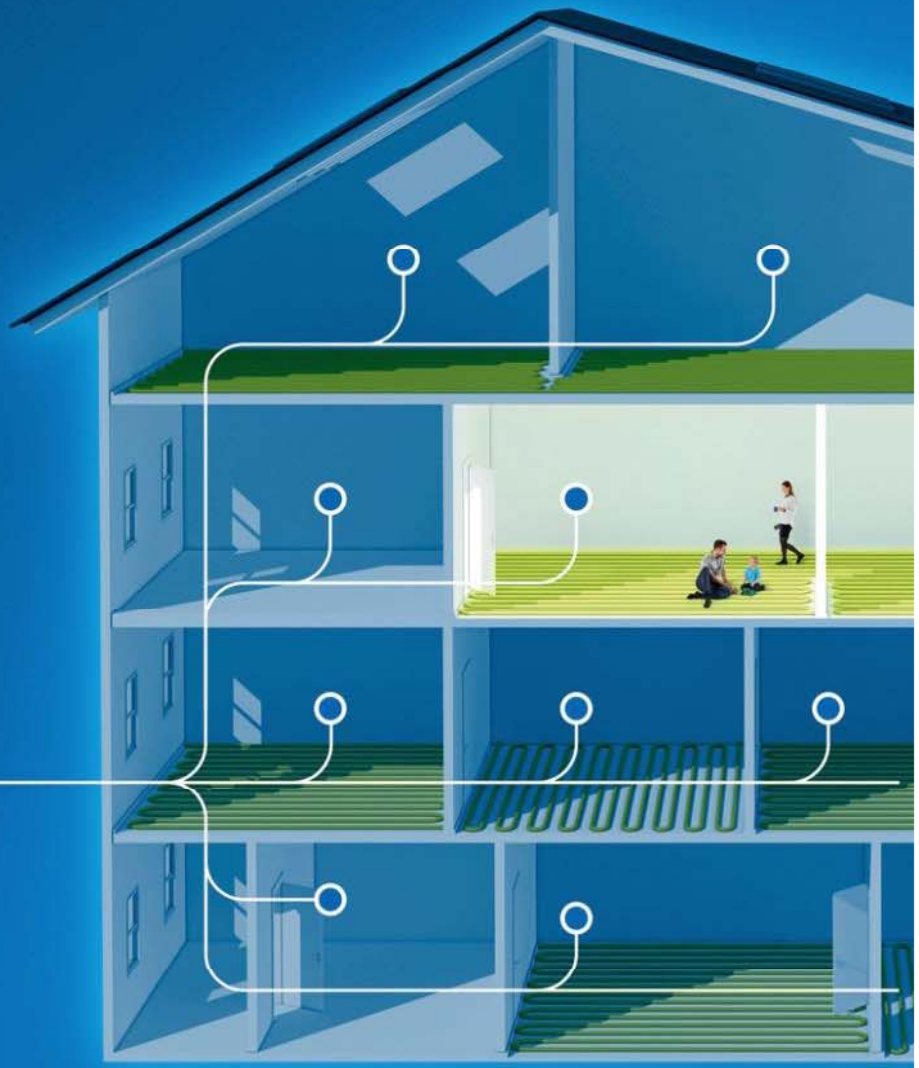
WLM3 – the 3rd generation of the OJ Waterline™ Control Systems



Industry leading intelligence, control and operation

OJ ELECTRONICS

Designed to deliver value for all.

Benefits;

- Reliability - Fit and Forget
- Flexibility – One system solution for any size application
- Cost-savings - Reducing system issues
- Supports the integrity of your business
- Maximised sales - Backward compatible with WLM2

(Back-light will not be operable)

Homeowners

- Comfortable and intuitive control
- Personalised installations
- Management of your environment.
- Cost-savings by energy reduction.

Installers

- Easy installation
- Minimise Call-backs.
- Suitable for all installation type domestic or commercial
- Promote a reliable solution

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The OJ Waterline™ Control System consist of two main parts;

Masters

- Ensure optimum operation of boilers, pumps and water temperature

Controllers / Sensors

- Ensure easy installation, high comfort, energy and cost efficiency with a high level of flexibility

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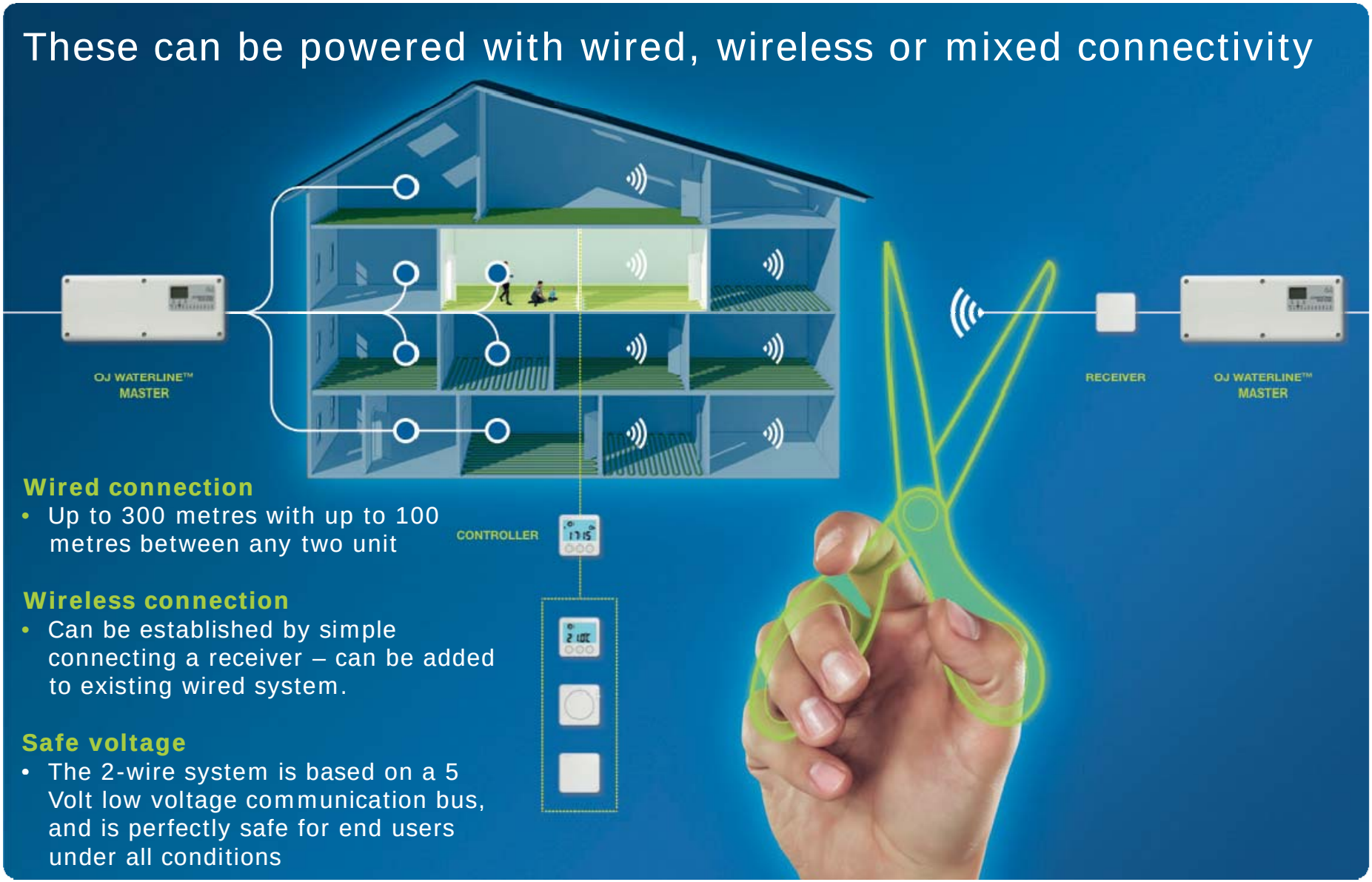
These can be powered with wired, wireless or mixed connectivity



