



System overview

Fuel/air ratio control system VMS



Sensors and systems for combustion engineering

www.lamtec.de

Approvals.



**EC Type Examination Certificate (Module B)
according to Directive 97/23/EC**

- DIN EN 298:2004
- DIN EN 1643:2001
- DIN EN 230:2005
- DIN EN 60730-2-5
- DIN EN 12067-2:2004
- DIN EN 50156-1:2005, point 10.5



SIL3

- DIN EN 61508 Parts 2+3



CE 0085



Type Examination Certificate

- EU/2009/142/EC
- DIN EN 298
- DIN EN 13611
- DIN EN 1643
- DIN EN 12067-2

EC Declaration of Conformity

- 2006/95/EC (Low Voltage Directive)
- 2004/108/EC (EMC Directive)
- 97/23/EC (Pressure Equipment Directive Cat. 4 Mod.) B+D
- 2009/142/EC (Gas Appliances Directive)



INNOVATIONSPREIS
DER DEUTSCHEN
GASWIRTSCHAFT
2004



The fuel/air ratio control system VMS.

These days, combustion systems are expected to meet one requirement above all others: efficiency. And this demand no longer just applies to the technology itself, we also expect the installation, configuration and commissioning processes to be effective as well.



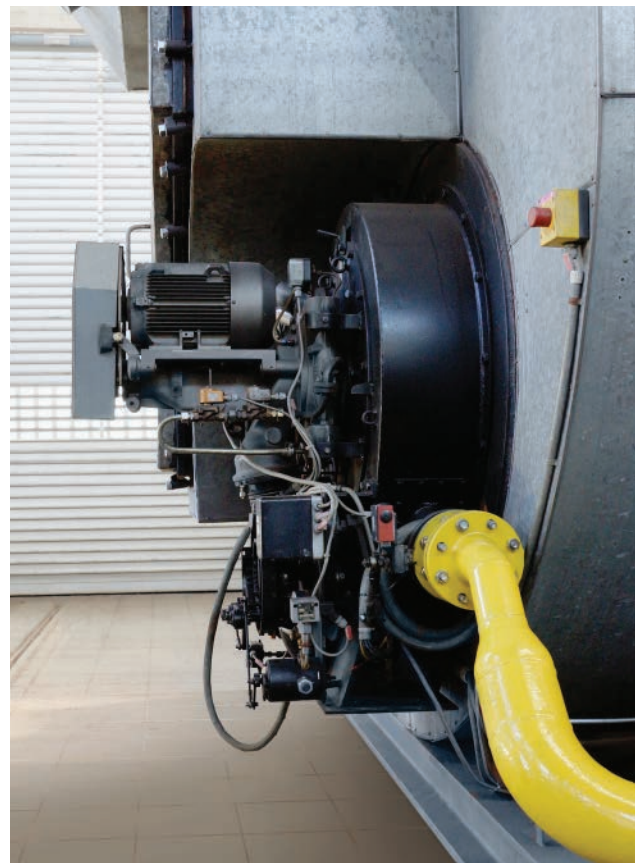
The fuel/air ratio control system VMS impresses by offering the benefits of an electronic fuel/air ratio control system with up to 5 actuators. It also features an integrated firing rate controller with CO/O₂ control. In short, this is an all-in-one device providing you with everything you need to control your burner. The fail-safe design offers a level of flexibility normally only achievable with a PLC. With it, LAMTEC is able to provide a single solution for almost all of your burner needs. Short wiring paths drastically reduce expenditure on additional relays and connections. When you use a VMS, you often only require a small on-site control cabinet. An integrated device like the VMS also offers significant advantages when it comes to the commissioning process. Reduced wiring work and the standard operator interface help to reduce the likelihood of error from the start, while intelligent information displays make searching for errors even easier.

For the electronic actuator, every actuator can either be controlled via 0/4 ... 20 A or a three-point-step (apart from channel 5).

