



ISO 9001



# Electronic Air / Fuel Ratio Control

**RVW25...**



**Electronic control unit for use with modulating single- or dual-fuel burners, with enhanced functionality for mechanical air / fuel ratio control.**

**RVW25... control units are CE-certified in compliance with the directives for gas-fired appliances and electromagnetic compatibility.**

**The RVW25... and this data sheet are intended for use by OEMs that integrate the control unit in their products!**

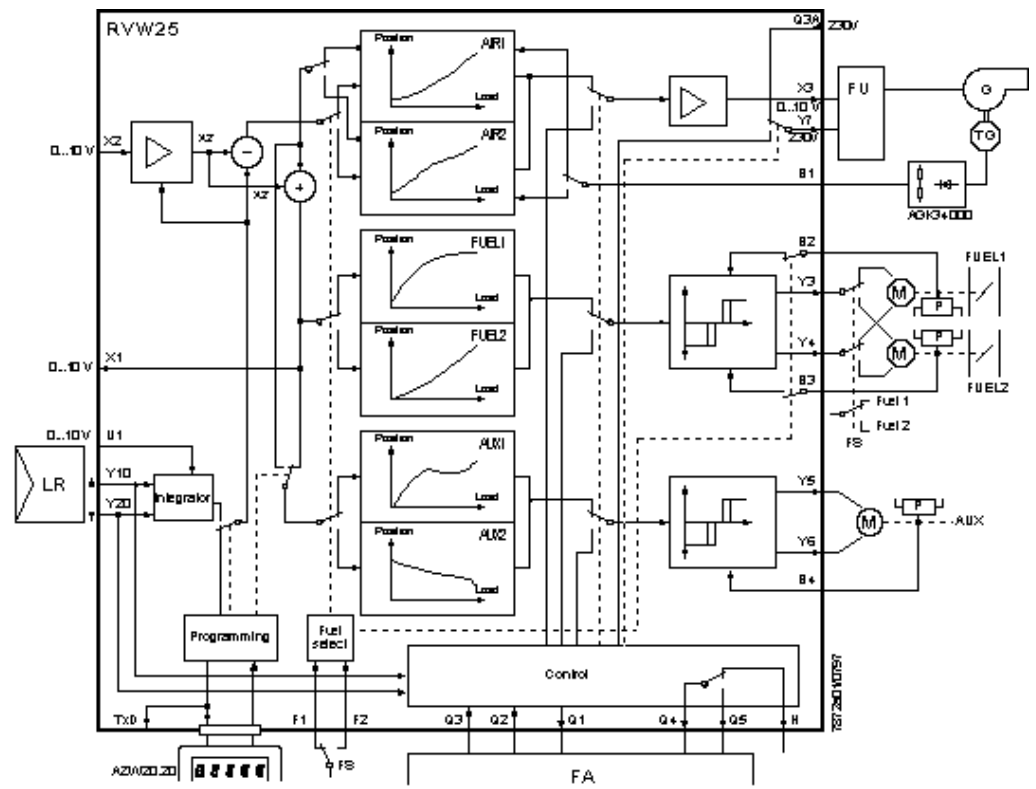
## Use

The RVW25... provides three-channel air / fuel ratio control for modulating single- or dual-fuel burners that use variable speed fans for the combustion air. It controls the fan's speed and the positions of two actuators depending on the characteristics of curves that can be programmed for each type of fuel. The RVW25... ensures synchronous control of the two actuators to one another and also with respect to the fan's speed. This functionality and the option of oxygen trim control (RPO25...) ensure optimum and efficient burner operation. The RVW25... can also be used with the RVW26... ancillary unit (refer to data sheet 7873) and another two actuator channels.

