



CUSTOMIZED PUMP SOLUTIONS FOR CIJ AND DOD PRINTING SYSTEMS



KNF GAS AND LIQUID PUMPS IN ACTION: DIGITAL INKJET PRINTERS

RELIABLE INK TRANSFER – ROBUST AND MAINTENANCE-FREE

KNF gas and liquid pumps are used in all areas of industrial inkjet printing, from printing equipment for large-format banners to decorative printing on furniture and ceramics as well as printing systems for barcodes and packaging labels. Our custom-built solutions ensure a continuous transfer of ink and boast a reliable, durable and maintenance-free design.

A valued solution partner

KNF works alongside the world's leading inkjet printer manufacturers. Thanks to our extensive expertise acquired over many years and our close working relationship with developers and designers, we know exactly how vital maximum running times are to both you as a manufacturer and your customers.

KNF gas and liquid pumps are the products of decades of engineering experience in diaphragm pump technology. Each of our solutions is tailored precisely to your printing equipment and process requirements.

We grow with your business

We have been involved in digital printing from the beginning, and so we know that some things just need time. And we are happy to invest this time to support you in the development of new printing systems. A single pump or serial production? Small or large production numbers? It makes no difference to us – we produce and deliver an optimal solution. Thanks to

the KNF modular system, every one of our pump series models can be quickly and inexpensively adapted to meet specific needs. We will be happy to support you throughout the specification process and provide advice drawn from our many years of practical experience.

Global network

As a technology leader in diaphragm pumps and systems, KNF provides its customers with a close-knit network of outstanding services and competent advisors. Highly skilled employees across a number of locations worldwide and efficient coordination ensure that our business operations run smoothly. KNF is by your side every step of the way from the development stage to the series production of your industrial digital printing systems. An ongoing commitment to quality, efficient processes and reliability are values that you can count on with KNF.

KNF gas and liquid pumps are used in industrial digital printing equipment for:

- Wide-format printing
- Packaging printing
- Decorative printing on ceramics, glass, wood, metal and plastic
- Labeling, marking
- Textile printing



CONFIGURED TO MEET CIJ AND DOD REQUIREMENTS

PINPOINT PRECISION

From ink supply and degassing to purging of print heads, vacuum generation on the print heads for the meniscus effect and ink circulation, our customized, comprehensive solutions use gas and liquid pumps to perform all the processes needed to ensure the continuous transfer of ink. KNF's diaphragm pumps are tailored to all the specific requirements of both CIJ and DOD technology.

Fully adaptable

KNF pumps are known for their outstanding flexibility. With their compact design, ability to be installed in any position and fully adjustable controls, all pump components can be adapted to meet the exact needs of your equipment.

Chemically resistant and robust

When designing our gas and liquid pumps, we take the chemical composition of the ink, the pigment density and the use of solvents into account. To ensure that our solution fulfills your specifications, you can choose to have your wetted pump components produced from

FFKM, PTFE, EPDM, FKM and other materials. KNF pumps are able to transfer all types of ink used in the printing industry, from water-based and pigment inks to solvent-based and UV inks. What's more, even our pump name plates are solvent resistant.

Flexible and efficient levels of performance

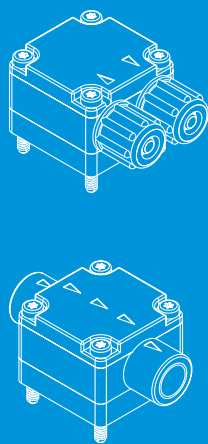
The wide array of industrial inkjet printing solutions on the market covers an extensive range of sophisticated printing processes. The variety of options available in our modular system help you to stand out from the crowd and can be used to create a solution with a price/performance ratio tailored precisely to any set of requirements.

Perfectly airtight

Leak-proof printer components are essential for long-term, fault-free operation. KNF liquid pumps feature an outstanding, tried-and-tested hermetically sealed pump head design and a large selection of hydraulic connection options, keeping them fully airtight at all times.

