO address for the hardware configuration of the reader/writer head channel can be viewed in the configuration interface, and it is necessary to ensure that the input and output address configurations are consistent.
	i_io_length	WORD	Process Data Length, It is measured in register bits and is generally a fixed 16 registers.
	i_ct_start	INT	The starting address for read/write operations on tags
	i_ct_length	WORD	The byte length required for reading and writing to the tag, the maximum length must not exceed the label capacity
	i_send_db	INT	Data block number for write data buffer
	i_send_adr	INT	Starting address of data block for write data buffer
	I_recv_db	INT	Data block number for read data buffer

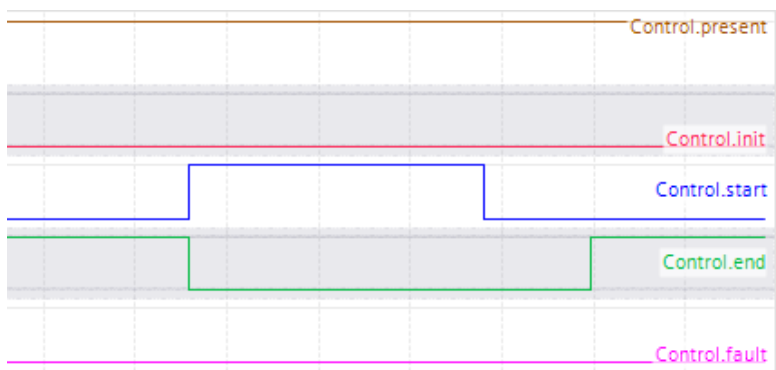
	i_recv_adr	INT	Starting address of data block for read data buffer
	l_ct_time	INT	This function is not yet available; keep the default value as "10".
	o_ct_present	BOOL	Data carrier present / data valid.
	o_end	BOOL	Job completed This bit is set when the job was completed. This output will be reset by a rising edge of Start input.
	o_dig_in	BOOL	Dynamic mode feedback, this function is not yet available.
	o_fault	BOOL	Job completed with error This bit is set if the job was completed with an error and is reset with a rising edge at init or start input.
	o_fault_id	BYTE	If the Error bit is set, the error number will be displayed here as hex value. Error codes can be referred to <a href="#">4.1.4 Definition of Input Status and Buffer</a>
	o_head	BYTE	This function is not yet available.

## 4.3.2 Timing Diagram of Function Block Pins

### 1) Initialization Process Timing



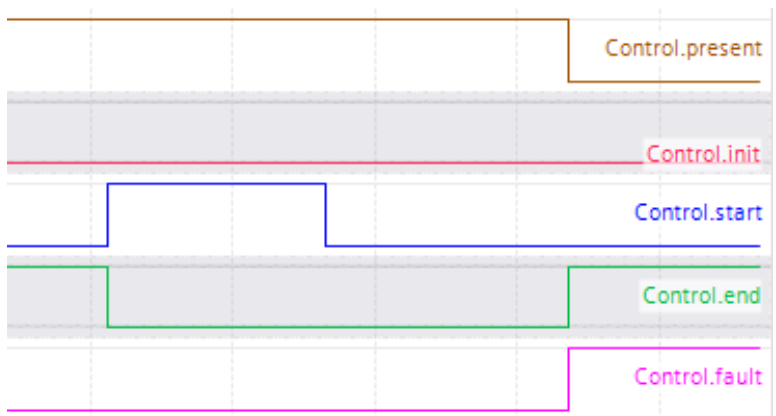
### 2) Reading data Process Timing



### 3) Writing data Process Timing



### 4) Reading/Writing Error Process Timing



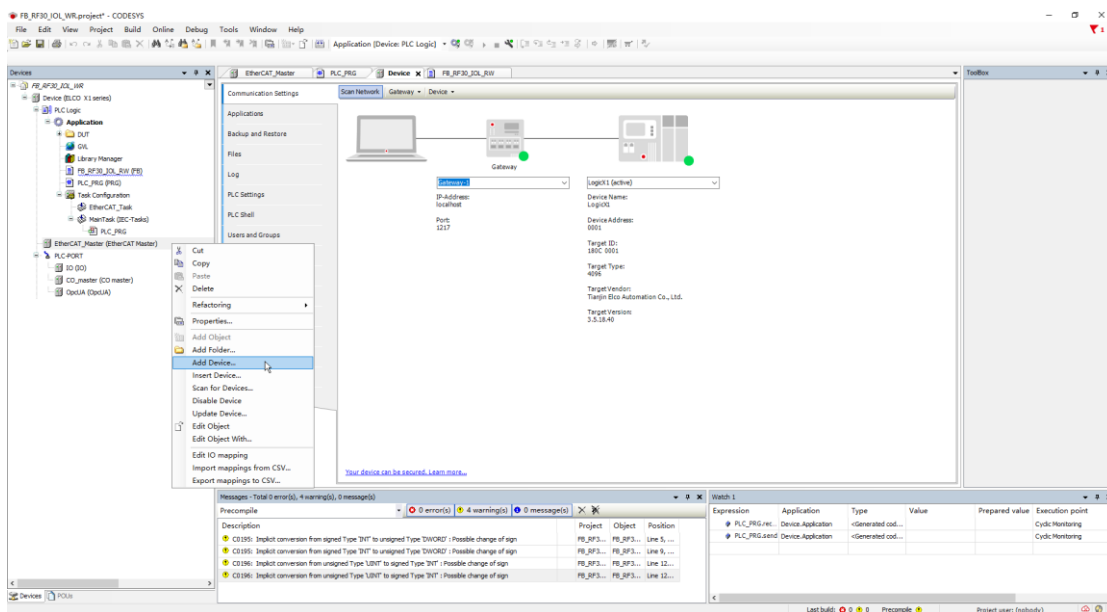
## 4.4 RFID operation example (ELCO PLC & ALL Codesys system)

In this example, the Compact67 series IO-Link module from ELCO is used as an EtherCAT slave to connect to the Logic X1 controller (equipped with an EtherCAT interface) also from ELCO. By default, Codesys has been installed, the required network card information has been configured, the master station XML file has been installed, and all power supply and bus connections have been completed. For the detailed operation procedure mentioned above, please refer to the FCEC-8LKM-8A User Manual.

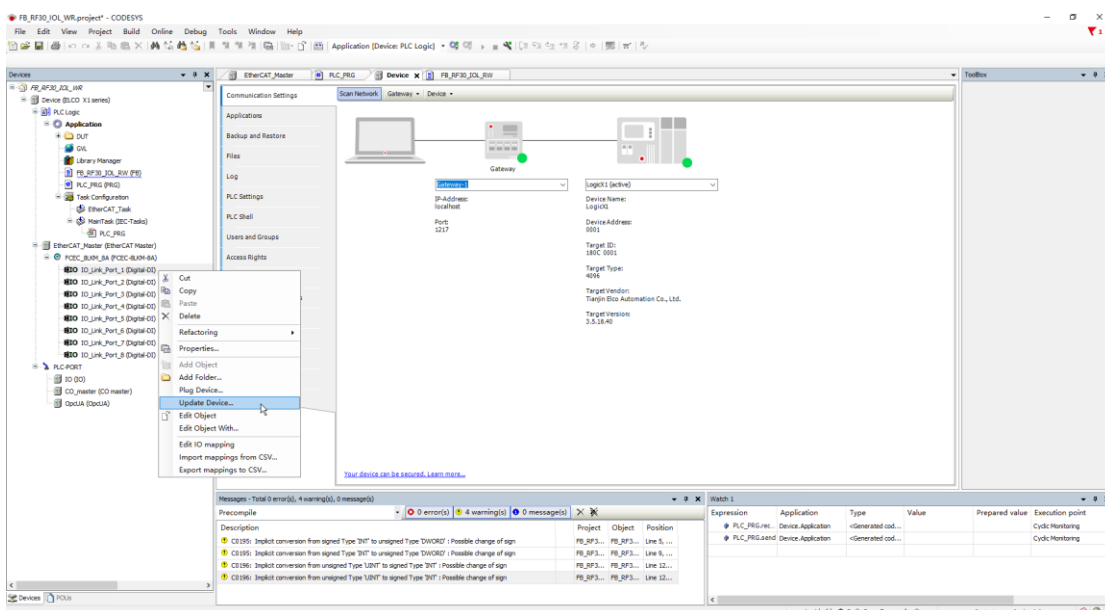
The master station XML file and the program function blocks required for reading and writing are provided by our company, and the version of the function blocks shall be subject to the actual one.

The Compact67 system includes one IO-Link master station (model: FCEC-8LKM-8A). Port 1 of the master station is connected to the IO-Link RFID device (model: RF30-WR-C40H/LK). We will illustrate the specific software configuration and debugging process in the form of images.

- 1) Add the master station module to the project



- 2) Configure the master station channel as the RFID model or select a universal IO-Link device based on the process data length



Update Device
✕

Name:

Action:  Append device  Insert device  Plug device  Update device  Update same devices in project

String for a full text search:  Vendor: <All vendors>

Name	Vendor
⊗ (LKHA_08UP_M8) 8 Bit Process Data Input / 8 Bit Process Data Output 8*™8 Port (ClassA)	ELCO Industry Autor
⊗ (LKHA_1600N_M12) 16 Bit Process Data Input NPN 8*™12 Port (ClassA)	ELCO Industry Autor
⊗ (LKHA_1600N_Tx/Qx) 16 Bit Process Data Input NPN IP20	ELCO Industry Autor
⊗ (LKHA_1600P_M12) 16 Bit Process Data Input 8*™12 Port (ClassA)	ELCO Industry Autor
⊗ (LKHA_1600P_Tx/Qx) 16 Bit Process Data Input IP20	ELCO Industry Autor
⊗ (LKHA_1616N_Tx/Qx) 16 Bit Process Data Input / 16 Bit Process Data Output NPN IP20	ELCO Industry Autor
⊗ (LKHA_1616P_Tx/Qx) 16 Bit Process Data Input / 16 Bit Process Data Output IP20	ELCO Industry Autor
⊗ (LKHA_16UN_M12) 16 Bit Process Data Input / 16 Bit Process Data Output NPN 8*™12 Port (ClassA)	ELCO Industry Autor
⊗ (LKHA_16UN_Tx/Qx) 16 Bit Process Data Input / 16 Bit Process Data Output NPN (ClassA) IP20	ELCO Industry Autor
⊗ (LKHA_16UP_M12) 16 Bit Process Data Input / 16 Bit Process Data Output 8*™12 Port (ClassA)	ELCO Industry Autor
⊗ (LKHA_16UP_M12-D) 16 Bit Process Data Input + 16 Bit Diag / 16 Bit Process Data Output 8*™12 Port (ClassA)	ELCO Industry Autor
⊗ (LKHA_16UP_Tx/Qx) 16 Bit Process Data Input / 16 Bit Process Data Output (ClassA) IP20	ELCO Industry Autor
⊗ (LKHA_3200N_Tx/Qx) 32 Bit Process Data Input NPN IP20	ELCO Industry Autor
⊗ (LKHA_3200P_Tx/Qx) 32 Bit Process Data Input IP20	ELCO Industry Autor
⊗ (RF30_WR_C40H) 32Byte IO-Link RFID Module-COM3	ELCO Industry Autor
⊗ (RF30_WR_Q39H) 32Byte IO-Link RFID Module-COM3	ELCO Industry Autor
IO Digital-DI	ELCO Industry Autor
IO Digital-DO	ELCO Industry Autor

Group by category  Display all versions (for experts only)  Display outdated versions

⊗ **Name:** (RF30\_WR\_C40H) 32Byte IO-Link RFID Module-COM3  
**Vendor:** ELCO Industry Automation AG  
**Categories:** Module  
**Version:** 0  
**Order Number:** RF30\_WR\_C40H  
**Description:** EtherCAT Module imported from Slave XML: FCEC-IO-LINK IP67 MODULE ESI V1.1.4.xml Device: (RF30\_WR\_C40H) 32Byte IO-Link RFID Module-COM3

**Update and try to preserve most information of IO\_Link\_Port\_1**

ⓘ (You can select another target node in the navigator while this window is open.)

