Metallisation

Thermal spray equipment and consumables

Equipment Specification

ARC528E(16)-ICC Arc Spray System
with contact tips on pistol

TYPICAL SYSTEM CONFIGURATIONS

Pictured below is a range of typical system configurations. Variations of these configurations may be possible. Contact Metallisation to discuss your specific application requirements.

STANDARD CONFIGURATION – PULL WITH WIRE IN DRUMS

Most commonly used for high volume production applications such as tube mill weld repair, multi-void tubes coating, capacitor coating and LPG cylinders etc. The material in drums minimises downtime due to material changes.

5m as standard from wire to pistol.
Longer lengths are possible*

5m power, air, control supplies as standard. Longer lengths are possible, normally 25m maximum.

S250(16) or S350(16) Energiser

Wire in drums or coils (use 2-tier dispenser)

Pistol

STANDARD CONFIGURATION – PULL WITH WIRE ON MIG REELS

Most commonly used for lower volume production applications and mainly engineering coatings where materials are not available in drums or coils.

5m as standard from wire to pistol.

5m power, air, control supplies as standard. Longer lengths are possible, normally 25m maximum.

S250(16) or S350(16) energiser. MIG reels mounted on energiser, floor or wall.

Pistol

* Standard distance from wire to the pistol is 5m. Within the industrial applications, longer lengths are achieved. Consideration must be take to minimise the drag / resistance of the wire during feeding. In practice, this means keep the wire run as straight as possible and use free running, large diameter pulleys when changing wire direction. When running in conduit, PTFE should be used.

INTRODUCTION

The following specification covers the standard range of ARC528(16)-ICC Arcspray systems. For the specific offer, please refer to a detailed quotation and cross-reference the part numbers for each piece of equipment.

This specification includes a range of recently updated energisers. A number of product improvements have been added to the range based on proven design and latest technology. In summary:

- Digital meters are fitted (as on other proven Arc Spray Systems).
- The latest version of PLC is fitted ensuring long future proofing and support.
- New, digital air pressure switches are fitted (as on other proven Arc Spray Systems).
- New air pressure regulators are fitted ensuring long future proofing and support.
- MCB's are fitted to the incoming power supply as additional protection if the correct fusing is not fitted to the electrical supply.
- New Data Kit option giving the possibility of remote monitoring and logging of certain Energiser data at a customer's HMI via a Siemens S7-1200 series CPU.

Functionally, the spray system will operate in the same way as before.

The new Metallisation ARC528E(16)-ICC systems, with either the 250 amp or 350 amp energiser, offers the ultimate in reliability and precision for demanding production applications. This includes both anti-corrosion and engineering coatings.

The pistol utilises our latest design of contact tips and air-concentrator. The head design, along with the contact tips improves cooling to the arc area, resulting in longer contact tip life and more reliable operation when spraying for extended periods of time. The improved airflow and more efficient arc also allow the system to produce a finer coating without compromising deposit efficiency. The new tips, manufactured from a hard wearing, copper alloy are quick and easy to change. The new material, along with improved cooling help to enhance tip life considerably and reduce downtime and running costs.

The system is designed to integrate into production processes, such as tube mills, capacitor end spraying and multivoid aluminium tube spraying. Options are available to enable connection/control from the process machinery and also feedback of spraying parameters for quality and SPC purposes.

Wire drive is supplied at the heavy-duty pistol by a highly accurate, powerful DC servo motor, driving a robust gearbox and drive roller system. The high performance pistol incorporates proven Metallisation technology, including a unique constant geometry (CG) head. This ensures smooth and consistent spray quality and minimal downtime when changing consumable spares.

The 528E system can be offered with a quick release supply package option. To further reduce machine downtime, the supplies package can be chosen with a quick release option, enabling the pistol to be removed quickly from the line and either maintained or exchanged for a spare pistol for preventative maintenance routines.

The energisers all have closed loop current control. This enables the operator to set the spray current independent of wire type before starting the job, enabling easier setup and protection of the system from over-current. The control function is now controlled by a simple PLC which ensures improved reliability as less component parts are required. It also makes fault finding simple using a standard multimeter with the I/O for the PLC. All of the control electronics are in a sealed area of the energiser to protect them from the often harsh, production environment.

