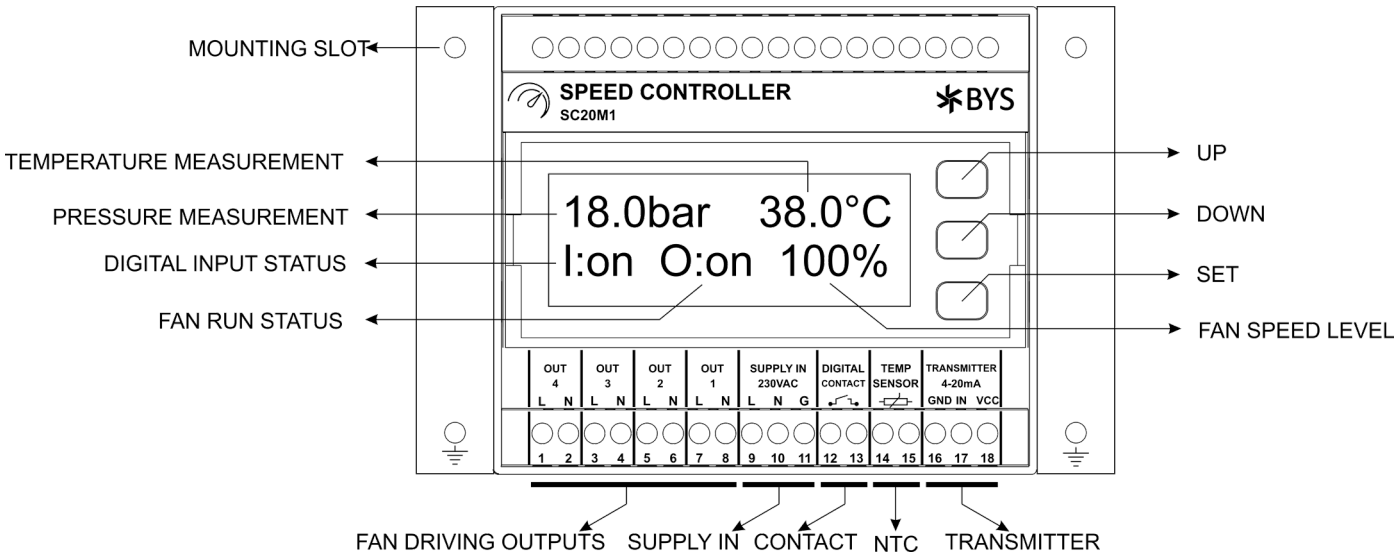
ELECTRONIC SPEED CONTROLLER FOR CONDENSER FAN MOTORS

SC20M1 v1.1

USER MANUAL



CONDENSER PRESSURE FIXER
TO IMPROVE ENERGY EFFICIENCY

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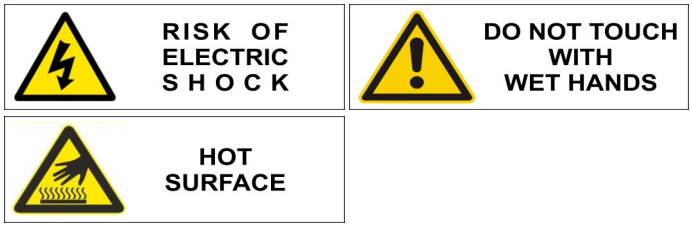
ELECTRONIC SPEED CONTROLLER FOR CONDENSER FAN MOTORS

1. Safety Rules

- Read the user manual carefully.
- Check that the fans used are suitable for voltage clipping operation.
- Use fuse suitable for device and fan power.
- Before starting up the device, make the electrical connections according to the instructions
- Follow the technical safety rules.
- The device must be installed by qualified personnel.
- Always check that the earth connections are correct before energizing the device.
- Never touch the device with wet hands and avoid liquid contact.
- Do not use the device in humid environments.
- Do not expose the device to direct sunlight.
- Install the device away from heat sources.
- Make sure that the installation area of the device is within the operating limits.
- Install the device so that the air flow is comfortable and the air ducts are perpendicular and upwards



2. How does it work

- This device processes the data it receives from the sensors and changes the speed of the condenser fans accordingly. This increases the energy efficiency by keeping the condenser pressure constant.
- Different pressure sensors can be used.
- Temperature control can also be done with NTC type temperature sensor connected to condenser line.
- It has pressure and temperature focused integrated operation function.
- it allows manual voltage adjustment for different applications.
- The fans can be soft-start or hard-start for compatibility with local weather conditions.

