

# LK Manifold Shunt VS2

## DESIGN

LK Manifold Shunt VS2 is a shunt unit with a two way control valve used in systems with a primary pump. The shunt unit is mountable from both the left and right of LK Manifolds.

The shunt unit is fitted as standard with a hand actuator on the control valve and with an adjustable maximum limit function of supply temperature. The pump has automatic speed-control for reduced energy consumption and quieter operation.

Guideline capacity of this shunt unit is 200 m<sup>2</sup> floor surface. Capacity is however dependent on primary temperature, pressure, laying method etc.

- Suitable for underfloor heating areas up to 200 m<sup>2</sup>
- Compact design.
- Energy efficient circulation pump.
- Thermostat-controlled maximum limit of supply temperature.
- VF valve.
- Right or left mounting.
- Can be supplemented with a unit for weather dependent temperature control, LK Control v.3.

## SUPPLIED WITH PRODUCT

Delivered as a complete unit, including:

- Circulation pump Grundfos UPM3 Auto 15-70 with automatic speed control.
- Supply pipe in two versions, for right and left mounting respectively.
- 2 thermometers to measure secondary supply and return temperature.
- Bracket.



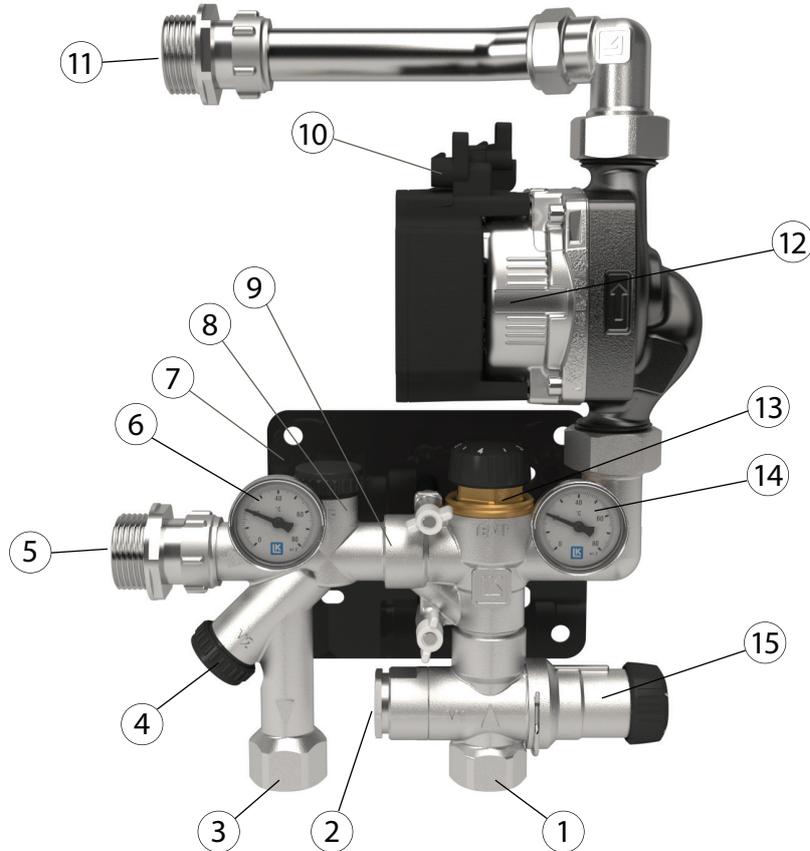
## ACCESSORIES

- LK Control v.3
- Installation cabinets for built-in or wall mounting, see heading *Assembly in LK Installation cabinets*.
- The valve actuator for 230 V or 0-10 V to connect to external control equipment.



*LK Control v.3*

## LK MANIFOLD SHUNT VS2, OVERVIEW



1. Supply flow from primary circuit. Female threads  $\frac{3}{4}$ ".
2. Locking control valve. Only used to close the primary side, if the primary pressure exceeds 3 bar, see heading below, *Shutting off primary side*.
3. Return flow connection to primary circuit. Female threads  $\frac{3}{4}$ ".
4. Isolation/flow control valve primary return (V2). Valve for adjustment and control of the primary flow. Also used as isolation valve. 8 mm hexagonal socket.
5. Return flow from the underfloor heating circuit. Male threads 1".
6. Built-in thermometers located in the underfloor heating return flow
7. Bracket.
8. VF Valve (VF). Should only be used in installations with low available drive pressure from the primary side of the circulation pump. 8 mm hexagonal socket.

