Metallisation

Thermal spray equipment and consumables

S500(16)

S500(16) ARC150 Energiser with closed loop current control

Maintenance Manual

This maintenance manual must be read and understood before any attempt is made to disassemble the equipment described herein.

Under no circumstances should any modifications be made to the equipment without prior written approval from Metallisation.

MAN-ENE-S500(16)-150

For Pistols: ARC150-CG23
ARC150-CG25

For Energiser: S500(16)-PLC
S500FV(16)-PLC
S500D(16)-PLC

Related Manuals:

Operation Manuals:
MAN-ARC150(16)-OP

Pistol Maintenance Manual:
MAN-ARC150-MA

Issue: 05-09-2016

SPECIFICATIONS

The Metallisation S500(16)-PLC Energiser for use with the ARC150 Arcspray System is designed for anti-corrosion and engineering coatings and will give consistent throughputs with high coating quality.

The following specification covers the standard range of S500(16)-PLC Energiser:

Dimensions:

LENGTH	HEIGHT	WIDTH	WEIGHT
900mm (35.4”)	800mm (31.5”) 876mm (34.5”) To Handle	485mm (19.1”) 670mm (26”) Wheel to Wheel	291.6kg (644lb)

S500(16)-PLC Energiser Specification:

DESCRIPTION	CHARACTERISTICS
Input Power Requirements	380/415/460 Vac 50-60Hz 3 Phase
Optional Input Power	220V 50-60Hz 3 Phase
Fusing Required	37A @ 460 Vac 40A @ 415 Vac 44A @ 380 Vac 76A @ 220 Vac 84A @ 200 Vac
Max Power Consumption	29 KVA (46Vdc/500A output)
Typical Power Consumption	16 KVA (Zinc 26Vdc/500A output) 22 KVA (Aluminium 35Vdc/500A output)
Duty	0-500 AMPS @ 100% Duty Cycle
Output Voltage	0-49 Vdc Switched High/Low & 1 – 5 (Nominal Spray Voltage 19 to 44Vdc)
Air Requirements	1.5m³ /min @ 5 bar (53cfm @ 72.5 psi)
Power Factor	0.85 Lag
Auxiliary Circuits	110Vac and 24Vdc
Pressure Switch Setting	30 psi (2.0 bar)

CONTENTS

SECTION 1

SAFETY PRECAUTIONS & RISK ASSESSMENTS

1.1 Safety Precautions

Provided that the equipment is properly set up, regularly maintained and used correctly, metal spraying does not present any great danger. However, like most industrial processes, misuse and careless practices can create hazards for personnel and damage to the equipment.

1.1.1 Disconnecting the Mains Supply

The mains supplies **MUST** be disconnected before removing any of the outer panels. This can be achieved as follows:

- Isolate the mains supply.
- **ALL** maintenance or overhaul should be conducted by a fully qualified electrician in accordance with local regulations.

1.2 Key Hazards

For the specific key hazards associated with Arc Spraying, please refer to the relevant operating manual. It includes a brief description of the hazards and their possible consequences. In any Risk Assessment for a Thermal Spray Process, a consideration of all relevant hazards will need to be included. Ancillary activities that are likely to be undertaken, such as grinding, grit blasting, solvent cleaning, machining etc. are not included in this section.

1.2.1 Electrical Hazards

Electricity can give rise to electric shock, fire, explosion and burns. It can also lead to falls and muscular injury. The risk of death from electric shock is related to the current that passes through the body, and the path it takes.
Voltages below 50Vac or 120Vdc are considered safe, except in conducting environments. A typical spray booth is a conducting environment. However, the power supply for the equipment will usually be fed from a higher voltage supply, typically 240V or 415V, which must always be considered hazardous.
Other related causes of electrical accidents include poor placement of cables. These may become trapped on booth doors, or damaged whilst on the floor, leading to exposure of the live conductors.

Key Hazards: Electric shock, explosion, fire, burns.

1.2.2 High Pressure Air / Inert Gas Supply to Energiser

There is high pressure Air / Inert Gas supply to the Energiser (typically 8 bar) and care must be taken to properly disconnect the pressure from the supply to avoid an accidental release.

Key Hazards: Asphyxiation if inert gas is used.

SECTION 2

MAINTENANCE & REPAIR

2.1 Routine Maintenance

The following table gives a basic routine maintenance schedule for the S500(16)-PLC Energiser with closed loop current control.

NB: Before commencing repairs or maintenance on any part of the Energiser ensure that the power supply has been isolated.

EVERY 8 HOURS

- Wipe down the exterior of the Energiser with a clean **DRY** cloth.
- Check all external power and control cable connections for security.
- Re-tighten as necessary.

EVERY 40 HOURS

- Isolate the electricity supply.
- Remove the side covers.
- Using a suitable vacuum cleaner remove any dust that has accumulated inside the unit, generally looking for signs of overheating on wire insulation.

DO NOT USE COMPRESSED AIR!

Compressed air can be damp and there is also a risk that dust can be propelled into the Energiser causing greater problems.

- Check mains power input / output connections are tight and in good condition.

2.2 Fuses

Fuses are located on the rear panel of the Energiser. Each fuse is identified with the designation 'F#' and the rating on the plate. Only replace a blown fuse with the equivalent rating. Do not replace with a higher rating as this could cause serious damage. Fitting a lower value fuse will inevitably cause instant failure of the equipment.

To check fuses:

- Turn off the electricity supply at the main isolator and ensure the Power switch on the Energiser is turned to off.
- Using a suitable screwdriver remove the fuse carrier by lightly depressing it and turning counter-clockwise.
- The fuse carrier will spring out.
- Test the fuse with a suitable test meter and replace with the indicated value if required.
- Replace the fuse carrier.
- Turn on the electrical supply at the isolator and turn on the Energiser.

NB: If the fuse fails straight away the Energiser must be tested for an electrical fault.

FUSE DESIGNATIONS & VALUES

FUSE NO	PART NO	RATED VOLTAGE	VALUE
F1	8069	250v	10 Amp - Anti-Surge (T) HBC
F2	1582	500v	10 Amp - Anti-Surge (T) HBC
F3	1582	500v	10 Amp - Anti-Surge (T) HBC
F4	2312	250v	3 Amp - Anti-Surge (T) HBC
F5	1564	250v	1 Amp - Anti-Surge (T) LBC
F6	2312	250v	3 Amp - Anti-Surge (T) HBC

FUSE NO	PART NO	RATED VOLTAGE	VALUE
F7	8069	250v	10 Amp - Anti-Surge (T) HBC
F8	2312	250v	3 Amp - Anti-Surge (T) HBC
F9	2312	250v	3 Amp - Anti-Surge (T) HBC
F10	9024	500v	5 Amp - Anti-Surge (T) HBC
F11	9024	500v	5 Amp - Anti-Surge (T) HBC
F12	9024	500v	5 Amp - Anti-Surge (T) HBC

The cooling fan for the Energiser is protected with a three phase overload (check relevant drawing in Section 5.1 for value). If the cooling fan overload trips, the cooling fan will stop and the Energiser will shut down. If this occurs check the condition of the Energiser cooling fan motor. To reset the trip press the start button on the overload.

Motor Protection C.B.
Model No: 7137 or 2546
Dependant on voltage of Energiser

2.3 Rectifier & Testing

NB: All Energiser maintenance or overhaul should be conducted by a competent, fully qualified electrician in accordance with local regulations.

The Energiser is fitted with a rectifier assembly. This consists of two groups of three PUK type diodes and are arranged as three positive and three negative.

In the rare event of diode failure individual diodes cannot be replaced and the entire rectifier must be changed.

2390 –
Rectifier / PUK Diodes

SELECTOR SWITCH VOLTAGES (APPROXIMATES)		
SELECTOR SWITCH POSITIONS		OPEN CIRCUIT OUTPUT VOLTS DC @ 415V INPUT
SWITCH LOW-HIGH	SWITCH 1-5	
1	1	21
1	2	22
1	3	24
1	4	26
1	5	28
2	1	30
2	2	34
2	3	37
2	4	42
2	5	48

NB: The open circuit voltages above are given as a guide only. The actual voltage achieved is affected by the supply voltage.

2.3.1 Testing the Diodes

NB: All Energiser maintenance or overhaul should be conducted by a competent, fully qualified electrician in accordance with local regulations.

To test the diodes have a competent and fully qualified electrician carry out the following procedure:

- Remove all cables and connecting bus bars from the transformer side of the diode assemblies.
- Using a good quality 'Multimeter', select the diode test function.
- Test each diode separately to identify which are faulty.

A diode can be in one of three states:

1. HEALTHY - A stable reading in one direction, open circuit in the other.
2. FAILURE - Open circuit.
3. FAILURE - Short circuit.

2.4 Thermal Switches

Each coil of the three phase transformer has a thermally actuated, normally closed switch built into the windings. Should the transformer temperature exceed 185 degrees centigrade, the power from the Energiser will be shut down.

The fan will remain on during the cooling period. It is advisable to allow the fan cooling to continue for at least 30 minutes before restart and to check that the spray current is not excessive.

It is necessary to determine why the thermal switches have been activated, so that these issues can be corrected. Examples are:

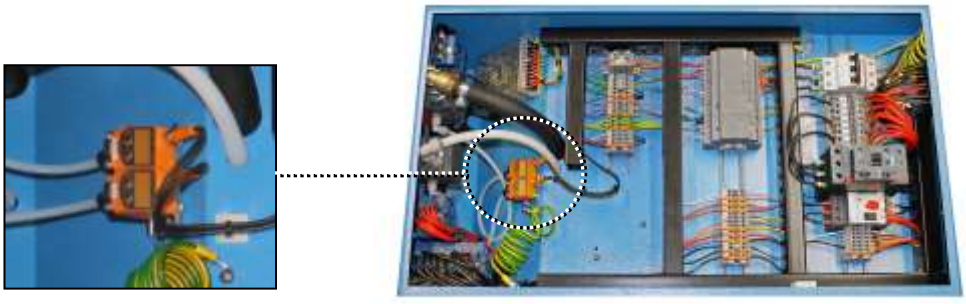
- The fan is running in the wrong direction (air should be blowing from front to back).
- Something is blocking the air flow, i.e. is the Energiser pushed against a wall?
- Broken fan blades.
- Excessive dust build up.

Isolate the Energiser from the electrical supply and remove the outer covers. Check that there is free air getting to the transformer and that the Energiser is not heavily contaminated with dust. If it is, then clean out as per the Routine Maintenance guidelines.

2.5 Air Pressure Switches

The air pressure switches are used to protect the pistol from low air pressure that could cause excessive burning of the Spray Head assembly and Contact Tubes.

They are situated under the top panel of the Energiser.



The unit is set to 2.0 bar (29 psi) falling, Therefore, If the air pressure falls below this the Energiser will shut down and can only be restarted when the air supply has resumed above 2 bar.

NB: The Air Pressure Switches should only need adjustment if a new Switch is fitted.

2.6 Switching between Closed Loop & Open Loop Mode

In some circumstances it may be necessary to convert the Energiser over from closed loop mode (current control) to conventional open loop mode (motor speed control). Follow the below procedure to switch between closed loop and open loop mode:
The system **MUST** be turned **OFF** for the change to be made:

- For closed loop mode the isolator T19 should be closed, (factory position) and switch the mains power on.

- For open loop mode the isolator T19 should be opened and switch the mains power on.

Once in open loop mode the potentiometer can be adjusted to achieve the desired spray rate. This mode can be useful when fault finding mechanical issues with the pistol, wire feed and associated mechanics.

It might be necessary to put the system into this mode when spraying at low spray rates, e.g. 250A.

When the system is operating in open loop mode the current sensor in the unit will shut down the system if it is operated above beyond its design limit, i.e. 500A.

In the event of the system shutting down due to an over current failure the unit must be turned off to reset the fault. The lights on top of the drive unit must go off prior to turning the unit on, the unit will not reset if it does not power down fully.
The spray rate must be reduced prior to continuing.

2.7 Over-Current Protection

The S500(16)-PLC Energiser is designed with an over-current protection function to prevent the system from being operated beyond its design limits when in Open Loop Mode.

- If the Energiser current output exceeds 550 Amps the current meter will display a reading of 'OVER' and intermittently flash red.
- If the Energiser exceeds 560 Amps for more than 2 seconds it will shut down to protect itself and the pistol.

The below diagram illustrates exactly what to expect on the Current Meter should an over current take place:

Normal Operation | **Intermittent red flash if exceeding 550 Amps** | **Cut-Out at 560 Amps**

NB: The over current flashing is an indication that the current should be reduced to 500 Amps.

To reset over-current follow the below procedure:

- Turn the Energiser 'OFF' at the MAINS SWITCH.
- Check the spraying current on the POTENTIOMETER – reduce if necessary.
- Turn the Energiser MAINS SWITCH to 'ON'.

NB: In closed loop mode the Energiser cannot exceed its design limits.

NB: If using the Arc Extension, if output exceeds 300 Amps the over-current protection will shut the Energiser down after 2 seconds.

2.8 Remote Operation E-Stop Kit for PLC Energisers

When any spray pistol is operated remotely i.e. when the pistol is not hand held and the controls for the pistol are not under the control of the person holding the pistol then an emergency stop circuit must be fitted.

This will enable the pistol and energiser to be stopped quickly and safely from a remote position should an emergency situation arise.

The Remote operation E-Stop kit for PLC energisers will provide the extra security that is required to run the system remotely should it be required.

PART NO.	DESCRIPTION
PLC-E/STOP-K	**Remote operation E-Stop kit for PLC energisers**

FIG 1 shows the parts that comprise the E-Stop Kit.

FIG 2 highlights the main components of Remote operation E-Stop kit in situ in the Energiser.

FIG 1.

FIG 2.

Diagram EN 277 – Circuit Wiring Loom for Pendant / Remote Kit, found in Section 5.1 gives wiring instructions for the Remote operation E-Stop kit for PLC energisers.

NB: Should your system be pre-installed with the E-Stop kit for PLC energisers, Section 5.1 also provides power and control circuit diagrams relevant to that configuration.

Section 4.5 highlights the part numbers for the E-Stop kit if pre-installed in the Energiser.

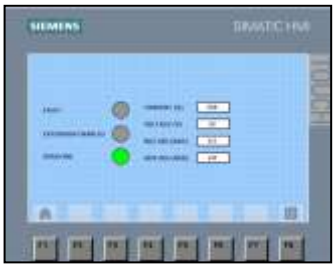
2.9 Data Kit for (16) Series Energisers

The Data Kit option gives the possibility of remote monitoring and logging of certain Energiser data at a customer's HMI via a Siemens S7-1200 series CPU.

PART NO.	DESCRIPTION
DATA(16)-K	Data Kit for (16) Series Energizers

Minimum requirements are a Siemens S7-1200 series PLC and a compatible HMI. Detailed instructions for setting up the LOGO – S7-1200 connections are supplied with the data kit.

Once installed the data kit gives the option for the customer to integrate our equipment into their Siemens PLC network via S7_Connection. The values from the energiser will be written to specified registers in the customer's PLC, and the screenshot below is an example of an HMI screen that can be designed to monitor these values:



- Extension Enabled
- Spray OK and Reset Required indication
- Current
- Voltage
- Nozzle Air Pressure
- Auxiliary Air Pressure

FIG 1 below shows the parts that comprise the Data Kit.

FIG 2 below highlights the main components of the Data Kit in situ in the Energiser.

FIG 1.

FIG 2.

Diagram EN 430 – (16) Series Energizer Data Kit Wiring and Fitting Instructions, found in Section 5.1 gives wiring instructions for the Data Kit for (16) Series Energizers.

NB: Should your system be pre-installed with the Data Kit for (16) Series Energizers, Section 5.1 also provides power and control circuit diagrams relevant to that configuration.

Section 4.5 highlights the part numbers for the Data Kit if pre-installed in the Energiser.

SECTION 3

FAULT FINDING

3.1 Troubleshooting

3.2 PLC Designations

3.1 Troubleshooting

It is essential that the Metallisation S500(16)-PLC Energiser is properly maintained and operated. Faults may occur due to incorrect operation or lack of proper maintenance.

If the problem still persists, then consult the below tables. These are the most commonly occurring problems, their causes and the action that should be taken to rectify the problem.