Update Device
✕

Name:

Action:  Append device  Insert device  Plug device  Update device  Update same devices in project

String for a full text search:  Vendor: <All vendors>

Name	Vendor
Fieldbuses	
EtherCAT	
Module	
⊗ (IOL_I/O_01/01 byte) IO-Link 1 Byte Process Data Input / 1 Byte Process Data Output	ELCO Industry Autor
⊗ (IOL_I/O_02/02 byte) IO-Link 2 Byte Process Data Input / 2 Byte Process Data Output	ELCO Industry Autor
⊗ (IOL_I/O_04/04 byte) IO-Link 4 Byte Process Data Input / 4 Byte Process Data Output	ELCO Industry Autor
⊗ (IOL_I/O_08/08 byte) IO-Link 8 Byte Process Data Input / 8 Byte Process Data Output	ELCO Industry Autor
⊗ (IOL_I/O_16/16 byte) IO-Link 16 Byte Process Data Input / 16 Byte Process Data Output	ELCO Industry Autor
⊗ (IOL_I/O_24/24 byte) IO-Link 24 Byte Process Data Input / 24 Byte Process Data Output	ELCO Industry Autor
⊗ (IOL_I/O_32/32 byte) IO-Link 32 Byte Process Data Input / 32 Byte Process Data Output	ELCO Industry Autor
⊗ (LKHA_0016N_Tx/Qx) 16 Bit Process Data Output NPN IP20	ELCO Industry Autor
⊗ (LKHA_0016P_M12-A) 16 Bit Process Data Output 8*™12 Port A-CODE_Aux PS L-CODE	ELCO Industry Autor
⊗ (LKHA_0016P_Tx/Qx) 16 Bit Process Data Output IP20	ELCO Industry Autor
⊗ (LKHA_0032N_Tx/Qx) 32 Bit Process Data Output NPN IP20	ELCO Industry Autor
⊗ (LKHA_0032P_Tx/Qx) 32 Bit Process Data Output IP20	ELCO Industry Autor
⊗ (LKHA_044UN_QM) 8 Bit Process Data Input And 4 Bit Process Data Output NPN Mini Hub	ELCO Industry Autor
⊗ (LKHA_044UP_QM) 8 Bit Process Data Input And 4 Bit Process Data Output Mini Hub	ELCO Industry Autor
⊗ (LKHA_044UA_Tx/Qx) IO-Link 8 Byte Process Data Input + 4 Byte Diagnosis / 8 Byte Process Data Output 4UA/Universal Analog IP20	ELCO Industry Autor

Group by category  Display all versions (for experts only)  Display outdated versions

⊗ **Name:** (IOL\_I/O\_32/32 byte) IO-Link 32 Byte Process Data Input / 32 Byte Process Data Output  
**Vendor:** ELCO Industry Automation AG  
**Categories:** Module  
**Version:** 0  
**Order Number:** IOL\_I/O\_32/32 byte  
**Description:** EtherCAT Module imported from Slave XML: FCEC-IO-LINK IP67 MODULE ESI V1.1.4.xml Device: (IOL\_I/O\_32/32 byte) IO-Link 32 Byte Process Data Input / 32 Byte Process Data Output

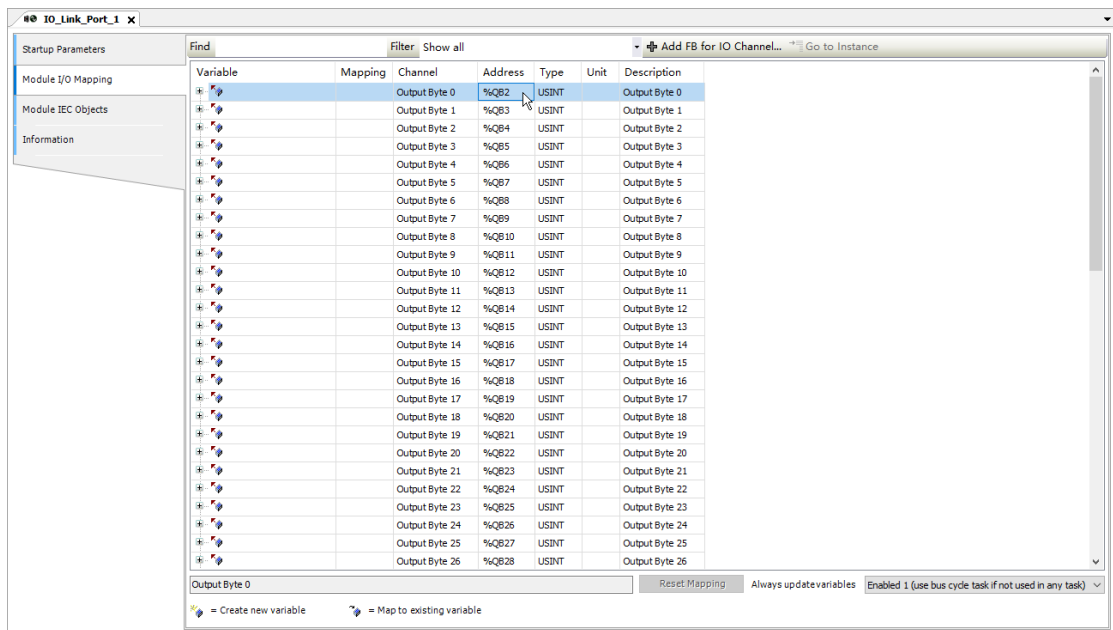
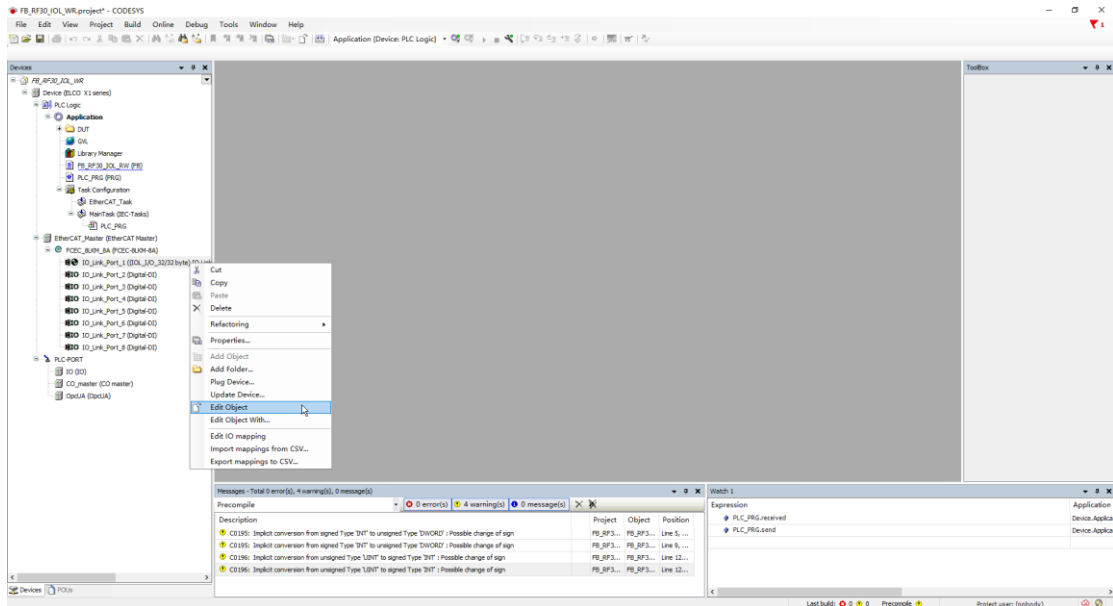
**Update and try to preserve most information of IO\_Link\_Port\_1**

ⓘ (You can select another target node in the navigator while this window is open.)

We reserve the right to make technical alterations without prior notice. | EN | Creation date: 24.11.25 | UM\_RFID\_IOLINK\_V1.0\_EN

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- Assign input and output addresses, and ensure the process data addresses for input and output are continuous



IO\_Link\_Port\_1

Startup Parameters Find Filter Show all Add FB for IO Channel... Go to Instance

Variable	Mapping	Channel	Address	Type	Unit	Description
+		Input Byte 0	%IB11	USINT		Input Byte 0
+		Input Byte 1	%IB12	USINT		Input Byte 1
+		Input Byte 2	%IB13	USINT		Input Byte 2
+		Input Byte 3	%IB14	USINT		Input Byte 3
+		Input Byte 4	%IB15	USINT		Input Byte 4
+		Input Byte 5	%IB16	USINT		Input Byte 5
+		Input Byte 6	%IB17	USINT		Input Byte 6
+		Input Byte 7	%IB18	USINT		Input Byte 7
+		Input Byte 8	%IB19	USINT		Input Byte 8
+		Input Byte 9	%IB20	USINT		Input Byte 9
+		Input Byte 10	%IB21	USINT		Input Byte 10
+		Input Byte 11	%IB22	USINT		Input Byte 11
+		Input Byte 12	%IB23	USINT		Input Byte 12
+		Input Byte 13	%IB24	USINT		Input Byte 13
+		Input Byte 14	%IB25	USINT		Input Byte 14
+		Input Byte 15	%IB26	USINT		Input Byte 15
+		Input Byte 16	%IB27	USINT		Input Byte 16
+		Input Byte 17	%IB28	USINT		Input Byte 17
+		Input Byte 18	%IB29	USINT		Input Byte 18
+		Input Byte 19	%IB30	USINT		Input Byte 19
+		Input Byte 20	%IB31	USINT		Input Byte 20
+		Input Byte 21	%IB32	USINT		Input Byte 21
+		Input Byte 22	%IB33	USINT		Input Byte 22
+		Input Byte 23	%IB34	USINT		Input Byte 23
+		Input Byte 24	%IB35	USINT		Input Byte 24
+		Input Byte 25	%IB36	USINT		Input Byte 25
+		Input Byte 26	%IB37	USINT		Input Byte 26

Output Byte 0 Reset Mapping Always update variables Enabled 1 (use bus cycle task if not used in any task)

= Create new variable 
 = Map to existing variable

4) Import the function block "FB\_RF30\_IOL\_RW" and fill in the pins according to the corresponding data types

