



WATER DUCT HEATER

WKH

EN

OPERATION MANUAL

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This user's manual is a main operating document intended for technical, maintenance, and operating staff.

The manual contains information about purpose, technical details, operating principle, design, and installation of the WKH unit and all its modifications.

Technical and maintenance staff must have theoretical and practical training in the field of ventilation systems and should be able to work in accordance with workplace safety rules as well as construction norms and standards applicable in the territory of the country.

SAFETY REQUIREMENTS

When installing and operating the product, comply with the user manual and all applicable local and national building, electrical, and technical codes and standards.

Before installing the product, make sure that the enclosure is not damaged and that there are no foreign objects in the product enclosure.

When installing the product, do not compress the housing!

Do not misuse the product or make any modifications or enhancements to it.

Do not expose the product to unfavorable weather conditions (rain, sun, etc.).

The air transported in the system must be free of dust, solid impurities as well as sticky substances and fibrous materials.

Do not use the product in a flammable or explosive environment containing, for example, alcohol, gasoline, insecticide vapors.

Do not sit on the product or place any objects on it.

The information in this manual is valid at the time of writing. Due to continuous product development, the company reserves the right to make changes to product specifications, design or equipment at any time.



**THE PRODUCT MUST BE DISPOSED SEPARATELY AT THE END OF ITS SERVICE LIFE.
DO NOT DISPOSE THE UNIT AS UNSORTED DOMESTIC WASTE.**

PURPOSE

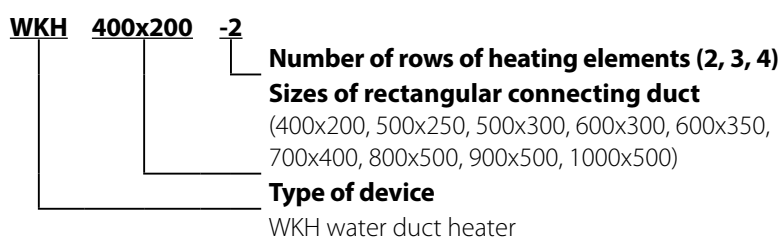
Device WKH with water as heat carrier and round or rectangular connection to the air duct is designed for heating of air in the air-conditioning, ventilation and hot-air heating systems and in drying units and warm air curtains.

DELIVERY SET

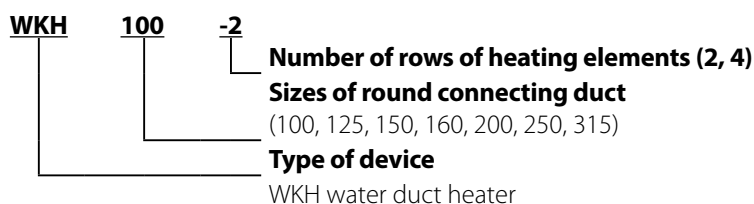
Name	Quantity
Device WKH	1 piece
Operation manual	1 piece
Packing box	1 piece

DESIGNATION KEY

For rectangular ducts:



For round ducts:



TECHNICAL DATA

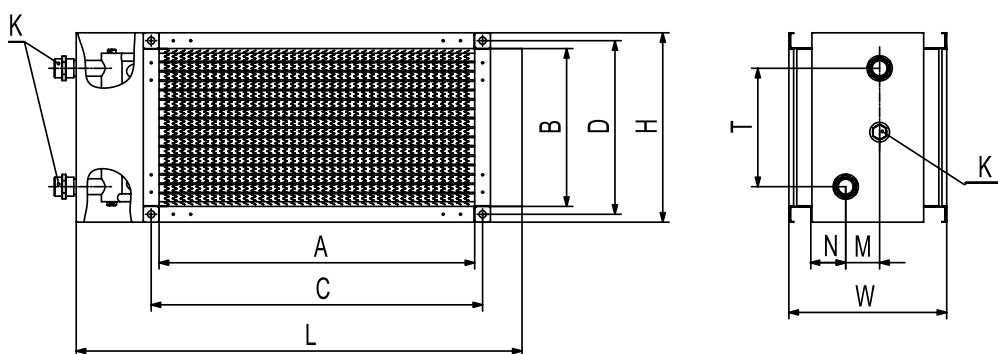
WKH devices are used in enclosed spaces at ambient air temperatures from +1 °C to +50 °C.
 Maximum temperature – 100 °C, maximum pressure at 100 °C – 1,6 MPa (16 bar).

