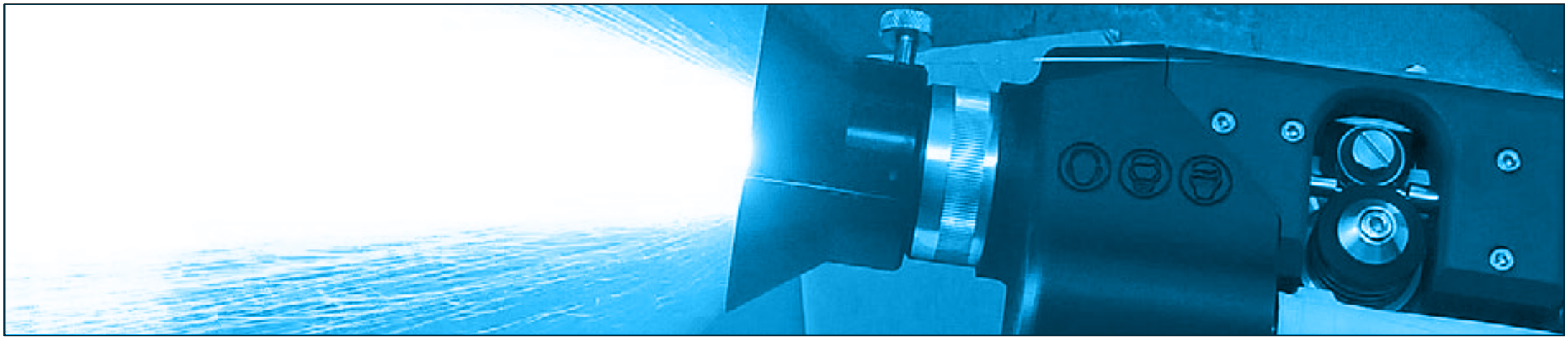
ARC150(19)



Equipment Spec

Metallisation
thermal spray **solutions**

CE

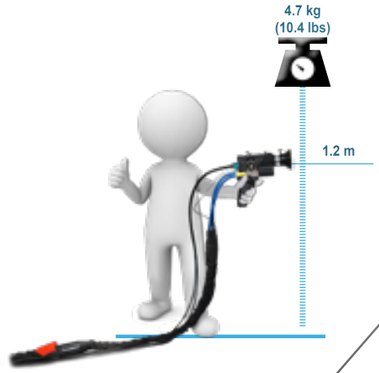
Introducing the ARC150(19)

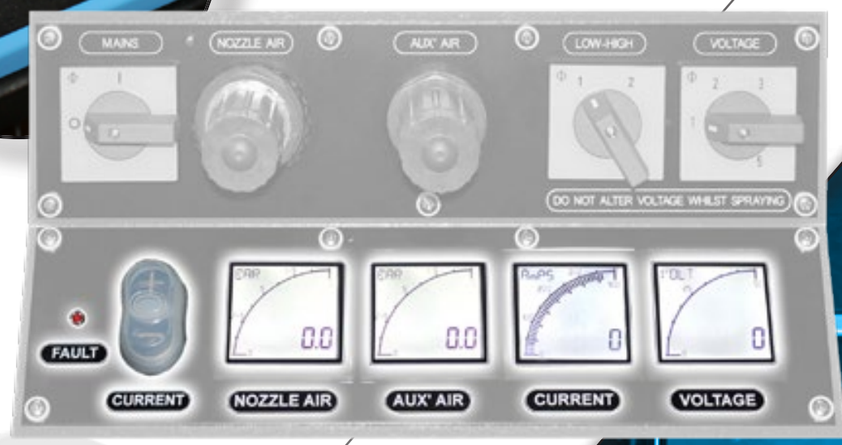
The most comprehensive 500 amp arc spray unit to date!

OUR MOST ROBUST TWIN WIRE ARC SPRAY

Introducing the ***NEW (19) range ARC150***. Similar to the pioneering ARC145P pistol the ARC150(19) Push Pull system utilises all the benefits that industrial additive manufacturing bring; lighter design but incredibly strong. The ARC150(19) provides both application and production versatility; a lightweight pistol for maximum operator comfort and a newly designed compact heavy-duty industrial drive system to allow flexibility for long supplies.

Designed with state-of-the-art features and options, the energisers sophisticated control technology enables quick and easy switching between closed loop and open loop spraying. The display screens show clear and concise details for parameter feedback. These details are monitored at over 500 times/sec to enable superior coating results. Whether engineering or anti-corrosion the ARC150(19) is the perfect choice for shop and site environments.





- **Powerful & innovative**
- **Our most robust system**
- **Outstanding performance**

A complete arc spraying system combining our NEW ARC150(19) push/pull pistol & NEW (19) Model 500 Amp Energiser.

SOPHISTICATED

CLEAR CONTROLS

System Overview

NEW PUSH / PULL PISTOL

- Industrial 3D printed parts.
- Carbon fibre reinforced.
- Spray voltage measured at pistol.
- Ergonomic handle design.
- Reversible V-Rollers.
- Contact tips and air concentrator.

'19' SERIES ENERGISER

- Fan on demand saves power and reduces noise.
- Robust push button current control.
- Industrial plugs / sockets.
- Rear handle.

'19' SERIES DRIVE UNIT

- Compact design.
- Quick release MIG reel carriers which are easy to disassemble to feed in small access manholes.
- Lighter weight.

