//Modified April-7-2020, Ulsan, Korea

#include <Wire.h>

#include "CommandHandler.h"

#include "TimeLib.h"

#include "MegunoLink.h"

Message MyCSVMessage("Data");

#include <DallasTemperature.h>

#define ONE\_WIRE\_BUS 37

OneWire oneWire(ONE\_WIRE\_BUS);

DallasTemperature sensors(&oneWire);

float Celcius=0;

float Fahrenheit=0;

int flowPin = 28; //This is the input pin on the Arduino

double flowRate; //This is the value we intend to calculate.

float count;

//RTC code\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

#include <DS1307.h>

#define updata\_flag 0 //1 updata time,0 only show time

//Modify the following data

#define TIME\_YR 19

#define TIME\_MTH 10

#define TIME\_DATE 4

#define TIME\_DOW 5

#define TIME\_HR 8

#define TIME\_MIN 43

#define TIME\_SEC 0

char\* str[]={"Mon","Tues","Wed","Thur","Fri","Sat","Sun"};//week

int rtc[7];

//\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

//LCD Code\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

/\* #include "DFRobot\_RGBLCD.h"

int r;

int g;

int b;

int t=0;

FRobot\_RGBLCD lcd(24,3); //16 characters and 2 lines of show

\*/

//\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

float ODMAX = 50;

float ODMIN = 700;

float ODVarT1;

float ODVarT2;

float ODVarT3;

float ODVarT4=0;

float ODVarT5=0;

float ODVarT6=0;

float ODVarT7;

float UVOFF;

float FEDWASTEVAR1;

float FEDWASTEVAR2;

float Initialfeed;

float ODMINLOOP;

float feedspeedcont1;

float feedspeedcont2;

float Conttimestopinterval2;

float Conttimestopinterval3;

float VolumerestMIN3;

float VolumerestMIN4;

float VolumerestHR4;

float VolumerestHR5;

float OFFLOOPINTVAR;

float ONLOOPINTVAR;

float REVLOOPINTVAR;

float samamountVAR;

float samcleaningVAR;

float samamountVAR2;

float samcleaningVAR2;

float Stirvar=50;

float temperaturesetvar=37;

float temperaturesetlowvar;

float Waterbathpumpvar=20;

float temperatureactualvar;

float Multiplyvar=0.7;

//this for the stacking give variable to the motors

float MotorV1;

float MotorV2;

float MotorV3;

float MotorV4;

float rpmfeedvar=24;

float PUMPONmlVar;

float PUMPONmlVar2;

float rpmfeedvar2;

float PUMPONmlhr2;

float PUMPONmlhr3;

float Multiplyvar1;

float timewastework;

float timefeedwork;

float timefeedinminvar;

float timewasteinminvar;

float PUMPONVstand;

float airpumpspvar;

float airflowsetvar;

float airflowactualvar;

float bottlepressuresetvar;

float bottlepressureactualvar0= analogRead (A8);

float bottlepressureposiactualvar0= analogRead (A9);

float bottlepressureactualvar;

float bottlepressureposiactualvar;

//This for small reactor combination system variables;

//-------------Combination system variables-------------------

float PuOFFCombVar1;

float PuONCombVar1=0;

float PuSpeedCombVar1;

float PuOFFCombVar2;

float PuONCombVar2=0;

float PuSpeedCombVar2;

float PuOFFCombVar3;

float PuONCombVar3=0;

float PuSpeedCombVar3;

float PuOFFCombVar4;

float PuONCombVar4=0;

float PuSpeedCombVar4;

float PuONCombminVar1= (PuONCombVar1/60);

float PuONCombminVar2= (PuONCombVar2/60);

float PuONCombminVar3= (PuONCombVar3/60);

float PuONCombminVar4= (PuONCombVar4/60);

float PuONCombmlVar1=0;

float PuONCombmlVar2=0;

float PuONCombmlVar3=0;

float PuONCombmlVar4=0;

float Allcombvalue = PuONCombmlVar1+PuONCombmlVar2+PuONCombmlVar3+PuONCombmlVar4;

//------------------------------------------------

float WAterbathlevel;

float calfeedinmlvar;

float calwasteinmlvar;

//-------Calibration variables-------------------

float calfeed1minmlval= 33.3;

float calfeed2minmlval= 33.3;

float calwaste1minmlval= 38.2;

float calwaste2minmlval= 38.2;

float calloop1minmlval= 36;

float calloop2minmlval= 40;

float calcomb1minmlval=43;

float calcomb2minmlval=43;

float calcomb3minmlval=44;

float calcomb4minmlval=44;

float calfeed1secmlval= 16.6;

float calfeed2secmlval= 16.6;

float calwaste1secmlval= 19.1;

float calwaste2secmlval= 19.1;

float calloop1secmlval= 18;

float calloop2secmlval= 20;

float calcomb1secmlval=21.5;

float calcomb2secmlval=21.5;

float calcomb3secmlval=22;

float calcomb4secmlval=22;

float calfeed1ratioval= (calfeed1minmlval)/ (calfeed1secmlval);

float calfeed2ratioval= (calfeed2minmlval)/ (calfeed2secmlval) ;

float calwaste1ratioval= (calwaste1minmlval)/ (calwaste1secmlval);

float calwaste2ratioval= (calwaste2minmlval)/ (calwaste2secmlval);

float calloop1ratioval= (calloop1minmlval)/ (calloop1secmlval);

float calloop2ratioval= (calloop2minmlval)/ (calloop2secmlval);

float calcomb1ratioval= (calcomb1minmlval)/ (calcomb1secmlval);

float calcomb2ratioval= (calcomb2minmlval)/ (calcomb2minmlval);

float calcomb3ratioval= (calcomb3minmlval)/ (calcomb3secmlval);

float calcomb4ratioval= (calcomb4minmlval)/(calcomb4secmlval);

float calfeed1n2ratioval= (calfeed1minmlval)/ (calfeed2minmlval);

float calwaste1n2ratioval= (calwaste1minmlval)/ (calwaste2minmlval);

float calfeed1wasteratioval= (calfeed1minmlval)/ (calwaste1minmlval);

float calfeed2wasteratioval= (calfeed2minmlval)/(calwaste2minmlval);

float Yvarusedml;

float Yvarusedmin;

float averagefeed1n2= ((calfeed1minmlval + calfeed2minmlval)/2);

//---------------------------------------------

unsigned long Timediff1;

unsigned long Timediff2;

float Timediff3;

float addPumpOFF;

float PulseUVNow;

float readuvOFF;

float readuvOFF2;

long Varday = 86400000; // 86400000 milliseconds in a day

long Varhour = 3600000; // 3600000 milliseconds in an hour

long Varminute = 60000; // 60000 milliseconds in a minute

long Varsecond = 1000; // 1000 milliseconds in a second

float TimeVarT2 = millis();

float ODVarT9=0;

float ProcessStatus =0;

int CurrentOD = analogRead(A0);

/\*int CurrentOD1= analogRead(A1);

int CurrentOD2= analogRead(A2);

int CurrentOD3= analogRead(A3);

unsigned long curOD1OD2= CurrentOD - CurrentOD1;

unsigned long curOD3OD4= CurrentOD2 - CurrentOD3;

unsigned long curOD1OD3= CurrentOD - CurrentOD2;

unsigned long curdiffOD1OD3= curOD1OD2 - curOD3OD4;\*/

//=======combination sys cal ml===========

float PuONCombmltominVar1 =(PuONCombmlVar1/calcomb1minmlval);

float PuONCombmltominVar2 =(PuONCombmlVar2/calcomb2minmlval);

float PuONCombmltominVar3 =(PuONCombmlVar3/calcomb3minmlval);

float PuONCombmltominVar4 =(PuONCombmlVar4/calcomb4minmlval);

//======================================

unsigned long EmptyODval= 600;

unsigned long RealOD= -log(CurrentOD/EmptyODval);

float UVMUT;

float FLOWINMAX = 100;

float FLOWINMIN = 250;

float FLOWADDIN = 50;

float PUMPONV = 0.2;

float PUMPONV3 = ((PUMPONV)/60);

double PUMPONV2 = (0.5\*(PUMPONV));

float PUMPOFFV = 10;

float PUMPOFFVhr = 1;

float PUMPOFFVmin = ((PUMPOFFVhr)/60);

float PUMPOFFVall = (PUMPOFFVmin+PUMPOFFV);

float ODREADSS = 0;

int Automaticcond1= 4;

float ODVarT8;

unsigned long previousMillis = 0;

unsigned long previousMillis2 = 0;

unsigned long previousMillis3 = 0;

unsigned long previousMillis4 = 0;

unsigned long previousMillis5 = 0;

unsigned long previousMillis6 = 0;

unsigned long previousMillis8 = 0;

unsigned long previousMillis9 = 0;

unsigned long previousMillistemp = 0;

unsigned long previousMillistemp2 = 0;

unsigned long previousMillisflowsens=0;

unsigned long previousMillisLOOP1 = 0;

unsigned long previousMillisLOOP2 = 0;

unsigned long previousMillisSampl = 0;

unsigned long previousMilliscombination = 0;

unsigned long previousMilliscombination1 = 0;

unsigned long previousMilliscombination2 = 0;

unsigned long previousMilliscombination3 = 0;

unsigned long currentMillis3 = millis();

unsigned long Countdownsec;

unsigned long Countdownmin;

unsigned long Countdownhr;

String operName;

// Select which 'port' M1, M2, M3 or M4. In this case, M1 (V2)

CommandHandler<200> SerialCommandHandler;

#include <SoftwareSerial.h>

InterfacePanel MyPanel;

#include <Adafruit\_MotorShield.h>

Adafruit\_MotorShield AFMS(0x60);

Adafruit\_MotorShield AFMS1(0x61); //this only flipped for the old (renewed) reactor 3) it should be [Adafruit\_MotorShield AFMS1(0x61);]

Adafruit\_MotorShield AFMS2(0x62); //this only flipped for the old (renewed) reactor 3) it should be [Adafruit\_MotorShield AFMS2(0x62);]

Adafruit\_MotorShield AFMS3(0x63); // This is the control sample M1,M2,M3 are the feed, waste, loop, and M4 is the Stirring

#include <avr/wdt.h>

Adafruit\_DCMotor \*myMotor1 = AFMS.getMotor(1); //Feed1

Adafruit\_DCMotor \*myMotor1Sh3 = AFMS.getMotor(2); //Feed2

Adafruit\_DCMotor \*myMotor2 = AFMS.getMotor(3); //Waste1

Adafruit\_DCMotor \*myMotor2Sh3 = AFMS.getMotor(4); //Waste2

Adafruit\_DCMotor \*myMotor1Sh1 = AFMS1.getMotor(1); //combination sys pump 1

Adafruit\_DCMotor \*myMotor2Sh1 = AFMS1.getMotor(2); //combination sys pump 2

Adafruit\_DCMotor \*myMotor3Sh1 = AFMS1.getMotor(3); //combination sys pump 3

Adafruit\_DCMotor \*myMotor4Sh1 = AFMS1.getMotor(4); //combination sys pump 4

Adafruit\_DCMotor \*myMotor1Sh2 = AFMS2.getMotor(1); //Main cooling Fan

Adafruit\_DCMotor \*myMotor2Sh2 = AFMS2.getMotor(2); //Air pump 2

Adafruit\_DCMotor \*myMotor3Sh2 = AFMS2.getMotor(3); //Waterbath pump

Adafruit\_DCMotor \*myMotor4Sh2 = AFMS2.getMotor(4); //Air pump 1

Adafruit\_DCMotor \*myMotor3 = AFMS3.getMotor(1); //Loop1

Adafruit\_DCMotor \*myMotor3Sh3 = AFMS3.getMotor(2); //Loop2

Adafruit\_DCMotor \*myMotor4 = AFMS3.getMotor(3); //Stir1

Adafruit\_DCMotor \*myMotor4Sh3 = AFMS3.getMotor(4); //Stir2

#include <SD.h>

#include <SPI.h>

File myFile;

int pinCS = 53;

//----------- flow and pressure sensor --------------------------

void Cmd\_airpumpspenter(CommandParameter &p)

{

airpumpspvar = p.NextParameterAsDouble();

MyPanel.SetNumber(F("airpumpspval"), airpumpspvar);

myMotor4Sh2->setSpeed(airpumpspvar);

myMotor4Sh2->run(FORWARD);

myMotor2Sh2->setSpeed(airpumpspvar);

myMotor2Sh2->run(FORWARD);

}

void Cmd\_airflowsetenter(CommandParameter &p)

{

airflowsetvar = p.NextParameterAsDouble();

MyPanel.SetNumber(F("airflowsetval"), airflowsetvar);

}

void Cmd\_bottlepressuresetenter(CommandParameter &p)

{

bottlepressuresetvar = p.NextParameterAsDouble();

MyPanel.SetNumber(F("bottlepressuresetval"), bottlepressuresetvar);

}

//------------------------------------------------------------

// Manual pump control -----------------////////////////////

void Cmd\_Multiplyvalenter(CommandParameter &p)

{

Multiplyvar = p.NextParameterAsDouble();

MyPanel.SetNumber(F("Multiplyval"), Multiplyvar);

Multiplyvar1= 1- Multiplyvar;

PUMPONVstand = (PUMPONmlhr2 \* rpmfeedvar2)/0.5;

PUMPONV = (Multiplyvar \* PUMPONVstand / 0.5);

}

void Cmd\_feedstartmanope(CommandParameter &p)

{

myMotor1->setSpeed(250);

myMotor1->run(FORWARD);

}

void Cmd\_feedstopmanope(CommandParameter &p)

{

myMotor1->run(RELEASE);

}

void Cmd\_feedrevmanope(CommandParameter &p)

{

myMotor1->setSpeed(250);

myMotor1->run(BACKWARD);

}

void Cmd\_feed2startmanope(CommandParameter &p)

{

myMotor1Sh3->setSpeed(250);

myMotor1Sh3->run(FORWARD);

}

void Cmd\_feed2stopmanope(CommandParameter &p)

{

myMotor1Sh3->run(RELEASE);

}

void Cmd\_feed2revmanope(CommandParameter &p)

{

myMotor1Sh3->setSpeed(250);

myMotor1Sh3->run(BACKWARD);

}

void Cmd\_wastestartmanope(CommandParameter &p)

{

myMotor2->setSpeed(250);

myMotor2->run(FORWARD);

}

void Cmd\_wastestopmanope(CommandParameter &p)

{

myMotor2->run(RELEASE);

}

void Cmd\_wasterevmanope(CommandParameter &p)

{

myMotor2->setSpeed(250);

myMotor2->run(BACKWARD);

}

void Cmd\_waste2startmanope(CommandParameter &p)

{

myMotor2Sh3->setSpeed(250);

myMotor2Sh3->run(FORWARD);

}

void Cmd\_waste2stopmanope(CommandParameter &p)

{

myMotor2Sh3->run(RELEASE);

}

void Cmd\_waste2revmanope(CommandParameter &p)

