TECHNICAL INSTRUCTIONS

THR 10-100

GEMINOX
CHAUDIERES

High fidelity heat

T30.29676.01

CONTENT

I - PRESENTATION

1 - DESCRIPTION

Standard description: floor-standing condensing gas boiler, for hot water heating, with a B_{23} type exhaust circuit with linearly modulated power, and a premixed burner with an air-gas servo-control system, according to PR EN 676 (03/98).

The THR 10-100 boiler is the association of two 50 kW modules (10 to 50 kW linearly modulated power) placed in a cascade in the same casing. The RVA box manages the cascade function and determines the flow temperature settings for each module. The LGM box (module management box) controls these two modules according to the temperature setting.

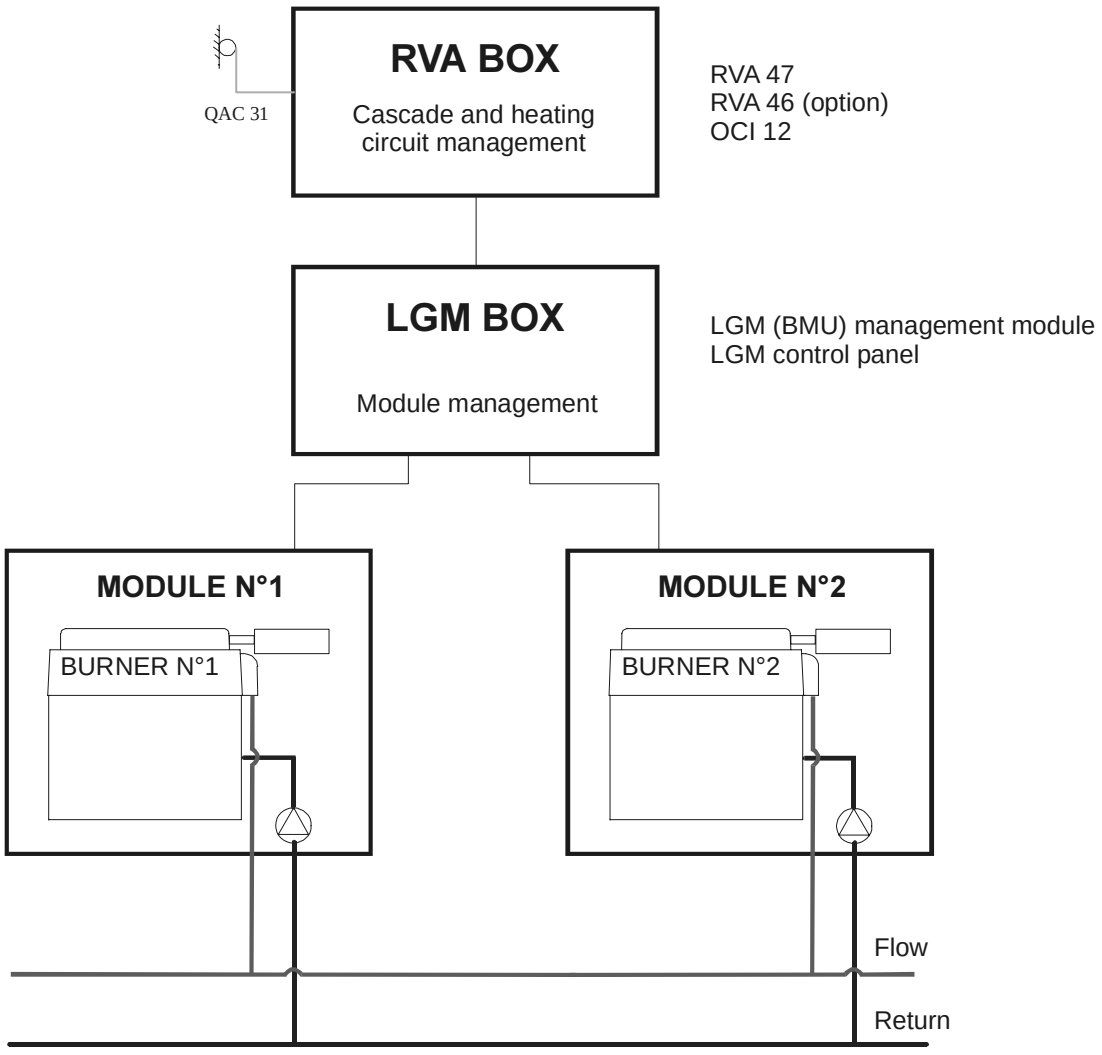
It is preset with natural gas H.

According to the selected options, the THR 10-100 has a very extensive control potential:

- from simple network control to multicircuit management,
- possible direct domestic hot water production on one of the modules or on the network.

The available modulation power potential varies from 10 to 400 kW through the association of several THR 10-100 boilers connected in a series in cascade (4 boilers maximum).

Fig. 1



The boiler THR 10-100 has the following components under its cover:

- Two 50 kW modules, each equipped with the following:
  - a boiler shell featuring:
    . a high performance condensing heat exchanger made from tubular fins,
  - a premixed burner with a heat resistant stainless steel grate,
  - a variable-speed fan (230 V AC - 50 Hz - 39 V DC) controlled by the regulator,
  - a 24 Volt gas valve unit with dual air pressure valve control,
  - a heating circulator,
  - "overheat" safety cut-out with manual reset (100 °C),
  - a water pressure sensor,
  - "flue gas overheat" safety cut-out with manual reset (85 °C),
  - a condensate siphon trap,
  - a 230 V power transformer,
  - a 24 V ignition transformer,
  - an automatic bleed,
  - a centrifugal degasser,
  - a-3 channel motorised selector valve[1],
- an LGM box (module management). It features:
  - two LGMs,
  - two LGM control panels each featuring:
    . flame ionization monitoring,
    . on/off switch,
    . heating setting potentiometer,
    . domestic hot water setting potentiometer,
    . Summer/Winter potentiometer,
    . operating sequence or fault display,
    . flame indicator,
    . alarm indicator,
    . display of water pressure in the heating network,
    . reset button in the event of a failure or an alarm,
    . three A, B and C buttons reserved for the heating engineer (specific functions),
- an RVA box for managing the cascade and multi-circuits featuring:
  - a series B RVA 47.320 regulator,
  - two OCI 12 interfaces,
- an outside sensor QAC 31,
- two heating flow-return temperature sensors QAD 21,

OPTIONS:

- RVA 46 regulator making it possible to control the flow temperature of a heating circuit (with a mixer valve or with a circulating pump) according to climatic conditions with or without room influence.

  (Two RVA 46 regulators can be integrated into the RVA box of the THR 10-100).

1. THR 10-100 CS model only.

2 - RANGE

Models	Control	Functions
THR 10-100 C	Basis: an RVA 47	- Network pump control or heating circuit pump control. - Domestic hot water production through a load pump (via RVA 47) connected to the network.
	With option: one or two RVA 46s	- Network pump control or heating circuit pump control. - Domestic hot water production through a load pump (via RVA 47) connected to the network - Multicircuit management. Heating circuit with a mixer valve or a circulating pump.
THR 10-100 CS	Basis: an RVA 47	- Network pump control or heating circuit pump control. - Domestic hot water production through a load pump (via RVA 47) connected to the network. - Domestic hot water production through a 3 channel motorised selector valve (controlled by the LGMs) connected to the 50 kW modules.
	With option: one or two RVA 46	- Network pump control or heating circuit pump control. - Domestic hot water production through a load pump (via RVA 47) connected to the network. - Domestic hot water production through a 3 channel motorised selector valve (controlled by the LGMs) connected to the 50 kW modules. - Multicircuit management. Heating circuit with a mixer valve or with a circulating pump.

3 - GENERAL OPERATION

10 to 100 kW modulation is carried out via the B series RVA 47 regulator, which integrates all heating and domestic hot water production requests. All requests are then transmitted to the LGM which thus adapts the power of each of the boiler's modules.

In order to maintain constant air/gas proportions in all the modulation range, the gas valve is directly servo-controlled by the ventilator.

If the boiler is equipped with the RVA 46 regulator (option), each one can control a heating circuit by transmitting its request to the B series RVA 47 regulator.

When several THR 10-100 boilers are installed in a cascade, 10 to 400 kW modulation is carried out by one of the B series RVA 47 regulators installed as master regulator and which integrates all the requests transmitted by the other boilers' B series RVA 47s.

II - TECHNICAL SPECIFICATIONS

1 - CHARACTERISTICS

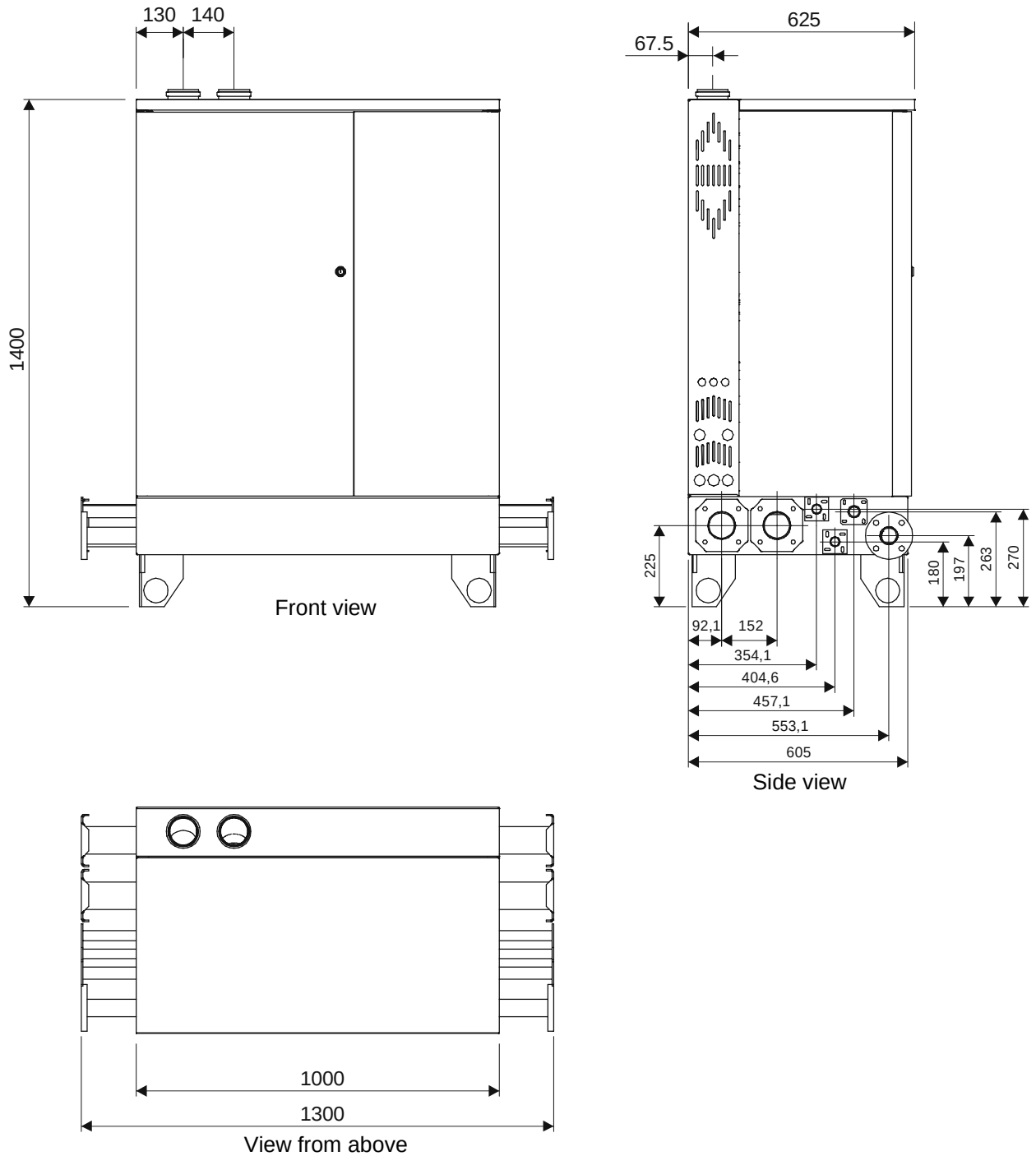
Type				THR 10-100 C	THR 10-100 CS
EC approval				**CE0085AR0323**	
gas/country installed in category				**II $_{2H3P}$/GB**	
Connection				**B_{23}**	
	T° heating	Setting			
Heat output	30/50 °C 60/80 °C	min./max. min./max.	kW kW	10.6 / 101 9.5 / 94.0	
nominal heat-generating flow			kW	10.0 / 100.0	
Efficiency on NCV	30/50 °C 60/80 °C	min./max. min./max.	% %	106.0 / 101.0 95.0 / 94.0	
Efficiency on GCV	30/50 °C 60/80 °C	min./max. min./max.	% %	95.4 / 91.0 85.5 / 84.6	
Part load efficiency according to EC directive 92/42 (30 %)			%	106.0	
Gas used				H natural gas or Propane	
Combustion products temperature		max.	°C	80	
Gas rate combustion products (0 °C, 1013 mbar)		min./max.	kg/h	18.0 / 180.0	
Required air flow rate for combustion (0 °C, 1013 mbar)		min./max.	m^3/h	12.5 / 125	
Admissible back pressure at maxi P (Combustion products) Collecting pipe Single pipe		max. max.	Pa Pa	0 100	
Heating water pressure			bar	1 / 3	
Domestic water primary circuit pressure			bar	-	1 / 3
Heating circuit water temperature		max.	°C	75	
Domestic water primary circuit temperature		max.	°C	-	80
Boiler water capacity			litre	19	20.5
Electrical power consumption in Heating function maxi (circulating pumps at speed 3)			W	490	
Protection index				IP x 0D	
Electrical supply/Frequency				230 V (+ 10%, - 15%)/50 Hz	
Weight packaged			kg	230	240

2 - PIPE CONNECTION DIAMETERS

- Combustion products	Ø 80	- Primary domestic water return	1"
- Gas inlet:	PN 6 DN 40	- Primary domestic water flow	3/4"
- Heating flow:	2"1/2	- Condensate drain	Ø 25
- Heating return:	2"1/2		

3 - DIMENSIONS

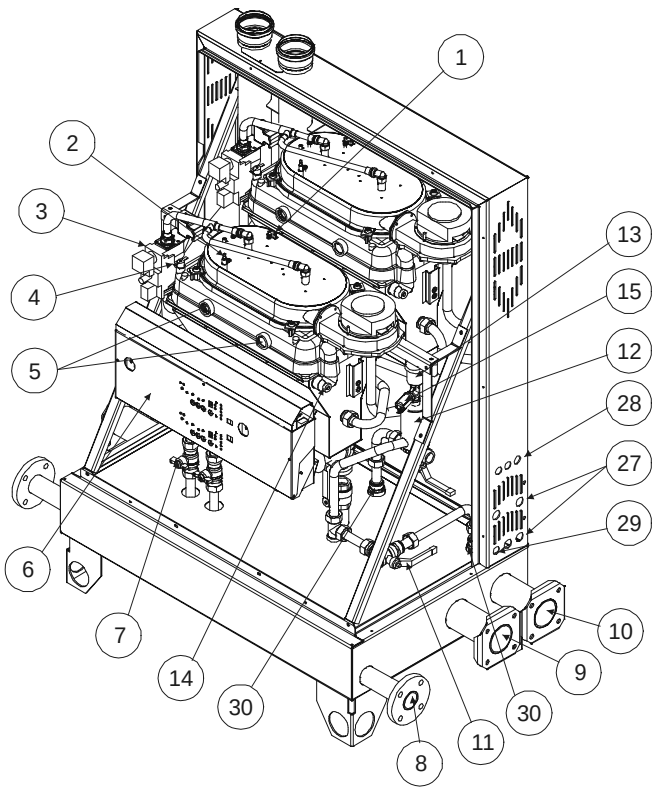
Fig. 2

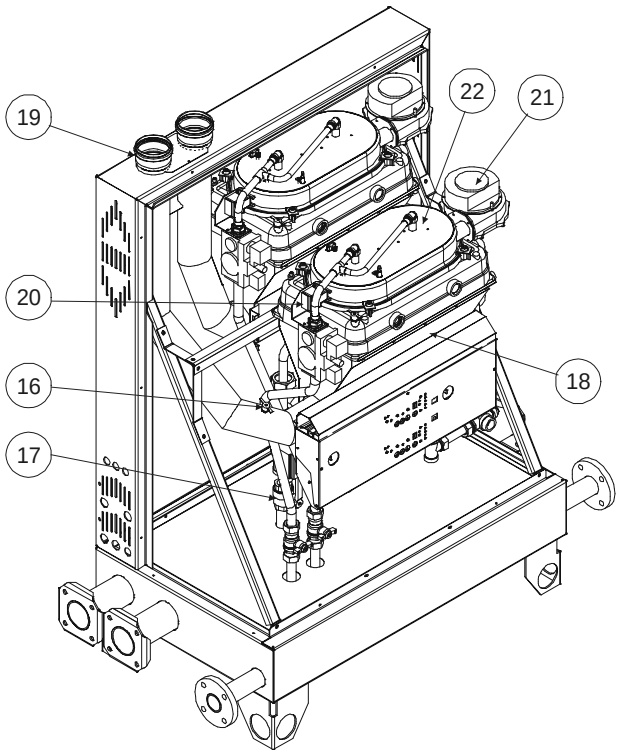


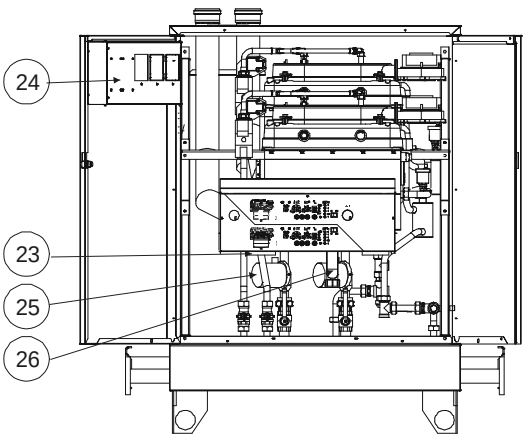
4 - DESIGNATION OF COMPONENTS

4.1 - THR 10-100 C

Fig. 3



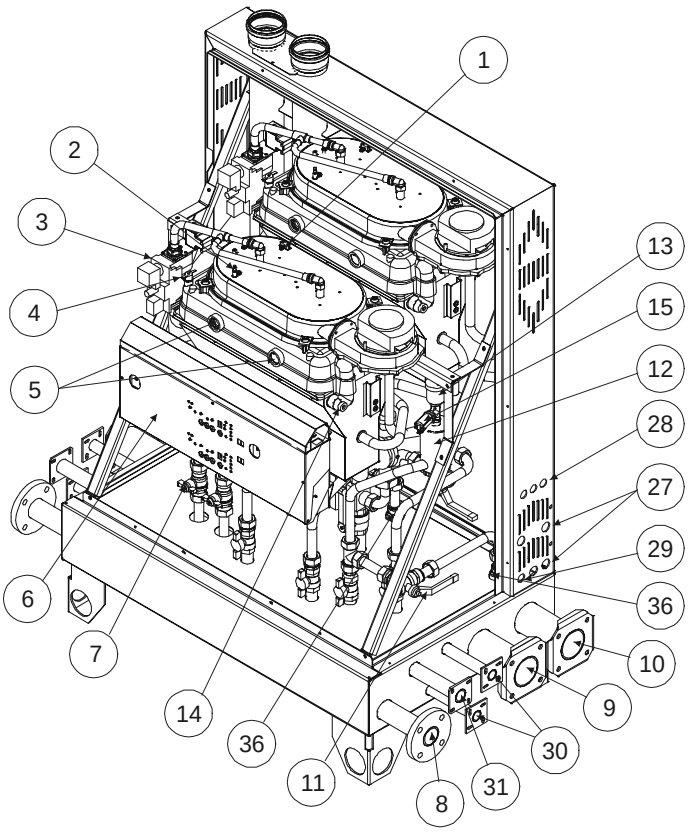


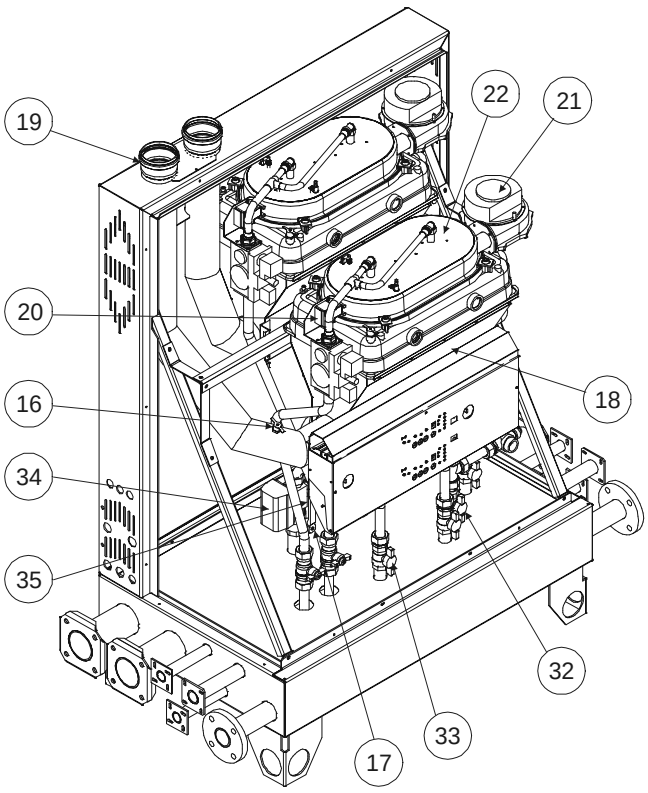


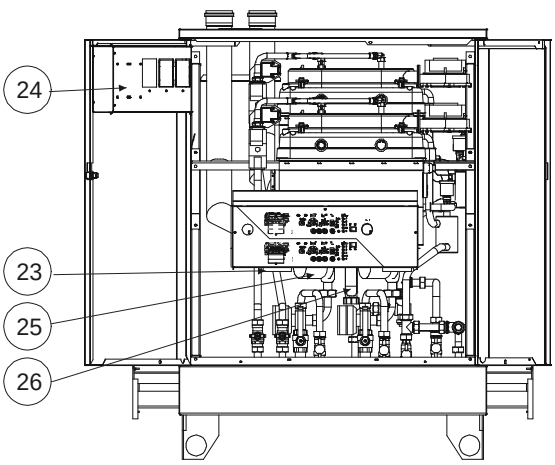
1) *Ignition electrodes*
2) *Ionization probes*
3) *24 V gas valves*
4) *100 °C water overheat safety device*
5) *Sight glass*
6) *Module management boxes*
7) *Gas inlet isolation valves*
8) *Gas supply*
9) *Heating returns*
10) *Heating flows*
11) *Heating flows and draining isolation valves*
12) *Centrifugal degassers*
13) *Air vents*
14) *Heat flow sensors*
15) *Pressure sensors*
16) *100 °C combustion product overheat safety device*
17) *Heating return non return isolation valves*
18) *Boiler shell*
19) *Combustion product evacuation*
20) *24 V ignition transformers*
21) *39 V/230 V fans*
22) *Gas burners*
23) *Mains transformers 230 V*
24) *RVA control boxes*
25) *Heating circulators*
26) *Siphon traps*
27) *Drain, condensate evacuation and safety valve outlet holes*
28) *Feeder grummet*
29) *sensor cable grummet.*
30) *Non return valves*

4.2 - THR 10-100 CS

Fig. 4





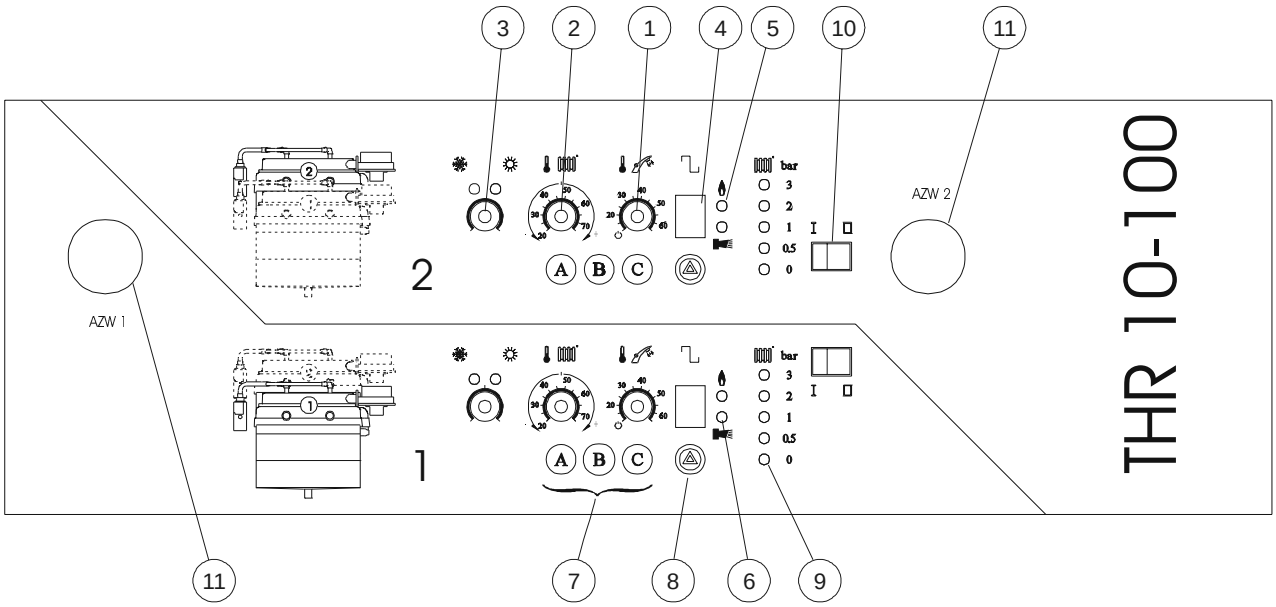


1) *Ignition electrodes*
2) *Ionization probes*
3) *24 V gas valves*
4) *100 °C water overheat safety device*
5) *Sight gas*
6) *Module management boxes*
7) *Gas inlet isolation valves*
8) *Gas supply*
9) *Heating returns*
10) *Heating flows*
11) *Heating flows and draining isolation valves*
12) *Centrifugal degassers*
13) *Air vents*
14) *Heat flow sensors*
15) *Pressure sensors*
16) *100 °C combustion product overheat safety device*
17) *Heating return non return isolation valves*
18) *Boiler shell*
19) *Combustion product evacuation*
20) *24 V ignition transformers*
21) *230 V / 39 V fans*
22) *Gas burners*
23) *Mains transformer 230 V*
24) *RVA control boxes*
25) *Heating circulators*
26) *Siphon traps*
27) *Drain, condensate evacuation and safety valve outlet holes*
28) *Feeder grummet*
29) *Sensor cable grummet.*
30) *Primary domestic water flows*
31) *Primary domestic water returns*
32) *Primary domestic water flow isolation valves*
33) *Primary domestic water return isolation valves*
34) *3 channel selector valve motors*
35) *3 channel selector valves*
36) *Non return valve*

5 - CONTROL PANEL ELEMENTS

5.1 - LGM box control panel (50 kW 1 and 2 module management)

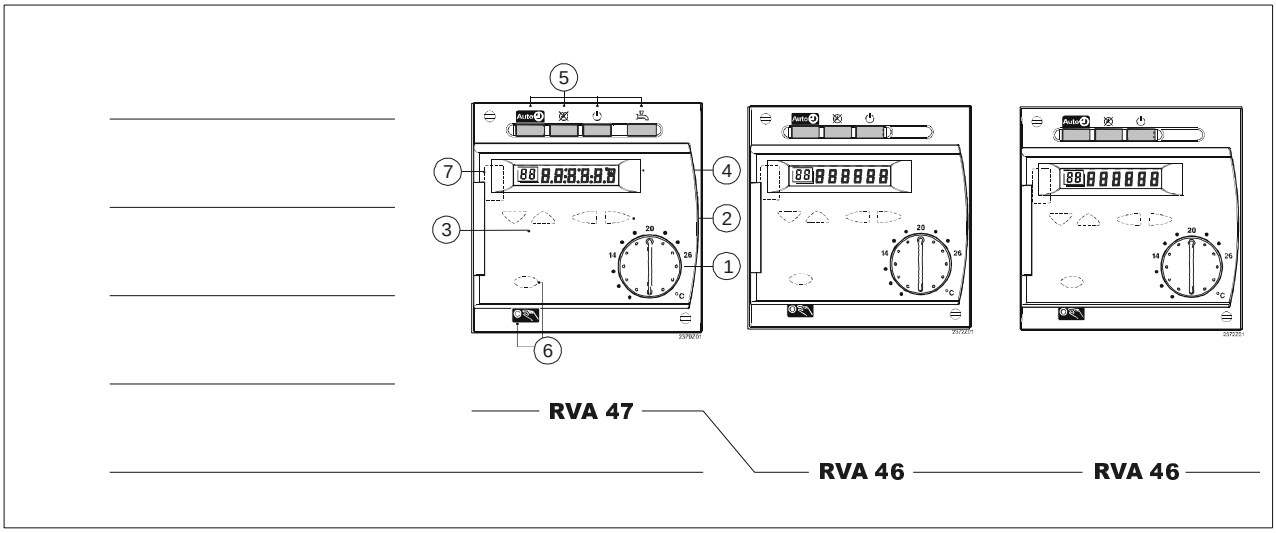
Fig. 5



1) ***Manual power setting potentiometer***
2) ***Inactive potentiometer with this model of boiler***
3) ***Summer/Winter potentiometer***
4) ***Display:***
   Displays operating or fault sequences
5) ***Flame indicator lamp:***
   It is lit when the burner is on
6) ***Alarm indicator lamp:***
   It is lit in the event of operating faults
7) ***Three buttons A, B, C:***
   Buttons reserved to the heating engineer. Allow access to specific functions
8) ***Reset button:***
   Reset in the event of a flame failure or of an alarm
9) ***Display system:***
   Displays the water pressure in the heating network
10) ***On/Off switch***
11) ***AZW connection***
    Programming and/or reading of each module's operating parameters

5.2 - RVA box control panel (cascade, circuit and heating management)

Fig. 6



	RVA 47	RVA 46 (option)
1) Room temperature setting knob: *Adjustment of room temperature setpoint*	X	X
2) Setting buttons: *Parameter setting*	X	X
3) Line selection buttons: *Parameter setting / switching between the programming lines*	X	X
4) Display: *Display of actual values and settings*	X	X
5) ***Operating mode buttons for heating circuit:*** *Operating mode changes to*	Domestic water and heating circuit	Heating circuit
automatic mode	X	X
continuous operation	X	X
stand-by	X	X
On/Off Domestic Hot Water	X	-
6) Button for manual operation with LED: *On / Off manual operation*	X	X
7) PC tool connection facility: *Diagnostics and service*	X	X

6 - WATER FLOW RATE FOR EACH 50 KW MODULE

Each 50 kW module is equipped with a 3-speed circulating pump.