9. Built-in check valve.
10. Pump connector.
11. Supply flow to underfloor heating circuit. Male threads 1".
12. Circulation pump Grundfos UPM3 Auto 15-70 with automatic speed control.
13. Temperature limiter (TEMP). Factory-set to 50 °C. Adjustable between 22 - 65 °C, see table below.
14. Built-in thermometers located in the underfloor heating supply flow
15. Two-way control valve (V1). The control valve is fitted with a hand actuator to manually adjust the supply flow temperature. May be replaced by motorized valve actuators, see *LK Control v.3*.

The valve is also used to close the primary side, see heading below, *Shutting off primary side*.



## REQUIREMENTS

The manual control version of LK Manifold Shunt VS2 should be used in systems with a primary supply temperature that is weather dependent. Check the settings of the temperature limiter control. Otherwise, it is advisable to fit the shunt unit with LK Control v.3 to ensure optimum operational comfort and low energy consumption.

The heating system must before assembly be flushed through and must not contain any impurities or additives that can damage the LK Manifold Shunt VS2. Max. 50% glycol or 30% ethanol mix.

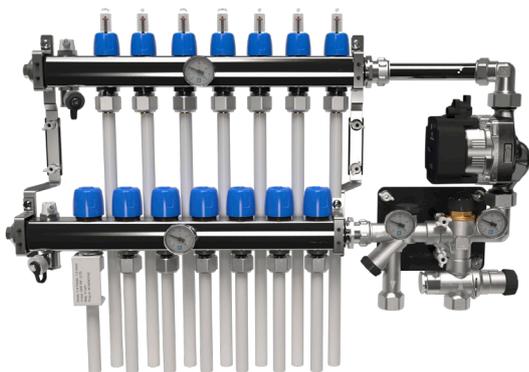
### Note!

Be aware of the fire hazard when mixing with ethanol and the resilience of other components to the ethanol mix.

During assembly, ensure that the pump axle is horizontal and that any valve actuators are not placed below the control valve.

When choosing a suitable location for installation, pay attention to any possible structure-borne noise.

## ASSEMBLY



The shunt unit can be mounted directly to LK Manifolds from both the right and left. To facilitate this, two Manifold Supply Pipes are supplied, where the shorter is used for right mounting, see illustration above.

When fitting from the left, move the thermometers to the opposite side of the shunt unit and use the longer pipe.

## By-pass

The shunt unit is fitted with an automatic speed controlled pump, which means the manifold does not require a mechanical By-Pass.

## Assembly in LK Installation Cabinet

The shunt unit can be mounted together with the LK Manifold in specially designed cabinets in accordance with industry practices. The cabinets have a sealed base with rubber pipe inlets. The base has a drainage opening which allows any water leakage to drain to a location which can be inspected.

### LK Shunt Cabinet VS2

The LK Shunt Cabinet VS2 can be installed in a wall or externally on a wall. When installing in a wall then the LK Frame/hatch UFH INB is used to cover the hole in the wall.

When the cabinet is installed externally on a wall, the LK Frame/hatch UFH UTV is used, which fits edge to edge with the outsides of the cabinet. Supplement with LK Base, which hides the pipes between the cabinet and the floor when mounting the cabinet externally.



- LK Shunt Cabinet VS2 800 holds LK Manifold Shunt VS2 and LK Manifold RF 2-7.
- LK Shunt Cabinet VS2 1050 holds LK Manifold Shunt VS2 and LK Manifold RF 2-12.

### Note!

When installing the LK Shunt Cabinet VS2 in a wall, a minimum stud-frame thickness of 95 mm with 13 mm wall covering is required. The shunt unit is placed to the right of the manifold, see instructions for LK Shunt Cabinet VS2.