3. Overview

- This device provides convenience for users with LCD display, it also shows fans speed level, condenser pressure and condenser temperature.
- In addition, it can be easily programmed with up, down and set buttons.
- There is no need for the users to refer to the user manual thanks to its meaningful menu content in Turkish or English .

4. Technical Specifications

Supply voltage	:	**230V AC ±10%**
Operating frequency	:	**50Hz**
Output voltage	:	**20-230V AC ±2%**
Output frequency	:	**50Hz**
Instant output current	:	**40A**
Nominal output current	:	**20A**
Input types	:	**Pressure, Temperature, Digital contact**
Pressure sensor type	:	**4-20mA , 6-30V , 2 wire**
Pressure sensor supply voltage	:	**12VDC**
Pressure measurement range	:	**-1.0bar ~ 50.0bar**
Pressure units	:	**bar, psi**
Temperature sensor type	:	**10K NTC Metal case**
Temperature measurement range	:	**-50 ~ 150°C**
Temperature units	:	**Centigrade, Fahrenheit**
Digital input type	:	**NO or NC selectable**
Measurement precision	:	**10bit ADC**
Alarm type	:	**Audible and visual**
Displayed values	:	**Pressure, Temperature, Digital Input, Output Level**
Operating temperature	:	**0°C / +70°C**
Device dimensions	:	**140x90x93mm**
Device Weight	:	**800gr.**

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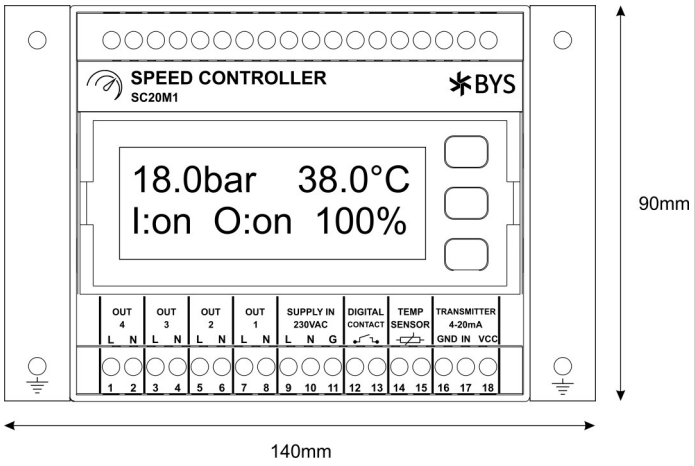
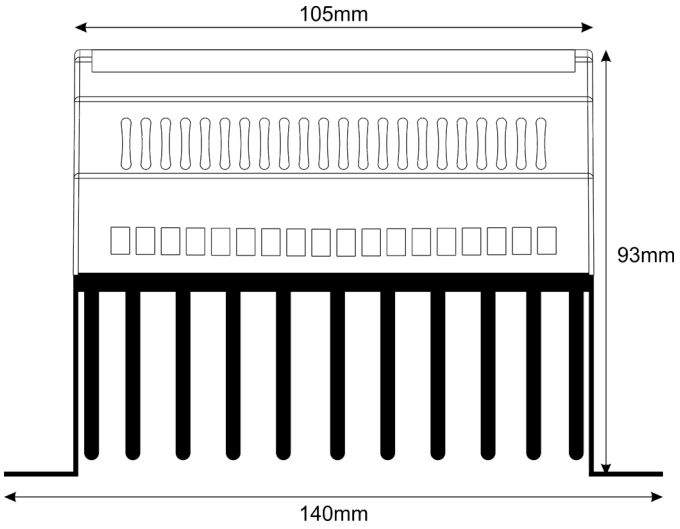
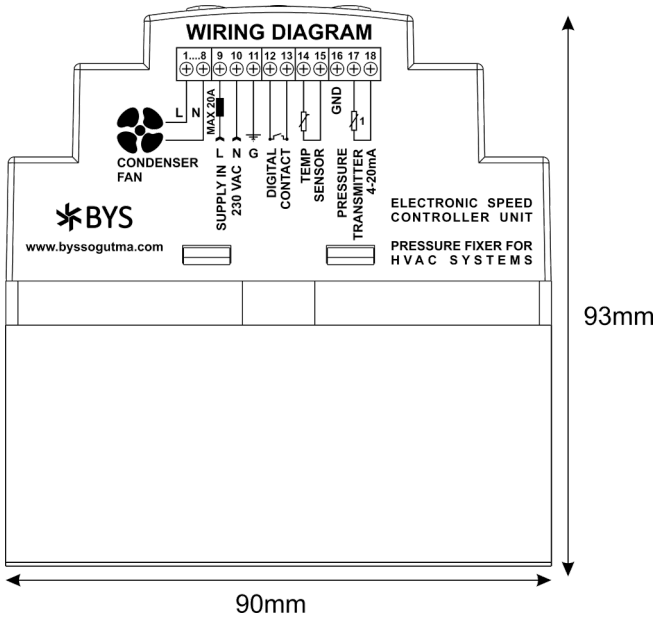
5. Device Dimensions