SUPPLIES PACKS:

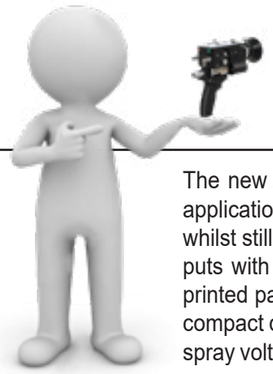
- Lengths to suit.
- Industrial connections.
- Robust manifold & cover.
- Lightweight cooled conductors.

NEW FOR 2019

ROBUST PARTS

POWERFUL

VERSATILE



Pistol

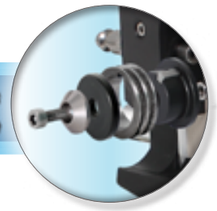
The new ARC150(19) pistol has been adapted to suit the most demanding applications. Ergonomically designed for comfortable operation day after day whilst still using the same standard consumables. It gives consistent through-puts with high coating quality at 500A and thanks to the introduction of 3D printed parts it is now even lighter, whilst retaining its heavy-duty, robust and compact design. The synchronised wire drive allows for longer supplies whilst spray voltage is measured at the pistol for improved reliability and diagnostics.

REDUCES OPERATOR FATIGUE

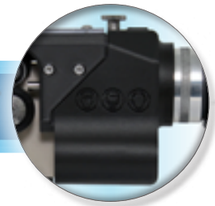
OPTIONS

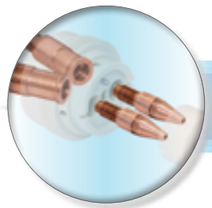
Part No.	Description
ARC150-CT16	ARC150 Pistol for 1.6mm wires
ARC150-CT20	ARC150 Pistol for 2.0mm wires
ARC150-CT23	ARC150 Pistol for 2.3mm wires
ARC150-CT25	ARC150 Pistol for 2.5mm wires

Reversible U-Rollers mean twice the life



Carbon fibre toughness for the harshest environments.





Contact tube & tip arrangement

Proven ARC Geometry

Ergonomic grip for true comfort

ROBUST ROBOT MOUNTING

INDUSTRIAL 3D CARBON FIBRE PRINTED

STRENGTH, DURABILITY & COMFORT COMBINED

Carbon Fibre Toughness

Improved Maintenance Access

Reduced Weight Design

'19 Series' Energiser

The energiser has been specifically designed for those users who are likely to spray a varying range of materials. Ideally suited for the Anti-corrosion industry and General Engineering Workshop.

ECO Friendly

Energy saving AUTO-STANDBY mode

OPTIONS

Part No.	Description
S500(19)-PLC	S500(19) ARC150 Energizer with closed loop current control (500A) (415Vac)
S500FV(19)-PLC	S500FV(19) ARC150 Energizer with closed loop current control (500A) (200-220Vac)
S500D(19)-PLC	S500D(19) ARC150 Energizer with closed loop current control (500A) (200-220~380-460Vac)
PLC-E/STOP-K(19)	Remote operation E-Stop kit for (19) PLC energisers

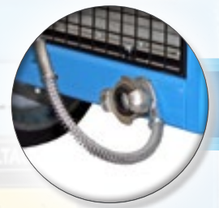
Dust proof current control & closed loop indicator

LED & Ethernet fault alarm feedback

Sturdy control connections

New case design & rear handle

IP65 Gorilla Glass LED gauges



Claw and whip-check air connection on rear

100% DUTY CYCLE

INDUSTRIAL CONNECTIONS

Sturdy Harting Connections

Push Button Current Set

Fan On Demand

'19 Series' MIG / SPOOL Wire Dispense

The drive unit is now more compact than ever, but that doesn't mean it's any less durable. The addition of a top set of driven rollers provides an even more reliable, positive wire feed. Quick release MIG covers make it easy to disassemble & fit through small manholes. Alternatively there is the option to dispense from layer spools which also features the quick release feature.

OPTIONS

Part No.	Description
DR150(19)-**M	ARC150(19) Drive unit for MIG Dispensing (**mm)
DR150(19)-**S	ARC150(19) Drive unit for SPOOL Dispensing (**mm)

** Sizes available: 1.6mm, 2.0mm, 2.3mm, 2.5mm

Quick release MIG covers

Additional top set of driven rollers

Heavy duty (0.55kW) electric inverter drive

Profiled drive rollers for 1.6, 2.0, 2.3 or 2.5mm

Ultimate performance & reliability of wire feeding

WIRE SPECIFIC ROLLERS

GROOVED & SMOOTH SETS

REVERSIBLE FOR LONG LIFE

NEW COMPACT DESIGN

Adjustable Wire Tension

Profiled Drive Rollers

Maintenance Free Gearbox

'19 Series' Drum Dispense

Through the Metallisation wire dispensing cone, wire is neatly guided to a dispense point, then over the pulley to give a free passage of wire from the drum to pistol. As before the drive unit is now more compact than ever, and there is still the addition of a top set of driven rollers providing even more reliability.

