

Large Format Vacuum Forming Machine : 2440



Installation, Operating and Service Manual

For Parts, Service & Technical Assistance

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Thank you for choosing Formech.
Please read and follow the below safety instructions before attempting to install or operate your machine.



Special attention should be paid to sections dealing with safety.



It is impossible to cover all aspects of thermoforming within the scope of this manual, we are therefore available to offer advice on special problems regarding thermoforming techniques, tooling and materials.



1) The electrical supply to the machine must be of adequate capacity. Wiring must be to local regulations and carried out by a suitably qualified technician. **THIS MACHINE MUST BE EARTHED IN ACCORDANCE WITH LOCAL REGULATIONS.**



2) Ensure that the pneumatic air supply is regulated to 7 BAR or less and is properly filtered & lubricated using a good quality airline oil. A competent person must make compressed air connections.



3) Do not operate the machine until you have been trained and are fully conversant with it. Read and understand all of this User Manual. Users of this machine should complete regular competence tests.



4) Never remove any panels unless both the electrical and pneumatic supplies have been isolated. Never remove any warning labels from the machine. It is important to understand that high pressures may be present within parts of the pneumatic system even after the supply has been isolated. Special care must be taken if any parts have become jammed to ensure that all pressure is removed before attempting a repair.



5) Daily repetitive use of this or any other machine may lead to a) fatigue and loss of concentration. b) possible strains. Operators should be trained in the use of correct lifting techniques in order to minimise these effects.



6) When servicing the machine care must be taken to prop any heavy moving parts. This refers particularly to the mould table, clamping frame and counter balance weights. Always restrict movement of these parts before entering any part of the machine to prevent possible injury.



7) Always let the machine cool down before attempting to work on it. Some parts of the heater and heat shield become extremely hot during operation.



8) Only use the machine for vacuum forming and blow moulding of plastic. It is not intended for any other purpose.



9) Ensure that the area you are working in is properly ventilated and that you are aware of the potential hazards from the plastics you are forming.



10) Ensure that the area surrounding the machine is clean and frequently cleared of finished product and any waste.



11) This machine is fitted with an oil based vacuum pump. Ensure the vacuum filter mounted on the pump is periodically cleaned of dust and particulate. Periodically check the oil level and ensure it is maintained at the level shown in the inspection window.

HEALTH & SAFETY - Hazards specific to this machine.



It is vital that any person using this machine and the person(s) responsible for the health & safety is made fully aware of the potential hazards that could arise from the use and misuse.

These can be broadly categorised as: -

1. Electric Shock.

This machine uses Voltages up to 415V.



NEVER ATTEMPT ANY REPAIR UNLESS THE ELECTRICAL SUPPLY HAS BEEN LOCKED IN THE OFF POSITION. ONLY SWITCH ON WHEN ALL COVERS & GUARDS HAVE BEEN REPLACED.

ONLY A QUALIFIED ELECTRICAL TECHNICIAN MAY WORK ON ANY PARTS CARRYING MAINS VOLTAGE AND SHOULD BE RESPONSIBLE FOR ENSURING THAT THE MACHINE IS IN A SAFE CONDITION BEFORE ALLOWING SERVICES TO BE RESTORED.

2. Burning.

Parts of this machine reach temperatures in excess of 300°C over large areas.

WAIT UNTIL THE MACHINE HAS COOLED DOWN BEFORE SERVICE WORK COMMENCES.



SPECIAL PRECAUTIONS MUST BE TAKEN TO ENSURE THAT ONLY THE MACHINE OPERATOR IS IN THE OPERATING AREA DURING USE.

USE PERSONAL PROTECTIVE EQUIPMENT SUCH AS GLOVES WHEN TESTING THE HEATED PLASTIC, HANDLING HOT VACUUM FORMED PARTS, MANUALLY ASSISTING THE FORMING PROCESS AND TOUCHING HOT SURFACES.

INFRARED RADIATION IS EMITTED BY THE QUARTZ HEATERS, ENSURE THAT ANY EXPOSURE TO THIS TYPE OF RADIATION IS SHORT OR COMPLETELY AVOIDED.

3. Injury from Compressed Air.



Pressures up to 1000 PSI will be present in large volumes on this machine.

BE EXTRA CAUTIOUS WHEN DEALING WITH COMPRESSED AIR EVEN AFTER THE MAIN SUPPLY HAS BEEN SHUT OFF DANGEROUS RESIDUAL PRESSURE MAY STILL BE PRESENT WITHIN THE SYSTEM.

4. Toxic Fume Inhalation.



When large sheets of plastic are heated fumes will be given off.

ENSURE THAT THE MACHINE IS POSITIONED IN AN ADEQUATELY VENTILATED PLACE. ASSESS THE RISKS OF THE MATERIALS TO BE FORMED PRIOR TO USE.

5. Injury from Moving Parts.

Where pneumatics components are used to power moving parts there is a risk of personal injury.



NEVER REMOVE ANY PANEL OR ATTEMPT ANY REPAIR UNLESS THE COMPRESSED AIR SUPPLY AND THE ELECTRIC SUPPLY HAS BEEN DISCONNECTED.

BE EXTRA CAUTIOUS WHEN DEALING WITH COMPRESSED AIR. EVEN AFTER MAIN SUPPLY HAS BEEN SHUT OFF DANGEROUS RESIDUAL PRESSURE MAY STILL BE PRESENT WITHIN THE SYSTEM.

NEVER ATTEMPT TO OVERRIDE ANY CONTROL SYSTEM INTERLOCK OR SAFETY RELATED CONTROL SYSTEM SUCH AS THE 2 HANDED CONTROL SYSTEM OR EMERGENCY STOP SYSTEM.

HEALTH & SAFETY - Hazards specific to this machine.

6. Injury from Trapping.



There is a risk of trapping fingers and hands when loading mould tools. Ensure appropriate care is taken to prevent trapping and use suitable personal protection. Care is required when operating the clamping frame to ensure that fingers or hands are not trapped. Keep hands clear of the heater rails when pulling the heater forwards.

7. Lifting, Reaching and Stretching.

TAKE CARE WITH LIFTING REACHING AND STRETCHING WHEN PERFORMING THE FOLLOWING ACTIVITIES:

- Operating the manual heater, the loading of materials and unloading of plastic formings.
- Applying manual assistance to formings during vacuum.
- Drilling holes and trimming of mouldings on the machine after forming.
- The fitting and loading of mould tools.
- Loading and fitting of reducing plates and frames.
- Fitting and adjustment of Fans.
- Replacement and maintenance of top frame and table seals.



ENSURE THAT LOCAL LIFTING AND HANDLING PROCEDURES ARE APPLIED AND MONITORED BY A PERSON RESPONSIBLE FOR HEALTH AND SAFETY.

8. Fire.

The sheet auto-levelling system allows the level of heated plastic to be kept constant. There is a risk that failure of the level sensors due to misuse of heaters OR the setting of the compressed air supply to a level that exceeds the operating pressure of pneumatics valve and the machine specification may cause the plastic to be blown into the heaters and to be ignited. Periodically monitor and check the condition of the infrared beam sensors.



ENSURE THE COMPRESSED AIR SUPPLY IS SET TO THE RECOMMENDED LEVEL AND ONLY USE THE HEATER FOR THE HEATING OF VACUUM FORMING PLASTIC MATERIALS.

RISK OF FIRE AS A RESULT OF HEAT AND PLASTICS PRESENTS AN EMERGENCY SITUATION. ENSURE FIRE SAFETY TRAINING IS PERFORMED & CONTROLLED.

IT IS ESSENTIAL TO HAVE FIREFIGHTING EQUIPMENT AVAILABLE AT OR NEAR THE MACHINE. USE DRY POWDER (BLUE) OR CARBON DIOXIDE (BLACK) FIRE EXTINGUISHERS.

9. Airborne Particles.



Particles present in the working area may become airborne during the use of the fan cooling system, when using an airline to blow onto plastics and when the release function is operated without tooling fitted.

ENSURE THAT THE DUST, PARTICLES AND DEBRIS IN THE WORKING AREA ARE KEPT TO A MINIMUM. ENSURE THAT SUITABLE EYE PROTECTION IS WORN.

10. Working at Height.

When installing the fan cooling system, it is necessary to work at an appropriate height.



Ensure that adequate safety precautions are taken to prevent falling from height and that suitable, stable and secure equipment is used to support your weight when working at height. Ensure that you DO NOT work on your own when working at height.

ENSURE THAT LOCAL LIFTING HANDLING AND HIGH LEVEL WORKING PROCEDURES ARE APPLIED AND MONITORED BY A PERSON RESPONSIBLE FOR HEALTH AND SAFETY.

HEALTH & SAFETY - Hazards specific to this machine.

11. Prohibited Uses

DO NOT USE THIS MACHINE FOR ANY PURPOSES OTHER THAN THE VACUUM FORMING AND BLOW MOULDING OF PLASTICS SHEET.

DO NOT USE THE HEATER TO APPLY HEAT TO ANY MATERIAL OTHER THAN PLASTIC SHEET AS PART OF THE VACUUM FORMING PROCESS SUCH AS: FOOD PRODUCTS, ALL TYPES OF PARTICLES, POWDER, DUST, ALL TYPES OF LIQUID, WOOD, PAPER, METALS AND ANY FORMS OF COMBUSTABLE MATERIALS.

DO NOT USE THE TABLE MECHANISM TO CLAMP, COMPRESS, FOLD OR APPLY FORCE TO ANY ITEM UNDER ANY CIRCUMSTANCES.

DO NOT USE THE CLAMPING FRAME TO CLAMP COMPRESS, FOLD OR APPLY FORCE TO ANY ITEM OTHER THAN THE CLAMPING OF SHEET PLASTICS AS PART OF THE VACUUM FORMING PROCESS.

DO NOT USE THE RELEASE TABLE AIR FUNCTION TO APPLY PRESSURE FOR ANY OTHER MEANS OTHER THAN TO RELEASE THE MOULDING FROM A FITTED MOULD TOOL.

DO NOT USE THE TABLE VACUUM PORT TO SUPPLY VACUUM FOR ANY OTHER MEANS OTHER THAN TO APPLY VACUUM UNDER A MOULD TOOL AS PART OF THE VACUUM FORMING PROCESS

DO NOT ALLOW OTHER PERSONS WITHIN 1 METRE (39 INCHES) OF THE TABLE / APERTURE TRAP POINT WHEN OPERATING THE TABLE USING THE TWO HANDED CONTROL TABLE LIFT FUNCTION.

DO NOT BLOCK THE PUMP EXHAUST PORT ON THE REAR OF THE MACHINE AND DO NOT USE THIS PRESSURE OUTLET TO APPLY PRESSURE FOR ANY OTHER PURPOSE.

DO NOT USE THE TOP OF THE HEATER OR TOP OF THE HEATER GUARD TO STACK PLASTICS OR OTHER MATERIALS.

DO NOT USE THE UNDERSIDE OF THE REAR OF THE MACHINE TO STORE ANY ITEM(S).

DO NOT USE THE MACHINE TO STACK OR LEAN ITEMS AGAINST THE SIDES.

DO NOT USE THE FAN OUTPUTS TO APPLY AIRFLOW FOR ANY OTHER PURPOSE OTHER THAN THE COOLING OF VACUUM FORMINGS AS PART OF THE VACUUM FORMING OR BLOW MOULDING PROCESS.

DO NOT USE THE FAN GANTRY TO HANG ANY ITEM.

DO NOT MOUNT THE FAN POSTS ON THE UNDER SIDE OF THE FAN GANTRY.

DO NOT OBSTRUCT THE HEATER TRANSPORT WITH ANY ITEM OR USE THE TRANSPORT WHEELS TO CUT OR FORM ANY ITEM OR MATERIAL.

DO NOT USE ANY OTHER PART OF THE HEATER TO MOVE THE HEATER FORWARDS AND BACKWARDS OTHER THAN THE HEATER HANDLE.

DO NOT REMOVE THE SIDE PANELS OF THIS MACHINE TO USE THE PNEUMATIC CYLINDER TO CUT, COMPRESS, BEND OR FORM ANY ITEM.

DO NOT USE OR MODIFY THE ELECTRICAL POWER IN THE CONTROL PANEL TO SUPPLY ANY OTHER DEVICE OR TO APPLY MODIFICATIONS TO THE MACHINE OR ITS FUNCTIONS.

THIS IS NOT AN EXHAUSTIVE LIST OF THE POSSIBLE MISSUSE OF THIS MACHINERY. THIS LIST IS WHAT IS CONSIDERED TO BE FORESEEABLE MISSUSE. THE USE OF THIS MACHINE MUST BE ASSESSED, MONITORED AND CONTROLLED BY THE PERSON RESPONSIBLE FOR THE HEALTH AND SAFETY IN THE ORGANISATION THAT OWNS AND OPERATES THIS MACHINE.

Foreword



Please read this manual thoroughly before attempting to install or use this machine. Special attention should be paid to sections dealing with safety.

It is impossible to cover all aspects of thermoforming within the scope of this manual, we are therefore available to offer advice on special problems regarding thermoforming techniques, tooling and materials.

Specifications

2440
Forming area: 2380mm x 1160mm. Depth: 600mm
Sheet Size: Nominal 2440mm x 1220mm - 2500mm x 1250mm
Material thickness 0.25mm min. 5.0mm max
Electrical Power - 52kW - Supply 380-415V, 5 wire, 3 phase + Neutral + Earth, 50Hz, 83A Power - 52kW - Supply 208-230V, 4 wire, 3 phase + Earth, 60Hz, 150A (N America)
Air Supply: Approx. 20 cu. ft / min @ 100 psi (approx. 600l / min @ 7 bar.)
Width: 3600mm Length: 3450mm Height: 2200mm Weight: 1800Kg

Features

- Pneumatic twin cylinder table lift and material clamping
- Quartz Heating with standby energy saving & power trim facility
- Auto sheet levelling
- Timed events Heater, Pre-stretch, Vacuum, Cooling, Release.
- Semi-automatic single sheet operation with 40 memory capability
- Full manual control through Touch Screen & PLC
- User friendly setup mode allows real time parameter change
- Heating Pyrometer (Option)

Noise emissions

Noise emissions on the Formech 2440 are less than 70dB(A).

Machine storage

The Formech 2440 must be stored in a dry environment. If the machine is not used for a long period of time, run the pump periodically (once a month).

Machine transportation, lifting and moving

The Formech 2440 is prepared for transportation with the heater secured in the rear position. Before lifting, remove all separate assemblies and leave the heater fixed in its position until positioning at its operating site. Remove packaging where it assists with lifting and moving. Ensure lifting forks pass through to the rear of the main cabinet and to the rear frame.

Ensure that local lifting and handling procedures are applied and monitored by a person responsible for health and safety.

The machine should be sited on a level concrete floor. Dusty or draughty areas will compromise machine performance but it is important to allow enough space (750mm) around the machine to allow access into the various panels and to ensure a good airflow to prevent overheating. During all of the following installation ensure that the power supply is properly isolated.

Electrical connection

An electric supply of correct voltage, current & frequency is required. An isolating switch with facility to be locked in 'OFF' position and capable of handling full current should be wall mounted, within easy reach of the operator.

208-230V Three phase supply

A three-phase supply should be connected to the L1 L2 & L3 of the machine. A neutral is not required. Cabling should be rated at 160A per phase.

Phase Connections / Motor Rotation



For all electrical connections the pump rotation direction is important. After switching the machine on press the Vacuum button on the operation screen and check that vacuum is present at the hole in the centre of the table. If there is no vacuum or if pressure is present then reverse 2 of the phase connections.

THIS MACHINE MUST BE EARTHED

Pneumatic connection



If the air supply is insufficient the performance of the machine will be compromised. The connection to the machine should be via a lockable shut off valve.

Ensure that the pneumatic air supply is regulated to 7 BAR or less and is properly filtered & lubricated using good quality airline oil. A competent person must make compressed air connections.

If flexible hoses are used it is strongly advised that they are of Nylon, canvas or wire reinforced rubber and suitably rated for pressure and temperature. The connection air inlet shut off valve connection is 1¼" BSP.

Maximum airline pressure must not exceed 7 BAR or 100 PSI.

The effectiveness of the Pre-stretch and Auto-level functions rely on a large volume of air being delivered rapidly to the machine.

For this reason an air reservoir should be sited as close to the machine as practical. If this is not possible then large bore pipes can be used to prevent pressure drop when the above functions are used.

The 2440 must be installed and commissioned by a Formech qualified technician.

It is essential to read and fully understand all the information in this manual relating to safety and the Safety Hazards specific to this machine before installing and operating. Operating procedures for this machine must be assessed, monitored and controlled by the person responsible for health and safety.

Assembly of the control POD

Where the 2440 is delivered in a packaging crate, the control pod may be rotated or removed. Remove the three fixing screws from their fixing point at the front RHS corner of the machine, rotate the POD and refit the 3 screws to allow the POD to be at a suitable angle. Ensure the rubber seal is located in the POD stand and the fixings are tight. DO NOT LEAN ON THE POD.

Counterbalance arms and weights

The counterbalance arm assembly is shipped separated from the clamp frame. Weights are easily adjusted by loosening the screw with a 13mm spanner or socket. ENSURE SCREWS ARE LOCKED TIGHT. Adjustment may be required where a reducing window is fitted. Adjust the weights so that the clamp frame is balance. Set the weights so that the clamping frame is balanced at a suitable height. COUNTERWEIGHTS ARE HEAVY ITEMS AND HENCE CARE MUST BE TAKEN TO PREVENT TRAPPING OF FINGERS. TAKE CARE WHEN ASSEMBLING, LOADING AND UNLOADING COUNTERWEIGHT. HEAVY ITEMS CAN CAUSE CRUSHING IF MISSHANDLED, MISSUSED OR IF DROPPED. WHEN LOADING AND UNLOADING COUNTERWEIGHTS ALWAYS ENSURE THE END STOP LOCKING SPLIT PIN AND WASHER IS REPLACED AT THE END OF THE COUNTERWEIGHT ARM.

Cooling System

The cooling fans are removed from their mounts and packed separately for transit. Once installed adjust the fan unit to the required position and tighten all the grub screws and lock nuts. The fan is best positioned slightly back from the centre and directed at the forming area towards the front of the machine. ENSURE THAT LOCAL LIFTING, HANDLING AND HIGH LEVEL WORKING PROCEDURES ARE APPLIED AND MONITORED BY A PERSON RESPONSIBLE FOR HEALTH AND SAFETY.

Using the Cooling System

The corresponding FAN button on the touch screen can operate the cooling fan at the appropriate time to cool the moulding. The button changes colour when operated ON/OFF. It is worth considering the position of the fan mounting to achieve good and consistent results with different mouldings.

IT IS ESSENTIAL TO READ AND FULLY UNDERSTAND ALL THE INFORMATION IN THIS MANUAL RELATING TO SAFETY AND THE SAFETY HAZARDS SPECIFIC TO THIS MACHINE BEFORE INSTALLING AND OPERATING. OPERATING PROCEDURES FOR THIS MACHINE MUST BE ASSESSED, MONITORED AND CONTROLLED BY THE PERSON RESPONSIBLE FOR HEALTH AND SAFETY.

The 2440 is a large sheet fed vacuum forming machine suitable for forming a wide variety of plastic materials. It has been designed with operating simplicity high on the list of priorities.

Operators who have previously used vacuum forming machines will quickly become familiar with the user-friendly controller programming. Those starting out in plastic moulding will find the 2440 more forgiving than most of its counterparts.

The absence of full guarding on the semi-auto version means that the forming area is accessible from the front and partially from the sides of the machine. This enables close inspection of the product being produced and allows for correction during the cycle.

Whether required for long or short production batches or for prototyping or sampling the 2440 adapts quickly to most needs.

Touch Screen HMI & PLC

The Formech 2440 uses the reliable and robust WAGO PLC with Weintek Touch screen user interface.

Formech have produced high quality functional graphic software to give an easy to use, flexible and versatile Thermoforming machine for all forms of industrial and commercial use.

The 2440 Software provides for both manual and semi-automatic functionality of the vacuum forming process.



The following section explains the 2440 control functions.

- Main Menu functions, Manual Controls and Function Buttons
- Manual Operation, Heater Settings and the Vacuum Forming Process.
- Set up and use of the Semi-Automatic Operation & Options.

Powering up

Ensure the Emergency stop button is latched out.

Turn ON the mains isolator at the control panel at the rear of the machine.

The main menu will be shown as below.



Main screen

The Main Menu shows the options.

Button descriptions are below.

On machine start up default settings are loaded for the heater zones to allow for manual operation.

Familiarise yourself with the button icons.

Main Screen Control

	Heater Press this button to activate the heater. The heater must be ON to use the machine. The heater may be switched off during machine idle periods or tooling set up.
	Pump Press this to enable the pump. The vacuum pump can be switched off when not required e.g. during machine or tooling set up.
	Automatic Mode Operate the machine using the automatic or semi-automatic cycle by selecting a stored program from the memory.
	Manual Mode Operate the machine with each action of the machine being activated by the operator.
	Language Select the required language.
	HELP Function This icon can be pressed at any time for an explanation of the icons.

Getting started

On the main menu screen

Turn the Heater ON

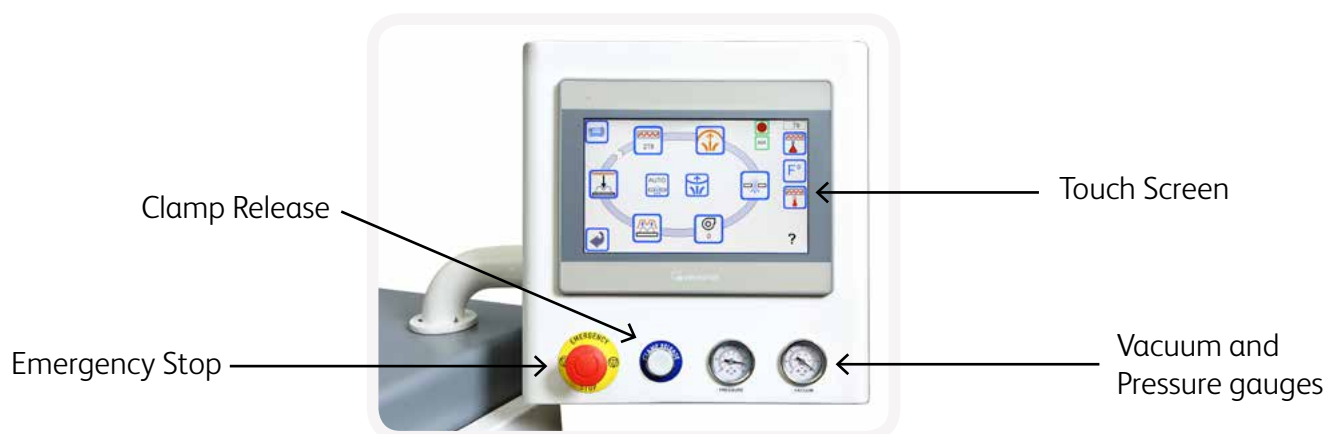
Ensure the Pump is ON

Press the Manual Button – The Manual Operation Screen will open

Manual Control Functions

The following section describes the manual controls of the 2440. Operate all of these controls independently to ensure you are fully familiar with how the machine operates and how each action behaves. There are three sets of controls:

1. The Control POD and touch screen.
2. The 'Table UP' buttons - Front panel.
3. The Pneumatic Clamp Triggers.



Operation Screen Safety Indicators

	Emergency Stop This momentary action latching button cuts the power to all outputs when pressed. The indicator shown will be displayed on the touch screen if pressed. The button will need to be manually reset for normal operations to continue. Only use this button in emergency situations.
	AIR This indicator will show if the air supply to the machine is lost. The heaters will shut off until air is restored. (Heating pyrometer option only)

Table buttons (on front machine panel)

To bring the table up, press and hold both the table buttons simultaneously (within 500msec). The table will rise to its top position. If the action of either button is stopped, the table will stop and the action must be repeated to continue.

To send the table down, press the table down icon on the touch screen and hold down until the table reaches the bottom of its travel.

To jog the table down, press the icon momentarily.

Table

Both Table buttons have to be pressed simultaneously in order to raise the table.



