Installation and Operation Manual | **EN**

RegulusRGMAT EA G 5/4 LOAD UNIT with UPM 3 for heating systems

RGMAT EA G 5/4

1. Introduction

RegulusRGMAT EA G 5/4 Load Unitmakes boiler installation quicker as it contains all components needed for circulation through a boiler and boiler protection against low-temperature corrosion. It is designed to be installed directly on return piping. The distance of pipe axis from a wall shall be at least 100 mm to enable insulation removal if needed. This Load Unit is intended for hydronic fireplaces and solid-fuel boilers.

2. RGMAT EA G 5/4 Description

RGMAT EA G 5/4 keeps the temperature at the boiler inlet above the flue gas condensation temperatures, which prevents so called low-temperature corrosion of the boiler combustion chamber. This limits condensation and boiler tarring significantly, the efficiency of fuel combustion increases and service life of the boiler is extended.

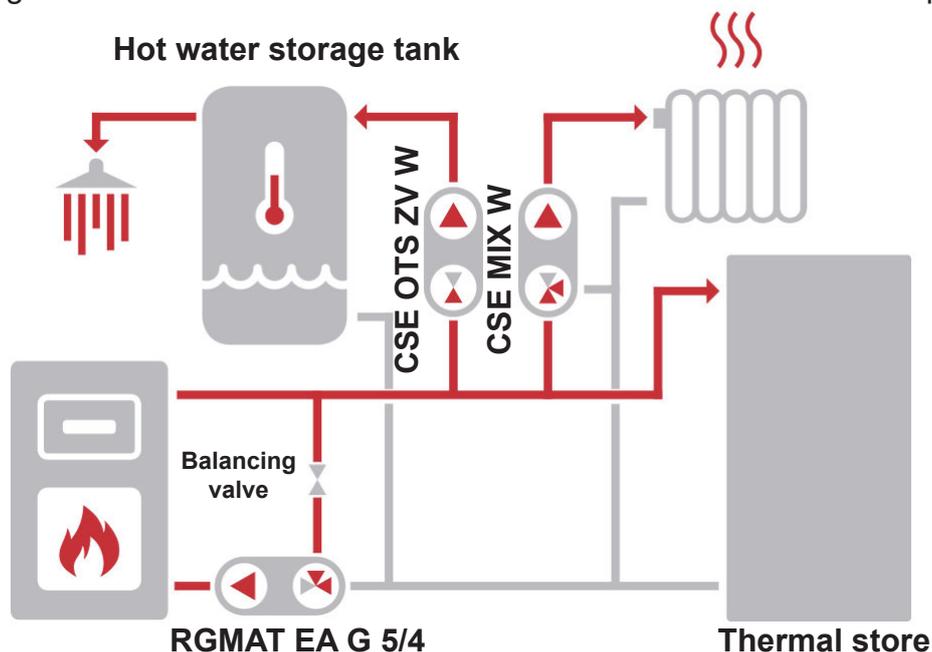| Main features	
Purpose	maintaining a minimum inlet temperature into a boiler (fireplace) through a load valve
Application	Load Unit for solid-fuel boilers and fireplaces; it prevents low-temperature corrosion and boiler (fire) fouling
Description	consists of a UPM3 Flex AS pump, a TSV5 valve (with manual bypass balancing), thermometer and insulation
Working fluid	water, water-glycol mixture (max. 1:1) or water-glycerine mixture (max. 2:1)
Installation	return pipe of a boiler, the min. distance of the pipe axis from a wall is 100 mm; for proper operation it is necessary to install a valve at the B inlet to balance flowrate

Code	Max. boiler output
16399 for opening temperature 65 °C	max. 50 kW at ΔT 20 K and fully open balancing valve
16400 for opening temperature 72 °C	max. 50 kW at ΔT 20 K and fully open balancing valve

