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ADDRESSABLE SYSTEMS

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AFAS Addressable System: AFAS Node Controller

Suitable for addressable window applications

Technical Specs

M-type Node Controller

Power supply: 220 Vac
CPU: Cortex-A7, 800 MHz
Consumption: 5 W
RAM: 128 MB DDR2
Storage: 128M Flash
Serial comm: RS485 *2, RS232 *1
Ethernet port: RJ45 *1, 10/100M
Display: 7" TFT LCD
Resolution: 800 x 480
Inputs: 4 (24Vdc or dry contact)
Outputs: 1x 24Vdc, 2x relay
Max number of vents: 50
RS485_1: 30 vents (or interfaces)
RS485_2: 20 vents
Max number of I/O modules: 5
Max number of bus switches: 10
Max number of sensors: 5
Max number of zones: 9
Recommended cable size: 0.75mm^2 shielded twisted pair
Max RS485 cable run: 1000 m
Operating temp: 0 - 50 °C
Operating RH: 5-90% (non-condensing)
Ingress Protection: IP20

Description

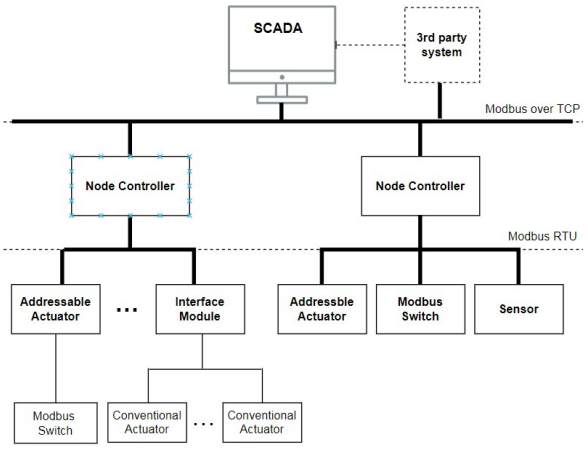
This Addressable Façade Automation System (AFAS) is ideal for smoke and natural ventilation applications where the precise control of each individual window is required. It can seamlessly interface with conventional devices and third party systems such as building automation and fire alarm systems. Utilizing AFAS Link protocol it enables easy deployment of both local and global strategies.

Features

- Robust and stable performance.
- Low consumption.
- Flexible configuration options.
- Supporting Modbus RTU and Modbus over TCP.
- Two parallel RS485 bus in a single node controller, supporting 50 vents in total.
- Interface module available for connecting conventional motors.
- Supporting up to 9 local zones.
- Easy assignment of switch to zone.
- Switch configurable as window-subordinate to save bus resource.

System Topology

The system is organized into three fundamental levels. At the field bus level, addressable actuators, interface modules and Modbus-compatible devices are connected. The middle level consists of node controllers that execute the local strategy and serve as gateways, relaying field data to the service level. At the service level, SCADA uses Modbus over TCP protocol to ensure intercommunication among node controllers, implement the global strategies and interface with third party systems.



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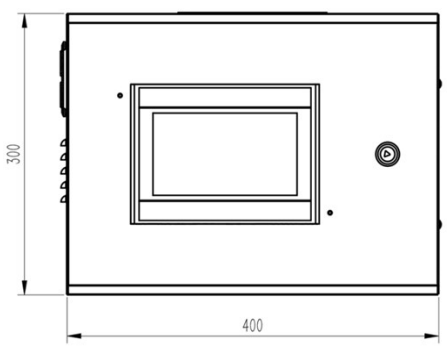
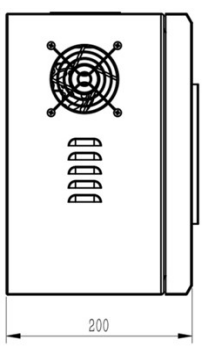
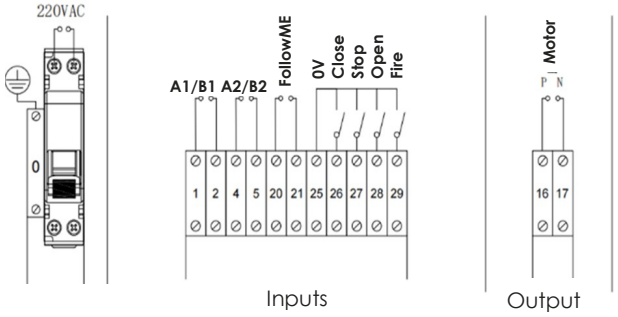
Dimensional Drawings