## Ordering

RVW...	Air / fuel ratio control unit with plugged-in RZD20 data storage module, without ARG61.0X0 casing	<b>RVW25.000A27</b>
Casing	For flush panel mounting, complete with connection terminals and cover For wall mounting, complete with connection terminals and cover	<b>ARG61.010</b> <b>ARG61.040</b>
Accessories	Handheld terminal for programming, tracing and rectification of faults, complete with KF8859 cable (L=2 m) Separate cable for handheld terminal (L=20 m) Data storage module Exchangeable relay board (plug-in type) Tacho-generator interface Conductive plastic potentiometers for actuators: 1 kΩ / 90° single potentiometer 1 kΩ / 130° single potentiometer 1 kΩ / 90° double potentiometer 1 kΩ / 130° double potentiometer	<b>AZW20.20</b> <b>KF8860</b> <b>RZD20</b> <b>4 431 9680 0</b> <b>AGK34.000</b> <b>ASZ12.803</b> <b>ASZ12.833</b> <b>ASZ22.803</b> <b>ASZ22.833</b>

# Basic diagram



## Legend

AIR...	Setpoint curves for fan speed	LR	Load controller
FUEL...	Setpoint curves for fuel actuators	M	Actuators
AUX...	Setpoint curves for auxiliary actuator	TG	Tacho-generator
AZW...	Handheld terminal	X1	Analog load signal output
FA	Burner control	X2	Input correcting signal
FU	Speed controller	U1	Analog load signal input
FS	Fuel selector	G	Fan

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## Functions

Programming	The setpoint curves and other plant parameters are programmed with the help of the <b>AZW20.20</b> handheld terminal, which must be ordered as a separate item. To do the programming, the operating mode selector on the RVW25... (located under the front plate) must be set to PROG. For each channel, there are two setpoint curves available (for fuel 1 and 2), with a maximum of 17 breakpoints. Intermediate positions are calculated. The ignition position, the load-specific operating positions and other parameters can be programmed and are stored in non-volatile memory. The values can be transferred to another unit with the help of the <b>RZD20</b> data storage module.
Supervision and display	RVW25... satisfies the safety requirements of large combustion plants. In the case of inadmissible operational statuses or system faults, the burner will be shut down. During startup and shutdown, the RVW25... displays operating phases 0...9. When the burner operates, the unit displays the output as a percentage that has internally been calculated. Faults are indicated by a flashing two-digit code.
Startup	The burner's startup is controlled by the burner control. Based on the control of the valves and the fan, the RVW25... identifies the startup sequence and controls the fan and the actuators accordingly. During the startup phase, the RVW25... monitors the proper functioning of the connected elements. For startup, the RVW25... assumes the programmed ignition position and, after the start of the burner, the programmed low-flame position.
Control operation	When the operating position is reached, the burner control releases the load controller, which in turn monitors the control of the burner. Based on the controller's setpoint signal (three-position or DC 0...10 V), the RVW25... controls the actuators and the fan's speed according to the programmed curves.
Shutdown	After the burner has been shut down and after completion of a possible post-purge time, the RVW25... drives the actuators to their start positions and waits for the next startup signal.
Correcting signal	Changes of combustion parameters (e.g. air density or quality of fuel) can be compensated by feeding a DC 0...10 V signal from the RPO25... oxygen trim control system to the correcting signal input of the RVW25....

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## Mechanical design

RVW25...	<p>The unit is of plug-in design with European standard printed circuit boards and two 32-pin DIN connectors. The RVW25... is supplied without casing.</p> <p>The relays for controlling the actuators and the speed controller are exchangeable and fitted on a separate printed circuit board.</p> <p>Located on the front of the unit are:</p> <ul style="list-style-type: none"><li>• LED 1 for fuel 1</li><li>• LED 2 for fuel 2</li><li>• Seven-segment display (three digits) for the operating phases, load and fault indication</li><li>• Under the hinged front plate are:<ul style="list-style-type: none"><li>- A jack for the AZW20.20 handheld terminal</li><li>- The operating mode selector PROG / RUN</li></ul></li></ul>
ARG61.0X0 casing	Made from impact-proof plastic, with transparent cover.
AGK34.000	Signal converter for the tacho-generator signal, accommodated in a casing for DIN rail mounting (DIN EN 50022). Connection of cable with screw terminals.