Due to the boiler's design, the water flow rate in each module is constant regardless of the flow rate in the network.

To reach maximum power, **the circulating pump must be set on speed 3** so as to ensure a 2.5 m^3/h flow rate, this makes it possible to optimize the operation of each module to the maximum.

7 - NETWORK FLOW RATE

Due to the boiler's design, the installation's water flow rate is not limited. For maximum power operation, the installation's optimum flow rate must be calculated so as to take into account a 15 to 20 °C temperature drop between the flow and the return. The flow rate will have to be ≥ 5 m^3/h.

Thanks to the integrated low pressure loss recirculation loop, the dimensioning of the installation's pump can be carried out without taking into account the boiler's pressure loss.

8 - EFFICIENCY OF A MODULE'S HEAT EXCHANGER-CONDENSER

An oversized heat exchanger-condenser (item no. 18) equipped with a water cooled combustion chamber in its upper section (item no. 37) groups the heat exchanger and condenser functions.

Condensation takes place on the tube walls (item no. 38) where the temperature is lower than the combustion products' dew point phenomenon temperature.

Fig. 7

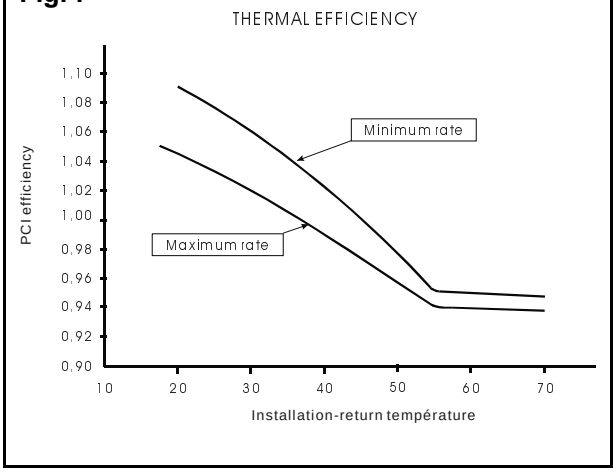
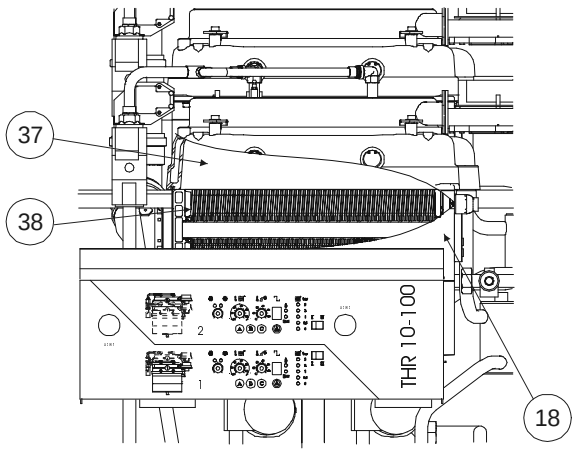
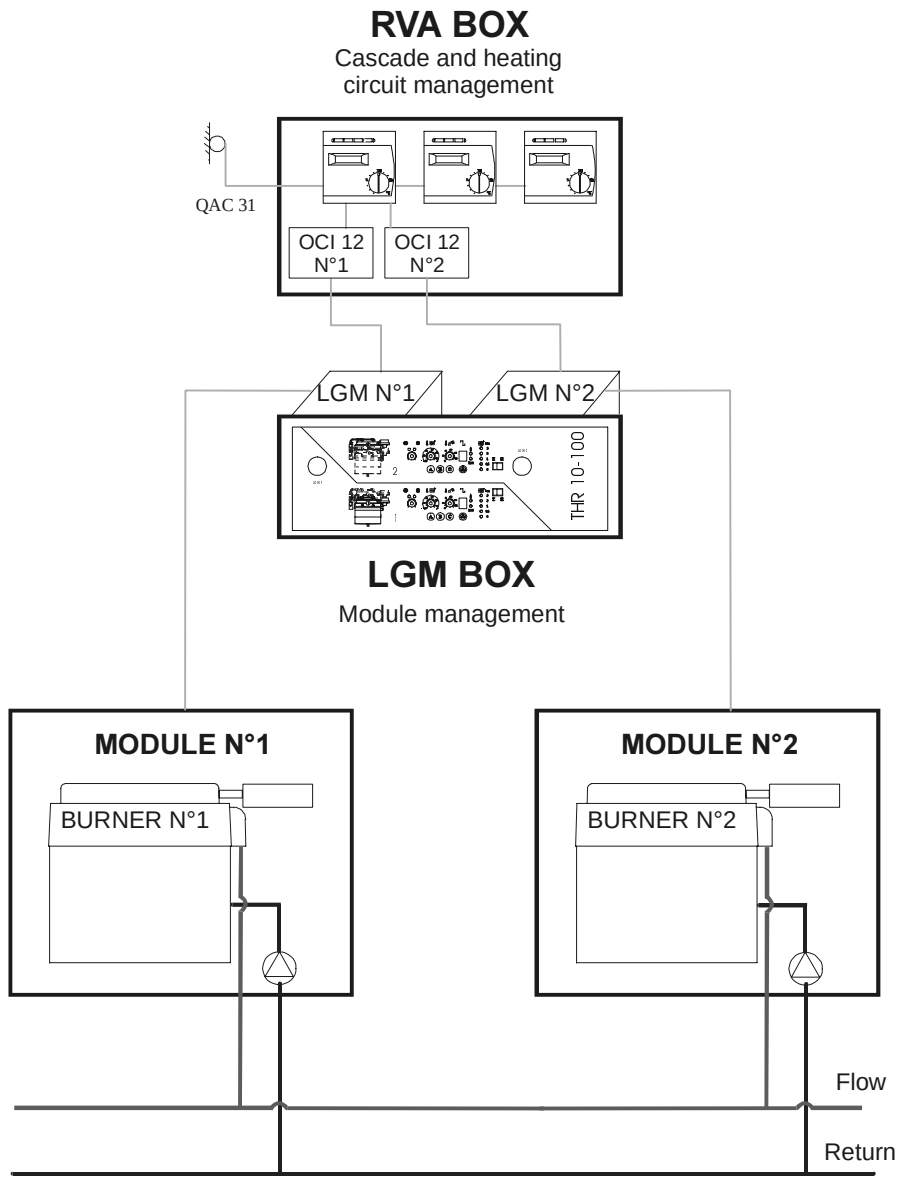


Fig. 8



1 - OPERATING PRINCIPLE

Fig. 9



The THR 10-100 is equipped with two 10 to 50 kW modules. These modules are controlled by their respective LGM. The RVA 47 manages the cascade between the two LGMs according to input and atmospheric conditions.

The RVA 47 regulator determines a boiler flow temperature according to atmospheric conditions or according to connected RVA 46 (option) regulator inputs and transmits it with a flow regulation to the first LGM (master) via an OCI 12 interface. According to the difference between the actual temperature and the boiler's temperature setting, the second module (slave) is either selected or not selected.

The THR 10-100 was originally pre-equipped to accommodate two RVA 46 regulators(options). These zone regulators, which can communicate with the RVA 47, can control an entire heating system (heat production and multiple zone heating by operating a pump or a mixer valve). Such a heating system can feature up to 40 regulators.

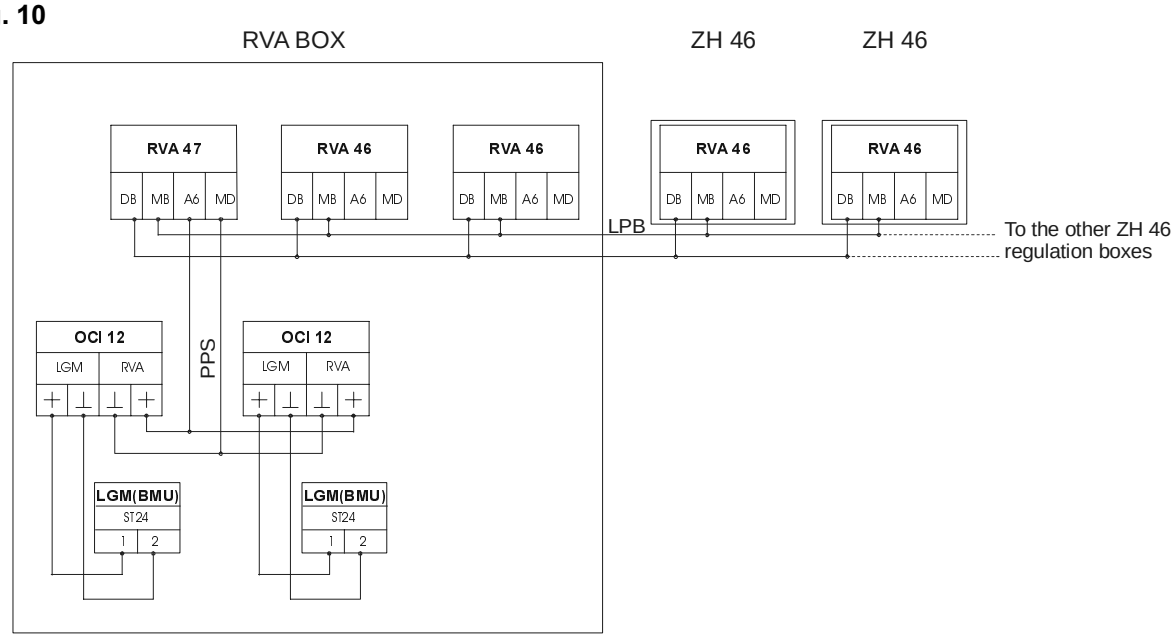
Thanks to this communication ability, only one outside sensor is required in the whole system.

Note:

- The heating system can be completed by adding other ZH 46 type control boxes. - see section VIII - MULTICIRCUIT WITH A THR 10-100.

2 - COMMUNICATION PRINCIPLE

Fig. 10



Communication signals:

- ***LPB:***

  Inter RVA local communication Bus.

  It ensures the integration of the network data, multicircuit data, d.h.w. production data and heating network data.

- ***PPS:***

  Process communication.

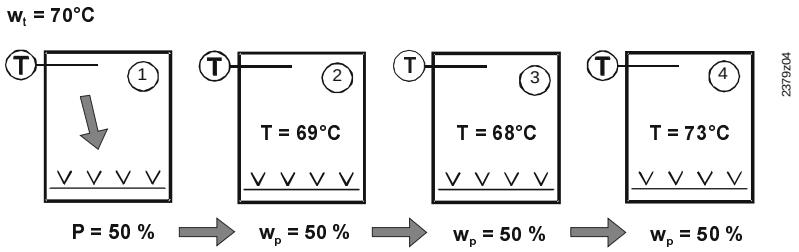
  It ensures the required data exchange for heat production (between the RVA and the LGMs via the OCIs).

3 - STANDARD CASCADE SETTING

LGM management is carried out with the applied power principle:

A distinction is made between the master LGM and the slave LGMs. The master LGM receives the temperature setting from the RVA 47 regulator and converts it into power. The power requested by the system is dispatched in equal proportions to all the selected LGMs.

Fig. 11

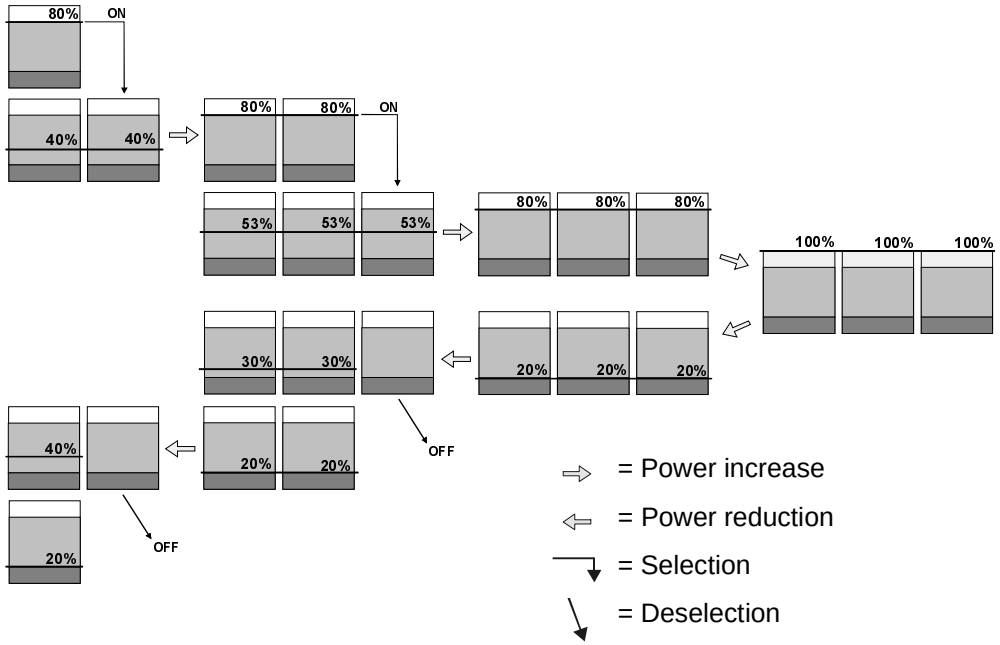


Wt = main boiler setting
Wp = LGM power setting
P = Actual power
T = Actual temperature

This type of operation is best to obtain the maximum boiler condensation rate.

The additional LGMs are selected as late as possible and deselected as late as possible. This means a **selection/deselection frequency that is as low as possible**.

Fig. 12 Example with three LGMs and a power range from 20 to 80 % :



4 - LGM OPERATION

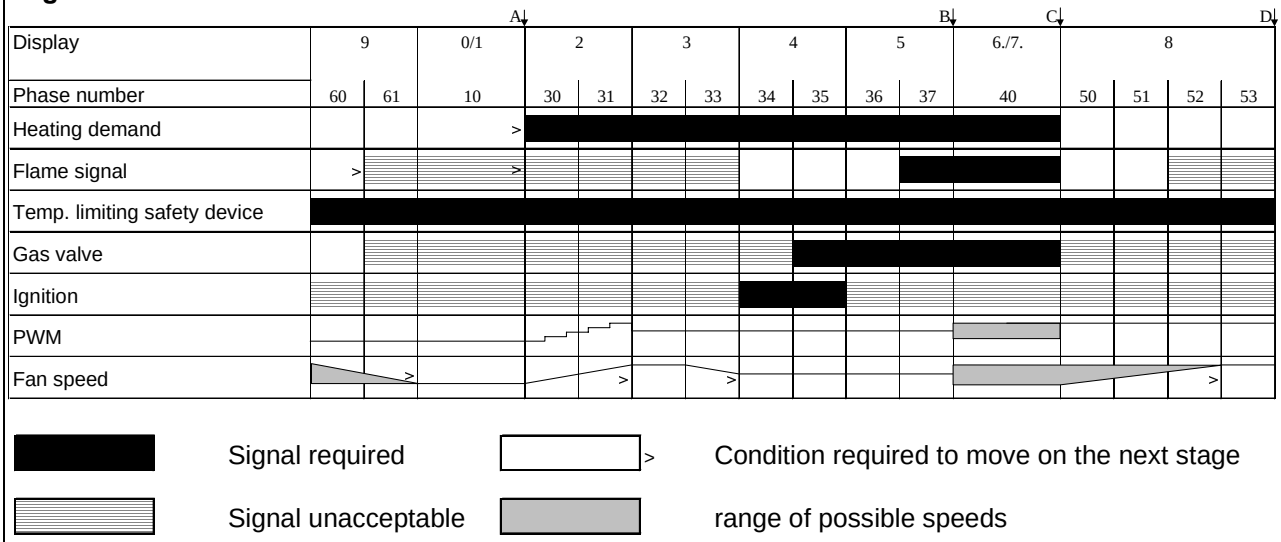
4.1 - Standard operating status

Codes appearing on the display (item no. 4, fig. 5).

Display	Meaning
0	Awaiting heating or hot water request
1	LGM terminal 6 shunt non available / switch open
2 3	Ventilator rate increase time / pre-ventilation
4	Preignition/ignition
5	Flame presence check
6	Domestic hot water mode burner operation
7	Heating mode burner operation
8	End of the heating or domestic hot water request, post-ventilation
9	Return to initial position, safety control box parameters reset (Ventilator OFF)

4.2 - Operating diagram

Fig. 13



Programme sequence:

- **Phase 10: Standby:**

  The boiler is on standby awaiting a heat request.

  A: Start-up instruction.

  It is given by the RVA 47 regulator or the LGM itself with a d.h.w. request (display 6) or a heating request (display 7).

- **Phase 30-31: Ventilator speed increase time:**

  This time ends as soon as the ventilator motor speed reaches the programmed load for preventilation.

- **Phase 32: Preventilation time.**

- **Phase 33: Tapering time:**

  This time ends as soon as the ignition load is reached.

- **Phase 34: Pre-ignition time (3 s):**

  Appearance of the ignition arc prior to opening the gas valve, which occurs at the start of phase 35.

- **Phase 35-36-37: Safety time (3 s):**

  A flame signal should be present (ionization current > 2.8 µA) before the safety time has elapsed. If this does not occur, another ignition attempt is made.

- **Phase 40 (B-C): Burner operation:**

  Burner operation following a domestic hot water request (display 6) or a heating request (display 7).

- **Phase C-D: Shut-down:**

  The switch from the operating position to the Standby position is referred to as "shut-down" and occurs when the heat request disappears. The gas valve closes and the residues are evacuated by post-ventilation.

- **Phase 50-51: Blocking time:**

  Blocking time for test purpose (approx. 2 s).

  Phase 52: Closure time:

  Required time to reach the programmed air flow rate.

- **Phase 53: Post-ventilation time (3 s):**

  The ventilator remains on during the post-ventilation time.

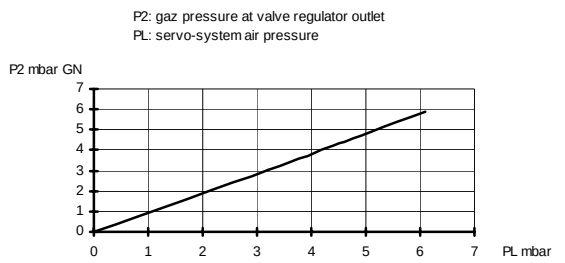
- **Phase 60-61: Return to initial position:**

  Compulsory switch from the shut-down position to standby. This phase is also used to bring the safety control box to the standby position after exceptional events such as a RESET.

4.3 - Principle of air/gas servo-control system

The gas valve with which is equipped each of the THR 10-100 boiler's 50 kW modules is controlled by the air pressure supplied by the ventilator, thus guaranteeing a correct air/gas ratio over the whole modulation range (constant CO_2). This ratio remains constant despite any pressure drop in the combustion products outlet or the air intake. The air-gas link is pneumatic.

Fig. 14



4.4 - Air pressure variation procedure

Each 50 kW module is equipped with a 230 volt variable-speed ventilator controlled by the LGM which calculates the speed needed at any given time to produce the required pressure.

4.5 - Emission of pollutants

Each 50 kW module is equipped with a high performance pre-mixed burner.

CO and NO_x emissions are within the values laid down by the most demanding quality standards (Blue Angel label).

4.6 - Functions common to the different versions

For these functions to work (antifreeze, pump kick, automatic summer/ winter switching, anti-legionella etc.), the On/Off switch must not be operated (it needs to be kept permanently in the 'on' position).

4.6.1-Antifreeze function

50 kW module antifreeze protection:

- when the boiler shell temperature is below 5 °C the burner and the module pump are switched on. When the temperature increases and exceeds 15 °C the burner is disconnected and the pump continues to circulate for 10 mins.

Antifreeze protection for the installation:

- the module pump starts operating automatically either intermittently or continuously depending on whether the outdoor temperature is under 1.5 °C or under - 10 °C.

Antifreeze protection for domestic hot water (THR 10-100 CS models only:

- when hot water production has shut down, a minimum temperature of 4 °C is ensured by the LGM.

4.6.2 - Anti-legionella function (THR 10-100 CS)

To provide a substantial degree of protection against the development of pathogenic bacteria in the domestic hot water tank during prolonged shutdowns, the domestic hot water must be heated once a week to a temperature above 60 °C.

The anti-legionella function is used for this purpose. It heats the hot water storage tank once a week to a 65 °C "anti-legionella" temperature.

4.6.3 - Pump run-on after the end of heating

When the heating mode ends, the module pump remains on for a further 10 minutes.

In hot water storage systems (BS with THR 10-100 CS), when domestic hot water heating ends, the module pump remains on until the d.h.w. exchanger temperature drops below 70 °C (max. Domestic Hot Water temperature being 65 °C). During this pump run-on period, the by-pass valve remains in the "domestic hot water feed" position.

4.6.4 - Pump kick or selector valve kick

If the module pump has not operated or if the selector valve has not been activated for more than about 24 hours, these elements are activated during operating stops for approx. 5 seconds.

4.6.5 - Boiler overheat protection

Each module LGM incorporates a temperature control function. It can switch off the burner when the temperature of the burner reaches the maximum value of 85 °C. The module heating circuit pump remains on until the actual value of the module water temperature drops below 79 °C. The burner can then be started up again.

A module overheat protection also exists (item no. 4, fig. 3).

When the water overheating safety thermostat activates, the heating circuit pump and the ventilator are switched on for 10 minutes. The selector valve switches to the "heating" position.

This second safety system requires a automatic reset and generates an alarm on the boiler. The reset button on the LGM's control panel (item no. 8, fig. 5) must therefore be pressed to return to normal operation.

4.6.6 - Anti-short burner cycle protection function

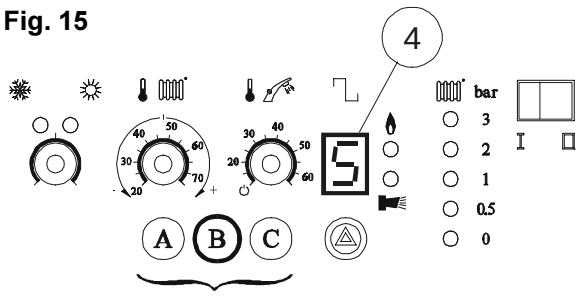
The mimimum time that the burner can operate is set to 60 seconds.

4.7 - Functions activated using the LGM's control panel

4.7.1 - Sweep function

Signal code "5" on the display (item no. 4, fig. 15).

Fig. 15

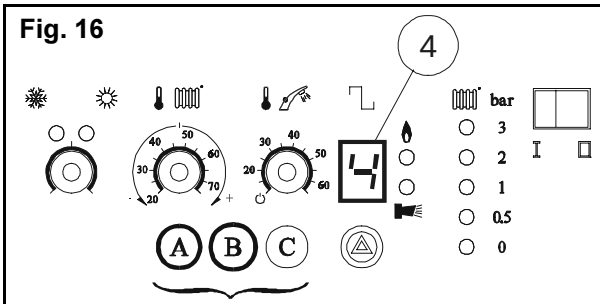


The sweeping function is activated by pressing button **B** for at least one second, i.e. a heating request is made and so the system comes on. The "on-off" functions of the internal management system remain inactive in this situation. Heating then operates at maximum heat output until the boiler's 85 °C maximum temperature is reached (temperature control function) so that the sweep function can carry out combustion product evacuation measurements.

4.7.2 - TÜV Function

Signalling code "4" on the display (item no. 4, fig. 16).

Fig. 16

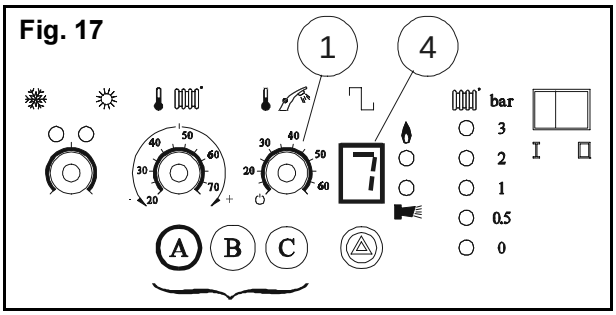


Pressing buttons **A** and **B** together for at least one second activates the TÜV function, i.e. the internal management unit / temperature controller function become inactive. Heating then operates at maximum output until the water or combustion product overheating safety device responds (item no. 4 and item no. 23, fig. 3). Releasing either of the two buttons interrupts the TÜV function.

4.7.3 - LGM management unit off function

Signalling code "7" flashes on the display (item no. 4, fig. 17).

Fig. 17



Pressing button **A** only for at least 3 seconds activates the "LGM off" function. This makes it possible to manually adjust the speed of the ventilator motor on the d.h.w. temperature setting potentiometer (item no. 1, fig. 17), and thus also the heat output (e.g. for setting the gas valve). The module then operates in its heating regime; the temperature controller's internal function and the "on-off" management unit are active.

The "LGM off" function is ended by pressing button **A** again or by switching off the burner.

5 - RVA 47 REGULATOR OPERATION

The RVA 47.320 (B series) regulator makes possible cascade control of two 50 kW modules.

In addition to the cascade, it allows:

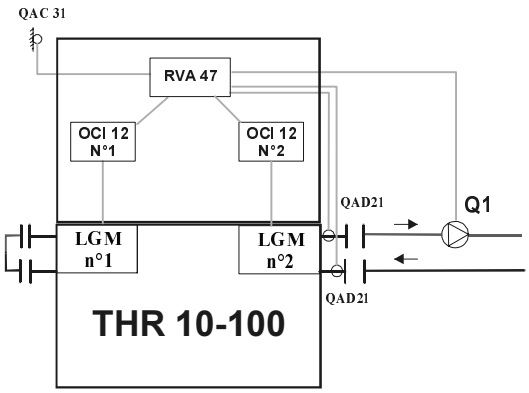
- the control of a network pump or of a heating network pump,
- the control of domestic hot water production bt the load pump (on THR 10-100 C models) or by the selector valve (on THR 10-100 CS models).

Boiler and heating circuit control is carried out according to atmospheric conditions, domestic hot water production is controlled according to the programmed temperature of the domestic hot water tank and the time programme.

By connecting the RVA 47s equipping each THR 10-100 boiler, it is possible to have four THR 10-100 operate in a cascading mode for a 10 to 400 kW modulation.

5.1 - Network pump control

Fig. 18



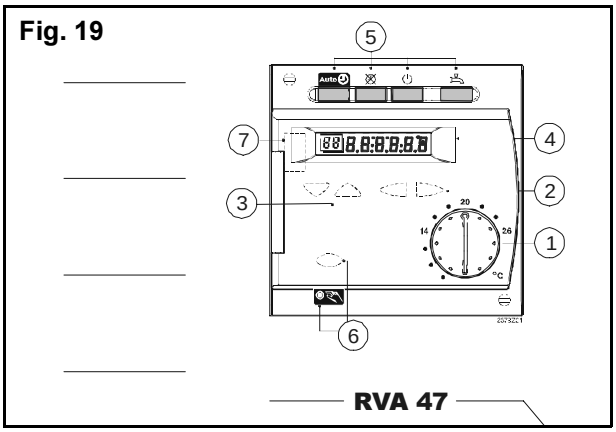
Q1 pump is a network pump.

It operates as soon as there is a zone circuit heating request (request made via RVA 46 regulators).

The heating flow temperature is the highest temperature setting of the all the zone circuits.

In that case, the control knob of the RVA 47's room temperature (item no. 1, fig. 19) becomes inactive.

Fig. 19

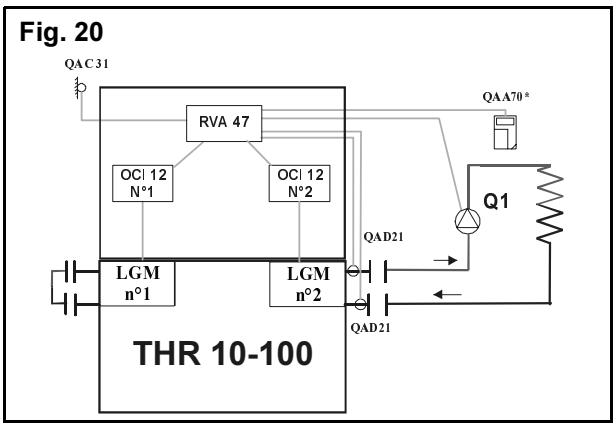


The Q1 network pump stops operating as soon as there is no more heating request in any of the zone circuits.

