

Eurotec Finishing Systems Limited

Unit 4 Lockflight Buildings, Wheatlea Industrial Estate,
Wigan WN3 6XR

Phone: 01942 829 111 Fax: 01942 820 491

<http://www.eurotecfinishing.com> e-mail : enquiries@eurotecfinishing.com

300 SERIES SPRAY GUNS & 300 SERIES CONTROL UNIT

INSTRUCTION MANUAL

DOCUMENT:	300 Guns & 300 GCU - Manual
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CAUTION

This equipment can be dangerous unless it is used in accordance with the rules laid down in this manual.

Read this manual completely before installing and operating the equipment.

Ensure all safety instructions and procedures are correctly followed and that all operators are fully trained.

IMPORTANT: *All other manuals relevant to components and equipment of the installation must be followed.*

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EC Declaration Of Conformity

We, Eurotec Finishing Systems Limited declare that the following product:

Description: i) Powder Coating Gun Control Unit
ii) Manual Powder Coating Spray Gun
iii) Automatic Powder Coating Spray Gun

Model: i) GCU85
ii) MG300
iii) AG300

Use: Electrostatic Powder Coating Gun Control Unit to be used in conjunction with the powder coating spray guns MG300-Manual type or AG300-Automatic type.

was manufactured by ourselves and conforms with the following standard (s) and / or other normative document (s):

EC Machinery Directive 89/392/EEC
EC Low Voltage Directive 73/23/EEC
EC Directive of Electromagnetic Compatibility 89/336/EEC
Electrostatic Painting and Finishing Equipment Using Flammable Materials
EN50 050:1986 and EN50 053:Part 2:1989

Signed on behalf of Eurotec Finishing Systems Ltd. By



Mr. D.H. Campbell
Technical Director

Eurotec Finishing Systems Limited
Unit 4 Lockflight Buildings, Wheatlea Industrial Estate, Wigan, WN3 6XR
Tel: 01942 829111 Fax: 01942 820491
V.A.T. Reg. No. 535 0123 87
Company No. 3008563 Registered In England

300 SERIES SPRAY GUNS & 300 SERIES CONTROL UNIT

TOTAL ENERGY CONTROL (TEC)

The 300 series powder coating spray guns utilise the "Total Energy Control" system developed by Eurotec. Once the maximum energy level has been set the "Total Energy Control" system automatically adjusts both the current and voltage enabling the operator to gain optimum spraying results. Defects caused by back ionisation and the faraday cage effect etc. are minimised.

SPRAY GUNS

MANUAL	Type MG 300	AUTOMATIC	Type AG 300
SPRAY GUN	Part No. 3016002	SPRAY GUN	Part No. 3021002

The Eurotec MG 300 and AG 300 spray guns are built to a robust and compact design with a high efficiency corona used to charge the powder coating material.

Both guns incorporate a high voltage multiplier charging system which converts the governed low voltage power supply received from Eurotec's 300 Series Gun Control Unit to a maximum 85 kV and 50 uA at the single point corona needle.

The gun nozzle is supplied with a variety of powder deflectors and a slotted cap which, combined with a forward air supply to the nozzle, enable the operator to control the spray pattern to suit the components being sprayed. A variety of nozzle adapters are available separately including extended nozzles and a cup gun.

Both guns are manufactured with a minimum number of components and feature several mouldings offering greater reliability and ease of servicing. To this end the gun services may be disconnected within seconds.

The power connection to the gun is via a screened highly flexible cable.

The MG 300 Manual Powder Coating Spray Gun has been ergonomically designed to be well balanced, light weight and comfortable with a contoured grip.

The AG 300 Automatic Powder Coating Spray Gun may be mounted on a swivelling clamp at the end of a support arm allowing the maximum flexibility of gun position and angle with respect to the workpiece. The gun and support bar may be carried on gun manipulators such as a Reciprocator or a Swinger TM, or mounted on a fixed gun stand.

GUN CONTROL UNIT

Type GCU85, Part No. 2020002

The Gun Control Unit provides all the control functions necessary to spray and charge powder using the Eurotec 300 Series of manual and automatic powder coating spray guns.

It contains the control P.C.B. which provides a governed low voltage d.c. power supply to the spray gun. The operator may set the spray gun output in the range 0 to 50 uA's and 0 to 85 kV's using the control unit.

A selector switch enables the operator to monitor the electrostatic charge supplied to the gun either in terms of the voltage or current. When used with manual guns the electrostatics may be turned on and the meter used to set the voltage level without spraying or charging powder. The electrostatic output may be turned off to enable powder emissions to be set without charging the powder.

A manually operated pneumatic valve is mounted on the front panel for turning an air output on and off. When this unit is mounted on a C85H Manual Unit, this air supply is used to fluidise the powder in the fluid bed independently of the gun trigger. When used on a C85D Manual Unit, it is used to turn the fluidising pad of the suction tube and the forward air to the gun on and off in conjunction with the gun

trigger. If this unit is mounted in multiples on a control console and the fluid bed or beds are controlled from the System Control Module, then this air supply can be used for other functions. For example, it may be linked into the Dilution Air supply line outside the rear panel and used to purge the powder supply hose from the venturi to the gun, removing loose powder.

The unit has 3 regulated pneumatic outlets, the pressure regulators and gauges being mounted on the front panel. Two of these supply air to the venturi powder air and dilution air ports for pumping and controlling the supply of powder fed to the gun. The third may be used to supply air to a spray gun; fluid bed or vibrator of a powder box platform depending upon how the unit is used. An additional non-regulated air outlet is provided which may be used for auxiliary equipment such as air blow down guns.

The mains electrical supply to the unit is provided via. a sealed connector.

A non-switched electrical outlet is provided to enable the electrical supply to be linked through to other units, for example when situated in an automatic system console.

All circuit protection is by means of miniature circuit breakers except for PCB short circuit protection which uses self resetting thermal fuses.

LED indicators on the front panel show whether the mains and the electrostatics are switched on.

The unit is mounted by means of 2 x M6 screws in each side.

SPECIFICATION

There are 3 variants of gun control unit:

1. **GCU-85A** used with automatic systems.
2. **GCU-85D** used with manual boxfeed units.
3. **GCU-85H** used with manual fluidbed units.

Electrical Data

Input Voltage	100-130 / 200-260 Volts 50 / 60 Hz single phase
Power Consumption (full load)	35 VA
Input Current (max.)	400 mA at 115 V 200 mA at 230 V
Electrostatic output voltage (max.)	10 - 85 kV negative.
Electrostatic output current	0- 50 uA

Electrical Controls

Mains Switch-Front Panel	Rotary 2 position-	OFF/ON(A green LED indicates when the switch is on).
Electrostatic Switch-Front Panel	Rotary 3 position-	Electrostatics OFF/Monitor uA/Monitor kV. (A yellow LED indicates when the electrostatics are switched on).
Charge Control-Front Panel	Rotary potentiometer-	sets the maximum level of charge.
Electrostatic Meter-Front Panel	Dual scale-	0 to 50 μ A / 0 to 100 kV
Mains Voltage Selector Switch-Rear Panel	Slide 2 position-	100 to 130 / 200 to 260 volts

Auto-Manual Switch- Rear Panel

Slide 2 position:-	<i>Auto position</i> -	Unit triggers automatically when mains switch is turned on.
	<i>Manual position</i> -	Unit is triggered by micro-switch in Hand Gun or other remote triggering device.

Mains Input Via connector on rear panel.

Mains Output Socket Non switched 6A max.- may be used to connect additional control units.

Trigger Switch- Remote Microswitch in hand gun- connected through plug and socket on rear of control unit.

Circuit Protection

Miniature circuit breakers:-	<i>Mains output</i>	- 6A
	<i>Mains transformer primary</i>	- 0.6A at 115V
		- 0.3A at 230V
	<i>Mains transformer secondary</i>	- 2A at 24V
Fuses:-	<i>PCB short circuit protection</i>	- 0.75A Self Resetting, Thermal
		- 2.50A Self Resetting, Thermal

Pneumatic Data

Input air pressure	7.0 bar (100 p.s.i.) max.
Input air conditioning	Oil free to 0.1 p.p.m. and dry to 1.3 g/cubic Nm.
Air consumption	C85H 10.0 cubic m/h. (6.0 c.f.m.)
(Nominal)	C85D 15.0 cubic m/h. (9.0 c.f.m.)
	GCU85A 10.0 cubic m/h. (6.0 c.f.m.)
Input Connection	1/4" BSP parallel thread for connection of 8.0 mm (5/16") OD tubing.

Pneumatic Controls

Incoming solenoid valve - Internal

Normally closed - opens upon triggering of unit. (See electrical controls Auto / Manual Switch). Controls air supply to 'powder' and 'dilution' pressure regulators as well as 'forward air' to the gun. Also controls air supply to the vibrator and fluidising pad of C85D Manual Units.

Switched Auxiliary

Manual rotary actuator on front panel of control unit enables fluidised powder hopper to be turned off when not in use on C85H units, the fluidising pad and 'forward air' to be turned off on C85D units and operation of an air purge for powder hoses on GCU85A automatic units.

Pressure regulators and gauges

These control the air supply pressure to the following :-

- Powder delivery 4 bar (60 psi) **venturi jet**; controls delivery of powder from the venturi to the gun.
- Dilution ratio 2 bar (30 psi) **venturi dilution**; controls mixture ratio of powder to air from venturi to gun.
- Gun, Fluid Bed, 4 bar (60 psi) **a) air supply to gun** on automatic units.
Vibrator **b) fluidisation in powder hopper** on C85H manual units.
c) vibration frequency of powder box platform on C85D manual units.

Auxiliary output

Maintained unregulated output for connection of ancillary equipment, eg. an air clean down gun. Connection 1/4" BSP female parallel thread. Supplied with blanking plug fitted.

Weights & Dimensions

Gun Control Unit GCU85

Nett Weight:-	8.0 kg
Nett Dimensions:-	360 mm x 360 mm x 120 mm
Packed Weight:-	8.8. kg
Packed Dimensions:-	510 mm x 400 mm x 160 mm
Total Packed Volume:-	0.0326 cubic metres

Manual Gun MG 300 -	Weight:-	0.58 kg
	Dimensions:-	350 mm x 200 mm x 45 mm
Automatic Gun AG 300 -	Weight:-	0.48 kg
	Dimensions:-	355 mm x 72 mm x 45 mm

ASSEMBLY INSTRUCTIONS

WARNING: THIS EQUIPMENT MUST BE EARTHED

NOTE:- Electrical and pneumatic circuit diagrams are given at the rear of this manual.

1. Carefully remove units and components from packaging, and check contents against packing list.
2. Determine whether the equipment is manual or automatic by simply checking the model number on the rear of the unit and comparing it with the *table below*.
The operational function of the left hand pressure regulator and the auxiliary air switch on each Gun Control Unit are different.

- a) **GCU 85H** is for use with a manual gun and piped for use on a fluid bed.
- b) **GCU 85D** is for use with an manual gun and is piped for use on a boxfeed unit.
- c) **GCU 85A** is for use with an automatic gun and is piped accordingly.

See pneumatic specification and diagrams for control functions.

NOTE:- In certain circumstances manual guns may be used with an automatic GCU if, for example, a shared fluid bed is being used.

3. Mount the Gun Control Unit in a secure manner and positioned at least 0.5m away from any spray booth opening.
4. Connect the airlines to the outlet ports of the rear panel of the Gun Control Unit as follows:- (Refer to the rear panel illustration and key to symbols).
 - a) RED airline from Venturi Jet to the 'Powder Delivery Air Supply Output'.
 - b) BLUE airline from Venturi Dilution Port to the 'Powder Dilution Air Supply Output'.
 - c) Automatic units connect the BLACK airline from the Automatic Gun to the 'Gun, Fluid Bed or Vibrator Air Supply Output'.

Fluid Bed and Box Feed units connect the CLEAR air line from the fluid bed or vibrator to the 'Gun, Fluid Bed or Vibrator Air Supply Output'.

Fluid Bed units connect the BLACK airline from the Manual Gun to the 'Switched Auxiliary Air Outlet'

Box Feed units connect the BLACK airlines from the Manual Gun and the Fluidising Pad to the 'Y' connector of the 'Switched Auxiliary Air Outlet'

NOTE:- The Venturi Jet is identified by a Red washer & the Dilution Port by a Blue washer.

5. Release the dust cover from the 'Gun Supply and Trigger' connector on the rear panel. Plug in and secure the gun cable with the latch provided.
6. Set the 'Auto / Manual Selector' to the correct position i.e. 'Auto' for an automatic gun and 'Manual' for a manual gun.
7. Connect a suitable airline to the main incoming air fitting, 'Mains Air Supply In'. The connection is 1/4" B.S.P. male parallel.
8. Prior to connecting the mains electrical socket into the plug on the rear panel of the Control Unit (Mains Electrical Input Plug) ensure that the voltage selection switch is set to the relevant position. i.e. 100-130V, 50-60Hz or 200-260V, 50-60 Hz.

NOTE:- The units are supplied set to 200 - 260 V.

IMPORTANT

When fitting a suitable plug to the mains lead, it is essential that it contains an earthing / grounding contact and that this is connected.