Wired connection

- Up to 300 metres with up to 100 metres between any two unit

Wireless connection

- Can be established by simple connecting a receiver – can be added to existing wired system.

Safe voltage

- The 2-wire system is based on a 5 Volt low voltage communication bus, and is perfectly safe for end users under all conditions

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OJ Waterline™ WLM3 Controllers/Sensors

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OJ Waterline™ WLM3 Master Product Range

WLM3-xFS Digital master

WLM3-xBA Standard master

WLM3-xAO Add-on module

Universal masters

- For wired and wireless systems
- 8 actuator outputs
- Pump & Boiler control

AO module

- Extensions of outputs
- 6 actuator outputs

Connection of room sensors/controllers

- Wired and wireless room sensors & controllers can be connected to the same master

Wireless function

- Connection of one or more external receivers

Exercise function

- To optimize lifetime of valves and pumps, these will be exercised every 72 hours during inactive periods

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OJ Waterline™ WLM3 Master Features

- **Master with eight outputs** For thermal a actuators
- **Add On module with additional six outputs**
- **Networking of Masters:** Adds support for large installations.
- **Double output terminals for thermal actuators:** Ensures easy connection of more loops to the same channel output
- **Easy interconnections:**RJ14 connectors – like telephone plugs - for quick connection of Add On module and Receiver to enable wireless operation
- **Output for motorized 0-10VDC mixing valve:** Enables control of supply water temperature

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OJ Waterline™ WLM3 Master Features

- **Supports Radiator zones, Domestic Hot Water heating and two step heating:** floor + boost unit like radiator
- **Room sensors and controllers are designed for easy wall mounting and battery replacement**
- **Temperature on time – Early start**: Adaptive function ensures the desired temperature on time
- **Advanced Cooling features**: Dew point protection through optional humidity sensors prevents condensing on floors – Control of connected de-humidifier, possibility for cooling and heating on different outputs
- **Communication interface for Building Management Systems (BMS) and Gateway for remote smartphone access.**

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OJ Waterline™ WLM3 Master Specification/Defaults

Product	 Standard Master	 Digital Master		 AO-module
Outputs	8	8		6
Supply voltage	230 V	230 V		230 V
Actuator output 230V	WLM3-1BA	WLM3-1FS		WLM3-1AO
Actuator output 24V	WLM3-3BA	WLM3-3FS		WLM3-3AO
Control of mixing valve	No	Yes, delivery incl. sensor		
Weather compensation	No	Yes, with optional Outdoor module type WLOC3-19		
Temperature settings	Fixed Factory settings	Default settings	User settings	
Comfort temperature	21ºC	21ºC	+5/+40ºC	
Setback temperature	18ºC	18ºC	+5/+40ºC	
Min. limitation	17ºC	17ºC	+10/+30ºC	
Max. limitation	27ºC	27ºC	+10/+40ºC	
Frost protection	5ºC	5ºC	+3/+8ºC	

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OJ Waterline™ room sensor/controller product range

WLTP3
non-adjustable version

WLTA3
Standard Room Sensor

WLTM3 & WLTD3
Room Sensor with setting mode

WLDT3
Room Sensor with Display

WLCT3
Room Controller with built-in clock functions

Design & mounting

- Modern design line with big 3.2 inch backlit display
- Surface wall mounting or to standard socket
- Wireless or Hard wired versions
- Emergency frost protection on flat batteries or loss of communication.

Control of temperature

- PI-control for accurate & stable comfort
- Individual room temperature adjustment ±4° C compared to system set point.
- Floor limit sensor for min. or max. limitation
- Automatic or manual setback temperature and frost protection.

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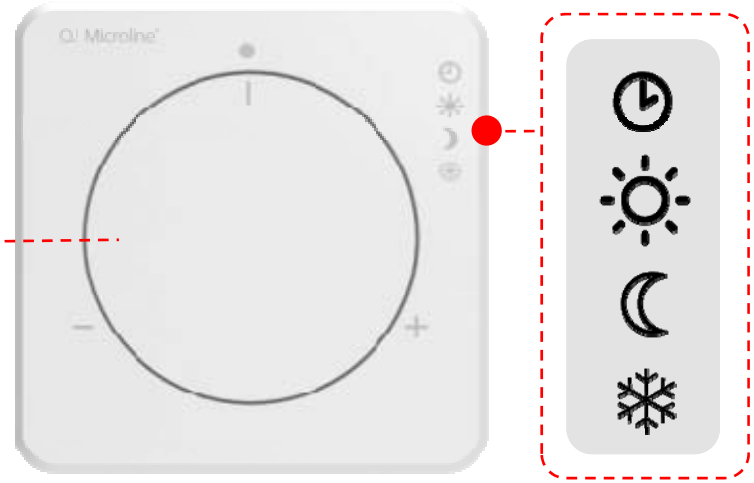
Room Sensors – Sensors & Functions

Setting of Room Temperature

- Max. setting ± 4°C preventing excessive adjustment



Setting Mode Switch

- Automatic operation according to a Room Controller or the timer input on the Master.
- Fixed comfort temperature (21°C).
- Fixed setback temperature (18°C).
- Fixed operation temperature (frost protection of 5°C).