5.2 - Heating circuit pump control

See section V - BASIC SETTING OF THE THR 10-100.

Fig. 20



La pompe Q1 fonctionne comme une pompe de chauffage.

It operates as soon as the RVA 47 receives a request and the outdoor temperature is lower than the Summer/Winter switching setting value (19 °C).

This request can be made either by:

- the RVA 47's room temperature control knob (item no. 1, fig. 19),
- the QAA 70 room sensor connected to the RVA 47.

The Q1 stops operating when there is no heat request.

The control of the heating circuit flow temperature is therefore carried out according to external conditions with or without room temperature influence.

5.3 - Temperature table

Temperature setting		Actual temperature	
Setting the temperature setting		**Display of the actual temperature**	
	Domestic hot water comfort temperature setting		Actual room temperature
	Energy saving room temperature setting		Actual outdoor temperature
	Frost protection room temperature setting		Actual boiler temperature 1 T° BMU No.1 2 T° BMU No.2
	Summer/winter switching temperature setting		Actual cascade flow temperature (input B10)
	Energy saving domestic hot water temperature setting		Actual cascade return temperature (input B70)
			Actual boiler tank temperature (input B4 see 97)
			Actual domestic hot water temperature (B3 input or BMU value)
			Average outdoor temperature
			Mixed outdoor temperature
Temperature setting display			
	BMU temperature setting 1 T° sett. BMU No.1 2 T° sett. BMU No.2		
	Cascade flow temperature setting		
	Domestic hot water temperature setting		
	Room temperature comfort setting + room temperature correction		
	Room temperature setting		
	Flow temperature setting		

6 - RVA 46 REGULATOR OPERATION (OPTION FOR THE THR 10-100)

These units are used for multiple zone heating networks featuring:

- a circulating pump,
- a mixer valve.

These units can communicate with each other as well as with the RVA 47 and the LGMs and thus form a complete heating system.

The control of the flow temperature of the heating circuit with a mixer valve and/or a circulating pump is carried out either:

- according to external conditions,
- according to external conditions with room influence.

A simple button is used to set the room temperature comfort setting.

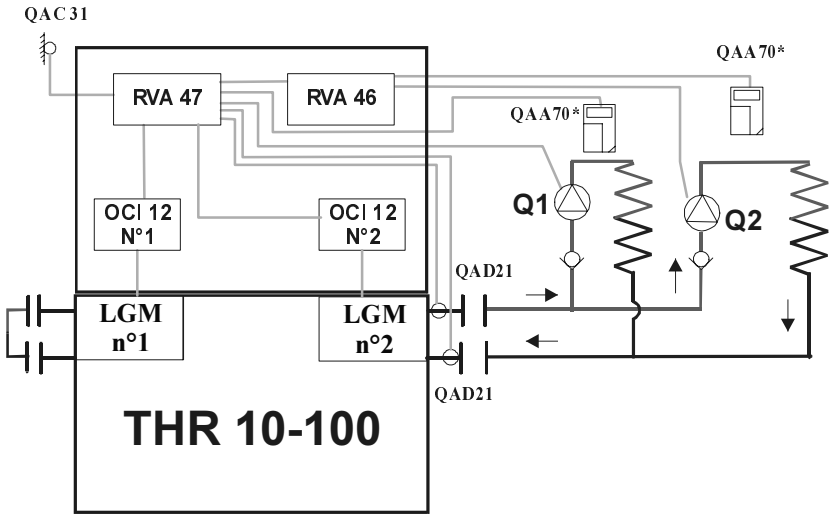
The RVA 46 regulator controls a pump circuit by default.

As soon as the heating flow temperature sensor (QAD 21) is connected to the RVA 46, the RVA 46 automatically recognizes that the circuit is equipped with a mixer valve.

6.1 - Control of a pump circuit using an RVA 46

No flow temperature sensor (QAD 21) is connected to the RVA 46.

Fig. 21

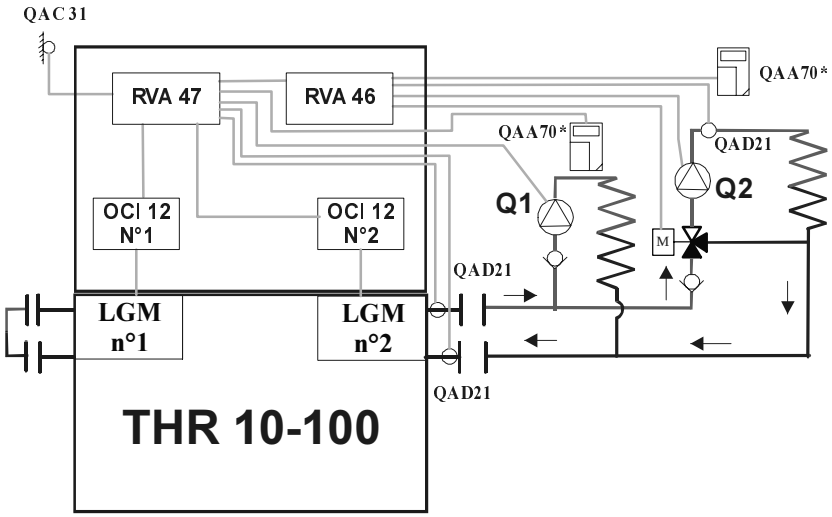


- With no QAA 70 room sensor on the pump circuit:
  - the pump circuit flow temperature is defined by the slope of the RVA 46 for a 20 °C room temperature,
  - corrections relating to this room temperature are carried out by the room temperature control knob of the RVA 46 (item no. 1, fig. 19) (setting from 8 to 26 °C).
- With a QAA 70 room sensor on the pump circuit:
  - the room temperature control knob of the RVA 46 (item no. 1, fig. 19) becomes inactive,
  - the pump circuit room temperature setting is set on the room sensor (setting value programmed in line 1 of the room sensor + correction with the control knob +/- 3 °C).

6.2 - Control of a circuit equipped with a mixer valve using an RVA 46

A flow temperature sensor (QAD 21) is connected to the RVA 46

Fig. 22



- With no QAA 70 room sensor on the mixer valve circuit:
  - the mixer valve circuit flow temperature is defined by the slope of the RVA 46 for a 20 °C room temperature,
  - corrections relating to this room temperature are carried out by the room temperature control knob of the RVA 46 (item no. 1, fig. 19) (setting from 8 to 26 °C).
- With a QAA 70 room sensor on the mixer valve circuit:
  - the room temperature control knob of the RVA 46 (item no. 1, fig. 19) becomes inactive,
  - the mixer valve circuit room temperature setting is set on the room sensor (setting value programmed in line 1 of the room sensor + correction with the control knob +/- 3 °C).

A circuit equipped with a mixer valve can control a floor heating system by setting the slope of the RVA 46 to 8.

6.3 - Q2 pump Operation

Q2 pumps start operating as soon as the RVA 46 regulators receive a heating request and the outside temperature is lower than the Summer/Winter switching setting value.

The Q2 pumps of the RVA 46 circuits stop operating when there is no heating request in any of the circuits

6.4 - Temperature table

Temperature setting		Actual temperature	
Setting of the temperature setting		**Display of actual temperature**	
	Energy saving room temperature setting		Actual room temperature
	Frost protection room temperature setting		Actual outdoor temperature
	Summer/winter switching temperature setting		Actual flow temperature (input B1)
Temperature setting display			
	Room temperature comfort setting		

IV - INSTALLATION

1 - GENERAL POINTS

These regulations are specific to the buildings in which the units are installed.

Unit installation and servicing will have to be carried out by a qualified person, in accordance with the written regulations and codes of practice in force.

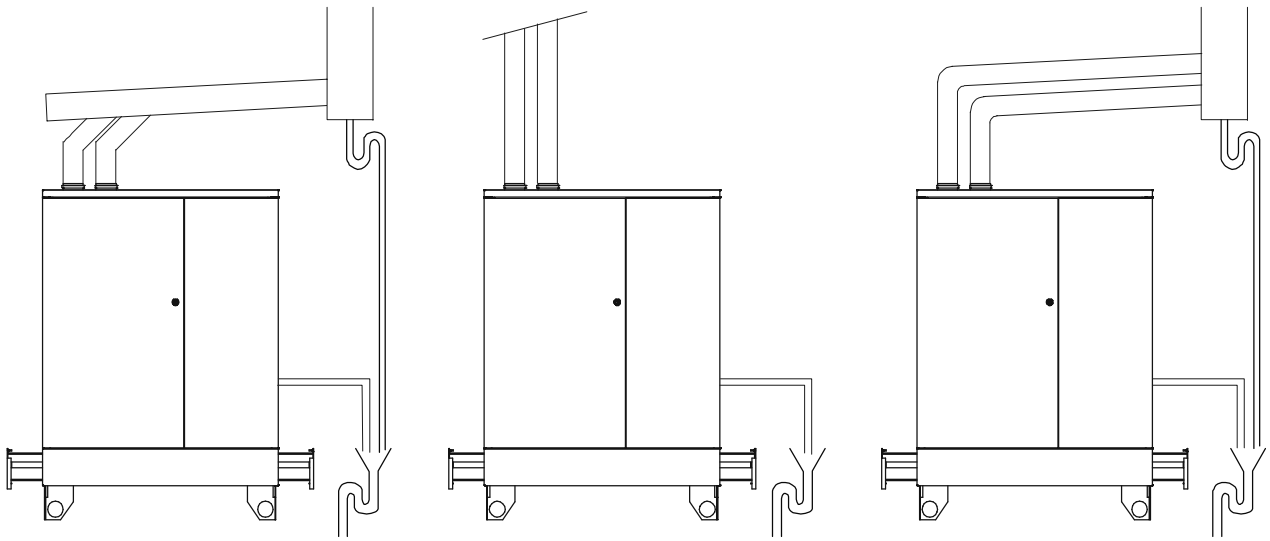
2 - VENTILATION

- All combustion units use a quantity of air that is proportional to their power. For this reason an efficient ventilation of the premises (see the installation standards).

3 - COMBUSTION PRODUCT EVACUATION (B23)

Use a corrosion resistant vertical flue (inox, PVDF or PP according to local regulations). This flue will have to be proportioned in size so as to ensure evacuation of the combustion products by natural draft.

Fig. 23



4 - HYDRAULIC CONNECTION

The expansion tank and the safety valve are not integral parts of the boiler.

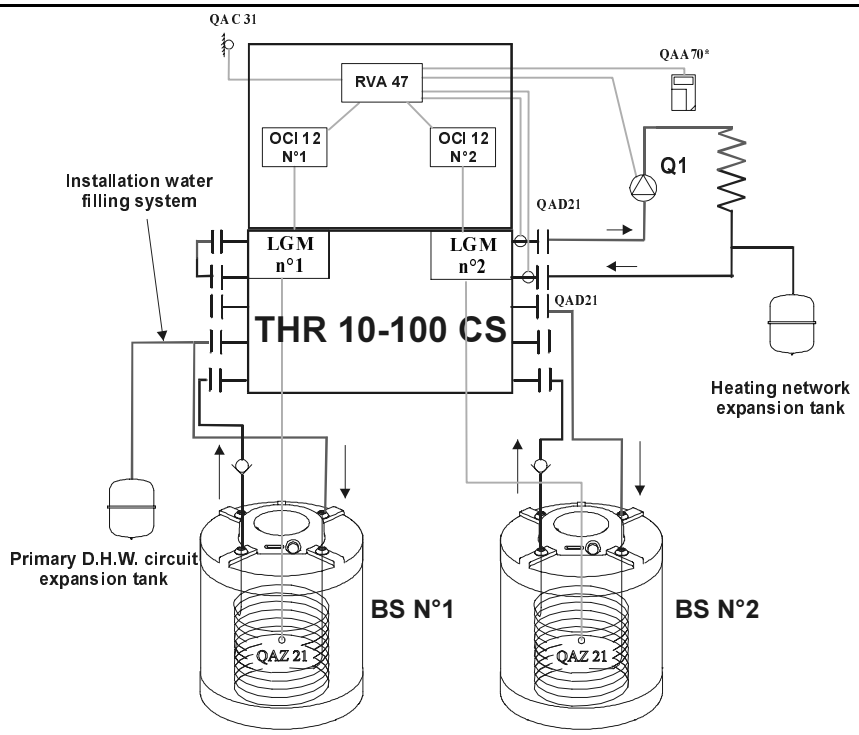
When the boiler is connected to an old installation, the installation must be rinsed with clarified water so as to remove sediment that may remain in the lower flow rate areas.

If the boiler is connected to a domestic water network that is calcareous, the installation of an antiliming system on the installation's general cold water inlet is recommended.

If thermostatic valves are installed, the following options are recommended:

- **either do not equip all the radiators with these valves,**
- **or install a differential valve,**
- **or use an automatic speed variation pump.**

Fig. 24



4.1 - Safety valve

- Rating pressure: 3 bars,
- Dimensioning to be defined according to the installation (power and water volume) - Follow the regulations in force.
- The valve must be placed on the recirculation loop (fig. 25).

4.2 - Expansion tank on the domestic water primary circuit (THR 10-100 CS only)

Because the domestic water primary circuit can be isolated from the heating network when the THR 10-100 CS is in the permanent summer mode, it is necessary to fit an expansion tank with a 5 to 6 litre capacity onto the domestic water flow of the THR 10-100 CS.

- If a single tank is connected, connect the expansion tank to the domestic water flow,
- If two tanks are connected, connect the expansion tank to one of the two domestic water flows.

For the same reason, it is recommended to fill the installation with water through the domestic water flow or one of the domestic water flows of the THR 10-100 CS. The filling system will have to meet the local regulations in force.

4.3 - The expansion tank of the heating network

The expansion tank must be determined according to the heating network.

To ensure the durability of the installation, the proportions of the expansion tank must be determined properly. The tank must be able to cope with a 6 % expansion of the total water capacity of the heating circuits. To cope with this expansion properly, it must be understood however that a tank's useful capacity is not equal to its actual capacity.

Example:

- Installation: 200 litres
- Domestic hot water tank heat exchanger: 12.5 litres
- Boiler: 20.5 litres (THR 10-100 CS)
- Total water capacity: 233 litres

Conditions: Use of a pre-loaded 1 bar tank (basement boiler = ground-floor heating + 1 floor), heating safety valve rated at 3 bars, installation filled at 1 bar (cold).

- Calculation of tank efficiency (R):

$$R = \frac{\text{Safety pressure} - \text{Filling pressure}}{\text{Safety pressure}}$$

$$R = \frac{(3+1)-(1+1)}{(3+1)} = 0,5$$

+ 1) = corresponds to the transformation of the relative pressures into absolute pressures

- Calculation of useful tank capacity (Cu):

$$Cu = \text{total volume} \times \text{expansion}$$

$$Cu = 233 \times 0,06 = 14\ dm^3$$

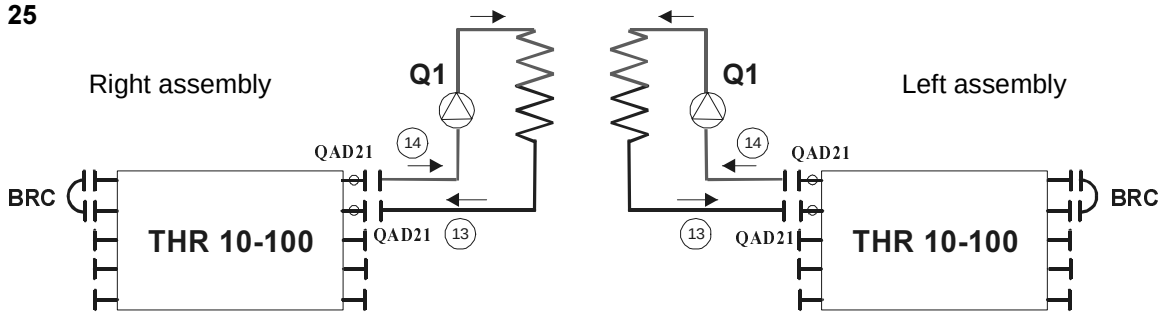
- Calculation of actual tank capacity (Cr):

$$Cr = \frac{Cu}{R}$$

$$Cr = \frac{14}{0,5} = 28 \text{ litres}$$

4.4 - Connection options of a THR 10-100

Fig. 25



Q1 *Heating pump*
QAD 21 *Heating flow-return temperature sensor*
BRC *Recirculation loop*
13 *Heating return*
14 *Heating flow*

Boiler installation:

- Choose the assembly sense of the boiler: right connection or left connection (fig. 25),
- Install:
  - the Q1 heating pump on the boiler's heating flow (item no. 14),

It must be determined so as to obtain a flow rate of approx. 5 m^3/h in the installation in order to reach maximum power.

  - the heating flow temperature sensor (QAD 21) on the boiler's heating flow (item no. 14),
  - the heating return temperature sensor (QAD 21) on the boiler's heating return (item no. 13),
  - the recirculation loop (BRC) on the unused heating flow/return flanges.

Notes:

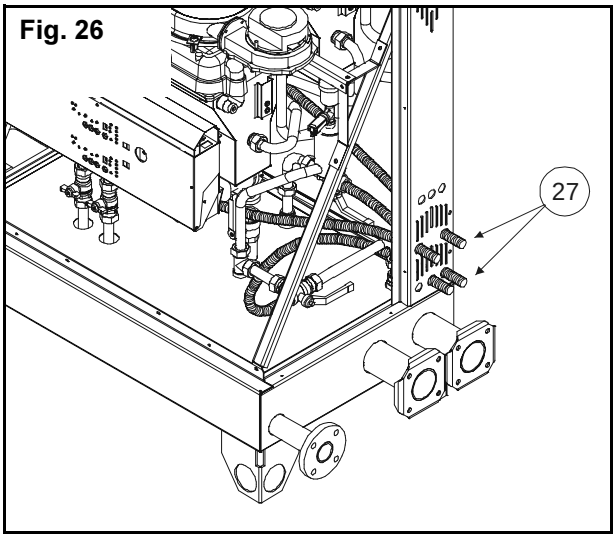
- The flow/return sensor cables (identified by a flow/sensor return sensor tag) are already connected to the RVA 47s and are at stand-by in the boiler in order to facilitate the assembly.

  For the electrical connection of the sensors and pumps, see section V - BASIC SETTING OF THE THR 10-100.

4.5 - Liquid waste evacuation

The 4 tubes liquid waste evacuation tubes (item no. 27) (condensate evacuation, drain and bleeds) must be connected to an accessible siphon.

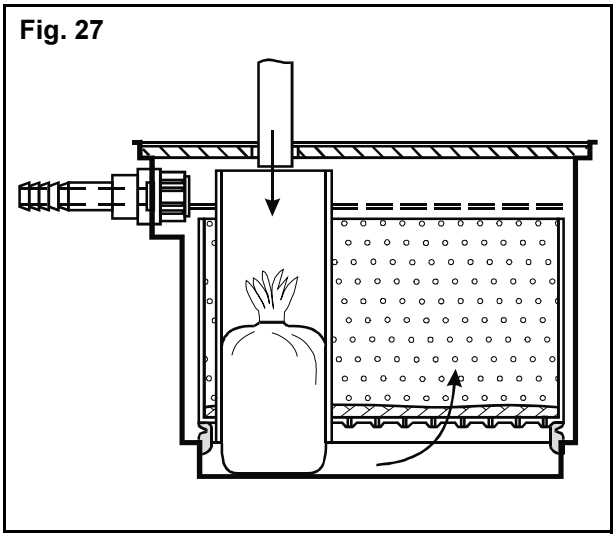
Fig. 26



A condensate processing system can be installed in the boiler according to local and national regulation requirements.

This accessory makes it possible to return the pH to a neutral value prior to network evacuation of liquid waste.

Fig. 27



5 - GAS CONNECTION

5.1 - General points

Originally the boiler was designed to operate with gas H. For operation with natural gas L or with propane, see paragraph 2 - section VII - COMBUSTION CONTROL.

- Only use connectors and seals that are authorized for use with gas.
- Flush the gas piping before connecting the boiler so as to evacuate possible residue created by welding and connections.
- Never test the gas piping when the boiler is connected (Pgas maxi = 60 mbar).
- The gas inlet piping to the boiler must not cause a pressure drop of over 1 mbar.
- A stop valve that meets gas regulations must be fitted near the unit and must remain accessible.

5.2 - Adapting an external gas solenoid safety valve

The RVA 47 does not enable the connection of an external solenoid safety valve in the case of liquid gas operation.

The only possible programming is located on the LGM (programming output ST9 as a signalling output).

However, the standard setting of the RVA 47 of the THR 10-100 allows an automatic LGM cascade mode switching according to a set number of hours (500 h). It is therefore necessary to adapt parameter setting of the switching mode on the RVA 47 according to the solution chosen hereafter.

Note:

- The number of LGMs in the system can be:
  - 2 for a single THR 10-100,
  - or a multiple of 2 in the case of a THR 10-100 cascade installation.

Standard setting

Line	*Function*	*Setting range/ display*	*Unit*	*Setting increment*	*Basic setting*
	Boiler cascade				
130	Cascade boiler switching --- No automatic switching (fixed boiler sequence) 10...990 Switching according to the number of hours set	--- / 10...990	- / hour	10	500
131	Boiler exclusion by automatic sequence permutation 0 none 1 first boiler 2 last boiler 3 first and last boiler	0...3	-	1	0
132	Main boiler for the fixed sequence	00.1...16.3	-	01.1	-

Programming output ST9 on the LGMs

Index 5 programming at signalling output:

Index 5 bit 7	Index 5 bit 6	Index 5 bit 1	Index 5 bit 0
1	0	0	0 ou 1

Output ST9 live at phase 30 (ventilator power increase), at phase 50 (end of heat request by the regulator).

Maximum solenoid valve ratings in the case of a direct connection to the LGM.

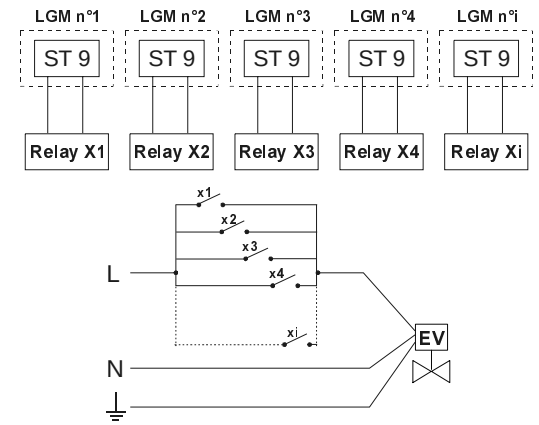
Current: AC - 230 V + 10 % / - 15%
I < 1.0 A ; cosφ > 0.8

- 1st solution:

Automatic permutation of all LGMs maintained

- Programming output ST9 as a signalling output of all LGMs in the system.
- Using a relay system, control of the external solenoid safety valve (EV, fig. 28) by using the ST9 outputs in all the LGMs in the system.

Fig. 28



- 2nd solution

Exclusion of the first LGM from the LGM automatic permutation system (authorized permutation for the other LGMs)

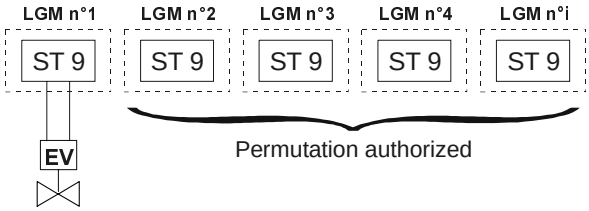
- Programming output ST9 as signalling output of LGM No.1 (main LGM) and connection of the external solenoid valve (EV, fig. 29) to this output.
- Exclusion of this LGM from the automatic sequence permutation.

Setting the RVA 47:

Line	*Function*	*Setting*
131	Exclusion of the boiler from the automatic sequence permutation 0 none 1 first boiler 2 last boiler 3 first and last boiler	1
132	Main boiler for the fixed sequence	01.1

132 = 01.1: the main LGM is the one carrying address 1 (of segment 0), and sub-address 1 (LGM n°1).

Fig. 29



- 3rd solution

Locking of the automatic permutation of all the LGMs

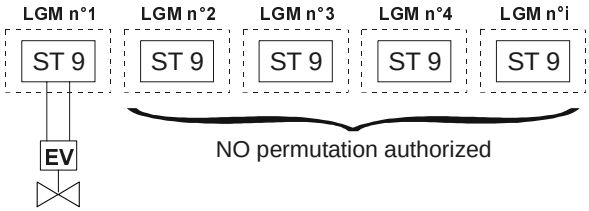
- Programming output ST9 as a signalling output on LGM No.1 (main LGM) and connection of the external solenoid safety valve (EV, fig. 30) to this output.
- Locking of the automatic permutation of all the LGMs.

Setting the RVA 47:

Line	*Function*	*Setting*
130	Switching of cascade boilers --- No automatic switching (fixed boiler sequence) 10...990 Switching according to the number of hours set	- - -
132	Main boiler for the fixed sequence	01.1

132 = 01.1: the main LGM is the one carrying address 1 (segment 0), et la sub-address 1 (LGM No.1).

Fig. 30



6 - ELECTRICAL CONNECTION

- Electrical connection as well as any equipment used to carry out this connection will conform to the codes of practice in force and in particular to standard NF C 15-100,
- the installation premises must be adapted to the boiler's level of protection (IP x 0D),
- mains voltage: 230 V - 50 Hz (single phase),
- earthing is compulsory,
- maximum electrical intensity absorbed by the boiler without the accessories (heating pump - domestic water pump, other RVA 46) is **2 A**,
- the power supply will have to take into account all the accessories connected to the different RVAs bearing in mind that each of the regulators' relays handle a maximum intensity of 2 A each (see paragraph 1 - section II - TECHNICAL SPECIFICATIONS in RVA 46 and RVA 47 technical instructions),
- the power supply must feature a cut-out switch, preferably bipolar, with a circuit-breaker or a fuse.
- Observe Live-Neutral polarity.

6.1 - Connection to the network

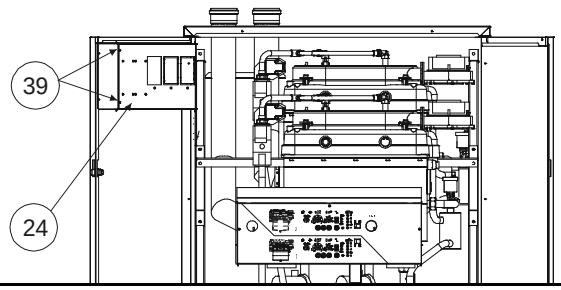
The boiler is equipped with a 3 m power cable. When connecting the socket, pay attention to Live-Neutral polarity.

6.2 - Connection of pumps and sensors

The pumps and connectors are connected to the terminals of regulator RVA 47 (see section V - BASIC SETTING OF THE THR 10-100):

- Open the RVA box (item no. 24) once the two screws have been removed (item no. 39),

Fig. 31



- connect the following elements to the RVA 47:
  - heating pump Q1,
  - the two heating flow-return temperature sensors QAD 21,
  - outside sensor QAC 31,

For domestic hot water on a THR 10-100 C:

- domestic hot water sensor QAZ 21,
- domestic hot water load pump Q3,

For domestic hot water on a THR 10-100 CS:

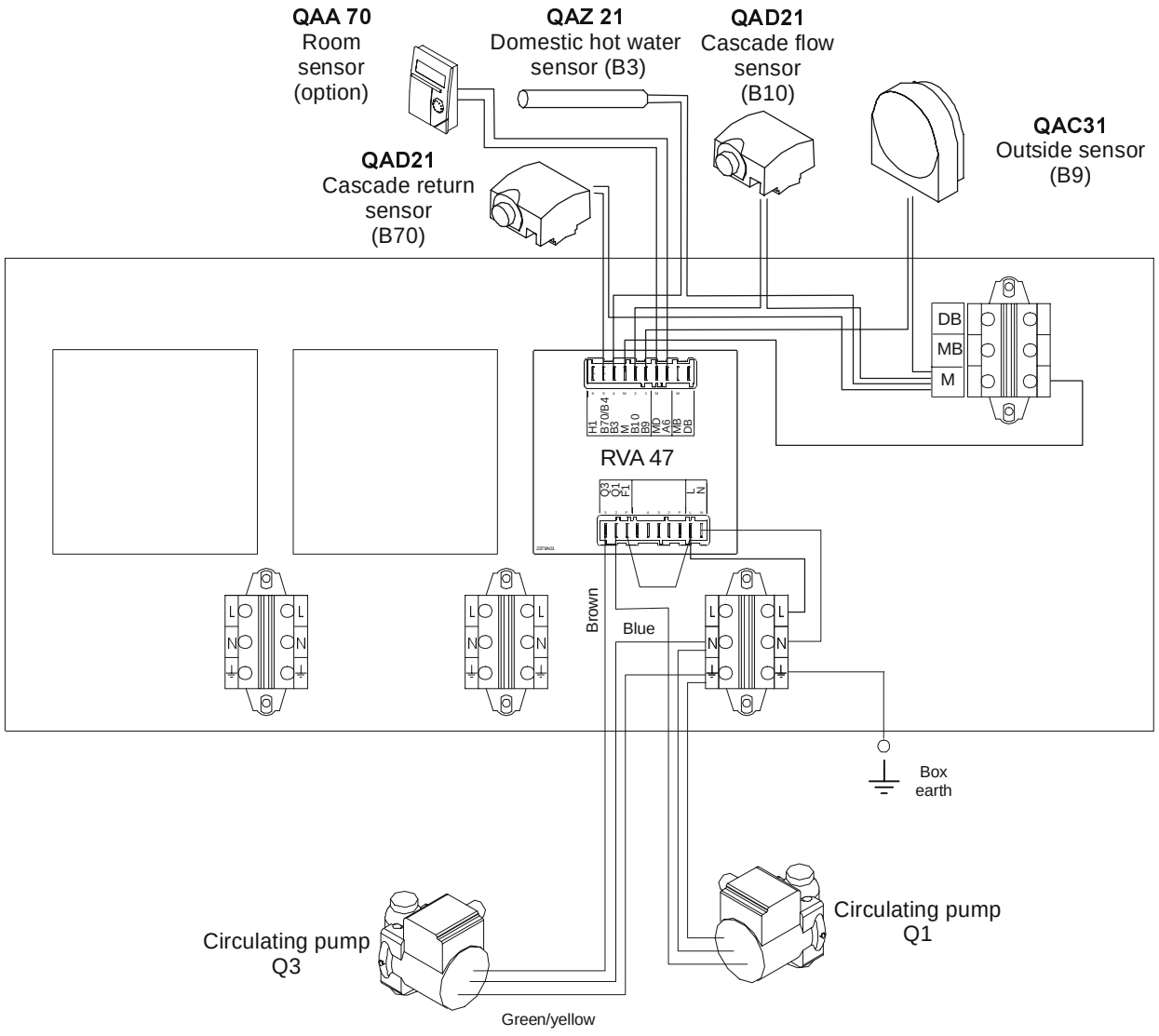
- domestic hot water sensor QAZ 21 on the LGM.

