VMS Fuel/Air Ratio Control System

TÜV type approval
Test no. TÜ 12 / 97 01 74
CE 0085 AS 0255

Advantages:

- Electronic compound, up to 5 channels

- Connects to control system

- Simple to program

- 10-bit resolution

- Can be operated from PC

- Integrated load regulator

- Integrated O_2 controller

Areas of use:

- Combustion installations of all kinds

- TRD 604 facilities

Sensors and Systems for Combustion Engineering

LAMTEC

Nowadays, modern firing installations are subjected to severe demands. On one hand, the combustion of the fuels used must be optimised and any losses minimised; and on the other, it is necessary to meet stringent environmental criteria. Furthermore, very high safety constraints are placed on such systems. As a result, the ratio between the volume of air and the amount of fuel used must be accurately adjusted -across the burner's entire output range.

The mechanical systems employed up to now can no longer achieve this. Mechanical linkage via levers and rods suffer from too much play to allow the necessary precision. What would be more obvious than to replace mechanical links by modern, fail-safe operating electronics?

Here LAMTEC has the right solution:
The VMS Fuel/Air Ratio Control System.

The VMS **Fuel/Air Ratio Control** System is the logical development of the VR 2/VR 4 ratio regulators, successfully introduced into the marketplace many years ago. With VMS you can accurately control up to 5 positioning elements as a combined system. And for each element you have a free choice whether you wish to control it via three-state-step positioning outputs (DPS) or via 0/4 to 20 mA.
However, VMS can do a lot more than just replacing the burner's mechanical mixing system. By using up to *eight!* curve sets, you can adjust complex special firing installations for the most varied operating modes.

For example:

● Firing two flue boilers with joint blower, also laid out for one-burner operation with oil and gas.

● Simultaneous combustion of two or more fuels with stepped mixture ratios.

● Single/group operation of several burners in one combustion chamber.

And all this with precision and reproducibility which no mechanical system can achieve.

You can shift the position of the servomotores via two correction imputs, ie. to build up a control loop. This compensates all interference which influence the firing process.

Operation is simple. Fuel and air are manually started up and the parameters saved by the operator, point for point. During automatic operation, the stored points are implemented by the VMS with an accuracy of 0.1 degrees of angle -error-free!

The display of operational and error messages is in plain text, including in the relevant national language. There is an integrated operating hours counter, which also totals the burner's operating hours for each fuel. All start-ups are also counted separately for each operating mode.