## Circulation pump

The circulation pump has automatic speed control, which reduces power consumption and gives a quieter operation as the pump adjusts the flow according to the requirements of the system. A cast arrow on the pump housing indicates the direction of the flow. For underfloor heating it is recommended that the pump is set to constant pressure control, see capacity diagram below. Select the constant pressure curve which best matches the design system flow and pressure drop, choose between the curve CONST. PRESS. CURVE 1, 2 or 3.

	CONSTANT PRESSURE 1	
	CONSTANT PRESSURE 2	
	CONSTANT PRESSURE-3MAX	



QR code for the installation instructions for UPM3

**Note!**

Ensure that the pump never runs dry and the system is well vented before use.

## Operating mode

Read the selected mode by studying the settings menu below on the Grundfos UPM3 Auto.

## Settings

To change the pump setting press the arrow button on the pump and the pump will show the selected setting in accordance with the settings menu.

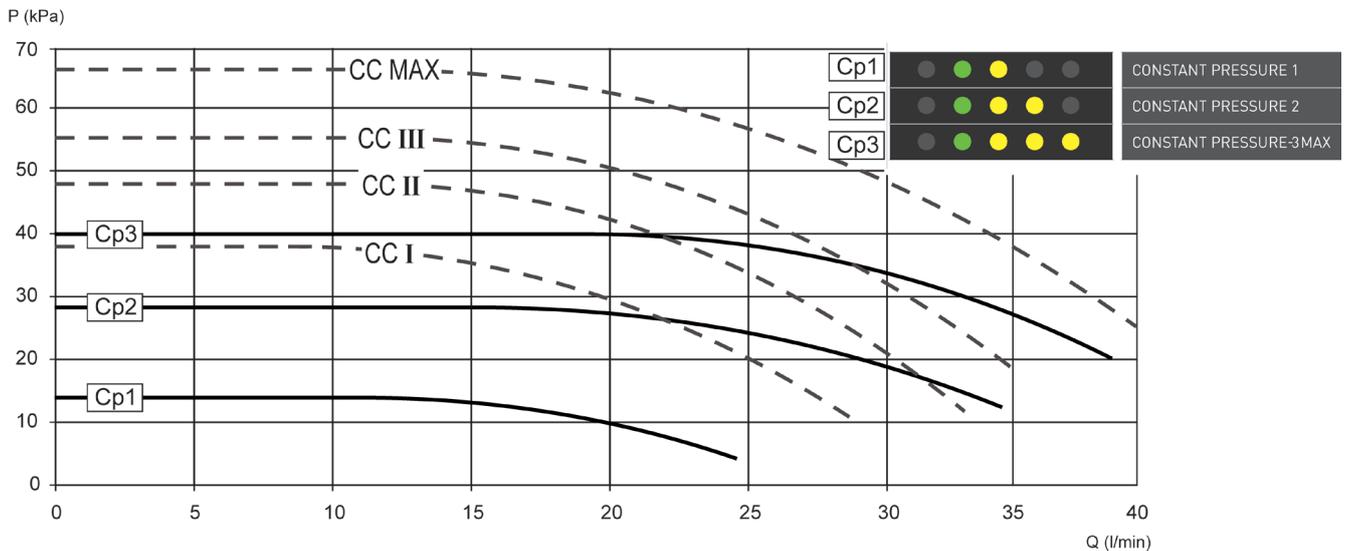
## Settings menu

	OPERATING PANEL	CONTROL MODE	
0		PROPORTIONAL PRESSURE AUTO ADAPT	
1		CONSTANT PRESSURE AUTO ADAPT	
2		PROPORTIONAL PRESSURE 1	
3		PROPORTIONAL PRESSURE 2	
4		PROPORTIONAL PRESSURE 3 - MAX	
5		CONSTANT PRESSURE 1	
6		CONSTANT PRESSURE 2	
7		CONSTANT PRESSURE-3MAX	
8		CONSTANT CURVE 1	
9		CONSTANT CURVE 2	
10		CONSTANT CURVE 3 MAX	

Overview of settings options for the UPM3. Relevant settings are marked with a blue rectangle, other settings are shaded.



## Capacity chart



## Electrical connection

The electrical connection is easily set up with the accompanying plug, with built-in strain relief. The plug no longer requires a 2-pole switch disconnecter. The circulation pump has built-in thermal motor protection. The electrical connection must be fused with Max. 10 A slow blow fuse.