The ARC528E(16)-ICC is offered with either the 250 amp or 350 amp energiser, depending on your production and throughput requirements. As an alternative, a high throughput version is also offered with either 700 amp or 1000 amp energisers. Please refer to the appropriate brochure and specification for more details on these products or consult with Metallisation to determine the most suitable system for your requirements.

For integration into production equipment, the ARC528E(16)-ICC energisers now allow input from line speed tacho of 4-20mA signals as standard but can be converted to 0-10v inputs. The energiser outputs various spray parameter data and can be interfaced for remote stop/start.

Safety: The equipment quoted will produce levels of noise, ultra violet light and dust that will require safety measures to be taken by those using the equipment. It may use pressurised gases. Careful consideration should also be given to the positioning of this equipment. It is the responsibility of the user to ensure that all appropriate measures are taken to ensure safe operation in accordance with local requirements. Metallisation will be pleased to advise as appropriate.

BENEFITS

NEW S250(16)-ICC AND S350(16)-ICC ENERGISERS

- New for 2016, model (16) Energisers. See Energiser section of this specification for more details.
- Closed Loop Current Control – easy setup / reliable spray rate / over-current protection.
- Easy setup – set the spray current before starting to spray.
- Over-current limit protection – protects all parts of spray system from over-current, regardless of wire type.
- PLC control for improved reliability and ease of maintenance / fault finding with program supplied on a Micro SD Card in case the PLC needs reprogramming.
- E-stop integration to link from and / or to production equipment.
- Remote stop/start linking for control by production equipment.
- Speed control link to production line to vary spray rate with production speed. Enables even coatings to be applied during ramp-up, shut down or production variances. 4-20mA signals as standard, 0-10v optional.
- 250 Amp or 350 Amp continuous operation at 100% duty cycle.
- Easy access energiser panels & external fuse bank for reduced Mean Time to Repair (MTTR).
- Sealed electrical control circuit - reduces dust ingression for added reliability.
- Clear digital displays and large controls give ease of operation.
- Integrated Arc current monitor - Stops pistol and supplies an output signal linked to production equipment if arc current stops i.e. due to wire out.
- 24v Safety relay circuit for external interlocks, extraction, acoustic, door locks etc.

GENERAL BENEFITS

- Pull system ensuring quality coatings with consistent operation.
- Contact tube and tip design gives finer coating finish and optimises reliability due to better heat dissipation at the contact tips.
- Easy to maintain, less than 2 minutes to change contact tips that do not require adjustment.
- Proven Arcspray system for automatic production environments.
- Interconnection options to process machinery.
- Suitable for Anti-corrosion and Engineering wires, steels, copper and bronzes.
- Sealed/lubed for life DC Servo motor.
- Uses 1.6mm to 2.5mm wire sizes without changing feed rollers.
- Easy to maintain, less than 3 minutes to change contact tubes and nozzles.
- Low running costs as compared with gas systems.
- Soft start for smooth start ups reducing electrical loading on components.
- Steel reinforced conduits for extended service life with standard 5m package.
- Safety interlocks.
- Choice of coating textures.

ARC528E PISTOL

Part No.	Description
ARC528E-CT**	Arcspray 528E Electric Drive Pistol with Tips for **mm wires
ARC528E-CT***AB	Arcspray 528E Electric Drive Pistol with Tips for **mm wires with Arcbeam Attachment

** Available wire sizes: 1.2, 1.4, 1.6, 2.0, 2.3 and 2.5mm

*** Available wire sizes: 1.2, 1.4, 1.6 and 2.0mm

The Pistol has been designed to give consistent throughputs with high coating quality. It is a heavy-duty unit with a robust construction.