Plastic drum cone with viewing window

Variable position clamp pad assembly

OPTIONS

Part No.	Description
DR150(19)-**D	ARC145(19) Drive unit for Drum Dispensing (**mm)

** Sizes available: 1.6mm, 2.0mm, 2.3mm, 2.5mm

21252-51A	Wire Dispensing Cone with Adjustable Reeling Pulley Assembly (51CM)
21252-56A	Wire Dispensing Cone with Adjustable Reeling Pulley Assembly (56CM)
21252-59A	Wire Dispensing Cone with Adjustable Reeling Pulley Assembly (59CM)
6274/5	Clamp Blocks (Pair) 1/2"
7144	1/2" Dia Ptfe Tubing

21252-51A
21252-56A
21252-59A

6274/5

7144

150 / 250 KG FOR ZINC

200 KG FOR ZINC / ALUMINIUM

60 KG FOR ALUMINIUM

Smooth Pulley Action

Large Viewing Window

Built To Last

Trolley Option

The (19) series trolley allows movement of the drive unit and wire dispense around the site independently of the energiser. It has a new compact design and the facility to 'hide' the supplies connections within the trolley in order to prevent dust ingress.

OPTIONS

Part No.	Description
DR1XX(19)-ET	Extension Trolley for (19) Series Drive Units

Channelling for supplies preventing dust & damage

Braked front castors

Heavy duty rear wheels

NEW COMPACT TROLLEY

REMOVEABLE COVER

Trolley with the top cover removed.

Demonstrating where the supplies connections sit.

Trolley with the top cover in place.

Demonstrating how supplies connections are protected from damage and dust ingress.

Trolley with the drive in position.

A compact and secure set up ready for the harshest environments.

Dust Limiting Cover

Braked Front Castors

Rugged Rear Wheels

Supplies Package

The system supplies connect from the energiser or trolley to the pistol. They include the power, air & control cables & wire conduits in the suitable size for the system (up to 20m). Refer to system configuration pages to select supplies lengths.

OPTIONS

Part No.	Description
SUP150(19)-10M	Arcspray 150(19), 10M Supplies Package for Electric Drive, S500(19)
SUP150(19)-15M	Arcspray 150(19), 15M Supplies Package for Electric Drive, S500(19)
SUP150(19)-20M	Arcspray 150(19), 20M Supplies Package for Electric Drive, S500(19)
SUP150(19)-10EX	Arcspray 150(19), 10M Extension Supplies Package for Electric Drive, S500(19)
SUP150(19)-20EX	Arcspray 150(19), 20M Extension Supplies Package for Electric Drive, S500(19)

