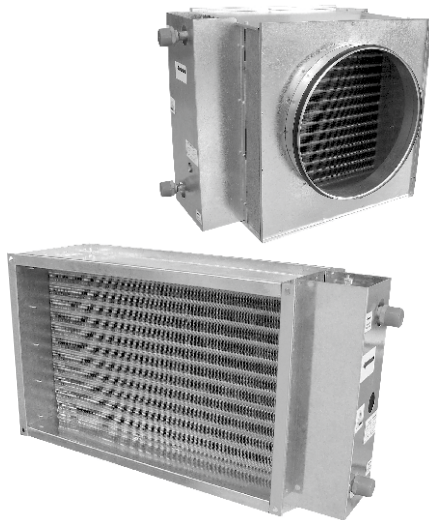


# WATER DUCT HEATER “NKV”

## OPERATION MANUAL



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## Introduction

The present operation manual is combined with technical specification, operating instruction, certificate, information on installation. Device: Water duct heater NKV of VENTS series (further in the text "NKV")

## 1. Function

Device NKV with water as heat carrier and round or rectangular connection to the air duct is designed for heating of air in the air-conditioning, ventilation and hot-air heating systems and in drying units and warm air curtains.

## 2. Delivery set contains:

- device NKV - 1 piece
- operation manual - 1 piece
- packing box - 1 piece.

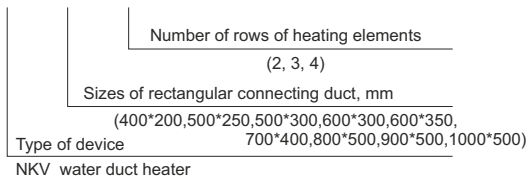
## 3. Technical specifications

NKV devices are used in enclosed spaces at ambient air temperatures from +1°C to +50°C. Maximum temperature: 100°C, maximum pressure at 100°C : 1.6 MPa (16 bar). NKVs are designed for exploitation in area with moderate and cold climate (UHL 3 by GOST 15150-69).

## 3.1 Symbolic representation of the device

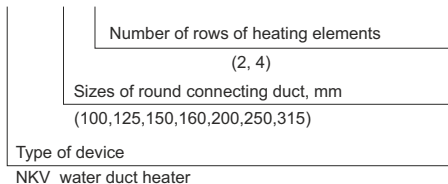
### For rectangular ducts:

**NKV 400\*200 - 2**



### For round ducts:

**NKV 100 - 2**



### Examples:

**NKV 400\*200-2** - water duct heater for connecting to rectangular ducts of 400\*200mm with two rows of heating elements.

**NKV 100-4** - water duct heater for connecting to round ducts of  $\varnothing$ 100mm with four rows of heating elements.

## 4. Design and principle of operation

Design of NKV with rectangular and round connecting to air duct (Picture 1 and Picture 2) consists of the case (1) and the heating element (3) built in the case. The case consists of the wall (6 for round ducts), two protective casings (2) manufactured from high-quality galvanized steel.

Heating block is a package of two or four rows of copper tubes with aluminum ribs set on them, and copper unions. The tubes are joined in groups the ends of which soldered in manifolds made from copper pipes through which the heat carrier goes in and out. For connecting to the external system the manifolds have special unions on the butt end of the heating block providing threaded connection. The output manifold has a nipple with thread (G1/4) with a plug (place П on Picture 1 and Picture 2), instead of which an immersion sensor may be placed for measuring the temperature or for protection from freezing. There is also a air-relief nipple with thread G1/2 (4), a water-drain nipple with thread G1/2 (5) from the butt end of NKV.

The air is heated during its passage through the heat exchanger in the process of interaction with copper tubes and aluminum plates. All heaters are tested for leaktightness at maximum working pressure of 1.6 MPa and water temperature of 100°C.

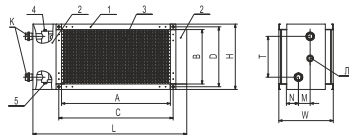
Connection dimensions correspond to connection dimensions of elements of duct ventilation (duct fans, electric duct heaters, duct noise mufflers, etc.)

For NKV a surface mount sensor is possible to apply instead of immersion sensor.

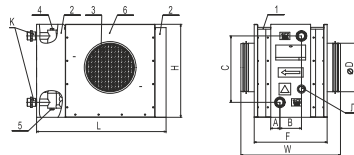
Water heaters are supplied without temperature sensors and frost protection. To avoid emergency situations during exploitation of NKV, please provide the water flow excluding a possibility of freezing of NKV.

## 5. Basic parameters and dimensions

Basic dimensions of NKV with round and rectangular connecting to the air duct must correspond to the values listed in tables 1, 2 and on Picture 1 and Picture 2. Basic parameters and technical specifications are listed in tables 3, 4.



