



iFCU™
Intelligent Fan Coil Unit

**REC Green
Technologies Co. Ltd.**

**Green Building
Intelligent Energy
Saving Solutions**

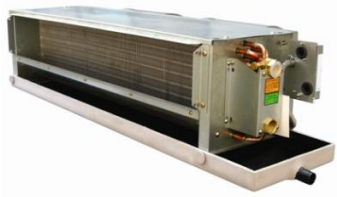
Using Energy Efficient
iFCU™ & Apps
in Smart Office

Ms. Carmen Wong
General Manager

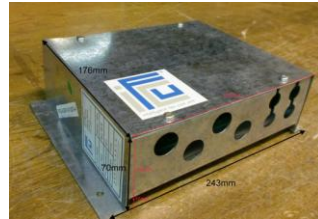
The more we save. The greener the building.
The better the environment



iFCU™ Intelligent Fan Coil Unit



iFCU™ Fan Coil Unit



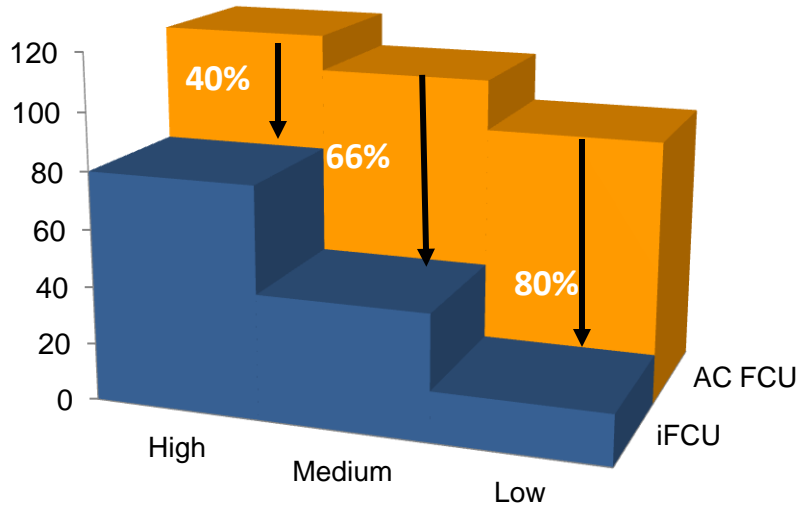
Integrated iFCU™ Control Box



iFCU™ Thermostat

iFCU™ Intelligent Fan Coil Unit (DC Motor)

Power Consumption - AC Motor vs PM Motor
(at 0 Pa Static Pressure)



- Permanent Magnet Motor Technology
- 40% - 80% Energy Saving
- iFCU Apps

Latest Application of iFCU in office



- Client : Yau Lee Holdings Limited
- Awarded the EMSD Energy Saving Championship Scheme 2017 “Hanson Grand Award 2017”
- Total Energy Bill saved 31%

