Milkplan

MPV & MPVC
OPERATION MANUAL

EN

Table of Contents

1. Introduction

MILKPLAN S.A. sincerely thanks you for selecting one of its products.

The open-type milk cooling tank MP Vertitank (MPV) provides fast and consistent cooling, preserving the quality of the milk at the highest level. Its carefully engineered design and high-quality construction materials ensure long-term operation and energy efficiency.

The MP Vertitank Closed (MPVC) series consists of closed-type tanks and offers an intelligent combination of the MPV series layout and the advantages of the MP Powertank series. The MPVC is designed as a vertical tank with a manhole and includes the MPP Standard cooling and washing control system.

The MPV & MPVC models are available in various capacities to meet the needs of every customer.

By choosing a milk cooling tank from MILKPLAN S.A., you have selected a premium product manufactured by a company with long-standing experience in milk cooling and milk processing.

This manual has been prepared to guide the installer through the required steps and procedures for the correct and safe installation of the milk cooling tank (MCT). Its purpose is to ensure that the equipment is installed, connected, and put into operation in accordance with the manufacturer's technical specifications and safety standards.

The manual includes:

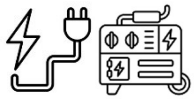
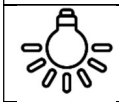
- Safety Rules
- Product Description
- Operating Instructions

The user is requested to read this manual carefully before operating the MCT.

Reading the manual in advance ensures maximum performance and longevity of the investment.

1.1. Symbol Definitions

Symbol	Description	Explanation
	Consult the instruction manual	Provides additional information.
	Caution!/Mandatory Action	Failure to follow the instructions precisely may result in: - Damage to the tank (such damage is not covered by the warranty). - Deterioration of milk quality.
	Safety Glasses / Gloves / Safety Shoes	The use of personal protective equipment is mandatory.
	Ventilation	Ventilation / exhaust system is required.
	Warning!	Hazard (risk of injury or irreversible equipment damage).
	Crane / Forklift	Use of a crane and/or forklift truck is required.
	Moving Parts	Warning! Moving / rotating parts.
	Electrical Load	Warning! Electrical load / risk of electric shock.
	Flammable	Warning! Contains flammable material.
	Explosive	Warning! Contains explosive material.
	Ignition Source	Use of ignition sources is prohibited.
	Water Spray	Use of water is prohibited.
	Fire Extinguisher	
	Alignment / Measurement	Alignment (leveling) is required.
	Tools	Work must be carried out by qualified personnel / professional.

	Electricity	Power supply from the grid and/or generator.
	Water	Connection to the water supply network.
	Drainage	Wastewater / drainage network.
	Light Source	Adequate lighting required.
	Weather Protection	Shelter / protection from external environmental conditions is required.
	Technical Support	Contact the supplier's Technical Support department.
	Information / Recommendations	Additional information & recommendations.

1.2. Safety Instructions

Safety instructions are preventive in nature and aim to ensure safe and healthy working conditions for workers/users. They are designed to protect against potential hazards in the workplace, such as preventing injuries and illnesses, by minimizing or eliminating risks to health and safety. At the same time, these instructions aim to prevent actions that, in addition to posing a risk of accidents, may also cause material damage to the equipment.

1.3. Operation Instructions

These instructions aim to inform the user regarding the correct use and operation of the milk cooling tank. Compliance with these guidelines ensures that the product will fully serve its purpose—cooling and preserving milk—while simultaneously ensuring its long-term operational reliability.

1.4. Environmental Compliance

MILKPLAN S.A. is committed to conducting its business operations with a focus on environmental sustainability throughout the stages of development, design, manufacturing, operation, and distribution of its products.

Decommissioning and Disposal

At the end of its life cycle, the tank and its equipment must be recycled or managed in accordance with relevant local regulations.

This appliance contains refrigerant and other potentially hazardous materials. For the disposal of this unit, specialized collection and treatment are required as defined by law. Do not dispose of this product with household waste or unsorted municipal waste.

1.5. Amendments

MILKPLAN S.A. reserves the right to make changes or updates to this manual at any time without prior notice.

2. Safety Regulations

2.1. General Information

This manual constitutes an integral part of the Milk Cooling Tank (MCT) and must be stored in a secure location near the unit, protected from rain and moisture. It is mandatory that all users are aware of its location and familiar with its contents.

The installer is required to study this manual thoroughly, regardless of any prior experience with similar equipment. A few moments of careful reading will save time and prevent future operational issues.

Unauthorized personnel must not come into contact with any part of the device!

The operation manual must be studied carefully before proceeding with the installation of the equipment!
All recommendations, warnings, and guidelines for proper installation and operation provided in this manual must be strictly observed.
<u>Installation must be performed exclusively by qualified personnel.</u>
MILKPLAN S.A. is liable only for the equipment it has supplied.
MILKPLAN S.A. bears no responsibility for any damages resulting from Improper transportation and unloading, misuse or incorrect operation or faulty installation or inadequate maintenance.

2.2. Maintenance and Repairs

<u>Maintenance and repairs must be carried out exclusively by qualified personnel.</u>
In the event of electrical or mechanical failure, the installation supervisor must be notified immediately.

2.3. Tank Entry Procedures

In the event that entry into the tank is required, the task must be performed strictly under continuous supervision and only after a complete electrical power isolation. It is mandatory to ensure that the agitator cannot be activated. Although the agitator motor is equipped with a gravity-fed safety switch, this does not eliminate the possibility of mechanical or electrical failure. Only the designated, factory-provided ladder must be used for entering the tank.

The lid must be operated (opening/closing) exclusively via the specially designed handle. The lid must be opened to its full extent to ensure it is securely stabilized during operations. Avoid leaving the lid in an intermediate or partially open position, as there is a significant risk of accidental closure, which may lead to serious injury.

SAFETY RESTRICTION: It is strictly prohibited to open the lid or the Ø200 manhole while the milk cooling tank is in operation.

In cases where frequent access to the tank interior is required, it is recommended to install a fixed work platform around the perimeter of the tank. The height and design of the platform must ensure the safe and unobstructed entry and exit of personnel. The platform must comply with local industrial safety standards regarding fall protection and ergonomic access.

2.4. Cleaning Procedure

Never spray high-pressure water onto the milk cooling tank.

WARNING: Cleaning agents must be stored out of reach of children and animals. Before use, read the instructions on the packaging carefully and strictly follow the prescribed safety measures.

Wear protective gloves and safety goggles while using cleaning agents.

Chemicals may cause skin irritation.
Alkaline detergents dissolve proteins; therefore, contact with eyes will cause serious injury.
In the event of eye contact with cleaning agents, immediately flush with plenty of water and seek medical attention at a hospital.

ATTENTION: Mixing different cleaning agents is strictly prohibited. Mixing may cause chemical reactions, resulting in the release of hazardous or toxic gases.

Always wear sturdy, non-slip footwear when washing the tank. In the case of MPVC, before starting the cleaning cycle, the manhole cover must be securely closed and the milk inlet must be covered to prevent chemicals and hot water from escaping the tank, as they may cause skin irritation.

2.5. Refrigeration Unit

The maintenance of the cooling unit must be performed by a certified professional (Refrigeration Technician).

CAUTION: Never spray water on the cooling unit.
Cleaning should be performed using compressed air. If this is not possible, the condenser should be carefully cleaned with a small brush or paintbrush to remove dust and debris from its surface.
Do not touch the cooling unit or its cover with bare hands, even when not in operation. Certain parts/components remain hot and there is a risk of burns.
Never step on the cooling unit or the piping.
Do not place objects on the cooling unit cover.
Do not cover the condenser, as this will restrict air circulation and reduce cooling performance.
The cooling unit must not be exposed to weather elements. It is the owner/user's responsibility to take all necessary protective measures.

***MILKPLAN S.A.**, in compliance with European Directives **2015/1094 & 2015/1095**, utilizes **R290** refrigerant for cooling tanks with capacities up to 300L, and **R454C** for capacities ranging from 400L to 2500L. Due to the flammable and explosive nature of these refrigerants, the following supplementary **Safety Instructions** are provided for the installation and maintenance of the cooling unit.*

---

3. Product Description

3.1. MP Vertitank (MPV)

The MP Vertitank (MPV) open-type milk cooling tank consists of a milk collection and storage tank and a cooling unit. It is designed and manufactured in accordance with Directive 2006/42/EC of the European Parliament and the following standards: EN 13732: 2022, ISO 5708: 1983, EN ISO 13857: 2020, EN ISO 12100: 2010, EN 349: 1993 + A1: 2008, EN 1672-1: 2014, EN 1672-2: 2020, and EN 60204-1: 2018.

The available capacities of the MPV range from 50L to 2500L.

Tanks from 50L to 300L are primarily suitable for sheep and goat livestock farms, while tanks from 400L to 2500L serve small cow farms or large sheep and goat farms.