Clamping

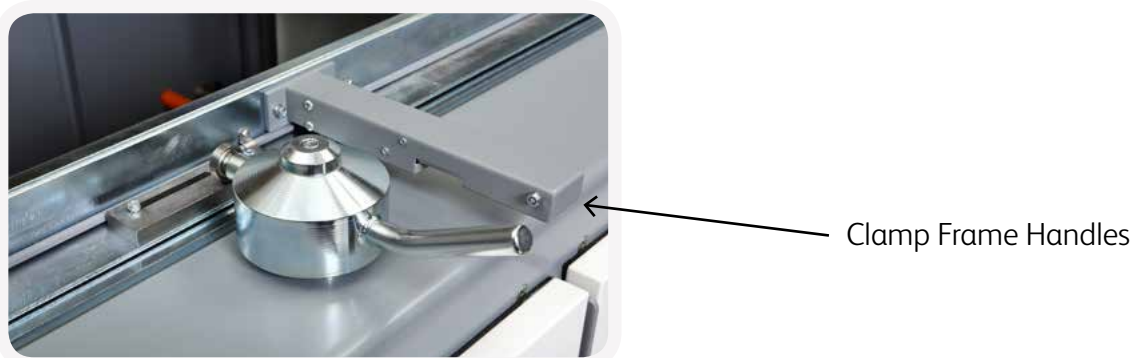
With the 2 manual clamps turned away from the clamp frame, lower the clamp frame holding clamp handles – one in each hand with fingers against the triggers on the underside of each handle.

Check there is no obstruction between the clamp frame and the top frame.

Lower the clamp frame so that the limit switch of the RHS handle is pressed. Squeeze and hold both clamp triggers simultaneously (within 500msec) and hold to activate the clamping mechanism. The clamp will pull down against the top frame.

Additional manual clamps are fitted due the clamp frame width. Rotate these over the clamp frame angle. A 2 position plate is fitted to allow for when a reducing plate is fitted.

To release the clamp press and hold the 'Clamp Release' button located on the control POD.



Clamping height plate adjustment



When using the full forming area (when a reducing plate is not fitted) the adjustment plate needs to be set as shown.



When a reducing plate is fitted, remove the LH side screw and, reposition the clamp height adjustment plate to the left and refit the screw. Additional packing may be required for thicker material

The rear of the clamp frame has 2 adjustment plates fitted. The purpose of these plates is to raise the clamping pivot point to assist with the manual clamping action. When reducing plates are used the clamping pivot point needs to be raised to further assisting with clamping. When using reducing plates, loosen the 2 screws and slide them so that they are positioned under the rear clamp. Tighten the screws to lock the plate in place.



Without reducing plates

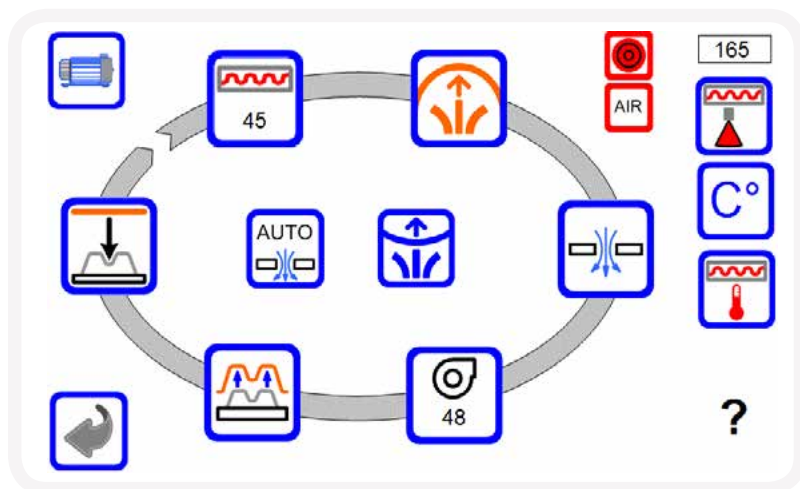


With reducing plates



Take care to ensure that hands are clear of the clamping frame when it is being moved. Note the labelling fitted to the front of the clamping frame

Control POD Manual Operation Screen



Press the Manual Button on the main menu screen – The Manual Operation Screen will open as shown. The meaning and operation of the buttons on this screen are shown below. Following this is a full description of the vacuum forming process.

The screen icons are designed to be followed round in a clockwise direction, starting with the heaters (top left) and ending with the Table Down Button.

Icons description

	Auto-level This button enables the auto-level feature. If the plastic is sagging and not being heated evenly then the auto-level feature may be used to keep the plastic level while the heater is forward and until the heater is fully back.
	Auto Vacuum The button enables the auto-vacuum feature. The 'TABLE UP' limit sensor mounted on the cylinder is used to trigger the vacuum function when the mould table is raised.
	Heater Zone Settings These buttons allows direct and real - time adjustment of the heater zone settings.
	Heater Drive This icon controls the movement of the heater. The direction of heater movement is reversed each time the button is pressed.
	Pre-Stretch Press the Pre-stretch button to inflate the plastic before moulding.
	Vacuum The vacuum icon is used to apply vacuum to the table. The vacuum tank is continually evacuated by the vacuum pump. In manual mode the timer counts up. This button latches ON when pressed. Press again to turn OFF.

Icons description (continuation)

	Fans Pressing the fan icon will turn the cooling fans ON. Press again to turn OFF. In manual mode the timer counts up.
	Release The release icon is used to blow compressed air between the mould and the finished moulding. This is a momentary HOLD TO RUN button.
	Table Down Used to lower the table, after mould release. This is a momentary HOLD TO RUN button.
	Page Back Allows return to the main menu.
	Pump Allows control of the vacuum pump from the manual screen when not required e.g. during machine or tooling set up.
	Heater Quartz Standby Feature In the heater setting screen the standby setting allows the heater to idle at a lower power setting when in the rear position.

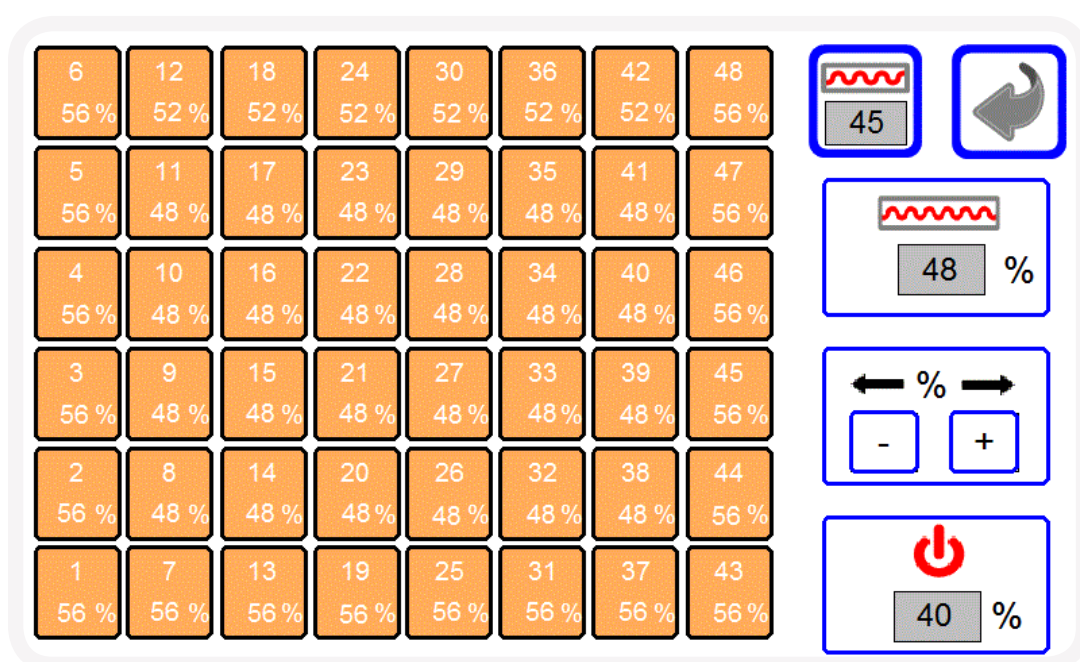
Manual Setup - Heater

Select the Manual icon on the main screen. Press the heater zone settings button. 

The heaters are controlled to vary the output of individual zones as displayed on the touch screen. Zone power can be set to 1 % increments.

The individual zones may be set up to provide an even spread of heat. To achieve the best results set the inner zones lower than the outer zones and remember that the rear of the heater will always run hotter than the front. After setting, slight adjustments may have to be made depending on the mould design, plastic type etc. We recommend that initially all zones are set to 70 % power. This will then allow the operator to increase or decrease individual zones as required.

Allow 10 - 15 minutes for the heaters to reach operating temperature.



There are 48 heating zones on the 2440.

The heater must be set to 'ON' to operate.

The set power % is shown on each zone.

The power setting box  shows the power level that is to be used to set each zone power. Press on this value to change the power level to be used and press on each of the zones that require this setting. The value will transfer to the zone. Change the power level to set other zones as required.

The trim function will adjust all zones UP & DOWN by pressing the + / - buttons.

The Standby setting is used to set the idle power setting for the quartz option. The Heater will run at this reduced % when in the rear position.

The Heater timer settings apply to the semi-automatic mode.

Manual Cycle

Once the mould is correctly located on the mould table, a manual cycle may be attempted.

Manual Plastic Clamping

Place the plastic over the forming area and ensure the material covers the top frame seal completely. Once the clamp frame is over the plastic correctly, squeeze both clamp triggers simultaneously as previously described and lock the manual clamping in place. The following describes the functions of the icons after the plastic has been clamped.

Heating

Press the heater icon and the heater will be driven forward over the plastic and stop automatically when the front limit switch is triggered. The heating of the plastic sheet may be checked by pressing the heater icon to send the heaters to the rear momentarily.

Auto-Level

If the plastic is sagging and not being heated evenly then switch the auto-level feature on, in the centre of the touch screen. If the plastic sheet drops and breaks the sensor beam, short bursts of air will be blown in to the chamber under the heated plastic ensuring the plastic remains level.

Auto-Vacuum

The auto-vacuum feature will assist with the application of vacuum since it is triggered by the TABLE UP limit sensor. Vacuum will be applied as soon as the table is raised UP.

Pre-Stretch

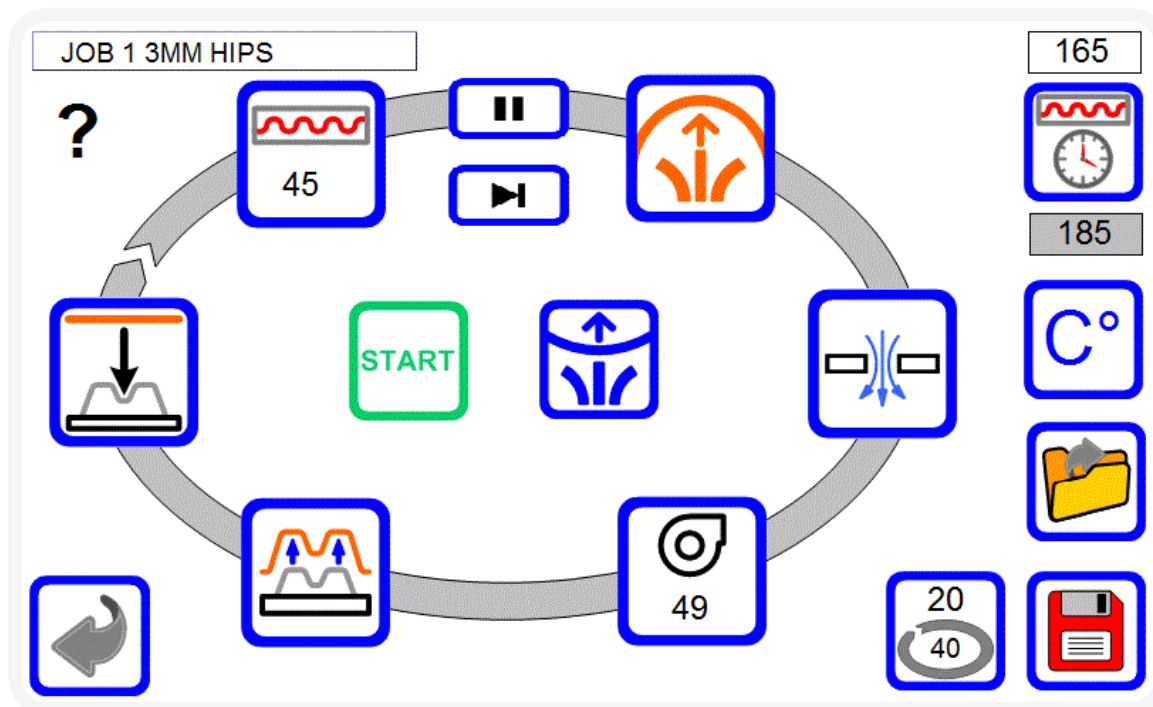
If the moulding is quite high it may be necessary to pre-stretch the plastic before moulding takes place. To do this press the pre-stretch button when the heater is in the back position.

Moulding

Send the heater to the back position by pressing the heater button when the plastic is at the correct temperature for moulding. When the heater has reached the back limit switch and stopped press both table buttons simultaneously to raise the mould into the plastic. Press the vacuum button to apply vacuum to the table. 

Cooling & Release

At the appropriate time the fans may be turned on to start the plastic cooling process. Once the plastic has cooled sufficiently the release icon may be pressed to blow the moulding off of the mould. The moulding is now complete and the table may be lowered  and the clamp frame unclamped.



On the main menu press the Semi-Auto button 

The Semi- Automatic screen shows all the stages and functions of the cycle. The stages follow the grey oval beginning with the heater. Parameter / timing settings for each stage are performed by pressing the corresponding button. Changes are made immediately. When the Semi-Auto screen is opened, the parameter settings for the last program used will show.

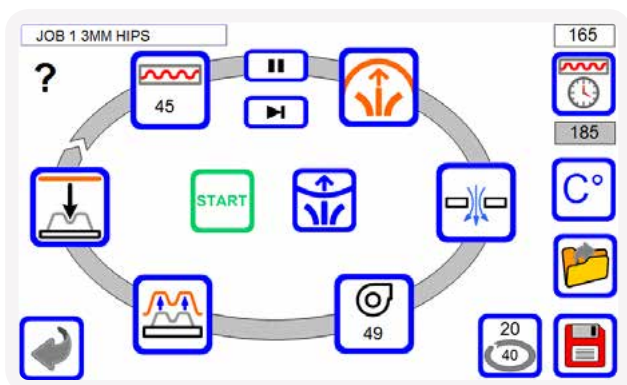
The purpose of the additional buttons are shown below.

Additional buttons description

	Timed Heater Cycle When this button shows the auto cycle is set for the timed cycle and the heaters will operate for the times set. Press this toggle button to set to the pyrometer heat cycle. (Option)
	Pyrometer timed cycle (Optional) When this button shows the auto cycle is set for the pyrometer control and the heaters will operate from the target temperature set. The temperature of the materials shown above the button and the target temperature is shown below the button. Press this toggle button to set to the timed heat cycle.
	START Press this to start the heat cycle after manual material clamping. The semi-automatic mode requires the table to be lifted UP manually using the 2 hand control buttons on the front panel. Once the table is UP all functions are automatic.

Additional buttons description (continuation)

	PROGRAM Select Press this button to load a different program. The load program screen is opened.
	SAVE Program Press this button to save the changes made to the current program. The save screen shown all the parameters for final check.
	CYCLE Counter This feature will count the quantity of automatic cycles. Press this to set the batch counter and reset the counter. The number shown in the oval shows the batch counter setting. The number shown at the top shows the actual count quantity.
	BACK or RETURN This button will return to the main menu.
	PAUSE This button is a manual over-ride to pause the heating stage timer. It is essential to monitor this manual intervention to prevent material overheating.
	JUMP This button is a manual over-ride to end the heating stage timer before time-out or to end the heating stage after Pause' is applied.

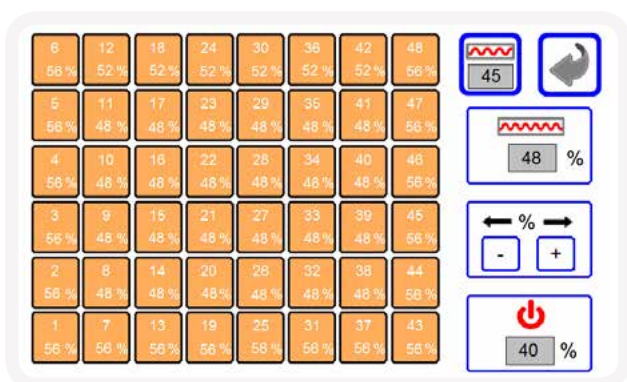


The cycle timing parameters are set 'real-time' by pressing on the corresponding function buttons on the screen.

Operation can be set to work from timer or the pyrometer (if option is fitted).

The Heater timings may be paused or advanced manually.

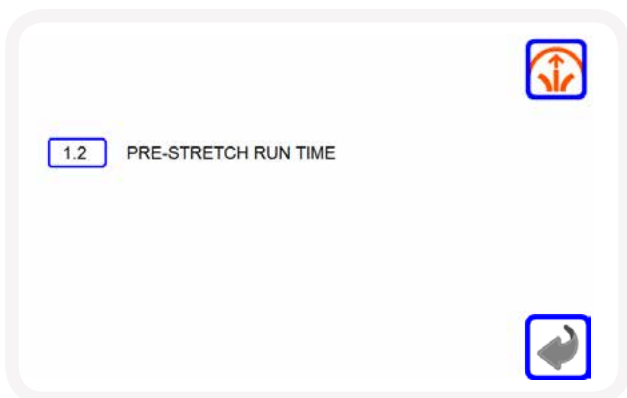
Semi-Automatic Timer Settings



Press the heater button on the semi-auto operation screen to adjust and set the heating zones power profile and standby value as described in the manual set up.

Press the value on the timer button  and adjust the time using the pop-up keypad.

Press  to return to the semi-auto screen.



Set the Pre-stretch parameters by pressing the pre-stretch button on the semi-auto screen.

Set the Pre-stretch time and the delay time (if required) by pressing on the time value and using the pop up keypad.



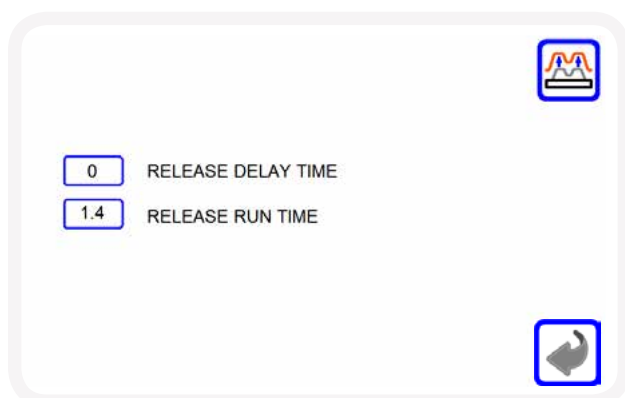
Set the Vacuum parameters by pressing the Vacuum button on the Semi-auto operation screen. Set the Vacuum time and delay times (if required) by pressing on the time value and using the pop up keypad.



The cooling setting page is accessed by pressing the FAN button on the operation screen.

The Fan may be turned ON or OFF.

Set the FAN time and the delay time by pressing on the time value and using the pop up keypad.



Set the Release parameters by pressing the Release button on the operation screen.

Set the Release time and delay time (if required) by pressing on the time value and using the pop up keypad.

The Release Air is triggered at the end of the Vacuum time and may be set to the same as the Table DOWN Delay time so the mould tool descends after release. This time may be set longer.



Set the Table Down delay time by pressing on the Table Down button on the operation screen.

Set delay time by pressing on the time value and using the pop up keypad.

In general it would be set the same as the release time. See note above.



Set the Cycle Counter parameters by pressing the cycle count button.

The RESET button will reset the count to zero.

Set the batch target value using the pop up keypad.

The last cycle time and the average cycle time are shown on this screen.

1 HIPS 1.5mm	6	
2	7	11-20
3	8	21-30
4	9	31-40
5	10	

Press the PROGRAM button to open and load a saved program.



Select the required program number to load in auto / semi-auto mode.

1 HIPS 1.5mm	6	
2	7	11-20
3	8	21-30
4	9	31-40
5	10	

Press the SAVE button to save programs.



To save an existing program, select the required program and press the SAVE button. To save as another program select another program number and press the SAVE button.

The Save Parameters screen will open showing the parameters set. This allows final review and adjustment. Press the SAVE button to complete.

Parameter memory setting final review

The following screen is available for final review of the parameters set. After selecting a memory reference 1-40, the set parameters may be checked and adjusted if required before final confirmation using the button.

Press on the relevant values to adjust using the pop-up keypad.

01 JOB 1 3MM HIPS					
TZ1 56	TZ14 48	TZ27 48	TZ40 48		TOP HEATER 38
TZ2 56	TZ15 48	TZ28 48	TZ41 48		PRE STRETCH 4.5
TZ3 56	TZ16 48	TZ29 48	TZ42 56		VACUUM RUN 58
TZ4 56	TZ17 48	TZ30 52	TZ43 56		FAN DELAY 12
TZ5 56	TZ18 52	TZ31 56	TZ44 56		FAN RUN 45
TZ6 56	TZ19 56	TZ32 48	TZ45 56		RELEASE DELAY 0
TZ7 56	TZ20 48	TZ33 48	TZ46 56		RH FASE RUN 2.5
TZ8 48	TZ21 48	TZ34 48	TZ47 56		TABLE DOWN DELAY 2.5
TZ9 48	TZ22 48	TZ35 48	IZ48 56		FAN 1
TZ10 48	IZ23 48	IZ36 52			AUTO-LEVEL 1
TZ11 48	IZ24 52	IZ37 56			HEAT PYRO 1
TZ12 52	IZ25 56	IZ38 48			HEAT PYRO VAL 168 °C
TZ13 56	TZ26 48	TZ39 48			QUARTZ STANDBY 40

Pyrometer Option

When in Semi-Auto, the heat cycle may operate from the heater timers or the pyrometer.

	When the pyrometer button shows, the heater cycle will be completed when the material reaches the target temperature. The value is shown below the button. The Actual temperature is shown above the button
	When the timer button shows the heat cycle will operate from the time shown on the heater buttons. The actual pyrometer temperature is shown above the button.

Semi-Automatic Operation

Give consideration to the timings set for the semi-auto sequence. It may be necessary to run the product in the manual mode first to establish the required time for settings.

The times for each stage of the process will affect the product produced.

The time settings can be adjusted while the machine is operating. Adjust the set times for optimum performance and monitor the output.

Simply press the button of a function, make the setting changes and return to the operating screen. Remember to save any changes.

Operation

Ensure the Heater has achieved its working temperature and that the heating zone profile is suitable for the plastic and product to be formed.

Clamp the plastic and press the START button. Once the heater is forward then the time display will count down the heating cycle time.

Once the heating cycle is complete the heater is sent to the rear position and pre-stretch will perform if a time has been entered.

The operator must at this stage raise the table. When the table has reached the top position then the mould, cooling and release cycles will be performed automatically.

At the end of the release cycle the table is sent down by pressing the table down icon on the touch screen. When the table is in the down position press the clamp release button on the control POD and lift the clamping frame.

Remove the finished moulding.

Manual intervention of the heating cycle when in semi-automatic mode

If the heated plastic becomes ready before the time is complete then press the JUMP button  to send the heater back.

If more heat is required at the end of the heat time press the PAUSE button  to continue heating. Press the JUMP button when satisfied. Adjust the heat timer as required to suit the product and material.

Table height adjustment

The 2440 have a facility to adjust the table stop height for shallow moulds. The adjustment handle is located on the RHS of the top frame.



Ensure the table is above the desired stop point before adjusting.

Do not attempt adjustment when the table is at its lower stop point.

Do not attempt to apply force when adjusting.

Rotate the hand wheel clockwise to raise the stop point to the desired level.

Clamp frame rear spring adjustment

The clamp frame is spring loaded at the rear. The springs are locked in place with 2 M10 nuts. The loading of the springs may need to be adjusted, for example, when using thinner or thicker plastics materials to assist clamping or when a reducing plate is fitted.

To adjust the spring loading loosen the lower Nut for each spring and adjust the upper nut to suit. Tighten the lower nut to lock against the upper nut.



Table speed adjustment

There are two table speed adjustments fitted to table Valve. These are flow regulators to adjust the air that is exhausted from the table pneumatic cylinder.

The picture shows the exhaust flow as fully open. Turn the tap on the ball valve to adjust the air flow and hence the cylinder speed.



TAKE CARE WHEN REACHING TO THE BACK OF THE MACHINE. THERE MAY BE VERY HOT SURFACES IN THIS AREA. ENSURE THE CLAMP AND COUNTERWEIGHTS ARE SECURED BEFORE WORKING IN THIS AREA

Clamp frame pressure and speed

The clamping pressure may be lowered by adjusting the clamp regulator that feeds the clamp valve. This is situated on the RHS of the machine.

Reducing the pressure of the clamp is required to reduce the mechanical stress to the clamp assembly when clamping thicker items and materials.

The clamp speed may be adjusted using the small exhaust flow controls on the clamp valve using a hex key.



Cooling fan adjustment

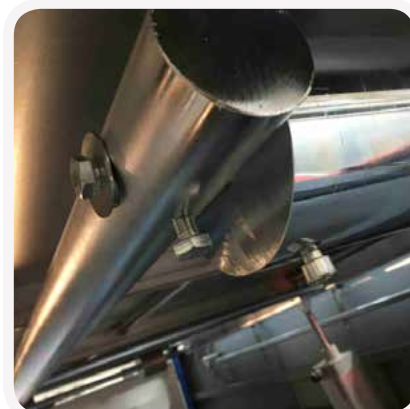
The cooling fans may be adjusted to give the correct direction for cooling of the vacuum forming. Loosen the nut and screws in the pivot block to rotate and position the fan on the fan post and fan plate.



Counterweight adjustment - loading and unloading

Counterweights are easily adjusted by loosening the screws and sliding the weights to an appropriate position so that the clamp frame is correctly balanced. ENSURE SCREWS ARE LOCKED TIGHT AFTER ADJUSTMENT.

Adjustment is required if, for example, a reducing window is fitted. Adjust the weights so that the clamp frame is balanced.

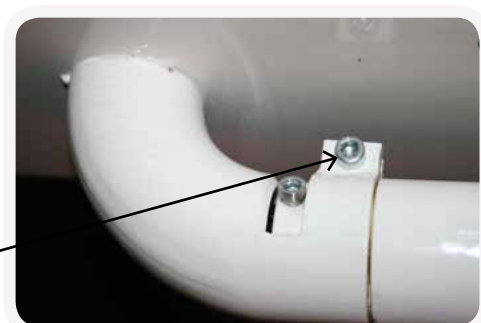


Touch screen control POD position

The tilt of the touch screen POD is adjustable. Change the pod position to suit the user as shown below.

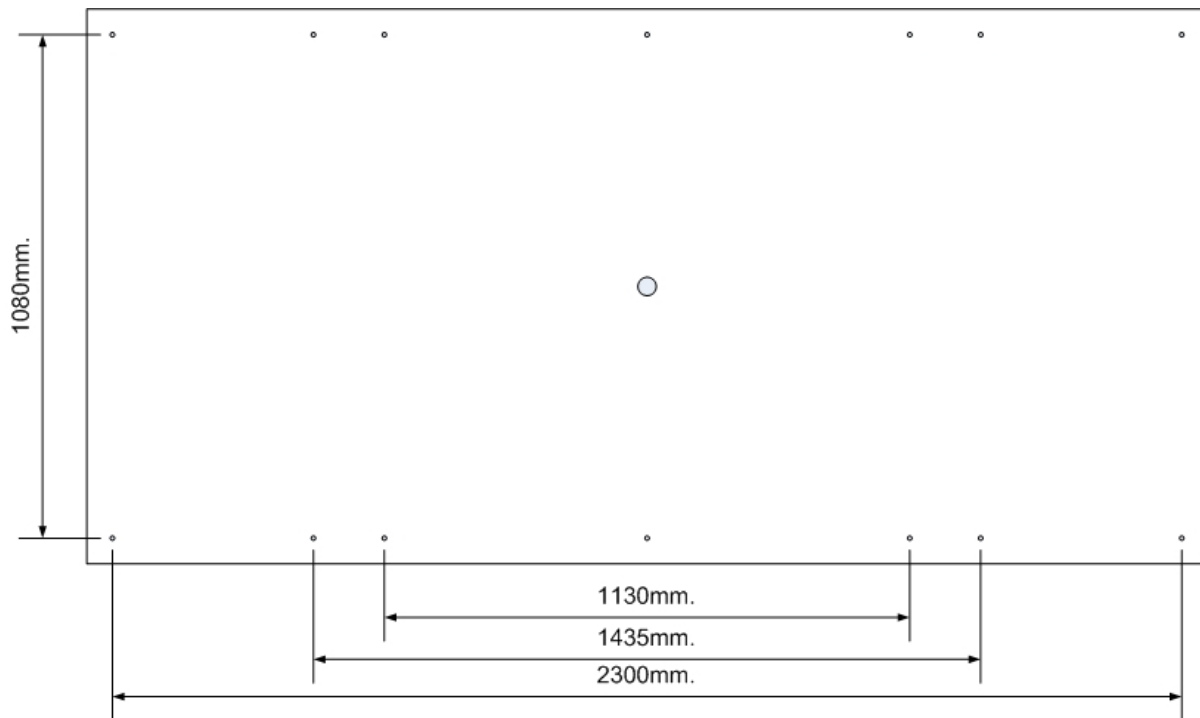
Loosen this screw to adjust the control pod tilt as desired.

Tighten the screw when adjustment is complete.



Fixing mould tools

Mould mounting holes are positioned on the mould table as shown. Additional holes may be drilled and tapped to suit. Full sized mould tool mounting boards may be fitted, maximum thickness 18mm. Thicker tool mounting may be used if the boards are reduced in size allowing a gap between the board and aperture or if the edges are chamfered.



Heater motor speed

The Heater Motor speed may be adjusted. It is set to an optimum factory setting so adjustment is not normally necessary.

On occasions where adjustment is necessary this can be performed by adjusting the potentiometer on the heater motor inverter. The speed is shown on the inverter.

If this speed is adjusted then it is essential to adjust the positions of the front and rear heater limit switch to suit the drive deceleration position. Deceleration may also be adjusted using the inverter function mode.

Pyrometer Air Pressure (Option)

The pyrometer has air cooling to prevent over-heat, it is important that this air supply is always connected. A pressure tank is provided to give the pyrometer air system a short term reserve supply if the main air supply is disconnected.

If the reserve air supply pressure falls then the heaters will turn off and the symbol  will show on the control screen. The pyrometer air supply may be adjusted using the regulator situated on top of the reserve tank.

Before any maintenance work is carried out, both electrical and air supplies must be locked in the OFF position. Only a qualified electrical technician may work on any parts carrying mains voltage. That person is responsible for ensuring that the machine is in a safe condition before allowing services to be restored.

Electrical

The PLC relies on the limit switches continually reporting correct mechanical positioning information.

Although extremely robust, limit switches and cylinder sensors are frequently activated. The security and operation of switches and sensors require checking during periodic maintenance.

If a limit switch is not operating properly, nor will the PLC operating system. Limit switch faults may stop the auto cycle and may prevent the machine functions completely.

A logical approach to detecting the fault begins with an exact appraisal of the fault scenario.

Much time can be wasted looking in the wrong areas for a problem that, when found, was obvious.

Assessment of the fault will entail understanding which interlocks operate to prevent further actions.

Software interlocks

There are several interlocks that will prevent the collision of mechanical components, these are specified below:

COMMAND / FUNCTION	CONDITIONS
Heater FORWARD Command	Table must be DOWN
Auto-level Function	Heater must be FORWARD
Pre-stretch ON Command	Heater must be BACK
Table UP Command	Heater must be BACK

The position of moving parts is monitored by sensors & limit switches fitted to actuators. If expected movements fail to occur then check the relevant actuator sensors are being triggered correctly.

Before any maintenance work is carried out, both electrical and air supplies must be locked in the OFF position. Only a qualified electrical technician may work on any parts carrying mains voltage. That person is responsible for ensuring that the machine is in a safe condition before allowing services to be restored.

Heater

The flexible cable chain between the heaters and the control cabinet contain a number of heatproof power and thermocouple cables. Due to the continual motion of the heater these may eventually suffer from fatigue and require replacement.

Only the correct grade of cable should be used, and the work carried out by a skilled technician.

The Quartz heating elements should be periodically inspected for damage and to make sure that they are securely mounted and that the electrical connections are tight.

For the reasons stated the elements, associated cables, connectors, fuses and are specifically excluded from our standard warranty.

Replacement of heating elements

Ensure the power is isolated and the air supply is switched off. Remove any side panels to allow access.

Remove the heater cover relating to the suspect problem element. Locate the problem element. Top heater elements are rated at 230V with various power ratings. When a faulty element is discovered, disconnect it and remove the clips. The fitting of the new element is in reverse.

It is recommended that the heater tray electrical connections are periodically checked. This requires systematic tightening every terminal screw. This procedure must be performed within the first 6 months of use or sooner if usage is heavy. Repeat this procedure every 12 months thereafter.

Auto-Level Sensing

This machine is fitted with an automatic sheet levelling system. An optical sensor directs a beam of infrared light across the machine. The system comprises of a transmitter and receiver. If the beam is broken air is pumped into the machine cabinet under the plastic lifting it until beam transmission is re-established.

Through beam sensors are reliable. The optical windows positioned in front of the sensors on the inside of the mould box may need periodic cleaning.

Faulty auto-level sensing would cause the air to blow continuously into the vacuum cabinet.

Before any maintenance work is carried out, both electrical and air supplies must be locked in the OFF position. Only a qualified electrical technician may work on any parts carrying mains voltage. That person is responsible for ensuring that the machine is in a safe condition before allowing services to be restored.

Vacuum

The vacuum circuit requires very little maintenance. The vacuum pump oil level needs to be checked occasionally depending on use and the vacuum pump filter mounted on top of the pump should be inspected occasionally and blown clean or replaced.



Loss of vacuum may be caused by worn or damaged seals around the perimeter of the table. These are regarded as a consumable part and should be replaced when signs of wear become apparent. Other causes of vacuum loss are loose or damaged flexible hoses and fittings.

The vacuum tank is fitted with a drain plug. Drain the tank if it is suspected that any moisture has been drawn into the tank.

THE VACUUM TANK IS FITTED WITH A NON RETURN VALVE TO PREVENT IT FROM EVER BECOMING PRESSURISED. UNDER NO CIRCUMSTANCES SHOULD THE MACHINE BE RETURNED TO SERVICE (AFTER REPAIR) WITHOUT THIS DEVICE. IF ALLOWED TO PRESSURISE THE VACUUM TANK MAY EXPLODE!

Before any maintenance work is carried out, both electrical and air supplies must be locked in the OFF position. Only a qualified electrical technician may work on any parts carrying mains voltage. That person is responsible for ensuring that the machine is in a safe condition before allowing services to be restored.

Pneumatics

Providing there is a good filtered regulated lubricated air supply, using good quality airline oil, maintenance will be minimal. However, a thorough inspection of the machine is necessary from time to time. Any mechanical damage of pipes and fittings should be dealt with before re using the machine.

Always lock air supply OFF and bleed out system air before attempting any maintenance of air system.

Excessive oil dripping or air escaping from a cylinder nose bush usually suggests that the seals require replacement. Seal kits are available for cylinders. Internal leaks within cylinders and valves are usually detected when a cylinder creeps into the wrong position or air continually seeps out of the valve exhaust port. Again seal kits can be provided - please specify cylinder / valve number & model when ordering.

Other problems that solenoid valves may suffer from are:

- 1) Lack of electrical supply - Check appropriate circuitry
- 2) Solenoid has become open circuit - Replace with new solenoid
- 3) Return mechanism jammed or broken - Dismantle valve to investigate. Replace if required.
- 4) Wet or dirty air supply - Check condition of air compressor and condensate management system.

If the machine is to be not used for more than a few hours the compressed air system should be de-pressurised.

We strongly recommend fitting a lubricator to the main air supply if the machine is intended to be used for daily production. This will extend the working life of the pneumatic cylinders and valves.

Adjust the lubricator such that the oil level drop can be noticed over the course of one days full use. Do not allow excessive amounts of oil to enter the pneumatic system.

Many problems can be caused by water in the pneumatic system.

Pneumatic table maintenance

Hazards exist when performing work on pneumatic powered assemblies. This is particularly the case with the table assembly due to its size, weight and hence the risks of trapping and crushing.

**ALWAYS REMOVE AIR. LOCK TABLE BEFORE
WORKING UNDERNEATH
REFER TO USER MANUAL
CONSIDER ALL RISKS AND HAZARDS**

Note the safety signs fitted to the table

Before any maintenance work is carried out on the table assembly it MUST be locked in place using the components supplied. When the table is locked the air must be removed from the table drive system after both electrical and air supplies are locked in the OFF position. The person responsible for ensuring safety must be established and take responsibility for the work and the actions of other workers involved and that the machine is in a safe condition before allowing services to be restored.

Procedure for locking the mould table

The Table drive system is fitted with system relief valves to drain the air in preparation for maintenance.

In summary the principle is to lift the table, fit the mechanical locking devices followed by removal of the air from the system. It is necessary to have the table in the top position and remove the air from the tops of the cylinder first to prevent unexpected movement.

There are 4 locking devices stored at the base of each of the table racks.

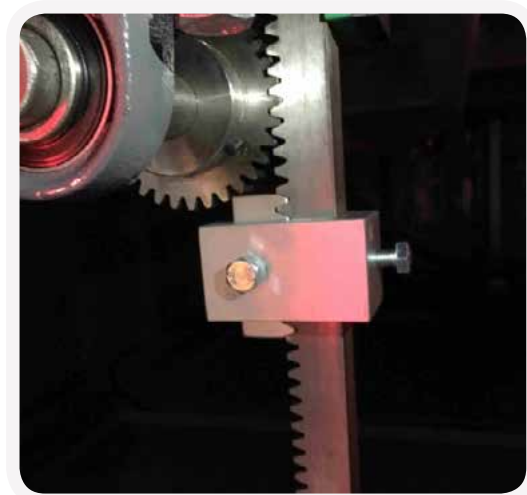
Activate the Emergency stop function and remove the side panels to gain access to the sides of the table. Ensure that persons are clear and with the Emergency Stop function reset, raise the table to the top position.

Disconnect the air supply and the electrical supply.

Remove the locking devices from the storage point and reposition them just below the table gears at the top of each rack as shown. Release the air from the top of the table cylinders by operating the relief ball valve V40. There will be a small amount air released. Leave the valve open.



Table locking device



Fit locking device on rack directly under gear as shown

When complete, release the air from the bottom of the cylinders by slowly operating then relief ball valve V41. There will be a significant amount of air released and the table will fall and rest on the locking devices. Close both relief valves V40 & V41. The person responsible for health and safety will need to verify that all air is removed from the system and the table assembly area is safe to work on. Perform any work / maintenance as required.

Procedure for restoring the table function

- > Ensure that both relief valves V40 & V41 are closed.
- > Ensure that persons are clear - reconnect the air and electrical supply.
- > Drive the table UP using the 2 handed control.
- > Remove the Locking devices and fit them at the bottom of the rack for storage.
- > Move the table to its lowest position.
- > Activate the Emergency Stop function and fit the side panels.
- > Re-engage the Emergency Stop function.

The person responsible for health and safety will need to verify that the restored table system operation is safe and that normal machine operation is safe after completion of maintenance work.

Before any maintenance work is carried out, both electrical and air supplies must be locked in the OFF position. Only a qualified electrical technician may work on any parts carrying mains voltage. That person is responsible for ensuring that the machine is in a safe condition before allowing services to be restored.

General lubrication

Bearing housings, slide and rails should be checked periodically, and lubricated when necessary using high temperature lithium grease.

Clamp and table seals

These are regarded as a consumable part and should be replaced when signs of wear become apparent. (See section dealing with Vacuum)

Replace a damaged or worn seal

Remove the existing seal with a sharp knife. Remove as much of the original sealant as possible. Using masking tape, make a frame inside where the seal will go (table) or outside (clamp), apply silicone sealant around the area where the seal is to be placed. Do not be too economical with the glue. Bed down a strip of silicon seal until it is firmly seated in the glue.

Do not attempt to stretch the rubber seal, it will contract back to its original size before the glue is dry. Cut the ends at 45 degrees. Continue this process for all 4 sides of the seal. Fill up any gaps in the mitred joints with glue. Place masking tape over the mitred corners to help keep them firmly positioned until the glue is dry.

Leave overnight, then remove masking tape and trim any excess glue off with a sharp knife.

We supply a kit comprising the necessary seal and Silicone adhesive.

Cleaning

Ensure the inside of the machine and the heater tray is cleared of dust, dirt and debris. Do not allow dirt and loose particles to build up, particularly on the heater tray.

Service Support

If you are unable to cure any problem relating to your machine, or if you wish to order spare parts please contact us on the numbers and emails shown on the back cover of this manual stating the model 2440 the serial number (on the specification plate), and a full description of the fault or parts you need.

Ongoing routine 'In Process' checks & work area housekeeping may be performed during normal operation. Monitoring and reporting of machine performance may allow maintenance requirements to be dealt with before wear, damage or when process problems occur. The following schedule indicates such checks / activities.

Areas to be monitored
Effectiveness of process functionality
Observation of sensor functionality
Observation of heating element functionality
Fault / event logging
Job data housekeeping
General work method housekeeping and safety of self and others
Monitoring for Hazardous & Dangerous situations

The following Periodic Maintenance Schedule summarises the regular maintenance required. Owners, designated responsible people and persons required to perform any level of maintenance / servicing must read this Formech 2440 manual thoroughly. Particular attention must be paid to references and notices regarding safety. The maintenance requirements will vary depending on the level of machine utilisation.

Inspection / Check	Daily	Weekly	Monthly	Annually
Air Pressure set at 7 Bar	X			
Monitor for air leaks	X			
Check integrity of mould table and clamp frame seals.	X			
Test Emergency stop operation	X			
Visible condition of clamp, table & heater sensors / switches	X			
General safety & housekeeping of overall working environment around equipment.	X			
Clamp frame adjustment depending upon material.	As required			
Monitor Pyrometer consistence (Option)		As required		
Check Clamping and Table silicone seals		X		
Inspect heating elements for damage			X	
Check condition of heater drive assemblies.			X	X
Replace / clean vacuum pump filtering.			X	X
Drain vacuum tank.				X
Lubricate major mechanical assemblies.			X	X
Inspect Pneumatics system				X
Clean Auto-level sensor optics				X
Check Security of Fan units.		X	X	X
Full Formech major service routine – dependant on utilisation				X

Reliability and a long service life are synonymous with the Formech brand. However, as with any machinery, certain parts will require periodic replacement.

Panel seals

The silicon seals applied to the mould table and to the top aperture of the machine (clamp) are seen as being consumable parts, their service life will depend on how the machine is treated and how often it is used.

THE TABLE AND CLAMP SEALS ARE NOT COVERED BY OUR WARRANTY.

Heating Elements

The infra-red heating elements supplied with this machine are manufactured from Quartz material and are brittle. A shock to the machine may break an element.

Interlocking systems are built into the machine to prevent a mould being pushed up into the heater and damaging the elements.

The heating elements contain a length of resistance wire internally which becomes extremely hot when electricity is applied. The wire expands and contracts as it heats and cools.

Eventually, due to the continual expansion and contraction, the wire will fracture and a new element will be needed. This may take a decade or more. Alternatively it could happen as a result of an impact or shock.

Because of this we are unable to apply our standard warranty to Quartz & Ceramic heating elements.

THE HEATING ELEMENTS ARE NOT COVERED BY OUR WARRANTY.

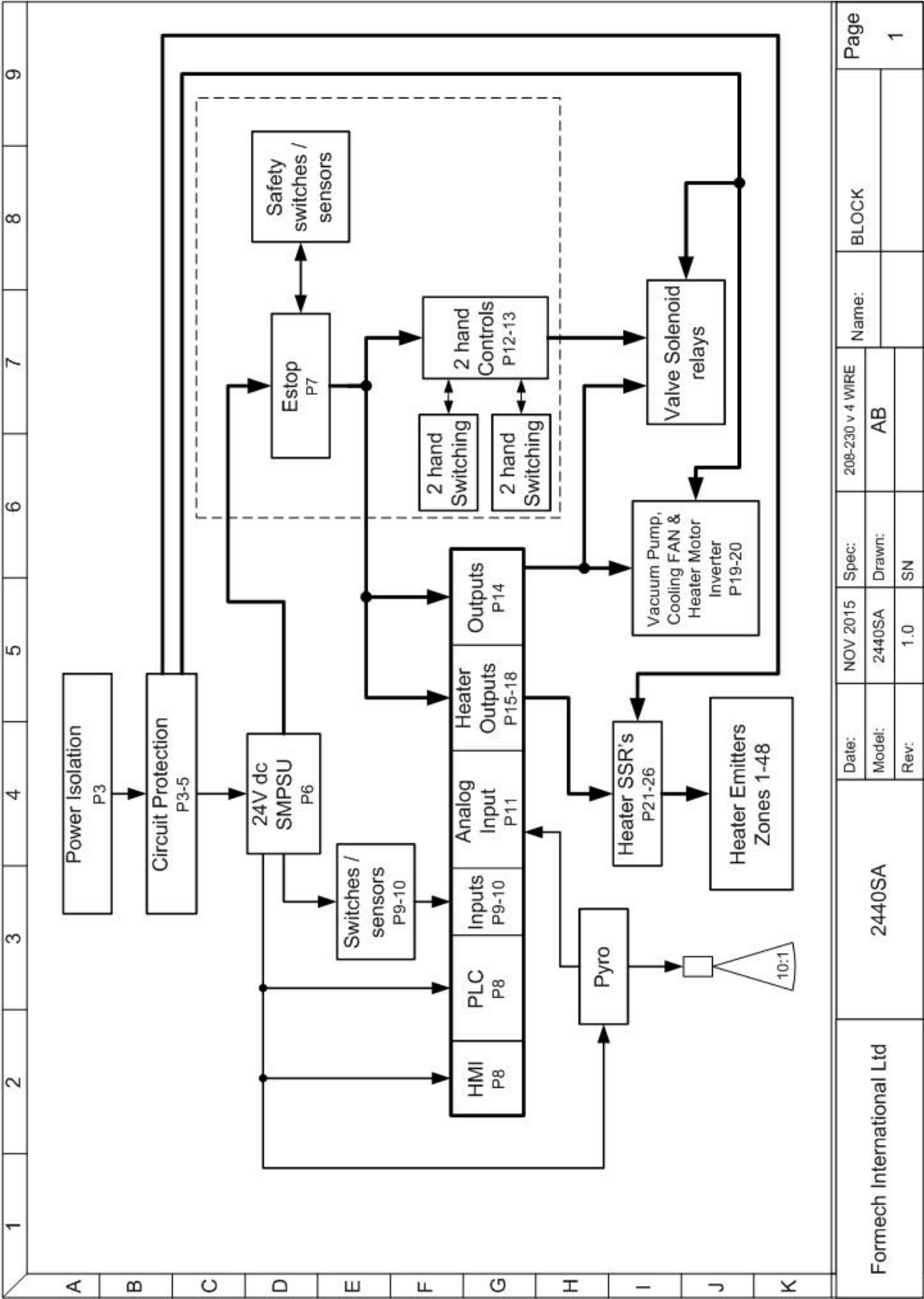
Vacuum System

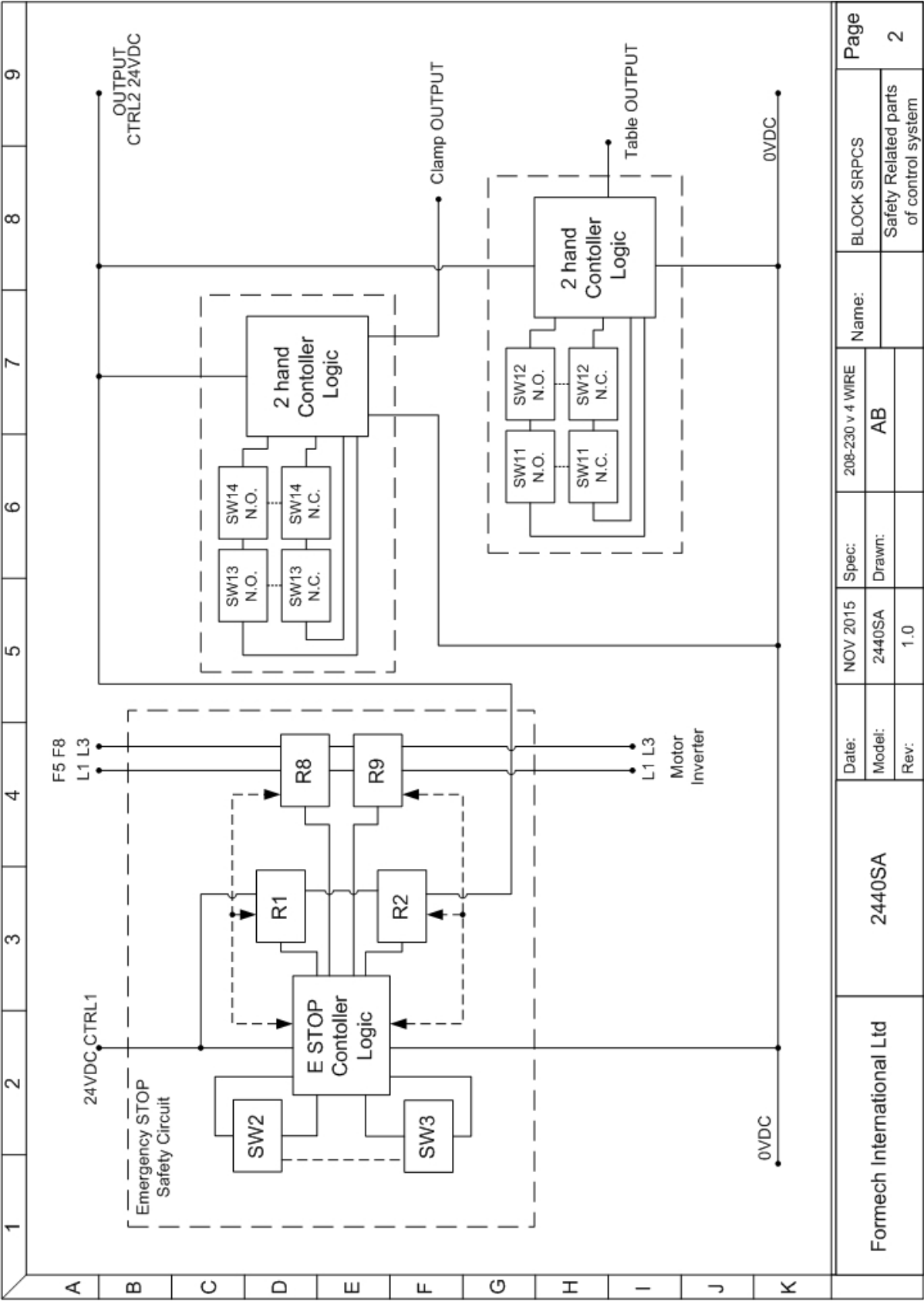
The vacuum system on this machine is relatively uncomplicated but uses high quality components throughout. The life expectancy of the vacuum system will be compromised by the ingress of dirt, dust, liquid etc.

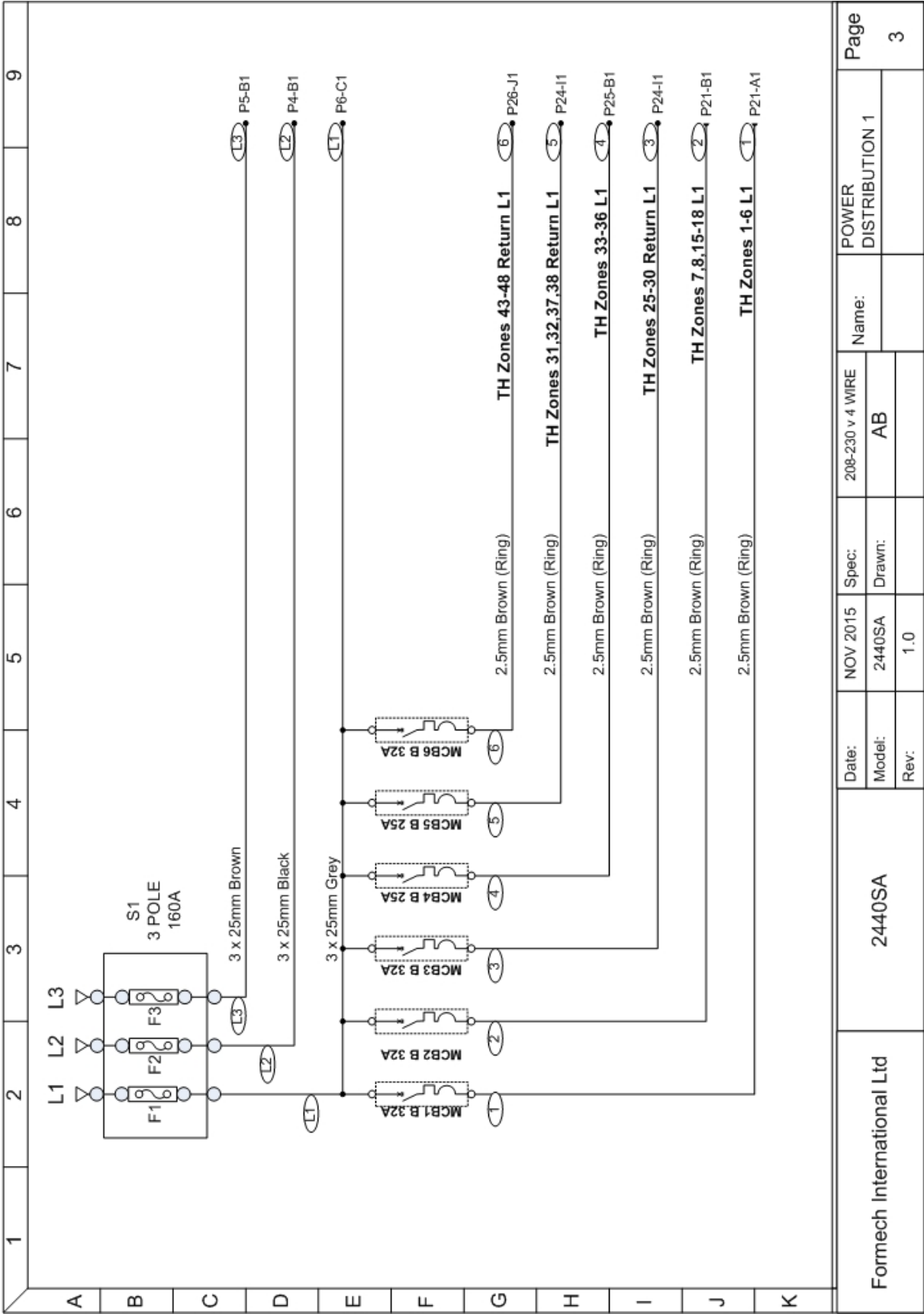


THE VACUUM CIRCUIT INCLUDING THE VACUUM PUMP WILL NOT BE COVERED BY OUR WARRANTY IF THEY ARE FOUND TO BE BLOCKED WITH FOREIGN MATTER OR CORRODED BY THE INGRESS OF LIQUID.

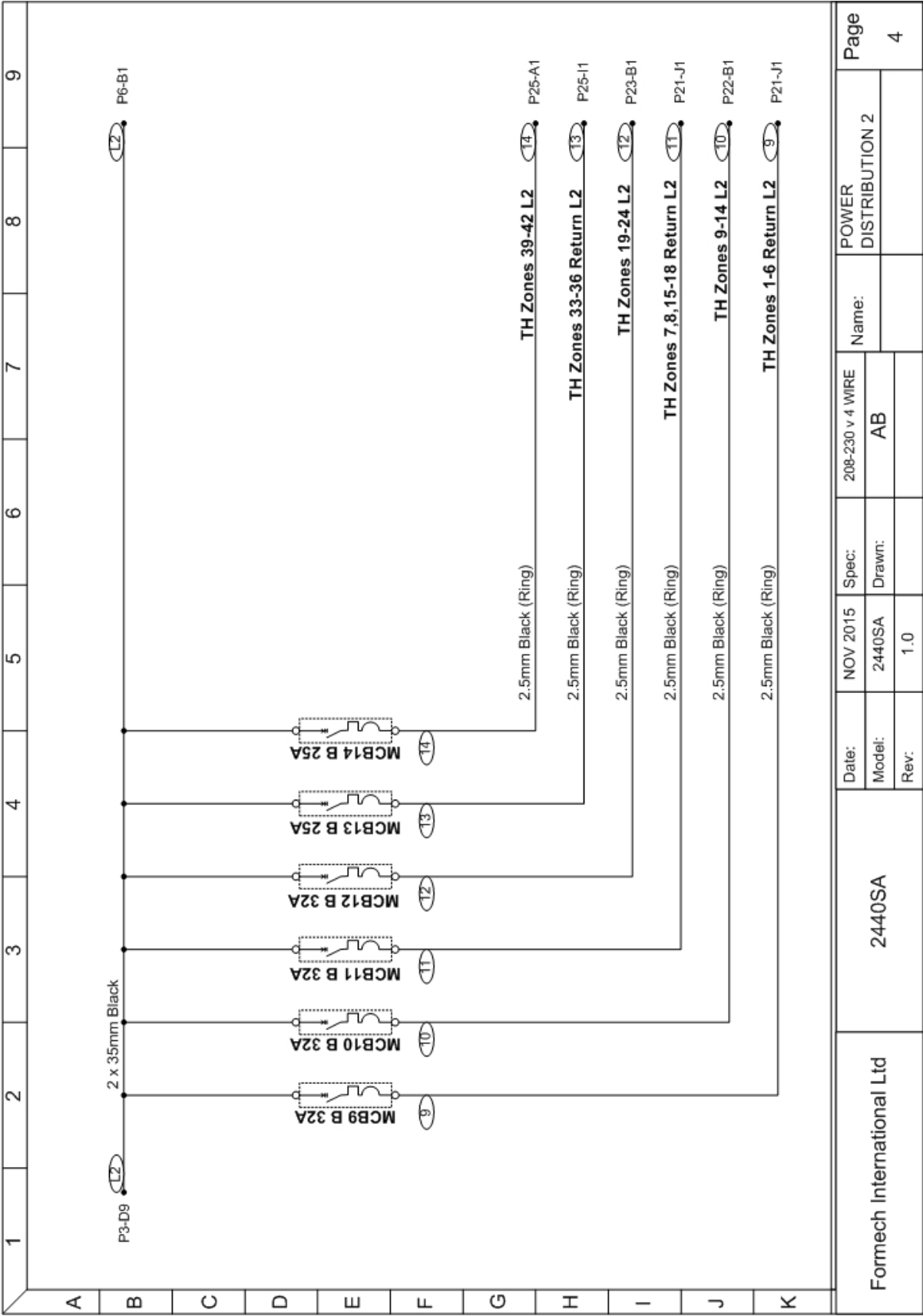
Electrical Schematic 1	2440 Block Schematic
Electrical Schematic 2	2440 Safety Block Schematic
Electrical Schematic 3	2440 Power distribution 1
Electrical Schematic 4	2440 Power distribution 2
Electrical Schematic 5	2440 Power distribution 3
Electrical Schematic 6	2440 Power distribution 4
Electrical Schematic 7	2440 Low Voltage Protection
Electrical Schematic 8	2440 Safety Circuit Emergency Stop
Electrical Schematic 9	2440 PLC / HMI
Electrical Schematic 10	2440 PLC Input 1
Electrical Schematic 11	2440 PLC Pyrometer
Electrical Schematic 12	2440 2 Hand Output 1
Electrical Schematic 13	2440 2 Hand Output 2
Electrical Schematic 14	2440 PLC Output 1
Electrical Schematic 15	2440 PLC Output 2
Electrical Schematic 16	2440 PLC Output 3
Electrical Schematic 17	2440 PLC Output 4
Electrical Schematic 18	2440 PLC Output 5
Electrical Schematic 19	2440 HV Output 1
Electrical Schematic 20	2440 HV Output 2
Electrical Schematic 21	2440 Heater Output Zones 1-8
Electrical Schematic 22	2440 Heater Output Zones 9-16
Electrical Schematic 23	2440 Heater Output Zones 17-24
Electrical Schematic 24	2440 Heater Output Zone 25-32
Electrical Schematic 25	2440 Heater Output Zones 33-40
Electrical Schematic 26	2440 Heater Output Zones 41-48
Electrical Schematic 27	2440 Heater Element & Zone Layout1
Electrical Schematic 28	2440 Heater Element & Zone Layout2
Pneumatic Schematic 29	Pneumatics 1
Pneumatic Schematic 30	Pneumatics 2

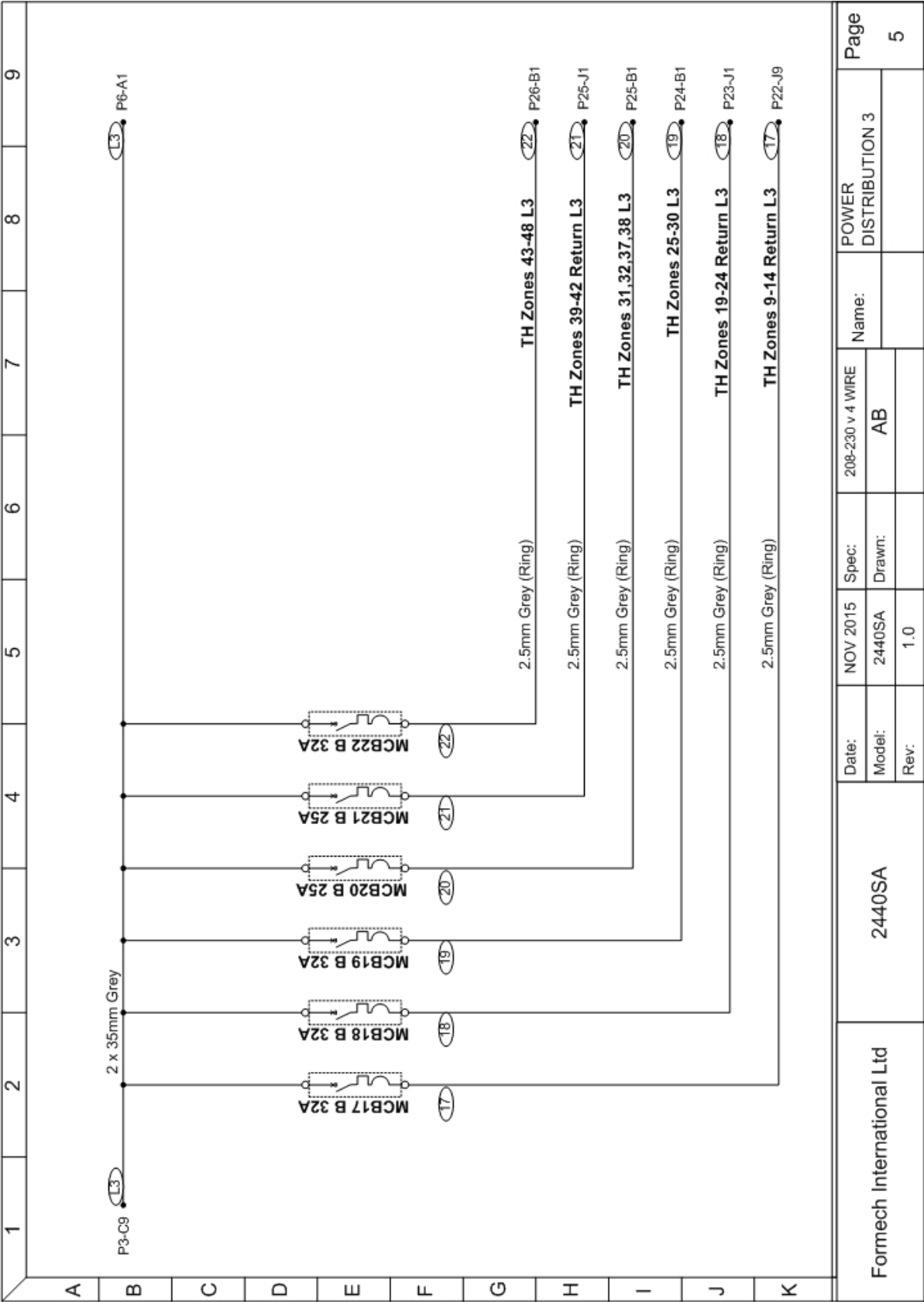


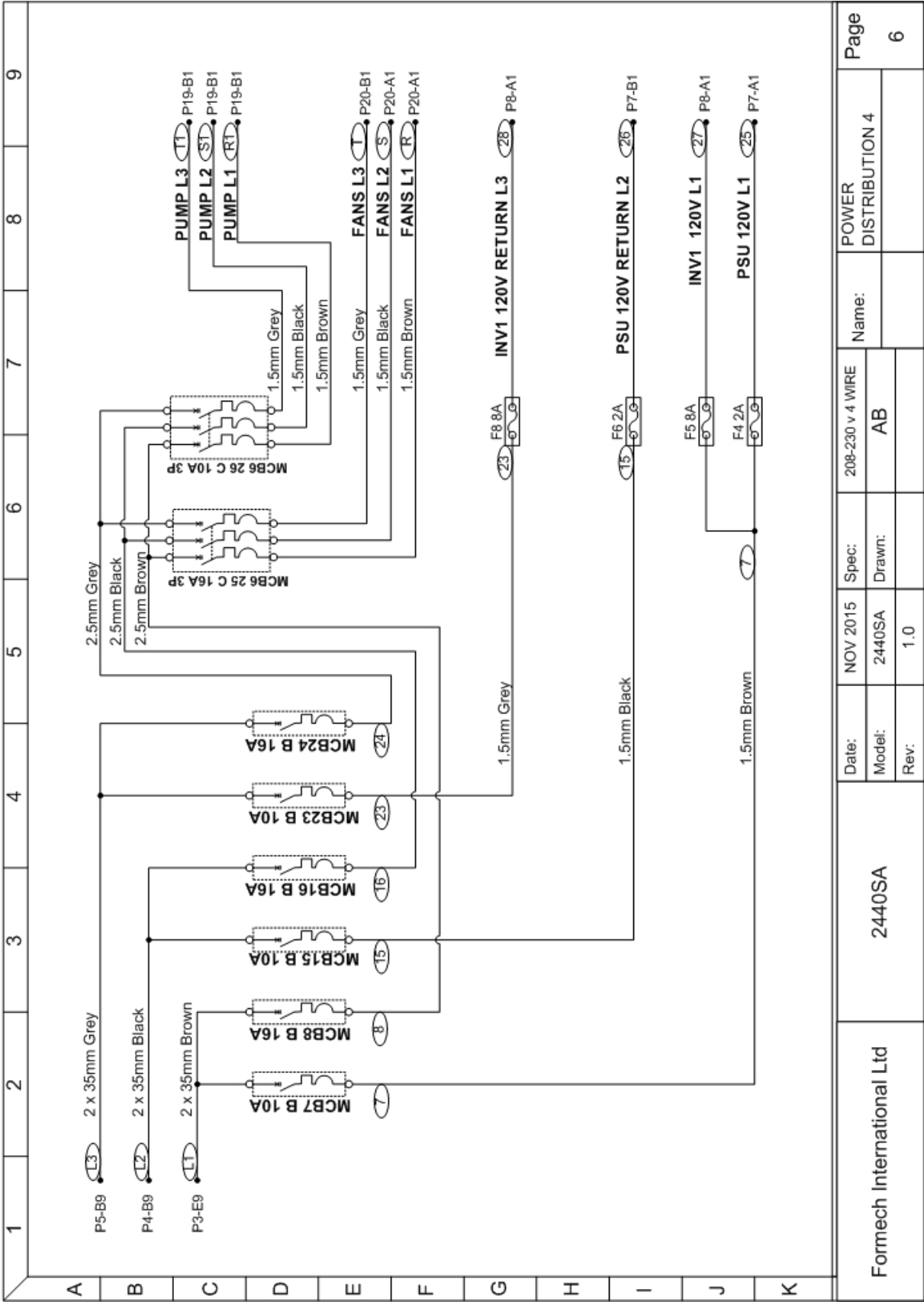


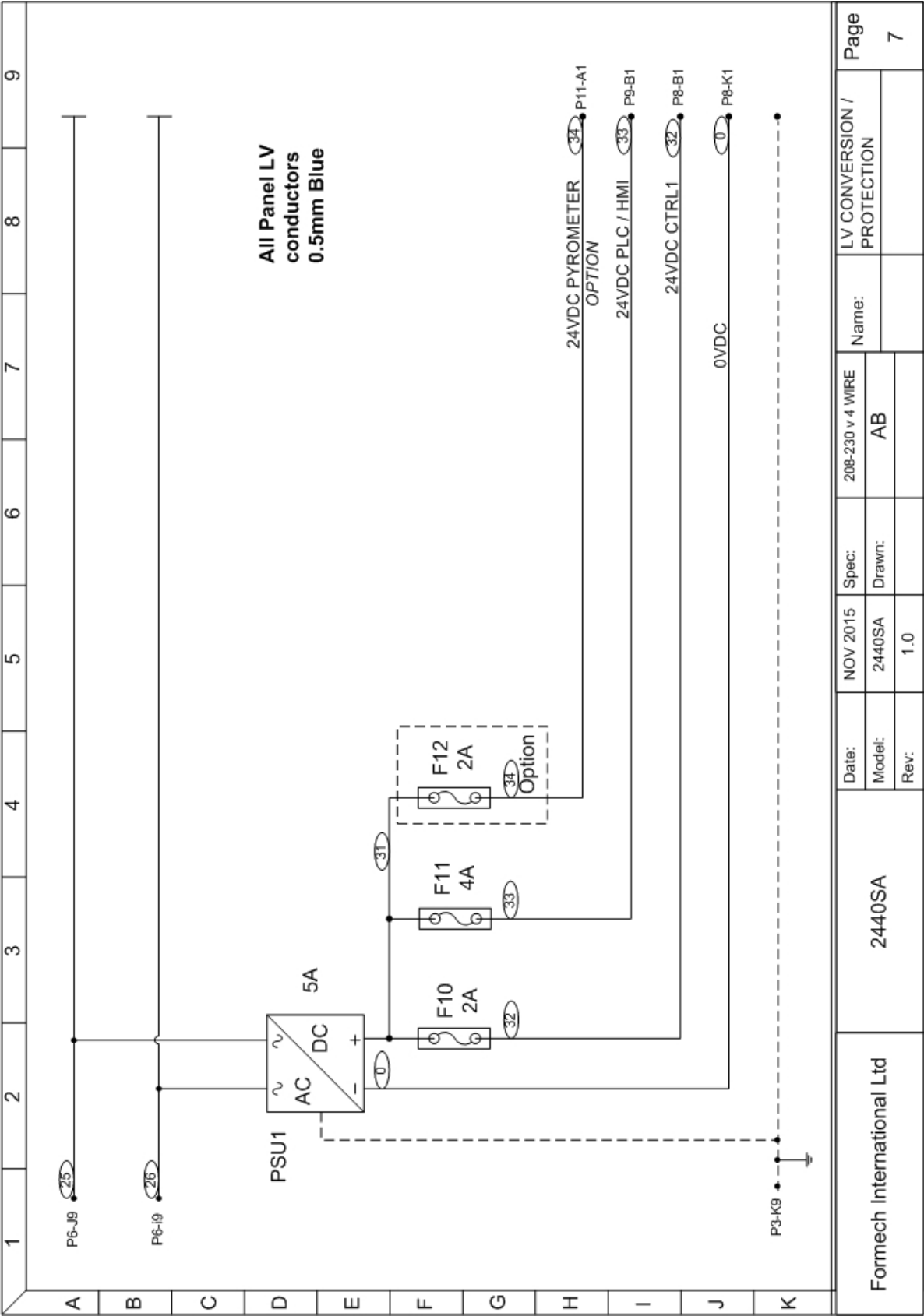


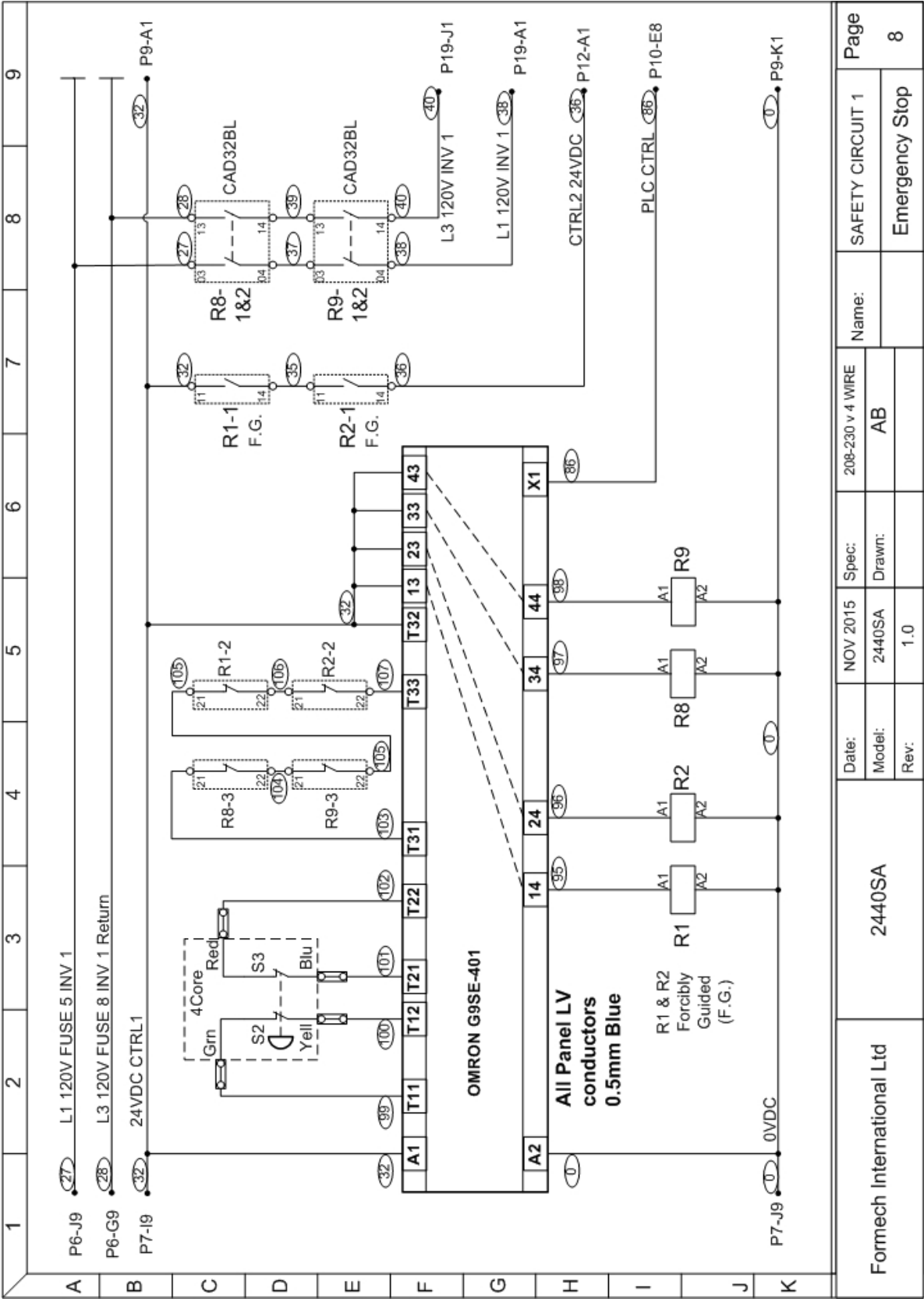
Formech International Ltd	2440SA				Date:	NOV 2015	Spec:	208-230 v 4 WIRE	Name:	POWER DISTRIBUTION 1	Page
					Model:	2440SA	Drawn:	AB			3
					Rev:	1.0					

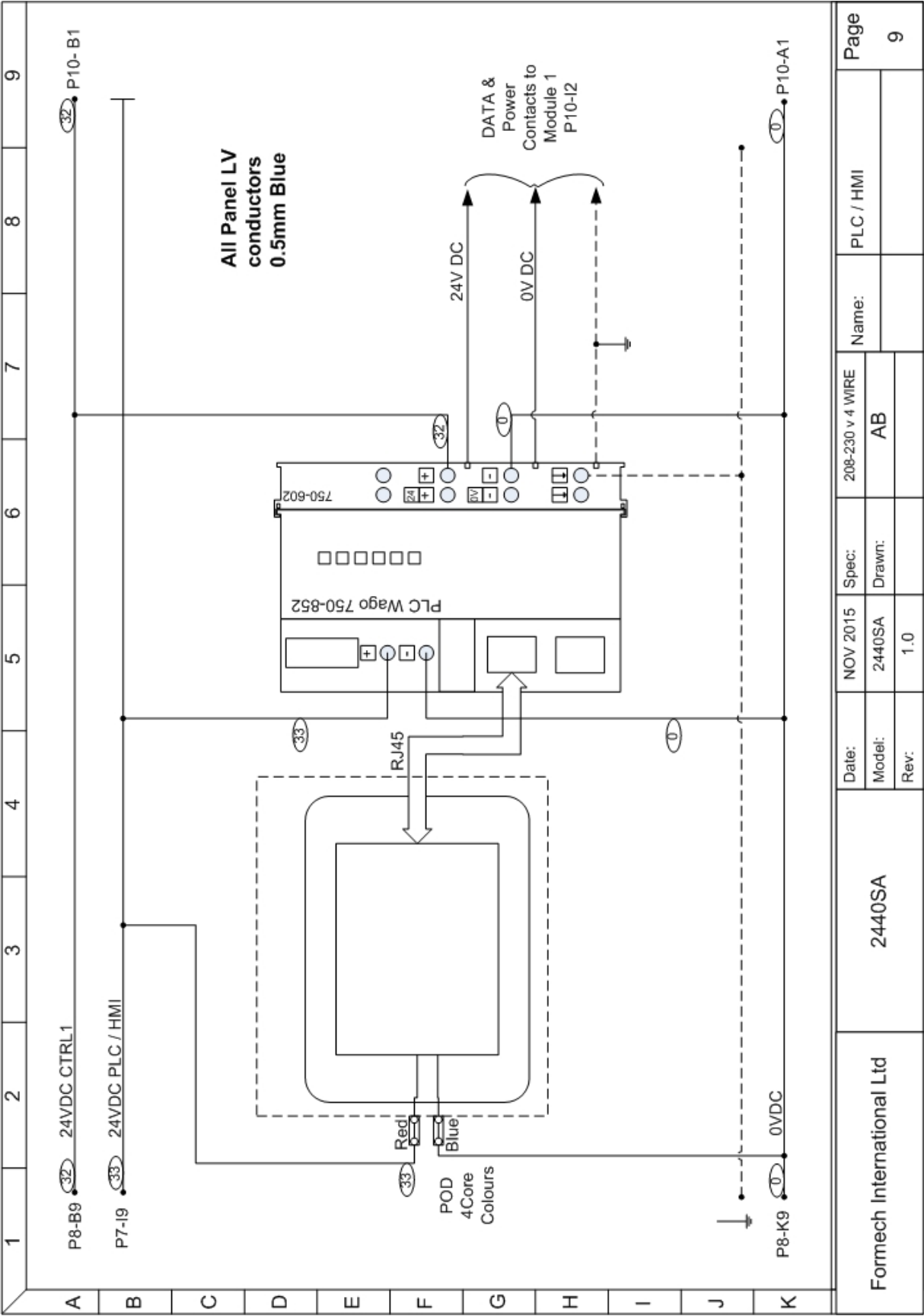


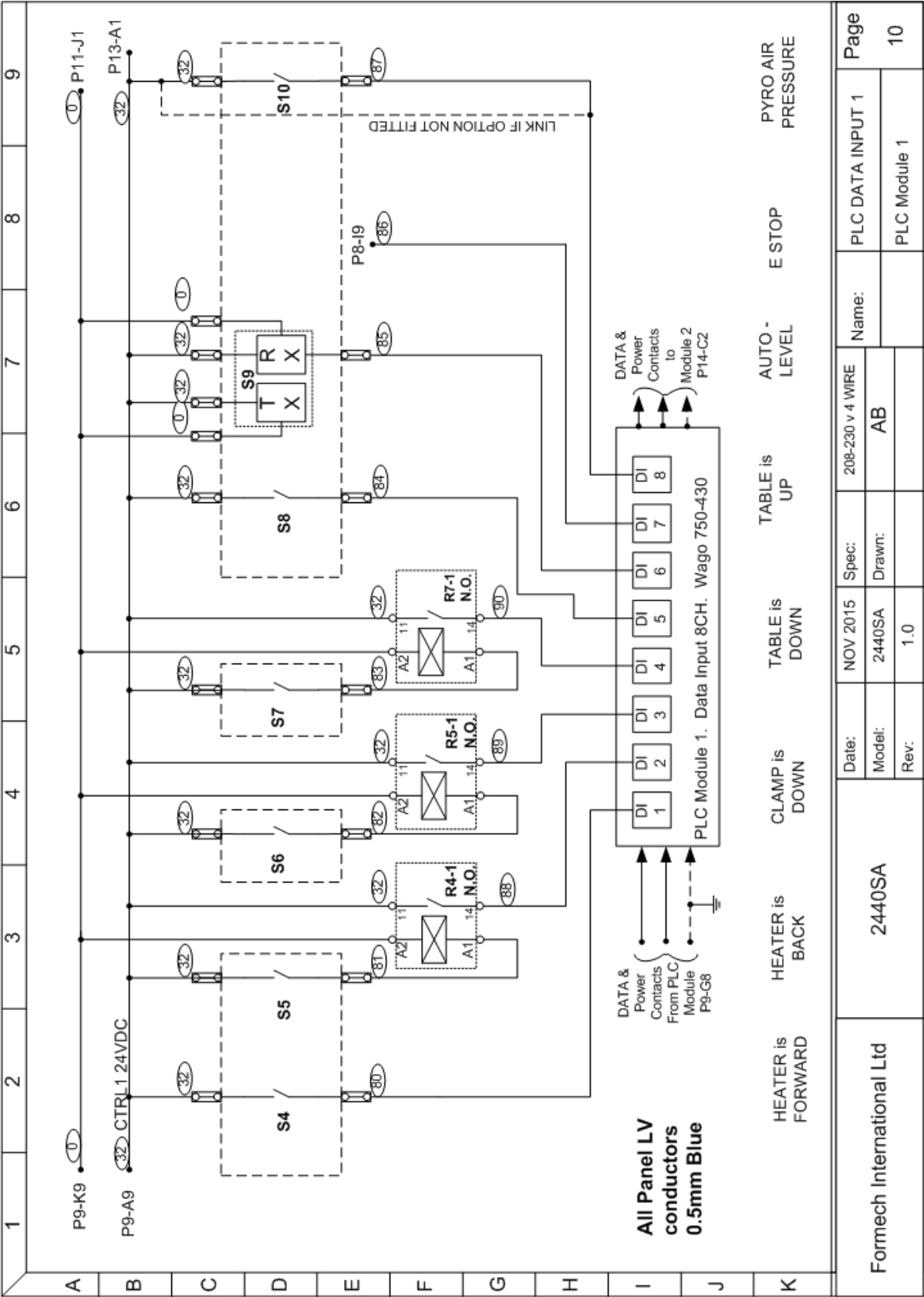


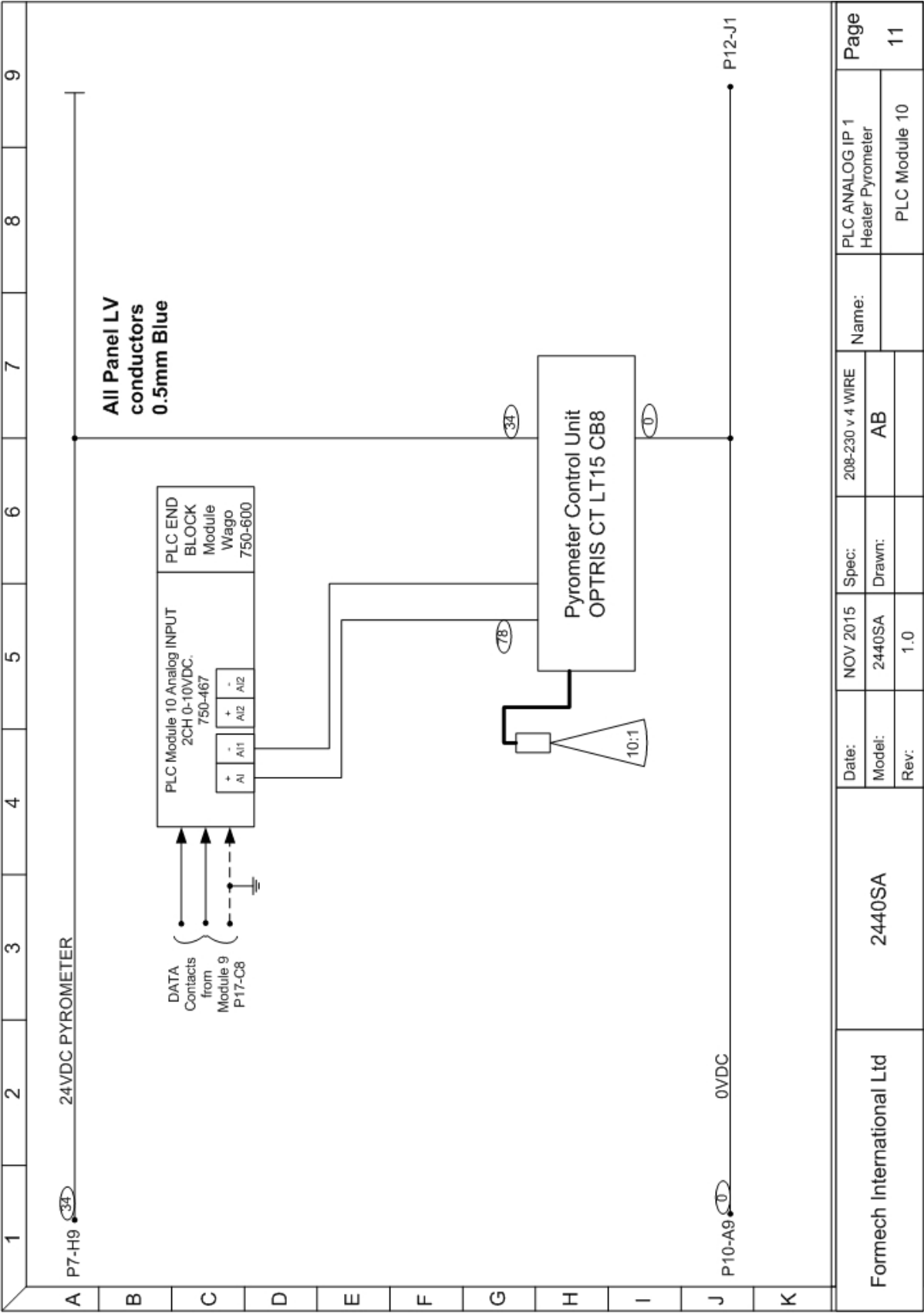


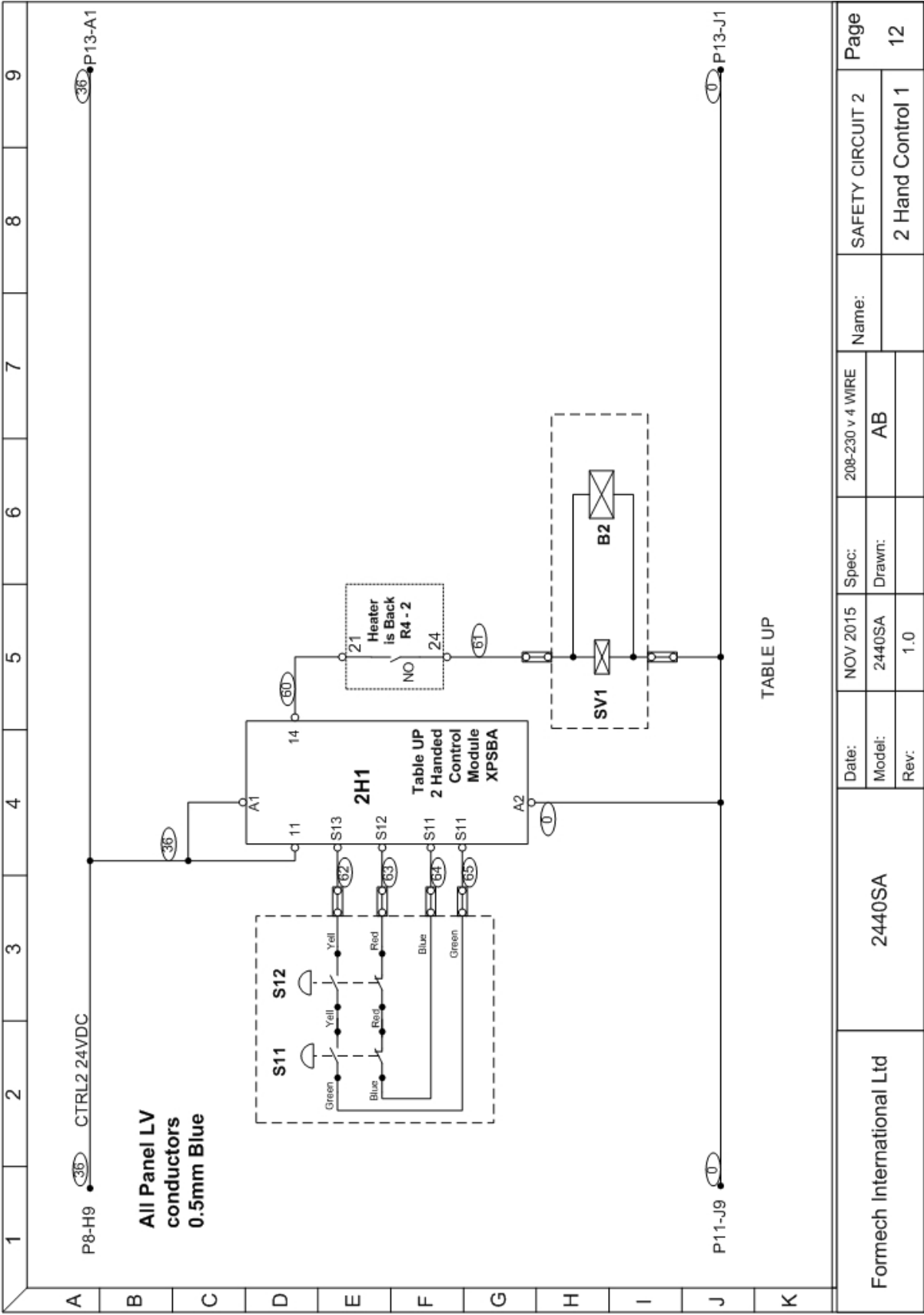


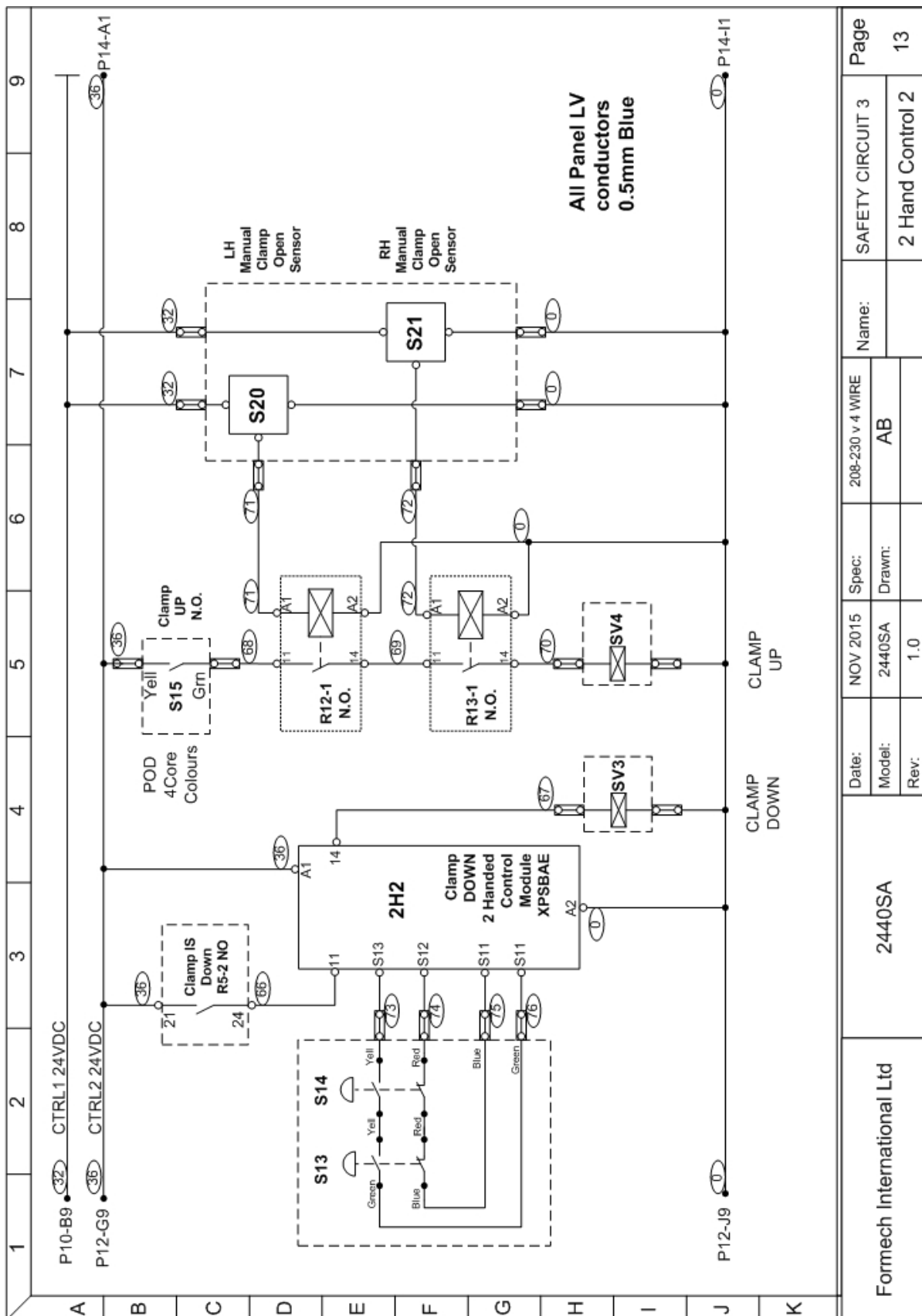


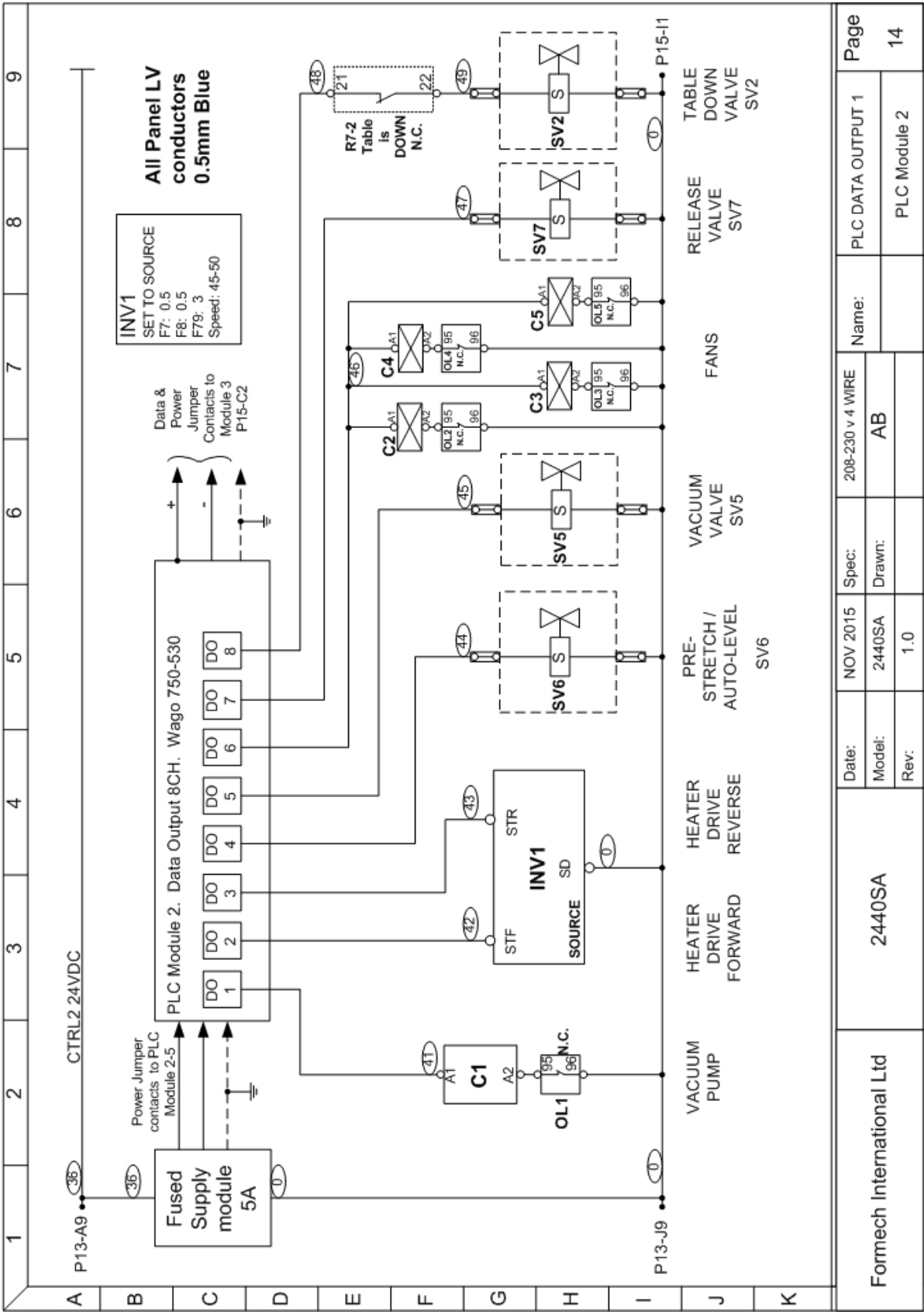


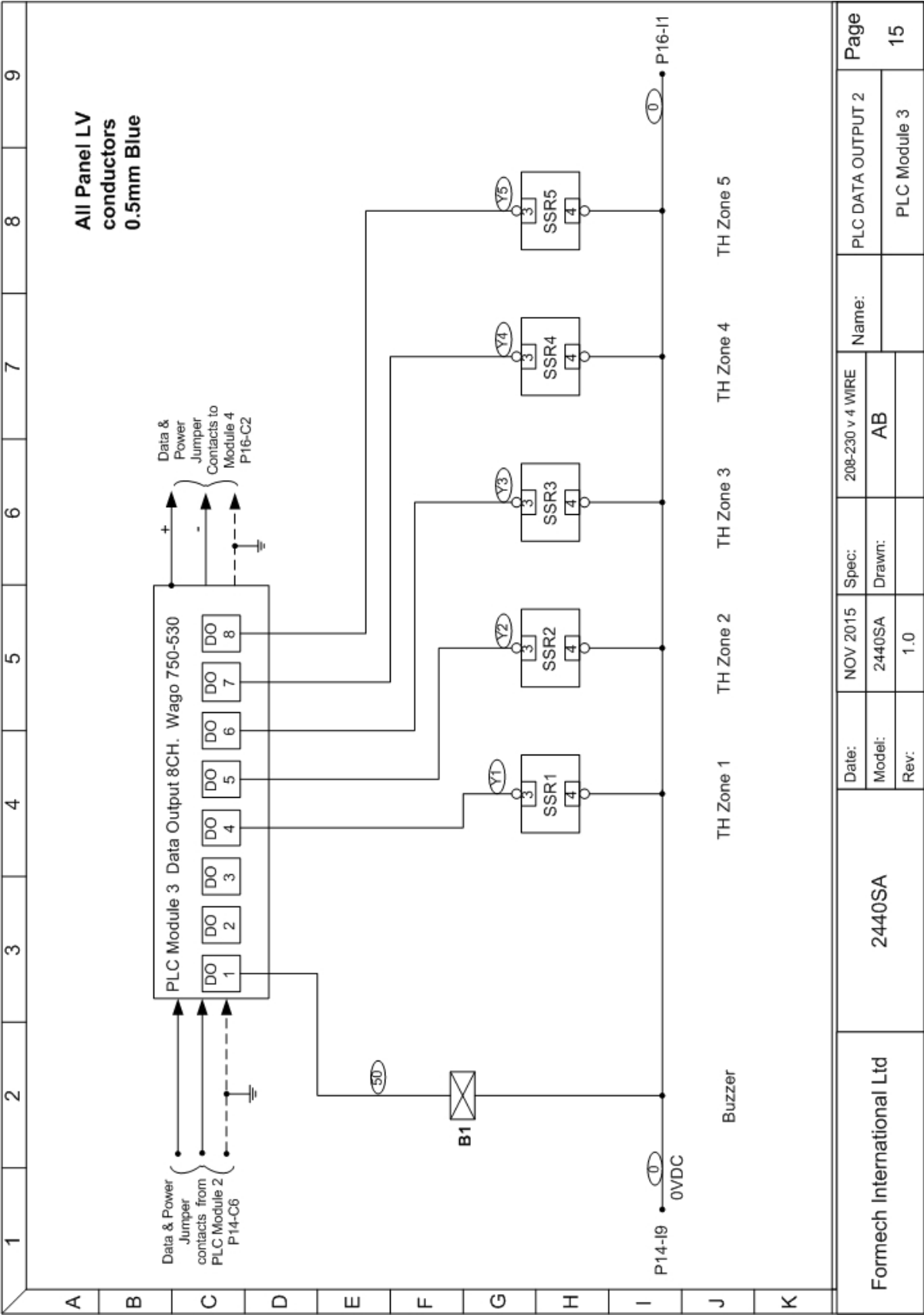


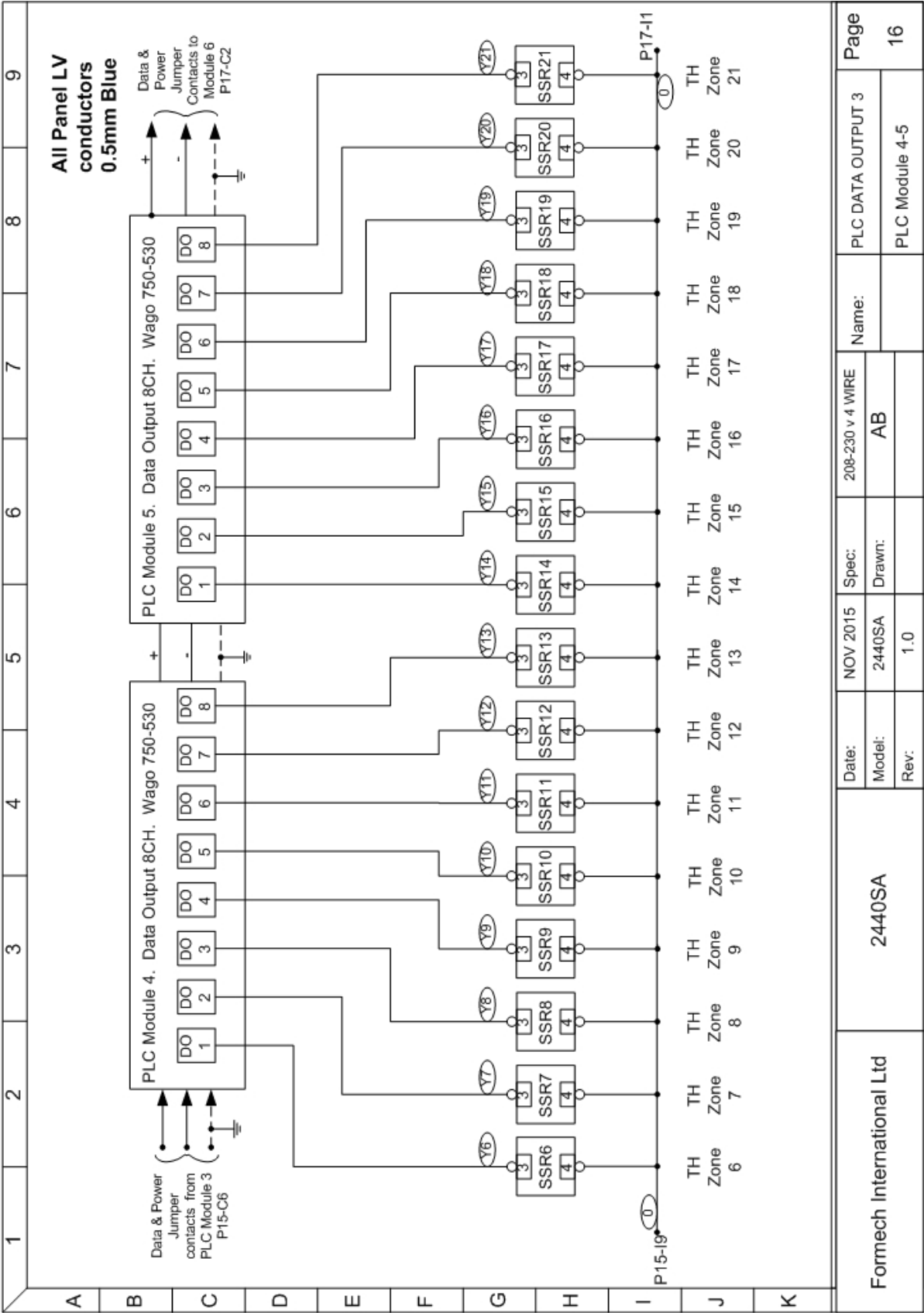




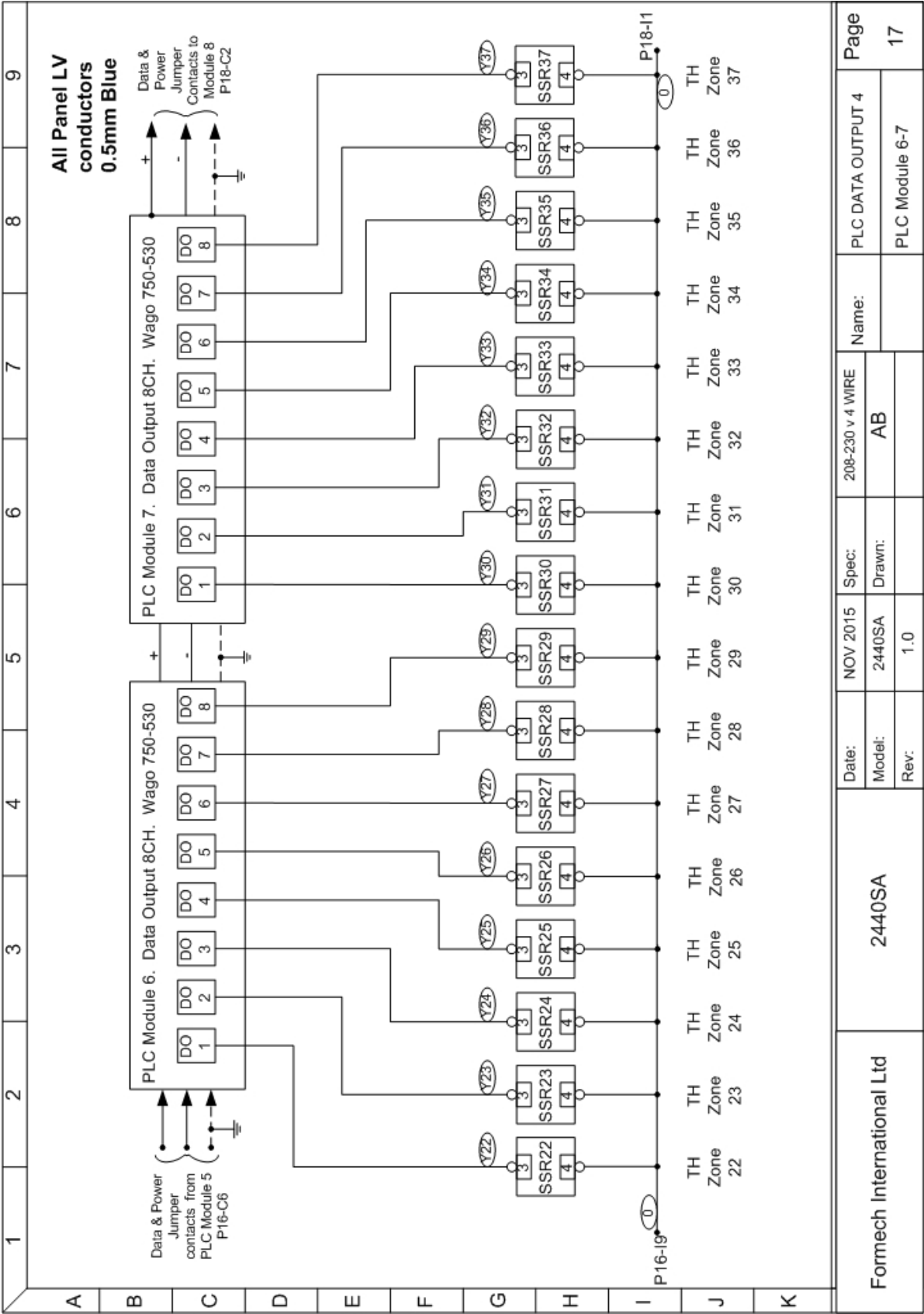


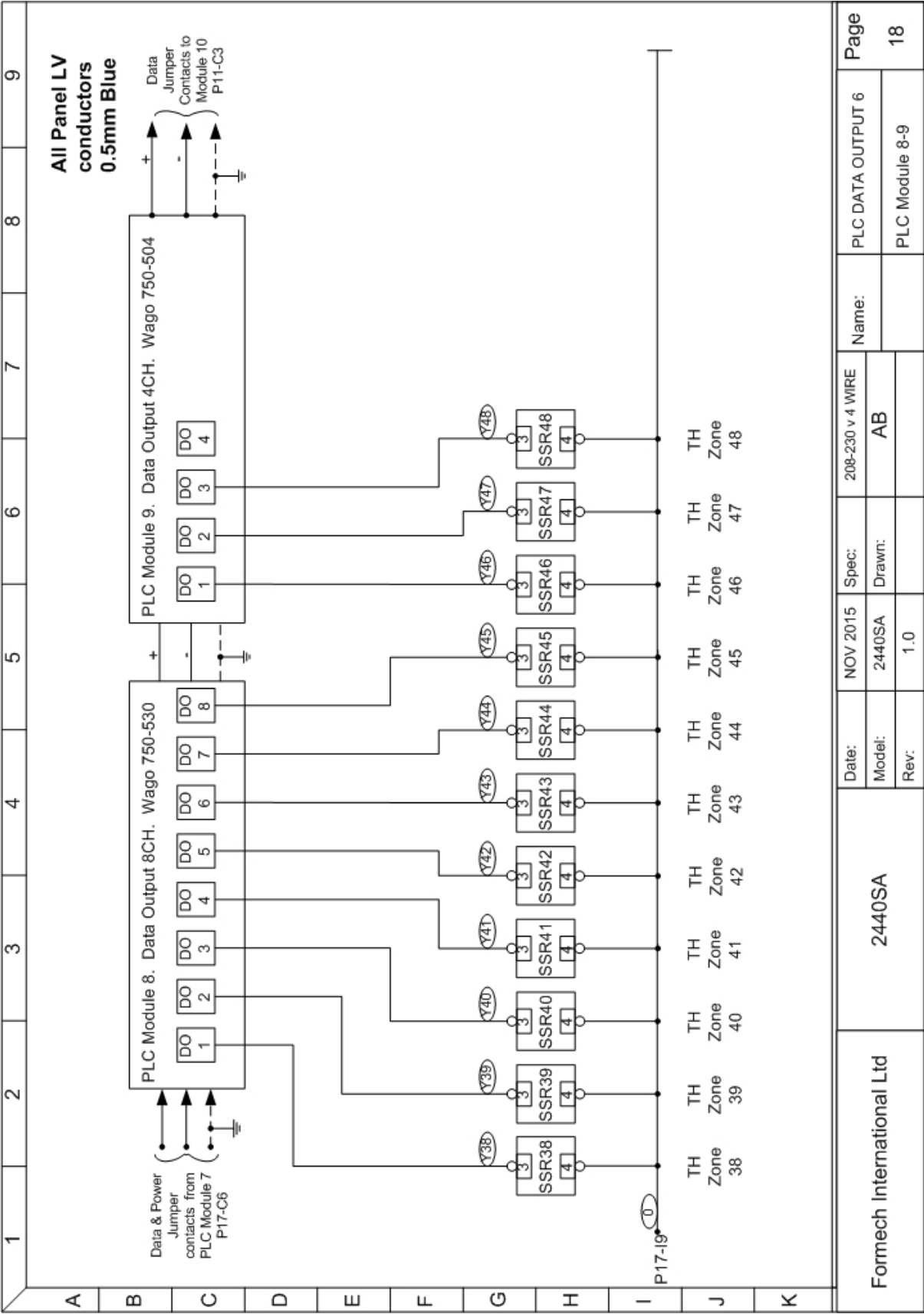


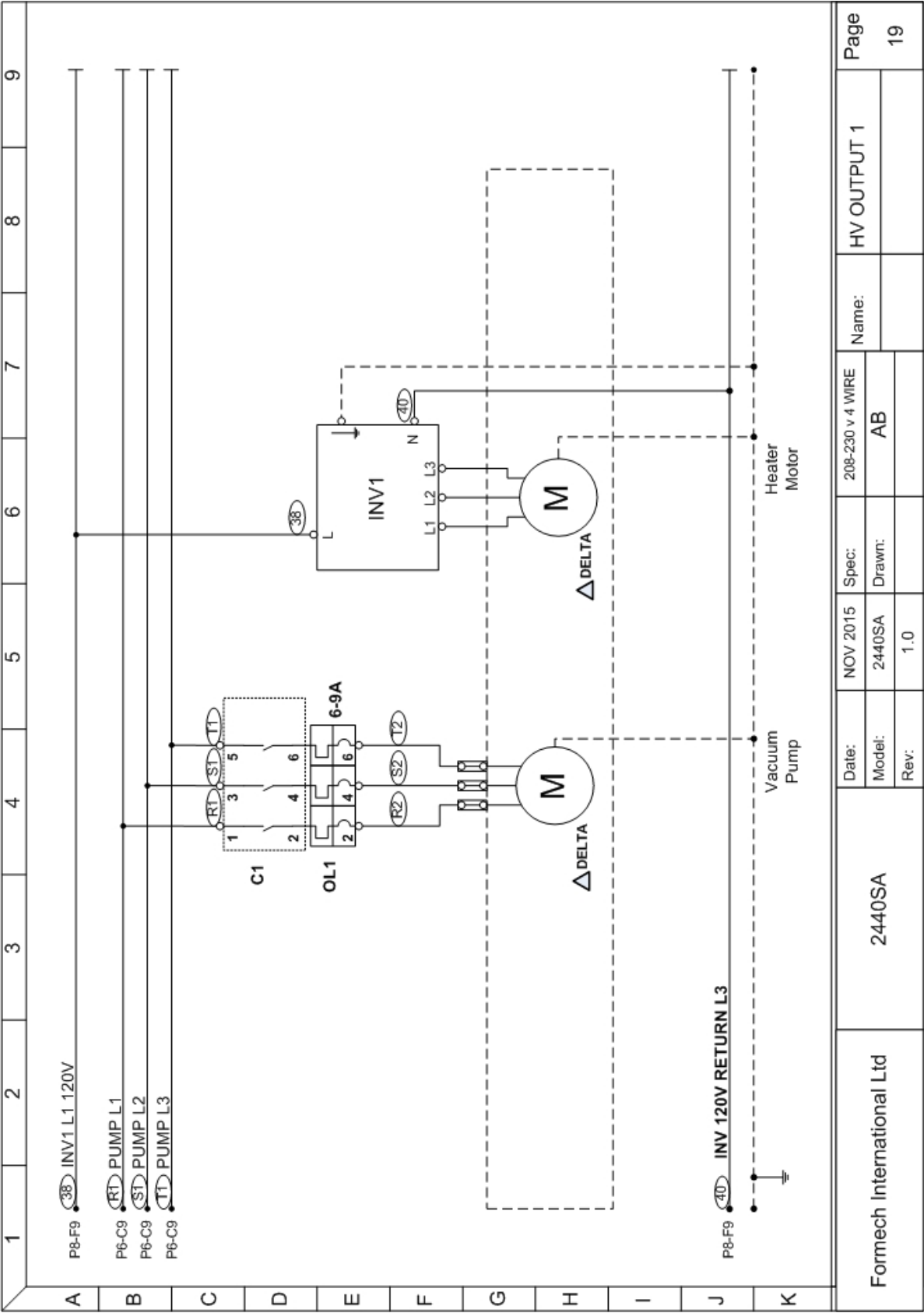


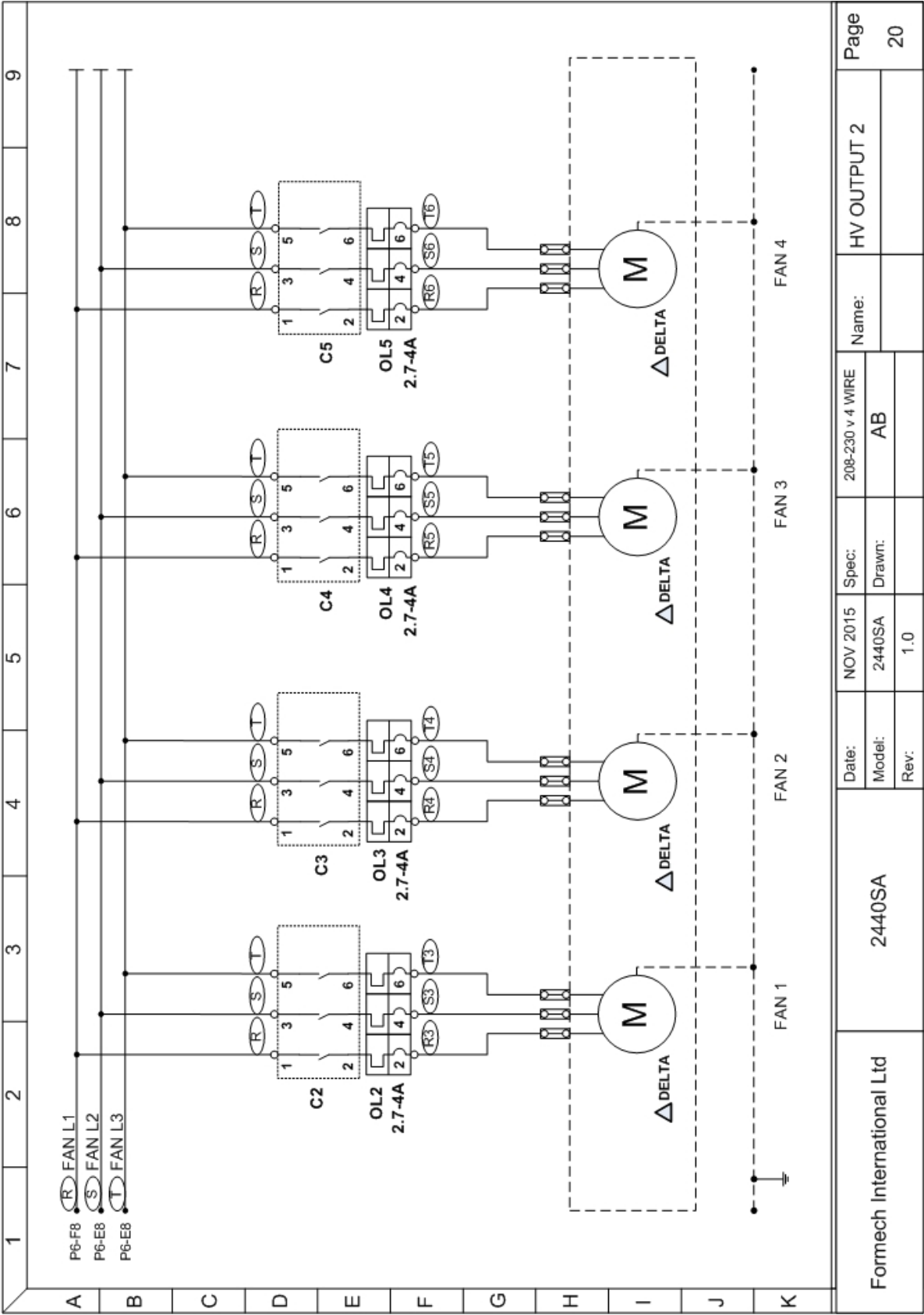


Formech International Ltd	2440SA	Date:	NOV 2015	Spec:	208-230 v 4 WIRE	Name:	PLC DATA OUTPUT 3	Page
		Model:	2440SA	Drawn:	AB			16
		Rev:	1.0				PLC Module 4-5	

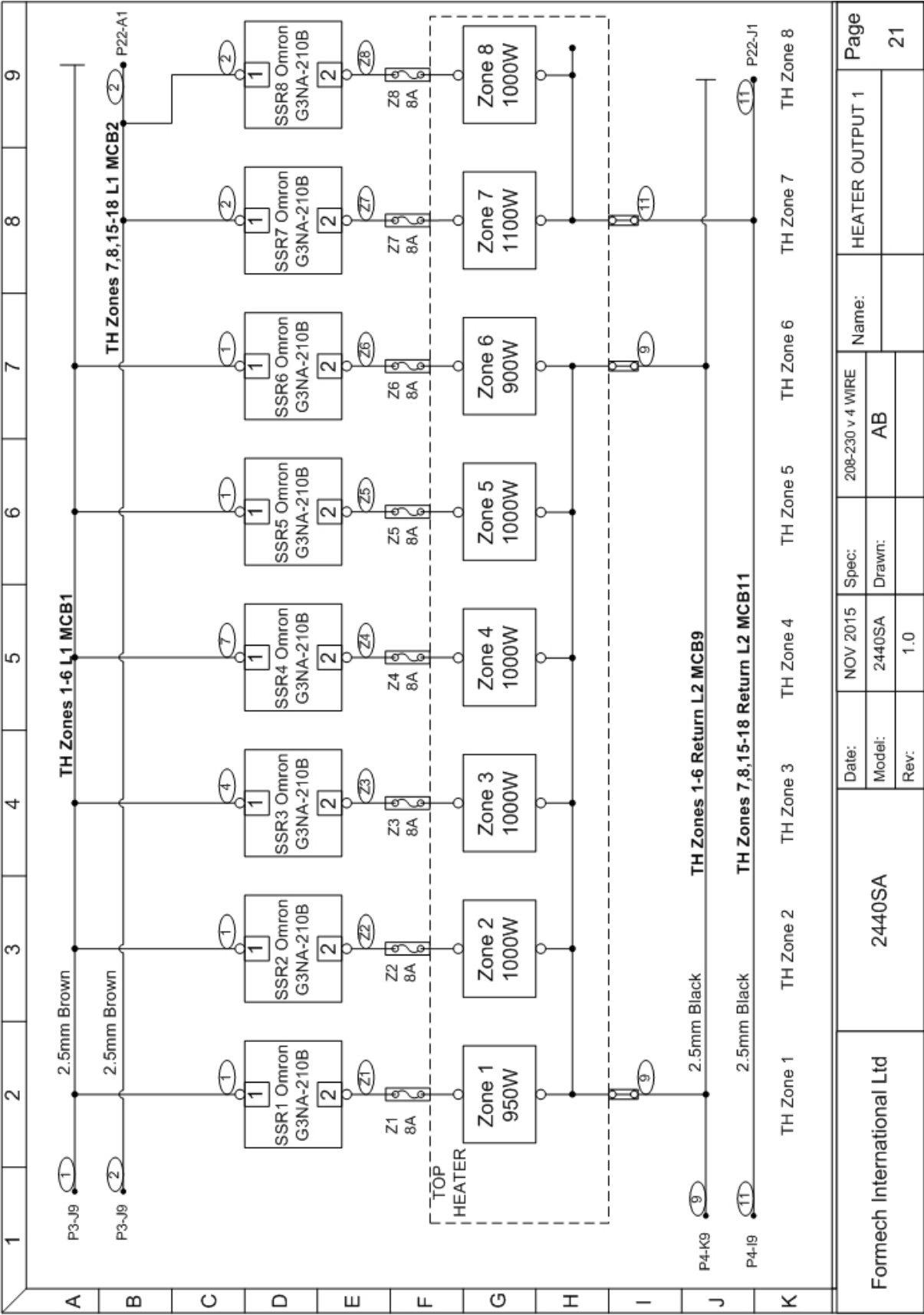


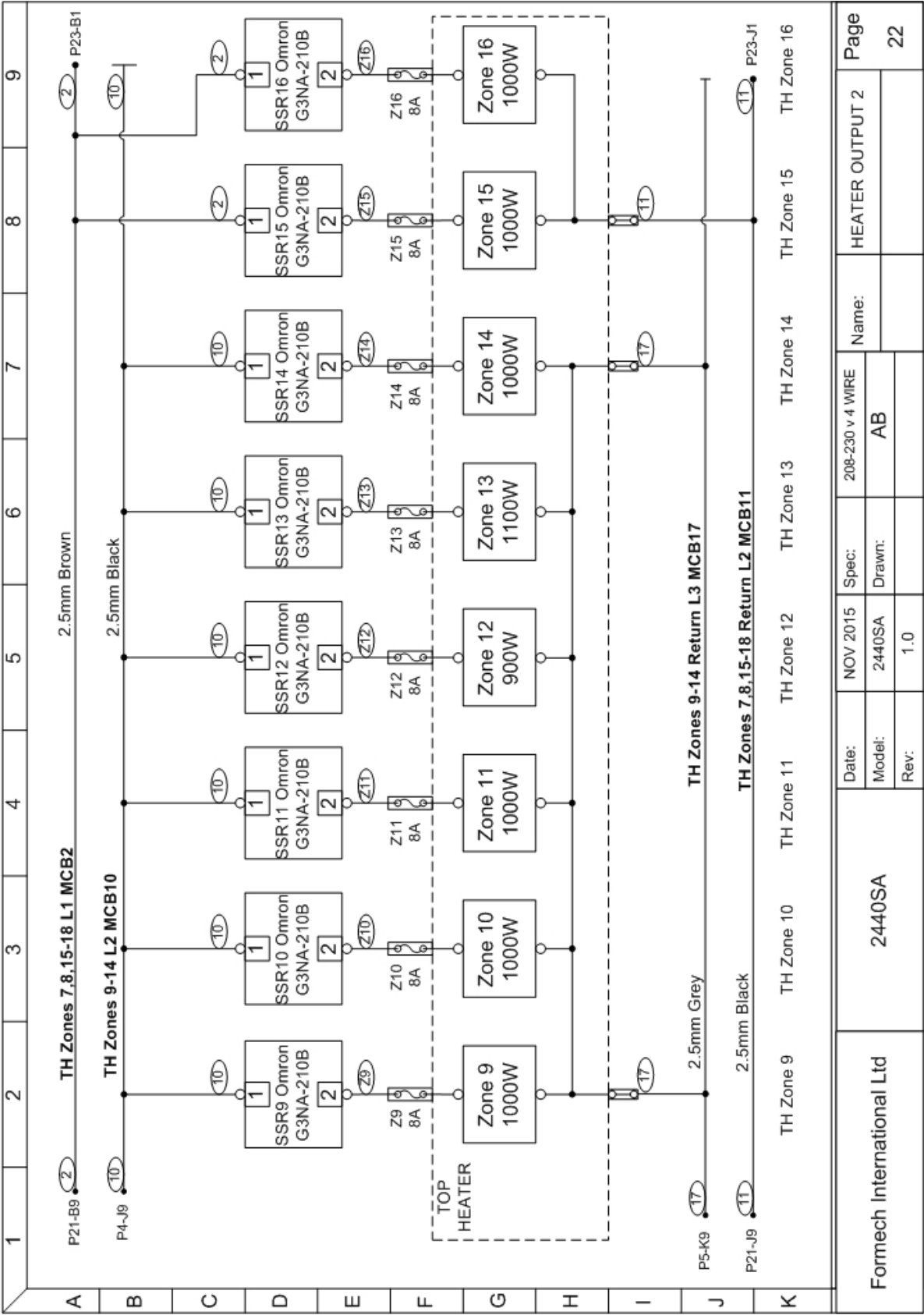


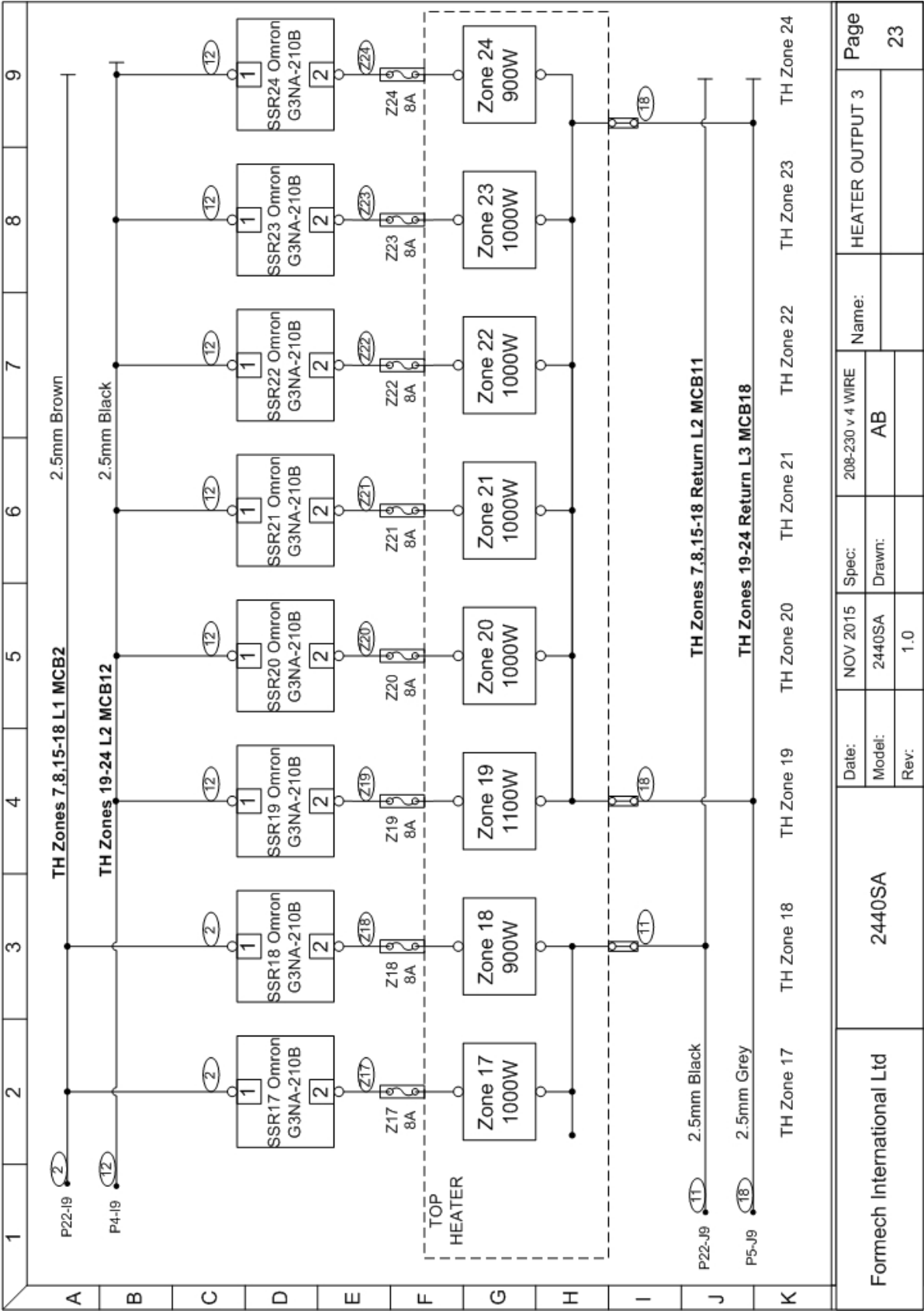


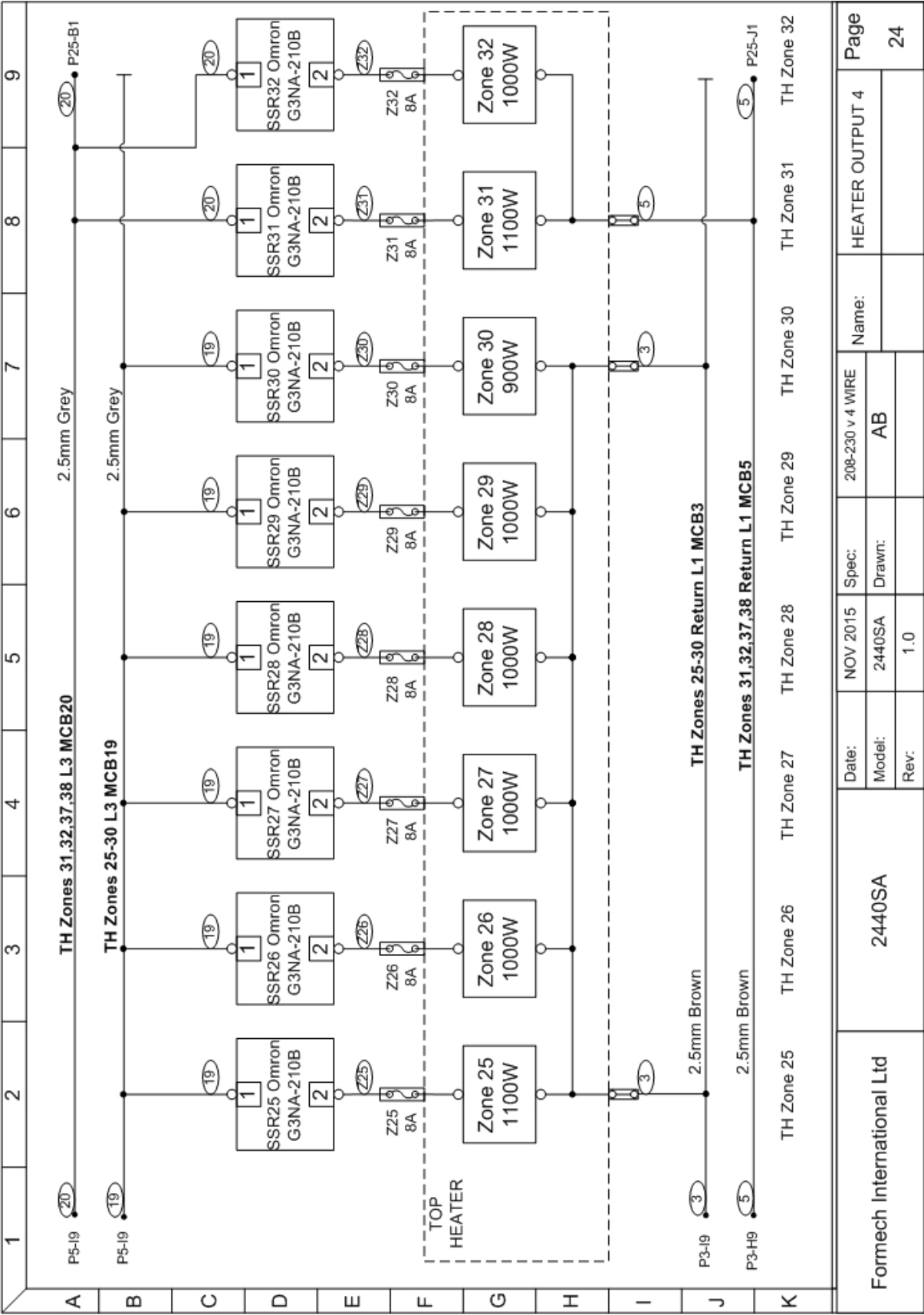


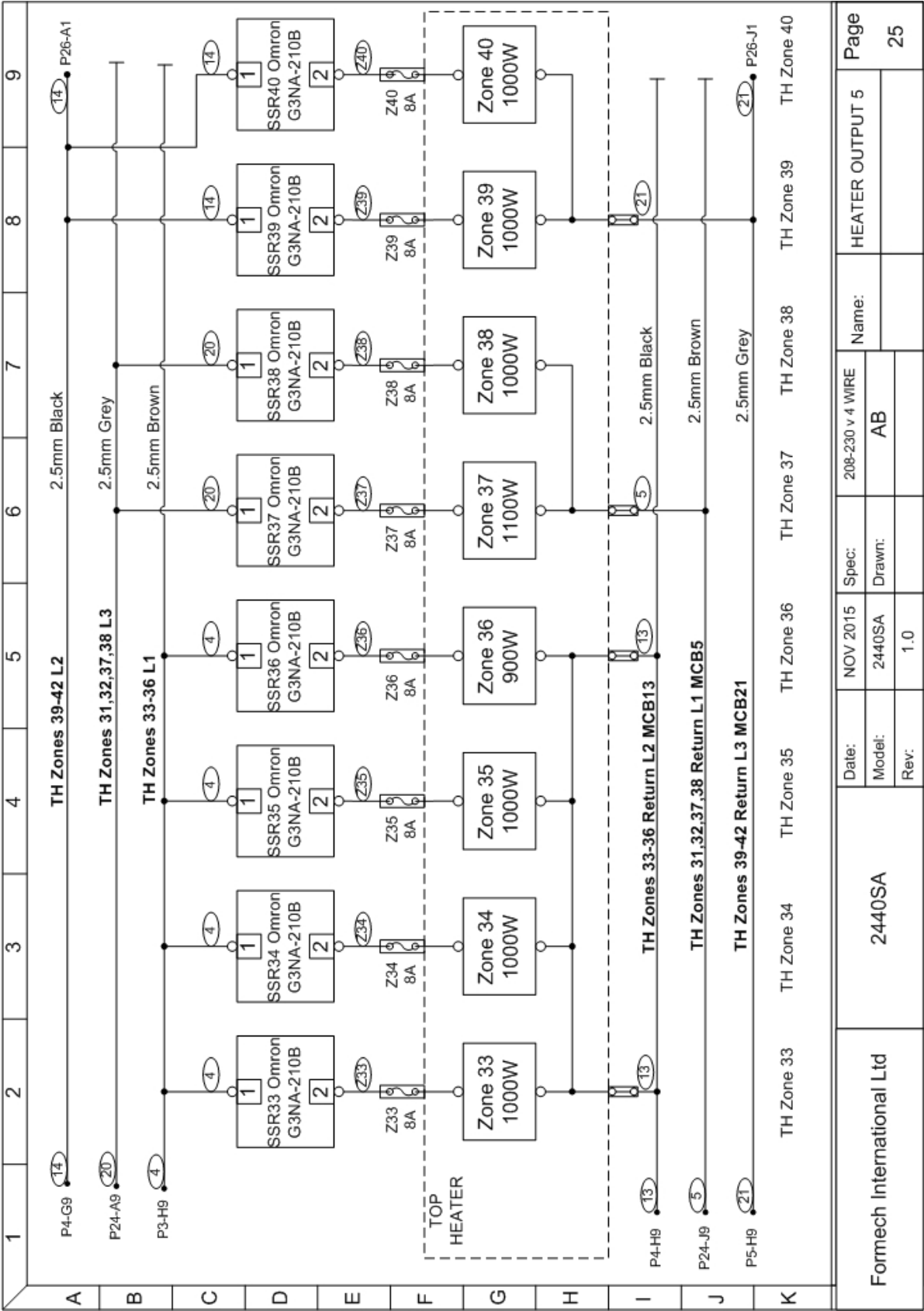
Formech International Ltd	2440SA			Date:	NOV 2015	Spec:	208-230 v 4 WIRE	Name:	HV OUTPUT 2		Page
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				Rev:	1.0						

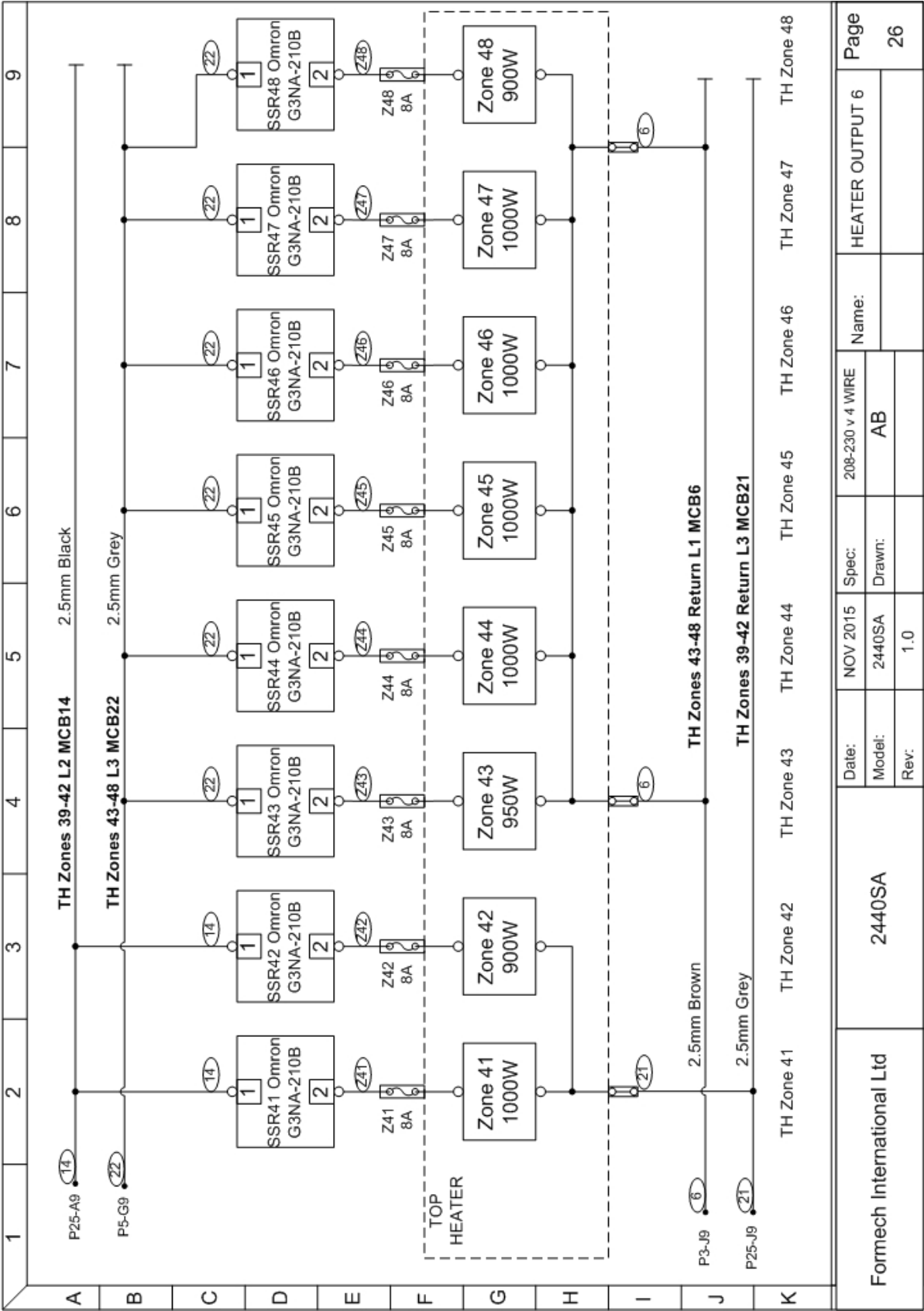






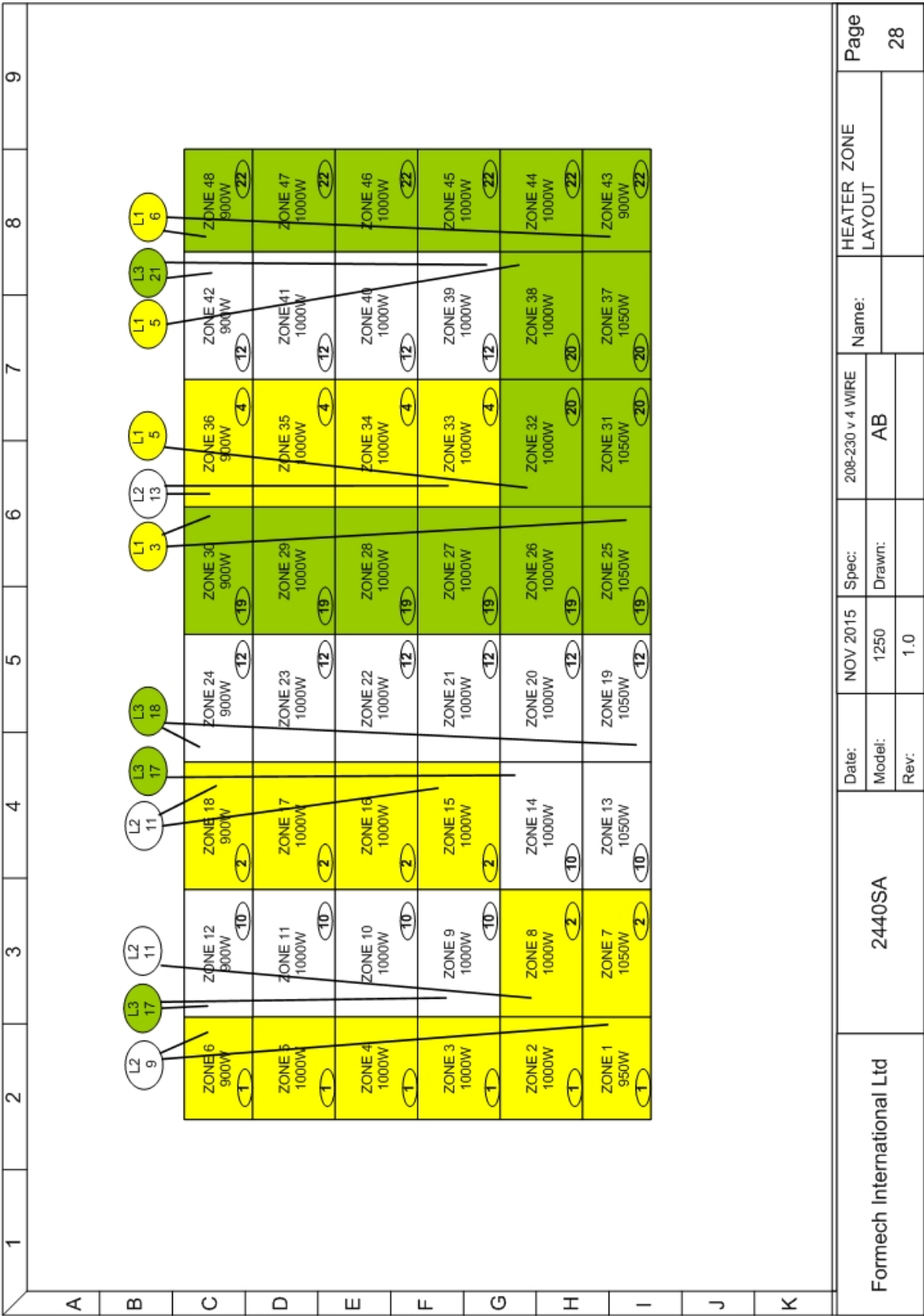


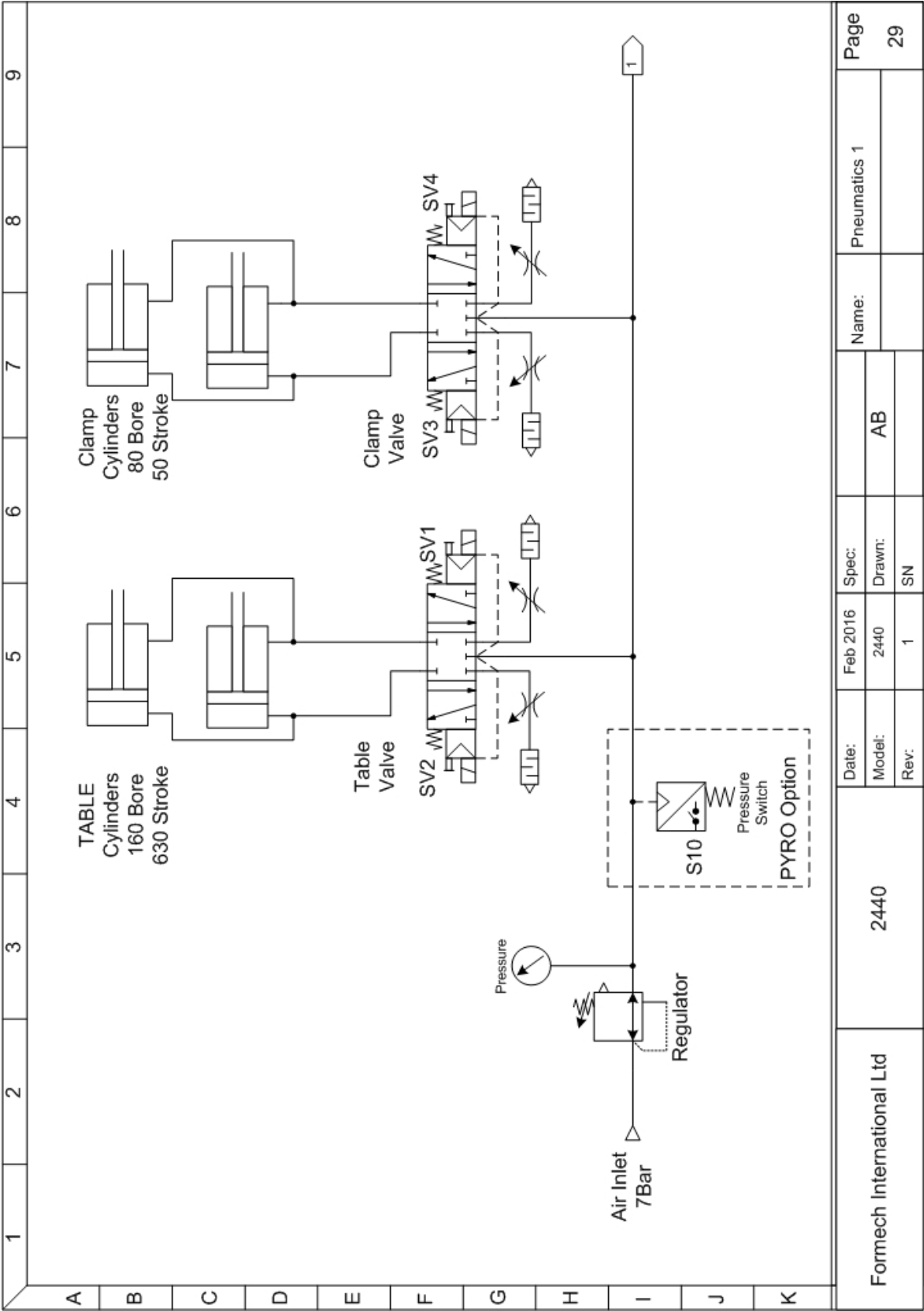


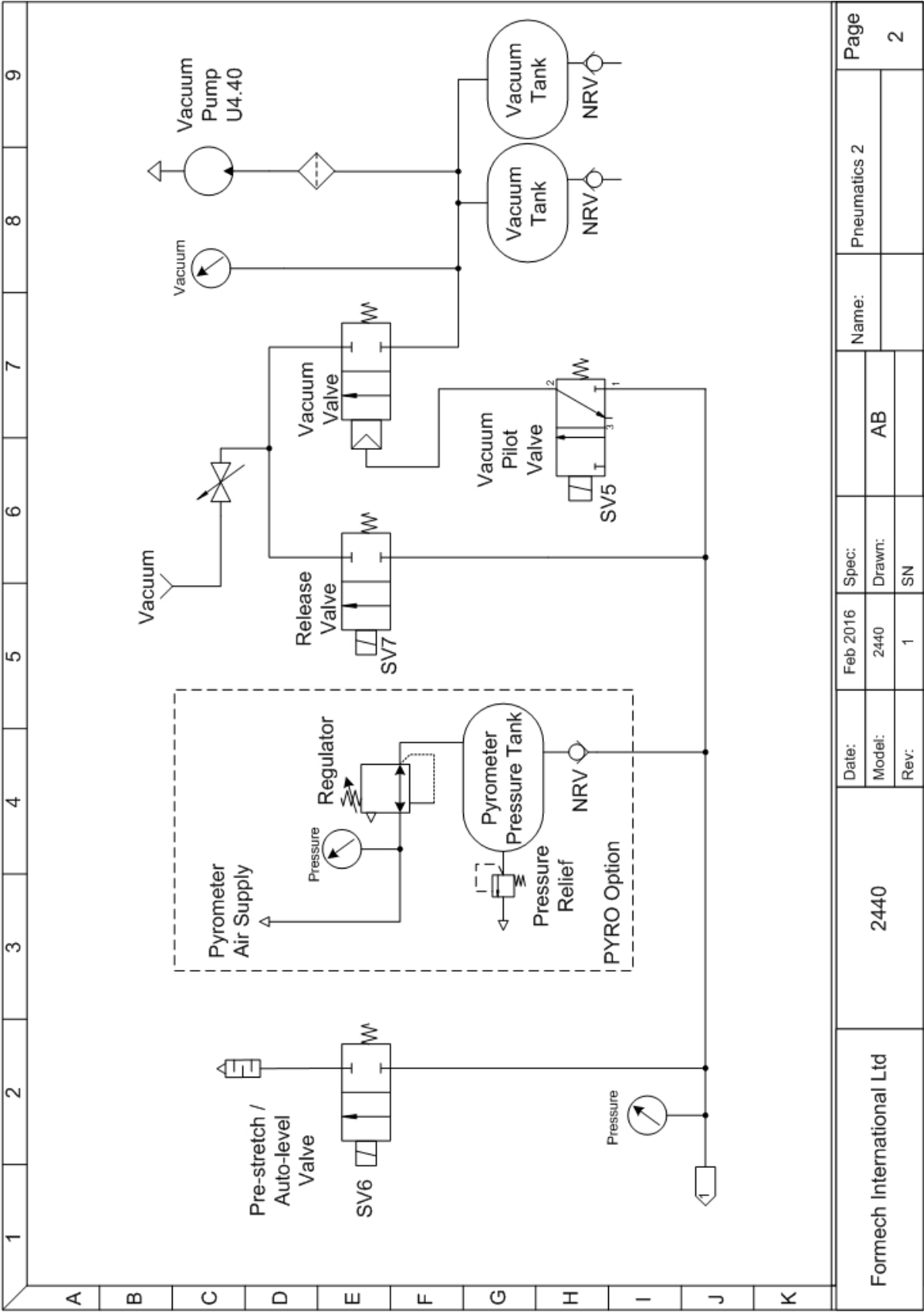


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2440 Major Component Parts & Options

Qty	Description	Cat.	Reference
4	Quartz Element	Heater	400W FSQ
53	Quartz Element	Heater	500W FSQ1 310 X 97mm
6	Quartz Element	Heater	550W FSQ1 310 X 97mm
6	Quartz Element	Heater	500W FSQ 310 X 62mm
6	Quartz Element	Heater	400W FSQ 310 X 62mm
18	Quartz Element	Heater	500W FSQ 244 X 97mm
2	Quartz Element	Heater	550W FSQ 244 X 97mm
1	Quartz Element PYRO	Heater	400W FSQ 244 X 97mm
1	Quartz Element PYRO	Heater	100W QSQ
52	30A Terminal Block (Qty 50 2440)	Heater	30A Ceramic Block
1	Cable 1mm	Heater	SiFGL 1mm
1	Cable White, Blue 2.5mm	Heater	2.5mm Sifgl
1	Heater earth	Heater	6mm Sif GY
1	Cable 1.63mm Solid	Heater	DG 1.63mm
1	Glass fibre Sleeving	Heater	S10 6MM
1	Heater Motor 0.25kw, 15:1 NMRV40	Heater	NMRV40 15:1, 0.25kW
2	17T TL sprocket	Heater	17T 3/8" TL Sprocket
1	17T bush 18mm	Heater	1008 18mm
1	17T bush 20mm	Heater	1008 20mm
1	20mm Oilite Bush	Heater	20 x 24 x 20 Oilite
1	Chain 3/8"	Heater	Chain 3/8"
1	3/8" link	Heater	3/8" link
1	3/8" link, single crank	Heater	3/8" link single crank
1.4	Top Heater Cable chain	Heater	SR355-066-100
1	Set of Cable chain brackets	Heater	AM355-M000-K00
3	20mm Bearing HT	Heater	6004ZZ
4	15mm Bearing 15 X 32 X 8	Heater	6002 2RS
4	FOOT M16	Mainframe	4947/100/223
5	Clamp Frame Spring	Clamp	SP1978
2	Comp spring, Trigger	Clamp	M205305
4	Clamp Spring(Clamp grab)	Clamp	A9-3834-2M
2	Clamp sponge seal	Clamp	EXA5625.
2	Clamp Washer seal	Clamp	N603112
4	25mm Bearing	Clamp	6205 ZZ 25mm
2	15mm Bearing 15 X 32 X 8	Clamp	6002 2RS
2	Spring, blue, 50 OD, 25ID, 76mm	Clamp	9 - 3212 - 210

2440 Major Component Parts & Options (continuation)

Qty	Description	Cat.	Reference
2	Handle Grip 3/4 X 4" DIA	Clamp	3/4 Dia Sleeve - 3in
4	Table gears	Table	Gear 2.5 mod x 32T
4	Table racks	Table	25mm 2.5 mod
8	25mm Pillow Bearing	Table	UCP205 or NP5
2	Mitre MOD 2 gear set	Table	GRSBM20/28N set
1	Leadscrew 20mm, 2X Lead	Table	L1320.R20-08-1.0
1	Square Steel Nut 20mm, 2X Lead	Table	L1336.R20-08
1	Handle 100 x 12mm sq	Table	GN471.1-100-V12
1	SR200 12mm Cable chain	Table	SR20012-040
1	SR200 end Bracket	Table	AN20012k
10	Silicone tube	Mainframe	PSIL4x2
10	15mm x 15mm Silicone Seal Strip	Mainframe	TYM 1279
1	High Modulus Silicone Sealant	Mainframe	HMA100
17	Natural rubber seal strip, 1M	Mainframe	12x6 Nat Rubber
12	Hinge	CTRL	702-7831
2	Key	CTRL	M32961
10	Cabinet lock	CTRL	M32170
3	MCB 10A	CTRL	Gtec 1-B 10
3	MCB 16A	CTRL	Gtec 1-B 16
6	MCB 25A	CTRL	Gtec 1-B 25
12	MCB 32A	CTRL	Gtec 1-B 32
1	3 POLE MCB 10A C	CTRL	Gtec 3-C 10
1	3 POLE MCB 16A C	CTRL	Gtec 3-B 16
5	20mm terminal fuse holder	CTRL	2002-1611
3	Fuse, 2A, 20mm, glass, Slow Blow	CTRL	20mm fuse 2A
2	Fuse, 8A, 20mm, glass, Quick Blow	CTRL	20mm fuse 8A
2	Fuse, 1A, 20mm, glass, Slow Blow	CTRL	20mm fuse 1A
1	Fuse, 4A, 20mm, Glass, Quick Blow	CTRL	20mm fuse 4A
1	160A Isolator Switch, 3P, Socomec	CTRL	513-5713
3	160A B2 FUSE,	CTRL	521-2753
1	Beam Sensor – Auto-Level	CTRL	E3Z-T81A 2M OMS
4	Limit Switch – Clamp Trigger	CTRL	159-4562
1	Clamp Limit switch	CTRL	436-0390 Modified
3	Limit switch, Table / Heater	CTRL	D4N-412G
2	D18 PNP proximity switches CARR	CTRL	XS118B3PAL2
3	2 POLE RELAY BASE	CTRL	P2RF-08-ESS
3	24VDC 2 POLE RELAY	CTRL	G2R-2-S 24DC(S)
1	Motor Inverter 0.4kw (247597)	CTRL	FRD720S025SCEC

2440 Major Component Parts & Options (continuation)

Qty	Description	Cat.	Reference
2	Relay Ultraslim single pole 6A, 24V	CTRL	G2RV-SL700AC/DC24
2	2 Handed ctrl module Cat I	CTRL	XPS BAE5120P
1	PLC	CTRL	750-852
1	8 Ch IP Module	CTRL	750-430
1	Contactor DIL-EM10 G 24VDC	Ctrl	DILEM-10-G 24V
1	Overload, 4-6A	Ctrl	ZE6
1	Buzzer 24V	Ctrl	35-0115
3	Grey Button	Ctrl	ZB4-BA8
7	8 Ch OP Module	CTRL	750-530
1	4 Ch OP module	CTRL	750-504
1	Supply module	CTRL	750-602
1	End block module	CTRL	750-600
1	Supply module inc fuse holder	CTRL	750-601
1	HMI MT-8100iE Weintek 10"	CTRL	MT-8100iE
2	RJ45 lead 3m black	CTRL	557-424
1	RJ45 socket, panel mount	CTRL	782-0791
48	10A SSR	CTRL	G3NA-210B
48	20mm terminal fuse holder	CTRL	2002-1611
48	Fuse, 8A, 20mm, Glass, Quick Blow	CTRL	20mm fuse 8A
1	Safety Relay Controller	CTRL	G9SE-401
1	24vdcpsu	CTRL	S8VK-C12024
5	J7KNAM 4POLE CONTACTOR 24VDC	CTRL	J7KNA-09-10 24D
4	J7TKN-A OVERLOAD 2.4-4A	CTRL	J7TKN-A 4
1	J7TKN-A OVERLOAD 6-9A	CTRL	J7TKN-A 9
2	Buzzer 24V	CTRL	35-0115
2	550W FAN 3 phase LH	CTRL	VBW6-00113
2	550W Fan 3 phase RH	CTRL	VBW6-00101
3	Grey Button	CTRL	ZB4-BA8
2	N.O / N.C. Switch body	CTRL	ZB4 BZ105
1	N.O. Switch body	CTRL	ZB4 BZ101
1	N.C / N.C. Switch body	CTRL	ZB4 BZ104
1	E Stop Button	CTRL	ZB4 BS54
1	E Stop legend	CTRL	ZBY 9330
2	2P Relay Base 95.05	CTRL	95.05 SPA BLUE
2	Forcibly guided 2P 24VDC Relay	CTRL	50.12.9.024.1000
2	Mechanically guided contactor 3NO, 2NC	CTRL	CAD 32 BL
1	1 1/4" Lever Ball Valve Full Flow, Male	PNUMO	BV-2091-20

2440 Major Component Parts & Options (continuation)

Qty	Description	Cat.	Reference
1	1 1/4" Regulator	PNUMO	M-R180-10W
2	2/2 Valve, 3/4"	PNUMO	SCE 238D004, 24VDC
1	3/4" Nylon / BEAD Silencer	PNUMO	EM-SU20
1	5/3 Closed centre 3/8	PNUMO	541 91 028
1	5/3 valve sub base 3/8	PNUMO	355 00 382
2	Sol. Pilots for 5/3 24VDC	PNUMO	189 00 001D2 24VDC
2	G series 80bore 50 stroke cylinder	PNUMO	G453 A8SK-0050-A00
1	G series 100bore 130 stroke cylinder	PNUMO	G453A1SK0130A00
1	Cylinder Rear Trunnion MP2	PNUMO	P493A1121110A00
1	Cylinder Rear Trunnion MP4	PNUMO	P493A1122100A00
2	1/2" Exhaust Regulator PE	PNUMO	APPRS-1/2"
2	Cylinder 160 A630 Tie Rod	PNUMO	G450 AQSK-0630-A00
1	Position Detector Mounting kit 450-160	PNUMO	P494AP129200A00,
1	Reed switch	PNUMO	P494A0021300-A00
1	Vacuum Pump	PNUMO	U 4.40 Three phase
1	1 1/2" Panel Mount Ball Valve, Festo	PNUMO	VAPB-1 1/2-F-25-F0405
1	Lever for 1 1/4" to 1 1/2" - BV Panel lever	PNUMO	Festo 542703
10	1 1/2" Wire Reinforced Vacuum Hose	PNUMO	P-AM038-10 (10m)
10	1 1/2" BSPT M X 1 1/2" Hosetail Brass	PNUMO	BMH 24/24U
1	2/2 Piston valve, 1 1/2" pilot operated	PNUMO	E290A482
1	3/2 Valve pilot for E290 1 1/2"	PNUMO	SCE374A098MS 24/DC
1	5/3 Closed centre 3/4"	PNUMO	544 90 022
1	5/3 valve sub base 3/4", 544 Series	PNUMO	355 00 144
2	Sol. Pilots for 5/3, 544 series	PNUMO	192 01 023 24VDC
4	Size 22 connectors - suppressed	PNUMO	881 22 405 24V dc
3	Size 30 connectors - suppressed	PNUMO	881 22 603 24V dc
2	3/4" T Handle Ball valve Full Flow, Male	PNUMO	B/V 2092-12
2	3/8" Exhaust Regulator PE	PNUMO	APPRS 3/8"
2	1/2" NRV Tank	PNUMO	BV 3100-08
1	40mm Pressure gauge 1/8"	PNUMO	B001F146A
1	Vacuum gauge	PNUMO	B001F139A
1	Regulator, Clamp	PNUMO	M-R55M-2W

2440 Options Parts

1	Pyro Unit 8M	Pyro	Optris CT LT15 CB8
1	2 Ch AI 1-10vdc module	Pyro	750-467
1	Regulator ¼"	Pyro	M-R55M-2W
1	1/8" Gauge, PYRO, 0-30psi	Pyro	YY003040B2D
1	8mm tube to ¼" Check Valve	Pyro	CDCVPC0802N
1	¼" Relief valve, 9 bar	Pyro	W60006-9.0
1	Tank pressure switch	Pyro	398-7045
1	Tank pressure 24L	Pyro	BPB0471

If you are unable to cure any problem relating to your machine, or if you wish to order spare parts please contact us, stating the model (2440), the serial No. (on specification plate) and a full description of the fault.

E C Machinery Directive 2006/42/EC

Declaration of Conformity

We hereby certify that the machinery stipulated below complies with all the relevant provisions of the EC Machinery Directive and the National Laws and regulations adopting this Directive. Modifications to this machinery without prior approval from the undersigned will render this declaration null and void.

Machine Description: Vacuum Forming Machine
Function: Thermoforming of Plastic Sheet
Model / Type: 686 1372 1500 1250 2440 FMDH Series

Is in conformity with the provisions of the following other EC Directives:

2014/30/EU – EMC

2014/35/EU – LVD

2011/65/EU – RoHS

Technical File Compiled by: Matthew Wareham at address below.

Significant harmonised standards applied:

EN ISO 12100: 2010

EN ISO 13849-1: 2015

EN 60204-1: 2018

EN 12409: 2008+A1:2011

Signed



Name: Joao costa

Position: Managing Director

Being the responsible person appointed by the manufacturer

Formech Europe GmbH
Am Wolfsberg / An der L553
76774 Leimersheim
Germany

UKCA Supply of Machinery Regulations S.I 2008:1597

Declaration of Conformity

We hereby certify that the machinery stipulated below complies with all the relevant provisions of the UKCA Supply of Machinery Regulations and the National Laws and regulations adopting these regulations. Modifications to this machinery without prior approval from the undersigned will render this declaration null and void.

Machine Description: Vacuum Forming Machine
Function: Thermoforming of Plastic Sheet
Model / Type: 686 1372 1500 1250 2440 FMDH Series

Is in conformity with the provisions of the following other UKCA Regulations:

S.I. 2016:1091 – EMC

S.I. 2016:1101 – Electrical Equipment Safety

S.I. 2012:3032 – RoHS

Technical File Compiled by: Matthew Wareham at address below.

Significant harmonised standards applied:

EN ISO 12100: 2010

EN ISO 13849-1: 2015

EN 60204-1: 2018

EN 12409: 2008+A1:2011

Signed 

Name: Joao costa

Position: General Manager

Being the responsible person appointed by the manufacturer

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