KOTŁOSPAW Sp. z o.o.
ul. Szenica 38
63-300 Pleszew

Water boiler with manual feed

type:

"ŻARKO/Z"

suitable for closed circuit protection

Operating and assembly instructions

Original instructions

Technical and operating documentation
Supplementary guidelines

Thermal output of the boiler … kW
Serial No. .....
Year of construction....

Attention!

- *The boiler is suitable for closed systems with vessels diaphragms for protecting low-temperature water boilers for solid fuels with manual fuel feed.*
- *Failure to properly secure the boiler may result in serious damage to the boiler and danger to the user.*
- *For your own safety, the user should ask the installer to confirm that the boiler is protected in a closed system in accordance with the guidelines given in the DTR.*

The boiler bears the "CE" marking

October 2022

Table of contents

1. Introduction

These operating instructions (DTR) are supplementary guidelines for the installation and operation of boilers of the type: "ŻARKO/Z" made for protection in a closed system with a diaphragm vessel.

For boilers protected in a closed circuit with a diaphragm vessel, the requirements for "ŻARKO" standard boilers also apply as an integral part, excluding the requirements for open circuit protection according to PN-91/B-02413 as well as the results of certification and attestation with regard to meeting the requirements of class 5 of the EN 303-5 standard and ecodesign.

Before installing and operating the boilers in the version for protection in a closed system with a diaphragm vessel, the user is obliged to read the operating manuals of both versions " ŻARKO/Z" and " ŻARKO".

2. Requirements for closed-circuit protected boilers with diaphragm vessels

In accordance with current regulations, boilers of the type: ***"ŻARKO/Z"*** meet the requirements of EU directives *at* the design and manufacturing stage. *In operation, they are subject to the conditions of UDT. In accordance with the* Decree of the *Ministry of Economy and Labour of 9 July 2003, Journal of Laws No. 135, item 1269, boilers of* this type are subject to *simplified or limited technical supervision.*

Boilers with a capacity of *more than 70kW* must be notified in writing by the user to the relevant technical supervision unit before being put into operation, in order to *obtain a decision authorising the equipment to be put into operation.*

The boilers meet the requirements of the EU product safety directives confirmed by a declaration of conformity and marked with the "CE" mark

The boiler equipment and accessories have a product declaration of conformity and a DTR or operating manual, which are integral parts of this DTR. Such requirements must also be met by system accessories, in particular the safety valve and the diaphragm expansion vessel. *The use of fittings and accessories of unknown origin is prohibited.*

3. Boiler protection

Protection of low-temperature water boilers for solid fuels with a heat output up to 300kW using closed systems with diaphragm vessels should meet the range of requirements provided in *EN 12828. Heating systems in buildings. Design of water central heating systems.*

4. Construction and installation of boiler cooling equipment.

Cooling units are the required equipment for the extraction of excess heat from the boiler in accordance with EN 303-5 for the protection of closed-loop boilers.

Excess heat energy is the result of central heating systems failing to take heat from the boiler due to interference or failure.

In boiler operation, an emergency situation may be the consequence of e.g. an electrical power failure

and other damage or interference with heat extraction, e.g. pump circuits, radiator thermostatic valves, etc. In pump circuits, the central heating water system has relatively small pipe diameters and heat extraction by gravity is further impeded.

As a result of the lack of, or significantly reduced, heat extraction, the combusted fuel causes a temperature rise in the boiler and generates additional unclaimed heat energy. According to EN 303-5, the size of the excess heat removal device - a protective heat exchanger - should be adapted to the structural and thermal characteristics of the boiler.

For boilers with manual fuel charging, the thermal output of the cooling device is equal to the nominal output of the boiler.

For the protection of boilers of the type: ***"ŻARKO/Z"*** in a closed system, the manufacturer envisages the use of:

Thermal protection - pressure relief and filling valve type: SYR 5067
or thermostatic safety valve type: DBV 2

The cooling equipment used for boilers of the ***"ŻARKO/Z"*** type must comply with the requirements of standard EN 303-5, point 4.3.8.3-4.

4.1 Installation requirements

The "ŻARKO/Z" boiler is equipped with basic connections (supply and return, drain, temperature regulator - draught measurer, thermometer (thermo-manometer) and safety valve connection.

Once the boiler has been set up and connected to the chimney, the additional equipment required for closed system protection according to EN 303-5, EN 12828 must be installed on the boiler.

The boiler, which is equipped as standard with a temperature regulator and draught measurer, must be fitted with a draught and fill valve, safety valve and diaphragm vessel.

5. Bleed and fill valve.

For boilers of the "ŻARKO/Z" type, it is necessary to use as a cooling device a thermal protection device with an appropriate heat output for the given boiler size.

Based on the design and requirements in accordance with standard: EN 303-5 and other technical specifications, the following have been selected for each boiler output as cooling devices - bleed and fill valve type: SYR 5067 or thermal protection valve type: DBV 2 The cooling valve is connected to the heating system supply and to the cold water intake. When the temperature reaches a critical value to lower it, the valve opens and bleeds the necessary amount of hot water while allowing cold water to circulate.