*Under no circumstances should this equipment be connected to a mains supply which does not include an earthing / grounding wire and contacts. e.g.. 2 -Wire extension leads as used for some domestic equipment **MUST NOT BE USED.***

NOTE:- The colour coding for mains wires are:-

		U.K.	U.S.A.
Live	<i>L</i>	Brown	Black
Neutral	<i>N</i>	Blue	White
Earth / Ground	<i>E</i>	Green / Yellow	Green

NOTE:- The terminals used in the mains connectors on the rear panel of the unit are:-

Live	Pin 1
Neutral	Pin 3
Earth / Ground	Pin E

For United Kingdom Installations

If the colours of the mains lead of this appliance do not correspond with the coloured markings identifying the terminals in your plug, proceed as follows:-

The GREEN and YELLOW wire must be connected to the terminal in the plug which is marked with the letter "E" or by the earth symbol, or coloured green or green/yellow.

The BLUE wire must be connected to the terminal which is marked with the letter "N" or coloured black.

The BROWN wire must be connected to the terminal which is marked with the letter "L" or coloured red.

NOTE:- The method of disconnection from the mains electrical supply shall be by removal of the plug on the mains lead from its respective supply socket.

NOTE:- If the system is intended to be permanently connected to mains wiring then the switch used to disconnect the unit from the supply voltage must disconnect all poles and have a contact separation of at least 3mm.

The unit is now ready for use

SET UP PROCEDURE

Ensure that the unit has been correctly assembled.

NOTE:- Full electrical and pneumatic circuit diagrams are given at the rear of this manual.

1. Determine whether the Gun Control Unit is built for use with:-
 - a) A Fluid Bed and Manual Gun
 - b) A Vibrating Box Platform and Manual Gun
 - c) An Automatic Gun

The operational function of the left hand pressure regulator and the auxiliary air switch are different on each unit. Refer to the name plate on the rear of the unit:-

- a) Will be marked GCU 85H
- b) Will be marked GCU 85D
- c) Will be marked GCU 85A

NOTE:- See pneumatic specification for control functions.

2. Ensure that all switches are in the OFF position and that all pressure regulators are closed (The knobs should be turned fully anticlockwise). The knobs of the pressure regulators are released by pulling upwards and locked by pressing inwards.
3. If a fluidised bed is being used, this should be fully fluidised prior to spraying.
4. With the spray gun pointing into an extracted spray booth, turn on the mains electrical switch. The green LED above the switch will illuminate.
When used with automatic spray guns (with the 'auto/manual' switch set to 'auto') the mains electrical switch will also trigger the electrostatic generator and air supplies. Then for automatic spray guns open the left hand regulator to approx. 5 psi to supply air to the gun nozzle.

For a manual gun, operate the gun trigger to energise the electrostatic generator and air supplies. For C85D Box Feed units, turn the 'Switched Auxiliary Air Supply' to the 'on' position to supply air to the gun and fluidising pad of the powder suction tube. Open the flow regulator on the left hand side of the gun handle to supply air to the gun nozzle.

Open the centre regulator (dilution air) to approximately 5-10 psi. and then open the right hand regulator (powder) to give the required powder output. It is good practice always to operate the "Powder" regulator last in order to avoid any powder contamination of air lines.

5. Having set the volume of powder required from the gun, there may be a tendency for the powder flow to surge unduly, this can normally be eliminated by adjusting the dilution air pressure.
6. With the charge control potentiometer turned anti-clockwise, turn the electrostatic switch to the position marked kV. The yellow LED above the charge control potentiometer will illuminate dimly, and the electrostatic meter will indicate approximately 22kV. Slowly turn the charge potentiometer clockwise and the brightness of the yellow LED will increase and the pointer of the electrostatic meter will rise to approximately 85kV when the potentiometer is fully clockwise.

With the gun pointing into an extracted spray booth, trigger the unit and slowly move the nozzle of the gun close to an earth point or the product. As the nozzle moves closer than approximately 280mm it will be seen that the kV level indicated on the meter will reduce progressively as the nozzle is moved closer to earth.

Repeat this procedure with the electrostatic switch set to the uA position and it will be seen that as the nozzle moves to within approximately 280mm from earth, the current will rise progressively to approximately 50uA. As the nozzle continues to be moved closer, the current then falls progressively.

NOTE:- Refer to the graph showing the typical electrostatic discharge characteristics with respect to the distance from earth.

NOTE:- The discharge current and voltage will be dependent on the proximity of the spray gun discharge needle to earth. When setting the maximum discharge voltage, the spray gun discharge needle should be placed at least 300 mm from earth.

GENERAL NOTE

An approved mask must always be worn when spraying.

GENERAL OBSERVATIONS

It is essential that all substrates and jigs are clean and that there is a good earth/ground to the workpiece to ensure maximum powder attraction.

Powder spraying is best performed by slow motions of the spray gun as opposed to the faster gun movements often associated with liquid paint spraying.

Higher powder emissions do not necessarily mean faster coating or better penetration into corners and recesses. In practice it can often cause the opposite effect and produce products with a poor finish.

Similarly, high electrostatic discharge currents or voltages do not necessarily mean faster or more efficient coating. Again, in practice, they can cause the opposite effect and produce products with a poor finish.

INSTALLATION AND OPERATING INSTRUCTIONS

IMPORTANT:- Refer to all corresponding instruction manuals for the spray unit and control unit for information relating to operating parameters.

1. This equipment can be dangerous unless it is used in accordance with the rules laid down in this manual.
2. Ensure that the equipment is properly earthed/grounded. Refer to assembly instructions. (7).
3. The electrical supply to the gun's electrostatic generator and the control unit must be interlocked with the spray booth extraction system such that spraying cannot be carried out unless the exhaust ventilation system is in operation. The efficiency of the exhaust ventilation system should be checked regularly.
4. All conductive structures within the vicinity of the spray area shall be bonded together with the earth terminal of the high voltage generator to the protective earth of the system electrical supply.
5. The equipment operates by electrostatically charging the powder by means of a high voltage corona discharge at the nozzle of the spray gun. This electrostatic discharge can seriously damage other electronic equipment if it is sited in close proximity and not suitably protected.
6. It is essential that all jigs and work pieces are adequately earthed. The workpiece shall have a resistance to earth of no greater than 1 Mohm. This should be checked regularly. If the earthing is not adequate, this can result in:-
 - a) Poor coating.
 - b) Sparks between the product and jigs, which can constitute an ignition or explosion hazard.
 - c) Radio and TV interference from sparks between the product and jigs. This interference may also affect computer systems and process controllers.
7. Ensure the air supply is clean and dry.

NOTE:- Refer to pneumatic specifications.

DO's And DON'TS

DO's

1. Ensure that the equipment is operated by trained personnel only.
2. Ensure that the equipment is serviced regularly by qualified personnel. All repairs and maintenance shall be carried out by qualified personnel only, in accordance with the manufacturers instructions (failure to observe may result in the invalidation of any warranty on the equipment).
Repairs must be carried out at the instigation of the operator when faults or defects are detected. Repairs must not be performed in hazardous areas and must not compromise safety standards.
3. Ensure that the operator is correctly earthed. If overalls are worn, they should be anti-static or non-insulating. If gloves are worn, they should be anti-static or non-insulating. If this is not possible, gloves with the palms removed may be used. Footwear intended for use by operators shall be anti-static or non-insulating and shall comply with the requirements of ISO 2251 / BS 5451 or equivalent. Shoes with leather soles are usually adequate.
4. Ensure that the operator wears suitable respiratory equipment and or protective clothing. All personnel working in a powder-laden atmosphere should wear similar equipment.
5. Ensure that the operator wears suitable eye protection e.g. goggles or visor (in addition to a respiratory mask) when using a compressed air clean down gun as particles in the airstream can damage eyes.
6. Avoid skin contact with powders where possible as some powders may cause skin irritation.
7. Wash hands and face after work and prior to eating or drinking.
8. Keep floors and equipment within 5 metres of the spray area clean using a suitable industrial vacuum cleaner.
9. Keep light fittings and all other electrical equipment clean.
10. Regularly check the effectiveness of dust/powder extraction filters and that recycled air is clean.
11. Regularly check the earthing of electrical equipment and manually operated spray guns.
12. Regularly check the earth bonding of all conductive electrical enclosures and all conductive structures such as floors, walls, ceilings, fences, conveyors, powder containers etc. within the vicinity of the spray area. These shall be bonded together with the earth terminal of the high voltage generator to the protective earth system of the electrical supply. Electrostatic grounding should comply with EN 50053.
13. Ensure that all jigs and work pieces are adequately earthed. Each workpiece shall have a resistance to earth of not greater than 1 Mohm. This resistance shall be checked regularly.
14. Ensure that correct cleaning procedures are followed. See "Shut down and cleaning procedures".
15. Ensure that powders are processed in compliance with the powder manufacturers instructions. Special care should be taken with powders containing metallic pigments.

NOTE:- The workplace must be kept tidy and well organised to reduce the risk of accidents. Good illumination, protection from any damp environment and correct storage of materials will assist the operator to maintain concentration and an awareness of potential hazards.

NOTE:- Before starting to clean the spray gun or carrying out any other work in the spraying area, the high voltage supply shall be switched off in such a manner that it cannot be re-energised by operating the trigger of the spray gun.

DON'TS

1. The operator must not wear insulating gloves, clothing or footwear.
2. Do not smoke in areas where powder coating is being carried out or in areas where powder is stored.
3. Do not eat or drink in areas where powder coating is being carried out or in dust-laden atmospheres.
4. Do not spray into areas which are not properly extracted. The direction of airflow should always be from behind the operator. It is recommended that airflow velocities over the face area of a booth opening should be in excess of 0.5 metres/sec.
5. Do not use compressed air for cleaning skin and clothing as it can penetrate the skin causing embolisms. Use a suitable industrial vacuum cleaner for clothing and wash skin with water.
6. Do not point compressed air clean down guns towards body orifices such as mouth, ears etc.
7. Do not enter spray booths when in operation.
8. Do not operate fluidised beds without connecting a suitable vent hose from its lid to an extracted area such as a spray booth.

CHANGING COLOUR

In order to prevent contamination of the product from a previous colour, it is essential to remove all traces of the previously sprayed powder from the application equipment. i.e.. Powder container, suction tubes, Venturies, Powder hoses and Spray guns. Also any other surfaces where powder may become dislodged and cause contamination of the product or new powder. If the powder is to be reclaimed, then the spray booth, ductwork and recovery equipment must also be thoroughly cleaned.

IMPORTANT *WHENEVER COMPRESSED AIR IS USED FOR CLEANING EQUIPMENT. THIS OPERATION MUST BE CARRIED OUT IN AN EXTRACTED SPRAYBOOTH.*

1. Turn the mains switch OFF, discharge the gun by touching the corona needle to a good earth and disconnect the mains supply.
2. Unclip the venturi from the base plate.
3. Remove the powder hose and airlines from the venturi.
4. Remove the venturi seal from the suction tube and lift the suction tube out of the venturi mounting bracket. Wipe the venturi seal clean and put in a safe place. Wipe clean any excess powder from the venturi mounting bracket.
5. Using clean, dry compressed air from a blow gun, blow through the suction tube and wipe clean the outside.
6. Remove the powder box or clean the fluid bed.
7. Remove the powder tail fitting complete with the PTFE insert from the venturi body and blow them clean.
8. Blow through the venturi body and clean the outside then refit the hose tail and insert. **ALWAYS CHECK THE CONDITION OF THE PTFE INSERT FOR SIGNS OF EXCESSIVE WEAR AND REPLACE AS NECESSARY.**
9. Remove the powder hose from the gun and purge the inside of the hose with compressed air.
10. Remove the nozzle from the gun and clean internally and externally with compressed air. Clean the gun in the same way.
11. Refit the nozzle and powder hose to the gun.
12. Replace the suction tube up through the venturi mounting spigot and stretch the venturi seal over the top end of the suction tube such that it locates into the groove and forms a cupped shape.

13. Re-connect the powder hose to the venturi, and the airlines i.e. red airline to fitting with red washer and blue airline to fitting with blue washer, then clip the venturi back on to the base plate.
14. Clean off any excess powder or contamination from base plate and frame.

FAULT FINDING

UNIT WILL NOT OPERATE (No LED's will illuminate)	Check that mains connector is fitted to rear panel of control unit.
	Check that unit is connected to a suitable mains electrical supply and is switched on. (The electrical supply should be interlocked with the booth extraction system.)
	Check that miniature circuit breaker (automatic fuses) on the rear panel of the control unit have not been tripped. If one or more has, then press to reset. If it trips again, switch off unit and refer to an authorised distributor or service agent.
UNIT WILL NOT OPERATE (LED's will illuminate)	Check the gun power and trigger connection on the rear panel of the control unit.
	Check that the trigger switch in the gun is operating. Depress the trigger and an audible click should be heard if the trigger switch is operating.
	Check that the voltage selector switch is set to the required voltage. The unit is supplied pre-set to 200-260 volts. If the supply voltage is between 100v and 130v reset the selector switch on the rear panel to 100-130v.
NO POWDER DELIVERY	Check air supply to unit.
	Check that the powder container is not empty.
	Check that the powder in the powder container has no rat holes or voids around the suction or induction point - increase fluidisation/vibration or agitate powder cup.
	Check for kinked or blocked powder hose.
	Check for blockage in suction tube, venturi body and gun.
	Check that the internal solenoid valve is operating by depressing gun trigger when an audible click should be heard. If it is not, check the gun power and trigger connection on the rear panel of the control unit.
POWDER DELIVERY INTERMITTENT OR SURGING	Check ratio of dilution air to powder air and adjust if necessary.
	Check for any kinks or partial blockages in the powder hose, venturi suction tube and body, or gun.
	Check that the venturi body is seating firmly against the sealing disc at the top of the suction tube.
	Check condition of PTFE insert in venturi for signs of wear- replace as necessary.
	Check that there is sufficient powder in the box.
	Check that the induction holes of the suction tube are immersed in the powder.
POWDER DOES NOT ADHERE TO WORKPIECE	Check that electrostatic switch is set to either the uA or kV positions. The yellow LED should be illuminated.
	Check the setting of the charge control potentiometer and that an electrostatic charge is present at the discharge electrode needle of the gun. If no charge (or very poor charge) is present, then check that the power/trigger cable between the control unit and the gun is fully connected and undamaged.
	Check that the workpiece is properly earthed/grounded.

