

# LK Manifold RF

## DESIGN

LK Manifold RF is made of stainless steel, the variants having 1 to 12 floor heating circuits. The manifold is delivered pre-mounted in brackets. The manifold has thermometers on the supply and return, manual air-bleed valves and filling/drain valves\*.

\* Does not apply to VKF RF 1

The upper manifold marked FLOW (supply) is fitted with flow indicators graded from 0,5-5 l/min and adjustment valves for the adjustment of individual circuit flows. The flow indicators are made of temperature and impact resistant plastic. The plastic is resistant to anti-freeze, as well as glycol and ethanol with up to 50% mix.

The lower manifold marked RETURN has hand actuators for shutting off individual circuits. The hand actuators are normally replaced with LK Actuator, see LK Actuator heading.

Primary flow and return can be connected from the left or right-hand sides. The manifold is ready to be connected to the right-hand side on delivery. Connection from the left is done by removing the end cap assemblies.

Marking plates for identifying individual floor heating circuits, assembly instructions and a protective bag used to protect the manifold from e.g. splashes of concrete during the assembly period are enclosed.

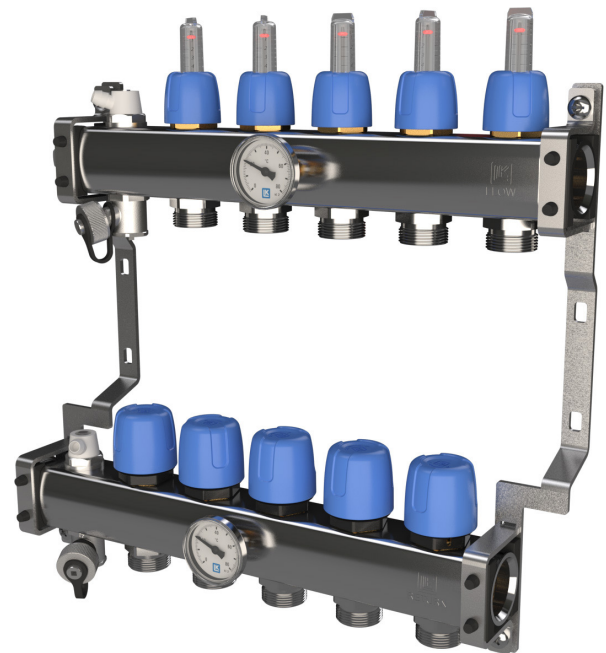
## REQUIREMENTS

We recommend weather compensation control of the supply line temperature and balancing of the primary and secondary flows, for the under floor heating system to function properly.

Further, we recommend recording settings for future reference.

## DOCUMENTATION

Settings and values/the flow must be recorded in the self-test document, which is enclosed with instructions for operation and maintenance. There is also a template for self-testing in the installation documents supplied by LK.



LK Manifold RF, 2-12 circuits.



LK Manifold RF, 1 circuit.

## GENERAL INSTRUCTIONS

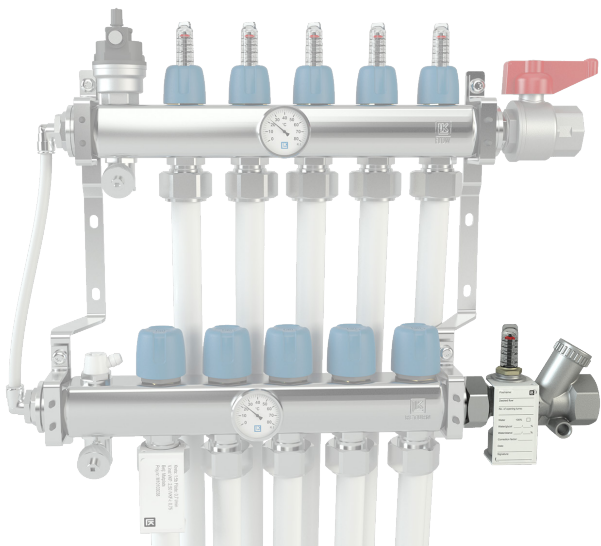
Begin by reading through this assembly instruction and the assembly instructions for the under floor heating system.

## LK BALL VALVE

The supply and return lines on the manifold must be equipped with an isolation ball valve. For more information about the return line, see instructions under adjustment valve.

