

–weishaupt–

# info

Product information on digital combustion management



The intelligent control concept

**W-FM 100 and W-FM 200 combustion managers**



# Digital combustion management

**Modern oil, gas and dual fuel burners use combustion processes which require a precise and reproducible mixture of fuel and combustion air.**

**Weishaupt's digital combustion management is the monitoring and optimising technology which allows the simple and safe operation of combustion plant.**

**Alongside the possibilities for remote operation, remote diagnosis and monitoring, digital combustion management also reduces commissioning and servicing costs.**

## **Simple connection**

All the necessary connections for the external components are available as plug-in terminal blocks and all functions are integrated into the combustion manager's software and hardware.

## **Optimal switching safety**

Outputs are realised via relays, to guarantee optimal switching safety. The W-FM 100 and W-FM 200's inputs and outputs are at mains voltage, no interlocking relays are required.

## **User-friendly operation**

A separate control and display unit (ABE) is available for the running and monitoring of the burner by the plant operator, as well as for commissioning by the engineer. The ABE is linked to the W-FM unit by a bus system (CAN bus cable). In this way, the ABE can be placed anywhere the user chooses within 100 m of the main unit.

## **Extremely precise control**

The bus system enables the operation of up to six servomotors. They are connected directly to the correcting elements for air, fuel and the head assembly. These highly precise stepping motors are supplied with power via the CAN bus cable.

## **Choice of flame sensor**

Four different types of flames sensor can be connected directly to the main unit. For basic oil burners the usual photo-resistor can be used. For continually operating dual fuel burners an infra-red flicker-detector has been developed. Burners operating solely on gas can be equipped with an ionisation probe developed for continual operation.

## **Numerous interfaces for ease of communication**

The integrated eBus interface enables all operational data to be relayed to a superordinate building management system. Similarly, all burner functions can be controlled by the BMS, including capacity regulation. This interface also allows all diagnostic functions to be called up remotely.

There are ports available on the ABE control and display unit for two digital interfaces. An RS 232 connection is readily accessible on the exterior of the ABE, which can be used to connect a PC or laptop. A software program then allows the burner to be easily commissioned. The operational data that has been set can be saved and printed out for reference. Furthermore, plant operation can be recorded thanks to a special recording function.

## **Advantages at a glance:**

- One unit for all burner variants
- Precise control for optimal combustion figures
- Choice of flame sensor
- Integral valve proving
- Integral capacity controller
- Integral speed control
- Easy to connect O<sub>2</sub> module for O<sub>2</sub> trim
- User friendly, separate control & display unit
- Legible text display for error free operation
- Flexible communication possibilities through a variety of interfaces
- Burners fitted with a W-FM combustion manager and speed control module meet the 2004 requirements of the UK government's Enhanced Capital Allowance scheme.

# System overview



## Combustion manager

The W-FM 100 and W-FM 200 combustion managers control the start-up and shutdown of the burner via an integral "burner controller." The W-FMs are suitable for continuous operation and can be connected to flame sensors for gas, oil and dual fuel burners.

Seven different start-up programs for oil, gas and heavy oil are available. Diverse parameters can be set (for example pre-purge time, post-purge time, ignition and safety timings, Pre- and post-purge positions of the stepping motors) to ensure an individual matching to the plant.

Oil, gas, heavy oil and dual fuel burners can all be individually controlled. The direct connection of all valves to the unit means that external fuel selection relays are unnecessary.

All the necessary pressure switches can be connected to the main unit as required. Their function is set during the configuration of the unit at the factory.



## Electronic compound

The error free CAN bus, which controls the servomotors (air damper, oil regulator, gas butterfly, mixing head), differentiates this electronic compound regulation from previous systems.

Each servomotor is fitted with its own microprocessor and is driven by a highly accurate stepping motor - an integrated regulation and monitoring circuit positions the drive shaft to within one tenth of a degree. The set position is transmitted from the main unit via the Bus and once the exact position has been reached this is transmitted from the servomotor back to the main unit. Completely separate data packets are used for each fuel.

