



# Intelligent Paint Kitchen

Take full control of your paint room

*Graco's Intelligent Paint Kitchen is a **modular, easy, and cost-effective system** for **smart monitoring and control** of your paint mix room components without the use of a PLC.*



[www.graco.com/ipk](http://www.graco.com/ipk)

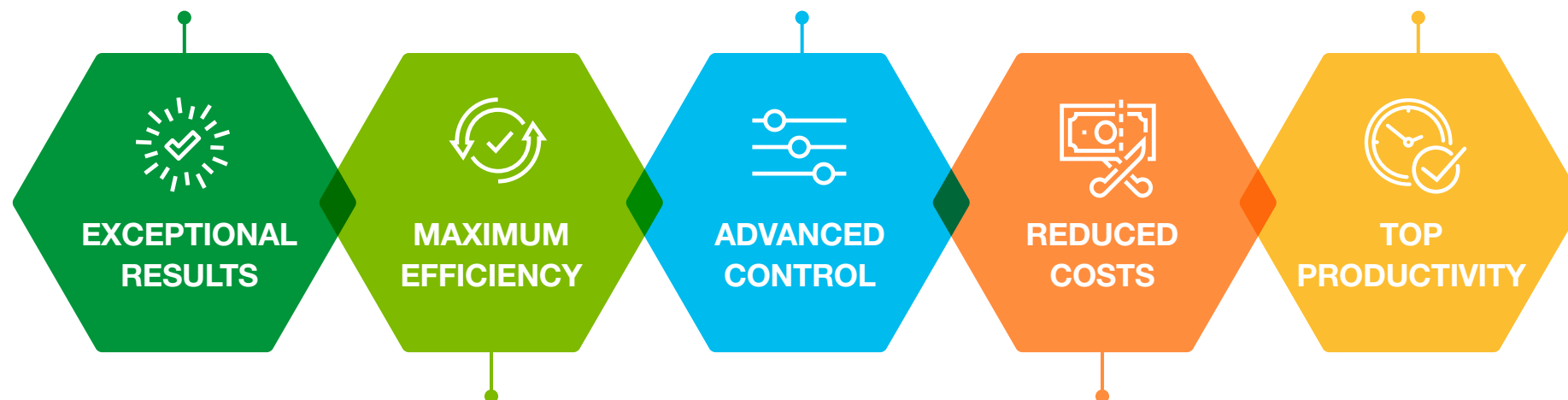
# Intelligent from start to finish

Operating a paint mix room is challenging at times. Keeping the systems up and running often requires manual work. Limited control and monitoring means operators have to enter hazardous, loud, and dirty areas every time a system is down or needs adjusting. We came up with a solution to help you overcome these challenges: the Intelligent Paint Kitchen, an innovative system for monitoring and controlling your paint mix room. And above all, it's intelligent from start to finish!

Optimizes the balance and performance of your paint supply and paint circulation system(s), leading to a high quality finish.

Real-time access to key paint circulation data from inside and outside the paint mix room enables quick diagnosis of issues.

Ensures your paint circulation systems are operational at all times, informing you and adjusting when necessary.



Monitors and controls pressure, flow rates, tank levels, and agitator speeds to ensure your system is operating at peak efficiency.

An inexpensive way to take full control of your paint mix room. You save on installation, operating, programming, and paint costs.



## EXCEPTIONAL RESULTS

### Superior finish

Smoother pump operation, flow, and pressure control guarantee products with a superior finish.

### Consistent quality

Consistent quality ensured by constant pressure due to smart sensors, monitoring, and adjustment.

### Reduced paint shear

Control of paint flow and pressure reduces paint shear and keeps your paint in optimal condition.



## MAXIMUM EFFICIENCY

### Easy start-up and operation

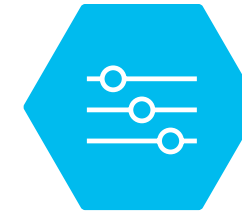
Plug-and-play hardware and ready-to-use software for easy installation, configuration, operation, and troubleshooting.

### Modular and scalable design

Start with pump control and gradually add components as needed and as your budget allows, from one to multiple stations.

