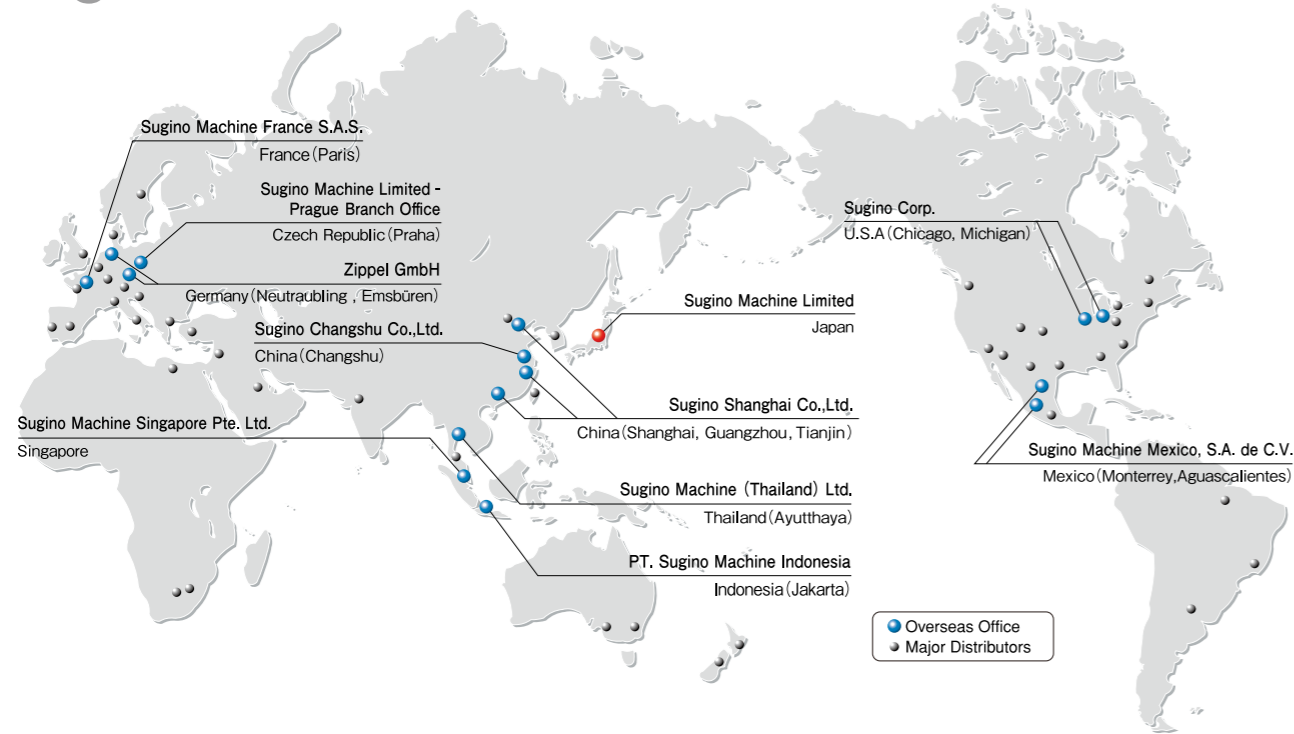


Sugino Global Network



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SUGINO



Multipurpose Highly Efficient Washing System

Jet Clean Center™ series



Total Solution-Wash / Deburr to Part Cleanliness Assessment

Since its introduction in 1998, the Jet Clean Center (JCC) has been well received among many worldwide customers. Now, Sugino is proud to introduce a New and Improved JET CLEAN CENTER family of fully programmable modular machines and the equipment needed to support the washing and deburring process. Creating this family of modular machines responds to our customer's requests to offer total solutions for washing and deburring to final part cleanliness assessment.

Fully proven and highly dependable performance

Our highly washing performance created by Sugino's original pump and unit has been valued by industries including the automotive for more than 15 years.

MC-based, easy to introduce washing machine

The basic operation is just the same as a vertical machining center; it does not require special skills, you can operate right after the introduction.