FB\_RF30\_IOL\_RW

```

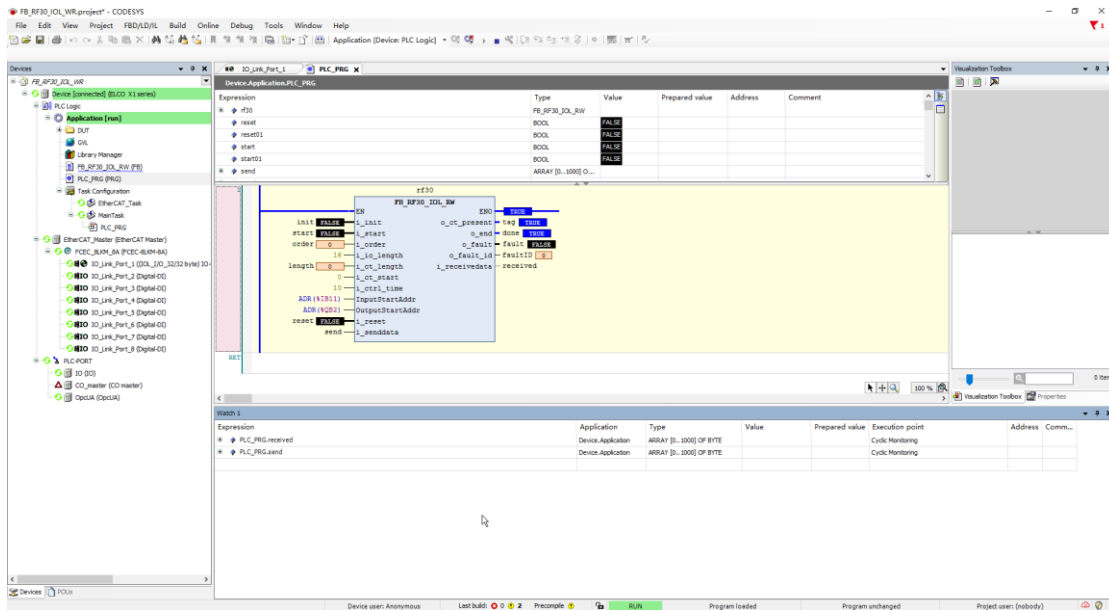
PROGRAM FB_RF30_IOL_RW
VAR
    zfb30 : FB_RF30_IOL_RW;
    reset_reset01 : BOOL;
    start_start01 : BOOL;
    send_send01 : ARRAY [0..1000] OF BYTE;
    received_received01 : ARRAY [0..1000] OF BYTE;
    done_done01 : BOOL;
    tag_tag01 : BOOL;
    fault_fault01 : BOOL;
    faultID_faultID01 : BYTE;
ENDVAR

FUNCTION_BLOCK FB_RF30_IOL_RW
    EN
    start --> o_ct_prestart -- tag
    start --> i_start -- o_send -- done
    order --> o_fault -- fault
    i_io_length --> o_fault_id -- faultID
    i_send --> i_sendwrite -- received
    o_ct_start --> i_ct_time
    i_start_time --> i_start_time
    ADR (i_start) --> InputStartAddr
    ADR (o_send) --> OutputStartAddr
    reset --> i_reset
    send --> i_senddata
    END
    
```

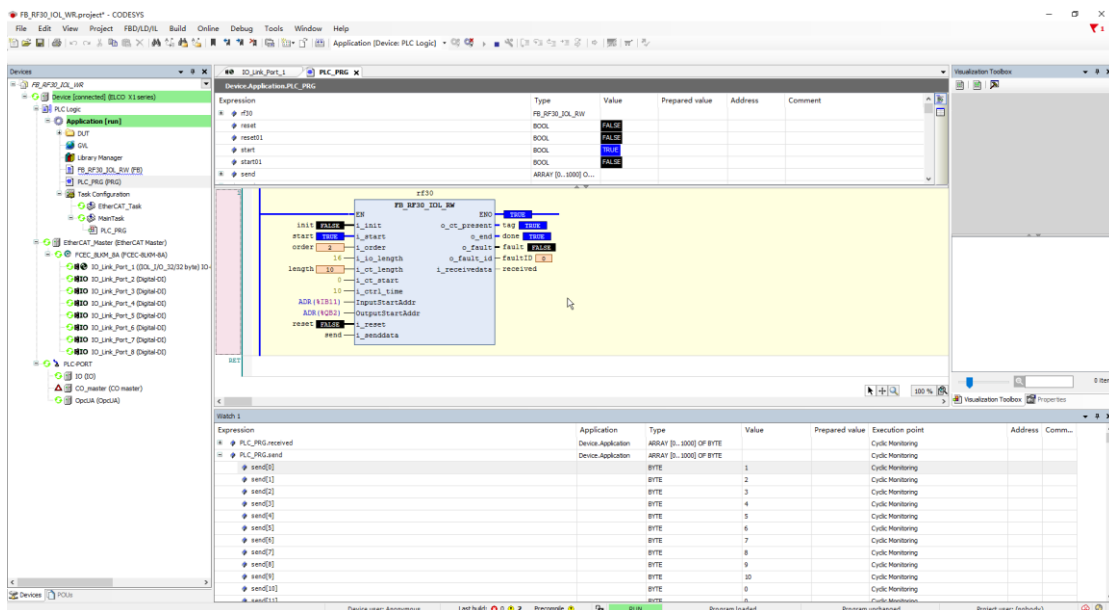
Messages: Total 0 error(s), 4 warning(s), 0 message(s)

Description	Project	Object	Position
C0195: Implicit conversion from signed Type INT to unsigned Type DWORD - Possible change of sign	FB_RF3...	FB_RF3...	Line 5...
C0196: Implicit conversion from signed Type INT to unsigned Type DWORD - Possible change of sign	FB_RF3...	FB_RF3...	Line 6...
C0196: Implicit conversion from unsigned Type UDINT to signed Type INT - Possible change of sign	FB_RF3...	FB_RF3...	Line 12...
C0196: Implicit conversion from unsigned Type UDINT to signed Type INT - Possible change of sign	FB_RF3...	FB_RF3...	Line 12...

- Download the program to the PLC, switch it to RUN mode, and open the monitoring table



- Test the read and write functions through the "write-first-then-read" process to ensure there are no abnormalities in the above configuration



The screenshot shows the CODESYS environment with the RF30 function block (FB) configured. The 'Data' table below the ladder logic shows the state of various variables:

Expression	Type	Value	Prepared value	Address	Comment
#?30	FB_RF30_IO_RW				
reset	BOOL	FALSE			
reset1	BOOL	FALSE			
start	BOOL	FALSE			
start1	BOOL	FALSE			
send	ARRAY [0..1000] OF BYTE				

The screenshot shows the CODESYS environment with the RF30 function block (FB) configured. The 'Data' table below the ladder logic shows the state of various variables, including received data:

Expression	Type	Value	Prepared value	Execution point	Address	Comm.
#?30	FB_RF30_IO_RW					
reset	BOOL	FALSE				
reset1	BOOL	FALSE				
start	BOOL	FALSE				
start1	BOOL	FALSE				
send	ARRAY [0..1000] OF BYTE					
PLC_PRG_received	ARRAY [0..1000] OF BYTE					
receive[0]	BYTE	0		Cyclic Monitoring		
receive[1]	BYTE	0		Cyclic Monitoring		
receive[2]	BYTE	0		Cyclic Monitoring		
receive[3]	BYTE	0		Cyclic Monitoring		
receive[4]	BYTE	0		Cyclic Monitoring		
receive[5]	BYTE	0		Cyclic Monitoring		
receive[6]	BYTE	0		Cyclic Monitoring		
receive[7]	BYTE	0		Cyclic Monitoring		
receive[8]	BYTE	0		Cyclic Monitoring		
receive[9]	BYTE	0		Cyclic Monitoring		
receive[10]	BYTE	0		Cyclic Monitoring		
receive[11]	BYTE	0		Cyclic Monitoring		
receive[12]	BYTE	0		Cyclic Monitoring		

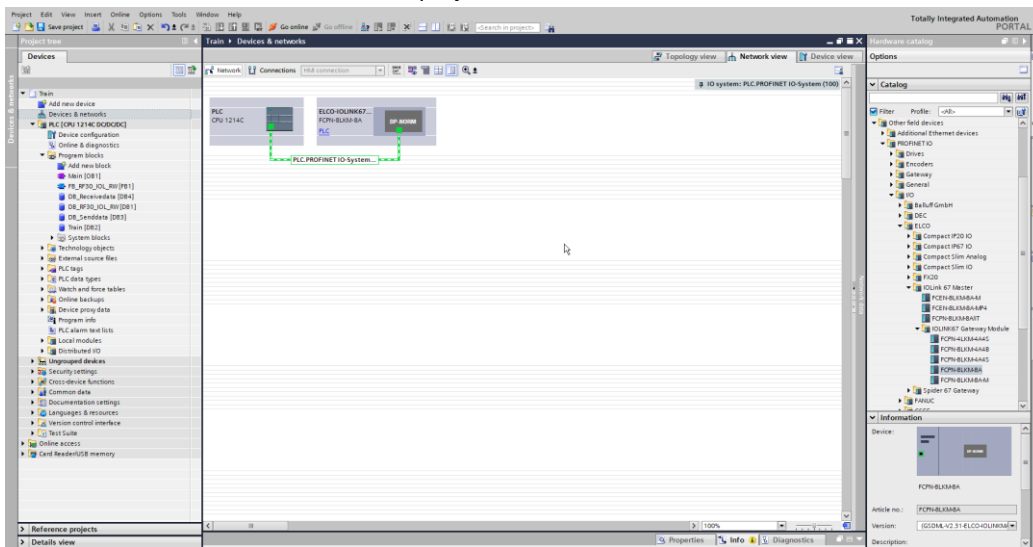
## 4.5 RFID operation example (Siemens PLC)

In this example, the Compact67 series IO-Link module from ELCO is used as a PROFINET slave to connect to Siemens' S7-1200 controller (equipped with a PROFINET interface). By default, TIA Portal has been installed, the required network information has been configured, the master station GSD file has been installed, and all power supply and bus connections have been completed. For the detailed operation procedure mentioned above, please refer to the FCPN-8LKM-8A User Manual.