Successful Green Building Projects

Energy Saving Project for Office Building



Energy Saving Opportunities

1. LED Lighting Replacement

- Meeting rooms
- Office Area

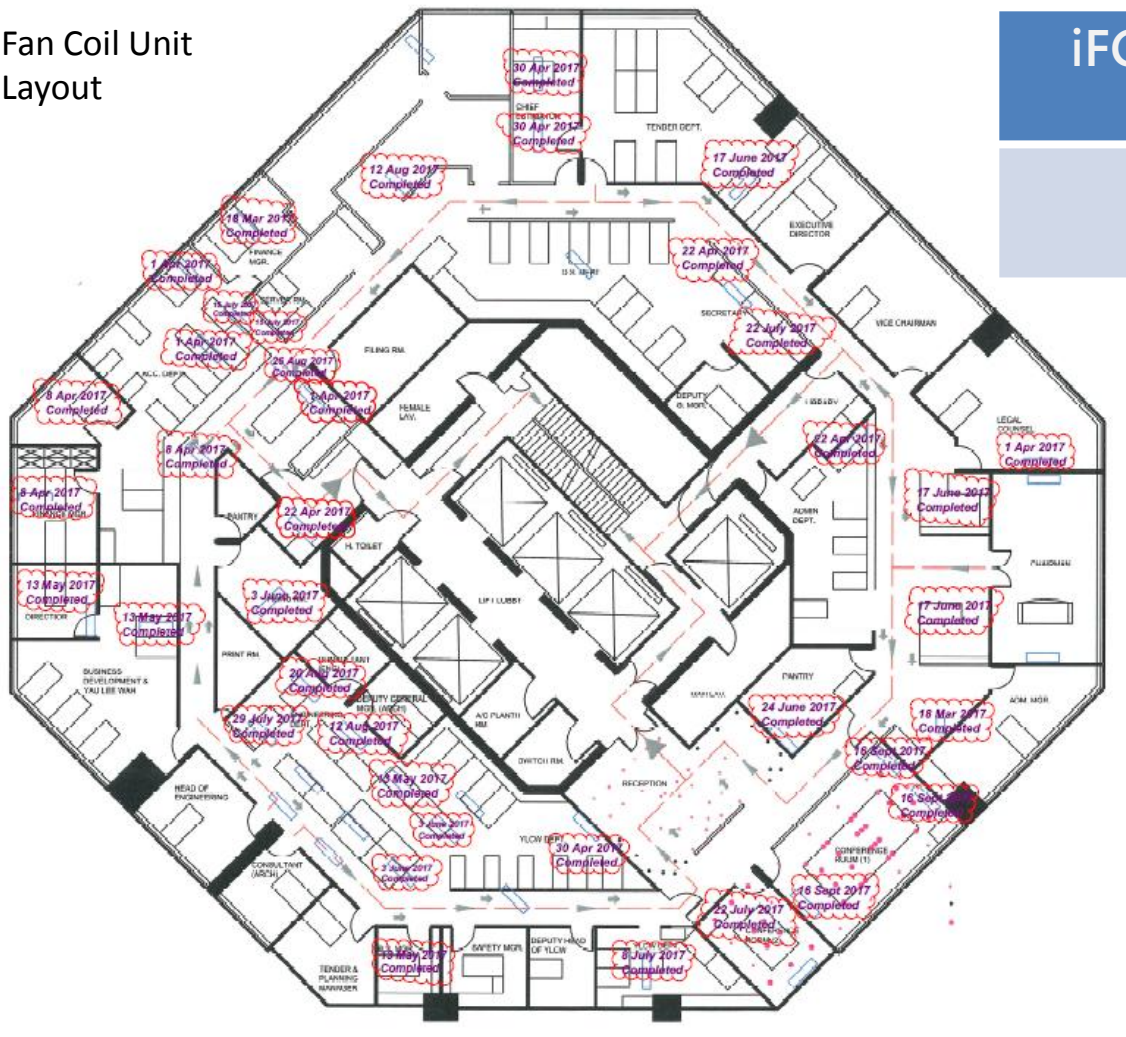


2. Replacement of iFCU™ Retrofit kit

- Whole floor working space

Replacement of iFCU™ (Retrofit kit)

Fan Coil Unit
Layout



iFCU (Retrofit kit) Qty	39
Savings	60%



Successful Green Building Projects

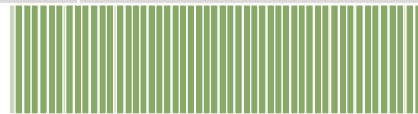
Holiday Inn Express Hong Kong SoHo



- The world's first high rise building granted 4 highest level of green certificates
- 22 energy efficient appliances were installed.



Energy Consumption Benchmark of Hotel		Saving
Hong Kong	437.5kWh/m ² /year	58.5%
US	401 kWh/m ² /year	54.8%
Sharp Street East (actual bill)	460 kWh/m ² /year	60.6%
Jervois Street (Hotel SoHo)	181 kWh/m²/year	*



Successful Green Building Projects

Holiday Inn Express Hong Kong SoHo

Site Aspects

- Optimal Structural Design
- Building Orientation
- 47.5% Greenery

Construction Aspects

- Standardized Design
- Offsite Fabrication
- Metal Formwork Panels

Water Use

- Rain Water Irrigation System
- Save 5.7% in fresh water consumption



Material Aspects

- FSC Timber
- Metal Formwork Panels
- Low VOC Products
- Starfon™ Low Carbon Materials