## Technical data

RVW25...

Operating voltage	AC 230 V ±15 %	Plug-in system	design D to DIN 41612
Frequency	50 Hz ±6 %	Connection terminals for	2 x 1.5 mm <sup>2</sup> or 1 x 2.5 mm <sup>2</sup>
Power consumption	25 VA		
<b>Degree of protection of casing</b>		Dimensions of RVW25... board	100 x 160 mm
- Front	IP 42, IEC 529		
- Base	IP 10, IEC 529	<b>Weight</b>	
		- With casing	1.4 kg
Safety class	II to IEC 730-1	- Without casing	0.75 kg
Mounting position	optional		
<b>Environmental conditions RVW25... and AGK34...</b>		<b>CE conformity</b>	
- Transport	IEC 721-3-2	Directives of the European Union	
Climatic conditions	class 2K2	Electromagnetic compatibility EMC	
Temperature range	-25...+70 °C	89/336 EEC incl. 92/31 EEC	
Humidity	< 95 % r.h.	Directive for gas-fired appliances	90/396 EEC
Mechanical conditions	class 2M2	Emissions	EN 50081-2
- Operation	IEC 721-3-3	Immunity	EN 50082-2
Climatic conditions	class 3K3	(level to EN298)	
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...2 A
at AC 24 V	0.02... 2A

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

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

### Extra low voltage inputs

- Max. hum voltage	AC 50 mV (50 Hz)
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### Terminals B1...B4

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

### Terminals X2, U1

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

### Potentiometers

(conductive plastic)	refer to "Ordering"
- Resistance	1 kΩ
- Angular rotation	90...130°

### Switching capacity of control outputs Y3...Y7

- Voltage	operating voltage
- Current (max.)	5 ... 150 mA eff.
- Number of switching cycles at	

cosφ = 0.6 : 13 x 10<sup>6</sup>

cosφ = 0.8 : 18.8 x 10<sup>6</sup>

cosφ = 1 : 20 x 10<sup>6</sup>

### Extra low voltage outputs

#### Terminal U10

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

#### Load signal X1

- Internal resistance	DC 0...10 V 100 Ω
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#### +5 V terminal

loading ≤ 1 mA

#### TxD terminal

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

Perm. actuator running time 30...60 s

#### Positioning signal X3

- Internal resistance	DC 0...10 V 470 Ω
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AGK34...

Input voltage B11, B12	AC 35 V max.	Safety class	IP10, IEC 529
Output voltage B1, M	DC 0...10 V	Mounting position	optional

