

## TEMPERATURE-RESISTANT AND HEATED DIAPHRAGM GAS SAMPLING PUMPS

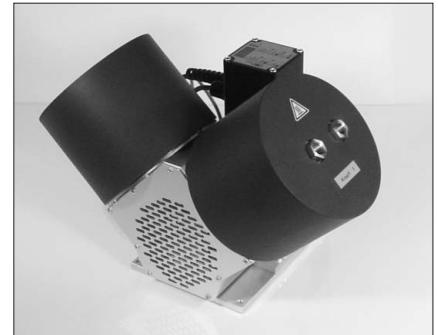
SECTION 84.45



N036.0ST.16I, temperature-resistant



N036.0ST.11I with thermostatic temperature control



N036.0ST.26I with electronic temperature controller

### Concept

The temperature-resistant and heated diaphragm vacuum pumps from KNF are based on a simple principle - an elastic diaphragm, fixed on its edge, moves up and down its central point by means of an eccentric. In this way the medium is transferred using directional valves.

Pumps for this new range are available in three different versions:

- A resistant to temperature version up to 240 °C (465°F) (.16)
- A heated version (240 °C) with thermostatic temperature control (.11)
- A heated version for temperatures up to 240 °C (465°F) with electronic temperature control (.26) with PC software .

There is a choice of pump drives ranging from a selection of AC motors to explosion-proof models. Please contact us for further details.

### Features and Benefits

Uncontaminated flow of the media (oil-free operation)  
No maintenance required

No condensation in the pump head

Even distribution of heat throughout the pump head

Low heat loss to surroundings

Easy access to the pump head

Energy efficient heating

Electronically controlled heating system

PC software for controlling the pump via a PC and documentation of all operational data

Gas tight:  
Leakage < 6 x 10<sup>-3</sup> mbar-l/s

### Areas of use

Diaphragm pumps have become the standard in many analytical applications. Based on their design, they work without any pump oil.

Often hot gases need to be analysed, and the gas must not be allowed to cool down when it is transferred from the source being checked, to the analyser as the constituent parts could condense out, leading to faulty results. To overcome these problems hot gases are pumped using diaphragm pumps with heated heads.

All models are characterised by an even spread of temperature throughout the pump head and highly efficient insulation.

## PERFORMANCE DATA

Type	Delivery (l/min)	Vacuum (mbar absolute)	atm. Press	Pressure (bar g)	Weight (kg)
N 036.0 AT.16I temperature-resistant	30 per head	200		1,5	18,2
N 036.0 ST.16I temperature-resistant	30 per head	200		1,5	22,2
N 036.0 ST.11I heated (with thermostat)	30 per head	200		1,5	22,0
N 036.0 ST.26I heated (electronic control)	30 per head	200		1,5	22,5

**PERFORMANCE DATA**

Type and OrderNo. <sup>2)</sup>	Delivery (per pump head) at atm. pressure (l/min) <sup>1)</sup>	Max. operating pressure (bar g)	Vacuum (mbar abs.)
<b>N 036.0 AT.16I</b>	30	1,5	200
<b>N 036.0 ST.16I</b>	30	1,5	200
<b>N 036.0 ST.11I</b>	30	1,5	200
<b>N 036.0 ST.26I</b>	30	1,5	200

<sup>1)</sup> Litre at STP .0 = without head connection. Various connections are available as options Please contact us for further details.

<sup>2)</sup> „See also „MODEL CODE FOR EASY ORDERING“

**MODEL CODES AND MATERIALS**

Type and Order No. <sup>2)</sup>	Pump head	Diaphragm	Valves
<b>N 036.0 AT.16I</b>	Aluminium	PTFE	PTFE
<b>N 036.0 ST.16I</b>	Stainless steel	PTFE	PTFE
<b>N 036.0 ST.11I</b>	Stainless steel	PTFE	PTFE
<b>N 036.0 ST.26I</b>	Stainless steel	PTFE	PTFE

.16 = temperature resistant pump, .11 = heated pump with thermostatic temperature control, .26 = heated pump with electronic temperature control

**MOTOR DATA**

Protection class	IP 54	IP54	
Voltage/Frequencies (V/Hz)	~230/50	115/60	
Power P <sub>1</sub> (W)	300	300	
Operating current (A)	2.0	4.0	

Motors with other voltages, frequencies and protection classes on request.

