SIEMENS

7872

ISO 9001

CE

Electronic Air / Fuel Ratio Control System

RVW25...

Electronic control unit

- **for use with modulating single- and dual-fuel burners**
- **with extended functionality for mechanical air / fuel ratio control**

The RVW25... and this Data Sheet are intended for use by OEMs which integrate the control system in their products!

Use

The RVW25... provides 3-channel air / fuel ratio control for modulating single- or dual-fuel burners equipped with variable speed combustion air fans.
It controls the speed of the fan and the positions of 2 actuators depending on curves that can be parameterized for each type of fuel.
The RVW25... ensures synchronous control of the 2 actuators among themselves and in relation to the fan's speed.
When used in connection with the RVW26… (refer to Data Sheet 7873), the RVW25… can be extended by another 2 actuator channels.
This functionality and the option of O_2 trim control RPO25... ensure optimum and efficient burner operation.

Warning notes

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

Do not open, interfere with or modify the unit!

- Before performing any wiring changes in the connection area of the RVW25…, completely isolate the unit from the mains supply (all-polar disconnection)
- Ensure protection against electric shock hazard by providing adequate protection for the terminals
- Check wiring and all safety functions
- Fall or shock can adversely affect the safety functions. Such units may not be put into operation, even if they do not exhibit any damage
- To warrant protection against electric shock hazard, ensure that AC 230 V mains voltage is strictly separated from extra low voltage

Engineering notes

- For additional information, especially on commissioning, refer to Basic Documentation P7872.1
- The following types of burner controls can be used in connection with the RVW25...: LAL..., LFL1..., LEC..., LGK16... and LOK16...
- Fan motor, speed controller and tacho-generator are monitored by the RVW25… and must be matched to one another. The mechanical coupling between fan motor and tacho-generator must be free from slippage

Mounting notes

- Ensure that the relevant national safety regulations are complied with
- After commissioning, check the flue gas values
- The RVW25... is designed for
  – flush panel mounting with housing ARG61.010
  – wall mounting with housing ARG61.040:
    fitting the 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
- The signal converter AGK34.000 should be mounted as close as possible to the RVW25... in order to ensure short cable lengths
- The speed controller should be located and the actuator cable be run in the greatest possible distance from the RVW25...

Installation notes

- Installation work must be carried out by qualified staff
- Prior to startup, check wiring and parameter settings carefully

Commissioning notes

- Commissioning and maintenance work must be carried out by qualified staff
- After commissioning, check the flue gas values

Disposal notes

The unit contains electrical and electronic components and may not be disposed of together with household garbage.
Local and currently valid legislation must be observed.

Mechanical design

RVW25...

- Insert of plug-in design with
  – European standard printed circuit boards
  – 2 x 32-pin DIN connectors
  – exchangeable relay board for controlling the actuators and for enabling the speed controller
- Supplied without housing

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

Housing ARG61.0X0

- Made of impact-proof plastic
- With a transparent cover under which are located:
  - jack for the handheld terminal AZW20.20
- To be ordered as a separate item (refer to «Ordering»)

AGK34.000

Signal converter for the tacho-generator signal, accommodated in a housing for DIN rail mounting (DIN EN 50022). Cable connections with screw terminals.

Ordering

Air / fuel ratio control unit **RVW25.000B27**
- With data storage module RZD20 plugged in
- Without housing ARG61.0X0

Housings
- For flush panel mounting, complete with connection terminals and cover **ARG61.010**
- For wall mounting, complete with connection terminals and cover **ARG61.040**

Accessories

Handheld terminal **AZW20.20**
- Complete with cable KF8859 (2 m)
- For setting the parameters
- For fault detection
- For troubleshooting

Separate **cable** for handheld terminal (20 m) **KF8860**

Data storage module **RZD20**
(2 pieces in one package (backup data carrier))