{

myMotor2Sh3->setSpeed(250);

myMotor2Sh3->run(BACKWARD);

}

void Cmd\_comp1startmanope(CommandParameter &p)

{

myMotor1Sh1->setSpeed(250);

myMotor1Sh1->run(FORWARD);

}

void Cmd\_comp1stopmanope(CommandParameter &p)

{

myMotor1Sh1->run(RELEASE);

}

void Cmd\_comp1revmanope(CommandParameter &p)

{

myMotor1Sh1->setSpeed(250);

myMotor1Sh1->run(BACKWARD);

}

void Cmd\_comp2startmanope(CommandParameter &p)

{

myMotor2Sh1->setSpeed(250);

myMotor2Sh1->run(FORWARD);

}

void Cmd\_comp2stopmanope(CommandParameter &p)

{

myMotor2Sh1->run(RELEASE);

}

void Cmd\_comp2revmanope(CommandParameter &p)

{

myMotor2Sh1->setSpeed(250);

myMotor2Sh1->run(BACKWARD);

}

void Cmd\_comp3startmanope(CommandParameter &p)

{

myMotor3Sh1->setSpeed(250);

myMotor3Sh1->run(FORWARD);

}

void Cmd\_comp3stopmanope(CommandParameter &p)

{

myMotor3Sh1->run(RELEASE);

}

void Cmd\_comp3revmanope(CommandParameter &p)

{

myMotor3Sh1->setSpeed(250);

myMotor3Sh1->run(BACKWARD);

}

void Cmd\_comp4startmanope(CommandParameter &p)

{

myMotor4Sh1->setSpeed(250);

myMotor4Sh1->run(FORWARD);

}

void Cmd\_comp4stopmanope(CommandParameter &p)

{

myMotor4Sh1->run(RELEASE);

}

void Cmd\_comp4revmanope(CommandParameter &p)

{

myMotor4Sh1->setSpeed(250);

myMotor4Sh1->run(BACKWARD);

}

void Cmd\_switch1ONmanope(CommandParameter &p)

{

digitalWrite (22, HIGH);

digitalWrite (23, LOW);

}

void Cmd\_switch1OFFmanope(CommandParameter &p)

{

digitalWrite (22, LOW);

digitalWrite (23, LOW);

}

void Cmd\_switch2ONmanope(CommandParameter &p)

{

digitalWrite (24, HIGH);

digitalWrite (25, LOW);

}

void Cmd\_switch2OFFmanope(CommandParameter &p)

{

digitalWrite (24, LOW);

digitalWrite (25, LOW);

}

// -----------------////////////////////////////

//Calibration commands ----------------------------------------------------

void Cmd\_mlfeedinghowmany (CommandParameter &p)

{

Yvarusedml = p.NextParameterAsDouble();

MyPanel.SetNumber(F("mlfeedinghowmanyval"),Yvarusedml);

averagefeed1n2 = ((calfeed1minmlval + calfeed2minmlval)/2);

Yvarusedmin = (Yvarusedml / averagefeed1n2);

MyPanel.SetNumber(F("Yvarusedminval"),Yvarusedmin);

}

//--------------------Calibration in min------------------------------------

void Cmd\_onfeed1calmin(CommandParameter &p)

{

myMotor1->setSpeed(FLOWINMIN);

myMotor1->run(FORWARD);

delay (60000);

}

void Cmd\_onfeed2calmin(CommandParameter &p)

{

myMotor1Sh3->setSpeed(FLOWINMIN);

myMotor1Sh3->run(FORWARD);

delay (60000);

}

void Cmd\_onwaste1calmin(CommandParameter &p)

{

myMotor2->setSpeed(FLOWINMIN);

myMotor2->run(FORWARD);

delay (60000);

}

void Cmd\_onwaste2calmin(CommandParameter &p)

{

myMotor2Sh3->setSpeed(FLOWINMIN);

myMotor2Sh3->run(FORWARD);

delay (60000);

}

void Cmd\_onloop1calmin(CommandParameter &p)

{

myMotor3->setSpeed(FLOWINMAX);

myMotor3->run(FORWARD);

delay (60000);

}

void Cmd\_onloop2calmin(CommandParameter &p)

{

myMotor3Sh3->setSpeed(FLOWINMAX);

myMotor3Sh3->run(FORWARD);

delay (60000);

}

void Cmd\_oncomp1calmin(CommandParameter &p)

{

myMotor1Sh1->setSpeed(250);

myMotor1Sh1->run(FORWARD);

delay (60000);

}

void Cmd\_oncomp2calmin(CommandParameter &p)

{

myMotor2Sh1->setSpeed(250);

myMotor2Sh1->run(FORWARD);

delay (60000);

}

void Cmd\_oncomp3calmin(CommandParameter &p)

{

myMotor3Sh1->setSpeed(250);

myMotor3Sh1->run(FORWARD);

delay (60000);

}

void Cmd\_oncomp4calmin(CommandParameter &p)

{

myMotor4Sh1->setSpeed(250);

myMotor4Sh1->run(FORWARD);

delay (60000);

}

void Cmd\_onfeed1calminml(CommandParameter &p)

{

calfeed1minmlval = p.NextParameterAsDouble();

MyPanel.SetNumber(F("calfeed1min"),calfeed1minmlval);

calfeed1ratioval= (calfeed1minmlval)/ (calfeed1secmlval);

calfeed1n2ratioval= (calfeed1minmlval)/ (calfeed2minmlval);

calfeed1wasteratioval= (calfeed1minmlval)/ (calwaste1minmlval);

MyPanel.SetNumber(F("calfeed1result"),calfeed1ratioval);

MyPanel.SetNumber(F("Feed1n2rationvv"),calfeed1n2ratioval);

MyPanel.SetNumber(F("Feed1wasterationvv"),calfeed1wasteratioval);

}

void Cmd\_onfeed2calminml(CommandParameter &p)

{

calfeed2minmlval = p.NextParameterAsDouble();

MyPanel.SetNumber(F("calfeed2min"),calfeed2minmlval);

calfeed2ratioval= (calfeed2minmlval)/ (calfeed2secmlval);

calfeed1n2ratioval= (calfeed1minmlval)/ (calfeed2minmlval);

calfeed2wasteratioval= (calfeed2minmlval)/(calwaste2minmlval);

MyPanel.SetNumber(F("calfeed2result"),calfeed2ratioval);

MyPanel.SetNumber(F("Feed1n2rationvv"), calfeed1n2ratioval);

MyPanel.SetNumber(F("Feed2wasterationvv"),calfeed2wasteratioval);

}

void Cmd\_onwaste1calminml(CommandParameter &p)

{

calwaste1minmlval = p.NextParameterAsDouble();

MyPanel.SetNumber(F("calwaste1min"),calwaste1minmlval);

calwaste1ratioval= (calwaste1minmlval)/ (calwaste1secmlval);

calwaste1n2ratioval= (calwaste1minmlval)/ (calwaste2minmlval);

calfeed1wasteratioval= (calfeed1minmlval)/ (calwaste1minmlval);

MyPanel.SetNumber(F("calwaste1result"),calwaste1ratioval);

MyPanel.SetNumber(F("waste1n2rationvv"), calwaste1n2ratioval);

MyPanel.SetNumber(F("Feed1wasterationvv"),calfeed1wasteratioval);

}

void Cmd\_onwaste2calminml(CommandParameter &p)

{

calwaste2minmlval = p.NextParameterAsDouble();

MyPanel.SetNumber(F("calwaste2min"),calwaste2minmlval);

calwaste2ratioval= (calwaste2minmlval)/ (calwaste2secmlval);

calwaste1n2ratioval= (calwaste1minmlval)/ (calwaste2minmlval);

calfeed2wasteratioval= (calfeed2minmlval)/(calwaste2minmlval);

MyPanel.SetNumber(F("calwaste2result"),calwaste2ratioval);

MyPanel.SetNumber(F("waste1n2rationvv"), calwaste1n2ratioval);

MyPanel.SetNumber(F("Feed2wasterationvv"),calfeed2wasteratioval);

}

void Cmd\_onloop1calminml(CommandParameter &p)

{

calloop1minmlval = p.NextParameterAsDouble();

MyPanel.SetNumber(F("calloop1min"),calloop1minmlval);

calloop1ratioval= (calloop1minmlval)/ (calloop1secmlval);

MyPanel.SetNumber(F("calloop1result"),calloop1ratioval);

}

void Cmd\_onloop2calminml(CommandParameter &p)

{

calloop2minmlval = p.NextParameterAsDouble();

MyPanel.SetNumber(F("calloop2min"),calloop2minmlval);

calloop2ratioval= (calloop2minmlval)/ (calloop2secmlval);

MyPanel.SetNumber(F("calloop2result"),calloop2ratioval);

}

void Cmd\_oncomp1calminml(CommandParameter &p)

{

calcomb1minmlval = p.NextParameterAsDouble();

MyPanel.SetNumber(F("calcomp1min"),calcomb1minmlval);

calcomb1ratioval= (calcomb1minmlval)/ (calcomb1secmlval);

MyPanel.SetNumber(F("calcomp1result"),calcomb1ratioval);

}

void Cmd\_oncomp2calminml(CommandParameter &p)

{

calcomb2minmlval = p.NextParameterAsDouble();

MyPanel.SetNumber(F("calcomp2min"),calcomb2minmlval);

calcomb2ratioval= (calcomb2minmlval)/ (calcomb2minmlval);

MyPanel.SetNumber(F("calcomp2result"),calcomb2ratioval);

}

void Cmd\_oncomp3calminml(CommandParameter &p)

{

calcomb3minmlval = p.NextParameterAsDouble();

MyPanel.SetNumber(F("calcomp3min"),calcomb3minmlval);

calcomb3ratioval= (calcomb3minmlval)/ (calcomb3secmlval);

MyPanel.SetNumber(F("calcomp3result"),calcomb3ratioval);

}

void Cmd\_oncomp4calminml(CommandParameter &p)

{

calcomb4minmlval = p.NextParameterAsDouble();

MyPanel.SetNumber(F("calcomp4min"),calcomb4minmlval);

calcomb4ratioval= (calcomb4minmlval)/(calcomb4secmlval);

MyPanel.SetNumber(F("calcomp4result"),calcomb4ratioval);

}

//-------------Calibration in sec--------------------------

void Cmd\_onfeed1calsec(CommandParameter &p)

{

myMotor1->setSpeed(FLOWINMIN);

myMotor1->run(FORWARD);

delay (30000);

}

void Cmd\_onfeed2calsec(CommandParameter &p)

{

myMotor1Sh3->setSpeed(FLOWINMIN);

myMotor1Sh3->run(FORWARD);

delay (30000);

}

void Cmd\_onwaste1calsec(CommandParameter &p)

{

myMotor2->setSpeed(FLOWINMIN);

myMotor2->run(FORWARD);

delay (30000);

}

void Cmd\_onwaste2calsec(CommandParameter &p)

{

myMotor2Sh3->setSpeed(FLOWINMIN);

myMotor2Sh3->run(FORWARD);

delay (30000);

}

void Cmd\_onloop1calsec(CommandParameter &p)

{

myMotor3->setSpeed(FLOWINMAX);

myMotor3->run(FORWARD);

delay (30000);

}

void Cmd\_onloop2calsec(CommandParameter &p)

{

myMotor3Sh3->setSpeed(FLOWINMAX);

myMotor3Sh3->run(FORWARD);

delay (30000);

}

void Cmd\_oncomp1calsec(CommandParameter &p)

{

myMotor1Sh1->setSpeed(250);

myMotor1Sh1->run(FORWARD);

delay (30000);

}

void Cmd\_oncomp2calsec(CommandParameter &p)

{

myMotor2Sh1->setSpeed(250);

myMotor2Sh1->run(FORWARD);

delay (30000);

}

void Cmd\_oncomp3calsec(CommandParameter &p)

{

myMotor3Sh1->setSpeed(250);

myMotor3Sh1->run(FORWARD);

delay (30000);

}

void Cmd\_oncomp4calsec(CommandParameter &p)

{

myMotor4Sh1->setSpeed(250);

myMotor4Sh1->run(FORWARD);

delay (30000);

}

void Cmd\_onfeed1calsecml(CommandParameter &p)

{

calfeed1secmlval = p.NextParameterAsDouble();

MyPanel.SetNumber(F("calfeed1sec"),calfeed1secmlval);

calfeed1ratioval= (calfeed1minmlval)/ (calfeed1secmlval);

MyPanel.SetNumber(F("calfeed1result"),calfeed1ratioval);

}

void Cmd\_onfeed2calsecml(CommandParameter &p)

{

calfeed2secmlval = p.NextParameterAsDouble();

MyPanel.SetNumber(F("calfeed2sec"),calfeed2secmlval);

calfeed2ratioval= (calfeed2minmlval)/ (calfeed2secmlval);

MyPanel.SetNumber(F("calfeed2result"),calfeed2ratioval);

}

void Cmd\_onwaste1calsecml(CommandParameter &p)

{

calwaste1secmlval = p.NextParameterAsDouble();

MyPanel.SetNumber(F("calwaste1sec"),calwaste1secmlval);

calwaste1ratioval= (calwaste1minmlval)/ (calwaste1secmlval);

MyPanel.SetNumber(F("calwaste1result"),calwaste1ratioval);

}

void Cmd\_onwaste2calsecml(CommandParameter &p)

{

calwaste2secmlval = p.NextParameterAsDouble();

MyPanel.SetNumber(F("calwaste2sec"),calwaste2secmlval);

calwaste2ratioval= (calwaste2minmlval)/ (calwaste2secmlval);

MyPanel.SetNumber(F("calwaste2result"),calwaste2ratioval);

}

void Cmd\_onloop1calsecml(CommandParameter &p)

{

calloop1secmlval = p.NextParameterAsDouble();

MyPanel.SetNumber(F("calloop1sec"),calloop1secmlval);

calloop1ratioval= (calloop1minmlval)/ (calloop1secmlval);

MyPanel.SetNumber(F("calloop1result"),calloop1ratioval);

}

void Cmd\_onloop2calsecml(CommandParameter &p)

{

calloop2secmlval = p.NextParameterAsDouble();

MyPanel.SetNumber(F("calloop2sec"),calloop2secmlval);

calloop2ratioval= (calloop2minmlval)/ (calloop2secmlval);

MyPanel.SetNumber(F("calloop2result"),calloop2ratioval);

}

void Cmd\_oncomp1calsecml(CommandParameter &p)

{

calcomb1secmlval = p.NextParameterAsDouble();

MyPanel.SetNumber(F("calcomp1sec"),calcomb1secmlval);

calcomb1ratioval= (calcomb1minmlval)/ (calcomb1secmlval);

MyPanel.SetNumber(F("calcomp1result"),calcomb1ratioval);

}

void Cmd\_oncomp2calsecml(CommandParameter &p)

{

calcomb2secmlval = p.NextParameterAsDouble();

MyPanel.SetNumber(F("calcomp2sec"),calcomb2secmlval);

calcomb2ratioval= (calcomb2minmlval)/ (calcomb2secmlval);