All MPV models, regardless of capacity, feature a built-in cooling unit. For capacities up to 300L, the cooling unit is positioned underneath the collection tank, whereas for capacities from 400L to 2500L, the cooling unit is mounted at the rear of the tank. Both the tank and the cooling unit share a common base. Detailed dimensions are presented in Table 1 in conjunction with Figure 1, as well as in Table 2 and Table 3 in correspondence with Figure 2.

Optional:
The tank and the cooling unit can be mounted on separate bases. In this case, the connection of the refrigeration lines must be performed at the installation site by a certified professional (refrigeration technician).

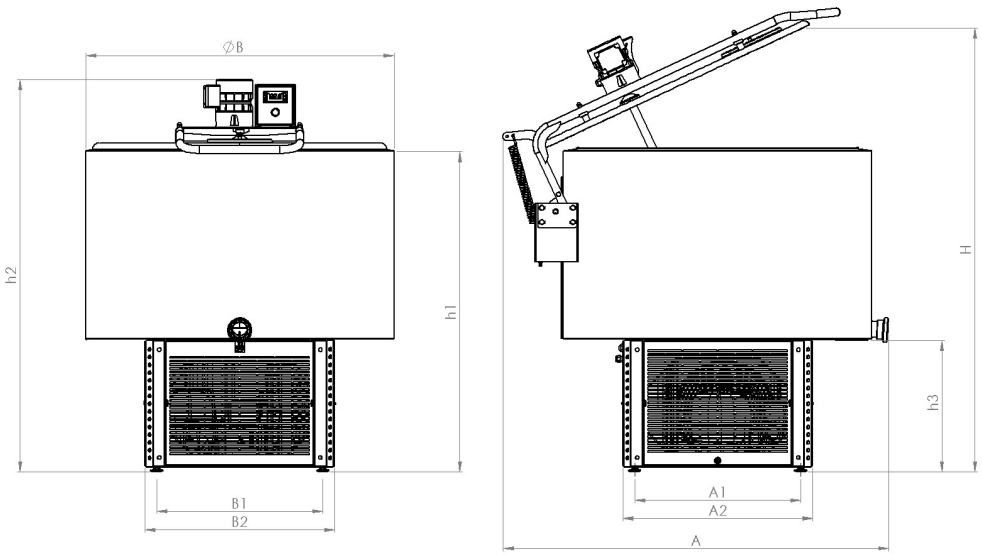


Figure 1: Dimensions MPV50-MPV300

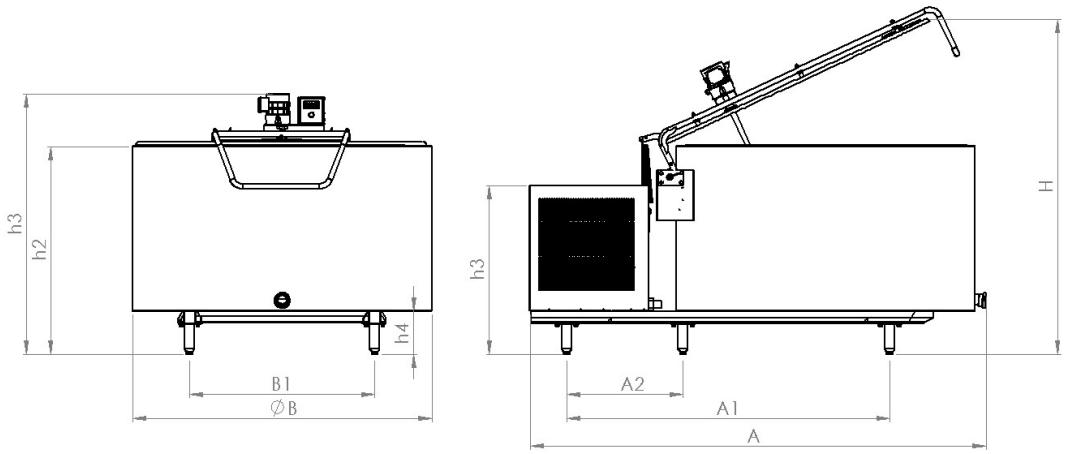


Figure 2: Dimensions MPV400-MPV2500

Table 1: Dimensions MPV50-MPV300 (mm)

Type	A	A1	A2	B	B1	B2	H	H1	H2	H3
MPV 50	560	280	365	520	280	365	1350	820	1050	440
MPV 100	780	330	400	680	410	500	1660	980	1190	420
MPV 200	1030	530	610	890	530	610	1520	990	1220	420
MPV 300	1130	530	620	990	530	610	1700	1030	1250	420

Table 2: Dimensions MPV400-MPV800 (mm)

Type	A	A1	B	B1	H	H1	H2	H3	H4
MPV 400	1600	950	1090	670	1445	1050	830	685	180
MPV 500	1600	950	1090	670	1620	1190	965	680	180
MPV 650	1600	950	1090	670	1765	1345	1120	750	180
MPV 800	1770	1310	1290	925	1910	1265	1040	685	192

Tanks with capacities from 1000L to 2500L are supported by 6 legs, with 3 legs on each side.

Table 3: Dimensions MPV1000-MPV2500 (mm)

Type	A	A1	A2	B	B1	H	H1	H2	H3	H4
MPV 1000	2050	1320	450	1495	910	1925	1250	1010	840	192
MPV 1250	2050	1320	450	1495	940	2090	1495	1150	840	192
MPV 1500	2275	1560	590	1495	1140	2200	1645	1304	818	192
MPV 2000	2320	1490	680	1840	1130	2200	1510	1200	880	192
MPV 2500	2320	1490	680	1840	1130	2390	1700	1390	1070	192

Main Components

The main components of the MPV are shown in Figure 3 and Figure 4.

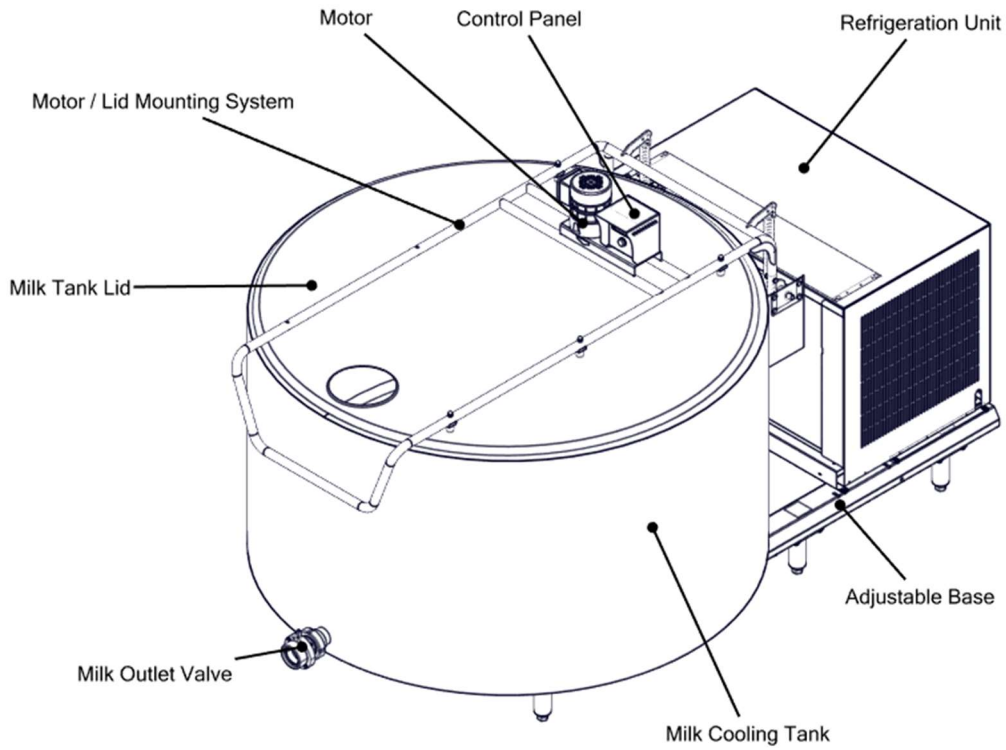


Figure 3: MPV Main components

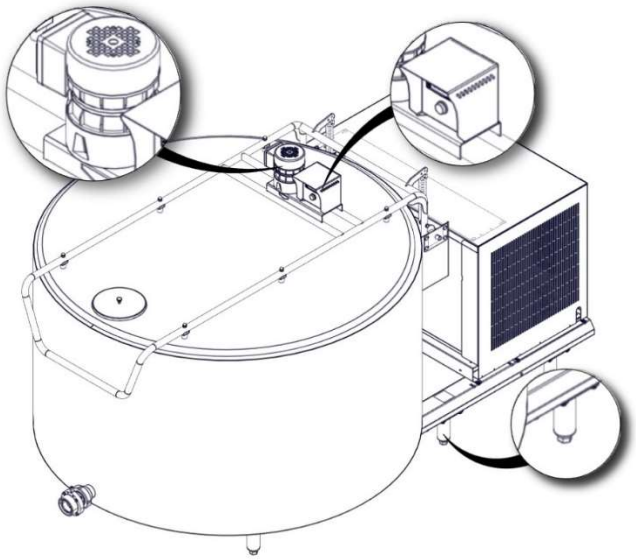


Figure 4: MPV Motor/ Electronic Control Panel/ Adjustable Support Leg

Milk Storage Tank

The milk collection and storage tank is an insulated, double-walled vessel of circular geometry. It is manufactured in accordance with international standards (EN 13732:2022), using food-grade AISI 304 Stainless Steel. It consists of the inner tank, which comes into direct contact with the milk, and the outer casing (cladding).