For the connection of sensors connect the common to the provided terminals.

6.3 - Skeleton diagram

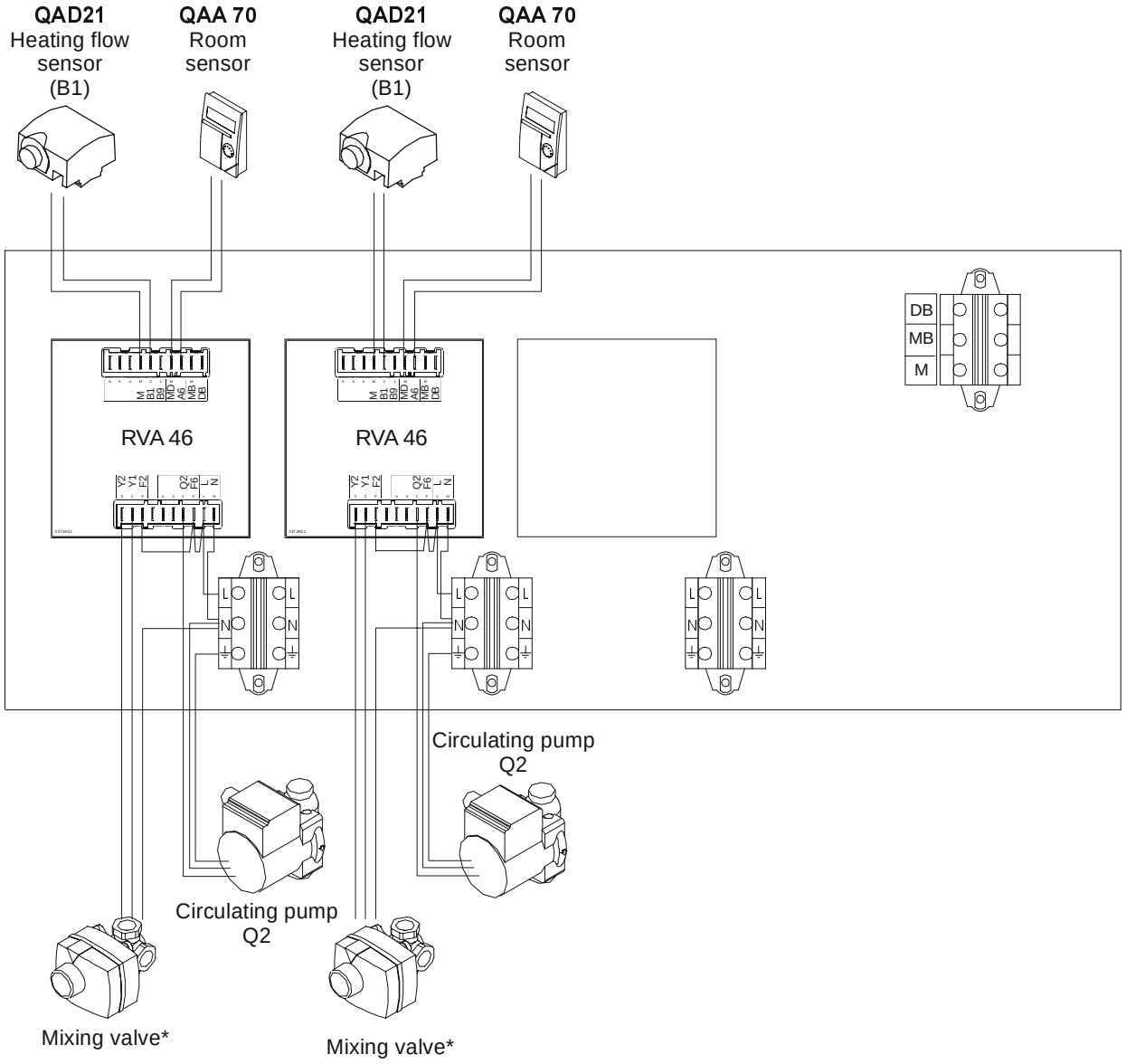
6.3.1 - Basic THR 10-100

Fig. 32



6.3.2 - THR 10-100 with two RVA 46 (options)

Fig. 33

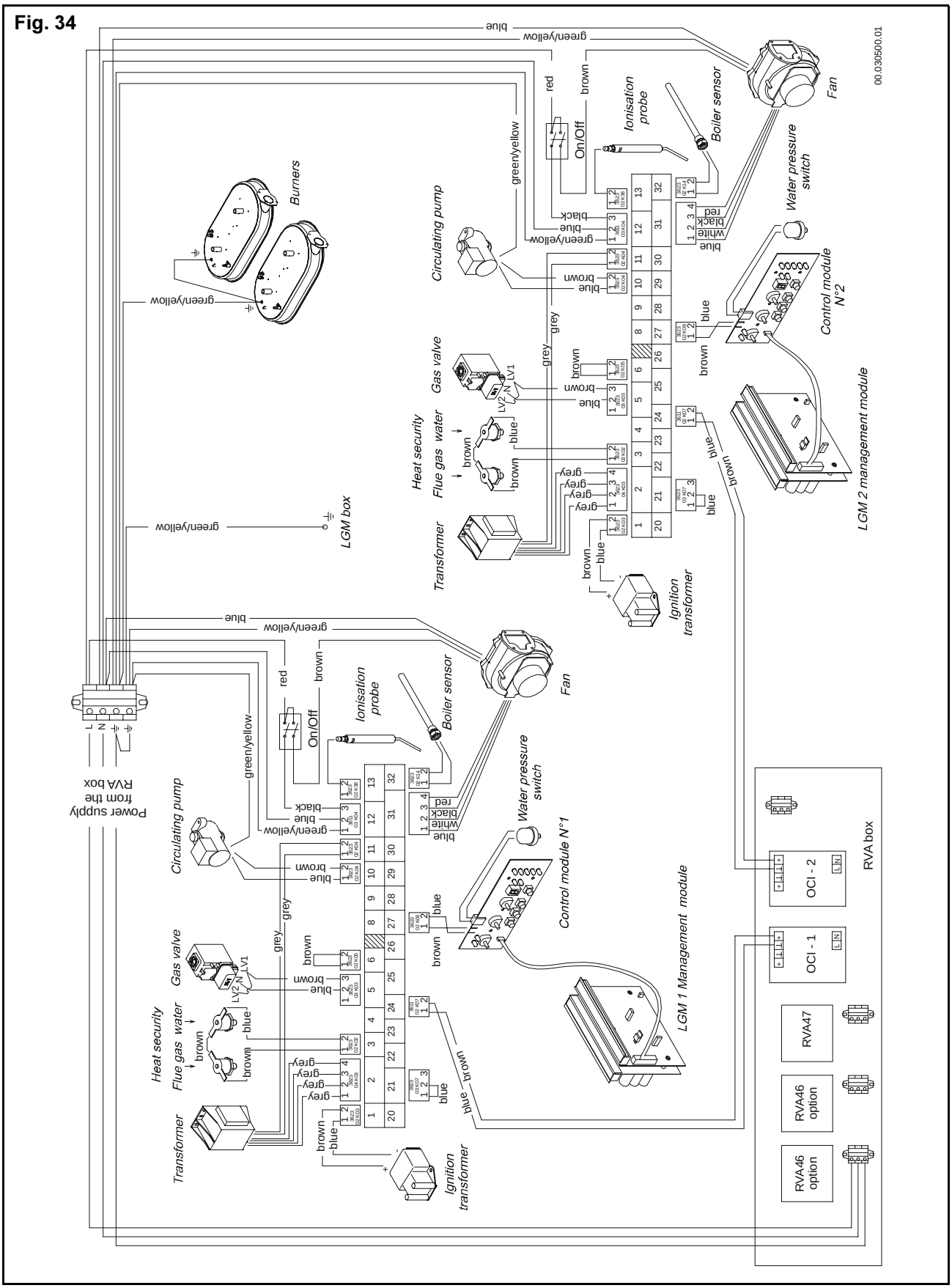


* In the event of one heating flow sensor being connected to the RVA 46 (Terminals M/B1).

6.4 - Wiring diagram

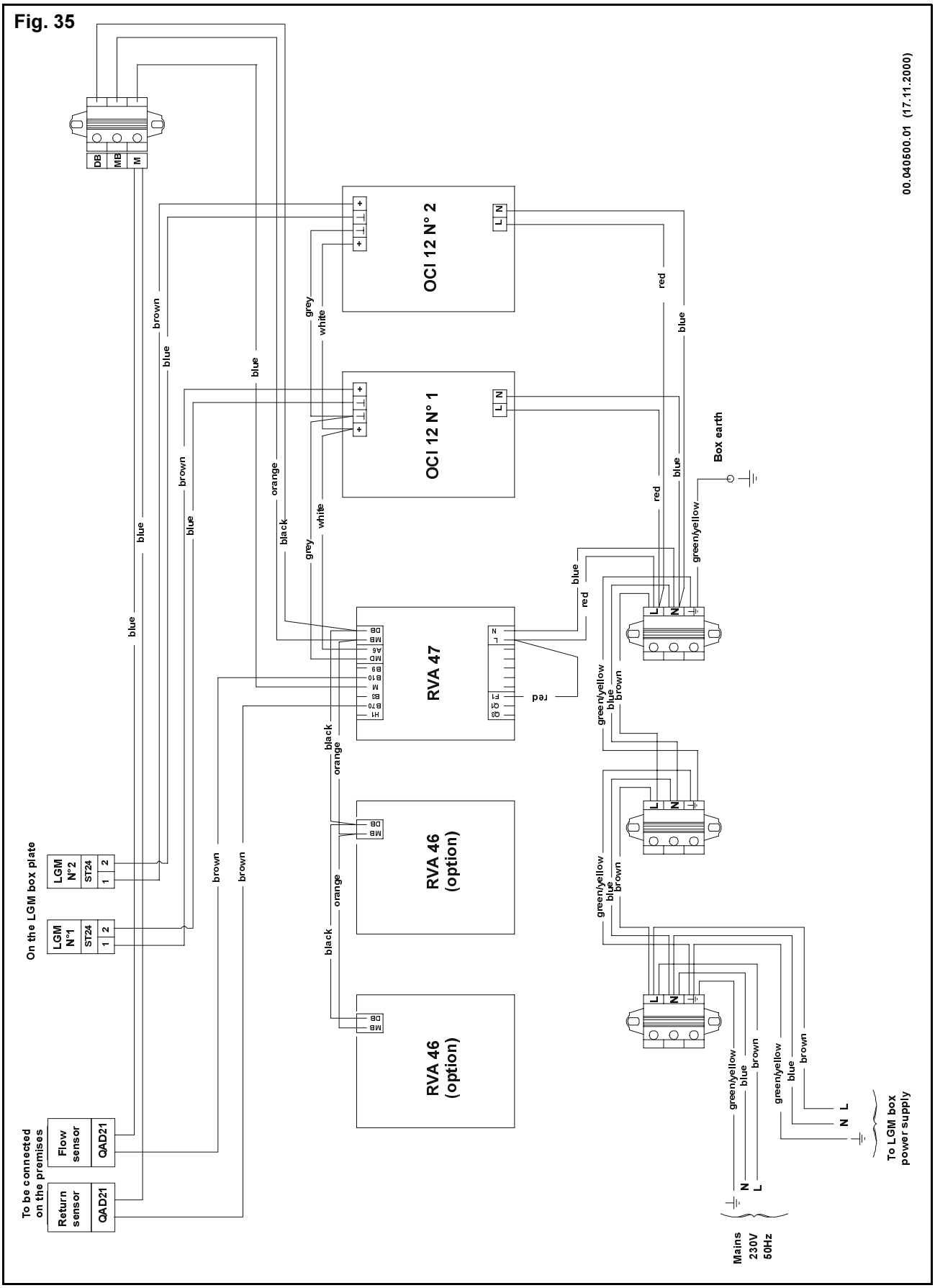
6.4.1 - Wiring diagram of the LGM box (Module management)

Fig. 34



6.5 - Wiring diagram RVA box (Cascade and heating circuit management)

Fig. 35



The standard THR 10-100 model (standard setting) is able to manage the following:

- a heating circuit (pump circuit - parameter 95 = 1 installation type 3),
- domestic hot water production by a load pump on the network via the RVA 47 (see paragraph 2 - section V - BASIC SETTING OF THE THR 10-100),
- domestic hot water production by a selector valve controlled by an LGM for THR 10-100 CS models only (see paragraph 3 - section V - BASIC SETTING OF THE THR 10-100).

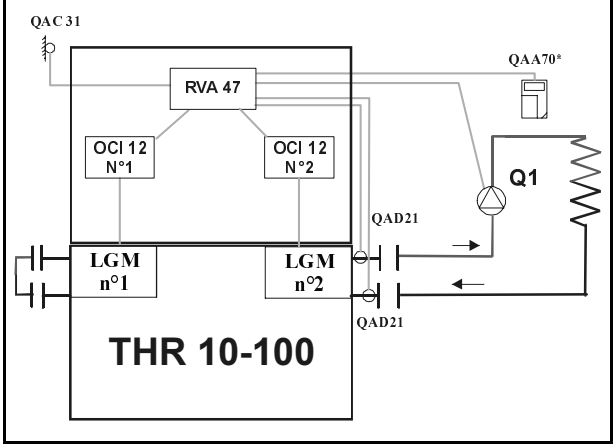
Unit	THR 10-100 C or CS preset	
Function	Domestic hot water + cascade + Q1 heating pump	
	line	value
Segment	141	0
Address	140	1
Clock	148	3
Pump Q1	95	1
Slope	17	15

1 - CONTROL OF A HEATING CIRCUIT WITH THE THR 10-100

1.1 - Hydraulic connection

The THR 10-100 was originally programmed to control a heating circuit (pump circuit). Parameter 95 of the RVA 47 equal to 1.

Fig. 36



Pump Q1 operates as a heating pump.

It operates as soon as the RVA 47 receives a request and that the outdoor temperature is lower than the Summer/Winter switching value.

This request can be carried out by either:

- The room temperature control knob of the RVA 47,
- the QAA 70 room sensor connected to the RVA 47 (terminal A6/MD of the RVA 47).

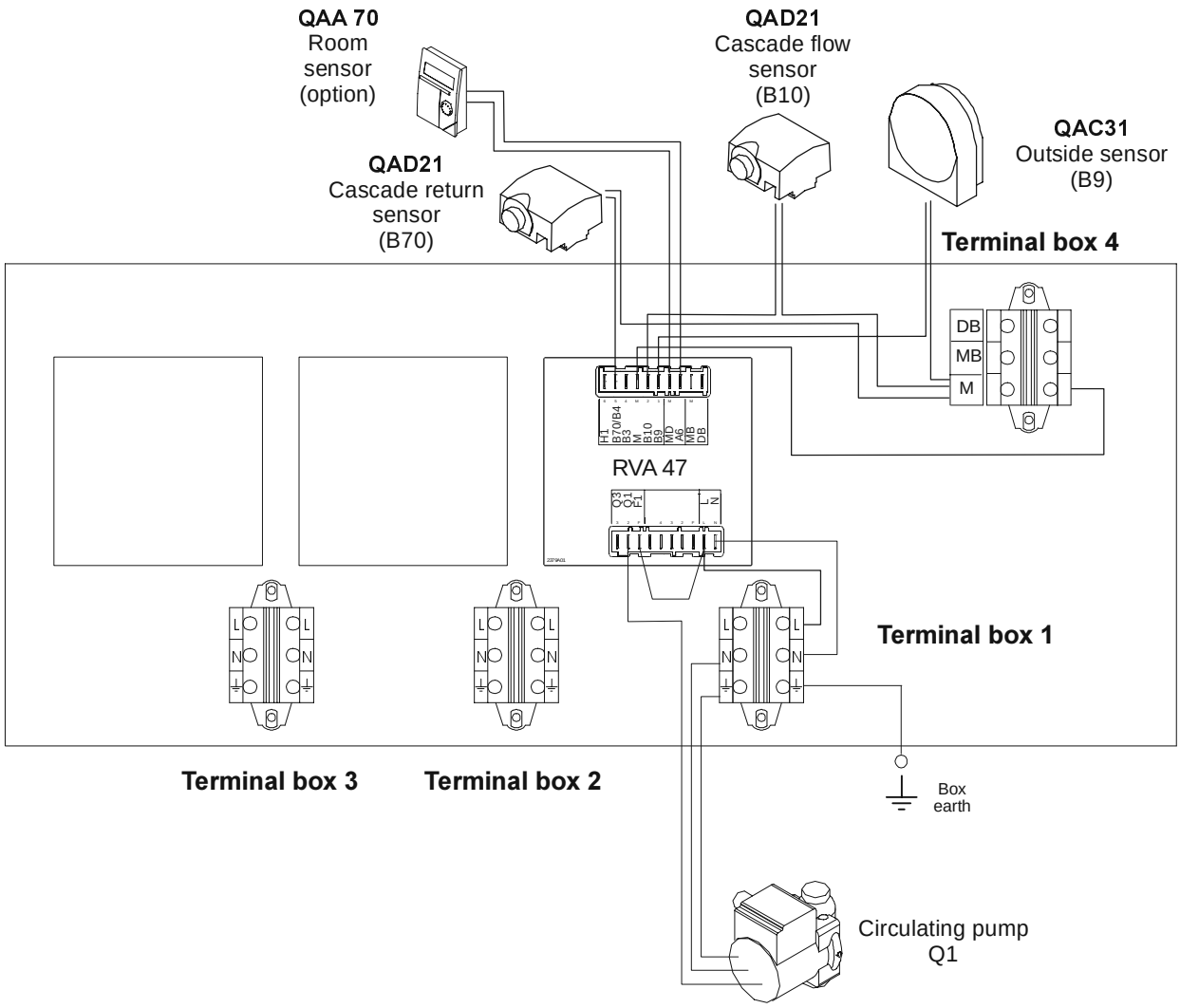
Pump Q1 stops operating when there is no heating request.

Control of the heating circuit flow temperature is therefore carried out according to external conditions with or without room temperature influence.

- With no QAA 70 room sensor on the pump circuit:
  - the pump circuit flow temperature is defined by the slope of the RVA 47 for a 20 °C room temperature setting,
  - corrections made to this room temperature are carried out by the room temperature control knob of the RVA 47 (setting from 8 to 26 °C).
- With a QAA 70 room sensor on the pump circuit:
  - the room temperature control knob of the RVA 47 becomes inactive,
  - the room temperature setting of the pump circuit is set on the room sensor (setting value programmed in line 1 of the room sensor + correction with the control knob +/- 3 °C).

1.2 - Electrical connection

Fig. 37



		Terminals
Outside sensor	QAC 31	B9/M terminal 4
Cascade flow sensor	QAD 21	B10/M terminal 4 - already connected
Cascade return sensor	QAD 21	B70/M terminal 4 - already connected
Room sensor (Option)	QAA 70	A6/MD (in parallel)
Heating circulator	Live Neutral Earth	Q1 on RVA 47 Neutral of terminal 1 Earth of terminal 1

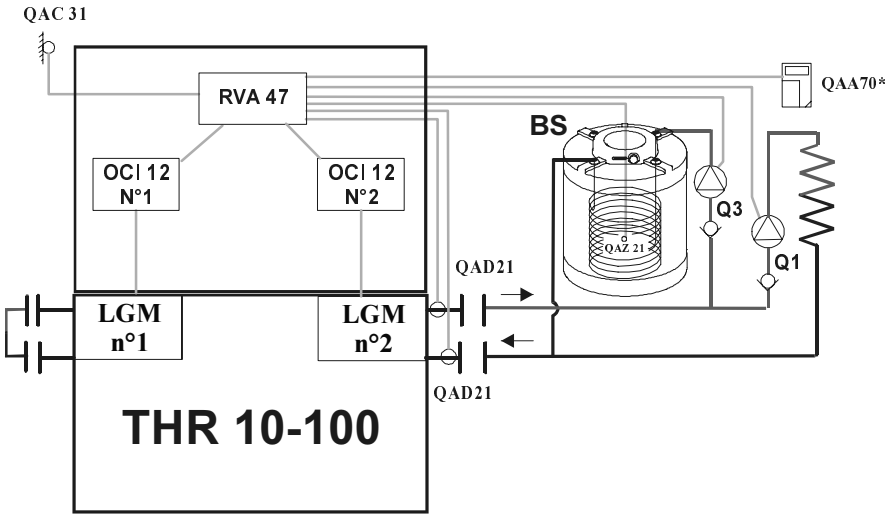
2 - DOMESTIC HOT WATER PRODUCTION BY THE LOAD PUMP (VIA THE RVA 47)

For the THR 10-100 C model:

- Domestic hot water production is carried out with a load pump directly connected to the network. This makes it possible to reach a maximum heating power of 100 kW for domestic hot water. Domestic hot water production is controlled according to the temperature of the domestic hot water tank and to the RVA 47 series B time programme.

2.1 - Hydraulic connection

Fig. 38



Benefits:

- Domestic hot water production by a load pump,
- available domestic hot water heating power : 100 KW,
- it is possible to choose the domestic hot water priority (absolute, shifting etc.),
  standard setting: shifting priority
- time programme on the RVA 47.

Drawbracks:

- high temperature network,
- heat carriage problem.

Operation and setting:

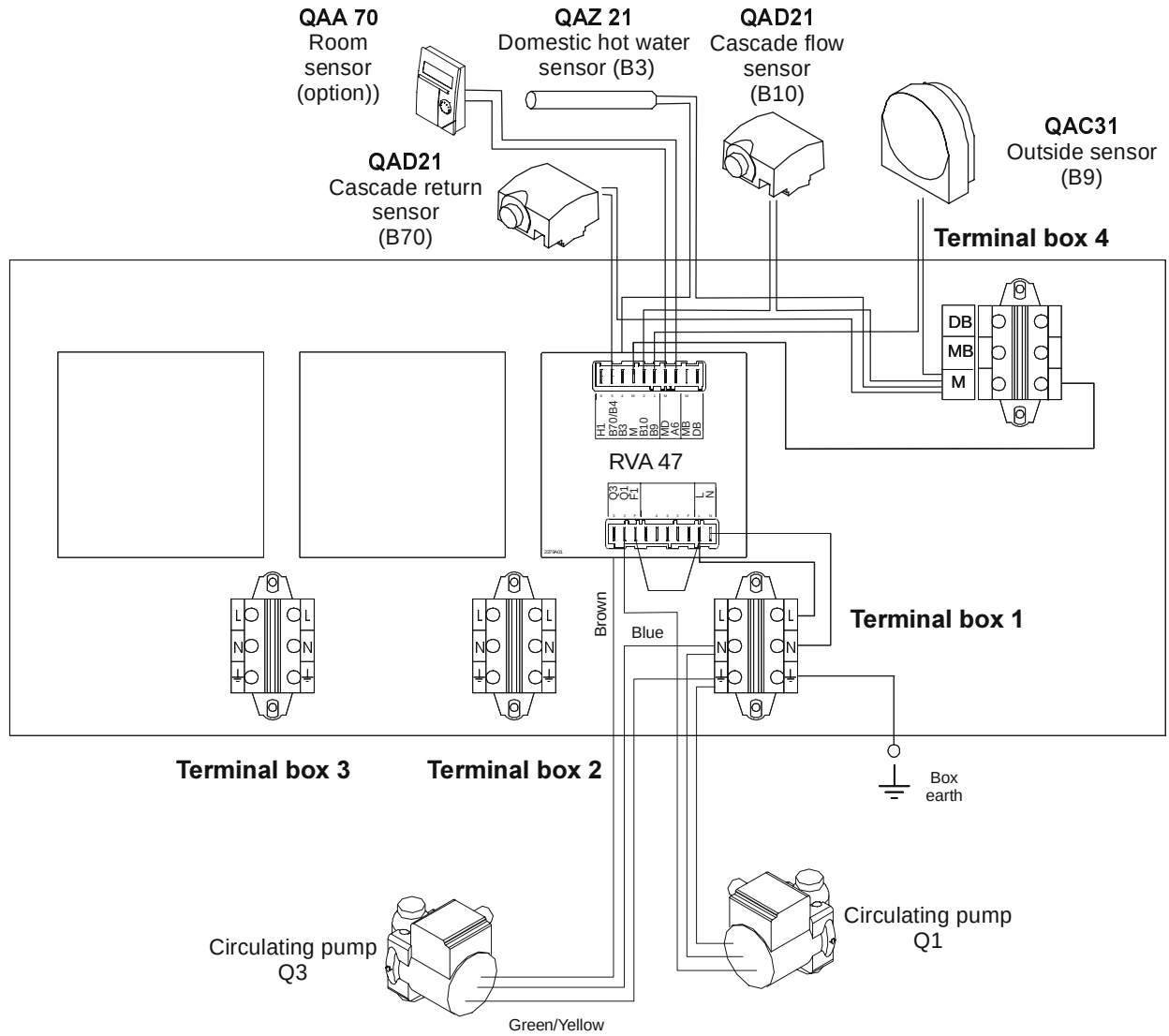
The domestic hot water load pump operates as soon as there is a domestic hot water request and stops operating as soon as the request disappears.

The d.h.w. request must be communicated with the button (d.h.w.) of the RVA 47.

- With no QAA 70 room sensor on the RVA 47 regulator:
  - the d.h.w. temperature setting is set in line 13 of the RVA 47,
  - the actual d.h.w. temperature is read out in line 59 of the RVA 47.
- With a QAA 70 room sensor on the RVA 47:
  - the d.h.w. temperature setting is set:
    . either in line 13 of the RVA 47,
    . or in line 3 of QAA 70 of the RVA 47.
  - the actual d.h.w. temperature is read out:
    . either in line 59 on the RVA 47,
    . or in line 13 of QAA 70 on the RVA 47.
  - the Summer/Winter potentiometer of each LGM must be in the Winter position. During a d.h.w. request, the LGMs are in the heating operating mode (7 on the display of the control panel):
    . the d.h.w. setting potentiometers of each LGM are inactive,
    . the d.h.w. time programme of the RVA 47 is active.

2.2 - Electrical connection

Fig. 39



		Terminals
D.h.w. sensor	QAZ 21	B3/M terminal 4
D.h.w. circulator	Phase Neutral Earth	Q3 du RVA 47 Neutral terminal 1 Earth terminal 1

2.3 - D.h.w. priority

When d.h.w. production is carried out with the RVA 47, it is possible to choose the domestic hot water priority.

Benefit	- Optimum allocation of boilers' heat output.
Description	Defines the priority of d.h.w. heating over room heating.
Setting 	- Press the line selection buttons to select programming line 127. - Press the plus / minus buttons to select d.h.w. priority.

Setting range	*Unit*	*Factory setting*
0...3	Increment	1

Effect

During d.h.w. heating, space heating will be restricted, depending on the setting made.
Entry:

0	Absolute priority The controller-internal heating circuit and the heating circuits of other controllers connected to the LPB will be locked until the d.h.w. is heated up. The primary pump remains in operation.
1	Shifting priority: If the capacity of the heat generating equipment is no longer sufficient, the amount of heat supplied to the heating circuits will be restricted until d.h.w. heating is terminated.
2	No priority: D.h.w. heating and space heating at the same time. In the case of tightly sized boilers and mixing heating circuits, the setpoint may not be reached if the heating load is great, since too much heat is required for space heating.
3	Shifting / absolute priority: If the capacity of the heat generating equipment is no longer sufficient, the pump heating circuits will be switched off and the amount of heat supplied to the mixing heating circuits restricted until d.h.w. heating is terminated.

Frost protection for the plant

Frost protection for the plant is fully active only in the case of setting 2. With setting 0 or 1, it will be partly or fully restricted. If the boiler is correctly sized, frost protection for the plant is also ensured when using setting 1. In the case of plants where there is a considerable risk of frost (e.g. plants with outdoor heating), setting 0 should not be used.

Standard setting: shifting priority (setting 1)

The purpose of the function "Shifting priority" is to achieve optimum d.h.w. heating. This means that during d.h.w. heating, the actual boiler temperature should be as close as possible to the boiler temperature setpoint without shutting down the burner. To achieve this, it may be necessary to restrict the heating circuits by means of a locking signal. Depending on the consumer, the locking signal will lead to switching on / off or a setpoint reduction.

