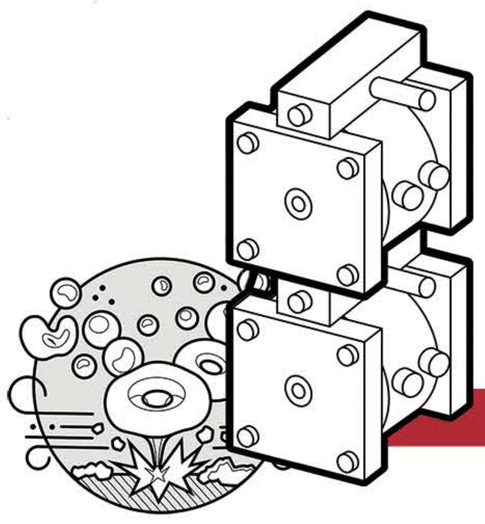
COOLINGCARE

Machines for diagnostics, cleaning & maintenance of mold cooling channels and injection molding equipment



A dedicated feed pump for every channel, working in alternating mode with cavitation generator

COOLINGCARE

Every year, companies around the world unknowingly lose hundreds of thousands of Euros due to the gradual decline in cooling efficiency in their tools and machines. Lower mold efficiency, longer cycle time due necessity of counteracting dimensional deviations of plastic parts, longer mold downtimes, maintenance and servicing - all these factors increase operating costs and translate into a decrease in company profits. The source of these problems originates not only in the quality of the cooling water, but also in the processing temperatures, which translate into precipitation and gradual deposition of deposits and rust inside cooling channels of molds as well as other heat exchangers.

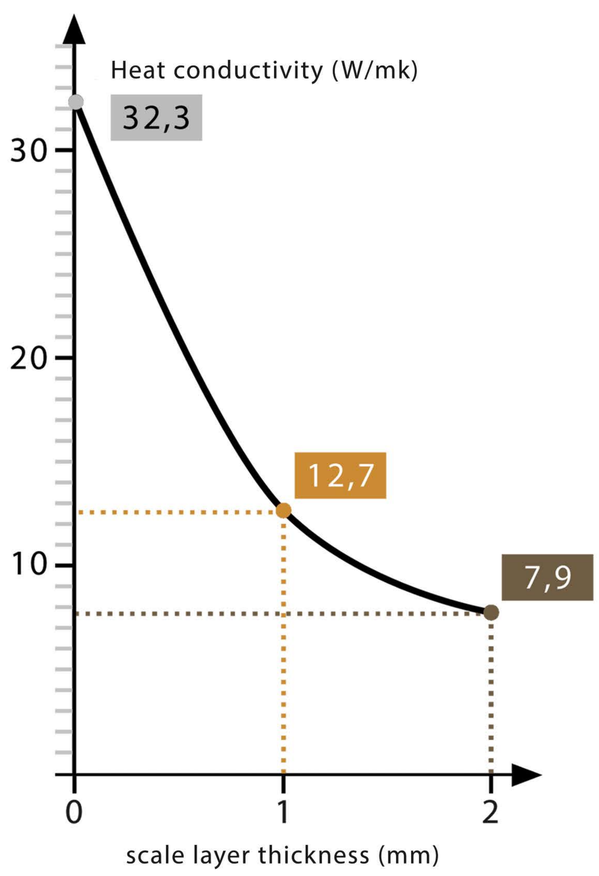
Rusty scale sediment removed during the cleaning process with CA6 machine

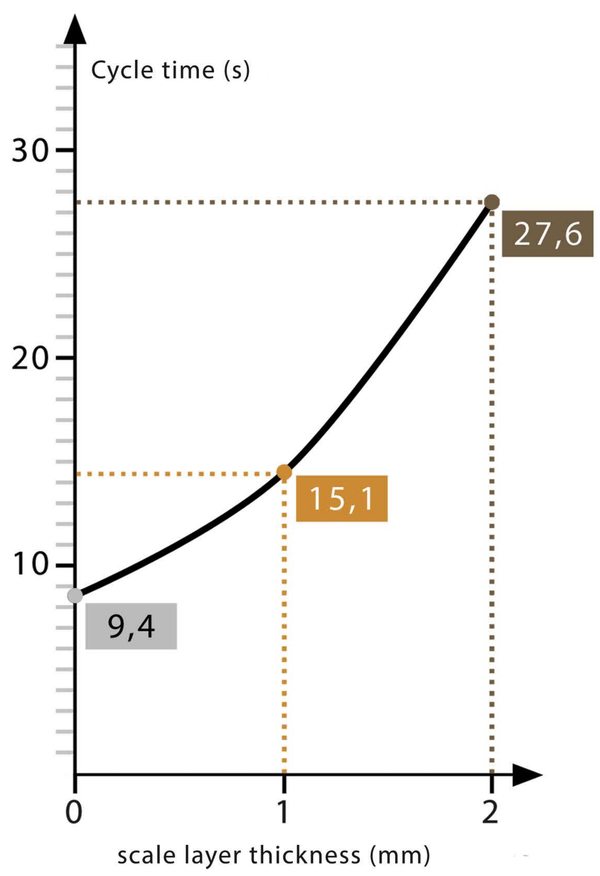
CAPACITY TO ABSORB HEAT IS DIRECTLY PROPORTIONAL TO HEAT CONDUCTIVITY OF SURFACES TAKING AWAY THE HEAT.