No limit to conveyor system

We suggest the best conveyor solution and system that will fit your production schedule. As well as the complete automation line of the gantry loader and conveyor, we also accumulate know-how of stand alone batch production and/or random production of multiple products. We offer solution the best in any situations.

Applicable to a Wide Variety of Workpieces

Looking for a system that works for deburring and/or removal of chips? We suggest systems not only meet the automotive industry's needs, but systems that meet a wide variety of customers' needs.

Washing Sample / ABS Valve Body

Material of workpiece : Aluminum
Pressure : 50MPa



Before Washing After Washing

Washing Sample / Hydraulic Body

Material of workpiece : Aluminum
Pressure : 30MPa



Before Washing After Washing



Satisfying After-sales Support

We have our network of services all over the world. Because all products, from the machine body itself to high-pressure pump and high-pressure device, are made in-house, we can provide you prompt and reliable support.

Contents

Family of Versatile Washing/Deburring Machines

The series of washing/deburring solutions includes turret type machines, submerged washing technology, drying equipment, and equipment for measuring cleanliness. Improved cost effectiveness is achieved using common components across machine types.



CNC Turret Type High Pressure Cleaning and Deburring Machine p4/6

Jet Clean Center-WIDE
Jet Clean Center-SLIM

List of Equipment p8-9

* Special-cover specification



CNC Turret Type Submerged Parts Washing Machine p5/7

Jet Clean Center-U-Jet

List of Equipment p8-9

* Special-cover specification



Air Blow Dryer p10

Jet Clean Center-BLOW

Vacuum Dryer p10

Jet Clean Center-Vacuum Dry

* Special-cover specification



Washing System p11

CNC Turret Type High Pressure Cleaning and Deburring Machine

Jet Clean Center-WIDE / Jet Clean Center-SLIM

Features

High Accuracy Target Washing

With CNC control, 0.08mm positioning contributes to highly accurate and efficient washing.

Total Removal of Any Chips and Burrs

We correspond to various workpieces by offering washing nozzle attachments such as L type nozzle and twin nozzle, and deburring tools. - Please see page 6 for details.

Corresponding to Automatic Transfer Line

Best modular type washing machine suitable for gantry loader, conveyer, and robot transfer.

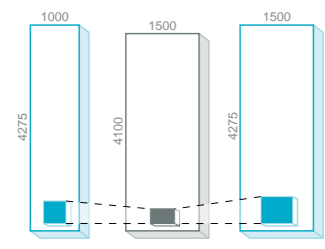
Varied Options

We offer suitable options for workpiece such as tables and filters. Please see page 8 and 9 for details.

Wider Washing Area

JCC-WIDE - same machine width as the JCC (conventional model) at 1,500mm, yet provides X-axis stroke of 650mm.

JCC-SLIM - even with the machine width at 1,000mm, it will handle the same part size as the conventional model.



| Applicable Stroke | | |
|-------------------|--------------------------|--------------|
| JCC-SLIM | JCC (conventional model) | JCC-WIDE |
| X-axis : 460 | X-axis : 500 | X-axis : 650 |
| Y-axis : 460 | Y-axis : 300 | Y-axis : 500 |
| Z-axis : 500 | Z-axis : 300 | Z-axis : 500 |



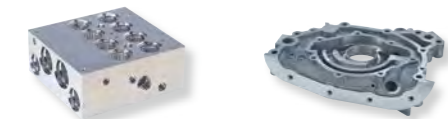
This CNC turret type cleaning and deburring machine is capable of jetting high pressure water of 50MPa (MAX) from a CNC positioned nozzle to the cross holes, deep holes and tap holes to totally remove chips and burrs. SLIM and WIDE machines are available depending on the installation space and workpiece size.

Applicable Work

JCC-WIDE Cylinder head, Cylinder block, Crankshaft, Stator housing for EV, Transmission parts, etc.



JCC-SLIM ABS Housing, Valve body, Pump body, Brake calipers, etc.



JCC-W6650
CE



JCC-S6450

(Special-cover specification)

CNC Turret Type Submerged Parts Washing Machine

Jet Clean Center-U-Jet

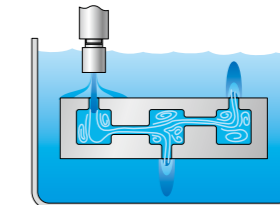


Synergy effect between the 7 MPa HP Jet and cavitation efficiently and effectively removes debris from complex features within a part.

