

Product Data Sheet

Metco Twin 150 Powder Feeder

A very versatile and accurate volumetric powder feeder that can be used as a stand-alone unit or integrated into a thermal spray, laser cladding or powder additive manufacturing system.

The Metco™ Twin 150 powder feeder engineered from well-proven Oerlikon Metco technology to precisely feed powders of all types for:

- Thermal spray
- Laser cladding
- Powder-fed additive manufacturing processes

The Metco Twin 150 powder feeder is a dual hopper feed system utilizing a volumetric method of feed rate control and uses a carrier gas to transport the powder via a hose to the point of application such as injection into a thermal spray plasma jet or a cladding laser beam. The two hoppers can be operated and controlled independently of each other. This flexibility allows powder injection of:

- A single material using one or both hoppers
- Two different materials simultaneously
- Two different materials for a layered or bond coat / top coat system

The unit incorporates an easy-to-use, graphical user interface, accessed by the on-board touchscreen display panel.

Digital mass flow controllers are used to control carrier gas flow with a high degree of accuracy. Argon or nitrogen can be selected as the carrier gas.

The design and construction of the Metco Twin 150 powder feeder produces a consistent, repeatable and pulse-free powder flow. It can transport powders over a wide range of particle sizes and particle morphologies at feed rates of 2 to 150 g/min. The flow reproducibility meets EN 1395-7:2007-04 (Thermal Spraying – Acceptance Inspection of Thermal Spray Equipment, Part 7: Powder Feed System). The feed rate stabilizes quickly once powder feed is initiated.



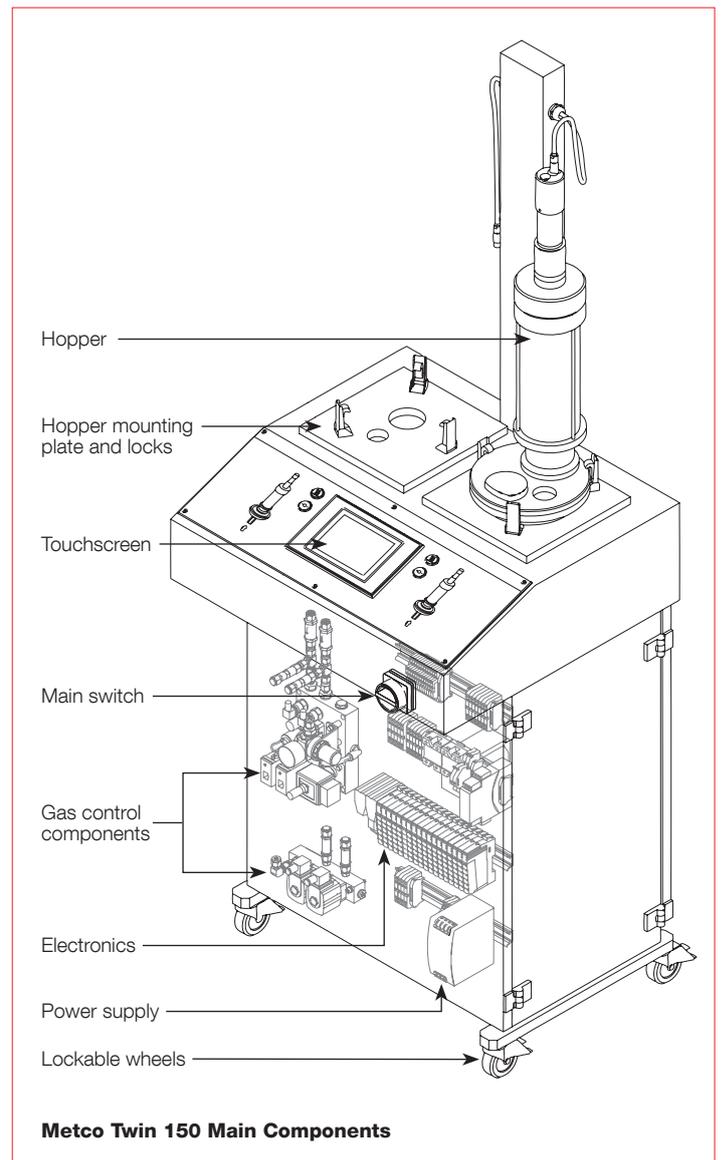
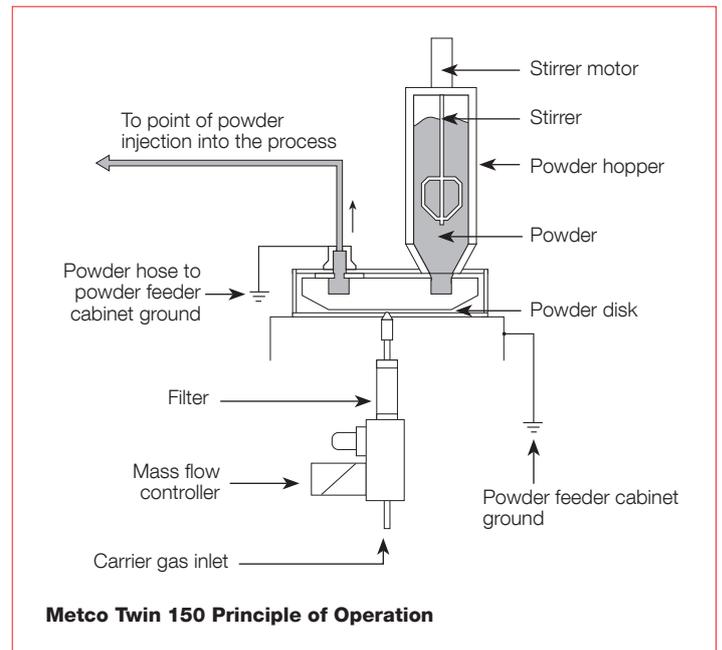
1 General Description