Virtual Design & Construction

- Scientific
- Baseline Assumption
- Optimal Result



Holiday Inn Express Hong Kong SoHo

Energy Use

- Solar Panel (1.32% saving)
- Low e Glass; Double Glazing
- Chiller (5.48 COP)
- BMS Control
- Heat Pump (37.36% saving)
- Energy Efficiency Products
- Motorized Roller Blind

- Chilled Headboard

- Solar Hot Water Panel

- iFCU™

- Lift Counterweight Optimization (13% saving)

- PowerBox Energy Monitoring System

- Pattern Recognition Energy Saving Solution "PRESS"

- Energy Optimization Solution (save 125,000kWh annually)



Indoor Environmental Quality

- Outdoor Air Ventilation Rates Exceeds ASHARE 62.1:2007 Standard by 30%

Successful Green Building Projects

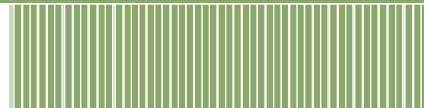
Intelligent Green Office in Shanghai

Location:	上海市申鑫大廈16樓
Area :	1,071 m ² (Gross Floor Area) 975 m ² (Saleable Area)
Capacity :	60 staff & 40 visitors at the same time
Usage :	<ul style="list-style-type: none"> ■ Open Office ■ Conference Room ■ Multi-function Room ■ BIM & CAD Room ■ Energy Saving Showroom ■ Starfon Showroom



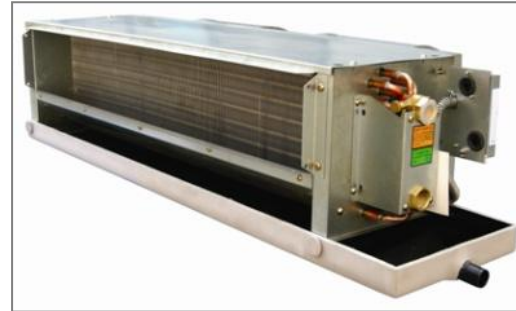
- Building Management System with staff card to control the air-conditioning and lighting system
- iFCU™
- Nanoflex luminaries
- AHU Heat Exchanger
- Powerbox – Real-time Energy Monitoring System

- 1st non-local project granted the BEAM plus Platinum of BI in July 2016
- Achieved LEED ID+C: Commercial Interiors in Dec 2017



iFCU™ – Intelligent Fan Coil Unit

Cost Saving :
iFCU™ can help you
saving HK\$624 in a year

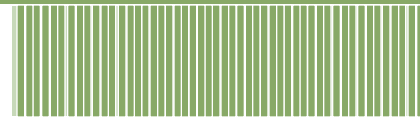


Replacement of iFCU 600 cfm operating 24 hrs per day for 1 year
 (Assume: 18 hours low speed, 3 hours med speed & 3 hours high speed)

	AC Motor FCU	iFCU™
Power Consumption	788.4 kWh	221.2 kWh
Annual Elect. Bill*	HK\$ 867	HK\$ 243
Saving per annum	N/A	HK\$ 624

* Notes: Electricity Tariff : HK\$1.1/kWh

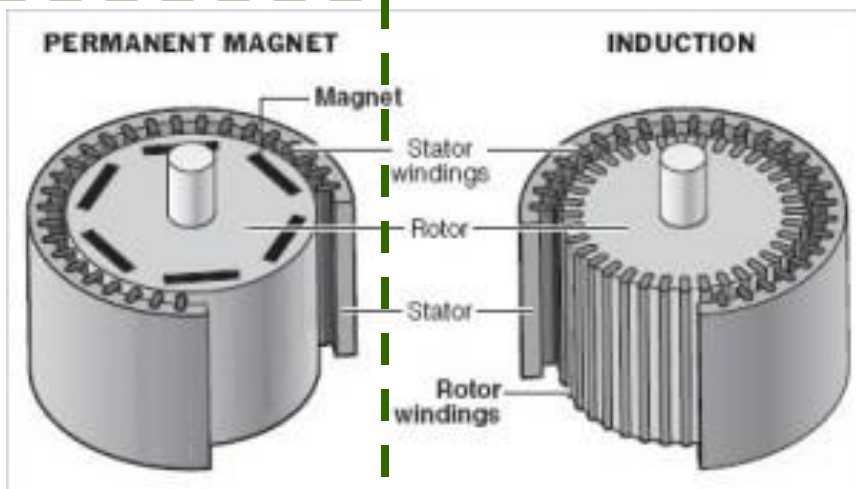
Operation Mode	Conventional AC Motor	iFCU™ Retrofit Kit	Power Factor	Saving	
	Power consumption (W)	Power consumption (W)		(W)	%
Low	85.0	17.0	0.850	68.0	80%
Med	98.2	33.4	0.942	64.8	66%
High	112.0	67.2	0.989	44.8	40%