MECHANICAL OPTIONS

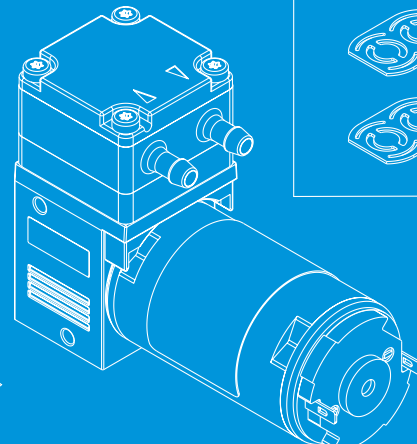
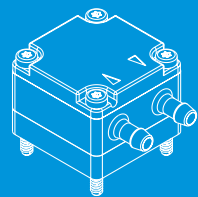
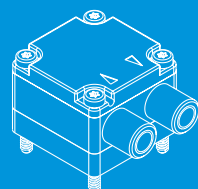
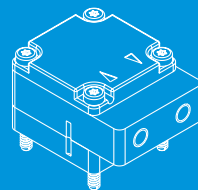
Circuit points and connections



MATERIAL OPTIONS

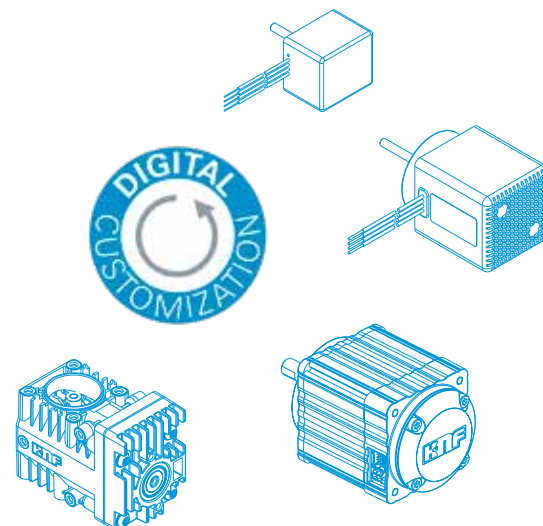
Valve/Diaphragm:
EPDM, FKM, FFKM,
HNBR, stainless steel
and others

Pump head:
PP, PPS, fluoroplastics,
stainless steel,
aluminum and others

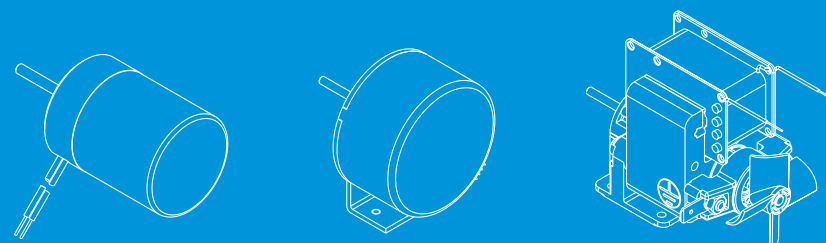


MOTOR OPTIONS

“DIGITAL CUSTOMIZATION” sets our brushless DC motors apart, allowing for their unique configuration. And we do mean unique. We develop and produce these motors ourselves or as part of an exclusive development partnership with a leading motor manufacturer. These motors map complex operating profiles, including required safety parameters. Your advantage: high energy efficiency, precisely controlled target variables and simple control via digital signals.



Explosion-proof versions
and all common voltage
configurations available.
Motor types: DC, DC-B, AC.



KNF MODULAR SYSTEM

FLEXIBLE, CUSTOM-FIT, COST-EFFECTIVE – FROM STANDARD TO HIGH-END

Every application is different and some are one of a kind. Our modular system is designed to give you a high degree of flexibility, speed and reliability. You can be sure that every gas and liquid pump supplied by KNF will exactly meet your requirements, no matter how complex or unusual these might be.

Series models – the first step to customized pumps

KNF offers a range of up to 90 series models designed for handling gases and liquids. The performance characteristics of these are described in our data sheets.

The KNF modular system for creating customized pumps

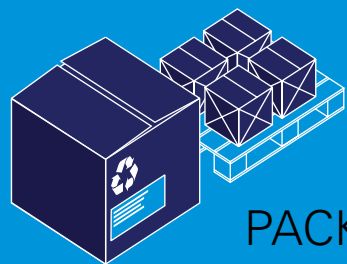
By selecting and combining a variety of options, ranging from the material used to make the pump components that come into contact with the media, to the drive and the mechanical elements such as the circuit points and connections, it is easy to tailor every series model to meet application-specific requirements. The configurations created by the KNF modular system are based on tried and tested individual components, meaning that developing customized pumps is quick and inexpensive.

Project pumps – precisely designed for the application

We support your development project by providing you with sample pumps quickly and easily. In consultation with you, our employees from the sales, engineering, and product management divisions determine the modifications to be made to the product's standard technical parameters.

