DCS Control Solutions for Farm Dairies

Dairy Cooling Solutions

A Division of Eurotec Limited

Tradition meets Technology

- **Maximise Refrigeration Plant Capacity and Efficiency**
- **Reduce Plant Operating Costs**
- **Reduce Milk Temperatures Faster (and improve Milk Quality)**

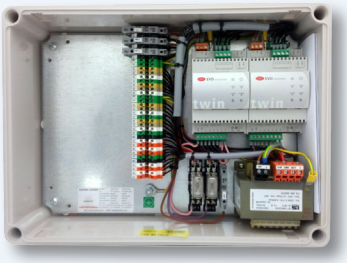
EUROTEC People • Technology • Solutions
HVAC • Refrigeration • Electrical • Measurement

Eurotec has been building and supplying Control Panel Solutions to the Refrigeration industry since 2008. Since then we have become a leading manufacturer and supplier of Refrigerated Milk Vat control panels to the dairy sector controlling the refrigeration system(s), pumps and CIP functions as well as Condensing Unit control panels for OEM's, custom control panels for Refrigeration Racks, Chillers and a variety of commercial refrigeration applications.

In 2012 the Control Panel Solutions division (CPS) was established to reflect the growing control panels business and we now supply Control Panel Solutions to the Refrigeration, HVAC and Electrical markets.
CPS is supported by the wealth of industry and application knowledge that has been synonymous with Eurotec for 30 years.

This dairy sector booklet contains details on the latest solutions to help meet the new milk cooling requirements which take effect from the 1st of August 2016.

Milk Vat Control Panel with viewing window as standard



Electronic expansion valve panels for milk tank upgrades

Changes to NZCP1: Operation Code for the Design and Operation of Farm Dairies

This code of practice is recognised and has been assessed to be a valid and appropriate means of partially fulfilling the requirements of a risk management programme for farm dairies.
The Ministry of Primary Industries (MPI) have reviewed this code of practice and in particular the cooling requirements for raw milk. The proposed changes are to help the NZ dairy industry meet the requirements and standards of new and existing export/import markets.

One of the main focus areas is around the faster cooling of raw milk post harvest. The code of practice suggests farm dairy operators should be targeting to cool their milk more effectively than these requirements to ensure the quality of milk is maintained.

The following is an extract from section 5.14, 5.15, 5.16 Milk Cooling NZCP1: Operational Code for the Design and Operation of farm dairies 1st December 2015. The full document can be reviewed at:
http://www.foodsafety.govt.nz/elibrary/industry/dairy-nzcp1-design-code-of-practice/amdt-2.pdf

5.14 Milk Cooling

(1) Raw milk grows bacteria rapidly above 7˚C. Therefore, adequate milk cooling is essential for ensuring quality milk is supplied. The following time/temperature requirements are a minimum standard for the cooling of milk. Farm Dairy Operators should be striving to cool their milk more effectively than these requirements.

(2) Unless used immediately for further processing, milk must be:

a. Primary cooled after filtering, refer to clause 11.1 General for further primary cooling requirements;
b. Cooled to 18˚C or less at the completion of the first milking into the bulk milk tank, and should not exceed 13°C at the completion of subsequent milkings; or
c. Cooled to and maintained at 7˚C or below within 3 hours of the completion of milking and kept at or below 7˚C until it is collected or the next milking.

(3) In the case of automatic milking systems (robotic) milk must be cooled to 7°C immediately after harvesting and held at 7°C or below until collection.

(4) Documented milk cooling checks must be carried out at least twice per season to demonstrate compliance to the above standards. Corrective action must be taken if these standards are not being met at any time.

