

# COOLING CONTROL



**My Fruit**  
The Best Fruit

# Unique reasons for combining Cooling & CA control in My Fruit

## CA:

Inseparable combination with Control of Temperature & Atmosphere in fruit storage

## Storage condition:

Every product has its specific optimal Temperature and Controlled Atmosphere conditions determined experimentally and based on practical experience

## Storage protocols:

Bringing together storage conditions, postharvest technique and operational rules in one protocol, to ensure optimal fruit quality during the long-term storage period

## Our goal:

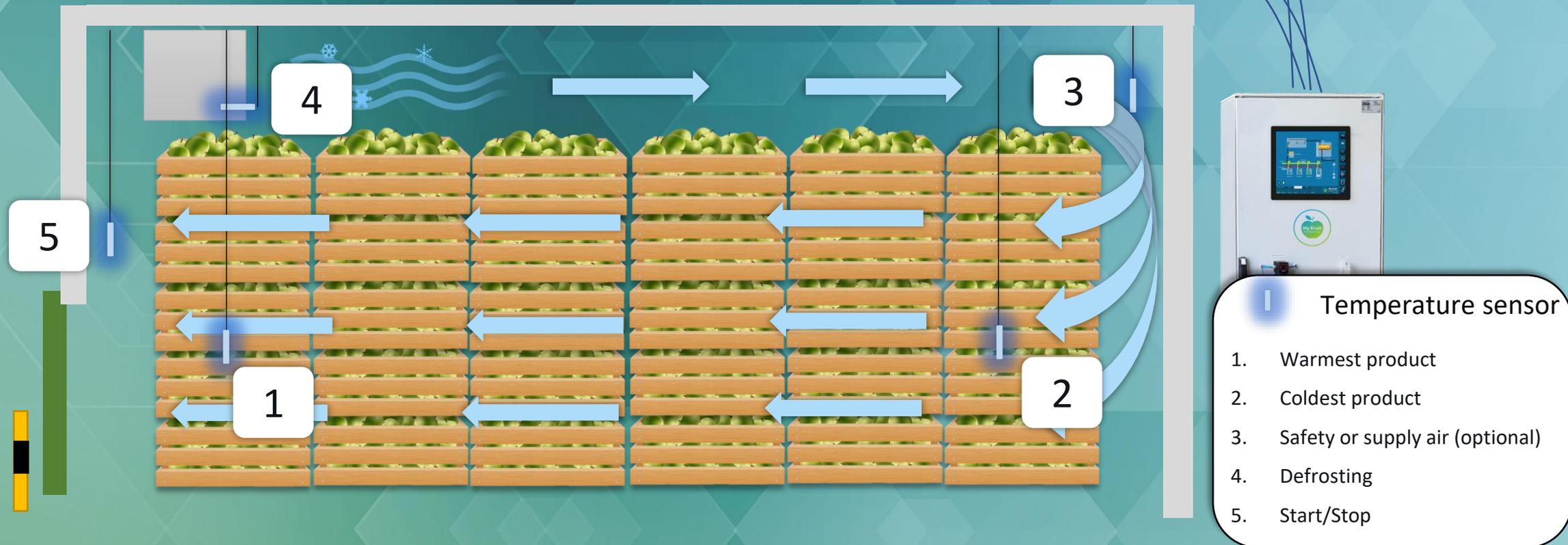
- Optimal control of fruit quality by best storage conditions
- Secure operation
- Minimal usage of energy and maintenance cost

## My Fruit control:

The intelligence to measure, control and give insight for the technology of Temperature and Controlled Atmosphere in favor of the product and for relieve of the cold store manager

# 100 % control at room level condition

- My Fruit can control all different types of cooling systems : Direct Expansion and (In)Direct Pumpsystems
- Multiple PT-1000 sensors for optimal cooling control (Customized sensor names)
- Additional sensors (RH, Pressure, Refrigerant, condense water loss, door status, fan status, ...)



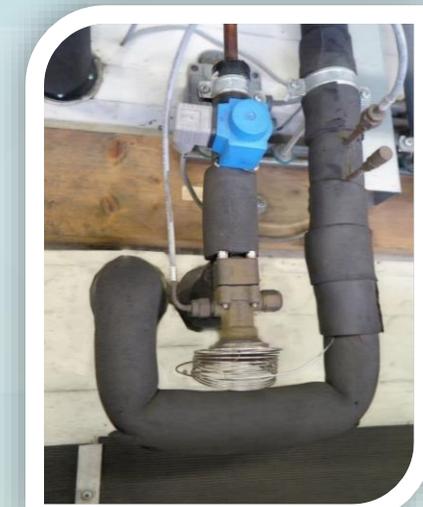
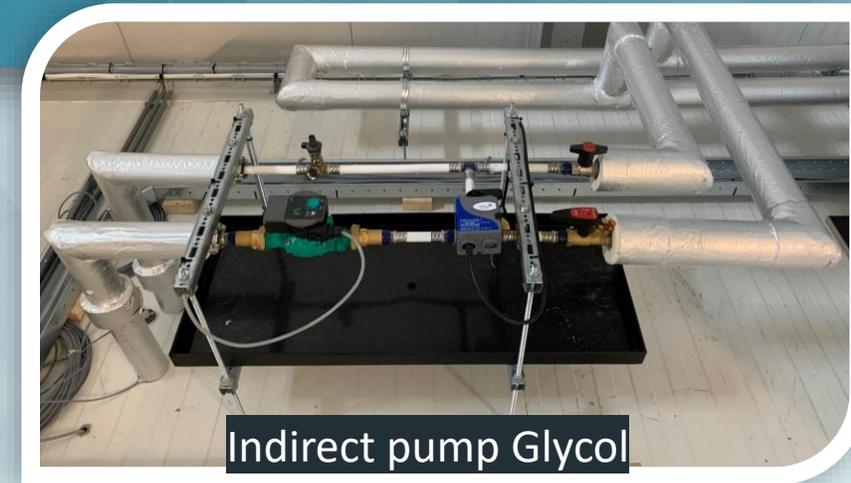
# MyFruit control of different types of cooling systems on room level