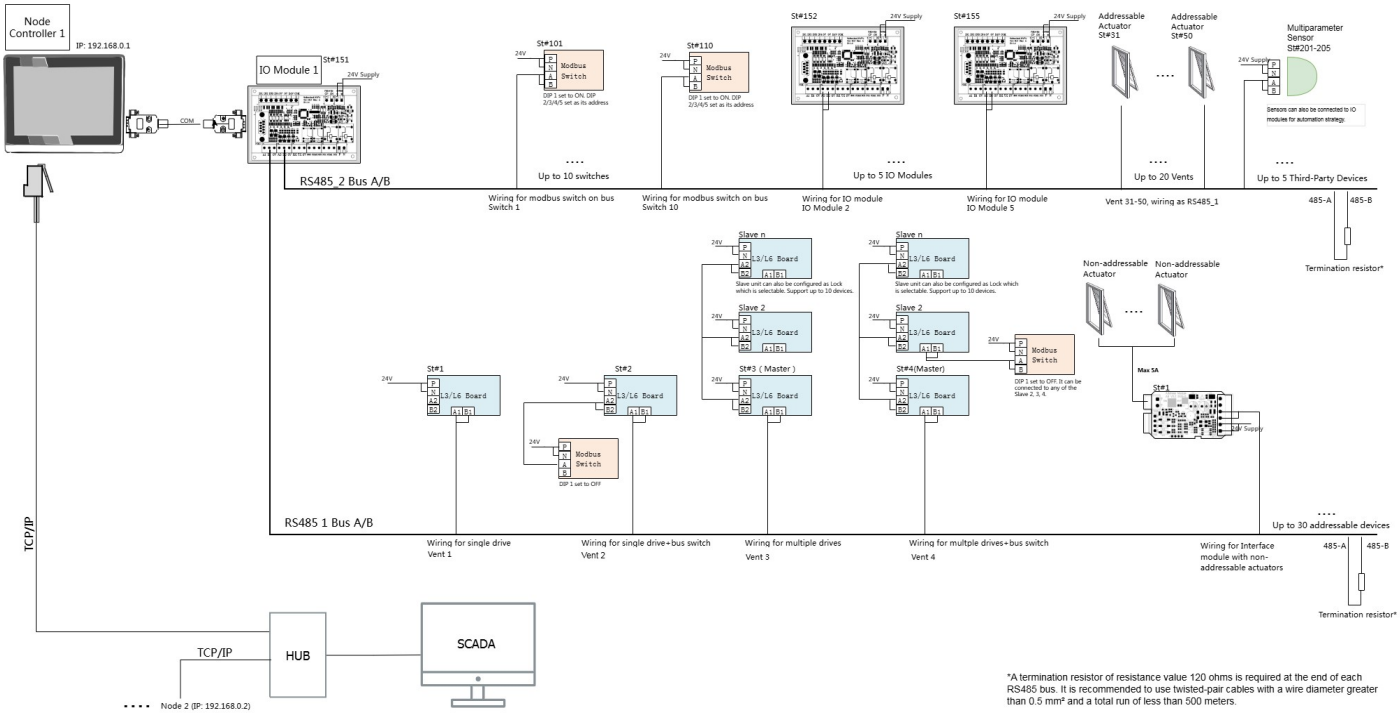




External Wiring (Default)



General System Structure and Wiring Diagram



A node controller is equipped with two RS485 buses, extended by an IO module (Station #151) which is built into the controller enclosure.

RS485_1 bus: Primarily intended for connecting addressable actuators (with L3/L6 PCB) or Modbus interface modules (for connecting non-addressable actuators). The maximum number of addressable devices on RS485_1 should not exceed 30.

RS485_2 bus: Recommended for connecting IO modules, Bus switches, or sensors. Note: IO modules, Bus switches and 3rd party devices (e.g. sensors) can only be connected to RS485_2, they're not allowed to be on RS485_1!

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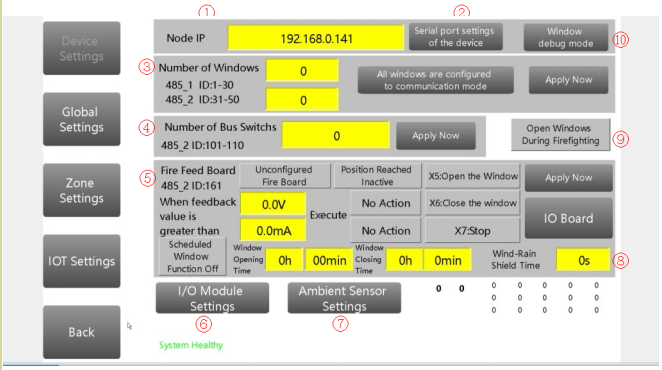
Node Controller Display Panel User Manual

System Configuration

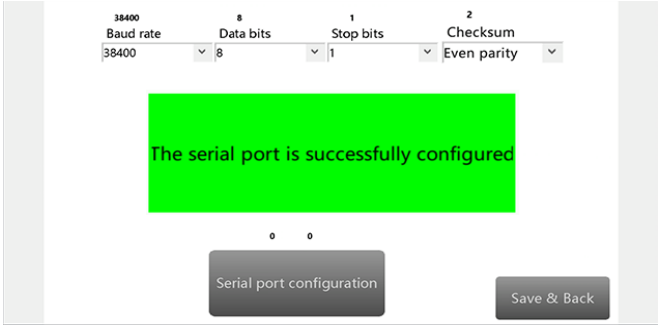
Click "System Configuration" to access Settings page.

Device Settings



1, Set the Node IP address as required (e.g. 192.168.0.1).

2, Configure the Serial port setting as required, "Save and Back". (The factory default is "8 data bit, 1 stop bit, even parity and baud rate 38400").



3, Configure the number of windows installed in RS485_1 and RS485_2:

RS485_1 supports up to 30 windows, with IDs ranging from 1to 30.

RS485_2 supports up to 20 windows, with IDs ranging from 31 to 50.

Click "Apply Now" to apply the settings immediately.

4, Input the actual number of bus switches installed. The max number of bus switches, which must be connected to RS485_2, is 10. The ID range is 101 to110.

5, The fire feed board is disabled by default. To activate it, click "Configure Fire Board".

Choose "Position Reached Inactive/Active" mode.

Specify threshold value for voltage (V) or current (mA).

Define the desired actions to be triggered.

Click "Apply Now" to apply the settings.

6, Click "I/O Module Settings" to access the I/O Module configuration page.

Input the actual number of I/O modules connected to

the node controller (supporting up to 5 modules on RS485_2 only, with IDs ranging from 151 to 155). Once completed, click "Apply Now" to apply the configuration.

The default window opening time is 120s and window closing time is 180s. Change them as desired.

I/O module supports two modes: "Connect Window" or "Not Connect Window". Click the button to toggle between these modes.

Each I/O module can be assigned to a specific zone. Click to toggle between "No Zone Assigned" or "Assigned Zone x".

There are 6 selectable input signal types: None, Open Reached, Close Reached, Open Command, Close Command, and Stop Command. Click the button to cycle through options.

There are 4 selectable output signal types: None, Fire Signal, Open Reached, and Close Reached. Click the button to cycle through options.

After completing all settings, click "Save & Exit" to finalize the configuration.

7, Click "Ambient Sensor Settings" button to open the configuration page. Enable/disable the sensor by

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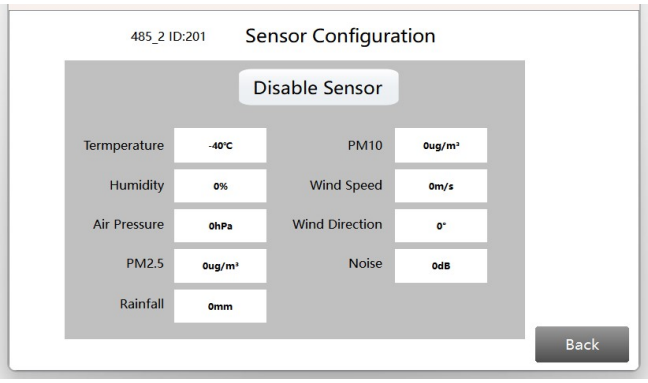
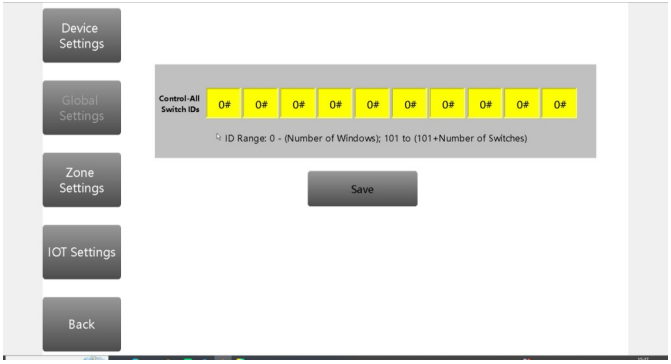
toggling the "Enable/Disable Sensor" button. All 3rd party Modbus devices like sensors must be connected to RS485_2 bus which supports up to 5 sensors with IDs ranging from 201 to 205.



