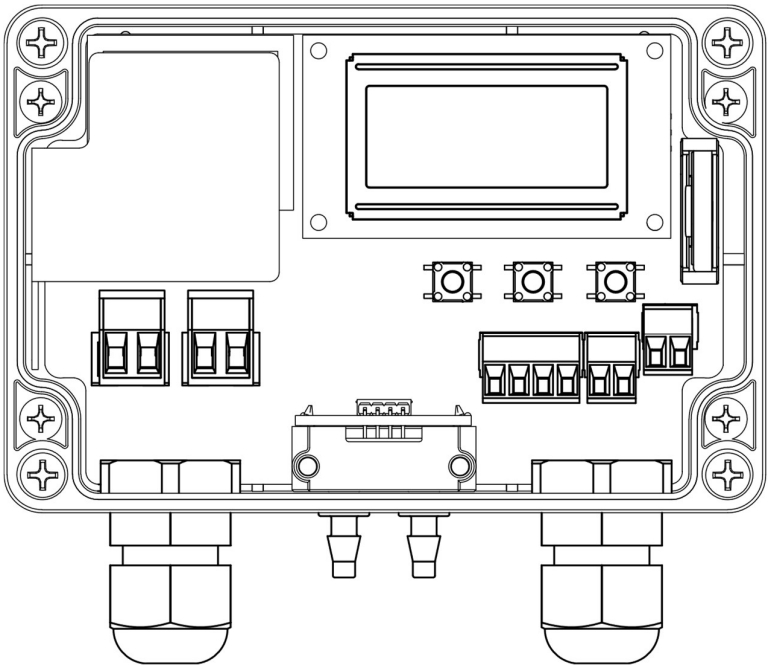
TECHNICAL REFERANCE - MANUEL

v1.3



Air Pressure and Volume Controller

DR-FPC

DR-FPxxx-xx

QBIT
QUANTUM CONTROL

›DR-FPC

Pressure and Volume Controller for Air and Non-Corrosive Gases.

- Pressure and Volume Control
- Roof Shot Fan Pressure Control
- Stair and Elevator Fan Pressure Control
- Damper Volume Control
- Filter Pollution Control
- Sensor and Controller Modes
- EC and AC Fan Control
- Working with 220V AC supply
- Internal Time Clock
- RS485 Modbus (Optional)
- CMOSens® Technology

General Information

Measuring Range	Measuring Resolution	Accuracy Range	Strength Pressure	Working Temperature	Protection
-500Pa ~ +500Pa	16Bit	±3%	100kPa	-40°C ~ 85°C	IP54

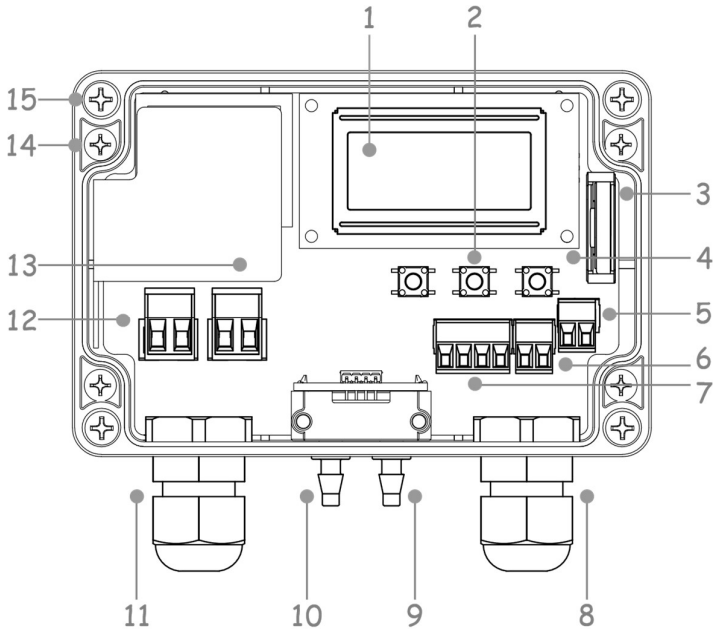
Technical Data

Electrical Features	Supply	220VAC 50/60Hz
	Consumption	<1.0VA
Functional Features	Application	Air and Non-Corrosive Gases
	Time Clock	Internal RTC and Battery
	Communication	Modbus RTU (Optional)
	Outputs	1 Analog Out O3 0-10V / 8Bit / Max. 15mA 1 Digital Out O1 Max. 30VDC / Max. 30mA / Open Collector 1 AC Fan Power Output O2 220VAC / Max. 1.2KW
	Inputs	1 Dry Contact Input I2 1 Universal Input I1 0-10V / NTC10K / Dry Contact 1 Digital Out O1
	User Interface	LCD 8x2 Text and 3 Menu Buttons
	Air Connector	Low/High Pressure Prob Suitable for using 4x6mm silicone hose

