



DM11 Module

Módulo DM11

(Ethernet)

User manual

Manual de usuario

VER: V15A



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It is recommended to use this module as a reference to the following content.

《AHM3 user manual》

《AHM3 Modbus-RTU user manual》

《Modbus protocol implementation guide over TCP/IP》

1 Safety Precautions / Precauciones de Seguridad

The manufacturer shall not be held responsible for failure to comply with the instructions in this manual.

The equipment must be installed and serviced only by qualified personnel.

El fabricante no se hace responsable de los fallos originados en los módulos si no se cumplen las instrucciones de este manual.

El equipo debe ser instalado y puesto en marcha por personal cualificado.

2 General

DM11 can extend the communication function of AHM3.

10/100M Ethernet RJ45 network interface.

Support 802.3 standard Ethernet frame format

Working mode: TCP Server

Support DHCP. Automatically obtain IP.

Pre-programmed Globally Unique Node MAC Address

Support standard Modbus-TCP protocol

Embedded Web Server

Embedded SMTP Simple Mail Transfer Protocol for sending event messages via email

Network anomalies detected and automatically disconnect the TCP connection.

El módulo DM11 extiende la función de comunicaciones del AHM3.

Interface de red Ethernet 10/100M con conector RJ45.

Soporta el standard de Ethernet 802.3.

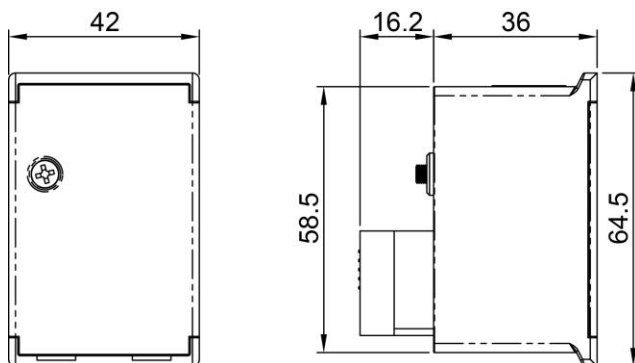
Modo de trabajo: servidor TCP

Soporta DHCP para obtener la dirección IP automáticamente

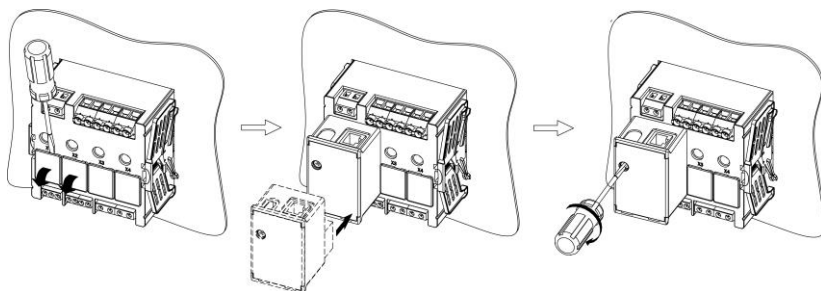
Protocolo TCP-Modbus

Desconexión automática ante anomalías de red. Desconecta la conexión TCP.

3 Dimensions / Dimensiones



4 Installation / Instalación



5 Operation / Operación

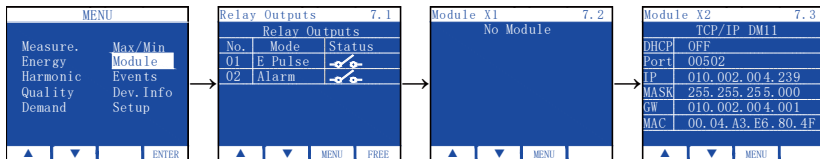
5.1 Connect to AHM3 / Conexión al AHM3

Disconnect the power supply of AHM3, and then connect DM11 module to slot X2 (take slot X2 as example).