NB: All fault diagnosis and rectification should be carried out by a competent electrician who should make all the necessary provisions to isolate the Energiser from the electricity supply before commencing work.

PROBLEM	CAUSE	REMEDY
No Power	Mains input breaker tripped	Reset mains input breaker
No nozzle air or power	Mains Power is switched off	Ensure that the mains power is turned on and that the Energiser is switched on
	There is insufficient air supply (less than 2 bar) or no air supply	Restore supply pressure or switch on air. Regulate nozzle air to greater than 2 Bar
	Fuses blown	Replace any blown fuses. If fuse blows again investigate further
	No electrical supply to the Energiser	Switch electrical supply to the Energiser
	Thermal switches activated	Wait 30 minutes with the cooling fan running before re-trying. If fault re-occurs investigate further
	Over-current activated – The Current Meter will flash red at 550A and cut out at 560A	Turn the Energiser off and wait 30 seconds. Then turn back on
	Air Solenoid Valve failed	Replace if coil burned out or the armature has seized
Power but no nozzle air at the pistol	Nozzle air hose disconnected or obstructed	Re-connect air hose or remove obstruction

Troubleshooting continued...

PROBLEM	CAUSE	REMEDY
Nozzle air but no power at the pistol	There is insufficient air (less than 2 bar)	Increase air supply. Regulate nozzle air accordingly
	Check Fuses	Replace if blown. If fuse blows again investigate further
	Check main contactor	Replace if coil or contacts have burned out
Nozzle air flows continuously	Solenoid diaphragm split	Replace solenoid valve
Insufficient voltage	Check rectifier diodes	Replace rectifier if found to be faulty
	Check mains input phases fuses and for correct voltage	Replace blown fuses or rectify low phase voltage
	Check the main contactor for poor connections or burned out contact	Re-tighten cable clamps or replace if burned out
	Check the voltage selector switches for loose connections, burned out contacts or open circuits	Re-tighten cable clamps or replace if burned out
Cooling fan stops	Circuit breaker tripped	Reset and check mains input
	Fan motor seized	Replace motor
No pistol motor drive	Power cable unplugged or damaged	Re-plug or replace cable
	Fuse blown	Replace any blown fuses. If fuse blows again investigate further
	Motor seized	Replace motor
	Inverter tripped	Reset and retry
	Inverter failed	Replace inverter

The above table is not an exhaustive list of faults and solutions. For further assistance please contact your local distributor.

3.2 PLC Designations

DESIGNATIONS TABLE 1:

The following table should be used in conjunction with the Control Circuit Diagrams found in Section 5.1.

			STATE			
INPUTS	**ASSIGNMENT**	**VOLTAGE WHEN ACTIVE**	**AT POWER ON WITH COMMAND POT SET TO 200A**	**WITH 'AIR ON' PRESSED & HELD**	**WITH TRIGGER PRESSED & POT SET TO 200A**	**WITH 'AIR OFF' PRESSED & HELD**
L+	Supply	+24vdc	-	-	-	-
M	Supply	0vdc	-	-	-	-
I1	Trigger	+24vdc	OFF	OFF	ON	OFF
I2	Air On	+24vdc	OFF	ON	OFF	OFF
I3	Pl loop Switch	+24vdc	ON	ON	ON	ON
I4	Air Off	+24vdc	ON	ON	ON	OFF
I5	Thermal Switch	+24vdc	ON	ON	ON	ON
I6	Pressure Switch	+24vdc	OFF	ON	ON	OFF
I7	Set command voltage	0-10vdc	2vdc	2vdc	2vdc	2vdc
I8	Current Feedback	0-10vdc	0vdc	0vdc	1vdc	0vdc
M1	Extension	0vdc	0vdc	0vdc	0vdc	0vdc
U1	Extension	0vdc	22vdc (if Extension Switch on)	22vdc (if Extension Switch on)	22vdc (if Extension Switch on)	22vdc (if Extension Switch on)
M2	Spray Voltage	0vdc	0vdc	0vdc	0vdc	0vdc
U2	Spray Voltage	0-10vdc	0vdc	0-10vdc	0-10vdc	0vdc

DESIGNATIONS TABLE 2:

The following table should be used in conjunction with the Control Circuit Diagram found in Section 5.1.

			STATE			
OUTPUTS	**ASSIGNMENT**	**VOLTAGE/ CURRENT WHEN ACTIVE**	**AT POWER ON WITH COMMAND POT SET TO 200A**	**WITH 'AIR ON' PRESSED & HELD**	**WITH TRIGGER PRESSED & POT SET TO 200A**	**WITH 'AIR OFF' PRESSED & HELD**
Q1.1	Air Solenoid	110vac	ON	ON	ON	ON
Q1.2	Air Solenoid	110vac	OFF	ON	ON	OFF
Q2.1	Main Contactor	110vac	ON	ON	ON	ON
Q2.2	Main Contactor	110vac	OFF	ON	ON	OFF
Q3.1	Spray OK	Volt free contacts	OPEN	OPEN	CLOSED	OPEN
Q3.2	Spray OK	Volt free contacts	OPEN	OPEN	CLOSED	OPEN
Q4.1	Motor Speed	0-10v	0-10v	0-10v	0-10v	0-10v
Q4.2	Motor Speed	0-10v	0v	0v	0-10v	0v
U1+	Motor Speed	0-10v	0-10v	0-10v	0-10v	0-10v
M1	Motor Speed	0vdc	0vdc	0vdc	0vdc	0vdc
U2+	Ammeter	0-10vdc	0v	0v	3.6v	0v
M2	Ammeter	0vdc	0vdc	0vdc	0vdc	0vdc

SECTION 4

ILLUSTRATED PARTS LIST

4.1 Control Panels

FIG 1.

FIG 1. – CONTROL PANELS

	NUMBER	DESCRIPTION	QTY
	2284A	3/4"Bsp 0-10 Bar Nozzle Air Regulator Assembly	1
	2284NA	Aux Air Reg C/W Panel Nut Assembly	1
	2481	Switch On-Off	1
or	2472	On / Off Switch 100A (FV & D MODELS)	1
	2482	Switch Low-High	1
	2483	Switch 1-5	1
	2479	GREEN LED INDICATOR 24V AC/DC	1
	2541	Red Neon Indicator	1
	2548	5K 10 Turn 3Watt Potentiometer	1
	2550	Dial 10 Turn Knob	1
5599	5599A	Programmed Air Panel Meter 0-10 Bar	2
	5599C-500	Programmed Current Panel Meter for S500	1
	5599V	Programmed Voltage Panel Meter 0-50V	1

4.2 Front & Rear Plates

FIG 1.

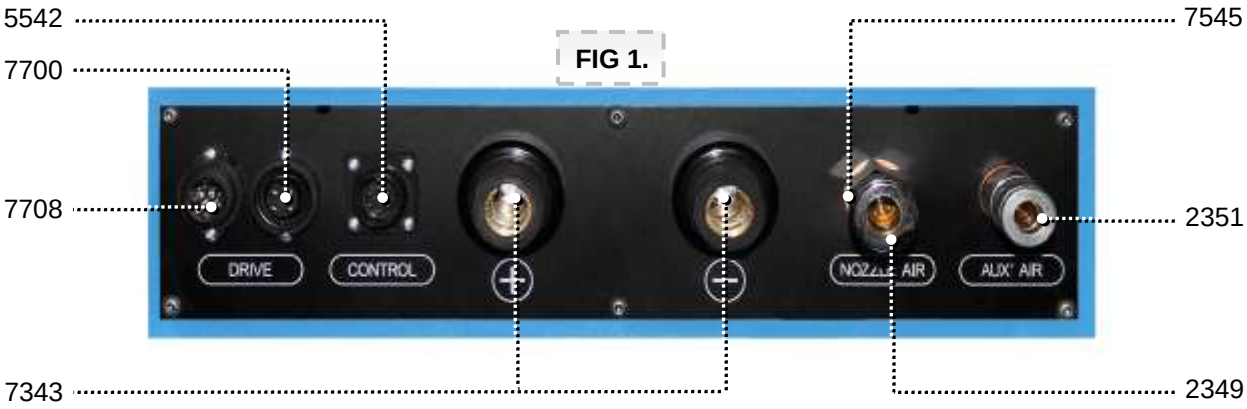


FIG 2.

PART NO.	DESCRIPTION	QTY
	FIG 1. – FRONT TERMINAL PLATE	
2349	Snap Coupling Female	1
2351	Snap Coupling 3/8" M Tpr	1
5542	6 Way Chassis Plug	1
7343	Dinse Chassis Socket Bes95/120	2
7545	Acetal Washer	1
7700	3 Pin Chassis Socket	1
7708	6 Pin Chassis Plug	1
	FIG 2. – REAR FUSE PLATE	
1564	Fuse - 20mm Anti-Surge 1A	1
1582	10A Anti Surge Fuse	2
2312	Fuse, 3 Amp.	4
2536	Keyswitch	1
8069	10 Amp Fuse	2
9024	Fuse, 5 Amp (32 X 6mm)	3

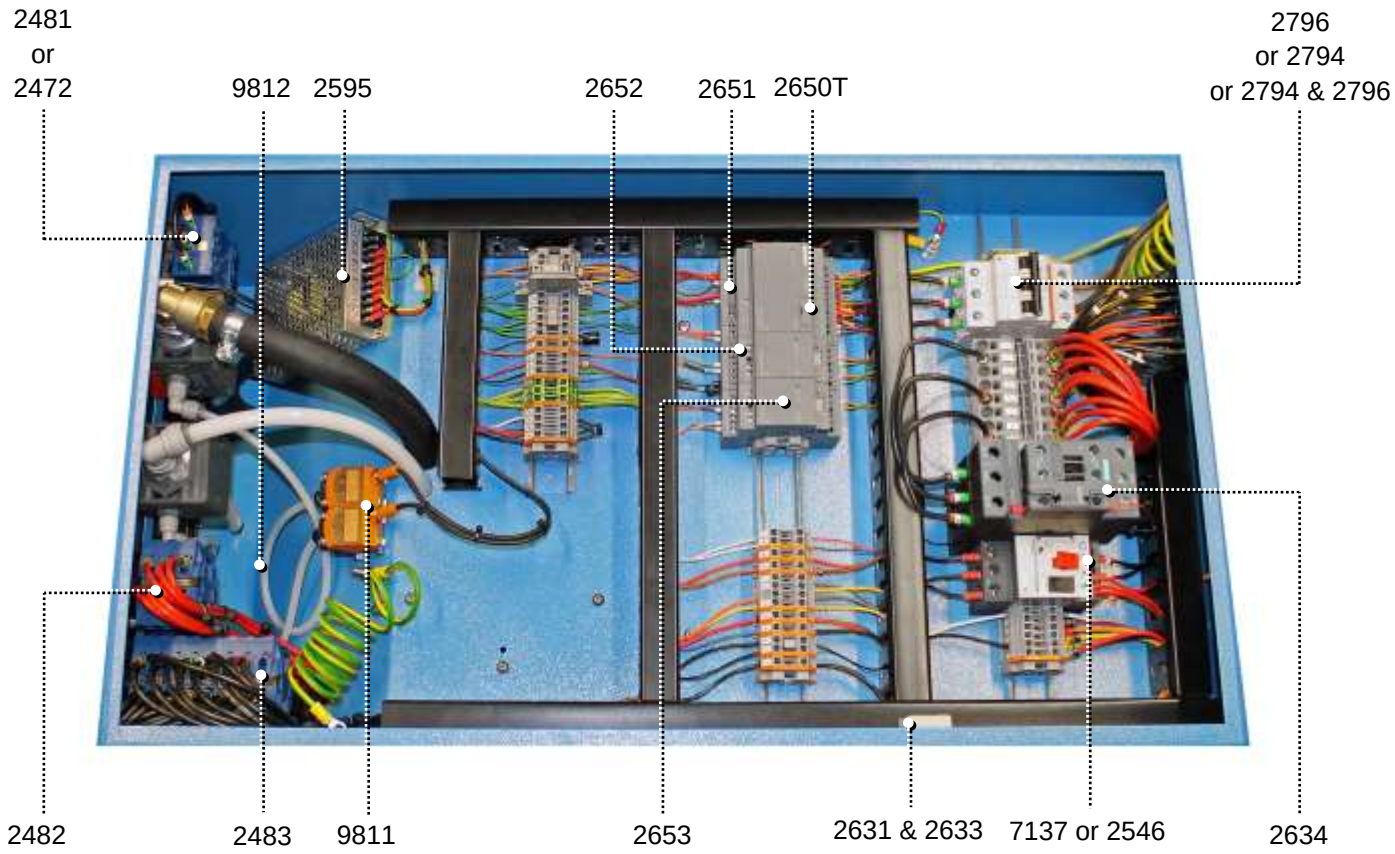
4.3 Left & Right Hand Side

FIG 1.

FIG 2.

PART NO.	DESCRIPTION	QTY
FIG1. – LEFT HAND SIDE		
2272A	Choke 700	1
2390	Rectifier / PUK Diodes	1
7131	Fan Blades 17" 17-6-45-Ppg	1
FIG 2. – RIGHT HAND SIDE		
2493	Solenoid Valve 3/4"	1
2498D	Toroidal Aux Transformer 1.5kva - Multi Tap	1
5550	Transformer Type N. 500A	1
7130	Fan Motor (Type St 71 L4)	1

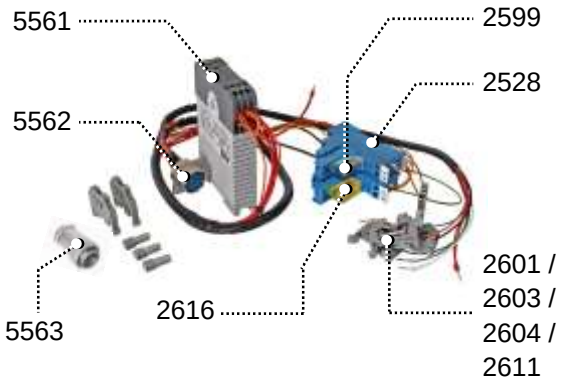
4.4 Top Panel



	PART NO.	DESCRIPTION	QTY
	2481	Switch On-Off	1
or	2472	On / Off Switch 100A	1
	2634	Mains Contactor 80A	1
	2842	Switch Low-High	1
	2483	Switch 1-5	1
	2651	LOGO Logic Module	1
	2652	LOGO Analogue Input Expansion Module	1
	2653	LOGO Analogue Output Expansion Module	1
	2595	Power Supply Unit - 60 Watt,Quad output	1
	2631	NTC Thermistor (For 2598D)	1
	2633	Ceramic Terminal Block	1
	2650T	Programmed Micro-SD Card : S500(16)-PLC	1
	2796	Mains Input Breaker 50A 'D' Rated (S500)	1
or	2794	Mains Input Breaker 100A 'D' Rated (FV MODELS)	1
or	2794 & 2796	Mains Input Breaker 100A 'D' Rated & Mains Input Breaker 50A 'D' Rated (S500) (DUAL VOLTAGE MODELS)	1 each
	7137	Motor Protection C.B. (GV2-ME07)	1
or	2546	Motor Protection Cb (2.5/4A) (FV & D MODELS)	1
	9811	Pressure Switch (1 to 10 bar electronic differential pressure sensor)	2
	9812	Pressure Switch Connection Lead 2 Mtr	2

