180904

by Gareth Wilkins

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The implementation of the project was achievable with the support of the engineering department. Commendation to Dean Hamer the site automation engineer for his knowledge on the process and the assistance with the modification of the legacy PLC software. Additionally, Gareth Stacey the engineering manager for the flexibility of working hours to complete the project.

1. Executive Summary

A glue storage, mixing and supply station was designed and built for a local tissue paper manufacturing company. The design phase was divided into the hardware and software design. The hardware design included the electrical, P&ID, instrumentation, and solenoid valve choices. The software design included the digital input/output allocation and a sequence of flow charts to design the software. The implementation phase included the fabrication of the station, the utility supply being electricity and air. The electrical control panel was constructed to ISO EN 60204 standards.

The software implementation included the modification of the glue rooms PLC software. The remote ET200 module was added to the project and assigned a profibus module address. The digital inputs/outputs as established in the design phase were allocated addresses. The ladder logic for the system was produced with the aid of the SFC from the design phase. The function calls designed were put into the main organisation block. The HMI was designed as per the requirements set in the FDS. HMI tags were allocated and five screens were designed for system functionality and four screens were designed for production data regarding usage. The project management was monitored using the Gantt chart produced in assignment 1. Some tasks took longer than anticipated and alternative tasks were performed earlier when obstacles arose.

The testing and results were compared to the expected results as defined in the test plan as outlined in assignment 1. The test plan was divided into conformity tests and functionality tests. The only tests failed were the production of the schematic electrical drawings and system operator instruction. During testing it was noted that the flow of adhesive would exceed the sensor working range. To alleviate the issue the ball valves were chocked back so the flow rate would decrease and the flow sensors could provide a reliable reading. The project was a success however due to labour shortages, production demand and a tight time schedule the project has not been completed fully. A conclusion and recommendations were produced and noted improvements to the system that would enhance the project.

2. Introduction

The project purpose is to provide a station to store, mix and deliver adhesive to a paper making machine in a converting plant in a local tissue manufacturing company. The system will automate the receipt and delivery of glue to the paper. The station will integrate with the existing glue therefore compatible Siemens modules, HMI and software will be implemented.

The main project outcome was to provide a system that fully automates the Glue request, storage, mixing and supply of Core glue, Ply glue, pickup glue, and tail glue. Five HMI were designed for the gluing application. The majority of the FDS deliverables were met however all could not be achieved due to labour shortages and time constraints.

The automatic delivery of the four gluing applications were achieved and met the deliverables of the FDS.

3. Design

3.1 Hardware design

3.1.1 Electrical

An overview block diagram of the solution to be implemented is shown in figure 1. A single-phase supply will be run to the glue mixing station. The glue mixing stations electrical components will be housed in a IP65 Rittal electrical enclosure. The electrical component layout in the panel is shown in appendix I. IP66 gland will be used to maintain the electrical enclosures IP rating. The power demand requires a 2.5mm 3 core SWA cable. The main breaker for the panel will be a two pole C10 MCB. The main breaker feeds the power supply and the two agitator motors. The two agitator motors are protected by their own C2 two pole MCB. The 24V circuit is protected by a C2 two pole MCB. A Profibus repeater is required as the distance between the PLC and glue mixing station exceeds the recommended distance. The Simatic DP IM151-1 ET200S interface module allows the interfacing of remote I/O to the PLC. The Simatic ET200S DP PM-E power module provides the 24V supply for the ET200 rack. The Simatic DP 5 terminal modules enable the connection of IO modules. The Simatic DP 4DI modules provide the digital input connectivity. The Simatic DP 4DO modules provide the digital output features. The Simatic Touch panel TP 177A 5.7" HMI will be the operator interface. The schematic wiring diagram is shown in appendix 9.1.

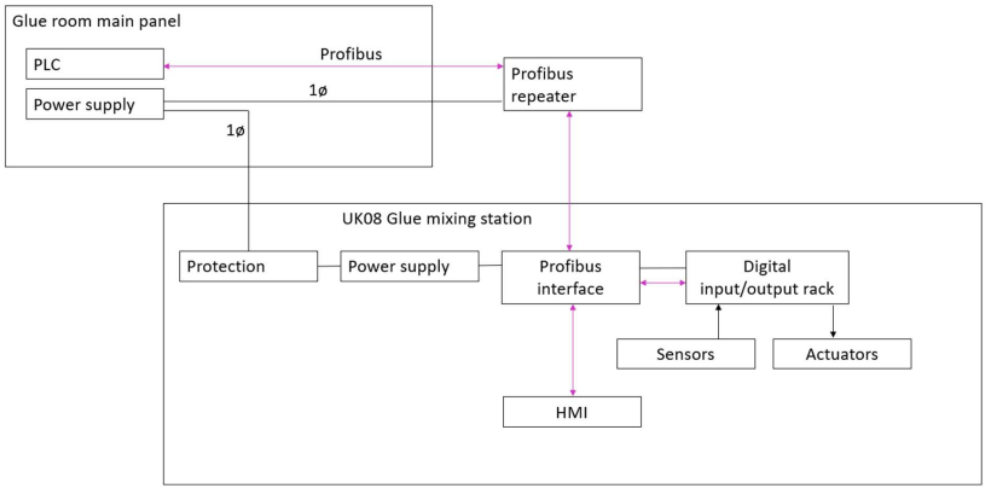


Figure 1: Block diagram of glue station

This is excellent information

3.1.2 P&ID

The P&ID diagram shown in figure 2 illustrates the instrumentation required for the design of the system.

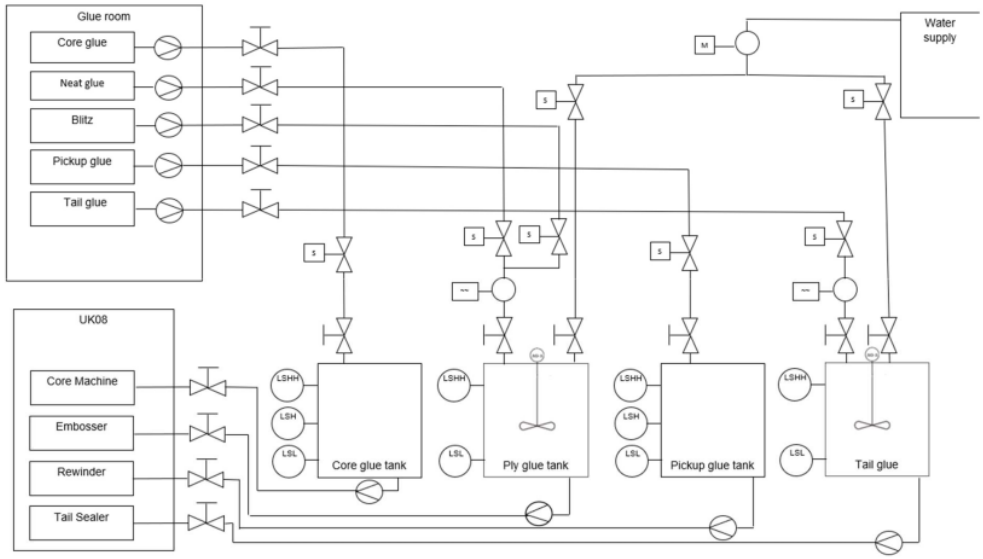


Figure 2: P&ID of glue station

3.1.2.1 Core glue

The core glue level control will be monitored by the conductivity level controller. There are three probes being low level (LSL), tank full (LSH) and emergency level (LSHH). Manual ball valves are present for maintenance.

3.1.2.2 Ply glue

The ply glue tank level will be monitored by the conductivity level controller. Two probes monitor low level (LSL) and emergency level (LSHH). Neat glue and Blitz glue are controlled by their respected solenoid valves. A single ultrasonic flow sensor will be implemented following the solenoid valves to monitor the flow rates. Blitz glue is pre mixed therefore no dosing is required. For neat glue water is filled to the desired value and regulated by the solenoid valve and then dosed with neat glue. Manual ball valves are present for maintenance.

3.1.2.3 Pick up glue

The pick-up glue level control will be monitored by the conductivity level controller. The three probes will provide low level (LSL), tank full (LSH) and emergency level (LSHH). Manual ball valves are present for maintenance.

3.1.2.4 Tail glue

The tail glue tank level will be monitored by the conductive level controller. Two probes monitor low level (LSL) and emergency level (LSHH). The supply of water is regulated by a solenoid valve and quantified by the magnetic flow sensor. The supply of tail glue is regulated by a solenoid valve. The quantity of tail glue is monitored by the ultrasonic flow sensor. Manual ball valves are present for maintenance.

3.1.2.5 Conductive level sensor

The level controller for the tanks are the Omron 61F-GPN-BT/-BC. The level probes are the GVAI-3VK1. The core glue and pick up glue will be wired to provide three signals being low level, tank full and emergency level. The ply glue and tail glue will provide two signals being low level and emergency level. The relay output contact from contact 10 provide the signal to the digital input cards. The controllers wiring diagram is shown in figure 3.

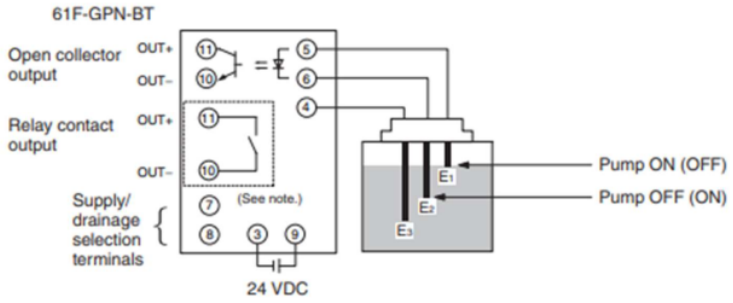


Figure 3: Omron 61F-GPN-BT/-C wiring diagram (Omron, 2020)

3.1.2.6 Flow sensors

The dosing chemicals are quantified by the SU7000 ultrasonic flow sensors. The flow sensors will be mounted in front of a rising pipe as recommended by the manufacturer's specification as shown in figure 4.

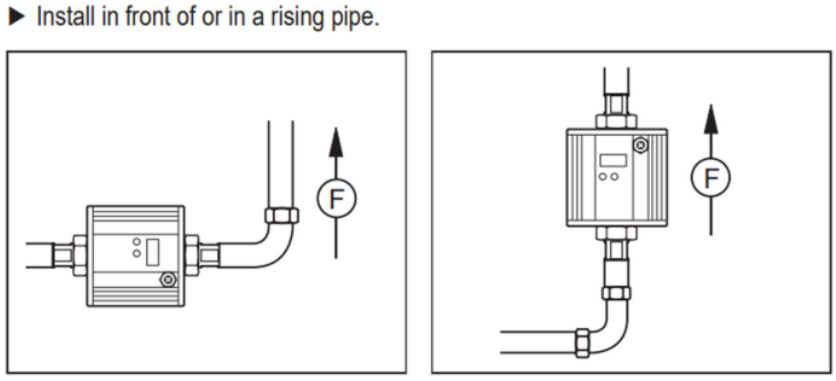


Figure 4: SU7000 Ultrasonic installation guide (IFM, 2014)

The sensor will be wired for OUT1 as shown in figure 5.

This extract from a datasheet is unnecessary and should have been simply explained and cited.

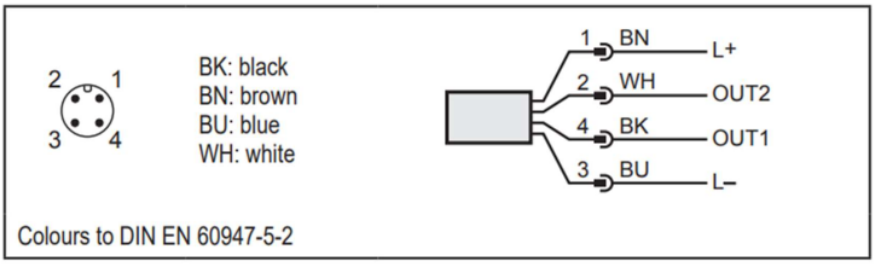


Figure 5: Wiring diagram for sensor (IFM, 2014)

The water flow is quantified by the SM8100 magnetic flow sensor. The flow sensor will be mounted to ensure the pipe is always filled as per the manufacturer's specification as shown in figure 6

This extract from a datasheet should simply have been cited.

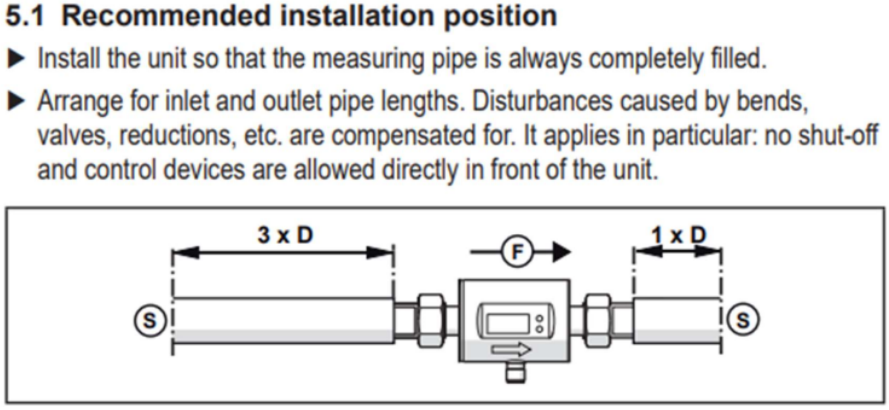


Figure 6: SM8100 magnetic flow sensor installation guide (IFM, 2020)

3.1.2.8 Solenoid valves

The station requires solenoid valves to control the flow of media. The solenoid valves require two states. The 5/2 pneumatic valve has five connection ports and two states. The supply port P1, two ports for the device to be controlled P2, P4 and two exhaust ports P3 and P5 as shown in figure 7.

This extract from a datasheet is unnecessary and should have been simply explained and cited.

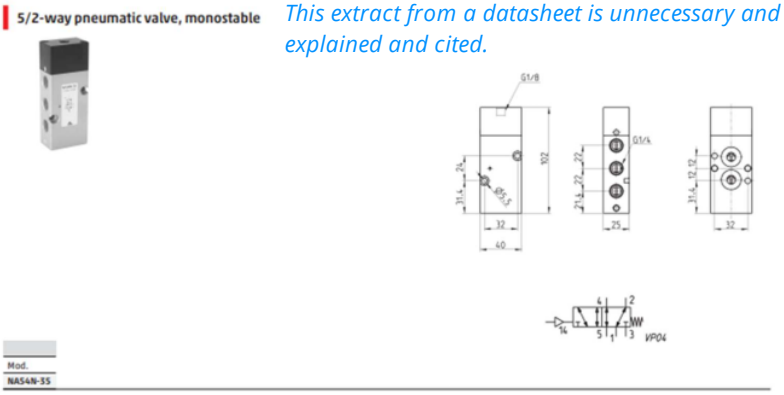


Figure 7: 5/2 pneumatic solenoid valve (Camozzi, 2021)

3.1.2.8 Agitator motors

The ply and tail glue tank require agitating. The solution to be mixed is not very viscous therefore a small motor is required. The motor selected is the STM UK MN56B/4 SIM 14 single phase motor.

The CAD diagram of the system is shown in figure 8.

This is a useful drawing

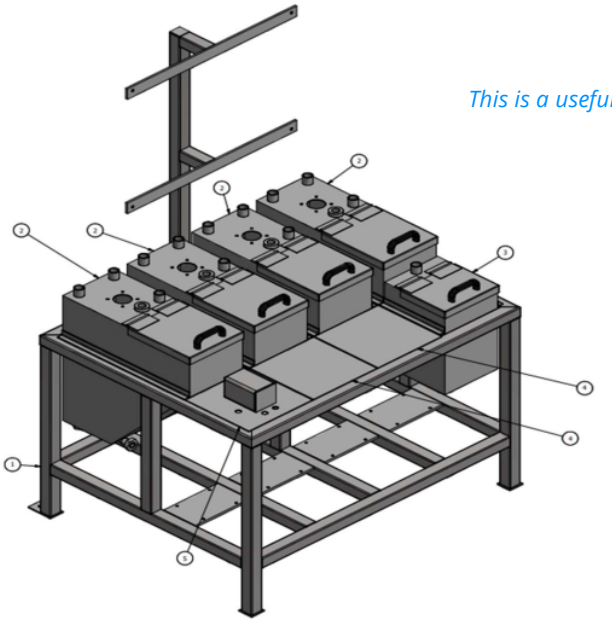


Figure 8: CAD diagram of glue mixing station

3.2 Software design

The software design includes the logic to control the glue delivery management to the line. The HMI will include the four gluing applications.

The FDS provided a list of inputs and outputs for the software. The list of digital input is shown in table 1 and the list of digital outputs is shown in table 2.

Table 1: Digital inputs

Description	I/O
Core glue low tank level probe	Input
Core glue tank max level	Input
Core glue tank emergency level	Input
Ply glue tank low level	Input
Ply glue tank emergency level	Input
Pickup glue low level probe	Input
Pick up glue tank max level	Input
Pickup glue tank emergency level	Input
Tail tank low level	Input
Tail tank emergency level	Input
Ply - Remote push button, pump out from tank to remove tank	Input
Ply – remote push button stop pump out from tank to remote tank	Input
Ply glue - Flow meter	Input
Tail – remote push button pump out from tank to remote tank	Input

You have included much design information which should be in the appendix and explained in the report.

Tail – Remote push button stop pump out from tank to remote tank	Input
Water – Flow meter	Input
Tail glue – Flow meter	Input

Table 2: Digital outputs

Description	I/O
Core glue lamp on running	Output
Ply glue blue tower light	Output
Pickup glue lamp on running	Output
Ply Water valve	Output
Ply glue valve	Output
Tail water valve	Output
Tail glue	Output
Ply - neat glue selected	Output
Ply – blitz glue selected	Output
Ply agitator	Output
Ply pump out valve	Output
Ply Pump out green LED on remote push button	Output
Ply – Anti syphon solenoid valve	Output

Ply – Red tower light	Output
Tail – Water valve	Output
Tail – Glue valve	Output
Tail - Mixer	Output
Tail – Pump out valve	Output
Tail – Pump out green LED on remote push button	Output
Tail – Anti syphon solenoid valve	Output
Tail – Red tower light	Output

The FDS provided the information for the design of the sequence function chart (SFC) for the software.

The core glue request sequence is shown in figure 9.

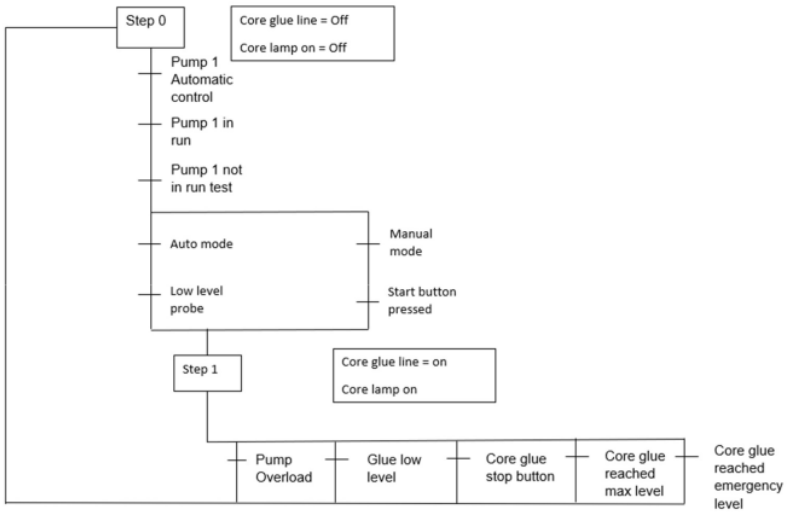


Figure 9: Core glue request SFC

The pick up glue request sequence is shown in figure 10.

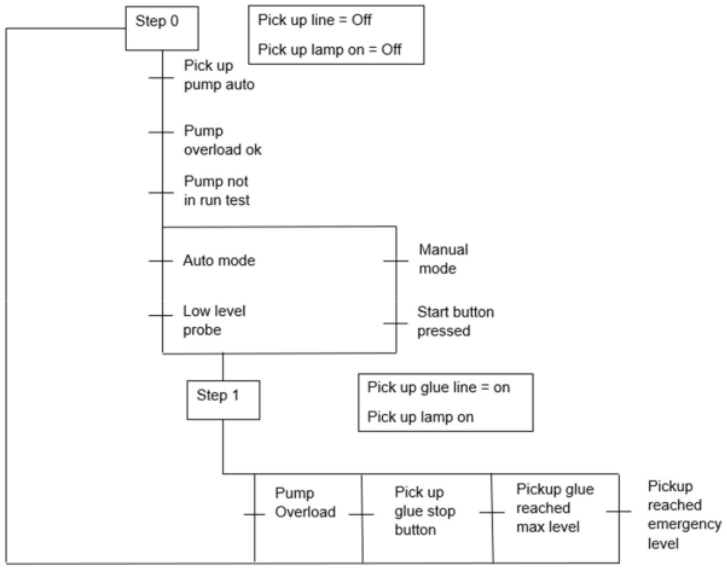


Figure 10: Pick up glue request SFC

The ply glue request sequence is shown in figure 11.

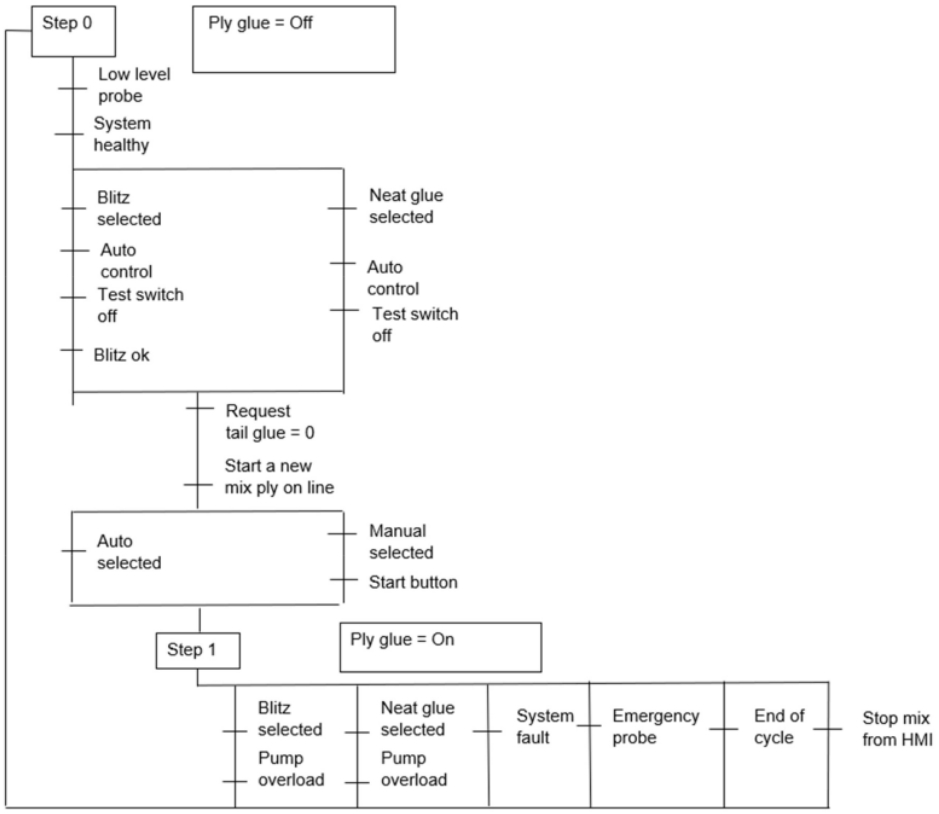


Figure 11: Ply glue request SFC

The tail glue request sequence is shown in figure 12.

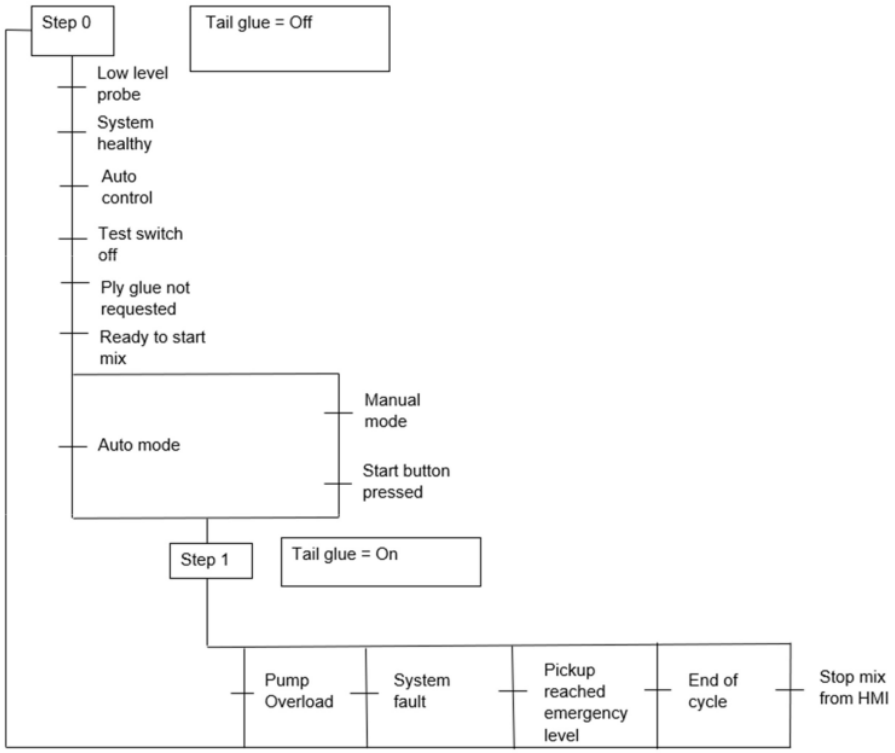


Figure 12: Tail glue request SFC

The Ply tank cycle sequence is shown in figure 13.

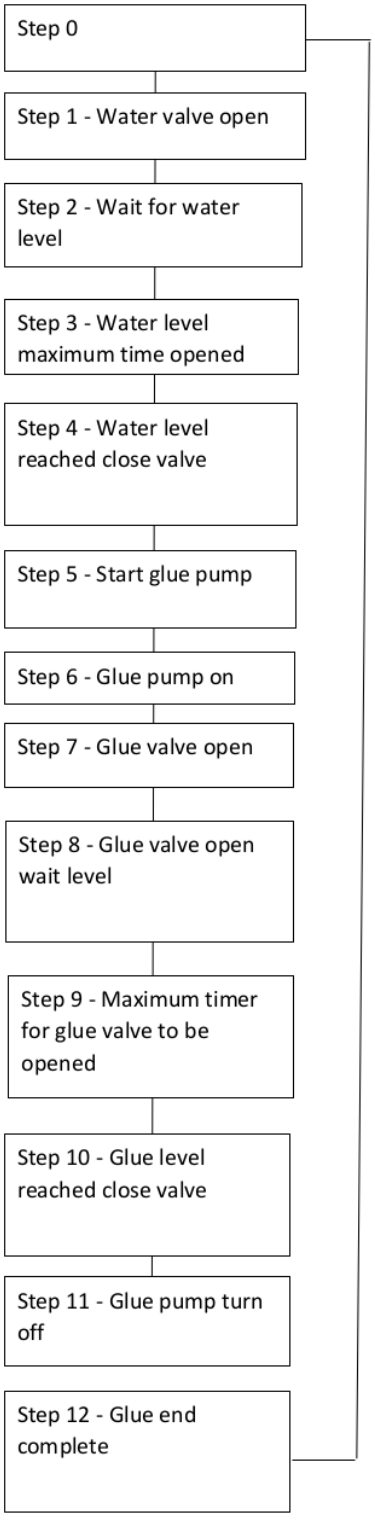


Figure 13: Ply tank SFC

The tail tank cycle sequence is shown in figure 14.