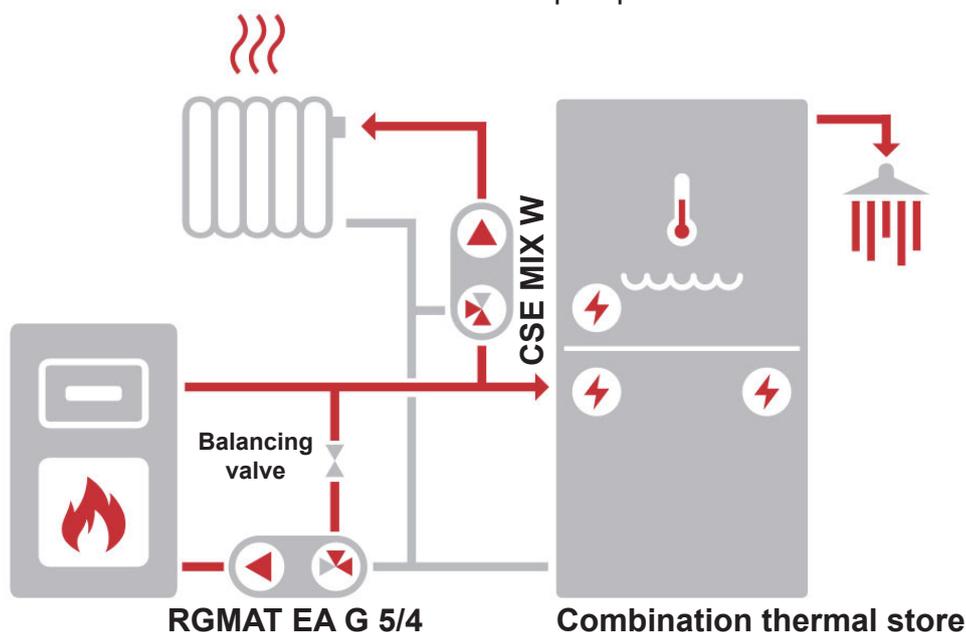| RGMAT EA G 5/4 Technical Data	
Fluid working temperature	5 - 95 °C
Max. working pressure	6 bar
Min. working pressure	0.5 bar
Ambient working temperature	5 - 40 °C
Max. rel. humidity	80 % , non condensing
Control Range of the Load Valve	opening temperature + 5 °C
Load Valve Kvs (direction A ▶AB)	7,0 m³/hod
Load Valve Kvs (direction B ▶AB)	11,5 m³/hod
Max. pump speed	5991 rpm
Pump motor protection	not needed
Overall dimensions	305 x 145 x 220 mm
Total weight	3,7 kg
Connections	3 x G 5/4" F

3. RGMAT EA G 5/4 Connection Diagram

Example of possible connection I.

The diagram shows a typical connection of a solid fuel boiler, thermal store and heating circuit (with the recommended CSE MIX W pump station – not included in supply). If the boiler is used also for hot water heating, it is recommended to install a CSE OTS ZV W pump station (not included in supply). A balancing valve shall be installed at the B inlet into the RGMAT EA G 5/4 pump station.

Hot water storage tank

CSE OTS ZV W

CSE MIX W

Balancing valve

RGMAT EA G 5/4

Thermal store

Example of possible connection II.

The diagram shows a typical connection of a solid fuel boiler, combination thermal store and heating circuit (with the recommended CSE MIX W pump station – not included in supply). A balancing valve shall be installed at the B inlet into the RGMAT EA G 5/4 pump station.
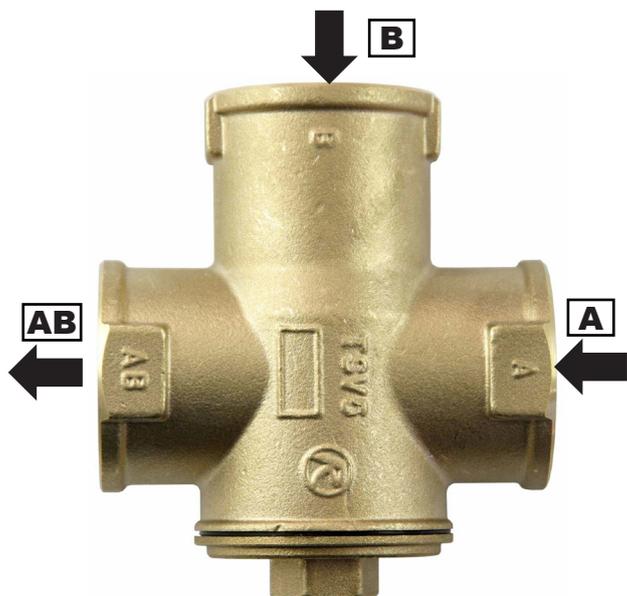
CSE MIX W

Balancing valve

RGMAT EA G 5/4

Combination thermal store

Install the Load Unit respecting the following instructions:

Connect the Load Unit outlet marked **AB** to the piping entering the boiler. Connect the return line from the heating system to the **A** inlet, and the outlet pipe from the boiler to the **B** inlet via a T-piece. Take care to install shut-off valves where necessary to avoid draining the whole system for valve cleaning or replacing the thermostatic element.