Commissioning has been much simplified. It is now only necessary to programme as many capacity points as the setting of the burner requires. It is still possible to enter further points, or alter the existing ones, as and when required later.

Independent operating curves are available for oil and gas. Each operating curve can be individually programmed for up to 6 stepping motors and a frequency convertor.

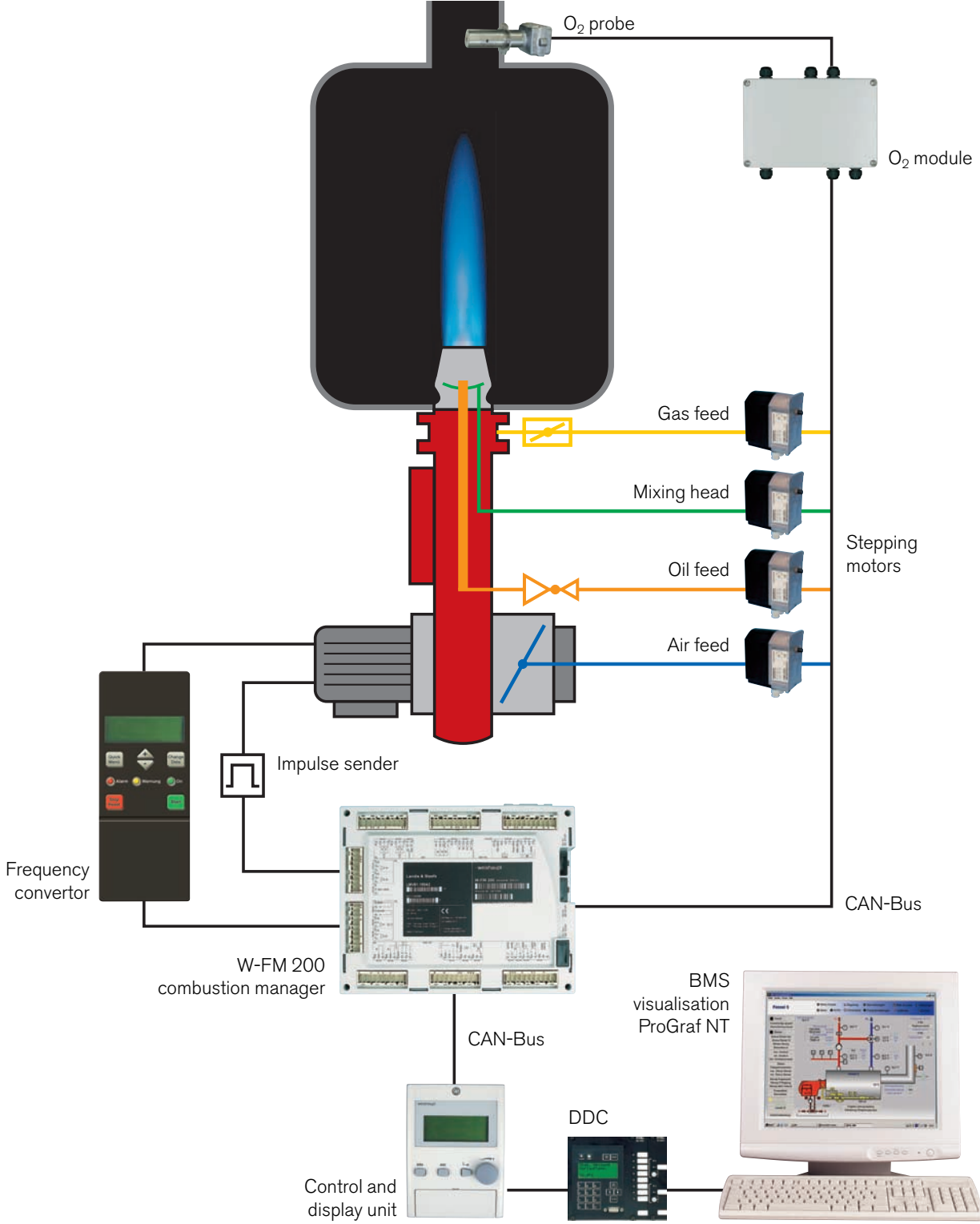


## Control and Display Unit

The ABE control and display unit is connected to the system bus and can be installed up to 100 m away from the main unit, giving the operator the freedom to choose its optimal installation position.