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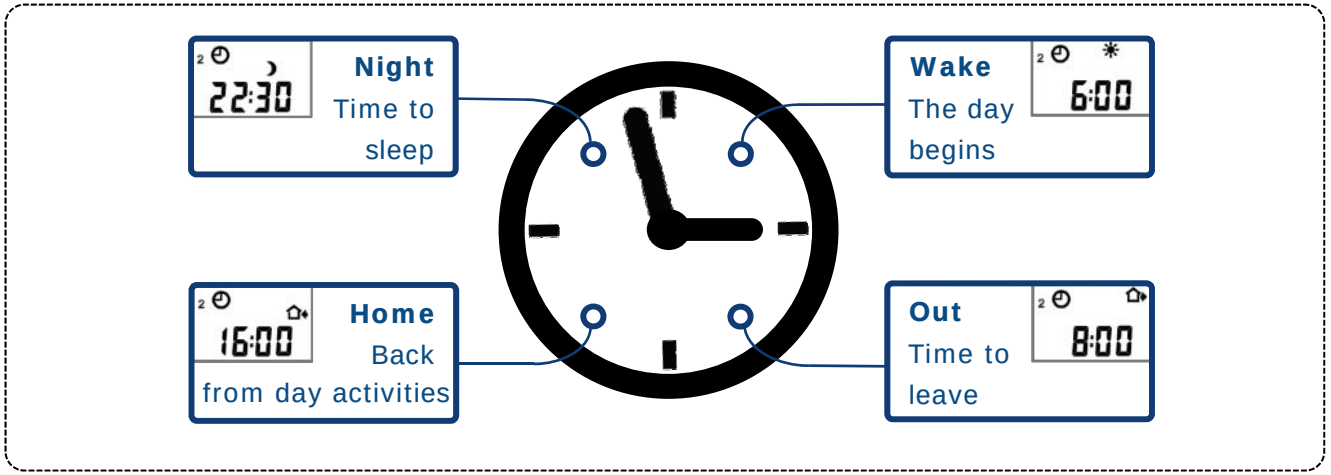
WLCT3 Room Controller with built-in clock function

Features

- Big 3.2 inch backlit display
- Automatic comfort and setback temperature
- Adaptive function (optimum start)
- For control of room temperature and additional areas
- Pre-programmed 4 event timing, requires only actual time and day to be set. Programs can be changed.
- Floor limit sensor can be connected

Example



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WLCT3 - Domestic Hot Water Control

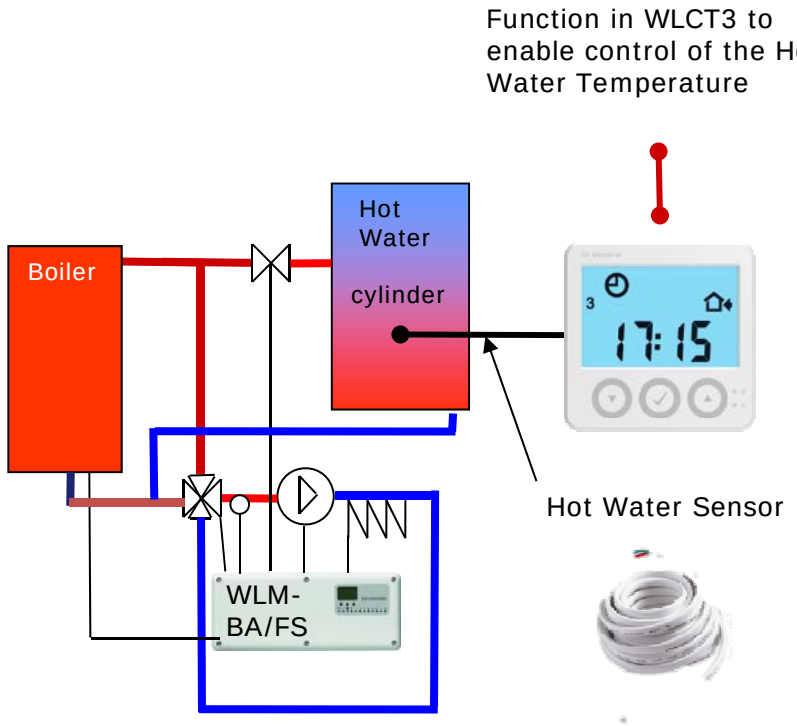
It is possible to control the domestic hot water temperature with a function in the clock thermostat to ensure optimum energy saving.

- A sensor from the thermostat measures the temperature in the storage cylinder.
- A zone valve is then controlled via the WLM master, which in turn activates the boiler on demand.
- The underfloor heating pump will NOT be activated

2-Wired type WLCT3-19

Wireless type WLCT3-29

- Automatic day and night temperature.
- Pre-programmed, requires only actual day and time to be set. Programs can be changed.
- External Sensor (ETF1899a OR ETF522 must be connected.



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WLCT3 - Radiator Control

It is possible to control a radiator circuit room temperature with a special function in the Room Controller to ensure optimum energy saving.

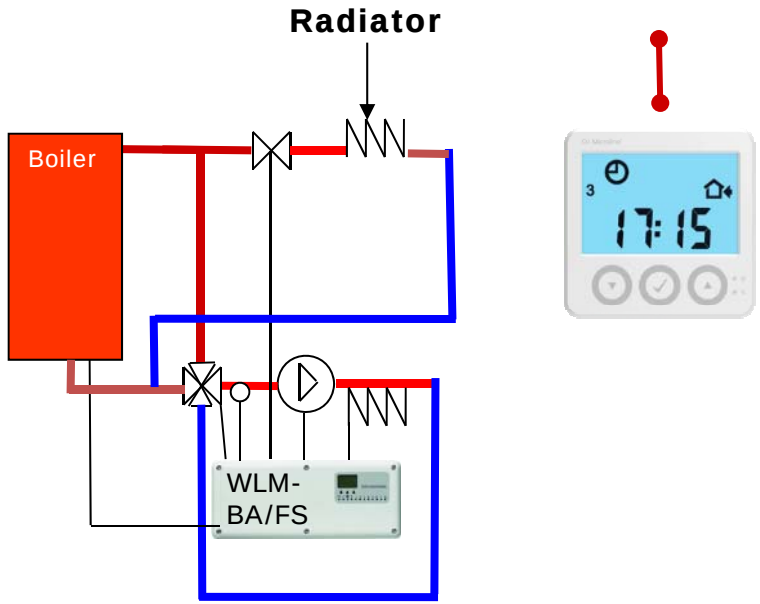
- The thermostat measures the temperature in the room, and a 2 port spring return zone valve is then controlled via the WLM master, which in turn activates the boiler on demand.

2-Wired type WLCT3-19

Wireless type WLCT3-29

- Automatic comfort and setback temperature.
- Pre- programmed, requires only actual day and time to be set. Programs can be changed.