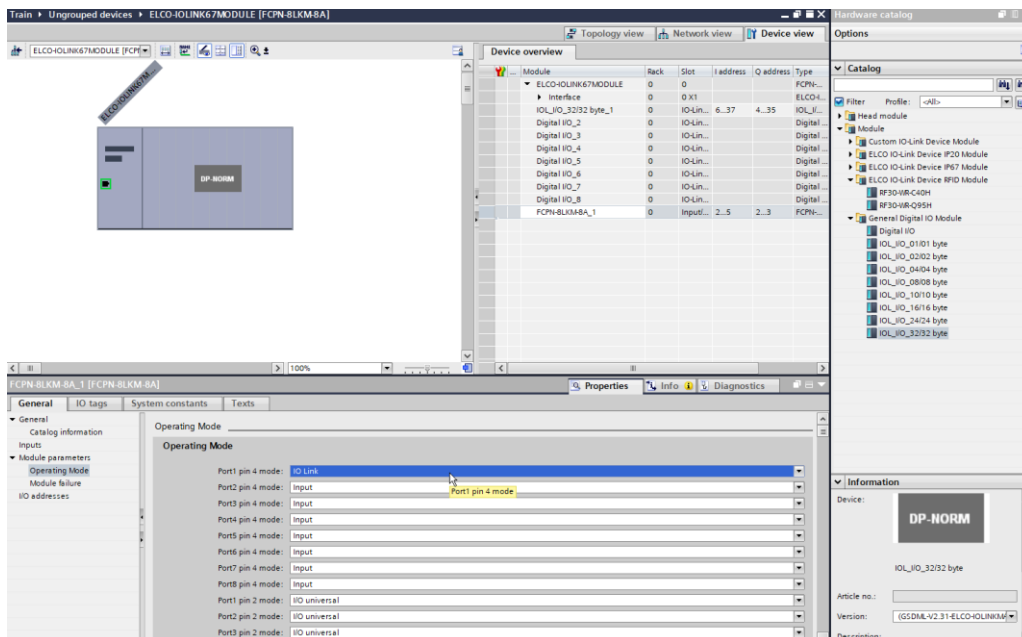
The master station GSD file and the program function blocks required for reading and writing are provided by our company, and the version of the function blocks shall be subject to the actual one.

The Compact67 system includes one IO-Link master station (model: FCPN-8LKM-8A). Port 1 of the master station is connected to the IO-Link RFID device (model: RF30-WR-C40H/LK). We will illustrate the specific software configuration and debugging process in the form of images.

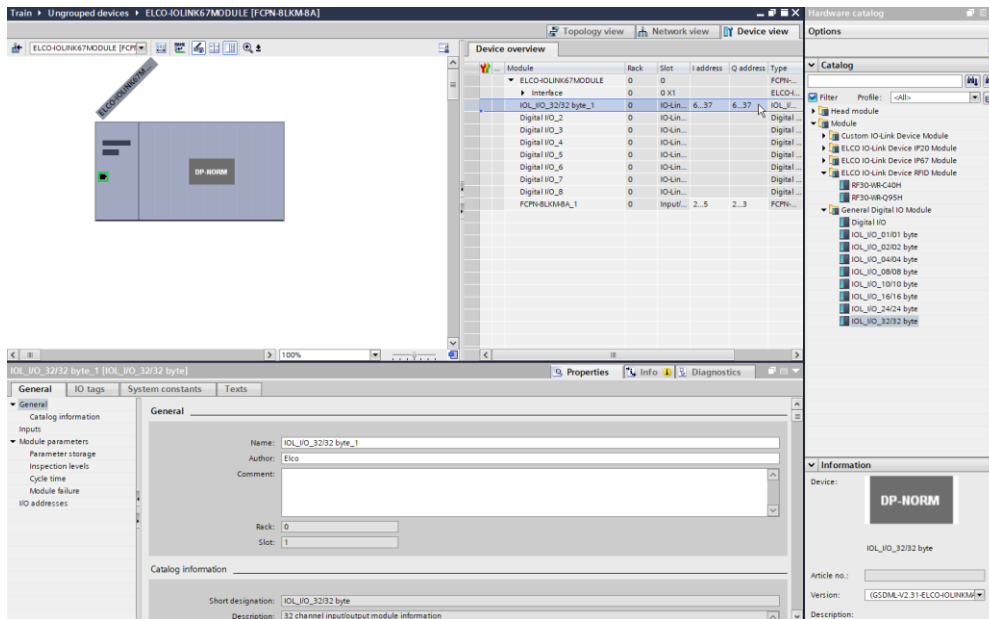
- 1) Add the master station module to the project



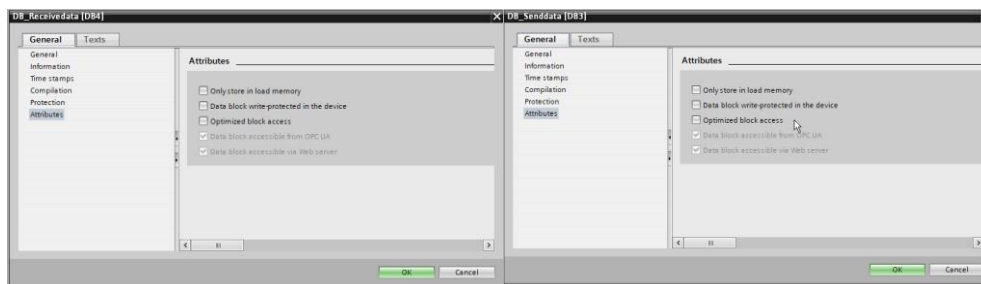
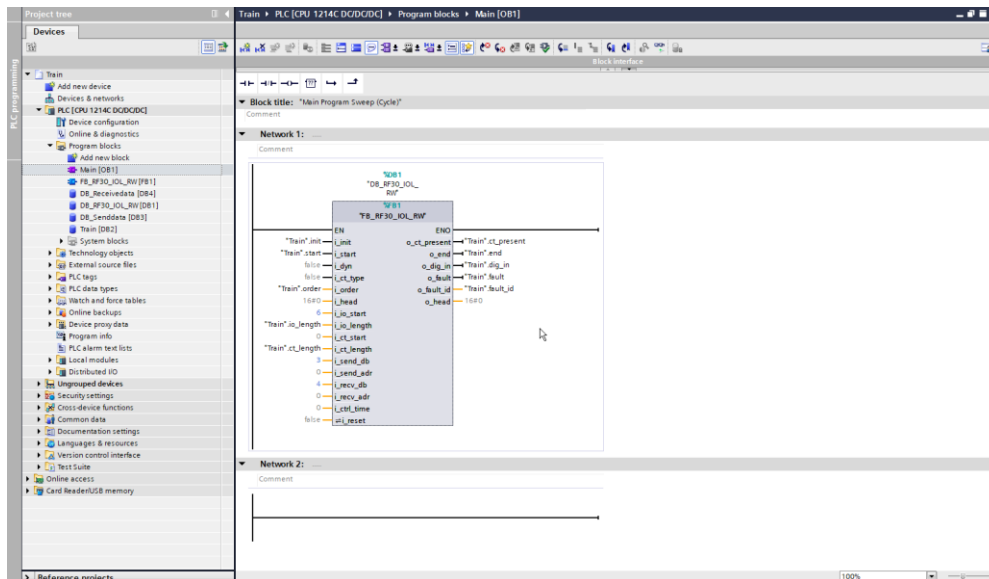
- 2) Select the IO-Link device based on the RFID model or process data length, and configure the corresponding master station channel to IO-Link mode



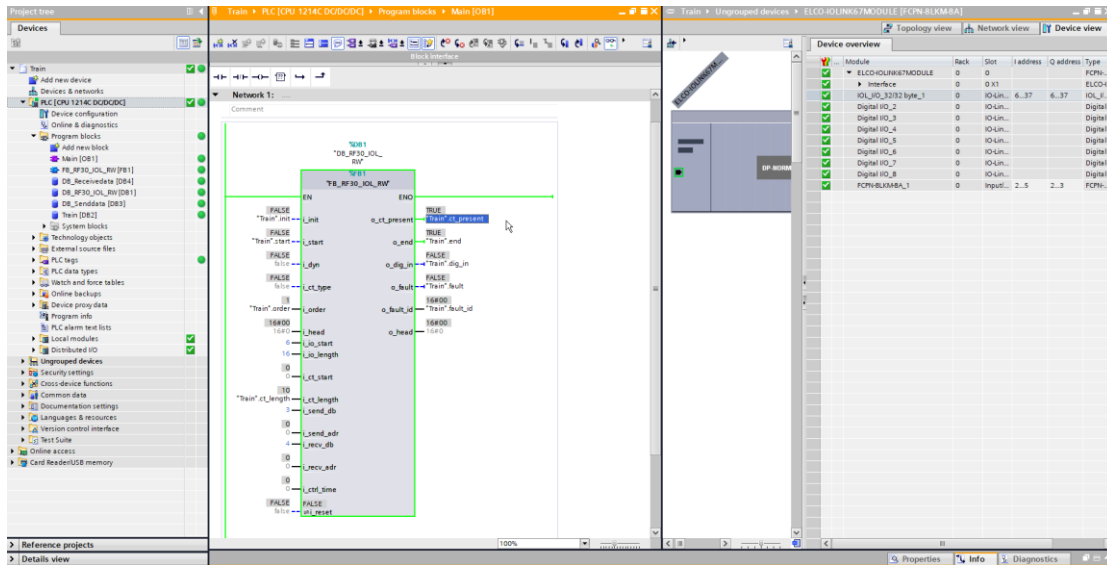
3) Assign input and output addresses, and keep the input and output addresses consistent



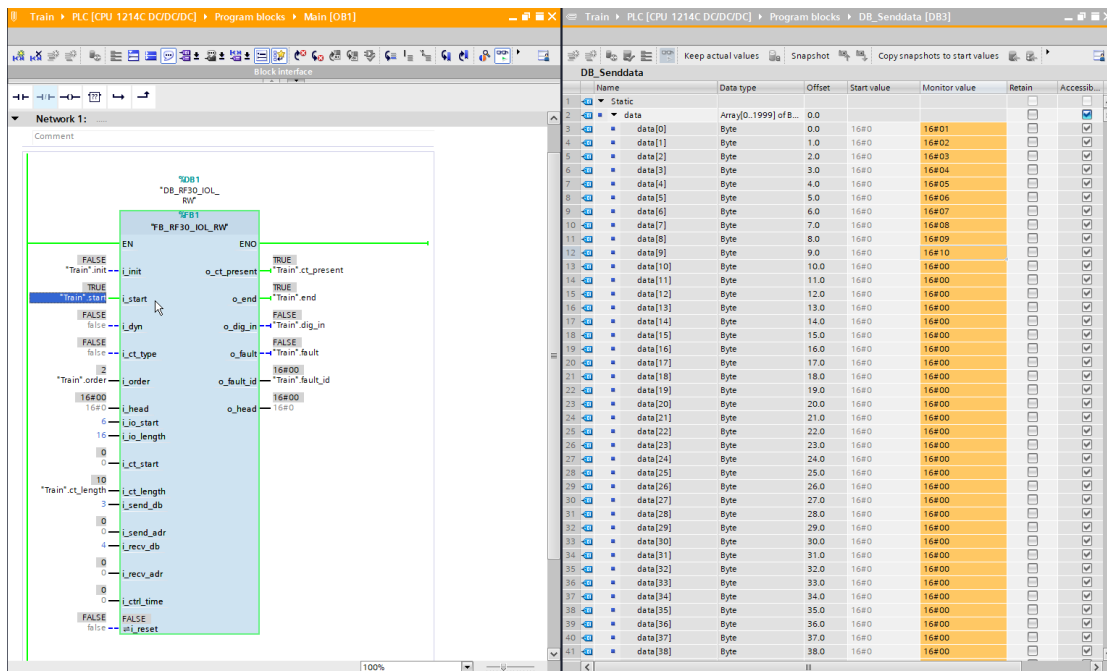
4) Import the function block "FB\_RF30\_IOL\_RW" and fill in the pins according to the corresponding data types; create a data buffer data block, and the "Optimized Block Access" function needs to be disabled



- Download the program to the PLC, switch it to RUN mode, and monitor the function block and IO-Link device communication status



- Test the read and write functions through the "write-first-then-read" process to ensure there are no abnormalities in the above configuration



The screenshot displays the SIMATIC Manager interface. On the left, the 'Block interface' shows the configuration for the '%DB1 DB\_RF30\_IO\_Link' block. The 'EN' input is active, and the 'o\_ct\_present' output is TRUE. The 'o\_head' output is 16#00. On the right, the 'DB\_Receivedata' table shows the data received from the IO-Link device.