**Picture 1** Basic dimensions of NKV with rectangular connecting to the air duct



**Picture 2** Basic dimensions of NKV with connecting to round air duct

table 1

Basic dimensions of NKV with rectangular connecting to the air duct

Type	A	B	C	D	L	H	W	N	M	T	K	Number of rows of pipes	Weight, kg
NKV 400*200-2	400	200	420	220	565	240	200	43	43	150	G 3/4"	2	7,6
NKV 400*200-4	400	200	420	220	565	240	200	38	65	150	G 3/4"	4	8,1
NKV 500*250-2	500	250	520	270	665	290	200	43	43	200	G 3/4"	2	15,8
NKV 500*250-4	500	250	520	270	665	290	200	38	65	200	G 3/4"	4	16,3
NKV 500*300-2	500	300	520	320	665	340	200	43	43	250	G 1"	2	11,5
NKV 500*300-4	500	300	520	320	665	340	200	38	65	250	G 1"	4	12,0
NKV 600*300-2	600	300	620	320	765	340	200	43	43	250	G 1"	2	21,8
NKV 600*300-4	600	300	620	320	765	340	200	38	65	250	G 1"	4	22,3
NKV 600*350-2	600	350	620	370	765	390	200	43	43	300	G 1"	2	22,4
NKV 600*350-4	600	350	620	370	765	390	200	38	65	300	G 1"	4	22,9
NKV 700*400-2	700	400	720	420	865	440	200	36	47	350	G 1"	2	27,8
NKV 700*400-3	700	400	720	420	865	440	200	42	58	350	G 1"	3	28,4
NKV 800*500-2	800	500	820	520	965	540	200	36	47	450	G 1"	2	36,5
NKV 800*500-3	800	500	820	520	965	540	200	42	58	450	G 1"	3	37,2
NKV 900*500-2	900	500	920	520	1065	540	200	36	47	450	G 1"	2	40,4
NKV 900*500-3	900	500	920	520	1065	540	200	42	58	450	G 1"	3	41,2
NKV 1000*500-2	1000	500	1020	520	1165	540	200	36	47	450	G 1"	2	44,3
NKV 1000*500-3	1000	500	1020	520	1165	540	200	42	58	450	G 1"	3	45,2

table 2

Basic dimensions of NKV with round connecting to the air duct

Type	D	L	H	W	F	A	B	C	K	Number of rows of pipes	Weight, kg
NKV 100-2	99	350	230	300	220	32	43	150	G 3/4"	2	4,5
NKV 100-4	99	350	230	300	220	28	65	150	G 3/4"	4	5,2
NKV 125-2	124	350	230	300	220	32	43	150	G 3/4"	2	4,5
NKV 125-4	124	350	230	300	220	28	65	150	G 3/4"	4	5,2
NKV 150-2	149	400	280	300	220	32	43	200	G 3/4"	2	7,5
NKV 150-4	149	400	280	300	220	28	65	200	G 3/4"	4	8,2
NKV 160-2	159	400	280	300	220	32	43	200	G 3/4"	2	7,5
NKV 160-4	159	400	280	300	220	28	65	200	G 3/4"	4	8,2
NKV 200-2	198	400	280	300	220	32	43	200	G 3/4"	2	7,5
NKV 200-4	198	400	280	300	220	28	65	200	G 3/4"	4	8,2
NKV 250-2	248	470	350	350	270	32	43	270	G 1"	2	10,3
NKV 250-4	248	470	350	350	270	28	65	270	G 1"	4	10,8
NKV 315-2	313	550	430	450	370	57	43	350	G 1"	2	11,5
NKV 315-4	313	550	430	450	370	53	65	350	G 1"	4	12,2

table 3

Basic technical specifications of NKV with rectangular connecting to the air duct for two-row, three-row and four-row execution.

Type	Air flow, m <sup>3</sup> /h	Differential pressure, Pa	Inlet air, °C	Water temperature, °C (inlet/outlet)			
				Inlet air, °C	Capacity of heater, kW	Water consumption, l/s	Water pressure drop, kPa
NKV 400*200-2	1100	62	-5	19	10	0.12	2
			0	23	9.2	0.12	2
			5	26	8.5	0.11	2
			10	29	8.0	0.10	1
			-5	35	17	0.21	1
NKV 400*200-4	1100	125	5	37	15	0.19	1
			10	39	14	0.17	1
			15	41	13	0.16	1
			20	45	12	0.15	1
			-5	20.5	17	0.20	6.5
NKV 500*250-2	1850	62	0	24	15.3	0.18	6.5
			5	27.5	14.5	0.17	4.5
			10	31	13	0.15	3.5
			15	38	28	0.34	6.1
			-5	40	26	0.32	5.1
NKV 500*250-4	1850	125	5	42.6	24	0.30	5
			10	42.5	22.1	0.27	4
			15	49	20	0.24	3
			20	51	18	0.22	2
			-5	25	16	0.21	2
NKV 500*300-2	2350	62	0	21	18	0.22	2
			5	28	15	0.19	2
			10	28	15	0.19	2
			15	37	34	0.42	5
			-5	39	31	0.40	4
NKV 500*300-4	2350	125	5	41	29	0.36	4
			10	43	26	0.32	3
			15	43	24	0.3	4
			20	43	22	0.28	3
			-5	20	22	0.25	3
NKV 600*300-2	3000	62	0	27	18	0.23	3
			5	37	42	0.51	9
			10	41	38	0.47	8
			15	42	36	0.43	7
			-5	45	32	0.4	6
NKV 600*350-2	3400	62	0	19	28	0.35	4
			5	20.5	26	0.32	4
			10	24	24	0.29	3
			15	27	22	0.27	3
			-5	37	49	0.6	10
NKV 600*350-4	3400	125	0	39	46	0.55	8
			5	41	41	0.51	7
			10	43	37	0.46	6
			15	43	34	0.43	6
			-5	21.8	43.3	0.56	4.1
NKV 700*400-2	4600	113	0	26.2	41.8	0.5	3.6
			5	28.5	38.2	0.47	3
			10	31.9	34.6	0.43	2.6
			15	33	33	0.42	2.6
			-5	35.8	64.2	0.78	10.9
NKV 700*400-3	4600	170	0	35.8	59.3	0.72	9.4
			5	38.4	54.4	0.67	8.1
			10	41	49.6	0.62	6.8
			15	41	45.6	0.62	6.8
			-5	20.5	63.7	0.78	4.4
NKV 800*500-2	6800	128	0	23.9	58.7	0.72	3.9
			5	27.3	53.6	0.67	3.2
			10	30.7	48.5	0.62	2.6
			15	29.7	46.7	0.62	2.6
			-5	32.2	86.7	1.05	5.8
NKV 800*500-3	6800	193	0	32.5	79.8	0.97	4.8
			5	35.3	72.9	0.89	4
			10	38.2	65.8	0.81	3.2
			15	38.2	60.8	0.81	3.2
			-5	21.5	70.2	0.86	5.7
NKV 900*500-2	7300	120	0	24.8	64.5	0.81	5.1
			5	28.2	59.8	0.73	4.2
			10	30.7	54.2	0.67	3.7
			15	32.2	54.2	0.67	3.7
			-5	32.5	96.5	1.18	7.2
NKV 900*500-3	7300	180	0	33.7	88.9	1.07	6.1
			5	36.4	81.2	0.99	5.2
			10	39.5	73.5	0.85	4.3
			15	39.5	78.4	0.94	7.1
			-5	22.4	76.4	0.94	7.1
NKV 1000*500-2	7800	111	0	25.7	72.3	0.89	6.1
			5	29	66.2	0.8	5.2
			10	33.6	60.1	0.71	4.8
			15	32	106.1	1.3	8.7
			-5	34.8	97.8	1.19	7.5
HKB 1000*500-3	7800	167	0	37.4	89.5	1.1	6.4
			10	40.8	81.3	0.9	5.3