MATERIAL	Calcium carbonate scale	Calcium sulphate scale	Calcium silicate scale	1.2343 steel
HEAT CONDUCTIVITY W/mK	0,6 – 6	2,3	0,3	24

Due to their low heat conductivity, presence of scale and corrosion products can greatly affect mold cooling efficiency and cause:

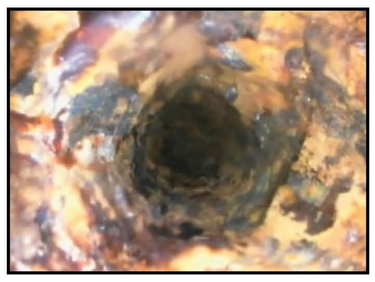
- Drop in production (longer cycle times and scrap rate increase)
- Dimensional issues with parts coming from different cavities
- Adjustment and correction of injection parameters with every production launch



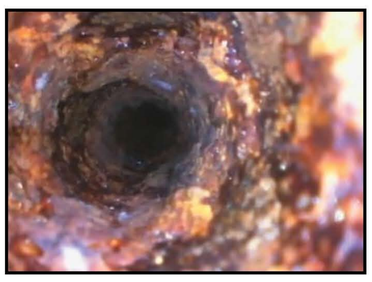


Scale formation depends primarily on water hardness and rises substantially in temperatures above 60°C. Areas with little or zero flow rates are more prone to scale deposition and corrosion issues.

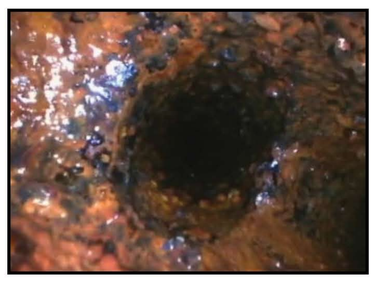
DIFFERENT SCALE TYPES



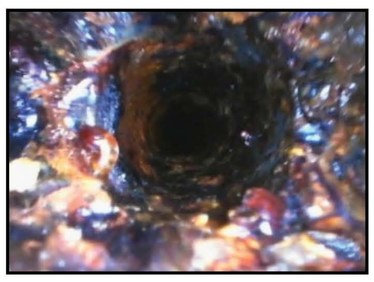
calcium carbonate/
calcium silicate/iron oxides



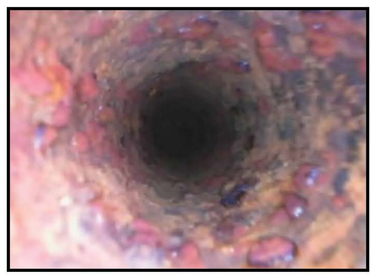
corrosion products
rust/calcium carbonate