The powder feed system is based on a rotating powder disk with an annular groove. The disk speed controls the powder feed rate, adjusted such that the powder fills the disk. A spreader bar ensures the powder does not over fill the groove. A suction bar ensures the powder is efficiently and completely exhausted into the powder feed line for conveyance by the carrier gas to the point of process injection. The powder feed rate is proportional to the rotational speed of the powder disk and can be infinitely varied to any desired value within the feed range. A PID controller is used to accurately control the disk speed. A stirrer in the powder hopper can be optionally used to maintain powder flow into the disk. To discharge any potential static that may build up in the feeder, the hopper is grounded.

1.1 Operating Modes

The Metco Twin 150 can be operated in the following modes:

- **Standalone Mode:** All set points, settings and commands are set via the built-in touchscreen panel and controlled by the feeder. The operator manually initiates and terminates powder feed at the Metco Twin 150 feeder.
- **Remote On/Off Mode:** All set points, settings and commands are set at the Metco Twin 150 feeder as in Standalone mode. Powder feed is initiated and terminated remotely via a digital on / off command from a process controller or robot.
- **Full Remote Mode:** Set points, settings and commands are set at a thermal spray, laser cladding or additive manufacturing controller and sent to the Metco Twin 150 feeder. Data exchange between the controller and the feeder takes place using UDP/IP protocol over Ethernet. The transmitted settings are displayed on the Metco Twin 150 touchscreen panel. Powder feed is initiated and terminated over the UDP/IP protocol. This is an ideal operating mode for integration of the Metco Twin 150 feeder into a laser cladding or additive manufacturing system.
- **PROFIBUS Mode:** This mode has functionality similar to that of Full Remote Mode except that data exchange between the controller and powder feeder takes place using PROFIBUS (Process Field Bus) protocol via a PROFIBUS cable.



1.2 Touchscreen Operator Interface

The Metco Twin 150 incorporates a color touchscreen display combined with user-friendly human-machine interface code. This allows the operator to set values and observe the actual values and status during operation. Feeder alarms are also accessible from this display, which alert the operator when actual values are out of range of the set point values.

When in Full Remote or PROFIBUS mode, actual values may be read from the Metco Twin 150 touchscreen interface, but commands and settings are set at the remote controller and cannot be set at the feeder. In these modes, should the controller report a shutdown, it will shutdown the feeder, as well.

1.3 Metco Twin 150 Feeder Models

Model No. ^a	Heater Option ^b	Order Number
Twin-150-OP	✘	1091902
Twin-150-HT-230-OP	230 V	1091937
Twin-150-HT-115-OP	115 V	1091905

^a Hoppers are not included and must be ordered separately. See section 2.1

^b Heater option provides the software and hardware interface to control the heater temperature and turn them on and off. The heater jackets must be ordered separately. Voltage designated is for operation of the heater jackets, not the Metco Twin 150 Feeder.