Relay board **4 668 9913 0**
- Exchangeable
- Plug-in design

Tacho-generator interface **AGK34.000**

Conductive plastic potentiometers for actuators refer to Data Sheet 7921

Technical data

Mains voltage	AC 230 V ±15 %
Mains frequency	50 Hz ±6 %
Power consumption	25 VA
Plug-in system	design D to DIN 41612
Dimensions of RVW25... board	100 x 160 mm
Connection terminals for	2 x 1.5 mm ² or 1 x 2.5 mm ²
Mounting position	optional
Safety class	II to IEC 730-1
Degree of protection of housing	
- Front	IP 42 to IEC 529
- Base	IP 10 to IEC 529
Weight	
- With housing	approx. 1.4 kg
- Without housing	approx. 0.75 kg
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...2 A
- Current at AC 24 V	0.02...2 A
Extra low voltage inputs	
Hum voltage	max. AC 50 mV (50 Hz)
Terminals **B1...B4**	
- Voltage	DC 0...10 V
- Impedance	≥ 100 kΩ
Conductive plastic potentiometers	
- Resistance	1 kΩ
- Angular rotation	90...135°
- Refer to Data Sheet 7921	
Positioning signal **X3**	
- Voltage	DC 0...10 V
- Internal resistance	470 Ω
Switching capacity of control outputs **Y3...Y7**	
- Voltage	AC 230 V ±15 %
- Current	max. 5...150 mA eff.
- Number of 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
Extra low voltage outputs terminal **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
	Perm. running time of actuators	30...60 s

Environmental conditions	**Transport**	IEC 721-3-2
	Climatic conditions	class 2K2
	Mechanical conditions	class 2M2
	Temperature range	-25...+70 °C
	Humidity	< 95 % r.h.
	Operation	IEC 721-3-3
	Climatic conditions	class 3K5
	Mechanical conditions	class 3M2
	Temperature range	0...60 °C
	Humidity	< 95 % r.h.
⚠	**Condensation, formation of ice and ingress of water are not permitted!**	

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

AGK34...	Input voltage **B10, B11**	max. AC 35 V
	Output voltage **B1, M**	DC 0...10 V
	Degree of protection	IP 10, IEC 529
	Mounting position	optional

Tacho-generator	Output voltage	AC 10 V / 1000 rpm
	Impedance	≤ 3 kΩ
	Number of poles	≥ 2

Speed controller	Speed control	DC 0...10 V, extra low voltage
	Input impedance	≥ 100 kΩ
	Ramp time (adjustable)	≤ 30 s
	Start / stop input	AC 230 V, e.g. Danfoss series VLT 3500

Function

Parameter settings

The setpoint curves and other plant parameters are set with the help of the handheld terminal AZW20.20 (to be ordered as a separate item).
For each channel, there are 2 setpoint curves available (fuel 1 and fuel 2), with a maximum of 17 breakpoints.
Intermediate positions are calculated.
The ignition position, the load-specific operating positions and other parameters can be set and are stored in nonvolatile memory.
The values can be transferred to another unit with the help of the data storage module RZD20.

Supervision and display

- If inadmissible operating states or system faults occur, the burner will be shut down
- During startup and shutdown, the RVW25... shows operating phases 0…9 on 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 RVW25...
  – identifies the startup sequence during the startup phase based on valve and fan control; the fan and the actuators are controlled accordingly
  – checks the correct functioning of the connected components during the startup sequence
  – runs to the parameterized ignition position to enable startup
  – runs to the parameterized low-fire position after startup

Controlled operation

After reaching the operating position, the burner control will enable the load controller which now ensures control of the burner.
According to the setpoint signal delivered by the controller (3-position or DC 0...10 V), the RVW25... controls the actuators and the fan's speed based on the parameterized curves.

Shutdown

The RVW25... drives the actuators to their start positions after burner shutdown and on completion of the postpurge time, if scheduled, and waits for the next startup command.