MyPanel.SetNumber(F("calcomp2result"),calcomb2ratioval);

}

void Cmd\_oncomp3calsecml(CommandParameter &p)

{

calcomb3secmlval = p.NextParameterAsDouble();

MyPanel.SetNumber(F("calcomp3sec"),calcomb3secmlval);

calcomb3ratioval= (calcomb3minmlval)/ (calcomb3secmlval);

MyPanel.SetNumber(F("calcomp3result"),calcomb3ratioval);

}

void Cmd\_oncomp4calsecml(CommandParameter &p)

{

calcomb4secmlval = p.NextParameterAsDouble();

MyPanel.SetNumber(F("calcomp4sec"),calcomb4secmlval);

calcomb4ratioval= (calcomb4minmlval)/(calcomb4secmlval);

MyPanel.SetNumber(F("calcomp4result"),calcomb4ratioval);

}

//--------------------------------------------------------

void Cmd\_bathpump(CommandParameter &p)

{

Waterbathpumpvar = p.NextParameterAsDouble();

MyPanel.SetNumber(F("Waterbathpump"), Waterbathpumpvar);

myMotor3Sh2->setSpeed(Waterbathpumpvar);

myMotor3Sh2->run(FORWARD);

}

void Cmd\_ODBASELINE(CommandParameter &p)

{

EmptyODval = p.NextParameterAsDouble();

MyPanel.SetNumber(F("ODBASELINEVal"),EmptyODval);

}

void Cmd\_feedspeedcont(CommandParameter &p)

{

feedspeedcont1 = p.NextParameterAsDouble();

MyPanel.SetNumber(F("FeedspeedVal"),feedspeedcont1);

feedspeedcont2= feedspeedcont1 + FLOWINMIN;

}

void Cmd\_Conttimestopinterval(CommandParameter &p)

{

Conttimestopinterval2 = p.NextParameterAsDouble();

MyPanel.SetNumber(F("FedWastestopint"),Conttimestopinterval2);

Conttimestopinterval3= Conttimestopinterval2 \* 1000;

}

void Cmd\_VolumerestMIN(CommandParameter &p)

{

VolumerestMIN3 = p.NextParameterAsDouble();

MyPanel.SetNumber(F("VolRestVAl"),VolumerestMIN3);

VolumerestMIN4 = VolumerestMIN3 \* 60000;

}

void Cmd\_VolumerestHR(CommandParameter &p)

{

VolumerestHR4 = p.NextParameterAsDouble();

MyPanel.SetNumber(F("VolRestVAl"),VolumerestHR4);

VolumerestHR5 = VolumerestHR4 \* 3600000;

}

void Cmd\_OFFLOOPINTsent(CommandParameter &p)

{

OFFLOOPINTVAR = p.NextParameterAsDouble();

MyPanel.SetNumber(F("OFFLOOPINTVAL"),OFFLOOPINTVAR);

}

void Cmd\_ONLOOPINTsent(CommandParameter &p)

{

ONLOOPINTVAR = p.NextParameterAsDouble();

MyPanel.SetNumber(F("ONLOOPINTVAL"),ONLOOPINTVAR);

}

void Cmd\_REVLOOPINTsent(CommandParameter &p)

{

REVLOOPINTVAR = p.NextParameterAsDouble();

MyPanel.SetNumber(F("REVLOOPINTVAL"),REVLOOPINTVAR);

}

//------Enter temperature--------------------------------------------------------

void Cmd\_Temperaturenter(CommandParameter &p)

{

temperaturesetvar = p.NextParameterAsDouble();

MyPanel.SetNumber(F("Temperatureset"),temperaturesetvar );

}

//-------------------------------------------------------------------------------

//------stirr--------------------------------------------------------------------

void Cmd\_Stirring(CommandParameter &p)

{

Stirvar = p.NextParameterAsDouble();

MyPanel.SetNumber(F("Stirvalue"),Stirvar );

myMotor4->setSpeed(Stirvar);

myMotor4Sh3->setSpeed(Stirvar);

myMotor4->run(FORWARD);

myMotor4Sh3->run(FORWARD);

}

//----------------------------------------------------

//-------------Calibration from ml to min-----------Fix ittttt Nov-24--

void Cmd\_rpmfeedenter(CommandParameter &p)

{

//rpmfeedvar = p.NextParameterAsDouble();

//MyPanel.SetNumber(F("rpmfeedval"), rpmfeedvar);

// rpmfeedvar2 = 23.5 / rpmfeedvar;

//Multiplyvar1= 1- Multiplyvar;

}

void Cmd\_PUMPDELAYONml(CommandParameter &p)

{

PUMPONmlVar = p.NextParameterAsDouble();

MyPanel.SetNumber(F("PUMPONmlVAL"), (PUMPONmlVar));

//PUMPONmlhr2 = (PUMPONmlVar \* 0.017)/ 4.125;

//PUMPONV = (PUMPONmlhr2 \* rpmfeedvar2)/Multiplyvar1;

averagefeed1n2 = ((calfeed1minmlval + calfeed2minmlval)/2);

Yvarusedmin = (PUMPONmlVar / averagefeed1n2);

PUMPONV= Yvarusedmin;

PUMPONV3 = ((PUMPONV)/60);

MyPanel.SetNumber(F("PUMPONVAL"), PUMPONV);

}

//-----------------------------------------------------------

//Combination system INPUT=====categorize---------------------------------------------------

void Cmd\_PuOFFComb1(CommandParameter &p)

{

PuOFFCombVar1 = p.NextParameterAsDouble();

MyPanel.SetNumber(F("PuOFFCombVal1"),PuOFFCombVar1 );

}

void Cmd\_PuONComb1(CommandParameter &p)

{

PuONCombVar1 = p.NextParameterAsDouble();

MyPanel.SetNumber(F("PuONCombVal1"),PuONCombVar1);

PuONCombmlVar1= PuONCombmltominVar1\*calcomb1minmlval;

MyPanel.SetNumber(F("PuONCombmlVal1"),PuONCombmlVar1);

Allcombvalue = PuONCombmlVar1+PuONCombmlVar2+PuONCombmlVar3+PuONCombmlVar4;

MyPanel.SetNumber(F("allcombvalvar"), Allcombvalue);

}

void Cmd\_PuSpeedComb1(CommandParameter &p)

{

PuSpeedCombVar1 = p.NextParameterAsDouble();

MyPanel.SetNumber(F("PuSpeedCombVal1"),PuSpeedCombVar1);

}

void Cmd\_PuOFFComb2(CommandParameter &p)

{

PuOFFCombVar2 = p.NextParameterAsDouble();

MyPanel.SetNumber(F("PuOFFCombVal2"),PuOFFCombVar2 );

}

void Cmd\_PuONComb2(CommandParameter &p)

{

PuONCombVar2 = p.NextParameterAsDouble();

MyPanel.SetNumber(F("PuONCombVal2"),PuONCombVar2);

PuONCombmlVar2= PuONCombmltominVar2\*calcomb2minmlval;

MyPanel.SetNumber(F("PuONCombmlVal2"),PuONCombmlVar2);

Allcombvalue = PuONCombmlVar1+PuONCombmlVar2+PuONCombmlVar3+PuONCombmlVar4;

MyPanel.SetNumber(F("allcombvalvar"), Allcombvalue);

}

void Cmd\_PuSpeedComb2(CommandParameter &p)

{

PuSpeedCombVar2 = p.NextParameterAsDouble();

MyPanel.SetNumber(F("PuSpeedCombVal2"),PuSpeedCombVar2);

}

void Cmd\_PuOFFComb3(CommandParameter &p)

{

PuOFFCombVar3 = p.NextParameterAsDouble();

MyPanel.SetNumber(F("PuOFFCombVal3"),PuOFFCombVar3);

}

void Cmd\_PuONComb3(CommandParameter &p)

{

PuONCombVar3 = p.NextParameterAsDouble();

MyPanel.SetNumber(F("PuONCombVal3"),PuONCombVar3);

PuONCombmlVar3= PuONCombmltominVar3\*calcomb3minmlval;

MyPanel.SetNumber(F("PuONCombmlVal3"),PuONCombmlVar3);

Allcombvalue = PuONCombmlVar1+PuONCombmlVar2+PuONCombmlVar3+PuONCombmlVar4;

MyPanel.SetNumber(F("allcombvalvar"), Allcombvalue);

}

void Cmd\_PuSpeedComb3(CommandParameter &p)

{

PuSpeedCombVar3 = p.NextParameterAsDouble();

MyPanel.SetNumber(F("PuSpeedCombVal3"),PuSpeedCombVar3);

}

void Cmd\_PuOFFComb4(CommandParameter &p)

{

PuOFFCombVar4 = p.NextParameterAsDouble();

MyPanel.SetNumber(F("PuOFFCombVal4"),PuOFFCombVar4 );

}

void Cmd\_PuONComb4(CommandParameter &p)

{

PuONCombVar4 = p.NextParameterAsDouble();

MyPanel.SetNumber(F("PuONCombVal4"),PuONCombVar4);

PuONCombmlVar4= PuONCombmltominVar4\*calcomb4minmlval;

MyPanel.SetNumber(F("PuONCombmlVal4"),PuONCombmlVar4);

Allcombvalue = PuONCombmlVar1+PuONCombmlVar2+PuONCombmlVar3+PuONCombmlVar4;

MyPanel.SetNumber(F("allcombvalvar"), Allcombvalue);

}

void Cmd\_PuSpeedComb4(CommandParameter &p)

{

PuSpeedCombVar4 = p.NextParameterAsDouble();

MyPanel.SetNumber(F("PuSpeedCombVal4"),PuSpeedCombVar4);

}

void Cmd\_PuONCombml1(CommandParameter &p)

{

PuONCombmlVar1 = p.NextParameterAsDouble();

MyPanel.SetNumber(F("PuONCombmlVal1"),PuONCombmlVar1);

PuONCombmltominVar1 =(PuONCombmlVar1/calcomb1minmlval);

PuONCombVar1 = PuONCombmltominVar1;

MyPanel.SetNumber(F("PuONCombVal1"),PuONCombVar1);

Allcombvalue = PuONCombmlVar1+PuONCombmlVar2+PuONCombmlVar3+PuONCombmlVar4;

MyPanel.SetNumber(F("allcombvalvar"), Allcombvalue);

}

void Cmd\_PuONCombml2(CommandParameter &p)

{

PuONCombmlVar2 = p.NextParameterAsDouble();

MyPanel.SetNumber(F("PuONCombmlVal2"),PuONCombmlVar2);

PuONCombmltominVar2 =(PuONCombmlVar2/calcomb2minmlval);

PuONCombVar2 = PuONCombmltominVar2;

MyPanel.SetNumber(F("PuONCombVal2"),PuONCombVar2);

Allcombvalue = PuONCombmlVar1+PuONCombmlVar2+PuONCombmlVar3+PuONCombmlVar4;

MyPanel.SetNumber(F("allcombvalvar"), Allcombvalue);

}

void Cmd\_PuONCombml3(CommandParameter &p)

{

PuONCombmlVar3 = p.NextParameterAsDouble();

MyPanel.SetNumber(F("PuONCombmlVal3"),PuONCombmlVar3);

PuONCombmltominVar3 =(PuONCombmlVar3/calcomb3minmlval);

PuONCombVar3 = PuONCombmltominVar3;

MyPanel.SetNumber(F("PuONCombVal3"),PuONCombVar3);

Allcombvalue = PuONCombmlVar1+PuONCombmlVar2+PuONCombmlVar3+PuONCombmlVar4;

MyPanel.SetNumber(F("allcombvalvar"), Allcombvalue);

}

void Cmd\_PuONCombml4(CommandParameter &p)

{

PuONCombmlVar4 = p.NextParameterAsDouble();

MyPanel.SetNumber(F("PuONCombmlVal4"),PuONCombmlVar4);

PuONCombmltominVar4 =(PuONCombmlVar4/calcomb4minmlval);

PuONCombVar4 = PuONCombmltominVar4;

MyPanel.SetNumber(F("PuONCombVal4"),PuONCombVar4);

Allcombvalue = PuONCombmlVar1+PuONCombmlVar2+PuONCombmlVar3+PuONCombmlVar4;

MyPanel.SetNumber(F("allcombvalvar"), Allcombvalue);

}

void Cmd\_entercomvalues(CommandParameter &p)

{

PuONCombminVar1= PuONCombVar1/60;

PuONCombminVar2= PuONCombVar2/60;

PuONCombminVar3= PuONCombVar3/60;

PuONCombminVar4= PuONCombVar4/60;

}

//-----------------------------------------------------------------------------

void Cmd\_ODREADS(CommandParameter &p)

{

ODREADSS = p.NextParameterAsDouble();

MyPanel.SetNumber(F("ODREADSVAL"), ODREADSS);

}

void Cmd\_FWValueBB(CommandParameter &p)

{

FEDWASTEVAR1 = p.NextParameterAsDouble();

MyPanel.SetNumber(F("FWValueV"),FEDWASTEVAR1 );

FEDWASTEVAR2= FEDWASTEVAR1\*1000;

}

void Cmd\_FeedBDown(CommandParameter &p)

{

MyPanel.ShowControl(F("Arrow1"));

myMotor1->setSpeed(FLOWINMIN);

myMotor1->run(FORWARD);

myMotor1Sh2->setSpeed(200);

myMotor1Sh2->run(FORWARD);

delay(FEDWASTEVAR2);

/\* while (Automaticcond1== 1){

SerialCommandHandler.Process();

Automaticcond();

MyPanel.SetNumber(F("PTime"), hour());

MyPanel.SetNumber(F("PTime2"), minute());

MyPanel.SetNumber(F("PTime3"), second());

MyPanel.SetNumber(F("PTime4"), day());

MyPanel.SetNumber(F("PTime5"), month());

}\*/

while (Automaticcond1== 0){

SerialCommandHandler.Process();

Manualcond();

MyPanel.SetNumber(F("PTime"), hour());

MyPanel.SetNumber(F("PTime2"), minute());

MyPanel.SetNumber(F("PTime3"), second());

MyPanel.SetNumber(F("PTime4"), day());

MyPanel.SetNumber(F("PTime5"), month());

}

/\* while (Automaticcond1== 2){

SerialCommandHandler.Process();

AutoManualcond();

MyPanel.SetNumber(F("PTime"), hour());

MyPanel.SetNumber(F("PTime2"), minute());

MyPanel.SetNumber(F("PTime3"), second());

MyPanel.SetNumber(F("PTime4"), day());

MyPanel.SetNumber(F("PTime5"), month());

} \*/

/\*

while (Automaticcond1== 3){

SerialCommandHandler.Process();

ContinousFS();

MyPanel.SetNumber(F("PTime"), hour());

MyPanel.SetNumber(F("PTime2"), minute());

MyPanel.SetNumber(F("PTime3"), second());

MyPanel.SetNumber(F("PTime4"), day());

MyPanel.SetNumber(F("PTime5"), month());

}

\*/

}

void Cmd\_Initialfeed(CommandParameter &p)