Connect AHM3 to power supply, and then enter module interface of AHM3 to check the information of slot X2. If the connection between meter and module is correct, parameters of DM11 will be shown. Detailed operation process is shown in the



following pictures.



Following parameters are used in this manual for ease of presentation.

Port = "502"

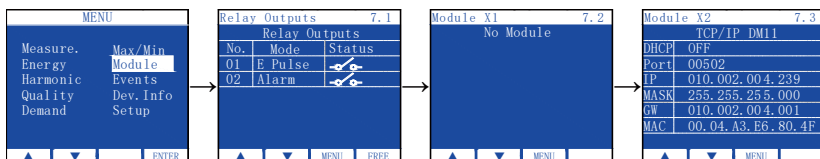
Local IP = "10.2.4.239"

Subnet mask = "255.255.255.0"

Gateway = "10.2.4.1"

Desconecte la fuente de alimentación de AHM3 y después conectar el módulo DM11 a la ranura X2 (tomar la ranura X2 como un ejemplo).

Conectar el AHM3 a la fuente de alimentación y luego entrar en la interfaz del módulo del AHM3 para comprobar la información de la ranura X2. Si la conexión entre el medidor y el módulo es correcta, se mostrarán parámetros en el DM11. El proceso de operación detallado se muestran en las siguientes imágenes.



Los siguientes parámetros se usan en este manual para facilitar la presentación.

Puerto = "502"

Dirección local IP = "10.2.4.239"

Máscara de subred = "255.255.255.0"

Puerta de enlace = "10.2.4.1"

5.2 Parameters configuration / Configuración de parámetros

5.2.1 Communication model / Modelo de comunicación

AHM3 equipped with DM11 module is used as server in a LAN built on switch or



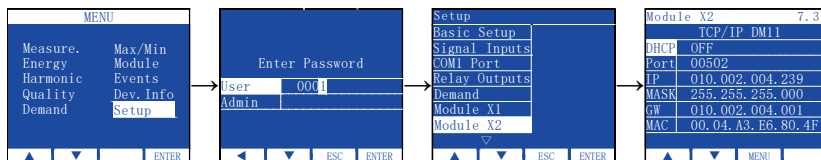
router. PC or other equipment with Ethernet is used as client to access server to realize data exchanging and relative control output. The model is shown in the following picture.

El AHM3 equipado con un módulo DM11 es usado como servidor en una red LAN conectado mediante un switch o router. Un PC u otro equipo con Ethernet se usa como cliente para acceder al servidor y realizar el intercambio de datos y el control del equipo. Un ejemplo de conexión se muestra en la siguiente imagen.



5.2.2 Module configuration through the panel of AHM3 / Configuración del módulo a través del panel AHM3

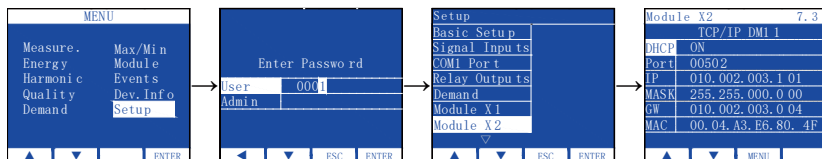
Communication parameters of DM11 such as DHCP, Port, Local IP, Subnet mask and Gateway are configured through the panel of AHM3. The operation process is shown in the following picture.



DM11 will re-start after the configuration is finished. It is suggested to wait for three seconds and return to module display interface and check whether the configuration is correct, see 5.1 operation.

DHCP

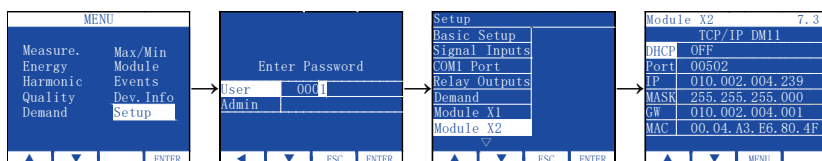
If switch or router is equipped with DHCP function, the DHCP of DM11 can be set as Enable to realize automatic address assignment. The operation process is shown in the following picture.