iFCU™ Intelligent Fan Coil Unit – Permanent Magnet Motor (“PM Motor”)

Features

1. Rotor of AC motor: **Induction Current**
2. Rotor of iFCU™ motor: **Permanent Magnet** generates the magnetic flux by the magnets.
3. Energy Saving: PM motor eliminates the **source of power loss** and enhance the power efficiency.
4. Motor heat dissipation: **Lowered by 95% and 58% at low and high speed respectively.**



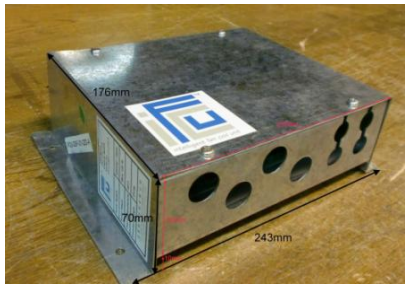
Operating Temperature Rise of motor

Speed	iFCU™ PM motor (°C)	AC motor (°C)	Diff. %
Low	1.2	26.9	95%
Med	2.3	18.1	87%
High	4.9	11.6	58%

iFCU™ – Intelligent Fan Coil Unit

Major Components – Control Box & Programmable Thermostat

Features



1. Variable speed FCU, fully controllable

- “AUTO” mode is available in iFCU™, stepless variable fan speed is controlled based on room temperature set point.
- Reduce energy use while maintaining comfortable condition.

2. Firmware customization

- Tailor-made programme to work with different system and fit the occasions requirements
- i.e. BMS control requirement, Room control unit, Group Control, RPM adjustment to reduce noise level etc.

Commercial Buildings



Hotels



Hospitals



Institutional Buildings



Railway Stations



iFCU™ – Intelligent Fan Coil Unit

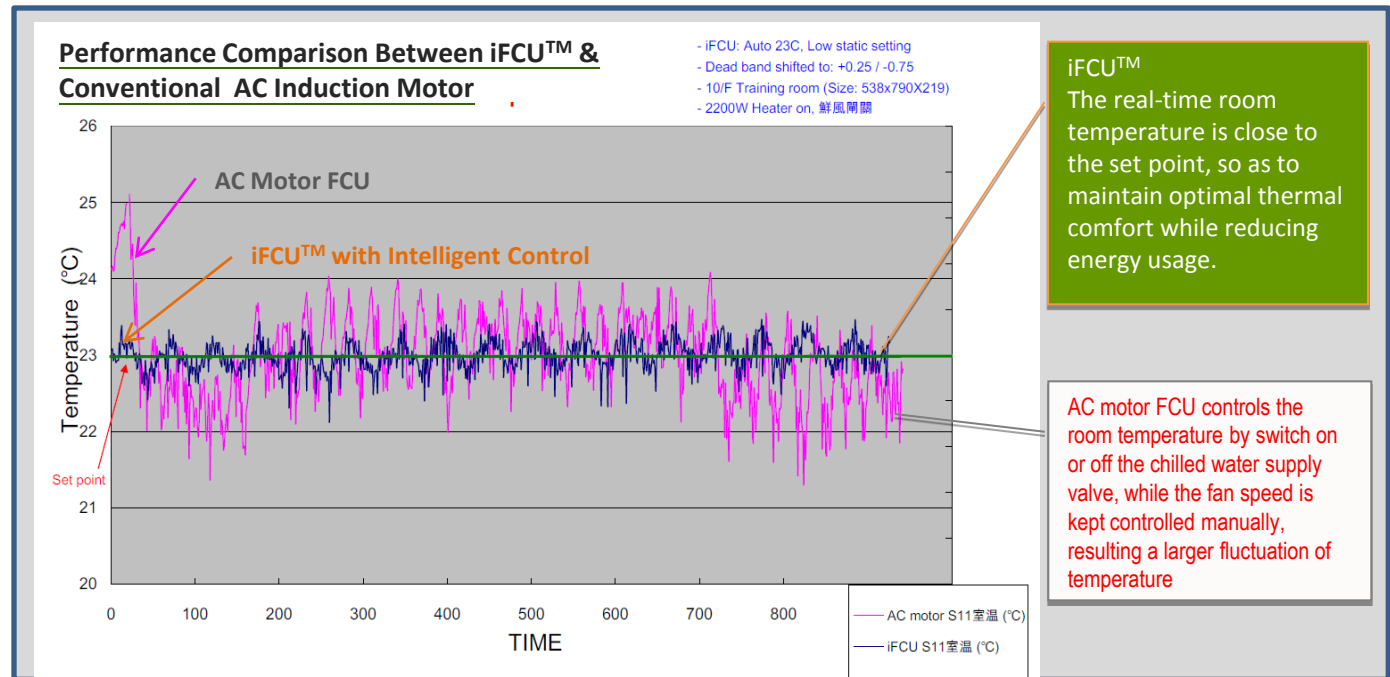
Major Components – Control Box & Programmable Thermostat