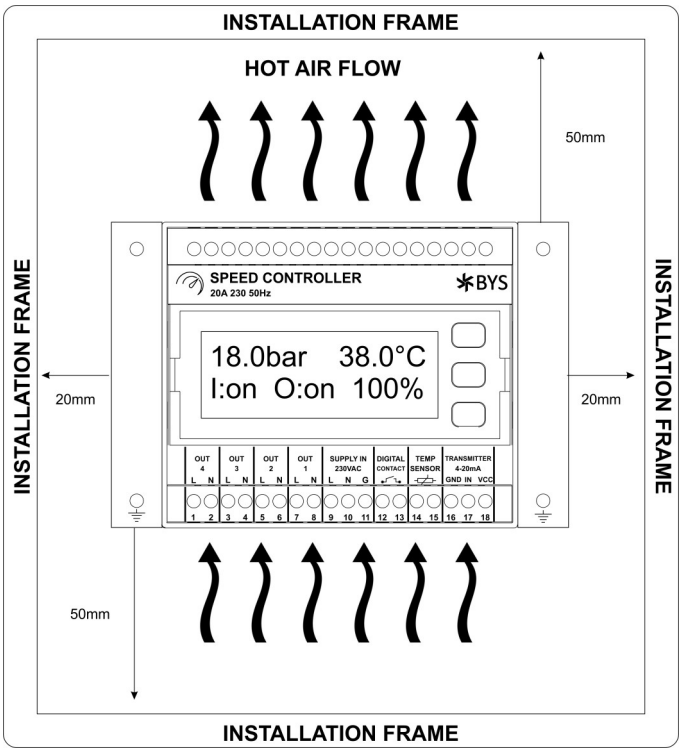
6. Installation Instructions

- Do not use the device in humid environments.
- Install the device away from heat sources.
- Make sure that the installation area of the device is within the operating limits.
- Install the device so that the air flow is smooth and the air ducts are perpendicular and in upward direction.
- Pay attention to panel ventilation in confined installation spaces. Use a ventilation fan if necessary. Not suitable for use in enclosed panels without ventilation.
- Avoid fluid contact with the device, do not use it in areas where there is a risk of fluid contact.

Warning: This device is not waterproof.