### Less human intervention

Maintenance and human intervention are kept to a minimum. This makes your operation not only safer, but more efficient overall.



## ADVANCED CONTROL

### Remote monitoring

Control all the tasks and functions of your paint supply and paint circulation system from outside the hazardous area via an HMI.

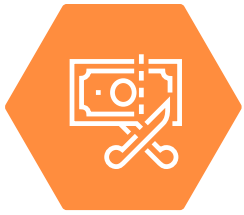
### With or without PLC

Can be implemented as a standalone self-controlling system or integrated with your PLC with a simple handshake.

### Traceable and clear

All data can be visualized and stored, allowing you to analyze and track your complete finishing process.





## REDUCED COSTS

### Cost-effective

A very cost-effective way to control your paint mix room, especially compared to traditional custom-built systems.

### No programming required

No need for expensive programming: Just connect all the hardware, set some parameters, and you're ready to go.

### Increased competitiveness

Your investment and installation costs are much lower than a custom-built system, increasing your competitiveness.



## TOP PRODUCTIVITY

### Minimal downtime

The system reduces the risk of unexpected downtime, with downtime caused by maintenance kept to a minimum.

### Always on and connected

The system can run on its own and will continue to collect data and adjust accordingly, even if your PLC is down.

### Ready for IoT & Industry 4.0

Connected via the internet, the system is ready for Industry 4.0 and is equipped with the technology for IoT.

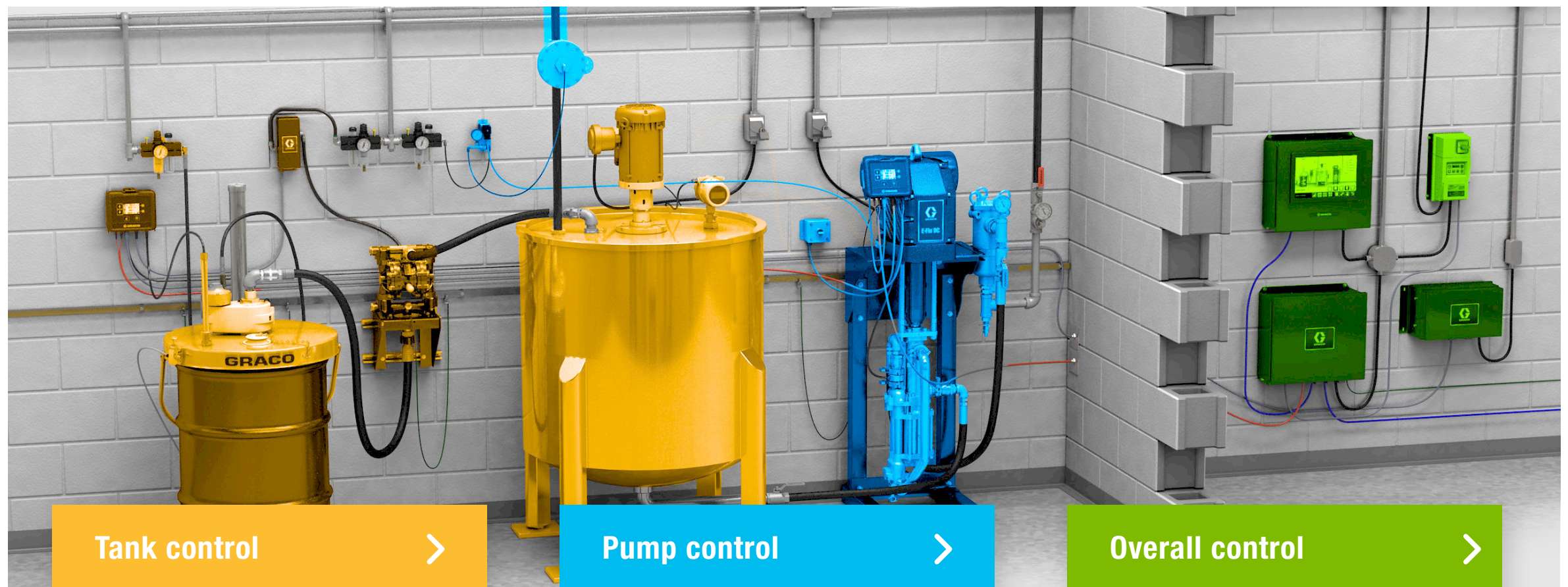
“

*When the Intelligent Paint Kitchen controls key paint circulation parameters – like pressure, flow rates, tank levels and agitator speeds – your system can operate at peak efficiency. This consistently results in more quality, less downtime, and great cost savings.*