Features



Duct type sensor

3. **Duct type sensor** installed in return-air box to control temp. accuracy up to $\pm 0.5^{\circ}\text{C}$ to increase human comfort.
4. **Active power factor corrector** employed to ensure $\text{PF} > 0.85$ at all operating speeds.
5. Applicable to **both high & low static** pressure settings.



iFCU™ – Qualification & Recognitions

(1) Certificate CE & CCC



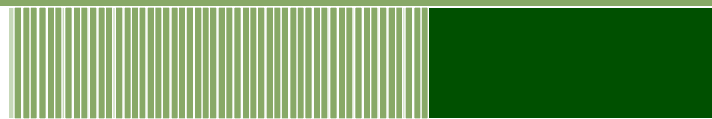
Certificate of Compliance:
EMC Directive



Certificate of Compliance:
Low Voltage Directive



China Compulsory Certification
CCC



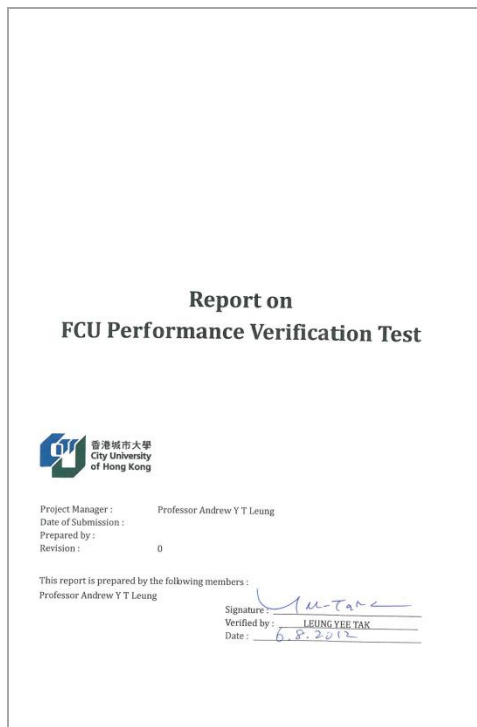
iFCU™ – Qualification & Recognitions

(2) Patent



Chinese Utility Model /
Patent CN 201120025375-5

(3) Performance Test Reports



iFCU Performance Verification
Test by City University of
Hong Kong

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序号	检测项目	单位	技术要求	检测结果	结论	备注
1.	外观检查	—	应符合 GB/T19232-2003 标准相关要求。	通过	合格	—
2.	耐压性试验	—	机组的盘管在 1.6MPa 压力下保压至少 5min, 盘管应无变形。	通过	合格	—
3.	密封性试验	—	机组的盘管在 1.6MPa 压力下保压至少 1min; 应无泄漏。	通过	合格	—
4.	启动和运转试验	—	机组在各档转速时均能正常启动和运转。	通过	合格	—
5.	风量	m ³ /h	机组实测风量不应小于额定值的 95% 额定值: 1020 m ³ /h	1014	合格	—
6.	输入功率	W	机组实测输入功率不应大于标准规定值的 110% 额定值: 96 W	57.1	合格	—
7.	供冷量	W	机组实测冷量不应小于额定值的 95% 额定值: 5400 W	5369	合格	—
8.	供热量	W	机组实测热量不应小于额定值的 95% 额定值: 8100 W	9937	合格	—
9.	水量和水阻力试验	kPa	机组实测水阻应不大于规定值的 110%。 额定值: 40 kPa。	21.4	合格	—
10.	噪声	dB(A)	机组实测噪声值不应大于标准规定值 规定值: 45 dB(A)。	45.0	合格	—
11.	凝露试验	—	机组表面应无凝露水外滴, 风口不应有露水外滴。	无水滴出	合格	—
12.	凝水处理试验	—	机组不应有凝结水外滴或吹出。	无水外滴或吹出	合格	—
13.	绝缘电阻试验	MΩ	绝缘电阻值应不小于 2MΩ。	>10 MΩ	合格	—
14.	电气强度试验	—	机组在带电部分和非带电金属部分之间施加额定频率和 1500V 的交流电压, 开始施加电压应不大于规定值的一半, 然后快速升为全值, 持续时间 1min, 应无击穿或闪络。	无击穿或闪络	合格	—

Test Report in PRC laboratory
Standard : GB/T 19232-2003

iFCU™ – Qualification & Recognitions