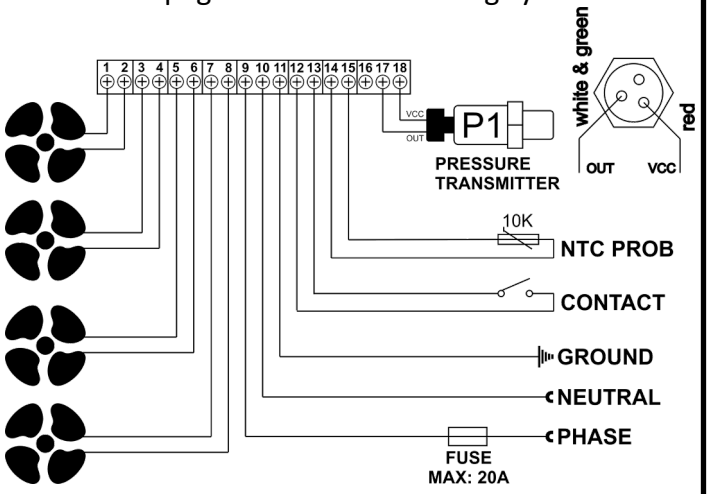
Contact with liquids may cause serious electric shock.

Minimum size for installation in ventilated electrical panels: 300*400*220mm



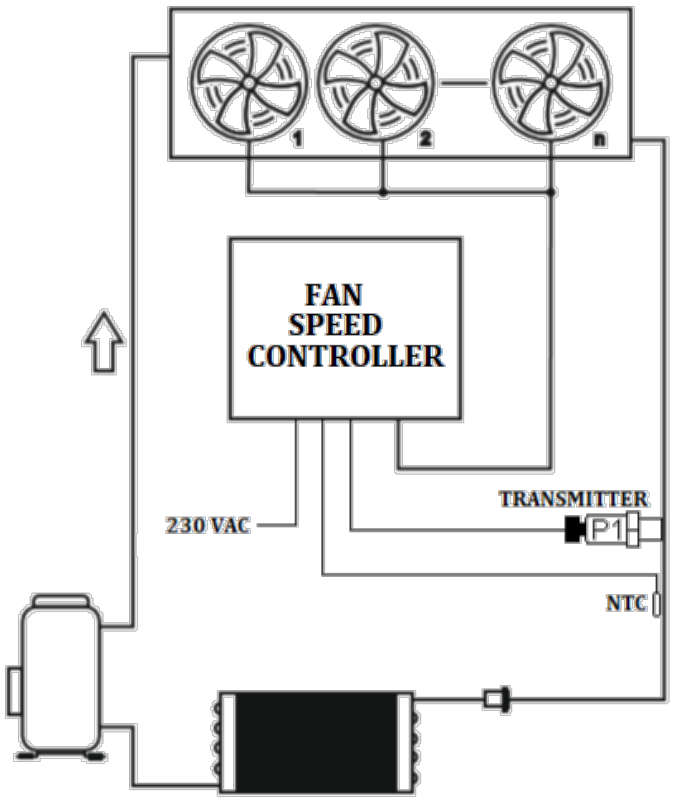
7. Wiring Instructions

- Use a fuse suitable for the current drawn by the fans. Maximum: 20A
- Take the presence of device grounding into consideration.
- Protect the inputs and outputs of the device from short circuits.
- Do not shorten the pressure and temperature sensor cables. Use shielded cable if extension is required.
- Refer to page 9 for detailed wiring system.



8. Physical Connection Instruction

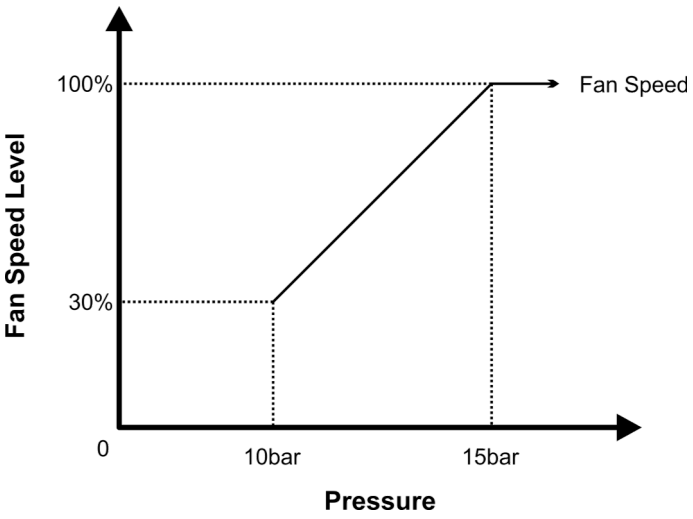
- Install the pressure sensor properly. Avoid physical damage.
- Isolate the NTC temperature sensor from the external environment.

