

FCS - Free Cooling Control Unit



FCS is a standalone product that provides the operation of Free Cooling, HVAC, environmental monitoring and energy efficiency thanks to its advanced features.

Environmental Monitoring:

This unit continuously monitors the located environment by using the different sensors attached to it and controls various equipment according to adjusted parameters and algorithms. Additionally, the unit records events at related instruments during the operation and if there is an alarm, it sends the alarm information to the pre-defined devices.

FCS is placed in an aluminum box which can be mounted inside a panel, on a wall or to a DIN rail.

Powerful Expandable Structure:

FCS has an expandable, flexible, modular hardware that can be adjusted due to possible future requirements. FCS modules contain hot-swap and plug-in features therefore it can be added to any system easily.

Enhanced Remote Management:

Remote management is available by developed WEB interface or desktop application. The integrated software of the system sends SNMP Trap, e-mail and SMS to the pre-defined addresses if there is an alarm. It enables the minimum risk level and maximum energy efficiency by 80 different parameter configurations. It can record up to 18276 events with their time, temperature, humidity values to its log memory.

User-friendly System Control:

Besides controlling the air conditioners, fans, generators, air inlet and outlet hood's fins, the system handles many functions such as measuring the power consumption of air conditioners and fans.

Intelligent Free Cooling:

With the ability of enhanced smart algorithms, the FCS optimizes the cooling performance with the lowest energy consumption.

FCS proportionally controls four fans simultaneously which can be operated by AC or DC voltage and have axial or centrifugal EC structure.

FCS consists of enhanced microprocessor structure which has single mod (1 fan) and multi mod (4 fans) operation modes, LCD screen and keypad.

FCS can drive EC fans which are operated by 48VDC and 220VAC up to 380W and 750W, respectively.

Additionally, FCS controls 2 Split A/C and 6 DX A/C by the connected air conditioner control modules.



Software Features:

- Graphical User Interface (GUI)
- Web Interface
- SNMP Trap
- Mail & SMS (Via Server)
- TCP & UDP (Responding to the queries with the UDP and TCP protocols)
- NMS (Monitoring all the FCS devices with a single WEB platform and allowing the parameter changes)

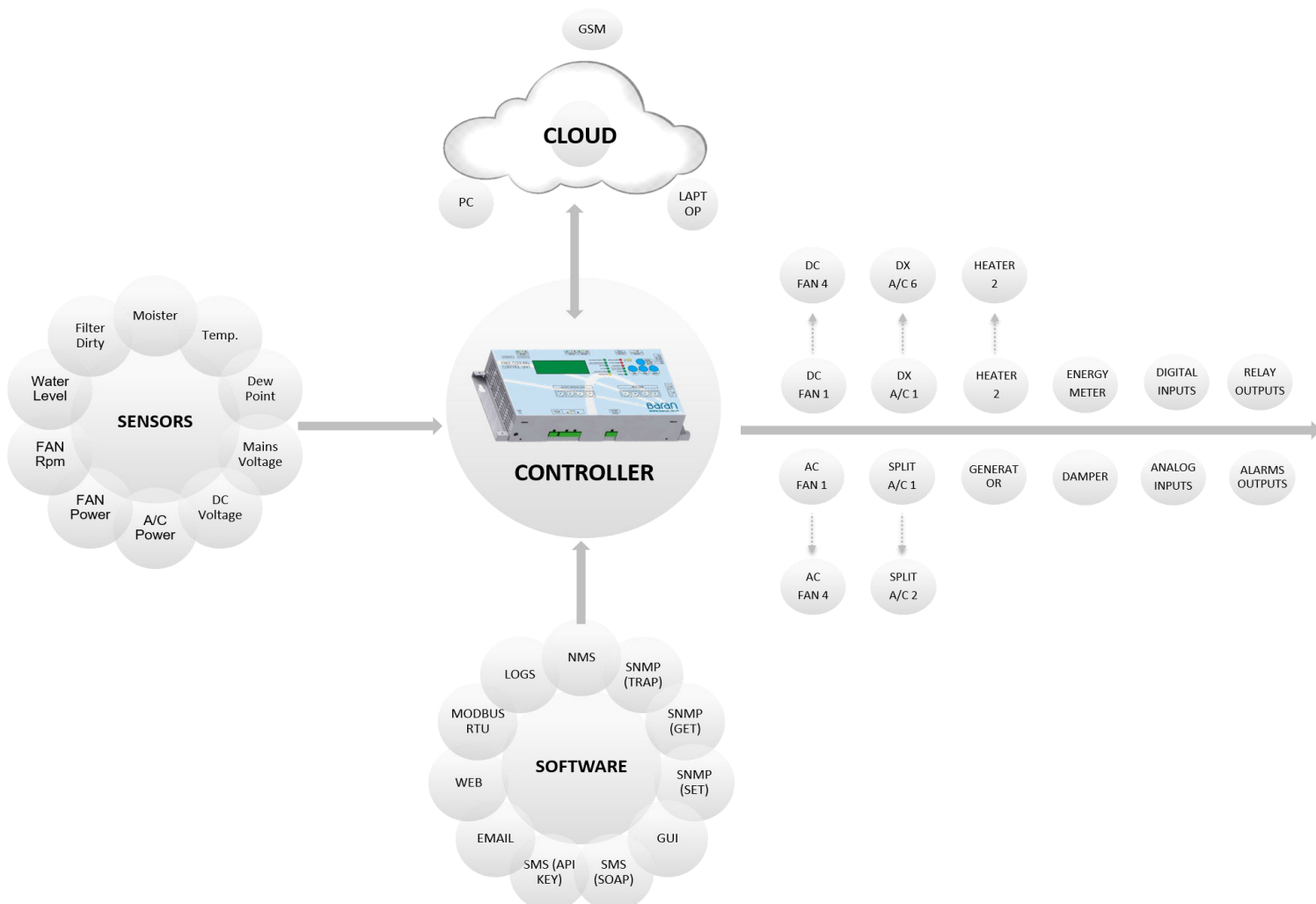
The software enables to change system parameters remotely.