Purchase Code

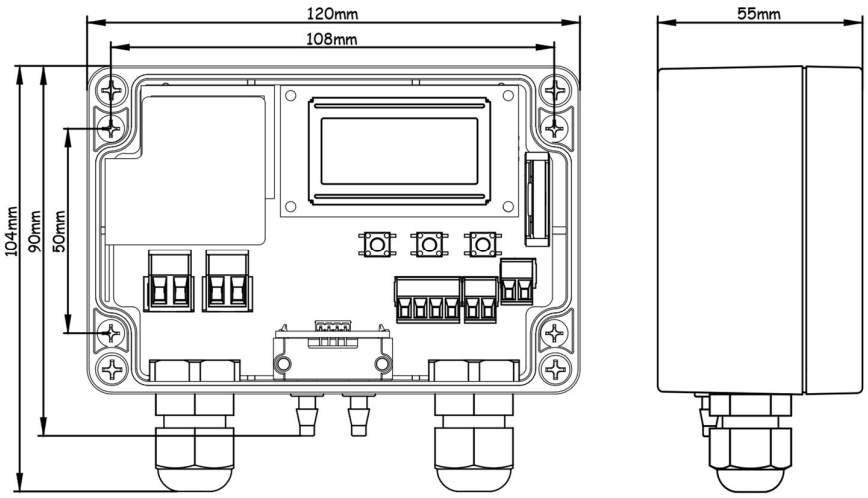
Type		Device	Control	Phase	Model		Optional
XX	-	X	X	X	XX	.	X
DR: Driver		F: Fan	P: Pressure	C: Controller	10: PCB Model		R:RS485 Modbus

Overview



1	LCD Display	6	Analog Output Terminal	11	Power Cable Coupling
2	Menu Buttons	7	Digital IO Terminal	12	Main Power Terminal
3	Time Clock Battery	8	IO Cable Coupling	13	Fan Power Terminal
4	State Led	9	Low Pressure Probe	14	Box Mounting Screw
5	MODBUS Terminal	10	High Pressure Probe	15	Cover Mounting Screw

Size



Boxing and Delivery

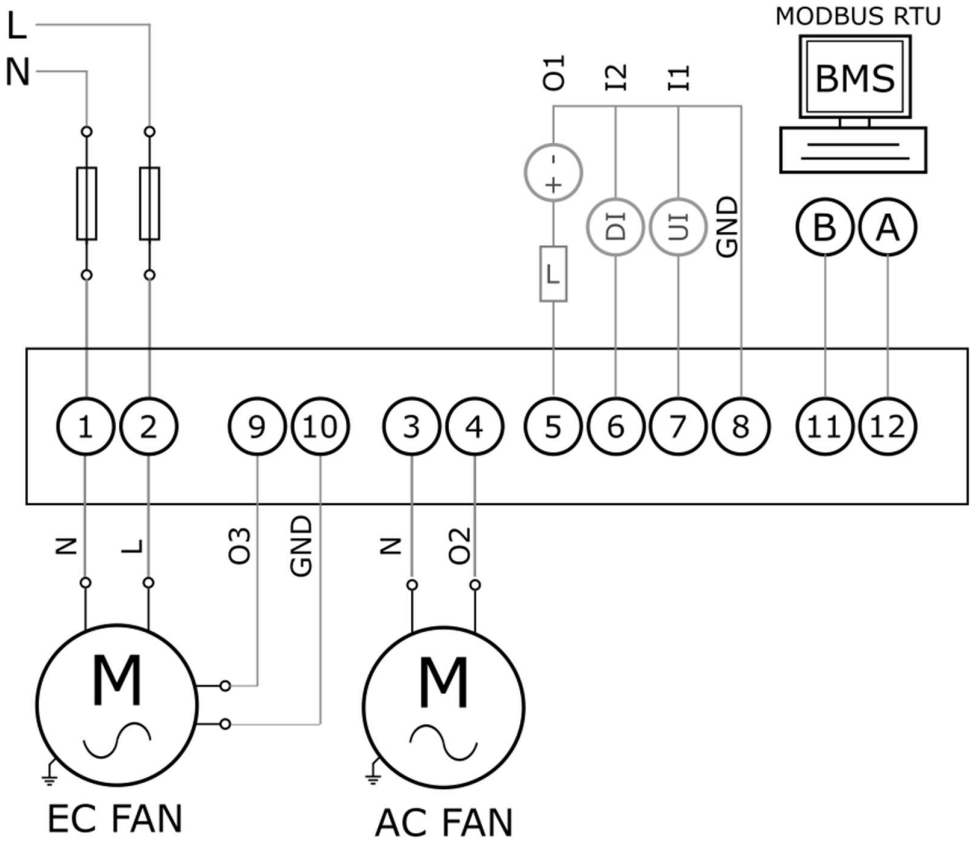
Box	Dimensions	12cm x 11cm x 6cm	Parcel	Dimensions	31cm x 24cm x 16cm
	Weight	325gr		Box Qnt.	20 pcs
			Pallet	Dimensions	80cm x 120cm x 87cm
				Parcel Qnt.	27 pcs

