

# Sustainable Solutions for the Commercial Building Industry

Olathe, Kansas



Fresno, California



Allentown, Pennsylvania



Oakville, Canada



Monterrey, Mexico



Bjerringbro, Denmark



## GRUNDFOS

### GLOBAL IMPACT

Grundfos is a global enterprise with more than 16,000 employees and 73 sister companies worldwide. From its beginning as Bjerringbro Foundry in Denmark in 1945, Grundfos has grown to become a leading manufacturer of pumps and pumping systems – producing more than 10 million pumps annually.

### OUR MISSION

As a pioneer of innovative pumping solutions, Grundfos is dedicated to developing, producing, and selling the highest quality pumps and pumping systems while at the same time contributing to a better quality of life and a healthier environment.

### EFFICIENCY AND SUSTAINABILITY

Grundfos constantly strives to make its pumps even more efficient and energy saving. Using state-of-the-art technology and cutting-edge design, Grundfos pumping solutions meet – and often surpass – virtually all customer requirements for efficiency, reliability, and cost effectiveness.

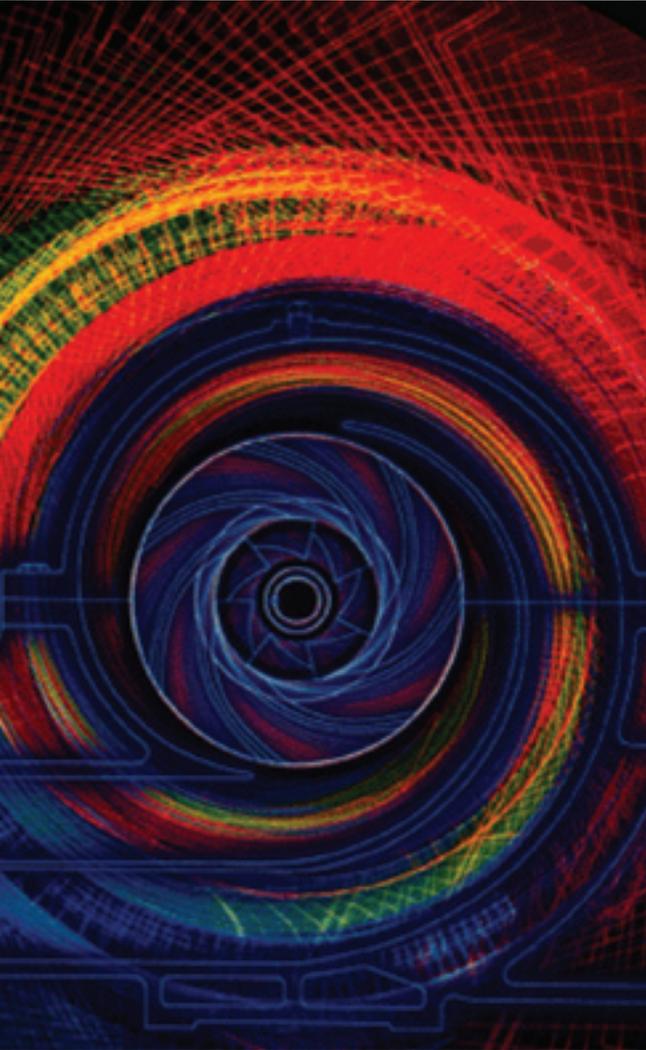
### MANUFACTURING STANDARDS

Grundfos has a major influence on the levels of manufacturing standards and operating efficiency that can be achieved with pumps. Our manufacturing facilities throughout the world are certified to ISO 9000 standard, and we exhaustively check and test our pumps prior to distribution.

### CORPORATE PHILOSOPHY

The Grundfos BE>THINK>INNOVATE> philosophy shapes who we are, what we do, and how we do it. Being responsible is our foundation. Whatever we do, we make sure that we have a firm and sustainable basis for doing it. Thinking ahead makes it possible. We think – and then we act. Innovation is the essence. We stand out because of our ability to constantly create new solutions to meet the ever-changing demands of the pumping industry. Innovation is the soul of Grundfos.