The water flow through the cooled boiler should be adequate It must not be too low, but also not too intensive. A stable, optimum flow is ensured by a pressure regulator integrated in the valve. *Rapid cooling of the boiler can lead to damage.*
The recommended optimum cooling water flow through the valve is given in Tables 1 and 2

The thermal protection device should be installed in close proximity to the boiler directly to the supply

and return connections. The discharge from the valve should be connected safely to the waste water system. It is important that the supply connection spigot is connected directly to the water system, without intermediate shut-off elements (valves).

Attention!
The hot water drain must be secured and discharged to the sewer.
The use of an additional hot water outlet cooling system from the boiler is recommended.

5.1 Type SYR 5067 thermal protection valve

The valve type SYR 5067 consists of a non-return valve, a pressure regulator, a filling valve and a discharge valve thermally controlled by a temperature sensor with a capillary. The operation of the valve is based on the direct admission of cold water from the mains (without diaphragm exchanger) to the boiler water charge and the simultaneous discharge of hot water from the boiler. In the event of a sensor failure, the entire unit will perform its functions continuously.

When the set opening temperature is exceeded (e.g. 90 °C), the filling valve connected to the boiler return starts to open to maintain stable pressure. The ejection valve connected to the boiler supply port opens at a higher temperature of a few °C. When the ejection valve is opened, hot water flows out of the heating system and cold water can flow in from the supply line, thus cooling the boiler. When the boiler is lowered and the correct safe temperature is reached, the ejection and filling valves are closed.

5.2 Thermostatic safety valve type: DBV 2

The DBV 2 valve has two levels - the lower level is used to drain heated hot water, the upper level is used to introduce cold water into the heat source and thus cool it down.
The valve is controlled by two independent thermostatic actuators. When the limit temperature is reached, a drain valve is opened simultaneously to allow the superheated water to be discharged into the sewer system and an inlet valve to open the mains water supply. When the temperature falls below the limit value, both valves are closed simultaneously. The valve will discharge sufficient heat even if one of them fails.

According to the statement of the manufacturer of the DBV 2 valve (company "Regulus"), "*The valve has been approved in accordance with Directive 97/23/ EC (PED)- (*now2014/68/EU) *its design meets the requirements for excess heat removal equipment according to para. 4.3.8.4 of EN 303-5:2012 and is a type Th STW device in accordance with EN 14597:2012."*

5.3 Installation of thermal protection

In order to fit a thermal protection device to the boiler, type SYR 5067 or DBV 2, connect the filling valve stub to the mains water source and boiler return connector, and the bleeder valve stub to the boiler feed connector and drainage connector.
The installation diagram is shown in Figures 1a and 1b.

5.4 Technical data

The given parameters refer to the boiler protection system for cooling devices - valve type: SYR 5067 or DBV 2 - Table 2.

Table 1

Thermal protection valve type: SYR 5067 for "ŻARKO/Z" boilers

Boiler type		"ŻARKO/Z"				
Boiler output	[kW]	12	16	20	24	28
Cooling water flow - required	[m^3 /h]	0,14	0,18	0,23	0,27	0,32
	[l/min].	2,27	3,02	3,78	4,53	5,29
Drop in boiler water temperature	[°C]	9	9	9	9	9
Cooling time of the boiler water	[min].	5,0	5,0	5,0	5,0	5,0
Boiler water cooling rate	[°C/min].	1,8	1,8	1,8	1,8	1,8
Cooling valve type		SYR 5067				
Number of valves	[pcs.]	1	1	1	1	1

Table 2

Thermal and technical parameters thermostatic safety valve type: DBV 2 for "ŻARKO/Z" boilers

Boiler type		"ŻARKO/Z"				
Boiler output	[kW]	12	16	20	24	28
Cooling water flow - required	[m^3 /h]	0,12	0,17	0,21	0,25	0,29
	[l/min].	2,07	2,77	3,46	4,15	4,84
Drop in boiler water temperature	[°C]	4	4	4	4	4
Cooling time of the boiler water	[min].	3,0	3,0	3,0	3,0	3,0
Boiler water cooling rate	[°C/min].	1,3	1,3	1,3	1,3	1,3
Cooling valve type		DVB 2				
Number of valves	[pcs.]	[1]	[1]	1	1	1