Special function in the WLCT3 to enable control of a Radiator zone



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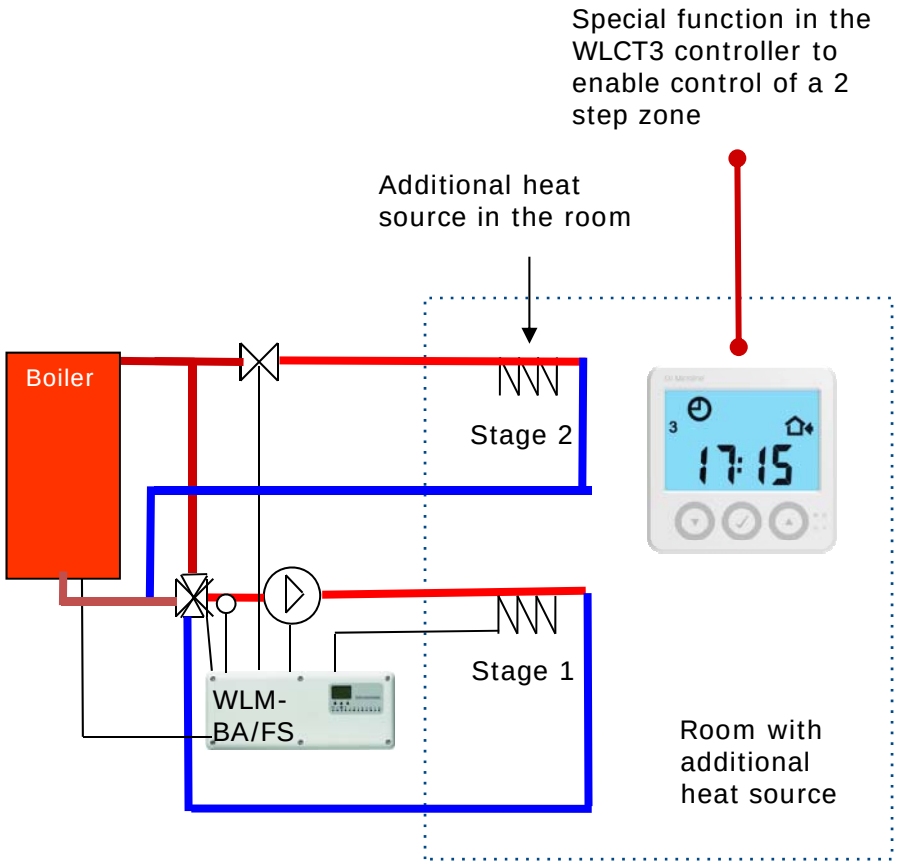
WLCT3-2 Stage Heating Control

If there is a need for enabling a secondary heat source in a room (e.g. a back-up electrical radiator*), it is possible to use a special function in the Room Controller that will control two separate outputs.

- The second output will be activated only if the temperature cannot be achieved within a preset time period and a programmed hysteresis
- Automatic comfort and setback temperature.
- Pre- programmed, requires only actual day and time to be set. Programs can be changed.
- ***PLEASE NOTE connection of the secondary heater must be in accordance with the electrical limits of the WLM control or via a suitable relay or contactor.**



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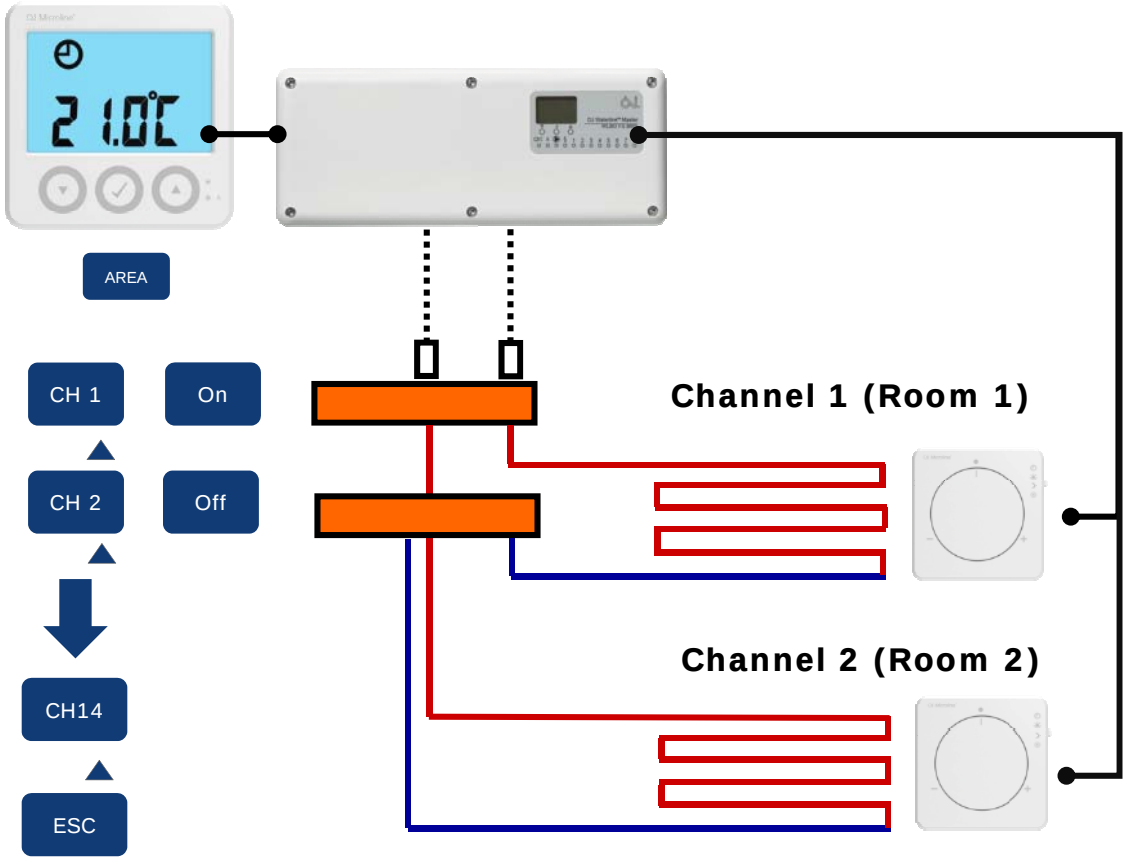
Room Controller with built-in clock function

Setting up areas with the room controller

1. Enter the Menu “AREA” in the WLCT3 Room Controller

2. Choose the channels (rooms) that should get the set point from this Room Controller, by setting the channel number to “On”



