

Mixing nodes USJR



Installation company: _____

Service phone number: _____

1. Use of mixing nodes

The USJR mixing nodes are intended for qualitative regulation of the output of hot or cool water heat exchangers in HVAC equipment. Nodes are offered in targeted type series graded according to the flow volume of media and differentiated by components included.

In the maximum configuration, the delivery consists of a partially assembled set including the following:

- flow regulator ball valve
- servo drive
- pump
- filter
- flexible stainless steel tube for connection to water heat exchanger
- flow regulating shut-off ball valve for setting pressure loss of the bypass.

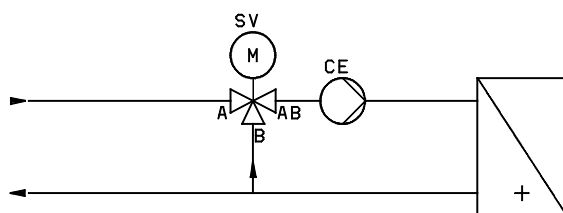
The nodes are delivered with modern electric pumps from the Grundfos ALPHA2 L, MAGNA, and MAGNA1 series, which guarantee excellent performance while achieving maximum energy efficiency. These pumps meet the European Directive ErP/EuP, which defines requirements for ecodesign of products associated with energy consumption.

Nodes are primarily intended for regulation of the performance of heat exchangers. The information stated in chapter 3 – Parameters of heat transfer media and their surroundings.

2. USJR variants

Depending on the components included, the USJR are delivered in four variants.

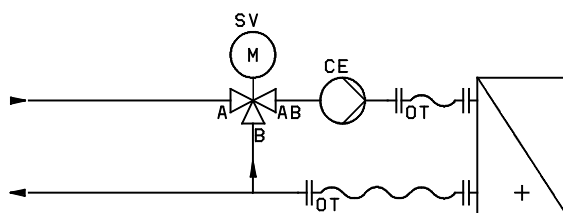
USJR-M – MINIMUM



Contents of delivery:

- | | |
|----|-------------------------------------|
| SV | control ball valve with servo drive |
| CE | pump |

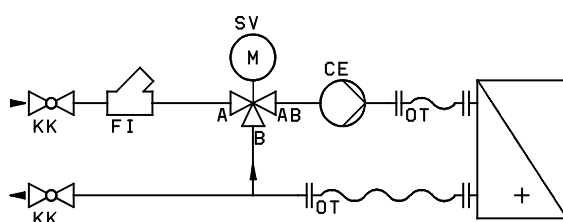
USJR-S – STANDARD



Contents of delivery:

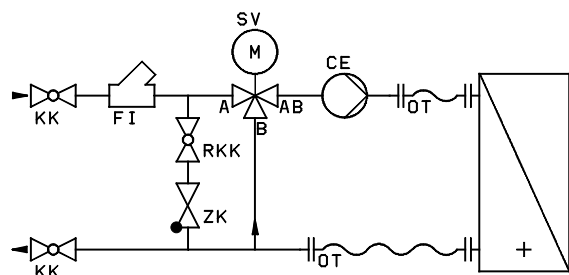
- | | |
|----|-------------------------------------|
| SV | control ball valve with servo drive |
| CE | pump |
| OT | 2x stainless steel flexible tube |

USJR-C – COMFORT



Contents of delivery:

- | | |
|----|---|
| KK | 2x flow shut-off ball valve |
| FI | filter |
| SV | flow regulating ball valve with servo drive |
| CE | pump |
| OT | 2x stainless steel flexible tube |

USJR-E – EXCLUSIVE**Contents of delivery:**

KK	2x flow shut-off ball valve
FI	filter
SV	flow regulating ball valve with servo drive
CE	pump
OT	2x stainless steel flexible tube
RKK	flow regulating shut-off ball valve (top ball)
ZK	reverse shutter

3. Parameters of heat transfer media and their surroundings

Parameters according to USJR nominal diameter	DN20	DN25	DN32	DN40	DN50
Maximum fluid pressure	1 MPa (PN10)	1 MPa (PN10)	0.5 MPa (PN5)	0.5 MPa (PN5)	0.5 MPa (PN5)
Minimal pressure on pump sled	35 kPa	35 kPa	35 kPa	65 kPa	65 kPa
Ambient temperature range / fluid temperature range	2 – 30 °C / 2 – 95 °C	2 – 30 °C / 2 – 95 °C	2 – 30 °C / 2 – 95 °C	2 – 40 °C / -10 – 110 °C	2 – 40 °C / -10 – 110 °C
Ambient temperature range / fluid temperature range	2 – 35 °C / 2 – 90 °C	2 – 35 °C / 2 – 90 °C	2 – 35 °C / 2 – 90 °C	—	—
Ambient temperature range / fluid temperature range	2 – 40 °C / 2 – 70 °C	2 – 40 °C / 2 – 70 °C	2 – 40 °C / 2 – 70 °C	—	—