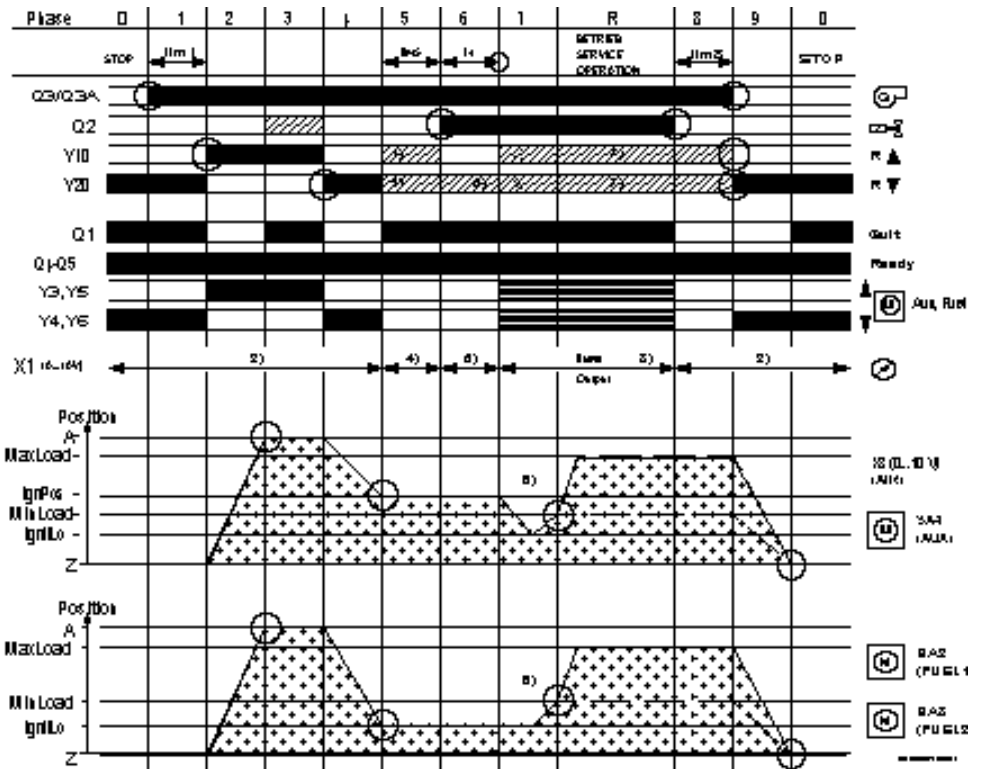
Tacho-generator

Output voltage	AC 10 V / 1000 rpm	Number of poles	≥ 2
Impedance	≤ 3 k Ω		

Speed controller

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

# Sequence diagram



Legend

- 1) Signals at Y10 or Y20 only act on output X1
  - 2) X1 signals the current air damper position
  - 3) X1 signals the current burner output
  - 4) X1 changes according to the signals Y10 and Y20
  - 5) Signals at Y10 and Y20 have no effect
  - 6) If the ignition load (IgnitLo) is set to a level above the minimum burner load, it will be active in phase 7
  - 7) Optionally Y10 / Y20 or analog signal at U1 for controller operation
- 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 phase has not changed, the unit will go to lockout
- t4* Interval

## Engineering and commissioning notes

The RVW25... can be used in connection with the following types of burner controls: LAL..., LFL1..., LGK16 / LOK16, and LEC. 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 slipping. For additional information, especially on commissioning, refer to Product Information P7872.

## Mounting notes

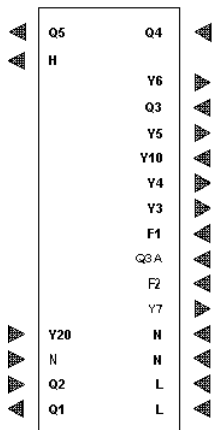
When used with the ARG61.010 casing, the RVW25... is suited for flush panel mounting, with the ARG61.040, for wall mounting. In the case of wall mounting, the screw terminal base must be fitted upside down, that is, terminal 32 at the top and terminal 2 at the bottom. The wiring must be made according to the plant connection diagram. The AGK34... should be installed as close as possible to the RVW25... in order to obtain the shortest possible cable lengths. The speed controller and the actuator cable should be located in the greatest possible distance from the RVW25... in order to eliminate electromagnetic interference.

