LAMPIRAN

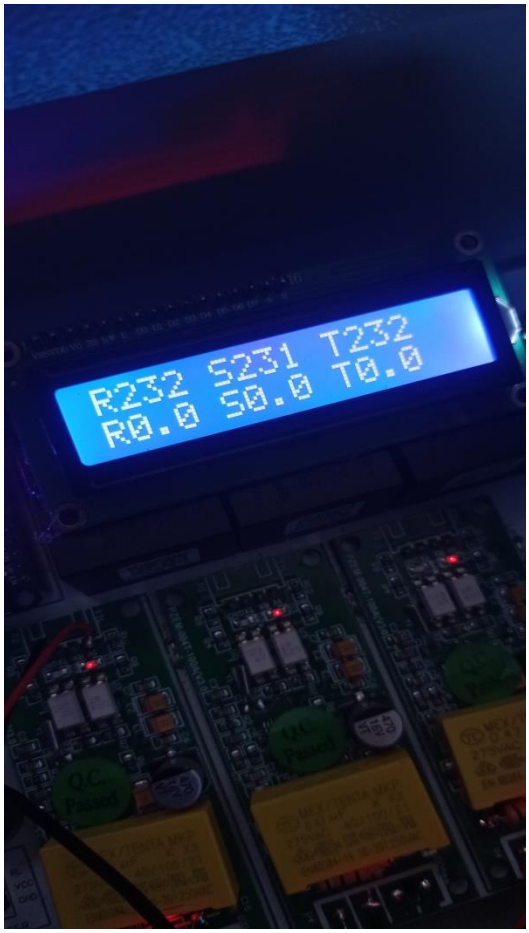
Lampiran -1 Program alat

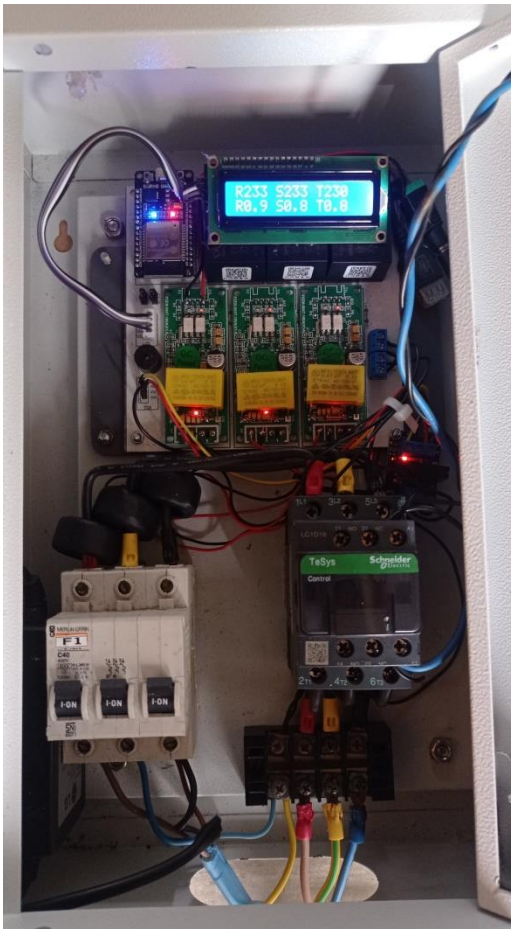
```
#include <WiFi.h>
#include <WiFiClientSecure.h>      //library wifi
#include <UniversalTelegramBot.h> //library telegram
#define WIFI_SSID "Infinix ZERO 30"
#define WIFI_PASSWORD "RSP164411"
String id = "6288309635";            //"6288309635";
#define BOT_TOKEN "6556869826:AAHeStDTrwZaYFadVo9tf7Di2uW5Ou4iobs"
WiFiClientSecure secured_client;
UniversalTelegramBot bot(BOT_TOKEN, secured_client);

#include <Wire.h>
#include <LiquidCrystal_I2C.h>
LiquidCrystal_I2C lcd(0x27,16,2);  // set the LCD address to 0x27
for a 16 chars and 2 line display

#include <PZEM004Tv30.h>
#include <HardwareSerial.h>
HardwareSerial SerialPort1(1); //for UART1

PZEM004Tv30 pzem1 (&Serial);
PZEM004Tv30 pzem2 (&Serial2);
PZEM004Tv30 pzem3 (&SerialPort1);

#define relay 18
#define buzzer 19
String kondisiRelay = "ON";

void setup() {
  Serial.begin(9600);
  SerialPort1.begin(9600,SERIAL_8N1,4,2);
  Serial2.begin(9600);
  pinMode(relay,OUTPUT);
  pinMode(buzzer,OUTPUT);
  lcd.begin();
  lcd.backlight();
  alarm();
  digitalWrite(relay,LOW);      //perintah relay on
  WiFi.begin(WIFI_SSID, WIFI_PASSWORD);
  while (WiFi.status() != WL_CONNECTED){delay(500);}
  secured_client.setCACert(TELEGRAM_CERTIFICATE_ROOT);
  bot.sendMessage(id, "SELAMAT DATANG DI BOT MONITORING LISTRIK 3
FASA");
}

void loop() {
```