FLEXIBLE SUPPORT FROM START TO FINISH – YOUR ADDED VALUE IS OUR PRIORITY

WITH KNF, FLEXIBILITY DOESN'T STOP AT THE TECHNICAL SOLUTION. WE FULFILL YOUR INDIVIDUAL REQUESTS EVERY STEP OF THE WAY UNTIL DELIVERY AND SERVICE.



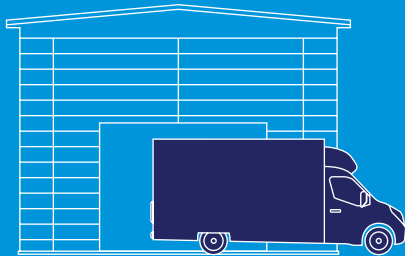
PACKAGING

We'll be happy to implement any measures that make life easier for your goods receiving department, as well as to support your efforts toward recycling and environmental protection.



DOCUMENTATION

Together, we'll define the type, scope and design of the documentation.



LOGISTICS

We support all types of production lot ordering – including Kanban, VMI, CMI, B2B and others.

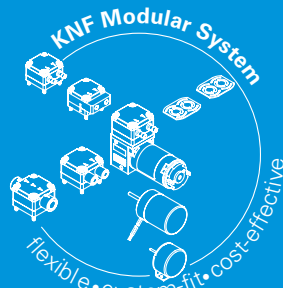


We inspect and test 100% in line with your requests.



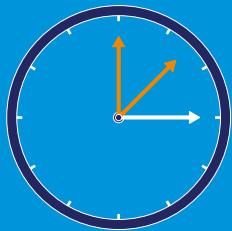
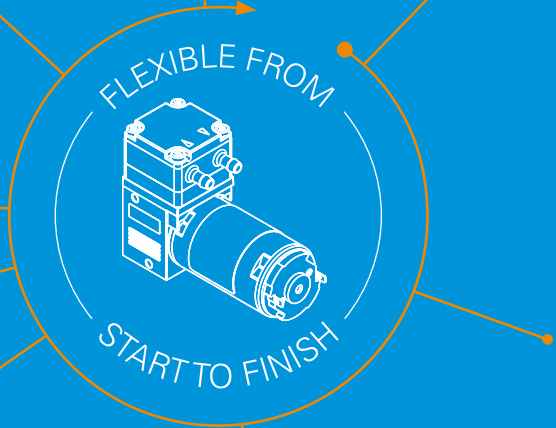
SERVICE

We implement custom-fit service concepts for you. It is important to us to minimize the overall running costs of our pumps, and we take this into account in the pricing of replacement parts.



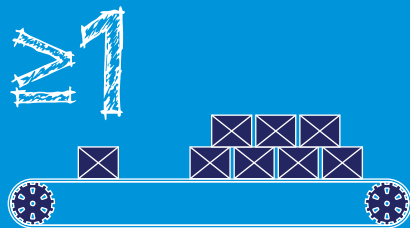
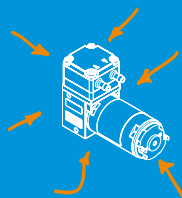
~3,000

customized adaptations are carried out at KNF every year for all our customers worldwide – quickly and inexpensively thanks to our modular system. We also develop exclusive pumps and drive concepts for individual customers.



"ASSEMBLY AND ENGINEERING IN ONE"

We will provide you with the pump as an assembly. This may include completing steps in the production process or installing components such as a valve block, sensors, tubing etc.



PRODUCTION

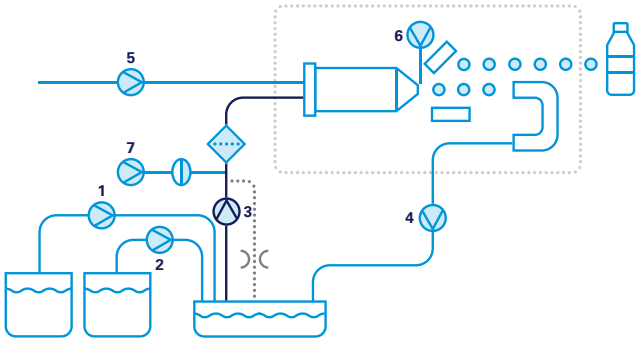
You can rely on the flexibility and quality of our support for every order with KNF, from large lot sizes to a single pump.

GAS AND LIQUID PUMPS FOR CONTINUOUS INKJET (CIJ) TECHNOLOGY

INK DELIVERY – FOR RELIABLE INK TRANSFER TO THE PRINTHEAD

The pressure pump (3) transfers the ink from the reservoir to the printhead.

| Series model | max. flow rate at atm. pressure (l/min) | max. suction height (mH ₂ O) | max. pressure head (mH ₂ O) |
|--------------|---|---|--|
| NF 1.5 | 0.06 | 3 | 60 |
| FP 1.7 | 0.07 | 2 | 60 |
| FF 20 | 0.23 | 3.5 | 30 |
| FP 1.25 | 0.25 | 3 | 60 |
| NF 1.25 | 0.3 | 3 | 60 |

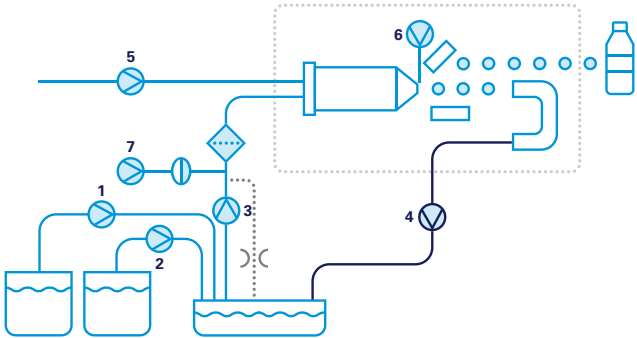


GENTLE INK FEEDBACK – FOR REDUCED SOLVENT CONSUMPTION

The gutter pump (4) creates a slight negative pressure in order to return the excess ink from the printhead back to the ink reservoir.

| Series model | max. flow rate at atm. pressure (l/min) | max. suction height (mH ₂ O) | max. pressure head (mH ₂ O) |
|--------------|---|---|--|
| NF 30 | 0.3 | 6 | 10 |

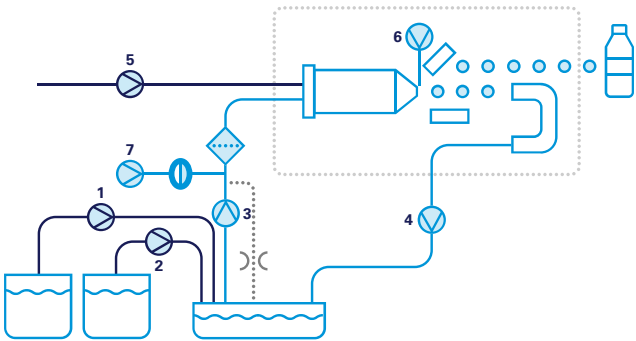
| Series model | max. flow rate at atm. pressure (l/min) | max. vacuum (mbar abs.) | max. pressure (bar rel.) |
|--------------|---|-------------------------|--------------------------|
| NMP 830 | 3.1 | 250 | 1.4 |



INK-SUPPLY, SOLVENT-SUPPLY AND PRINTHEAD CLEANING

The pumps (1) and (2) transfer ink and solvent into the main tank. Additionally, the diaphragm pumps contribute to precisely regulating the viscosity of the printing ink within the printing circuit. Before the system is shut down, the purging pump (5) delivers solvent to the printhead to remove any ink residue.

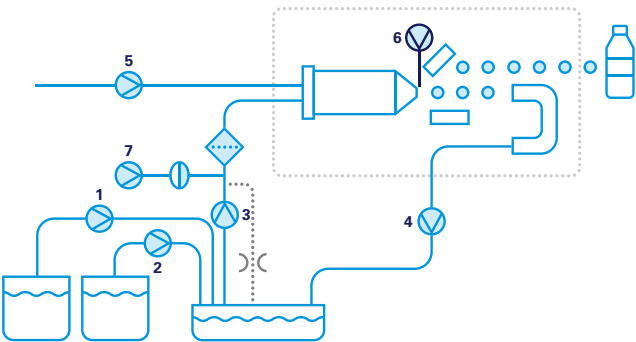
| Series model | max. flow rate at atm. pressure (l/min) | max. suction height (mH ₂ O) | max. pressure head (mH ₂ O) |
|--------------|---|---|--|
| NF 5 | 0.07 | 3 | 10 |
| FF 12 | 0.15 | 3 | 10 |
| FF 20 | 0.23 | 3.5 | 30 |



PRINTHEAD VENTILATION SYSTEM – FOR DUSTY ENVIRONMENTS

A gas pump (6) cleans the printhead by producing a continuous air stream. This prevents particles from collecting on the printhead and clogging up the nozzles in dusty environments.

