

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.



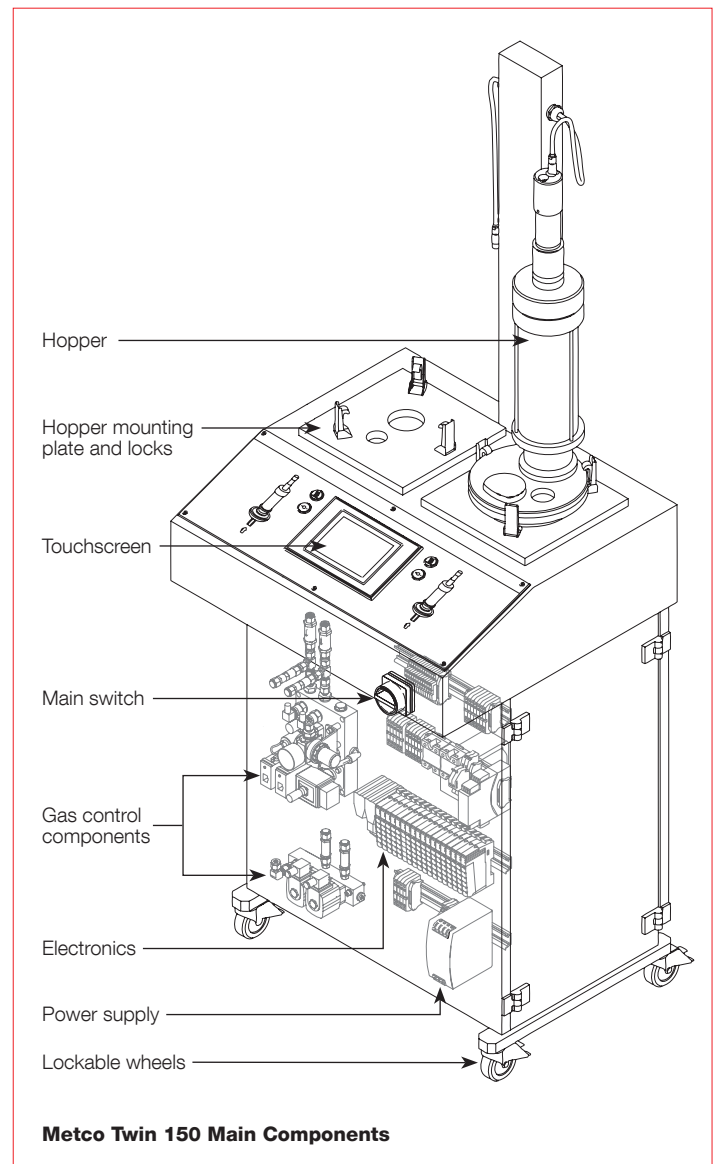
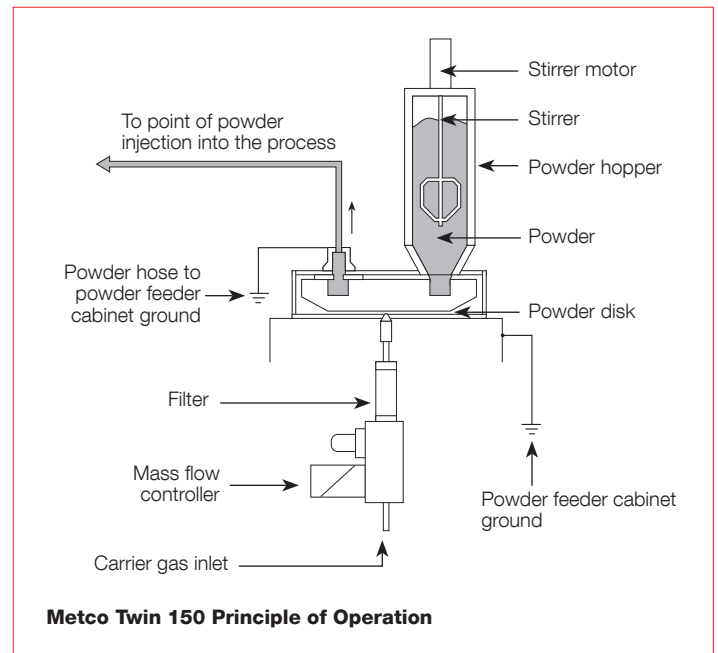
1 General Description

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.
- **Data Communication:** Either PROFINET or PROFIBUS supported for full remote operation.



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 PROFINET 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.



