VIESMANN

climate of innovation

Vitocrossal 200, CM2 - Product Introduction

Vitocrossal 200, CM2

Commercial high mass, gas-fired condensing boiler

Vitocrossal Boiler Family

Vitocrossal 300 CU3A
93 – 199 MBH
Introduced 2015

Vitocrossal 200 CM2
663 – 2,248 MBH
Introduced 2012

Vitocrossal 300 CT3
(formerly Vertomat)
638 – 3,361 MBH
Introduced 1993

Vitocrossal 200, CM2

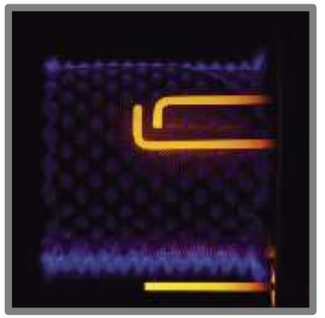
Features:

- Commercial gas-fired condensing boiler
- High water volume / high mass construction
- Low friction loss in heat exchanger
- High temperature operation with maximum supply temperature up to 99°C (210°F)
- Fuel saving, highly efficient condensing operation
- 97% Thermal efficiency
- Fast and easy to install, simple to service
- Compact design fits thru mechanical room doors
- Modern appearance

Vitocrossal 200, CM2

Features:

- InoX-Crossal stainless steel heat exchanger
- Self cleaning action in heat exchanger
- Sediment / sludge settlement area in bottom of heat exchanger
- MatriX-Cylinder burner (NG or LP)
- 5:1 Turndown
- Low NOx emissions < 20 ppm
- High altitude operation up to 10,000 FASL



Vitocrossal 200, CM2

Features:

- Vitotronic 300 GW6B boiler control with touch screen interface for easy programming and set up
- Comes internet ready for:
  - BMS interface thru 0-10V input
  - Vitocom 100 LAN1 module and Vitotrol App
  - Vitogate 300 for BMS network integration
- Full line of Viessmann System Technology accessories available:
  - Mixing valve and actuators
  - Custom control panels
  - DHW storage tanks

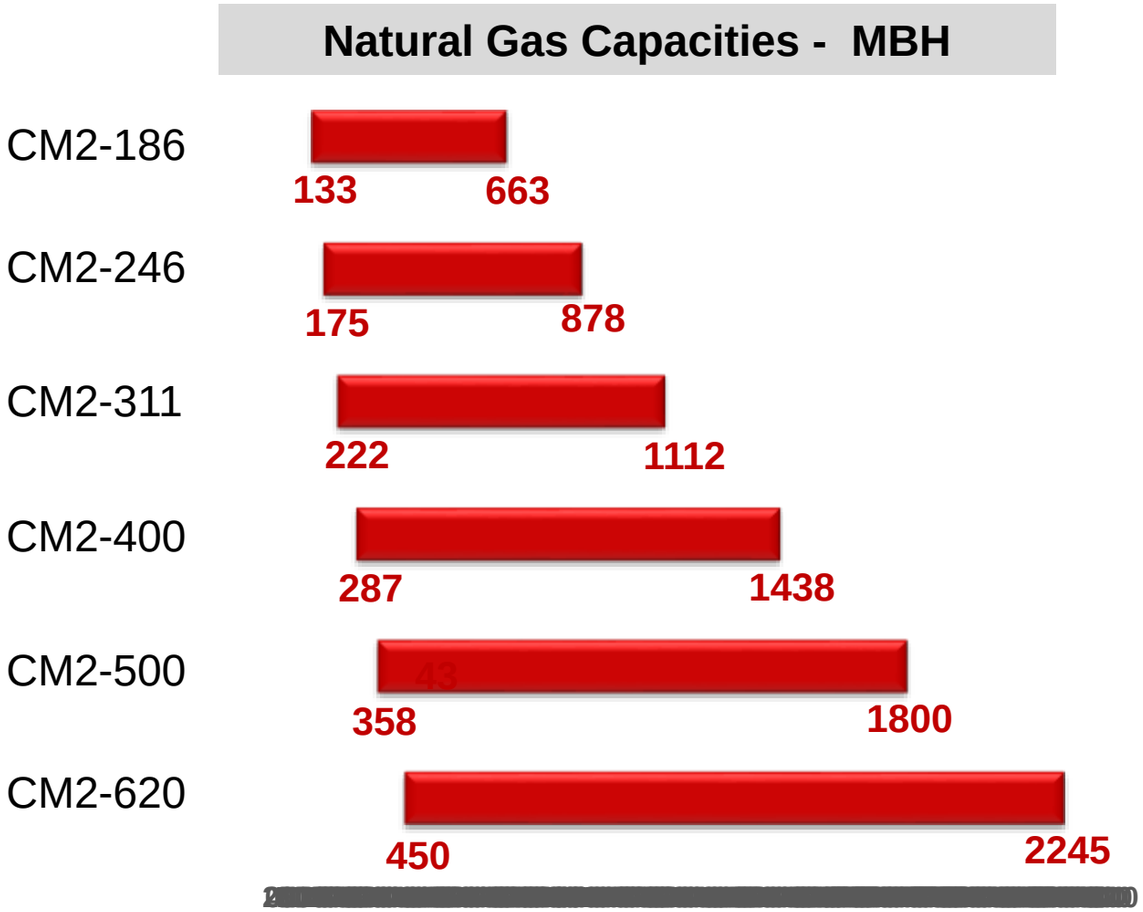
Vitocrossal 200, CM2

Benefits:

- **Long service life**
- **Lowest possible fuel consumption**
- **Simplified designs:** No need for dedicated boiler pump, primary secondary piping, LLH
- **Reliability:** Less maintenance and breakdowns as reduced boiler cycling decreases wear and tear on boiler HX and burner components
- Suitable for a **wide range of applications**
- **Perfect** for multi-zone systems with micro-loads
- **Fast and easy to service and maintain**

Vitocrossal 200, CM2

Six sizes available



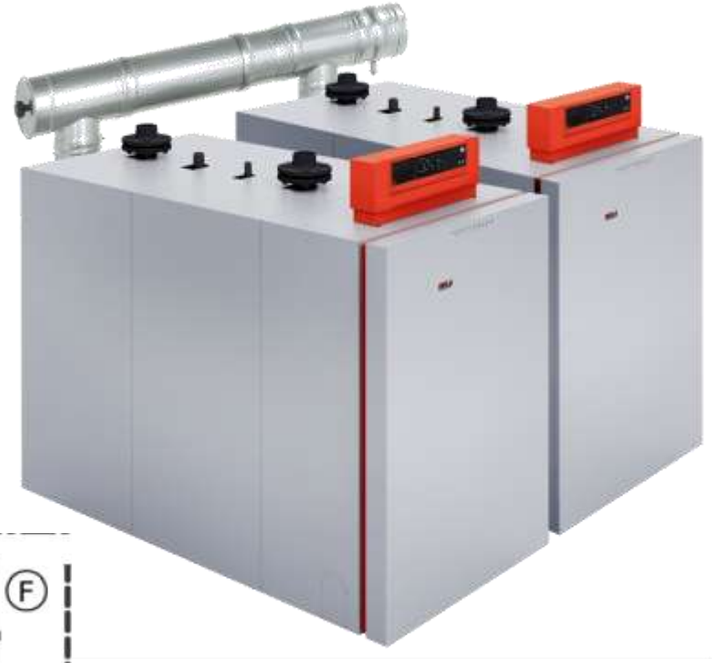
Notes:

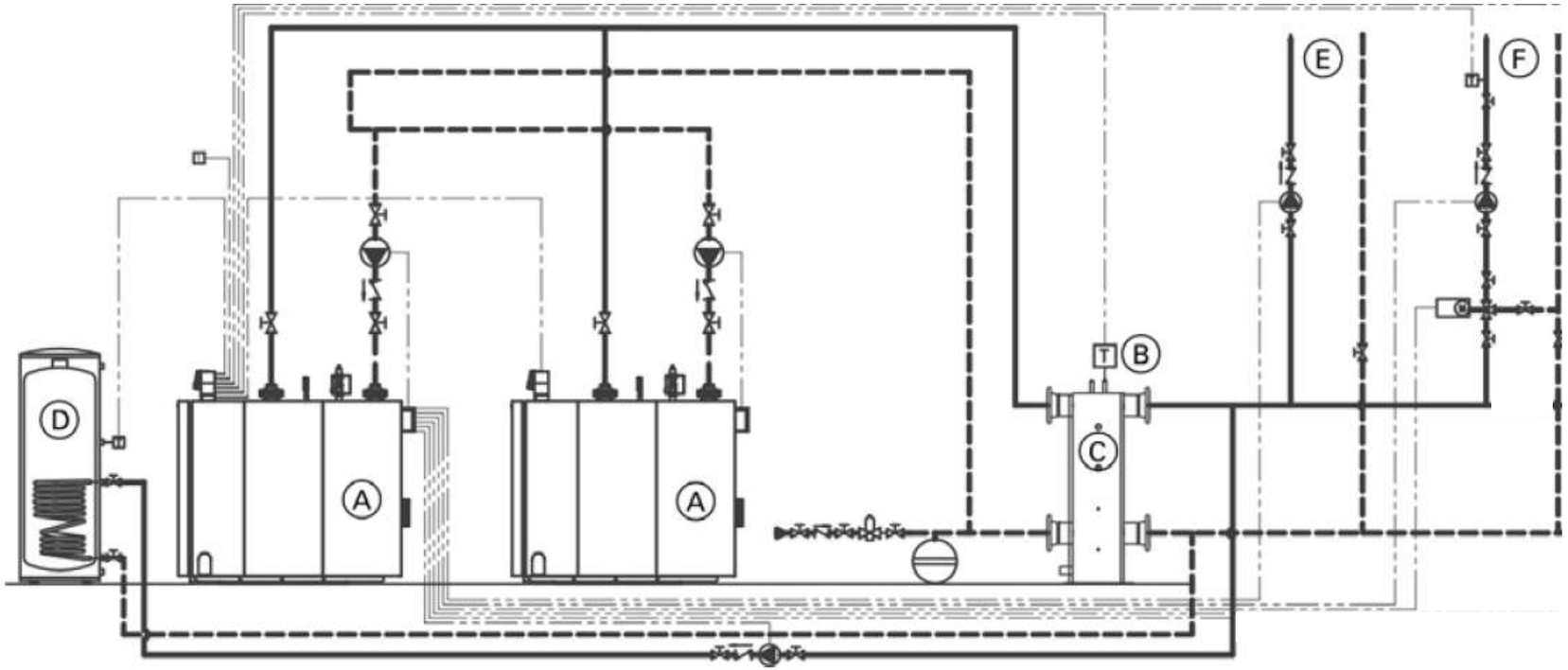
- Input must be de-rated for high altitude.
- Different Min. inputs for LPG

Vitocrossal 200, CM2

Multi-Boiler Cascade up to 8 boilers

- For systems **up to 8 boilers** with GW6B control
- No external control required
- Common venting up to 4 boilers
- Total capacity **up to 17,960 MBH**





Vitocrossal 200, CM2 Installation

Vitocrossal 200, CM2

BTS-2000 Tested Efficiencies

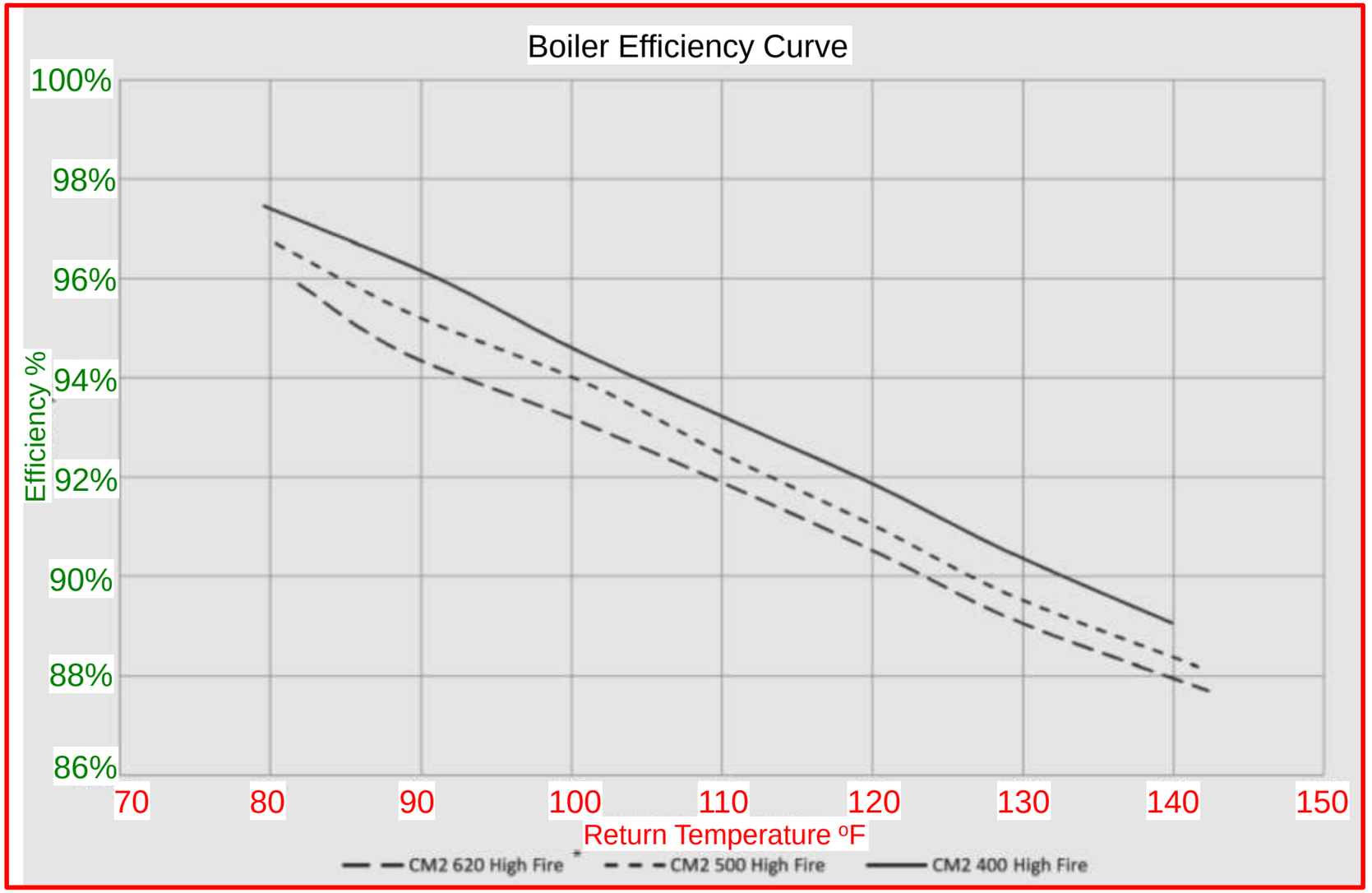
Model	186	246	311	400	500	620
Efficiency Combustion *1	95.0	95.0	95.0	95.1	95.1	95.1
Efficiency Thermal *1	97.0	97.0	97.0	95.0	95.0	95.0

BTS-2000 standards tests prove the Vitocrossal 200 CM2 boiler to be among **the most efficient in the industry.**

1 Tested to U.S. Standards ANSI Z21.13/CSA 4.9.

Vitocrossal 200, CM2

Boiler Efficiencies vs Return Water Temperature



Vitocrossal 200, CM2

Pressure And Temperature

Model CM2 -		186	246	311	400	500	620
Maximum working pressure	psig	75	75	75	75	75	75
Maximum working temperature	F (C)	190 (88)	190 (88)	190 (88)	210 (99)	210 (99)	210 (99)

High working pressure, and up to 210°F operation makes the **CM2 suitable for both high temperature boiler retrofit, and new high efficiency system projects**.

ASME H

Vitocrossal 200, CM2

Extremely Quiet Operation

- Matrix burner has very **quiet operation**
- Sound **insulation** on front cover
- Extremely quiet: **45dB at the burner**, with the front cover installed.

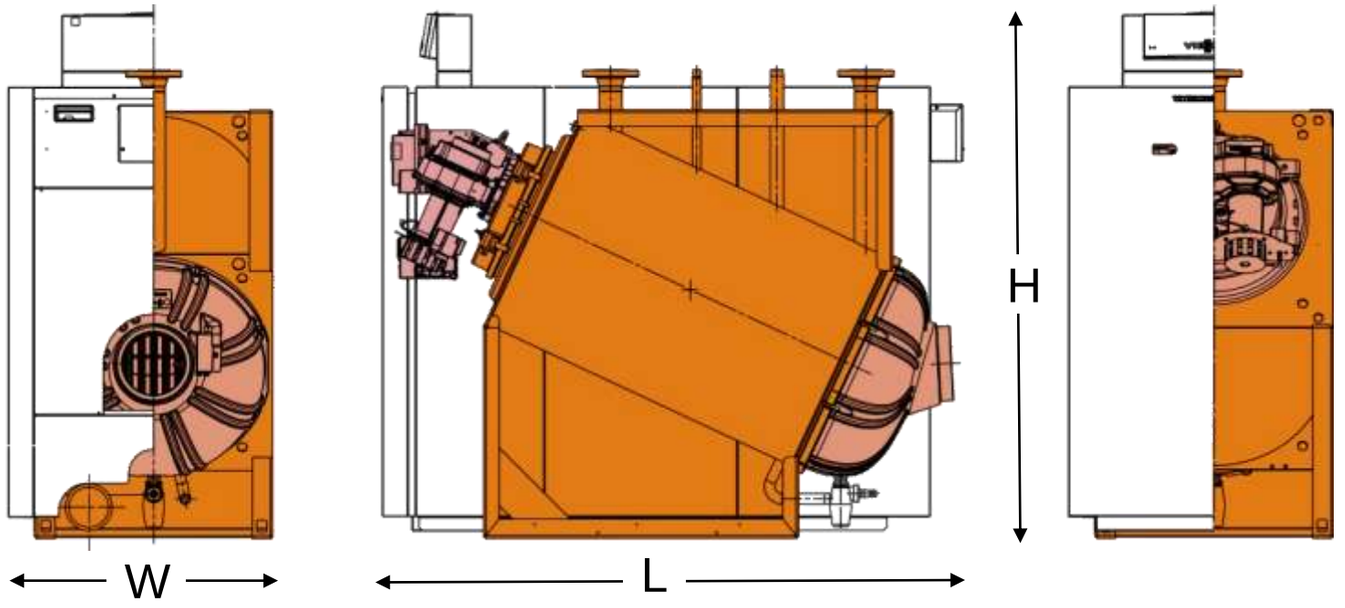
WOW! A 2+ million BTUH boiler that's **quieter than a typical refrigerator.**

Sound insulated front cover

Vitocrossal 200, CM2

Compact size

- Small footprint
- Small clearances
- Makes it easy to find a home for the CM2 in the mechanical room.

