

## Product Data Sheet

# Diamond Jet® DJC Series Semi-Automatic HVOF Controller

Diamond Jet® DJC Series Control Units interface with all necessary components of an HVOF spray system. DJC Series Control Units are built to provide many years of reliable service. Versatile, easy to operate and maintain, these units are ideal for job shops and production use.

The Sulzer Metco Diamond Jet® DJC series of controllers are PLC-based controllers that conveniently provide semi-automatic control, monitoring and operation of Sulzer Metco gas-fueled HVOF thermal spray systems. They are designed and constructed to apply high quality, HVOF coatings reliably and repeatedly.

DJC Controllers are multi-gas compatible that can operate with all fuel gas parameters available for the Diamond Jet HVOF process. Propylene, propane, hydrogen, ethylene or natural gas (methane) are conveniently selected by simply connecting to the fuel gas supply.

DJC Series Controllers feature remote start / stop of powder feed operation and can be optionally interfaced

with workpiece equipment, gun handling equipment, exhaust systems and accessory controls. Multiple DJC units can be configured in "Master / Slave" configuration; a unique configuration that permits multiple DJC units to be interfaced together, allowing control of multiple guns from a single DJC controller — a configuration ideal for high volume production environments.

Monitoring of safe operating conditions are a standard feature of DJC Series Controllers, and alarms are clearly indicated on a large, easy to read message center. Interlocks prevent operation in the event of unsafe conditions. Terminal points are provided to allow customers to add up to four additional remote alarms and a remote emergency stop.



## 1 General Description

Two models of the Diamond *Jet* DJC HVOF Control Unit are available. The DJC model and a CE-conformant DJCE-H model that meets the latest ATEX requirements.

DJC controllers are designed to interface to Sulzer Metco Diamond Jet HVOF spray guns, as an integral part of a complete HVOF thermal spray system. DJC series controllers are capable of lighting the gun, adjusting the flame to preset parameters and automatically starting the powder feed process. The control unit continuously monitors the pressures of the fuel gas, oxygen and air supplies and is capable of shutting down the system if the pressure should change beyond safe operating limits.

At system startup, the DJC series controller verifies that the exhaust equipment is operating (optional), purges all gas lines and initiates the flow of powder feeder carrier gas. It initiates and monitors the ignition sequence for the HVOF spray gun, shutting down the system should the gun fail to ignite or in the event of an interruption of the flame. Upon successful ignition, the DJC series controller initiates the flow of fuel gas, oxygen and gun air in accordance with the coating parameters preset by the operator prior to startup.

Powder feed is then automatically initiated or can be sequenced by remote handling equipment.

Safety is an important design consideration of DJC series controllers. Electrical and gas components are in separated enclosures and an exhaust fan continuously ventilates the open gas enclosure. A positive pressure condition is maintained in the electrical enclosure to prevent entrance of spray dust or process gases. The system monitors for safe operating conditions through the use of interlocks and alarms if a problem is detected.

The DJC series controller monitors low pressure conditions for all process gases and monitors the HVOF flame in the event it is extinguished.

If the fuel gas to be used is propane, ethylene or natural gas (methane), the DJC2700 Hydrogen Pilot Lighting Kit is required to ignite the Diamond *Jet* gun. This kit is standard with DJCE-H controller model.

For system where a water-cooled HVOF Diamond Jet gun will be used, the DJC2600 Water Sensing Interface Unit is required. This unit will signal the DJC series controller in the event gun water flow is below safe limits, allowing the controller to initiate shut down of the HVOF system.

An emergency E-stop is provided with the capability to series-connect other components of the HVOF system, permitting emergency stop at the controller or remotely.

## 2 Features and Benefits

### Effective

- Accurately and reliably controls HVOF gas fuel spray parameters for consistent coating quality.
- Interfaces with and controls additional HVOF system components including exhaust equipment, workpiece and gun handling equipment and accessories.
- Versatile, allowing use of propylene, propane, hydrogen, ethylene or natural gas (methane) for the HVOF fuel gas.

### Efficient

- Easily interfaces with compatible Sulzer Metco HVOF powder feeders and Diamond *Jet* air-cooled and water-cooled HVOF spray guns.
- Large, easy to read rotameters and pressure gages
- Large, easy to read message center clearly displays all alarms for safe and simple operation.

### Economical

- Gun flame idle mode and automatic start and stop of the flame and powder reduces operating costs.
- Unique, multi-unit operation with “Master / Slave” mode for high-volume production capability with control from a single control unit saves set up time and reduces personnel requirements.

### Environmental

- Monitors for safe operating conditions, with alarms and system shut down in the event an unsafe condition occurs.
- Meets rigorous safety codes.

### 3 Options and Accessories

Sulzer Metco offers options that provide flexible configuration of DJC series controllers with a variety of components to meet different customer production requirements. These include hoses, cables, gas regulators and interface modules.

For a complete list of optional parts and spare parts, please refer to the parts lists section of the reference manual.

**6CE51520 Remote Control Pendant** provides start/stop control for spray operation up to 7.6 m (25 ft) away from a DJC series controller.

**9MC420 Transformer** is used to connect the DJC model controller to 200, 220 or 240 VAC, single phase 50/60 Hz power sources (not for use with the DJCE-H model).

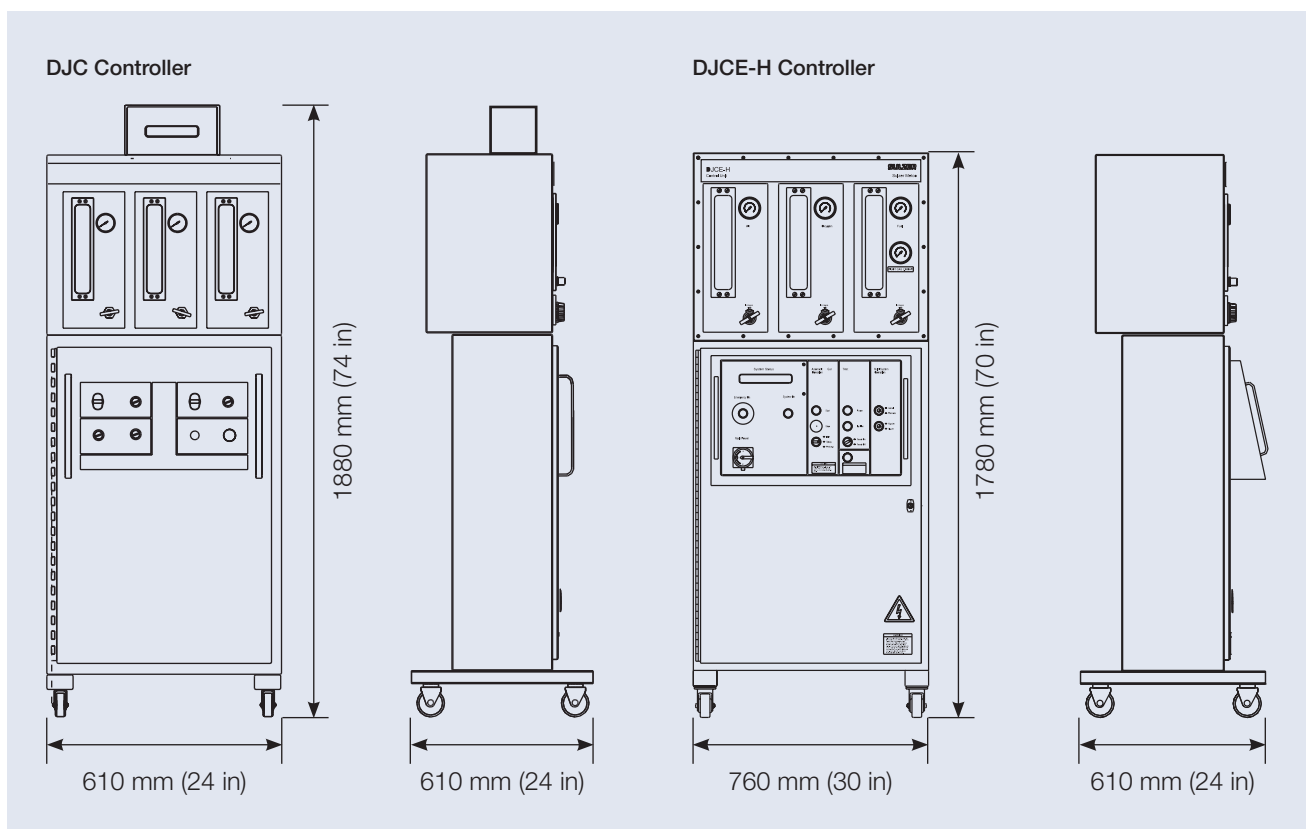
**DJC2700 Hydrogen Pilot Lighting Retrofit Kit** is required for DJC model controllers when the fuel gas to be used is propane, ethylene or natural gas (methane). Note: This kit is standard with DJCE-H model controllers.

**DJC2600 Water Sensing Interface Unit** is required for systems using the DJC model controller and a Sulzer Metco Diamond Jet water-cooled HVOF gun. The unit interfaces with the DJC model controller, monitoring and controlling gun cooling water. It signals the controller to initiate shut down if water flow drops below preset limits.

**DJCE2600 Water Sensing Interface Unit** is functionally the same as the DJC2600 Water Sensing Interface Unit, but for use with the DJCE-H model controller.

### 4 Technical Data

#### 4.1 Dimensions



### 4.2 Specifications

			DJC		DJCE-H	
<b>Process Gases</b>						
Compatible Fuel Gases			Propylene, propane, hydrogen, ethylene, natural gas (methane)		Propylene, propane, hydrogen, ethylene, natural gas (methane)	
<b>Process Gas Maximum Operating Limits</b>						
Hydrogen	H <sub>2</sub>	Flow	745 NLPM	700 SCFH	745 NLPM	700 SCFH
		Pressure	9.7 bar	140 psi	9.7 bar	140 psi
		Purity	99.5 %		99.5 %	
Propylene <sup>1</sup>	C <sub>3</sub> H <sub>6</sub>	Flow	74 NLPM	170 SCFH	74 NLPM	170 SCFH
		Pressure	6.9 bar	100 psi	6.9 bar	100 psi
		Purity	96 %		96 %	
Propane <sup>1</sup>	C <sub>3</sub> H <sub>8</sub>	Flow	74 NLPM	170 SCFH	74 NLPM	170 SCFH
		Pressure	6.2 bar	90 psi	6.2 bar	90 psi
		Purity	96 %		96 %	
Oxygen	O <sub>2</sub>	Flow	307 NLPM	700 SCFH	307 NLPM	700 SCFH
		Pressure	11.7 bar	170 psi	11.7 bar	170 psi
		Purity	99.5 %		99.5 %	
Nitrogen <sup>2</sup>	N <sub>2</sub>	Flow	17.5 NLPM	40 SCFH	17.5 NLPM	40 SCFH
		Pressure	12.1 bar	175 psi	12.1 bar	175 psi
		Purity	99.7 %		99.7 %	
Compressed Air		Flow	438 NLPM	1000 SCFH	438 NLPM	1000 SCFH
		Pressure	7.2 bar	105 psi	7.2 bar	105 psi
		Purity	Clean and oil free		Clean and oil free	
<b>Power</b>						
Voltage			110 – 120 VAC single phase		110 / 200 / 220 VAC single phase	
With 9MC420 Transformer			200 / 220 / 240 VAC single phase		N/A	
Line Frequency			50 / 60 Hz		50 / 60 Hz	
Amperage			15 A		7.5 A	
With 9MC420 Transformer			7.5 A		N/A	
<b>Compatibility</b>						
Spray Guns			All Sulzer Metco Diamond Jet <sup>®</sup> gas fuel, automatic spray guns		All Sulzer Metco Diamond Jet <sup>®</sup> gas fuel, automatic spray guns	
Powder Feeders			Sulzer Metco 9MP-DJ, 5MPE-HP <sup>3</sup>		Sulzer Metco 9MPE-DJ, 5MPE-HP	

1 Industrial grade

2 Powder feeder carrier gas

3 5MPA Interface is required to use a 5MPE-HP with the DJC model controller (not required for DJCE-H model).