Name	Data type	Offset	Start value	Monitor value	Retain	Accessib.
data	Array(0..199)	0.0				
data[0]	Byte	0.0	16#0	16#00		
data[1]	Byte	1.0	16#0	16#00		
data[2]	Byte	2.0	16#0	16#00		
data[3]	Byte	3.0	16#0	16#00		
data[4]	Byte	4.0	16#0	16#00		
data[5]	Byte	5.0	16#0	16#00		
data[6]	Byte	6.0	16#0	16#00		
data[7]	Byte	7.0	16#0	16#00		
data[8]	Byte	8.0	16#0	16#00		
data[9]	Byte	9.0	16#0	16#00		
data[10]	Byte	10.0	16#0	16#00		
data[11]	Byte	11.0	16#0	16#00		
data[12]	Byte	12.0	16#0	16#00		
data[13]	Byte	13.0	16#0	16#00		
data[14]	Byte	14.0	16#0	16#00		
data[15]	Byte	15.0	16#0	16#00		
data[16]	Byte	16.0	16#0	16#00		
data[17]	Byte	17.0	16#0	16#00		
data[18]	Byte	18.0	16#0	16#00		
data[19]	Byte	19.0	16#0	16#00		
data[20]	Byte	20.0	16#0	16#00		
data[21]	Byte	21.0	16#0	16#00		
data[22]	Byte	22.0	16#0	16#00		
data[23]	Byte	23.0	16#0	16#00		
data[24]	Byte	24.0	16#0	16#00		
data[25]	Byte	25.0	16#0	16#00		
data[26]	Byte	26.0	16#0	16#00		
data[27]	Byte	27.0	16#0	16#00		
data[28]	Byte	28.0	16#0	16#00		
data[29]	Byte	29.0	16#0	16#00		
data[30]	Byte	30.0	16#0	16#00		
data[31]	Byte	31.0	16#0	16#00		
data[32]	Byte	32.0	16#0	16#00		
data[33]	Byte	33.0	16#0	16#00		
data[34]	Byte	34.0	16#0	16#00		
data[35]	Byte	35.0	16#0	16#00		
data[36]	Byte	36.0	16#0	16#00		
data[37]	Byte	37.0	16#0	16#00		
data[38]	Byte	38.0	16#0	16#00		

The screenshot displays the SIMATIC Manager interface. On the left, the 'Block interface' shows the configuration for the '%DB1 DB\_RF30\_IO\_Link' block. The 'EN' input is active, and the 'o\_ct\_present' output is TRUE. The 'o\_head' output is 16#00. On the right, the 'DB\_Receivedata' table shows the data received from the IO-Link device.

Name	Data type	Offset	Start value	Monitor value	Retain	Accessib.
data	Array(0..199)	0.0				
data[0]	Byte	0.0	16#0	16#01		
data[1]	Byte	1.0	16#0	16#02		
data[2]	Byte	2.0	16#0	16#03		
data[3]	Byte	3.0	16#0	16#04		
data[4]	Byte	4.0	16#0	16#05		
data[5]	Byte	5.0	16#0	16#06		
data[6]	Byte	6.0	16#0	16#07		
data[7]	Byte	7.0	16#0	16#08		
data[8]	Byte	8.0	16#0	16#09		
data[9]	Byte	9.0	16#0	16#10		
data[10]	Byte	10.0	16#0	16#00		
data[11]	Byte	11.0	16#0	16#00		
data[12]	Byte	12.0	16#0	16#00		
data[13]	Byte	13.0	16#0	16#00		
data[14]	Byte	14.0	16#0	16#00		
data[15]	Byte	15.0	16#0	16#00		
data[16]	Byte	16.0	16#0	16#00		
data[17]	Byte	17.0	16#0	16#00		
data[18]	Byte	18.0	16#0	16#00		
data[19]	Byte	19.0	16#0	16#00		
data[20]	Byte	20.0	16#0	16#00		
data[21]	Byte	21.0	16#0	16#00		
data[22]	Byte	22.0	16#0	16#00		
data[23]	Byte	23.0	16#0	16#00		
data[24]	Byte	24.0	16#0	16#00		
data[25]	Byte	25.0	16#0	16#00		
data[26]	Byte	26.0	16#0	16#00		
data[27]	Byte	27.0	16#0	16#00		
data[28]	Byte	28.0	16#0	16#00		
data[29]	Byte	29.0	16#0	16#00		
data[30]	Byte	30.0	16#0	16#00		
data[31]	Byte	31.0	16#0	16#00		
data[32]	Byte	32.0	16#0	16#00		
data[33]	Byte	33.0	16#0	16#00		
data[34]	Byte	34.0	16#0	16#00		
data[35]	Byte	35.0	16#0	16#00		
data[36]	Byte	36.0	16#0	16#00		
data[37]	Byte	37.0	16#0	16#00		
data[38]	Byte	38.0	16#0	16#00		

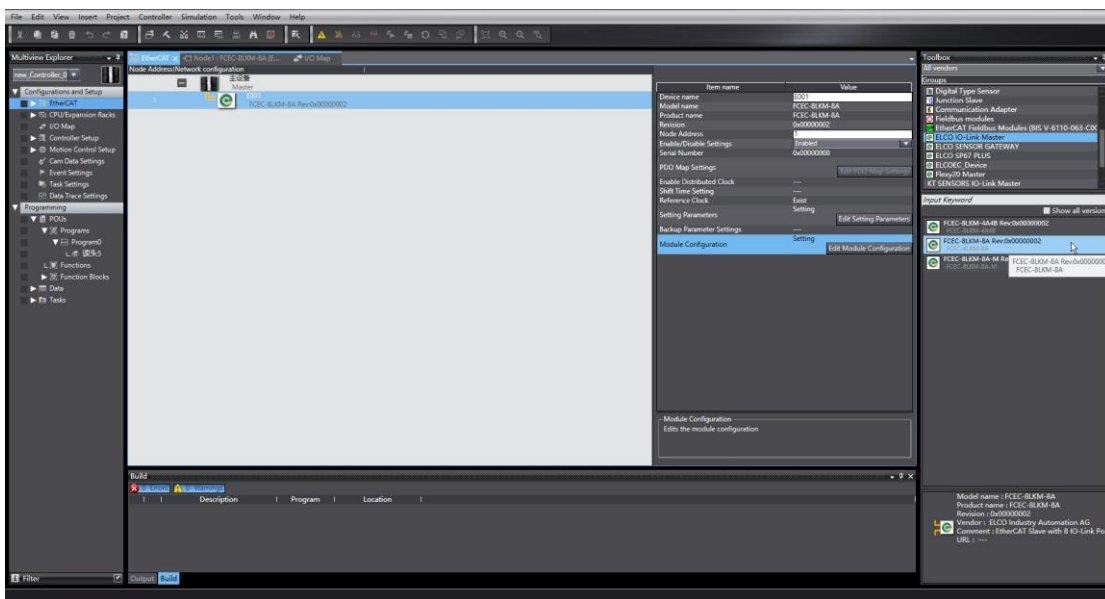
## 4.6 RFID operation example (OMRON PLC)

In this example, the Compact67 series IO-Link module from ELCO is used as an EtherCAT slave to connect to OMRON's NJ301 controller (equipped with an EtherCAT interface). By default, Sysmac Studio has been installed, the required network card information has been configured, the master station XML file has been installed, and all power supply and bus connections have been completed. For the detailed operation procedure mentioned above, please refer to the FCEC-8LKM-8A User Manual.

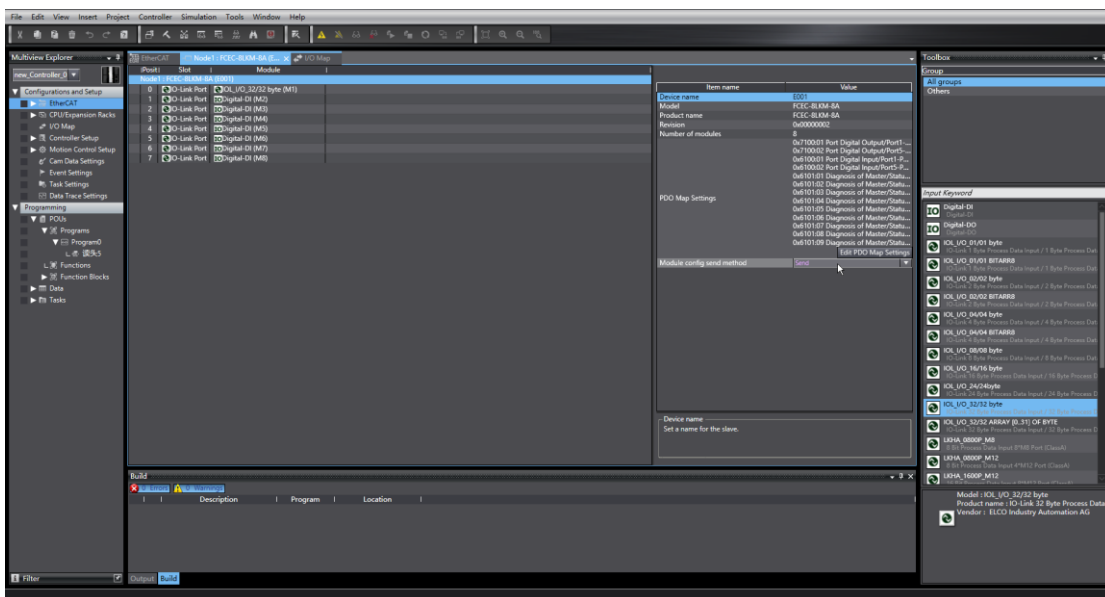
The master station XML file and the program function blocks required for reading and writing are provided by our company, and the version of the function blocks shall be subject to the actual one.

The Compact67 system includes one IO-Link master station (model: FCEC-8LKM-8A). Port 1 of the master station is connected to the IO-Link RFID device (model: RF30-WR-C40H/LK). We will illustrate the specific software configuration and debugging process in the form of images.

