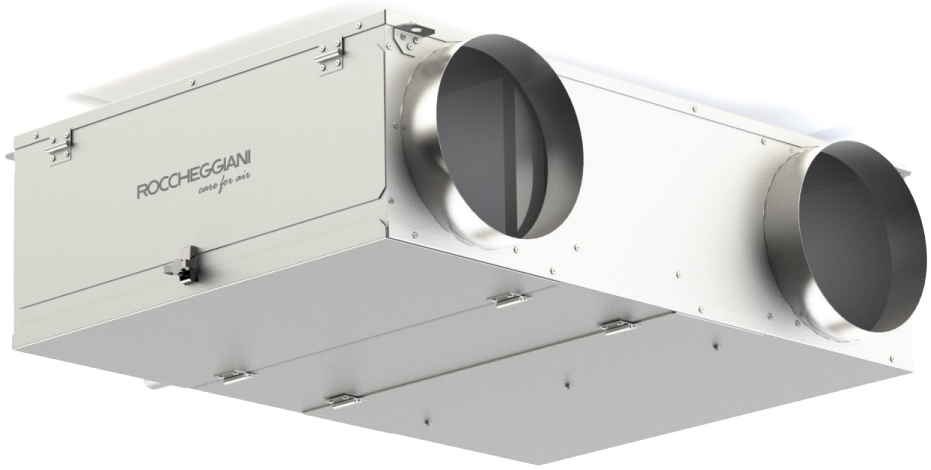
TCU

DUCTABLE FANCOILS

BIM READY

- Air flows from 330 to 880 m^3/h
- EC fans adjustable with 0… 10V signal
- High Static Pressure
- Compact dimensions



The TCU Roccheggiani series ductable terminals are the result of continuous research geared to the most current system requirements and represent a unique proposal on the market for their flexibility.
The unit consists of A filter, a 4-row water cooling/heating coil, 1-ow water heating coil (optional), fan, primary air intake (optional).
This series is produced in 2 different models with a nominal air flow rate from 330 to 880 m^3/h and with an available static pressure of 200 -140 Pa.
These appliances, built with a particular "U" configuration, and only 280 mm in height, have been designed and built to be installed in a false ceiling, preferably in a position where the hot-cold water distribution networks are located and primary air.
The air can be distributed using different types of diffusers which are connected to the units through flexible ducts with sound and thermal insulation
The compactness, the high air flow, the high head available, the silence and the particular configuration make their use decisive and optimal in civil / commercial environments, in medium-small rooms, such as offices, shops, apartments and villas .
Due to the high available static pressure at the mouth of the fan, these units can be installed in comfortable and easy locations for maintenance, away from the room requiring air-conditioning and adapting to the existing plant designs.
A rapid selection software is available.

Publication: Sales technical information sheet for high-efficiency heat-recovery unit (TCU)

Copyright © 2024: all rights reserved in all countries - Roccheggiani Spa

Technical data and information expressed in this preliminary publication are the property of Roccheggiani Spa and for general information purposes. With a view to making ongoing improvements, Roccheggiani Spa has the right to introduce at any time, without any obligation or commitment, whatever modifications it deems appropriate in order to improve the product. The pictures showing examples of components inside the units are for illustration purposes and therefore the brands of the components used to build the units, may differ from those brands shown in this document. This document was prepared with the utmost care and attention as regards the contents shown; nevertheless, Roccheggiani Spa cannot accept any liability arising from the direct or indirect use of the information contained in it.

Regulatory Compliance

The TCU ductable terminal units series are designed and manufactured in accordance with the following reference provisions:
- Directive 2006/42/EU - Machinery;
- UNI EN 1886
- UNI EN 12100
- UNI EN ISO 16890
- UNI EN 13053
- UNI EN 9177
- UNI EN 10152
- UNI EN 13523-8
- UNI EN 13523-23
- ISO 1940-1
- DIN 24163
- BS 848-1
- AMCA 210
- UNI EN 308
- Directive 2014/68/EU - PED
- Italian Presidential Decree 459/96
- Italian Presidential Decree 547/55
- Law Decree 81/08
- Directive 2009/125/EU - EcoDesign

Application fields

The ductable terminal units in the TCU range have been designed to respond in a specialised manner to a wide spectrum of applications and are particularly suitable for the following applications:

- Hotel
- Tertiary
- Shops
- Medium-small rooms
- Single-family homes
- Offices

Air solutions

Roccheggiani provides complete systems, taking care of their production and, upon request, of the installation of all components.
The aim is to offer our customers the most appropriate solution so as to satisfy every need related to air quality and to the wellness of users in several application fields.
The Roccheggiani solutions are capable of guaranteeing excellent values in terms of Total Life Cost and they represent the best choice for those who are making investments in the construction or use of buildings.

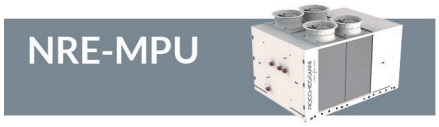
High efficiency hydronic solution with TCU fan-coil terminal units.

Roccheggiani has designed this solution for air conditioning in individual, independent spaces such as offices.
The system consists of a multi-purpose unit for the generation of hot and cold fluids, a heat recovery unit with a control system on board the machine, capable of renewing the air required by the structure and by TCU ductable terminal units which ensure heat regulation inside the rooms.

Specifically, the systems can be of three types

- The System includes a multi-purpose unit from the NRE-MPU range, a high-efficiency heat-recovery unit from the RRU range and the terminal air handling unit from the TCU range.
- The System includes a multi-purpose unit from the NRE-MPU range, a high-efficiency heat-recovery unit from the HE-HRU range and a terminal air handling unit from the TCU range.
- The System includes a multi-purpose unit from the NRE-MPU range, a high-efficiency heat-recovery unit from the HRU range and the terminal air handling unit from the TCU range.