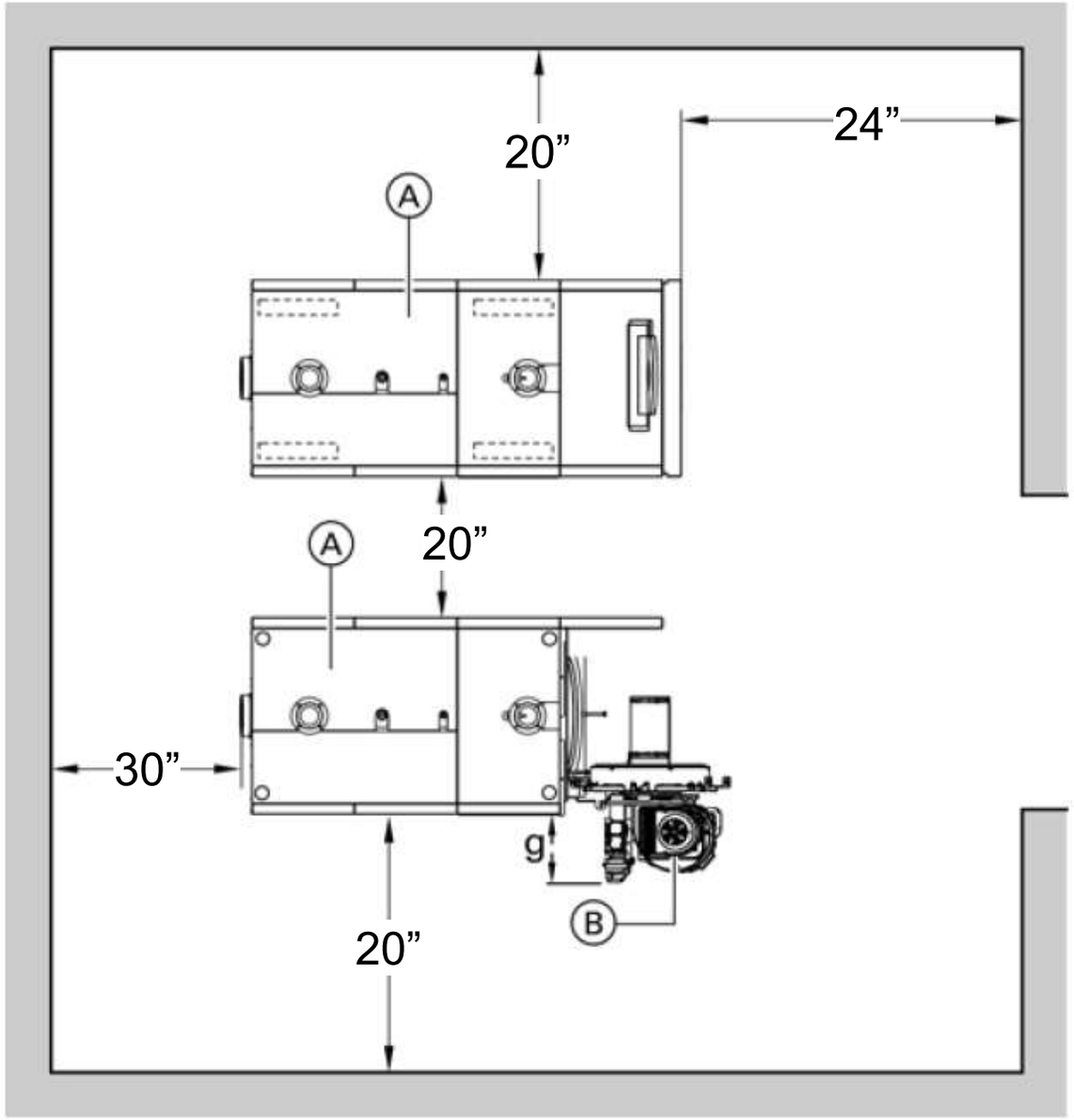


Model		186	246	311	400	500	620
Dimension Overall Inches	L	73	73	73	90	96	101
	W	37	37	37	42	42	44
	H	66	66	66	66	66	69
Dimension P. Vessel Inches	L	59	59	59	66	72	78
	W	30	30	30	36	36	38
	H	57	57	57	59	59	63

Vitocrossal 200, CM2

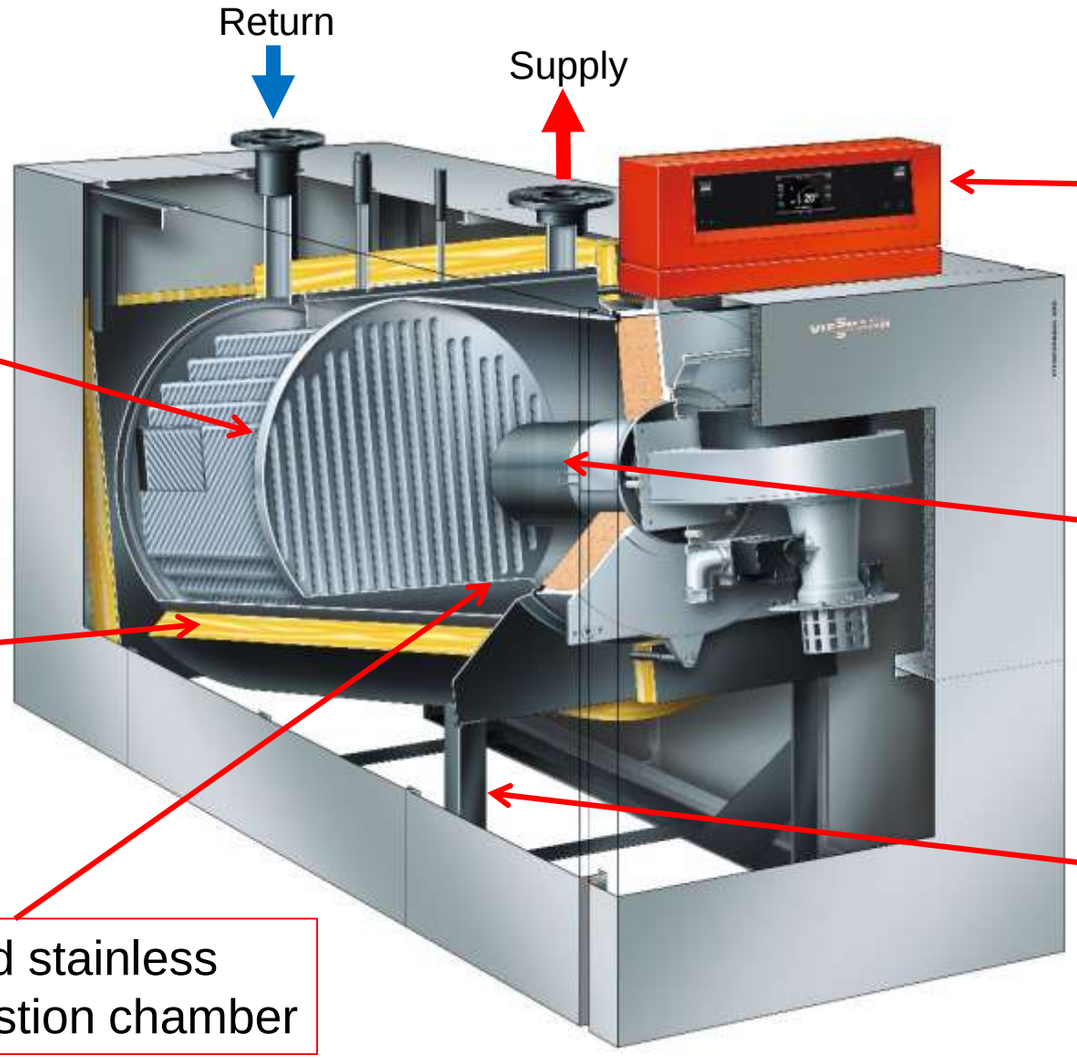
Service clearances

- Small footprint
- Small clearances
- Makes it easy to find a home for the CM2 in the mechanical room.



Vitocrossal 200, CM2

Construction Details



Inox-Crossal stainless steel heat exchanger

4” thick insulation blanket

Water cooled stainless steel combustion chamber

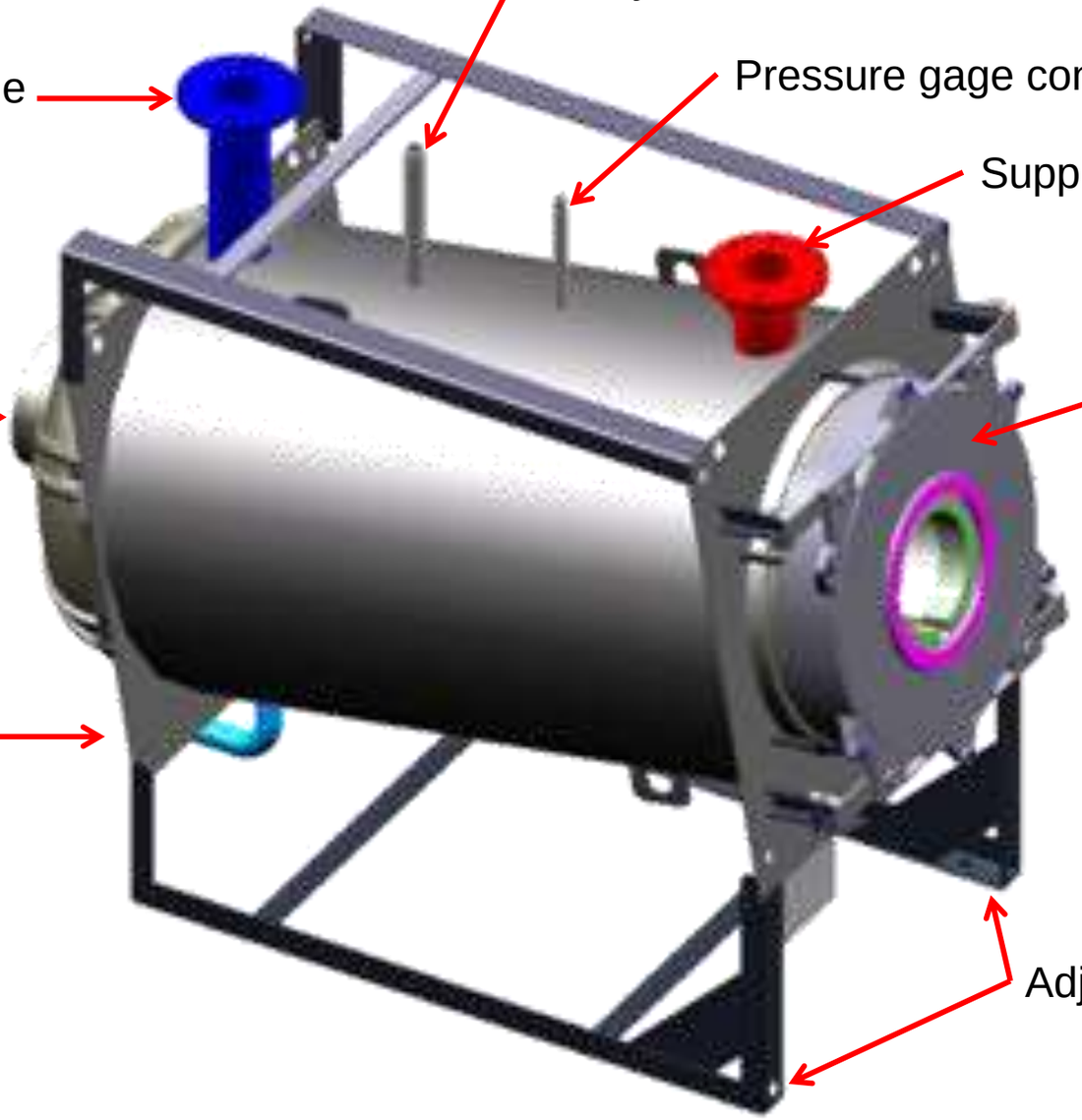
Vitotronic 300, GW6B touch screen boiler control

Matrix cylinder gas burner

Internal boiler frame

Vitocrossal 200, CM2

Construction Details



Vitocrossal 200, CM2

Connections

Legend:

A Boiler supply

B Boiler return

C Safety header connection

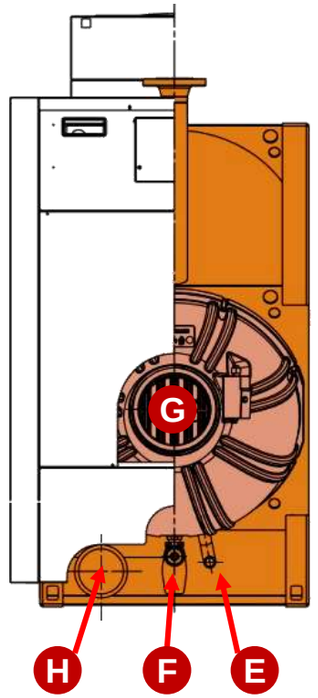
D Gas connection (back or side)

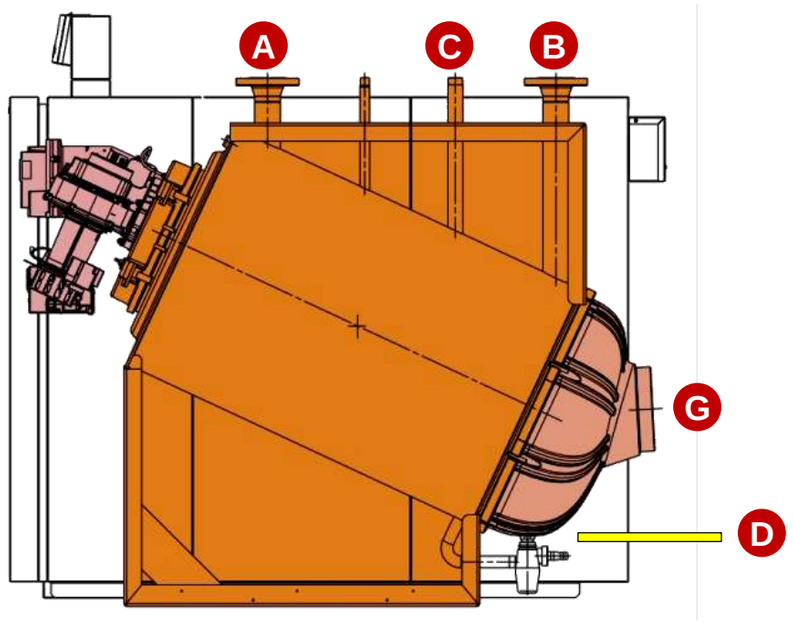
E Boiler drain

F Condensate drain connection

G Vent connection

H Combustion air connection





Model	186	246	311	400	500	620
Vent diameter	8	8	8	10	10	10
Supply Piping	2 ½	2 ½	2 ½	4	4	4
Return Piping	2 ½	2 ½	2 ½	4	4	4
Boiler Drain	1	1	1	1 ½	1 ½	1 ½
Safety Supply	1 ¼	1 ¼	1 ¼	1 ¼	1 ¼	1 ¼
Condensate Drain	¾	¾	¾	¾	¾	¾
Gas Connection	1	1	1	1 ¼	1 ¼	1 ¼

Standardized North American ANSI Connection Sizes in Inches

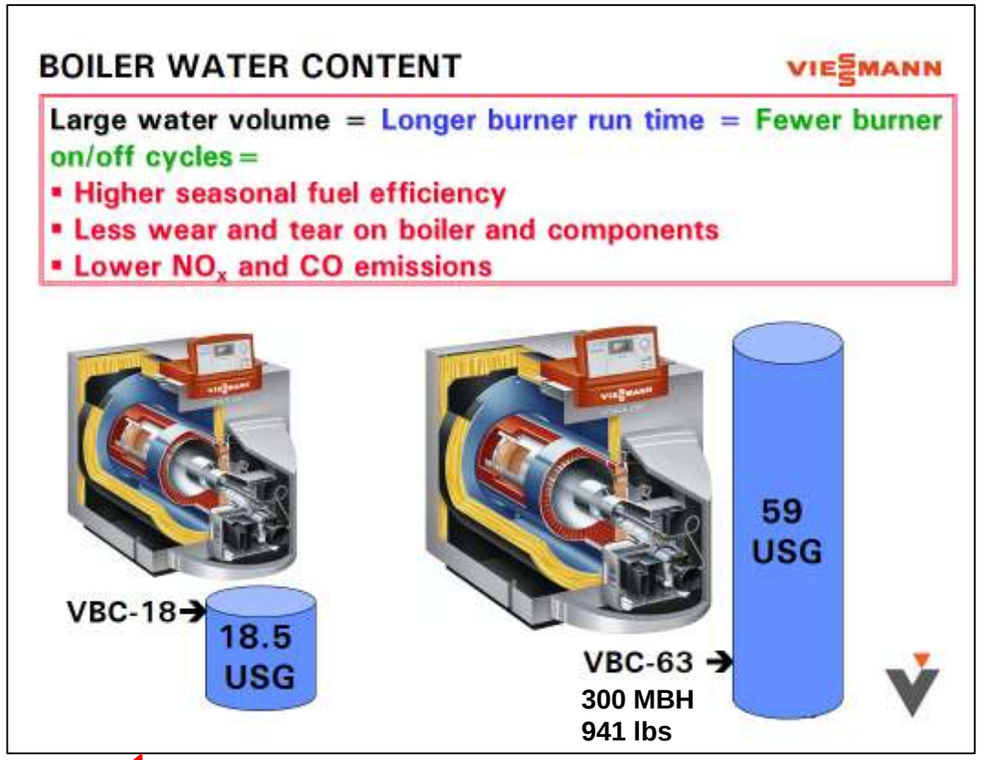
Vitocrossal 200, CM2

Commercial boiler with **high mass, large water content**

- Why is mass and water volume important?
- How does it impact boiler operation?