## ADJUSTMENT VALVE

During the laying process involving two or more manifolds, or during connection to a mixed system, all returns from manifolds should be fitted with adjustment valves, e.g. LK OptiFlow Evo II. This is to enable the total flow to the respective manifold to be adjusted correctly. Even during laying involving 1 manifold, the adjustment is made easier if the adjustment valve is fitted. The adjustment valve can be mounted to the manifold, or alternatively to the heat source if there are separate return pipes from the respective manifold.



*Adjustment valve LK OptiFlow Evo II*

Adjustment and isolation valves can also be assembled to group manifolds where necessary, e.g. LK Qmax, see separate instructions for group manifold LK Qmax. This is a normal procedure on larger installations.

## LK CONNECTION COUPLINGS RF

For pipe connection to LK Manifold RF there are compression fittings for LK Under Floor Heating Pipe and LK Universal Pipe in PE-X and PAL for dimensions 12, 16, 20 mm and press connection couplings for dimensions 16 and 20 mm.

## LOCATION OF LK MANIFOLD RF

The LK Manifold is assembled at designated place according to drawing. If the manifold is to be assembled in LK Manifold Cabinet, see below.

## LK MANIFOLD CABINET

LK Manifold is positioned with a manifold in the LK Manifold Cabinet. The cabinet comes in two different designs; LK Manifold Cabinet GV and LK Manifold Cabinet. The LK Manifold Cabinet GV has been designed in accordance with the standards of Swedish industry, see section *LK Manifold Cabinet GV*.

### LK Manifold Cabinet GV

The LK Manifold RF is intended to be mounted in the LK Manifold Cabinet GV. The cabinet is available in three different sizes for recess-mounting into a wall. Using the LK Base accessory, the cabinet can also be mounted on a wall. The cabinet is fitted with a water-tight base with rubber pipe grommets, meaning that any water leakage can be directed to a specific place, in accordance with Swedish industry standards. The rear of the cabinet is equipped with mountings that have been designed to work with the brackets of the heating circuit manifold that is used to regulate the temperature of a room.

Frame and hatch are delivered as a separate article. The hatch is delivered with a screwdriver lock as well as a key lock accessory.

## LK BY-PASS RF

A lower circulation flow may be necessary to ensure the function of the circulation pump when all circuits are fitted with thermoelectric actuators. The manifold should then be fitted with a by-pass. There are two types, LK By-Pass RF and LK By-Pass Delta P RF.

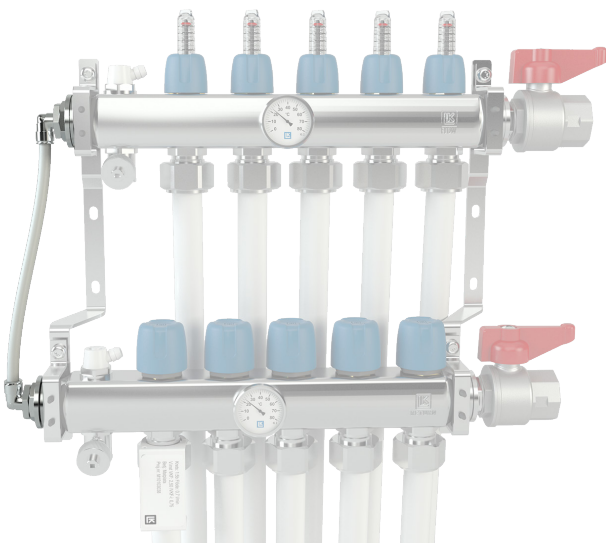
The former provides a small continuous "leak flow" via a fixed throttle, Kvs 0.05, from the supply to the return pipe.

The other type is LK By-Pass Delta P RF which has an adjustable differential pressure valve. When the actuator (or multiple actuators) close the return valves the differential pressure rises.

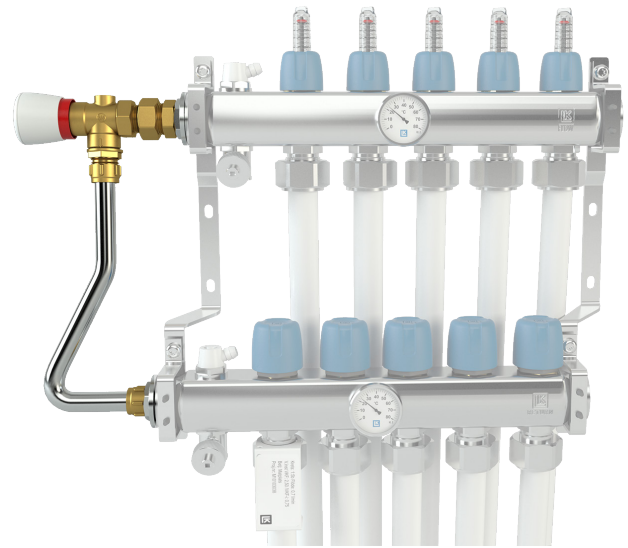
The differential pressure valve thereby opens, and the pressure differential over the valves is reduced by the appropriate degree. Both by-pass types can be assembled as desired on the right or left of the manifold.