Effect on two-position loads

Cycling or deactivation of the pumps will reduce the amount of heat drawn from the heat source. This will considerably shorten the time required for heating up the d.h.w.

- **Heating circuit pump :**

Status	*Effect*
Locking signal < 20 %	Normal pump operation
Locking signal > 20%	Heating circuit pump cycles
Locking signal > 93%	Heating circuit pump cycles

- **D.h.w. pump or boiler pump:**

  No effect.

Switching point:

The locking signal not only takes account of the duration, but also of the size of the differential. This means that when the crossing is significant, the pumps will be de-activated earlier.

Effect on modulating loads

The consumption of heat is considerably reduced through the reduction of the flow temperature setpoints. This reduces considerably the heating up time for d.h.w., with a minimum impact on the heating circuits.

- **Mixing valve:**

Status	*Effect*
Locking signal greater than 0%	Room temp. setting is reduced this reduction depends on significance and duration of the lower threshold overshoot.
Locking signal reset to 0%	Setting according to normal control status

Reduction of the setting:

The locking signal does not only take into account the duration, but also the size of the differential. If the differential is significant, the setting reduction will be greater than in the event of a small differential.

3 - D.H.W. PRODUCTION WITH A DERIVATION VALVE (VIA THE LGM)

Only valid for version THR 10-100 CS

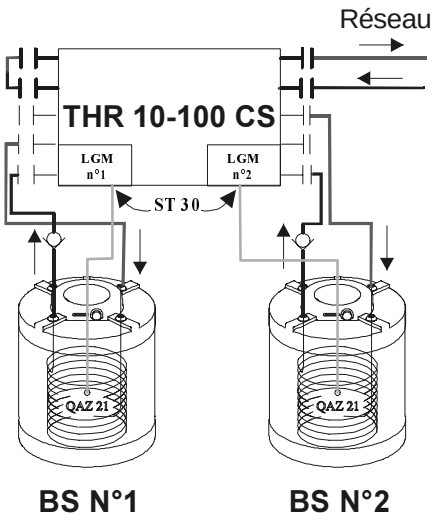
D.h.w. production is carried out with a selector valve and a d.h.w. sensor on the module(s) controlled by the LGMs. This makes it possible to reach a maximum heating power of 50 kW for each tank. Each LGM manages its own d.h.w. production.

3.1 - Hydraulic connection

The THR 10-100 CS was originally equipped with two selector valves which make it possible to connect two d.h.w. production systems (1 on the right, the other on the left).

An expansion tank and a water filling system for the installation must be provided on the d.h.w. outlet(s) of the THR 10-100 CS (see paragraph 4 - section IV - INSTALLATION).

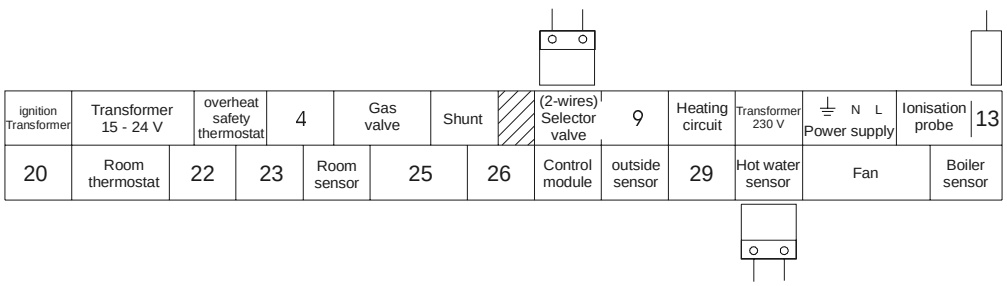
Fig. 40



3.2 - Electrical connection

The selector valves were originally connected to the LGMs. The d.h.w. sensors must be connected to the ST 30 terminals of the relevant LGMs with the provided connectors and must be inserted into each d.h.w. production system.

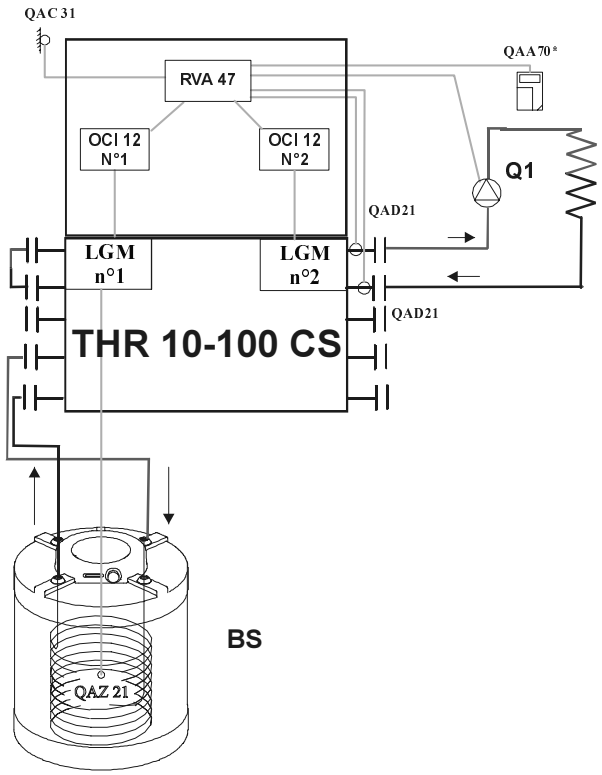
Fig. 41



3.3 - D.h.w. production with a selector valve (via an LGM) (1 single tank connected to a selector valve)

The d.h.w. sensor is connected to an LGM (Terminal ST 30)

Fig. 42



Benefits:

- D.h.w. production with a selector valve,
- absolute D.H.W. priority,
- a single LGM for d.h.w. production (1 high temperature LGM only) the other LGM continues to ensure heating.
- limited heat carriage, only the d.h.w. loop is at a high temperature,
- it is possible to control a floor heating system directly via the pump circuit of the RVA 47 thanks to the limited heat carriage.

Drawbacks:

- D.h.w. heating power limited to 50 KW.

Operation and setting:

The d.h.w. request must be communicated using the button (d.h.w. on) of the RVA 47.

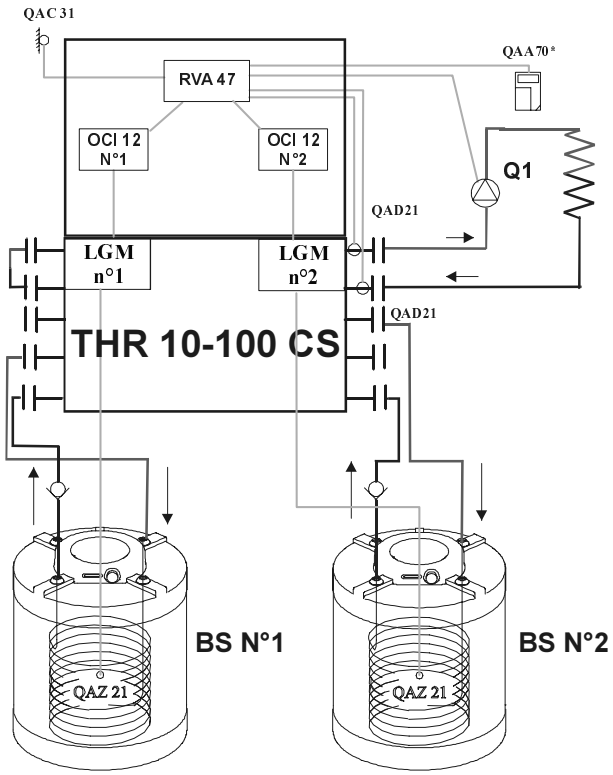
- the d.h.w. temperature setting is set either
  - in line 13 of the RVA 47,
  - in line 3 of the QAA 70 of the RVA 47.
  - the d.h.w. potentiometer of the LGMs' control panel is inactive,
  - during a d.h.w. request, the relevant LGM is in d.h.w. mode (6 on the control panel display)
  - the d.h.w. time programme of the RVA 47 is active.

3.4 - D.h.w. production with a selector valve (via two LGMs) (1 tank connected to each selector valve)

The d.h.w. sensor of tank No.1 is connected to LGM No.1 (Terminal ST 30).

The d.h.w. sensor of tank No.2 is connected to LGM No.2 (Terminal ST 30).

Fig. 43



Benefits:

- D.h.w. production with a selector valve,
- absolute d.h.w. priority,
- limited heat carriage: only the d.h.w. loops are at a high temperature,
- it is possible to control a floor heating system directly via the pump circuit of the RVA 47 thanks to the limited heat carriage.

Drawbacks:

- same d.h.w. setting for both tanks,
- same time programme for both tanks.

Operation and setting:

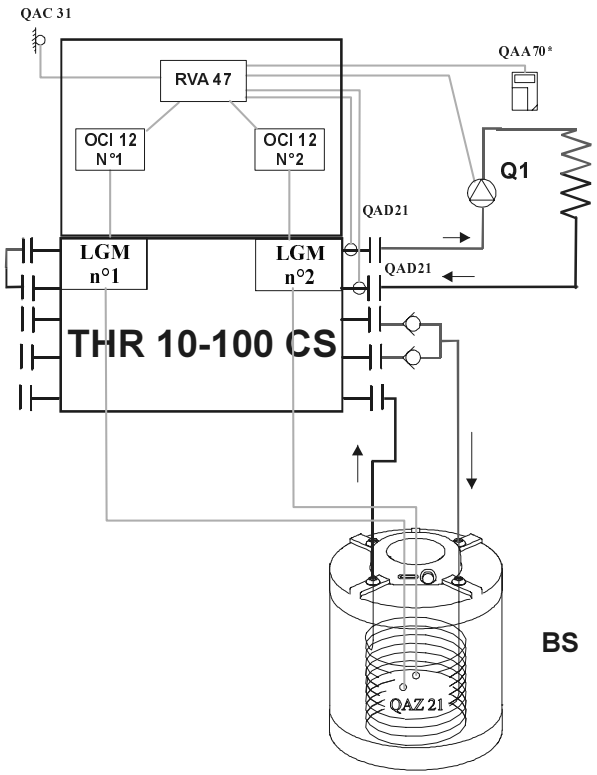
The d.h.w. request must be communicated with the button (d.h.w. on) on the RVA 47.

- the d.h.w. setting is set either
  - in line 13 of the RVA 47,
  - or in line 3 of QAA 70 of the RVA 47. It is the same setting for both boilers.
- the d.h.w. setting potentiometers of the LGMs' control panel are inactive,
- during a d.h.w. request, the relevant LGMs are in d.h.w. mode (6 on the control panel display).

3.5 - D.h.w. production with a selector valve (via two LGMs) (1 single tank connected to the two selector valves)

The two d.h.w. sensors are inserted into the same tank and each one is connected to an LGM.

Fig. 44



Benefits:

- D.h.w. production with a selector valve,
- available d.h.w. heating power: 100 KW,
- limited heat carriage: only the d.h.w. loop is at a high temperature,
- it is possible to control a floor heating system directly via the pump circuit of the RVA 47 due to the limited heat carriage,
- due to the difference in the position of the second d.h.w. sensor, one LGM is released before the other which allows a single LGM to finish the tank switch. The second one can already ensure heating.

Drawbacks:

- two d.h.w. sensors in the tank.

Operation and setting:

The d.h.w. request must be communicated with the button (d.h.w. on) of the RVA 47.

- the d.h.w. temperature setting is set either
  - . in line 13 of the RVA 47,
  - . or in line 3 of QAA 70 of the RVA 47.
- the d.h.w. setting potentiometers of the LGMs' control panel are inactive,
- during a d.h.w. request, the relevant BMUs are in the d.h.w. operating mode (6 on the control panel display).

VI - COMMISSIONING

1 - ANTI-CORROSION PROTECTION FOR THE INSTALLATION

A water conditioning product (INIBAL) must be added into the heating circuit when the installation is filled with water.

Only use INIBAL, failing which the boiler shell would not be guaranteed. INIBAL ensures protection from corrosion for multimetal circuits, from gassing

INIBAL DOSAGE: one litre to one hundred litres.

Note:

- INIBAL must be ordered separately.

2 - FROST PROTECTION AND ANTI-CORROSION FOR THE INSTALLATION

Only use INIBAL ANTIFREEZE, failing which the boiler shell would not be guaranteed. INIBAL ANTIFREEZE ensures protection from frost, multimetal circuit corrosion and gassing.

INIBAL ANTIFREEZE DOSAGE

Number of litres of INIBAL ANTIFREEZE to be added to the central heating circuit to reach the protection temperature (left hand column in table) according to its capacity given in litres (top row of table).

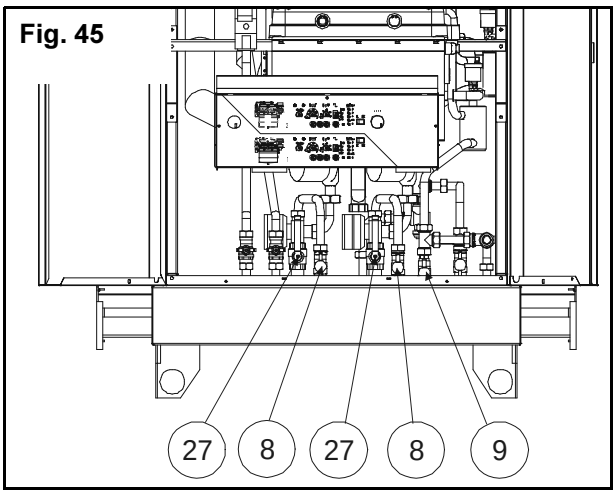
Note:

- INIBAL ANTIFREEZE must be ordered separately.

Temperature protection limit	Installation capacity (litres)				
	100	200	300	400	500
- 8 °C	18	37	55	74	92
- 10 °C	22	44	66	88	110
- 12 °C	25	50	75	100	125
- 14 °C	28	55	80	110	137
- 16 °C	30	60	90	120	150
- 18 °C	32	64	96	128	160
- 20 °C	34	68	100	136	170
- 22 °C	36	72	108	144	180
- 24 °C	38	76	114	152	170
- 26 °C	40	80	120	160	200
- 28 °C	42	84	126	168	210
- 30 °C	44	88	132	176	220

3 - FILLING THE INSTALLATION WITH WATER

Fig. 45



- The installation will have to be rinsed before the boiler is filled with water. Installation decantation should be provided for.
- To ensure proper boiler bleeding during the installation's filling stage:
  - check that the isolation valves are open (item no. 8, no. 9 - THR 10-100 C models, item no. 27 - THR 10-100 CS models),
  - fill the installation,
  - do not forget to add INIBAL or INIBAL ANTIFREEZE,
  - check the leaktightness of the circuit,
  - bleed the whole installation, in particular the radiators,
  - readjust installation pressure to about 1.5 bars.

Note:

- For THR 10-100 CS models bleed the primary circuit of the d.h.w. production system by manually activating the 3 channel selector valves or by making a d.h.w. request if the electrical connection is carried out.

Reminder: With THR 10-100 CS models, it is best to fill the installation with water through the or one of the d.h.w. outlets (see paragraph 4 - section IV - INSTALLATION).

4 - GAS SUPPLY

- Open the gas inlet isolation valves (item no. 7).
- Carefully bleed the gas piping. If the installation is new, the bleed evacuates the air that is contained in the piping so that the boiler has an adequate fuel. Another effect of the gas bleed will be to evacuate oxide particles from the piping that result from agitating.

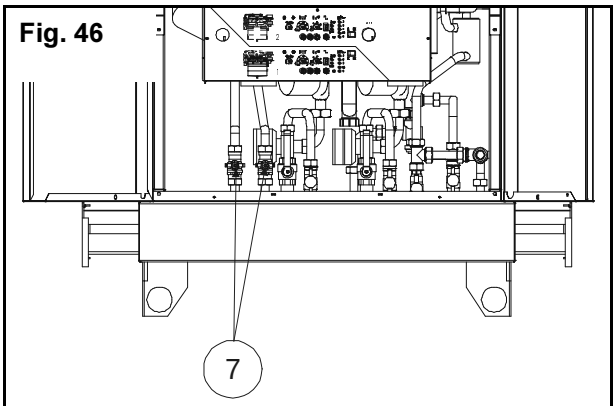
  The presence of air in the gas prevents the ignition of the burner and leads to safety shut-down by the flame monitoring unit.

  This is the case both with a natural gas and a GPL new installation. With a GPL installation the storage tank must also be bled properly before commissioning.

  The external discharge of the gas bleed must be carried out with all necessary safety measures.

- Check the tightness of the connectors and the airtightness of the gas circuit using a foaming product or a water column pressure gauge.

Fig. 46



5 - VERIFICATIONS PRIOR TO COMMISSIONING

- Check that the boiler is adequately adapted to the gas used,
- check that the boiler is filled with water and that pressure is applied (1.5 bars) - radiators bled, valves open,

  Never reach pressure below 1 bar.

  During normal operation, the door must be locked with the key so as to ensure protection from any electrical shock hazard. The key must be removed and kept by authorized personnel.

- check that the boiler's electrical connection is correct: 230 V, 50 Hz, conforming earth connection, polarity observed,
- check that the combustion product evacuation outlet is properly assembled, airtight and free from any obstruction. Check that the heating system ventilations are not obstructed,
- check that the siphons are filled with water,
- check that the condensate outlets are properly connected.

6 - USER INFORMATION

- The heating engineer must inform the user about the unit's operating mode. In particular the user must be informed about the function and the operation of the safety systems and the need for regular servicing by a qualified person.

7 - COMMISSIONING

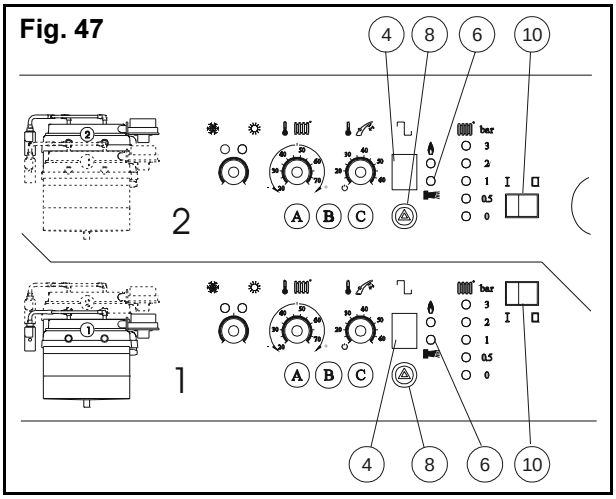
Activate the boiler's external electrical circuit-breaker.

During initial commissioning, the heating engineer must check:

- the correct operation of each module,
- the correct operation of RVA control.

7.1 - Control of each module's operation

Fig. 47



- activate the On/Off switches (item no. 10) of each module.
- an LGM self-regulation phase of each module begins and signals **L P C 7 5** appear in succession on the displays (item no. 4) then **9** and finally **O**.

Note:

- The alarm indicator (item no. 6) is on:
  - manually reset button (item no 8),
  - if the alarm continues, refer to the operating fault list paragraph 1 - section XI - OPERATING FAULTS.
- Check the setting of the burners. The burners are preset for natural gas H (G20). However, during commissioning, separate CO2/CO combustion verifications must be carried out on each module (paragraph 3 - section VII - COMBUSTION CONTROL).

7.2 - Checking RVA control

7.2.1 - Parameter setting

- The basic THR 10-100 requires no specific programming. The RVA 47 is preprogrammed.
- When the RVA 46 option is integrated into the THR 10-100, the THR 10-100 requires programming (paragraph 5 - section VIII - MULTICIRCUIT WITH A THR 10-100),
- Set the time and day on regulator RVA 47:

  (see paragraph 3.3 - section III - INSTALLATION from the RVA 47 technical instructions)

  [1] : time setting,

  [2] : day setting.

Note:

- if one or several RVA 46s are connected to the master RVA 47, their time and day are automatically updated.

7.2.2 - Communication control

7.2.2.1 - Parameter control

- Check that the following parameters do not indicate any errors. If the displays differ from the displays in the following tables, see section XI - OPERATING FAULTS.

Following the elimination of the fault, error message Er on the RVA 47 may take 1 to 10 minutes to disappear according to the type of fault.

RVA 47 Regulator parameters	Display
[49] : display of BMU (LGM) error codes	- - -
[50] : error display	blank
[54] : display of PPS communication selection of PPS addresses using buttons +/-	4 102 5 102

RVA 46 Regulator parameters	Display
[60] : display of BMU (LGM) error codes	blank
[50] : error display	blank
[62] : display of PPS communication if room sensor on RVA 46	- - - or 1 83

- Also check the location of the outside sensor and if necessary test the inputs/outputs of each regulator.

7.2.2.2 - Outside temperature source

A single outside sensor is required for several linked regulators. It can be connected to any regulator and transmits the signal via the bus system, but it is simpler to always connect it to the same regulator i.e. the master RVA 47 regulator (segment 0, address 1).

To control communication, the location of the outside sensor can be checked.

7.2.2.2.1 - RVA 47 Regulator

Setting

- Press the line selection buttons to select programming line 62.
- No setting can be made with the plus / minus buttons.

Display range	*Unit*
- - . - -	No signal
00.01...14.16	Segment and unit address

Effect

The address of the outside detector that currently delivers the outside temperature signal will automatically be displayed on this line.

Displays

- - . - -	No outside sensor signal
00.01	Segment and unit address The first two digits represent the segment number (00.) The second two digits represent the device number (.01)

7.2.2.2.2 - RVA 46 Regulator

Regulators with no connected sensors receive the outdoor temperature signal via the system with bus, from a regulator to which a sensor is connected.

Setting

- Press the line selection buttons to select programming line 95.
- No settings can be made with the plus / minus buttons.

Display	*Unit*
- - . - -	No signal
00.01...14.16	Segment and device address

Effect

The address of the outdoor temperature sensor that is currently delivering the outside temperature signal will automatically be displayed on this programming line.

Display

- - . - -	No outside sensor reading
00.01	Address of outside sensor The first two digits represent the segment number (00.) The second two digits represent the unit number (.01)

7.2.3 - Input/output test

Check the correct operation of the units connected to the RVAs. RVA regulators make it possible to test the outputs and inputs. This facilitates commissioning and fault localisation.

7.2.3.1 - The RVA 47 regulator

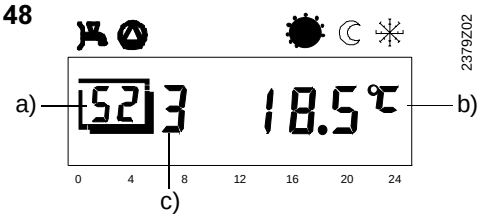
Input test (sensors)

	Buttons	Explanation	Line
1		Press either of the two line selection buttons. - This will take you first to the programming mode "End-user"	
2		Press both line selection buttons for at least 3 seconds. - This will take you to the programming level "Heating engineer".	
3		Press line selection button "Up" until you reach line 52. - This will take you to the input test.	
4		Press the plus or minus button repeatedly, which will take you one test step further: Etape 0 — Display of the cascade return temperature(B70). Etape 1 — Display of d.h.w. temperature (B3). Etape 2 — Display of the cascade flow temperature (B10). Etape 3 — Display of the outside temperature (B9). Etape 4 — Display of room temperature acquired with room unit connected to A6. Etape 5 — Display input H1 according to the function selected on line 170 (°C, - - - , ooo).	
5	 	You leave the programming line "Input test" by pressing either one of the line selection buttons, or one of the operating mode or function buttons. - Note: If no button is pressed for about 8 minutes, the regulator will automatically return to the operating mode selected last.	Continuous display

The selected sensor values are updated within a maximum of 5 seconds. If no sensor is present, the connecting line interrupted, or the contact open, the display shows "---". In the event of a short-circuit, or if the contact is closed, the LCD displays "ooo". ("- - -" or "ooo" appear on the display at the temperature value level (item no. b, fig. 48)).

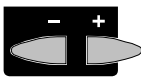
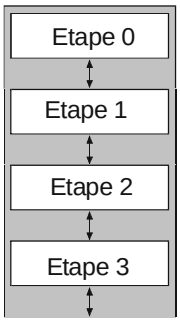
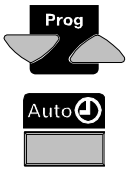
Display :

Fig. 48



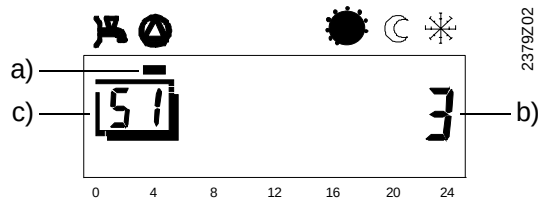
a) The framed number indicates the selected setting line.
b) Displayed value of the temperature measured
c) The number indicates the selected test step

Output test (relays)

	Buttons	Explanation	Line
1		Press one of the line selection buttons. - This will take you first to programming mode "End-user".	
2		Press both line selection buttons for at least 3 seconds. - This will take you to programming mode ''heating engineer'' and, at the same time, to the output test (relay test).	
3		Press the plus or minus button repeatedly, which will take you one test step further:  All outputs are switched according to actual control operation. All outputs are deactivated. D.h.w. charging pump (Q3) is activated. Heating circuit or primary pump activated (Q1).	
4		You leave the programming line "Output test" by pressing either one of the line selection buttons, or one of the operating mode buttons. - Note: If no button is pressed for about 8 minutes, the regulator will automatically return to the operating mode selected last.	Continuous display

Display:

Fig. 49

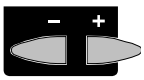
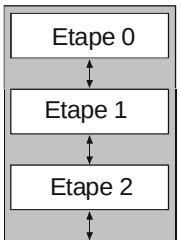


a) The bar below the symbol indicates the output activated
b) The number indicates the current test step
c) The framed number indicates the selected setting line

7.2.3.2 - The RVA 46 regulator

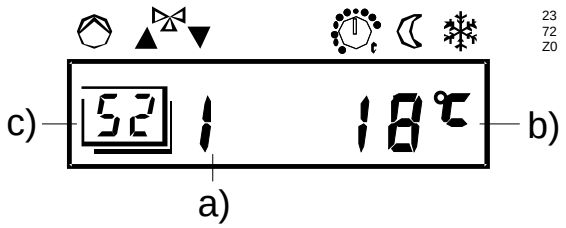
In the event of the installation of option RVA6 for THR 10-100.

Input test (sensor test)

	Buttons	Explanation	Line
1		Press both line selection buttons for at least 3 seconds. - This will take you to the Programming mode.	
2		Press line selection button "Up" until you reach line 52. - This will take you to the input test mode.	
3		Press the plus or minus button repeatedly, which will take you one test step further:  Display of flow temperature acquired by sensor B1. Display of outside temperature acquired by sensor B9. Display of room temperature acquired by sensor A6.	
4		By pressing any of the operating mode buttons, you leave the programming mode and thus the input test. - Note: If no button is pressed for about 8 minutes, the controller will automatically return to the operating mode selected last.	Continuous display

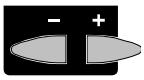
Display:

Fig. 50



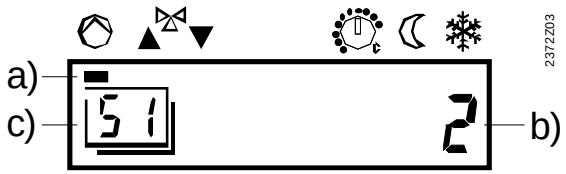
a) The number indicates the test step currently selected
b) Displayed value of the temperature measured
c) The framed number shows the selected setting line

Output test (relays)

	Buttons	Explanation	Line
1		Press both line selection buttons for at least 3 seconds. - This will take you to the programming mode and, at the same time, to the output test.	
2		Press the plus or minus button repeatedly, which will take you one test step further: Etape 0 — All outputs perform their switching actions in compliance with the control mode. Etape 1 — All outputs are switched off. Etape 2 — Circulating pump (Q2) is activated. Etape 3 — Mixer valve OPEN (Y1). Etape 4 — Mixer valve CLOSED (Y2).	
4		By pressing any of the operating mode buttons, you leave the programming mode and thus the output test mode. - Note: If no button is pressed for about 8 minutes, the controller will automatically return to the operating mode selected last.	Continuous display

Display:

Fig. 51



a) The bar below the symbol indicates the output activated
b) The number indicates the test step currently selected
c) The framed number = the selected setting line

7.2.4 - Temperature reading

Check that all the values of the sensors connected to the boiler are correct.