8, Wind/rain signal lockout time: Sets the delay time before the system responds to a wind/rain signal. When higher priority signals are active, the wind/rain signal is suppressed. The system will only respond to the wind/rain signal after all higher priority signals are cleared and the set lockout time has elapsed.
9, By default, the system executes the window-opening command when a fire signal is received. In some special scenarios, windows are required to close upon a fire alarm. Press and hold the button to switch between the two modes.
10. This is intended for qualified engineers to configure the actuator parameters.

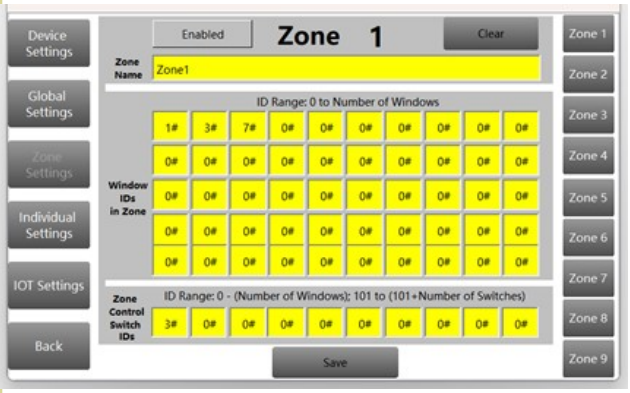
Global Settings



1, This section allows you to designate specific bus switches for global control. e.g. if the bus switch with address 101 is used to control all windows, input 101 in the Control-All Switch IDs field; if you want the bus switch subordinate to the window with address 10 to control all windows, input 10. Click "Save" to complete the setting.

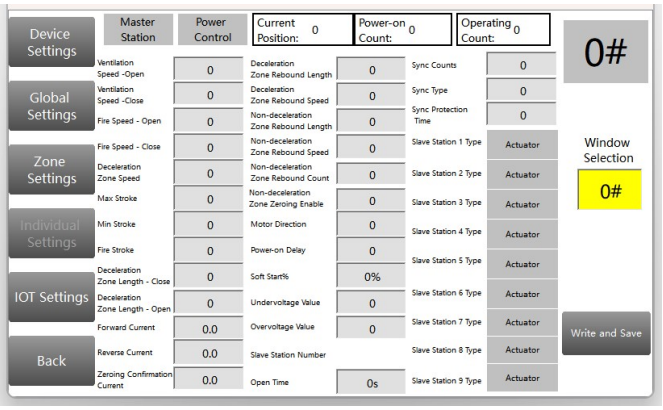
Zone Settings

1, All zones (1-9) are disabled by default. Select the zone you want to configure, then click "Enable" to activate it.



2, Assign windows to the zone. Input the window IDs one by one. e.g. The above picture shows windows with address ID 1, 3, 4 and 7 are assigned to Zone 1.
3, Specify the bus switches that will control this zone. The above example shows the switch subordinate to the window ID3 is now the control switch for the Zone 1.
4, Click "Save" to complete the setting.

Individual Settings



This section is to configure parameters for individual window actuators. Each actuator must be configured separately.
*Changing actuator parameter can lead to abnormal driving operation. Only qualified technicians are authorized to perform these settings.
1, Input the window address ID in the "Window Selection" field.
2, Change the specific parameters as required.
3, Click "Write and Save" to apply the settings.

IOT Settings

This feature is only available with WiFi-enabled node controllers, allowing remote access and assistance over the internet. Contact us for more information.

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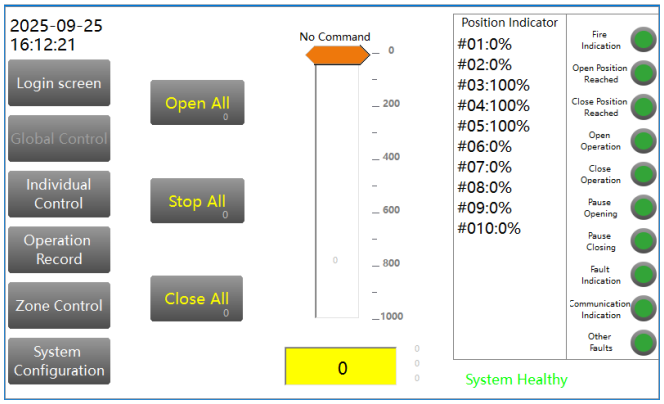
System Operations

Global Control

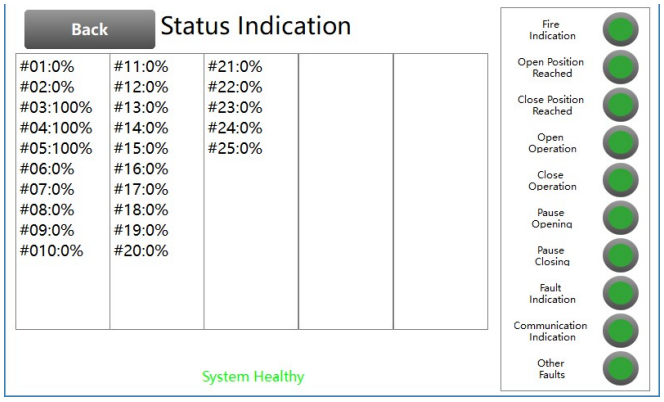
Click "Global Control" to access the control options for open, stop and close all windows connected to the node controller.



You can adjust the windows open/close position by sliding or entering a value directly.

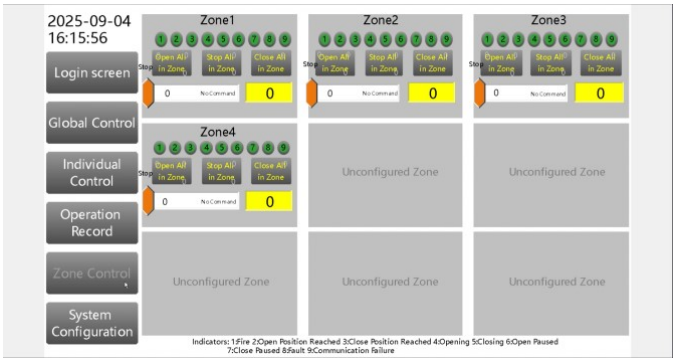
The "Position Indicator" displays the position of every window in the node. Click on it to show all.