WARNING Do NOT set the voltage selector switch to 100-130v if a higher supply voltage is being applied as damage may result.

DEFECTS ON FINISHED PRODUCT

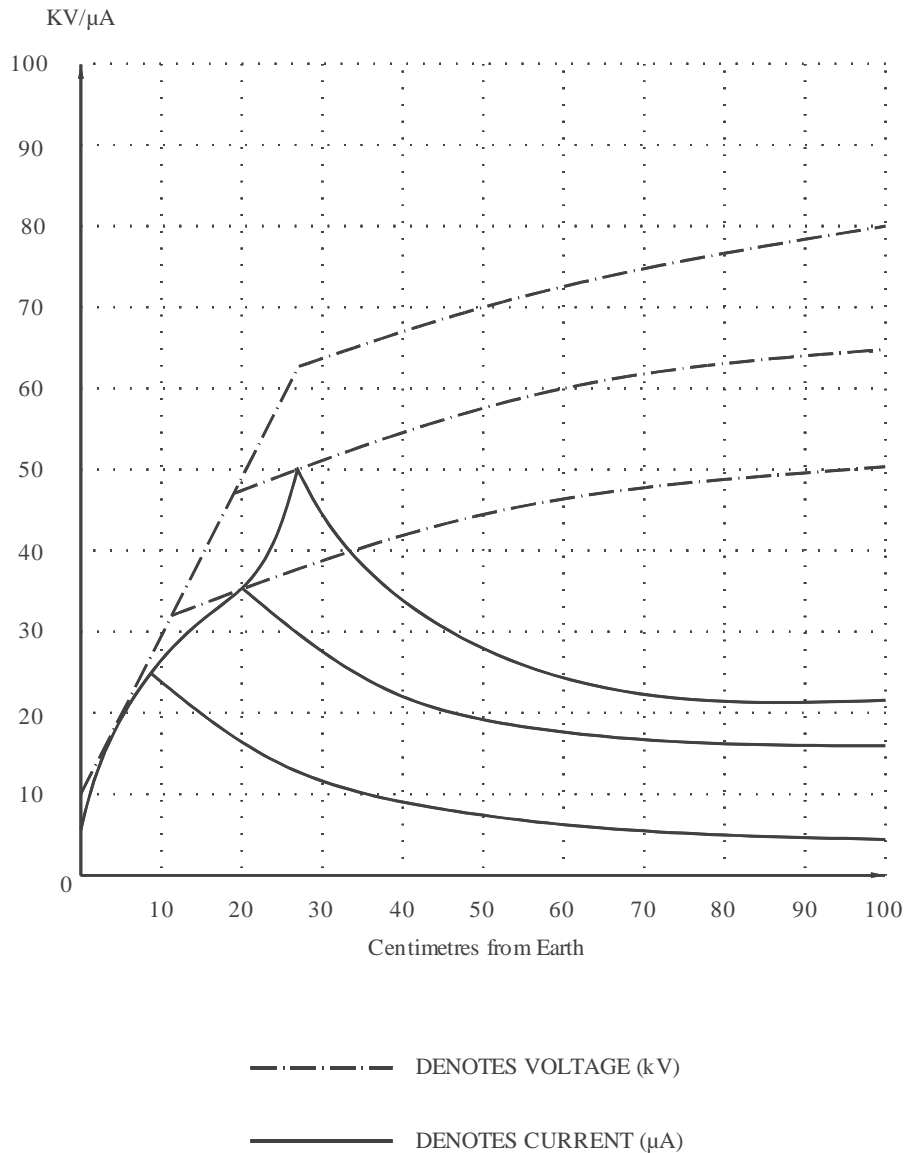
CONTAMINATION OF SURFACE WITH SPECKS OF OTHER COLOURS	Application equipment inadequately cleaned after using previous powder.
	Airborne powder of different type within a contaminated spray booth, or sucked in from dirty surroundings.
	Reclaimed powder contaminated with other powders from within the reclaim system e.g. ductwork, cyclone, booth etc.
	Airborne contamination within the oven.
	Dust or dirt dislodged from jigs or conveyor.
	Dusty environment before or after coating.
LUMPS OR PROTRUSIONS ON SURFACE	Dirty or contaminated powder.
	Dirty or contaminated substrate (workpiece).
	Rusty substrate.
	Dusty environment before or after coating.
	Dust or dirt in oven.
	Dust or dirt dislodged from jigs or conveyor.
HEAVY “ORANGE PEEL”	Applied coating is too thick.
	Incorrect cure cycle and/or temperature.
	Inferior quality or powder.
FISH EYES	Contamination of substrate.
	Contamination of powder.
	Contamination of compressed air supply
CRATERS AND VOIDS	Poor cleaning of substrate e.g. trapped oils or solvents.
	Wet components e.g. water trapped in corners or joints.
	Contamination of powder.
	Contamination of substrate.
PIN-HOLING AND BUBBLES	Porous substrate e.g. expansion or air or solvents from porosity or cavities in castings during curing cycle. Pre-heating of the workpiece may help to overcome this.
	Excessive electrostatic charge applied to the powder. To overcome, reduce the discharge voltage and/or increase the spraying distance.
	Rusty substrate.
	Contamination of substrate, powder, air supply or from dirty surroundings.
	Excessive moisture in compressed air supply. Refer to pneumatic data in specifications.

NOTE:- Contamination may be caused by airborne vapour such as wet paint, airline or conveyor oil or stripping facilities.

NOTE:- Silicones and acrylic paints are the worst offenders and can contaminate the powder and/or substrate.

TOTAL ENERGY CONTROL

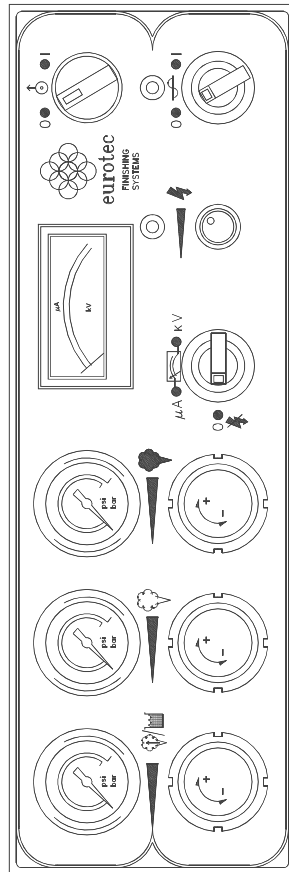
The "Total Energy Control" system developed by Eurotec is used to set the discharge energy of the spray guns corona needle up to a maximum of 85kV and 50 μ A. The maximum current generated is limited to 50 μ A (as with existing current control equipment) but now both the current and voltage are reduced as the gun approaches the product. Rather than controlling just the current or the voltage the operator is now able to control the total energy output from the gun.



In free air, away from the influence of any earthed objects the maximum discharge current will be 20 μ A when the Discharge potential is set to maximum 85 kV. As the gun is moved within one meter of the product the current starts to rise and, in tandem, the control circuit reduces the voltage. This process continues as the gun is moved closer to the product until a point is reached at which the energy is limited by the setting of the control potentiometer. At this point the Total Energy Control system rapidly reduces the energy output from the gun as it further approaches the product.

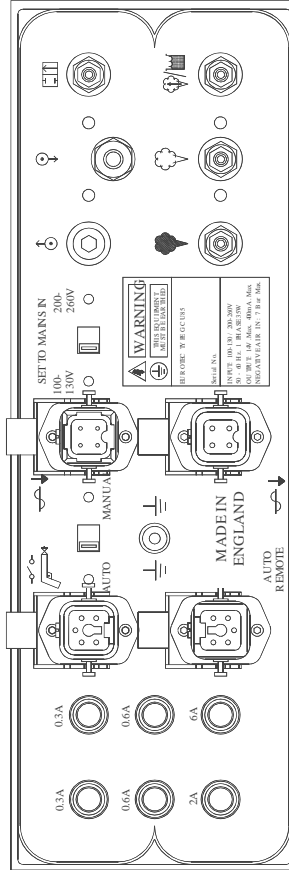
The ability to control the output energy of the gun allows the operator to take the gun right in to corners and recesses and still effectively charge powder at very low electrostatic outputs. High film builds are achieved with superior finishes and no surface disruption, whilst very significant improvements are noted in the ability to re-coat previously coated products.

Eurotec GCU-85 Gun Control Unit Front Panel Symbols Explanation Illustration No. 6000079



- SWITCHED AUXILIARY AIR SUPPLY (FLUIDISED PAD AIR)
- MAINS (ELECTRICAL)
- ELECTROSTATIC
- KILO VOLTS
- SCALE SELECTION
- MICRO AMPS
- ELECTROSTATIC OFF
- POWDER DELIVERY AIR SUPPLY
- POWDER DILUTION AIR SUPPLY
- GUN, FLUID BED OR VIBRATOR AIR SUPPLY

Eurotec GCU-85 Gun Control Unit Rear Panel Symbols Explanation Illustration No. 6000078



- AUXILIARY AIR SUPPLY OUTLET (ARROW POINTS AWAY FROM CONNECTOR)
- MAINS AIR SUPPLY IN (ARROW POINTS TOWARD CONNECTOR)
- MAINS ELECTRICAL INPUT (ARROW POINTS TOWARD SOCKET)
- MAINS ELECTRICAL OUTPUT (ARROW POINTS AWAY FROM SOCKET)
- SUPPLY VOLTAGE SELECTION
- AUTO MANUAL SELECTION
- EARTH CONNECTION POINT
- GUN SUPPLY AND TRIGGER
- REMOTE GUN TRIGGERING
- SWITCHED AUXILIARY AIR OUTPUT
- POWDER DELIVERY AIR SUPPLY OUTLET
- POWDER DILUTION AIR SUPPLY OUTLET
- GUN, FLUID BED OR VIBRATOR AIR SUPPLY OUTLET

APPENDIX (i)

**ASSEMBLY DRAWINGS
AND PARTS LISTS**

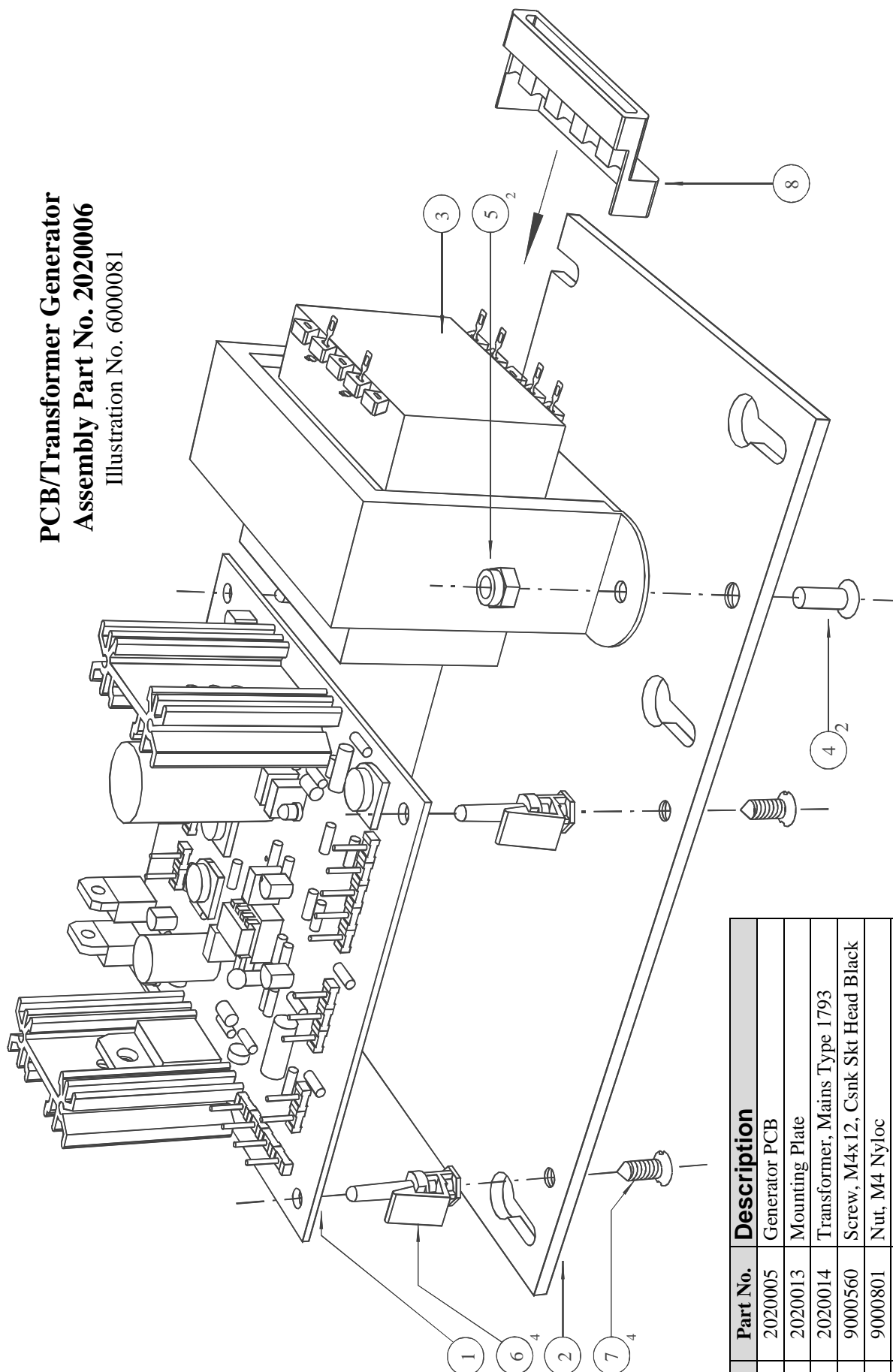
GCU-85D Gun Control Unit General Assembly
PARTS LIST

