DOPAG

A MEMBER OF THE
HILGER&KERNGROUP

dynamicLine

GASKETING, BONDING, POTTING

HILGER&KERNGROUP


DOPAG

Dynamic mixing

Solutions for gasketing, bonding and potting

DOPAG is the system provider for gasketing, bonding and potting in highly automated production processes. DynamicLine is based on the new dynamic mixing head with innovative valve technology. With dynamicLine, DOPAG is setting the benchmark in terms of user friendliness, precision and reliability in dynamic mixing. DynamicLine automates all production steps, thus ensuring process reliability, replicability and cost-efficiency. This guarantees the consistently high quality and durability of all components produced.

The high-performance mixing head is based on over 40 years of experience in multi-component low-pressure metering and features a unique valve technology. Functions such as rinsing of the mixing system with water as standard, without the need for a environmentally harmful solvent, controlled opening and closing of the mixing system, and high-precision metering are setting new standards in the market.

Your partnership with DOPAG

- One contact for the entire system solution: from the dynamic mixing head and automation to service
- Competent support, design and process automation
- A dedicated technical centre for testing and customer training
- Contract production: sampling, prototypes, small volumes and large-scale production
- Close collaboration and regular communication with material manufacturers
- Decades of experience in metering and mixing technology
- Global distribution and service in over 40 countries

For perfectionists

The new dynamic mixing system guarantees accurate results.

DynamicLine was developed for the precise processing of highly reactive gasketing, adhesives and potting compounds based on polyurethane and silicone – especially when rapid mixing and application are required. Depending on the application, one of the two processes below is used in gasketing:

FIPFG: formed-in-place foam gaskets

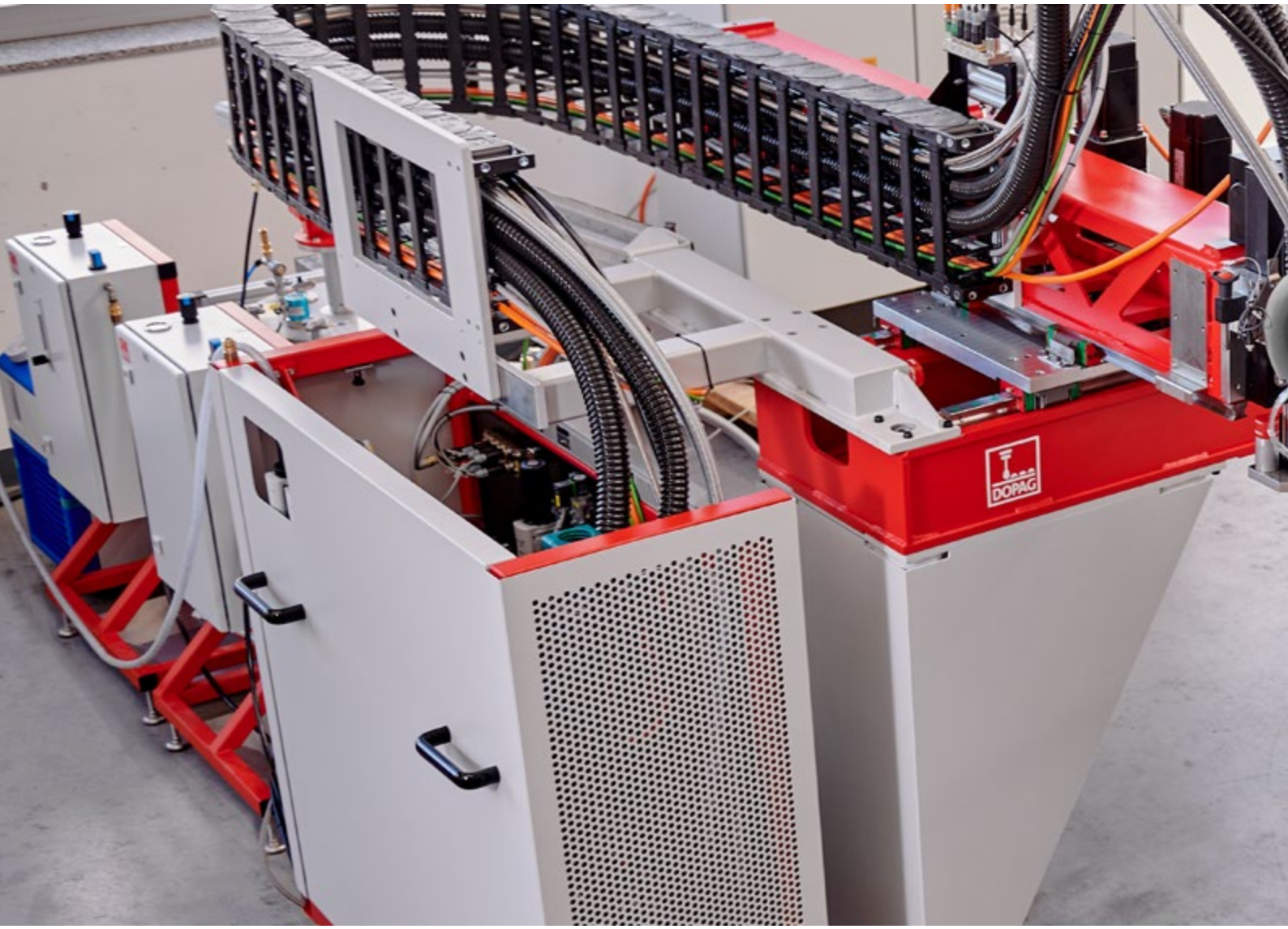
When gasketing with FIPFG technology, reactive polymer materials are metered precisely, mixed and then automatically applied on a component along a contour or a level surface. After a certain reaction time dependent on the material and other factors (temperature, humidity), the material foams up and bonds firmly to the component. Foam gasketing has many advantages compared to cut or manually applied gasketing. The start and end point of the gasket are connected practically seamlessly. They bond without any additional adhesive tape and there is considerably less waste.

FIPG: formed-in-place gaskets

DynamicLine is also perfect for FIPG (formed-in-place gaskets). Here, non-foaming, highly reactive sealing systems that cannot be processed using a static mixing system are metered, mixed and applied.

For efficient production processes

Short production cycles and reproducible results ensure high cost-efficiency.



With dynamicLine, all production steps are not only reproducible, but also cost-efficient in particular. DynamicLine offers numerous benefits compared to manually applied or inserted gasketing. The automated production enables shorter cycle times, while the potential for error is very low. The high precision of dynamicLine also ensures a high level of reproducibility. Compared to punched or cut gasketing, foam gasketing is significantly more cost-efficient and higher in quality. There is also practically no waste and the system is rinsed only with water, with no need for solvent. This ensures an overall more sustainable production process.

Bonding and potting applications are also cost-effective and efficient with dynamicLine. Various automation modules, such as a linear robot and shuttle sliding tables or a 6-axle articulated robot, ensure rapid handling of components and enable short cycle times.

For versatile use

Reliable technology enables a wide range of highly reactive materials to be processed.

Control cabinets:
Foam seal on doors and ventilation grilles

Car speaker:
Foam bead as vibration protection and for sealing

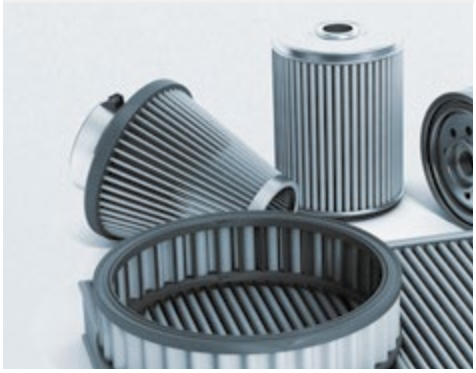
Lights:
Foam seal for casing

Electronic components:
Foam seal for certified casing

Highly reactive sealing, bonding and potting materials are used in a wide range of applications and industries. Implementation requires individual consulting and a technology that can be adapted to specific requirements. With dynamicLine, DOPAG is offering a system for tailored solutions and individual production processes.

Packaging material:
Sealing of containers, barrels and drums

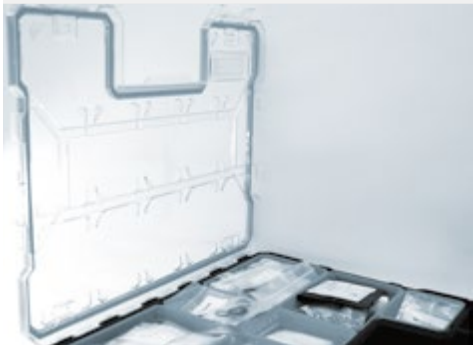
Filter:
Bonding, foam potting and gasketing



Electronic components:
Sensor and LED potting

Door module:
Foam seal

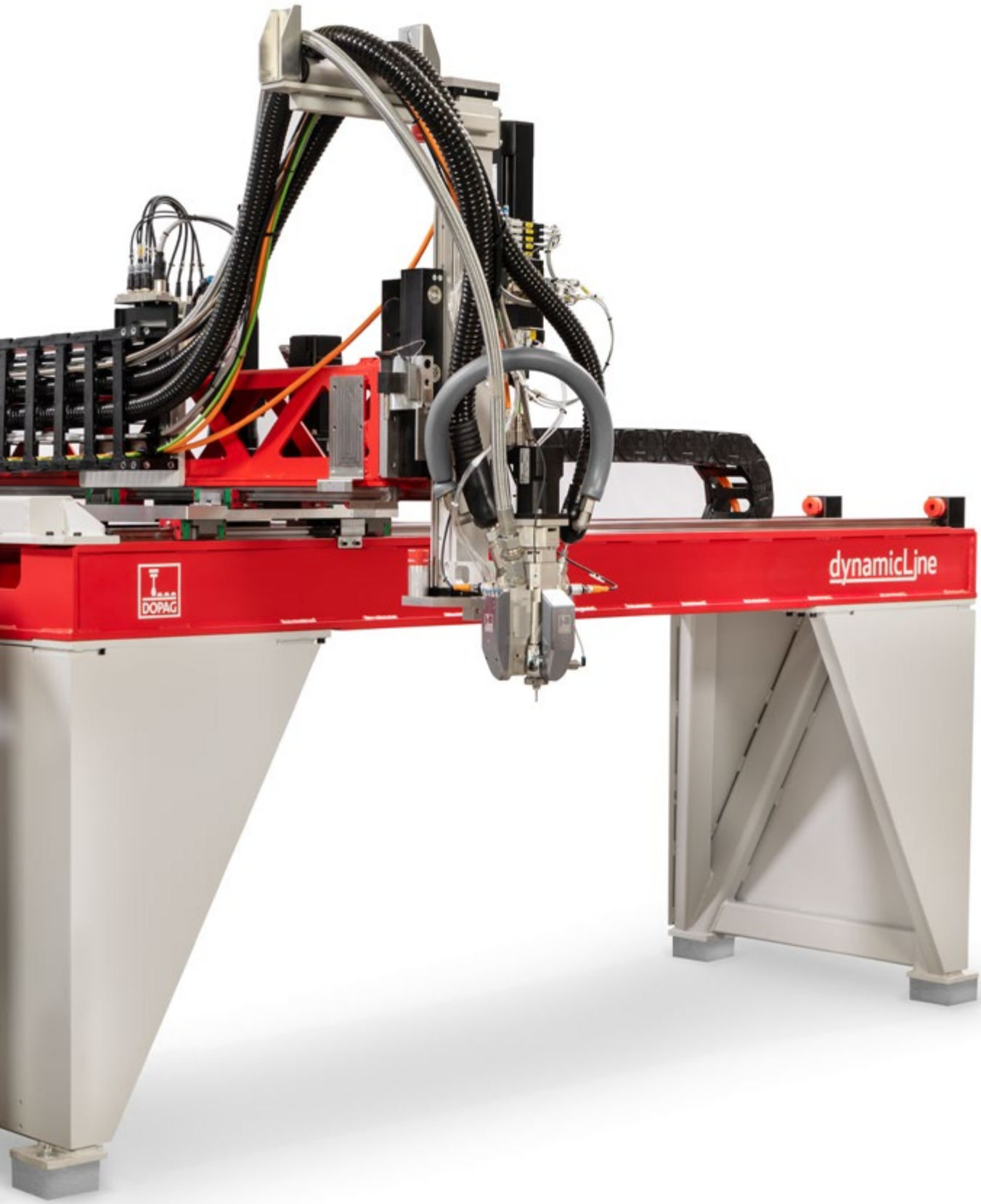
Industrial use:
Foam seal of toolboxes



Household appliances:
Sealing of vacuum cleaner casings

dynamicLine

Top performance every time


DOPAG
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Reliable technology

Precise processing of highly reactive materials

The demands for the processing of highly reactive materials are increasing. Gasketing, adhesives and potting compounds need to be processed ever quicker. DynamicLine is specially designed for processing highly reactive materials.

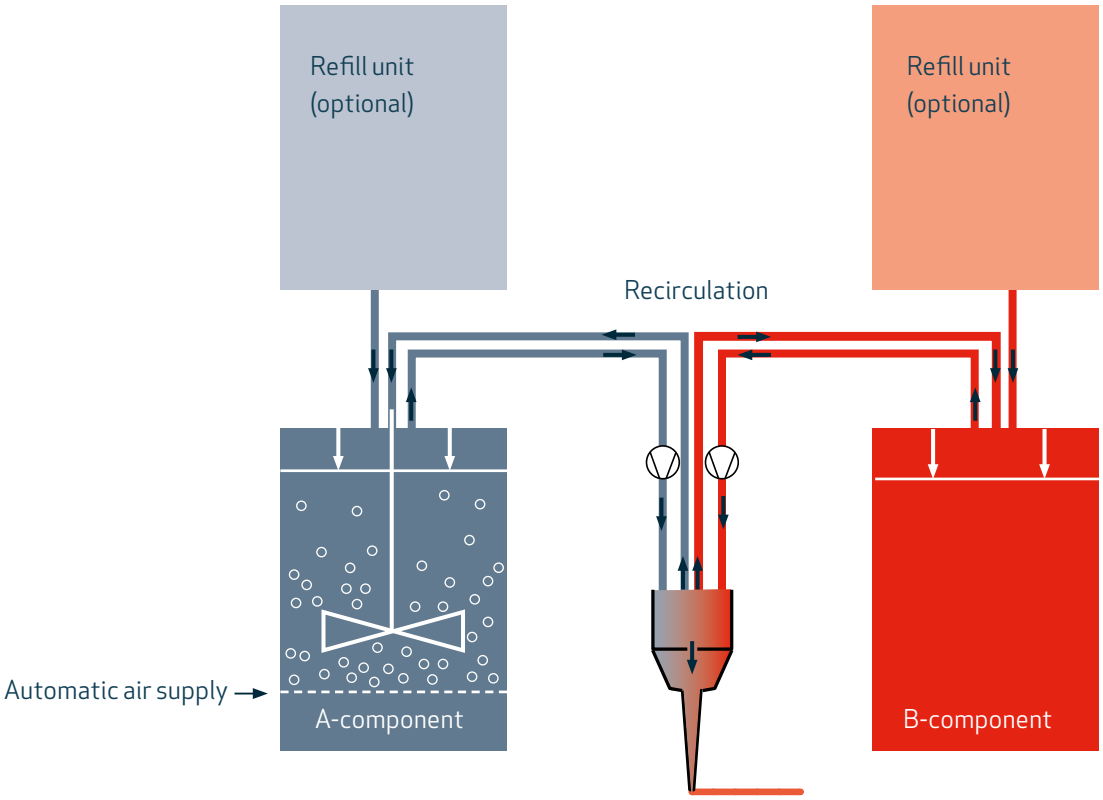
The metering process involves three steps:

1. First, the dynamic mixing system goes to a filling position. The individual material components are metered and mixed in the mixing chamber. After the filling process, there is cleanly mixed material in the chamber corresponding exactly to the mixing ratio.

2. Application on the component begins. During the process, new material is constantly metered into the mixing chamber via precise DOPAG gear pumps. The control system ensures absolutely constant material pressure at the mixing head here. Material conditioning is carried out in the material supply modules with material pressure tanks. To ensure a seamless, reproducible coupling point of the seal, the individual components work in a recirculatory mode.

3. After the foam bead has been applied to a defined number of components, the dynamic mixing system moves to the rinsing position. The mixing chamber and nozzle are rinsed with water at a high pressure of approx. 100 bar for cleaning. Depending on the application, a maximum of 250 ml of water is required per process. The use of solvents is not necessary, which protects the environment.

The material pressure tank for the A-component is fitted with an electric agitator as standard, and air is supplied automatically. Sieve filters are also fitted as standard for polyols and silicones to avoid contamination and thus prevent premature wear of the gear pumps. To avoid potential errors due to crystalline particles, a slotted filter is used for isocyanates.



Benefits of dynamicLine

- **Nozzle-closing system (NCS):** The nozzle-closing system prevents the material from dripping and ensures seamless closure of the sealing bead.
- **Careful processing of material:** Practically no heat development and no premature cross-linking of material in mixing system
- **Material-independent technology:** Processing of all common materials for gasketing, bonding and potting. We cooperate with the leading material manufacturers in this. As an independent machine manufacturer, we come up with the perfect solution for every challenge.
- **Flexible control of individual valves:** Separate control of metering valve and recirculation valve ensures high flexibility and optimisation of the application, particularly around the coupling point
- **High-pressure water rinsing:** Environmentally friendly, cost-efficient cleaning of mixing system
- **Process monitoring:** All work steps are monitored during production.

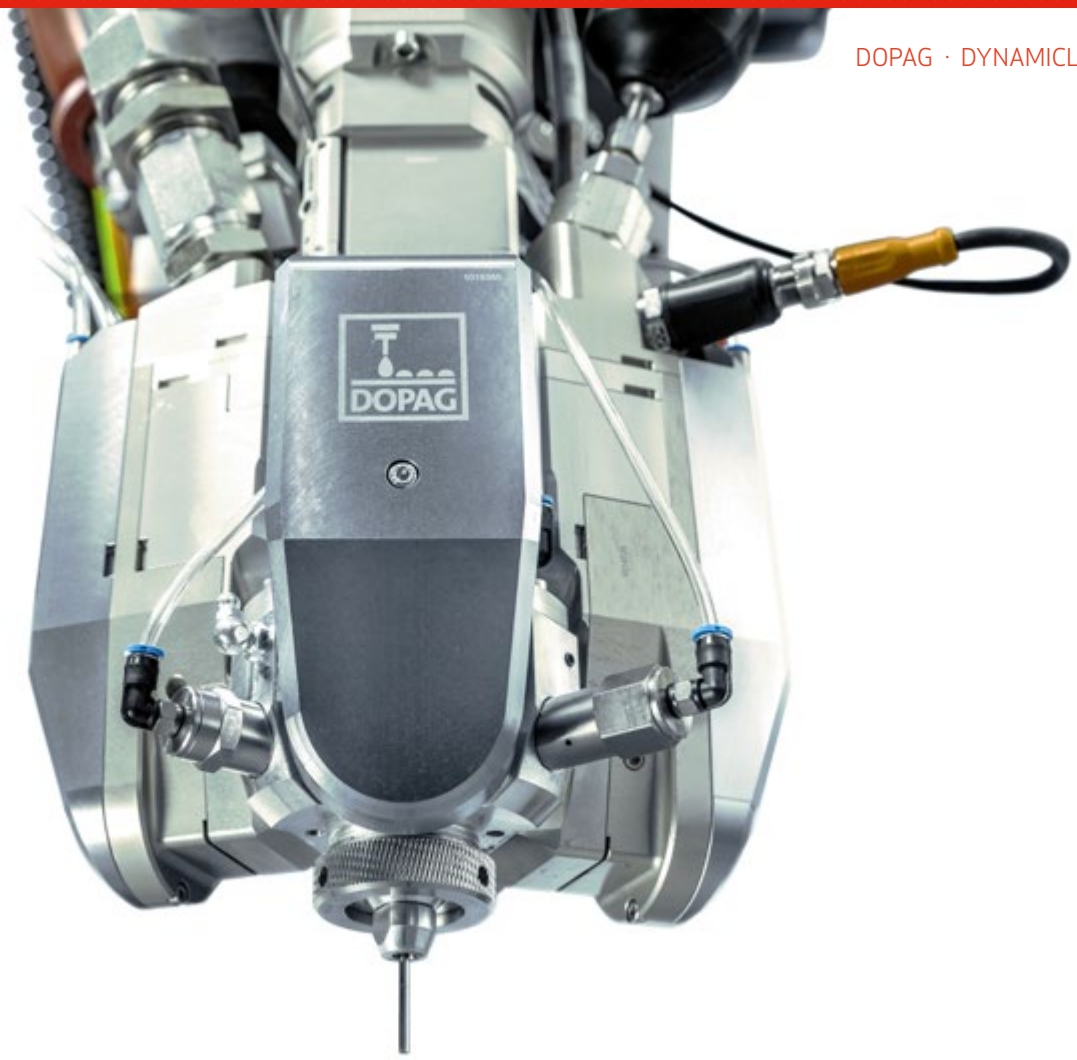
The dynamic mixing head

In a class of its own

The dynamic mixing head has a modular design and is available in three forms. Different mixing chamber sizes enable discharge capacities of 0.1 to 30 g/s. The various types of valves and mixing chambers can be combined flexibly in accordance with the required discharge quantity and material properties. This ensures an optimal relationship between the flow rate of the material and the application speed. Our experts determine the appropriate combination during the individual sampling in the DOPAG technical centre.

Properties of dynamic mixing heads

- Robust version for use in complex production environments with maximum accuracy
- Installation of component valves quickly and conveniently
- Processing of up to four components possible, whereby only three components can be metered simultaneously
- Easy cleaning and maintenance of mixing head and mixing systems
- Metering accuracy of better than +/– 1% (depending on the material, discharge capacity and mixing ratio)
- Recirculation of all components up to the mixing system before and after metering
- Separate control of metering valve and recirculation valve ensures high flexibility and optimisation of the application, particularly around the coupling point
- Automated material pressure adjustment for a defined target value



Technical specifications

	Mixing head P1	Mixing head P2	Mixing head P3
Available in three mixing chamber sizes [cm³]	0.2 0.4 0.8	1.0 1.6 2.0	2.5 4.0 8.0
Discharge capacity* [g/s]	0.1–1.6	0.5–4.0	1.2–30.0
Metering accuracy*	+/– 1%		
Control unit	Motion control and visualisation: B&R Metering control: MR40		
Operating unit	10.1" handheld operating box Optional 5.6" operating panel		
Mixing ratio	from 100:1 to 1:100 infinitely variable		
Selectable mixer speed	1-3,000 U/min infinitely variable		
Weight	approx. 12 kg (incl. drive and attachment parts)		

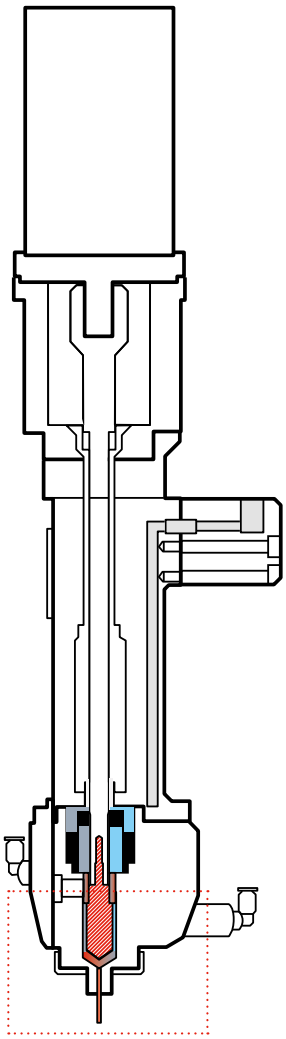
*depending on the material, mixing ratio and viscosity

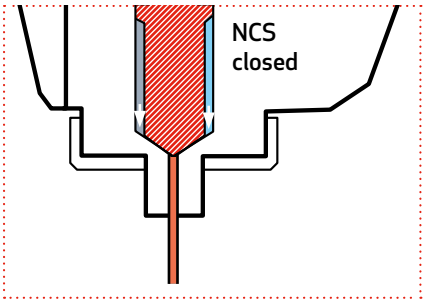
Nozzle-closing system

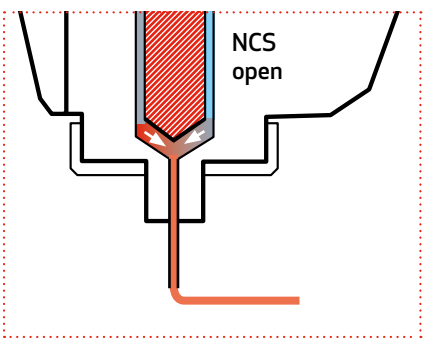
Clean ap

The nozzle-closing system (NCS) prevents dripping at the nozzle opening. This ensures a smooth transition on the bead and prevents undesired contamination of the components.

The NCS moves the drive shaft vertically in the bottom of the mixer, allowing the rotor in the chamber to position on a Teflon seal. This mechanically designed closure prevents the reactive material from being pushed out of the chamber.







6 series

10 series

High-performance linear robot

Contour precision on three axles

The dynamic mixing head, in conjunction with a linear robot, ensures precise material application and efficient production. The linear robot is available in two different types, offering different movement speeds and accelerations.

Properties

- Highly dynamic AC servo and rack and pinion drive on X and Y axis
- Torsionally stiff precision gears and couplings
- Guide system with maintenance-free, low-wear linear bearings
- Mechanical limit stop and wear-free software limit switches
- Supported energy chain, accommodation of pneumatic and electrical lines
- Repeat accuracy: < 0.15 mm (ISO 9283)
- Programming via G code, G code converter may be used
- Load capacity: 20 kg

6 series: for basic styles	10 series: For complex styles
Movement speed: X = 36 m/min; Y = 36 m/min; Z = 24 m/min	Movement speed: X = 60 m/min; Y = 60 m/min; Z = 24 m/min
Max. acceleration: 6 m/s²	Max. acceleration: 10 m/s²
Larger discharge quantities	Smaller sealing beads
Larger radii > 5 mm	Smaller radii < 5 mm (with high speed)
For small to medium-sized capacities	Faster accelerations for more precise, smooth disengaging of radii

Electrical shuttle sliding table with protective barrier

Efficient handling of components

Electrical shuttle sliding tables from DOPAG allow uninterrupted production. While the workpieces are being fitted on one table top, the material is simultaneously applied to the components on the second table top. The newly equipped table then moves to the processing position and processing of these components can begin immediately. The protective barrier with access doors provides the necessary safety in accordance with the standard to obtain the CE declaration of conformity.

Properties

- Two electrical, servo-powered shuttle sliding table tops
- Gentle acceleration and deceleration without jolting: the components to be processed remain in position throughout the handling and do not slip.
- Milled aluminium plates for high accuracy
- Hole pattern grid for installation of customer fixtures
- Capacity of up to 80 kg per shuttle sliding table top
- Three standardized sizes, adapted to the dimensions of our linear robots:
  - 450 x 1,000 mm
  - 950 x 1,000 mm
  - 1,200 x 1,000 mm

  (special dimensions for larger components also possible)
- DOPAG can also optionally offer a shuttle table on which the table tops are arranged on top of one another. This is particularly suitable for processing large, flat components.

Automation with industrial robots

Unlimited material handling

If an individual solution is required, the DOPAG team, which has decades of experience in implementing complex production solutions, develops a system concept tailored to the application requirements which optimally depicts all work steps. Ultra-modern robotic technology is used here. Depending on the process, different types of robots may be used.

Six-axle articulated robots are ideal for illustrating complex situations. Depending on the viscosity of the material, they can move components in the space as required. The system concept can also include additional work steps before and after the metering process using an industrial robot.

Areas of application

- Plasma pre-treatment
- Component handling
- Mixing head handling
- Visual control systems

Refill unit and agitator for polyol and silicone components

Dual refill unit for polyol and silicone components

Diaphragm pump for isocyanate components

Drum pump for processing thixotropic materials

Refill units for continuous material supply

Uninterrupted production

To ensure uninterrupted production, automated refilling of the material pressure tanks is essential. DOPAG offers various compact refill units for this purpose. The fill level probe in the material pressure tanks enables refilling to be started automatically from a defined material quantity. This ensures that there is always sufficient conditioned material available for production and machine downtime is avoided.

Depending on the material type, the following refill units are available:

- If the material needs to be stirred cyclically, this can be performed using an agitator and cyclic operation. Homogenisation during drum change is also possible.
- For more fluid systems, in particular, isocyanate, DOPAG offers refilling via a diaphragmpump.
- Depending on material consumption, 200 L drums or 20/30 L containers can be used between refill units. Refilling from 1,000 L containers is also possible. For non-self-levelling materials, DOPAG offers a wide range of drum and barrel pumps.
- Dual refill units are optionally available for quick, convenient drum change. Here, two material drums are positioned side by side on the collection tray, and the drums are replaced by swivelling the bell housing.

Versatile control panel

All process data at a glance

Thanks to the mobile control panel with a 15.6" screen, the user has a good overview of all the important production data at all times. The control panel was specially produced for DOPAG plant systems and is ideally suitable for use on production lines. Thanks to its mobile design, the control panel is very versatile and is not tied to a specific location. Its high-quality, robust design protects it from damage. Operation is also user-friendly and intuitive. The user therefore has an overview of all process data at all times and can respond promptly if needed. The mobile control panel is optionally available for dynamicLine. A hand-held mobile panel is included as standard.

Cooling and heating unit for material conditioning

High reproducibility thanks to constant temperature

A constant material temperature is required to ensure reliable production processes. A material conditioning system is therefore optionally available for dynamicLine. This is always beneficial if the production environment is subject to fluctuations in temperature. With the use of water, the temperatures of the material pressure tanks in particular and the hose lines are controlled. The temperatures of the components can be controlled individually or in combination. In addition to controlling the temperature of the material-conveying components, the temperature of the component to be processed also needs to be observed. If this is too cold or too hot, for example, optimal production results will not be possible even if the temperature of the material is controlled.

Automation

Individual solutions for complex requirements

DOPAG offers complete individual solutions for automated gasketing, bonding or potting. Here, metering and mixing applications including all required pre-treatment and post-treatment are integrated in an efficient manufacturing process.

DOPAG's service includes production cells, stand-alone solutions and solutions for multi-stage manufacturing processes. These include conveying and handling technology using linear robots or six-axle articulated robots as well as tried-and-tested metering systems. The product range also includes peripheral components such as workpiece conditioning and nozzle position control and wipers.

METERING AND MIXING TECHNOLOGY

Potting
Bonding
Gasketing
Greasing and Oiling

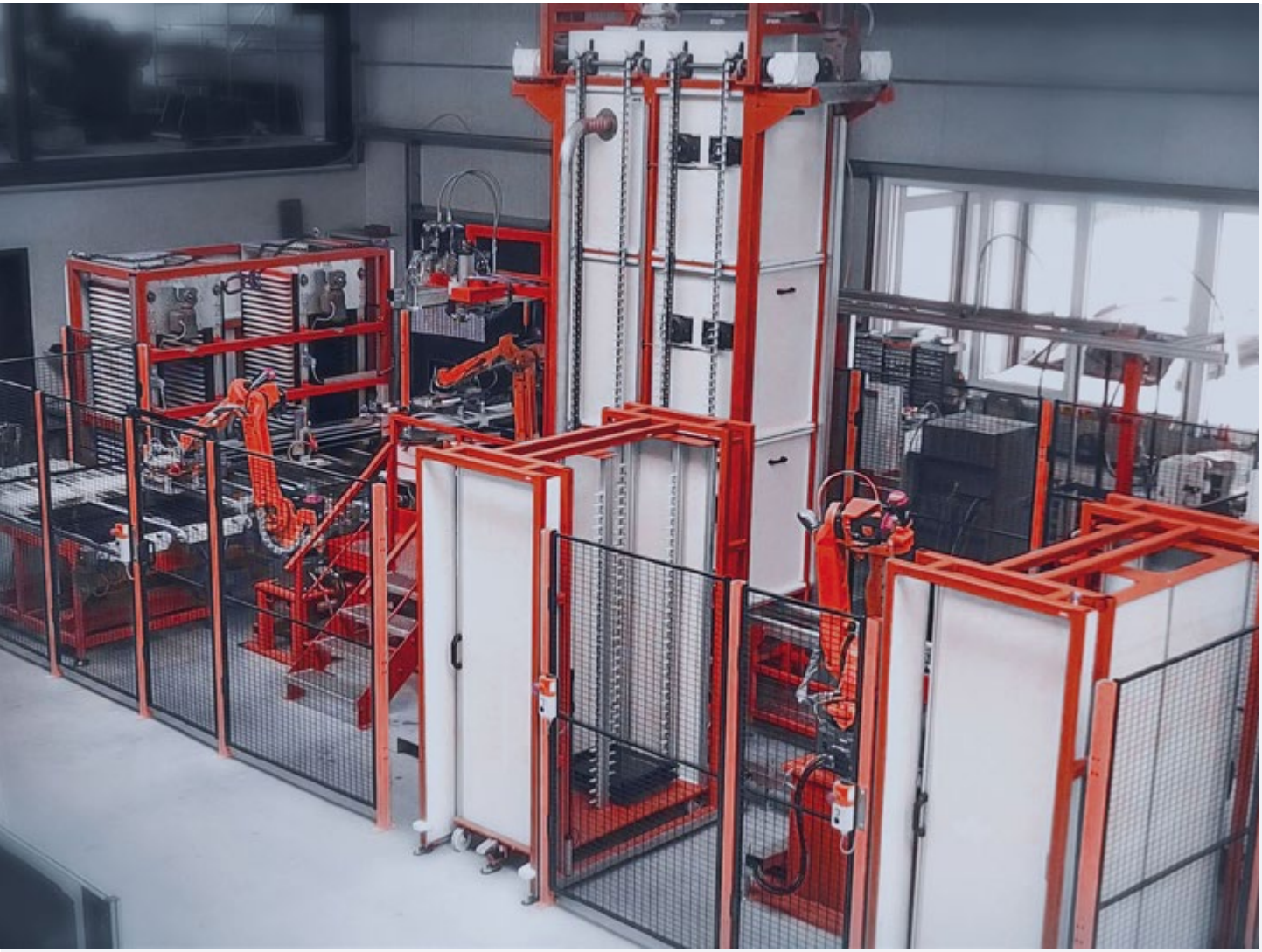
PRE-TREATMENT
- Tempering
- Plasma-, Pyrosil flame

TRANSFER
- Conveyor
- Roller conveyor
- Robot
- Hoist

HANDLING
- Linear robots
- 6-axle articulated robot

SAFETY
- Light curtain
- Two-hand operation
- Enclosure

POST-TREATMENT
- Cooling
- Heating
- Labelling



Everything from a single source:

- Consulting
- Planning and development of solution concepts
- Implementation and project support
- Production support
- Service

NEW

Contract gasketing

Your partner for consultation and implementation of customer orders

Contract manufacturing represents an economically attractive alternative for many industries, for example for the manufacture of switch cabinets, for the production of components in the automotive and lighting industry, or for applications in the household appliances, filtration and packaging industries. Independent production lines with qualified staff are not needed, and a close eye can be kept on costs at all times. Automated applications for three-dimensional components, in grooves, moulds and on flat surfaces, can be implemented. DOPAG's core areas of expertise include individual consultation in relation to the production of prototypes as well as assistance in getting started with gasketing. Firstly, experts in the industry prepare a feasibility study for the desired application and calculate all the production parameters. The first prototypes are then produced during sampling and complete series are subsequently produced according to customer requirements.

Avail of our services in contract manufacturing:

- ✔ Support with development work for gasketing, potting and bonding
- ✔ Sampling and prototype production
- ✔ Contract manufacturing of small volumes
- ✔ Large-scale production
- ✔ Support in reducing production peaks
- ✔ Customer-specific material adjustments or even developments are possible in cooperation with material manufacturers

Notes

Notes

Legal notice

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We are one of the world's most experienced manufacturers of high-quality metering technology. Wherever adhesives, resins, silicones or lubricants are metered and applied in industrial production, we offer reliable, precise solutions. We provide systems and components for highly automated production processes, including for the automotive, wind, household appliances and electrical industries, as well as for aviation.

DOPAG is part of the HILGER & KERN GROUP, a reliable supplier and a development and service partner to industrial companies in a variety of market segments for almost 100 years. The group employs around 350 people and has subsidiaries and distributors in more than 40 countries.

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