System for the generation of hot and cold fluids



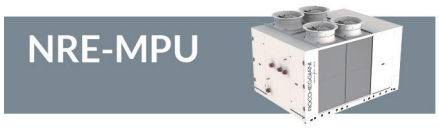
+

Primary air handling system

+

Air handling and distribution system

System for the generation of hot and cold fluids



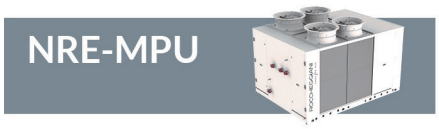
+

Primary air handling system

+

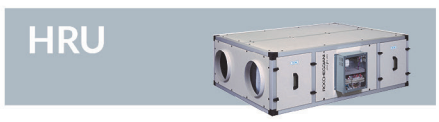
Air handling and distribution system

System for the generation of hot and cold fluids



+

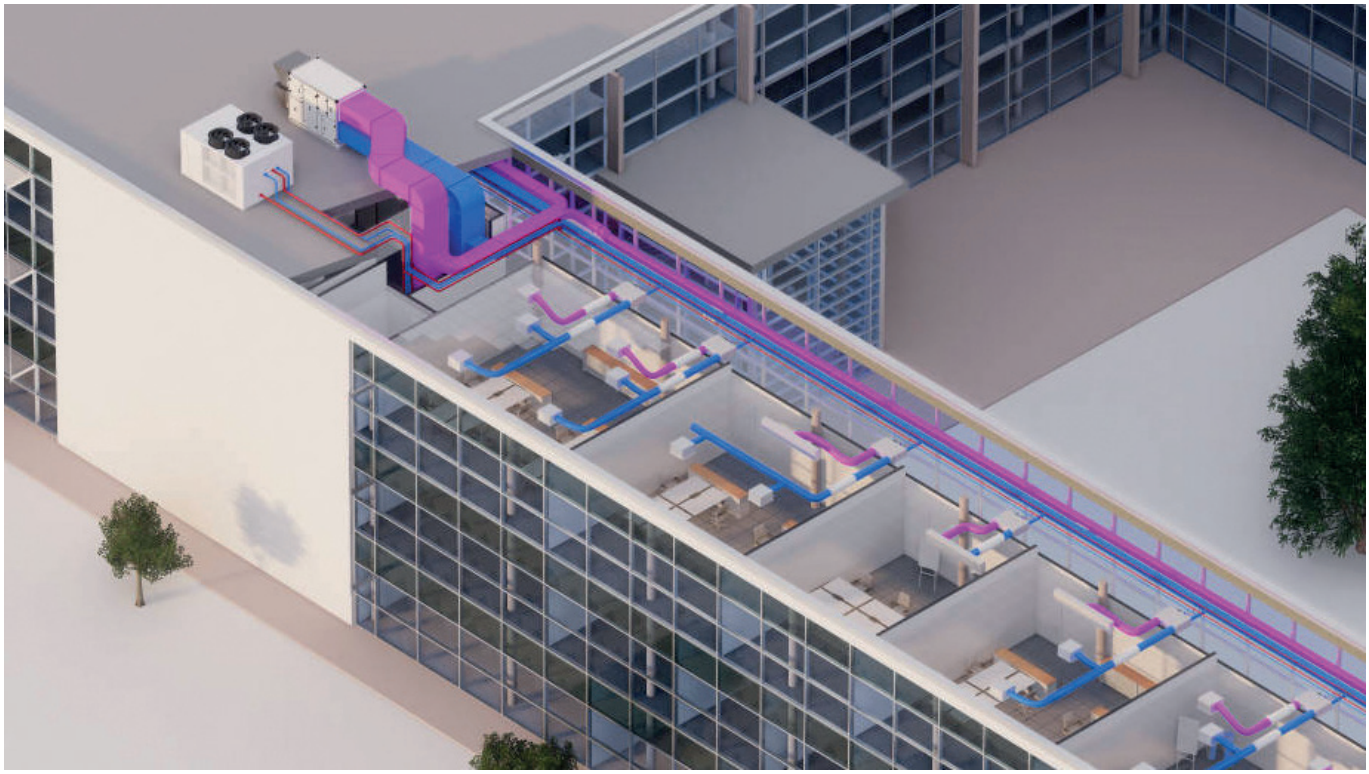
Primary air handling system



+

Air handling and distribution system

The compactness, silent operation, the high static pressure available and the high air flow are all features that make the TCU ductable terminal unit particularly suitable for office applications.
The primary air provided by the air handling unit is sent directly to the TCU terminal unit, which has a height of just 280 mm and as such is specifically designed to be installed inside false ceilings.
Any type of diffuser connected to the TCU unit by means of thermally and acoustically-isolated flexible ducts can be used for the supply and return air sections. A recommended solution provides for the use of DER swirl diffusers as supply terminals and DIF linear-slot diffusers as return terminals.