When the connecting pipes are not arranged or sloped properly, the load valve may get blocked by air inside. This may hinder or even disable its operation.

Always respect valid rules and boiler manufacturer's data during installation.

4. Function description of TSV5 valve

The TSV5 load valve is fitted with an integrated thermostatic insert that will close the **A** inlet (from a heating system), if the return water temperature to the boiler (**AB** outlet) is lower than the opening one. As soon as the opening temperature is reached, the thermostat starts opening the **A** inlet slowly and mixing the cold return water with the hot water from the **B** inlet (boiler flow) with the aim to reach the return temperature (**AB** outlet) slightly higher than the valve opening temperature. The **B** inlet remains always open. However, since the **B** inlet remains permanently open, it may happen depending on the hydraulic conditions that under a higher return temperature more hot water will be mixed from the **B** inlet than necessary for reaching an optimum temperature at **AB** outlet. Under these conditions, the return water temperature will be unnecessarily high. In order to set the optimum flow rate for a specific application, a balancing valve shall be fitted before the **B** inlet (e.g. a plain ball valve is sufficient). Its size can be two sizes down from the dimension of **B** inlet (like the entire piping between the Tee at the boiler outlet and the **B** inlet), however not bigger than the piping at the **AB** outlet.

Adjusting the balancing valve:

a. Set the valve to fully open for the first firing. Immediately after firing up, before the return line reaches the opening temperature of the TSV5 valve, set the balancing valve to half open. Let it partially open in such a way that at least the min. flow required by the boiler manufacturer passes through the boiler (usually this corresponds to a temperature drop at the boiler of 20-30 °C at full power). Monitor the boiler flow temperature, it must not exceed the max. operation temperature during the entire temperature ramp, nor after the full output is reached with nominal return temperature. Should the flow temperature rise too high, open the valve a bit more.

b. If the temperature at the **AB** outlet is higher, adjust the valve towards closed. In case the valve cannot be set properly, check the hydraulic system of the system for undesired counter-pressures from another pump or from other wrong connections in the system. Also check that the circulation pump after the **AB** outlet of the valve is set to full power and its performance is suitable for the boiler output.
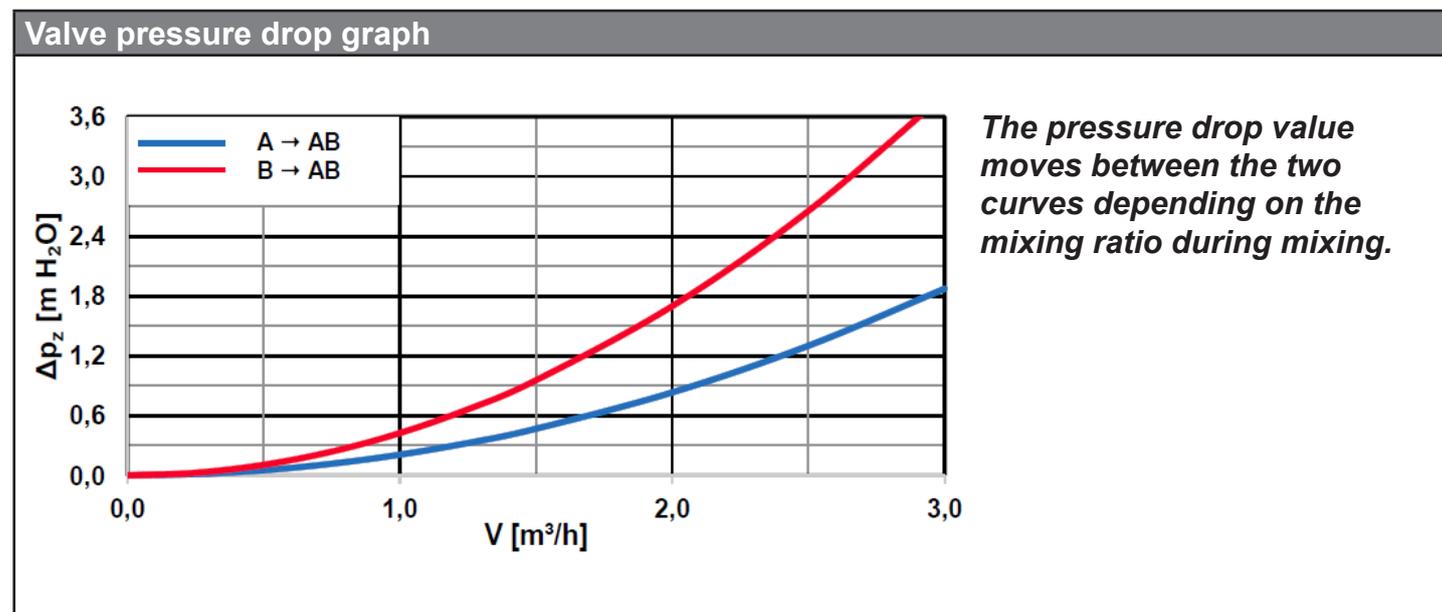
It is recommended to remove the lever of the balancing valve after balancing in order to avoid possible unintentional shut-off or other movement of the lever.