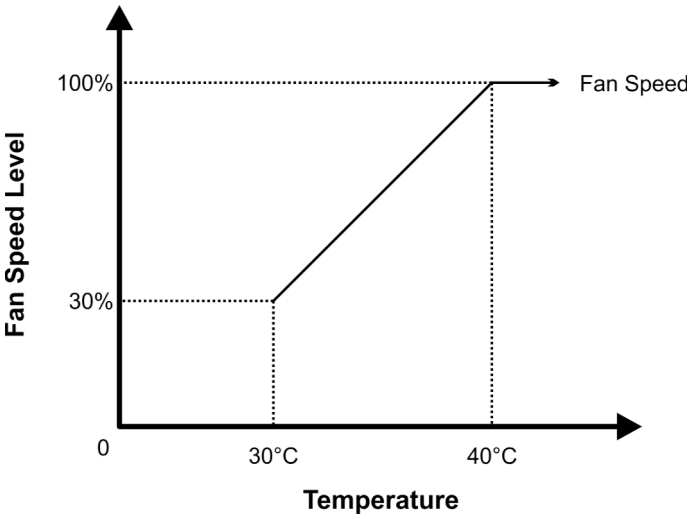


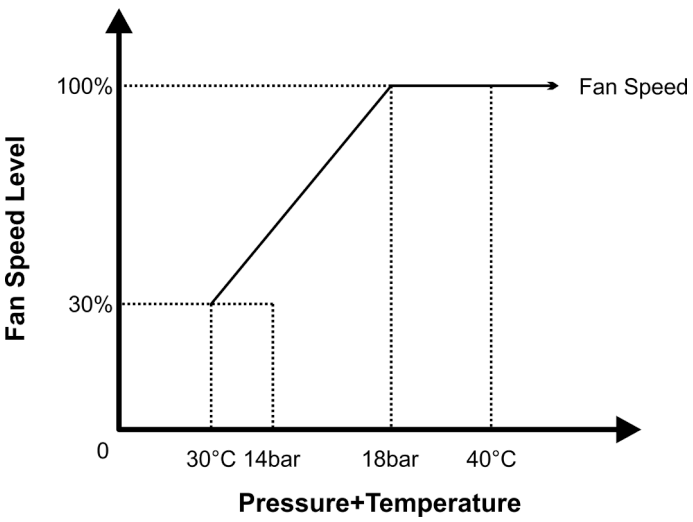
9. Graphical Operating Curve

Pressure lower level is set to 13bar, pressure upper level to 18bar, temperature lower level to 30 °C, temperature upper level to 40 °C, fan speed lower level to 30% and fan speed upper level to 100%.

Fan speed graph of the speed controller is shown below.