Item	Part No.	Description	Qty.
1	2000007	Manifold Outlet Block Assy.	1
2	2000026	Pressure Regulator Assy, 2 Bar	1
3	2010006	Manifold Inlet Block Assy.	1
4	2010018	Pressure Regulator Assy, 4 Bar	2
5	9000500	Screw,M3x10, Skt, Cap, Black	12
6	2020006	PCB Transformer Chassis Assy.	1
7	2020007	Cableform, Mains	1
8	2020010	Case, GCU	1
9	2020011	Overlay Panel, Front	1
10	2020012	Overlay Panel, Rear	1
11	9000501	Screw,M3x6, S Stl, Pan Head	4
12	9000551	Screw,M4x8, Skt, Btn Head, Black	4
13	2020015	Meter, Electrostatic, 50uA	1
14	2020017	Trigger Lead Assy.	1
15	2020018	Solenoid Lead Assy.	1
16	2020019	Transformer Lead Assy.	1
17	2020020	Switch Lead Assy.	1
18	2020021	Potentiometer Lead Assy.	1
19	2020022	LED Lead Assy.	1
20	2020023	Pressure Gauge, 0-4 Bar	2
21	2020024	Pressure Gauge, 0-2 Bar	1
22	5000040	Disc, Porous Plastic	3
23	9001202	Switch, Slide, 2 Posn	1
24	9000002	Knob, Collet Black	1
25	9000004	Nut Cover, Black	1
26	9001428	LED Housing	2
27	9000007	Valve, Manual, 3-2 1/8 BSP	1
28	9000008	Cable Tie Base, Self Adhesive	17
29	9000011	Connector Plug, Insert 3 Pin + E	1
30	9000012	Connector Socket, Insert 3 Pin + E	1
31	9000013	Connector Socket, Insert 4 Pin + E	2
32	9000014	Connector, Protective Cover	4
33	9000015	Circuit Breaker, 0.3A	2
34	9000016	Circuit Breaker, 0.6A	2
35	9000017	Circuit Breaker, 2A	1
36	9000018	Circuit Breaker, 6A	1

Continued:-

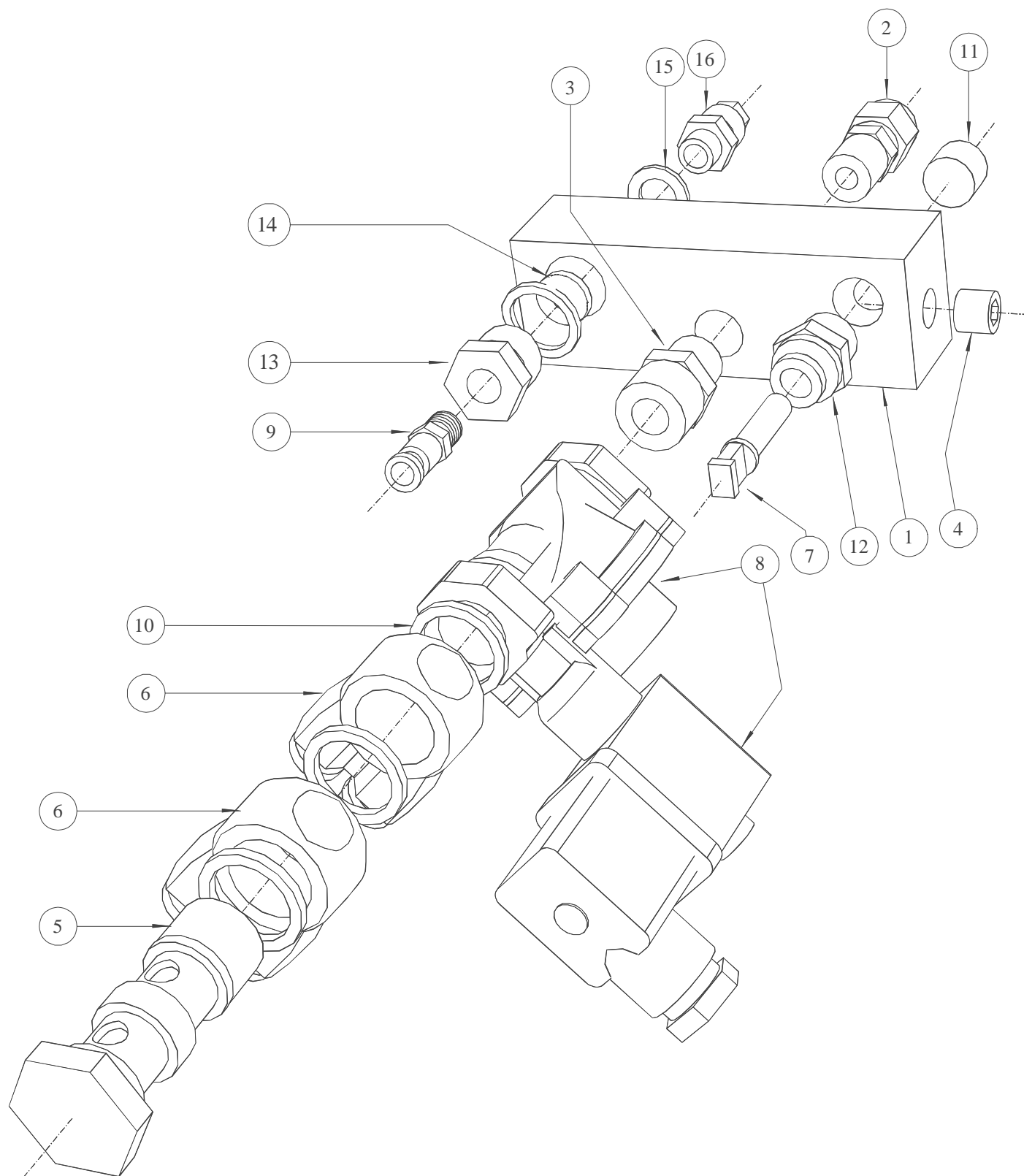
Item	Part No.	Description	Qty.
37	9000019	Boot Circuit Breaker Cover	6
38	9000020	Switch, 2 Posn, Voltage Selector	1
39	9000021	Terminal, Earth Post	1
40	9000022	Cable Tie, 2.5 x 100	26
41	9000041	Tube, Straight, 1/8BSPMT 6mm OD, PI	2
42	9001420	Potentiometer, 10K, Cermet	1
43	9000052	Tube, Straight, 1/8BSPFT 4mm OD, PI	3
44	9000071	O-Ring, BS 009	3
45	9000084	Tubing, 6mm OD x 4mm ID, PU Black	3
46	9000120	Connector Base, Panel Mounting	4
47	9000203	Tubing, 4mm OD x 2.5mm ID, PU Black	0.4
48	2020027	Cover	1
49	9000063	Seal Strip, Foam	12
50			
51			
52	9000862	Washer, M5 Ext. Shakeproof	1
53	9000600	Screw, M5x6, Skt Head, Csnk, Black	8
54	9000650	Screw, M6x12, Skt, Btn Head, Black	2
55	9000800	Nut, M3 Nyloc	12
56	9000801	Nut, M4 Nyloc	6
57	9000832	Washer, M3 Crinkle	4

PCB/Transformer Generator
Assembly Part No. 2020006
 Illustration No. 6000081



Item	Part No.	Description
1.	2020005	Generator PCB
2.	2020013	Mounting Plate
3.	2020014	Transformer, Mains Type 1793
4.	9000560	Screw, M4x12, Csnk Skt Head Black
5.	9000801	Nut, M4 Nyloc
6.	9001156	Pillar, PCB Mounting
7.	9000545	Screw No. 8G x 9, 5Lg, Self Tapping
8.	9001492	Cover Terminals

Manifold Inlet Block Assy **GCU-85, Part No. 2010006** Illustration No. 6000088



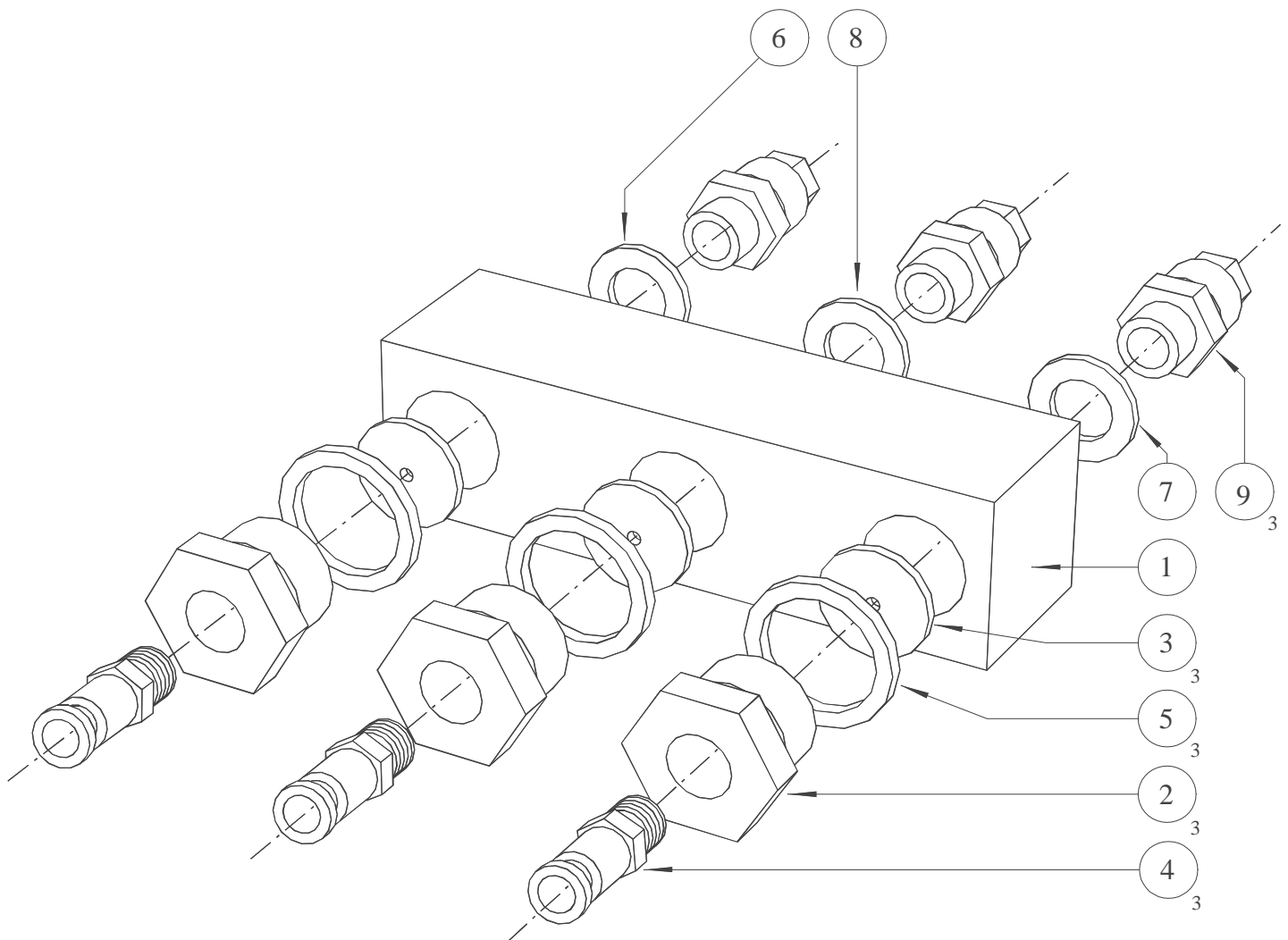
Manifold Inlet Block Assy
PARTS LIST



Item	Part No.	Description
1	2000019	Manifold Inlet Block Detail
2*	9000030	Straight, 1/4BSPMT-8mm OD PI
3	9000032	Straight, 1/4BSPMT 3/8BSPMT
4	9000034	Blank, 1/8BSPMT, Hex. Skt Head
5	9000035	Banjo Bolt, Double 3/8BSP PI
6	9000036	Banjo Body, Double 3/8BSP 2x6mm PI
7	9000037	Blank, 6mm OD PI
8	9000038	Valve, Solenoid, 2-2, 3/8BSP, 24V DC
9	9000041	Straight, 1/8BSPMT 6mm OD Tube PI
10	9000042	Washer, Sealing, 3/8BSP, Nylon
11	9000073	Blank, 1/4BSPMT, Hex. Skt.
12	9000105	Straight, 1/4BSPMT 6mm OD Tube PI
13	2000031	Valve, Non Return
14	2000037	Seal, Non Return Valve
15	9000855	Washer, 1/8BSP Nylon
16	9001405	Straight, 1/8BSPMP-6mm OD Tube Rapid