Touchscreen home page of the Metco Twin 150 Feeder

2 Options and Accessories

2.1 Powder Hoppers

Metco Twin 150 feeders require that the customer order the hoppers appropriate for his process. Please see the table below for the available hopper configurations. Note that 2 hoppers should be ordered for each feeder. Optional hardware for various feed conditions can be ordered separately.

For customers who need to switch powder types frequently, it may be convenient to order additional hoppers. Storage of the powder in the hopper prevents the need for constant hopper clean out when switching powders. This is also advisable if hoppers must be configured with different hardware because of the types of powders being used.

Hopper Type	Spray Process ^a	Stirrer Type	Disk Type	Suction Unit	Spreader Unit	Heater Jacket ^b	Order Number
1.1 Liter APS	APS, CP, LC, AM	Standard	16 / 1.2 Steel	1.6 / 1.2 NL	1.6 / 1.2 NL	✘	1078276
		Standard	16 / 1.2 Steel	1.6 / 1.2 L	1.6 / 1.2 L	✘	1078277
		Standard	16 / 1.2 Steel	1.6 / 1.2 NL	1.6 / 1.2 NL	✓	1086543
		Standard	16 / 1.2 Steel	1.6 / 1.2 L	1.6 / 1.2 L	✓	1086544
1.5 Liter APS	APS, CP, LC, AM	Standard	16 / 1.2 Steel	1.6 / 1.2 NL	1.6 / 1.2 NL	NA	1078272
		Standard	16 / 1.2 Steel	1.6 / 1.2 L	1.6 / 1.2 L	NA	1078273
		Paddle	16 / 1.2 Arnite	1.6 / 1.2 NL	1.6 / 1.2 NL	NA	1092091
5 Liter APS	APS, CP, LC, AM	Standard	16 / 1.2 Steel	1.6 / 1.2 NL	1.6 / 1.2 NL	✘	1086542
		Standard	16 / 1.2 Steel	1.6 / 1.2 L	1.6 / 1.2 L	✘	1078269
		Standard	16 / 1.2 Steel	1.6 / 1.2 NL	1.6 / 1.2 NL	✓	1078270
		Standard	16 / 1.2 Steel	1.6 / 1.2 L	1.6 / 1.2 L	✓	1078271
		Standard	11 / 0.6 Steel	11 / 0.6 NL	11 / 0.6 NL	✘	1088914
5 Liter HVOF LF	HVOF LF	Standard	16 / 1.2 Steel	1.6 / 1.2 L	1.6 / 1.2 L	✘	1066641

^a **APS** = Atmospheric Plasma; **CP** = Combustion Powder Thermospray, **HVOF LF** = High Velocity Oxy-Fuel - Liquid Fuel; **LC** = Laser Cladding; **AM** = Powder-Fed Additive Manufacturing

^b ✓ = heater jacket is included; ✘ = heater jacket is not included, however heater is compatible; **NA** = heater jackets are not compatible with the hopper type.

2.2 Stirrers and Dampers

A choice of stirrers and dampers are available. A standard stirrer is supplied with the hopper. Stirrers must be ordered to the size of the hopper.

The standard damper is the same for all powder hopper models. The optional damper / riser for powders that tend to pack under their own weight must be ordered to the size of the hopper.

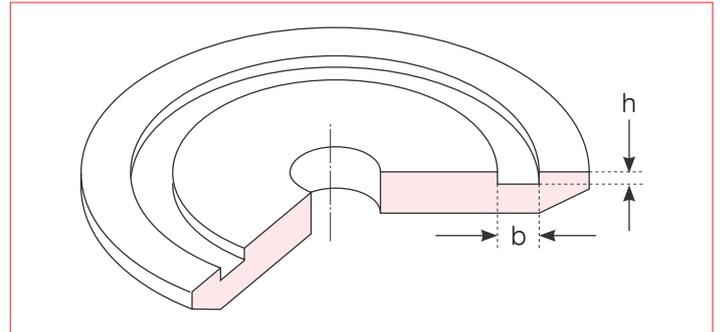
Stirrer Type	Standard	Paddle	Pin
			
Use	Standard	Low apparent density powders	High apparent density powders
1.1 liter	1003175	1003176	1003177
1.5 liter	1003334	1003336	1003335
5.0 liter	1003160	1003161	1003162

Damper Type	Standard	Pin
		
Use	Standard	Powders that pack under their own weight
1.1 liter		1003255
1.5 liter	1003254	1003256
5.0 liter		1003257

2.3 Disks

The standard steel metering disk ($b = 16 \text{ mm}$; $h = 1.2 \text{ mm}$) is appropriate for most applications, particularly for thermal spray. However, optional disks are available for higher or lower feed rate situations.