Viessmann High Mass Design

A history of high mass, large water content boilers



Vitola presentation from **2000**

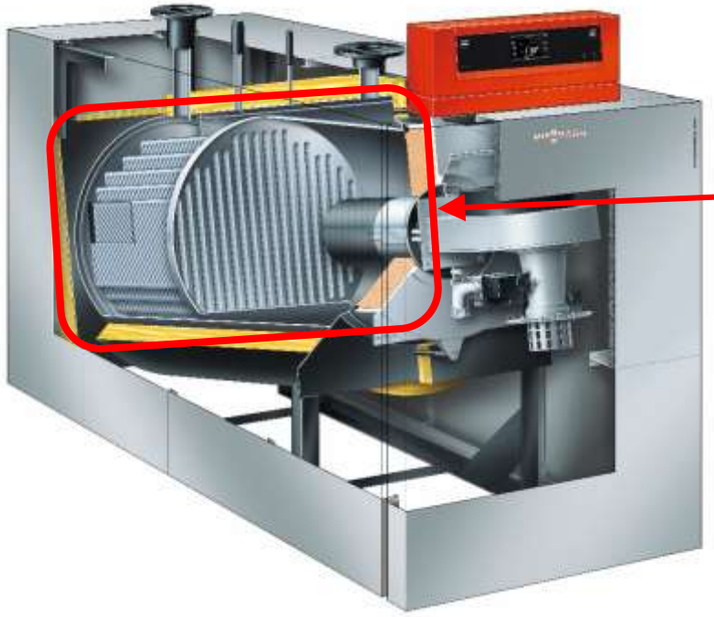
The benefits of high mass and large water volume are **not new to Viessmann**.

We have been teaching the merits for years!

Example:
Vitocrossal 300, CT3-89
3341 MBH
222 gal water volume
3344 lbs

Vitocrossal 200, CM2

High mass design with large water content

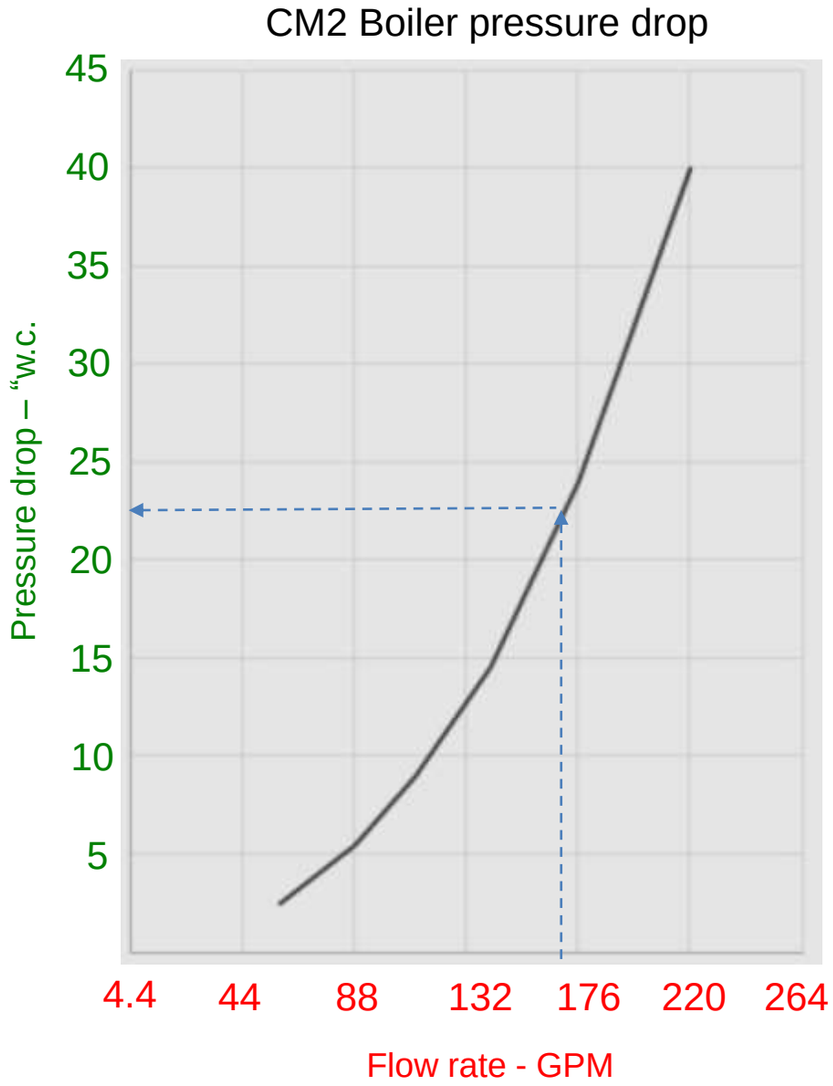


- Very large heat exchanger surface area
- Low thermal BTU loading per unit area of HX
- Wide water passageways
- Large water content (thermal mass)

Model CM2 -		186	246	311	400	500	620
Boiler weight	lbs	726	759	792	1495	1662	1929
Boiler Water content	USG	81	77	74	104	112	131
Heat exchanger surface area	ft^2	73.2	90.4	114.1	166.6	208.6	234

Vitocrossal 200, CM2

High mass design with large water content



- Very **low boiler friction** loss
- **Reduces pump** size requirements

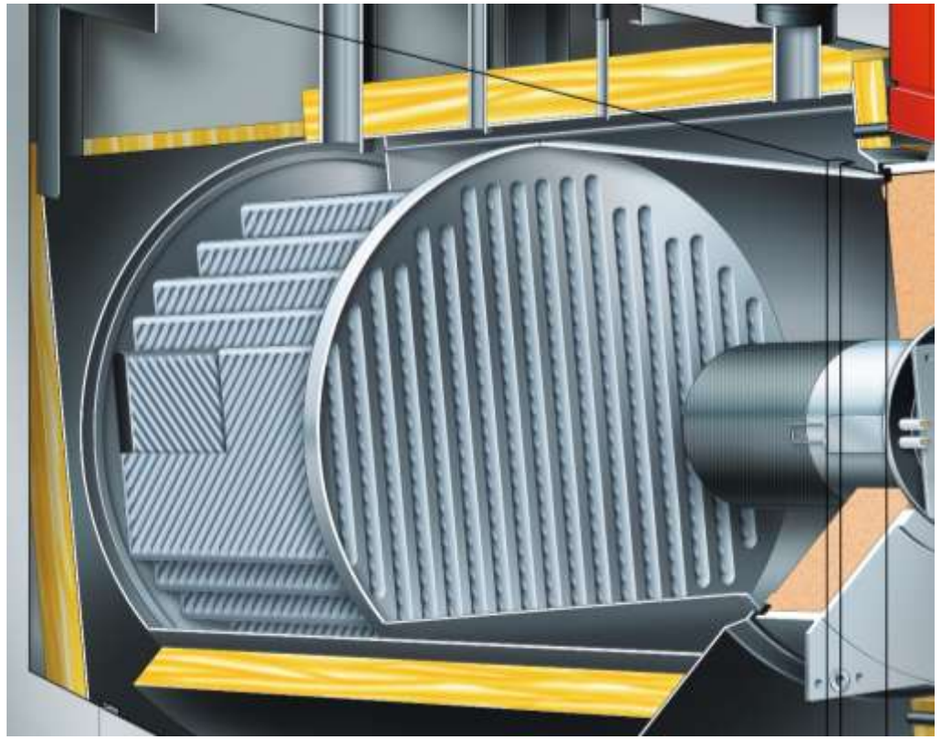
Example:

- CM2-500 recommended flow rate at 20° ΔT = 171 GPM
- Friction loss thru boiler = 22.5 "w.c. (1.87 ft. hd)

Vitocrossal 200, CM2

Benefits of high mass, high water volume

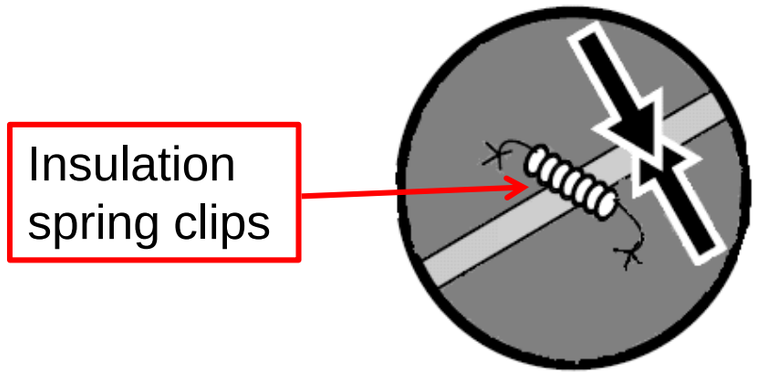
1. **Durability, reliability, value that's build to last**
   - Less stress on the boiler HX
   - Dramatically reduced burner short cycling
2. **Simplified system design, with fewer components**
   - No minimum flow rates
   - No flow switch required
   - No dedicated boiler pump required
   - No high head boiler pumps required
   - No low loss header or primary/secondary piping required
3. **A more forgiving boiler design**
   - Less susceptible to flow fluctuations
   - Better design for mismatched and micro-load systems



Vitocrossal 200, CM2

Insulation blanket

- The **4” thick** insulation consists of two parts: front and length insulation.
- **Wrap around** and fasten with spring clips.



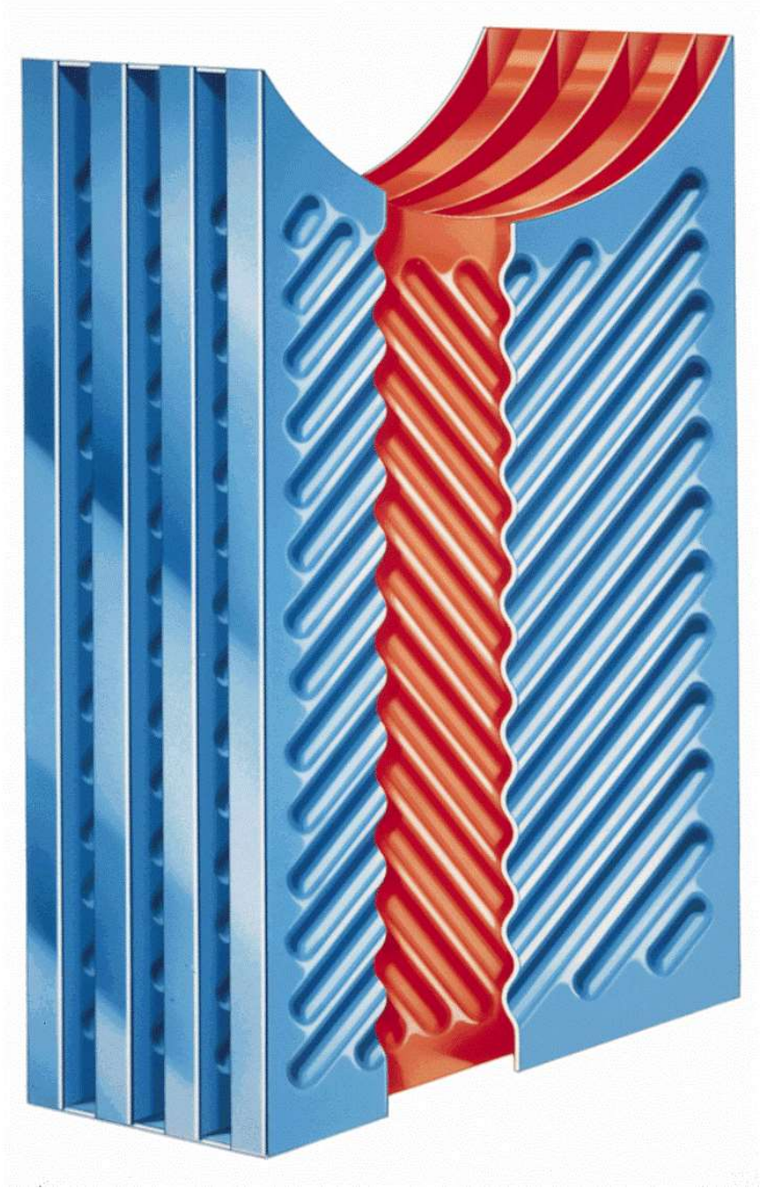
Insulation is easy to install and greatly reduces potential standby losses. **Keeping the heat in the water, not the boiler room**.

Vitocrossal 200, CM2

Inox-Crossal heat exchanger

- Corrosion resistant high grade **316Ti** stainless steel construction
- Developed and manufactured **by Viessmann** in Germany
- **Time tested reliability** for over 25 years
- Used in several different Vitocrossal models

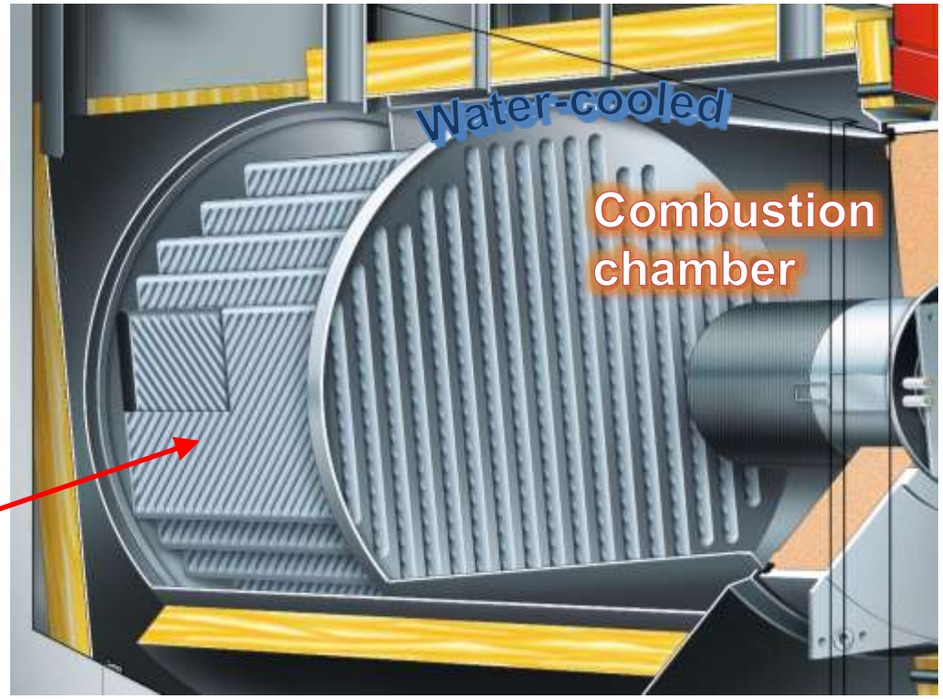
Material SA240 316 Ti



Vitocrossal 200, CM2

Inox-Crossal heat exchanger

- **Low thermal loading** reduces stress
  - **Water cooled** combustion chamber
  - **Large** heat transfer surface area
- **Accessible**, easy to clean surfaces
- **Wide water passages** for extremely low pressure loss
- Debris and sludge **settlement area** at bottom of boiler

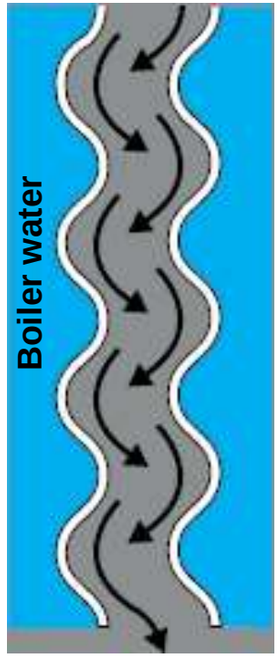


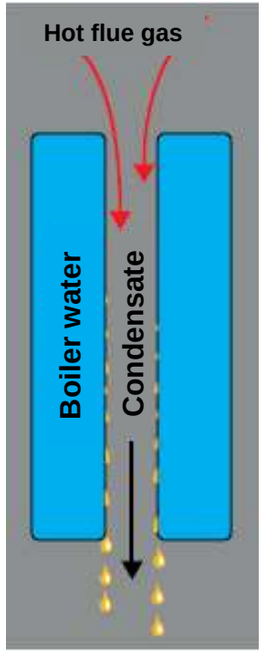
Inox-Crossal pockets

Vitocrossal 200, CM2

Inox-Crossal heat exchanger

- **Intensive contact** of hot gas with heat exchange surface is ensured by turbulent flow of flue gas and mutually inclined indentations
- **Parallel flow** of flue gas and condensate (no accumulation of concentration)
- **Flue gas cools rapidly** and condenses on the inside of pocket
- Both **sensible and latent** heat extracted
- **Self cleaning action** through smooth heat exchanger surface

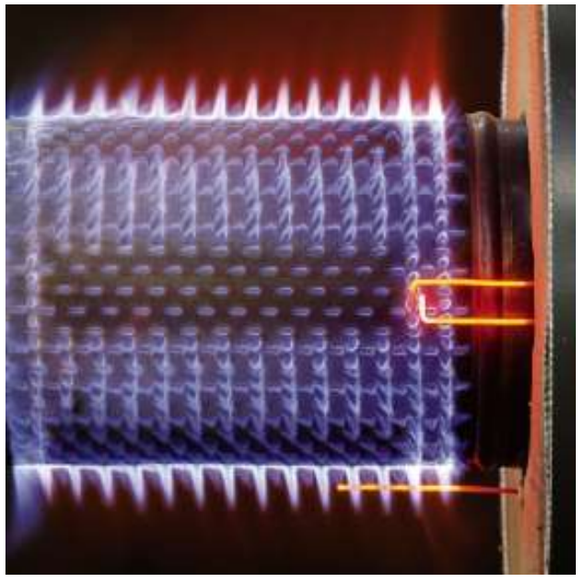




Vitocrossal 200, CM2

Matrix Cylinder Burner

- Developed and manufactured **by Viessmann**
- **CSD-1** gas train with valve closure test system
- Viessmann **burner management control**, with extensive diagnostics onboard
- Matrix cylinder screen made of high grade **stainless steel**
- Suitable for **high altitude** operation up to 10,000 ft.



