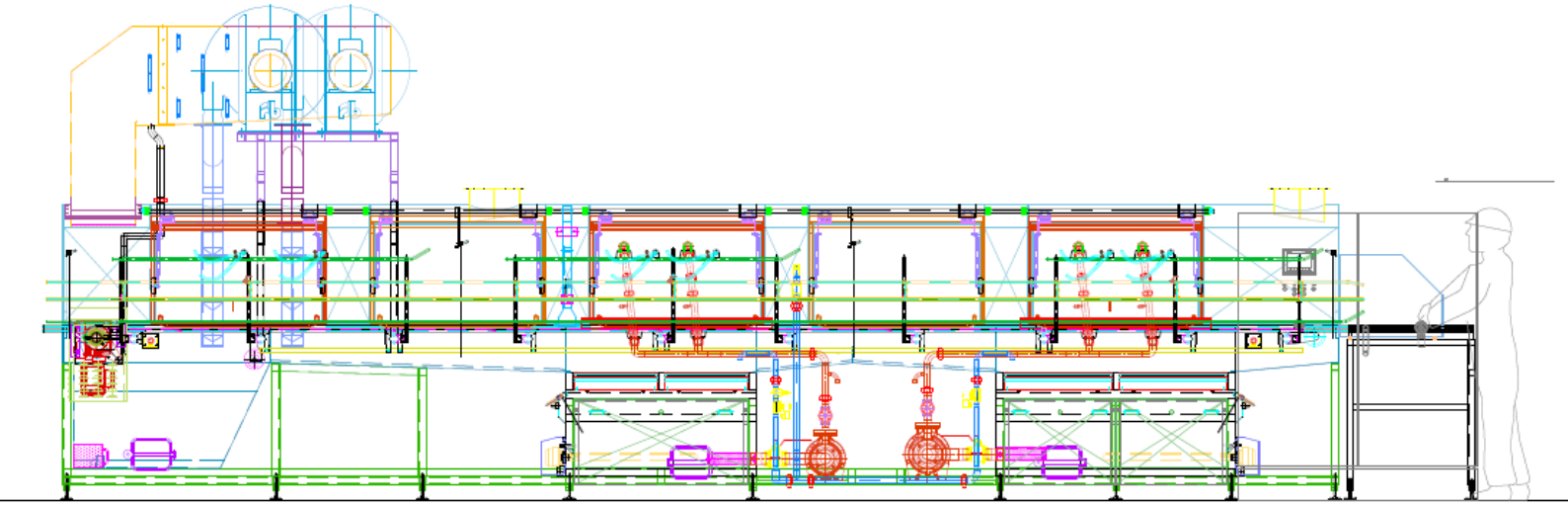
UNITECH
WASHERS



Tote Washer
Operating & Maintenance Information
GENERIC
SERIAL NUMBER:

Intentionally Blank

Amendment Record

No:	Amendment/Revision Reference	Amendment / Revision Date	Name & Signature
01			
02			
03			
04			
05			
06			
07			
08			
09			
10			
11			
12			
13			
14			
15			
16			
17			
18			
19			
20			
21			
22			
23			
24			
25			
26			
27			
28			
29			
30			

GENERIC

Preface

Introduction

1. This manual has been prepared to guide and assist all personnel involved with the operation and maintenance of Unitech Tote Washer. To the best of knowledge, the information it contains was current at the time of publication.

Safety

2. All personnel concerned with operation and maintenance of the washer systems, are to ensure that they have read and understood and the Health and Safety information / procedures applicable before undertaking any tasks. Clients should take reasonable steps to ensure that the information in this file is kept available for inspection by any person who may need it to comply with the relevant statutory provisions.

Amendments

3. This manual may be amended from time to time to reflect modifications to be machine or control system. Such amendments usually result from experience gained during operation and / or maintenance. Comments relative to this manual are to be forwarded too:

Unitech Washing Systems Ltd
West Coppice Road
Coppice Side Industrial Estate
Brownhills
West Midlands
WS8 7HB
United Kingdom
Telephone: +44(0)1543687096
Email: washer@unitech.uk.com

Warnings, Cautions and Notices

Warnings

4. The following warnings, or similarly worded warnings refer to residual risks that affect the operation and maintenance of the Original Instructions: English (EN) RETAIN FOR FUTURE REFERENCE. They are also reproduced in the appropriate sections of the manual. Failure to observe warnings may result in serious injury or harm.

(1) **MOVING MACHINERY, SCALDING, and CHEMICAL HAZARD.** Moving conveyor and hot water/chemical sprays. DO NOT reach into the machine tunnel, via the infeed or discharge ends, during operation.

(2) **MOVING MACHINERY HAZARD**. Internal conveyor may start or stop without warning. Ensure the mains power isolator is set and locked in the off position before commencing maintenance on any part of the machine.

(3) **MOVING MACHINERY HAZARD.** Totes jammed in a conveyor may be under mechanical strain. Take care when releasing container jams. Only release container jams when the conveyor is stopped. DO NOT use rods or similar objects to clear container jams on moving conveyors.

(4) **MOVING MACHINERY HAZARD.** Fans in blowers/extraction/exhaust units continue to rotate after their motor has stopped. Before removing any fan cover, ensure the mains power isolator is set and locked in the off position, and the fan/blower has stopped rotating. Maintenance is only to be undertaken by personnel authorised by the manufacturer.

(5) **ELECTRICAL SHOCK HAZARD.** Before carrying out any maintenance work on any drive, control panel or other electrical equipment, check and ensure that the local mains power isolator is set and locked in the off position. The conveyor drive gear motors and extraction fans are controlled via adjustable AC frequency inverters. Capacitors in the inverters take time to discharge after removal of the mains supply. Verify that the voltage on the bus capacitors has discharged before performing any work on the drive. The voltage must be zero.

(6) **CHEMICALS HAZARD.** The machine employs chemical agents for the sanitizing rinse process. Whenever carrying out operating or maintenance tasks on the chemical dosing equipment, or sanitizing rinse section, protective clothing (including eye protection) specified for chemical hazards is to be worn.

(7) **SCALDING HAZARD.** The temperature of water exceeds 85^0C (185^0F) in hot water sections. Wear the protective equipment specified for working in these areas, and wait until heating has been switched off, and water cooled to an acceptable level, before commencing tasks. Allow steam to disperse before opening washer access doors.

(8) **WORKING AT HEIGHT HAZARD.** Equipment is mounted on the machine roof at high level. When working at high level use appropriate access equipment and follow local safety procedures/regulations.

Cautions

5. The following cautions affect the operation and maintenance of the Tote Washer.

(1) NOISE HAZARD. Always wear the approved ear protection for the noise level when the machine is operating.
(2) TRAPPING HAZARD. Always use the handles/handholds provided when operating machine doors or moving guard panels. DO NOT move the tunnel access doors or water tank guard panels by their sides/edges.

Notices

6. The following notices affect the operation and maintenance of the system. Failure to observe Notices may result in damage to property or equipment.

(1) When grease is applied to a `sealed for life' bearing, the inner protective membrane will be broken, and the bearings sealed-for-life properties lost. It will therefore be necessary to lubricate the bearing periodically until a replacement is fitted.
(2) Hot water in heated tanks exceeds 85°C. Verify with Supervisory Management it is acceptable to release hot water to drain, if not, allow water to cool to an acceptable level prior to opening drain valves. Otherwise, site drainage facilities may sustain damage.

Terminology

7. Specific terms are used throughout this manual with the meanings indicated below:

Term	Description
Washer / Machine	The installed machine including one or more of washing/rinsing/drying/ facilities but excluding infeed or discharge equipment such as conveyors or tables
Container(s)	General description for items processed through the Washer
Infeed	The end of the machine that receives totes
Discharge	The end of the machine that dispatches totes
Right (hand) Side	When viewed from machine infeed
Left (Hand) Side	When viewed from machine infeed
Tunnel	The internal volume of the Washer, through which totes pass, between the conveyor and roof canopy, from infeed end to discharge end
Pump Set	Pump and drive motor
Gear Motor	Gearbox and drive motor
PPE	Personal Protective Equipment
E.Stop	Emergency Stop mushroom head pushbutton
OCP	Operators Control Panel
MECC/ECC	Main Electrical Control Cabinet/Electrical Control Cabinet
SV	Solenoid Valve. Solenoid valves are numbered for ease of reference i.e. SV1, SV2 etc.
PSU	Power Supply Unit
HMI	Human Machine Interface display screen
PLC	Programmable Logic Controller
ASU	Air Service Unit (Air Service Panel/Pneumatic Air Supply Panel)

Intentionally Blank

Section 1 – Overview

Intentionally Blank

Section 1
Tote Washer
Overview

Contents

Introduction

Machine Description

Page	Figure	Description
11	1	Tote Dimensions
12	2	Compatible Totes
14	3	35507 GA
17	4	Exterior of Control Panel
21	5	Washer: Main Wash Level Probe / Overflow
23	6	Wash Zone
23	7	Wash Pump and Wash Tank (typical)
24	8	Rinse Zone
25	9	Air Knife Zone

Introduction

1. The machine (Project No. 35507) is a tote washer. Totes are transported through the wash tunnel via a drag chain conveyor to discharge. In the washer the totes receive a main wash, final rinse then a drying process.

Intended Use

2. The system is intended to cleanse totes of the following specific types:

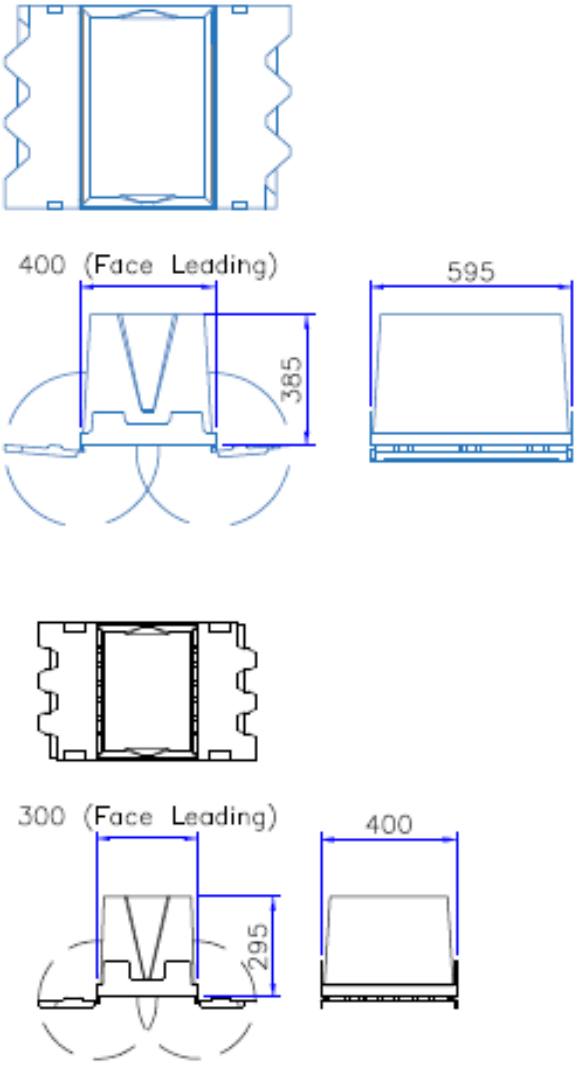


Figure 1 – Tote Dimensions

3. The system is intended to be operated by authorised, trained, personnel only. Maintenance work is only to be undertaken by authorised, trained, and suitably qualified competent personnel.
4. The system is NOT intended to cleanse other items. Do not place other items into the system. The use of the system for any purpose other than that intended may present a risk of personal injury and/or damage to property. Refer to Unitech to verify the suitability of the system for cleansing other items.

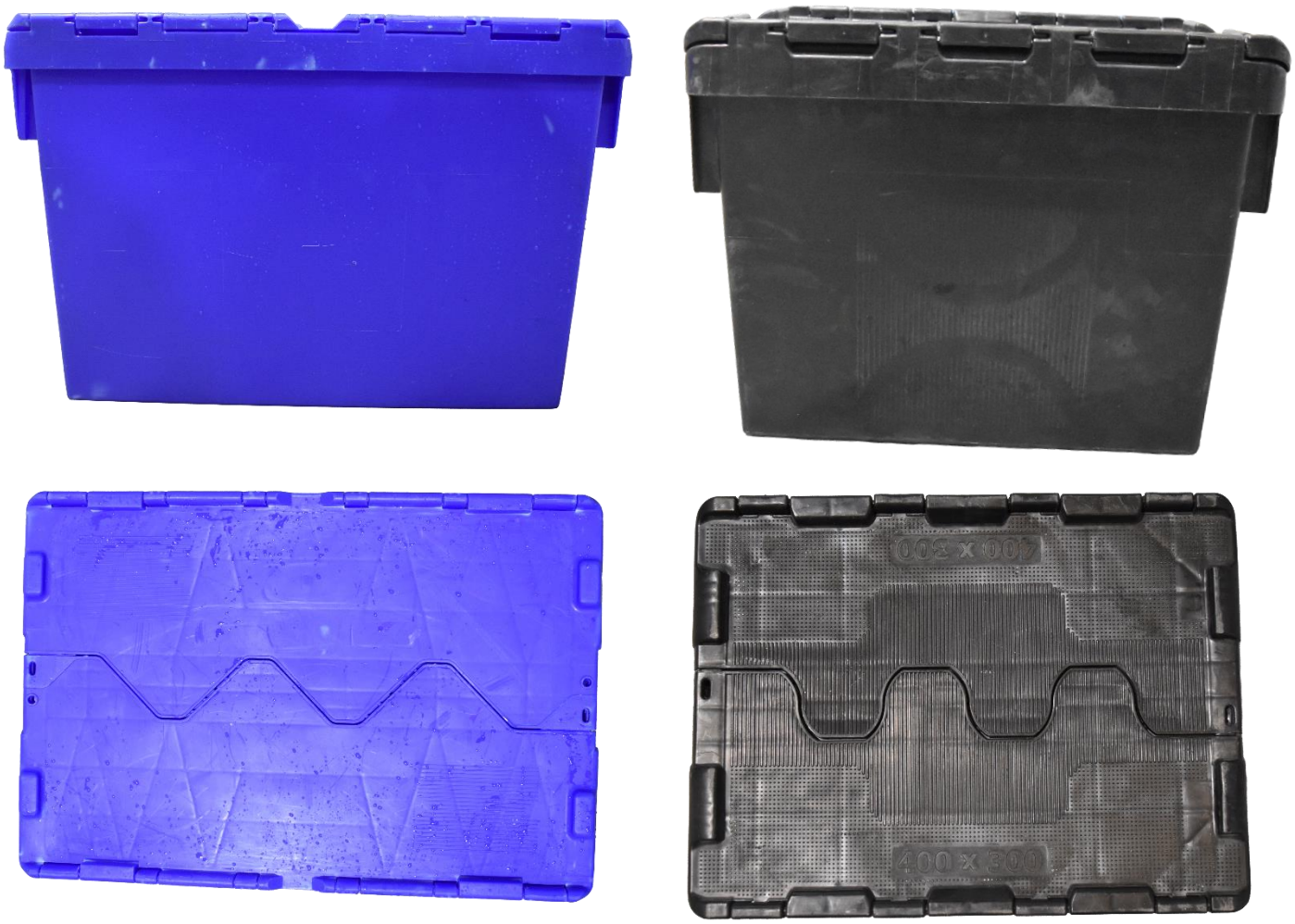


Figure 2 – Compatible Totes

Safety

5. Unitech washers are designed and built to conform to United Kingdom, European, and international safety standards. Safety facilities include:
   5.1. Access to the washer tunnel (except infeed and discharge points) via 10 tunnel access doors (5 on the left side, 5 on the right side).
   5.2. Guard panels/covers clipped/slotted/locked in place.
   5.3. Emergency Stop pushbuttons (Qty 4) installed at both sides of the discharge end, one at infeed end and final one mounted on the Electrical Control Panel.
   5.4. Electrical control cabinets secured by panel locks with mains power isolator door interlock.
6. All operators should be trained in the use of the machine, and have read, and understood, the user instructions, warnings, & cautions, and markings & labels, prior to commencing operations. Operators should ensure they use the appropriate personal protective equipment (PPE).

Installation, Commissioning and Disposal

7. The washer is delivered to site and installed in accordance with the agreed site plan. Unitech engineers will commission the system to ensure it runs to agreed specifications and/or customer requirements. The system requires a suitable weight-bearing level surface; height-adjustable (screw type) bolt down levelling feet are provided to secure the machine in a level operating position.
8. If it is considered necessary to move the machine after installation Unitech can advise on a lifting/transport plan to suit requirements.
9. When it is considered necessary to affect a non-resale disposal, do so in accordance with the EU, national and local directives & regulations in force for the respective materials. The frame, panels, pipework, and support structures are manufactured from stainless steel. For details of other proprietary materials or components used in the construction of the machine refer to Unitech Washing Systems Ltd.

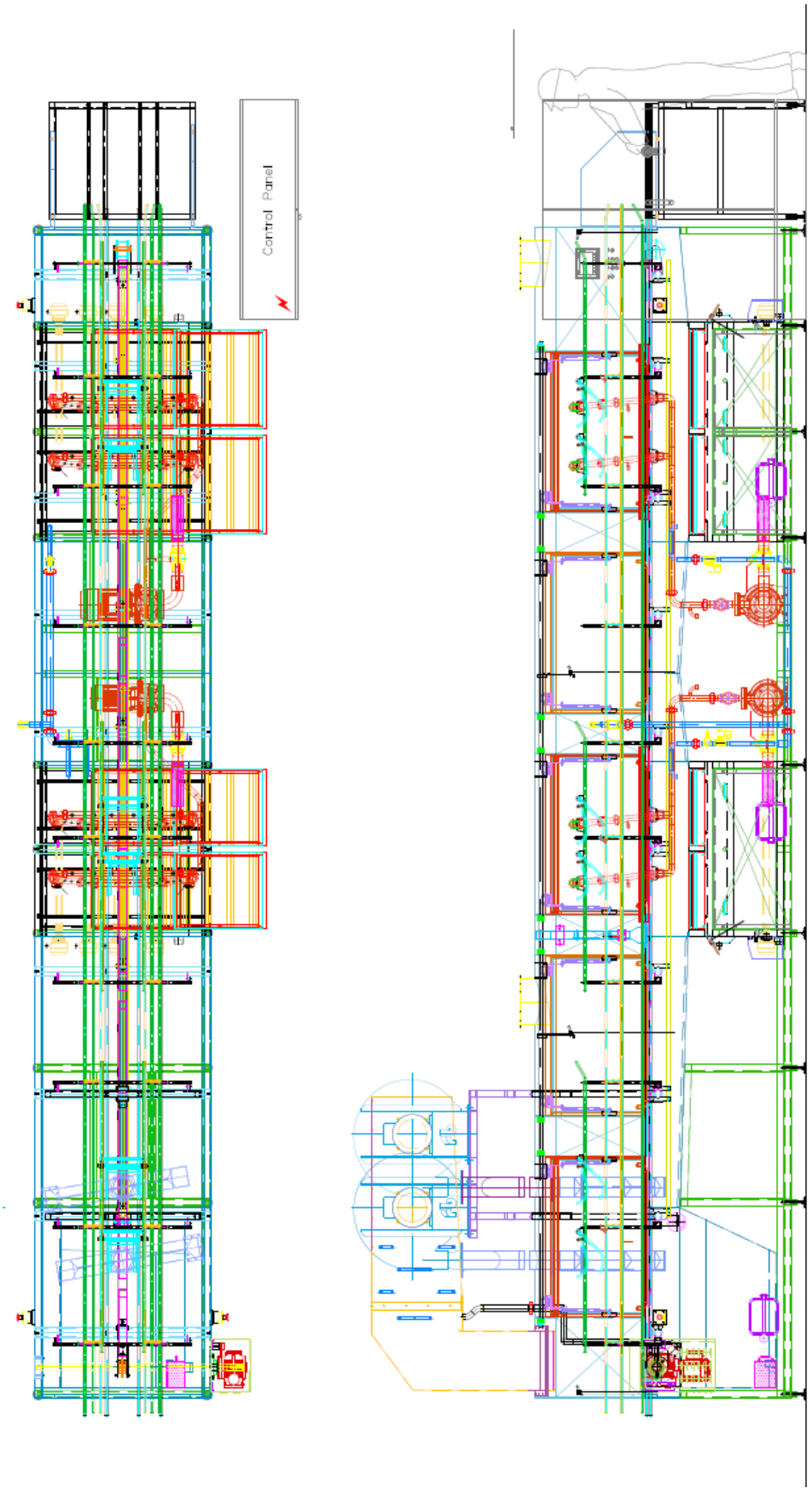


Figure 3 – 35507 GA

Connections

10. The machine has the following connections:
    10.1. **Water:** 1” BSP connection.
    10.2. **Drainage:** 2” BSP tank valves.
    10.3. **Overview:** 1’’ BSP.
    10.4. **Electricity:** 400V 3phase & neutral plus earth, 50Hz, hard-wired to client supply.
    10.5. **Electrical Heated:** Element immersion heater, 18kw, 400V, 2 ¼ ‘’ BSP fitting.
    10.6. **Extraction Fans:** Wash tunnel 315mm flange port connections.
    10.7. Chemical Doser: Bright Well Membrane Type (refer to Bright Logic proprietary literature listed in Section 6)

General

11. The machine (Project No. 35507) is a single-track tunnel type washer for cleansing soiled food totes of various types with a maximum throughput of 100 totes per hour. The machine provides an electrically heated main wash, electrically heated rinse and drying air knife zone for totes to be conveyed through a wash tunnel, via a drag chain conveyor.

11.1 Single Track Chain Through Conveyor. The conveyor transports totes through an electrically heated wash, electrically heated rinse and an air knife drying section. The chain is tensioned in the catenary tank.

11.2 Wash Zone. Totes are then conveyed through the wash tunnel where they are jetted with electrically heated water pumped by an ESHE 40-200/55, held down with hockey sticks. Within this zone a tank with filter drawers fitted.

11.3 Final Rinse Zone: Totes continue to convey through the wash tunnel where they receive a final electrically heated rinse, pumped by an ESHE 40-160/30, held down by hockey sticks. Within this zone a tank fitted with filter drawers.

11.4 Air Knife Drying Zone. 2 air knifes powered by 2 fan blowers.

11.5 Catenary Tank. The conveyor chain is tensioned in this section and there is a drain point to remove any water that has collected from the chain and passing totes.

Machine Description

Operation

12. Prior to production, when water volumes and temperatures are at operating levels, the operator are to set the side guides as follows:

12.1 Totes are fed with short edge leading.

12.2 Totes are transported through a wash, rinse and drying process:

12.3 Wash settings are pre-programmed for conveyor speed, wash and rinse cycle.

12.4 During production, totes are placed onto the infeed point and loaded into the tunnel via the drag chain conveyor, transporting the totes through the 35507 process.

13. Main Wash: electrically hot detergent water, exceeding 60-65ºC, sprayed at 60psi, via two spray manifolds, to remove ingrained soiling and stains. Detergent for the main wash is supplied to the main wash tank via a chemical doser.
14. Rinse: electrically heated hot clean water, exceeding 85ºC, sprayed at 40psi, via a single spray manifold per track, to remove wash residues.

12.5 Air knife: 2 air knifes powered by 2 blowers to remove any residual water.

12.6 Main operator control panel is stand alone to the side of the washer which includes wash start & stop, safety circuit. Emergency stop pushbuttons, located at strategic points around the washer will stop all operations in the event of an emergency.

12.7 Water volumes in the water tanks are monitored by level sensors working in conjunction with level controllers, mounted in the ECC, to open/close water supply solenoid valves to maintain operational levels. During washing operations mains water is continuously trickle fed into the wash tank from the rinse sprays to maintain water clarity.

12.8 Wash and rinse water tanks are heated by electrically elements mounted on the inside of the water tanks and connected to the client's electrical supply. Water temperatures are monitored via thermostats in the tank, working in conjunction with temperature controllers mounted in the ECC.

12.9 Used water from the mains and rinse wash, returns to the respective water tanks via micromesh filter drawers.

Controls

13. The main electrical control cabinet (ECC) is located at the washer side. Operator controls include text display screen, power on lamp, reset pushbutton, wash start/stop pushbutton, heating start/stop pushbutton, extraction start/stop pushbutton, emergency stop pushbutton and a main isolator.

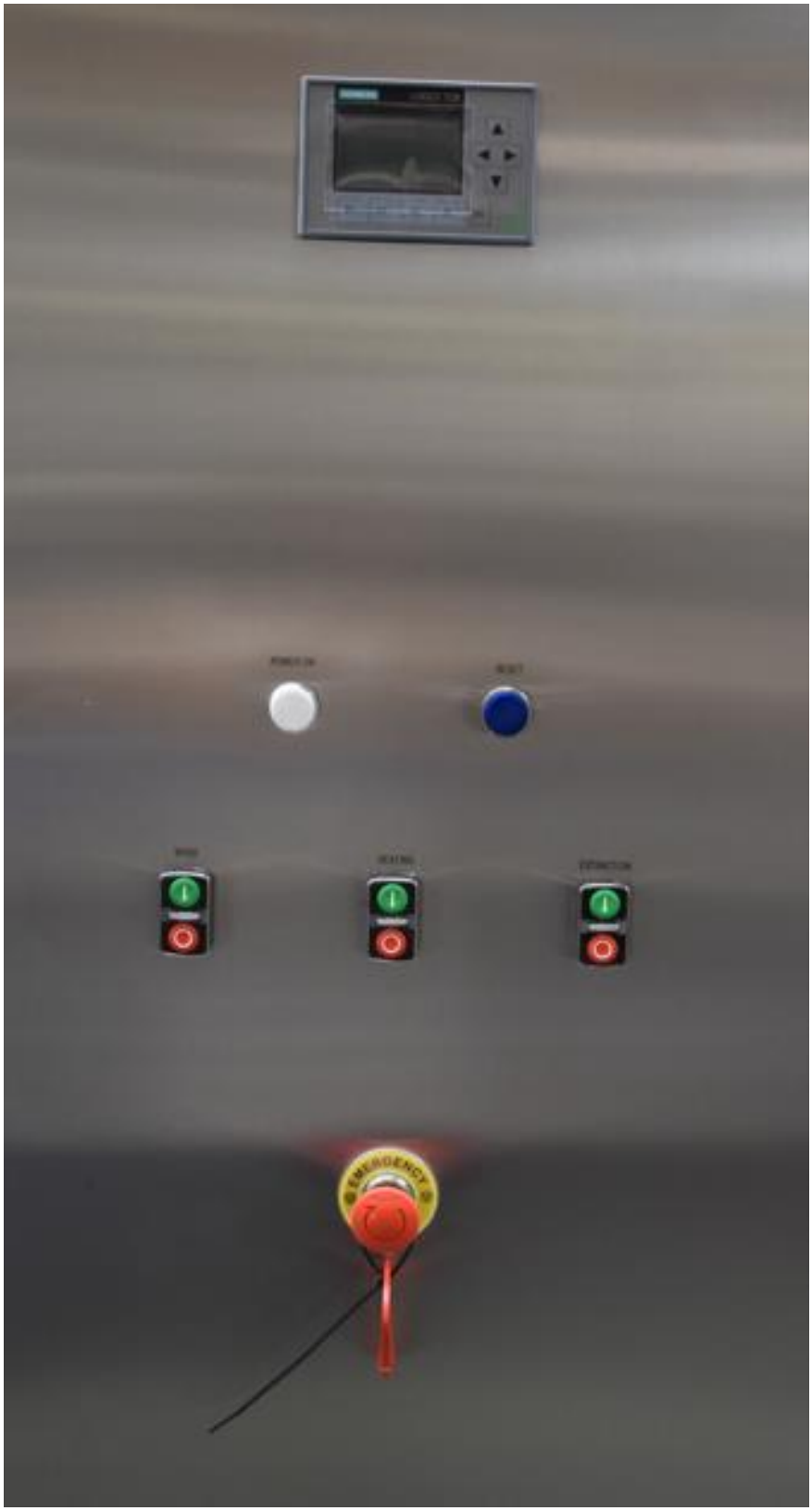


Figure 4 – Exterior of Control Panel

Construction

14. The machine is constructed from grade 304 stainless steel, 8000mm (washer length) x 1200mm wide (washer width) x 1853mm (washer height) comprising a tunnel structure based on a box section frame incorporating two separate water tanks and a catenary tank. Height adjustable, bolt-down, feet support the frame.

Control Panels / Electrical Control Cabinets

15. The machine incorporates the following operator accessible features including controls, safety facilities, utility supplies, maintenance components and access systems:
16. The main electrical control cabinet (ECC) is located at the washer side. Operator controls include text display screen, power on lamp, reset pushbutton, wash start/stop pushbutton, heating start/stop pushbutton, extraction start/stop pushbutton, emergency stop pushbutton and a main isolator.

Note. Water tank drain valves must NOT be opened during wash operations.

17. Emergency Stop pushbuttons (Qty 4) installed strategically around the washer.
18. There are 10 wash tunnel access doors. Doors are secured closed as groups by roof-mounted retaining bars operated by master release handles (one on each side of the machine). Electro-magnetic safety switches protect the tunnel access door master release handles. To open an access door, first lift the relevant master release handle into its open position, rotating the roof mounted retaining bar and tabs and allowing the doors to be lifted.

Note: Do NOT attempt to lift the doors before locating the master release handle in its upper cradle as failure to do so may damage the system

19. A water overflow pipe is fitted to the level probe housing, mounted in the end faces of the tanks located on the level probe box.
20. Tanks fitted with sludge doors.

Note. Wash and Rinse section sludge doors must NOT be opened when water tanks are full/partially filled or during wash operations.

21. Wash and rinse section filter drawers mounted over the respective tanks are withdrawn, for cleaning, from the side of the machine. Each drawer comprises two sections with an inter-locking lip. When inserting drawers into the machine ensure the two sections are inter-locked correctly.
22. Wash and rinse section pumps fitted with inlet manual isolation valves fitted between the respective tank and pump.

Note. Pump outlet pipes to the spray manifolds are fitted with flow control valves which must NOT be adjusted once set on commissioning.