For this purpose, simply read the temperature measured by the sensors by going to the corresponding programming line:

7.2.4.1 - RVA 46 regulator

Temperature setting		Actual temperature	
Setting of the temperature setting		**Display of actual temperature**	
14	Energy saving room temperature setting	18	Actual room temperature
15	Frost protection room temperature setting	19	Actual outdoor temperature
16	Summer/winter switching temperature setting	55	Actual flow temperature (input B1)
Temperature setting display			
54	Room temperature comfort setting		

7.2.4.2 - RVA 47 regulator

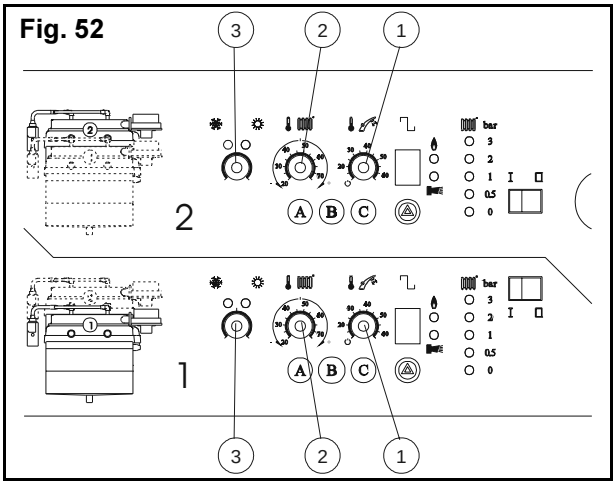
Temperature setting		Actual temperature	
Setting the temperature setting		**Display of the actual temperature**	
13	Domestic hot water comfort temperature setting	18	Actual room temperature
14	Energy saving room temperature setting	19	Actual outdoor temperature
15	Frost protection room temperature setting	55	Actual boiler temperature 1 T° BMU No.1 2 T° BMU No.2
16	Summer/Winter switching temperature setting	56	Actual cascade flow temperature (input B10)
120	Energy saving domestic hot water temperature setting	57	Actual cascade return temperature (input B70)
		58	Actual boiler tank temperature (input B4 see 97)
		59	Actual domestic hot water temperature (input B3 or BMU value)
		60	Average outdoor temperature
		61	Mixed outdoor temperature
Temperature setting display			
65	BMU temperature setting 1 T° sett. BMU No.1 2 T° sett. BMU No.2		
66	Cascade flow temperature setting		
69	Domestic hot water temperature setting		
70	Room temperature comfort setting + room unit correction		
71	Room temperature setting		
72	Flow temperature setting		

7.2.5 - Commissioning the control

The Summer/Winter potentiometer of the LGMs must always be in the Winter position.

The automatic Summer/Winter switching setting of RVA regulators and of LGMs must be fixed at the same value. These are supplied from the outset at value 19 °C. On the LGM, this setting can be modified with interface AZW 75.1.

Fig. 52



- The two heating (item no. 2) and d.h.w. (item no. 1) potentiometers of the LGMs become inactive.
- The Summer/Winter potentiometer (item no. 3) of the LGMs remains active and must always be <u>in the Winter position</u>:
  - Summer/Winter switching is automatically carried out by the RVA regulators and the LGMs.
    . if the average outdoor temperature is lower than 19 °C (Average temperature calculated by the regulator and visible in parameter e 60 of the RVA 47), the boiler ensures the heating and d.h.w. functions,
    . if the average outdoor temperature is above 19 °C, the boiler only ensures the d.h.w. function (the heating function is automatically halted).

7.2.6 - Controlling the cascade control

7.2.6.1 - General points

The master LGM differs from the slave LGM. The master LGM receives the temperature setting from the RVA 47 and converts it into power. If this power reaches 75 % of a 50 kW module's maximum power, the second module is selected and both modules set themselves at 50 % of the requested power.

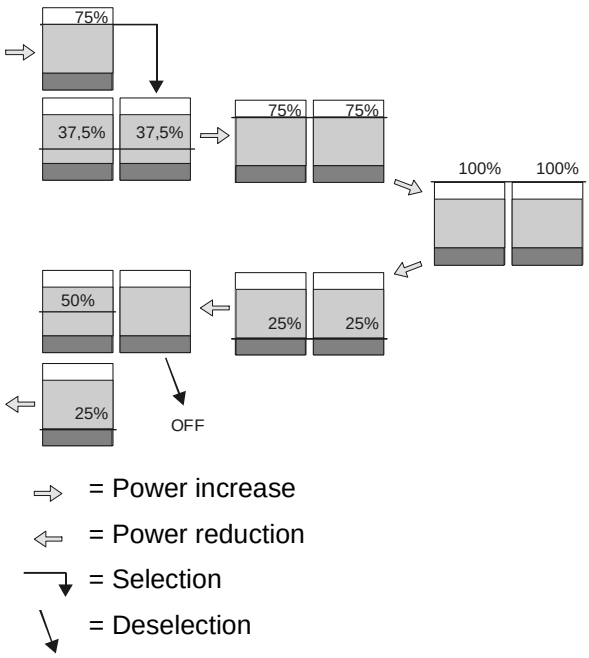
7.2.6.2 - Surveillance procedure

- Check d.h.w. operation by creating a domestic hot water request via the regulator or the LGMs and check the correct operation of the pumps or selector valves and the storage temperature.
- Check the LGM selection operation by creating a heating request via the RVA 47 or the QAA 70 room sensor.
- Check the LGM deselection operation by reducing the heating request.

7.2.6.3 - Selection /Deselection of the LGMs

The slave LGM is selected as late as possible and is deselected as late as possible. This equates to **selection/deselection frequencies that are as low as possible.**

Fig. 53



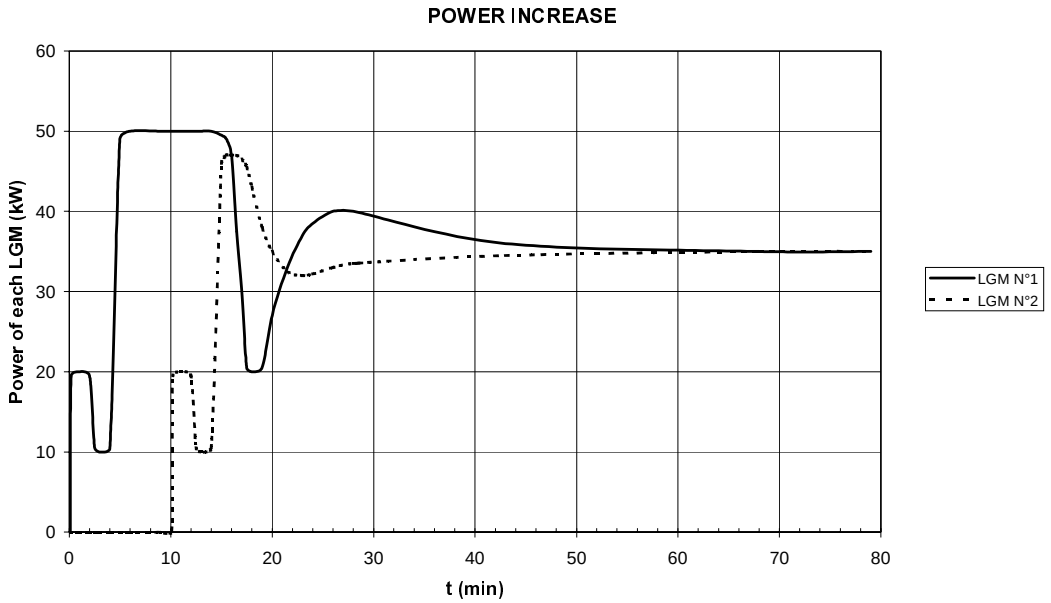
Power increase:

When the master LGM reaches 45 kW, the second LGM is selected. For stability reasons, each LGM that has just been selected in the cascade switches to the minimum rate before being freed at modulation.

The first LGM then progressively decreases its power while the second LGM increases its power until they have reached the same power level. From then on the two LGMs modulate together at the same power level.

Stabilisation takes quite long.

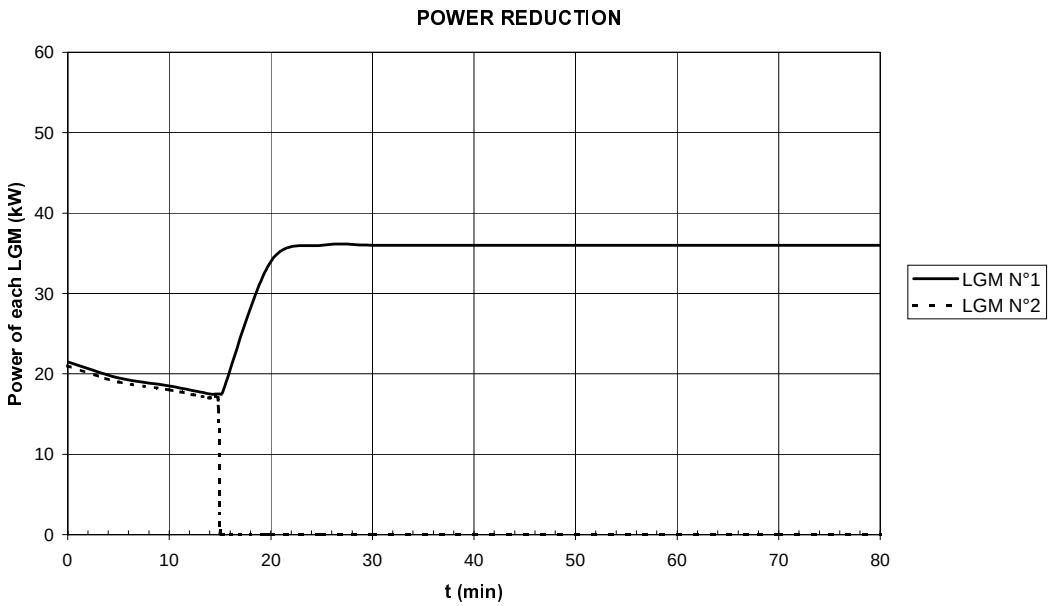
Fig. 54



Power reduction:

When both LGMs each reach 18 kW, the slave LGM is deselected. The master LGM then compensates the loss by increasing its power (switching from 18 kW to 36 kW). The master LGM then modulates alone.

Fig. 55



VII - COMBUSTION CONTROL

Check that the boiler is properly adapted to the gas used, otherwise change the gas.

See paragraph 2 - section VII - COMBUSTION CONTROL.

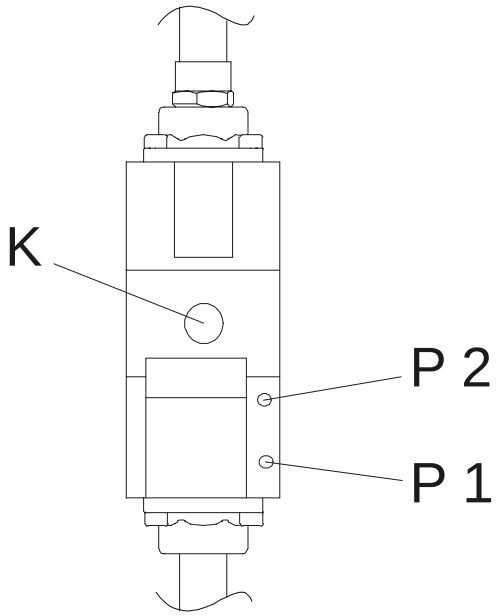
1 - SERVICE PRESSURE CONTROL

P_1 = Network gas pressure (upstream gas valve):
Natural gas H G20: 20 mbar,
Propane G31: 37 mbar or 50 mbar.

P_2 = Gas pressure at the gas valve regulator outlet, with pressure servo-system.

PL = Servo-system air pressure (burner-gas valve).

Fig. 56



K = Adjusting screw for the parallel shifting of the characteristic. This screw is preset. Its setting must not be modified even for changing gas. If however an adjustment is required, it may be carried out **at a low rate only** with a low scale pressure gauge 0-10 mmCE, and **a CO_2, CO analyser**. By screwing the pressure to be controlled in P_2 is increased.

2 - GAS CHANGE

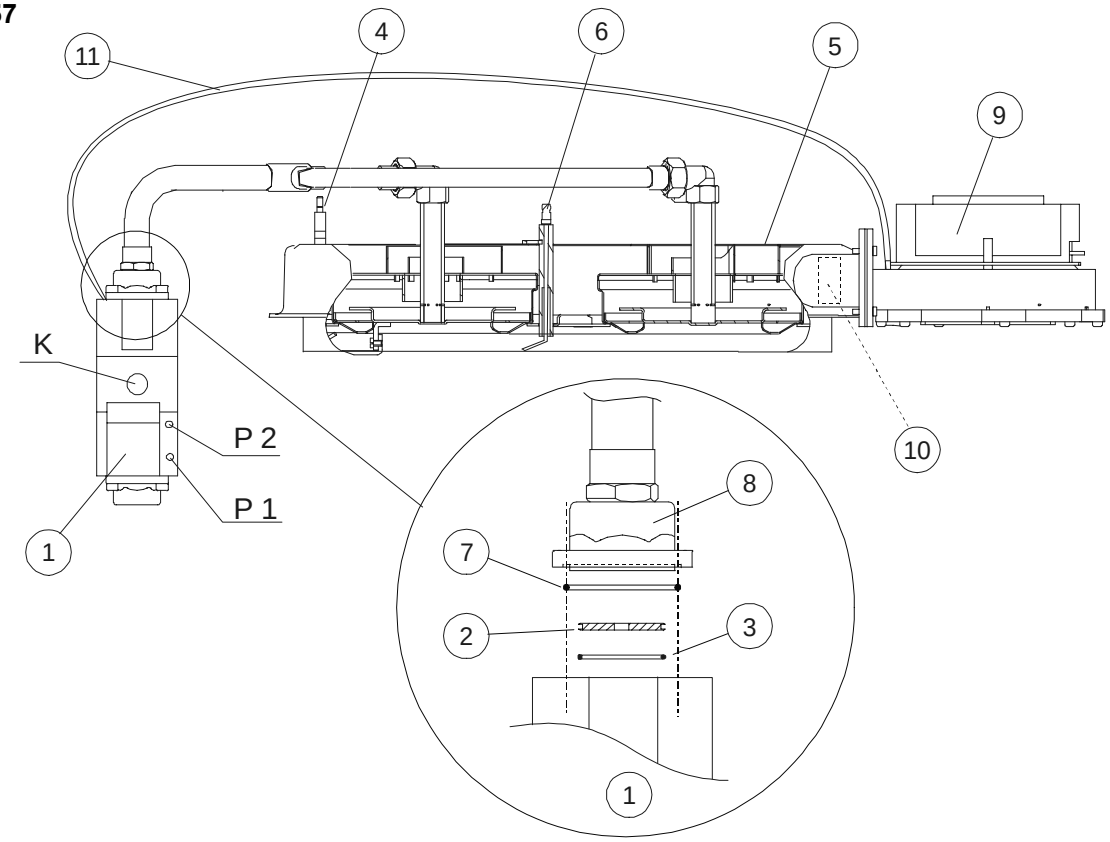
This operation must be carried out by a qualified person equipped with a calibrated combustion analyser.

Prior to any servicing cut the electrical and gas supplies.

The boiler is preset for natural gas H (G20) 20 mbar.

When changing the gas the "gas setting" label that is in the gas change sleeve must be fixed on the inside of the boiler's door so as to indicate the new setting.

Fig. 57



1) Gas valve
2) Gas reducer
3) Gas reducer o-ring
4) Ignition electrode
5) 50 kW module burner
6) Ionising electrode
7) Gas valve flange o-ring
8) Gas valve flange
9) Ventilator
10) Air ring ∅ 31 (propane only)

2.1 - Switching from Natural Gas to Propane

- Replace the gas reducer (item no. 2) - Ø 7.30 (natural gas H) with gas reducer Ø 5.60 (propane) - at the gas valve outlet (item no. 1),
- Insert the air ring Ø 31 (item no. 10) into the burner's pipe (item no. 5),
- check the combustion parameters (see setting table paragraph 3.2 - section VII - COMBUSTION CONTROL),

  and, if necessary:

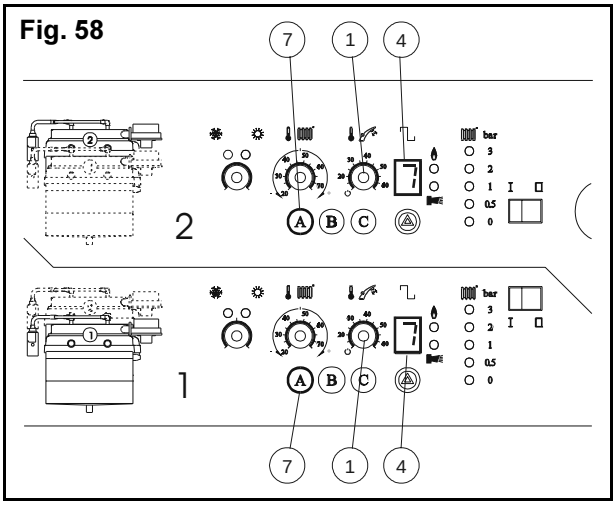
  • set the gas valve (item no. 1) according to the surveillance procedure (paragraph 3.1 - section VII - COMBUSTION CONTROL).

3 - GAS FLOW CONTROL CO2/CO/NOX

To control the combustion parameters more effectively, the combustion of each module must be controlled (one-module on, the other module off).

3.1 - Surveillance procedure

Fig. 58



- To commission the burner:
  - press button **A** (item no. 7) on the LGM's control panel for about 5 secs:
    - . flashing "**7**" appears on the display (item no. 4),
- progressively position the d.h.w. potentiometer (item no. 1) to the maximum on the right:
  - the burner switches to max. rate,
- check the CO_2/CO ratio (see setting table paragraph 3.2 - section VII - COMBUSTION CONTROL),

  note:

  The gas flow at maximum rate cannot be set, it is set by the gas regulation plate.
- set the d.h.w. potentiometer (item no. 1) to the maximum on the left:
  - the burner switches to the minimum rate,
- Check the CO_2/CO ratio (see setting table paragraph 3.2 - section VII - COMBUSTION CONTROL),
- if necessary:
  - adjust screw **K** (fig. 57) (screwing increases gas flow and conversely).

Before starting the minimum rate setting (screw K), wait for a stable CO_2/CO analyser read-out. Repeat <u>switching from the minimum rate to the maximum rate several times</u> to ensure that the setting has been done properly. Use a precalibrated analyser.

3.2 - Setting table

Set the gas flow with an analyser in order to obtain the CO/CO_2 ratios that are indicated in the following table.

Models				THR 10-100 C	THR 10-100 CS
Useful power	30/50 °C 60/80 °C	mini/maxi mini/maxi	kW kW	10.6 / 101.0 9.5 / 94.0	
Maximum heat-generating flow			kW	10 / 100	
∅ Gas regulation plate		Nat Gas H Propane	mm mm	7.30 5.60	
∅ Air ring		Nat Gas H Propane	mm mm	- 31	
Gas flow (15 °C 1013 mbar)		Nat Gas H G20 Propane G31	m^3/h kg/h	1.06 / 10.58 0.776 / 7.762	
Gas pressure P2		Nat Gas H Propane	mbar mbar	0.40 / 6.00 0.40 / 6.20	
Servo-system air pressure (PL)		Nat Gas H Propane	Pa Pa	40 / 610 40 / 630	
CO_2 Emission		Nat Gas H Propane	% %	7.5 - 8.0 / 9.0 - 9.5 10.0 - 10.5 / 10.5 - 11	
CO Emission		Nat Gas H	ppm	0 / 20	
No_x Emission		Nat Gas H	ppm	20 / 25	

Combustion product evacuation outlet back pressure: 0 mmCE.

P1 and P2 values may be more or less high according to whether back pressure is greater or smaller.

VIII - MULTICIRCUIT WITH A THR 10-100

1 - GENERAL POINTS

ALBATROS regulators can be connected to one another to meet the demand of the market for complete and complex installation regulation.

Parameters must be set as indicated in the table of the standard installation diagram.

The RVA 47 is the master regulator. Time and day setting is carried out on the RVA 47 only. The time and day are automatically transmitted to all the other connected RVA 46 regulators as well as to all the QAA 70 room sensors.

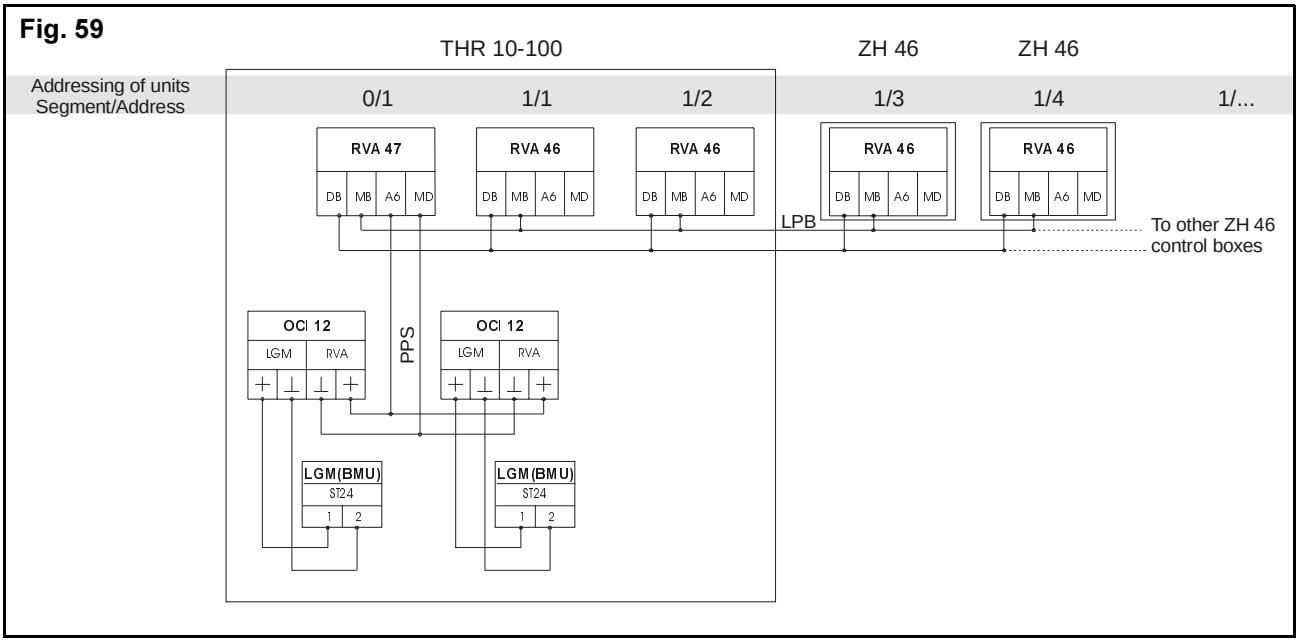
The automatic switching setting of the LGM and RVA regulators must be fixed at the same value. They are supplied with value 19 °C. With the LGM, this setting can only be modified with interface AZW 75.1.

Two RVA 46s can be integrated into the RVAs' control panel in order to control two heating circuits (pump circuit or mixer valve circuit). The connection of this option (RVA 46 for THR 10-100) is made easier with prewiring (communication bus, power supply) - (see paragraph 3 - section VIII - MULTICIRCUIT WITH A THR 10-100 and the RVA 46 installation instructions for THR 10-100).

To control more than two heating circuits, it is necesary to connect as many ZH 46 control boxes as additional heating circuits.

2 - COMMUNICATION PRINCIPLE

Fig. 59



In order to ensure correct communication between each regulator, each RVA (RVA 47 and RVA 46) must be addressed (see paragraph 4 - section VIII - MULTICIRCUIT WITH A THR 10-100).

By default:

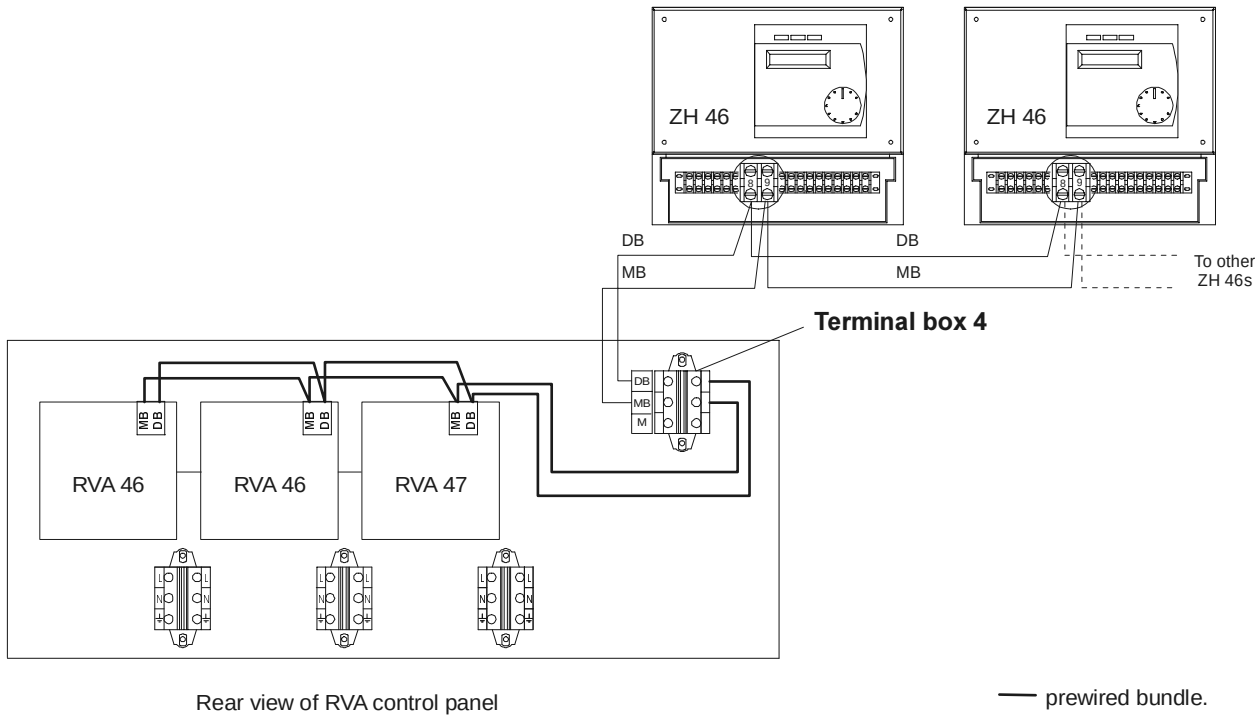
- the heat production regulators (RVA 47) must be on segment 0,
- the heat distribution regulators (RVA 46) must be on a segment situated between 0 and 14 (for example all RVA 46s on segment 1).

3 - CONNECTION BETWEEN REGULATORS

Be sure to observe the polarity of the connection of the communication bus:

- for RVA 46s assembled in the control pannel of the RVAs, a conector with polarization tabs is already prewired and must be connected to terminals MB/DB of the RVA 46 regulator (see the RVA 46 installation instructions for THR 10-100),
- for the additional control boxes, the connection must be carried out.
  - terminal 8 of box(es) ZH 46 with terminal DB of terminal box 4,
  - terminal 9 of box(es) ZH 46 with terminal MB of terminal box 4.

Fig. 60



4 - SETTING REGULATOR PARAMETERS

The unit's address and the segment's address identify each unit on the bus somewhat like a postal address. Each unit must have a correct address to ensure communication.

4.1 - Segment address

Setting

- Press the line selection buttons to select programming line 141.
- Press the plus / minus buttons to enter the segment address.

Setting range	*Unit*	*Factory setting*
0...14	Increment	0

Effect

Entry of the segment address is especially important when the regulator is used in a multicircuit installation. With this setting, the system can be subdivided into a number of segments.
Inputs:

0	Heat generation segment	RVA 47
1...14	Heat consumer segment	RVA 46

Segment number

A bus segment is comprised of a number of devices that are used in the same place of application. All units in a segment must carry the same segment address.

4.2 - Device address on the bus

Setting

- Press the line selection buttons to select line 140.
- Press the plus / minus buttons to enter the device number.

Setting range	*Unit*	*Factory setting*
0...16	Increment	1

Effect

Entry of the device address is especially important when using combinations of units, or in a system. The addresses classify the regulators within a segment.
Inputs:

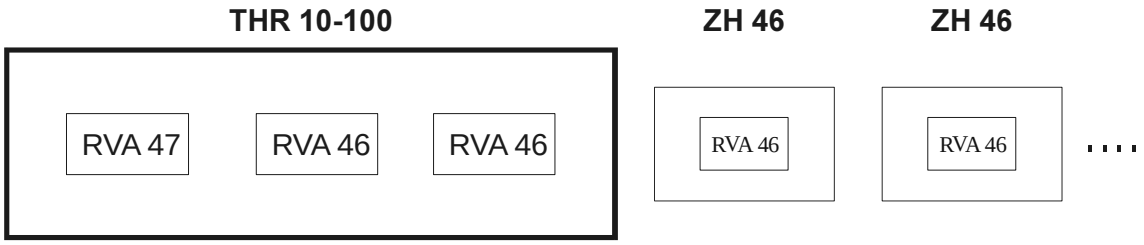
Adress	*Effect*	*Example*
0	Standalone	Single regulators
1	Master (local bus)	- Regulators with master function - Cascade master - Heat generation master - Consumer master in the respective segment
2...16	Slave (local bus)	- Regulators with slave function - Other heat generation regulators - Heating circuit regulator - D.h.w. regulator

Device address

The device addresses should be assigned in consecutive order in accordance with the regulators connected. It is not permitted to assign an address several times within a bus segment, since this would lead to communication errors. Each segment must have a unit as a master (address 1).

4.3 - Addressing

Fig. 61



Segment address	141	0	1	1	1	1 ....
Unit address	140	1	1	2	3	4 ....

