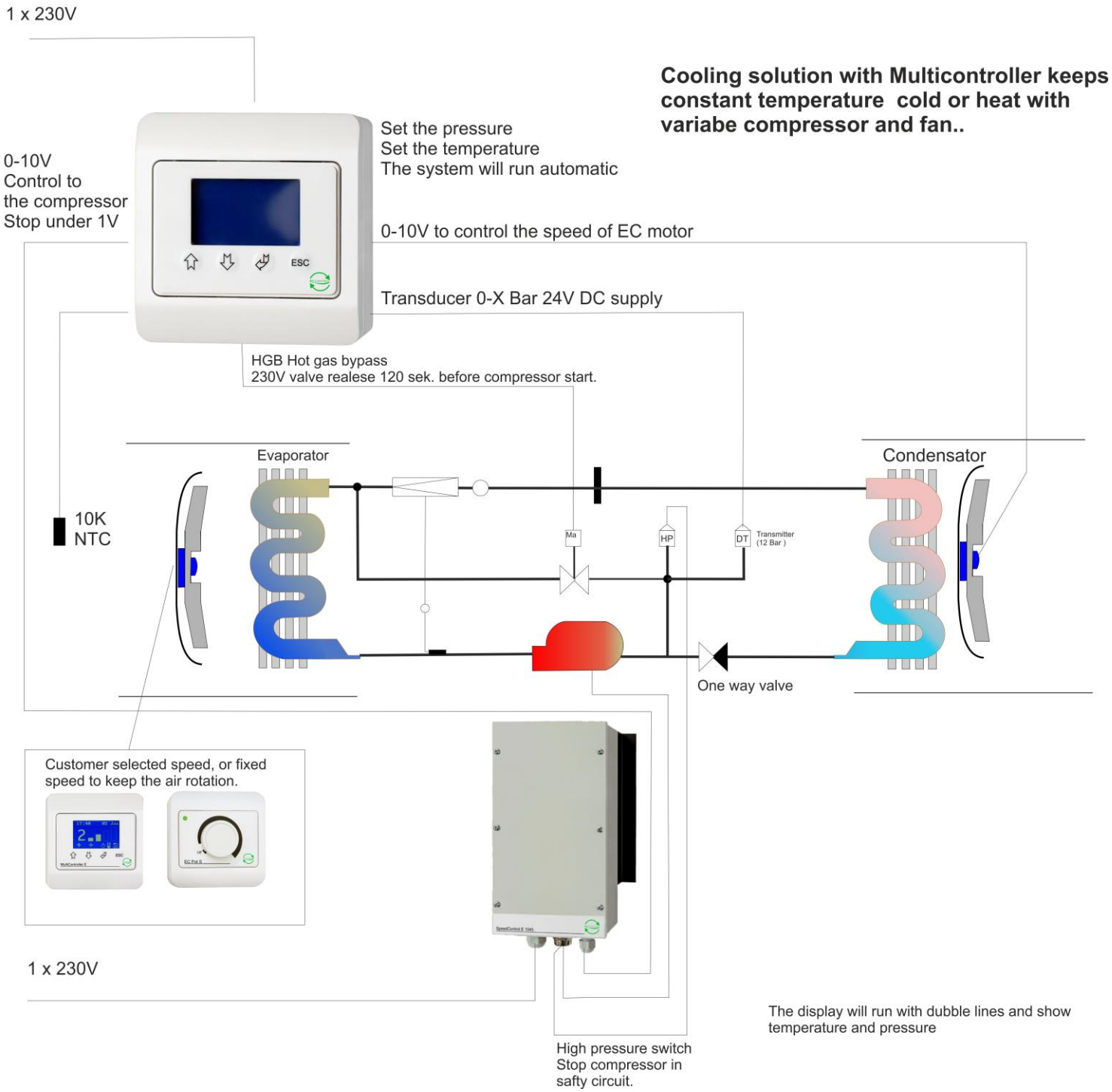
MultiController E Regulate 230V
Compressor / Chiller Configuration

