AIR HEATING UNIT **STAVOKLIMA**

Installation and operation manual

Nevada JET model

EN

www.stavoklima.cz

version C

1. Table of Contents

Explanation of symbols used

 Instructions for mechanical repairs and maintenance.	 Important safety information, technical information, data and device output.
 Important electric information - read carefully - unit damage hazard in case of wrong installation.	 Important information - please read carefully.

2. Unpacking, check after transport or warehousing

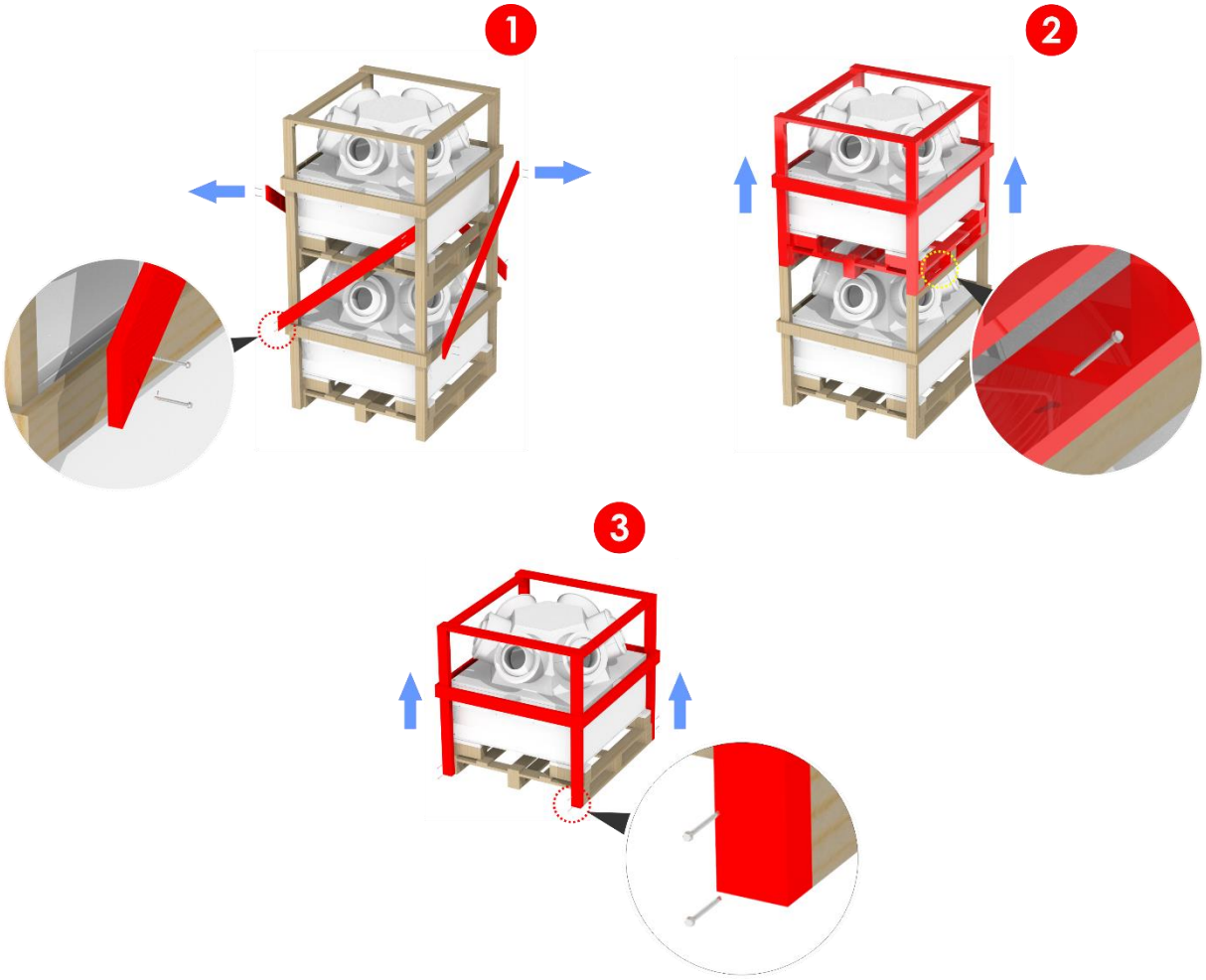
2.1. Unpacking and check

Carefully check the delivery note attached to the delivery. For components identified as extra accessories in the delivery note (not included in the unit or installed therein), please check completeness to the parcel and perfect condition (usually delivered in a separate box). Report any serious damage to packaging or boxes, and make a basic record to the parcel transport documents. Inform the transport company or manufacturer (if the manufacturer arranges transport) immediately.

All packaging material used is environmentally friendly and may be reused or recycled. Dispose of or reprocess the non-environmentally friendly components correctly.

When unpacking, follow the procedure diagrammatically shown below:

1. Unscrew the screws shown in step 1 and remove the brackets.
2. Unscrew the screws shown in step 2 to release the upper transport pallet. Then you can remove the same using a lifting device.
3. To remove the frame that protects the unit, unscrew the screws from the frame side as shown in step 3.