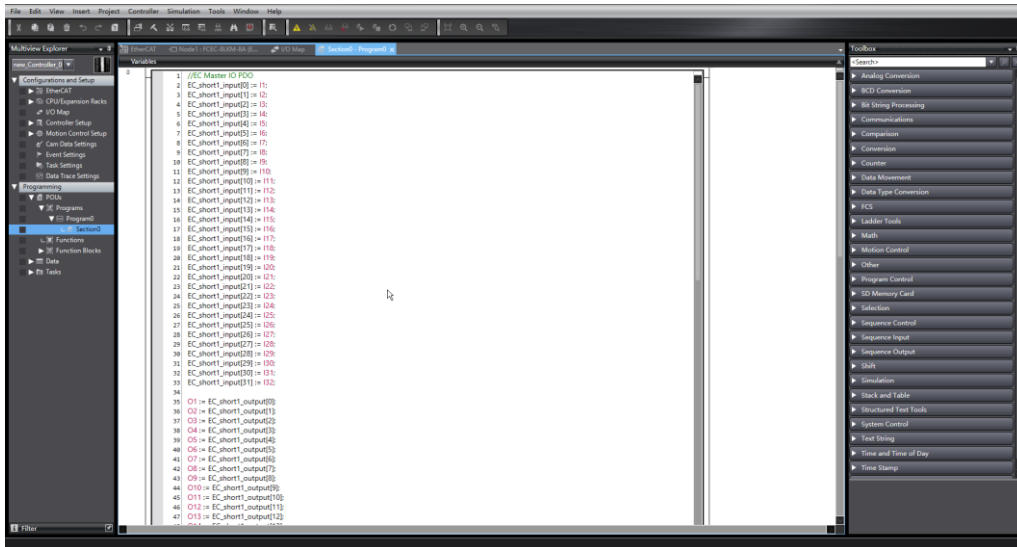
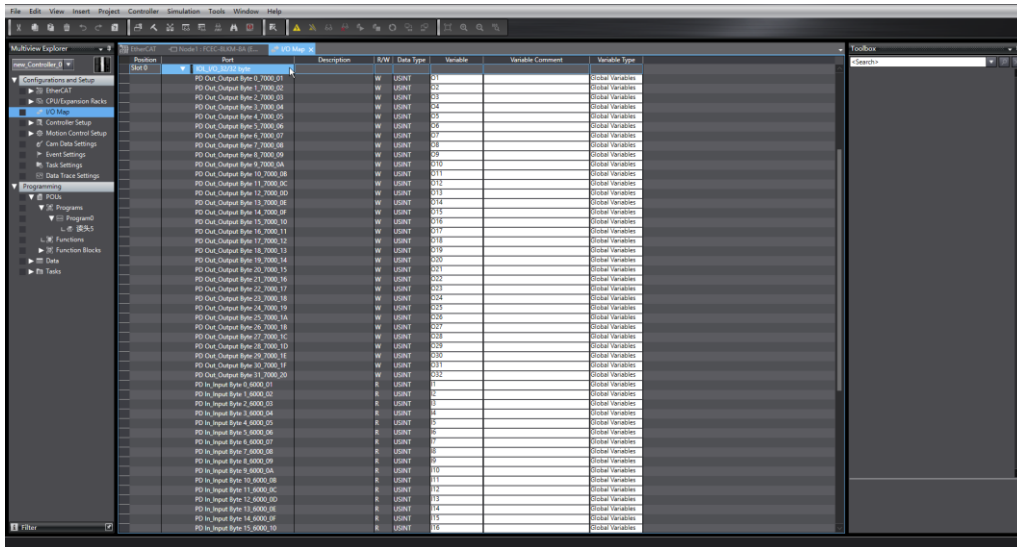
- 1) Add the master station module to the project



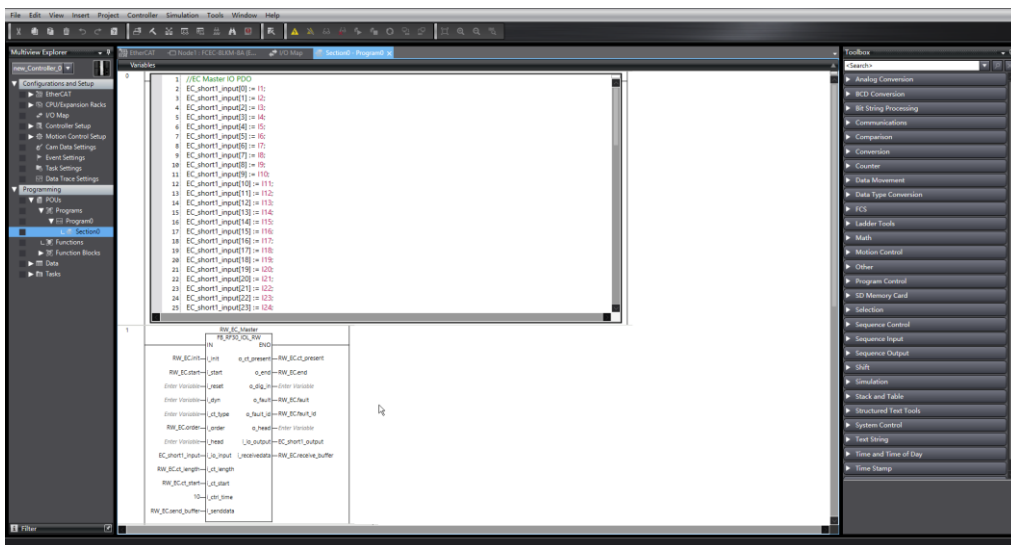
- 2) Select the IO-Link device based on the RFID model or process data length, and set the "Module Config send method" item to "send"



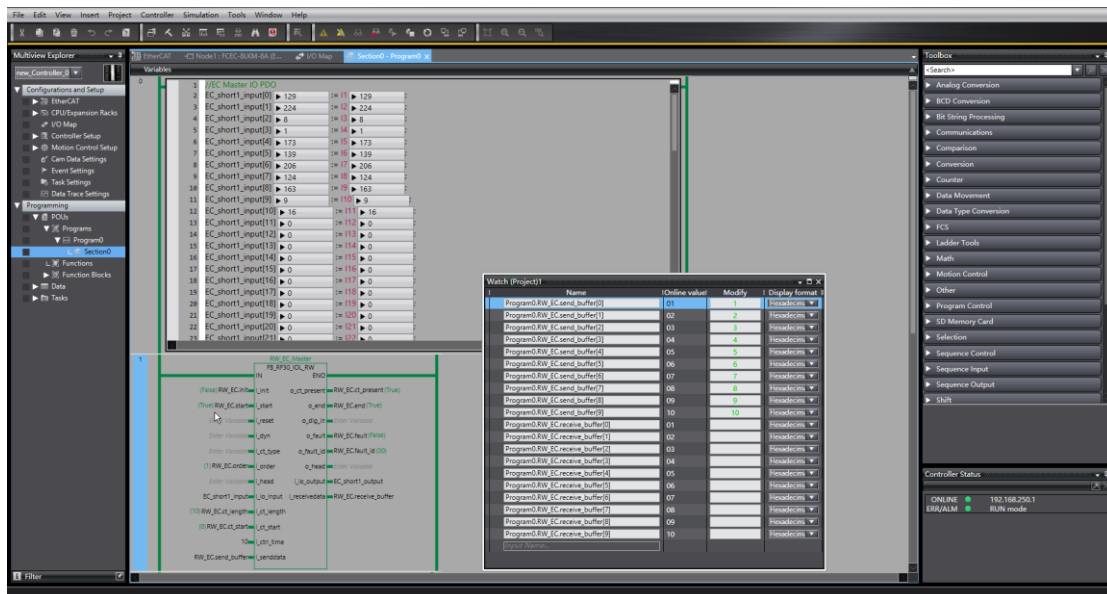
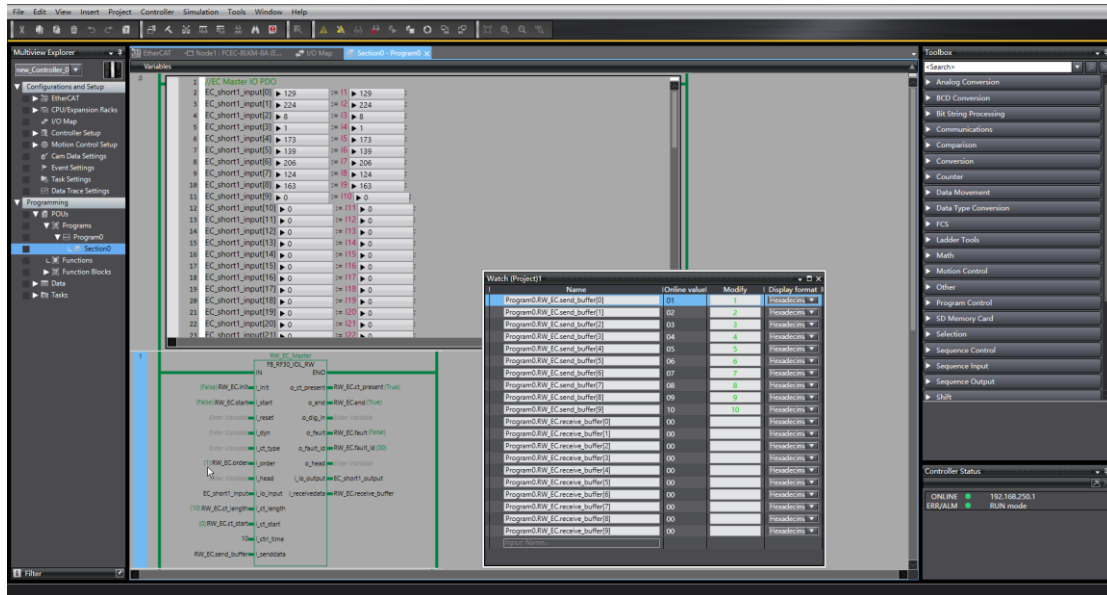
### 3) Assign input and output addresses and map them to array variables



### 4) Import the function block "FB\_RF30\_IOL\_RW" and fill in the pins according to the corresponding data types







## 4.7 RFID operation example (AB PLC)

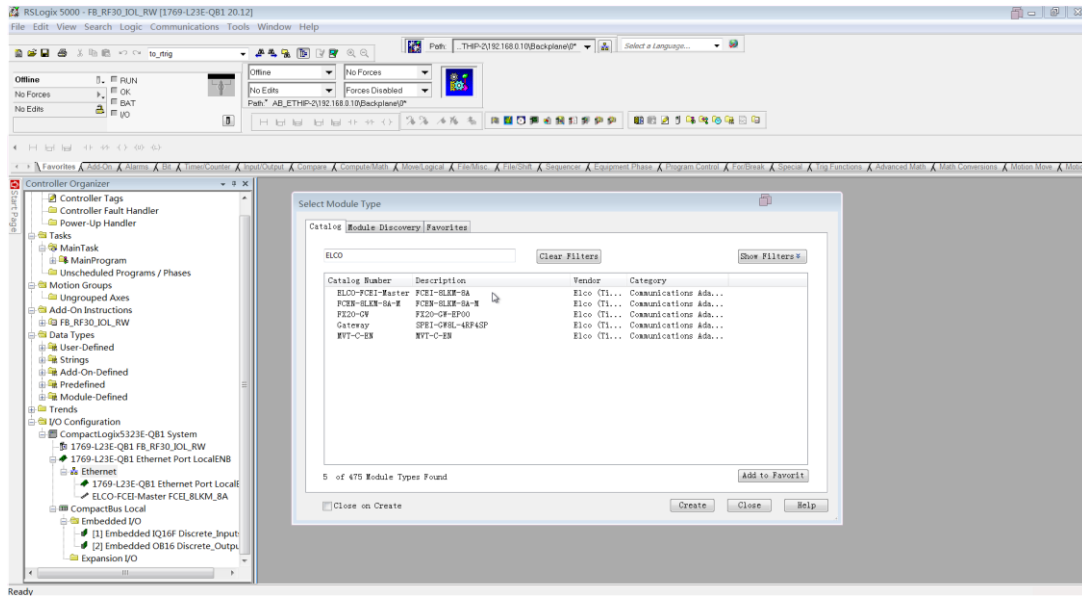
In this example, the Compact67 series IO-Link module from ELCO is used as an EtherNet/IP slave to connect to Allen-Bradley (AB)'s L23E-QB1B controller (equipped with an EtherNet/IP interface). By default, RSLogix 5000 has been installed, the required network card information has been configured, the master station EDS file has been installed, and all power supply and bus connections have been completed. For the detailed operation procedure mentioned above, please refer to the FCEI-8LKM-8A User Manual.