Vitocrossal 200, CM2

Matrix Cylinder And Dome Burners

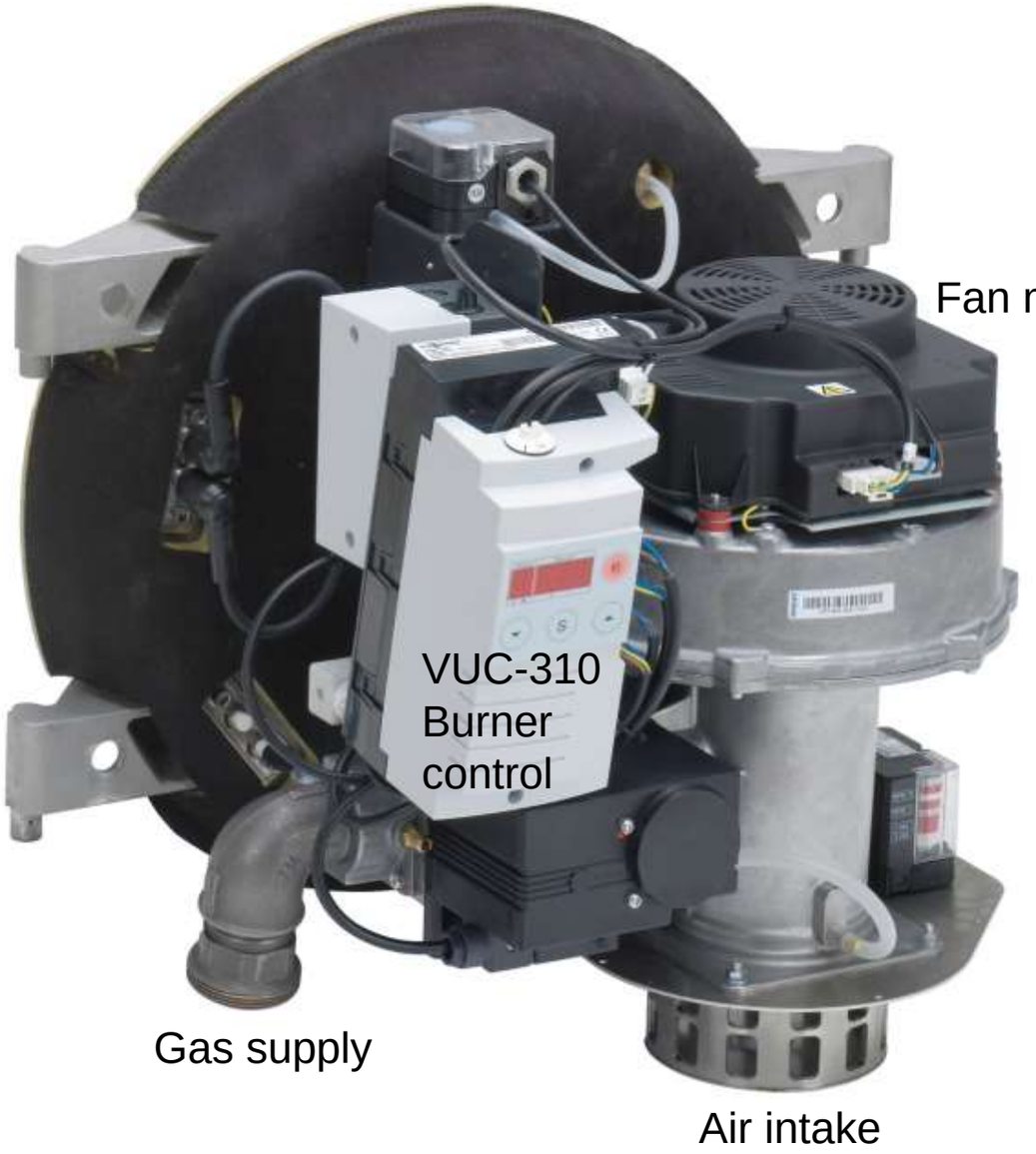
Production Plant Viessmann Allendorf

Developed and manufactured by Viessmann and used for floorstanding and wallhung boilers for over 15 years

Vitocrossal 200, CM2

Matrix Cylinder Burner

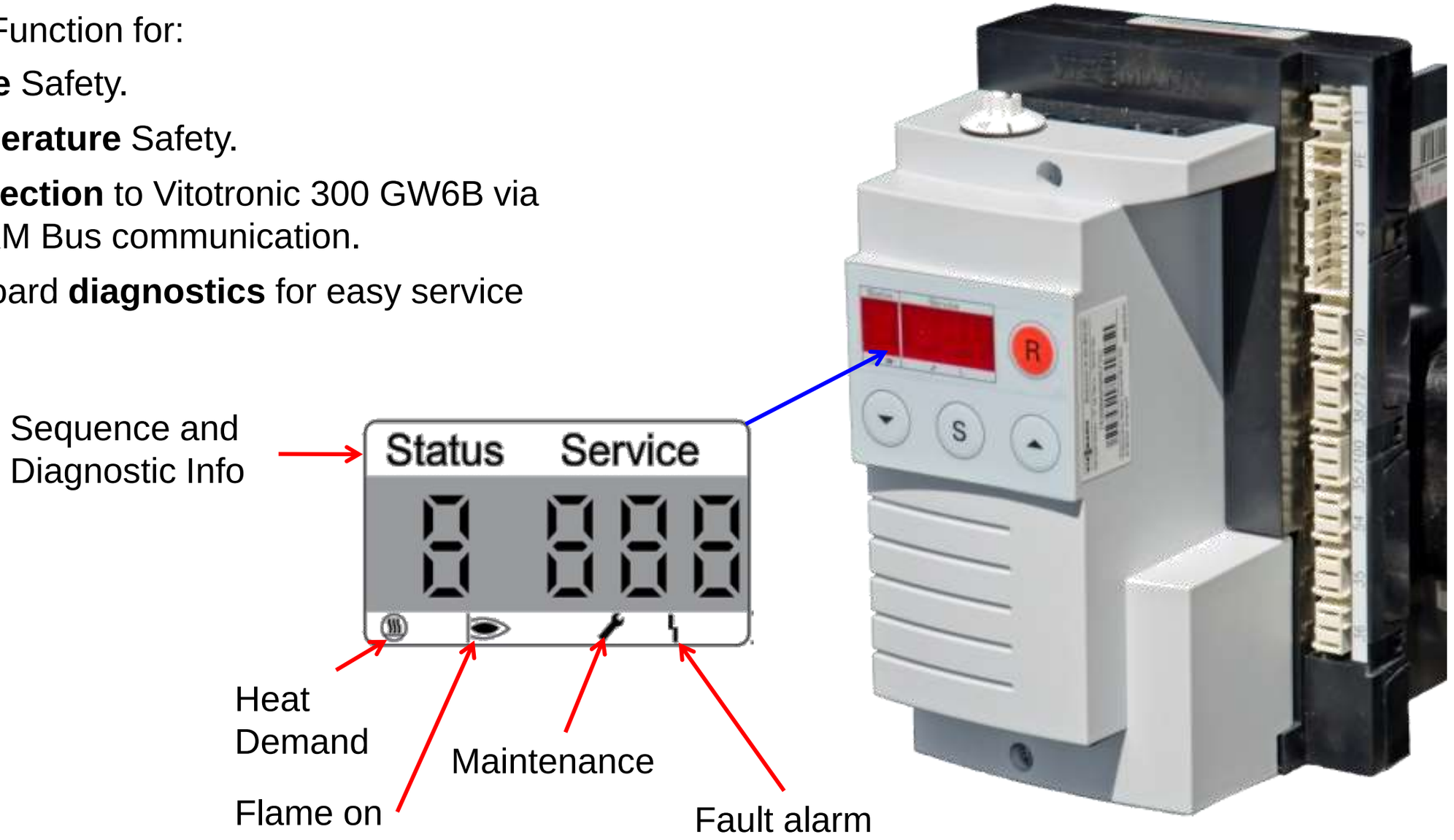
- Fully **modulating** burner
  - Up to **5:1** turndown
- Natural gas or LP gas
- **Low NOx** (< 20 ppm)
- **Factory** calibrated
- **Easy** to setup and service



Vitocrossal 200, CM2

Viessmann VUC-310 Burner Management Control.

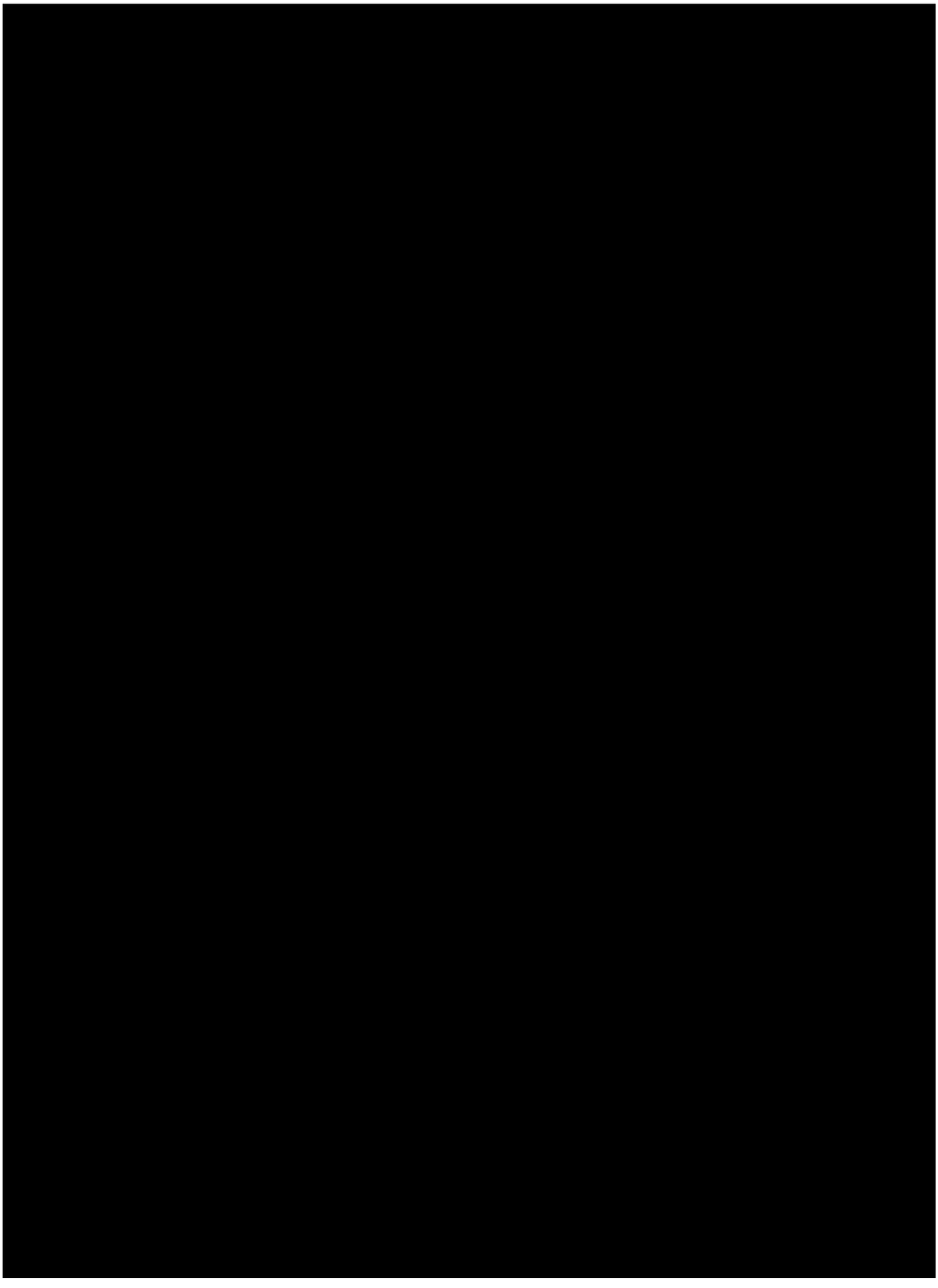
- Provides Function for:
  - **Flame** Safety.
  - **Temperature** Safety.
  - **Connection** to Vitotronic 300 GW6B via 145 KM Bus communication.
  - On-board **diagnostics** for easy service



Vitocrossal 200, CM2

Enhanced Temperature Safety

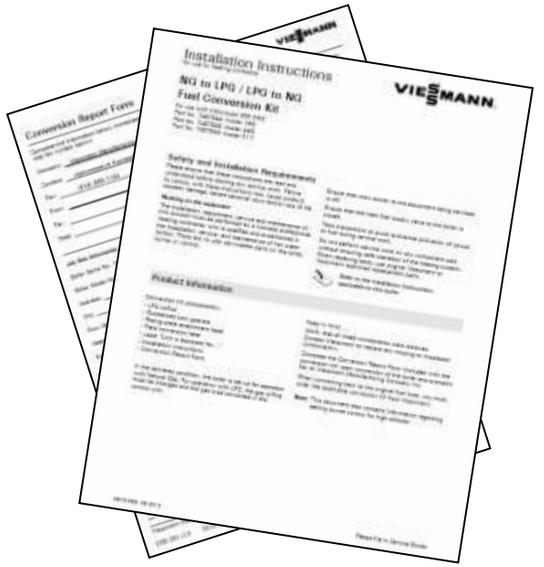
- No Mechanical Limits.
  - FHL & AHL replaced by ***redundant electronic sensors*** compared to each other for greater accuracy and safety.
- Temperature sensors and limit functions are **part of burner control**.
- If a sensor falls out of spec the burner will provide an **alert to the control.**



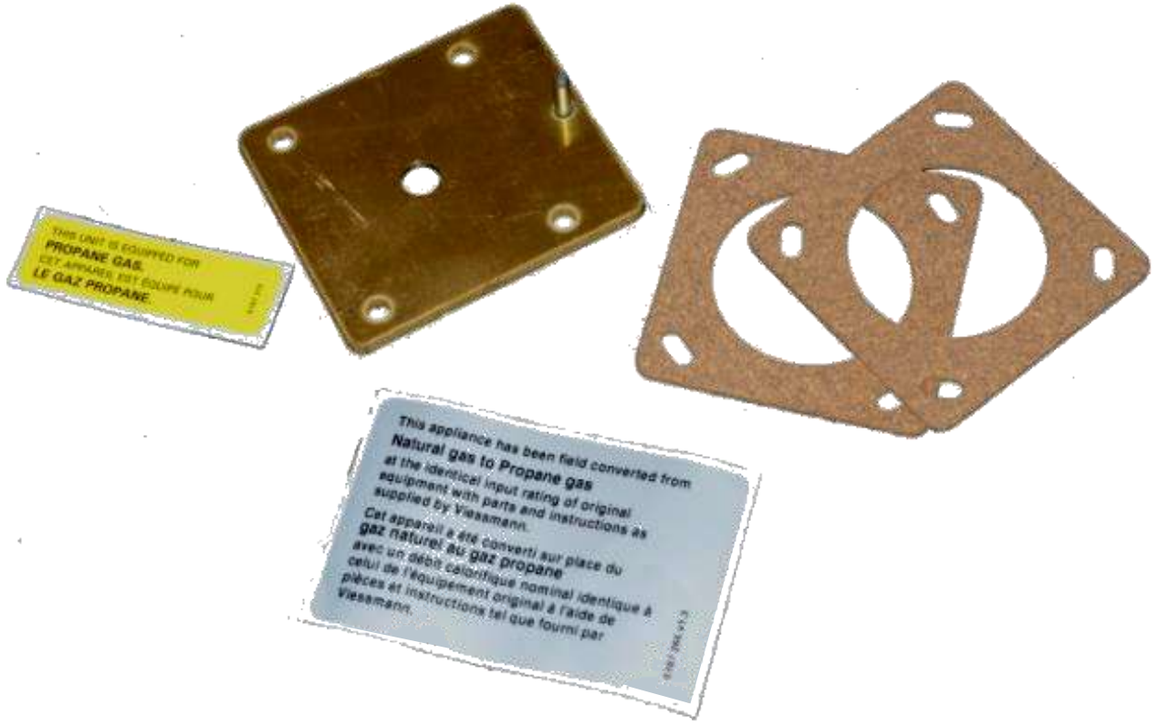
Vitocrossal 200, CM2

Natural Gas **or** LP Gas Operation

- Boilers are shipped ready for **Natural Gas**
- **LP Conversion** components shipped with the burner
- **No additional parts** need to be purchased.
- Software change means **no de-rating** for LP Gas.