Nodes are intended for assembly in an indoor environment without the presence of aggressive substances and maximum relative humidity of 95%. A non-freezing glycol-based mixture may be used as a heat transfer medium; in this case, it is of course necessary to take into account the performance characteristics of the pump for this mixture.

For USJR-x 25-60-kvs-xx the ambient temperature must be the same or lower than the temperature of the pumped fluid.

Using USJR for cold water

USJR nodes are primarily intended for regulation of the performance of hot water heat exchangers. All nodes with

25-100, 40-120, 50-120, 50-180 pumps may nonetheless be used also for regulating the performance of water cooling heat exchangers. When using a mixing node in the circuit of a cooling heat exchanger, it is recommended that you augment the pump with thermal insulation protection for air conditioning (this may be ordered separately).

4. Safety

- Do not touch hot/cold surfaces – risk of burning or freezing.
- When loosening joints or performing other heating engineering work, proceed with caution – risk of scalding or freezing.
- When connected to electricity, there is risk of electric shock. When performing any work on electrical installation of components of the mixing node, ensure that the installation is disconnected from its power source.

A person fulfilling the legal regulations relating to work on electric equipment may only carry out the connection of electrical equipment. Applicable safety standards, especially ČSN 33 2000-4-41, must be complied with. It is essentially required to carry out a check of connections prior to putting the equipment into service. Prior to deploying the equipment, the standard inspection of electrical installations per ČSN 33 2000-6 must be demonstrably performed.

5. Installation

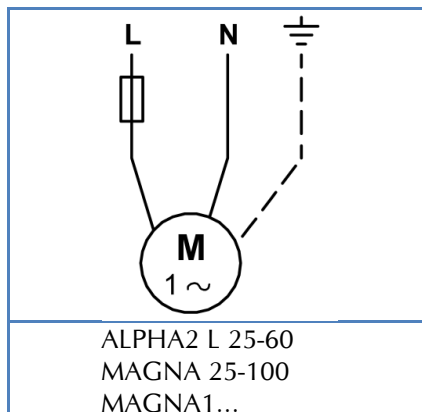
A person with the appropriate qualifications according to valid legislation must perform the assembly and electrical connection of USJR. Prior to beginning work, it is necessary to familiarize yourself with this entire guide.

The USJR is mounted near the water heat exchanger using pipe collars. Observe the following instructions:

- The shaft of the pump must be in the horizontal position. Comply with the instructions in the original manual for the pump, particularly the permitted assembly position of the pump and its terminal box;
- The flow-regulating valve must not point downward from the shaft (the servo drive must not be under the valve).
- The flexible tubes must not create a siphon, should not be bent back over (no more than 5 corrections by bending in one spot), the tube must not be broken or otherwise damaged after the bend, and its cross-section must not be reduced or deformed; bend the tube with your hand, do not use metal tools, prevent contact with sharp edges; the tube must be shaped prior to installation, and the minimum bend radius must be observed (relative to the longitudinal axis of the tube):
 DN 20 30 mm
 DN 25 45 mm
 DN 32 60 mm
 DN 40 80 mm
 DN 50 100 mm
- The node must be mounted such as to enable ventilation of the node and the water heat exchanger.
- During installation, it is necessary to proceed in such a way that the joints to the node are not placed under strain (secured against twisting).
- The cables for the servo drive and pump must run in such a way that they are not exposed to the effects of high temperatures from the hot water. When using an electrical connection, the valid electro-technical norms for electrical safety must be observed.
- Connection schematic for individual types of servo drives:

3-point control	AC 230 V, 3-point	AC/DC 24 V, modulating Y — DC (0)2...10 V U — DC 2...10 V Cable colours: 1 = black 2 = red 3 = white 5 = orange
TR24, LR24A, NR24A	TR230-3, LR230A, NR230A	TR24-SR, LR24A-SR, NR24A-SR TRF24-SR, LRF24A-SR, NRF24A-SR

- Pump connection schematic:



- Servicing access must be ensured for the entire node. The entire regulation node must be capable of disassembly.
- Uphold the conditions of the chapter Hydraulic balancing.
- Perform the tasks described in Deploying into operation.
- USJR delivered without a filter (USJR-M and USJR-S) must always have a heating filter installed in the intake from the heat source.