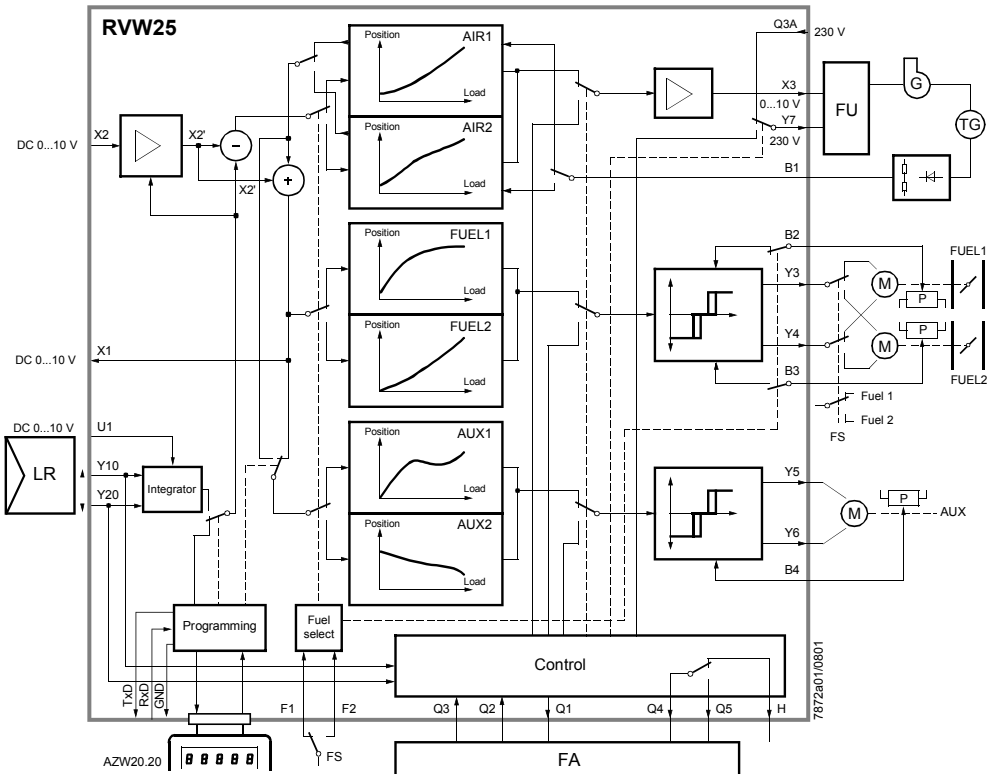
Correcting signal

- Changes to the combustion parameters (e.g. density of air or quality of fuel)
  – can be offset by connecting O_2 trim control RPO25... to the input for the correcting signal
  – the authority of the correcting variable can be parameterized

Compensation of hysteresis

- The RVW25... offsets mechancial play between actuator and controlling element
- The authority of compensation of the hysteresis can be parameterized

