

**oerlikon**  
hrsflow

# FLEXflow HRS Family. Make the future green

The next generation process is electrical.





# The electrical world at a glance: simple, safe and clean

## The future is electric.

FLEXflow HRS Family includes the electrically driven valve gate systems, FLEXflow HRS and FLEXflow One HRS, 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 position and speed 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 doors to many other possibilities.

## Main benefits of our servo driven solutions



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



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

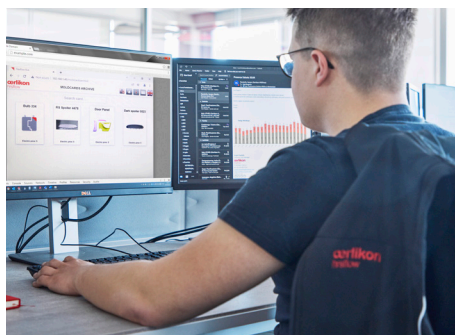


- Clean operation
- Easy to use from the operator side
- Reduced maintenance through elimination of seals, hoses, and hydraulic fluid

# FLEXflow HRS HMI 4.0: Simplified Software Solution

Easy and intuitive, the updated user interface of FLEXflow HRS Control Unit, HMI 4.0, is a web-based solution accessible through a standard PC or tablet.

The advanced FLEXflow HRS controller allows the operator to set and monitor the valve pin position and speed for a 360° flow control.



## Advanced Control

Systems with different nozzle types available

One card for each mold where are stored all the recipes related to

Independent advanced motor control

## Easy to Use

Recipes management

Self-explanatory software solution

Graphs comparison

Recipes import/export

## Customized User Profile

Customized functionalities for each user

More than one user connected at the same time (the control can be taken only by one at a time)

Traceability of all the operations carried out by the user

## Industry 4.0: Interactive Factory with an Integrated Approach

### FLEXflow HRS controller HMI 4.0 visualization into any Injection Molding Machine controller via VNC\*.

Possibility to operate and manage FLEXflow HRS controller using only the Injection Molding Machine screen. The two equipment remain independent, but the operator can drive and manage FLEXflow HRS controller from the machine screen.

\* To enable the integrated visualization on the Injection Molding Machine, an hardware option should be acquired separately.





# Applications for sequential injection



Exterior



Interior



Lighting



Underhood



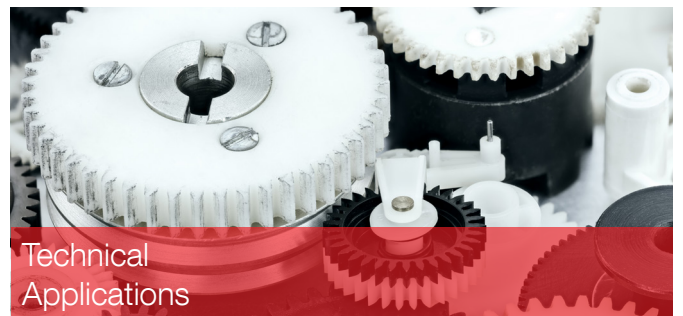
Domestic Appliances



Gardening



Logistics & Environmental



Technical Applications



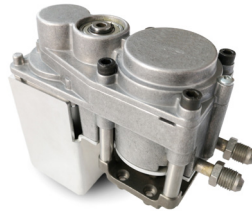
Aerospace



Building



# Actuator Units



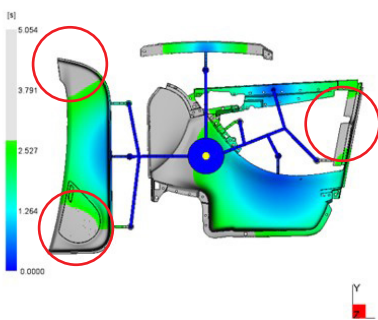
## ON MANIFOLD

## ON PLATE

Valve pin diameter (mm)	5 - 7 - 10	5 - 7 - 10
Nominal stroke (mm)	12 - 18	12 - 18
Benefits	<ul style="list-style-type: none"> <li>- Suggested for angled nozzle and lighting applications</li> <li>- Reduced cut-out required</li> </ul>	<ul style="list-style-type: none"> <li>- Compact system</li> <li>- Increased plate stiffness</li> <li>- Reduced cut-out required</li> <li>- Water free</li> <li>- Less components: 1 actuator, 3 different nozzle type</li> </ul>

