SIEMENS

7865

ISO9001

CE

RWF40... complete with housing

Compact Universal Controllers

RWF40...

The RWF40... is a universal digital boiler temperature / pressure controller with functions designed specifically for the control of heat generating plant.

The RWF40... and this data sheet are intended for use by OEMs which integrate the controller in their products!

Mechanical design

The controller is supplied complete with a housing for flush panel mounting. The RWF40... is matched to the controlled variable and the required setpoint range by making parameter settings. The control parameters can be set and optimized while the burner is running. All settings are made with four buttons located on the unit front and are directly displayed.

LEDs on the front indicate the following operational statuses:

- Control «ON / OFF»
- Positioning pulses «ON» or «OFF» for driving the burner´s air damper when using modulating burner control, or «Stage I / stage II» when using two-stage burner control
- «Two-stage» operating mode
- Position of the configurable contact «K6»
- Manual control «ON / OFF»

During operation, the digital displays above the LEDs show the setpoint (green), the actual value (red) and – when making parameter settings – the relevant parameters.

CC1N7865E
March 28, 2000

Siemens Building Technologies
Landis & Staefa Division

Warning notes

To avoid injury to persons, damage to property or the environment, the following warning notes should be observed!
It is not permitted to open, interfere with or modify the controller!

- When selecting the cables, when making the installation and the electrical connections, observe the regulations of VDE 0100 «Erection of power installations with rated voltages below AC 1000 V» and the relevant national regulations
- The electrical connections may only be made by authorized staff
- Provide double-pole isolation of the controller from the mains supply if there is a risk of touching live parts while work is carried out

Installation notes

Please observe the notes given in the user documentation CC1B7865E.

Service notes

- For service purposes, the controller can be removed from is housing with no need for tools
- The electrical connections are made via the screw terminals located at the rear of the housing

Type summary

Controller with — **RWF40.000A97**
- three-position output
- housing
- fixing material and seal

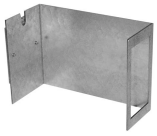
Controller with — **RWF40.001A97**
- three-position output
- analog output
- housing
- fixing material and seal

Controller with — **RWF40.002A97**
- three-position output
- analog output
- RS-485 port
- housing
- fixing material and seal

Packaging variants — **RWF40.010A97**, **RWF40.011A97**, **RWF40.012A97**

Accessories

Adapter frame for replacing the RWF32... — **ARG40**



Bracket — **ARG41**
For mounting the RWF40... on 35 mm DIN rails to DIN 46277

Dummy cover — **AVA10.200/109**
For covering a panel cutout for the RWF40...

Technical data

General controller data	Mains voltage	AC 100...240 V ±10 %
	Mains frequency	50...60 Hz
	Safety class	II to DIN 0631
	Mounting orientation	optional
	Terminals for 2 x 1.5 mm² or 1 x 2.5 mm²	
	Power consumption	approx. 8 VA
	Safety extra low voltage	DC 24 V
	Contact rating of the control outputs (relays «K1...K3»)	
	- Up to 2 x 10^5 switching cycles	max. 2 A; AC 24...240 V
	- Up to 10^7 switching cycles	max. 0.1 A; AC 24...240 V
	Weight complete with housing	approx. 760 g
	Recommended actuator running time	15...60 s
	Degree of protection of housing	
	- Front	IP 65, EN 60529
	- Base	IP 20, EN 60529

Environmental conditions	**Transport**	
	Temperature range	-40...+70 °C
	Humidity	< 75 % r.h.
	Operation	
	Temperature range	-20...+50 °C
	Humidity	< 75 % r.h.
⚠	**Condensation, formation of ice and ingress of water are not permitted!**	