table 4

Basic technical specifications of NKV with round connecting to the air duct

Type	Air flow, m <sup>3</sup> /h	Differential pressure, Pa	Inlet air, °C	Water temperature, °C (inlet/outlet) 80/60			
				Inlet air, °C	Capacity of heater, kW	Water consump- tion, l/s	Water pressure drop, KPa
NKV 100-2	150	20	-5	21,6	1,6	0,02	1
			0	25,9	1,4	0,02	1
			5	30,2	1,2	0,01	0,5
			10	34	1,0	0,01	0,5
			-5	36	2,3	0,03	2
NKV 100-4	150	31	0	39	2,03	0,02	2
			5	42	1,75	0,02	2
			10	45	1,5	0,02	1
			-5	18,4	2	0,03	1
			0	22,8	1,8	0,02	1
NKV 125-2	215	15	5	27,3	1,5	0,02	1
			10	31,8	1,2	0,02	1
			-5	43	4,8	0,06	10
			0	46	4,3	0,06	9
			5	48	3,8	0,05	8
NKV 125-4	215	40	10	51	3,4	0,05	6
			-5	24	4,1	0,05	8
			0	26	3,8	0,05	6
			5	30,5	3,6	0,04	5
			10	35	3,0	0,04	4
NKV 150-2	320	28	-5	36	6,05	0,06	15
			0	40	5,4	0,06	14
			5	42	5,0	0,06	13
			10	46	4,3	0,05	11
			-5	26,1	4,4	0,05	9
NKV 160-2	400	31	0	30,8	4,0	0,05	7
			5	35,3	3,5	0,04	6
			10	39	3,0	0,04	4
			-5	38	6,5	0,07	16
			0	42	5,6	0,07	15
NKV 160-4	400	42	5	45,5	5,2	0,06	14
			10	48,3	4,5	0,06	12
			-5	20,6	5,9	0,07	13
			0	26,0	5,2	0,06	10
			5	31,0	4,6	0,06	8
NKV 200-2	600	23	10	36,8	4,0	0,05	7
			-5	36,8	11	0,13	13
			0	40,5	9,8	0,12	11
			5	43,6	8,7	0,11	9
			10	47,2	7,8	0,09	7
NKV 200-4	600	44	-5	22,3	9,9	0,12	7
			0	27,1	8,9	0,11	6
			5	31,9	7,7	0,09	5
			10	36,6	6,7	0,08	4
			-5	40,4	16	0,2	12
NKV 250-2	900	25	0	43	14	0,17	9
			5	47	12	0,15	8
			10	49	10,5	0,13	6
			-5	27	18	0,22	9
			0	32	16,3	0,2	8
NKV 315-2	1420	27	5	36,9	14,5	0,18	6
			10	41,2	12,9	0,16	5
			-5	39,6	24	0,3	15
			0	43,2	21,9	0,27	12
			5	46,5	19	0,24	10
NKV 315-4	1420	37	10	49,8	16,8	0,2	8



## 6. Safety requirements

Requirements of the present operation manual, Rules of safe operation of consumer's electric devices, current building norms and rules, Rules of fire safety in Ukraine shall be observed during installation and operation of NKV. Before starting the NKV please make sure there are no visible damage of the device, no foreign objects in the duct or leaks in the joins.

Connection of NKV shall be carried out by a qualified worker who has admittance to such works. The heated air shall not contain any solid, fiber, adhesive, aggressive admixtures that may cause aluminum, copper and zinc corrosion.

Maximum permissible water temperature is +100°C. Maximum permissible pressure is 1.6 MPa. Working pressure of the heating water is 0.8 MPa. If water is used as heat carrier, a NKV shall be mounted only inside the room with maintained constant temperature not going down to the freezing point. External mounting is possible only if n case if a nonfreezing mixture is used as heat carrier.

### **Warning!**

Do not use a NKV for work with explosive dust air mixture.

### **Warning!**

Damage of copper pipes (deformation and breakup) may occur in the heat exchanger at freezing of water. As a result, leakage of water from the heat exchanger circuit will occur and the heater will be out of order.

Exploitation of the device beyond the temperature range specified in the operation manual and in rooms with the air containing aggressive admixtures is forbidden.

## 7. Installation

Installed directly in the air ducts in the positions that make possible to join connecting pipes in horizontally, from the side of a NKV or vertically from above.

Connection of pipes vertically from below is impermissible. Water duct heater may be of right or left executions depending on the customer's request. When water is used as the heat carrier, the heaters shall be used in rooms where temperature is above 0°C.

The heater shall be installed in the air ducts of the similar diameter (size). Operating position of the heater shall ensure free access for service maintenance, for joining of pipes with heat carrier. It is recommended to install the air filter in front of a NKV in the direction of air flow.

A water heater may be installed in front of or behind the fan.

If a NKV is placed in front of a fan, its capacity must be adjusted so that the air temperature inside The fan does not exceed the maximum permissible value.

## 8. Rules for storage and transportation

Keep NKV in the original package in a closed room at temperature from 10°C to +40°C and relative humidity not exceeding 80% (at temperature of 25°C).

Presence in the air of steam and admixtures causing corrosion and failure of isolation and leaktightness is not admitted.

Transportation by any mode of transport is possible on condition of protection from atmospheric precipitation and mechanical damage.

Loading and unloading must be performed avoiding Any bumps and pushes.

## 9. MANUFACTURER'S GUARANTEES

Manufacturer Closed joint-stock company "VENTS" guarantees that NKV complies with technical specification subject to observing the installation and operation, storage and transportation rules.

Guaranty period of exploitation is 24 months from the date of sale through the retail network. In case of absence of a note about the date of sale, the guarantee period shall be calculated from the date of manufacture.

The guarantee becomes invalid in case a NKV has damages because of the use of the device with the purpose other than it was designed for and because of rough mechanical interference with the device.

## 10. GUARANTEE CARD

To be filled out by a trade enterprise

Sold by \_\_\_\_\_  
(name of a trade enterprise)

s.s. \_\_\_\_\_  
stamp of a shop

Date of sale \_\_\_\_\_

\_\_\_\_\_  
(Signature of a salesman)