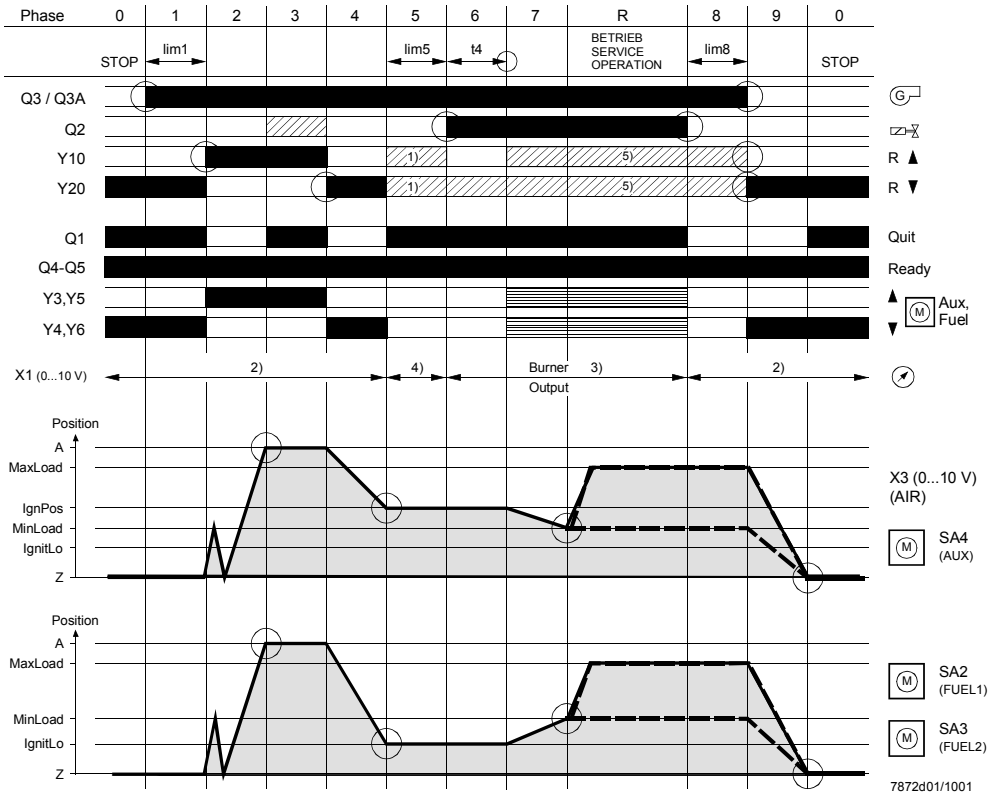
Basic diagram



Legend

AIR	Setpoint curves of the fan speed
AUX	Setpoint curves of the auxiliary actuators
AZW...	Handheld terminal
FA	Burner control
FS	Fuel selector
FU	Speed controller
FUEL	Setpoint curves of the fuel actuator
G	Fan
LR	Load controller
M	Motor of the actuators
Q...Y	Terminal markings (refer to «Connection diagram»)
TG	Tacho-generator
U1	Analog load input
X1	Analog load output
X2	Correcting signal of O_2 trim control RPO25...

Sequence diagram



Legend

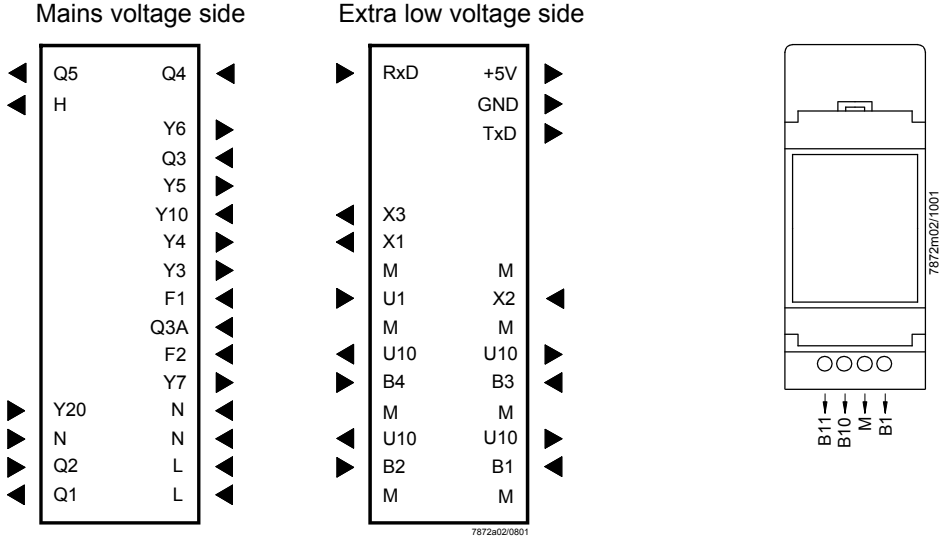
■	Signal must be present or output is under voltage
□	Signal may not be present or output is dead
▨	Signal can be present
▤	Controlled output
○	Prerequisite for changing to the next phase
Phase	Parameter setting phase

AIR	Setpoint curves of the fan speed
AUX	Setpoint curves of the auxiliary actuators
AZW...	Handheld terminal
FA	Burner control
FS	Fuel selector
FU	Speed controller
FUEL	Setpoint curves of the fuel actuator
G	Fan
LR	Load controller
M	Motor of the actuators
P	Potentiometer
Q...Y	Terminal marking (refer to «Connection diagram»)
SA	Actuator
TG	Tacho-generator
U1	Analog load input
X1	Analog load output
X2	Correcting variable (input)