Features

Best suited for complex-shaped workpieces

Submerged washing demonstrates power in washing inside the workpiece. By the synergistic effect of high-pressure jet and cavitation, it removes residual chips completely from complex workpieces like water jacket.



Effectively and aggressively washes and removes debris from areas within a part that cannot be reached directly with a high pressure nozzle.

Target Washing at High Accuracy

Highly accurate and efficient washing is achieved utilizing the CNC control and positioning accuracy of 0.08 mm.

Applicable to both Submerged & Open-air Washing

Submerged and open air high pressure washing can be combined into one machine saving cost and floor space.

Horn Nozzle for Submerged Washing

Cavitation bubbles are effectively created by Sugino's original Horn Nozzle design.



Underwater jetting taken by high speed camera

Applicable Work

Cylinder head, Cylinder block, Valve body, etc.



Washing Sample / Cylinder Head

Material of work piece : Aluminum
Pressure : 5MPa



Before Washing

After Washing



JCC-W6635UE

CE

(Special-cover specification)

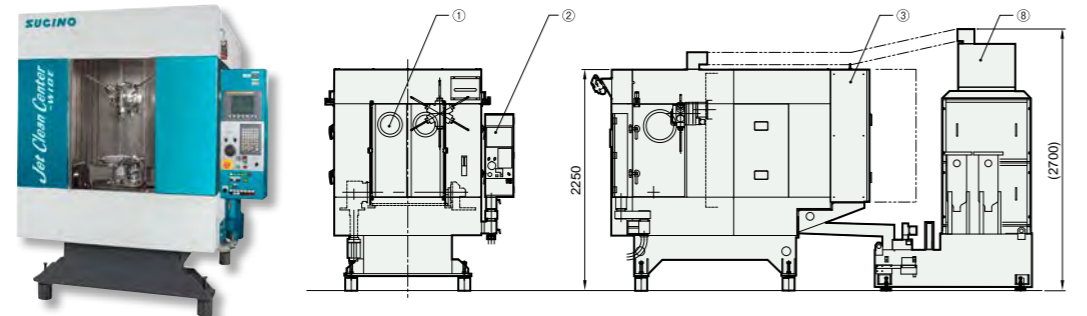
Specifications

| Item | Model | JCC-WIDE | JCC-SLIM |
|-------------------------------|------------------|---|-------------------|
| | | JCC-W6650 | JCC-S6450 |
| Pressure | MPa | Max.50 | |
| Flow Rate | L/min | 18 (At 50MPa) | |
| Stroke | X axis | 650 | 460 |
| | Y axis | 500 | 460 |
| | Z axis | 500 | 500 |
| Rapid Feed Speed (X,Y,Z axes) | m/min | 48 | |
| Main Spindle Speed | mm ⁻¹ | Max.1,000 | |
| Positioning Accuracy | mm | 0.08 (Total Stroke) | |
| Repeatability | mm | ±0.05 | |
| Number of Tools | — | Max.6 | |
| Indexing Time | sec | 0.5 (Random Shortest Approach by CNC Control) | |
| Machine Dimensions (WxDxH) | mm | 1,500x4,275x2,700 | 1,000x4,275x2,700 |
| Machine Weight | kg | 4,000 | 3,000 |
| Controller | — | FANUC Oi-MD | |
| Power Capacity | kVA | 45 | |

