

2M



AUTOMATION LTD

Cylinder Conveyor System

Project Brief

One of the UK's leading domestic boiler manufacturers sought a method of automating the transfer of their inner cylinders from Weld stations to their Pickling Plant.

The cylinders are placed on the conveyors from six welders stationed in two banks of three allowing the provision of two separate conveyor systems. Each of the six weld stations has a remote control panel that allows workers to gain access to the conveyors and reset a light guard circuit upon exiting.

The light guard and safety circuit were designed to protect the

operators from injury by disabling all moving parts while the operators are placing cylinders onto the

conveyors.

The cylinders are then transported to a storage unit with a capacity of 28 cylinders. The cylinders are loaded onto the 3-tier storage by means of lifting stations working from inverter-driven AC motors and level switches. Within the storage area, the cylinders are transported using Interroll's intelligent conveyor system, Intelliveyor ©.

At the pickling plant, the operator will request a cylinder from the storage area by removing any waiting cylinder at the out-feed end of the storage area.



Key 2M Services Supplied:

- PLC Software Development
- Control Panels and Field Wiring
 - HMI Design
- Remote Access Setup using a modem
- Conveyor Drives Configuration
- Intelliveyor © Setup and Interfacing

Design Philosophy

The Cylinder Conveyor System was to be designed in a way that affords maintenance engineers to diagnose problems quickly and efficiently. This led to the requirement of point-to-point wiring of all I/O devices as opposed to using a field network.

Despite the long installation process the system does not require an engineer with PLC skills to diagnose it, as properly documented drawings and easy

layout of control panels have made it accessible for the maintenance crew.

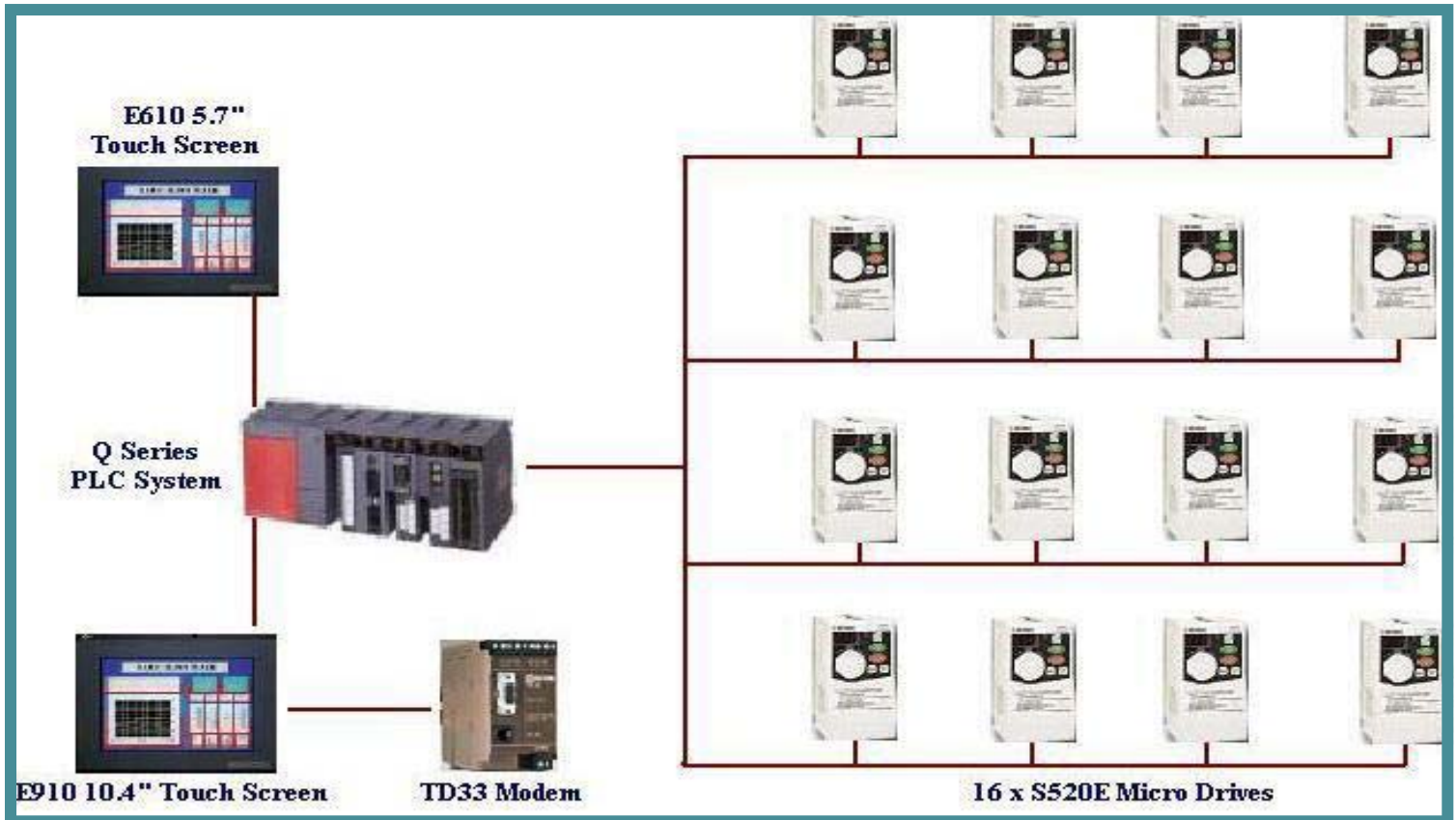
In addition, the HMI has been designed using easy to follow graphics.

Key Components Used:

- Mitsubishi Q-series PLC with 448 digital I/O
- Mitsubishi S520 Micro Drives
- Mitsubishi E910 10.4" Touch Screen
- Westermo TD33 Modem
- Interroll Intelligent Drives



System Overview



Technical Risk Management

Ease of Maintenance

- As the conveyor system interlinks approximately a dozen other pieces of equipment, reducing downtime was a key consideration. Therefore, Point-to-Point wiring was preferred to field bus networking for easier maintenance.
- All alarm messages are displayed on the primary HMI at the main panel. Due to the size of the conveyor system, a remote HMI panel was fitted at the out-feed end for both alarm handling and local manual control optimization.

Remote Diagnostics

- It was important for the customer to get a quick response from their suppliers if a fault occurred on the system. Therefore, a modem was installed on the system which allows engineers to diagnose the PLC and HMI programmes from anywhere in the world using a dedicated phone line.

“ Having worked closely with 2M Automation Ltd on a major project, we can verify that the electrical installation and supply of Hardware & Software was undertaken to a very high standard. The Software written for the system is very user friendly and minimal training has been required, the hardware supplied has been of the highest standard, and the system has proved to be very reliable. The administration has been clear and precise from the proposal stage, through to the manuals. We would have no hesitation to use 2M Automation again on any future projects. ”

Simon Meakin
Works Manager, F.W. Frost

Safety Concerns

Of utmost importance in this application is the guaranteed safety of the operators. The following measures were undertaken for their protection:

- Access to the 3-tier storage area is via Solenoid Locking Gates which only open when the power is switched off.
- Safety Light Beams control the areas at which access is sought to place cylinders onto the conveyors. On detecting movement, the beams immediately halt all movement in the affected area by cutting the power to all moving devices. The operator then resets the system upon exiting to resume operation.
- All aspects of the safety design were carried out with the customer's involvement in order to ensure that the safety of operators was not compromised in any way.