In case the LK Connection Box or the LK ICS Receiver are assembled with connected pump logic then a by-pass flow is not necessary. The connection box/receiver controls the circulation pump so that it remains with closed valves.

In cases where any of LK's shunt groups with automatic speed-controlled pump is assembled, no by-pass is needed. The pump adjusts the speed/flow to the requirement of the system.



*LK By-Pass RF mounted on LK Manifold RF.*



*LK By-Pass Delta P RF mounted on LK Manifold RF.*

## LAYING THE PIPES

Lay out the pipe according to the attached installation diagram and mark the circuits with the number and name as per the diagram, use the enclosed marking plates. Begin laying the pipes by connecting the feed pipe to the upper stem of the manifold. Give attention to the direction of the flow in the circuit so that the supply line (out going flow) is nearest to the outside wall(s). Pipe bend supports on all pipe is needed up to the connection to the manifold. Pipe decoiler is helpful when laying pipes.

## PIPE CONNECTION WITH COMPRESSION FITTINGS

To connect the pipes to the manifold first adjust the pipe length, and then assemble the connection coupling according to the illustration below. Lubricate the compression olive. Make sure that the O-rings are not lubricated. Use LK Connection Coupling RF which is made/adapted to the LK Manifold and LK Heating Pipe, LK Universal Pipe and LK PAL-pipe. The insert has an assembled fibre washer to separate the PAL pipe's aluminium layer from the brass of the pipe insert which could otherwise result in corrosion. Pipes should always be cut with a pipe cutter so that the cut is straight.

After a pressure and hot water testing operation with heat, the couplings shall be retightened.



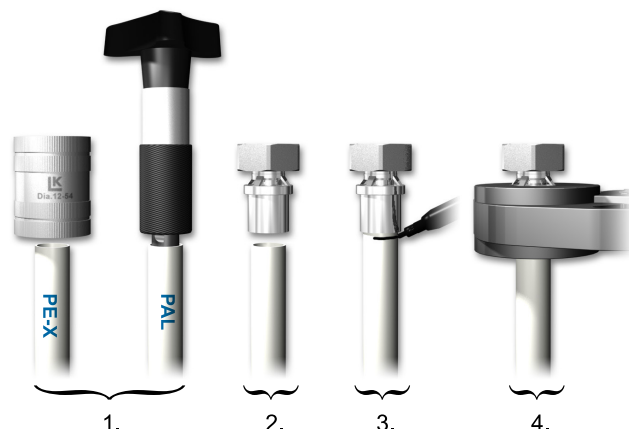
Pipe connection with LK Connection Coupling RF.

### PIPE CONNECTION WITH PRESS CONNECTION COUPLING

To connect the pipes to the manifold first adjust the pipe length, and then assemble the press connection coupling according to the illustration below. The pipe ends should be bevelled so that the O-rings on the coupling's insert sleeve are not damaged. For PE-X pipes a standard pipe deburrer is used for bevelling according to the illustration below. For PAL pipes LK's PressPex calibration tool should be used for simultaneous bevelling and pipe calibration. The bevelled pipe ends are inserted into the coupling towards the first O-ring, and then with a gentle twist down to the base of the coupling.

NB! Check that the pipe has touched the bottom of the coupling via its inspection hole. Mark the insert depth to ensure that the pipe has not slipped out before pressing is commenced. Check that the jaws are cleaned and that the lock pin is completely inserted in the machine's grip. Use the jaws marked KSP11/LK or TH for the intended pipe dimension. The press tool is put in place and the automatic pressing can begin. NB! The jaws must be directed at right angles towards the coupling during pressure. Pay attention to ensure that no foreign objects are present which may prevent the jaws from joining completely.

Before the work is concluded all couplings should be checked so that no coupling is unpressed.

