



ISO 9001



Universal Burner Controllers

RWF40...



RWF40... complete with housing

The RWF40... is a compact universal digital boiler temperature / pressure controller providing 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 RWF40... is supplied complete with housing for flush panel mounting. The controller 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 OPEN or CLOSE for driving the burner's air damper when using modulating burner control, or stage I / stage II when using two-stage burner control
- Position of the configurable contact «K6»
- Manual control ON / OFF
- «Two-stage» operating mode

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

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 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 its 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 – three-position output – housing – fixing material and seal | RWF40.000A97 |
| Controller with – three-position output – analog output – housing – fixing material and seal | RWF40.001A97 |
| Controller with – three-position output – analog output – RS-485 port – housing – fixing material and seal | RWF40.002A97 |

Accessory

| | |
|---|--------------|
| Adapter frame for replacing the RWF32... | ARG40 |
|---|--------------|

Technical data

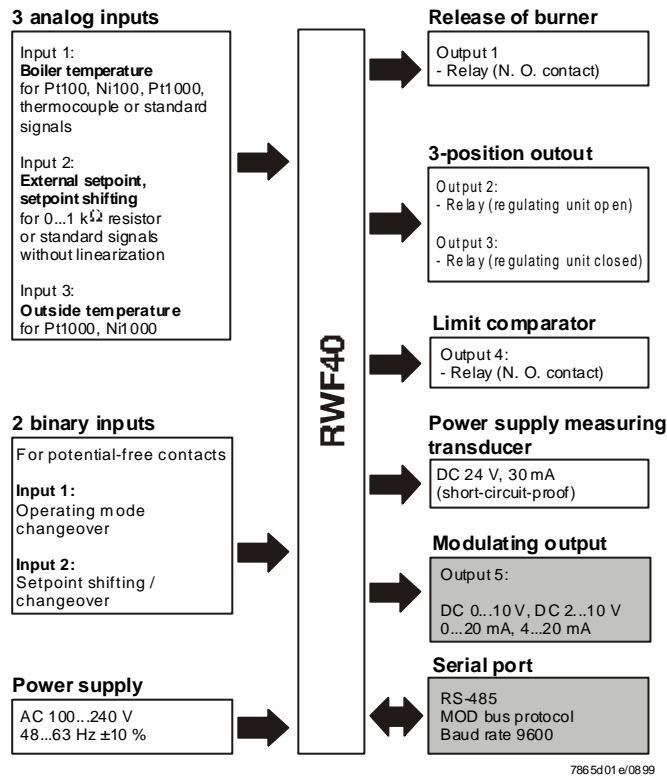
| | | | |
|---|--|--|--|
| Mains voltage | AC 100...240 V ±10 % | Power consumption | approx. 8 VA |
| Mains frequency | 50...60 Hz | Safety extra low voltage | DC 24 V |
| Safety class | II to DIN 0631 | Perm. contact rating of the control outputs (relays «K1...K3») | - Up to 2 x 10 ⁵ switching cycles 2 A; AC 24...240 V - Up to 10 ⁷ switching cycles 0,1 A; AC 24...240 V |
| Mounting orientation | optional | Weight (complete with housing) | approx. 760 g |
| Terminals for | 2 x 1.5 mm ² or 1 x 2.5 mm ² | Recommended actuator running time | 15...60 s |
| Environmental conditions | | CE conformity | |
| Transport | | According to the directives of the European Union | |
| Temperature range | -40...70 °C | Electromagnetic compatibility EMC | |
| Humidity | < 75 % r.h. | according to NAMUR recommendation | |
| Operation | | NE 21, EN 50081 Part 1 and EN 50082 Part 2 | |
| Temperature range | -20...50 °C | | |
| Humidity | < 75 % r.h. | | |
| Condensation, formation of ice and Ingress of water are not permitted! | | | |



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-flame 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

Function of the controller when used for burner control

Low-flame operation

In low-flame 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-flame operation only when an adjustable limit is exceeded.

This function is aimed at optimizing the burner's switching ratio.

High-flame 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-flame 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 of setpoint shifting, the current setpoint is shifted by an adjustable amount.

Setpoint changeover provides changeover between two setpoints adjusted on the RWF40... controller.

If analog input 2 is set to the 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 at 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 or 4...20 mA
- 1 k Ω potentiometer in a two-wire circuit