Arnite disks can be used when it is necessary to ensure that there is no metallic contamination from the steel disk, such as for food-safe, biomedical or sputtering target coatings.

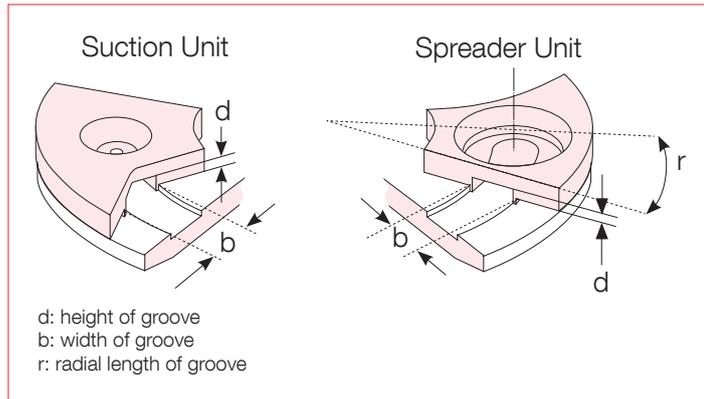


b (mm)	h (mm)	Material	Order No.
16.2	1.7	Arnite (grit blasted)	1008349
16	3.2	Steel	1003234
16	1.7	Arnite	1003296
16	1.7	Arnite (6 screws)	1008351
16	1.2	Steel (standard disk)	1003232
16	1.2	Arnite	1003295
16	1.2	Arnite (grit blasted)	1003298
16	0.6	Steel	1003233
16	0.6	Arnite	1008350
11	0.6	Steel	1003302
11	0.6	Arnite	1003301
7.5	0.6	Steel	1008318
7.5	0.6	Arnite	1003300
5	1	Steel (stainless)	1003297
5	0.6	Steel	1003239
5	0.6	Arnite	1003299
5	0.4	Steel	1003238
3.5	0.3	Steel	1003237
3.5	0.3	Arnite	1008354
2	0.3	Steel	1003236
2	0.3	Arnite	1008353

2.4 Suction / Spreader Units

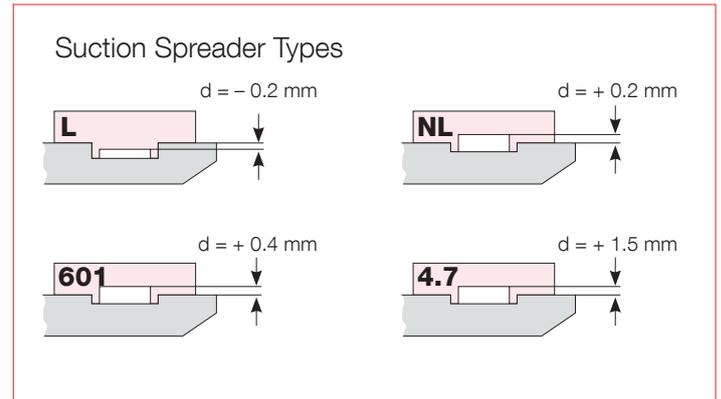
The suction and spread units ensure even filling of the disk slot (spreader) and proper exhaust of the powder into the powder hose (suction).

The size of the suction and spreader units must be matched to the size of the disk groove. Various types of suction spreader units are available for powders with different feed characteristics. The standard set are type NL.



Type NL units are for non-liquid powders (powders that do not flow easily). Type L units are for freely flowing liquid powders. Additional types can be used for powders such as abrasives with plastic or graphite additives or other special cases.

Please contact Oerlikon Metco for help with the correct suction and spreader unit combination for your processing needs.