{

myMotor1->setSpeed(FLOWINMIN);

myMotor1->run(FORWARD);

myMotor1Sh2->setSpeed(200);

myMotor1Sh2->run(FORWARD);

delay(Initialfeed);

myMotor1Sh2->setSpeed(70);

myMotor1Sh2->run(FORWARD);

myMotor1->run(RELEASE);

}

void Cmd\_WasteBDown(CommandParameter &p)

{

MyPanel.ShowControl(F("Arrow2"));

myMotor2->setSpeed(FLOWINMIN);

myMotor2->run(FORWARD);

myMotor1Sh2->setSpeed(200);

myMotor1Sh2->run(FORWARD);

delay(FEDWASTEVAR2);

/\* while (Automaticcond1== 1){

SerialCommandHandler.Process();

Automaticcond();

MyPanel.SetNumber(F("PTime"), hour());

MyPanel.SetNumber(F("PTime2"), minute());

MyPanel.SetNumber(F("PTime3"), second());

MyPanel.SetNumber(F("PTime4"), day());

MyPanel.SetNumber(F("PTime5"), month());

}\*/

while (Automaticcond1== 0){

SerialCommandHandler.Process();

Manualcond();

MyPanel.SetNumber(F("PTime"), hour());

MyPanel.SetNumber(F("PTime2"), minute());

MyPanel.SetNumber(F("PTime3"), second());

MyPanel.SetNumber(F("PTime4"), day());

MyPanel.SetNumber(F("PTime5"), month());

}

/\* while (Automaticcond1== 2){

SerialCommandHandler.Process();

AutoManualcond();

MyPanel.SetNumber(F("PTime"), hour());

MyPanel.SetNumber(F("PTime2"), minute());

MyPanel.SetNumber(F("PTime3"), second());

MyPanel.SetNumber(F("PTime4"), day());

MyPanel.SetNumber(F("PTime5"), month());

} \*/

/\*

while (Automaticcond1== 3){

SerialCommandHandler.Process();

ContinousFS();

MyPanel.SetNumber(F("PTime"), hour());

MyPanel.SetNumber(F("PTime2"), minute());

MyPanel.SetNumber(F("PTime3"), second());

MyPanel.SetNumber(F("PTime4"), day());

MyPanel.SetNumber(F("PTime5"), month());

}

\*/

}

void Cmd\_LoopStop(CommandParameter &p)

{

FLOWINMAX = 0;

MyPanel.SetNumber(F("INMAXVAL"), FLOWINMAX);

}

void Cmd\_UVHR(CommandParameter &p)

{

UVMUT = p.NextParameterAsDouble();

MyPanel.SetNumber(F("UVVAL"), UVMUT);

if (UVMUT <= 0.1) {

UVOFF=0;

PulseUVNow = 0;

readuvOFF= 0;

readuvOFF2=0;

}

else if (UVMUT >= 0.2) {

UVOFF=2000;

readuvOFF= 0.01;

}

}

void Cmd\_PUMPON(CommandParameter &p)

{

PUMPONV = p.NextParameterAsDouble();

PUMPONV3 = ((PUMPONV)/60);

MyPanel.SetNumber(F("PUMPONVAL"), PUMPONV);

Initialfeed= (PUMPONV\*0.2)\*3600000;

}

void Cmd\_PUMPOFF(CommandParameter &p)

{

PUMPOFFV = p.NextParameterAsDouble();

MyPanel.SetNumber(F("PUMPOFFVAL"), PUMPOFFV);

ODVarT8=PUMPOFFV\*3600000;

hour(0);

second(0);

minute(0);

Timediff2 = PUMPOFFV\*3600000;

addPumpOFF = PUMPOFFV + hour();

PUMPOFFVall = (PUMPOFFVmin+PUMPOFFV);

}

void Cmd\_PUMPDELAYOFFmin(CommandParameter &p)

{

PUMPOFFVhr = p.NextParameterAsDouble();

MyPanel.SetNumber(F("PUMPOFFminVAL"), PUMPOFFVhr);

PUMPOFFVmin = ((PUMPOFFVhr)/60);

PUMPOFFVall = (PUMPOFFVmin+PUMPOFFV);

}

void Cmd\_ReverseWaste(CommandParameter &p)

{

MyPanel.ShowControl(F("Arrowreverse"));

myMotor2->setSpeed(FLOWINMIN);

myMotor2->run(BACKWARD);

myMotor1Sh2->setSpeed(200);

myMotor1Sh2->run(FORWARD);

delay(8000);

MyPanel.HideControl(F("Arrowreverse"));

/\*while (Automaticcond1== 1){

SerialCommandHandler.Process();

Automaticcond();

MyPanel.SetNumber(F("PTime"), hour());

MyPanel.SetNumber(F("PTime2"), minute());

MyPanel.SetNumber(F("PTime3"), second());

MyPanel.SetNumber(F("PTime4"), day());

MyPanel.SetNumber(F("PTime5"), month());

}\*/

while (Automaticcond1== 0){

SerialCommandHandler.Process();

Manualcond();

MyPanel.SetNumber(F("PTime"), hour());

MyPanel.SetNumber(F("PTime2"), minute());

MyPanel.SetNumber(F("PTime3"), second());

MyPanel.SetNumber(F("PTime4"), day());

MyPanel.SetNumber(F("PTime5"), month());

}

/\*while (Automaticcond1== 2){

SerialCommandHandler.Process();

AutoManualcond();

MyPanel.SetNumber(F("PTime"), hour());

MyPanel.SetNumber(F("PTime2"), minute());

MyPanel.SetNumber(F("PTime3"), second());

MyPanel.SetNumber(F("PTime4"), day());

MyPanel.SetNumber(F("PTime5"), month());

} \*/

/\*

while (Automaticcond1== 3){

SerialCommandHandler.Process();

ContinousFS();

MyPanel.SetNumber(F("PTime"), hour());

MyPanel.SetNumber(F("PTime2"), minute());

MyPanel.SetNumber(F("PTime3"), second());

MyPanel.SetNumber(F("PTime4"), day());

MyPanel.SetNumber(F("PTime5"), month());

}

\*/

}

void Cmd\_GetODMAX(CommandParameter &p)

{

ODMAX = p.NextParameterAsDouble();

MyPanel.SetNumber(F("ODMAXVAL"), ODMAX);

}

void Cmd\_FLOWADDINV(CommandParameter &p) //This is the OD Min

{

ODMIN = p.NextParameterAsDouble();

MyPanel.SetNumber(F("ADDINVAL"), ODMIN);

ODMINLOOP = ODMIN;

}

void Cmd\_FLOWMAXV(CommandParameter &p)

{

FLOWINMAX = p.NextParameterAsDouble();

MyPanel.SetNumber(F("INMAXVAL"), FLOWINMAX);

}

void Cmd\_FLOWMINV(CommandParameter &p)

{

FLOWINMIN = p.NextParameterAsDouble();

MyPanel.SetNumber(F("INMINVAL"), FLOWINMIN);

}

void Cmd\_Auto(CommandParameter &p)

{

analogWrite (10, 2000);

analogWrite (29, 2000);

delay (100);

analogWrite (10, 0);

analogWrite (29, 0);

ODMAX = 50;

FLOWINMAX = 220;

FLOWINMIN = 250;

FLOWADDIN = 50;

Automaticcond1= 1;

ProcessStatus=1;

MyPanel.DisableControl(F("Manualcheck"));

MyPanel.DisableControl(F("ContinousFB"));

MyPanel.SetNumber(F("INMAXVAL"), FLOWINMAX);

MyPanel.SetNumber(F("INMINVAL"), FLOWINMIN);

MyPanel.SetNumber(F("PUMPOFFVAL"), PUMPOFFV);

MyPanel.DisableControl(F("MAN-AUTO"));

MyPanel.DisableControl(F("INMAXVAL"));

MyPanel.DisableControl(F("INMINVAL"));

MyPanel.DisableControl(F("ADDINVAL"));

MyPanel.DisableControl(F("PUMPOFFVAL"));

MyPanel.DisableControl(F("PUMPONVAL"));

MyPanel.EnableControl(F("ODMAXVAL"));

MyPanel.DisableControl(F("PUMPONBUT"));

MyPanel.DisableControl(F("PUMPOFFBUT"));

MyPanel.DisableControl(F("INMAX"));

MyPanel.DisableControl(F("INMIN"));

MyPanel.DisableControl(F("ADDIN"));

MyPanel.EnableControl(F("ODMAX"));

}

void Cmd\_Manual(CommandParameter &p)

{

analogWrite (10, 2000);

analogWrite (29, 2000);

delay (100);

analogWrite (10, 0);

analogWrite (29, 0);

Automaticcond1= 0;

ProcessStatus=2;

MyPanel.DisableControl(F("MAN-AUTO"));

MyPanel.DisableControl(F("Autocheck"));

MyPanel.DisableControl(F("ContinousFB"));

MyPanel.EnableControl(F("INMAXVAL"));

MyPanel.EnableControl(F("INMINVAL"));

MyPanel.EnableControl(F("ADDINVAL"));

MyPanel.EnableControl(F("PUMPOFFVAL"));

MyPanel.EnableControl(F("PUMPONVAL"));

MyPanel.EnableControl(F("ODMAXVAL"));

MyPanel.SetNumber(F("PUMPOFFVAL"), PUMPOFFV);

MyPanel.SetNumber(F("PUMPONVAL"), PUMPONV);

MyPanel.EnableControl(F("PUMPONBUT"));

MyPanel.EnableControl(F("PUMPOFFBUT"));

MyPanel.EnableControl(F("INMAX"));

MyPanel.EnableControl(F("INMIN"));

MyPanel.EnableControl(F("ADDIN"));

MyPanel.EnableControl(F("ODMAX"));

}

//------Reports--------------------------

void Cmd\_ReportRefresh(CommandParameter &p)

{

MyPanel.SetText(F("Number"), "3");

MyPanel.SetText(F("Report2"), "3");

MyPanel.SetNumber(F("Report3"), ProcessStatus);

MyPanel.SetNumber(F("Report4"), 0);

MyPanel.SetNumber(F("Report5"), PUMPOFFV);

MyPanel.SetNumber(F("Report6"), PUMPONV);

MyPanel.SetNumber(F("Report7"), FLOWINMAX);

MyPanel.SetNumber(F("Report8"), FLOWINMIN);

MyPanel.SetNumber(F("Report9"), ODMIN);

MyPanel.SetNumber(F("Report10"), ODMAX);

MyPanel.SetNumber(F("Report11"), ODREADSS);

MyPanel.SetNumber(F("Report12"), 0);

MyPanel.SetNumber(F("Report13"), 0);

MyPanel.SetNumber(F("Multiplyval"), Multiplyvar);

MyPanel.SetNumber(F("Waterbathpump"), Waterbathpumpvar);

MyPanel.SetNumber(F("ODBASELINEVal"),EmptyODval);

MyPanel.SetNumber(F("FeedspeedVal"),feedspeedcont1);

MyPanel.SetNumber(F("FedWastestopint"),Conttimestopinterval2);

MyPanel.SetNumber(F("VolRestVAl"),VolumerestMIN3);

MyPanel.SetNumber(F("VolRestVAl"),VolumerestHR4);

MyPanel.SetNumber(F("OFFLOOPINTVAL"),OFFLOOPINTVAR);

MyPanel.SetNumber(F("ONLOOPINTVAL"),ONLOOPINTVAR);

MyPanel.SetNumber(F("REVLOOPINTVAL"),REVLOOPINTVAR);

MyPanel.SetNumber(F("Temperatureset"),temperaturesetvar );

MyPanel.SetNumber(F("Stirvalue"),Stirvar );

MyPanel.SetNumber(F("PuONCombVal1"),PuONCombVar1);

MyPanel.SetNumber(F("PuONCombVal2"),PuONCombVar2);

MyPanel.SetNumber(F("PuONCombVal3"),PuONCombVar3);

MyPanel.SetNumber(F("PuONCombVal4"),PuONCombVar4);

MyPanel.SetNumber(F("ODREADSVAL"), ODREADSS);

MyPanel.SetNumber(F("FWValueV"),FEDWASTEVAR1 );

MyPanel.SetNumber(F("INMAXVAL"), FLOWINMAX);

MyPanel.SetNumber(F("UVVAL"), UVMUT);

MyPanel.SetNumber(F("PUMPONVAL"), PUMPONV);

MyPanel.SetNumber(F("PUMPOFFVAL"), PUMPOFFV);

MyPanel.SetNumber(F("ODMAXVAL"), ODMAX);

MyPanel.SetNumber(F("ADDINVAL"), ODMIN);

MyPanel.SetNumber(F("INMAXVAL"), FLOWINMAX);

MyPanel.SetNumber(F("INMINVAL"), FLOWINMIN);

MyPanel.SetNumber(F("INMAXVAL"), FLOWINMAX);

MyPanel.SetNumber(F("INMINVAL"), FLOWINMIN);

MyPanel.SetNumber(F("PUMPOFFVAL"), PUMPOFFV);

MyPanel.SetNumber(F("PUMPOFFminVAL"), PUMPOFFVhr);

MyPanel.SetNumber(F("calfeed1min"),calfeed1minmlval);

MyPanel.SetNumber(F("calfeed1result"),calfeed1ratioval);

MyPanel.SetNumber(F("Feed1n2rationvv"),calfeed1n2ratioval);

MyPanel.SetNumber(F("Feed1wasterationvv"),calfeed1wasteratioval);

MyPanel.SetNumber(F("calfeed2min"),calfeed2minmlval);

MyPanel.SetNumber(F("calfeed2result"),calfeed2ratioval);

MyPanel.SetNumber(F("Feed1n2rationvv"), calfeed1n2ratioval);

MyPanel.SetNumber(F("Feed2wasterationvv"),calfeed2wasteratioval);

MyPanel.SetNumber(F("calwaste1min"),calwaste1minmlval);

MyPanel.SetNumber(F("calwaste1result"),calwaste1ratioval);

MyPanel.SetNumber(F("waste1n2rationvv"), calwaste1n2ratioval);

MyPanel.SetNumber(F("Feed1wasterationvv"),calfeed1wasteratioval);

MyPanel.SetNumber(F("calwaste2min"),calwaste2minmlval);

MyPanel.SetNumber(F("calwaste2result"),calwaste2ratioval);

MyPanel.SetNumber(F("waste1n2rationvv"), calwaste1n2ratioval);

MyPanel.SetNumber(F("Feed2wasterationvv"),calfeed2wasteratioval);

MyPanel.SetNumber(F("calloop1min"),calloop1minmlval);

MyPanel.SetNumber(F("calloop1result"),calloop1ratioval);

MyPanel.SetNumber(F("calloop2min"),calloop2minmlval);

MyPanel.SetNumber(F("calloop2result"),calloop2ratioval);

MyPanel.SetNumber(F("calcomp1min"),calcomb1minmlval);

MyPanel.SetNumber(F("calcomp1result"),calcomb1ratioval);