## SETTING FOR TEMPERATURE LIMITER (TEMP)

The temperature limiter can be set between 22 - 65 °C. The factory setting is about 50 °C. Always check the setting at the time of installation; refer to the table below.

## Alarm codes

In the event of an operating problem then a fault code will be displayed as below.

Settings for the temperature limiter (TEMP)	Max. temperature
0	22 °C
1	30 °C
2	37 °C
3	45 °C
4	53 °C
5	65 °C

Display	Indication	Operation	Action
Red LED, Yellow LED #5	Blocked rotor	Start attempt each 1.33 sec.	Wait or release rotor/
Red LED, Yellow LED #4	Too low voltage	Only warning, the pump operates as normal	Check the voltage to the pump
Red LED, Yellow LED #3	Electric fault	Pump stopped because of low voltage or serious fault	Check voltage to pump / Replace pump/ impeller*

\*Release impeller using screwdriver PH2. Break the voltage to the pump. Insert the screwdriver into the center hole of the drive side, press the screwdriver in about 5 mm, then rotate forward /backward until the impeller loosens.



### Underfloor heating with constant supply temperature

The shunt unit can also be used in an underfloor heating system where a constant supply temperature is needed. Close control valve (V1). Reduce the temperature controller (TEMP) to a projected supply temperature, normally about 40 °C. Then, open the control valve until about 40 °C is read off the flow-side thermometer

### FLOW CONTROL VALVE (V2)

#### Return flow primary circuit

The estimated primary flow can be adjusted using the shunt unit's return valve, as shown in the table below.

Revolutions	Kv (m <sup>3</sup> /h)
Fully open. (12 turns)	4.1 Kvs
11	3.9
10	3.7
9	3.4
8	3.0
7	2.6
6	2.1
5	1.7
4	1.2
3	0.8
2	0.4
1	0.2
0	0.0

### LK CONTROL v.3 (ACCESSORY)

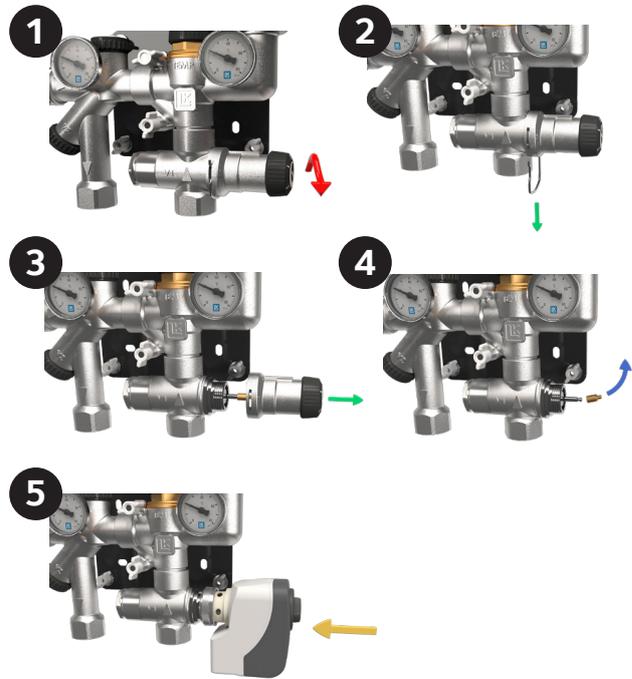


The LK Control v.3 is a complete unit for weather dependent temperature control, adapted and pre-programmed for LK's floor heating systems.

The LK Control v.3 consists of a control unit, valve actuator as well as a flow and outdoor temperature sensor.

As an option, the LK Control v.3 can be supplemented with the LK Room Unit v.3 for regulating room temperature to the control unit's heat curve. This function is similar to a room thermostat, but with the possibility of remote control of the control unit. The LK Room Unit v.3 is often used in areas with an open floor plan where only one room sensor is needed.

When mounting the LK Control v.3 the shunt group's hand actuator must be removed and replaced with the valve actuator, which is enclosed with the LK Control v.3. See illustrations below for placement and installation.