“

Terminal Informations

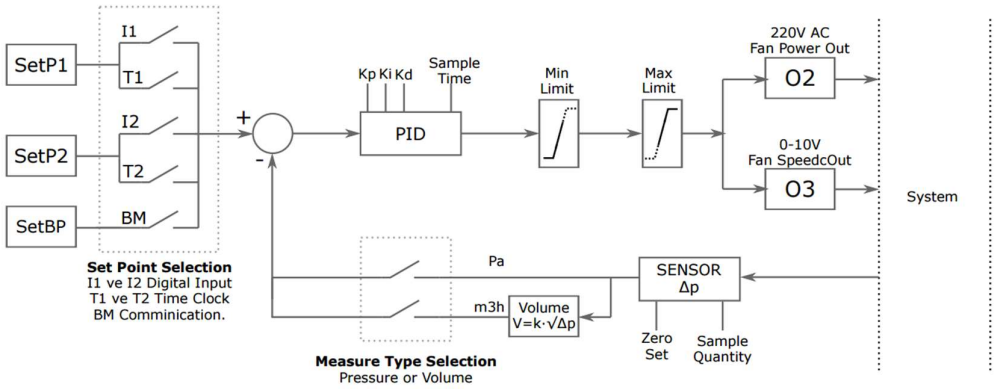
Terminal No	Function Label	Function Info	Electrical Info
1	N	Power Inputs	220VAC 50/60Hz
2	L		
3	N	Fan Power Out	80-220VAC <1.2kW
4	O2		
5	O1	Digital Out	Open Collector 30VDC <30mA
6	I2	Digital Input	Dry Contact Input
7	I1	Universal Input	Dry-0-10V-NTC Input
8	GND	Common	Digital Ground
9	O3	Analaog Output	0-10V Oupput
10	GND	Common	Analog Graound
11	B	Modbus RTU	RS485 up to 128 device (Aditional)
12	A		

Terminal Connection



Working Modes Blok Diagram

Controller Mode Block Diagram



Control Loop Description

This section explains the **PID control loop** and its components used in the system. The following steps outline the working principles of the system in detail:

1. **Set Point Selection (SetP1, SetP2, SetBP):**
   The target parameters of the system (e.g., pressure or airflow) are defined through these inputs.
   - **I1 and I2:** Target values are set via digital inputs.
   - **T1 and T2:** Scheduled set points using Time Clock functions.
   - **BM:** External control via communication protocol.
2. **Measurement Type Selection (Pressure or Volume):**
   The measurement type is selected as either **pressure** or **volume**.
   - **Pa:** Pressure measurement is performed.
   - **m³/h:** Volume measurement is performed, and the volume is calculated using the formula V=k·ΔPV = k \cdot \sqrt{\Delta P}V=k·ΔP.
3. **SENSOR and Measurement:**
   The system uses a differential pressure sensor (**ΔP SENSOR**) for measurements.
   - **Zero Set:** Sensor calibration is performed by resetting to zero.
   - **Sample Quantity:** The sampling quantity is determined.
4. **PID Control:**
   The difference between the measured value and the set point is processed by the **PID control algorithm**.
   - **Kp, Ki, Kd:** PID parameters are used to adjust the control sensitivity.
   - **Sample Time:** The algorithm's sampling time is set.
5. **Minimum and Maximum Limits:**
   The PID control output is constrained within user-defined **minimum** and **maximum limits**.
6. **Output Control:**
   - **O2:** Controls the 220V AC fan output.
   - **O3:** Regulates the fan speed using a 0-10V analog output.

This control loop enables precise control of fans for pressure and airflow management in the system, optimizing energy efficiency and system performance.

Working Modes

Working modes can set in the “WMode” option in the Main Menu.

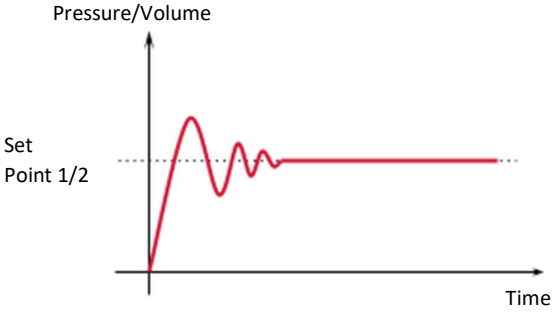
Device behavior according working modes:

Device has three different working mode by Constant, Proportion and Sensor Mode.