Spreader Unit				
Type	b (mm)	d (mm)	r (°)	Order No.
L	16.2	1.7		1003262
L/55°	16	3.2	55	1003316
4.7/55°	16	3.2	55	1003315
L	16	1.7		1003262
L	16	1.2		1003261
L/55°	16	1.2	55	1003292
NL	16	1.2		1003282
NL/55°	16	1.2	55	1003293
601	16	1.2		1003291
601/55°	16	1.2	55	1003294
L	16	0.6		1008348
NL	16	0.6		1003307
L	11	0.6		1003289
NL	11	0.6		1003306
L	7.5	0.6		1003311
NL	7.5	0.6		1008357
NL	5	1		1003312
NL	5	0.6		1003310
NL	5	0.4		1003313
NL	3.5	0.3		1003309
NL	2	0.3		1003308

Suction Unit				
Type	b (mm)	d (mm)	r (°)	Order No.
NL	16.2	1.7		1003284
4.7/55°	16	3.2	55	1003324 ^a
L	16	1.7		1003284
L	16	1.2		1003264
NL	16	1.2		1003283
601	16	1.2		1003290
Elliptic	16	1.2		1003305 ^b
L	16	0.6		1008347
NL	16	0.6		1003304
L	11	0.6		1003288
NL	11	0.6		1003303
L	7.5	0.6		1003320
NL	7.5	0.6		1008358
NL	5	1		1003321
NL	5	0.6		1003319
NL	5	0.4		1003322
NL	3.5	0.3		1003318
NL	2	0.3		1003317

^a Requires suction unit holder "slot" 1003227

^b Requires suction unit support "finishing" 1003226

2.5 Hoses

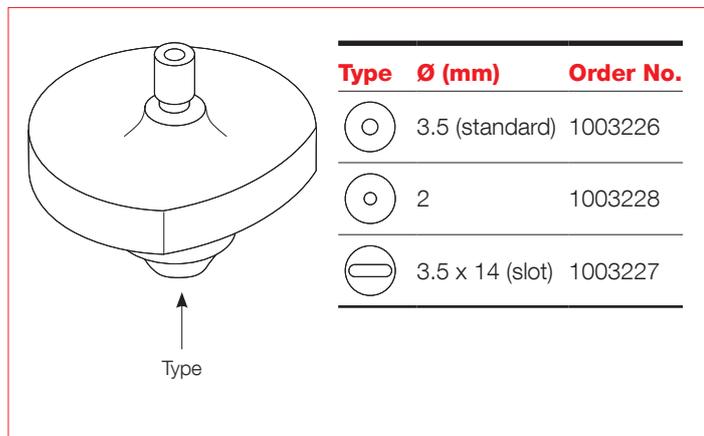
Powder hoses are available with different inner diameters, lengths and of different materials for various feed conditions.

Hose Type	ID (mm)	OD (mm)	Length (m)	Connectors	Order No.
Standard (black with yellow and white stripe)	4	6	5	included	1018806 ^a
	4	6	7	included	1014040 ^a
	4	6	8	included	1014041 ^a
	4	6	10	included	1068552
	4	6	12	included	1019125 ^a
Black	2.7	4.7	specify	Ferrule: 1004365 Nut: 1004363	1004517
	4	6	specify	Ferrule: 1004364 Nut: 1004362 Quick disconnect: 1004366	1004515
Orange	4.8	8	9	O-ring: 1001323	1000898
			4.5	Adapter: 1002330	1001910

^a Set of 2 hoses with connectors

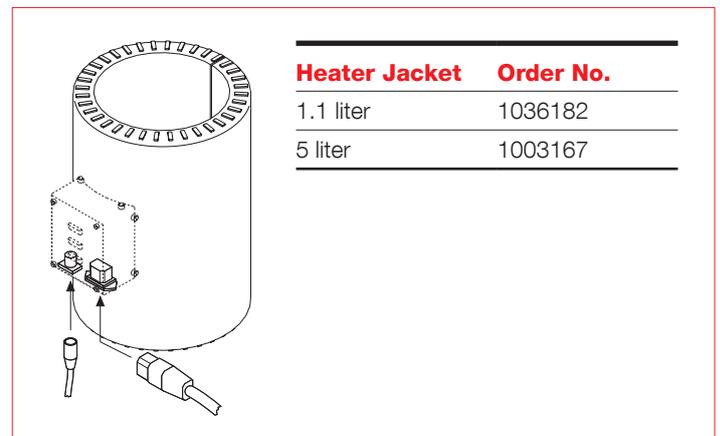
2.6 Hose Support

A standard hose support (3.5 mm Ø) is included with the hopper. Optional hose supports can be used to feed at very low feed rates or for difficult to feed powders.



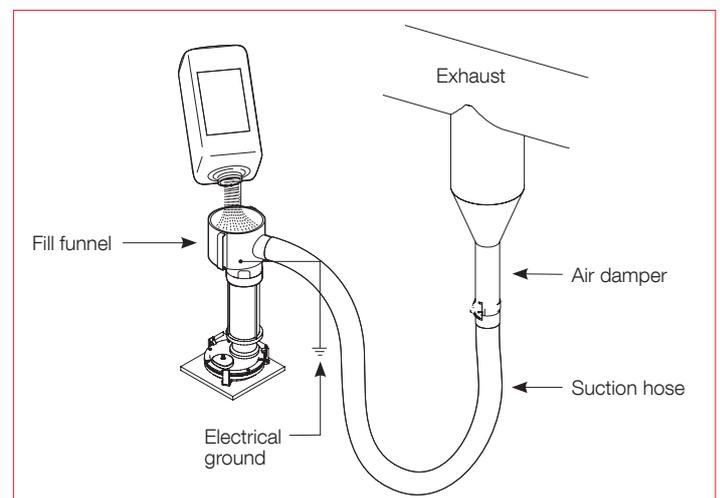
2.7 Heater Jackets

1.1 and 5 liter powder hoppers can be equipped with optional heater jackets. The Metco Twin 150 must be ordered with the heating option to control the temperature of the jacket and turn the heater on and off.



2.8 Powder Filling Options

Powder Refilling Funnel: Provides a connection to the system exhaust so any powder overflow is safely extracted. The kit consists of a fill funnel, hose, air valve and mounting hardware.



3 Suggested Configurations

	Thermal Spray (Atmospheric Plasma)		Laser Cladding		
Feeding Conditions	Freely Flowing Powders Feed rate: ≥ 30 g/min	Non-Freely Flowing Powders Feed rate: ≥ 30 g/min	≤ 5 g/min Powder density: high Particle size: ≤ 40 μm	30 to 50 g/min Powder density: high Particle size: ≤ 30 μm	> 50 g/min Powder density: high Particle size: coarse
Disc (Steel)	16 mm width 1.2 mm depth No. 1003232	16 mm width 1.2 mm depth No. 1003232	3.5 mm width 0.3 mm depth No. 1003237	11 mm width 0.6 mm depth No. 1003302	16 mm width 1.2 mm depth No. 1003232
Suction / Spreader	16/1.2 L No. 1003264 (suction) No. 1003261 (spreader)	16/1.2 NL No. 1003283 (suction) No. 1003282 (spreader)	3.5/0.3 NL No. 1003318 (suction) No. 1003309 (spreader)	11/0.6 NL No. 1003303 (suction) No. 1003306 (spreader)	16/1.2 NL No. 1003283 (suction) No. 1003282 (spreader)
Hose (mm)	OD: 6.0 / ID: 4.0 No. 1004515	OD: 6.0 / ID: 4.0 No. 1004515	OD: 4.7 / ID: 2.7 No. 1004517	OD: 4.7 / ID: 2.7 No. 1004517	OD: 6.0 / ID: 4.0 No. 1004515
Hoppers	1.5 l acrylic No. 1078273	1.5 l acrylic No. 1078272	1.1 l with heater jacket No. 1093907	1.5 l acrylic No. 1093438	5.0 l with heater jacket No. 1097949
Stirrer	Standard No. 1003334	Standard No. 1003334	Pin No. 1003177	Pin No. 1003335	Pin No. 1003162
Damper	Standard No. 1003254	Standard No. 1003254	Anti-Packing No. 1003255	Anti-Packing No. 1003256	Anti-Packing No. 1003257

Note: Many other configurations are available for special powder feed conditions. Please ask your Oerlikon Metco Representative for more information.