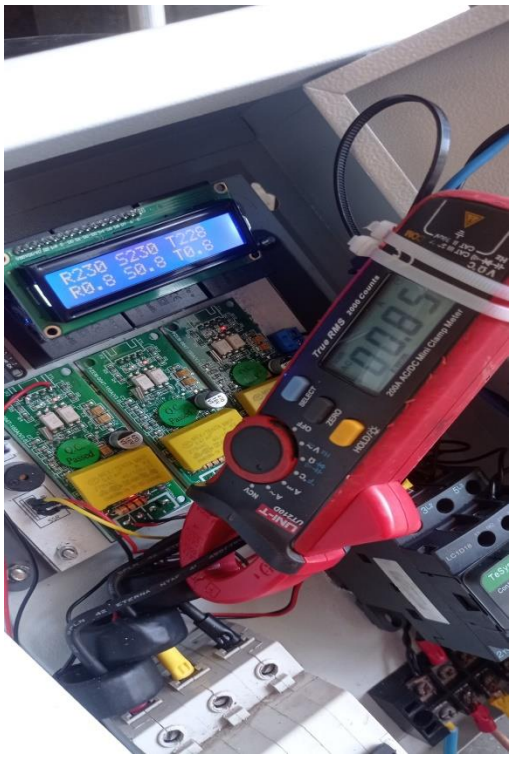
```
    int voltageR = pzem1.voltage();
    float currentR = pzem1.current();
    if(isnan(voltageR) || voltageR>1000){voltageR=0;}
    if(isnan(currentR)){currentR=0.0;}

lcd.setCursor(0,0);lcd.print("R");lcd.setCursor(1,0);lcd.print(vol
tageR);

lcd.setCursor(0,1);lcd.print("R");lcd.setCursor(1,1);lcd.print(cur
rentR,1);
    if(voltageR<=200){bot.sendMessage(id, "Tegangan Fasa R
bermasalah, Relay
dimatikan");digitalWrite(relay,HIGH);kondisiRelay="OFF";
delay(5000);}

    int voltageS = pzem2.voltage();
    float currentS = pzem2.current();
    if(isnan(voltageS) || voltageS>1000){voltageS=0;}
    if(isnan(currentS)){currentS=0.0;}

lcd.setCursor(5,0);lcd.print("S");lcd.setCursor(6,0);lcd.print(vol
tageS);

lcd.setCursor(5,1);lcd.print("S");lcd.setCursor(6,1);lcd.print(cur
rentS,1);
    if(voltageS<=200){bot.sendMessage(id, "Tegangan Fasa S
bermasalah, Relay
dimatikan");digitalWrite(relay,HIGH);kondisiRelay="OFF";
delay(5000);}

    int voltageT = pzem3.voltage();
    float currentT = pzem3.current();
    if(isnan(voltageT) || voltageT>1000){voltageT=0;}
    if(isnan(currentT)){currentT=0.0;}

lcd.setCursor(10,0);lcd.print("T");lcd.setCursor(11,0);lcd.print(v
oltageT);

lcd.setCursor(10,1);lcd.print("T");lcd.setCursor(11,1);lcd.print(c
urrentT,1);
    if(voltageT<=200){bot.sendMessage(id, "Tegangan Fasa T
bermasalah, Relay
dimatikan");digitalWrite(relay,HIGH);kondisiRelay="OFF";
delay(5000);}

    int numNewMessages = bot.getUpdates(bot.last_message_received
+ 1);
     for (int i=0; i<numNewMessages; i++) {
           String pesan = bot.messages[i].text;
           if(pesan=="/cekDATA"){String DATA = "Berikut data
listrik 3 fasa\n";
              DATA+= "Tegangan FasaR = " + String(voltageR) +
"Volt\n";
              DATA+= "Tegangan FasaS = " + String(voltageS) +
"Volt\n";
              DATA+= "Tegangan FasaT = " + String(voltageT) +
```

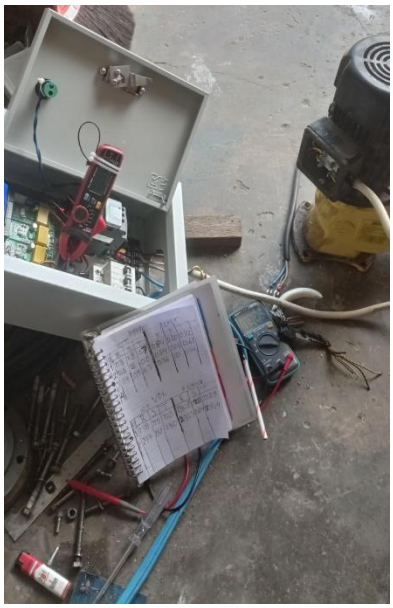
```
"Volt\n";
              DATA+= "Arus FasaR = " + String(currentR,1) +
"Ampere\n";
              DATA+= "Arus FasaS = " + String(currentS,1) +
"Ampere\n";
              DATA+= "Arus FasaT = " + String(currentT,1) +
"Ampere\n";
              DATA+= "Kondisi Relay = " + kondisiRelay + " \n";
              bot.sendMessage(id, DATA);}

if(pesan=="/relayON"){digitalWrite(relay,LOW);kondisiRelay="ON";bo
t.sendMessage(id, "Relay telah diaktifkan");}

if(pesan=="/relayOFF"){digitalWrite(relay,HIGH);kondisiRelay="OFF"
;bot.sendMessage(id, "Relay telah dinonaktifkan");}
                                    }

}

void alarm(){
  for(int
x=0;x<3;x++){digitalWrite(buzzer,1);delay(100);digitalWrite(buzzer
,0);delay(70);}
  }
```

Lampiran -2 Alat Penelitian






R230 S230 T228
R0.8 S0.8 T0.8




14:37
Herwin
bot
Kondisi Relay = ON 11:55
/cekDATA 11:55
Berikut data listrik 3 fasa
Tegangan FasaR = 233Volt
Tegangan FasaS = 233Volt
Tegangan FasaT = 231Volt
Arus FasaR = 0.9Ampere
Arus FasaS = 0.8Ampere
Arus FasaT = 0.8Ampere
Kondisi Relay = ON 11:55
/cekDATA 11:55
Berikut data listrik 3 fasa
Tegangan FasaR = 233Volt
Tegangan FasaS = 233Volt
Tegangan FasaT = 231Volt
Arus FasaR = 0.9Ampere
Arus FasaS = 0.8Ampere
Arus FasaT = 0.8Ampere
Kondisi Relay = ON 11:55
Berikut data listrik 3 fasa
Tegangan FasaR = 233Volt
Tegangan FasaS = 233Volt
Tegangan FasaT = 231Volt
Arus FasaR = 0.9Ampere
Arus FasaS = 0.8Ampere
Arus FasaT = 0.8Ampere
Kondisi Relay = ON 11:55
/relayOFF 11:55
Relay telah dinonaktifkan 11:55
Pesan

Lampiran -3 *Datasheet*

1. ESP32

ESP32-C3 Series

Datasheet Version 1.8

Ultra-Low-Power SoC with RISC-V Single-Core CPU
2.4 GHz Wi-Fi (802.11b/g/n) and Bluetooth® 5 (LE)
Optional 4 MB flash in the chip's package
QFN32 (5×5 mm) package