MyPanel.SetNumber(F("calcomp2min"),calcomb2minmlval);

MyPanel.SetNumber(F("calcomp2result"),calcomb2ratioval);

MyPanel.SetNumber(F("calcomp3min"),calcomb3minmlval);

MyPanel.SetNumber(F("calcomp3result"),calcomb3ratioval);

MyPanel.SetNumber(F("calcomp4min"),calcomb4minmlval);

MyPanel.SetNumber(F("calcomp4result"),calcomb4ratioval);

MyPanel.SetNumber(F("calfeed1sec"),calfeed1secmlval);

MyPanel.SetNumber(F("calfeed1result"),calfeed1ratioval);

MyPanel.SetNumber(F("calfeed2sec"),calfeed2secmlval);

MyPanel.SetNumber(F("calfeed2result"),calfeed2ratioval);

MyPanel.SetNumber(F("calwaste1sec"),calwaste1secmlval);

MyPanel.SetNumber(F("calwaste1result"),calwaste1ratioval);

MyPanel.SetNumber(F("calwaste2sec"),calwaste2secmlval);

MyPanel.SetNumber(F("calwaste2result"),calwaste2ratioval);

MyPanel.SetNumber(F("calloop1sec"),calloop1secmlval);

MyPanel.SetNumber(F("calloop1result"),calloop1ratioval);

MyPanel.SetNumber(F("calloop2sec"),calloop2secmlval);

MyPanel.SetNumber(F("calloop2result"),calloop2ratioval);

MyPanel.SetNumber(F("calcomp1sec"),calcomb1secmlval);

MyPanel.SetNumber(F("calcomp1result"),calcomb1ratioval);

MyPanel.SetNumber(F("calcomp2sec"),calcomb2secmlval);

MyPanel.SetNumber(F("calcomp2result"),calcomb2ratioval);

MyPanel.SetNumber(F("calcomp3sec"),calcomb3secmlval);

MyPanel.SetNumber(F("calcomp3result"),calcomb3ratioval);

MyPanel.SetNumber(F("calcomp4sec"),calcomb4secmlval);

MyPanel.SetNumber(F("calcomp4result"),calcomb4ratioval);

/\*while (Automaticcond1== 1){

SerialCommandHandler.Process();

Automaticcond();

MyPanel.SetNumber(F("PTime"), hour());

MyPanel.SetNumber(F("PTime2"), minute());

MyPanel.SetNumber(F("PTime3"), second());

MyPanel.SetNumber(F("PTime4"), day());

MyPanel.SetNumber(F("PTime5"), month());

}\*/

while (Automaticcond1== 0){

SerialCommandHandler.Process();

Manualcond();

MyPanel.SetNumber(F("PTime"), hour());

MyPanel.SetNumber(F("PTime2"), minute());

MyPanel.SetNumber(F("PTime3"), second());

MyPanel.SetNumber(F("PTime4"), day());

MyPanel.SetNumber(F("PTime5"), month());

}

/\* while (Automaticcond1== 2){

SerialCommandHandler.Process();

AutoManualcond();

MyPanel.SetNumber(F("PTime"), hour());

MyPanel.SetNumber(F("PTime2"), minute());

MyPanel.SetNumber(F("PTime3"), second());

MyPanel.SetNumber(F("PTime4"), day());

MyPanel.SetNumber(F("PTime5"), month());

} \*/

/\*

while (Automaticcond1== 3){

SerialCommandHandler.Process();

ContinousFS();

MyPanel.SetNumber(F("PTime"), hour());

MyPanel.SetNumber(F("PTime2"), minute());

MyPanel.SetNumber(F("PTime3"), second());

MyPanel.SetNumber(F("PTime4"), day());

MyPanel.SetNumber(F("PTime5"), month());

}

\*/

}

//---------------------------------------------------------------------------------

void Cmd\_MANAUTO(CommandParameter &p)

{

analogWrite (10, 2000);

analogWrite (29, 2000);

delay (100);

analogWrite (10, 0);

analogWrite (29,0);

Automaticcond1= 2;

ProcessStatus=3;

MyPanel.DisableControl(F("Autocheck"));

MyPanel.DisableControl(F("Manualcheck"));

MyPanel.DisableControl(F("ContinousFB"));

MyPanel.EnableControl(F("INMAXVAL"));

MyPanel.EnableControl(F("INMINVAL"));

MyPanel.EnableControl(F("ADDINVAL")); //OD MIN

MyPanel.EnableControl(F("PUMPOFFVAL"));

MyPanel.EnableControl(F("PUMPONVAL"));

MyPanel.EnableControl(F("ODMAXVAL"));

MyPanel.SetNumber(F("PUMPOFFVAL"), PUMPOFFV);

MyPanel.SetNumber(F("PUMPONVAL"), PUMPONV);

MyPanel.EnableControl(F("PUMPONBUT"));

MyPanel.EnableControl(F("PUMPOFFBUT"));

MyPanel.EnableControl(F("INMAX"));

MyPanel.EnableControl(F("INMIN"));

MyPanel.EnableControl(F("ADDIN"));

MyPanel.EnableControl(F("ODMAX"));

}

void Cmd\_STOPOPTION(CommandParameter &p) //Freeze option

{

analogWrite (10, 2000);

analogWrite (29, 2000);

delay (100);

analogWrite (10, 0);

analogWrite (29, 0);

ProcessStatus=5;

MyPanel.DisableControl(F("INMAXVAL"));

MyPanel.DisableControl(F("INMINVAL"));

MyPanel.DisableControl(F("ADDINVAL"));

MyPanel.DisableControl(F("PUMPOFFVAL"));

MyPanel.DisableControl(F("PUMPONVAL"));

MyPanel.DisableControl(F("ODMAXVAL"));

MyPanel.DisableControl(F("PUMPONBUT"));

MyPanel.DisableControl(F("PUMPOFFBUT"));

MyPanel.DisableControl(F("INMAX"));

MyPanel.DisableControl(F("INMIN"));

MyPanel.DisableControl(F("ADDIN"));

MyPanel.DisableControl(F("ODMAX"));

MyPanel.EnableControl(F("Autocheck"));

MyPanel.EnableControl(F("Manualcheck"));

MyPanel.EnableControl(F("MAN-AUTO"));

MyPanel.EnableControl(F("ContinousFB"));

MyPanel.DisableControl(F("Entcont1"));

MyPanel.DisableControl(F("FeedspeedVal"));

MyPanel.DisableControl(F("IPButton59"));

MyPanel.DisableControl(F("FedWastestopint"));

MyPanel.DisableControl(F("Entcont2"));

MyPanel.DisableControl(F("IPButton60"));

MyPanel.DisableControl(F("VolRestVAl"));

}

void Cmd\_Move1(CommandParameter &p)

{

analogWrite (9, 2000);

MyPanel.HideControl(F("Arrow0"));

analogWrite (10, 2000);

analogWrite (29, 2000);

delay (500);

analogWrite (10, 0);

analogWrite (29, 0);

delay (100);

analogWrite (10, 2000);

analogWrite (29, 2000);

delay (500);

analogWrite (10, 0);

analogWrite (29, 0);

MyPanel.SetText(F("Switch"), "ON");

MyPanel.SetBackColor(F("Switch"), F("green"));

MyPanel.ShowControl(F("Refresh"));

MyPanel.DisableControl(F("Initialfeedbut"));

unsigned long currentMillis = millis();

unsigned long currenthour = hour(0);

unsigned long currentsec = second(0);

unsigned long currentmin = minute(0);

setTime(00,00,00,01, 01, 0000);

previousMillis = currentMillis;

previousMillis2 = currentMillis;

MyPanel.SetNumber(F("Statusshow"), ProcessStatus);

MyPanel.DisableControl(F("cali1delaymin"));

MyPanel.DisableControl(F("cali2delaymin"));

MyPanel.DisableControl(F("cali3delaymin"));

MyPanel.DisableControl(F("cali4delaymin"));

MyPanel.DisableControl(F("cali5delaymin"));

MyPanel.DisableControl(F("cali6delaymin"));

MyPanel.DisableControl(F("cali7delaymin"));

MyPanel.DisableControl(F("cali8delaymin"));

MyPanel.DisableControl(F("cali9delaymin"));

MyPanel.DisableControl(F("cali10delaymin"));

MyPanel.DisableControl(F("cali1delaysec"));

MyPanel.DisableControl(F("cali2delaysec"));

MyPanel.DisableControl(F("cali3delaysec"));

MyPanel.DisableControl(F("cali4delaysec"));

MyPanel.DisableControl(F("cali5delaysec"));

MyPanel.DisableControl(F("cali6delaysec"));

MyPanel.DisableControl(F("cali7delaysec"));

MyPanel.DisableControl(F("cali8delaysec"));

MyPanel.DisableControl(F("cali9delaysec"));

MyPanel.DisableControl(F("cali10delaysec"));

MyPanel.ShowControl(F("ONSgin"));

/\*while (Automaticcond1== 1){

SerialCommandHandler.Process();

Automaticcond();

MyPanel.SetNumber(F("PTime"), hour());

MyPanel.SetNumber(F("PTime2"), minute());

MyPanel.SetNumber(F("PTime3"), second());

MyPanel.SetNumber(F("PTime4"), day());

MyPanel.SetNumber(F("PTime5"), month());

}\*/

while (Automaticcond1== 0){

SerialCommandHandler.Process();

Manualcond();

MyPanel.SetNumber(F("PTime"), hour());

MyPanel.SetNumber(F("PTime2"), minute());

MyPanel.SetNumber(F("PTime3"), second());

MyPanel.SetNumber(F("PTime4"), day());

MyPanel.SetNumber(F("PTime5"), month());

}

/\*

while (Automaticcond1== 2){

SerialCommandHandler.Process();

AutoManualcond();

MyPanel.SetNumber(F("PTime"), hour());

MyPanel.SetNumber(F("PTime2"), minute());

MyPanel.SetNumber(F("PTime3"), second());

MyPanel.SetNumber(F("PTime4"), day());

MyPanel.SetNumber(F("PTime5"), month());

} \*/

/\*

while (Automaticcond1== 3){

SerialCommandHandler.Process();

ContinousFS();

MyPanel.SetNumber(F("PTime"), hour());

MyPanel.SetNumber(F("PTime2"), minute());

MyPanel.SetNumber(F("PTime3"), second());

MyPanel.SetNumber(F("PTime4"), day());

MyPanel.SetNumber(F("PTime5"), month());

}

\*/

}

void Manualcond(){

unsigned long currentMillis = millis();

unsigned long currentMillis2 = millis();

unsigned long currentMillis3 = millis();

unsigned long currentMillis4 = millis();

int CurrentOD = analogRead(A0);

int CurrentOD1 = analogRead(A1);

int CurrentOD2 = analogRead(A14);

int CurrentOD3 = analogRead(A15);

unsigned long curOD1OD2 = CurrentOD - CurrentOD1;

unsigned long curOD3OD4 = CurrentOD2 - CurrentOD3;

unsigned long curOD1OD3 = CurrentOD - CurrentOD2;

unsigned long curdiffOD1OD3 = curOD1OD2 - curOD3OD4;

unsigned long EmptyODval;

unsigned long RealOD= -log(CurrentOD/EmptyODval);

wdt\_enable(WDTO\_4S);

//------------Temp and pressure and Waterbath level sensor------------

sensors.requestTemperatures();

Celcius=sensors.getTempCByIndex(0);

MyPanel.SetNumber(F("Temperatureactual"), Celcius);

float bottlepressureactualvar0= analogRead (A8);

bottlepressureactualvar = ((bottlepressureactualvar0 / 1024)\*(30));

float bottlepressureposiactualvar0= analogRead (A9);

bottlepressureposiactualvar= ((bottlepressureposiactualvar0 / 1024)\*(30));

MyPanel.SetNumber(F("airflowactualval"), airflowactualvar);

MyPanel.SetNumber(F("bottlepressureactualval"), bottlepressureactualvar);

MyPanel.SetNumber(F("bottlepressure+actualval"), bottlepressureposiactualvar);

//-------//Alarm for pressure

if (bottlepressureactualvar >= 6){

analogWrite (10, 2000);

analogWrite (29, 2000);

delay (50);

analogWrite (10, 0);

analogWrite (29, 0);

MyPanel.ShowControl(F("Pressure1"));

myMotor4Sh2->run(RELEASE);

}

else {

analogWrite (10, 0);

analogWrite (29, 0);

MyPanel.HideControl(F("Pressure1"));

myMotor4Sh2->setSpeed(airpumpspvar);

myMotor4Sh2->run(FORWARD);

}

if (bottlepressureposiactualvar >= 6){

analogWrite (10, 2000);

analogWrite (29, 2000);

delay (50);

analogWrite (10, 0);

analogWrite (29, 0);

MyPanel.ShowControl(F("Pressure2"));

myMotor2Sh2->run(RELEASE);

}

else {

analogWrite (10, 0);

analogWrite (29, 0);

MyPanel.HideControl(F("Pressure2"));

myMotor2Sh2->setSpeed(airpumpspvar);

myMotor2Sh2->run(FORWARD);

}

//--------------

MyPanel.SetNumber(F("OD-1"), CurrentOD);

MyPanel.SetNumber(F("OD-2"), CurrentOD1);

MyPanel.SetNumber(F("OD1-OD2"), curOD1OD2);

MyPanel.SetNumber(F("OD-3"), CurrentOD2);

MyPanel.SetNumber(F("OD-4"), CurrentOD3);

MyPanel.SetNumber(F("OD3-OD4"), curOD3OD4);

MyPanel.SetNumber(F("OD1-OD3"), curOD1OD3);

MyPanel.SetNumber(F("Diff-OD1-OD2"), curdiffOD1OD3);

if (Celcius <= (temperaturesetvar - 0.4)){

if ((currentMillis - previousMillistemp) >= 7000){

analogWrite (30, 2000);

analogWrite (40, 2000);

myMotor1Sh2->setSpeed(190);

myMotor1Sh2->run(FORWARD);

}

}

else if (Celcius >= (temperaturesetvar)) {

analogWrite (30, 0);

analogWrite (40, 0);

myMotor1Sh2->setSpeed(50);

myMotor1Sh2->run(FORWARD);

previousMillistemp = currentMillis;

}

if (Celcius >= (temperaturesetvar+2)|| Celcius <= (temperaturesetvar-2)){

if ((currentMillis - previousMillistemp2) >= 60000){

analogWrite (10, 2000);

analogWrite (29, 2000);

delay (200);

analogWrite (10, 0);

analogWrite (29, 0);

MyPanel.ShowControl(F("temperatureupsign1"));

MyPanel.ShowControl(F("temperaturedownsign1"));

}

}

else {

analogWrite (10, 0);

analogWrite (29, 0);

MyPanel.HideControl(F("temperatureupsign1"));

MyPanel.HideControl(F("temperaturedownsign1"));

previousMillistemp2 = currentMillis;

}

WAterbathlevel= analogRead(A11);

if (WAterbathlevel <= 5){

analogWrite (10, 2000);

analogWrite (29, 2000);

delay (50);

analogWrite (10, 0);

analogWrite (29, 0);