* For Boxfeed & Hopper GCU's This Item = 9000029 Straight, 1/4BSPMT OD CF

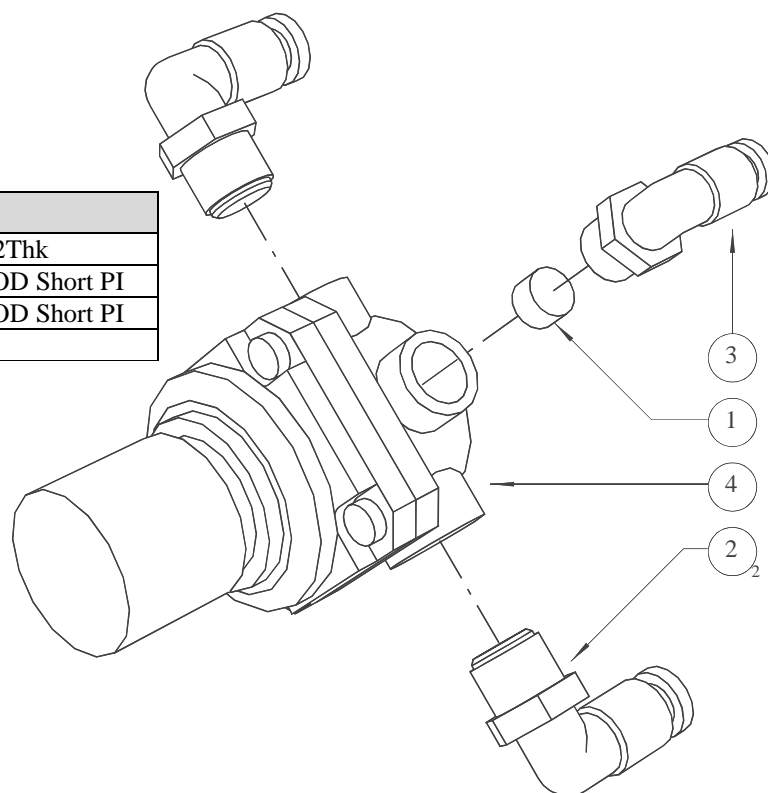
Manifold Outlet Block Assy **GCU-85, Part No. 2000007** Illustration No. 6000089



Item	Part No.	Description
1	2000018	Manifold Outlet Block
2	2000031	Valve, Non Return
3	2000037	Seal, Non Return Valve
4	9000041	Straight, 1/8BSPMT 6mm OD Tube PI
5	9000042	Washer, Sealing, 3/8BSP, Nylon
6	9000852	Washer, 1/8BSP Nylon, White
7	9000854	Washer, 1/8BSP Nylon, Red
8	9000855	Washer, 1/8BSP Nylon, Blue
9	9001405	Straight, 1/8BSPMP-6mm OD Tube Rapid

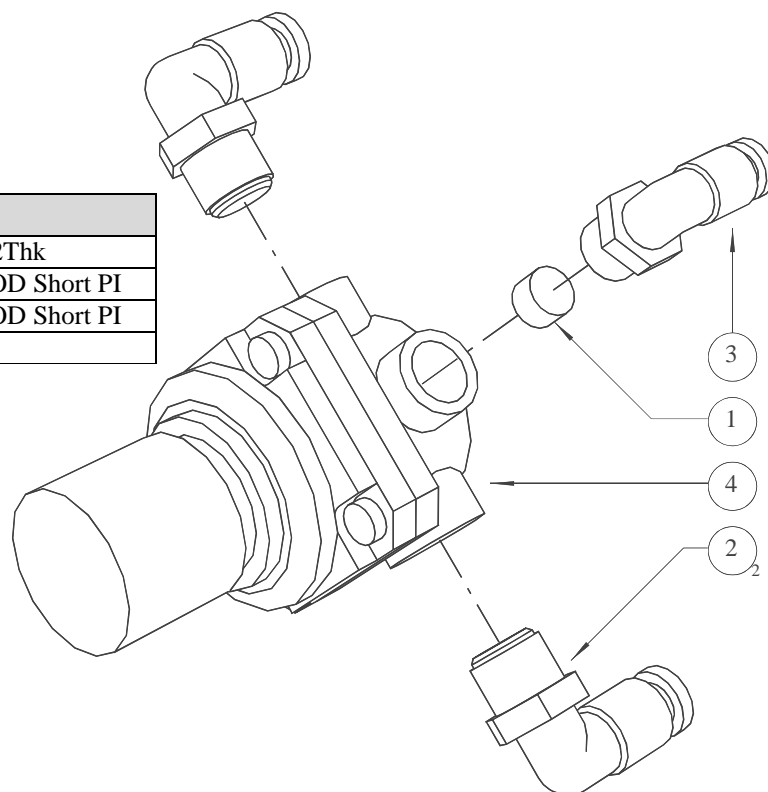
Pressure Regulator Assy 4 Bar
Part No. 2010018
 Illustration No. 6000091

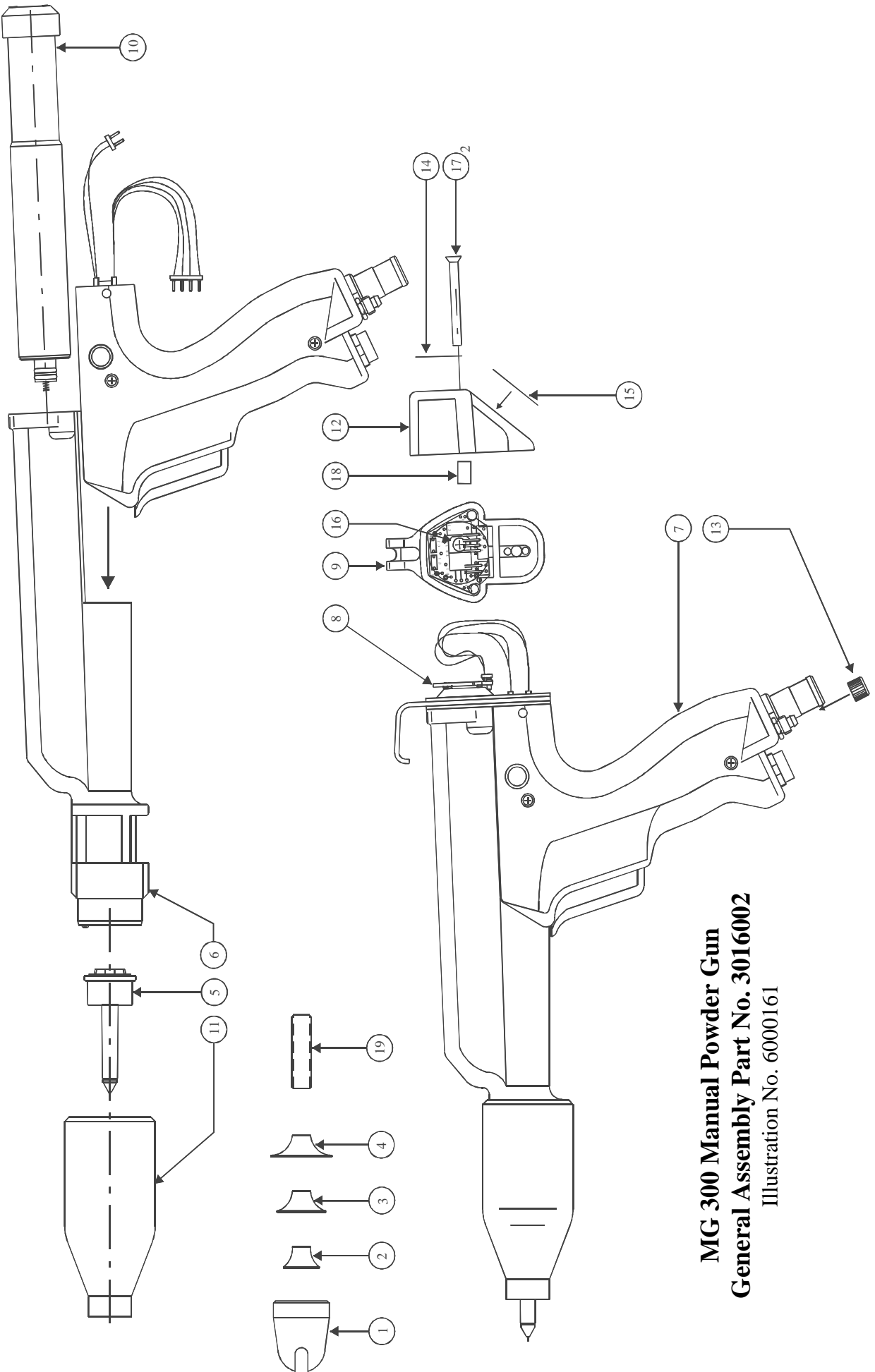
Item	Part No.	Description
1	5000050	Disc Porous Plastic 8 x 3.2Thk
2	9000033	Elbow, 1/4BSPMT 6mm OD Short PI
3	9000062	Elbow, 1/8BSPMT 4mm OD Short PI
4	9000112	Pressure Regulator, 4 Bar



Pressure Regulator Assy 2 Bar
Part No. 2000026
 Illustration No. 6000090

Item	Part No.	Description
1	5000050	Disc Porous Plastic 8 x 3.2Thk
2	9000033	Elbow, 1/4BSPMT 6mm OD Short PI
3	9000062	Elbow, 1/8BSPMT 4mm OD Short PI
4	9000111	Pressure Regulator, 2 Bar



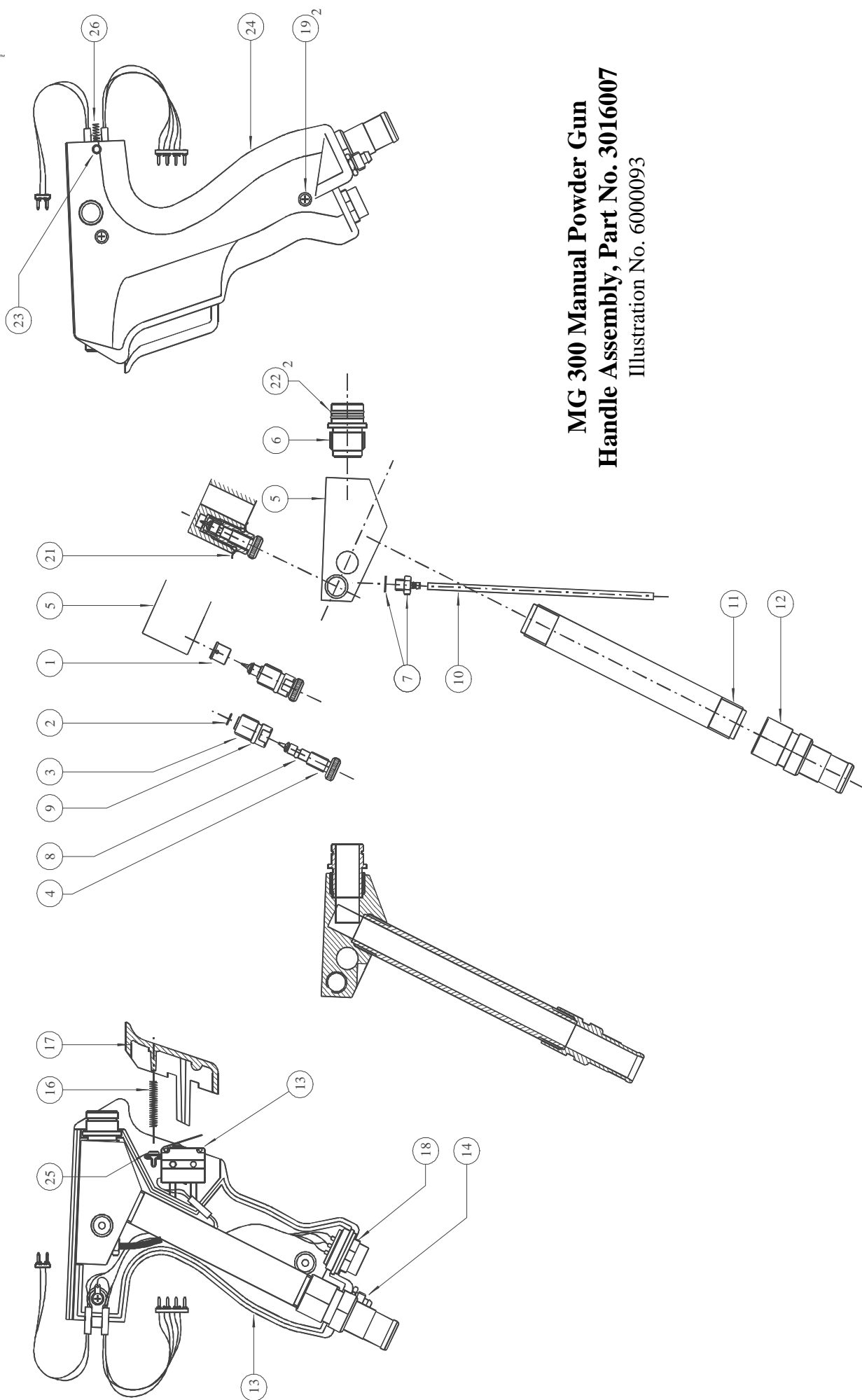


MG 300 Manual Powder Gun
General Assembly Part No. 3016002
 Illustration No. 6000161