2.2. Storing of the unit, additional transport recommendations

- Observe packaging decals on the unit. The device in its packaging must not be turned or placed in transport positions other than those supplied and recommended by the manufacturer. Packaging also contains production number and unit type for easy unit type identification.
- Use genuine packaging for further transport of the unit. The packaging is tested for re-use, and a different packaging may cause damage to the unit.
- Use means with certified sufficient loading capacity for transport and handling; properly qualified persons only may operate the transport means.
- Permissible warehousing conditions: -10°C ÷ 50°C, 50-85% humidity without condensation.
- Do not remove genuine packaging until installation is complete (to avoid device damage). At least 2 persons are recommended for safe handling.
- **Upon unboxing, do never put the unit standing on the fan grid. This is to avoid deformation and irreparable destruction of the unit.**

3. Safety measures

The unit has been manufactured in line with the government decrees and Czech standards harmonized with the EU regulations mentioned in the manufacturer's declaration of conformity.

The above mentioned product complies with the following standards:
ČSN EN 60335-1 ed.3 ČSN EN 60335-2-30 ed. 3
ČSN EN IEC 61000-6-2 ed. 4 ČSN EN 61000-6-3 ed. 2

The above mentioned product complies with the following directives:

- Directive 2009/125/EC of the European Parliament and of the Council establishing a framework for the setting of eco-design requirements for energy-related products.
- Government Decree No. 118/2016 Coll. Directive 2014/35/EU of the European Parliament and of the Council on the harmonisation of the laws of the Member States relating to the making available on the market of electrical equipment designed for use within certain voltage limits.
- Government Decree No. 117/2016 Coll. Directive 2014/30/EU of the European Parliament and of the Council on the harmonisation of the laws of the Member States relating to electromagnetic compatibility.
- Government Decree No. 481/2012 Coll. (Regulation of the European Parliament and of the Council No. 2014/35/EU, Regulation of the European Parliament and of the Council No. 2011/65/EU).
- Government Decree on restriction the use of some hazardous materials found in electrical and electronic products.

Observe generally applicable national provisions and other related regulations. Unplug the unit from mains before any service intervention. Connection and earthing of the electric device or components thereof must be in line with laws applicable in the country of use. Only qualified staff may carry out any electric service works.

Observe applicable laws, in particular:

- on safety of electric and thermal appliances,
- on central heat distribution systems,
- on fire safety,
- do never exceed working pressure and temperature specified in the production label.

Follow standards and rules applicable in the country of use, in particular the fire safety of appliances and heat sources, and the fire technical properties of materials - flammability levels. Place the unit 150mm from B, C1, C2 level flammable materials, and 400mm and 1000mm for C3 level easily flammable materials in the radiation direction (air flow from the unit).

4. Basic information about the unit and its use

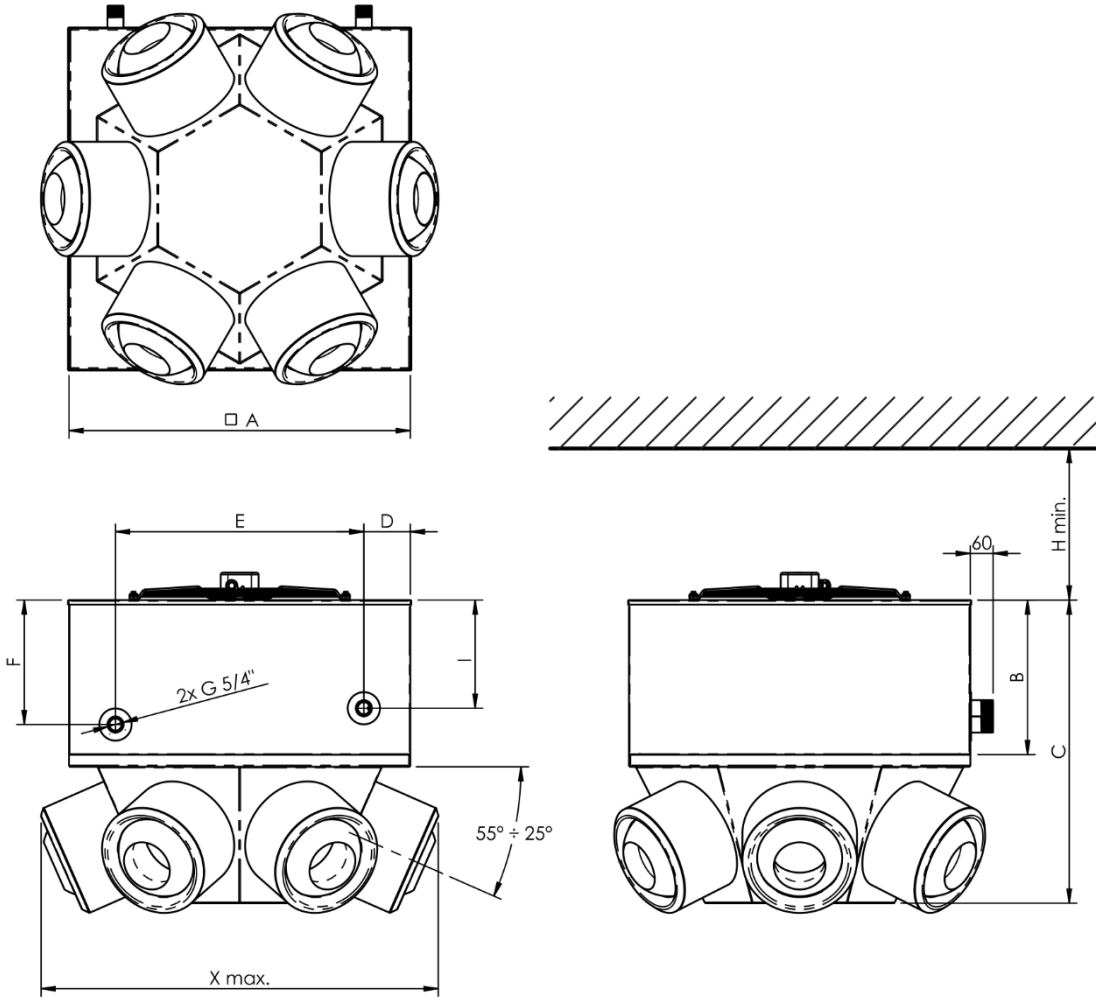
The heating unit covers losses of the heated room. The units are suitable for basic spaces, i.e., without moisture. Not suitable for dusty rooms. A hot water heater is used to heat air for heating. These devices are suitable for shops, industrial, and warehouse environments. The permitted temperature range in the space is 5–40 °C.