Contact Tip Support Tubes & Contact Tips

Air Concentrator

TECHNICAL OVERVIEW

- New, longer contact tube and tip arrangement – improved coating quality and reliability due to optimised heat dissipation.
- Contact tips accessible and easily changed without dis-assembling the spray head (see above).
- Designed to spray both anti-corrosion and engineering coatings.
- No requirement to change feed rollers when changing wire sizes.
- CG (constant geometry head) ensuring smooth feed, repeatable wire alignment and no adjustment of contact tubes required.
- The drive box is factory lubricated for longer life.
- A range of spray head sizes to accommodate high spray rates, large wire diameters and fine coatings, small wire diameters.
- Closed arc for improved spray conditions and efficiency.
- Armature voltage feed back for closed loop wire speed control.
- Tacho feedback for Motor speed display and integration into closed loop production systems.

Technical data

Description	Characteristics
Maximum Current	350 Amps
Weight	7.4 Kgs
Weight – at a held height of 1.2 M	10 Kgs – inc Cables and Hoses

Description	Characteristics
Width	102mm
Length	457mm
Height	229mm

Typical performance figures for the Arc528E pistol at current shown

Material	Wire Diameter	Throughput (kg/hr)	Coverage m^2/kg/100µ
Metallisation Wire 02E Zinc	2.0mm **2.3mm**	**36.0** (@350A)	**0.82**
Metallisation Wire 01E/17E/25E Aluminium & Alloys	2.0mm **2.3mm**	**8.5** (@350A)	**2.88**
Metallisation Wire 021E Zinc/Aluminium 85/15	2.0mm **2.3mm**	**31.0** (@350A)	**1.00**
Metallisation Wire 05E Copper	**1.6mm**	**15**(@300A)	**0.91**
Metallisation Wire 30E,35E,45E, 55E,57E,60E 65E,80E,84E Steels	**1.6mm**	**13.6**(@300A)	**1.02**
Metallisation Wire 75E Nickel Aluminium	**1.6mm**	**16.4**(@300A)	**1.09**
Metallisation Wire 10E Aluminium Bronze	**1.6mm**	**13.6**(@300A)	**1.37**
Metallisation Wire 15E Phosphor Bronze	**1.6mm**	**19**(@300A)	**0.91**
Metallisation Wire 70E/71E Monel	**1.6mm**	**17.2**(@300A)	**1.02**
Metallisation Cored Wire 103T FeCrB	**1.6mm**	**14.4**(@300A)	**1.18**

Typical performance figures for the Arc528E pistol at 250A

Material	Wire Diameter	Throughput (kg/hr)	Coverage m^2/kg/100µ
Metallisation Wire 02E Zinc	1.6 / 2.0mm **2.3mm**	**26**	**0.82**
Metallisation Wire 01E/17E/25E Aluminium & Alloys	1.6 / 2.0mm **2.3mm**	**6**	**2.88**
Metallisation Wire 021E Zinc/Aluminium 85/15	1.6 / 2.0mm **2.3mm**	**22**	**1.00**
Metallisation Wire 05E Copper	**1.6mm**	**12.5**	**0.91**
Metallisation Wire 30E,35E,45E, 55E,57E,60E 65E,80E,84E Steels	**1.6mm**	**11.3**	**1.02**
Metallisation Wire 75E Nickel Aluminium	**1.6mm**	**13.6**	**1.09**
Metallisation Wire 10E Aluminium Bronze	**1.6mm**	**11.3**	**1.37**
Metallisation Wire 15E Phosphor Bronze	**1.6mm**	**15.8**	**0.91**
Metallisation Wire 70E/71E Monel	**1.6mm**	**14.3**	**1.02**
Metallisation Cored Wire 103T FeCrB	**1.6mm**	**7.2**(@180A)	**1.18**

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

SUPPLIES PACKAGE

Part No.	Description
SUP528E-5-350	ARC528E 5Mtr supplies pack for S250 / S350 systems
SUP528E-10-350	ARC528E 10m supplies pack from S250 / S350 systems (no conduits)
SUP528E-10-250-MV	ARC528E 10 supplies pack for S250 multivoid (inc 11m QR arcbeam hose)
SUP528E-15-250-MV	ARC528E 15Mtr supplies pack for S250 multivoid (inc 15m QR arcbeam hose) - Suitable upto 40'C

STANDARD SUPPLIES PACKAGE INCLUDES

Power, Air and Control Cables

Wire Conduits

TECHNICAL OVERVIEW

- 5 or 10 meter supplies package as standard with all fittings appropriate to connect to 528E Pistol and Energisers.
- Longer power, air and control supplies package options available to suit your application.
- Protective cover supplied for protection in a workshop environment.
- Various wire conduits to suit different applications and wire dispensing methods (dedicated conduits for 5m lengths or PTFE tubing for longer lengths and 3.17mm wires).

QUICK RELEASE SUPPLIES

Quick release fittings are supplied for the power and control cables plus the air hose. These are located approximately 1m from the pistol. This option is particularly useful for continuous production plants where downtime is costly, enabling the rapid disconnection and reconnection of the pistol.

There are two options available:

OPTION 1

In this instance cables / hoses are not provided with the quick release kits unless ordered with a complete supplies pack. Parts as standard are the **Cable Sockets and the Cable Plugs ONLY.**

Part No.	Description
QR528E-S250/350-C	Quick Release Power Connectors Only for S250/350 System Supplies (2 Cables)

OPTION 2

This option is desirable if a spare pistol is ordered and the user requires the second pistol to have its own quick release cables / hoses attached. With these kits cables, hoses and other necessary fittings **are included**.

Part No.	Description
QR528E-S250/350-P	Quick Release Hose & Power Connectors for S250/350 Pistol (2 Cables)

1m power and air extension with quick release connections

ENERGISER

Part No.	Description
S250(16)-ICC	S250(16) ARC528E Energizer with closed loop current control
S250FV(16)-ICC	S250(16) ARC528E Energizer with closed loop current control (200v-220v Fixed Voltage)
S250(16)-ICC-MB	S250(16) ARC528E Energiser with speed control + Modbus interface
S350(16)-ICC	S350(16) ARC528E Energizer with closed loop current control
S350FV(16)-ICC	S350(16) ARC528E Energizer with closed loop current control (200v-220v Fixed Voltage)

TECHNICAL OVERVIEW

- Closed Loop Current Control – easy setup / reliable spray rate / over-current protection.
- PLC control for improved reliability and ease of maintenance / fault finding.
- 250 amp and 350 amp continuous operation (100% duty cycle).
- New digital panel meters
    - Easy to read with scale and numerical display.
    - Higher accuracy than traditional gauges.
    - Warning alert status (ammeter turns red if overcurrent).
    - Wide viewing angle with high contrast for ease of viewing inside or out.
    - IP65 rated and Gorilla glass screens.
- Sealed electrical control circuit - reduces dust ingression for added reliability.
- Easy access energiser panels & external fuse bank for reduced Mean Time to Repair (MTTR).
- Switched output voltage control.
- Integrated Arc current monitor - Stops pistol and supplies an output signal linked to production equipment if arc current stops i.e. due to wire out.
- 24v Safety relay circuit for external interlocks, extraction, acoustic, door locks etc.
- ICC energiser interface signals include:
    - Air/Voltage on/off, motor on/off, motor on lamp, air on lamp, system reset, reset lamp, motor speed (0-10v), spray voltage (0-50v), spray current (0-10v), spray fault, tacho input to vary spray current with line speed (4-20mA or 0-10v)

- ICC-APF energiser interface signals are as ICC but signal are all 4-20mA. Air pressure transducers are also added to allow output of air pressures.
- ICC-MB energiser interface signals are all via Modbus interface.
- -RMB energiser is specifically for connecting to fully automated control systems via Modbus (like multivoid tube mills). It has no gauges or operation on the energiser apart from mains on/off and voltage adjustment. It can be supplied with a Modbus maintenance pendant.

NEW FOR 2016 – (16) MODEL ENERGISERS

- Latest version of Siemens Logo PLC.
    - SD card allows easy program updates.
    - RJ45 communications available (see page 14 for more details).
- New air regulators with 'lock-off' potential.
- New digital air pressure switches with display for easy setting and diagnostics.
- New MCB's to provide additional electrical protection (used in-conjunction with customers own supply/fusing).