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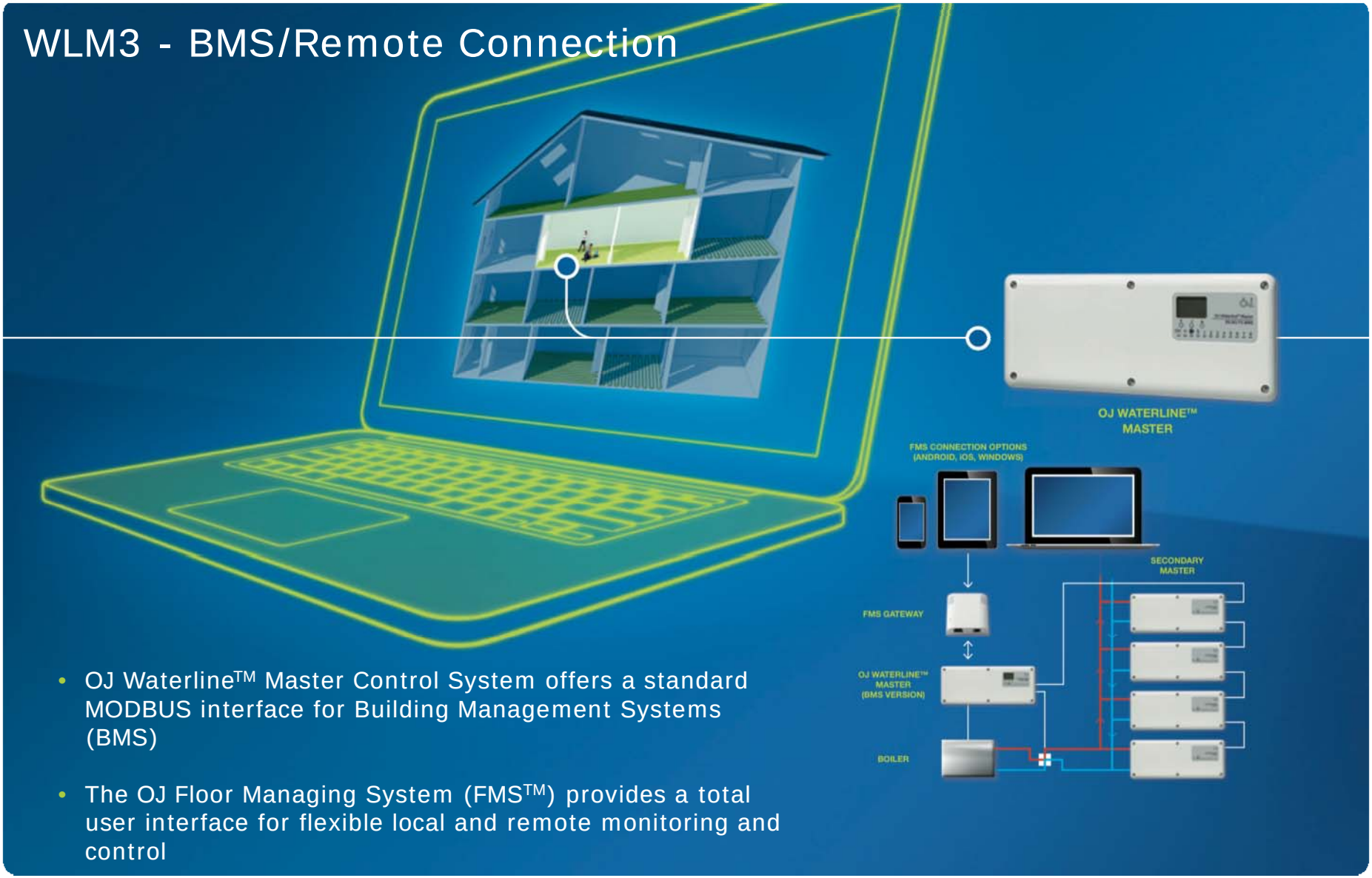
WLM3 - BMS/Remote Connection



- OJ Waterline™ Master Control System offers a standard MODBUS interface for Building Management Systems (BMS)
- The OJ Floor Managing System (FMS™) provides a total user interface for flexible local and remote monitoring and control

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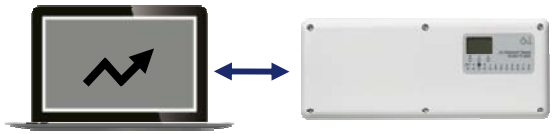
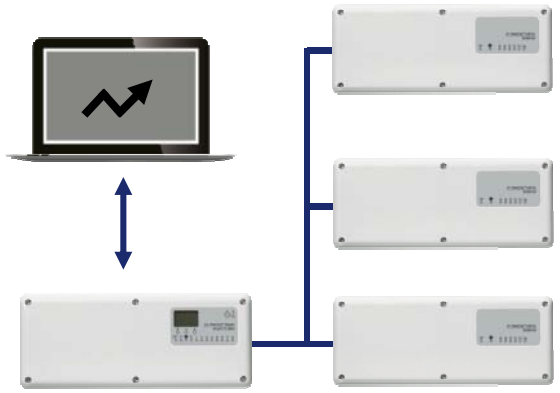
BMS functions on FS masters

The BMS function:
In buildings with a Building Management System, this system can communicate with the WLM3 system by using the versions with BMS interface. This enables full remote control to ensure optimal control and energy efficiency in the building.

Example 1:
Building Management Computer communicating with a standalone WLM3 with BMS interface



Example 2:
Building Management Computer communicating with a network of WLM3 with BMS interface



Main BMS features:

- Read & set all individual room & floor limit temperatures
- Read all masters in a WLM3 network through the WLM3 network master.
- Read out status of all outputs like pumps, boiler and actuators
- Read & set weather compensation values
- Override functions to support testing
- Based on RS485 RTU MODBUS

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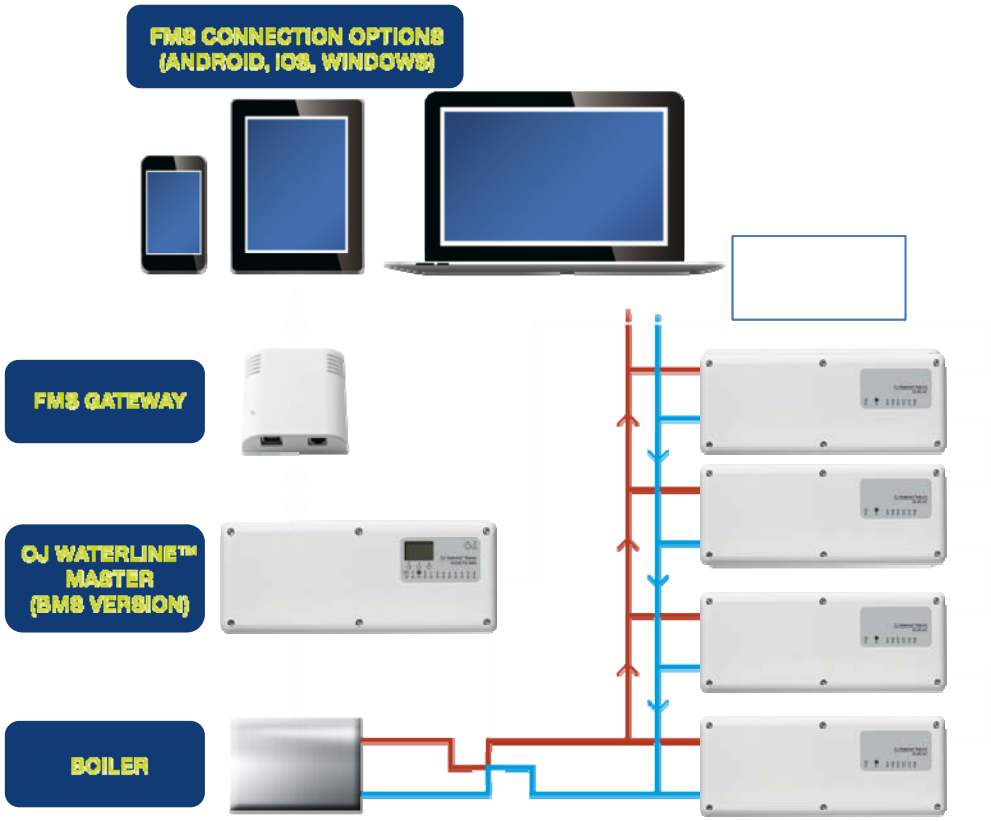
The OJ Waterline™ BMS and FMS System offers