MG 300 Manual Powder Gun General Assembly
PARTS LIST



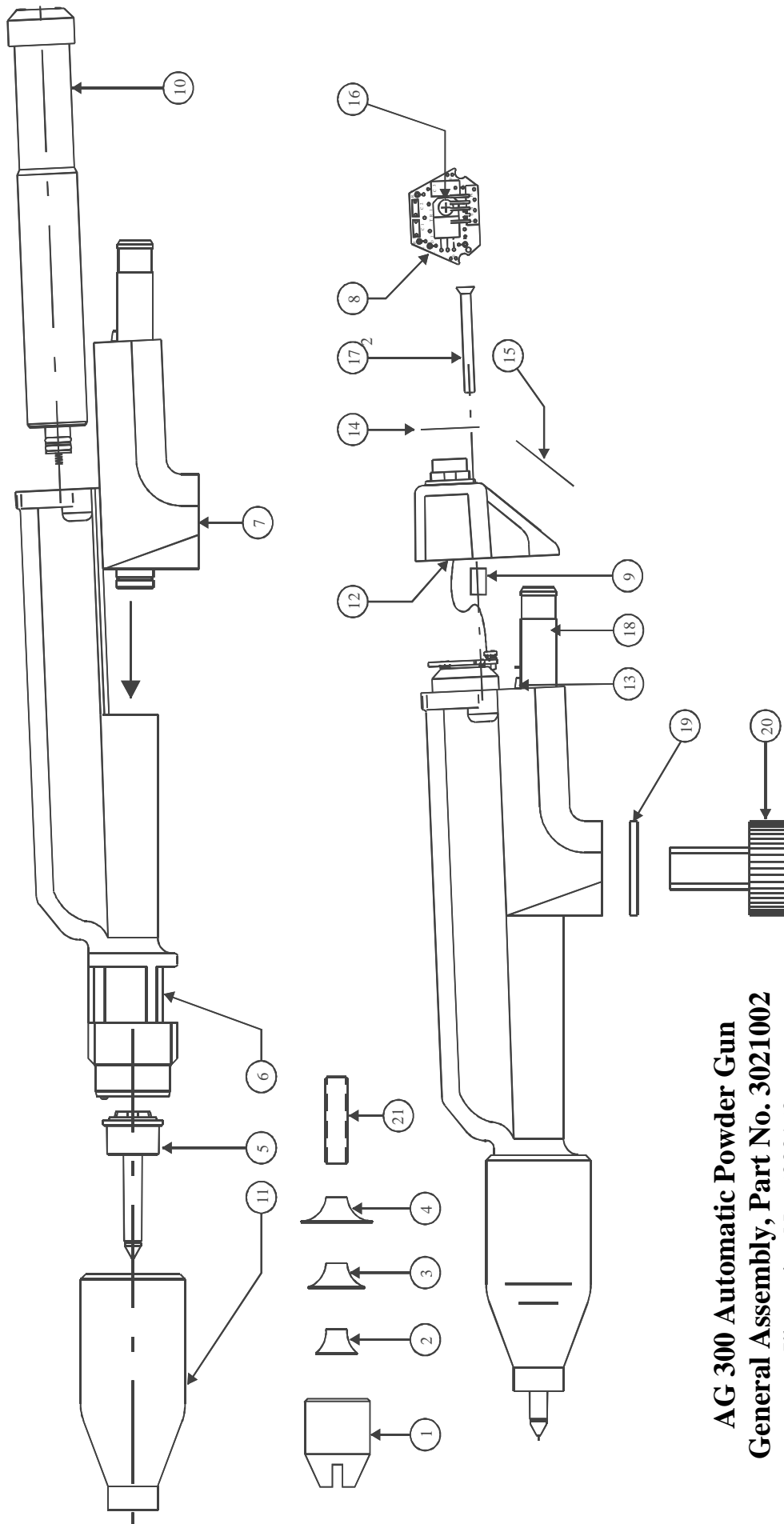
Item	Part No.	Description	Qty.
1	3016187	Slotted Cap Assy	1
2	3015047	Deflector Assy, Small	1
3	3015048	Deflector Assy, Medium	1
4	3015049	Deflector Assy, Large	1
5	3016185	Electrode Assembly	1
6	3016006	Barrel Assembly	1
7	3016007	Handle Assembly	1
8	3016008	Oscillator PCB Assy.	1
9	3016010	Gun Hook Assembly	1
10	3016011	HV Multiplier Assembly	1
11	3016186	Nozzle Nut Assembly	1
12	3016027	Rear Cap	1
13	3016034	Air Connector Nut	1
14	3016042	Label, Type	1
15	3016083	Label, Rating	1
16	9000512	Screw, M3 x 8, Pozi Pan Head	1
17	9000571	Screw, M4 x 40, Ctsk skt head Blk	2
18	3016063	Locating Bush PCB	2
19	3016182	Electrode Sleeve	1



**MG 300 Manual Powder Gun
Handle Assembly, Part No. 3016007**
Illustration No. 6000093

MG 300 Gun Handle Assembly
PARTS LIST

Item	Part No.	Description	Qty.
1	3016032	Air Regulator Orifice	1
2	9001379	Circlip	1
3	3016023	Air Regulator Body	1
4	3016022	Air regulator Needle	1
5	3016029	Powder Elbow	1
6	3016020	Powder Bore Insert	1
7	9001380	Air Fitting	1
8	9001376	O-Ring, 2.2x1.6	1
9	9001328	O-Ring, BS No. 011	1
10	9001378	3mm Airline	0.115
11	3016028	Powder Tube	1
12	3016031	Powder Tail	1
13	3016060	Handle Moulding, Left Hand Side	1
14	3016033	Air Fitting	1
15	3016045	Microswitch Assembly	1
16	9001375	Spring, Compression	1
17	3016018	Trigger Moulding	1
18	3016044	Connector Assembly	1
19	9000513	Screw, M3x20, Slr Csk Hd, Black	2
20	9000510	Screw, M3x6, Pan Head	1
21	3016062	Washer, Conductive, Plastic	1
22	9001377	O-Ring, 13.0x1.0	1
23	9001434	M3 Threaded Brass Insert	5
24	3016026	Handle Moulding, Right Hand Side	1
25	9000318	O-Ring, BS.007	1
26	9000375	Spring Compression	1

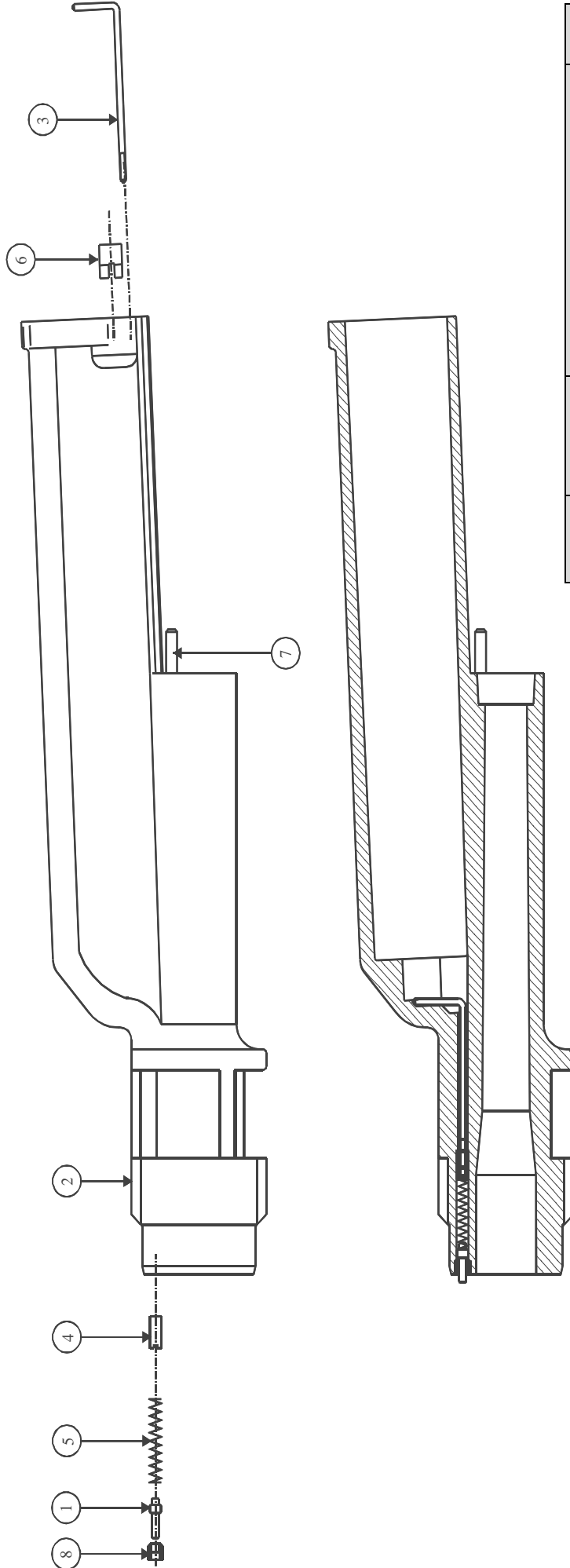


AG 300 Automatic Powder Gun
General Assembly, Part No. 3021002
 Illustration No. 6000162

AG 300 Automatic Powder Gun General Assembly
PARTS LIST

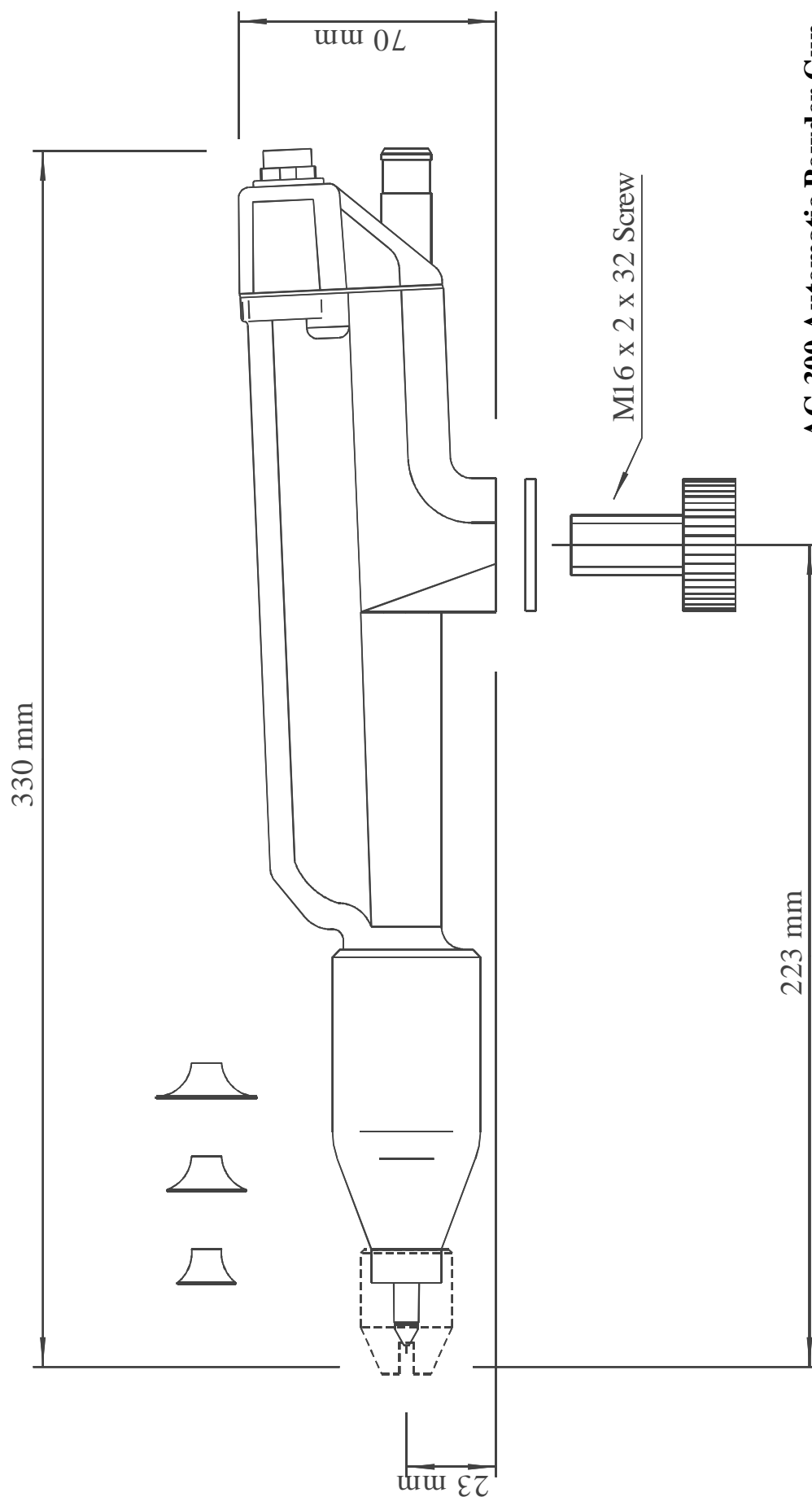


Item	Part No.	Description	Qty.
1	3015187	Slotted Cap Assembly	1
2	3015047	Deflector Assembly, Small	1
3	3015048	Deflector Assembly, Medium	1
4	3015049	Deflector Assembly, Large	1
5	3016185	Electrode Assembly	1
6	3016006	Barrel Assembly	1
7	3021016	Mounting Block	1
8	3016008	Oscillator PCB Assembly	1
9	3021032	Locating Bush, PCB	2
10	3016011	HV Multiplier Assembly	1
11	3016186	Nozzle Nut Assembly	1
12	3021005	Rear Cap Assembly	1
13	3021019	Air Line Tail	1
14	3021020	Label, Type	1
15	3021021	Label, Rating	1
16	9000512	Screw, M3x8, Posi Pan Hd	1
17	9000572	Screw, M4x35, Pozidrive Countersunk Head	2
18	3021015	Powder Tail	1
19	3001014	Gun Clamp Washer	1
20	3001012	Gun Clamp Screw	1
21	3016185	Electrode Sleeve	1