Robust conduits

Twist & lock power cables and quick release air hose

Industrial connections as standard

FOR S500(19) ENERGISERS

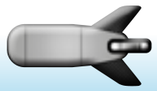
5-20 METRE & EXTENDED OPTIONS

ROBUST & STURDY COVERS

CONDUCTOR CROSS SECTION

Lightweight air-cooled conductors reduces operator fatigue

Sturdy Industrial Connections



Torpedo Shaped Manifold

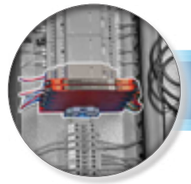
Twist & Lock Connectors

Optional Accessories

Arcbeam system kit

Remote operation & pendants

Arc extension

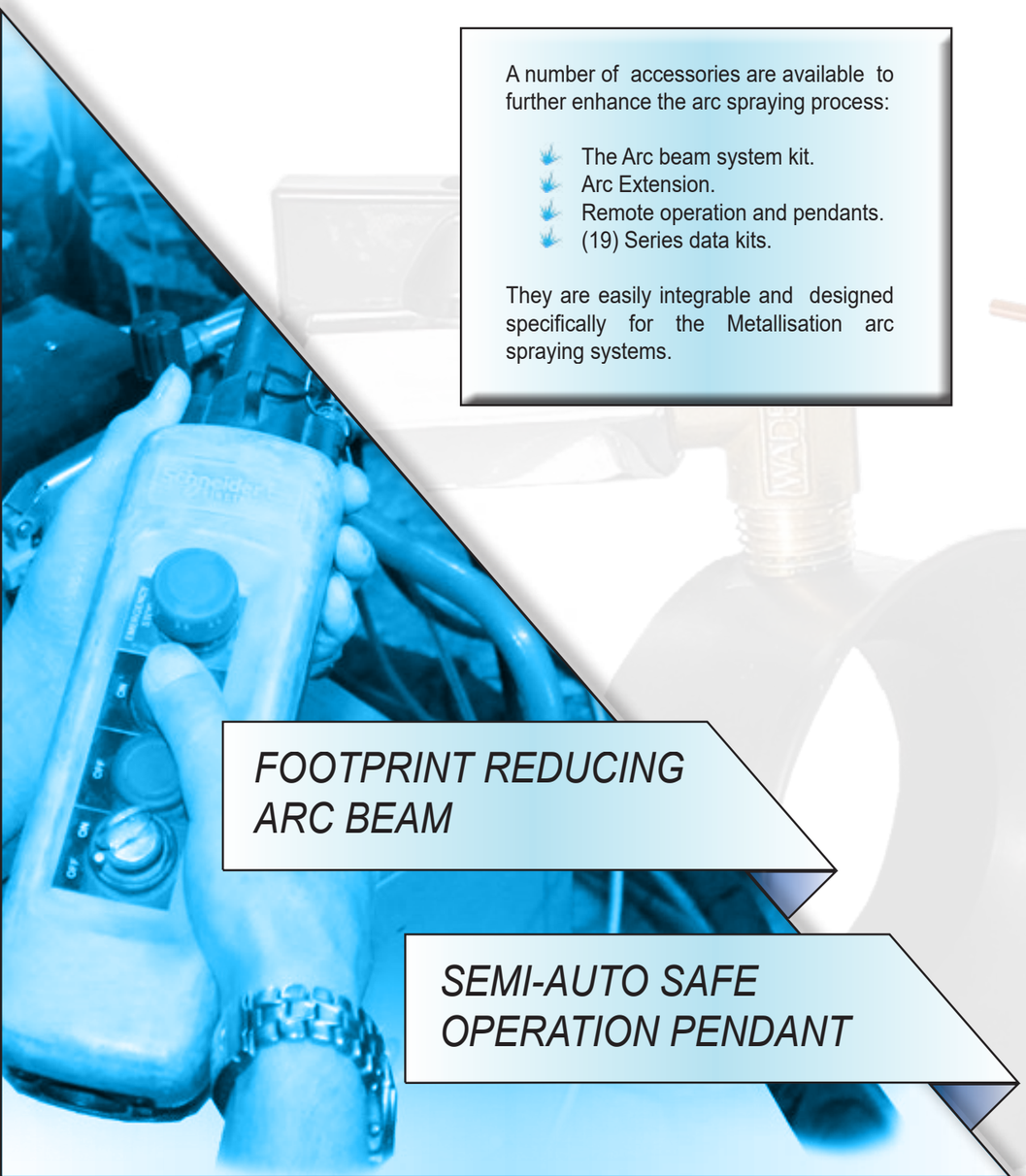


(19) series data kits connectivity & industry 4.0 feedback

A number of accessories are available to further enhance the arc spraying process:

- The Arc beam system kit.
- Arc Extension.
- Remote operation and pendants.
- (19) Series data kits.

They are easily integrable and designed specifically for the Metallisation arc spraying systems.



FOOTPRINT REDUCING ARC BEAM

SEMI-AUTO SAFE OPERATION PENDANT

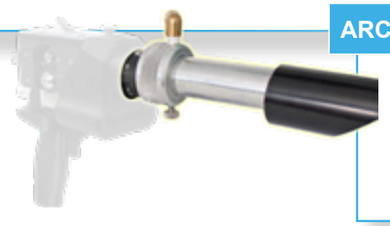
OPTIONS

Part No.	Description	Part No.	Description
ARCBEAM SYSTEM KIT		**ARC EXTENSION**	
ARCBEAM(150)1.6	Arcbeam System Kit for ARC150 using 1.6mm or 2.0mm wires	ARC150-EXT-XX-YY	Arcspray 150 Extension Deflector XXmm Long YYmm Wires
ARCBEAM(150)2.3	Arcbeam System Kit for ARC150 using 2.3mm or 2.5mm wires	XX = Lengths available (150mm, 500mm, 1000mm, 1500mm) YY = Wire Sizes available (1.6mm, 2.0mm, 2.3mm, 2.5mm)	
21601/*	3/8" QR Air Hose (* x 6 / 11 / 16 / 21 m)	21601/*	3/8" QR Air Hose (* x 6 / 11 / 16 / 21 m)
REMOTE OPERATION & PENDANTS			
PLC-REMOTE-H	Remote operation plug & cable for PLC energisers with Harting Connectors	PLC-PENDANT-H	Remote Operation Pendant for PLC Energizers with Harting Connection
PLC-REMOTE-K(19)	Remote operation plug & cable for (19) PLC energisers + E-Stop kit	PLC-PENDANT -K(19)	Remote operation pendant for (19) PLC energisers + E-Stop kit
(19) SERIES ENERGISER DATA KITS			
DATA(19)-K	Data Kit for (19) Series Energizers		

ARC BEAM KIT

The Arc beam system kit reduces the arcspray footprint by forming a cone of compressed air outside the spray stream. This provides several benefits such as finer coatings and improved deposit efficiency when spraying onto small components.

The kit includes the non-opaque parts visible in the exploded illustration to the left.



ARC EXTENSION

The Arc extension is suitable for internal bores (min diameter 75mm) or recess and has a variable deflected spray from 0 to 75 degrees. 1.6 to 2.5mm versions are available for zinc, zinc/aluminium and aluminium wires. Engineering wires can only be sprayed with 1.6mm extension. 150mm version is also capable of spraying 2mm, 2.3mm and 2.5mm Al wires.

The extension includes the non-opaque parts visible in the illustration to the left.

REMOTE KITS & PENDANTS

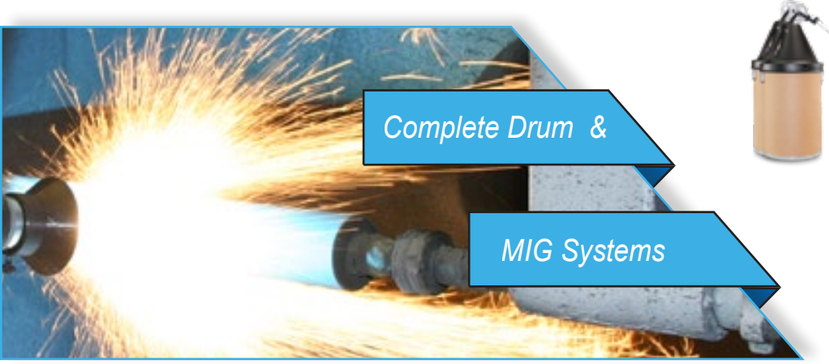
The remote kits & pendant allow remote operation of the system when a pistol is mounted to a robot or manipulator. They connect into the energiser in a dedicated socket on the rear of the energiser. If remote connection is made, the pistol cannot be operated from the pistol buttons and there is no need to remove the pistol control cable from the front of the energiser.