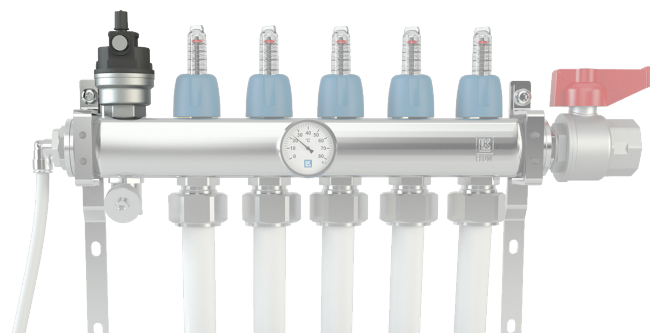


For the PE-X pipe a standard pipe deburrer can be used. For PAL pipes LK's PressPex calibration tool should be used for simultaneous bevelling and pipe calibration

### LK AUTOMATIC AIR VENT RF

The manual air-bleed valve can, if so desired, be replaced with an automatic air-bleed valve\*. The automatic air-bleed valve makes air bleeding easier during start up of the system. LK Automatic Air Vent RF has two air screws, one manual for quick air bleeding on the top of the air-bleed valve, as well as an air screw on the side for automatic air bleeding. The air vent should be closed approx. 1 month from the start up of the heating system.

\* not possible for Manifold RF, 1 circuit



### CHARGING AND VENTING

Applies to Manifold RF, 2-12 circuits

Before the heating system is filled up you should ensure that the respective floor heating circuit is not affected by the system being filled up, close the supply and return valve for the respective circuit. If necessary, the system can be filled via the manifold's filling and draining valve.

Bleed the heating system sufficiently before filling of the manifold commences.



Execute the steps below for the filling/air bleeding of the floor heating system:

1. Close the isolation valves to the supply and return pipes to the manifold.
2. The adjustment valves on the upper manifolds should be closed, i.e. screwed at the bottom. Lift of the blue hood and close the valve by hand (tools, e.g. polygrip must not be used).
3. The hand actuator on the lower manifold must also be closed.
4. Connect the water pressure to the filler valve on the upper manifold.
5. Connect the hose to the corresponding valve on the lower manifold. The hose is pulled towards the floor drain or collection vessel.
6. Open the valves on the fill and drain valves. Then gently release the water pressure.
7. First open the adjustment valve which is furthest away from the filling.
8. Then carefully open the corresponding hand actuator on the lower manifold and flush through the circuit until all the air is gone. This is a way of simultaneously checking that the circuits are both correctly connected to the manifold.
9. Then close the hand actuator, first of all, followed by the adjustment valve.
10. Repeat the procedure circuit by circuit until all of them are air-bled.
11. Close the fill and drain valves. Shut down water pressure, disconnect the hoses and screw the valve protective cap.
12. Open the isolation valves towards the supply and return pipes to the manifold and bleed the manifold via its manual air bleed valves.
13. Then restore the adjustment valves and hand actuator for the respective circuit.

## SEALING TEST/LEAK TIGHTNESS

Sealing test/leak tightness of LK Manifold with connected floor heating circuits is carried out as described below.

Tightness testing with water or gas should be conducted in accordance to national regulations. Tightness testing with gas should only occur in exceptional cases as this testing method can involve risks to personal safety. Please note that tightness testing with gas may only be carried out by an accredited/company.

Tightness testing is carried out before assembly of any actuators, with all of the valves fully open.

Tightness testing should be carried out with 9 bars water pressure. The pressure should be maintained for 30 min, and there after being reduced to 4.5 bar. This pressure will remain for 90 minutes without the pressure being lowered. However, slight variations in the pressure may arise due to changes in the temperature by the medium and surrounding ambient, as well as due to the elasticity of the plastic pipe.

If press fittings are used the sealing test should be preceded by an additional leak tightness test according to Sweden's plumbing safety regulations. The pipes are pressurized to a control pressure of 3 bar for at least 30 minutes. All joints should be inspected. The pressure must not drop during the control time. Then proceed with sealing test as described above.