If IP address is automatically assigned through DHCP, the parameters of Local IP, Subnet mask and Gateway can not be set by manual.

After the configuration is finished, return to module display interface to check dynamic assignment address. See operation process 4.1.

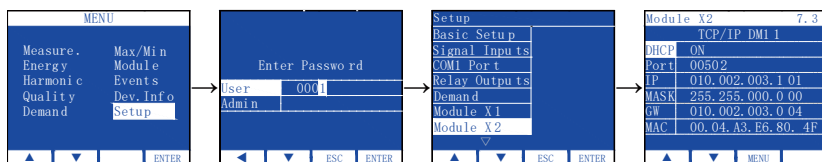
Los parámetros de comunicación del DM11 tales como el DHCP, el Puerto, la dirección local IP, la máscara de subred y la entrada se configuran a través del panel del AHM3. El proceso de operación se muestra en la siguiente figura.



DM11 se reiniciará después de terminar la configuración. Se recomienda esperar tres segundos y luego volver a la interfaz del módulo para comprobar si la configuración es correcta, véase el proceso 5.1.

DHCP

Si el interruptor o el router están equipados con la función DHCP, el DHCP del DM11 puede ser configurado como Enable para realizar la asignación automática de direcciones. El proceso de operación se muestra en la siguiente figura.



Si la dirección IP es asignada automáticamente a través del DHCP, los parámetros de la dirección local IP, la máscara de subred y la entrada no pueden configurarse de manera manual.



Después de terminar la configuración, hay que volver a la interfaz de visualización del módulo para comprobar la asignación dinámica de direcciones. véase el proceso 4.1.

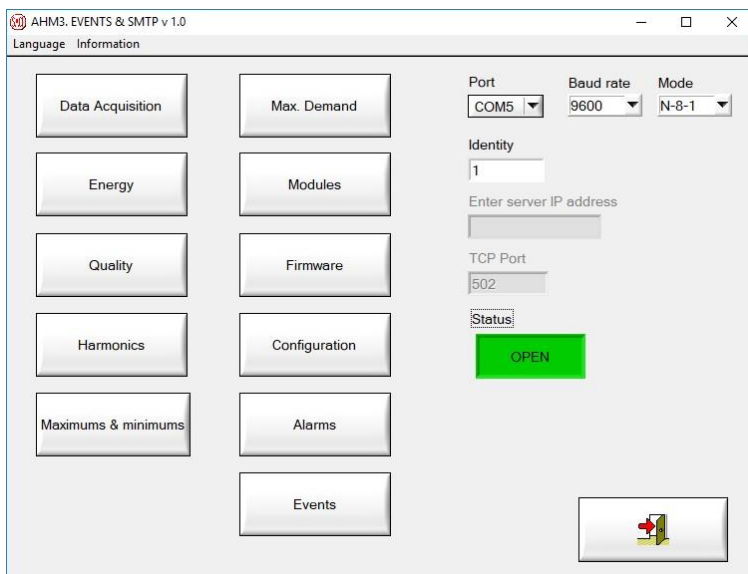
5.2.3 Configure parameters of DM11 module through special software / Configuración de parámetros del DM11 a través de un software especial.

Configure the parameters of DM11 module through special software for AHM3. AHM3 is equipped with a RS485 interface. It is connected to PC through RS232 (or USB)/RS485 conversion device.

Step1: Set serial communication

Click on Port and select Serial Port:

Set communication address of AHM3 in Identity item and Press the red button with the text “CLOSED” to open the port. If succeed, the button changes to green.





Step2: Connection test

Press the button “Data Acquisition” to read the instantaneous values or press the button “Modules” to see the actual configuration and state of inputs and outputs.