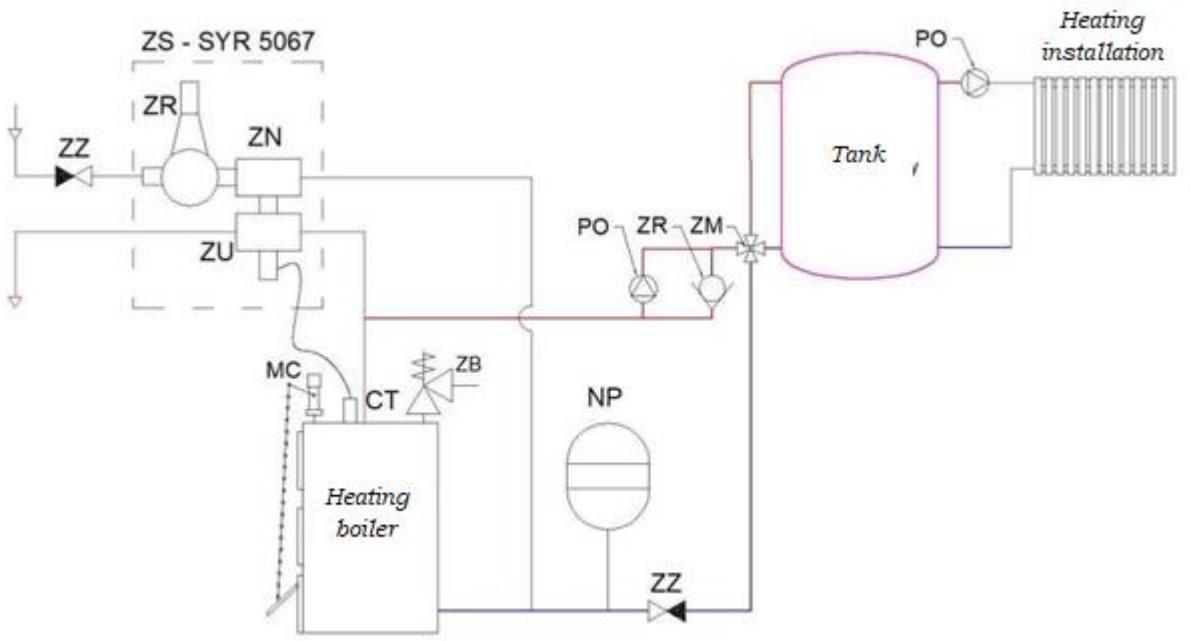
The cooling valves have been sized so that the water flow through the valve is less than its catalogue capacity, which ensures that the boiler water is cooled and excess energy is compensated for.

The required cooling water flow meets the throughput capacity of the SYR 5067 thermal protection device, which, according to catalogue data, is 0.58 m3/h (9.7 l/min) at the smallest setting and parameters, while the valve type: DBV 2 is 1.3 m3/h (21.7 l/min),

Tables 1 and 2 show the required valve capacities to achieve the assumed boiler water discharge temperature reduction and cooling down time.

The boiler manufacturer is not responsible for the selection of a different type of cooling valve or thermal protection.

5.5 Installation diagram



Drawing No. 1a - Variant No. 1

Diagram and description of equipment installation for closed-circuit protection with type SYR 5067 thermal protection valve.

ZS- chill valve
ZR - reducing valve
ZN - filling valve
ZU - pressure relief valve
ZO - shut-off valve
MC - thrust throttle
ZB - safety valve
IG - heating installation
NP - diaphragm vessel
PO - circulating pump
CT - temperature sensor

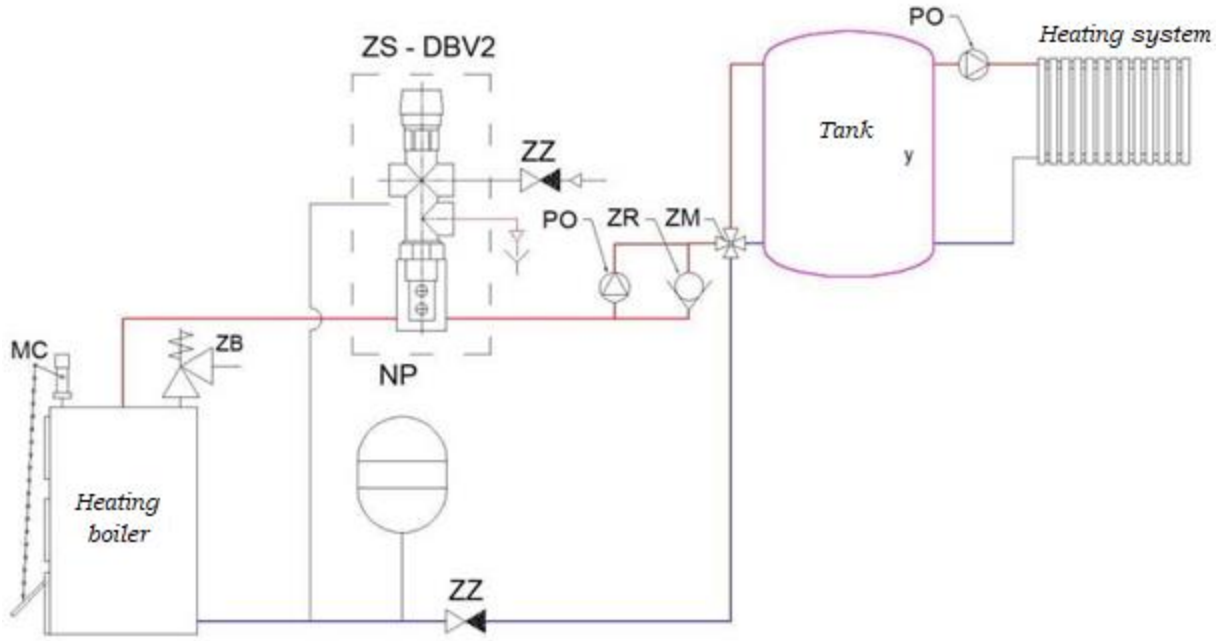
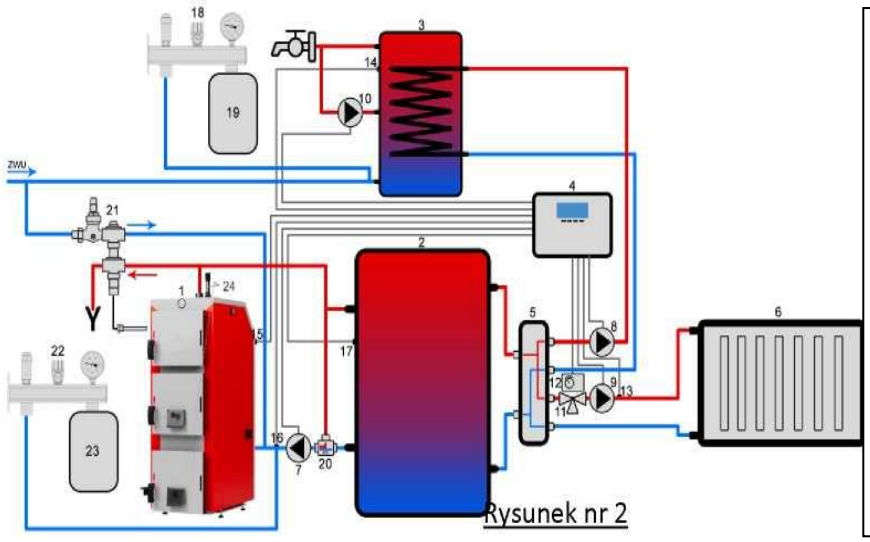


