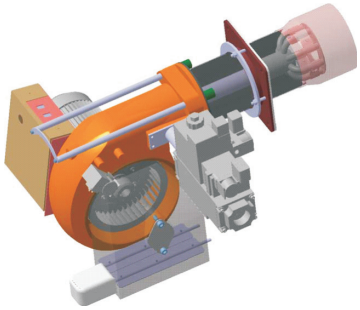
Burner Controller

MOTORIZED VALVE CONTROL APPLICATION WITH ESM-xx53 SERIES BURNER CONTROL DEVICES

ESM-xx53 series for Motorized Valf operation for Burners. ESM-XX53 series could work with natural gas, diesel fuel, fuel-oil, glycerin... etc. systems. Motorized valve and burner work together in synchronize.

- Minimum & Maximum Flow Control via Proportional Control
- Pre-sweeping for Firing Chamber and Chimney
- Detailed Iconic Display
- RS-232 (standard) or RS-485 (optional) serial communication with Modbus RTU protocol



PARAMETERS

ULtt **Motorized valve open / close travelling time (Modbus Address = 40019)**
That is the time defination parameter forvalve complate open. Value can select between 5 and 600 seconds.
IMPORTANT: In this parameter is described how many seconds to reach the position of the valve from %0 to %100. Firstly completely close the valve and by completely opening manually is measured opening time (please see Access Manuel Control below). After meusured opening time adds almost %5 to value for this parameter as **SECOND**.

ACCESS MANUAL CONTROL

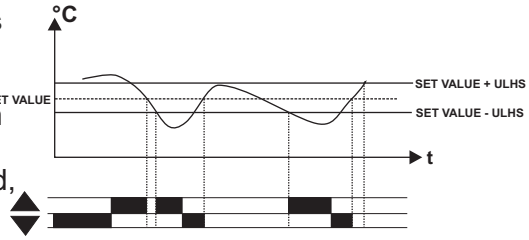
Press set button 5 sec.

While device is on manual situation display view ULUE parameter. Motorized valve can be open with using up arrow, can be close with using down arrow.
You can check the motorized valve when device on Manual mode.
Manual operation needs to measure of motorized valve opening time to describtion in ULTT parameter.

ULHY **The minimum duration of the valve motor drive output (0.1, 5.0)% (Modbus Address = 40020)**
Ultt = 100 sec and ULHY = %1.0 and the motor driving the valve outlet. The minimum time to be active in 100 * 1.0%=1 sec.Parameter value must be **INCREASED!** if while the controlling your valf is doing fastly and small movements.

ULHS Dead Band Value (0, 9999) (Modbus Address = 40022)

Device is not resume heating process in specified range.
If this parameter value is different from 0, dead band is active. When the temperature reaches the set value and gets in to the dead band, opening and closing outputs can not be active.
If the temperature gets out of the dead band, the dead band can not be active. The temperature should reach the set value for activating the dead band again.

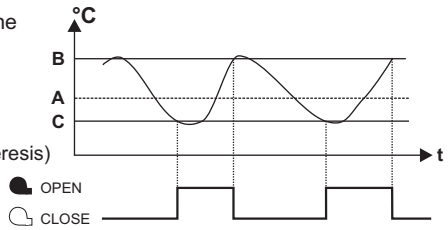


bHS1 Brulor Set Hysteresis Value (Modbus Address = 40021)

Hysteresis value is subtracted from Brulor Set value and the difference becomes the value which switch on thresold burner. It can be adjusted from 0 to 200°C.

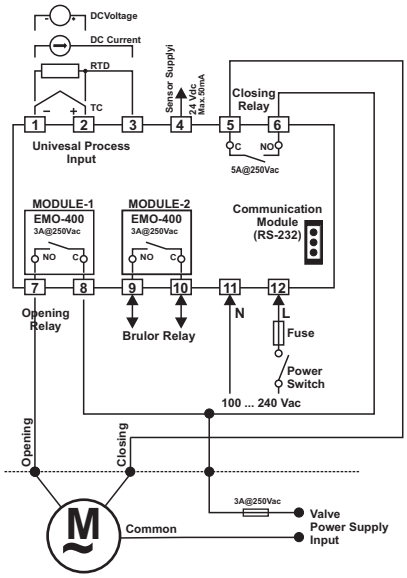
Only small amounts of heat are drawn from the boiler. A 2-position controller maintains the setpoint, switching the burner on and off.

A = Process Set
B = Process Set + Brulor Set
C = Process Set + (Brulor Set - Brulor Set Hysteresis)



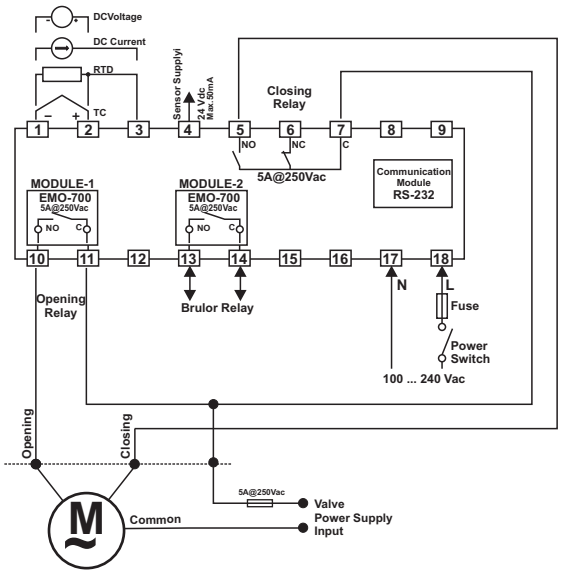
ESM-4453 ELECTRICAL CONNECTION

ESM-4453.1.20.1.1/01.01



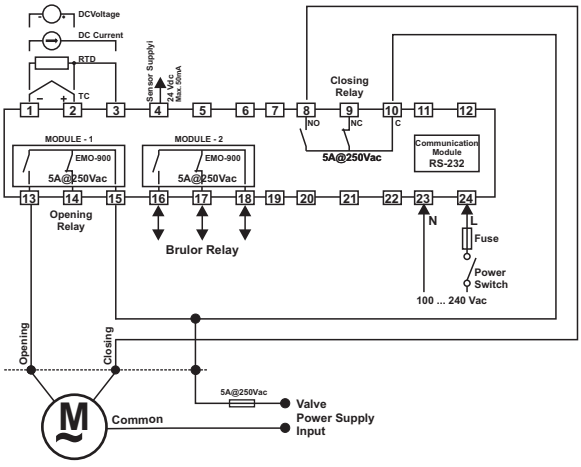
ESM-7753 ELECTRICAL CONNECTION

ESM-7753.1.20.1.1/01.01



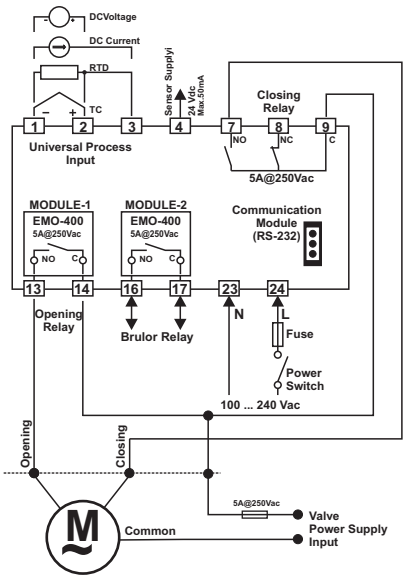
ESM-9953 ELECTRICAL CONNECTION

ESM-9953.1.20.1.1/01.01



ESM-9453 AND ESM-4953 ELECTRICAL CONNECTION

ESM-9453.1.20.1.1/01.01 **ESM-4953.1.20.1.1/01.01**



PID TUNNING PROCESS

Tunning proces is used to determine PID parameters by the device.

ESM-XX53 devices have **Auto Tune** for PID tunning;

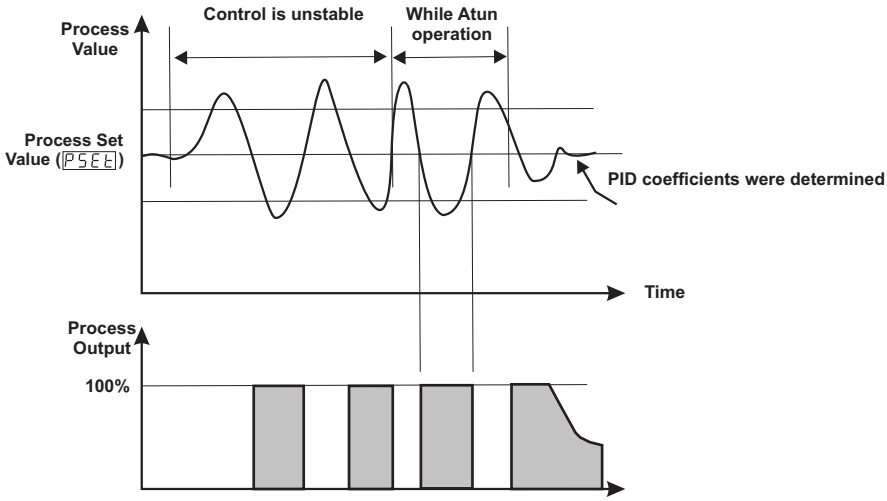
Autotune : *Autotune* can be start by user during the control.
If one of conditions below occurs, auotune process is cancelled.

- Changing process Set Value
- Sensor Break
- Autotune process fails in 8 hours.
- While Tune operation is being performed, if operation type selection is changed as “Manual” when it is “Automatic”.

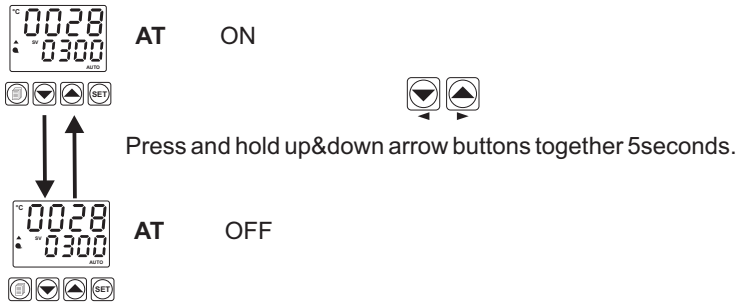
Auto Tune is canceled. Then, without doing any changes in PID parameters, device continues to run with former PID parameters.

***NOTE :** *Autotune* process should make before working while system on room temperature and in real system conditions.

Auto Tune (Limit Cycle Tuning) operation ;
Process control output runs according to heating function and PID control form is selected.



ACTIVATE AUTO TUNE PROCESS



While pressed up&down arrows together 5 seconds AT led will active and AUTO TUNE starts. Motorized valve will go to minimum and maximum points for identify autotone. For a while Auto tune finish and proportional band starts.

READ INPUT REGISTER

MODBUS ADDRESS:30001 Process Variable

MODBUS ADDRESS:30002 Output Power

MODBUS ADDRESS:30003 Set Value

MODBUS ADDRESS:30007 Leds : 0.bit Motorized Valve Closing Led,
1.bit Value Led (V),
2.bit Motorized Valve Opening Led,
3.bit Brulor Output Led,
5.bit Fahrenheit Led(°F),
6.bit Centigrade Led(°C),
9.bit Auto Led,
10.bit Man Led,
13.bit Auto Tune Led (AT),
15.bit Set Led(SV)

MODBUS ADDRESS:30008 Errors : 0.bit Sensor Break,
1.bit Reading Value Overflow from UpL,
2.bit Reading Value Underflow from LoL,
3.bit Tuning can't ended before 8 hours,
4.bit Reading heater current value exceeded current set value

MODBUS ADDRESS:30009 Decimal Point Selection

MODBUS ADDRESS:30015 Instrument Type & Revision Number
Reading Value : XXYY
XX : Intrument Type
25 = 4453
26 = 7753
27 = 9953
28 = 4953
29 = 9453
YY : Revision Number

MODBUS ADDRESS:30024 Calculating Current Value

MODBUS ADDRESS:30025 PID Proportional Calculating Value

MODBUS ADDRESS:30026 PID Integral Calculating Value

MODBUS ADDRESS:30027 PID Derivative Calculating Value

MODBUS ADDRESS:30025 Valve Position Calculating Value