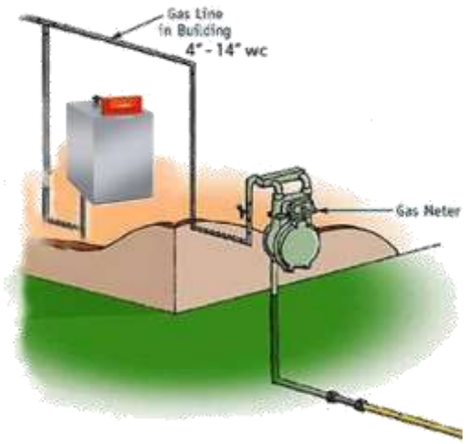


- Install the supplied orifice and make one coding change, the CM2 is ready for LP Gas.
- A combustion setting adjustment is not normally required for most installations.



Vitocrossal 200, CM2

Fuel Pressure Requirements



Model CM2 -		186	246	311	400	500	620
Min Press. NG	"wc	4	4	4	4	4	4
Min Press. LPG	"wc	10	10	10	10	10	10
Max Press. NG/LPG	"wc	14	14	14	14	14	14

- **Flexible fuel choices** with no extra parts to buy.
- Extremely **flexible pressure** requirements.
- Installations can be just about **anywhere** with this flexibility.

Vitocrossal 200, CM2

Power Requirements

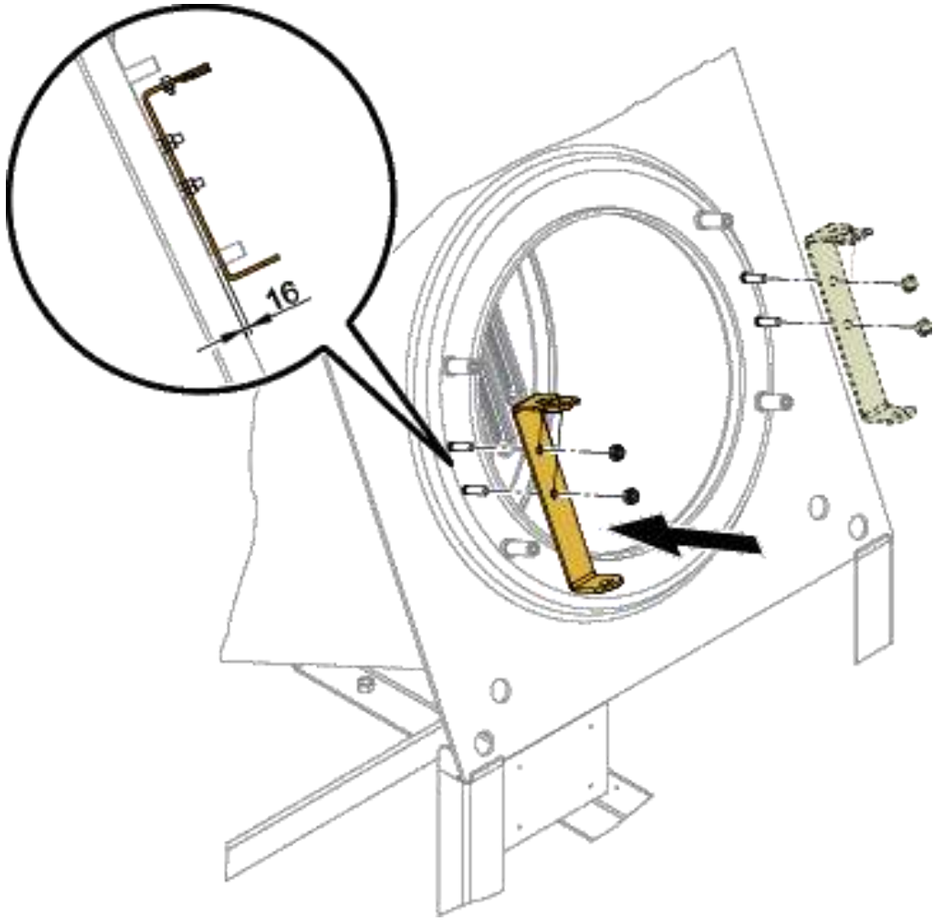
Model CM2 -		186	246	311	400	500	620
Voltage V/1/60		120	120	120	120	120	120
Power Consumption	**Max Watts**	225	278	368	540	700	900
	Min Watts	51	52	67	54	60	60

120 VAC supply and **low power consumption** means that not only are these boilers fuel efficient, but **electrically efficient** and **cost effective to wire** as well.

Vitocrossal 200, CM2

HX Front Door For Sizes Up To 311 kW

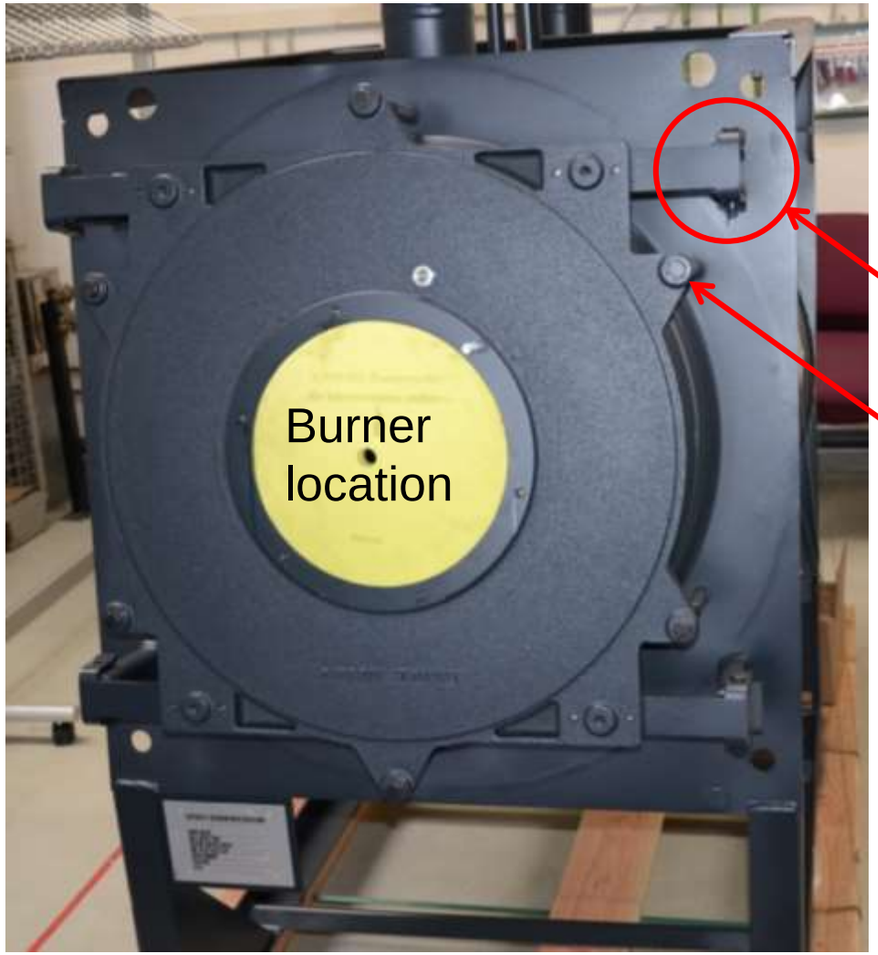
- The burner is the front door on models up to 311kW
- Can be configured for a **left or right** hand hinge.



Vitocrossal 200, CM2

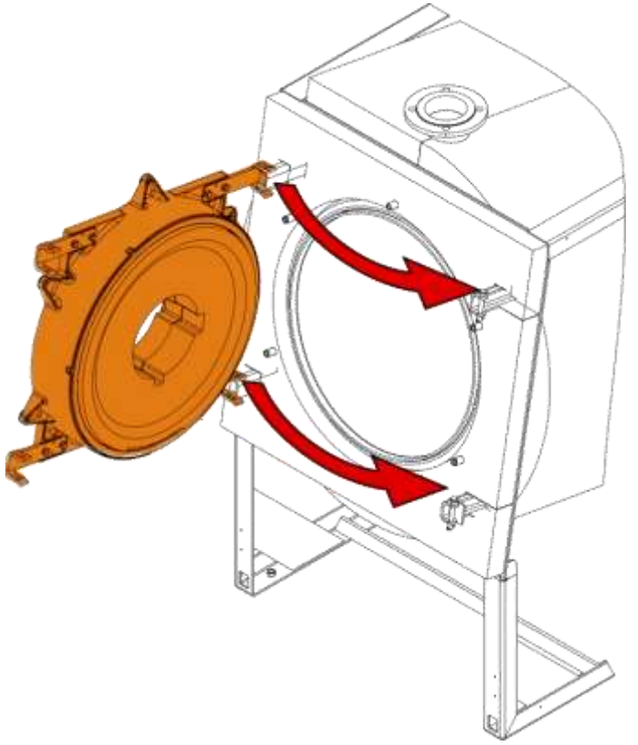
HX Front Door 400 - 620

- The larger sizes have a front door similar to the Vitocrossal 300 CT3.
- The door can be hinged **left or right**.



Door Hinge
(shown on right)

Door Fastening
Bolt



Vitocrossal 200, CM2

Integrated Vitotronic 300, GW6B control

- Multi-function outdoor reset boiler and system control for single or multiple boilers
- Large colour touch screen display
- Modulates burners, stage and rotates boilers
- Multi-temperature space heating with 1 high temperature heating circuit + 2 low temperature heating circuits (with mixing valves)
- DHW production
- Setback timers with daily, weekly and holiday programs
- Integrated LON module

Comunicaton accessories:

- Vitogate 300 – BMS Gateway
- Vitocom 100 LAN1 – Internet communication

Vitocrossal 200 CM2 + Vitotronic 300, GW6B

Three Application Configurations

1. Single Boiler operation.
   - OA reset with three Heating circuits + DHW + External demand

2. Cascade + Master
   - Cascade control for up to 8 boilers
   - Stage and rotates boilers
   - OA reset with three Heating circuits + DHW + External demand

3. Slave Boiler
   - Part of a Cascade system.

Application type is set in the Startup Wizard.

Single Boiler

Cascade + Master

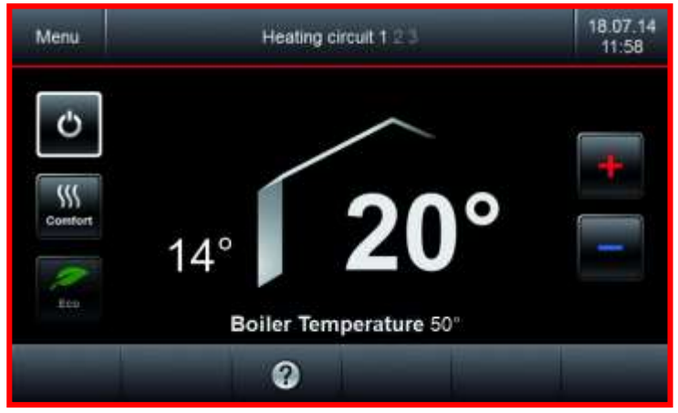
Slave

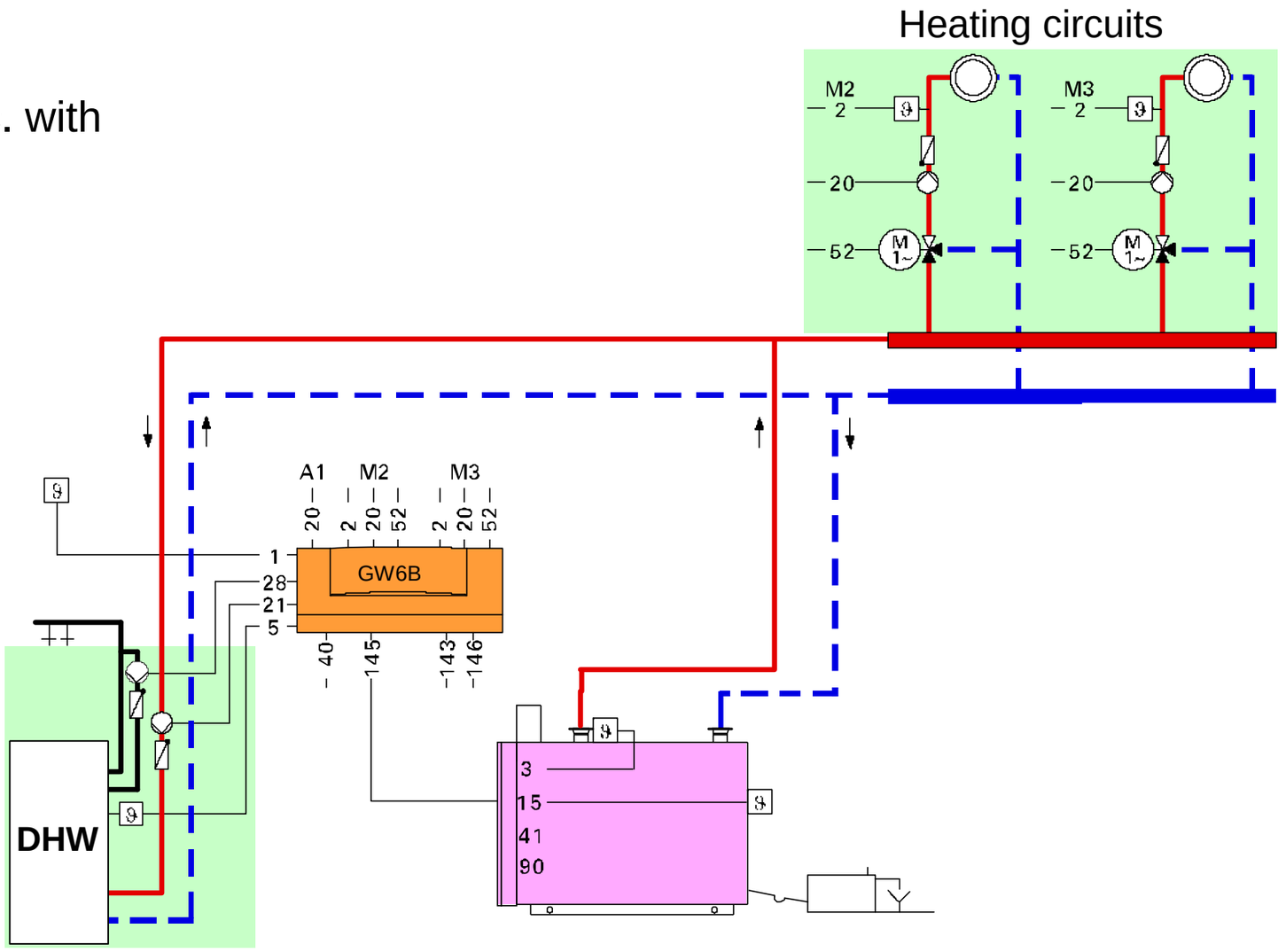
Vitocrossal 200, CM2

Vitotronic 300, GW6B - Single Boiler System With DHW

1. Control set to “Single boiler”

- With outdoor reset
  - Can receive set point via BMS etc. with EA1 module or Gateway
  - Controls DHW, mixing valves etc.
- Burner modulation command
- Safety management
  - Safety limits and sensors through VUC310 burner control