Type	Air flow, m ³ /h	Differential pressure, Pa	Inlet air, °C	Water temperature, °C (inlet / outlet) 80/60			
				Outlet air, °C	Capacity of heater, kW	Water consumption, l/s	Water pressure drop, KPa
WKH 400x200-2	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
WKH 400x200-4	1100	125	-5	35	17	0,21	1
			0	37	15	0,19	1
			5	39	14	0,17	1
			10	4,5	12	0,15	1
WKH 500x250-2	1850	62	-5	20,5	17	0,20	6,5
			0	24	15,3	0,18	6,5
			5	27,5	14,5	0,17	4,5
			10	31	13	0,15	3,5
WKH 500x250-4	1850	125	-5	38	28	0,34	6,1
			0	40	26	0,32	5,1
			5	42,6	24	0,30	5
			10	42,5	22,1	0,27	4

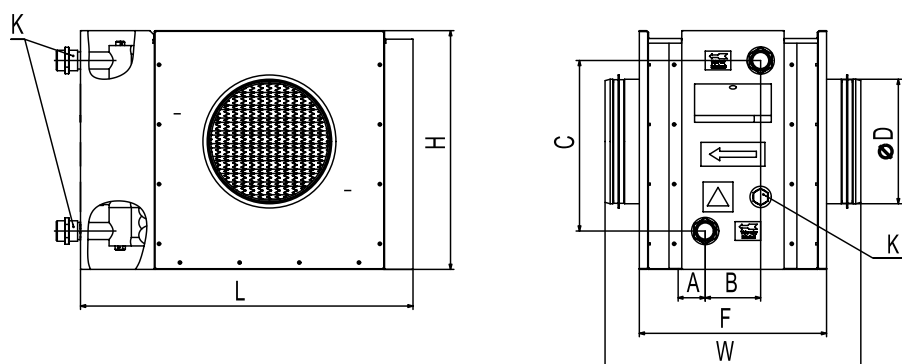
Type	Air flow, m ³ /h	Differential pressure, Pa	Inlet air, °C	Water temperature, °C (inlet / outlet) 80/60			
				Outlet air, °C	Capacity of heater, kW	Water consumption, l/s	Water pressure drop, KPa
WKH 500x300-2	2350	62	-5	19	20	0,24	3
			0	21	18	0,22	2
			5	25	16	0,21	2
			10	28	15	0,19	2
WKH 500x300-4	2350	125	-5	37	34	0,42	5
			0	39	31	0,40	4
			5	41	29	0,36	4
			10	43	26	0,32	3
WKH 600x300-2	3000	62	-5	18	24	0,3	4
			0	20	22	0,28	3
			5	24	20	0,25	3
			10	27	18	0,23	3
WKH 600x300-4	3000	125	-5	37	42	0,51	9
			0	41	38	0,47	8
			5	42	35	0,43	7
			10	45	32	0,4	6
WKH 600x350-2	3400	62	-5	19	28	0,35	4
			0	20,5	26	0,32	4
			5	24	24	0,29	3
			10	27	22	0,27	3
WKH 600x350-4	3400	125	-5	37	49	0,6	10
			0	39	45	0,55	8
			5	41	41	0,51	7
			10	43	37	0,46	6
WKH 700x400-2	4600	113	-5	21,8	45,3	0,56	4,1
			0	25,2	41,8	0,5	3,6
			5	28,5	38,2	0,47	3
			10	31,9	34,6	0,43	2,6
WKH 700x400-3	4600	170	-5	33	64,2	0,78	10,9
			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
WKH 800x500-2	6800	128	-5	20,5	63,7	0,78	4,4
			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
WKH 800x500-3	6800	193	-5	29,7	86,7	1,05	5,6
			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
WKH 900x500-2	7300	120	-5	21,5	70,2	0,86	5,7
			0	24,8	64,5	0,81	5,1
			5	28,2	59,8	0,73	4,2
			10	32,2	54,2	0,67	3,7
WKH 900x500-3	7300	180	-5	30,5	96,5	1,18	7,2
			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
WKH 1000x500-2	7800	111	-5	22,4	78,4	0,94	7,1
			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
WKH 1000x500-3	7800	167	-5	32	106,1	1,3	8,7
			0	34,8	97,8	1,19	7,5
			5	37,4	89,5	1,1	6,4
			10	40,8	81,3	0,9	5,3