Advantages

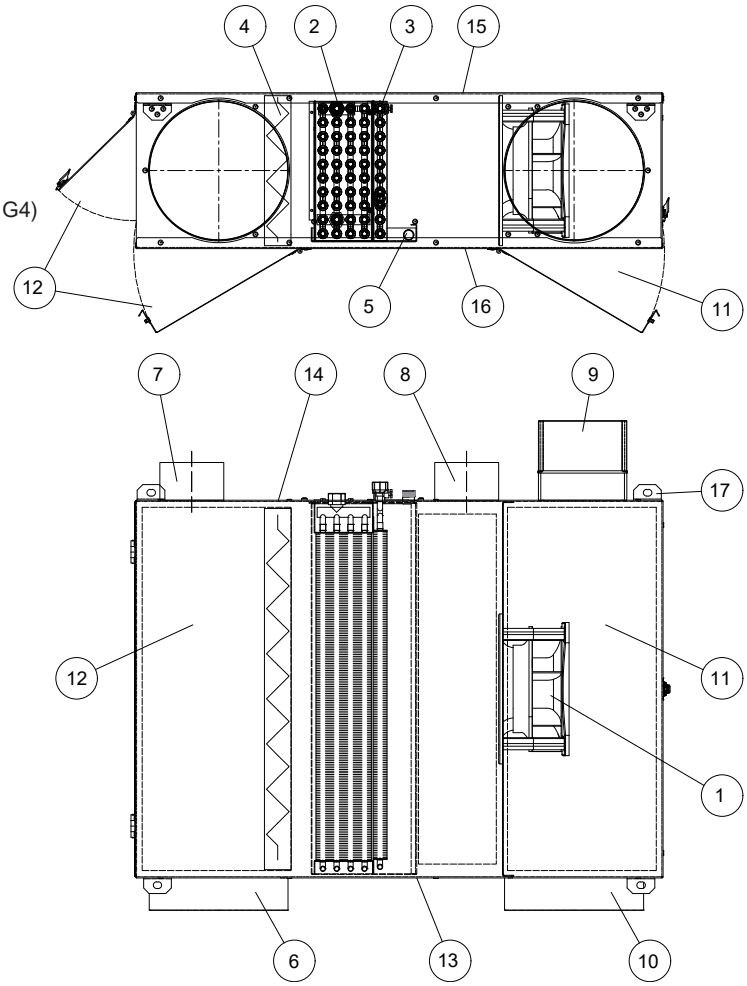
- Thanks to the high static pressure capacity available at the mouth of the supply fan, TCU terminal units can be installed away from the area requiring air conditioning (usually corridors), thus allowing easy maintenance outside occupied rooms.
- Their particular "U"-shaped construction form means that supply and return can be on the same side of the unit; this considerably simplifies the distribution of ducting in the area.
- Using a TCU terminal unit brings together high performance levels and low power consumption.
- Exceptional plant-engineering flexibility: if the layout of the rooms needs to be changed, you only have to move the flexible ducts.

Description of the Unit and main components

Casing

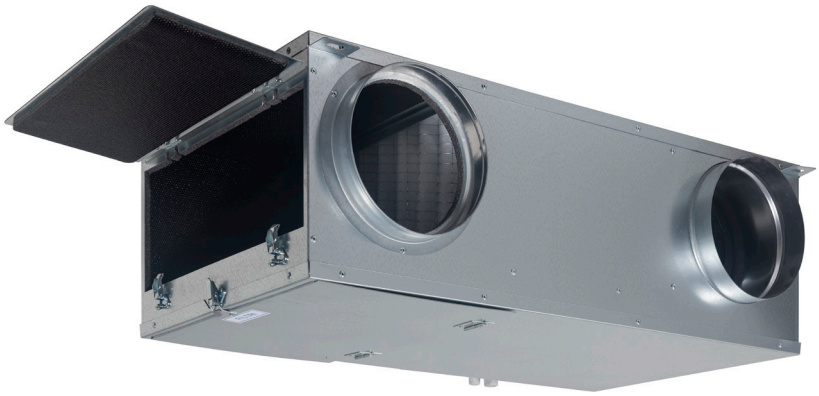
The housing is made from galvanised sheet metal. The inside is lined with closed-cell, heat and sound proof material that is self-extinguishing with “class 1” fire rating.
Wide access inspection doors allow easy maintenance of the various components.

1. Fan
2. Mixed coil - 4 rows
3. Heating coil - 1 row (optional)
4. Pleated filter with efficiency ISO Coarse 55% (formerly G4)
5. Pan
6. Return
7. Fresh air intake (optional)
8. Primary air intake (optional)
9. Wiring box
10. Supply
11. Inspection door
12. Filter removal access
13. Front side (duct connections)
14. Rear side (coil connections)
15. Upper side
16. Lower side
17. Anchoring



Heat exchanger coil

It is made with a galvanised frame, copper pipes and continuous aluminium fins, which are fixed to the pipes via mechanical expansion.
The inlet manifolds have female connections Φ 1/2”G and air vent holes and water drainage outlet Φ 1/8”G with stopper.



Electric fan

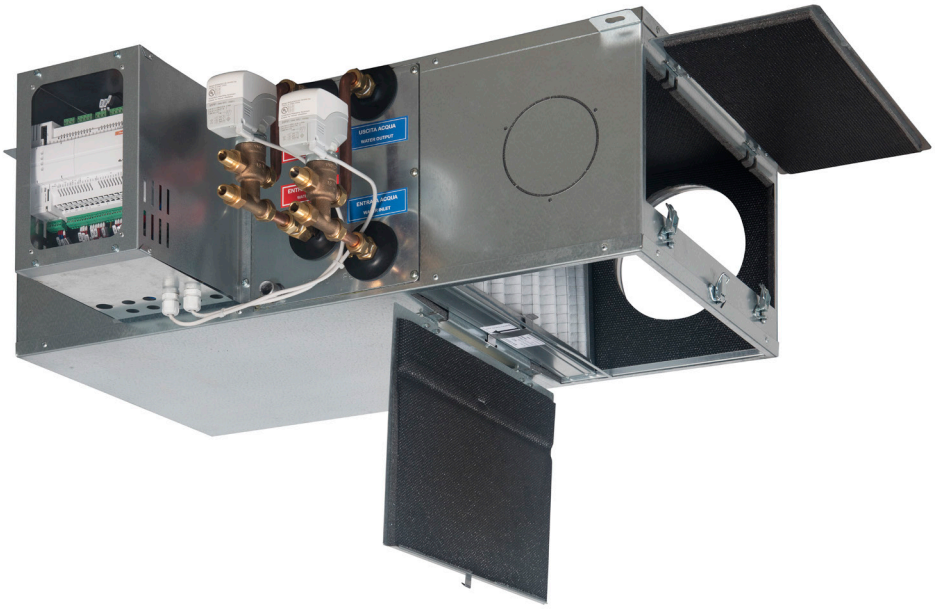
The installed fan is of the plenum-type, driven by an external rotary motor directly coupled to the impeller.
This fan complies with the applicable European ERP regulations, ensuring low energy consumption levels and sound efficiency.
The motor is of the “brushless” type, with electronic control (EC) and class F insulation. The rotation speed can be regulated via modulation with 0...10VDC/PWM input and soft start.
The motor is supported by spherical bearings, and comes with output for 10 VDC, output for fan revolutions, speed limiter, motor current limiter and protection against overheating.