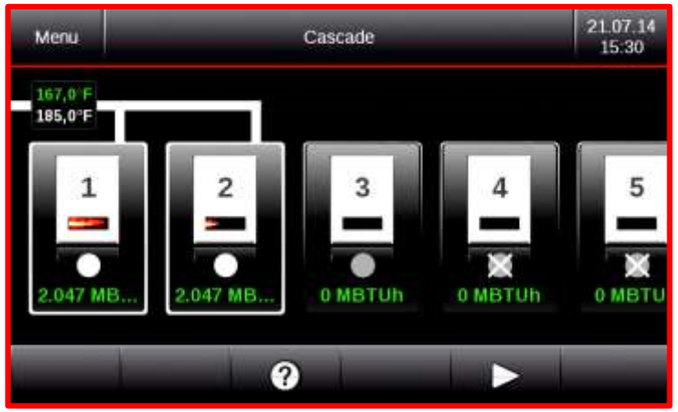


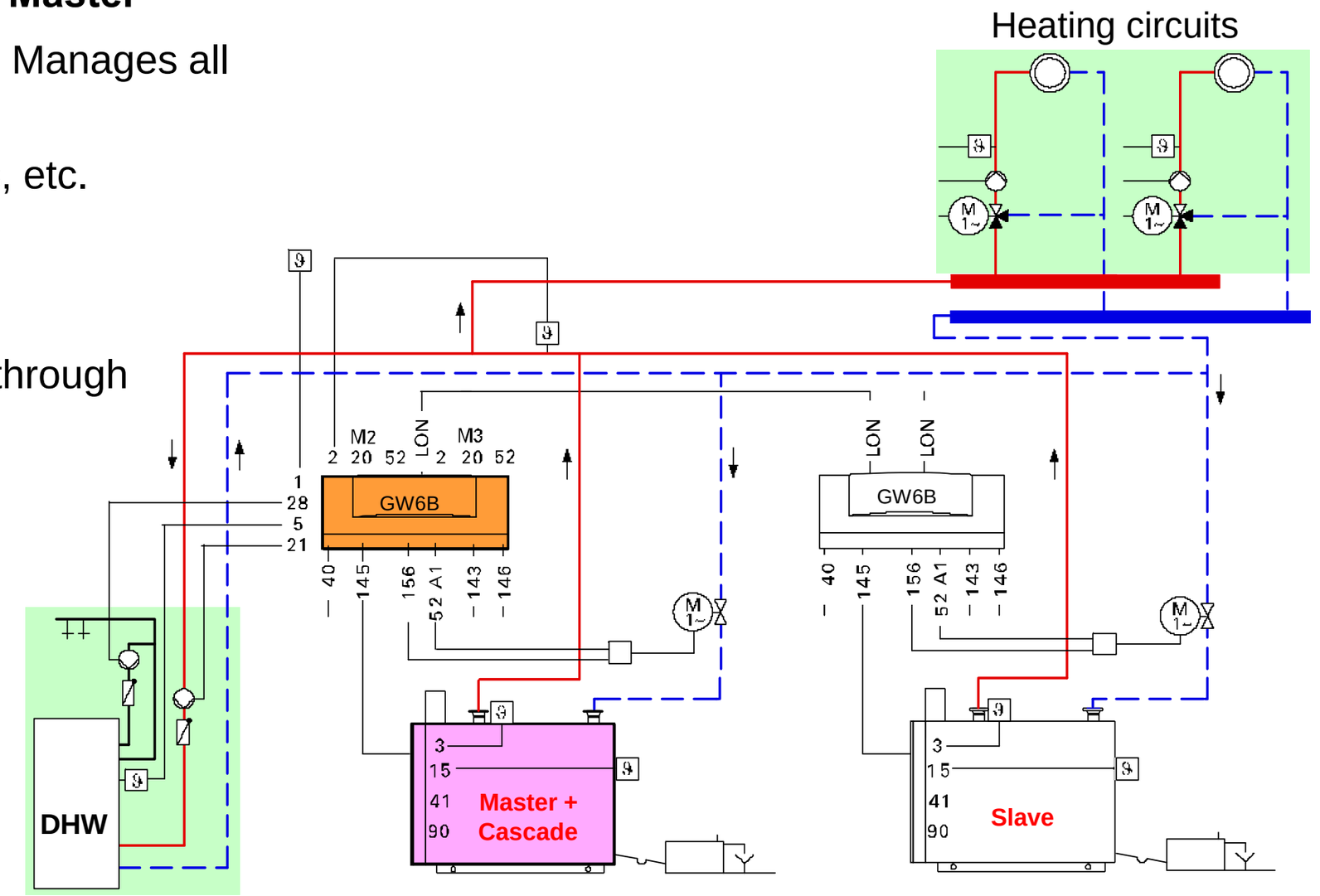
Vitocrossal 200, CM2

Vitotronic 300, GW6B - Cascade Multi Boiler System With DHW

2. Control set for “Cascade + Master”

- Located on the Master boiler. Manages all boilers in the cascade
- Controls, DHW, mixing valves, etc.
- Burner modulation command
- Safety management
  - Safety limits and sensors through VUC310 burner control



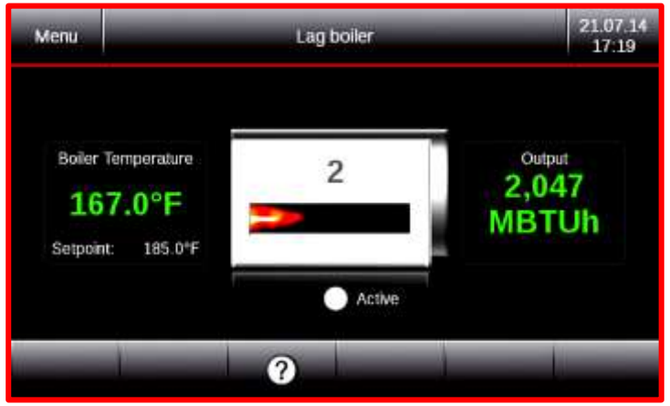


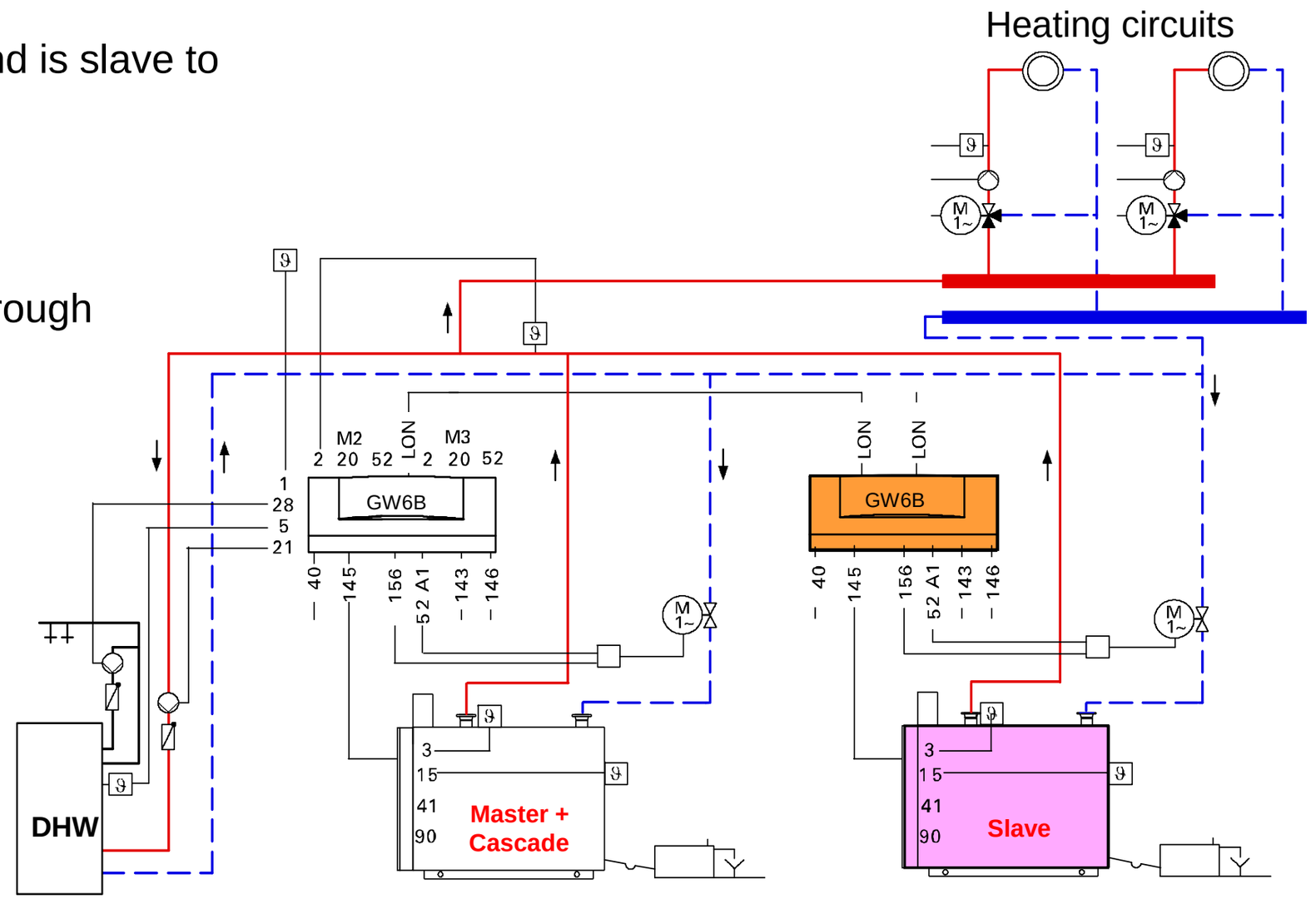
Vitocrossal 200, CM2

Vitotronic 300, GW6B - Cascade Multi Boiler System With DHW

3. Control set for “Slave”

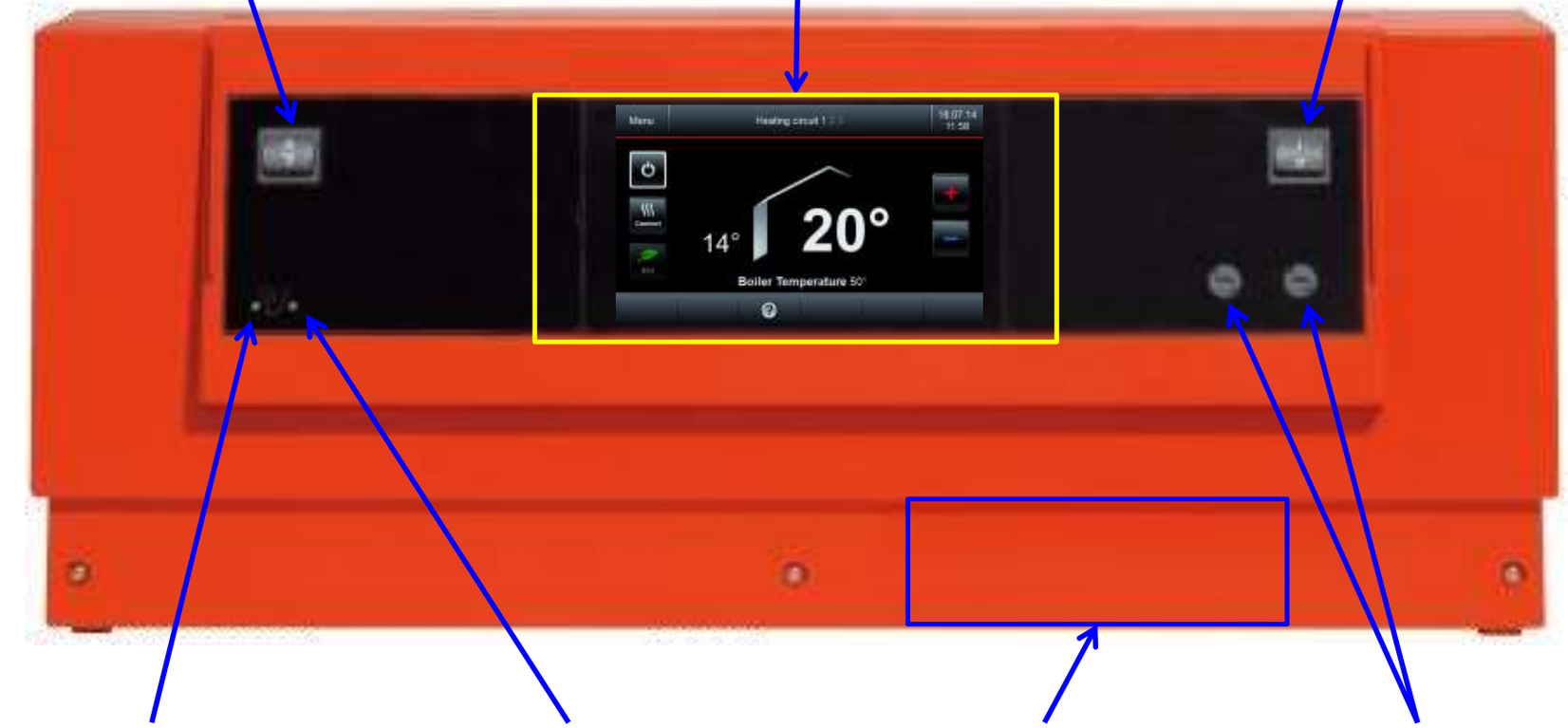
- Located on the Slave boiler and is slave to “Master + Cascade” control
- Burner modulation command
- Safety management
  - Safety limits and sensors through VUC310 burner control





Vitocrossal 200, CM2

Vitotronic 300, GW6B Boiler Control for CM2

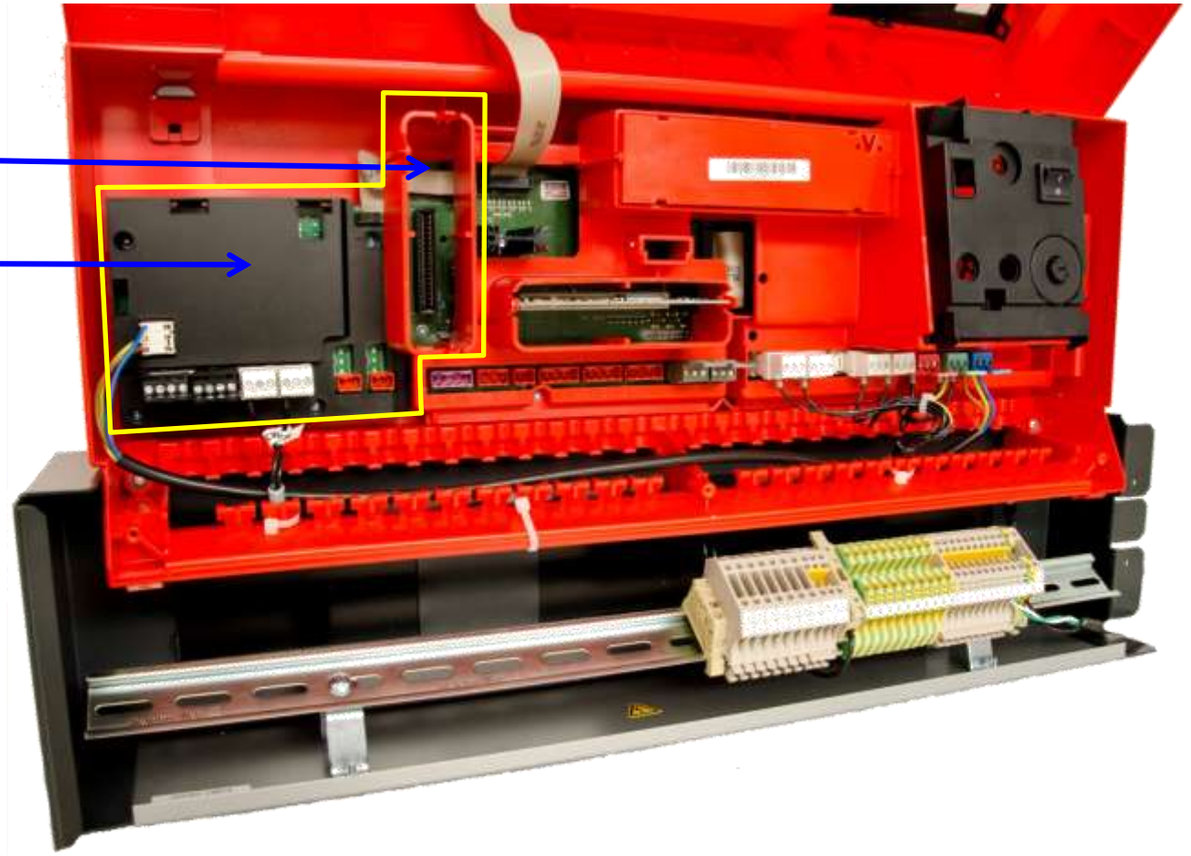


Vitocrossal 200, CM2

Vitotronic 300, GW6B Boiler Control

LON card

Mixer control board.

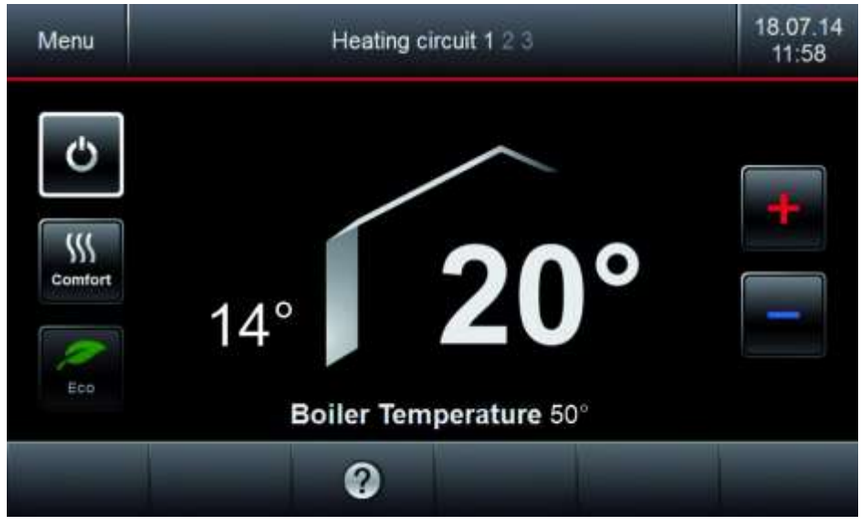


The included mixing valve module and LON communications card expands the capabilities of the GW6B for **local control of mixing valves** or **integration into a BMS system**.