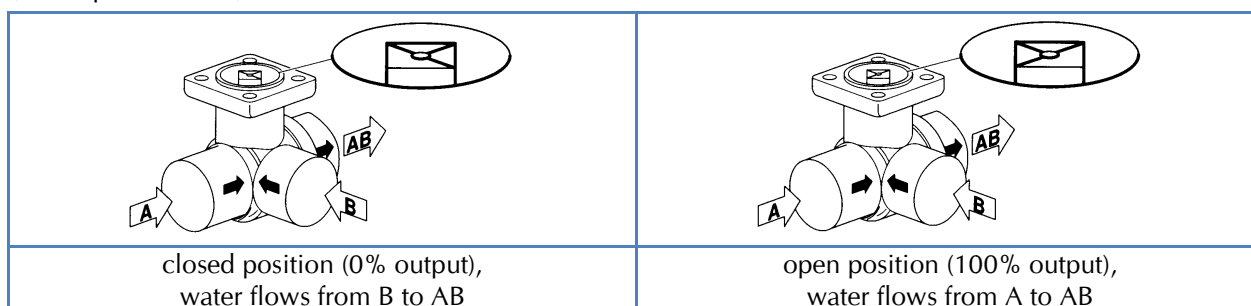
Caution:

Every mixing node prior to shipping is subjected to pressure test and inspected for joint tightness.

Any mechanical damage to the joints of the mixing node during its assembly or operation may not be reclaimed as a manufacturing defect; in such cases, the manufacturer does not offer warranties for any damage caused.

6. Deployment into operation

- Install the mixing node according to the instructions.
- Test the tightness of the joints and proceed with filling and deaerating of the heating assembly.
- Perform a pressure test.
- Review the electrical connection of the pump and servo drive of the flow-regulating valve.
- Engage the servo drive properly. Check the sense of rotation of the flow-regulating valve and its link to the instructions of the control system. Position of the valve in the closed position (0% performance) and open (100% performance):



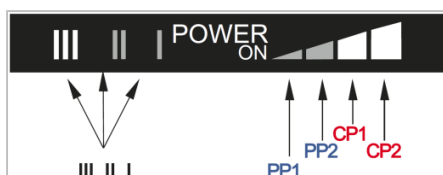
- Perform a functional test of the pump and deaerate the pump and heat exchanger. In order to deaerate the pump, engage the pump for several minutes at maximum power (setting III or MAX). The pump must not be allowed to run without fluid!
- Perform pump settings – for more details, see the next section
- Check the flow of heat transfer medium through the mixing node, check the hydraulic balancing of the assembly (see also chapter 9).
- Test the regulation output function of the heat exchanger.

7. Pump settings

In order to achieve maximum energy efficiency and optimum use of pump performance, it is necessary to set the pump properly. Set the pump to a constant pressure (head of delivery) such that it covers the pressure loss of the regulating valve, water heat exchanger, and flexible tube at the calculated flow rate. We recommend using the settings for the constant pressure curve CP1 or CP2, in certain cases it may be necessary to use settings for curve III. For the MAGNA 25-100 pump, set the proper head of delivery. The necessary settings may be specified by calculation or determined from JESY design aids for allocation of valves. Certain other information for the hydraulic balancing of the system and setting pump performance are listed in section 9.

USJR-x 25-60-kvs-yy nodes

Setting the ALPHA2 pump is performed by repeatedly pressing the  button until the appropriate indicator light for the desired setting is lit (indicator lights CP1, CP2, III are marked in white):



More detailed information about settings is listed in the original Grundfos installation instructions in chapter 10. In the instructions, you will also find the performance curves of the pump. An excerpt from these instructions is enclosed with USJR-x 25-60-kvs-yy nodes.

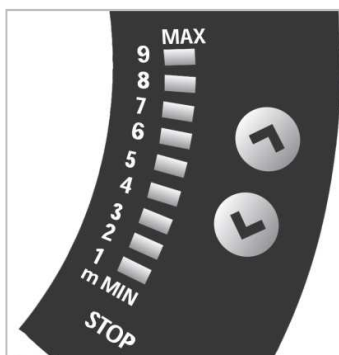
Orientation settings

If it is not possible to perform a calculation of necessary pressure, the data in the table can be used. If the performance of the heater is not sufficient, use a higher setting.