## Direct expansion systems and direct pump systems (freon, propane, CO2, ammonia)

- Cooling valve
- Evaporation pressure
- Suction valve
- Defrosting by hot gas, electric or warm glycol

## Indirect pump systems (freon-glycol, propane-glycol, propane-CO2, ammonia-glycol, ammonia-CO2)

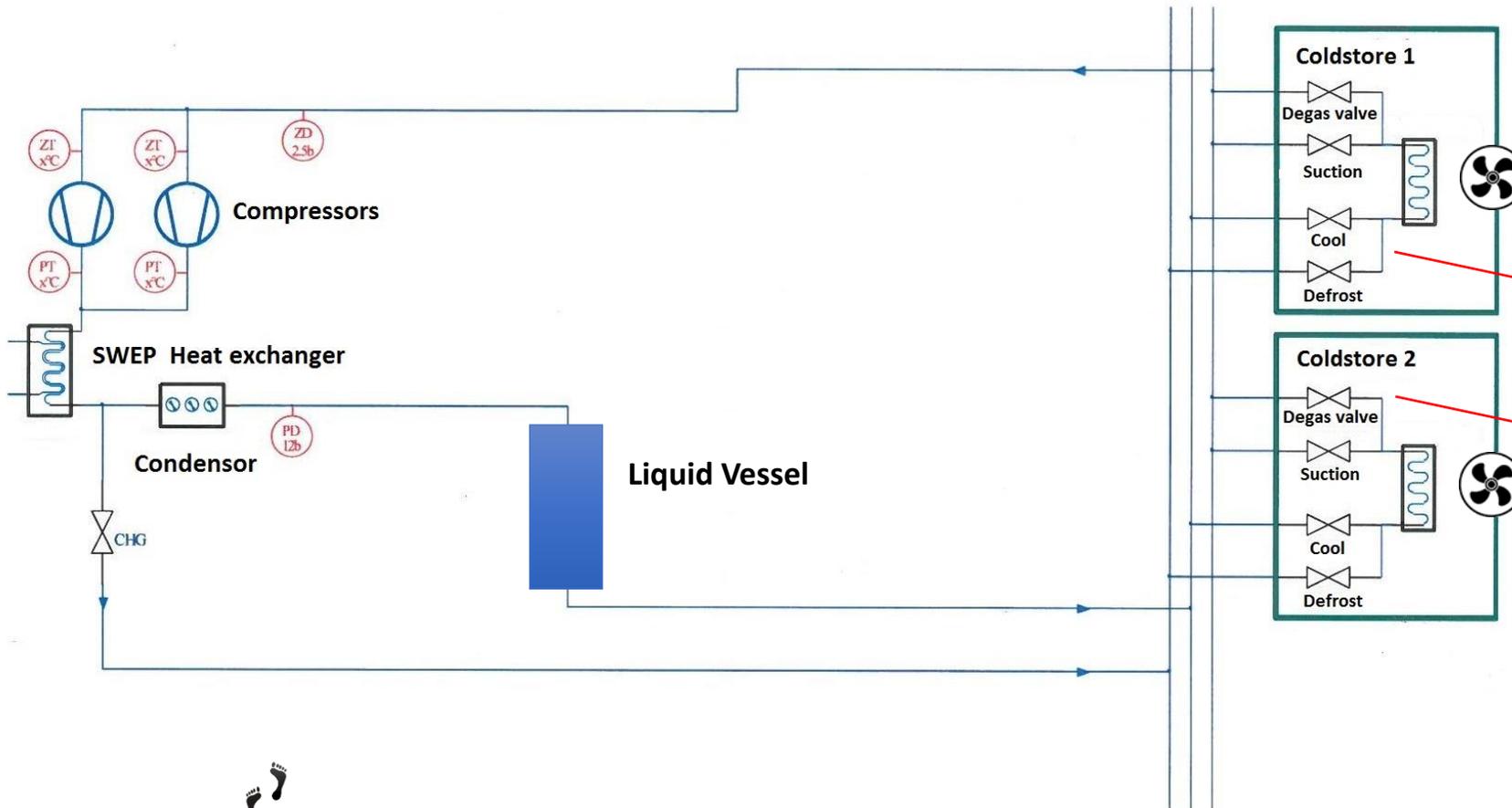
- Temperature control incoming glycol
- Mixing valve control
- Defrosting by warm glycol or electric