The side bar displays the control status.



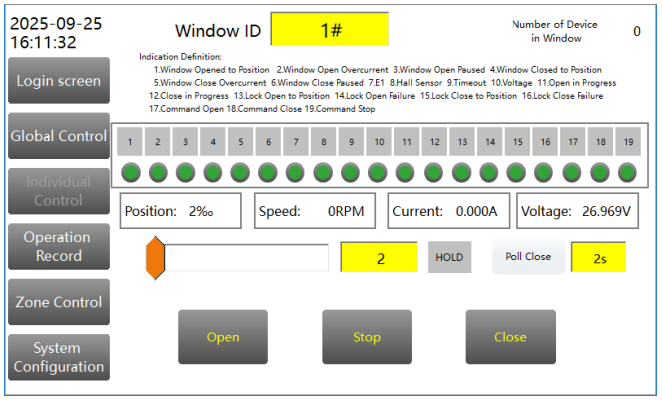
Zone Control

Zone Control section allows you to control the specific zone by opening, stopping or closing all windows within it. The operation status is displayed with numbered indicators for easy reference.



Individual Control

This section allows for the individual control of a specific window actuator. It supports status polling, enabling sequential checks of each window based on a predefined time interval. This helps monitor the operational state of each window efficiently.



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AFAS Addressable System: Addressable Actuators

Suitable for addressable window applications

Technical Specs

Addressable Actutators

Power supply: 24Vdc +/-25%
Control variant: 3A/6A
Serial comm: RS485
Protocol: Modbus RTU
Max number on Bus: 50
Address range: 1-50

Refer to the specific models for more technical details.

The default communication parameters are “8 data bits,1 stop bit, even parity and 38.4K baud rate”. These parameters can be modified by writing a new value to Address 209 as per below table. The station number can also be updated by writing to Address 204, followed by writing 1111 to Address 201 to save the change. Restart the device for the changes to take effect.

Setting Comm Parameters

Add.	Bit	Description
209	Bit0: Baud rate	1: 4800 2:9600 3:14400 4: 19200 5: 28800 6: 38400 7: 57600 8: 115200
	Bit1: Stop bit	0: 1 1: 2
	Bit2: Checksum	0: None 1: Even parity 2: Odd parity
204	Word	New station#
201	Word	Write 1111 to 201 to save station# change

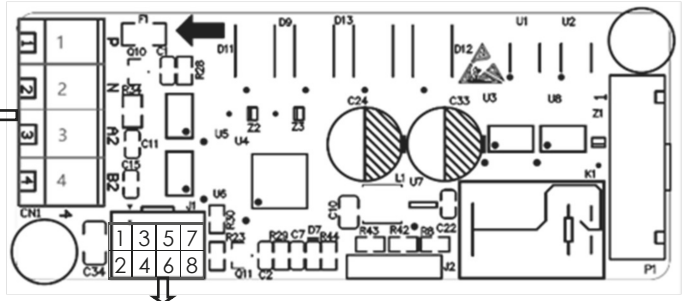
Description

All AuotFacade electrical window actuators can be upgraded into addressable Modbus devices by using our advanced control and communication board, ensuring seamless integration in the window control system.

Configuration and Wiring

1: P	24V output
2: N	
3: A2	485 sync port
4: B2	

CN1



CN2

1: B1	3: ARR	5: IN1	7: 5V
2: A1	4: GND	6: OUT1	8: GND

A1/B1 on CN2 connector is the networking port. Follow the wiring instruction as per General System Structure and Wiring Diagram in controller datasheet.

Communication Protocol Definition

Function Code	Address	Bit	Description	Type	Remarks
06 or 16	401	Bit0	Open	Read/Write	Write 1 to open
		Bit1	Close	Read/Write	Write 1 to close
		Bit2	Stop	Read/Write	Write 1 to stop
		Bit3	Fire	Read/Write	Write 1 to set Fire active
		Bit4	Force Zero	Read/Write	Write 1 to force zero on full close
		Bit5	Save target pos	Read/Write	Write 1 to save change by 402
	402	word	Change target 0.1%	Read/Write	Change target position, 1000=full
03	502	Bit0	Fw pos reached	Read	-
		Bit1	Fw overcurrent	Read	-
		Bit2	Fw pause	Read	-
		Bit3	Rv pos reached	Read	-
		Bit4	Rv overcurrent	Read	-
		Bit5	Rv pause	Read	-
		Bit6	Fault overcurrent	Read	-
		Bit9	Voltage abnormal	Read	-
		Bit12	Lock Fw pos reached	Read	-
		Bit13	Lock Fw fault	Read	-
		Bit14	Lock Rv pos reached	Read	-
		Bit15	Lock Rv exception	Read	-
	503	word	Pos feedback 0.1%	Read	Based on opening time
	504	word	Speed feed rpm	Read	-
	505	word	Current feed mA	Read	-

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AFAS Addressable System: I/O Module

Suitable for addressable window applications

Technical Specs

I/O Module

Power supply: 24Vdc +/-25%
Input: 4x Universal (configurable)
FollowME input: 24V+/-
Output: 2 relay outputs
P/N O/P: Max. 4A@24V
Serial comm: RS485
Protocol: Modbus RTU
Max number on Bus: 5
Address range: 151-155
Operating temp: 0 - 50 °C
Operating RH: 5-90% (non-condensing)

Attention: The unit does not have built-in lightning protection or isolation mechanism. If the RS485 network cable runs over long distances or passes through outdoor areas prone to lightning strikes, additional lightning protection devices must be installed. If the devices on the RS485 network do not share a common ground, isolation devices must be added.

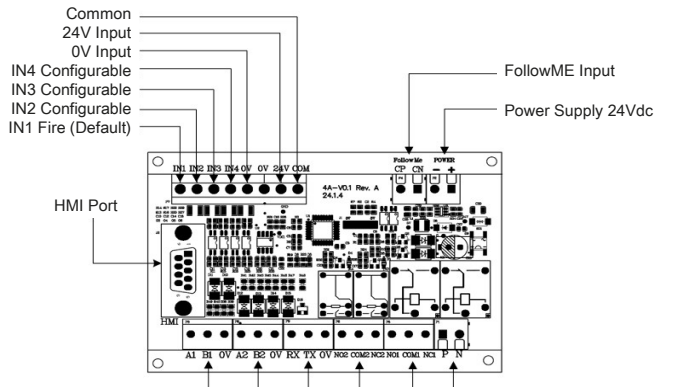
Comm Protocol Definition

Fn Code	Add.	Bit	Description	Type
03	2	Bit0	Input 1	Read
		Bit1	Input 2	Read
		Bit2	Input 3	Read
		Bit3	Input 4	Read
		Bit4	Direction CW	Read
		Bit5	Direction CCW	Read
	4	Bit0	O/P +24V	Read
		Bit1	O/P –24V	Read
		Bit2	O/P 1	Read
		Bit3	O/P 2	Read
06,16	204	Word	Station#	R/W
	209	Word	Comm paras	R/W
	406	Bit0	DO 1	R/W
		Bit1	DO 2	R/W
	407	word	0:No,1:+24v,2:-24v	R/W

Description

This module is a key component of the node controller, serving as a bridge between the control panel and field devices. Additionally it can function as an independent device within the bus. The module features 4 universal inputs and 2 relay outputs. The inputs can be configured in the panel as either 24dc signal (polarity insensitive) or dry contacts. Each input and output has an unique address displacement in the system. Furthermore, this module can interface with conventional actuators using P/N port, adding to its versatility.

