# WISE I/O Modules

10

10.1. Overview

WISE (**W**eb **I**nside, **S**mart **E**ngine) is a product series developed by ICP DAS that functions as control units for use in remote logic control and monitoring in various industrial applications. WISE offers a user-friendly and intuitive web site interface that allows users to implement IF-THEN-ELSE control logic on controllers just a few clicks away; no programming is required. With its powerful and easy-to-use features, it will minimize the learning curve, shorten time to market and dramatically reduce the labor and cost spent on system development.

Through Web browser, users can access Web Server on WISE controllers to perform tasks such as logic rule edition and download. A Rule Engine will be set up to manage and deploy logic rules for controllers. The Rule Engine will check whether the rules are valid or not and determine the execution of actions under specific conditions, for examples: setting up I/O channel values, perform scheduled tasks, sending Email/SMS message or sending CGI command under a specific condition. With WISE Advanced P2P function, all WISE controllers (not apply to WISE-580x) in network can freely share their status such as AIO value, DIO value, DIO Counter value or Internal Register value to each others. This function greatly enhances the flexibility and boosts accuracy to the logic rule design and makes it easy to enable the interactions between the controllers. In addition, through Modbus TCP Protocol, SCADA package enables to control and monitor I/O channel or system status on WISE controller in real time.
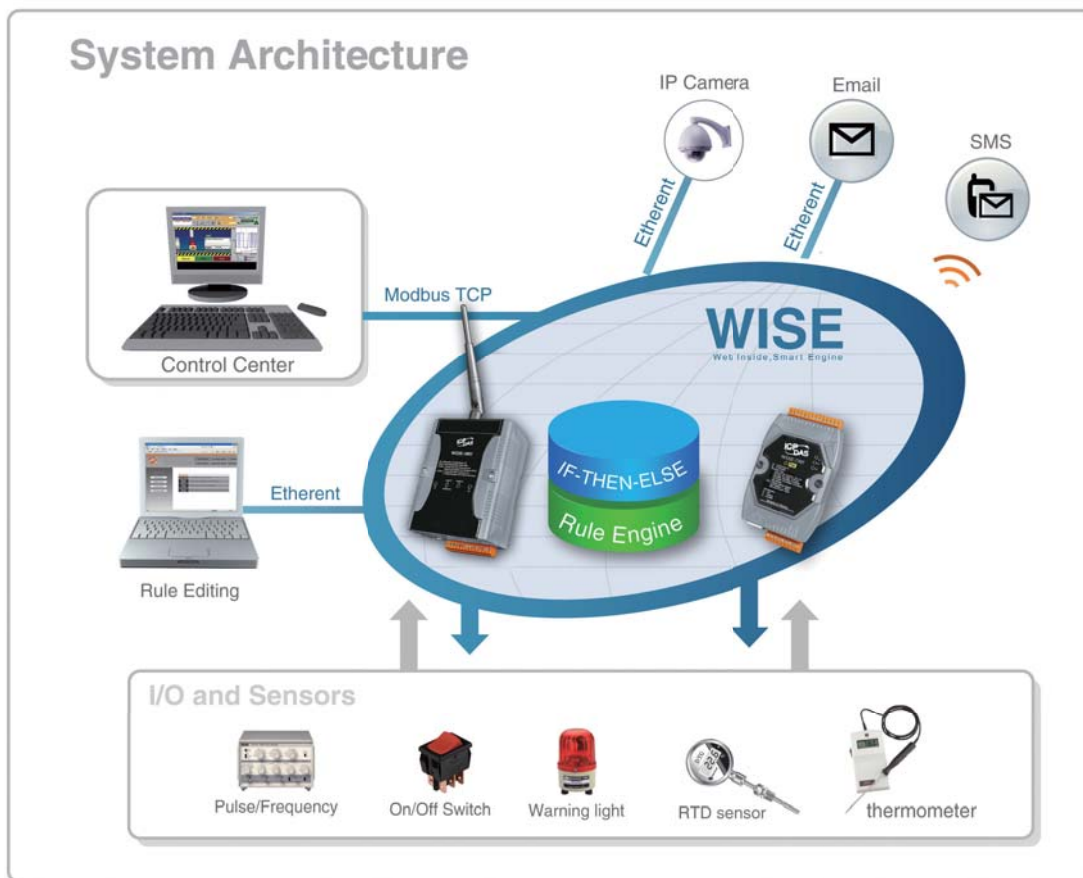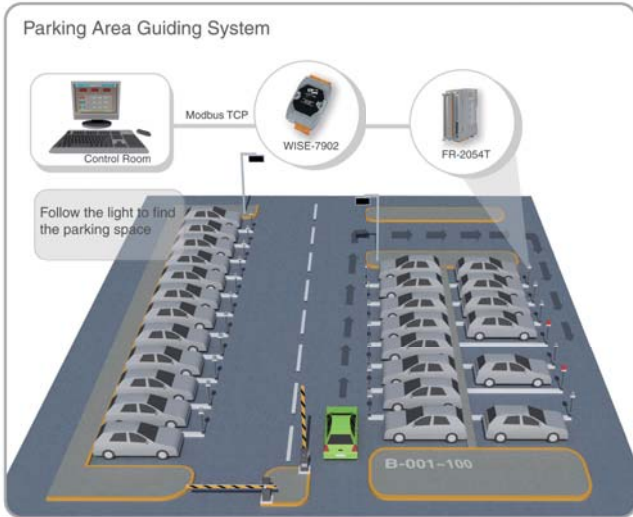
▲ WISE System Architecture

● Applications

- Building Automation
- Factory Automation
- Machine Automation
- Remote diagnosis
- Remote Maintenance
- Equipment Monitoring

10
1

WISE I/O Modules

● Application Stories

▶ Greenhouse Automation Solution

Greenhouse cultivation plays a very important role in modern agriculture. As the greenhouse usually equips with various high-tech equipments, management tend to be very complex. An automated greenhouse control system powered by WISE brings obvious benefit such as labor saving, but far more importantly, it enables improved quality of produce and information gathering that will make significant differences in profit earning.

Greenhouse Automation Solution
WISE-7118Z

Parking Area Guiding System
Modbus TCP
WISE-7902
FR-2054T
Control Room
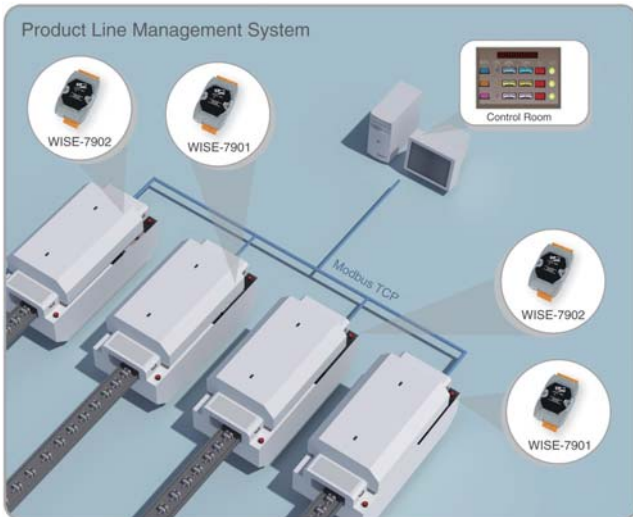Follow the light to find the parking space
B-001~100

◀ Parking Area Guiding System

ICP DAS WISE-7902 controller, together with the high-speed FR-2054 FRnet modules distributed all over the parking facility, offer a total solution that is perfect for large-scale parking facilities. With help of sensors and lights installed on each space, the system will guide drivers directly to the vacant parking spaces signified by auto-lighting flashing light. WISE supports seamless integration with SCADA software that makes it easy to achieve real time monitoring and remote management for entire parking facility.

▶ Environment Management System

WISE is perfect for building an Environment Management System for it provides a variety of I/O modules to choose from to meet your specific requirements for your applications. WISE allows to sending Email/SMS to related personals for immediately response. In addition, through CGI command sending, WISE can communicate with Surveillance system and perform real time video recording for you to easily identify real-time emergency events and facilities status in the remote locations.

Environment Management System
Pump
IP Camera
SMS
Limit Switch
WISE-5801
Rain Gauge

Product Line Management System
WISE-7902
WISE-7901
Control Room
Modbus TCP
WISE-7902
WISE-7901

◀ Production Line Management System

Eliminating unnecessary machine downtime, ensuring maximum productivity and maintaining appropriate stock are keys to successful product line management. ICP DAS offers full-range I/O module that works with WISE controller, the system developer can easily set up logic rule for a single controller or interaction between controllers with Advanced P2P. WISE also provides seamless integration with the control center management system to makes real time monitoring the overall production line status more efficiently.

10
1

WISE I/O Modules

• Why WISE ?

✓ No programming is required. Dramatically reduce the labor and cost spent on system development.

✓ No extra software tool is required; all operations can be done through the Web browser.

✓ IF-THEN-ELSE logic rules execution ability.

✓ Extra Timer and Schedule function for periodic operation.

✓ Real Time message sending via SMS and Email.

✓ CGI command sending for interaction with Surveillance systems

✓ Recipe function provided for easy operations of Group Actions

✓ Advanced P2P function provided, WISE controllers in network can freely share their I/O status.

✓ Modbus TCP/RTU Protocol provided for seamless integration with SCADA package.

✓ Wide range of I/O modules provided allows users to find best solutions.

✓ PoE(Power over Ethernet) for simplifying system design, reducing cable and saving space.

• Features

1. IF-THEN-ELSE logic rules execution ability

WISE controller equips with an IF-THEN-ELSE logic Rule Engine, it offers up to 36 IF-THEN-ELSE rules for users to set up the logic content. After completing rule edition and downloading rules to the WISE controller, the Rule Engine will loop execute the rules in accordance with the execute order under specific conditions.

2. No extra software tool is required

WISE HMI interface runs on regular Web browsers. To edit control logic, it only requires a browser to connect to the Web server on WISE controller. No extra software tool installation is needed on the target PC.

3. No more programming

WISE provides user-friendly Web UI pages for editing control logic on the controllers. It enables to implement logic edition by a few clicks on the mouse to set up and deploy logic rules without writing a single line of code.

4. Recipe function for grouping a series of Actions

In addition to 3 THEN Actions and 3 ELSE Actions settings WISE provides for each Rule, Recipe function is provided for easily grouping a series of Actions. A series of actions can be stored and saved in a Recipe action and will be executed when the IF-THEN-ELSE condition is matched.

5. Provide Timer and Schedule operation

WISE features Timer and Schedule functions: It allows user to schedule specific date or time for control logic execution, or perform specific tasks such as time delay. With Calendar user interface provided, Schedule setting can be more efficient and flexible.

6. Remote monitoring and alarm via SMS or Email

WISE supports SMS and Email functions for real-time message communication. The sending action can be added to the logic edition as part of logic control to provide real-time message transmission function.

7. CGI Command Sending for Surveillance system integration

WISE provides CGI commands sending function. It provides integrated access to a wide variety of Web devices and Surveillance systems.

8. Data Logger function

WISE-580x provides Data Logger function to real-time record the I/O data of the controller and sends the data files by FTP or Email to the control center for further administration management or data analysis.

▲ WISE Web Page User Interface
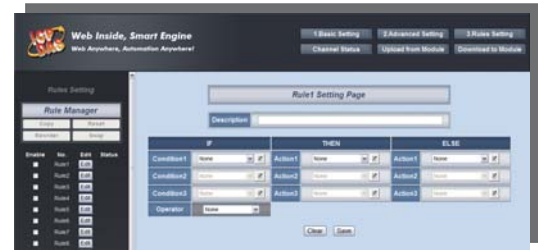
▲ Click and get done!

▲ WISE Schedule setting page

10

1

WISE I/O Modules

9. Advanced P2P for Controller's Resource Sharing

Each WISE controller can communicate with 8 remote WISE controllers. The Advanced P2P function provided by WISE is far more superior than the traditional P2P (DI-DO mapping) function, all WISE controllers can freely share their status such as AIO channel value, DIO cha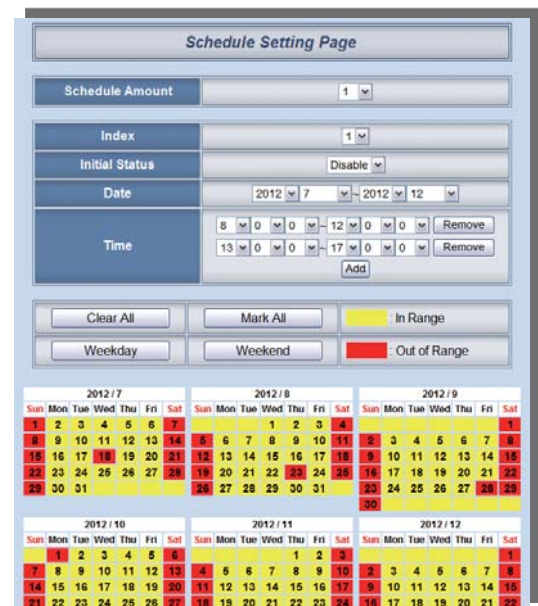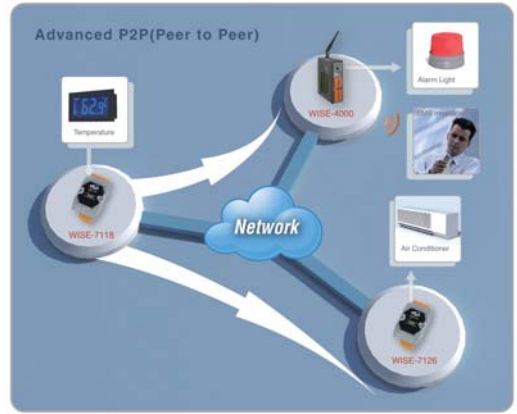nnel value, DI/DO Counter value or Internal Register value to each others, therefore, greatly enhances the flexibility and boosts accuracy to the logic rule design and makes it easy to enable the interactions between the controllers. (Not apply to WISE-580x)

10. Offer various options for channel settings

WISE offers various options for channel settings; for example: noise filter for DI signals, deadband setting for AI signals, linear scale setting, temperature degree in Celsius or Fahrenheit setting, power on value setting for DO channel, pulse output setting and DI/DO counter setting, etc.

▲ WISE Advanced P2P operation

11. Seamless integration with SCADA

WISE supports Modbus TCP/RTU Protocol for users to perform real-time monitoring and control of the controllers. Through Modbus TCP/RTU, it allows SCADA package seamlessly integrate with WISE and enables total solutions for remote monitoring and control.
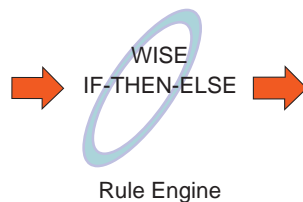
EZ Data Logger is an easy-to-use software to implement HMI and data logger on Windows 2K/XP/7 systems for I/O monitoring, controlling, and data logging. Through the Ethernet, WISE modules can be centralized to a single PC by Modbus TCP protocol. And each WISE module can cowork by the help of the VB Script Engine built-in the EZ Data Logger.

12. Real-time Control for the Emergency Status

With the built-in IF-THEN-ELSE rule engine inside WISE controller, it allows user to pre-define the WISE logic rules for immediately response to the emergency status (or condition), and allows to perform real-time control for safety. Compare to the traditional control system that all actions have to be based on commands (or responses) derived from SCADA; WISE provides a much more flexible and easy way to build a real-time control system.

IF Conditions	
DI Channel	ON, OFF, ON to OFF, OFF to ON, Change
AI Channel	=, >, <, >=, <= (value)
Internal Register	
DI Counter	=, >, <, >=, <= (value), Change
DO Counter	
Timer	Timeout, Not Timeout
Schedule	In Range, Out of Range
P2P	DI, AI, DI counter, DO counter, IR
Rule Status	Enable, Disable

THEN / ELSE Actions	
DO Channel	ON, OFF, Pulse Output
AO Channel	Change the value
Internal Register	
DI Counter	Reset
DO Counter	
Timer	Start, Reset
Schedule	Enable, Disable
SMS	Send
Email	
CGI Commands	
Recipe	Execute
P2P	DO (On/OFF), AO, IR
Data Logger	Start, Stop, One-Time Log
Rule Status	Enable, Disable

WISE
IF-THEN-ELSE

Rule Engine

▲ IF-THEN-ELSE Rule Engine

10

1

WISE I/O Modules

10.2. Specifications

ICP DAS provides various WISE controllers for users to choose from to meet their demands for use in various industrial applications:

● Hardware

☑ WISE-71xx Intelligent I/O Controller

Model Name		WISE-7105	WISE-7115	WISE-7117	WISE-7118Z	WISE-7119	WISE-7126
Pictures							
OS		MiniOS7					
Built-in Software		WISE Firmware					
CPU		16-bit CPU					
Ethernet Port		10/100 Base-TX with PoE (Power over Ethernet)					
I/O Channel	DI	-	-	-	-	-	2
	DO	4	-	4	6	4	2
	AI	8	7	8	10	8	6
	AO	-	-	-	-	-	2
Over Voltage Protection		110 VDC/VAC	-	240 Vrms	240 Vrms	240 Vrms	240 Vrms
Note		* Support Thermistor	* Support RTD	-	* Also Support Thermocouple Input		-

Model Name		WISE-7144	WISE-7151	WISE-7152	WISE-7160	WISE-7167
Pictures						
OS		MiniOS7				
Built-in Software		WISE Firmware				
CPU		16-bit CPU				
Ethernet Port		10/100 Base-TX with PoE (Power over Ethernet)				
I/O Channel	DI	8	16	8	6	-
	DO	8 (Sink Type)	-	8 (Source Type)	6 (Power Relay)	8 (Power Relay)
Note		* DI for Sink & Source Type				-

10

2

WISE I/O Modules

☑ **WISE-790x Extensible I/O Intelligent Controller**
☑ **WISE-4000 SMS Intelligent Controller**
☑ **WISE-580x Intelligent Data Logger Controller**

Model Name	WISE-7901(D)	WISE-7902(D)	WISE-4000(D)	WISE-5800	WISE-5801
Pictures					
OS	MiniOS7				
Built-in Software	WISE Firmware				
CPU	16-bit CPU				
Ethernet Port	10/100 Base-TX with PoE (Power over Ethernet)		10/100 Base-TX		
GPRS/GSM	-		GPRS/GSM Quad-band 850/900/1800/1900 MHz for SMS	-	GPRS/GSM Quad-band 850/900/1800/1900 MHz for SMS
I/O Function	Support ICP DAS I/O expansion board (X-Board), X107, X109, X110, X111, X202, X203, X303, X304, X305, X308, X310, X324	Support ICP DAS FRnet remote I/O modules: FR-2053T, FR-2054T, FR-2057T	3 Digital inputs, 3 Digital outputs & 8 Analog inputs	Support ICP DAS I-7000 remote I/O modules (up to 16), Modbus RTU devices (up to 4), and I/O expansion board (XW-Board)	
Note	* WISE-790xD is WISE-790x with LED Display		* WISE-4000D is WISE-4000 with LCD Display	-	-

☑ **I/O Expansion Boards (X-board) Ordering Information**

DI, DO Expansion		
Model Name	DI	DO
X107	6	7
X109	-	7
X110	14	-
X111	-	13

Note1: DI is Dry contact, Source type   Note2: DO is Open Collector, Sink type

AI, AO, DI, DO Expansion						
Model Name	AI (12-bit)		AO (12-bit)		DI	DO
	Ch	Range	Ch	Range		
X202	7	0 ~ 20 mA	-	-	-	-
X203	2	0 ~ 20 mA	-	-	2	6
X303	1	±5 VDC	1	±5 VDC	4	6
X304	3	±5 VDC	1	±5 VDC	4	4
X305	7	±5 VDC	1	±5 VDC	2	2
X308	4	0 ~ 10 VDC	-	-	-	6
X310	2	Ch0 : 0 ~ 20 mA Ch1 : 0 ~ 10 VDC	2	0 ~ 10 VDC	3	3
X324	-	-	4	0 ~ 5 VDC	-	4

☑ **I/O Expansion Boards (XW-board) Ordering Information**

DI, DO Expansion			
Model Name	DI	DO	Isolation
XW107	8	8	-
XW107i			3750 Vrms
XW110i	16	-	3750 Vrms

AI, AO, DI, DO Expansion							
Model Name	AI (12-bit)		AO (12-bit)		DI	DO	Isolation
	Ch	Range	Ch	Range			
XW304	6	±5 V	1	±5 V	4	4	
XW310	4	±10 V	2	±10 V	3	3	-
XW310C	4	0 ~ 20 mA	2	0 ~ 20 mA	3	3	

10
2

WISE I/O Modules

☑ I-7000 Remote I/O Module Ordering Information

AI/AO Module		AI	AO	DI	DO
Voltage/Current	I-7012	1	-	1	2
	I-7017	8	-	-	-
Thermocouple	I-7011	1	-	1	2
	I-7018	8	-	-	-
	I-7019	8	-	-	-
RTD	I-7013	1	-	-	-
	I-7015	6	-	-	-
	I-7033	3	-	-	-
Thermistor	I-7005	8	-	-	6
Thransmitter	I-7014	1	-	1	2
Analog Output	I-7021	-	1	-	-
	I-7022	-	2	-	-
	I-7024	-	4	-	-
	I-7024R	-	4	5	-

DI/DO Module		DI	DO
Digital Input	I-7041	14	-
	I-7051	16	-
	I-7052	8	-
	I-7053	16	-
	I-7058	8	-
	I-7059	8	-
Digital Output	I-7042	-	13
	I-7043	-	16
	I-7045	-	16
Digital Input & Output	I-7044	4	8
	I-7050	7	8
	I-7055	8	8
Relay Output	I-7060	4	4
	I-7061	-	12
	I-7063	8	3
	I-7065	4	5
	I-7066	-	7
	I-7067	-	7

Others		DI Counter	DO
Counter/Frequency	I-7080	2	2
Model Name		DI	PWM Output
PWM	I-7088	8	8

● Software function

Model Name	WISE-71xx	WISE-790x(D)	WISE-4000(D)	WISE-580x
Pictures				
I/O Function	Built-in	7901 With X-Board, 7902 With FRnet	Built-in	I-7000 modules (up to 16), Modbus RTU devices (up to 4), and XW-Board.
Rule Configuration Website	Yes	Yes	Yes	Yes
36 IF-THEN-ELSE Logic Rule	Yes	Yes	Yes	Yes
48 Internal Register	Yes	Yes	Yes	Yes
12 Timer/12 Email/12 Recipe/ 12 CGI Command Supported	Yes	Yes	Yes	Yes
Connect with SCADA or HMI	Yes (By Modbus TCP)	Yes (By Modbus TCP)	Yes (By Modbus TCP)	Yes (By Modbus TCP/RTU)
8 P2P Controllers Supported	Yes	Yes	Yes	-
12 Schedule Supported	-	Yes	Yes	Yes (More Powerful)
12 SMS Supported	-	-	Yes	Yes (WISE-5801) (Note1)
SNTP Time Synchronization	-	-	-	Yes
Data Logger Supported	-	-	-	Yes

Note1: WISE-5801 also provides SMS command receiving function.

10
2

WISE I/O Modules

For more information, refer to **http://wise.icpdas.com**

WISE
Web Inside, Smart Engine

WISE-7901/WISE-7901D
User-defined I/O Expansion PoE Module

Features

- Built-in Web Server for IF-THEN-ELSE rule setting
- Built-in IF-THEN-ELSE rule enigne for logic operation
- No more programming. Click and get done!
- Support I/O, Counter, Timer, Email, Recipe operations
- Modbus TCP Protocol for SCADA Software Seamless Integration
- IEEE 802.3af-compliant Power over Ethernet (PoE)
- 10/100 Base-TX Ethernet
- I/O Expansion Bus
- Support DI/DO X-Boards: X107, X109, X110, X111
- Support Multi-Function X-Boards: X202, X203, X303, X304, X305, X308, X310, X324

Introduction

WISE (Web Inside, Smart Engine) is a product series developed by ICP DAS that functions as control units for use in remote logic control and monitoring in various industrial applications. WISE offers a user-friendly and intuitive web site interface that allows users to implement IF-THEN-ELSE control logic on controllers just a few clicks away; no programming is required. With its powerful and easy-to-use features, it will minimize the learning curve, shorten time to market and dramatically reduce the labor and cost spent on system development.

WISE-7901 follows IEEE 802.3af-compliant (classification, Class 1) Power over Ethernet (PoE) specification. It allows receiving power from PoE enabled network by Ethernet pairs (Category 5 Ethernet cable). This feature provides greater flexibility and higher efficiency therefore simplifying systems design, saving space, reducing cables and eliminating the requirement for dedicated electrical outlets. Meanwhile, in case under a non-PoE environment, WISE-7901 will still be able to receive power from auxiliary power sources like AC adapters or battery, etc.

This module WISE-7901 supports Modbus/TCP protocol to make seamless integration with SCADA software available. It supports an I/O expansion bus to implement various I/O functions such as D/I, D/O, A/D, D/A based on the selected X-Board.

System Specifications

Models	WISE-7901	WISE-7901D
System		
CPU	16-bit CPU	
SRAM	512KB	
Flash Memory	512KB	
EEPROM	16KB	
NVRAM	31 Bytes	
OS	MiniOS7	
RTC (Real Time Clock)	Provide second, minute, hour, date of week, month and year	
64-bit Hardware Serial Number	Yes	
Watchdog	Yes	
Communication		
Ethernet	RJ-45 x 1, 10/100 Base-TX (Auto-negotiating, Auto MDI/MDI-X, LED indicators)	
COM 1	Reserved	
COM 2	Reserved	
LED Indicators		
System LED	Yes (Red)	
LED Display	-	5-digit 7-segment LED display
Special Indicator	PoE LED (Green)	
Hardware Expansion		
I/O Expansion Bus	Yes	
Power Requirements		
Protection	Power Reverse Polarity Protection	
Frame Ground	Yes (for ESD Protection)	
Input Range	12 ~ 48 V_{DC}	
Power over Ethernet (PoE)	IEEE 802.3af Class 1	
Power Consumption	1.5 W	2.5 W
Mechanical		
Dimensions (W x H x D)	72 mm x 123 mm x 35 mm	
Installation	DIN-Rail or Wall Mounting	
Environmental		
Operating Temperature	-25 °C ~ +75 °C	
Storage Temperature	-40 °C ~ +80 °C	
Humidity	5 ~ 90% RH, non-condensing	

10
2

WISE I/O Modules

Software Specifications

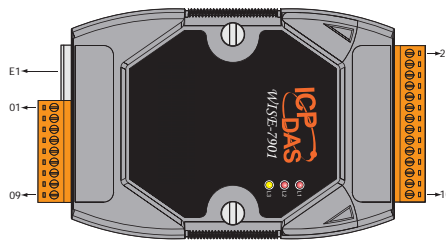| Functions	
Rule Configuration Website	Access Web server on WISE controllers to edit and upload logic rules through web browser.
36 IF-THEN-ELSE Logic Rules	3 IF conditions with AND or OR operators; 3 THEN actions and 3 ELSE actions
48 Internal Registers	Hold temporary variables and read/write data via Modbus/TCP address.
12 Timers	Delay / Timing functions.
12 Schedules	Setup prescheduled routine tasks.
12 Emails	Send Email messages to pre-set Email receivers.
12 CGI Commands	Send pre-set CGI commands.
12 Recipes	Set up THEN/ELSE action groups.
8 P2P remote modules	Set up the connection information for the remote WISE modules.
Modbus TCP Protocol	Real time control and monitoring I/O channels and system status of controllers via SCADA software.

IF Conditions	
DI Channel	ON, OFF, ON to OFF, OFF to ON, Change
AI Channel	=, >, <, >=, <= (value)
Internal Register	
DI Counter	=, >, <, >=, <= (value), Change
DO Counter	
Timer	Timeout, Not Timeout
Schedule	In Range, Out of Range
P2P	DI, AI, DI counter, DO counter, IR
Rule Status	Enable, Disable

WISE
IF-THEN-ELSE
Rule Engine

THEN / ELSE Actions	
DO Channel	ON, OFF, Pulse Output
AO Channel	Change the value
Internal Register	
DI Counter	Reset
DO Counter	
Timer	Start, Reset
Schedule	Enable, Disable
Email	Send
CGI Commands	
Recipe	Execute
P2P	DO (On/Off), AO, IR
Rule Status	Enable, Disable

Pin Assignments

Terminal No.		Pin Assignment
E1		Link/Act / 10/100M
COM1	01	CTS1
	02	RTS1
	03	RxD1
	04	TxD1
	05	INIT*
COM2	06	D2+
	07	D2-
	08	(R)+Vs
	09	(B)GND

Terminal No.	Pin Assignment
23	-
22	-
21	-
20	-
19	-
18	-
17	-
16	-
15	-
14	-
13	-
12	-
11	-
10	-

Wiring & Boarding

Ethernet Internet Intranet
RS-232 Device
GND
10 ~ 30 V_DC
RS-485 Network
X-Board

Dimensions (Unit:mm)

49.8
10.9
123.0
101.2
56.0
10.9
32.3
59.2
72.0
Front View

35.0
31.7
35.4
31.7
8.0
Left Side View

35
Bottom View
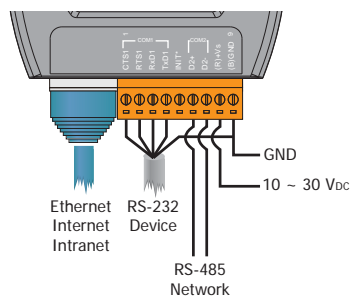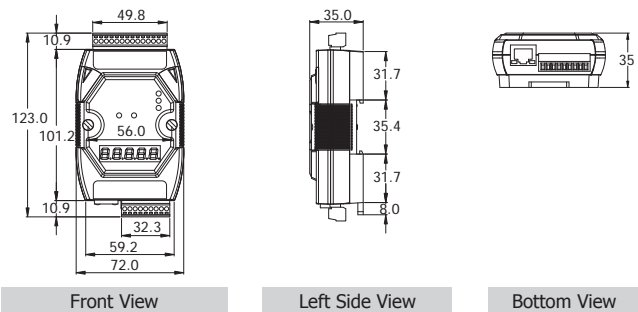
Ordering Information

WISE-7901	User-defined I/O Expansion PoE Module (RoHS)
WISE-7901D	User-defined I/O Expansion PoE Module with LED Display (RoHS)

Accessories

GPSU06U-6	24V/0.25A, 6W Power Supply
MDR-20-24	24V/1A, 24W Power Supply with DIN-Rail Mounting
NS-205 CR	Unmanaged 5-Port Industrial Ethernet Switch (RoHS)
NS-205PSE CR	Unmanaged 5-Port Industrial PoE Ethernet Switch (RoHS)
I/O Expansion Boards	Other add-on expansion boards: X107, X109, X110, X111, X202, X203, X303, X304, X305, X308, X310, X324

10
2
WISE I/O Modules

Features

- Built-in Web Server for IF-THEN-ELSE rule setting
- Built-in IF-THEN-ELSE rule enigne for logic operation
- No more programming. Click and get done!
- Support I/O, Counter, Timer, Email, Recipe operations
- Modbus TCP Protocol for SCADA Software Seamless Integration
- IEEE 802.3af-compliant Power over Ethernet (PoE)
- 10/100 Base-TX Ethernet
- Support FRnet Modules: FR-2053T, FR-2054T, FR-2057T

CE FC PoE

WISE-7902/WISE-7902D
FRnet Remote I/O PoE Module

■ Introduction

WISE (Web Inside, Smart Engine) is a product series developed by ICP DAS that functions as control units for use in remote logic control and monitoring in various industrial applications. WISE offers a user-friendly and intuitive web site interface that allows users to implement IF-THEN-ELSE control logic on controllers just a few clicks away; no programming is required. With its powerful and easy-to-use features, it will minimize the learning curve, shorten time to market and dramatically reduce the labor and cost spent on system development.

WISE-7902 follows IEEE 802.3af-compliant (classification, Class 1) Power over Ethernet (PoE) specification. It allows receiving power from PoE enabled network by Ethernet pairs (Category 5 Ethernet cable). This feature provides greater flexibility and higher efficiency therefore simplifying systems design, saving space, reducing cables and eliminating the requirement for dedicated electrical outlets. Meanwhile, in case under a non-PoE environment, WISE-7902 will still be able to receive power from auxiliary power sources like AC adapters or battery, etc.

This module WISE-7902 supports Modbus/TCP protocol to make seamless integration with SCADA software available. It supports an I/O expansion bus to implement various I/O functions such as D/I and D/O according to the using FRnet modules: FR-2053T, FR-2054T, and FR-2057T.

■ System Specifications

Models	WISE-7902	WISE-7902D
System		
CPU	16-bit CPU	
SRAM	512KB	
Flash Memory	512KB	
EEPROM	16KB	
NVRAM	31 Bytes	
OS	MiniOS7	
RTC (Real Time Clock)	Provide second, minute, hour, date of week, month and year	
64-bit Hardware Serial Number	Yes	
Watchdog	Yes	
Communication		
Ethernet	RJ-45 x 1, 10/100 Base-TX (Auto-negotiating, Auto MDI/MDI-X, LED indicators)	
COM 1	Reserved	
COM 2	Reserved	
FRnet	Max. 1M	
LED Indicators		
System LED	Yes (Red)	
LED Display	-	5-digit 7-segment LED display
Special Indicator	PoE LED (Green)	
Power Requirements		
Protection	Power Reverse Polarity Protection	
Frame Ground	Yes (for ESD Protection)	
Input Range	12 ~ 48 V_{DC}	
Power over Ethernet (PoE)	IEEE 802.3af Class 1	
Power Consumption	1.5 W	2.5 W
Mechanical		
Dimensions (W x H x D)	72 mm x 123 mm x 35 mm	
Installation	DIN-Rail or Wall Mounting	
Environmental		
Operating Temperature	-25 °C ~ +75 °C	
Storage Temperature	-40 °C ~ +80 °C	
Humidity	5 ~ 90% RH, non-condensing	

10

2

WISE I/O Modules

◼ Software Specifications

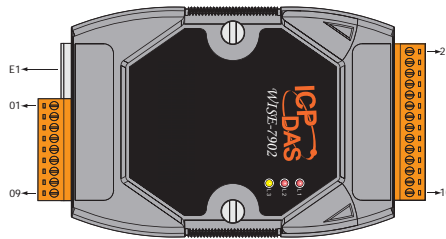| Functions	
Rule Configuration Website	Access Web server on WISE controllers to edit and upload logic rules through web browser.
36 IF-THEN-ELSE Logic Rules	3 IF conditions with AND or OR operators; 3 THEN actions and 3 ELSE actions
48 Internal Registers	Hold temporary variables and read/write data via Modbus/TCP address.
12 Timers	Delay / Timing functions.
12 Schedules	Setup prescheduled routine tasks.
12 Emails	Send Email messages to pre-set Email receivers.
12 CGI Commands	Send pre-set CGI commands.
12 Recipes	Set up THEN/ELSE action groups.
8 P2P remote modules	Set up the connection information for the remote WISE modules.
Modbus TCP Protocol	Real time control and monitoring I/O channels and system status of controllers via SCADA software.

IF Conditions	
DI Channel	ON, OFF, ON to OFF, OFF to ON, Change
Internal Register	=, >, <, >=, <= (value)
DI Counter	=, >, <, >=, <= (value), Change
DO Counter	
Timer	Timeout, Not Timeout
Schedule	In Range, Out of Range
P2P	DI, AI, DI counter, DO counter, IR
Rule Status	Enable, Disable

WISE
IF-THEN-ELSE
Rule Engine

THEN / ELSE Actions	
DO Channel	ON, OFF, Pulse Output
Internal Register	Change the value
DI Counter	Reset
DO Counter	
Timer	Start, Reset
Schedule	Enable, Disable
Email	Send
CGI Commands	
Recipe	Execute
P2P	DO (On/OFF), AO, IR
Rule Status	Enable, Disable

◼ Pin Assignments

Terminal No.		Pin Assignment
E1		Link/Act / 10/100M
COM1	01	CTS1
	02	RTS1
	03	RxD1
	04	TxD1
	05	INIT*
COM2	06	D2+
	07	D2-
	08	(R)+Vs
	09	(B)GND

Terminal No.	Pin Assignment
23	-
22	-
21	-
20	-
19	-
18	-
17	FRnet Port A
16	FRnet Port A
15	FRnet Port B
14	FRnet Port B
13	-
12	-
11	-
10	-

◼ Wiring

FRnet Modules
FRnet
WISE-7902

GND
10 ~ 30 V$_{DC}$
Ethernet Internet Intranet
RS-232 Device
RS-485 Network

◼ Dimensions (Unit:mm)

49.8
10.9
123.0
101.2
10.9
56.0
32.3
59.2
72.0

35.0
31.7
35.4
31.7
8.0

35

Front View   Left Side View   Bottom View
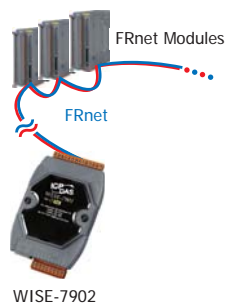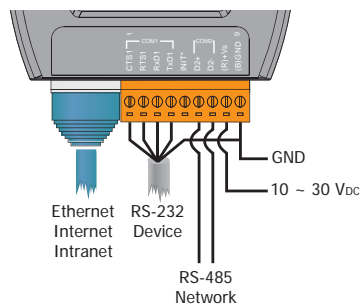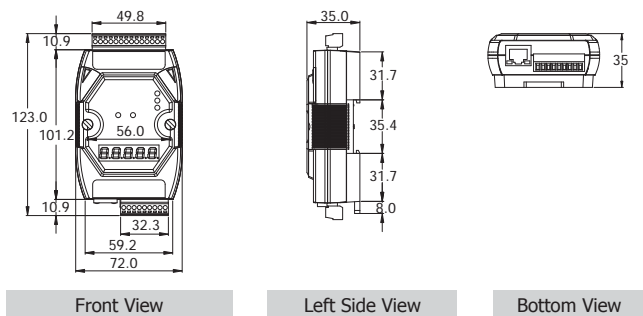
◼ Ordering Information

WISE-7902	FRnet Remote I/O PoE Module
WISE-7902D	FRnet Remote I/O PoE Module with LED Display

◼ Accessories

GPSU06U-6	24V/0.25A, 6W Power Supply	FR-2053T	16-channel Isolated Sink Digital Input Distributed I/O Module
MDR-20-24	24V/1A, 24W Power Supply with DIN-Rail Mounting	FR-2054T	8-Channel Digital Output and 8-Channel Digital Input Module
NS-205 CR	Unmanaged 5-Port Industrial Ethernet Switch (RoHS)	FR-2057T	16-Channel Isolated Sink Digital Output Distributed I/O Module
NS-205PSE CR	Unmanaged 5-Port Industrial PoE Ethernet Switch (RoHS)		

10
2

WISE I/O Modules

Features

- Built-in Web Server for IF-THEN-ELSE rule setting
- Built-in IF-THEN-ELSE rule enigne for logic operation
- No more programming. Just click and get done!
- Support IO, Counter, Timer, Email operations
- Modbus/TCP Protocol for SCADA Software Seamless Integration
- 10/100 Base-TX Ethernet
- Support SMS (GSM: Quad-band 850/900/1800/1900 MHz)
- I/O: 3 channels DI, 3 channels DO, 8 channels AI
- 128*64 dots LCM display (apply to WISE-4000D only)

WISE-4000/WISE-4000D

3-channel Digital Input, 3-channel Digital Output, and 8-channel Analog Input SMS Module

Introduction

WISE (Web Inside, Smart Engine) is a product series developed by ICP DAS that functions as control units for use in remote logic control and monitoring in various industrial applications. WISE offers a user-friendly and intuitive web site interface that allows users to implement IF-THEN-ELSE control logic on controllers just a few clicks away; no programming is required. With its powerful and easy-to-use features, it will minimize the learning curve, shorten time to market and dramatically reduce the labor and cost spent on system development.

The WISE-4000 is an embedded controller that is perfect for use in real-time industrial equipment monitoring and environment monitoring. It allows updated status information being sent to the backend monitoring system via Ethernet interface. WISE-4000 supports Modbus/TCP protocol that allows seamless integration with SCADA software. It features 3 digital inputs, 3 digital outputs and 8 analog inputs. WISE-4000 also features SMS sending function for alarm report. By integrating with IF-THEN-ELSE rule engine, WISE-4000 even provides more powerful functions such as Schedule, Send SMS, Send e-mail, Timer & I/O operation for use in various industrial applications.