10. Programing

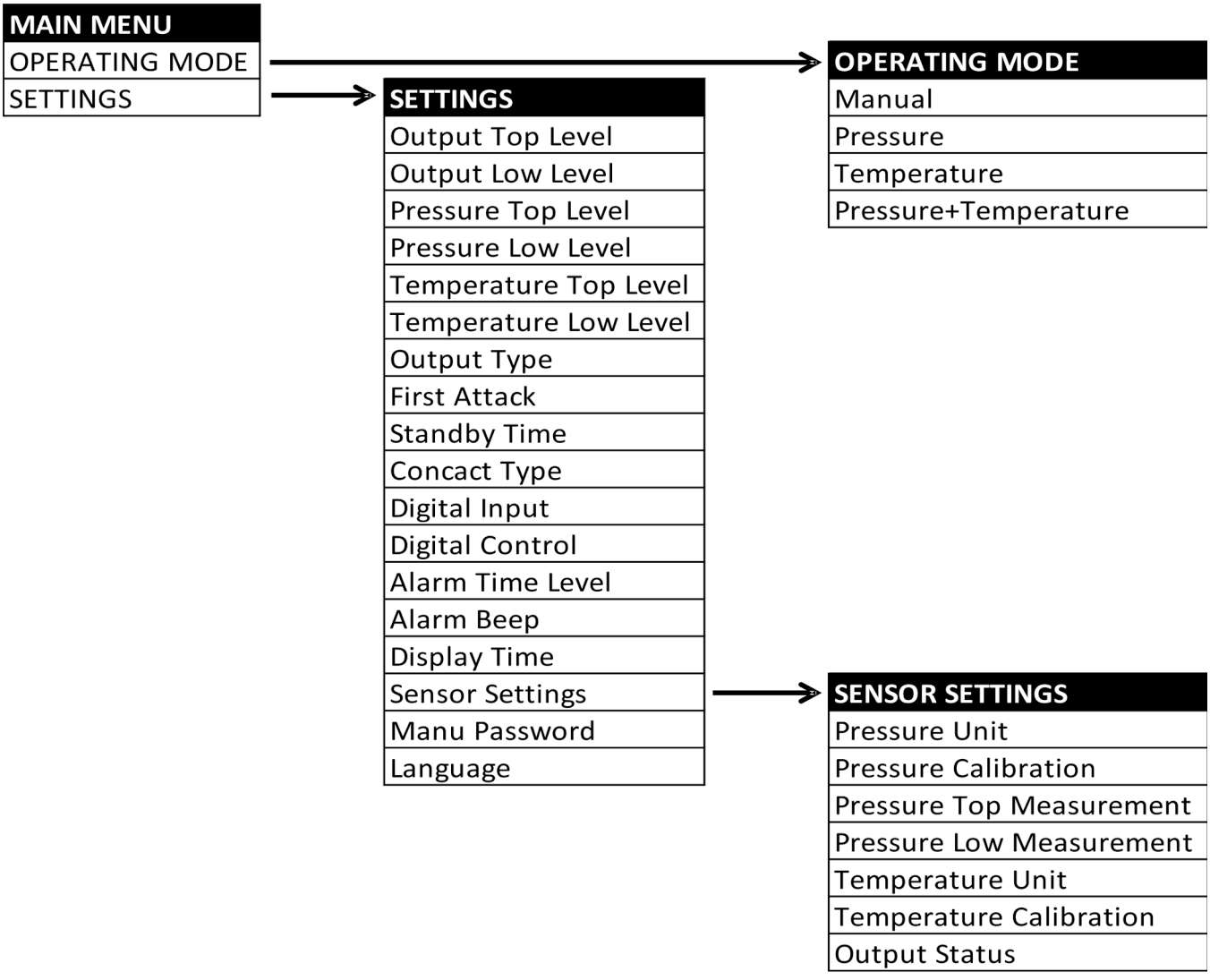
- Press and hold SET button for 5 seconds to enter programming menu.
- Scroll to the menu you want to enter and press the SET button.
- Change the values with up and down buttons. Exit by pressing SET button again.
- If no button is pressed for 30 seconds, automatically exited from the menu.
- **The fan outputs can be selected as active or passive during programming. (see: Parameters)**
- **Service menu password : 1234 (cannot be changed).**

- **To restore the device to factory settings;**

1. Turn off the power of the device.

2. Press and hold the up and down buttons. Turn on the power of the device without pulling your hand from the buttons. Wait until the display shows *Reset to Factory Settings*. Select *Yes* and press the SET button. The device will be reset after returning to factory settings. Refer to the parameter table for factory settings.