**Heating: N 036.0 ST.11I and N 036.0 ST.26I**

Voltage/Frequencies (V/Hz)	~230/50	115/60	
Power P <sub>1</sub> (W)	900	900	
Operating current (A)	3,8	7.6	
Heating temperature (°C)	240	240 (465°F)	

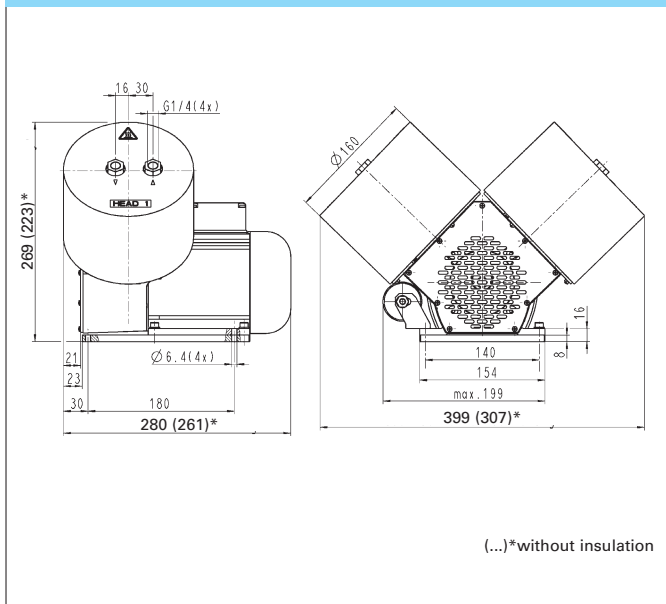
Heating with other voltages and frequencies on request.

In standard configuration, temperature is set separately for each pump head. A shared temperature specification for both pump heads is available as an option (see Operating Instructions).

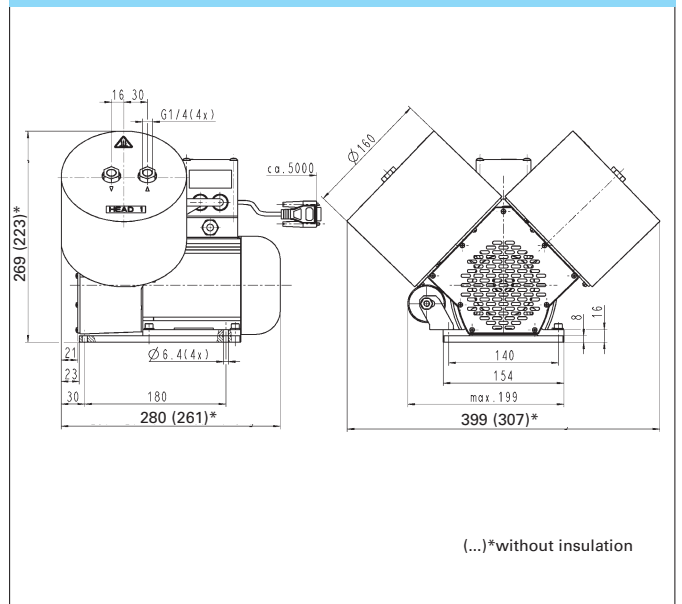
KNF offers the pump N 012 ST.26I with an RS 232 interface. The interface protocol can be made available for applications which require external control.