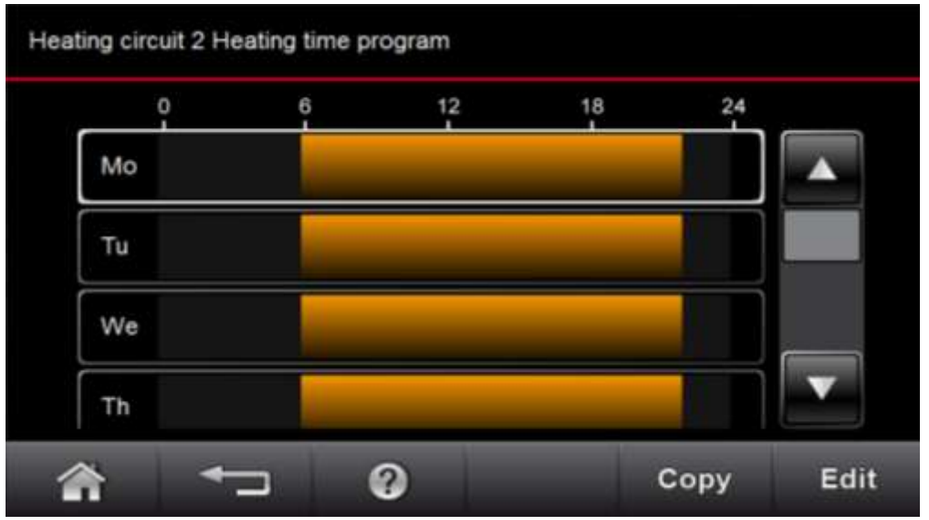
Vitocrossal 200, CM2

Integrated Vitotronic 300 Boiler Control

- Easy to navigate screens, with plain text and graphics

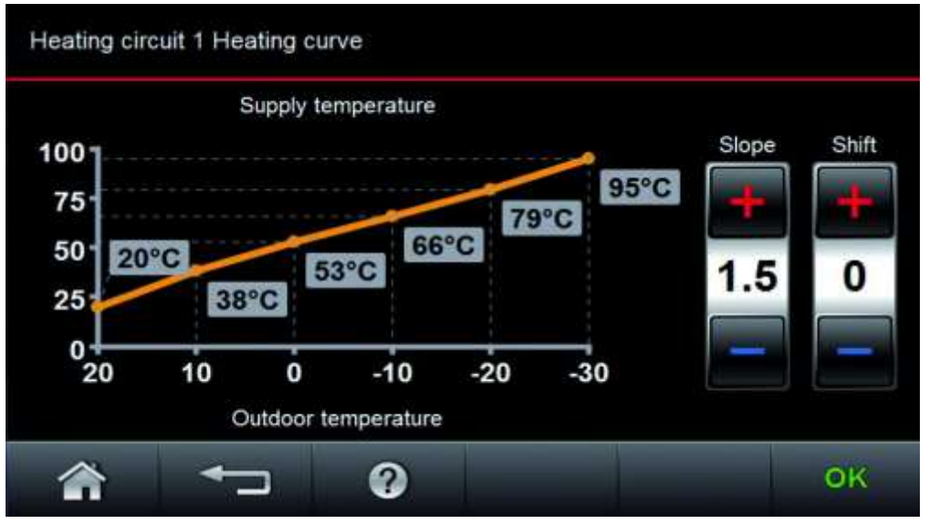


Home screen



Setback timers

Main menu



Heating curves

Vitocrossal 200, CM2

Vitotronic - BMS Integration

Integration to BMS can be done in several ways:

1. Dry contact inputs and outputs with analogue 0-10VDC set point.
2. Direct mapping of LON points (Requires Tool binding Mode).
   - Requires mapping all control LON points.
3. **Vitogate 300 Gateway.**
   - Maps important internal points and commands to BMS without the need for Tool Binding Mode. Map only the points required.
   - **Two versions** available:
     - LON to BACnet.
     - LON to Modbus.

LonWorks

BACnet

Modbus

Vitogate 300 BN (BACnet) / MB (Modbus)

Features and Benefits

- Flexible BACnet and Modbus gateway solution for BMS connectivity
  - Enables the BMS to view and/or operate essentially all boiler controller functions
- Provides connectivity for all Vitotronic controllers to:
  - BACnet.
  - Modbus .
- Mounts directly into the CM2 junction box.
- Configurable via integrated Web server.
- Supports RS485 and IP communication.
- CSA / UL certification.
- Diagnostics functions.

LonWorks

BACnet

Modbus

Vitogate 300

Vitotronic - BAS Connectivity Concept

BAS Management Layer

BACnet

Modbus

System Integration Layer

BACnet / Modbus communication controller

Vitogate 300

BACnet

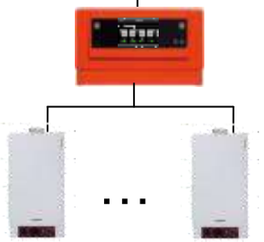
Modbus

Mechanical System / Device Layer

LON

Vitocrossal 200 CM2 with GW6B

LON



Vitodens 200 with or without MW2C

LON

Other Viessmann boilers with Vitotronic boiler controllers

Vitocrossal 200, CM2

Internet communication with Vitocom LAN1

LON-Module

LON

Vitocom 100
LAN1

LAN*

Router

Internet – Vitodata Server

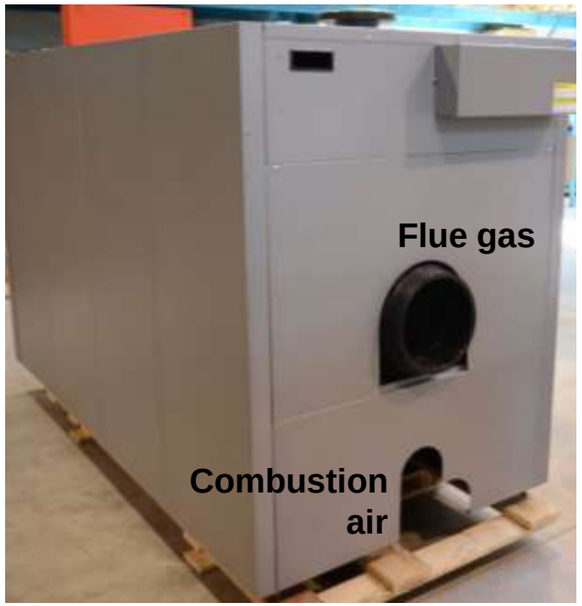
Vitotrol App

*Vitocom 100 must be wired with LAN cable to router

Vitocrossal 200, CM2

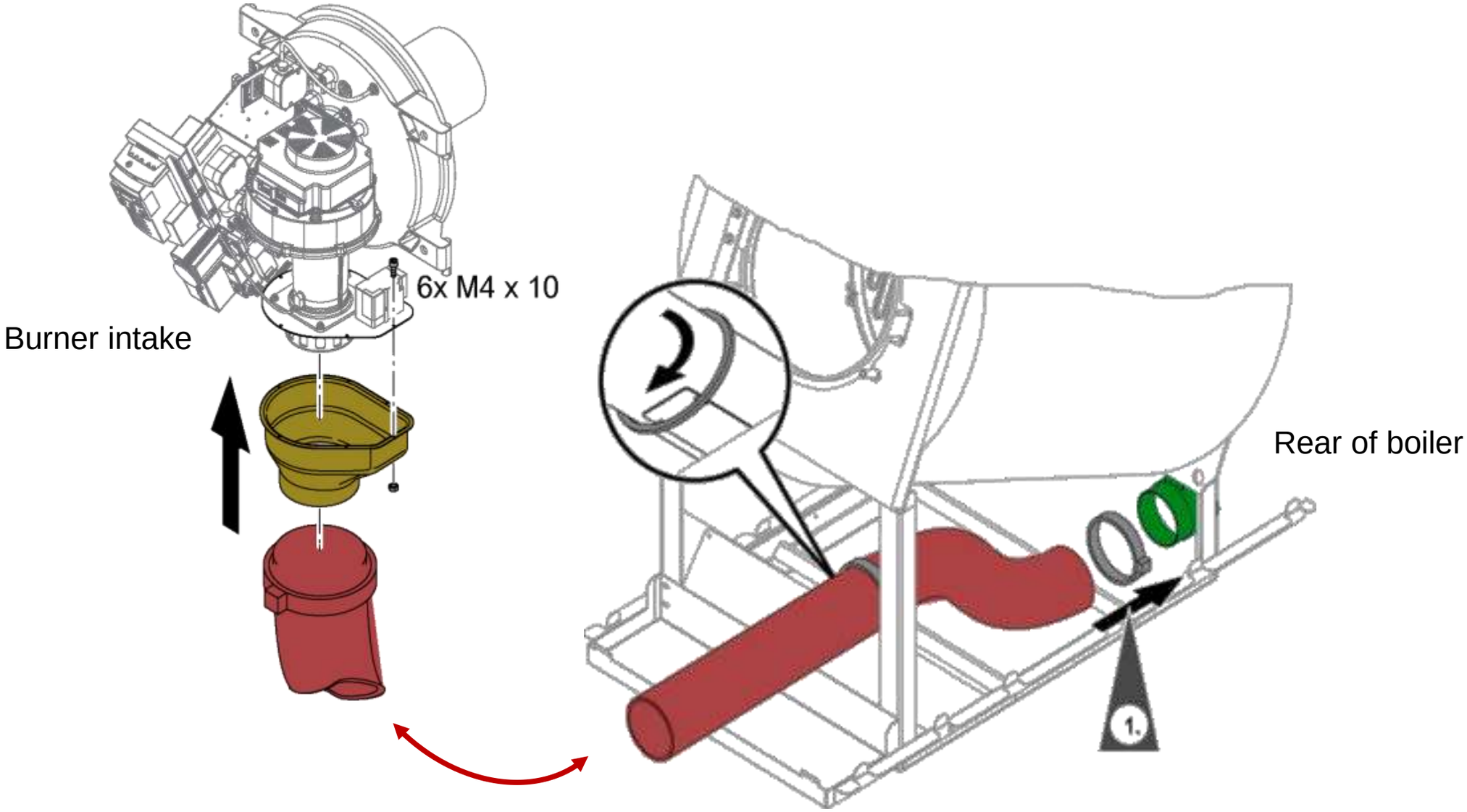
Multiple venting options

- Venting made easy with **multiple** venting options
- Separate **flue gas and combustion air** openings on boiler
- Approved **materials**:
  - Rigid Polypropylene PPs
  - Stainless Steel
- **Vertical or sidewall** vent terminations.
- **Independent or common** vent configurations
- Maximum equivalent lengths **up to 200 ft.**



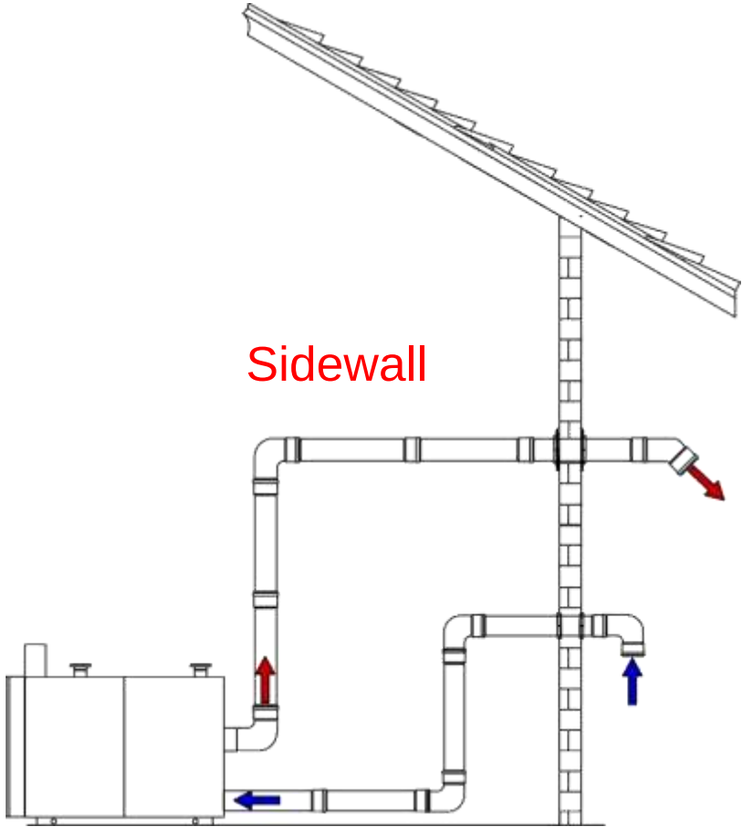
Vitocrossal 200, CM2

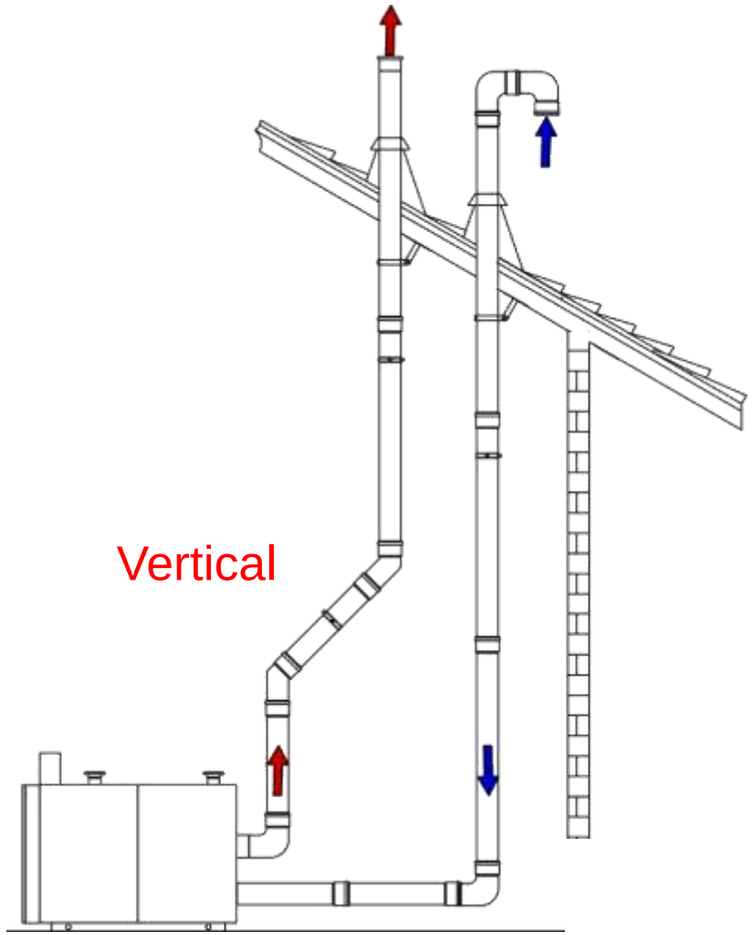
Combustion Air Intake Kits Supplied With Boiler

