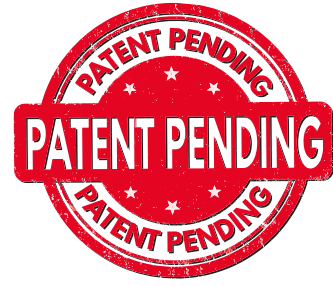
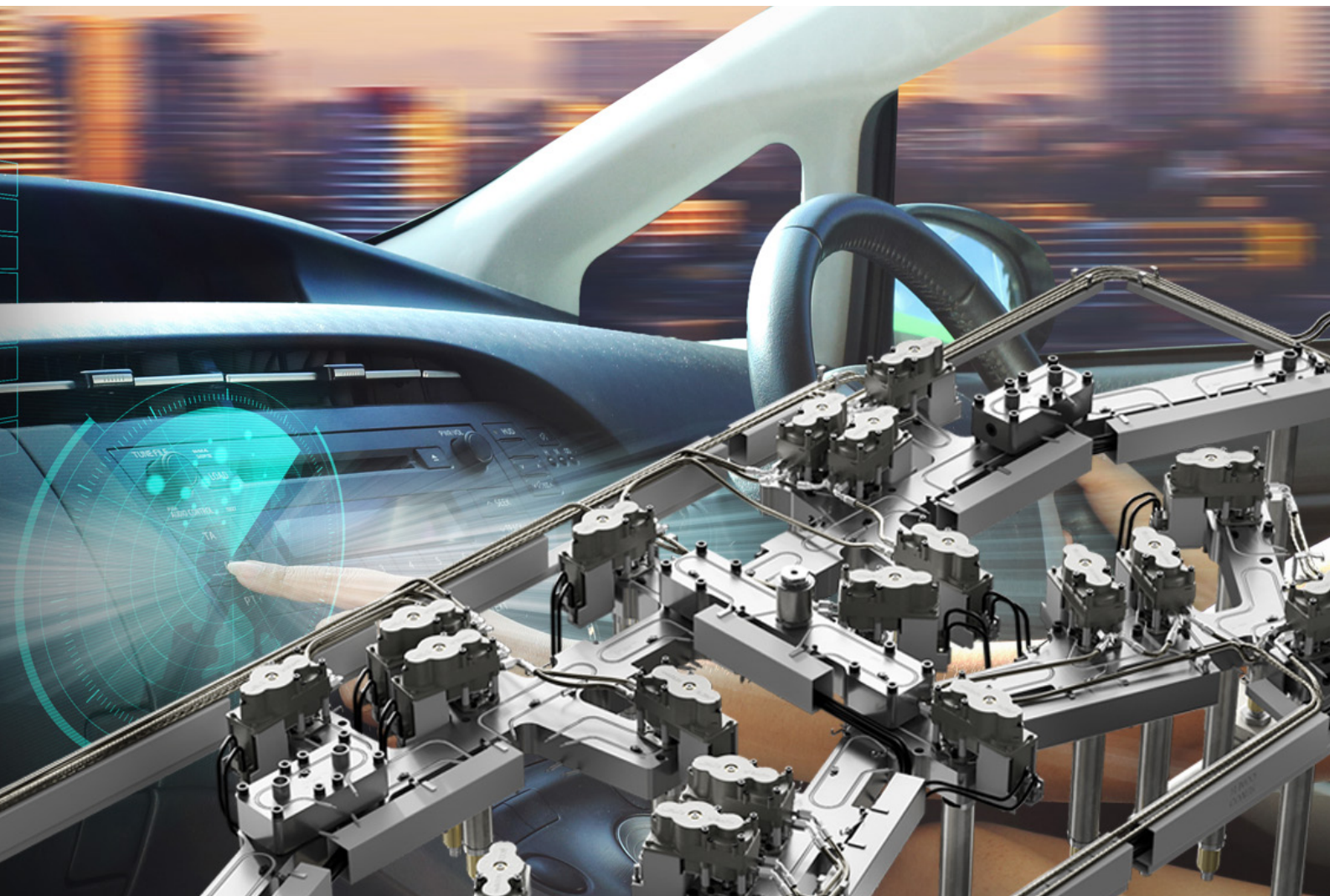


oerlikon
hrsflow



FLEXflow Evo Family

New FLEXflow Evo Family to simplify next generation electrical process.