4.5 Top Panel – With Optional Extras

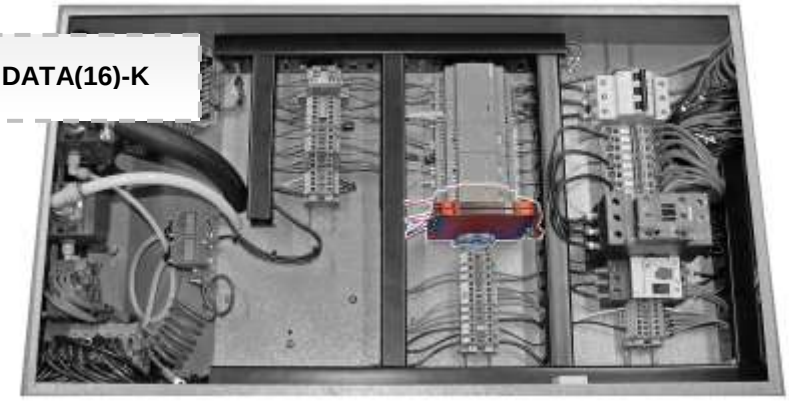
PLC-E/STOP-K

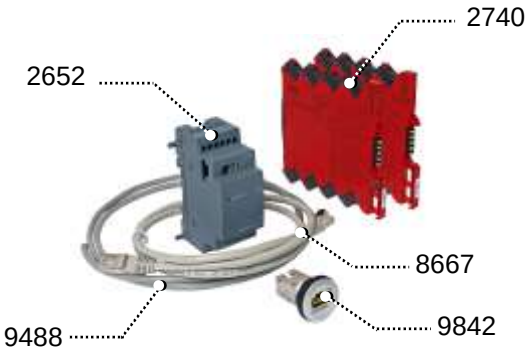


PART NO.	DESCRIPTION	QTY
2528	5mm R P Socket & Clip	2
2599	Double Pole Changeover Relay 24Vdc	1
2601	Push In Grey Terminal 4mm	4
2603	End Cover 4mm	1
2604	Terminal Jumper 4mm	3

PART NO.	DESCRIPTION	QTY
2611	Terminal End Stop	2
2616	Double Pole Changeover Safety Relay	1
5561	Safety Relay 24Vdc (E-Stop)	1
5562	10 Pin Chassis Socket	1
5563	10 Pin Cable Plug	1

DATA(16)-K





PART NO.	DESCRIPTION	QTY
2652	LOGO Analogue Input Expansion Module	1
2740	Isolated Repeater for 0-20mA	2

PART NO.	DESCRIPTION	QTY
8667	RJ45 Shielded Cable Lead 1M	1
9488	2 Core Screened Cable	1
9842	RJ45 Cat 6 Coupler	1

4.6 Recommended Spares Holding

Recommended Spare Parts for S500(16)-PLC ARC150 Energizer with closed loop current control:

	PART NO	DESCRIPTION	QTY
	1564	Fuse - 20mm Anti-Surge 1A	6
	1582	10A Anti Surge Fuse	6
	2312	Fuse, 3 Amp	6
	8069	10 Amp Fuse	6
	9024	Fuse, 5 Amp (32 X 6mm)	6
	7343	Dinse Chassis Socket Bes95/120	2
	2390	Rectifier / PUK Diodes	1
	2481	Switch On-Off	1
or	2472	Switch On-Off	1
	2482	Switch Low-High	1
	2483	Switch 1-5	1
	2634	Mains Contactor 80A	1
	2493	Solenoid Valve 3/4"	1
	2548	5K 10 Turn 3Watt Potentiometer	1
	9811	Pressure Switch (1 to 10 bar electronic differential pressure sensor)	2

SECTION 5

DATA SHEETS

5.1 Circuit Diagrams

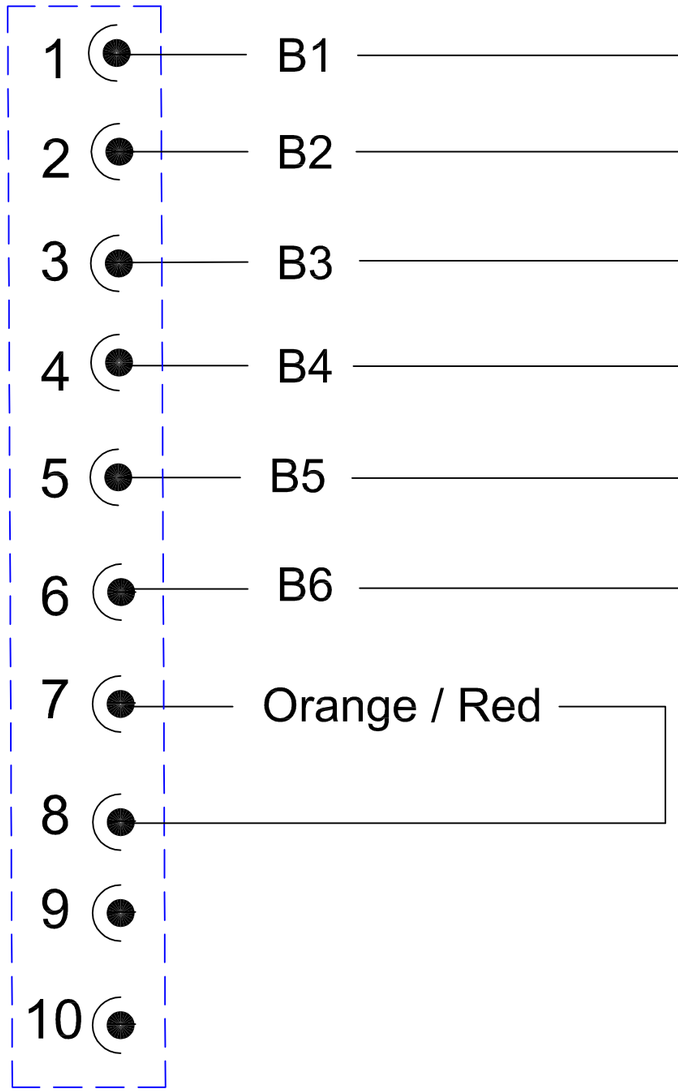
5.1 Circuit Diagrams

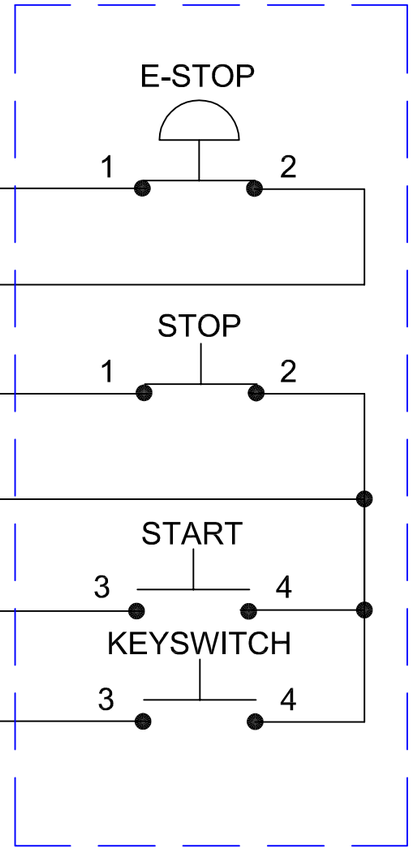
SYSTEMS THAT DO NOT HAVE THE REMOTE SOCKET OR DATA KIT FACTORY FITTED	
DRAWING NO.	**DESCRIPTION**
EN 267(Iss A)	PLC-PENDANT Pendant Wiring Circuit
EN 268(Iss A)	145/150 PISTOL WIRING CIRCUIT
EN 269(Iss A)	ARC 145/150 to S500 Control Lead Wiring
EN 277(Iss B)	Circuit Wiring Loom For Pendant / Remote Kit
EN 346	Electrical Wiring Diagram for ARC145 / ARC150 Inverter
EN 420	S500(16)-PLC : ARC150 Closed Loop Control Circuit
EN 421(Iss B)	S500(16)-PLC : ARC150 Power Circuit 415 vac
EN 422	S500FV(16)-PLC : ARC150 Power Circuit 200-220 Vac
EN 423	S500D(16)-PLC : ARC150 Dual Power Circuit 200-220~380-460Vac
2225(16)	Energizer (16) Air Schematic

SYSTEMS THAT HAVE THE REMOTE SOCKET AND/OR DATA KIT FACTORY FITTED	
DRAWING NO.	**DESCRIPTION**
EN 420P	S500(16)-PLC : ARC150 Closed Loop Control Circuit With factory fitted pendant / remote
EN 420D	S500(16)-PLC : ARC150 Closed Loop Control Circuit with factory fitted Data Kit
EN 420PD	S500(16)-PLC : ARC150 Closed Loop Control Circuit with factory fitted pendant / remote & data kit
EN 421P(Iss B)	S500(16)-PLC : ARC150 Power Circuit 415 vac With factory fitted pendant / remote
EN 422P	S500FV(16)-PLC : ARC150 Power Circuit 200-220 Vac With factory fitted pendant / remote
EN 423P	S500D(16)-PLC : ARC150 Dual Power Circuit 200-220~380-460Vac With factory fitted pendant / remote
EN 430	(16) Series Energizer Data Kit Wiring and Fitting Instructions

Cable Plug & Gland
5563 & 5564

6 CORE + E
FLEX 2576 @ 10 Mtr





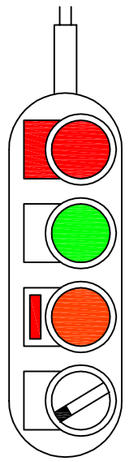
2585, 2781, 2783

2583, 2585, 2784

2582, 2584, 2785

2584, 2782, 2787

Pendant Case
2780



E-STOP

START

STOP

KEYSWITCH (RUN)

REV	DESCRIPTION	DATE	BY
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
A	Design Change To Include E-Stpo Button	05/12/2013	SGS

REVISIONS

Tolerance Unless Stated: ± 0.1
1 Decimal Place: ± 0.05
2 Decimal Places: ± 0.02

Third Angle Projection

Metallisation
Thermal spray equipment and consumables

Unless Stated All Dimensions In Millimetres

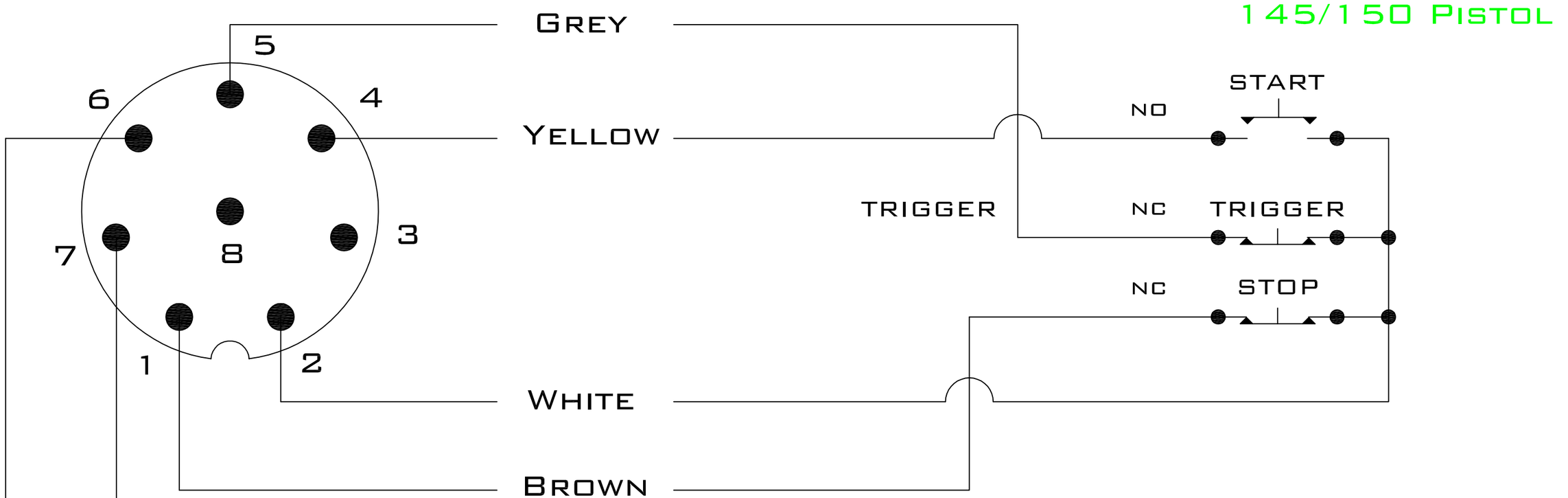
DO NOT SCALE : IF IN DOUBT ASK : REMOVE ALL BURRS & SHARP EDGES

NOTES:
-

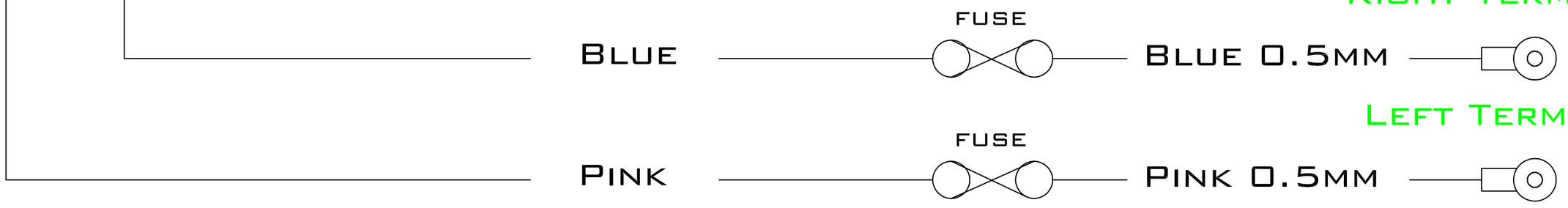
TITLE	PLC-PENDANT Pendant Wiring Circuit		
DRAWING NUMBER	EN 267	REV	A
DRAWN BY	S.Skidmore	DATE	05/12/2013
CHECKED BY	-	DATE	-

M12 8 WAY MALE SOCKET
5540
(VIEWED FROM FRONT)

145/150 PISTOL



RIGHT TERMINAL



LEFT TERMINAL

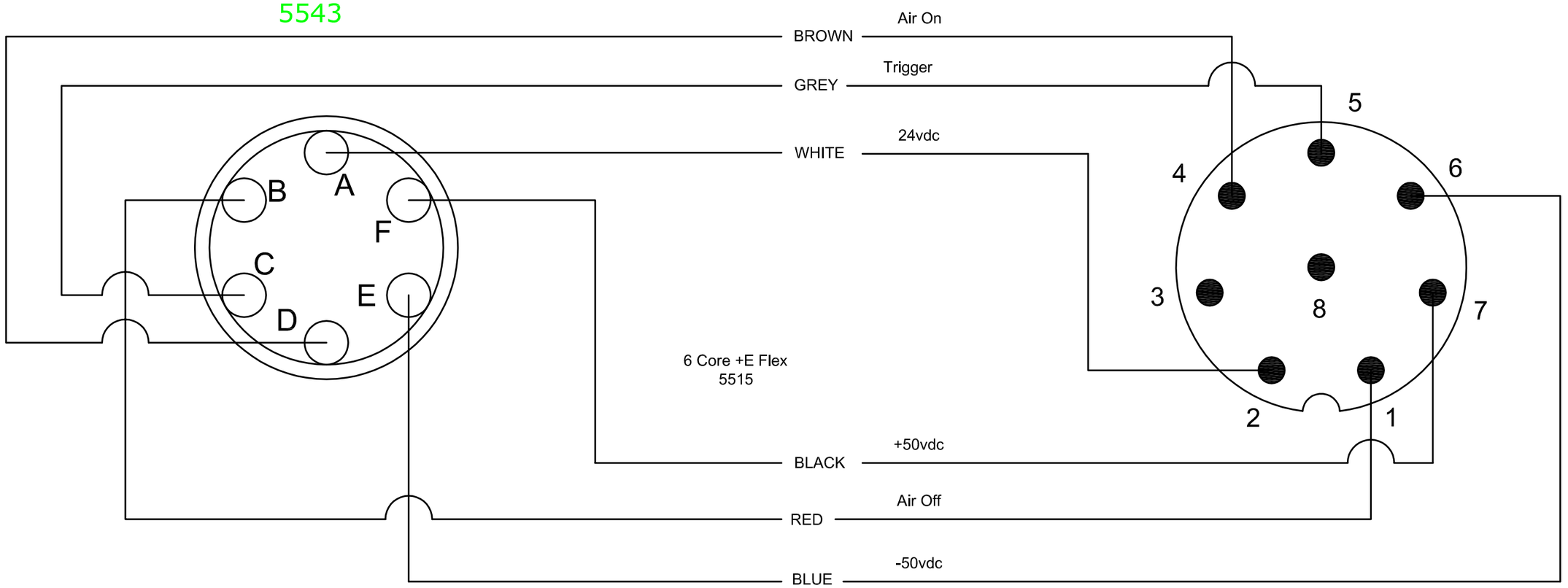
FUSE DETAILS
RATED CURRENT : 1 AMP
RATED VOLTAGE : 250V
TRIP CHARACTERISTICS : T