- Centralised access for maintenance of building controls
- Masters that can be easily set, limited and activated for individual rooms and floors
- System balance ensuring multiple systems work together
- Status read-outs
- Override functions to support testing
- Communication with all masters in an OJ Waterline™ network through a single connection point - the OJ Waterline™ FS network master



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Intelligent temperature control for maximum comfort

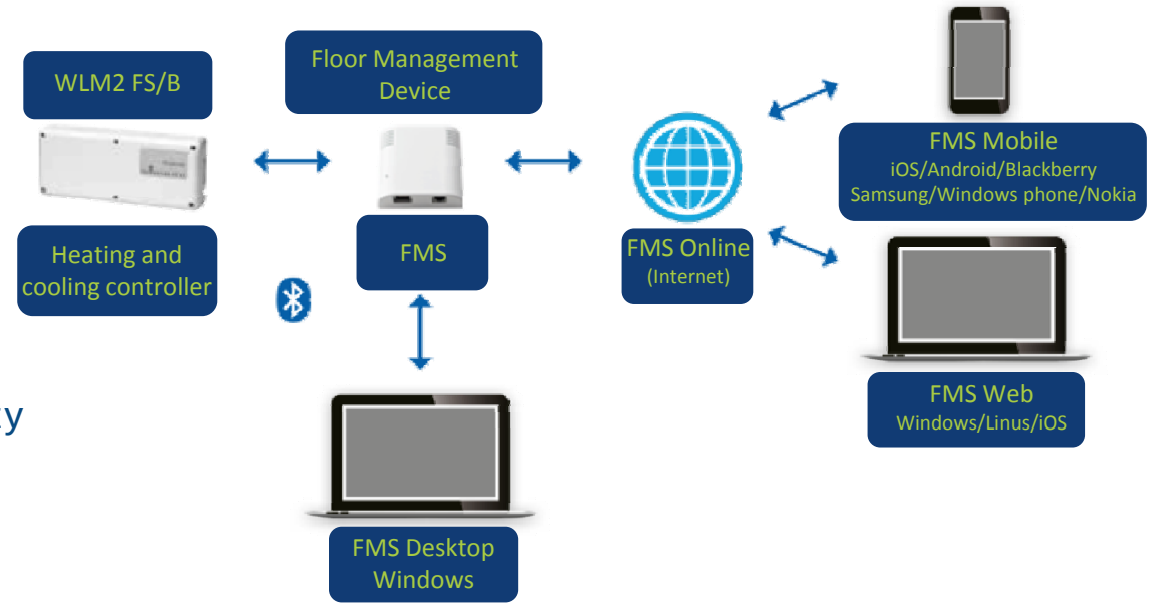
General features
- Local and remote monitoring and control
- MODBUS interface

PC Computer type
- Desktop
- Laptop

PC Computer type
- Tablet computer
- Smartphone

Connection types
- Ethernet, web or Lan connectivity
- Bluetooth

System requirements
(underfloor heating controls)
WLM3-xFS master
WLM3-xFS or WLM2-xBA (networked)
WLM3 Room Sensors & Controllers



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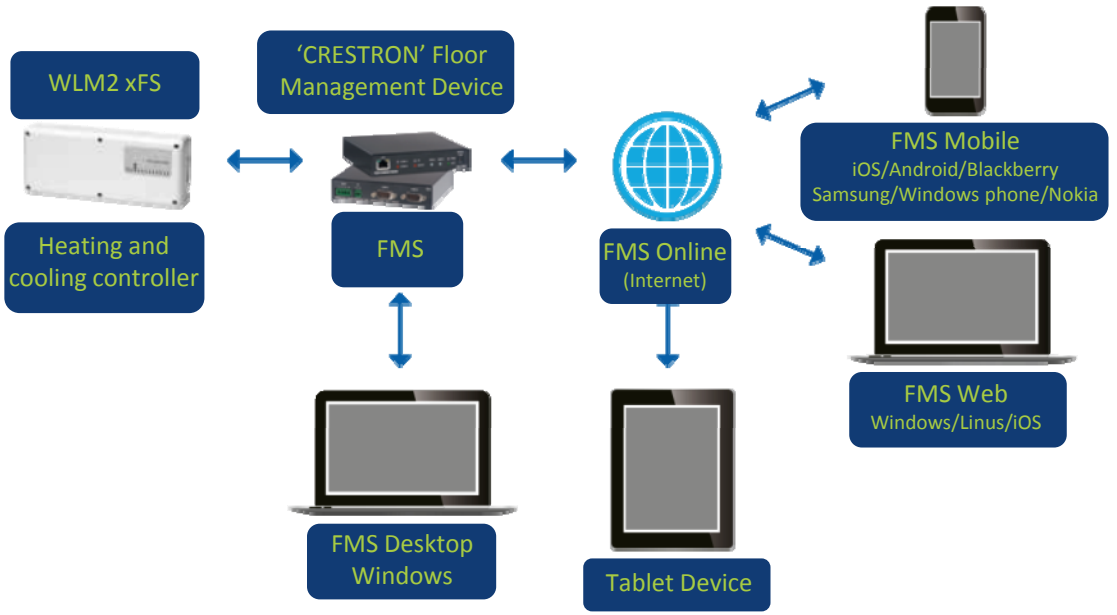
FMS™ CRESTRON

General features

- Interface for the WLM3-xFS
- Desktop, laptop, tablet or smartphone access
- Suitable for standard homes or commercial buildings



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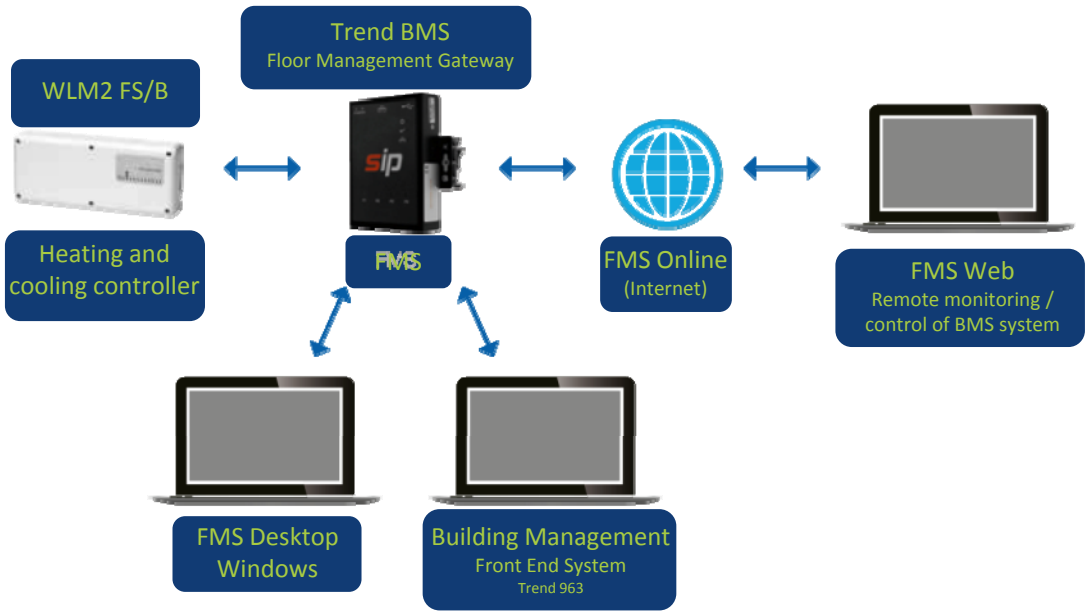
FMS™ SIP