The master station EDS file and the program function blocks required for reading and writing are provided by our company, and the version of the function blocks shall be subject to the actual one.

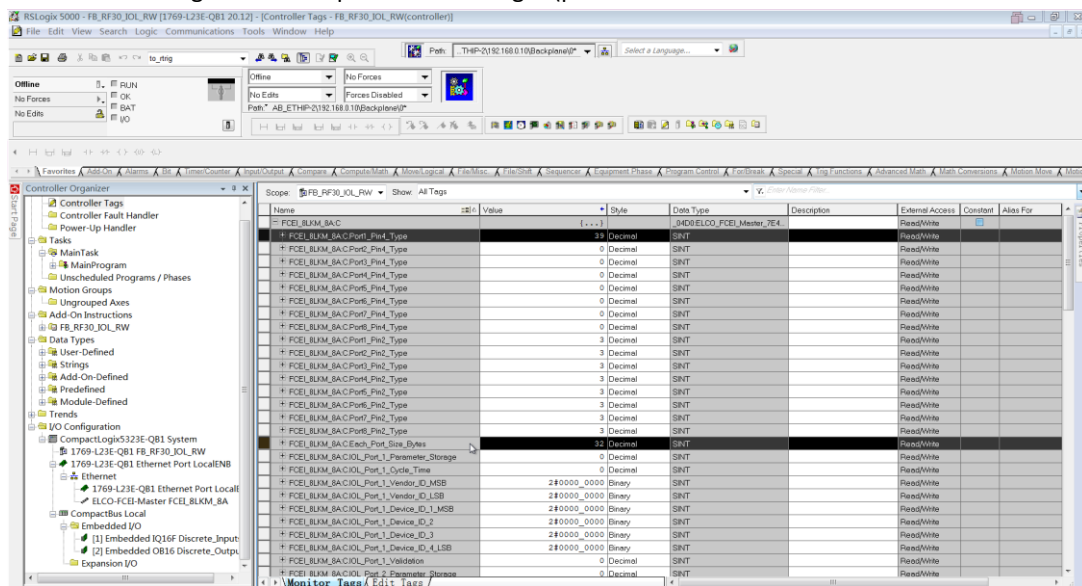
The Compact67 system includes one IO-Link master station (model: FCEI-8LKM-8A). Port 1 of the master station is connected to the IO-Link RFID device (model: RF30-WR-C40H/LK). We will illustrate the specific software configuration and debugging process in the form of images.

- 1) Add the master station module to the project, and configure the parameters according to the actual IP

address

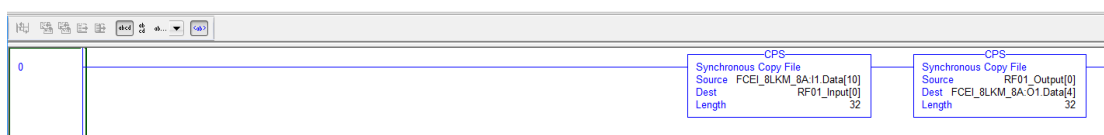


- 2) Modify the control word of the corresponding master station channel and the data length allocated per channel according to the RFID process data length (please refer to the FCEI-8LKM-8A manual for details)

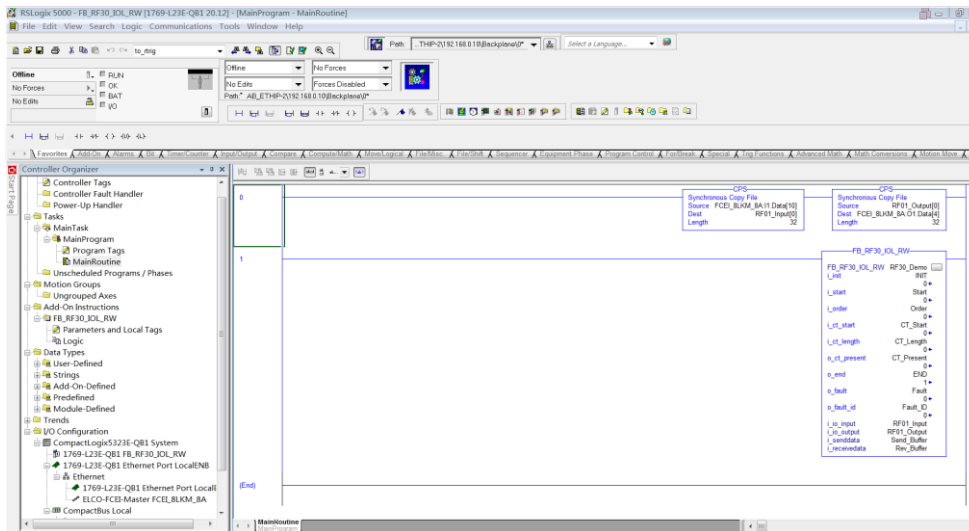


- 3) Map the input and output addresses of the corresponding channel to array variables (refer to the FCEI-8LKM-8A User Manual for master station address assignment)

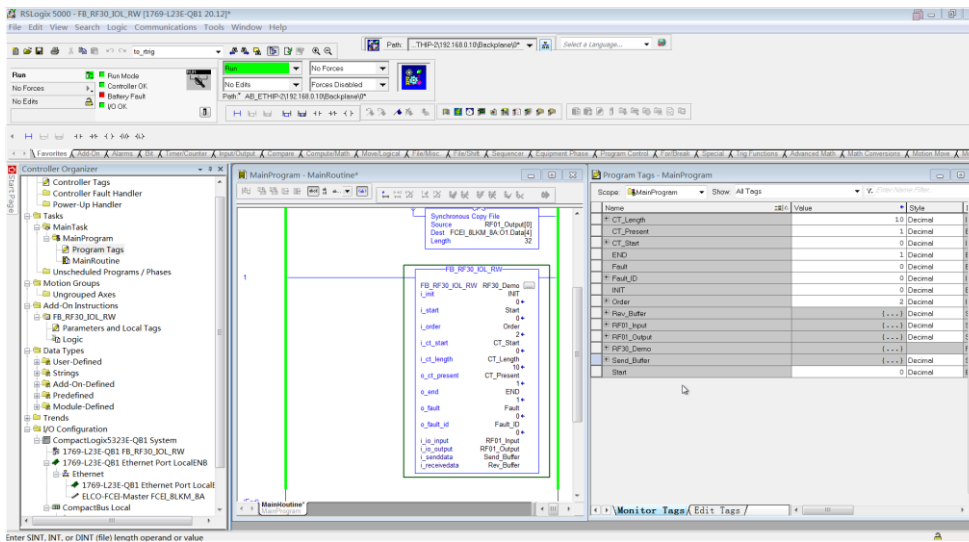
Name	Value	Style	Data Type	Description	External Access	Constant	Alias For
FCEI_8LKM_BA_C		{...}	04D0 ELCO_FCEI_Master_7E4		Read/Write		
FCEI_8LKM_BA11		{...}	04D0 ELCO_FCEI_Master_961		Read/Write		
FCEI_8LKM_BA11_ConnectionFaulted		0	Decimal	BOOL	Read/Write		
FCEI_8LKM_BA11_Data		{...}	Decimal	SINT[382]	Read/Write		
FCEI_8LKM_BA_O1		{...}	04D0 ELCO_FCEI_Master_9E8		Read/Write		
FCEI_8LKM_BA_O1_Data		{...}	Decimal	SINT[260]	Read/Write		



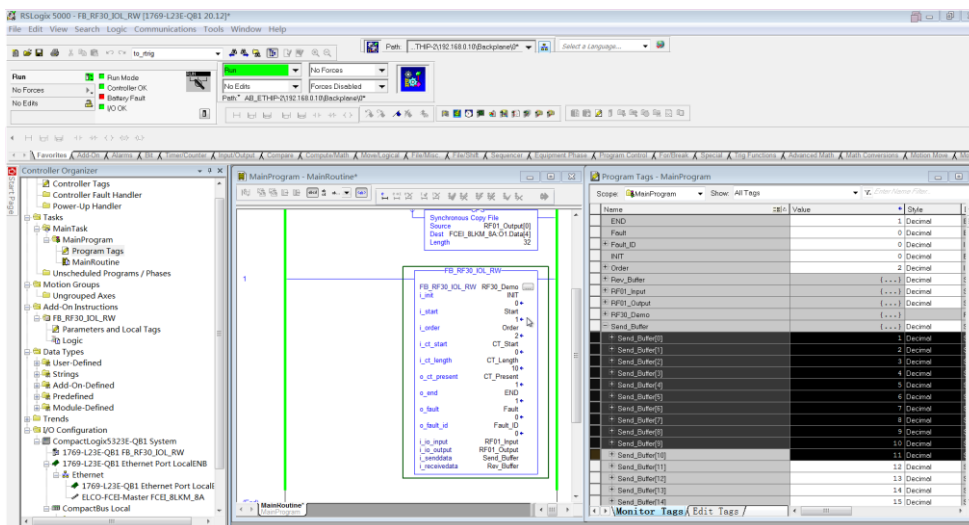
- 4) Import the function block "FB\_RF30\_IOL\_RW" and fill in the pins according to the corresponding data types