System Specifications

Model	WISE-4000	WISE-4000D
System		
CPU	16-bit CPU	
SRAM	512KB	
Flash Memory	512KB	
EEPROM	16KB	
NVRAM	31 bytes	
RTC (Real Time Clock)	RTC Provide seconds, minutes, hours, dateof week/month; month and year, validfrom 1980 to 2079	
Communication		
COM ports	Reserved	
Ethernet Port	10/100 Base-TX Ethernet controller	
SMS Function		
Frequency Band	Quad-band 850/900/1800/1900 MHz	
Mode	Text and Unicode mode	
LCD Interface		
General	Effective display area	-	80.61 mm x 14.37 mm (W x H)
	Module Dimension	-	93 mm x 70 mm x 1.6 mm (W x H x T)
Life Time		-	Expected life is more than 100,000 hours under normal operation
LED Indicators		
System	Red	
Power Requirements		
Reverse Polarity Protection	Yes	
Frame Ground Protection	ESD, Surge, EFT, Hi-Pot	
Input Range	15W; Unregulated +10 V_{DC} ~ +30 V_{DC}	
Consumption	Idle: 75 mA @ 24 V_{DC} Data Link: 150 ~ 400 mA (peak) @ 24 V_{DC}	
Mechanical		
Dimensions (W x H x T)	47 mm x 142 mm x 168 mm	
Installation	DIN-Rail or Wall mounting	
Environment		
Operating Temperature	-20 °C ~ +70 °C	-15 °C ~ +55 °C
Storage Temperature	-40 °C ~ +80 °C	-20 °C ~ +70 °C
Humidity	5~ 90% RH, non-condensing	

I/O Specifications

Analog Input		
Input Channels	8	
Input Range/Type	0~20 mA	
Resolution	12-bit	
Sampling Rate	1 KHz max. (Read one channel)	
Accuracy	±2 LSB (+/-0.0097 mA)	
Digital Input		
Input Channels	3	
Input Type	Source(Dry Type), Common Ground	
On Voltage Level	+3.5 V_{DC} ~ +30 V_{DC}	
Off Voltage Level	+1V_{DC} Max.	
Isolated Voltag	Non-isolated	
Counters	Max. Count	65535 (16 bits)
	Max. Input Frequency	50 Hz
	Min. Pulse Width	10 ms
Digital Output		
Output Channels	3	
Output Type	Open Collector (Sink/NPN)	
Load Voltage	+30 V_{DC} MAX.	
Load Current	100 mA MAX.	
Isolated Voltag	Non-isolated	
Counters	Max. Count	65535 (16 bits)
	Max. Input Frequency	50 Hz
	Min. Pulse Width	10 ms

10
—
2

WISE I/O Modules
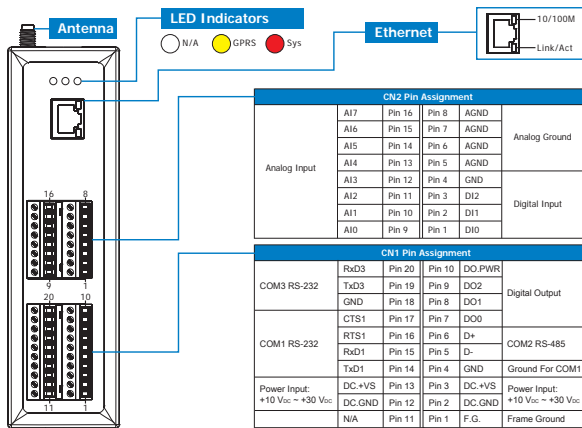
Software Specifications

Functions	
Rule Configuration Website	Access Web server on WISE controllers to edit and upload logic rules through web browser.
36 IF-THEN-ELSE Logic Rules	3 IF conditions with AND or OR operators; 3 THEN actions and 3 ELSE actions
48 Internal Registers	Hold temporary variables and read/write data via Modbus/TCP address.
12 Timers	Delay / Timing functions.
12 Schedules	Setup prescheduled routine tasks.
12 SMS	Send SMS to pre-set mobile phone numbers.
12 Emails	Send Email messages to pre-set Email receivers.
12 CGI Commands	Send pre-set CGI commands.
12 Recipes	Set up THEN/ELSE action groups.
8 P2P remote modules	Set up the connection information for the remote WISE modules.
Modbus/TCP Protocol	Real time control and monitoring I/O channels and system status of controllers via SCADA software.

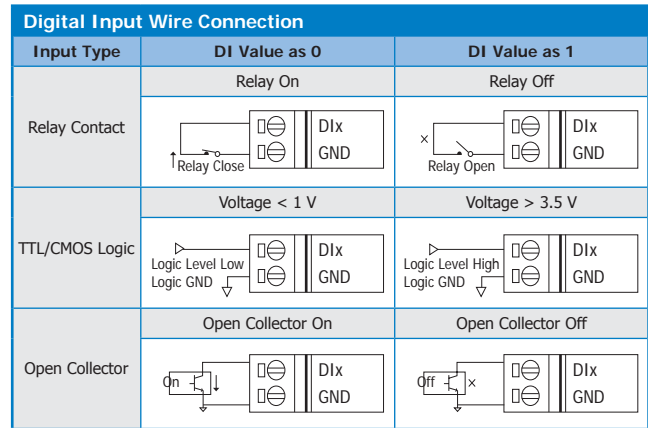| IF Conditions	
DI Channel	ON, OFF, ON to OFF, OFF to ON, Change
AI Channel	=, >, <, >=, <= (value)
Internal Register	
DI Counter	=, >, <, >=, <= (value), Change
DO Counter	
Timer	Timeout, Not Timeout
Schedule	In Range, Out of Range
P2P	DI, AI, DI counter, DO counter, IR
Rule Status	Enable, Disable

WISE
IF-THEN-ELSE
Rule Engine

THEN / ELSE Actions	
DO Channel	ON, OFF, Pulse Output
Internal Register	Change the value
DI Counter	Reset
DO Counter	
Timer	Start, Reset
Schedule	
SMS	Send
Email	
CGI Commands	
Recipe	Execute
P2P	DO (On/OFF), AO, IR
Rule Status	Enable, Disable

Pin Assignments

CN2 Pin Assignment				
	AI7	Pin 16	Pin 8	AGND
	AI6	Pin 15	Pin 7	AGND	Analog Ground
	AI5	Pin 14	Pin 6	AGND
Analog Input	AI4	Pin 13	Pin 5	AGND
	AI3	Pin 12	Pin 4	GND
	AI2	Pin 11	Pin 3	DI2	Digital Input
	AI1	Pin 10	Pin 2	DI1
	AI0	Pin 9	Pin 1	DI0

CN1 Pin Assignment					
	RxD3	Pin 20	Pin 10	DO.PWR	
COM3 RS-232	TxD3	Pin 19	Pin 9	DO2	Digital Output
	GND	Pin 18	Pin 8	DO1	
	CTS1	Pin 17	Pin 7	DO0	
COM1 RS-232	RTS1	Pin 16	Pin 6	D+	COM2 RS-485
	RxD1	Pin 15	Pin 5	D-	
	TxD1	Pin 14	Pin 4	GND	Ground For COM1
Power Input: +10 Vdc ~ +30 Vdc	DC.+VS	Pin 13	Pin 3	DC.+VS	Power Input: +10 Vdc ~ +30 Vdc
	DC.GND	Pin 12	Pin 2	DC.GND	
	N/A	Pin 11	Pin 1	F.G.	Frame Ground

Wire Connections

Digital Input Wire Connection

Input Type	DI Value as 0	DI Value as 1
Relay Contact	Relay On	Relay Off
TTL/CMOS Logic	Voltage < 1 V	Voltage > 3.5 V
Open Collector	Open Collector On	Open Collector Off

Digital Output Wire Connection

Output Type	DO Value as 0	DO Value as 1
Drive Relay	Relay On	Relay Off
Resistance Load		

Current Input Wire Connection

Input Type	

Dimensions (Unit:mm)

WISE-4000

RUN
Lock
INIT
DIP switch

SIM Card
Antenna
MMC/SD

142
128.1

Top View

LCD

WISE-4000D
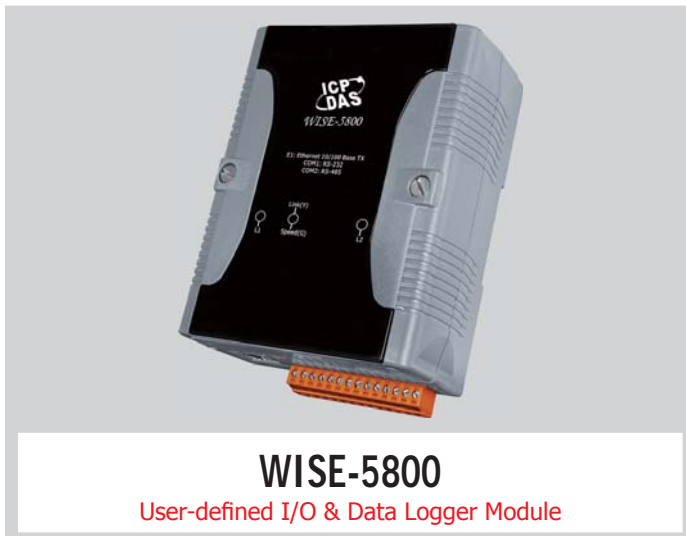
Right Side View

47.0

168.0
158.7

Front View

Ordering Information

WISE-4000	3-channel DI, 3-channel DO, and 8-channel AI WISE Controller with SMS Module (RoHS)
WISE-4000D	3-channel DI, 3-channel DO, and 8-channel AI WISE Controller with SMS Module and LCD Display (RoHS)