Segment 0 = Heat production unit ⇒ RVA 47
Segment 1 = Heat distribution unit ⇒ RVA 46

(see fig. 63 for complete parameter setting)

5 - STANDARD INSTALLATION

Standard installation makes possible:

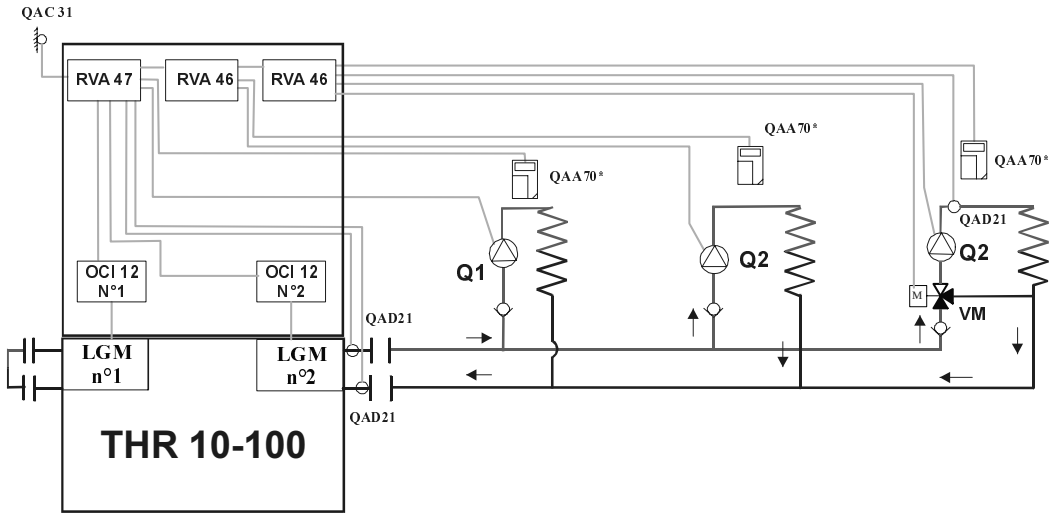
- Domestic hot water production with a load pump connected to the RVA 47,
- Or d.h.w. production with a selector valve controlled by one of or the two BMUs of a THR 10-100 CS.
- Control of a pump heating circuit by the RVA 47.
- Control of a pump circuit or of a circuit with a mixer valve by the additional ZH 46 control boxes.

Each RVA 46 zone regulator calculates a temperature setting according to the outdoor temperature, the room temperature settings, the slopes or the d.h.w. settings. The boiler temperature setting is the highest temperature of all the zone regulator temperature settings.

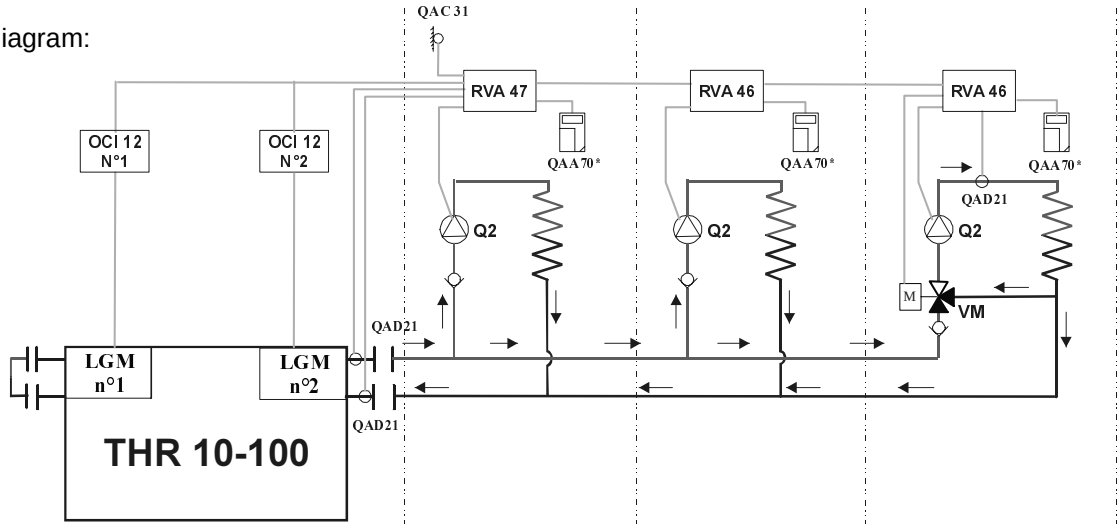
In order to make parameter setting easier to understand, it is best to use a skeleton diagram. Thus the diagrams of section III - OPERATION are fragmented (i.e. the RVA 46s are removed from the THR 10-100).

Fig. 62

diagram :



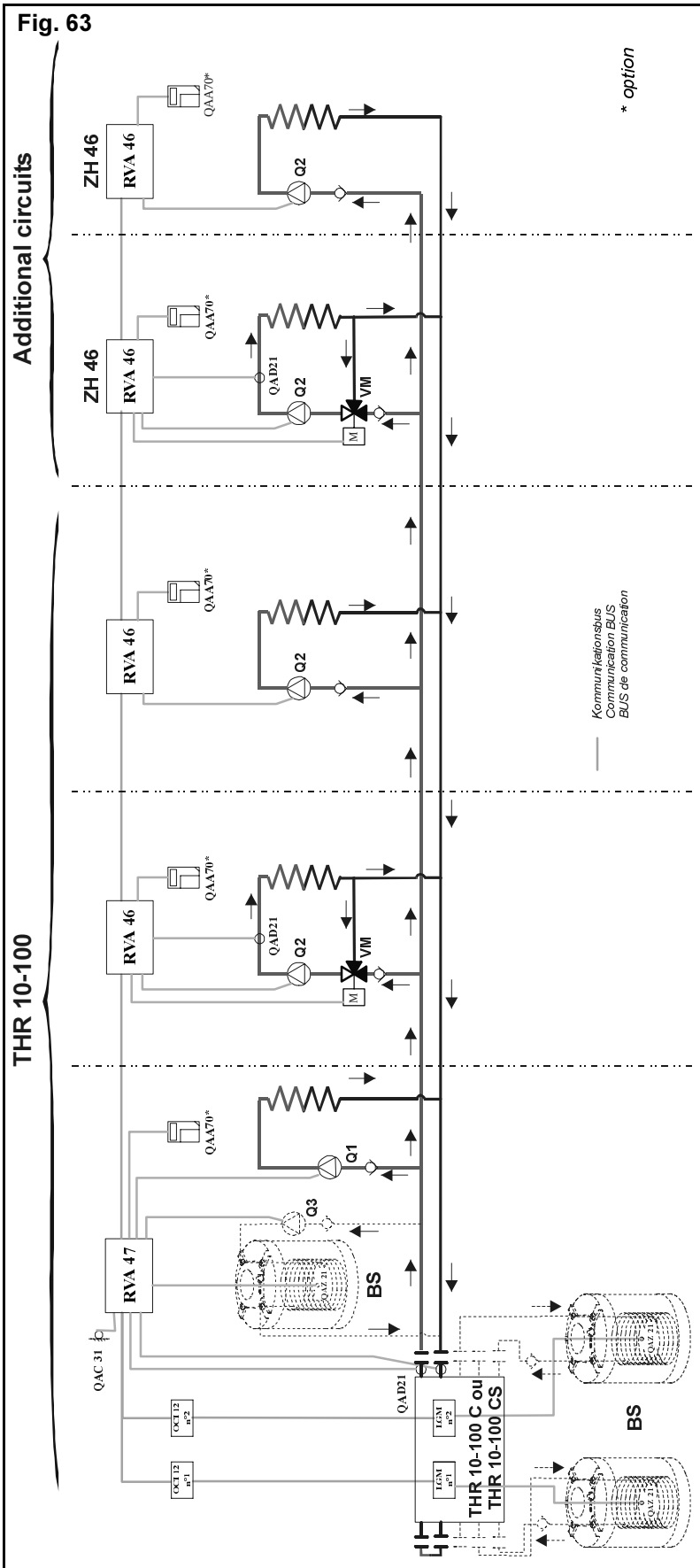
becomes diagram:



Legend	Description
QAA 70	Room sensor
QAC 31	Outside sensor
QAD 21	Cascade flow-return sensor
QAZ 21	Domestic hot water sensor
Q1	Circulating pump
Q2	Heating circuit pump
Q3	Domestic hot water load pump
VM	Motorised mixer valve
ZH 46	One circuit management (mixer valve or pump)

5.1 - Standard installation diagram

Fig. 63



	THR 10-100						Additional circuits					
Unit	Main unit : an RVA 47		with option : an RVA 46		with option : two RVA 46		ZH 46		ZH 46			
Function	Q1 as heating pump Domestic hot water production either on the RVA 47 or on one of (or both) BMUs		Valve circuit		Pump circuit		Valve circuit		Pump circuit			
	Line	Value	Line	Value	Line	Value	Line	Value	Line	Value		
Segment	141	0	86	1	86	1	86	1	86	1		
Address	140	1	85	1	85	2	85	3	85	4		
Clock	148	3	87	1	87	1	87	1	87	1		
Q1 Pump	95	1										
Slope	17	2,5..40	17	2,5..40	17	2,5..40	17	2,5..40	17	2,5..40		

5.2 - Operation

- Circulating pump Q1 operates as a heating pump.
- D.h.w. can be ensured:
  - either with a d.h.w. pump using the RVA 47,
  - either with a selector valve of one of or of the BMU(s) of the THR 10-100.
- The heating and d.h.w. setting potentiometers of the boiler's BMUs are inactive.
- The Summer/Winter potentiometers of the boiler remain active and must remain on the Winter position.

5.2.1 - Setting the temperatures

- D.h.w. temperature setting:
  - See paragraphs 2 -, 3 - section V - BASIC SETTING OF THE THR 10-100.
  - The setting of the d.h.w. temperature setting in line 13 of the RVA 46s or line 3 of the QAA 70s of the RVA 46s can be modified but this has no consequence.
- Heating circuit temperature setting of the RVA regulators (RVA 47 and RVA 46):
  - *With no QAA 70 room sensor on the pump circuit:*
    . the heating circuit flow temperature is defined by the RVA's slope for a 20 °C room temperature setting.
    . Corrections to this room temperature are carried out by the RVA's room temperature control knob (setting from 8 to 26 °C).
  - *With a QAA 70 room sensor on the pump circuit:*
    . The RVA's room temperature control knob becomes inactive.
    . The heating circuit's room temperature setting is set on the room sensor (setting value programmed in the room sensor line 1 + correction with the control knob +/- 3 °C).
- Boilers' setpoint temperature:
  - The boilers' setpoint temperature is the highest temperature setting of all the zone circuits.

5.2.2 - Pump operation

The circulating pump of the heating circuit operates as soon as the RVA receives a request and the outdoor temperature is lower than the Summer/Winter switching setting value.

The circulating pump of the heating circuit stops operating when there is no heating request (e.g.: RVA on standby – RVA in auto + QAA 70 on standby – RVA in auto + QAA 70 in auto + room temperature setting reached).

Since the domestic hot water priority is a shifting priority, during a Domestic Hot Water request:

- When the actual Domestic Hot Water is very different from the D.H.W. temperature setting:
  - Pump Q3 operates,
  - Pump Q1 of the heating circuit of regulator RVA 47 stops operating,
  - The Q2 pumps of the RVA 46 pump circuits stop operating,
  - The valves of the RVA 46 mixer valve circuits close (the pumps continue to operate).
- When the actual Domestic Hot Water temperature nears the D.H.W. temperature setting:
  - Pump Q3 operates,
  - Pump Q1 of the RVA 47 regulator heating circuit operates intermittently,
  - The Q2 pumps of the RVA 46 pump circuits operate intermittently,
  - The valves of the RVA 46 mixer valve circuits open (the pumps continue to operate).
- The pumps of the THR 10-100 operate as soon as there is a zone request (heating or domestic hot water).
- The pumps of the THR 10-100 stop operating as soon as there is no more zone request (heating or domestic hot water).

IX - CASCADE OF SEVERAL THR 10-100

1 - GENERAL POINTS

When 100 kW are no longer sufficient to heat the network, it is possible to combine several B series RVA 47 regulators in order to achieve cascades featuring up to 4 THR 10-100 boilers.

To do this, each RVA 47 must be identified and one of them must be designated as the master (to which will be linked the only outside sensor, the only cascade flow sensor, and the only cascade return sensor). The other RVA 47s (unit address greater than 1) are slaves.

The master RVA 47 regulator sets the operation of the network pump and manages the cascade setting.

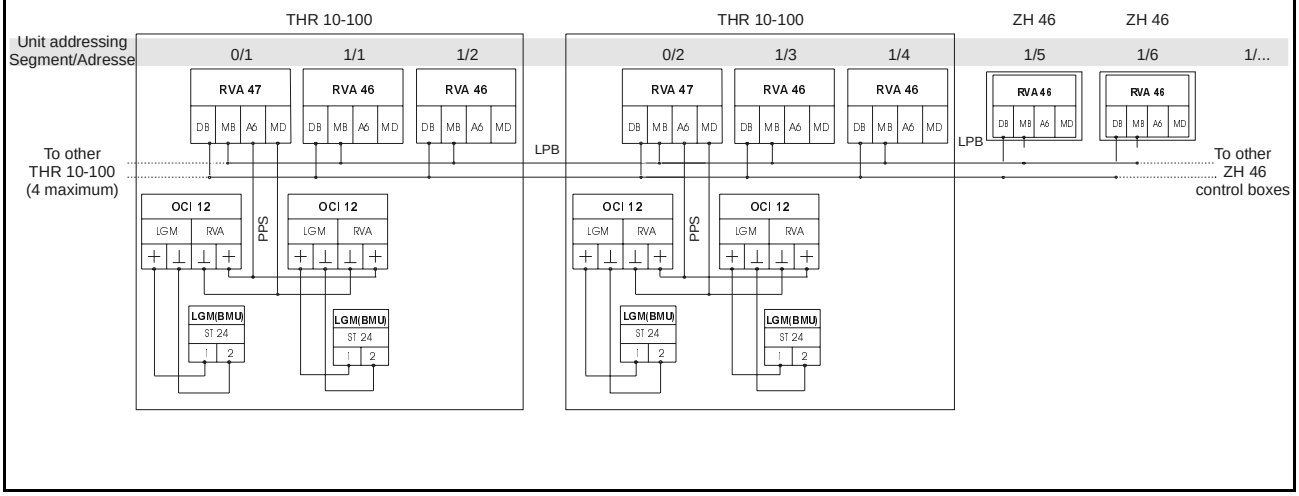
2 - COMMISSIONING

When commissioning a cascade installation with several THR 10-100s, each THR 10-100 must be commissioned one by one, and to check the correct operation of the cascade control.

Follow the parameter setting table indications carefully.

3 - COMMUNICATION PRINCIPLE

Fig. 64



To ensure correct communication between each regulator, each RVA (RVA 46 and RVA 47) must be addressed (see paragraph 5 - section IX - CASCADE OF SEVERAL THR 10-100).

By default:

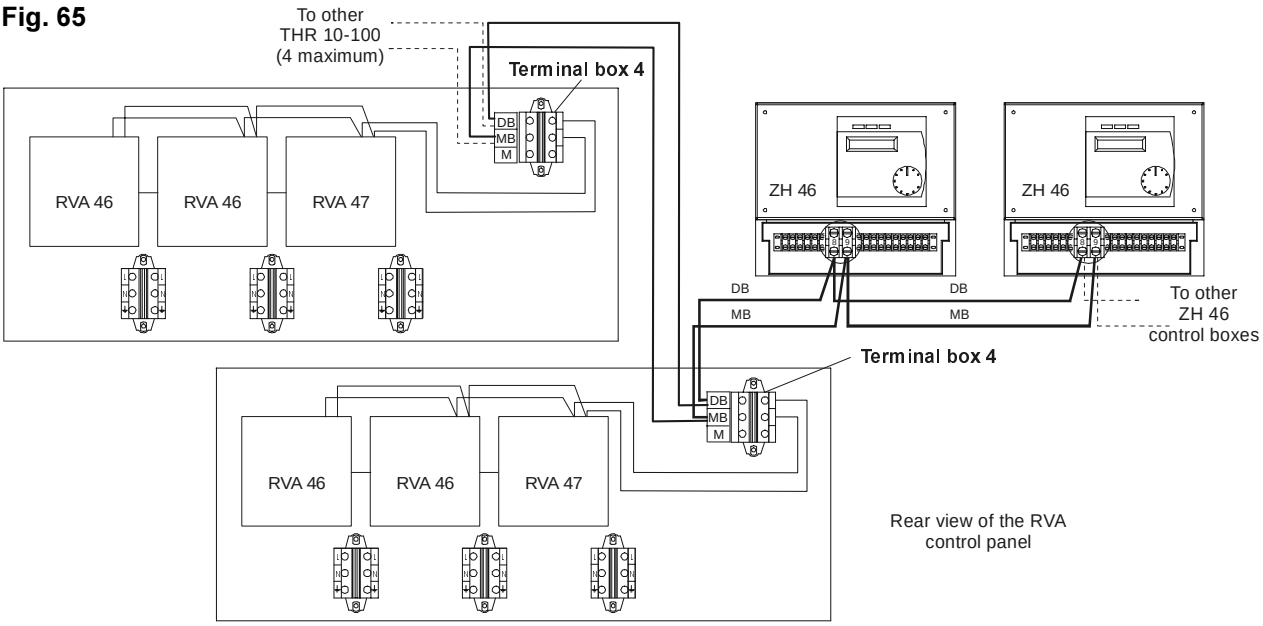
- the heat production regulators (RVA 47) must be on segment 0,
- the heat distribution regulators (RVA 46) must be on a segment between 0 and 14 (for example all the RVA 46s on segment 1).

4 - CONNECTION BETWEEN REGULATORS

Be sure to observe the polarity of the connection of the communication bus:

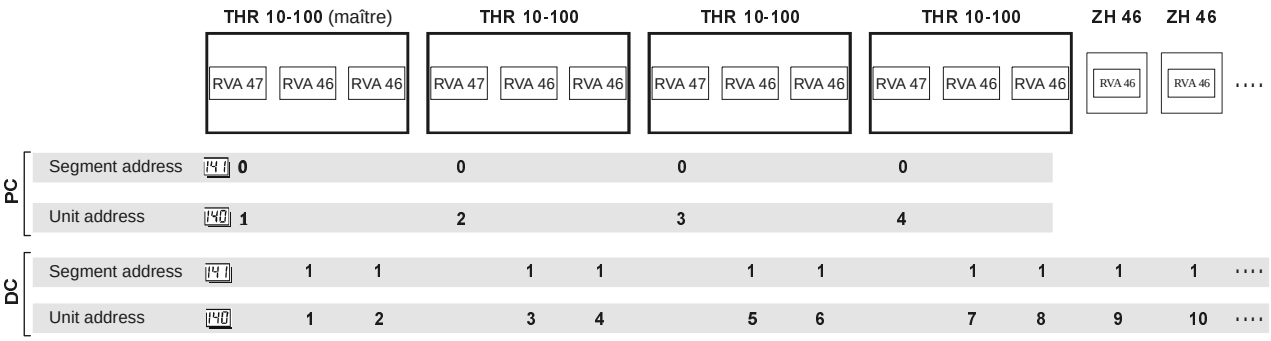
- connection between THR 10-100:
  - connect terminals DB with each other as well as the MB terminals of terminal boxes 4 (observe the polarity),
- connection between THR 10-100 and terminal box ZH 46:
  - terminal 8 of terminal box(es) ZH 46 with terminal DB of terminal box 4 of the THR 10-100,
  - terminal 9 of box(es) ZH 46 with terminal MB of terminal box 4 of the THR 10-100.

Fig. 65



5 - REGULATOR PARAMETER SETTING

Fig. 66



PC = Heat producer RVA 47
DC = Heat distributor RVA 46

Segment 0 = Heat producting unit ⇒ RVA 47
Segment 1 = Heat distribution unit ⇒ RVA 46

See fig. 67 for complete parameter setting

6 - CASCADE INSTALLATION

In any event, the THR 10-100 can be replaced with a set of THR 10-100s in a cascade (4 maxi.). Domestic hot water production is ensured in the same way, i.e.:

- either by the domestic hot water load pump on the network (via the RVA 47),
  - The domestic hot water sensor and the load pump can be connected to any RVA 47 in the cascade.
  - The domestic hot water request and the d.h.w. setting may be set on **this RVA 47**. (paragraph. 2 - section V - BASIC SETTING OF THE THR 10-100).
- or by a selector valve (controlled by a BMU) with a THR 10-100 CS within the cascade.
  - This domestic hot water production is only possible if at least one domestic hot water tank is connected to a THR 10-100 CS within the cascade.
  - The domestic hot water request and the d.h.w. setting may be set **on the THR 10-100 CS**.
  - Several tank connection cases are possible (paragraph 3 - section V - BASIC SETTING OF THE THR 10-100).

The cascade operation is the same as with a single THR 10-100. Selection/Deselection of the LGMs identical see paragraph 7.2.5 - section VI - COMMISSIONING

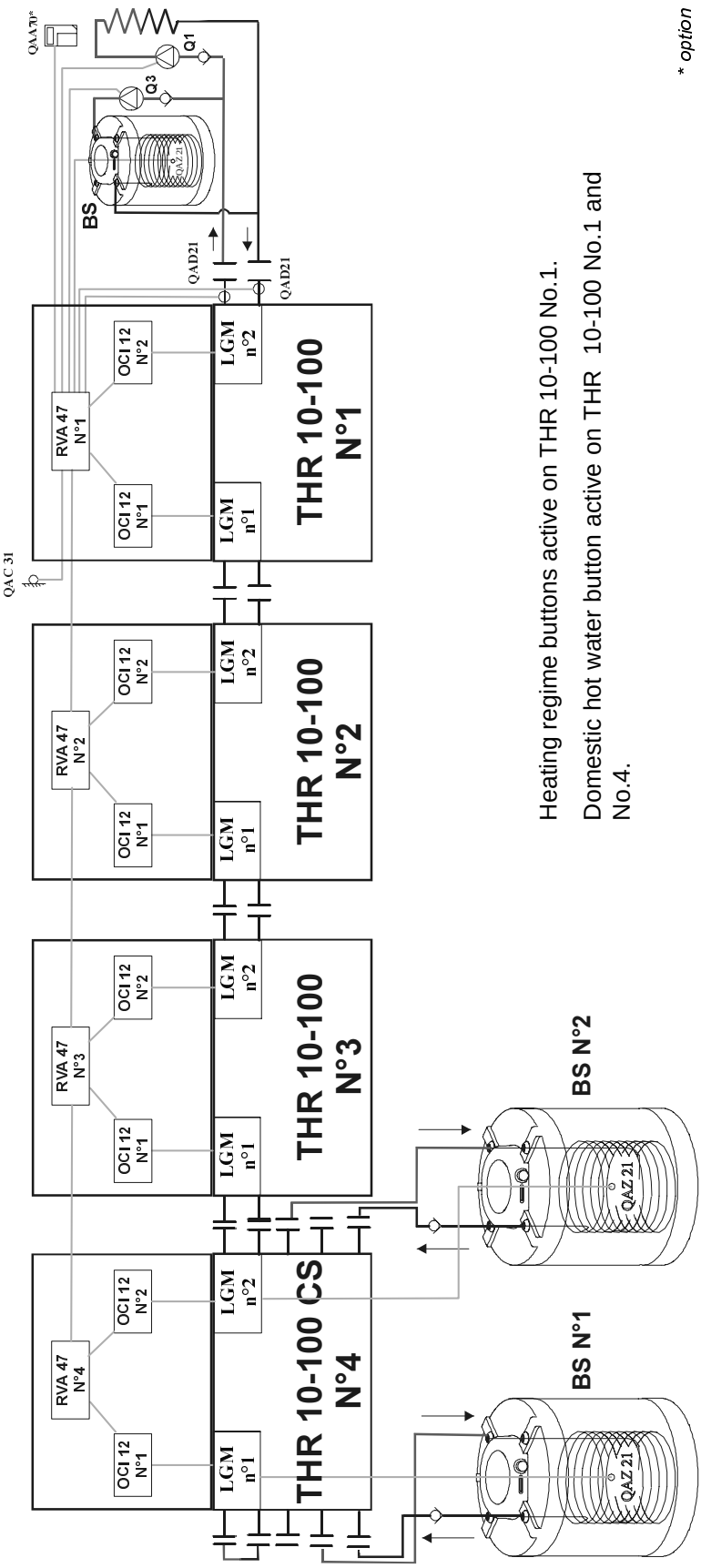
Note:

- The buttons of the heating regime, the automatic regime, the permanent regime and the standby of the slave RVA 47s are inactive. The d.h.w. regime button is only active on the
  THR 10-100 CS or on the THR 10-100 C to which a d.h.w. sensor is connected (Terminal B3 of the RVA 47).

Legend	Description
QAA 70	Room sensor
QAC 31	Outside sensor
QAD 21	Cascade flow-return sensor
QAZ 21	Domestic hot water sensor
Q1	Circulating pump
Q2	Heating circuit pump
Q3	Domestic hot water load pump
VM	Motorised mixer valve
ZH 46	Regulation of one circuit (mixer valve or pump)

6.1 - Standard installation

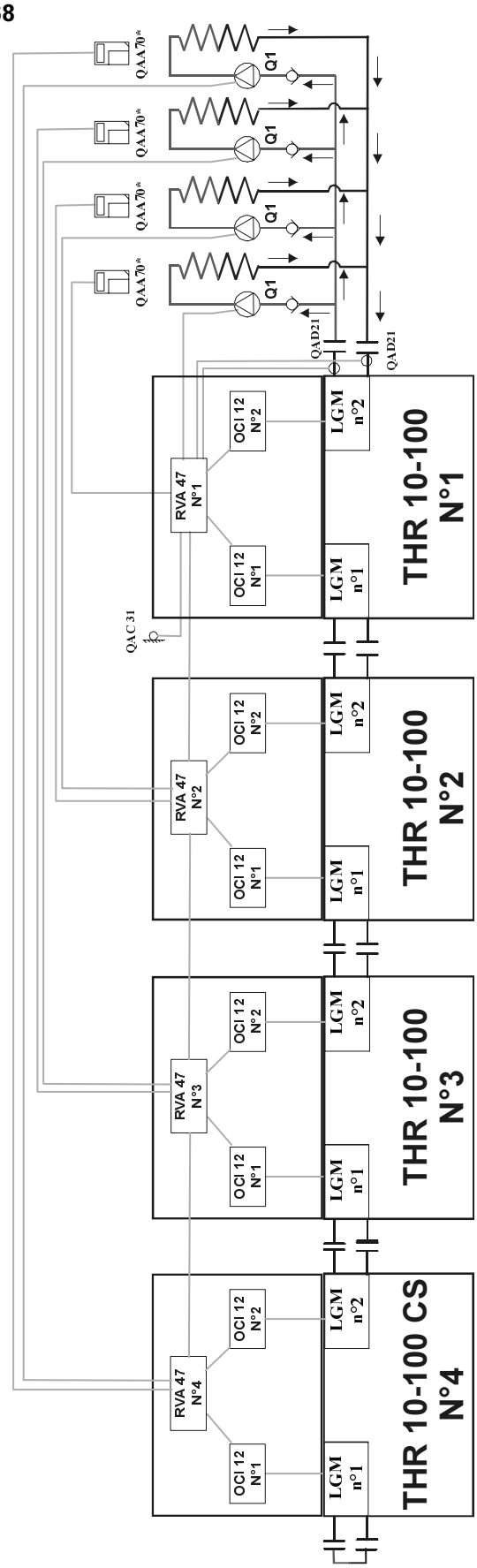
Fig. 67



RVA 47 Number		1	2	3	4
	Line	Value	Value	Value	Value
Segment	141	0	0	0	0
Address	140	1	2	3	4
Clock	148	3	1	1	1
Q1 pump	95	1	1	1	1
Slope	17	2,5..40	- -. - (inactive)	- -. - (inactive)	- -. - (inactive)

6.2 - Particularity of a THR 10-100 cascade

Fig. 68



* option

According to the programming of the slope of the THR10-100 slave boilers, it is also possible to control a pump circuit by slave RVA 47 (slope different from 0)

Note:

- With a pump circuit, it is strongly advised to use a room sensor.

pump circuit setting can be set on the relevant RVA 47.

Heating regime buttons active on THR 10-100 No.1 - No.2 - No.3 - No.4.

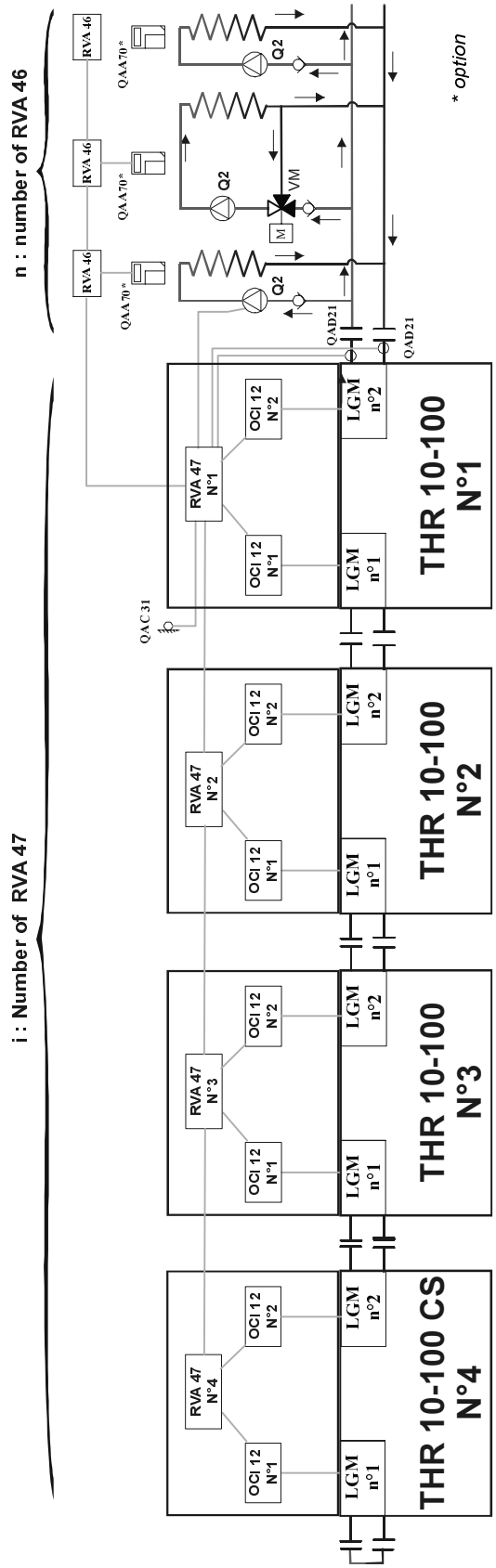
RVA 47 number		**1**	**2**	**3**	**4**
	Line	**Value**	**Value**	**Value**	**Value**
Segment	141	0	0	0	0
Address	140	1	2	3	4
Clock	148	3	1	1	1
Q1 pump	95	1	1	1	1
Slope	17	2,5...40	2,5...40	2,5...40	2,5...40

6.3 - Installation of multicircuits with a THR 10-00 cascade

Note:

- With a pump circuit, it is strongly advised to use a room sensor.

