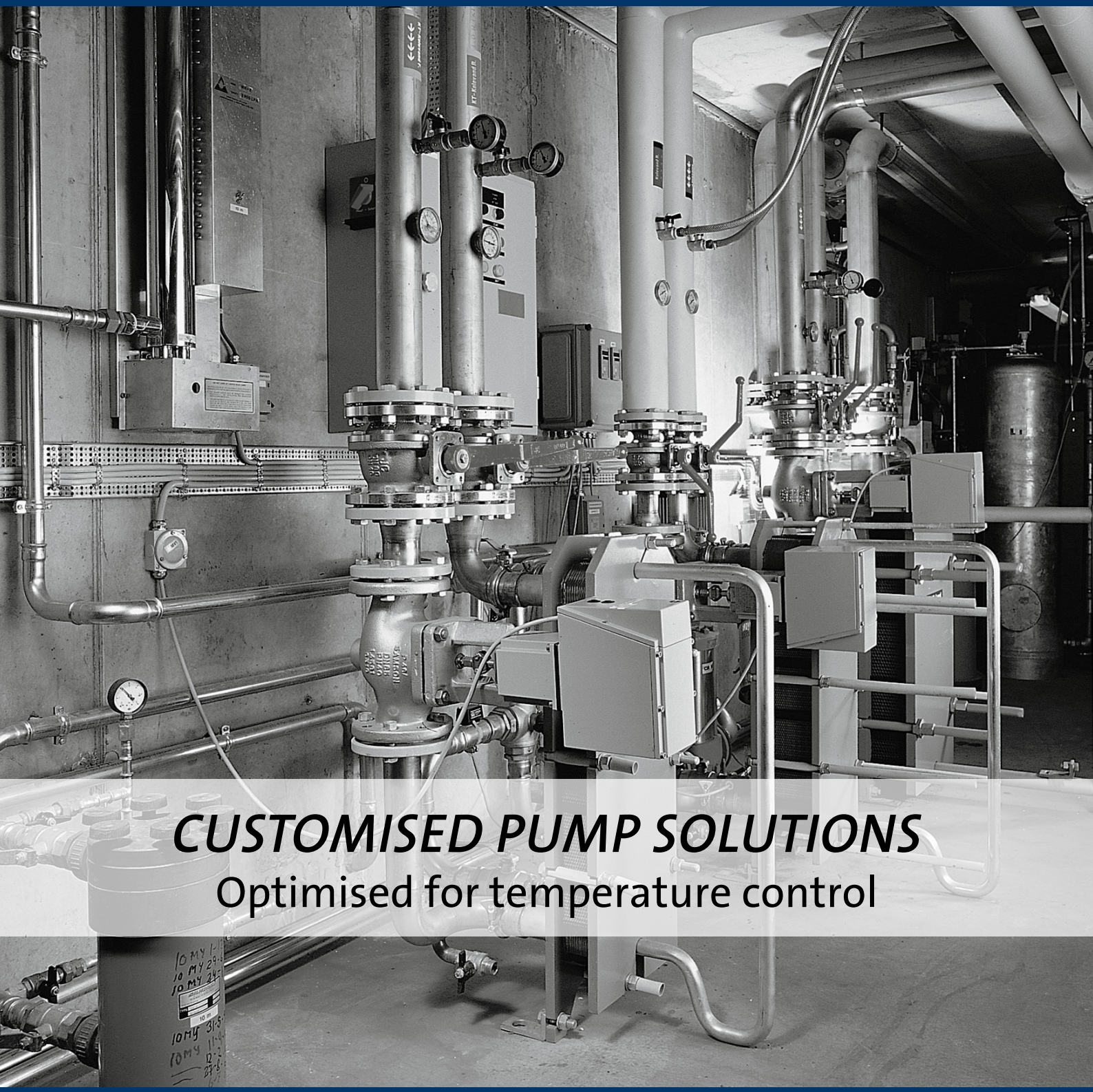
GRUNDFOS ***CRE RANGE***



CUSTOMISED PUMP SOLUTIONS

Optimised for temperature control

BE › THINK › INNOVATE ›

GRUNDFOS

Get upgraded. Twice.

A double upgrade for temperature control applications

Your first upgrade: The new CRE with three-phase motors
You already know the electronically controlled CRE pump range and how it combines reliability and efficiency thanks to the integrated frequency converter in its MGE motor.

You may also already know that the new generation of CRE pumps with three-phase, dual-voltage MGE motors from Grundfos has hit the market.

You have heard how they are:
– even more efficient
– even more robust
– offering a very wide power supply range
– incorporated with a duty/standby function
– improveing stock management seriously.

You may even have heard that they are matched to different pump applications with a range of different functional modules. But there's even more in store for you.

Your second upgrade: Software to push the limits
The new MGE motors are good news for everyone. You, however, are a special case. The Grundfos experts have found ways to use sophisticated software to further customise the CRE range. And temperature control applications have received special attention.