**Dimensions <sup>3)</sup> (mm)**

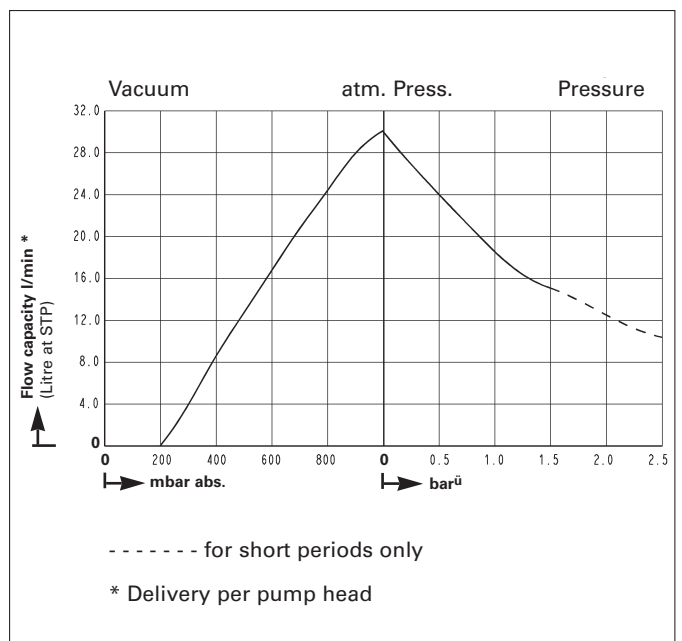
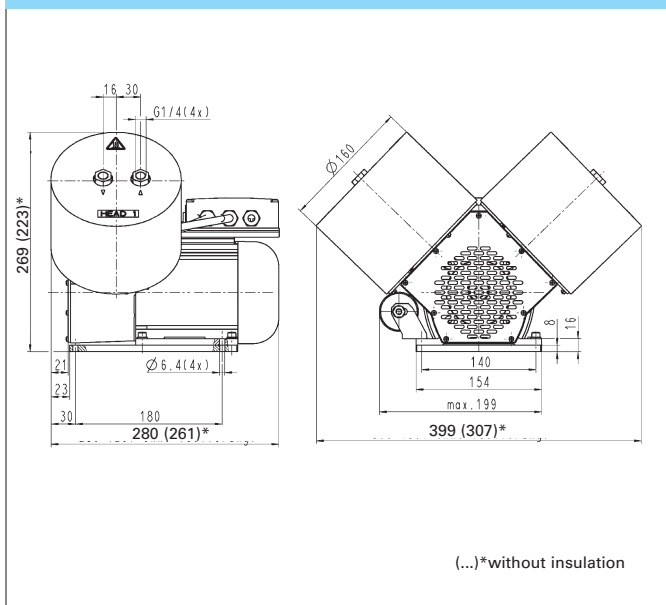
**N036.0AT/ST.16I**