- Appoint an expert to lead the work and to draw up the test report. The report should be attached to the documents for operation and maintenance.
- Ensure that the installation and all actuators, fixings, supports etc can bear the strain during tests.
- If there is a risk of freezing the system should be protected against frost with a mix of ethylene or propylene glycol. An ethanol mix can also be used, however you should consider the resistance to ethanol mix of the heating system's other components. The mix ratio should be according to the manufacturer's instructions.
- Before the unit is operated the system should be flushed clean of any anti-freeze. Note that other equipment in the heating system can be frost protected from the factory and contain small amounts of antifreeze. Remember to dispose the flushed out glycol emulsion in an environmentally friendly manner. Ensure that all joints are visible and dry.

- Ensure that the measuring equipment is working correctly.
- In tests with water the pipe system should be filled with water, air-bled and then pressurised to the value indicated.

During the time indicated for the tightness testing all coupling points should be inspected in particular to:

- Ensure that there is no "drip leakages". This inspection is very important because such leakages cannot always be identified by the manometer on the pressure equipment.
- Ensure that all compression fittings are controlled, and that all PressPex fittings are pressed.

Guidance for installation in existing heating systems. If the new installation cannot be separated from the existing heating system during the sealing test, the test should be carried out with the working pressure of the existing heating system.

#### Tightness testing with air, low pressure

- A method devised by VVS Företagen (the Swedish Association of Plumbing and HVAC Contractors) and Säker Vatten AB

If there is a risk of freezing or bacterial growth before a pipe system is to be commissioned, carrying out tightness testing using water is impractical. Industry regulations Säker Vatteninstallation displays on its website [www.sakervatten.se](http://www.sakervatten.se) how a simplified tightness test with air can be performed.

Note! Under no circumstances may this method be performed with a test pressure higher than 1.1 bar, and it does NOT replace the mandatory tightness test.

Carefully follow the document "Förenklad täthetskontroll med luft för vissa rörsystem" (Simplified tightness testing with air for certain piping systems). Use testing protocols, that are available to download from [www.sakervatten.se](http://www.sakervatten.se).

Note! The system must be depressurized immediately when tightness testing is complete.

#### Screed and concrete floors (embedding)

The pipe system must be pressurised when embedding the pipes in screed and concrete. This is to ensure that no damage occurs during the work. Pay attention to the danger of freezing when embedding PE-X pipes in concrete.



As the concrete cures, high temperatures can occur in the concrete. In order to avoid damage to the pipe caused by excessive pressure in connection with the concrete curing, a 10 bar safety valve must be mounted on the manifold. Use, for example, LK 514 MultiSafe G15, 10 bar which is mounted where the manual air-bleed valve is fitted. Before bringing into operation, remove the safety valve from the manifold.

#### Other floor types

When laying flooring on timber joist floors, floating floors or similar, piping must remain under pressure to ensure that no damage occurs.

#### ADJUSTMENT OF THE CIRCUIT FLOW

Always begin by ensuring that all of the manifold's return valves are fully open. Then adjust the manifold's adjustment valves. Lift of the blue hood and adjust the valve by hand (tools, e.g. polygrip must not be used). The adjustment value for each circuit is given from the print out of the LK Calculation Program. The adjustment values are indicated in the number of opening revolutions.

In installations where more than one manifold is installed the respective manifold's total flow should be adjusted after the adjustment of the circuit flows. The adjustment is carried out on the manifold's group valve LK OptiFlow Evo II (optional), or similar. Begin the adjustment with the manifold which is closest to the circulation pump. The total flow can be identified from the calculation printout from LK.

Thereafter the manifold's circuit flow is fine-tuned with the help of the integrated flow indicators. The indicators have a display range of 0.5 to 5 l/min, in extreme cases the circuit over 5 l/m may be required. In this case you should disregard the flow indicator's display.



## LK ACTUATOR 24 V AC

The hand actuator on the lower manifold can be replaced with thermoelectric actuators. Unscrew the hand actuator. Let the black plastic adapters remain so that the actuator can be assembled on top of them.

Do not assemble any actuators before pressure testing and venting, as this is easier if the hand actuators remain on the manifold.

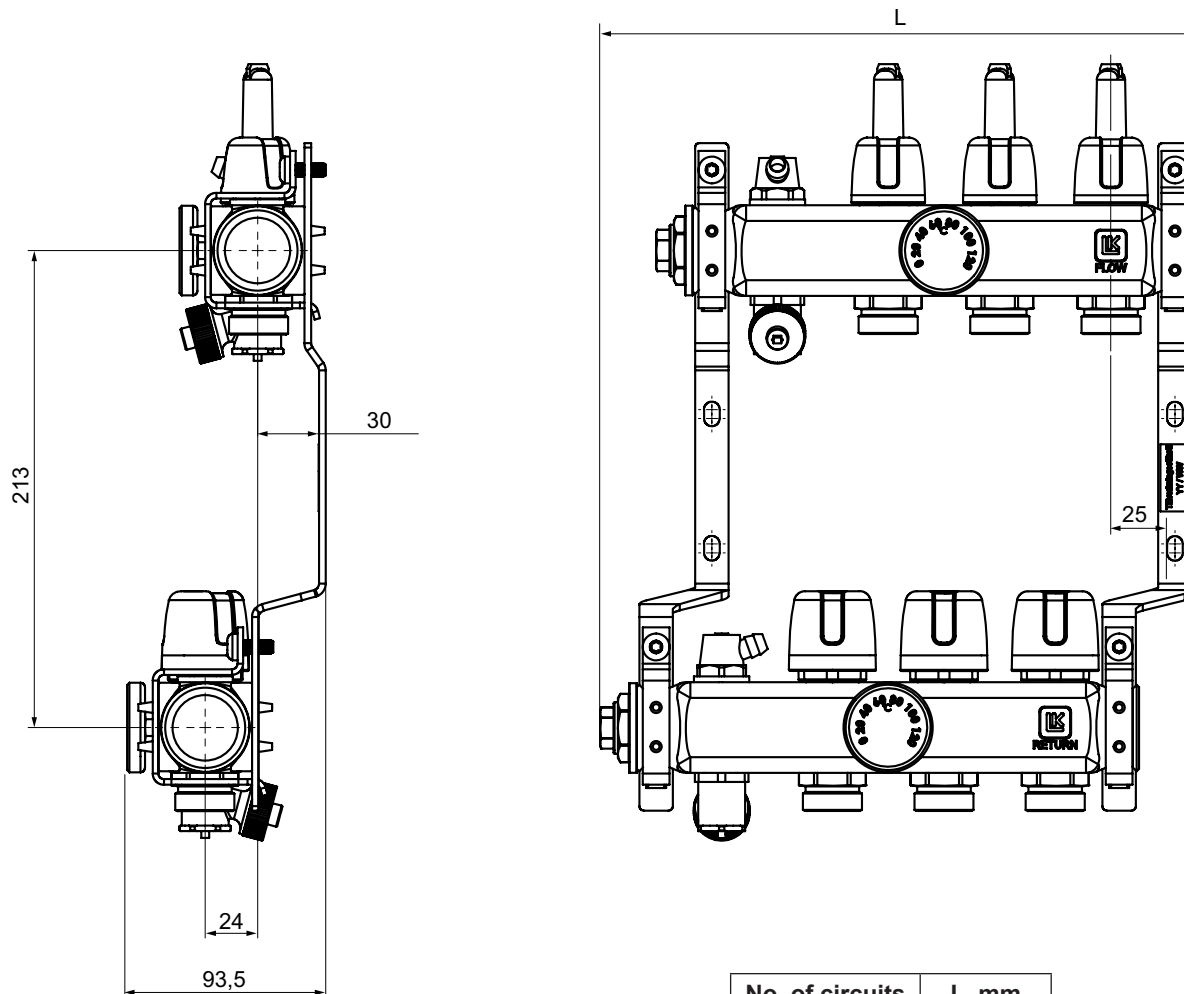


## TECHNICAL DATA

Max working pressure	10 bar
Max cont. working temperature	70°C
Max. instantaneous working temperature (max 10 min/day)	85°C
Max. differential pressure	1 bar
Media 1	Water
Media 2	Water/ethylene glycol 50/50%
Media 3	Water/propylene glycol 50/50%
Media 4	Water/ethanol 70/30% *
Flow indication scale	0,5-5 l/min ±10%
Adjustment valve	Kvs 1,15
Return valve	Kvs 2,5
Connection heat feed	1" female
Circuit connection	¾" male EuroCone
Filling/air bleeding	½" male
Thermometer	0-80°C
Material, manifold	Stainless steel quality SS-EN 10088-3 1.4306.
Material, nipples & isolation valve	Nickel-plated brass CW 617N EN 12165

\*Note! Observe fire hazard with ethanol mixture.

## DIMENSIONS



No. of circuits	L, mm
1	128
2	220
3	270
4	320
5	370
6	420
7	470
8	520
9	570
10	620
11	670
12	720