ISO 9001

CE

Electronic Air / Fuel Ratio Control

RVW20...

Electronic control units
– for modulating single- and dual-fuel burners
– with enhanced functions for mechanical air / fuel ratio control

The RVW20... are tested and certified to EN 298. They carry the CE mark based on the directives for gas-fired appliances and electromagnetic compatibility.

The RVW20... and this data sheet are intended for use by OEMs which integrate the control unit in their products!

Use

- Load-dependent control of
  - burner's air damper
  - fuel valves
  - an additional regulating unit
- Oxygen trim control RPO25... can be connected
- Optimum burner operation

Mechanical design

RVW20...

- Insert of plug-in design with
  - European standard printed circuit boards
  - two 32-pin DIN connectors
  - an exchangeable relay board for controlling the actuators
- Supplied without housing

Located on the front of the unit are:
– LED 1 for fuel 1
– LED 2 for fuel 2
– A 7-segment 3-digit display for burner output, operating phases and fault indication

Housings ARG61.0X0

- Made of impact-proof plastic
- With a transparent cover under which are located:
  - A jack for the handheld terminal AZW20.20
  - An operating mode selector PROG / RUN
- **Must** be ordered as a separate item (refer to «Ordering»)

Warning notes

To avoid personal injury, damage to property or the environment, the following warning notes must be observed!

- It is not permitted to open, interfere with or modify the unit!
- The unit must be completely isolated from the mains supply before performing any work in its connection area!
- Check wiring and all safety functions!
  ⇒ Risk of explosion
- Protection against electric shock hazard on the unit itself and on all electrical connections **must be** ensured through appropriate mounting!
- When wiring the unit, AC 230 V mains voltage and extra low voltage must always be run strictly separate to warrant protection against electric shock hazard!

Engineering notes

- Check the electromagnetic compatibility with nearby components!
- For more details, especially on commissioning, refer to the Basic Documentation P7871!
- The following burner controls can be used in connection with the RVW20...:
  – LAL... / LFL...
  – LEC...
  – LGK16... / LOK16...

Mounting notes

- Observe the relevant national safety regulations!
- When commissioning is completed, check the flue gas values!
- The RVW20...is designed for
  – flush panel mounting with housing ARG61.010
  – wall mounting with housing ARG61.040
    ⇒ Mounting of screw terminal base to the subassembly:
    - Terminal 32 at the top
    - Terminal 2 at the bottom
    - Wiring to be made according to the plant connection diagram

Installation notes

- Installation and commissioning may **only** be carried out by qualified staff!
- Ignition cables must always be laid separate from the unit and other cables while observing the greatest possible distances!
- Prior to commissioning, check wiring and programming carefully!

Ordering

RVW20...	**Air / fuel ratio control** – With data storage module RZD20 plugged in	**RVW20.000D27**
	Air / fuel ratio control – For fuel changeover in operation and 50 % disturbance value authority	**RVW20.001D27**
Housings	For flush panel mounting, with connection terminals and cover	**ARG61.010**
	For wall mounting, with connection terminals and cover	**ARG61.040**
Accessories	**Handheld terminal,** incl. cable KF8859 (L = 2 m) – For programming – For the detection of faults – For the rectification of faults	**AZW20.20**
	Separate cable for handheld terminal (L = 20 m)	**KF8860**
	Data storage module	**RZD20**
	Relay board – Exchangeable – Plug-in design	**4 668 9846 0**
	Conductive plastic potentiometers for actuators (refer to data sheet 7921)	
	– Single potentiometer 1 kΩ / 90°	**ASZ12.803**
	– Single potentiometer 1 kΩ / 135°	**ASZ12.833**
	– Double potentiometer 1 kΩ / 90°	**ASZ22.803**
	– Double potentiometer 1 kΩ / 135°	**ASZ22.833**
	Demo case	**KF8869**