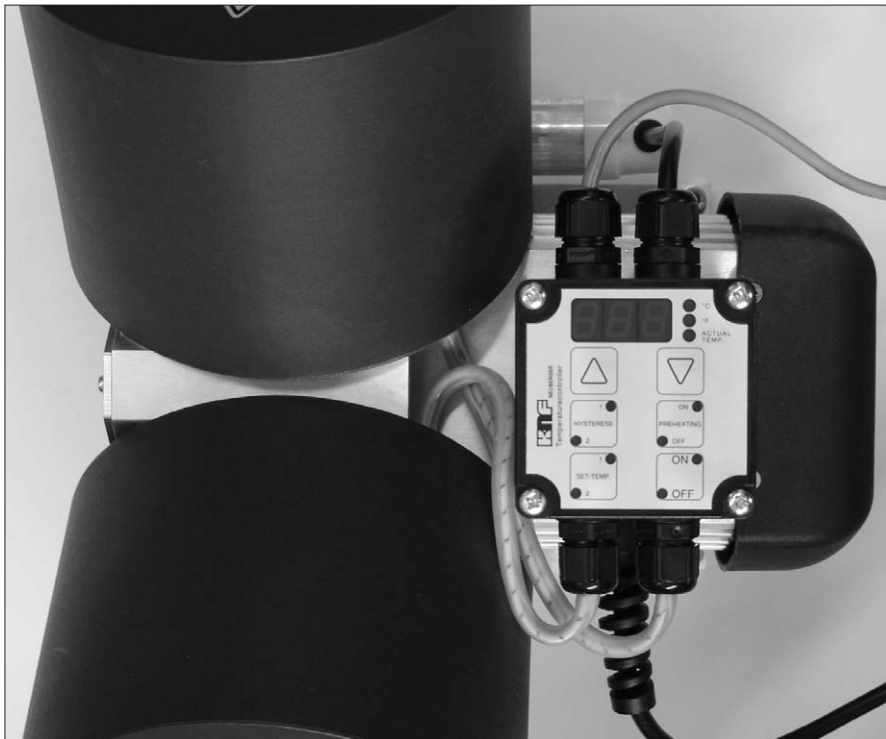
**N036.0ST.26I**



**N036.0ST.11I**



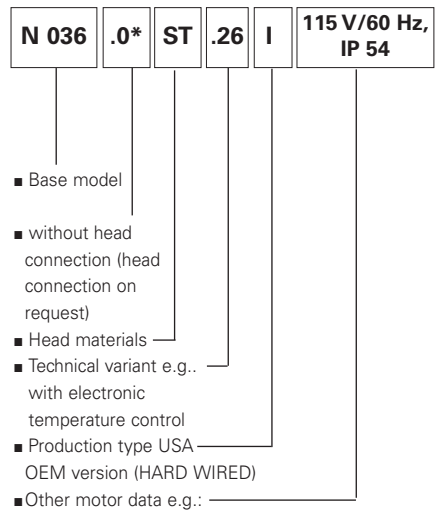
<sup>3)</sup> All dimensional tolerances conform to DIN ISO 2768-1, Tolerance Class V



Heated Pump with electronic temperature control and control panel with display.

## MODEL CODE FOR EASY ORDERING

The model code is identical to the order number. It is made up as follows:



In addition motor data must be given in the purchase order (voltage, frequency, and protection class, see before).

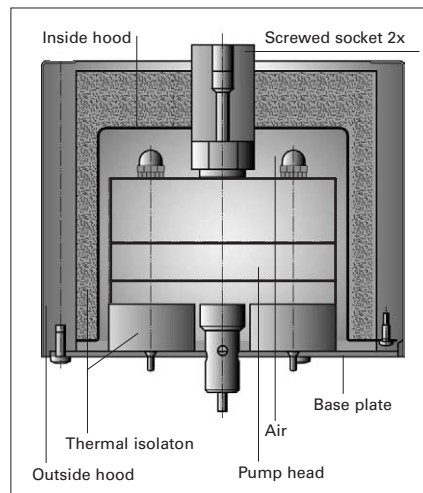
## INSULATION OF THE PUMP HEAD A PRACTICAL SOLUTION

In all models of the new pump range the pump head is completely sealed by a removable cover. This encapsulation leads to excellent heat insulation and an even distribution of heat in the pump head.

As the insulation unit requires easy removal, a method of insulation was chosen which is not in direct contact with the pump head. Therefore, only air comes into direct contact with the pump head. Air, with an extremely low thermal conductivity of ( $= 0,038 \text{ W / m K}$ ), at  $200 \text{ }^\circ\text{C}$ , limits heat transfer very effectively. Heat transfer through convection is also extremely low because of the small volume of air.

Up to 85 percent of the radiation is reflected by an internal, stainless-steel cover, again resulting in an even heat saturation within the pump head. In addition, thermal insulation is provided by a fleece material made of glass fibres. This is protected, by the stainless-steel cover, from direct heat radiation so that its only purpose is to limit thermal conduction. On the outside, a protective cover provides the final

insulation and protection against contact (see below, section drawing) .



In order to provide the design with the best possible thermal insulation and thermal distribution, KNF engineers made extensive use of complex finite element calculations.

Motors with other voltages, frequencies and protection classes on request.

\* Twin-head pumps (.0 versions) are delivered standard without a head connection. Various connections are available as options.

KNF is the competent partner for vacuum and compressor technology, especially for unusual problems. Call us and talk to our application engineers.

## KNF Neuberger, Inc

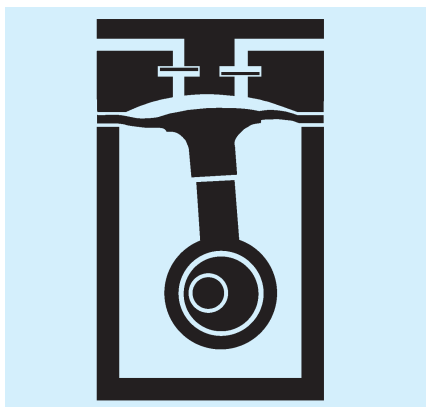
2 Black Forest Road  
Trenton, NJ 08691-1810  
Tel. 609-890-8600  
Fax 609-890-8323  
[www.knf.com/usa.htm](http://www.knf.com/usa.htm)

## FUNCTION, INSTALLATION AND SERVICE

### FUNCTION OF KNF DIAPHRAGM VACUUM PUMPS AND COMPRESSORS

An elastic diaphragm is moved up and down by an eccentric (see illustration). On the down-stroke it draws the air or gas being handled through the inlet valve. On the up-stroke the diaphragm forces the medium through the exhaust valve and out of the head. The compression chamber is hermetically separated from the drive mechanism by the diaphragm. The pumps transfer, evacuate and compress completely oil-free.

#### Diaphragm pump



### INSTALLATION AND OPERATION

- Range of use: Transferring air and gases at temperatures between +5°C and +240°C
- Permissible ambient temperature: between +5°C and +40°C
- The standard pumps are not suitable for use in areas where there is a risk of explosion. In these cases there are other products that are more suitable. Please ask us for details
- The pumps are designed to start against vacuum. Pumps that start against pressure are available on request.
- To prevent the maximum operating pressure being exceeded, restriction or regulation of the air flow should only be present in the suction line
- Components connected to the pump must be designed to withstand the pneumatic performance of the pump
- Install the pump so that the fan can blow in sufficient cooling air
- Fit the pump at the highest point in the system, so that condensate of the tubing cannot flow to in the pump head

### SERVICE

The diaphragm and valve plates are the only parts of the KNF diaphragm pumps subject to wear. They are easy to change, as no special tools are needed.

### ELECTRONIC CONTROL

The .26 version permits electronic control of the pump head temperature. The following values can be set:

- The head temperature
- The hysteresis i.e. the level in degree's C. by which the temperature can reduce before the heating element in the head is switched back on.

The pumps are equipped with a thermal sensor; controlled electronically. The display shows either the current temperature or the desired temperature. The operator can choose whether the temperature is displayed in degrees Celsius or degrees Fahrenheit.

In addition, the new heated diaphragm pumps equipped with electronic controls have a completely new function for increased reliability in analyzing results and for lowering energy consumption. When the pre-heating mode is activated at the controls, the pump only starts when the pump head has reached the required operating temperature. Thus it is impossible for the medium under analysis to be pumped at a stage when constituent elements could condense out in the pump head.

The pumps can also be controlled by a PC via the supplied PC software. Up to five measurement cycles can be preprogrammed, with defined operational parameters. The measured operational data is shown on the PC in graphical form, and is documented as a .knf file.

If you have any questions, please call one of our sales engineers (see below for contact telephone number).

**KNF Neuberger, Inc.**  
2 Black Forest Road  
Trenton, NJ 08691-1810  
Tel. 609-890-8600  
Fax 609-890-8323  
[www.knf.com/usa.htm](http://www.knf.com/usa.htm)