Including:

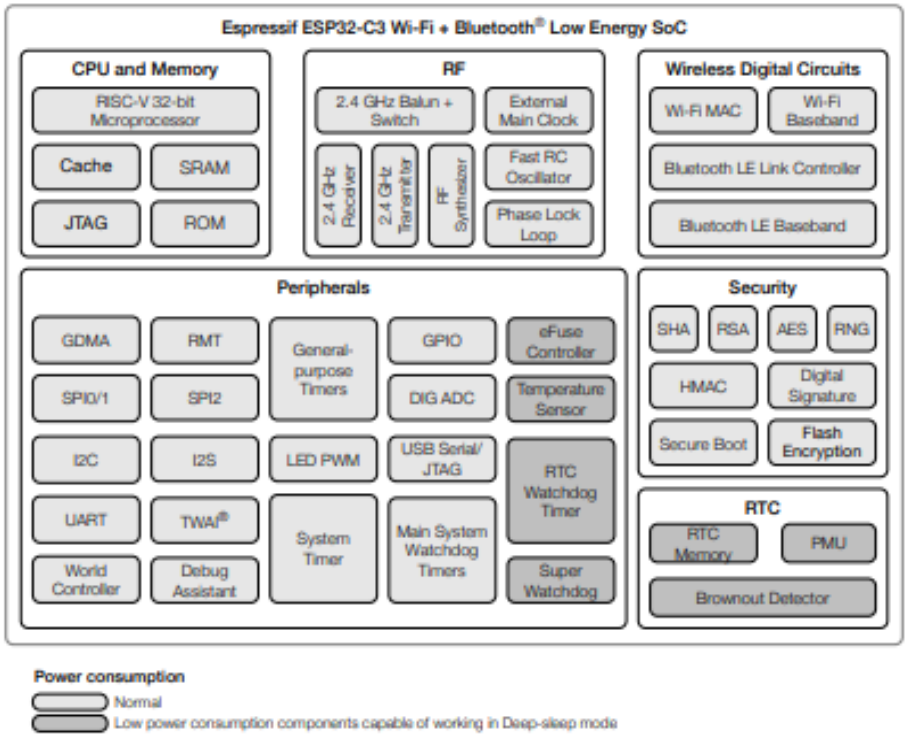
- ESP32-C3
- ESP32-C3FN4 – End of life
- ESP32-C3FH4
- ESP32-C3FH4AZ – Not Recommended for New Designs (NRND)
- ESP32-C3FH4X – Recommended

ESPRESSIF

Product Overview

ESP32-C3 is an low-power and highly-integrated MCU-based solution that supports 2.4 GHz Wi-Fi and Bluetooth® Low Energy (Bluetooth LE).

The functional block diagram of the SoC is shown below.



ESP32-C3 Functional Block Diagram

For more information on power consumption, see Section 4.1.3.6 *Power Management Unit*.

Features

Wi-Fi

- IEEE 802.11b/g/n-compliant
- Supports 20 MHz, 40 MHz bandwidth in 2.4 GHz band
- 1T1R mode with data rate up to 150 Mbps
- Wi-Fi Multimedia (WMM)
- TX/RX A-MPDU, TX/RX A-MSDU
- Immediate Block ACK
- Fragmentation and defragmentation
- Transmit opportunity (TXOP)
- Automatic Beacon monitoring (hardware TSF)
- Four virtual Wi-Fi interfaces
- Simultaneous support for Infrastructure BSS in Station mode, SoftAP mode, Station + SoftAP mode, and promiscuous mode
  Note that when ESP32-C3 scans in Station mode, the SoftAP channel will change along with the Station channel
- Antenna diversity
- 802.11mc FTM

Bluetooth®

- Bluetooth LE: Bluetooth 5, Bluetooth mesh
- High power mode (20 dBm)
- Speed: 125 Kbps, 500 Kbps, 1 Mbps, 2 Mbps
- Advertising extensions
- Multiple advertisement sets
- Channel selection algorithm #2
- Internal co-existence mechanism between Wi-Fi and Bluetooth to share the same antenna

CPU and Memory

- 32-bit RISC-V single-core processor, up to 160 MHz
- CoreMark® score:
  - 1 core at 160 MHz: 407.22 CoreMark; 2.55 CoreMark/MHz
- 384 KB ROM
- 400 KB SRAM (16 KB for cache)

2. Modul SSR

OMRON

Solid State Relay
G3MB

Low cost Subminiature PCB mounting 2 amp Single in-line package (SIP) SSR

- Bottom is approximately 3 times smaller than G3M.
- Low cost "SIP" package switches up to 2A loads.
- Built in Snubber circuit and input resistor as option.
- Two footprints available for design flexibility.
- The G3MB-202PEG-4-DC20MA crosses directly to the Motorola M0C2A-60 series power triac.

Ordering Information

NOT FOR NEW DESIGN. Discontinuation planned for April, 2010.

To Order: Specify input voltage at end of part number. Example: G3MB-202P-*DC24*

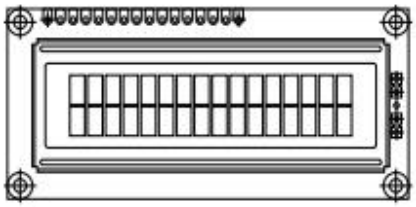
Isolation	Output terminal pitch	Zero cross	Input resistor	Built-in snubber circuit	Rated output load	Rated input voltage	Model
Phototriac	7.62 mm	Yes	Yes	Yes	2 A at 100 to 240 VAC	5 VDC	**G3MB-202P**
						12 VDC	
						24 VDC	
		No			2 A at 100 to 240 VAC	5 VDC	**G3MB-202PL**
						12 VDC	
						24 VDC	
	5.08 mm	Yes			2 A at 100 to 240 VAC	5 VDC	**G3MB-202P-4**
						12 VDC	
						24 VDC	
		No			2 A at 100 to 240 VAC	5 VDC	**G3MB-202PL-4**
						12 VDC	
						24 VDC	
		Yes	No	No	2 A at 100 to 240 VAC	N/A *(See Note)	**G3MB-202PEG-4-DC20MA**
		No			2 A at 100 to 240 VAC	N/A *(See Note)	**G3MB-202PLEG-4-DC20MA**

Note: 1. For versions without input voltage specified, a current limiting resistor must be placed in series with the input. See LED drive specifications and recommendations.