USJR type	Heat exchanger pressure loss 5 kPa	Heat exchanger pressure loss 10 kPa	Heat exchanger pressure loss 20 kPa
USJR 25-60-0,6-24	CP1	CP1	CP2
USJR 25-60-1,0-24	CP1	CP1	CP2
USJR 25-60-1,6-24	CP1	CP1	CP2
USJR 25-60-2,5-24	CP2	CP2	III
USJR 25-60-4,0-24	CP2	CP2	CP2
USJR 25-60-6,3-24	CP1	CP1	--

USJR-x 25-100-kvs-yy nodes

Setting the MAGNA pump is performed by repeatedly pressing the  button until the  indicator light for setting regulation and constant pressure is lit. Desired pressure – head of delivery – can be set using the buttons with arrows so that the appropriate number of signal lights is lit:



Buttons with arrows serve for setting output. The signal lights display the head of delivery and, if applicable, the performance of the pump:

- STOP – pump stops
- MIN – pump is on minimal constant curve
- 1 through 9 – head of delivery (pressure) 1 through 9 m (10 through 90 kPa)
- MAX – pump is on maximal constant curve

More detailed information about settings is listed in the original Grundfos installation instructions in chapter 8. In the instructions, you will also find the performance curves of the pump. An excerpt from these instructions is enclosed with USJR-x 25-100-kvs-yy nodes.

Orientation settings

If it is not possible to perform a calculation of necessary pressure, the data in the table can be used. The ranges of the heads of delivery (pump pressure) for the approximate size of the heater output for Δt 20 °C are listed.

USJR type	Heat exchanger pressure loss 5 kPa	Heat exchanger pressure loss 10 kPa	Heat exchanger pressure loss 20 kPa
USJR 25-100-4-24	--	--	3 – 6 m for output of 40 - 50 kW
USJR 25-100-6,3-24	3 – 4 m for output of 60 - 80 kW	3 – 5 m for output of 60 - 80 kW	4 – 8 m for output of 60 - 100 kW
USJR 25-100-10-24	3 – 5 m for output of 100 - 140 kW	3 – 5 m for output of 90 - 120 kW	5 – 7 m for output of 110 - 150 kW
USJR 25-100-16-24	3 – 4 m for output of 160 - 190 kW	3 – 5 m for output of 140 - 190 kW	4 – 5 m for output of 150 - 170 kW

USJR-x 40-120-kvs-yy, 50-120-kvs-yy, 50-180-kvs-yy nodes

Setting the MAGNA1 pump is performed by repeatedly pressing the  button until the appropriate indicator light for the desired setting is lit. Do not confuse the symbols for  (constant pressure CPx) and  (proportional pressure PPx).

	Lowest constant pressure curve CP1
	Medium constant pressure curve CP2
	Highest constant pressure curve CP3

More information about settings is listed in the original installation instructions in chapter 3 under the title Control panel; pump performance curves are in chapter 9.

8. Type series and electrical parameters

Basic USJR series

Basic technical data valid for the entire series

USJR type	Servo drive	Kvs regul. valve (m ³ /h)	Pump	Nominal average	Flow (m ³ /h)
Servo drive 24V, continuous control					
USJR-x 25-60-0,6-SR	TR24-SR	0.6	25-60	DN20	0.30
USJR-x 25-60-1,0-SR	TR24-SR	1.0	25-60	DN20	0.48
USJR-x 25-60-1,6-SR	TR24-SR	1.6	25-60	DN20	0.76
USJR-x 25-60-2,5-SR	TR24-SR	2.5	25-60	DN20	1.28
USJR-x 25-60-4,0-SR	TR24-SR	4.0	25-60	DN20	1.68
USJR-x 25-60-6,3-SR	LR24A-SR	6.3	25-60	DN25	2.24
USJR-x 25-100-4-SR	TR24-SR	4.0	25-100	DN20	1.94
USJR-x 25-100-6,3-SR	LR24A-SR	6.3	25-100	DN25	3.64
USJR-x 25-100-10-SR	LR24A-SR	10	25-100	DN32	5.80
USJR-x 25-100-16-SR	NR24A-SR	16	25-100	DN32	7.26
USJR-x 40-120-16-SR	NR24A-SR	16	40-120	DN40	11.26
USJR-x 40-120-25-SR	SR24A-SR	25	40-120	DN40	13.62
USJR-x 50-120-25-SR	SR24A-SR	25	50-120	DN50	16.46
USJR-x 50-180-25-SR	SR24A-SR	25	50-180	DN50	16.62
USJR-x 50-120-40-SR	SR24A-SR	40	50-120	DN50	19.98
USJR-x 50-180-40-SR	SR24A-SR	40	50-180	DN50	23.24

The flow rates listed are for water heat exchanger loss of 10 kPa.

Other delivered variants with other servo drives:

USJR-x type	Servo drive	USJR-x type	Servo drive	USJR-x type	Servo drive
Servo drive 24V, 3-point control		Servo drive 230V, 3-point control		Servo drive 24V, joint control, reverse spring	
USJR-x 25-60-0,6-24	TR24	USJR-x 25-60-0,6-230	TR230	USJR-x 25-60-0,6-FSRx *	TRF24-SR
USJR-x 25-60-1,0-24	TR24	USJR-x 25-60-1,0-230	TR230	USJR-x 25-60-1,0-FSRx *	TRF24-SR
USJR-x 25-60-1,6-24	TR24	USJR-x 25-60-1,6-230	TR230	USJR-x 25-60-1,6-FSRx *	TRF24-SR
USJR-x 25-60-2,5-24	TR24	USJR-x 25-60-2,5-230	TR230	USJR-x 25-60-2,5-FSRx *	TRF24-SR
USJR-x 25-60-4,0-24	TR24	USJR-x 25-60-4,0-230	TR230	USJR-x 25-60-4,0-FSRx *	TRF24-SR
USJR-x 25-60-6,3-24	LR24A	USJR-x 25-60-6,3-230	LR230A	USJR-x 25-60-6,3-FSRx *	LRF24-SR
USJR-x 25-100-4-24	TR24	USJR-x 25-100-4-230	TR230	USJR-x 25-100-4-FSRx *	TRF24-SR
USJR-x 25-100-6,3-24	LR24A	USJR-x 25-100-6,3-230	LR230A	USJR-x 25-100-6,3-FSRx *	LRF24-SR
USJR-x 25-100-10-24	LR24A	USJR-x 25-100-10-230	LR230A	USJR-x 25-100-10-FSRx *	LRF24-SR
USJR-x 25-100-16-24	NR24A	USJR-x 25-100-16-230	NR230A	USJR-x 25-100-16-FSRx *	NRF24A-SR

USJR-x 40-120-16-24	NR24A	USJR-x 40-120-16-230	NR230A	USJR-x 40-120-16-FSRx *	NRF24A-SR
USJR-x 40-120-25-24	SR24A	USJR-x 40-120-25-230	SR230A	USJR-x 40-120-25-FSRx *	SRF24A-SR
USJR-x 50-120-25-24	SR24A	USJR-x 50-120-25-230	SR230A	USJR-x 50-120-25-FSRx *	SRF24A-SR
USJR-x 50-180-25-24	SR24A	USJR-x 50-180-25-230	SR230A	USJR-x 50-180-25-FSRx *	SRF24A-SR
USJR-x 50-120-40-24	SR24A	USJR-x 50-120-40-230	SR230A	USJR-x 50-120-40-FSRx *	SRF24A-SR
USJR-x 50-180-40-24	SR24A	USJR-x 50-180-40-230	SR230A	USJR-x 50-180-40-FSRx *	SRF24A-SR

* it is necessary to state in the order whether the servo drive without power is closed (-FSRC) or open (-FSRO)

Input/output dimensions, weight – USJR-M and USJR-S

USJR type "MINIMUM"	D1	D3	D2, D4	Weight (kg)	USJR type "STANDARD"	D1	D2, D3, D4	Weight (kg)
USJR-M 25-60-0,6	Rp 1/2"	Rp 1"	Rp 3/4"	3.4	USJR-S 25-60-0,6	Rp 1/2"	Rp 3/4"	4.1
USJR-M 25-60-1,0	Rp 1/2"	Rp 1"	Rp 3/4"	3.4	USJR-S 25-60-1,0	Rp 1/2"	Rp 3/4"	4.1
USJR-M 25-60-1,6	Rp 1/2"	Rp 1"	Rp 3/4"	3.4	USJR-S 25-60-1,6	Rp 1/2"	Rp 3/4"	4.1
USJR-M 25-60-2,5	Rp 1/2"	Rp 1"	Rp 3/4"	3.4	USJR-S 25-60-2,5	Rp 1/2"	Rp 3/4"	4.1
USJR-M 25-60-4,0	Rp 1/2"	Rp 1"	Rp 3/4"	3.4	USJR-S 25-60-4,0	Rp 1/2"	Rp 3/4"	4.1
USJR-M 25-60-6,3	Rp 3/4"	Rp 1"	Rp 1"	3.9	USJR-S 25-60-6,3	Rp 3/4"	Rp 1"	4.8
USJR-M 25-100-4	Rp 1/2"	Rp 1"	Rp 3/4"	5.5	USJR-S 25-100-4	Rp 1/2"	Rp 3/4"	6.2
USJR-M 25-100-6,3	Rp 3/4"	Rp 1"	Rp 1"	6.0	USJR-S 25-100-6,3	Rp 3/4"	Rp 1"	6.9
USJR-M 25-100-10	Rp 1"	Rp 1"	Rp 5/4"	6.4	USJR-S 25-100-10	Rp 1"	Rp 5/4"	7.3
USJR-M 25-100-16	Rp 5/4"	Rp 1"	Rp 5/4"	6.9	USJR-S 25-100-16	Rp 5/4"	Rp 5/4"	7.9
USJR-M 40-120-16	Rp 5/4"	Rp 6/4"	Rp 6/4"	22.3	USJR-S 40-120-16	Rp 5/4"	Rp 6/4"	24.5
USJR-M 40-120-25	Rp 6/4"	Rp 6/4"	Rp 6/4"	23.2	USJR-S 40-120-25	Rp 6/4"	Rp 6/4"	25.4
USJR-M 50-120-25	Rp 6/4"	Rp 2"	Rp 2"	26.8	USJR-S 50-120-25	Rp 6/4"	Rp 2"	29.5
USJR-M 50-180-25	Rp 6/4"	Rp 2"	Rp 2"	27.3	USJR-S 50-180-25	Rp 6/4"	Rp 2"	30.0
USJR-M 50-120-40	Rp 2"	Rp 2"	Rp 2"	27.5	USJR-S 50-120-40	Rp 2"	Rp 2"	30.2
USJR-M 50-180-40	Rp 2"	Rp 2"	Rp 2"	28.0	USJR-S 50-180-40	Rp 2"	Rp 2"	30.7

Designation of dimensions

Heat source side		HVAC heat exchanger side	
Start	D1	Start	D3
Reverse	D2	Reverse	D4

Rp... – inner thread for sealing into thread

Input/output dimensions, weight – USJR-C and USJR-E

USJR type "COMFORT"	Input and output dimension	Weight (kg)	USJR type "EXCLUSIVE"	Input and output dimension	Weight (kg)
USJR-C 25-60-0,6	Rp 3/4"	5.2	USJR-E 25-60-0,6	Rp 3/4"	7.2
USJR-C 25-60-1,0	Rp 3/4"	5.2	USJR-E 25-60-1,0	Rp 3/4"	7.2
USJR-C 25-60-1,6	Rp 3/4"	5.2	USJR-E 25-60-1,6	Rp 3/4"	7.2
USJR-C 25-60-2,5	Rp 3/4"	5.2	USJR-E 25-60-2,5	Rp 3/4"	7.2
USJR-C 25-60-4,0	Rp 3/4"	5.2	USJR-E 25-60-4,0	Rp 3/4"	7.2
USJR-C 25-60-6,3	Rp 1"	6.8	USJR-E 25-60-6,3	Rp 1"	10.1
USJR-C 25-100-4	Rp 3/4"	7.3	USJR-E 25-100-4	Rp 3/4"	9.3
USJR-C 25-100-6,3	Rp 1"	8.9	USJR-E 25-100-6,3	Rp 1"	12.2
USJR-C 25-100-10	Rp 5/4"	10.4	USJR-E 25-100-10	Rp 5/4"	14.8
USJR-C 25-100-16	Rp 5/4"	10.9	USJR-E 25-100-16	Rp 5/4"	15.3
USJR-C 40-120-16	Rp 6/4"	30.5	USJR-E 40-120-16	Rp 6/4"	36.9
USJR-C 40-120-25	Rp 6/4"	31.1	USJR-E 40-120-25	Rp 6/4"	37.5
USJR-C 50-120-25	Rp 2"	39.1	USJR-E 50-120-25	Rp 2"	48.0

USJR type "COMFORT"	Input and output dimension	Weight (kg)	USJR type "EXCLUSIVE"	Input and output dimension	Weight (kg)
USJR-C 50-180-25	Rp 2"	39.6	USJR-E 50-180-25	Rp 2"	48.5
USJR-C 50-120-40	Rp 2"	39.8	USJR-E 50-120-40	Rp 2"	48.7
USJR-C 50-180-40	Rp 2"	40.3	USJR-E 50-180-40	Rp 2"	49.2

Pump parameters

Pump (from table above)	Type	Power supply	Max. power	Max. current	Electrical protection
25-60	ALPHA2 L 25-60	1x 230 V 50Hz	45 W	0.38 A	IP42
25-100	MAGNA 25-100	1x 230 V 50Hz	185 W	1.25 A	IP44
40-120	MAGNA1 40-120 F	1x 230 V 50Hz	463 W	2.05 A	IPX4D
50-120	MAGNA1 50-120 F	1x 230 V 50Hz	533 W	2.37 A	IPX4D
50-180	MAGNA1 50-180 F	1x 230 V 50Hz	769 W	3.40 A	IPX4D

Servo drive parameters

Type of servo drive (from table above)	Supply voltage	Power	Control signal	Additional functions	Electrical protection
TR24	24V AC/DC	0.5 W / 0.5 VA	3-point		IP40
LR24A	24V AC/DC	1 W / 2 VA	3-point		IP54
NR24A	24V AC/DC	1.5 W / 3.5 VA	3-point		IP54
TR24-SR	24V AC/DC	0.5 / 1 VA	continuous 2 through 10 V		IP40
LR24A-SR	24V AC/DC	1 W / 2 VA	continuous 2 through 10 V		IP54
NR24A-SR	24V AC/DC	1.5 W / 3.5 VA	continuous 2 through 10 V		IP54
TR230-3	230 V AC	1 W / 1 VA	3-point		IP40
LR230A	230 V AC	1 W / 2 VA	3-point		IP54
NR230A	230 V AC	2.5 W / 5.5 VA	3-point		IP54
TRF24-SR	24V AC/DC	2.5 W / 4 VA	continuous 2 through 10 V	reverse spring	IP42
LRF24-SR	24V AC/DC	2.5 W / 5 VA	continuous 2 through 10 V	reverse spring	IP54
NRF24A-SR	24V AC/DC	3.5 W / 6 VA	continuous 2 through 10 V	reverse spring	IP54

Other technical data about servo drives is listed in the BELIMO company literature.

9. Hydraulic balancing

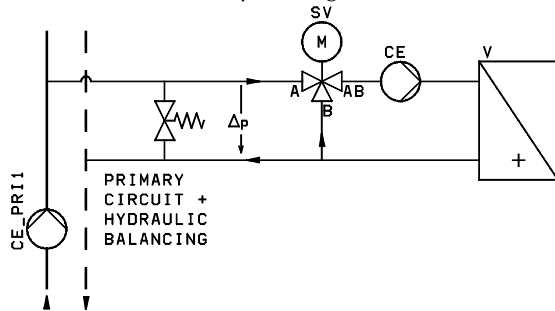
The CE pump, which is part of the mixing node, is intended for covering pressure losses of the water heat exchanger, flow regulating valve, and ultimately the connective stainless steel flexible tubes. The primary CE_PRI pump must overcome all pressure losses up to the flow regulating valve.

Disposal pressure Δp before the flow-regulating valve should not exceed these values according to the calculated flow rate (even when the flow regulating valve is closed):

- up to 2.0 m³/h 10 kPa
- up to 10.0 m³/h 12 kPa
- over 10.0 m³/h 18 kPa

Balance the disposal pressure using the STAD balancing valves, blowdown valve, or pump with electronic pressure differential regulation. If the flow-regulating valve is under pressure from the heat source side, its regulation characteristics will be worsened and it will not be possible to achieve good regulation results. Such a status does not represent a defect of either the mixing node or the control system.

Pressure loss of the flow regulating valve should always be the same or greater than the disposal pressure Δp . Set the appropriate functions and performance of the pump CE in such a way that the pump covers pressure loss of the secondary circuit of the mixing node at the calculated flow rate. Further information on settings is provided in section 7. *Pump settings*.