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

OVERALL DIMENSIONS



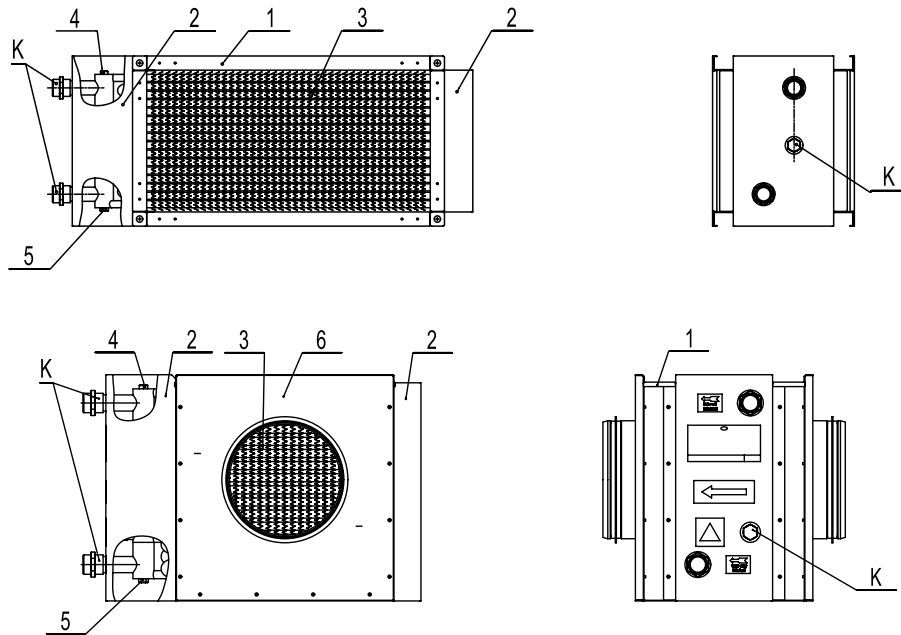
Type	A	B	C	D	L	H	W	N	M	T	K	Number of rows of pipes	Weight, kg
WKH 400x200-2	400	200	420	220	565	240	200	43	43	150	G 3/4"	2	7,6
WKH 400x200-4	400	200	420	220	565	240	200	38	65	150	G 3/4"	4	8,1
WKH 500x250-2	500	250	520	270	665	290	200	43	43	200	G 3/4"	2	15,8
WKH 500x250-4	500	250	520	270	665	290	200	38	65	200	G 3/4"	4	16,3
WKH 500x300-2	500	300	520	320	665	340	200	43	43	250	G 1"	2	11,5
WKH 500x300-4	500	300	520	320	665	340	200	38	65	250	G 1"	4	12,0
WKH 600x300-2	600	300	620	320	765	340	200	43	43	250	G 1"	2	21,8
WKH 600x300-4	600	300	620	320	765	340	200	38	65	250	G 1"	4	22,3
WKH 600x350-2	600	350	620	370	765	390	200	43	43	300	G 1"	2	22,4
WKH 600x350-4	600	350	620	370	765	390	200	38	65	300	G 1"	4	22,9
WKH 700x400-2	700	400	720	420	865	440	200	36	47	350	G 1"	2	27,8
WKH 700x400-3	700	400	720	420	865	440	200	42	58	350	G 1"	3	28,4
WKH 800x500-2	800	500	820	520	965	520	200	36	47	450	G 1"	2	36,5
WKH 800x500-3	800	500	820	520	965	540	200	42	58	450	G 1"	3	37,2
WKH 900x500-2	900	500	920	520	1065	540	200	36	47	450	G 1"	2	40,4
WKH 900x500-3	900	500	920	520	1065	540	200	42	58	450	G 1"	3	41,2
WKH 1000x500-2	1000	500	1020	520	1165	540	200	36	47	450	G 1"	2	44,3
WKH 1000x500-3	1000	500	1020	520	1165	540	200	42	58	450	G 1"	3	45,2



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

DESIGN AND OPERATING PRINCIPLE

Design of WKH with rectangular and round connecting to air duct 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 K), 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 WKH. 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.)