4 Features and Benefits

Effective

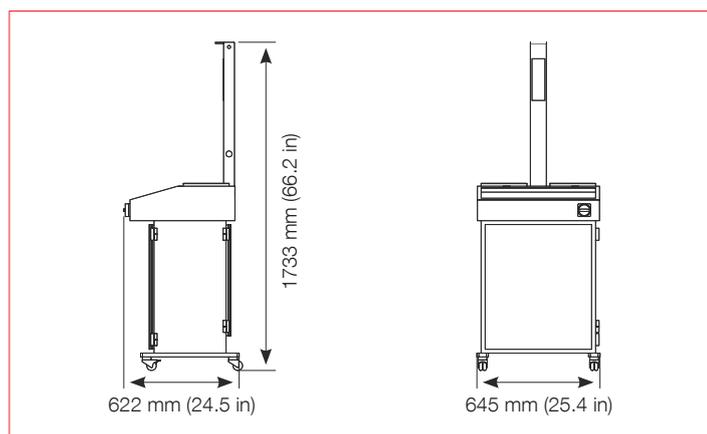
- Proven and reliable powder feed technology
- Suitable for thermal spray, laser cladding and powder-fed additive manufacturing systems
- Operates as a standalone unit or fully controlled via a system controller
- Feeds powders with very high precision
- Reproducible powder flow during long operating periods
- Feeds powders with poor flow characteristics
- Powder feed rate and carrier gas are adjusted independently of each other
- Insensitive to external disturbances
- Choice of mechanical stirrer avoids powder segregation

Efficient

- Easy to use, touchscreen user interface
- Each hopper can be configured and operated independently, such as for a bond coat and top coat
- Visual monitoring of the feed mechanism during operation
- Selection of powder hoppers with different sizes
- Wide selection of options for various types of powders with different feed characteristics or special properties
- Very simple and quick powder changeover
- Wide range of feed rates, including very low rates
- Easy to clean, few wear parts, low maintenance
- Easily change optional components to feed different powders

5 Technical Data

5.1 Dimensions



5.2 Specifications

Weight			
Without powder hoppers		110 kg	242.5 lb
Power Requirements			
Voltage		100 to 120 / 200 to 240 VAC ($\pm 2\%$)	
Frequency		48 to 62 Hz	
Power consumption	without heaters	0.25 kW	
	with heaters	1.25 kW	
Stirrers			
Power		36 W (2.5 A)	
Precision		$\pm 3\%$	
Nominal control		3300 rpm (22 / 24 V x 3600 rpm)	
Metering Disk			
Motor output		65 W (4 A)	
Precision		$\pm 0.08\%$	
Time to reach nominal speed		6 s	
Speed control range (2.5 to 100 % full speed)		0.2 to 10 rpm	
Powder feed accuracy		$\pm 1\%$ max. deviation from set point	
Heaters (if equipped)			
Temperature range		40 to 80 °C	104 to 176 °F
Temperature accuracy		$\pm 3\text{ °C}$	$\pm 5.4\text{ °F}$
Voltage		115 / 230 VAC	
Fusing (heater jackets)		max 16 A (per CE)	max 20 A (per UL)
Carrier Gas			
Type		Argon or Nitrogen (switchable by user)	
Supply pressure	APS, LC, AM	3 bar to 10 bar	43.5 to 145 psi
	HVOF-LF	3 bar to 10 bar	43.5 to 145 psi
Supply flow (min)	APS, LC, AM	16 NLPM	45.7 SCFH
	HVOF-LF	100 NLPM	228.3 SCFH
Output flow (max per line)	APS, LC, AM (argon or nitrogen)	16 NLPM	36.5 SCFH
	HVOF-LF (nitrogen)	16 NLPM	36.5 SCFH
Powder Feeding			
Particle size		$\leq 200\ \mu\text{m}$	≤ 76 mesh (ASTM)
Feed rate		2 to 150 g/min	0.25 to 20 lb/hr
Accuracy		$\pm 1\%$	
Operating Environment			
Temperature		+10 to +40 °C	+50 to +104 °F
Rel. humidity (non condensing)		< 75 %	
Housing			
Protection Class		IP 54	IEC 60529
System Compatibility		Operational as a stand-alone feeder or integrated into a system via Ethernet UDP or PROFIBUS	

APS = Atmospheric Plasma; **CP** = Combustion Powder Thermospray, **HVOF LF** = High Velocity Oxy-Fuel - Liquid Fuel; **LC** = Laser Cladding; **AM** = Powder-Fed Additive Manufacturing

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