Dimensions
Sample layout

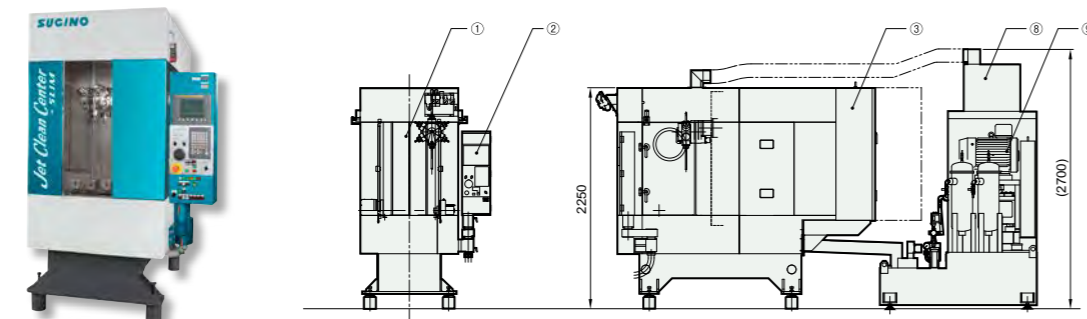
JCC-WIDE

- ① Slide Door
- ② Operation Panel
- ③ Electrical Cabinet
- ④ Primary (Dirty) Tank
- ⑤ Oil Skimmer
- ⑥ Bag Filter (Standard : 1)
- ⑦ Secondary (Clean) Tank
- ⑧ Mist Collector
- ⑨ Sugino High Pressure Pump



JCC-SLIM

- ① Slide Door
- ② Operation Panel
- ③ Electrical Cabinet
- ④ Primary (Dirty) Tank
- ⑤ Oil Skimmer
- ⑥ Bag Filter (Standard : 1)
- ⑦ Secondary (Clean) Tank
- ⑧ Mist Collector
- ⑨ Sugino High Pressure Pump



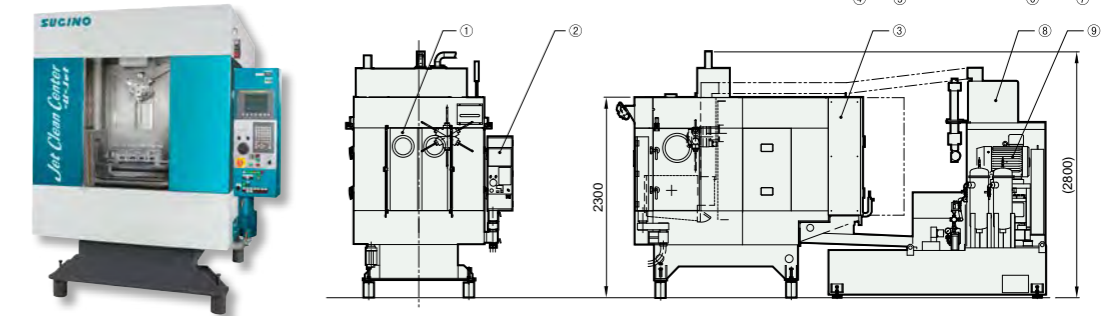
Specifications

| Item | Model | JCC-U-Jet |
|-------------------------------|------------------|---|
| | | JCC-W6635UE |
| Pressure | MPa | Max. 35 (Open-Air) / Max.7 (Submerged) |
| Flow Rate | L/min | 29 |
| Stroke | X axis | 650 |
| | Y axis | 500 |
| | Z axis | 350 |
| Rapid Feed Speed (X,Y,Z axes) | m/min | 48 |
| Main Spindle Speed | mm ⁻¹ | Max.1,000 |
| Positioning Accuracy | mm | 0.08 (Total Stroke) |
| Repeatability | mm | ±0.05 |
| Number of Tools | — | Max.6 |
| Indexing Time | sec | 0.5 (Random Shortest Approach by CNC Control) |
| Machine Dimensions (WxDxH) | mm | 1,500x4,725x2,800 |
| Machine Weight | kg | 5,000 |
| Controller | — | FANUC Oi-MD |
| Power Capacity | kVA | 45 |

Dimensions
Sample layout

JCC-U-Jet

- ① Slide Door
- ② Operation Panel
- ③ Electrical Cabinet
- ④ Primary (Dirty) Tank
- ⑤ Oil Skimmer
- ⑥ Bag Filter (Standard : 1)
- ⑦ Secondary (Clean) Tank
- ⑧ Mist Collector
- ⑨ Sugino High Pressure Pump



* Single spindle type is also available. Please inquire details to nearby sales office.