Touchscreen home page of the Metco Twin 150 Feeder

1.3 Metco Twin 150 Feeder Models

| Model No. ^a | Heater Option ^b | Order Number |
|----------------------------|----------------------------|--------------|
| Twin-150-ARHE16-HT-230-OP | 230V | 1752040 |
| Twin-150-ARN216-OPN | | 2261801 |
| Twin-150-ARN216-HT-230-OPN | 230V | 2261803 |
| Twin-150-ARN216-HT-115-OPN | 115V | 2261759 |
| Twin-150-ARHE16-HT-230-OPN | 230V | 2261760 |

^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.

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.

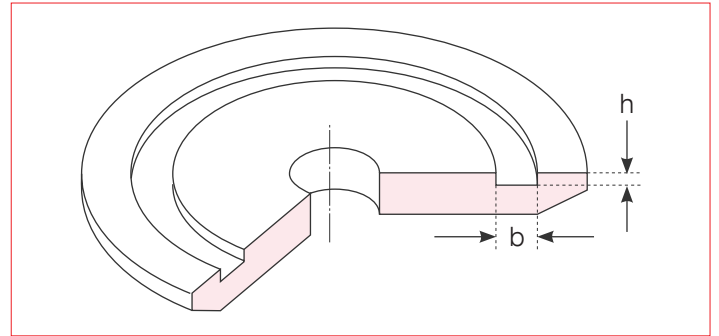
| Stirrer Type | Standard | Paddle | Pin |
|--------------|---|---|---|
| |  |  |  |
| Use | Standard | Low apparent density powders | High apparent density powders |
| 1.1 liter | 1003175 | 1003176 | 1003177 |
| 1.5 liter | 1003334 | 1003336 | 1003335 |
| 5.0 liter | 1003160 | 1003161 | 1003162 |

| 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.

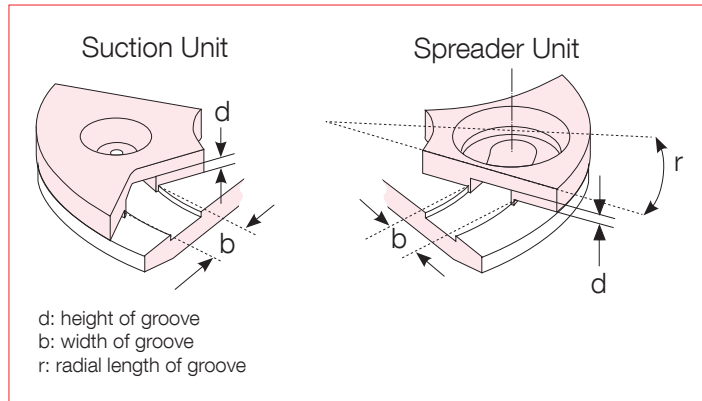


| b (mm) | h (mm) | Material | Order No. |
|--------|--------|-----------------------|-----------|
| 16.2 | 1.7 | Arnite (grit blasted) | 1008349 |
| 16 | 3.2 | Steel | 1003234 |
| 16 | 1.7 | Arnite | 1003296 |
| 16 | 1.7 | Arnite (6 screws) | 1008351 |
| 16 | 1.2 | Steel (standard disk) | 1003232 |
| 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

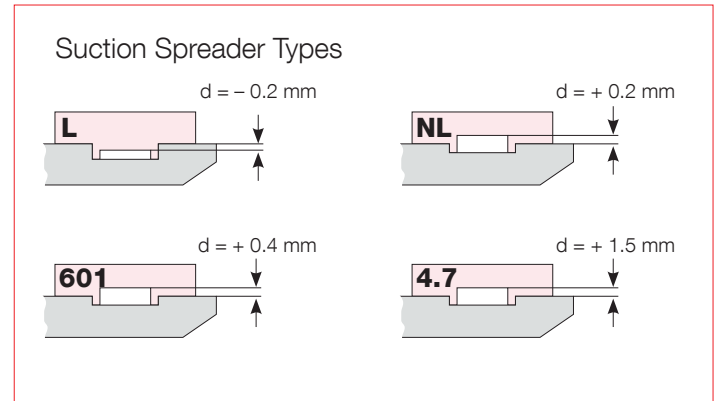
The suction and spread units ensure even filling of the disk slot (spreader) and proper exhaust of the powder into the powder hose (suction).