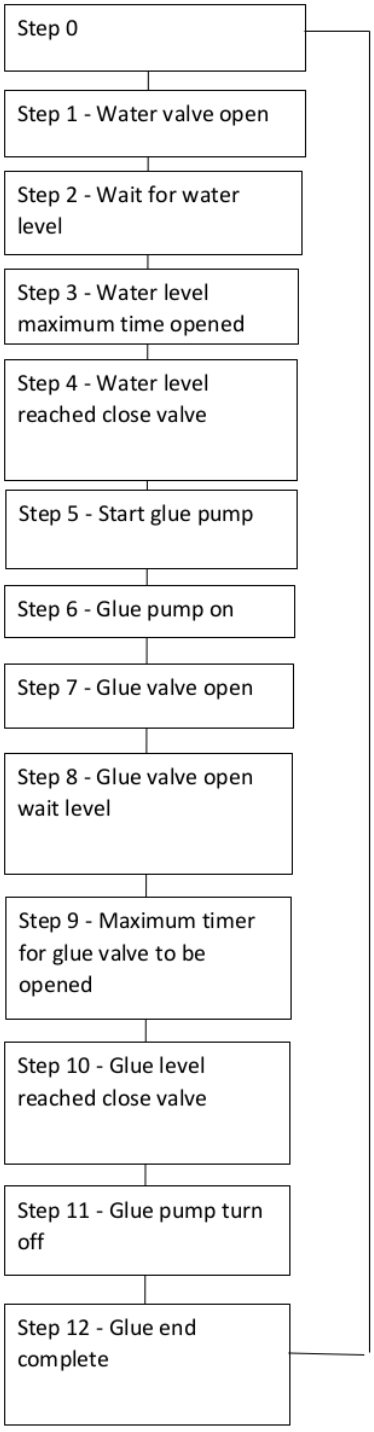


Figure 14: Tail tank SFC

4. Implementation and Management

The glue mixing station frame was fabricated by an external company. The frame was constructed from 316 stainless steel as per the manufacturing environment requirements. The utility supplies being the electricity and pneumatic supply was run by the engineering department. The stainless-steel pipework was fabricated off site and installed by external contractors.

4.1 Panel construction

The electrical components as selected in the design phase were mounted in the electrical panel. The components were mounted on DIN rail and the cabling was run through the trunking. Gland holes were drilled and IP66 gland were secured to ensure the enclosure IP integrity was maintained. ISO EN 60204 Safety of Machinery – Electrical equipment of machines – Part 1 : General Requirements standard was followed (MachineBuilding, 2018). Cable cross sectional area, colour, and identification were cable implemented. The completed panel is shown in figure 15.

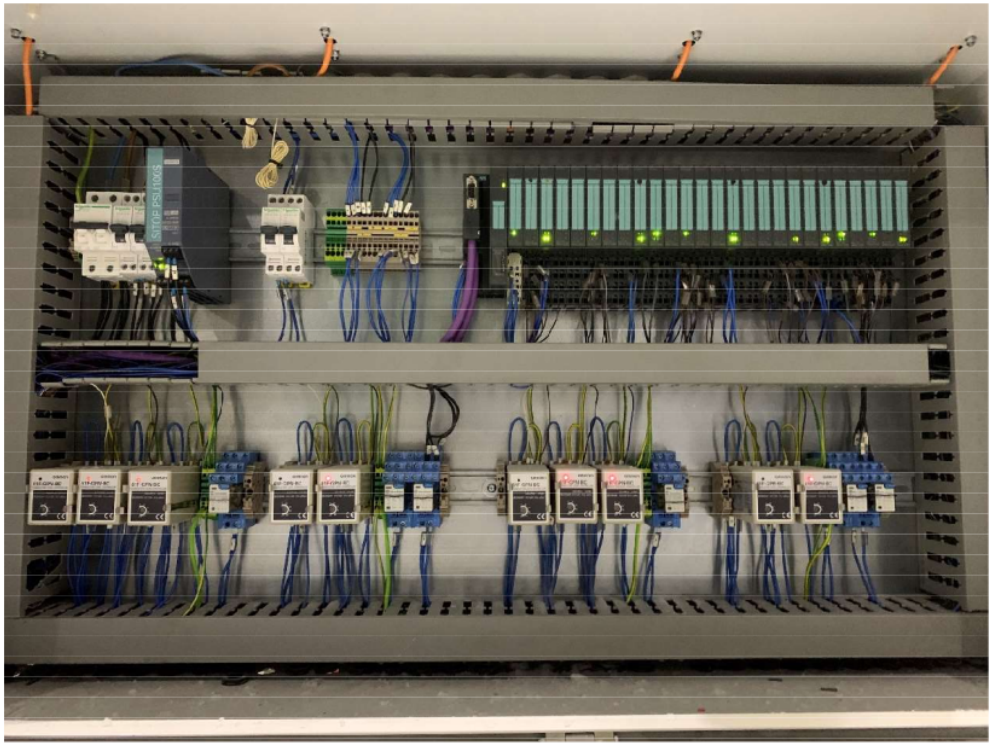


Figure 15: Completed electrical control panel

4.2 Software implementation

The glue rooms PLC software was modified to add the glue mixing station. The ET200 module was added to the project and given the node address 80 as shown in figure 10.

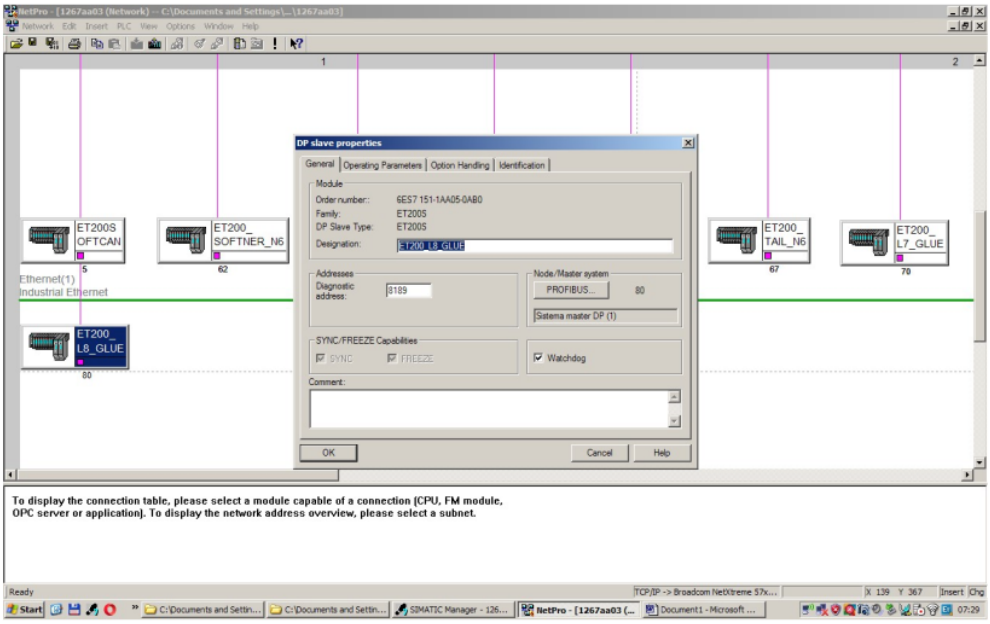


Figure 16: Adding ET200 module to project

With the modules added the addresses for the inputs and outputs for the station were allocated as shown in table 3 and table 4.

Table 3: Digital inputs

Description	I/O	Address
Core glue low tank level probe	Input	E93.1
Core glue tank max level	Input	E93.2
Core glue tank emergency level	Input	E93.3
Ply glue tank low level	Input	E96.2
Ply glue tank emergency level	Input	E96.3
Pickup glue low level probe	Input	E103.1
Pick up glue tank max level	Input	E103.2
Pickup glue tank emergency level	Input	E103.3

Tail tank low level	Input	E106.2
Tail tank emergency level	Input	E106.3
Ply - Remote push button, pump out from tank to remove tank	Input	E97.0
Ply – remote push button stop pump out from tank to remote tank	Input	E97.1
Ply glue - Flow meter	Input	E92.0
Tail – remote push button pump out from tank to remote tank	Input	E107.0
Tail – Remote push button stop pump out from tank to remote tank	Input	E107.1
Water – Flow meter	Input	E92.2
Tail glue – Flow meter	Input	E92.1

Table 4: Digital outputs

Core glue lamp on running	Output	A94.2
Ply glue blue tower light	Output	A97.2
Pickup glue lamp on running	Output	A104.2
Ply Water valve	Output	A96.2
Ply glue valve	Output	A96.3
Tail water valve	Output	A106.2
Tail glue	Output	A106.3
Ply - neat glue selected	Output	A98.1
Ply – blitz glue selected	Output	A98.0

Ply agitator	Output	A96.0
Ply pump out valve	Output	A96.1
Ply Pump out green LED on remote push button	Output	A98.3
Ply – Anti syphon solenoid valve	Output	A98.2
Ply – Red tower light	Output	A97.0
Tail – Water valve	Output	A106.2
Tail – Glue valve	Output	A106.3
Tail - Mixer	Output	A106.0
Tail – Pump out valve	Output	A106.1
Tail – Pump out green LED on remote push button	Output	A108.3
Tail – Anti syphon solenoid valve	Output	A108.2
Tail – Red tower light	Output	A107.0

The ladder logic was constructed from the SFC in the design phase. The program was divided into 8 separate function calls (FC).

All these function calls were put into the main organisation block (OB) as shown in figure 11.



Figure 17: Function calls in the main OB

The full program is shown in appendix 9.1.

Most of these images belong in the appendix
However, they do provide excellent evidence and information

4.3 HMI implementation

The HMI screen was added to the network and the Profibus address was 118 allocated as shown in figure 11.

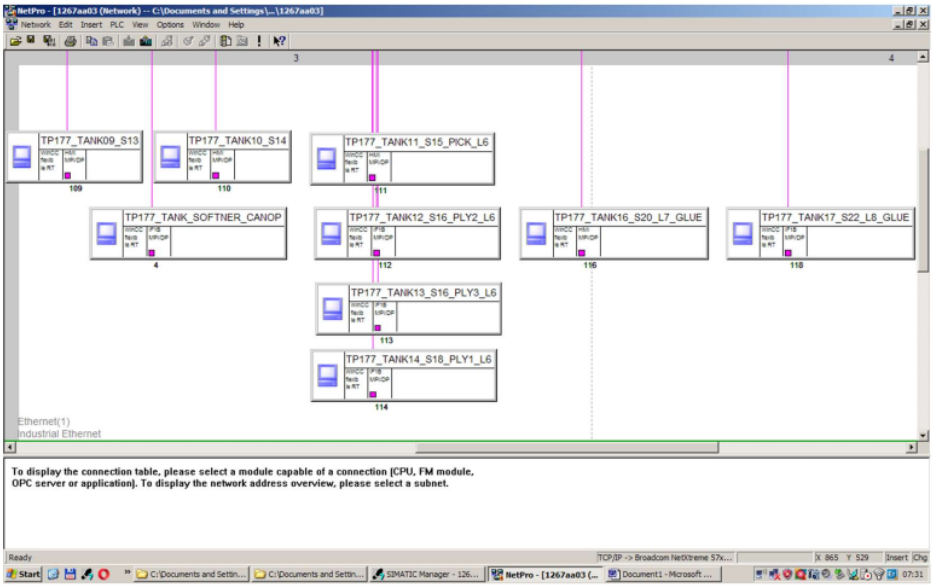


Figure 18: Adding HMI to project

Aided by the FDS HMI tags were addressed as shown in figures 19, 20 and 21.

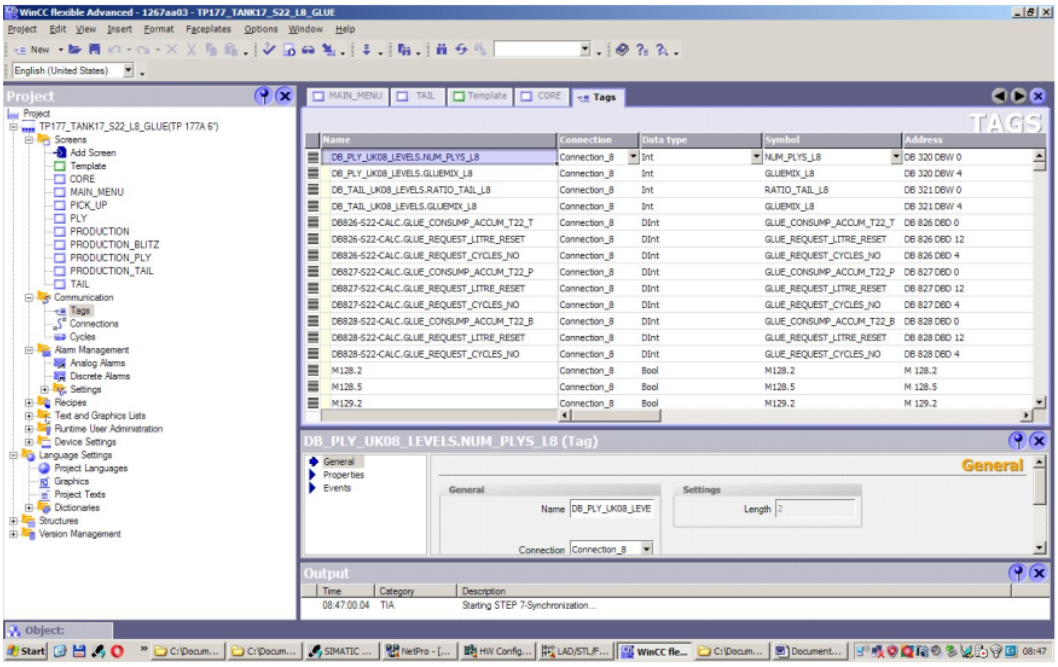


Figure 19: HMI tags

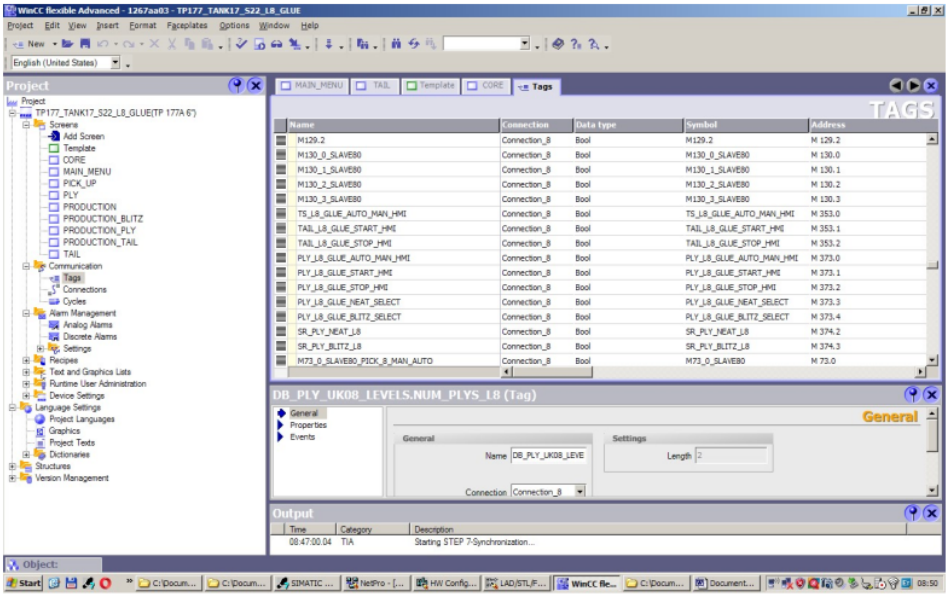


Figure 20: HMI tags

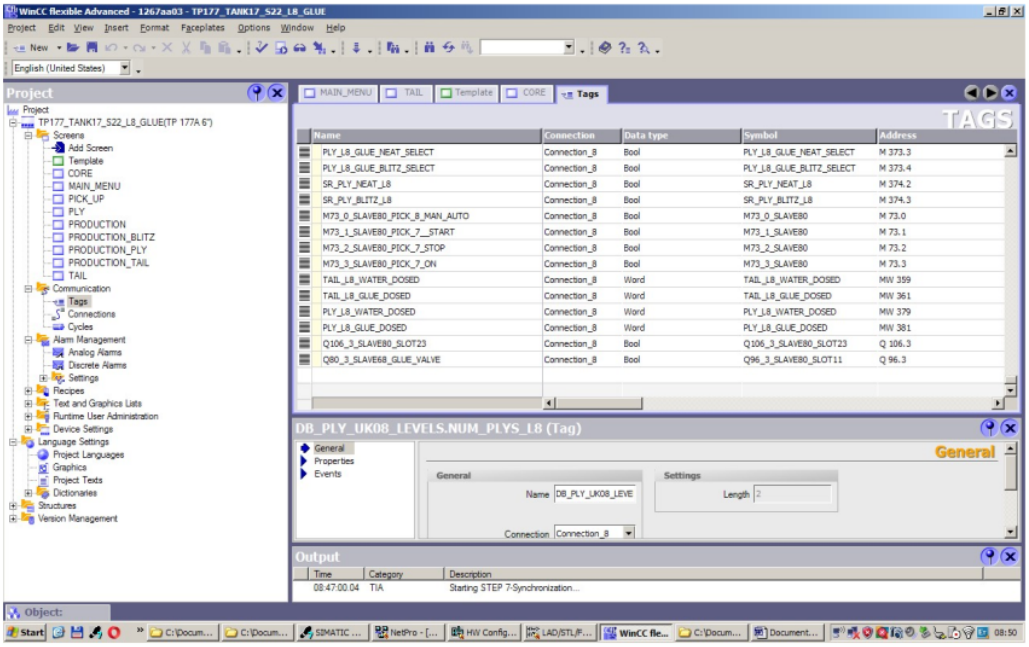


Figure 21: HMI tags

The HMI screens were designed as outlined in the FDS. The main menu screen enables the operator to navigate to the core glue, ply/blitz glue, pickup glue, tail glue or production data screens.

The main menu screen is shown in figure 22.

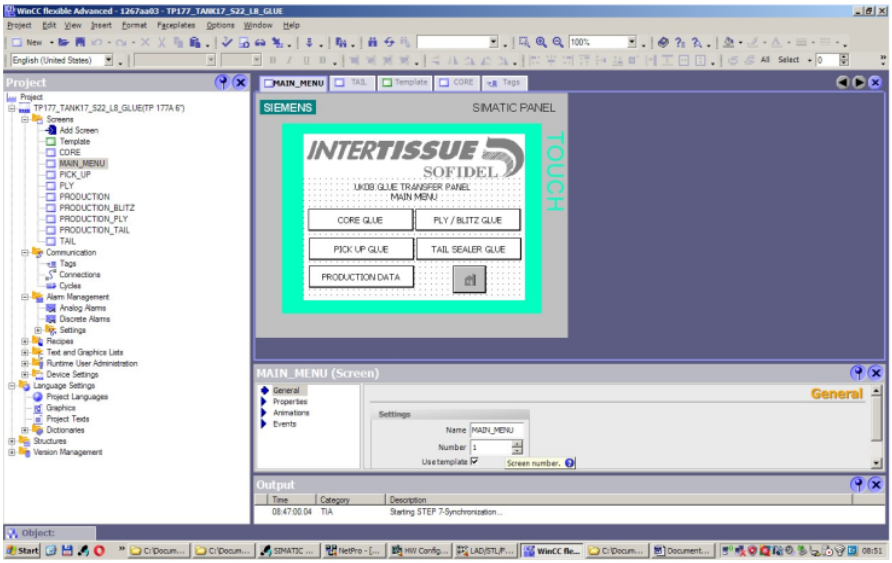


Figure 22: Main menu HMI screen

The core glue screen shown in figure 23 includes an automatic and manual selection. The operator can select glue start or glue stop from the screen. The main menu button navigates the operator back to the main menu.

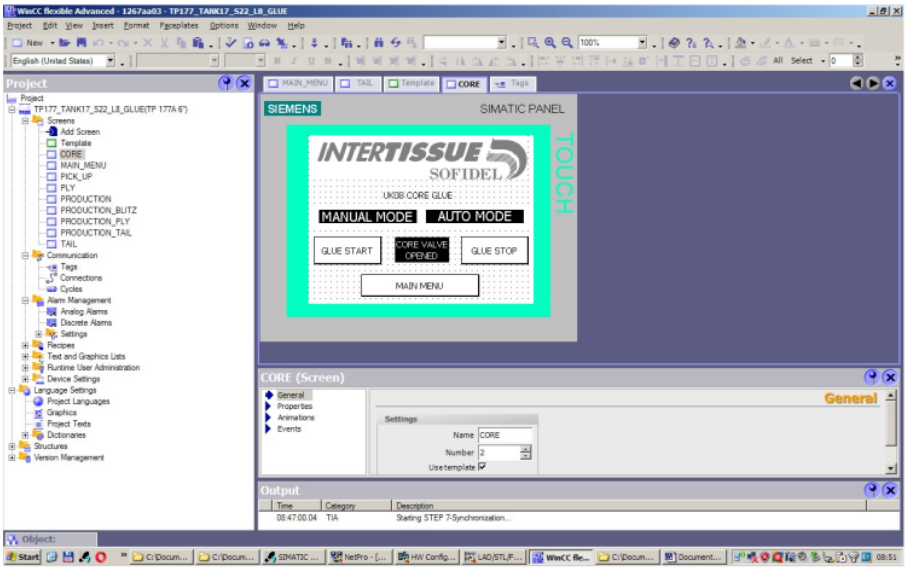


Figure 23: Core glue HMI screen

The pick-up glue screen as shown in figure 24 includes an automatic and manual selection. The operator can select glue start or glue stop from the screen. The main menu button navigates the operator back to the main menu.

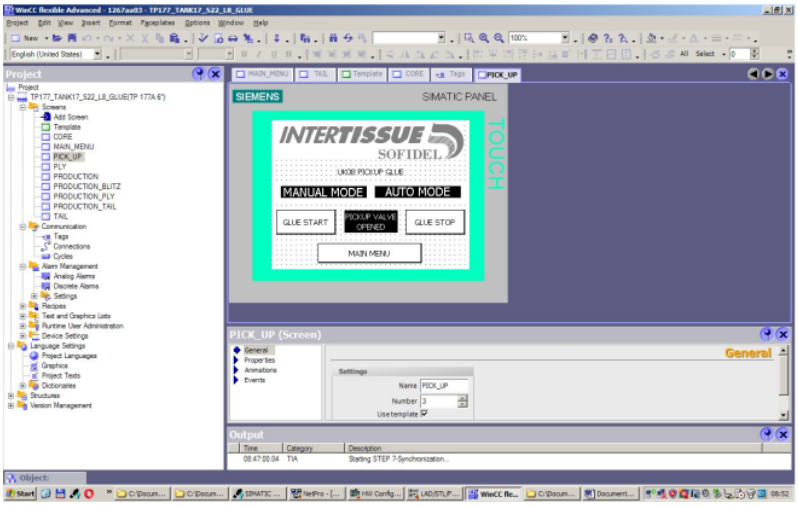


Figure 24: Pick up glue HMI screen

The ply glue screen as shown in figure 19 includes an automatic and manual function. The screen has two glue options being Blitz or neat. The number of ply's field range is 1-4 to prevent operators inputting a ply number that does not exist. The number of ply's selected will determine the litres of water and glue to be dosed for the ply. There's a start glue cycle and stop glue push button on the HMI. The user can also navigate back to the main menu by pressing the main menu button.

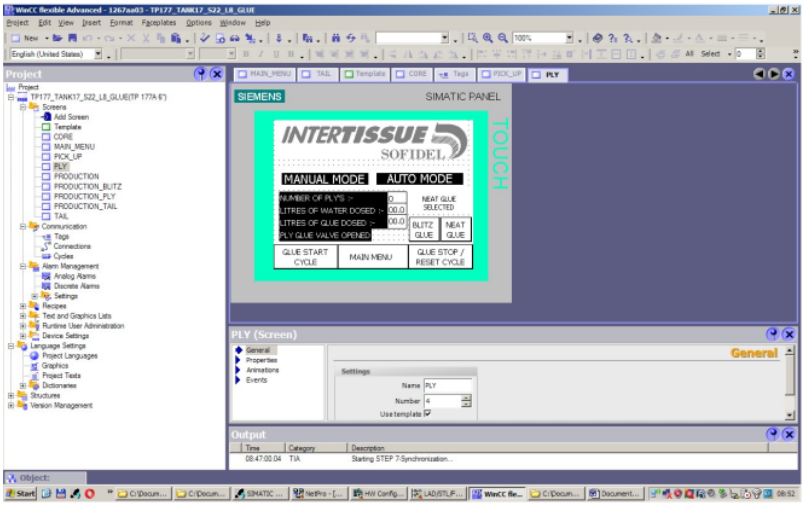


Figure 25: Ply glue HMI screen

The Blitz production data screen as shown in figure 26 includes the glue level quantity, accumulative consumption of glue, number of glue request cycles and consumption of glue since reset data.

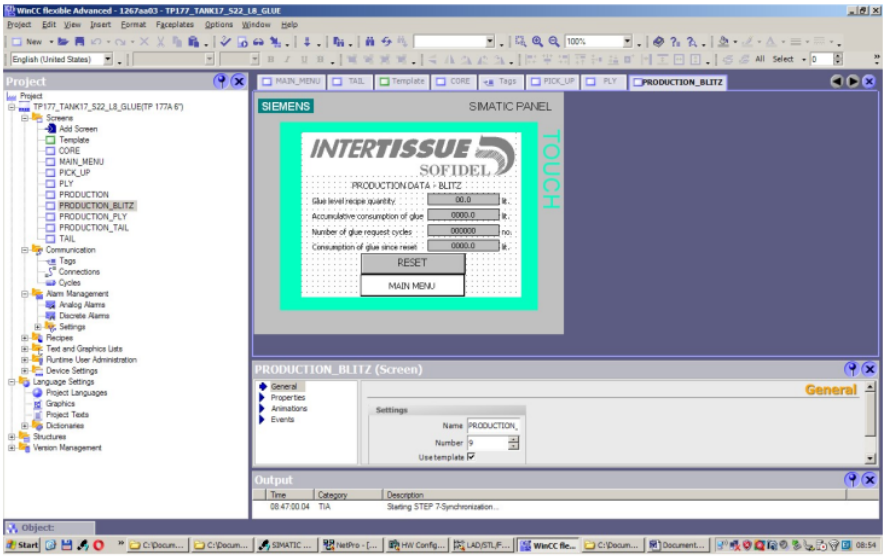


Figure 26: Blitz production data

The ply production data screen as shown in figure 27 includes the glue level quantity, accumulative consumption of glue, number of glue request cycles and consumption of glue since reset data.

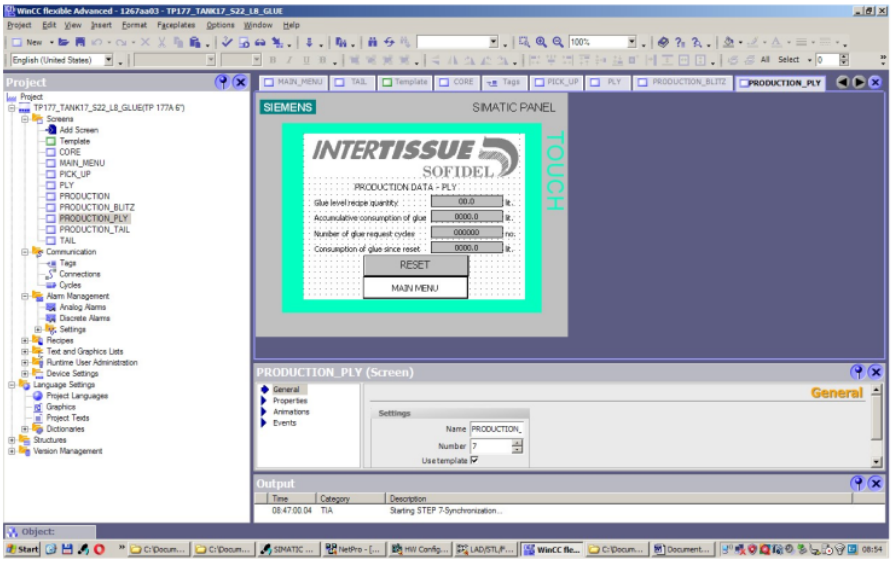


Figure 27: Ply production data

Line spacing should be 1.5

The tail production data screen as shown in figure 28 includes the glue level quantity, accumulative consumption of glue, number of glue request cycles and consumption of glue since reset data.

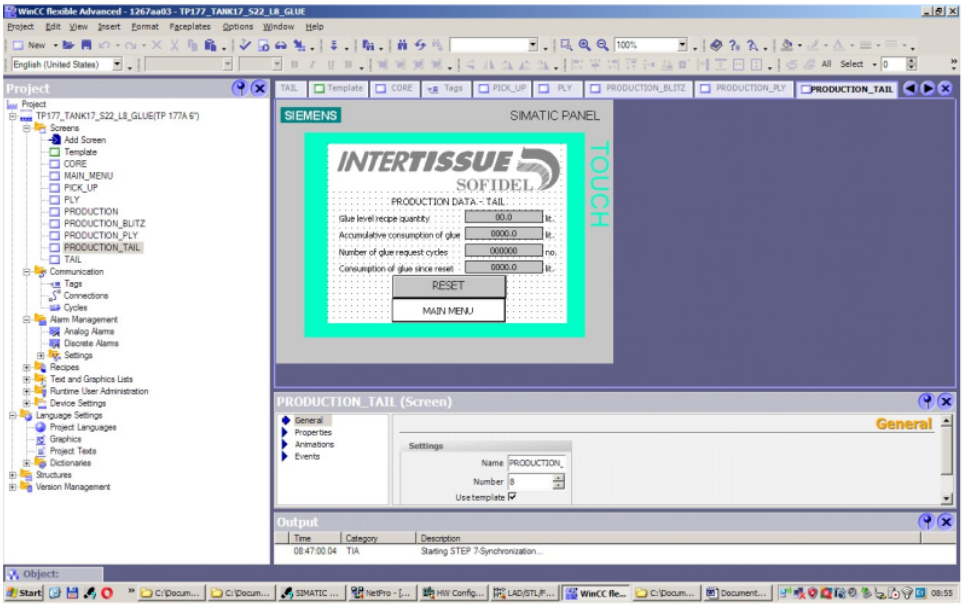


Figure 28: Tail production data HMI screen

The production data as required by the FDS enables production and logistics to monitor glue consumption on the lines.

4.4 Flow sensor configuration

The SM8100 magnetic flow sensor volumetric flow per pulse was configured supported by the manufacturers manual as shown in figure 29. Setting 10.3.3 was set to 0000.1 litre.

This extract from a datasheet is unnecessary and should have been simply explained and cited.

10.3 Settings for consumed quantity monitoring

10.3.1 Quantity monitoring by pulse output (OUT1)

- Select [ou1] and set ImP.
- Select [ImPR] and set YES.
- Select [ImPS] and set the volumetric flow quantity at which 1 pulse is provided (→ 10.3.3).

Figure 29: Quantity monitoring pulse output configuration (IFM, 2020)

In the program FC320 the pulse input signifies 0.1 litres and is added until the desired value level of water in the ply tank is reached as shown in figure 30

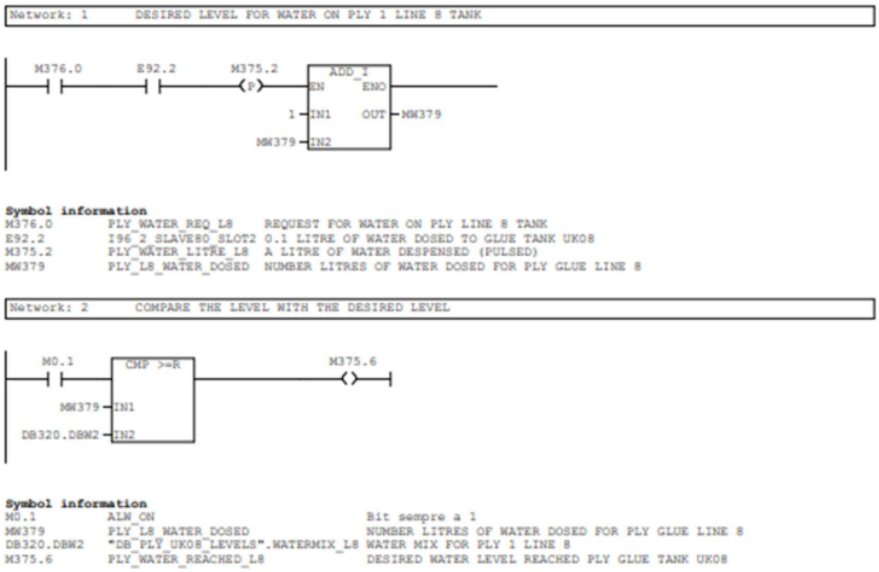


Figure 30: Water flow sensor logic

The SU7000 ultrasonic flow sensor volumetric flow quantity per pulse was configured aided by the manufacturers manual as shown in figure 31. Setting 10.3.3 was set to 0.0001litre.

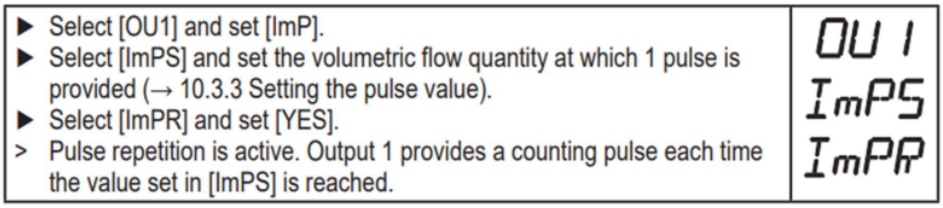


Figure 31: Quantity monitoring pulse output configuration for SU7000 flow sensor (IFM, 2014)

In FC320 the pulse input signifies 0.1 litres and is added until the desired value level of ply glue is reached as shown in figure 32.

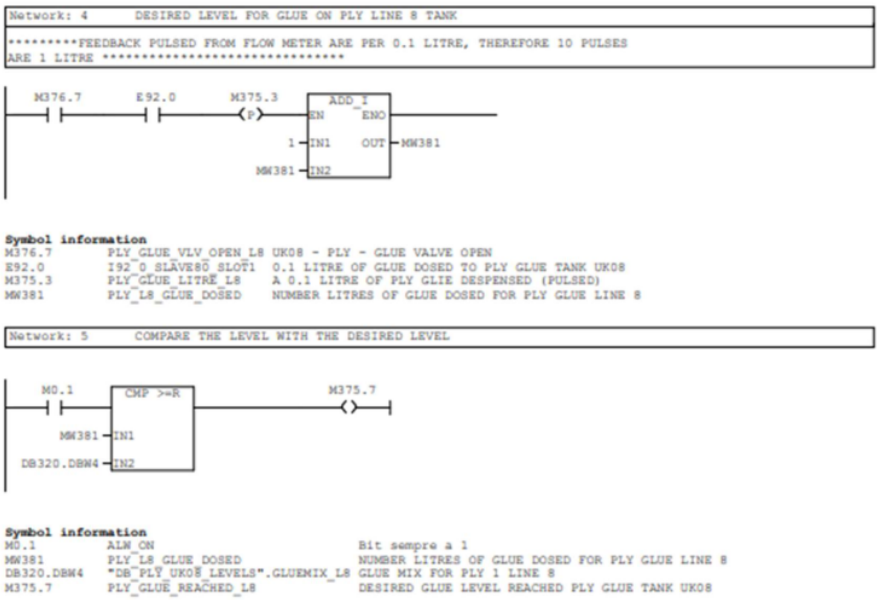


Figure 32: Ply flow sensor logic

The same parameter is set on the tail glue SU7000 sensor and added the output is configured in FC321 as shown in figure 25.

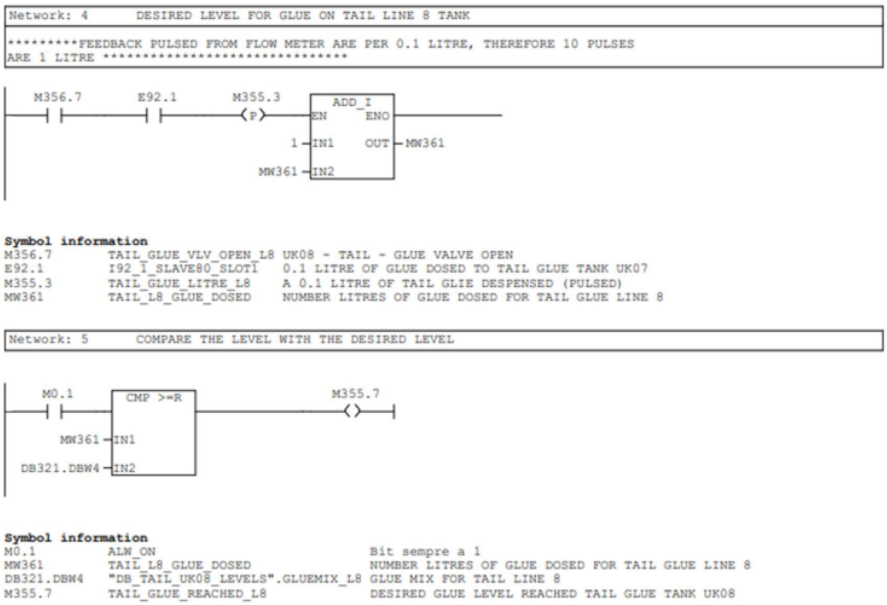


Figure 33: Tail flow sensor logic

4.5 Project management

The Gantt chart was invaluable to the project management and planning of the project. The tracking and monitoring of the Gantt chart enabled project manager to see progress and feed back to stakeholders. Milestones showed key aspects of the project deliverables from the design and implementation phases. Labour shortages was apparent during the design and implementation phase as production demand sometimes outweighed project priority. The final milestone has not yet been achieved as the operating instruction nor the operator training has been provided. The Gantt chart comparing the projected and actual times is shown in figure 34.

Your plan seems to have work with some overruns

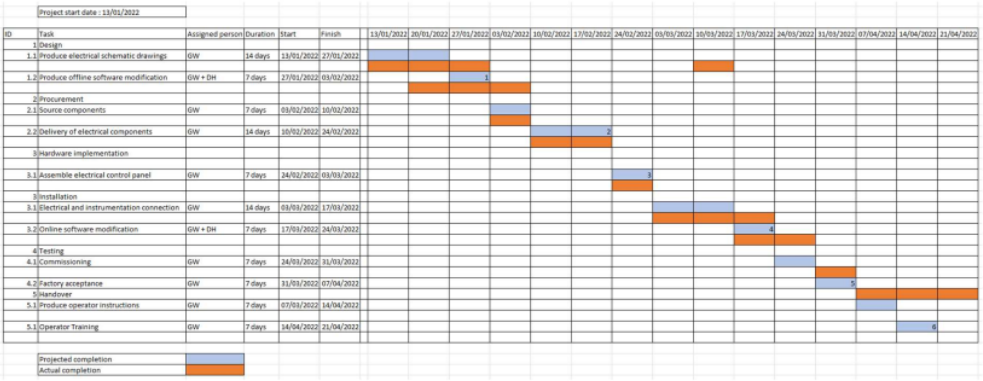


Figure 34: Project Gantt chart comparing projected and actual time of project stages.

5 Testing and results

The test plan as established in assignment 1 was the basis of the system testing. The conformity tests are shown in table 5.

Table 5: Conformity test results

Excellent evidence, though this table should be in the appendix

Reference	FDS Reference	Description of test	Expected result	Actual result	Appendix reference	Pass/fail
CT1	1.1	Profibus communication	In Simatic Manager software the I/O modules and HMI should be discoverable in the network.	The I/O modules and HMI was added and discoverable in the network view.	9.3	Pass
CT2	1.4	Automatic/ manual mode selection	On the HMI the user selects manual operation. This in turn latches into position. The mode selection on the screen clearly shows manual operation. The operator selects automatic operation. The selector	The user selected manual mode and the user was able to operate in manual mode. In automatic mode the system operated in automatic mode.	9.4	Pass

			latches into automatic mode. The HMI clearly states automatic operation.			
CT3	1.7	Flow sensors manufacturer	All flow sensors are manufactured by IFM.	The flow sensor on the station are IFM SU7000 and IFM 8100.	9.5	Pass
CT4	1.8	Electrical supply and lockable isolation point	A voltmeter will measure the supply voltage. With the isolator in the ON position: The readings should be Phase-Neutral ≈ 230V Phase-Earth ≈ 230V Neutral-Earth ≈ 0V With the isolator in the OFF position a lock must be applied. The isolator	With the isolator in the locked position a voltage proving unit was used and no voltage was present.	9.6	Pass

			cannot be energised with the lock in position. The readings should be Phase-Neutral ≈ 0V Phase-Earth ≈ 0V Neutral – Earth ≈ 0V			
CT5	1.9	Stability of machine	The machine is subject to moderate force and the integrity is not compromised.	The machine is sturdy and cannot be moved without considerable force.	N/A	Pass
CT6	1.10	Performance level of machine	The risks associated with the machine as per the risk assessment and performance level classification match that of the physical machine.	The risk assessment generated before the install was evaluated and no further risk were highlighted. The date carried out for the risk assessment	9.7	Pass

				was updated.		
CT7	1.10	Technical documentation	CAD drawings of the system and schematic electrical drawings are available. The CAD drawing and schematic electrical drawings are accurate to the physical system.	The CAD drawings have been produced. A basic schematic electrical diagram was produced and awaiting the Eplan software	9.2 + 9.8	Fail
CT8	1.11	Enclosure IP rating	The closure IP rating and cable entry glands conform to IP65 rating.	The electrical enclosure and entry glands conform to IP65 rating.	9.9	Pass
CT9	1.12	Machine operational instructions	The operational instruction provides a detailed instruction on the operation of the machine.	The operational instructions have not been produced.	N/A	Fail
CT10	1.13	Project costs	The total spend is	The total spend for	9.10	Pass

			below £20,000	the project came in at £13,225		

The functionality test was as follows.

Table 6: Functionality test results

Reference	FDS Reference	Description of test	Expected result	Actual result	Appendix reference	Pass/ fail
FT1	1.2.1	Core glue automatic sequence	On the core glue screen automatic mode is selected on the selector. As the tank is low level core glue is requested solenoid valve actuated and the glue is pumped from the glue room. The tank fills up to until it reaches the desired level probe. The glue is then pumped to the core machine.	Automatic mode was selected. The tank was low so core glue was requested and the core glue solenoid actuated and the core glue was pumped from the glue room. The tank filled up to the tank full probe. The glue was then pumped to the core machine.	9.11	Pass
FT2	1.2.2.1 1.2.2.3	Ply glue automatic sequence	On the Ply/Blitz screen automatic is selected then neat glue is	Automatic was selected on the Ply Blitz screen and neat glue	9.12	Pass

			selected and the number of plys entered as 3. As the tank is empty the tank will fill with the desired water level. Then the desired quantity of laminating glue will be dosed. The desired consistency will be established with the support of the quality department. The remote operator request button will be pressed and the glue will be sent to the embosser.	was selected. The number of ply's seslected was 3. The tank was filled with water then dosed with laminating glue. Through trial and error the desired consistency was established and agreed with the quality department. The ply glue request button was pressed and glue was sent to the embosser holding tank.		
FT3	1.2.2.2 1.2.2.3	Ply/blitz automatic sequence	On the Ply/Blitz screen automatic is selected then blitz is selected. As the tank is empty the tank	Automatic was selected on the Ply Blitz screen and blitz was selected. The tank was filled with Blitz. The	9.13	Pass

			will fill with the desired quantity of Blitz. The remote operator request button will be pressed, and the glue will be sent to the embosser.	ply glue request button was pressed and glue was sent to the embosser holding tank.		
FT4	1.2.3	Pick up glue automatic sequence	On the pickup glue screen automatic mode is selected. As the tank is empty the tank fill up until it reaches the high level probe. The pickup glue is pumped over to the rewinder and controlled by the paper machine.	Automatic mode was selected on the pick up glue screen. The solenoid actuated and the pump in the glue room started. The tank filled up until it reached the tank full sensor. The pickup glue was then pumped over to the rewinder and controlled by the paper machine.	9.14	Pass
FT5	1.2.4	Tail sealer glue	On the tail seal screen	Automatic mode was	9.15	Pass

		automatic sequence	automatic mode is selected. As the tank is empty water is filled into the tank. Once the desired volume of water is filled into the tank the desired value of tail seal glue is dosed into the tank. The request button on the remote panel on the tail sealer section of the paper machine is activated and the glue is supplied to the tail sealer.	selected on the tail seal screen. The tank was filled with water to the desired value. Then the tail glue was dosed. The dosing consistency was agreed with the quality department. The tail glue request button was pressed on the remote panel and glue was pumped to the tail seal holding tank.		
FT7	1.5 1.5.1 1.5.1.1 1.5.1.2	HMI operation	The system loads to the root screen being the main menu. From the main menu navigated to the core glue screen back to the main menu.	On start up the system loads to the main menu screen. From the main menu navigated to the core glue screen back	9.16	Pass

	1.5.1.3 1.5.1.4 1.5.2.1 1.5.2.2 1.5.2.3 1.5.2.4		From the main menu navigated to the Ply/Blitz screen back to the main menu From the main menu navigated to the pick up glue screen back to the main menu From the main menu navigated to the tail seal glue screen back to the main menu From the main menu navigated to the production data screen back to the main menu. From the production data navigate to the production data ply and back to production data.	to the main menu. From the main menu navigated to the Ply/Blitz screen back to the main menu From the main menu navigated to the pick up glue screen back to the main menu From the main menu navigated to the tail seal glue screen back to the main menu From the main menu navigated to the production data screen back to the main menu. From the production data navigate to the production		

			From the production data navigate to the production data Blitz and back to production data From the production data navigate to the production data tail and back to production data.	data ply and back to production data. From the production data navigate to the production data Blitz and back to production data From the production data navigate to the production data tail and back to production data.		
FT8	1.6 1.6.1 1.6.2	Machine beacon indicator	In automatic mode glue is requested from the glue room the blue beacon indicator will illuminate. Once the request is complete the indicator will switch off.	Automatic mode was selected and glue was requested from the glue room. The blue beacon indicator illuminated. The tank was full and the indicator switched off.	9.17	Pass

			In automatic mode core glue the glue tanks are filled up to the emergency level probe. The red beacon will illuminate and only clear when the tank level is lowered and reset cycle is pressed on the screen	He glue tank was filled to the emergency level probe. The red beacon illuminator switched on. The tank was pumped out until the level in the tank was below the tank full probe. Reset cycle was pressed on the HMI and the sequence started again.		

5.1 Flow rate issues

During testing it was noted that the flow rate would exceed the working range of the ultrasonic flow meter. The tank would exceed its dose and the consistence would be incorrect. This occurred several times during testing. To prevent the flow rate exceeding the working range of the sensor the ball valve was chocked back to increase the resistance to the flow. The ball valve was chocked back quarter of a turn, and this remediated the issue. The ball valve in the working position is shown in figure 35.



Figure 35: Tail glue ball valve chocked back to reduce flow

6. Evaluation of Project Outcomes

The FDS as outlined in assignment 1 had 16 deliverables that must be met to ensure project completion. The station integrated with the glue room PLC via profibus communication protocol to provide the input/outputs and HMI interface. The automatic glue request, storage and delivery of core, ply/blitz, pickup and tail glue was designed implemented and tuned to achieve optimal performance. The automatic and manual mode were simply selected on the HMI and performed the appropriate operation. Nine HMI screen were designed and allowed the operator to select a gluing application. Also, the facility of production data including number cycles performed. Each tank includes a beacon that shows the operator the state of the gluing application. The blue light signified that glue was pumping from the glue room and the red light indicated system fault. The flow sensors used were IFM as per company standard and the sensors were suitable to the application through configuration. A single-phase supply was provided with a method of isolation. The station was fixed and stable on the line. Each tank incorporates an emergency level probe to prevent the tank from overflowing. The electrical enclosure is IP65 rated and suitable for the production environment. The risk assessment for the system was reviewed and no additional risks were highlighted and the PLr categorisation a was attained. The technical data included the CAD diagram of the system, the electrical schematic diagram of the system and the P&ID diagram. The CAD diagram and the P&ID were completed. The schematic electrical diagram was drawn by hand and has started to be produced in a digital format. The unavailability of the EPlan electrical CAD was frustrating. The operating instruction for the station have started to be drafted however have not been complete due to time constraints. The total spend for the project so far has reached £13,225 which is £6,775 below the budget of £20,000. The implementation and commissioning has been complete however the supporting documentation has not been completed therefore the project cannot be completely signed off.

7. Conclusions and Recommendations

To conclude 13 out of the 16 deliverables outlined in the FDS have been achieved with satisfactory test results. The project as a whole was a success however the supporting documentation must be compiled to complete the project.

During performance testing it was noted when production would exchange from blitz to ply and vice versa the tank would involve the operators flushing the tank before filling the tank with the required glue. A separate ply and blitz holding tank would improve change over times and reduce waste. The ply/blitz adhesive has a single ultrasonic flow sensor and a solenoid directs which adhesive to go in the tank. A separate ultrasonic flow sensor for blitz and neat would be beneficial. The ply and tail glue water supply is monitored by a single magnetic flow sensor and directed to the desired tank by solenoid valves. Only one tank can be filled at a time with water and this is governed by the ladder logic. It would be of benefit if two magnetic flow sensors were implemented on the water supply so both tanks could be dosed at the same time to prevent a possible bottleneck. The legacy PLC requires upgrading and profinet communication would be of benefit. Profibus is proven however profinet is faster and provides more reliable communication and capabilities. The flow rate was reduced in the commissioning stage to prevent the sensor going over range. This work around works presently however a better solution such as a larger quantity flow sensor or a method of flow control could be implemented.

8. Citation list

Camozzi, 2021. *Camozzi.* [Online]
Available at: http://catalogue.camozzi.com/CATALOGUES/CCC-GENCAT/00153/PDF/ENG.4.2.30.pdf
[Accessed 10 02 2023].

IFM, 2014. *IFM.* [Online]
Available at: https://www.ifm.com/mounting/80011616UK.pdf
[Accessed 10 02 2023].

IFM, 2020. *IFM.* [Online]
Available at: https://www.ifm.com/mounting/11393456UK.pdf
[Accessed 10 02 2023].

MachineBuilding, 2018. *MachineBuilding*. [Online]
Available at: https://www.machinebuilding.net/bs-en-60204-12018-new-edition-of-machinery-safety-standard
[Accessed 11 02 2023].

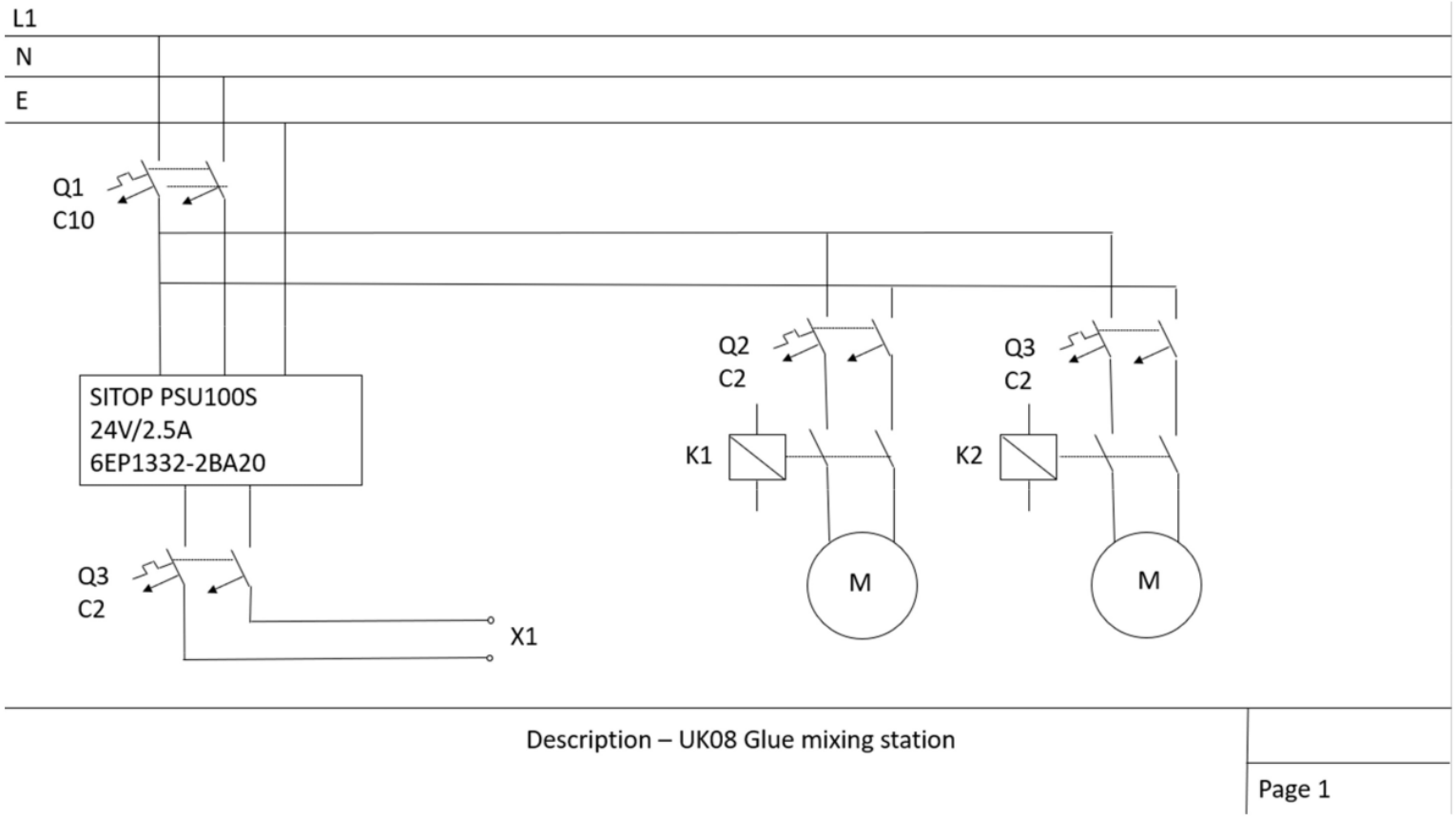
Omron, 2020. *Omron.* [Online]
Available at: https://assets.omron.eu/downloads/datasheet/en/v4/f053_61f-gpn-bt_-bc_conductive_level_controller_datasheet_en.pdf
[Accessed 03 02 2023].

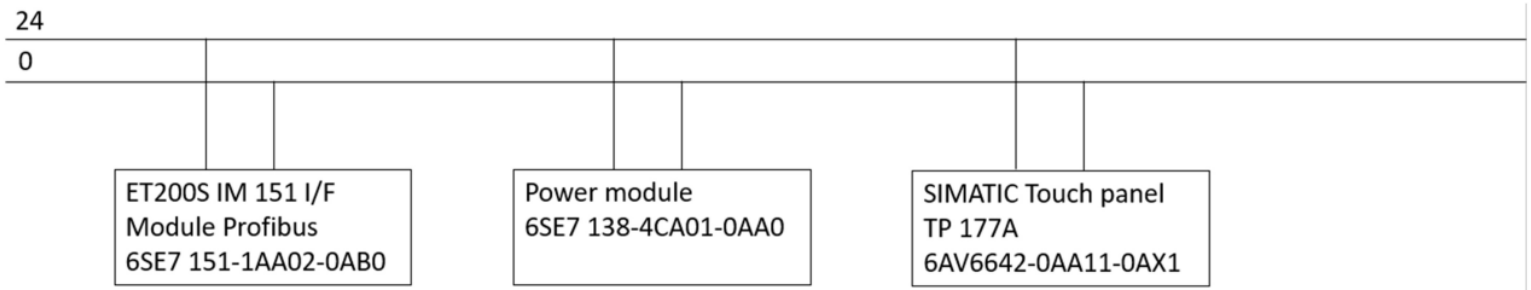
For a level 6 final report, this is a very small list and show little engagement in research using literature to inform your design process.

There are lots of datasheets in the main report but you should have extracted the information, explained and cited the sources.

9. Appendix

9.1 Electrical schematic diagram





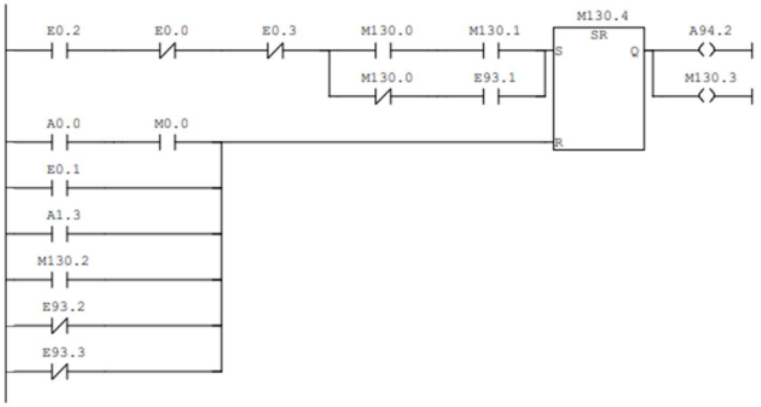
Description – UK08 Glue mixing station

Page 2

9.2 Program

The glue request function call networks are as follows:

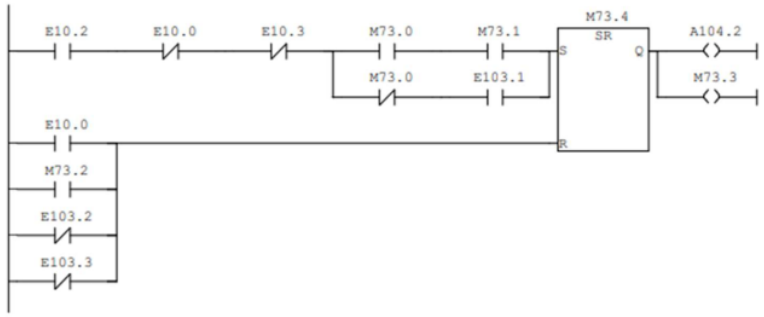
Network: 2 GLUE REQUEST UK08 - LINE 1 NODE 8 (CORE GLUE)



Symbol information

E0.2	I0_2_CPU_SLOT5	CPU: Pump 1 automatic control
E0.0	I0_0_CPU_SLOT5	CPU: Pump 1 run
E0.3	I0_3_CPU_SLOT5	CPU: Pump 1 run test
M130.0	M130_0_SLAVE80	SLAVE 80: CORE GLUE - MAN=1 AUTO=0
M130.1	M130_1_SLAVE80	SLAVE 80: CORE GLUE START BUTTON
E93.1	I93_1_SLAVE80_SLOT2	SLAVE 80: CORE L8 GLUE REACHED LOW PROBE WHEN INPUT = 0
A0.0	Q0_0_CPU_SLOT6	CPU: Pump 1 running
M0.0	ALW_OFF	Bit sempre a 0
E0.1	I0_1_CPU_SLOT5	CPU: Pump 1 overload
A1.3	Q1_3_CPU_SLOT6	CPU: Glue low level contact
M130.2	M130_2_SLAVE80	SLAVE 80: CORE GLUE STOP BUTTON
E93.2	I93_2_SLAVE80_SLOT2	SLAVE 80: CORE L8 GLUE REACHED MAX WHEN INPUT = 0
E93.3	I93_3_SLAVE80_SLOT2	SLAVE 80: CORE L8 GLUE HAS REACHED EMERGENCY WHEN IN = 0
M130.4	GLUE_CORE_REQ_N8	REQUEST CORE GLUE FROM N8 ON PANEL
A94.2	Q94_2_SLAVE80_SLOT6	SLAVE 80: HL3 LINE 8 CORE GLUE LAMP ON (RUNNING)
M130.3	M130_3_SLAVE80	SLAVE 80: CORE GLUE LINE 8 ON

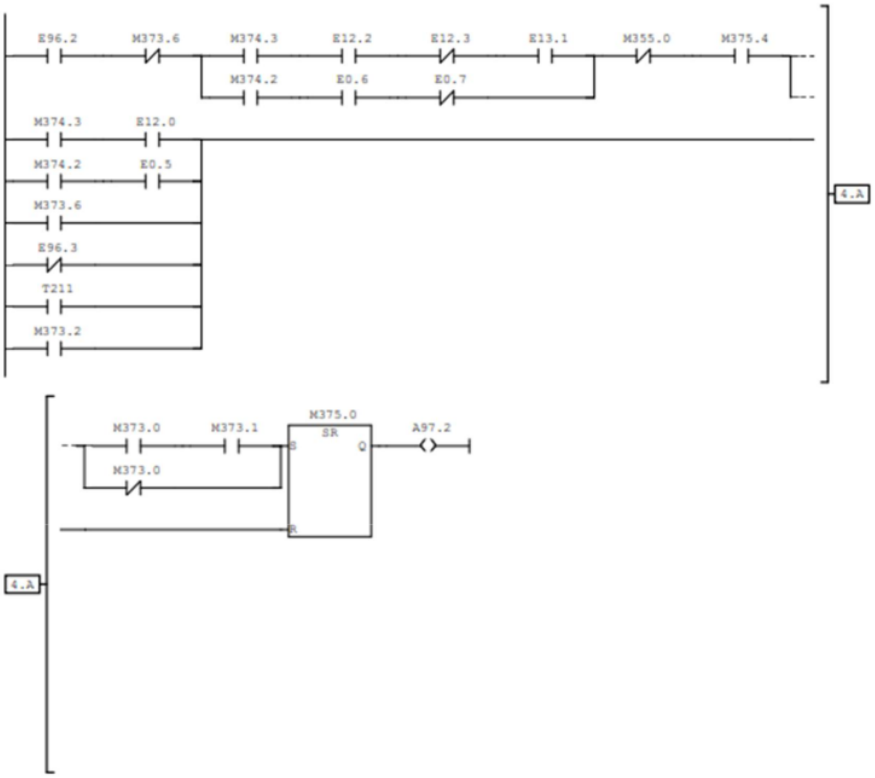
Network: 3 GLUE REQUEST UK08 - PICKUP GLUE REQUEST



Symbol information

E10.2	I10_2_SLAVE3_SLOT2	SLAVE 3: AUTOMATIC CONTROL OF PICKUP GLUE PUMP
E10.0	I10_0_SLAVE3_SLOT2	SLAVE 3: PICKUP PUMP OVERLOAD INPUT
E10.3	I10_3_SLAVE3_SLOT2	SLAVE 3: PICKUP PUMP TEST SWITCH TOGGLE ON
M73.0	M73_0_SLAVE80	SLAVE 80: PICKUP GLUE - MAN=1 AUTO=0
M73.1	M73_1_SLAVE80	SLAVE 80: CORE GLUE START BUTTON
E103.1	I103_1_SLAVE80_SLOT14	SLAVE 80: PICK L8 GLUE REACHED LOW PROBE WHEN INPUT = 0
M73.2	M73_2_SLAVE80	SLAVE 80: PICKUP GLUE STOP BUTTON ON PANEL
E103.2	I103_2_SLAVE80_SLOT14	SLAVE 80: PICK L8 GLUE REACHED MAX WHEN INPUT = 0
E103.3	I103_3_SLAVE80_SLOT14	SLAVE 80: PICK L8 GLUE HAS REACHED EMERGENCY WHEN IN = 0
M73.4	GLUE_PICKUP_REQ_N8	REQUEST PICKUP GLUE FROM N8 ON PANEL
A104.2	Q104_2_SLAVE80_SLOT18	SLAVE 80: HL3 LINE 8 PICKUP GLUE LAMP ON (RUNNING)
M73.3	M73_3_SLAVE80	SLAVE 80: PICKUP GLUE LINE 8 ON

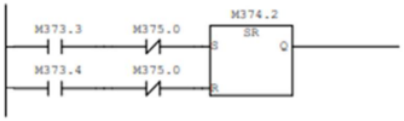
Network: 4 GLUE REQUEST UK08 - PLY/BLITZ



Symbol information

E96.2	I96_2_SLAVE80_SLOT8	UK08 PLY - LOW LEVEL PROBE (TRUE-NO CONTACT)
M373.6	SR_PLY_L8_ALARM	SET ALARM FOR PLY L8 - ISSUE WITH SYSTEM
M374.3	SR_PLY_BLITZ_L8	SELECTION MADE PLY GLUE TANK - BLITZ GLUE NEEDED
E12.2	I12_2_SLAVE3_SLOT4	SLAVE 3: AUTOMATIC CONTROL OF BLITZ GLUE PUMP
E12.3	I12_3_SLAVE3_SLOT4	SLAVE 3: BLITZ PUMP TEST SWITCH TOGGLE ON
E13.1	I13_1_SLAVE3_SLOT5	SLAVE 3: BLITZ PUMP CONSENT (ENOUGH MIX IN SAVIO HOLDING TANK)
M374.2	SR_PLY_NEAT_L8	SELECTION MADE PLY GLUE TANK - NEAT GLUE NEEDED
E0.6	I0_6_CPU_SLOT5	CPU: Pump 2 automatic control
E0.7	I0_7_CPU_SLOT5	CPU: Pump 2 run test
M355.0	SR_TAIL_REQ_L8	REQUEST TAIL GLUE FROM UK08
M375.4	PLY_GLUE_READY_START_L8	Ready to start a new mix on PLY LINE 8
M373.0	PLY_L8_GLUE_AUTO_MAN_HMI	AUTO (0) MANUAL (1) SET FROM HMI FOR LINE 8 PLY/BLITZ
M373.1	PLY_L8_GLUE_START_HMI	START PLY L8 GLUE MIX FROM HMI
E12.0	I12_0_SLAVE3_SLOT4	SLAVE 3: BLITZ PUMP OVERLOAD INPUT
E0.5	I0_5_CPU_SLOT5	CPU: Pump 2 overload
E96.3	I96_3_SLAVE68_SLOT8	UK08 PLY - EMERGENCY LEVEL PROBE (TRUE-NO CONTACT)
T211	T211	End of cycle PLY1 delay line 8
M373.2	PLY_L8_GLUE_STOP_HMI	STOP PLY L8 GLUE MIX FROM HMI
M375.0	SR_PLY_REQ_L8	REQUEST PLY GLUE FROM UK08
A97.2	Q97_2_SLAVE80_SLOT12	UK08 - PLY - BLUE TOWER LIGHT

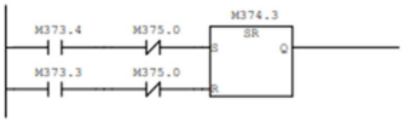
Network: 5 GLUE REQUEST FOR (NEAT GLUE SELECTION) ON PLY TANK LINE 8



Symbol information

M373.3	PLY_L8_GLUE_NEAT_SELECT	SELECTION ON PLY GLUE TANK - NEAT GLUE NEEDED
M375.0	SR_PLY_REQ_L8	REQUEST PLY GLUE FROM UK08
M373.4	PLY_L8_GLUE_BLITZ_SELECT	SELECTION ON PLY GLUE TANK - BLITZ GLUE NEEDED
M374.2	SR_PLY_NEAT_L8	SELECTION MADE PLY GLUE TANK - NEAT GLUE NEEDED

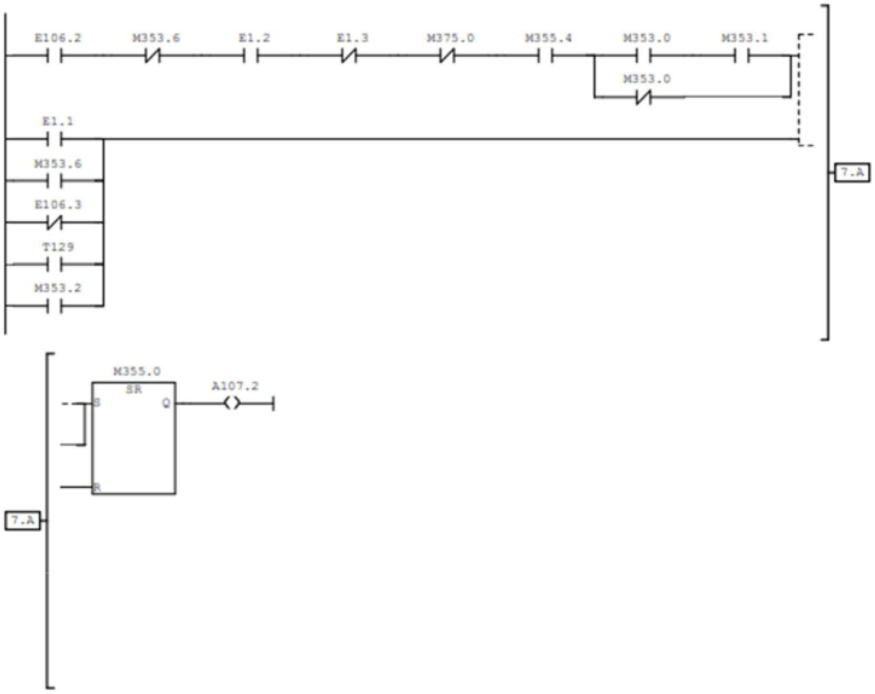
Network: 6 GLUE REQUEST FOR (BLITZ GLUE SELECTION) ON PLY TANK LINE 8



Symbol information

M373.4	PLY_L8_GLUE_BLITZ_SELECT	SELECTION ON PLY GLUE TANK - BLITZ GLUE NEEDED
M375.0	SR_PLY_REQ_L8	REQUEST PLY GLUE FROM UK08
M373.3	PLY_L8_GLUE_NEAT_SELECT	SELECTION ON PLY GLUE TANK - NEAT GLUE NEEDED
M374.3	SR_PLY_BLITZ_L8	SELECTION MADE PLY GLUE TANK - BLITZ GLUE NEEDED

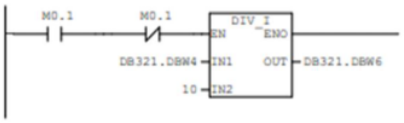
Network: 7 GLUE REQUEST UK08 - TAIL SEAL



Symbol information

E106.2	I106_2_SLAVE80_SLOT20	UK08 TAIL - LOW LEVEL PROBE (TRUE-NO CONTACT)
M353.6	SR_TAIL_L8_ALARM	SET ALARM FOR TAIL L8 - ISSUE WITH SYSTEM
E1.2	I1_2_CPU_SLOT5	CPU: Pump 3 automatic control
E1.3	I1_3_CPU_SLOT5	CPU: Pump 3 run test
M375.0	SR_PLY_REQ_L8	REQUEST PLY GLUE FROM UK08
M355.4	TAIL_GLUE_READY_START_L8	Ready to start a new mix on TAIL LINE 8
M353.0	TS_L8_GLUE_AUTO_MAN_HMI	AUTO (0) MANUAL (1) SET FROM HMI FOR LINE 8 TAIL SEAL
M353.1	TAIL_L8_GLUE_START_HMI	START TAIL L8 GLUE MIX FROM HMI
E1.1	I1_1_CPU_SLOT5	CPU: Pump 3 overload
E106.3	I106_3_SLAVE80_SLOT20	UK08 TAIL - EMERGENCY LEVEL PROBE (TRUE-NO CONTACT)
T129	T129	End of cycle TAIL delay line 8
M353.2	TAIL_L8_GLUE_STOP_HMI	STOP TAIL L8 GLUE MIX FROM HMI
M355.0	SR_TAIL_REQ_L8	REQUEST TAIL GLUE FROM UK08
A107.2	Q107_2_SLAVE80_SLOT24	UK08 - TAIL - BLUE TOWER LIGHT

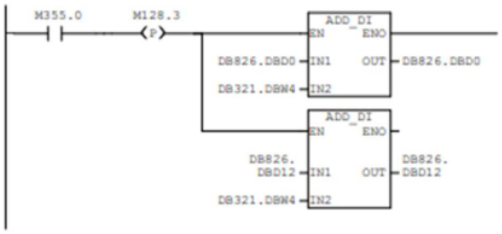
Network: 8 CONVERT CENTILITRES TO LITRES UK08 TAIL



Symbol information

M0.1	ALW_ON	Bit sempre a 1
DB321.DBW4	"DB_TAIL_UK08_LEVELS".GLUEMIX_L8	GLUE MIX FOR TAIL LINE 8

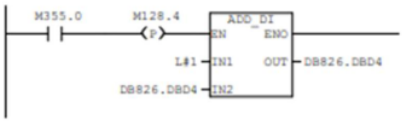
Network: 9 CONSUMPTION CALCULATION UK08 TAIL GLUE LITRES



Symbol information

M355.0	SR_TAIL_REQ_L8	REQUEST TAIL GLUE FROM UK08
DB826.DBD0	"DB826-S22-CALC".GLUE_CONSUMP_ACCUM_T22_T	GLUE ACCUMULATIVE CONSUMPTION TOTAL ON TANK 22 (LINE 8 TAIL)
DB321.DBW4	"DB_TAIL_UK08_LEVELS".GLUEMIX_L8	GLUE MIX FOR TAIL LINE 8
DB826.DBD12	"DB826-S22-CALC".GLUE_REQUEST_LITRE_RESET	GLUE RESET LITRE COUNT TAIL

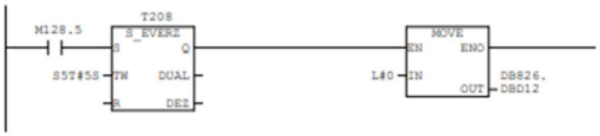
Network: 10 QUANITY OF NUMBER OF FILLING UP CYCLES TANK 17 UK08 TAIL GLUE



Symbol information

M355.0	SR_TAIL_REQ_L8	REQUEST TAIL GLUE FROM UK08
DB826.DBD4	"DB826-S22-CALC".GLUE_REQUEST_CYCLES_NO	GLUE REQUEST NUMBER OF CYCLES CARRIED OUT ON TANK 22 (LINE 8 TAIL)

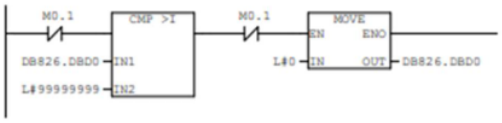
Network: 11 RESET OF LITRE COUNTER FOR UK08 TAIL



Symbol information

M128.5	M128.5	RESET OF LITRE COUNTER S22 UK08 TAIL
DB826.DBD12	"DB826-S22-CALC".GLUE_REQUEST_LITRE_RESET	GLUE RESET LITRE COUNT TAIL

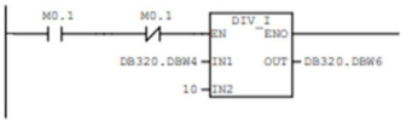
Network: 12 AUTOMATIC RESET OF ACCUMULATIVE LITRE COUNTER FOR UK08 TAIL



Symbol information

M0.1	ALW_ON	Bit sempre a 1
DB826.DBD0	"DB826-S22-CALC".GLUE_CONSUMP_ACCUM_T22_T	GLUE ACCUMULATIVE CONSUMPTION TOTAL ON TANK 22 (LINE 8 TAIL)

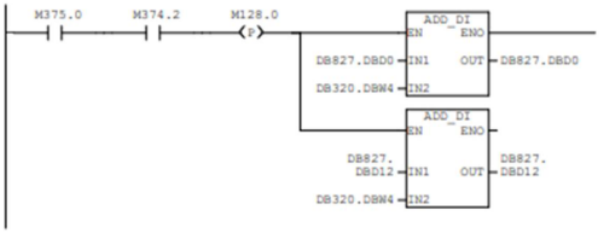
Network: 13 CONVERT CENTILITRES TO LITRES UK08 PLY



Symbol information

M0.1	ALW_ON	Bit sempre a 1
DB320.DBW4	"DB_PLY_UK08_LEVELS".GLUEMIX_L8	GLUE MIX FOR PLY 1 LINE 8

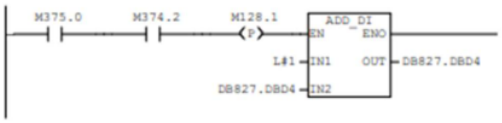
Network: 14 CONSUMPTION CALCULATION UK08 PLY GLUE LITRES



Symbol information

M375.0	SR_PLY_REQ_L8	REQUEST PLY GLUE FROM UK08
M374.2	SR_PLY_NEAT_L8	SELECTION MADE PLY GLUE TANK - NEAT GLUE NEEDED
DB827.DBD0	"DB827-S22-CALC".GLUE_CONSUMP_ACCUM_T22_P	GLUE ACCUMULATIVE CONSUMPTION TOTAL ON TANK 22 (LINE 8 PLY)
DB320.DBW4	"DB_PLY_UK08_LEVELS".GLUEMIX_L8	GLUE MIX FOR PLY 1 LINE 8
DB827.DBD12	"DB827-S22-CALC".GLUE_REQUEST_LITRE_RESET	GLUE RESET LITRE COUNT PLY

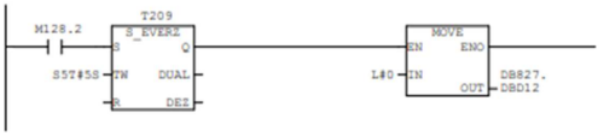
Network: 15 QUANITY OF NUMBER OF FILLING UP CYCLES TANK 17 UK08 PLY GLUE



Symbol information

M375.0	SR_PLY_REQ_L8	REQUEST PLY GLUE FROM UK08
M374.2	SR_PLY_NEAT_L8	SELECTION MADE PLY GLUE TANK - NEAT GLUE NEEDED
DB827.DBD4	"DB827-S22-CALC".GLUE_REQUEST_CYCLES_NO	GLUE REQUEST NUMBER OF CYCLES CARRIED OUT ON TANK 22 (LINE 8 PLY)

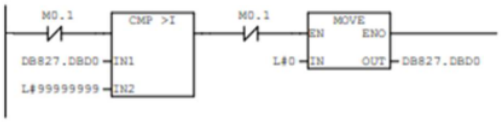
Network: 16 RESET OF LITRE COUNTER FOR UK08 PLY



Symbol information

M128.2	M128.2	RESET OF LITRE COUNTER S22 UK08 PLY
DB827.DBD12	"DB827-S22-CALC".GLUE_REQUEST_LITRE_RESET	GLUE RESET LITRE COUNT PLY

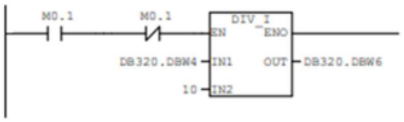
Network: 17 AUTOMATIC RESET OF ACCUMULATIVE LITRE COUNTER FOR UK08 PLY



Symbol information

M0.1	ALW_ON	Bit sempre a 1
DB827.DBD0	"DB827-S22-CALC".GLUE_CONSUMP_ACCUM_T22_P	GLUE ACCUMULATIVE CONSUMPTION TOTAL ON TANK 22 (LINE 8 PLY)

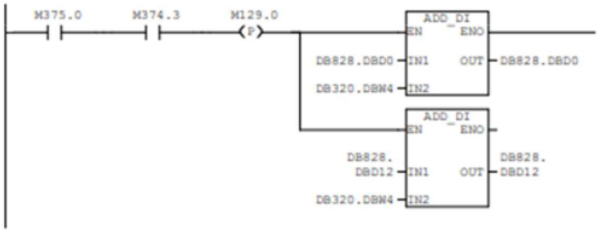
Network: 18 CONVERT CENTILITRES TO LITRES UK08 BLITZ



Symbol information

M0.1	ALW_ON	Bit sempre a 1
DB320.DBW4	"DB_PLY_UK08_LEVELS".GLUEMIX_L8	GLUE MIX FOR PLY 1 LINE 8

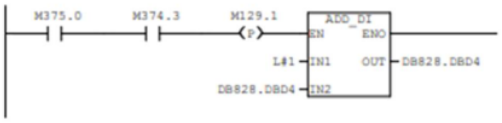
Network: 19 CONSUMPTION CALCULATION UK08 BLITZ GLUE LITRES



Symbol information

M375.0	SR_PLY_REQ_L8	REQUEST PLY GLUE FROM UK08
M374.3	SR_PLY_BLITZ_L8	SELECTION MADE PLY GLUE TANK - BLITZ GLUE NEEDED
DB828.DBD0	"DB828-S22-CALC".GLUE_CONSUMP_ACCUM_T22_B	GLUE ACCUMULATIVE CONSUMPTION TOTAL ON TANK 22 (LINE 8 BLITZ)
DB320.DBW4	"DB_PLY_UK08_LEVELS".GLUEMIX_L8	GLUE MIX FOR PLY 1 LINE 8
DB828.DBD12	"DB828-S22-CALC".GLUE_REQUEST_LITRE_RESET	GLUE RESET LITRE COUNT BLITZ

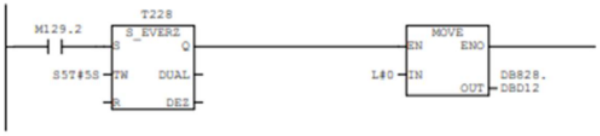
Network: 20 QUANITY OF NUMBER OF FILLING UP CYCLES TANK 17 UK08 BLITZ GLUE



Symbol information

M375.0	SR_PLY_REQ_L8	REQUEST PLY GLUE FROM UK08
M374.3	SR_PLY_BLITZ_L8	SELECTION MADE PLY GLUE TANK - BLITZ GLUE NEEDED
DB828.DBD4	"DB828-S22-CALC".GLUE_REQUEST_CYCLES_NO	GLUE REQUEST NUMBER OF CYCLES CARRIED OUT ON TANK 22 (LINE 8 BLITZ)

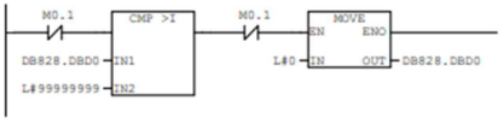
Network: 21 RESET OF LITRE COUNTER FOR UK08 BLITZ



Symbol information

M129.2	M129.2	RESET OF LITRE COUNTER S17 UK08 BLITZ
DB828.DBD12	"DB828-S22-CALC".GLUE_REQUEST_LITRE_RESET	GLUE RESET LITRE COUNT BLITZ

Network: 22 AUTOMATIC RESET OF ACCUMULATIVE LITRE COUNTER FOR UK08 BLITZ

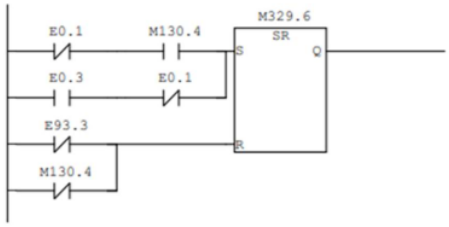


Symbol information

M0.1	ALW ON	Bit sempre a 1
DB828.DBD0	"DB828-S22-CALC".GLUE_CONSUMP_ACCUM_T22_B	GLUE ACCUMULATIVE CONSUMPTION TOTAL ON TANK 22 (LINE 8 BLITZ)

The Pump function call is as follows:

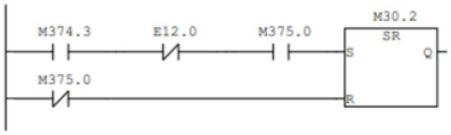
Network: 2 CPU: Pump 1 CORE running



Symbol information

E0.1	I0_1_CPU_SLOT5	CPU: Pump 1 overload
M130.4	GLUE_CORE_REQ_N8	REQUEST CORE GLUE FROM N8 ON PANEL
E0.3	I0_3_CPU_SLOT5	CPU: Pump 1 run test
E93.3	I93_3_SLAVE80_SLOT2	SLAVE 80: CORE L8 GLUE HAS REACHED EMERGENCY WHEN IN = 0
M329.6	SR_PUMP1_RUN_N8	SR to run PUMP 1 - Called from N8 - UK08 CORE GLUE

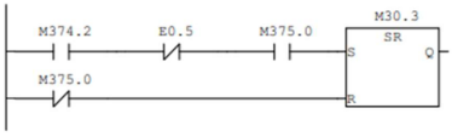
Network: 3 CPU: CALL FOR BLITZ GLUE FROM UK08



Symbol information

M374.3	SR_PLY_BLITZ_L8	SELECTION MADE PLY GLUE TANK - BLITZ GLUE NEEDED
E12.0	I12_0_SLAVE3_SLOT4	SLAVE 3: BLITZ PUMP OVERLOAD INPUT
M375.0	SR_PLY_REQ_L8	REQUEST PLY GLUE FROM UK08
M30.2	SR_BLITZ_PUMP_RUN_N8	SR BLITZ PUMP - CALLED FROM N8

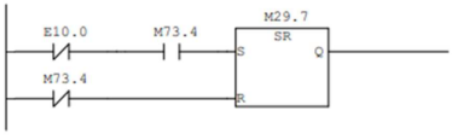
Network: 4 CPU: CALL FOR NEAT PLY GLUE FROM UK08



Symbol information

M374.2	SR_PLY_NEAT_L8	SELECTION MADE PLY GLUE TANK - NEAT GLUE NEEDED
E0.5	I0_5_CPU_SLOT5	CPU: Pump 2 overload
M375.0	SR_PLY_REQ_L8	REQUEST PLY GLUE FROM UK08
M30.3	SR_PUMP2_RUN_N8_PLY	SR per marcia PUMP 2 - called from N8 - PLY

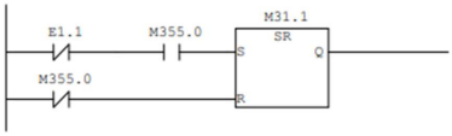
Network: 5 SLAVE 80: PICK UP Pump running for line 8



Symbol information

E10.0	I10_0_SLAVE3_SLOT2	SLAVE 3: PICKUP PUMP OVERLOAD INPUT
M73.4	GLUE_PICKUP_REQ_N8	REQUEST PICKUP GLUE FROM N8 ON PANEL
M29.7	SR_PICKUP_PUMP_RUN_N8	SR PICKUP PUMP - CALLED FROM N8

Network: 6 CPU: CALL FOR TAIL GLUE FROM UK08

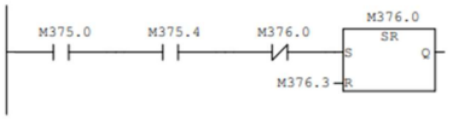


Symbol information

E1.1	I1_1_CPU_SLOT5	CPU: Pump 3 overload
M355.0	SR_TAIL_REQ_L8	REQUEST TAIL GLUE FROM UK08
M31.1	SR_TAIL_PUMP_RUN_N8	SR TAIL PUMP - CALLED FROM N8

Ply tank cycle FC240 is as follows:

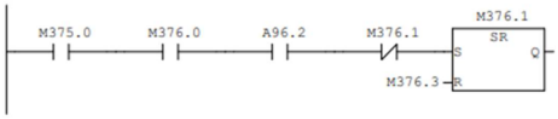
Network: 2 WATER VALVE OPEN



Symbol information

M375.0	SR_PLY_REQ_L8	REQUEST PLY GLUE FROM UK08
M375.4	PLY_GLUE_READY_START_L8	Ready to start a new mix on PLY LINE 8
M376.0	PLY_WATER_REQ_L8	REQUEST FOR WATER ON PLY LINE 8 TANK
M376.3	PLY_WATER_LVLRCH_L8	UK08 - PLY - WATER - LEVEL REACHED - CLOSE VALVE

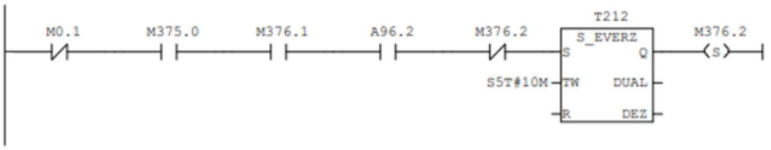
Network: 3 Water Valve opened - wait level



Symbol information

M375.0	SR_PLY_REQ_L8	REQUEST PLY GLUE FROM UK08
M376.0	PLY_WATER_REQ_L8	REQUEST FOR WATER ON PLY LINE 8 TANK
A96.2	Q96_2_SLAVE80_SLOT11	UK08 - PLY - WATER VALVE
M376.1	PLY_WATER_WAIT_L8	WAIT FOR WATER ON PLY LINE 8 TANK
M376.3	PLY_WATER_LVLRCH_L8	UK08 - PLY - WATER - LEVEL REACHED - CLOSE VALVE

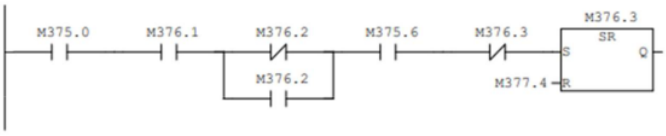
Network: 4 Water valve maximum time opened for



Symbol information

M0.1	ALW_ON	Bit sempre a 1
M375.0	SR_PLY_REQ_L8	REQUEST PLY GLUE FROM UK08
M376.1	PLY_WATER_WAIT_L8	WAIT FOR WATER ON PLY LINE 8 TANK
A96.2	Q96_2_SLAVE80_SLOT11	UK08 - PLY - WATER VALVE
M376.2	PLY_WATER_MAX_T_L8	PLY LINE 8 - WATER - MAXIMUM TIME REACHED
T212	T212	PLY L8 - WATER - MAXIMUM TIME REACHED

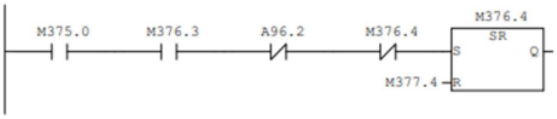
Network: 5 Water Valve - Level OK reached - CLOSE Valve



Symbol information

M375.0	SR_PLY_REQ_L8	REQUEST PLY GLUE FROM UK08
M376.1	PLY_WATER_WAIT_L8	WAIT FOR WATER ON PLY LINE 8 TANK
M376.2	PLY_WATER_MAX_T_L8	PLY LINE 8 - WATER - MAXIMUM TIME REACHED
M375.6	PLY_WATER_REACHED_L8	DESIRED WATER LEVEL REACHED PLY GLUE TANK UK08
M376.3	PLY_WATER_LVLRCH_L8	UK08 - PLY - WATER - LEVEL REACHED - CLOSE VALVE
M377.4	PLY_GLUE_END_L8	UK08 - PLY - GLUE END

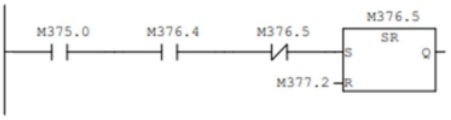
Network: 6 Water Valve - Closed



Symbol information

M375.0	SR_PLY_REQ_L8	REQUEST PLY GLUE FROM UK08
M376.3	PLY_WATER_LVLRCH_L8	UK08 - PLY - WATER - LEVEL REACHED - CLOSE VALVE
A96.2	Q96_2_SLAVE80_SLOT11	UK08 - PLY - WATER VALVE
M376.4	PLY_WATER_VLVCLO_L8	UK08 - PLY - WATER VALVE CLOSED
M377.4	PLY_GLUE_END_L8	UK08 - PLY - GLUE END

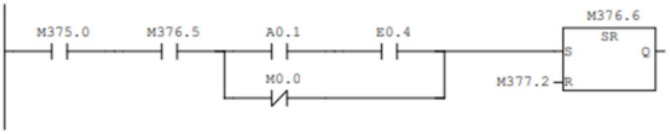
Network: 8 Glue Pump - START



Symbol information

M375.0	SR_PLY_REQ_L8	REQUEST PLY GLUE FROM UK08
M376.4	PLY_WATER_VLVCLO_L8	UK08 - PLY - WATER VALVE CLOSED
M376.5	PLY_GLUE_PUMP_START_L8	UK08 - PLY - GLUE PUMP START
M377.2	PLY_GLUE_CLOSE_VLV_L8	UK08 - PLY - GLUE LEVEL REACHED CLOSE VALVE

Network: 9 Glue pump turned ON

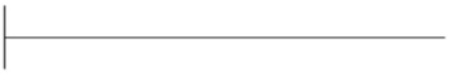


Symbol information

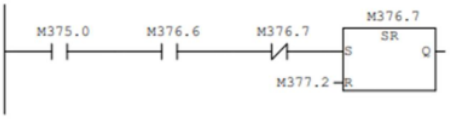
M375.0	SR_PLY_REQ_L8	REQUEST PLY GLUE FROM UK08
M376.5	PLY_GLUE_PUMP_START_L8	UK08 - PLY - GLUE PUMP START
A0.1	Q0_1_CPU_SLOT6	CPU: Pump 2 running
E0.4	I0_4_CPU_SLOT5	CPU: Pump 2 run
M0.0	ALW_OFF	Bit sempre a 0
M376.6	PLY_GLUE_PUMP_ON_L8	UK08 - PLY - GLUE PUMP ON
M377.2	PLY_GLUE_CLOSE_VLV_L8	UK08 - PLY - GLUE LEVEL REACHED CLOSE VALVE

Network: 10 Comment

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-------------------------------NOTA BENE-----------------------------------
Glue Valve Management
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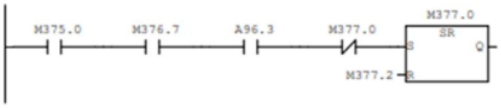
Network: 11 Glue Valve - OPEN



Symbol information

M375.0	SR_PLY_REQ_L8	REQUEST PLY GLUE FROM UK08
M376.6	PLY_GLUE_PUMP_ON_L8	UK08 - PLY - GLUE PUMP ON
M376.7	PLY_GLUE_VLV_OPEN_L8	UK08 - PLY - GLUE VALVE OPEN
M377.2	PLY_GLUE_CLOSE_VLV_L8	UK08 - PLY - GLUE LEVEL REACHED CLOSE VALVE

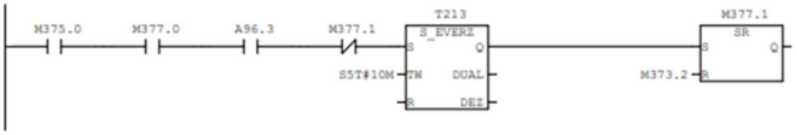
Network: 12 Glue Valve opened - wait level



Symbol information

M375.0	SR_PLY_REQ_L8	REQUEST PLY GLUE FROM UK08
M376.7	PLY_GLUE_VLV_OPEN_L8	UK08 - PLY - GLUE VALVE OPEN
A96.3	Q96_3_SLAVE80_SLOT11	UK08 - PLY - GLUE VALVE
M377.0	PLY_GLUE_VLV_OPENW_L8	UK08 - PLY - GLUE VALVE OPEN (WAIT)
M377.2	PLY_GLUE_CLOSE_VLV_L8	UK08 - PLY - GLUE LEVEL REACHED CLOSE VALVE

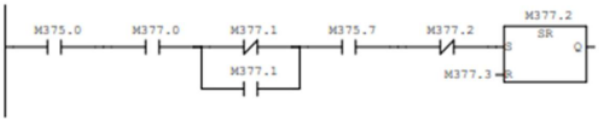
Network: 13 Maximum timer for glue valve to be opened on UK07 PLY



Symbol information

M375.0	SR_PLY_REQ_L8	REQUEST PLY GLUE FROM UK08
M377.0	PLY_GLUE_VLV_OPENW_L8	UK08 - PLY - GLUE VALVE OPEN (WAIT)
A96.3	Q96_3_SLAVE80_SLOT11	UK08 - PLY - GLUE VALVE
M377.1	PLY_GLUE_MTIME_VLV_L8	UK08 - PLY - GLUE VALVE MAXIMUM TIME REACHED
T213	T213	PLY - L8 - GLUE - MAXIMUM TIME REACHED
M373.2	PLY_L8_GLUE_STOP_HMI	STOP PLY L8 GLUE MIX FROM HMI

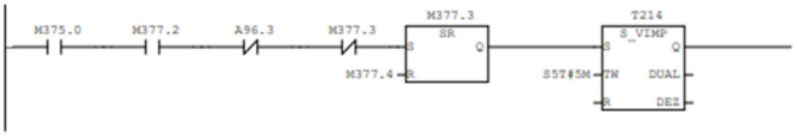
Network: 14 Glue Valve - Level OK reached - CLOSE Valve



Symbol information

M375.0	SR_PLY_REQ_L8	REQUEST PLY GLUE FROM UK08
M377.0	PLY_GLUE_VLV_OPENW_L8	UK08 - PLY - GLUE VALVE OPEN (WAIT)
M377.1	PLY_GLUE_MTIME_VLV_L8	UK08 - PLY - GLUE VALVE MAXIMUM TIME REACHED
M375.7	PLY_GLUE_REACHED_L8	DESIRED GLUE LEVEL REACHED PLY GLUE TANK UK08
M377.2	PLY_GLUE_CLOSE_VLV_L8	UK08 - PLY - GLUE LEVEL REACHED CLOSE VALVE
M377.3	PLY_GLUE_PUMP_OFF_L8	UK08 - PLY - GLUE PUMP TURN OFF

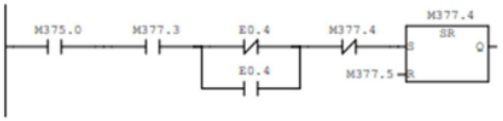
Network: 15 Glue Valve - Closed - Glue pump turn OFF



Symbol information

M375.0	SR_PLY_REQ_L8	REQUEST PLY GLUE FROM UK08
M377.2	PLY_GLUE_CLOSE_VLV_L8	UK08 - PLY - GLUE LEVEL REACHED CLOSE VALVE
A96.3	Q96_3_SLAVE80_SLOT11	UK08 - PLY - GLUE VALVE
M377.3	PLY_GLUE_PUMP_OFF_L8	UK08 - PLY - GLUE PUMP TURN OFF
M377.4	PLY_GLUE_END_L8	UK08 - PLY - GLUE END

Network: 16 Glue Valve - END



Symbol information

M375.0	SR_PLY_REQ_L8	REQUEST PLY GLUE FROM UK08
M377.3	PLY_GLUE_PUMP_OFF_L8	UK08 - PLY - GLUE PUMP TURN OFF
E0.4	IO_4_CPU_SLOT5	CPU: Pump 2 run
M377.4	PLY_GLUE_END_L8	UK08 - PLY - GLUE END
M377.5	PLY_GLUE_END_COMP_L8	UK08 - PLY - GLUE END COMPLETED

Network: 19 Comment

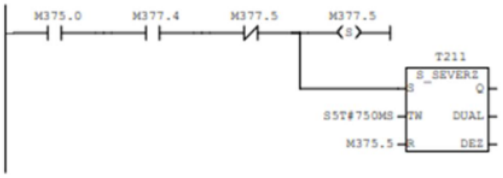
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--------------------------------NOTA BENE-----------------------------------
Mixer Valve Management
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Symbol information

M375.0	SR_PLY_REQ_L8	REQUEST PLY GLUE FROM UK08
M375.5	PLY_GLUE_ENDED_L8	PLY GLUE ON LINE 8 HAS ENDED THE SEQUENCE

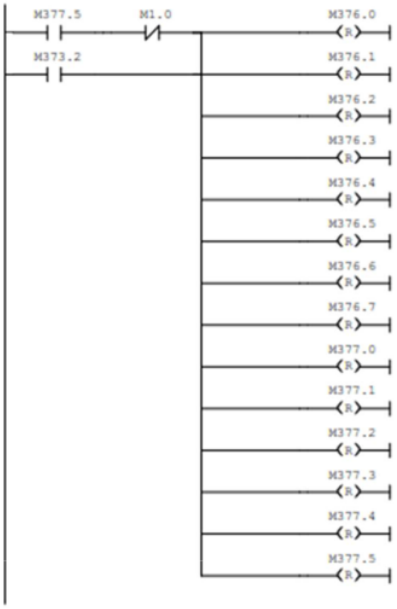
Network: 20 Ok to End



Symbol information

M375.0	SR_PLY_REQ_L8	REQUEST PLY GLUE FROM UK08
M377.4	PLY_GLUE_END_L8	UK08 - PLY - GLUE END
M377.5	PLY_GLUE_END_COMP_L8	UK08 - PLY - GLUE END COMPLETED
T211	T21Y	End of cycle PLY1 delay line 8
M375.5	PLY_GLUE_ENDED_L8	PLY GLUE ON LINE 8 HAS ENDED THE SEQUENCE

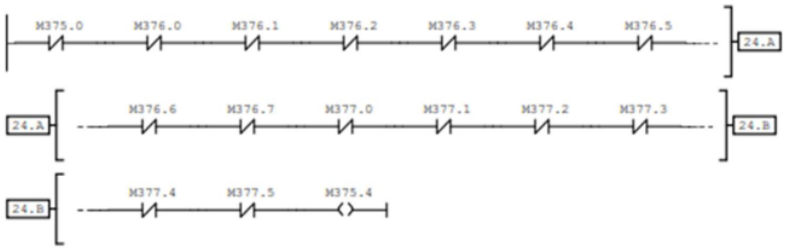
Network: 22 RESET



Symbol information

M377.5	PLY_GLUE_END_COMP_L8	UK08 - PLY - GLUE END COMPLETED
M373.2	PLY_L8_GLUE_STOP_HMI	STOP PLY L8 GLUE MIX FROM HMI
M376.0	PLY_WATER_REQ_L8	REQUEST FOR WATER ON PLY LINE 8 TANK
M376.1	PLY_WATER_WAIT_L8	WAIT FOR WATER ON PLY LINE 8 TANK
M376.2	PLY_WATER_MAX_T_L8	PLY LINE 8 - WATER - MAXIMUM TIME REACHED
M376.3	PLY_WATER_LVLRCH_L8	UK08 - PLY - WATER - LEVEL REACHED - CLOSE VALVE
M376.4	PLY_WATER_VLVCLO_L8	UK08 - PLY - WATER VALVE CLOSED
M376.5	PLY_GLUE_PUMP_START_L8	UK08 - PLY - GLUE PUMP START
M376.6	PLY_GLUE_PUMP_ON_L8	UK08 - PLY - GLUE PUMP ON
M376.7	PLY_GLUE_VLV_OPEN_L8	UK08 - PLY - GLUE VALVE OPEN
M377.0	PLY_GLUE_VLV_OPENW_L8	UK08 - PLY - GLUE VALVE OPEN (WAIT)
M377.1	PLY_GLUE_MTIME_VLV_L8	UK08 - PLY - GLUE VALVE MAXIMUM TIME REACHED
M377.2	PLY_GLUE_CLOSE_VLV_L8	UK08 - PLY - GLUE LEVEL REACHED CLOSE VALVE
M377.3	PLY_GLUE_PUMP_OFF_L8	UK08 - PLY - GLUE PUMP TURN OFF
M377.4	PLY_GLUE_END_L8	UK08 - PLY - GLUE END

Network: 24 Sequence Completed - Ready for next mix

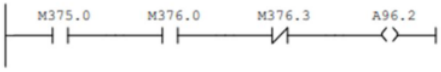


Symbol information

M375.0	SR_PLY_REQ_L8	REQUEST PLY GLUE FROM UK08
M376.0	PLY_WATER_REQ_L8	REQUEST FOR WATER ON PLY LINE 8 TANK
M376.1	PLY_WATER_WAIT_L8	WAIT FOR WATER ON PLY LINE 8 TANK
M376.2	PLY_WATER_MAX_T_L8	PLY LINE 8 - WATER - MAXIMUM TIME REACHED
M376.3	PLY_WATER_LVLRCH_L8	UK08 - PLY - WATER - LEVEL REACHED - CLOSE VALVE
M376.4	PLY_WATER_VLVCLO_L8	UK08 - PLY - WATER VALVE CLOSED
M376.5	PLY_GLUE_PUMP_START_L8	UK08 - PLY - GLUE PUMP START
M376.6	PLY_GLUE_PUMP_ON_L8	UK08 - PLY - GLUE PUMP ON
M376.7	PLY_GLUE_VLV_OPEN_L8	UK08 - PLY - GLUE VALVE OPEN
M377.0	PLY_GLUE_VLV_OPENN_L8	UK08 - PLY - GLUE VALVE OPEN (WAIT)
M377.1	PLY_GLUE_MTIME_VLV_L8	UK08 - PLY - GLUE VALVE MAXIMUM TIME REACHED
M377.2	PLY_GLUE_CLOSE_VLV_L8	UK08 - PLY - GLUE LEVEL REACHED CLOSE VALVE
M377.3	PLY_GLUE_PUMP_OFF_L8	UK08 - PLY - GLUE PUMP TURN OFF
M377.4	PLY_GLUE_END_L8	UK08 - PLY - GLUE END
M377.5	PLY_GLUE_END_COMP_L8	UK08 - PLY - GLUE END COMPLETED
M375.4	PLY_GLUE_READY_START_L8	Ready to start a new mix on PLY LINE 8

Ply valve control

Network: 1 SLAVE 80 - WATER VALVE



Symbol information

M375.0	SR_PLY_REQ_L8	REQUEST PLY GLUE FROM UK08
M376.0	PLY_WATER_REQ_L8	REQUEST FOR WATER ON PLY LINE 8 TANK
M376.3	PLY_WATER_LVLRCH_L8	UK08 - PLY - WATER - LEVEL REACHED - CLOSE VALVE
A96.2	Q96_2_SLAVE80_SLOT11	UK08 - PLY - WATER VALVE

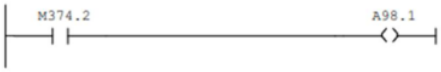
Network: 2 UK08 - PLY - GLUE VALVE



Symbol information

M375.0	SR_PLY_REQ_L8	REQUEST PLY GLUE FROM UK08
M376.7	PLY_GLUE_VLV_OPEN_L8	UK08 - PLY - GLUE VALVE OPEN
M377.2	PLY_GLUE_CLOSE_VLV_L8	UK08 - PLY - GLUE LEVEL REACHED CLOSE VALVE
A96.3	Q96_3_SLAVE80_SLOT11	UK08 - PLY - GLUE VALVE

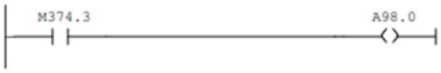
Network: 3 UK08 - PLY - NEAT GLUE VALVE SELECTED ON INCOMING TO GLUE SYSTEM



Symbol information

M374.2	SR_PLY_NEAT_L8	SELECTION MADE PLY GLUE TANK - NEAT GLUE NEEDED
A98.1	Q98_1_SLAVE80_SLOT13	UK08 - PLY - NEAT GLUE VALVE SELECTED ON INCOMING TO GLUE SYSTEM

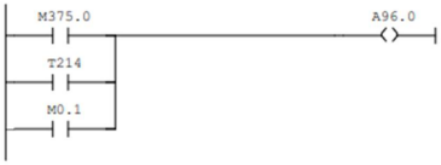
Network: 4 UK08 - PLY - GLUE VALVE SELECTED ON INCOMING TO GLUE SYSTEM



Symbol information

M374.3	SR_PLY_BLITZ_L8	SELECTION MADE PLY GLUE TANK - BLITZ GLUE NEEDED
A98.0	Q98_0_SLAVE80_SLOT13	UK08 - PLY - BLITZ GLUE VALVE SELECTED ON INCOMING TO GLUE SYSTEM

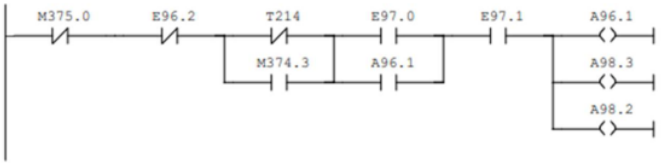
Network: 5 UK08 - PLY 1 - AGITATE VALVE / MIXER MOTOR



Symbol information

M375.0	SR_PLY_REQ_L8	REQUEST PLY GLUE FROM UK08
T214	T214	PLY - LINE 8 - GLUE - EXTENDED TIMER AGITATE AFTER GLUE REQUEST
M0.1	ALW_ON	Bit sempre a 1
A96.0	Q96_0_SLAVE80_SLOT11	UK08 - PLY - MIXER VALVE

Network: 6 UK08 - PLY - PUMP OUT VALVE FROM MIXER TO LINE

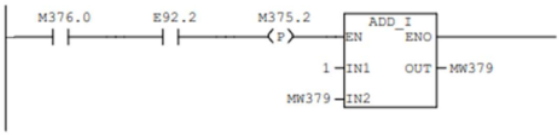


Symbol information

M375.0	SR_PLY_REQ_L8	REQUEST PLY GLUE FROM UK08
E96.2	I96_2_SLAVE80_SLOT8	UK08 PLY - LOW LEVEL PROBE (TRUE-NO CONTACT)
T214	T214	PLY - LINE 8 - GLUE - EXTENDED TIMER AGITATE AFTER GLUE REQUEST
M374.3	SR_PLY_BLITZ_L8	SELECTION MADE PLY GLUE TANK - BLITZ GLUE NEEDED
E97.0	I97_0_SLAVE80_SLOT9	UK08 PLY - REMOTE PUSH BUTTON PUMP OUT FROM TANK TO REMOTE TANK
A96.1	Q96_1_SLAVE80_SLOT11	UK08 - PLY - PUMP OUT VALVE
E97.1	I97_1_SLAVE80_SLOT9	UK08 PLY - REMOTE PUSH BUTTON STOP PUMP OUT FROM TANK TO REMOTE TANK
A98.3	Q98_3_SLAVE80_SLOT13	UK08 - PLY - PUMP OUT GREEN LED ON REMOTE PUSH BUTTONS
A98.2	Q98_2_SLAVE80_SLOT13	UK08 - PLY - ANTI SYPHON SOLENOID VALVE

Ply levels FC320

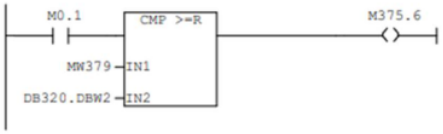
Network: 1 DESIRED LEVEL FOR WATER ON PLY 1 LINE 8 TANK



Symbol information

M376.0	PLY_WATER_REQ_L8	REQUEST FOR WATER ON PLY LINE 8 TANK
E92.2	I96_2_SLAVE80_SLOT2	0.1 LITRE OF WATER DOSED TO GLUE TANK UK08
M375.2	PLY_WATER_LITRE_L8	A LITRE OF WATER DESPENSED (PULSED)
MW379	PLY_L8_WATER_DOSED	NUMBER LITRES OF WATER DOSED FOR PLY GLUE LINE 8

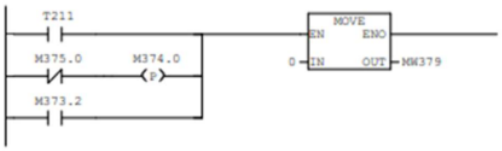
Network: 2 COMPARE THE LEVEL WITH THE DESIRED LEVEL



Symbol information

M0.1	ALW_ON	Bit sempre a 1
MW379	PLY_L8_WATER_DOSED	NUMBER LITRES OF WATER DOSED FOR PLY GLUE LINE 8
DB320.DBW2	"DB_PLY_UK08_LEVELS".WATERMIX_L8	WATER MIX FOR PLY 1 LINE 8
M375.6	PLY_WATER_REACHED_L8	DESIRED WATER LEVEL REACHED PLY GLUE TANK UK08

Network: 3 RESET WATER DESPENSED LEVEL

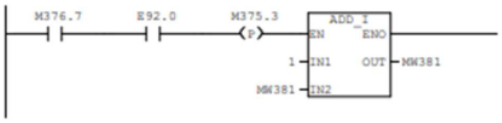


Symbol information

T211	T211	End of cycle PLY1 delay line 8
M375.0	SR_PLY_REQ_L8	REQUEST PLY GLUE FROM UK08
M374.0	M374.0	PULSED RESET
M373.2	PLY_L8_GLUE_STOP_HMI	STOP PLY L8 GLUE MIX FROM HMI
MW379	PLY_L8_WATER_DOSED	NUMBER LITRES OF WATER DOSED FOR PLY GLUE LINE 8

Network: 4 DESIRED LEVEL FOR GLUE ON PLY LINE 8 TANK

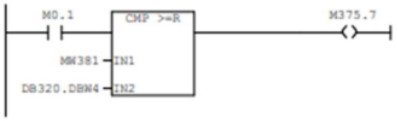
*********FEEDBACK PULSED FROM FLOW METER ARE PER 0.1 LITRE, THEREFORE 10 PULSES ARE 1 LITRE **********



Symbol information

M376.7	PLY_GLUE_VLV_OPEN_L8	UK08 - PLY - GLUE VALVE OPEN
E92.0	I92_0_SLAVE80_SLOT1	0.1 LITRE OF GLUE DOSED TO PLY GLUE TANK UK08
M375.3	PLY_GLUE_LITRE_L8	A 0.1 LITRE OF PLY GLIE DESPENSED (PULSED)
MW381	PLY_L8_GLUE_DOSED	NUMBER LITRES OF GLUE DOSED FOR PLY GLUE LINE 8

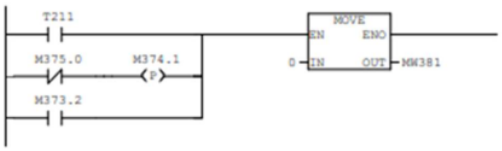
Network: 5 COMPARE THE LEVEL WITH THE DESIRED LEVEL



Symbol information

M0.1	ALW_ON	Bit sempre a 1
MW381	PLY_L8_GLUE_DOSED	NUMBER LITRES OF GLUE DOSED FOR PLY GLUE LINE 8
DB320.DBW4	"DB_PLY_UK08_LEVELS".GLUEMIX_L8	GLUE MIX FOR PLY 1 LINE 8
M375.7	PLY_GLUE_REACHED_L8	DESIRED GLUE LEVEL REACHED PLY GLUE TANK UK08

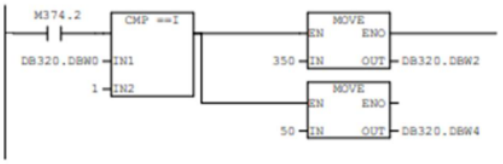
Network: 6 RESET GLUE DESPENSED LEVEL



Symbol information

T211	T211	End of cycle PLY1 delay line 8
M375.0	SR_PLY_REQ_L8	REQUEST PLY GLUE FROM UK08
M374.1	M374.1	PULSED MARKER
M373.2	PLY_L8_GLUE_STOP_HMI	STOP PLY L8 GLUE MIX FROM HMI

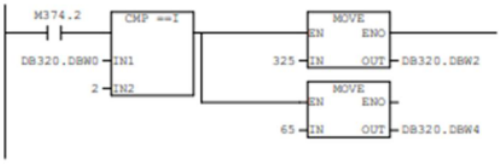
Network: 9 NUMBER OF PLYS RUNNING IS EQUAL TO 1



Symbol information

M374.2	SR_PLY_NEAT_L8	SELECTION MADE PLY GLUE TANK - NEAT GLUE NEEDED
DB320.DBW0	"DB_PLY_UK08_LEVELS".NUM_PLYS_L8	NUMBER OF PLYS PLY 1 LINE 8
DB320.DBW2	"DB_PLY_UK08_LEVELS".WATERMIX_L8	WATER MIX FOR PLY 1 LINE 8
DB320.DBW4	"DB_PLY_UK08_LEVELS".GLUEMIX_L8	GLUE MIX FOR PLY 1 LINE 8

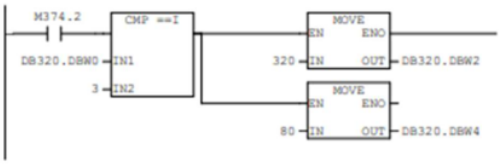
Network: 10 NUMBER OF PLYS RUNNING IS EQUAL TO 2



Symbol information

M374.2	SR_PLY_NEAT_L8	SELECTION MADE PLY GLUE TANK - NEAT GLUE NEEDED
DB320.DBW0	"DB_PLY_UK08_LEVELS".NUM_PLYS_L8	NUMBER OF PLYS PLY 1 LINE 8
DB320.DBW2	"DB_PLY_UK08_LEVELS".WATERMIX_L8	WATER MIX FOR PLY 1 LINE 8
DB320.DBW4	"DB_PLY_UK08_LEVELS".GLUEMIX_L8	GLUE MIX FOR PLY 1 LINE 8

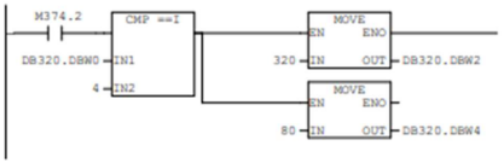
Network: 11 NUMBER OF PLYS RUNNING IS EQUAL TO 3



Symbol information

M374.2	SR_PLY_NEAT_L8	SELECTION MADE PLY GLUE TANK - NEAT GLUE NEEDED
DB320.DBW0	"DB_PLY_UK08_LEVELS".NUM_PLYS_L8	NUMBER OF PLYS PLY 1 LINE 8
DB320.DBW2	"DB_PLY_UK08_LEVELS".WATERMIX_L8	WATER MIX FOR PLY 1 LINE 8
DB320.DBW4	"DB_PLY_UK08_LEVELS".GLUEMIX_L8	GLUE MIX FOR PLY 1 LINE 8

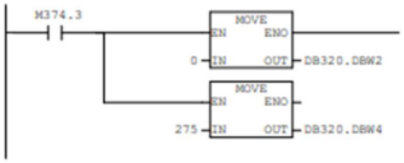
Network: 12 NUMBER OF PLYS RUNNING IS EQUAL TO 4



Symbol information

M374.2	SR_PLY_NEAT_L8	SELECTION MADE PLY GLUE TANK - NEAT GLUE NEEDED
DB320.DBW0	"DB_PLY_UK08_LEVEL8".NUM_PLYS_L8	NUMBER OF PLYS PLY 1 LINE 8
DB320.DBW2	"DB_PLY_UK08_LEVEL8".WATERMIX_L8	WATER MIX FOR PLY 1 LINE 8
DB320.DBW4	"DB_PLY_UK08_LEVEL8".GLUEMIX_L8	GLUE MIX FOR PLY 1 LINE 8

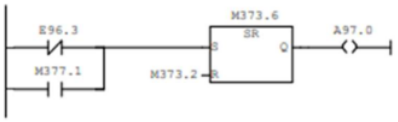
Network: 13 BLITZ MIX



Symbol information

M374.3	SR_PLY_BLITZ_L8	SELECTION MADE PLY GLUE TANK - BLITZ GLUE NEEDED
DB320.DBW2	"DB_PLY_UK08_LEVEL8".WATERMIX_L8	WATER MIX FOR PLY 1 LINE 8
DB320.DBW4	"DB_PLY_UK08_LEVEL8".GLUEMIX_L8	GLUE MIX FOR PLY 1 LINE 8

Network: 14 RED LIGHT ALARM



Symbol information

E96.3	I96_3_SLAVE68_SLOT8	UK08 PLY - EMERGENCY LEVEL PROBE (TRUE-NO CONTACT)
M377.1	PLY_GLUE_MTIME_VLV_L8	UK08 - PLY - GLUE VALVE MAXIMUM TIME REACHED
M373.6	SR_PLY_L8_ALARM	SET ALARM FOR PLY L8 - ISSUE WITH SYSTEM
M373.2	PLY_L8_GLUE_STOP_HMI	STOP PLY L8 GLUE MIX FROM HMI
A97.0	Q97_0_SLAVE80_SLOT12	UK08 - PLY - RED TOWER LIGHT

Tail tank cycle FC241

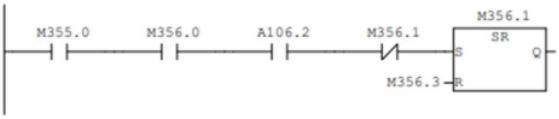
Network: 2 WATER VALVE OPEN



Symbol information

M355.0	SR_TAIL_REQ_L8	REQUEST TAIL GLUE FROM UK08
M355.4	TAIL_GLUE_READY_START_L8	Ready to start a new mix on TAIL LINE 8
M356.0	TAIL_WATER_REQ_L8	REQUEST FOR WATER ON TAIL LINE 8 TANK
M356.3	TAIL_WATER_LVLRCH_L8	UK08 - TAIL - WATER - LEVEL REACHED - CLOSE VALVE

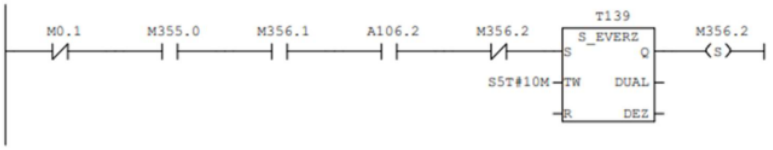
Network: 3 Water Valve opened - wait level



Symbol information

M355.0	SR_TAIL_REQ_L8	REQUEST TAIL GLUE FROM UK08
M356.0	TAIL_WATER_REQ_L8	REQUEST FOR WATER ON TAIL LINE 8 TANK
A106.2	Q106_2_SLAVE80_SLOT23	UK08 - TAIL - WATER VALVE
M356.1	TAIL_WATER_WAIT_L8	WAIT FOR WATER ON TAIL LINE 8 TANK
M356.3	TAIL_WATER_LVLRCH_L8	UK08 - TAIL - WATER - LEVEL REACHED - CLOSE VALVE

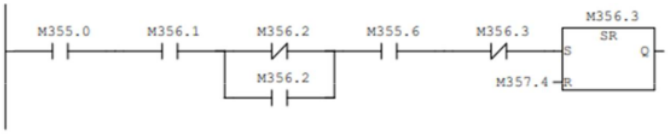
Network: 4 Water valve maximum time opened for



Symbol information

M0.1	ALW_ON	Bit sempre a 1
M355.0	SR_TAIL_REQ_L8	REQUEST TAIL GLUE FROM UK08
M356.1	TAIL_WATER_WAIT_L8	WAIT FOR WATER ON TAIL LINE 8 TANK
A106.2	Q106_2_SLAVE80_SLOT23	UK08 - TAIL - WATER VALVE
M356.2	TAIL_WATER_MAX_T_L8	TAIL LINE 8 - WATER - MAXIMUM TIME REACHED
T139	T139	TAIL L8 - WATER - MAXIMUM TIME REACHED

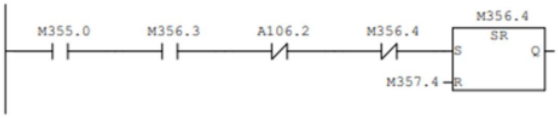
Network: 5 Water Valve - Level OK reached - CLOSE Valve



Symbol information

M355.0	SR_TAIL_REQ_L8	REQUEST TAIL GLUE FROM UK08
M356.1	TAIL_WATER_WAIT_L8	WAIT FOR WATER ON TAIL LINE 8 TANK
M356.2	TAIL_WATER_MAX_T_L8	TAIL LINE 8 - WATER - MAXIMUM TIME REACHED
M355.6	TAIL_WATER_REACHED_L8	DESIRED WATER LEVEL REACHED TAIL GLUE TANK UK08
M356.3	TAIL_WATER_LVLRCH_L8	UK08 - TAIL - WATER - LEVEL REACHED - CLOSE VALVE
M357.4	TAIL_GLUE_END_L8	UK08 - TAIL - GLUE END

Network: 6 Water Valve - Closed



Symbol information

M355.0	SR_TAIL_REQ_L8	REQUEST TAIL GLUE FROM UK08
M356.3	TAIL_WATER_LVLRCH_L8	UK08 - TAIL - WATER - LEVEL REACHED - CLOSE VALVE
A106.2	Q106_2_SLAVE80_SLOT23	UK08 - TAIL - WATER VALVE
M356.4	TAIL_WATER_VLVCLO_L8	UK08 - TAIL - WATER VALVE CLOSED
M357.4	TAIL_GLUE_END_L8	UK08 - TAIL - GLUE END

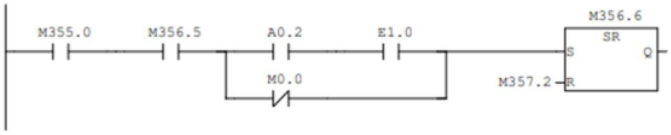
Network: 8 Glue Pump - START



Symbol information

M355.0	SR_TAIL_REQ_L8	REQUEST TAIL GLUE FROM UK08
M356.4	TAIL_WATER_VLVCLO_L8	UK08 - TAIL - WATER VALVE CLOSED
M356.5	TAIL_GLUE_PUMP_START_L8	UK08 - TAIL - GLUE PUMP START
M357.2	TAIL_GLUE_CLOSE_VLV_L8	UK08 - TAIL - GLUE LEVEL REACHED CLOSE VALVE

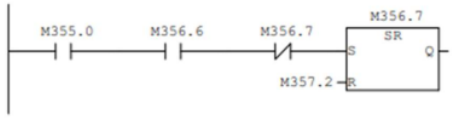
Network: 9 Glue pump turned ON



Symbol information

M355.0	SR_TAIL_REQ_L8	REQUEST TAIL GLUE FROM UK08
M356.5	TAIL_GLUE_PUMP_START_L8	UK08 - TAIL - GLUE PUMP START
A0.2	Q0_2_CPU_SLOT6	CPU: Pump 3 running
E1.0	I1_0_CPU_SLOT5	CPU: Pump 3 run
M0.0	ALW_OFF	Bit sempre a 0
M356.6	TAIL_GLUE_PUMP_ON_L8	UK08 - TAIL - GLUE PUMP ON
M357.2	TAIL_GLUE_CLOSE_VLV_L8	UK08 - TAIL - GLUE LEVEL REACHED CLOSE VALVE

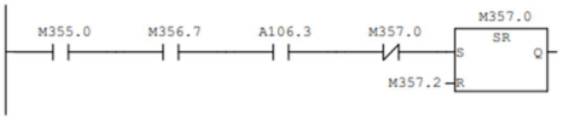
Network: 11 Glue Valve - OPEN



Symbol information

M355.0	SR_TAIL_REQ_L8	REQUEST TAIL GLUE FROM UK08
M356.6	TAIL_GLUE_PUMP_ON_L8	UK08 - TAIL - GLUE PUMP ON
M356.7	TAIL_GLUE_VLV_OPEN_L8	UK08 - TAIL - GLUE VALVE OPEN
M357.2	TAIL_GLUE_CLOSE_VLV_L8	UK08 - TAIL - GLUE LEVEL REACHED CLOSE VALVE

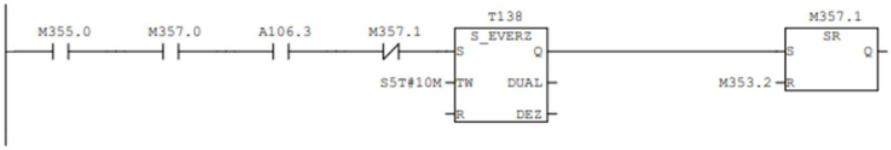
Network: 12 Glue Valve opened - wait level



Symbol information

M355.0	SR_TAIL_REQ_L8	REQUEST TAIL GLUE FROM UK08
M356.7	TAIL_GLUE_VLV_OPEN_L8	UK08 - TAIL - GLUE VALVE OPEN
A106.3	Q106_3_SLAVE80_SLOT23	UK08 - TAIL - GLUE VALVE
M357.0	TAIL_GLUE_VLV_OPENW_L8	UK08 - TAIL - GLUE VALVE OPEN (WAIT)
M357.2	TAIL_GLUE_CLOSE_VLV_L8	UK08 - TAIL - GLUE LEVEL REACHED CLOSE VALVE

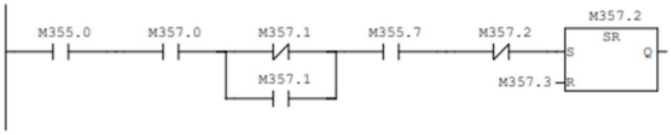
Network: 13 Maximum timer for glue valve to be opened on UK07 PLY



Symbol information

M355.0	SR_TAIL_REQ_L8	REQUEST TAIL GLUE FROM UK08
M357.0	TAIL_GLUE_VLV_OPENW_L8	UK08 - TAIL - GLUE VALVE OPEN (WAIT)
A106.3	Q106_3_SLAVE80_SLOT23	UK08 - TAIL - GLUE VALVE
M357.1	TAIL_GLUE_MTIME_VLV_L8	UK08 - TAIL - GLUE VALVE MAXIMUM TIME REACHED
T138	T138	TAIL - L8 - GLUE - MAXIMUM TIME REACHED
M353.2	TAIL_L8_GLUE_STOP_HMI	STOP TAIL L8 GLUE MIX FROM HMI

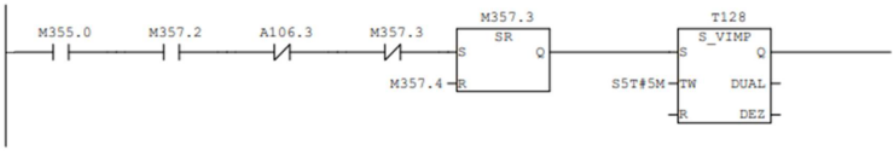
Network: 14 Glue Valve - Level OK reached - CLOSE Valve



Symbol information

M355.0	SR_TAIL_REQ_L8	REQUEST TAIL GLUE FROM UK08
M357.0	TAIL_GLUE_VLV_OPENW_L8	UK08 - TAIL - GLUE VALVE OPEN (WAIT)
M357.1	TAIL_GLUE_MTIME_VLV_L8	UK08 - TAIL - GLUE VALVE MAXIMUM TIME REACHED
M355.7	TAIL_GLUE_REACHED_L8	DESIRED GLUE LEVEL REACHED TAIL GLUE TANK UK08
M357.2	TAIL_GLUE_CLOSE_VLV_L8	UK08 - TAIL - GLUE LEVEL REACHED CLOSE VALVE
M357.3	TAIL_GLUE_PUMP_OFF_L8	UK08 - TAIL - GLUE PUMP TURN OFF

Network: 15 Glue Valve - Closed - Glue pump turn OFF

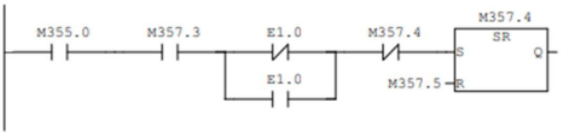


Symbol information

M355.0	SR_TAIL_REQ_L8	REQUEST TAIL GLUE FROM UK08
M357.2	TAIL_GLUE_CLOSE_VLV_L8	UK08 - TAIL - GLUE LEVEL REACHED CLOSE VALVE
A106.3	Q106_3_SLAVE80_SLOT23	UK08 - TAIL - GLUE VALVE
M357.3	TAIL_GLUE_PUMP_OFF_L8	UK08 - TAIL - GLUE PUMP TURN OFF
M357.4	TAIL_GLUE_END_L8	UK08 - TAIL - GLUE END

T128	T128	TAIL - LINE 8 - GLUE - EXTENDED TIMER AGITATE AFTER GLUE REQUEST

Network: 16 Glue Valve - END

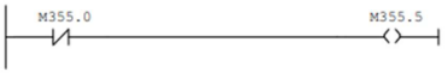


Symbol information

M355.0	SR_TAIL_REQ_L8	REQUEST TAIL GLUE FROM UK08
M357.3	TAIL_GLUE_PUMP_OFF_L8	UK08 - TAIL - GLUE PUMP TURN OFF
E1.0	I1_0_CPU_SLOT5	CPU: Pump 3 run
M357.4	TAIL_GLUE_END_L8	UK08 - TAIL - GLUE END
M357.5	TAIL_GLUE_END_COMP_L8	UK08 - TAIL - GLUE END COMPLETED

Network: 19 Comment

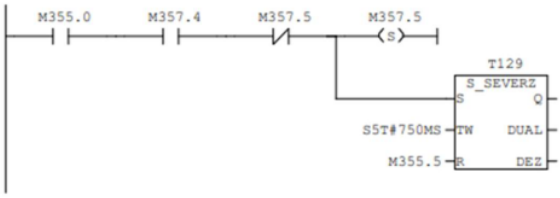
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-------------------------------NOTA BENE-------------------------------------
Mixer Valve Management
-----------------------------------------------------------------------------
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Symbol information

M355.0	SR_TAIL_REQ_L8	REQUEST TAIL GLUE FROM UK08
M355.5	TAIL_GLUE_ENDED_L8	TAIL GLUE ON LINE 8 HAS ENDED THE SEQUENCE

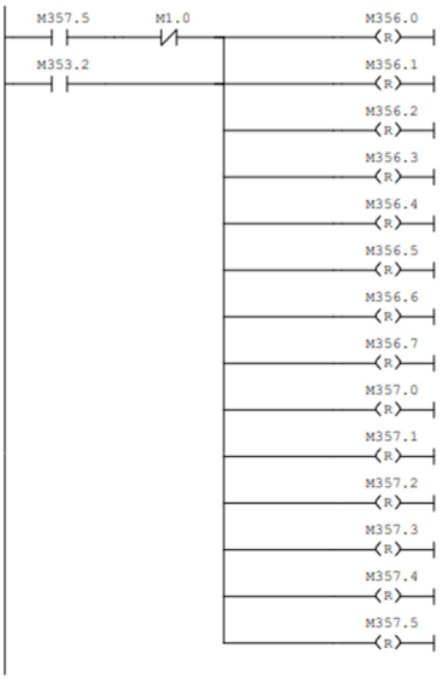
Network: 20 Ok to End



Symbol information

M355.0	SR_TAIL_REQ_L8	REQUEST TAIL GLUE FROM UK08
M357.4	TAIL_GLUE_END_L8	UK08 - TAIL - GLUE END
M357.5	TAIL_GLUE_END_COMP_L8	UK08 - TAIL - GLUE END COMPLETED
T129	T129	End of cycle TAIL delay line 8
M355.5	TAIL_GLUE_ENDED_L8	TAIL GLUE ON LINE 8 HAS ENDED THE SEQUENCE

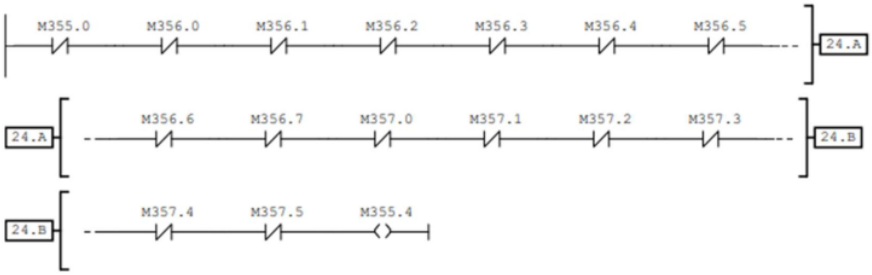
Network: 22 RESET



Symbol information

M357.5	TAIL_GLUE_END_COMP_L8	UK08 - TAIL - GLUE END COMPLETED
M353.2	TAIL_L8_GLUE_STOP_HMI	STOP TAIL L8 GLUE MIX FROM HMI
M356.0	TAIL_WATER_REQ_L8	REQUEST FOR WATER ON TAIL LINE 8 TANK
M356.1	TAIL_WATER_WAIT_L8	WAIT FOR WATER ON TAIL LINE 8 TANK
M356.2	TAIL_WATER_MAX_T_L8	TAIL LINE 8 - WATER - MAXIMUM TIME REACHED
M356.3	TAIL_WATER_LVLRCH_L8	UK08 - TAIL - WATER - LEVEL REACHED - CLOSE VALVE
M356.4	TAIL_WATER_VLVCLO_L8	UK08 - TAIL - WATER VALVE CLOSED
M356.5	TAIL_GLUE_PUMP_START_L8	UK08 - TAIL - GLUE PUMP START
M356.6	TAIL_GLUE_PUMP_ON_L8	UK08 - TAIL - GLUE PUMP ON
M356.7	TAIL_GLUE_VLV_OPEN_L8	UK08 - TAIL - GLUE VALVE OPEN
M357.0	TAIL_GLUE_VLV_OPENW_L8	UK08 - TAIL - GLUE VALVE OPEN (WAIT)
M357.1	TAIL_GLUE_MTIME_VLV_L8	UK08 - TAIL - GLUE VALVE MAXIMUM TIME REACHED
M357.2	TAIL_GLUE_CLOSE_VLV_L8	UK08 - TAIL - GLUE LEVEL REACHED CLOSE VALVE
M357.3	TAIL_GLUE_PUMP_OFF_L8	UK08 - TAIL - GLUE PUMP TURN OFF
M357.4	TAIL_GLUE_END_L8	UK08 - TAIL - GLUE END

Network: 24 Sequence Completed - Ready for next mix

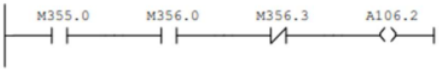


Symbol information

M355.0	SR_TAIL_REQ_L8	REQUEST TAIL GLUE FROM UK08
M356.0	TAIL_WATER_REQ_L8	REQUEST FOR WATER ON TAIL LINE 8 TANK
M356.1	TAIL_WATER_WAIT_L8	WAIT FOR WATER ON TAIL LINE 8 TANK
M356.2	TAIL_WATER_MAX_T_L8	TAIL LINE 8 - WATER - MAXIMUM TIME REACHED
M356.3	TAIL_WATER_LVLRCH_L8	UK08 - TAIL - WATER - LEVEL REACHED - CLOSE VALVE
M356.4	TAIL_WATER_VLVCLO_L8	UK08 - TAIL - WATER VALVE CLOSED
M356.5	TAIL_GLUE_PUMP_START_L8	UK08 - TAIL - GLUE PUMP START
M356.6	TAIL_GLUE_PUMP_ON_L8	UK08 - TAIL - GLUE PUMP ON
M356.7	TAIL_GLUE_VLV_OPEN_L8	UK08 - TAIL - GLUE VALVE OPEN
M357.0	TAIL_GLUE_VLV_OPENW_L8	UK08 - TAIL - GLUE VALVE OPEN (WAIT)
M357.1	TAIL_GLUE_MTIME_VLV_L8	UK08 - TAIL - GLUE VALVE MAXIMUM TIME REACHED
M357.2	TAIL_GLUE_CLOSE_VLV_L8	UK08 - TAIL - GLUE LEVEL REACHED CLOSE VALVE
M357.3	TAIL_GLUE_PUMP_OFF_L8	UK08 - TAIL - GLUE PUMP TURN OFF
M357.4	TAIL_GLUE_END_L8	UK08 - TAIL - GLUE END
M357.5	TAIL_GLUE_END_COMP_L8	UK08 - TAIL - GLUE END COMPLETED
M355.4	TAIL_GLUE_READY_START_L8	Ready to start a new mix on TAIL LINE 8

Tail valves FC182

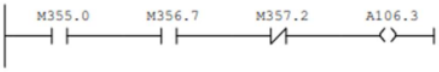
Network: 1 SLAVE 80 - WATER VALVE



Symbol information

M355.0	SR_TAIL_REQ_L8	REQUEST TAIL GLUE FROM UK08
M356.0	TAIL_WATER_REQ_L8	REQUEST FOR WATER ON TAIL LINE 8 TANK
M356.3	TAIL_WATER_LVLRCH_L8	UK08 - TAIL - WATER - LEVEL REACHED - CLOSE VALVE
A106.2	Q106_2_SLAVE80_SLOT23	UK08 - TAIL - WATER VALVE

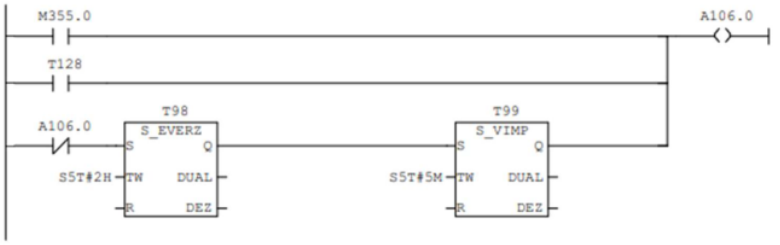
Network: 2 UK08 - PLY - GLUE VALVE



Symbol information

M355.0	SR_TAIL_REQ_L8	REQUEST TAIL GLUE FROM UK08
M356.7	TAIL_GLUE_VLV_OPEN_L8	UK08 - TAIL - GLUE VALVE OPEN
M357.2	TAIL_GLUE_CLOSE_VLV_L8	UK08 - TAIL - GLUE LEVEL REACHED CLOSE VALVE
A106.3	Q106_3_SLAVE80_SLOT23	UK08 - TAIL - GLUE VALVE

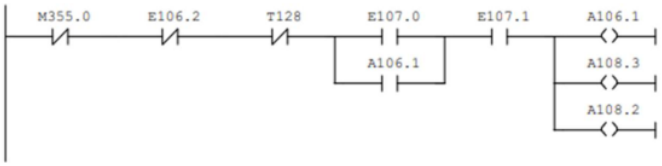
Network: 3 UK08 - PLY 1 - AGITATE VALVE / MIXER MOTOR



Symbol information

M355.0	SR_TAIL_REQ_L8	REQUEST TAIL GLUE FROM UK08
T128	T128	TAIL - LINE 8 - GLUE - EXTENDED TIMER AGITATE AFTER GLUE REQUEST
A106.0	Q106_0_SLAVE80_SLOT23	UK08 - TAIL - MIXER VALVE
T98	T98	UK08 TAIL CARLO FUSSY TIMER 1
T99	T99	UK08 TAIL CARLO FUSSY TIMER 2

Network: 4 UK07 - PLY - PUMP OUT VALVE FROM MIXER TO LINE

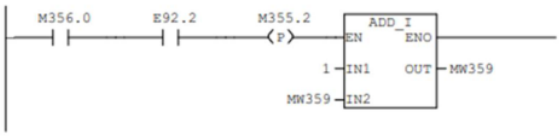


Symbol information

M355.0	SR_TAIL_REQ_L8	REQUEST TAIL GLUE FROM UK08
E106.2	I106_2_SLAVE80_SLOT20	UK08 TAIL - LOW LEVEL PROBE (TRUE-NO CONTACT)
T128	T128	TAIL - LINE 8 - GLUE - EXTENDED TIMER AGITATE AFTER GLUE REQUEST
E107.0	I107_0_SLAVE80_SLOT21	UK08 TAIL - REMOTE PUSH BUTTON PUMP OUT FROM TANK TO REMOTE TANK
A106.1	Q106_1_SLAVE80_SLOT23	UK08 - TAIL - PUMP OUT VALVE
E107.1	I107_1_SLAVE80_SLOT24	UK08 TAIL - REMOTE PUSH BUTTON STOP PUMP OUT FROM TANK TO REMOTE TANK
A108.3	Q108_3_SLAVE80_SLOT25	UK08 - TAIL - PUMP OUT GREEN LED ON REMOTE PUSH BUTTONS
A108.2	Q108_2_SLAVE80_SLOT25	UK08 - TAIL - ANTI SYPHON SOLENOID VALVE

Tail level FC321

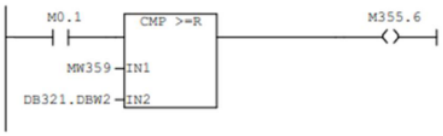
Network: 1 DESIRED LEVEL FOR WATER ON TAIL LINE 8 TANK



Symbol information

M356.0	TAIL_WATER_REQ_L8	REQUEST FOR WATER ON TAIL LINE 8 TANK
E92.2	I96_2_SLAVE80_SLOT2	0.1 LITRE OF WATER DOSED TO GLUE TANK UK08
M355.2	TAIL_WATER_LITRE_L8	TAIL PULSE
MW359	TAIL_L8_WATER_DOSED	NUMBER LITRES OF WATER DOSED FOR TAIL GLUE LINE 8

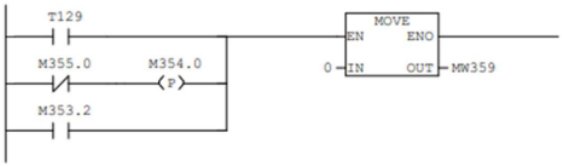
Network: 2 COMPARE THE LEVEL WITH THE DESIRED LEVEL



Symbol information

M0.1	ALW_ON	Bit sempre a 1
MW359	TAIL_L8_WATER_DOSED	NUMBER LITRES OF WATER DOSED FOR TAIL GLUE LINE 8
DB321.DBW2	"DB_TAIL_UK08_LEVELS".WATERMIX_L8	WATER MIX FOR TAIL LINE 8
M355.6	TAIL_WATER_REACHED_L8	DESIRED WATER LEVEL REACHED TAIL GLUE TANK UK08

Network: 3 RESET WATER DESPENSED LEVEL

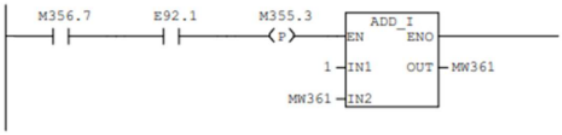


Symbol information

T129	T129	End of cycle TAIL delay line 8
M355.0	SR_TAIL_REQ_L8	REQUEST TAIL GLUE FROM UK08
M354.0	M354.0	
M353.2	TAIL_L8_GLUE_STOP_HMI	STOP TAIL L8 GLUE MIX FROM HMI
MW359	TAIL_L8_WATER_DOSED	NUMBER LITRES OF WATER DOSED FOR TAIL GLUE LINE 8

Network: 4 DESIRED LEVEL FOR GLUE ON TAIL LINE 8 TANK

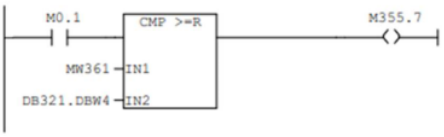
*********FEEDBACK PULSED FROM FLOW METER ARE PER 0.1 LITRE, THEREFORE 10 PULSES ARE 1 LITRE ******************************



Symbol information

M356.7	TAIL_GLUE_VLV_OPEN_L8	UK08 - TAIL - GLUE VALVE OPEN
E92.1	I92_1_SLAVE80_SLOT1	0.1 LITRE OF GLUE DOSED TO TAIL GLUE TANK UK07
M355.3	TAIL_GLUE_LITRE_L8	A 0.1 LITRE OF TAIL GLIE DESPENSED (PULSED)
MW361	TAIL_L8_GLUE_DOSED	NUMBER LITRES OF GLUE DOSED FOR TAIL GLUE LINE 8

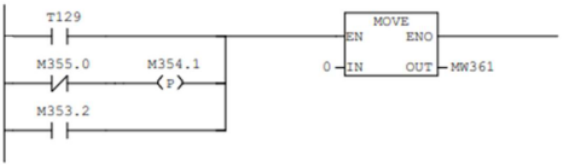
Network: 5 COMPARE THE LEVEL WITH THE DESIRED LEVEL



Symbol information

M0.1	ALW_ON	Bit sempre a 1
MW361	TAIL_L8_GLUE_DOSED	NUMBER LITRES OF GLUE DOSED FOR TAIL GLUE LINE 8
DB321.DBW4	"DB_TAIL_UK08_LEVELS".GLUEMIX_L8	GLUE MIX FOR TAIL LINE 8
M355.7	TAIL_GLUE_REACHED_L8	DESIRED GLUE LEVEL REACHED TAIL GLUE TANK UK08

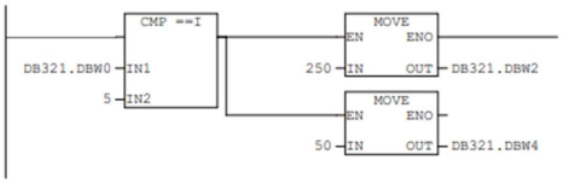
Network: 6 RESET GLUE DESPENSED LEVEL



Symbol information

T129	T129	End of cycle TAIL delay line 8
M355.0	SR_TAIL_REQ_L8	REQUEST TAIL GLUE FROM UK08
M353.2	TAIL_L8_GLUE_STOP_HMI	STOP TAIL L8 GLUE MIX FROM HMI
MW361	TAIL_L8_GLUE_DOSED	NUMBER LITRES OF GLUE DOSED FOR TAIL GLUE LINE 8

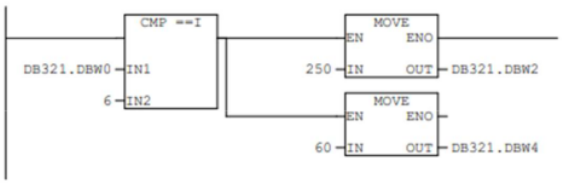
Network: 9 RATIO OF TAIL SEAL GLUE TO WATER



Symbol information

DB321.DBW0	"DB_TAIL_UK08_LEVELS".RATIO_TAIL_L8	RATIO OF TAIL LINE 8
DB321.DBW2	"DB_TAIL_UK08_LEVELS".WATERMIX_L8	WATER MIX FOR TAIL LINE 8
DB321.DBW4	"DB_TAIL_UK08_LEVELS".GLUEMIX_L8	GLUE MIX FOR TAIL LINE 8

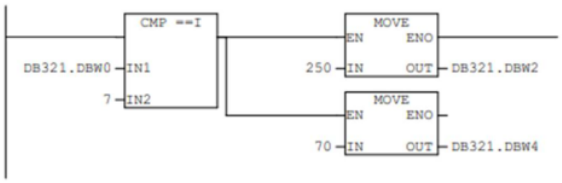
Network: 10 25L OF WATER TO 6L OF TS GLUE



Symbol information

DB321.DBW0	"DB_TAIL_UK08_LEVELS".RATIO_TAIL_L8	RATIO OF TAIL LINE 8
DB321.DBW2	"DB_TAIL_UK08_LEVELS".WATERMIX_L8	WATER MIX FOR TAIL LINE 8
DB321.DBW4	"DB_TAIL_UK08_LEVELS".GLUEMIX_L8	GLUE MIX FOR TAIL LINE 8

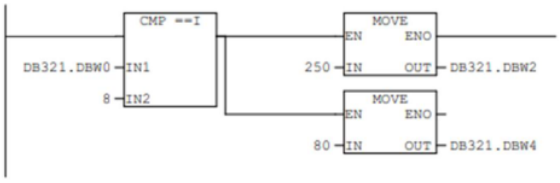
Network: 11 25L OF WATER TO 7L OF TS GLUE



Symbol information

DB321.DBW0	"DB_TAIL_UK08_LEVELS".RATIO_TAIL_L8	RATIO OF TAIL LINE 8
DB321.DBW2	"DB_TAIL_UK08_LEVELS".WATERMIX_L8	WATER MIX FOR TAIL LINE 8
DB321.DBW4	"DB_TAIL_UK08_LEVELS".GLUEMIX_L8	GLUE MIX FOR TAIL LINE 8

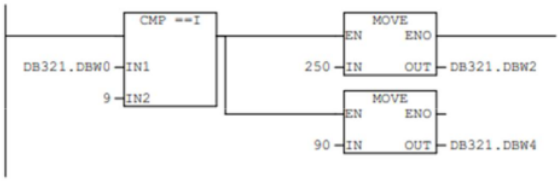
Network: 12 25L OF WATER TO 8L OF TS GLUE



Symbol information

```
DB321.DBW0    "DB_TAIL_UK08_LEVELS".RATIO_TAIL_L8 RATIO OF TAIL LINE 8
DB321.DBW2    "DB_TAIL_UK08_LEVELS".WATERMIX_L8   WATER MIX FOR TAIL LINE 8
DB321.DBW4    "DB_TAIL_UK08_LEVELS".GLUEMIX_L8    GLUE MIX FOR TAIL LINE 8
```

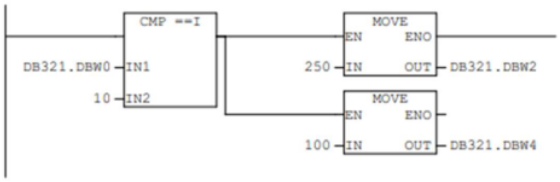
Network: 13 25L OF WATER TO 9L OF TS GLUE



Symbol information

```
DB321.DBW0    "DB_TAIL_UK08_LEVELS".RATIO_TAIL_L8 RATIO OF TAIL LINE 8
DB321.DBW2    "DB_TAIL_UK08_LEVELS".WATERMIX_L8   WATER MIX FOR TAIL LINE 8
DB321.DBW4    "DB_TAIL_UK08_LEVELS".GLUEMIX_L8    GLUE MIX FOR TAIL LINE 8
```

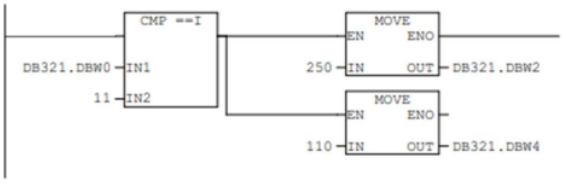
Network: 14 25L OF WATER TO 10L OF TS GLUE



Symbol information

```
DB321.DBW0    "DB_TAIL_UK08_LEVELS".RATIO_TAIL_L8 RATIO OF TAIL LINE 8
DB321.DBW2    "DB_TAIL_UK08_LEVELS".WATERMIX_L8   WATER MIX FOR TAIL LINE 8
DB321.DBW4    "DB_TAIL_UK08_LEVELS".GLUEMIX_L8    GLUE MIX FOR TAIL LINE 8
```

Network: 15 25L OF WATER TO 11L OF TS GLUE

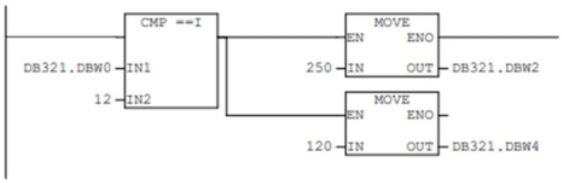


Symbol information

```
DB321.DBW0    "DB_TAIL_UK08_LEVELS".RATIO_TAIL_L8 RATIO OF TAIL LINE 8
DB321.DBW2    "DB_TAIL_UK08_LEVELS".WATERMIX_L8   WATER MIX FOR TAIL LINE 8

DB321.DBW4    "DB_TAIL_UK08_LEVELS".GLUEMIX_L8    GLUE MIX FOR TAIL LINE 8
```

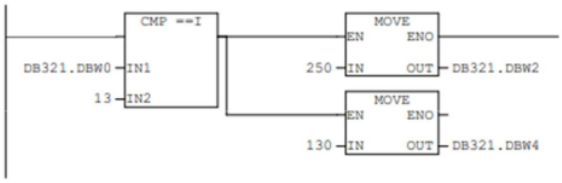
Network: 16 25L OF WATER TO 12L OF TS GLUE



Symbol information

```
DB321.DBW0    "DB_TAIL_UK08_LEVELS".RATIO_TAIL_L8 RATIO OF TAIL LINE 8
DB321.DBW2    "DB_TAIL_UK08_LEVELS".WATERMIX_L8   WATER MIX FOR TAIL LINE 8
DB321.DBW4    "DB_TAIL_UK08_LEVELS".GLUEMIX_L8    GLUE MIX FOR TAIL LINE 8
```

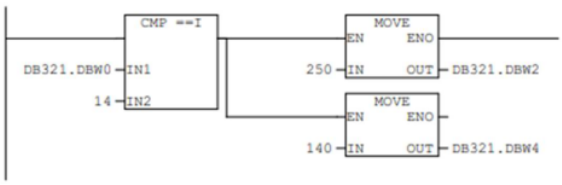
Network: 17 25L OF WATER TO 13L OF TS GLUE



Symbol information

```
DB321.DBW0    "DB_TAIL_UK08_LEVELS".RATIO_TAIL_L8 RATIO OF TAIL LINE 8
DB321.DBW2    "DB_TAIL_UK08_LEVELS".WATERMIX_L8   WATER MIX FOR TAIL LINE 8
DB321.DBW4    "DB_TAIL_UK08_LEVELS".GLUEMIX_L8    GLUE MIX FOR TAIL LINE 8
```

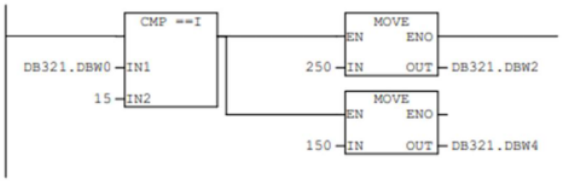
Network: 18 25L OF WATER TO 14L OF TS GLUE



Symbol information

```
DB321.DBW0    "DB_TAIL_UK08_LEVELS".RATIO_TAIL_L8 RATIO OF TAIL LINE 8
DB321.DBW2    "DB_TAIL_UK08_LEVELS".WATERMIX_L8   WATER MIX FOR TAIL LINE 8
DB321.DBW4    "DB_TAIL_UK08_LEVELS".GLUEMIX_L8    GLUE MIX FOR TAIL LINE 8
```

Network: 19 25L OF WATER TO 15L OF TS GLUE

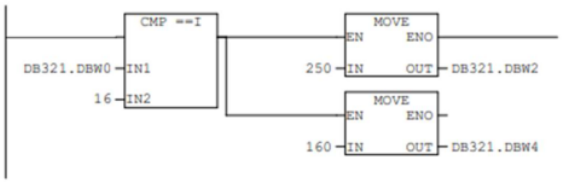


Symbol information

```
DB321.DBW0    "DB_TAIL_UK08_LEVELS".RATIO_TAIL_L8 RATIO OF TAIL LINE 8

DB321.DBW2    "DB_TAIL_UK08_LEVELS".WATERMIX_L8   WATER MIX FOR TAIL LINE 8
DB321.DBW4    "DB_TAIL_UK08_LEVELS".GLUEMIX_L8    GLUE MIX FOR TAIL LINE 8
```

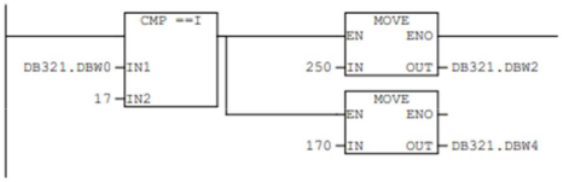
Network: 20 25L OF WATER TO 16L OF TS GLUE



Symbol information

DB321.DBW0 "DB_TAIL_UK08_LEVELS".RATIO_TAIL_L8 RATIO OF TAIL LINE 8
DB321.DBW2 "DB_TAIL_UK08_LEVELS".WATERMIX_L8 WATER MIX FOR TAIL LINE 8
DB321.DBW4 "DB_TAIL_UK08_LEVELS".GLUEMIX_L8 GLUE MIX FOR TAIL LINE 8

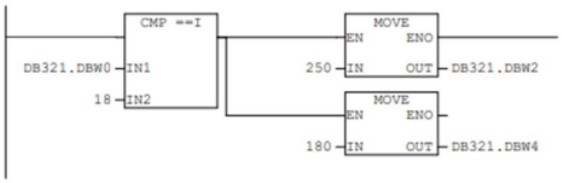
Network: 21 25L OF WATER TO 17L OF TS GLUE



Symbol information

DB321.DBW0 "DB_TAIL_UK08_LEVELS".RATIO_TAIL_L8 RATIO OF TAIL LINE 8
DB321.DBW2 "DB_TAIL_UK08_LEVELS".WATERMIX_L8 WATER MIX FOR TAIL LINE 8
DB321.DBW4 "DB_TAIL_UK08_LEVELS".GLUEMIX_L8 GLUE MIX FOR TAIL LINE 8

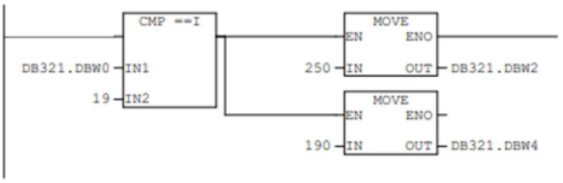
Network: 22 25L OF WATER TO 18L OF TS GLUE



Symbol information

DB321.DBW0 "DB_TAIL_UK08_LEVELS".RATIO_TAIL_L8 RATIO OF TAIL LINE 8
DB321.DBW2 "DB_TAIL_UK08_LEVELS".WATERMIX_L8 WATER MIX FOR TAIL LINE 8
DB321.DBW4 "DB_TAIL_UK08_LEVELS".GLUEMIX_L8 GLUE MIX FOR TAIL LINE 8

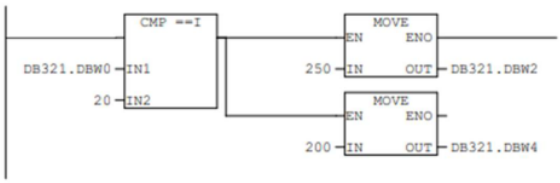
Network: 23 25L OF WATER TO 19L OF TS GLUE



Symbol information

DB321.DBW0 "DB_TAIL_UK08_LEVELS".RATIO_TAIL_L8 RATIO OF TAIL LINE 8
DB321.DBW2 "DB_TAIL_UK08_LEVELS".WATERMIX_L8 WATER MIX FOR TAIL LINE 8
DB321.DBW4 "DB_TAIL_UK08_LEVELS".GLUEMIX_L8 GLUE MIX FOR TAIL LINE 8

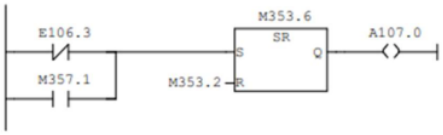
Network: 24 25L OF WATER TO 20L OF TS GLUE



Symbol information

DB321.DBW0	"DB_TAIL_UK08_LEVELS".RATIO_TAIL_L8	RATIO OF TAIL LINE 8
DB321.DBW2	"DB_TAIL_UK08_LEVELS".WATERMIX_L8	WATER MIX FOR TAIL LINE 8
DB321.DBW4	"DB_TAIL_UK08_LEVELS".GLUEMIX_L8	GLUE MIX FOR TAIL LINE 8

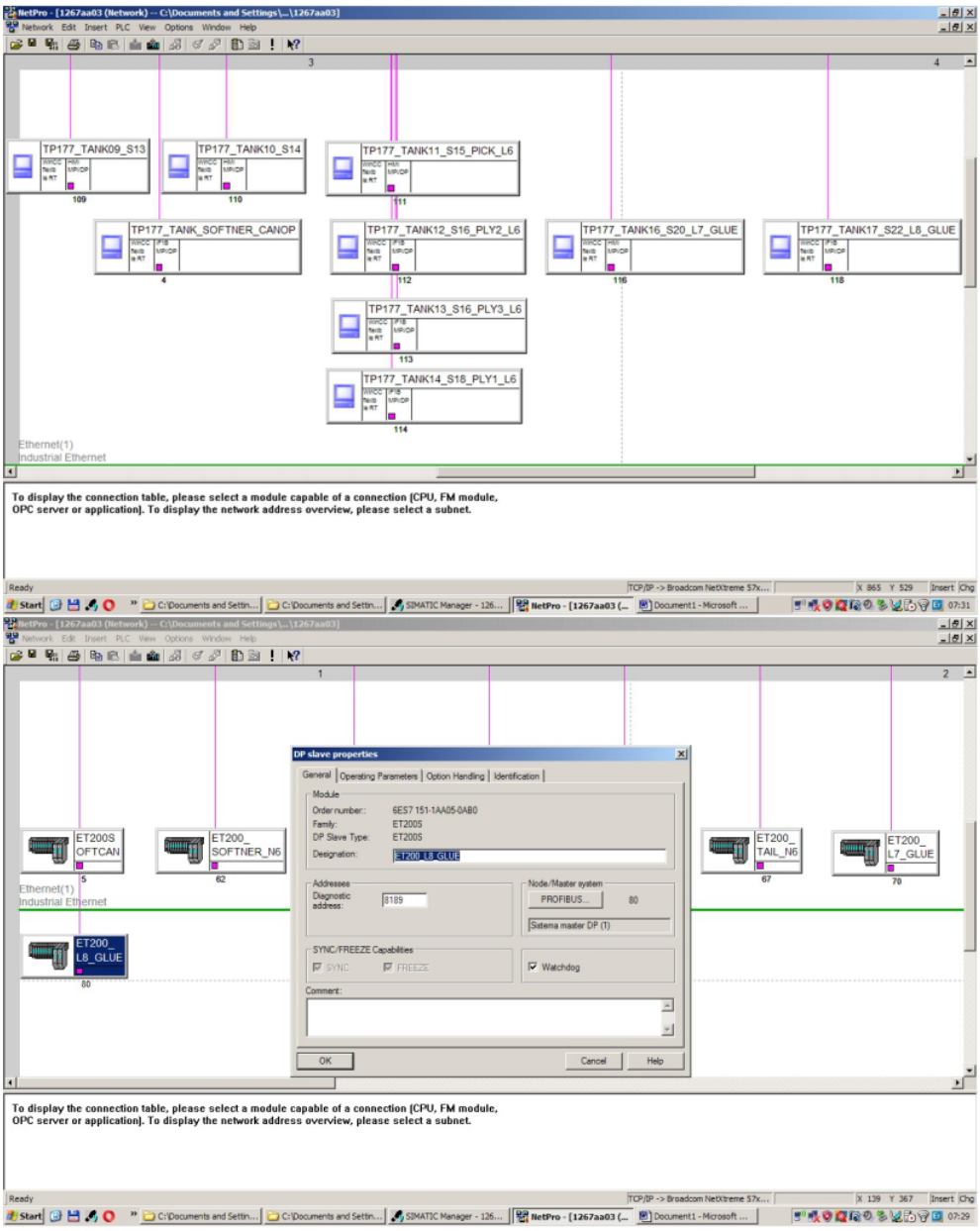
Network: 25 RED LIGHT ALARM



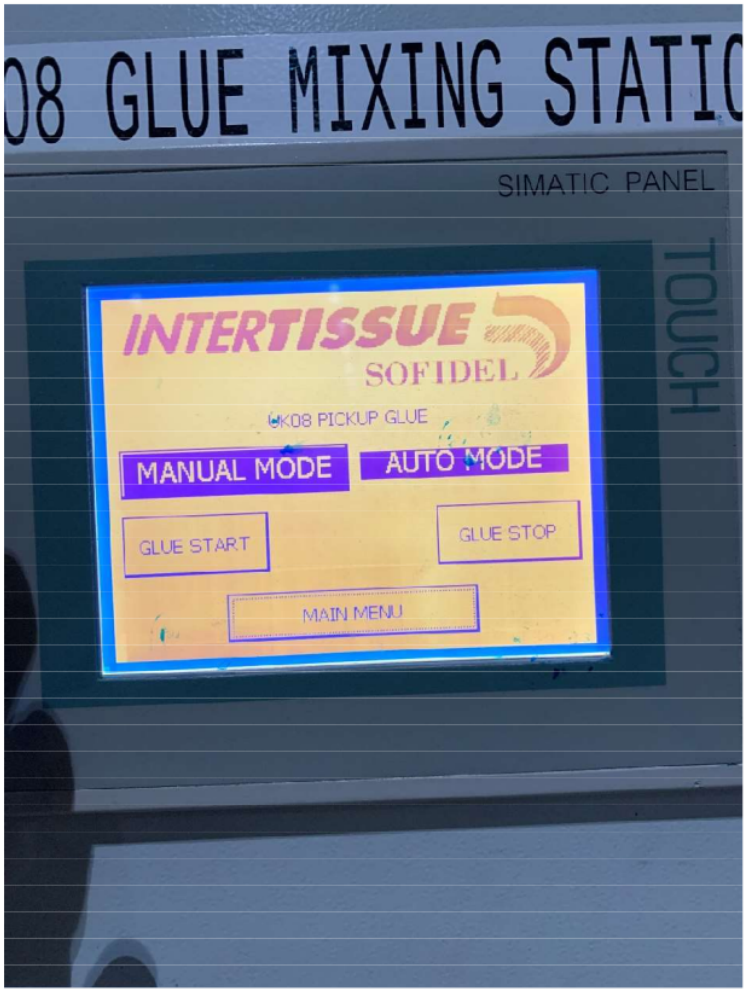
Symbol information

E106.3	I106_3_SLAVE80_SLOT20	UK08 TAIL - EMERGENCY LEVEL PROBE (TRUE-NO CONTACT)
M357.1	TAIL_GLUE_MTIME_VLV_L8	UK08 - TAIL - GLUE VALVE MAXIMUM TIME REACHED
M353.6	SR_TAIL_L8_ALARM	SET ALARM FOR TAIL L8 - ISSUE WITH SYSTEM
M353.2	TAIL_L8_GLUE_STOP_HMI	STOP TAIL L8 GLUE MIX FROM HMI
A107.0	Q107_0_SLAVE80_SLOT24	UK08 - TAIL - RED TOWER LIGHT

9.3 Profibus connection



9.4 Automatic/Manual mode



9.5 IFM Sensors



9.6 Safe isolation



9.7 Evaluating risk assessment

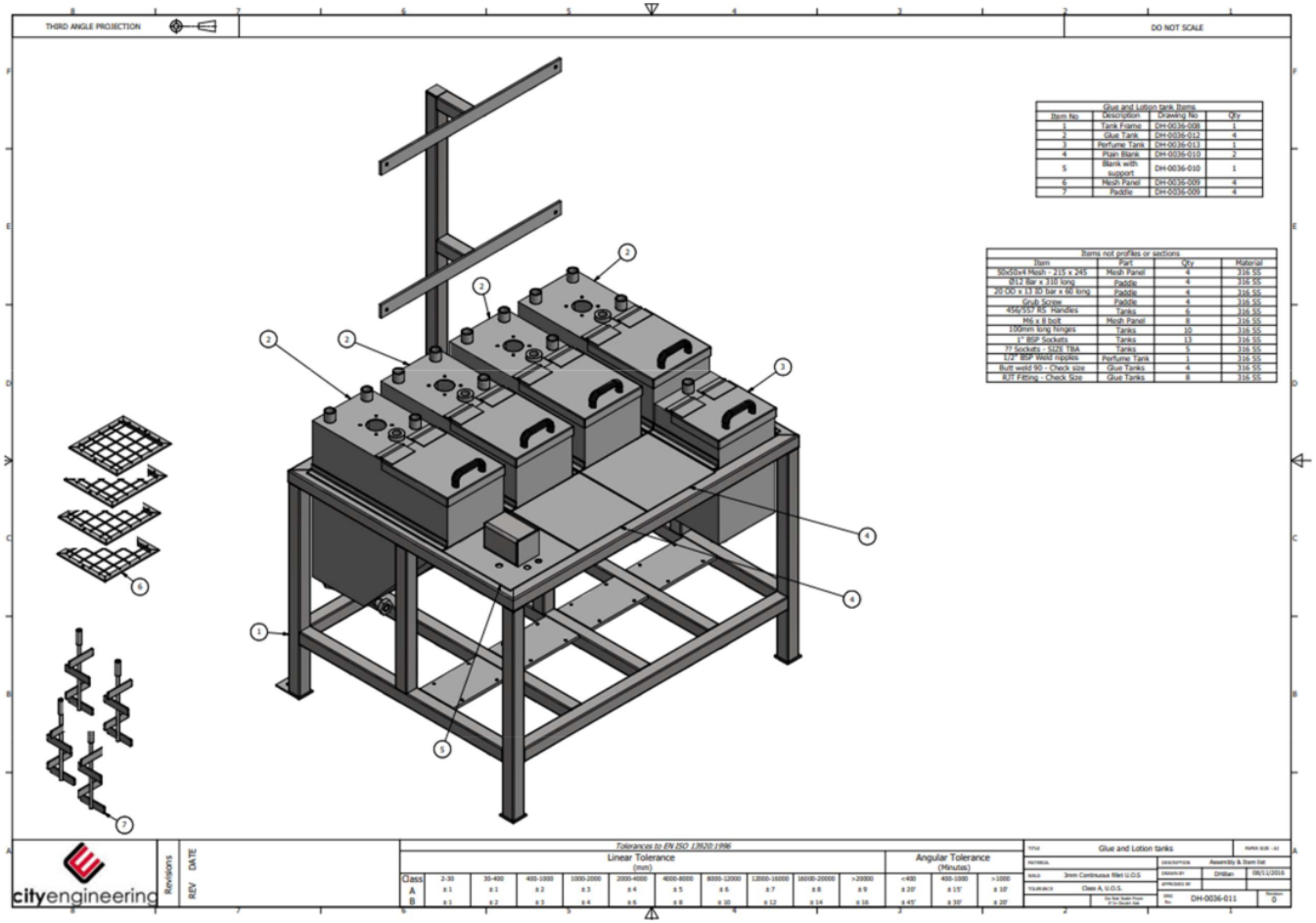
Title:	Transporting ink to line							
Risk assessment number	RA - 15	Version:	1	Location: Converting	Assessment date	20/04/2023	Assessor name	G. Wilkins
Department	Converting							
Activity	Operation and maintenance of glue mixings station						Overall Risk rating	Low

Hazard Identification				Risk level			Method of reducing the risk	By whom	Final Risk Level			
Hazard number	Hazard (What could cause harm)	Risk (How is could cause harm)	Whom maybe Harmed / Affected Parties (Employees, Contractors & Visitors)	Likelihood of impact/injury	Severity of injury	Risk level	Control measures to be applied	By whom	Likelihood of impact injury	Severity of impact	Risk level	Hazard control
1	Slips, Trips and Falls	Liquid spillages cause an operator to slip, trip or fall	Employees, contractors and visitors	3	3	9	The tanks will have high level controls to prevent tank from overflowing	Engineering	1	3	3	EC
							Any leaks are to be cleaned immediately using the spill kits located around the department. Leaks must be reported to the engineering and	Operators	1	3	3	AC

							Environmental department.					
							Strict cleaning regimes are in place to limit the amount of dust, debris on the floor. These housekeeping routines must be completed at the designated times to ensure cleanliness and reduce the risk	Operators	1	3	3	AC
2	Skin irritation	Glue Contact with operators/ maintenance personnel during cleaning or maintenance activities	Operators/ Maintenance	4	1	4	Rubber gloves and safety glasses to be provided and worn at all times to avoid skin contact.	Operators/ Maintenance	3	1	3	PPE
							If glue has contact, skin to be washed as soon as possible with warm soapy water as per the SDS advice. If excessive amount of ink, Swarfega can be obtained from workshop	Operators/ Maintenance	3	1	3	AC

							If glue has contact with eyes, rinse with water for 15 minutes	Operators/ Maintenance	3	1	3	AC
3	Compressed air	Unexpected release of air		3	3	9	All pipes are to be inspected before use and any leaks reported immediately		1	3	3	AC
							Safe isolation procedure to be followed during maintenance activities	Maintenance	1	3	3	AC
4	Electricity	Electrocution caused by contact to live electrical components	Maintenance	2	4	8	Electrical panel locked off and only competent personnel with access. Safe isolation procedure to be followed	Maintenance	1	4	4	AC

9.8 CAD drawing of station



9.9 Enclosure details

Product data sheet

Specifications



Wall mounted steel enclosure, Spacial S3D, plain door, without mounting plate, 1000x600x250mm, IP66, IK10

NSYS3D10625

9.10 Costing spreadsheet

Quantity	Part Number	Description	Quote	Each	Total
1	6EP1332-2BA20	SITOP PSU100S 24V/2.5A	Web	£102	£102
1	6AV6642-0AA11-0AX1	SIMATIC Touch panel TP 177A	Web	£1,942	£1,942
10	61F-GPN-BT/-BC	Conductive Level Controller	Web	£114.90	£1,149
2	SU7000	Ultrasonic volumetric flow sensor	Web	£775.94	£1,552
1	SM8100	Magnetic-Inductive flow meter	Web	£761.42	£761
1	NSYS3D10625	Control Panel 1000 x 600	Web	£197.50	£198
4	GVAG-3VK1	Level probe	Web	£450.78	£1,803
2	STM UK MN56B/4 SIM 14	Motor 0.09KW	Web	£466.66	£933
1	6SE7 151-1AA02-0AB0	ET200S IM 151 I/F Module Profibus	Web	£995.44	£995
1	6SE7 138-4CA01-0AA0	Power module	Web	£21	£21
5	6ES7-193-4CB30	Simatic ET200SP (Pack of 5)	Web	£25	£125
13	6ES7 131-4BD01-0AA0	DI module	Web	£39.80	£517
12	6ES7 132-4BD32-0AA0	DO module	Web	£104.60	£1,255
9	NA54N15-02	Solenoid valve	Web	£100.12	£901
		Miscellaneous - Cabling, glands etc	Web	£1,000	£1,000

Total	£13,255

9.11 Core glue automatic sequence

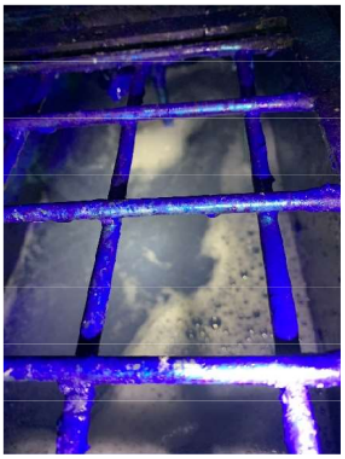






9.12 Ply glue automatic sequence – Neat



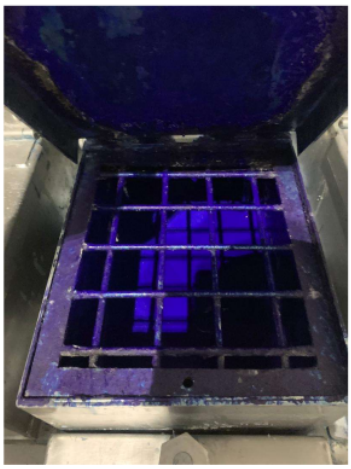






9.13 Ply glue automatic sequence



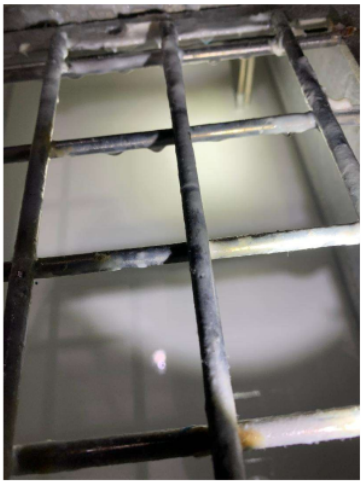






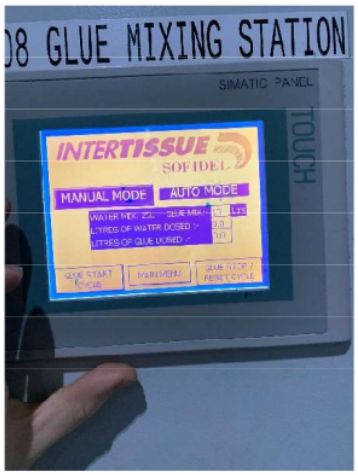
9.14 Pickup glue automatic sequence

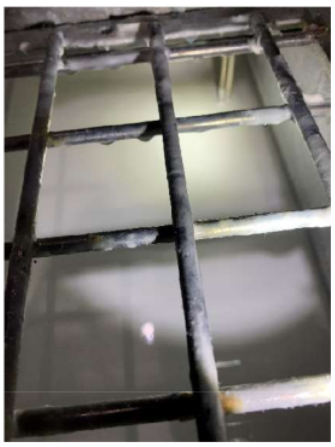






9.15 Tail glue automatic sequences



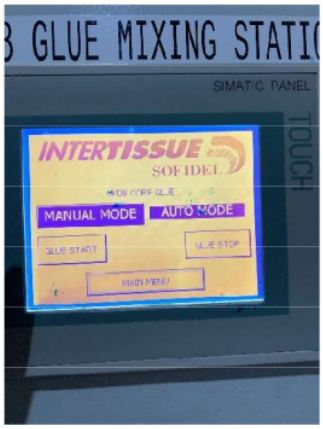






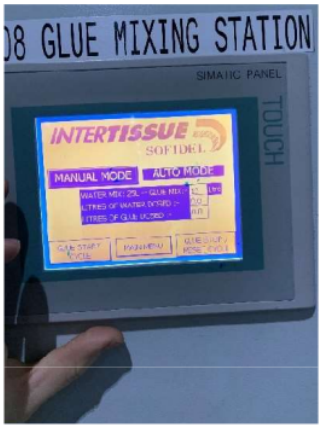
9.16 HMI Operation















9.17 Machine beacon indicator





SGEL6000

Independent Project

Log Book

Gareth Wilkins

Glue mixing station

2022-2023

Summary of Entries

Log Entry	Date	Brief Description of Activity	Duration (hrs)	Accumulated time (hrs)
15	13/01/23	Presentation preparation and electrical drawings	8	108
16	20/01/23	Presentation present issue with EPlan software	8	116
17	27/01/23	Investigated software modification	8	124
18	03/02/23	P&ID produced and software modifications started	8	132
19	10/02/23	List of components established and provided to procurement	8	140
20	17/02/23	Delivery of components chased up and IFM manuals studied.	16	156
21	24/02/23	Components delivered and panel build complete	24	180
22	03/03/23	Supply and profibus cable run	16	196
23	10/03/23	Delays sensor cabling run	16	212
24	17/03/23	Instrumentation mounted	16	228
25	24/03/23	Software modifications	24	252
26	31/03/23	Testing and tuning	32	284
27	07/04/23	Factory acceptance	32	316
28	14/04/23	Performance qualification	32	348
29	21/04/23	Evaluation of risk assessment	24	372

Log Entry Sheet

Log Number	15
Date	13/01/23
Duration (hrs)	8
Accumulated time (hrs)	108

Record of activities and achievements
The power point presentation was produced. The presentation was practiced ensuring professional presentation. The electrical drawings were drafted up by hand.

Plans for next week
The presentation will be presented and the electrical drawings will be produced on a Eplan software.

Signed _____ Signed _____

Log Entry Sheet

Log Number	16
Date	20/01/23
Duration (hrs)	8
Accumulated time (hrs)	116

Record of activities and achievements
The presentation was presented, and questions answered. The Eplan software licence has expired waiting for IT to renew licence.

Plans for next week
Produce schematic electrical diagram.

Signed _____ Signed _____

Log Entry Sheet

Log Number	17
Date	27/01/23
Duration (hrs)	8
Accumulated time (hrs)	124

Record of activities and achievements
No response from IT department. Investigation into software modification performed week early.

Plans for next week
A P&ID of system will be produced, and offline software modification will be performed. Produce offline software modifications.

Signed _____ Signed _____

Log Entry Sheet

Log Number	18
Date	03/02/23
Duration (hrs)	8
Accumulated time (hrs)	132

Record of activities and achievements
The P&ID of the system was produced. Offline software modification were started.

Plans for next week
Further work on the software will be performed and a component list will be produced.

Signed _____ Signed _____

Log Entry Sheet

Log Number	19
Date	10/02/23
Duration (hrs)	8
Accumulated time (hrs)	140

Record of activities and achievements
The component list was established, and the panel layout diagram was produced. The list of components was provided to procurement to obtain.

Plans for next week
Chase up delivery of components, investigate configuration of IFM sensors.

Signed _____ Signed _____

Log Entry Sheet

Log Number	20
Date	17/02/23
Duration (hrs)	16
Accumulated time (hrs)	156

Record of activities and achievements
The delivery time of components was chased and no definitive delivery date was provided. The IFM sensors manuals were downloaded and read to ensure correct mounting and set up.

Plans for next week
The components should be delivered and the electrical control panel should be constructed.

Signed _____ Signed _____

Log Entry Sheet

Log Number	21
Date	24/02/23
Duration (hrs)	24
Accumulated time (hrs)	180

Record of activities and achievements
The electrical control panel was constructed.

Plans for next week
The electrical supply will be run to the station.

Signed _____ Signed _____

Log Entry Sheet

Log Number	22
Date	03/03/23
Duration (hrs)	16
Accumulated time (hrs)	196

Record of activities and achievements
The supply and profibus cabling was run to the station.

Plans for next week
The instrumentation will be connected and wired up.

Signed _____ Signed _____

Log Entry Sheet

Log Number	26
Date	10/03/23
Duration (hrs)	16
Accumulated time (hrs)	212

Record of activities and achievements
Due to delays with the external contractor the stainless steel pipework has not been installed therefore the instrumentation cannot be mounted. The sensor cable was run and coiled up.

Plans for next week
The instrumentation will be connected and wired up.

Signed _____ Signed _____

Log Entry Sheet

Log Number	26
Date	17/03/23
Duration (hrs)	16
Accumulated time (hrs)	228

Record of activities and achievements
The pipework was installed, and the flow sensors and actuators mounted.

Plans for next week
The software modification will be downloaded.

Signed _____ Signed _____

Log Entry Sheet

Log Number	26
Date	24/03/23
Duration (hrs)	24
Accumulated time (hrs)	252

Record of activities and achievements
The software modification were downloaded and configured.

Plans for next week
The testing and commissioning process begins.

Signed _____ Signed _____

Log Entry Sheet

Log Number	27
Date	31/03/23
Duration (hrs)	32
Accumulated time (hrs)	284

Record of activities and achievements
The test table produced in assignment one was used to ensure the system met the FDS. It was noted during testing that the flow from the glue systems exceeded the flow rate of the pumps from the glue room. To ensure the flow sensors functioned correctly the manual ball valves were chocked back. This work around ensured that the flow sensors provided an accurate reading.

Plans for next week
The factory acceptance of the system will be performed.

Signed _____ Signed _____

Log Entry Sheet

Log Number	28
Date	07/04/23
Duration (hrs)	32
Accumulated time (hrs)	316

Record of activities and achievements
The factory acceptance involved the production and quality department agreeing that the system meets the requirements. A performance qualification was run to ensure the system delivered the same quality as the existing method used.

Plans for next week
The result of the performance qualification will be known.

Signed _____ Signed _____

Log Entry Sheet

Log Number	29
Date	14/04/23
Duration (hrs)	32
Accumulated time (hrs)	348

Record of activities and achievements
The performance qualification performed by the quality department showed that the system performed the operation to a satisfactory level.

Plans for next week
A risk assessment will be performed and operating instructions will be produced for operators.

Signed _____ Signed _____

Log Entry Sheet

Log Number	28
Date	21/04/23
Duration (hrs)	24
Accumulated time (hrs)	372

Record of activities and achievements
The risk assessment for the station was performed and evaluated by Health and Safety. Due to work commitments the operating instruction have not been completed. Due to the deadline approaching the project as it stands must be evaluated and the outstanding documentation must be completed later.

Plans for next week
All information and documentation will be compiled for the final report.

Signed _____ Signed _____

180904

GRADEMARK REPORT

FINAL GRADE

GENERAL COMMENTS

Instructor

68 /100

PAGE 1

PAGE 2

QM

Good Structure

Report is structured exactly as stated in the assignment brief.

PAGE 3

PAGE 4

PAGE 5

PAGE 6

PAGE 7

PAGE 8

PAGE 9

Text Comment. This is excellent information

PAGE 10

PAGE 11

Text Comment. This extract from a datasheet is unnecessary and should have been simply explained and cited.

Text Comment. This extract from a datasheet should simply have been cited.

PAGE 12

Text Comment. This extract from a datasheet is unnecessary and should have been simply explained and cited.

Text Comment. This is a useful drawing

PAGE 13

Text Comment. You have included much design information which should be in the appendix and explained in the report.

PAGE 14

PAGE 15

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PAGE 26

Text Comment. Most of these images belong in the appendix

Text Comment. However, they do provide excellent evidence and information

PAGE 27

PAGE 28

PAGE 29

PAGE 30

PAGE 31

QM

Line spacing should be 1.5

This allows the marker to put comments in between your lines

Text Comment. This extract from a datasheet is unnecessary and should have been simply explained and cited.

PAGE 32

PAGE 33

PAGE 34

Text Comment. Your plan seems to have work with some overruns

PAGE 35

Text Comment. Excellent evidence, though this table should be in the appendix

PAGE 36

PAGE 37

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QM

Spelling

Spelling error

PAGE 47

PAGE 48

PAGE 49

Text Comment. For a level 6 final report, this is a very small list and show little engagement in research using literature to inform your design process.

Text Comment. There are lots of datasheets in the main report but you should have extracted the information, explained and cited the sources.

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GRADING FORM: NEW CSG-RUBRIC

GARETH WILKINS	**68**

1. ENGAGEMENT WITH LITERATURE

Section 3: Judicial use and critical evaluation of technical literature in the design of the project
There is some evidence of the use of literature in the design of the project. (2/5)
Section 8: Extent of reading, range of credible sources and use of Harvard method.
A small range of sources correctly listed and cited. (2/5)

4

2. KNOWLEDGE AND UNDERSTANDING

Sections 3 and 4: Advanced knowledge and critical understanding demonstrated in the design and implementation of the project.
There is excellent evidence of these throughout the project. (7/10)

7

3. COGNITIVE AND INTELLECTUAL

Section 5: Testing and analysis of results.
Excellent evidence of testing, a detailed testing table with evidence included. (8/10)
Section 5: Critical evaluation of the project outcomes.
A detailed evaluation given in the testing section against the FDS with a good evaluation summary in this section. (7/10)
Section 6: Conclusions and recommendations.
Brief conclusions and useful recommendations given (6/10)

21

4. PRACTICAL APPLICATION

Section 4: Deployment method, use of material, tools, equipment and techniques in the construction of the project.
Excellent use of materials and equipment, techniques etc. to a professional standard (7/10)
Section 4: Quality of the final product or system.
High quality end product (7/10)
Sections 5, 6 and appendix: Management of the design process including use of plans, costing spreadsheet and log book.
Very good evidence of management and planning and log-entries. (7/10)

21

5. TRANSFERABLE SKILLS

Section 1: Acknowledgements, executive summary and introduction.

15

Brief acknowledgements, a good summary and brief introduction. (3/5)

All Sections: Presentation quality of the report, diagrams, charts, tables, figure numbering, page and section numbering etc..

Good quality presentation, well structured and formatted. However, there are too many diagrams and table cluttering up the main report which should have been placed in the appendix. (3/5)

All Sections: Quality of the writing style, use of punctuation and grammar.

Generally well written with few errors. (4/5)

Word count limit not exceeded (5/5)