JCC-WIDE/JCC-SLIM List of Equipment

●: Included as Standard ○: Option Items

| Machine Body | JCC-WIDE/SLIM | JCC-U-Jet |
|------------------------------------|-------------------------|-----------|
| ◆ Tooling (See right illustration) | | |
| ◆ Washing Nozzle Options | | |
| Direct Nozzle | | |
| Flat Spray Nozzle | | |
| Lance Nozzle | | |
| L-type Nozzle | | |
| Multi-Nozzle | ● Standard: 3 positions | |
| Twin Nozzle | ○ Option: 3 positions | |
| Offset Nozzle | | |
| Horn Nozzle(JCC U-Jet only) | | |
| ◆ Deburring Tool | | |
| Drill / Special Deburring Tool | | |
| Drill / Special Deburring Tool | | |
| ◆ Table (See page 9) | | |
| ◆ CNC Index Table (Single Station) | | ○ |
| ◆ Pallet Shuttle Table | | ○ |
| ◆ 180°Turntable | ○ | — |
| ◆ Exhaust Device | | |
| ◆ Mist Collector (0.4kW) | | ● |
| ◆ Mist Collector (0.75kW) | | ○ |
| ◆ Air Blow Unit | | ○ |
| ◆ Air Blow | | ○ |
| ◆ Auto Lube Device | | ● |
| ◆ Slide Door | | ○ |
| ◆ Revolving Light / Signal Light | | ○ |
| ◆ Fixture and Clamp Device | | ○ |
| ◆ Auto Loader | | ○ |
| ◆ Ceiling Auto Door | | ○ |
| ◆ Area Sensor / Light Curtain | | ○ |
| ◆ Air Gun | | ○ |
| ◆ Coolant Gun | | ○ |
| ◆ Part Type Detector | | ○ |
| ◆ Specified Paint | | ○ |
| ◆ Inside Light | | ○ |
| ◆ Standard Cover | | ● |
| ◆ Special-Cover | | ○ |

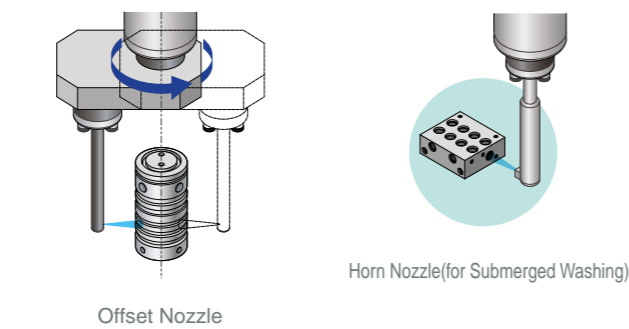
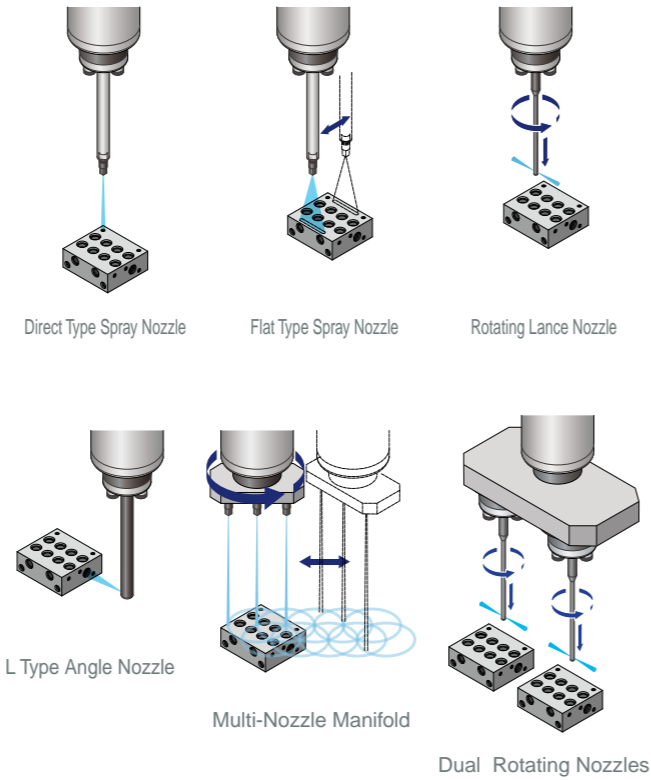
| Pump Station (See page 9) | JCC-WIDE/SLIM | JCC-U-Jet |
|--------------------------------------|-----------------------|-----------|
| ◆ High Pressure Pump | | |
| HP Pump (50MPax18L) | | |
| HP Pump (35MPax29L) | | |
| HP Pump (20MPax50L) | | |
| ◆ LP Washing Pump (1.1kW) | | ○ |
| ◆ Filter Pump | | |
| Filter Pump (0.55kW) | | ● |
| Filter Pump (1.5kW) | | ○ |
| ◆ 3-Way Cylinder Valve | | ● |
| ◆ Primary (Dirty) Tank (200L/880L) | ●(200L) | ●(880L) |
| ◆ Secondary (Clean) Tank (450L/550L) | ●(550L) | ●(450L) |
| ◆ Primary Filter | | |
| Basket Filter | | ● |
| Rotary Filter | | ○ |
| Magnet Separator | | ○ |
| Drum Filter | | ○ |
| ◆ Secondary Filter | | |
| Bag Filter | ● Standard: 1 | |
| Cyclone Filter | ○ Option (Standby): 1 | |
| ◆ Oil Skimmer | | ● |
| ◆ Liquid - Level Gauge | | ● |
| ◆ Washing Coolant Warming Heater | | ○ |