calcium sulphate/
iron oxides



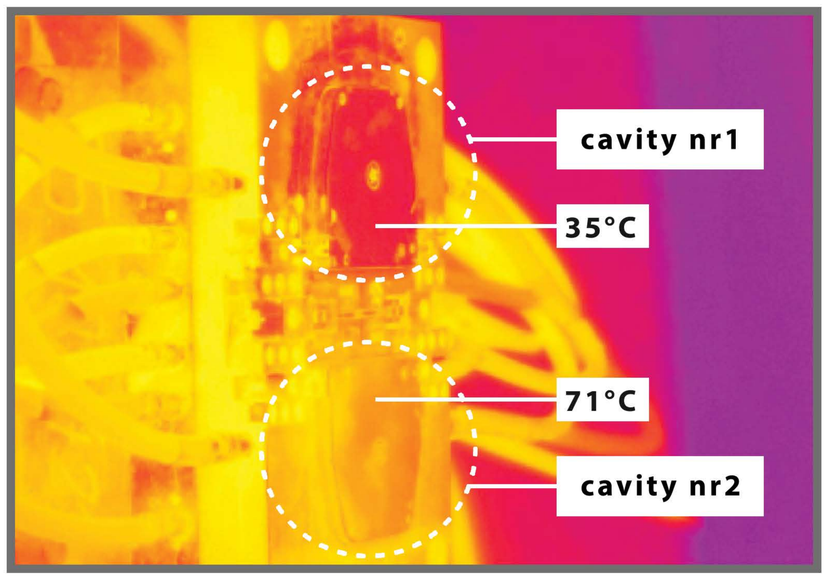
Scale with high amounts of
iron oxides



calcium carbonate/
calcium sulphate

calcium carbonate

THERMOVISION PICTURE OF A MOLD WITH A CLOGGED COOLING CHANNEL



-Temperature rise in the second cavity

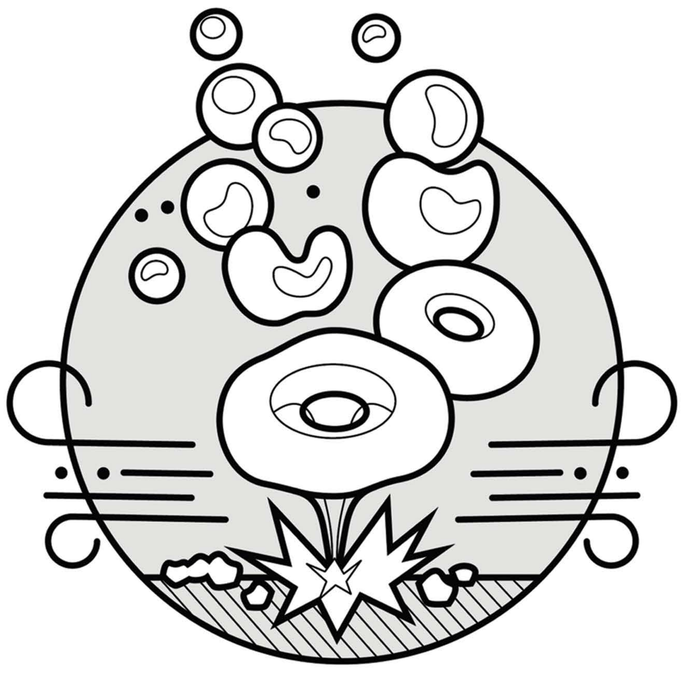
-Unstable injection molding conditions

THIS BROCHURE IS FOR INFORMATIONAL PURPOSES ONLY AND SHALL NOT BE CONSTRUED AS AN OFFER.

CAVITATION EFFECT & PATENTED TECHNOLOGY OF HYBRID CHANNEL CLEANING

HYDRAULIC SHOCKWAVES GENERATING A CONTROLLED CAVITATION EFFECT THAT INITIATES THE PROCESS OF SCALE AND RUST REMOVAL FROM CHANNEL WALLS

Abrupt compression and decompression of liquid inside the channel generates local pressure drops, which result in creation of cavitation bubbles

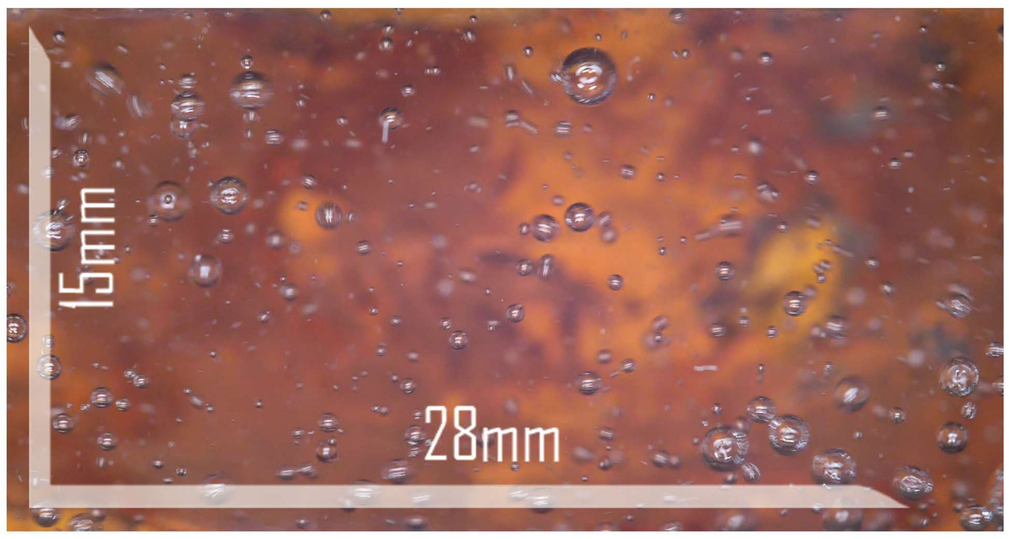


HYDROMECHANICAL PROCESS SUPPORTED WITH LOW CONCENTRATION CLEANING SOLUTION

Microimplosions are supported with mild cleaning media based on water, further augmenting the process of scale removal

UNIQUE UNCLOGGING FEATURE FOR COMPLETELY BLOCKED COOLING LINES

Patented cleaning method using the 'water hammer' effect is the only available technology that enables unclogging fully blocked cooling channels



As a result of sudden local pressure drops in the system generated in the pulsation phase, millions of vacuum bubbles appear. Moments later they implode, creating a shockwave that intensifies the cleaning dynamics. Everything happens in fractions of a second and is hard to notice with a naked eye.