FCS sends alarm information to the users with e-mail and SMS instantaneously. This information can be used by the users with SNMP TRAP and SNMP GET.

Event Logs: "16 standard alarms, inside & outside temperature values, inside relative humidity value" are recorded once every hour or on any state change.

Operation Logs: Operation Time and energy consumptions of fan and air conditioners are recorded daily.

FCS can store up to 18276 event logs inside its memory with FIFO algorithm.



Outstanding Features:

- Multi fan drive
- Dew point calculation
- Real-time clogginess level measurement with digital differential pressure sensor
- Water flood detection
- Extra features could be added with Input, Output and Alarm Modules
- ***Input Module:** This module adds 16 new sensor inputs to the control unit, 5 fixed sensor inputs such as Fire Alarm (two levels), Leakage Alarm, Dust Alarm, Knock, Vibration Alarm and performing Fan Switch OFF, Fan&Air Conditioner Switch OFF. The remaining inputs are left free for user.
- ***Output Module:** This module adds 16 dry contact outputs for the activation of devices such as Light, Door Lock, Emergency Horn.
- ***Alarm Module:** This module adds 16 dry contact outputs and activates the related output for any of the fixed 16 alarms individually. It also sends SNMP Trap for the related alarm.
- Measuring power consumption of split A/C's, RBS, BTS, PC etc via external power analyzer
- Measuring and logging of electric meters with IEC 61107 protocol.
- Generator control (off grid areas)
- Motorized damper control
- Poor Cooling measurement, after a certain time of starting the air conditioner if the inside temperature does not decrease, the control unit generates an alarm
- Poor Heating measurement, after a certain time of starting the heater if the inside temperature does not increase the control unit generates an alarm
- FCS is designed to detect ± 0.1 °C temperature difference between indoor and outdoor. At the same time, it provides maximum energy efficiency by enhanced algorithm which takes "the sun movement from sun rise until sun set" into consideration.
- FCS measures temperatures of every districts of the field and plots the temperature distribution of the field by the controllers inside the fan box.