1)	Signals at «Y10» or «Y20» only act on output «X1»
2)	Output «X1» gives the current fan speed
3)	Output «X1» gives the current burner output
4)	Output «X1» changes according to signals at «Y10» and «Y20»
5)	Optionally «Y10 / Y20» or analog signal «U1» for controlled operation

lim...	Duration of phase is limited. If the sequence does not change by the time the set period has elapsed, the unit will initiate lockout
lim1	= 30 s
lim5	= 75 s
lim8	= 30 s
t4	Interval

Connection terminals



RVW25... AGK34...

Legend

Terminal	Input / output	Voltage	Description
B1	I	DC 0...10 V	Tacho-generator signal (fan speed) from the AGK34.000
B2	I	DC 0...10 V	Potentiometer (wiper) fuel actuator (Fuel1)
B3	I	DC 0...10 V	Potentiometer (wiper) second fuel actuator (Fuel2)
B4	I	DC 0...10 V	Potentiometer (wiper) auxiliary actuator (AUX)
F1	I	AC 230 V	Selection of fuel: fuel 1
F2	I	AC 230 V	Selection of fuel: fuel 2
L	I	AC 230 V	Live for internal power supply, actuator output and «Q1»
M	---	---	Reference potential for all extra low voltage inputs / outputs and for screening (all M-terminals are internally interconnected)
N	I	---	Neutral conductor for internal power supply, reference potential for the mains voltage inputs (all N-terminals are internally interconnected)
Q1	O	AC 230 V	Acknowledge signal: indicates when certain actuator positions are reached
Q2	I	AC 230 V	Signal from the burner control: first fuel valve on / off
Q3	I	AC 230 V	Signal from the burner control: fan on /off
Q3A	I	AC 230 V	Signal from the burner control: fan on /off
Q4-Q5 / H	O	potential-free	Readiness contact / control loop: indicates when the RVW25... is ready to operate
TxD	O	---	Output = interface for communication with the RVW26...
RxD	I	---	Input = interface for communication with the RVW26...
GND	---	---	Reference potential for RS-232 output
U1	I	DC 0...10 V	Signal input for analog control of the burner's output
U10	O	DC 10 V	Power supply for the potentiometers (all «U10» terminals are internally interconnected)
X1	O	DC 0...10 V	Burner load signal
X2	I	DC 0...10 V	Correcting signal from O2 trim control RPO25...
X3	O	DC 0...10 V	Preset speed for speed controller
Y3	O	AC 230 V	Positioning signal (open) (3-position control of the actuators)
Y4	O	AC 230 V	Positioning signal (close) (3-position control of the actuators)
Y5	O	AC 230 V	Positioning signal (open) (3-position control of the actuators)
Y6	O	AC 230 V	Positioning signal (close) (3-position control of the actuators)
Y7	O	AC 230 V	Enabling the speed controller and the fan
Y10	I	AC 230 V	Signal for increasing the burner's output (from the 3-position controller)
Y20	I	AC 230 V	Signal for decreasing the burner's output (from the 3-position controller)
+5 V	O	DC 5 V	Auxiliary voltage, max. 1 mA