(19) SERIES DATA KITS

The data kit allows spraying parameters and operational data to be read from the energiser. It connects via an Ethernet cable to a port that is installed on the rear of the energiser. The Ethernet cable can then be connected into a PLC, or an HMI screen or via a web browser on a laptop and the values will be written to specified registers.

Packaged Systems

Our most commonly supplied systems are offered as a package with a single part number. Part numbers are made up of the pistol followed by the desired energiser, wire size, supplies length and wire dispense method. Examples are provided below:



EXAMPLES

Part No.	Description
ARC150/S500(19)-1610M	ARC150/S500(19) System, 1.6mm, 10m supplies, MIG dispense
ARC150/S500(19)-2520D	ARC150/S500(19) System, 2.5mm, 20m supplies, Drum dispense

MIG System Inclusions

INCLUDING

- 1 x Pistol (wire size as indicated).
- 1 x Supplies package (length as indicated).
- 1 x S500(19)-PLC Energiser.
- 1 x DR150(19)-MIG dispenser and drive unit.
- 1 x Toolkit.

Drum System Inclusions

INCLUDING

- 1 x Pistol (wire size as indicated).
- 1 x Supplies package (length as indicated).
- 1 x S500(19)-PLC Energiser.
- 1 x DR150(19)-DRUM dispenser and drive unit.
- 2 x 21252-51A Wire Dispensing Cone with Adjustable Reeling Pulley Assembly (51CM).
- 1 x Toolkit.
- 4m PTFE conduit & 2 x clamp blocks (pair).

Useful Information

MATERIAL USAGE

Material	Throughput Kg/Hr @ 500 Amps	Coverage (Kg/M²/100µ)
Metallisation Wire 02E Zinc	51	1.22
Metallisation Wire 01E/17E/25E/28E Aluminium & Alloys	12	0.35
Metallisation Wire 21E Zinc/Aluminium 85/15	44	1.00

The table on the left shows the approximate material throughput and coverage assuming a spray rate of 500 A with 2.3mm diameter material.

TIME TO SPRAY

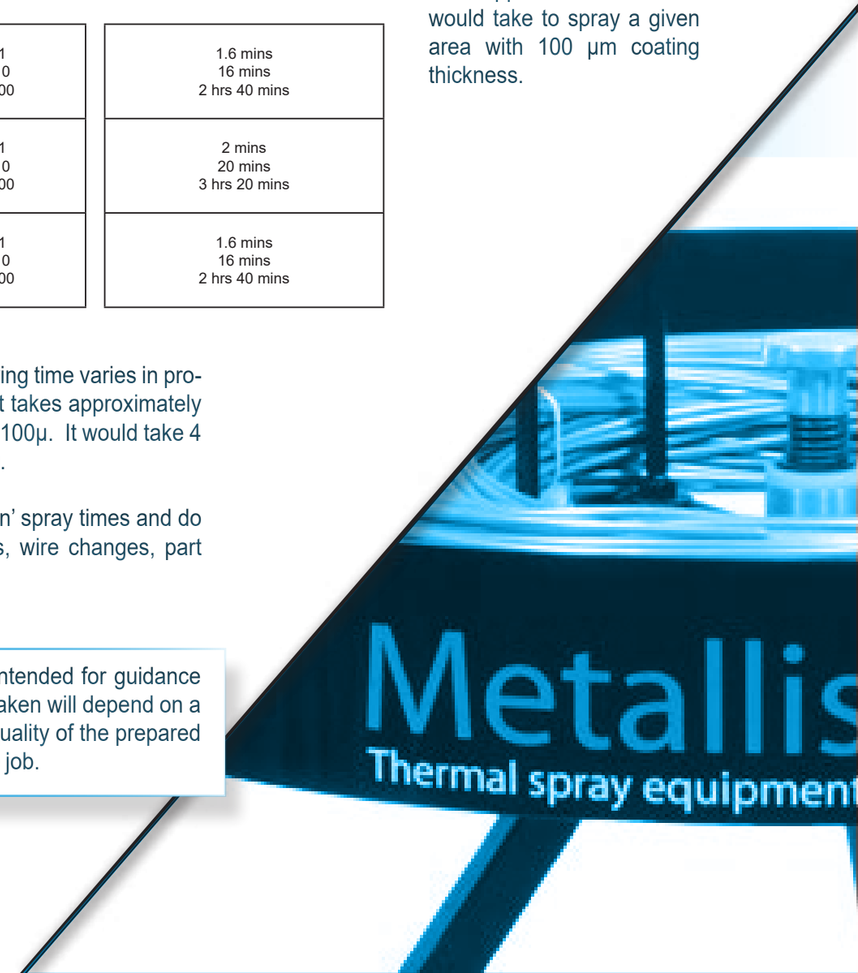
Material	Area (m2@100µ)	Time
Metallisation Wire 02E Zinc	1 10 100	1.6 mins 16 mins 2 hrs 40 mins
Metallisation Wire 01E/17E/25E/28E Aluminium & Alloys	1 10 100	2 mins 20 mins 3 hrs 20 mins
Metallisation Wire 21E Zinc/ Aluminium 85/15	1 10 100	1.6 mins 16 mins 2 hrs 40 mins

The table on the left shows the approximate time it would take to spray a given area with 100 µm coating thickness.

