### SOLID FUEL PRODUCTS

# SOLID FUEL KIT SERIES SFK100

The ESBE load units' series SFK100 are the perfect choice for return temperature control applications used with solid fuel boilers. Used for automatically and efficiently load accumulation tanks and protect solid fuel boilers from tarring, reduced output and short life span of the boilers.

### OPERATION

The ESBE series SFK100 is a load unit designed to protect the boiler from return temperatures that are too low. Maintaining a high and stable return temperature enables a higher level of boiler efficiency, reduced tarring and increased life span of the boiler.

The SFK100 is made to be installed inside and outside the boilers in applications where solid fuel boilers are used to feed storage tanks.

#### FUNCTION

The unit is a set of ball valves, thermometers, pump and depending from the version; a thermic load valve with adjustable temperature range, a thermic load valve with fixed temperature, a rotary mixing valve with actuator or a rotary mixing valve with temperature controller.

The SFK100 unit regulates on two ports, which makes it easy to install and doesn't require any additional control valve in the bypass.

The thermic units begins to open port A when outgoing mixed temperature is reached. Port B will be closed if the temperature on port A exceeds the nominal opening temperature with 10°C.

The SFK100 motorized version will regulate the load mixed temperature according to the settings on the boiler controller. The unit with a controller will regulate the load mixed temperature according to the settings on the ESBE controller.

### VERSIONS

Two versions are equipped with thermostats, SFK110 with fixed mix temperature (available mix temperatures: 50, 55, 60, 65, 70°C). The second version, SFK120 has an adjustable mix temperature setting in a range of 50-70°C. Version SFK130 is equipped with a rotary valve and actuator, and version SFK140 is a motorized unit with return temperature controller.

#### MEDIA

Maximum 50% glycol for freezing protection and oxygen absorbing compounds are allowed as additives. As both the viscosity and the thermal conduction are affected when glycol is added to the system water, this fact has to be considered when dimensioning the unit.

### SERVICE AND MAINTENANCE

The load units are equipped with shutoff ball valves to facilitate future service.

The units does not require any maintenance under normal conditions. However spare parts such as thermostats, pumps etc. are available.





SFK110 Fixed temperature

SFK120 Adjustable temperature





SFK130 Motorized mixing valve

SFK140 Controller motorized mixing valve

### **KEY FEATURES**

- Boiler protection
- Applicable in- and outside the boiler
- Compact size
- Stable load temperature
- Secured return temperature
- Customization on request
- Constant curve, variable pressure pump working principle
- PWM pump control signal
- Shutoff ball valve
- Thermometer
- Insulation shell available for rotary mixing valve
- ESBE thermic load valve technology
- Two thermic units available: fix temperature and adjustable temperature
  - Fixed temperature: 50, 55, 60, 65, 70°C
  - Valve with adjustable temperature: 50-70°C
- Kvs value for thermic fixed temp. units 3,2
- Kvs value for thermic adjustable temp. units 4,5
  - ESBE VRG300 series valve technology
  - 60%/100% kvs valve feature
  - Kvs value for motorized unit 8/13
  - Motorized versions available
  - 3-point actuator
    - control signal 230VAC
    - Actuator running time 60s
  - Return temperature controller



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# **TECHNICAL DATA**

| The l | Load | unit, | in | gene | ral: |
|-------|------|-------|----|------|------|
|-------|------|-------|----|------|------|

| Pressure class:               | PN 6                      |
|-------------------------------|---------------------------|
| Media temperature:            | max. +100°C               |
|                               | min. 0°C                  |
| Ambient temperaure:           | max. +50°C                |
|                               | min. 0°C                  |
| Working pressure:             | 0,6 MPa (6 bar)           |
| Connections: Intern           | al thread (G), ISO 228/1  |
| Media: Heating water (in ad   | cordance with VDI2035)    |
| Water / G                     | lycol mixtures, max. 50%. |
| (above 20% admixture, the pun | np data must be checked)  |
| Water / Etl                   | nanol mixtures, max. 28%  |
|                               |                           |

#### The integrated thermic load valve, SFK110:

| Load valve type:                 | VTC312               |
|----------------------------------|----------------------|
| Max. differential pressure drop: | 100kPa (1bar)        |
| Temperature range:               | 50, 55, 60, 65, 70°C |

# The integrated thermic load valve, SFK120:

| Load valve type:                 | VTC422        |
|----------------------------------|---------------|
| Max. differential pressure drop: | 100kPa (1bar) |
| Temperature range:               | 50-70°C       |

# The integrated mixing valve, SFK130/SFK140:

| Mixing valve type:                  | VRG332            |
|-------------------------------------|-------------------|
| Max. differential pressure drop:    | . 100 kPa (1 bar) |
| Close off pressure:                 | 200 kPa (2 bar)   |
| Rangeability Kv/Kv <sup>min</sup> : | 100               |
| Leakrate in % of flow*:             | < 0,05%           |

\* Differential pressure 100kPa (1 bar)

#### Material, in contact with water:

| Components of:       | Brass, Cast iron         |
|----------------------|--------------------------|
| Sealing material of: | PTFE, Aramid fibre, EPDM |

EEI (Energy Efficiency Index),

\_<0,21

# Conformities and certificates:

WILO circulation pump:

CC LVD 2014/35/EU EMC 2014/30/EU RoHS 2011/65/EU PED 2014/68/EU, article 4.3

| Leakrate A - AB:                    | Tight sealing  |
|-------------------------------------|----------------|
| Leakrate B - AB:                    | max. 3% of Kvs |
| Rangeability Kv/Kv <sup>min</sup> : | 100            |

| Leakrate A - AB:                    | Tight sealing |
|-------------------------------------|---------------|
| Leakrate B - AB:                    | Tight sealing |
| Rangeability Kv/Kv <sup>min</sup> : | 100           |

## VALVE CHARACTERISTICS



## The integrated actuator, SFK130:

| Actuator type:     | ARA651                |
|--------------------|-----------------------|
| Control signal:    | 3-point               |
| Power supply:      | 230 ± 10% V AC, 50 Hz |
| Power consumption: | 5 VA                  |
| Running time 90°:  | 60s                   |
| Enclosure rating:  | IP41                  |
| Protection class:  | II                    |

# **ACTUATOR WIRING\***



\* The actuator should be preceded by a multi-pole contact breaker in the fixed installation.

#### The integrated controller, SFK140:

| CRA111                  |
|-------------------------|
| +5 to +95°C             |
| _ 230 ± 10% V AC, 50 Hz |
| 10 VA                   |
| max. 30s                |
| IP41                    |
| I                       |
|                         |

# **CONTROLLER WIRING\***





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#### The integrated circulation pump:

| Power supply:                  | _230 ± 10% V AC, 5 | 50/60 Hz |
|--------------------------------|--------------------|----------|
| Power consumption - Wilo RSTG  | 3 130mm:           | _4-75 W  |
| Enclosure rating:              |                    | _ IP X4D |
| Insulation class:              |                    | F        |
| EEI (Energy Efficiency Index): |                    | <0,21    |

# PUMP WIRING



The circulation pump should be preceded by a multipole contact breaker in the fixed installation.





### SERIES SFK110 Fixed temperature

| Ant No.            | rt No. Deference DN |               | Kuc Connection | Temperature |            | Moight     |            |      |  |
|--------------------|---------------------|---------------|----------------|-------------|------------|------------|------------|------|--|
| Art. No. Reference | Reference           |               | NV5            | Adapter     | Opening    | Mixed (AB) | [kg]       | Note |  |
| 55020100           |                     | SFK111 25 3,2 |                |             | 50         | 52°C ± 2°C | 3,52       |      |  |
| 55020200           |                     |               | 25 3,2         |             | 55         | 57°C ± 2°C |            |      |  |
| 55020300           | SFK111              |               |                | 3,2 G 1"    | 60         | 62°C ± 2°C |            |      |  |
| 55020400           |                     |               |                | 65          | 67°C ± 2°C |            |            |      |  |
| 55020500           |                     |               |                |             |            | 70         | 72°C ± 2°C |      |  |



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# SERIES SFK120 Adjustable temperature

| Art. No. | Reference | DN | Kvs | Connection<br>Adapter | Tem       | perature        | Weight<br>[kg] |      |
|----------|-----------|----|-----|-----------------------|-----------|-----------------|----------------|------|
|          |           |    |     |                       | Opening   | Mixed (AB)      |                | Note |
| 55021100 | SFK121    | 25 | 4,5 | G 1"                  | 50 - 70°C | 52 - 72°C ± 3°C | 3,93           |      |



# SERIES SFK130/SFK140 Motorized

| Art. No. | Reference | DN | Kvs*<br>□ - ▲ | Kvs*<br>∎ - ● | Connection<br>Adapter | Weight<br>[kg] | Note                              |
|----------|-----------|----|---------------|---------------|-----------------------|----------------|-----------------------------------|
| 55021300 | SFK131    | 25 | 13            | 8             | G 1"                  | 4,15           | Actuator ARA651, 3-point 230 V AC |
| 55021500 | SFK141    | 25 | 13            | 8             | G 1"                  | 4,62           | Controller CRA111                 |



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#### DIMENSIONING

**Example:** Start with the heat output of the boiler (e.g. 25 kW) and move horizontally to the right in the diagram to the chosen  $\Delta t$  (recommended by boiler supplier), which is the temperature difference between the riser from the boiler and the return to the boiler (e.g.  $85^{\circ}\text{C}$  - $65^{\circ}\text{C}$  =  $20^{\circ}\text{C}$ ).

#### SFK110 - Constant speed



Move vertically up to the curves representing load unit performance. Check that the pump curve overcomes the additional pressure drops in system components such as pipes, boiler and storage tank.

### SFK110 - Variable pressure







SFK120 - Variable pressure





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#### SFK130/SFK140 - Constant speed



# SFK130/SFK140 - Variable pressure



## OPTIONS

| Art. No.  |                      |
|-----------|----------------------|
| 57020200_ | Thermostat 55°C      |
| 57020300_ | Thermostat 60°C      |
| 57020800_ | Thermostat 65°C      |
| 57020400_ | Thermostat 70°C      |
| 57080600_ | Thermostat 50 – 70°C |
| 12101200_ | Actuator ARA651      |
| 12720100_ | Controller CRA111    |
|           |                      |

# **INSTALLATION EXAMPLE**