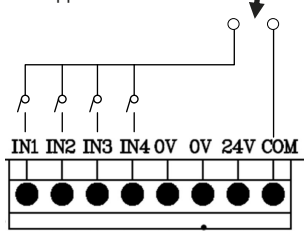
Configuration and Wiring



Dimension: L107 * W73mm

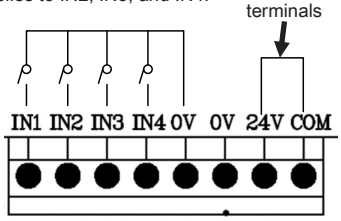
Configuring Inputs as 24Vdc signal

The inputs are polarities insensitive. Connecting 24V+ or – to COM and 24V-or + to IN1 will activate input 1. The same applies to IN2/3/4.



Configuring Inputs as dry contact signal

By default, the input is active when closed. e.g. If 0V and IN1 are shorted, input 1 becomes active. The same applies to IN2, IN3, and IN4.



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AFAS Addressable System: Modbus Interface Module

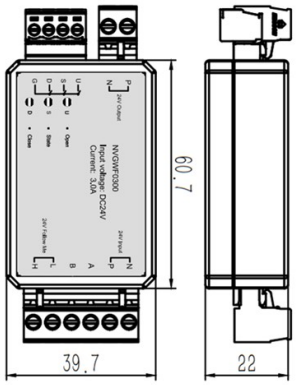
Suitable for addressable window applications

Technical Specs

Modbus Interface Module

Power supply: 24Vdc +/-25% (Polarity insensitive)
Input: 3x dry contact (NO)
FollowME Input*: 24V +/- 6V
P/N O/P: 3A or 5A@24V optional
Serial comm: RS485
Protocol: Modbus RTU
Max number on Bus: 30+20
Address range: 1-50 (same as window)
Operating temp: 0 - 50 °C
Operating RH: 5-90% (non-condensing)
Ingress Protection: IP20

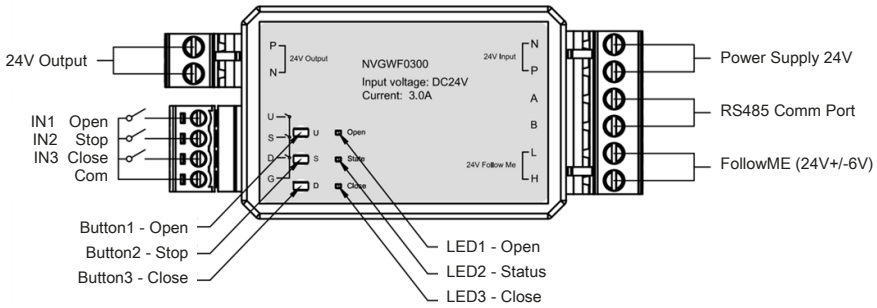
*By default (v5102), FollowME signal takes highest priority over bus commands while button operations holds the lowest priority. Optional versions are available for special applications such as using 24V power supply as FollowME input (v6102) or using inputs as "Position reached" feedback (v7102). Please consult supplier for details.



Description

This module is a standard Modbus device designed for addressable systems to integrate with conventional actuators (non-addressable) to enhance system compatibility. Its slim design allows for easy installation within window profiles. Built-in buttons and LED indicators facilitate field control and monitoring.

Configuration and Wiring



LED Definition: LED1 On - Open; LED2 On - Close; LED3 - Status indicated as below

Flash once	Forward position reached	Flash 6 times	Reverse pause
Flash twice	Forward overcurrent	Flash 7 times	Drive overcurrent
Flash 3 times	Forward pause	Flash 8 times	Hall error
Flash 4 times	Reverse position reached	Flash 9 times	Synchronization timeout
Flash 5 times	Reverse overcurrent	Flash 10 times	Voltage abnormal

Communication Protocol Definition

Function Code	Address	Bit	Description	Type	Remarks
06 or 16	401	Bit0	Open	Read/Write	Write 1 to open
		Bit1	Close	Read/Write	Write 1 to close
		Bit2	Stop	Read/Write	Write 1 to stop
03	502	Bit0	Fw pos reached	Read	-
		Bit1	Fw overcurrent	Read	-
		Bit2	Fw pause	Read	-
		Bit3	Rv pos reached	Read	-
		Bit4	Rv overcurrent	Read	-
		Bit5	Rv pause	Read	-
		Bit6	Fault overcurrent	Read	-
		Bit9	Voltage abnormal	Read	-
		Bit10	Opening	Read	-
		Bit11	Closing	Read	-
	503	word	Pos feedback 0.1%	Read	Based on opening time
	505	word	Current feed mA	Read	-
	508	word	Voltage feed mV	Read	-
	6	16 bits	Voltage in mV	Read	Unsigned data
	7	16 bits	Current in mA	Read	Unsigned data
	307	16 bits	Open time in 0.1S	Read	Stop counting on max parameter
	308	16 bits	Close time in 0.1S	Read	Stop counting on max parameter
06 or 16	217	16 bits	Max open time S	Read/Write	Parameter setting
	218	16 bits	Max close time S	Read/Write	Parameter setting

The default comm parameters are 8 data bits,1 stop bit, even parity and 38.4K baud rate. These parameters can be modified by writing to Address 209. The station number can also be updated by writing the new value to Address 204, followed by writing 1111 to Address 201 to save the change. Restart the device for the changes to take effect.