2. TUV versions available. When ordering models certified by VDE (TUV), add "-UTU" to the model number given in the above table.

3. LCD I2C

16 x 2 Character LCD



FEATURES

- Type: Character
- Display format: 16 x 2 characters
- Built-in controller: ST 7066 (or equivalent)
- Duty cycle: 1/16
- 5 x 8 dots includes cursor
- + 5 V power supply
- LED can be driven by pin 1, pin 2, or A and K
- N.V. optional for + 3 V power supply
- Optional: Smaller character size (2.95 mm x 4.35 mm)
- Material categorization: For definitions of compliance please see www.vishay.com/doc?99912

RoHS COMPLIANT

MECHANICAL DATA

ITEM	STANDARD VALUE	UNIT
Module Dimension	80.0 x 36.0 x 13.2 (max.)	mm
Viewing Area	66.0 x 16.0	
Dot Size	0.55 x 0.65	
Dot Pitch	0.60 x 0.70	
Mounting Hole	75.0 x 31.0	
Character Size	2.95 x 5.55	

ABSOLUTE MAXIMUM RATINGS

ITEM	SYMBOL	STANDARD VALUE			UNIT
		MIN.	TYP.	MAX.	
Power Supply	V_{DD} to V_{SS}	- 0.3	-	13	V
Input Voltage	V_i	V_{SS}	-	V_{DD}	

Note

- V_{SS} = 0 V, V_{DD} = 5.0 V

ELECTRICAL CHARACTERISTICS

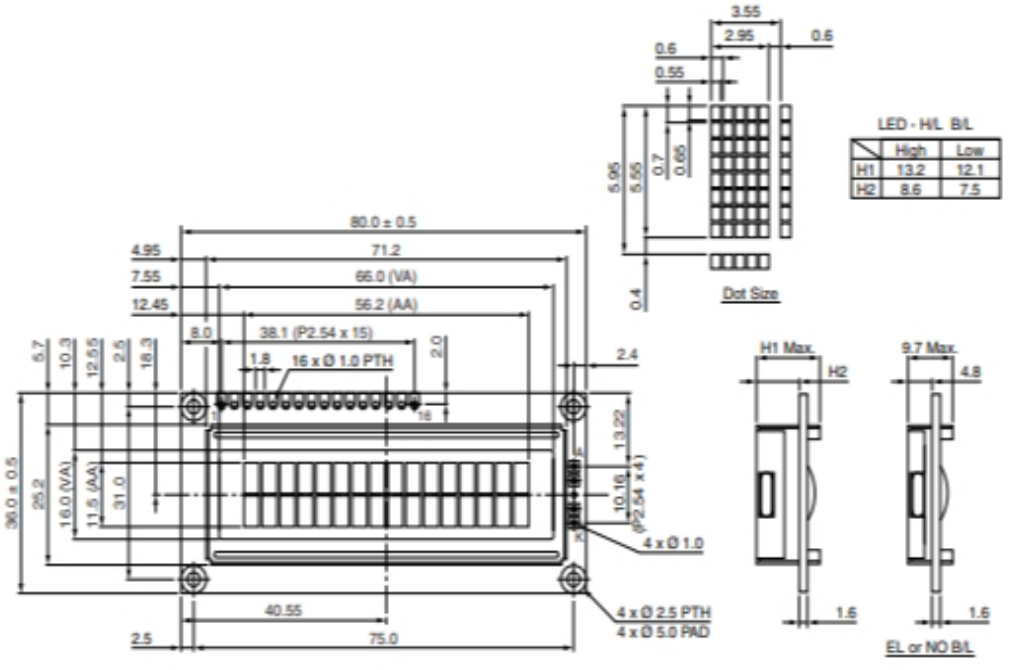
ITEM	SYMBOL	CONDITION	STANDARD VALUE			UNIT
			MIN.	TYP.	MAX.	
Input Voltage	V_{DD}	V_{DD} = + 5 V	4.5	5.0	5.5	V
Supply Current	I_{DD}	V_{DD} = + 5 V	1.0	1.2	1.5	mA
Recommended LC Driving Voltage for Normal Temperature Version Module	V_{DD} to V_0	- 20 °C	-	-	5.2	V
		0 °C	-	-	-	
		25 °C	-	3.7	-	
		50 °C	-	-	-	
		70 °C	3.1	-	-	
LED Forward Voltage	V_F	25 °C	-	4.2	4.6	V
LED Forward Current - Array	I_F	25 °C	-	100	-	mA
LED Forward Current - Edge			-	20	40	
EL Power Supply Current	I_{EL}	V_{EL} = 110 V_{AC}, 400 Hz	-	-	5.0	mA

DISPLAY CHARACTER ADDRESS CODE

Display Position	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
DD RAM Address	00	01	02	03	04	05	06	07	08	09	0A	0B	0C	0D	0E	0F
DD RAM Address	40	41	42	43	44	45	46	47	48	49	4A	4B	4C	4D	4E	4F

INTERFACE PIN FUNCTION		
PIN NO.	**SYMBOL**	**FUNCTION**
1	V_{SS}	Ground
2	V_{DD}	Supply voltage for logic
3	V_0	Operating voltage for LCD
4	RS	H: Data/L: Instruction code
5	R/$\overline{W}$	H: Read (MPU → Module)/L: Write (MPU → Module)
6	E	H → L chip enable signal
7	DB0	Data bus line
8	DB1	Data bus line
9	DB2	Data bus line
10	DB3	Data bus line
11	DB4	Data bus line
12	DB5	Data bus line
13	DB6	Data bus line
14	DB7	Data bus line
15	A	Supply power for LED+
16	R	Supply power for Red-
17	G	Supply power for Green-
18	B	Supply power for Blue-

DIMENSIONS in millimeters



4. Sensor PZEM004T

PZEM-004T V3.0 User Manual

Overview

This document describes the specification of the PZEM-004T AC communication module, the module is mainly used for measuring AC voltage, current, active power, frequency, power factor and active energy, the module is without display function, the data is read through the TTL interface.