The VMS can also meet a number of special requirements.

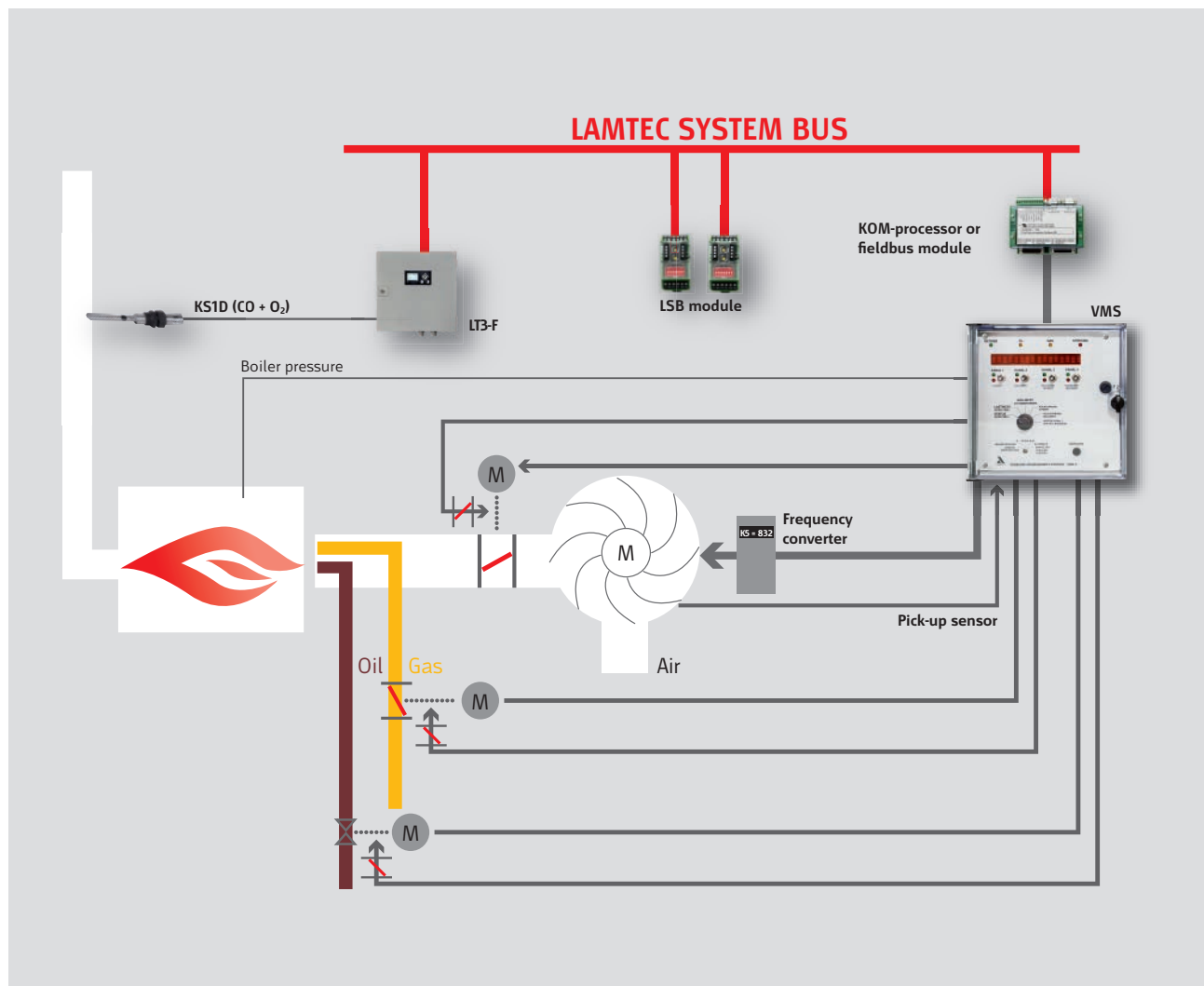
The set fuel/air curves can be shifted using two correction inputs for disturbance variable feedforward during operation. As such, this can help to offset influences on combustion, e.g. changes to the suction air temperature.