LENGTHS OF WIRE AFTER FUSE 75MM

Metallisation Thermal spray equipment and consumables	DO NOT SCALE	****	MODS		DATE	SIG	MATERIAL	****
	3RD ANGLE PROJECTION	****	ISSUE A. 1AMP FUSES ADDED TO CIRCUIT.		27/01/16	SGS	DRAWN BY	STEVE MOORE
							TITLE	145/150 PISTOL WIRING CIRCUIT
							DATE	16 MAY 2013
							DRAWING NO	EN 268

6 WAY FEMALE PLUG

5543



Viewed from front

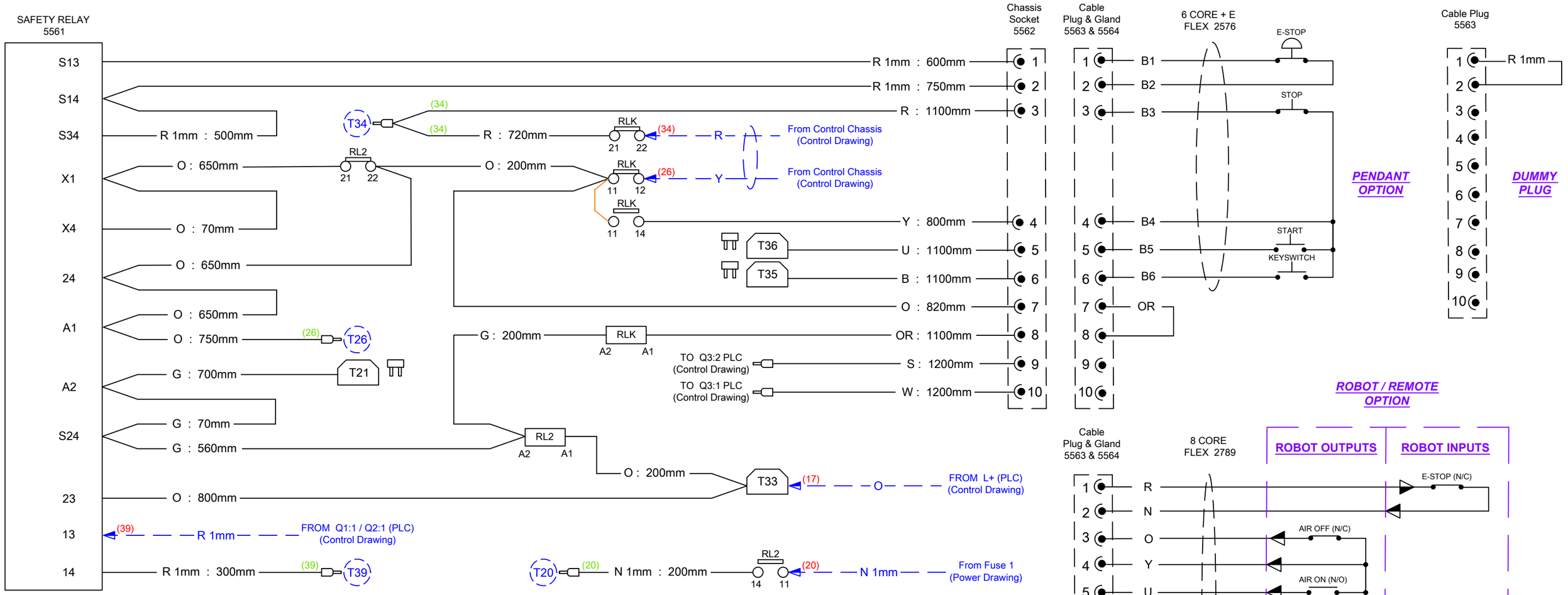
M12 8 way female plug

5541

Viewed from front

A	2
B	1
C	5
D	4
E	6
F	7
nc	3
nc	8

Metallisation Thermal spray equipment and consumables	Do Not Scale	****	Mods	Material	****
	3rd Angle Projection All Dims in mm	****	Issue A. Wire colours changed. 30/10/2013	Drawn By	Steve Moore
				Title	ARC 145/150 Control Lead Wiring
				Date	16 May 2013
				Drawing No	EN 269



WIRING INSTRUCTIONS

1, Remove the top covers from the trunking.
2, Fit the pre-wired safety relay to din rail in the corner of the energizer next to the motor breaker with the wires to the chassis socket going to the rear of the energizer and secure with an end stop.
3, In the ancilliary plate mounted at the rear of the energizer marked 'REMOTE' knock out the pre-punched hole, remove the pre fitted pins and feed the chassis socket into the hole from the inside and secure to the plate using the previously removed pins.
4, Fit the two pre-wired relays next to the terminals on the PLC rail, RL2 nearest the existing terminals along with the pre-wired terminal T33, secure in place with the remaining end stop.
5, On the short length terminal rail, remove the end stop so that the terminals can be moved across.
6, Insert the pre-wired terminal T21 into the bank of T21 terminals next to the 'fused terminal' T19 end and fit one of the jumper links to connect the new T21 terminal to the existing bank.
7, Insert the pre-wired terminal T35 next to the existing T35 terminal and fit one of the jumper links to connect the new T35 terminal to the existing T35.
8, Insert the pre-wired terminal T36 next to the existing T36 terminal and fit one of the jumper links to connect the new T36 terminal to the existing T36.
9, Re-fit the end stop to secure the terminals in place.
10, Disconnect the brown wire (Marked 20) (coming from Fuse 1) from T20 in the energizer and connect this wire to the relay RL2 - 11.
11, Connect the loose brown wire (Marked 20) in the loom to T20 where the previous brown wire was removed from.
12, Disconnect the red wire (Marked 34) (coming from the control chassis plug) from T34 in the energizer and connect this wire to the relay RLK - 22.
13, Connect the two connected loose red wires (Marked 34) in the loom to T34 where the previous red wire was removed from.
14, Disconnect the yellow wire (Marked 26) (coming from the control chassis plug) from T26 in the energizer and connect this wire to the relay RLK - 12.
15, Connect the loose orange wire (Marked 26) in the loom to T26 where the previous orange wire was removed from.
16, Disconnect the red wire (Marked 39) (coming from the PLC Q1:1 / Q2:1) from T39 in the energizer and connect this wire to the safety relay 5561 - 13.
17, Connect the loose red wire (Marked 39) in the loom to T39 where the previous red wire was removed from.
18, Disconnect the orange wire (Marked 17) (coming from L+ PLC) from T17 in the energizer and connect this wire to T33 (part of the new loom fitted).
19, Connect the loose grey wire to Q 3.2 at the PLC.
20, Connect the loose white wire to Q 3.1 at the PLC.
21, Feed the wires from the new loom and re-located wires back into the trunking and re-fit the covers.

CODE	COLOUR
B	BLACK
G	GREEN
K	PINK
LG	LT GREEN
N	BROWN
O	ORANGE
P	PURPLE
R	RED
S	GREY
U	BLUE
W	WHITE
Y	YELLOW

REV	DESCRIPTION	DATE	BY
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
B	N/C contacts added on RL2	01/09/2015	SGS
A	Terminal numbers, plugs & socket changed	23/05/2014	SGS

REVISIONS

Tolerance Unless Stated: ± 0.1
1 Decimal Place: ± 0.05
2 Decimal Places: ± 0.02

Third Angle Projection

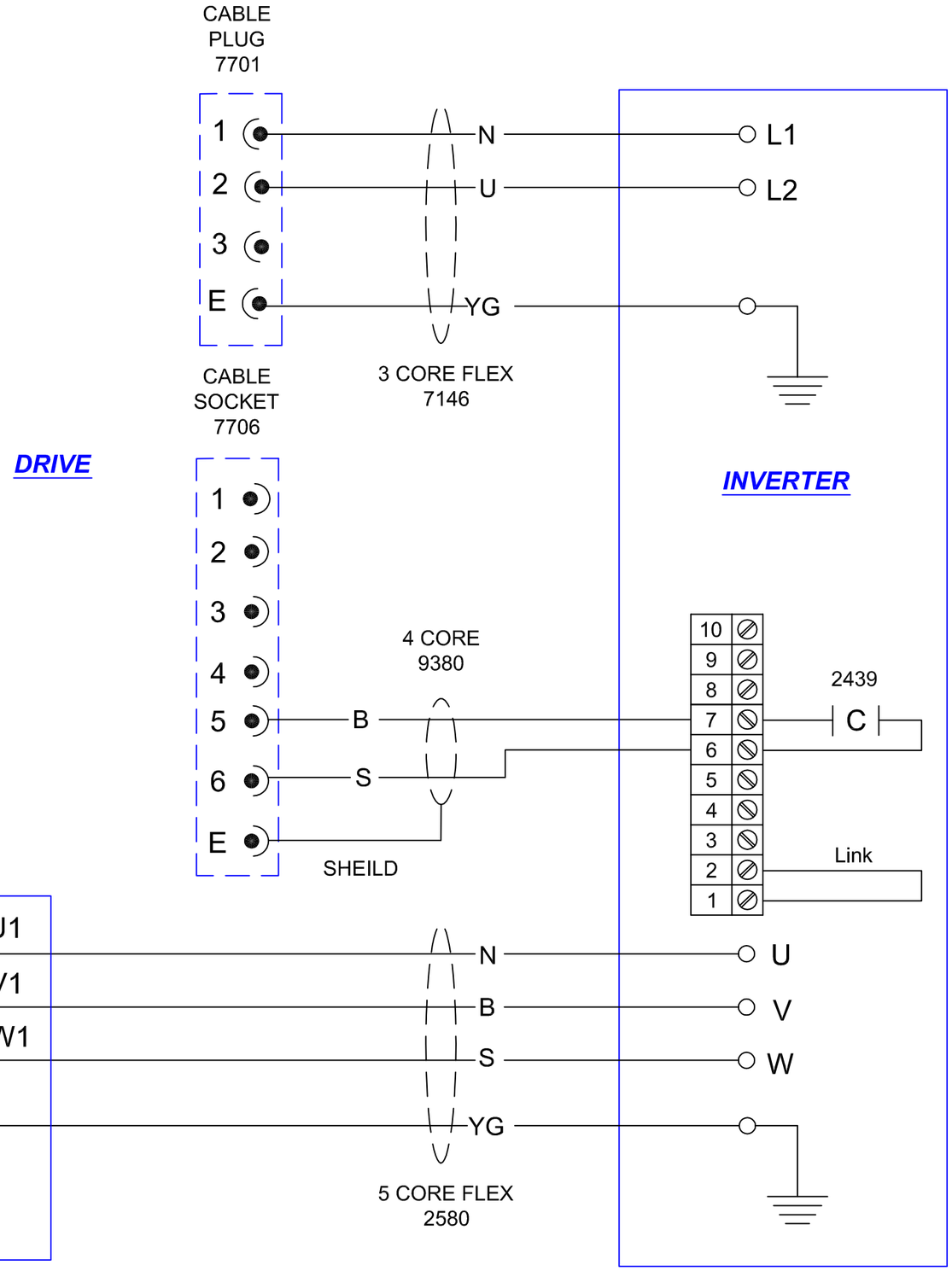
Metallisation
Thermal spray equipment and consumables

Unless Stated All Dimensions In Millimetres

NOTES:
Terminals & Wires Referenced To Power & Control Circuits

DO NOT SCALE : IF IN DOUBT ASK : REMOVE ALL BURRS & SHARP EDGES

TITLE	Circuit Wiring Loom For Pendant / Remote Kit		
DRAWING NUMBER	EN 277	REV	B
DRAWN BY	S.Skidmore.	DATE	05/11/2013
CHECKED BY	-	DATE	-



REV	DESCRIPTION	DATE	BY
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-

REVISIONS

Tolerance Unless Stated: See Chart
1 Decimal Place: ± 0.05
2 Decimal Places: ± 0.02

Metallisation
Thermal spray equipment and consumables

Third Angle Projection

ISO 2768 (T2) H

Non-Toleranced Dimensions

0.5.....3	> 3.....6	> 6.....30	> 30....120	>120.....400	>400.....1000+
+/- 0.1	+/- 0.1	+/- 0.2	+/- 0.3	+/- 0.5	+/- 1

Radii, Chamfers

+/- 0.2	+/- 0.3	+/- 0.5	+/- 1	+/- 1	+/- 1

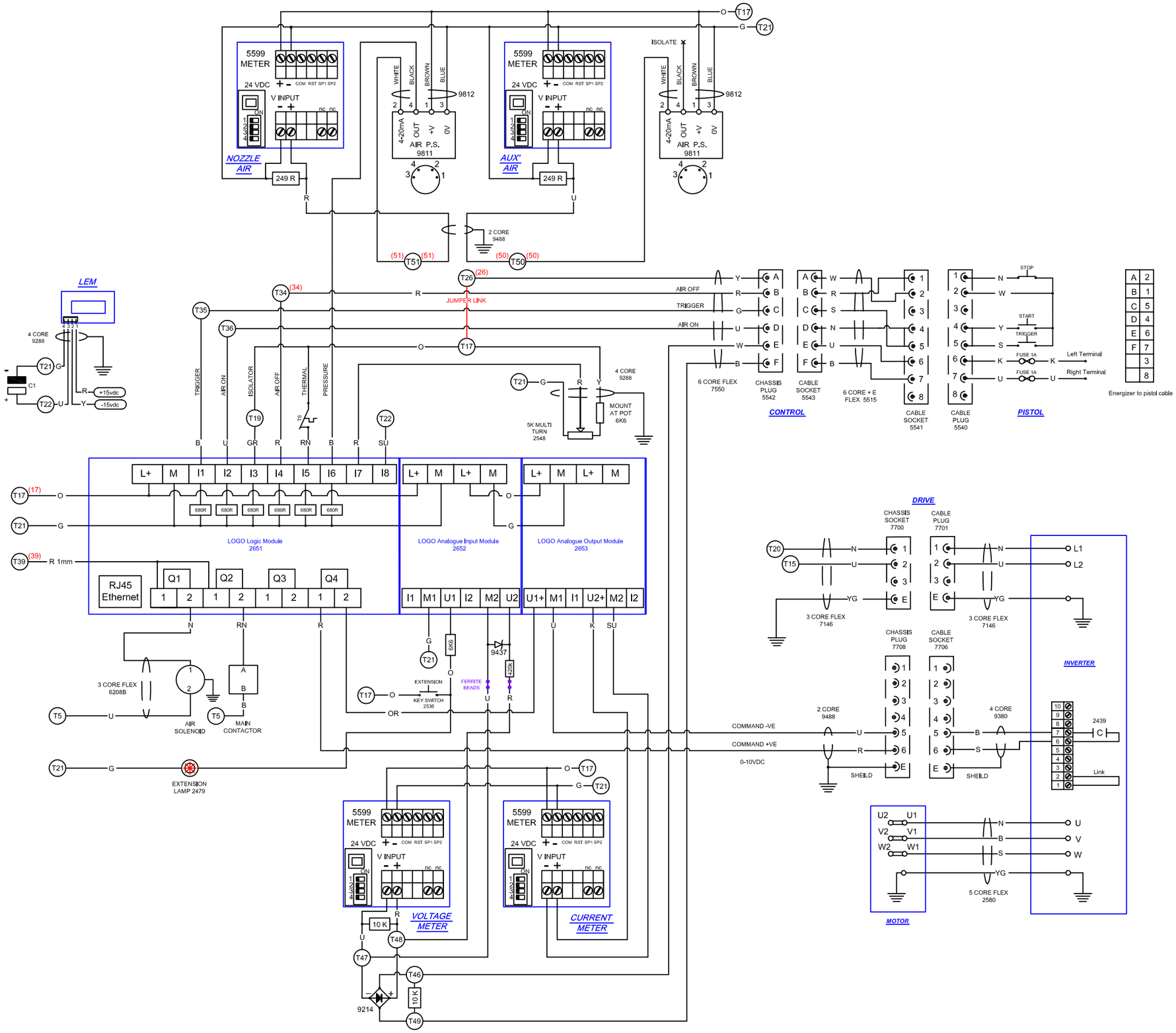
General Angles & Chamfers +/- 1° Inclusive Angles +/- 0.25°
Tolerances on Form & Position to ISO 2768 (T2) H

Unless Stated All Dimensions In Millimetres

DO NOT SCALE : IF IN DOUBT ASK : REMOVE ALL BURRS & SHARP EDGES

NOTES:
.