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AFAS Addressable System: Bus Switch

Suitable for addressable window applications

Technical Specs

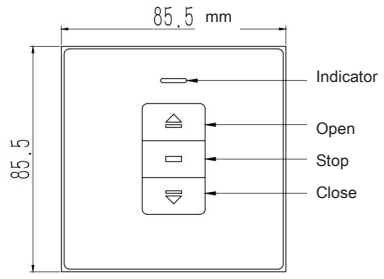
Bus Switch

Power supply: 24Vdc +/-25%
(Polarity insensitive)
Serial comm: RS485
Protocol: Modbus RTU
Max number on Bus: 10
Unique address range: 101-110
Operating temp: 0 - 50 °C
Operating RH: 5-90% (non-condensing)
Ingress Protection: IP20

Comm Protocol Definition

Fn Code	Add.	Bit	Description	Type
03	2	Bit0	Open state	Read
		Bit1	Close state	Read
		Bit2	Stop state	Read
		Bit3	DIP 1 state	Read
		Bit4	DIP 2 state	Read
		Bit5	DIP 3 state	Read
		Bit6	DIP 4 state	Read
		Bit7	DIP 5 state	Read
	4	Bit0	LED red	Read
		Bit1	LED green	Read
06 or 16	204	Word	Station#	R/W
	209	Word	Comm paras	R/W

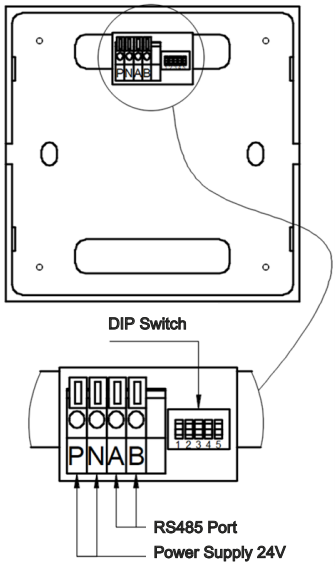
Dimensions

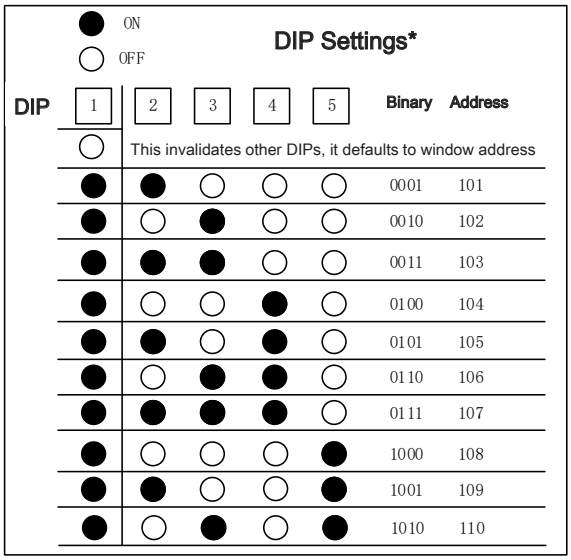


Description

This Modbus switch is designed for dual purpose functionality. It can operate as a standalone conventional switch to control the local window it is subordinate to. More importantly it functions as a Modbus device which can be assigned to any window zones in addressable system, enabling easy control.

Configuration and Wiring





*When DIP 1 is set to Off, DIP 2/3/4/5 are invalid. The switch then uses window actuator's address as its address (master mode). When no zone is assigned to the switch, it directly control the connected window; when a zone is assigned, it controls the assigned zone plus the connected window regardless of whether it is in this zone. When DIP is set to On, DIP 2/3/4/5 become valid, and the switch is assigned its own address as per above table (slave mode). In this scenario, if no zone is assigned to it, it does not control anything.

If the state of DIP 1 is changed, the switch must be powered off and restarted for the change to take effect. Changes to DIP 2/3/4/5 take effect immediately without requiring a power reset.

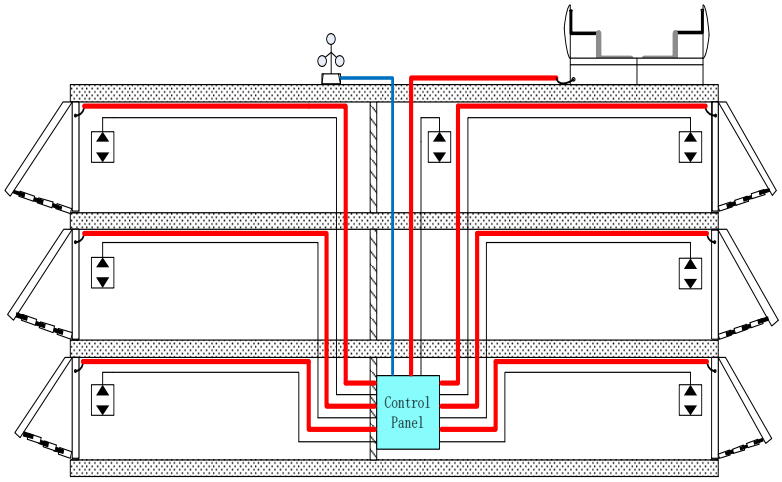
LED Indicator Status

Off	No command received
Red on for 3S, then off	Opening command in progress
Green on for 3S, then off	Closing command in progress
Yellow on for 3S, then off	Stop command in progress
Yellow flashing every 1s for 8 times	Communication error

PRODUCT DATASHEET

CANBus-Driven Addressable Windows Controls (AWC)

For motorized automatic vents for smoke and natural ventilation system



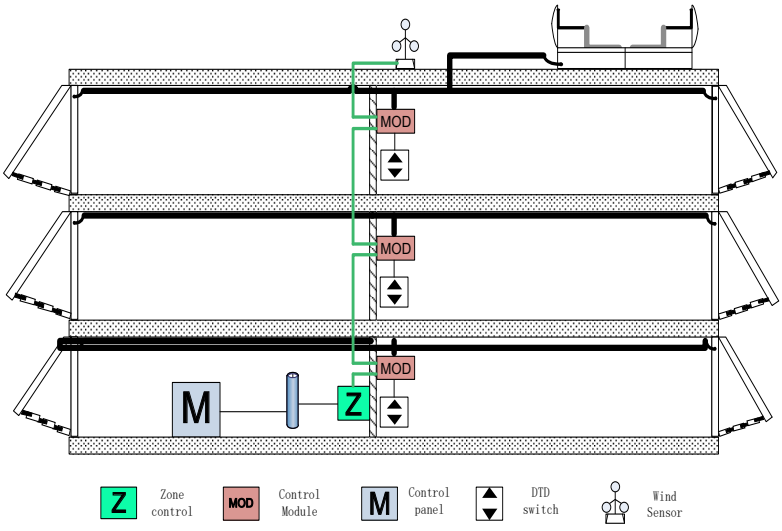
Conventional System - Cabling

Conventional Window Controls

- ◊ Simple to use and no frills
- ◊ Suitable for small system without complex controls
- ◊ Costly rewiring is required for changes in controls once installation has been completed
- ◊ Limited functionality and no upgrade is available in future
- ◊ Installation costs are higher for cabling and cable containment.

Addressable Window Controls (AWC)

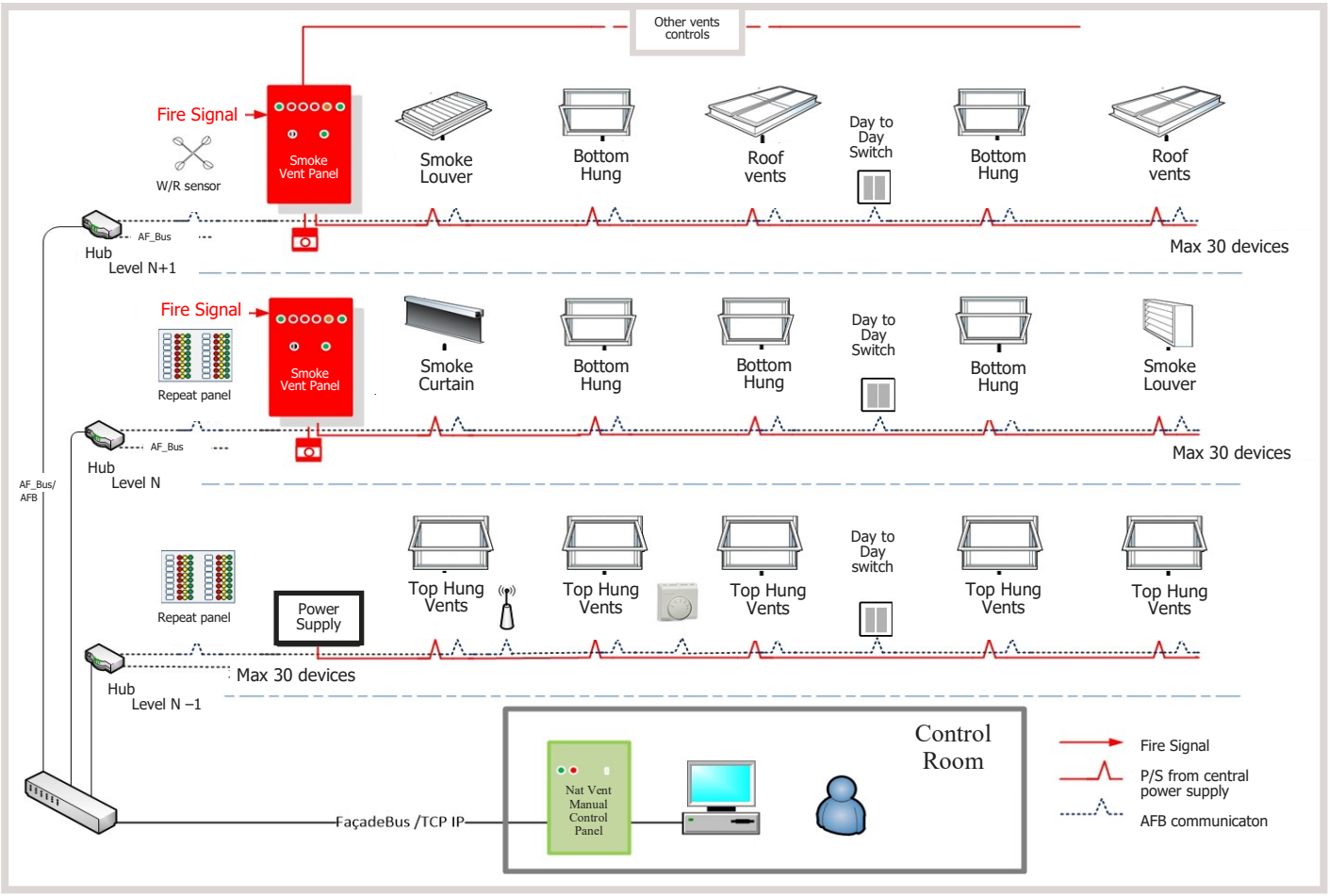
- ◊ Suitable for use in buildings required complex controls. Software based controls up to 9999 devices for flexibility;
- ◊ Reliable AF_bus scalable for high speed communication with immunity to interference;
- ◊ Ease of design and installation for specifiers and installers, last minute changes in control is possible to meet client's desire without expensive rewiring;
- ◊ Lowest lifetime cost for building owners. Surveys shown that average office layout changes every 18 months, there is no expensive hard wiring cost in future system upgrade.
- ◊ Precise control and true status monitoring are possible by either built-in MMI or by 3nd parties BMS.



Addressable Window Controls System (AWC)

PRODUCT DATASHEET

CANBus-Driven Addressable Window System



Technical Details
Max capacity: 9999 Physical Devices

Natural Smoke Zone
Max. capacity: < 128
There is no limit of AOV in one smoke zone. All lines are being monitoring for fault reporting for short and open circus

Natural Vent Zone
Max. capacity: < 9,999
Each zone can be controlled by either addressable switch or automatically by BMS or environmental sensors.

All devices are being connected a 4-core cables. 2 for 24Vdc supply and another pair for data communication for AFB.

Additional devices can be added or removed from the AFB, and changes in the system configuration is required in the master controller panel.

Example, if you want to spilt 1 zone to 2 controls zone and controls by 2 switches, the things that you need to do is to add one switch to any nearest devices with a 4 core cables, and reconfigure the system software locally to implement the changes.

Environmental Sensors
Environmental sensor, such as thermostat, hydrostat, CO2 sensor or presence detectors can be connected to network to implement automatic controls.

Manual Controls
Beside wired options of manual controls, Hand held remote control can be appended to an interface unit for ease of manual control.

Integration to 3rd parties equipment
3rd parties equipment can be integrated into AWC by using interface units. Legacy system can easily be incorporated into the system to scale the system improvement by stage.

Controls System
Systems can be used as a stand alone system or integrated with 3rd party SCADA system via open protocol, such as ModBus/TCPIP.

Remote Access
Master controller has a built-in engine for web browsing capability which can connect to any mobile phone or tablet either via intranet.

A cloud services is available to connect your remote devices to AWC system. You can easily monitor the system and push you filtered system message if you want to receive them accordingly.

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CANBus-Driven Addressable Windows Controls (AWC)

System 3800 Controller/PSU/Interface Unit/Sensor

Master Controller (S3300 and S3800)

NV.A.MA.99.99

Master Controller Module for S 3300 and S 3800

Order Code:

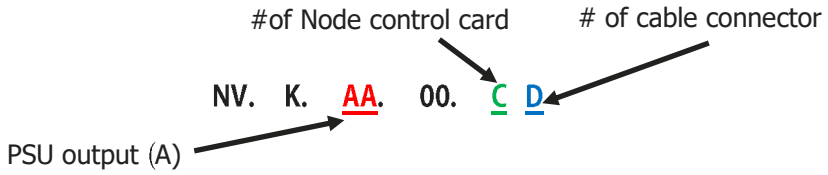
NV.A.MA.01.00	AWS S3300/S3800 Master Controller	< 100 addresses
NV.A.MA.05.00	AWS S3300/S3800 Master Controller	< 500 addresses
NV.A.MA.20.00	AWS S3300/S3800 Master Controller	< 5,000 addresses
NV.A.MA.50.00	AWS S3300/S3800 Master Controller	< 2,000 addresses
NV.A.MA.99.99	AWS S3300/S3800 Master Controller	< 9,999 addresses

Housing and graphic terminal to be ordered separately c/w power supply and connectors. (Please enquire our sales representative for details)

S3800-PSU

Node Controller with Power Supply and cable connectors

Order Method



Example

NV.K.10.00.10	10A MWS CAN PSU Panel, c/w 1 NV node
NV.K.20.00.20	20A MWS CAN PSU Panel, c/w 2 NV nodes
NV.K.20.00.21	20A MWS CAN PSU Panel, c/w 2 NV nodes, 1 cable connectors
NV.K.60.00.44	60A MWS CAN PSU Panel, c/w 4 NV nodes, 4 cable connectors
NV.K.80.00.54	80A MWS CAN PSU Panel, c/w 5 NV nodes, 4 cable connectors
NV.K.80.00.60	80A MWS CAN PSU Panel, c/w 6 NV nodes
NV.K.80.00.83	80A MWS CAN PSU Panel, c/w 8 NV nodes, 3 cable connectors

S3800-MOD

AWC Modules (24Vdc, CANbus)

NV.K. I T.22.00	CAN bus Interface Unit (2 IN 2 OUT) module only
NV.K. I T.22.01	CAN bus Interface Unit (2 IN 2 OUT) with enclosure
NV.K. I T.84.00	CAN bus Interface Unit (8 IN 4 OUT) module only
NV.K. I T.84.01	CAN bus Interface Unit (8 IN 4 OUT) with enclosure
NV.K.WF.04.00	CAN bus Window Actuator Interface Unit 4A module only
NV.K.WF.04.01	CAN bus Window Actuator Interface Unit 4A with enclosure

S3800-SW

Addressable Day to Day Switch

NV.K.SW.A0.86	CAN bus Addressable Switch module
NV.K.SW.A3.86	CAN bus Addressable Rocker Switch, 3-position Spring return
NV.K.SW.A4.86	Same as NVKSWA386, c/o status display
NV.K.SW.A4.86	CAN bus Addressable Rotary Switch, 3-position Spring return

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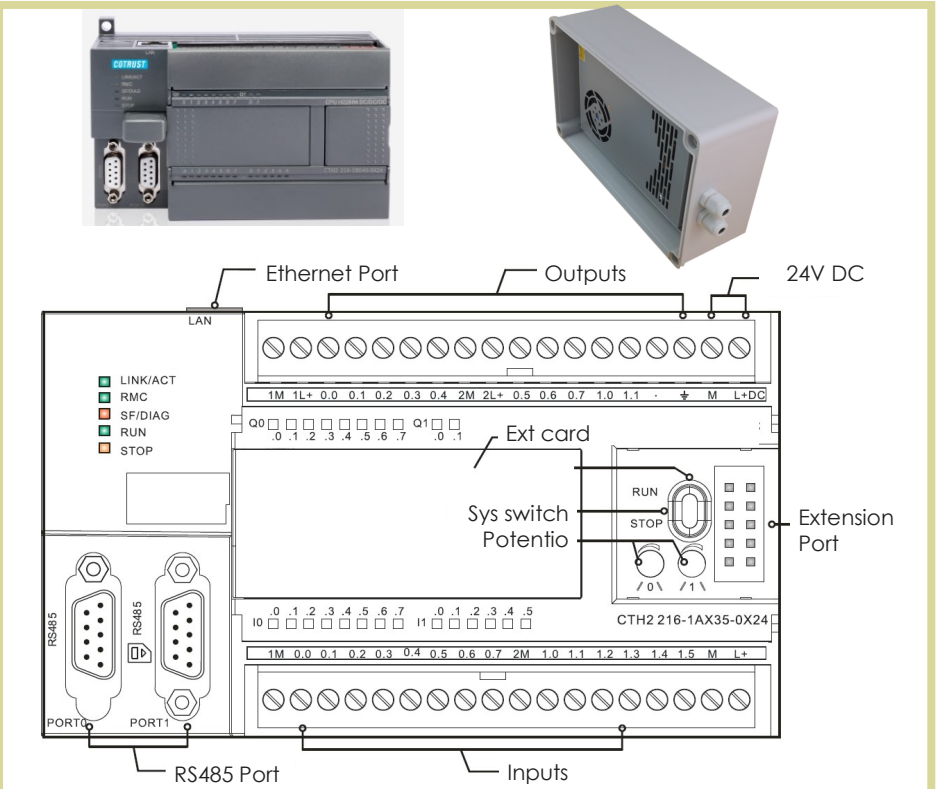
Programmable Master Controller

Suitable for interfacing BMS systems

Technical Specs

Power supply: 24 Vdc
Consumption: 7 W
RAM: 128 KB
Flash ROM: 64 KB
Digital Inputs: 14
Digital Outputs: 10
Extension modules: 7
Max DIs: 128
Max Dos: 128
Max Ais: 32
Retaining time: >10ms
Timers: 512
Counters: 256
Bool Computing: ≤0.15us
Float Computing: ≤6.2us
PPI Ports: 2, RS485
PPI Baud Rate: 9.6/19.2/187.5 kbps
Max substations: 32
Ethernet Port: RJ45
Ethernet Protocol: UDP/TCP
Max Ether Connection: 8
Max packet size:
UDP_PPI 200 bytes
Modbus_TCP 240 bytes
Socket 512 bytes
S7 200bytes
Max ether cable run: 100M Cat5e



Description

This programmable controller is typically used to interface with other systems such as building automation system and fire alarm system etc. It receives input signals from sensors and commands controls based on given logics. This controller is flexible in configuration by supporting multiple communication protocols and various input/output types.

Features

- Robust stability.
- Low consumption.
- Flexible configuration.
- Support Modbus over TCP, Socket, S7, CANopen, CANfree.
- 14 DI /10 DO expandable up to 128 DI /128 DO and 32 AI.
- Support both transistor and relay outputs.
- Expandable up to 7 modules.
- Substations up to 32 using CAN-open bus.