PZEM-004T-10A: Measuring Range 10A (Built-in Shunt)
PZEM-004T-100A: Measuring Range 100A (external transformer)

1. Function description

1.1 Voltage

1.1.1 Measuring range:80～260V
1.1.2 Resolution: 0.1V
1.1.3 Measurement accuracy: 0.5%

1.2 Current

1.2.1 Measuring range: 0～10A(PZEM-004T-10A)； 0～100A(PZEM-004T-100A)
1.2.2 Starting measure current: 0.01A(PZEM-004T-10A)； 0.02A(PZEM-004T-100A)
1.2.3 Resolution: 0.001A
1.2.4 Measurement accuracy: 0.5%

1.3 Active power

1.3.1 Measuring range: 0～2.3kW(PZEM-004T-10A)； 0～23kW(PZEM-004T-100A)
1.3.2 Starting measure power: 0.4W
1.3.3 Resolution: 0.1W
1.3.4 Display format:
＜1000W, it display one decimal, such as: 999.9W
≥1000W, it display only integer, such as: 1000W
1.3.5 Measurement accuracy: 0.5%

1.4 Power factor

1.4.1 Measuring range: 0.00～1.00
1.4.2 Resolution: 0.01
1.4.3 Measurement accuracy: 1%

1.5 Frequency

1.5.1 Measuring range: 45Hz～65Hz
1.5.2 Resolution: 0.1Hz
1.5.3 Measurement accuracy: 0.5%

1.6 Active energy

1.6.1 Measuring range: 0～9999.99kWh
1.6.2 Resolution: 1Wh
1.6.3 Measurement accuracy: 0.5%
1.6.4 Display format:
＜10kWh, the display unit is Wh(1kWh=1000Wh), such as: 9999Wh
≥10kWh, the display unit is kWh, such as: 9999.99kWh
1.6.5 Reset energy: use software to reset.

1.7 Over power alarm

Active power threshold can be set, when the measured active power exceeds the threshold, it can alarm

1.8 Communication interface

RS485 interface。

2 Communication protocol

2.1 Physical layer protocol

Physical layer use UART to RS485 communication interface
Baud rate is 9600, 8 data bits, 1 stop bit, no parity

2.2 Application layer protocol

The application layer use the Modbus-RTU protocol to communicate. At present, it only supports function codes such as 0x03 (Read Holding Register), 0x04 (Read Input Register), 0x06 (Write Single Register), 0x41 (Calibration), 0x42 (Reset energy).etc.

0x41 function code is only for internal use (address can be only 0xF8), used for factory calibration and return to factory maintenance occasions, after the function code to increase 16-bit password, the default password is 0x3721

The address range of the slave is 0x01 ~ 0xF7. The address 0x00 is used as the broadcast address, the slave does not need to reply the master. The address 0xF8 is used as the general address, this address can be only used in single-slave environment and can be used for calibration etc.operation.

2.3 Read the measurement result

The command format of the master reads the measurement result is(total of 8 bytes):

Slave Address + 0x04 + Register Address High Byte + Register Address Low Byte + Number of Registers High Byte + Number of Registers Low Byte + CRC Check High Byte + CRC Check Low Byte.

The command format of the reply from the slave is divided into two kinds:

Correct Reply: Slave Address + 0x04 + Number of Bytes + Register 1 Data High Byte + Register 1 Data Low Byte + ... + CRC Check High Byte + CRC Check Low Byte

Error Reply: Slave address + 0x84 + Abnormal code + CRC check high byte + CRC check low byte

Abnormal code analyzed as following (the same below)

- 0x01,Illegal function
- 0x02,Illegal address
- 0x03,Illegal data
- 0x04,Slave error

The register of the measurement results is arranged as the following table

Register address	Description	Resolution
0x0000	Voltage value	1LSB correspond to 0.1V
0x0001	Current value low 16 bits	1LSB correspond to 0.001A
0x0002	Current value high 16 bits	
0x0003	Power value low 16 bits	1LSB correspond to 0.1W
0x0004	Power value high 16 bits	
0x0005	Energy value low 16 bits	1LSB correspond to 1Wh
0x0006	Energy value high 16 bits	
0x0007	Frequency value	1LSB correspond to 0.1Hz
0x0008	Power factor value	1LSB correspond to 0.01
0x0009	Alarm status	0xFFFF is alarm, 0x0000is not alarm

For example, the master sends the following command (CRC check code is replaced by 0xHH and 0xLL, the same below)

0x01 + 0x04 + 0x00 + 0x00 + 0x00 + 0x0A + 0xHH + 0xLL

Indicates that the master needs to read 10 registers with slave address 0x01 and the start address of the register is 0x0000

The correct reply from the slave is as following:

0x01 + 0x04 + 0x14 + 0x08 + 0x98 + 0x03 + 0xE8+0x00 + 0x00 +0x08 + 0x98+ 0x00 + 0x00 + 0x00 + 0x00 + 0x00 + 0x00 + 0x01 + 0xF4 + 0x00 + 0x64 + 0x00 + 0x00 + 0xHH + 0xLL

The above data shows

- Voltage is 0x0898, converted to decimal is 2200, display 220.0V
- Current is 0x000003E8, converted to decimal is 1000, display 1.000A
- Power is 0x00000898, converted to decimal is 2200, display 220.0W
- Energy is 0x00000000, converted to decimal is 0, display 0Wh
- Frequency is 0x01F4, converted to decimal is 500, display 50.0Hz
- Power factor is 0x0064, converted to decimal is 100, display 1.00
- Alarm status is 0x0000, indicates that the current power is lower than the alarm power threshold

2.4 Read and modify the slave parameters

At present,it only supports reading and modifying slave address and power alarm threshold
The register is arranged as the following table

Register address	Description	Resolution
0x0001	Power alarm threshold	1LSB correspond to 1W
0x0002	Modbus-RTU address	The range is 0x0001~0x00F7

The command format of the master to read the slave parameters and read the measurement results are same(descrybed in details in Section 2.3), only need to change the function code from 0x04 to 0x03.

