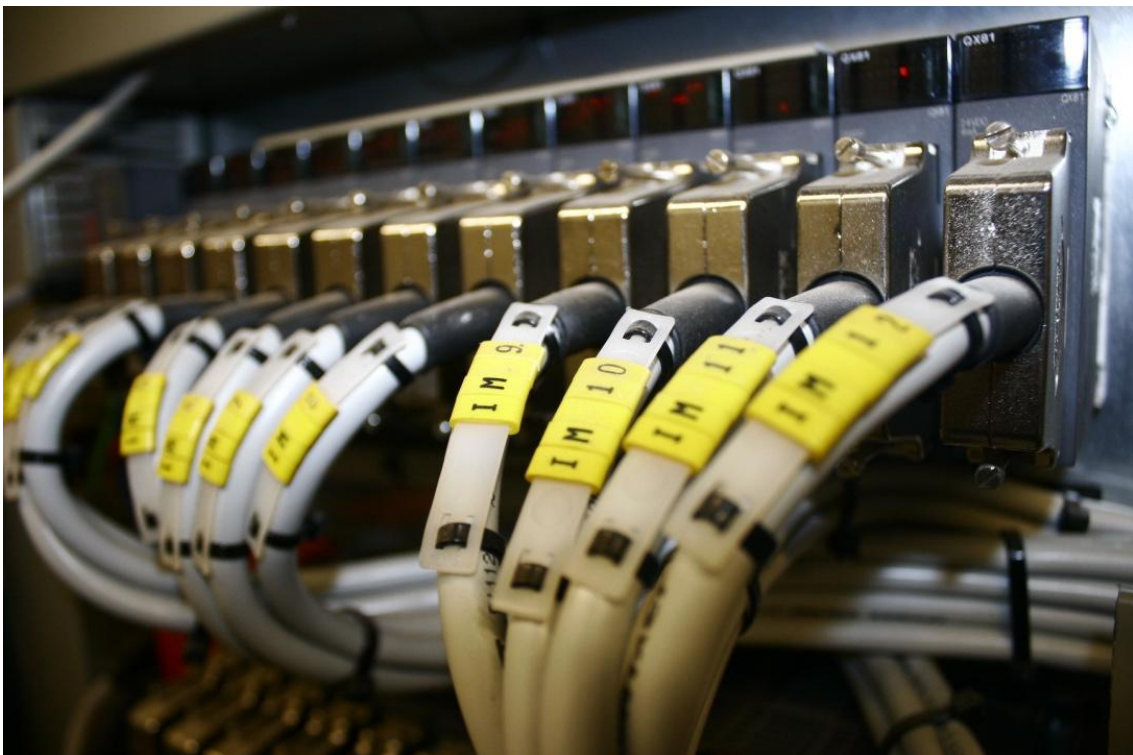


Coldcurve Ltd. - A SCADA system that is in production

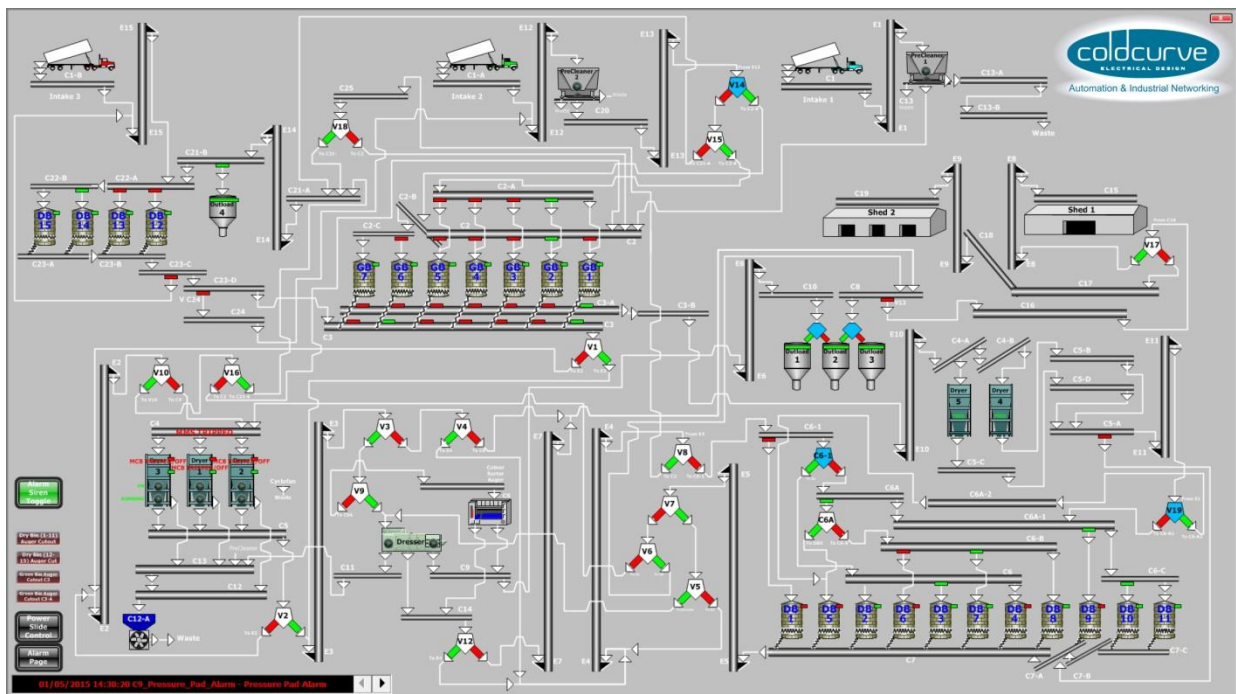


1. Examples of Coldcurve Ltd. - SCADA system that is in production

Coldcurve Ltd. has created and installed the electrical control system, PLC control network and visual SCADA system for a grain drying production line to produce the very best quality malting barley, produced for the Scotch Whisky Distilling industry.

- The malting barley grain plant is capable of drying and storing **40,000** tonnes of dried product.
- The drying plant consists of 5 continuous flow dryers, and storage facilities are in 22 silos and two flat stores of 7,500 tonne capacity each.
- 22 silos range from 250 tonne capacity up to 2,300 tonne capacity.

Production Line - Active Diagram & Controls



Production Line Active Diagram Installed on a 55" LED 1080p HD Monitor

This allows the staff to access and view all individual aspects of the system at all times, regardless of whether or not the system is in use by other operators. This improves operating efficiency, increasing output resulting in increased profits.



Coldcurve Ltd. is constantly evolving its PLC and SCADA & HMI systems.

At Coldcurve Ltd. we offer a wide variation of control methods by using algorithms to meet the current and future requirements of all our customers.

To improve productivity at the grain drying production line, Coldcurve Ltd. installed two PCs and one HMI: one PC for a intake system and the other PC for the production and outload system. The HMI allows instant access for staff while the intake and outload PC are in-use by other operators.

At the grain drying production line there is wide variation of instruments and equipment to be controlled by the PLC & SCADA system, with over **173** motors - **544** PLC inputs - **244** PLC Outputs & Analogue devices currently controlled in the system.