23. The water tanks sides protected by lockable guard panels.
24. The gear motor protected by a clip-on guard.
25. The functions of controls and indicators are described in Table 1.

26. During normal production, after machine start-up, operators are to periodically review the status of the machine at the ECC to ensure no alarm messages or warning conditions are present.

Table 1 – Operator Controls & Indicators

Designation	Description	Function
Mains Power Isolator	2 Position Handle Switch	Turn to OFF to isolate washer from mains power.
Power ON	Text Display Screen	Illuminates when main power connected and turned ON
RESET	Pushbutton / Indicator	Press to RESET the control/safety circuit. The indicator illuminates to indicate a reset is required. When all emergency stops are in de-activated position, press the pushbutton to reset the circuit, the indicator will extinguish to signal safety circuit is reset. If an emergency stop is activated during machine operation the RESET indicator will illuminate. Address issue then press pushbutton to reset safety circuit prior to restart.
Wash START	Pushbutton/Indicator	Press to start washer operations (i.e. conveyor & pumps) when water has achieved operating level and temperature. LED indicator illuminates to confirm start.
Wash STOP	Pushbutton	Press to stop washer operations. Steam extraction, water heating and level control remain on. START indicator extinguishes.
Heating START	Pushbutton/Indicator	Press to start water heating when water volume in wash and rinse tank at operating levels. LED indicator illuminates to confirm start.
Heating STOP	Pushbutton/Indicator	Press to stop water heating. START indicator extinguishes.
Extraction START	Pushbutton/Indicator	Press to start steam extraction fan. LED indicator illuminates to confirm start.
Extraction STOP	Pushbutton	Press to stop steam, extraction fan. START indicator extinguishes.
Emergency Stop	Mushroom-Head Pushbutton (Red & Yellow)	When pressed stops all conveyor and washer activities. To reset after activation, twist head clockwise and release.

27. The conveyor serves to pull totes through the tunnel via ‘M’ type attachments/pegs mounted on a chain installed between the infeed and discharge ends of the washer tunnel. The conveyor comprises: single Acetal type chain with ‘M’ attachments, SEW type SA67/TDRN80MK6 gear motor stainless steel drive shaft & sprocket with 2-hole flange bearings, idler roller with catenary chain tension adjuster, rebated return roller and stainless-steel trackway. The motor is protected by a clip-on guard cover. The drive section (motor, drive shaft & sprockets) is mounted at the discharge end of the washer.
28. Pivoting hold-down bars retain totes in position, on the chain, against the pressure of water sprays whilst totes traverse the wash and rinse zones.
29. The conveyor tunnel incorporates left and right-side guides to maintain container horizontal position on the drag chain during production.

Figure 5 – Washer: Main Wash Level Probe / Overflow

Wash Zone

30. In the main wash zone, electrically heated water is sprayed over and around passing totes to remove ingrained soiling. The main wash zone comprises:
    - 30.1 Water input to a main wash tank via a solenoid valve operating in conjunction with a tank level probe set.
    - 30.2 Wash water is delivered via a Lowara ESHE 40-200/55 type pump a pair of spray manifolds, mounted vertically, in parallel, along the track to surround passing totes. Each manifold consists of a rectangular shaped pipe/jet assembly delivering sprays from above, below, and each side. Spray manifolds are installed with a series of jets, each comprising body, seal, and tip.
    - 30.3 Wash water heated to over 60-65ºC by a means of electrical elements installed within the water tank operating in conjunction with a temperature probe mounted in the water tank connected to the temperature controller. Current temperature and heating status displayed via the control panel.
    - 30.4 Used water is returned to the wash tank via filter drawers mounted in the floor of the tunnel, above the tank.
    - 30.5 The water tank includes a sludge door, overflow pipe, drain valve and access panel. Clip-on covers protect sides of the water tank.
    - 30.6 A tunnel access door, mounted on gas struts, provides access to the spray zone. The outer skin/panel may be pivoted away from the inner panel for cleaning purposes. During operation, the two panels are secured together via a pair of panel locks.

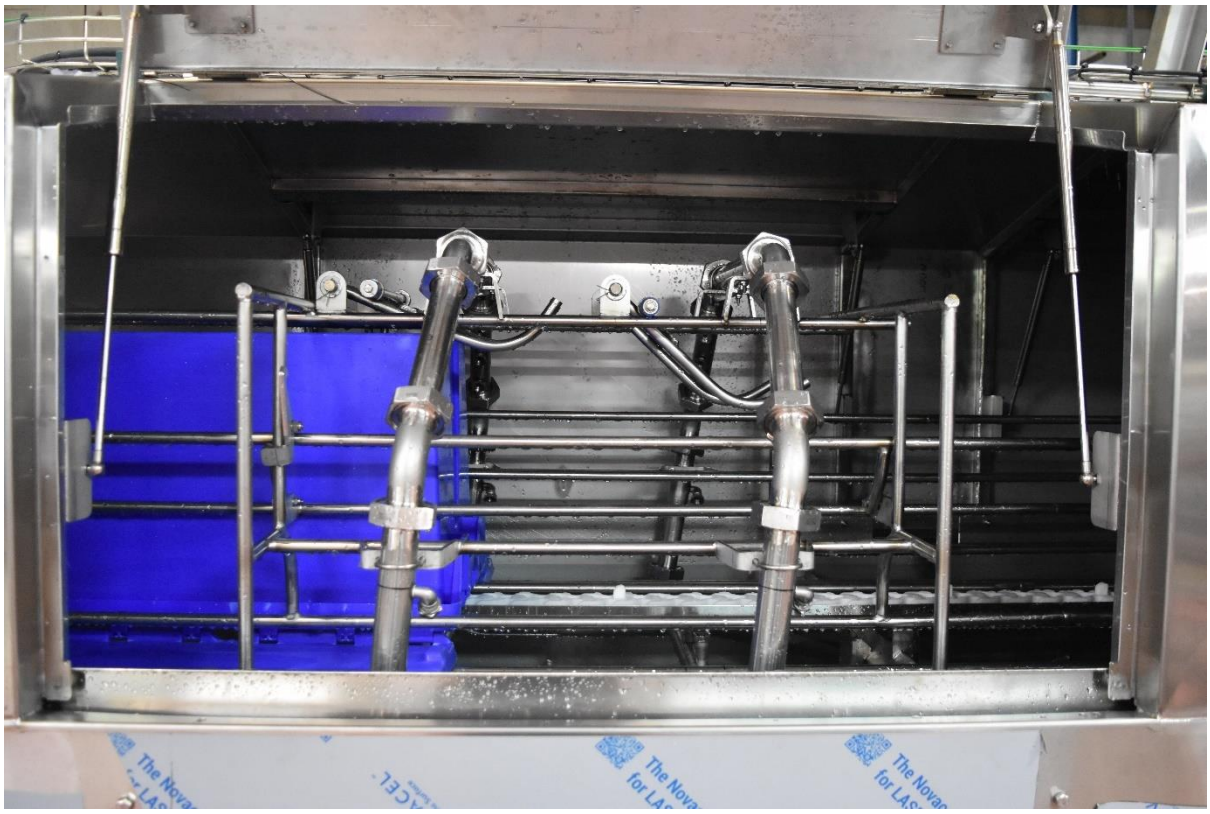


Figure 6 – Wash Zone

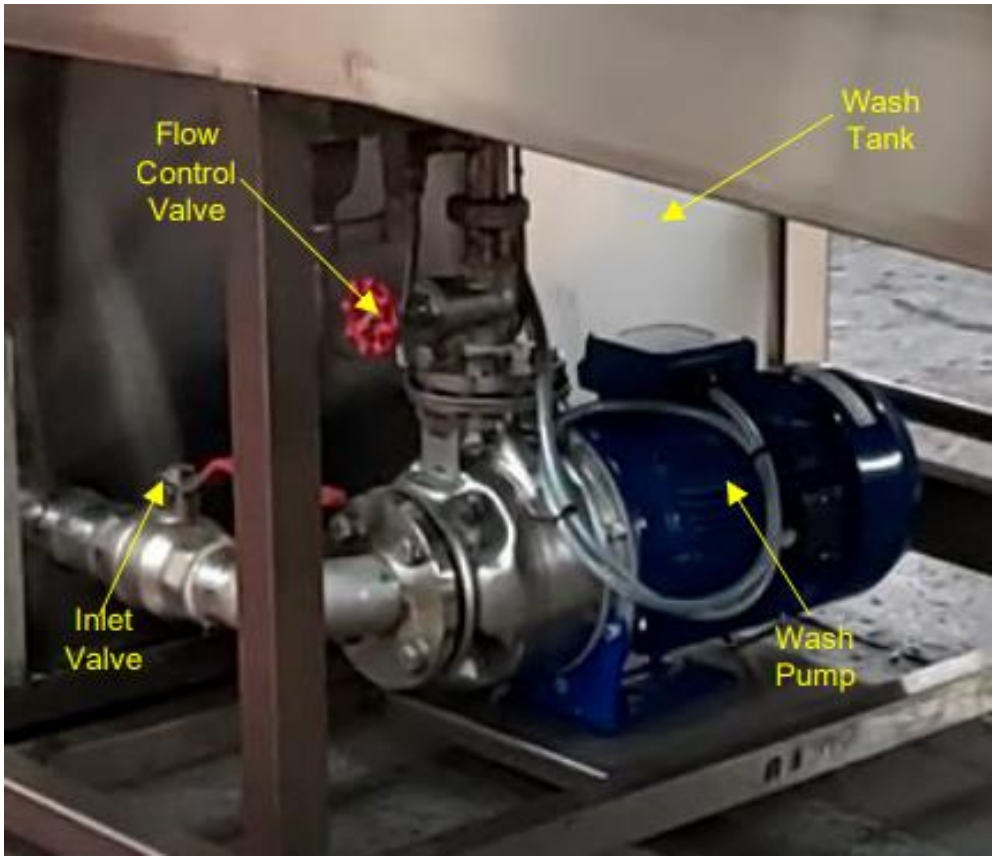


Figure 7 – Wash Pump and Wash Tank (typical)

Rinse Zone

31. In the rinse zone, electrically heated water is sprayed over and around passing totes to remove wash residues. The rinse zone comprises:
    - 31.1 Water input to the rinse wash tank via a solenoid valve operating in conjunction with a level probe set.
    - 31.2 Rinse water is delivered via a type ESHE 40-160/30 pump to spray manifolds, mounted horizontally, to surround passing totes. The manifold consists of a rectangular shaped pipe/jet assembly delivering sprays from above, below, and each side. Spray manifolds are installed with a series of jets, each comprising body, seal, and tip.
    - 31.3 Wash water heated to over 85ºC by a means of electrical elements installed within the water tank operating in conjunction with a temperature probe mounted in the water tank connected to the temperature controller. Current temperature and heating status displayed via the control panel.
    - 31.4 Used water is returned to the rinse tank via filter drawers mounted in the floor of the tunnel, above the tank.
    - 31.5 The water tank includes a sludge door, overflow pipe, drain valve and access panel. Clip-on covers protect sides of the water tank.
    - 31.6 A tunnel access door, mounted on gas struts, provides access to the spray zone. The outer skin/panel may be pivoted away from the inner panel for cleaning purposes. During operation, the two panels are secured together via a pair of panel locks.

Figure 8 – Rinse Zone

Air Knife Zone

32. After the wash and rinse process, 2 air knives are mounted above the conveyor track to blow air across the top face of passing totes. This serves to remove wash residues which may be trapped in the top face mouldings. Recovered wash water is returned to the catenary tank via the angle of the tunnel floor. The air knife consists of a stainless steel box section inlet chamber with a tapered rectangular outlet slot that directs air in a narrow, knife-like, configuration. The air knives are connected via stainless steel ducting mounted on the tunnel roof to the air blowers of the main air knife zone.
    - 2 Blowers is used that are located above the washer tunnel, type: 225QZ, type.

Figure 9 – Air Knife Zone

Intentionally Blank

Section 2 – Operating Information

Intentionally Blank

Section 2
Tote Washer
Operating Information

Contents

Introduction

Operating Procedure

Production

Page	Figure	Description
30	10	35507 GA
33	11	Exterior of Control Panel
35	12	Water Supply IN Valve
	13	Emergency Stop Pushbutton
39	14	Electromagnetic Door Switch

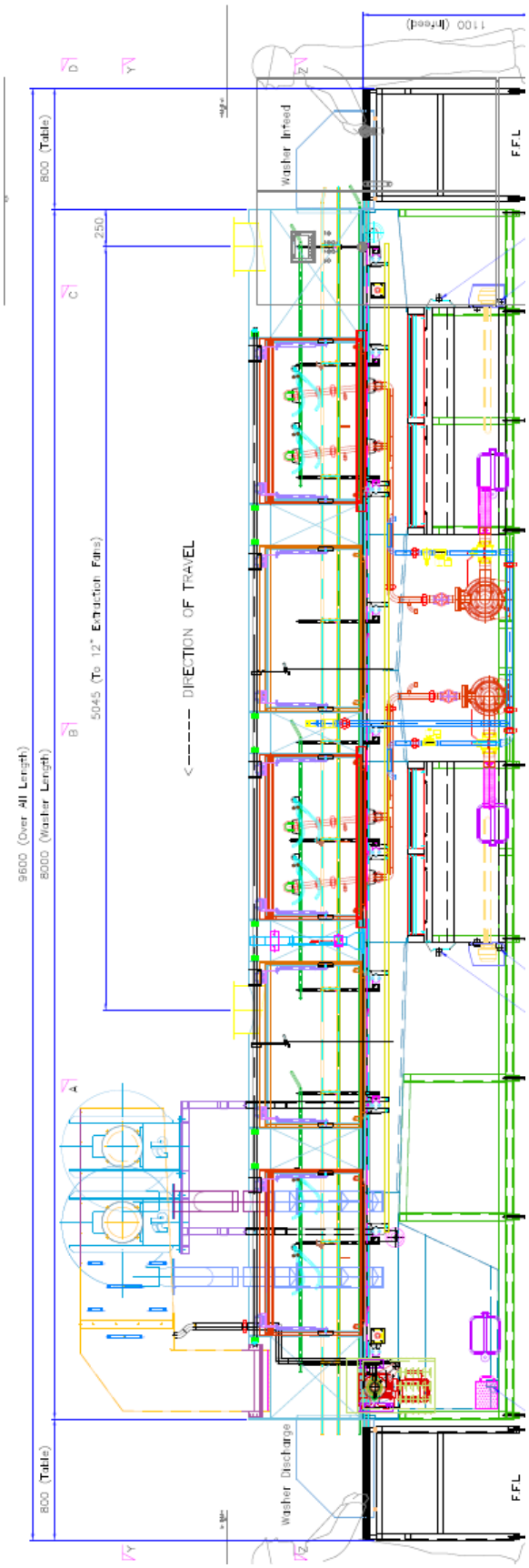


Figure 10 – 35507 GA

Introduction

General

1. This section describes the manual actions required to operate the tote washer. All operators should be trained in the use of the machine, and have read, and understood, the user instructions and warnings & cautions, prior to commencing operations. Refer to Section 1 ‘Overview’ for general machine orientation.
2. Do not attempt to operate the washer until you understand the operator’s controls and machine functions. If you are uncertain after studying these instructions contact your team leader, line engineer, or Unitech Ltd and quote the project number 35507.

Safety Warnings

- **MOVING MACHINERY, SCALDING, and CHEMICAL HAZARD.** Moving conveyor and hot water/chemical sprays. DO NOT reach into the machine tunnel, via the infeed or discharge ends, during operation.
- **MOVING MACHINERY HAZARD**. DO NOT use rods or similar objects to clear jams in moving machinery.
- **MOVING MACHINERY HAZARD.** Internal conveyor may start or stop without warning. Ensure the mains power isolator is set and locked in the off position before commencing maintenance on any part of the machine.
- **CHEMICALS HAZARD**. The machine employs chemical agents for detergent wash process. When carrying out operating or maintenance tasks on the chemical dosing equipment, detergent wash section, protective clothing (including eye protection) specified for chemical hazards is to be worn.

3. The following safety instructions are to be read, understood, and become part of the daily routine when operating a Tote Wash:
   - Do NOT operate machine unless, and until, the access door is correctly positioned with safety switch properly engaged.
   - Do NOT operate the machine whilst tired or under the influence of drugs, alcohol, or medication.
   - Do NOT wear loose clothing. The correct personal protective equipment (PPE) is to be worn when operating/maintaining the machine e.g. goggles, waterproof apron, rubber gloves and approved protective footwear.
   - Do NOT bypass any safety circuit. A faulty safety switch of Emergency stop pushbutton MUST be replaced before further washer operations are carried out
   - Do NOT reach into the washer whilst conveyor is in motion. It is important that container jams are released with power OFF.
   - When accessing the tunnel allow steam vapour to dissipate before opening doors fully.
   - Do NOT put your hands into water tanks unless they have been drained and protective gloves are worn.
   - Do NOT open sludge doors until the tank is fully drained.
   - Pay strict attention to all WARNING and CAUTION labels displayed on line equipment.

Note. It is recommended that a face/eye shower be available to operators when detergents are used.

Operating Procedure
General

4. This section describes the manual actions required to operate the Tote Washer. Operator controls and indicators are mounted on the door of the electrical control cabinet (ECC) Emergency Stop pushbuttons (Qty 4) 2 installed at the discharge end, one at infeed end and final one mounted on the Electrical Control Panel. Electro-magnetic safety switches are fitted to the tunnel access door. The functions of controls and indicators are described in this section.

Controls

5. The main electrical control cabinet (ECC) is located at the washer side. Operator controls include text display screen, power on lamp, reset pushbutton, wash start/stop pushbutton, heating start/stop pushbutton, extraction start/stop pushbutton, emergency stop pushbutton and a main isolator.

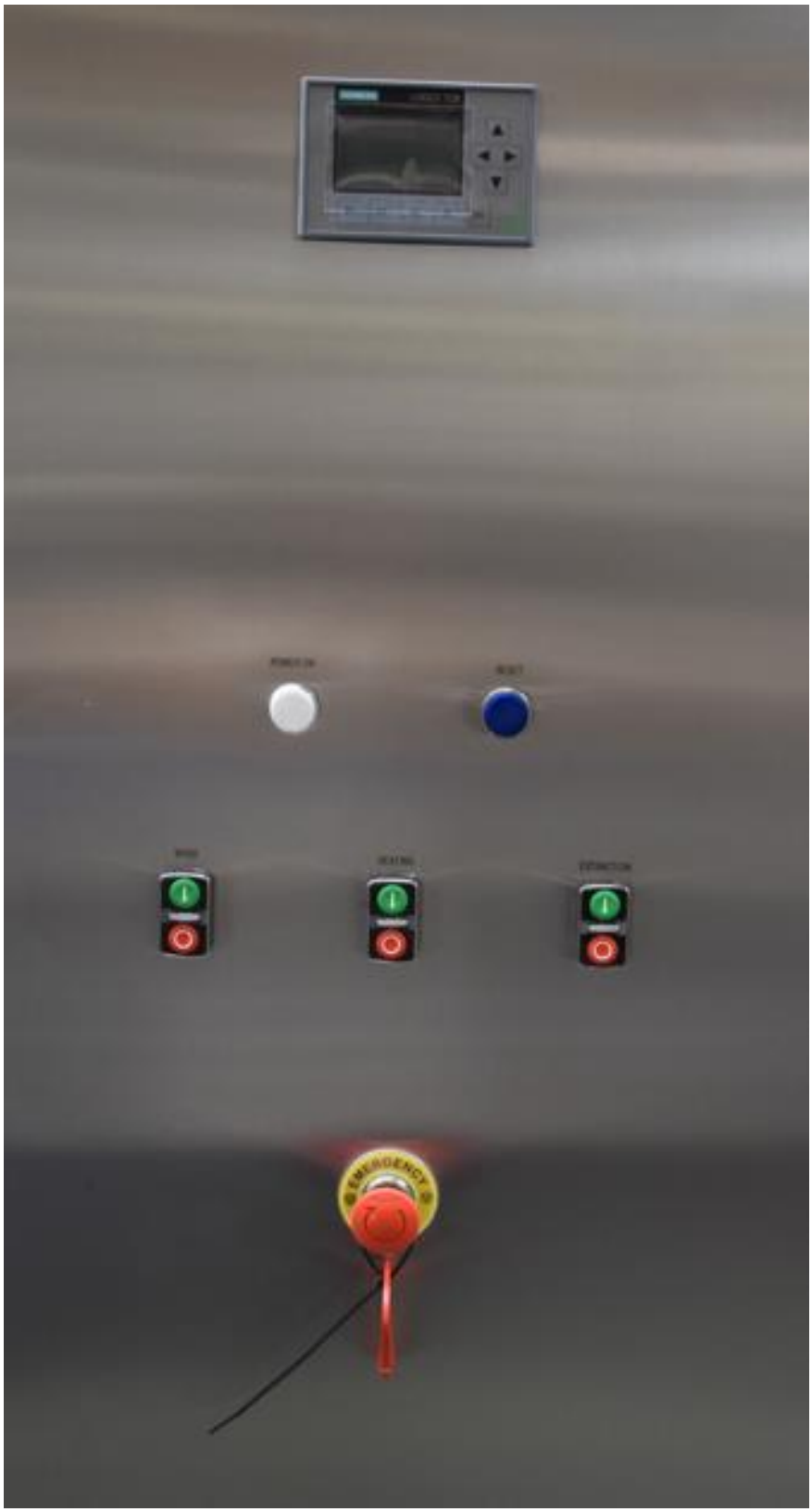


Figure 11 – Exterior of Control Panel

Table 2 – Operator Controls & Indicators

Designation	Description	Function
Mains Power Isolator	2 Position Handle Switch	Turn to OFF to isolate washer from mains power.
Power ON	Text Display Screen	Illuminates when main power connected and turned ON
RESET	Pushbutton / Indicator	Press to RESET the control/safety circuit. The indicator illuminates to indicate a reset is required. When all emergency stops are in de-activated position, press the pushbutton to reset the circuit, the indicator will extinguish to signal safety circuit is reset. If an emergency stop is activated during machine operation the RESET indicator will illuminate. Address issue then press pushbutton to reset safety circuit prior to restart.
Wash START	Pushbutton/Indicator	Press to start washer operations (i.e. conveyor & pumps) when water has achieved operating level and temperature. LED indicator illuminates to confirm start.
Wash STOP	Pushbutton	Press to stop washer operations. Steam extraction, water heating and level control remain on. START indicator extinguishes.
Heating START	Pushbutton/Indicator	Press to start water heating when water volume in wash and rinse tank at operating levels. LED indicator illuminates to confirm start.
Heating STOP	Pushbutton/Indicator	Press to stop water heating. START indicator extinguishes.
Extraction START	Pushbutton/Indicator	Press to start steam extraction fan. LED indicator illuminates to confirm start.
Extraction STOP	Pushbutton	Press to stop steam, extraction fan. START indicator extinguishes.
Emergency Stop	Mushroom-Head Pushbutton (Red & Yellow)	When pressed stops all conveyor and washer activities. To reset after activation, twist head clockwise and release.

6. Water supply valve located on the machine left side adjacent to the wash zone.

Figure 12 – Water Supply IN Valve

7. 4 mushroom head (red & yellow) Emergency Stop pushbuttons:
    - 1.1.1 Infeed right
    - 1.1.2 Discharge left
    - 1.1.3 Discharge right
    - 1.1.4 Mounted on the Electrical Control Panel

Figure 13 – Emergency Stop Pushbutton

Automatic Operation

8. During normal production, after machine start-up, operators are positioned to load at the infeed and unload at the discharge. Operators are to periodically review the status of the machine at ECC to ensure no alarm messages or warning conditions are present.

Preparatory Inspection

9. Commence machine preparatory inspection at least two hours prior to production start time. Confirm with Supervisor the production requirements:
   9.1 Tray type to be processed during production run.
   9.2 Requirement for wash stage.
   9.3 Requirement for rinse stage.
   9.4 Requirements for air knife stage.
   9.5 Machine speed as a percentage (%) of maximum speed.
   9.6 Inspect the system systematically from infeed point, via the washer, to the discharge. Where necessary, open access doors/panels or remove guard panels/covers to access equipment; ensure guard panels/covers are refitted (and locked as applicable) and doors closed after inspection.

Check the following: Infeed:

10.1.1 Check/ensure no maintenance in progress and clear of tools.
10.1.2 Clear any debris/soiling from the conveyor chains and frame.
10.1.3 Check conveyor for damage/excess wear. Report unsatisfactory items for maintenance.
10.1.4 Check/ensure OCP Emergency Stop pushbutton is reset (twist mushroom head and release).

Discharge:

10.2.1 Check/ensure no maintenance in progress and clear of tools.
10.2.2 Clear any debris/soiling from the conveyor belts, drip trays and frame.
10.2.3 Check conveyor for damage/excess wear or signs of belt misalignment. Report unsatisfactory items for maintenance.
10.2.4 Check/ensure drip tray drain outlets clear.
10.2.5 Check/ensure sensors and reflector are in place, undamaged and clean.
10.2.6 Check/ensure ECC Emergency Stop pushbutton is reset (twist mushroom head and release).

Washer:

10.3.1 Check/ensure no maintenance in progress on any part of the washer including interior and exterior, lower equipment bays, operator control panels and electrical control cabinets (ECCs). Check all parts of the washer are clear of any tools or other work materials.
10.3.2 Check/ensure wash tunnel interior is clean and clear of debris from infeed point to discharge end. Check the tunnel roof, floor and walls, spray manifolds, pipework, fittings, conveyor chain, track, infeed rollers, drive sprockets, side guides, support bars, extraction grills, spray curtains, etc.
10.3.3 Check conveyors for damage and/or excess wear. Pay attention to idler rollers, chain, pegs, spray curtains, track, wear strip, drive sprockets, return rollers, side guides, support bars, hold-downs etc.). Report unsatisfactory items for maintenance.

10.3.4 Check/ensure all spray jets in the spray manifolds are in position and clean (wash zone and rinse zone) All missing jets must be replaced, and blocked jets cleared.

10.3.5 Check/ensure all pump inlet isolation valves are fully OPEN (wash, and rinse zones).

10.3.6 Check/ensure all tank drain valves are fully CLOSED (wash tank, rinse tank and catenary tank).

10.3.7 Check/ensure all level sensors are properly located in mounting pockets (wash tank and rinse tank).

10.3.8 Remove wash and rinse tank filter drawers and flush clear all debris. Re-fit drawers.

10.3.9 Check/ensure all ECC doors are closed and locked.

10.3.13 Check/ensure all water tank guard panels and gear motor guard covers securely in place.

10.3.14 Check/ensure control panels closed and locked.

Tunnel Access Doors and Guard Panels:

11. Close all tunnel access doors. Ensure wash, rinse and air knife zone doors inner guard panels securely in place
    a. Check/ensure all exterior guard panels and covers in place.
    b. Ensure associated client equipment is prepared e.g. wash tank detergent doser.

12. Preparatory inspection complete.

Pre-Start Actions

13. Complete the following actions prior to machine start:
    a. At the ECC left hand door: set mains power isolator switch to ON. Control ON indicators will illuminate.
    b. Press start pushbutton for wash, extraction and heat.
14. Safety circuit RESET pushbutton indicator will flash, indicating a start-up safety circuit reset is required. If the indicator is illuminated with a solid light an E-Stop is activated. Check/ensure all E-Stops are reset. With all E-Stops reset press the RESET pushbutton to reset safety circuit. If successful, the RESET indicator will extinguish. If safety circuit fails to reset, check that all Emergency Stop pushbuttons are reset/deactivated. If the safety circuit continues to fail to reset, seek technical assistance.
    a. When the safety circuit has been reset, resolve any alarm/warning messages, with technical assistance if required.
    b. The wash and rinse zone will begin to fill with water if respective level probes detect low water level.

NOTE: Water temperature set points for the respective tanks are set at commissioning and can only be changed by authorised personnel.

Start-up procedure

15. When preparatory phase complete, go to OCP/ECC: Turn mains power Isolator to ON.

15.1 Check ‘Power ON’ indicator illuminated. If indicator fails to illuminate request technical assistance.

15.2 Check Text Display, if an alarm/fault condition is displayed take the appropriate action to resolve situation. Alarm/fault condition(s) must be resolved, as appropriate, before proceeding with ‘Start-Up’. Request technical assistance if necessary.

15.3 Check RESET pushbutton indicator is flashing. If not seek technical assistance. Press Reset push button, indicator will change to solid (fixed) illumination to indicate safety circuit has been reset. If RESET indicator remains flashing, check and ensure all E. Stops are in ‘reset’ position and no alarm/fault conditions displayed. Press Reset again. If circuit fails to reset seek technical assistance.

16. Start-up procedure complete, totes can be fed into to the machine.

NOTE: After Start-Up, mains water will flow to the wash tank, as required, to maintain level.

Totes Loading Operator

17. Load totes into the machine as specified below:
    17.1 Single operator mode

Stop Washing Operations

Normal Stop

18. To stop machine operations, as a matter of routine, allow all totes in the machine to be discharged, press system STOP push button on OCP. Conveyor, washer and air blower will stop. 'System START' LED extinguishes.

Emergency Stops

19. In case of an emergency requiring an immediate halt to all machine operations press one of the emergency stop pushbuttons in the system, all machine operations will stop immediately, an 'Emergency Stop Operated' red alarm message will be displayed on the text display and the RESET pushbutton will commence flashing. To restart the machine:
    19.1 Restore the activated E. Stop (twist clockwise and release).
    19.2 Press RESET push button (integral indicator changes to solid illumination) and clear the displayed message.
    19.3 Press Washer START push button (associated LED illuminates).

Door Open

20. The access doors to the tunnel are fitted with an electro-magnetic guard (safety) switches connected to a dual channel safety relay. If the guard switch is de-activated (door open) conveyor will stop immediately, and an orange 'Door Opened' warning message displayed on the text display screen. The machine cannot be re-started until the door is properly closed and the message automatically cleared. Press systems START push button (associated LED illuminates).

Figure 14 – Electromagnetic Door Switch

Text Display Information Screens

21. The text display screen shows the status of machine facilities including the conveyor on the 'Machine Status' screens. Periodically review the text display to determine the machine is functioning correctly. In the event of a fault an alarm or warning message will be displayed by the text display. Table 3 details text display information.
    21.1 Alarm message - red flashing screen indicating major item or emergency situation that has stopped washing operations.
    21.2 Warning message – orange flashing screen indicating minor item or action that has temporarily stopped operations or will reduce machine performance.

Table 3 – Text Display Information

22.

Item	Messages	Conditions
Conveyor	Stopped	Internal conveyor not operating. Internal conveyor operates with normal washer operations
	Running	Internal conveyor operating normally
	Tripped (alarm)	Presence of fault on the internal conveyor. Washer operations stop - request technical assistance to check inverter
Wash	Stopped	Wash zone not operating
	Running	Wash zone operating
	Tripped (alarm)	Wash zone drive fault. Washer operations stop – request technical assistance to check drive/contactor
Rinse	Stopped	Rinse zone not operating
	Running	Rinse zone operating
	Tripped (alarm)	Rinse zone drive fault. Washer operations stop – request technical assistance to check drive/contactor
Air Blower	Stopped	Air blower not operating
	Running	Air blower operating
	Tripped (alarm)	Air blower drive fault. Washer operations stop - request technical assistance to check drive/contactor
Door(s)	Opening (warning)	Tunnel access door open (electromagnetic switch not made). Machine operations stop or cannot be started
Emergency Stop	Operated (alarm)	One of the installed E. Stops has been pressed. All machine operations stop immediately

Machine Routine

During Production

23. To obtain and maintain an efficient service from the machine, during routine operations:
    - 23.1 Do NOT feed damaged totes into the machine.
    - 23.2 If applicable, remove any loose material/debris etc., from totes before they enter the machine.
    - 23.3 Periodically, during the shift, stop the machine, open the tunnel access door, and check/clean all jets and air knifes.
24. In case of a tray jam within the machine, DO NOT reach into the infeed or discharge ends of the tunnel while the machine is operating. Stop the system, stop heaters and turn mains power isolator to off. Allow approximately 10 minutes for the tunnel to clear, then open the tunnel access door, remove totes jam, and inspect tunnel interior for any damage, request technical assistance if necessary.

End of production

25. At cessation of washing operations, when all totes have cleared the machine:
    - 25.1 Press system STOP.
    - 25.2 Set mains power isolator to OFF *(unless otherwise directed by Supervisory Management).*
    - 25.3 Clean jets and air knifes.

Machine Faults

26. The machine will stop automatically if a fault condition occurs, and an appropriate message will be displayed on the test display screen. Refer to failure diagnosis information at Table 4. Act as appropriate or seek technical assistance. When resolved follow start-up procedure to restart washing operations.

Table 4 – Fault Finding

Item	Symptom	Diagnosis
1	Power ON indicator not illuminated	1.1 Main Isolator OFF* 1.2 Control primary/secondary circuit breaker tripped 1.3 Faulty control transformer/faulty power supply 1.4 Faulty wiring 1.5 Blown bulb
4	Wash pump/air blower will not run	4.1 Circuit breaker tripped 4.2 Contactor faulty 4.3 Pump only - low water levels 4.4 Faulty pump/air blower
8	Drag chain conveyor will not run	8.1 Faulty Inverter / MCB tripped 8.2 Inverter trips on overload 8.3 Totes jammed in washer 8.4 Chain jammed 8.5 Faulty motor

NOTE: Items marked with an asterisk * in the diagnosis column can generally be cleared by the operator. Otherwise seek technical assistance (mechanical or electrical as appropriate).

Fault Finding

27. Solutions to typical faults with washers are given in table 5. Also, refer to fault finding information in the manufacturer's literature for proprietary components, see Section 6.

Table 5 – Fault Findings

Item	Symptom	Diagnosis
1	Control ON indicator will not illuminate	1.1 Main Isolator OFF*- ensure isolator turned to ON 1.2 Control primary/secondary circuit breaker OFF/tripped 1.3 Faulty control transformer 1.4 Faulty power supply 1.5 Faulty wiring 1.6 Blown bulb
2	Water tank(s) will not fill with water	2.1 Main water supply valve in OFF position* 2.2 Water supply Y strainer blocked 2.3 Tank drain valve(s) OPEN* 2.4 Faulty level probe(s)/blown fuse/tripped MCB 2.5 Faulty solenoid valve(s)/blown fuse/tripped MCB
4	Washer conveyor will not run	4.1 Faulty/tripped inverter 4.2 Faulty/tripped motor-starter 4.3 Container/chain jam/torque monitor activated* 4.4 Faulty motor 4.5 Build-back sensor activated
5	Pump will not run	5.1 Pump motor-starter/MCB OFF/tripped/faulty 5.2 Low water level 5.3 Faulty pump
6	Poor sprays	6.1 Blocked jets/pipe work 6.2 Blocked/damaged pump impellers 6.3 Blocked pump suction 6.4 Faulty pump 6.5 Misaligned/missing jets/seals*
7	Air Blower not functioning	7.1 Motor-starter/MCB OFF/faulty/tripped 7.2 Faulty blower motor

Note: Items annotated * in the diagnosis column can generally be cleared by the operator. Otherwise seek technical assistance (mechanical or electrical, as appropriate)

Intentionally Blank

Section 3 – Maintenance Information

Intentionally Blank

Section 3
Tote Washer
Maintenance Information

Contents

Page	Figure	Description
51	15	Exterior of Control Panel
62	16	Drag Chain Conveyor Catenary Diagram
63	17	Wash Pump and Wash Tank
64	18	Extraction Fan

Introduction

1. This section contains the maintenance information for mechanical components. Refer to Section 2 for operating information. Refer to Section 4 for maintenance information for Electrical, Automation & Control. The Tote Washer incorporates several components which require periodic servicing to maintain optimal performance, failure to maintain the machine properly can result in poor machine performance and/or increase risks to personnel safety.

Safety

2. Do not attempt to operate the washer until you understand the operator's controls and machine functions. If you are uncertain after studying these instructions contact your team leader, line engineer, or Unitech Ltd and quote the contract number.

Warnings

- **MOVING MACHINERY, SCALDING, and CHEMICAL HAZARD.** Moving conveyor and hot water/chemical sprays. DO NOT reach into the machine tunnel, via the infeed or discharge ends, during operation.
- **MOVING MACHINERY HAZARD.** Internal conveyors are likely to start without warning. Implement isolation procedures before commencing maintenance or other tasks on any part of the washer.
- **MOVING MACHINERY HAZARD.** Do not use rods or similar objects to clear jams in moving machinery.
- **MOVING MACHINERY HAZARD.** Fans in the extraction units and/or air blowers continue to rotate after their drive motors have stopped. Before removing any extraction unit/air blower cover, ensure the mains power isolator is set and locked in the off position, and the fan/blower has stopped rotating. Maintenance is only to be undertaken by personnel authorised by the manufacturer.
- **ELECTRIC SHOCK HAZARD.** Before carrying out any maintenance work on any drive or other electrical equipment, check and ensure that the local mains power isolator is set and locked in the off position.
- **WORKING AT HEIGHT HAZARD.** Equipment is mounted on the machine roof at high level. When working at high level use appropriate access equipment and follow local safety procedures/regulations.

Cautions

- When grease is applied to a ‘sealed for life’ bearing, the inner protective membrane will be broken, and the bearings sealed-for-life properties lost. It will therefore be necessary to lubricate the bearing periodically until a replacement is fitted.

3. The following safety instructions are to be read, understood, and become part of the daily routine when operating a Tunnel Tote Washer:
   3.1 Do NOT operate machine unless, and until the access door and master release handles are closed with safety switches properly engaged, and all guard covers are in place.
   3.2 Do NOT operate the machine whilst tired or under the influence of drugs, alcohol, or medication.
   3.3 Do NOT wear loose clothing, it may get caught in moving parts. The correct personal protective equipment (PPE) is to be worn when operating the machine e.g. goggles, waterproof apron, rubber gloves, approved protective footwear, and ear-protection as specified by local regulations.
   3.4 Do NOT bypass any safety circuit. A faulty safety switch or Emergency Stop pushbutton MUST be replaced before further washer operations are carried out.
   3.5 Do NOT reach into the washer whilst conveyor is in motion. It is important that container jams are released with power OFF.
   3.6 When accessing the tunnel allow steam vapour to dissipate before opening doors fully.
   3.7 Do NOT put your hands into water tanks unless they have been drained and protective gloves are worn.
   3.8 Do NOT subject electric motors, other electrical components, or gas valves to high pressure hoses when cleaning the washer. Such devices can force fluid through seals causing electrical shorting or valve failure to occur when power is switched ON.
   3.9 Do NOT open sludge doors until the tank is fully drained.
   3.10 When cleaning air dryer inlets, allow at least 10 minutes, after machine isolation, for fans to cease rotating.
   3.11 Do NOT carry out repairs or maintenance on the washer unless, and until, the mains power isolator on the Electrical Control cabinet (ECC) has been set and locked to the OFF position.
   3.12 Pay strict attention to all WARNING and CAUTION labels displayed on line equipment.

NOTE: It is recommended that a face/eye shower be available to personnel when detergents are used.

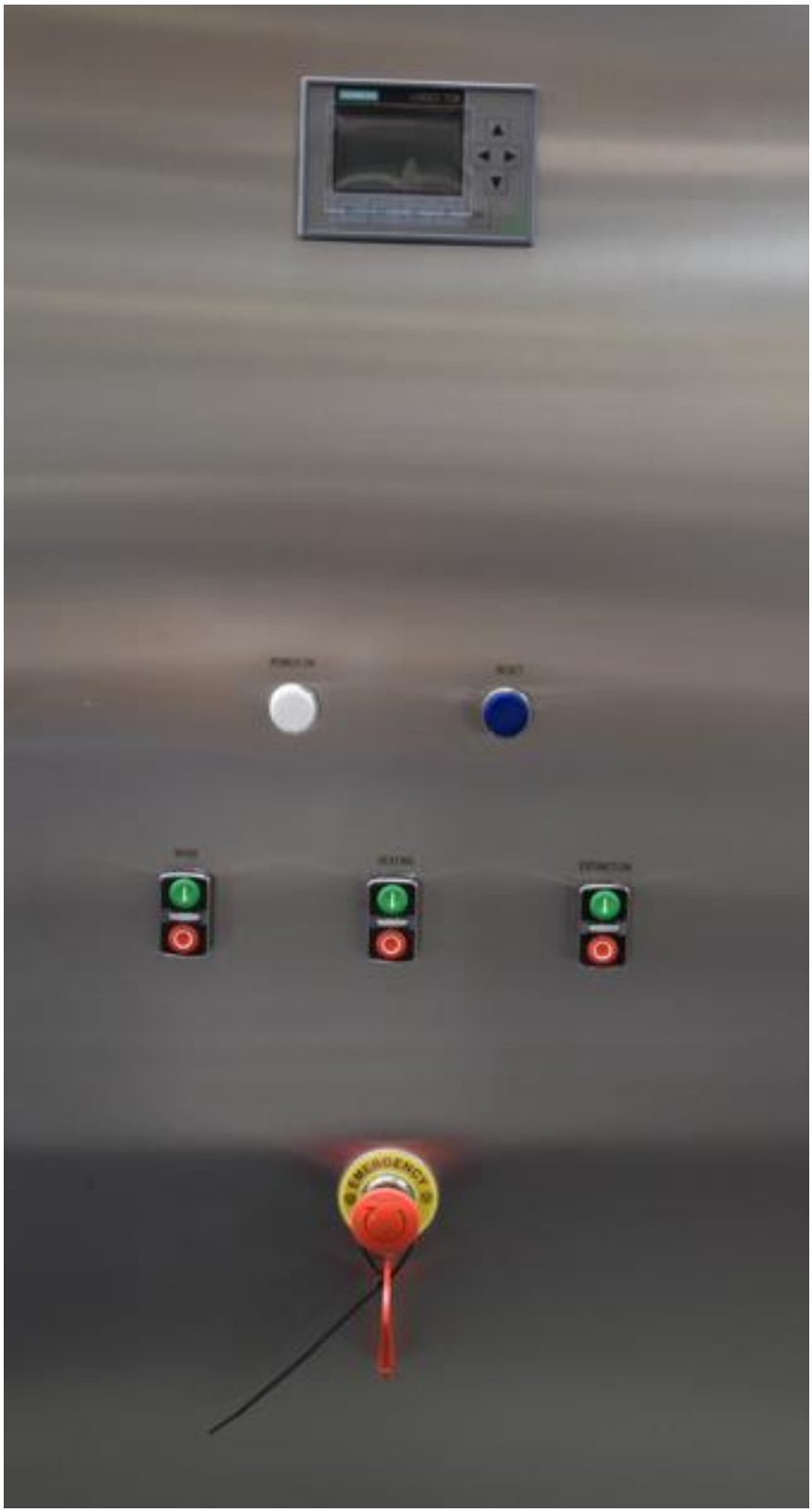


Figure 15 – Exterior of Control Panel

Lubrication
General

4. The following lubricants are commended for use with conveyors and associated equipment:
   4.1 Oil:
      4.1.1 Constant loss systems (hand oiling points etc.) use Shell Camea 100 or equivalent.
      4.1.2 Slideways (slides, open cams, chains etc.) use Shell Tonna T68 or equivalent.
   4.2 Grease:
      4.2.1 General purpose, use medium soft lithium based NLGI No 3, Shell Avana.

Drive Motors

5. An SEW gear motor is used to drive the internal drag chain conveyor. Lubrication maintenance schedule for the gear motor is detailed in Table 6, and in the manufacturer's literature in Section 7. See Table 2 for lubricant volume per specified gear motor. During six monthly (or more regular if required) inspections record the volume of oil required to top-up (if necessary); this quantity, when compared with total capacity, provides an indication of the drive unit's well-being.

Table 6 – Inspection & Maintenance SEW Gear Motors

<table>
<tr><th>Interval</th><th>Requirements</th><th>Details</th></tr>
<tr><td>3000 hrs (atleast 6 monthly)</td><td>Check Oil</td><td>• Take a sample of oil from the 'Oil Level' adjust screw
• Check the sample (colour/ consistency) – if it appears polluted change the oil
• Remove oil level plug
• Check oil level, replenish as necessary
• Replace oil level plug</td></tr>
<tr><td>Three years</td><td>Oil change
Mineral oils</td><td rowspan="2">With gear box warm:
Place receptacle under oil level adjust screw
Remove oil level plug, breather plug/vent valve and oil drain plug
Allow oils to drain completely
Screw in the oil drain plug
Fill the gearbox with new oil via the breather hole (quantity required will depend on mounting position)
Monitor oil level at the level plug – when level correct, screw in oil level plug
Screw in breather plug/vent valve</td></tr>
<tr><td>Five years</td><td>Oil Change
Synthetic Oil</td></tr>
</table>

Flange Bearings

6. Flange bearings fitted to the internal conveyor are `sealed for life' and as such require no periodic lubrication. However, if for any reason a flange bearing gives cause for concern (noisiness or overheating), a nipple can be fitted to the point provided (it may be necessary to remove the plastic cap) and grease applied. When grease is applied, the inner protective membrane will be broken and the bearing's sealed-for-life properties lost. It will therefore be necessary to lubricate the bearing periodically until a replacement is fitted.

Periodic Servicing

General

7. Ensure the mains power is isolated prior to commencing any maintenance on the machine.

Cleaning Procedure

8. Use the following general cleaning procedure:

8.1 Clear and collect all debris from the washer.

8.2 At the washer tunnel interior:

8.2.1 Remove and clean all wash tunnel spray curtains.

8.2.2 Working from top to bottom, and infeed end to discharge end, clean down the tunnel interior. Pay attention to accumulations of dirt around idler roller, chain, trackways, wear strips, support bars/side guides, hold-downs, return ways, return rollers, drive shafts and drive sprockets. Allow water to drain into tanks.

8.2.3 Clean all spray jets in each of the spray manifolds.

8.2.4 Remove and clean all filter drawers.

8.2.5 Open manual drain valves to all washer tanks. Allow tanks to fully drain.

8.2.6 At each water tank and the catenary tank, open the sludge door and remove all gross sediment from the tank. Take care not to damage probe units, heating pipe arrays or other equipment mounted in the tanks. Clean down the interior of the tanks; this can be achieved through the sludge door and from above when the filter drawers are removed.

8.2.7 Remove and clean the catenary tank drain valve filter box. Re-fit filter box.

8.2.8 Remove level sensor probe units from their mounting pockets, clean the probes (use Scotch-Brite pad or similar). Re-fit level sensors.

8.2.9 When all tanks are clean, close and lock (screw-type compression lock) sludge doors.
8.2.10 Refit all filter drawers.
8.2.11 Refit all spray curtains.
8.2.12 Unlock and open all ventilated dual-skin tunnel access doors. Clean the air gap interior. When complete lock panels together.
8.2.13 Clean the exterior of the washer. Do not use water hoses, sprays or high- pressure jets on electrical components, control cabinets, motors, pumps, fans, or valve units. Clear dust/dirt from electrical components, motors, etc. using a dry cloth, brush, or air jets.
8.2.14 Complete a final inspection/cleaning verification before releasing washer for production. Report any damaged or unsatisfactory items identified during cleaning for corrective maintenance.

Inspections

9. Complete the following periodic inspections plus those recommended in the manufacturer's literature for proprietary components (refer to Section 6 of this manual). Complete more frequently, as determined by working conditions/hours.

Weekly (100 hours)

10. Complete the following inspections. Report unsatisfactory items for corrective maintenance.
11. At the washer:
    - 11.1.1 Check all spray manifolds for missing jets/seals. Replace missing jets/seals.
    - 11.1.2 Check all pivoting hold-downs are secure and move freely.
    - 11.1.3 Check all water tank level sensors (3-probe units) and secondary safety float switches (where fitted) are undamaged.
    - 11.1.4 Check all pump sets, air blowers, gear motors, flange bearings, rollers and sprockets for unusual noises, vibrations & bearing temperatures.
    - 11.1.5 Check all pump sets for leaks at pump seal. Replace pump seal kit if required.
    - 11.1.6 Check conveyor wear strips for excessive wear. Replace if required.
    - 11.1.7 Check all sludge door seals for leaks, pliability, and damage. Replace if required.
    - 11.1.8 Check gear motor torque arm mountings are secure and no oil leaks.

Monthly (500hours)

12. In addition to weekly inspections complete the following. Report unsatisfactory items for corrective maintenance.
13. At the washer:
    - 13.1.1 Check drag chain tension.
    - 13.1.2 Adjust if required, refer to Repairs & Adjustments. Check all water pipework for leaks, damage, distortion, or corrosion. Include pipework from mains inlet to tanks via solenoid valves and from tanks to spray manifolds via pumps.
    - 13.1.3 Check tunnel support bars, side guides, track and mountings for damage, distortion, or corrosion.
    - 13.1.4 Check all temperature probes in water tanks are securely mounted. Tighten fitting if required.
    - 13.1.5 Check all water tank overflow and drain connections are secure and undamaged.
    - 13.1.6 Check the drag chain conveyor idler, chain, return roller, drive shaft & sprockets for excessive wear or damage.
    - 13.1.7 Check all air knife mountings are secure. Tighten ducting fitting if required.
    - 13.1.8 Check air blower to air knife ducting for damage/distortion.
    - 13.1.9 Check flange bearings are free running and secure. Refer also to Lubrication.
    - 13.1.10 Check gear motor oil levels in gearboxes, top up as required. Refer to Lubrication.
    - 13.1.11 Check frames and supports for damage, distortion, or corrosion.

3 Months (1500 hours)

14. Check all water pipework for leaks, damage, distortion, or corrosion. Include pipework from mains inlet to tanks via solenoid valves and from tanks to spray manifolds via pumps.
    - 14.1.1 Check tunnel support bars, side guides, track and mountings for damage, distortion, or corrosion.
    - 14.1.2 Check all temperature probes in water tanks are securely mounted. Tighten fitting if required.
    - 14.1.3 Check all water tank overflow and drain connections are secure and undamaged.
    - 14.1.4 Check the drag chain conveyor idler, chain, return roller, drive shaft & sprockets for excessive wear or damage.
    - 14.1.5 Check all air knife mountings are secure. Tighten ducting fitting if required.
    - 14.1.6 Check air blower to air knife ducting for damage/distortion.
    - 14.1.7 Check flange bearings are free running and secure. Refer also to Lubrication.
    - 14.1.8 Check gear motor oil levels in gearboxes, top up as required. Refer to Lubrication.
    - 14.1.9 Check frames and supports for damage, distortion, or corrosion.

6 Monthly (600 hours)

15. In addition to weekly, monthly, and 3-monthly inspections complete the following tasks. Report unsatisfactory items for corrective maintenance.
    15.1 Check all support framework, leg assemblies, panels and structures including tank panels, guard panels/covers, tunnel walls, floor and roof sections for damage, corrosion, or distortions.

Planned Maintenance

Monthly (500 hours)

16. Complete the following planned maintenance tasks plus those recommended in the manufacturer's literature for proprietary components. Report unsatisfactory items for corrective maintenance.
    16.1 At the washer:
        16.1.1 With water supply OFF, remove the washer water supply 'Y' strainer, clean and re-fit.
        16.1.2 At each washer pump inlet valve: open/close valve at least three times and return to fully open position, if necessary, apply a light coating of grease to the valve stem.
        16.1.3 At each tank drain valve: open/close valve at least three times and return to fully closed position, if necessary, apply a light coating of grease to the valve stem.

Annually (6000 hours)

17. In addition to monthly planned maintenance tasks complete the following. Report unsatisfactory items for corrective maintenance.
    17.1 Each SEW gear motor (refer to manufacturer's literature listed in Section 6
        17.1.1 Drain oil from gear box, replenish with new oil of correct grade.
        17.1.2 Clean motor cooling passages thoroughly.
        17.1.3 Change motor's bearings and seals.

Periodic Servicing – Air Knifes Sections

Weekly (100 hours)

18. Carry out the following tasks, report unsatisfactory items for corrective maintenance:
    17.1 Clean tunnel interior:
        18.1.1.1 At discharge end of tunnel;
        18.1.1.2 Clean down the conveyor, tunnel and catenary tank including chain/track, drive sprocket/shaft, guides and return way. Take care not to direct water jet into the air knives or air intake grill.
    18.2 Air knives. Inspect air knives. Check/ensure that:
        17.2.1 Outlet slots are clean and free from debris.
        17.2.2 Knives are secure and undamaged.
    18.3 Ducting (air knife to air blower) – rigid & flexible. Inspect for signs of damage/distortion. Ensure all connections are secure.
    18.4 Air Inlet to Blower; check/ensure inlet grill is secure, clean, and undamaged

Monthly (500 hours)

19. Carry out the following tasks in addition to the weekly maintenance schedule, and report any unsatisfactory items for corrective maintenance:
    19.1 Sludge door seal. Inspect for pliability, damage/excess wear. Replace as necessary.
    19.2 Conveyor track. Inspect track and supports/guides for damage.

Three Monthly (1500 hours)

20. Carry out the following in addition to the weekly/monthly maintenance schedules, and request corrective maintenance for unsatisfactory items:
    20.1 Air Blower Unit; check mounting, ensure secure and undamaged. Clear dirt and fibres etc. from motor frame and fan cover.
    20.2 Access doors – inspect each door providing access to the tunnel section:
    20.3 Door hinges – with door open check/ensure hinges undamaged and properly secure.
    20.4 Master release handles & door retaining rod – check operation and undamaged.

Fault Finding

21. General operational faults for single track tray washers are detailed in Table 7. Refer to manufacturer's proprietary information in Section 6 for proprietary component diagnostic information.

Table 7 – General Fault Finding

Item	Symptom	Diagnosis
1	Air blower will not run	4.1 Circuit breaker tripped 4.2 Contactor faulty 4.3 Pump only - low water levels 4.4 Faulty pump/air blower

Internal Drag Chain Conveyor
Weekly (100 hours)

22. With the conveyor made safe, complete the following tasks:
    22.1 Inspect conveyor drive motor. Ensure torque arm mounting secure.

Monthly (500 hours)

23. In addition to weekly maintenance schedule, carry out the following tasks and report unsatisfactory items for corrective maintenance:
    23.1 **Inspect track supports**, hold-downs, and side guides for signs of damage or distortion.
    23.2 **Inspect rebated return roller/shoes** for damage/excess wear.
    23.3 **Inspect drive sprockets** and rebated idler roller for signs of damage/excess wear.
    23.4 **Conveyor gear motor**: check oil level in gearbox, top up as required. Refer to 'Lubrication' in this Section.

Three Monthly (1500 hours)

24. In addition to weekly/ monthly maintenance inspect the following:
    24.1 Check tension of drag chain, adjust as required (see 'Repairs & Adjustments' in this section).
    24.2 Check wear strips (if fitted) for wear, change if worn.
    24.3 Inspect chains, especially 'M' type attachment, if necessary, replace damaged section(s).

Annually (6000 hours)

25. SEW Gear motor - Refer to Manufacturer's maintenance information in Section 6 and complete the following tasks:
    25.1 **Drain oil** from gearboxes, replenish with new oil of correct grade.
    25.2 **Clean motor** cooling passages thoroughly.
    25.3 **Change motor's bearings and seals**.

Fault Findings

26. Solutions to typical faults with Tote Washers and Drag Chain Conveyors are given in Tables 8 & 9.

Table 8 – Fault Finding Drag Chain Conveyor

Item	Symptom	Option	Action Required
1	Conveyor chain/belt jumps drive sprocket teeth	1.1	Check for inadequate catenary
		1.2	Check for obstructions, debris etc. remove as required
		1.3	Check for loose drive or idler shafts. Correct as necessary
		1.4	Check for loose drive or idler shaft bearings. Examine for excess wear, if necessary, replace bearing. Otherwise, tighten as required
2	Pulsating chain/belt	2.1	Check for loose drive or idler shaft bearings. Examine for excess wear, if necessary, replace bearing. Otherwise, tighten as required
		2.2	Check chain tension. Adjust as required.
		2.3	Inspect bed for obstructions (debris etc on wear strips)
3	Totes jam	3.1	Check the guide rails along both sides of conveyor track and ensure that there are no distortions
		3.2	Check hold-down sections; ensure no distortions

Table 9 – Fault-Finding Single-Track Tray Washer

Item	Symptom	Diagnosis
1	Power ON indicator will not illuminate	1.1 main isolator OFF -ensure isolator fully turned on 1.2 control primary/ secondary circuit breaker OFF or faulty 1.3 Faulty control transformer 1.4 Faulty power supply 1.5 Faulty wiring 1.6 Blown bulb
2	Water tanks will not fill with water	2.1 main water supply valve – OFF position 2.2 tank water valves (open) 2.3 faulty level probe 2.4 faulty solenoid vales 2.5 blown fuse / tripped MCB to solenoid valve
3	Water tanks not achieving operating temperature	3.1low water levels in respective tanks – see above 3.2faulty steam solenoid valve 3.3vaccum breaker blocked (unscrew and check for dirt/blockage) 3.4 fault on HMI/PLC 3.5 Faulty temperature probe
4	Conveyor will not run	4.1faulty inverter 4.2inverter trips on overload 4.3totes jammed in washer 4.4chain jammed 4.5 faulty motor
5	Pumps will not run	5.1 pump circuit breakers OFF or faulty 5.2pump contactors faulty 5.3water levels low 5.4Faulty pump
6	Poor wash / rinse	6.1 blocked jets/pipe work 6.2 blocked/damage pump impellers 6.3 blocked pump suction 6.4 faulty pump 6.5 misaligned jets 6.6 missing jets/seals

Repair and Adjustments
Warnings

- **MOVING MACHINERY HAZARD.** Internal conveyor may start or stop without warning. Ensure the mains power isolator is set and locked in the off position before commencing maintenance on any part of the machine.
- **ELECTRICAL SHOCK HAZARD.** Before carrying out maintenance work on any drive unit, pump set, fan, or other electrical equipment, check and ensure the mains power isolator is set and locked in the off position.

Internal Drag Chain Conveyor
General

27. When carrying out periodic inspections of the drag chain conveyor check the following and take further investigative or corrective actions as necessary:
    27.1 Excessive/unusual wear on links/attachments.
    27.2 Uneven top surfaces, damaged or excessively worn attachments.
    27.3 Excessive gaps between links. Suspect jams or overloads, and/or pulsating or jerking chain operation.
    27.4 Sprockets for signs of excessive wear and/or build-up of dirt in tooth pockets.
    27.5 Return ways and wear strips for excessive wear.
28. Malfunctions found during an inspection usually stem from one or more of the following conditions:
    28.1 Severe over-loads and/or jams
    28.2 Interference or obstruction.
    28.3 Worn sprockets.
    28.4 Badly worn or damaged chain and/or attachments.
29. Conveying chains and sprockets should be replaced when:
    29.1 Conveying surface jumps in the sprocket.
    29.2 Conveying surface becomes uneven through wear.
    29.3 Sprocket teeth develop a hooked profile, or the conveying surface tends to “hang” on the sprocket teeth.
    29.4 Wear in one or more chain strands resulting in misaligned pole attachments, which cannot be remedied by tension adjustments or replacing chain links or sections.

Wear Strips

30. The correct dimensions, profile, and composition of wear strip (if fitted) have been built into your conveyor for optimum performance under design load and speed. Do NOT replace it with any other type. Unitech can supply spare strip from stock. Inspect regularly for excessive or uneven wear.

Bearings

31. Unitech conveyors are normally fitted with ‘Self Lube’ bearing units in case or pressed housings. The housing is fitted with a single-row, deep-groove ball bearing (referred to as the bearing insert). The bearing is fully sealed on both sides and pre-packed with No. 3 consistency lithium-based grease. Standard Self-Lube units are suitable for operating in temperatures from -10ºC to +90ºC.

CAUTION… (1) When grease is applied to a `sealed for life’ bearing, the inner protective membrane will be broken and the bearing’s sealed-for-life properties lost. It will therefore be necessary to lubricate the bearing periodically until a replacement is fitted.

Drag Chain Removal & Installation

32. If a section of chain is to be removed because of wear or damage, jog the conveyor until the affected section is positioned on the top surface of the conveyor, clear of drive/tail sprockets. If a section of chain is to be removed, to reduce sag (catenary), carry out the operation on the section immediately upstream of the drive sprocket.

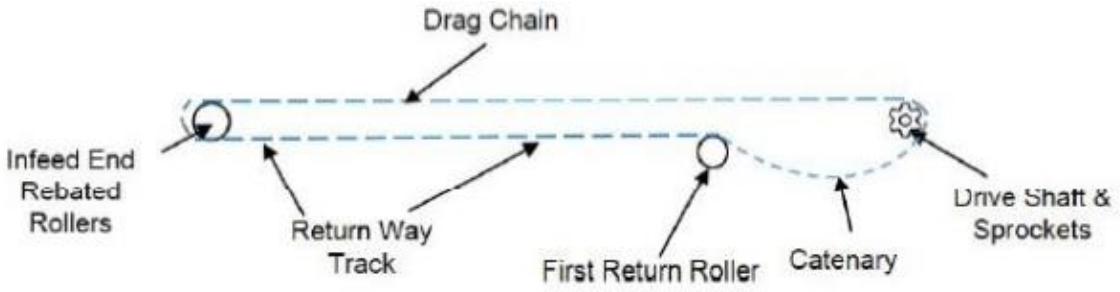


Figure 16 – Drag Chain Conveyor Catenary Diagram

33. To replace a section of conveyor chain:
    33.1 Stop conveyor, turn mains power isolator to OFF, and if possible, apply a personal lock.
    33.2 Obtain a pin extractor tool (Cardanic pin extractor or similar).
    33.3 If chain is worn/damaged obtain a replacement section of suitable length (at least six links or 0.5 metre longer than the damaged section), then proceed as follows:
        33.3.1 Using the pin extractor tool, remove the pins from the end of damage section to be replaced. Retain the pins and remove the damaged section of chain.
        33.3.2 Using the pin extractor tool, and the pins removed, connect the replacement section.

NOTE: If there are signs of increased catenary at the drive end of the chain, use this opportunity to remove additional links/section from the chain and counter the effect.

34. When wear in the chain makes it necessary to reduce the catenary:
    34.1 Calculate the number of links to be removed.

NOTE: On 1700 series chain; distance between `knuckle' & 'pin' centre lines = 50 mm (1.97").

    34.2 Using the pin extractor tool, disconnect the chain at a convenient point up stream of the drive unit. Retain the pin.
    34.3 Fold back the number of links (length of section) to be removed, using the pin extractor disconnect the excess links. Return the excess links and 2nd pin to stores for disposal.
    34.4 Pull the two ends of chain together and connect them using the pin removed above, and the pin extractor tool.
    34.5 When operations above are complete, restore mains power, then start the conveyor. Let the conveyor run for a few minutes whilst monitoring chain for smooth transition over the track, around drive and tail shafts, and along the return way.

Adjustment

35. A drag chain conveyor should have a catenary of 3” (75mm) when cold and 4” (100mm) when hot. A chain should never be run tight, i.e. less than 1½” (38mm) when cold. If catenary is excessive, or increases with wear, it should be adjusted by removing links/section of chain. Catenary is the permitted ‘sag’ of chain between drive sprocket and 1st return shoe on the return-way.

Miscellaneous

Pump Sets

36. Wash: ESHE 40-200/55 400v 3ph 50Hz 5.5kw
37. Rinse: ESHE 40-160/30 400v 3ph 50Hz 3kw

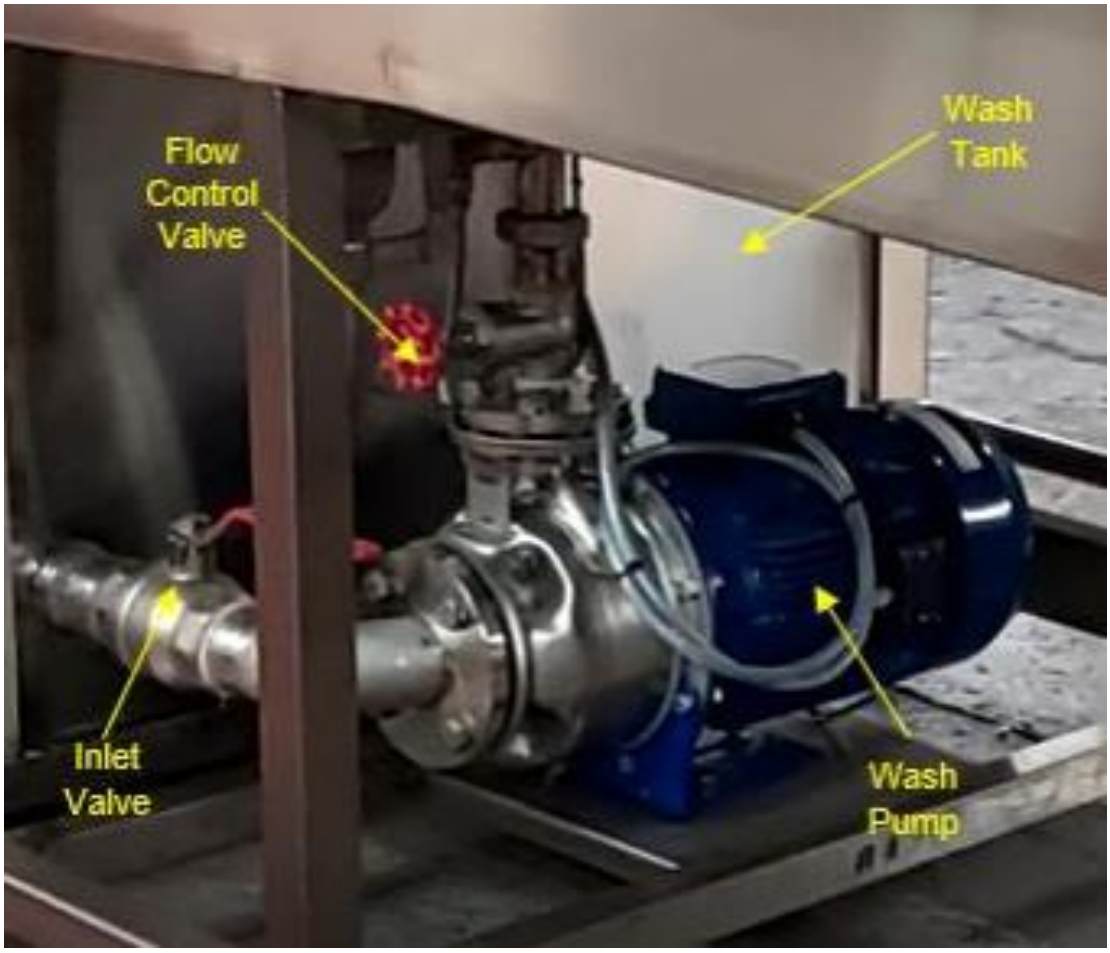


Figure 17 – Wash Pump and Wash Tank

Extraction Fan

38. The roof mounted extractor fans are proprietary items. Servicing requirements are detailed in the manufacturer's maintenance instructions issued under separate cover. Any repair tasks, or servicing requirements, beyond those described in the leaflet, are to be carried out by the Manufacturer or authorised representative(s).

Figure 18 – Extraction Fan

Drive Units

39. An SEW gear motor is used to drive the internal drag chain conveyor. Refer to Section 7, Manufacturers Proprietary Literature, for maintenance information; see Para 5 of this Section and Tables 1 & 2 for lubrication information.

Care and Maintenance of Stainless Steel Surfaces

General

40. Stainless steel grade 304L is used in the fabrication of Unitech screens. Although robust, all grades of stainless steel will stain and discolor due to surface deposits. Thus, they can never be accepted as completely maintenance free. Therefore, to achieve maximum corrosion resistance, the surfaces of stainless items must be kept clean.

Factors Affecting Maintenance

41. Surface contamination, and the formation of deposits, must be prevented in order to maintain durable and hygienic surfaces. Contamination/deposits may result from:
    - Minute particles of iron or rust from other sources, incurred during installation or resulting from local ongoing processes.
    - Industrial and naturally occurring atmospheric conditions e.g salt.
    - High humidity (Swimming pool type conditions).
    - Processes that use proprietary cleaners, sterilizers and bleaches for hygienic purposes are safe if used as directed in the makers instructions. However, if used incorrectly e.g. warm or concentrated, may cause discoloration and/or corrosion irrespective of the stainless-steel quality.

42. Always observe and follow the basic rules:
    - Never use wire brushes or wire wool to remove marks (including cement spillage during installation/renovation work).
    - Never allow strong acid solutions (as are sometimes used to clean masonry and tiling) to encounter stainless steel. However, if this should happen the acid solution is to be removed immediately by copious application of water.

Maintenance Program

43. A thorough cleansing program should be initiated in the following circumstances:
    - Immediately, on completion of site installation/fabrication.
    - Immediately, when any form of surface contamination is suspected.
    - Whenever the surfaces become soiled or marked. Dependent on operational usage this may be every shift, one a day, or at least less frequent intervals.

Note: Frequency and cost of cleaning stainless steel surfaces is lower than most other materials and often outweighs initial cost of the unit(s).

Cleaning Methods

44. Stainless steel is easy to clean. Wash with soap and water, or a mild detergent, followed by a clear water rinse. Finally wipe dry to achieve an enhanced aesthetic appearance.

Precautions

45. Acid based cleaners are to be used sparingly and only when all other methods have proved unsatisfactory.

WARNINGS

- **BURNS HAZARD. WHEN USING ACID BASED CLEANERS, PERSONAL PROTECTIVE CLOTHING (INCLUDING EYE PROTECTION, GLOVES AND APRON) IS TO BE WORN AT ALL TIMES.**

- **POISONOUS FUMES HAZARD. WHEN USING ACID BASED CLEANERS, ENSURE THE AREA IS PROPERLY VENTILATED ANDANOSMOKING RULE RIGIDLY APPLIED TO ALL PERSONNELTHEAFFECTED AREA. OBSERVE THE MANUFACTURERS DIRECTIONS FOR USE.**

Problem Analysis and Resolution

46. Refer to table 10 for an analysis of stainless-steel cleansing problems.

Table 10 - Problem Analysis & Resolution

Problem	Cleaning Agent	Comment
Routine cleaning, all finishes.	Soap or mild detergent and water (such as washing up liquid).	Sponge, rinse with clean water, wipe dry.
Fingerprints, all finishes.	Soap or warm water or organic solvents (e.g acetone, alcohol).	Rinse with clean water and wipe dry.
Stubborn stains & discolouration.	Mild cleaning solutions (e.g Cif Goddard stainless steel care).	Rinse well with clean water and wipe dry.
Oil and greasemarks, all finish.	Organic solvents (e.g acetone, alcohol, trichloroethylene).	Clean after with soap and water, rinse with clean water and wipe dry.
Rust and other corrosion products	Oxalic acid. The cleaning solution should be applied with a swab and allowed to stand for 15 – 20 minutes before being washed away. Continue using Cif, or similar, to give a final clean.	Rinse well with clean water then wipe dry, Observe all precautions acid cleaners.
Scratches on Brush (satin) finish.	Household synthetic fibre scouring pads (eg scotch brite fibre pad). If there is deeper scratches apply in direction polishing. Then clean with soap or detergent as per routine cleaning.	Do not use ordinary steel wool (in case particles become embedded in stainless steel and can cause further surface problems).

Intentionally Blank

Section 4 – Maintenance Information - Electrical

Intentionally Blank

Section 4
Tote Washer
Maintenance Information – Electrical

Contents

Page	Figure	Description
72	19	Exterior of Control Panel
74	20	Interior of Control Panel

Introduction

1. This Section contains the maintenance information for Electrical, Automation & Control. Refer to Section 2 for operating information. Dependent on the Customer's requirements, the Electrical Control Cabinet (ECC) is a standalone panel. Operators' controls and indicators are mounted on the ECC door.

Safety
Warnings

- **ELECTRIC SHOCK HAZARD.** Before carrying out any maintenance work on any drive or other electrical equipment, check and ensure that the local mains power isolator is set and locked in the off position.
- **MOVING MACHINERY HAZARD.** Do not use rods or similar objects to clear jams in moving machinery.

2. Be sure that the following safety instructions are read, understood, and become part of daily practice when operating or maintaining the machine:
   2.1 Do NOT perform any maintenance tasks when taking any kind of drug, sedative, when under the influence of alcohol, or if over tired.
   2.2 Do NOT wear loose clothing, jewellery etc. that could get caught in moving parts.
   2.3 Pay strict attention to all warning and caution labels.

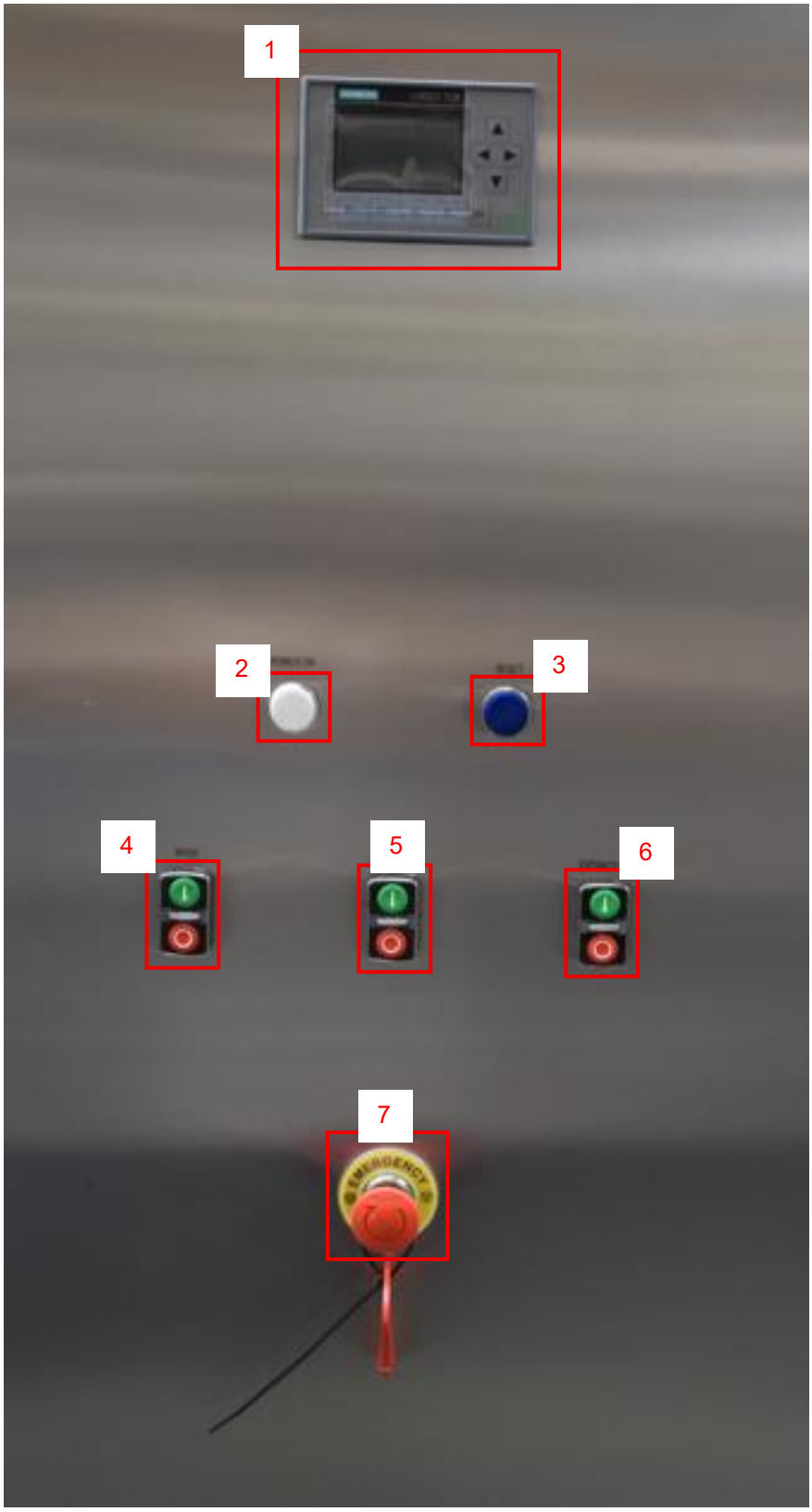


Figure 19 – Exterior of Control Panel

1) Text Display Screen
2) Power ON Lamp
3) Reset Pushbutton
4) Wash Start/Stop Pushbutton
5) Heating Start/Stop Pushbutton
6) Extraction Start/Stop Pushbutton

Figure 20 – Interior of Control Panel

7) Motor Circuit Breaker
8) PSU
9) Thermostat
10) Safety Relay
11) Main Isolator
12) Contactors
13) Ethernet Switch
14) Tank Temperature Controls
15) PLC
16) Contactors
17) Inverters
18) Torque Limiter
19) Terminals

3. The chain conveyor is driven by a SEW SA67 gear motor (refer to Section 5 for manufactures literature). An electro-magnetic safety switch is fitted to the tunnel access door. An Emergency Stop push button is located on the ECC door. If fitted, additional Emergency Stops are located at the infeed and discharge ends of the Tote Wash. A Safety Relay is used in conjunction with the emergency stops and electro-magnetic safety switch to form a safety control circuit.

Safety Circuits

4. Emergency Stop pushbuttons (Qty 4) are wired to a dedicated two channel safety relay.
5. When an E-Stop is activated all machine operations stop, a warning is displayed on the data screen and the RESET pushbutton indicator begins to flash. When the E-Stop has been reset (after any emergency has been resolved) a safety circuit reset is required prior to re-starting production.
6. Electro-magnetic safety switch fitted to the tunnel access door handle operate in conjunction with a dedicated two channel safety relay. When activated the drag chain conveyor and sprays stop (i.e. operations within the wash tunnel stop). Water level control and heating continue to operate. The reset button illuminates and a warning display is shown on the data screen. When the door is closed the data screen warning clears and the door safety relay automatically resets allowing the machine to be re-started using the ‘Wash Start’ pushbutton.
7. The machine cannot be re-started until the lid is properly closed. Press Wash ‘START’ pushbutton to re-start operations.

Pump

8. A pump driven by an electric motor is used to deliver wash water at pressure to the wash sprays. The pump starts and stops automatically at washer start/stop. Motor power and control for the pumps is mounted in the ECC. Manufacturer’s operating and maintenance instructions for the pumps is provided in Section 7 of the manual. The operating status of the pumps is shown on the test display.

Water Heating

9. The **immersion heater** is a tubular heating element designed to be directly inserted into the water tank via the **2 1/4”-inch BSP threaded fitting**. Once installed and connected to a **400V three-phase power supply**, it operates as follows:
   9.1 **Electric Heating**: When power is supplied, the heating elements inside the immersion heater convert electrical energy into heat through resistive heating. The **18kW power rating** indicates that it can rapidly raise the temperature of a significant volume of water, making it ideal for high-demand applications like rack washers.
   9.2 **Direct Heat Transfer**: Since the heater is submerged in the water, heat is transferred directly from the element to the surrounding water with minimal loss, resulting in high thermal efficiency.
   9.3 **Temperature Control**: Most systems will include thermostats or temperature sensors that control the operation of the immersion heater. These sensors ensure that the water is heated to the optimal temperature for the washing cycle and maintain that temperature within a defined range.
   9.4 **Integration in the Tote Washer**: In a tote washer, hot water is essential for both effective cleaning and sanitization. The immersion heater ensures the water in the tank reaches the required temperatures—typically between **60-65°C for wash tank and 85°C for rinse tank.**
   9.5 **Safety Features**: High-quality immersion heaters typically include safety cut-outs to prevent overheating or dry firing (when the element operates without being submerged in water), protecting both the heater and the system.

Periodic Servicing

Daily (24 hours)

10. Safety facilities. Check the following and ensure that each function correctly:
    - 10.1 Emergency Stop push button(s)
    - 10.2 Electromagnetic safety switches – Door safety release handle

Weekly (100 hours)

11. Electrical connections. Check the security and integrity of electrical connections to field devices such as motors, guard switches and E-Stops etc.

Monthly (500 hours)

12. Earth bonding. Visually check earth bonding connection to field devices such as drives etc.

Annually (6000 hours)

13. Inspect the installation, using appropriate & calibrated instruments where appropriate, check:
    - 13.1 All resistors, contactors, relays, circuit breakers and overloads.
    - 13.2 Connections to all field devices such as motors, etc.
    - 13.3 Settings of all protective circuit breakers, relays and timers.
    - 13.4 Labels and instrument scales.
    - 13.5 Output of all transformers, and power supply units.
    - 13.6 Earth bonding and earth continuity.
    - 13.7 Operation of all relays and contactors.
    - 13.8 Operation of circuit breakers and overloads.
    - 13.9 Insulation resistance, check the insulation resistance of all machine power supplies to pumps and drives.
    - 13.10 Test earth bonding.
    - 13.11 Earth loop impedance. Test all machine power supplies to pumps, motors etc.
    - 13.12 Emergency stopping devices and access panel safety switches. Check each facility on the machine for correct operation.
    - 13.13 Issue certificate of electrical safety upon satisfactory completion of all tests.

Water Tank Detergent Dosing

14. Connections for power and control of a client supplied detergent dosing unit are provided in the electrical cabinets. Refer to the Electrical Circuit Drawings in Annex A.

Fault Diagnosis

15. If the Tote Washer fails to function correctly refer to Table 11 Fault Finding, for common causes and remedial action.

Table 11 – Fault Finding

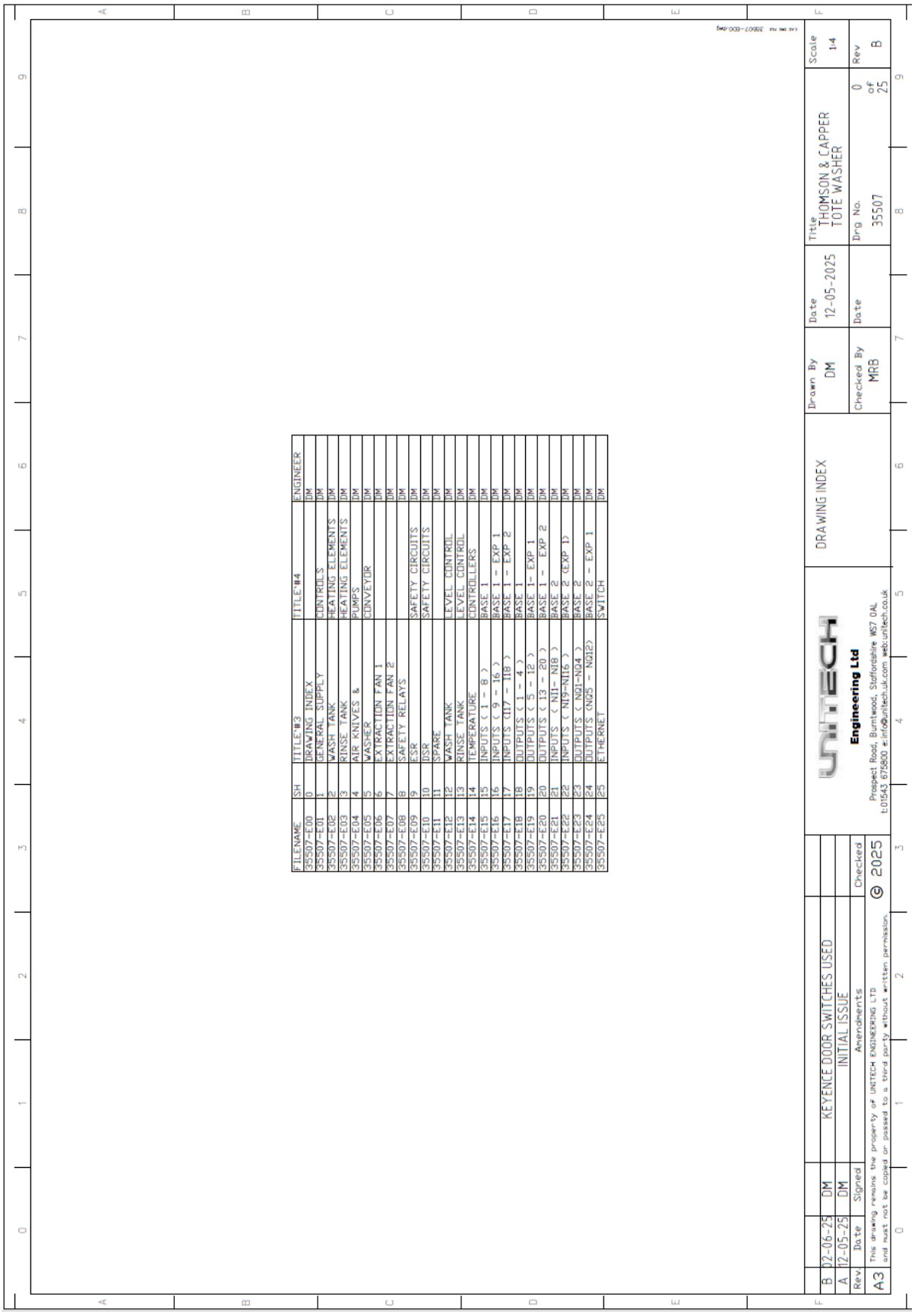
Item	Issue	Diagnosis
1	Power On not illuminated	1.1 Mains isolator off 1.2 Control primary/secondary circuit breaker tripped or faulty 1.3 Faulty power supply 1.4 Faulty wiring 1.5 Blown bulb
2	Reset indicator not illuminated	2.1 Mains isolator off 2.2 Circuit breaker tripped or faulty
3	Conveyor does not run	3.1 Circuit breaker tripped or faulty 3.2 Inverter fault 3.3 Inverter trips on overload 3.4 Tray jammed in tunnel 3.5 Gear motor fault
4	Poor rinse sprays in Wash / Rinse	4.1 Blocked jets/pipework 4.2 Misaligned jets 4.3 Missing jets/seals or leaks 4.4 Manual isolation valves to upper and/or lower spray manifolds not fully open
5	Water not flowing to rinse sprays	5.1 Manual isolation valves to upper and/or lower spray manifolds not open 5.2 Mains water supply valve in off position 5.3 Faulty solenoid valve (SV1) 5.4 Solenoid valve fuse/circuit breaker tripped or faulty
6	Wash / Rinse Tank will not fill with water	6.1 Main water supply valve in OFF position 6.2 Tank drain valve(s) OPEN 6.3 Faulty level probes 6.4 Faulty solenoid valves 6.5 Blown fuse / tripped MCB to solenoid valve
7	Wash / Rinse Tanks not achieving operating temperature	7.1 Low water levels in tank – see above 7.2 Faulty solenoid valve 7.3 Faulty steam solenoid valve 7.4 Steam inlet valve CLOSED* - ensure fully OPEN 7.5 Faulty temperature controller/incorrect set-point 7.6 Faulty temperature probe
8	Pumps will not run	8.1 Pump circuit breaker is OFF or faulty 8.2 Pump contactors are faulty 8.3 Low water levels 8.4 Faulty pump
9	Extraction fan is not working	9.1 MCB / overload /fuse OFF or tripped 9.2 Faulty fan motor 9.3 Extraction fan not switched ON

Intentionally Blank

Section 5 – Electrical Circuit Drawing

Intentionally Blank

Section 5
Tray Washer
Electrical Circuit Drawing



FILENAME	SH	TITLE#3	TITLE#4	ENGINEER
35507-E00	0	DRAWING INDEX		DM
35507-E01	1	GENERAL SUPPLY	CONTROLS	DM
35507-E02	2	WASH TANK	HEATING ELEMENTS	DM
35507-E03	3	RINSE TANK	HEATING ELEMENTS	DM
35507-E04	4	AIR KNIVES &	PUMPS	DM
35507-E05	5	WASHER	CONVEYOR	DM
35507-E06	6	EXTRACTION FAN 1		DM
35507-E07	7	EXTRACTION FAN 2		DM
35507-E08	8	SAFETY RELAYS		DM
35507-E09	9	ESR	SAFETY CIRCUITS	DM
35507-E10	10	DSR	SAFETY CIRCUITS	DM
35507-E11	11	SPARE		DM
35507-E12	12	WASH TANK	LEVEL CONTROL	DM
35507-E13	13	RINSE TANK	LEVEL CONTROL	DM
35507-E14	14	TEMPERATURE	CONTROLLERS	DM
35507-E15	15	INPUTS (1 - 8)	BASE 1	DM
35507-E16	16	INPUTS (9 - 16)	BASE 1 - EXP 1	DM
35507-E17	17	INPUTS (17 - 18)	BASE 1 - EXP 2	DM
35507-E18	18	OUTPUTS (1 - 4)	BASE 1	DM
35507-E19	19	OUTPUTS (5 - 12)	BASE 1- EXP 1	DM
35507-E20	20	OUTPUTS (13 - 20)	BASE 1 - EXP 2	DM
35507-E21	21	INPUTS (N1- N8)	BASE 2	DM
35507-E22	22	INPUTS (N9-N16)	BASE 2 (EXP 1)	DM
35507-E23	23	OUTPUTS (N01-N04)	BASE 2	DM
35507-E24	24	OUTPUTS (N05 - N012)	BASE 2 - EXP 1	DM
35507-E25	25	ETHERNET	SWITCH	DM

Rev	Date	Amendments	Checked
B	02-06-25	KEYENCE DOOR SWITCHES USED	DM
A	12-05-25	INITIAL ISSUE	DM

A3

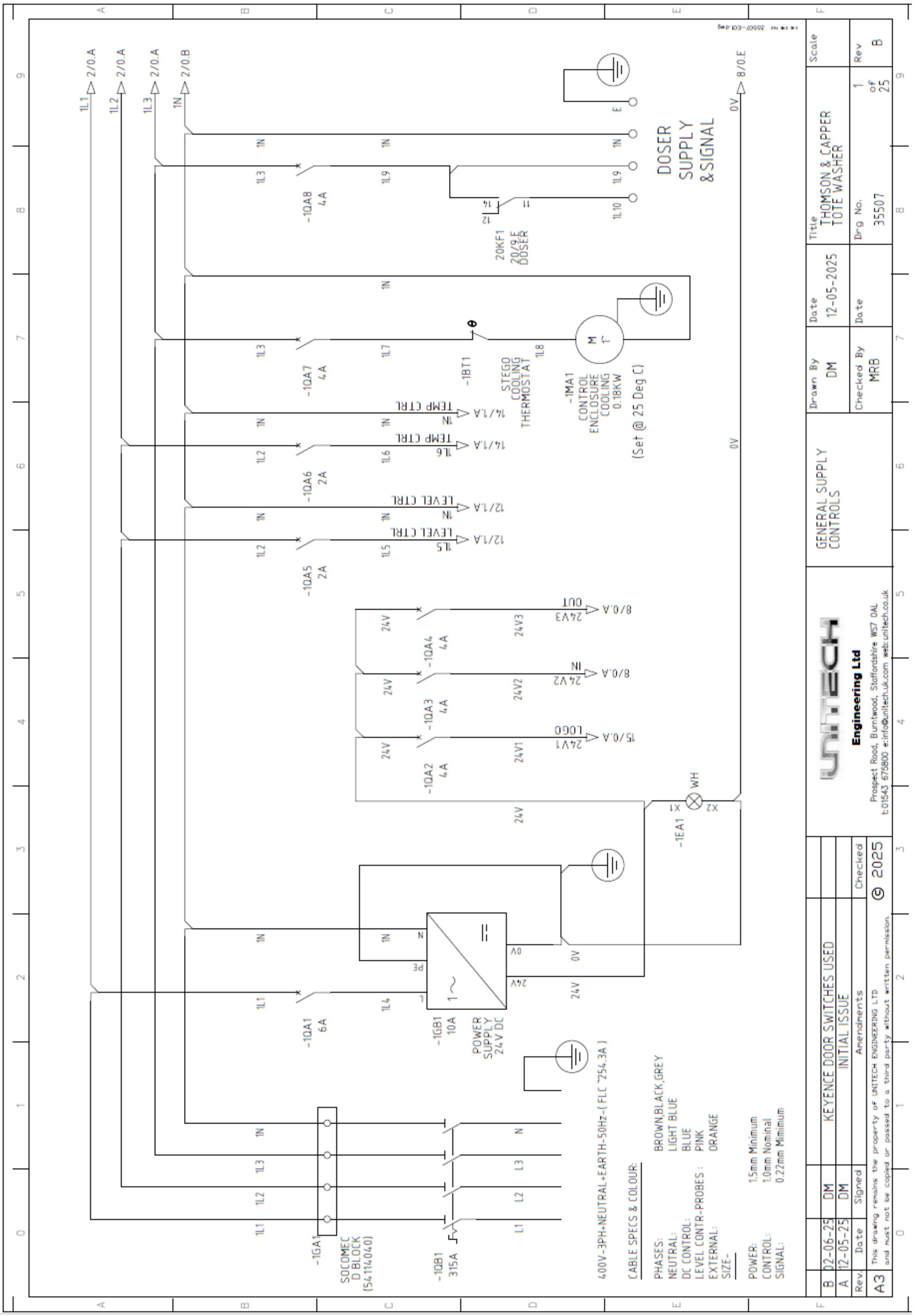
DRAWING INDEX

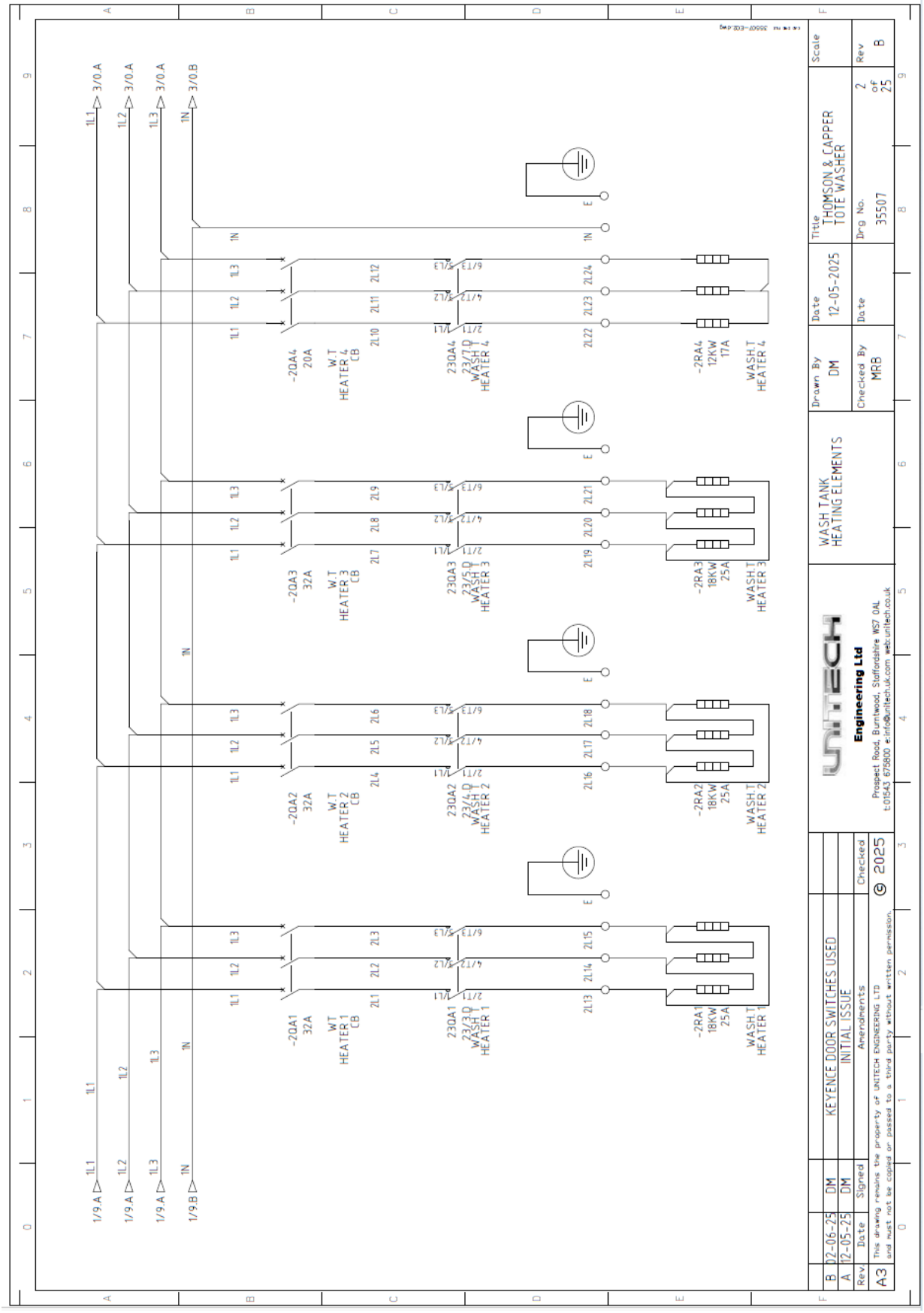
UNITECH
Engineering Ltd
Prospect Road, Burntwood, Staffordshire WS7 0AL
t:01543 675800 e:info@unitech.uk.com web:unitech.co.uk

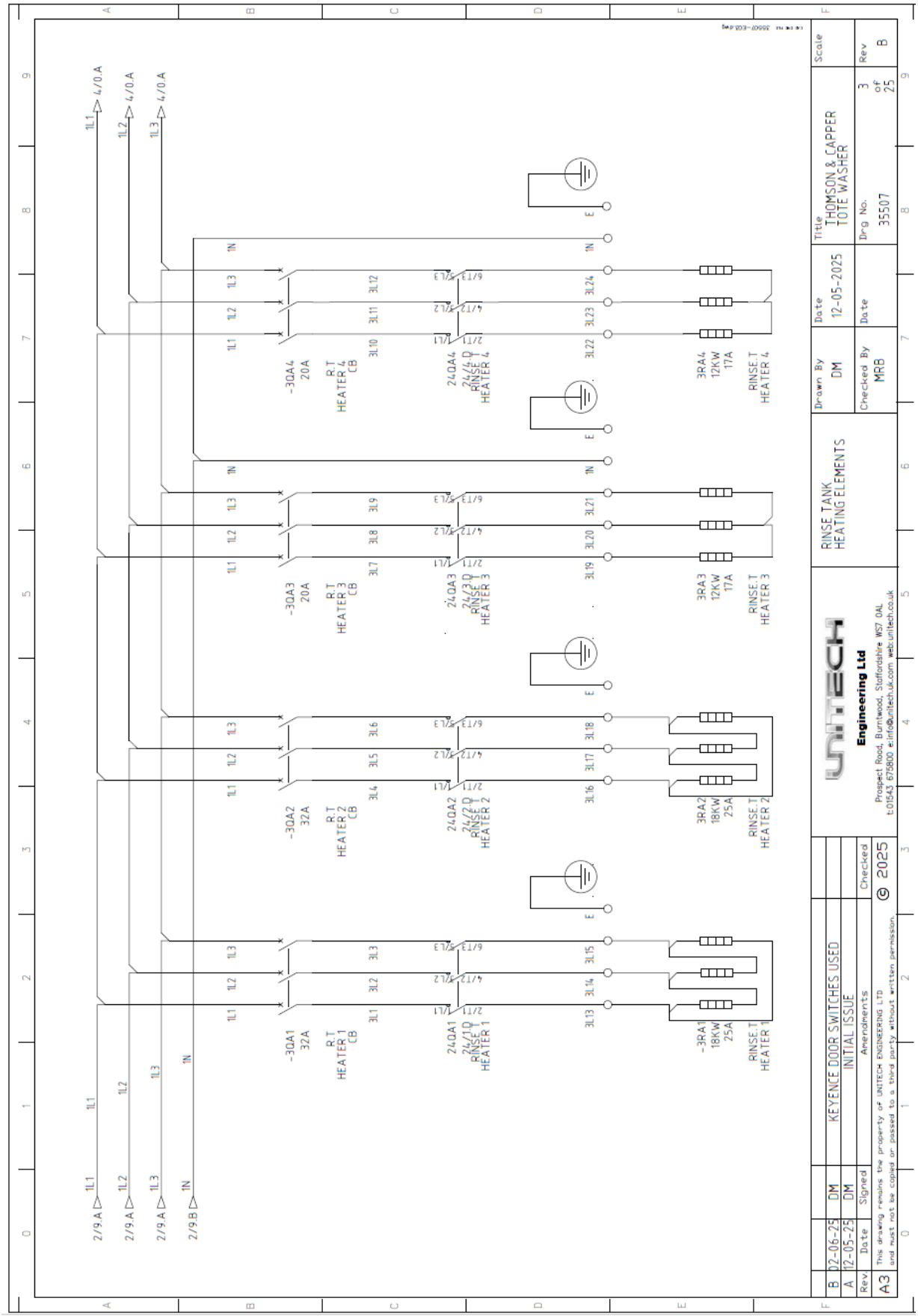
Drawn By: DM — Date: 12-05-2025
Checked By: MRB — Date:

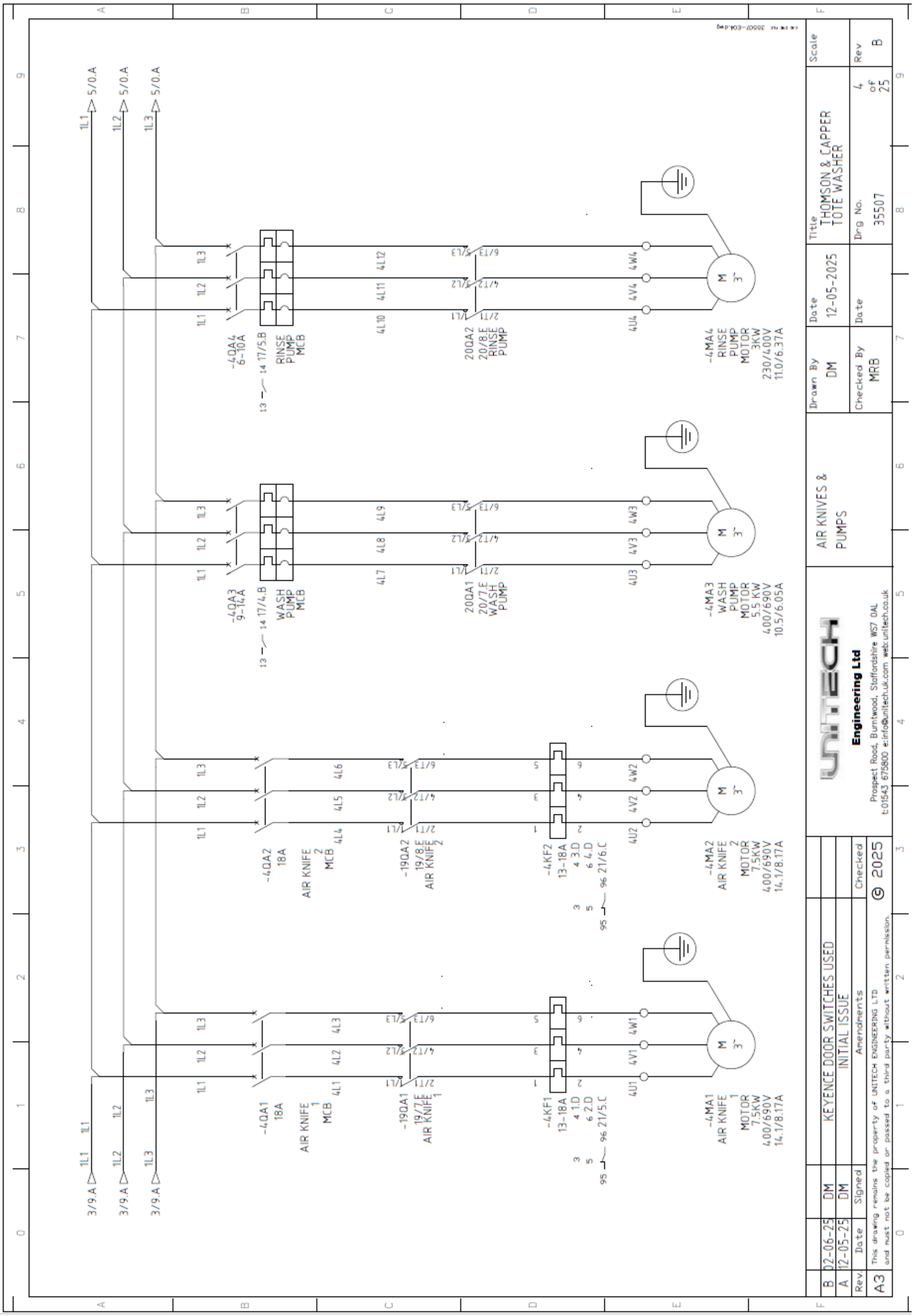
Title: THOMSON & CAPPER TOTE WASHER
Drg No.: 35507
0 of 25

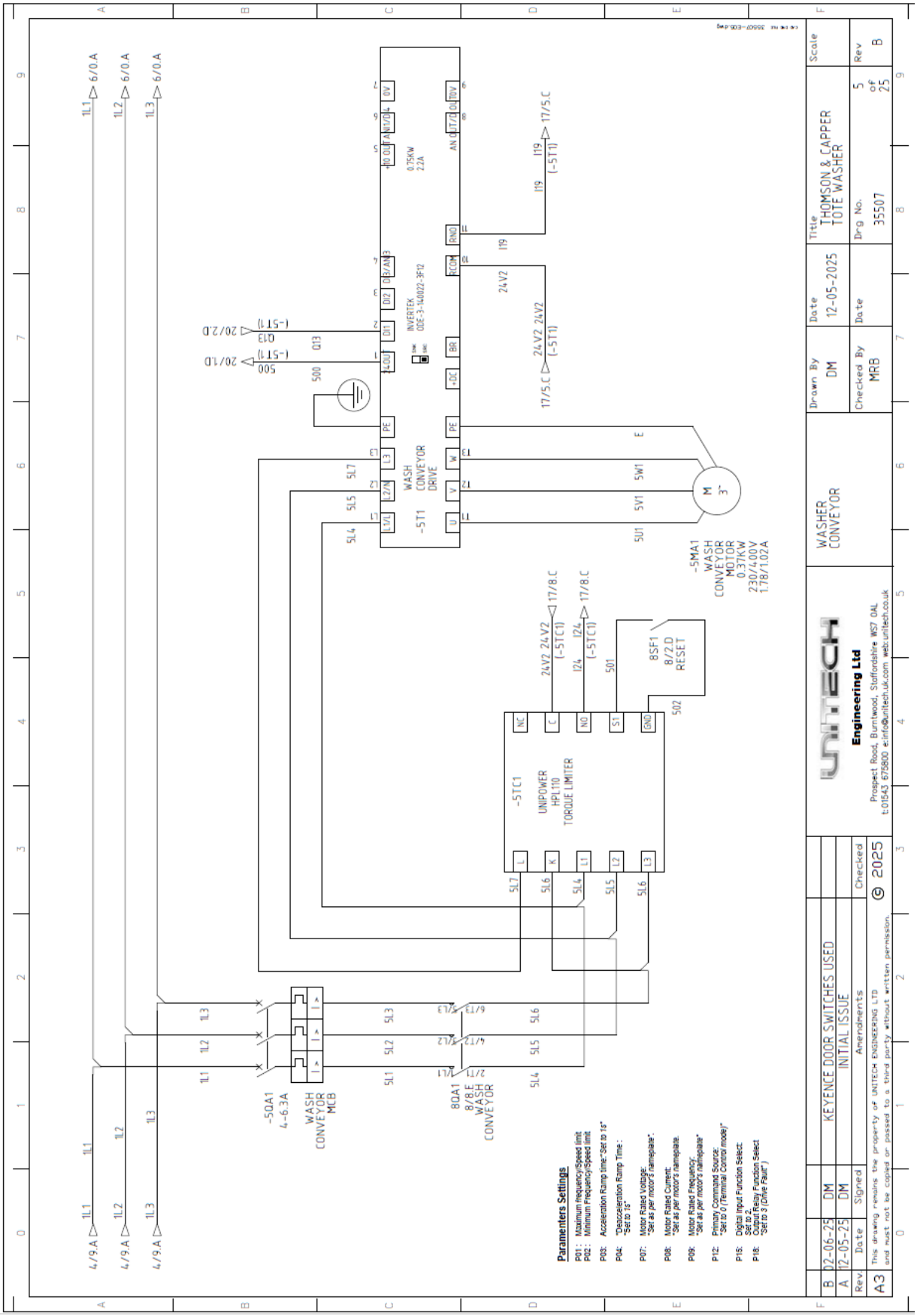
Scale: 1-4
Rev: B

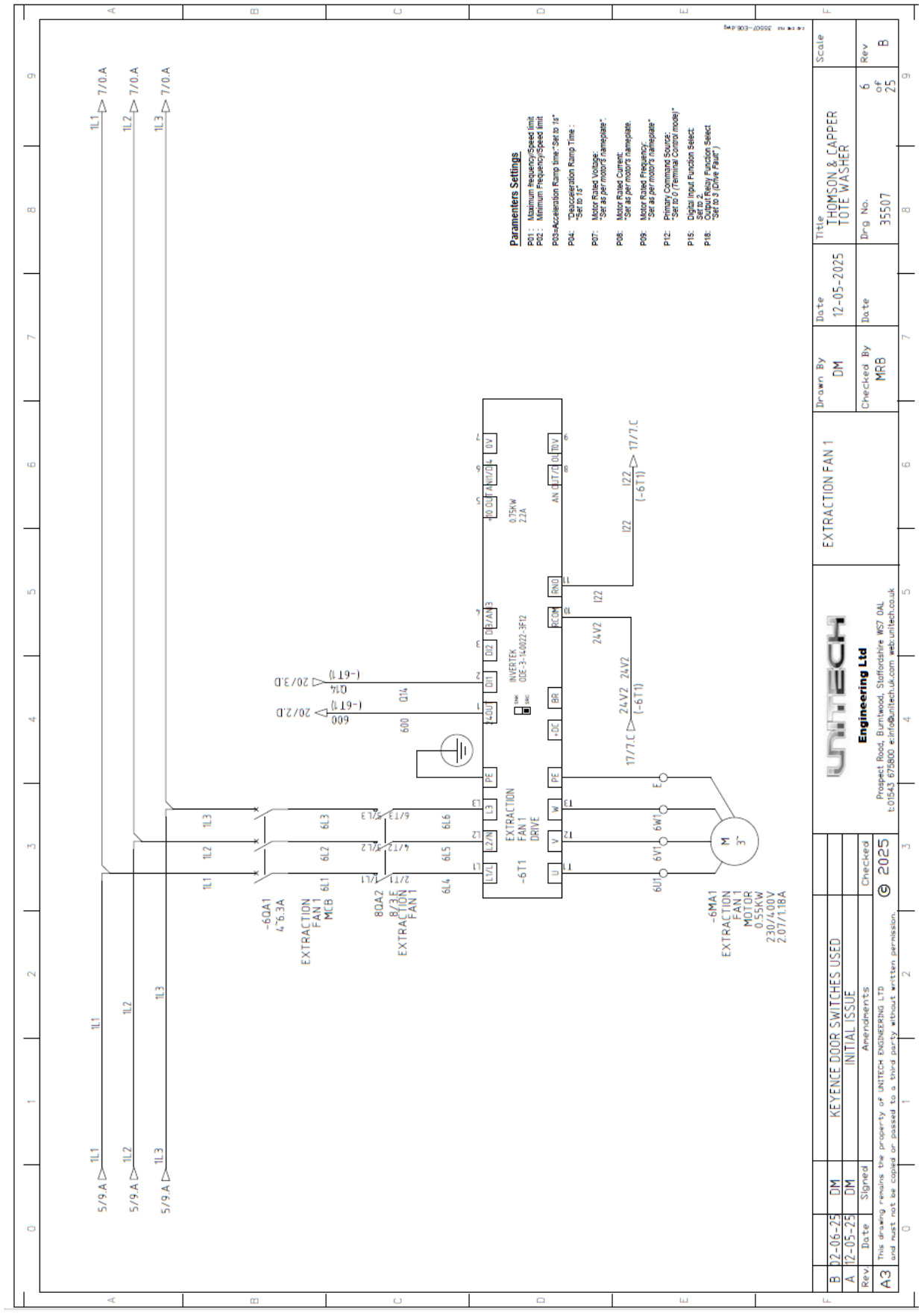

DOSER SUPPLY & SIGNAL
GENERAL SUPPLY CONTROLS
POWER SUPPLY 24V DC
STEGO COOLING THERMOSTAT
CONTROL ENCLOSURE COOLING 0.18KW
(Set @ 25 Deg C)
SOCOMEC D BLOCK (54114040)
400V-3PH+NEUTRAL+EARTH-50Hz-(FLC "254.3A)
CABLE SPECS & COLOUR:
PHASES: BROWN,BLACK,GREY
NEUTRAL: LIGHT BLUE
DC CONTROL: BLUE
LEVEL CONTR-PROBES : PINK
EXTERNAL: ORANGE
POWER: 1.5mm Minimum
CONTROL: 1.0mm Nominal
SIGNAL: 0.22mm Minimum
KEYENCE DOOR SWITCHES USED
INITIAL ISSUE
THOMSON & CAPPER TOTE WASHER
35507
Engineering Ltd
© 2025

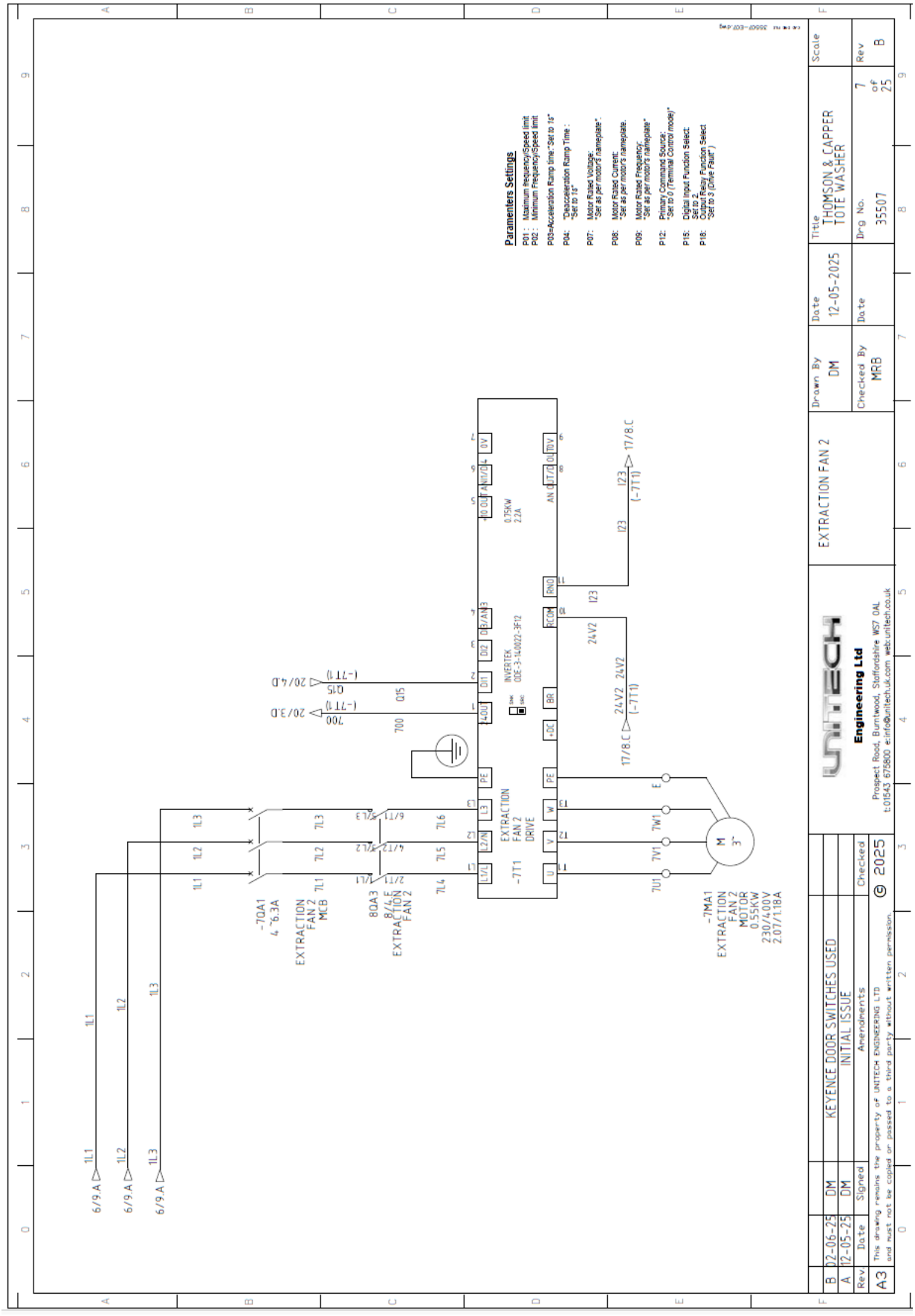

WASH TANK
HEATING ELEMENTS
THOMSON & CAPPER
TOTE WASHER
Drg No.
35507
Date
12-05-2025
Drawn By
DM
Checked By
MRB
Scale
Rev
B
KEYENCE DOOR SWITCHES USED
INITIAL ISSUE
Amendments
Checked
Signed
Date
Rev
B 02-06-25 DM
A 12-05-25 DM
A3
Unitech
Engineering Ltd
Prospect Road, Burntwood, Staffordshire WS7 0AL
t:01543 675800 e:info@unitech.uk.com web:unitech.co.uk
© 2025
-2QA4 20A W.T HEATER 4 CB
-2QA3 32A W.T HEATER 3 CB
-2QA2 32A W.T HEATER 2 CB
-2QA1 32A WT HEATER 1 CB
23QA4 23/7 D WASH T HEATER 4
23QA3 23/5 D WASH T HEATER 3
23QA2 23/4 D WASH T HEATER 2
23QA1 23/3 D WASH T HEATER 1
-2RA4 12KW 17A WASH T HEATER 4
-2RA3 18KW 25A WASH T HEATER 3
-2RA2 18KW 25A WASH T HEATER 2
-2RA1 18KW 25A WASH T HEATER 1

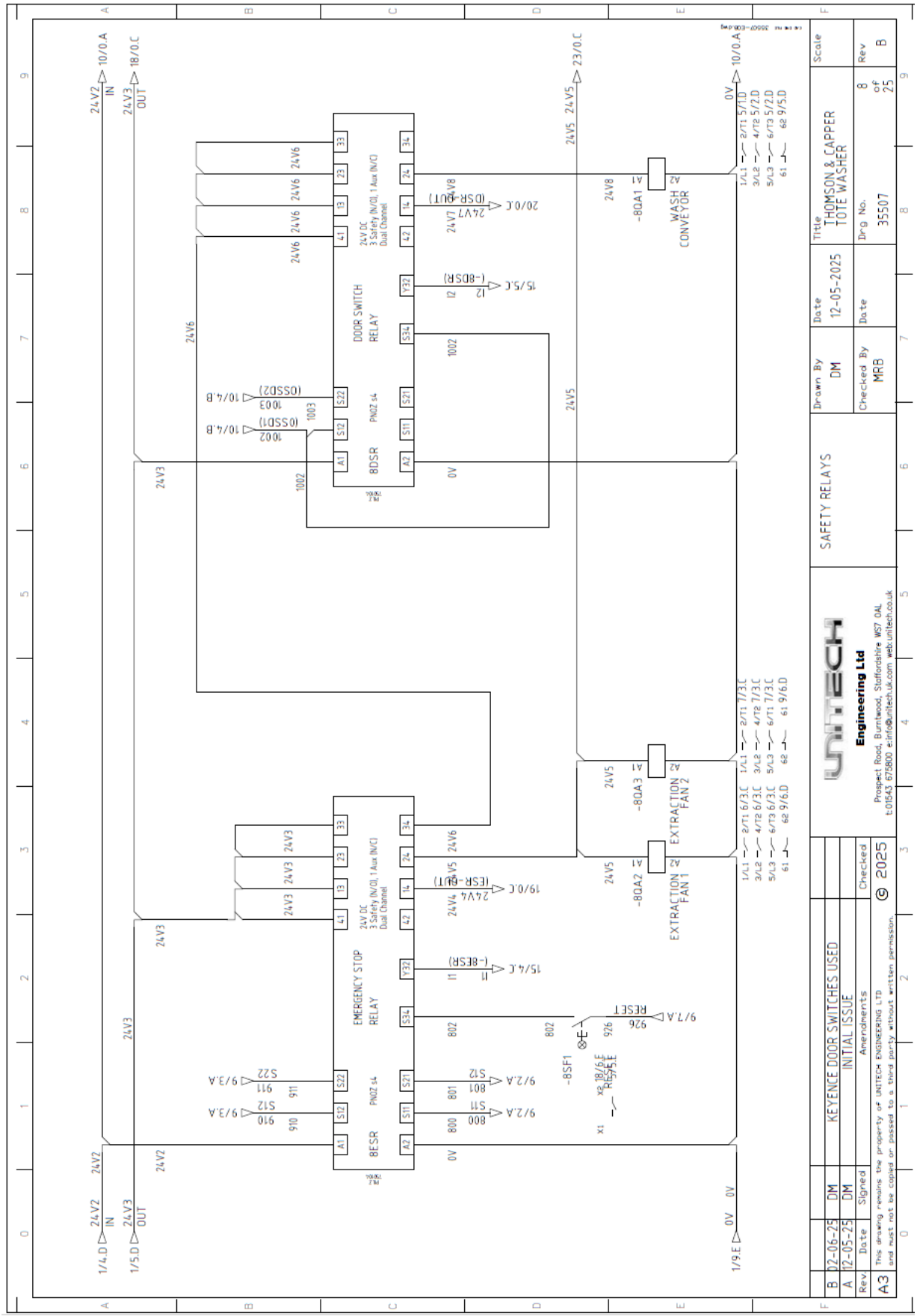

RINSE TANK
HEATING ELEMENTS
THOMSON & CAPPER
TOTE WASHER
35507
KEYENCE DOOR SWITCHES USED
INITIAL ISSUE
Engineering Ltd
Prospect Road, Burntwood, Staffordshire WS7 0AL
t:01543 678800 e:info@unitech.uk.com web:unitech.co.uk
This drawing remains the property of UNITECH ENGINEERING LTD
and must not be copied or passed to a third party without written permission.
© 2025

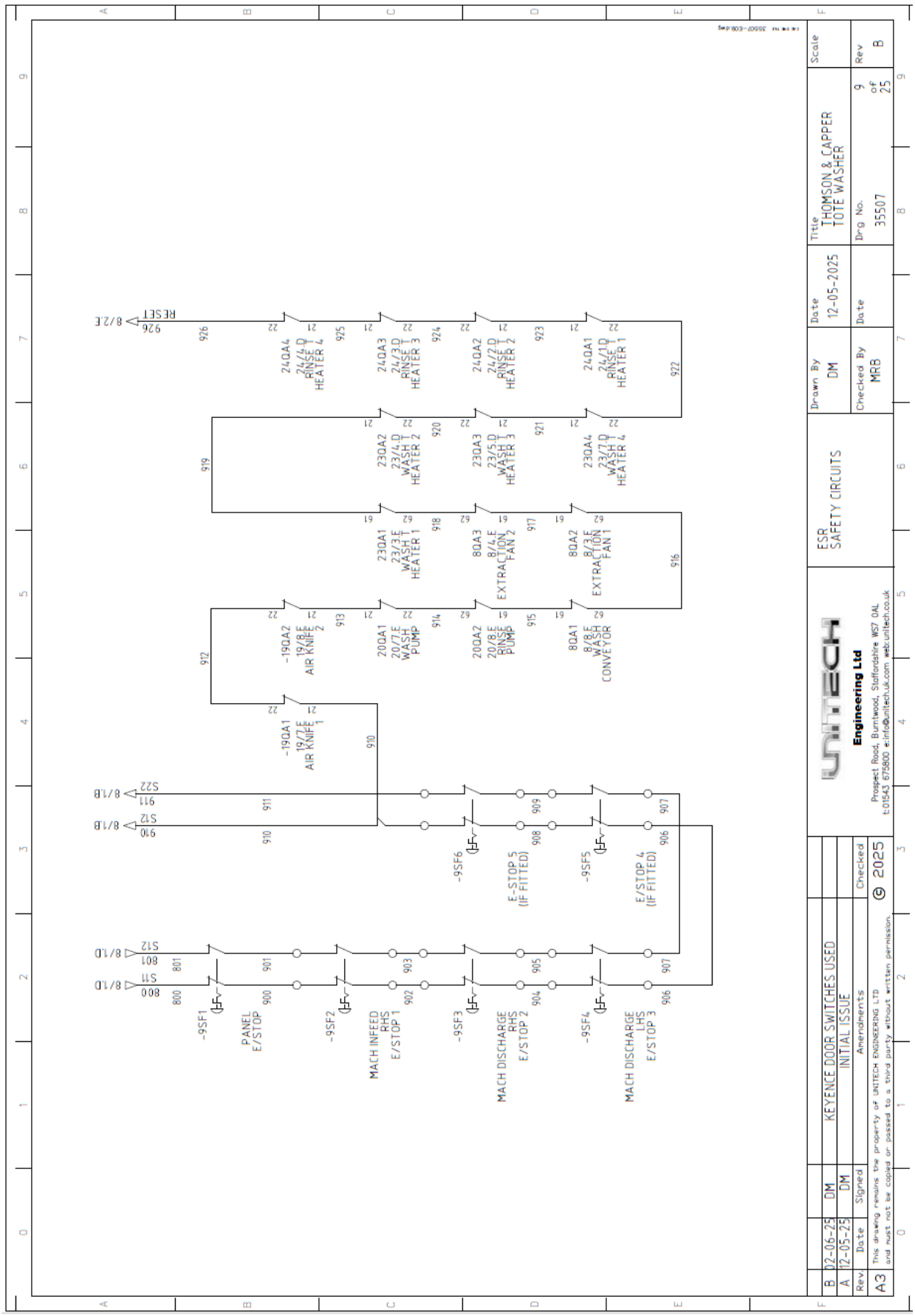

THOMSON & CAPPER
TOTE WASHER
AIR KNIVES &
PUMPS
Drawn By DM
Checked By MRB
Date 12-05-2025
Drg No. 35507
Rev B
4 of 25
UNITECH Engineering Ltd
Prospect Road, Burntwood, Staffordshire WS7 0AL
B 02-06-25 DM KEYENCE DOOR SWITCHES USED
A 12-05-25 DM INITIAL ISSUE
Rev Date Signed Amendments Checked
A3
© 2025
-4MA1 AIR KNIFE 1 MOTOR 7.5KW 400/690V 14.1/8.17A
-4MA2 AIR KNIFE 2 MOTOR 7.5KW 400/690V 14.1/8.17A
-4MA3 WASH PUMP MOTOR 5.5 KW 400/690V 10.5/6.05A
-4MA4 RINSE PUMP MOTOR 3KW 230/400V 11.0/6.37A
-4QA1 18A AIR KNIFE 1 MCB
-4QA2 18A AIR KNIFE 2 MCB
-4QA3 9-14A WASH PUMP MCB
-4QA4 6-10A RINSE PUMP MCB
-4KF1 13-18A
-4KF2 13-18A

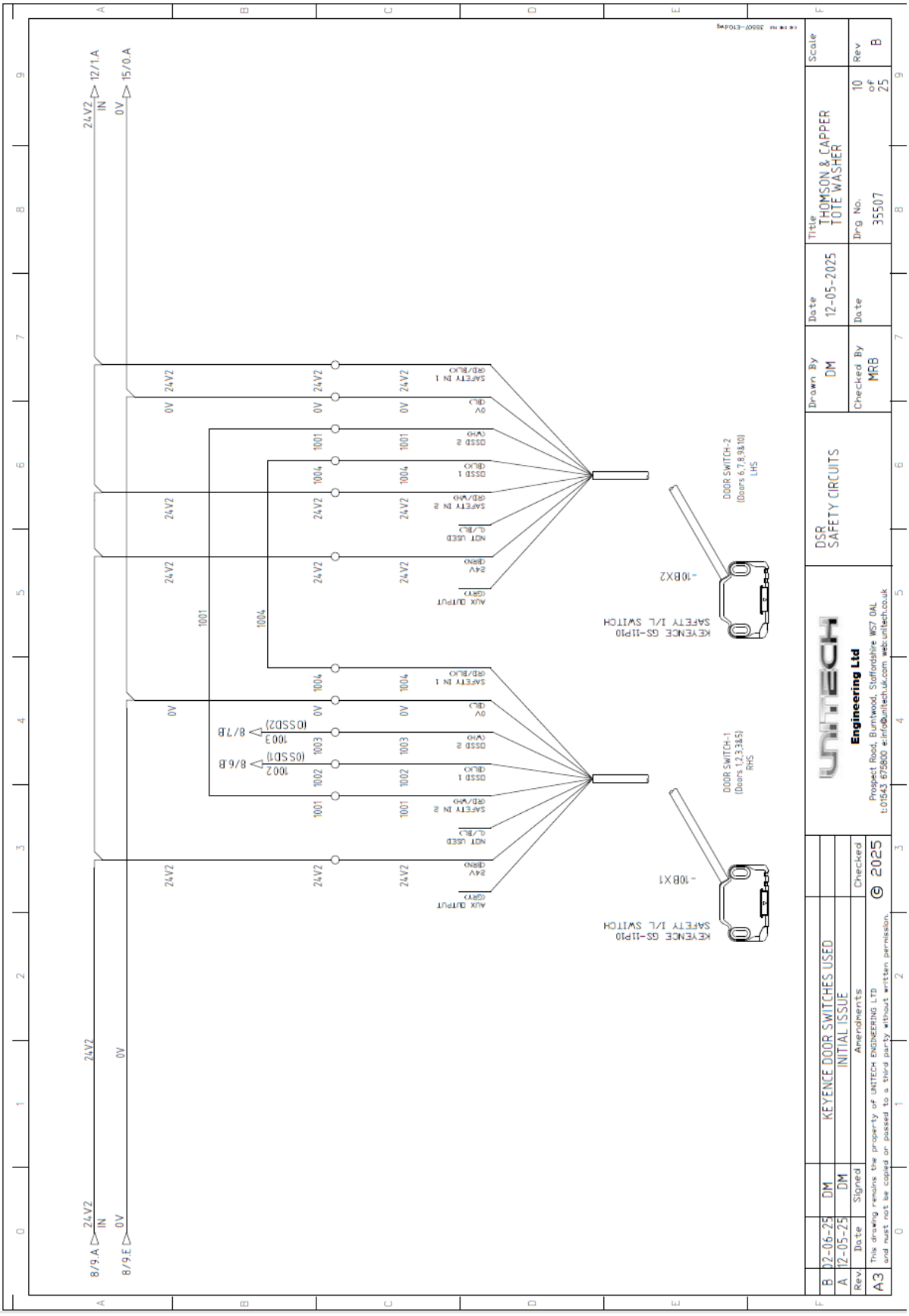

WASHER CONVEYOR
Drawn By DM
Checked By MRB
Date 12-05-2025
Title THOMSON & CAPPER TOTE WASHER
Drg No. 35507
Sheet 5 of 25
Rev B
KEYENCE DOOR SWITCHES USED
INITIAL ISSUE
Engineering Ltd
Prospect Road, Burntwood, Staffordshire WS7 0AL
t:01543 675800 e:info@unitech.uk.com www.unitech.co.uk
-5MA1 WASH CONVEYOR MOTOR 0.37KW 230/400V 1.78/1.02A
-5T1 WASH CONVEYOR DRIVE
INVERTEK ODE-3-140022-3F12
-5TC1 UNIPOWER HPL110 TORQUE LIMITER
8SF1 B/2.D RESET
-5QA1 4-6.3A WASH CONVEYOR MCB
8QA1 8/8.E WASH CONVEYOR
Paramenters Settings
P01: Maximum Frequency/Speed limit
P02: Minimum Frequency/Speed limit
P03: Acceleration Ramp time "Set to 1s"
P04: "Deacceleration Ramp Time : "Set to 1s"
P07: Motor Rated Voltage: "Set as per motor's nameplate"
P08: Motor Rated Current: "Set as per motor's nameplate.
P09: Motor Rated Frequency: "Set as per motor's nameplate"
P12: Primary Command Source: "Set to 0 (Terminal Control mode)"
P15: Digital Input Function Select: "Set to 2"
P18: Output Relay Function Select "Set to 3 (Drive Fault)"
© 2025

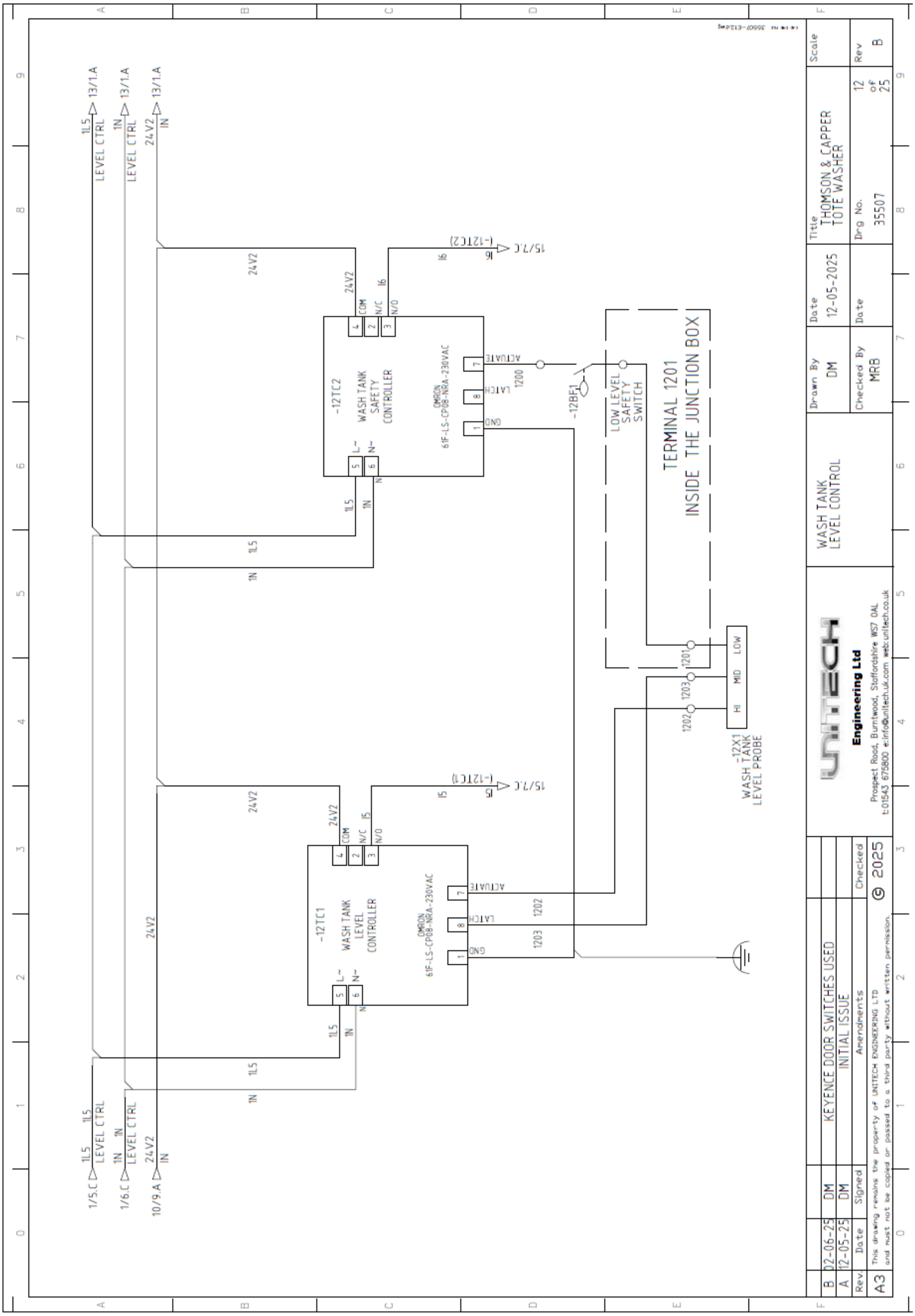

Parameters Settings
P01 : Maximum Frequency/Speed limit
P02 : Minimum Frequency/Speed limit
P03=Acceleration Ramp time "Set to 1s"
P04: "Deceleration Ramp Time : "Set to 1s"
P07: Motor Rated Voltage: "Set as per motor's nameplate"
P08: Motor Rated Current: "Set as per motor's nameplate.
P09: Motor Rated Frequency: "Set as per motor's nameplate"
P12: Primary Command Source: "Set to 0 (Terminal Control mode)"
P15: Digital Input Function Select: Set to 2
P18: Output Relay Function Select: Set to 3 (Drive Fault)
EXTRACTION FAN 1
THOMSON & CAPPER TOTE WASHER
35507
Drawn By DM
Checked By MRB
Date 12-05-2025
Scale
Rev B
6 of 25
UNITECH Engineering Ltd
Prospect Road, Burntwood, Staffordshire WS7 0AL
t:01543 675800 e:info@unitech.co.uk web:unitech.co.uk
KEYENCE DOOR SWITCHES USED
INITIAL ISSUE
Amendments
Checked
Signed
Date
Rev
B 02-06-25 DM
A 12-05-25 DM
A3
This drawing remains the property of UNITECH ENGINEERING LTD and must not be copied or passed to a third party without written permission.
© 2025
-6QA1 4.6-6.3A EXTRACTION FAN 1 MCB
8QA2 8/3 E EXTRACTION FAN 1
-6T1 EXTRACTION FAN 1 DRIVE
INVERTEK ODE-3-140022-3F12
0.75KW 2.2A
-6MA1 EXTRACTION FAN 1 MOTOR 0.55KW 230/400V 2.0/1.18A
5/9.A
7/0.A
20/2.D
20/3.D
24V2
17/7.C
I22


Paramenters Settings
P01 : Maximum frequency/Speed limit
P02 : Minimum frequency/Speed limit
P03=Acceleration Ramp time "Set to 1s"
P04: "Deacceleration Ramp Time : "Set to 1s"
P07: Motor Rated Voltage: "Set as per motor's nameplate".
P08: Motor Rated Current: "Set as per motor's nameplate.
P09: Motor Rated Frequency: "Set as per motor's nameplate"
P12: Primary Command Source: "Set to 0 (Terminal Control mode)"
P15: Digital Input Function Select: Set to 2
P18: Output Relay Function Select: Set to 3 (Drive Fault)
-7T1 EXTRACTION FAN 2 DRIVE
INVERTER ODE-3-140022-3F12
0.75KW 2.2A
-7MA1 EXTRACTION FAN 2 MOTOR 0.55KW 230/400V 2.07/1.18A
-7QA1 4 - 6.3A EXTRACTION FAN 2 MCB
8QA3 8/4.E EXTRACTION FAN 2
EXTRACTION FAN 2
Drawn By DM
Checked By MRB
Date 12-05-2025
Title THOMSON & CAPPER TOTE WASHER
Dwg No. 35507
Scale
Rev B
KEYENCE DOOR SWITCHES USED
INITIAL ISSUE
Amendments
Checked
Signed
Date
Rev
B 02-06-25 DM
A 12-05-25 DM
A3
This drawing remains the property of UNITECH ENGINEERING LTD and must not be copied or passed to a third party without written permission.
© 2025
Engineering Ltd
Prospect Road, Burntwood, Staffordshire WS7 0AL
t:01543 675800 e:info@unitech.uk.com web:unitech.co.uk

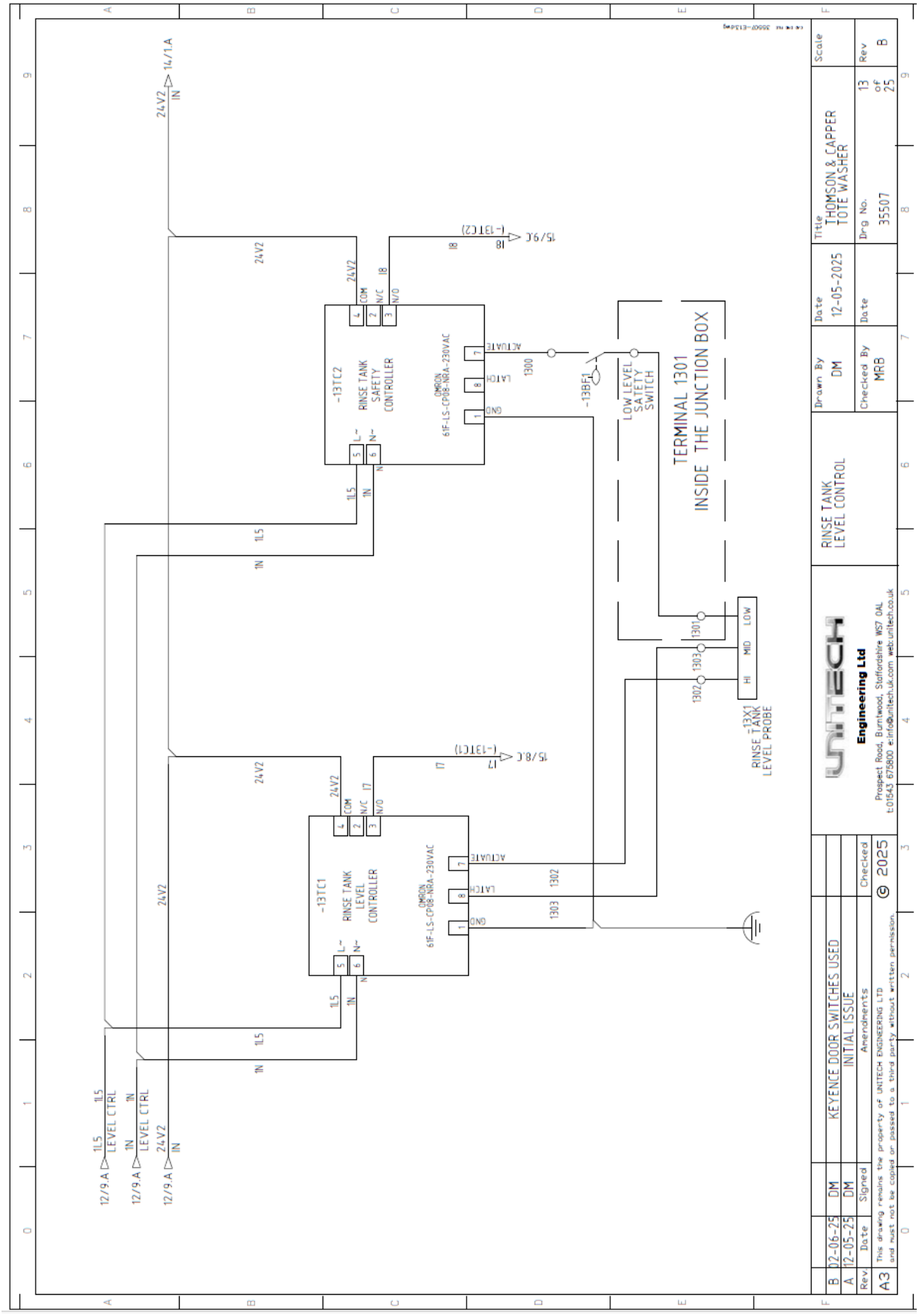

SAFETY RELAYS
THOMSON & CAPPER
TOTE WASHER
35507
Drawn By DM
Checked By MRB
Date 12-05-2025
Scale
Rev B
8 of 25
KEYENCE DOOR SWITCHES USED
INITIAL ISSUE
Amendments
Checked
Signed
Date
Rev
B 02-06-25 DM
A 12-05-25 DM
A3
DOOR SWITCH RELAY
EMERGENCY STOP RELAY
8DSR
8ESR
-8QA1 WASH CONVEYOR
-8QA2 EXTRACTION FAN 1
-8QA3 EXTRACTION FAN 2
-8SF1 RESET
24V DC 3 Safety (N/O), 1 Aux (N/C) Dual Channel
PNOZ s4
Unitech Engineering Ltd
Prospect Road, Burntwood, Staffordshire WS7 0AL
t:01543 675800 e:info@unitech.uk.com web:unitech.co.uk
© 2025 UNITECH ENGINEERING LTD
This drawing remains the property of UNITECH ENGINEERING LTD and must not be copied or passed to a third party without written permission.

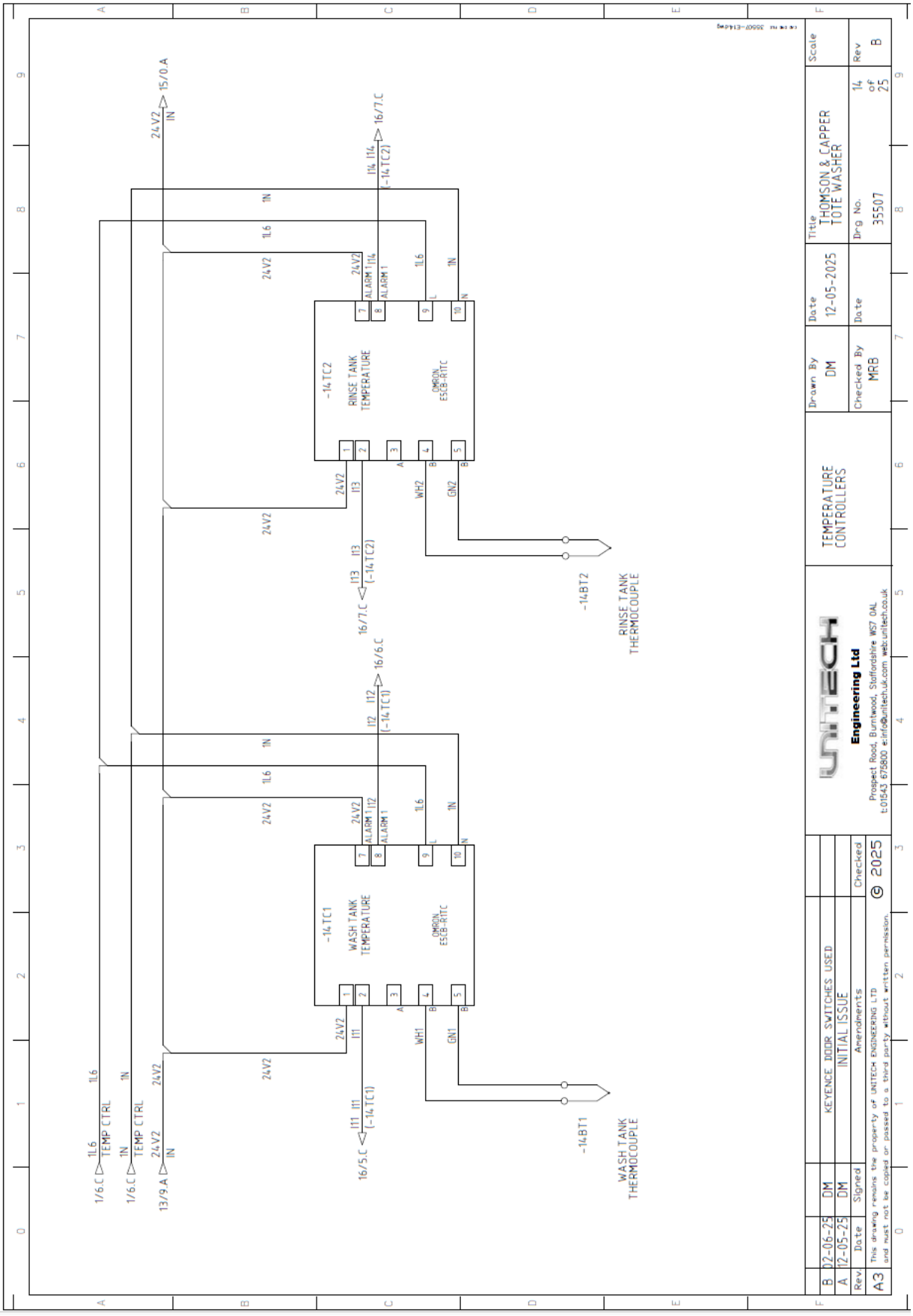

ESR
SAFETY CIRCUITS
THOMSON & CAPPER
TOTE WASHER
35507
KEYENCE DOOR SWITCHES USED
INITIAL ISSUE
Unitech Engineering Ltd
Prospect Road, Burntwood, Staffordshire WS7 0AL
t:01543 675800 e:info@unitech.uk.com web:unitech.co.uk
This drawing remains the property of UNITECH ENGINEERING LTD
and must not be copied or passed to a third party without written permission.
© 2025
-9SF1 PANEL E/STOP
-9SF2 MACH INFEED RHS E/STOP 1
-9SF3 MACH DISCHARGE RHS E/STOP 2
-9SF4 MACH DISCHARGE LHS E/STOP 3
-9SF6 E-STOP 5 (IF FITTED)
-9SF5 E/STOP 4 (IF FITTED)
-19QA1 19/7.E AIR KNIFE 1
-19QA2 19/8.E AIR KNIFE 2
20QA1 20/7.E WASH PUMP
20QA2 20/8.E RINSE PUMP
8QA1 8/8.E WASH CONVEYOR
8QA2 8/3.E EXTRACTION FAN 1
8QA3 8/4.E EXTRACTION FAN 2
23QA1 23/3.E WASH 1 HEATER 1
23QA2 23/4.D WASH 1 HEATER 2
23QA3 23/5.D WASH 1 HEATER 3
23QA4 23/7.D WASH 1 HEATER 4
24QA1 24/1.D RINSE 1 HEATER 1
24QA2 24/2.D RINSE 1 HEATER 2
24QA3 24/3.D RINSE 1 HEATER 3
24QA4 24/4.D RINSE 1 HEATER 4
RESET
S11
S12
S21
S22

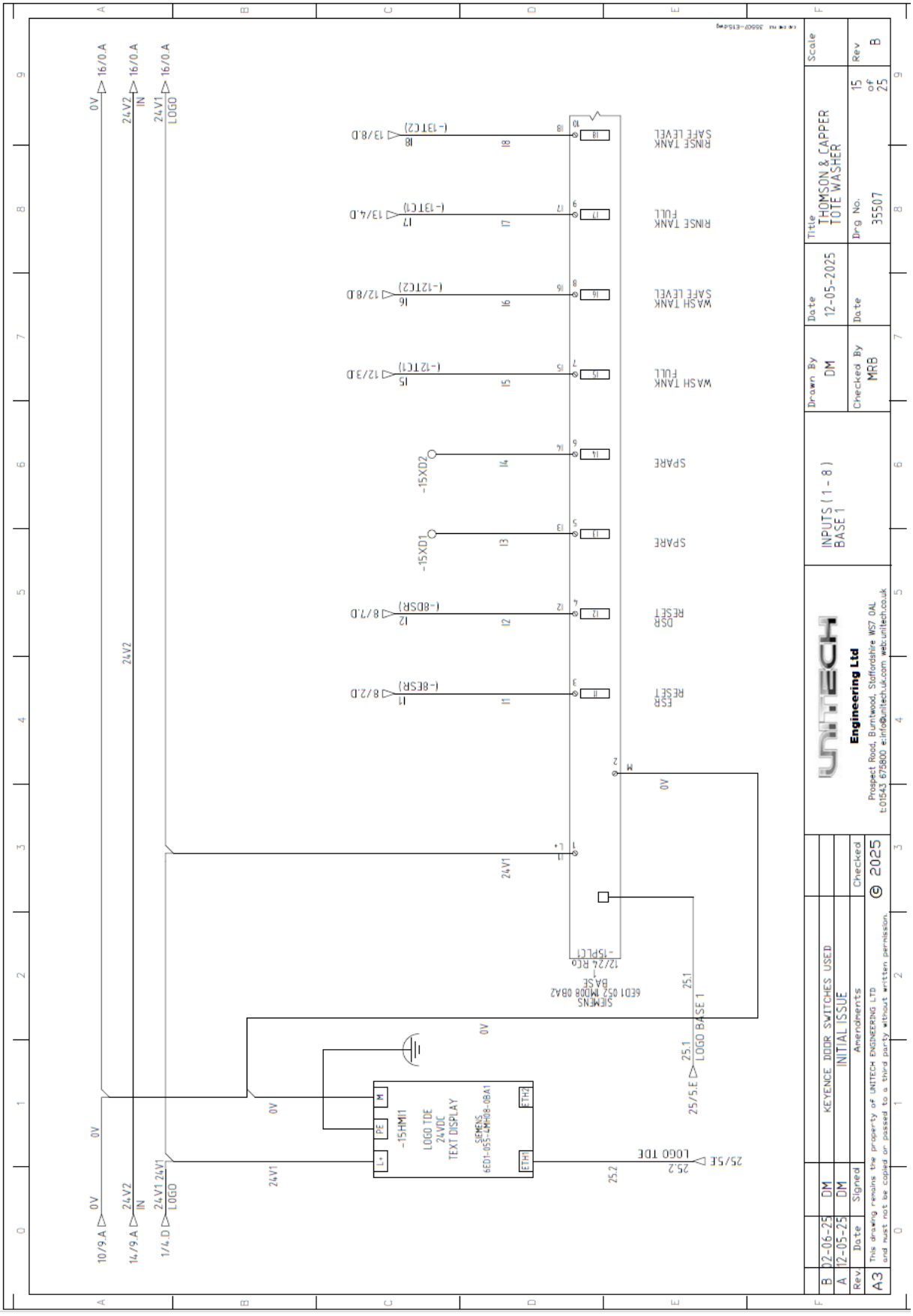

DSR
SAFETY CIRCUITS
THOMSON & CAPPER
TOTE WASHER
Drg No.
35507
Drawn By
DM
Checked By
MRB
Date
12-05-2025
Scale
Rev
B
KEYENCE DOOR SWITCHES USED
INITIAL ISSUE
Engineering Ltd
Prospect Road, Burntwood, Staffordshire WS7 0AL
t:01543 675800 e:info@unitech.uk.com web:unitech.co.uk
DOOR SWITCH-2
(Doors 6,7,8,9&10)
LHS
DOOR SWITCH-1
(Doors 1,2,3,3&5)
RHS
-10BX2
-10BX1
KEYENCE GS-11P10
SAFETY I/L SWITCH
SAFETY IN 1
SAFETY IN 2
DSSD 1
DSSD 2
NOT USED
AUX OUTPUT
24V2
0V
1001
1002
1003
1004
(OSSD1)
(OSSD2)
8/6.B
8/7.B
8/9.A
8/9.E
12/1.A
15/0.A
© 2025

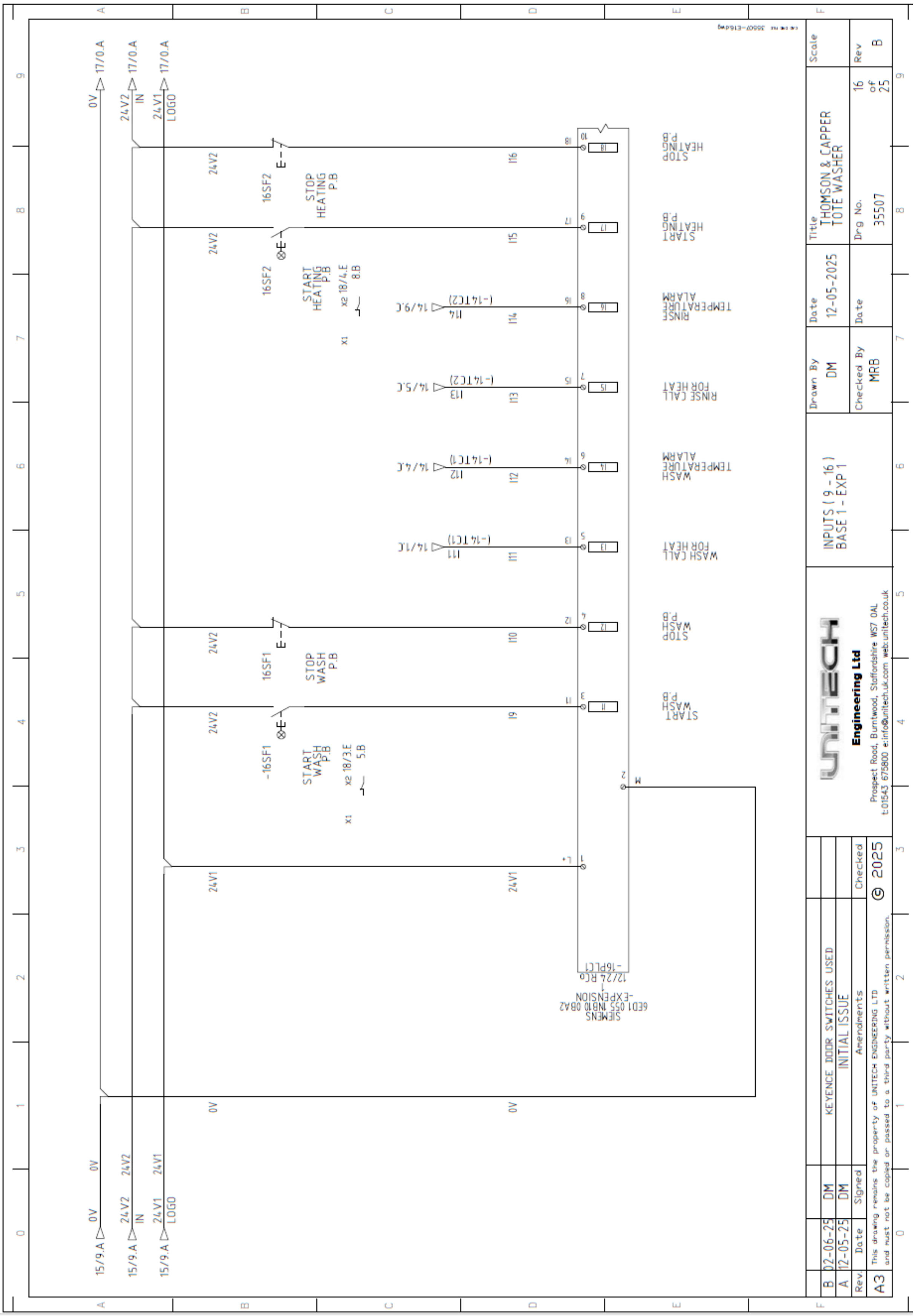


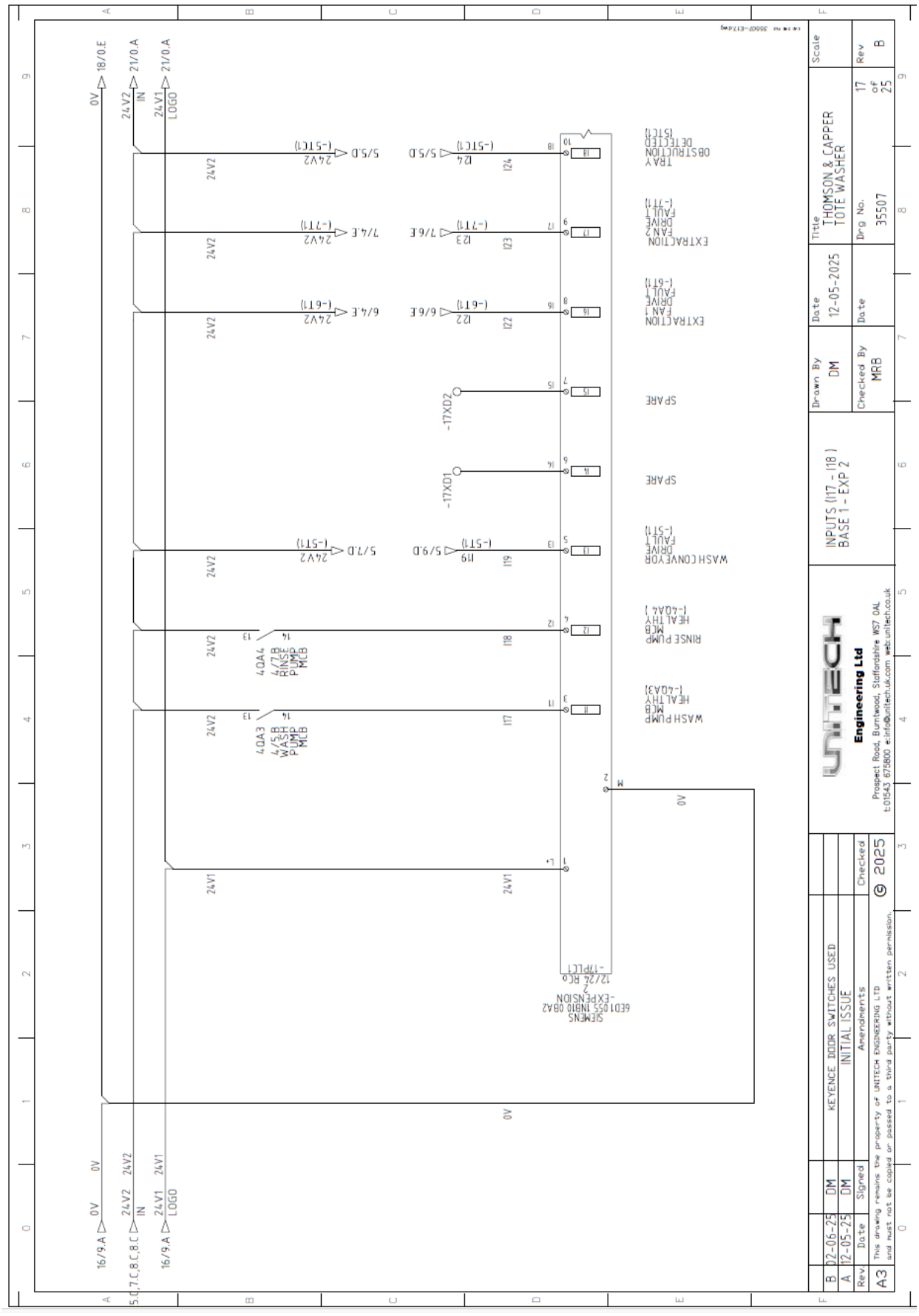
THOMSON & CAPPER
TOTE WASHER
WASH TANK
LEVEL CONTROL
Drg No. 35507
12 of 25
Rev B
Drawn By DM
Checked By MRB
Date 12-05-2025
-12TC2
WASH TANK
SAFETY
CONTROLLER
OMRON
61F-LS-CP08-NRA-230VAC
-12TC1
WASH TANK
LEVEL
CONTROLLER
OMRON
61F-LS-CP08-NRA-230VAC
-12BF1
LOW LEVEL
SAFETY
SWITCH
TERMINAL 1201
INSIDE THE JUNCTION BOX
-12X1
WASH TANK
LEVEL PROBE
HI
MID
LOW
COM
N/C
N/O
ACTUATE
LATCH
GND
LEVEL CTRL
24V2
15/7.C
13/1.A
1/5.C
1/6.C
10/9.A
B 02-06-25 DM KEYENCE DOOR SWITCHES USED
A 12-05-25 DM INITIAL ISSUE
Rev. Date Signed Amendments Checked
A3
© 2025
UNITECH
Engineering Ltd
Prospect Road, Burntwood, Staffordshire WS7 0AL
t:01543 675800 e:info@unitech.uk.com web:unitech.co.uk
This drawing remains the property of UNITECH ENGINEERING LTD and must not be copied or passed to a third party without written permission.

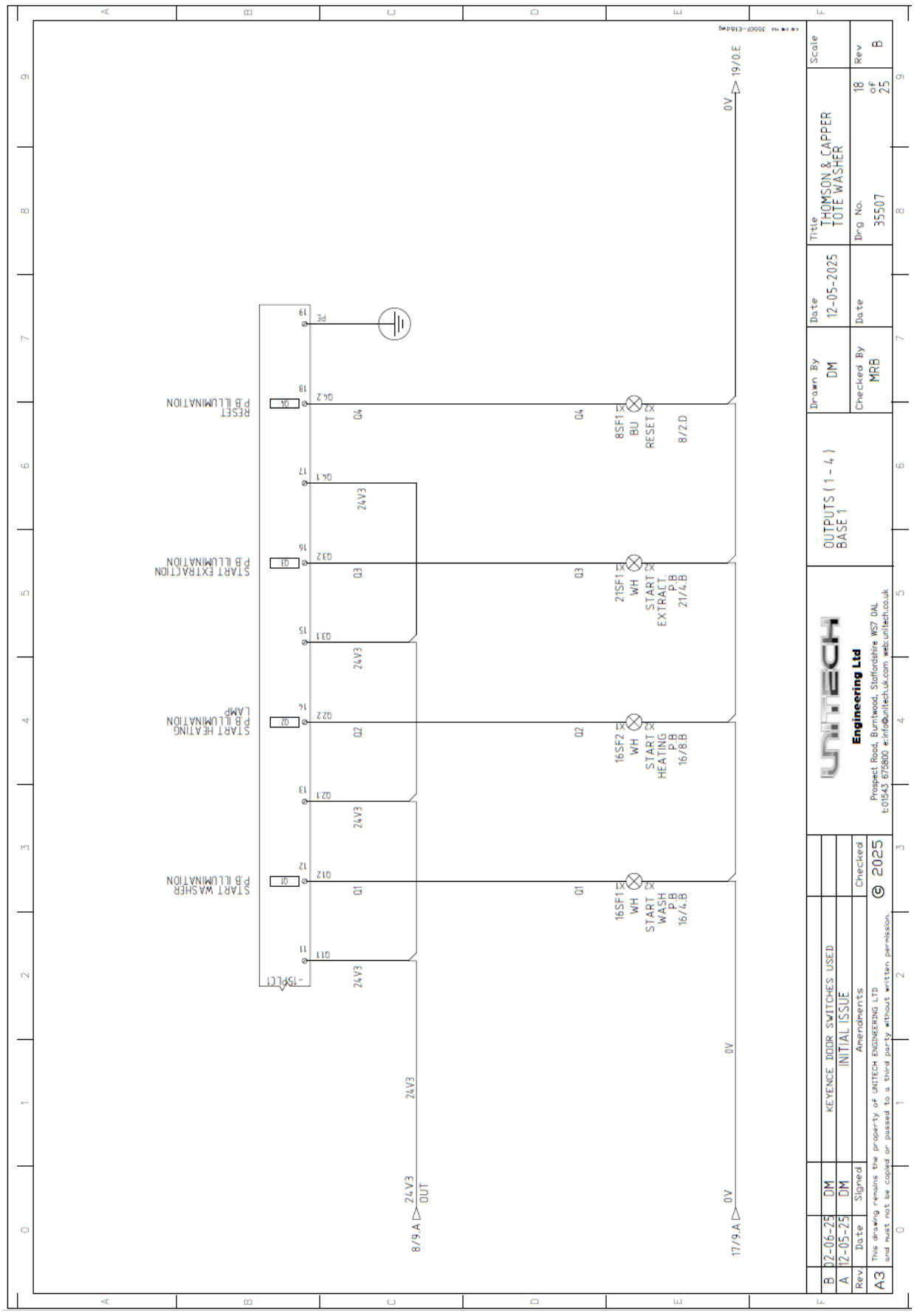

RINSE TANK LEVEL CONTROL
TERMINAL 1301
INSIDE THE JUNCTION BOX
-13TC2
RINSE TANK SAFETY CONTROLLER
-13TC1
RINSE TANK LEVEL CONTROLLER
OMRON 61F-LS-CP08-NRA-230VAC
LOW LEVEL SAFETY SWITCH
-13BF1
RINSE TANK LEVEL PROBE
-13X1
HI MID LOW
24V2 IN 14/1A
12/9.A LEVEL CTRL
12/9.A LEVEL CTRL
12/9.A 24V2 IN
15/9.C
15/8.C
KEYENCE DOOR SWITCHES USED
INITIAL ISSUE
Engineering Ltd
Prospect Road, Burntwood, Staffordshire WS7 0AL
t:01543 675800 e:info@unitech.co.uk web:unitech.co.uk
THOMSON & CAPPER TOTE WASHER
Drg No. 35507
Drawn By DM
Checked By MRB
Date 12-05-2025
13 of 25
Rev B
A3
© 2025

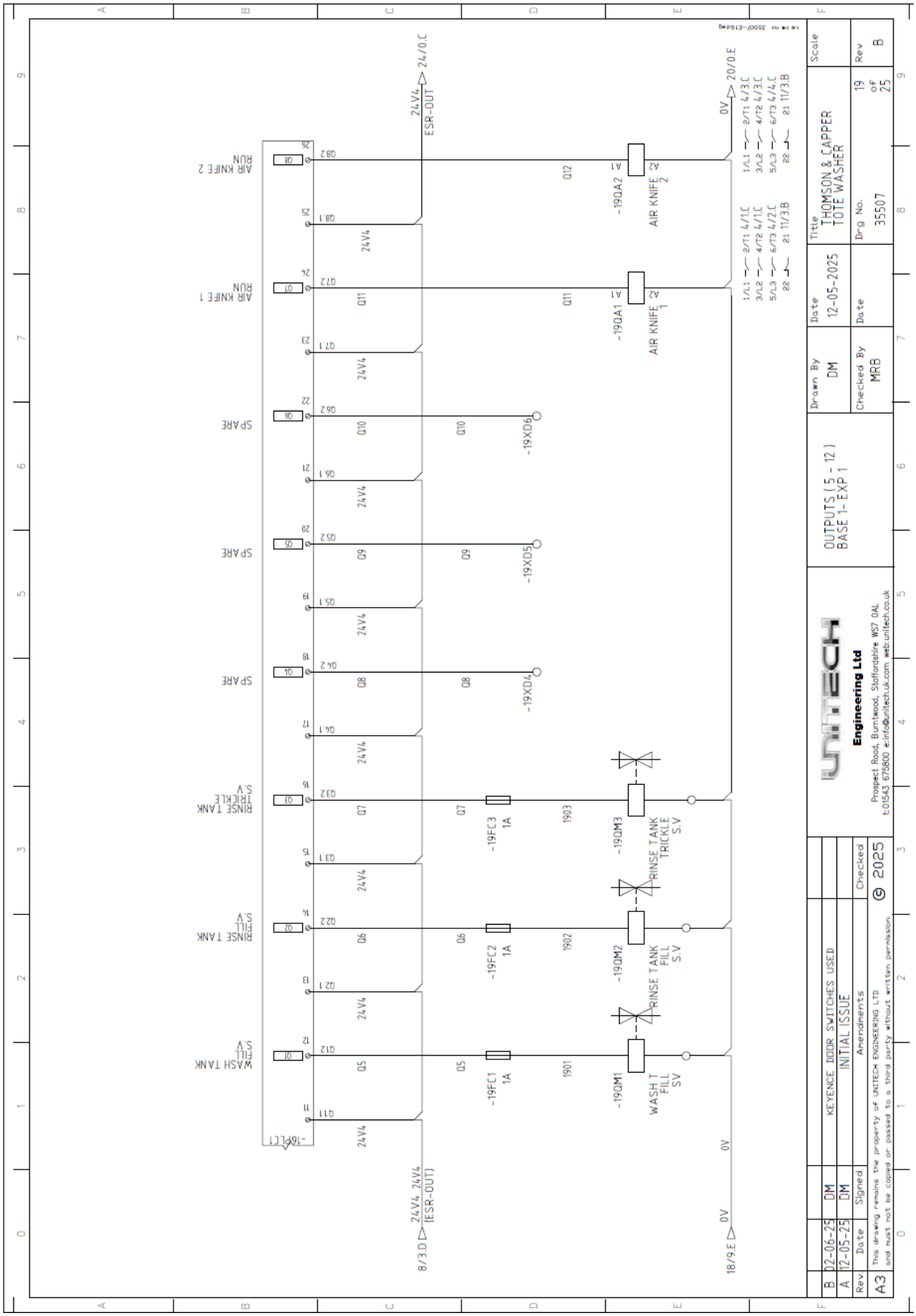

24V2 15/0.A
IN
16/7.C
I14 I14
(-14TC2)
1N
1L6
24V2
ALARM 1 I14
ALARM 1
-14TC2
RINSE TANK
TEMPERATURE
OMRON
E5LB-R1TC
WH2
GN2
-14BT2
RINSE TANK
THERMOCOUPLE
I13 I13
(-14TC2)
16/7.C
16/6.C
I12 I12
(-14TC1)
ALARM 1 I12
-14TC1
WASH TANK
TEMPERATURE
WH1
GN1
-14BT1
WASH TANK
THERMOCOUPLE
I11 I11
(-14TC1)
16/5.C
1/6.C
TEMP CTRL
13/9.A
TEMPERATURE
CONTROLLERS
Drawn By
DM
Checked By
MRB
Date
12-05-2025
Title
THOMSON & CAPPER
TOTE WASHER
Drg No.
35507
Scale
Rev
B
14
of
25
Unitech
Engineering Ltd
Prospect Road, Burntwood, Staffordshire WS7 0AL
t: 01543 675800 e: info@unitech.uk.com web.unitech.co.uk
KEYENCE DOOR SWITCHES USED
INITIAL ISSUE
B 02-06-25 DM
A 12-05-25 DM
Rev Date Signed Amendments Checked
A3
This drawing remains the property of UNITECH ENGINEERING LTD
and must not be copied or passed to a third party without written permission.
© 2025

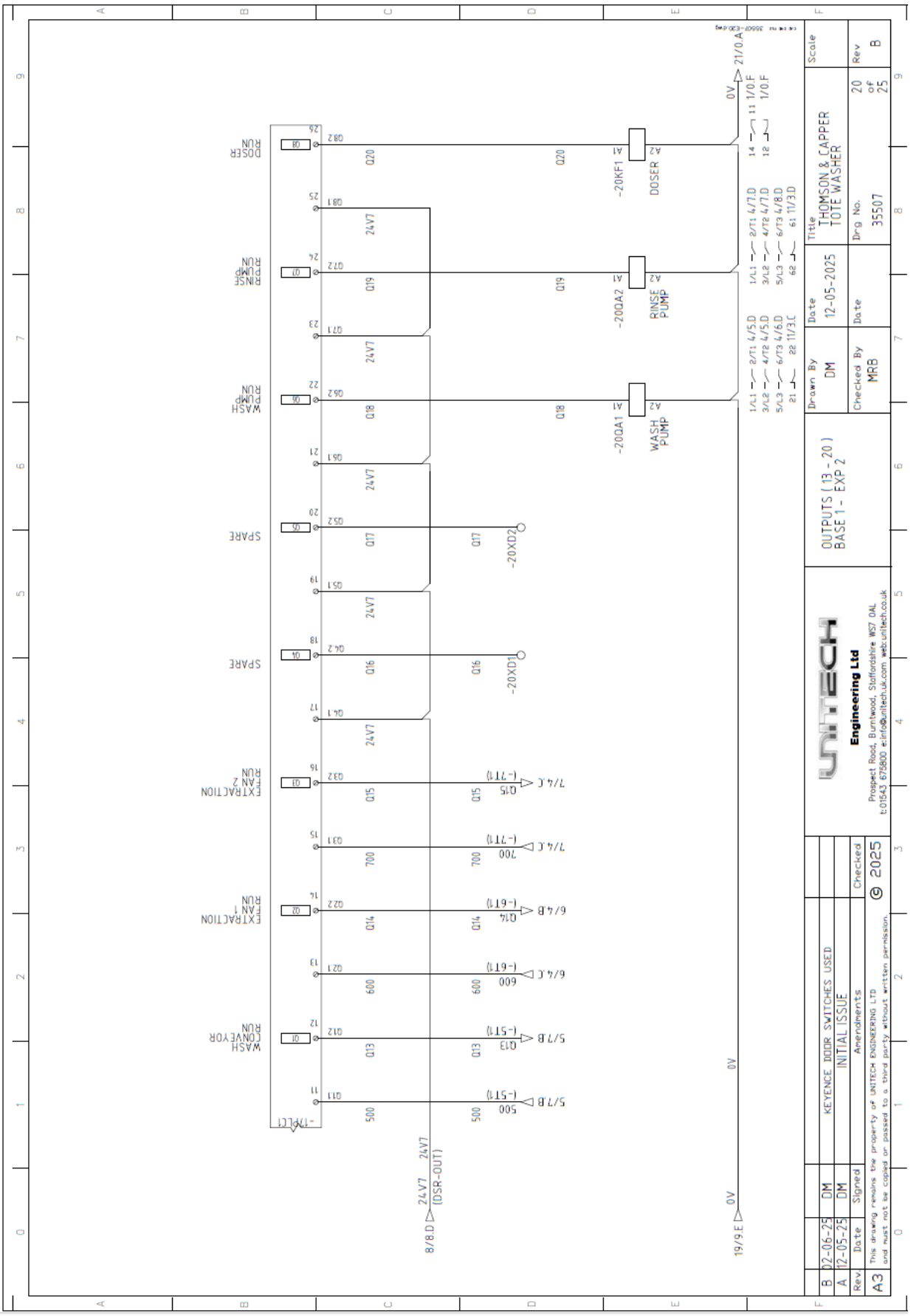

INPUTS (1 - 8)
BASE 1
Title
THOMSON & CAPPER
TOTE WASHER
Drg No.
35507
Drawn By
DM
Checked By
MRB
Date
12-05-2025
Scale
Rev
B
Engineering Ltd
Prospect Road, Burntwood, Staffordshire WS7 0AL
t:01543 675800 e:info@unitech.uk.com web:unitech.co.uk
KEYENCE DOOR SWITCHES USED
INITIAL ISSUE
Amendments
Checked
Signed
Date
Rev
02-06-25 DM
12-05-25 DM
A3
This drawing remains the property of UNITECH ENGINEERING LTD and must not be copied or passed to a third party without written permission.
© 2025
-15HMI1
LOGO TDE
24VDC
TEXT DISPLAY
SIEMENS
6ED1-055-1MM08-0BA1
SIEMENS
6ED1 052 1MD08 0BA2
BASE
-15PLC1
-15XD1
-15XD2
-8DSR)
-8ESR)
-13TC1)
-13TC2)
-12TC1)
-12TC2)
RESET
DSR
ESR
SPARE
WASH TANK FULL
WASH TANK SAFE LEVEL
RINSE TANK FULL
RINSE TANK SAFE LEVEL
LOGO TDE
LOGO BASE 1
0V
24V1
24V2
IN
LOGO
16/0.A
10/9.A
14/9.A
1/4.D
8/2.D
8/7.D
12/3.D
12/8.D
13/4.D
13/8.D
25/5.E
25.1
25.2

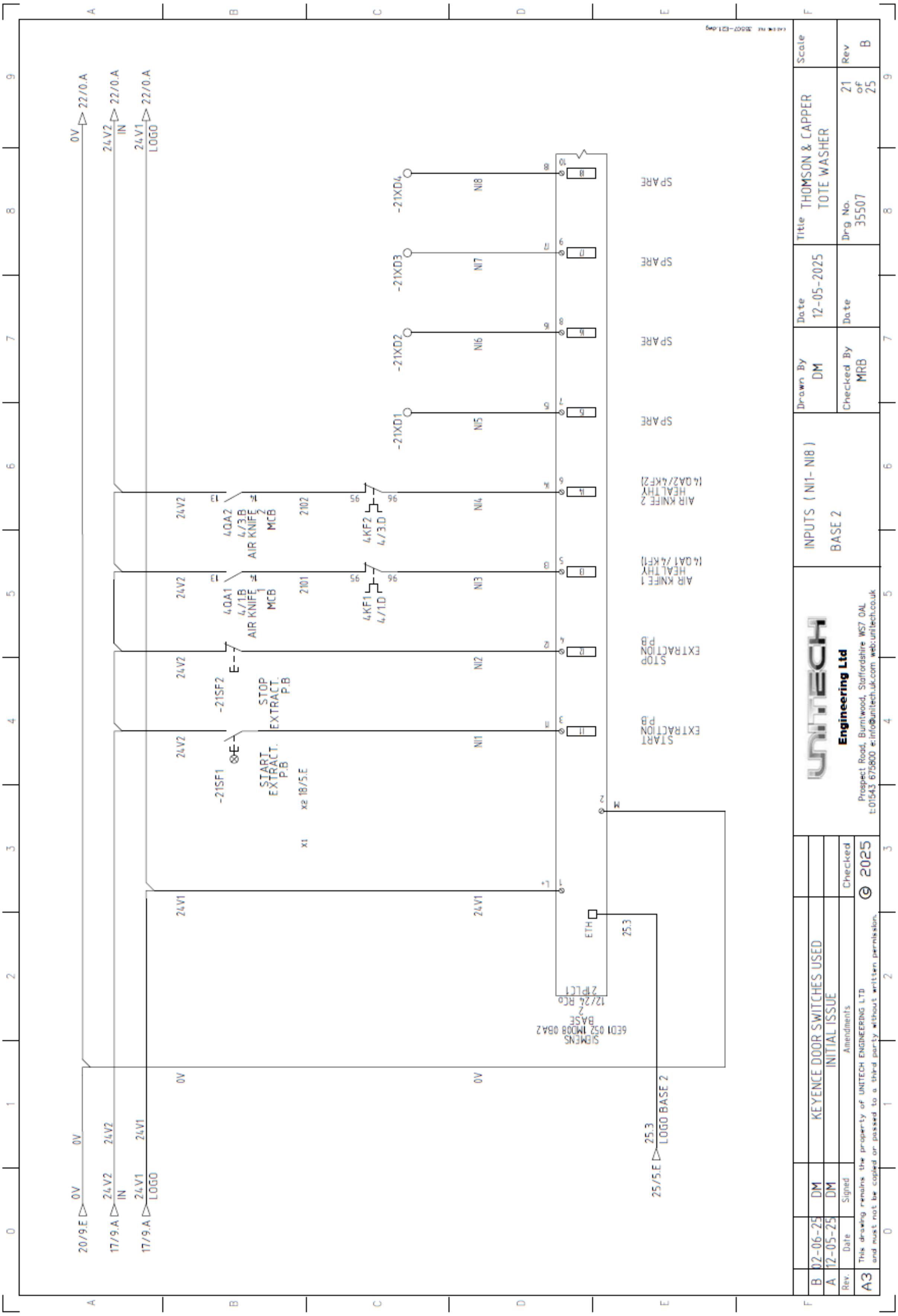

THOMSON & CAPPER
TOTE WASHER
INPUTS (9 - 16)
BASE 1 - EXP 1
35507
12-05-2025
DM
MRB
16 of 25
KEYENCE DOOR SWITCHES USED
INITIAL ISSUE
START WASH P.B
STOP WASH P.B
WASH CALL FOR HEAT
WASH TEMPERATURE ALARM
RINSE CALL FOR HEAT
RINSE TEMPERATURE ALARM
START HEATING P.B
STOP HEATING P.B
SIEMENS 6ED1 055 1NB10 0BA2 -EXPENSION 12/24 RCo -16PLC1

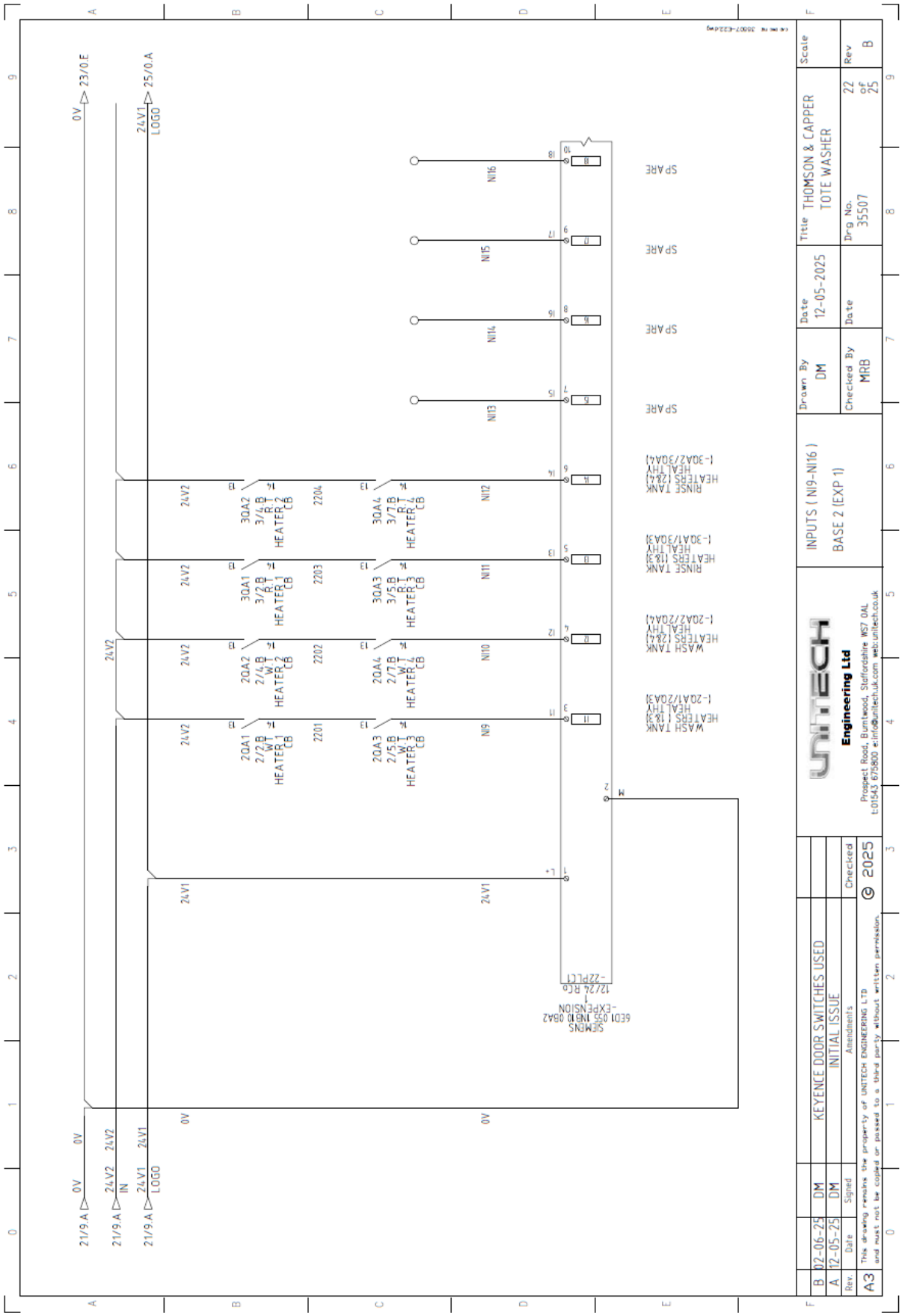

Title
THOMSON & CAPPER
TOTE WASHER
Drg No.
35507
Rev
B
Drawn By
DM
Checked By
MRB
Date
12-05-2025
INPUTS (I17 - I18)
BASE 1 - EXP 2
Engineering Ltd
Prospect Road, Burntwood, Staffordshire WS7 0AL
t:01543 675800 e:info@unitech.co.uk web:unitech.co.uk
KEYENCE DOOR SWITCHES USED
INITIAL ISSUE
Amendments
Checked
Signed
Date
Rev
© 2025
This drawing remains the property of UNITECH ENGINEERING LTD
and must not be copied or passed to a third party without written permission.
A3
0V
24V2
24V1
LOGO
IN
TRAY OBSTRUCTION DETECTED
EXTRACTION FAN2 DRIVE FAULT
EXTRACTION FAN1 DRIVE FAULT
SPARE
SPARE
WASH CONVEYOR DRIVE FAULT
RINSE PUMP MCB HEALTHY
WASH PUMP MCB HEALTHY
4QA4 4/7.B RINSE PUMP MCB
4QA3 4/7.B WASH PUMP MCB
-17XD2
-17XD1
-17PLC1
SIEMENS 6ED1055 1NB10 0BA2 -EXPENSION

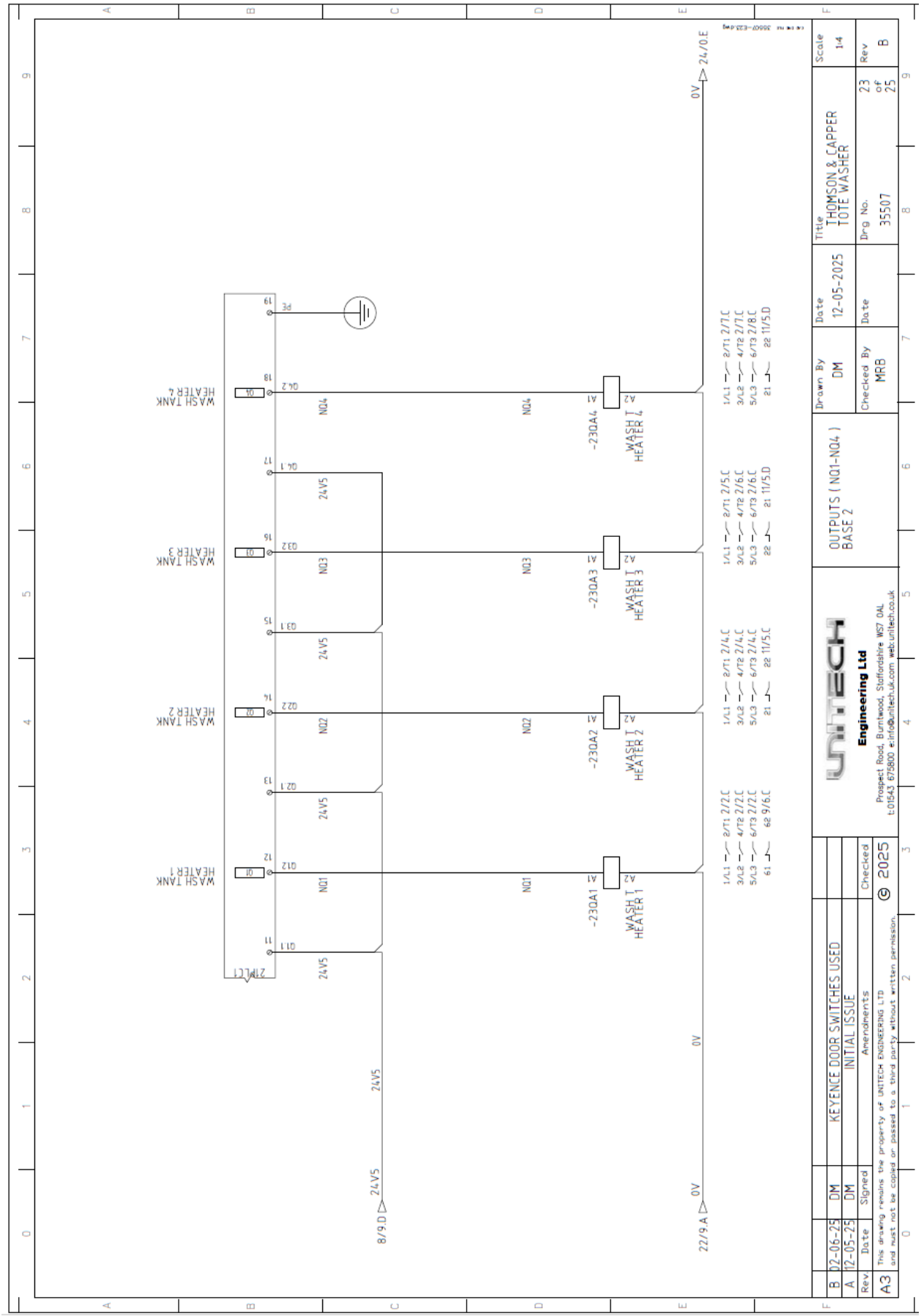

OUTPUTS (1 - 4)
BASE 1
THOMSON & CAPPER
TOTE WASHER
Drg No. 35507
Rev B
Drawn By DM
Checked By MRB
Date 12-05-2025
Engineering Ltd
Prospect Road, Burntwood, Staffordshire WS7 0AL
t:01543 675800 e:info@unitech.uk.com web:unitech.co.uk
KEYENCE DOOR SWITCHES USED
INITIAL ISSUE
Amendments
Checked
Signed
Date
Rev
This drawing remains the property of UNITECH ENGINEERING LTD and must not be copied or passed to a third party without written permission.
© 2025
A3
START WASHER P.B ILLUMINATION
START HEATING LAMP P.B ILLUMINATION
START EXTRACTION P.B ILLUMINATION
RESET P.B ILLUMINATION
16SF1 WH START WASH P.B 16/4.B
16SF2 WH START HEATING P.B 16/8.B
21SF1 WH START EXTRACT. P.B 21/4.B
8SF1 BU RESET 8/2.D
24V3
0V
19/0.E
8/9.A OUT
17/9.A

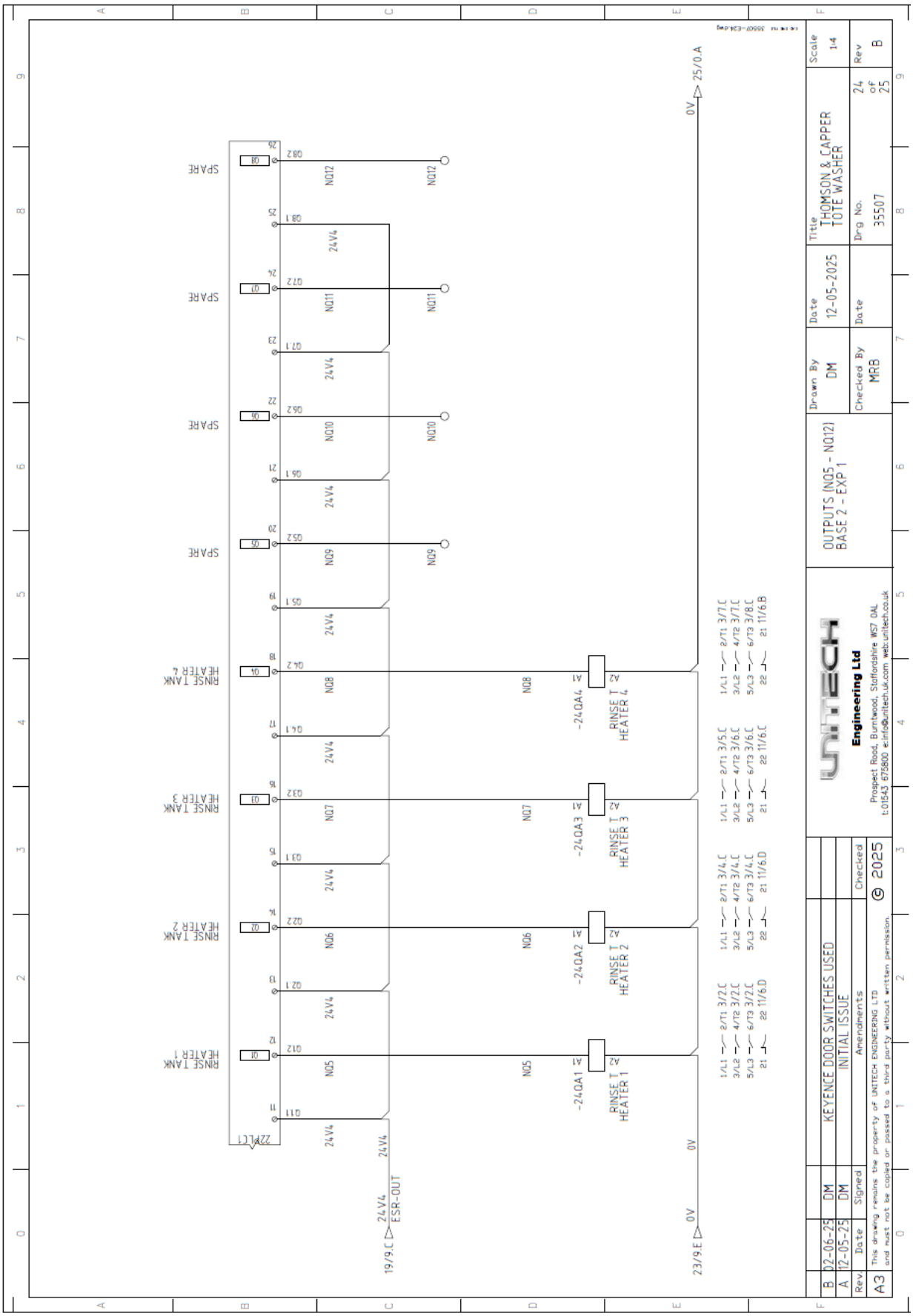

OUTPUTS (5 - 12)
BASE 1- EXP 1
Drawn By DM
Checked By MRB
Date 12-05-2025
Date
Title THOMSON & CAPPER TOTE WASHER
Drg No. 35507
Scale
Rev B
19 of 25
Engineering Ltd
Prospect Road, Burntwood, Staffordshire WS7 0AL
t:01543 675800 e:info@unitech.uk.com web:unitech.co.uk
© 2025
KEYENCE DOOR SWITCHES USED
INITIAL ISSUE
Amendments
Checked
Signed
Date
This drawing remains the property of UNITECH ENGINEERING LTD and must not be copied or passed to a third party without written permission.
A3
B 02-06-25 DM
A 12-05-25 DM
Rev.
24V4 24V4 (ESR-OUT) 8/3.D
24V4 24V4 ESR-OUT 24/0.C
0V 18/9.E
0V 20/0.E
-19PLC1
-19QA1 AIR KNIFE 1
-19QA2 AIR KNIFE 2
-19QM1 WASH T FILL S.V
-19QM2 RINSE TANK FILL S.V
-19QM3 RINSE TANK TRICKLE S.V
-19FC1 1A
-19FC2 1A
-19FC3 1A
-19XD4
-19XD5
-19XD6
WASH TANK FILL S.V
RINSE TANK FILL S.V
RINSE TANK TRICKLE S.V
SPARE
SPARE
SPARE
AIR KNIFE 1 RUN
AIR KNIFE 2 RUN

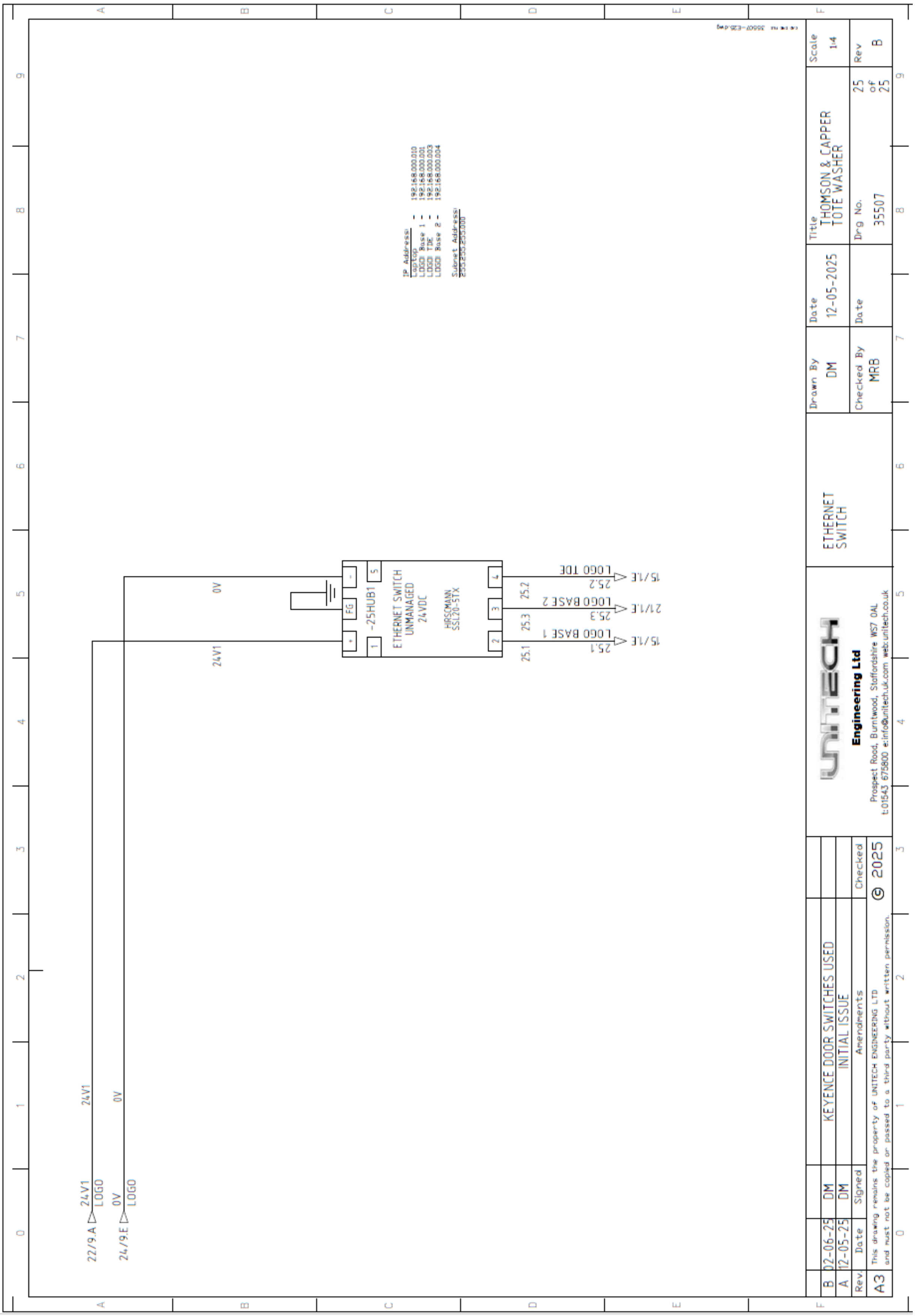

DOSER RUN
RINSE PUMP RUN
WASH PUMP RUN
SPARE
SPARE
EXTRACTION FAN 2 RUN
EXTRACTION FAN 1 RUN
WASH CONVEYOR RUN
-20KF1
DOSER
-20QA2
RINSE PUMP
-20QA1
WASH PUMP
-20XD2
-20XD1
-17PLC1
OUTPUTS (13-20) BASE 1 - EXP 2
Drawn By DM
Checked By MRB
Date 12-05-2025
Title THOMSON & CAPPER TOTE WASHER
Drg No. 35507
Scale
Rev B
KEYENCE DOOR SWITCHES USED
INITIAL ISSUE
Amendments
Checked
Signed
Date
Rev
02-06-25 DM
12-05-25 DM
B
A
A3
Engineering Ltd
Prospect Road, Burntwood, Staffordshire WS7 0AL
t:01543 675800 e:info@unitech.uk.com web:unitech.co.uk
© 2025
This drawing remains the property of UNITECH ENGINEERING LTD and must not be copied or passed to a third party without written permission.
24V7
0V
8/8.D (DSR-OUT)
19/9.E
21/0.A


THOMSON & CAPPER TOTE WASHER
INPUTS (NI1- NI8)
BASE 2
Drg No. 35507
KEYENCE DOOR SWITCHES USED
INITIAL ISSUE
SPARE
SPARE
SPARE
SPARE


INPUTS (NI9-NI16)
BASE 2 (EXP 1)
Title THOMSON & CAPPER
TOTE WASHER
Drg No. 35507
Rev B
Drawn By DM
Checked By MRB
Date 12-05-2025
KEYENCE DOOR SWITCHES USED
INITIAL ISSUE
Engineering Ltd
Prospect Road, Burntwood, Staffordshire WS7 0AL
t:01543 675800 e:info@unitech.uk.com web:unitech.co.uk
This drawing remains the property of UNITECH ENGINEERING LTD
and must not be copied or passed to a third party without written permission.
© 2025


WASH TANK HEATER 4
WASH TANK HEATER 3
WASH TANK HEATER 2
WASH TANK HEATER 1
WASH 1 HEATER 4
WASH 1 HEATER 3
WASH 1 HEATER 2
WASH 1 HEATER 1
-230A4
-230A3
-230A2
-230A1
24V.E
0V
24V.S
8/9.D
22/9.A
OUTPUTS (NQ1-NQ4) BASE 2
THOMSON & CAPPER TOTE WASHER
35507
KEYENCE DOOR SWITCHES USED
INITIAL ISSUE
Engineering Ltd
Prospect Road, Burntwood, Staffordshire WS7 0AL
t:01543 675800 e:info@unitech.uk.com web:unitech.co.uk
This drawing remains the property of UNITECH ENGINEERING LTD and must not be copied or passed to a third party without written permission.
© 2025


OUTPUTS (NQ5 - NQ12)
BASE 2 - EXP 1
THOMSON & CAPPER
TOTE WASHER
35507
KEYENCE DOOR SWITCHES USED
INITIAL ISSUE
RINSE T HEATER 1
RINSE T HEATER 2
RINSE T HEATER 3
RINSE T HEATER 4
SPARE
ESR-OUT
Engineering Ltd
Prospect Road, Burntwood, Staffordshire WS7 0AL
t:01543 675800 e:info@unitech.uk.com web:unitech.co.uk
This drawing remains the property of UNITECH ENGINEERING LTD
and must not be copied or passed to a third party without written permission.
© 2025


ETHERNET SWITCH
UNMANAGED
24VDC
HIRSCHMANN
SSL20-5TX
-25HUB1
FG
24V1
0V
22/9.A
24V1
LOGO
24/9.E
0V
LOGO
LOGO TDE
25.2
15/1.E
LOGO BASE 2
25.3
21/1.E
LOGO BASE 1
25.1
15/1.E
IP Address:
Laptop - 192.168.000.010
LOGO Base 1 - 192.168.000.001
LOGO TDE - 192.168.000.003
LOGO Base 2 - 192.168.000.004
Subnet Address:
255.255.255.000
Title
THOMSON & CAPPER
TOTE WASHER
Scale
1:4
Drg No.
35507
25 of 25
Rev
B
Drawn By
DM
Date
12-05-2025
Checked By
MRB
ETHERNET SWITCH
Engineering Ltd
Prospect Road, Burntwood, Staffordshire WS7 0AL
t:01543 675800 e:info@unitech.uk.com web:unitech.co.uk
B 02-06-25 DM KEYENCE DOOR SWITCHES USED
A 12-05-25 DM INITIAL ISSUE
Rev Date Signed Amendments Checked
A3
This drawing remains the property of UNITECH ENGINEERING LTD and must not be copied or passed to a third party without written permission.
© 2025

Intentionally Blank

Section 6 – Recommended Spares

Intentionally Blank

Section 6
Tray Washer
Recommended Spares

Introduction

1. The recommended spares for project, 35507, Thomson & Capper are shown in table 1 below.

Table 1 – Recommended Spares

Part No	Description	Qty
WSP001	Chain	6m
WSP113	Drive sprocket	1
WSP026	Idler roller – rebated conveyor	1
WSP027	Idler roller – plain conveyor	1
WSP098	Drive shaft bearing	2
WSP333	Stainless steel wear strip (supplied in 2m sections)	8m
WSP751-B	Main wash pump seal kit	1
WSP751-B	Rinse pump seal kit	1
Wash & rinse jets:		
WSP529	Twistloc jet body	10
WSP507	Twisloc jet seal	10
WSP506	Twistloc jet tips	10
WSP284B	Sludge door seal	2
WSP548	Tunnel access door gas strut	4
WSP008	Level probe	1
WSP783	Temperature controller	1
WSP447	Heating element – 18kw	1
WSP328A	Heater immersion – 12kw	1
WSP626	Water supply ¾” BSP solenoid valve	1
WSP014	Surface mount emergency stop pushbutton	1
WSP473	Panel mount emergency stop pushbutton	1
WSP703A	Safety switch	1

Intentionally Blank

Section 7 – Proprietary Literature

Intentionally Blank

Section 7
Tray Washer
Proprietary Literature

Introduction

1. The suppliers' literature for identified proprietary components installed in the system is listed in table 1.

Table 1 – Proprietary Literature

Supplier	Equipment / Component
SEW	Gear Motor
Lowara	Pump
Fans & Blowers	Blower Unit

Intentionally Blank

Section 8 – Commissioning, Certification and Handover Documentation

Intentionally Blank

Section 8
Tray Washer
Commissioning, Certification and Handover Documentation

Introduction

1. Certification, or additional handover documentation, provided for the 35507, Thomson & Capper Tray Washer.

UKCA DECLARATION OF CONFORMITY
Tray Washer
Serial Number: 35507
Year of Manufacture: 2025

Manufactured in the UK by:
Unitech Washing Systems Ltd
West Coppice Road, Coppice Side Industrial Estate, Brownhills, West Midlands, WS8 7HB, ENGLAND

The unit of equipment covered by this document is designed to clean trays received from the infeed, loaded by operators. To then convey them through the Tunnel Washer and discharged.

THOMSON & CAPPER

Harmonised standards applied:-

BS EN ISO 13857:2019	Safety of machinery - Safety distances to prevent hazard zones being reached by upper and lower limbs.
BS EN ISO 12100:2010	Safety of machinery - General principles for design - Risk assessment and risk reduction.
BS EN ISO 13854:2019	Safety of machinery - Minimum gaps to avoid crushing of parts of the human body.
BS EN 60204-1:2018	Safety of machinery - Electrical equipment of machines – General requirements.
BS EN 62061:2021+A1:2024	Safety of machinery. Functional safety of safety-related electrical, electronic and programmable electronic control systems.
BS EN ISO 13849-1:2023	Safety of machinery. Safety-related parts of control systems. General principles for design.
BS EN ISO 13850: 2015	Safety of machinery. Emergency stop function. Principles for design.
2014/35/EU	Low Voltage Directive.
2014/30/EU	Electromagnetic Compatibility Directive.

The above-mentioned equipment must not be put into service until the service connections have been declared in conformity with the provision of the Directive.

Residual Risk
Operators of this equipment must be trained in its use and also be equipped with relevant personal protective equipment.

Signed: **Date:**

Name: **Position:**

Intentionally Blank

Unitech Washing Systems Ltd
West Coppice Road
Coppice Side Industrial Estate
Brownhills
West Midlands
WS8 7HB
United Kingdom

Telephone: +44(0) 1543 687096
Email: washer@unitech.uk.com