11. Menu Diagram



12. Menu Definitions

OPERATING MODE	
Manual	: User-defined level control
Pressure	: Pressure sensor based level control
Temperature	: Temperature sensor based level control
Pressure + Temperature	: Pressure sensor and temperature sensor based integrated level control
SETTINGS	
Output Top Level	: Maximum operating level of the fans
Output Low Level	: Minumum operating level of the fans
Pressure Top Level	: Pressure upper limit from fan speed upper limit (s1) to be obtained from the output
Pressure Low Level	: Pressure lower limit from fan speed lower limit (s2) to be obtained from the output
Temperature Top Level	: Temperature upper limit from fan speed upper limit (s1) to be obtained from the output
Temperature Low Level	: Temperature lower limit from fan speed lower limit (s2) to be obtained from the output
Output Type	: Output can be selected as linear or inverting
First Attack	: First start type of the fans
Stand by Time	: Stand by time of the fans at minimum speed
Contact Type	: Normal position of the contact connected to the digital input
Digital Input	: Operating status of fans in digital input detection
Digital Control	: Fans speed level value to be obtained from output in digital input detection
Alarm Time Level	: Fans speed level value to be obtained from output in case of sensor failures
Alarm Beep	: Audible alarm in case of sensor failures
Display Time	: Display off time
Sensor Settings	: Reading, calibration settings of connected sensors
Menu Password	: Device menu login password
Language	: Device menu language option
SENSOR SETTINGS	
Pressure Unit	: Pressure measurement unit
Pressure Calibration	: Zero calibration of pressure sensor at atmospheric pressure
Pressure Sensor Top Measurement	: Maximum measurement value of pressure sensor
Pressure Sensor Low Measurement	: Minimum measurement value of pressure sensor
Temperature Unit	: Temperature measurement unit
Temp Calibration	: Temperature measurement calibration
Output Status	: Fans operating status at the time of programming the device

13. Parameter Table

Parameter Code	Parameter (See page 6)	Factory Setting	Value Range	Descriptions (page 8)
S0	OPERATING MODE	Pressure	Manual Pressure Temperature Press + Temp	1
SETTINGS				
S1	Output Top Level	100%	(S2+1%) ~ 100%	
S2	Output Low Level	15%	1% ~ (S1-1%)	
S3	Pressure Top Level	18bar	(s4+0.1bar) ~ 50bar	
S4	Pressure Low Level	13bar	-1.0bar ~ (s3-0.1bar)	
S5	Temperature Top Level	40°C	(S6+1°C) ~ 150°C	
S6	Temperature Low Level	30°C	-50°C ~ (S5-1°C)	
S7	Output Type	Linear	Linear Inverted	2
S8	First Attack	Soft	Soft Hard	3
S9	Stand by Time	0 sec	0 ~ 600 sec	4
S10	Contact Type	Open Contact	Open Contact Close Contact	5
S11	Digital Input	None	Run Level Control None	6
S12	Digital Kontrol	100%	1% ~ 100%	
S13	Alarm Time Level	100%	1% ~ 100%	
S14	Alarm Beep	Active	Active Passive	
S15	Display Time	0 sec	0 ~ 600 sec	
S16	Menu Password	0	0001 ~ 9999	
S17	Language	Türkçe	Türkçe English	
SENSOR SETTINGS				
S18	Pressure Unit	bar	bar psi	
S19	Pressure Calibration	203	0 ~ 1023	7
S20	Pressure Top Measurement	30.0 bar	50.0 bar	8
S21	Pressure Low Measurement	0	-1.0 bar	9
S22	Temperature Unit	°C	°C °F	
S23	Temperature Calibration	0	-50 ~ +50	
S24	Output Status	On	On Off	10

14. Descriptions

1. **Operating Modes:**

- **Manual:** Used for user-defined speed control. Speed can be adjusted with up and down keys on the main display screen.
- **Pressure:** This mode must be selected for pressure-oriented operation of the device. In this mode, the alarm voltage specified is applied to the output in case of pressure sensor failure.
- **Temperature:** This mode should be selected for condenser temperature-oriented operation of the device. In this mode, the alarm voltage specified is applied to the output in case of NTC temperature sensor failure.
- **Pressure + Temperature:** This mode should be selected for both the condenser pressure and condenser temperature-oriented operation of the device. The device will compare the two sensor values and apply the appropriate output voltage to the fans. In this mode, while the device continues to operate according to condenser pressure regardless of condenser temperature, in case of NTC temperature sensor failure; whereas the determined alarm voltage is applied to the output in case of pressure sensor failure.

2. **Output Type :** Purpose as output limits linear or reversing.

3. **First Attack :** The first start time of the fans can be selected as soft or hard. At soft, the fans run at the specified minimum (S2) level. At hard, the fans run at maximum speed until 5sec and slow down to the required level.