Constant Working Mode

This mode use for stable pressure or volume control.

It controls the fan using PID algorithm.

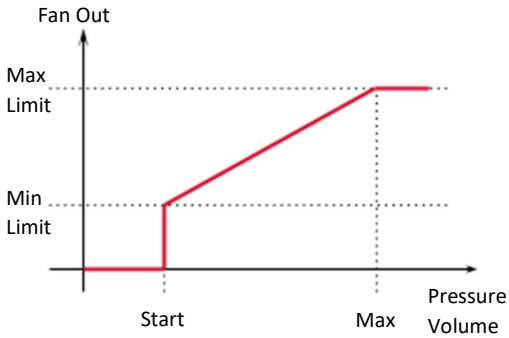


Proportion Working Mode

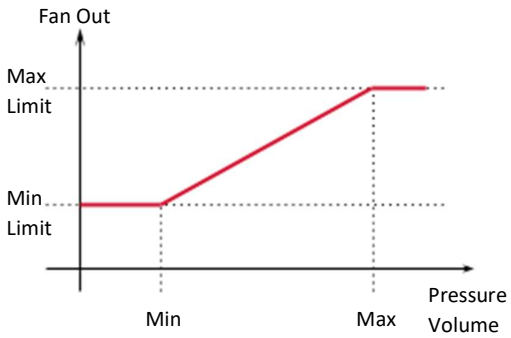
This mode use for proportion fan control.

There are two types.

- Start to Max



- Min to Max



Sensor Working Mode

It is the sensor operating mode where the differential pressure value measured from +/- probes is transferred to analog output as 0-10V. The pressure value measured from the sensor can be transferred to the analog output in 3 different frequencies as Differential, Positive and Negative. Analog output scale setting is setted from the

Sensor (Pa)	Analog Out Scale		
	Differentia	Positive	Negative
+500 Pa	10V	10V	0V
0 Pa	5V	0V	0V
-500 Pa	0V	0V	10V

Menu Buttons

"AOut" option on the sensor screen. The resolution of the measurement scale is 8 Bit.

- OK Short Press:

  * Enters the option that appears on the screen.
  * It allows switching between the data entered in the setting screens.
- OK Long Press:
  * If in the menu, it returns to the previous screen.
  * If there is a change in the set entered in the setting screen, it saves the set and quits. If set not changed returned previous screen.
- UP Short Press:
  * While in the menu, it allows upwards among the options.
  * Allows the value to be decreased while on the setting screens.
- UP Long Press:
  * It allows the value to be increased rapidly while on the setting screens.
- DOWN Short Press:
  * It allows down through the options while in the menu.
  * Allows the value to be decreased while on the setting screens.
- DOWN Long Press:
  * It allows the value to be decreased rapidly while on the setting screens.

Menu Table Overview

Main Menu	Sub Menu	Settings	Default	Limits
Set Wmode	-	Constatnt		Constant Proport. Sensor
Set Constant	**Set P1**	30Pa		.-500Pa +500Pa
	Set P2	30Pa		
	Alarm	State	Off	Off/On
		Timeout	60sc	30sc-120sc
		Hystrs.	10Pa	.5-30Pa
		.--Back--		
	Pid	Kp	15	0-100
		Ki	30	
		Kd	0	
		Spl. Time	15sc	5sc-600sc
		Revers	Off	Off-On
		.--Back--		
	.--Back--			
Set Proport.	**Type**	Str-Max		Str-Max Min-Max
	Start	30Pa		.-500Pa +500Pa
	Min	30Pa		
	Max	60Pa		
	.--Back--			
Set Sensor	**Measure**	Pressure		Pressure Volume
	SmpCount	10		1-100
	Zero	0Pa		.-200Pa +200Pa
	Aout	Diff		Diff Positive Negative
	.--Back--			
Set Fan	**Kfactor**	70		0-1000
	LimitMax	100%		0-100%
	LimitMin.	20%		
	.--Back--			
Set Dout	-	Alarm		Alarm W.State
Set Timer	**T1 Start**	00:00		00:00 23:59
	T1 Stop	00:00		
	T2 Start	00:00		
	T2 Stop	00:00		
	.--Back--			
Set Time	**Date**	1.01.2022		
	Clock	00:00:00		
	.--Back--			
Set BMS Port	**Address**	1		0-255
	Bound	9600		2400- 19200
	Parrity	No		No,Even, Odd
	.--Back--			
.--Back--				

Üniversite Mah. Sarıgül Sk.
No:37/1 İç Kapı No:85
Avcılar/İSTANBUL
T : +90 212 691 61 31
M: +90 537 376 94 41
E : qbit@qbitcontrol.com
W: qbitcontrol.com