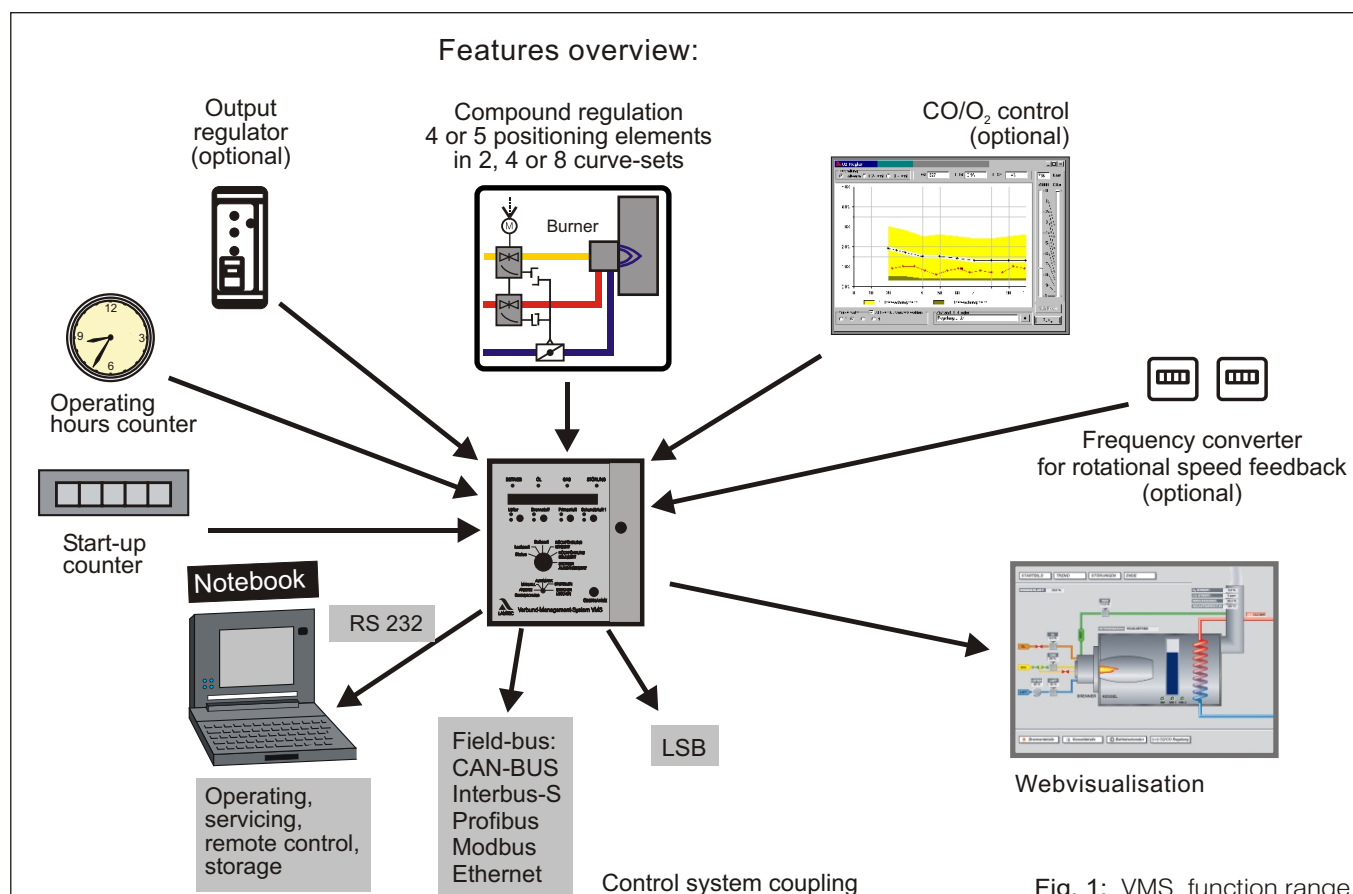If required, the VMS also takes over the burner's output regulation.
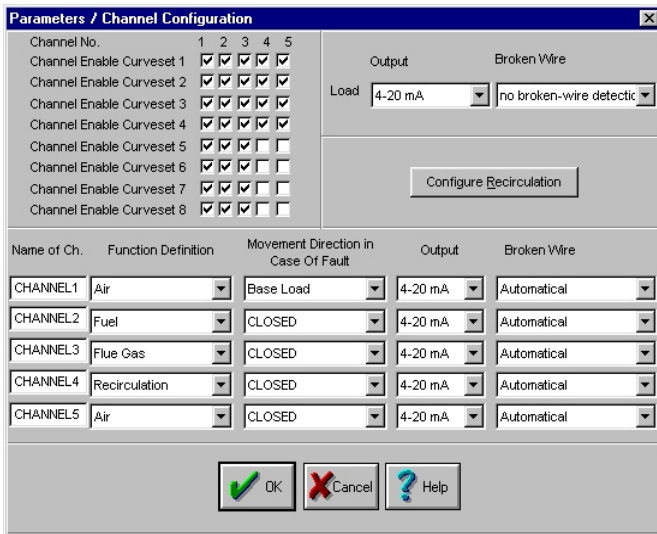

Fig. 1: VMS function range

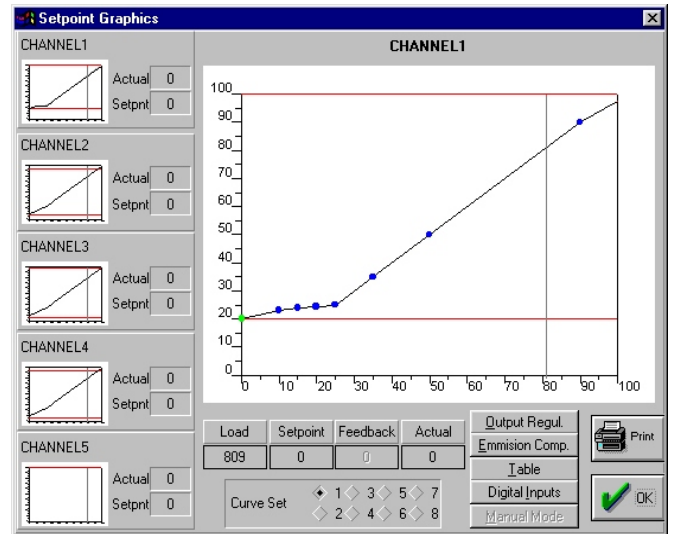Fig. 2: VMS channel configuration by using the remote control software

Fig. 3: Visualisation of the compound curves through remote control software

The VMS analog inputs can be configured to the most diverse physical input quantities via plug-in cards. The parameters of many software functions, such as e.g. a final ventilation period, can be set by the operating personnel on site.

A software module CO/O_2 control is integrated into the VMS. In combination with the CO/O_2-measurement devices LT1/LT2 via the LAMTEC SYSTEM BUS every firing installation can be maintained constantly at the ideal operating point, independently of environmental conditions such as temperature and air pressure.

The VMS can be very effectively combined with existing control systems. It "speaks" almost all the languages of conventional field buses.

The VMS is TÜV-tested and also meets the TRD 604 requirements for continuous operation.

An additional PC interface significantly facilitates the operator's work with the VMS. The unit can be remote-controlled from a laptop, and the selected configuration plus the curve data can be saved. If it should ever be necessary, a replacement unit can thus be readied for operation within seconds: the back-up data are simply read in.