Operating notifications and error messages are displayed in clear text in the user's native language. On request, the VMS can also assume responsibility for regulating the burner firing rate. The analogue inputs of the VMS can be configured using plug-in cards at various physical input variables. A number of software functions, e.g. corrections, can be parametrised by the commissioning engineer on site.



Advantages:

- Electronic fuel/air ratio control system with up to 5 channels
- Universal fieldbus interface for connection to control technology
- Integrated firing-rate controller (optional)
- Integrated CO/O₂ control
- Simultaneous combustion of 2 fuels with variable mix ratio



Functions in the VMS.

A CO/O₂ controller software module is integrated in the VMS. When used in conjunction with the LT1/LT2/LT3 O₂ and CO/O₂ measuring devices, this means that every combustion system can always run at the ideal level regardless of external influences such as temperature and air pressure.

The VMS is easy to combine with existing control technology. It “speaks” virtually all languages used by conventional fieldbuses. The VMS is TÜV-checked and meets all applicable European standards.

For the commissioning engineer, an additional PC interface makes work on the VMS even easier. Users can operate the device remotely from a laptop that they can then also use to archive configurations and store curve data. If you ever need to replace the device, this solution means that the replacement will be ready to use in just a few minutes as the stored data simply needs to be imported to the new device.

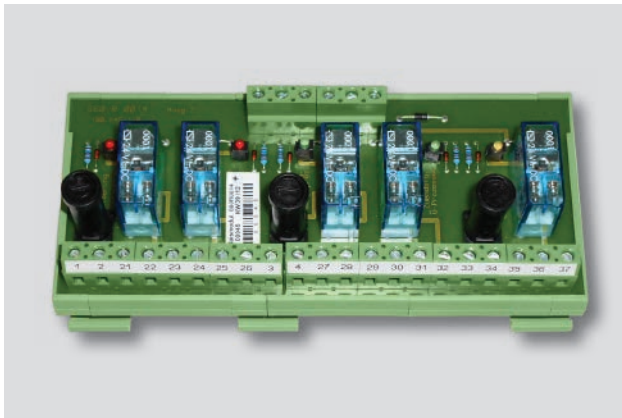


Use of an industrial modem means that you can access data on the VMS from your laptop or PC as well. This means you don't actually have to be on site to detect the source of any errors.

Modular options.