The 'Data Acquisition' window displays the following data:

Voltage (V)				Current (A)				Total			
V1	0.00	V12	0.00	I1	0.000	P	0.000	kW			
V2	0.00	V23	0.00	I2	0.000	Q	0.000	kvar			
V3	0.00	V31	0.00	I3	0.000	S	0.000	kVA			
VFavg	0.00	VLevg	0.00	IN	0.000	PF	0.000	Fr	0.00		
				Iavg	0.000						

L1			L2			L3		
P	0.000	kW	P	0.000	kW	P	0.000	kW
Q	0.000	kvar	Q	0.000	kvar	Q	0.000	kvar
S	0.000	kVA	S	0.000	kVA	S	0.000	kVA
PF	0.000		PF	0.000		PF	0.000	

At the bottom right, there is a button with a plug icon.

Press the button “Configuration” to access to the configuration panel. In this panel you can change the parameters of the AHM3 and it is possible to access to the configuration of the module plugged.

The 'Configuration' window contains the following settings:

- CONFIG. DO1 & DO2**: Button
- SLOT X1**: NC | **CONF. X1**: Button
- SLOT X2**: DM11 | **CONF. X2**: Button
- SLOT X3**: DM1 | **CONF. X3**: Button
- SLOT X4**: DM6 | **CONF. X4**: Button
- PASSWORD**: 1 | 0.9999
- PAG. INICIAL**: A
- IDIOMA (LANG.)**: ESPAÑOL
- CONTRASTE**: 4 | 0.7
- BACKLIGHT**: 0 | 0.255 s
- MODBUS ID**: 99 | 1.247
- BAUD**: 9600
- PAR**: N,8,1
- CON. (WIRING)**: 3P3W
- PT PRIM. (V)**: 690
- PT SEC. (V)**: 690
- CT PRIM. (A)**: 150
- CT SEC. (A)**: 5
- DM1 INTER.**: 1 | 1.255 min
- REG. #1 VAR.**: V1
- REG. #2 VAR.**: V1
- REG. #3 VAR.**: V1
- REG. #4 VAR.**: V1
- REG. #5 VAR.**: V1
- REG. #6 VAR.**: V1

At the bottom right, there are two buttons: a green checkmark button and a button with a plug icon.



Pressing on the button “CONF. X2”, show that a DM11 is connected, access to the panel with the configuration data of the DM11 module.

Step3: Change parameters

This panel shows the complete set of parameters used to configure the module DM11. After change the parameters, press the “Validate” button, the button with the green check” and data shall be uploaded.

DM11 will re-start after the setting is finished. It is suggested to operate AHM3 after three seconds and return to module display interface and verify the setting. See operation process 5.1.

La configuración de los parámetros del módulo DM11 se realiza mediante el uso de un software dedicado para el AHM3. El AHM3 está equipado con una interfaz RS485, la cual se conecta al PC mediante una interfase de RSR232 (o USB)/RS485.

Paso 1: Establecer comunicación de serie

Seleccionar el puerto COM de comunicaciones y escribir el valor de la dirección Modbus en el campo “Identidad”. Pulsar en el botón de color rojo con el texto



“CLOSED” para abrir el puerto. Si no hay errores el botón cambia a verde.

Idioma Información

Toma de Datos Máxima demanda

Energía Módulos

Calidad Versión

Harmónicos Configuración

Máximos y mínimos Alarmas

Eventos

Puerto COM5 Baudios 9600 Modo N-8-1

Identidad 1

Introduzca la dirección IP del servidor

Puerto TCP 502

Estado OPEN

Paso 2: Test de conexión.

Para probar la conexión pulsar el botón “Toma de Datos” para visualizar las variables instantáneas o sobre el botón “Módulos” para visualizar los parámetros de configuración y el estado de las entradas, salidas y módulos conectados.