Full performance of the unit may be provided only when maintenance is regular and proper. All controls are accessible and well maintained.

Technical conditions for unit operation:

- max. media working temperature 90°C/pressure 1.6MPa – unless specified otherwise,
- working voltage 230V-50Hz or 400V-50Hz,
- max. surrounding temperature 40 °C,
- hot water IP rating – IP 54,
- the unit is designed for spacious and tall spaces,
- minimum pressure difference 23kPa must be provided for use of a 2W valve (applies only to a pressure-independent valve,
- the unit is designed only for heating and not cooling.

5. Dimensions of the unit



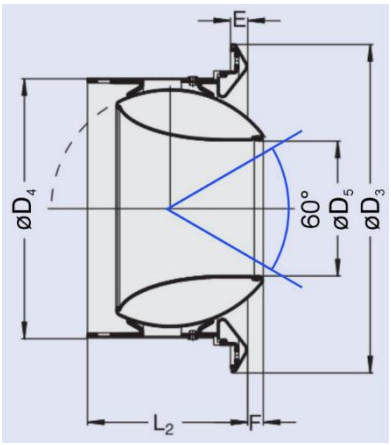
Model	Dimension (mm)								
	A	B	C	D	E	F	H	I	X
Nevada N3 JET	900	408	800	123	655	330	400	287	990
Nevada N4 JET	1120	456	914	75	970	377	630	334	1190

6. Setting up and disassembly of the outlet nozzle

The long-range nozzles are used in particular where the supplied air must span large distances between the nozzle and the zone of stay.

This is in case where large spaces (halls etc.) does not permit or make unsuitable to arrange for uniform air supply through ceiling anemostats. Here, the long-range nozzles located on sides of the spaces find their use.

The long-range nozzles offer high noise comfort due to their aerodynamic optimized shape. For these reasons and for their corresponding design the may also be used in comfort spaces, such as concert halls, theatres, museums, and more.



The outlet nozzle may be directed up to 30° in all directions (see Figure).

To disassemble the nozzle, proceed as follows:

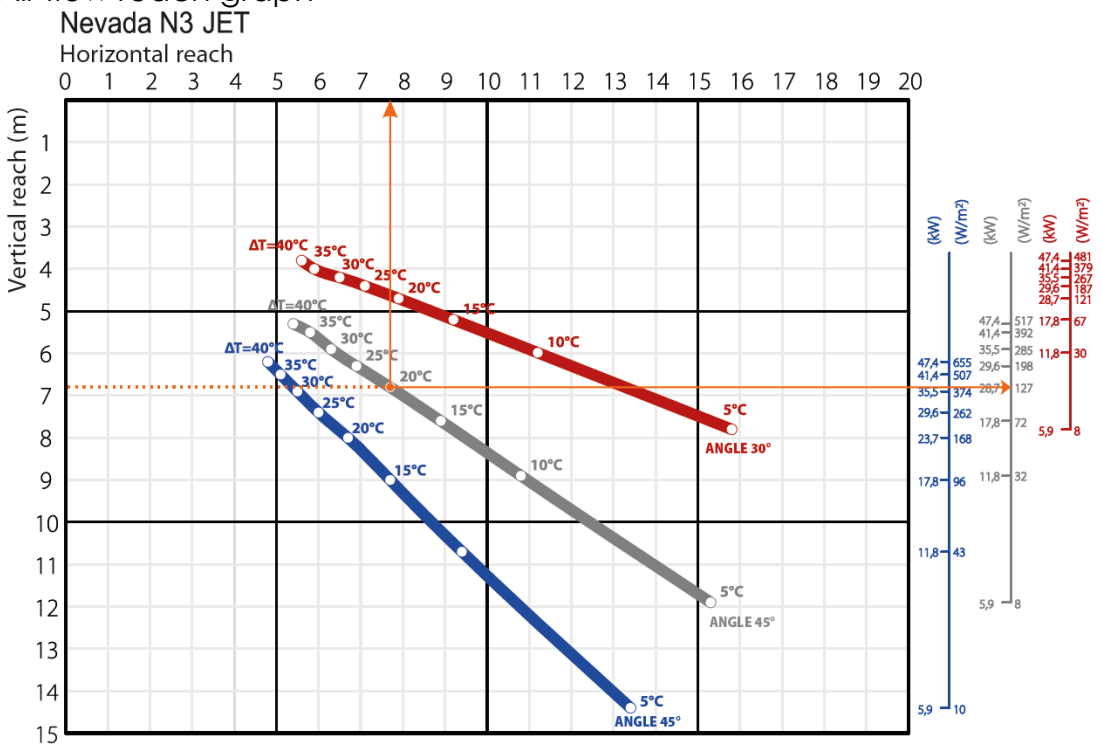
1. Remove the screws around the collar and remove it.
2. Use the Allen wrench to loose the bolts that lock the nozzle.
3. Slide the nozzle out.