TSV5 load valve offers fully automatic operation, needs no el. energy, operator or maintenance. When the valve gets clogged with impurities from the system or in case of its breakdown, first close the ball valves on all connecting pipes in order to avoid draining the system. Then loosen the plug using spanner #21 or another suitable tool. Take out the pressure spring of the element and the thermostatic element itself. When re-assembling the valve, take care of the thermostatic element's perfect fit to the gasket with its entire contact surface and its spring being centred within the plug.

TSV5 Valve

Technical data	
Max. working temperature	95 °C
Max. working pressure	6 bar
Valve opening temperature	depending on the thermostatic element
Control range	$t_{valve,\ opening}$ + 5 °C
Valve Kvs (A→AB direction)	7,0 m³/h
Valve Kvs (B→AB direction)	11,5 m³/h
Connections	3x G 5/4" F
Nominal inner diameter	DN 32

Materials	
Housing, cone and plug	brass
Spring	stainless steel
Element and plug seals	EPDM
Cone seal	NBR

Valve pressure drop graph

The pressure drop value moves between the two curves depending on the mixing ratio during mixing.

5. UPM3 FLEX AS 25-75 Pump

Design

Wet-running circulation pump with G 6/4" M connection.

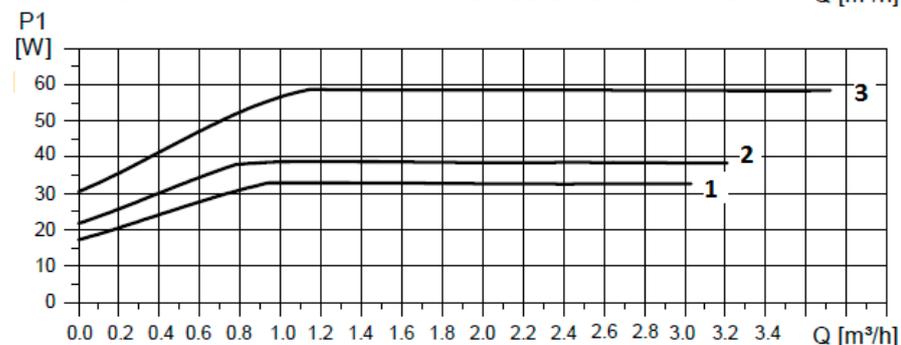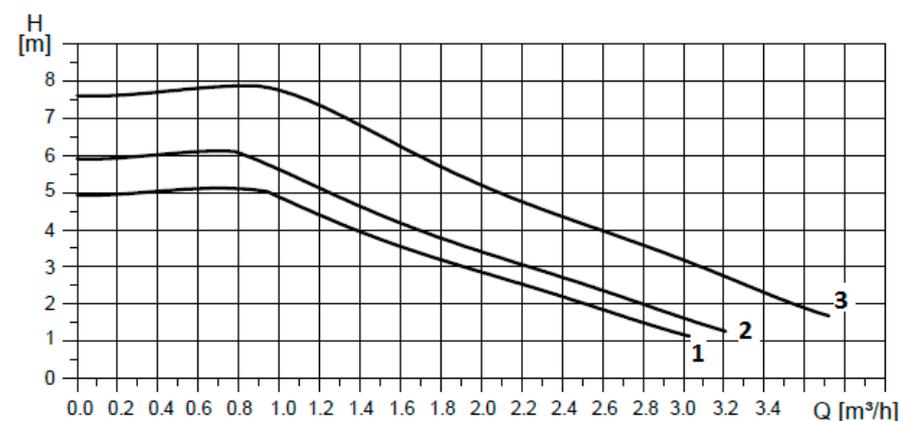| Electrical data	
Power supply	230 V, 50 Hz
Power input (min./max.)	2/60 W
Current (min./max.)	0,04/0,58 A
IP rating	IP44
Max. speed	5991 rpm
Weighted average power	≤ 28 W
Energy Efficiency Index	≤ 0,20 by EN 16 297/3
Motor protection	not needed

Pump control

The circulation pump can be controlled by an external PWM signal (profile for use in heating systems) or without a PWM signal by selecting a pump performance curve.