Toma de Datos

Tensión (V)

v1 0.00 v12 0.00

v2 0.00 v23 0.00

v3 0.00 v31 0.00

vFavg 0.00 vLaug 0.00

Corriente (A)

I1 0.000

I2 0.000

I3 0.000

IN 0.000

Iavg 0.000

Total

P 0.000 kW

Q 0.000 kvar

S 0.000 kVA

PF 0.000 FI 0.00

L1 L2 L3

P 0.000 kW P 0.000 kW P 0.000 kW

Q 0.000 kvar Q 0.000 kvar Q 0.000 kvar

S 0.000 kVA S 0.000 kVA S 0.000 kVA

PF 0.000 PF 0.000 PF 0.000



En el menú principal pulsar en el botón “Configuración” para visualizar al panel con los parámetros de configuración del AHM3. También es posible acceder a la configuración de los módulos conectados.

Pulsar el botón “CONF. X2” para visualizar la configuración del módulo conectado, en este caso un DM11.

Paso 3: Cambio de parámetros.

Una vez cambiados los parámetros del módulo, o los generales en el menú de configuración principal, pulsar en el botón de “Validar”, el botón con un check verde,



y los datos se guardarán en el AHM3.

El módulo DM11 se reiniciará después de que termine el ajuste. Se recomienda operar el AHM3 después de tres segundos y volver a la interfaz de visualización del módulo y verificar el ajuste. Véase el proceso de operación 5.1.

5.2.3 Test / Test

Ping

An easy way to test the connection of the AHM3 to the LAN in to use the command “ping”. Open a command window and execute the command ping to the IP address of the AHM3. If success, the communications statistics are showed.

```
C:\WINDOWS\system32\cmd.exe

C:\Documents and Settings\8030.LOCAL>ping 10.2.4.239

Pinging 10.2.4.239 with 32 bytes of data:

Reply from 10.2.4.239: bytes=32 time<1ms TTL=128
Reply from 10.2.4.239: bytes=32 time<1ms TTL=128
Reply from 10.2.4.239: bytes=32 time<1ms TTL=128
Reply from 10.2.4.239: bytes=32 time<1ms TTL=128

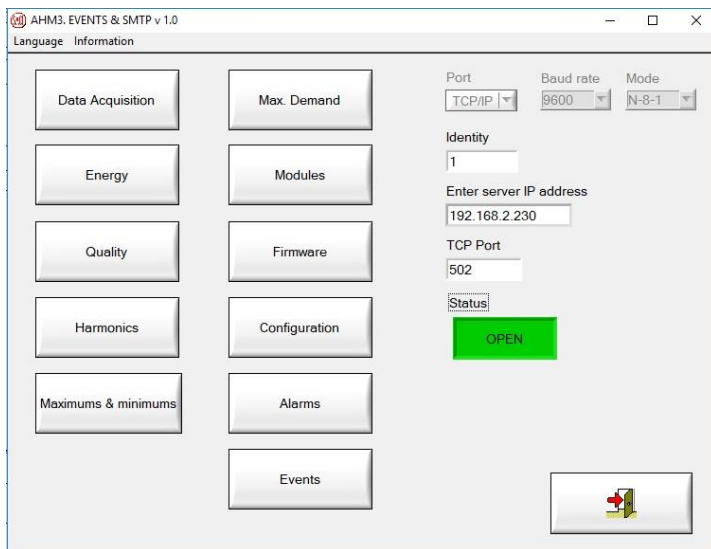
Ping statistics for 10.2.4.239:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\Documents and Settings\8030.LOCAL>
```

Modbus/TCP

Using the same software for the AHM3 close the COM port and change the Port from COM to TCP/IP.

Configure the field “IP address” with the AHM3 IP address and open the port. The TCP port by default has the value 502.



Check the communications pressing the button “Data Adquisition” or the button “Modules” to see the instantaneous values and the configuration data and state of the digital inputs and outputs.