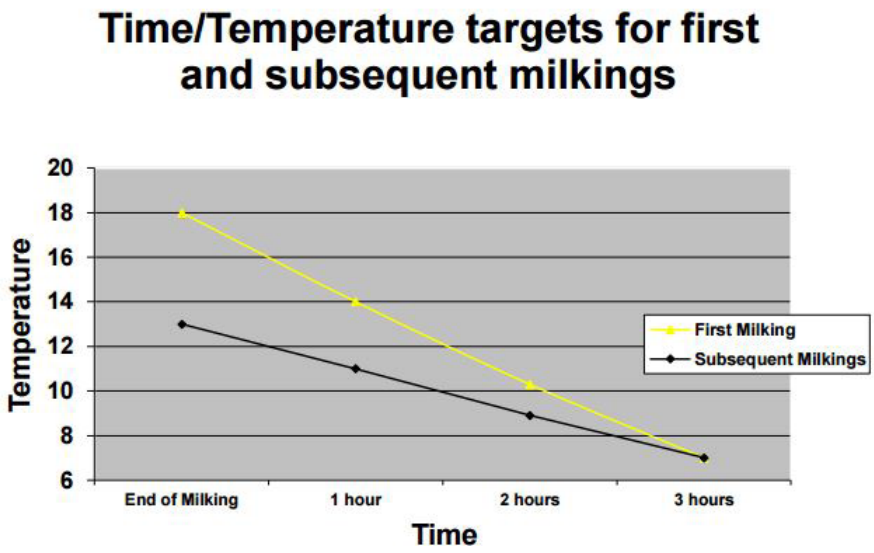
(5) The following milk cooling curve can be used as a guide for compliance for the first milking, and subsequent milkings into the vat.

(6) It is recommended that the temperature of the milk be maintained at 4˚C to 5˚C.

(7) Any system that can be demonstrated to be capable of meeting the regulatory and company's requirements for cooling is acceptable. A record of milk temperature at collection or use must be available for independent confirmation.

Reference:
Ministry of Primary Industries. NZCP1: Operational Code for the Design and Operation of Farm Dairies, 1 December 2015

Figure 1: Milk Cooling Curve



5.15 New Milk Cooling Standards

(1) The following raw milk cooling standards apply as of the applicable commencement date in clause 5.15.1 Implementation Date.

(2) Raw milk must:

a. be cooled to 10ºC or below within four hours of the commencement of milking; and

b. be cooled to 6ºC or below within the sooner of:

i. six hours from the commencement of milking, or

ii. two hours from the completion of milking; and

c. be held at or below 6ºC without freezing until collection or the next milking; and

d. must not exceed 10ºC during subsequent milkings.

(3) In situations where there is continuous or extended milking, such as automated milking systems, the milk must enter the bulk milk tank at 6°C or below. "Continuous or extended milking" is defined as milking for six hours or longer from the time that milk first enters any bulk milk tank.

5.15.1 Implementation Date

(1) From 1 August 2016 farm dairies that are:

a. new; or

b. undergoing any significant change to the secondary milk cooling system

must meet the milk cooling requirements set out in clause 5.15(2).

(2) From 1 June 2018 all farm dairies must meet the milk cooling requirements set out in clause 5.15(2).

(3) Consideration should be given to improving the cooling performance of existing equipment, and to technology options that improve existing equipment performance. New technology options must meet the requirements of this Code directly and be acceptable to the RMP Operator/Dairy Company.

(4) It is recommended that Farm Dairy Operators contemplating an upgrade to primary cooling or secondary bulk milk tank refrigeration discuss options with their dairy company, farm dairy assessor, refrigeration supplier, or the Energy Efficiency and Conservation Authority (EECA) before committing capital.

