HYDRAULIC KIT

4-PIPE COMPACT KIT

EUROPO

INTEGRATED
COMFORT
SYSTEMS

4-Pipe Compact Kit

Eurapo 4-Pipe Compact Kit fits a fan coil to a 4-pipe circulating system (4-Pipe Common Load Systems), without equipping the unit with an extra heating coil (as foreseen in a 4-Pipe Independent Load Systems).

In 4-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 4-Pipe Compact Kit uses the same multi-row coil in heating and cooling mode** (this is a typical 4-Pipe Common Load configuration), while the 4-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 4-Pipe Common Load Systems heating mode, it is possible to decrease the hot water flow to the FCU, keeping the same capacity.

This makes the fan coil equipped with the Compact 4-Pipe Kit perfectly adaptable to a system with a condensing boiler or a polyvalent heat pump for 4-pipe systems. With this solution, **it is possible to significantly increase the thermal efficiency of the system**, making it comparable to that of a radiant system.

4-PIPE COMPACT KIT

The advantages, compared to the traditional solution, are clear both from an energy efficiency standpoint and in terms of installation costs.

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

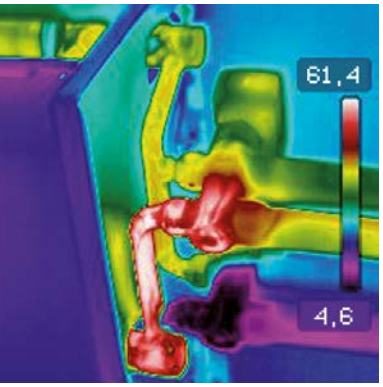
- The Compact 4-Pipe Kit can also be used to increase the delta T on the supply side compared to the solution with an auxiliary coil, while maintaining the same thermal output (or even greater output). In this way, it is possible **to reduce the nominal flow rate of the system, which allows for a reduction in the weight of the pipes, accessories, thermal insulation**, and the size of the pump during the design phase.

- **Eurapo 4-Pipe Compact Kit** is therefore a suitable solution for a 4-pipe system dedicated to high heating demanding buildings. 4-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 4-pipe system philosophy and heating load satisfaction.

As can be deduced from these different application examples, the **Eurapo 4-Pipe Compact Kit** makes the fan coil highly adaptable to any system configuration. The system that results from combining the Eurapo fan coils with the 4-pipe compact kit is a 'tailor-made suit' that can be adapted to the specific performance and energy efficiency requirements of the system.

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 4-Pipe Independent Load Systems) and the same unit without the heating coil, but equipped with the **Eurapo 4-Pipe Compact Kit** (4-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 + KIT4	Med	20	35,4	**2,55**	**222**	45	**35**	2,0
CV 216 3R + 1R	Med	20	33,5	**2,40**	**207**	65	**55**	9,0

As can be seen, in this case, the solution with the auxiliary row, with a supply temperature of 65°C and a delta T of 10°C, has a lower output compared to the similar solution with the Compact 4-Pipe Kit, but with a supply temperature of 45°C and a delta T of 10°C.

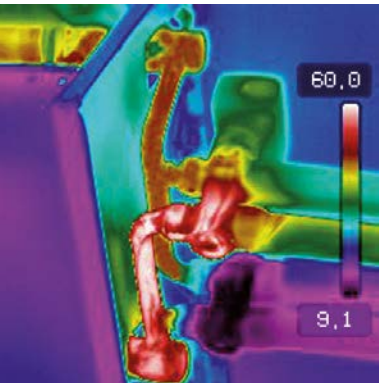
The adopted solution is **ideal** if a **polyvalent heat pump** for 4-pipe systems or a **condensing boiler** is to be used for heating.

4-PIPE COMPACT KIT
THERMOGRAPHIC DATA ANALYSIS

Technical Data Comparison:

4-PIPE COMPACT KIT

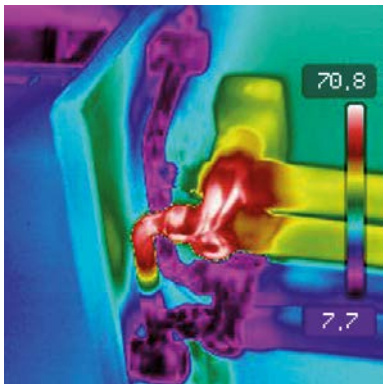
Another simulation carried out in Eurapo laboratories with the same FCUs, but keeping the same hot water flow:



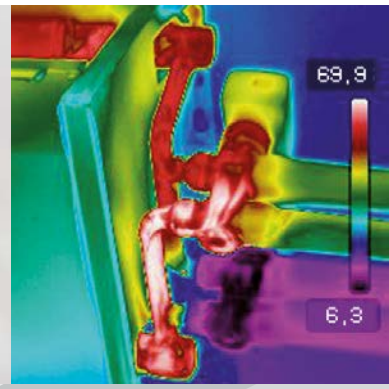
COMPARISON								
Fan Coil Unit	Speed	Air inlet temp [°C]	Outlet Air temp [°C]	Heating Capacity [W]	Water flow [lt/h]	Inlet water temp [°C]	Outlet water temp [°C]	Water pressure drop [kPa]
CV 216 3R + KIT4T	Med	20	36	**2770**	**81**	61,5	**32**	0,3
CV 216 3R + 1R	Med	20	33,5	**2400**	**207**	65	**55**	9,0

Similarly, with the Compact 4-Pipe Kit, the **output is higher** (+15%) compared to the 1-row solution, but with a flow rate that is almost reduced by 60% and a return temperature of 32°C compared to the 60°C of the traditional solution. In this case, the advantages of using the Compact 4-Pipe Kit are evident when combined with a condensing boiler; **this allows for a reduction in both construction and operating costs of the system.**

Operation



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



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

4-PIPE COMPACT KIT
INSTALLED ON A FAN COIL UNIT

Eurapo 4-Pipe Compact Kit main features are:

- Additional heating coil removal.
- One common coil for both cooling and heating mode (4-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.
- High thermal efficiency of the system (comparable with similar radiant system):
  - »If it is matched with a condensing boiler, high energy efficiency (comparable with a radiant system), due to low return temperature (T<40°C).
  - »If it is matched with a multi-purpose heat pump for 4-pipe systems, due to the low return temperature (T<45°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 4-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 4-pipe system dedicated to high heating demanding buildings.

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