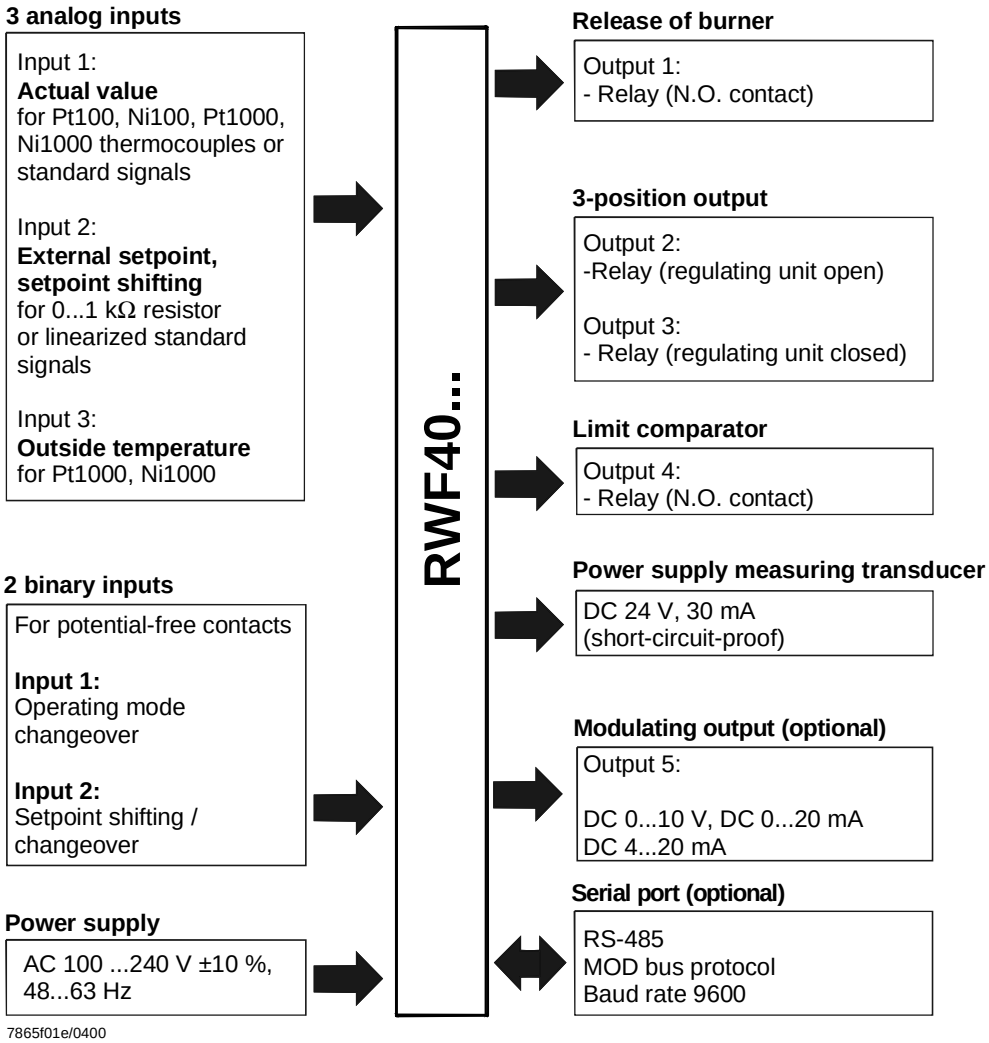
CE conformity	
According to the directives of the European Union	
Electromagnetic compatibility EMC according to NAMUR recommendation	NE 21, EN 50 081 Part 1 and EN 50 082 Part 2

Function

The RWF40... provides the following functions:

- One **digital PID controller** with a three-position or analog output (optional)
- To control two-stage burners, the RWF40... can be switched over to provide two-position control
- Automatic **thermostat (or pressurestat) function** in low-fire operation
- One **shift controller** for weather-dependent setpoint shifting
- One **minimum limiter and one maximum limiter** for the boiler temperature or the boiler pressure
- One **limit thermostat** to DIN 3440
- One potential-free **configurable** contact
- Manual operating mode
- Communication via serial port (option)
- Self-setting function

Block structure



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Function of the controller when used for burner control

Low-fire operation

In low-fire operation, the RWF40... operates like a control thermostat or pressurestat. This means that it operates as a two-position controller maintaining the required setpoint by switching the burner on and off. The switching differential for two-position operation can be adjusted within a wide range. If the demand for heat increases, the controller switches to high-fire operation only when an adjustable limit is exceeded. This function is aimed at optimizing the burner´s switching ratio.

High-fire operation, two-stage control

In that case, the RWF40... operates as a two-position controller with adjustable switching thresholds. Using the relays of the three-position output, the RWF40... drives the actuator to the 1st and 2nd output stage. In this operating mode, the optional analog output switches between the minimum signal for the 1st stage and the maximum output signal for the 2nd stage.

High-fire operation, modulating control

In that case, the RWF40... operates as a PID / PI controller with a three-position output without position feedback signals or, optionally, with a modulating output. By making use of its self-setting facility, the RWF40... is able to determine the PID / PI control parameters, or the parameters can be set manually.

Binary input 1 (changeover of operating mode)

Using a potential-free contact, the RWF40... can be switched from the modulating mode to two-stage operation.

Binary input 2 (setpoint shifting or setpoint changeover)

In the case setpoint shifting is configured, the current setpoint is shifted by an adjustable amount. Configuration of setpoint changeover provides changeover between two setpoints adjusted on the RWF40... If analog input 2 is configured for an external setpoint, changeover is provided between the setpoint adjusted on the RWF40... and an external setpoint.