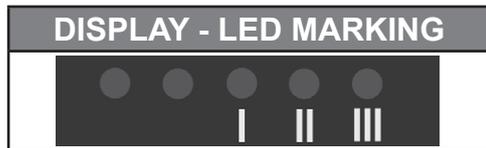A maximum curve of a pump working range can be defined.
- with PWM signal the pump speed changes with the signal value up to the maximum of the selected curve
- without PWM signal the pump runs at the max. speed according to the selected curve

Performance curves

Curve	Max. H (upper graph)	Max. P_1 (lower graph)
1	5 m	33 W
2	6 m	39 W
3	7.5 m	60 W

Performance Display

DISPLAY - LED MARKING
● ● ● ● ● I II III

The LED marking is further omitted for better clarity.

DISPLAY	PERFORMANCE CURVES	STATE	Max. H (upper graph)
🟢 ⚫ 🟡 ⚫ ⚫	1	LOW PERFORMANCE	5 m
🟢 ⚫ 🟡 🟡 ⚫	2	MEDIUM PERFORMANCE	6 m
🟢 ⚫ 🟡 🟡 🟡	3	HIGH PERFORMANCE	7,5 m

WARNING: LEDs may be turned by 90° or 180°, depending on the specific pump type.

GREEN LED FLASHING FREQUENCY	PWM SIGNAL RECEPTION
1 flash per second	NO
8 flashes per second	YES

When switched on, the pump runs at factory settings or the last setting. The display shows the current pump performance.

Setting selection for UPM3

To select your desired setting, press the button repeatedly until you find the setting you need (see the table above). If you pass the desired setting, you have to go one more round until it appears again.

Error Display

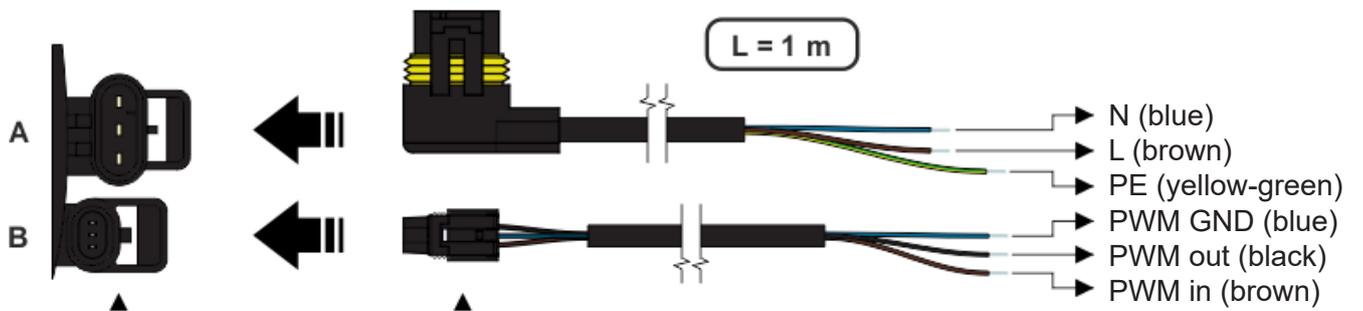| DISPLAY	CONTROL MODE
🔴 ⚫ ⚫ ⚫ 🟡	Seized pump
🔴 ⚫ ⚫ 🟡 ⚫	Too low power supply voltage
🔴 ⚫ 🟡 ⚫ ⚫	Electric fault

Forbidden positions

Permissible positions

Pump wiring

socket for power supply (A)
and signal transmission (B)

power supply (A)
and signal (B) terminals

A

B

L = 1 m

N (blue)
L (brown)
PE (yellow-green)
PWM GND (blue)
PWM out (black)
PWM in (brown)

6. Installation options

This Load Unit comes in the version for horizontal installation to the right of a boiler. However, it can be installed also into vertical piping or horizontally to the left of a boiler. When being installed horizontally to the left of a boiler, the Load Unit needs to be turned by 180° and the TSV valve turned as shown in the pics below.

FLOW DIRECTION

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