MultiController version 2.5 og 2.6

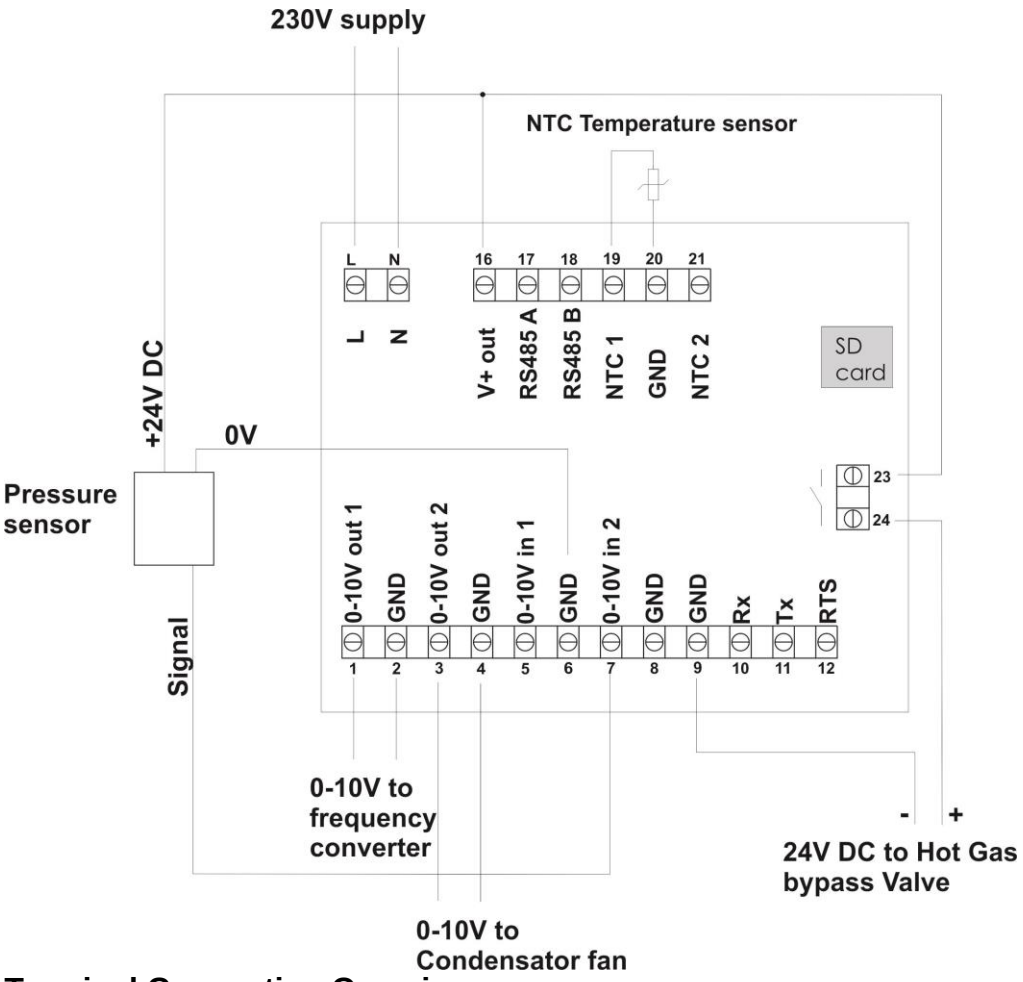
1. System Build



1.1. Basic Configuration for Compressor Control

When MultiController is connected to supply voltages for the first time, you must choose the functionality of the MultiController. First you need to choose the language and then the configuration (0-100 – see complete manual for all options). To use the MultiController to regulate a compressor and condenser vent you must choose configuration 11.

Connection Example



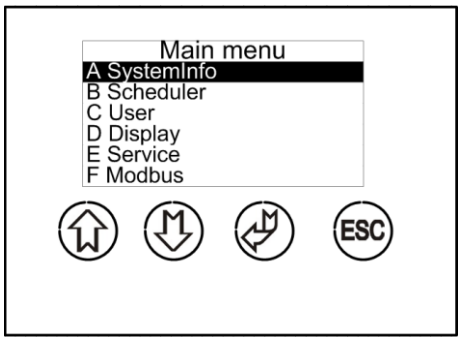
Terminal Connection Overview

Terminal No.	Description	Comment
1 & 2 (Vout1)	0-10V output 1	Load max 10mA
3 & 4 (Vout2)	0-10V output 2	Load max 10mA
5 & 6 (Vin1)	0-10V input 1	7k ohm input impedance
7 & 8 (Vin2)	0-10V input 2	7k ohm input impedance
L & N	Connection of Supply Voltage	230V AC ±10%
16	24V Voltage Output	+24VDC max 100mA
17 & 18	RS 485 Modbus	
19 & 20	NTC1 Temperature Sensor	10k / 22k NTC
21 & 20	NTC2 Temperature Sensor / Alarm input / PIR input	10k / 22k NTC / Contact
2,4,6,8,9,20	0V, GND	
23 & 24	Potential free contact.	Max 5A-AC1, 250VAC