The command format of the master to modify the slave parameters is (total of 8 bytes):

Slave Address + 0x06 + Register Address High Byte + Register Address Low Byte + Register Value High Byte + Register Value Low Byte + CRC Check High Byte + CRC Check Low Byte.

The command format of the reply from the slave is divided into two kinds:

Correct Response: Slave Address + 0x06 + Number of Bytes + Register Address Low Byte + Register Value High Byte + Register Value Low Byte + CRC Check High Byte + CRC Check Low Byte.

Error Reply: Slave address + 0x86 + Abnormal code + CRC check high byte + CRC check low byte.

For example, the master sets the slave's power alarm threshold:

0x01 + 0x06 + 0x00 + 0x01 + 0x08 + 0xFC + 0xHH + 0xLL

Indicates that the master needs to set the 0x0001 register (power alarm threshold) to 0x08FC (2300W).

Set up correctly, the slave return to the data which is sent from the master.

For example, the master sets the address of the slave

0x01 + 0x06 + 0x00 + 0x02 + 0x00 + 0x05 + 0xHH + 0xLL

Indicates that the master needs to set the 0x0002 register (Modbus-RTU address) to 0x0005

Set up correctly, the slave return to the data which is sent from the master.

2.5 Reset energy

The command format of the master to reset the slave's **energy** is (total 4 bytes):

Slave address + 0x42 + CRC check high byte + CRC check low byte.

Correct reply: slave address + 0x42 + CRC check high byte + CRC check low byte.

Error Reply: Slave address + 0xC2 + Abnormal code + CRC check high byte + CRC check low byte

2.6 Calibration

The command format of the master to calibrate the slave is (total 6 bytes):

0xF8 + 0x41 + 0x37 + 0x21 + CRC check high byte + CRC check low byte.

Correct reply: 0xF8 + 0x41 + 0x37 + 0x21 + CRC check high byte + CRC check low byte.

Error Reply: 0xF8 + 0xC1 + Abnormal code + CRC check high byte + CRC check low byte.

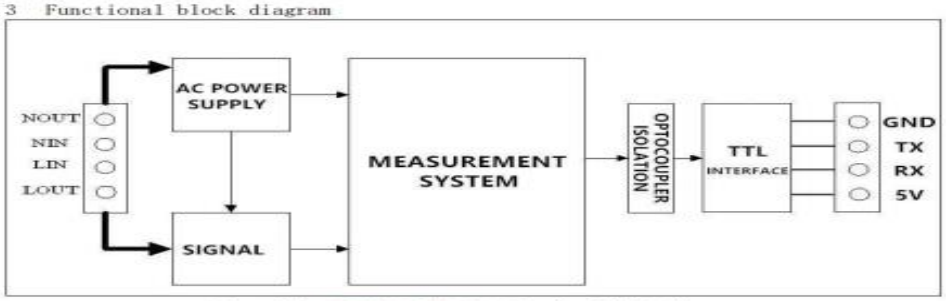
It should be noted that the calibration takes 3 to 4 seconds, after the master sends the command, if the calibration is successful, it will take 3 ~ 4 seconds to receive the response from the slave.

2.7 CRC check

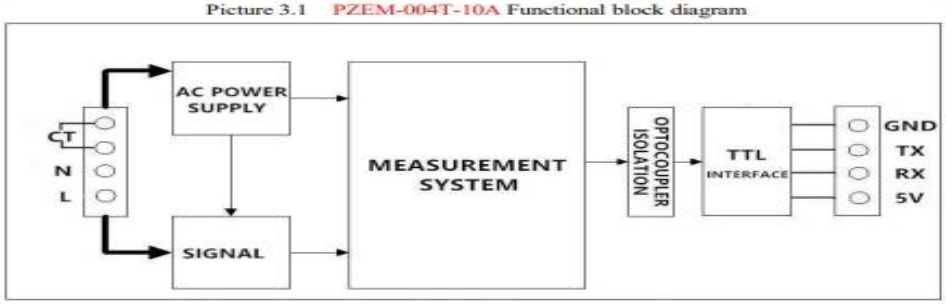
CRC check use 16bits format, occupy two bytes, the generator polynomial is X16 + X15 + X2 +1, the polynomial value used for calculation is 0xA001.

The value of the CRC check is a frame data divide all results of checking all the bytes except the CRC check value.

3 Functional block diagram



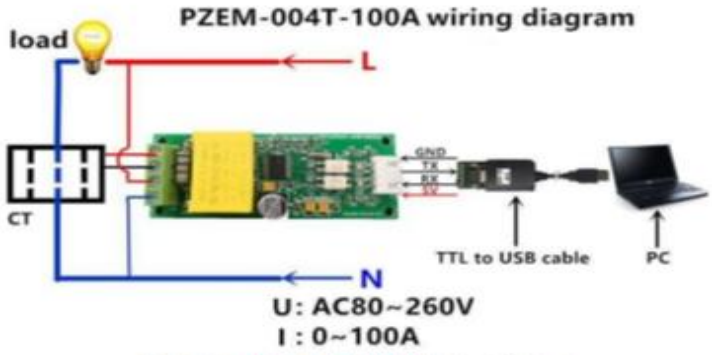
Picture 3.1 PZEM-004T-10A Functional block diagram



Picture 3.2 PZEM-004T-100A Functional block diagram

4 Wiring diagram

Picture 4.1 PZEM-004T-10A wiring diagram



Picture 4.2 PZEM-004T-100A wiring diagram

5 Other instructions

5.1 The TTL interface of this module is a passive interface, it requires external 5V power supply, which means, when communicating, all four ports must be connected (5V, RX, TX, GND), otherwise it cannot communicate.