Nozzles

A variety of available nozzles are selected based on the application.

3 nozzles are included as standard, optional up to 6.

Washing Nozzle Options



Deburring Tools



Table (Fixture Platform, Optional Equipment)

Combining table axis and spindle axis to wash 6 faces.



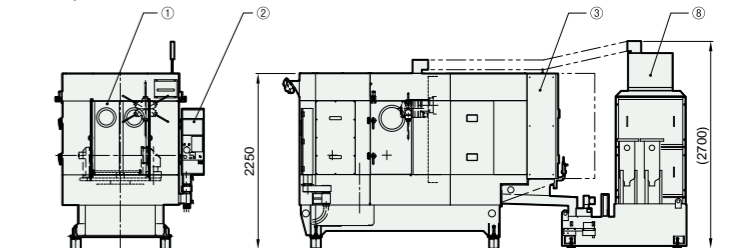
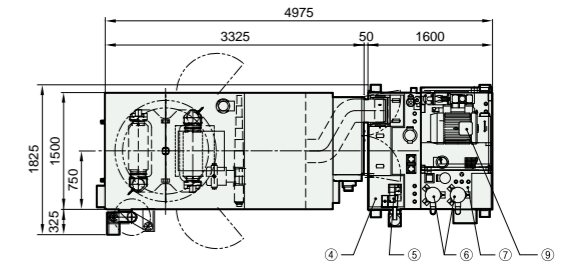
Servo Driven 4th Axis Index Table



Pallet Shuttle Table

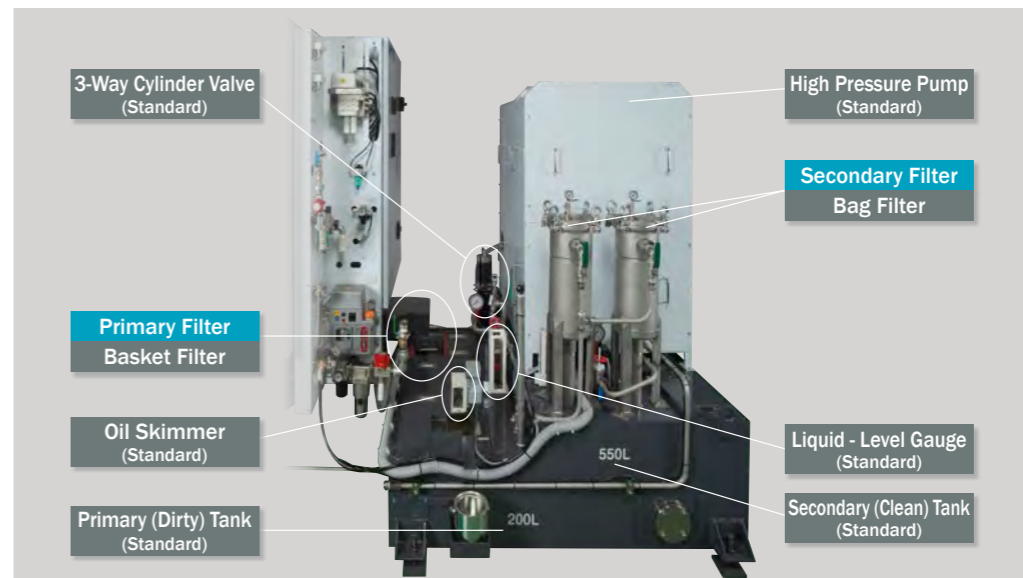
JCC-WIDE 180°Turntable (Sample Layout)