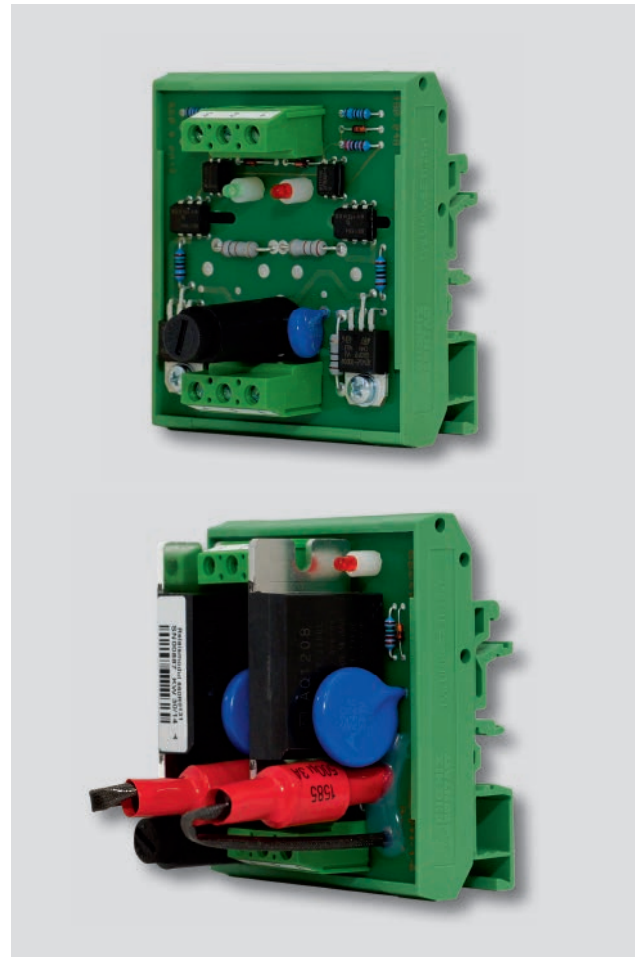
Relay module for message outputs

For use as a communication interface to burner sequencers.



Relay module for motor control

“Three-point-output” relay modules are required to control the actuating motors. Various relay modules are available depending on the motor torque.



Inputs.

Outputs.

Pre-purge	Digital inputs 24V	Indicator outputs Depending on power supply R14 relay module	High fire
Burner start-up			Ignition position
Flame signal			Ignition train
Control release			Problem
Recirculation ON			Safety chain
Curve set 1			
Curve set 2			
Curve set 3			
Curve set 4			
Curve set 5			
Curve set 6			
Curve set 7			
Curve set 8			

Channel 1 feedback (potentiometer, speed, current 4 ... 20 mA)	Feedback signals from the actuators	Fuel/air ratio control/activation of the actuators (fuel/air ratio)	Channel 1 (DPS or current)
Channel 2 feedback (potentiometer, speed, current 4 ... 20 mA)			Channel 2 (DPS or current)
Channel 3 feedback (potentiometer, speed, current 4 ... 20 mA)			Channel 3 (DPS or current)
Channel 4 feedback (potentiometer, speed, current 4 ... 20 mA)			Channel 4 (DPS or current)
Channel 5 feedback (potentiometer, speed, current 4 ... 20 mA)			Channel 5 (current)

External load setting (potentiometer, DPS, current 4 ... 20mA)	Firing rate/ power regulator specification	Firing rate/power output	Internal firing rate output (current)
Boiler temperature (Pt100)			
Pressure/external tempera- ture (current)			
Correction 1 (current)			
Correction 2 / mixing signal (current)			

Burner ON	Selection of additional BUS signal inputs LSB module and fieldbus (Ethernet, PROFIBUS, MODBUS, INTERBUS)	Selection of additional BUS signal outputs LSB module and fieldbus (Ethernet, PROFIBUS, MODBUS, INTERBUS)	Fuel operation
Control release			Assembly output informa- tion: Ignition position reached - high fire reached