5.2 Working temperature

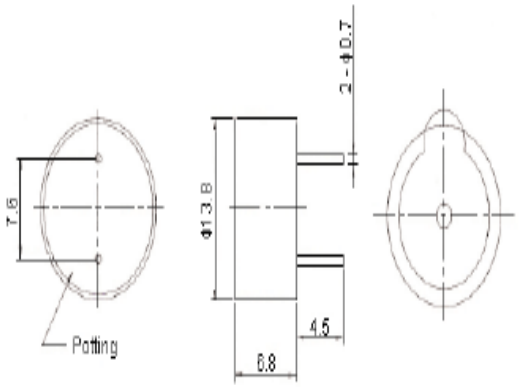
-20°C ~ +60°C.

5. *BUZEER*

pro-SIGNAL

PART NO. ABT-402-RC

REVISIONS								
ECN #	REV	DESCRIPTION	DRAWN	DATE	CHECKD	DATE	APPRVD	DATE
-	A	RELEASED	ASH	8/12/11	JAG	8/12/11		22/12/11



Tolerance: ±0.5

Dimensions : Millimetres

Features:

- Low power consumption
- PCB mountable
- Sealed base
- Wave solderable and washable

All data at 25°C unless otherwise specified.

Specifications	ABT-402-RC Piezo Transducer
Rated Voltage (Vp-p Square Wave)	5 Vp-p
Operating Voltage	1 to 20 Vp-p
Rated Current at Rated Voltage	1 mA
Capacitance	13,000 ±30% pF
Sound Output at 4,000Hz at 10 cm, at Rated Voltage	≥ 80 dB
Resonant Frequency	4,000 ±500 Hz
Operating Temperature	-20 to +70°C
Storage Temperature	-30 to +80°C
Weight	1 g

Part Number Table

Description	Part Number
Piezo Transducer, 5 V, PCB	ABT-402-RC

www.element14.com
www.farnell.com
www.newark.com
www.cpc.co.uk

TOLERANCES:

UNLESS OTHERWISE SPECIFIED, DIMENSIONS ARE FOR REFERENCE PURPOSES ONLY.

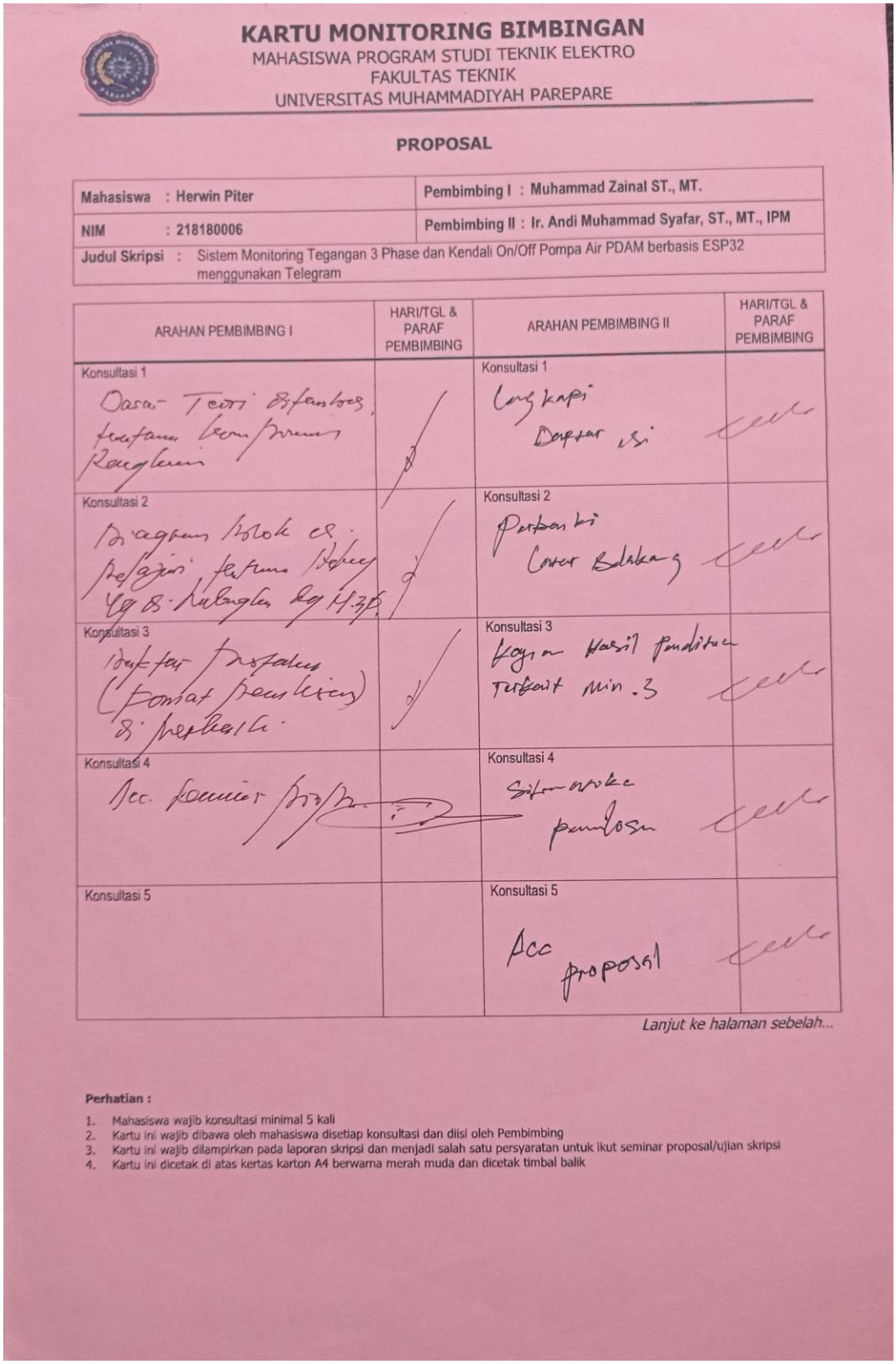
DRAWN BY:	DATE:
ASH	8/12/11
CHECKED BY:	DATE:
JAG	8/12/11
APPROVED BY:	DATE:
	22/12/11