Configuration of optimal nozzle angle (°) based on the mounting height (H) and diameter of heated floor area (D).

		D (m)									
		10	12,5	15	17,5	20	22,5	25	27,5	30	32,5
H (m)	3	36	30	26	25	22	20	-	-	-	-
	4	43	36	33	32	29	28	27	25	23	22
	5	-	44	39	36	34	31	30	28	26	24
	6	-	-	44	39	36	34	32	30	28	26
	7	-	-	-	44	39	37	34	32	31	31
	8	-	-	-	-	45	42	41	38	35	33
	9	-	-	-	-	46	45	42	40	38	36
	10	-	-	-	-	-	46	45	43	40	38
	11	-	-	-	-	-	-	47	45	43	42
	12	-	-	-	-	-	-	-	47	46	44
	13	-	-	-	-	-	-	-	-	48	46
	14	-	-	-	-	-	-	-	-	-	48

Nevada N3 JET Nevada N4 JET

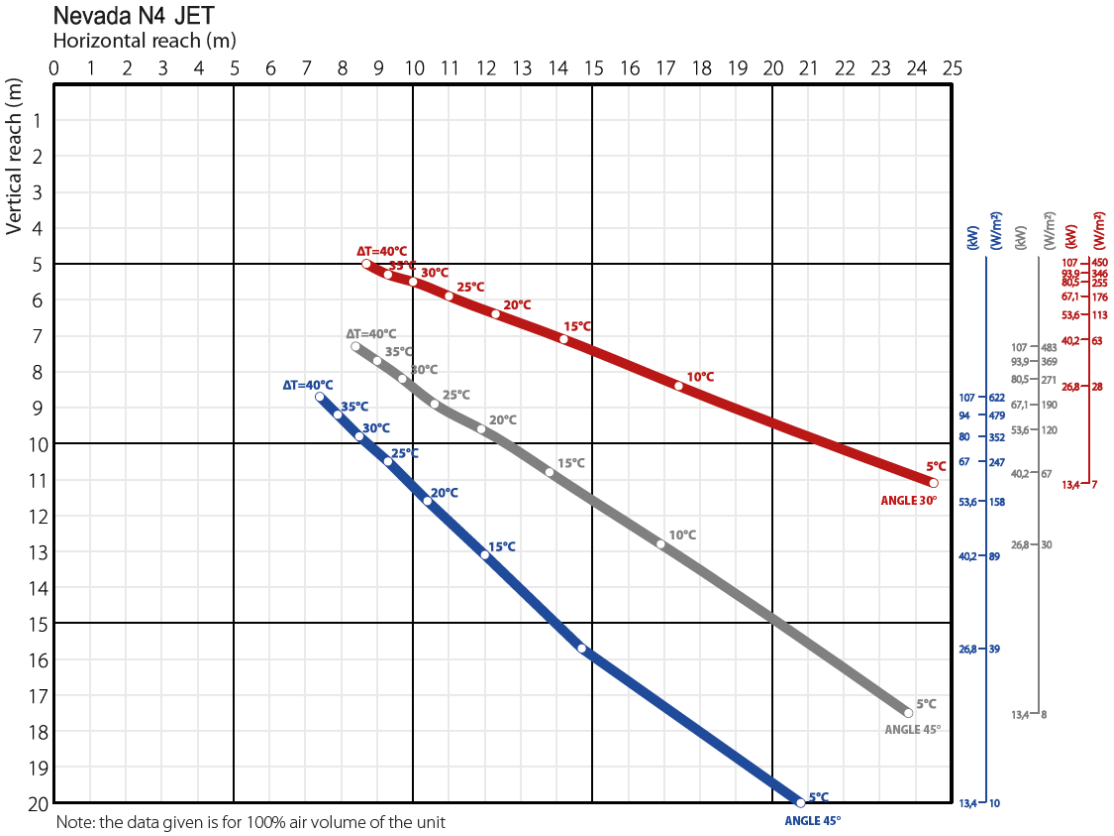
6.1. Air flow reach graph



Note: the data given is for 100% air volume of the unit

Exemplary graph reading:

1) Mounting height H Nevada JET unit is 6,8 m.
2) Using the values in table on page 6, an optimum angle was selected, which is 45° in this exemplary case (grey curve).
3) Determination of the difference between suction (Ta) and exhaust (Ti) temperature. In the model case: 43,6-20=23,6 °C (ΔT = 20 °C).
4) Horizontal reach is 7,7 m (this is R radius). Average of floor area D = 2 x R. In this exemplary case it is 15,4 m.
5) Heating output for said input values is 23,7 kW (surface area output 127 W/m²).