General features

- Management user interface for the OJ Electronics WLM3-Waterline Master System
- Built in ModBus for ‘Plug & Play’ installation
- Controlled from any PC or laptop computer via an IP connection
- Ethernet, web or LAN connectivity



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WLM3 Product Features

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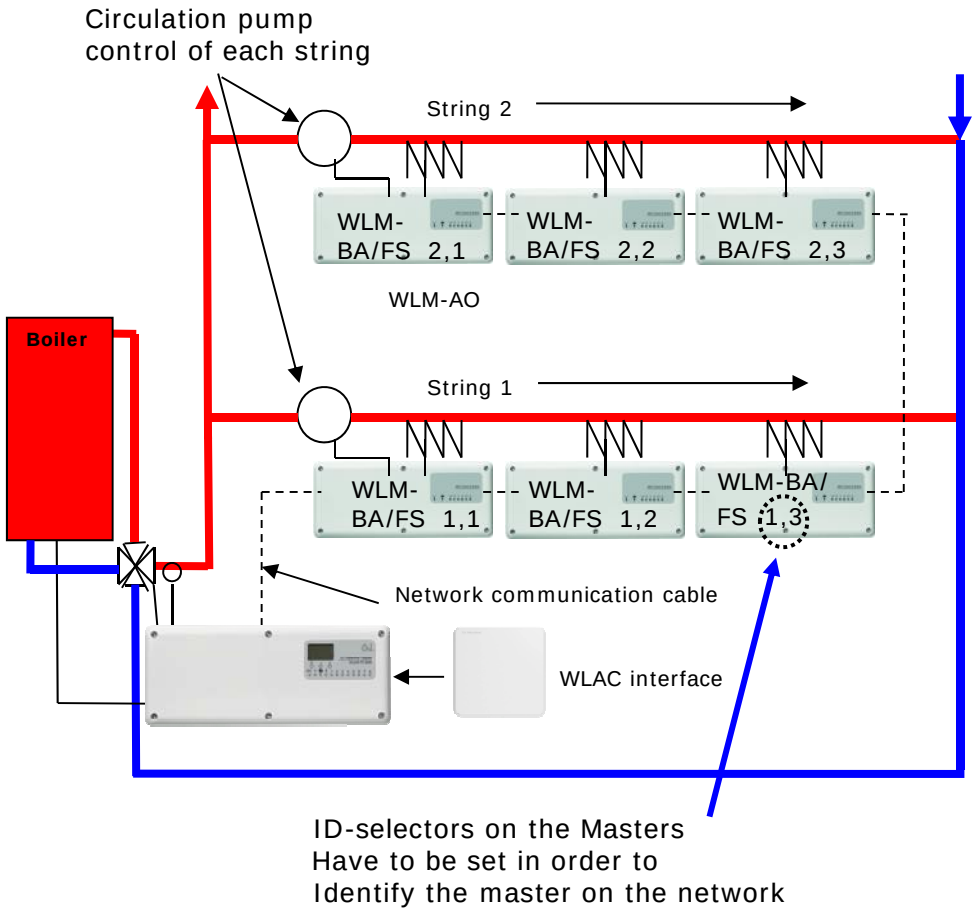
Network Functions

In large buildings with multiple areas it is possible to use a master to create a network of multiple zones.

- A “network master” could be a Digital Master for centralized control of mixed supply water or a Basic Master where no mixing is required.
- “Slave Masters” can then be added to the network to create additional zones.
- “Slave Masters” controlling a common pump are connected as a string on the network system.
- Up to 15 strings, each of up to 9 masters, can be connected as a network.



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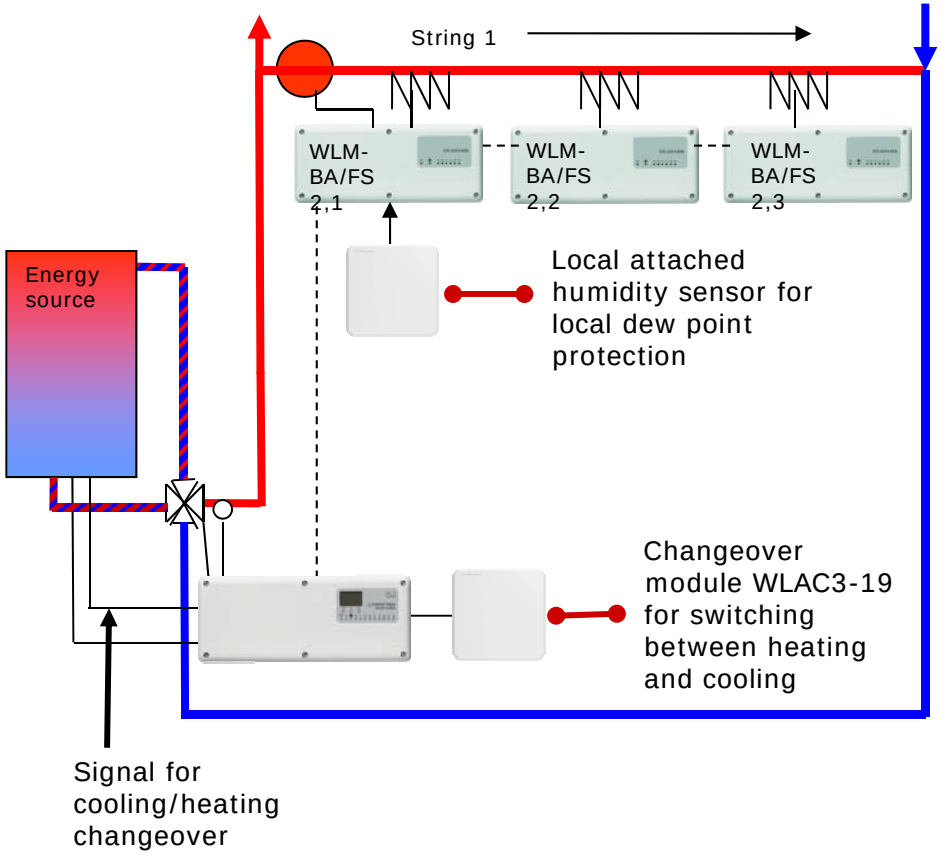
Cooling functions

In addition to controlling heating, all WLM masters have the ability to control the system for cooling.