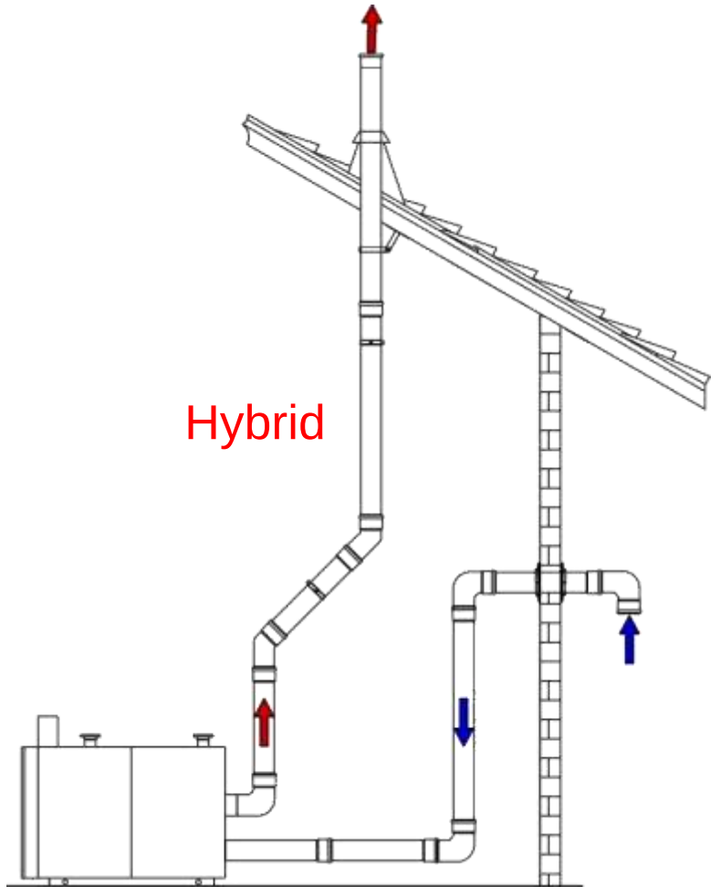


Vitocrossal 200, CM2

Two Pipe Venting Configurations

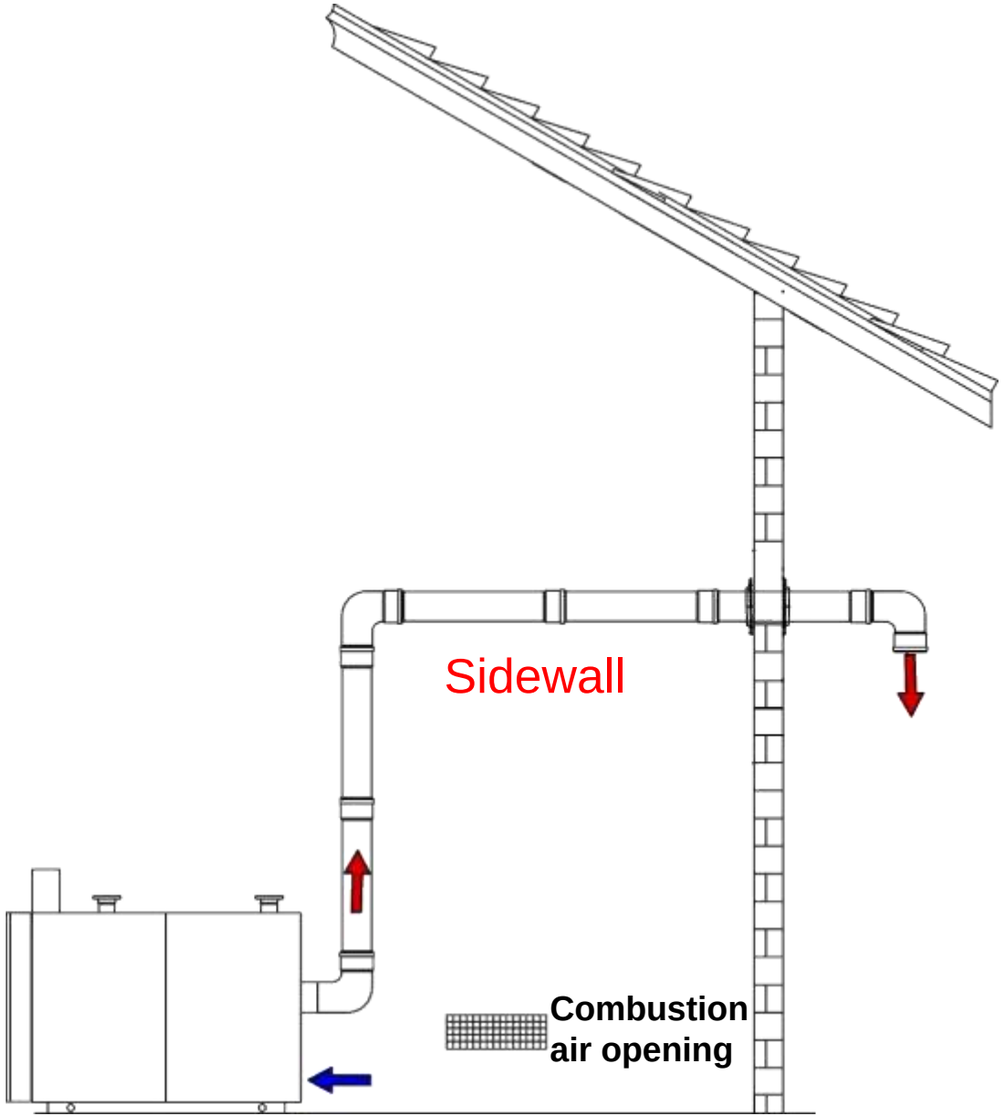


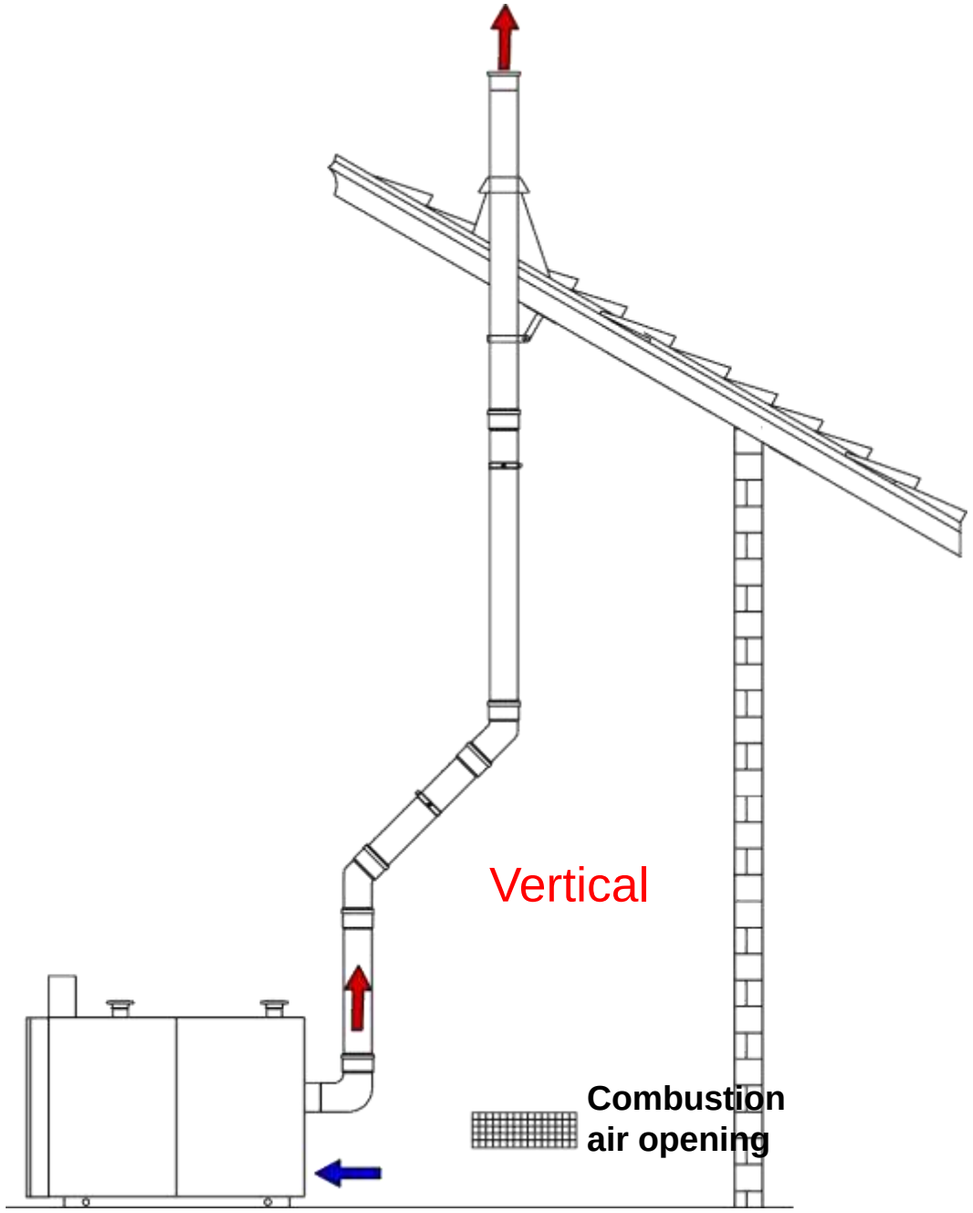




Vitocrossal 200, CM2

Single Pipe Vent Configurations

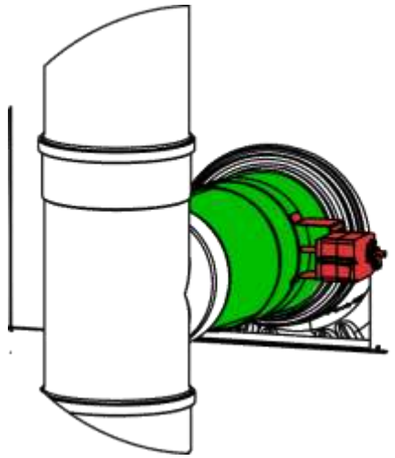


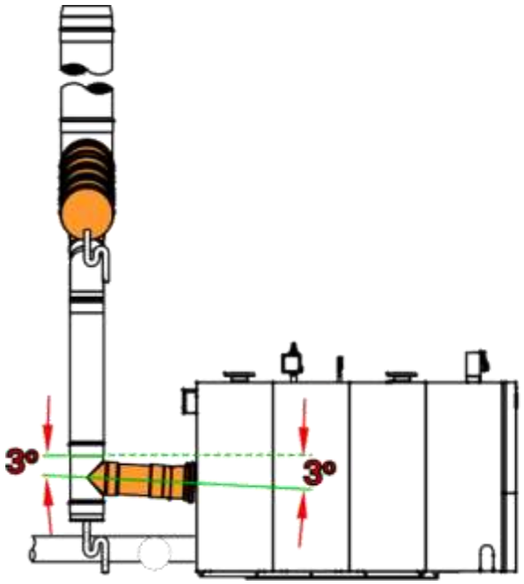


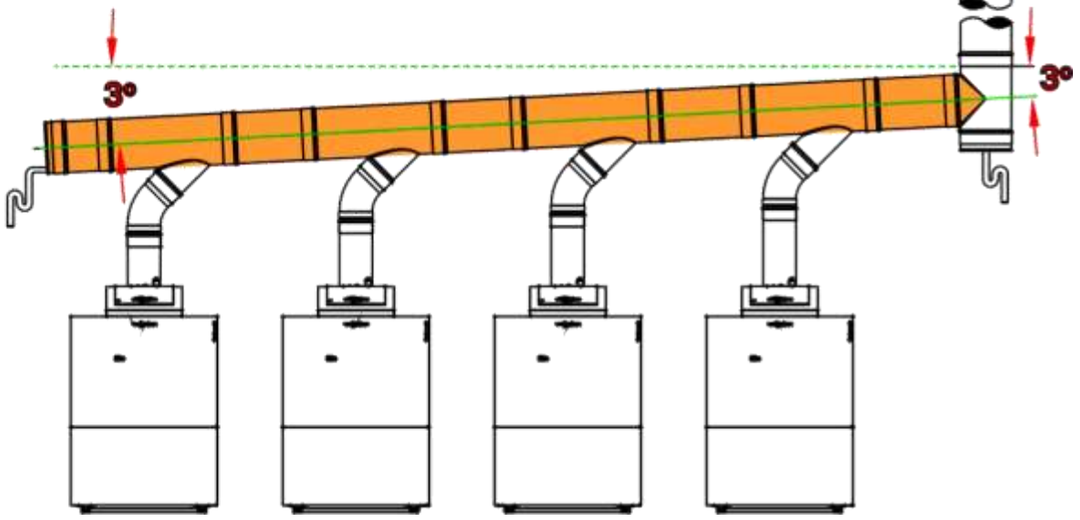
Vitocrossal 200, CM2 Models 400, 500, 620

Common Venting For Multiple Boiler Installations

- **Up to four boilers** into one common vent.
- Separate combustion air intakes.
- **Vertical** vent termination.
- Up to 200’ TCEL, 12” to 22” vent
- Flue gas **damper** on each boiler

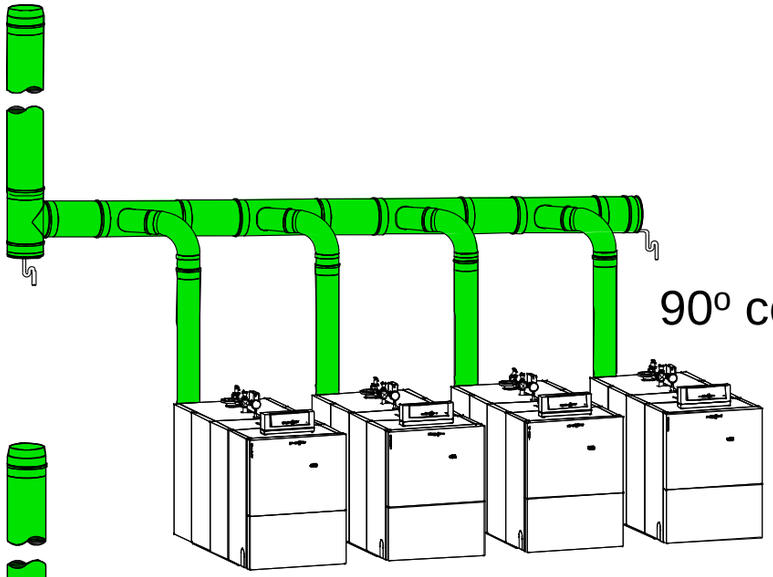




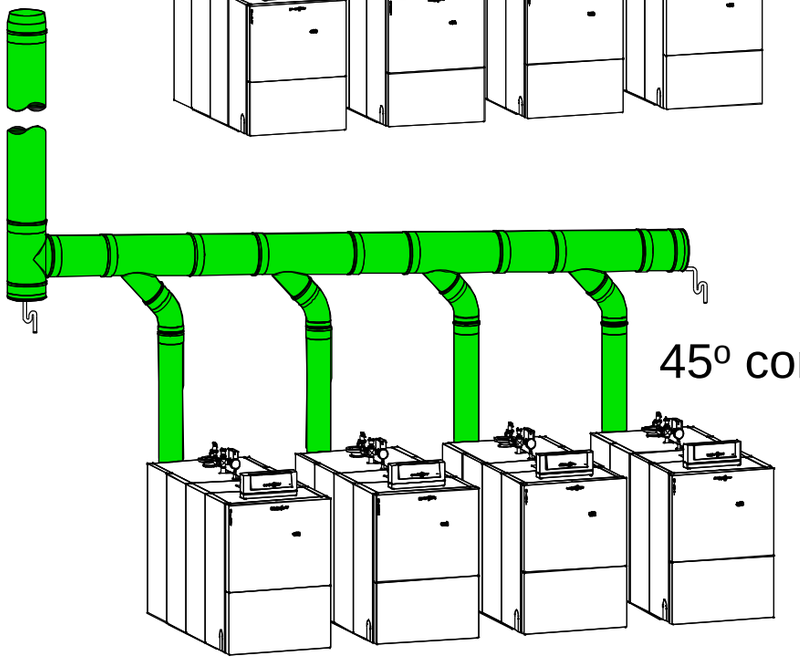


Vitocrossal 200 CM2, Models 400, 500, 620

Common Vent Header with 45º or 90°Connection

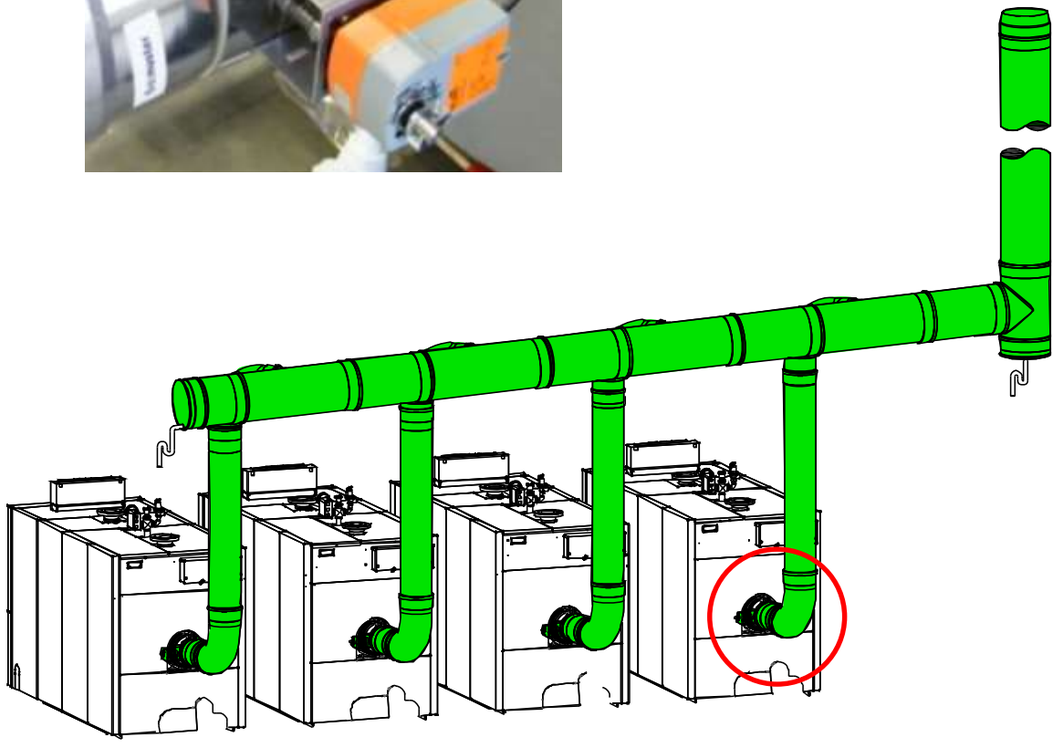


90º connection



45º connection

Electrically operated flue gas damper interlocked with burner



Vitocrossal 200, CM2

Where is the opportunity?

Anywhere a non-condensing or condensing boiler could be used:

- Commercial or large residential applications
  - Boiler retrofits
  - New construction
  - High temperature applications…Radiators, fancoils
  - Low temperature applications…Radiant floor heating, snowmelting
  - Volume DHW heating
  - Multi-load, Multi-temperature hydronic systems
  - Multi-zone systems with micro loads

Vitocrossal 200, CM2

Everything you need in a Commercial Heating Boiler

- Suitable for a wide range of applications
- Cascade up to 8 boilers with built in cascade control
- High temperature and high pressure capability
- Highly efficient condensing operation for dramatic fuel savings
- Durable, reliable and long service life with stainless steel construction and high mass design
- Viessmann NG /LPG premix burner with 5:1 turndown, and low gas pressure requirements
- Extremely quiet operation
- Flexible venting options
- Easy to service and maintain

VIESMANN

climate of innovation

Vitocrossal 200, CM2 - Product Introduction