Limit comparator

Potential-free contact «K6» can be assigned a number of functions.
Example: limit value supervision

Operation

Four buttons on the unit front are used to operate and program the RWF40... . During operation and programming, the seven-segment displays show the parameter values and parameter names.

Weather-dependent setpoint shifting

The controller´s standard configuration ex works is such that when connecting a QAC22 outside sensor, automatic changeover to weather-dependent setpoint shifting takes place.

⚠ **The signal delivered by the QAC2... outside sensor may not be fed parallel to several RWF40...!**

Analog input 1 (actual value sensor)

To acquire the actual value, a number of sensors can be connected to the RWF40...

		Measurement range
Two-or three-wire resistance sensors	Pt100 / IEC 751	-200...+850 °C
	Pt1000 / IEC 751	-200...+850 °C
	Ni100 / DIN 43760	-60...+230 °C
	Ni1000 / DIN 43760	-60...+230 °C
	L&S-Ni1000	-50...+160 °C
Thermocouples	NiCr-Ni / type «K»	-200...+1372 °C
	Cu-Cu-Ni / type «U»	-200...+400 °C
	NiCroSil-NiSil / type «N»	-100...+1300 °C
	FeCuNi / type «J»	-200...+1000 °C
Linearized standard signals	0...20 mA	Scaleable -1999...+9999
	4...20 mA	Scaleable -1999...+9999
	DC 0...10 V	Scaleable -1999...+9999
	DC 0...1 V	Scaleable -1999...+9999

To power provided for the measuring transducers is DC 24 V / 30 mA.

Analog input 2 (external setpoint shift or external setpoint)

Feeding a signal to analog input 2, the controller´s setpoint can be influenced. The influence can be scaled.

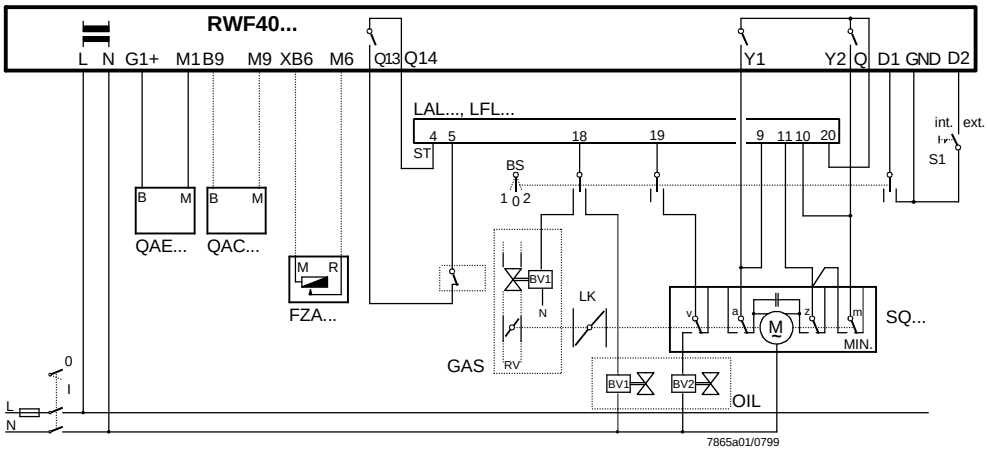
The following signals can be used:
- Input signals DC 0...1 V, DC 0...10 V, 0...20 mA, 4...20 mA
- 1 kΩ potentiometer in a two-wire circuit

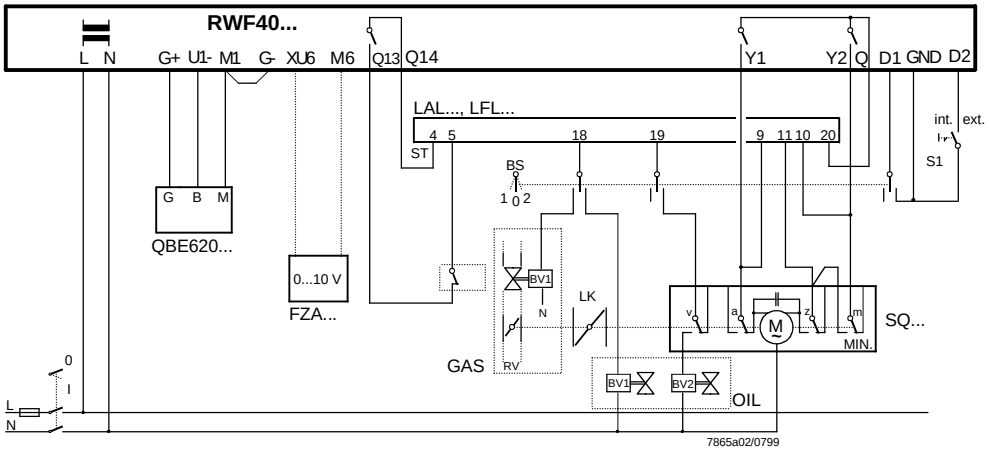
Connection diagram (basic diagram)

Temperature and pressure control on a dual-fuel burner.
Burner control and supervision are provided by burner control type LAL... or LFL...