Figure 1b - Variant 2

Diagram and description of the equipment installation for closed circuit protection with thermostatic safety valve type: DBV 2



1 Boiler
2 Buffer
3 WHU storage tank
4 Installation controller
5 Hydraulic distributor (no clutch!)
6 Radiator heating
7 Return protection pump I short circuit
8 WHU tank charging pump
9 Heating pump
10 WHU circulation pump
11 Three-way rotary valve
12 Valve actuator
13 Valve temperature sensor
14 WHU temperature sensor
15 Boiler temperature sensor
16 Return temperature sensor
17 Buffer temperature sensor
18 WHU safety group
19 WHU diaphragm vessel
20 Return protection valve
21 Cooling valve with capillary
22 Safety group
23 Diaphragm vessel
24 Draught meter

Heating installation diagram recommended by the manufacturer

6. Safety requirements

For boilers in a closed system installation, the requirements of EN 12828 and other applicable standards and requirements must be applied.

Stop valves and other devices and fittings may not be installed on the pipelines connecting the cooling valves to the cooling water inlet and outlet.

Operation of the boiler without a safety valve or with an inadequate, inoperative (blocked, fossilised)

safety valve is not permitted, as it is a risk of failure and constitutes a danger to the life and health of people and property. Strictly observe the requirements specified in the installation and operating instructions for the safety valve.

The boiler must be installed in accordance with the aforementioned requirements and applicable regulations by an authorised installation company and the boiler commissioning must be carried out by a trained manufacturer's service.

Any interference or tampering with the safety and control system of the boiler or the connection of additional control devices not included in this manual may result in danger and will void the guarantee.

Repairs and overhaul of the boiler may only be carried out by an installation and service company trained by the manufacturer.

The installation must take into account the guidelines and requirements contained in the DTR for diaphragm vessels, thermostatic valves, safety valves and other boiler and system equipment.

The responsibility for the correct installation of the boiler and its repair lies with the installation and service company, which carries out the initial start-up of the boiler and records this in the boiler warranty card. The condition for maintaining the warranty on the boiler is to return the annotation to the address indicated by the manufacturer.

The use of cooling valves and cooling system accessories of unknown origin and without specifying the required parameters is prohibited.

If the aforementioned requirements and other safety conditions are not complied with, the manufacturer is not liable for accidents and possible consequential damage.

6.1 Safety valve

For boilers of type: "ŻARKO/Z" with rated output: 12 *+ 24 kW* the given types and sizes of safety valves can be used.

SYR 1915 **-** Through hole diameter do = 12, opening start pressure p= 0.2MPa, thread diameter G1/2

781C **-** Through seat diameter do = 16, opening start pressure p =0.2MPa, thread diameter G3/4

WATTS MSL/MSV - habitat diameter up to =13.5 size G1/2 x G3/4

6.2 Diaphragm vessel

The size (volume) of the diaphragm vessel depends on the specific characteristics and parameters of the central heating system. (hydrostatic pressure value and water volume of the installation). For this purpose, the selection guidelines for diaphragm expansion vessels (closed systems) in accordance with PN-EN 12828:2003 - Annex D (extract from this standard - point 9) should be used.

You can also use the diaphragm vessel selection programmes available on websites.

Due to the nature of the closed system and safety, it is recommended that the selection of the diaphragm vessel is made by an authorised designer.

7. Operational requirements

Before commissioning:

Check by the manufacturer's or installer's service the correct operation of all equipment in a closed system with diaphragm vessel. Check by calling up the emergency simulation in a controlled manner, *taking all safety and precautionary measures.*

During operation, the user is obliged to.