”

# What is it and how does it work?

The Intelligent Paint Kitchen is a smart set of sensors, actuators, and control modules that communicate with each other to optimize the performance of your paint supply and paint circulation system. It allows pump control, tank control, and overall (remote) control.



## Tank control



- ✓ Controls tank levels and agitator speeds
- ✓ Keeps your fluids at level and in high quality condition

## Pump control

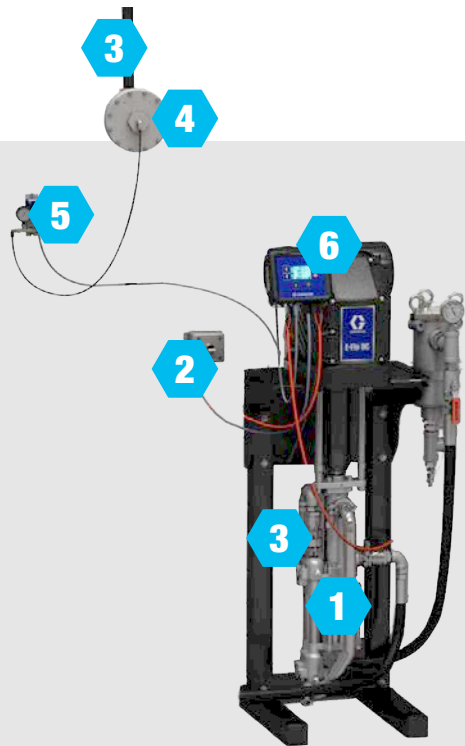


- ✓ Controls fluid pressure and flow rates
- ✓ Keeps your pressure and flow stable and balanced

## Overall control



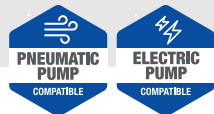
- ✓ Allows control from outside the hazardous area
- ✓ Gives access to (real-time) key paint circulation data



## Pump control

- 1** Electric/Pneumatic Paint Circulation Pump
- 2** Pump Run/Stop Switch
- 3** Fluid Pressure Sensors
- 4** Back Pressure Regulator (BPR)
- 5** Electric/Pneumatic Transducer
- 6** Pump Control Module

Our Intelligent Paint Kitchen works with our electric and pneumatic paint circulation pumps. In this brochure we use our electric pump to visualize the system setup.



## Tank control

- 1** Refill Pump
- 2** Refill Pump Solenoid
- 3** Radar Level Sensors
- 4** Supply Tank
- 5** Production Tank
- 6** Electric/Pneumatic Agitators
- 7** Tank Control Module



## Overall control

- 1** HMI Touchscreen
- 2** Variable Frequency Drive (VFD)
- 3** Supervisor Box
- 4** Power Supply

## HOW DOES IT WORK?

# Pump control optimizes quality

Fluid pressure and flow rates are controlled by the Pump Control Module. It keeps your pressure and flow stable and in balance. Plus it ensures optimal paint feed to the applicators and reduces paint shear.