Reference:

Ministry of Primary Industries. NZCP1: Operational Code for the Design and Operation of Farm Dairies, 1 December 2015

5.16 Milk Cooling Performance Monitoring

5.16 Milk Cooling Performance Monitoring

(1) From 1 August 2016 the periodic confirmation of milk cooling performance must be undertaken to confirm that the milk cooling system is meeting the requirements under clause 5.14 Milk Cooling, or clause 5.15 New Milk Cooling as follows:

a. Farm Dairy Operators must have records to confirm that milk cooling requirements are being met to confirm the capability of milk cooling equipment. Milk cooling performance should bemonitored monthly, but as a minimum must be monitored and recorded:
   - **i.** about the time of expected peak milk production; and
   - **ii.** in February.

b. Each performance check must cover at least two consecutive milking's, and the records must include:
   - **i.** the temperature of milk in each bulk milk tank immediately prior to the start of milking (if there is any);
   - **ii.** the time that milking starts;
   - **iii.** the time that milking is completed;
   - **iv.** the temperature of the milk in the bulk milk tank at the completion of milking; and
   - **v.** the time that the milk is confirmed to meet the requirements of clause 5.14 Milk Cooling, or clause 5.15(2)(a) and (b) New Milk Cooling, whichever is applicable.

(2) Temperature measurements and recording can be accomplished using:

a. an electronic monitoring system;
b. a chart recorder;
c. a "tiny tag" or similar temperature logging device;
d. manual measurements using an electronic thermometer (non-glass); or
e. any other equivalent method.

(3) The accuracy of the temperature measurement device must be known as the data collected is an official record.

5.16.1 Failure to meet milk cooling requirements

(1) Action must be taken to correct milk cooling performance should the information collected show that milk is not being cooled within the required parameters. In such cases the milk cooling performance checks described above must be repeated to confirm compliance with the milk cooling requirements. Where any equipment upgrade is contemplated, it is recommended that the farm dairy assessor or dairy company is consulted before committing to capital expenditure.

5.16.2 Electronic monitoring systems

(1) Where electronic monitoring systems are installed it is recommended that such systems be capable of holding delivery line and bulk milk tank temperature data for a minimum of 30 days for both milk and CIP solutions.

Reference:

Ministry of Primary Industries. NZCP1: Operational Code for the Design and Operation of Farm Dairies, 1 December 2015

Electrical Control Panels for Refrigerated Milk Vats

Features:
IP65 Lockable Main Enclosure. Metal Tagged lock supplied.
Pre-wired back to terminal block
Electrical controls mounted in internal enclosure
Multifunction switch > PUMP - IPC - OFF - REF1 - REF2
IPC timer adjustable from 0 secs - 10hrs, set to 10 minutes
IPC start push button
Agitator control relay included
Carel IR33 Series Controller
6 meter special vat probe included
Dual Controller option available (p/n IR33DAIRYPANEL2CW)
Wiring Diagram Included
Application Sheet & Parameters Guide included
External Viewing Window
Milk Document Clip

Product Codes: **IR33DAIRYPANELW** Single Milk Vat **IR33DAIRYPANEL2CW** Dual Milk Vat

Refrigeration Control Technology from Carel & Eurotec

Milk Vat Control Panel - Single with viewing window as standard
(provides enhanced visibility of the system status)

Panel Configurations:

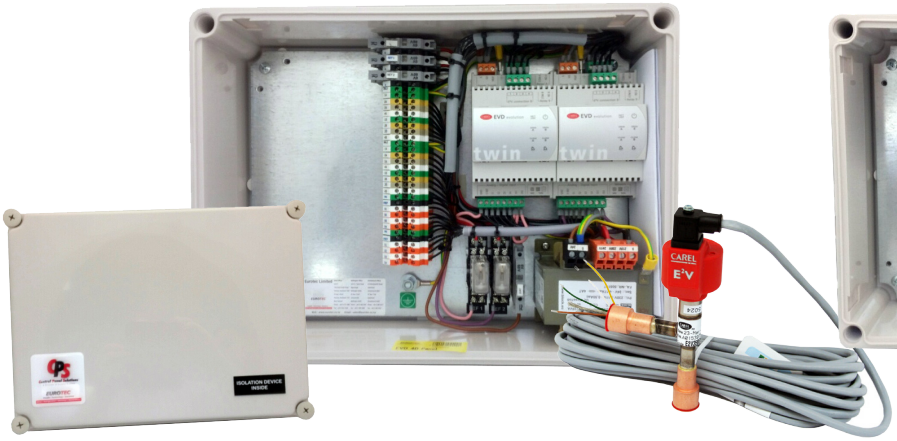
- DCS offers a range of configurations which can be fitted into the standard enclosure
- Alternatively these options can be supplied as stand alone solutions.