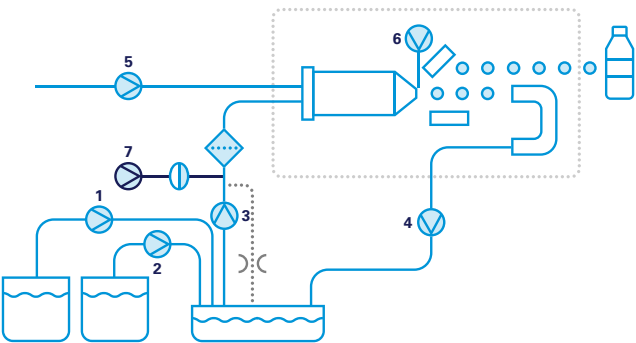
| Series model | max. flow rate at atm. pressure (l/min) | max. vacuum (mbar abs.) | max. pressure (bar rel.) |
|--------------|---|-------------------------|--------------------------|
| NMP 830 | 3.1 | 250 | 1.4 |
| NMP 850 | 4.5 | 230 | 2.5 |
| NMP 850.1.2 | 15 | 50 | 2.2 |



AIR POCKET FOR PULSATION DAMPING

The swing piston compressor (7) is used to create an air pocket which dampens pulsation.

| Series model | max. flow rate at atm. pressure (l/min) | max. vacuum (mbar abs.) | max. pressure (bar rel.) |
|--------------|---|-------------------------|--------------------------|
| NPK 03 | 3 | 250 | 5.5 |

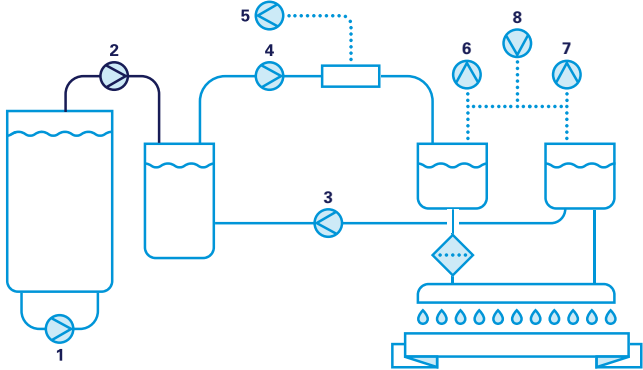


GAS AND LIQUID PUMPS FOR DROP-ON-DEMAND (DOD) TECHNOLOGY

INK DELIVERY – DIRECT TRANSFER OF INK TO THE PRINTHEAD

The liquid pump (2) transfers ink from the external tank to the intermediate tank within the printing circuit.

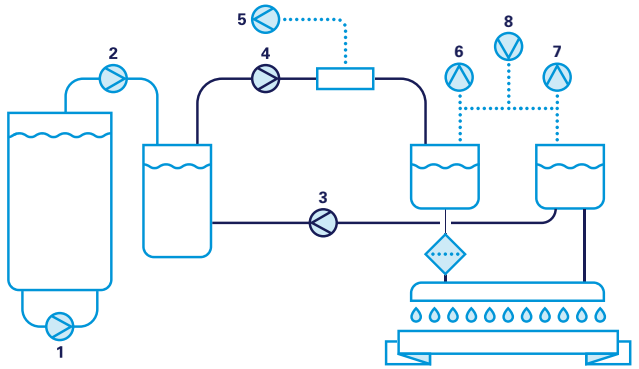
| Series model | max. flow rate at atm. pressure (l/min) | max. suction height (mH ₂ O) | max. pressure head (mH ₂ O) |
|---------------------|---|---|--|
| FP 7 / FP 1.7 | 0.07 | 2 | 60 |
| FL 10 | 0.1 | 2 | 10 |
| FF 12 / FF 20 | 0.23 | 3.5 | 30 |
| FP 25 / FP 1.25 | 0.25 | 3 | 60 |
| NF 25 / NF 1.25 | 0.3 | 3 | 60 |
| NF 60 / NF 1.60 | 0.65 | 3 | 60 |
| FP 70 | 0.85 | 3 | 20 |
| FP 150 / FP 1.150 | 1.5 | 2.3 | 60 |
| FP 400 / FP 1.400 | 4.6 | 3 | 60 |
| FK 1100 / FK 1.1100 | 12.4 | 4.5 | 60 |



RECIRCULATION FOR CONSISTENTLY HIGH PRINT QUALITY

The liquid pumps (3 and 4) continuously circulate ink through the printhead by transferring it from the return header tank back to the supply tank.

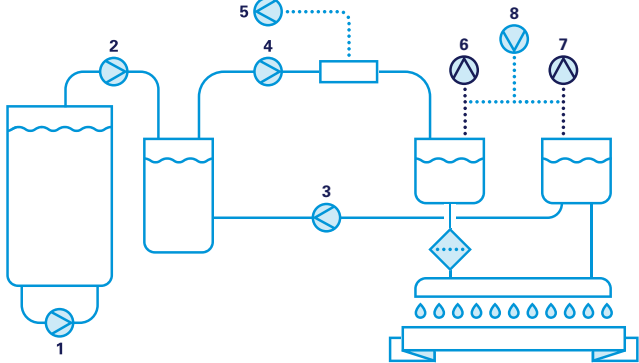
| Series model | max. flow rate at atm. pressure (l/min) | max. suction height (mH ₂ O) | max. pressure head (mH ₂ O) |
|--------------|---|---|--|
| FP 7 | 0.07 | 2 | 10 |
| FP 25 | 0.25 | 3 | 10 |
| FP 70 | 0.85 | 3 | 20 |
| NFB 60 | 1.2 | 3 | 10 |
| FP 150 | 1.5 | 2.3 | 20 |
| NFB 100 | 2.6 | 3 | 10 |
| FP 400 | 4.6 | 3 | 10 |



VACUUM GENERATION ON THE PRINTHEAD FOR THE MENISCUS EFFECT

The gas pumps (6 and 7) create a slight vacuum in the reservoir to prevent the ink on the printhead from leaking.

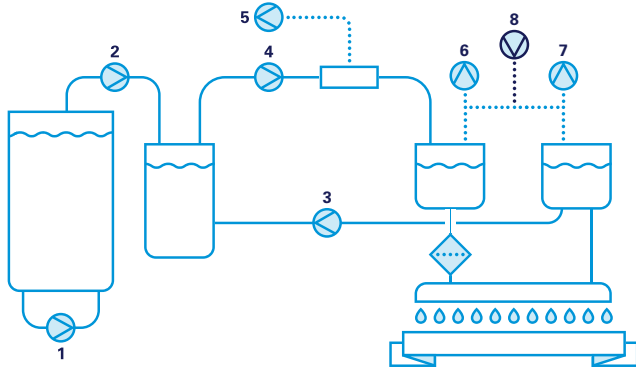
| Series model | max. flow rate at atm. pressure (l/min) | max. vacuum (mbar abs.) | max. pressure (bar rel.) |
|--------------|---|-------------------------|--------------------------|
| NMP 03 | 0.33 | 600 | 0.33 |
| NMP 09 | 0.9 | 500 | 0.65 |
| NMP 015 | 1.6 | 400 | 0.9 |
| NMP 820 | 2.1 | 330 | 1.2 |
| NMP 830 | 3.1 | 250 | 1.4 |



PURGING – INDIRECT PRINTHEAD RINSING BY WAY OF PRESSURE SUPERIMPOSITION

Gas pumps (8) and swing piston pumps (8) create positive pressure, allowing for gas bubble and residue removal on the printhead.

| Series model | max. flow rate at atm. pressure (l/min) | max. vacuum (mbar abs.) | max. pressure (bar rel.) |
|--------------|---|-------------------------|--------------------------|
| NMP 015 | 1.6 | 400 | 0.9 |
| NMP 820 | 2.1 | 330 | 1.2 |
| NMP 830 | 2.5 | 250 | 1.4 |
| NPK 03 | 3 | 250 | 5.5 |
| NMP 850 | 4.2 | 230 | 2.5 |
| NMP 830 HP | 5 | 230 | 3 |
| NMP 850 HP | 7 | 220 | 2.2 |



DEGASSING – RELIABLE REMOVAL OF DISSOLVED GASSES

Dissolved gasses are removed from the ink using a vacuum pump (5) that creates negative pressure on the degassing cartridge.

| Series model | max. flow rate at atm. pressure (l/min) | max. vacuum (mbar abs.) |
|--------------|---|-------------------------|
| NMP 820.3 | 1.7 | 100 |
| NMP 830.3 | 3 | 40 |
| NMP 830 HP | 5 | 230 |
| N 84.3 | 5 | 7 |
| N 86.3 | 5.5 | 30 |
| NMP 850.3 HP | 6.7 | 50 |
| NMP 850 HP | 7 | 220 |
| N 816 | 16 | 100 |
| N 816.3 | 16 | 15 |
| N 920 | 21 | 1.5 |
| N 952 | 36 | 1.5 |