Technical data

Operating voltage	AC 230 V ±15 %
Mains frequency	50 Hz ±6 %
Power consumption	25 VA
Plug-in system	design D to DIN 41612
Dimensions of RVW20... board	100 x 160 mm

Degree of protection of housing

- Front	IP 42 to IEC 529
- Base	IP 10 to IEC 529

Environmental conditions

Transport	IEC 721-3-2
Climatic conditions	class 2K2
Temperature range	-25...+70 °C
Humidity	< 95 % r.h.
Mechanical conditions	class 2M2
Operation	IEC 721-3-3
Climatic conditions	class 3K5
Temperature range	0...+60 °C
Humidity	< 95 % r.h.

Condensation, formation of ice and ingress of water are not permitted!

Switching capacity of terminals L-Q1

- Voltage	AC 230 V ±15 %
- Current	0.005...2 A

Switching capacity of terminals Q4-Q5 / H

- Voltage	AC 24...265 V
- Current at AC 230 V	0.005...2A
- Current at AC 24 V	0.02...2A

Extra low voltage inputs

- Hum voltage	max. AC 50 mV (50 Hz)

Terminals B1...B4

- Voltage	DC 0...10 V
- Impedance	≥ 100 kΩ

Terminals TxD

RS-232 level, 9600 Baud, 8 data bits, 1 stop bit,
- no parity bit

Permissible running time of actuators	20...120 s

Conductive plastic potentiometers

- Resistance	1 kΩ
- Angular rotation	90...135°

- Refer to «Ordering»

Connection terminals for	2 x 1.5 mm²
or	1 x 2.5 mm²
Mounting position	optional
Safety class	II to IEC 730-1

Weight

- With housing	approx. 1.4 kg
- Without housing	approx. 0.75 kg

CE conformity

According to the directives of the European Union
Electromagnetic compatibility EMC
89/336 EWG incl. 92/31 EEC
Directive for gas-fired appliances 90/396 EEC
(level to EN 298)

Positioning signal X3

- Voltage	DC 0...10 V
- Internal resistance	470 Ω

Switching capacity of control outputs Y1...Y6

- Voltage		AC 230 V ±15 %
- Current		max. 5...150 mA eff.
- Switching cycles at	cos φ = 0.6	: 13 x 10^6
	cos φ = 0.8	: 18.8 x 10^6
	cos φ = 1	: 20 x 10^6

Terminals +5 V

- Current	≤1 mA

Extra low voltage output terminals U10

- Voltage	DC 10 V
- Current (all terminals)	max. 50 mA

Terminals X2, U1

- Voltage	DC 0...10 V
- Impedance	25 kΩ

Control inputs Q2, Q3, Y10, Y20, F1, and F2

- Voltage on	AC 187...265 V
- Voltage off	< AC 50 V
- Current on	< 1 mA

Load signal X1

- Voltage	DC 0...10 V
- Internal resistance	100 Ω

Functions

General

- The RVW20... controls the actuators in function of the positioning signals delivered by the load controller
  - depending on programmable curves, for each type of fuel
  - synchronously to one another

Programming

- With the help of the handheld terminal AZW20.20 (to be ordered as a separate item)
  - Programming of setpoint curves
  - Programming of other plant parameters
- Operating mode selector on the RVW20... must be set to PROG
- Three channels:
  - For two, three or four actuators
  - Each with two setpoint curves, with a maximum of 17 breakpoints
- Programmable and stored in non-volatile memory:
  - The ignition position
  - The load-specific operating positions
  - Other parameters
- By using the data storage module RZD20, the values can be transferred to other RVW20...