MyPanel.ShowControl(F("wblevelsign1"));

}

else {

analogWrite (10, 0);

analogWrite (29, 0);

MyPanel.HideControl(F("wblevelsign1"));

}

wdt\_reset();

wdt\_disable();

wdt\_enable(WDTO\_2S);

//--------------------------------

//--------------Flow sensor ------------------------

// count++;

//if (currentMillis4 - previousMillisflowsens >= 1100) {

// flowRate = (count \* 2.25); //Take counted pulses in the last second and multiply by 2.25mL

//flowRate = flowRate \* 60; //Convert seconds to minutes, giving you mL / Minute

//flowRate = flowRate / 1000; //Convert mL to Liters, giving you Liters / Minute

// MyPanel.SetNumber(F("airflowactualval"), flowRate);

//count = 0;

//previousMillisflowsens = currentMillis4;

// }

//--------------time for waste and feed--------------

timewastework= ((((PUMPONV\*Multiplyvar)+PUMPOFFV)\*3600000 )- (PUMPOFFV\*3600000))/ 3600000 ; //become min april-2-2020

timefeedwork= (((PUMPONV+PUMPOFFV)\*3600000) - (((PUMPONV\*Multiplyvar)+PUMPOFFV)\*3600000))/ 3600000; //become min april-2-2020

timewasteinminvar = timewastework \* 60; //become Sec april-2-2020

timefeedinminvar = timefeedwork \* 60; //become Sec april-2-2020

calfeedinmlvar= PUMPONmlVar;

calwasteinmlvar= (PUMPONmlVar \* timewasteinminvar)/ timefeedinminvar;

MyPanel.SetNumber(F("timefeedworkval"), timefeedwork);

MyPanel.SetNumber(F("timewasteworkval"), timewastework);

MyPanel.SetNumber(F("timefeedinminval"), timefeedinminvar);

MyPanel.SetNumber(F("timewasteinminval"), timewasteinminvar);

MyPanel.SetNumber(F("calfeedinmlval"), calfeedinmlvar);

MyPanel.SetNumber(F("calwasteinmlval"), calwasteinmlvar);

//------------------------------------------------

if (CurrentOD >= ODMIN) {

ODVarT1 = currentMillis2;

}

// wait and check the correct od measurements (wait 100 round)

if (CurrentOD <= ODMAX) {

ODVarT4 =ODVarT4 +1;

}

else {

ODVarT4 =0;

}

if (ODVarT4 >= 100) {

ODVarT2 = currentMillis2;

ODVarT4 =0;

}

ODVarT3= ((ODVarT2 - ODVarT1)/3600000);

MyPanel.SetNumber(F("DiffOD"), ODVarT3);

TimePlot ODR2("Time-Dif=");

ODR2.SendData("Time-Dif=", ODVarT3);

PulseUVNow =readuvOFF2;

readuvOFF2= readuvOFF2 + readuvOFF;

if (currentMillis3 - previousMillis5 >= (UVMUT\*60000)) {

analogWrite (A2, UVOFF);

}

if (currentMillis3 - previousMillis5 >= ((UVMUT\*60000)+5000)) {

analogWrite (A2, 0);

PulseUVNow = 0;

readuvOFF2 = 0;

previousMillis5 = currentMillis3;

}

Timediff1= currentMillis - previousMillis6;

Countdownhr= ((Timediff2 - Timediff1)/3600000);

wdt\_reset();

wdt\_disable();

wdt\_enable(WDTO\_2S);

if ((currentMillis - previousMillis) < ((PUMPOFFVall\*0.6)\*3600000)) {

MyPanel.HideControl(F("Arrow1"));

MyPanel.HideControl(F("Arrow2"));

//simulation operation------------------------

MyPanel.HideControl(F("Feedsimu1"));

MyPanel.HideControl(F("Feedsimu2"));

MyPanel.HideControl(F("wastesimu1"));

MyPanel.HideControl(F("wastesimu2"));

MyPanel.HideControl(F("loopsimu1"));

MyPanel.HideControl(F("loopsimu2"));

MyPanel.HideControl(F("combinsimu1"));

MyPanel.HideControl(F("combinsimu2"));

MyPanel.HideControl(F("combinsimu3"));

MyPanel.HideControl(F("combinsimu4"));

//-------------------------------------------

myMotor1->run(RELEASE);

myMotor2->run(RELEASE);

myMotor1Sh3->run(RELEASE);

myMotor2Sh3->run(RELEASE);

digitalWrite(22,LOW);

digitalWrite(23,LOW);

digitalWrite(24,LOW);

digitalWrite(25,LOW);

Countdownsec= 60 - second();

Countdownmin= 60 - (minute()+1);

MyPanel.SetNumber(F("TtoNext"), Countdownhr);

MyPanel.SetNumber(F("TtoNext2"),Countdownmin);

MyPanel.SetNumber(F("TtoNext3"),Countdownsec );

}

wdt\_reset();

wdt\_disable();

//----------------Combination commands---------------------------------------------------------------------------

wdt\_enable(WDTO\_4S);

if ((PuONCombmlVar1+PuONCombmlVar2+PuONCombmlVar3+PuONCombmlVar4) > 45) {

MyPanel.DisableControl(F("Entercombvalbu"));

}

else

{

MyPanel.EnableControl(F("Entercombvalbu"));

}

wdt\_enable(WDTO\_2S);

if (PuONCombVar1>0) {

if ((currentMillis - previousMillis) <= (((PUMPOFFVall\*0.6)+(PuONCombminVar1))\*3600000) && (currentMillis - previousMillis) >= ((PUMPOFFVall\*0.6)\*3600000) ) {

myMotor1Sh1->setSpeed(250);

myMotor1Sh1->run(FORWARD);

myFile.println("combination[1]-Hr=");

myFile.print(Countdownhr);

MyPanel.ShowControl(F("combinsimu1"));

}

if ((currentMillis - previousMillis) > (((PUMPOFFVall\*0.6)+(PuONCombminVar1))\*3600000)) {

myMotor1Sh1->run(RELEASE);

MyPanel.HideControl(F("combinsimu1"));

}

}

else {

myMotor1Sh1->run(RELEASE);

MyPanel.HideControl(F("combinsimu1"));

}

if (PuONCombVar2>0) {

if ((currentMillis - previousMillis) <= (((PUMPOFFVall\*0.6)+(PuONCombminVar2))\*3600000) && (currentMillis - previousMillis) >= ((PUMPOFFVall\*0.6)\*3600000) ) {

myMotor2Sh1->setSpeed(250);

myMotor2Sh1->run(FORWARD);

myFile.println("combination[1]-Hr=");

myFile.print(Countdownhr);

MyPanel.ShowControl(F("combinsimu2"));

}

if ((currentMillis - previousMillis) > (((PUMPOFFVall\*0.6)+(PuONCombminVar2))\*3600000)) {

myMotor2Sh1->run(RELEASE);

MyPanel.HideControl(F("combinsimu2"));

}

}

else {

myMotor2Sh1->run(RELEASE);

MyPanel.HideControl(F("combinsimu2"));

}

if (PuONCombVar3>0) {

if ((currentMillis - previousMillis) <= (((PUMPOFFVall\*0.6)+(PuONCombminVar3))\*3600000)&& (currentMillis - previousMillis) >= ((PUMPOFFVall\*0.6)\*3600000)) {

myMotor3Sh1->setSpeed(250);

myMotor3Sh1->run(FORWARD);

myFile.println("combination[1]-Hr=");

myFile.print(Countdownhr);

MyPanel.ShowControl(F("combinsimu3"));

}

if ((currentMillis - previousMillis) > (((PUMPOFFVall\*0.6)+(PuONCombminVar3))\*3600000)) {

myMotor3Sh1->run(RELEASE);

MyPanel.HideControl(F("combinsimu3"));

}

}

else {

myMotor3Sh1->run(RELEASE);

MyPanel.HideControl(F("combinsimu3"));

}

if (PuONCombVar4>0) {

if ((currentMillis - previousMillis) <= (((PUMPOFFVall\*0.6)+ (PuONCombminVar4))\*3600000) && (currentMillis - previousMillis) >= ((PUMPOFFVall\*0.6)\*3600000)) {

myMotor4Sh1->setSpeed(250);

myMotor4Sh1->run(FORWARD);

myFile.println("combination[1]-Hr=");

myFile.print(Countdownhr);

MyPanel.ShowControl(F("combinsimu4"));

}

if ((currentMillis - previousMillis) > (((PUMPOFFVall\*0.6)+ (PuONCombminVar4))\*3600000)) {

myMotor4Sh1->run(RELEASE);

MyPanel.HideControl(F("combinsimu4"));

}

}

else {

myMotor4Sh1->run(RELEASE);

MyPanel.HideControl(F("combinsimu4"));

}

//----------------------------------------------------------------------------------------------------------------------------------------------------

if ((currentMillis - previousMillis) <(((PUMPONV3\*Multiplyvar)+PUMPOFFVall)\*3600000) && (currentMillis - previousMillis) > (PUMPOFFVall\*3600000)) {

previousMillis6 = currentMillis;

MyPanel.ShowControl(F("Arrow2"));

digitalWrite(22,LOW);

digitalWrite(23,LOW);

digitalWrite(24,LOW);

digitalWrite(25,LOW);

myMotor2->setSpeed(FLOWINMIN);

myMotor2->run(BACKWARD);

myMotor2Sh3->setSpeed(FLOWINMIN);

myMotor2Sh3->run(BACKWARD);

MyPanel.ShowControl(F("wastesimu1"));

MyPanel.ShowControl(F("wastesimu2"));

}

wdt\_reset();

wdt\_disable();

wdt\_enable(WDTO\_2S);

if ((currentMillis - previousMillis2) >=(((PUMPONV3\*Multiplyvar)+PUMPOFFVall)\*3600000)) {

myMotor2->run(RELEASE);

myMotor2Sh3->run(RELEASE);

MyPanel.HideControl(F("wastesimu1"));

MyPanel.HideControl(F("wastesimu2"));

MyPanel.HideControl(F("Arrow2"));

MyPanel.ShowControl(F("Arrow1"));

myMotor1->setSpeed(FLOWINMIN);

myMotor1->run(FORWARD);

myMotor1Sh3->setSpeed(FLOWINMIN);

myMotor1Sh3->run(FORWARD);

MyPanel.ShowControl(F("Feedsimu1"));

MyPanel.ShowControl(F("Feedsimu2"));

digitalWrite(22,LOW);

digitalWrite(23,LOW);

digitalWrite(24,LOW);

digitalWrite(25,LOW);

previousMilliscombination = currentMillis;

previousMilliscombination1 = currentMillis;

previousMilliscombination2 = currentMillis;

previousMilliscombination3 = currentMillis;

}

wdt\_reset();

wdt\_disable();

if ((currentMillis - previousMillis) >= ((PUMPONV3+PUMPOFFVall)\*3600000)) {

MyPanel.HideControl(F("Arrow1"));

MyPanel.HideControl(F("Arrow2"));

myMotor1->setSpeed(220);

myMotor1->run(BACKWARD);

myMotor1Sh3->setSpeed(220);

myMotor1Sh3->run(BACKWARD);

MyPanel.HideControl(F("Arrow4"));

MyPanel.ShowControl(F("Arrow0"));

MyPanel.HideControl(F("Arrow0"));

MyPanel.ShowControl(F("Arrow4"));

delay(300);

myMotor1->run(RELEASE);

myMotor1Sh3->run(RELEASE);

MyPanel.HideControl(F("Feedsimu1"));

MyPanel.HideControl(F("Feedsimu2"));

digitalWrite(22,LOW);

digitalWrite(23,LOW);

digitalWrite(24,LOW);

digitalWrite(25,LOW);

myMotor2->setSpeed(220);

myMotor2->run(BACKWARD);

myMotor2Sh3->setSpeed(220);

myMotor2Sh3->run(BACKWARD);

MyPanel.ShowControl(F("backwardwaste1"));

MyPanel.ShowControl(F("backwardwaste2"));

MyPanel.HideControl(F("Arrow3"));

MyPanel.ShowControl(F("Arrow2"));

delay(300);

myMotor2->run(RELEASE);

myMotor2Sh3->run(RELEASE);

digitalWrite(22,LOW);

digitalWrite(23,LOW);

digitalWrite(24,LOW);

digitalWrite(25,LOW);

MyPanel.HideControl(F("backwardwaste1"));

MyPanel.HideControl(F("backwardwaste2"));

MyPanel.ShowControl(F("Arrow3"));

MyPanel.HideControl(F("Arrow2"));

previousMillis = currentMillis;

previousMillis2 = currentMillis;

previousMilliscombination = currentMillis;

previousMilliscombination1 = currentMillis;

previousMilliscombination2 = currentMillis;

previousMilliscombination3 = currentMillis;

}

wdt\_enable(WDTO\_4S);

if (currentMillis3 - previousMillisLOOP1 < (OFFLOOPINTVAR\*60000)) {

myMotor3->run(RELEASE);

myMotor3Sh3->run(RELEASE);

}

else if (currentMillis3 - previousMillisLOOP1 < ((OFFLOOPINTVAR+ONLOOPINTVAR)\*60000)) {

myMotor3->setSpeed(FLOWINMAX);

myMotor3->run(FORWARD);

myMotor3Sh3->setSpeed(FLOWINMAX);

myMotor3Sh3->run(FORWARD);

MyPanel.ShowControl(F("loopsimu1"));

MyPanel.ShowControl(F("loopsimu2"));

if (currentMillis3 - previousMillis3>= (ODREADSS\*1000)) {

MyPanel.SetNumber(F("ODshow"), analogRead(A0));

MyPanel.SetNumber(F("Pointer"), analogRead(A0));

MyPanel.SetNumber(F("OD-1"), analogRead(A0));

MyPanel.SetNumber(F("OD-2"), analogRead(A1));

MyPanel.SetNumber(F("OD-3"), analogRead(A14));

MyPanel.SetNumber(F("OD-4"), analogRead(A15));

TimePlot ODR2("OD1-OD2=");

TimePlot ODR3("OD3-OD4=");

TimePlot ODR5("OD1-OD3=");

TimePlot ODR6("Diff:OD1-OD3=");

TimePlot ODR4("Pressure1-2");

ODR2.SendData("OD1-OD2=", curOD1OD2);

ODR3.SendData("OD3-OD4=", curOD3OD4);

ODR4.SendData("Pressure1-2", analogRead(A0));

ODR5.SendData("OD1-OD3=", curOD1OD3);

ODR6.SendData("Diff:OD1-OD3=", curdiffOD1OD3);

MyPanel.ShowControl(F("Arrow3"));

MyCSVMessage.Begin();

Serial.print("Reactor No-1");

Serial.print(",");

Serial.print(millis());

Serial.print(",");

Serial.print("Current OD=");

Serial.print(",");

Serial.print(analogRead(A0));

Serial.print(",");

Serial.print("Current OD1=");

Serial.print(",");