**Improper installation or operation may lead to severe personal injury or damage to property!**

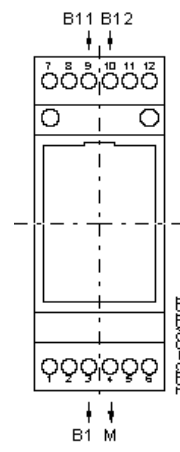
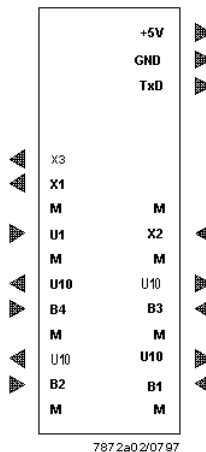
- In the geographical areas where DIN standards are in use, the installation must be in compliance with VDE requirements, particularly with the standards DIN / VDE 0100 and 0722!
- All regulations and standards applicable to the particular application must be observed!
- Installation and commissioning work must always be carried out by qualified personnel!
- Condensation and ingress of humidity must be avoided!
- The electrical wiring must be made in compliance with national and local standards and regulations!
- Ignition cables must always be laid separately, maintaining the greatest possible distance to the unit and other cables!
- RVW25... are safety devices. It is therefore not permitted to open, interfere with or modify the units!
- Check wiring carefully before putting the unit into operation!
- The unit must be completely isolated from the mains before performing any work in the electrical connection area of the RVW25...!
- Check all safety functions when putting the unit into operation, or after performing service work!
- After putting the unit into operation, check the flue gas values!
- Electromagnetic emissions must be checked from an application point of view!
- To warrant protection against electric shock hazard, make certain that AC 230 V mains voltage is strictly separated from extra low voltage!

# Electrical connections

Mains voltage connections



Extra low voltage connections



RVW25...

AGK34.000

Legend

Terminal	Input / output	Voltage	Description
B1	input	DC 0...10 V	Tacho-generator signal (fan speed) from AGK34.000
B2	input	DC 0...10 V	Potentiometer (wiper) from fuel actuator (fuel 1)
B3	input	DC 0...10 V	Potentiometer (wiper) from second fuel actuator (fuel 2)
B4	input	DC 0...10 V	Potentiometer (wiper) from auxiliary actuator (AUX)
F1	input	AC 230 V	Fuel selection: fuel 1
F2	input	AC 230 V	Fuel selection: fuel 2
L	input	AC 230 V	Live for internal power supply, actuator outputs and Q1
N	input		Neutral for internal power supply, reference potential for mains voltage inputs (all N-terminals are <b>internally</b> interconnected)
M			Reference potential for all extra low voltage inputs / outputs and for shielding (all M-terminals are <b>internally</b> 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
Q3A	input	AC 230 V	Same as Q3
Q4-Q5 / H	output	potential-free	Standby contact / control loop: indicates when RVW25... is ready to operate
TxD	output		Output RS-232
GND			Reference potential for RS-232 output
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 <b>internally</b> interconnected)
X1	output	DC 0...10 V	Burner load signal
X2	inout	DC 0...10 V	Correcting signal from oxygen trim control of RPO25...
X3	output	DC 0...10 V	Preset speed for speed controller
Y3	output	AC 230 V	Positioning signal (open) (three-position control of actuators)
Y5	output	AC 230 V	Positioning signal (open) (three-position control of actuators)
Y4	output	AC 230 V	Positioning signal (close) (three-position control of actuators)
Y6	output	AC 230 V	Positioning signal (close) (three-position control of actuators)
Y7	output	AC 230 V	Release of speed controller and fan
Y10	input	AC 230 V	Signal for higher burner output from three-position controller
Y20	input	AC 230 V	Signal for lower burner output from three-position controller
+5V	output	DC 5 V	Auxiliary voltage, 1 mA max.