Pleated synthetic filter

It consists of a galvanised steel frame, 50 mm thick, with double, welded steel support mesh and filtering media in pleated synthetic fibre that can be regenerated.
It has Coarse 55% efficiency according to ISO16890 (formerly G4 – EN 779).

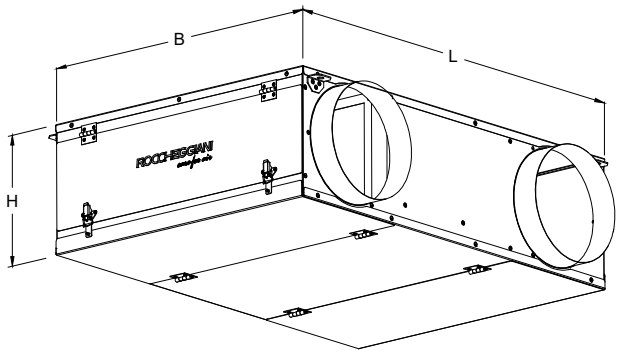
Primary air intake (optional)

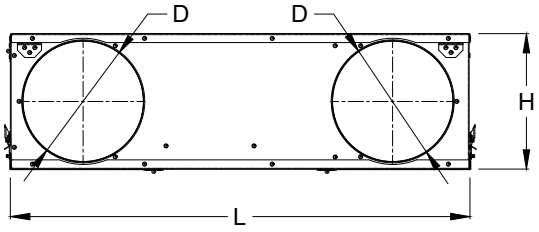
This is a predetermined air-flow regulation module with cylindrical form Φ 116 mm. The external part is made of galvanised sheet metal and the internal part of plastic material (M1 class).
It can be requested with a fixed flow rate, calibrated in the Company, from 30 to 160 m3/h.

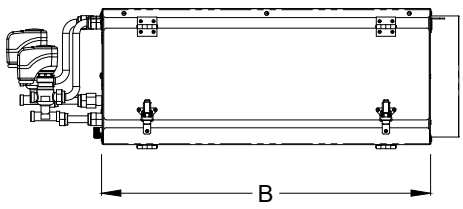


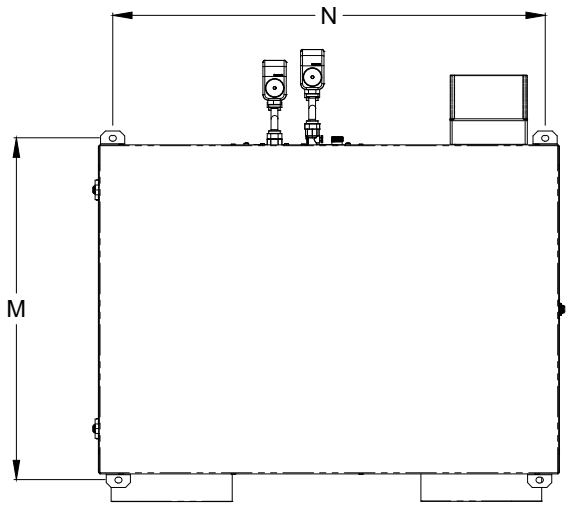
Dimensions and weights

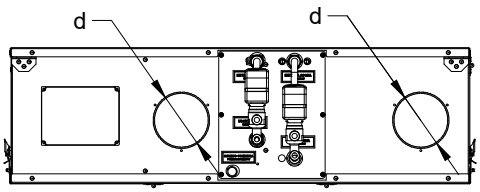
Dimensions			
L	mm	850	950
H	mm	280	280
B	mm	450	680
N	mm	798	896
M	mm	480	708
D	mm	200	250
d	mm	116	116
Weight (version with 4-row coil)	kg	24	36
Weight (version with 4-row coil + optional 1-row coil)	kg	27	40











General technical data

TCU model		**12**	**34**
Nominal air flow	m^3/h	540	880
External Static Pressure maximum	Pa	200	140
Performance			
Total Heating Capacity with 4-row coil (1)	kW	2.1	3.3
Total Heating Capacity with 1-row coil - optional (1)	kW	0.8	1.4
Total Cooling Capacity with 4-row coil (2)	kW	3.0	6.4
Sensible Cooling Capacity with 4-row coil (2)	kW	2.1	4.3
Fans			
Supply Fan Motor Rating	kW	0.168	0.168
Supply Fan Nominal Current	A	1.40	1.40
Power supply	V/Ph/Hz	230/1/50	230/1/50
Filtration			
Filtration class		ISO Coarse 55% (ISO 16890) / G4 (EN 779)	
Compliance EN 1253/2014		**-**	
Unit type		Full recirculation unit	
Ventilation Control		Variable turns	
Absorbed power (3)	kW	0.06	0.16
Specific Fan Power	$W/m^3/s$	400	654
Airborne Sound Power Level	dB (A)	53.7	60.7

(1) Performance related to conditions: incoming air 20°C / 50% RH - water temperature on entry 35°-30° C.
(2) Performance related to conditions: incoming air 27°C / 50% RH - water temperature on entry 7°-12° C.
(3) Values referring to the base configuration, with available static pressure of 100Pa.

Accessories

The following accessories can be supplied to go with the base module.

Constant air flow regulator on primary/fresh air intake

Air flow rate regulation module, supplied ready fitted in the primary air intake. The module allows the air flow rate to be kept constant despite any air pressure changes.
The air flow rate can be regulated during the installation phase without the use of tools, by simply rotating the adjustment dial.
There are sizes available:

- **TCU 1020PA**: adjustable primary air intake. Flow capacity range 15-85 m^3/h.
- **TCU 3040PA**: adjustable primary air intake. Flow capacity range 100-190 m^3/h.

Regulation valve

2-way regulation valve or 3-way regulation valve with bypass, PN16. Valve body in bronze. Male threaded connections DN10.
Complete with three-piece threaded couplings.

0-10V modulating servo-control for 2-way or 3-way valve.