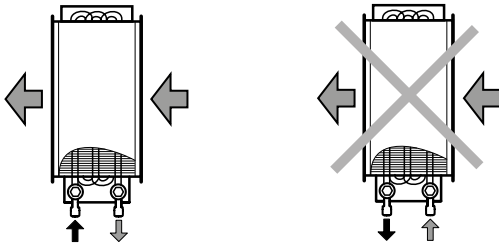


For WKH a surface mount sensor is possible to apply instead of immersion sensor. Water heaters are supplied without temperature sensors and frost protection. To avoid emergency situations during exploitation of WKH, please provide the water flow excluding a possibility of freezing of WKH.

MOUNTING AND SET-UP



READ THE USER'S MANUAL BEFORE INSTALLING THE UNIT



The connection of the forward and return piping to the heat exchanger must be made in such a way that the heat exchanger operates in counterflow mode.

The direct-flow connection lowers the temperature head and reduces the heat output of the heat exchanger.

The supply piping system must be planned in such a way that it does not interfere with other sections. The connection of the heat exchangers to the supply system must allow easy disassembly of the piping and the possibility of removing the heat exchanger from the installation space during maintenance operations.

The heater is mounted using a flange connection. Water heaters can be installed in any position that allows air to be vented from them. The direction of air movement must correspond to the indicator on the heater.

It is recommended to install the heater so that the airflow is evenly distributed over the entire cross-section.

An air filter must be installed in front of the heater to protect it from contamination.

The heater can be installed in front of or behind the fan. If the heater is located behind the fan, it is recommended to provide at least 1-1,5 m of ducting between them to stabilize the air flow and not to exceed the maximum permissible air temperature inside the fan.

The duct heater must be connected according to the counterflow principle, otherwise its output will be 5-15% lower. All calculation nomograms in the catalog are valid for this connection.

If the heat transfer medium is water, the heaters are intended for indoor installation only. For outdoor installation, a non-freezing mixture (e.g. ethylene glycol solution) must be used as the heat transfer medium.

For proper and safe operation of the heaters, it is recommended to use an automation system that provides control and de-icing protection in combination:

- automatic adjustment of power and air heating temperature;
- switching on the ventilation system with preheating of the heater;
- use of air dampers equipped with a servo actuator with a return spring;
- monitoring of the filter status by means of a differential pressure sensor;
- stopping the fan in case of a threat of icing on the heater.

STORAGE AND TRANSPORTATION REGULATIONS

- Store the unit in the manufacturer's original packaging box in a dry closed ventilated premise with temperature range from +5 °C to +40 °C and relative humidity up to 70 %.
- Storage environment must not contain aggressive vapors and chemical mixtures provoking corrosion, insulation, and sealing deformation.
- Use suitable hoist machinery for handling and storage operations to prevent possible damage to the unit.
- Follow the handling requirements applicable for the particular type of cargo.
- The unit can be carried in the original packaging by any mode of transport provided proper protection against precipitation and mechanical damage. The unit must be transported only in the working position.
- Avoid sharp blows, scratches, or rough handling during loading and unloading.
- Prior to the initial power-up after transportation at low temperatures, allow the unit to warm up at operating temperature for at least 3-4 hours.

MANUFACTURER'S WARRANTY

The product is in compliance with EU norms and standards on low voltage guidelines and electromagnetic compatibility. We hereby declare that the product complies with the provisions of Electromagnetic Compatibility (EMC) Directive 2014/30/EU of the European Parliament and of the Council, Low Voltage Directive (LVD) 2014/35/EU of the European Parliament and of the Council and CE-marking Council Directive 93/68/EEC. This certificate is issued following test carried out on samples of the product referred to above.

The manufacturer hereby warrants normal operation of the unit for 24 months after the retail sale date provided the user's observance of the transportation, storage, installation, and operation regulations. Should any malfunctions occur in the course of the unit operation through the Manufacturer's fault during the guaranteed period of operation, the user is entitled to get all the faults eliminated by the manufacturer by means of warranty repair at the factory free of charge. The warranty repair includes work specific to elimination of faults in the unit operation to ensure its intended use by the user within the guaranteed period of operation. The faults are eliminated by means of replacement or repair of the unit components or a specific part of such unit component.