Ammonia direct pump

Direct expansion Freon

# Direct Expansion (freon)



## Expansion valve

- Thermal
- Electronic



## Temperature sensors

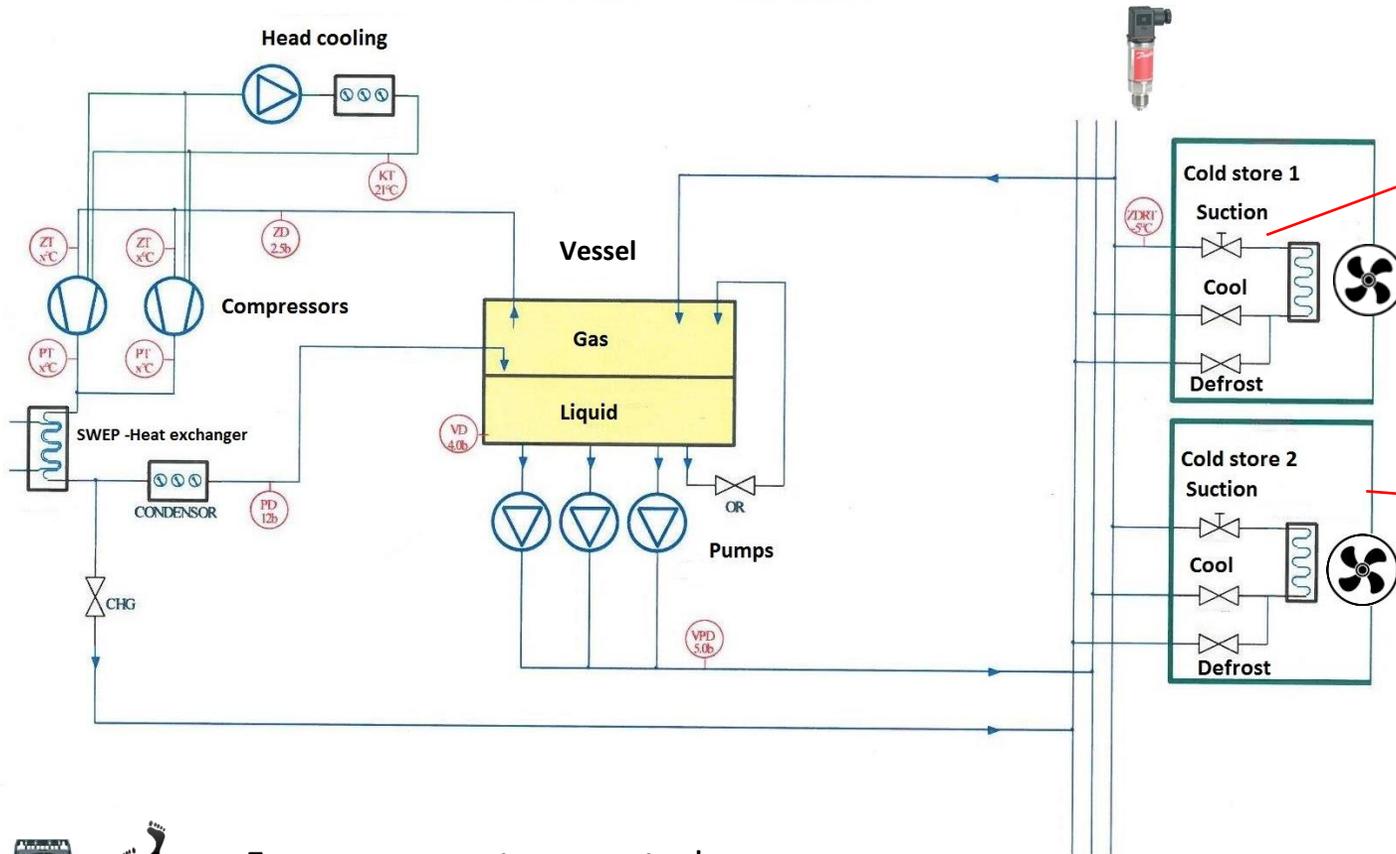
- Fixed sensor
- 1 or 2 Defrost sensors
- 1 pilot sensor
- 1 exhaust sensor
- 1 to 10 product sensors



Frequency or steps control  
Compressor, condenser, pump and fans.

# Direct Pump (ammonia)

## Machineroom Pumpsystem



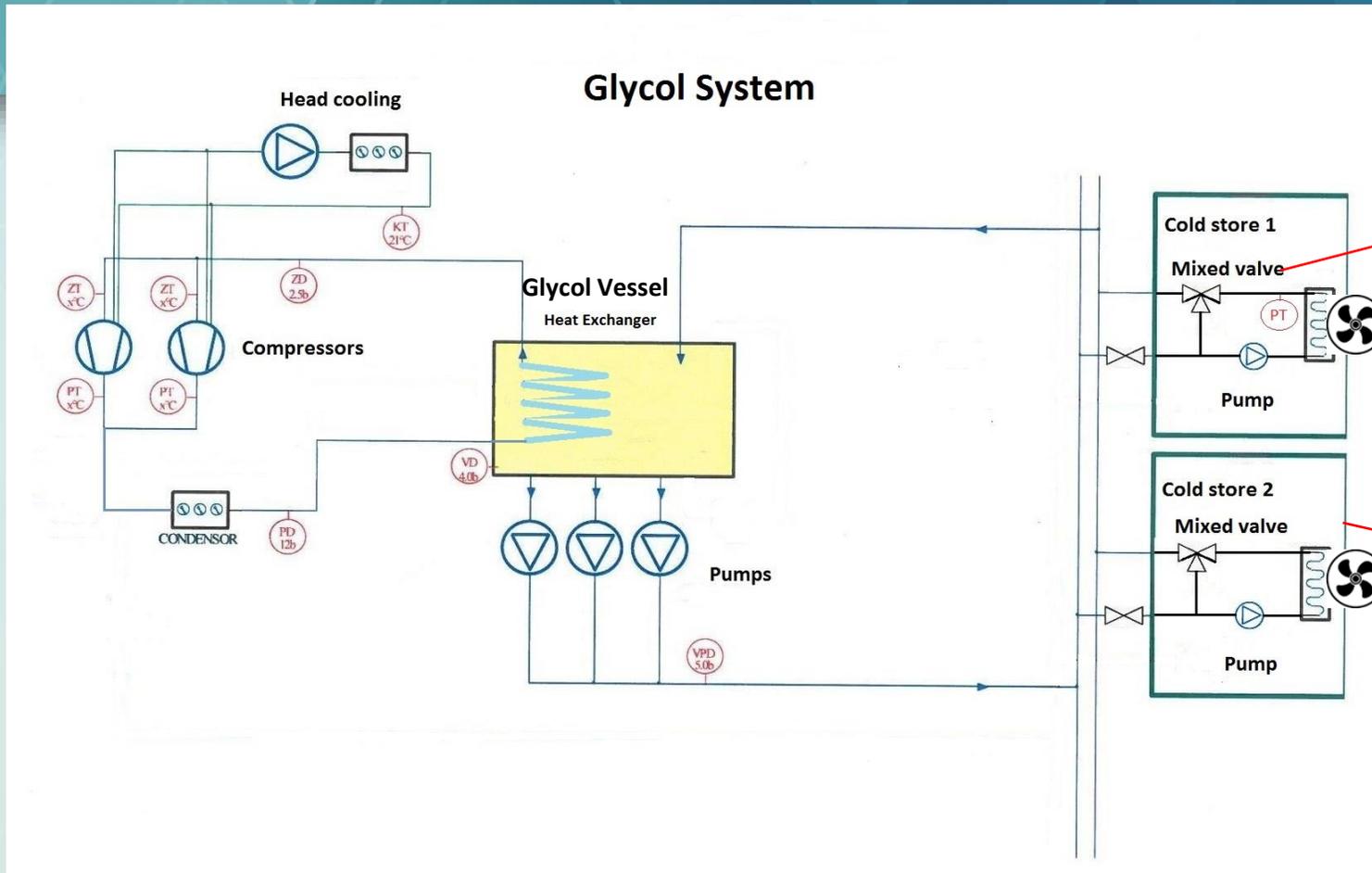
Kornwestheim valve  
Analog signal 4-20mA

- Temperature sensors
- Fixed sensor
  - 1 or 2 Defrost sensors
  - 1 pilot sensor
  - 1 exhaust sensor
  - 1 to 10 product sensors



Frequency or steps control  
Compressor, condensor, pump and fans.