0-10V modulating electric servo-control, stroke 1,2 - 6,5 mm, power supply 24V AC

ON/OFF servo-control for 2-way or 3-way valve.

ON/OFF electric servo-control, stroke 6,5 mm, power supply 230V AC

Flexible circular silencer ZSCF

The ZSCF flexible round silencers are used to reduce the noise level in civil and industrial air conditioning systems.
Its excellent flexibility makes it suitable for use in places with limited space.

Thermaflex ISO insulated flexible duct

Flexible duct made of aluminium polyester incorporating a helical reinforcement in harmonic steel wire, insulated with a covering of high thermal-sound insulation material (thickness 25 mm), outer anti-vapour protection in aluminised kraft paper reinforced with fibreglass mesh.

DER-DEF series helical effect diffusers

The DER and DEF ceiling swirl diffusers, suitable for use in offices, hospitals and shops, they can be mounted inside false ceilings or exposed.

Linear diffusers DIF

The DIF is an induction diffuser with linear slots. It can be mounted on the ceiling or wall and is suitable for showrooms, offices, meeting rooms and all those areas where seamless air diffusion terminals are required to ensure comfortable conditions with an eye on visual appeal.

Electronic control

The TCU unit can be fitted with three different regulation systems.
The first one (**RIR** "Roccheggiani integrated regulation"), is more complete and consists of an on-board control panel plus a remote location touch screen terminal.
The second one (**RAC1** "accompanying room regulator") consists of a room regulator fitted with quick access keys for the most common functions.
The third one (**RAC2** "simplified accompanying room regulator"), consists of a more elementary room regulator than RAC1 that can regulate simpler configurations.

RIR Regulation

This type of built-in regulation system on the unit enables full control over all possible TCU configurations.
According to the various configurations, the on-board control panel is provided with a kit consisting of 2 duct temperature probes, one differential pressure switch which raises an alarm for soiled filters and a touch screen terminal to be installed in the room.
This element is provided with a temperature and relative humidity probe.
If the TCU is configured for return air plus primary air, the return air temperature probe in the duct is supplied together.

The following can be fitted as regulation accessories:
- bracelet-type water temperature probe for installation on pipe.

The main features are as follows:
- Constant/variable speed: minimum, medium, maximum and automatic speeds can be selected. Automatic speed is available when there are handling coils.
- Possibility to regulate based on the room, return or supply temperature.
- Winter heating/summer cooling (H_2O valve) (2-pipe system).
- Only winter heating (H_2O valve) (2-pipe system).
- Only summer cooling (H_2O valve) (2-pipe system).
- Heating (H_2O valve) and cooling (H_2O valve) (4-pipe system).
- Programming time periods

The RIR regulation is provided with the following external connections.
- Ethernet: Bacnet IP, Modbus TCP Master/Slave, Webserver, Ftp Client/Server, SNTP.
- CANBus: CANopen.
- RS485: Modbus RTU o BACnet MS/TP.
- There is a slot for an SD micro memory card that can be used to record data or for storing on Webserver.
- USB programming portals.
- Plug-in RS-232: ASCII (optional).
- Plug-in RS-485: Modbus RTU (optional).
- Plug-in RS-485: Modbus RTU - BACnet MSTP (optional).
- Plug-in LONWORKS: LON (optional).
- Plug-in CANBus: CANopen (optional).

Regulation RAC1

The RAC1 regulation consists of a room regulator to which all utilities are connected: fans, actuators, pressure switches and probes.

Therefore, the regulator and the various accessories are supplied together with the TCU unit according to the chosen configuration.

The following accessories go together with the room regulator:
- temperature probes in the duct/wall versions;
- differential pressure switches to detect soiled filters;
- bracelet-type water temperature probe for installation on pipe;
- 230/24V transformer required to supply power to the auxiliary circuit when modulating valve actuators are used.

The regulator also has a relative humidity probe (only useful for displaying) in addition to the room temperature probe.
The choice of regulator can be based on the following table.
RAC1 regulation is provided with Modbus RTU (slave) connectivity, according to the selected regulator model.
Time period programming is available with this type of regulation.
The regulator can be supplied with pre-programming and fitted with a simplified wiring diagram at the customer's request.

Regulation RAC2

The RAC2 regulation consists of a room regulator to which all utilities are connected: fans and probes.

The regulator and various accessories are supplied together with the TCU unit according to the chosen configuration.

The following accessories go together with the room regulator:
- temperature probes in the duct/wall versions;
- bracelet-type water temperature probe for installation on pipe;
- 230/24V transformer required to supply power to the auxiliary circuit when modulating valve actuators are used.

A temperature probe is fitted on the regulator.
The choice of regulator can be made based on the table.
RAC2 regulation is not fitted with time scheduling or connections to supervisor systems.

			RAC1		RAC2			
		REGULATOR CODE	REG-AMB-V0 / REG-AMB-V0-M	REG-AMB-V2 / REG-AMB-V2-M	CRTD EC			
	I/O	REGULATOR MODEL	AHU-0xCSH1(3)	AHU-2xCSH1(3)	TF Z01M 0002 AN			
CONTEMPORARY FUNCTIONS	AO	CONTROL 0-10V VENTILATION	•	•	•	•	•	•
	AO	CONTROL 0-10V VALVE	•		•	•		
	AO	CONTROL 0-10V VALVE	•		•	•		
	AI	SUPPLY TEMPERATURE PROBE	•	•		•(1)		•(1)
	AI	RETURN TEMPERATURE PROBE	•	•	•(2)		•(2)	
		ROOM TEMPERATURE PROBE (INSIDE THE REGULATOR)	•	•	•(2)	•	•(2)	•
		ROOM HUMIDITY PROBE (INSIDE THE REGULATOR)	•	•				
	AI	WATER TEMPERATURE PROBE			•	•	•	•
	AI	HEATING COIL ANTIFREEZE TEMPERATURE PROBE	•	•				
	DO	ON/OFF VALVE		•			•	•
	DO	ON/OFF VALVE		•			•	•
	DO	SELECTABLE BETWEEN: fan alarm, relay for EC fan switch on, heating coil antifreeze alarm	•	•				
	DI	SELECTABLE BETWEEN: season change, economy function, regulation stop, ON/OFF, motor alarm, motor speed control			•	•	•	•
	DI	SELECTABLE BETWEEN: season change, economy function, regulation stop, ON/OFF, motor alarm, motor speed control			•	•	•	•
	DI	SELECTABLE BETWEEN: season change, economy function, regulation stop, ON/OFF, motor alarm, motor speed control			•	•	•	•
	DI	SELECTABLE BETWEEN: remote season change, remote ON/OFF, presence contact, economy/boost contact, force presence contact, coil antifreeze contact, generic alarm, condensate contact, generic filter contact, supply filter contact, return filter contact, total shut down alarm contact, fan alarm contact, recovery unit antifreeze contact	•	•				
	DI	SELECTABLE BETWEEN: remote season change, remote ON/OFF, presence contact, economy/boost contact, force presence contact, coil antifreeze contact, generic alarm, condensate contact, generic filter contact, supply filter contact, return filter contact, total shut down alarm contact, fan alarm contact, recovery unit antifreeze contact	•	•				