- 1** Electric/Pneumatic Paint Circulation Pump
- 2** Pump Run/Stop Switch
- 3** Fluid Pressure Sensors
- 4** Back Pressure Regulator (BPR)
- 5** Electric/Pneumatic Transducer
- 6** All connected to and monitored by the Pump Control Module







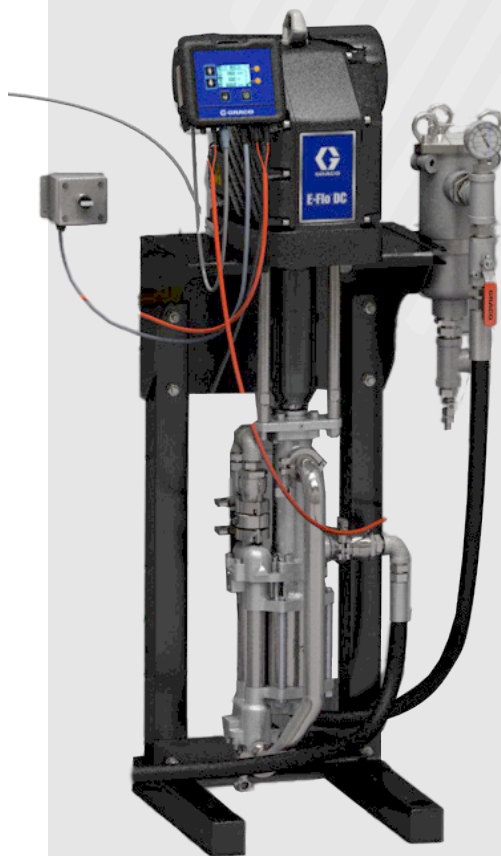
### A closer look at the Pump Control Module

- Connection point and power source for all pump control components
- Allows advanced monitoring and controlling of the pump
- Sends instructions between the non-hazardous and hazardous area
- Can be mounted on the pump or remotely

## Electric or pneumatic, the choice is yours

The Paint Circulation Pump continuously circulates one paint color through the paint mix room. Depending on your preference/situation/system ... you can choose an electric or a pneumatic pump.

### Electric pump



Our E-Flo DC Pump is an energy-efficient reciprocating piston pump with an electric Brushless Dual Control Motor.

It is up to 5 times more efficient than a pneumatic pump.

- Can stall under pressure (similar to pneumatic pressure)
- Optimal paint feed to the applicators
- Low pulse, low noise, no icing

### Pneumatic pump

Graco's pneumatic pumps are built to last. They range in size from 150 cc per cycle up to 4,000 cc per cycle to meet almost any paint circulation application. Choose between these 3 pumps that can be configured to a new level of performance with the Intelligent Paint Kitchen technology:

- **EnduraFlo:** Small to mid-sized double diaphragm pump that offers industry-leading flushing capabilities
- **Glutton:** 4:1 pump that is made for tough applications and has been an industry workhorse for many years
- **HighFlo:** 4-ball piston pump that delivers in mid-size to large circulation applications using the low-maintenance sealed 4-ball lower



## How the Intelligent Paint Kitchen controls fluid pressure and flow rates

The Intelligent Paint Kitchen gives you the possibility to choose between pressure, flow, and hybrid mode. These modes are available for both electric and pneumatic pumps.



- 1 The target fluid pressure is set in the **Pump Control Module**.
- 2 The **Fluid Pressure Sensors** measure the fluid pressure inside the paint circulation line:
  - At the pump outlet
  - At the Back Pressure Regulator
- 3 The **Pump Control Module** compares the target fluid pressure with the actual fluid pressure at the pump outlet.
- 4 The **Paint Circulation Pump** automatically adjusts the pressure (PID Closed Loop) to meet the pressure setpoint.
- 5 This results in steady pressure in the paint circulation line and minimal pulsing at the **pump outlet**.