Note: the data given is for 100% air volume of the unit

7. Unit installation

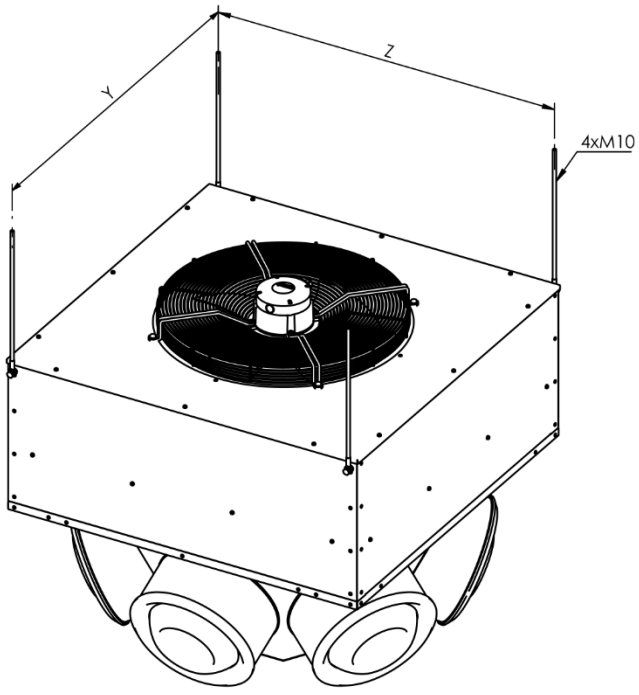
Installation under ceiling

7.1. ZS-Nevada JET suspensions under ceiling

The door unit is suspended in four suspension points on the unit casing. The suspension points are accessible from outside and rivet nuts (M10 threads) are installed on the unit from production plant.

Upon special purchase order, the following is supplied as accessories to the ZS-Nevada JET under-ceiling suspensions:
4 pcs M10x1000 - 8.8 thread bar, 4 pcs M10/40 anchor, 4 pcs M10 suspension lug, 8 pcs M10 - 8.8 nuts, 4 pcs M10x45 - 8.8 bolt, 4 pcs big flat washer size 10, 4 pcs spring washers size 10.

Measure the position of the unit and its distance from the ceiling, and cut the threaded bars to required length. Mark the anchoring points and drill ceiling holes for installation of the anchors. Fit the threaded rods into the prepared ceiling anchors and rotate the nuts. Fit ends of the threaded bars with suspension lugs. Set the unit to the required position and attach the suspension lugs to the unit using the bolts provided.



Model	Dimension (mm)	
	Y	Z
Nevada N3 JET	925	860
Nevada N4 JET	1145	1080

Keep minimum distance from the ceiling and wall in order to fully use the output of the unit. Regardless orientation of the assembly, always make sure that entry to the air curtain unit is spaced at least one fan diameter from the wall or ceiling.

Pay attention to correct fitting of all nuts to all assembly components. Pay attention to the end position of the threads to avoid loosening and falling the unit by rotation.

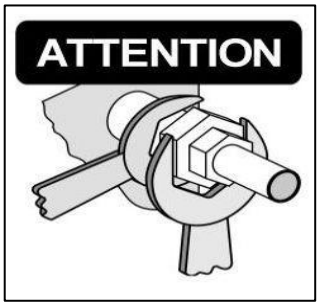
Use quality anchors and wall plugs only. Consider installation situation and suitability of anchoring and installation material, including loading capacity of the structure properly. The manufacturer accepts no liability for improperly used wall plugs or other installation and hanging material.

Following the assembly, check for horizontal position in both directions. Make sure that tightening up of individual hangers and sleeves do not cause crossing and twisting of the unit. Always properly consider loading capacity of the ceiling or of the wall. Install the device to structurally solid beams.

Always suspend the device to all suspension points.

8. Connection of the unit to heating system

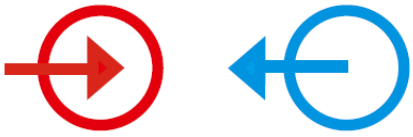
Please check all hot water connections for readiness and perfect condition before connecting media to the unit. Furthermore, please check the hot distribution for components or other measures to ensure zero transmission of static, dynamic, and dilatation forces at the input and output neck connections. No excessive force may be applied when connecting the hot water circuit of the building to the unit's heat exchanger. By the neck of the air conditioner there is a mark that notes use of two keys so that no stressing of the necks occurs in the course of tightening or loosening. **When bolting and tightening up the screw union of the heat exchanger must be secured by a clamp against undesired rotation that may subsequently result in deformations or damage to pipe necks on the heat exchanger**.



Considering the above the manufacturer clearly recommends that flexible connection hoses are used for connection of the heat exchanger necks (available as PPH accessories, length 300mm, DN 32) or a bellows compensator.

Any non-compliance with the instructions above results in rejection of any complaint.

The hot water heater necks are usually located on the left hand side of the unit (when viewed from the interior). The inputs are identified by round marks – **medium input red** with arrow pointing inside, and **medium output blue** with arrow pointing outside.



Media input Media output

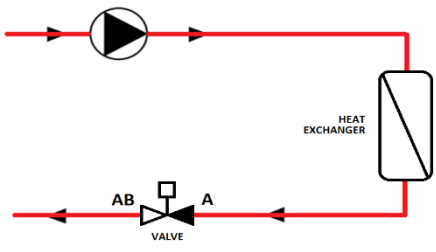
Do not swap the return and supply neck positions - this may cardinally change performance and parameters of the heater with consequent impact on the hydraulic system. Do not exceed max temperature and pressure for which the unit is rated.

The function of the electrothermic valve drive is given by a control type. The connection is then made directly on the neck for media input. For electrothermic drive functions, refer to clause 7.1.