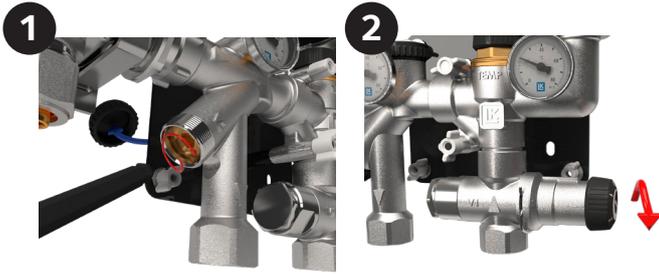


1. Unscrew the handle on the hand actuator (anti-clockwise).
2. Pull out the clasp.
3. Remove the hand actuator
4. Remove the spindle extension
5. Install the valve actuator.

### SHUTTING OFF PRIMARY SIDE

The shunt unit can be used to shut off the primary side, e.g. during service work on the shunt unit or underfloor heating manifold.



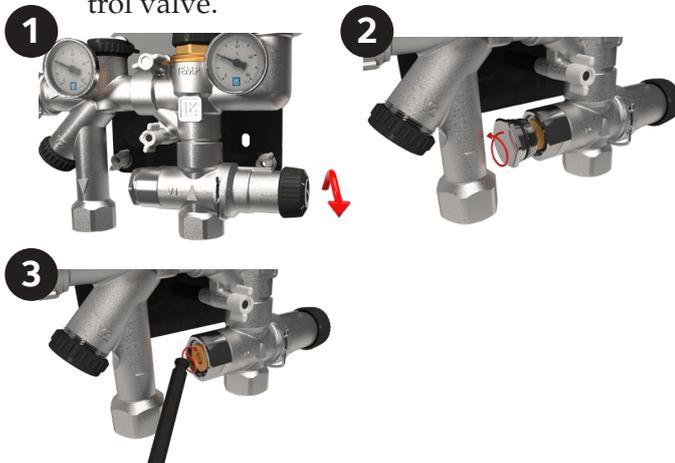


1. The primary side's return is shut off by screwing the cone clockwise for the control valve (V2).
2. The primary side's flow is shut off by unscrewing the hand actuator on the control valve (V1), i.e. screwing out anti-clockwise to its farthest position.

**Note!** The control valve remains sealed for a primary pressure of up to about 3 bar. Above 3 bar the control valve's cone must be locked. This may be needed for larger installations with a relatively high static pressure.

### Locking the control valve.

1. Close the control valve (V1) by unscrewing the hand actuator anti-clockwise to its farthest position.
2. Dismantle the cover, see illustration below.
3. Screw in the cone (hex 4 mm) to lock the control valve.



The valve is now sealed for pressure above 3 bar.

**Note!** When service has been completed, remember to fully open the control valve lock and then open the control valve with the hand actuator.

## TROUBLESHOOTING

The floor heating circuit is not heating up or not heating sufficiently.

- Check that the control valves (V1+V2) are open. See heading, *Shutting off primary side*.
- Check settings for the control valve (V1).
- Are the actuator and adjustment valves open for the underfloor heating manifold?
- Check the settings for the temperature limiter (TEMP).
- Check that the correct pump curve is selected.

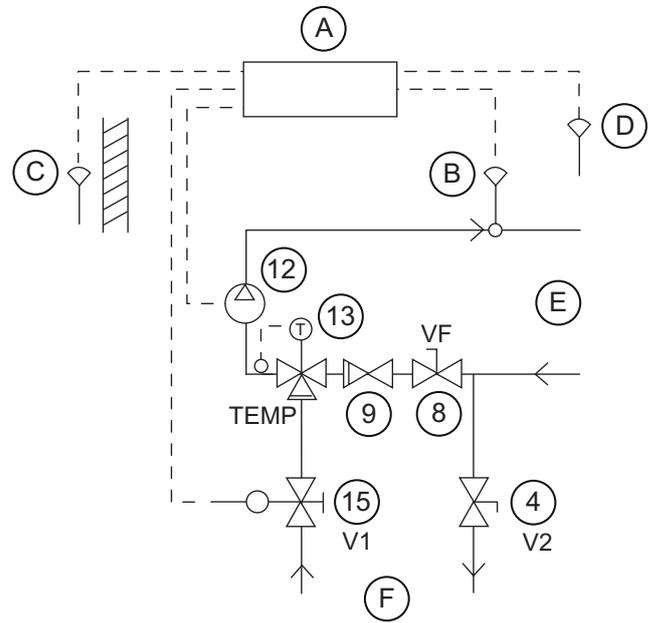
If the above checks have been completed and the heat to the manifold is still insufficient, this may suggest too little drive pressure from the primary side's main circulation pump (normally located at the heat source).