(1) If the supply air probe is chosen as the regulation probe, the integrated probe in the regulator is for display purposes only
(2) Room regulation can only be performed without air supply limits
(3) x = S without Modbus; x = M with Modbus.

Performance

Performance of a 4-row heating coil at nominal flow rate						
			12@330 m³/h	12@540 m³/h	34@710 m³/h	34@880 m³/h
	Battery input conditions		**20°C - 50% U.R.**			
Water 35°C - 30°C	Total Capacity	kW	1.4	2.1	2.8	3.3
	Supply temperature	° C	32.4	31.5	31.7	31.3
	Waterflow	m³/h	0.2	0.4	0.5	0.6
	Water Pressure Drop	kPa	9.0	18.5	5.8	7.9
Water 45°C - 40°C	Total Capacity	kW	2.4	3.0	5.0	6.0
	Supply temperature	° C	41.3	37.0	41.2	40.5
	Waterflow	m³/h	0.4	0.5	0.9	1.1
	Water Pressure Drop	kPa	18.8	30.0	15.7	21.5
Water 70°C - 60°C	Total Capacity	kW	2.8	4.5	5.9	7.4
	Supply temperature	° C	45	45	45	45
	Waterflow	m³/h	0.2	0.4	0.5	0.7
	Water Pressure Drop	kPa	6.9	16.2	4.9	7.1

Performance of a 4-row cooling coil at nominal flow rate						
			12@330 m³/h	12@540 m³/h	34@710 m³/h	34@880 m³/h
	Battery input conditions		**27°C - 50% U.R.**			
Water 7°C - 12°C	Total Capacity	kW	2.4	3.0	5.4	6.4
	Sensitive capacity	kW	1.61	2.06	3.6	4.3
	Supply temperature	° C	12.5	15.6	11.7	12.4
	Waterflow	m³/h	0.4	0.5	0.9	1.1
	Water Pressure Drop	kPa	22.4	32.1	21.0	28.6
Water 10°C - 15°C	Total Capacity	kW	1.7	2.5	3.9	4.7
	Sensitive capacity	kW	1.4	2.0	3.1	3.7
	Supply temperature	° C	14.5	15.9	13.9	14.4
	Waterflow	m³/h	0.3	0.43	0.67	0.81
	Water Pressure Drop	kPa	12.1	24.9	11.8	18.6

Performance of a 1-row heating coil at nominal flow rate (optional)						
			12@330 m³/h	12@540 m³/h	34@710 m³/h	34@880 m³/h
	Battery input conditions		**20°C - 50% U.R.**			
Water 35°C - 30°C	Total Capacity	kW	0.6	0.8	1.2	1.4
	Supply temperature	° C	25.2	24.3	25.1	24.7
	Waterflow	m³/h	0.1	0.1	0.2	0.2
	Water Pressure Drop	kPa	3.2	5.5	15.3	19.2
Water 45°C - 40°C	Total Capacity	kW	1.2	1.6	1.9	2.2
	Supply temperature	° C	30.4	28.6	27.9	27.3
	Waterflow	m³/h	0.2	0.3	0.33	0.4
	Water Pressure Drop	kPa	10.3	17.7	26.9	33.9
Water 70°C - 60°C	Total Capacity	kW	2.4	3.2	3.8	4.4
	Supply temperature	° C	41.5	37.8	36.1	34.8
	Waterflow	m³/h	0.2	0.3	0.3	0.4
	Water Pressure Drop	kPa	9.3	15.7	25.5	32

Noise levels

Sound powers

TCU 12@330 m³/h, Ext. Press. 100 Pa	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz	dB (A)
Supply	65.1	64.9	60.8	58.2	56.6	53.7	49.8	41.8	61.6
Return	60.1	59.9	55.8	53.2	51.6	48.7	44.8	36.8	56.6
Unit external radiation	59.1	52.9	48.8	43.2	41.6	37.7	28.8	17.8	46.9

TCU 12@540 m³/h, Ext. Press. 100 Pa	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz	dB (A)
Supply	69.5	67.5	61.9	62.8	61.5	59.1	55.5	49.7	66.3
Return	64.5	62.5	56.9	57.8	56.5	54.1	50.5	44.7	61.3
Unit external radiation	63.5	55.5	49.9	47.8	46.5	43.1	34.5	25.7	51.1

TCU 34@710 m³/h, Ext. Press. 100 Pa	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz	dB (A)
Supply	69.6	65.9	63.5	65.1	64.7	62.6	58.7	54.8	69.3
Return	64.6	60.9	58.5	60.1	59.7	57.6	53.7	49.8	64.3
Unit external radiation	63.6	53.9	51.5	50.1	49.7	46.6	37.7	30.8	53.7