- checking the readings of measuring instruments (manometer, thermometer),

- successively check the technical condition of the safety devices and check the function of the boiler protection system devices - safety valve, thermostatic valve, cooling water flow,

- check the cooling system for leaks - any leaks and leaks will cause the pressure in the system to drop and boiler water to flow out of the cooling water outlet port during normal operation,

- a comprehensive check must be carried out at least before the start and in the middle of the heating season by the boiler manufacturer's service department or by an approved heating engineer and confirmed by means of a protocol.

A systematic inspection is a prerequisite for the correct functioning of the safety devices and the safe operation and use of the boiler. A check and inspection by the manufacturer's service department or an authorised heating engineer is recommended at least once per heating season.

8. Operational requirements according to UDT requirements

During operation, boilers installed in a closed system are subject to technical supervision in accordance with the Regulation of the Council of Ministers of 7 December 2012 on types of technical equipment subject to technical supervision (Journal of Laws 2012, item 1468)

Pursuant to the Regulation of the Minister of Economy, Labour and Social Policy of 9 July 2003 on technical conditions of technical supervision as regards the operation of certain pressure equipment (Journal of Laws No. 135, item 1269):

- boilers with a power output less than or equal to 70 kW are covered by the simplified supervision form, and in accordance with Article 15, section 1 of the Act of 21 December 2000 on technical supervision (Journal of Laws No. 122, item 1231, as amended), they do not require a decision authorising their operation issued by a competent technical supervision authority. (Dz. U. Nr 122 poz.1231 as amended) they do not require a decision permitting their operation issued by a competent technical supervision authority.

- boilers of more than 70kW are subject to a form of limited supervision and pursuant to Article 14 of the aforementioned Act the operator should obtain a decision authorising their operation issued by a competent technical supervision authority. the operator should obtain a decision authorising their operation issued by the competent technical supervision authority.

For boilers over 70kW, it is the responsibility of the user to apply in writing to the relevant UDT unit in order to obtain a decision authorising the boiler for operation.

<u>It is forbidden to start up the boiler without a decision from the Office of Technical Inspection authorising its operation!</u>

In accordance with the aforementioned decree of the Minister of the Economy, prior to commencing operation, the user shall report the equipment in writing to the relevant technical supervision unit in order to obtain a decision authorising the equipment for operation.

The operator is obliged to provide technical documentation with the application. The scope of the registration documentation should be in accordance with § 3.2 of the Decree of the Minister of the Economy. In order to fulfil these requirements, the boiler manufacturer is obliged to provide the operator with technical documentation for the appliance in accordance with § 3.2 insofar as it concerns him.

9. Guidelines for the selection of diaphragm expansion vessels (closed systems) in accordance with EN 12828:2003 - Annex D

D.1 General provisions

The following guidelines are recommended when using diaphragm expansion vessels:

a) The location of the expansion vessels in the central heating system determines the neutral point in the system. At this point, the static or total pressure is always constant, regardless of the operation of the circulation pumps. This location should be chosen so that the pressure on the suction side of the circulating pumps is sufficient for their operation, i.e. to protect against cavitation and to keep the temperature load on the diaphragm of the expansion vessel to a minimum. The filling point should be between the connection point of the expansion vessel and the inlet to the circulating pump. The recommended point of connection of the expansion vessel to the system is shown in Figure D.1;

b) Maximum temperature with allowance for exceeding the design temperature. A failure of the safety thermostat can cause the temperature to rise above the highest operating temperature to a higher temperature referred to as the maximum temperature including the design temperature exceedance, $\theta_{max.}$ This maximum temperature in the central heating system occurring during a failure should be used to calculate the vessel size;

c) Initial design system pressure. The initial design pressure in the system, p_O, should be at least equal to the sum of the static pressure height, p_{ST} , and the water vapour pressure, p_D:

$$p_O > P_{ST} + P_D$$

The minimum p_0 value should be equal to 0.7 bar. Determined by practice, the excess added to the static pressure instead of the vapour pressure is equal to 0.3 bar;

d) The final design pressure in the system, p_C should not be higher than the pressure set at the pressure relief valve reduced by the difference in pressure at closing and opening (usually 10% of the pressure set at the pressure relief valve);

e) The static pressure height difference between the position of the expansion vessel and the safety valve should be taken into account;

f) The total capacity of the installation, $V_{system,}$ should be determined. Where accurate calculations cannot be made, a safety surplus should be used to estimate the capacity;

g) The minimum capacity of the expansion vessel, ***vsystem*** should be determined. The method for exact capacity selection given in D.2 should be used. In case the data for the design is not complete, Table D.1 can be used as a guideline for sizing the vessel. Note that the values given in Table D.1 refer to the case of a maximum design limit temperature of 110°C and no reserve water volume, i.e. ***vWR*** **= 0** litres;

h) In cases where a chemical inhibitor is added to the heating medium, e.g. to prevent corrosion in the system, attention should be paid to its effect on the diaphragm and other components of the closed system.