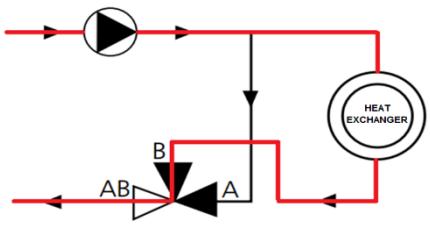
Pay attention to quality of media fed to the unit; check for installation of cleaning valve downstream the unit (not included in the supply). Observe max temperature and media pressure to avoid heat exchanger damage. To make sure the heat exchanger operates correctly, drain the exchanger (sludge valve) and purge the cleaning valve because construction or assembly impurities may be present in the system. Deaerate the heat exchanger for perfect operation of the heat exchanger. Install the closing valves on both pipes downstream the unit (ball valves) ⋈. Connection thread near the unit must be removable and not fixed.

As required by the customer, a not embedded 2-way or 3-way valve with control head can be delivered for the hot water heat exchanger. The valve drive is supplied electrothermic

Instructions for electric connection of the valve is included in the wiring scheme for connection of the unit. Specific wiring scheme or valve instructions are available upon request only.



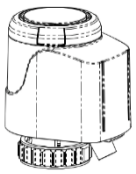
Connection of 2-way ETVQ valve



Connection of 3-way ETVT valve

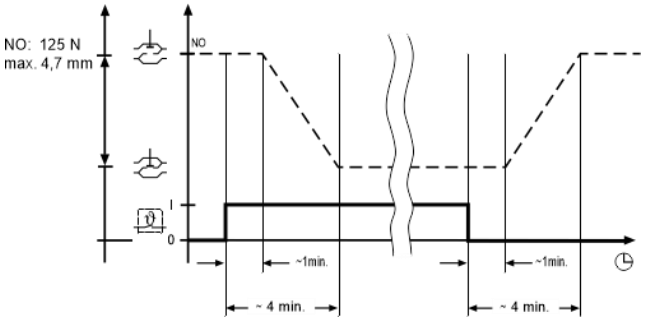
8.1. Heat exchanger control with a valve with electrothermic head

The electrothermic valve drive can be supplied to the hot water heat exchanger as not embedded either as 2-way (ETVQ) or 3-way (ETVT).



"Normally open" version (NO).

When the thermal drive is under voltage, the electrically heated sensor heats up Upon "dead time" expiration for continuous opening of thermic drive due to cooling down of the sensor.

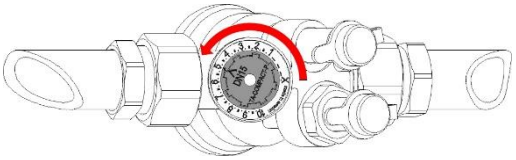


Note:

The time delay (dead time) needs to be considered during the functional test; the opening and closing time depends on surrounding temperature. Electric data: 230V/50Hz-3V, IP 54.

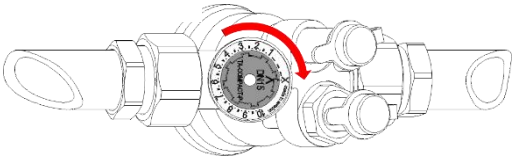
8.2. Setting of independent valve flow pressure (ETVQ)

Setup



Turn the setting wheel to required value, e.g., 5.0.

Closing



Turn the setting wheel counterclockwise to position X.

q_{max} values

Setup

	1	2	3	4	5	6	7	8	9	10
DN 25	370	610	830	1050	1270	1490	1720	1870	2050	2150
DN 32	800	1220	1620	2060	2450	2790	3080	3350	3550	3700

q_{max} = l/h for each setting with the control cone fully open

9. Electric connection of the unit

The heating unit must be protected by a suitable circuit breaker according to its electric parameters – refer to attached electric wiring. The connection terminals on the hot water unit are accessible after unscrewing the cover of the fan wiring box. The connection terminals on the unit with electric heater are accessible after unscrewing the cover. Connect the ready-to-install cables to the terminals following the attached electric wiring schemes, make connection check, equipotential bonding, and finally turn the power supply on. Use the cable wires with cross section suitably rated according to the current load – refer to electric wiring documentation.

Make sure the cable is neither twisted nor deformed in any way. Keep free ends of the cable wires sufficiently long for easy handling and cut the wire only after you are sure the wire is long enough.

Observe generally applicable national provisions, particularly ČSN 12 2002 and other related regulations. Unplug the unit from mains before any service intervention. Provisions of ČSN 332190, 332000-5-51 ed. 3, and 33 2000-5-54 ed. 3 must be observed for connecting and earthing of the electric devices. Qualified electrician only may perform any electric service works (qualification according to Section 6 of Decree of ČBU No. 50/78 Coll.).

During assembly, carefully check everything and carry out the initial review of the device. Check operation of the FU1-FU3 electric fuses (Ditronic) for interior circuits (for fuse values, refer to the box of electronics), and make sure that the external components (accessories), which may have an essential impact on correct function of the device, operate.

ATTENTION: The delivery note serves as a warranty sheet!