TCU 34@880 m³/h, Ext. Press. 100 Pa	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz	dB (A)
Supply	70.7	66.8	68.4	69.1	69	67.1	63.5	61.6	73.7
Return	65.7	61.8	63.4	64.1	64	62.1	58.5	56.6	68.7
Unit external radiation	64.7	54.8	56.4	54.1	54	51.1	42.5	37.6	58.1

Sound pressure

TCU 12@330 m³/h, Ext. Press. 100 Pa	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz	dB (A)
Supply	51.1	50.9	46.8	44.2	42.6	39.7	35.8	27.8	47.6
Return	46.1	45.9	41.8	39.2	37.6	34.7	30.8	22.8	42.6
Unit external radiation	45.1	38.9	34.8	29.2	27.6	23.7	14.8	3.8	32.9

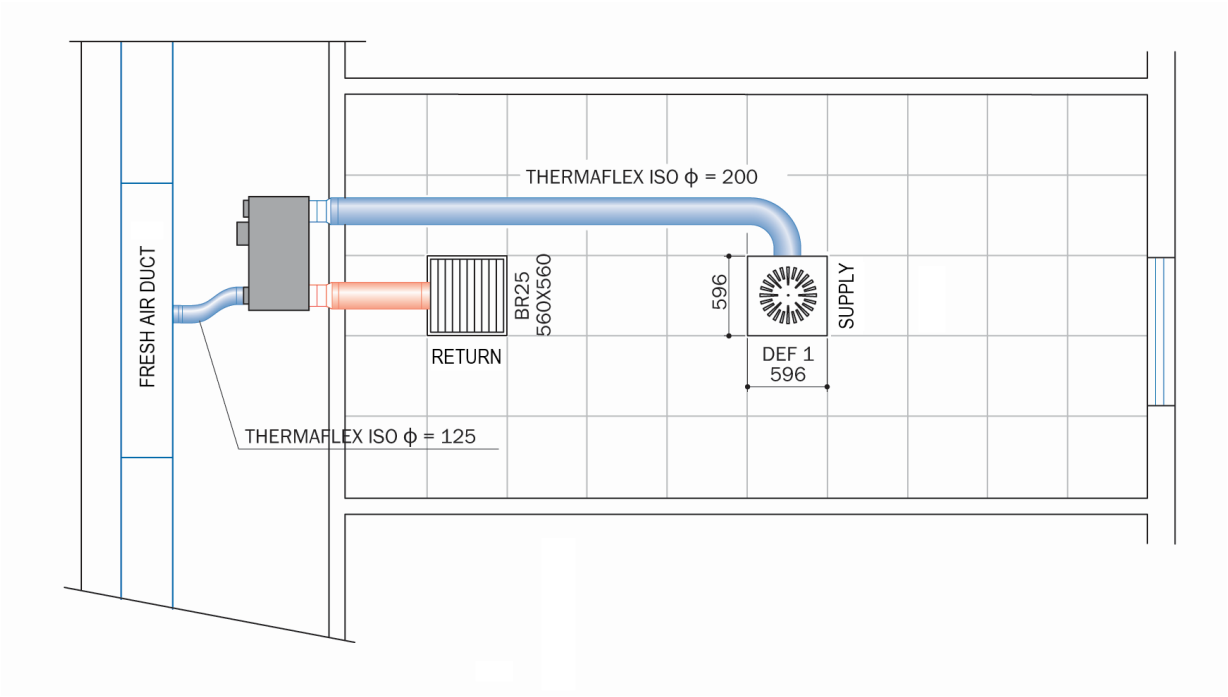
TCU 12@540 m³/h, Ext. Press. 100 Pa	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz	dB (A)
Supply	55.5	53.5	47.9	48.8	47.5	45.1	41.5	35.7	52.3
Return	50.5	48.5	42.9	43.8	42.5	40.1	36.5	30.7	47.3
Unit external radiation	49.5	41.5	35.9	33.8	32.5	29.1	20.5	11.7	37.1

TCU 34@710 m³/h, Ext. Press. 100 Pa	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz	dB (A)
Supply	55.6	51.9	49.5	51.1	50.7	48.6	44.7	40.8	55.3
Return	50.6	46.9	44.5	46.1	45.7	43.6	39.7	35.8	50.3
Unit external radiation	49.6	39.9	37.5	36.1	35.7	32.6	23.7	16.8	39.7

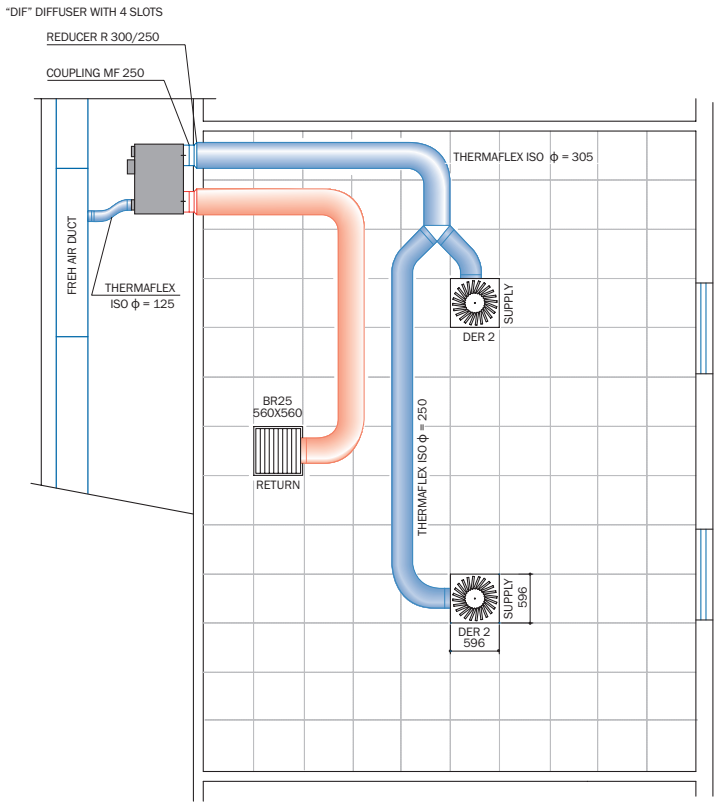
TCU 34@880 m³/h, Ext. Press. 100 Pa	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz	dB (A)
Supply	56.7	52.8	54.4	55.1	55.0	53.1	49.5	47.6	59.7
Return	51.7	47.8	49.4	50.1	50.0	48.1	44.5	42.6	54.7
Unit external radiation	50.7	40.8	42.4	40.1	40.0	37.1	28.5	23.6	44.1