All burner functions can be controlled directly from the ABE unit, no external control elements - such as buttons or switches - are necessary. All operations and diagnosis functions are displayed in legible text and virtually any language can be loaded via a PC. A separate data recorder in the unit enables a complete back-up copy of the on-site settings to be saved.

The ABE unit also serves as the interface with a superordinate building management system and as a connection point for a PC during commissioning.



# Separate access levels for safety



## User/Operator level (AB)

All the necessary commands for operating the plant can be accessed from this level, and all values can be read.

Examples of commands:

- Burner on/off control
- Fuel changeover
- Manual setting of the burner rating
- Reset

Examples of readable values:

- Actual temperature or pressure
- Current burner rating
- Flame signal
- Error messages such as "Max. gas pressure exceeded"



## Heating engineer level (HF, password protected)

This level is used by the engineer for commissioning and service of the burner.

Examples for commissioning:

- Setting of the electronic compound
- Matching the capacity regulator to the plant
- Setting the speed control and O<sub>2</sub> trim

Examples for service:

- Reading of error codes for early diagnosis
- Resetting the burner after exchanging components
- Reading the number of start-ups and hours run



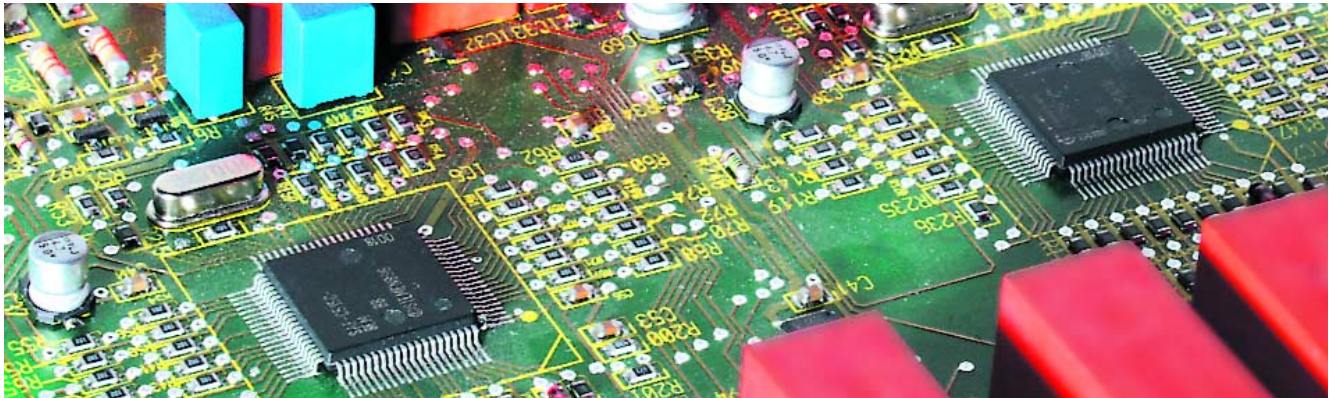
## Weishaupt level (OEM, password protected)

The configuration of the combustion manager is carried out at the factory using this level.

Examples for configuration:

- Selection of connected pressure switches
- Setting the fuel type, gas, light oil, or heavy oil
- Program runtimes, e.g. pre- and post-purge
- Country specific settings
- Presetting during QA checks

## Function overview



### **Integral valve proving**

A valve proving program is integrated into the system, requiring only an additional pressure switch on the gas valve train.

Using a special control program, it is possible to select whether valve proving takes place at burner start, burner shutdown, or on both occasions.

After a power failure or emergency shutdown, a valve proving test is always carried out at the next burner start.

### **Integral capacity controller**

The integral capacity controller can be connected to various temperature and pressure sensors.