12 analogue inputs "Special activations" possible			O ₂ actual value
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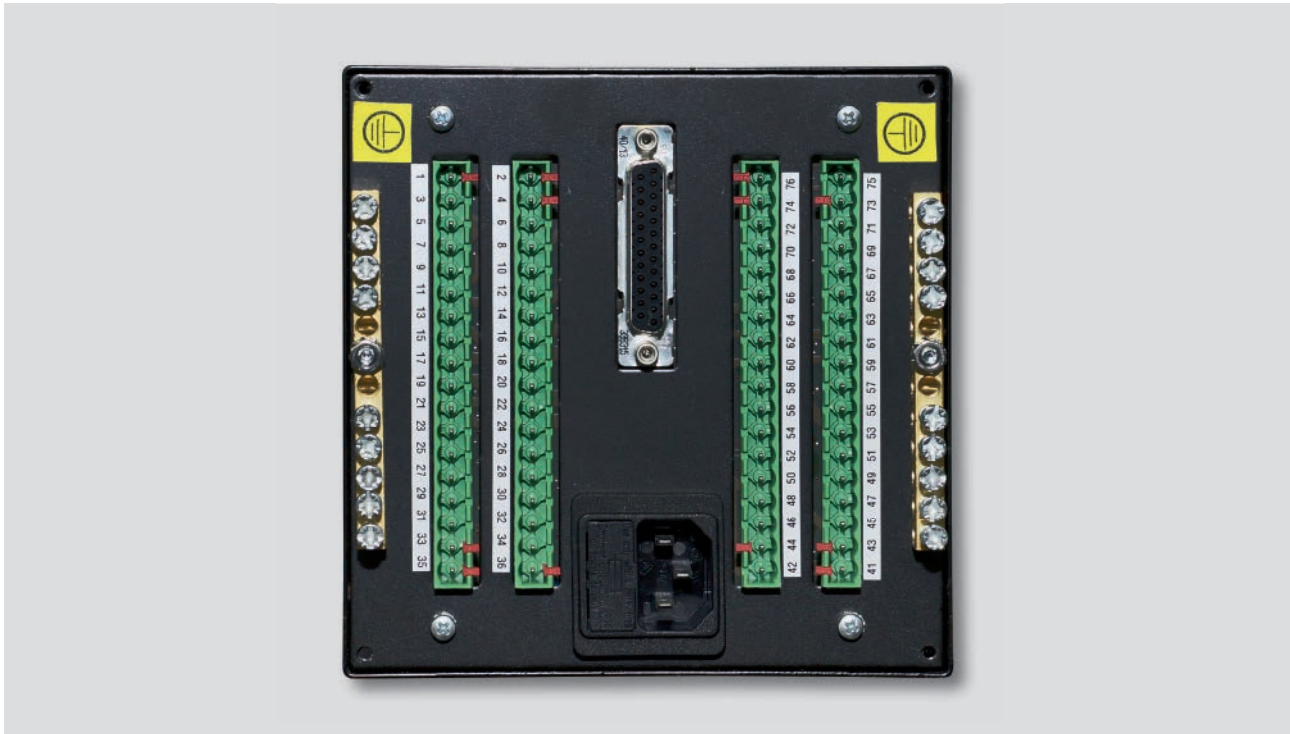
Digital (LSB)

Analogue
(LSB)

Basic model.



VMS front.



VMS rear.

The LAMTEC VMS fuel/air ratio control system can be operated directly on the device. Password protection prevents data from being entered unintentionally. Thanks to its modular design, the VMS provides a high degree of flexibility for any application. Settings can also

be adjusted via a PC interface, enabling users to work remotely, e.g. using a laptop.

Optional components.

LAMTEC SYSTEM BUS (LSB) module

Each VMS comes with an optional LAMTEC SYSTEM BUS (LSB) interface. The LSB module is compatible across the LAMTEC range and enables users to connect LAMTEC devices to one another using a quick and easy solution that doesn't require a lot of wiring work. It also enables users to control fieldbus modules in a top hat rail mounting via an adjustable address so that the input status and modifications to the fieldbus can be forwarded.



Analogue input/output.



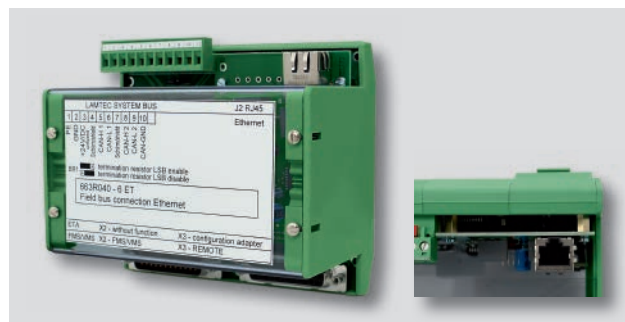
Digital input/output.