By using an industrial modem, the VMS can also be interrogated from your office. In the event of a fault you
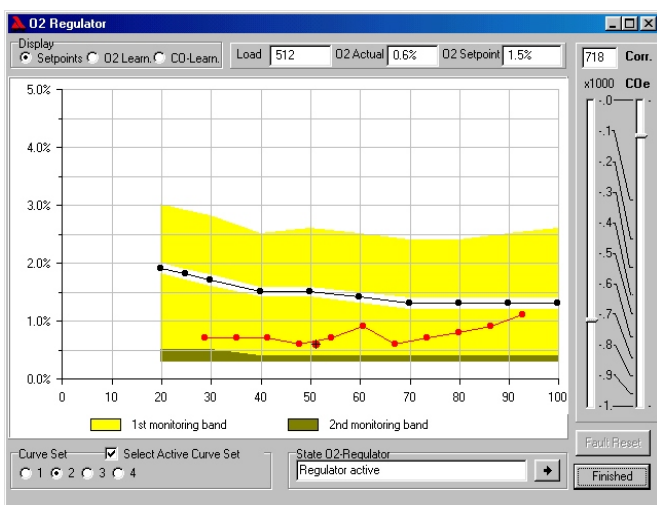

Fig. :4 Visualisation of the O_2 and CO setpoint-curve with its monitoring-band-gaps when using the VMS's integrated O_2 or CO controller
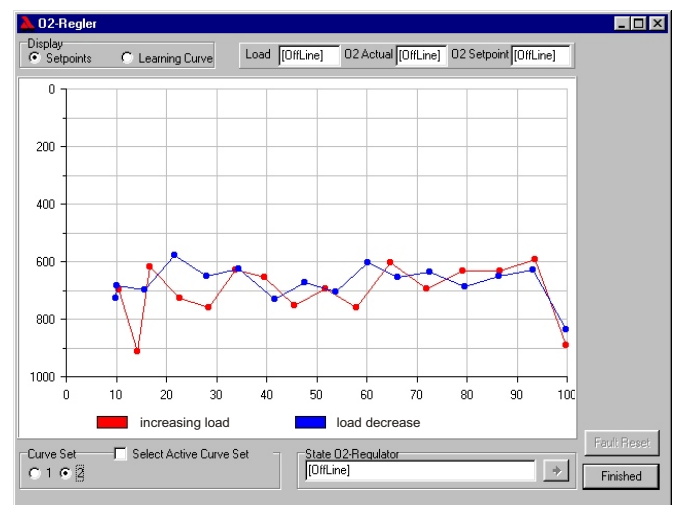

Fig. 5: Visualisation of the self-learned-curve of the O_2 controller

Voltage supply	230 V + 10 % - 15 % 50/60 Hz **To be used only in a grounded power line network!**		Resolution per analog input	999 digits, 10 bit
Power consumption	ca. 34 VA		Three-state-step Recommended run time of the positioning drives	30 sec…60 sec
Ambient temperature Operation Transport and storage	+ 0 ° C…+ 60° C - 2 5 ° C…+ 60° C		Continuous outputs Load	0…10 V > 5 k 0/4…20 mA < 600
Display	16-character alphanumeric display, switchable to target value, load value, status, actual value feedback, target value feedback, digital inputs, continuous positioning output value, correction input and correction range. Running text display.		Correction inputs	2, adjustable to 0...20 or 4...20 mA Channel and action parametrically adjustable
			Signal outputs	Faults Ignition point Open valves / flaps, high fire position
Permiss. ambient humidity	Class F, DIN 40 040			
Inputs and outputs	16 digital inputs 8 - 16 digital outputs 1 - 5 analog outputs 12 analog inputs all none isolated		Storage of target values and variable data	In EEPROM up to 20 points per curve with linear interpolation
Digital signal inputs	16 via isolated relay contact (24 V DC), or optionally via 230 V module, type 6 60 R 0018		Number of curve-sets	2 per channel (e.g. for oil/gas combined burner) Optionally 4 and 8
Load preset	Selectable potentiometer 1 - 5 k , current signal (0/4…20mA) or three-state-step positioning output Optionally: PT 100 direct actuation (when using the firing-rate-controller)		Number of programmings	Unlimited (EEPROM)
			Interface	2 serial interfaces on 25-pole Sub-D socket only addressable via adapter RS 232 (standard setting 19200 baud, even parity, 8, 1) and LAMTEC SYSTEM BUS
Analog inputs	Selectable potentiometer 1 - 5 k current signal (0/4…20mA) Optionally: Namur transducer direct actuation, PT 100 direct actuation		BUS coupling	Via 25-pole Sub-D socket Optional BUS card for the following systems: Interbus-S (Phoenix) Profibus Modbus CAN-BUS / CANOpen Ethernet (Modbus TCP)
Positioning outputs	4 or 5, selectable between continuous or three-state-step, in VMS 5 channel 5 always continuous.			

Dimensional data

Minimum spacing between several cut-outs

20

20

Single cut-out

137 +2

137 +2

328

20

12

135,5

10

40

147

147

135,5

295