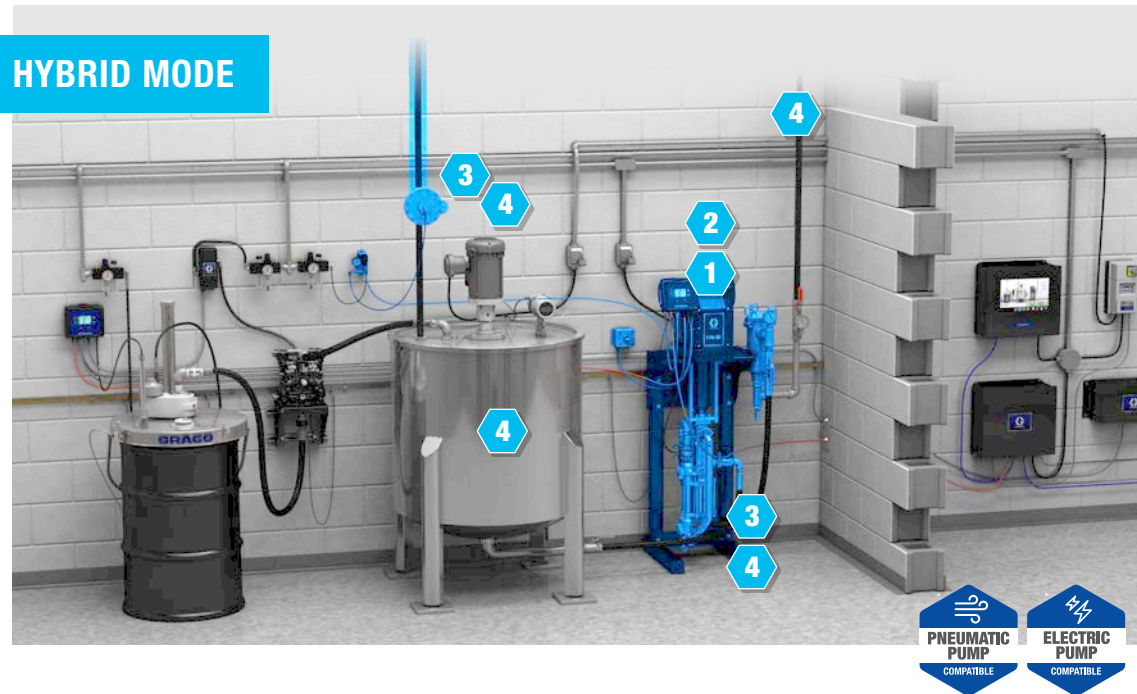


- 1 The target flow rate is set in the **Pump Control Module**.
- 2 The **Back Pressure Regulator** is set to deliver the desired fluid pressure in the system.
- 3 The **Paint Circulation Pump** circulates the paint at the desired flow rate, based on the volume of the pump and the position of the piston.
- 4 This results in a steady flow rate in the **circulation line**, while the system monitors the pressure transducers to prevent pump runaway.



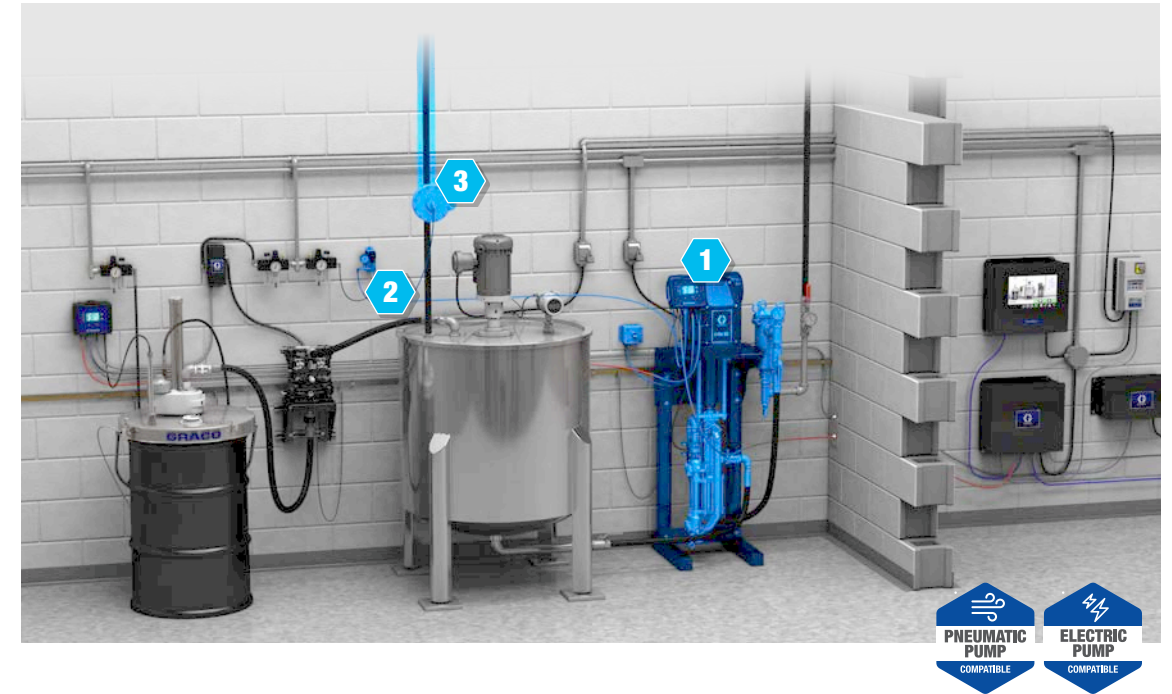
## How the Intelligent Paint Kitchen controls fluid pressure and flow rates