10. Types of controllers and options for controlling

OE 230 & OE 400

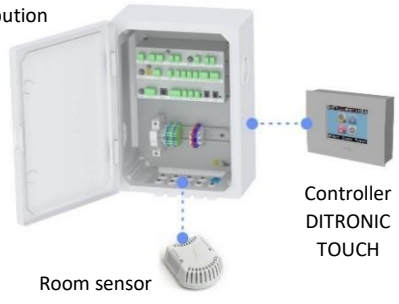
The OE 230 & OE 400 series control for continuous control of EC fan revolutions with integrated 10V power source. The OE 230 and EO 400 controller is powered by 230V and 400V, respectively. The controller enables connection up to three units with maximum power part up to 10A. It enables connection of the room thermostat and the "FAILURE (TK)" fan contacts can be connected using the multi-functional input.

Type of control	OE 230	OE 400
Type of unit	Nevada N3 JET	Nevada N4 JET
Unit power supply	1x230V	3x400V
IP rating	IP 40	
For max unit current	10A	
Dimensions (length x width x height)	230x180x90mm	

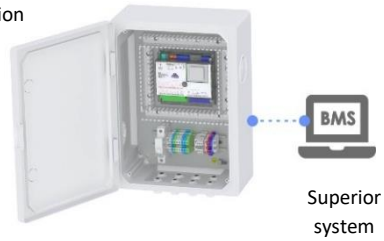
UNIREG

UNIREG is the distribution board suitable for hot water units with 230V and 400V EC fans where it is not possible to integrate the control electronics into the unit. The system permits the use of all functions offered by Ditronic Touch, or BMS input switch. The controller enables connection of 5 units at the same time. Unireg type must consider the power input of the unit (output power limitation in "A"). **For each of the controllers (Ditronic), refer to specific user manuals.**

UNIREG DIT distribution

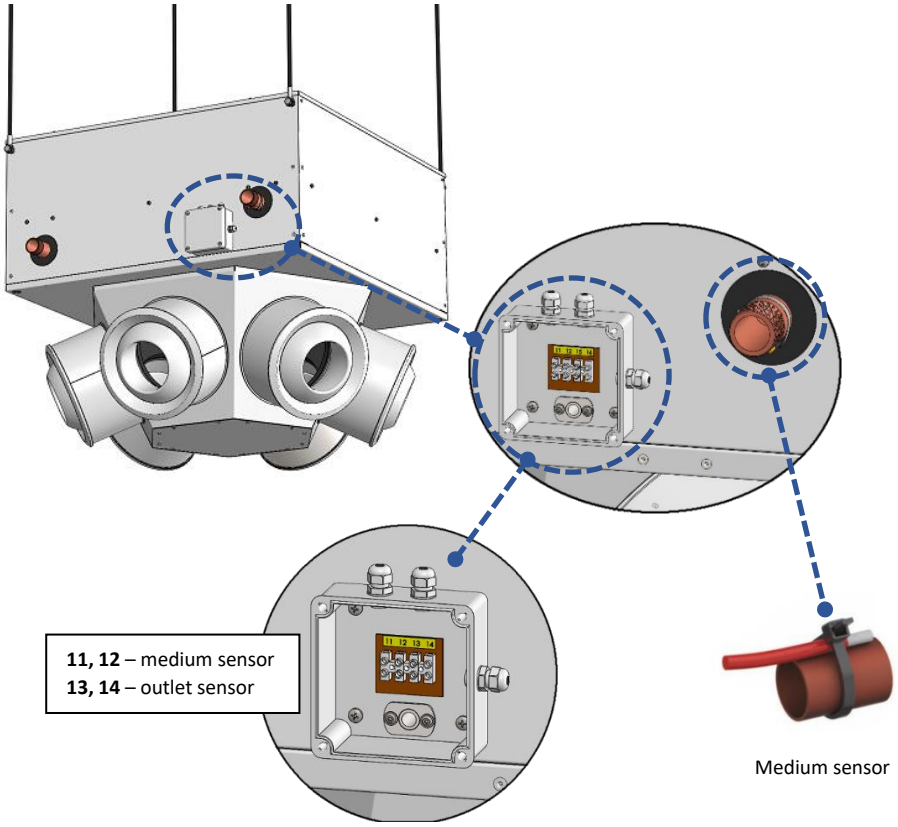


UNIREG BMS distribution



Type of control	Unireg DIT EC	Unireg DIT EC 400	Unireg BMS EC	Unireg BMS EC 400
Type of unit	Nevada N3 JET	Nevada N4 JET	Nevada N3 JET	Nevada N4 JET
Unit power supply	230V	400V	230V	400V
For max unit current	14A	9A	14A	9A
IP rating	IP 20		IP 20	
Dimensions (length x width x height)	300x400x170mm		300x400x170mm	

The medium sensor and outlet sensor are ready in the terminal box in the unit. The terminal numbers are identical to the terminal numbers in the Ditronic controller inside the Unireg DIT distribution board (refer to the connection scheme).



11. Commissioning, starting of the unit

Before commissioning make and check:

- covers and shell of the unit are in perfect condition,
- mechanic fixing and anchoring of the unit,
- fixing of electrothermic head and its setting,*
- function of circulating pump (not included in the device),
- correct connection of media and tight connections,
- tightness and function of the valves,*
- availability of power voltage,
- correct connection of all unit cables,
- fitting and setting of a pre-circuit breaker (not included in the device),
- free from mechanical impurities or objects.

*- if installed

Initial review of the electric appliance according to ČSN 331500 and ČSN 33 2000-6-61 ed. 2 must be made upon commissioning.