Ping

Un método sencillo para comprobar la conexión en la red LAN del AHM3 es utilizar el comando “ping”. Abrir una ventana de comandos y ejecutar el comando ping a la dirección IP del AHM3. Si todo es correcto se muestran las estadísticas de comunicaciones.



```
C:\WINDOWS\system32\cmd.exe

C:\Documents and Settings\S030.LOCAL>ping 10.2.4.239

Pinging 10.2.4.239 with 32 bytes of data:

Reply from 10.2.4.239: bytes=32 time<1ms TTL=128
Reply from 10.2.4.239: bytes=32 time<1ms TTL=128
Reply from 10.2.4.239: bytes=32 time<1ms TTL=128
Reply from 10.2.4.239: bytes=32 time<1ms TTL=128

Ping statistics for 10.2.4.239:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\Documents and Settings\S030.LOCAL>
```

TCP-Modbus

Utilizando el mismo programa del AHM3 cerramos el puerto COM y seleccionamos en Port el puerto TCP/IP. Escribimos la dirección IP del AHM3 en el campo “Dirección IP” y abrimos el puerto. Dejamos el valor 502 por defecto en el campo TCP Puerto.



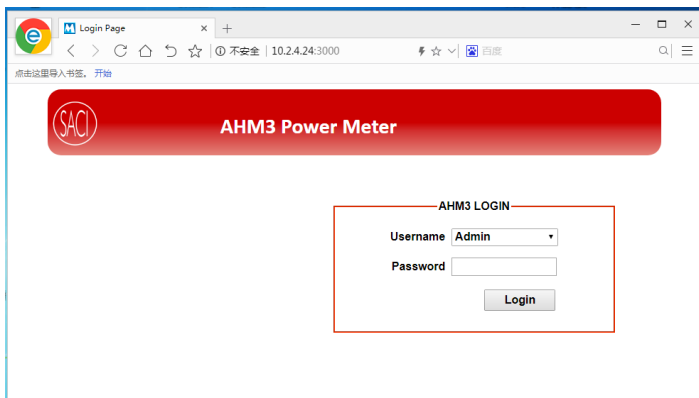


Pulsar en “Toma de Datos” o en “Módulos” para ver los valores instantáneos y los parámetros de configuración y el estado de las entradas y salidas digitales.

6.Web server

The DM11 module has a Web Server embedded in it. Users can access AHM3 through a browser to query or set related information. http default port number is 80. Other port numbers (port mapping) can also be used.

For example: DM11 module IP address: 10.2.4.24 Port mapping: 3000. Enter 10.2.4.24:3000 in the browser's web address. If the access is successful, enter the login interface, as shown below:



Choose Username: Admin, and the initial password is 1234. If choose User, login without password, but it is read-only mode.

If login successfully, as shown below:



AHM3 Power Meter

DEVICE INFO MODULES MEASURING RECORD SETUP

DEVICE INFORMATION

AHM3 multifunction power meters are designed to be used for the measurement and calculation of electrical variables such as voltage, current, frequency, power, power factor, energy, harmonic components, etc. in low-voltage power distribution. It is capable of single-phase, two-phase, or three-phase measurement and can be used in two-wire, three-wire, four-wire, TN, TT, and IT systems.

There are **four interfaces** on the meter for modules which are used to extend function, such as analog inputs/output, digital inputs/outputs and communications with the Profibus-DP(V0), Ethernet, WiFi, GPRS, etc.

AHM3 MODULES INFORMATION

NAME	DESCRIPTION
DM1	Memory: 8MB + RTC
DM2	2 Analogue Inputs: mA
DM3	2 Analogue Inputs: PT100
DM4	2 Analogue Inputs: thermocouple



AHM3 related query interface


AHM3 Power Meter

DEVICE INFO MODULES MEASURING RECORD SETUP

V/I POWER ENERGY

ENERGY

NAME	TARIFF	OL
EP+		h
EP-		h
EQ+		h
EQ-		h
ES	0.020	kvarh
EQ1	32.507	kVAh
EQ2	11.801	kvarh
EQ3	0.001	kvarh
EQ4	0.020	kvarh
SpareEP+	0.000	kvarh
SpareEP-	0.017	kWh
SpareEQ+	0.003	kWh
SpareEQ-	0.019	kvarh
icnavaES	0.003	kvarh
	0.032	kVAh



AHM3 related setting interface



7. Mail sending alarms or record information

(SMTP)

The DM11 module has SMTP Simple Mail Transfer Protocol embedded in it with 25-port number. When some events occur in AHM3, such as DI state's change, relay action, over-voltage, under-voltage, over-current, overload and other alarm events, DM11 will send the relevant alarm information to the specified mailbox by mail.