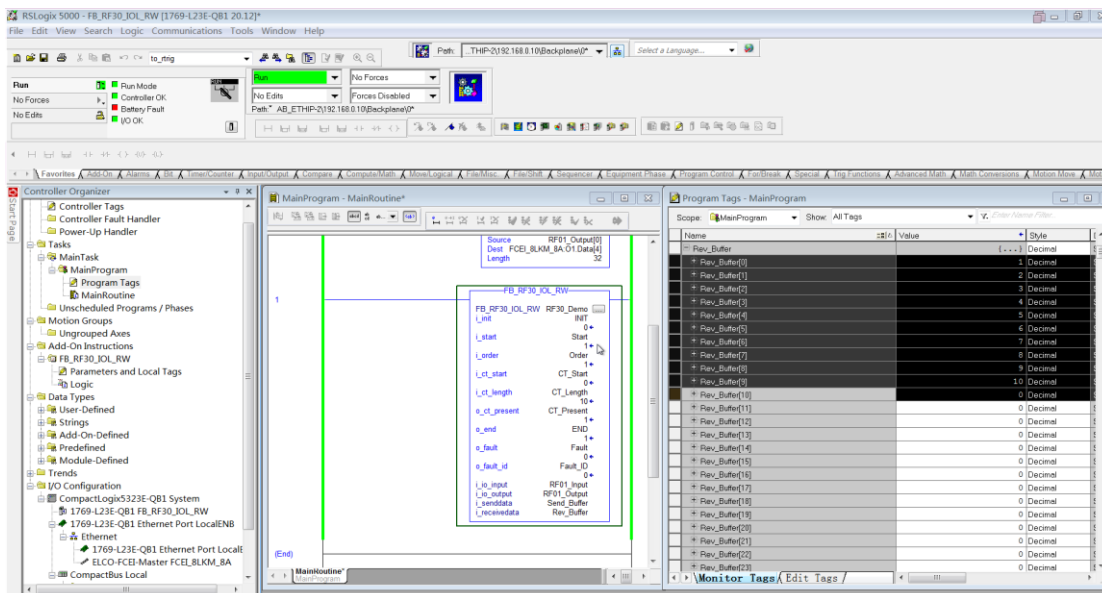
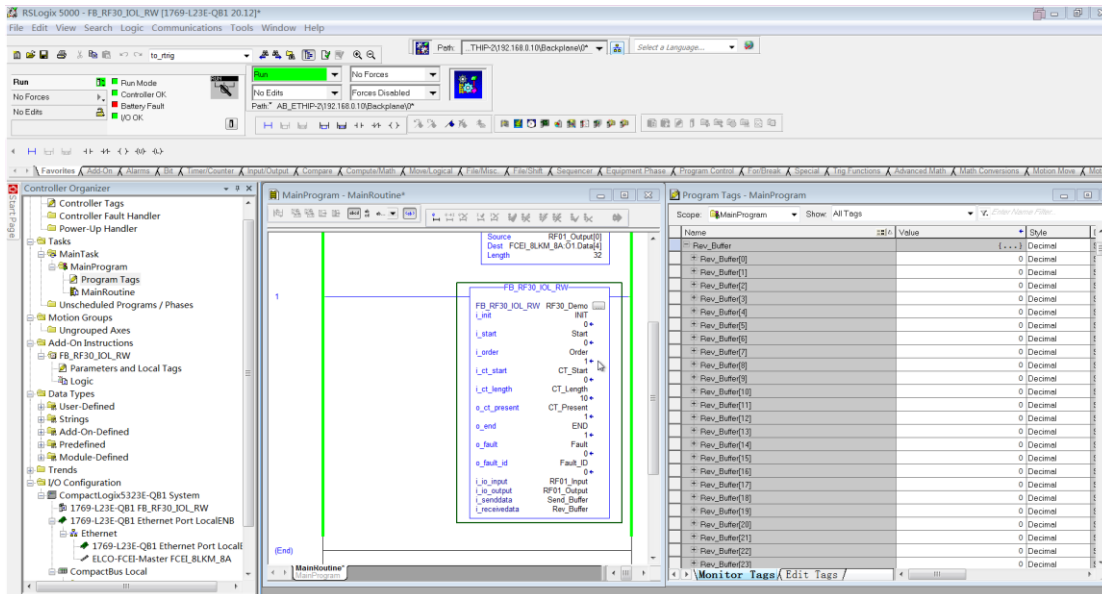


5) Download the program to the PLC, switch it to RUN mode, and monitor the function block and data buffer



6) Test the RFID function through the "write-first-then-read" process to ensure there are no abnormalities in the above configuration





## 4.8 RFID operation example (MITSUBISHI PLC)

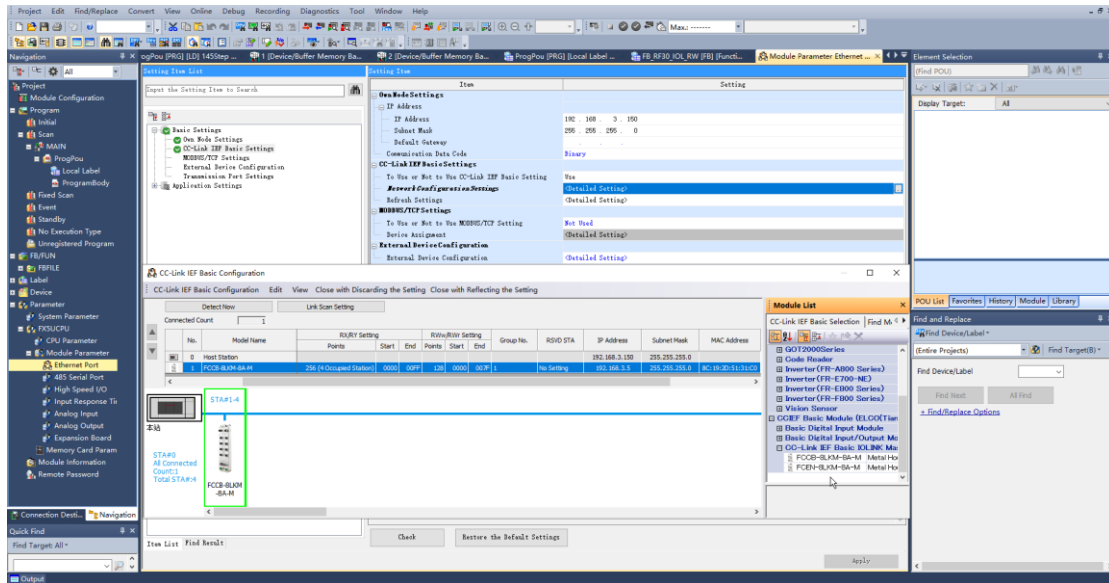
In this example, the Compact67 series IO-Link module from ELCO is used as a CC-Link IE Field Basic slave to connect to Mitsubishi's FX5U-32MR controller (equipped with a CC-Link IE Field Basic interface). By default, GX Works3 has been installed, the required network card information has been configured, the master station configuration file has been installed, and all power supply and bus connections have been completed. For the detailed operation procedure mentioned above, please refer to the FCCB-8LKM-8A-M User Manual.

The master station configuration file and the program function blocks required for reading and writing are provided by our company, and the version of the function blocks shall be subject to the actual one.

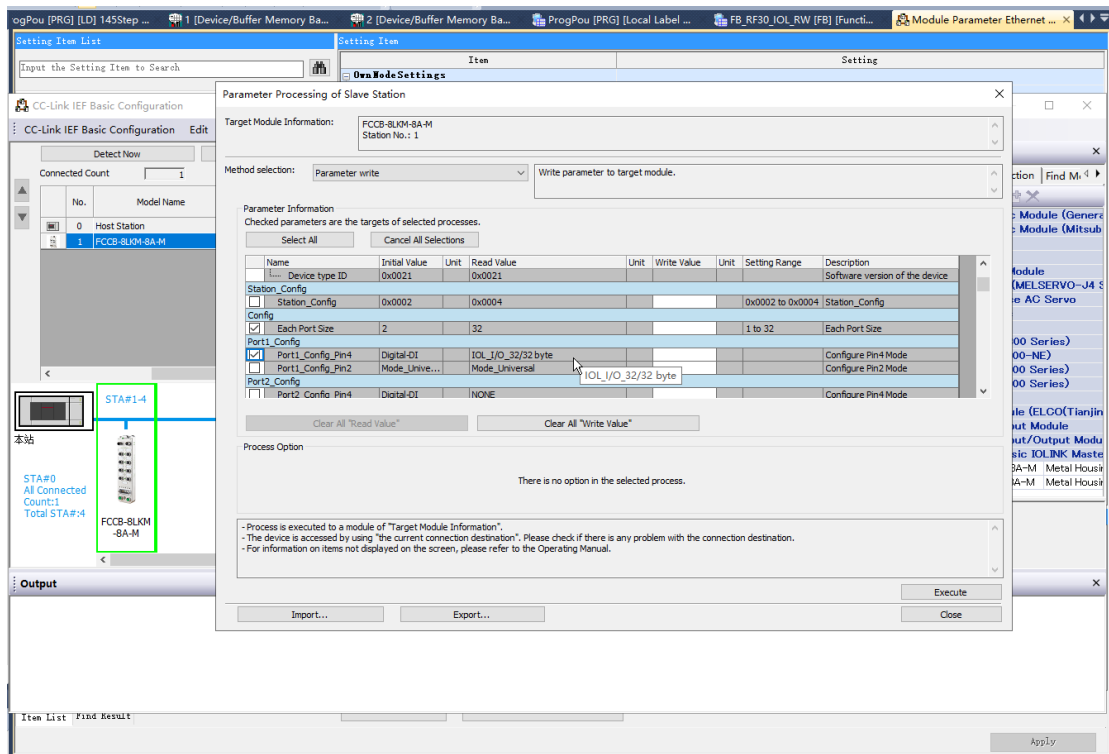
The Compact67 system includes one IO-Link master station (model: FCCB-8LKM-8A-M). Port 1 of the master station is connected to the IO-Link RFID device (model: RF30-WR-C40H/LK). We will illustrate the specific software configuration and debugging process in the form of images.

- 1) Add the master station module to the project and configure the parameters according to the actual IP

address

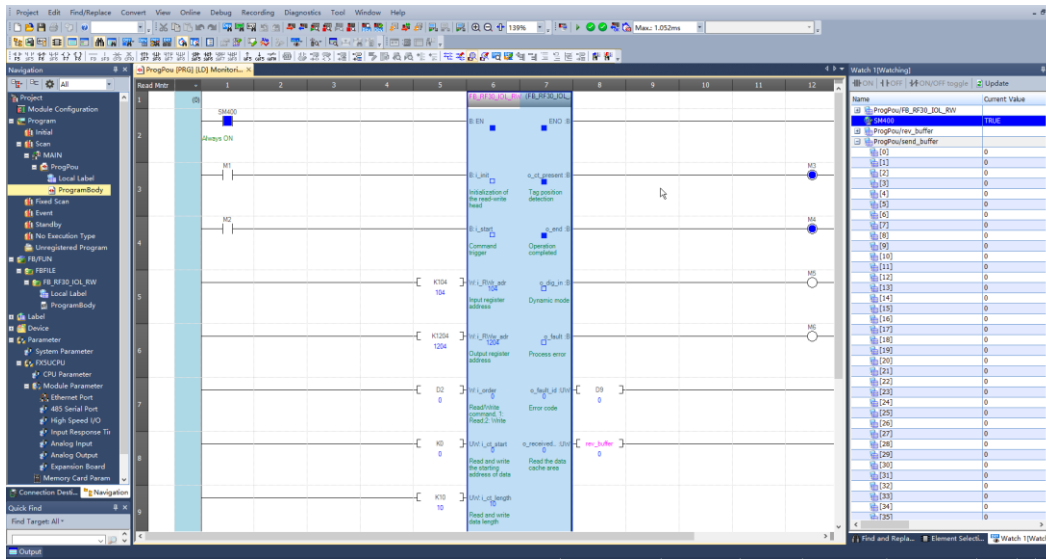


- 2) Select the IO-Link device according to the RFID process data length, and configure the data length per channel (please refer to the FCCB-8LKM-8A-M manual for details)





- Download the program to the PLC, switch the PLC to RUN mode, and monitor the function block and data buffer



- Test the RFID function through the "write-first-then-read" process to ensure there are no abnormalities in the above configuration