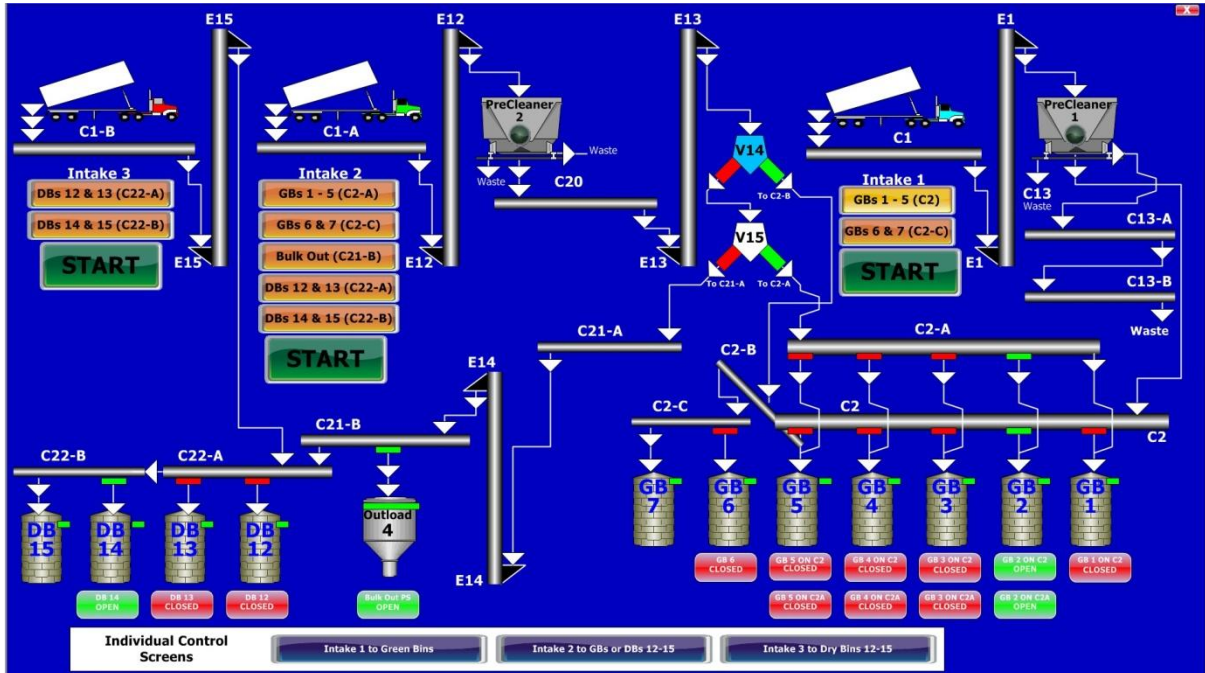
173 motors control items such as:

- Conveyor Motors
- Auger Motors
- Power Slides Motors
- Elevators Motors
- Sweep & Progression Motors
- Dressers Motors
- Pre Cleaners Motors
- Motorised valves
- Dust Cyclo-fans
- Aeration Fans

Expansion of the system is always progressing with devices being added to control more aspects of production such as:

- Temperature - Control, monitoring & data logging
- Humidity - Control, monitoring & data logging
- Barcode - Control, monitoring & data logging
- Security systems

1.1. Intake Line - Active Diagram & Controls



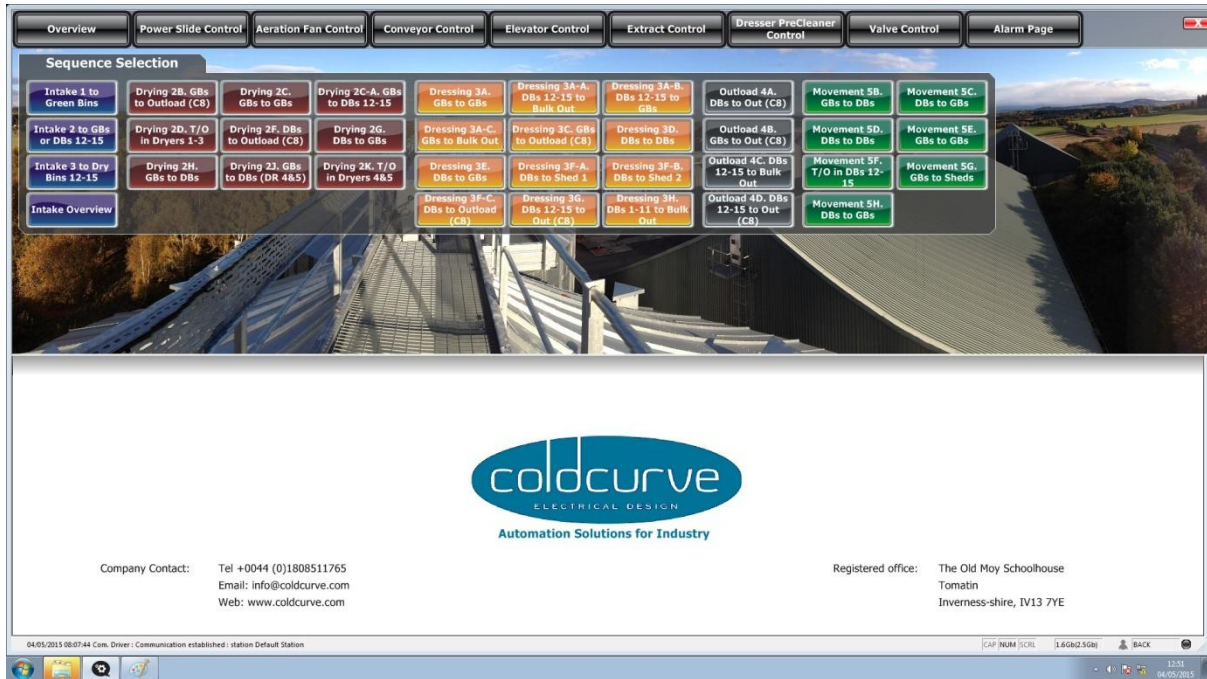
Intake Line Active Diagram Installed on a 32" LED 1080p HD Monitor

The intake line SCADA system is installed on its own individual PC. This allows the intake operator to view and control all individual aspects of the intake system at all times, regardless to if the system is in use by other operators at the time. This allows for the grain to be loaded constantly from the lorries arriving at the plant, regardless of production line and out-loading issues.

The system is designed for ease of operators use. Coldcurve Ltd. create innovative productive systems for complex production lines and machinery that is simple to use.

1.2. Production & Outload Line Active Diagram & Controls

1.2.1. Startup

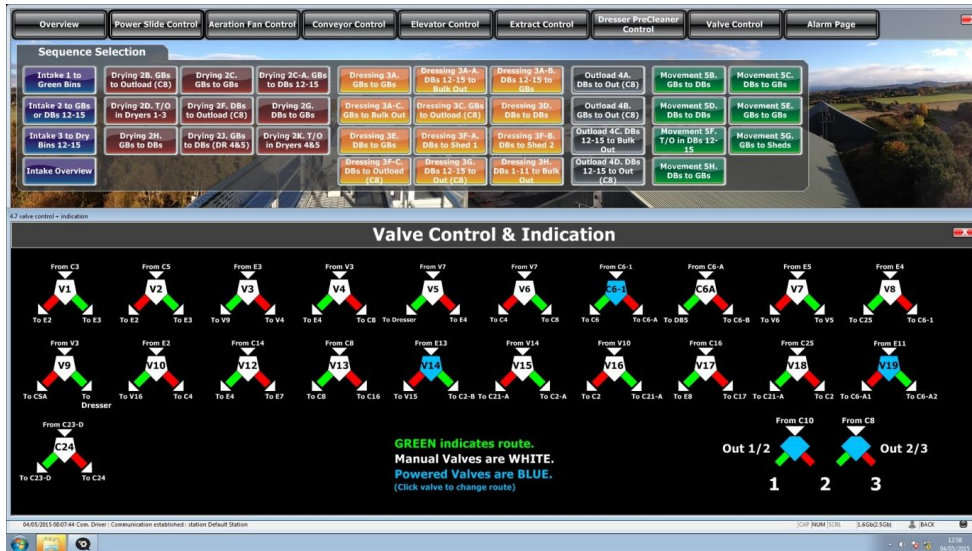


With simple choices for the operators to select, the system can be setup to carry out the tasks required.

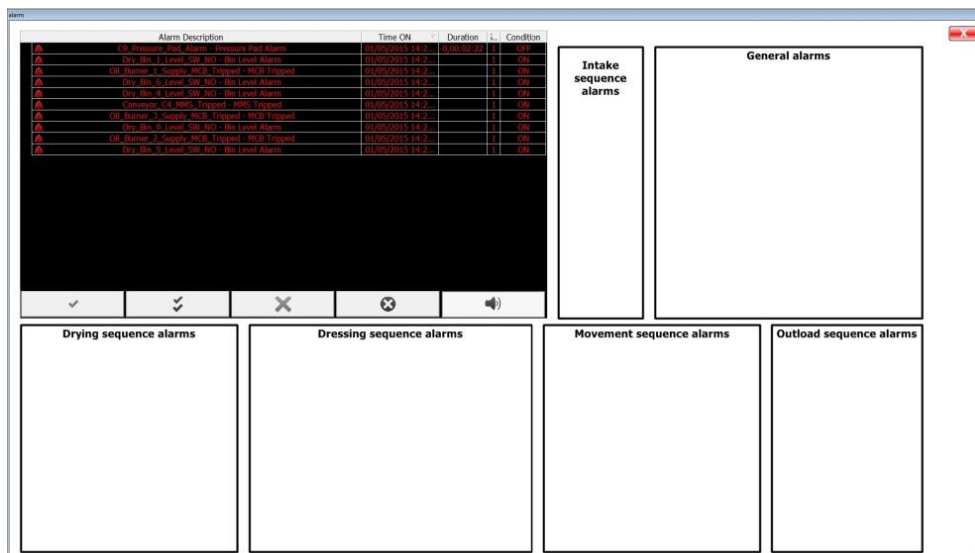
The operators can easily view the current positions, speeds, temperatures, load, alarms and all other aspects of the system through menus and pop up screens.

Screens will be designed to suit the individual needs of the Coldcurve Ltd. - Dry Heat Oven - Maintenance Contract - Quotation for the Biosil Ltd.

1.2.2. Inspect Equipment State



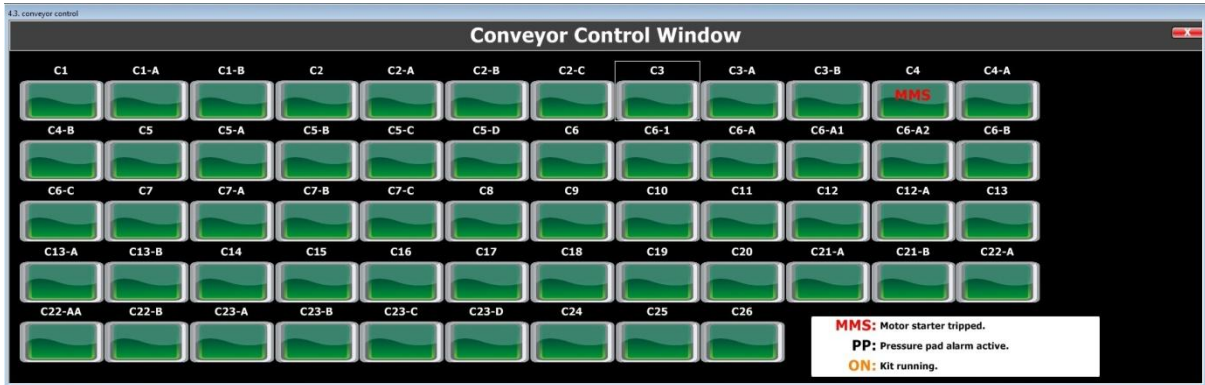
1.2.3. Alarms



Alarms can be easily viewed, check and acknowledged.

For routine maintenance and other procedures controls can be setup for individual access and monitoring of all equipment. This can be password protected to ensure security and allow engineers and operators to have higher levels of control.

1.2.4. Controls - Individual Equipment Control



Screens for individual equipment controls for manual operations of the plant can be setup to the individual requirements of the system.



Coldcurve Ltd. create simple to use production screens that allow the operators to have control of the required parts of the system as and when they are required.

Algorithms will be programmed to allow complex systems to be easily used by the operators.

Below are some examples of the start-up systems designed by Coldcurve Ltd. for the grain drying production line

1.2.5. Production Control

Production - Intake:



Intake 2 to Green Bins or Dry Bins 12-15.

1 Valve position indication. Click valve 14 to change. (Diagram showing V14 and V15 valves)

2 Select product destination for sequence start.

- GBs 1 - 5 (C2 -A)
- GBs 6 & 7 (C2-C)
- Bulk Out (C21-B)
- DBs 12 & 13 (C22-A)
- DBs 14 & 15 (C22-B)

3 Power Slide Control - Green Bins.

- GB 2 ON C2A: OPEN
- GB 3 ON C2A: CLOSED
- GB 4 ON C2A: CLOSED
- GB 5 ON C2A: CLOSED
- GB 6: CLOSED

3.1 Power Slide Control - Dry Bins. If dry bins are selected, flow must be reduced.

- Bulk Out PS: OPEN
- DB 12: CLOSED
- DB 13: CLOSED
- DB 14: OPEN

4 START

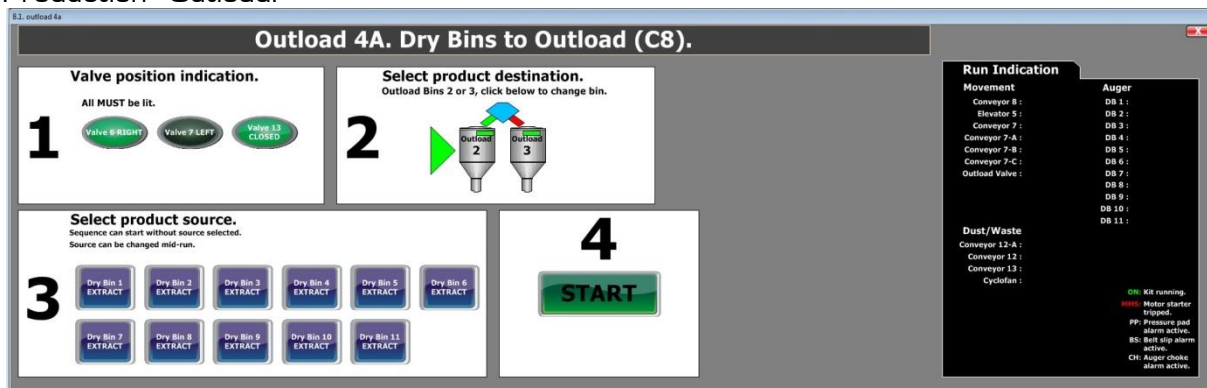
Run Indication

Movement

- Conveyor 2-C:
- Conveyor 2-B:
- Conveyor 2-A:
- Conveyor 22-B:
- Conveyor 22-A:
- Conveyor 21-B:
- Elevator 14:
- Conveyor 21-A:
- Elevator 13:
- Conveyor 20:
- Precleaner 2:
- Elevator 12:
- Conveyor 1-A:

Legend:
 ON: Kit running.
 HSD: Motor starter tripped.
 PP: Pressure pad alarm active.
 BS: Belt slip alarm active.
 CH: Auger choke alarm active.

Production - Outload:



Outload 4A. Dry Bins to Outload (C8).

1 Valve position indication. All MUST be lit. (Value 6 RIGHT, Value 7 LEFT, Value 13 CLOSED)

2 Select product destination. Outload Bins 2 or 3, click below to change bin. (Diagram showing Outload 2 and Outload 3)

3 Select product source. Sequence can start without source selected. Source can be changed mid-run.

- Dry Bin 1 EXTRACT
- Dry Bin 2 EXTRACT
- Dry Bin 3 EXTRACT
- Dry Bin 4 EXTRACT
- Dry Bin 5 EXTRACT
- Dry Bin 6 EXTRACT
- Dry Bin 7 EXTRACT
- Dry Bin 8 EXTRACT
- Dry Bin 9 EXTRACT
- Dry Bin 10 EXTRACT
- Dry Bin 11 EXTRACT

4 START

Run Indication

Movement

- Conveyor 8:
- Elevator 5:
- Conveyor 7:
- Conveyor 7-A:
- Conveyor 7-B:
- Conveyor 7-C:
- Outload Valve:
- DB 1:
- DB 2:
- DB 3:
- DB 4:
- DB 5:
- DB 6:
- DB 7:
- DB 8:
- DB 9:
- DB 10:
- DB 11:

Dust/Waste

- Conveyor 12-A:
- Conveyor 12:
- Conveyor 13:
- Cyclolan:

Legend:
 ON: Kit running.
 HSD: Motor starter tripped.
 PP: Pressure pad alarm active.
 BS: Belt slip alarm active.
 CH: Auger choke alarm active.

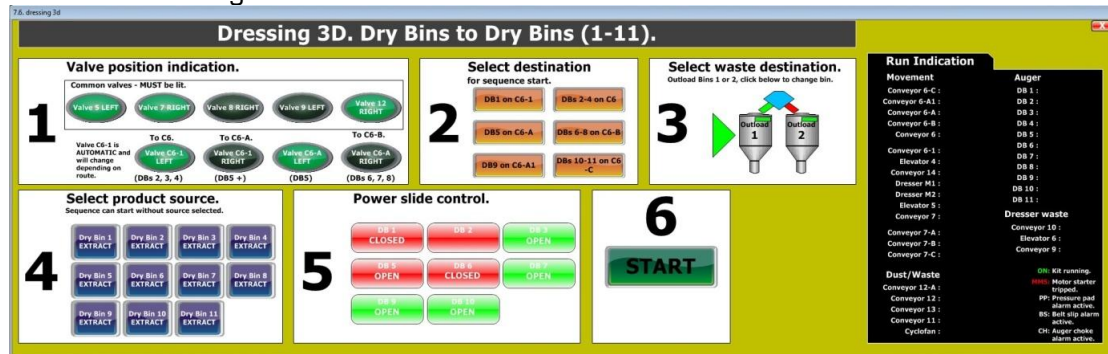
Production - Drying:



Production - Movement:



Production - Dressing:



Simple production screens are designed to the specific requirements of the project.

Each screen asks the operator to check all the required aspects, then select how they would like the system to run. Then press start.

✓ At we like to keep it *simple for the operators.*

2. Programmable Logic Controller



Mitsubishi MELSEC Q-Series PLC

MELSEC-Q Series: its powerful performance takes the Q Series to levels rarely seen by other PLCs before.

As the requirements of manufacturing evolve daily, the next generation MELSEC-Q Series, with its nano speed processing, can dramatically improve system and machine performance.
(Quotation 1)



Mitsubishi MELSEC FX3-Series PLC

MELSEC-FX3 Series: its powerful performance takes the FX3 Series to levels rarely seen by other compact PLCs before.

As the requirements of manufacturing evolve daily, the next generation MELSEC-FX3 Series, with its high speed processing, can improve system and machine performance.
(Quotation 2)

2.1. Programmable Logic Controller - Bespoke Software



The software program for the Mitsubishi CPU will be designed to suit the individual need of Biosil Ltd. This will control the operation of the plant along with data entered by the operators/maintenance engineers through the SCADA control system.

Coldcurve Ltd. will design a tailor made program that will control all the equipment in the system. The PLC is the brains of the system and the code designed for Biosil Ltd. will run the plant in reference to the setting set on the SCADA system. The SCADA system will in turn display the real-time state of the plant by reading the PLC data and displaying it in a graphical representation on the monitor or HMI.

A hard copy of the code will be presented at the completion of the work along with all other documentation. All relevant information regarding the system that is provided by Coldcurve Ltd will be presented along with:-

- PLC program information
- SCADA program information
- HMI or PC program information
- PLC Layout drawings
- PLC IO drawings
- PLC Control Network Module Drawings
- PLC Analogue drawings
- Control panel layout drawings
- Schematic control circuit drawings
- Attachments documentation
- All other documentation regarding the project

All documentation will be presented to Biosil Ltd. once payment has been received in full. The PLC code and SCADA system or HMI programs designed by Coldcurve Ltd. remain the property of Coldcurve and are leased for the lifetime of this particular system. The lease is included in this price.

2.2. Programmable Logic Controller - System Information & Details

Coldcurve Ltd. is constantly looking ahead to meet your future demands and expectations.

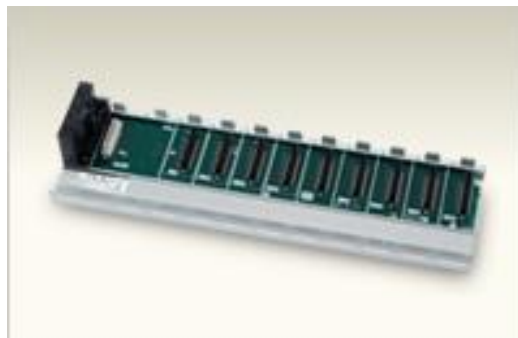
High performance and future proof solutions are delivered by Coldcurve with the use of MELSEC Series of PLCs with their wide range of modular units and network systems that are available.

2.2.1. PLC Q-Series Base Unit System:

These base units provide the mounting platform for the power supply, CPU, and input/output modules.

The modular concept - building on its predecessor System Q - is a control concept that allows Coldcurve Ltd. to mix and select the best combination of CPUs, communication devices, specialist control modules and discreet I/O on a back-plane. This allows Coldcurve Ltd. to configure bespoke systems tailored to Biosil Ltd. specific needs, when they need it, where they need it.

The wide lineup of base units, catering to each user's requirements, also include high-speed variations for multi-CPU systems.



2.2.2. PLC Q-Series CPU Systems:

The MELSEC-Q Series offers a wide range of CPUs to meet your factory control needs whilst improving your production efficiency.

Powerful CPU solutions for PLC Processes are available.



2.2.3. PLC Q-Series PSU Systems

This module supplies power to the CPU, input/output and special function modules.

A wide variety of power supply modules are available to cater to the different input/output voltages requirements needed for different applications.

2.2.4. PLC Q/FX -Series IO Systems:

Coldcurve Ltd. offer a wide range of individual IO modules digital and analog for connecting input and output and industrial monitoring devices to cover all the needs of the medical, construction, manufacturing, production, renewable energy , oil & gas industries.

This lineup of IO digital & analog modules support high-speed, high-resolution & high-accuracy control to enable processes to be controlled as and when required by the Biosil Ltd.

Modules Available for the Q Series

- I/O module
- Analog I/O module
- Pulse I/O module
- Counter module
- Positioning module
- Information module
- Control network module
- Energy measurement module

2.2.5. PLC Network Systems:



Mitsubishi network interface modules provide a wide ranging support group for control-system networks. For seamless integration of each level of the factory automation architecture, a wide range of network connectivity modules are available. Coldcurve Ltd. have included in this quotation for one Ethernet control module in each PLC system to communicate with the Movicon SCADA system. A wide range of network connectivity modules are available if required (Q-Series specified):-

- Ethernet
- CC-Link IE Controller Network
- CC-Link IE Field Network
- MELSECNET/H
- CC-Link
- MODBUS
- PROFIBUS
- DEVICENET
- FL-net(OPCN-2) - AS-i



- Programmable Logic Controllers.
- Human Machine Interface.
- Supervisory Control And Data Acquisition.
- Automated industrial electrical control systems.
- Programming, installation, maintenance.
- Infrared thermal surveys.
- Consultancy service.

www.coldcurve.com