SMTP working procedure:

- Obtain the IP address of the SMTP server through the DNS server domain name query function.
- Establish a TCP connection with the sending mailbox SMTP server (using port number: 25)



- Send a message
- EHLO handshake
- AUTH LOGIN login mailbox client
- MAIL FROM:< > sender address
- RCPT TO: < > Recipient
- DATA: request data
- Email body
- QUIT disconnects from the server

To use the SMTP function, set the following related parameters (refer to the *AHM3 Modbus-RTU User Manual*).

AHM3 device ID number	e.g. 12345678
Email sending alarm total enable	e.g. 1 (enable)
Public DNS server IP address	e.g. 8.8.8.8 (Google DNS)
SMTP mail server domain	e.g. smtp.hotmail.com
Recipient address	e.g. AAA@ hotmail.com
Recipient password (authorized)	e.g. 1234abcd
Recipient 1 address	e.g. BBB@ hotmail.com
Recipient 2 enable	e.g. 1 (enable)
Recipient 2 address	e.g. CCC@ hotmail.com
Recipient 3 enable	e.g. 1 (enable)
Recipient 3 address	e.g. DDD@ hotmail.com

Configure SMTP parameters through AHM3 specific setup software



MODULO DM11

DHCP ☐ On ☒ Off TCP Port ☐ CLIENTE ☒ SERVIDOR

PUERTO TCP 502

IP LOCAL 192 168 2 230

Wiring ☐ IP Local ☐ 0 ☐ 0

MASCARA RED 255 255 255 0

GATEWAY 192 168 2 1

NetMask 54 10 EcIP Remote 7 9

Port Web 80 SMTP Port 25

Device ID 19 2 21 1

Email Send Alarm ☒

DNS Server IP 192 168 2 11

SMTP Server Domain sacisntp.saci.es

SMTP Server IP 0 0 0 0



Email Address (From) tstsmtpsaci@saci.es

Email Password (From) 33_e@2019eAc.

Email Address #1 (To) a.vigli@saci.es

Email Address #2 (To) ☐

Email Address #3 (To) ☐

Configure SMTP parameters through Webserver

SACI

AHM3 Power Meter

DEVICE INFO MODULES MEASURING RECORD SETUP

ALARM/EMAIL

EMAIL(SMTP)		
Port(WEB)	80	E.g. 8080
Device ID	57589909	E.g. 12345678
Email send alarm	Enable	
DNS Server IP	114.114.114.114	E.g. 8.8.8.8
SMTP Server Domain	smtp.sina.com	E.g. smtp.sina.com
SMTP Server IP	0.0.0.0	E.g. 232.150.20.12
(From) Sender Addr	zybreeze1029@sina.com	E.g. example@hotmail.com
(From) Sender Password	*****	Login Smtip-server password(MAX 32 chars)
(To)Recipients Addr1	zybreeze1029@126.com	
(To)Recipients Addr2	<input checked="" type="checkbox"/> zybreeze1029@163.com	
(To)Recipients Addr3	<input checked="" type="checkbox"/> 53564898@qq.com	