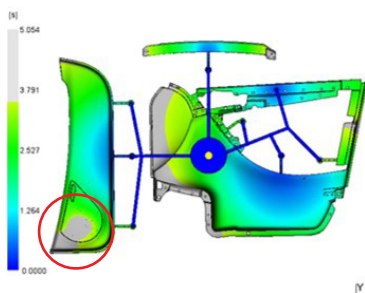
## When simulation analysis matches with real molded parts

### Filling time: 2.7s



Specific rheological analyses are performed in order to examine the proper plastic behaviour and predict the best process parameters. Integration between rheological analysis results and FLEXflow HRS operating parameters is available.

### Filling time: 3.5s



Examples of flow control and flow balancing with different valve gate stroke position during short shot at 2.7s and 3.5s respectively.



# FLEXflow HRS Family: beyond the limits

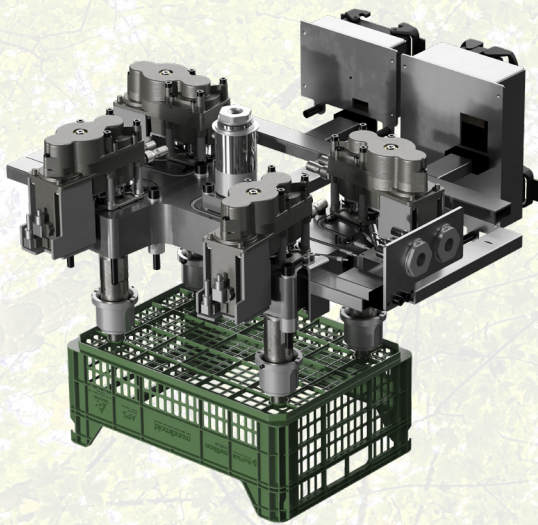
Discover all the benefits you can get from our servo driven valve gate systems for your premium parts.

## The right solution for special injection process

- PCR compounds and biopolymers
- Injection on film
- Silver molded in color technology