Event Alarms:

- High Temperature,
- Low Temperature,
- Very High Temperature,
- High Battery Voltage,
- Low Battery Voltage,
- Poor Cooling,
- Poor Heating,
- Mains of A/C 1,
- Mains of A/C 2,
- High Humidity,
- Dew Point,
- Filter Clogginess Level,
- Fan Power,
- Fan Speed,
- Free Cooling OFF

Real-time Measurements:

- Inside Temperature Value,
- Outside Temperature Value,
- Inside Humidity Value,
- Inside Dew Point calculate,
- DC Supply Voltage,
- 2 different Mains Value,
- 4 different Fan Power Consumption,
- 4 different Fan Speed,
- 4 different Clogginess Level of the Filter
- 4 different Water Flood level



FCS Control Unit System Specifications

PRODUCT OVERVIEW			TECHNICAL DATA	
GENERAL FEATURES	Cooling Systems		Single fan mode or Multi fan mode	
	Operational Features		Silence mode, with & without A/C mode, day & night mode	
	Installation		Wall \ Panel board \ Din-ray mounted	
	Connection		Plug-in connectors	
	Protection level		P55	
	MTBF		≥70,000 hours	
	DC Supply Voltage Range		(18 to 30) VDC / (- 40 to - 60) VDC	
	Power Consumption		< 8 W	
	Weight		800 gr.	
	Display		4x20 LCD	
	Operational Temperature Range		(-20 to 60) °C	
	Dimension (WxDxH)		250x170x55 mm	
FAN CONTROL	Fan Quantity		4 qty of EC Fan - Centrifugal & Axial	
	Fan Control Method		0-10 VDC - Modbus RTU7	
	Fan Current (DC)		up to 10 A	
	Fan Power (DC)		up to 380 W	
	Fan Power (AC)		up to 750 W	
	Fan Speed		up to 5000 Rpm	
	Fan Voltage		48VDC or 220VAC	
	Fan Power Consumption Measurement		up to 380 W/h	
A/C CONTROL	Controlable Number of DX A/Cs		6	
	DX A/C Control Method		Over dry contacts (configurable NO&NC)	
	Controlable Number of Split Type A/Cs		2	
	Split Type A/C Control Method		up to 30 Amp Current Rating	
	Split A/C Power Consumption Measurement		up to 7000 W/h	
	Split A/C Contact Ratings		300.000 Times @ Full Load	
INPUT MODULE	Input Ports		16 dry contact inputs	
	Input Impedance		~ 1.000.000 ohms	
	Input Current		2,5 uA ~ 28 uA	
	Protection		250 Vac or 300 Vdc (dry contact input protection)	
	Power Consumption		< 100 mW	
OUTPUT & ALARM MODULES	Output Ports		16 dry contact outputs	
	Maximum Load		60V 500mA	
	Output Impedance		50 ohms	
	Output Current		120 mA	
	Power Consumption		< 300 mW	
SENSORS	Output Isolation		1500 Vrms	
	Indoor Temperature&Humidity Sensor		(-40 ~ 125) °C - Resolution ±0.4°C / (0 ~ 100)RH, Resolution ±3RH, 14 bit	
	Outdoor Temperature Sensor		(-55 ~ 125) °C Resolution ±0.5°C / 12 bit	
	Digital Differential Presure Sensor		500 Pascal, Resolution ±4.5 %P, 16 bit, 4 mA, 5VDC, I2C	
	Analog Differential Presure Sensor		500 Pascal, Resolution ±10, Dry contacts	
COMMUNICATION	Water Flood Level		48V DC, 200mW, Dry contacts	
	Ethernet		RJ45, 10/100Mbit	
	USB		Serial port	
ADDITIONAL CONTROLS	RS-485		Serial port	
	Heater Control		1 - (With dry contact ON/OFF)	
	Disel Generator control		1 - (With dry contact ON/OFF)	
CERTIFICATIONS	Outlet air damper control		1 - (With dry contact ON/OFF)	
	EN 55024:2010/A1:2015 & EN55032:2015/AC:2016-07		EMC- Electromagnetic Magnetic Compatible	
	EN61000-3-3:2013 & EN61000-3-2:2014		Limitation of voltage changes, voltage fluctuations and flicker in public	
	EN 60950-1: 2006/A2:2013		LVD - Low Voltage Directive	
SOFTWARE	User Interface	GUI - Web	OPTIONAL FEATURES	
	SNMP	SNMP TRAP - SNMP GET		
	Mail & SMS	Via Server		
	TCP & UDP	Replying to the queries in UDP & TCP format		
	NMS	Network Management System		
	LOG details	Event Logs - Operation Logs		
	LOG count	18276 qty / event log		
OPTIONAL FEATURES	Emergency Fire Control			
	Air Outlet Damper Control			
	Wall Mounted Panel			
	Digital Pressure Sensor			
	Split A/C Power Consumption Measurement			
	Input, Output, Alarm Modules			
SECONDARY FEATURES	Second Split A/C Control Module			

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