Values measured at 2 m from the unit

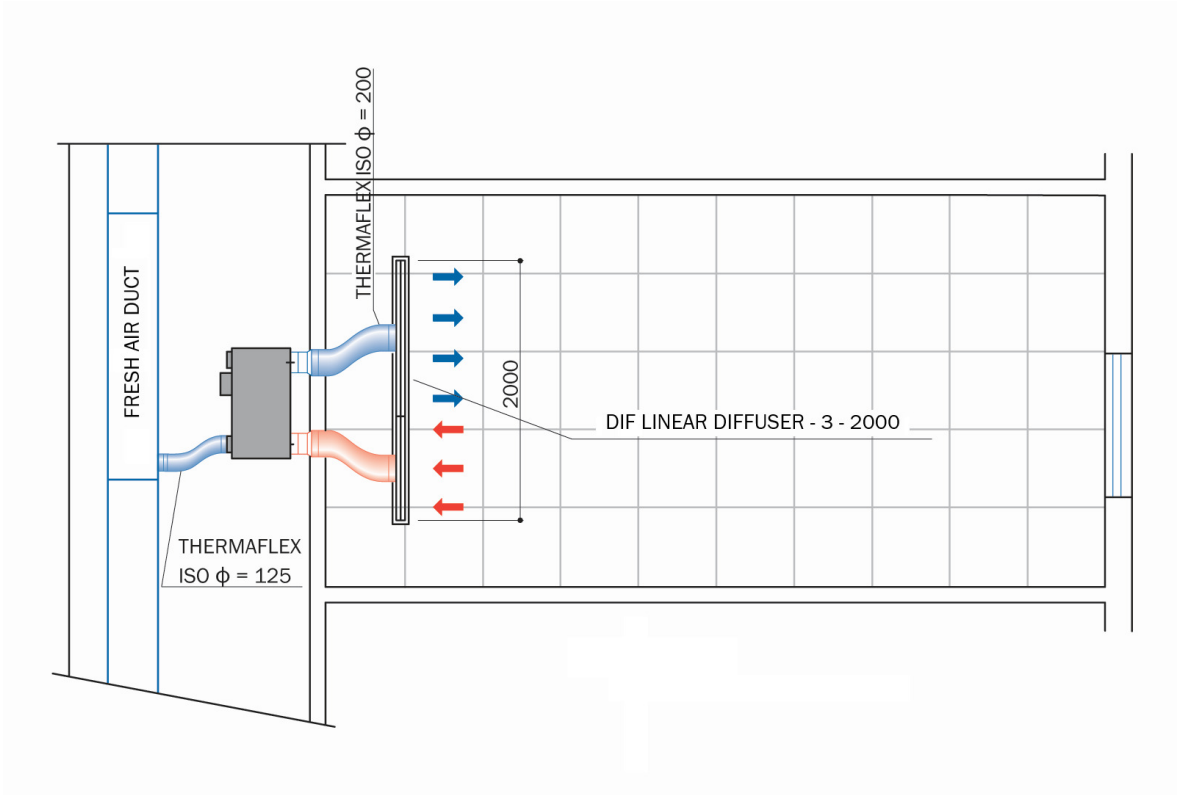
Examples of possible configurations



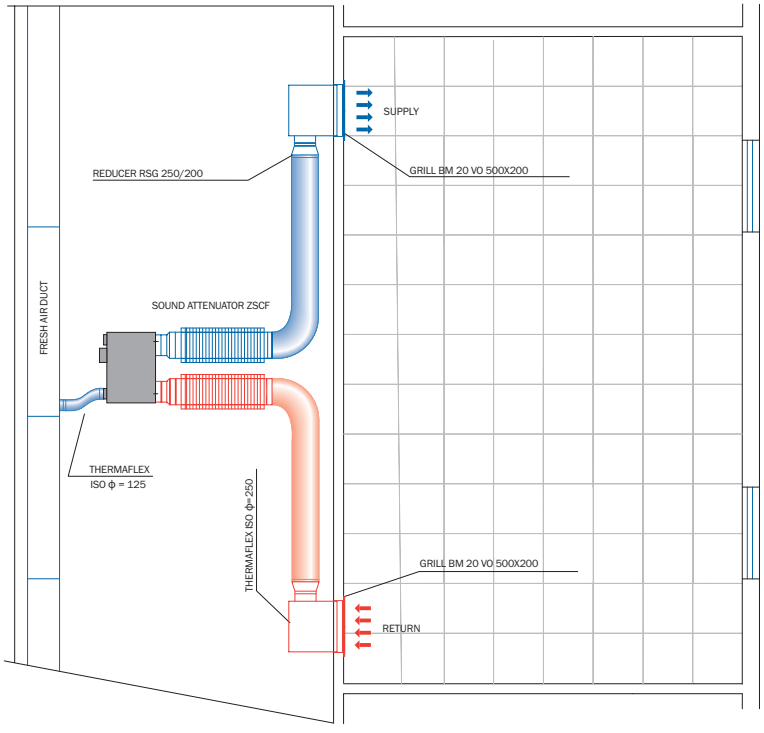
TCU 12 module with DEF1 diffuser



TCU 34 module with DER 2 diffuser



TCU 12 module with DIF diffuser



TCU 34 module with BM 20 air supply intake

Roccheggiani S.p.a.
Via 1° Maggio, 10 - 60021 Camerano (An) Italy
Tel +39 071 730 00 23
Fax +39 071 730 40 05
info@roccheggiani.it

www.roccheggiani.it

ROCCHEGGIANI®
care for air