4. **Stand by Time :**The fans are kept at the minimum speed for the next operation during the set time. If there are no situations that require the fans to run during the period, the fans will stop at the end of the period.

5. **Contact Type:** It is for the selection of the normal position of the contact connected to the digital input.

6. **Digital Input :** It determines the operation of the device in digital input detection. If the operation of the fans is required by energizing the device, it should be selected as ***None***. In **Run** selection; The fans are activated by digital contact detection. In ***Level Control*** selection; With digital contact detection, the output level specified with ***Level Control*** is applied to the fans.

7. **Pressure Calibration:** It is for calibrating the pressure sensor at atmospheric pressure. The pressure reading is reduced to 0 by changing this value up or down.

8. **Pressure Sensor Top Measurement:** It is the maximum measured value of the pressure sensor installed in the device.

9. **Pressure Sensor Low Measurement:** It is the minimum measured value of the pressure sensor installed in the device.

10. **Output Status :** During the programming of the device, the operating status of the fans is determined.

15. Electrical Connection Examples

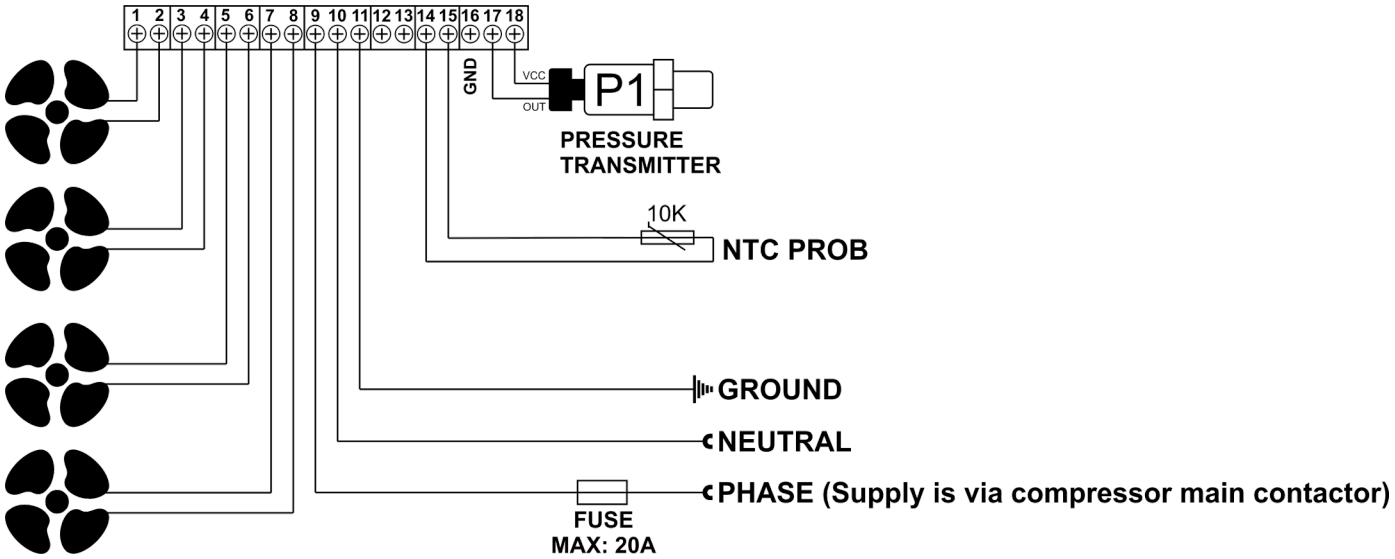
Example 1 : Supply input control,

In this connection, the device supply is taken from the compressor contactor main contact line.

The device switches on together with the compressor.

Related settings to be made;

Digital Input: None



Example2 : Digital input control,

In this connection, the device control is made from the digital input contact while the device supply is constant.

In this way, the device always shows the condenser pressure and temperature on the display screen. The digital input contact connection of the device completes the circuit from the auxiliary contact of the compressor contactor.

Related settings to be made;

Contact Type: Open Contact (This setting can be changed according to the auxiliary contact type)

Digital Input: Run