For thicker or thinner coatings, the spraying time varies in proportion to the thickness. For example, it takes approximately 2 minutes to spray a 1m² area of zinc at 100µ. It would take 4 minutes to spray the same area at 200µ.

The given times are approximate ‘gun-on’ spray times and do not make any allowance for stoppages, wire changes, part manipulation etc.

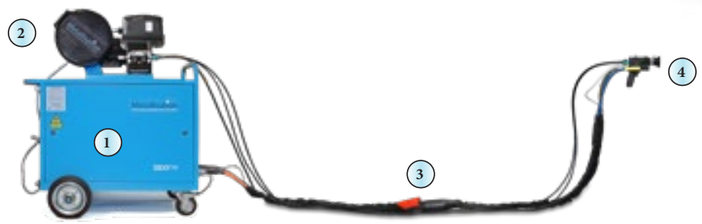
Note: The information given above is intended for guidance purpose only. Material usage and time taken will depend on a number of factors, these including the quality of the prepared substrate and the shape and size of the job.



Typical System Configurations

Metallisation has the right configuration for all requirements. Below are some typical set ups. Variations of these configurations may be possible. Please contact Metallisation to discuss your specific application requirements.

STANDARD CONFIGURATIONS



Most commonly used for on-site anti-corrosion applications where loading of the smaller MIG reels is more feasible than using drum material.

PUSH / PULL SYSTEM WITH WIRE IN MIG REELS

1. (19) Model Energiser - 500A.
2. Drive Unit & MIG Reels (can be mounted on Energiser, wall, floor or trolley).
3. 10 / 15 / 20m supplies from wire drive to pistol.
4. ARC150(19) Pistol.

Most commonly used for in-house or on-site anti-corrosion applications where drums can easily be handled.

PUSH / PULL SYSTEM WITH WIRE IN DRUMS

1. (19) Model Energiser - 500A.
2. Push / Pull Drive Unit (can be mounted on Energiser, wall, floor or trolley).
3. 10 / 15 / 20m supplies from wire drive to pistol.
4. ARC150(19) Pistol.
5. Wire in Drums or coils (use 2-tier wire dispenser - 3m max. wire to drive).

THE PERFECT SOLUTION FOR EVERY APPLICATION

TYPICAL EXTENDED TROLLEY CONFIGURATIONS

Extended Supplies	Pistol Supplies	Total Max
10 m	10 / 15 / 20 m	50 m
20 m		
10+20 m		
20 + 20 m	10 m	

Note: Maximum total supplies pack length is 50 m. This can be a combination of 30+20 or 40+10.

EXTENDED CONFIGURATIONS

MIG:
Most commonly used in hard to reach areas such as boilers/vessels where access for the energiser is limited. Also used to spray longer objects where easy movement around the workpiece is needed.

DRUM:
For very long access applications where there is a benefit to remotely site the energiser away from the spraying area and maintain the benefit of having wire in drums.

MIG and DRUM configurations most commonly used as above but with this configuration the ability to extend the supplies is increased further.

The extension supplies from the energiser to trolley are securely joined and protected.

PUSH / PULL SYSTEM WITH DRIVE ON FLOOR

1. (19) Model Energiser - 500A.
2. Extension Supplies can be 10 or 20 m complete supplies or a combination of: 10+20 (making 30 m) or 20+20 (making 40 m) - joined with sleeve.
3. Drive Unit (on floor / shelf) & MIG Reels (or Drum) with quick release connections.
4. Standard supplies: 10, 15 or 20 m (maximum of 10m when using 20+20 extension).
5. ARC150(19) Pistol.

PUSH / PULL SYSTEM WITH DRIVE ON TROLLEY

1. (19) Model Energiser - 500A.
2. Extension Supplies can be 10 or 20 m complete supplies or a combination of: 10+20 (making 30 m) or 20+20 (making 40 m) - joined with sleeve.
3. Drive Unit (on extension trolley) & MIG Reels (or Drum) with quick release connections.
4. Standard supplies: 10, 15 or 20 m (maximum of 10 m when using 20+20 extension).
5. ARC150(19) Pistol.

Detailed Specifications

PISTOL

Key Information

Width	95 mm (3.7 “)
Length	265 mm (10.4 “)
Height	240 mm (9.5 “)
Weight	1.96 kg (4.3 lbs)
Weight – at a held height of 1.2 m	4.7 kg (10.4 lbs)
Maximum Current	500 Amps

Detailed Specifications

- Industrial 3D printing technology.
- Closed arc for improved spray conditions and efficiency.
- Air concentrator for fine coatings and contact tip cooling.
- Push button design for easy operation and maintenance.
- Standard 1.6, 2.0, 2.3 and 2.5mm wire size.
- Contact tips accessible and easily changed without dis-assembling the spray head.
- Lightweight air-cooled conductor cables are fitted; which reduces the operator supported weight and further improves the overall balance of the pistol.
- Long contact tube and tip arrangement – improved coating quality and reliability due to optimised heat dissipation.
- Spray voltage measured at the pistol for improved reliability and diagnostics with long supplies packs.
- Profiled drive rollers suitable for 1.6/2.0mm and 2.3/2.5mm wires. Rollers have 2 grooves and can be reversed for long life operation.
- Retrofittable to (16) range energisers (NB: requires drive modification).