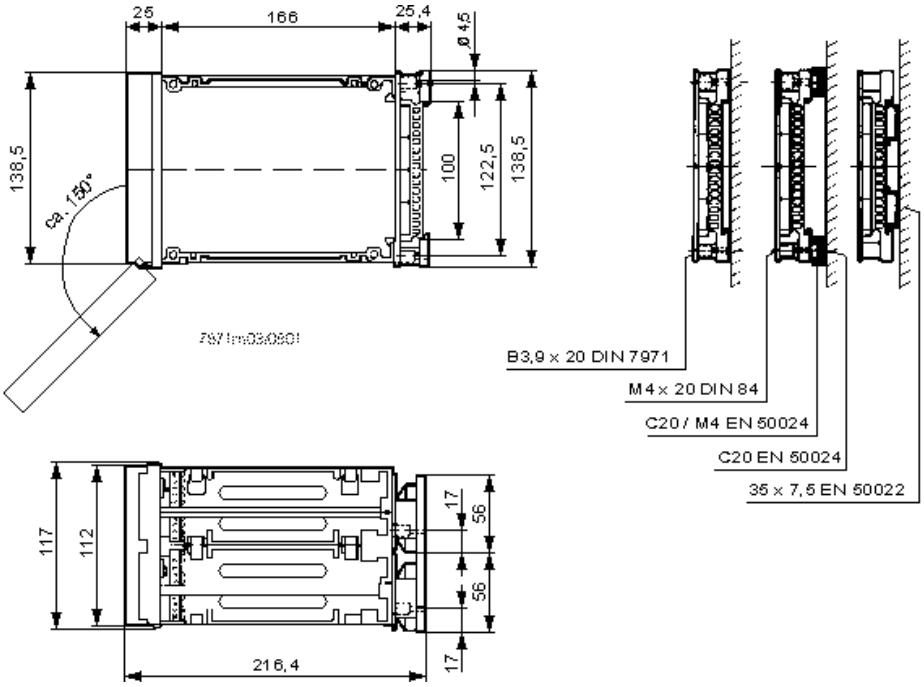
AGK34.000

Terminal	No.	Input / output	Voltage	Description
B1	3	O	DC 0...10 V	Speed signal to the RVW25…
M	4	O	---	Reference potential
B10	9	I	AC 0...35 V	Tacho-generator signal
B11	10	I	AC 0...35 V	Tacho-generator signal

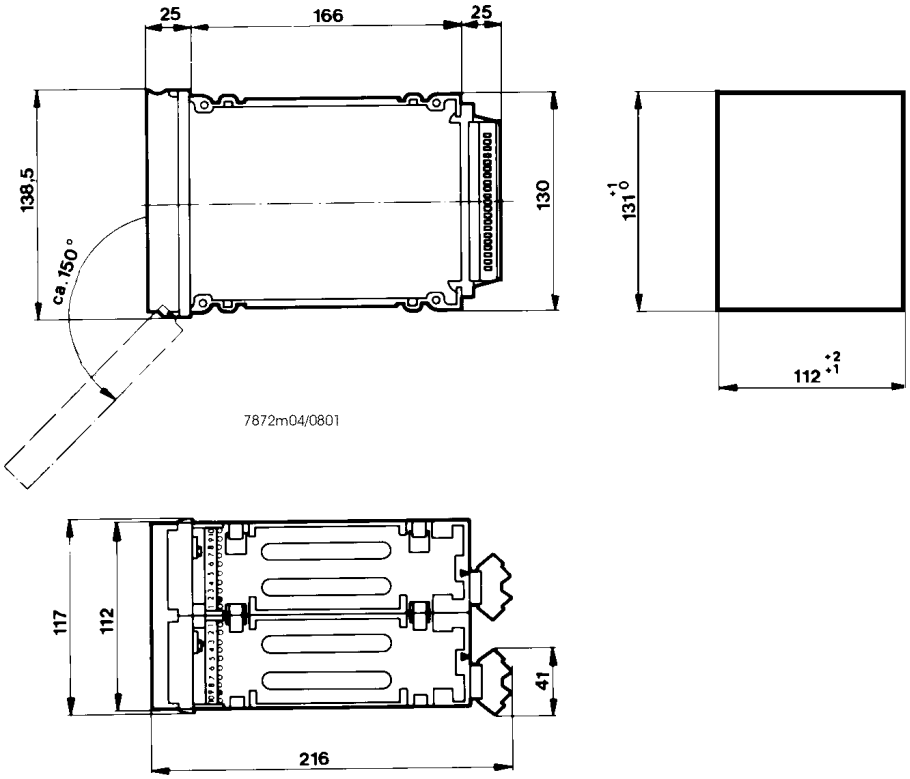
Dimensions

Dimensions in mm

Housing ARG61.040
for wall mounting



Housing ARG61.010
for flush panel mounting



Accessories AGK34.000