Serial.print(analogRead(A1));

Serial.print(",");

Serial.print("Current OD2=");

Serial.print(",");

Serial.print(analogRead(A14));

Serial.print(",");

Serial.print("Current OD3=");

Serial.print(",");

Serial.print(analogRead(A15));

Serial.print(",");

Serial.print("OD1-OD2=");

Serial.print(",");

Serial.print(curOD1OD2);

Serial.print(",");

Serial.print("OD3-OD4=");

Serial.print(",");

Serial.print(curOD3OD4);

Serial.print(",");

Serial.print("OD1-OD3=");

Serial.print(",");

Serial.print(curOD1OD3);

Serial.print(",");

Serial.print("Diff:OD1-OD3=");

Serial.print(",");

Serial.print(curdiffOD1OD3);

Serial.print(",");

Serial.print("Pressure1-2");

Serial.print(",");

Serial.print(analogRead(A3));

Serial.print(",");

Serial.print("Temp");

Serial.print(",");

Serial.print(Celcius);

Serial.print(",");

Serial.print("Stirr");

Serial.print(",");

Serial.print(Stirvar);

Serial.print(",");

Serial.print("Time-Cut-down");

Serial.print(",");

Serial.print(Countdownhr);

Serial.print(",");

Serial.print("Incubation period");

Serial.print(",");

Serial.print(PUMPOFFV);

Serial.print(",");

Serial.print("Volume feed in=");

Serial.print(",");

Serial.print(PUMPONV);

Serial.print(",");

Serial.print("Time-DIFF=");

Serial.print(",");

Serial.print(ODVarT3);

Serial.print(",");

Serial.print("Pump speed");

Serial.print(",");

Serial.print(FLOWINMIN);

Serial.print(",");

Serial.print("LOOP SPEED");

Serial.print(",");

Serial.print(FLOWINMAX);

Serial.print(",");

Serial.print("UV-pulses rate");

Serial.print(",");

Serial.print(UVMUT);

Serial.print(",");

Serial.print("UV-PULSE");

Serial.print(",");

Serial.print(PulseUVNow);

Serial.print(",");

Serial.print("OD Adjust MAX");

Serial.print(",");

Serial.print(ODMAX);

Serial.print(",");

Serial.print("OD Adjust MIN");

Serial.print(",");

Serial.print(ODMIN);

Serial.print(",");

Serial.print("Program used=");

Serial.print(",");

Serial.print(ProcessStatus);

Serial.print(",");

Serial.print("Day No=");

Serial.print(",");

Serial.print(day());

Serial.print(",");

Serial.print("Hour=");

Serial.print(",");

Serial.print(hour());

Serial.print(",");

Serial.print("Combination-sub1");

Serial.print(",");

Serial.print(PuONCombmlVar1);

Serial.print(",");

Serial.print("Combination-sub2");

Serial.print(",");

Serial.print(PuONCombmlVar2);

Serial.print(",");

Serial.print("Combination-sub3");

Serial.print(",");

Serial.print(PuONCombmlVar3);

Serial.print(",");

Serial.print("Combination-sub4");

Serial.print(",");

Serial.print(PuONCombmlVar4);

Serial.print(",");

MyCSVMessage.End();

previousMillis3=currentMillis3;

}

}

if (currentMillis3 - previousMillisLOOP1 >= ((OFFLOOPINTVAR+ONLOOPINTVAR)\*60000)) {

myMotor3->setSpeed(FLOWINMAX);

myMotor3->run(BACKWARD);

myMotor3Sh3->setSpeed(FLOWINMAX);

myMotor3Sh3->run(BACKWARD);

}

if (currentMillis3 - previousMillisLOOP1 >= ((OFFLOOPINTVAR+ONLOOPINTVAR+REVLOOPINTVAR)\*60000)) {

myMotor3->run(RELEASE);

myMotor3Sh3->run(RELEASE);

MyPanel.HideControl(F("loopsimu1"));

MyPanel.HideControl(F("loopsimu2"));

previousMillisLOOP1 = currentMillis3;

}

wdt\_reset();

wdt\_disable();

}

//--------------------------------------------------------------------------------------------

//-----------------------------------------------------------------

void showtime(){

wdt\_enable(WDTO\_4S);

RTC.get(rtc,true);

{

Serial.print( rtc[6]); /\*YEAR MONTH DATE\*/

Serial.print("-");

Serial.print( rtc[5]);

Serial.print("-");

Serial.println( rtc[4]);

Serial.print( rtc[2]); /\*HOUR MIN SEC \*/

Serial.print(":");

Serial.print( rtc[1]);

Serial.print(":");

Serial.println( rtc[0]);

Serial.println( str[rtc[3]-1]); /\*\*\*\*\*\*\*\*WEEK\*\*\*\*\*/

Serial.println("\*\*\*\*\*\*\*\*\*\*");

}

wdt\_reset();

wdt\_disable();

}

//\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

//\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

void setup() {

Serial.begin(9600);

sensors.begin();

Wire.begin();

SD.begin();

EmptyODval=600;

if(updata\_flag)

{ Serial.println(" OldTime: ");

showtime();

RTC.stop();

RTC.set(DS1307\_SEC,TIME\_SEC); //---Update time----

RTC.set(DS1307\_MIN,TIME\_MIN);

RTC.set(DS1307\_HR,TIME\_HR);

RTC.set(DS1307\_DOW,TIME\_DOW);

RTC.set(DS1307\_DATE,TIME\_DATE);

RTC.set(DS1307\_MTH,TIME\_MTH);

RTC.set(DS1307\_YR,TIME\_YR);

RTC.start();

Serial.println(" SetTime: ");

showtime();

}

pinMode(22, OUTPUT);

pinMode(23, OUTPUT);

pinMode(24, OUTPUT);

pinMode(25, OUTPUT);

pinMode(26, OUTPUT);

pinMode(10, OUTPUT);

pinMode(29, OUTPUT);

pinMode(30, OUTPUT); //Heater (1):

pinMode(40, OUTPUT); //Heater (2):

pinMode(A11, INPUT);

pinMode(33, OUTPUT);

pinMode(34, OUTPUT);

pinMode(35, OUTPUT);

pinMode(36, OUTPUT);

pinMode(9, OUTPUT);

analogWrite (10, 2000);

analogWrite (29, 2000);

analogWrite (9, 0);

delay (500);

analogWrite (10, 0);

analogWrite (29, 0);

temperaturesetvar=38;

Stirvar=50;

Waterbathpumpvar=20;

analogWrite (22, 0);

Multiplyvar=0.7;

rpmfeedvar=24;

FLOWINMAX = 100;

FLOWINMIN = 250;

SerialCommandHandler.AddCommand(F("Auto"), Cmd\_Auto);

SerialCommandHandler.AddCommand(F("Manual"), Cmd\_Manual);

SerialCommandHandler.AddCommand(F("Go"), Cmd\_Move1);

SerialCommandHandler.AddCommand(F("Stop"), Cmd\_AllStop);

SerialCommandHandler.AddCommand(F("Refresh"), Cmd\_Refresh);

SerialCommandHandler.AddCommand(F("GetODMAX"), Cmd\_GetODMAX);

SerialCommandHandler.AddCommand(F("PUMPDELAYON"), Cmd\_PUMPON);

SerialCommandHandler.AddCommand(F("PUMPDELAYOFF"), Cmd\_PUMPOFF);

SerialCommandHandler.AddCommand(F("FLOWMAXV"), Cmd\_FLOWMAXV);

SerialCommandHandler.AddCommand(F("FLOWMINV"), Cmd\_FLOWMINV);

SerialCommandHandler.AddCommand(F("FLOWADDINV"), Cmd\_FLOWADDINV);

SerialCommandHandler.AddCommand(F("StopOption"), Cmd\_STOPOPTION);

SerialCommandHandler.AddCommand(F("MANAUTO"), Cmd\_MANAUTO);

//SerialCommandHandler.AddCommand(F("Sampling--check"), Cmd\_Samplingcheck);

//SerialCommandHandler.AddCommand(F("Sam--Now"), Cmd\_SamNow);

//SerialCommandHandler.AddCommand(F("Sam--Count"), Cmd\_SamCount);

//SerialCommandHandler.AddCommand(F("Samplingval"), Cmd\_Samplingval);

SerialCommandHandler.AddCommand(F("Feed-BDown"), Cmd\_FeedBDown);

SerialCommandHandler.AddCommand(F("FWValueBB"), Cmd\_FWValueBB);

SerialCommandHandler.AddCommand(F("Waste-BDown"), Cmd\_WasteBDown);

SerialCommandHandler.AddCommand(F("Initialfeed"), Cmd\_Initialfeed);

SerialCommandHandler.AddCommand(F("Loop-Stop"), Cmd\_LoopStop);

SerialCommandHandler.AddCommand(F("UV--HR"), Cmd\_UVHR);

//SerialCommandHandler.AddCommand(F("TurnOF--Samp"), Cmd\_TurnOFSamp);

SerialCommandHandler.AddCommand(F("ODREADS"), Cmd\_ODREADS);

//SerialCommandHandler.AddCommand(F("Delay-samp"), Cmd\_Delaysamp);

SerialCommandHandler.AddCommand(F("Report-Refresh"), Cmd\_ReportRefresh);

SerialCommandHandler.AddCommand(F("Reverse-Waste"), Cmd\_ReverseWaste);

//SerialCommandHandler.AddCommand(F("ContinousF"), Cmd\_ContinousF);

SerialCommandHandler.AddCommand(F("feedspeedcont"), Cmd\_feedspeedcont);

SerialCommandHandler.AddCommand(F("Conttimestopinterval"), Cmd\_Conttimestopinterval);

SerialCommandHandler.AddCommand(F("VolumerestMIN"), Cmd\_VolumerestMIN);

SerialCommandHandler.AddCommand(F("VolumerestHR"), Cmd\_VolumerestHR);

SerialCommandHandler.AddCommand(F("OFFLOOPINTsent"), Cmd\_OFFLOOPINTsent);

SerialCommandHandler.AddCommand(F("ONLOOPINTsent"), Cmd\_ONLOOPINTsent);

SerialCommandHandler.AddCommand(F("REVLOOPINTsent"), Cmd\_REVLOOPINTsent);

//SerialCommandHandler.AddCommand(F("samamount"), Cmd\_samamount);

//SerialCommandHandler.AddCommand(F("samcleaning"), Cmd\_samcleaning);

//SerialCommandHandler.AddCommand(F("samcleaningnow"), Cmd\_samcleaningnow);

SerialCommandHandler.AddCommand(F("Stirring"), Cmd\_Stirring);

//Combination system serial orders

SerialCommandHandler.AddCommand(F("PuOFFComb1"), Cmd\_PuOFFComb1);

SerialCommandHandler.AddCommand(F("PuONComb1"), Cmd\_PuONComb1);

SerialCommandHandler.AddCommand(F("PuSpeedComb1"), Cmd\_PuSpeedComb1);

SerialCommandHandler.AddCommand(F("PuOFFComb2"), Cmd\_PuOFFComb2);

SerialCommandHandler.AddCommand(F("PuONComb2"), Cmd\_PuONComb2);

SerialCommandHandler.AddCommand(F("PuSpeedComb2"), Cmd\_PuSpeedComb2);

SerialCommandHandler.AddCommand(F("PuOFFComb3"), Cmd\_PuOFFComb3);

SerialCommandHandler.AddCommand(F("PuONComb3"), Cmd\_PuONComb3);

SerialCommandHandler.AddCommand(F("PuSpeedComb3"), Cmd\_PuSpeedComb3);

SerialCommandHandler.AddCommand(F("PuOFFComb4"), Cmd\_PuOFFComb4);

SerialCommandHandler.AddCommand(F("PuONComb4"), Cmd\_PuONComb4);

SerialCommandHandler.AddCommand(F("PuSpeedComb4"), Cmd\_PuSpeedComb4);

SerialCommandHandler.AddCommand(F("Temperaturenter"), Cmd\_Temperaturenter);

SerialCommandHandler.AddCommand(F("PuONCombml1"), Cmd\_PuONCombml1);

SerialCommandHandler.AddCommand(F("PuONCombml2"), Cmd\_PuONCombml2);

SerialCommandHandler.AddCommand(F("PuONCombml3"), Cmd\_PuONCombml3);

SerialCommandHandler.AddCommand(F("PuONCombml4"), Cmd\_PuONCombml4);

SerialCommandHandler.AddCommand(F("entercomvalues"), Cmd\_entercomvalues);

//Pump Manual cntrol

SerialCommandHandler.AddCommand(F("feedstartmanope"), Cmd\_feedstartmanope);

SerialCommandHandler.AddCommand(F("feedstopmanope"), Cmd\_feedstopmanope);

SerialCommandHandler.AddCommand(F("feedrevmanope"), Cmd\_feedrevmanope);

SerialCommandHandler.AddCommand(F("wastestartmanope"), Cmd\_wastestartmanope);

SerialCommandHandler.AddCommand(F("wastestopmanope"), Cmd\_wastestopmanope);

SerialCommandHandler.AddCommand(F("wasterevmanope"), Cmd\_wasterevmanope);

SerialCommandHandler.AddCommand(F("feed2startmanope"), Cmd\_feed2startmanope);

SerialCommandHandler.AddCommand(F("feed2stopmanope"), Cmd\_feed2stopmanope);

SerialCommandHandler.AddCommand(F("feed2revmanope"), Cmd\_feed2revmanope);

SerialCommandHandler.AddCommand(F("waste2startmanope"), Cmd\_waste2startmanope);

SerialCommandHandler.AddCommand(F("waste2stopmanope"), Cmd\_waste2stopmanope);

SerialCommandHandler.AddCommand(F("waste2revmanope"), Cmd\_waste2revmanope);

SerialCommandHandler.AddCommand(F("comp1startmanope"), Cmd\_comp1startmanope);

SerialCommandHandler.AddCommand(F("comp1stopmanope"), Cmd\_comp1stopmanope);

SerialCommandHandler.AddCommand(F("comp1revmanope"), Cmd\_comp1revmanope);

SerialCommandHandler.AddCommand(F("comp2startmanope"), Cmd\_comp2startmanope);

SerialCommandHandler.AddCommand(F("comp2stopmanope"), Cmd\_comp2stopmanope);

SerialCommandHandler.AddCommand(F("comp2revmanope"), Cmd\_comp2revmanope);

SerialCommandHandler.AddCommand(F("comp3startmanope"), Cmd\_comp3startmanope);

SerialCommandHandler.AddCommand(F("comp3stopmanope"), Cmd\_comp3stopmanope);

SerialCommandHandler.AddCommand(F("comp3revmanope"), Cmd\_comp3revmanope);

SerialCommandHandler.AddCommand(F("comp4startmanope"), Cmd\_comp4startmanope);

SerialCommandHandler.AddCommand(F("comp4stopmanope"), Cmd\_comp4stopmanope);

SerialCommandHandler.AddCommand(F("comp4revmanope"), Cmd\_comp4revmanope);