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

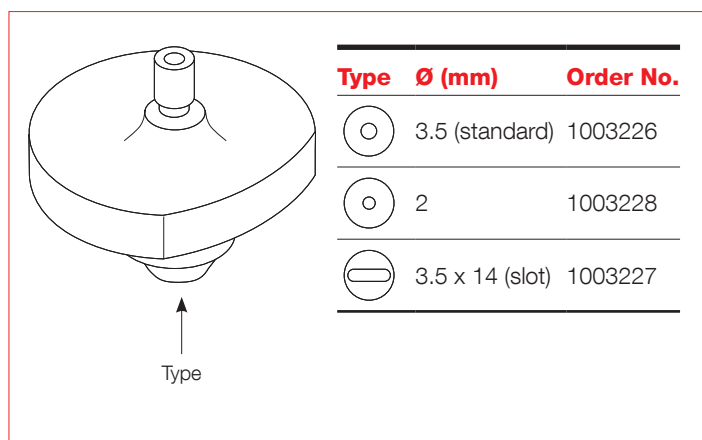
Powder hoses are available with different inner diameters, lengths and of different materials for various feed conditions.

| 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.

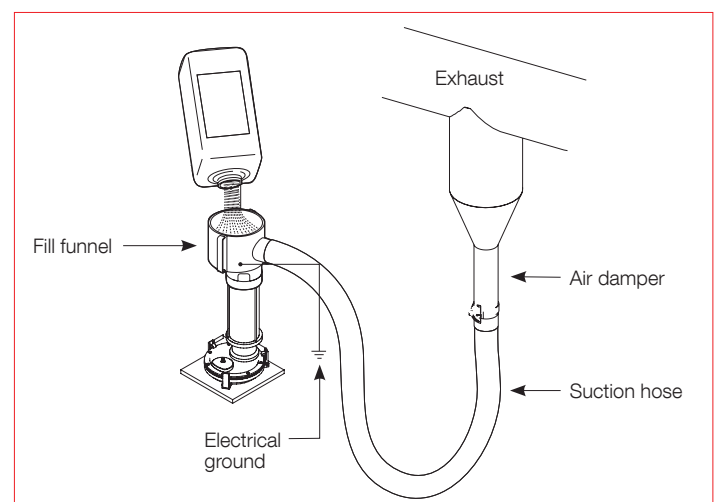
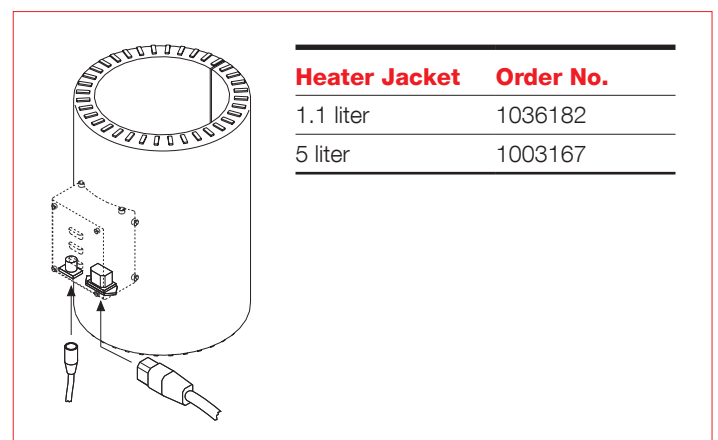


2.8 Powder Filling Options

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.

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.



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

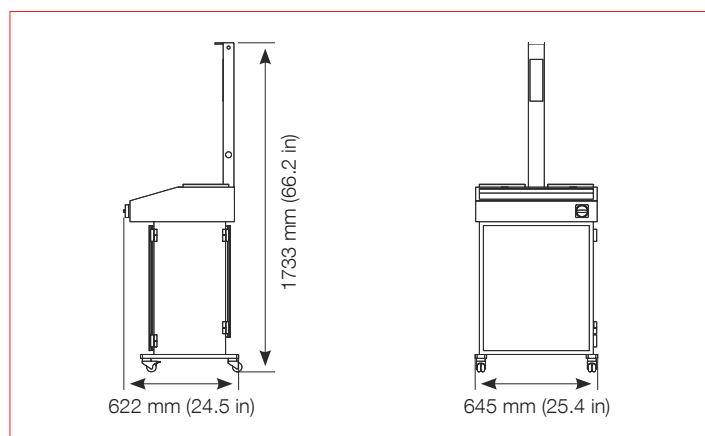
- Proven and reliable powder feed technology
- Suitable for thermal spray, laser cladding and powder-fed additive manufacturing systems
- Operates as a standalone unit or fully controlled via a system controller
- Feeds powders with very high precision
- Reproducible powder flow during long operating 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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