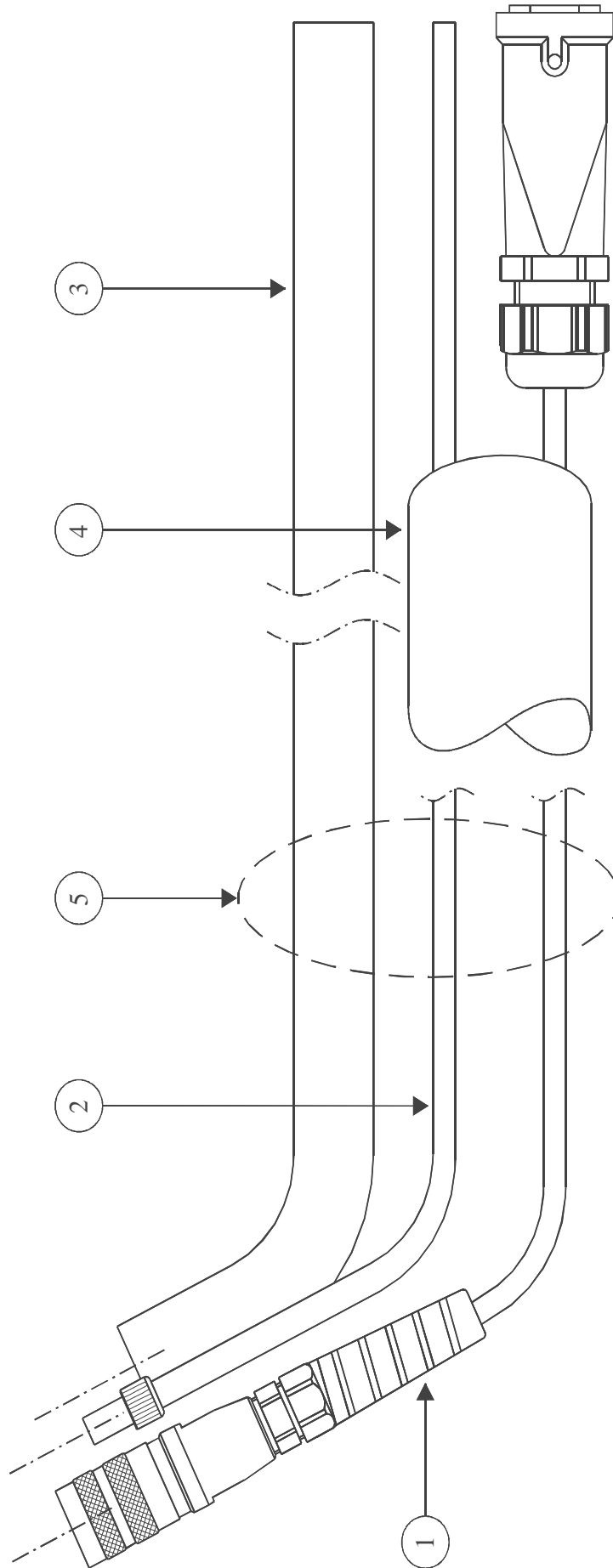


Item	Part No.	Description	Qty
1.	3015024	HT Contact Pin	1
2.	3016057	HT Barrel Type 85	1
3.	3016038	HT Contact Rod	1
4.	3016039	HT Contact Nut	1
5.	9001375	Spring, Compression	1
6.	9001435	Insert, Threaded	2
7.	3021022	Air Connection Pin	1
8.	3016013	HT Pin Retaining Screw	1

AG/MG 300 Powder Guns
Barrel Assembly, Part No. 3016006
 Illustration No. 6000094



AG 300 Automatic Powder Gun
Outline Drawing
 Illustration No. 6000163



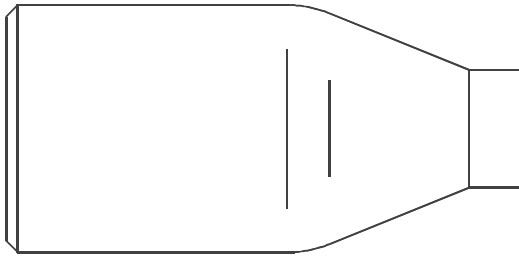
Item	Part No.	Description
1.	3016046	Cable Assembly
2.	9000084	Tubing, 6mm OD x 4mm ID, PU, Black
3.	9000081	Powder Hose Black
4.	9001436	Sleeving, Black
5.	9000256	Velcro, Double Sided

5m Hose & Cable Set General Assembly

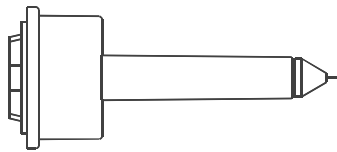
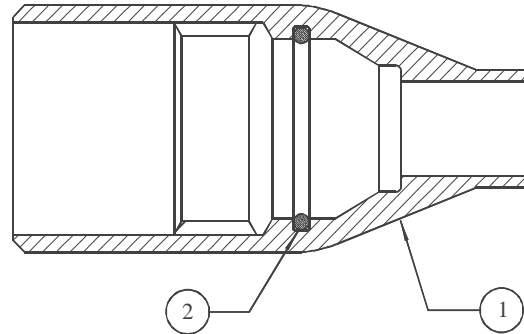
Product No. 3016047

Illustration No. 6000049

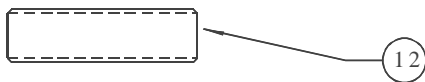
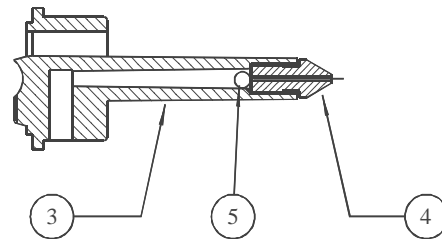
Nozzle Components **Automatic & Manual Powder Guns** Illustration No. 6000164



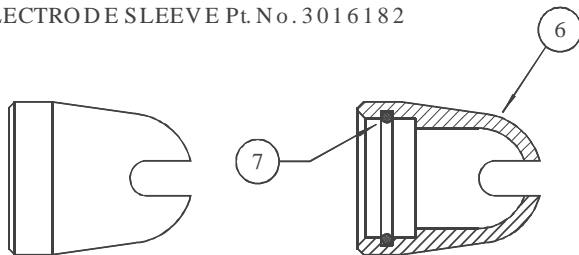
NOZZLE NUT ASSEMBLY Pt.No. 3016186



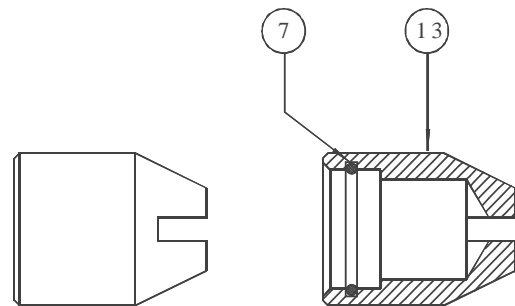
ELECTRODE ASSEMBLY Pt.No. 3016185



ELECTRODE SLEEVE Pt.No. 3016182



SLOTTED CAP ASSEMBLY (Manual Gun) Pt.No. 3016187



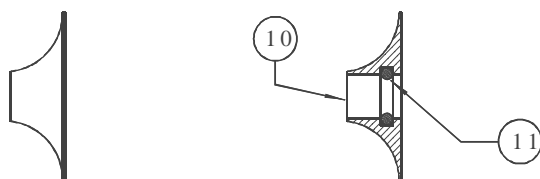
SLOTTED CAP ASSEMBLY (Auto Gun) Pt.No. 3021



DEFLECTOR ASSEMBLY, SMALL Pt.No. 3015047



DEFLECTOR ASSEMBLY, MEDIUM Pt.No. 3015048



DEFLECTOR ASSEMBLY, LARGE Pt.No. 3015049

Item	Part No.	Description
1	3016170	Nozzle Nut
2	9001330	O-Ring
3	3016158	Moulded Electrode
4	3016171	Electrode Support
5	3016172	Electrode
6	3016173	Slotted Cap (Manual Gun)
7	9001423	O-Ring
8	3015037	Deflector, Small
9	3015038	Deflector, Medium
10	3015039	Deflector, Large
11	9001422	O-Ring BS No. 11
12	3016182	Electrode Sleeve
13	3021082	Slotted Cap (Auto Gun)

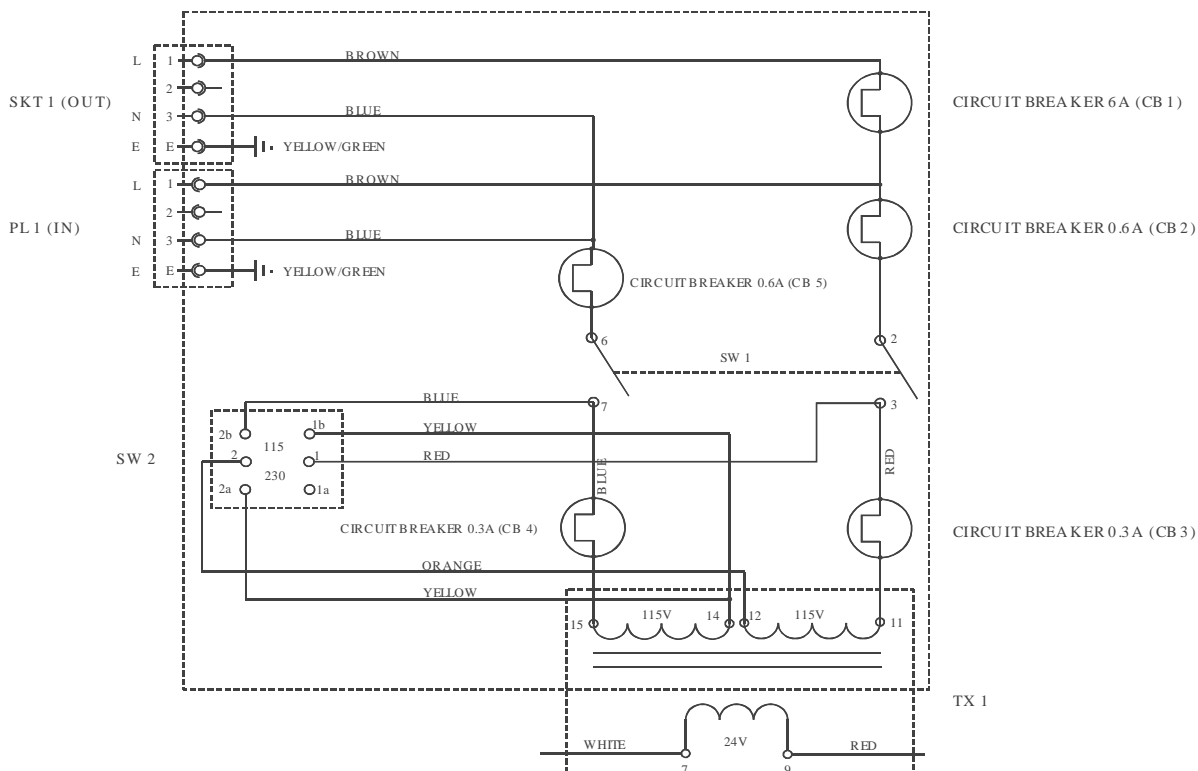
APPENDIX (ii)