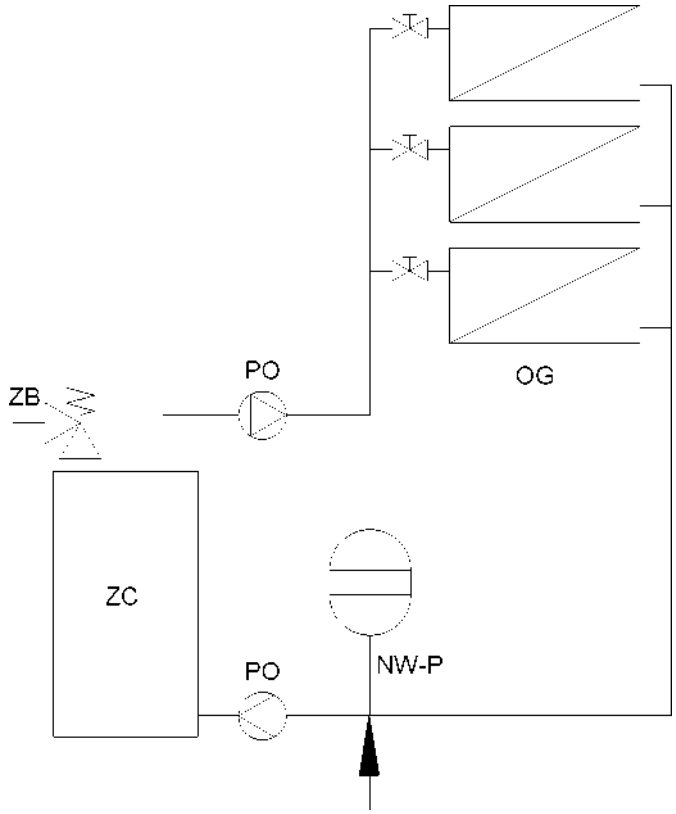


Figure D.1 - Recommended location of an expansion vessel in a central heating system

ZC - Heat source, PO - Circulation pump, OG - Heating circuit, ZB - Safety valve, NW-P - Recommended location for connection of expansion vessel.

D.2 Calculating the size of the expansion vessel

The exact size of the expansion vessel can be calculated as follows:

a) Determine:

- the water volume of the system, ***vsystem*** in litres. It is the total volume of pipes, radiators, heat sources and auxiliary circuits;

- the maximum temperature with respect to exceeding the design temperature, θ_{max} in degrees Celsius (°C);

- relative increase in volume, ***e,*** see Table D.2

Attention.

The addition of antifreeze or similar fluid affects the specific volume of the heating medium and therefore the percentage of expansion, and may also affect the diaphragm material.

- the extension volume ***Ve*** in litres corresponding to the percentage extension and the maximum temperature of the jet in the installation;

$$Ve = e \cdot \frac{V_{system}}{100}$$

- Water reserve volume, v_{WR}, in litres. In addition to the water capacity due to thermal expansion, the expansion vessel should have a minimum water reserve to compensate for possible water losses in the system. An expansion vessel with a capacity of less than 15 litres should have at least 20% of its capacity as water reserve. An expansion vessel with a capacity greater than 15 litres should have a water reserve of at least 0.5% of the total water content of the system, Vsystem at least 3 litres;

- static pressure, p_{ST}, in bar.

NOTEMarket available expansion vessels designed for residential central heating systems are pre-filled with air during their manufacture to pressures of 0.5 bar, 1.0 bar or 1.5 bar.

b) The total volume of the expansion vessel, Vsystem in litres, can be calculated from the relationship:

$$V_{exp\ min} = (V_e + V_{WR}) \cdot \frac{p_e + 1}{p_e - p_0}$$

c) In order to obtain a water reserve, v_{WR} in a system filled with cold water, the initial pressure, $p_{a\ min}$ (filling the system) should meet the following condition:

$$p_{a\ min} \geq \frac{V_{exp\ min} \cdot (p_0 + 1)}{V_{exp\ min} - V_{WR}} - 1$$

In which $v_{exp\ min}$ is the volume of the selected expansion vessel in litres.

d) In order to prevent the final pressure, ***Pe*** at the maximum temperature taking into account the design overrun, the initial pressure, $p_{a\ max}$ (system filling pressure) should meet the following condition:

$$p_{a\ max} \leq \frac{(p_e + 1)}{1 + \frac{V_e \cdot (p_e + 1)}{V_{exp\ min} \cdot (p_0 + 1)}} - 1$$

Table D.1 - Capacities of expansion vessels in a central heating system ($\&_{mm}$ = 110°C, V_{WR} = 0 l)