The space between the walls is insulated with high-density, two-component polyurethane foam (type V-Pur TP-73-400). The insulation is applied through a fully controlled injection process, ensuring uniform filling, high mechanical strength, and consistent thermal performance. The insulation thickness is 45 mm around the perimeter and 90 mm at the base of the tank. These values minimize thermal losses, contributing to maximum energy efficiency and ensuring the lowest possible power consumption.

The bottom of the inner tank functions as the heat exchanger (evaporator). The heat exchanger is a direct expansion type, featuring a single embossed pillow plate design. It consists of two sheets with thicknesses of 2 mm and 0.8 mm. The exchanger has undergone stress testing to failure via hydraulic oil pressure. To certify compliance during quality control, the exchanger must withstand at least 70 bar before any form of failure occurs, while the operational test pressure is 30 bar. This eliminates the possibility of refrigerant leaks and confirms high mechanical durability. The diamond-patterned welding layout of the exchanger ensures immediate heat dissipation and prevents ice formation, even with small quantities of milk.

In high-capacity models (e.g., **2500L / 2 milkings**), the inner tank body also functions as a heat exchanger to handle the increased thermal load. The use of a second exchanger ensures immediate and uniform heat dissipation without the risk of ice formation on the walls.

Motor / Lid Mounting System

The motor mounting system functions as a unified support base for the motor, the agitator, and the machine's electronic control panel. Additionally, it houses the temperature controller and serves as the suspension point for the tank lid.

Furthermore, it acts as a handle for opening and closing the lid. It is constructed from AISI 304 stainless steel and features heavy-duty springs, which ensure effortless lifting and secure retention of the tank lid in the open position.

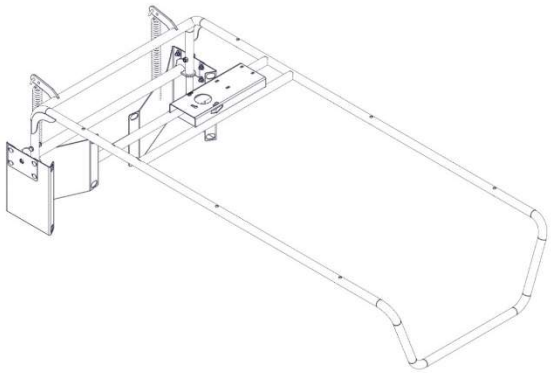


Figure 5: Motor and Lid Mounting system

Motor

The single-phase agitator motor operates at 30 rpm to prevent milk foaming. For tank capacities from 50L to 1200L, the motor power is 90W, while for larger capacities, it is 120W. It features a built-in gravity switch that automatically stops operation when the tank lid is lifted.

Electronic Control Panel

The control panel for cooling and agitation (Figure 6) complies with standards EN 60529/91 and LVT 73/23/EEC, successfully offering an IP55 protection rating.

Operation is based on the XR80C electronic thermostat, which features an IP65 rating. The XR80C model is a microprocessor-based controller specifically designed for applications in the dairy industry. It is equipped with an NTC temperature sensor with IP68 waterproof rating and thermal resistance up to 110°C, two output relays for controlling the compressor and the agitator and a 3digit display with high visibility indicators. The XR80C allows for precise control of all essential functions required in milk storage tanks, including time-based agitation cycles. The instrument is fully adjustable via specific parameters programmed through the keypad.

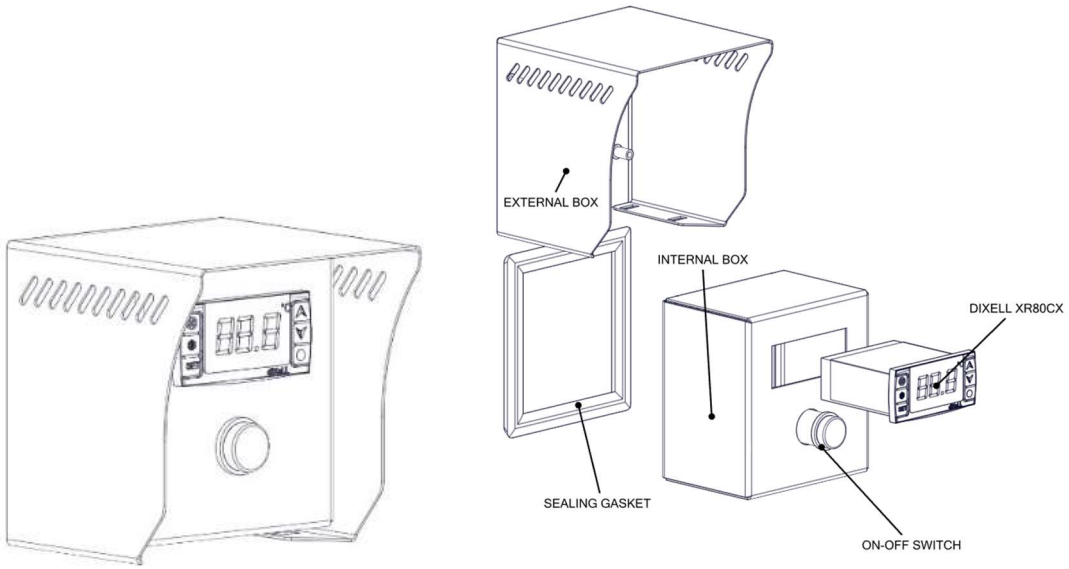


Figure 6: MPV Control Panel

Lid

The tank is covered by a robust lid that isolates the content from the surrounding environment, reducing the risk of contact and potential contamination of the milk by external factors. Each lid features an Ø200 mm hole (two holes on 2000L and 2500L models) for filling the tank and direct inspection of the content. The hole is covered by a Stainless Steel cap secured with a hinge.

Dipstick

For monitoring the milk level and calculating its quantity, all MP Vertitank models are equipped with a Stainless Steel dipstick and a calibration chart for conversion into liters or gallons.

Milk Outlet Valve

The tank outlet is available in DN50, SMS51, or Triclamp types, equipped with a Stainless Steel butterfly valve.

Optional:

The tank can be supplied without a valve upon request.

Adjustable Base

The tank base features adjustable support legs to achieve perfect leveling, even on uneven floors. Correct leveling is an essential prerequisite for the accurate measurement of milk volume.

Refrigeration Unit

A wide range of refrigeration units is available to meet the needs of every livestock farm, taking into account both the milking routine (2 or 4 milkings) and environmental conditions, as there are versions suitable for a broad range of ambient temperatures.

The units are available with European or American-made compressors.

In compliance with European Directives, MILKPLAN S.A. uses R290 refrigerant for cooling tanks with capacities up to 300L, while R454C is used for capacities from 400L to 2500L.

To ensure safe compressor operation and optimal performance of the cooling system, the refrigerant circuit is equipped with the following control and protection components:

- Solenoid valve for refrigerant flow control.
- Low-pressure switch to protect the compressor from operating outside permissible limits.
- High-pressure switch to protect the refrigerant circuit from overpressure.
- Pressure switch for the second condenser fan, featured in models MPV1250 to MPV2500.
- Capillary tube expansion system for models MPV50 to MPV1500.
- Thermostatic Expansion Valve (TXV) and liquid receiver for models MPV2000 to MPV2500.

The above components have been selected and adjusted according to the safety and functionality requirements of the cooling unit.

The cooling units feature a perforated stainless steel protective cover, which prevents small animals and foreign objects from entering the unit area without affecting compressor performance. In certain cases—where the installation or unit type does not permit it, or upon customer request—the cover is not installed. Its easy removal allows immediate access to the cooling unit for maintenance and/or repair. It is worth noting that MILKPLAN S.A. holds a patent (No. 1004080) for this perforated enclosed metal tank base.

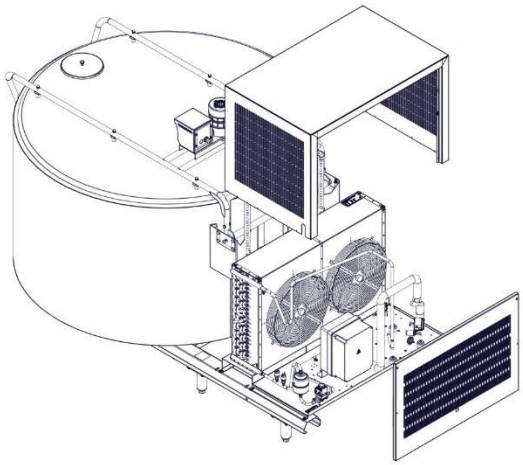


Figure 7: MPV, Refrigeration Unit and Cover.