The new software options mean that your usual benefits:

- Reliable, efficient operation
- Energy efficiency
- Rapid response
- Intelligent operation

... become even more pronounced. And are joined by new ones. Read on to learn more.

The new CRE can now be customised by means of software that pushes the benefits of the integrated frequency converter and electronics to even greater heights.

Software that solves challenges

Customised software make the benefits of an integrated frequency converter even greater and helps you overcome the challenges of temperature control applications. See page 5 for further details.

Challenge	*Solution*
High/low temperatures	Better tolerance of ambient temperatures, e.g. thanks to automated derating
Low flow operation	Get continuous operation at low load; maintain processes in idle mode
Variable viscosity/density/ loads	Adjust speed and performance to suit variations in media processes.
Difficult regulation parameters	The CRE can be fitted with sensors for virtually any parameter – and will take into account secondary influences. See page 5 for details

The rules don't apply to you any more

Making your pumps more focused
Using customised software means you can bend the rules for what your pumps can do. Quite simply, the software instructs the pump to do only the things it needs for the job at hand – nothing else. When we turn to temperature control, there are many benefits to be had by regulating the pump directly compared to via external frequency converters and controls.

What you can achieve:

Constant operating temperature
Keeping a constant temperature is crucial in many situations, and your CRE can be set to maintain it, thereby ensuring efficient processes. One example would be moulding tool applications, where temperatures need to be constant in order to maintain the material flow and short curing times.

Constant discharge temperature
Potential application areas include maintaining a constant feeding temperature for heat exchangers – or assisting chemical or biological processes.

Constant return temperature
Getting your CRE to keep a constant return temperature can help ensure that processes never exceed the temperatures allowed.

Regulating differential temperature
The CRE pump can be set to e.g. keep a constant differential temperature across a heat exchanger or cooling tower, to maintain a constant temperature for secondary regulating devices, etc.

Constant differential pressure regulation
This remains the most widespread method of regulation used for hydronic heating systems – and of course the CRE will handle this, too.

Never overshoot your temperature marks
Temperature regulation involves a certain transmission time. When the pump speeds up, it still takes a while for the media to respond. In most systems, that leads to overshooting as the temperature is bumped up suddenly and then has to be brought down. But by means of an internal PI regulator, the motor of your CRE pump can monitor and supervise thermal processes – ensuring that set limits are never exceeded and/or always evoke the desired response.

The PI regulator can be set to the timing you want: fast, slow, with long delays – whatever your process needs. PC tools can be used to trim or verify slow processes – and to allow additional inputs to be processed, e.g. alarms. Essentially, the PI regulator uses a time constant to avoid "bumpy rides", gently and gradually reaching the desired temperature level within the time frame you want. That's much more efficient.

Rough environments handled with ease
The CRE is very robust in itself, and its updated electronics let it withstand temperatures up to 65 degrees Celsius. With customised software, the automated derating option responds to excessive heat by having the pump operate at lower power. Similarly, the use of local inverters makes it easier for the pump to appropriately respond to wet, damp, or changeable environments. A tough pump just got tougher.

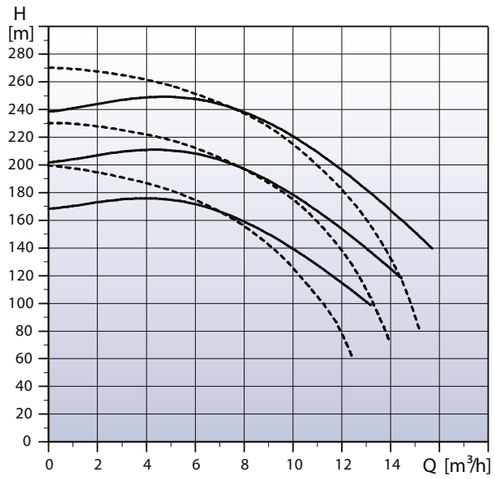
Low-flow operation means access to full data
One key advantage of frequency converters is their ability to retain a constant flow in the system while using less energy. Having that flow enables us to get accurate readings on what is going on in the system, and with customised software, you have virtually unlimited choice on what sensor input you want your pump to respond to.

Basically, your CRE pump can measure anything. Regulate anything. If you have the sensor, the CRE can work with it. For example, the CRE can be set to adjust its speed and performance in response to changes in the media's viscosity or density. This is part of what makes it ideal for transporting energy via liquids. But anything's possible. Just ask.

Better energy efficiency
Frequency converters will in themselves promote energy efficiency, so the extra savings added by customised software are, admittedly, not huge. Even so, they will be felt wherever many pumps are used.

Curve adjustment may be accompanied by physical adjustments
Adjusting the pump curve optimises its performance for your specific task. But the CR is, of course, also fully customisable in physical terms, and we might recommend minor adjustments of that kind – e.g. special seals and gaskets to maintain the long lifetime you expect from a CR pump. For an overview of your options, we refer you to other CR materials. Here, the key point remanis that curve adjustment can get your chosen pump to perform more accurately than you ever thought possible.

Getting the best can save you money
Getting the right, customised E-pump solution may let you save money on the initial investment as well as on the more efficient operation. This is because sensors of your choice can be connected easily and directly to the pump, eliminating the need for external control cabinets and instrumentation. You will also need less equipment in your system, as the PI regulator/MGE motor can replace regulating valves and sensors completely. You save money on parts, and it is very likely that you also get a more reliable system with fewer fragile parts. You get a solution that's more compact, easier to install, and perfectly integrated. Best of all, you get Grundfos quality, but you actually pay less.



Straightening the pump curve optimises the pump for your task.

Customised software lets you regulate pump performance directly where its relevant.You won't need external controls, and you get the temperature you want all the time.

The Science Bits:

More about what software can do for you

Customised software enables you to embed exactly the functionalities you want in your pumps. And to change the way they perform.

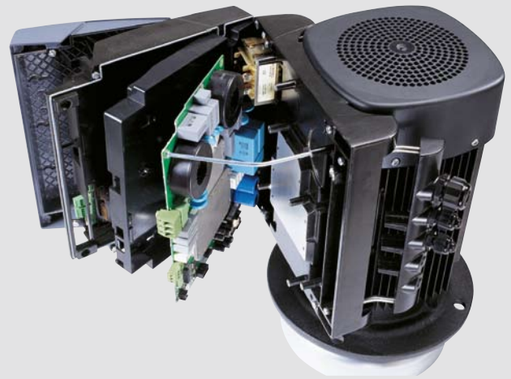
Details for those who want them ...

For those interested, this "Science Bit" section gives those with a keen interest in technical matters a little more information on how software can give you a dedicated system upgrade.

Creative software. Made for you.
The latest developments in software allow us to create completely customised solutions with very compact object code. Basically, that means our designers are free to think creatively about how your systems can be improved. And because it's all done with software, they can target your challenges very, very specifically, making the hardware do exactly what is best for you. Nothing else.

Get different results out of the same pumps
Essentially, we change the hardware without touching it – or touching it only very little. You won't see any difference. Your installations remain the same. But it feels like you have a different, more powerful, and more accurate pump installed.

How it works
Our intelligent solutions are developed in several stages. First, we inject the basic software – the OS, if you like. We then add a number of operation parameters (known as a GSC file – Grundfos Software Communication) via GENI. These instructions may include operating speed, motor size, etc. This information cannot be changed by you.

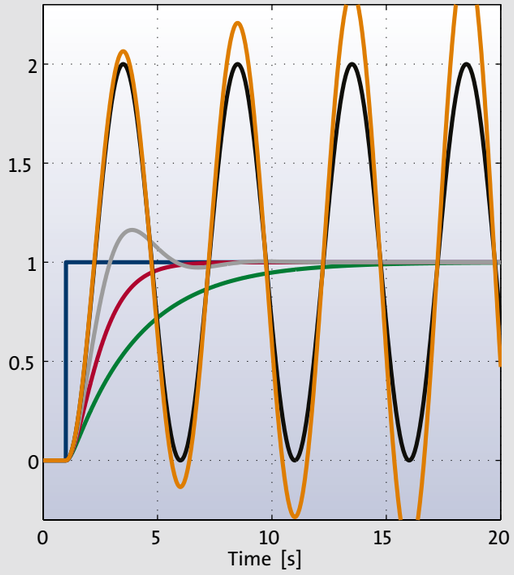


We then add the user interface, telling the pump how it should interpret and respond to sensor signals. This is followed by the careful development of a second GSC file with detailed pump and sensor information. The new GSC file, which is where the completely dedicated customisation comes in, is embedded in both the front and back ends of the motor's "brain".
When the pump reaches you, you can communicate with it via e.g. the R100 remote unit. To make life simple for you, your options will be restricted to those that are useful to you
- e.g. setting the desired reference temperatures.

Get your very own solution

As you might imagine, you can have codes made just for you. We will check out your system and find out exactly what your pumps need to do to – for example adjust its speed when the liquid's viscosity changes. Then we set them up to respond to sensor inputs by increasing or decreasing their speed. You can't get performance more accurate than that.

Our regulator trim allows the pump to provide the optimum response to changes. You achieve critical damping, meaning that responses are as quick as possible – and overshooting is avoided.



BE > THINK > INNOVATE >

Being responsible is our foundation
Thinking ahead makes it possible
Innovation is the essence

The CR range from Grundfos

Grundfos was the first company ever to develop a multistage in-line pump. The present-day CR pump series is the most extensive in-line pump programme on the market and remains second to none. With many innovative features unique to Grundfos, CR pumps provide superior reliability and the lowest possible cost of ownership to customers worldwide.

Customisation made easy

In order to meet all customer requirements with complete precision, Grundfos has developed a unique mix-and-match approach to customised pumps. The elements of the CR range can be combined any which way to create the solution that is exactly right for you.

Grundfos: a pump for every purpose

Impressive as the CR range is, Grundfos offers much more. A complete range of pump solutions means that all applications – industrial and domestic – can benefit from the Grundfos touch.

Customers can always rely on our complete dedication to quality and service.

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