

REFERENCE GUIDE



 **FARM
ELECTRONICS**

→ THINKING AHEAD

OUR HISTORY



1960

Started from a one man electrical contracting business by Nick Chandler.

1980's

Established a strong market position in potato storage. In 1990 the company was re-located to a larger premise at Alma Park, Grantham.

1999

The company grew from strength to strength which saw record trading years, seeing a 2 million pound turnover.

2016

The Dutch company Tolsma-Grisnich acquired Farm Electronics Ltd.

2023



New premises for Farm Electronics

1977

Chandler Farm Electronics and Installations Ltd was created in the village of Welby, near Grantham.

1991

A new refrigeration manager was appointed and developed our packaged cooling units. The company changed its name to Farm Electronics Ltd in 1994.

2000's

Started exporting to France and also expanded its premises gaining a storage warehouse.

2019

New management team was put in place to lead the company into 2020.



WELCOME TO FARM ELECTRONICS

Being a fully established crop storage engineering business for over 50 years, Farm Electronics reputation is built upon a strong reputation of having unrivalled quality, simplicity and performance.



All these attributes are based upon a strong understanding of the customers needs as well as a strong engineering background. At Farm Electronics each project is designed with the customer and the crop in mind. From spare one-off parts such as louvres to full integrated systems for multiple stores, Farm Electronics can offer a solution to your crop storage needs.

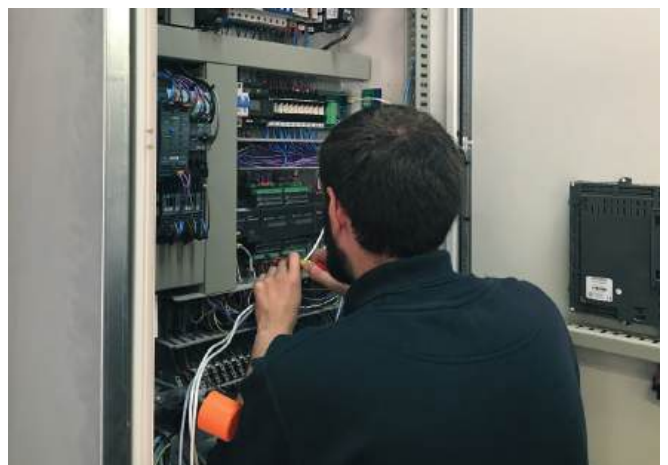


Centrally located in the UK, on the outskirts of Grantham is home to Farm Electronics Head Office. This is where the administration, technical sales, fabrication, paint, manufacturing and service departments are based. Our friendly technical sales team use the latest in 3D and 2D design software to work with customers to discuss their requirements. Consultations with customers and 3rd party dealerships are conducted on sites throughout the UK. Projects are discussed, plans and offers are then put in place to make sure the most effective and efficient crop storage is achieved.



Farm Electronics prides itself in being a manufacturer of high-quality products, this means investing in the best fabrication, painting and assembly equipment for the factory, this in turn delivers the quality standards the company prides itself on.

Being able to offer all the tools required to make an effective and efficient crop store, Farm Electronics can offer one off parts such as sensors and louvres up to a full refrigerated storage solution including, roof fans, gas heaters and our Cropscan Vision Control storage computer touch screen controller which you can connect to remotely via an app.



DESIGN & ENGINEERING

Whether it be a new or existing store our team of trained technical sales engineers are available to assist across the UK. From conception through to delivery, Farm Electronics can help you get the storage solution that suits you.

At the end of the project, Farm Electronics will conduct a project installation check and commissioning of the system. We also work closely with a selection of approved contractors who are well versed with Farm Electronics equipment for if you urgently require assistance.

These approved contractors can be found on our website.

As well as our standard fans, we work closely with our suppliers so we can provide our customers with the perfect solution to fit their needs. Our fans are ordered

specifically for each job, this allows us to specify exactly what each customer requires in terms of size, air flow, noise cancellation, guards and dampers. This isn't only for in packaged cooling units but also plenum units, air ducts, grain drying fans and any other application when fans are required.



AIR CONTROL MAX FANS

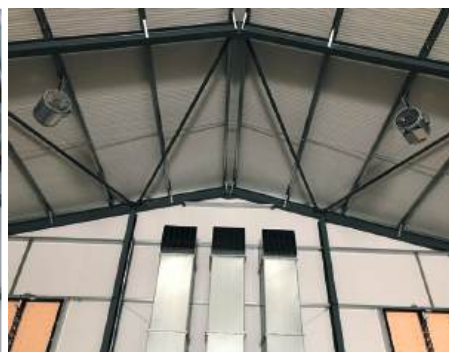
The Air Control Max fan has been fully developed in-house and is the result of innovative thinking based on previously unused ventilation technology principles. The wing profiles are optimized with the help of computer simulation, whereby the blades have an upright wing tip. As a result, the air flow optimizes and the efficiency is increased (up to 7%) and the noise level drops considerably (up to 36%). An integrated hub motor has been used, making the construction lighter and more compact. The optimized distribution of forces (engine mounts and engine mount) means a longer service life. Because of the plug-and-play connection, the costs for assembly and maintenance are lower. The motor of the fan (with adjustable speed) is controlled with external electronics and is therefore 100% dust-proof. Because the electronics are separated from the motor, there is a lower operating temperature. This has a positive effect on the life of the electronics.



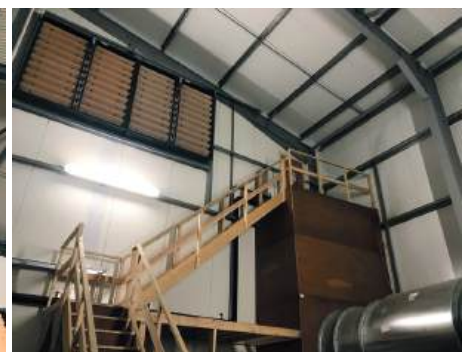
EXAMPLE OF AIR DOWN DAMPERS



EXAMPLE OF LOCATION OF ROOF FANS



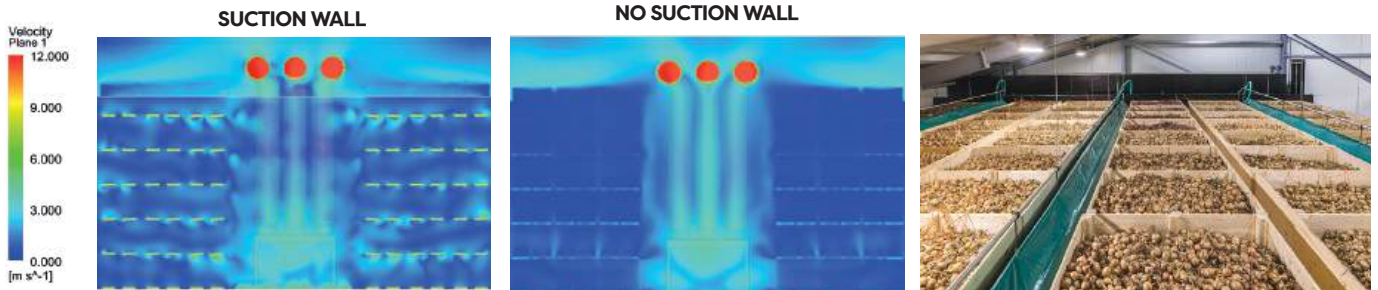
EXAMPLE OF A FAN HOUSE LAYOUT



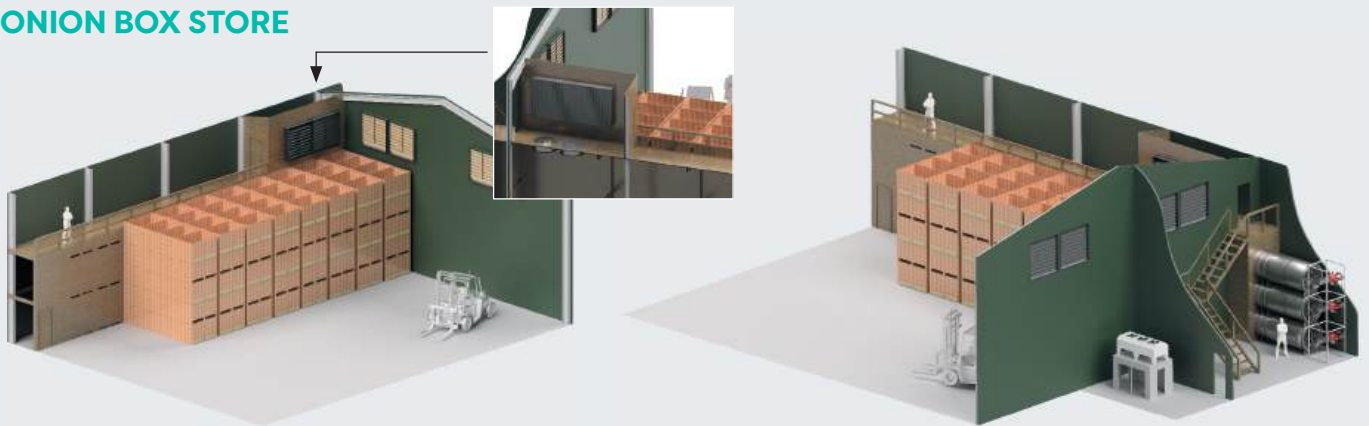
SUCTION WALLS

Suction walls have gained popularity in recent years to greatly improve the air distribution in 'Free Blow' Box Potato Stores. By matching the openings in the suction wall to the air volume used the overall air pattern can be much more evenly distributed.

Usually constructed in timber the suction wall is positioned at the same end of the store as the air handling units and/or refrigeration coil. The exhaust louvres (on ambient equipped stores) are positioned behind (inside) the suction wall thereby guaranteeing the air path during ambient cooling as well.



ONION BOX STORE



AMBIENT BOX STORE

Farm Electronics can offer tailor made storage solutions to suit existing or new builds. We will work closely with the customers chosen contractors, to implement our equipment.

Onion Box Store: Gas burners, ambient & refrigerated air to cover all stages of onion storage.

Ambient Box Store: Ambient air directed through an open face duct using multiple fans.



Farm Electronics can offer Reynolds plates to be fitted to the openings of drying walls. This improves the airflow going through the boxes.

EXAMPLE OF NEW STORE LOCATION



EXAMPLE OF DRYING WALL



EXAMPLE OF A BESPOKE POTATO BOX STORE

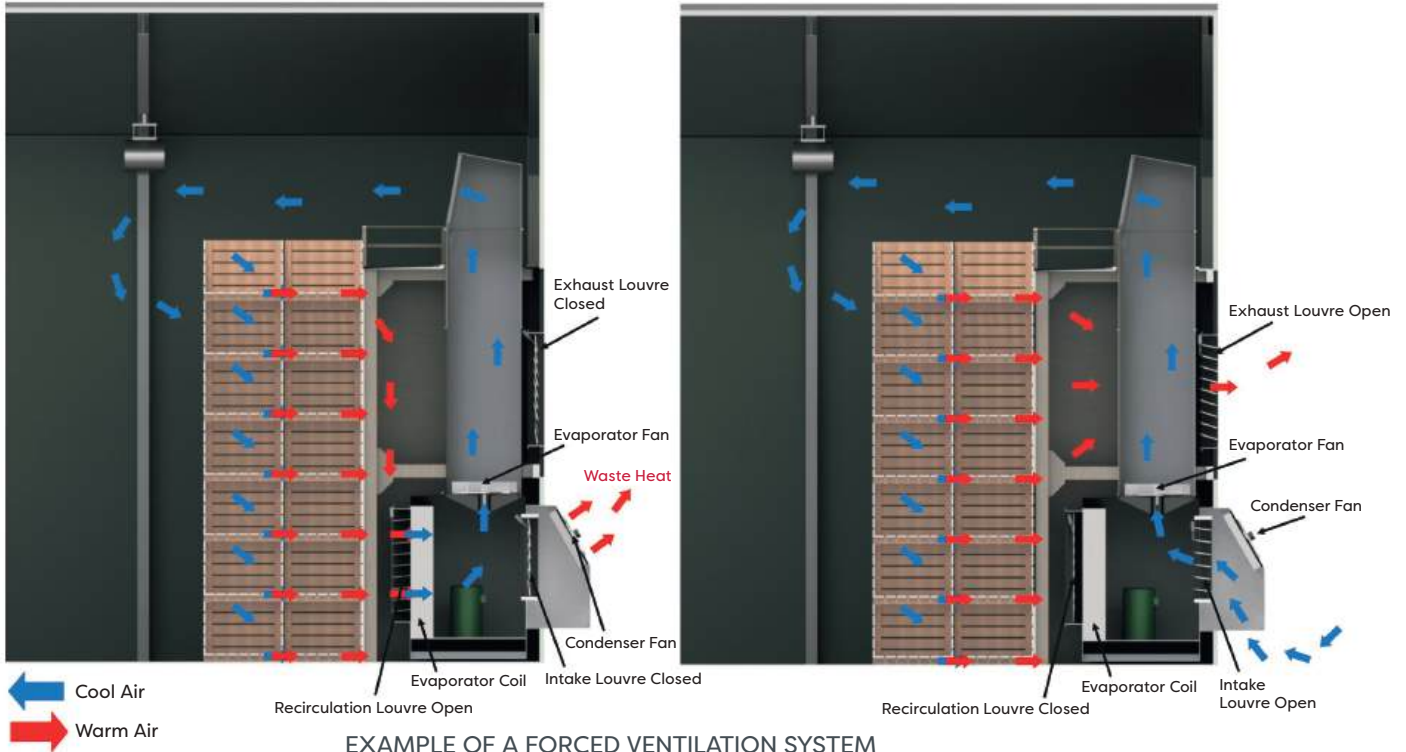


BOX STORAGE

Farm Electronics offers tailored solutions for box Onion and Potato storage, be it the use of ambient or refrigerated air. Dealing with new or existing buildings, we will calculate and specify the optimum way of efficiently storing your crop.

REFRIGERATION & RECIRCULATION

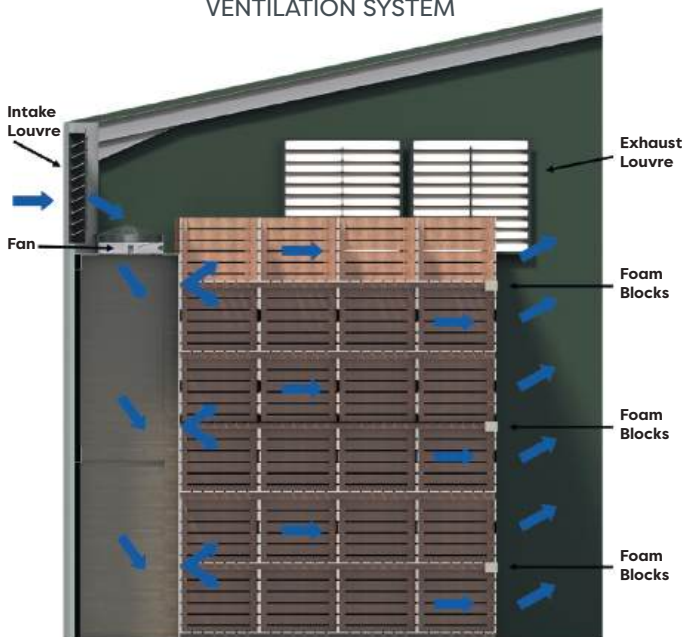
AMBIENT COOLING & AIRMIX



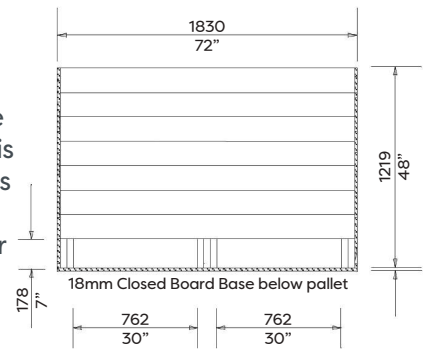
EXAMPLE OF A FORCED VENTILATION SYSTEM

During Airmix the intake and recirculation louvres will open in opposition to each other to achieve the desired duct temperature. The exhaust louvres will open in proportion to the intake louvre.

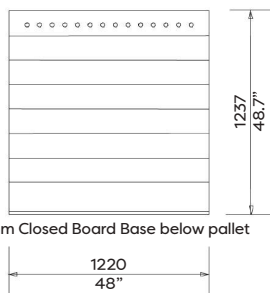
EXAMPLE OF A POSITIVE VENTILATION SYSTEM



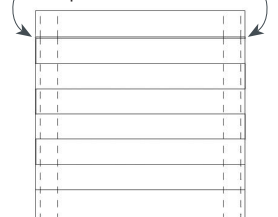
Farm Electronics can also assist with calculations for open areas on boxes where air flow and pressure is critical. We can discuss with the customers preferred box supplier and determine the correct solution for you.



Air Exhaust Holes
14 x 25.4mm (1") dia holes
on each side



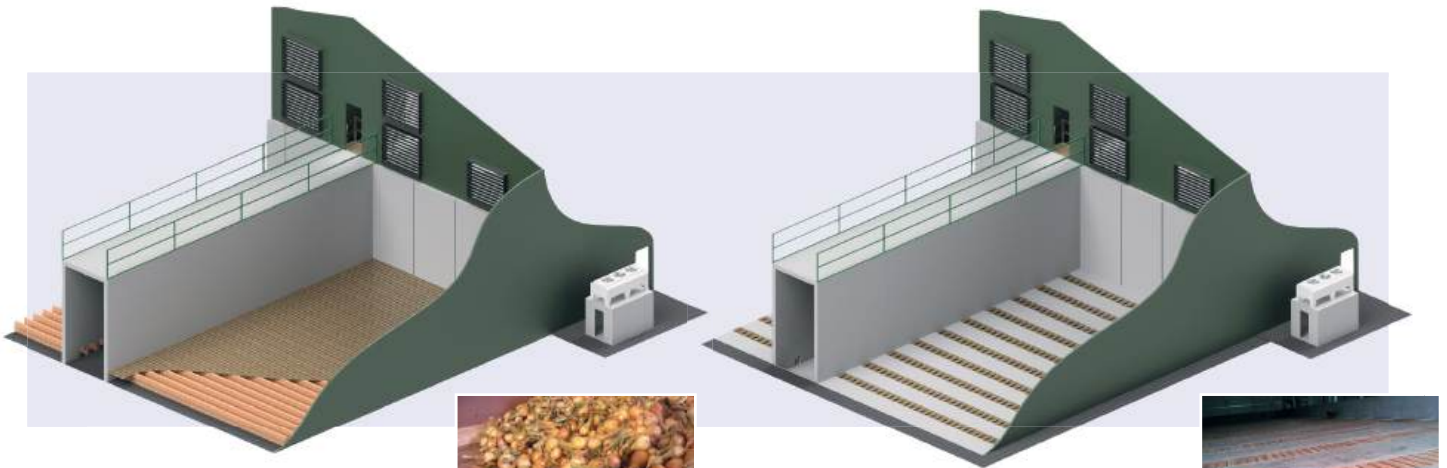
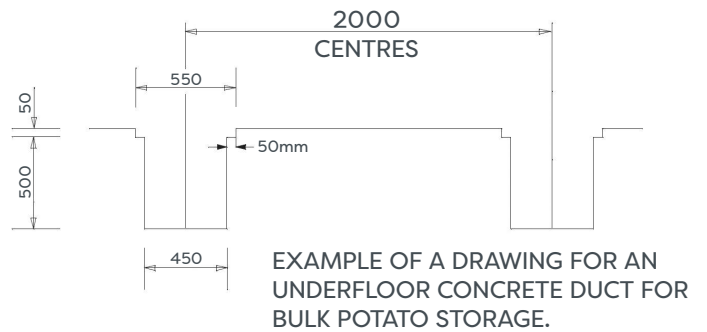
Alternative Air Exhaust
7.5mm (0.29") gap under
top board on each side



BULK STORAGE

Farm Electronics will work with customers to put together a solution for bulk Onion and Potato storage.

From conceptual design through to completion we are able to offer our in-depth technical knowledge to create the perfect bulk store to suit your requirements.



EXAMPLE OF BULK ONION STORE - DRIVE OVER TIMBER FLOOR.

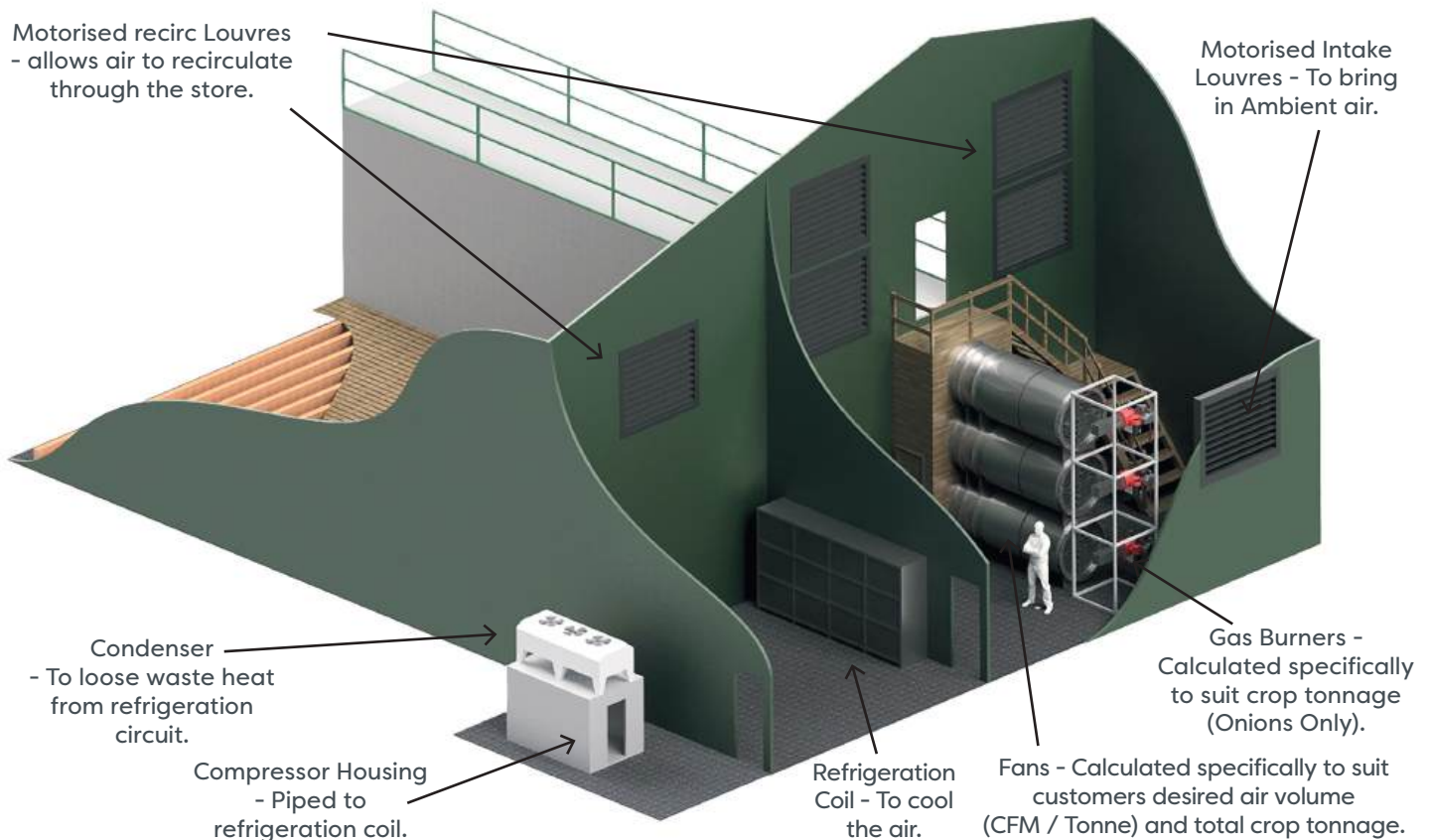


EXAMPLE OF BULK POTATO STORE - CONCRETE DUCT WITH TIMBER LATERAL.



Motorised recirc Louvres - allows air to recirculate through the store.

Motorised Intake Louvres - To bring in Ambient air.



PACKAGE COOLING SYSTEMS

PACKAGE AMBIENT UNIT	Ventilation Capacity	Fan Size Diameter	Fan Motor Size	KVA	*Approximate Tonnage (potatoes)
Air-50	60,000 m ³ /h 16.7 m ³ /s	800 mm x 2	3.88 x 2	6	590
QML 60	90,000 m ³ /h 25 m ³ /s	800 mm x 3	3.24 x 3	9.9	885
QML 120	132,000 m ³ /h 36.7 m ³ /s	800 mm x 4	3.24 x 4	13.2	1,295

PACKAGE REFRIGERATION UNIT	Ventilation Capacity	Fan Size Diameter	Fan Motor Size	KVA	*Approximate Tonnage (potatoes)
Cool-50 (29-50 kW duty)	50,000 m ³ /h 13.9 m ³ /s	800 mm x 2	3.88 x 2	21.8	650
Dry-50 (29-50 kW duty)	50,000 m ³ /h 13.9 m ³ /s	800 mm x 2	3.88 x 2	25.5	650
QCC 60 CR11 (60-90 kW duty)	83,400 m ³ /h 23.2 m ³ /s	800 mm x 3	3.24 x 3	31.8	1100
QCC 120 (78-117 kW duty)	128,000 m ³ /h 35.6 m ³ /s	800 mm x 4	3.24 x 4	43.1	1450

*This is for approximate use only. Consult technical sales team for more information.



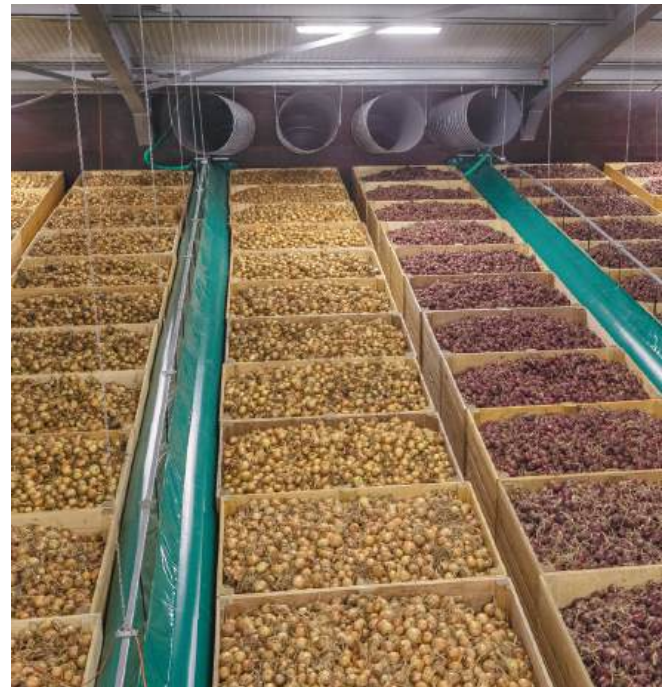
VENTILATING, COOLING AND DRYING UNITS

The climate units are ready to plug in and can be used modularly in the storage area. This allows savings on installation and construction costs. These units can be used for room ventilation (cooling) and forced ventilation in combination with a suction wall for products in boxes. By combining the different units, the air volume and the cooling and drying capacity can be adapted to the storage location and the product. The units are sustainable due to the use of energy-efficient fans and natural refrigerant. The refrigeration design ensures minimal weight loss during the storage period and this increases storage efficiency.

The plug & play version with condensation drying function is unique in its kind. One unit that ensures that the product is dried as quickly as possible in all situations to prevent mold and bacterial growth. Drying and heating with outside air whenever possible and internal condensation drying regardless of the weather when the outside conditions are not suitable.

Natural Refrigerant

In future, prevailing legislation will mean that only natural refrigerants will be permitted. Tolsma-Grisnich can provide a wide range of direct and indirect cooling installations with a GWP value of 3, using propane (R290) as a refrigerant. These installations are energy-efficient, sustainable and designed to ensure minimal drying-out of the product. Propane has clear benefits for the storage of agricultural products because it is odorless and can be used in a wide range of applications. Easy to use and maintain, these installations are also safe by virtue of their design.



VENTILATION & CONTROL SYSTEMS

Louvres

Motorised louvres are used to provide positive air control in both ambient and refrigerated cooling systems, since Farm Electronics firmly believe in the benefits of combining the ambient ventilation and refrigeration cooling systems.



Blade height/Width	Free Area	900 (mm)	1000 (mm)	1200 (mm)	1300 (mm)	1500 (mm)	1800 (mm)	2000 (mm)
570mm 22" / 3 Blade	m ² ft ²	0.45 4.91	0.51 5.45	0.61 6.55	0.66 7.01	0.76 8.18	0.91 9.82	1.00 10.91
760mm 30" / 4 Blade	m ² ft ²	0.61 6.55	0.67 7.28	0.81 8.73	0.88 9.46	1.00 10.91	1.21 13.10	1.35 14.55
950mm 38" / 5 Blade	m ² ft ²	0.76 8.18	0.84 9.09	1.01 10.91	1.10 11.82	1.27 13.64	1.52 16.37	1.69 18.19
1140mm 45" / 6 Blade	m ² ft ²	0.91 9.82	1.01 10.91	1.21 13.10	1.32 14.19	1.52 16.37	1.83 19.65	2.03 21.83
1330mm 53" / 7 Blade	m ² ft ²	1.06 11.47	1.18 12.73	1.42 15.28	1.54 16.55	1.77 19.10	2.13 22.92	2.36 25.47
1520mm 60" / 7 Blade	m ² ft ²	1.21 13.10	1.35 14.55	1.62 17.46	1.76 18.92	2.03 21.83	2.43 26.20	2.70 29.11
1710mm 68" / 8 Blade	m ² ft ²	1.37 14.73	1.52 16.37	1.82 19.65	1.98 21.29	2.28 24.56	2.74 29.47	3.04 32.75
1900mm 75" / 10 Blade	m ² ft ²	1.52 16.37	1.69 18.19	2.03 21.83	2.20 23.65	2.54 27.29	3.04 32.75	3.38 36.39

EXAMPLES OF POPULAR COLOURS AVAILABLE

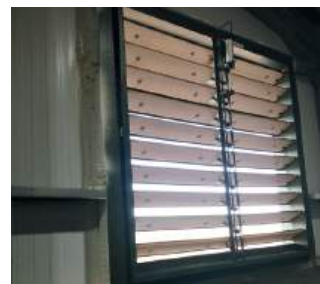


Fully insulated with overlapping 20mm Polyfoam insulation on the reverse face (to minimise cold bridging) with brush seal strips on the blade ends and unique individually sprung blades to eliminate slack in the drive linkages, the louvres have minimal air leakage. All louvres come complete with a 240v drive actuator.

Louvre light & Water Filters



NO LOUVRE LIGHT FILTER FITTED



LOUVRE LIGHT FILTER FITTED



Farm Electronics Louvre Light & Water filters are manufactured from black PVC waveform light filter cassettes encased in a galvanised steel support frame. Simply fitted directly to the flange of the louvre, the filters will prevent direct sunlight and water from entering through the louvres.

Hatches

Tolsma inlet and outlet hatches are designed to ensure that the exact calculated air volume is evenly distributed throughout the storage. This means that each fan gets the required volume of air. To prevent overpressure in the storage, the outlet hatches are bigger than the hatches on the inlet side.

Features hatches:

- Maintenance free
- Equipped with rubber seal
- Inox hinges

Options:

- Other Colours
- Louvers



CROPSCAN VISION CONTROL

The Cropscan Vision Control is an intelligent storage computer that controls temperature and relative humidity as well as CO2 level by controlling fans, hatches, heaters and refrigeration devices. This results in minimal storage losses as well as optimal energy saving.

The screen of the Vision Control shows a diagrammatic view of the storage and of the refrigeration. The status of the product and the installation are clearly shown. Furthermore, the Cropscan Vision Control gives the users automated tips for the optimal settings of the climate computer.

Control of Cooling Systems

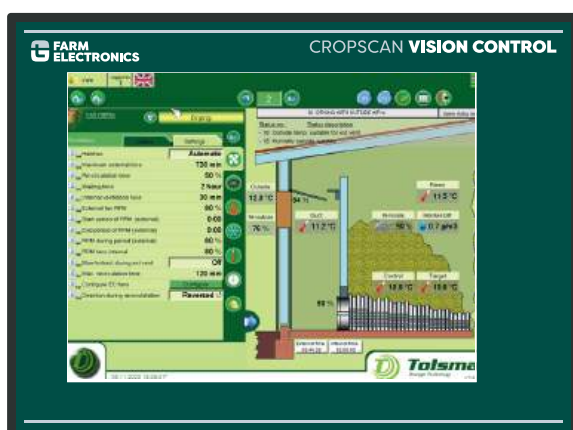
The cooling installation is also controlled by the intelligent Cropscan Vision Control climate computer. The user-friendly touch screen provides a well-organised and graphic rendering of temperatures, pressures, running hours and valve positions. Because the Cropscan Vision Control controls both cooling and fans, these can be optimally fine-tuned which contributes to the storage efficiency.

Energy Management Module

The optional Cropscan Vision Control energy management module is an energy efficient module. By setting the maximum allowed energy consumption and setting the system priorities, the storage and other energy consuming facilities are automatically switched on or off. This results in the least storage losses and highest energy savings.

Online control

The climate computer can be controlled via internet connection (PC, tablet, smartphone). This gives the user continuous insight in the storage facility and the possibility to adjust the settings.



OTHER PRODUCTS

Control Panels

Farm Electronics has built fully integrated electrical control panels for over 30 years. From the very simple DOL motor starter to Star-Delta, Soft Start or Frequency Speed Inverter we can build the solution. Only high quality control gear and components are used throughout to ensure long term reliability. We only use leading manufacturers motor control and frequency inverters as standard. PLC's can be programmed and incorporated into any of our panels when required. All our panels are supplied with CAD drawings of control, power and schematic detail. Replacement drawings held on our computers can be supplied FOC at any time in the future.



Drying Wall Plenum Fan Box

This unit allows forced drying/warming of a small batch of boxed product. The unit pictured serves 2 boxes wide x 6 boxes high and up to 9 boxes out. (108 Boxes) Sturdily constructed from 40mm Box Section & 20mm Plywood infill panels along with recessed restrictor plates configured to suit different box heights, the box is designed to survive the rigours of day to day usage. Using the side mounted control panel, the operator can either run the fan continuously or program a number of hours blowing after which time the fan will stop.



Grain Drying and Gas Burners

Farm Electronics also supply grain drying equipment to cater for grain stores throughout the UK. Our Grain Drying TS7 touch screen store controller can be connected to the internet so it can be controlled by a smartphone app, provide email reports and alarm messaging. Farm Electronics also supply direct coupled modulating gas heaters which can be wired into the touch screen panel for control. The heaters can be supplied in single, duplex or triplex to suit the fans.



Humidifier Units & add-on

We offer a range of humidification units to suit various applications. Shown below is a free standing humidifier with in built control panel and time clock. Fitted with a 1000mm x 1000mm phenolic resin evaporative pad and a 450mm diameter, 240v fan it is suitable for stores up to 500 tonnes. We also produce a wall mounted humidifier which takes up less room if there is a space issue as well as providing add-on humidification for use with existing fan systems.



YOU

The Yield Observation Unit (YOU) is placed in the bulk batch and continuously measures the product weight. Analysis of measurement data can be carried out in an online environment (website).

SEMI-CIRCULAR AIR DUCTS

Above floor laterals for bulk storage are also available. These come in various sizes depending on air flow through the product and the size of the building.

TRACK & TRACE

Tolsma track and trace system provides an actual overview of storage and traceability of your product. Each box is fitted with an electronics chip with a unique number. This allows for adding information for example, variety, size, supplier. Filling, dispatching, or emptying every box



AIR BAGS

Air sleeves fitted between 2 rows of boxes can be inflated and deflated to create an air pocket forcing the air to pass through the boxes. These air sleeves can be inflated and deflated independently, and they are on rails so if the store is only partially full you can move the sleeve to align with the last box in the row.

WHITE-GREEN LED LIGHT

The Tolsma high bay LED lighting has been specially developed for use in the storage and processing area. The fittings have a very wide radiation angle, so that they can be hung at a great distance from each other. Moreover, the LED technology is energy-efficient. During the storage period, the LED fixture can be switched from white to green light to prevent potatoes from turning green.



SERVICE AND SUPPORT

Our skilled technicians with many years of experience offer UK and Ireland wide coverage to support your equipment. We offer scheduled service contracts as well as break down service support and always available on the phone to offer support and guidance relating to the equipment. We have a dedicated service support vehicle kitted out with a comprehensive range of spare parts and specialist tools.

We hold stock of a wide range of spare parts from refrigeration, electrical, gas burners as well as any other storage related products, most of which can be delivered next day. We also hold some superseded stock to ensure we can provide backup for older equipment.

As well as this, we can offer remote support to the controller via a 4G modem or a wired internet connection. This is a very common and useful optional extra, as this can help to diagnose and fix problems

very quickly as well as giving you piece of mind if you are away from the store for a long period of time. This also can send errors to an email address or via an app so you are in full control of the equipment even when you are not close by.



Complete Sorting, Grading & Packing Systems

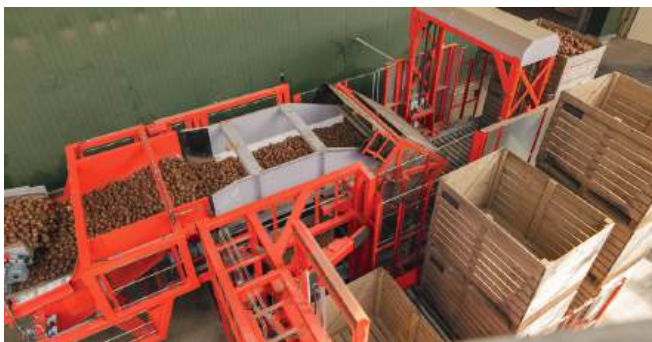
Grisnich specialises in designing and building processing installations for potatoes, onions and carrots. The product line consists of a range of machines and installations for:

- reception in boxes or trucks
- buffering and dosing (bunkers)
- internal transport (conveyors, fall-breakers)
- wet and dry cleaning (washers, clod separators, cleaning rollers)
- separation based on specific gravity
- grading for size
- taring and sampling



SAMRO STONE AND CLOD SEPARATOR

The stone and clod separator can remove stones and clods from a batch of potatoes, onions or other root vegetables with an accuracy of 95%. Because of the advanced sensor technology, a high capacity (10 to 45 tons/hr) can be realized.



BOX FILLERS

The TG Automatic Box filler-18 is capable of stacking, de-stacking and filling empty boxes fully automatically. The filled boxes are stacked and transported by means of a roller conveyor. A capacity of 80 tons per hour can be realised thanks to the uninterrupted filling process. In addition, the TG Automatic Box filler-18 reduces the number of forklift truck movements by 40%.



SHUFFLE GRADERS

High grading capacity as well as exceptionally accurate grading for size are the characteristics of our shuffle graders. The line of graders consists of machines particularly suitable for ware and seed potatoes and for the processing industry.



FALL BREAKERS

The automatic retractable fall breaker (folding chute) is a unique and proven concept for filling lorries, bunkers, boxes and big bags without damaging the product. It can be used for potatoes, onions, shallots, carrots, etc. The flaps are operated by means of a hoist motor with hoist straps.



UNLOADING SYSTEMS (RECEIVING HOPPERS)

Receiving hoppers for unloading product can be used for both back-end tipping and sideways tipping. For unloading from boxes, Tolsma-Grisnich has developed evenflow dosing bunkers, to suit every need in capacity.



FARM ELECTRONICS

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