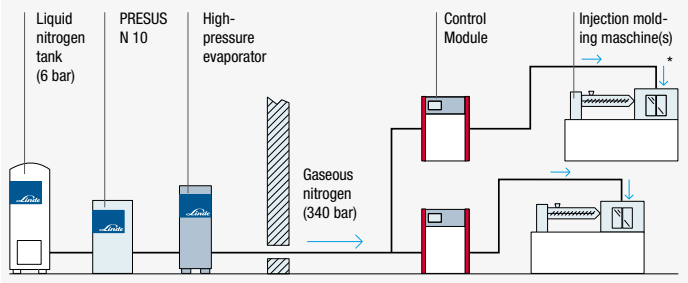
System Technology

Systems technology of gas and water assisted molding technology

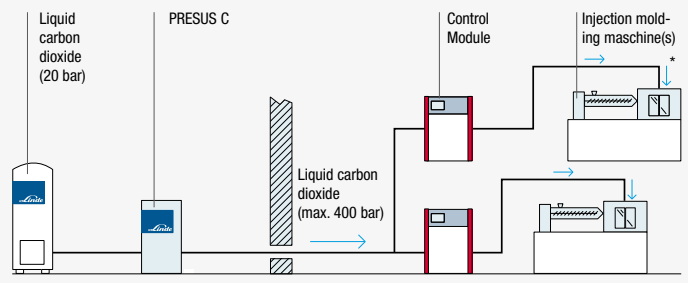
For the application of gas and water assisted injection technology, as well as the injection molding machine, basically two additional functions are to be applied: Pressure generation and pressure control.
In the area of gas assisted molding technology, two different types of gas pressure generation are differentiated. On the one hand, discontinuous gas pressure generation which is mainly employed for the GIT process in case of individual machines and, on the other hand, continuous gas pressure generation which is employed for the centralized supply of several injection molding machines. The gas pressure regulation is applied individually with pressure-control modules at every injection molding machine. The pressure-control module decreases the supplied system pressure to the necessary gas pressure. Communication with the injection molding machine is realized by means of an electrical control. Maximator offers compressor stations and control modules, as well as combined compressor control modules, for discontinuous and continuous gas pressure generation.
In the area of water assisted molding technology of the MAXIMATOR WID system, both the pressure generation and the pressure control are applied in one system. The following schematics indicate the basic structure of the systems technology.

Gas assisted molding with liquid gas supply

Supply with liquid nitrogen

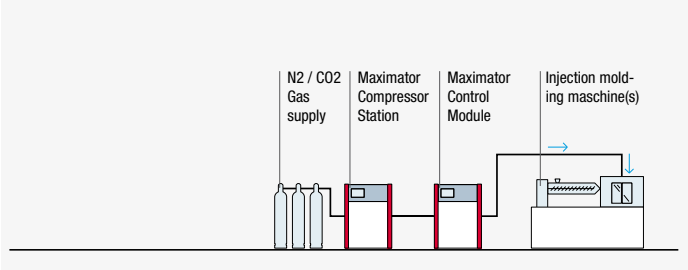


Supply with liquid carbon dioxide

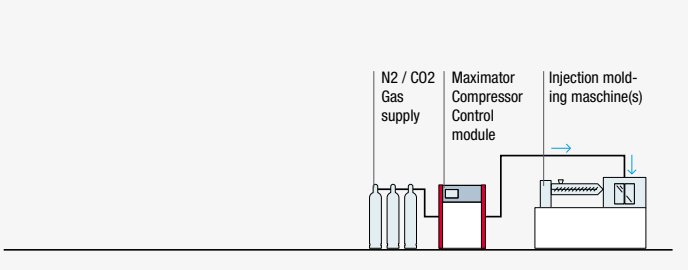


Gas assisted molding with gas bottle supply

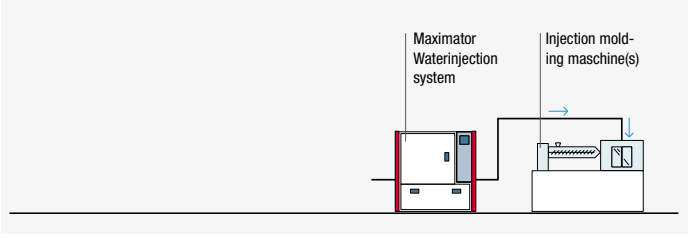
Compressor Station and Control Module



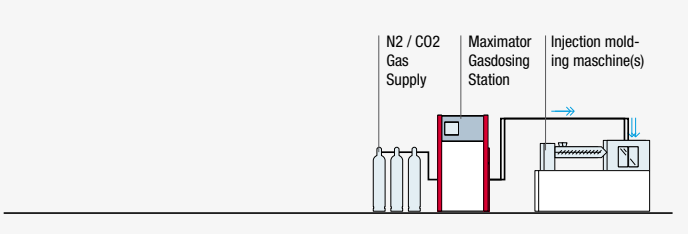
Compressor- Control Module



Water assisted molding



Gasdosing Technology



* Courtesy of Linde AG

Compressor Stations

Maximator Compressor Stations are specially designed for the compression of nitrogen or carbon dioxide from gas bottles, and are employed for pressure generation in gas assisted molding applications.

VP/120/500/300/N2

Compressor station for nitrogen to 415 bar

The VP/120/500/300/N2 compressor station is designed for the effective compression of nitrogen. The nitrogen supply can be implemented both via nitrogen bottles (200 bar and 300 bar) or a liquid nitrogen storage (20 bar - 30 bar).

- Compressor with continuous pressure generation
- Mobile
- Bottle pressure is used optimally
- Oil-free and grease-free gas compression
- No electric auxiliary energy required
- Cooling water not required

Application

This mobile compressor station is an autonomously-working, pneumatically-driven, gas compressor unit, constructed in compact design.

The station is equipped with two Maximator gas boosters, which compress the injection gas in two stages. As a result of the integrated gas cooler and the media filtration, an optimal operation is ensured.

Technical Data	VP/120/500/300/N2	VP/500/CO2
Working Pressure	20 - 500 bar	
Outlet Pressure	3,5 - 415 bar	
Flow Capacity	max. 400 l_N/min*	max. 60 kg/h**
Accumulator	6l / 550 bar	-
Inlet Pressure	10 - 300 bar	approx. 56 bar from riser pipe bottles
Compressed Air Drive***	6 - 10 bar	
Cabinet	mobile with guide roller	
Weight (incl. Packaging)	211 kg (315 kg)	

* at 300 bar inlet pressure, following VDMA 4362 Tol. ±5%

** at approx. 56 bar inlet pressure liquid CO2 supply from riser pipe bottles, following VDMA 4362 Tol. ±5%

*** operation with 4 bar air drive pressure is possible, but this will reduce the flow capacity.

Control Modules

Maximator Control Modules are suitable for series production with high-pressure nitrogen supply or high-pressure carbon dioxide supply, at a pressure of 500 bar (7,250 psi). The control modules regulate the injection pressure in the GID process.

RM/500/2(4)/N2

Control Module for nitrogen up to 500 bar

The RM/500/2(4)/N2 Control Module is designed for the exact injection of nitrogen in gas assisted molding processes. Depending on the design, the Control Module is equipped either with 2 or 4 highly-dynamic, Maximator 3/3-way proportional valves for the pressure control, and can optionally supply up to two injection molding machines.

- Very high reproducibility
- Self-contained functional unit
- Available with two or four 3/3-way proportional pressure-control valves
- Graphic representation of curve progressions
- Pressure/Time profile freely programmable
- Compatible with all injection molding machines
- EUROMAP 62 interface

Application

The Control Module is a self-contained functional unit for pressure-controlled fluid injection in the GIT process, and can be adapted to all injection molding machines, independent of the type and manufacturer.

After receipt of the start signal from the injection molding machine, the fluid injection is implemented. The pressure control is realized exactly by means of hydraulically-operated, 3/3-way

Technical Data	RM/500/2/N2	RM/500/2/CO2	RM/500/4/N2	RM/500/4/CO2
No. of proportional valves	2	2	4	4
Control tolerance	± 0,5 bar			
Range of control	5 - 500 bar			
Response period	0 - 400 bar in 140 ms			
High pressure filter	2 Nos. / 90 µm		4 Nos. / 90 µm	
Curve visualisation	1 to 2		1 to 4	
Interface	EUROMAP 62			
Air drive consumption	approx. 500 l_N/min			
Compressed air connection	6 bar / 1/2“ BSP Hose nozzle			
N2 / CO2 Inlet	M16 x 1,5 (Ermeto 8S) 1 Nos.			
N2 / CO2 Outlet	M16 x 1,5 (Ermeto 8S) 2 Nos.		M16 x 1,5 (Ermeto 8S) 4 Nos.	
Dimensions (W/D/H)	725 / 562 / 1230 mm	725 / 630 / 1830 mm	725 / 562 / 1230 mm	725 / 630 / 1830 mm
Weight	approx. 180 kg	approx. 330 kg	approx. 220 kg	approx. 370 kg

Compressor Control Modules

Maximator Compressor Control Modules are suitable for mold trials and smaller production run applications with the gas assisted injection molding process with gas bottle supply. As a result of the integrated Maximator gas booster, the gas is compressed to the required pressure level and subsequently controlled to the required injection pressure using the pressure-control technology.

RM/500/2/VP/80/500/N2

Compressor Control Module for nitrogen up to 500 bar

The N2 Compressor Control Module is used for the pressure supply and pressure control for the N2-GIT process. With this sytem, N2 is compressed to 500 bar and then controlled to the required pressure in each case by the high-precision and rapid 3/3-way proportional control technology.

- Compressor and control unit in one system
- Very high repeat accuracy
- Integrated 3 liter / 690 bar storage for continuous volume flow
- Integrated N2 gas booster approx. 80 IN/min, 500 bar
- Visual representation of pressure/time profiles
- Pressure/Time profile freely programmable
- Compatible with all injection molding machines

Application

The Compressor Control Module is a self-contained functional unit for pressure generation, as well as pressure-controlled fluid injection in the GIT process, and can be adapted to all injection molding machines independent of the type and manufacturer.

The gas booster supplies continuously into a storage tank and thus ensures that the pressure in this storage tank is always within the adjustable limit values.

Technical Data	RM/500/2/VP/80/500/N2	RM/500/2/VP/500/CO2	RM/500/4/VP/500/CO2
No. of proportional valves	2	2	4
Control tolerance	± 0,5 bar		
Range of control	5 - 500 bar		
Response period	0 - 400 bar in 140 ms		
Booster flow capacity	80 l_N/min	approx. 60 kg/h	approx. 60 kg/h
High pressure filter	2 Nos. / 90 µm		4 Nos. / 90 µm
Curve representation	1 to 2		1 to 4
Interface	EUROMAP 62		
Air drive consumption	approx. 500 - 4000 l_N/min		
Compressed air connection	6 bar / 1/2“ BSP Hose nozzle		
N2 / CO2 Inlet	M16 x 1,5 (Ermeto 8S) 1 Nos		
N2 / CO2 Outlet	M16 x 1,5 (Ermeto 8S) 2 Nos		M16 x 1,5 (Ermeto 8S) 4 Nos
Dimensions (W/D/H)	725 / 562 / 1230 mm	725 / 630 / 1830 mm	
Weight	approx. 180 kg	approx. 370 kg	approx. 385 kg