### HYBRID MODE



- 1 The minimum and maximum flow rates required by the circulation conditions are set in the **Pump Control Module**.
- 2 The minimum and maximum fluid pressure to maintain proper spray conditions are set in the **Pump Control Module**.
- 3 The **system** actively manages the pump pressure and flow rate to keep the system within the pressure or flow operating window.
- 4 Changes in viscosity or the number of guns in use will cause the **system** to adjust the **Paint Circulation Pump** and **Back Pressure Regulator** to maintain system pressure and flow requirements.

## How the Intelligent Paint Kitchen keeps your pressure and flow stable and in balance



- 1 A production and a non-production profile are set in the **Pump Control Module**:
  - **Production mode**
    - Constant pressure
    - BPR open/closed percentage set by user
  - **Non-production mode (sleep mode)**
    - Constant flow
    - BPR as open as possible
- 2 The **Electric/Pneumatic Transducer** automatically reaches the setpoint of the BPR.
- 3 The **Electric/Pneumatic Transducer** adjusts the **Back Pressure Regulator**, depending on the target back pressure required.



## HOW DOES IT WORK?

# Tank control maintains quality

The Tank Control Module allows monitoring and control of tank levels and agitator speeds. This keeps paint viscosity consistent, resulting in a top quality finish you can count on.

- 1 Refill Pump
- 2 Refill Pump Solenoid
- 3 Radar Level Sensors
- 4 Supply Tank
- 5 Production Tank
- 6 Electric/Pneumatic Agitators
- 7 All connected to and monitored by the Tank Control Module





### A closer look at the Tank Control Module

- Connection point and power source for all tank control components
- Allows advanced monitoring and controlling of tanks
- Sends instructions between hazardous and non-hazardous areas

## How the Intelligent Paint Kitchen controls tank levels



- 1 The **tank target level** is set in the Tank Control Module.
- 2 The **Radar Level Sensor** measures the tank levels inside the Production Tank: the tank target level and the tank fill level.  
  
The **Radar Level Sensor** detects if the tank fill level has been reached and communicates with the Tank Control Module.
- 3 The Tank Control Module activates the **Refill Pump Solenoid**, which starts up the Refill Pump.
- 4 The **Refill Pump** fills the Production Tank until the tank target level is reached.
- 5 This sequence is repeated based on the paint level changes in the **Production Tank**.

## How the Intelligent Paint Kitchen controls agitator speeds



- 1 The **Electric Agitator** parameters are set:
  - Minimum speed (%)
  - Minimum tank level (%)
  - Maximum speed (%)
  - Maximum tank level (%)
  - On-Off time programming
- 2 The **Radar Level Sensor** measures the tank level inside the Production Tank and sends a 4-20 mA signal to the Pump Control Module and the Supervisor Box.
- 3 The **Variable Frequency Drive** (controlled by the Tank Control Module and the Supervisor Box) activates the **Electric Agitator**.
- 4 The **Agitator** will automatically slow down when the tank level is falling and automatically speed up when the tank level is rising.

## HOW DOES IT WORK?

# Overall control improves safety

The Supervisor Box and HMI Touchscreen allow you to remotely control the paint mix room and easily access critical paint circulation data from outside the hazardous area. This not only improves worker safety, it provides real-time information that can be used to improve the environment.

- 1 HMI Touchscreen
- 2 Variable Frequency Drive (VFD)
- 3 Supervisor Box
- 4 Power Supply







### A closer look at the Supervisor Box

- Communication hub for the Intelligent Paint Kitchen
- Links with your Programmable Logic Controller (PLC)
- Contains the software that runs the Intelligent Paint Kitchen
- Can control up to 20 paint supply and paint circulation systems



### A closer look at the HMI Touchscreen

- Remote interface between the Intelligent Paint Kitchen and operator
- Displays all paint mix room conditions and settings
- Allows you to change parameters and preferences or install updates
- Allows you to schedule production and non-production times

## How the Intelligent Paint Kitchen allows control from outside the hazardous area



- 1** Pump and tank control settings and configurations are done via the **Pump Control Module** and **Tank Control Module**.
- 2** All settings and configurations can also be done from outside the hazardous area via the **HMI Touchscreen**.
- 3** The **Supervisor Box** communicates with all key Intelligent Paint Kitchen components:
  - Pump Control Module
  - Tank Control Module
  - HMI Touchscreen
  - Variable Frequency Drive (VFD)
- 4** From outside the hazardous area, paint kitchen control and real-time access to key data are done via the **HMI Touchscreen**.

## GRACO'S INTELLIGENT PAINT KITCHEN

# Component overview

The Intelligent Paint Kitchen consists of multiple components, such as sensors, actuators, control modules, switches, and cables. All these components are ATEX approved. Below you can find the part number of each component.

## Pump control

<b>Electric Pump Control</b>	
ADCM 220 VAC	24P822
ADCM 3 Phase	17V232
<b>Pneumatic Pump Control</b>	
ADCM Pneumatic Control	19Y486
Air Control Kit	19Y482
Air Control Kit, NXT	19Y996
<b>Pressure Transducer</b>	
Pressure Transducer Tri-Clamp	24X089
Pressure Transducer NPT	24R050
<b>BPR Control</b>	
Electric/Pneumatic Transducer	24V001
<b>Pump Run/Stop Switch</b>	
Pump Run/Stop Switch	16U729

## Tank control

<b>Control Module</b>	
ADCM Tank Control	17S843
<b>Tank Level Sensor</b>	
Tank Level Sensor FM	25D293
Tank Level Sensor ATEX	25D294
<b>Transfer Pump</b>	
Tr Pump Control Kit	24Z671
Reed Switch for 515/716 Fill Pump	241405
Reed Switch for 1050 Fill Pump	24A032

## Overall control

<b>Interface</b>	
Supervisor Box	25A830
Supervisor Expansion Box	25A843
HMI Touchscreen	25A693
Fiber/Serial Converter	24N978
<b>Gateways</b>	
Ethernet IP	15X492
Profibus	15V965
Devicenet	15V966
<b>Fiber cables</b>	
Fiber Cable 10 ft (3 m)	17T898
Fiber Cable 50 ft (16 m)	16M172
Fiber Cable 100 ft (32 m)	16M173
Fiber Cable 330 ft (100 m)	17B160
<b>CAN cables</b>	
CAN Cable 3 ft (1 m)	16P911
CAN Cable 25 ft (8 m)	16P912
<b>Power cables</b>	
Power Cable 50 ft (16m)	19Y499
Power Cable 100 ft (32m)	19Y502

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# ABOUT GRACO

Founded in 1926, Graco is a world leader in fluid handling systems and components. Graco products move, measure, control, dispense and apply a wide range of fluids and viscous materials used in vehicle lubrication, commercial and industrial settings. The company's success is based on its unwavering commitment to technical excellence, world-class manufacturing and unparalleled customer service. Working closely with qualified distributors, Graco offers systems, products and

technology that set the quality standard in a wide range of fluid handling solutions. Graco provides equipment for spray finishing, protective coating, paint circulation, lubrication and dispensing sealants and adhesives, along with power application equipment for the contractor industry. Graco's ongoing investment in fluid management and control ensures the continued provision of innovative solutions to a diverse global market.

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