Supervision and display

- If there are inadmissible operational statuses or fualts in the system, the burner will be shut down
- During startup and shutdown, the RVW20... shows operating phases 0...9 in the display
  ⇒ During operation, the burner's output is displayed as a percentage
- Faults are indicated by a flashing 2-digit code

Startup

- Burner startup is controlled by the burner control
- The RVW20...
  - identifies the startup sequence during the startup phase based on valve and fan control; the actuators are controlled accordingly
  - checks the function of the connected components during the startup sequence
  - runs to the programmed ignition position to allow startup
  - after burner startup, runs to the programmed low flame position

Control mode

- When the operating position is reached, the burner control enables the load controller
- The load controller controls the burner's output via the RVW20...
- The positions of the actuators are calculated
  - based on the required output
  - based on the type of fuel selected
  - with the help of the programmed setpoint curves
- The RVW20... drives the actuators to the calculated positions

Shutdown

- The RVW20... drives the actuators to their start positions
  - after burner shutdown
  - on completion of the post-purge time, if required

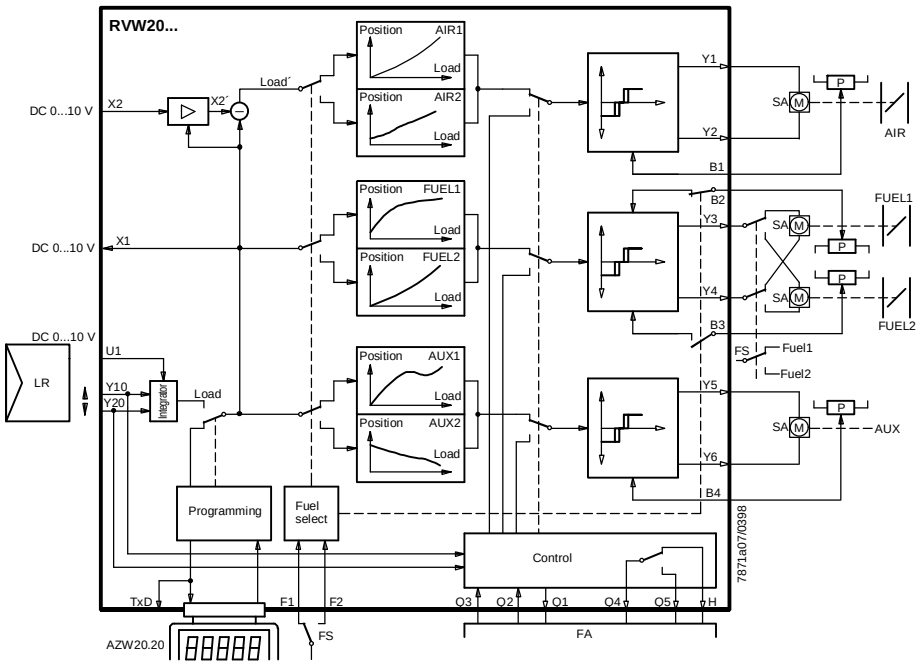
Compensating signal

- Changing combustion parameters (e.g. air density or quality of fuel)
  - can be offset by applying oxygen trim control RPO25... and connecting it to the compensating signal input
  - the authority of the compensating variable can be programmed

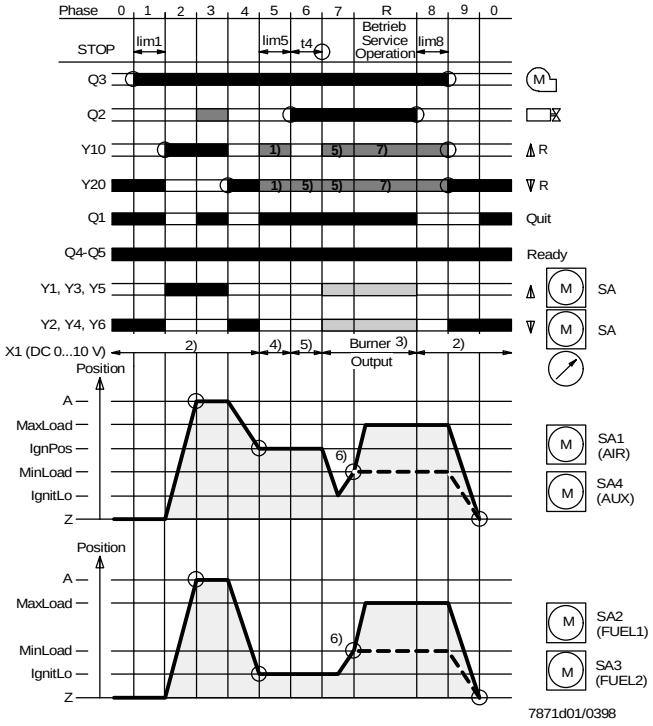
Compensation of hysteresis

- The RVW20... offsets any mechanical play between actuator and regulating unit
- The authority of the compensation can be programmed

Basic diagram



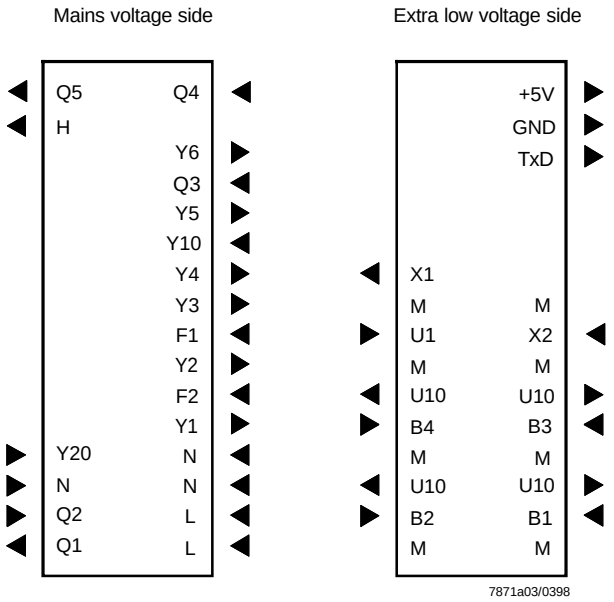
Sequence diagram



Legend

■	Signal must be present or output is live	□	Signal may not be present or output is dead
▒	Signal may be present	▭	Controlled output
○	Prerequisite for changing to the next phase	1)	Signals at Y10 or Y20 only act on output X1
Phase	Program phase	2)	X1 gives the current air damper position
AIR	Setpoint curves of air damper actuator	3)	X1 gives the current burner output
AUX	Setpoint curves of auxiliary actuator	4)	X1 changes according to signals Y10 and Y20
AZW...	Handheld terminal	5)	Signals at Y10 or Y20 have no effect
lim...	Duration of phase 1 is limited to 30 s, phase 5 to 75 s, and phase 8 to 300 s. If, on completion of these periods of time, the sequence does not change, the unit will initiate lockout	6)	If the ignition load (IgnitLo) is set to a level above the minimum burner load, it will be active in phase 7
FA	Burner control	7)	Optionally Y10 / Y20 or analog signal at U1 for controller operation
FS	Fuel selector	P	Potentiometer
FUEL	Setpoint curves of fuel actuator	Q…Y	Terminal designations (refer to «Connection diagram»)
LR	Load controller	SA	Actuators
M	Fan motor	t4	Interval

Electrical connections



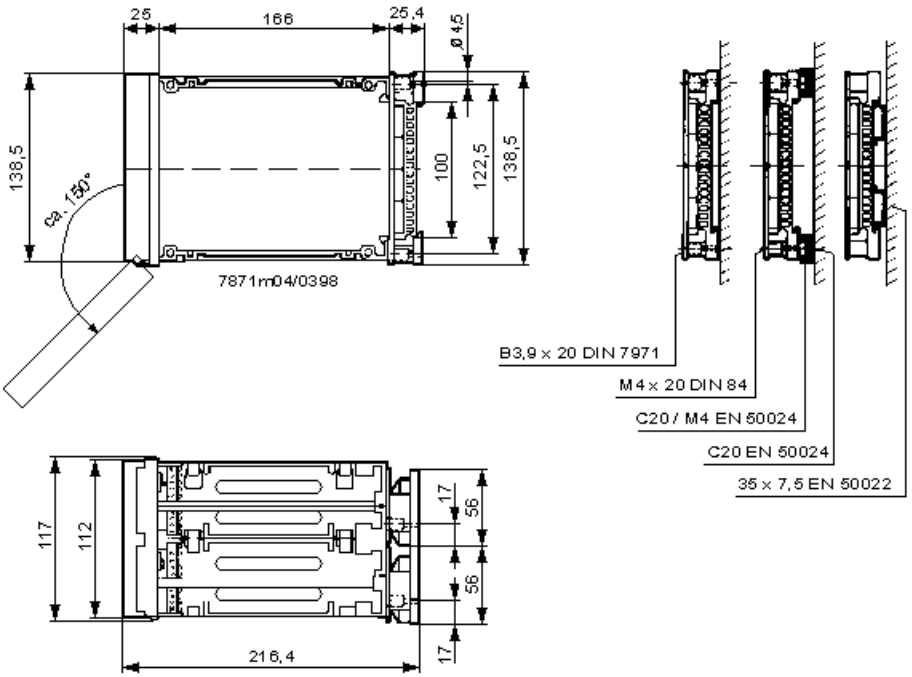
Legend

Terminal	Input / output	Voltage	Description
B1	Input	DC 0...10 V	Feedback signal from air damper actuator
B2	Input	DC 0...10 V	Potentiometer from fuel valve actuator (Fuel1)
B3	Input	DC 0...10 V	Potentiometer from fuel valve actuator (Fuel2)
B4	Input	DC 0...10 V	Potentiometer from auxiliary actuator (AUX)
F1	Input	AC 230 V	Selection of fuel: fuel 1
F2	Input	AC 230 V	Selection of fuel: fuel 2
GND	—	—	Reference potential for RS-232 output
L	Input	AC 230 V	Live for internal power supply, actuator outputs and Q1
M	—	—	Reference potential for all low voltage inputs / outputs and for the screening (all M-terminals are **internally** interconnected)
N	Input	—	Neutral for internal power supply, reference potential for mains voltage inputs (all N-terminals are **internally** interconnected)
Q1	Output	AC 230 V	Acknowledge signal: indicates when certain actuator positions are reached
Q2	Input	AC 230 V	Signal from burner control: first fuel valve on / off
Q3	Input	AC 230 V	Signal from burner control: fan on / off
Q4-Q5 / H	Output	Potential-free	Readiness contact or non-readiness / control loop: indicates when RVW20... is ready to operate
TxD	Output	—	Output RS-232
U1	Input	DC 0...10 V	Signal input for analog burner load control
U10	Output	DC 10 V	Power supply for the potentiometers (all U10 terminals are **internally** interconnected)
X1	Output	DC 0...10 V	Burner load signal
X2	Input	DC 0...10 V	Compensating signal from oxygen trim control RPO25...
Y1	Output	AC 230 V	Positioning signal (open) (three-position control of actuators)
Y2	Output	AC 230 V	Positioning signal (closed) (three-position control of actuators)
Y3	Output	AC 230 V	Positioning signal (open) (three-position control of actuators)
Y4	Output	AC 230 V	Positioning signal (closed) (three-position control of actuators)
Y5	Output	AC 230 V	Positioning signal (open) (three-position control of actuators)
Y6	Output	AC 230 V	Positioning signal (closed) (three-position control of actuators)
Y10	Input	AC 230 V	Signal for higher burner output from the three-position controller
Y20	Input	AC 230 V	Signal for lower burner output from the three-position controller
+5V	Output	DC 5 V	Auxiliary voltage, max. 1 mA

Dimensions

Housing ARG61.040
for wall mounting

Dimensions in mm



Housing AGG61.010
for flush panel mounting