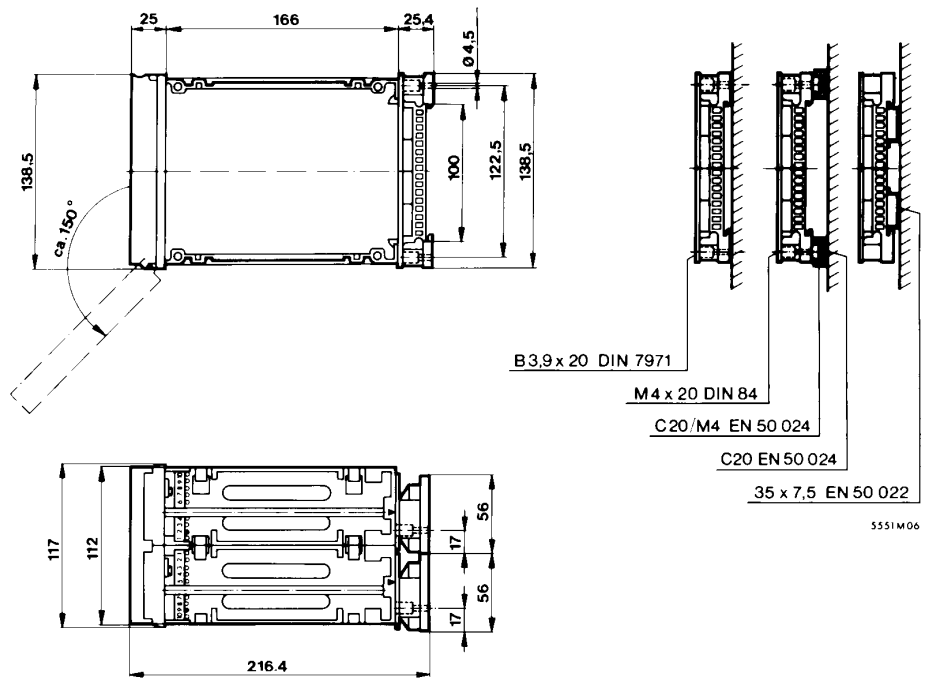
AGK34.000

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

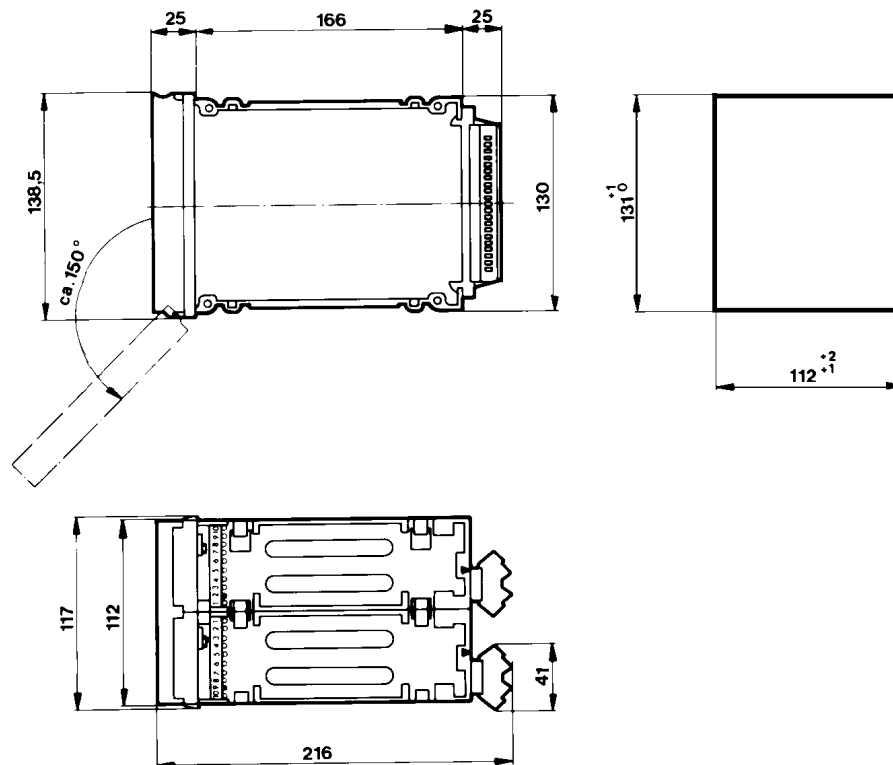
## Dimensions

ARG61.040  
casing for wall mounting

Dimensions in mm



AGG61.010  
casing for flush panel  
mounting





**Accessories**

Dimensions in mm

AGK34.000