3.2. MP Vertitank Closed (MPVC)

The MP Vertitank MPVC, a vertical closed-type milk cooling tank, consists of a milk collection and storage tank, a cooling unit, and the CIP MPVC Standard ECO washing system. It has been designed according to the same standards as the MPV series.

The available capacities for the MPVC range from 500L to 3000L.

All MPVC models, regardless of capacity, come with a pre-installed cooling unit. The cooling unit is mounted at the rear of the tank, and both the tank and the cooling unit share a common base. The layout of the tanks is shown in Figure 8, while the dimensions are provided in Table 4 in conjunction with Figure 10.

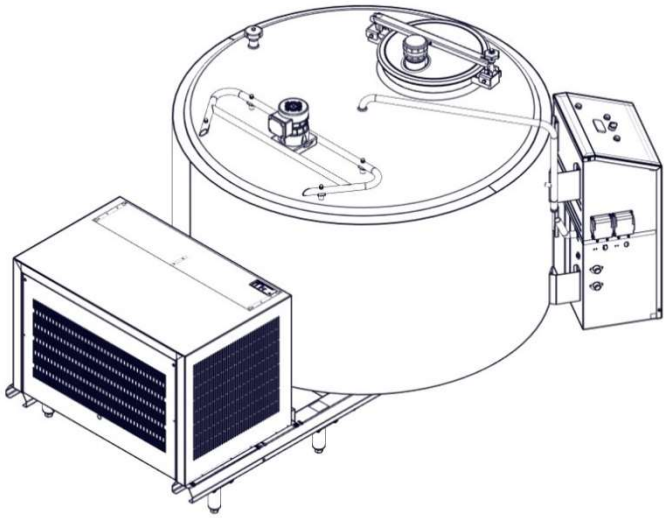


Figure 8: MP Vertitank Closed (MPVC)

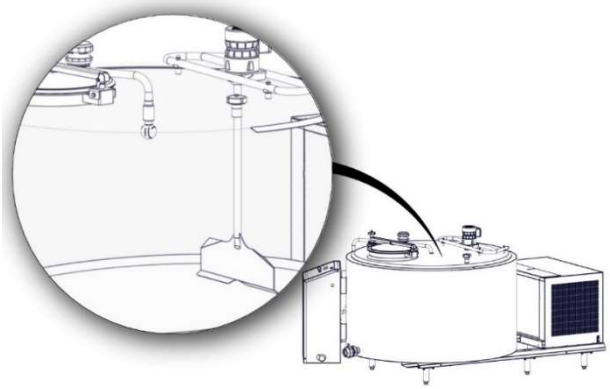


Figure 9: MP Vertitank Closed (MPVC) – Agitator & SprayBall

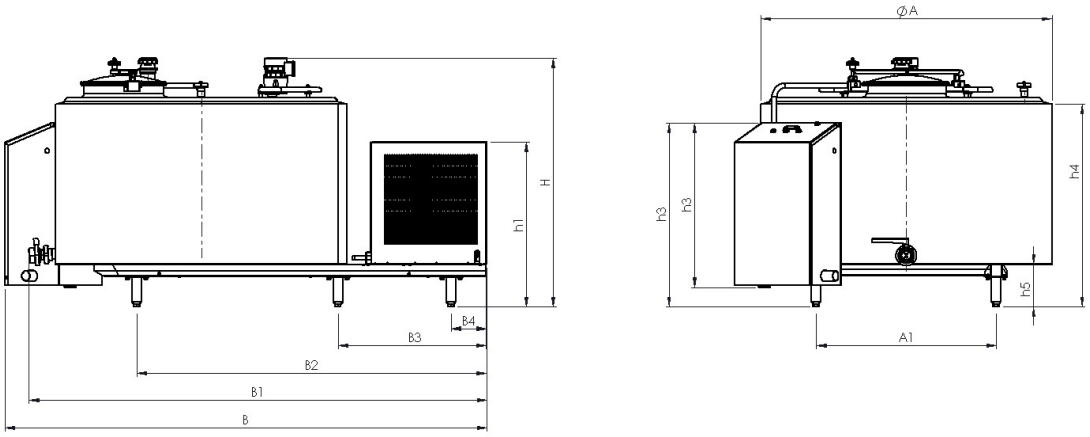


Figure 10: Dimensions MPVC 500-3000

Table 4: Dimensions MPVC 500-3000 (mm)

Type	A	A1	B	B1	B2	B3	B4	H	H1	H2	H3	H4	H5
MPVC500 2M	1090	670	1770	1585	1140	-	200	1235	765	1035	835	1035	305
MPVC500 4M	1090	670	2065	1880	1435	-	220	1235	765	1035	835	1035	305
MPVC650 2M/4M	1090	670	1770	1585	1140	-	200	1400	765	1035	835	1200	305
MPVC800 2M	1290	925	2315	2130	1610	-	220	1335	785	1035	835	1135	305
MPVC800 4M	1290	925	1965	1780	1260	-	220	1335	785	1035	835	1135	305
MPVC1000 2M	1490	925	2469	2362	1793	761	181	1361	937	1035	835	1127	305
MPVC1000 4M	1490	925	2469	2362	1793	761	181	1361	937	1035	835	1127	305
MPVC1250 2M	1490	925	2469	2362	1793	761	181	1490	937	1035	835	1127	305
MPVC1250 4M	1490	925	2469	2362	1793	761	181	1490	937	1035	835	1127	305
MPVC1500 2M	1490	925	2440	2260	1785	755	170	1595	905	1035	835	1380	305
MPVC1500 4M	1490	925	2440	2260	1785	755	170	1595	905	1035	835	1380	305
MPVC2000 2M	1840	1140	2435	2260	1685	880	210	1590	945	1035	835	1270	305
MPVC2500 4M	1840	1140	2435	2260	1685	880	210	1780	945	1035	835	1460	305
MPVC2800 4M	1840	1140	2435	2260	1685	880	210	1880	945	1035	835	1560	305
MPVC3000 4M	1840	1140	2435	2260	1685	880	210	1960	945	1035	835	1640	305

Main Components

Milk Collection and Storage Tank

The milk collection and storage tank is an insulated, double-walled vessel of circular geometry, manufactured to the same standards as the MPV tank. The key difference from the MPV model is that it does not feature a hinged lid; instead, it has a welded top head on the tank body. The MPVC tank head includes a Ø400 mm manhole for direct inspection of the interior, equipped with an insulated cover and a milk inlet pipe. The cover is secured with a specialized arm assembly (yoke). Additionally, the tank head features a water inlet pipe for the washing system, connected to a DN25 Sprayball.

Washing System

The washing system features the CIP MPVC Standard ECO, which controls the cooling and agitation functions while simultaneously providing a comprehensive five-stage washing and disinfection process. The washing system is mounted directly onto the tank body.