- A WLAC3 module is required for the master to know that cooling is required.
- By using a WLHX3-19 humidity sensor the system handles DEW-point problems.
- Humidity sensors is attached to each master, and in a network the worst case situation will control the water supply temperature.
- If cooling is being limited due to high humidity a dehumidifier can be enabled by a master.
- When cooling is enabled the cooling set point will be pre-determined by the master and will override any settings in any clock thermostat to ensure optimum energy efficiency.



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OJ Waterline™ Room Sensors/Controllers incl. Floor Sensor

The Air Sensor

For control of room temperature

Min. temperature limitation

Gives a minimum surface temperature of the floor, even when the air temperature is above the set point.

Recommended for tiled floors to ensure high comfort.

The Floor limit Sensor

with *priority* is for limitation of floor temperature.

Max. temperature limitation

Prevents too high temperatures damaging the floor material.

Recommended as protection to wood floors.

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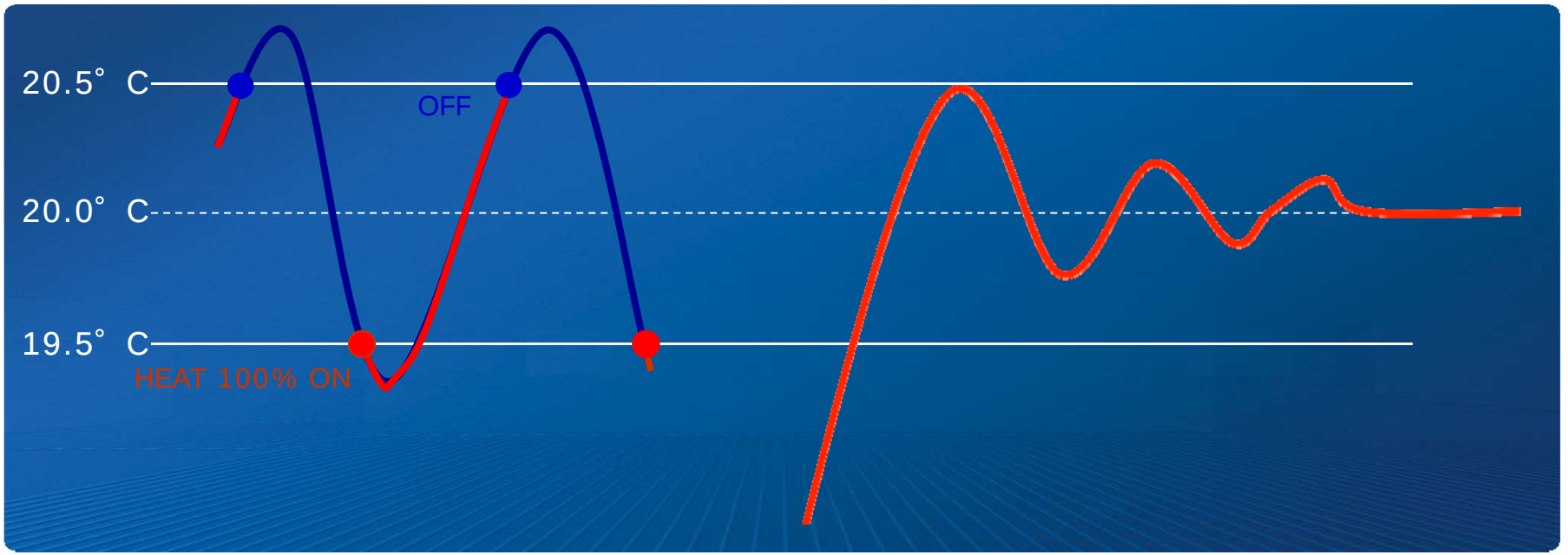
Control of Room Temperature

Traditional ON / OFF control

Over and undershoots the room temperature meaning poor comfort and energy waste as an end user tends to increase the set point while feeling cold at the undershoot periods

Advanced PI-control

No over and undershooting of temperature ensures high and stable temperature comfort with a minimum energy consumption



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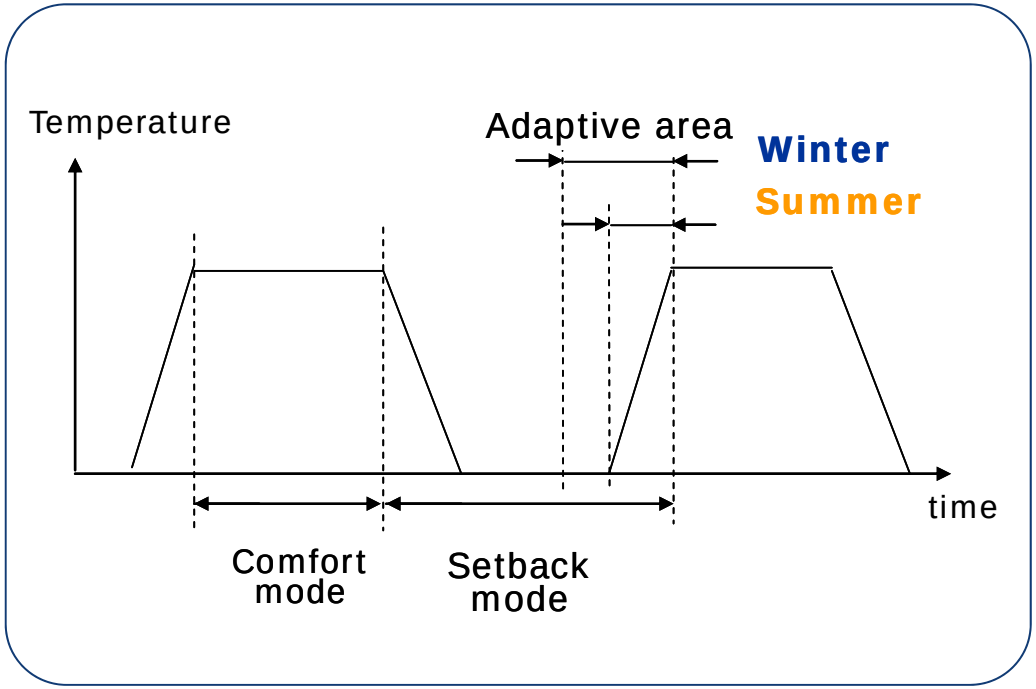
Adaptive Function (Optimum Start)

Adaptive function (optimum start)

- The adaptive function allows the start time of the heating system to be automatically varied
- Provides energy savings, but ensures that the room will reach the correct temperature at the desired time
- A Room Controller is necessary on the system for the adaptive function to operate
- All Rooms controlled by a Room Controller can use the adaptive function



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