Check the main circulation pump's operation and whether this can be increased. If this does not rectify the situation, the circulation pump of the manifold shunt can help to "draw" the water from the primary side to the underfloor heating side by gradually closing the VF valve until the correct temperature is reached.

## TECHNICAL DATA

Article number	243 52 14
Max. operating pressure	1.0 MPa
Max. pressure differential in operation	0.1 MPa
Operational temperature secondary	+12 - +65 °C
Operational temperature primary	Max. 80 °C
Ambient temperature	Max. 70 °C
Max. valve capacity control valve V1 with hand actuator fitted.	Kv 2.2
Max. valve capacity control valve V1 with electric valve actuator.	Kvs 3.6
Control valve V2	Kvs 4.1
Material	Nickel-plated brass MS58, stainless acid-proof steel
Media	Water, water/glycol 50/50%, water/ethanol 70/30%
Circulation pump	Grundfos UPM3 Auto 15-70, with cast iron pump housing
Voltage	1 phase 230V AC, -15 % / +10 %, 50 Hz, PE
Output	Max. 52 W
Current	Max. 0.52 A
Cable protection class	IP44
Relative humidity	Max. 95%
Approved pump	CE, EC Low Voltage Directive (2006/95/ EC) incl. additions

## FLOW DIAGRAM

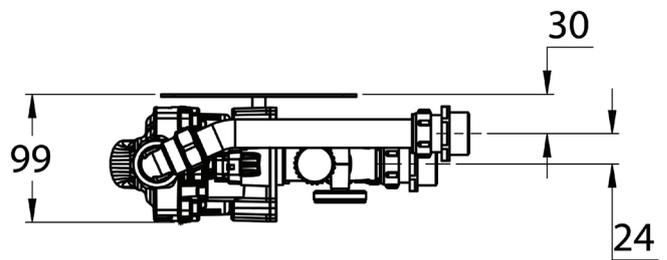
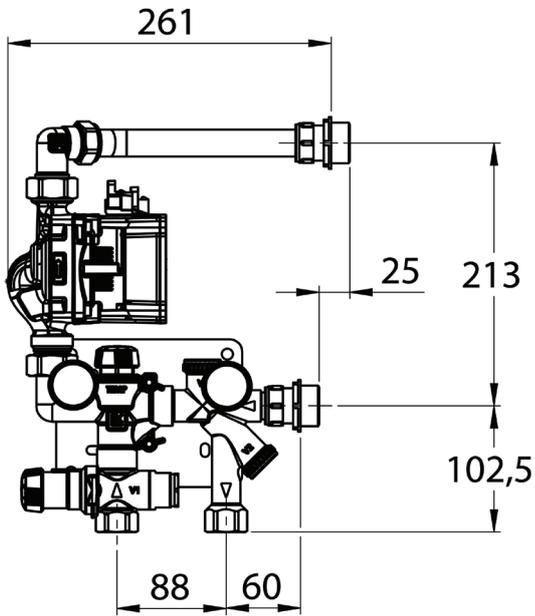


- 15. Control valve (V1).
- 4. Isolation/flow control valve primary return (V2).
- 13. Temperature limiter (TEMP).
- 12. Circulation pump.
- 9. Built-in check valve.
- 8. VF Valve (VF).
- A. Control unit (LK Control v.3) accessory.
- B. Supply flow sensor (LK Control v.3) accessory.
- C. Outdoor sensor (LK Control v.3) accessory.
- D. Room unit (LK Control v.3) accessory.
- E. Secondary side underfloor heating system.
- F. Primary side, system with main pump.



## DIMENSIONS DRAWING

Left



Right