Control technology link-up

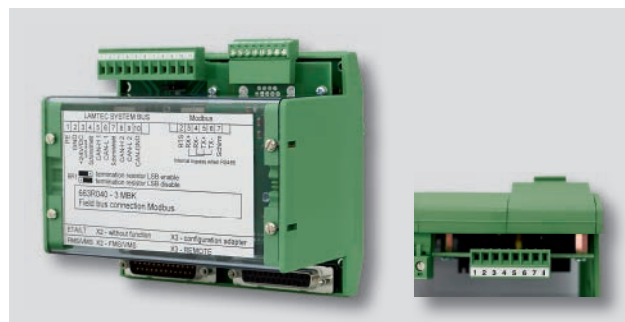
The VMS can be very easily combined with existing control technology. It "speaks" virtually all languages used by conventional fieldbuses. Connections for PROFIBUS-DP, TCP/IP (MODBUS TCP), MODBUS and INTERBUS-S are available as options (other bus systems on request).



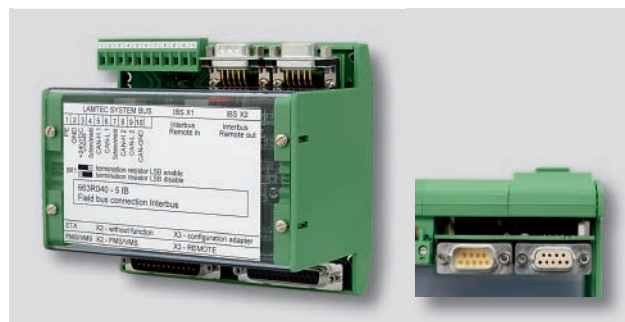
PROFIBUS DP fieldbus.



Ethernet fieldbus.



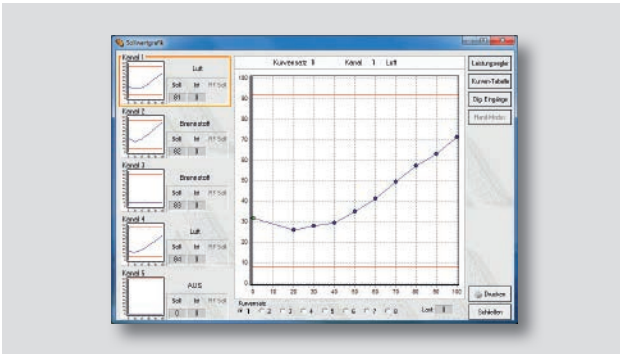
MODBUS fieldbus.



INTERBUS fieldbus.

PC interface (RS232)

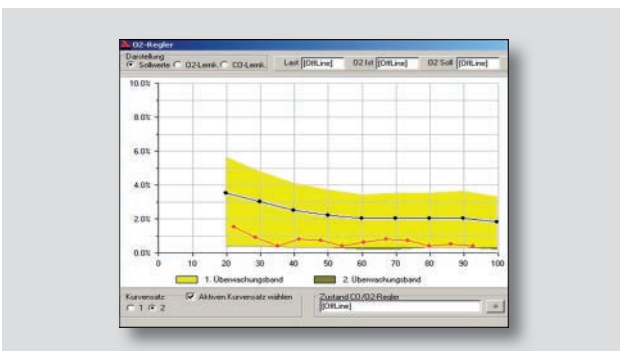
The PC interface makes working with the VMS even easier: The device can be operated remotely using a laptop. Set configurations and curve data can be archived – this backs up data so that it can be re-imported in the event of an emergency, enabling the device to be ready for operation again in just a few minutes. By using an industrial modem, you can check the status of the VMS from your office so that you can detect faults and their causes without having to be on-site.



Screenshot from Remote Software: Setpoint graph.

CO/O₂ controller

Combustion processes are subject to constant interference from changes in temperature, moisture levels, air pressure and changes to the quality of the fuel used (oil viscosity, gas fuel value). The CO/O₂ control integrated into the VMS helps to compensate these influences during ongoing operation (shift in the assembly curves). It includes a software module that we have developed specifically for combustion control. This module translates the precise values from our CO/O₂ measuring devices to automatically control the air supply as required in real time. For example, it automatically reduces the air supply until CO is produced. It is always able to detect CO/O₂, no matter how small the quantity is. The assembly then increases the air supply by one step and thus generates an individual operating curve in line with the local conditions with which the burner still just burns without CO. The system learns and improves almost automatically in a sustainable and fail-safe manner. This means that almost every combustion system will always run at the ideal combustion point.