Innovation Award
for the Engineering Industry 2012/2013
- Certificate of Merits
(The Hong Kong Institution of Engineers)

The 9th International Hotel Expo 2013
– Asia Green Award

Leadership Award in Evident-base New Technologies
Application for Building Energy Conservation 2014
(The Hong Kong Institution of Engineers)

Green Building Award 2014
Building Products & Technologies Category
– Merit Award

2014 HK Awards for Industries: Equipment &
Machinery Design
– Certificate of Merit

iFCU™ has been included in “The Third Batch of
Recommended Product List (Technology)” by
“Guangdong Energy Conservation Association”

2014 Hong Kong
Green Innovations Awards – Certificate of Merit

Excellent Intelligent Green Building System
APIGBA Hong Kong Award (2015)



iFCU™ Intelligent Fan Coil Unit Project Reference (iFCU Package/Hotel)

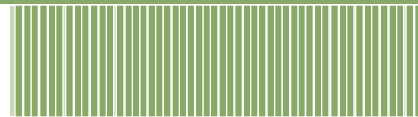
Holiday Inn Express Hong Kong SoHo Jervois Street, Sheung Wan, Hong Kong

The first high rise hotel in the world achieved
QUADRUPLE of Green certificates

Total nos. of iFCU™: 365 sets



Comparison of energy consumption Conventional AC Motor FCU & iFCU™ 274 sets in guest room (24hr/600cfm)	Conventional AC Motor FCU	iFCU™
Electricity power consumption (W) at low speed 18hr/d x 365d x 274 fcu x W	84W 151,215.12kWh	17W 30,603.06kWh
Electricity power consumption (W) at high speed 6hr/d x 365d x 274 fcu x W	100.58W 60,354.03kWh	51.5W 30,903.09kWh
Total electrical energy consumption (kWh)	211,569.15	61,506.15
Annual electricity bill (HK\$1.3/kWh)	HK\$275,039.8	HK\$79,958.0
Saving per annum	HK\$195,081.8(71%)/ 150,063.00 kWh	
Payback Period: 2.12 Years		



iFCU™ Intelligent Fan Coil Unit

Project Reference (Engineering Solution)



Problem:

- Parts are NOT available

Solutions :

Tailor-made

iFCU™ Retrofit Kit c/w Back Panel

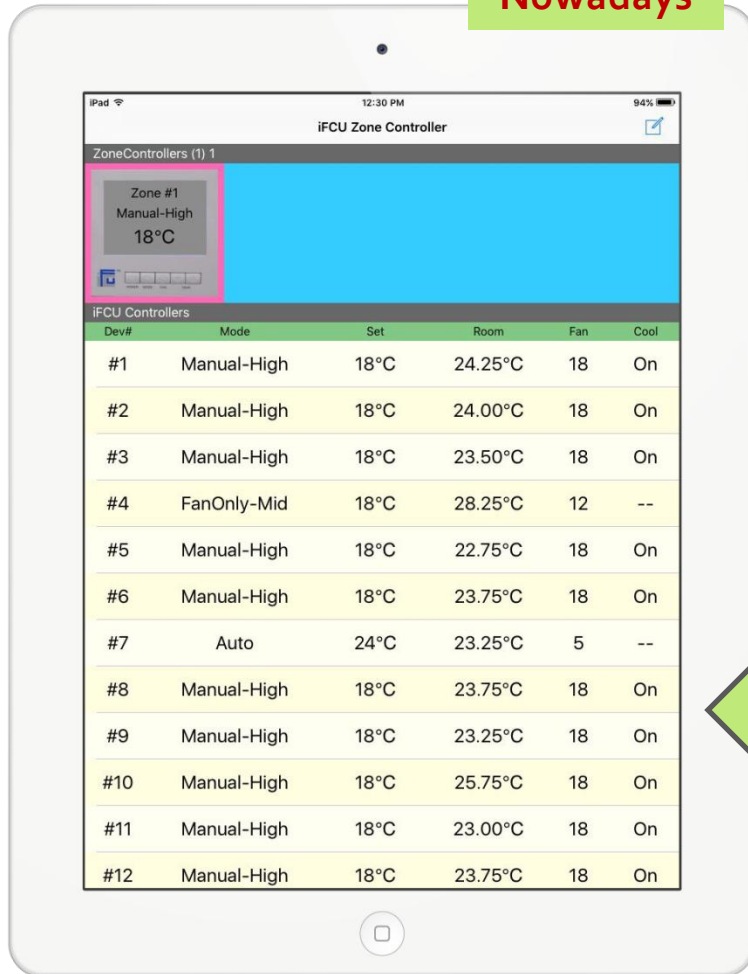
- Pre-installed Design to replace Motors & Fans
- Reduce installation time & manpower

iFCU™ – Intelligent Fan Coil Unit

Control Method - Wi-Fi Group Control



Nowadays



Wi-Fi Control

- Individual & Group iFCU Control
- Customize temp. set-point / mode
- Display room temperature & valve status (on/off)



Wi-Fi Network

- Supply with Own Standalone Wi-Fi Network
- Support Client Network Connection


Conventional

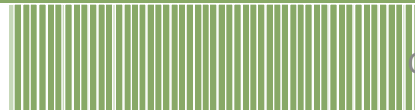


iFCU™ Features

I-version

3-Speed

	I-version	3-Speed
Package	✓	✓
Retrofit Kit	✓	✓
Speed control		
Auto mode		
• Variable Speed : 20-speed control	✓	✗
• Quick cool mode		
• Unoccupied mode (ultra low speed)		
Manual (H/M/L) mode	✓	✓
RPM adjustment	✓	✓
External input signal (3 programmable aux. input for customization control logics)	✓	✗
Duct type temperature sensor	✓	✗
iFCU Programmable thermostat built-in functions		
BMS Integration (Built-in RS-485 Port)	 Modbus RTU	By Others
Group control (max. 24)	✓	✗
Apps Wifi Control	✓	✗



iFCU™ – Intelligent Fan Coil Unit

Job Reference - Wi-Fi Control



Client	Type
URA Urban Renewal Exploration Centre, The Center	Group Control
Central Plaza	Group Control
Millennium City 5, APM	Individual Control
Four Seasons Hotel	Individual Control

The latest Project Reference in Offices

Client	Type
Department of Justice & law-related organizations The West Wing of the former Central Government Offices, Central	iFCU Packages w/ Modbus Thermostats
HKJC, Headquarter & Club House	iFCU Packages
Smartone Office	IFCU Retrofit Kits

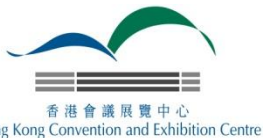
iFCU™ – Intelligent Fan Coil Unit

Other Job Reference

Public Sector



建築署
Architectural Services Department
Kai Tak Secondary School
Kowloon Government Office, Yaumatei, Kowloon



iFCU™ Retrofit Kit



iFCU™ Retrofit Kit

iFCU™ Retrofit Kit

Private Sector



iFCU™ Retrofit Kit

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**Thank You
Q & A**