PACO Manufacturing Facility  
Oakland, California; Circa 1940s



PACO/Grundfos CBS Inc. Headquarters  
Brookshire, Texas; Present Day



## PACO PUMPS

### WHO IS PACO PUMPS?

PACO Pumps – one of the industry’s most complete line of premium efficient centrifugal pumps and pumping systems – are manufactured by Grundfos CBS Inc., a Grundfos company.

### HISTORY OF PACO PUMPS

PACO was founded as Pacific Pumping Company in San Francisco in 1907. Today, their modern headquarters and manufacturing complex are located just outside Houston in Brookshire, Texas.

### MARKET APPLICATIONS

PACO Pumps is the preferred choice for centrifugal pumps for many market applications, including HVAC, plumbing, recreation, water works, wastewater, irrigation and agriculture, aquaculture, steel mills, and power plants.

### PRODUCT RANGE

Extensive product offerings with broad performance ranges make the selection of a PACO pump easy. And, nearly all PACO Pumps products are custom designed to provide a perfect fit for the customer’s application.

### INNOVATIVE PUMP DESIGN

PACO’s pumps incorporate innovative designs and intensive engineering efforts that translate into a lower initial cost, longer pump life, reduced operating and maintenance costs, maximum efficiency and reliability, and quieter operation for the end user.

## GRUNDFOS CBS

### TWO COMPANIES WITH ONE GOAL

Grundfos CBS represents the coming together of two great companies – Grundfos and PACO – with one shared vision for success in the commercial building market. With more than 160 years combined experience, an established network of sales and service representatives, highly trained pump specialists and technicians, and a diverse portfolio of innovative pumps and pumping systems, you can trust we have the right solution for your specific application.

## Taking Responsibility with Sustainable Solutions

When you specify or install a Grundfos pump, you have the assurance that you're doing your part to conserve valuable water, energy, and other precious resources.

It's estimated that pumps use up to 20% of the world's electrical power. That's why Grundfos is proud to say that sustainability has long been at the forefront of our processes.

We invest more financial resources than any other pump manufacturer in order to push the limits for reaching energy-saving efficiency, and we continue to pioneer innovative designs and technology that support sustainability. For example:

- Permanent-magnet motors (ECM Technology) reduce energy consumption by up to 78% over older technology and contribute to the reduction of carbon dioxide emissions.
- Intelligent-design electronic controls allow pumps to customize their settings to fit the needs of a particular system application and maximize energy savings.
- Double volute design increases pump life by balancing and reducing net radial force.
- Premium efficient "SMART" pump designs reduce operating and maintenance costs.
- "No Wait" hot water recirculation systems help prevent water from flowing down the drain as waste.
- Digital Dosing™ metering pumps are so precise that they conserve significant amounts of additives.
- Pumps are being manufactured that are 95% recyclable at the end of their usefulness.

From reduced life cycle costs to removal of used pumps, you'll want to consider Grundfos as your best choice for providing the most sustainable products.



## DO YOUR PART TO HELP SAVE ENERGY AND REDUCE WASTE

Power consumption accounts for 85% of all costs incurred during the life cycle of a pump – nine times more than the initial purchase price and cost of regular maintenance. So, even the smallest improvement in efficiency can translate to sizeable savings.

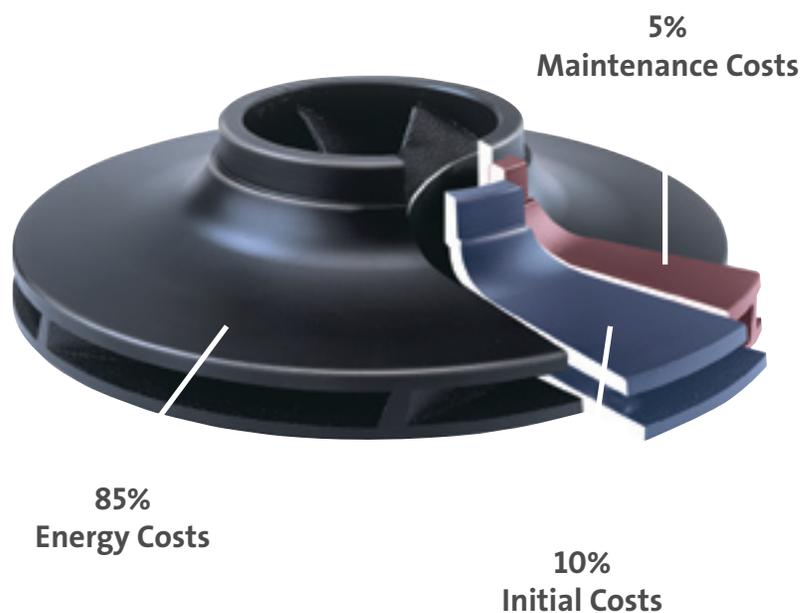
ML motors for centrifugal pump applications are designed and manufactured by Grundfos. Coupled with our pumps, ML motors provide unbeatable wire to water efficiencies, which helps you to reduce your energy costs. In addition, ML motors produce less heat during operation, allowing for smaller fan sizes and, consequently, reduced noise.

When it comes to energy savings, go with the industry's leader in pumping innovation: Grundfos!

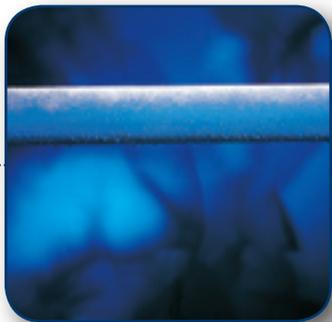
## Minimize Your Life Cycle Costs

Grundfos offers a wide range of E-pumps (electronically controlled) that enable adjustment of pump performance to meet your specific demand. Not only does this provide convenience, but it also saves a great deal of energy.

With Grundfos, you get more than just a pump!



**GRUNDFOS CBS PUMP SOLUTIONS for COMMERCIAL BUILDING SERVICES**



## HEATING

### **CIRCULATOR PUMPS FOR HEATING COMMERCIAL BUILDINGS**

When you specify or install our circulator pumps, you've got peace of mind knowing that Grundfos is the largest manufacturer of circulators worldwide and the most experienced manufacturer of large, wet-rotor circulators in the North American commercial market.

Our latest wet-rotor circulators are whisper-quiet and virtually maintenance-free: no seals, no oil, no couplers. An integrated pump and motor design with fewer parts means greater ease of installation and durability.

The new MAGNA – an integrated variable-speed wet rotor circulator – features numerous control options to maximize energy savings, including the patented AUTOADAPT function that self-adjusts to your system.

## AIR CONDITIONING

### **AIR CONDITIONING PUMPS FOR COMMERCIAL BUILDINGS**

Whether you're looking for an end suction workhorse, split case, or sophisticated inline circulator pump with integrated speed control, Grundfos can offer the commercial building industry with reliable and energy-efficient pumps.

For automated systems, we've got a large selection of integrated variable-speed drive E-circulator pumps, such as the TPE, LPE, and LME. E-circulators offer a variety of control options, including constant differential pressure, proportional differential pressure, and temperature control.

## PRESSURE BOOSTING

### **PRESSURE BOOSTING PUMPS AND SYSTEMS FOR BUILDINGS**

Your pressure boosting applications will find a fit with the PACO VSM (Vertical Space Miser) pump, designed to have the smallest footprint to fit tight spaces. And, for the ultimate in control, Grundfos' packaged pumping systems, like the BoosterpaQ® Hydro MPC controlled booster system, feature user-friendly graphic displays and are compatible with automated building management systems.

Grundfos also offers pumps with NSF 61 Certification for Drinking Water System Components, including the Digital Dosing™ line of pumps for chemical metering.

## WASTEWATER

### **COMMERCIAL PUMPS FOR MOVING WASTEWATER**

Grundfos CBS Solutions offer you expertise in pumps for moving fluids from pits and basins. We can help you find the right pump for dewatering, septic effluent, and storm drainage. Our pumps feature durable construction and favorable life-cycle costs.

		PUMP TYPE												
		UP	VersaFlo UPS	MAGNA	TP, LP, LM	TPE, LPE, LME	CR	LC, LCV	LF	VL, VLS	VSM, VSMS	GR, GS	OLN, LN	OL
RECOMMENDED SYSTEM	Main Pumps		▲	▲	▲	▲		▲	▲	▲	▲			
	Mixing Loops	▲	▲	▲		▲								
	Heat Surfaces	▲	▲	▲		▲								
	Boiler Feed/Deerator						▲						▲	▲
	Geothermal & Deep Lake		▲		▲	▲		▲	▲	▲	▲	▲		
	DHW Circulation	▲	▲		▲	▲		▲	▲	▲	▲			
	DHW Production		▲		▲	▲		▲	▲	▲	▲			

		PUMP TYPE											
		UP	VersaFlo UPS	TP, LP, LM	TPE, LPE, LME	CR	LC, LCV	LF	VL, VLS	VSM, VSMS	KP, KPV		
RECOMMENDED SYSTEM	Primary Chilled Water			▲	▲		▲	▲	▲	▲	▲	▲	▲
	Secondary Chilled Water			▲	▲		▲	▲	▲	▲	▲	▲	▲
	Cooling Tower		▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
	Cooling Surfaces	▲	▲	▲	▲		▲	▲	▲	▲	▲	▲	▲
	Thermal Energy Storage			▲	▲		▲	▲	▲	▲	▲	▲	▲
	Condenser Water			▲	▲		▲	▲	▲	▲	▲	▲	▲
	Geothermal & Deep Lake		▲	▲	▲		▲	▲	▲	▲	▲	▲	▲
	District Cooling		▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲

		PUMP TYPE										
		Hydro MPC	CRE-Plus	CR	PACOFlo	MiniFlo	LC, LCV	LF	VL, VLS	VSM, VSMS	KP, KPV, KPH	
RECOMMENDED SYSTEM	System with Break Tank	▲			▲	▲						
	System with Connection to Water Mains	▲			▲	▲						
	System with Roof Tank	▲			▲	▲						
	Water Transfer to Roof Tank	▲		▲			▲	▲	▲	▲	▲	▲
	Zone Divided Water Supply	▲			▲	▲						
	Landscape Irrigation	▲	▲									

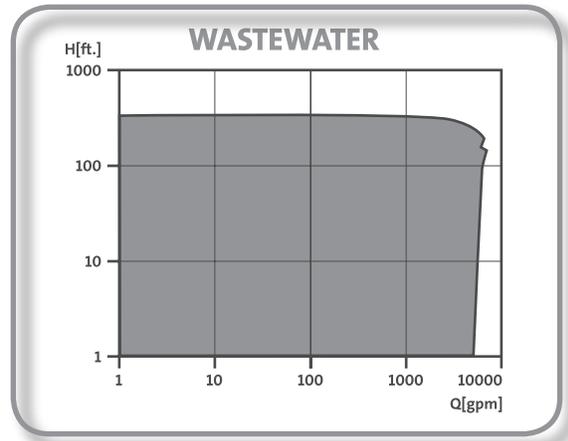
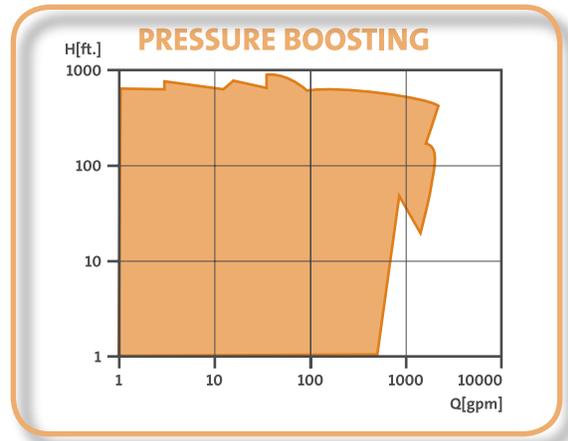
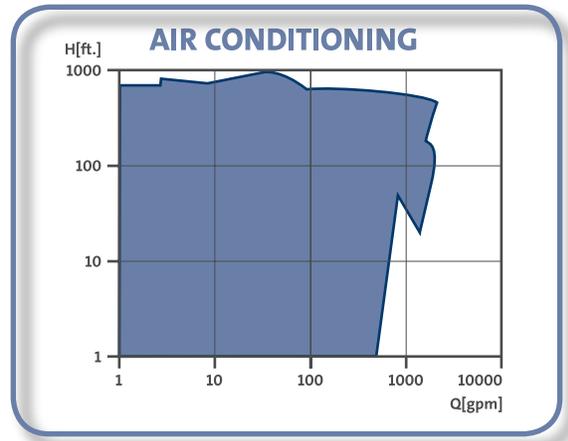
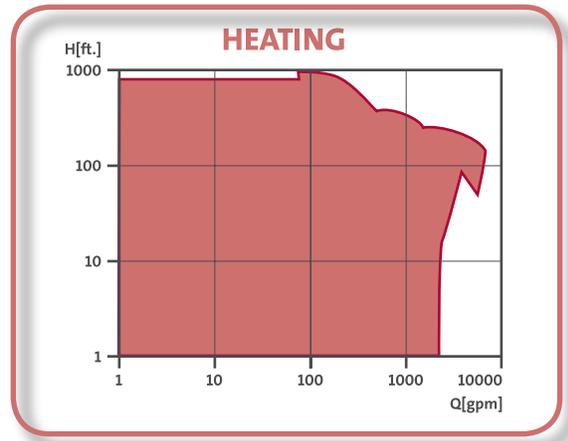
		PUMP TYPE										
		SU, AP	SE	EF	E-PaQ	PIP 500	PIP 700	NC, NCD	SL, SLD	QDSC, NSC	SM	
RECOMMENDED SYSTEM	Storm Drainage	▲		▲	▲		▲	▲	▲	▲		
	Drainage from Facility Rooms	▲		▲	▲		▲		▲			▲
	Laundry	▲		▲	▲		▲					▲
	Emptying of Pools and Tanks	▲	▲	▲			▲		▲			▲
	Effluent/Sewage from Basement		▲		▲	▲	▲	▲		▲		
	Transfer of Sewage		▲		▲			▲		▲		
	Emergency Use	▲	▲	▲		▲			▲			▲

**GRUNDFOS**

BoosterpaQ® Hydro MPC	Packaged Booster Pump System
CR	Vertical Multi Stage Centrifugal Pump
CRE-Plus	Simplex Packaged Booster Pump System
EF	Effluent Pump
E-paQ™	Packaged Pump System
MAGNA	Variable Speed Wet Runner Pump
SE	Sewage Pump
SU, AP	Sump and Utility Pumps
TP, LP, LM	Dry Runner Inline Pumps
TPE, LPE, LME	Variable Speed Dry Runner Inline Pumps
UP	Wet Runner Small Circulator Pump
VersaFlo UPS	Wet Runner Large Circulator Pump

**PACO**

GR, GS	Condensate Return Pumps
KP, KPV, KPH	Horizontal and Vertical Split Case Pumps
LC, LCV	Close Coupled End Suction Pumps
LF	Frame-Mounted End Suction Pump
MiniFlo	Simplex Packaged Booster Pump System
NC, NCD	Non-Clog Wet-Pit Column Pumps
OL	Two Stage Centrifugal Pump
OLN, LN	Low NPSH Centrifugal Pumps
PACOFlo 9000	Packaged Booster Pump System
PIP 500	Small Sewage Pump
PIP 700	Effluent Pump
QDSC, NSC	Submersible Sewage Pumps
SL, SLD	Column Type Sump Pumps
SM	Submersible Sump Pumps
VL, VLS	Vertical Inline Pumps
VSM, VSMS	Vertical Space Miser Pumps



# HEATING

# AIR CONDITIONING

# PRESSURE BOOSTING

# WASTEWATER

**Grundfos VersaFlo® UP(S)**  
Wet Runner Large  
Circulator Pump



**Grundfos MAGNA**  
Variable Speed Wet  
Runner Pump



**PACO VL**  
Vertical Inline  
Pump



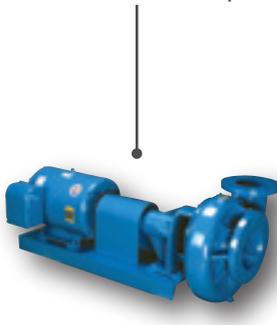
**PACO GR**  
Condensate Return  
Pump



**Grundfos TPE**  
Variable Speed Dry  
Runner Inline Pump



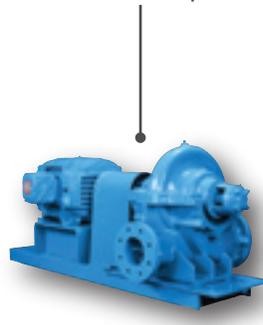
**PACO LF**  
Frame Mounted  
End Suction Pump



**PACO VSM**  
Vertical Space Miser  
Pump



**PACO KP**  
Horizontal Split  
Case Pump



**Grundfos BoosterpaQ®**  
**Hydro MPC**  
Packaged Booster  
Pump System



**Grundfos CR**  
Vertical Multi Stage  
Centrifugal Pump



**PACOFlo 9000**  
Packaged Booster  
Pump System



**PACO KPV**  
Vertical Split  
Case Pump



**Grundfos SE**  
Sewage  
Pump



**Grundfos E-paQ™**  
Packaged Pump  
System



**PACO PIP 500**  
Small Sewage  
Pumps



**PACO QDSC**  
Submersible  
Sewage Pumps





**HEATING**

**AIR  
CONDITIONING**

**PRESSURE  
BOOSTING**

**WASTEWATER**

## Quality in Construction, Reliability in Use

Reliability is one of the hallmarks of Grundfos pump technology, and it's built into every aspect of our pump designs. Our mindset is to construct pumps of the highest quality by paying attention to the details and investing in innovative research and development.

Your systems will benefit from our constant process of improvement with reduced life cycle costs and maintenance. Our alternative materials and components raise the bar for producing energy-efficient pumps that are more durable and easier to install and maintain.



### PROTECT THE MOTOR WITH ONE-PIECE ROTOR CANS

By molding the rotor cans for the Grundfos MAGNA circulator pumps into one single piece, the risk of water damage to the motor is eliminated.



Fig. 1



Fig. 2

### ELIMINATE CORROSION WITH ELECTROCOATING

Cataphoresis treatment on all housing surfaces of Grundfos inline pumps virtually eliminates corrosion. Fig. 1 illustrates an electrocoated, cataphoresis-treated pump casing after 672 hours in salt fog. Fig. 2 illustrates a painted pump casing (with no treatment) after 24 hours in a salt fog.

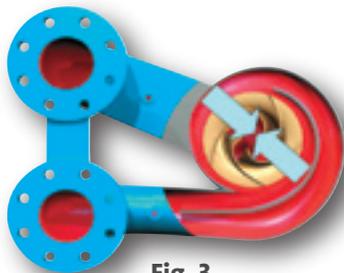


Fig. 3

### PROTECT MECHANICAL SEALS AND BEARINGS WITH PACO'S DOUBLE VOLUTE DESIGN

PACO's pumps use a double volute design, which ensures that the hydraulic radial loads are equal and opposed and thereby nullified. Pump operation remains stable throughout the entire performance curve, with minimal shaft deflection, prolonging seal, bearing, and shaft life. Fig. 3 illustrates a double volute design with opposing radial forces.



### TACKLE HARSH CONDITIONS WITH GRUNDFOS' FAIL-PROOF MECHANICAL SEALS

Grundfos pumps face harsh environmental conditions day in and day out. As a result of our innovative mechanical seal design, our pumps work without seal failure. And, we make our seals available in various material configurations to meet the needs of your specific environment.



## Garmin Intl. Gets A Boost from Grundfos and PACO Pumps

In 2004, Garmin International Inc., a leading manufacturer of navigation and communications equipment, required expansion of their facilities due to significant growth of the company.

Their expansion plans included an 8-story office building that would be located in Olathe, Kansas, and would house an engineering R&D operation and customer support technical center.

Whenever any new, multi-story building goes up, HVAC systems automatically become an important part of the continued success of its future tenants.

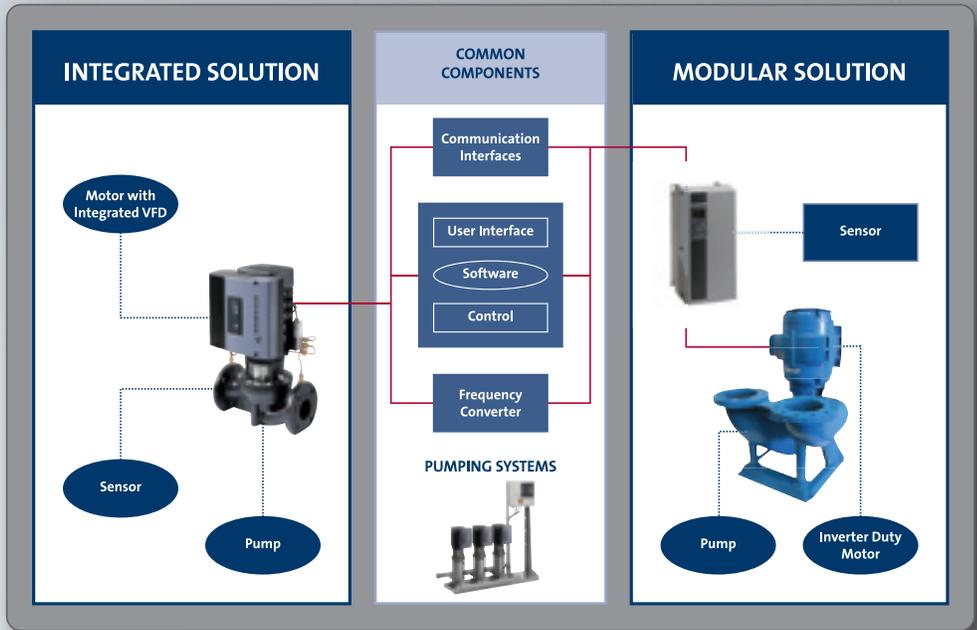
For the HVAC systems in Garmin's new building, Grundfos and PACO pumps were chosen because of their quality, reliability, and reputation in the commercial building market. The Grundfos and PACO pumps installed in this application would provide Garmin with low life cycle costs for their pumping systems.

One of the packaged systems utilized to boost domestic water pressure and provide constant pressure throughout the building was the three-pump Grundfos ME integrated variable-speed BoosterpaQ. This system helped to lower operating costs and also provided water for the cooling tower make-up.

PACO LF end suction pumps with integral suction splitters were used because they offer higher operating efficiencies and lower operating costs. A total of eight of these pumps were installed: four in the chilled water service and four in the condenser water service. Two additional LF pumps were installed to provide glycol/water service for the closed-loop dry cooling system.

Other Grundfos pumps were also used in the new building: the CR pressures their fire system as jockey pump and the DME dosing pump meters chemicals to the water feature at the main building entrance.

A successful application such as the Garmin installation is a perfect example of why Grundfos CBS deserves to be your preferred full-line pump supplier..



## Ready for a Building Management System?

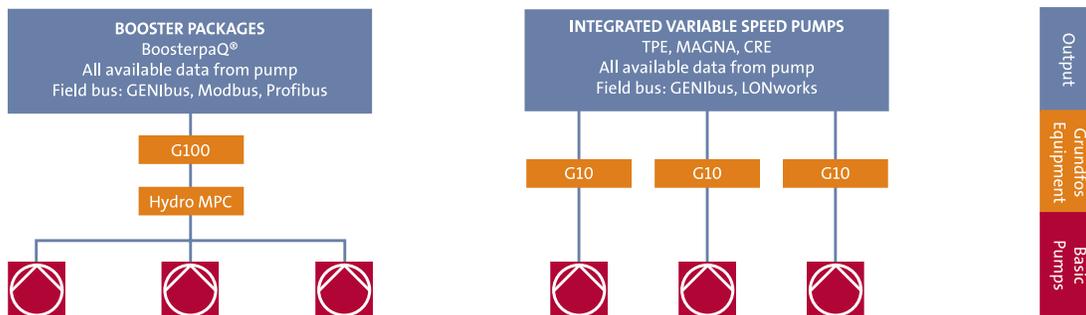
Computerized building management systems have opened the doors and created a sizeable opportunity for optimizing installations in commercial building structures.

Unique solutions from Grundfos are proven in the field and maximize this significant potential. In terms of comfort and life cycle costs, convincing benefits can be presented for using speed-controlled pumps integrated with computerized building management systems.

By using bus communication, Grundfos' speed-controlled pumps are able to exchange data with building management systems, which makes it easy to optimize all aspects of operation and to coordinate a wide range of control systems. They're available with a network option for analog, digital, or infrared communication.

Grundfos pumps with integrated variable-speed drive are prepared for bus communication modules compatible with LONbus and the specially developed Grundfos GENIbus.

Grundfos offers both modular and integrated solutions that further simplify installation and commissioning. These solutions are a result of working toward optimizing the pump hydraulics, frequency converter, sensors, and motors to make everything work as a whole while communicating efficiently with the central system controller.



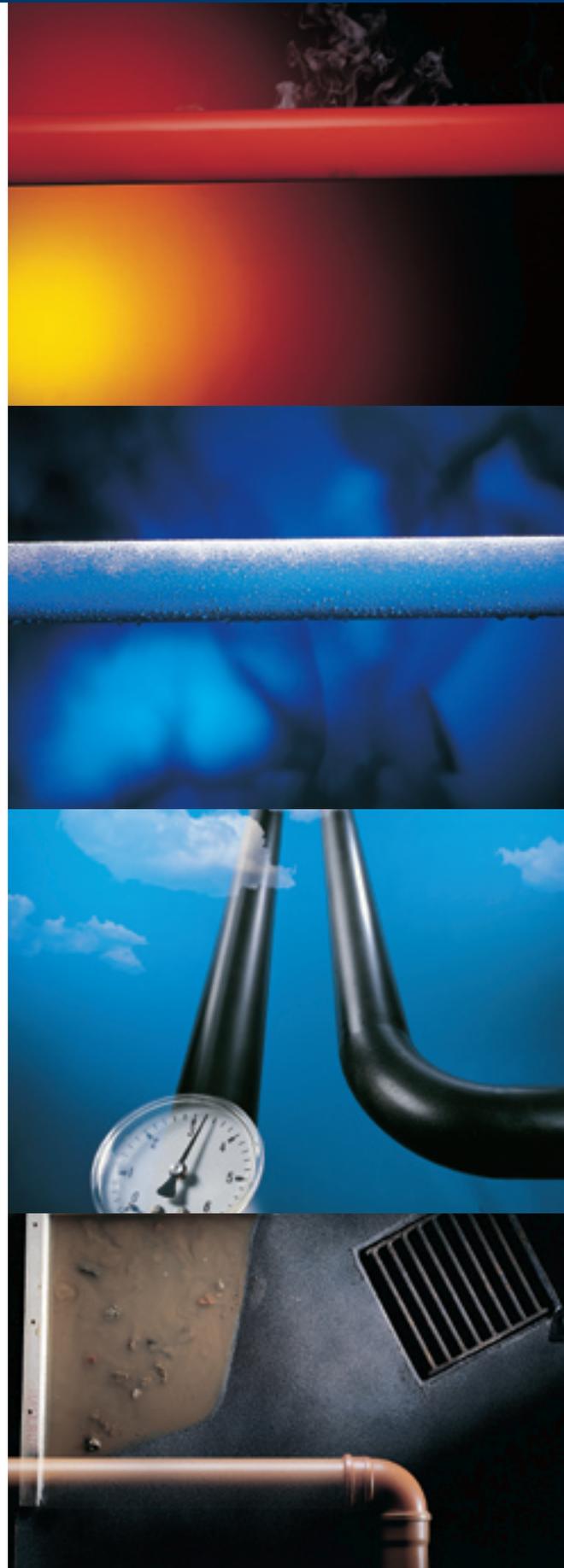
## Select the Right Pump – FAST!

With Grundfos WebCAPS and PACO Express, you can get quick and easy access to online tools that will help you select the right pump – fast!

Our user-friendly tools let you simply enter the system requirements to find the best pump match. You'll find:

- › help with pump sizing and selection
- › CAD drawings you can import into your own applications
- › performance data and pump curves
- › life cycle cost calculations
- › installation and operation manuals

Give our online tools a test run. Try out Grundfos WebCAPS at [www.grundfos.us](http://www.grundfos.us) and PACO Express at [www.pacopumps.com](http://www.pacopumps.com).





Pumps are literally the heart of fluid movement in the commercial/municipal infrastructure and are crucial in the handling of the many complex flows used in heating, air conditioning, pressure boosting, and wastewater systems. We depend on these pumps to move fluids that enhance human comfort, health, safety, and productivity in everyday life.

Grundfos and PACO Pumps are poised to meet the commercial building industry's demand for energy-efficient pumps with solutions that are economical and environmentally sustainable. By taking a holistic approach and optimizing the performance of the entire system, rather than any one single component, we can deliver pumps that meet your requirements in the most cost-effective and efficient way possible.

That's why we want to be your *preferred* pump manufacturer. Visit us at [www.grundfos.com/CBS](http://www.grundfos.com/CBS) for more information.

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