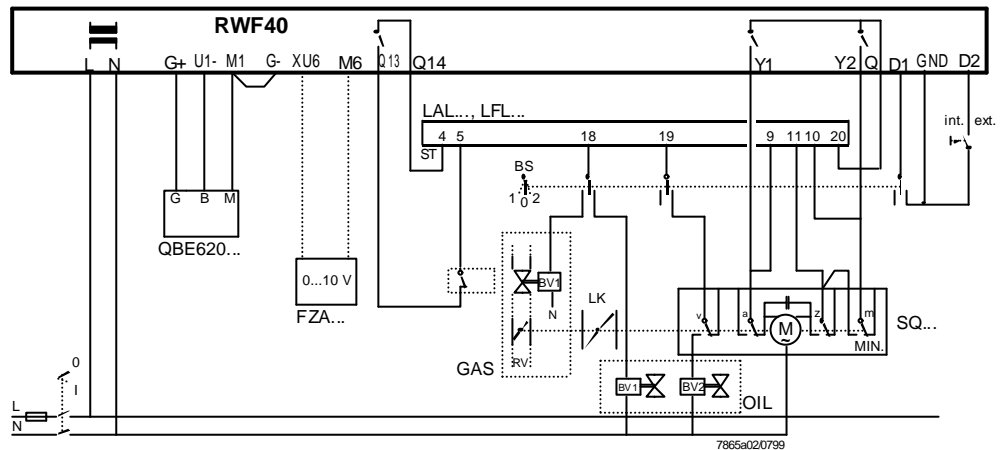
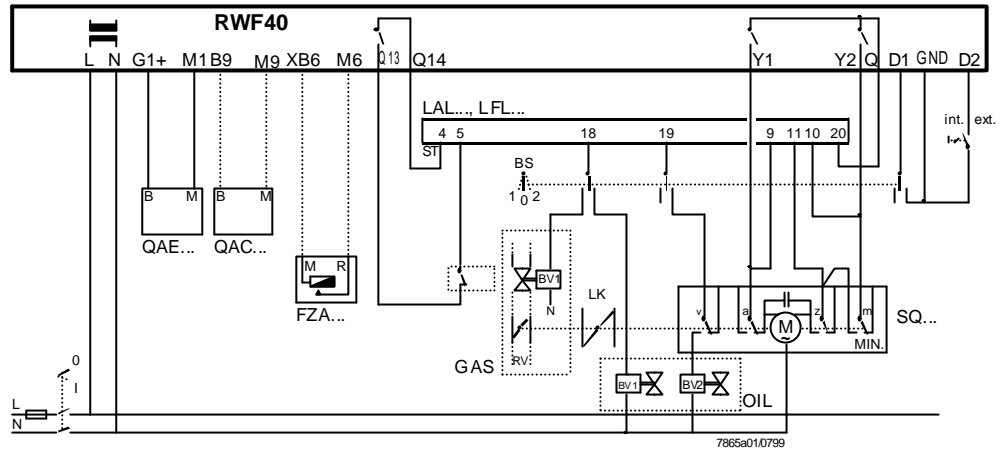
Connection diagram (basic diagram)

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!

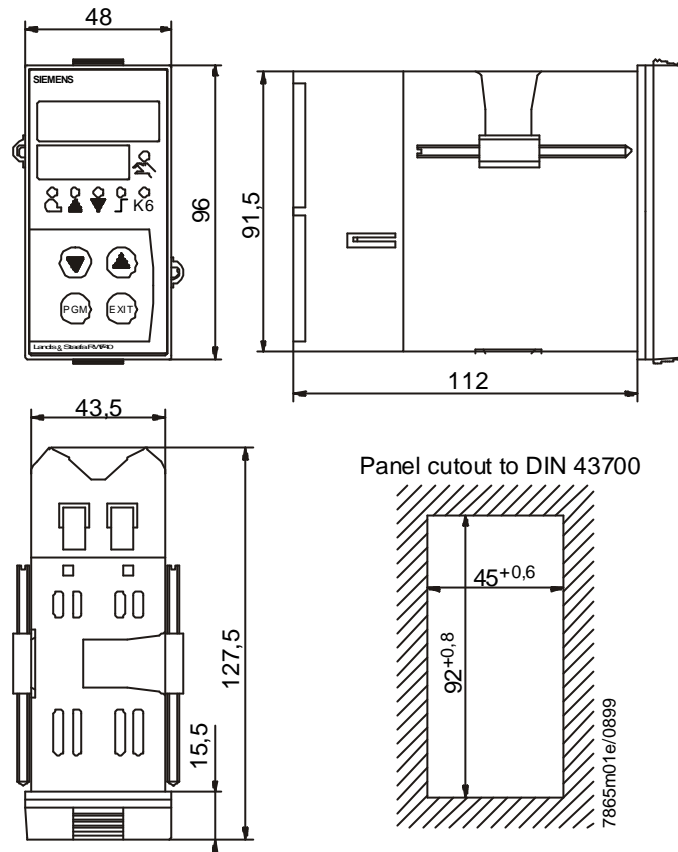


Legend

| | | | |
|---------|---|--------|--|
| 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 |
| BV... | Fuel valve | RV | Gas control damper |
| FZA... | Remote setpoint adjuster (active when «S1» is closed) | S1 | Internal / external setpoint switch (E) |
| L... | Burner control | SQ... | Actuator of burner's air damper and gas control damper |
| LK | Burner's air damper | ST | Connections of burner control's start control loop |
| m (MIN) | Auxiliary switch for controlling the low-flame operation | v | Auxiliary switch for the release of the second fuel valve depending on the air damper position |
| QAC... | Outside sensor for weather-dependent setpoint shifting | z | Limit switch for the fully «CLOSED» position of the air damper |

Dimensions

Dimensions in mm



ARG40 adapter frame