DRAWING TITLE: ABT-402-RC - Piezo Buzzer

SIZE	DWG NO.	ELECTRONIC FILE	REV
A		66697_DWG	A

SCALE: NTS | U.O.M.: mm | SHEET: 1 OF 1

Lampiran -4 Kartu Monitoring Bimbingan



KARTU MONITORING BIMBINGAN
MAHASISWA PROGRAM STUDI TEKNIK ELEKTRO
FAKULTAS TEKNIK
UNIVERSITAS MUHAMMADIYAH PAREPARE

PROPOSAL

Mahasiswa : Herwin Piter	**Pembimbing I : Muhammad Zainal ST., MT.**
NIM : 218180006	**Pembimbing II : Ir. Andi Muhammad Syafar, ST., MT., IPM**
Judul Skripsi : Sistem Monitoring Tegangan 3 Phase dan Kendali On/Off Pompa Air PDAM berbasis ESP32 menggunakan Telegram	

ARAHAN PEMBIMBING I	HARI/TGL & PARAF PEMBIMBING	ARAHAN PEMBIMBING II	HARI/TGL & PARAF PEMBIMBING
Konsultasi 1 Dasar Teori Pendukung, tentang komponen Rangkaian		Konsultasi 1 Lengkapi Daftar isi	
Konsultasi 2 Diagram blok cara kerja, flowchart Keseluruhan Sistem, Rangkaian Keseluruhan		Konsultasi 2 Perbaiki Cover Belakang	
Konsultasi 3 Daftar Pustaka (Format penulisan) diperbaiki		Konsultasi 3 Lengkapi Hasil Pendukung Terbaru min. 3	
Konsultasi 4 Acc Seminar Proposal		Konsultasi 4 Silahkan ke penguji	
Konsultasi 5		Konsultasi 5 Acc proposal	

Lanjut ke halaman sebelah...

Perhatian :

1. Mahasiswa wajib konsultasi minimal 5 kali
2. Kartu ini wajib dibawa oleh mahasiswa disetiap konsultasi dan diisi oleh Pembimbing
3. Kartu ini wajib dilampirkan pada laporan skripsi dan menjadi salah satu persyaratan untuk ikut seminar proposal/ujian skripsi
4. Kartu ini dicetak di atas kertas karton A4 berwarna merah muda dan dicetak timbal balik

Lanjutan ...

ARAHAN PEMBIMBING I	HARI/TGL & PARAF PEMBIMBING	ARAHAN PEMBIMBING II	HARI/TGL & PARAF PEMBIMBING
Konsultasi 6		Konsultasi 6	
Konsultasi 7		Konsultasi 7	
Konsultasi 8		Konsultasi 8	
Konsultasi 9		Konsultasi 9	
Konsultasi 10		Konsultasi 10	

Parepare, 10/8/2023

Mengetahui
Ketua Program Studi

Asrul, ST., MT.
NBM. 986 836

Mahasiswa

Herwin Piter
NIM. 218180006

Perhatian :

1. Mahasiswa wajib konsultasi minimal 5 kali
2. Kartu ini wajib dibawa oleh mahasiswa disetiap konsultasi dan diisi oleh Pembimbing
3. Kartu ini wajib dilampirkan pada laporan skripsi dan menjadi salah satu persyaratan untuk ikut seminar proposal/ujian skripsi
4. Kartu ini dicetak di atas kertas karton A4 berwarna merah muda dan dicetak timbal balik

KARTU MONITORING BIMBINGAN

MAHASISWA PROGRAM STUDI TEKNIK ELEKTRO
FAKULTAS TEKNIK
UNIVERSITAS MUHAMMADIYAH PAREPARE

SKRIPSI

Mahasiswa : Herwin Piter	**Pembimbing I** : Muhammad Zainal ST., MT.
NIM : 218180006	**Pembimbing II** : Dr. Ir.A.Muhammad Syafar.,A.Md.,S.T.,M.T.,IPM
Judul Skripsi : Sistem Monitoring Tegangan 3 Phase dan Kendali On/Off Pompa Air PDAM berbasis ESP32 menggunakan Telegram	

ARAHAN PEMBIMBING I	HARI/TGL & PARAF PEMBIMBING	ARAHAN PEMBIMBING II	HARI/TGL & PARAF PEMBIMBING
Konsultasi 1 Bab I, II		Konsultasi 1 Lengkapi daftar Tabel / Gambar	
Konsultasi 2 Bab III, IV		Konsultasi 2 Tambahkan kosa kata Abstrak	
Konsultasi 3 Kesimpulan & daftar pustaka		Konsultasi 3 Perbaiki Gambar Flowcart	
Konsultasi 4 Alat dan bahan		Konsultasi 4 Sistematika Penulisan	
Konsultasi 5 ACC.		Konsultasi 5 Hasil ACC	

Lanjut ke halaman sebelah...

Perhatian :

1. Mahasiswa wajib konsultasi minimal 5 kali
2. Kartu ini wajib dibawa oleh mahasiswa disetiap konsultasi dan diisi oleh Pembimbing
3. Kartu ini wajib dilampirkan pada laporan skripsi dan menjadi salah satu persyaratan untuk ikut seminar proposal/ujian skripsi
4. Kartu ini dicetak di atas kertas karton A4 berwarna merah muda dan dicetak timbal balik

Lanjutan...

ARAHAN PEMBIMBING I	HARI/TGL & PARAF PEMBIMBING	ARAHAN PEMBIMBING II	HARI/TGL & PARAF PEMBIMBING
Konsultasi 6		Konsultasi 6	
Konsultasi 7		Konsultasi 7	
Konsultasi 8		Konsultasi 8	
Konsultasi 9		Konsultasi 9	
Konsultasi 10		Konsultasi 10	

Parepare, Rabu 10 Juli 2024

Mengetahui
Ketua Program Studi

Asrul, ST., MT.
NBM. 986 836

Mahasiswa

Herwin Piter
NIM. 218180006

Perhatian :

1. Mahasiswa wajib konsultasi minimal 5 kali
2. Kartu ini wajib dibawa oleh mahasiswa disetiap konsultasi dan diisi oleh Pembimbing
3. Kartu ini wajib dilampirkan pada laporan skripsi dan menjadi salah satu persyaratan untuk ikut seminar proposal/ujian skripsi
4. Kartu ini dicetak di atas kertas karton A4 berwarna merah muda dan dicetak timbal balik