Fig. 69



HEAT PRODUCER REGULATOR			
RVA 47number		**1**	**2 à 4**
	Line	**Value**	**Value**
Segment	141	0	0
Address	140	1	2 à 4
Clock	148	3	1
Q1 pump	95	1	1
Slope	17	2,5...40	- - . - (inactive)

HEAT DICTRIBUTOR REGULATOR		
RVA 46 number		**1**
	Line	**Value**
Segment	86	1
Address	85	1 à 16-i
Clock	87	1
Slope	17	2,5...40

i = number of RVA 47 $1 \leq i \leq 4$ $i + n \leq 16$

n = number of RVA 46 $0 \leq n \leq 16\text{-}i$

If $n \leq 2i$: all the RVA 46s can be connected to the control panel of the THR 10-100

If $n > 2i$: It is necessary to add ZH 46 control boxes

X - MAINTENANCE

The annual inspection of the boiler and of the combustion product outlet is compulsory. It must be carried out by a qualified person.

Before any servicing, cut the power supply. Close the gas inlet of the boiler and the water wickets if required.

If the boiler is removed, provide a port at the end of the gas piping.

Note:

- The various services and controls mentioned below are to be carried out on each module of the THR 10-100 boiler.

1 - SERVICING THE VENTILATOR AND THE BURNER

The burner must be serviced annually.

Disassembling the ventilator:

- Unscrew the three screws (item no. 1) fixing the ventilator (item no. 9) to the burner's air sleeve (item no. 2),
- clean it using a domestic vacuum cleaner by placing the suction device over the air inlet and outlet successively.

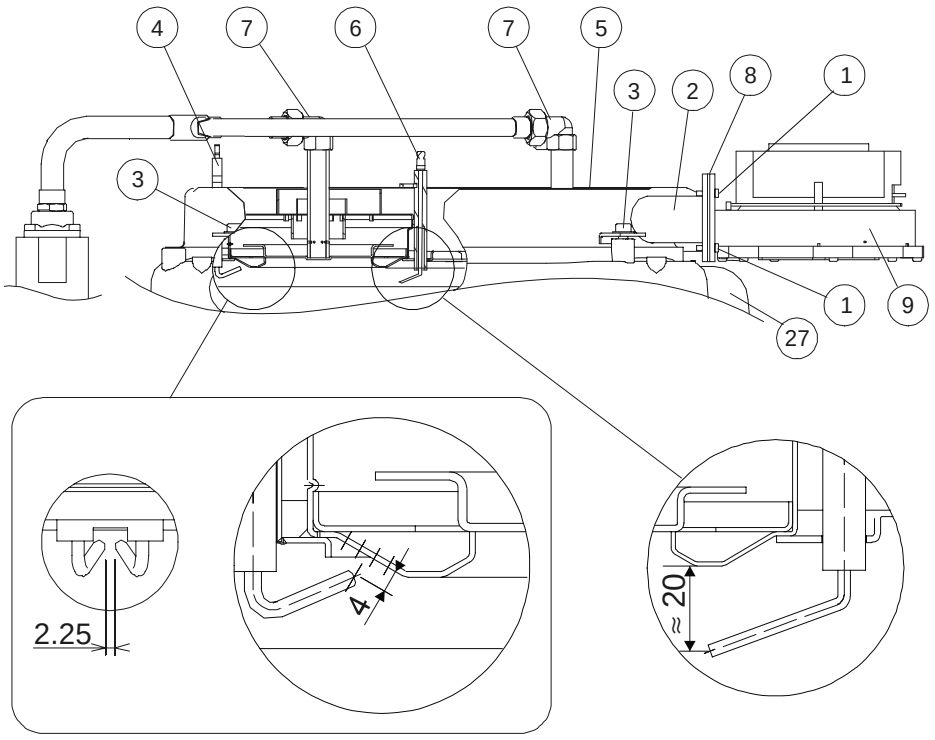
Disassembling the burner:

- Unscrew the four screws fixing (item no. 3) the burner (item no. 5) to the boiler shell (item no. 27),
- disassemble the two elbow joints (item no. 7),
- clean the burner (item no. 5) using a domestic vacuum cleaner by placing the suction device over the air inlet and the gas inlet successively,
- check the ignition electrodes (item no. 4) and the ionisation electrodes (item no. 6).

During reassembly:

- Check the airtightness of the gas at the burner elbow joint/gas inlet tube level,
- check airtightness at the burner and boiler shell levels,
- following the assembly of the ventilator:
  - check the correct positioning of the ventilator/burner gasket (item no. 8),
  - check the airtightness of the gasket and replace it if necessary.

Fig. 70



2 - SERVICING THE HEAT EXCHANGER OF THE BOILER SHELL

The heat exchanger must be cleaned once the burner has been disassembled (paragraph 1 - section X - MAINTENANCE).

- Sprinkle the heat exchanger with water. The water is evacuated through the condensate evacuation siphon,
- when reassembling the burner onto the boiler shell check the correct positioning of the gasket.

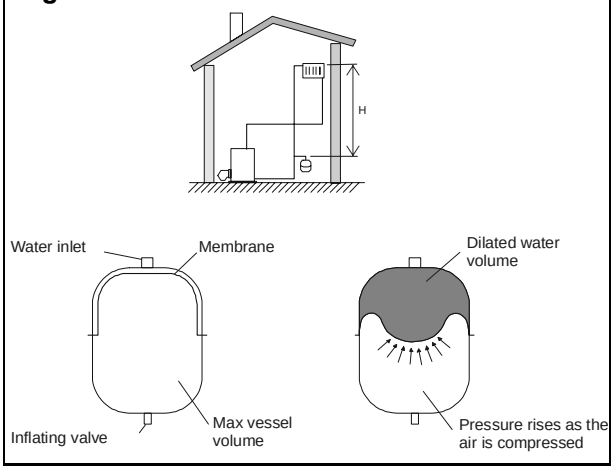
3 - CHECKING ACCESSORIES

- Check that the safety and control devices (3 bar safety valve, air bleed, safety control box, etc.) are operating properly.
- Check that the condensate drain siphon is clean (remove it, clean it, replace it and then fill it with water).
- Also check that neither the installation nor the boiler present any water or fuel leaks (leaks may produce a risk for safety and shorten the lifespan).
- When it is frequently necessary to add water to maintain pressure in the installation, even though no leaks have been discovered, perform an expansion tank check (paragraph 4 - section X - MAINTENANCE).

4 - EXPANSION VESSEL PRE-INFLATION PRESSURE CHECK

- Drop the pressure in the heating installation by opening the drain cock or the safety valve (pressure gauge reading under 0.5 bar).
- Check the pressure in the expansion vessel and if necessary bring it back up to pressure, or replace it if the membrane is punctured (water present in the inflating valve).
- To optimise the efficiency of the vessel:
  - adjust its pre-inflation pressure in line with the installation. It must correspond to the static height of the installation (H) expressed in bars (height between the highest point of the installation and the expansion tank, with 10 metres = 1 bar),
  - adjust the filling pressure of the installation to a value of over 0.2 bar above the pre-inflation pressure of the vessel (after totally bleeding the air from the installation).

Fig. 71



5 - COMBUSTION PRODUCT CONDUITS

- Check the combustion product evacuation conduit and the air inlet conduit at least once a year (airtightness of the parts that may be disassembled - conduits not obstructed).

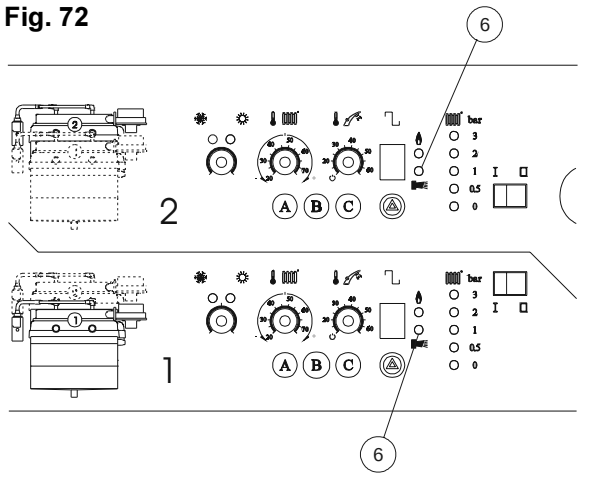
The combustion product evacuation circuit is slightly pressurized. If this conduit is punctured, be sure to block this puncture.

6 - FLAME CONTROL

After the boiler has been powered up:

- Check the flame control by deconnecting the ionisation electrode:
  - boiler safety shut-down (alarm indicator lit (item no. 6) following two ignition attempts).

Fig. 72



7 - CHECKING COMBUSTION

Once the boiler is live, control (CO2/CO) combustion.

See section VII - COMBUSTION CONTROL).

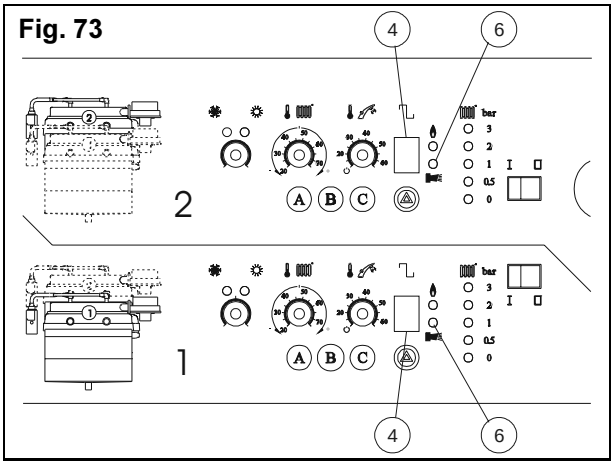
8 - CONTROL

Check the correct operation of control - See section V - BASIC SETTING OF THE THR 10-100.

XI - OPERATING FAULTS

1 - LGM OPERATING FAULT

Fig. 73



The sequence display (item no. 4) of each LGM's module can display two types of code:

- signalling codes,
- alarm codes.

1.1 - List of signalling codes

- the alarm indicator (item no. 6, fig. 73) is off,
- the display (item no. 4, fig. 73) flashes.

Note:

- If several signalling codes appear simultaneously, the display follows priority.

Display	Meaning	Priority
1	Absence of the boiler setting value potentiometer	1
2	Absence of the domestic hot water setting value potentiometer	1
4	TÜV function active	1
5	Sweep function active	1
7	Management unit stop function active	1
8	Domestic hot water sensor 1: interrupt	1
0	Domestic hot water sensor 1: short-circuit	1
A	Anti-legionella function active	2
C	Sweeping button closed following RESET/unlocking	1
d	TÜV button closed following RESET/unlocking	1
E	Forced intermittence active	2
F	Warmer/colder correction made	1
L	Return to standard values	1
P	Kick of heating circuit pump Q1 active	2
U	Derivation valve kick or domestic hot water pump Q3 kick active	2

1.2 - List of alarm codes

- the alarm indicator (item no. 6, fig. 73) is lit,
- the display (item no. 4, fig. 73) flashes.

Note:
- All other alarm codes signal an internal fault

Display	Fault	Possible source/Corrective action
0	Ventilator speed incorrect in preventilation phase	DA3 parameter to be checked
2	Overheating thermostat activated or flue gas thermostat activated	Check the water flow rate and pressure (min.P: 1 bar) Bleed the installation properly
4	Flame fault or premature flame signal	- The flame does not appear: no gas, gas valve does not open, substantial gas valve setting fault, high voltage transformer defective, high voltage cable dead, high voltage electrode defective - The flame only appears for 3 seconds: Live-Neutral inversion , ionising electrode defective, ionising electrode cable defective
5	Ventilator speed incorrect at maximum load	Parameter DA4 to be checked
6	Ventilator start-up time too long	Check that the ventilator's rotation is not hindered
9		
A	Maximum ventilator speed overshoot during the preventilation phase	- Check mains voltage (too high) - Check that the flue or the ventilator air inlet are not obstructed - Parameter DA to be checked
H	Boiler sensor interruption	Replace the sensor
L	Boiler sensor interruption	Replace the sensor
C	Insufficient boiler water pressure	- Check the heating circuit water pressure - Check the operation of the pressure-mechanism sensor that can accessed when the plastic cover is removed.

2 - OPERATING FAULTS OF REGULATOR RVA 47

Once the fault has been eliminated, the Er error message on the RVA 47 may take 1 to 10 minutes to disappear according to the type of fault.

2.1 - Operating faults

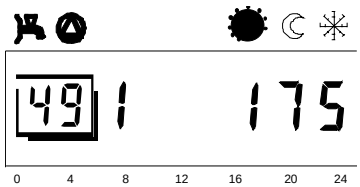
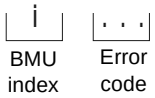
- **The display of the regulator remains blank (no display):**
  - Check whether the main heating switch is selected .
  - Check the heating circuit's fuses.
  - Check the wiring.
- **The time displayed by the regulator is wrong:**
  - Adjust the regulator's clock (programming line 1).
  - Adjust the master regulator's clock (if need be).
- **An LGM does not activate:**
  - Should this LGM really be in service?

    Check the boilers' cascade strategy, timing at selection, timing at deselection).
  - Si nécessaire, déverrouiller le LGM.
  - Check the control thermostat (TR) and the safety thermostat (STB).
  - Check the LGM's wiring and fuse.
  - Check the communication link with the LGM (line 54).
  - Check the wiring of the cascade temperature sensors (input test, line 52).
- **A pump does not operate:**
  - Check that the displayed type of installation is correct (line 53).
  - Is the pump correctly defined? (line 95)
  - Check the pump's wiring and the fuses (output test, line 51).
  - Check the sensors' wiring (input test, line 52).
- **The D.H.W. is not heated:**
  - Check that the DHW button is 'ON'
  - Check the Domestic Hot Water temperature setting.
  - Check that the Domestic Hot Water load is released.
  - Check the wiring and the fuses of the domestic hot water load pump (output test, line 51).
  - Check the Domestic Hot Water sensor's wiring (input test, line 52).
  - Check the setting of the control thermostat (TR). It must be greater than TKmax.
- **The room temperature does not match the desired value:**
  - Does the setting displayed on the control knob match the desired value ? (Regulator control knob, possibly on the room sensor.)
  - Is the desired regime displayed?
  - Do the displayed weekday, the time and the heating programme coincide? (lines 1-11).
  - Is the heating characteristic's slope correctly set (line 17)?
  - Check the wiring of the outdoor sensor (line 52).
  - Was the room temperature comfort setting set with the translation of the heating characteristic (line 100)?
- **Le message de défaut "ER" apparaît sur l'affichage :**
  - Check that the LGM's Summer/Winter potentiometer is <u>on the Winter position</u>.
  - Select programming lines 49, 50 and 54. The error code and the address where the error took place are displayed there. Paragraph 2.2 - below lists the possible error codes and their meaning.

    The displays of these parameters must be those of the table below.

RVA 47 regulator parameters	Display
49 : display of the BMU (LGM) error codes	- - -
50 : display of errors	vide
54 : display of PPS communication selection of the PPS addresses using the +/- buttons	4 102 5 102

2.2 - Display of the BMU error codes (LGM)

Benefits	- Simple and fast control of the installation. - Error detection aided
Description	The RVA47.320 can save and memorize an error message by the BMU and displays the BMU No. and the corresponding error code. The errors are displayed on this line.
Setting 	- Press the line selection buttons to select programming line 49. - Press the plus / minus buttons to select the individual BMUs. *Display* / *Unit*: 1...4 / 0...255 — BMU number / error code
Effect	The number of the lowest connected BMU number containing a fault entry will automatically be displayed on this line. Note: Error messages cannot be acknowledged. They disappear only if the appropriate fault has been rectified.
Display	The display shows the BMU number and the associated error code. When none of the connected BMUs delivers a message error, or when no BMU is connected, there will be no display. The meaning of the different error codes depends on the make of BMU used. For this reason, no overview of all the different error codes can be given here. For details, please refer to the technical documentation of the respective product. *Example:* *:*  0 4 8 12 16 20 24 **Fig. 74** BMU 1 displays error code 175.  i : BMU index; . . . : Error code 175 — LGM (BMU) No.i : - non connected - badly connected (check the polarity of connection ST24) - fault (see paragraph 1 - section XI - OPERATING FAULTS) 1 — LGM (BMU) No.i : - has no more boiler sensor - has no more overheating safety device - fault (see paragraph 1 - section XI - OPERATING FAULTS) - Note: If there is a BMU error code, operating line 50 also displays a general BMU fault (error code 150).

2.3 - Display of faults

Benefits	- Simple control of the installation. - Fault search tool
Description	The controller displays faults that may have occurred in the regulator itself or in the system. In normal operation, the display shows "Er" if a fault has occurred.
Setting 	- Press the line selection buttons to select programming line 50. - Press the plus / minus buttons to display the list of faults. *Display range*: 0...255 — *Unit*: -
Effect	The first entry in the fault list will automatically be displayed on this programming line. Note: - By pressing  , it is possible to switch between error message signals.
Fault status signals	The regulator can store a maximum of two error message signals. The errors will be cleared only after the cause of the fault has been removed. If additional faults are present, they will be memorized when memory capacity becomes available. **Faults that may occur locally on this device:**

Display	*Description of fault*
Blank	No fault
10	Outside sensor
26	Cascade flow temperature sensor
46	Cascade return temperature sensor
50	D.h.w. temperature sensor
58	D.h.w. control thermostat
61	Room unit fault
62	Wrong room unit
70	Buffer storage tank temperature sensor
81	Short-circuit LPB
82	Address collision on LPB (several times the same address)
86	Short-circuit PPS
100	Two master clocks present
145	Non compatible device connected to PPS
146	Unacceptable installation configuration
147	No BMU/boiler connected
150	General BMU/boiler fault

- Note:

  In the case of error code 150, operating line 49 also gives the manufacturer-specific error code of the BMU.

Faulty devices

Other devices that are faulty and whose faults are signalled:

Display	*Description of fault*
Example: 26.0.01	Fault with the address of the faulty device

- The first digit gives the error code (26). (see the error list of the unit indicated by the address)
- The second digit indicates the segment address of the faulty device (.01).
- (for the segments 10-14, the letters A, b, C, d, and E are used)
- The third digit indicates the device address of the faulty device (.01).

Display

Example of a display after a fault has occurred

Fig. 75

2.4 - Display of PPS communication

Benefits

- Interface for BMUs and digital room unit
- Checking the communication with the peripheral devices (BMUs, room units).

Description

The PPS bus is a point-to-point interface for communication between the regulator, the BMU and the room unit. The display provides information about the communication status and the types of connected peripheral devices.

Setting

- Press the line selection buttons to select programming line 54.
- Press the plus / minus buttons to interrogate the various PPS users.

Display	*Unit*
- - -	No communication
1...12 / 0...255	PPS address / identification code
0 0 0	Short-circuit of communication line

Effect

The status of the PPS communication will automatically be displayed on this line. If communication is error-free, the controller identifies the unit connected by displaying the identification number, in addition to the device address.

Displays

The display features a PPS address and an identification code.

Adresse PPS

The display is comprised of PPS address and a device identification code:

Room unit	⇒ 1
BMU-Number 1	⇒ 4
BMU-Number 2	⇒ 5
BMU-Number 3	⇒ 6
BMU-Number 4	⇒ 7

- Note:
  - These peripheral devices can only operate under the respective PPS address. If one of these devices is not used, the PPS address can be allocated to some other peripheral device (allocation is one-way). Assignment of all the other peripheral devices to the PPS addresses can be made randomly.
  - Since every regulator has a specific and confined PPS address space, the same PPS addresses can be assigned to each device.

Identification codes

The regulator only allows the connection of digital peripheral devices. Analogue devices are not compatible. The digital devices transmit their specific identification code to the regulator. This enables the identification of the type of unit using the following list:

82	Room unit QAA 50 (digital)
83	Room unit QAA 70 (digital)
90	Room sensor QAA 10 (digital)
102	BMU

- Note:
  - The display of a PPS address with the identification code means that the communication with the corresponding unit is correct.
  - If neither PPS address or identification code are displayed, communication is faulty or wrong.
  - Non compatible units are displayed but generate error message 145 (line 50).

2.5 - Temperature reading error

Special displays	- - - : Sensor cut-off or no sensor connected o o o : Sensor short-circuit

3 - RVA 46 OPERATING FAULTS

Once the fault has been eliminated, the Er error message on the RVA 46 may take 1 to 10 minutes to disappear according to the type of fault.

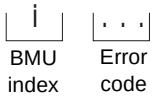
3.1 - Operating faults

- **Heating control does not operate, wrong or absent display of the time:**
  - Check the heating circuit's fuses.
  - Carry out a RESET: isolate the regulator from the mains for about 5 seconds (by positioning the boiler's main switch on stop for 5 seconds for example).
  - Set the clock.
- **The setting device does not open / close, or at least not properly:**
  - The manual lever of the setting device may not be disengaged.
  - Wiring to the setting device interrupted (output test).
  - Check the wiring of the sensor (input test).
  - Daily heating active or limit rapid lowering active.
- **The heating circuit's circulating pump does not operate:**
  - Check the wiring and the fuses (relay test).
  - Check the wiring of the sensors (input test).
- **The room temperature is not correct:**
  - Check the room temperature setting values.
  - Is the desired regime displayed?
  - Was an exception made to the automatic regime on the room unit?
  - Do the displayed weekday, time and heating programme coincide?
- **The heating installation does not operate properly:**
  - Check all the parameters according to the "Heating Engineer" parameters and the "End-user" service instructions.
  - Test the relays.
  - Test the inputs.
  - Check the control thermostat (TR) and the safety thermostat (STB).
- **The frost protection of the installation does not operate or "not properly":**
  - Check the correct operation of the burner.
  - For the heating circuits with a circulating pump, does the room temperature limiting function have priority over the frost protection function?
- **The accelerated temperature lowering or warm-up do not operate:**
  - Check the "Heating Engineer" level settings.
  - Check the sensor connected to A6 (input test).
- **The "ER" fault message appears on the display:**
  - Check that the LGMs' Summer/Winter potentiometer is on the Winter position.
  - Select programming lines 50, 60 and 62. Both the error code and the address where the error occured are displayed there. Paragraph 3.2 - below lists the possible error codes and their meaning.

    The displays of these parameters must be those of the following table.

RVA 46 regulator parameters	Display
60 : display of the BMUs' error codes (LGM)	blank
50 : error display	blank
62 : display of PPS communication if room sensor on RVA 46	- - - or 1 83

3.2 - Display of the BMU (LGM) error codes

<table>
<tr><td>Benefits</td><td>- Detection of BMU errors,
- Simplified control of the installation,
- Disorder localisation tool.</td></tr>
<tr><td>Description</td><td>Display of the BMU disorders transmitted via PPS communication. These displays are reproduced in their original form.
The signal is transmitted via digital PPS communication via terminal A6 to the regulator.
This display is only possible if a BMU generates the corresponding signal.</td></tr>
<tr><td>Setting
  </td><td>- Using the line selection buttons, choose programming line 60.
- Use the + / - buttons to select the desired input signal.
<table><tr><th>Display</th><th>Unit</th></tr><tr><td>blank</td><td>No fault</td></tr><tr><td>1..255</td><td>Error code</td></tr></table></td></tr>
<tr><td>Effect</td><td>Access to this programming line brings about the automatic display in digital form of the error code transmitted by PPS communication.
A transmitted error code automatically generates error message 150 in the regulator error display, line 50.</td></tr>
<tr><td>Error code</td><td>The exact meaning of the display and the measures that must consequently be taken must be looked up in the error list of the connected heat generators.</td></tr>
<tr><td>Display</td><td> 

<table><tr><td>175</td><td>LGM (BMU) No.i :
- non connected
- badly connected (check the polarity of connection ST24)
- fault (see paragraph 1 - section XI - OPERATING FAULTS)</td></tr><tr><td>1</td><td>LGM (BMU) No.i:
- has no more boiler sensor
- has no more overheating safety device
- fault (see paragraph 1 - section XI - OPERATING FAULTS)</td></tr></table></td></tr>
</table>

3.3 - Error display

Benefits

- Simple installation control.
- Fault search tool

Description

The regulator displays errors that can occur in the unit itself or in the system. In the comfort regime, "ER" is displayed when a fault occurs.

Setting

- Using the line selection buttons, choose programming line 50.
- Display the fault list using the + / - buttons.

Display	*Unit*
0...255	-

Effect

Accessing this programming line automatically brings about the display of the first input in the error list.

Error messages

The regulator can memorize 2 error messages maximum. Errors are only deleted once their cause has been eliminated. If other errors are present, they are memorized as soon as there is available space in the memory.

Possible faults:

Display	*Description of fault*
0	No fault
10	Outside sensor
30	Flow sensor
61	Room unit fault
81	Bus short-circuit
100	Two master clocks present
140	Unacceptable unit or segment address
145	PPS unit non compatible
150	General BMU alarm

Faulty signalling by the communication of the connected units:

Display	*Description of fault*
For example: 20.0.01	Error with the address of the faulty unit

The first number indicates the error code (20.).
The second number indicates the segment address of the faulty unit (.0.).
The third number indicates the address of the faulty unit (.01).

- Note:

  If the unit connected to the indicated address is not an RVA46.531, refer to own manual to establish the meaning of the displayed code.

3.4 - Display of communication on the PPS

Benefits

- Display of the different room units,
- Verification of the communication with the connected room units and of the BMU.

Setting

- Using the line selection buttons, select programming line 62.
- The + / - buttons do not enable any setting.

Display	*Unit*
0..15 / 0...255	Address / Unit identification

- Note:

  If it is an analogue input signal, the address of the unit is not displayed and selection with the + / - buttons is not possible.

Effect

Accessing the programming line automatically activates the display of the status of the PPS communication.
In the event of correct communication, the identification of the connected unit is displayed in digital which defines the unit.

Displays

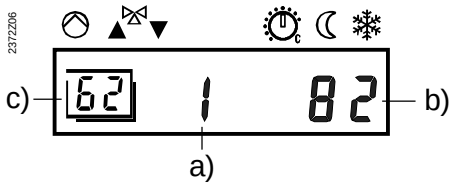
The displays differ according to the signal chosen for input A6, digital or analogue (line 63).
Digital signal: it is possible to display the status of several units. To do this, use the + / - buttons to select the address of the relevant unit. This then makes it possible to read the display.
Analogue signal: the address is not displayed, only the status of the connected unit.

Possible displays

display	*Status*
0 0 0	Telephone switch active / short-circuit
- - -	No communication
55	Analogue room unit QAA 95
82	Digital room unit QAA 50
83	Digital room unit QAA 70
102	BMU hot water tank management unit

Example:

Fig. 76



a) Unit address (display in the presence of a digital signal)
b) Unit identification (see list)
c) Selected programming line

3.5 - Temperature reading error

Special displays

- - -	Sensor cut-off or no sensor connected
0 0 0	Sensor short-circuit

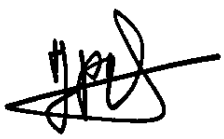
XII - REGULATIONS

1 - DECLARATION OF CONFORMITY

Appendix II article 3.1 of directive 90/396/CEE
Appendix IV module D of directive 92/42/CEE

SERIES:	**THR RANGE**
MANUFACTURER:	**GEMINOX SA** 16 rue des Ecoles 29410 SAINT THEGONNEC - FRANCE
PRODUCT CATEGORY:	**CONDENSING GAS BOILER** **Heating only or heating and domestic water heating**
NOTIFIED BODY:	**0085 / DVGW** Josef-Wirmerstr. 1-3 D - 53123 BONN
TYPE EXAMINATION / IDENTIFICATION No.:	**THR 2-13 C / THR 5-25 C** **THR 5-25 S / THR 5-25 SEP / THR 5-25 M 75** **THR 10-50 / THR 10-100** **THR 2-13 : CE0085AT0244** **THR 5-25 : CE0085AQ0543** **THR 10-50/THR 10-100 : CE0085AR0323**
TEST LABORATORY:	**GWI** HAFENSTRASSE 101 45356 ESSEN
CE DIRECTIVES:	90/396 CEE, 92/42 CEE, 73/23 CEE, 89/336 CEE.
BASIS OF EXAMINATION:	EN 437, PR EN 483, PR EN 677, EN 60335.1, EN 55014, EN 55104.
SURVEILLANCE PROCEDURE:	**Manufacture quality assurance**
DECLARATION:	**The products identified in this document are in compliance with the mentioned directives and the approved type.** **Manufacture is subject to the mentioned surveillance procedure.** **THR boilers are compliant with the requirements applied to condensation boilers.**

Saint-Thégonnec: 27 November 2000



NOVEMBRE 2001

GEMINOX
CHAUDIERES

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