# Indirect Pump (glycol)



- Temperature sensors
- Fixed sensor
  - 1 or 2 Defrost sensors
  - 1 water sensor
  - 1 pilot sensor
  - 1 to 10 product sensors



Frequency or steps control  
Compressor, condensor, pump and fans.

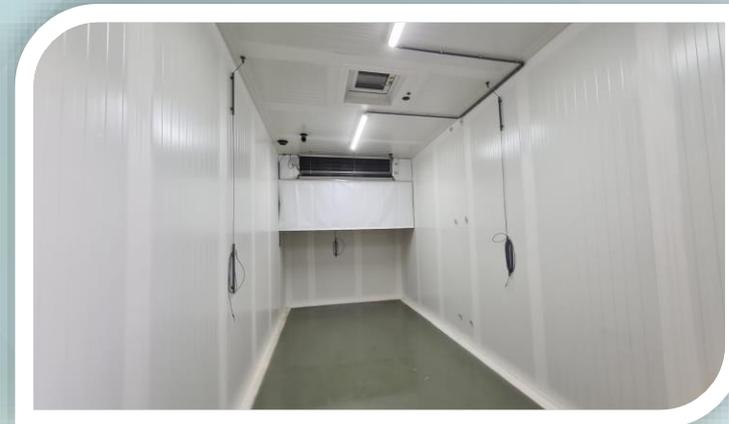
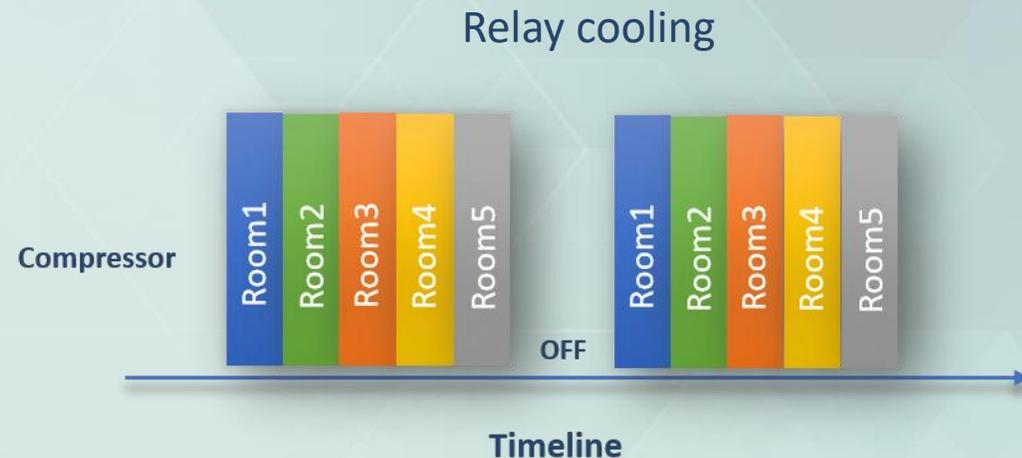
# Cooling Control & Energy Management

## 2 ways to start cooling during the storage period

- $\Delta$  Delta Temperature  
Target temperature – Measured temperature
- Relay cooling  
A group of rooms start cooling based on interval time one by one and each room uses the compressor (frequency controlled) in the most efficient way (ENERGY SAVING)

## Innovative Energy Management (IEM)

- Advanced control of circulation
- Smart Cooling: based on power-consumption, solar-cooling during daytime, low-price energy, etc.
- Auto Defrosting: interval measurement of coil temperature
- Machine room: compressor & condenser control the needed capacity for cooling & protection of technical parts of the compressor
- Respiration/heat-production control: Active Control of Respiration (ACR)



# Options

Sensing		System		
		Direct expansion	Pump direct	Pump indirect
Room	Control T sensor	X	X	X
	Defrost T sensor	X	X	X
	Exhaust T sensor	X	X	X
	Pilot T sensor	X	X	X
	Product T sensor 1..10	X	X	X
	Evaporation pressure / temperature	X	X	X
	Refrigerant leakage sensor	X	X	X
	Defrost water volume	X	X	X
	Door status	X	X	X
Refrigeration plant	ionSuction pressure	X	X	X
	Pump pressure		X	X
	Condensing pressure	X	X	X
	Hot gas temperature	X	X	X
	Machineroom temperature	X	X	X
	Ambient T sensor	X	X	X
	Head / oil temperature		X	(X)
	Refrigerant level	X	X	X
	Refrigerant leakage sensor	X	X	X
	Secondair coolant supply temperature			X
Secondair coolant return temperature			X	

Controlling		System		
		Direct expansion	Pump direct	Pump indirect
Room	Room activation	X	X	X
	Room T, cooling valve	X	X	X
	Modulaire inlet valve / electronic expansion valve	X	X	X
	Secondary circulation pump			X
	Coolant supply temperature (3-way)			X
	Defrost (hotgas valve, electric element)	X	X	X
	Defrost drain heating	X	X	X
	Evaporation pressure	X	X	
	Sunction valve	X	X	
	Evaporator Fan running	X	X	X
	Heating	X	X	X
	Dehumification (cooling + heating)	X	X	X
	Alarm T based (control, product)	X	X	X
	Alarm refrigerant leakage	X	X	X
	Alarm thermic	X	X	X
Refrigeration plant	Compressor capacity (step / frequency)	X	X	X
	Condensor capacity (step / frequency / EC)	X	X	X
	Pump capacity		X	X
	Hotgas / heat exchanger valve	X	X	X
	Oil / Head cooling	(X)	X	X
	Alarm T based (control, product)	X	X	X
	Alarm refrigerant leakage / level	X	X	X
	Alarm thermic	X	X	X

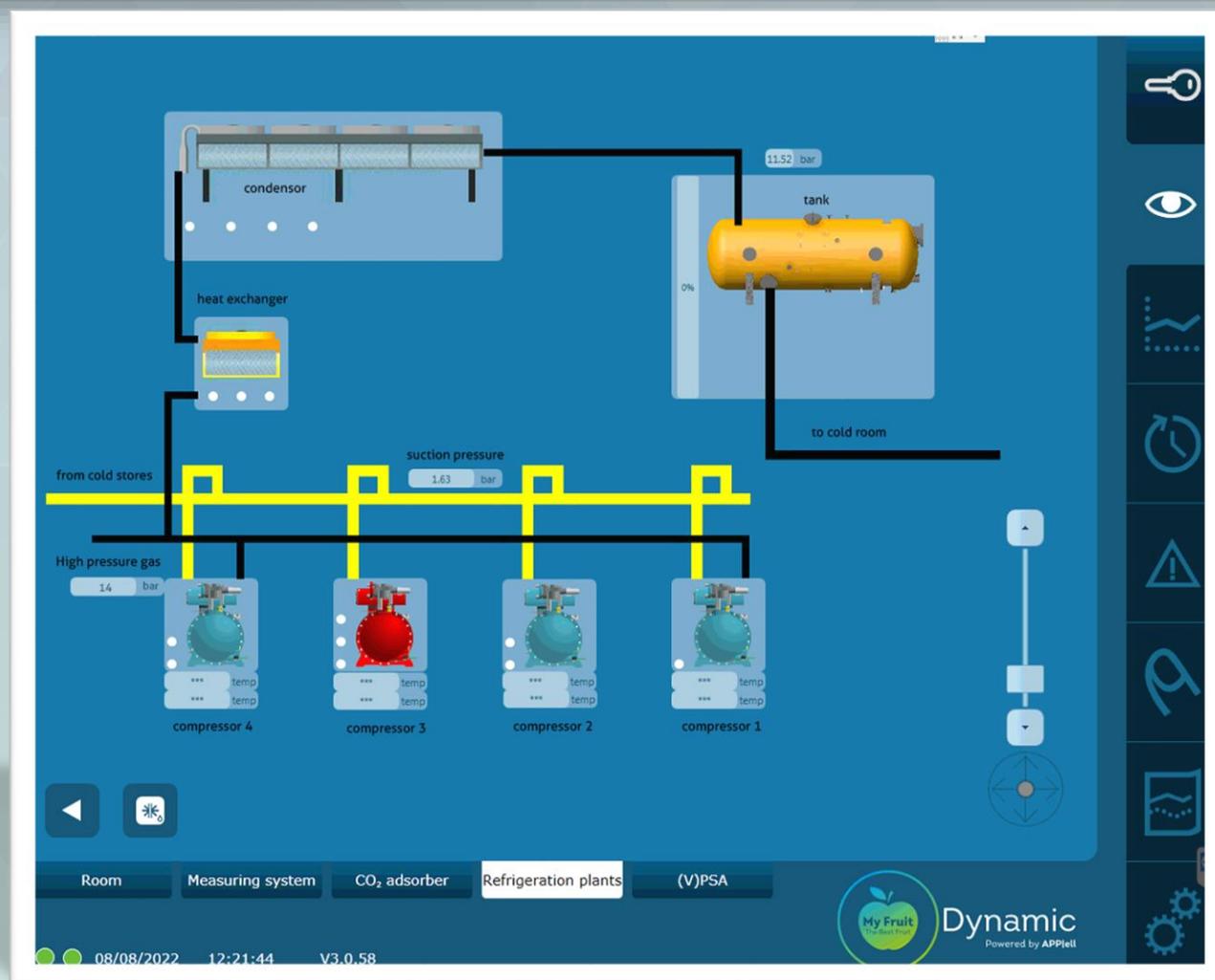
# My Fruit Machine Room Control

## Up to 6 refrigeration plants

- Compressors (frequency control)
- Condensers (frequency control or EC)
- Tanks for liquid refrigerant
- Pumps
- Compressor head cooling
- Heat exchanger for indirect cooling

### Safety management

- Refrigerant level sensors
- Refrigerant Leakage detection sensors
- Input alarms (compressors, condensers, pumps)

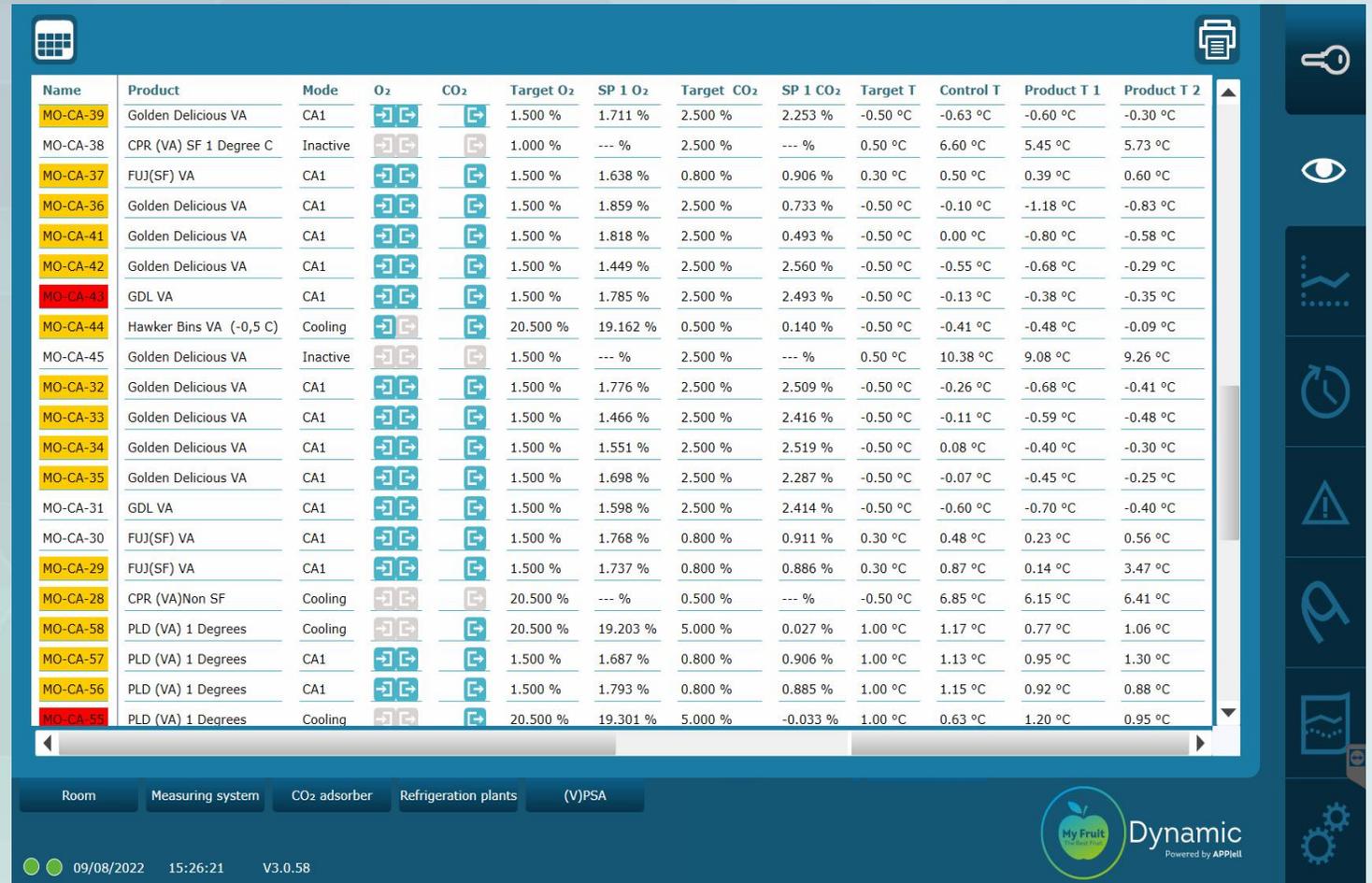


# My Fruit Cooling & CA control

## Benefits for Operation & Management

- ❖ All settings and monitoring in one system
- ❖ Product and Mode pre-settings
- ❖ Multiple functionalities:
  - Clear overview of cooling & CA data in ONE table or graph
  - Registration overviews
  - Alarm system for cooling & CA overviews
  - Number of actions & running hours for service & energy info

**My Fruit makes it simple**



Name	Product	Mode	O <sub>2</sub>	CO <sub>2</sub>	Target O <sub>2</sub>	SP 1 O <sub>2</sub>	Target CO <sub>2</sub>	SP 1 CO <sub>2</sub>	Target T	Control T	Product T 1	Product T 2
MO-CA-39	Golden Delicious VA	CA1	[-] [E]	[E]	1.500 %	1.711 %	2.500 %	2.253 %	-0.50 °C	-0.63 °C	-0.60 °C	-0.30 °C
MO-CA-38	CPR (VA) SF 1 Degree C	Inactive	[-] [E]	[E]	1.000 %	---	2.500 %	---	0.50 °C	6.60 °C	5.45 °C	5.73 °C
MO-CA-37	FUJ(SF) VA	CA1	[-] [E]	[E]	1.500 %	1.638 %	0.800 %	0.906 %	0.30 °C	0.50 °C	0.39 °C	0.60 °C
MO-CA-36	Golden Delicious VA	CA1	[-] [E]	[E]	1.500 %	1.859 %	2.500 %	0.733 %	-0.50 °C	-0.10 °C	-1.18 °C	-0.83 °C
MO-CA-41	Golden Delicious VA	CA1	[-] [E]	[E]	1.500 %	1.818 %	2.500 %	0.493 %	-0.50 °C	0.00 °C	-0.80 °C	-0.58 °C
MO-CA-42	Golden Delicious VA	CA1	[-] [E]	[E]	1.500 %	1.449 %	2.500 %	2.560 %	-0.50 °C	-0.55 °C	-0.68 °C	-0.29 °C
MO-CA-43	GDL VA	CA1	[-] [E]	[E]	1.500 %	1.785 %	2.500 %	2.493 %	-0.50 °C	-0.13 °C	-0.38 °C	-0.35 °C
MO-CA-44	Hawker Bins VA (-0,5 C)	Cooling	[-] [E]	[E]	20.500 %	19.162 %	0.500 %	0.140 %	-0.50 °C	-0.41 °C	-0.48 °C	-0.09 °C
MO-CA-45	Golden Delicious VA	Inactive	[-] [E]	[E]	1.500 %	---	2.500 %	---	0.50 °C	10.38 °C	9.08 °C	9.26 °C
MO-CA-32	Golden Delicious VA	CA1	[-] [E]	[E]	1.500 %	1.776 %	2.500 %	2.509 %	-0.50 °C	-0.26 °C	-0.68 °C	-0.41 °C
MO-CA-33	Golden Delicious VA	CA1	[-] [E]	[E]	1.500 %	1.466 %	2.500 %	2.416 %	-0.50 °C	-0.11 °C	-0.59 °C	-0.48 °C
MO-CA-34	Golden Delicious VA	CA1	[-] [E]	[E]	1.500 %	1.551 %	2.500 %	2.519 %	-0.50 °C	0.08 °C	-0.40 °C	-0.30 °C
MO-CA-35	Golden Delicious VA	CA1	[-] [E]	[E]	1.500 %	1.698 %	2.500 %	2.287 %	-0.50 °C	-0.07 °C	-0.45 °C	-0.25 °C
MO-CA-31	GDL VA	CA1	[-] [E]	[E]	1.500 %	1.598 %	2.500 %	2.414 %	-0.50 °C	-0.60 °C	-0.70 °C	-0.40 °C
MO-CA-30	FUJ(SF) VA	CA1	[-] [E]	[E]	1.500 %	1.768 %	0.800 %	0.911 %	0.30 °C	0.48 °C	0.23 °C	0.56 °C
MO-CA-29	FUJ(SF) VA	CA1	[-] [E]	[E]	1.500 %	1.737 %	0.800 %	0.886 %	0.30 °C	0.87 °C	0.14 °C	3.47 °C
MO-CA-28	CPR (VA)Non SF	Cooling	[-] [E]	[E]	20.500 %	---	0.500 %	---	-0.50 °C	6.85 °C	6.15 °C	6.41 °C
MO-CA-58	PLD (VA) 1 Degrees	Cooling	[-] [E]	[E]	20.500 %	19.203 %	5.000 %	0.027 %	1.00 °C	1.17 °C	0.77 °C	1.06 °C
MO-CA-57	PLD (VA) 1 Degrees	CA1	[-] [E]	[E]	1.500 %	1.687 %	0.800 %	0.906 %	1.00 °C	1.13 °C	0.95 °C	1.30 °C
MO-CA-56	PLD (VA) 1 Degrees	CA1	[-] [E]	[E]	1.500 %	1.793 %	0.800 %	0.885 %	1.00 °C	1.15 °C	0.92 °C	0.88 °C
MO-CA-55	PLD (VA) 1 Degrees	Cooling	[-] [E]	[E]	20.500 %	19.301 %	5.000 %	-0.033 %	1.00 °C	0.63 °C	1.20 °C	0.95 °C

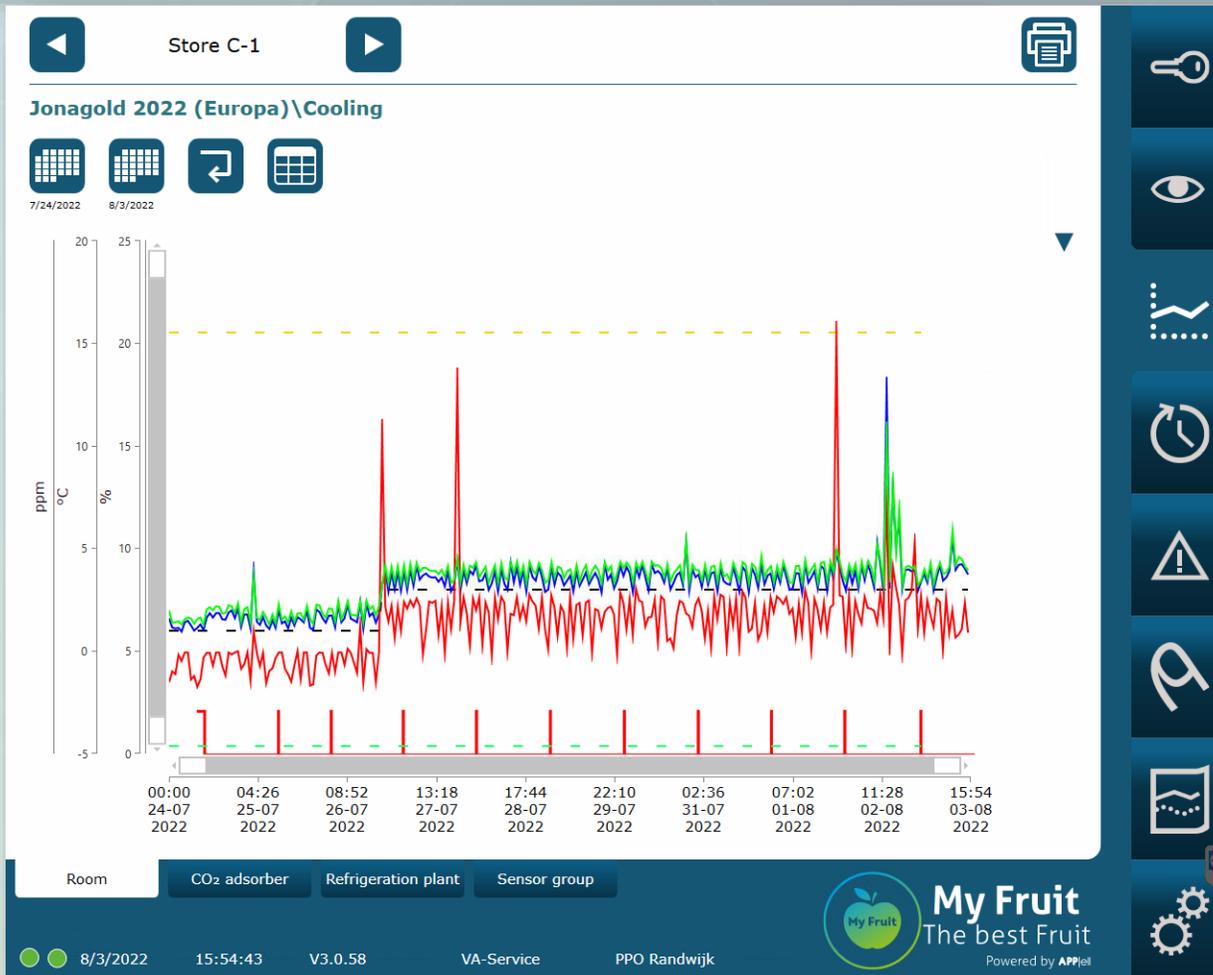
Room    Measuring system    CO<sub>2</sub> adsorber    Refrigeration plants    (V)PSA

09/08/2022    15:26:21    V3.0.58

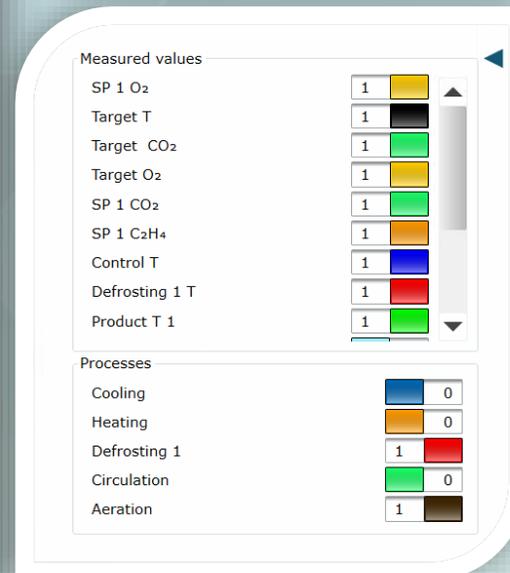
My Fruit The Best Plus    Dynamic Powered by APPIelt

# My Fruit Cooling & CA control

## Benefits for your products



- ❖ All related parameters in one (customized) graph
  - CA conditions values
  - Temperature & RH values
  - Product status indicator
  - CA & cooling process indicator
- ❖ Easy to track & trace the deviations and malfunctioning
- ❖ Historical data gives information for future storage



My Fruit makes  
it simple

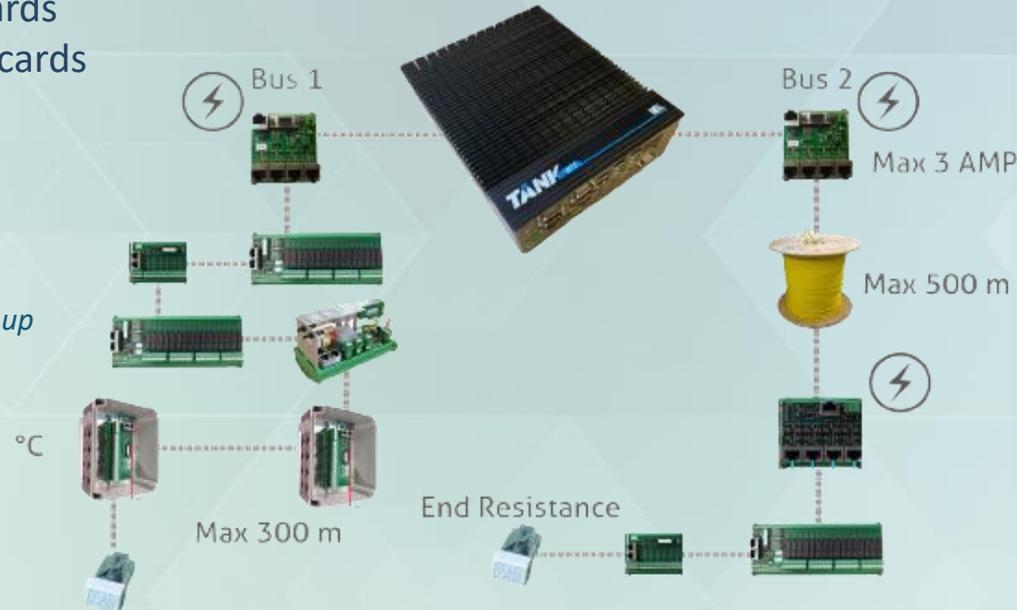
# My Fruit Cooling & CA control

## Benefits for Installation & Communication

- ❖ Cat6 cables
- ❖ Manual forcing of relay outputs via a print switch
- ❖ Plug & play
- ❖ Easy to extend
  - Relay cards
  - Digital input cards
  - Analogue entry cards
  - Analogue output cards
  - PT100 and PT1000 cards

My Fruit can customize your CA & cooling installation via flexible configuration of In/Outputs

Example of installation set up



Cooling panel



Main panel



# These Options Make Big Differences!

## Pressure sensor per room:

- Pressure control during cooling
- Pressure control for leakage testing
- Pressure control during ACR respiration measurement



## Water meter per room:

- Water loss indicates the functioning of cooling system
- Water loss gives info on fruit quality



## Independent temperature pilot sensor per room:

- To prevent too low temperature

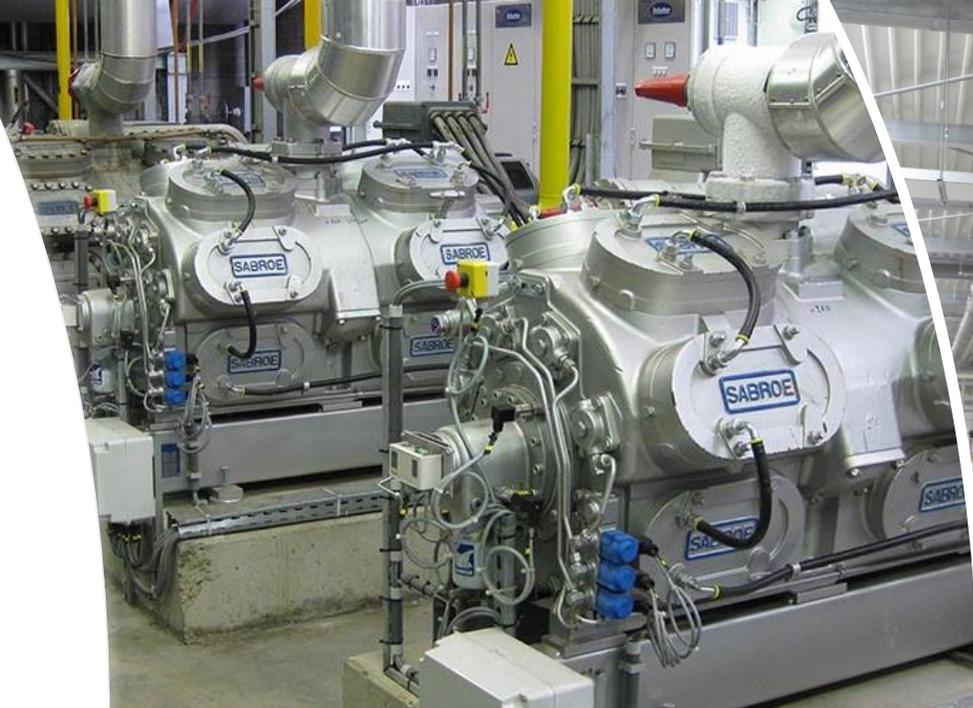


# Worldwide monitoring and control

## Data is safe in the Cloud



References in  
over 60  
countries



THE DYNAMIC FRUIT MANAGER



Check our  
webinar



SCAN ME

FRUIT STORAGE



# The next level of CA storage

CA EQUIPMENT



RESEARCH  
CONTROL



CA CONDITIONS

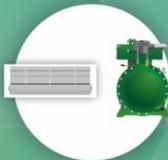


**VAN CA technology  
AMERONGEN**

FLEXIBLE  
CA STORAGE



COOLING CONTROL



DYNAMIC CA



WATERLOSS CONTROL



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