Accessories

ANT-421-01	3m external GPRS/GSM antenna

10
2

WISE I/O Modules

WISE-5800
User-defined I/O & Data Logger Module

Features

- Built-in Web Server for IF-THEN-ELSE rule setting
- Built-in IF-THEN-ELSE rule enigne for logic operation
- No more programming. Click and get done!
- Support I/O, Counter, Timer, Email, Recipe operations
- Data logger and data files send back function supported
- Modbus TCP/RTU Protocol for SCADA Software Seamless Integration
- Support XW-Board
- Support I-7000 Remote I/O Modules(Up to 16)
- Support Modbus RTU Slave Devices(Up to 4)
- SNTP Time Synchronization Supported

Introduction

WISE (Web Inside, Smart Engine) is a product series developed by ICP DAS that functions as control units for use in remote logic control and monitoring in various industrial applications. WISE offers a user-friendly and intuitive web site interface that allows users to implement IF-THEN-ELSE control logic on controllers just a few clicks away; no programming is required. With its powerful and easy-to-use features, it will minimize the learning curve, shorten time to market and dramatically reduce the labor and cost spent on system development.

WISE-5800 supports an I/O expansion bus to implement various I/O functions such as D/I, D/O, A/D and D/A according to the XW-Board. In addition, WISE-5800 also support ICP DAS I-7000 remote I/O modules and Modbus RTU slave devices. Based on the variety I/O module of I-7000 and the connection ability with Modbus RTU slave devices, WISE-5800 can provide user more flexibility in application field.

WISE-5800 supports Modbus TCP/RTU protocol to make seamless integration with SCADA software available. It include all advantages which WISE series controllers can provide. In addition, WISE-5800 provide data logger function with microSD card, it can record I/O channel value by event trigger or regular time period. The data files can be sent back by Email or FTP. All setting can be completed through browser.

System Specifications

System	
CPU	16-bit CPU
SRAM	768KB
Flash Memory	512KB
EEPROM	16 KB
NVRAM	31 Bytes
microSD Expansion	microSD socket with one 2 GB microSD card
RTC (Real Time Clock)	Provide second, minute, hour, date of week, month and year
Watchdog	Yes
Communication	
Ethernet	RJ-45 x 1, 10/100 Base-TX (Auto-negotiating, Auto MDI/MDI-X)
COM 1	RS-232 (TxD, RxD, RTS, CTS, GND), non-isolated, Speed: 115200 bps max.
COM 2	RS-485 (D2+, D2-), self-tuner ASIC inside, non-isolated, Speed: 115200 bps max.
LED Indicators	
System LED	Yes (Red)
Ethernet Link LED	Yes (Green: Ethernet link detected, Flashing Green: Ethernet packet received)
Hardware Expansion	
I/O Expansion Bus	Yes
Power Requirements	
Protection	Power Reverse Polarity Protection
Frame Ground	Yes (for ESD Protection)
Input Range	12 ~ 48 V$_{DC}$
Redundant Power Input	Yes
Power Consumption	2.0 W
Mechanical	
Dimensions (W x H x D)	91 mm x 132 mm x 52 mm
Installation	DIN-Rail
Environmental	
Operating Temperature	-25 °C ~ +75 °C
Storage Temperature	-30 °C ~ +80 °C
Humidity	10 ~ 90% RH, non-condensing

10
2

WISE I/O Modules
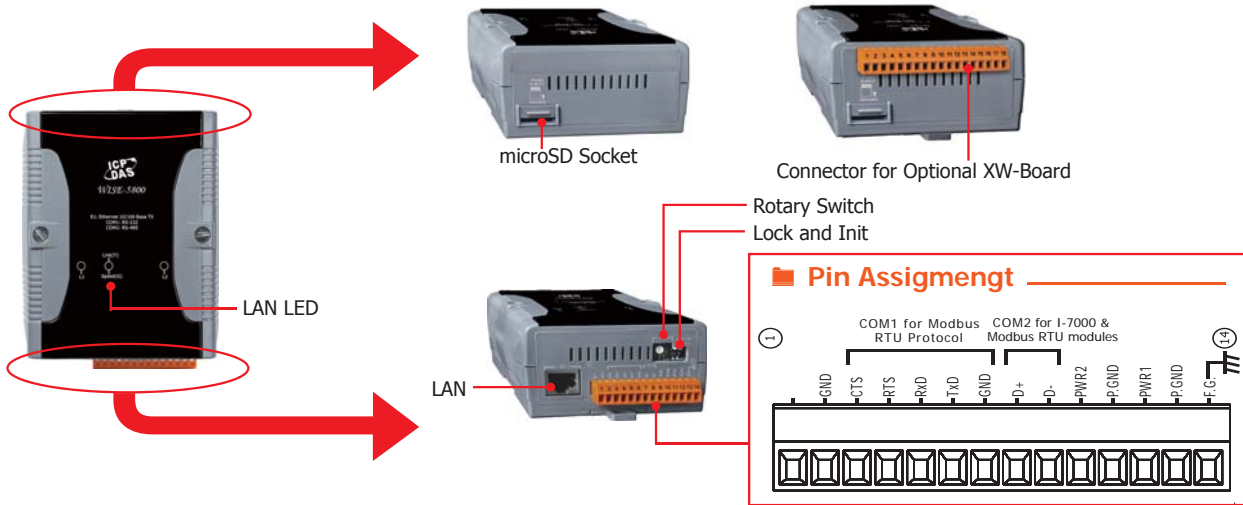
Software Specifications

Functions	
Rule Configuration Website	Access Web server on WISE controllers to edit and upload logic rules through web browser.
36 IF-THEN-ELSE Logic Rules	3 IF conditions with AND or OR operators; 3 THEN actions and 3 ELSE actions
48 Internal Registers	Hold temporary variables and read/write data via Modbus/TCP address.
12 Timers	Delay / Timing functions.
12 Schedules	Setup prescheduled routine tasks.
12 Emails	Send Email messages to pre-set Email receivers.
12 CGI Commands	Send pre-set CGI commands.
12 Recipes	Set up THEN/ELSE action groups.
Data Logger	Set up the Data Logger configuration, include the data record format, and data file sending operation.
Modbus TCP/RTU Protocol	Real time control and monitoring I/O channels and system status of controllers via SCADA software.

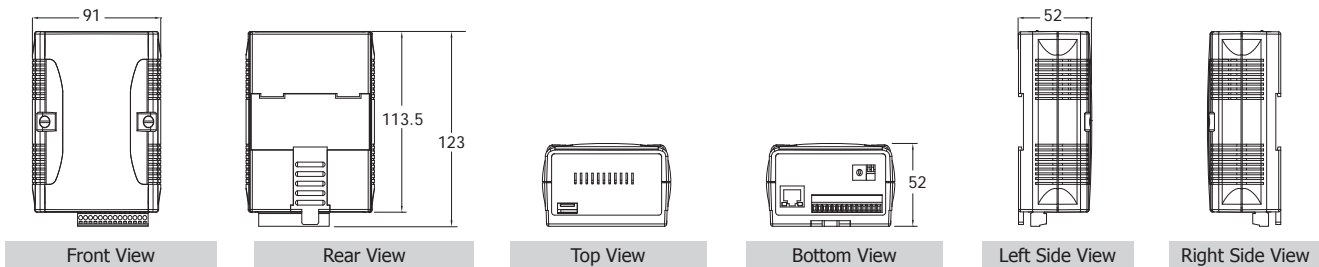| IF Conditions	
DI Channel	ON, OFF, ON to OFF, OFF to ON, Change
AI Channel	=, >, <, >=, <= (value)
Internal Register	
DI Counter	=, >, <, >=, <= (value), Change
Timer	Timeout, Not Timeout
Schedule	In Range, Out of Range
Rule Status	Enable, Disable

WISE
IF-THEN-ELSE
Rule Engine

THEN / ELSE Actions	
DO Channel	ON, OFF, Pulse Output (apply to XW-Board only)
AO Channel	Change the value
Internal Register	
DI Counter	Reset
Timer	Start, Reset
Schedule	Enable, Disable
Email	Send
CGI Commands	
Recipe	Execute
Data Logger	Start, Stop, One-Time Log
Rule Status	Enable, Disable

Appearance

microSD Socket

Connector for Optional XW-Board

LAN LED

Rotary Switch
Lock and Init

LAN

Pin Assigmengt

COM1 for Modbus RTU Protocol   COM2 for I-7000 & Modbus RTU modules

GND, CTS, RTS, RxD, TxD, GND, D+, D-, PWR2, P.GND, PWR1, P.GND, F.G.