TITLE	Electrical Wiring Diagram for ARC145 / ARC150 Inverter		
DRAWING NUMBER	EN 346	REV	-
DRAWN BY	S.Skidmore.	DATE	02/12/2015
CHECKED BY	B.Hawkins	DATE	02/12/2015



CODE	COLOUR
B	BLACK
G	GREEN
K	PINK
N	BROWN
O	ORANGE
P	PURPLE
R	RED
S	GREY
U	BLUE
W	WHITE
Y	YELLOW

REV	DESCRIPTION	DATE	BY
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-

REVISIONS

Tolerance Unless Stated: See Chart
1 Decimal Place: ± 0.05
2 Decimal Places: ± 0.02

Metallisation
Thermal spray equipment and consumables

Third Angle Projection

ISO 2768 Tolerance Form/Mm

ISO 2768 (T2) H

Non-Toleranced Dimensions

0.5.....3	> 3.....6	> 6.....30	> 30.....120	>120.....400	>400.....1000+
+/- 0.1	+/- 0.1	+/- 0.2	+/- 0.3	+/- 0.5	+/- 1

Radii, Chamfers

+/- 0.2	+/- 0.3	+/- 0.5	+/- 1	+/- 1	+/- 1

General Angles & Chamfers +/- 1° Inclusive Angles +/- 0.25°

Tolerances on Form & Position to ISO 2768 (T2) H

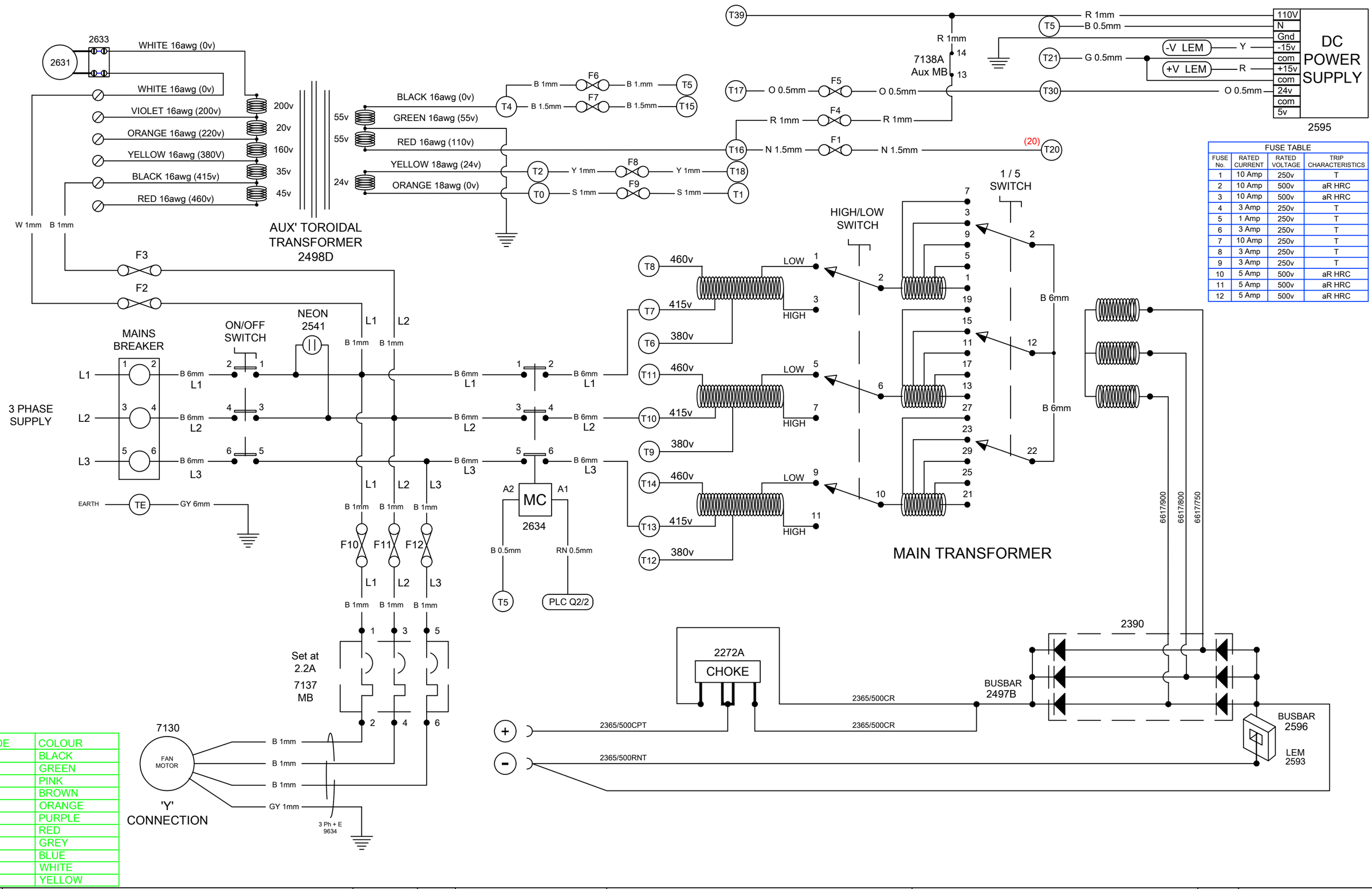
Unless Stated All Dimensions In Millimetres

NOTES:

1. All wires are 0.5mm unless otherwise stated.
2. Terminals referenced to control circuit.
3. Earth all screened cables at PLC end.
4. The (Numbered) wires need to be long enough to connect to the relays etc if a remote/pendant : data is to be fitted as kits (EN277):(EN430)

DO NOT SCALE : IF IN DOUBT ASK : REMOVE ALL BURRS & SHARP EDGES

TITLE	S500(16)-PLC : ARC150 Closed Loop Control Circuit
DRAWING NUMBER	EN 420
REV	-
DRAWN BY	S.Skidmore.
DATE	15/12/2015
CHECKED BY	A.Liffen.
DATE	15/12/2015



CODE	COLOUR
B	BLACK
G	GREEN
K	PINK
N	BROWN
O	ORANGE
P	PURPLE
R	RED
S	GREY
U	BLUE
W	WHITE
Y	YELLOW

REV	DESCRIPTION	DATE	BY
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
B	2634 Mains transformer was 2363 (Re: FMEA approvals)	25/07/2016	SGS
A	2631 & 2633 thermister & terminal block added (Re: FMEA approvals)	31/03/2016	SGS

REVISIONS

Tolerance Unless Stated: See Chart
1 Decimal Place: ± 0.05
2 Decimal Places: ± 0.02

Metallisation
Thermal spray equipment and consumables

Third Angle Projection

ISO 2768 (T2) H

Non-Toleranced Dimensions

0.5.....3	> 3.....6	> 6.....30	> 30....120	>120.....400	>400.....1000+
+/- 0.1	+/- 0.1	+/- 0.2	+/- 0.3	+/- 0.5	+/- 1

Radii, Chamfers

+/- 0.2	+/- 0.3	+/- 0.5	+/- 1	+/- 1	+/- 1

General Angles & Chamfers +/- 1° Inclusive Angles +/- 0.25°

Tolerances on Form & Position to ISO 2768 (T2) H

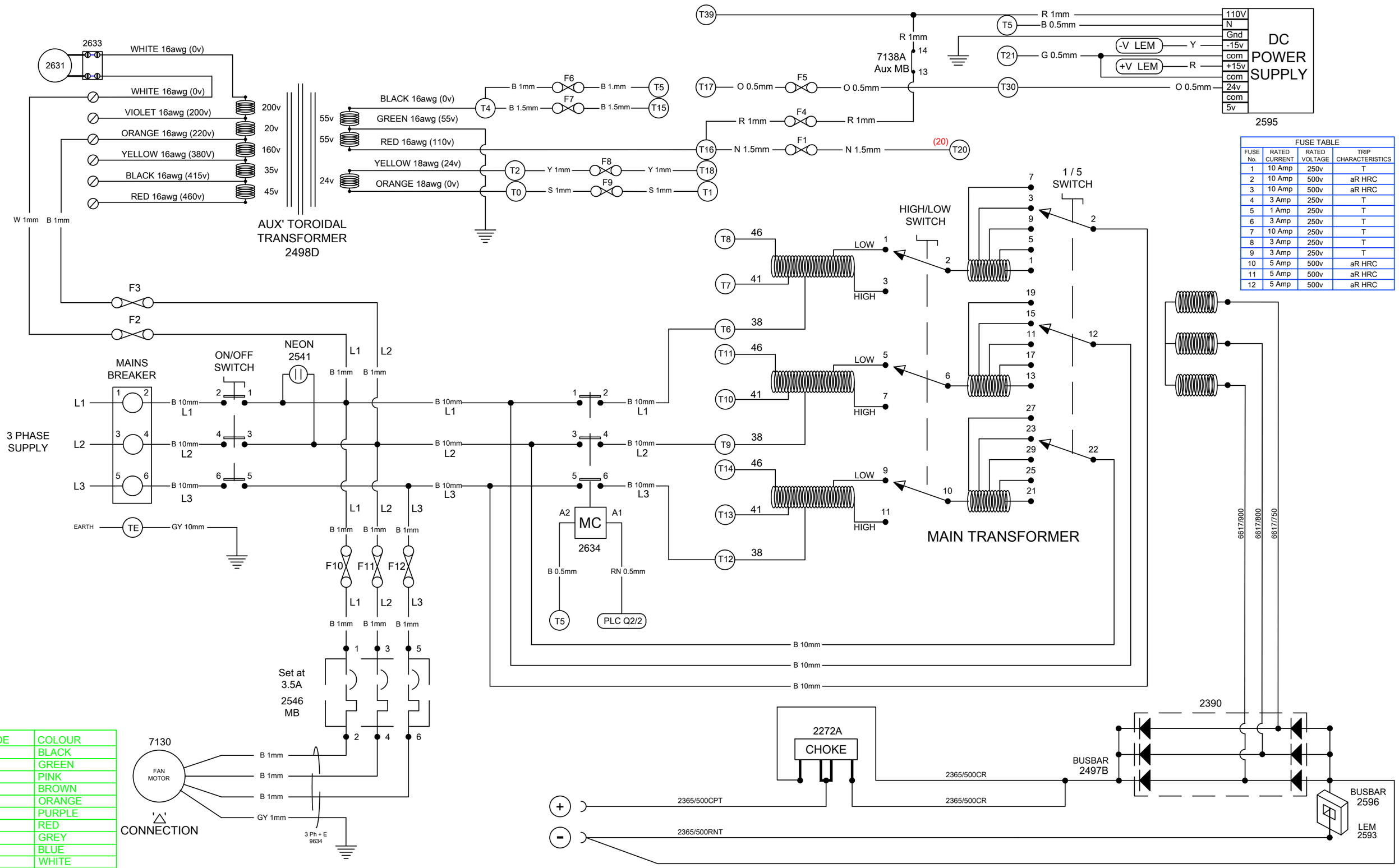
Unless Stated All Dimensions In Millimetres

DO NOT SCALE : IF IN DOUBT ASK : REMOVE ALL BURRS & SHARP EDGES

NOTES:

All wires are 0.5mm unless otherwise stated.
Terminals referenced to control circuit.
The (Numbered) wire needs to be long enough to connect to the relay if a remote/pendant is to be fitted as a kit (EN277)

TITLE	S500(16)-PLC : ARC150 Power Circuit 415 Vac		
DRAWING NUMBER	EN 421	REV	B
DRAWN BY	S.Skidmore.	DATE	15/12/2015
CHECKED BY	A.Liffen.	DATE	15/12/2015



CODE	COLOUR
B	BLACK
G	GREEN
K	PINK
N	BROWN
O	ORANGE
P	PURPLE
R	RED
S	GREY
U	BLUE
W	WHITE
Y	YELLOW

REV	DESCRIPTION	DATE	BY
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-

REVISIONS

Tolerance Unless Stated: See Chart
1 Decimal Place: ± 0.05
2 Decimal Places: ± 0.02

Metallisation
Thermal spray equipment and consumables

Third Angle Projection

ISO 2768 Tolerance Form.ht
ISO 2768 (T2) H

Non-Toleranced Dimensions

0.5.....3	> 3.....6	> 6.....30	> 30....120	>120.....400	>400.....1000+
+/- 0.1	+/- 0.1	+/- 0.2	+/- 0.3	+/- 0.5	+/- 1

Radii, Chamfers

+/- 0.2	+/- 0.3	+/- 0.5	+/- 1	+/- 1	+/- 1

General Angles & Chamfers +/- 1° Inclusive Angles +/- 0.25°

Tolerances on Form & Position to ISO 2768 (T2) H

Unless Stated All Dimensions In Millimetres

DO NOT SCALE : IF IN DOUBT ASK : REMOVE ALL BURRS & SHARP EDGES

NOTES:

All wires are 0.5mm unless otherwise stated.
Terminals referenced to control circuit.
The (Numbered) wire needs to be long enough to connect to the relay if a remote/pendant is to be fitted as a kit (EN277)

TITLE	S500FV(16)-PLC : ARC150 Power Circuit 200-220 Vac		
DRAWING NUMBER	EN 422	REV	-
DRAWN BY	S.Skidmore.	DATE	15/12/2015
CHECKED BY	A.Liffen.	DATE	15/12/2015

TO CHANGE INPUT VOLTAGE FROM 220v TO 415v.
REMOVE LINKS T23 TO T42, T24 TO T40 & T25 TO T41...
RE-FIT LINKS BETWEEN T23 TO T25 & T24 TO T25...
CHANGE THE WIRE (L1) FROM T6 TO T7...
CHANGE THE WIRE (L2) FROM T9 TO T10...
CHANGE THE WIRE (L3) FROM T12 TO T13...
MOVE THE BLACK WIRE ON THE AUX' TRANSFORMER
FROM THE 220v TAPPING TO THE 415v TAPPING...
CHANGE FAN MOTOR FROM '△' TO 'Y'
SET THE 2546 CURRENT BREAKER TO MINIMUM...
CHANGE THE MAINS INPUT FROM THE 2794 (100Amp)
BREAKER TO THE 2796 (50Amp) BREAKER...

2633
2631
WHITE 16awg (0v)
WHITE 16awg (0v)
VIOLET 16awg (200v)
ORANGE 16awg (220v)
YELLOW 16awg (380v)
BLACK 16awg (415v)
RED 16awg (460v)
200v
20v
160v
35v
45v
55v
55v
24v
BLACK 16awg (0v)
GREEN 16awg (55v)
RED 16awg (110v)
YELLOW 18awg (24v)
ORANGE 18awg (0v)
W 1mm
B 1mm
AUX' TOROIDAL TRANSFORMER 2498D
T4
T5
T15
T16
T2
T18
T0
T1
F6
F7
F8
F9
B 1mm
B 1.5mm
Y 1mm
S 1mm
T39
T17
T20
T30
T21
T5
7138A Aux MB
R 1mm
O 0.5mm
N 1.5mm
F5
F4
F1
(20)
-V LEM
+V LEM
Y
R
G 0.5mm
110V
N
Gnd
-15v
com
+15v
com
24v
com
5v
DC POWER SUPPLY
2595
F3
F2
L1
L2
NEON 2541
ON/OFF SWITCH
2796 50Amp MAINS BREAKER
B 10mm
L1
L2
L3
T40
T24
T25
T41
T42
JUMPER LINK
T23
2794 100Amp MAINS BREAKER
3 PHASE SUPPLY
F10
F11
F12
Set at 3.5A
2546 MB
EARTH
TE
GY 10mm
7130
FAN MOTOR
'△' CONNECTION
B 1mm
GY 1mm
3 Ph + E 9634
T8
T7
T6
T11
T10
T9
T14
T13
T12
460v
415v
380v
LOW
HIGH
HIGH/LOW SWITCH
1 / 5 SWITCH
MC
2634
A2
A1
B 0.5mm
RN 0.5mm
T5
PLC Q2/2
MAIN TRANSFORMER
6617/900
6617/800
6617/750
2390
2272A
CHOKE
2365/500CR
2365/500CPT
2365/500RNT
BUSBAR 2497B
BUSBAR 2596
LEM 2593

FUSE TABLE			
FUSE No.	RATED CURRENT	RATED VOLTAGE	TRIP CHARACTERISTICS
1	10 Amp	250v	T
2	10 Amp	500v	aR HRC
3	10 Amp	500v	aR HRC
4	3 Amp	250v	T
5	1 Amp	250v	T
6	3 Amp	250v	T
7	10 Amp	250v	T
8	3 Amp	250v	T
9	3 Amp	250v	T
10	5 Amp	500v	aR HRC
11	5 Amp	500v	aR HRC
12	5 Amp	500v	aR HRC

CODE	COLOUR
B	BLACK
G	GREEN
K	PINK
N	BROWN
O	ORANGE
P	PURPLE
R	RED
S	GREY
U	BLUE
W	WHITE
Y	YELLOW

REV	DESCRIPTION	DATE	BY
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-

REVISIONS

Tolerance Unless Stated: See Chart
1 Decimal Place: ± 0.05
2 Decimal Places: ± 0.02

Metallisation
Thermal spray equipment and consumables

Third Angle Projection

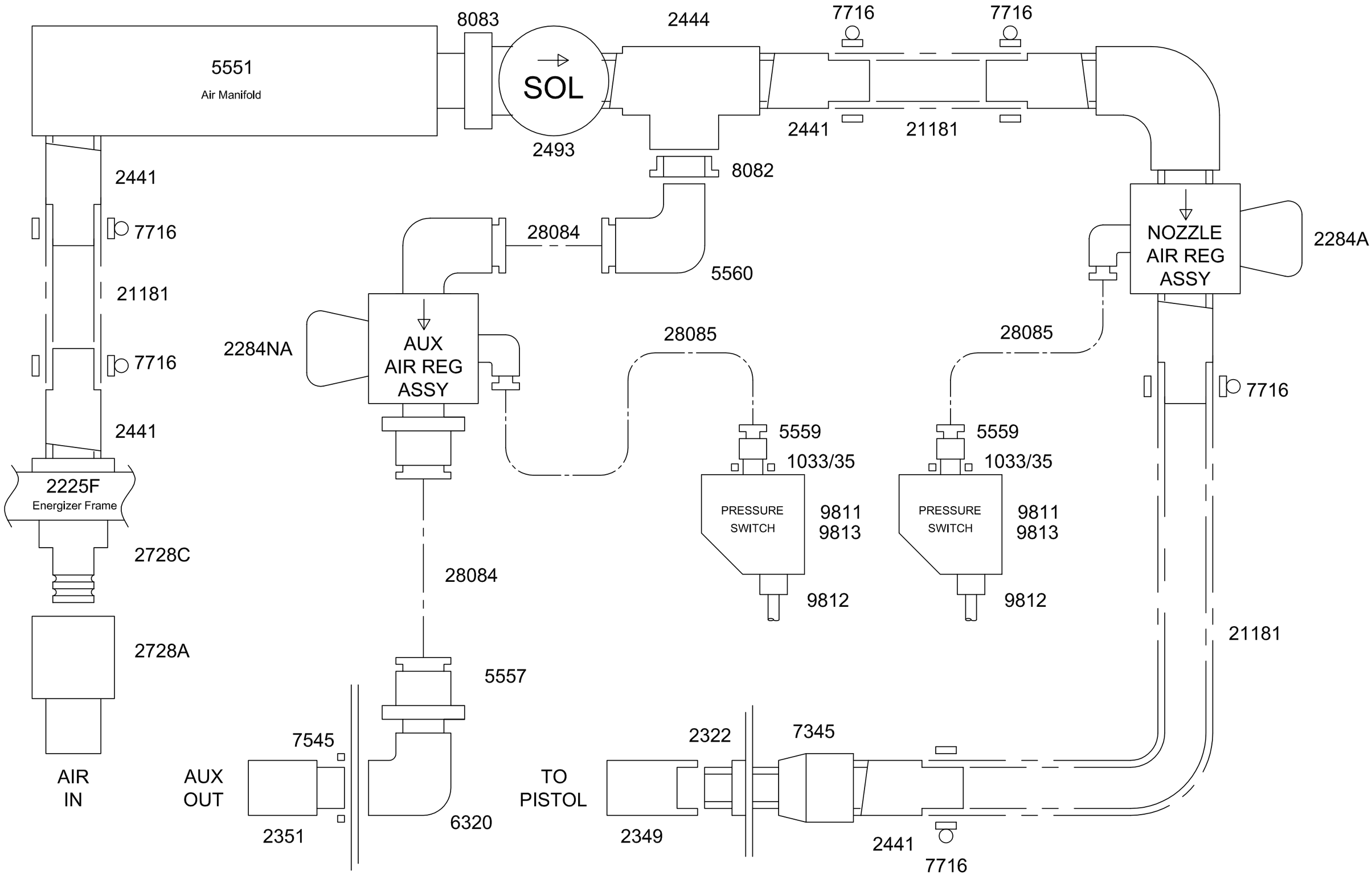
2768 Tolerance Form.ht
ISO 2768 (T2) H

Non-Toleranced Dimensions
0.5.....3 > 3.....6 > 6.....30 > 30....120 >120.....400 >400.....1000+
+/- 0.1 +/- 0.1 +/- 0.2 +/- 0.3 +/- 0.5 +/- 1
Radii, Chamfers
+/- 0.2 +/- 0.3 +/- 0.5 +/- 1 +/- 1 +/- 1
General Angles & Chamfers +/- 1° Inclusive Angles +/- 0.25°
Tolerances on Form & Position to ISO 2768 (T2) H
Unless Stated All Dimensions In Millimetres

DO NOT SCALE : IF IN DOUBT ASK : REMOVE ALL BURRS & SHARP EDGES

NOTES: ***DUAL VOLTAGE*** (Drawn as 220v)
All wires are 0.5mm unless otherwise stated.
Terminals referenced to control circuit.
The (Numbered) wire needs to be long enough to connect to the relay if a remote/pendant is to be fitted as a kit (EN277)

TITLE	S500D(16)-PLC : ARC150 Dual Power Circuit 200-220~380-460Vac		
DRAWING NUMBER	EN 423	REV	-
DRAWN BY	S.Skidmore.	DATE	15/12/2015
CHECKED BY	A.Liffen.	DATE	15/12/2015



REV	DESCRIPTION	DATE	BY
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-

REVISIONS

Tolerance Unless Stated: See Chart
1 Decimal Place: ± 0.05
2 Decimal Places: ± 0.02

Metallisation
Thermal spray equipment and consumables

Third Angle Projection

ISO 2768 (T2) H

Non-Toleranced Dimensions

0.5.....3	> 3.....6	> 6.....30	> 30....120	>120.....400	>400.....1000+
+/- 0.1	+/- 0.1	+/- 0.2	+/- 0.3	+/- 0.5	+/- 1

Radii, Chamfers

+/- 0.2	+/- 0.3	+/- 0.5	+/- 1	+/- 1	+/- 1

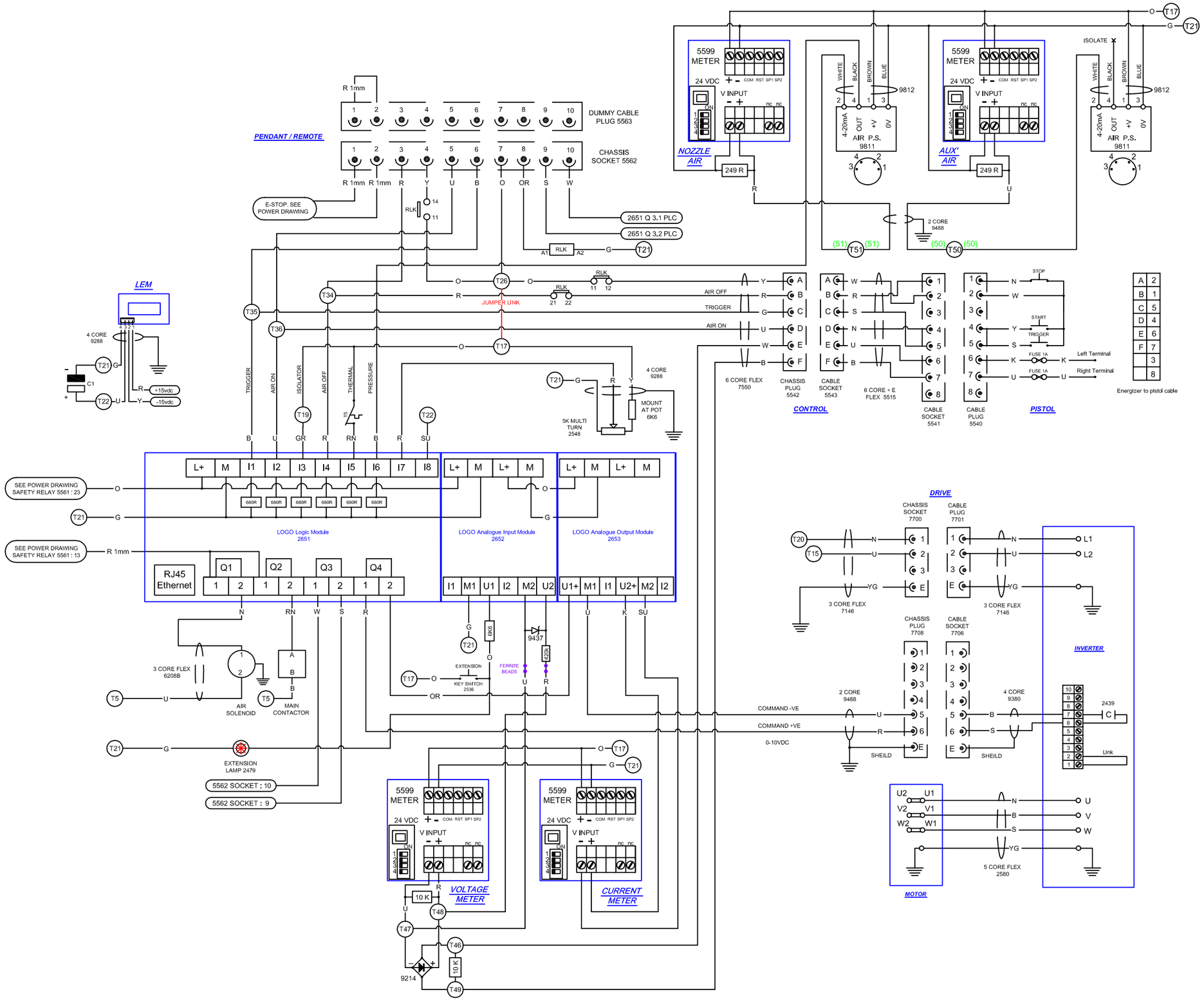
General Angles & Chamfers +/- 1° Inclusive Angles +/- 0.25°
Tolerances on Form & Position to ISO 2768 (T2) H

Unless Stated All Dimensions In Millimetres

DO NOT SCALE : IF IN DOUBT ASK : REMOVE ALL BURRS & SHARP EDGES

NOTES:
-

TITLE	Energizer (16) Air Schematic		
DRAWING NUMBER	2225(16)	REV	-
DRAWN BY	S.Skidmore.	DATE	11/12/2015
CHECKED BY	B.Hawkins	DATE	11/12/2015



CODE	COLOUR
B	BLACK
G	GREEN
K	PINK
N	BROWN
O	ORANGE
P	PURPLE
R	RED
S	GREY
U	BLUE
W	WHITE
Y	YELLOW

REV	DESCRIPTION	DATE	BY
-	-	-	-
-	-	-	-
-	-	-	-
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-	-	-	-
-	-	-	-

REVISIONS

Tolerance Unless Stated: See Chart
1 Decimal Place: ± 0.05
2 Decimal Places: ± 0.02

Metallisation
Thermal spray equipment and consumables

Third Angle Projection

ISO 2768 (T2) H

Non-Toleranced Dimensions

0.5.....3	> 3.....6	> 6.....30	> 30....120	>120.....400	>400.....1000+
+/- 0.1	+/- 0.1	+/- 0.2	+/- 0.3	+/- 0.5	+/- 1

Radii, Chamfers

+/- 0.2	+/- 0.3	+/- 0.5	+/- 1	+/- 1	+/- 1

General Angles & Chamfers +/- 1° Inclusive Angles +/- 0.25°

Tolerances on Form & Position to ISO 2768 (T2) H

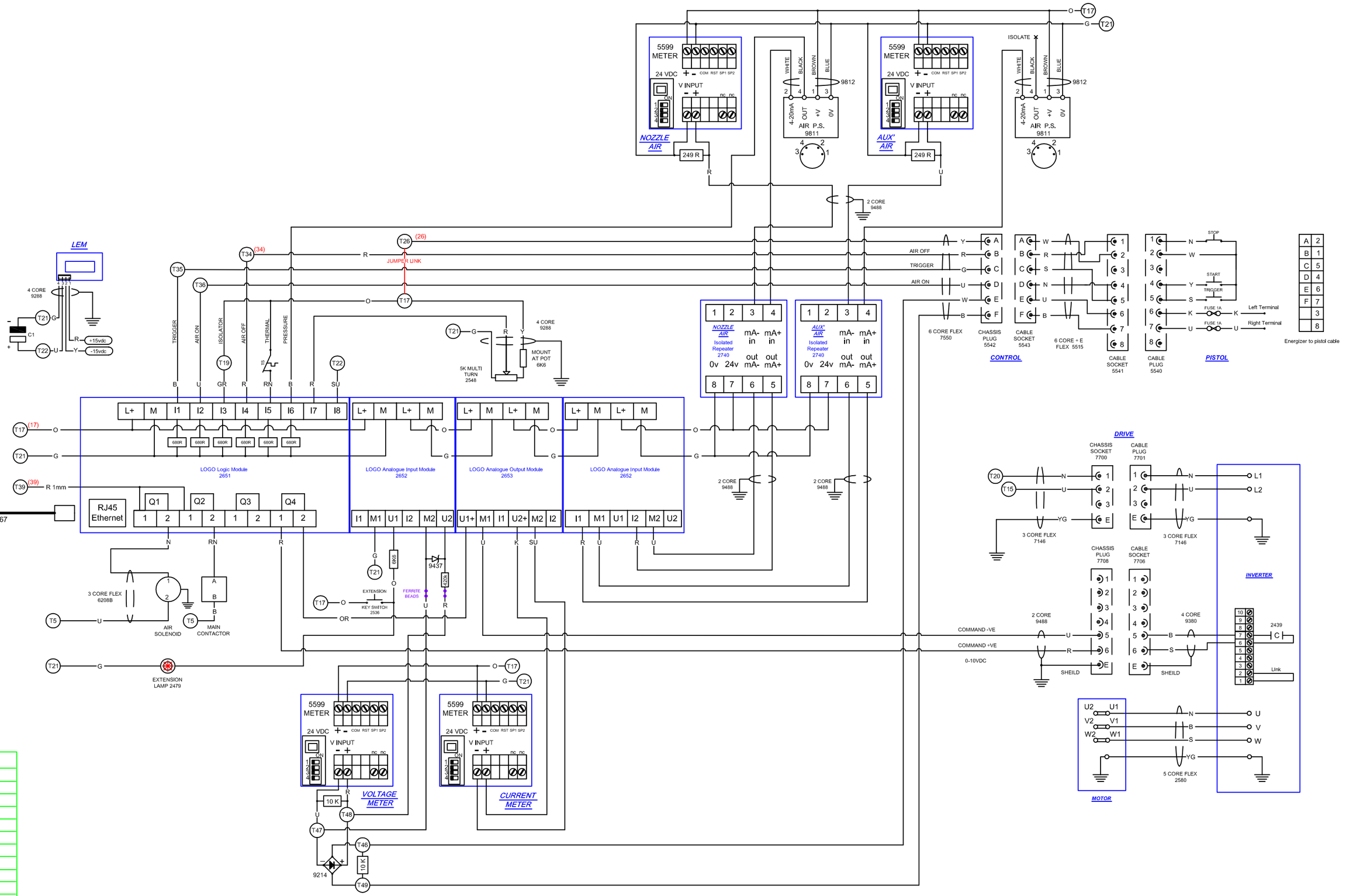
Unless Stated All Dimensions In Millimetres

DO NOT SCALE : IF IN DOUBT ASK : REMOVE ALL BURRS & SHARP EDGES

NOTES:

1. All wires are 0.5mm unless otherwise stated.
2. Terminals referenced to control circuit.
3. Earth all screened cables at PLC end.
4. The (Numbered) wires need to be long enough to connect to the repeater relays if a data kit is to be fitted (EN430)

TITLE	S500(16)-PLC : ARC150 Closed Loop Control Circuit With factory fitted pendant / remote
DRAWING NUMBER	EN 420P
REV	-
DRAWN BY	S.Skidmore.
DATE	15/12/2015
CHECKED BY	A.Liffen.
DATE	15/12/2015



CODE	COLOUR
B	BLACK
G	GREEN
K	PINK
N	BROWN
O	ORANGE
P	PURPLE
R	RED
S	GREY
U	BLUE
W	WHITE
Y	YELLOW

REV	DESCRIPTION	DATE	BY
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-

REVISIONS

Tolerance Unless Stated: See Chart
1 Decimal Place: ± 0.05
2 Decimal Places: ± 0.02

Metallisation
Thermal spray equipment and consumables

Third Angle Projection

ISO 2768 Tolerance Form/trm

ISO 2768 (T2) H

Non-Toleranced Dimensions

0.5.....3	> 3.....6	> 6.....30	> 30....120	>120.....400	>400.....1000+
+/- 0.1	+/- 0.1	+/- 0.2	+/- 0.3	+/- 0.5	+/- 1

Radii, Chamfers

+/- 0.2	+/- 0.3	+/- 0.5	+/- 1	+/- 1	+/- 1

General Angles & Chamfers +/- 1° Inclusive Angles +/- 0.25°

Tolerances on Form & Position to ISO 2768 (T2) H

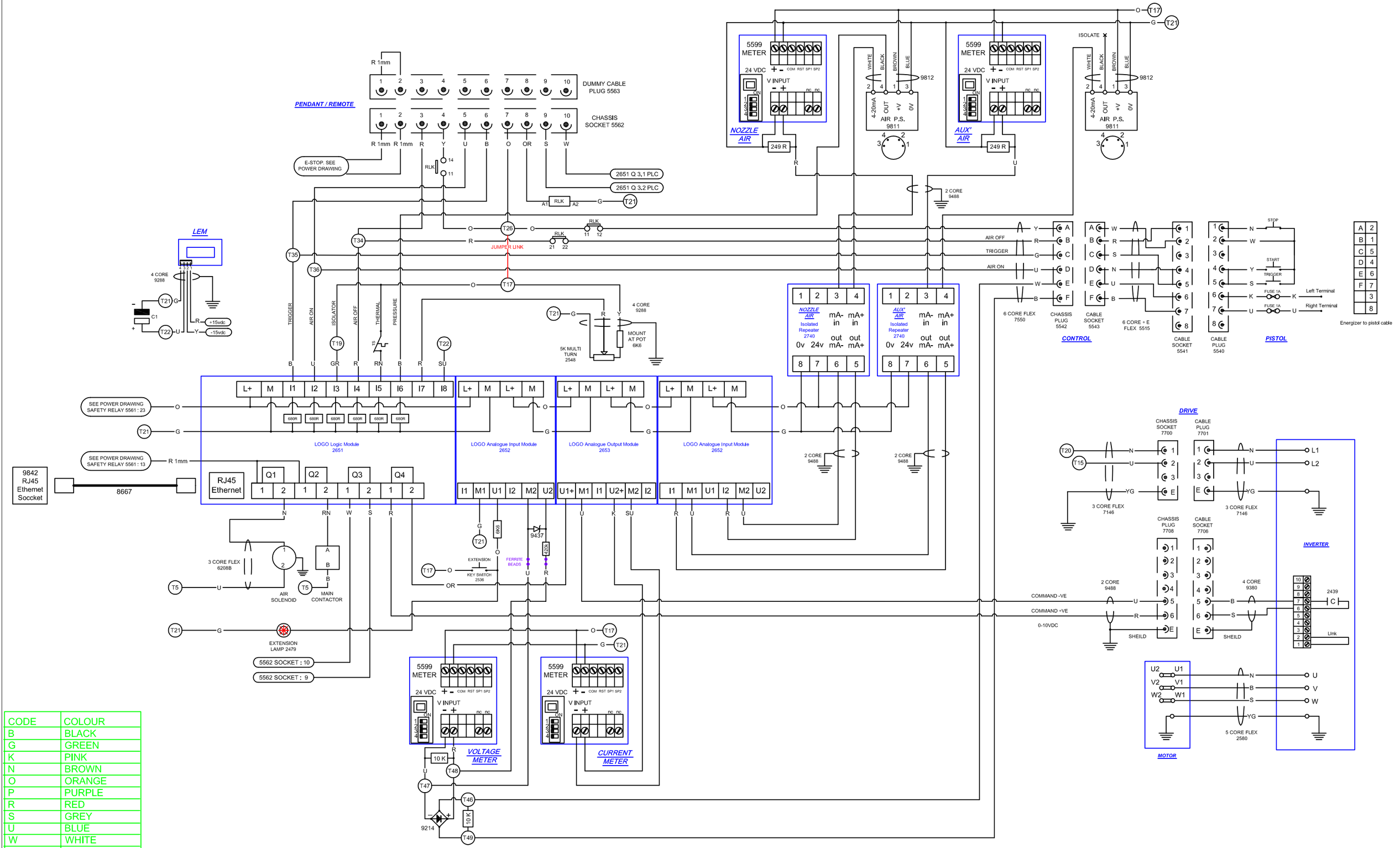
Unless Stated All Dimensions In Millimetres

DO NOT SCALE : IF IN DOUBT ASK : REMOVE ALL BURRS & SHARP EDGES

NOTES:

All wires are 0.5mm unless otherwise stated.
Terminals referenced to control circuit.
Earth all screened cables at PLC end.
The (Numbered) wires need to be long enough to connect to the relays etc if a remote/pendant is to be fitted as as kit (EN277)

TITLE	S500(16)-PLC : ARC150 Closed Loop Control Circuit with factory fitted Data Kit
DRAWING NUMBER	EN 420D
REV	-
DRAWN BY	S.Skidmore.
DATE	15/12/2015
CHECKED BY	A.Liffen.
DATE	15/12/2015



CODE	COLOUR
B	BLACK
G	GREEN
K	PINK
N	BROWN
O	ORANGE
P	PURPLE
R	RED
S	GREY
U	BLUE
W	WHITE
Y	YELLOW

REV	DESCRIPTION	DATE	BY
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-

REVISIONS

Tolerance Unless Stated: See Chart
1 Decimal Place: ± 0.05
2 Decimal Places: ± 0.02

Metallisation
Thermal spray equipment and consumables

Third Angle Projection

ISO 2768 Tolerance Form/Item
ISO 2768 (T2) H

Non-Toleranced Dimensions

0.5.....3	> 3.....6	> 6.....30	> 30....120	>120.....400	>400.....1000+
+/- 0.1	+/- 0.1	+/- 0.2	+/- 0.3	+/- 0.5	+/- 1

Radii, Chamfers

+/- 0.2	+/- 0.3	+/- 0.5	+/- 1	+/- 1	+/- 1

General Angles & Chamfers +/- 1° Inclusive Angles +/- 0.25°

Tolerances on Form & Position to ISO 2768 (T2) H

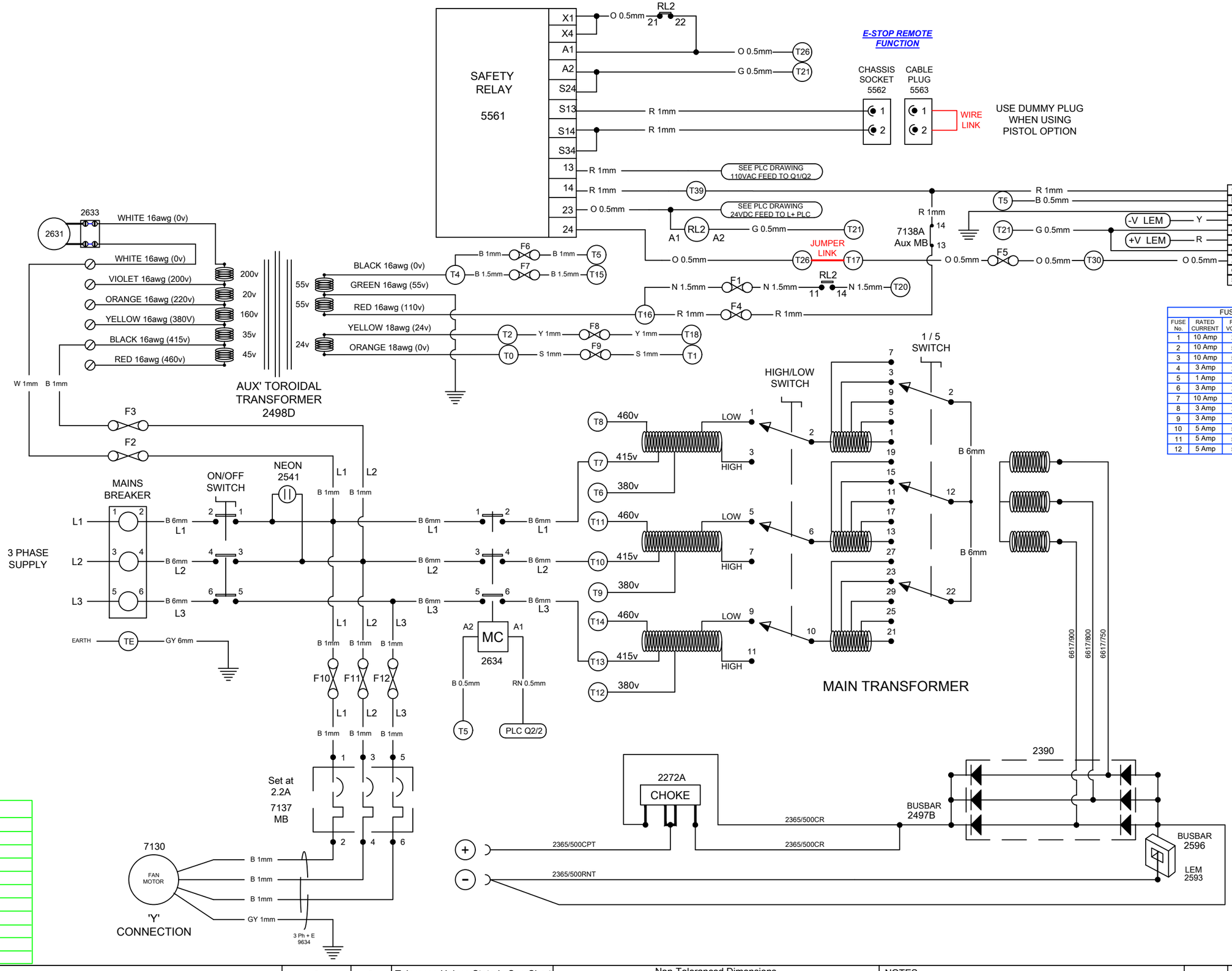
Unless Stated All Dimensions In Millimetres

DO NOT SCALE : IF IN DOUBT ASK : REMOVE ALL BURRS & SHARP EDGES

NOTES:

All wires are 0.5mm unless otherwise stated.
Terminals referenced to control circuit.
Earth all screened cables at PLC end.

TITLE	S500(16)-PLC : ARC150 Closed Loop Control Circuit with factory fitted pendant / remote & data kit		
DRAWING NUMBER	EN 420PD	REV	-
DRAWN BY	S.Skidmore.	DATE	15/12/2015
CHECKED BY	A.Liffen.	DATE	15/12/2015



FUSE TABLE			
FUSE No.	RATED CURRENT	RATED VOLTAGE	TRIP CHARACTERISTICS
1	10 Amp	250v	T
2	10 Amp	500v	aR HRC
3	10 Amp	500v	aR HRC
4	3 Amp	250v	T
5	1 Amp	250v	T
6	3 Amp	250v	T
7	10 Amp	250v	T
8	3 Amp	250v	T
9	3 Amp	250v	T
10	5 Amp	500v	aR HRC
11	5 Amp	500v	aR HRC
12	5 Amp	500v	aR HRC

CODE	COLOUR
B	BLACK
G	GREEN
K	PINK
N	BROWN
O	ORANGE
P	PURPLE
R	RED
S	GREY
U	BLUE
W	WHITE
Y	YELLOW

REV	DESCRIPTION	DATE	BY
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
B	2634 Mains contactor was 2363 (Re: FMEA approvals)	25/07/2016	SGS
A	2631 & 2633 thermister & terminal block added (Re: FMEA approvals)	31/03/2016	SGS

REVISIONS

Tolerance Unless Stated: See Chart
1 Decimal Place: ± 0.05
2 Decimal Places: ± 0.02

Metallisation
Thermal spray equipment and consumables

Third Angle Projection

ISO 2768 (T2) H

Non-Toleranced Dimensions

0.5.....3	> 3.....6	> 6.....30	> 30....120	>120.....400	>400.....1000+
+/- 0.1	+/- 0.1	+/- 0.2	+/- 0.3	+/- 0.5	+/- 1

Radii, Chamfers

+/- 0.2	+/- 0.3	+/- 0.5	+/- 1	+/- 1	+/- 1

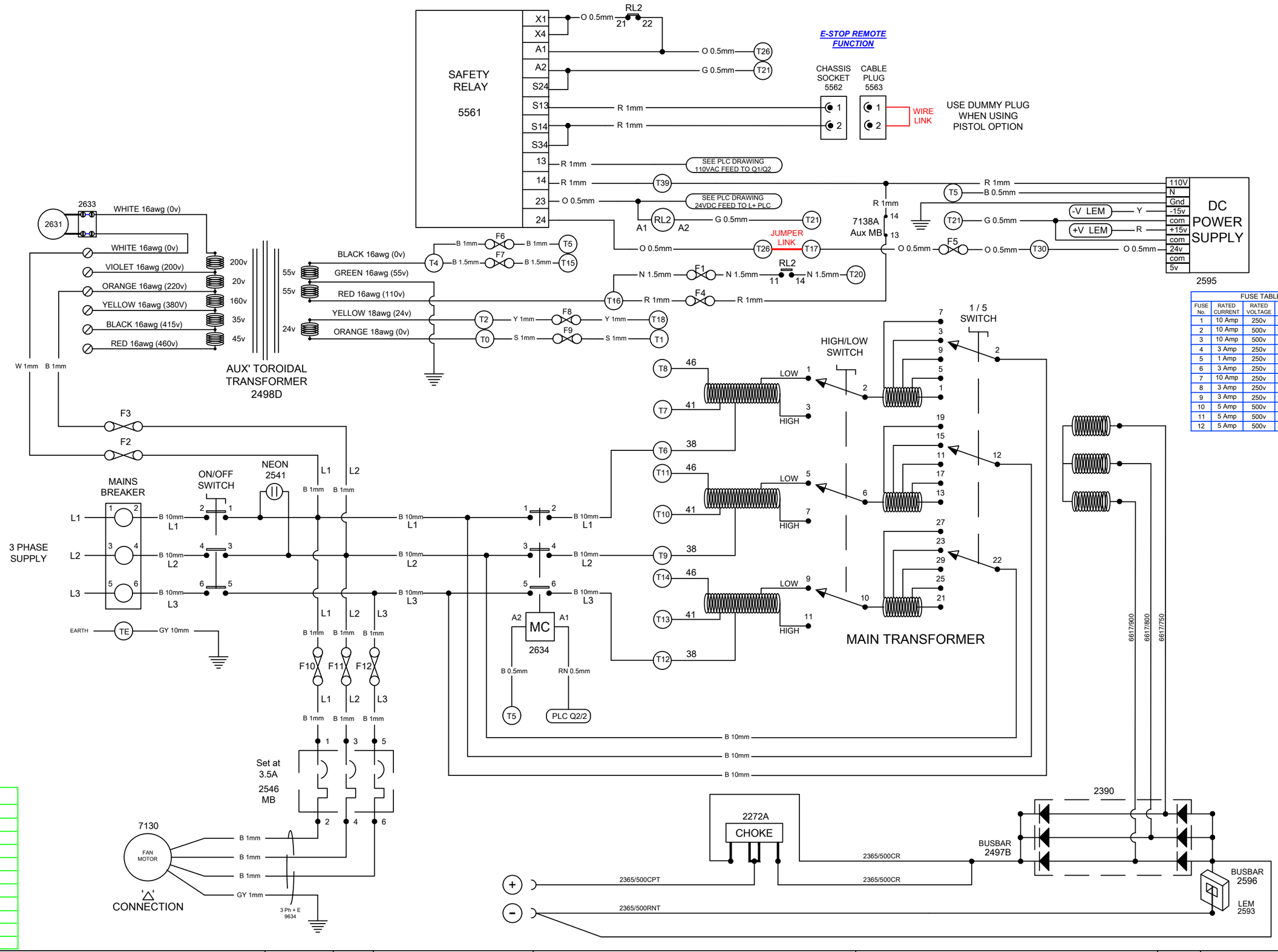
General Angles & Chamfers +/- 1° Inclusive Angles +/- 0.25°
Tolerances on Form & Position to ISO 2768 (T2) H

Unless Stated All Dimensions In Millimetres

DO NOT SCALE : IF IN DOUBT ASK : REMOVE ALL BURRS & SHARP EDGES

NOTES:
All wires are 0.5mm unless otherwise stated.
Terminals referenced to control circuit.

TITLE	S500(16)-PLC : ARC150 Power Circuit 415 Vac With factory fitted pendant / remote		
DRAWING NUMBER	EN 421P	REV	B
DRAWN BY	S.Skidmore.	DATE	15/12/2015
CHECKED BY	A.Liffen.	DATE	15/12/2015



FUSE TABLE			
FUSE No.	RATED CURRENT	RATED VOLTAGE	TRIP CHARACTERISTICS
1	10 Amp	250v	T
2	10 Amp	500v	aR HRC
3	10 Amp	500v	aR HRC
4	3 Amp	250v	T
5	1 Amp	250v	T
6	3 Amp	250v	T
7	10 Amp	250v	T
8	3 Amp	250v	T
9	3 Amp	250v	T
10	5 Amp	500v	aR HRC
11	5 Amp	500v	aR HRC
12	5 Amp	500v	aR HRC

CODE	COLOUR
B	BLACK
G	GREEN
K	PINK
N	BROWN
O	ORANGE
P	PURPLE
R	RED
S	GREY
U	BLUE
W	WHITE
Y	YELLOW

REV	DESCRIPTION	DATE	BY
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-

REVISIONS

Tolerance Unless Stated: See Chart
1 Decimal Place: ± 0.05
2 Decimal Places: ± 0.02

Metallisation
Thermal spray equipment and consumables

Third Angle Projection

D 2768 Tolerance Form.ht
ISO 2768 (T2) H

Non-Toleranced Dimensions

0.5....3	> 3....6	> 6....30	> 30....120	>120....400	>400....1000+
+/- 0.1	+/- 0.1	+/- 0.2	+/- 0.3	+/- 0.5	+/- 1

Radii, Chamfers

+/- 0.2	+/- 0.3	+/- 0.5	+/- 1	+/- 1	+/- 1

General Angles & Chamfers +/- 1° Inclusive Angles +/- 0.25°
Tolerances on Form & Position to ISO 2768 (T2) H

Unless Stated All Dimensions In Millimetres

NOTES:
All wires are 0.5mm unless otherwise stated.
Terminals referenced to control circuit.

DO NOT SCALE : IF IN DOUBT ASK : REMOVE ALL BURRS & SHARP EDGES

TITLE	S500FV(16)-PLC : ARC150 Power Circuit 200-220 Vac With factory fitted pendant / remote
DRAWING NUMBER	EN 422P
REV	-
DRAWN BY	S.Skidmore.
DATE	15/12/2015
CHECKED BY	A.Liffen.
DATE	15/12/2015

TO CHANGE INPUT VOLTAGE FROM 220v TO 415v.
REMOVE LINKS T23 TO T42, T24 TO T40 & T25 TO T41...
RE-FIT LINKS BETWEEN T23 TO T25 & T24 TO T25...
CHANGE THE WIRE (L1) FROM T6 TO T7...
CHANGE THE WIRE (L2) FROM T9 TO T10...
CHANGE THE WIRE (L3) FROM T12 TO T13...
MOVE THE BLACK WIRE ON THE AUX' TRANSFORMER FROM THE 220v TAPPING TO THE 415v TAPPING...
CHANGE FAN MOTOR FROM '△' TO 'Y'
SET THE 2546 CURRENT BREAKER TO MINIMUM...
CHANGE THE MAINS INPUT FROM THE 2794 (100Amp) BREAKER TO THE 2796 (50Amp) BREAKER...

SAFETY RELAY 5561
X1 X4 A1 A2 S24 S13 S14 S34 13 14 23 24
O 0.5mm RL2 21 22 O 0.5mm T26 G 0.5mm T21
R 1mm R 1mm
SEE PLC DRAWING 110VAC FEED TO Q1/Q2
SEE PLC DRAWING 24VDC FEED TO L+ PLC
A1 RL2 A2 G 0.5mm T21
O 0.5mm T26 JUMPER LINK T17

E-STOP REMOTE FUNCTION
CHASSIS SOCKET 5562 CABLE PLUG 5563 WIRE LINK
USE DUMMY PLUG WHEN USING PISTOL OPTION

7138A Aux MB 14 13
R 1mm B 0.5mm T5 T21 G 0.5mm -V LEM Y +V LEM R F5 O 0.5mm T30 O 0.5mm
110V N Gnd -15v com +15v com 24v com 5v
DC POWER SUPPLY 2595

2633 2631 WHITE 16awg (0v) WHITE 16awg (0v) VIOLET 16awg (200v) ORANGE 16awg (220v) YELLOW 16awg (380V) BLACK 16awg (415v) RED 16awg (460v)
200v 20v 160v 35v 45v
55v 55v 24v
BLACK 16awg (0v) GREEN 16awg (55v) RED 16awg (110v) YELLOW 18awg (24v) ORANGE 18awg (0v)
B 1mm F6 B 1mm T5 T4 B 1.5mm F7 B 1.5mm T15
N 1.5mm F1 N 1.5mm RL2 11 14 N 1.5mm T20
T16 R 1mm F4 R 1mm
T2 Y 1mm F8 Y 1mm T18 T0 S 1mm F9 S 1mm T1
W 1mm B 1mm
AUX' TOROIDAL TRANSFORMER 2498D

F2
2796 50Amp MAINS BREAKER
ON/OFF SWITCH
NEON 2541
L1 L2
B 10mm L1 B 10mm L2 B 10mm L3
2794 100Amp MAINS BREAKER
3 PHASE SUPPLY
EARTH TE GY 10mm

JUMPER LINK T40 T24 T25 T41 T23 T42
B 10mm L1 B 10mm L2 B 10mm L3
F10 F11 F12 B 1mm
Set at 3.5A 2546 MB
7130 FAN MOTOR '△' CONNECTION B 1mm B 1mm B 1mm GY 1mm 3 Ph + E 9634

T8 460v T7 415v T6 380v LOW HIGH
T11 460v T10 415v T9 380v LOW HIGH
T14 460v T13 415v T12 380v LOW HIGH
HIGH/LOW SWITCH
1 / 5 SWITCH
MAIN TRANSFORMER
6617/900 6617/800 6617/750

A2 MC A1 2634
B 0.5mm RN 0.5mm T5 PLC Q2/2

2272A CHOKE
2365/500CPT 2365/500RNT 2365/500CR 2365/500CR
BUSBAR 2497B 2390 BUSBAR 2596 LEM 2593

FUSE TABLE

FUSE No.	RATED CURRENT	RATED VOLTAGE	TRIP CHARACTERISTICS
1	10 Amp	250v	T
2	10 Amp	500v	aR HRC
3	10 Amp	500v	aR HRC
4	3 Amp	250v	T
5	1 Amp	250v	T
6	3 Amp	250v	T
7	10 Amp	250v	T
8	3 Amp	250v	T
9	3 Amp	250v	T
10	5 Amp	500v	aR HRC
11	5 Amp	500v	aR HRC
12	5 Amp	500v	aR HRC

CODE	COLOUR
B	BLACK
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K	PINK
N	BROWN
O	ORANGE
P	PURPLE
R	RED
S	GREY
U	BLUE
W	WHITE
Y	YELLOW

REV	DESCRIPTION	DATE	BY
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-

REVISIONS

Tolerance Unless Stated: See Chart
1 Decimal Place: ± 0.05
2 Decimal Places: ± 0.02

Metallisation
Thermal spray equipment and consumables

Third Angle Projection
2768 Tolerance Form.ht
ISO 2768 (T2) H

Non-Toleranced Dimensions
0.5.....3 +/- 0.1 | > 3.....6 +/- 0.1 | > 6.....30 +/- 0.2 | > 30....120 +/- 0.3 | >120.....400 +/- 0.5 | >400.....1000+ +/- 1
Radii, Chamfers
+/- 0.2 | +/- 0.3 | +/- 0.5 | +/- 1 | +/- 1 | +/- 1
General Angles & Chamfers +/- 1° Inclusive Angles +/- 0.25°
Tolerances on Form & Position to ISO 2768 (T2) H
Unless Stated All Dimensions In Millimetres

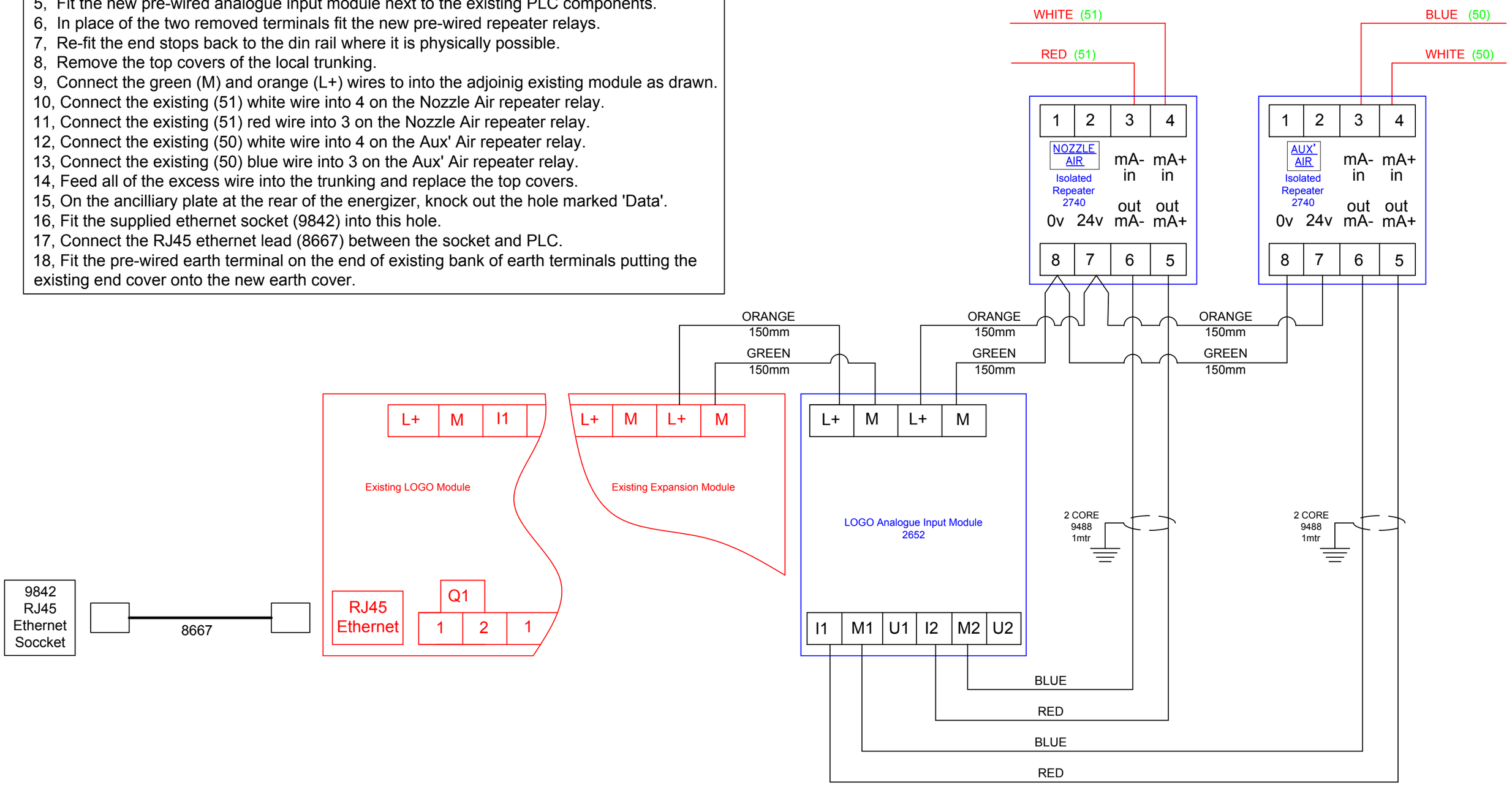
NOTES: **DUAL VOLTAGE** (Drawn as 220v)
All wires are 0.5mm unless otherwise stated.
Terminals referenced to control circuit.

DO NOT SCALE : IF IN DOUBT ASK : REMOVE ALL BURRS & SHARP EDGES

TITLE	S500D(16)-PLC : ARC150 Dual Power Circuit 200-220~380-460Vac With factory fitted pendant / remote
DRAWING NUMBER	EN 423P
REV	-
DRAWN BY	S.Skidmore.
DATE	15/12/2015
CHECKED BY	A.Liffen.
DATE	15/12/2015

FITTING INSTRUCTIONS

1, Disconnect the white and red wires (51) from terminal number 51.
2, Disconnect the white and blue wires (50) from terminal number 50.
3, Remove the two off terminals 50 & 51 from the din rail and discard.
4, Remove the two off end stops from the din rail.
5, Fit the new pre-wired analogue input module next to the existing PLC components.
6, In place of the two removed terminals fit the new pre-wired repeater relays.
7, Re-fit the end stops back to the din rail where it is physically possible.
8, Remove the top covers of the local trunking.
9, Connect the green (M) and orange (L+) wires to into the adjoinig existing module as drawn.
10, Connect the existing (51) white wire into 4 on the Nozzle Air repeater relay.
11, Connect the existing (51) red wire into 3 on the Nozzle Air repeater relay.
12, Connect the existing (50) white wire into 4 on the Aux' Air repeater relay.
13, Connect the existing (50) blue wire into 3 on the Aux' Air repeater relay.
14, Feed all of the excess wire into the trunking and replace the top covers.
15, On the ancilliary plate at the rear of the energizer, knock out the hole marked 'Data'.
16, Fit the supplied ethernet socket (9842) into this hole.
17, Connect the RJ45 ethernet lead (8667) between the socket and PLC.
18, Fit the pre-wired earth terminal on the end of existing bank of earth terminals putting the existing end cover onto the new earth cover.



REV	DESCRIPTION	DATE	BY
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-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-

REVISIONS

Tolerance Unless Stated: See Chart
1 Decimal Place: ± 0.05
2 Decimal Places: ± 0.02

Metallisation
Thermal spray equipment and consumables

Third Angle Projection

ISO 2768 Tolerance Form.ht
ISO 2768 (T2) H

Non-Toleranced Dimensions

0.5.....3	> 3.....6	> 6.....30	> 30....120	>120.....400	>400.....1000+
+/- 0.1	+/- 0.1	+/- 0.2	+/- 0.3	+/- 0.5	+/- 1

Radii, Chamfers

+/- 0.2	+/- 0.3	+/- 0.5	+/- 1	+/- 1	+/- 1

General Angles & Chamfers +/- 1° Inclusive Angles +/- 0.25°
Tolerances on Form & Position to ISO 2768 (T2) H

Unless Stated All Dimensions In Millimetres

DO NOT SCALE : IF IN DOUBT ASK : REMOVE ALL BURRS & SHARP EDGES

NOTES:
All wires are 0.5mm unless otherwise stated.
The RED items & wires are already in the energizer.
The GREEN numbered wires are fitted into existing terminals in the energizer.

TITLE	(16) Series Energizer Data Kit Wiring and Fitting Instructions		
DRAWING NUMBER	EN 430	REV	-
DRAWN BY	S.Skidmore.	DATE	16/12/2015
CHECKED BY	A.Liffen.	DATE	16/12/2015

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