S250(16)-ICC ENERGISER SPECIFICATION

Description	Characteristics
Input Power Requirements	380/415V 50-60Hz 3 Phase
Fusing Required	21A/Phase (415V input)
Max Power Consumption	15 KVA
Duty	0-250 Amps @ 100% Duty Cycle
Output Voltage	0-49 Vdc Switched High/Low & 1 – 5 (Nominal Spray Voltage 19 to 44Vdc)
*Typical air consumption	1.3m³ /min @ 5.5 bar(g) (for 4.5 bar(g) nozzle pressure) with arcbeam an additional 0.85m³/min is required
*Max air consumption	1.6m³ /min @ 6.5 bar(g) (for 5.5 bar(g) nozzle pressure) with arcbeam an additional 1.05m³/min is required
Weight	208 Kgs
Dimensions (W x L x H)	670mm x 900mm x 889mm

S350(16)-ICC ENERGISER SPECIFICATION

Description	Characteristics
Input Power Requirements	380/415/460V 50-60Hz 3 Phase
Fusing Required	29A/Phase (415V input)
Max Power Consumption	21 KVA
Duty	0-350 Amps @ 100% Duty Cycle
Output Voltage	0-49 Vdc Switched High/Low & 1 – 5 (Nominal Spray Voltage 19 to 44Vdc)
*Typical air consumption	1.3m³ /min @ 5.5 bar(g) (for 4.5 bar(g) nozzle pressure) with arcbeam an additional 0.85m³/min is required
*Max air consumption	1.6m³ /min @ 6.5 bar(g) (for 5.5 bar(g) nozzle pressure) with arcbeam an additional 1.05m³/min is required
Weight	218 Kgs
Dimensions (W x L x H)	670mm x 900mm x 889mm

***Air consumption figures are for guidance only and will vary depending on pistol head set up.**

WIRE DISPENSE

WIRE DISPENSING CONES (PULLEY)

Part No.	Description
21252	Wire Dispensing Cone with Adjustable Reeling Pulley and Frame (2 required)
21252-MV	Wire dispensing cone (plastic with viewing window), 51cm drums including pulley (2 required)
7144	PTFE Wire Conduits (Supplied by the meter)
6274/5	½" Clamp Pads for PTFE Tubing

21252

21252-MV

7144

6274/5

TECHNICAL OVERVIEW

The Metallisation wire dispensing cone offers the ability to conveniently dispense anti-corrosion wires from production packs (drums). The wire is neatly guided to a dispense point, then over the pulley to give a free passage of wire from the drum to pistol. Benefits include:

- Suitable for dispensing Zinc, Aluminium and Zinc/Aluminium wire
- Specifically designed to suit Arcspraying with each drum being individually insulated from each other.
- Variable position clamp assembly allows the clamp to be rotated to give the smoothest wire transfer path from the drum to the pistol.
- Drums available in 250 Kg for Zinc, 200kg for Zinc/Aluminium and 60Kg for Aluminium.

TWO TIER WIRE DISPENSER

Part No.	Description
2006-2T	2-Tier Wire Stand - Without Wire Straighteners
5006A	Wire Straightener (Arc) Pair

TECHNICAL OVERVIEW

- Suitable for dispensing raw materials that are only available in coil form.
- Can fit MIG reels to centre core.
- Includes 6m of conduit to feed to the drive unit and clamp pads.
- Specifically designed to suit Arcspraying with each coil being individually insulated.
- Variable brake tension to ensure wire does not uncoil.
- Designed to ensure a smooth wire feed to the pistol.
- Rigid construction.
- Lower tier swings out for ease of loading and unloading of the coils.
- Castors fitted to the bottom of the dispenser allowing excellent manoeuvrability.
- Optional wire straightener can be supplied for use with stiff wires (typically 2.3mm engineering wires).

MIG REEL WIRE DISPENSER

Part No.	Description
2008-ICC-MIG	MIG Dispenser for ICC style energisers

TECHNICAL OVERVIEW

- Specifically designed to suit Arcspraying with the MIG reels being individually insulated from each other.
- Brake tension to ensure wire does not uncoil.
- MIG reel dust cover to ensure more consistent spraying.
- All common anti-corrosion materials and most engineering materials available on MIG reels.
- Designed to ensure a smooth wire feed to the pistol.