Typical Performance Figures

MATERIAL	WIRE DIAMETER	THROUGHPUT (KG/HR @ 500 A)	COVERAGE m2/kg/100 µ
Metallisation Wire 01E Aluminium	2.3mm	12	2.88
Metallisation Wire 02E Zinc	2.3mm	51	0.82
Metallisation Wire 21E Zinc/Aluminium 85/15	2.3mm	44	1.00
Metallisation Wire 28E Arctec	2.3mm	12	3.85
Metallisation Wire 72E Inconel 625	1.6mm	13.6(@300A)	1.02

Throughput is assumed to be independent of wire diameter.
All data provided is an approximation and is offered as guidance only as performance can vary depending on application and parameters.

Detailed Specifications

S500(19)-PLC ENERGISER

Key Information

	S500(19)
Dimensions (W x L x H)	670 mm x 1220 mm x 910 mm 26.4 " x 48 " x 36 "
Weight	288.8 kg (637 lbs)
Input Power Requirements	380/415/460 V 50-60 Hz 3 Phase
Optional Input Power	200/220 V 3 phase 50/60 Hz
Fusing Required	37 A @ 460 Vac 40 A @ 415 Vac 44 A @ 380 Vac 76 A @ 220 Vac 84 A @ 200 Vac
Max Power Consumption	29 KVA (46 Vdc/500 A output)
Typical Power Consumption	16 KVA (Zinc 26 Vdc/500 A output) 22 KVA (Aluminium 35 Vdc/500 A output)
Duty	0-500 AMPS @ 100% Duty Cycle
Output Voltage	0-49 Vdc Switched High/Low & 1 – 5 (Nominal Spray Voltage 19 to 44 Vdc)
Air Requirements	1.5 m³ /min @ 5 bar (53 cfm @ 72.5 psi)

DIGITAL DISPLAYS

- Easy to read with scale and numerical display.
- Higher accuracy than traditional gauges.
- Warning alert status (ammeter turns red if over-current).
- Wide viewing angle with high contrast for ease of viewing inside or out.
- IP65 rated and Gorilla glass screens.

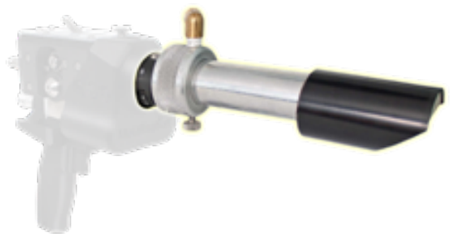
Detailed Specifications

- 500 Amp Continuous operation (100% duty cycle).
- Large ‘Site Capable’ wheels and rigid handle offers portability on site and in workshop.
- Dust proof push button control - for current setting.
- Fan on demand (energy saving and noise reduction when not spraying).
- PLC control for improved reliability and ease of maintenance / fault finding.
- Sealed electrical control circuit - reduces dust ingress for added reliability.
- Specifically designed to suit only ARC spraying.
- LED and Ethernet fault alarm feedback.
- LED mode indicator for closed / open loop mode.
- Closed Loop Current Control – easily switchable / reliable spray rate / over-current protection.
- Robust industrial connections as standard for all control cables.
- Claw and whip-check air connection.
- Air regulators with ‘lock-off’ potential.
- Digital air pressure switches with display for easy setting and diagnostics
- Thermal switch on rectifiers.
- Heat sink increased for better thermal dissipation.
- Easy access energiser panels & external fuse bank for reduced Mean Time to Repair (MTTR). Shake-proof terminals minimise risk of loose control connections.
- Switched output voltage control.
- 220V/380V/415V input supply options available (hard wired).
- Remote operation E-stop kit allows energiser to be started/ stopped remotely via a pendant or interfaced into an automation E-stop circuit. It comes with a plug that can be wired as required.

Detailed Specifications

Technical Information

Maximum Current	500 Amps
Compressed Air	0.7m3 / min @ 3.5 Bar



Technical Information

Maximum Current	500 Amps
Compressed Air	0.7m3 / min @ 3.5 Bar

Note:

Pendant comes with 10m control cable to connect to energiser (can be longer on request).

ARC BEAM SYSTEM KIT

Detailed Specifications

- Reduces Arcspray footprint by forming a cone of compressed air outside the spray stream.
- Finer coatings resulting in lower porosity.
- Improved Deposit efficiency when spraying onto small components (less overspray).
- Increased hardness due to higher oxide content.
- Air hoses with quick release connections to connect the accessories to the auxiliary air supply on the energiser.

ARC EXTENSION

Detailed Specifications

- Suitable for internal bores (min Diameter 75mm) or recesses.
- Variable deflected spray from 0 to 75 Degrees.
- 1.6mm, 2.0mm, 2.3mm and 2.5mm versions available for zinc, zinc/aluminium and aluminium wires.
- Engineering wires can only be sprayed with 1.6mm extension.
- 150mm version is also capable of spraying 2mm, 2.3mm and 2.5mm Al wires.

REMOTE OPERATION

Detailed Specifications

- The ‘REMOTE’ items consist of a 10m cable and pre-wired plug to connect to the energiser. The other end is free to allow connection to customer automation/robot etc.
- The ‘PENDANT’ items consist of a remote operation pendant to start/stop the system and also have an E-stop button for safe operation.
- Allows remote operation of the system for when pistol is mounted to a robot or manipulator.
- Connects into energiser in a dedicated socket on the rear of the energiser. If remote connection is made, the pistol cannot be operated from the pistol buttons and there is no need to remove the pistol control cable from the front of the energiser.

Detailed Specifications

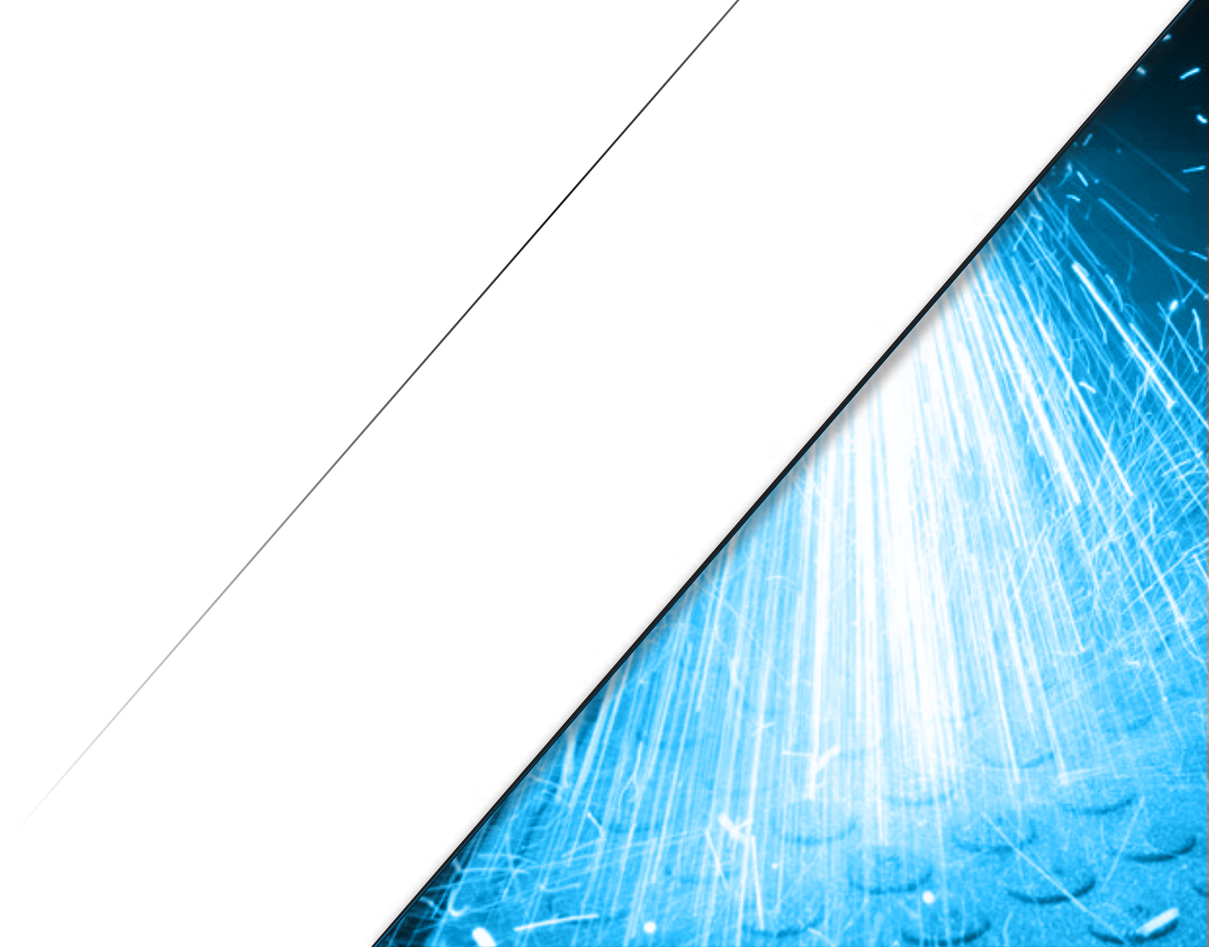
Data available:

Spray OK indication (on when the spray current is above 15A).
Spray Current: output value = actual spray current.
Spray Voltage: output value = actual spray voltage.
Nozzle Air Pressure: output value = nozzle air pressure in bar.
Auxiliary Air Pressure: output value = auxiliary air pressure in bar.
Fault indications (over temperature, low air pressure, over current).

DATA KIT

Detailed Specifications

- The data kit allows information to be read from the energiser. It connects via an Ethernet cable to a port that is installed on the rear of the energiser.
- The Ethernet cable can be connected directly into a Siemens PLC, into an HMI screen (either programmable or not) that has an Ethernet port (for example, Proface or Simatic screen). or to a web browser on a laptop.
- Once connected, the values from the energiser will be written to specified registers.
- Industry 4.0 feedback.



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