HYDRAULIC KIT

FOUR-PIPE COMPACT KIT

EUROPO

INTEGRATED
COMFORT
SYSTEMS

Four-Pipe Compact Kit

Eurapo Four-Pipe Compact Kit fits a fan coil to a four-pipe circulating system (Four-Pipe Common Load Systems), without equipping the unit with an extra heating coil (as foreseen in a Four-Pipe Independent Load Systems).

In Four-Pipe systems both heating and cooling are available to each load device and the changeover can be managed independently for each FCU. This scenario is suitable for hydraulic systems in which some loads are in heating mode, while others are in cooling mode.

For instance: during winter time, in office buildings, areas contiguous to external walls could be in heating mode, while due to electrical equipment loads, internal rooms could be in cooling mode. Or during mid-seasons, western oriented room could be heated in the morning and cooled in the late afternoon, while, in the same building, eastern oriented ones could be cooled in the morning and heated since early evening.

A FCU provided with the Eurapo Four-Pipe Compact Kit uses the same multi-row coil in heating and cooling mode (this is a typical Four-Pipe Common Load configuration), while the Four-Pipe Independent Load FCU is equipped with a multi-row coil in cooling mode and a single row coil in heating mode.

It stands to reason that implementing heater exchanger surface, as in Four-Pipe Common Load Systems heating mode, it is possible to decrease the hot water flow to the FCU, keeping the same capacity.

So by using Eurapo Four-Pipe Compact Kit, economical and energy saving benefits are obvious:

Four-pipe Compact Kit is made by 2 3-way valves and 2 actuators On-Off 230-24V (IP40) or 2 modulating actuators 24V (IP40)

- Matched with a condensing boiler, low return temperature (T<40°C) provide fan coil system with an high energy efficiency (comparable with a radiant system, but with a great cost saving);
- Hot water flow decreasing involves a reduction of, pipes weight, hydraulic accessories weight, thermal insulation weight, circulation pump size;
- Keeping unchanged nominal hot water flow and heating capacity, it is possible to foresee a supply temp <≈50°C with a return temp <≈40°C . This water temperature is still compatible with a condensing boiler;
- Another Eurapo Four-Pipe Compact Kit configuration option could be listed: keeping unchanged nominal hot water flow, with a supply temp>≈50°C, due to the multi-row coil bigger exchange surface, the heating capacity is bigger than a Four-Pipe Independent Load FCU (which is provided with 1 or 2 rows heating coils at most).

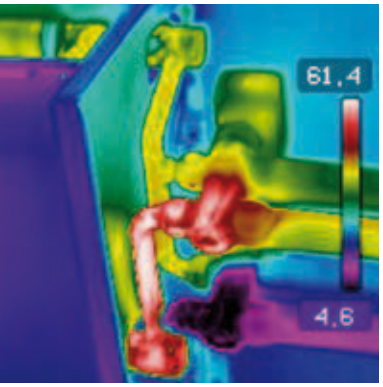
These are just some examples how Eurapo Kit can fit a FCU to any technicolor requirements of performance and energy efficiency in a four-pipe philosophy system.

Eurapo Four-Pipe Compact Kit is therefore a suitable solution for a four-pipe system dedicated to high heating demanding buildings. Four-Pipe Independent Load FCUs are equipped with a dedicated heating coil with 1 or 2 rows and they could be undersized for these kind of high-demanding systems. Eurapo Kit enables to use the same multi-row coil for both cooling and heating, keeping four-pipe system philosophy and heating load satisfaction.

Technical Data Comparison:

Comparison

Two tests carried out in Eurapo Laboratories compare the heating capacities of a CV 216 3R + 1R FCU equipped with one row heating coil (typical solution for a Four-Pipe Independent Load Systems) and the same unit without the heating coil, but equipped with the **Eurapo Four-Pipe Compact Kit** (Four-Pipe Common Load Systems solution):



COMPARISON								
Fan Coil Unit	Speed	Air inlet temp [°C]	Outlet Air temp [°C]	Heating Capacity [W]	Water flow [lt/h]	Inlet water temp [°C]	Outlet water temp [°C]	Water pressure drop [kPa]
CV 216 3R + KIT4T	Med	20,57	36	**2777**	**81,25**	61,45	**32,06**	0,28
CV 216 3R + 1R	Med	20,10	38	**2730**	**237,12**	69,90	**60**	12,4

Keeping almost the same heating capacity (+1,7 %), the unit equipped with **Eurapo Kit** reduces hot water flow of about 66%, with a FCU outlet temperature of about 32°C (instead of 60°C).

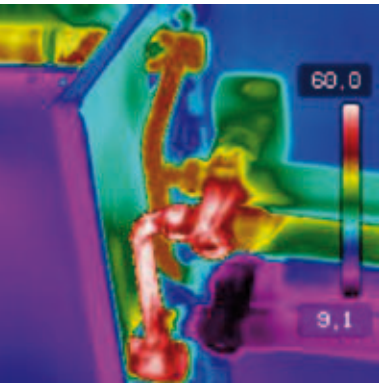
Comparing the results of these two tests, it is obvious that Eurapo Four-Pipe Compact Kit provides a less expensive system offering a also considerable energy saving (matching the Kit with a condensing boiler).

FOUR-PIPE COMPACT KIT
THERMOGRAPHIC DATA ANALYSIS

Technical Data Comparison:

FOUR-PIPE COMPACT KIT

Another simulation carried out in Eurapo laboratories with the same FCUs, but keeping the same hot water flow:

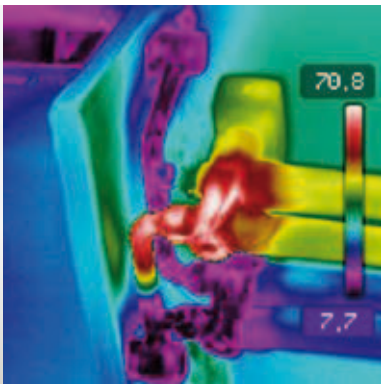


COMPARISON

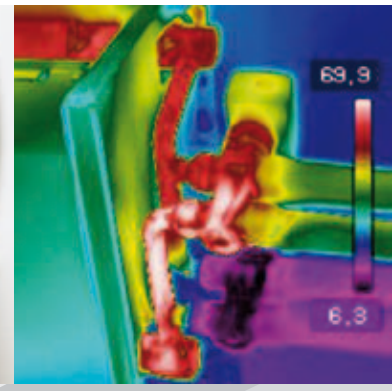
Fan Coil Unit	Speed	Air inlet temp [°C]	Outlet Air temp [°C]	Heating Capacity [W]	Water flow [lt/h]	Inlet water temp [°C]	Outlet water temp [°C]	Water pressure drop [kPa]
CV 216 3R + KIT4T	Med	20	43	**4360**	**237**	60	**44**	2,1
CV 216 3R + 1R	Med	20,10	38	**2730**	**237,12**	69,90	**60**	12,4

Despite a lower supply temperature (60°C vs. 70°C), FCU equipped with **Eurapo Four-Pipe Compact Kit** gives out a higher heating capacity (+60%). Eurapo Kit is a good solution for a four-pipe system dedicated to high heating demanding buildings too.

Operation



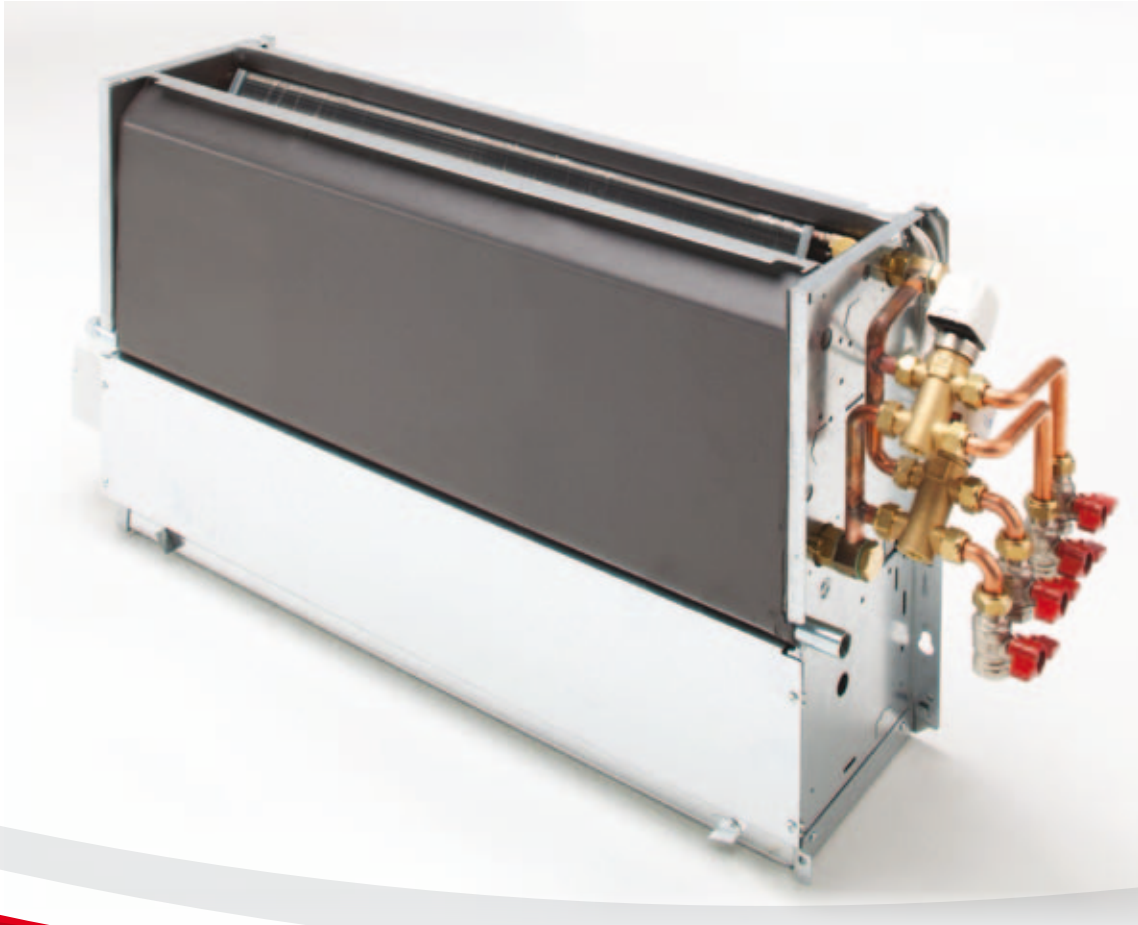
FOUR-PIPE COMPACT KIT
THERMOGRAPHIC DATA ANALYSIS
IN **SUMMER** MODE



FOUR-PIPE COMPACT KIT
THERMOGRAPHIC DATA ANALYSIS
IN **WINTER** MODE

Installation

FOUR-PIPE COMPACT KIT
INSTALLED ON A FAN COIL UNIT



FOUR-PIPE COMPACT KIT

Eurapo Four-Pipe Compact Kit main features are:

- Additional heating coil removal.
- One common coil for both cooling and heating mode (Four-Pipe Common Load Systems).
- Installation cost savings, due to reduction of: pipe line weight, hydraulic accessories weight, thermal insulation weight, labor costs, heating pump size.
- If it is matched with a condensing boiler, high energy efficiency (comparable with a radiant system), due to low return temperature (T<40°C).
- Reduced operating costs: due to decrease of hot water flow and coil pressure drop, it is possible to provide a lower power consumption heating pump, guaranteeing the same heating capacity.
- Cost-effective fan coil units, compared to a classical Four-Pipe Independent Load FCU.
- Possibility to integrate the sensible capacity with an electrical re-heater, in order to guarantee a perfect comfort in transitory condition. For instance during the daily HVAC system start up or during a changeover from cooling to heating mode.
- Transport costs saving due to FCU weight reduction.
- Good technical solution for a four-pipe system dedicated to high heating demanding buildings.
- In a Four-Pipe System, Omnibus Control will be able to manage a frequency controlled heating pump in order to guarantee a return temperature compatible with a condensation boiler (incoming).

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