DATA KIT FOR (16) SERIES ENERGISERS

Part No.	Description
DATA(16)-K	Data Kit for (16) Series Energizers

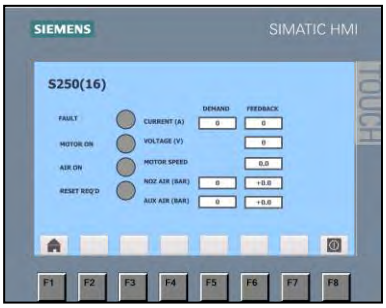
The data kit allows information to be read from the energiser. It connects via an Ethernet cable to a port that is installed on the rear of the energiser.

The Ethernet cable can then be connected to one of the following:

- Directly into a Siemens PLC.
- An HMI screen (either programmable or not) that has an Ethernet port (for example, Proface or Simatic screen).
- A web browser on a laptop.

Once connected, the values from the energiser will be written to specified registers.

The screenshots below are examples of screens that can be used to monitor these values:



HMI screen specifically designed to monitor values

Web browser screen accessed via a laptop

The following data is available on the ARC528E system:

- **Motor ON Indication** (on when power is supplied).
- **Air ON indication** (on when the air solenoid is open).
- **Reset Required Indication** (on when a reset is required).
- **Spray Current** – output value = actual spray current.
- **Spray Voltage** – output value = actual spray voltage.
- **Motor Speed** – output value = actual motor speed feedback.
- **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).

OPTIONS

ARCBEAM

Part No.	Description
ARCBEAM-1.6/2.0	Arcbeam System Kit for ARC528E-ICC/ARC340-PLC using 1.6mm or 2.0mm wires
ARCBEAM-2.3	Arcbeam System Kit for ARC528E-ICC/ARC340-PLC using 2.3mm wires

TECHNICAL OVERVIEW

- Reduces Arcspray footprint by forming a cone of compressed air outside the spray stream.
- Finer Coatings.
- Improved Deposit efficiency when spraying onto small components (less overspray).
- Less apparent porosity.
- Increased hardness due to higher oxide content

TECHNICAL DATA

Description.	Characteristic
Maximum Current	350 Amps
Compressed Air	0.7m^3 / min @ 3.5 Bar

REMOTE OPERATION PENDANTS

Part No.	Description
RMB-MCP	Remote Modbus energiser maintenance control pendant.
ICC-PENDANT	Remote operation pendant for ICC energisers

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

TECHNICAL OVERVIEW

- The RMB-MCP is a control panel for connecting to the RMB energiser. It allows full control and display of the spray parameters of the RMB energiser which has no gauges or method of operation without this panel or connecting to dedicated automation.

- The 'PENDANT' consists of a remote operation pendant to start/stop the system and also has 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.

ARC EXTENSIONS

Part No.	Description
ARCEXT*150	Arcspray340/528 extension, 1.6mm wires, 150mm long
ARCEXT*500	Arcspray340/528 extension, 1.6mm wires, 500mm long
ARCEXT*1000	Arcspray340/528 extension, 1.6mm wires, 1000mm long
ARCEXT*1500	Arcspray340/528 extension, 1.6mm wires, 1500mm long

TECHNICAL OVERVIEW

- Suitable for internal bores (min Diameter 75mm) or recesses.
- Variable deflected spray from 0 to 75 Degrees.

TECHNICAL DATA

Description.	Characteristic
Maximum Current	200 Amps
Compressed Air	0.6m^3 / min @ 4.5 Bar

HOSES FOR EXTENSIONS / ARCBEAMS

Part No.	Description
21601/6	3/8" QR Air Hose x 6Mtr
21601/11	3/8" QR Air Hose x 11Mtr
21601/21	3/8" QR Air Hose x 21Mtr

TECHNICAL OVERVIEW

- Air hoses with quick release connections to connect the accessories to the auxiliary air supply on the energiser.
- Lengths supplied to suit our standard 5m, 10m and 20m supplies packs.

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Metallisation

Thermal spray equipment and consumables

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