COMPARISON OF DIFFERENT COOLING CHANNEL CLEANING METHODS

MECHANICAL SCALE REMOVAL BY MEANS OF CHANNEL RE-DRILLING	CHEMICAL CLEANING WITH CONVENTIONAL ROTARY OR DIAPHRAGM PUMPS	HYDROMECHANICAL,TWO-STAGE PULSATION CLEANING
Time-consuming and costly process. It requires mold disassembly, re-drilling all holes and exchange of bubblers, bufflers, plugs and seals. Due to the inhomogeneous material inside the channels, there is a risk of the drill breaking. Each regeneration of the cooling system is associated with a production downtime lasting several days or more, depending on the size of the mold and its degree of complexity.	This type of cleaning is based on the steady pumping of the cleaning liquid through the channel. The effectiveness of the process depends on the cleaning time and concentration of the cleaning solution. Each chemical is more or less aggressive to the steel and alloys used in the mold design, which creates the risk of damaging the system of bubblers, bufflers and plugs. The most environmentally unfriendly method. The cleaning process requires channels to be minimally open for the pump to freely circulate the cleaning solution, therefore it is ineffective in the case of completely blocked channels.	A method that uses the phenomenon of microimplosions resulting from cavitation. The formation of cavitation bubbles in the channel is triggered in a controlled manner by the bi-directional pulsating motion of pumps. Cavitation initiates the process of removing scale and rust deposits from the surface of the channels and is supported by a much less aggressive chemical solution. Hydromechanical cleaning is the fastest and cheapest method that allows for effective unblocking of completely clogged channels, provided that the clogging is caused by sediment build-up and not, for example, by displacement of a plug. Thanks to these features, it is the only one suitable for servicing conformal cooling.

COOLINGCARE

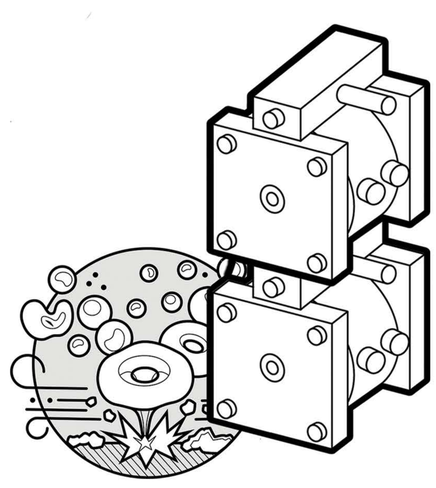
COMPARISON OF MACHINES IN TERMS OF THEIR APPLICATION & SUITABILITY

Machine type	CM case	CM1	CS1	CS2	CA2	CA6	CX
No. of independent cleaning sections	1	1	1	2	2	6	1
In & Out diameter	½″	½″	½″	½″	¾″	¾″	1½″
Conventional cooling	✔	✔	✔	✔	✔	✔	
Conformal cooling	✔	✔	✔	✔	✔✔✔	✔✔✔	✔
Channels connected in series	It is not recommended to connect channels in series or parallel, unless mold design allows for such connection.						✔
Channels connected in parallel							✔✔✔
Cleaning of injection molding machines cooling systems	✔	✔	✔	✔	✔	✔	✔✔✔
A feed pump and cavitation generator for every channel	✔	✔	✔	✔	✔	✔	✔
Collective connection of channels by through a manifold							✔

CLEANING CHANNELS CONNECTED IN SERIES

Machine type	CM	CS1	CS2	CA2	CA6
Work mode	manual	semi-automatic	semi-automatic	automatic	automatic
Average cleaning time of 1 channel (h)	8	4	4	4	4
No. of channels connected individually	1	1	2	2	2
No. of channels cleaned in 24h (machine working time + operator time)	1 1 channel 1 session	2 1 channel 2 sessions	4 2 channels 2 sessions	6 2 channels 3 sessions	18 6 channels 3 sessions

A DEDICATED FEED PUMP AND CAVITATION GENERATOR FOR EVERY CHANNEL



Connecting every channel to a separate, dedicated feed pump, working in alternate mode with cavitation generators translates into greater efficiency and dynamics of the cleaning process. This design of the device not only allows to shorten the operation time, but also gives incomparably greater possibilities in terms of process monitoring. Many cooling channel cleaning systems on the market are equipped with a single feed pump, and manufacturers of these machines suggest connecting channels in series during cleaning to multiply their capacity.

CLEANING CHANNELS CONNECTED IN SERIES

The time saving that we achieve by connecting several channels to one cleaning circuit is illusionary, because such a connection always generates much higher pressure drops in the system. In practice, connecting cooling lines in series requires a significant extension of cleaning time, at the same time giving no guarantee that all channels will be cleaned equally. Parallel connection, on the other hand, creates limitations in the form of the inability to assess the flow rates of separate lines. Individual connection of channels allows us to monitor and control both the dynamics of the process and the assessment of cleaning efficiency.

CM SERIES – COMPACT DEVICES THAT CAN BE CUSTOMISED

The CM series are modular devices with the possibility of selecting functionalities to suit your needs. Thanks to this, we can create a machine optimized to specific expectations of the user while maintaining the lowest possible price. The heart of the CM series device, which is also the base module, is the CM Case model, a compact, single section unit with the function of cleaning, airblow, pressure and blockage tests. CM Case is not equipped with its own tanks, thanks to which the structure is light, handy and small. The device can be connected to any external tank.

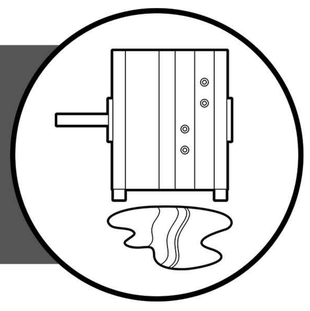
CM SERIES HIGHLIGHTS

Bi-directional pulsation cleaning based on the hydraulic shockwave effect and cavitation effect known from CA models, optional flow rate diagnostics and rinsing function with mains water

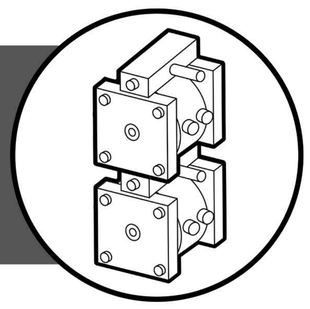
Its compact design allows the expansion of the device with additional functions

CM Case

PRESSURE & BLOCKAGE TESTS



HYBRID, TWO-STEP PULSATION BASED CLEANING FUNCTION



CM1

	CM case	CM1
No. of sections	1	1
Cavitation generator	✔	✔
Feed pump	25L/min	25L/min
Cleaning media tank		80L
Suction filter	✔	✔
Return filter		✔
Pneumatic control	✔	✔
Air filter	✔	✔
Pressure regulator	✔	✔

	CM case	CM1
Pressurized air release function	✔	✔
Pressure measurement	✔	✔
Channel blockage test	✔	✔
Channel leakage test	✔	✔
Pump startup suction feature	✔	✔
Flow reversal function		(✔)
Neutralization section		(✔)
External water supply section		(✔)
Flow measurement section		(✔)

Symbol ( ) means the feature is available as an option

COOLINGCARE

CS SERIES - SEMI-AUTOMATIC DEVICES FOR DIAGNOSTICS AND MAINTENANCE OF COOLING CHANNELS

The CS series has been created for those who are looking for an effective way to clean and maintain mold channels in good condition, and at the same time do not need advanced control functions combined with monitoring the history of mold cooling performance. This semi-automatic device is equipped with all the necessary functions known from the flagship CA machines, enabling customers to maintain a constant cooling capacity of the mold throughout its lifetime.

CS SERIES HIGHLIGHTS

Tutorial mode – intuitive software walking the operator through all the machine functions and steps of the process

Bi-directional cleaning based on hydraulic shockwave and cavitation effect known from flagship CA models.

Additional, manual flow reversal feature enhancing the cleaning process with programmable timing that can be set up by the user

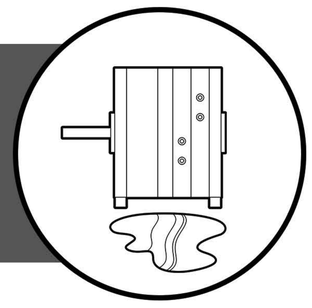
Independent diagnostics section with a separate hydraulic circuit excluding the risk of cleaning and diagnostics liquids mixing

Precise measurement of liquid amount in the tank by means of a capacitive probe for protection against uncontrolled spillage. A user can define the acceptable level of liquid leakage that will active the alarm which stops the process.

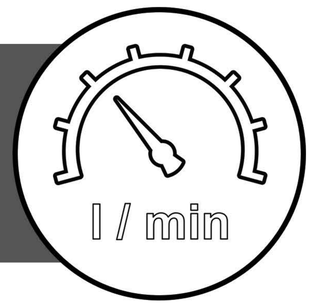
Built-in filter clogging sensors informing operators about the neccessity to clean filter cartridges

CS2 version

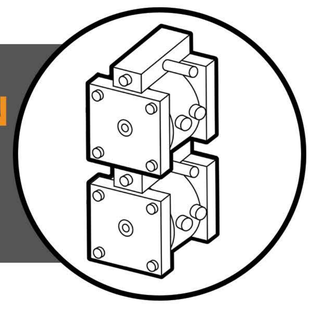
LEAKAGE & BLOCKAGE TESTS



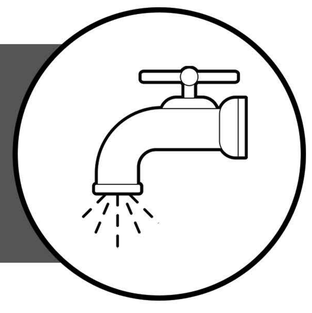
FLOW RATE MEASUREMENT



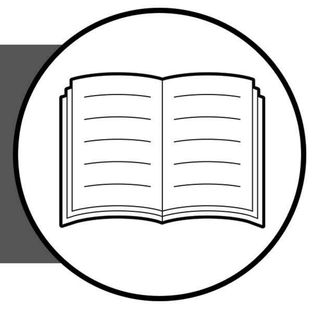
HYBRID, TWO-STEP PULSATION BASED CLEANING FUNCTION



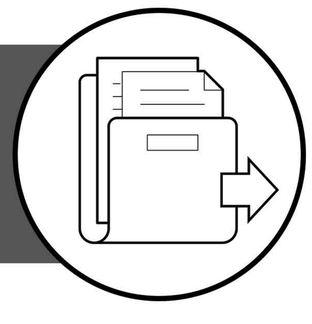
CHANNEL RINSING & CONSERVATION



BUILT-IN TUTORIAL MODE



REPORTING WITH DATA EXPORT FUNCTION



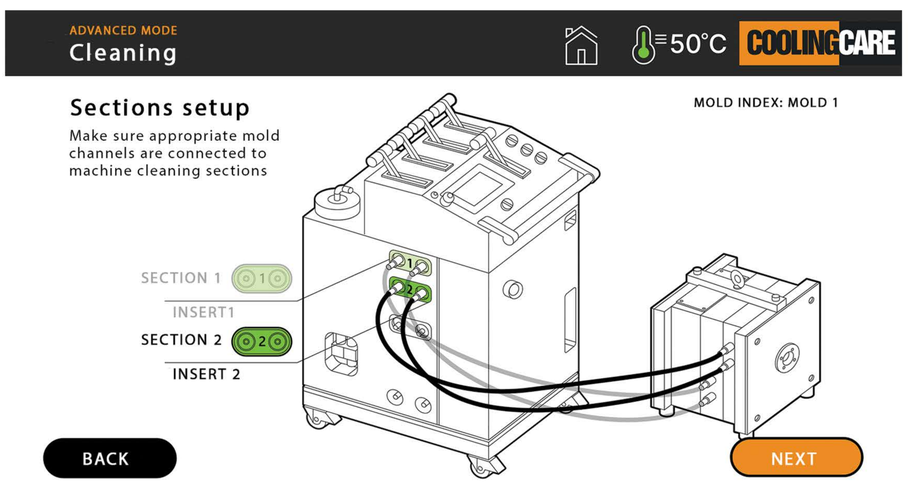
CS AVAILABLE FUNCTIONS

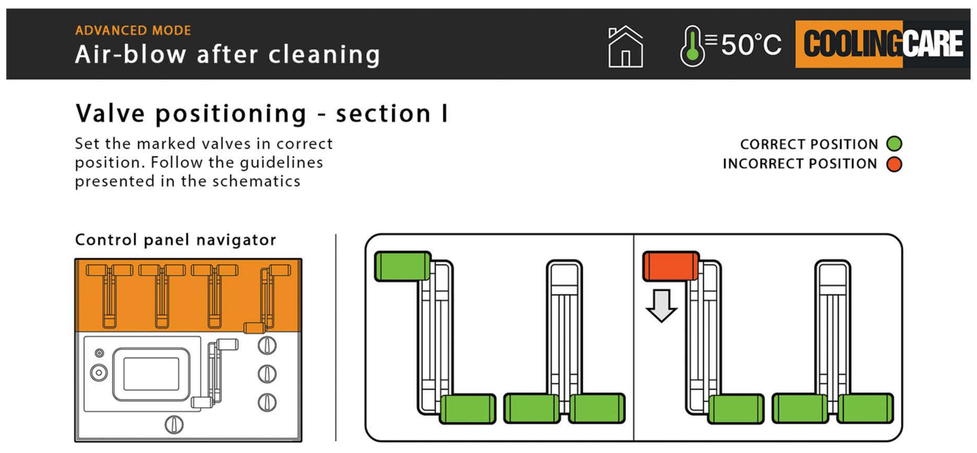
Cleaning	
Hydromechanical, hybrid cleaning process based on bi-directional, dynamic pulsation effect	✔
Rapid change in flow direction of cleaning solution generating cavitation phenomenon	✔
Additional, manual flow reversal feature increasing the cleaning efficiency	✔
Two independent sections allowing for simultaneous, efficient cleaning of channels with diameter up to 12mm	✔
Channel drying with compressed air at the end of the process	✔
Cleaning summary generated at the end of the process	✔
Diagnostics	
Leakage & blockage tests with compressed air	✔
Flow rate measurement in the range of 1-50L/min, 'before & after' results comparison	✔
Additional microflow measurement for conformal cooling channels in the range of 0-5L/min	(✔)
Conservation	
Rinsing with external water supply	✔
Neutralization of the remaining cleaning solution in the channel at the end of the process	✔
Possibility of applying additional layer of protection with corrosion inhibitors	✔
Others	
Efficient heating system based on 6kW inflow heater	✔
Dedicated tanks for cleaning solution and diagnostics/conservation liquid	✔
Tank filling with external water supply	✔
Continuous measurement of liquid in the tank integrated with the leakage protection system	✔
Built-in filter clogging sensors informing the operator about the necessity of cleaning filter cartridges	✔
Software available in different languages	✔
Mold cleaning raport with the possibility of exporting results by means of Wi-Fi module	✔

Symbol ( ) means the feature is available as an option

TUTORIAL MODE

The built-in guide accessible from the machine control panel enables the user to walk through all the functions of the machine. Step-by-step intuitive software informs the operator about the necessity to perform specific operations. This allows for a very quick preparation of staff so that they can begin working without the need to go through long training courses.





Sample screenshots of CS2 software

COOLINGCARE

CA SERIES - AUTONOMOUS SYSTEM FOR MONITORING AND MANAGING THE EFFICIENCY OF COOLING SYSTEMS IN INJECTION MOLDS

CA devices are the most advanced systems in the CoolingCare family. These fully automatic machines are designed to meet the highest demands in the modern plastics production environment. They are equipped with features allowing users to monitor and maintain full control of the cooling capacity of their molds.

CA SERIES HIGHLIGHTS

Automatic work modes limiting the operator's involvement to connecting the mold and selecting it from the machine's database

A set dedicated pumps and cavitation generators for every section enabling independent and efficient cleaning of channels regardless of their diameter

Built-in database collecting mold maintenance information with the possibility of exporting the data to external devices

High pulsation dynamics of the cleaning process allows for use of less aggressive cleaning solution, minimising the risk of damaging a mold cooling system.

Intelligent monitoring of the cleaning process – the device recognizes when desired flow rates are reached and finishes the process before the appointed time

A dedicated mode for unclogging completely blocked cooling lines

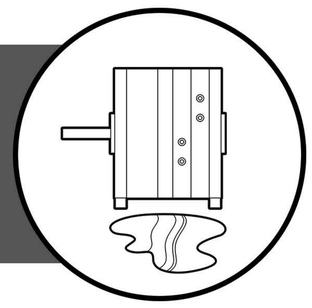
Intelligent system for spillage prevention stopping the process in case of mold leakage, integrated with remote communication feature informing the operator about the alarm