FLEXflow
EVO
F A M I L Y

*Passion for
expertise*

New FLEXflow Evo, the evolution of the servo driven valve gate systems.

The future is electric.

FLEXflow Evo, a patent pending solution, is an advancement of the FLEXflow technology for servo-electrically driven valve gate systems, which had revolutionized sequential injection molding. FLEXflow Evo Family includes the electrically driven valve gate systems, FLEXflow Evo and FLEXflow One Evo, the innovative and smart way to get the best results.

How will you drive perfection?

The electrical technology is designed for the independent adjustment of each valve pin with precise control of stroke and force during opening and closing phases. This solution assures accurate, easy to operate, flexible control of pressures and flow rates at each individual gate during the injection process. Giving the user the ability to individually drive valve pins, it opens the door to many other possibilities.

Main benefits of our servo driven solutions



- Quality improvements for: Class “A” large surfaces, grained surfaces, chromed surfaces, and other cosmetic parts
- Part warpage reduction
- Optimal flow balancing
- Wall thickness reduction



- Clamping force optimization
- Scrap reduction
- High process repeatability
- Mold deflection reduction = longer tool life
- Successful family mold operation



- Clean operation
- Easy to use
- Faster mold change
- Integration between rheological analysis results and FLEXflow Evo operating parameters
- Reduced maintenance through elimination of seals, hoses, and hydraulic fluid.

FLEXflow Evo Family: new features

Compared to the previous version, the new FLEXflow Evo Family features advanced benefits:

Upgraded software for FLEXflow Evo

The new software provides better performances in terms of:

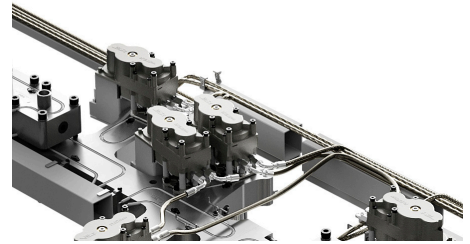
- Simplification: 4 maximum steps
- Responsiveness: faster control unit reaction thanks to data transfer optimization
- Easy to use: setting can be done by speed/stroke to simplify operations

New patented tips based on polymer to guarantee for both FLEXflow Evo and FLEXflow One Evo:

- Wider possibility of flow rate management for all materials
- Greater pressure control

New on manifold actuators to provide for both FLEXflow Evo and FLEXflow One Evo:

- Ready-to-install system for quick and safe installation on the mold
- Compact solution to reduce the cutout
- Improved mechanical efficiency



Applications for sequential injection



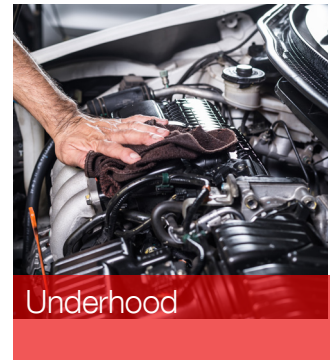
Exterior



Interior



Lighting



Underhood



Domestic Appliances



Gardening

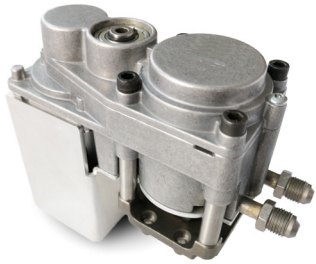


Logistics & Environmental



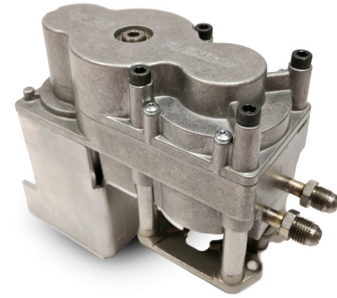
Technical Applications

Actuator Units



Technical features

Nozzle series	M
Valve pin diameter	5
Nominal stroke	12
Dimensions	W 66 x H 105
Force Range	1000 - 4200 N
Accuracy	< 0.1 mm
Cooling	Required
Magnetic clamping plate	Compatible



FLEXflow Evo on manifold

	G
	7
	18
	W 72 x H 115 (G)
	3000 - 7000 N
	< 0.1 mm
	Required
	Compatible

Note:

- Compact system
- Increased plate stiffness
- Reduced cut-out required
- No oil/air lines
- Reduced maintenance

Recommended for:

- Angled nozzle applications

NEW FLEXflow Evo actuator unit

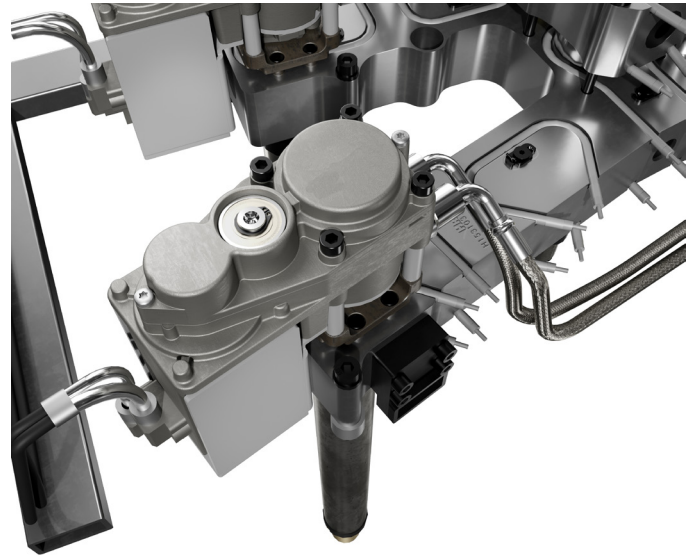
Suggested for:

- angled nozzle applications
- lighting applications
- limited cut-out needed

NEW FLEXflow Evo actuator unit

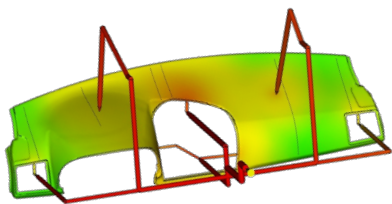


Motor unit positioned on the manifold

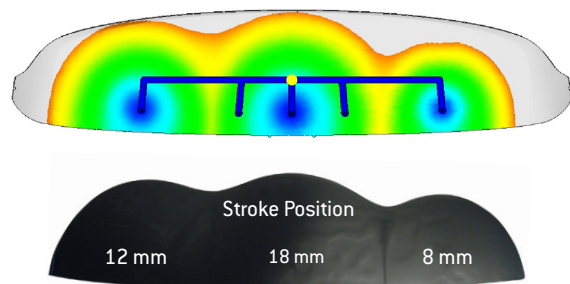


Simulation Analysis

Specific rheological analyses are performed in order to examine the proper plastic behaviour and predict the best process parameters.



— Fig. 1 - Instrument Panel



— Fig.2.Example of flow control and flow balancing with different valve gate stroke position during short shot.

FLEXflow Evo Family: beyond the limits

Discover all the benefits you can get from our servo driven valve gate systems for your automotive premium parts.

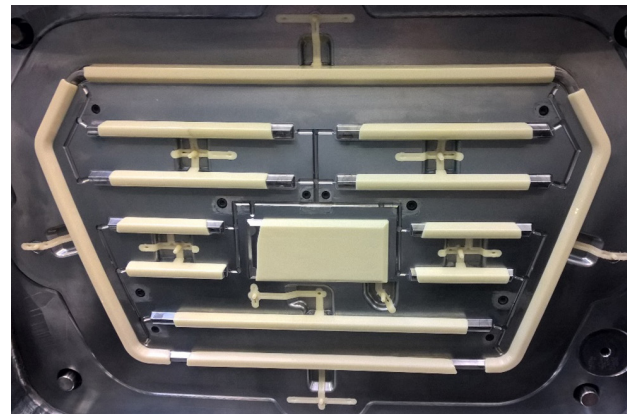
Optimal balancing results in family tools

Produce high-quality chrome grille components in a single shot. Our servo driven valve gate systems allow the filling of different volume cavities in one shot adjusting independently and accurately the flow rate into each cavity.

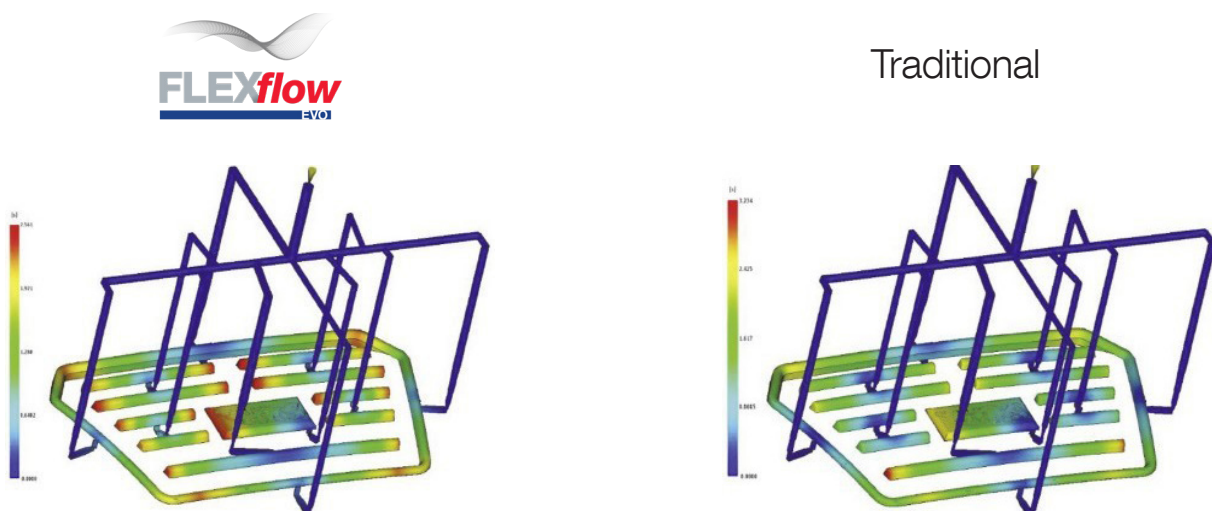
Main advantages:

- Optimal balancing avoiding flash effects on the part
- Optimal pressure on the part resulting in an optimized chromed process
- Scrap rate reduction

Filling time comparison:

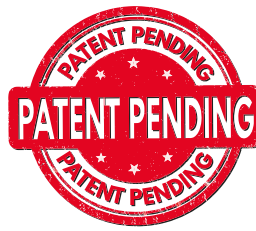


— Fig.3 - Short-shot 90% of volume approx.



— Fig.4 - FLEXflow Evo allows to have the same filling time even though with different part volumes

Weld line management



Improve the aesthetical results.

Our servo driven valve gate technologies allow to manage the shape and the position of the weld line keeping it perfectly straight.

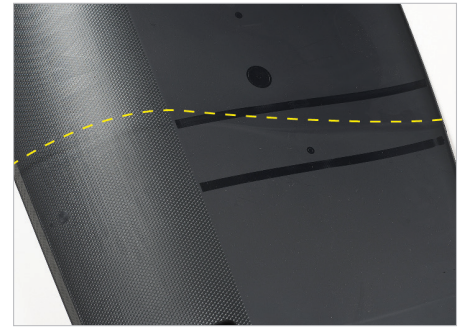
Main advantages:

- Weld line shape management
- Weld line repositioning

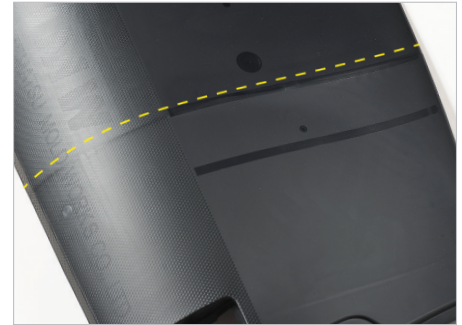
In collaboration with **TMW**



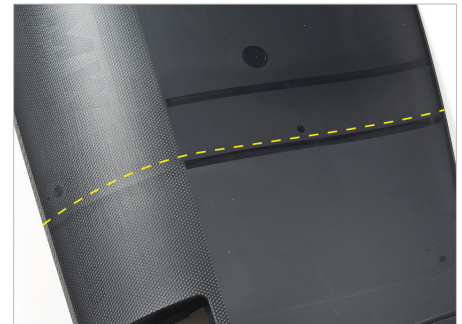
— Fig.5 - Instrument Panel



— Fig.6 - Angled weld line shape



— Fig.7 - Perfectly straight weld line / Left



— Fig.8 - Relocated weld line: 70 mm perfectly in parallel to the right

Warpage control

Get top quality parts.

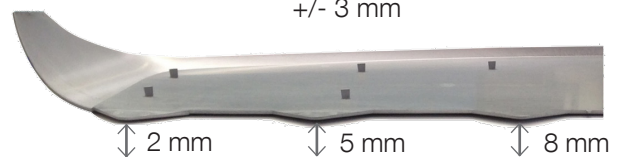
Since the packing pressure can be adjusted independently for each nozzle, inner pressure can be uniform inside the cavity. The result is lower stress in the part and a controlled warpage.

Main advantages:

- Lower part stress
- Reduced scrap rate
- Easier assembly of the parts

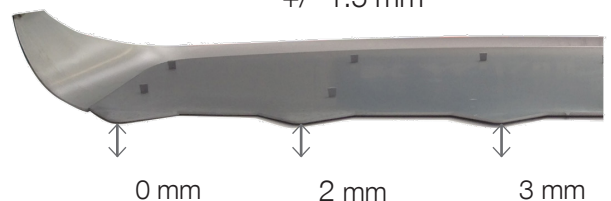
Standard

+/- 3 mm



FLEXflow Evo® Family settings

+/- 1.5 mm



— Fig.9 - Part deformation analysis done by Laser Scan Measurement

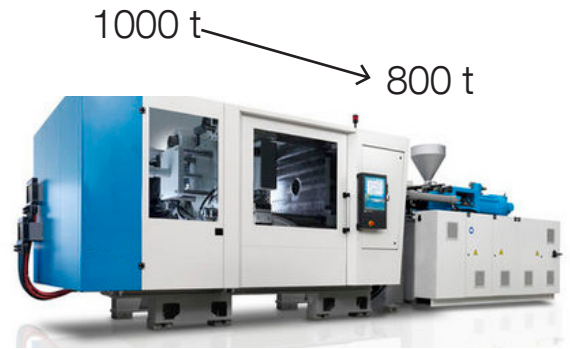
Clamping force reduction

Save the cost.

Our servo driven valve gate systems ensure flexible control of the pressure distribution in the cavity and a uniform pressure profile. This leads to a lower average pressure value compared to standard sequential injection. Therefore, smaller injection molding machines with lower tonnage can be used to reduce operating costs.

Main advantages:

- Smaller injection machines required
- Operation cost reduction



— Fig.10 - Performance obtained using FLEXflow Evo optimization with reference to Oerlikon HRSflow spoiler mold (see the molded part below).

— Fig. 12

Sensor positions:

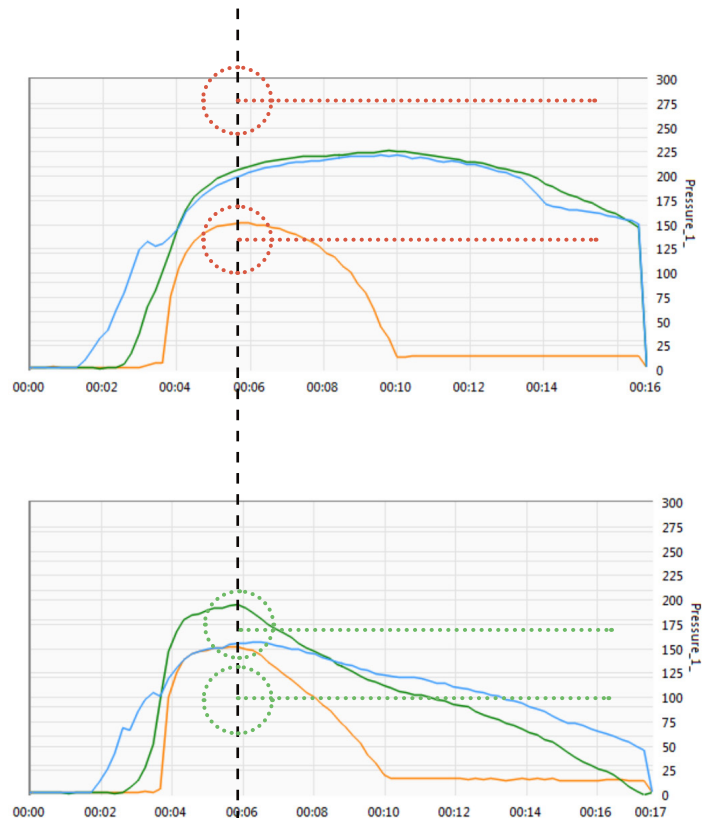
- S1 - Location pressure sensor 1
- S2 - Location pressure sensor 2
- S3 - Location pressure sensor 3



Standard sequential

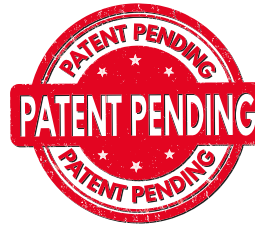


FLEXflow Evo Family settings



— Graph. 2 - Chart to show the pressure distribution in the cavity for the 3 sensors

Reduced tool deflection



Increase the tool life.
Thanks to the uniform pressure distribution, the bending of the mold is minimized. Mold parting lines remain undamaged and consequently require reduced maintenance.

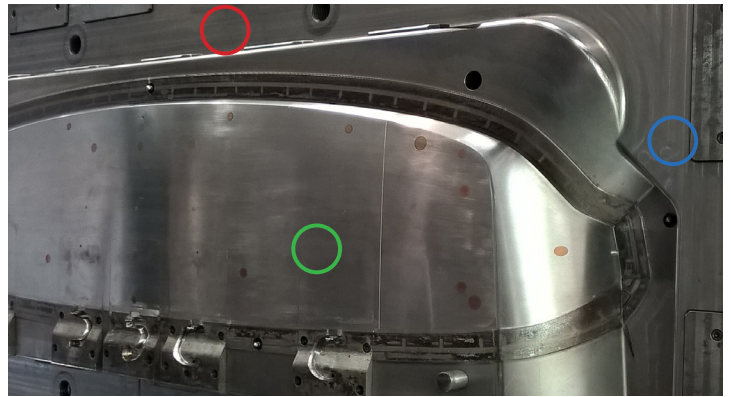
Main advantages:

- Reduced tool maintenance
- No flashes on the parts

— Fig. 13

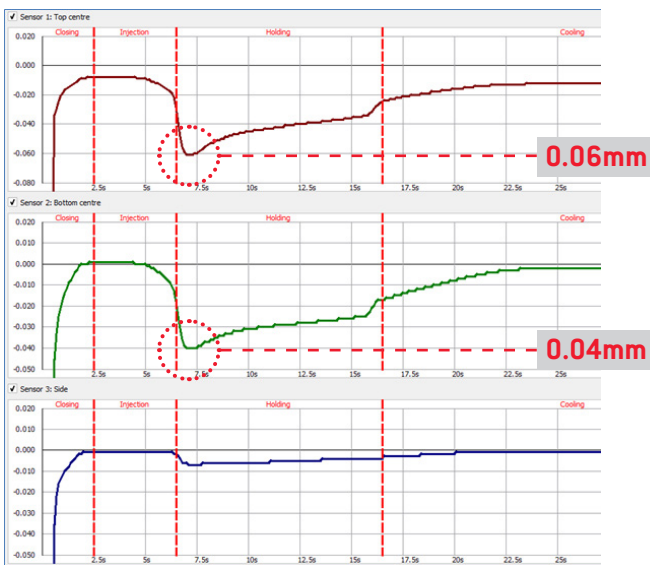
Sensor positions:

- S1 - Location linear position sensor 1
- S2 - Location linear position sensor 2
- S3 - Location linear position sensor 3



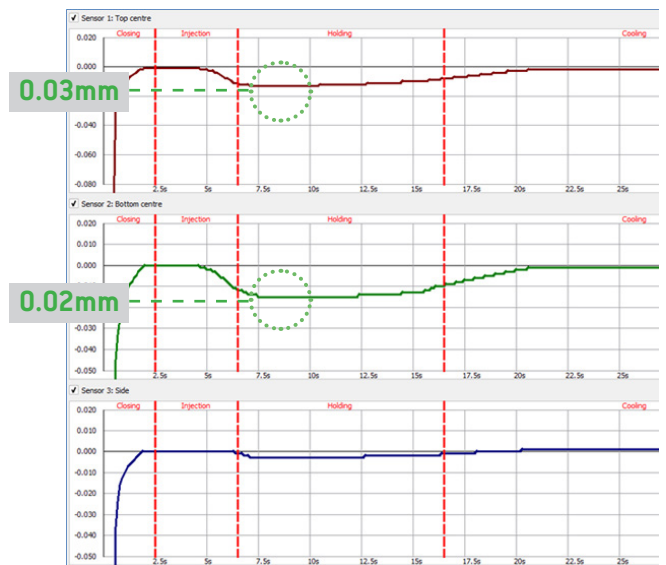
STANDARD sequential

FLEXflow Evo Family settings



Vs

Vs

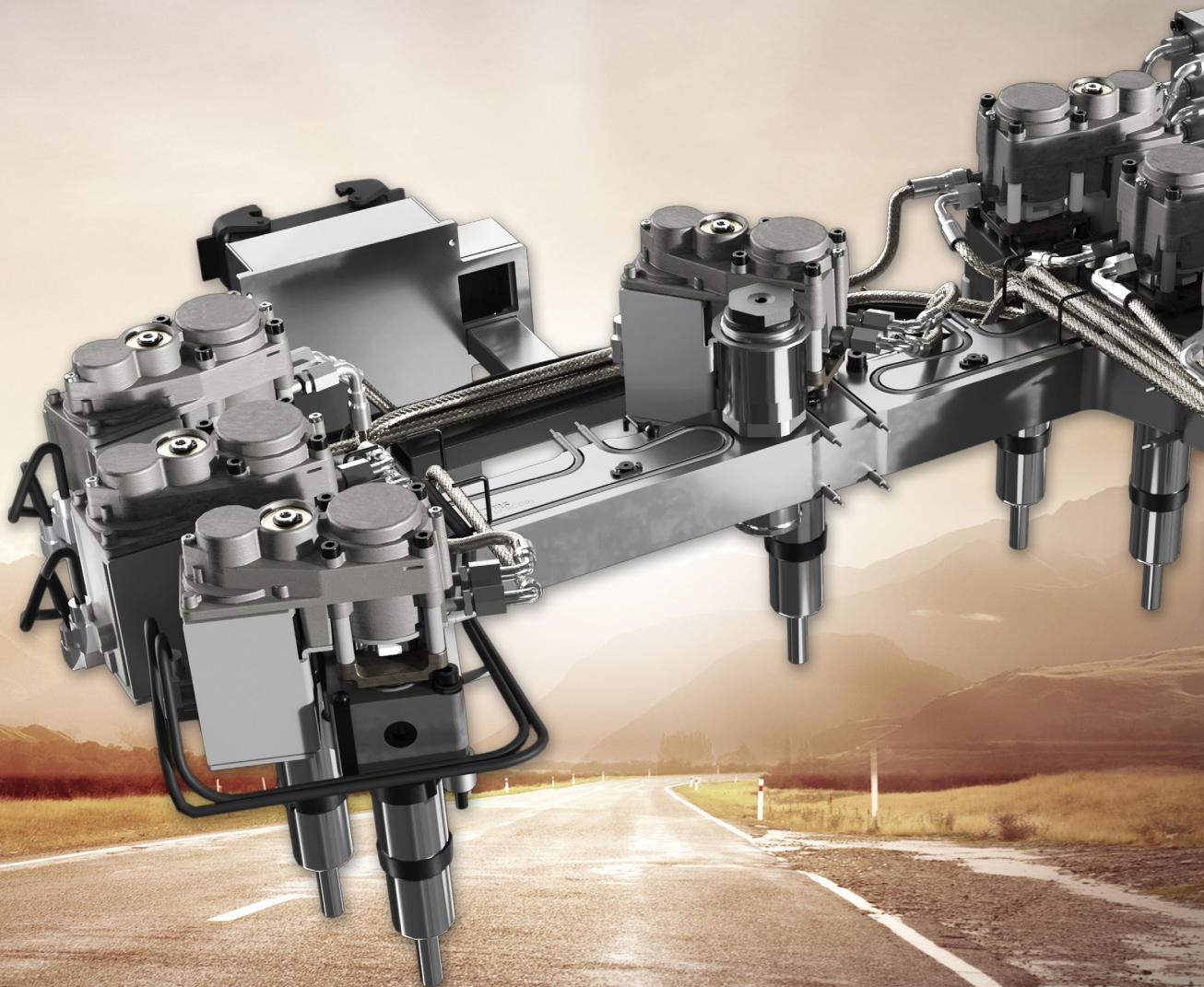


— Graph. 3 - Chart related to the linear displacement of 3 sensors (see the picture above)

FLEXflow Evo: Driving Perfection

FLEXflow
EVO

FLEXflow Evo is the evolution of the well-known servo-driven valve gate technology. The FLEXflow Evo system is equipped with an advanced Control Unit to set and monitor the valve pin position. It assures accurate and flexible control of pressures and flow rates providing additional functions for 360° flow control and monitoring.



Main benefits

- New Software that provides better performances in terms of:
 - Simplification: 4 maximum steps
 - Responsiveness: faster control unit reaction thanks to data transfer optimization
 - Easy to use: setting can be done by speed/stroke to simplify operations
- Data Storage
- Recipe manager and import/export
- Remote connectivity for quick assistance
- Color change settings
- Multi-language user interface
- User interface integrated into MM monitor



— Fig. 11. FLEXflow Evo Control Unit

Technical equipment

The Control Unit

FLEXflow Evo control unit is an advanced controller to set and monitor the valve pin position. Ability to read up to 6 pressure sensor signals (0 - 10 v). Controllers are available in 9 different configurations: from 4 to 24 drives.



— Fig. 12. The display can be located alternatively at the molding machine operator station



— Fig. 13 - Encoder cable



— Fig. 14. - Motor cable

FLEXflow One Evo: no additional control unit required



FLEXflow One Evo is the one of our version of our servo driven valve gate system where an additional control unit is not required during the injection process. It is as easy to use as the hydraulic/pneumatic system but with the advanced features of the electrical solution.



Main benefits

- No control unit required during the production phase
- Same input from the IMM for the sequential control as for traditional Hydraulic/pneumatic hot runners
- Same Servo driven family as for FLEXflow Evo
- Easy to Use



— Fig. 15. FLEXflow One Evo Driver Module for 2 drops

Technical equipment

THE HEART OF TECHNOLOGY

All the settings (valve pin's stroke and force) are saved in a Driver Module assembled on the mold. In its current design, this module comes with a default setting that fully opens/closes the needle. The servo-electric drive precisely controls the melt flow providing highly reproducible quality parts.



— Fig. 16. ESI – External Smart Interface

ONE DEVICE, COUNTLESS POSSIBILITIES

Using a hand-held External Smart Interface (ESI) which is briefly connected to the driver module needle stroke and force can be individually set for specific applications, including multiple steps if required.

A SAFE AND RELIABLE INJECTION MOLDING PROCESS

Connected with the safety circuit monitoring the status of the IMM guards, the Safety Interface Box (or SIB) is the device that assures power supply and operator safety. SIB also protect each drive module present on the mold. SIB size depends on the number of driver modules to control.






— Fig. 17. SIB – Safety Interface Box

From the standard system to the electrical one: all possible solutions for your needs




Software & Settings

	Standard Hydraulic/Pneumatic	FLEXflow One Evo	FLEXflow Evo
MultiSteps for Pin Opening		✓ Up to 4	✓ Up to 4
MultiSteps for Pin Closing		✓ Up to 4	✓ Up to 4
Second Opening with same profile	✓	✓ Signal from IMM	✓
Second Opening with different profile			✓
Color Change Settings			✓
Charts of movement profiles and signals			✓
Data storage			✓ (1000 cycles)
Recipe Manager			✓
Recipe Import/Export			✓
Max Nr. of Pins	No limit	24	24
Remote connectivity for quick assistance			✓
Multilanguage user interface		Standard: English/Italian/German Any further language will be implemented	✓

Connection with IMM

	Standard Hydraulic/Pneumatic	FLEXflow One Evo	FLEXflow Evo
IMM alarm & safety connectivity		 Safety Circuit/E-stop button	 Safety Circuit/E-stop button
IMM signals		Open/Close signal from IMM or from an external Sequential Controller	Screw position, start injection, Switch over
External connectivity vs\ customer (MES, IMM,...)			

Hardware and Other

	Standard Hydraulic/Pneumatic	FLEXflow One Evo	FLEXflow Evo
Control Unit			
ESI (External Smart Interface)		Required. At least one for Plant will be mandatory	
Type of actuator	Hydraulic cylinder	Electric	Electric
Pressure sensor connectivity			
Thermocouples on FF motor monitoring	Temperature monitoring on cylinder by special request		

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