Note

DC 24 V at terminals «G+» and «G-» is used for powering the QBE620... pressure sensor!



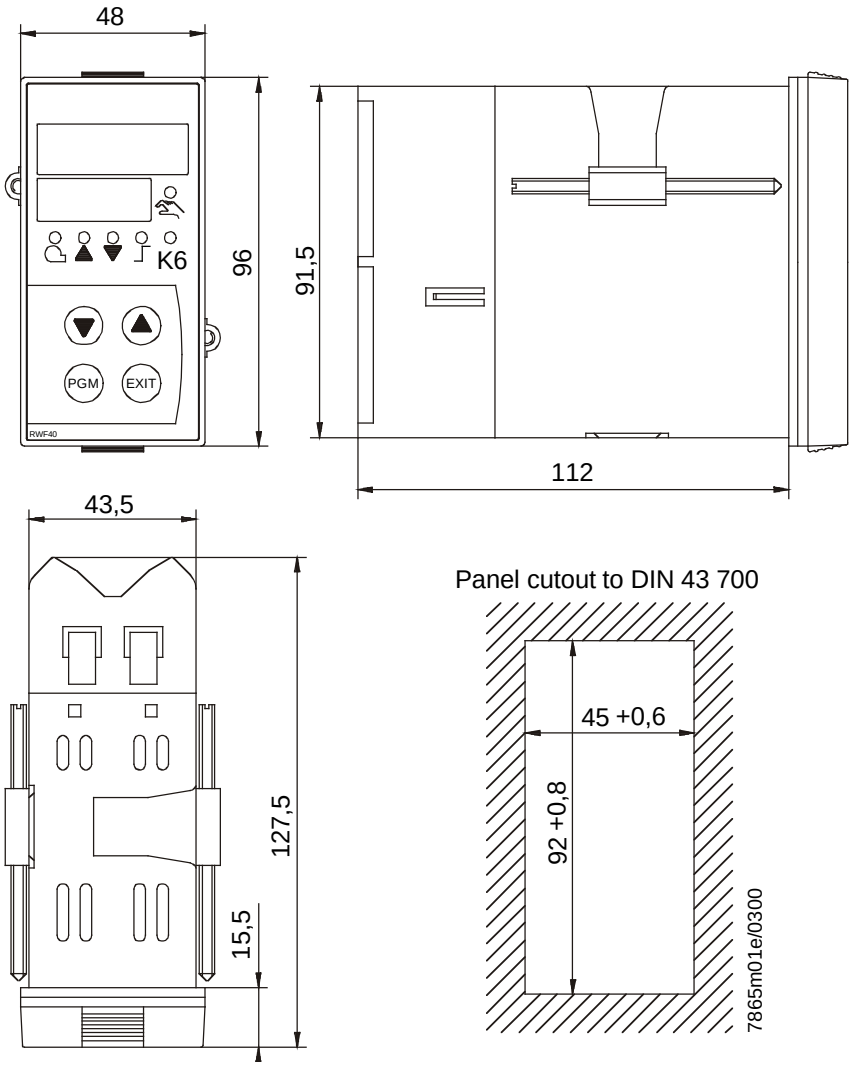


Legend

a	Limit switch for air damper position «OPEN»	QAE...	Immersion temperature sensor
BS	Operation selector 1 = «gas» (modulating burner control) 2 = «oil» (two-stage burner control)	QBE...	Pressure sensor
		RV	Gas control damper
		S1	Internal / external setpoint switch (E)
		SQ...	Actuator of burner´s air damper and gas control damper
BV...	Fuel valve	ST	Connections for burner control´s start control loop
FZA...	Remote setpoint adjuster (active when «S1» is closed)	v	Auxiliary switch for the release of the 2nd fuel valve depending on the air damper position
L...	Burner control		
LK	Burner´s air damper		
m (MIN)	Auxiliary switch for controlling low-fire operation	z	Limit switch for the fully «CLOSED» position of the air damper
QAC...	Outside sensor for weather-dependent setpoint shifting		

Dimensions

Dimensions in mm



ARG40 adapter frame