Pressure loss of filter FI (USJR-C and USJR-E)

Type of node	Filter dimensions	Value of kv filter (m ³ /h)
• USJR 25-60-0,6/1,0/1,6/2,5/4,0-...; USJR 25-100-4,0-...	DN20	6.66
• USJR 25-60-6,3-...; USJR 25-100-6,3-...	DN25	9.84
• USJR 25-100-10/16-...	DN40	21.0
• USJR 40...	DN50	34.0
• USJR 50...	DN65	64.0

10. Regular maintenance

The status of the mixing node must be checked at least 2x per year. Inspection should include checking seals, damage, corrosion, deaerating, pressure in the assembly, servo drive function, and the flow regulating valve, flow rate, and filter cleaning. Check the pump to ensure it is not producing excessive noise. We recommend also performing a test of antifreezing protection of the water heat exchanger in cooperation with the control system.

11. Dimensioning of mixing node

Determine:

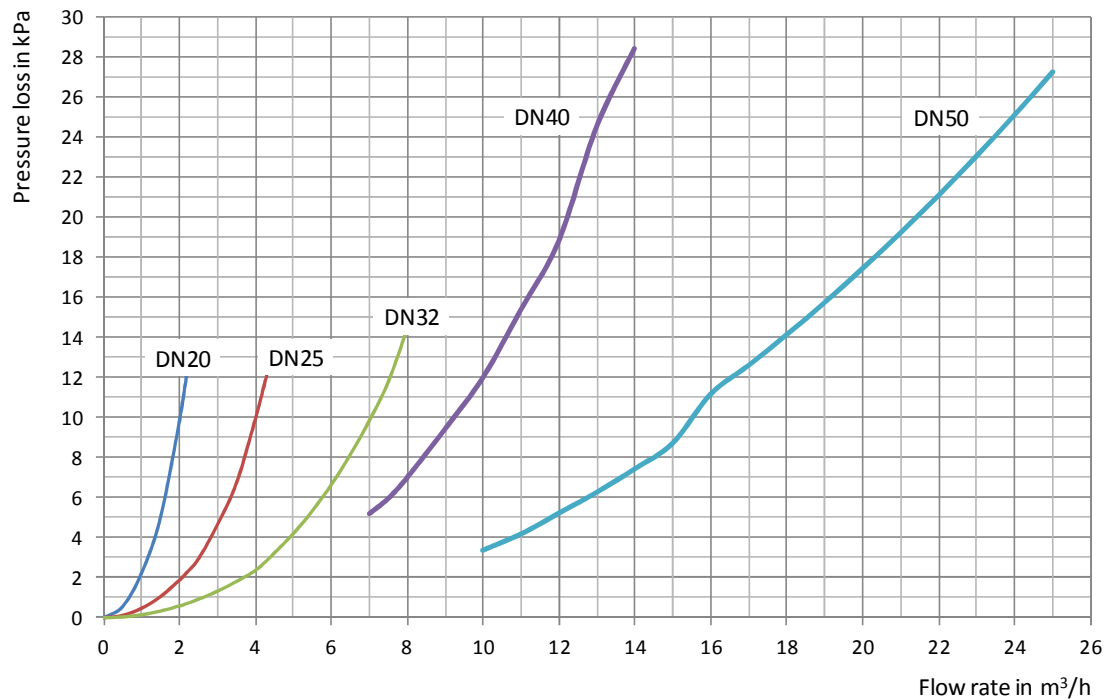
- necessary flow rate of heat transfer medium for the required performance of the water heat exchanger
- pressure loss of the water heat exchanger at this flow rate; increase this value by the reserve corresponding to the pressure loss of the flexible connecting tubes
- disposal pressure at the node input Δp .

Select the kvs value of the flow regulating valve such that its pressure loss at the required flow rate might be the same or higher than the disposal pressure Δp . Read the pressure loss of the flow regulating valve and water heat exchanger with an added reserve – you will obtain the overall pressure loss of the secondary circuit. Depending on the kvs value, select suitable nodes from the list of types in chapter 8 and check whether the pump provides the required flow rate for the overall determined pressure loss of the secondary circuit. Select a suitable node that meets the entered requirements.

The characteristics of flow regulating valves may be found in the BELIMO company literature; the performance characteristics of pumps in the Grundfos company literature.

To make design easier, JESY s.r.o. provides design aids for assigning a mixing node in the form of a Microsoft Excel workbook (requires macros).

Pressure losses of straight flexible tubes by diameter (according to manufacturer data):



12. Liquidation

USJR mixing nodes must be ecologically liquidated at the end of their usable lives; comply with local regulations. Contact your local organization for collection and processing of waste.

13. Manufacturer

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