Heavy duty design, highest quality components and user friendly interface

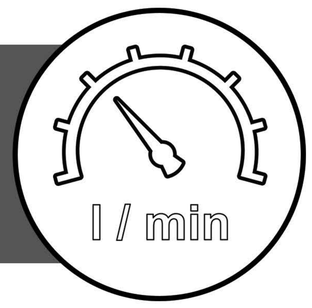
six-section version

two-section version

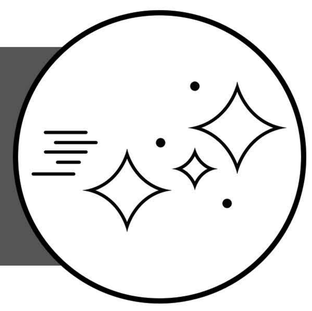
LEAKAGE & BLOCKAGE TESTS



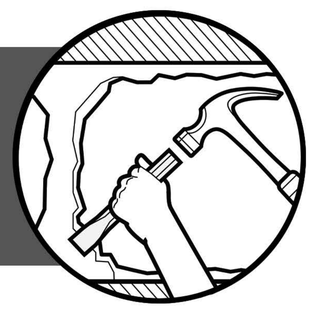
FLOW RATE MEASUREMENT



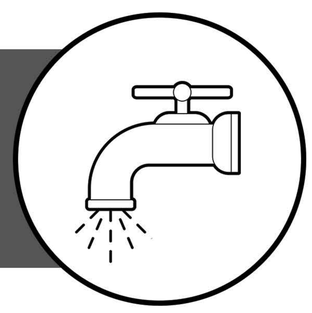
INTELLIGENT CLEANING MODES



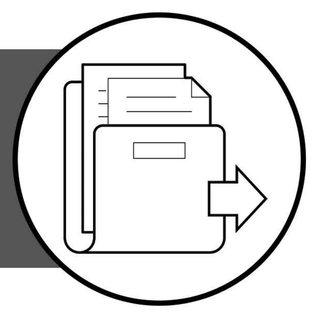
UNCLOGGING MODE FOR BLOCKED CHANNELS



RINSING & CONSERVATION



REPORTING WITH EXPORT FUNCTION



CA6/CA2 FUNCTIONS

Cleaning	
Hydromechanical, hybrid cleaning process based on bi-directional, dynamic pulsation effect	✔
Rapid change in flow direction of cleaning solution generating cavitation phenomenon	✔
Autonomous cleaning mode continuing the process until reference flow rate values are reached	✔
Autonomous cleaning mode continuing the process until stable, repeatable flow rate results are reached	✔
Cleaning time for each channel is defined individually, the process lasts only as long as it is necessary	✔
Two different work modes available (manual & automatic)	✔
Possibiity of simultaneous, individual cleaning of channels with different diameters	✔
A dedicated unclogging mode for blocked channels	✔
Record of cleaning history for every mold	✔
Diagnostics	
Automatic flow rate measurements with unmanned switch to cleaning mode	✔
Air based pressure tests during cleaning with the possibility of defining the testing frequency	✔
Water based leakage test	✔
Air based blockage test with automatic switch to unclogging mode	✔
Flow rate measurement with comparison of results to the reference values saved in the data base	✔
Additional microflow measurement & flow measurement with external water supply	✔
Record of all reference flow rates for every mold/channel	✔
Conservation	
Rinsing channels with mains water supply	✔
Neutralisation of residual cleaning media in channels after cleaning	✔
Machine self-cleaning function	✔
Possibility of applying additional layer of protection with corrosion inhibitors	✔
Other	
Continuous measurement of liquid in the tank integrated with the leakage protection system	✔
Built-in modem allowing for remote diagnostics in the case of machine failure	✔
CoolingCare connect (text message based communication with machine operators in the case of alarm)	✔
Built-in filter clogging sensors informing the operator about the necessity of cleaning filter cartridges	✔
Record of working hours for every pump and cavitation generator	✔
Record of cleaning media working hours	✔
Intuitive software allowing for individual parametrization of process algorithm settings	✔
Possibility of creating multiple user accounts with different access levels to machine functions	✔
Modular design allowing for easier parts replacement in case of machine failure	✔
Data export feature (USB, Ethernet, GSM modem, Wi-Fi)	✔
Certificates: CE,UL	✔

COOLINGCARE

CX - AUTOMATIC DEVICE FOR DIAGNOSTICS AND MAINTENANCE OF MACHINE COOLING SYSTEMS AND LARGE INJECTION MOLDS

The CX is a big brother of the CA devices. The machine was designed for injection molders that run production based on large molds with cooling systems based on manifolds and multi-couplings. To ensure high cleaning efficiency with this type of connection, it is equipped with a single circuit powered by a pump and a cavitation generator with a capacity of 300L/min. Such efficiency enables the supply of large manifolds that distribute the flow into individual channels without losing high process dynamics. In addition, the machine is equipped with the function of changing the flow direction, which further increases the cleaning efficiency. All these functions make the CX machine suitable not only for large tools, but also for cleaning cooling systems of injection molding machines or other large heat exchangers.

CX MACHINE HIGHLIGHTS

Created to clean the biggest tools with multiple channels connected to a manifold

A single cleaning section with 1½" inlet and outlet, suitable for manifolds and multi-couplings

Highly efficient system enabling simultaneous cleaning of channels connected in parallel

Very high dynamics of bi-directional pulsation effect deploying microimplosions and cavitation effect

Automatic flow reversal feature augmenting the cleaning efficiency

Flow rate measurement taking place in real time during the cleaning

CX machine

PRESSURE & BLOCKAGE TESTS

FLOW RATE DIAGNOSTICS

INTELLIGENT CLEANING MODES

AUTOMATIC FLOW REVERSAL OF CLEANING SOLUTION

CHANNEL RINSING & CONSERVATION

REPORTING WITH DATA EXPORT FUNCTION

COOLINGCARE

CX FUNCTIONS

Cleaning	
Hydromechanical, hybrid cleaning process based on bi-directional, dynamic pulsation effect	✔
Rapid change in flow direction of cleaning solution generating cavitation phenomenon	✔
Autonomous cleaning mode continuing the process until reference flow rate values are reached	✔
Autonomous cleaning mode continuing the process until stable, repeatable flow rate results are reached	✔
Additional, automatic flow reversal function during cleaning process	✔
Two different work modes available (manual & automatic)	✔
Designed for dynamic cleaning of parallel connections	✔
Record of cleaning history for every mold/channel	✔
Diagnostics	
Real-time flow rate measurement during cleaning	✔
Air based leakage test of individual channels during the cleaning process	✔
Water based leakage test	✔
Air based blockage test	✔
Flow rate measurement with comparison of results to the reference values saved in the data base	✔
Additional flow rate measurement with external water supply	✔
Record of all reference flow rates for every mold/channel	✔
Conservation	
Rinsing channels with mains water supply	✔
Machine self-cleaning function	✔
Other	
Continuous measurement of liquid in the tank integrated with the leakage protection system	✔
Built-in modem allowing for remote diagnostics in the case of machine failure	✔
CoolingCare connect (text message based communication with machine operators in the case of alarm)	✔
Built-in filter clogging sensors informing the operator about the necessity of cleaning filter cartridges	✔
Record of working hours for every pump and cavitation generator	✔
Record of cleaning media working hours	✔
Intuitive software allowing for individual parametrization of process algorithm settings	✔
Possibility of creating multiple user accounts with different access levels to machine functions	✔
Modular design allowing for easier parts replacement in case of machine failure	✔
Data export feature (USB, Ethernet, GSM modem, Wi-Fi)	✔
Certificates: CE,UL	✔

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