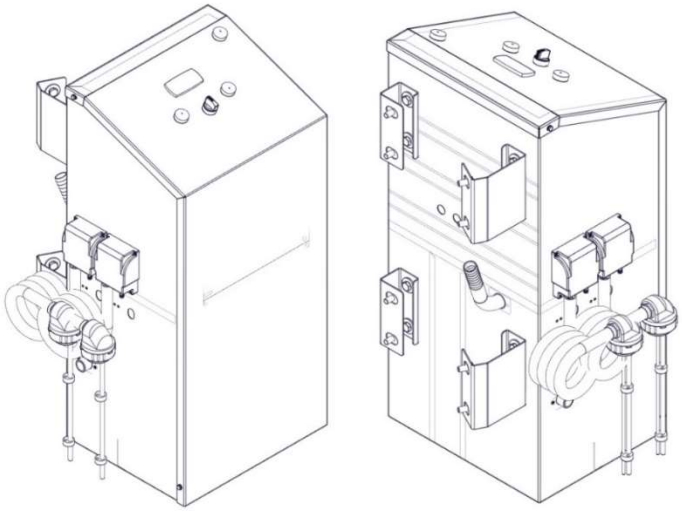


Figure 11: CIP MPVC Standard ECO

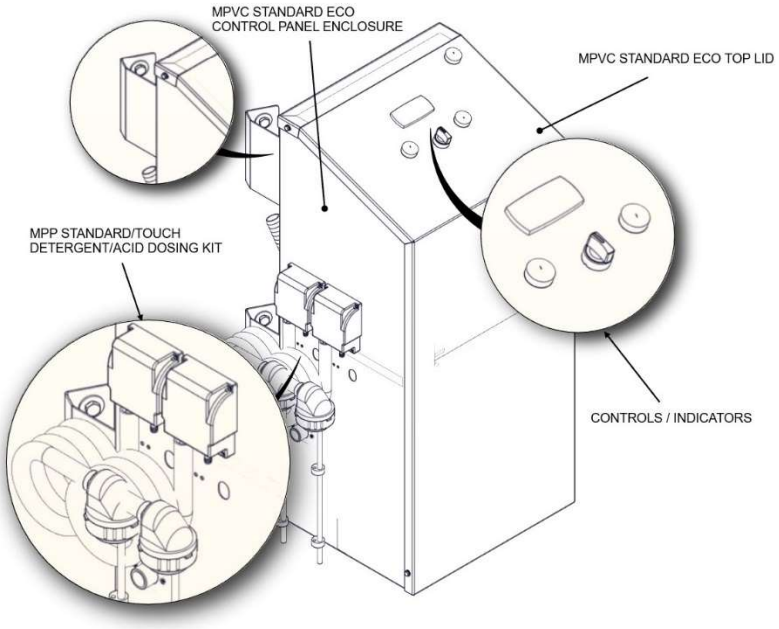


Figure 12: CIP MPVC Standard ECO, Basic External Elements

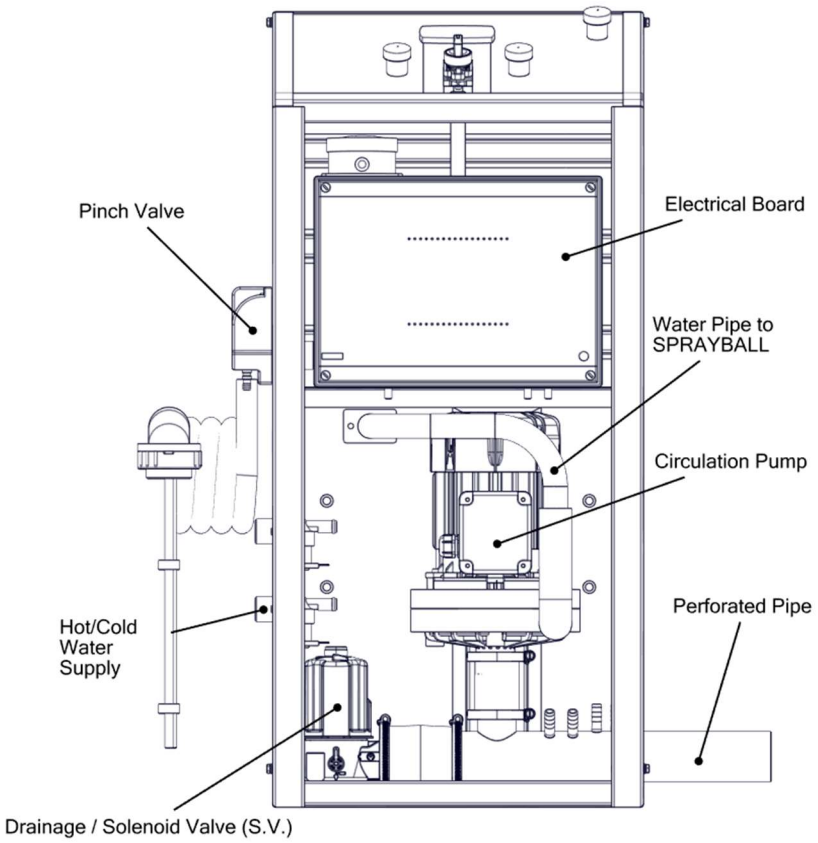


Figure 13: CIP MPVC Standard ECO, Basic Elements Internal

The Motor, Electronic Control Panel, Dipstick, Milk Outlet Valve, Adjustable Base, and Refrigeration Unit correspond to the MPV.

3.3. Operating Principle of MPV / MPVC

The milk cooling and storage machine (tank) is specifically designed to cool and preserve milk, thereby ensuring its excellent quality. Cooling and preservation must take place immediately after milk collection to minimize the risk of microbial growth or alteration of its properties during transport.

The operating principle of the **MPV / MPVC** is based on the **heat pump cycle**. This system utilizes a refrigerant medium (**R290, R454C, R449A**) which, under pressure, extracts heat from one point (tank interior/milk) and releases it to another (ambient environment). The core components of the heat pump are the **evaporator** (the bottom of the inner vessel), the **compressor**, the **expansion valve**, and the **condenser**, all of which are integrated into the cooling unit.

After milking, the milk is collected in the tank at a temperature of approximately **35°C** and must be cooled to a temperature of around **4°C**. The milk comes into contact with the bottom of the tank. The refrigerant, initially in a liquid state, is injected into the evaporator/bottom through the expansion valve and absorbs the heat from the milk. This increases its energy content, causing it to evaporate.

The compressor, connected to the evaporator outlet, compresses the gaseous refrigerant and directs it to the condenser. The condenser consists of copper piping through which the refrigerant flows and fins (**heat bridges**) that dissipate the heat. Heat dissipation is forced by the use of fans. The gaseous medium then condenses and liquefies to restart the cycle.

The use of an **agitator** ensures uniform cooling and prevents the formation of ice, as no volume of milk remains in continuous contact with the bottom at any point during the cooling cycle.

The installation manual must be carefully studied before the installation of the equipment!
All recommendations, warnings, and rules must be taken into consideration.
MILKPLAN S.A. bears no responsibility for any damages resulting from incorrect transport and unloading, as well as from misuse, improper installation, operation, or unsuitable and insufficient care and maintenance.
The installation must be performed by qualified personnel.

3.4. Labeling

Identification Plate

The manufacturer's identification plate is located in a prominent position and contains all the necessary product information. In any future communication with the supplier regarding product-related issues, reference must be made to the Serial Number (Serial No).

Figure 14: Identification Plate MPV & MPVC

Table 5: Explanation of the Identification Plate

Tank Model	MPV300
Rated Volume	300 l
Colling Performance Class	2BII
Refrigerant Type	R290
CO_2 Equivalent	0.0005t
Max. High Pressure	25 bar
Rated Voltage / Phase	230V - 1N
Power Rate	1100W
IP Rating	X4
Serial Number	
Date of Manufacture	02/2025
Weight	kg
Refrigerating Capacity	2321W
Refrigerant Charge	150 gr
Low Operation Pressure	1.5 bar
Rated Frequency	50Hz
Max Current	5A

The cooling classification defines the performance of the tank and is described by a code, e.g., 2BII. This classification is indicated on the identification plate, provided that the cooling unit is an integral part of the tank. In the event that a tank is supplied without an installed cooling unit, the cooling classification will be determined upon completion of the installation by the technician at the end-user's premises.

The cooling classification code consists of three (3) parts:

1. Number of Milkings: 2, 4, or 6 milkings.
2. Ambient Temperature during performance testing:

   A = Ambient temperature 38°C (Safe operating temperature: 43°C)
   B = Ambient temperature 32°C (Safe operating temperature: 38°C)
   C = Ambient temperature 25°C (Safe operating temperature: 32°C)

3. Time duration for cooling the milk from 35°C to 4°C:

   0 = Maximum acceptable cooling time of 2 hours
   I = Maximum acceptable cooling time of 2.5 hours
   II = Maximum acceptable cooling time of 3 hours
   III = Maximum acceptable cooling time of 3.5 hours

As an example, a cooling tank classified as 2BII refers to a 2-milking tank that can cool the specified quantity of milk within a maximum of three (3) hours.

IPX4: Protection against water splashes from any direction.

Labels

R290 Refrigerant (Flammable)

R454C Refrigerant (Flammable)

Electrical Connections

Do not use water / Avoid water contact

Grounding

Moving Parts

4. Operating Instructions for MPV & MPVC

4.1. Controller XR80CX

The control and operation of the MPV & MPVC units are performed exclusively via the DIXELL XR80CX controller equipped on the cooling tank. The XR80CX is highly versatile and allows for automatic ON/OFF management of the product.

The agitation function is factory-preset and requires no user intervention. The agitator operates continuously during the compressor's operation. Once the target cooling temperature is reached, the cooling unit stops, and the agitator enters a programmed cycle, stirring the milk for 3 minutes (IAg) every 15 minutes of standstill (Agt).

Main Features:

- User-friendly: Easy to operate.
- Precision Control: Accurate temperature management.
- Manual & Automatic Agitation: Flexibility in stirring modes.
- Full Customization: Completely programmable parameters.
- Real-time Display: Current temperature is always shown on the screen.
- Electronic Thermometer/Thermostat: Integrated dual-functionality.
- Agitation Program: Includes a built-in stirring cycle.

The XR80CX controller is shown in Figure 15, while the explanation of its button functions is provided in Table 6.

Figure 15: XR80CX Controller

On MPV models, the XR80CX controller is mounted on the motor and lid support base (Figure 16), whereas on MPVC models, it is located on the front panel of the washing system.

Figure 16: Control Panel MPV, XR80CX & Button On/Off

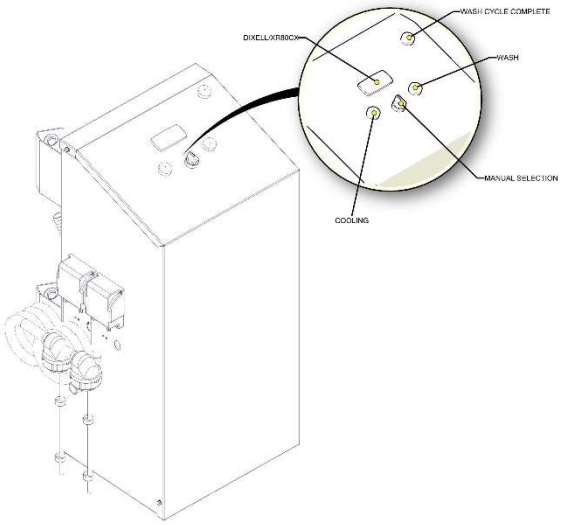


Figure 17: Control Panel MPVC

The 3-position selector switch is used to select the operating mode:

- Cooling (Left Position)
- Washing (Right Position)
- System Shutdown / OFF (Center Position).

Table 6: Control Buttons XR80XC

Buttons	Operation
SET	Set Point
	Differential
▲	Min. Set Point
▼	Max. Set Point
	Sensitivity

4.2. Important Operations

1. Activate the tank. Do not switch off the tank as long as it contains milk.
2. Switch off the tank when you intend to empty it.
3. If you need to take a milk sample while the agitator is in its 15-minute standby (pause) mode, press and hold the button for 3 seconds to start the agitator manually. This ensures that the sample is homogeneous.
4. During winter, if the ambient temperature drops below 4°C, the tank will not start. It is necessary to pour warm milk into the tank and wait a few minutes until the cooling unit activates.

4.3. Operating Parameters

The operating parameters are presented in Table 7.

Table 7: Parameters XR80XC / XR80XC Default setting values

Label	Name	Range	Value
SEt	Set Point	LS÷US	4,0
Hy	Differential	0,1÷25,5 °C 1÷255 °F	2,0
LS	Minimum set point	-50 °C÷SET -58 °F÷SET	1.0
US	Maximum set point	SET÷150 °C SET÷302 °C	5.0
SrS	Second Set Point	SET to US	15.0
Srt	Compressor off time with SrS set Point	0÷255 min	0
ot	Thermostat probe calibration	-12 °C÷12 °C -120 °C÷120 °C	-0,5
odd	odS Operating mode	0-2	0
odS	Outputs delay at start up	0÷255 min	0
AC	Anti-short cycle delay	0÷50 min	1
Con	Compressor ON time with faulty probe	0÷255 min	15
CoF	Compressor OFF time with faulty probe	0÷255 min	30
CF	Temperature measurement units	°C÷°F	OC
rES	Resolution	In÷dE	dE
AgC	Agitator configuration	EL=with compressor in=independent	EL
tiC	Resolution for the Agt parameter	nP: minutes Pb: seconds	nP
iAg	Interval between agitation cycle	1÷120 min	15
Agt	Length for agitation cycle	0÷255 min	3
APo	First agitation cycle after startup	n:immediately y=after IAg	y
ALC	Temperature alarms configuration	rE÷Ab	Ab
ALU	Maximum temperature alarm	ALL÷150 °C ALL÷302 °F	100
ALL	Minimum temperature alarm	-50.0 °C÷ALU -58 °F÷ALU	-50
ALd	Temperature alarm delay	0÷255 min	15
dAo	Delay of temperature alarm at start up	0÷23h & 50 min	1,3
I1P	Digital input 1 polarity	oP(0): CL(1)	CL
Adr	Serial address	1 to 247	1
PbC	Probe selection	Ptc÷ntc	ntc
Srt	Initial regulation time	0÷59min	0
SrS	Initial regulation Set point	-55,0 °C÷150,0 °C	15
onF	On/Off key Configuration	Nu(0): OFF(1); ES(2)	nu
rEL	Software release	-	3,0
Ptb	Map code	-	2
	Hidden parameters		

Parameter Explanation

Settings

Differential (Hy): The temperature difference from the Set Point. The compressor starts when the temperature reaches the Set Point + Differential (Hy). The compressor stops operating once the temperature reaches the Set Point (Set).

Minimum Set Point (LS): Defines the minimum acceptable value for the target temperature (Set Point).

Maximum Set Point (US): Defines the maximum acceptable value for the target temperature (Set Point).

Thermostat Calibration (Ot): Allows the adjustment of any possible offset of the temperature probe.

Start-up Delay (OdS): This function is activated upon the initial power-up of the controller and inhibits any output activation for the pre-defined time period.

Anti-short Cycle Delay (AC): The minimum time interval between the compressor's shutdown and its subsequent restart.

Compressor ON time with faulty probe (COn): The duration for which the compressor remains active in the event of a probe failure. If COn=0, the compressor remains permanently OFF.

Compressor OFF time with faulty probe (COF): The duration for which the compressor remains inactive in the event of a probe failure. If COF=0, the compressor remains permanently ON.

Display indications

Temperature Measurement Unit (CF): °C = Celsius/°F = Fahrenheit.

When the measurement unit is changed from °C to °F (or vice versa), the SET point value and the values of parameters Hy, LS, US, Ot, ALU, and ALL must be checked and modified if necessary.

Resolution (rES) for °C / In = 1°C, dE = 0.1 °C: This parameter enables the decimal point display. It determines whether the temperature will be displayed as an integer or with decimal precision.

Agitation Cycle

Agitator Operation (AgC):

- EL Selection: Agitator activation and deactivation based on compressor status.
- in Selection: Activation according to parameter IAg.

Agt tIC Parameter Analysis:

- nP: Parameter Agt is set in minutes.
- Pb: Parameter Agt is set in seconds.

IAg Time interval between agitation cycles: Defines the time interval between the start of two consecutive agitation cycles.

When a continuous agitation cycle begins, the timer is reset and starts from zero.

Agitation Cycle Duration (Agt): Defines the duration of the stirring cycle.

1st Agitation cycle after Startup (APO): Determines the first agitation cycle after the unit is powered on: (y = Immediate start, n= Start after the lag time interval elapsed)

Alarms & Warnings

Temperature Alarm Configurator (ALc): This alarm sets the temperature parameters for alarm activation:

- Ab: This alarm activation is defined by the absolute temperature values of ALL or ALU.
- rE: This alarm is linked to the set point (SET). The alarm is triggered when the temperature exceeds the limits "SET+ALU" or "SET-ALL".

Maximum Temperature Alarm (ALU): The alarm is activated when this temperature is reached, following the alarm delay period (ALd).

Minimum Temperature Alarm (ALL): The alarm is activated when this temperature is reached, following the alarm delay period (ALd).

Alarm Delay (ALd): The time interval between the detection of an alarm condition and the actual alarm signaling.

Temperature Alarm Delay at Startup (dAO): The time interval between the detection of an alarm condition and the alarm signaling during the initial power-on (startup) of the device.

Miscellaneous Parameters

Sensor Selection (PbC): Allows the selection of the sensor type.

Software Version (rEL): For internal use only.

Parameter Map Code (Ptb): Read-only parameter.

Checking and Configuring Basic Parameters (XR80XC)

1. Power On: After powering on the tank, a dashed line appears on the display, followed immediately by the ambient temperature of the tank's location.
2. Access Menu: Press and hold the SET key and the down arrow (▼) simultaneously for at least 7 seconds.
3. Initial Display: The indication **Hy** will appear.
4. Access Advanced Menu (Pr2): Repeat step 2 by holding both keys (SET and ▼) again for 7 seconds until the indication **Pr2** appears.
5. View Hy Value: Press the SET key; the current value for **Hy** (e.g., 2.0 °C) will be displayed.
6. Navigate to LS: Press the SET key again until the indication **LS** appears.
7. Set Minimum Temperature: Press SET and use the arrows (▲▼) to define the minimum operating temperature. Factory set at 1.0 °C.
8. Save Setting: Press the SET key again. The display will flash three times, indicating that the selected temperature has been saved.

9. Set Maximum Temperature (US): Immediately after, the parameter **US** appears. Press SET and use the arrows (▲▼) to define the maximum operating temperature. Factory set at 4.0 °C.
10. Save Setting: Press the SET key; the display will flash three times, confirming the value is saved.
11. Adjust Sensor Calibration (Ot): Immediately after, the parameter **Ot** appears, which adjusts the electronic sensitivity (offset). Press SET and use the arrows (▲▼) to set the desired value. Press SET again; the display flashes three times to confirm storage. Factory set at 0.5 °C.

Checking the Factory Set-point

1. Press and immediately release the SET key; the stored value will appear on the display.
2. Press and release the SET key again, or wait for 3 seconds to return to the normal display showing the milk temperature inside the tank (as measured by the sensor).

Changing the Factory Set-point

1. Press and hold the SET key for more than 3 seconds to initiate the set-point change.
2. The current value will appear on the display, and the °C icon in the upper right corner will begin to flash.
3. To change this value, use the up/down arrows (▲▼).
4. To store the new value, press the SET key or wait for 15 seconds for the system to save and exit automatically.

Manual Start of the Agitation Cycle

Press and hold the for more than 3 seconds to start the stirring cycle manually.

Checking Minimum Temperature (Low Peak)

1. Press and release the down arrow (▼).
2. The message "**Lo**" will appear on the display, followed by the minimum stored temperature.
3. Press the down arrow (▼) again or wait for 5 seconds to return to the normal temperature display.

Checking Maximum Temperature (High Peak)

1. Press and release the up arrow (▲).
2. The message "**Hi**" will appear on the display, followed by the maximum recorded temperature.
3. Press the up arrow (▲) again or wait for 5 seconds to return to the normal temperature display.

Parameter Modification

1. Enter the programming mode by pressing the SET and down arrow (▼) keys simultaneously for 7 seconds. The **°C** indicator in the upper right corner will begin to flash, signaling that you are in the programming menu.
2. Select the required parameter: Use the arrows (▲▼) to navigate to the desired parameter.
3. View value: Press the SET key to display the current value of the parameter (the °C icon in the upper right corner will begin to flash).
4. Modify value: Use the arrows (▲▼) to change the value of the selected parameter.
5. Save and move next: Press the SET key to store the new value and proceed to the next parameter.
6. Exit: To exit the programming mode, press SET + up arrow (SET & ▲) simultaneously, or wait for 15 seconds without pressing any key.

Modifying Hidden Parameters

1. Enter Programming Mode: Press and hold the SET and down arrow (▼) keys simultaneously for 7 seconds (the **°C** icon in the upper right corner will begin to flash).
2. Access Hidden Menu (**Pr2**): Press the SET and down arrow (▼) keys simultaneously again for another 7 seconds until the Pr2 label is momentarily displayed. The parameter list will now include advanced settings that were not visible during the first stage.
3. Select Parameter: Use the arrows (▲▼) to navigate and select the required parameter.
4. View Value: Press the SET key to display the current value of the parameter.
5. Modify Value: Use the arrows (▲▼) to change the parameter's value.
6. Save and Advance: Press the SET key to store the new value and move to the next parameter.
7. Exit: To exit, press SET + up arrow (▲) simultaneously, or wait for 15 seconds without pressing any keys.

Keyboard Lock

1. Press and hold the up and down arrows (▲▼) simultaneously for more than 3 seconds.
2. The message "**POF**" will appear on the display, and the keyboard will be locked. In this state, you can only view the maximum and minimum stored temperatures.
3. If any key is pressed for more than 3 seconds while the keyboard is locked, the "**POF**" message will be displayed again.

Keyboard Unlock

Press and hold the up and down arrows (▲▼) simultaneously for more than 3 seconds and the keyboard will unlock immediately.

LED Indicators (Description)

°C/°F	Steady on: Normal operation.
	Flashing: Programming mode.
	**Steady on:** Compressor is running.
	Flashing: Programming phase or cycle delay activation.
	**Steady on:** Agitator is running.
	Flashing: Start-up activation delay (**ods** non-zero value).
	**Steady on:** Fans enabled (or Fans running).
	Flashing: Fan delay; Defrost in progress.
	**Steady on:** Fault / Alarm condition.
	**Steady on:** Continuous cycle in progress.
	**Steady on:** Energy saving active.
	**Steady on:** Light on.

4.4. Display Messages

- **EE**: Memory Error. The instrument is equipped with an internal check to verify memory integrity. This message appears when an error is detected in the internal memory. Contact the authorized service provider immediately.
- **P1**: Probe Failure. Fault in the sensor operation. The compressor will operate according to the settings in parameters Con and COF. The message starts flashing a few seconds after the malfunction is detected and clears automatically once normal operation resumes. Check all connections before replacing the sensor.
- **HA**: High Temperature Alarm. Maximum temperature limit exceeded. The message stops flashing once the temperature returns to normal levels or when a defrost cycle starts.
- **LA**: Low Temperature Alarm. Minimum temperature limit exceeded. The message stops flashing once the temperature returns to normal levels or when a defrost cycle starts.

4.5. CIP MPVC Standard ECO

Cooling & Agitating Operation

The control and operation of the cooling and agitating functions are described in the MPV & MPVC Operating Instructions section of this document. To start the cooling operation, turn the three-position selector switch to the "COOLING" position left.

Washing Operation

To start the washing operation, turn the selector switch to the "WASH" position right.

The washing cycle is controlled by a PLC (Programmable Logic Controller) located inside the Electrical Control Panel (Figure 18).

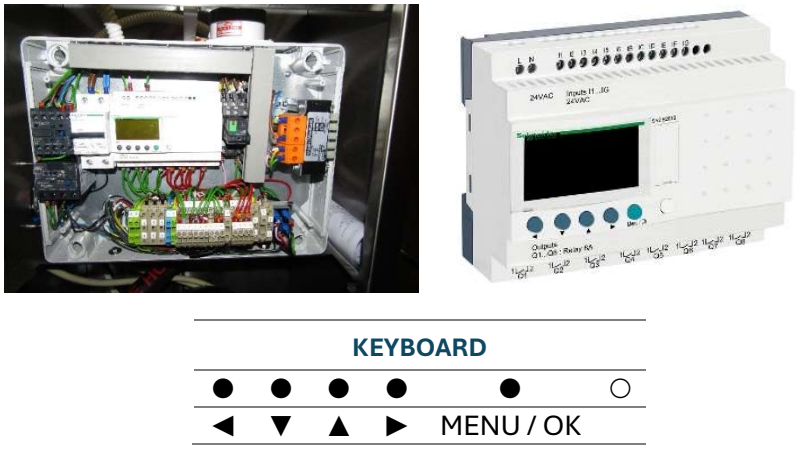


Figure 18: Electrical control panel & PLC

Washing Programs

There are two washing programs available: 5-Cycle and 7-Cycle.

In the 5-Cycle program (Figure 19), the main wash is performed using only alkaline detergent. In the 7-Cycle program (Figure 20), in addition to the alkaline wash, a hot water rinse cycle and an acid wash cycle are included.

The execution sequence of these programs is determined by PLC parameter B101. The factory default value for B101 is set to 3 (three).

Main Wash Sequence (Parameter B101):

In terms of the main wash, the value 3 (Parameter B101) is defined as:

An acid wash is performed after three (3) consecutive alkaline washes.

Washing Program Sequence:

In terms of "Washing Programs," this translates to:

The execution sequence consists of two (2) iterations of the 5-Cycle Program followed by one (1) iteration of the 7-Cycle Program.

The flow chart based on parameter B101 is shown in Figure 21.

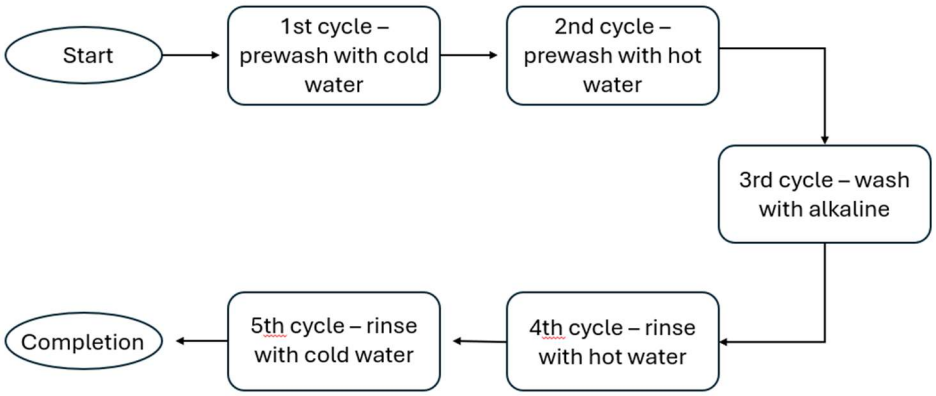


Figure 19: 5-Cycle Program Flow Chart

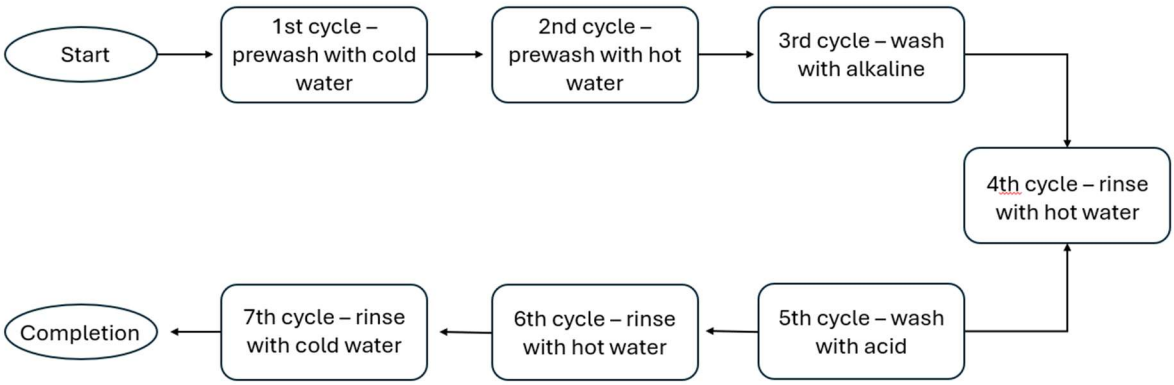


Figure 20: 7-Cycle Program Flow Chart

5-Cycle Program

1st Cycle – Cold Water Pre-rinse

Stage 1: The cold water valve is activated for a preset duration, supplying water to the tank.

Stage 2: Upon deactivation of the cold water valve, the recirculation pump (circulator) and the agitator motor are activated for a preset duration to wash the tank walls.

Stage 3: Upon deactivation of the water pump, the drain valve is activated for a preset duration.

The cycle is completed when the drain valve is deactivated.

2nd Cycle – Hot Water Pre-rinse

Stage 1: The hot water valve is activated for a preset duration, supplying water to the tank.

Stage 2: Upon deactivation of the hot water valve, the recirculation pump and the agitator motor are activated for a preset duration to wash the tank walls.

Stage 3: Upon deactivation of the water pump, the drain valve is activated for a preset duration.

The cycle is completed when the drain valve is deactivated.

3rd Cycle – Alkaline Wash

Stage 1: Simultaneous activation of the hot water valve and the alkaline peristaltic pump for a preset duration.

Stage 2: Upon deactivation of the hot water valve, the recirculation pump and the agitator motor are activated for a preset duration to wash the tank walls.

Stage 3: Upon deactivation of the water pump, the drain valve is activated for a preset duration.

The cycle is completed when the drain valve is deactivated.

4th Cycle – Hot Water Rinse

Same operation as the 2nd Cycle.

5th Cycle – Cold Water Rinse

Same operation as the 1st Cycle.

7-Cycle Program

1st Cycle – Cold Water Pre-rinse: As described in the 1st Cycle of the 5-Cycle Program.

2nd Cycle – Hot Water Pre-rinse: As described in the 2nd Cycle of the 5-Cycle Program.

3rd Cycle – Alkaline Wash: As described in the 3rd Cycle of the 5-Cycle Program.

4th Cycle – Hot Water Rinse: As described in the 2nd Cycle of the 5-Cycle Program.

5th Cycle – Acid Wash:

Stage 1: Simultaneous activation of the hot water valve and the acid peristaltic pump for a preset duration.

Stage 2: Upon deactivation of the hot water valve, the recirculation pump (circulator) and the agitator motor are activated for a preset duration to wash the tank walls.

Stage 3: Upon deactivation of the water pump, the drain valve is activated for a preset duration.

The cycle is completed when the drain valve is deactivated.

6th Cycle – Hot Water Rinse: As described in the 4th Cycle of the 5-Cycle Program.

7th Cycle – Cold Water Rinse: As described in the 5th Cycle of the 5-Cycle Program.

The preset durations for each stage of a cycle are presented in Table 11.

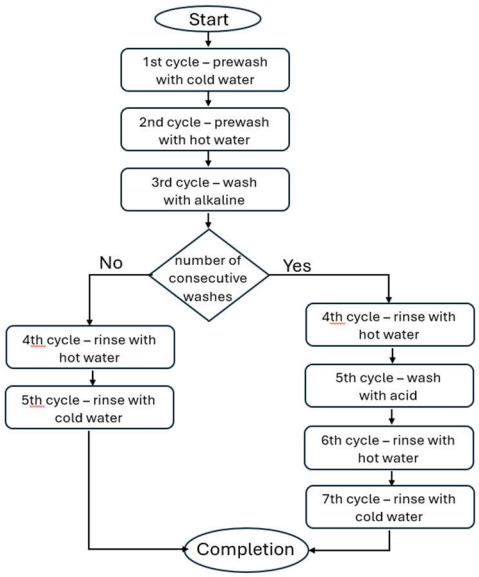


Figure 21: Flow Chart based on B101 parameterization

The controller (PLC) provides a series of manual functions, allowing the user to verify the correct operation of the primary washing process components. The user can press the buttons located on the PLC to activate the peristaltic pumps and the drain valve, as described in Table 8.

All manual functions can only be activated during the water filling stage of the tank (the first phase of each cycle).

Table 8: PLC Manual Control Functions

Function	PLC Button
Manual Operation: Alkaline Peristaltic Pump	◀
Manual Operation: Acid Peristaltic Pump	▼
Manual Operation: Sanitizer Peristaltic Pump	▲
Manual Operation: Drain Valve	▶

Table 9: Control and Parameter Configuration

Parameter Configuration	PLC Button
Enter MENU	MENU / OK
Select "PARAMETERS" command	▼ ▲
Confirm	MENU / OK
Search Parameter	▼ ▲
Select Parameter to configure	▶
Change Parameter value	▼ ▲
Confirm new value	◀
Confirm / Exit to MENU	MENU / OK
Confirm / Exit	MENU / OK

Table 10: Parameter Coding

Cycle	Cycle Stage	Parameters V6.1
1st Cycle	Cold Water	B116
	Water Circulation	B002
	Drain	B003
2nd Cycle	Hot Water	B117
	Water Circulation	B006
	Drain	B007
3rd Cycle	Hot Water	B119
	Water Circulation	B010
	Drain	B011
4th Cycle	Hot Water	B121
	Water Circulation	B014
	Drain	B015
5th Cycle	Cold Water	B124
	Water Circulation	B018
	Drain	B019
	Alkaline	B075
	Acid	B107
Optional	Sanitizer	B128
	Program Logic with Alkaline/Acid Wash Ratio (Washing Program Sequence)	B101

Table 11: Washing Cycle Durations

Parameters V6.1			MPVC500	MPVC650	MPVC 800	MPVC 1000	MPVC 1500	MPVC 2000	MPVC 2500	MPVC 3000
1st Cycle	Cold Water	B116	02:00	02:00	02:00	03:00	03:00	03:00	03:00	04:00
	Water Circulation	B002	03:00	03:00	03:00	03:00	03:00	03:00	03:00	03:00
	Drain	B003	02:00	02:00	02:00	02:00	02:00	02:00	02:00	02:00
2nd Cycle	Hot Water	B117	02:00	02:00	02:00	03:00	03:00	03:00	03:00	04:00
	Water Circulation	B006	03:00	03:00	03:00	03:00	03:00	03:00	03:00	03:00
	Drain	B007	02:00	02:00	02:00	02:00	02:00	02:00	02:00	02:00
3rd Cycle	Hot Water	B119	02:00	02:00	02:00	03:00	03:00	03:00	03:00	04:00
	Water Circulation	B010	07:00	07:00	07:00	07:00	07:00	07:00	07:00	07:00
	Drain	B011	02:00	02:00	02:00	02:00	02:00	02:00	02:00	02:00
4th Cycle	Hot Water	B121	02:00	02:00	02:00	03:00	03:00	03:00	03:00	04:00
	Water Circulation	B014	03:00	03:00	03:00	03:00	03:00	03:00	03:00	03:00
	Drain	B015	02:00	02:00	02:00	02:00	02:00	02:00	02:00	02:00
5th Cycle	Cold Water	B124	02:00	02:00	02:00	03:00	03:00	03:00	03:00	04:00
	Water Circulation	B018	03:00	03:00	03:00	03:00	03:00	03:00	03:00	03:00
	Drain	B019	02:00	02:00	02:00	02:00	02:00	02:00	02:00	02:00
	Alkaline	B075	00:40	00:40	00:40	00:50	00:50	00:50	00:50	01:00
	Acid	B107	00:40	00:40	00:40	00:50	00:50	00:50	00:50	01:00
	Sanitizer	B128	00:40	00:40	00:40	00:50	00:50	00:50	00:50	01:00
Optional	Program Logic with Alkaline/Acid Wash Ratio (Washing Program Sequence)	B101	3	3	3	3	3	3	3	3

5. Warranty Contitions

The company provides a warranty for proper operation lasting one (1) year for all electromechanical parts of the device and five (5) years for stainless steel parts, covering cases of corrosion and leaks in the evaporator.

The warranty covers all components of the milk cooling tank, excluding the compressor, and refers exclusively to the value of the spare parts, not the cost of replacement labor or repair. The warranty period begins on the date of the equipment's delivery document. The warranty is valid only if the defective part is returned to the company.

Upon receipt of the product, the purchaser must immediately inspect the device for any defects or damage that may have occurred during transportation and notify Milkplan in writing without delay.

Spare parts under warranty are shipped to the customer at the company's expense, while the shipment of defective parts to the company is borne by the customer. The transport of the device for technical inspection or repair is carried out at the owner's responsibility and expense.

Exclusions

The warranty does not apply in cases of:

- Misuse or negligence.
- Natural wear and tear or physical damage (e.g., drops or impacts).
- Natural disasters (e.g., flood, fire).
- Problems caused by electrical fluctuations/disturbances or improper installation.
- Intervention or repairs by an unauthorized technician.

Upon delivery, the buyer must inspect the device for any transport damage and notify the company in writing without delay.

Operating Voltage

- 230V ± 5%, 50/60Hz
- 230/400V ± 5%, 50Hz
- 120V ± 5%, 50/60Hz.