Screenshot from Remote Software: O₂ controller.

Rotational-speed transducer

There are two different rotational-speed transducers available for the VMS. The 663R8101 r.p.m. sensor is equipped with two-line technology and has a switching distance of 2 mm. The 663R8103 r.p.m. sensor is an inductive proximity switch with switch contact in three-line technology and has a switching distance of 4 mm. This means that you can always find the right sensor for the design features in question. Due to the variety of sensors that can be used, LAMTEC only offers a two-line and a three-line element. These have been selected to ensure that most measuring tasks can be covered with just these two elements. Please let us know if neither of these elements is suitable for a specific measuring task, we will be happy to find a solution.



Rotational-speed transducer with 2 wires, Namur.



Rotational-speed transducer with 3 wires.

Actuating motor

To drive the flaps and control valves on your combustion systems, LAMTEC also offers safety approved motors tried and tested in operation for the electronic assembly in line with the concept of "everything from one source".

Of course, these motors also meet all safety requirements related to the use of tested potentiometers with an interlocking, form-fit connection. LAMTEC offers five types of standard motor: 6 Nm, 20 Nm, 30 Nm, 40 Nm and 90 Nm, all at 60s. runtime. In addition to these standard motors, we can also supply motors up to 200 Nm available with a range of different limit switches, potentiometers and runtimes. LAMTEC also offers other models for electronic manual adjustment, electronic control and special models.



Actuating motor.

Order information.

Fuel/ai ratio control system VMS basic model	
VMS4 configuration	664V00
VMS5 configuration	665V00
Relay modules	
“VMS control unit” relay module for gas valve, oil valve and fan (x1 for each VMS)	660R0014
Relay module with two relays to control an actuating motor up to 50 mA power input (up to approx. 30 Nm), protection rating IP00	660R0013
Relay module with two relays to control an actuating motor up to 50 mA power input (up to approx. 30 Nm), protection rating IP20	660R0013 IP20
Relay module with two relays to control an actuating motor up to 3.15 A power input	660R0131
Relay module for channel changeover oil/gas	660R0030
Additional modules	
LSB module with 4 analogue outputs (0 ... 10 VDC)	663R4025
LSB input module with 4 analogue inputs (0 ... 10 VDC)	663R4026
LSB output module with 4 digital outputs, floating	663R4027
LSB input module with 4 digital inputs 24 VDC	663R4028
LSB output module with 4 analogue outputs (0 ... 20 mA)	663R4029
Additional power pack for LSB modules	663R4024
Communications processor	663P0401
Fieldbus module PROFIBUS DP, incl. connector cable type 663P0305N	663R040-1PB
Fieldbus module MODBUS on terminals (RTU), incl. connector cable type 663P0305N	663R040-3MBK
Fieldbus module Ethernet TCP/IP, incl. connector cable type 663P0305N	663R040-6ET
Fieldbus module INTERBUS, incl. connector cable type 663P0305N	663R040-5IB
Rotational-speed transducer, 2 wires, Namur	663R8101
Rotational-speed transducer, 3 wires	663R8103

Flame monitoring		
F200K		659R60
Accessory cable 3m		659R6112
Accessory holder		659G0501
F300K		659A50
Accessory cable 3m		659N0500
Accessory holder		659S1200
F152		659G0501
FFS07 flame sensor		659D21
Accessory holder		659S1500
FFS08 flame sensor		659D31
Accessory holder		659S1500
Actuating motors		
6 Nm		662R2127
20 Nm		662R2111
30 Nm		662R2112
40 Nm		662R2121
90 Nm		662R2123
Technical documentation		
German manual		DLT1016
English manual		DLT1016
Other languages on request		



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