Submit



7.1 Alarms & Events (Mailing)

AHM3 supports following events and alarm information that can be sent to the specific email box	
DI state's changed	0->1 (no signal --> signal) 1->0 (signal --> no signal)
DO(Relay) state's changed	0->1 (disconnection --> connection) 1->0(connection--> disconnection)
Over-voltage alarm	Record start: $V > V_{set}$ Record end: $V < V_{set} + Hys$
Under-voltage alarm	Record start: $V < V_{set}$ Record end: $V > V_{set} + Hys$
Over-current alarm	Record start: $I > I_{set}$ Record end: $I < I_{set} + Hys$
Under-current alarm	Record start: $I < I_{set}$ Record end: $I > I_{set} + Hys$
Over-load alarm	Record start: $P > P_{set}$ Record end: $P < P_{set} + Hys$
Under-load alarm	Record start: $P < P_{set}$ Record end: $P > P_{set} + Hys$

7.2 Test Mail Function

- Apply for an SMTP mailbox server that supports port 25
- Confirm the domain name, user name, and password (authorized) of the SMTP mailbox server.
- Enter the recipient email address correctly
- AHM3 must be connected to the DM1 clock storage module, otherwise there is no alarm record function.



DI state's test
Operate AHM3 <ul style="list-style-type: none">· connect a DM6 module· connect the first way of digital input(with signal)
Mail box receiving information <div><p>AHM3's SOE/Alarm record Device ID Num :57589099 SOE/Alarm Type : DI status changed SOE/Alarm Date : 2018.11.08/13:25:41--- SOE/Alarm Value : DI01 0(O) to 1(C)</p></div>

Relay action test
Operate AHM3 <ul style="list-style-type: none">· connect a DM6 module· connect the first way of relay by remote control
Mail box receiving information <div><p>AHM3's SOE/Alarm record Device ID Num :57589099 SOE/Alarm Type : Relay status changed SOE/Alarm Date : 2018.11.08/13:33:02--- SOE/Alarm Value : RL03 0(O) to 1(C)</p></div>

Over-voltage alarm test
Operate AHM3 <ul style="list-style-type: none">· set over-voltage alarm value 240V and hysteresis 10V· increase the voltage signal to 260V (>240V record starts)· a few seconds' delay, reduce voltage signal to 220V(recovery record ends)



Mail box receiving information

AHM3's SOE/Alarm record
Device ID Num :57589099
SOE/Alarm Type : Over voltage alarm
SOE/Alarm Date : 2018.11.08/14:25:55 --- 2018.11.08/14:26:07
SOE/Alarm Value : VL1=260.0V/VL2=259.9V/VL3=259.8V

Over-current alarm test

Operate AHM3

- set over-current alarm value 5.5A and hysteresis 0.1A
- increase the current signal to 6A(>5.5A record starts)
- a few seconds' delay, reduce current signal to 5A(recovery, record ends)

Mail box receiving information

AHM3's SOE/Alarm record
Device ID Num :57589099
SOE/Alarm Type : Over current alarm
SOE/Alarm Date : 2018.11.08/14:30:05 --- 2018.11.08/14:32:20
SOE/Alarm Value : IL1=5.998A/IL2=6.000A/IL3=5.999A

8 Technical specifications / *Especificaciones*

técnicas

Interface	RJ45 (10M to 100M)
Frame format	IEEE 802.3



Working mode	Server
MAC	IEEE certification,Globally Unique
IP	Static set or DHCP
Protocol	Modbus-TCP/HTTP(Webserver) /SMTP
Insulation	1.5 kV
Working temperature	-10 ~ 60°C
Storage environment	-25 ~ 70°C, ≤95%RH

<i>Interfaz</i>	<i>RJ45 (10M a 100M)</i>
<i>Formato de frame</i>	<i>IEEE 802.3</i>
<i>Modo de trabajo</i>	<i>Servidor</i>
<i>MAC</i>	<i>IEEE certification,Globally Unique</i>
<i>IP</i>	<i>Static set or DHCP</i>
<i>Protocolo</i>	<i>Modbus-TCP</i>
<i>Aislamiento</i>	<i>1.5 kV</i>
<i>Temperatura de trabajo</i>	<i>-10 ~ 60°C</i>
<i>Temperatura de almacenamiento</i>	<i>-25 ~ 70°C, ≤95%RH</i>