SerialCommandHandler.AddCommand(F("switch1ONmanope"), Cmd\_switch1ONmanope);

SerialCommandHandler.AddCommand(F("switch1OFFmanope"), Cmd\_switch1OFFmanope);

SerialCommandHandler.AddCommand(F("switch2ONmanope"), Cmd\_switch2ONmanope);

SerialCommandHandler.AddCommand(F("switch2OFFmanope"), Cmd\_switch2OFFmanope);

SerialCommandHandler.AddCommand(F("bathpump"), Cmd\_bathpump);

SerialCommandHandler.AddCommand(F("Multiplyvalenter"), Cmd\_Multiplyvalenter);

SerialCommandHandler.AddCommand(F("ODBASELINE"), Cmd\_ODBASELINE);

SerialCommandHandler.AddCommand(F("airpumpspenter"), Cmd\_airpumpspenter);

SerialCommandHandler.AddCommand(F("airflowsetenter"), Cmd\_airflowsetenter);

SerialCommandHandler.AddCommand(F("bottlepressuresetenter"), Cmd\_bottlepressuresetenter);

SerialCommandHandler.AddCommand(F("rpmfeedenter"), Cmd\_rpmfeedenter);

SerialCommandHandler.AddCommand(F("PUMPDELAYONml"), Cmd\_PUMPDELAYONml);

SerialCommandHandler.AddCommand(F("PUMPDELAYOFFmin"), Cmd\_PUMPDELAYOFFmin);

// Calibration commands

SerialCommandHandler.AddCommand(F("onfeed1calmin"), Cmd\_onfeed1calmin);

SerialCommandHandler.AddCommand(F("onfeed2calmin"), Cmd\_onfeed2calmin);

SerialCommandHandler.AddCommand(F("onwaste1calmin"), Cmd\_onwaste1calmin);

SerialCommandHandler.AddCommand(F("onwaste2calmin"), Cmd\_onwaste2calmin);

SerialCommandHandler.AddCommand(F("onloop1calmin"), Cmd\_onloop1calmin);

SerialCommandHandler.AddCommand(F("onloop2calmin"), Cmd\_onloop2calmin);

SerialCommandHandler.AddCommand(F("oncomp1calmin"), Cmd\_oncomp1calmin);

SerialCommandHandler.AddCommand(F("oncomp2calmin"), Cmd\_oncomp2calmin);

SerialCommandHandler.AddCommand(F("oncomp3calmin"), Cmd\_oncomp3calmin);

SerialCommandHandler.AddCommand(F("oncomp4calmin"), Cmd\_oncomp4calmin);

SerialCommandHandler.AddCommand(F("onfeed1calminml"), Cmd\_onfeed1calminml);

SerialCommandHandler.AddCommand(F("onfeed2calminml"), Cmd\_onfeed2calminml);

SerialCommandHandler.AddCommand(F("onwaste1calminml"), Cmd\_onwaste1calminml);

SerialCommandHandler.AddCommand(F("onwaste2calminml"), Cmd\_onwaste2calminml);

SerialCommandHandler.AddCommand(F("onloop1calminml"), Cmd\_onloop1calminml);

SerialCommandHandler.AddCommand(F("onloop2calminml"), Cmd\_onloop2calminml);

SerialCommandHandler.AddCommand(F("oncomp1calminml"), Cmd\_oncomp1calminml);

SerialCommandHandler.AddCommand(F("oncomp2calminml"), Cmd\_oncomp2calminml);

SerialCommandHandler.AddCommand(F("oncomp3calminml"), Cmd\_oncomp3calminml);

SerialCommandHandler.AddCommand(F("oncomp4calminml"), Cmd\_oncomp4calminml);

SerialCommandHandler.AddCommand(F("onfeed1calsec"), Cmd\_onfeed1calsec);

SerialCommandHandler.AddCommand(F("onfeed2calsec"), Cmd\_onfeed2calsec);

SerialCommandHandler.AddCommand(F("onwaste1calsec"), Cmd\_onwaste1calsec);

SerialCommandHandler.AddCommand(F("onwaste2calsec"), Cmd\_onwaste2calsec);

SerialCommandHandler.AddCommand(F("onloop1calsec"), Cmd\_onloop1calsec);

SerialCommandHandler.AddCommand(F("onloop2calsec "), Cmd\_onloop2calsec);

SerialCommandHandler.AddCommand(F("oncomp1calsec"), Cmd\_oncomp1calsec);

SerialCommandHandler.AddCommand(F("oncomp2calsec"), Cmd\_oncomp2calsec);

SerialCommandHandler.AddCommand(F("oncomp3calsec"), Cmd\_oncomp3calsec);

SerialCommandHandler.AddCommand(F("oncomp4calsec"), Cmd\_oncomp4calsec);

SerialCommandHandler.AddCommand(F("onfeed1calsecml"), Cmd\_onfeed1calsecml);

SerialCommandHandler.AddCommand(F("onfeed2calsecml"), Cmd\_onfeed2calsecml);

SerialCommandHandler.AddCommand(F("onwaste1calsecml"), Cmd\_onwaste1calsecml);

SerialCommandHandler.AddCommand(F("onwaste2calsecml"), Cmd\_onwaste2calsecml);

SerialCommandHandler.AddCommand(F("onloop1calsecml"), Cmd\_onloop1calsecml);

SerialCommandHandler.AddCommand(F("onloop2calsecml"), Cmd\_onloop2calsecml);

SerialCommandHandler.AddCommand(F("oncomp1calsecml"), Cmd\_oncomp1calsecml);

SerialCommandHandler.AddCommand(F("oncomp2calsecml"), Cmd\_oncomp2calsecml);

SerialCommandHandler.AddCommand(F("oncomp3calsecml"), Cmd\_oncomp3calsecml);

SerialCommandHandler.AddCommand(F("oncomp4calsecml"), Cmd\_oncomp4calsecml);

SerialCommandHandler.AddCommand(F("mlfeedinghowmany"), Cmd\_mlfeedinghowmany);

//---------------------------------------------

MyPanel.EnableControl(F("cali1delaymin"));

MyPanel.EnableControl(F("cali2delaymin"));

MyPanel.EnableControl(F("cali3delaymin"));

MyPanel.EnableControl(F("cali4delaymin"));

MyPanel.EnableControl(F("cali5delaymin"));

MyPanel.EnableControl(F("cali6delaymin"));

MyPanel.EnableControl(F("cali7delaymin"));

MyPanel.EnableControl(F("cali8delaymin"));

MyPanel.EnableControl(F("cali9delaymin"));

MyPanel.EnableControl(F("cali10delaymin"));

MyPanel.EnableControl(F("cali1delaysec"));

MyPanel.EnableControl(F("cali2delaysec"));

MyPanel.EnableControl(F("cali3delaysec"));

MyPanel.EnableControl(F("cali4delaysec"));

MyPanel.EnableControl(F("cali5delaysec"));

MyPanel.EnableControl(F("cali6delaysec"));

MyPanel.EnableControl(F("cali7delaysec"));

MyPanel.EnableControl(F("cali8delaysec"));

MyPanel.EnableControl(F("cali9delaysec"));

MyPanel.EnableControl(F("cali10delaysec"));

MyPanel.HideControl(F("ONSgin"));

MyPanel.HideControl(F("Arrow1"));

MyPanel.HideControl(F("Arrow2"));

MyPanel.HideControl(F("Arrow3"));

MyPanel.HideControl(F("Arrow0"));

AFMS.begin();

myMotor1-> run(FORWARD);

myMotor2-> run(FORWARD);

myMotor3-> run(FORWARD);

myMotor4-> run(FORWARD);

myMotor1-> run(RELEASE);

myMotor2-> run(RELEASE);

myMotor3-> run(RELEASE);

myMotor4-> run(RELEASE);

AFMS1.begin();

myMotor1Sh1-> run(FORWARD);

myMotor2Sh1-> run(FORWARD);

myMotor3Sh1-> run(FORWARD);

myMotor4Sh1-> run(FORWARD);

myMotor1Sh1-> run(RELEASE);

myMotor2Sh1-> run(RELEASE);

myMotor3Sh1-> run(RELEASE);

myMotor4Sh1-> run(RELEASE);

AFMS2.begin();

myMotor1Sh2-> run(FORWARD);

myMotor2Sh2-> run(FORWARD);

myMotor3Sh2-> run(FORWARD);

myMotor4Sh2-> run(FORWARD);

myMotor1Sh2-> run(RELEASE);

myMotor2Sh2-> run(RELEASE);

myMotor3Sh2-> run(RELEASE);

myMotor4Sh2-> run(RELEASE);

AFMS3.begin();

myMotor1Sh3-> run(FORWARD);

myMotor2Sh3-> run(FORWARD);

myMotor3Sh3-> run(FORWARD);

myMotor4Sh3-> run(FORWARD);

myMotor1Sh3-> run(RELEASE);

myMotor2Sh3-> run(RELEASE);

myMotor3Sh3-> run(RELEASE);

myMotor4Sh3-> run(RELEASE);

MyPanel.SetCheck(F("Stopoption"), true);

MyPanel.EnableControl(F("Autocheck"));

MyPanel.EnableControl(F("Manualcheck"));

MyPanel.EnableControl(F("MAN-AUTO"));

MyPanel.ShowControl(F("Start"));

MyPanel.ShowControl(F("ALLSTOP"));

MyPanel.SetText(F("Switch"), "RD");

MyPanel.SetText(F("Number"), "3");

MyPanel.SetBackColor(F("Switch"), F("yellow"));

pinMode(pinCS, OUTPUT);

myMotor3Sh2->setSpeed(Waterbathpumpvar);

myMotor3Sh2->run(FORWARD);

myMotor1Sh2->setSpeed(70);

myMotor1Sh2->run(FORWARD);

Stopoption();

}

void(\* resetFunc) (void) = 0; //declare reset function @ address 0

void Stopoption(){

MyPanel.DisableControl(F("INMAXVAL"));

MyPanel.DisableControl(F("INMINVAL"));

MyPanel.DisableControl(F("ADDINVAL"));

MyPanel.DisableControl(F("PUMPOFFVAL"));

MyPanel.DisableControl(F("PUMPONVAL"));

MyPanel.DisableControl(F("ODMAXVAL"));

MyPanel.DisableControl(F("PUMPONBUT"));

MyPanel.DisableControl(F("PUMPOFFBUT"));

MyPanel.DisableControl(F("INMAX"));

MyPanel.DisableControl(F("INMIN"));

MyPanel.DisableControl(F("ADDIN"));

MyPanel.DisableControl(F("ODMAX"));

}

void loop()

{

uint8\_t i;

SerialCommandHandler.Process();

unsigned long currentMillis = millis();

//if(updata\_flag==0)

// showtime(); //Output data from serial port

//R:0-255 G:0-255 B:0-255

bottlepressureactualvar = analogRead (A8);

if ((PuONCombmlVar1+PuONCombmlVar2+PuONCombmlVar3+PuONCombmlVar4) > 45) {

MyPanel.DisableControl(F("Entercombvalbu"));

}

else

{

MyPanel.EnableControl(F("Entercombvalbu"));

}

MyPanel.SetNumber(F("ODshow"), 0);

MyPanel.SetNumber(F("Pointer"), 0);

TimePlot ODR2("ODR2=");

ODR2.SendData("ODR2=",0);

MyCSVMessage.Begin();

Serial.print(millis()/3600000);

Serial.print(",");

Serial.print("0");

Serial.print(",");

Serial.print("water level");

Serial.print(WAterbathlevel);

MyCSVMessage.End();

delay(1000);

sensors.requestTemperatures();

Celcius=sensors.getTempCByIndex(0);

MyPanel.SetNumber(F("Temperatureactual"), Celcius);

if (Celcius <= (temperaturesetvar - 0.4)){

if ((currentMillis - previousMillistemp) >= 7000){

analogWrite (30, 2000);

analogWrite (40, 2000);

myMotor1Sh2->setSpeed(190);

myMotor1Sh2->run(FORWARD);

}

}

else if (Celcius >= (temperaturesetvar)) {

analogWrite (30, 0);

analogWrite (40, 0);

myMotor1Sh2->setSpeed(50);

myMotor1Sh2->run(FORWARD);

previousMillistemp = currentMillis;

}

if (Celcius >= (temperaturesetvar+2)|| Celcius <= (temperaturesetvar-2)){

if ((currentMillis - previousMillistemp2) >= 60000){

analogWrite (10, 2000);

analogWrite (29, 2000);

delay (200);

analogWrite (10, 0);

analogWrite (29, 0);

MyPanel.ShowControl(F("temperatureupsign1"));

MyPanel.ShowControl(F("temperaturedownsign1"));

}

}

else {

analogWrite (10, 0);

analogWrite (29, 0);

MyPanel.HideControl(F("temperatureupsign1"));

MyPanel.HideControl(F("temperaturedownsign1"));

previousMillistemp2 = currentMillis;

}

WAterbathlevel= analogRead(A11);

if (WAterbathlevel <= 5){

analogWrite (10, 2000);

analogWrite (29, 2000);

delay (50);

analogWrite (10, 0);

analogWrite (29, 0);

MyPanel.ShowControl(F("wblevelsign1"));

}

else {

analogWrite (10, 0);

analogWrite (29, 0);

MyPanel.HideControl(F("wblevelsign1"));

}

}

void Cmd\_AllStop(CommandParameter &p)

{

analogWrite (10, 2000);

analogWrite (29, 2000);

delay (1000);

analogWrite (10, 0);

analogWrite (29, 0);

delay (100);

analogWrite (10, 2000);

analogWrite (29, 2000);

delay (1000);

analogWrite (10, 0);

analogWrite (29, 0);

delay (100);

ProcessStatus=0;

resetFunc();

MyPanel.EnableControl(F("Initialfeedbut"));

MyPanel.SetBackColor(F("Switch"), F("red"));

MyPanel.SetText(F("Switch"), "OFF");

MyPanel.SetCheck(F("Manualcheck"), false);

MyPanel.SetCheck(F("Autocheck"), false);

MyPanel.SetCheck(F("MAN-AUTO"), false);

MyPanel.SetCheck(F("Stopoption"), true);

MyPanel.HideControl(F("Arrow1"));

MyPanel.HideControl(F("Arrow2"));

MyPanel.HideControl(F("Arrow3"));

resetFunc();

}

void Cmd\_Refresh(CommandParameter &p)

{

MyPanel.ShowControl(F("Start"));

MyPanel.ShowControl(F("ALLSTOP"));

MyPanel.ShowControl(F("Switch"));

MyPanel.SetText(F("Number"), "3");

MyPanel.SetNumber(F("Statusshow"), ProcessStatus);

while (Automaticcond1== 0){

SerialCommandHandler.Process();

Manualcond();

MyPanel.SetNumber(F("PTime"), hour());

MyPanel.SetNumber(F("PTime2"), minute());

MyPanel.SetNumber(F("PTime3"), second());

MyPanel.SetNumber(F("PTime4"), day());

MyPanel.SetNumber(F("PTime5"), month());

}

}