SCHEMATIC DIAGRAMS

Gun Control Unit

Mains Voltage Wiring Diagram

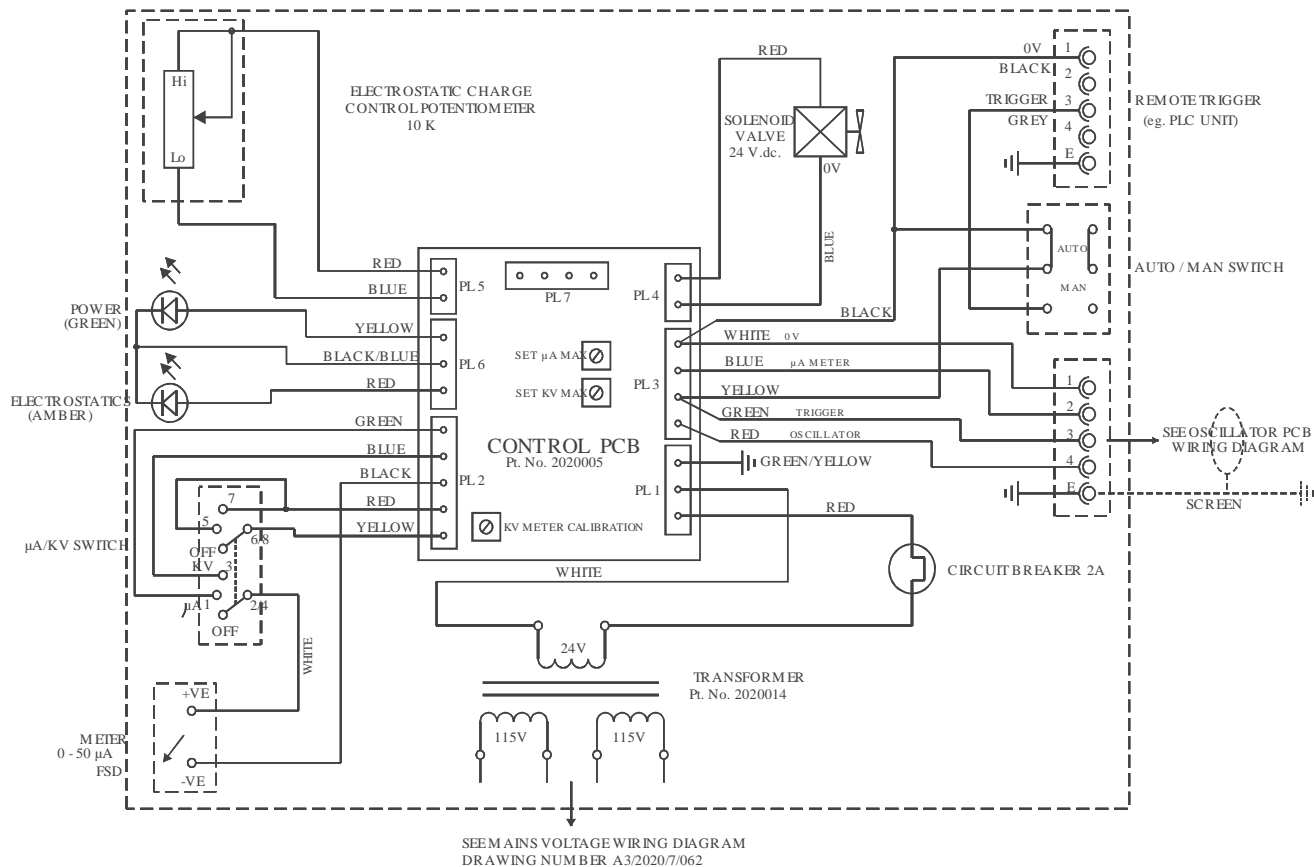
Illustration No. 6000082



Gun Control Unit

Low Voltage Wiring Diagram

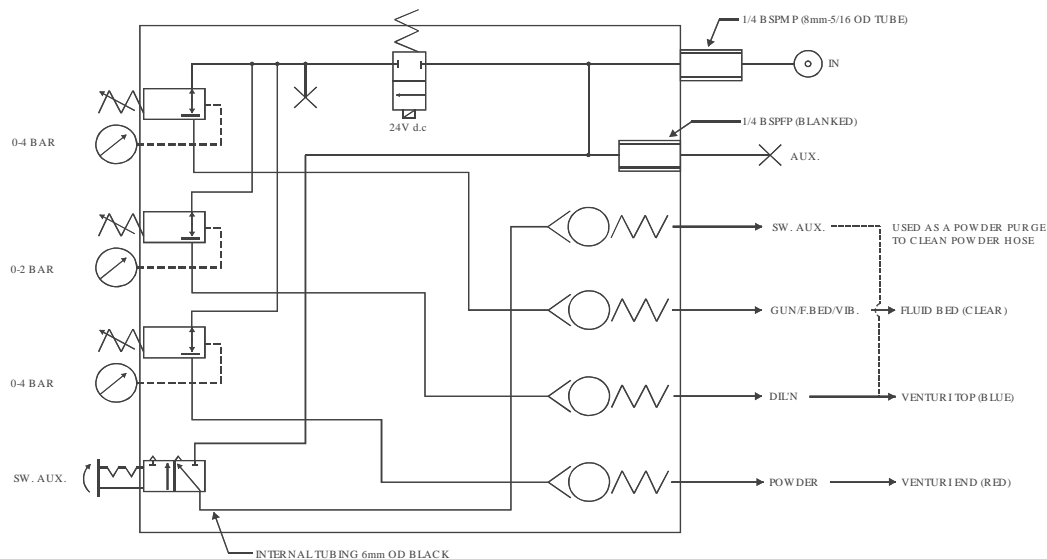
Illustration No. 6000083



Auto (A) Gun Control Unit

Pneumatic Diagram

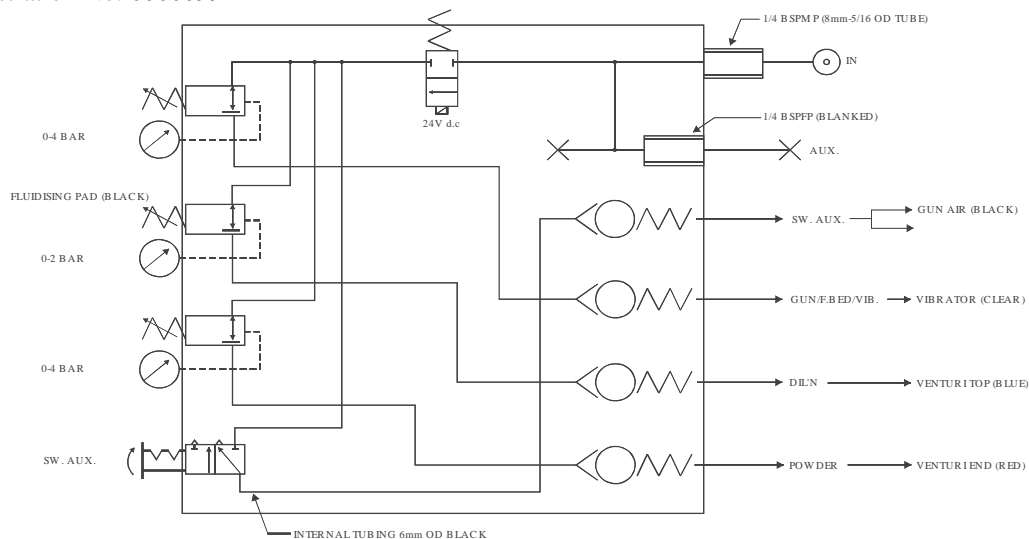
Illustration No. 6000098



Boxfeed (D) Gun Control Unit

Pneumatic Diagram

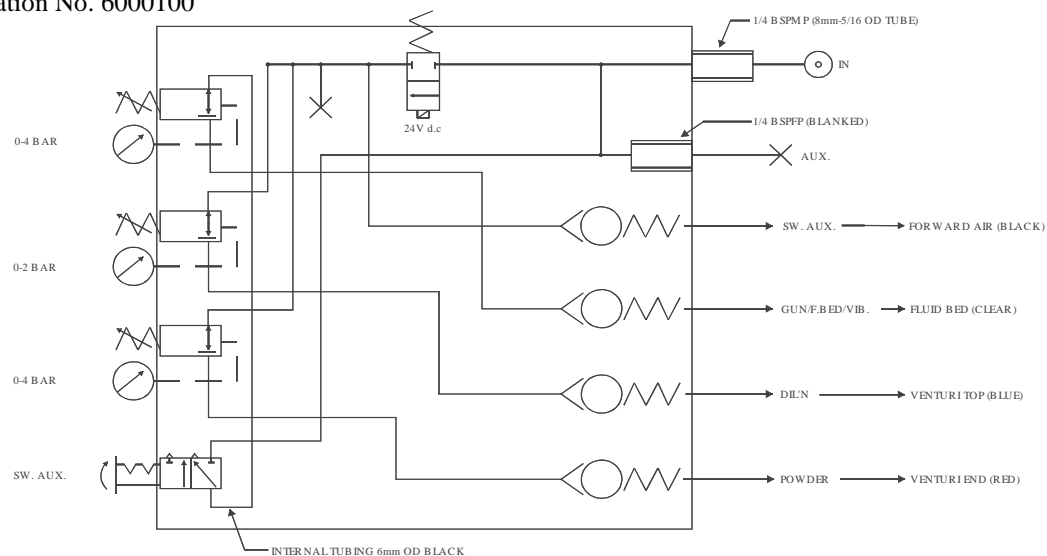
Illustration No. 6000099



Hopper (H) Gun Control Unit

Pneumatic Diagram

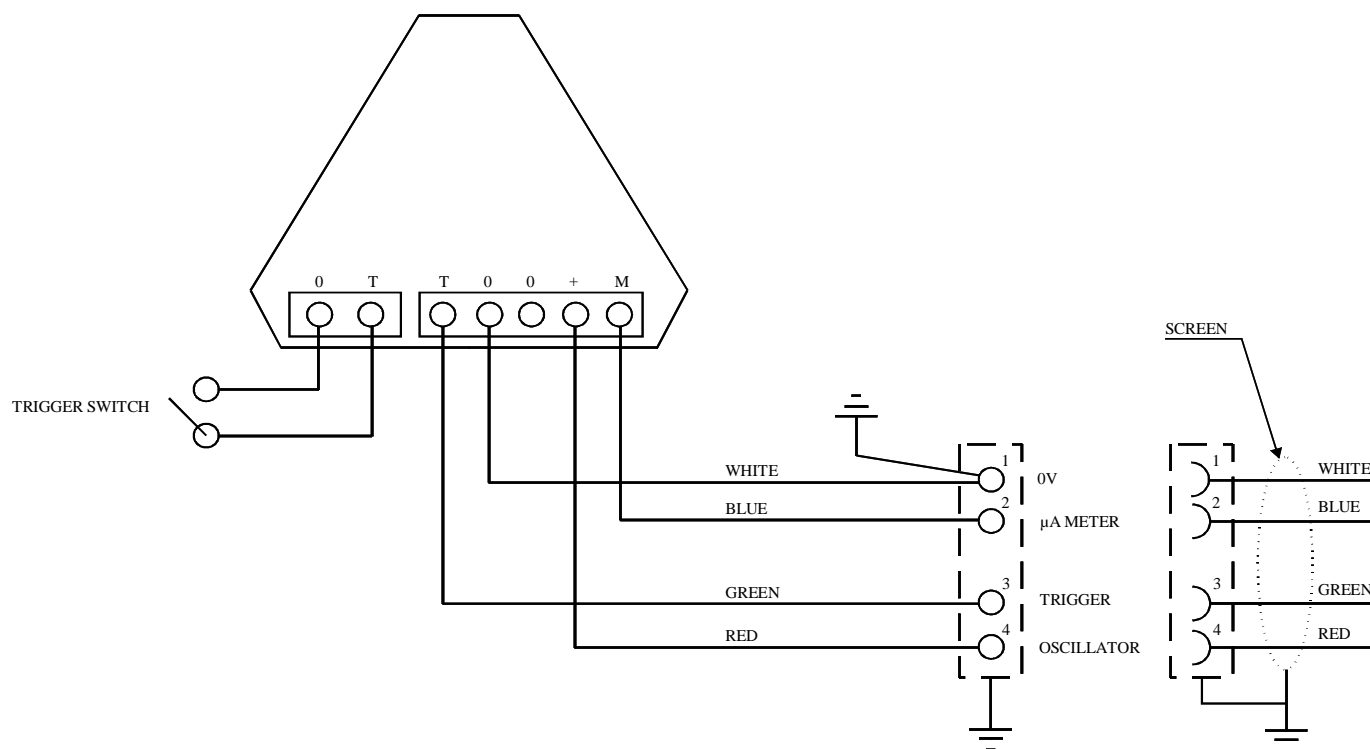
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Manual Powder Gun

Wiring Diagram, Oscillator PCB

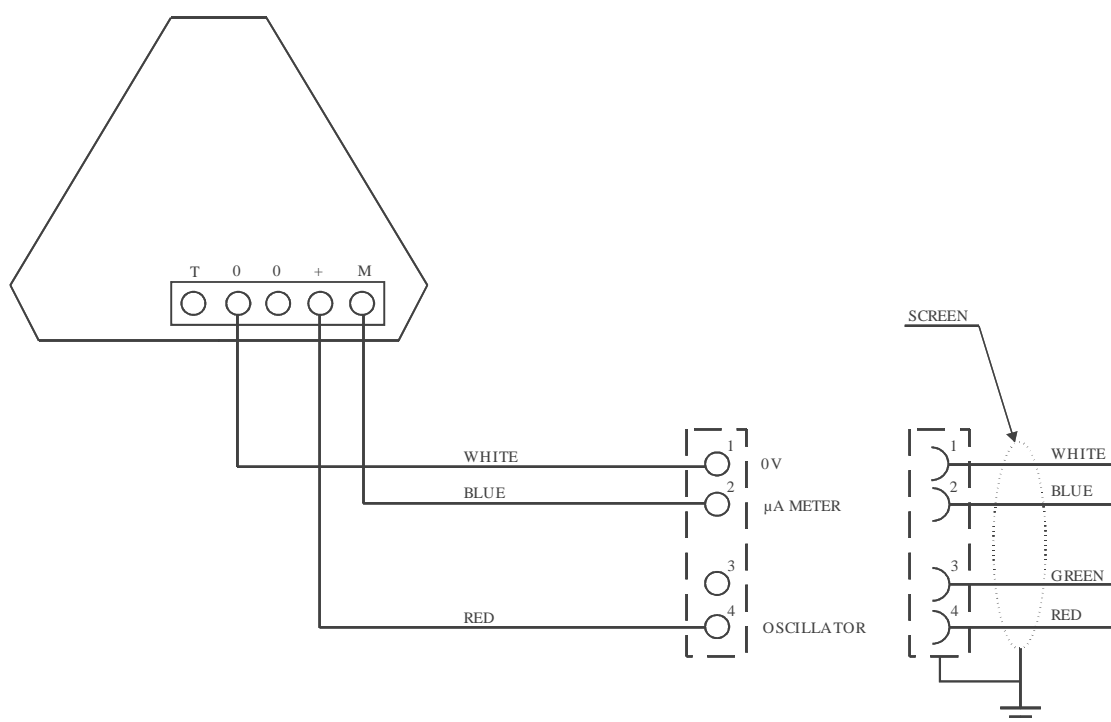
Illustration No. 6000084



Automatic Powder Gun

Wiring Diagram, Oscillator PCB

Illustration No. 6000085



NOTES:

NOTES: