CARON

Caron Products & Services

OPERATIONS MANUAL

CLASS II BIOSAFETY CABINET RANGE

MODELS: MR085G, MR120H, MU120H, MD085G, MD120H, MT120H, ME085J, ME120K, MX120K, MU120H, MX120K, MT120H

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At CARON, we are committed to continuous quality improvement. Our goal is to supply our customers with highly reliable equipment at a fair price. In order to openly monitor our performance, we would appreciate your feedback on our products and services.

If you have questions, or any suggestions for improvement based on the installation or operation of the equipment you have purchased, please contact our service department at www.caronproducts.com or USA Tel 740-373-6809 – UK Tel +44-2392-266400.

Thanks again for your business!

REVISION LOG

Version	Date	Description
1	Oct 24, 2022	Production Released
2	Nov 15, 2023	Electrical Schematics Updated. Declaration of conformity updated.
3	Dec 12, 2023	MU, MT & MX Cabinets added

Contents

EQUIPMENT LIMITED WARRANTY

Please review this section before requesting warranty service. At CARON, one of our primary goals is to provide customers with high levels of personal service and top quality products, delivered on time, backed by technical service and supported for the life of the product.

Before contacting us for warranty service, please be aware that there are repairs that are not covered under warranty.

WARRANTY DEFINED

Caron Products & Services, Inc. (herein after CARON) hereby warrants that equipment manufactured by CARON is free from defects in materials and workmanship when the equipment is used under normal operating conditions in accordance with the instructions provided by CARON.

COVERED:

- Parts and labor for a period of two (2) years from date of shipment.
- Any part found defective will be either repaired or replaced at CARON's discretion, free of charge, by CARON in Marietta, OH. Parts that are replaced will become the property of CARON.
- If CARON factory service personnel determine that the customer's unit requires further service CARON may, at its sole discretion, provide a service technician to correct the problem, or require the return of the equipment to the factory or authorized service depot.
- CARON will have the right to inspect the equipment and determine the repairs or replacement parts necessary. The customer will be notified, within a reasonable time after inspection, of any costs incurred that are not covered by this warranty prior to initiation of any such repairs.

NOT COVERED:

- Calibration of control parameters.
- Improper installation; including electrical service, gas and water supply tubing, gas supplies, room ventilation, unit levelling, facility structural inadequacies or ambient conditions that are out of specification.
- Cost of express shipment of equipment or parts.
- Any customer modifications of this equipment, or any repairs undertaken without the prior written consent of CARON, will render this limited warranty void.
- CARON is not responsible for consequential, incidental or special damages; whether shipping damage or damages that may occur during transfer to the customer's point of use. When the equipment is signed for at the customer's site, ownership is transferred to the customer. Any damage claims against the shipping company become the responsibility of the customer.
- Repairs necessary because of the equipment being used under other than normal operating conditions or for other than its intended use.
- Repair due to the customer's failure to follow normal maintenance instructions.
- Parts considered consumable; including: light bulbs, filters, gases, etc.
- Damage from use of improper water quality.
- Damage from chemicals or cleaning agents detrimental to equipment materials.
- Force Majeure or Acts of God.

This writing is a final and complete integration of the agreement between CARON and the customer. CARON makes no other warranties, express or implied, of merchantability, fitness for a particular purpose or otherwise, with respect to the goods sold under this agreement. This warranty cannot be altered unless CARON agrees to an alteration in writing and expressly stated herein shall be recognized to vary or modify this contract.

Ohio Law governs this warranty.

EQUIPMENT INTERNATIONAL LIMITED WARRANTY

Please review this section before requesting warranty service. At CARON, one of our primary goals is to provide customers with high levels of personal service and top quality products, delivered on time, backed by technical service and supported for the life of the product.

Before contacting your distributor for warranty service, please be aware that there are repairs that are not covered under warranty.

WARRANTY DEFINED

Caron Products & Services, Inc. (herein after CARON) hereby warrants that equipment manufactured by CARON is free from defects in materials and workmanship when the equipment is used under normal operating conditions in accordance with the instructions provided by CARON.

COVERED:

- Parts for a period of two (2) years from date of shipment.
- Any part found defective will be either repaired or replaced at CARON's or their authorized representative's discretion. Parts that are replaced will become the property of CARON.
- If CARON or their authorized representatives determine that the customer's unit requires further service, CARON or the representative may, at its sole discretion, provide a service technician to correct the problem, or require the return of the equipment to the authorized service depot.
- CARON or their authorized representative will have the right to inspect the equipment and determine the repairs or replacement parts necessary. The customer will be notified, within a reasonable time after inspection, of any costs incurred that are not covered by this warranty prior to initiation of any such repairs.

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Caron Products & Services, Inc.
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740-373-6809

ABOUT THIS MANUAL

This User Manual is intended to provide guidance for the **Installation, Commissioning, Operation** and **Servicing** of the Medical Safety Cabinet (MSC) range.

This manual's descriptions do not describe the functionality or processing of the final system into which this product may be incorporated. Reference should be made to other applicable documentation.

SAFETY INFORMATION 

HAZARDS

During servicing and maintenance, this equipment can potentially cause danger through exposure to used (contaminated) filters, the employment of high voltages[1] and high-speed rotating fans where access panels are opened.
Failure to observe the recommendations in this manual will constitute a SAFETY OR ELECTRICAL SHOCK HAZARD

INSTALLATION, COMMISSIONING, OPERATION AND SERVICING

The equipment must be operated and serviced as recommended in this manual, otherwise the electrical protection and/or the airflow integrity of the cabinet could be compromised. Any such installation or use may affect the terms and conditions of any guarantees and warranties.

PRODUCT GUARANTEE

Caron guarantees that this product is free from defects in materials and workmanship when shipped from the factory and will replace or repair the unit if it proves defective in normal use or during service for a period of 12 months from delivery and commissioning. This guarantee is invalidated if the unit is
used incorrectly, poorly serviced, misused or accidentally damaged.

ENVIRONMENT

- This product is intended for indoor use;
- It is not designed or certified for use in a potentially explosive environment as defined in Atex Directive 94/9/EC.
- Temperature range: 15^0C to 32^0C
- Humidity: Max RH 80% for temperatures up to 31^0C.
- Mains supply voltage fluctuations up to ± 10% of nominal voltage 240V
- Mains supply voltage: 110V to 120V AC
- Containment & Operator Protection

Safe, acceptable levels of hazardous substances containment, for operator protection can only be assured whilst the cabinet is fully operating, developing correct airflow face velocity under normal conditions. In the event of a power failure, all substances under process should be removed from the enclosure (to a separate safe environment), or separately sealed whilst within the enclosure, with all doors remaining closed.

FIRE OR EXPLOSION RISK

There are no direct sources of ignition within the working zone of the cabinet and no intrinsic risk of fire or explosion during normal use. The acrylic enclosure may only provide initial containment should a fire occur, caused by flammable materials and an ignition source introduced during a process by the end-user. Adequate risk assessment must be applied to determine the potential hazards posed by all processes to be undertaken.

[1] *Defined in LV Directive 2006/95/EC as voltages of 50VAC-1000VAC, 75VDC-1500*

INTERNATIONAL SYMBOLS AND DEFINITIONS

The equipment is fitted with identification and ISO/ANSI safety hazard warning labels shown below, which uniquely identifies the product, validation and safety information. These labels must not be removed or defaced, as evidence of compliance to Quality Assurance Tests, and CE Mark may be lost.

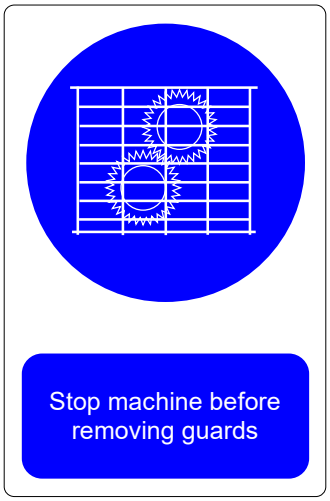
Warning of hazardous area

Warning of dangerous electric voltage

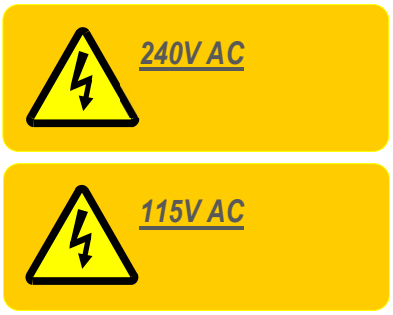
UV-C Radiation from The Biocidal Lamp
is Harmful to Both Eyes and Skin

Earth (ground) protective conductor

Tested For
Electrical Safety

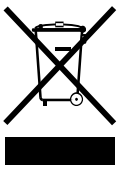


Warning Label Fan
Label Guard



Warning Label
Operating Voltage

WARNINGS



The use of the WEEE Symbol indicates that this product cannot be treated as household waste at end-of-life.
By ensuring that this product is disposed of correctly, you will help protect the environment.
For more detailed information about the recycling of this product, please contact your supplier,
Restriction of the use of certain Hazardous Substances (RoHS) 2011/65/EU as amended

1.0 INTRODUCTION

This Manual is applicable to the following powder weighing products:

Recirculating Medical Safety Cabinet:
MR085G, MR120H, MU120H

Ducted Medical Safety Cabinet with exhaust spigot:
MD085G, MD120H, MT120H

Medical Safety Cabinet with Exhaust Box:
ME085J, ME120K, MX120K

1.1 INTRODUCTION AND OPERATING PRINCIPLES

Caron's Medical Safety Cabinet (MSC) range has been designed to provide an energy conscious, single operator based, bio-hazard safety cabinet where laboratory space may be limited. There is three different models of the MSC's with two different sizes. Recirculating MSC, Ducted MSC with Exhaust Spigot and MSC with filtered exhaust box.

It is designed and constructed as a Class II MSC cabinet, providing nominal 70% recirculation and 30% exhaust air. Containment and protection from potential exposure to hazardous substances and physical harm to laboratory personnel during processing is assured.

Airflow calibration, low airflow alarm, service and filter saturation indicators are provided by the integrated 'Nextion TFT' airflow and alarm control system.

1.1.1 – Recirculating MSC

Airflow Pattern Principles

The enclosure utilises a percentage recirculation airflow system. Initially, unfiltered air is drawn through the lower door aperture and via the inflow grille the air is passed through a rear plenum providing the downflow HEPA filters (approximately 70% flow) and exhausted via the exhaust filter (approximately 30% flow). Both downflow and exhaust airflows are fully balanced to provide the following.

Product Protection – Downflow Air

Unfiltered air is pulled through the rear plenum by the single balanced centrifugal fan, which simultaneously develops a positive pressure in the common plenum. After HEPA filtering, this 70% airflow volume is recirculated within the cabinet as the downflow air, without entering a worker's breathing zone.

This vertical air stream continuously 'flushes' out the interior of airborne contaminants and protects specimens handled in the cabinet from contamination.
Nearer to the work surface level this downflow divides a portion of the air entering an intake grille at the rear of the cabinet, with the remainder entering the front aerofoil grille nearest the operator, thus providing additional operator protection. All airstreams are combined under the stainless-steel work surface where the cycle is repeated continuously.

Operator Protection - Exhaust air

The remaining 30% airflow drawn into the common plenum is removed via the exhaust HEPA filter(s).

Operator protection is achieved by the application of high velocity inflow-air created by the downflow fan blower, which pulls the surrounding room air under negative pressure airflow via the open aperture in the front hinged door. This airflow is rapidly drawn down into the stainless-steel intake grille in the frontal working zones of the enclosure, creating a virtual 'air curtain' when combined with the downflow airflow to enhance operator protection.

All airstreams combine below the work surface then guided to the common plenum in the roof mounted fan-filter housing where the exhaust fan extracts a proportion of the airflow, which passes through the exhaust HEPA filters and out through the top cover of the unit.

1.1.2 – Ducted MSC with exhaust spigot

Airflow Pattern Principles

The enclosure utilises a percentage recirculation airflow system. Initially, unfiltered air is drawn through the lower door aperture and via the inflow grille the air is passed through a rear plenum providing the downflow HEPA filters (approximately 80% flow) and exhausted via the exhaust filter (approximately 20% flow). Both downflow and exhaust airflows are fully balanced to provide the following.

Product Protection – Downflow Air

Unfiltered air is pulled through the rear plenum by the single balanced centrifugal fan, which simultaneously develops a positive pressure in the common plenum. After HEPA filtering, this 70% airflow volume is recirculated within the cabinet as the downflow air, without entering a worker's breathing zone.

This vertical air stream continuously 'flushes' out the interior of airborne contaminants and protects specimens, handled in the cabinet from contamination.
Nearer to the work surface level this downflow divides, with a portion of the air entering an intake grille at the rear of the cabinet, with the remainder entering the front aerofoil grille, nearest the operator, thus providing additional operator protection. All airstreams are combined under the stainless-steel work surface where the cycle is repeated continuously.

Operator Protection - Exhaust air

The remaining 30% airflow drawn into the common plenum is through the HEPA filters held below the Exhaust spigot up into the end-users ducting.

Operator protection is achieved by the application of high velocity inflow-air created by the end users airflow ducting which pulls the surrounding room air under negative pressure airflow via the open aperture in the front hinged door. This airflow is rapidly drawn down into the stainless-steel intake grille in the frontal working zones of the enclosure, creating a virtual 'air curtain' when combined with the downflow airflow to enhance operator protection.

All airstreams combine below the work surface then guided to the common plenum in the roof mounted fan-filter housing where the exhaust fan extracts a proportion of the airflow, which passes through the exhaust HEPA filters and out into the end-users ducting through the exhaust spigot.

1.1.3 – MSC with filtered exhaust box

Airflow Pattern Principles

The enclosure utilises a percentage recirculation airflow system. Initially, unfiltered air is drawn through the lower door aperture and via the inflow grille the air is passed through a rear plenum providing the downflow HEPA filters (approximately 80% flow) and exhausted via the exhaust filter (approximately 20% flow). Both downflow and exhaust airflows are fully balanced to provide the following.

Product Protection – Downflow Air

Unfiltered air is pulled through the rear plenum by a dynamically balanced centrifugal fan, which simultaneously develops a positive pressure in the common plenum. After HEPA filtering, this 80% airflow volume is recirculated within the cabinet as the downflow air, without entering a worker's breathing zone.

This vertical air stream continuously 'flushes' out the interior of airborne contaminants and protects specimens, handled in the cabinet from contamination.
Nearer to the work surface level this downflow divides, with a portion of the air entering an intake grille at the rear of the cabinet, with the remainder entering the front aerofoil grille, nearest the operator, thus providing additional operator protection. All airstreams are combined under the stainless-steel work surface where the cycle is repeated continuously.

Operator Protection - Exhaust air

The remaining 20% airflow drawn into the common plenum is drawn through the exhaust HEPA Filter(s) from a dynamically balanced centrifugal fan.

Operator protection is achieved by the application of high velocity inflow-air created by the exhaust fan blower, which pulls the surrounding room air under negative pressure airflow via the open aperture in the front hinged door. This airflow is rapidly drawn down into the stainless-steel intake grille in the frontal working zones of the enclosure, creating a virtual 'air curtain' when combined with the downflow airflow to enhance operator protection.

All airstreams combine below the work surface then guided to the common plenum in the roof mounted fan-filter housing where the exhaust fan extracts a proportion of the airflow, which passes through the exhaust HEPA filters and out through the post-filtered exhaust grille box.

2.0 GENERAL CONSTRUCTION

In this section the general components of the unit are given with a detailed explanation for the key components of a unit.

The bench-mounted cabinet is constructed as a welded steel assembly. The main body is fabricated from high-grade steel, finished in chemical-resistant epoxy paint.

A separate, satin finished type-316L stainless steel internal liner is incorporated to facilitate cleaning and decontamination of the cabinet work zone.

The Fan, Filters and Common Plenum are installed within the housing at the top of the cabinet.
Removable, side and rear access panels provide access to these components and at the front; a hinged fascia allows access to the LED lighting, Nextion TFT and PCB for all servicing and maintenance requirements.

2.0.1 Main Access Door

The top hinged, front facing main access door is constructed from fire-retardant acrylic, optically clear, fitted with a neoprene seal around the periphery to ensure airtight sealing when fully closed.
Key-lockable 'T' handle latches secure the front door in place during operation.
An all-acrylic blanking panel is also provided for securing onto the main door panel for use as a 'night door' during fumigation. Key-lockable 'T' handle latches lock this acrylic panel down.
This blanking panel must not be fitted during normal operation of the cabinet.

2.0.2 Electrical

The electrical supply, control and indicator circuits for the exhaust and downflow fan blowers, Class II airflow system, alarms and lighting are wired to DIN rail mounted screw terminals located behind the front-hinged cover. A multi-pole IEC electrical connector is used to couple the Fan blower to the terminal grid and aids removal of the common plenum during servicing of the cabinet.

2.0.4 Downflow Filter

A High efficiency particle (HEPA Grade H14) filter provides filtered and diffused downflow air for product protection during normal operation of the cabinet. The filter is located in the filter plenum within the top fan/filter housing. Removable side and rear covers provide access to the HEPA filter for maintenance.

2.0.4 Exhaust Filter

A single (HEPA Grade H14) filter is installed within the exhaust filter box within the top fan/filter housing. This provides the high level filtration of the exhaust airstream.

2.0.5 Airflow Control and Alarm System

The cabinet incorporates Caron's Nextion TFT display airflow and alarm system to control the blower motor. Airflow balance is precisely measured and controlled by this system and will enunciate low and high airflow alarm signals during operation.
A user-interface comprising a horizontal aspect touch screen controller display and keypad enables a selection of various pre-programmed menu options during settings and calibration.

2.0.6 Work Surface

A Stainless-steel work surface is fitted internally as one solid component or split into three individual components for easy access and cleaning.

2.0.7 Lighting

Internal Lighting is provided by an externally mounted 24V Led Tube Light.

2.0.8 UVC Lamp (Optional)

UVc germicidal fumigation is provided by the inclusion UVc lamps mounted under the diffuser grille. The lamp produces UVC wavelength of 254nm @ Photometric power of 12.4W, Electrical power: 30W. Rated life is 8,000 hours, effective 6,000 hours, after which the UVc output will fall to less than 80% power relative to a new lamp.

2.1 RECIRCULATING MSC SPECIFIC CONSTRUCTION

The Recirculating MSC incorporates one fan in the downflow fan housing which operates both the inflow and downflow functions of the unit. Of the 100% of the air that is drawn through the inflow 70% of the air is pushed through the HEPA filters from the positive pressure contained in the downflow fan housing. The other 30% of air is also pushed through the exhaust HEPA filters to be exhausted through a top cover.

2.2 DUCTED MSC SPECIFIC CONSTRUCTION

The Ducted MSC incorporates one fan in the downflow fan housing which operates both the inflow and downflow functions of the unit. Of the 100% of the air that is drawn through the inflow 70% of the air is pushed through the HEPA filters from the positive pressure contained in the downflow fan housing. The other 30% of air is also drawn through the exhaust HEPA filters via the ducting connected to the exhaust spigot.

2.3 MSC WITH EXHAUST BOX SPECIFIC CONSTRUCTION

The MSC with exhaust box incorporates two fans one in the downflow fan housing which operates the downflow functions of the unit; another in the exhaust box which operates the inflow function of the unit. Of the 100% of the air that is drawn through the inflow 80% of the air is pushed through the HEPA filters from the positive pressure contained in the downflow fan housing. The other 20% of air is also drawn through the exhaust HEPA filters to be exhausted through a exhaust box.

The addition of an exhaust fan to this unit allows for the fine tuning of the airflow velocities allowing you to tune in the inflow velocity to a required set point, without affecting the downflow.

3.0 INSTALLATION GUIDELINES

Follow the below guidelines to ensure safe use and unpacking along with optimum operation of the unit.

3.0.1 UNPACKING

Where supplied 'flat-packed' the cabinet will require re-assembling on site by trained installation personnel. All component parts must be carefully unpacked, and the protective film should remain on the acrylic panels intact until the cabinet is fully assembled and ready for commissioning.

3.0.2 SITE SELECTION

For operator safety and reliable function, the cabinet should be placed on a firm and level bench/work surface, or on top of the (optional) custom trolley frame.

3.0.3 AIRFLOWS AND PRESSURE REGIMES

To avoid air currents and pressure fluctuations in the room affecting the overall performance of the safety cabinet, it should be positioned well away from direct sources of disruptive air changes such as open windows, doors etc. Room air velocity should not exceed 0.25m/s.

3.0.4 GENERAL INSTALLATION RECOMMENDATIONS

The following environment requirements should be considered during installation:

- Ambient temperature: from 15ºC to 32ºC
- Relative humidity: RH < 80% at 30ºC
- Recommendations as detailed in BS 14175:4 2003.
- Refer to HSG 258 guide to local exhaust ventilation for your requirements

3.0.5 NOISE LEVELS

The noise generated by the fan and resulting air movement will not rise above measured limits during normal operation, with the bi-folding access door closed and secured.

3.0.6 CLEANLINESS STANDARD

The site should be maintained as clean and dust free as possible, since the cleaner the environment the more efficient the filtration will be and also help to reduce pre-filter maintenance costs. Use a damp cloth, to clean the exterior surfaces of the cabinet, regularly, particularly the front and side surfaces, to remove accumulated dust.

NOTE:

Do not use solvent-based chemicals to clean the acrylic panels, particularly on a regular basis as this may promote stress cracking of the acrylic material.

3.0.7 ELECTRICAL CONNECTION

Connect the cabinet to an adjacent, earthed and switched supply of:

230 Volts, single phase, ~ 50Hz 13-amp outlet using the IEC mains lead supplied.

115 Volts, single phase, ~ 60Hz outlet or 230 Volts, single phase, 50/60Hz outlet using the IEC mains lead supplied

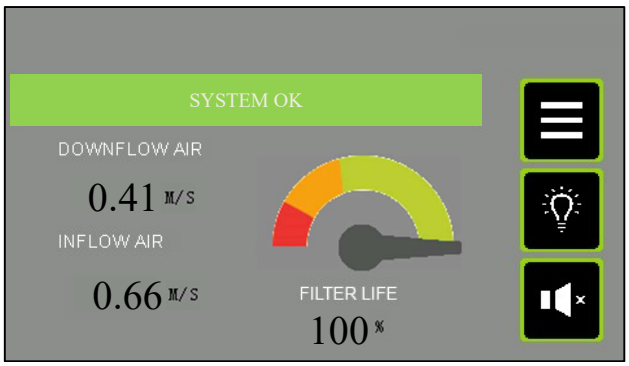
PART 1 - COMMISSIONING

4.0 COMISSIONING

4.1 COMMISSIONING GUIDELINES

After connecting to the electrical supply, operate the cabinet fan by pressing the rocker switch at the side of the fan/filter hood.
After the 'splash screen' appears on power-up for 10 secs. it will be replaced by the 'home screen' from where all menus / sub-menus can be selected.

SPLASH SCREEN



HOME SCREEN

4.1.1 SETTING NORMAL AIRFLOW VELOCITY AND CALIBRATING THE TFT ALARM:

GENERAL

- For the following commissioning procedures, the cabinet should already be fitted with new chemical filters of the type suitable for capturing the chemical vapours, which will be encountered when using this cabinet and must be emptied of all labware. The bi-folding acrylic door must also be closed and both RH & LH blanking caps fitted. The internal fan should be allowed to run for several minutes in order to stabilise, after which measurements and adjustments may be made as follows:

- The inflow and downflow measurements are used to establish that the safety cabinet continues to meet both design and industry compliance standards and that no significant deterioration in performance has occurred since previous factory acceptance tests or future servicing. It forms the basis of all subsequent testing and thorough examination protocol.

- The fan speed and alarm calibration set point have been pre-set during factory acceptance testing the downflow set between >0.25 to 0.50m/s and the inflow is set at >0.4m/s.

- When calibrating the inflow face velocity, take measurements at the access aperture using a rotary-vane type anemometer; when calibrating the downflow velocity, take measurements along the downflow grille using a rotary vane type anemometer positioned 50mm for the grille. Readings should be taken over a 30 second interval noting the highest and lowest values at multiple notional 'grid points' at the apertures of the acrylic front door. (Refer to Figures 1a and 1b as appropriate)

- When measurements have been taken and the average found look too section 4.10 for the correct procedure on how to in put this information into the unit.

4.1. FIGURES 1a & 1b

Figure 1a
Inflow anemometer measurement positions.

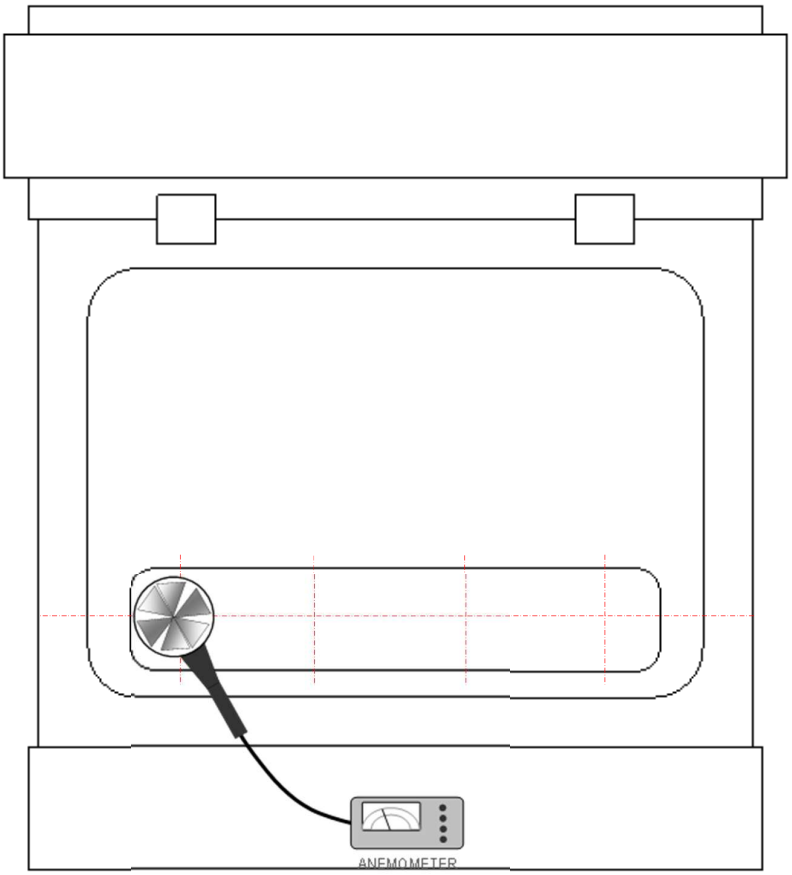
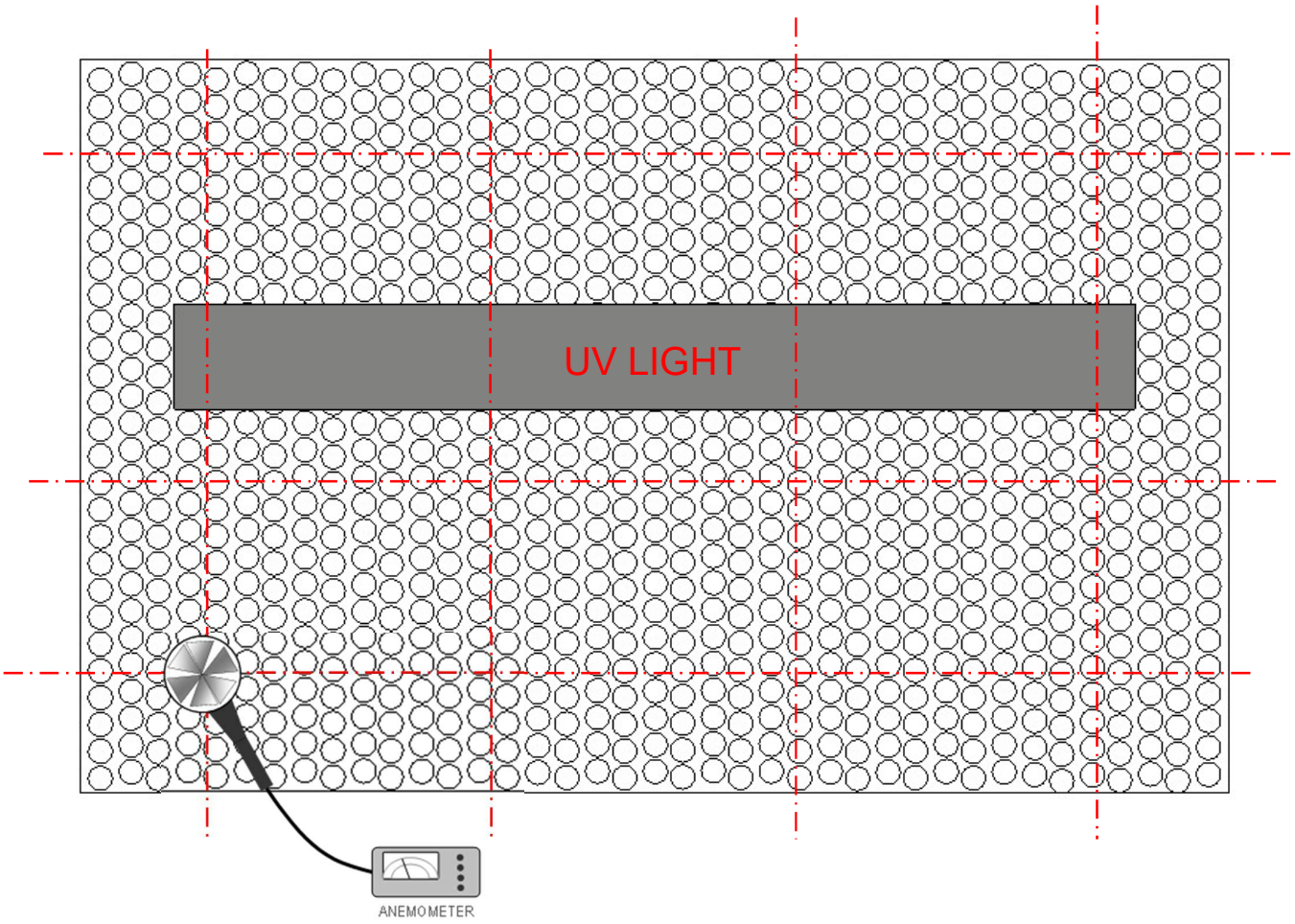


Figure 1b
Downflow Anemometer measurement positions



***Note:** Depending on the size of this unit will depend on the position of the UV light as shown in figure 1b as the UV light must be placed 300mm from the acrylic on the front of the unit.*

4.2 FILTER INTEGRITY TEST

There are two forms of Filter Integrity testing for these units, as standard the Carbon Filter Integrity test is used where the option has been taken for the HEPA Filters you are required to do a HEPA Filter and Seal Integrity.

4.2.1 CARBON FILTER INTEGRITY TESTING

During servicing, carbon filter integrity testing can be performed with gas detection tubes such as the Draeger™ or Gastec™. The filter is challenged with a known chemical, and the concentration of this chemical in the exhaust air is measured with a suitable detection tube.

4.2.1.1 METHOD

Ensure the cabinet is switched on and confirm airflow is correct by direct measurement and/or examination of the TFT alarm status indicators.
Introduce the chemical challenge inside the cabinet that is appropriate to that normally in use within the unit (or a less toxic equivalent Iso Propyl Alcohol IPA for test purposes)

Test the exhaust filter to confirm there is no evidence of the chemical and at the inflow aperture to check if a breach has been made

If the challenge chemical is detected then the follow actions should be taken:

1. Ensure that the filter seal is undamaged and free of gaps
2. Check that the filter is fitted correctly with the seal seated and evenly compressed
3. Replace the filter and retest the cabinet

The result should be recorded in a logbook, a legal requirement under section 9 of the Control of Substances hazardous to Health (COSHH) regulations.

4.2.2 HEPA FILTER AND SEAL INTEGRITY (LEAK TEST)

The integrity of the HEPA filter and seal is established during factory acceptance testing in accordance with Caron Quality Standard (SOP 9.0) using the D.O.P. aerosol test method.
After installation the system should be re-tested by the installation engineer to re-confirm filter and seal integrity as follows:

The HEPA filter should be tested at normal operating airflow velocity ± 10% using calibrated test equipment.

4.2.2.1 METHOD

The aerosol generator pipe is to be placed inside the cabinet's interior through an intake aperture, in such a way that the aerosol can be introduced into the upstream side of the filter as far from the filter as is practical to ensure adequate mixing and minimal interruption to the airflow velocity through the intake aperture.
Use the scanning probe positioned over the exhaust grille of the fan housing to determine downstream aerosol concentration levels, with separate passes made around the entire periphery of the filters, along the bond between the filter set and the enclosure frame, to confirm integrity of the seal of the filters.

Tests should be applied in accordance with SOP 9.0 and results should confirm the following:

- The photometer reading should indicate < [0.01%] penetration for leakage value
- The photometer reading should indicate < [0.005%] penetration for efficiency value

If a steady and repeatable reading on the photometer at any point exceeds the stated maximum permitted concentration, then a leak must be assumed.

Readings on the test set can be set to indicate direct percent penetration using [0.01%], [0.1%] scales as appropriate.
The average downstream concentration value shall not exceed (0.01%) of the upstream concentration measurement.

4.3 CONTAINMENT TEST

4.3.1 Smoke Pencil Test

It is not practical to apply containment testing to BS EN 14175-4:2003 using SF6 gas to this type of recirculatory fume cabinet on site, due to the safety requirement to include specific exhaust ducting and where restrictions on introducing sulphur hexafluoride in particular laboratories exist. This may prevent the application of any quantitative containment integrity testing, however, qualitative measurement of the airflow profile at the face of the cabinet, operating at the correct face velocity and in a specific room environment can be evaluated by smoke visualisation testing.

In accordance with BS EN 14175-4:2003, a smoke pencil generating a trace should be placed approx. 400mm in front of the cabinet with smoke released upwards to the ceiling. The tracer should be moved across the frontal region of the cabinet not faster than 0.2 m/s.

The airflow profile should show no evidence of escape of the tracer 'smoke' from the cabinet and a smooth and a continuous airflow pattern should exist.
There should be no evidence at any point of smoke being significantly disrupted or otherwise deflected counter to the inflow or indications of a delay in entering the aperture.
If tests show significant disturbance to the airflow profile, then room air velocity must also be checked to ensure it is not greater than 0.2m/s**.**

4.3.2 Particle Count Test

Clean rooms/Clean zones and associated controlled environments provide for the control of airborne particulate contamination to levels appropriate for accomplishing contamination-sensitive activities. This pertains to units/models that are used for product protection ensuring that no contamination makes it to the product. The method of determining the concentration of considered airborne particle sizes to ensure compliance with the classification of specified class of environmental cleanliness in accordance with the requirements of:

- BS EN ISO 14644-1:2015 (Classification of air cleanliness by particle measurement-UK/EU)
- ANSI/IEST/ISO 14644-1:2015 (Classification of air cleanliness by particle measurement-USA)
- EU GGMP Annexe 1-2008 Clean room classifications

Interpretation of the test results for verification of the classification of a clean room/ clean zone shall be in accordance with the above national standards. It is required that the particle counted used for this test is calibrated and meets the requirements set out by ISO21501-4.

4.3.2.1 Procedure

1. Make sure the particle counter is in calibration and set up in accordance with SOP 6.0 and the "Particle counter setup and run procedure" documents.

2. Place the particle counter into position as shown below in Figure 2.

   Note: *The particle counter will need to be set up in two positions for the PCR cabinet*

3. Set the particle counter to run. Once the particle counter has run make note of the results.

4. Repeat step 2 and 3 for the next location.

5. Compare the results firstly against the standards. If the results are below the standards ISO Class 5 (shown in table 1), then the unit has passed and if the units are above the standards, then it has failed.

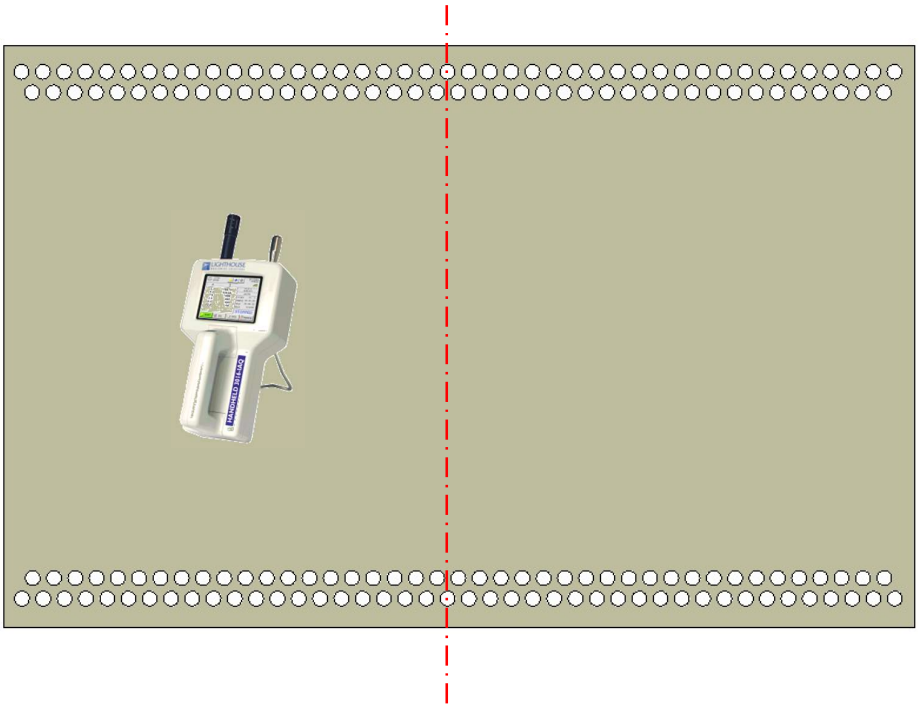
6. If the unit has passed the test the compare the values from the different locations to make sure there are no outliers. As this may indicate a fault in the unit that could worsen over time.

7. If the unit has failed test, then a leak must be assumed. This could be through a faulty filter, incorrect alignment of the seals or incorrect assembly of the enclosure. The root cause must be found.

Table 1
Table representing the maximum concentration limits of particles for each classification number

Classification Number (N)	Maximum concentration limits (particles/m³ of air) for particles equal to and larger than the considered size shown below. Shaded area particle sizes not measured by Lighthouse instruments but are shown here for completeness.					
Particle size	0.1 µm	0.2 µm	0.3 µm	0.5µm	1.0µm	5.0 µm
ISO 14644-1:2015 for UK & EU based products						
ANSI/IEST/ISO 14644-1:2015 for US based products						
ISO Class 1	10	2				
ISO Class 2	100	24	10	**(4)**		
ISO Class 3	1 000	237	102	35	**(8)**	
ISO Class 4	10 000	2 370	1 020	352	83	
ISO Class 5	100 000	23 700	10 200	3 520	832	**(29)**
ISO Class 6	1 000 000	237 000	102 000	35 200	8 320	293
ISO Class 7				352 000	83 200	2 930
ISO Class 8				3 520 000	832 000	29 300
ISO Class 9				35 200 000	8 32 000	293 000

Figure 2
Positioning of the particle counter.



4.3.3 KI-Discus Test

The KI-Discus test is a potassium iodide test method use to evaluate the level of containment of contaminants when operating Class I and Class II safety cabinets and general purpose fume cupboards. This test gives the operator protection factor (OPF) of the unit.

Acceptable OPF values and the criteria for determination are described in BS EN12469:2000.

To carry out this test procedure refer to SOP 2.0 and the KI-Discus containment testing system manual.

If the unit fails, this test due to a un-acceptable OPF value, then the root cause of the problem t must be found. Typically, this could be due to inadequate setup of the airflow.

4.4 NEXTION TFT SYSTEM-OPERATOR CONTROLS

4.4.1 POWER ON/OFF

A rocker switch normally mounted on the side of the hood turn mains power ON/OFF to the control system.

4.4.2 MMI INTERFACE DISPLAY

A 4.3” TFT display is the user interface to the system. It displays the value of airflow to the enclosure, indicates alarm conditions & is used to calibrate the airflow. There are both Landscape & Portrait options.

The MMI display is a 4.3” TFT colour graphic display with touch screen control operation. It connects to the system controller PCB, and functions as a means for configuring the airflow control system, alarm indication mechanism, and status display.

4.4.3 SPLASHSCREEN

The splash screen, or power up screen, is the initial display on power up & merely displays the Caron logo. The splash screen remains for approximately 10 seconds, at which point the display should change to the HOME (Main) screen.

4.5 OPERATION, SEQUENCE

Caron engineers will commission the normal operating condition of the enclosure, setting the parameters to suit the application. Once commissioned, the operator can safely use the cabinet. Typically, the sequence of operations is as follows:

1. Apply power to the control system via main power supply & operate the rocker switch on side of hood.

2. Observe that TFT display illuminates to the MAIN (aka HOME) display.

3. The fans are ON by default at power up.

4. Once all operating conditions are correct, the message “System OK” appears on the status object at the bottom of the MAIN screen. The airflow disc anemometer monitors the airflow (for alarm indication).

5. The airflow audible/visual alarm will annunciate if the airflow deviates above the high alarm level or below the Low alarm level parameterized in the MMI display menu system

6. Touch the MENU button to navigate to the main menu.

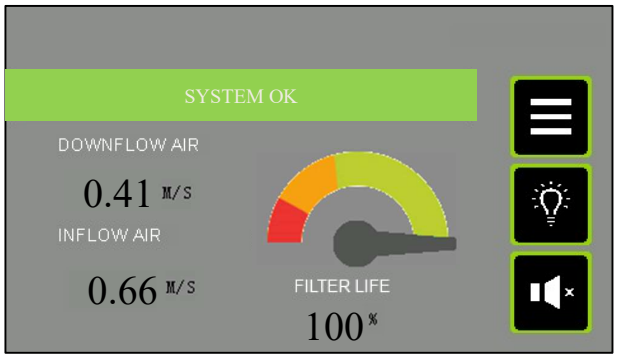
7. In the MENU screen, touch the FAN ON/OFF button to navigate into the fan on/off control screen. In here touch the “Fan ON” button to run the fans at setpoint speed. Touch the “Fan OFF” button to stop the fans running. Touch the “Night-mode” button to run the fans in Night-mode speed. The Fan can also be controlled by touching the fan icon on the HOME screen, to turn the fan and off.

NOTE:

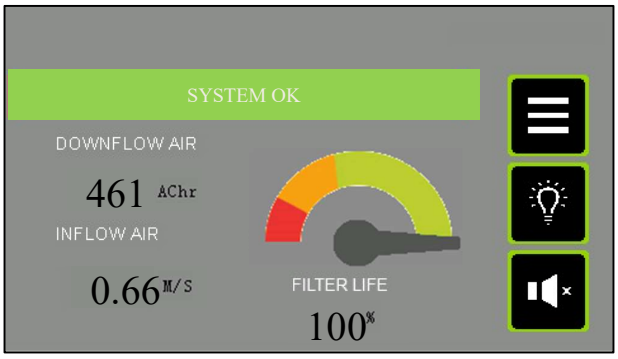
On power up of the unit the audible alarm will not annunciate for the first FIVE minutes to allow the airflow to stabilise. The visual alarm on the TFT display will still be visible till the airflow has stabilised.

4.6 MAIN SCREEN

The main screen is the default display on power up, after the splash screen has been displayed for approx. 10 seconds. It is the normal operating display being presented to the user. Access to other screens is usually only for configuration.



Version with 'm/s' airflow display.



Version with air changes/hr ('Achr') airflow display.

4.6.1 AIRFLOW VALUE DISPLAY

The airflow movement is detected by an air speed sensor anemometer mounted on the enclosure. The reading is scaled and indicated here in "m/s" to 2 decimal places. The indication, scaling and fan speed (airflow) is setup in the CALIBRATION menu. The display can also be presented in "air changes per hour" (AC/hr). The choice of 'm/s' or 'AC/hr' is made in the System Configuration screen.

4.6.2 FILTER LIFE

This gauge/dial is used as a simple way to advise the user of the time left before the next recommended service interval. It is based on calendar time from the previous service engineer visit to change filters. After the filters are freshly changed, and the engineer resets the service dates, the pointer is in the MAX green position. When the pointer is in the red zone it indicates an impending requirement for the next service visit.

4.6.3 FILTER LIFE INDICATION

The gauge graphic display is further clarified by the % of lifespan remaining before a filter change is recommended.

4.6.4 SYSTEM STATUS & ALARMS

This status text object gives the status of the system using both descriptive text & colour. If will report on any critical status affecting the normal & healthy running of the enclosure airflows. The list of status texts is as follows.

4.6.5 LIST OF STATUS TEXT

Item	Message Text	Event Description
1	SYSTEM OK	System operating within parameters
2	AIRFLOW LOW	The measured airflow is below the Low alarm level programmed in the System Configuration.
3	AIRFLOW HIGH	The measured airflow is above the High alarm level programmed in the System Configuration.
4	AIRFLOW SENSOR FAULT	The system detects a fault with the airflow sensor elements.
5	DOOR(S) OPEN	A door that is normally left closed is now open.
6	FILTER SENSOR.1 SOLVENT ALARM	Filter Saturation alarm #1 sensor is detecting solvent breakthrough.
7	FILTER SENSOR.2 SOLVENT ALARM	Filter Saturation alarm #2 sensor is detecting solvent breakthrough.
8	FILTER SENSOR.3 SOLVENT ALARM	Filter Saturation alarm #3 sensor is detecting solvent breakthrough.
9	FILTER SENSOR.4 SOLVENT ALARM	Filter Saturation alarm #4 sensor is detecting solvent breakthrough.
10	ENCLOSURE IN NIGHTMODE	The system is not running in normal mode & has been placed in night-mode (standby). The user should resume normal mode before operating the enclosure again.
11	FAN TURNED OFF	The Fan has been turned off & there is no airflow
12	FAN/FILTER TIMER EXPIRED	Self-explanatory
13	UV LAMP TIMER EXPIRED	Self-explanatory
14	ANNUAL SERVICE NOW DUE	More than 11 months have expired since the enclosure was last serviced. This status message brings this fact to the user's attention.
15	ANNUAL SERVICE NOW OVERDUE	More than 12 months have expired since the enclosure was last serviced. This status message brings this fact to the user's attention.
16	COMMUNICATION FAULT...!!!	The main control board is not communicating with the display module. Any status indication is invalid.

The status object is green when the system is OK & without any exceptions. It is amber when there is a warning and is red when there is a critical alarm present. When more than one message needs to be displayed, then they are sequentially displayed on the status banner.

4.6.6 Touch Button Functions

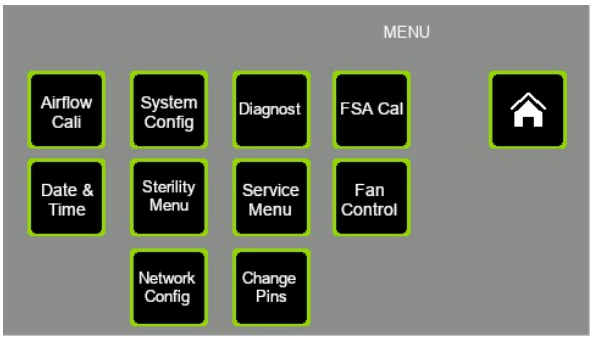
 **WHITE LIGHTING** – Touch this light button to toggle the white light on and off.

 **MUTE –** If an alarm is active & the audible is pulsing, you can touch this button to MUTE this audible sound. The audible alarm will resume after 5 minutes if the alarm is still present. Once alarms clear (they are self-clearing), the mute condition is automatically cancelled so that a new alarm occurring will again result in an audible indication of an alarms' presence.

 **MENU –** Press the MENU touch screen button object to exit this default (Main) display screen to the MENU list of screens.

4.7 MENU SCREEN

The menu screen consists of a list of touch buttons giving the user access to the ancillary setup & information screens on the MMI. The user accesses all screens (with the exception of the MAIN screen) via the MENU screen.



HOME– Press the Home button object to exit this display screen and return to the Main (Home) screen.

AIRFLOW CAL – Touch this touch screen button to enter the airflow CALIBRATION screen where the airflow is setup by the Caron engineer to suit the application. This screen is password protected. The password level required is ENGINEER level.

SYSTEM CONFIGURATION – Touching this touch screen button takes the user to the CONFIGURATION setup screen where the Airflow High alarm, Airflow Low alarm & Filter/UV service intervals are set by the Caron engineer to suit the application. This screen is password protected. The password level required is ENGINEER level.

DATE & TIME – Touching this touch screen button takes the user to the screen for setting the current Time & Date values that are shown on the Main screen. This screen is password protected. The password level required is SUPERVISOR level.

SERVICE MENU – Touching this touch screen button takes the user to the Service menu screen where the user has access to the service screen buttons for UV Lamp service hour counter, Filter Service hour counter, & General system service date check & reset. This screen is not password protected.

FSA CAL – Touching this touch button takes the user to the calibration screen for the system filter saturation alarm probes, if any are enabled in the Configuration screen. This screen is password protected. This screen is password protected. The password level required is ENGINEER level.

FAN CONTROL – Touching this touch screen button takes the user to the FAN on/off controls. This screen is not password protected.

DIAGNOSTIC – Touching this touch screen button takes the user to the DIAGNOSTIC screens where software data points can be viewed. This screen is really for use by a Caron engineer. This screen is not password protected.

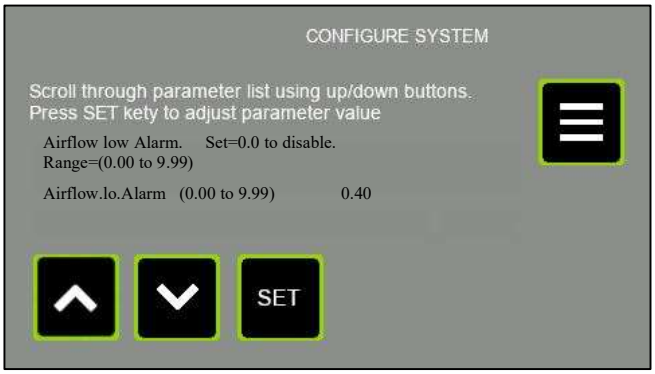
STERILIZATION MENU – Pressing this object button takes the user to the Sterilization Menu screen where the user has access to the three fumigation options (H2O2, UVc & Formalin) for the enclosure. This screen is not password protected and its function is detailed in this manual.

NETWORK CONFIGURATION – Touching this touch screen button takes the user to the CONFIGURATION setup screen where the WIFI connections for Caron enclosures in one area. The WIFI operation is not yet implemented. This screen is password protected. The password level required is ENGINEER level.

CHANGE PINS – Touching this touch screen button takes the operator to the screen allowing him to alter the Supervisor & User levels passwords. This screen is password protected. The password level required is SUPERVISOR level.

4.8 SYSTEM CONFIGURATION SCREEN

The CONFIG screen is where the control system features are configured by the Caron engineer to suit the application. Access to this screen is password protected. The password level required is ENGINEER level.



Using the scroll buttons on this page, the user can inspect & alter the value of any of the configuration parameters. You use the UP & DOWN buttons to scroll through the parameter list, and their value of each parameter is shown as you do so. Press the Set button to cause the keypad to be displayed where the parameter value can be altered.


Touch the DOWN button to move down to the next parameter in the parameter list.


Touch the UP button to move up to the previous parameter in the parameter list.

Touch this button to edit/alter the value of the currently displayed configuration parameter. You are taken to the keypad with the current value of the parameter shown. You can edit the value here & store the new value to permanent memory.


Touch the MENU to return to the Main Menu.

4.8.1 CONFIGURATION PARAMETER LIST

- **D/F AIRFLOW LO ALARM**
  Enter the low airflow value below which an audible & visual alarm indication is given via the TFT if the airflow drops below this value. Enter a value of 0.00 to deactivate this alarm. Range 0.00 – 9.99

- **D/F IRFLOW HI ALARM**
  Enter the high airflow value above which an audible & visual alarm indication is given via the TFT if the airflow rises above this value. Enter a value of 0.00 to deactivate this alarm. Range 0.00 – 9.99

- **I/F AIRFLOW LO ALARM**
  Enter the low airflow value below which an audible & visual alarm indication is given via the TFT if the airflow drops below this value. Enter a value of 0.00 to deactivate this alarm. Range 0.00 – 9.99

- **I/F AIRFLOW HI ALARM**
  Enter the high airflow value above which an audible & visual alarm indication is given via the TFT if the airflow rises above this value. Enter a value of 0.00 to deactivate this alarm. Range 0.00 – 9.99

- **UV MAX HOURS**
  Enter the number of hours of UV lamp ON time above which a visual indication is given via the TFT if the number of UV lamp running hours exceeds this value since the timer was last reset. Enter a value of 0 to deactivate this visual indication. Range 0 – 20000.

- **FILTER MAX HOURS**
  Enter the number of hours of fan run time above which a visual indication is given via the TFT if the number of fan running hours exceeds this value since the timer was last reset. Enter a value of 0 to deactivate this visual indication. Range 0 – 20000.

- **D/F PROPORTIONAL GAIN**
  For use by the commissioning engineer. Adjust in conjunction with ‘Igain’ & ‘Dgain’ to alter the dynamic response of the fan if it needs to be adjusted. Range 0 – 9999.

- **D/F INTEGRAL GAIN**
  For use by commissioning engineer. Adjust in conjunction with ‘Pgain’ & ‘Dgain’ to alter the dynamic response of the fan if it needs to be adjusted. Range 0 – 9999.

- **D/F DERIVATIVE GAIN**
  For use by commissioning engineer. Adjust in conjunction with ‘Pgain’ & ‘Igain’ to alter the dynamic response of the fan if it needs to be adjusted. Range 0 – 9999.

- **I/F PROPORTIONAL GAIN**
  For use by the commissioning engineer. Adjust in conjunction with ‘Igain’ & ‘Dgain’ to alter the dynamic response of the fan if it needs to be adjusted. Range 0 – 9999.

- **I/F INTEGRAL GAIN**
  For use by commissioning engineer. Adjust in conjunction with ‘Pgain’ & ‘Dgain’ to alter the dynamic response of the fan if it needs to be adjusted. Range 0 – 9999.

- **I/F DERIVATIVE GAIN**
  For use by commissioning engineer. Adjust in conjunction with ‘Pgain’ & ‘Igain’ to alter the dynamic response of the fan if it needs to be adjusted. Range 0 – 9999.

- **AC/HR OR (M/S)**
  Set this parameter =0 if the main display airflow indication is to be in linear air speed of m/s).
  Set this parameter =1 if the main display airflow indication is to be in volumetric air changes per hour (AC/hr). Range 0 – 1.

- **AC/HR SCALER**
  This parameter becomes relevant of the display mode is set for AC/Hr indication.
  This is a commissioning parameter. It acts as a multiplier on the airflow indication in (m/s) to produce the display value in AC/Hr. Range 0 – 9999.

- **D/F SENSOR OFFSET**
  This parameter holds the zero offset for the airflow anemometer zero airflow offset. To set this value, turn off the fan on the FAN ON/OFF display. Wait 2 minutes. Navigate to the DIAGNOSTIC display #1. Read off the value of the diagnostic point “CompdaNC3”. Enter this value into the ‘A/F sensor offset’ parameter in the Configuration parameter list.

- **I/F SENSOR OFFSET**
  This parameter holds the zero offset for the airflow anemometer zero airflow offset. To set this value, turn off the fan on the FAN ON/OFF display. Wait 2 minutes. Navigate to the DIAGNOSTIC display #1. From here, go to DIAGNOSTIC display #5. Read off the value of the diagnostic point “CompdAND1”. Enter this value into the ‘A/F sensor offset’ parameter in the Configuration parameter list.

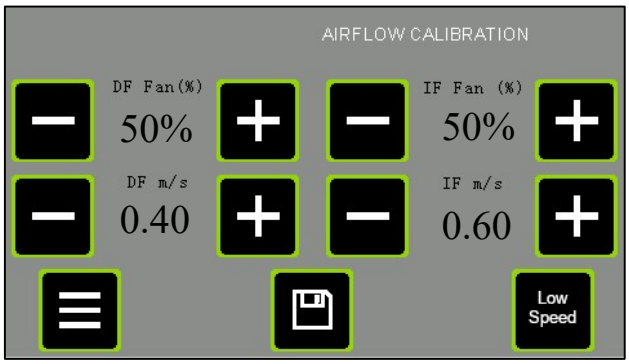
- **HOW MANY FSA SENSORS IN USE (0-4)**

  This parameter “How many FSA sensors in use (0-4)” allows the user to set the number of FSA sensors for the system. Set to ‘0’ if no sensors are in use. Range 0 – 4.

- **ENABLE I/F FAN MAX RPM**
  “0” Disables the Fan from ramping up when front doors or tip chute is open. “1” Enables the I/F fan to ramp up when the front doors and or tip chute is opened to allow for maximum operator protection.

4.9 AIRFLOW CALIBRATION SCREEN AND FUNCTIONS

The CALIBRATION screen is where the airflow is setup by the Caron engineer to suit the application. Access to this screen is password protected.



In the Calibration display, we can set the normal running airflow (fan speed) for the system when the fans(s) are started up. We can also set up the Low Speed for certain running conditions of the unit

 Touch the (+) button to increase the value of the relevant parameter (Fan speed% or Airflow m/s).

 Touch the (-) button to decrease the value of the relevant parameter (Fan speed% or Airflow m/s).

 **SAVE–** Touch this button to save both values (Airflow fan speed & Airflow in m/s) as running setpoint values to permanent store memory.

LOW SPEED – Touch this button to set the down flow low speed Fan speed (%) value at 17.5%. This low speed in use when the unit is under any of the servicing modes and in these modes the Airflow (m/s) value is ignored.

 Touch the “MENU” button to return to the MENU screen without saving any parameters if you wish to do so. So, you may have adjusted the on-screen airflow or fan speed. But if you do not touch one of the ‘Save’ buttons, then no effect is made on calibration parameters.

4.10 NORMAL AIRFLOW CALIBRATION PROCEDURE

These steps apply to both inflow and downflow calibration procedures.

1. Ensure system is powered up.

2. Close all doors.

3. From the Main (HOME) screen navigate to the MENU screen.

4. If calibrating the airflow for the 1st time, then you should set the "I/F sensor offset" and "D/F sensor offset" parameter in the System Configuration before continuing here. Refer to the 'Config Screen' section for that procedure.

4.10.1 Downflow Airflow Calibration Procedure

1. The anemometer should be set in the horizontal plane with the direction arrow facing downwards inside the cabinet, set at 50 mm below the downflow grille at the first chosen position from the total of eight grid points.

2. Take a 'spot' measurement averaged over a 1-minute interval moving the anemometer to each of the eight grid points as shown in the matrix [Figure 5] determining the lowest and highest mean velocity levels.

3. Add the mean totals together and divide by eight to calculate the grand mean value. If this mean value is close to the desired values, then follow step four and five and jump to step eight.

4. If the value isn't within the correct range, then you will need to adjust the airflow velocity by going to the MENU screen, touch the 'Airflow Cal' button. You will be presented with a password entry screen.

5. Enter the user access password to enter the Airflow Calibration screen. If you enter the correct password, you will be taken to the AIRFLOW CALIBRATION screen shown above.

6. Using the +/- touch buttons on display corresponding to the "I/F Fan Speed (%)", adjust the fan speed up or down to achieve the desired airflow indication on the vane anemometer measuring airflow through the D/F roof grille. You can hold your finger down on the + or – button to cause the fan speed to continue to change speed over time. Allow time for the fan speed to settle. Take a grid array of measurements again across downflow roof grilles area to determine an average value indication.

7. Now that you have taken the airflow values across the grid the values need to be added together and divide by eight to calculate the grand mean value if this value isn't with the stated range repeat step six again.

8. Now you have the calculated mean value input this into the AIRFLOW CALIBRATION screen using the +/- touch buttons on display corresponding to "I/F Airflow (m/s)", adjust the airflow indication (m/s) to match the aperture average reading from the anemometer measurements. You can hold your finger down on the + or – button to cause the airflow (m/s) value to continue to change over time. Allow time for the display value to settle. Allow time for the display value to stabilize.

9. Once the final desired velocity is achieved, then push the save button now the initial 'DOWNFLOW' calibration is now complete.

4.10.1.1 Downflow reference points

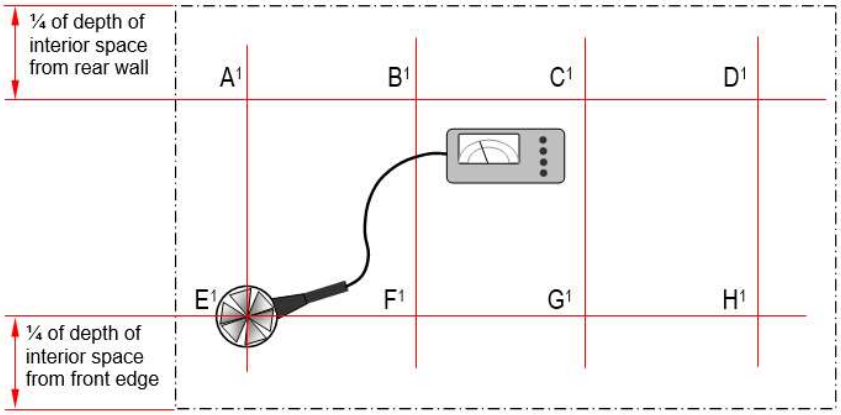


Figure 5
Plan view of Class II and Class II [type] cabinet showing the eight (horizontal plane) grid points within the cabinet for the anemometer spot-measurements during downflow velocity tests

4.10.2 Inflow Airflow Calibration Procedure for recirculating MSC

1. In the MENU screen, touch the 'Airflow Cal' button. You will be presented with a password entry screen.

2. Enter the user access password to enter the Airflow Calibration screen. If you enter the correct password, you will be taken to the AIRFLOW CALIBRATION screen shown above.

3. Set the cabinet door system to normal running condition and locate a vane anemometer.

4. The anemometer should be zeroed and allowed to stabilise before readings are made

5. Allow 2-3 minutes for the fans to stabilise-during this time the airflow alarms may sound

6. Take a 'spot' measurement averaged over a 1-minute interval moving the anemometer to each of the eight grid point positions as shown in [Figure 6] to determine the lowest and highest mean velocity levels.

7. Add these totals together and divide by eight to calculate the grand mean value. If the average value falls within the desired range jump to step 9 If the value doesn't fit within specified range follow step 8.

8. On the top cover where the exhaust vents there are adjustable louvres. By adjusting these you can increase or decrease the velocity of the inflow air. Once you have adjusted the louvres to decrease or increase the velocity of the air repeat step 5-7.

9. Then, using the +/- touch buttons on display corresponding to "Airflow (m/s)", adjust the airflow indication (m/s) to match the aperture average reading from the hotwire probe anemometer measurements. You can hold your finger down on the + or – button to cause the airflow (m/s) value to continue to change over time. Allow time for the display value to settle. Allow time for the display value to stabilize.

10. Touch the Save button to save all calibration point parameters to permanent store memory. Also, by touching this button the system takes you out to the MENU screen.

11. Due to the inflow velocity being affected by the louvres on the top cover with no independent fan, you will now need to recheck the Downflow velocity to ensure that the measured values haven't changed due to the changing in the louvre position.

12. Power off, and then on, system. Observe in the main display that the system eventually reaches a steady state condition where the AIRFLOW in (m/s) is the same as the value set during the calibration procedure.

4.10.3 Inflow Airflow Calibration Procedure for Ducted MSC

Where the ducted system is typically Exhausted to client HVAC. Once the Downflow has been set up the inflow speed will remain constant and can't be changed without altering the client HVAC system or through an in-line damper.

1. In the MENU screen, touch the 'Airflow Cal' button. You will be presented with a password entry screen.

2. Enter the user access password to enter the Airflow Calibration screen. If you enter the correct password, you will be taken to the AIRFLOW CALIBRATION screen shown above.

3. Set the cabinet door system to normal running condition and locate a vane anemometer.

4. The anemometer should be zeroed and allowed to stabilise before readings are made

5. Allow 2-3 minutes for the fans to stabilise-during this time the airflow alarms may sound

6. Take a 'spot' measurement averaged over a 1-minute interval moving the anemometer to each of the eight grid point positions as shown in [Figure 6] to determine the lowest and highest mean velocity levels.

7. Add these totals together and divide by eight to calculate the grand mean value. If the average value falls within the desired range jump to step 9 If the value doesn't fit within specified range follow step 8.

8. Adjust the clients HVAC system and or the in-line damper if fitted to the required velocity range this would be found by using the anemometer to find a rough reading in the open aperture. Once you are in the correct range for the required airflow repeat steps 5-6.

9. Then, using the +/- touch buttons on display corresponding to "Airflow (m/s)", adjust the airflow indication (m/s) to match the aperture average reading from the hotwire probe anemometer measurements. You can hold your finger down on the + or – button to cause the airflow (m/s) value to continue to change over time. Allow time for the display value to settle. Allow time for the display value to stabilize.

10. Touch the Save button to save all calibration point parameters to permanent store memory. Also, by touching this button the system takes you out to the MENU screen.

11. Due to the inflow velocity being affected by the louvres on the top cover with no independent fan, you will now need to recheck the Downflow velocity to ensure that the measured values haven't changed due to the changing in the louvre position.

12. Power off, and then on, system. Observe in the main display that the system eventually reaches a steady state condition where the AIRFLOW in (m/s) is the same as the value set during the calibration procedure.

4.10.4 Inflow Airflow Calibration Procedure for MSC with the exhaust box

1. In the MENU screen, touch the 'Airflow Cal' button. You will be presented with a password entry screen.

2. Enter the user access password to enter the Airflow Calibration screen. If you enter the correct password, you will be taken to the AIRFLOW CALIBRATION screen shown above.

3. Set the cabinet door system to normal running condition and locate a vane anemometer.

4. Using the +/- touch buttons on display corresponding to the "Fan Speed (%)", adjust the fan speed up or down to achieve the desired airflow indication on the vane anemometer measuring airflow through the front open door's aperture. You can hold your finger down on the + or – button to cause the fan speed to continue to change speed over time. Allow time for the fan speed to settle. Take a grid array [Figure 6] of measurements across open doors area to determine an average value indication.

5. Then, using the +/- touch buttons on display corresponding to "Airflow (m/s)", adjust the airflow indication (m/s) to match the aperture average reading from the hotwire probe anemometer measurements. You can hold your finger down on the + or – button to cause the airflow (m/s) value to continue to change over time. Allow time for the display value to settle. Allow time for the display value to stabilize.

6. Touch the Save button to save all calibration point parameters to permanent store memory. Also, by touching this button the system takes you out to the MENU screen.

7. Power off, and then on, system. Observe in the main display that the system eventually reaches a steady state condition where the AIRFLOW in (m/s) is the same as the value set during the calibration procedure.

4.10.5 Inflow Reference Measurement Points

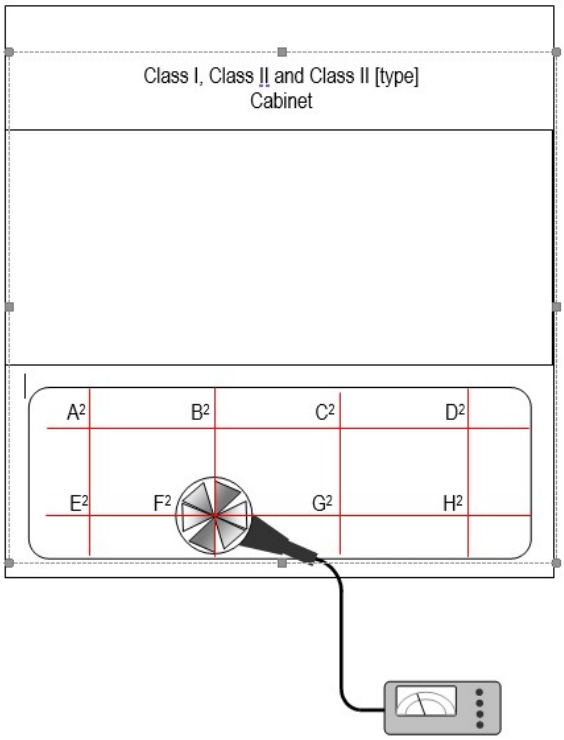
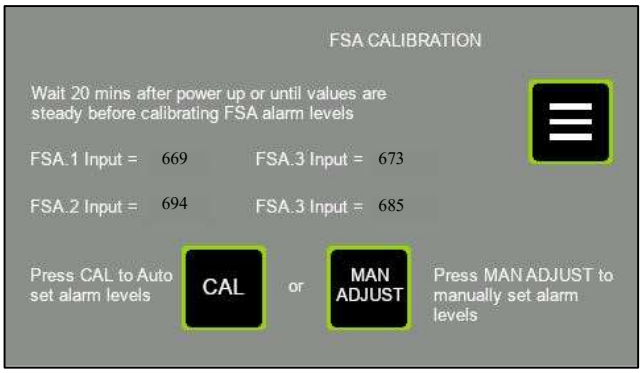


Figure 6
Elevation view of cabinet showing the eight (minimum) grid points at the sash (or door opening) for non-volumetric spot-measurements during inflow velocity tests

4.13 FSA ALARMS

4.13.1 FSA CALIBRATION SCREEN

The FSA CALIBRATION screen is where the alarm levels for the Filter Saturation alarm sensors are setup by the Caron engineer to suit the application. Access to this screen is password protected.



The screen shows the current sensor input of each configured FSA sensor (a maximum of 4). If there is only one enabled FSA sensor from the Configuration screen, then only one value will be shown on this display for FSA.1. The value shown next to each FSA input is the binary input to the microcontroller (range 0 to 1023). The value is shown for comparative & diagnostic purposes.


Press the MENU touch screen button object to return to the MENU list of screens.

Touch this button to take you to a Manual Adjustment screen where you can manually enter a specific alarm level value for each of up to 4-off FSA sensors.

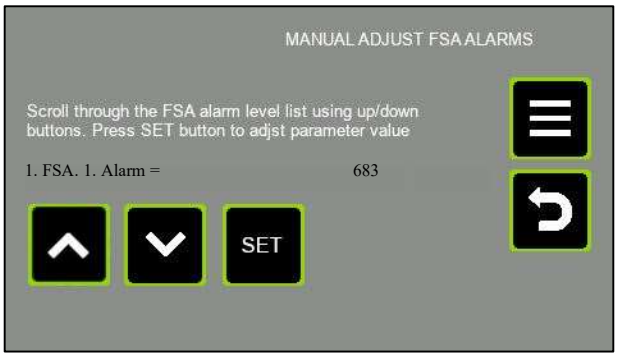
Touch this button to cause the system to calculate 50% of each sensor input reading of the configured list of FSA sensors, and store in memory as the alarm threshold for that sensor.

4.13.2 FSA CALIBRATION PROCEDURE

1. Ensure system is powered up.
2. Navigate from HOME screen → MENU screen, and press the “FSA Cal” button.
3. Enter the required password when asked to do so, and you will be brought to the screen shown here above.
4. Allow 20 minutes for the FSA sensors to warm up, or until the values cease climbing slowly.
5. When the sensor input values finally stabilize, press the CAL button.
6. You will hear a long audible beep, and the display will revert to the MENU screen, having saved the alarm thresholds for the FSA sensors.

4.13.3 FSA ALARMS ADJUST SCREEN

The FSA ALARMS ADJUST screen is where the alarm levels for the Filter Saturation alarm sensors can have the individual sensor alarm threshold manually set to any value by the user. This is useful in cases where the automatic 50% threshold set in the FSA CALIBRATION screen needs refinement. You enter this screen via the “Man Adjust2 button in the FSA CALIBRATION screen.



 Touch the DOWN button to move down to the next parameter in the parameter list.

 Touch the UP button to move up to the previous parameter in the parameter list.

Touch this button to edit/alter the value of the currently displayed configuration parameter. You are taken to the keypad with the current value of the parameter shown. You can edit the value here & store the new value to permanent memory.

 Press this button to return to the FSA CALIBRATION screen.

 Press this button to return to the main MENU screen. This screen shows the current sensor input of each of 4-off FSA sensor, whether they are enabled (in configuration) or not

4.13.4 FSA ALARMS ADJUST PROCEDURE

1. Ensure system is powered up.
2. Navigate to MAIN SCREEN → MENU SCREEN → FSA CAL.
3. Enter the required password when asked to do so, and you will be brought to the screen shown here above.
4. Inside the FSA CAL screen, touch the man adjust button.
5. This takes you to the FSA ALARMS ADJUST (Manual FSA Alarm levels adjustment).
6. Scroll up/down using the arrow buttons to select the desired FSA number (1 to 4)
7. Press the set button to edit/alter the value of the currently displayed FSA alarm threshold value. You are taken to the keypad with the current value of the parameter shown. You can edit the value here & store the new value to permanent memory.
8. When finished press the return button to return to the FSA calibration screen, or the menu button to return direct to the MENU screen.

4.14 PASSWORDS

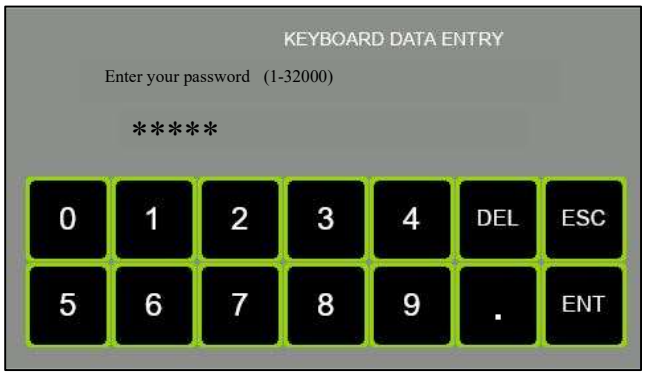
There are 3 password options to gain access to different levels of controlled screens:

ENGINEER (Caron personnel).
SUPERVISOR (Principal laboratory person).
USER (General enclosure operator).

The following screens are access controlled via password:

- Airflow Cal (ENGINEER level access required).
- System Config (ENGINEER level access required).
- FSA cal. (ENGINEER level access required).
- Network Config (ENGINEER level access required).
- Service Dates, in the 'Service Menu' sub menu screen. (ENGINEER level access required).
- Date & Time (SUPERVISOR level access required).
- Change Pins. (SUPERVISOR level access required).
- UV Light (USER level access required).

The system will present the password keyboard below when the password is required. Simply enter the password. A correct entry will result in passage to the destination parameter screen. The screen gives no response to an incorrect entry. It remains displaying the password keypad. As you enter the 4 characters, each digit is represented on screen by an asterisk, so the password is not shown on display.



You do not have to backspace (BS) over the 4 asterisks 1st before entering the 4 digits, you simply start by pressing the 1st numerical digit in the password sequence.

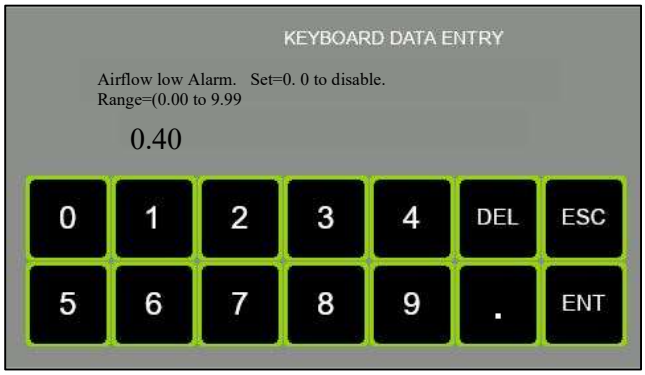
DEL – "Delete". Pressing this button deletes the character to the LHS of the cursor.

ESC – "Escape". Pressing this button takes the data entry out of edit mode, and so the displayed value reverts to the current value of the parameter.

ENT – "Enter". Pressing this button causes the system to evaluate the entered value for this parameter. Limits are checked. Data type is checked. If the entered value is valid then the parameter value is changed in the control system, and the non-volatile memory is updated.
[0-9 &.] – numerical & decimal point characters.

4.15 DATA ENTRY SCREEN

Several screens have within them the feature to alter parameter values. The data entry keypad screen is used for this purpose. It is the same keypad display as the password keypad display, with the exception that entered parameter characters are shown on display as you enter them.
In the data entry keypad screen, the parameter description & valid range of the parameter are shown above the data entry text box.
When you enter the parameter value, if the entered value is valid, and you press the ENT key to enter the value, then the keypad display will close & the display returns to the parameter screen (in the Config or UV light screen). If the value being entered is invalid, then when you press the ENT key, there will be no response, the keypad screen will remain on the display.



4.16 FAN ON-OFF

The FAN ON-OFF screen is where the fans can be turned on and off. At power up, the fans are default to the OFF state. You must access this screen to turn the fans on or off, or, simply touch the fan icon in the centre of the Home screen. The screen is not password protected.

 Press this button to Turn the fans ON, and run at normal setpoint. Observe the status message changes to “Fan is..ON”.

 Press this button to Turn the fans OFF. Observe the status message changes to “Fan is OFF”.

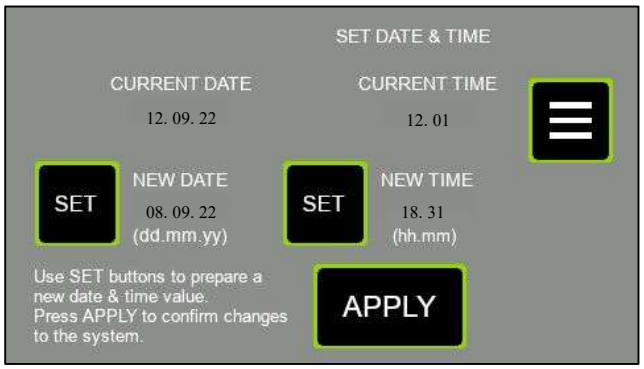
 Press this button to Turn the fans to Nightmode speed. Observe the status message changes to “Fan is: in NIGHTMODE”. See the chapter on Airflow Calibration for a description of what Nightmode means, and how it is setup.

 Press this button to return to the main MENU screen.

 Press the Home button to return to the Main (Home) screen.

4.17 DATE AND TIME

The DATE & TIME screen is where you can set the current Time & Date used for display on the Main screen. It is also used for tracking the general Service intervals & indicating this on the Main screen.



SET (New Date) – Touch this button to edit/alter the value of the preparation value for "New Date." You are taken to the keypad with the current value of the parameter shown. You can edit the value here. The value is only temporarily stored. It is only when you press the "Apply New Date/Time" button that the prepared new date & new time are stored to permanent memory.

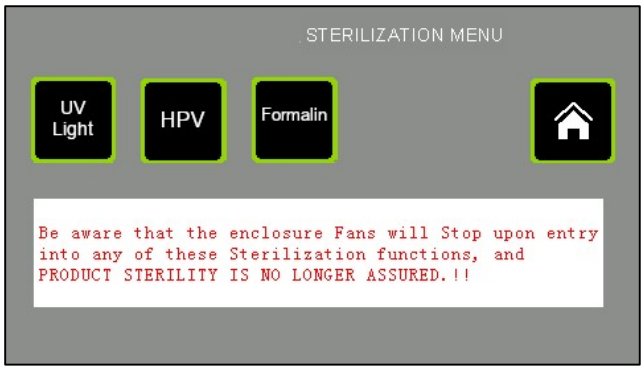
SET (New Time) – Touch this button to edit/alter the value of the preparation value for "New Time." You are taken to the keypad with the current value of the parameter shown. You can edit the value here. The value is only temporarily stored. It is only when you press the "Apply New Date/Time" button that the prepared new date & new time are stored to permanent memory.

APPLY NEW DATE/TIME – Touch this button to store the prepared new date & new time to permanent memory. You should first prepare a new date & time for the next 'minute' value rollover. Then press the apply new date/time button as soon as the time reference rolls over.

Press this button to return to the main MENU screen.

4.18 STERILITY MENU

It is from this screen that you can choose the appropriate fumigation method for the enclosure that has been implemented by design. The options shown below are UV light, HPV and Formalin. Access to this screen is not password protected.



AS A REMINDER OF THE WARNING SHOWN ON THE SCREEN GRAPHIC, BE AWARE THAT THE ENCLOSURE FANS WILL STOP UPON ENTRY INTO ANY OF THESE FUMIGATION MODES, AND THEREFORE PRODUCT STERILITY OR PERSONNEL PROTECTION IS NO LONGER ASSURED.

UV LIGHT – Pressing this screen button takes the user to the UV light control screen where the UV light ON timer value is set & the UV light is turned ON or OFF. This screen is password protected. The password level required is USER level.

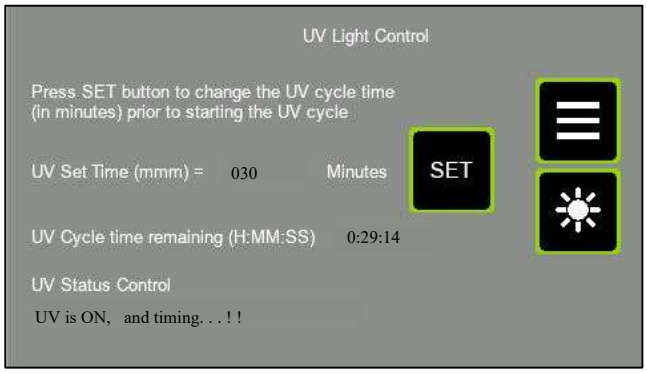
HPV – Pressing this screen button takes the user to the HPV (Hydrogen Peroxide) control screen following which the exhaust fan is turned off & the Downflow will run at the calibrated 'Low Speed' setpoint once HPV mode is activated & turned on. This screen is password protected. The password level required is USER level.

Formalin - Pressing this screen button takes the user to the Formalin control screen following which the exhaust fan is turned off & the Downflow will run at the calibrated 'Low Speed' setpoint once Formalin mode is activated & turned on. This screen is password protected. The password level required is USER level.

4.19 UV

4.19.1 UV CONTROL SCREEN

The UV Control screen allows the user to turn the UV light on/off & decide the time for which the light should be energized.



 Press this button to return to the main MENU screen. If the UV light is on, then it will turn off, and the white lighting will resume previous status (on or off) at the point the UV was activated.

Touch this button to set the UV “on” time duration. If you press it, you are taken to the data entry keypad where you can enter a UV on time duration range of 0-120 minutes. The entered value is retained in permanent memory & so is still retained even after a power cycle.

 This touch screen object is used by the operator to turn the enclosure UV lights on or off. It is a toggle button so the UV lights will alternate on & off as the button is repeatedly touched. When the UV turns on, the white lights will turn off.

UV CYCLE TIME REMAINING – This indicator shows the time left in the activated UV cycle in the format HH:MM:SS.

UV Control Status Message
This text object gives the status of the UV light control cycle, and information regarding the door switch if relevant. The display texts are as follows:

UV OFF, Door Open This tells us that the UV lamp is off, and it is not ready to be turned on, as the door is open.

UV OFF, Ready This tells us that the UV lamp is off, and it is ready to be turned on, as the door is properly closed.

UV ON, Timing - This tells us that the UV cycle is running, and it is timing down. The door is clearly closed as otherwise, the cycle would be interrupted.

UV ON, Cycle Ending -This tells us that the UV cycle is running, and it is timing down. Also, as it is in the ‘Cycle Ending’ phase it means there is less than 10 seconds to go before the UV cycle is completed. During this phase also, the audible buzzer is pulsed once per second. The door is clearly closed as otherwise, the cycle would be interrupted.

If the UV cycle is interrupted either by the door opening or the user toggling the UV button, then the system remains on the UV control screen & the fans come back up. If on the other hand a UV cycle is allowed to complete naturally, then the display reverts to the MAIN screen & the fans come up. The white lights will resume previous state of on or off.

4.19.2 PROCEDURE FOR ACTIVATING THE UV CYCLE

Sequence to activate the UV control...

1. Ensure system is powered up.
2. Close all hinged doors.
3. Navigate to the UV LIGHT control screen via the Main MENU screen.
4. Check the value of the UV.SET.TIME in minutes. If the value is OK then go to step 6, else press the SET button.
5. This takes you to the keypad display. Enter the required UV on time in minutes (range = 0-120 minutes). If the entered value is OK, the system takes you back to the UV control screen.
6. Inspect the UV status text at the bottom of the UV CONTROL screen. it must read “UV OFF, Ready!!” before the UV is ready to start. Rectify any issue with the door switch of it reads “UV OFF, Door Open.!!”
7. Touch the UV button to start the UV cycle.
8. Notice the white lights turn OFF (if they were on), the fan turns off (if it was on) & the UV lights turn on.

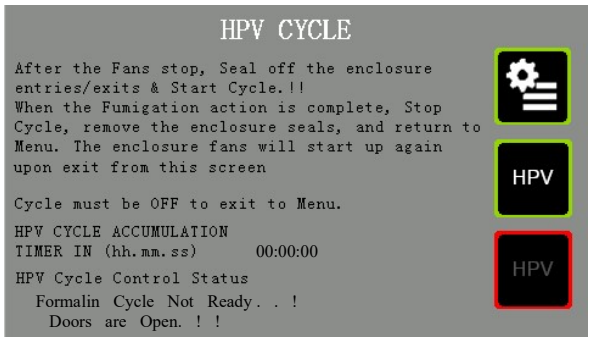
4.19.3 UV SWITCH OFF MODES

1. The UV lights will remain on until either...
    a) The preselected UV timer has expired.
    b) The front horizontal hinged door is opened.
    c) The user touches the UV button on the TFT display
2. If the UV cycle has not yet completed but you want to interrupt it, then touch the UV button on the UV CONTROL display (or open the door to break the door switch sensing). You should notice that the white come back on (if they were energized prior to engaging the UV lights). Also, the fans come back on (if they were energized prior to engaging the UV lights). You can navigate back to the MAIN display via MENU→ HOME.

If the UV cycle is allowed to complete, the UV lights switch off. You should notice that the MMI display reverts to the Main screen & the fans start back up on if they were on before UV cycle was started. Also, the white come back on (if they were energized prior to engaging the UV lights).

4.20 HPV CONTROL SCREEN

The HPV Control screen allows the user to set the Downflow & Inflow fans into a condition that suits a HPV fumigation process. A timer indicates the running time on screen so the user can time the process. The password level required is USER level.



 Press this button to return to the Service Menu screen. If the HPV mode is active, then the button will not respond, so HPV mode must be turned off before you can leave this screen. This prevents inadvertent return when HPV mode is active & the fans returning to setpoint during fumigation.

DO ENSURE THAT THE FUMIGATION PROCESS HAS FULLY COMPLETED, THE FUMIGANT IS REMOVED & ALL FUMIGATION COVERS (NIGHT DOORS) ARE REMOVED **BEFORE** LEAVING THIS SCREEN, AS THE FANS WILL RETURN TO THE DEFAULT SETPOINT UPON LEAVING IT.

Press this button to start the HPV fumigation mode. The effect of this will be to set the Downflow fans running at the 'Low Speed' setpoint, (set during Airflow Calibration), and to set the HPV cycle timer accumulating.

Press this button to Stop the HPV fumigation mode. The effect of this is to stop the Downflow fans, and to stop the HPV cycle timer accumulating.

4.20.1 HPV Cycle Control Status Message

This text object shows the status of the HPV control cycle, and information regarding the door switch if relevant. The display texts are:

1. **HPV Cycle Not Ready.. Doors are Open.!!**
   This tells us that HPV mode is inactive, but cannot be started as the monitored doors are open.
2. **HPV Cycle Ready to Start.. Doors Closed OK..!!**
   This tells us that HPV mode is inactive, but can be started as the monitored doors are closed OK.
3. **HPV Cycle Running.. But Doors are Open..!!**
   This tells us that HPV mode is active & timing, but the monitored doors are open.
4. **HPV Cycle Running OK.. Doors Closed OK..!!**
   This tells us that HPV mode is active & timing and the monitored doors are closed OK.

4.20.2 PROCEDURE FOR ACTIVATING THE HPV CYCLE

1. Ensure enclosure is powered up.

2. Close all hinged doors.

3. Before proceeding further, ensure that processes requiring full containment & sterility are stopped, as during HPV cycle the fans will no longer be operating normally.

4. Navigate to the “STERILITY MENU” screen via the Main MENU screen.

5. Press the HPV button to enter the HPV control screen. You should hear the fans all stop upon entry to this screen.

6. Now fit the supplied fumigation cover plates (Night doors) to the enclosure doors & exhaust grille then attach the 3rd party HPV control equipment for injection & extraction of the HPV vapour using the hose kit and couplings provided and initiate the HPV injection.

7. On the “HPV CYCLE” screen, press the 

button to start the Downflow fan running at the ‘Low Speed’ setpoint & start the display timer. The fan running at a low speed aids the process by pushing the fumigant through the filters.

8. When the fumigation is complete, extract the fumigant using the proprietary 3rd party HPV control equipment.

9. When the post cycle trace fumigant has been extracted, disconnect the HPV control equipment & remove the fumigation covers.

10. On the TFT, Press the 

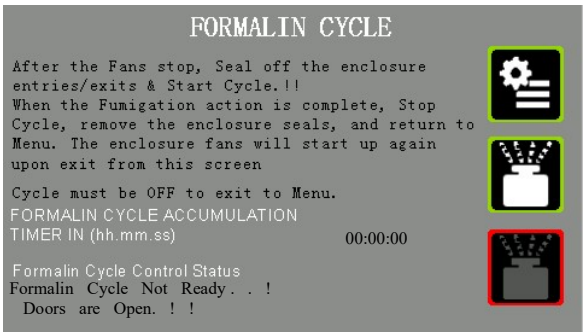
button to stop the Downflow fans and the accumulation timer.

11. Now Press the service menu button to return to the Sterilization Menu. You should now hear all fans running and returning to their setpoint.

12. From here, return to the Main Screen via the home button.

4.21 FORMALIN CYCLE

The Formalin Control screen allows the user to set the Downflow & Inflow fans into a condition that suits a Formalin fumigation process. A timer indicates the running time on screen so the user can time the process. The password level required is USER level.



 Press this button to return to the Service Menu screen. If the Formalin mode is active, then the button will not respond, so Formalin mode must be turned off before you can leave this screen. This prevents inadvertent return when Formalin mode is active & the fans returning to setpoint during fumigation.

DO ENSURE THAT THE FUMIGATION PROCESS HAS FULLY COMPLETED, THE FUMIGANT IS REMOVED & ALL FUMIGATION COVERS (NIGHT DOORS) ARE REMOVED **BEFORE** LEAVING THIS SCREEN, AS THE FANS WILL RETURN TO THE DEFAULT SETPOINT UPON LEAVING IT.

 Press this button to start the Formalin fumigation mode. The effect of this will be to set the Downflow fans running at the 'Low Speed' setpoint, (set during Airflow Calibration), and to set the Formalin cycle timer accumulating.

 Press this button to Stop the Formalin fumigation mode. The effect of this is to stop the Downflow fans, and to stop the Formalin cycle timer accumulating.

4.21.1 Formlalin Cycle Control Status Message

This text object shows the status of the Formalin control cycle, and information regarding the door switch if relevant. The display texts are:

1. **Formalin Cycle Not Ready.. Doors are Open.!!**
   This tells us that Formalin mode is inactive, but cannot be started as the monitored doors are open.
2. **Formalin Cycle Ready to Start.. Doors Closed OK..!!**
   This tells us that FORMALIN mode is inactive, but can be started as the monitored doors are closed OK.
3. **Formalin Cycle Running.. But Doors are Open..!!**
   This tells us that FORMALIN mode is active & timing, but the monitored doors are open.
4. **Formalin Cycle Running OK.. Doors Closed OK..!!**
   This tells us that FORMALIN mode is active & timing and the monitored doors are closed OK.

4.21.2 PROCEDURE FOR ACTIVATING THE FORMALIN CYCLE

1. Ensure enclosure is powered up.

2. Close all hinged doors.

3. Before proceeding further, ensure that processes requiring full containment & sterility are stopped, as during FORMALIN cycle the fans will no longer be operating normally.

4. Navigate to the “STERILITY MENU” screen via the Main MENU screen.

5. Press the FORMALIN button to enter the FORMALIN control screen. You should hear the fans all stop upon entry to this screen.

6. Now fit the supplied fumigation cover plates (Night doors) to the enclosure doors & exhaust grille then attach the 3rd party FORMALIN control equipment for injection & extraction of the FORMALIN vapour using the hose kit and couplings provided and initiate the FORMALIN injection.

7. On the “FORMALIN CYCLE” screen, press the  button to start the Downflow fan running at the ‘Low Speed’ setpoint & start the display timer. The fan running at a low speed aids the process by pushing the fumigant through the filters.

8. When the fumigation is complete, extract the fumigant using the proprietary 3rd party FORMALIN control equipment.

9. When the post cycle trace fumigant has been extracted, disconnect the FORMALIN control equipment & remove the fumigation covers.

10. On the TFT, Press the  button to stop the Downflow fans and the accumulation timer.

11. Now Press the service menu button to return to the Sterilization Menu. You should now hear all fans running and returning to their setpoint.

12. From here, return to the Main Screen via the home button.

PART 2 - OPERATING THE MEDICAL SAFETY CABINET

5.0 OPERATING THE MSC

The MSC must have been installed and commissioned in accordance with 4.0 Commissioning of this manual before attempting to operate.

5.1 TO OPERATE THE CABINET:

1) With the mains supply on, press the rocker switch at the side of the fan hood.
2) Observe that TFT display illuminates to the MAIN (aka HOME) display.
3) Once all operating conditions are correct, the message “System OK” appears on the status object at the bottom of the MAIN screen.

The fan speed will quickly stabilise at the level pre-set during commissioning, however, during this period the control system will visually alarm until the airflow velocity has reached the calibrated setting. Allow sufficient time for the airflow velocity to stabilise throughout the interior before carrying out any processing.

The level of containment protection afforded by the fume cabinet is affected by the manner in which it is used. The cabinet provides the primary barrier and will contain the hazard source but must be used as part of a comprehensive laboratory safety routine.

5.2 GOOD LABORATORY PRACTICE

Good Practice Should Include the Following:

- Adequate planning and understanding the function of the cabinet.
- Keep the front aperture free from obstruction by apparatus or containers.
- Ensure that both RH and LH port blanking caps are securely inserted in the enclosure
- Limit the amount of chemicals and labware within the acrylic enclosure during procedures where possible
- Close and secure the bi-folding front panels during operation.
- Do not lift the bi-folding front panels except where necessary for apparatus set up. The front panels should always be closed and secured by the catches during use of the enclosure. This ensures the airflow velocity remains at the pre-set safe level. In addition, it serves as a protective shield and helps protect the user from hazardous or highly reactive materials.

NOTE:

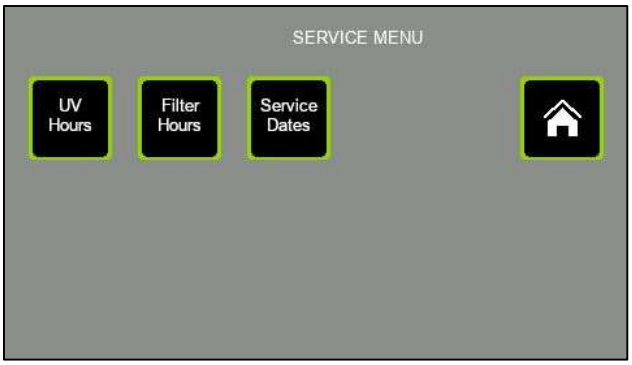
- *The product is not designed or certified to Directive 2014/34/EU (Atex) 240V models, or Directive 94/9/EC (Atex) 115V models, or use in a potentially explosive atmosphere.*
- *It is not designed for use where toxic substances above OHC3 category may be used.*
- *There are no direct sources of ignition within the working zone of the cabinet and no risk of fire or explosion during what is considered normal use. However, in the event of fire caused by the actual process atmosphere and where the end-user may introduce an ignition source, it will provide only short-term initial containment.*
- *It should not be relied upon to provide absolute protection and you should evacuate the laboratory/room according to your current fire regulations.*
- *If it is safe to do so, switch the fan off promptly; this may help to prevent fan-assisted airflow aiding further combustion.*

- Access to the cabinet interior during processing should be confined to the aperture in the hinged front panel; otherwise, the airflow and containment integrity will be affected.
- In the event of a significant disturbance to the incoming airflow during use the airflow alarm monitor will activate, however, this will cease as soon as the airflow velocity is allowed to return to pre-set levels.
- When installing or removing labware, the complete front bi-folding acrylic panel can be hinged upwards for full access to the enclosure. This panel should be secured for safety and convenience by aligning the access aperture in the panel and ‘hooking’ over the retaining tabs fitted on top of the fan housing
- Do not switch the cabinet off during processing operations and allow 15 minutes *after* operations cease before switching off the fan.

PART 3 - SERVICE MENUS

6.0 SERVICE MENUS (sub menu)

This screen is a menu of service-related functions for the enclosure. The UV lamp & Filter Timer check operations are observed in here. The annual service interval can be reset & adjusted in here by the Service engineer.



UV HOURS – Touch this button to inspect the duration of operation of the UV Lamps, and reset the timer if desired. The button takes you to the screen titled “UV SERVICE CHECK.”

FILTER HOURS – Touch this button to inspect the duration of operation of the Filters, and reset the timer if desired. The button takes you to the screen titled “FILTER SERVICE CHECK.”

SERVICE DATES – Touch this button to inspect the next general service date, and reset to the next date if the service engineer has just completed a service operation. This screen is password protected. The password level required is ENGINEER level.

 Press the Home button to return to the Main (Home) screen.

6.1 FILTER HOURS RUN SCREEN

This screen gives the values of Filter actual running hours & maximum allowed (before visual alarm indication) running time (in hours) to the user. This information can be used to determine whether the filters need changing. The value 'Filter hours usage alarm setpoint' is set in the CONFIG menu where the parameters are access restricted using a password. There the parameter is called "filter Max Hours'.

6.1.1 Filter Hours Run

This register indicates the accumulated running time of the enclosure as an indication of when the Filter should be considered for testing or replacement. The accumulated 'Filter hours run' value is compared with the setup 'Filter hours usage alarm setpoint' time. If the 'Filter hours run' exceeds the setpoint time, then a visual alarm condition is generated & is displayed in the status message area on the MAIN display. There is no audible alarm for this exception, but the message is clearly displayed like any other alarm on the system status object on the MAIN display. It does not prevent use of the enclosure. You can clear the accumulated hours to stop the nuisance of the alarm as follows:

1) Navigate to this "Filter Hours run check" screen using the path:
   MENU → SERVICE MENU → FILTER HOURS

2) Touch the RESET button underneath the text "Filter Hours Run."

3) Observe that the Filter Hours Run resets to 00000.

 Press this button to return to the main MENU screen.

 Touch this button to return to the Service Menu screen

6.2 UV HOURS SCREEN

This screen gives the values of UV Lamp actual running hours & maximum allowed (before visual alarm indication) running time (in hours) to the user. This information is used to determine whether the efficacy of the UV lamp is likely to be reduced because of its age & running time. The value 'UV Lamp hours usage alarm setpoint' is set in the CONFIG menu where the parameters are access restricted using a password. There it is called 'UV Max Hours'.

6.2.1 UV HOURS RUN

This register indicates the accumulated running time of the UV lamps in the enclosure as an indication of when the lamps should be considered for testing or replacement. The accumulated 'UV hours run' value is compared with the setup 'UV Lamp hours usage alarm setpoint' time. If the UV lamp run hours (UV hours run) exceeds the setpoint time, then a visual alarm condition is generated & is displayed in the status message area on the MAIN display. There is no audible alarm for this exception, but the message is clearly displayed like any other alarm on the system status object on the MAIN display. It does not prevent use of the enclosure. You can clear the accumulated hours to stop the nuisance of the alarm as follows:

1) Navigate to this "UV Hours run check" screen using the path:
   MENU → SERVICE MENU → UV HOURS

2) Touch the RESET button underneath the text "UV.HRS.RUN".

3) Observe that the UV Hours Run resets to *00000*.

 Press this button to return to the main MENU screen.

 Touch this button to return to the Service Menu screen.

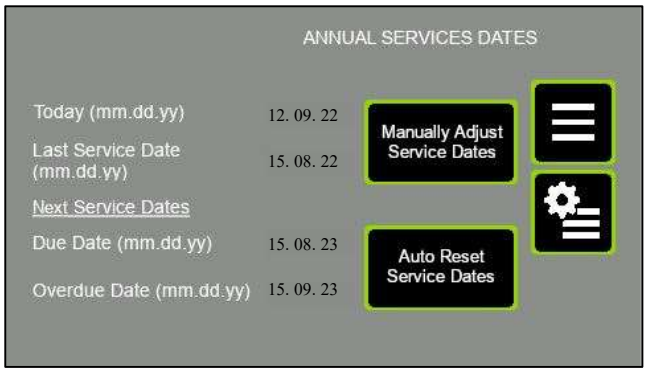
6.3 ANNUAL SERVICE DATES

This screen allows you to reset the service due & overdue dates for next year's general service. The Auto Reset function always sets the dates for one year ahead of today's current date.

The warning date is 11 months from the current date and the overdue date is 12 months from the current date.

When the warning date is reached then a visual alarm is generated on the main screen with a message to "Annual Service Now Due!". No audible alarm is produced as a result of this event.

When the overdue date is reached then a visual alarm is generated on the main screen with a message to "Annual Service Over Due!". No audible alarm is produced as a result of this event.



Touch this button to advance the Service Due & overdue dates one year ahead of today's date. The warning date is 11 months from the current date & the overdue date is 12 months from the current date. The new Service Overdue date & Due Date are both updated into permanent memory.

Touch this button to navigate to the 'Manual Service Date Adjustment' screen, where you can decide on what date the next 'overdue' service date lies. The system calculates the 'service due' date as one month less than that.


Press this button to return to the main MENU screen.


Touch this button to return to the Service Menu screen.

6.3.1 MANUAL SERVICE DATE ADJUSTMENT

This screen allows you to manually decide when the next service due & overdue dates occur. The Auto reset function in the preceding screen always sets the dates for one year ahead of today's current date. The warning date is 11 months from the current date & the overdue date is 12 months from the current date.

Touch this button to edit/alter the value of the preparation value for "Next Service Overdue Date." You are taken to the keypad with the current value of the parameter shown. You can edit the value here. The new Service Overdue date & Due Date are both stored to permanent memory.


Press this button to return to the main MENU screen.

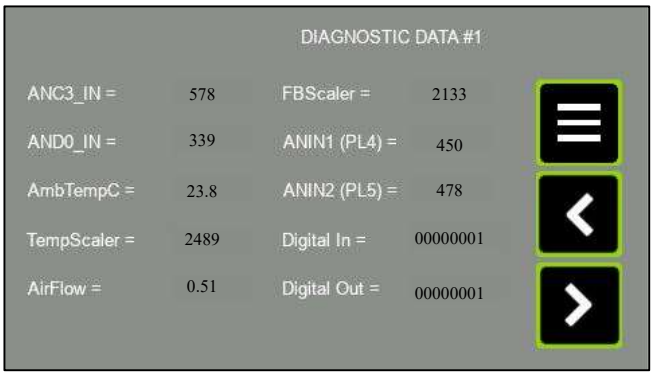

Touch this button to return to the Service Menu screen.


Press this button to return to the previous screen (Annual Service Dates).

6.4 DIAGNOSTIC SCREENS

The diagnostic screens are for use by Caron engineers in inspecting the operation of the system. However, the screens are not password protected, and so can be accessed by anyone.

6.4.1DIAGNOSTIC SCREEN #1



ANC3_IN This is the uncompensated analogue signal input value from the airflow anemometer 'hotwire' thermistor. It can be used to determine what value to enter for the 'A/f sensor offset' in the CONFIGURATION parameters.

AND0_IN This is the analogue signal input value of the from the ambient temperature thermistor inside the airflow anemometer.

AmbTempC This is the ambient temperature as measured using the thermistor inside the airflow anemometer.

TempScaler This is an internal scaler used in airflow calculations generated from the ambient temperature signal.

Airflow The airflow in m/s. it is the same value that is shown on main display.

FBScaler The value of the scaler generated in the Calibration screen when setting the airflow display value using +/- buttons.

ANIN.1 (PL4) This is the analogue input signal value into PL4 connector of the main control board. The signal is a 0 to 10V input.

ANIN.2 (PL5) This is the analogue input signal value into PL5 connector of the main control board. The signal is a 0 to 10V input.

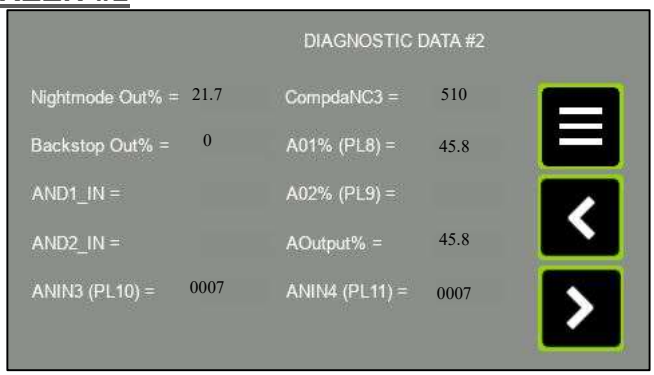
DIGITAL IN This is the binary expression of all 5 digital inputs to the PL3 connector of the main control board.

1. Bit.0 status (1 or 0) = input #1 on PL3-pin.3.
2. Bit.1 status (1 or 0) = input #2 on PL3-pin.4.
3. Bit.2 status (1 or 0) = input #3 on PL3-pin.5.
4. Bit.3 status (1 or 0) = input #4 on PL3-pin.6.
5. Bit.4 status (1 or 0) = input #5 on PL3-pin.7.
6. All other bits are not used.

DIGITAL OUT This is the binary expression of all 5 digital outputs from the MCU in the main control board.

1. Bit.0 status (1 or 0) = WhiteLightOutput, output on PL2-pin.3.
2. Bit.1 status (1 or 0) = UVLightOutput, output on PL2-pin.4.
3. Bit.2 status (1 or 0) = AlarmStatusOutput, output on PL2-pin.5.
4. Bit.3 status (1 or 0) = Aux_Relay1 (unassigned), output on PL2-pin.6.
5. Bit.4 status (1 or 0) = Aux_Relay2 (unassigned), output on PL2-pin.7.
6. Bit.5 status (1 or 0) = Output to Buzzer on PCB.
7. All other bits are not used

6.4.2 DIAGNOSTIC SCREEN #2



Nightmode Out% This is the % of maximum speed that will be output to the fan, when running in Nightmode (standby mode). The setpoint is configured in the Airflow Calibration screen.

Backstop Out% This is the % of maximum speed that will act as a lower limit speed to the fan, when in VAV mode, and the fan wants to reduce speed to achieve the setpoint airflow. The setpoint is configured in the Airflow Calibration screen.

AND1_IN This is the hotwire input to the 2nd unused airflow sensor interface. Observe no data is displayed here.

AND2_IN This is the ambient temperature input to the 2nd unused airflow sensor interface. Observe no data is displayed here.

ANIN3 (PL10) This is the analogue input signal value to the a general purpose 0..10VDC analogue input port on PL10 on the main control board.

CompdaNC3 This is the compensated version of the hotwire signal. It can be used to set the “A/F sensor offset” in the system Configuration.

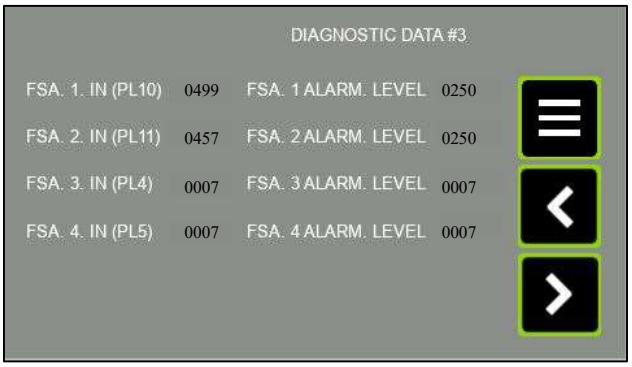
AO1% This is the % of maximum 10V analogue output appearing now on PL8.

AO2% This is the % of maximum 10V analogue output appearing now on PL9.

AOutput% This is the % of maximum 10V analogue output to the fan or fan speed controller.

ANIN4 (PL11) This is the analogue input signal value to the a general purpose 0..10VDC analogue input port on PL11 on the main control board.

6.4.3 DIAGNOSTIC SCREEN #3



FSA.1.IN (PL10) This is the analogue input signal value from the Filter Saturation sensor connected to PL10 of the main control board.

FSA.2.IN (PL11) This is the analogue input signal value from the Filter Saturation sensor connected to PL11 of the main control board.

FSA.3.IN (PL4) This is the analogue input signal value from the Filter Saturation sensor connected to PL4 of the main control board. A Filter Saturation Alarm sensor connected to PL4 requires the use of a BN5001 interface module.

FSA.4.IN (PL5) This is the analogue input signal value from the Filter Saturation sensor connected to PL5 of the main control board. A Filter Saturation Alarm sensor connected to PL5 requires the use of a BN5001 interface module.

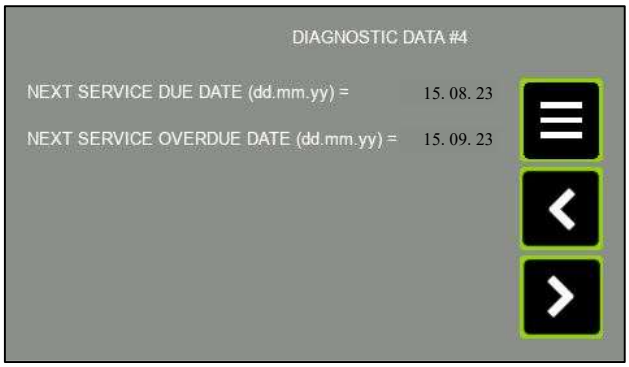
FSA.1.Alarm Level This is the currently operating alarm threshold for the FSA #1 input sensor. It only applies if the alarm is enables. When the FSA.1.IN value drops below this value an audible & visual alarm is triggered.

FSA.2.Alarm Level This is the currently operating alarm threshold for the FSA #2 input sensor. It only applies if the alarm is enables. When the FSA.2.IN value drops below this value an audible & visual alarm is triggered.

FSA.3.Alarm Level This is the currently operating alarm threshold for the FSA #3 input sensor. It only applies if the alarm is enables. When the FSA.3.IN value drops below this value an audible & visual alarm is triggered.

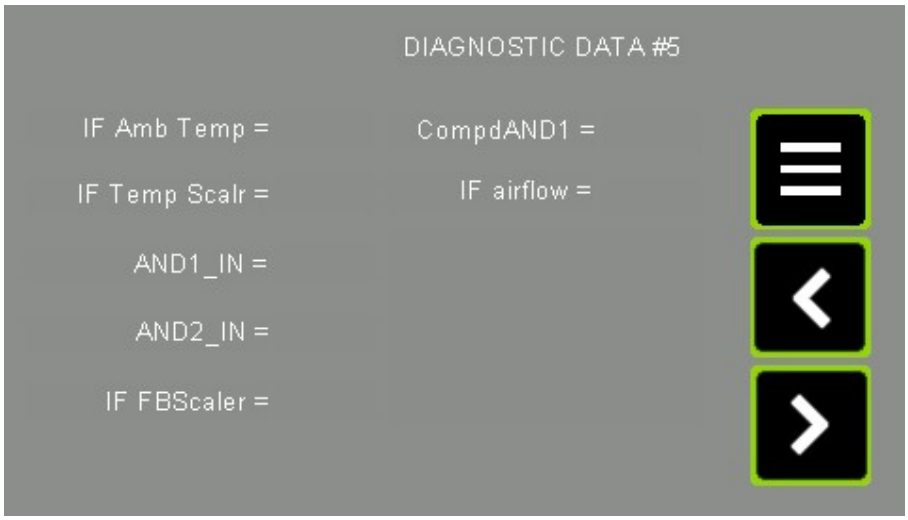
FSA.4.Alarm Level This is the currently operating alarm threshold for the FSA #4 input sensor. It only applies if the alarm is enables. When the FSA.4.IN value drops below this value an audible & visual alarm is triggered.

6.4.4 DIAGNOSTIC SCREEN #4



Next Service Due Date This is the next date that a “service now due” warning message will be issued on the MAIN screen to the user.
Next Service Overdue Date This is the next date that a “service overdue” warning message will be issued on the MAIN screen to the user.

6.4.5 DIAGNOSTIC SCREEN #5



IF AmbTempC This is the ambient temperature as measured using the thermistor inside the airflow anemometer.

IF TempScaler This is an internal scaler used in airflow calculations generated from the ambient temperature signal.

AND1_IN This is the uncompensated analogue signal input value from the airflow anemometer ‘hotwire’ thermistor. It can be used to determine what value to enter for the ‘D/F sensor offset’ in the CONFIGURATION parameters.

AND2_IN This is the analogue signal input value of the from the ambient temperature thermistor inside the I/F airflow anemometer.

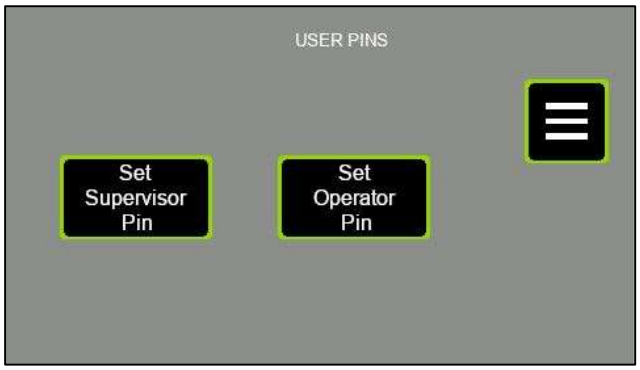
IF FBScaler The value of the scaler generated in the Calibration screen when setting the airflow display value using +/- buttons.

CompdAND1 This is the compensated version of the hotwire signal. It can be used to set the “I/F sensor offset” in the system Configuration.

IF Airflow The airflow in m/s. it is the same value that is shown on main display.

6.5 USER PINS SCREEN

The User PINS screen can be used to alter the access password for the SUPERVISOR and the USER. However, only the ENGINEER & SUPERVISOR can access this screen to change the passwords. The SUPERVISOR & ENGINEER can change both the SUPERVISOR & the USER passwords. The USER has no access in here.



Touch this button to alter the SUPERVISOR password.

Touch this button to alter the USER (operator) password.


Press this button to return to the main MENU screen.

PART 4 -PREVENTIVE MAINTENANCE

7.0 EXAMINATION & TESTING

7.1 Statutory Examination, Testing and Preventative Maintenance-General

These fume cabinets are subject to statutory examination and testing under current COSHH 2002 and OSHA regulations for LEV systems-the interval between examinations must not exceed 14 months.

This requirement, placed upon all employers who install fume cabinets in their workplace, is fully supported throughout the intervening period by the automatic detection (for units supplied with the Nextion TFT) and recording of the following parameters:

a) Filter life dial-indicator, based on calendar time set by the service engineer during the previous visit. It also shows remaining filter lifespan as a % value.

b) “Annual Service Now Due” and “Annual Service Overdue” screens/alarms are presented.

c) Filter saturation alarm (FSA) monitoring and annunciation.

d) After each examination and service filter replacement, the dates should be recorded in a suitable Log Book maintained by the end-user. Caron can provide an appropriate log book to end-users on request.

e) A ‘PASSED’ test label must be affixed by the examiner to the exterior of the cabinet to clearly indicate that the cabinet has passed test and inspection. Otherwise, in the event of a fault where the repair required cannot be completed at the time of the test a ‘FAILED’ test label must be affixed to clearly indicate to operators and supervisors that the cabinet cannot be used until remedied.

After each examination and service filter replacement, the dates should be recorded in a Log Book maintained by the end-user.

The Logbook should include record of:

- Identified daily, monthly checks for each item in the system,
- Maintenance carried out,
- Replacements made,
- Planned and unplanned repairs,
- Faults observed (information for next operator where appropriate)
- Operators daily correct use of the cabinet,
- Fan increased noise or vibration

7.2 FACE VELOCITY

The Nextion TFT alarm system will continuously monitor the face inflow and downflow velocity the control system will both audibly and visually annunciate an alarm when the value falls below the present level. This will also occur if any of the doors are opened causing the airflow to drop; along with the “airflow low” alarm there will also be a “doors open” alarm.

7.3 FILTER CONTAINMENT BREAKTHROUGH

When measurement of the sampling port reveals a breakthrough of contaminant, the installed filter(s) must be replaced. This filter must be replaced as soon as possible as further breakthrough could take place allowing for harmful gases to break through.

7.4 ELECTRICAL SAFETY

7.4.1 For 230V Units:

This safety cabinet must continue to meets the requirements of the Electricity at Work Regulations 1989 and conformity assessment to BS EN 61010 Safety Requirements-Electrical equipment for laboratories
The correct fuse must be fitted to the mains plug at all times and the mains lead should be examined frequently for signs of damage.
There should be regular formal inspections carried out by a 'competent person' and must include earth bonding and insulation tests. All inspections carried out should be recorded.

7.4.2 For 115V Units:

The product must continue to meet the requirements of NEC 2008 with the correct fuse fitted -the mains lead should be examined frequently for signs of damage.
There should be regular formal inspections carried out by a 'competent person' and must include earth bonding and insulation tests. All inspections carried out should be recorded.

7.5 UV SAFETY

UV Safety is for units fitted with the UV light option.

UVc wavelength penetration can cause damage to eyes and skin where exposure to UVc radiation is prolonged. Reflective capabilities are high.

It should also be recognised that UV light can damage plastics and rubber-based materials which may be used within the cabinet and this may lead to secondary hazards such as leaking tubing or containers, over continuous periods.

Due to the employment of special glass, the lamp does not generate ozone.

7.5.1 UV Lamp Life Expectancy-general

The lamp has a rated life of 8,000 hours maintaining an effective intensity for 6,000 hours, after which the UVc output will fall to less than 80% power relative to a new lamp.
Irradiation time will need to be increased to achieve same levels of UVc sterilisation.
A record of UVc usage is recorded by the Nextion TFT system so that accumulated hours can be determined and the point from which an increase in UVC duration or lamp replacement may be required.

8.0 PREVENTATIVE MAINTENANCE

Regular maintenance and statutory testing is essential to the proper functioning of this safety cabinet and we strongly advise entrusting this to trained personnel who are technically competent and equipped with suitable calibrated instruments.

8.1 CLEANING AND CLEANLINESS STANDARD

Daily:
Using a damp cloth, clean the exterior surfaces of the cabinet, regularly, particularly the front and side surfaces, to remove accumulated dust

Weekly:
Thoroughly surface-decontaminate the work surface using ethanol/propan-2-ol such as Micronclean (or other approved disinfectant).
The recommended method of cleaning the acrylic surfaces is by damp wiping with diluted detergent and water.

IMPORTANT: DO NOT USE SOLVENT-BASED CLEANING SOLUTIONS, AS THIS MAY PROMOTE STRESS CRACKING OF THE ACRYLIC MATERIAL.

8.2 MAIN FILTER REMOVAL AND REPLACEMENT

8.2.1 PREPARATION

Safety Warning!

ENSURE THAT THE CABINET IS SWITCHED OFF AND ISOLATED FROM THE MAINS SUPPLY BEFORE OPENING THE FILTER HOUSING!

It is recommended that a trained service engineer should carry out the replacement of the main filter(s).

Wear appropriate PPE when handling contaminated filters.

- Place a hazardous waste sack close to the enclosure in preparation.
- Ensure that a HEPA filtered vacuum cleaner is available.
- Unpack new filters *just prior* to installing.
- Remove all apparatus from the inside of the cabinet, lift open the fan housing and secure it with the two red coloured safety stays, which should be pulled out from each side of the lower housing. Make certain that both stays are correctly ‘latched’ into position. See Figure 4

8.2.2 REPLACING CONTAMINATED DOWNFLOW FILTERS

1. First open the access panels to the upper plenum and remove fan housing from upper plenum.

2. No there is access to the HEPA Filters remove them. Be careful when removing these filters as overtime the filter seal may have stuck to the metal from of the unit and rip off.

3. Place the filter promptly inside a waste sack and seal.

4. Vacuum clean the inside of the filter frame and surrounding area-also wipe clean with a damp lint-free cloth.

5. Remove the new HEPA filter from its packaging and install the new filter in reverse order to removal; make sure it is pushed to the very back of the locating tray,

6. Replace the fan housing atop of the new HEPA filter(s) and then close access panels to the upper plenum

7. Carry out airflow velocity checks and adjust fan speed as necessary.

8. Recalibrate the Nextion TFT alarm *(Refer to "8.2.2 Resetting Airflow Velocity")*

9. Next check the integrity of the filters *(Refer to 8.4 Filter Integrity Testing)*

8.2.3 REPLACING CONTAMINATED INFLOW FILTERS

The Inflow filters are typically a double bank of HEPA filters. One carbon filter can be fitted as an option.

1. First remove the exhaust component that related to the unit you are working on (Recirculating – Top Cover, Ducted – Ducts and Exhaust Spigot and Exhaust – Remove exhaust box.

2. Now gain access to the Upper Plenum area by removing the top covers.

3. Next remove the top HEPA filter (or optional Carbon Filter) from the exhaust and immediately place the contaminated filter into a waste sack and seal.

4. If the optional carbon filter has been fit and this filter is the only to be replaced, then carefully hoover any loose particles around the spacer frame. Then place then new carbon filter in position and jump to step 9

5. If replacing the lower exhaust filter, carefully remove the spacer frame and then remove the filter and immediately place this into a waste sack and seal.

6. Vacuum clean the inside of the filter frame and surrounding area-also wipe clean with a damp lint-free cloth.

7. Remove the new filter from its packaging and locate it into position making sure it is pushed to the very back of its locating bracket.

8. Now the lower filter is fit, replace the spacer frame. Next remove the packaging from the upper filter and locate the filter into position ensuring it is pushed to the locating bracket.

9. Fit the Top covers to the upper plenum area back into position and the fit the respective exhaust component back into place.

10. Carry out airflow velocity checks and adjust fan speed as necessary.

11. Recalibrate the Nextion TFT alarm *(Refer to "8.2.2 Resetting Airflow Velocity")*

12. Next check the integrity of the filters *(Refer to 8.4 Filter Integrity Testing)*

8.3 RESETTING AIRFLOW VELOCITY

Carry out airflow measurements and adjust fan speed as necessary.
Recalibrate the 'Nextion TFT' airflow alarm. If further assistance is required to re-set the airflow velocity please refer to *"4.8 Normal Airflow Calibration Procedure".*

8.4 FILTER INTEGRITY TESTING

Please Refer to section *"4.2 Filter Integrity Testing"* for a guide on how to test the HEPA filters and if the unit has the optional Carbon filters fitted.

8.5 GUIDELINES TO SELECTING THE CORRECT FILTER TYPE-CHANGE OF USE

It is important that the type of substance intended for use in this fume cabinet is identified in order to determine the correct choice of filters. This is particularly important if a change of use is intended. The risk assessment, classification, labelling and subsequent disposal of used filters is the responsibility of the end-user.
If a change of use of the cabinet is intended, then it is important to carry out a suitable risk assessment to identify the predominant vapour and /or particulate that is to be filtered.

NOTE:
The separate label fitted at the front of the fan housing identifies the actual filter type/filter combination fitted by Caron at first installation. It should be referred to in order to identify the correct filter replacement during planned maintenance, subject to any planned new usage and risk assessment.

8.6 TROUBLESHOOTING

The following fault symptoms and remedies are intended as a first level approach only and should be carried out by trained service personnel to isolate and rectify faults at this level.
Escalation and appropriate fault reporting should be made to Caron otherwise.

8.6.1 CONTROL SYSTEM FORMAT

The Powder weighing models use the Nextion TFT Controller unit which consists of:

- Control Pcb Bn4001.
- 12vdc Powers Supply
- 24vdc Power Supply
- Panel Mounted Sockets

Symptom	Remedial action
Fans Do Not Start:	• Check that electrical supply to the enclosure is available • Check that Fan rocker switch is on and illuminated • Contact Caron otherwise
Airflow Indication Low: Audible Alarm:	• Check that the fan is operational • Check that the bi-folding door is closed securely • Check pre-filter condition-replace in accordance with this manual • Check Main filter for saturation-replace in accordance with this manual • Check and re-adjust fan speed controller after filter change • Check calibration of the Nextion TFT alarm • Check fault status of Nextion alarm
Airflow Indication Too High:	• Fan speed controller requires re-calibration
Airflow Noise or Fan Vibration Excessive:	• Check for foreign objects in intake access apertures-remove • Fan bearing faulty [Contact Caron]

8.7 SPARE PARTS LIST

Part Number	Description
EF0079/01	Downflow Fan (230V)
EF0069/01	Inflow (230V)
EF0081/01	Downflow Fan (115V)
EF0072/01	Inflow Fan (115V)
EC0097/01	PCB Control Board
EC0116/01	TFT Display
EP0060/02	12VDC PSU
EP0060/03	24VDC PSU
EL0137/05	200MM LED Strip
EL0003/03	3ft UV Tube
EL0137/06	400MM LED Strip
EL0002/05	2ft UV Tube

PRODUCT SPECIFICATIONS RECIRCULATING MSC

MODEL		**MR085G**	**MR120H**	**MU120H**
MAIN- FILTER	Downflow	HEPA CLASS H-14, efficiency 99.997% @ 0.3µm tested to EN1822: 2009		
	Exhaust	HEPA CLASS H-14, efficiency 99.997% @ 0.3µm tested to EN1822: 2009		
AIRFLOW VELOCITIES	Downflow	>0.25ms^{-1} to 0.5ms^{-1} (Measured 50mm below diffuser face)		
	Inflow	>0.51ms^{-1} mean inflow through the front open aperture		
FAN TYPE		Dynamically Balanced Centrifugal Fan EC FAN R3G250-RE07-07 230V 50/60Hz	Dynamically Balanced Centrifugal Fan EC FAN R3G250-RE07-07 230V 50/60Hz X2	
		Dynamically Balanced Centrifugal Fan EC FAN R3G250-RO33-81 115V 60Hz	Dynamically Balanced Centrifugal Fan EC FAN R3G250-RO33-81 115V 60Hz X2	
FAN CONTROL		Automatic, Programmable Nextion TFT Fan & Alarm Control System		
ALARM SYSTEM		Automatic, Programmable Nextion TFT Fan & Alarm Control System		
SOUND LEVEL		< 50dBA at 1 meter		
LIGHTNING		Integrated LED Lighting		
UV (optional)		UVc Germicidal type: Wavelength 253.7 nm		
FINISH EXT		Light Grey, Gloss Finish, Plastic Coating		
COMPLIANCE STANDARDS		BS7989:2001 Specification For Recirculatory Filtration Fume Cupboards		
		AFNOR NFX 15-211 Class 1 For Filter Retention Capacity		
		AFNOR NFX 15-203 For Containment		
		BS EN 61010:2010 Safety Requirements for Electrical Equipment for Measurement, Control and Laboratory Use		
		BS EN 61326:2013 Electrical Equipment for Measurement, Control and Laboratory Use. EMC Requirements.		
		HEPA Filter: EN1822:2009		
		2015/863/EU Restriction of use of certain Hazardous Substances (RoHS3) Directive		

PRODUCT SPECIFICATIONS – POWER AND WEIGHT FOR RECIRCULATING MSC

MODEL	MR085G	MR120H	MU120H	MR085G	MR120H	MU120H
	-1			-4		
ELECTRICAL	110V – 120V 60 Hz,			230V +10% -6% 50 Hz		
POWER CONSUMPTION	232W	402W		232W	402W	
LOAD AMPS	4.0A	6.0A		2.0A	3.5A	

MODEL	MR085G	MR120H	MU120H
NET WEIGHT	107kg	129kg	176kg

PRODUCT SPECIFICATIONS MSC WITH DUCTED EXHAUST

MODEL		**MD085G**	**MD120H**	**MT120H**
MAIN- FILTER	Downflow	HEPA CLASS H-14, efficiency 99.997% @ 0.3µm tested to EN1822: 2009		
	Exhaust	HEPA CLASS H-14, efficiency 99.997% @ 0.3µm tested to EN1822: 2009		
AIRFLOW VELOCITIES	Downflow	>0.25ms^{-1} to 0.5ms^{-1} (Measured 50mm below diffuser face)		
	Inflow	>0.51ms^{-1} mean inflow through the front open aperture		
FAN TYPE		Dynamically Balanced Centrifugal Fan EC FAN R3G250-RE07-07 230V 50/60Hz		Dynamically Balanced Centrifugal Fan EC FAN R3G250-RE07-07 230V 50/60Hz X2
		Dynamically Balanced Centrifugal Fan EC FAN R3G250-RO33-81 115V 60Hz		Dynamically Balanced Centrifugal Fan EC FAN R3G250-RO33-81 115V 60Hz X2
FAN CONTROL		Automatic, Programmable Nextion TFT Fan & Alarm Control System		
AIRFLOW ALARM		Nextion TFT Fan & Alarm Control System		
LIGHTING		Integrated LED Lighting		
UV LIGHT (optional)		UVc Germicidal type: Wavelength 253.7 nm		
SOUND LEVEL		Less than 50dBA at 1 metre		
FINISH EXT		Light Grey, Gloss Finish, Plastic Coating		
COMPLIANCE STANDARDS		BS7989:2001 Specification For Recirculatory Filtration Fume Cupboards		
		AFNOR NFX 15-211 Class 1 For Filter Retention Capacity		
		AFNOR NFX 15-203 For Containment		
		BS EN 61010:2010 Safety Requirements for Electrical Equipment for Measurement, Control and Laboratory Use		
		BS EN 61326:2013 Electrical Equipment for Measurement, Control and Laboratory Use. EMC Requirements.		
		[1] Carbon Filter: BS7989:2001, [2] HEPA Filter: EN1822:2009		

PRODUCT SPECIFIACTION – POWER AND WEIGHT FOR MSC WITH DUCTED EXHAUST

MODEL	**MD085G**	**MD120H**	**MT120H**	**MD085G**	**MD120H**	**MT120H**
	-1			-4		
ELECTRICAL	110V – 120V 60 Hz,			230V +10% -6% 50 Hz		
POWER CONSUMPTION	402W		572W	402W		572W
LOAD AMPS	6.0A		8.5A	3.5A		5.0A

MODEL	**MD085G**	**MD120H**	**MT120H**
NET WEIGHT	116kg	137kg	181kg

PRODUCT SPECIFICATION FOR MSC WITH EXHAUST BOX

MODEL		ME085J	ME120K	MX120K
MAIN- FILTER	Downflow	HEPA CLASS H-14, efficiency 99.997% @ 0.3µm tested to EN1822: 2009		
	Exhaust	HEPA CLASS H-14, efficiency 99.997% @ 0.3µm tested to EN1822: 2009		
FACE VELOCITY	Downflow	>0.25ms^{-1} to 0.5ms^{-1} (Measured 50mm below diffuser face)		
	Inflow	>0.51ms^{-1} mean inflow through the front open aperture		
FAN TYPE	Downflow	Dynamically Balanced Centrifugal Fan EC FAN R3G250-RE07-07 230V 50/60Hz	Dynamically Balanced Centrifugal Fan EC FAN R3G250-RE07-07 230V 50/60Hz X2	
		Dynamically Balanced Centrifugal Fan EC FAN R3G250-RO33-81 115V 60Hz	Dynamically Balanced Centrifugal Fan EC FAN R3G250-RO33-81 115V 60Hz X2	
	Exhaust	Dynamically Balanced Centrifugal Fan EC Fan R3G225-RE07-03 230V 50Hz		
		Dynamically Balanced Centrifugal Fan EC Fan R3G225-RE19-04 115V 60Hz		
FAN CONTROL		Automatic, Programmable Nextion TFT Fan & Alarm Control System		
AIRFLOW ALARM		Nextion TFT Fan & Alarm Control System		
LIGHTING		Integrated LED Lighting		
SOUND LEVEL		Less than 50dBA at 1 metre		
FINISH EXT		Light Grey, Gloss Finish, Plastic Coating		
COMPLIANCE STANDARDS		BS7989:2001 Specification For Recirculatory Filtration Fume Cupboards		
		AFNOR NFX 15-211 Class 1 For Filter Retention Capacity		
		AFNOR NFX 15-203 For Containment		
		BS EN 61010:2010 Safety Requirements for Electrical Equipment for Measurement, Control and Laboratory Use		
		BS EN 61326:2013 Electrical Equipment for Measurement, Control and Laboratory Use. EMC Requirements.		
		[1] Carbon Filter: BS7989:2001, [2] HEPA Filter: EN1822:2009		

PRODUCT SPECIFICATION – POWER AND WEIGHT FOR MSC WITH EXHAUST BOX

MODEL	**ME085J**	**ME120K**	**MX120K**	**ME085J**	**ME120K**	**MX120K**
	-1			-4		
ELECTRICAL	110V – 120V 60 Hz,			230V +10% -6% 50 Hz		
POWER CONSUMPTION	402W		572W	402W		572W
LOAD AMPS	6.0A		8.5A	3.5A		5.0A

MODEL	**ME085J**	**ME120K**	**MX120K**
NET WEIGHT	115kg	138kg	199kg

FILTER SELECTION

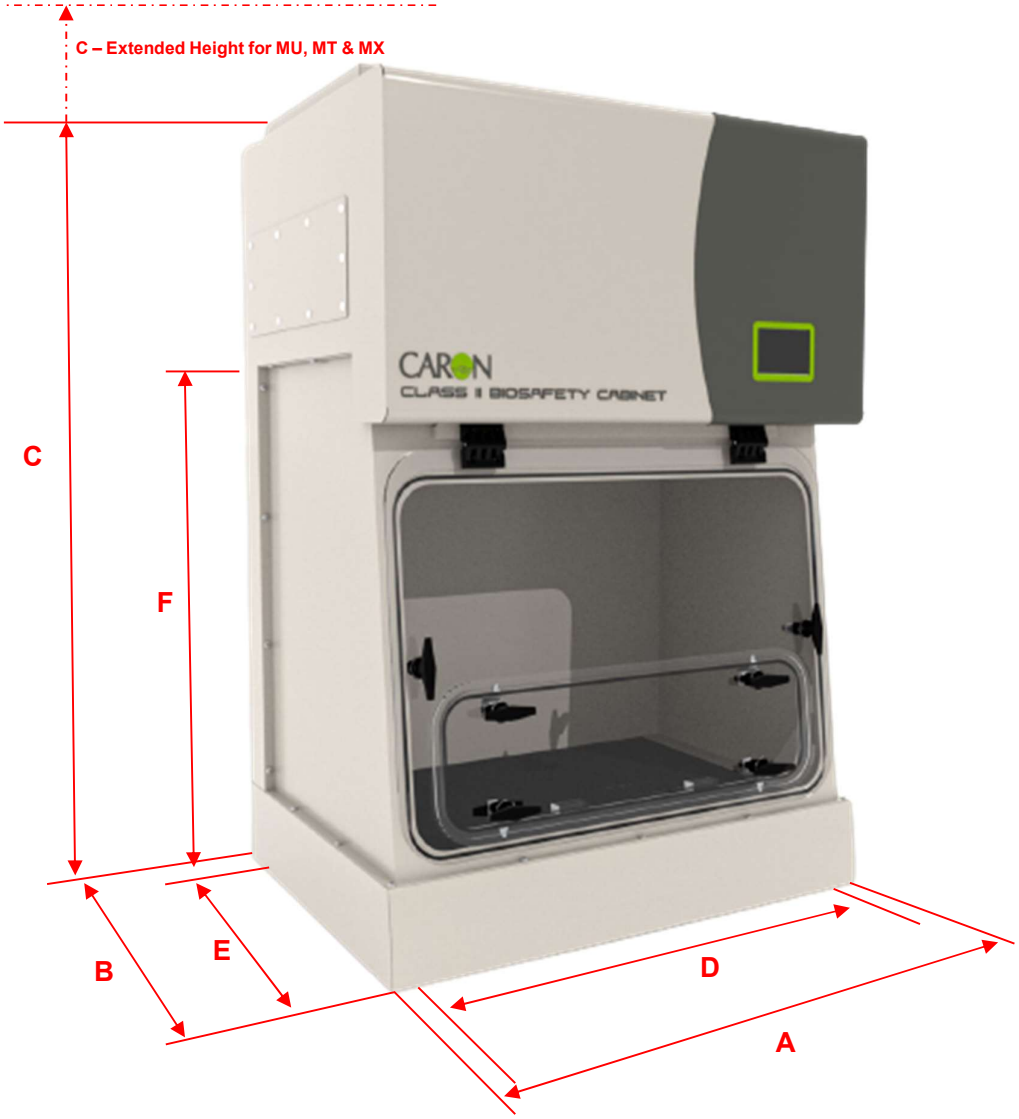
Stock No.	Description	MR085G	MR120H	MU120H	MD085G	MD120H	MT120H	ME085J	ME120K	MX120K
ACF02/01	Acid Filter, size #2, Qty 1									
ACF04/01	Acid Filter, size #4, Qty 1									
AMF02/01	Ammonia Filter, size #2, Qty 1									
AMF04/01	Ammonia Filter, size #4, Qty 1									
FHF02/01	Formaldehyde Filter, size #2, Qty 1									
FHF04/01	Formaldehyde Filter, size #3, Qty 1									
HPF02/01	HEPA Filter, size #2, Qty 1	●	●	●	●	●	●	●	●	●
HPF04/01	HEPA Filter, size #4, Qty 1	◐			◐			◐	◐	◐
HPF17/01	HEPA Filter, size #G, (set of HPF02/01 & HPF04/01)	◐			◐					
HPF18/01	HEPA Filter, size #H, (set of HPF02/01 & FH0016/01)		◐	◐		◐	◐			
HPF19/01	HEPA Filter, size #J, (set of 2x HPF02/01 & HPF04/01)							◐		
HPF20/01	HEPA Filter, size #K, (set of 2x HPF02/01 & FH0016/01)								◐	◐
MPF02/01	Multi-Purpose Filter, size #2, Qty 1									
MPF04/01	Multi-Purpose Filter, size #4, Qty 1									
OSF02/01	Organic Solvent Filter, size #2, Qty 1									
OSF04/01	Organic Solvent Filter, size #4, Qty 1									
PRF02/01	Prefilter, size #2, Qty 1									
PRF04/01	Prefilter, size #4, Qty 1									
PRF04/02	Prefilter, size #4, Qty 2									
SPF02/01	Filter Spacer, size #2, Qty 1									
SPF04/01	Filter Spacer, size #4, Qty 1									
SPF04/02	Filter Spacer, size #4, Qty 2									
ULF02/01	ULPA Filter, size #2, Qty 1	●	●	●	●	●	●	●	●	●
ULF04/01	ULPA Filter, size #4, Qty 1	◐			◐			◐	◐	◐
ULF17/01	ULPA Filter, size #G (set of ULF02/01 & ULF04/01)	◐			◐					
ULF18/01	ULPA Filter, size #H (set of ULF02/01 & FU0016/01)		◐	◐		◐	◐			
ULF19/01	ULPA Filter, size #J, (set of 2x ULF02/01 & ULF04/01)							◐		
ULF20/01	ULPA Filter, size #K, (set of 2x ULF02/01 & FU0016/01)								◐	◐

KEY:

● – Exhaust Filters

◐ - Downflow Filters

DIMENSIONAL REFERENCES RECIRCULATING MSC



MODEL	*'A'* EXTERNAL WIDTH	*'B'* EXTERNAL DEPTH	*'C'* EXTERNAL HEIGHT	*'D'* INTERNAL WIDTH	*'E'* INTERNAL DEPTH	*'F'* INTERNAL HEIGHT
MR085G	854mm	650mm	1218mmm	814mm	418mm	686mm
MR120H	1221mm	661mm	1200mm	1160mm	540mm	686mm
MU120H	1221mm	753mm	1470.7mm	1160mm	660mm	939mm
MD085G	854mm	650mm	1431mm	814mm	418mm	686mm
MD120H	1221mm	661mm	1446.2mm	1160mm	540mm	686mm
MT120H	1221mm	753mm	1710.7mm	1160mm	660mm	939mm
ME085J	854mm	650mm	1431mm	814mm	418mm	686mm
ME120K	1221mm	661mm	1446.2mm	1160mm	540mm	686mm
MX120K	1221mm	753mm	1685.7mm	1160mm	660mm	939mm

EU DECLARATION OF CONFORMITY

QA Doc 92-0011 Rev 2

CE

CARON
Opening Doors for Scientists

EU Declaration of Conformity

1. Product Model / Type:

Product Name:	Class II Biosafety Cabinet
Model:	CA130U, CA190U, CC130U, CC190V, MR085G, MR120H, ME085J, ME120K, MD085G, MD120H, MU120H, MX120K, MT120H & Variants,
Serial No.:	N/A
Operating Voltage and Frequency:	230V + 10% -6%, 50Hz, Single Phase 115V + 10% -6%, 60Hz, Single Phase (Harmonised Voltage)
Description/ Specifications:	Photo  

2. Manufacturer:

Bigneat Ltd t/a Caron Products, 4&5 Piper's Wood Industrial Park, Waterberry Drive, Waterlooville, Hampshire PO7 7XU, United Kingdom.
Tel +44-2392-266400.
Info@bigneat.com
www.bigneat.com

3. This declaration is issued under the sole responsibility of the product manufacturer.

4. The object of the declaration described above is in conformity with the relevant Union harmonisation legislation and their amendments:

2006/42/EC	Machinery Directive
2014/30/EU	Electromagnetic Compatibility Directive
2011/65/EU	Restriction of Hazardous Substances in Electrical and Electronic Directive

5. We hereby declare that following harmonised standards have been applied to the product described above, to which this declaration of conformity refers to.

2006/42/EC:

EN ISO 12100:2010	Safety of machinery - General principles for design - Risk assessment and risk reduction
EN ISO 13849-1:2015	Safety of machinery — Safety-related parts of control systems — Part 1: General principles for design
EN 60204-1:2018	Safety of machinery - Electrical equipment of machines - Part 1: General requirements

2014/30/EU:

EN 61326-1:2013	Electrical Equipment for measurement, control and laboratory use – EMC requirements
EN 63000-3-2:2018	Electromagnetic compatibility (EMC) – Part 3-2: Limits – Limits for harmonic current emissions (equipment input current ≤ 16 A per phase)

2011/65/EU

EN 63000:2018	Technical documentation for the assessment of electrical and electronic products with respect to the restriction of hazardous substances

Other Applicable Standards:

a) BS EN 12469:2000, b) BS EN 14644-1:2015 (ISO Class 5)	Specification for microbiological safety cabinets
EN 61010-1:2010+A1:2019	Safety requirements for electrical equipment for measurement, control and laboratory Use
EN 62311:2020	EMF Standard
a) BS7989:2001 elements b) AFNOR NFX 15-211 Class 1 For Filter Retention Capacity	Specification For Recirculatory Filtration Fume Cupboards (when carbon filtration installed)
ASHRAE 110-199 12-203 Containment NSF/ANSI 49 – 2022	American Standard

The following authorised representative is authorised by the manufacture to compile the technical file:

Name:	**Casus Europe B.V.**
Address (Authorised Representative):	**Lange Viestraat 2b** **3511 BK Utrecht** **The Netherlands.**

Signed for & behalf of Bigneat Ltd t/a Caron:

Place of issue:	**UK**
Date of Issue:	**14 November 2023**
Name:	**Iain Howes**
Function:	**Quality Manager**
Signature:	

UKCA DECLARATION OF CONFORMITY

QA Doc 93-0011 Rev 2

UK CA

CARON
Opening Doors for Scientists

Declaration of Conformity

1. **Product Model / Type:**

Product Name:	Class II Biosafety Cabinet
Model:	CA130U, CA190U, CC130U, CC190V, MR085G, MR120H, ME085J, ME120K, MD085G, MD120H, MU120H, MX120K, MT120H & Variants,
Serial No:	N/A
Operating Voltage and Frequency:	230V + 10% -6%, 50Hz, Single Phase 115V + 10% -6%, 60Hz, Single Phase (Harmonised Voltage)
Description / Specifications:	Photo  

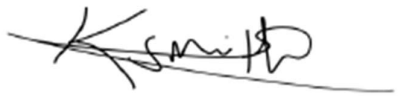
2. **Manufacturer (and Technical Documentation source):**

EN 63000:2018	Technical documentation for the assessment of electrical and electronic products with respect to the restriction of hazardous substances

Other Applicable Standards:

a) BS EN 12469:2000, b) BS EN 14644-1:2015 (ISO Class 5)	Specification for microbiological safety cabinets
EN 61010-1:2010+A1:2019	Safety requirements for electrical equipment for measurement control, and laboratory use
EN 62311:2020	EMF Standard
a) BS7989:2001 elements b) AFNOR NFX 15-211 Class 1 For Filter Retention Capacity	Specification For Recirculatory Filtration Fume Cupboards (when carbon filtration installed)
ASHRAE 110-199 12-203 Containment NSF/ANSI 49 – 2022	American Standard

Signed for & behalf of Bigneat Ltd t/a Caron:

Place of issue:	**4-5 pipers wood industrial park, Waterlooville, Hampshire, PO7 7XU**
Date of Issue:	**11/08/2023**
Name:	**Kelvin Robins-Smith**
Function:	**Engineering Manager (UK)**
Signature:	

Bigneat Ltd t/a Caron Products, 4&5 Piper's Wood Industrial Park, Waterberry Drive, Waterlooville, Hampshire PO7 7XU, UK.
Tel 02392-266400.
Info@bigneat.com
www.bigneat.com

3. This declaration is issued under the sole responsibility of the product manufacturer.

4. The object of the declaration described above is in conformity with the relevant UK Statutory Instruments and their amendments:

SI 2008 No. 1597	The Supply of Machinery (Safety) Regulations 2008
SI 2016 No. 1091	Electromagnetic Compatibility Regulations 2016
SI 2012 No. 3032	The Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations 2012

5. We hereby declare that the product described above, to which this declaration of conformity refers to, is in conformity with the essential requirements of the following designated standards:

SI 2008 No. 1597:

EN ISO 12100:2010	Safety of machinery - General principles for design - Risk assessment and risk reduction
EN ISO 13849-1:2015	Safety of machinery — Safety-related parts of control systems — Part 1: General principles for design
EN 60204-1:2018	Safety of machinery - Electrical equipment of machines - Part 1: General requirements

SI 2016 No. 1091

EN 61326-1:2013	Electrical Equipment for measurement, control and laboratory use – EMC requirements
EN 63000-3-2:2018	Electromagnetic compatibility (EMC) – Part 3-2: Limits – Limits for harmonic current emissions (equipment input current ≤ 16 A per phase)

SI 2012 No. 3032

APPENDIX 1 – RECIRCULATING MSC ELECTRICAL SCHEMATIC

M Product range

MR085G/MD085G-1: 115V, 1Φ, 60Hz, FLC 4.04A

MR085G/MD085G-4: 230V, 1Φ, 50/60Hz, FLC 2.26A

MR120H/MD120H/MU120H/MT120H-1: 115V, 1Φ, 60Hz, FLC 6.44A

MR120H/MD120H/MU120H/MT120H-4: 230V, 1Φ, 50/60Hz, FLC 3.66A

ME085J-1: 115V, 1Φ, 60Hz, FLC 6.44A

ME085J-4: 230V, 1Φ, 50/60Hz, FLC 3.66A

ME120K/MX120K-1: 115V, 1Φ, 60Hz, FLC 8.84A

ME120K/MX120K-4: 230V, 1Φ, 50/60Hz, FLC 5.06A

M Series
Document book

REV.	DATE	NAME	CHANGES
B	12/12/2023	zerpa.g	Addition of MU MT MX
A	13/06/2023	zerpa.g	First Release

CARON®

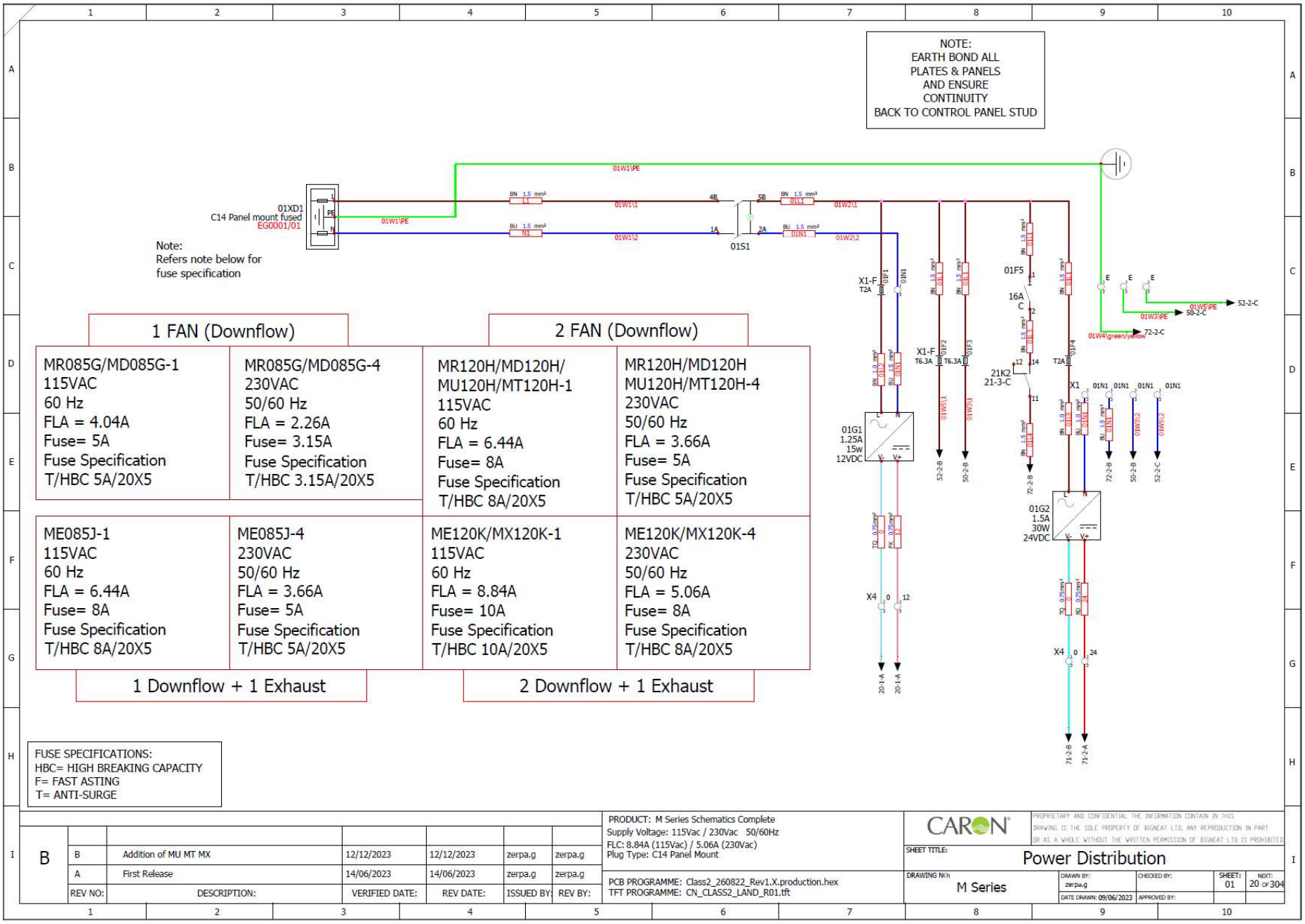
4/5 Piper's Wood Industrial Park
Waterberry Drive
Waterlooville
PO7 7XU

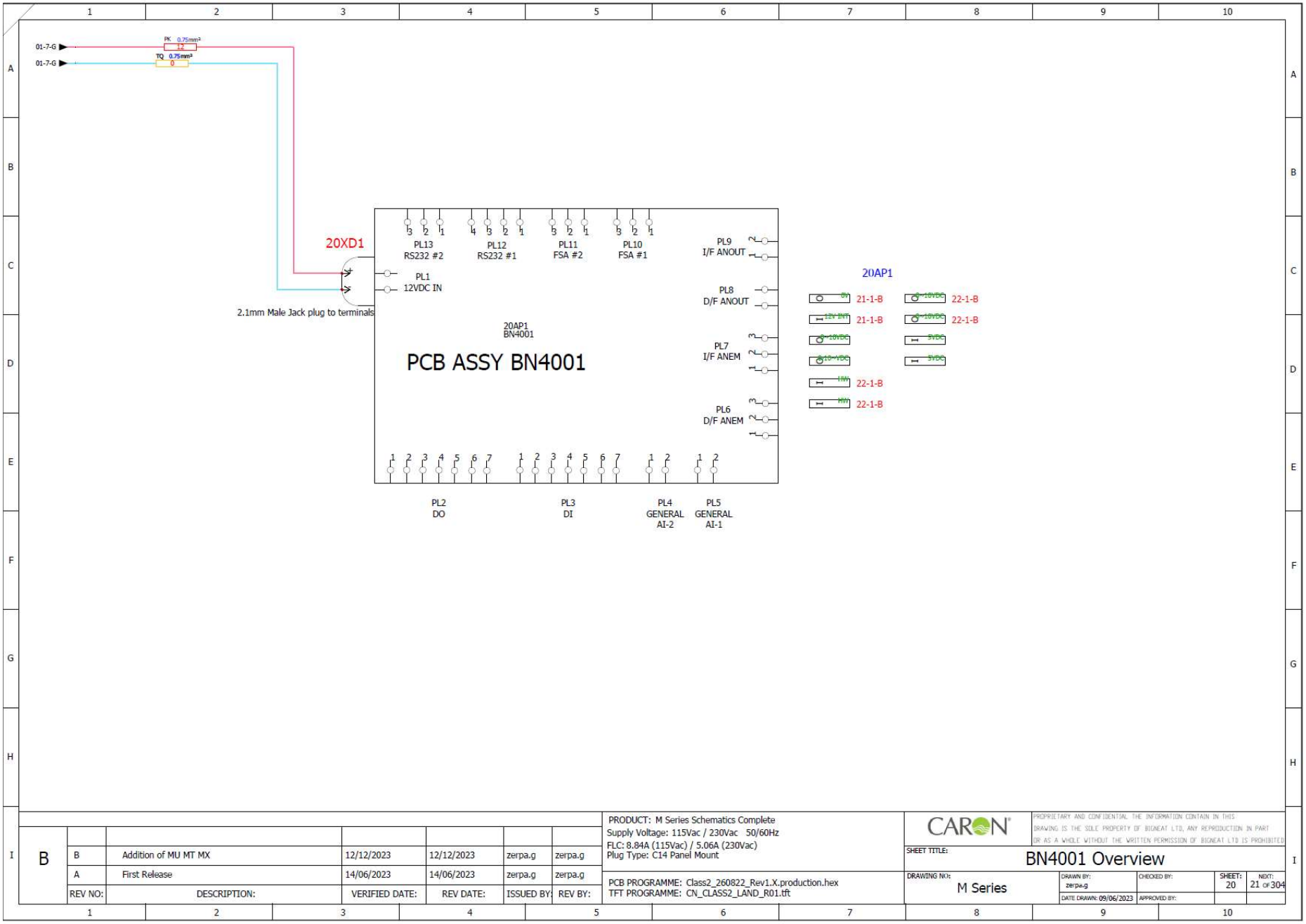
REVISION B

CONTRACT :

Checked By Zerpa.G
Approved By Zerpa.G

SCHEME 00


NOTE:
EARTH BOND ALL
PLATES & PANELS
AND ENSURE
CONTINUITY
BACK TO CONTROL PANEL STUD
01XD1
C14 Panel mount fused
EG0001/01
Note:
Refers note below for
fuse specification
01S1
01G1
1.25A
15w
12VDC
01G2
1.5A
30W
24VDC
01F5
16A
21K2
21-3-C
X1-F
T2A
T6.3A
X1
X4
1 FAN (Downflow)
MR085G/MD085G-1
115VAC
60 Hz
FLA = 4.04A
Fuse= 5A
Fuse Specification
T/HBC 5A/20X5
MR085G/MD085G-4
230VAC
50/60 Hz
FLA = 2.26A
Fuse= 3.15A
Fuse Specification
T/HBC 3.15A/20X5
2 FAN (Downflow)
MR120H/MD120H/
MU120H/MT120H-1
115VAC
60 Hz
FLA = 6.44A
Fuse= 8A
Fuse Specification
T/HBC 8A/20X5
MR120H/MD120H
MU120H/MT120H-4
230VAC
50/60 Hz
FLA = 3.66A
Fuse= 5A
Fuse Specification
T/HBC 5A/20X5
ME085J-1
115VAC
60 Hz
FLA = 6.44A
Fuse= 8A
Fuse Specification
T/HBC 8A/20X5
ME085J-4
230VAC
50/60 Hz
FLA = 3.66A
Fuse= 5A
Fuse Specification
T/HBC 5A/20X5
ME120K/MX120K-1
115VAC
60 Hz
FLA = 8.84A
Fuse= 10A
Fuse Specification
T/HBC 10A/20X5
ME120K/MX120K-4
230VAC
50/60 Hz
FLA = 5.06A
Fuse= 8A
Fuse Specification
T/HBC 8A/20X5
1 Downflow + 1 Exhaust
2 Downflow + 1 Exhaust
FUSE SPECIFICATIONS:
HBC= HIGH BREAKING CAPACITY
F= FAST ASTING
T= ANTI-SURGE
B | B | Addition of MU MT MX | 12/12/2023 | 12/12/2023 | zerpa.g | zerpa.g
A | First Release | 14/06/2023 | 14/06/2023 | zerpa.g | zerpa.g
REV NO: | DESCRIPTION: | VERIFIED DATE: | REV DATE: | ISSUED BY: | REV BY:
PRODUCT: M Series Schematics Complete
Supply Voltage: 115Vac / 230Vac 50/60Hz
FLC: 8.84A (115Vac) / 5.06A (230Vac)
Plug Type: C14 Panel Mount
PCB PROGRAMME: Class2_260822_Rev1.X.production.hex
TFT PROGRAMME: CN_CLASS2_LAND_R01.tft
CARON
PROPRIETARY AND CONFIDENTIAL. THE INFORMATION CONTAIN IN THIS DRAWING IS THE SOLE PROPERTY OF BIGNEAT LTD. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF BIGNEAT LTD IS PROHIBITED
SHEET TITLE:
Power Distribution
DRAWING NO:
M Series
DRAWN BY: zerpa.g
CHECKED BY:
SHEET: 01
NEXT: 20 or 304
DATE DRAWN: 09/06/2023
APPROVED BY:



REV NO:	DESCRIPTION:	VERIFIED DATE:	REV DATE:	ISSUED BY:	REV BY:
B	Addition of MU MT MX	12/12/2023	12/12/2023	zerpa.g	zerpa.g
A	First Release	14/06/2023	14/06/2023	zerpa.g	zerpa.g

PRODUCT: M Series Schematics Complete
Supply Voltage: 115Vac / 230Vac 50/60Hz
FLC: 8.84A (115Vac) / 5.06A (230Vac)
Plug Type: C14 Panel Mount

PCB PROGRAMME: Class2_260822_Rev1.X.production.hex
TFT PROGRAMME: CN_CLASS2_LAND_R01.tft

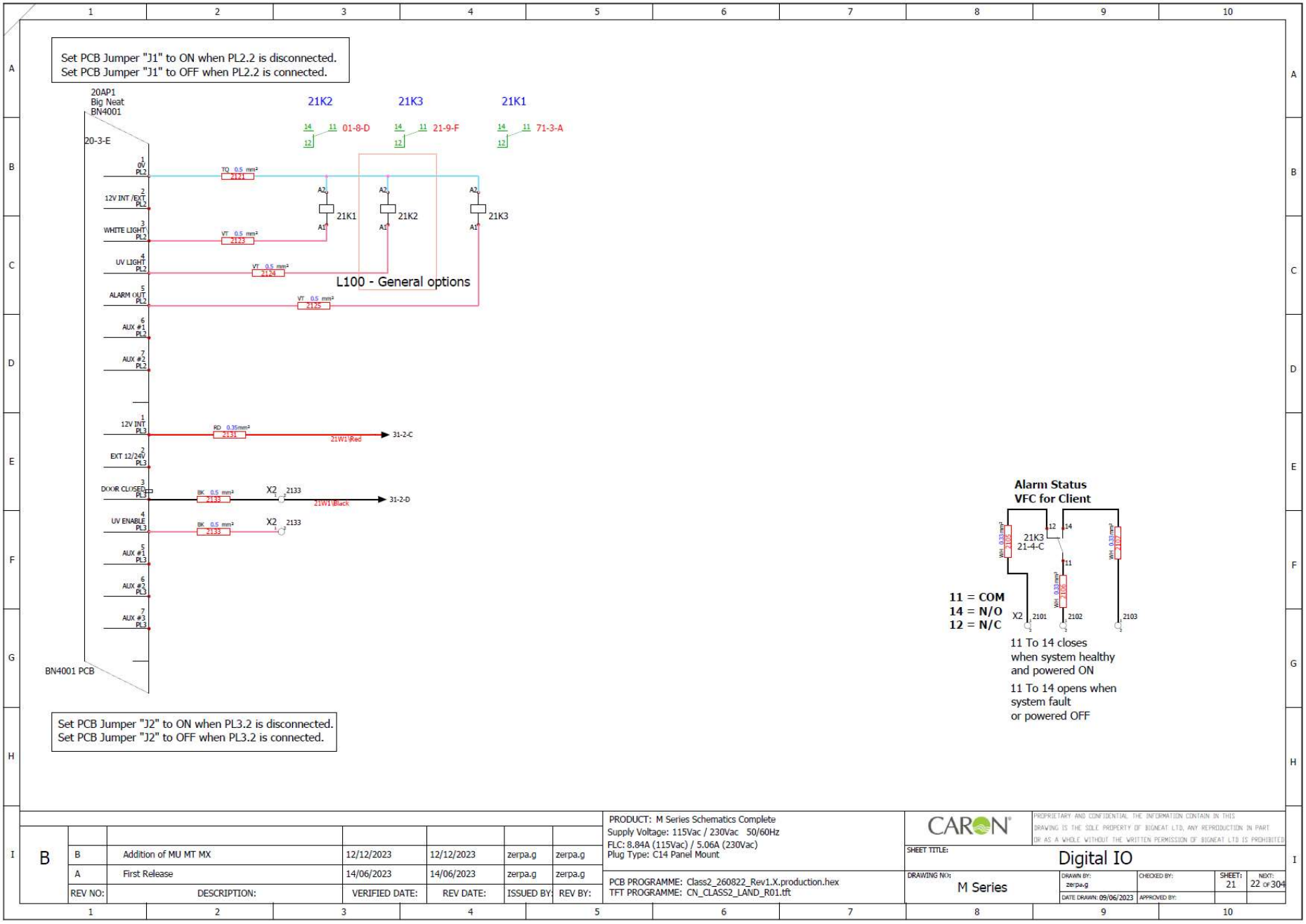
CARON

SHEET TITLE: BN4001 Overview

DRAWING NO: M Series

DRAWN BY: zerpa.g | CHECKED BY: | SHEET: 20 | NEXT: 21 OF 304

DATE DRAWN: 09/06/2023 | APPROVED BY:



REV NO:	DESCRIPTION:	VERIFIED DATE:	REV DATE:	ISSUED BY:	REV BY:
B	Addition of MU MT MX	12/12/2023	12/12/2023	zerpa.g	zerpa.g
A	First Release	14/06/2023	14/06/2023	zerpa.g	zerpa.g

PRODUCT: M Series Schematics Complete
Supply Voltage: 115Vac / 230Vac 50/60Hz
FLC: 8.84A (115Vac) / 5.06A (230Vac)
Plug Type: C14 Panel Mount

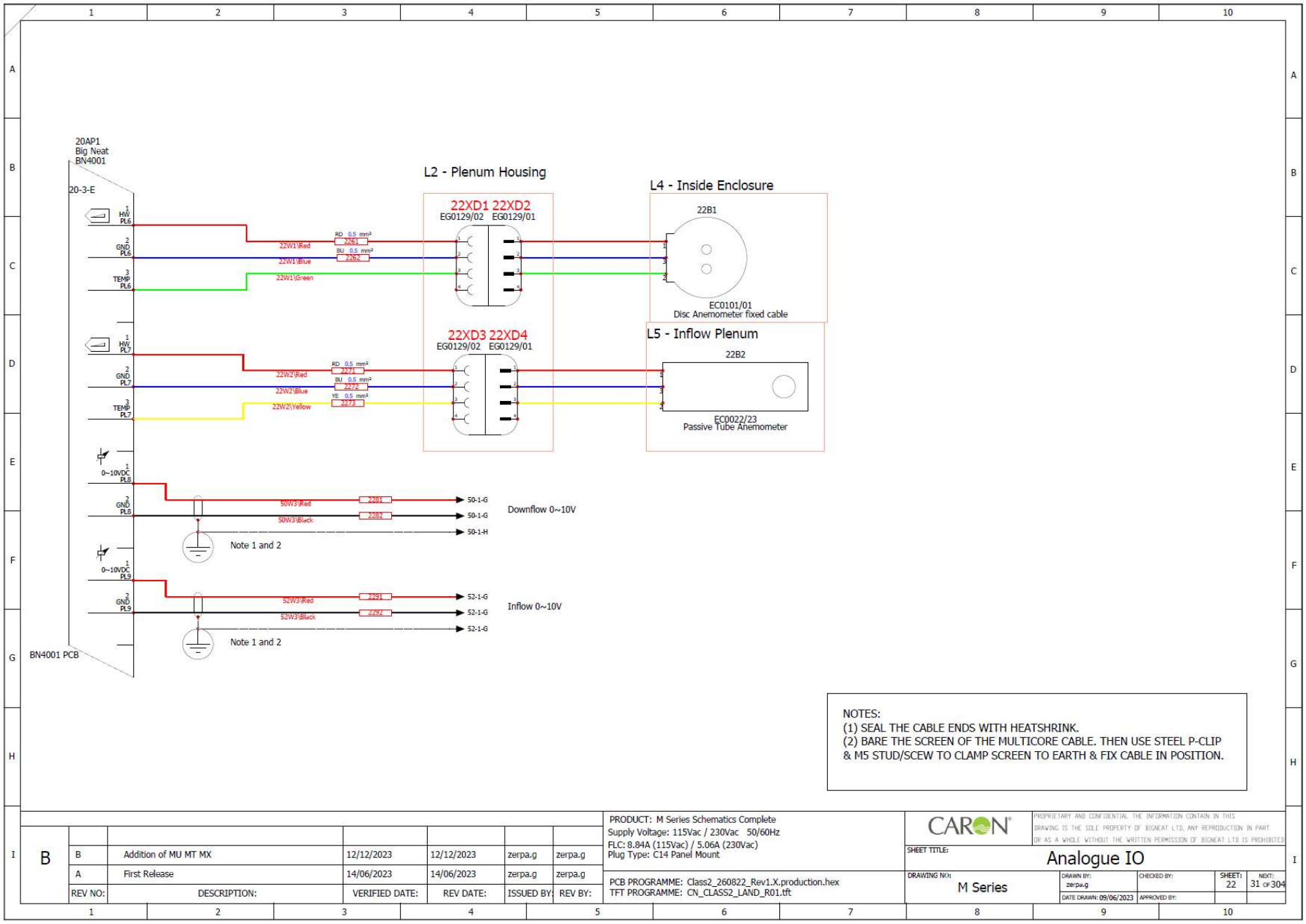
PCB PROGRAMME: Class2_260822_Rev1.X.production.hex
TFT PROGRAMME: CN_CLASS2_LAND_R01.tft

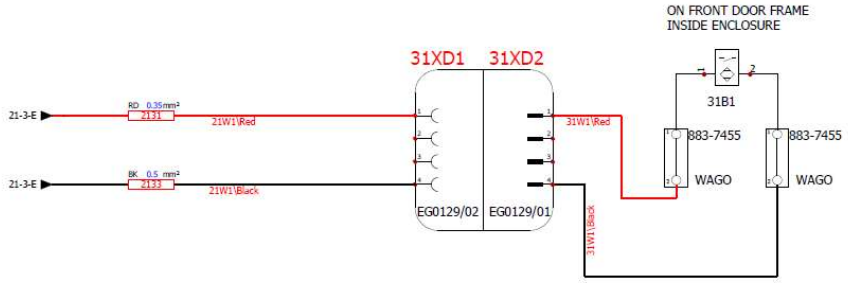
CARON

SHEET TITLE: Digital IO

DRAWING NO: M Series

DRAWN BY: zerpa.g
DATE DRAWN: 09/06/2023
CHECKED BY:
APPROVED BY:
SHEET: 21
NEXT: 22 or 304


20AP1
Big Neat
BN4001
20-3-E
L2 - Plenum Housing
22XD1 22XD2
EG0129/02 EG0129/01
L4 - Inside Enclosure
22B1
EC0101/01
Disc Anemometer fixed cable
22XD3 22XD4
EG0129/02 EG0129/01
L5 - Inflow Plenum
22B2
EC0022/23
Passive Tube Anemometer
HW PL6
GND PL6
TEMP PL6
HW PL7
GND PL7
TEMP PL7
0~10VDC PL8
GND PL8
0~10VDC PL9
GND PL9
22W1\Red
22W1\Blue
22W1\Green
22W2\Red
22W2\Blue
22W2\Yellow
50W3\Red
50W3\Black
52W3\Red
52W3\Black
50-1-G
50-1-H
52-1-G
Downflow 0~10V
Inflow 0~10V
Note 1 and 2
BN4001 PCB
NOTES:
(1) SEAL THE CABLE ENDS WITH HEATSHRINK.
(2) BARE THE SCREEN OF THE MULTICORE CABLE. THEN USE STEEL P-CLIP
& M5 STUD/SCEW TO CLAMP SCREEN TO EARTH & FIX CABLE IN POSITION.
PRODUCT: M Series Schematics Complete
Supply Voltage: 115Vac / 230Vac 50/60Hz
FLC: 8.84A (115Vac) / 5.06A (230Vac)
Plug Type: C14 Panel Mount
PCB PROGRAMME: Class2_260822_Rev1.X.production.hex
TFT PROGRAMME: CN_CLASS2_LAND_R01.tft
SHEET TITLE: Analogue IO
DRAWING NO: M Series
B Addition of MU MT MX 12/12/2023 12/12/2023 zerpa.g zerpa.g
A First Release 14/06/2023 14/06/2023 zerpa.g zerpa.g
REV NO: DESCRIPTION: VERIFIED DATE: REV DATE: ISSUED BY: REV BY:
DRAWN BY: zerpa.g
DATE DRAWN: 09/06/2023
CHECKED BY:
APPROVED BY:
SHEET: 22
NEXT: 31 or 304



NOTE:
THE WAGO TERMINAL BLOCKS
WILL BE USED AS EXTENSION
OF THE WIRES COMING
FROM THE SENSORS.

REV NO:	DESCRIPTION:	VERIFIED DATE:	REV DATE:	ISSUED BY:	REV BY:
B	Addition of MU MT MX	12/12/2023	12/12/2023	zerpa.g	zerpa.g
A	First Release	14/06/2023	14/06/2023	zerpa.g	zerpa.g

PRODUCT: M Series Schematics Complete
Supply Voltage: 115Vac / 230Vac 50/60Hz
FLC: 8.84A (115Vac) / 5.06A (230Vac)
Plug Type: C14 Panel Mount

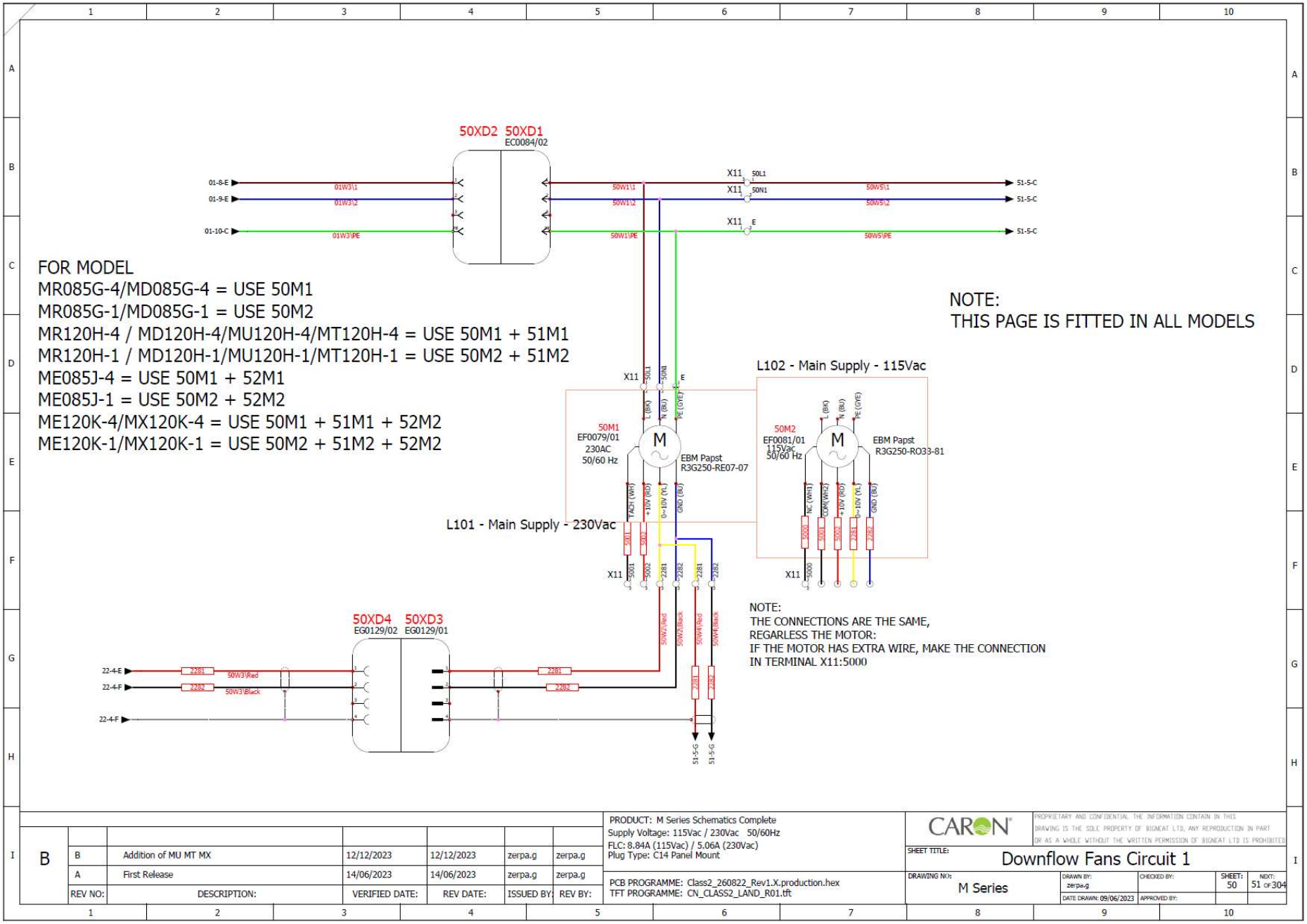
PCB PROGRAMME: Class2_260822_Rev1.X.production.hex
TFT PROGRAMME: CN_CLASS2_LAND_R01.tft

CARON

SHEET TITLE: Reed Switch Connections 1

DRAWING NO: M Series

DRAWN BY: zerpa.g
DATE DRAWN: 09/06/2023
CHECKED BY:
APPROVED BY:
SHEET: 31
NEXT: 50 OF 304



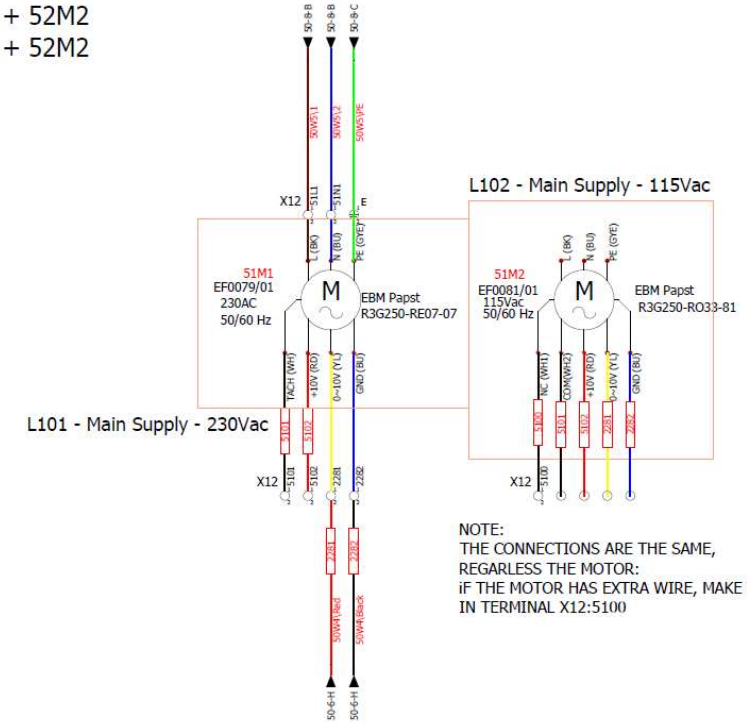
REV NO:	DESCRIPTION:	VERIFIED DATE:	REV DATE:	ISSUED BY:	REV BY:
B	Addition of MU MT MX	12/12/2023	12/12/2023	zerpa.g	zerpa.g
A	First Release	14/06/2023	14/06/2023	zerpa.g	zerpa.g

PRODUCT: M Series Schematics Complete
Supply Voltage: 115Vac / 230Vac 50/60Hz
FLC: 8.84A (115Vac) / 5.06A (230Vac)
Plug Type: C14 Panel Mount

PCB PROGRAMME: Class2_260822_Rev1.X.production.hex
TFT PROGRAMME: CN_CLASS2_LAND_R01.tft

SHEET TITLE: Downflow Fans Circuit 1
DRAWING NO: M Series
DRAWN BY: zerpa.g
DATE DRAWN: 09/06/2023
CHECKED BY:
APPROVED BY:
SHEET: 50
NEXT: 51 or 304

FOR MODEL
MR085G-4/MD085G-4 = USE 50M1
MR085G-1/MD085G-1 = USE 50M2
MR120H-4 / MD120H-4/MU120H-4/MT120H-4 = USE 50M1 + 51M1
MR120H-1 / MD120H-1/MU120H-1/MT120H-1 = USE 50M2 + 51M2
ME085J-4 = USE 50M1 + 52M1
ME085J-1 = USE 50M2 + 52M2
ME120K-4/MX120K-4 = USE 50M1 + 51M1 + 52M2
ME120K-1/MX120K-1 = USE 50M2 + 51M2 + 52M2



NOTE:
THE CONNECTIONS ARE THE SAME,
REGARLESS THE MOTOR:
iF THE MOTOR HAS EXTRA WIRE, MAKE THE CONNECTION
IN TERMINAL X12:5100

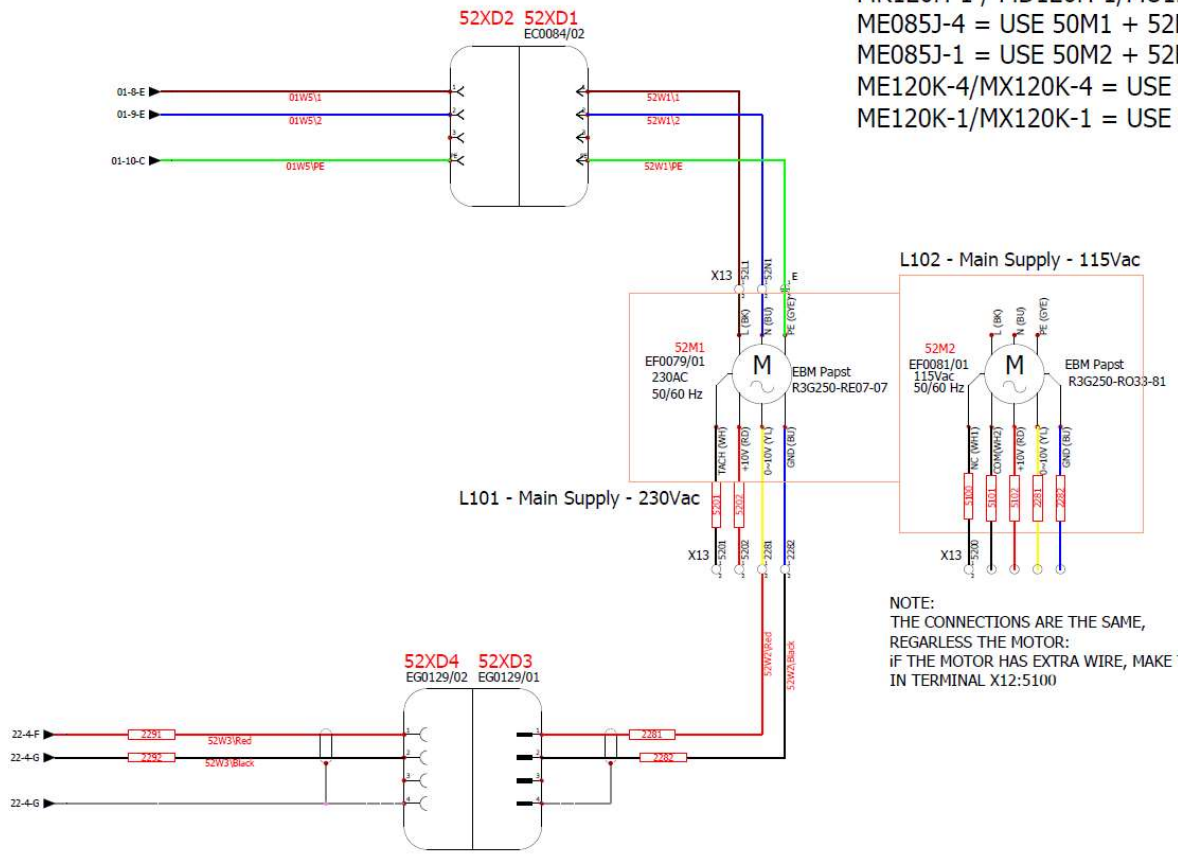
NOTE:
THIS PAGE IS FITTED IN MODELS
MR120H
MD120H
ME120K
MU120H
MT120H

REV NO:	DESCRIPTION:	VERIFIED DATE:	REV DATE:	ISSUED BY:	REV BY:
B	Addition of MU MT MX	12/12/2023	12/12/2023	zerpa.g	zerpa.g
A	First Release	14/06/2023	14/06/2023	zerpa.g	zerpa.g

PRODUCT: M Series Schematics Complete
Supply Voltage: 115Vac / 230Vac 50/60Hz
FLC: 8.84A (115Vac) / 5.06A (230Vac)
Plug Type: C14 Panel Mount
PCB PROGRAMME: Class2_260822_Rev1.X.production.hex
TFT PROGRAMME: CN_CLASS2_LAND_R01.tft

SHEET TITLE: Downflow Fans Circuit 2
DRAWING NO: M Series
DRAWN BY: zerpa.g
DATE DRAWN: 09/06/2023
CHECKED BY:
APPROVED BY:
SHEET: 51
NEXT: 52 OF 304

FOR MODEL
MR085G-4/MD085G-4 = USE 50M1
MR085G-1/MD085G-1 = USE 50M2
MR120H-4 / MD120H-4/MU120H-4/MT120H-4 = USE 50M1 + 51M1
MR120H-1 / MD120H-1/MU120H-1/MT120H-1 = USE 50M2 + 51M2
ME085J-4 = USE 50M1 + 52M1
ME085J-1 = USE 50M2 + 52M2
ME120K-4/MX120K-4 = USE 50M1 + 51M1 + 52M2
ME120K-1/MX120K-1 = USE 50M2 + 51M2 + 52M2



NOTE:
THE CONNECTIONS ARE THE SAME,
REGARLESS THE MOTOR:
iF THE MOTOR HAS EXTRA WIRE, MAKE THE CONNECTION
IN TERMINAL X12:5100

NOTE:
THIS PAGE IS FITTED IN MODELS
ME085J
ME120K
MX120K

REV NO:	DESCRIPTION:	VERIFIED DATE:	REV DATE:	ISSUED BY:	REV BY:
B	Addition of MU MT MX	12/12/2023	12/12/2023	zerpa.g	zerpa.g
A	First Release	14/06/2023	14/06/2023	zerpa.g	zerpa.g

PRODUCT: M Series Schematics Complete
Supply Voltage: 115Vac / 230Vac 50/60Hz
FLC: 8.84A (115Vac) / 5.06A (230Vac)
Plug Type: C14 Panel Mount

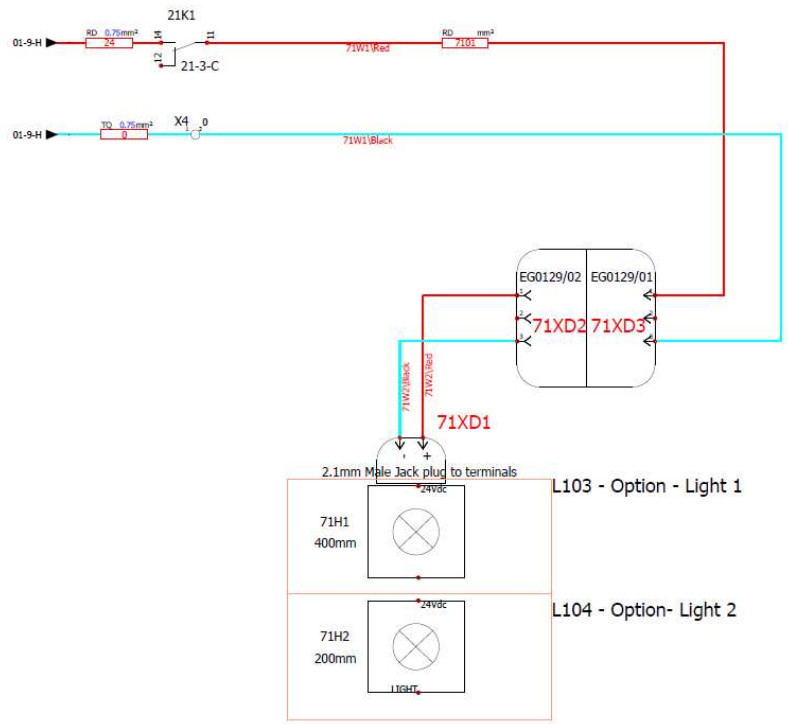
PCB PROGRAMME: Class2_260822_Rev1.X.production.hex
TFT PROGRAMME: CN_CLASS2_LAND_R01.tft

CARON

SHEET TITLE: Exhaust Fans Circuit

DRAWING NO: M Series

DRAWN BY:	CHECKED BY:	SHEET:	NEXT:
zerpa.g		52	71 OF 304
DATE DRAWN: 09/06/2023	APPROVED BY:		



FOR MODELS MR MD ME:
085G / 085J = USE 71H1 (400mm)
120H / 120K = USE 71H1 (400mm) + 71H2 (200mm)

REV NO:	DESCRIPTION:	VERIFIED DATE:	REV DATE:	ISSUED BY:	REV BY:
B	Addition of MU MT MX	12/12/2023	12/12/2023	zerpa.g	zerpa.g
A	First Release	14/06/2023	14/06/2023	zerpa.g	zerpa.g

PRODUCT: M Series Schematics Complete
Supply Voltage: 115Vac / 230Vac 50/60Hz
FLC: 8.84A (115Vac) / 5.06A (230Vac)
Plug Type: C14 Panel Mount

PCB PROGRAMME: Class2_260822_Rev1.X.production.hex
TFT PROGRAMME: CN_CLASS2_LAND_R01.tft

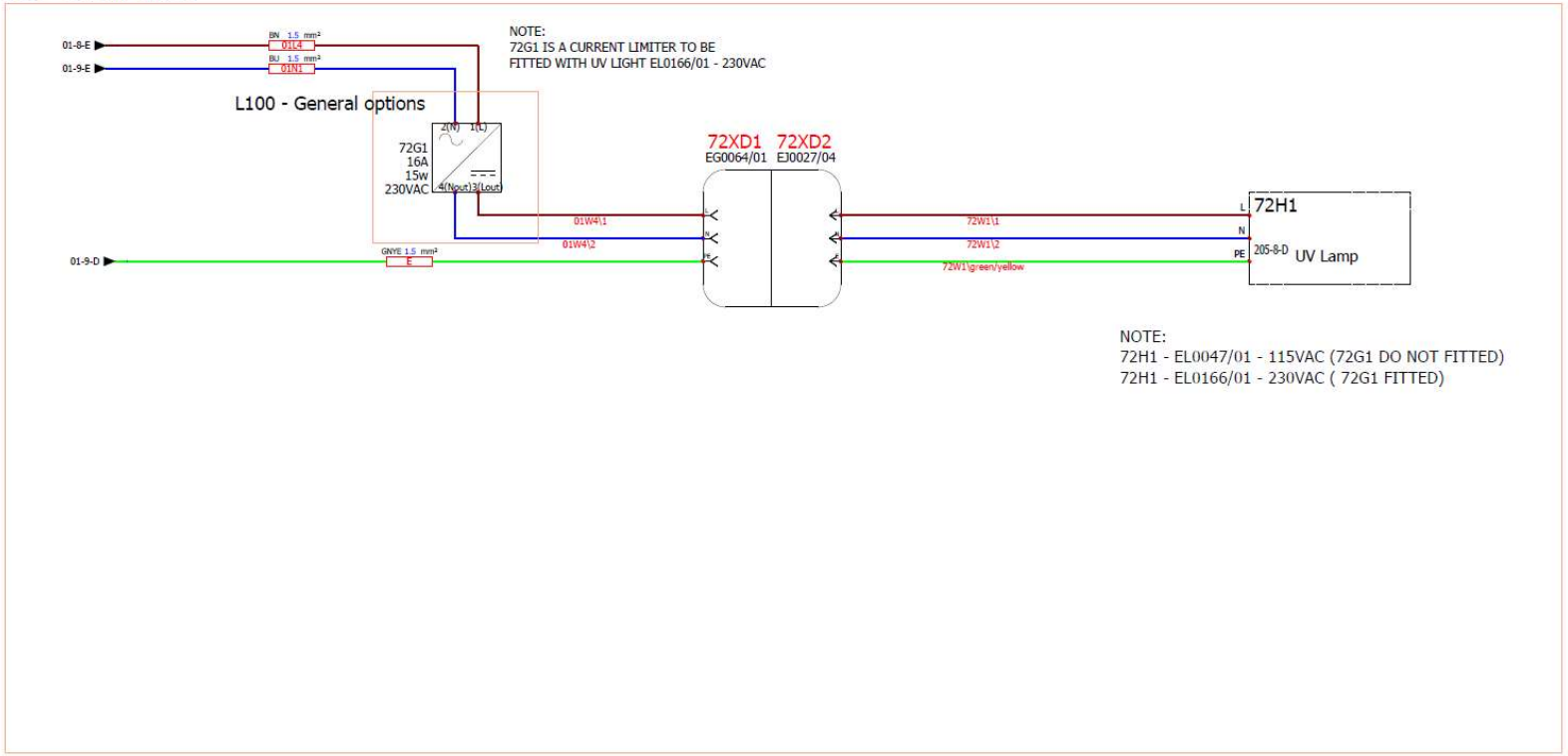
CARON

SHEET TITLE: White Lights connections

DRAWING NO: M Series

DRAWN BY: zerpa.g
DATE DRAWN: 09/06/2023
CHECKED BY:
APPROVED BY:
SHEET: 71
NEXT: 72 OF 304

L100 - General options



REV NO:	DESCRIPTION:	VERIFIED DATE:	REV DATE:	ISSUED BY:	REV BY:
B	Addition of MU MT MX	12/12/2023	12/12/2023	zerpa.g	zerpa.g
A	First Release	14/06/2023	14/06/2023	zerpa.g	zerpa.g

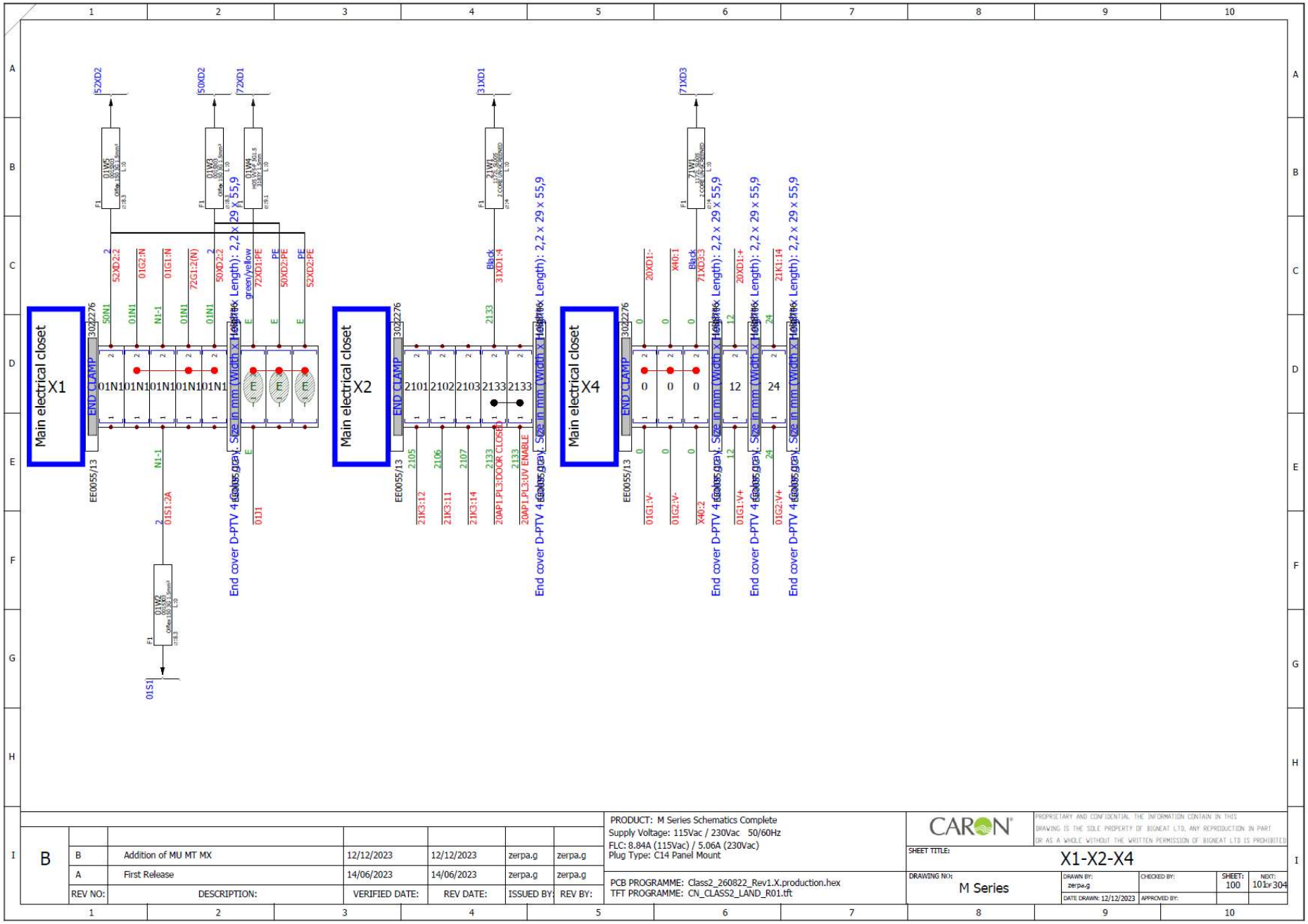
PRODUCT: M Series Schematics Complete
Supply Voltage: 115Vac / 230Vac 50/60Hz
FLC: 8.84A (115Vac) / 5.06A (230Vac)
Plug Type: C14 Panel Mount

PCB PROGRAMME: Class2_260822_Rev1.X.production.hex
TFT PROGRAMME: CN_CLASS2_LAND_R01.tft

SHEET TITLE: UV Lights connections

DRAWING NO: M Series

DRAWN BY: zerpa.g
CHECKED BY:
DATE DRAWN: 12/12/2023
APPROVED BY:
SHEET: 72
NEXT: 100r304



REV NO:	DESCRIPTION:	VERIFIED DATE:	REV DATE:	ISSUED BY:	REV BY:
B	Addition of MU MT MX	12/12/2023	12/12/2023	zerpa.g	zerpa.g
A	First Release	14/06/2023	14/06/2023	zerpa.g	zerpa.g

PRODUCT: M Series Schematics Complete
Supply Voltage: 115Vac / 230Vac 50/60Hz
FLC: 8.84A (115Vac) / 5.06A (230Vac)
Plug Type: C14 Panel Mount

PCB PROGRAMME: Class2_260822_Rev1.X.production.hex
TFT PROGRAMME: CN_CLASS2_LAND_R01.tft

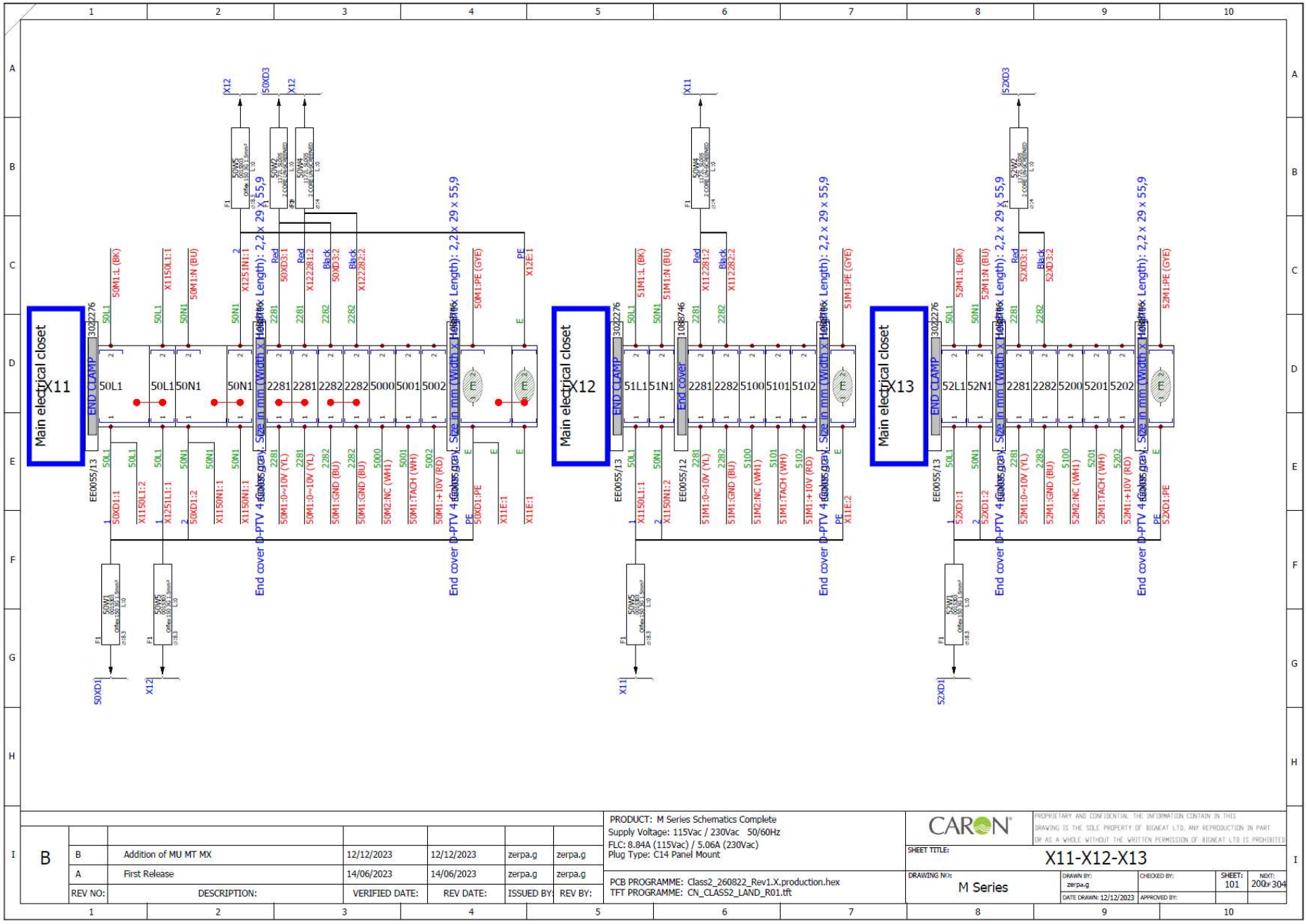
CARON

SHEET TITLE: X1-X2-X4

DRAWING NO: M Series

DRAWN BY: zerpa.g | CHECKED BY: | SHEET: 100 | NEXT: 101

DATE DRAWN: 12/12/2023 | APPROVED BY:



REV NO:	DESCRIPTION:	VERIFIED DATE:	REV DATE:	ISSUED BY:	REV BY:
B	Addition of MU MT MX	12/12/2023	12/12/2023	zerpa.g	zerpa.g
A	First Release	14/06/2023	14/06/2023	zerpa.g	zerpa.g

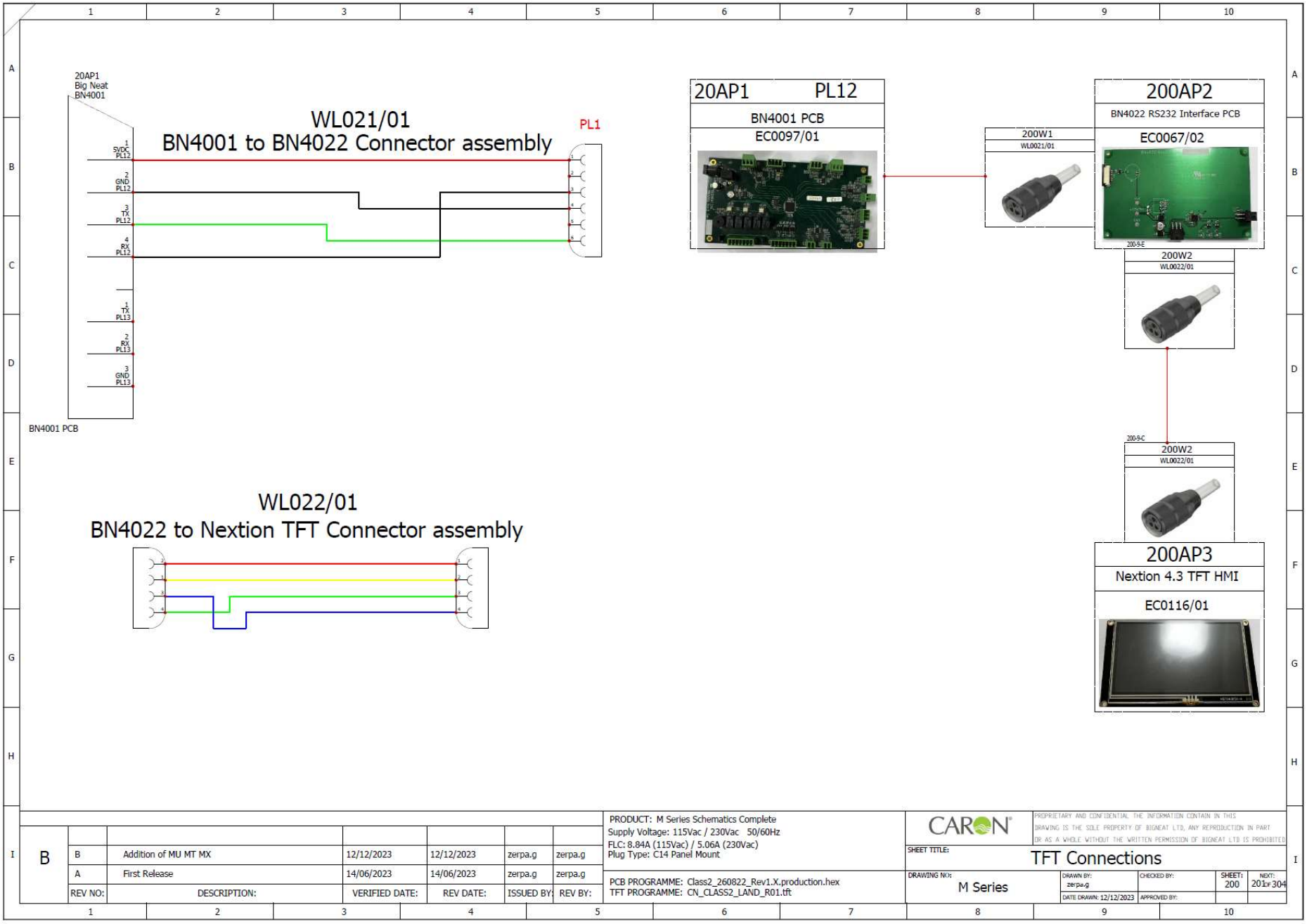
PRODUCT: M Series Schematics Complete
Supply Voltage: 115Vac / 230Vac 50/60Hz
FLC: 8.84A (115Vac) / 5.06A (230Vac)
Plug Type: C14 Panel Mount

PCB PROGRAMME: Class2_260822_Rev1.X.production.hex
TFT PROGRAMME: CN_CLASS2_LAND_R01.tft

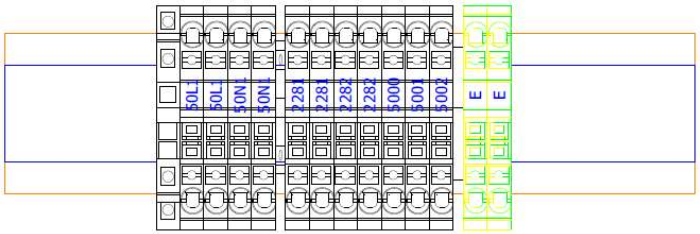
SHEET TITLE: X11-X12-X13

DRAWING NO: M Series

DRAWN BY: zerpa.g
DATE DRAWN: 12/12/2023
CHECKED BY:
APPROVED BY:
SHEET: 101
NEXT: 200r304

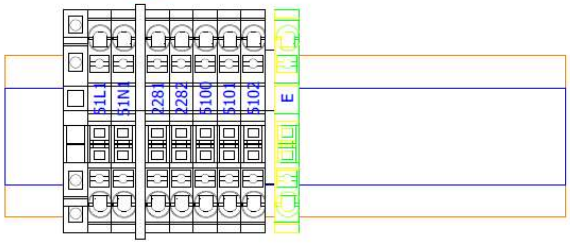

20AP1
Big Neat
BN4001
WL021/01
BN4001 to BN4022 Connector assembly
PL1
5VDC PL12
GND PL12
TX PL12
RX PL12
TX PL13
RX PL13
GND PL13
BN4001 PCB
20AP1 PL12
BN4001 PCB
EC0097/01
200W1
WL0021/01
200AP2
BN4022 RS232 Interface PCB
EC0067/02
200-9-E
200W2
WL0022/01
200-9-C
200W2
WL0022/01
200AP3
Nextion 4.3 TFT HMI
EC0116/01
WL022/01
BN4022 to Nextion TFT Connector assembly
PRODUCT: M Series Schematics Complete
Supply Voltage: 115Vac / 230Vac 50/60Hz
FLC: 8.84A (115Vac) / 5.06A (230Vac)
Plug Type: C14 Panel Mount
PCB PROGRAMME: Class2_260822_Rev1.X.production.hex
TFT PROGRAMME: CN_CLASS2_LAND_R01.tft
B
B Addition of MU MT MX 12/12/2023 12/12/2023 zerpa.g zerpa.g
A First Release 14/06/2023 14/06/2023 zerpa.g zerpa.g
REV NO: DESCRIPTION: VERIFIED DATE: REV DATE: ISSUED BY: REV BY:
PROPRIETARY AND CONFIDENTIAL. THE INFORMATION CONTAIN IN THIS DRAWING IS THE SOLE PROPERTY OF BIGNEAT LTD. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF BIGNEAT LTD IS PROHIBITED
SHEET TITLE:
TFT Connections
DRAWING NO:
M Series
DRAWN BY: zerpa.g
CHECKED BY:
DATE DRAWN: 12/12/2023
APPROVED BY:
SHEET: 200
NEXT: 201 to 304

X11



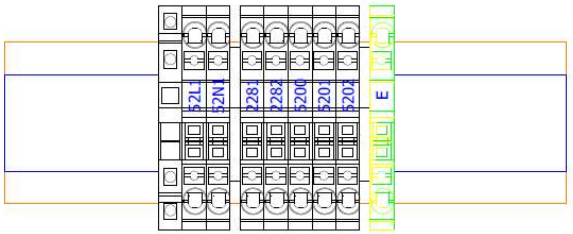
DIN RAIL LAYOUT 1 (150mm):
DOWNFLOW FAN 1 (50M1/50M2)
MR / MD / ME

X12



DIN RAIL LAYOUT 2 (122mm):
DOWNFLOW FAN 2 (51M1/51M2)
MR120H
MD120H
ME120K

X13



DIN RAIL LAYOUT 3 (122mm):
EXHAUST FAN 1 (52M1/52M2)
ME085J
ME120K

REV NO:	DESCRIPTION:	VERIFIED DATE:	REV DATE:	ISSUED BY:	REV BY:
B	Addition of MU MT MX	12/12/2023	12/12/2023	zerpa.g	zerpa.g
A	First Release	14/06/2023	14/06/2023	zerpa.g	zerpa.g

PRODUCT: M Series Schematics Complete
Supply Voltage: 115Vac / 230Vac 50/60Hz
FLC: 8.84A (115Vac) / 5.06A (230Vac)
Plug Type: C14 Panel Mount

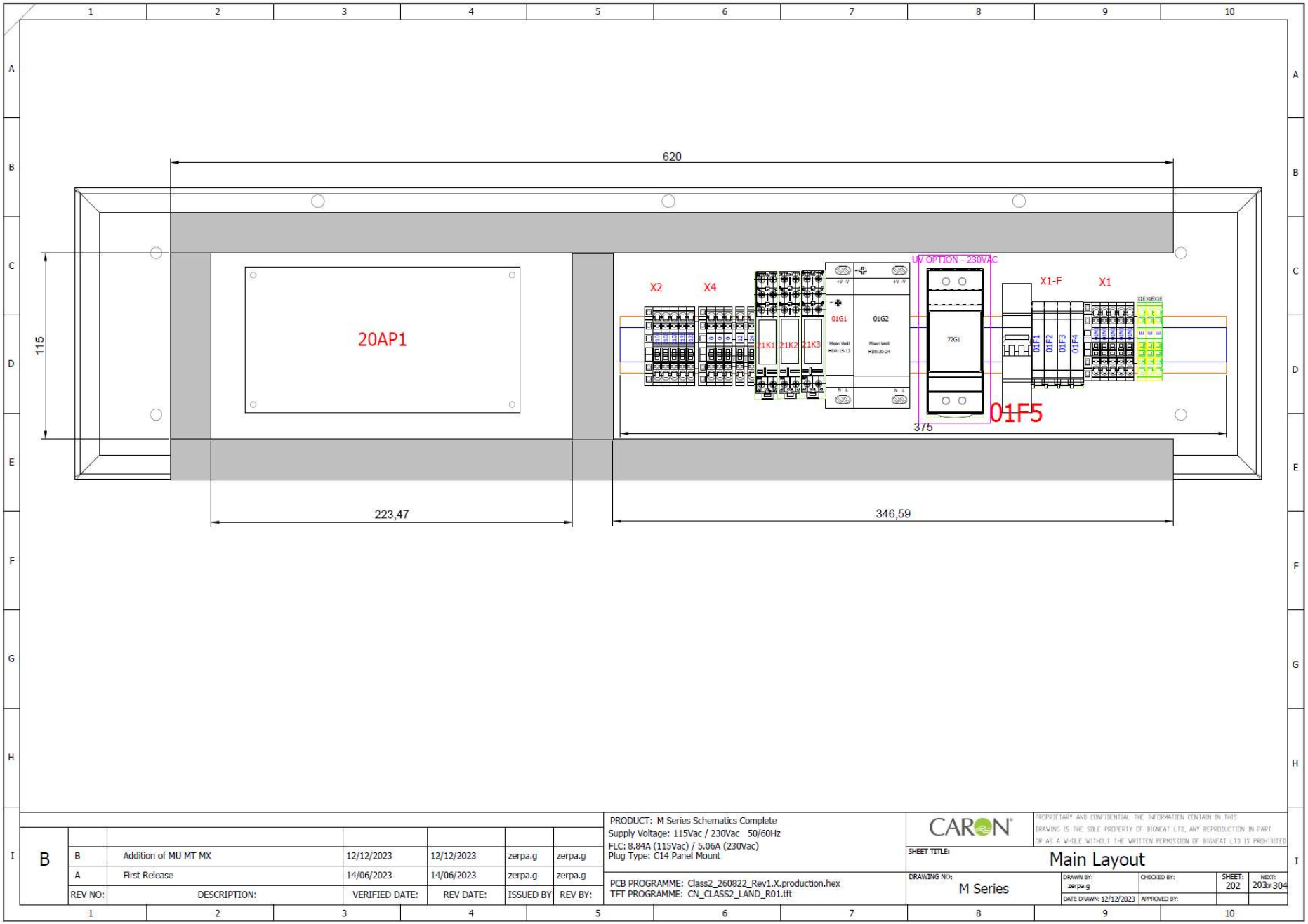
PCB PROGRAMME: Class2_260822_Rev1.X.production.hex
TFT PROGRAMME: CN_CLASS2_LAND_R01.tft

CARON

SHEET TITLE: Din Rail Layout

DRAWING NO: M Series

DRAWN BY: zerpa.g
DATE DRAWN: 12/12/2023
CHECKED BY:
APPROVED BY:
SHEET: 201
NEXT: 202 or 304



REV NO:	DESCRIPTION:	VERIFIED DATE:	REV DATE:	ISSUED BY:	REV BY:
B	Addition of MU MT MX	12/12/2023	12/12/2023	zerpa.g	zerpa.g
A	First Release	14/06/2023	14/06/2023	zerpa.g	zerpa.g

PRODUCT: M Series Schematics Complete
Supply Voltage: 115Vac / 230Vac 50/60Hz
FLC: 8.84A (115Vac) / 5.06A (230Vac)
Plug Type: C14 Panel Mount

PCB PROGRAMME: Class2_260822_Rev1.X.production.hex
TFT PROGRAMME: CN_CLASS2_LAND_R01.tft

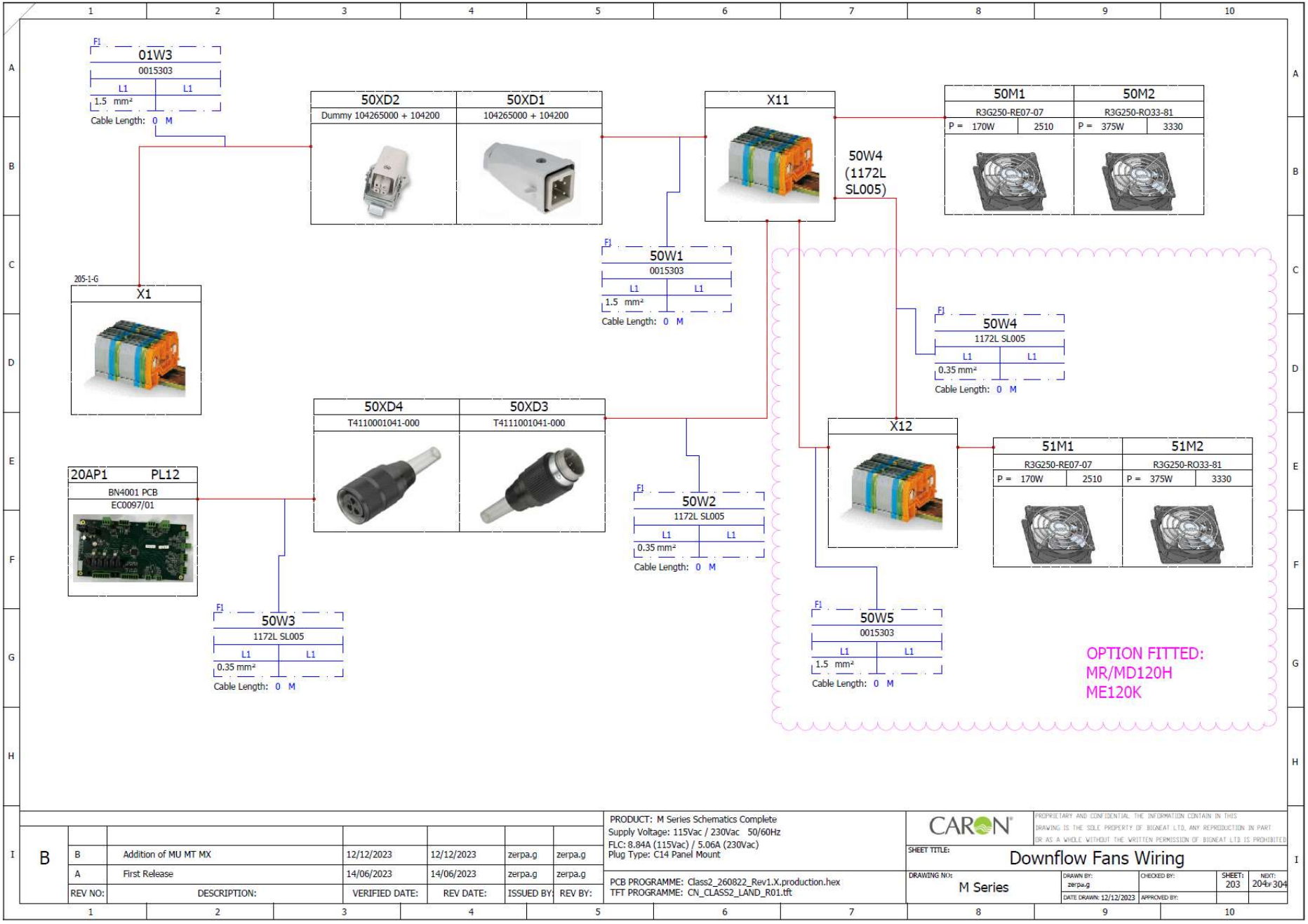
CARON

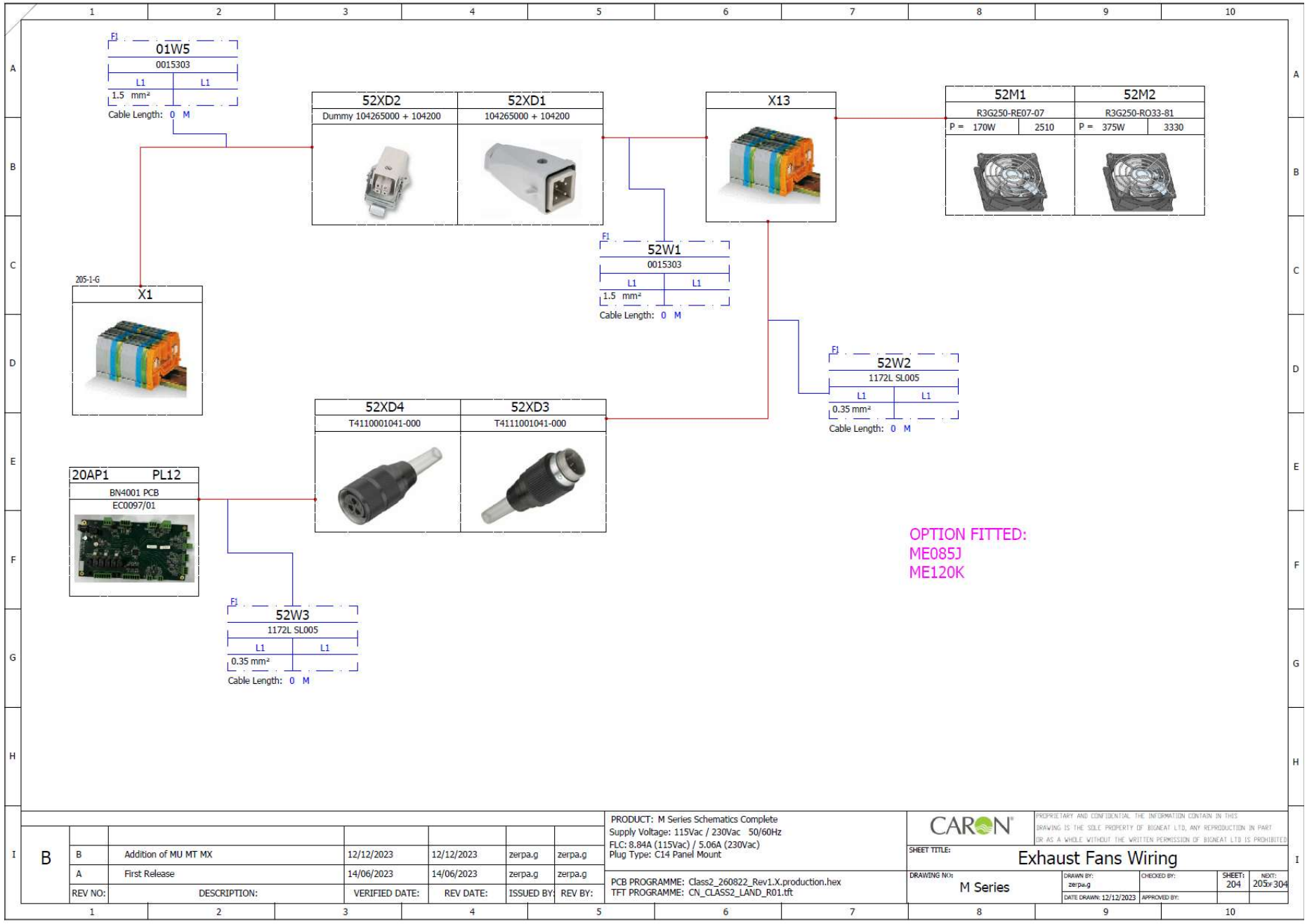
SHEET TITLE: Main Layout

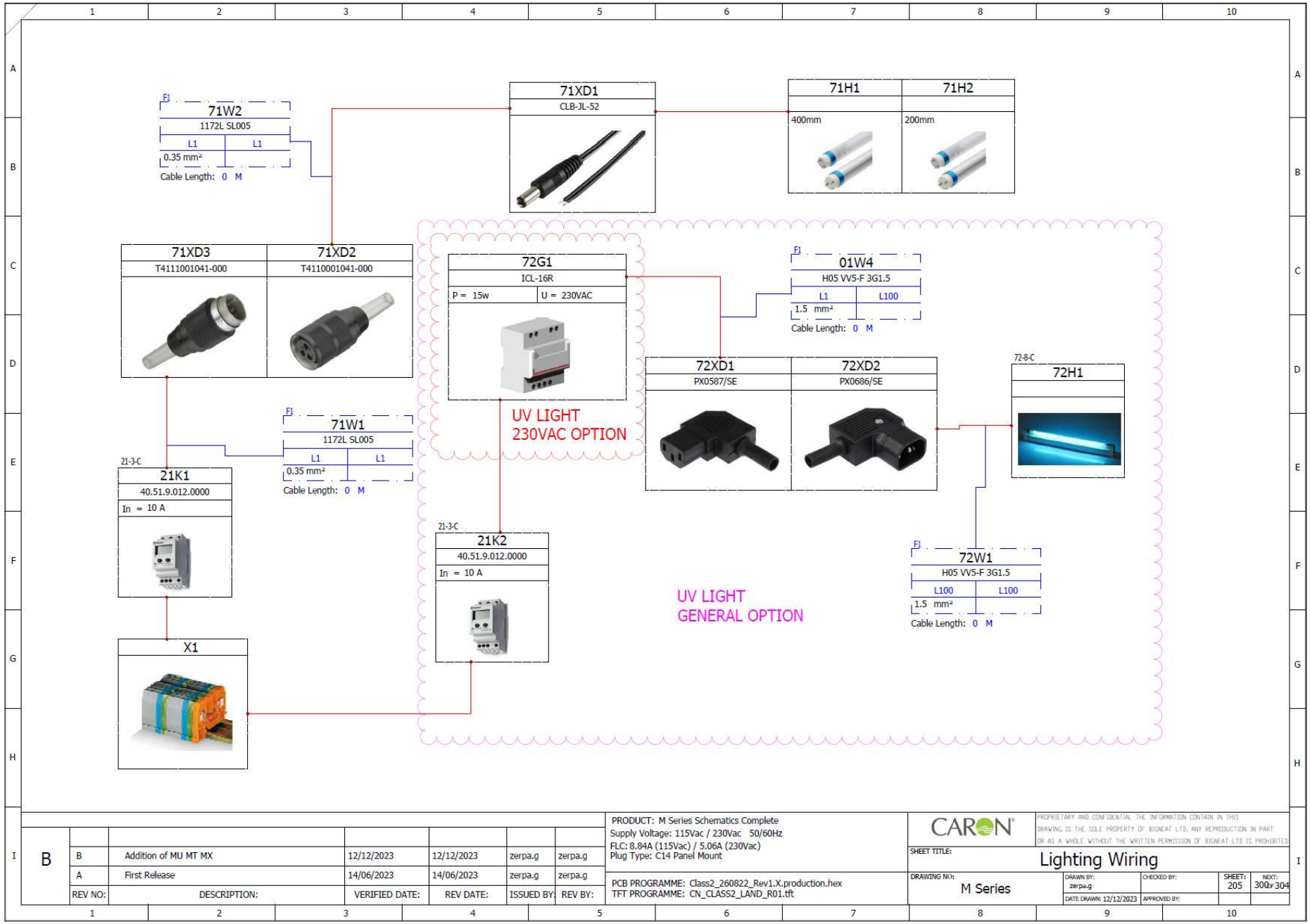
DRAWING NO: M Series

DRAWN BY: zerpa.g | CHECKED BY: | SHEET: 202 | NEXT: 203 or 304

DATE DRAWN: 12/12/2023 | APPROVED BY:


01W3
0015303
L1 L1
1.5 mm²
Cable Length: 0 M
50XD2
Dummy 104265000 + 104200
50XD1
104265000 + 104200
X11
50M1
R3G250-RE07-07
P = 170W 2510
50M2
R3G250-RO33-81
P = 375W 3330
50W4
(1172L SL005)
50W1
0015303
L1 L1
1.5 mm²
Cable Length: 0 M
205-1-G
X1
50W4
1172L SL005
L1 L1
0.35 mm²
Cable Length: 0 M
50XD4
T4110001041-000
50XD3
T4111001041-000
X12
51M1
R3G250-RE07-07
P = 170W 2510
51M2
R3G250-RO33-81
P = 375W 3330
20AP1 PL12
BN4001 PCB
EC0097/01
50W2
1172L SL005
L1 L1
0.35 mm²
Cable Length: 0 M
50W3
1172L SL005
L1 L1
0.35 mm²
Cable Length: 0 M
50W5
0015303
L1 L1
1.5 mm²
Cable Length: 0 M
OPTION FITTED:
MR/MD120H
ME120K
B
B Addition of MU MT MX 12/12/2023 12/12/2023 zerpa.g zerpa.g
A First Release 14/06/2023 14/06/2023 zerpa.g zerpa.g
REV NO: DESCRIPTION: VERIFIED DATE: REV DATE: ISSUED BY: REV BY:
PRODUCT: M Series Schematics Complete
Supply Voltage: 115Vac / 230Vac 50/60Hz
FLC: 8.84A (115Vac) / 5.06A (230Vac)
Plug Type: C14 Panel Mount
PCB PROGRAMME: Class2_260822_Rev1.X.production.hex
TFT PROGRAMME: CN_CLASS2_LAND_R01.tft
CARON
PROPRIETARY AND CONFIDENTIAL. THE INFORMATION CONTAIN IN THIS DRAWING IS THE SOLE PROPERTY OF BIGNEAT LTD. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF BIGNEAT LTD IS PROHIBITED
SHEET TITLE: Downflow Fans Wiring
DRAWING NO: M Series
DRAWN BY: zerpa.g
CHECKED BY:
SHEET: 203
NEXT: 204 or 304
DATE DRAWN: 12/12/2023
APPROVED BY:


01W5
0015303
L1 L1
1.5 mm²
Cable Length: 0 M
52XD2
Dummy 104265000 + 104200
52XD1
104265000 + 104200
X13
52M1
R3G250-RE07-07
P = 170W 2510
52M2
R3G250-RO33-81
P = 375W 3330
52W1
0015303
L1 L1
1.5 mm²
Cable Length: 0 M
205-1-G
X1
52W2
1172L SL005
L1 L1
0.35 mm²
Cable Length: 0 M
52XD4
T4110001041-000
52XD3
T4111001041-000
20AP1 PL12
BN4001 PCB
EC0097/01
52W3
1172L SL005
L1 L1
0.35 mm²
Cable Length: 0 M
OPTION FITTED:
ME085J
ME120K
B
B Addition of MU MT MX 12/12/2023 12/12/2023 zerpa.g zerpa.g
A First Release 14/06/2023 14/06/2023 zerpa.g zerpa.g
REV NO: DESCRIPTION: VERIFIED DATE: REV DATE: ISSUED BY: REV BY:
PRODUCT: M Series Schematics Complete
Supply Voltage: 115Vac / 230Vac 50/60Hz
FLC: 8.84A (115Vac) / 5.06A (230Vac)
Plug Type: C14 Panel Mount
PCB PROGRAMME: Class2_260822_Rev1.X.production.hex
TFT PROGRAMME: CN_CLASS2_LAND_R01.tft
CARON
PROPRIETARY AND CONFIDENTIAL THE INFORMATION CONTAIN IN THIS DRAWING IS THE SOLE PROPERTY OF BIGNEAT LTD, ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF BIGNEAT LTD IS PROHIBITED
SHEET TITLE: Exhaust Fans Wiring
DRAWING NO: M Series
DRAWN BY: zerpa.g
CHECKED BY:
SHEET: 204
NEXT: 205 of 304
DATE DRAWN: 12/12/2023
APPROVED BY:



REV NO:	DESCRIPTION:	VERIFIED DATE:	REV DATE:	ISSUED BY:	REV BY:
B	Addition of MU MT MX	12/12/2023	12/12/2023	zerpa.g	zerpa.g
A	First Release	14/06/2023	14/06/2023	zerpa.g	zerpa.g

PRODUCT: M Series Schematics Complete
Supply Voltage: 115Vac / 230Vac 50/60Hz
FLC: 8.84A (115Vac) / 5.06A (230Vac)
Plug Type: C14 Panel Mount

PCB PROGRAMME: Class2_260822_Rev1.X.production.hex
TFT PROGRAMME: CN_CLASS2_LAND_R01.tft

CARON

SHEET TITLE: Lighting Wiring

DRAWING NO: M Series

DRAWN BY: zerpa.g | CHECKED BY: | SHEET: 205 | NEXT: 300r304

DATE DRAWN: 12/12/2023 | APPROVED BY: