

# VACUUM



# FX JET



FOR  
HIGH-PRESSURE  
DIE CASTING



# SINCE 1946

Since 1946, Fondarex has contributed to the successful implementation of thousands of projects in vacuum die casting.

Initially established as a high-pressure die casting (HPDC) foundry in Montreux, Switzerland, for over 30 years, the company produced high-quality castings.

In 1952, the first vacuum system was developed in-house for the foundry, with the aim of optimizing the part quality. During the last 45 years, the company has continuously expanded – not only in terms of customers, whose number today exceeds 1000, but also its consistent focus on product development, with an emphasis on reliability. Fondarex differentiates itself by offering its customers comprehensive advice and technological support for each individual project, based on its extensive expertise and experience. Our goal is for foundries, to be able to produce the best-quality parts as efficiently and cost-effectively as possible.

Fondarex made a great step forward in expanding the company by creating 2 new entities: “Fondarex Europe GmbH” in Dillingen, Germany, and “Fondarex Wuxi Machinery Co., Ltd” in Wuxi, China. Both new sites will have a production and a warehouse to better serve our customers.

Last but not least, over the last two years Fondarex developed a new innovative jet cooling system called FX JET so we could meet our customers’ needs more effectively in terms of die cast part quality. This new development is part of a new Fondarex strategy which will soon be rounded out by complementary technologies.

These achievements are made possible only through the dedication and expertise of Fondarex’s employees and, of course, our customers.

Our most heartfelt **THANK YOU** for your trust and loyalty throughout these 75 years.

D. Baumgartner  
CEO

K. Baumgartner  
President

**COMPANY**

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# FONDAREX GROUP

As part of its plan to strengthen its presence and customer support, Fondarex SA founded Fondarex Europe GmbH in Dillingen, Germany, and Fondarex (Wuxi) Machinery Co., Ltd in Wuxi, China.

## SWITZERLAND

The headquarters of Fondarex are where we develop our vacuum technologies for high-pressure die casting and where our production site and warehouse are located.

## EUROPE

Created in 2022 in Dillingen, Germany, Fondarex Europe GmbH aims to better serve our European customers in collaboration with our existing representatives. This Fondarex subsidiary will provide the newly developed FX JET as a complementary product to our vacuum technology. With the commercialization of the FX JET in April 2023, Fondarex will offer even more when it comes to the quality of die-cast parts.

## ASIA

After 30 years of building a reputable customer network in China, in 2021 Fondarex SA launched Fondarex (Wuxi) Machinery Co., Ltd in Wuxi, China. This Fondarex subsidiary successfully developed and produced an unique range of vacuum systems for the Chinese local market that meet the quality standards of our Swiss headquarters. Furthermore, we are able to provide the best technical service and can deliver spare parts throughout Asia more quickly.



# FX JET

“Achieve castings with quality” This motto led Fondarex to develop a new jet cooling concept with disruptive technology and implement a novel strategy for managing jet cooling.

Taking into account the best practices of the HPDC industry, this unit will help foundries to be more competitive on the current market with its challenging conditions.

The purpose meets the need -  
from simple castings all the way to the Giga sizes.

- 2 to 8 cooling channels for up to 64 controlled jet nozzles (upgradable)
- Dissipated heat and flow rate are monitored per nozzle and production cycle
- Compatible with conventional jet nozzles
- Easy to use and maintain
- Energy-efficient pump technology



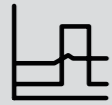
Traceability for all production cycle/cast parts



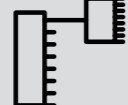
Automatic filter contamination surveillance



Error diagnostic display



All jet nozzles are temperature and flow controlled



From 2 to 8 cooling channels (16 to 64 controlled jet nozzles)



Max. flow rate up to 100 l/min



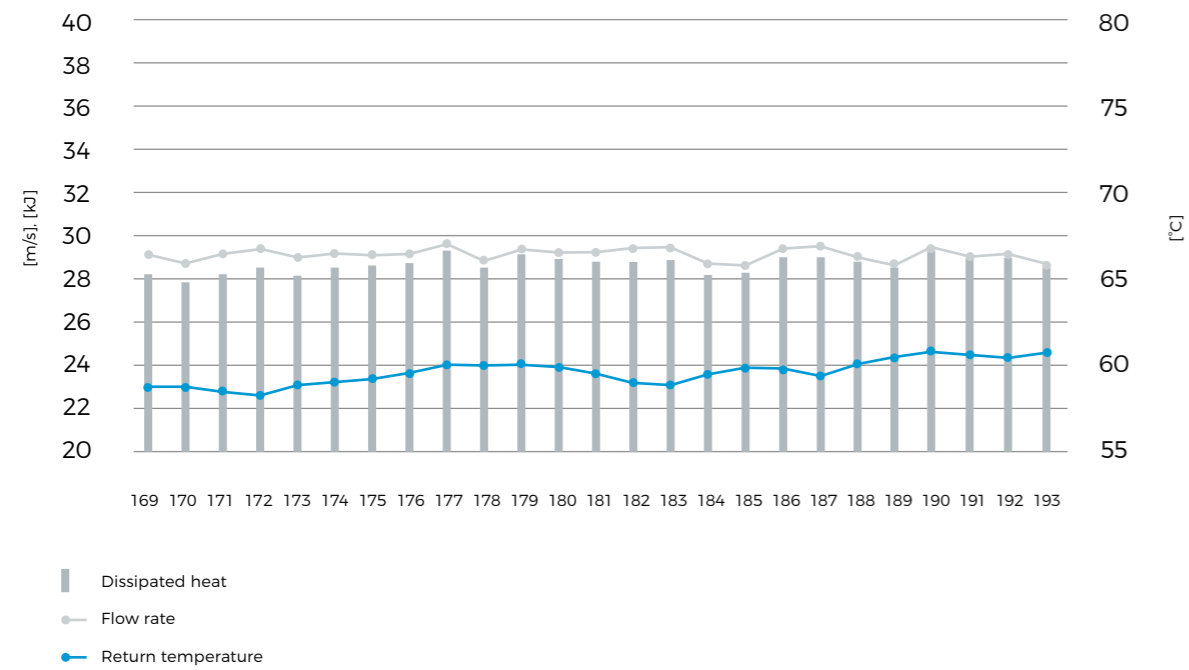
Removable control panel



Real time data transmission to external systems



## CYCLE RECORDING

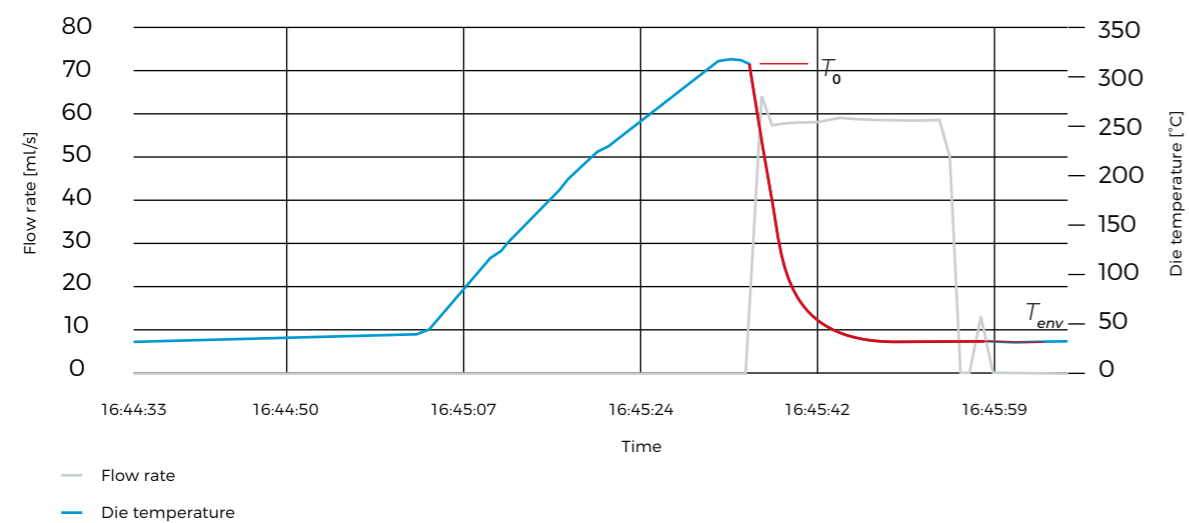


## EVALUATION OF COOLING CAPACITY

Determination of heat dissipated per jet nozzle and production cycle

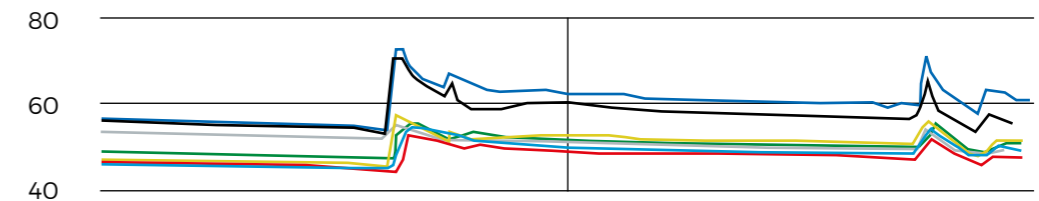
$$P(t) = -m \cdot c_p \cdot r \cdot (T_0 - T_{env}) \cdot e^{-r \cdot t}$$

$$r = -\frac{1}{t} \cdot \ln \left( \frac{T(t) - T_{env}}{T_0 - T_{env}} \right)$$



## INDIVIDUAL CURVE TEMPERATURE PER JET

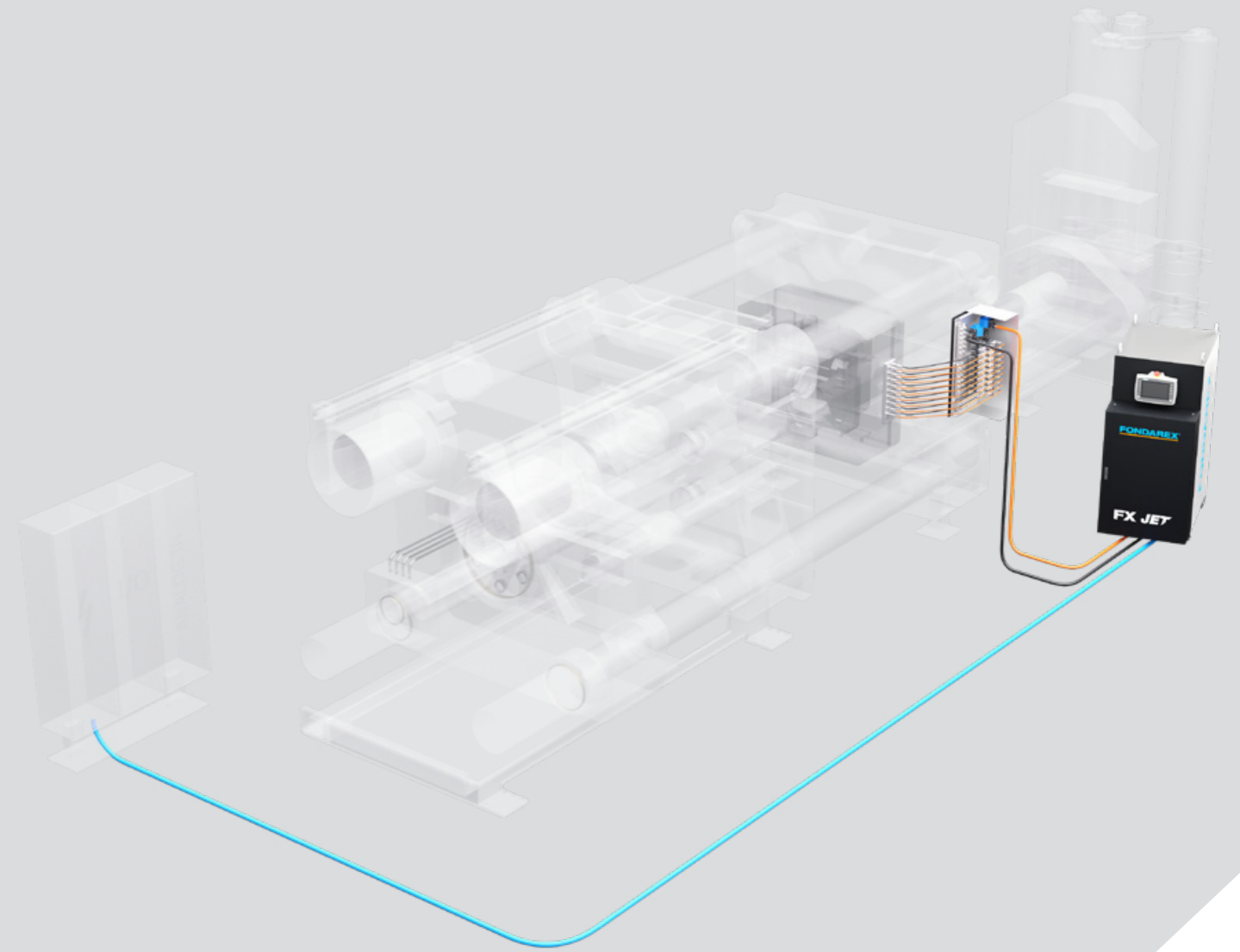
Recording of temperature-time and flow-time curves for each jet nozzle



Curve	Input variable	Value	Date	Time
Temp 1	DB41_Analog CC1_Te...	60.0	07.02.2023	14:46:01:052
Temp 2	DB41_Analog CC1_Te...	48.5	07.02.2023	14:46:01:052
Temp 3	DB41_Analog CC1_Te...	62.3	07.02.2023	14:46:01:052
Temp 4	DB41_Analog CC1_Te...	50.6	07.02.2023	14:46:01:052
Temp 5	DB41_Analog CC1_Te...	52.5	07.02.2023	14:46:01:052
Temp 6	DB41_Analog CC1_Te...	49.2	07.02.2023	14:46:01:052
Temp 7	DB41_Analog CC1_Te...	47.5	07.02.2023	14:46:01:052
Temp 8	DB41_Analog CC1_Te...	50.9	07.02.2023	14:46:01:052

Back	Unit	Circuit 1 active	Circuit 2 active	Circuit 3 active	Circuit 4 active	Recipes	System
------	------	------------------	------------------	------------------	------------------	---------	--------

MODEL	FX JET
MAX. TEMP. FORWARD	60°C
HEAT-TRANSFER MEDIUM	Water
MAIN CIRCUITS	4 (Optional 8)
PINS	32 (Optional 64)
TEMPERATURE CONTROL	Monitored
DEIONISER	Integrated and automatically controlled
FLOW MEASUREMENT	Integrated
AIR PRESSURE	Integrated
MANUAL RINSING FUNCTION	Integrated
WATER-PRESSURE MEASUREMENT	Integrated
PIN-BREAK MONITORING	Integrated
CURVE / PIN	Integrated
FAULT DIAGNOSIS	Integrated
FAULT RECORDING	Integrated
PULSE OPERATION MODE	Integrated
TANK CAPACITY [L]	250
DATA MEMORY & TRANSFER	Integrated
TOUCHSCREEN	Removable HMI
COOLER	Inox heat exchanger
PUMP TYPE	Centrifugal pump
MAX. FLOW RATE	100 l/min
POWER CONSUMPTION	5,5 kw
MAX. PRESSURE	24 bar
CONTROL SYSTEM	Siemens SPS
CONNECTION VOLTAGE	400 V / 50 Hz / 32 A
EXT. CONTROL VOLTAGE	Internally generated control voltage DC24V
COMPRESSED AIR CONNECTION	3/8 "
COOLING WATER FITTING	3/8 "
DISTRIBUTOR FITTING	3/8 "
PROTECTION CLASS	IP54
DIMENSIONS W X H X D [mm]	800 x 1700 x 1200
WEIGHT [kg]	500 / 600



## FX JET

**NEW  
NOZZLE DESIGN**



16-17



# **ELECTRIC**

22-25



# **FX PREMIUM**

18-19



# **ONE**



# **TWO**

26-31



# **MODULAR**

20-21



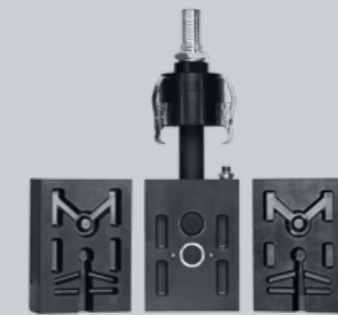
# **ZAMAK**

32-33



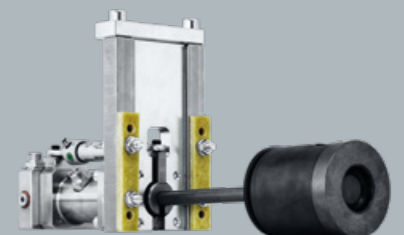
# **STEEL VENTS**

34-35



# **KINETIC VALVES**

36-37



# **HYDRAULIC VALVE**



# ELECTRIC

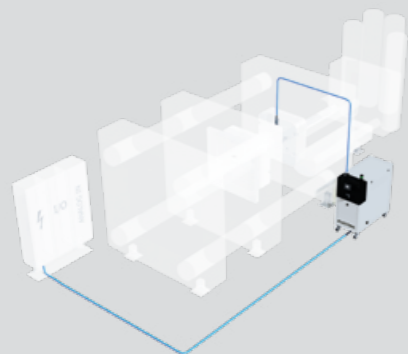
## MOBILE

This new, fully electric vacuum system concept allows up to 3 electric units to be connected together on 1 DCM.

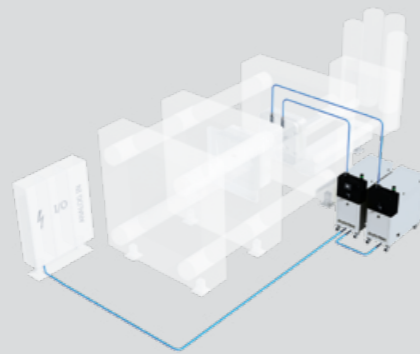
- Compact solution
- Simplified interface
- Affordable unit
- No installation assistance required
- No need for compressed air
- Upgradable up to 3 vacuum channels
- Compatible with any DCM
- Available for Zamak applications

### POSSIBLE CONFIGURATIONS

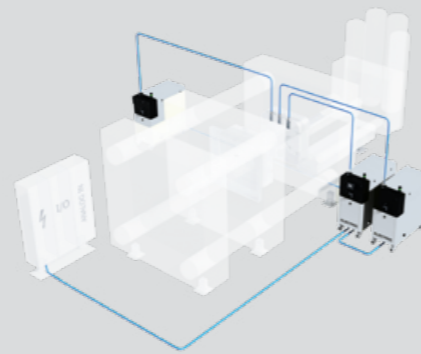
Start with 1 controller unit and add 1 or 2 additional units at any time.



1 UNIT



2 UNITS



3 UNITS



# ONE / TWO

## MOBILE / CELL / CENTRAL

The Fondarex ONE system controls 1 vacuum valve or 1 chill vent and is suitable for die casting machines up to 800 t.

The Fondarex TWO system controls 2 valves or 2 chill vents and is recommended for die casting machines up to 1400 t.

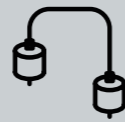
- 1 or 2 vacuum channels
- Easy-to-install system
- Compatible with any vent or mechanical valve
- Easy to use and maintain
- Available for Zamak applications



Curve display of vacuum measurement



Vacuum measurement in the tank



Filter contamination control per cycle



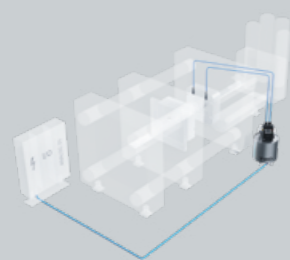
Valve / vent profile control to ensure performance



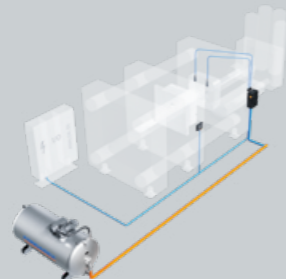
Internal storage of 50 production recipes



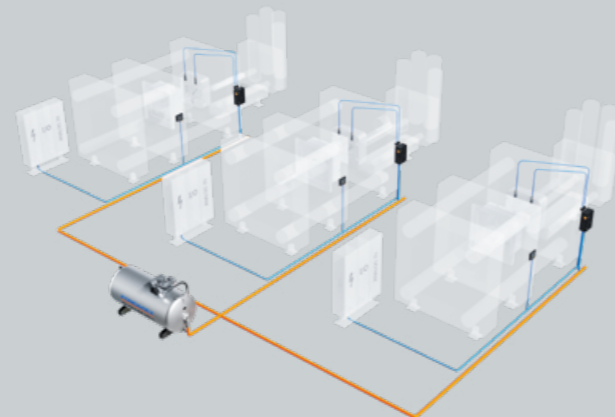
Error diagnostic display



MOBILE



CELL



CENTRAL



# ZAMAK

## MOBILE / EXTENDED / CENTRAL

Based on the FX Premium concept, this unit is specifically adapted for the hot-chamber die casting industry.

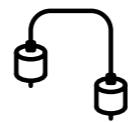
- Fast vacuum opening
- Vacuum control
- Data transfer
- OPC UA ready
- Compact design



Curve display of vacuum measurement



Vacuum measurement in the tank



Filter contamination control per cycle



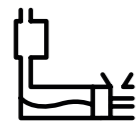
Internal storage of 500 production recipes



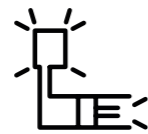
Error diagnostic display



Vacuum control (3 positions)



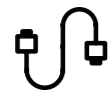
Evacuated air volume



Leak test / leak detection



Separate electrical and pneumatic cabinets



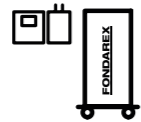
Wire interface compatible with the Highvac Premium series



Profinet interface



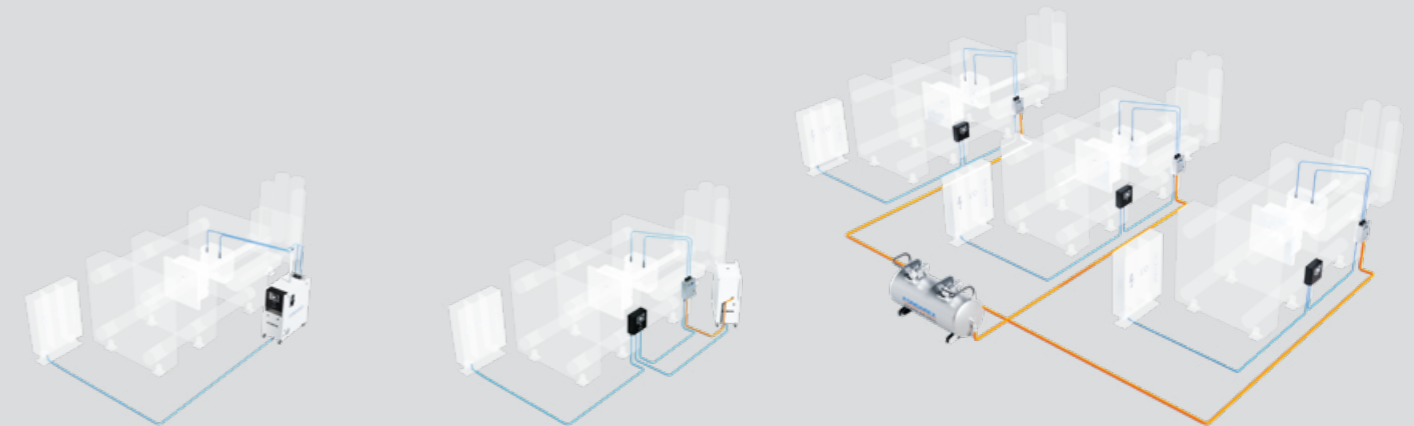
OPC UA ready



Extended version with flexible configuration



HOT-CHAMBER



MOBILE

EXTENDED

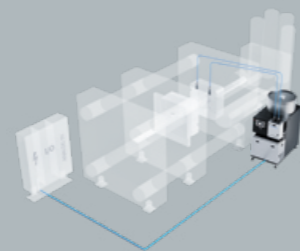
CENTRAL



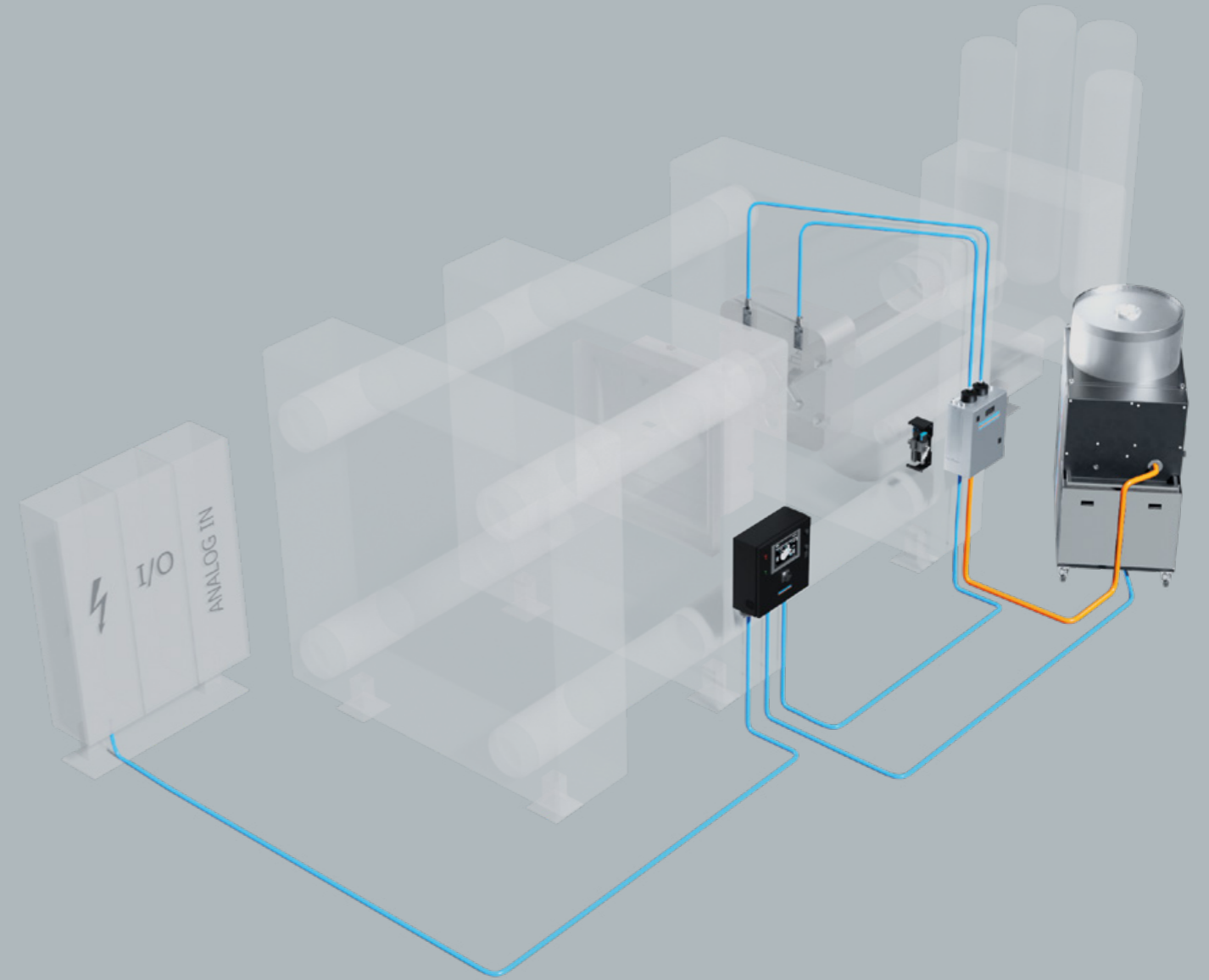
# FX PREMIUM

## MOBILE

Since the launch of the Highvac series in 2010, the Highvac Premium system has been internationally recognized as the quality standard for vacuum-assisted high-pressure die casting. Now being replaced by FX Premium.



MOBILE



# FX PREMIUM

## EXTENDED

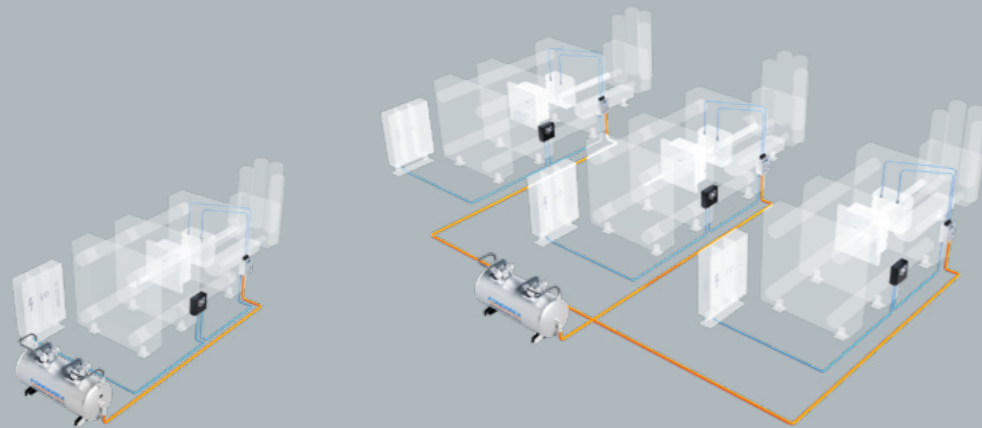
Full flexibility of configuration and placement. Simply position the modules to best suit your layout. To ensure the best performance and quality, link the vacuum channels closer to the die.



# FX PREMIUM

## CELL / CENTRAL

The FX Premium electrical and pneumatic cabinets can be purchased for Cell or Central solutions. The vacuum tank and pump sizes will be configured according to customer needs.



CELL

CENTRAL

## FEATURES

An update and redesign of the Highvac Premium series which offers increased performance (larger tanks and pumps) and optimized control options:

Curve display of vacuum measurement

Vacuum measurement in the tank

Filter contamination control per cycle

Valve/vent profile control to ensure performance

Internal storage of 500 production recipes

Error diagnostic display

Vacuum control (3 positions)

Evacuated air volume

Leak test / leak detection

Wire interface compatible with the Highvac Premium series

Profinet interface

OPC UA ready

Separate electrical and pneumatic cabinets

Extended version with flexible configuration

# MODULAR

## CELL / CENTRAL

A new vacuum concept to meet the demands of the Giga Era and greater casting size.

The Fondarex Modular system allows independent placement of the modules.

The user interface has also been completely redesigned for ease of operation, offering more precise control and comprehensive process analysis.

The system comes with all of the standard controls and features for which Fondarex machines are known.



Supports not for sale

# MODULAR

## FEATURES



Curve display of vacuum measurement



Vacuum measurement in the tank



Filter contamination control per cycle



Valve/vent profile control to ensure performance



Internal storage of 500 production recipes



Error diagnostic display



Evacuated air volume



Leak test / leak detection



Vacuum in shot sleeve



Wire interface compatible with the Highvac Premium series



Profinet interface



OPC UA ready



Software upgradable at any time



Hydraulic valve management

## OPTIONS



### INDUSTRY 4.0

A new way to manage, communicate and handle data through integrated vacuum process statistics and quality reports. This option includes a web dashboard to follow your production from your laptop.



### REAL-TIME VACUUM CONTROL

The butterfly valve precisely controls evacuated airflow. The high-speed control is done independently through each vacuum channel.



### AIRFLOW MEASUREMENT

The module measures evacuated airflow and air volume per vacuum channel.



### AIR HUMIDITY

Air humidity is measured by sampling in a dedicated tank before injection.



### INDIVIDUAL VACUUM CHANNELS (up to 8)

Individual vacuum channel boxes can be placed wherever needed around the DCM, allowing you to work as closely as possible to the mold.



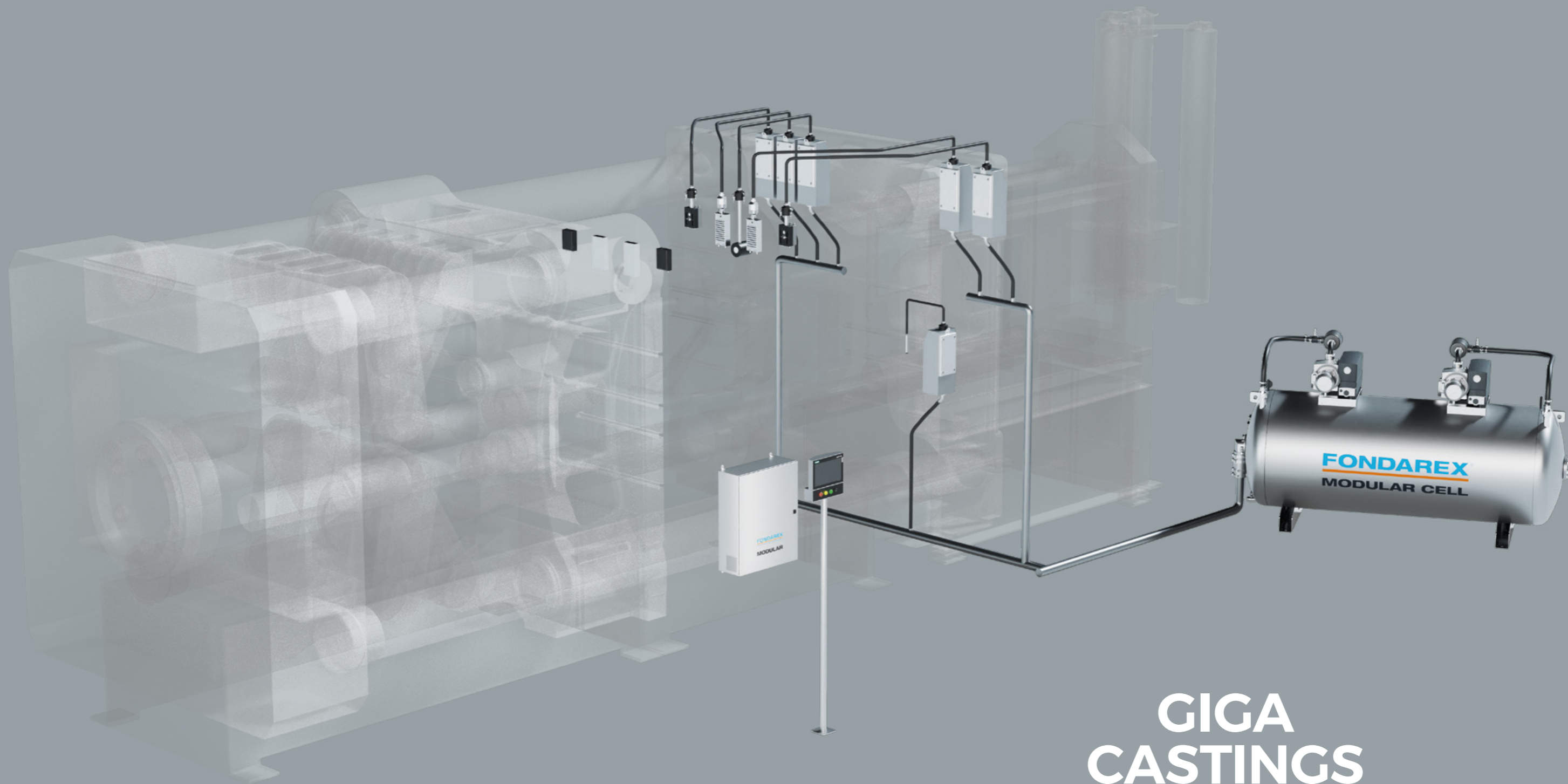
### REMOTE CONTROL PANEL

Always keep an eye on the vacuum process data by positioning the remote control panel as close as possible to the operator.



### ID KEY

The ID key enhances parameters and data security with up to 4 different access levels. Each level has 1 dedicated key.

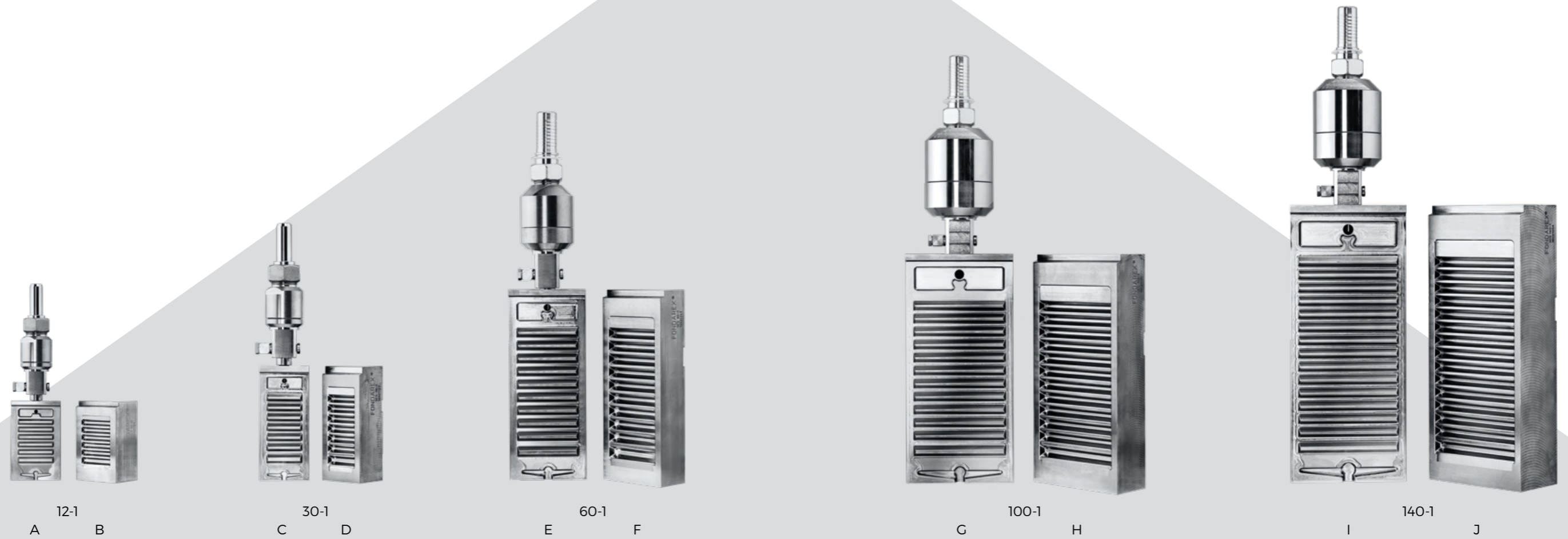


# GIGA CASTINGS

The Fondarex Modular Cell is the Giga Casting vacuum solution for high-pressure die casting.

This modular concept incorporates robust, modern technology to guarantee ongoing high-performance use.



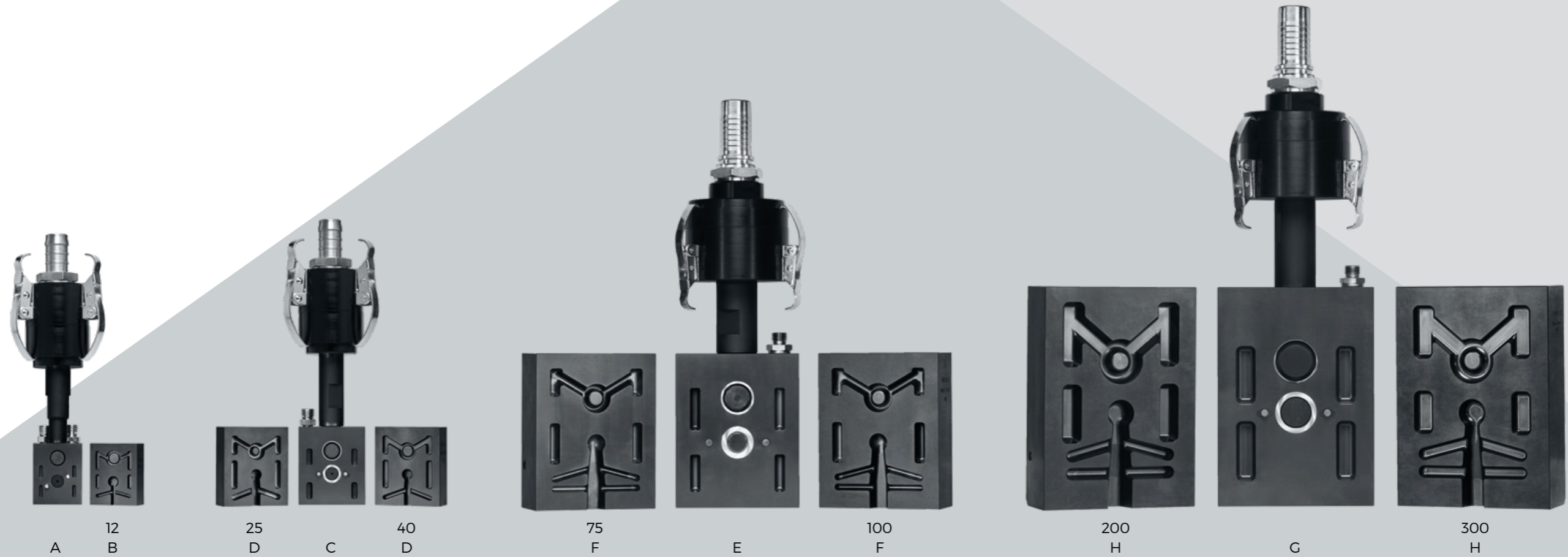


# STEEL VENTS

The aerodynamic profile of our SCS steel vent ensures both efficient air evacuation and fast alloy solidification.

The SCS steel vent delivers reliable performance for over 400,000 shots.

MODEL	SCCZ 12-1		SCS 30-1		SCS 60-1		SCS 100-1		SCS 140-1	
<b>SECTION [mm<sup>2</sup>]</b>	12		30		60		100		140	
<b>DCM TONNAGE [t]</b>	< 200 approx.		< 400 approx.		200 - 1200		800 - 2800		1600 - 4500	
<b>SHOT WEIGHT Al [kg]</b>	/		0.1 - 1.5		0.7 - 10		5 - 22		10 - 40	
<b>SHOT WEIGHT Mg [kg]</b>	0.05 - 0.8		0.07 - 1		0.5 - 6		3 - 12		6 - 26	
<b>SHOT WEIGHT Zn [kg]</b>	0.1 - 3		0.2 - 4		1 - 20		/		/	
<b>DIMENSIONS</b>	A	B	C	D	E	F	G	H	I	J
<b>WIDTH [mm]</b>	63	63	63	63	100	100	140	140	150	150
<b>DEPTH [mm]</b>	63.4	63.5	50	50	50	50	60	60	80	80
<b>HEIGHT [mm]</b>	100	99	150	149	250	249	300	299	360	359



# KINETIC VALVES

A new family of mechanical valves that give you high evacuation capacity, high reliability and compact size at a competitive price.

- The proper way to reach high vacuum
- Up to 300 mm<sup>2</sup> evacuation capacity
- Compact design for better mold integration
- Less weight for easy handling
- Available in 4 sizes and 7 evacuation sections

### LOW AND EASY MAINTENANCE

Simplified mechanism to reduce the number of moving parts and to lower maintenance costs.



### INTEGRATED COOLING CIRCUIT

Available on:

**KINETIC VALVES**  
100 / 75  
300 / 200

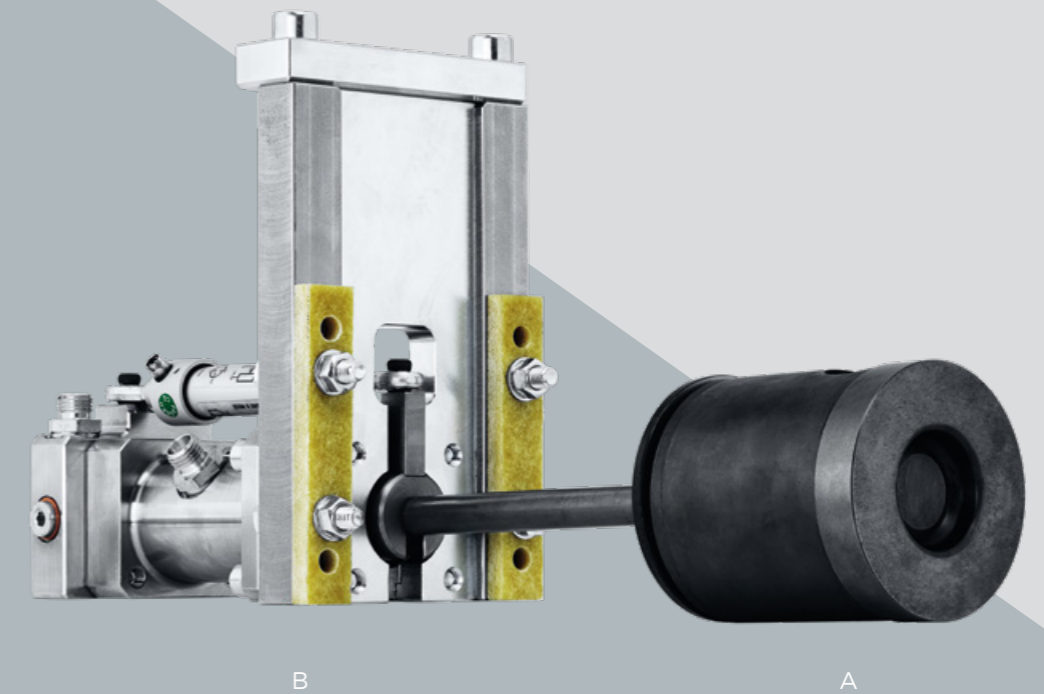


### REDESIGNED FILTER

New robust filter for easy and quick maintenance.



MODEL	KINETIC VALVE 12		KINETIC VALVE 40/25		KINETIC VALVE 100 / 75		KINETIC VALVE 300 / 200	
	A	B	C	D	E	F	G	H
<b>PROFILE [mm<sup>2</sup>]</b>	12		25 40		75 100		200 300	
<b>DCM TONNAGE [t]</b>	20 - 200		80 - 800		200 - 2000		1200 - 6000	
<b>SHOT WEIGHT [kg]</b>	ZN 0.1 - 2		ZN 0.2 - 8 AL 0.2 - 5		ZN 0.8 - 14 AL 0.6 - 15		AL 7 - 50	
<b>DIMENSIONS</b>	A	B	C	D	E	F	G	H
<b>WIDTH [mm]</b>	40	40	55	55	100	100	125	125
<b>DEPTH [mm]</b>	44	20	50	25	75	50	95.5	57.5
<b>HEIGHT [mm]</b>	50	50	65	65	125	125	175	175



# HYDRAULIC VALVE

The redesign of the hydraulic vacuum valve features high evacuation capacity, great reliability, easy integration into the mold and smart control of the evacuation piston stroke.

- Vacuum valve controlled by a hydraulic cylinder
- 300 mm<sup>2</sup> vacuum valve evacuation capacity
- Reactive manifold connected to the hydraulic circuit of the DCM
- 50 ms hydraulic valve closing time
- Stroke control of the evacuation piston through the Fondarex Modular unit

MODEL	MOLD VACUUM VALVE (A)
SECTION [mm <sup>2</sup> ]	300
DCM TONNAGE [t]	6000
SHOT WEIGHT [kg]	AL 7 - 50
VACUUM VALVE BODY DIMENSIONS [mm]	80 $\phi$ x 95
VACUUM VALVE BODY ATTACHMENT	4 x M8 90 x 50
VACUUM PISTON ROD DIAMETER [mm]	Up to 900
DIAMETER VACUUM PISTON ROD [mm]	20 $\phi$

MODEL	HYDRAULIC CYLINDER WITH COUPLING (B)	MANIFOLD	ELECTRICAL CABINET
LENGTH [mm]	187	266	400
WIDTH [mm]	110	139	210
HEIGHT [mm]	200	268	300



## TECHNICAL SUPPORT

Our experienced engineers provide support at your production sites.

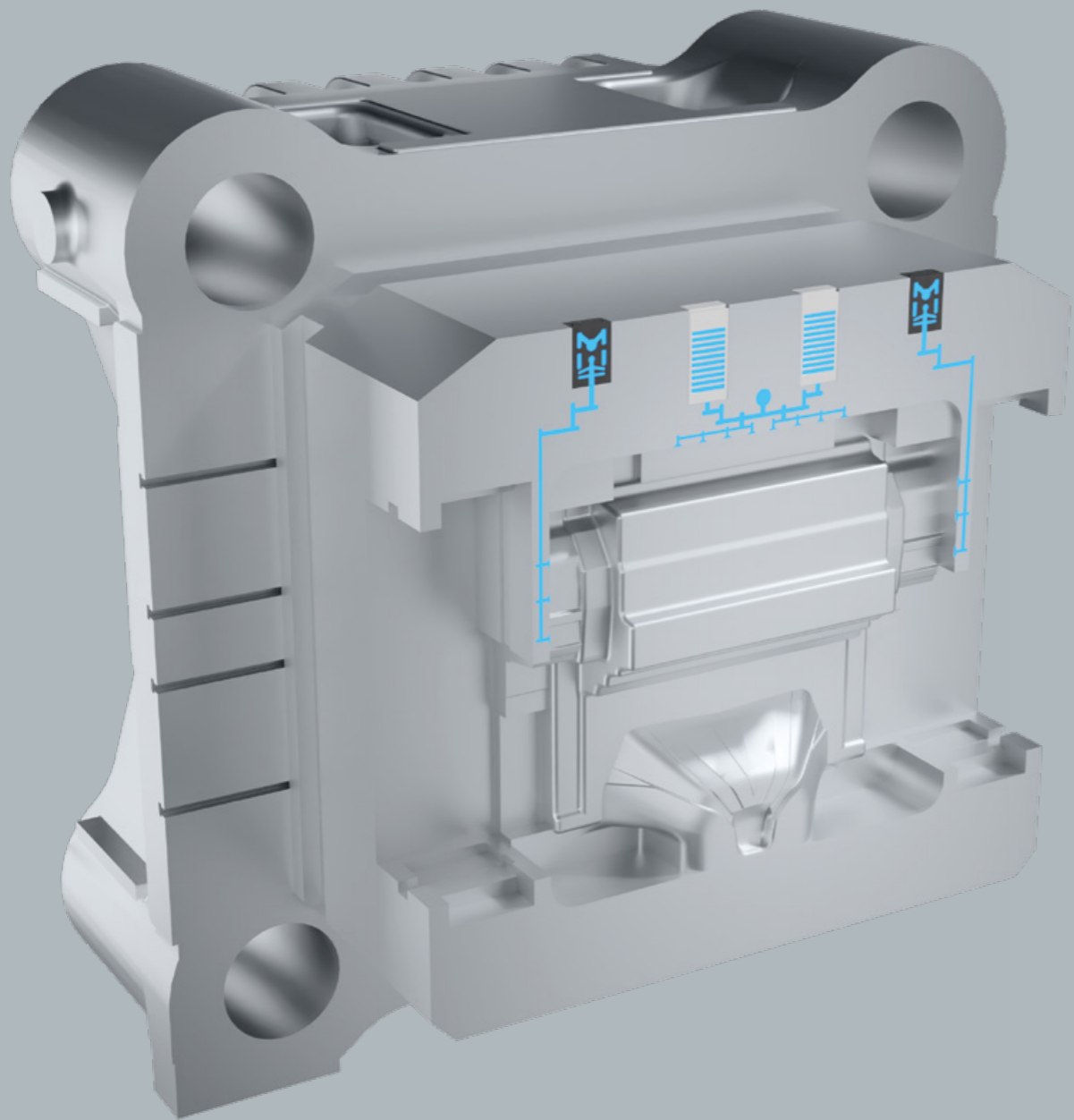
We take care of  
mold design,  
installation / start-up,  
on-site training  
and maintenance.

Your continued satisfaction is our primary goal.

## REMOTE ASSISTANCE

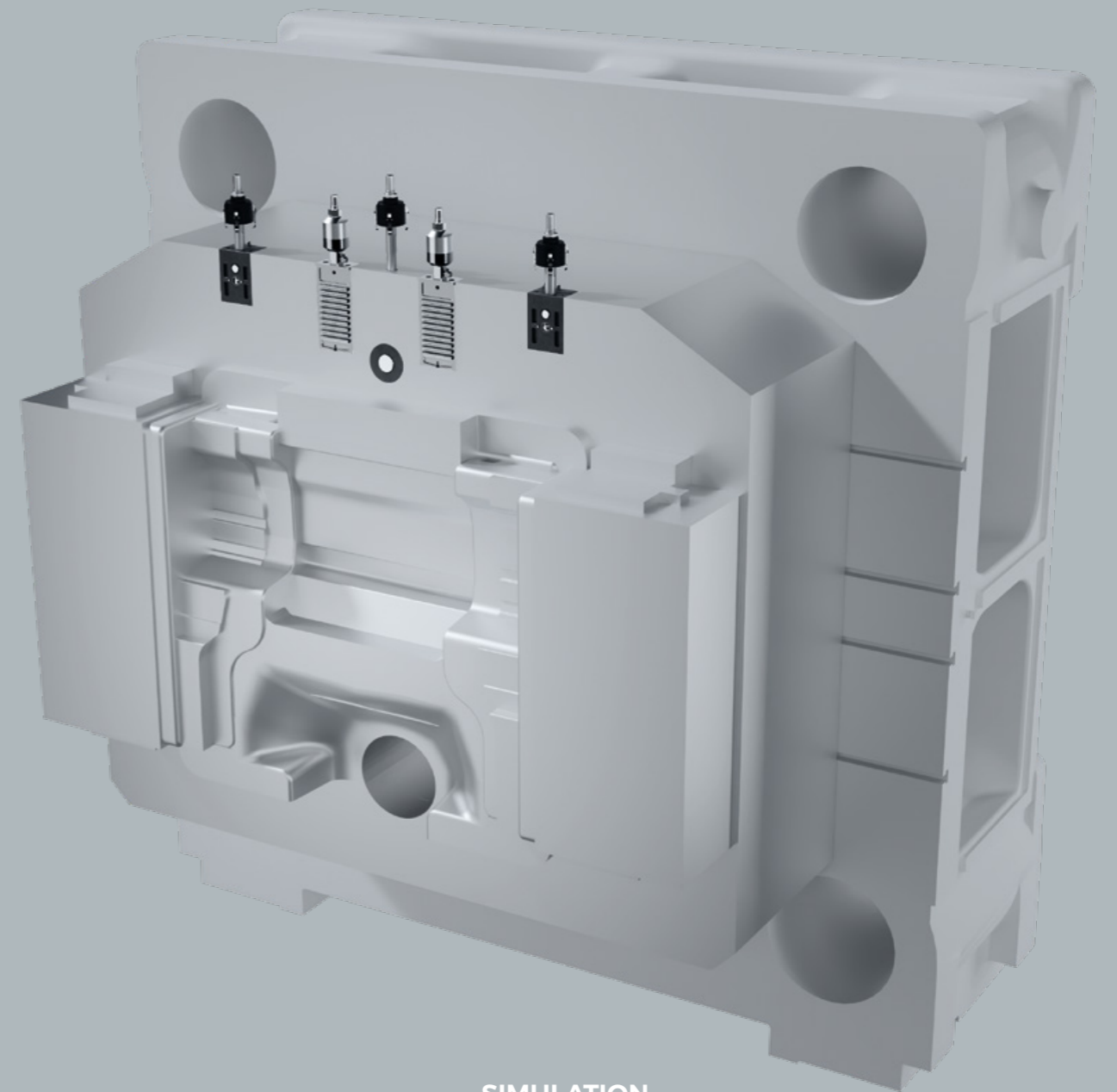
Our experts can provide real-time instructions and guidance for faster troubleshooting.

# VACUUM APPLICATIONS



## CHANNEL DESIGN

Vacuum application studies are fundamental to good vacuum integration into your processes. With over 5000 successful projects, Fondarex is the leading specialist in vacuum channel design.



## SIMULATION

We constantly strive to discover new possibilities. To better understand complex dynamic flows inside the cavity, please ask Fondarex!

MODEL	ELECTRIC	ONE / TWO	ZAMAK HOT-CHAMBER	FX PREMIUM
TYPE OF VACUUM UNIT	Mobile	Mobile	Mobile Extended	Mobile Extended
TANK [l]	150	300 500	300	700 950
PUMP [m <sup>3</sup> /h]	25	40	40	63 100 (Also with model 700)
CHANNELS	Up to 3	1 2	2	2
TYPE OF DIE CAST PROJECT	Simple parts	Standard parts	All zinc parts	Complex and security parts
DCM [t]	Up to 600	Up to 800 Up to 1400	Up to 800	Up to 2200 Up to 3000
DIMENSIONS L X D X H [m]	1.05 x 0.4 x 1.15	0.7 x 0.7 x 1.8 0.9 x 1.0 x 1.8	1.2 x 0.59 x 1.43	0.9 x 1.3 x 1.5 0.9 x 1.3 x 1.9
INTERFACE	Potential free contacts	Potential free contacts	Potential free contacts Optional Profinet	Potential free contacts Optional Profinet
DATA MANAGEMENT	Internal log data	Internal log data	Data communication	Data communication
VACUUM MEASUREMENT IN THE TANK	OK	OK	OK	OK
ERROR DIAGNOSTIC DISPLAY	OK	OK	OK	OK
PRODUCTION DATA (INTERNAL STORAGE)	OK	OK	OK	OK
PRODUCTION DATA (EXPORT)	OK	OK	OK	OK
STANDBY MODE FOR ENERGY SAVING	OK	OK	OK	OK
EVACUATED AIR VOLUME	OK	/	OK	OK
COMPATIBLE WITH CHILL VENTS	OK	OK	OK	OK
COMPATIBLE WITH MECHANICAL VALVES		OK	OK	OK
VACUUM MEASUREMENT BY CHANNEL		OK	OK	OK
VACUUM PROCESS OVERVIEW		OK	OK	OK
REMOTE CONTROL PANEL		Optional	OK (Optional connection cables)	OK (Optional connection cables)
CONTAMINATION CONTROL		OK	OK	OK
PROFILE CONTROL		OK	/	OK
VACUUM CURVE DISPLAY		OK	OK	OK
ANALOG CURVE DISPLAY ON DCM			Optional	Optional
LEAK DETECTION			OK	OK
VACUUM CONTROL			OK (3 positions)	OK (3 positions)
REMOTE ASSISTANCE (EWON)			Optional	Optional
ADVANCED COMMUNICATION PROCESSOR			Optional, CP or OPC UA	Optional, CP or OPC UA

MODEL	FACTORY VACUUM	ONE / TWO	ZAMAK HOT-CHAMBER	FX PREMIUM	MODULAR
TYPE OF VACUUM UNIT	Cell (Central + Factory Vacuum)	Cell Central	Central	Cell Central	Cell Central
TANK [l]	1000 2000 3000 4000 and more	/	/	/	/
PUMP [m³/h]	1x/2x 100 1x/2x 160 1x/2x 200 1x/2x 250 1x/2x 300 and more	/	/	/	/
CHANNELS	All	1 2	2	2	Standard up to 6
TYPE OF DIE CAST PROJECT	All	Standard and complex parts	Standard, complex and security parts	Standard, complex and security parts	Complex, security, structural parts and Giga Casting
DCM [t]	All	800 to 1400	Up to 800	Up to 3000	All
DIMENSIONS L X D X H [m]		0.4 x 0.3 x 0.7	Main cabinet 0.5 x 0.21 x 0.5 Channel cabinet 0.4 x 0.21 x 0.5	Main cabinet 0.5 x 0.21 x 0.5 Channel cabinet 0.4 x 0.21 x 0.5	User cabinet 0.313 x 0.112 x 0.38 Standard main cabinet 0.8 x 0.3 x 1.0 Extended main cabinet 0.8 x 0.6 x 2.0 Channel cabinet 0.3055 x 0.3 x 1.05
INTERFACE		Potential free contacts	Potential free contacts Optional Profinet	Potential free contacts Optional Profinet	Optional potential free contacts Optional Profinet / Profibus / OPC UA
DATA MANAGEMENT		Internal log data	Data communication	Data communication	Data analysis and communication
VACUUM MEASUREMENT IN THE PIPELINE		OK	OK	OK	OK
ERROR DIAGNOSTICS		OK	OK	OK	OK
PRODUCTION DATA (INTERNAL STORAGE)		OK	OK	OK	OK
PRODUCTION DATA (EXPORT)		OK	OK	OK	OK
STANDBY MODE FOR ENERGY SAVING		OK	OK	OK	OK
VACUUM MEASUREMENT BY CHANNEL		OK	OK	OK	OK
VACUUM PROCESS OVERVIEW		OK	OK	OK	OK
REMOTE CONTROL PANEL		Optional	OK (Optional connection cables)	OK (Optional connection cables)	OK
VACUUM CURVE DISPLAY		OK	OK	OK	OK
CONTAMINATION CONTROL		OK	OK	OK	OK
PROFILE CONTROL		OK	/	OK	OK
COMPATIBLE WITH CHILL VENTS		OK	OK	OK	OK
COMPATIBLE WITH MECHANICAL VALVES		OK	OK	OK	OK
COMPATIBLE WITH HYDRAULIC VALVES			/	/	OK
EVACUATED AIR VOLUME			OK	OK	OK
LEAK DETECTION			OK	OK	OK
VACUUM CONTROL			OK (3 positions)	OK (3 positions)	Optional, real-time
ANALOG CURVE DISPLAY ON DCM			Optional	Optional	Optional
REMOTE ASSISTANCE (EWON)			Optional	Optional	Optional
ADVANCED COMMUNICATION PROCESSOR			Optional, CP or OPC UA	Optional, CP or OPC UA	Optional, CP or OPC UA
INDUSTRY 4.0 (WITH WEB DASHBOARD)					Optional
AIRFLOW / AIR VOLUME MEASUREMENT					Optional
ID KEY					Optional
PUMP MONITORING					Optional
HUMIDITY CONTROL					Optional
SIGNAL MODE WITHOUT TIMER					OK
STROKE MODE (WITH PISTON POSITION)					OK
INDEPENDENT CHANNELS					OK
PRESSURIZING					OK
VACUUM ON SHOOT SLEEVE					OK
VACUUM ON EJECTOR CASE					OK

# CONTACTS

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