Milk Vat Dual Panel - Small

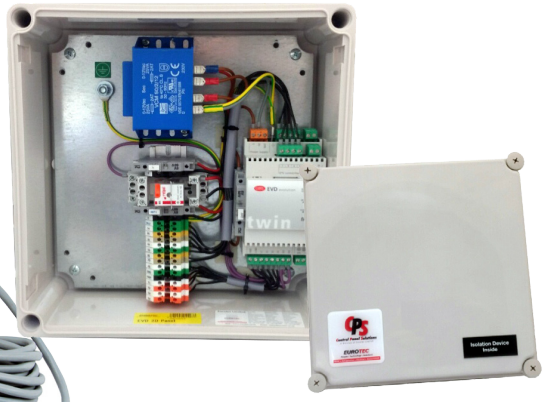
Single Panel Vertical - Small

Single Panel Horizontal - Small

Control Panels for Electronic Expansion Valves



EVD 4D Panel: 4 x EEV Valve Driver Dairy Panel



EVD 2D Panel: 2 x EEV Valve Driver Dairy Panel

Refrigeration Control Technology from Carel & Eurotec

- **Maximises Refrigeration Plant Capacity and Efficiency**
- **Reduces Plant Operating Costs**
- **Faster Cooling of Milk**

HOW?

Replacement of the traditional (and old technology) Thermostatic Expansion Valves (TEV's) with Carel ***Electronic Expansion Valves (EEV's)*** provides outstanding superheat control of your refrigeration plant. This in turn maximises the cooling efficiency of the refrigeration system and the milk vat. It does this by feeding more refrigerant into the dimple pad and improves heat transfer.

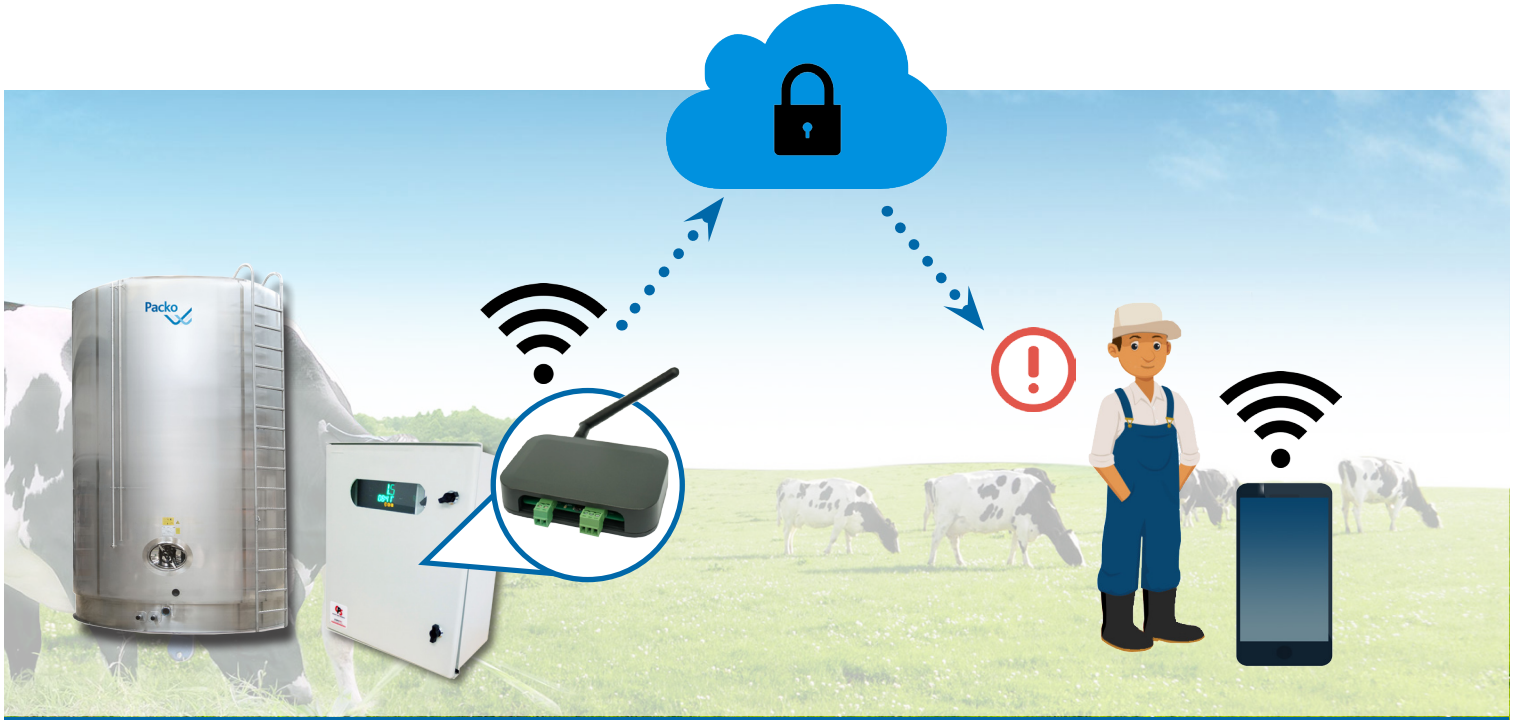
TEV systems can be easily upgraded to EEV versions. In addition to their proven Milk Vat Control Panels, Eurotec now offer for retrofit a range of Prewired ***Electronic Valve Driver (EVD)*** Panels complete with Valve Drivers installed, with all temperature and pressure sensors and cables included.

Tip: By also installing Carel FCP Condenser Fan Speed Controls you can further maximise the plant potential.

Tip: Non standard applications are our specialty!

Cloud based WiFi Solition for Milk Vat Monitoring on Dairy Farms

MODBridge



MODBridge by untrol.io simplifies the Internet of Things, allowing you to connect to existing dairy panels with Carel controllers to the Cloud, wirelessly.

We believe Dairy Farmers would benefit from a simple solution to deliver IoT connectivity via the internet. We worked hard to deliver a cost effective, reliable and simple solution that is easily accessible at push of a button. The technology once installed, will give dairy farmers peace of mind that their milk is monitored from the cow shed right through to tanker pickup, preserving the premium milk quality.

No annual costs, extra fees or SIM Cards required. MODBridge connects to your existing Wireless Network. The data is stored and accessible anywhere using your smartphone.

Versions

- **CPS Dairy W MB** – Complete Dairy Panel with Modbridge
- A Retrofit Modbridge Solution is also available to upgrade existing CPS/Carel Dairy Panels. Ask your Eurotec Refrigeration Sales Engineer for more information.

Features:

- Temperature recording
- Basic parameter access
- Compressor status
- High and low temp alarms
- Faulty probe alarm
- Controller offline alarm
- Email and app notifications
- Automatic scheduled reports
- Free App (Apple and Android)
- WiFi connectivity

INTUITIVE SET UP no PhD in science required

TECHNICAL SPECIFICATIONS	
WiFi protocols	802.11 b/g/n
Security	WPA/WPA2
Encryption	WEP/TKIP/AES
Frequency Range	2.4GHz
TX power	Max. 20dBm
RX sensitivity, 11 Mbps	-91dBm
Operating voltage	5VDC
Operating current	< 120mA
Min power supply	500mA
Operating temp.	-10°C ~ 85°C
Storage temp.	-10°C ~ 85°C
Operating Humidity	5% - 90% RH, Non-condensing

MODBridge App

FREE! Available for Apple and Android

ANDROID APPLE

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