12. Optional accessories - depending on equipment level

The most frequent accessories include electrothermic valves for the temperature control (chapter 7.1). The valves are supplied as **not embedded**, for all available valve types refer to the catalogue. The function of the electrothermic valve drive is given by a control type.

An optional accessories may be e.g., room thermostat, hanging of the unit, 0–10V signal control of the unit over the superior BMS, and more. Selection of an appropriate type of accessories must be supported by the controller type.

For all accessories offered for the Nevada JET unit, refer to the catalogue documentation.

13. Basic service and maintenance information

All units are thoroughly checked and tested by the manufacturer before dispatch. The most frequent errors root from misunderstanding of the unit function or incorrect cabling and connection. For this, observe instructions from the manufacturer to avoid complex troubleshooting. In no case try to operate the unit when connected in a different way - the unit may operate for a while as you wish or expect but this irreversible step may result in damage beyond repair and loss. No warranty claims can be accepted with respect to this damage.

The Nevada JET heating units are supplied **without a filter** in front of the heat exchanger in standard, and therefore, special attention needs to be paid to the heat exchanger condition check. The regularity of checks depend on environment in which the device is operated. To access the heat exchanger, demount the upper plate of the unit (with a fan) being fixed around the circumference by bolts.

Before any work with the unit, disconnect the electric power supply, mains supply for the unit. Electric shock hazard!!!

Observe generally applicable national provisions, particularly ČSN 12 2002 and other related regulations. Unplug the unit from mains before any service intervention. Provisions of ČSN 332190, 332000-5-51 ed. 3, and 33 2000-5-54 ed. 3 must be observed for connecting and earthing of the electric devices. Qualified electrician only may perform any electric service works (qualification according to Decree of ČBU No. 50/78 Coll., § 6 is required.

Please contact your vendor or distributor for a service agreement. You will get regular service and excellent care of your unit.

Quarterly checks:

- Unit hanging and tightening of all bolt connections. Then, check tightening of bolts of exhaust splines.
- Disconnect the closest fan from the power box to check the space of the heat exchanger and to remove dirt or objects, if any. Then, demount the top plate with the fans. Use vacuum cleaner to remove dust from the heat exchanger. When using steam for cleaning, set as lowest temperature as possible and as lowest pressure as possible for not to damage the heat exchanger.*
- Before winter, check in particular the anti-frost protection function (applicable to the variant with Unireg DIT controller), superior circulating pump (not included in the supply of the device), setting electrothermic valve.*
- Re-test tightness of the unit or of installed fittings on the water side. If a sludge filter is installed before the unit – clean the filter and check deaeration of the heat exchanger.

- Check cleanliness of the motor suction grid and inner or outer parts of the unit. Do not wash the motor body with water! Wipe with lukewarm towel only – motor winding damage hazard; after the motor is cleaned, do not turn the unit on for at least 60 minutes – let the unit dry. Use vacuum cleaner to remove dust from the suction grid. Proceed carefully when wiping the exhaust splines!
- Check unit safety with respect to electric shock hazard according to applicable ČSN or national standards, including earthing inspection.

* if installed

13.1. Troubleshooting

Problem	Possible cause	Remedy
The unit can not be turned on	Unit circuit-breaker is off	Turn on
	Mains failure	Inspection
	Anti-freeze protection* (refer to Unireg DIT)	Inspection
	Controller position “0”*	Check, > position than “0”
	External contact*	Check connection or interconnection
Noisy motor	Defective motor mount	Check - replacement
Motor overheats (motor thermal contact turns off)	Defective motor mount or winding	Replace fan unit
	Heavily soiled motor – insufficient cooling	Check, clean
	Excessive temperature of intake air	Inspection
The fan delivers little air only	Soiled suction grid of the fan	Check – clean
The unit does not heat	Broken or clogged medium supply	Check - replacement
	Little air flows through the heat exchanger	Check - remove
	Soiled heat exchanger splines	Check – clean
	Insufficient media temperature	Remove
	Medium does not circulate	Check, deaerate
	Temperature achieved in line with controller setup	Controller setup
	Defective drive of electrothermic valve	Check setup, or replace if defective
Automatic operation disconnection	Overheated motor	Find out and clear the cause
	External clock	Check correct function (refer to controller description)

* if installed

14. Decommissioning – disposal

After the expiration of the service life, the unit must be disassembled and disposed of. Only qualified company may disassemble the device. The product or components thereof must be disposed in environmentally-friendly manner at the end of its service life.

The components of the unit must be separated and sorted out by type of material for disposal. Dispose of the metal and plastic components at your local collection yard. The transport packaging of the product is made of common recyclable material (paper, polyethylene, wood) and is labelled as such according to ČSN 77 0052-2.

As far as disposal is concerned, it is operator’s responsibility to comply with applicable national provisions in the country of use. In addition, follow regulations and laws of your country applicable to waste disposal. Separated collection and recycling of the products may help to protect environment and human health.

15. Important notes

The heating unit covers losses of the heated room. Other uses are not intended. The manufacturer accepts no liability for damage resulting from use other than intended. Observe this manual in operation of the units.

Installation, electric connection, and repairs must be carried out by qualified persons according to § 6 of Decree No. 50/78 Coll. or according to applicable national standards and regulations. An expert company is needed to connect the heating medium.

Before the start of the heating season, it is necessary to provide the required amount of heating medium with the design values for units with the hot water heater.

The manufacturer reserves right to changes for marketing or production reasons without prior notice!

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