2. User Interface

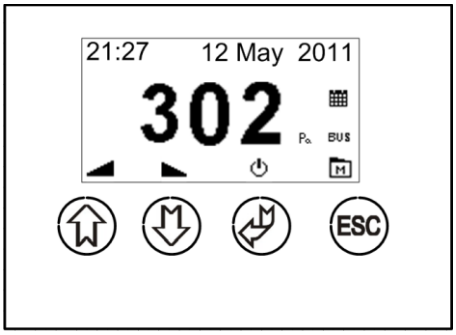
To operate the display, use the push buttons.
Below you will find the general functionality of the buttons.

Button	Functionality
↵	Enter
⇧	Adjust up /one step up in menu
⇩	Adjust down / one step down in menu
ESC	Escape



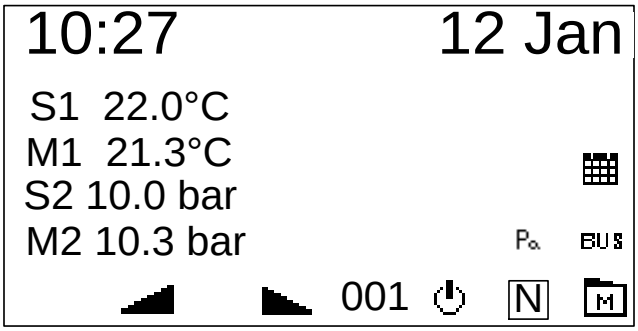
In the main window you will find shortcuts, those are illustrated By icons over each button.

Icon	Description
⏻	Shift amongst Normal/Alternative/Stop mode.
◢	Adjust setpoint up
◣	Adjust setpoint down
M	Go to menu



2.1. Main Window

When the MultiController is used as a compressor controller it is recommended to choose the double screen function (**C7**=dbl screen), as it makes it possible to monitor operation data for both temperature and pressure.



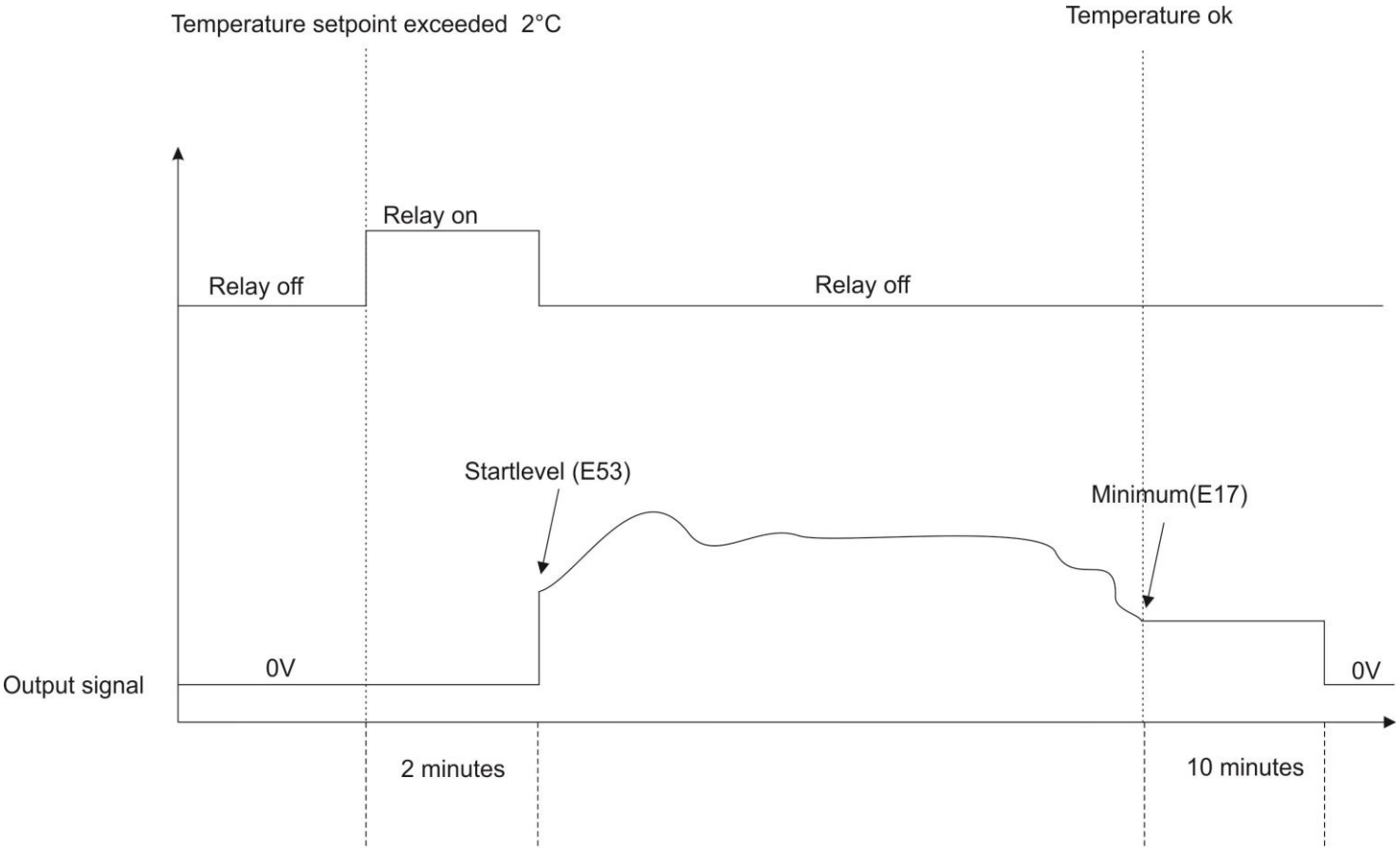
S1: Setpoint regulator 1
M1: Measured value regulator 1
S2: Setpoint regulator 2
M2: Measured value Regulator 2

3. Description of Regulation:

Cooling Control (E2 = Inverted)
When temperature rise 2°C above setpoint (**C1**), regulation of compressor starts. At first relay will close for 2 minutes to equalize pressure, then regulation of compressor speed takes over (star level **E53**). When temperature = setpoint or lower, compressor will turn to minimum speed (**E17**) for 10 minutes before coming to a full stop.

Heating Control (E2 = Normal)
When temperature falls 2°C below setpoint (**C1**), regulation of compressor starts. At first relay will close for 2 minutes to equalize pressure, then regulation of compressor speed takes over (start level **E53**). When temperature = setpoint or lower, compressor will turn to minimum speed (**E17**) for 10 minutes before coming to a full stop.

Pressor Control of Compressor Fans:
When pressure is higher than setpoint (**C11**), regulating of fan speed starts, to ensure constant pressure within the compressor system.



4. Setting of Menu Options:

4.1. User Menu (C-menu)

C1: Setpoint for **Regulator1** (NORM), **Temperature** is set here.

C7: Display Setpoint or measured value from a connected sensor, or double screen. It is recommended to set C7=dbl screen, to get double lines in display – displaying both setpoint and measured value for both regulator 1 and 2 simultaneously.

Other options are; (OFF) display setpoint. (ON) display measured value. **Note**, when (ON) is chosen setpoint (indicated by 'SET' after the value) is displayed for 5sceonds when setpoint is adjusted from main window and at point of time for operational shifts. (AVG display the average of the latest 10 measurements.

C11: Setpoint for **Regulator2** (NORM), **Pressure** is set here.

4.2. Service Menu (E-menu)

Access Code is 5550

E02: Regulator direction. Choose if system is to produce heating (Normal), or cooling (Inverted)

E04: Regulator output (**Regulator1**). Output must be set to '4 (compressor control).

E10: PID regulator - P parameter. (**Regulator1**) Amplification parameter.

E11: PID regulator - I parameter. (**Regulator1**) Attenuation parameter.

E12: PID regulator - D parameter. (**Regulator1**) Parameter for frequency of regulations (how often should the regulator react to signal). Resolution is 100ms.

E17: Minimum output voltage. (**Regulator1**)
If connected equipment is incapable of regulating from 0V, minimum output signal must be adjusted here.

E18: Maximum output voltage. (**Regulator1**)
If connected equipment is incapable of regulating up to 10 Volt, maximum output signal must be adjusted here.

E25: Minimum output voltage from the connected sensor (on Vin2). (**Regulator2**) (Pressure sensor)

E26: Maximum output voltage from the connected sensor (on Vin2). (**Regulator2**) (Pressure sensor)

E27: Sensor value at minimum. (**Regulator2**) (Pressure sensor)
Enter sensor value submitted at minimum output voltage (E25).

E28: Sensor value at maximum. (**Regulator2**) (Pressure sensor)
Enter sensor value submitted at maximum output voltage (E26).

E33: PID regulator - P parameter. (**Regulator2**) Amplification parameter.

E34: PID regulator - I parameter. (**Regulator2**) Attenuation parameter.

E35: PID regulator - D led. (**Regulator2**) Parameter for frequency of regulations (how often should the regulator react to signal). Resolution is 100ms.

E36: Minimum output voltage. (**Regulator2**)
If connected equipment is incapable of regulating from 0V, minimum output signal must be adjusted here.

E37: Maximum output voltage. (**Regulator 2**)
If connected equipment is incapable of regulating up to 10 Volt, maximum output signal must be adjusted here.

E53: Start level for (**Regulator1)**. To ensure a quick inducing of the regulating, an optimum start level may be set. E.g. if the typical operating point for the regulator is 50%, E53 is set to 500 and the regulator will then start with 50% as starting point and regulate up and down from this point. E53 may be set to value 0-1000.

E54: Start level for (**Regulator2)**. To ensure a quick inducing of the regulating, an optimum start level may be set as described above for E53.

5. Overview of Setpoints

Name	**Factory Setting**	**Min.**	**Max.**	**Unit**
C1 regulator1 setpoint (NORM)	Temp.: 22.0	Temp.: -20.0	Temp.: 50.0	Temp.: °C
C7 Display Setpoint (C7=OFF), Display measured value (C7=ON), Display average (C7=AVG). Double display (C7=dbl disp)	OFF			OFF ON AVG Dbl. disp
C11 regulator2 setpoint (NORM)	Pressure: 10.0	Pressure: 0	Pressure: 50.00	bar
E2 Regulator direction	Normal	Normal	Inverted	
E4 Regulator1 output 0=0-10V, 1=PWM, 2=PWM+1, 3=PWM+2, **4=compressor /cooling control**	0	0	4	
E10 PID P (Regulator1)	Temp: 20	1	100	
E11 PID I (Regulator1)	Temp: 100	0	5000	
E12 PID D regulating time (H) x 100	3	1	50	ms
E17 Min.output1	0.0	0.0	5.0	Volt
E18 Max.output1	10.0	5.0	10.0	Volt
E25 Min. input2	0.0	0.0	10.0	Volt
E26 Max. input2	10.0	0.0	10.0	Volt
E27 Sensor2 value at Min.	Pressure: 0.0	0.0	50.00	bar
E28 Sensor2 value at Max.	Pressure: 30.00	0.0	50.00	bar
E33 PID P (Regulator2)	20	1	100	
E34 PID I (Regulator2)	200	0	5000	
E35 PID D regulating time (H) x100	1	1	50	ms
E36 Min. output2	0.0	0.0	5.0	V
E37 Max output2	10.0	5.0	10.0	V
E53 Start level Reg1	500	0	1000	
E54 Start level Reg2	500	0	1000	

6. Technical Data

	230V model
Supply Voltage	230V AC ±10%
Safety Fuse	13A
Mains	Max <1W
Enclosure	IP 40 / IP 54
Dimension (h x w x d)	LSBOX85: 42x87x87 mm IP 54 box: 120x122x56 mm
Operating Temperature	0 - 50 °C
Relay	5A-AC1, 250VAC NO, 150W / 1150VA.
0-10VDC input1 (Vin1)	7k Ohm input impedance
0-10VDC input2 (Vin2)	7k Ohm input impedance
0-10VDC output1 (Vout1)	0-10,0V DC Max 10mA
0-10VDC output2 (Vout2)	0-10,0V DC Max 10mA
RS-485	Chanel A and B
SD Card Reader	MicroSD, must include LSC firmware
Jumper	120 Ohms termination RS-485

7. Applied Standards

EN 61000-6-1 and EN 61000-6-3 Electromagnetic Compatibility (EMC)
EN-60335-1 The Low Voltage Directive

This product complies with the RoHS, Directive 2011/65/EU.
Drawing: QuickGuide_ MC-Reg_Up-set_11_Compressor-SW_UK
Dato: 02-07-2018
Rev.: 2.6
Software Version: Program 2.6 Sub 10
Drawn by: UP/MJ/df
Manufacturer: LS Control A/S Industrivej 12, DK 4160 Herlufmagle.
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