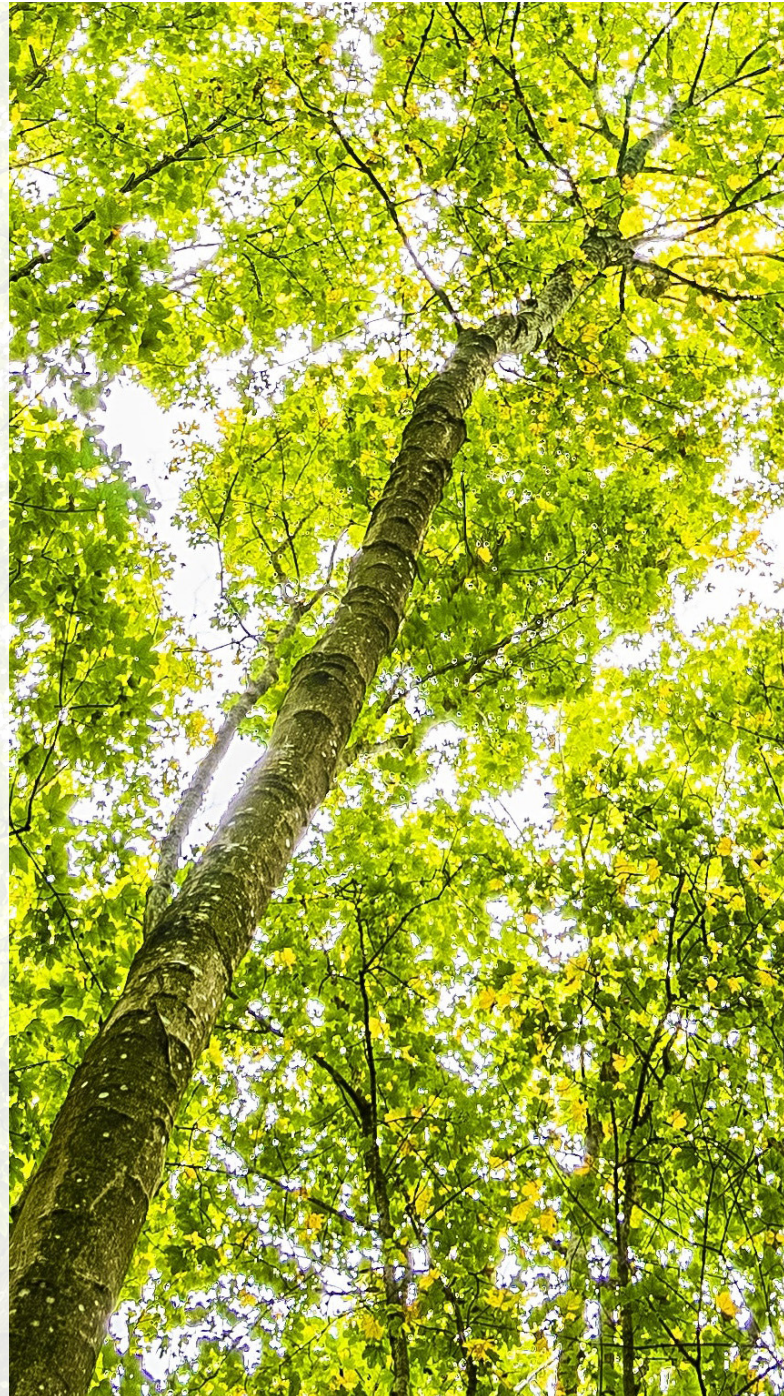
### Eco-friendly Fruit box

Maximum precision combined with sustainability



### Highlights

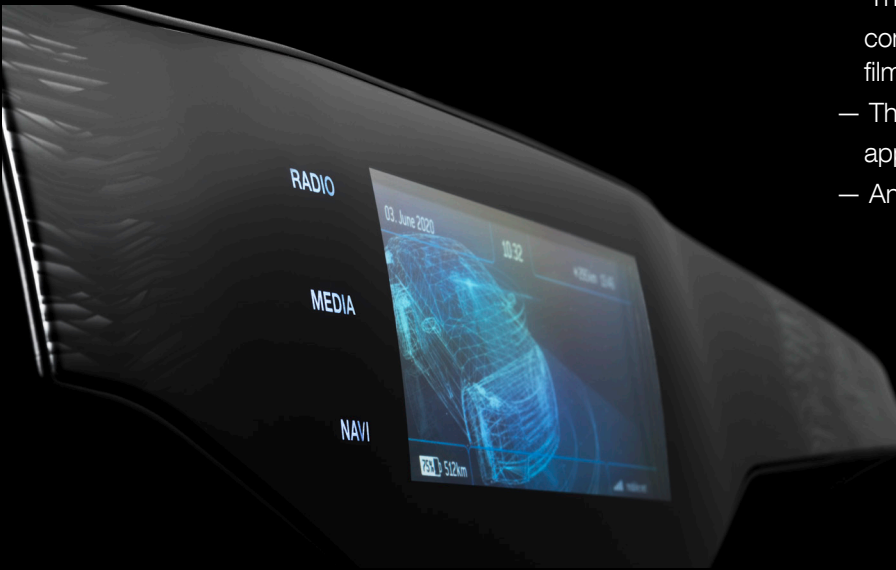
- Hot runner configuration designed for an APS PE compound with recycled TETRA PAK® carton package Alu Foil
- FLEXflow HRS solution for sustainable results
- High process repeatability
- TTC - Through The Cavity, easy maintenance bushing





## Futuristic touch surfaces

High quality film injection molding



HMI (Human Machine Interface) concept panel  
by courtesy of Kurz

### Highlights

- The integration of capacitive films for sensors or touch control panels in combination with backlit decorative films
- The gentle, low-stress injection and the perfect appearance of the IMD design
- An unknown concept and functional flexibility

## Optimal balancing results in family tools

- Optimal balancing avoiding flash effects on the part or under packing
- The molded part is ready for finishing even with complex processes such as chroming, painting, metallization
- Scrap rate reduction

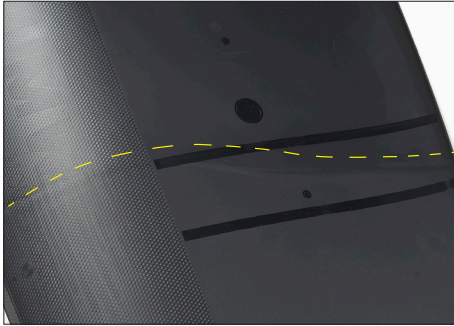




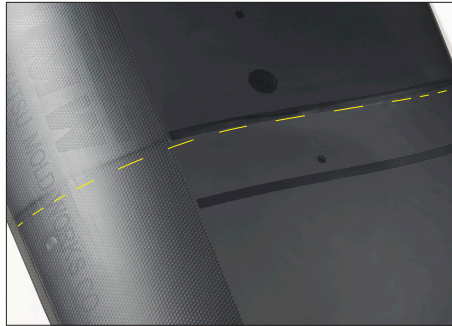
# Weld line management

**PATENT  
PROTECTED**

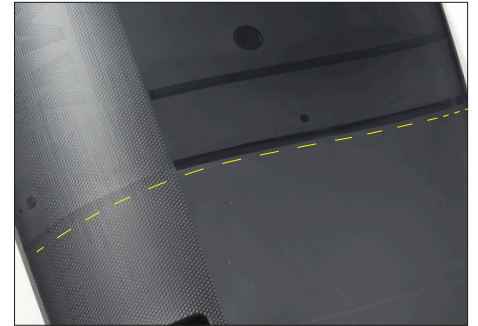
- Weld line repositioning
- The high repeatability ensures the same weld line positioning for all cycles



Angled weld line shape



Perfectly straight weld line / Left

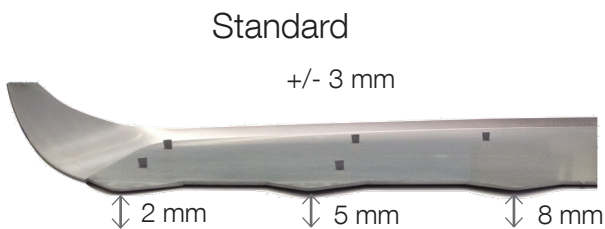


Relocated weld line: 70 mm perfectly in parallel to the right

In collaboration with **TMW**

# Warpage management

- Lower part stress
- Easier assembly of the parts
- Uniform pressure distribution



Part deformation analysis done by Laser Scan Measurement



## Clamping force reduction

- Smaller injection machines required (lower tonnage)
- Operation cost reduction

1000 t → 800 t



Performance obtained using FLEXflow HRS optimization with reference to Oerlikon HRSflow door panel mold (see the mold below).

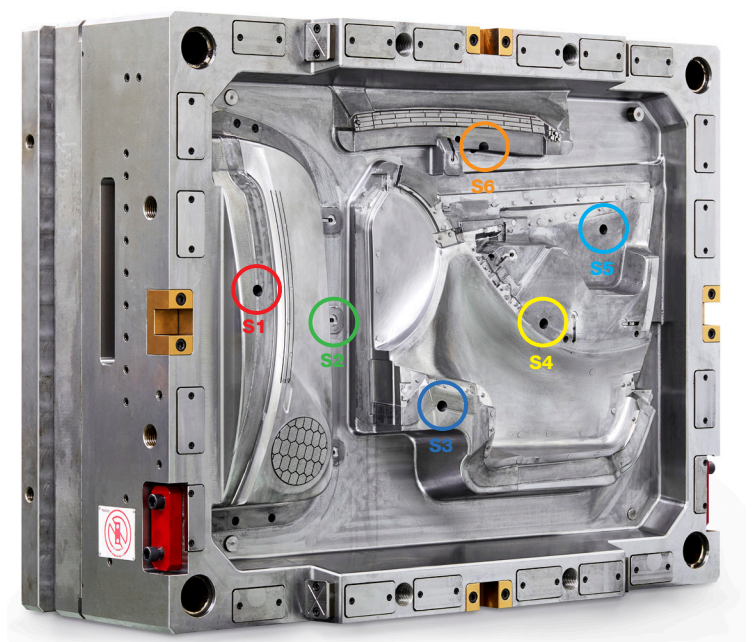
## Reduced tool deflection

**PATENT  
PROTECTED**

- Reduced tool maintenance
- Increase the tool life
- No flashes on the parts

Sensor positions:

- S1** - Location linear position sensor 1
- S2** - Location linear position sensor 2
- S3** - Location linear position sensor 3
- S4** - Location linear position sensor 4
- S5** - Location linear position sensor 5
- S6** - Location linear position sensor 6





# FLEXflow HRS: Driving Perfection

FLEXflow HRS is the servo-driven valve gate system equipped with an advanced Control Unit to set and monitor the valve pin position and speed during the injection process. It assures accurate and flexible control of pressures and flow rates providing additional functions for 360° flow control and monitoring.

## Main Benefits

- 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
- Available and certified CE and UL Listed

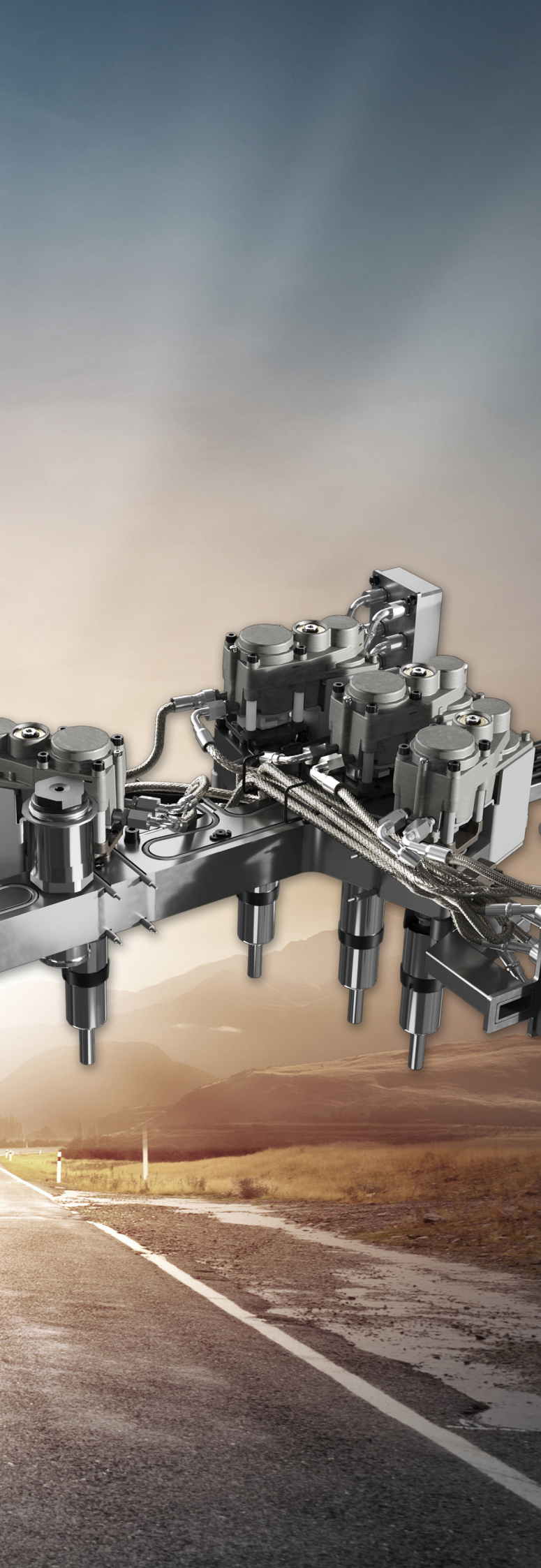


FLEXflow HRS Control Unit

**FLEXflow HRS &  
FLEXflow One HRS:**  
same hot runner  
system hardware,  
two options of control.







# FLEXflow One HRS: no additional control unit required

FLEXflow One HRS is the servo driven valve gate version being control unit free during the injection process. Sequential management is similar to standard hydraulic/pneumatic system with the advanced features of the electrical solution.

## The heart of technology

The External Smart Interface (ESI) is connected to the driver module assembled on the mold. This module comes with a default setting that fully opens/closes the needle. The servo driven solution precisely controls the melt flow providing highly reproducible quality parts.

Available and certified CE and UL Listed



SIB  
Safety Interface Box



FLEXflow One HRS  
Driver Module for 2 drops



ESI  
External Smart Interface



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