- ① Slide Door
- ② Operation Panel
- ③ Electrical Cabinet
- ④ Primary (Dirty) Tank
- ⑤ Oil Skimmer
- ⑥ Bag Filter (Standard : 1)
- ⑦ Secondary (Clean) Tank
- ⑧ Mist Collector
- ⑨ Sugino High Pressure Pump



Pump Station

A variety of optional equipment is offered based on the application. Flexible pump layout.



Primary Filter

Standard Equipment



Basket Filter

Optional Equipment



Magnet Separator

Optional Equipment



Drum Filter

Secondary Filter

Standard Equipment



Bag Filter(Standard:1)

Optional Equipment



Cyclone Filter

Air Blow Dryer

Jet Clean Center-BLOW



Combining the rotating action of a 4th axis table with multiple air nozzles configured in 3 directions to effectively dry parts.

Features

Highly Efficient Drying

High speed 4th axis table and multiple nozzles improve drying efficiency and cycle time.

Energy Saving

Energy saving is achieved when an optional regenerative type blower is used.

Low Acoustic Noise

A sealed structure limits noise levels to less than 80dB creating a safer working environment.



JCC-BL55
(Special-cover specification)

Vacuum Dryer

Jet Clean Center-Vacuum Dry

A high drying standard is accomplished using a vacuum pump to generate a vacuum of less than 10 torr in the chamber to evaporate remaining moisture.

Features

Dry Any Part Features

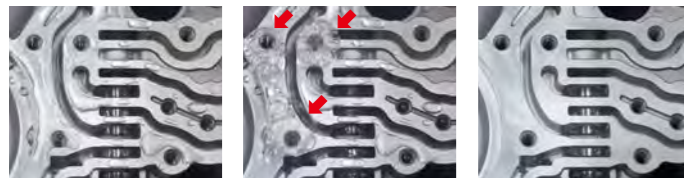
Trapped moisture in deep drilled and tapped holes and other complicated features can be evaporated from a part.

No Large Amount of Air Supply Needed

Energy is saved since no large amount of air supply is required.

Part Cooling Process Not Necessary

Vacuum drying and lowering the part temperature simultaneously eliminates cooling processes prior to inspection.



Before Drying Drying (Evaporating) After Drying



JCC-VCD55
(Special-cover specification)

* Please inquire details to nearby sales office.

Washing System Examples

From washing to drying, Sugino consistently offer total solutions.

We suggest conveyor solution and system that will fit your production plan.

Example 1

Combination of JCC-U-Jet and JCC-Vacuum Dry with a conveyor system

Combination of JCC-U-Jet and JCC-Vacuum Dry is equipped with automatic conveyor and automatic retractable systems. Realized complete drying after removing residual chips and burrs inside the workpiece. This is particularly effective to cylinder block and head, valves for construction machines.



Example 2

Combination of JCC-U-Jet and JCC-BLOW with a gantry loader

This is a combination of a gantry loader, JCC-U-Jet, JCC-BLOW. By adding extra JCC units, it corresponds to line cycle time within 30 seconds.



Example 3

Combination of JCC-WIDE and JCC-Vacuum Dry by a robot

Combination of JCC-WIDE and JCC-Vacuum Dry with an articulated robot. It is flexible to changing of production plan due to the replacement of new models and/or layout modification associated with relocation.