Dimensions (Unit:mm)

| Front View | Rear View | Top View | Bottom View | Left Side View | Right Side View |

91
113.5
123
52
52

Ordering Information

WISE-5800	User-defined I/O & Data Logger Module

Accessories

NS-205 CR	Unmanaged 5-Port Industrial Ethernet Switch (RoHS)
MDR-20-24 CR	24V/1A, 24 W Power Supply with DIN-Rail Mounting (RoHS)
DIN-KA52F CR	24V/1.04A, 25 W Power Supply with DIN-Rail Mounting (RoHS)

10
2

WISE I/O Modules

WISE-5801
User-defined I/O & Data Logger Module with SMS Function

Features

- Built-in Web Server for IF-THEN-ELSE rule setting
- Built-in IF-THEN-ELSE rule enigne for logic operation
- No more programming. Click and get done!
- Support I/O, Counter, Timer, Email, Recipe operations
- Data logger and data files send back function supported
- Modbus TCP/RTU Protocol for SCADA Software Seamless Integration
- Support XW-Board
- Support I-7000 Remote I/O Modules(Up to 16)
- Support Modbus RTU Slave Devices(Up to 4)
- SNTP Time Synchronization Supported
- Support SMS (GSM: Quad-band 850/900/1800/1900 MHz)

Introduction

WISE (Web Inside, Smart Engine) is a product series developed by ICP DAS that functions as control units for use in remote logic control and monitoring in various industrial applications. WISE offers a user-friendly and intuitive web site interface that allows users to implement IF-THEN-ELSE control logic on controllers just a few clicks away; no programming is required. With its powerful and easy-to-use features, it will minimize the learning curve, shorten time to market and dramatically reduce the labor and cost spent on system development.

WISE-5801 supports an I/O expansion bus to implement various I/O functions such as D/I, D/O, A/D and D/A according to the XW-Board. In addition, WISE-5801 also support ICP DAS I-7000 remote I/O modules and Modbus RTU slave devices. Based on the variety I/O module of I-7000 and the connection ability with Modbus RTU slave devices, WISE-5801 can provide user more flexibility in application field.

WISE-5801 supports Modbus TCP/RTU protocol to make seamless integration with SCADA software available. It include all advantages which WISE series controllers can provide. In addition, WISE-5801 provide data logger function with microSD card, it can record I/O channel value by event trigger or regular time period. The data files can be sent back by Email or FTP. WISE-5801 also features SMS sending function for alarm report and SMS command receiving function. All setting can be completed through browser.

System Specifications

System	
CPU	16-bit CPU
SRAM	768KB
Flash Memory	512KB
microSD Expansion	microSD socket with one 2 GB microSD card
RTC (Real Time Clock)	Provide second, minute, hour, date of week, month and year
Watchdog	Yes
Communication	
Ethernet	RJ-45 x 1, 10/100 Base-TX (Auto-negotiating, Auto MDI/MDI-X)
COM 1	RS-232 (TxD, RxD, RTS, CTS, GND), non-isolated, Speed: 115200 bps max.
COM 2	RS-485 (D2+, D2-), self-tuner ASIC inside, non-isolated, Speed: 115200 bps max.
LED Indicators	
System LED	Yes (Red)
Ethernet Link LED	Yes (Green: Ethernet link detected, Flashing Green: Ethernet packet received)
Hardware Expansion	
I/O Expansion Bus	Yes
SMS Function	
Frequency Band	Quad-band 850/900/1800/1900 MHz
Mode	Text and Unicode mode
Power Requirements	
Protection	Power Reverse Polarity Protection
Frame Ground	Yes (for ESD Protection)
Input Range	12 ~ 48 V_{DC}
Redundant Power Input	Yes
Power Consumption	Idle: 2.0 W; Data Link: 150 ~ 400 mA (peak) @ 24 V_{DC}
Mechanical	
Dimensions (W x H x D)	91 mm x 132 mm x 52 mm
Installation	DIN-Rail
Environmental	
Operating Temperature	-25 °C ~ +75 °C
Storage Temperature	-30 °C ~ +80 °C
Humidity	10 ~ 90% RH, non-condensing

Software Specifications

Functions	
Rule Configuration Website	Access Web server on WISE controllers to edit and upload logic rules through web browser.
36 IF-THEN-ELSE Logic Rules	3 IF conditions with AND or OR operators; 3 THEN actions and 3 ELSE actions
48 Internal Registers	Hold temporary variables and read/write data via Modbus/TCP address.
12 Timers	Delay / Timing functions.
12 Schedules	Setup prescheduled routine tasks.
12 Emails	Send Email messages to pre-set Email receivers.
12 SMS	Send SMS to pre-set mobile phone numbers.
12 CGI Commands	Send pre-set CGI commands.
12 Recipes	Set up THEN/ELSE action groups.
Data Logger	Set up the Data Logger configuration, include the data record format, and data file sending operation.
Modbus TCP/RTU Protocol	Real time control and monitoring I/O channels and system status of controllers via SCADA software.

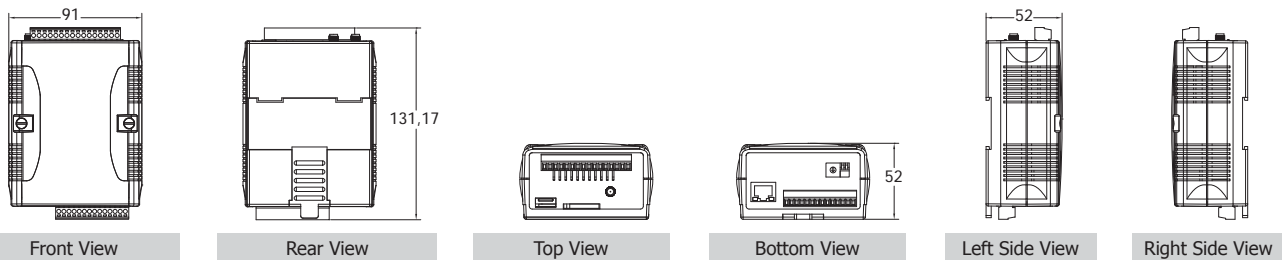| IF Conditions	
DI Channel	ON, OFF, ON to OFF, OFF to ON, Change
AI Channel	=, >, <, >=, <= (value)
Internal Register	
DI Counter	=, >, <, >=, <= (value), Change
Timer	Timeout, Not Timeout
Schedule	In Range, Out of Range
Rule Status	Enable, Disable

WISE IF-THEN-ELSE Rule Engine

THEN / ELSE Actions	
DO Channel	ON, OFF, Pulse Output (apply to XW-Board only)
AO Channel	Change the value
Internal Register	
DI Counter	Reset
Timer	Start, Reset
Schedule	Enable, Disable
Email	Send
SMS	
CGI Commands	
Recipe	Execute
Data Logger	Start, Stop, One-Time Log
Rule Status	Enable, Disable

Appearance

GSM LED
LAN LED
microSD Socket
SIM Card
Antenna
Connector for Optional XW-Board
Rotary Switch
Lock and Init
LAN

Pin Assigmengt

COM1 for Modbus RTU Protocol   COM2 for I-7000 & Modbus RTU modules

GND, CTS, RTS, RxD, TxD, GND, D+, D-, PWR2, P.GND, PWR1, P.GND, F.G.

Dimensions (Unit:mm)

Front View	Rear View	Top View	Bottom View	Left Side View	Right Side View

91
131,17
52
52

Ordering Information

WISE-5801	User-defined I/O & Data Logger Module with SMS Function

Accessories

NS-205 CR	Unmanaged 5-Port Industrial Ethernet Switch (RoHS)
MDR-20-24 CR	24V/1A, 24 W Power Supply with DIN-Rail Mounting (RoHS)
DIN-KA52F CR	24V/1.04A, 25 W Power Supply with DIN-Rail Mounting (RoHS)
ANT-421-01	GSM/GPRS Antenna with SMA male connector, 3 m cable length & magnetic mount base