Two internal set values can be called up via an external drive (heat retention function, night setback). If required, the capacity controller can also be activated by external set values or signals. Switching back to internal set values and regulators is possible at any time.

There is a separate start up program for a cold boiler start, which gently brings the heating appliance up to nominal temperature or pressure.

### **Integral speed control**

The burner can also be speed controlled by using a frequency converter. The frequency converter is controlled directly by the combustion manager.

If fuel meters are fitted (extra cost option), cumulative fuel consumption and current throughput rates can be displayed.

### **Integral O<sub>2</sub> trim**

Fitting an O<sub>2</sub> probe and O<sub>2</sub> module and connecting them to the W-FM 200 via the internal system bus is all that is required to equip the burner for O<sub>2</sub> trim - a great simplification compared with older systems.

The O<sub>2</sub> module converts the signal from the O<sub>2</sub> probe for the CAN bus. The module can be placed up to 10 m away from the O<sub>2</sub> probe.

The use of flue and inlet temperature sensors enables combustion efficiency to be displayed.

## Overview of digital combustion management

System overview	W-FM 05	W-FM 10	W-FM 20	W-FM 21	W-FM 50 <sup>1)</sup>	W-FM 100	W-FM 200 <sup>2)</sup>
Digital combustion management							
Burner controller for intermittent operation	●	●	●	●	●	●	●
Burner controller for continuous operation				●		●	●
Flame sensor for intermittent operation	QRB, Ion	QRB, Ion	QRB, Ion	QRB, Ion	QRB, Ion	QRB, Ion	QRB, Ion
Flame sensor for continuous operation				QRB, Ion <sup>1)</sup>		QRI, Ion	QRI, Ion
Servomotors in electronic compound			2 off	2 off	2 off	4 off	5 off
Servomotors with stepping motor		●	●	●	●	●	●
Frequency converter in pneumatic compound			●	●			
Frequency converter in electronic compound					●	● <sup>3)</sup>	●
Input for O <sub>2</sub> probe							●
Integral O <sub>2</sub> regulator							●
Single fuel operation	●	●	●	●	●	●	●
Dual fuel operation						●	●
Gas valve proving		●	●	●	●	●	●
Integral self-adjusting PID regulator for temperature or pressure						Optional	●
Removable control unit (max. distance)			30 m	30 m	10 m	100 m	100 m
Fuel consumption meter			●	●		●	●
Display of combustion efficiency							●
Error-free parallel running for two burners						●	
eBus interface	●	●	●	●	●	●	●
PC supported commissioning						●	●
Applicable burner types	WL5 WL10 C	WL 10 C WL 20 C	WL 30 C WL 40	WL 30 C WL 40	L1Z - L40Z L1T - L40T RL3 - RL11	RL, G, GL, RGL 30-70	RL, G, GL, RGL 30-70
<sup>1)</sup> In planning <sup>2)</sup> Early 2004 <sup>3)</sup> Extra cost item	WG5 WG 10 C	WG 10 C WG 20 C WG 30 C WG 40 C	WG 10 C WG 20 C WG 30 C WG 40	WG 10 C WG 20 C WG 40	G1 - G11 G30 - G40	WKL, WKG WKGL	WKL, WKG WKGL
	Single stage	Two stage	Two stage Modulating	Two stage Modulating	Two stage Three stage Modulating	Two stage Three stage Modulating	Two stage Three stage Modulating

Digital combustion management is available for nearly all Weishaupt burners.

All combustion managers operate over a digital eBus interface. This enables all the necessary information and commands to be relayed to a superordinate building management system.

W-FM 100 and W-FM 200 Advantages at a glance:

- One combustion manager for all industrial burner variants
- Precise control for optimal combustion figures
- Choice of flame sensor
- Integral valve proving
- Integral capacity controller
- Integral speed control
- O<sub>2</sub> module can be easily connected

- User friendly, separate control & display unit
- Legible text display for error free operation
- Flexible communication possibilities through a variety of interfaces
- New technology offers a price advantage
- Burners fitted with a W-FM combustion manager and speed control module meet the 2004 requirements of the UK government's Enhanced Capital Allowance scheme.