The warranty repair does not include:

- routine technical maintenance
- unit installation/dismantling
- unit setup

To benefit from warranty repair, the user must provide the unit, the user's manual with the purchase date stamp, and the payment paperwork certifying the purchase. The unit model must comply with the one stated in the user's manual. Contact the Seller for warranty service.

The manufacturer's warranty does not apply to the following cases:

- User's failure to submit the unit with the entire delivery package as stated in the user's manual including submission with missing component parts previously dismantled by the user.
- Mismatch of the unit model and the brand name with the information stated on the unit packaging and in the user's manual.
- User's failure to ensure timely technical maintenance of the unit.
- External damage to the unit casing (excluding external modifications as required for installation) and internal components caused by the user.
- Redesign or engineering changes to the unit.
- Replacement and use of any assemblies, parts and components not approved by the manufacturer.
- Unit misuse.
- Violation of the unit installation regulations by the user.
- Violation of the unit control regulations by the user.
- Unit connection to power mains with a voltage different from the one stated in the user's manual.
- Unit breakdown due to voltage surges in power mains.
- Discretionary repair of the unit by the user.
- Unit repair by any persons without the manufacturer's authorization.
- Expiration of the unit warranty period.
- Violation of the unit transportation regulations by the user.
- Violation of the unit storage regulations by the user.
- Wrongful actions against the unit committed by third parties.
- Unit breakdown due to circumstances of insuperable force (fire, flood, earthquake, war, hostilities of any kind, blockades).
- Missing seals if provided by the user's manual.
- Failure to submit the user's manual with the unit purchase date stamp.
- Missing payment paperwork certifying the unit purchase.



FOLLOWING THE REGULATIONS STIPULATED HEREIN WILL ENSURE A LONG AND TROUBLE-FREE OPERATION OF THE UNIT



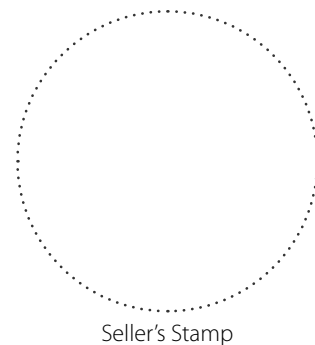
USER'S WARRANTY CLAIMS SHALL BE SUBJECT TO REVIEW ONLY UPON PRESENTATION OF THE UNIT, THE PAYMENT DOCUMENT AND THE USER'S MANUAL WITH THE PURCHASE DATE STAMP

CERTIFICATE OF ACCEPTANCE

Unit Type	Water duct heater
Model	
Serial Number	
Manufacture Date	
Quality Inspector's Stamp	

SELLER INFORMATION

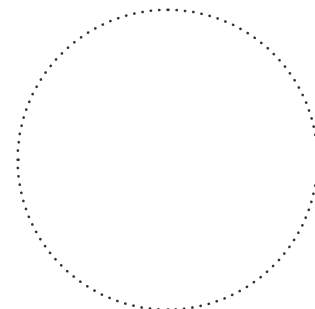
Seller	
Address	
Phone Number	
E-mail	
Purchase Date	
This is to certify acceptance of the complete unit delivery with the user's manual. The warranty terms are acknowledged and accepted.	
Customer's Signature	



Seller's Stamp

INSTALLATION CERTIFICATE

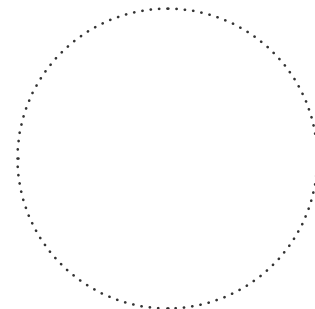
The _____ unit is installed pursuant to the requirements stated in the present user's manual.	
Company name	
Address	
Phone Number	
Installation Technician's Full Name	
Installation Date:	Signature:
The unit has been installed in accordance with the provisions of all the applicable local and national construction, electrical and technical codes and standards. The unit operates normally as intended by the manufacturer.	
Signature:	



Installation Stamp

WARRANTY CARD

Unit Type	Water duct heater
Model	
Serial Number	
Manufacture Date	
Purchase Date	
Warranty Period	
Seller	



Seller's Stamp