Safety valve setting	3.0 bar			2.5 bar			2.0 bar	
The initial load pressure of the vessel, $_{after}$	0.5 bar	1.0 bar	1.5 bar	0.5 bar	1.0 bar	1.5 bar	0.5 bar	1.0 bar
Total water content of the installation, V_{system} litres	**Container capacity/ expansion vessel**							
	litres	litres	litres	litres	litres	litres	litres	litres
25	2,1	2,7	3,9	2,3	3,3	5,9	2,8	5
50	4,2	5,4	7,8	4,7	6,7	11,8	5,6	10
75	6,3	8,2	11,7	7	10	17,7	8,4	15
100	8,3	10,9	15,6	9,4	13,4	23,7	11,3	20
125	10,4	13,6	19,5	11,7	16,7	29,6	14,1	25
150	12,5	16,3	23,4	14,1	20,1	35,5	16,9	30
175	14,6	19,1	27,3	16,4	23,4	41,4	19,7	35
200	16,7	21,8	31,2	18,8	26,8	47,4	22,6	40
225	18,7	24,5	35,1	21,1	30,1	53,3	25,4	45
250	20,8	27,2	39	23,5	33,5	59,2	28,2	50
275	22,9	30	42,9	25,8	36,8	65,1	31	55
300	25	32,7	46,8	28,2	40,2	71,1	33,9	60
325	27	35,7	50,7	30,5	43,5	77	36,7	65
350	29,1	38,1	54,6	32,9	46,9	82,9	39,5	70
375	31,2	40,9	58,5	35,2		88,8	42,3	75
400	33,3	43,6	62,4	37,6	53,6	94,8	45,2	80
425	35,4	46,3	66,3	39,9	56,9	100,7	48	85
450	37,5	49	70,2	42,3	60,3	106,6	50,8	90
475	39,6	51,8	74,1	44,6	63,6	112,5	53,6	95
500	41,6	54,5	78	47	67	118,5	56,5	100
Multiplier for other plant capacities	0,0833	0,109	0,158	0,094	0,134	0,237	0,113	0,2

Table D.2 - relative volume increase, ***e*** , in relation to maximum temperature taking into account design temperature exceedance (filling temperature 10°C - design water volume temperature 4°C)

Maximum temperature including design temperature	**Relative volume increase e**
°C	%
30	0,66
40	0,93
50	1,29
60	1,71
70	2,22
80	2,81
90	3,47
100	4,21
110	5,03
120	5,93
130	6,9

Attention!

These guidelines do not limit the selection of diaphragm expansion vessels in closed systems according to other commonly used standards and regulations that meet the safety requirements in this area. It is recommended that the selection is made by an authorised designer.

10. Residual risk

Although the manufacturer takes responsibility for the design and labelling of the boiler to eliminate

hazards during operation as well as during operation and maintenance, some elements of risk are unavoidable. Residual risks arise from erroneous or inappropriate behaviour on the part of the boiler operator, so basic safety principles and rational behaviour should be followed in all situations.

In assessing and presenting the residual risk, the boiler is treated as a device which, up to the point of production, has been designed and manufactured according to the current state of the art in accordance with recognised engineering practice and the requirements for protection in a closed system.

In order to draw the attention of the user and operators, the boiler is marked with the appropriate symbols, signs and notes in the DTR about the dangers involved and the impermissible methods of use - which the user must observe without fail.

10.1 Causes of residual risk and ways to address them

A residual risk exists if the listed recommendations
and instructions in the DTR of the boiler and its accessories are not followed.
The greatest danger exists
when carrying out the prohibited activities:

Using the boiler for purposes other than those described in the DTR.

- *A boiler used for other purposes and operated improperly can cause danger to life, property and the environment with associated irreversible consequences.*
- *The boiler must be operated in accordance with its intended use. The instruction manual specifies the requirements and conditions for safe operation. Therefore, it is obligatory for operators of the boiler to familiarise themselves with its contents as well as with the instructions for the standard equipment and the cooling system (thermal protection valve, safety valve, diaphragm vessel).*

Failure to meet the requirements for a closed security system

- *Boiler protection in a closed system with diaphragm vessel in accordance with EN 12828 and its confirmation by the installer.*
- *For boilers over 70kW, written notification to the relevant UDT unit to obtain a decision authorising the boiler for operation.*

Operation by minors as well as by persons not acquainted with the DTR and the instructions for operating the equipment and not trained in health and safety.

- *Observe all requirements and prohibitions for operation specified in the DTR of the boiler type: ŻARKO/Z,*
- *It is strictly forbidden to operate the boilers (above 50kW) by persons without a valid licence and by minors, unshod, under the influence of alcohol or other intoxicants.*

Leaving the boiler unattended and unattended during operation

- *Carry out checks on the combustion process as required, at least several times a day, and successively check the operation of the safety system of the cooling system.*
- *Equip boiler rooms with a chad and smoke detector.*

Unauthorised modifications of any kind

- *Prohibit tampering with the boiler and equipment design and protection system,*
- *The heating installation and security system can only be carried out by a specialist installer,*
- *Carry out any repairs to the electrical installation and check the effectiveness of the socket*

neutralisation only by an authorised electrician,

Lack of required care and distraction during handling

- *Prohibit putting hands into dangerous and forbidden hot areas of the boiler and operating the boiler without protective equipment (gloves, goggles, headgear),*
- *Prohibit operation of the boiler with open doors or covers of openings and hatches.*

Prohibition of installation of inappropriate boiler equipment

- *cooling valves of unknown origin and not complying with the requirements, safety valves and other accessories specified in the DTR.*
- *Shut-off valves on the inlet and outlet of the cooling system*

11. Boiler protection system equipment in a closed system.

Table 3 shows the set of equipment of the "ŻARKO/Z" boilers adapted for protection in a system with a diaphragm vessel**.**
The boilers should be equipped with a safety valve, a bleed-cooling valve with parameters according to Table 3 below.

Table 3

Set of fittings and accessories for boilers adapted for closed system protection *with a diaphragm* vessel						
Water boiler *with* manual feed "ŻARKO/Z"						
Boiler power kW		12	16	20	24	28
Safety valve						
Safety valve type	SYR 1915	Through hole diameter up to =16mm, G1/2				
	781C	Through hole diameter up to =12mm, G3/4				
	WATTS	Through hole diameter up to =13.5 mm, G1/2xG3/4				
	MSL/MSV					
Opening pressure	MPa	0,20				
Chill-fill valve SYR 5067						
Cooling water flow	l/min	2,27	3,02	3,78	4,53	5,29
Number of valves	pcs.	1		1	1	1
Thermostatic safety valve type: DVB 2						
Cooling water flow	l/min	2,07	2,77	3,46	4,15	4,84
Number of valves	pcs.	1	1	1	1	1
Diaphragm vessel						
Total volume of the expansion vessel Filling pressure of the system		The size and parameters of the diaphragm vessel should be determined on the basis of: Calculation according to EN 12828:2003 Annex D or Table D1 2. manufacturer's selection programme for diaphragm vessels				

Confirmation of boiler protection
in accordance with EN 12828:2003

Boiler: ŻarKo .....
Type /Model No. / Year of manufacture

Installer:
company name

installer's name

address/telephone

User: .....
Company/name

address/telephone

It is confirmed that the above mentioned boiler has been installed in a closed system meeting the requirements of *PN-EN 12828:2003. Heating installations in buildings. Design of hydronic central heating systems.* and has been equipped with basic protection elements (type, type, size):

- Diaphragm vessel

- Safety valve*

- SYR 1915 to = 16
- 781C 1915- to = 12
- WATTS MSL/MSV do=13.5

- relief and filling valve*.

- Type SYR 5067 thermal protection valve
- Thermostatic safety valve type: DBV 2

** - delete as appropriate*

Other regulations, standards, requirements applied:

Installer

Signature and stamp

KOTŁOSPAW Sp. z o.o.

DECLARATION OF CONFORMITY

Person representing the above company authorised to issue technical documentation: ***Przemyslaw Wroński*** By signing this document we declare with full responsibility that the manufactured by our company: *Ecological water boiler with manual feeding.* ***"ŻARKO/Z" -*** low-temperature adapted for protection in a closed system with a diaphragm vessel.

Type: **" *ŻARKO/Z*"**
Power ..... kW
Model No. .....
Year of construction

to which this declaration relates complies with the requirements of the following EU directives, legislation, regulations and standards and recognised engineering practice to ensure safety:

DIRECTIVE 2006/42/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL
of 17 May 2006 on machinery (OJ L.152/43 of 09.06.2006) amending Directive 95/16/EC (recast)
DIRECTIVE 2014/68/EU OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL
of 15 May 2014 on the harmonisation of the laws of the Member States relating to making available on the market of pressure equipment (Article 4(3)) (OJ L.189/164 of 27.06.2014)
REGULATION OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL (EU) 2017/1369
of 4 July 2017 establishing a framework for energy labelling and repealing Directive 2010/30/EU (OJ L-198/1 of 28.07.2017)
DIRECTIVE 2009/125/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL
of 21 October 2009 establishing a framework for the setting of ecodesign requirements for energy-related products (OJ L 285/10 of 31.10.2009).
COMMISSION DELEGATED REGULATION (EU) 2015/1187
of 27 April 2015 supplementing Directive 2010/30/EU of the European Parliament and of the Council with regard to energy labelling of solid fuel boilers and kits comprising a solid fuel boiler, additional heaters, temperature controllers and solar thermal equipment (OJ L.193/43 of 21.07.2015) ***COMMISSION REGULATION (EU) 2015/1189***
of 28 April 2015 implementing Directive 2009/125/EC of the European Parliament and of the Council with regard to ecodesign requirements for solid fuel boilers (OJ L.193/100 of 21.07.2015)
Regulation of the Minister of Development and Finance on requirements for solid fuel boilers Journal od Laws2017 item 1690 as amended ***Journal od Laws2019 item 363,***
Journal of Laws. 2019 item 2549
including on the basis of a declaration of conformity of the boiler equipment
DIRECTIVE OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL2014/35/EU
of 26 February 2014 on the harmonisation of the laws of the Member States relating to the making available on the market of electrical equipment designed for use within certain voltage limits (OJ L.96/368 of. 29.03.2014)
DIRECTIVE OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL 2014/30/EU
of 26 February 2014 on the harmonisation of the laws of the Member States relating to electromagnetic compatibility (recast) (OJ L.96/79 of 29.03.2014)
based on the following standards and technical specifications adopted for evaluation:
EN 303-5. Solid fuel heating boilers with manual and automatic fuel feed up to 500 kW nominal output. Definitions, requirements, tests and markings.
EN 12828 Heating installations in buildings. Design of hydronic central heating systems.
EN ISO 12100 Safety of machinery. General principles for design. Risk assessment and risk reduction
WUDT-UC. Conditions of the Office of Technical Inspection - pressure equipment
The boiler has:
EU Design Examination Certificate Module B No.
Certificates and test certificates for ecodesign and EN 303-5

The boiler bears the "CE" marking

Company owner

Place, date

Signature of authorised signatory