Quick start guide
H-5800-1158-02-D

QuantAM/QuantAM dental 2018
build preparation software
This quick start guide covers the Renishaw QuantAM/QuantAM dental build preparation software version 2018.

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**Patents**

Features of the Renishaw QuantAM/QuantAM dental build preparation software are the subject of one or more of the following patents and/or patent applications:

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<th>CN 105102160</th>
<th>CN 105228775</th>
<th>CN 105492981</th>
<th>CN 107206484</th>
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<td>WO 2017/055853</td>
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1 Disclaimer and trademarks

1.1 Disclaimer

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1.3 Warranty

Equipment requiring attention under warranty must be returned to your equipment supplier.

Unless otherwise specifically agreed in writing between you and Renishaw, if you purchased the equipment from a Renishaw company, the warranty provisions contained in Renishaw’s CONDITIONS OF SALE apply. You should consult these conditions in order to find out the details of your warranty but, in summary, the main exclusions from the warranty are if the equipment has been:

- neglected, mishandled or inappropriately used; or
- modified or altered in any way except with the prior written agreement of Renishaw.

If you purchased the equipment from any other supplier, you should contact them to find out what repairs are covered by their warranty.

1.4 Changes to equipment

Renishaw reserves the right to change equipment specifications without notice.
2 Setup

2.1 Install and activate

1. After you have purchased QuantAM 2018 you will receive an email from Renishaw.

2. Follow the instructions in the email to install and activate Renishaw QuantAM 2018.

2.2 Configure

1. The QuantAM 2018 software is pre-configured for Renishaw additive manufacturing systems.

2.3 PC hardware

- Operating system – Windows 7/10 Professional/Enterprise/Ultimate – 64 bit
- Memory – recommended allocation 16 Gb RAM (8 Gb minimum)
- Graphics card – NVIDIA Quadro FX (Any graphics card supporting DirectX 9 and above)
- Hard drive size – Minimum of 10 Gb free space required for installation
- Hard drive type – SSD (Solid State Drive) will result in faster computational speeds

**Note:** The QuantAM User interface can be used with a regular Windows compatible mouse or a space mouse.
3 User interface

3.1 Introduction

The User interface of QuantAM/QuantAM dental 2018 is described in the following sections:

1. Start page – Section 3.2.
2. Generic QuantAM functions – Section 3.3.
8. QuantAM 2018 Dental – Section 3.9.
Quick start guide

3.2 Start page

1. New
2. Open
3. ?
4. i
5. (6)
6. (6)
1 Start
Returns you to the 'Start page' – button has no effect when on the 'Start page'.

2 Settings
Enables you to control various parameters of the build, including 'Build', 'Support', 'Miscellaneous' and if purchased 'Dental'. Within 'Build you can select the type of Renishaw AM system the part will be built on and build volume size – default or reduced build volume (RBV). If you have purchased a QuantAM Dental licence, within 'Dental' you can enable the functionality and enable or disable various parameters, see section 3.9.

3 Help (F1)
Launches the Quick Start Guide. Also launches from the '3D area'.

4 About QuantAM
Displays product licence and trademark information about the Renishaw QuantAM software, the function is also available when a model file is open.

5 Open
Opens a dialog which enables you to choose from an existing workspace containing, Parts – *.stl files, Projects – *.amx files or Scanpaths – *.mtt files. Choosing and opening a Scanpath (*.mtt file) will open MTT viewer. MTT viewer (see Section 3.2.1) enables you to rapidly prepare a build with the file selected, for example where you only wish to make minor revisions to the build file before starting your build.
6  New
Enables you to create a new blank workspace in the Orientation stage of build preparation, into which you can select and import CAD data of the following types (*.catpart, *.sat, *.sab, *.x_t, *.x_b, *.prt, *.stp, *.step, *.sldprt, *.amx, *.dat, *.stl or *.ctm files).

3.2.1 MTT viewer

MTT viewer enables you to rapidly prepare a build with the file selected, for example where you only wish to make minor revisions to the build file before starting your build. MTT viewer enables you to display toolpaths, build times and various other parameters for the build. There is a time-based scroll bar to navigate hatching (the lower bar is coarse and the upper is fine).
3.3 Generic QuantAM functions
1 Navigate to Start Page
Returns you to the 'Start page' – button has no effect when on the 'Start page'.

2 Save (Ctrl+S)
Saves the project (scanpath, model and support) as a QuantAM project file, an *.amx file.

3 Save As (Ctrl+Shift+S)
Saves a copy of the project (scanpath, model and support) as a QuantAM project file, an *.amx file, in a location of your choice.

4 Settings
Enables you to control various parameters of the build, including 'Build', 'Support', 'Miscellaneous' and if purchased 'Dental'. Within 'Build' you can select the type of Renishaw AM system the part will be built on and build volume size – default or reduced build volume (RBV). If you have purchased a QuantAM Dental licence, within 'Dental' you can enable the functionality and enable or disable various parameters, see section 3.9.

5 Undo (Ctrl+Z) and Redo (Ctrl+Y)
Enables you to 'Undo' the last action and revert to the previous state. 'Redo' enables you to redo the previously undone action.

6 Export (Ctrl+E)
Exports models only, supports only, or both as an *.stl file. Export of both only available in 'Orientation' and 'Support' stages of build preparation process.
7 Show/Hide 2D Measurement (K)
Enables you to see a ruler around the edge of the build plate window. The ruler will be in the units of your choice, mm or inches.

8a Perspective View (Ctrl+8)
Perspective view – the rendering is optimised to give a more natural view of the model. Toggle between the two views using the shortcut.

8b Orthographic View (Ctrl+8)
Orthographic view – the model is represented with right angles and parallel lines. Toggle between the two views using the shortcut.

9 Zoom to Extents (Ctrl+0)
Zooms out to fit the entire part to be built into the available window.

10 Help User (F1)
Select the question mark and the Quick Start Guide will launch. Select the down arrow and this displays a flyout with a choice of two Help options, 'Help User' (10a) and 'Keyboard Shortcuts' (10b).

10a Help User (F1)
Launches from the '3D area' in a flyout. Displays the QuantAM Quick start guide. You can browse or search for the information you want.
10b  Keyboard Shortcut (Ctrl+F1)
Launches from the '3D area' in a flyout and displays six grouped lists of keyboard shortcuts. See Section 3.8 for details.

11  Navicube
Enables you to rotate the view of the part around as you wish. You can select pre-determined views by selecting the edges, corners and planes of the Navicube. Alternatively, you can select and drag the Navicube to display a view to suit your needs. Ctrl+9 enables you to toggle between the Navicube views to select the view you want (edges, corners or planes). The direction of the orange arrow identifies the front of the build plate.

12  Choose Material File
Enables you to chose the material file you want for your build. Once the material file is chosen, you can view several tabs containing information about the material file selected. Tabs include 'Slicing', 'Hatching', 'Order' and 'Scanning'. You can also use the drop down to change the selected material file and associated parameters.

13  Orientation
The first stage of the build preparation process. Position your part in the optimal orientation to ensure the best quality build and surface finish.

14  Support
The second stage of the build preparation process. Add support to your model, where required, to enable it to be successfully built.

15  Layout
The third stage of the build preparation process. Layout your models on the build plate to maximise the available space for your build.
Review
The fourth stage of the build preparation process. In Review you generate slices and scanpaths for your model before it is sent to the AM system.

Import CAD data
Opens the 'Import model' dialog which enables you to select the CAD data you wish to import (*.stl, *.amx, *.ctm, *.sat, *.sab, *.x_t, *.prt, *.stp, *.step, *.x_b, *.sldprt, *.iges or *.igs files) into the workspace.

Model thumbnail
Displays a thumbnail of the model files open in the workspace. The orange shadow indicates that the model file is selected.
Part designed and manufactured by HiETA Technologies Ltd on a Renishaw AM system. An Annular Radial Flow Recuperator for a Microgas Turbine System developed in the Innovate UK supported SLAMMIT project in collaboration with Delta Motorsport Ltd.
3.4 Stage 1 of build preparation – 'Orientation'
1 Show/Hide Bounding Box (B)
Enables you to see a bounding box around the model. A bounding box helps you position a model on the build plate and avoid collisions between closely spaced parts. This function is available in the Orientation and Layout stages of build preparation.

2 Show/Hide Support Region Colour (C)
Indicates regions on the part that QuantAM determines needs support adding. Regions highly likely to require support are coloured red and regions that may require support are coloured yellow. This function is available in the Orientation and Layout stages of build preparation.

3 Part Orientation (O)
Enables you to tilt and rotate the model relative to the build plate before supports are added. Values can be added in degrees or dragged.

4 Select Downward Surface (D)
Enables you to select part of the models surface, and set it as the downward facing surface nearest the build plate.

5 Scale Part (X)
Enables you to scale the model within the 3D area. This enables easy upscaling of the part without going back to the CAD data.
6 Z Offset (Q)
Enables you to define the Z offset between the model and the build plate. Z offset gives sufficient distance for suitable supports to be added.

7 Extrude
This enables you to extrude part of your model. This can be useful when small adjustments need to be made to a model without having to go back to the original CAD model. Select the area of the model you wish to adjust, enter the distance you want to adjust it by and select 'Apply'.

8 Orientation Stage
The first stage of the build preparation process. Position your part in the optimal orientation to ensure the best quality build and surface finish.

Note: In the Orientation stage of the build preparation process, if you right-click on the selected model thumbnail, a context sensitive menu will open. The context sensitive menu displays options for the model, see the screen shot below.
Note: In the Orientation and Support stages of the build preparation process, if you select the H keyboard shortcut, QuantAM will highlight the areas where small features are present. This is shown in the screen shot below where the small features of the Renishaw logo are highlighted in black.
Quick start guide

3.5 Stage 2 of build preparation – 'Support'

User interface

20

1 2 3

4 5 6

7 8 9 10

11 12 13

Renishaw QuantAM 2018
1 Export (Ctrl+E)
In the 'Support Stage' this enables you to export 'Only Part', 'Only Support', 'Both Part and Supports' or 'Exposures'. Select the button, this opens the 'Export' dialog where you can choose what to export.

2 Import Supports (Ctrl+I)
Enables you to import externally generated support files in *.stl file format. Select the button, this opens the 'Import supports' dialog, select the supports you want to import and select 'Ok'.

3 Section (V)
Enables you to section the active model, to ease the process of adding support. Selecting 'Section' will display a flyout with three selections available 'Clip all', 'Clip part only' and 'Clip supports only'.

4 Auto Generate Point Supports (A)
Enables you to automatically generate point supports for the model. Progress is displayed on-screen in a progress indicator.

5 Enable/Disable Point Supports (P)
Enables you to generate point support from a user defined point on an overhanging surface of the model.
6 Enable/Disable Line Supports (L)
Enables you to define and generate a line of grouped supports under the model.

7 Enable Region Selection (G)
Enables users to specify areas where support material is required, rather than support material being applied to all downward facing surfaces. It can also enable users to apply different support strategies to specific regions and can be used in conjunction with the 'Show/Hide Support Region Colour' tool (C) and the 'Region Viewer' (R). A slider enables you to select a value between 0 and 15, where 0 is no support and 15 will be all supportable surfaces.

8 Support Selection
Enables you to select supports. Selecting 'Support Selection' will display a flyout with three selections available 'Select all Supports' (Ctrl+A), 'Select Supports Intersecting with Part' (Ctrl+Alt+P) and 'Select all Intersecting Supports' (Ctrl+Alt+A).

9 Support Edit Mode (M)
Select a support and 'Support Edit Mode', this highlights the support and displays a control with three axis around it. The control allows you to drag the support around in three dimensions to achieve the support orientation you want.
10 Display Slices (S)
This enables you to view the model and support slices whilst remaining in the 'Support Stage'. Generating slice progress is displayed on-screen. If you select 'Display Slices' and have not specified a material file you will be prompted to do so before the slices are generated. Once slices are generated slice controls will be displayed, these are 'Slice Properties', 'Go to Next Layer', 'Go to Previous Layer', 'Flip Clipped Region', 'Show/Hide Clipped Region' and 'Update Slices'. See Section 3.7 for details of these functions.

11 Region Viewer (R)
Selecting this displays the 'Region viewer' tools. This enables you to have different support strategies for different regions of a part and to manage, edit and delete these regions. These tools can be floating or docked.

12 Support Stage
The second stage of the build preparation process. Add support to your model, where required, to enable it to be successfully built.

13 Properties – Support
Enables you to set parameters for generated support. Select anywhere on the 'Properties – Support' bar to open the flyout menu and select the chevron to close it. Parameters such as 'Cross Section', 'Cluster Support Settings' and 'Support Type' can be edited as required.
**Note:** If a support is blue, the support is not intersecting the part or another support: dark blue – isolated internal support or light blue – isolated substrate to part support. If the support is red, the support is intersecting another object: dark red – intersecting the part or light red – intersecting another support.

**Note:** In the Support stage of the build preparation process, if you select an individual support and right-click, a context sensitive menu will open. The context sensitive menu displays options for the selected part and supports, see the screen shot below.
Robot Bike Co. R160 frame lugs and inset a complete bike. The frame lugs are made from titanium powder on a Renishaw AM system. To complete the frame, the lugs are bonded to carbon fibre-reinforced tubes.
3.6 Stage 3 of build preparation – 'Layout'
1 **Export MTT (Ctrl+E)**
Select the 'Export' symbol and the 'Export Build' dialog will appear, if no material file has been selected the 'Material Details' dialog will open first, enabling you to select a material for your build. Select the down arrow and this displays a flyout with a choice of three options, 'Export MTT', 'Export STL' and 'Export Other'.

2 **Show/Hide Silhouette (U)**
A simple On/Off button to show and hide the silhouette on the build plate beneath the selected model.

3 **Show/Hide Bounding Box (B)**
Enables you to see a bounding box around the model. A bounding box helps you to position a model on the build plate and avoid collisions with adjacent models.

4 **Show/Hide Build Plate (H)**
A simple On/Off button to show or hide the build plate beneath the selected model.

5 **Rotate Part (R)**
Enables you to rotate the selected model on the build plate. Drag and drop to the angle you want using the angular display in degrees.
6  Instancing (I)
Enables you to make multiple copies of the selected model and place them a user defined distance apart on the build plate. Select your part and either drag the arrow to create multiple instances of the selected model or use the 'Instancing' dialog to define how many copies of the model you want on the build plate in rows and columns.

7  Nesting (N)
This enables you to define the spacing between instances of a part on a build plate. Select the parts, open the 'Nesting' dialog, enter a value equating to the distance you want between parts and select 'Apply'.

8  Translation (Y)
This enables you to move parts by relative or absolute amounts across the build plate in a more precise way than dragging. Select the 'Translation' button, select 'Absolute' or 'Relative' enter the values you wish to move the parts by in X and Y axis and select 'Apply'.

9  Material viewer
Enables you to view several tabs containing information about the build. The tabs include 'General', 'Strategy', 'Control', 'Order', 'Volume', 'Upskin', 'Downskin', 'Scan Volume', 'Scan Upskin', 'Scan Downskin', 'Scan Exposures' and 'Shrinkage Factors'. There are buttons to enable you to 'Import a CSV File (Ctrl+I)', 'Export the Selected Tab to CSV File' or 'Export All to CSV File (Ctrl+E)'. These tools can be floating or docked. This also enables you to select a different material for each part.
10 Layout
The third stage in the build preparation process. This enables you to layout the models on the build plate.

11 Properties – Layout
Enables you to view parameters for the layout. Select anywhere on the 'Properties – Layout' bar to open the flyout menu and select the chevron to close it. Parameters include 'Part Name', 'Part ID', 'Part Z Height', 'Number of Layers', 'Part Volume' and Total Support Volume' can be viewed.

Note: In the Review stage, the model(s) can be re-positioned on the build plate by selecting the model, holding the Alt key and dragging the model to the desired position.

Note: In the Review stage, the front edge of the build plate (the edge nearest the AM system door) is indentified by a black dot.

Note: In the Review stage, you can create more than one layout for the part. Each layout can have a different material file. All layouts will be saved in the same QuantAM project file (*.amx).
3.7 Stage 4 of build preparation – 'Review'
1 Theme (Ctrl+T)
In the 'Review' stage of build preparation, this enables you to change the
colour theme for the scanpath and layers according to preference.

2 View Part and Layer (Ctrl+J)
'View part and layer' enables you to toggle between 'View Part and Layer'
or 'View only Layer'.

3 Exposure Lines (Ctrl+H)
Enables you to toggle between a view the scanpath as 'Exposure Lines',
'Exposure Points' or as an 'Energy Density Map'. In an 'Energy Density
Map' red indicates areas of high energy density and green indicates areas
of lower energy density.

4 Slider bar pointer
Enables you to move the slice point through the build. Select and drag the
slider to the slice you want to see, the slice number is displayed below the
slider.

5 Slice number indicator
Displays the slice number you are currently viewing. Select the number,
type the slice number you want to see and select 'Return'.
6 Go to Next Layer
Shows the 'Next Layer'.

7 Go to Previous Layer
Shows the 'Previous Layer'.

8 Flip Clipped Region
Reverses the direction of the visible model in the cut plane progression, not available for a transparent model.

9 Show/Hide Clipped Region
Enables you to toggle between viewing the transparent model and the solid model.

10 Slice Properties
Selecting this opens the 'Slice Properties Viewer' and displays information about the build including the 'Sr. No.', 'Z offset' and 'Status'.

11 Steps through the Scan Blocks (F2)
This enables you to step scan line by scan line through each layer of the build, to see the order and sequence of each line of each layer of the build. Selecting this will open a slider bar that displays the position of the laser within every layer. Buttons for 'Previous Move' and 'Next Move' are displayed.
12 Material Details
Enables you to chose the material file you want for your build. Once the material file is chosen, you can view several tabs containing information about the material file selected. Tabs include 'Slicing', 'Hatching', 'Order' and 'Scanning'. You can also use the drop down to change the selected material file and associated parameters.

13 Review
The fourth stage in the build preparation process. The tools in review enable you to review slices and scanpaths for the build.

14 Properties – review
Enables you to view individual parameters of the properties. Click anywhere on the bar to open the flyout menu and click the chevron to close it. Information including 'Build Time', 'Total Costs', 'Build Information', 'Machine Information', 'Build Parameters' and 'Cost Parameters' can be viewed.
3.8 Keyboard shortcuts

There are six groups of keyboard shortcuts. They are as follows:

1. Mouse Control – Section 3.8.1.
2. Common Shortcuts – Section 3.8.2.
3. Orientation Stage – Section 3.8.3.
4. Support Stage – Section 3.8.4.
5. Layout Stage – Section 3.8.5.

The six groups are described in the following sections.

3.8.1 Mouse Control

Scene Rotation – Left Button  
Pan Operation – Right Button
Zoom Camera – Mouse Scroll

3.8.2 Common Shortcuts

Fit to Screen – Ctrl+0  
Top View – Ctrl+1
Bottom View – Ctrl+2  
Front View – Ctrl+3
Back View – Ctrl+4  
Left View – Ctrl+5
Right View – Ctrl+6  
Isometric View – Ctrl+7
3.8.3 Orientation Stage

Part Orientation – O
Scale Part – X
Extrude Part – E
Show/Hide Support Region Colour – C
Wireframe – W
Undo – Ctrl+Z
Export Part – Ctrl+E

3.8.4 Support Stage

Auto Supports – A
Enable/Disable Point Support Mode – P
Region Selector – G
Select all Intersecting Supports – Ctrl+Alt+A
Support Edit Mode – M
Section – V

Auto Minima Supports – M
Enable/Disable Line Support Mode – L
Select all Supports – Ctrl+A
Select all Part Intersecting Supports – Ctrl+Alt+P
Slicing – S
Region Viewer – R
**User Interface**

Show/Hide Support Region Colour – C
Select/Deselect Multiple Instances – Ctrl+Left Click
Delete Support – Delete
Model Transparent/Opaque – T
Hard Edges – H
Redo – Ctrl+Y
Import Supports – Ctrl+I

Toggle Support Clipping Options – Ctrl+K
Enable/Disable Line Support Mode – Right Button Click
Translate Supports – Alt+Left Click+Drag
Wireframe – W
Undo – Ctrl+Z
Export Parts/Supports – Ctrl+E

**3.8.5 Layout Stage**

Hide Substrate – H
Show Silhouette – U
Instancing – I
Translation – Y
Paste – Ctrl+V

Move Part – Alt+Left Click+Drag
Undo – Ctrl+Z
Export MTT – Ctrl+E
Material Viewer – Ctrl+M

Show/Hide Bounding Box – B
Show Rotation Tool – R
Nesting – N
Copy – Ctrl+C
Select/Deselect Multiple Instances – Ctrl+Left Click
Delete Instance – Delete
Redo – Ctrl+Y
Select all Instances – Ctrl+A
3.8.6 Review Stage

Hide Substrate – H
Show Previous Slice or Scanpath – Page Down
Show Last Slice or Scanpath – End
Toggle Part Layer View – Ctrl+J
Material Viewer – Ctrl+M
Model Transparent/Opaque – T

Show Next Slice or Scanpath – Page Up
Show First Slice or Scanpath – Home
Toggle Colour Theme – Ctrl+T
Toggle Exposure – H
Steps Through the Scan Blocks – F2
Export MTT – Ctrl+E
3.9 QuantAM 2018 Dental

Diagram showing the settings panel with various options such as Build, Support, and Miscellaneous. Specific numbered elements likely correspond to different settings or features within the software.

Key points:
1. Dental Plugin
2. Auto Orientation
3. Auto Nesting
4. Auto Tag Creation
5. Auto Support Generation
6. Default Support Style (Fine supports)
7. Numbers 7 and 8 may refer to specific settings or options within the user interface.

User Interface
If you have purchased a QuantAM Dental licence, from 'Settings', 'Dental' you can select the functionality you want to enable and disable using toggles.

1. **Dental Plugin**
   This enables you to toggle 'On' or 'Off' the Dental features within QuantAM Dental 2018.

2. **Auto Orientation**
   This enables you to toggle 'On' or 'Off' the 'Auto Orientation' feature for parts imported into QuantAM Dental.

3. **Auto Nesting**
   This enables you to toggle 'On' or 'Off' the 'Auto Nesting' feature for parts imported into QuantAM Dental.

4. **Auto Tag Creation**
   This enables you to toggle 'On' or 'Off' the 'Auto Tag Creation' feature for parts imported into QuantAM Dental. Tags can be printed next to each part to enable you to easily identify parts visually. Within QuantAM Dental tags can be searched for to enable you to locate where on a build a specific part is located.

5. **Auto Support Generation**
   This enables you to toggle 'On' or 'Off' the 'Auto Nesting' feature for parts imported into QuantAM Dental.
6 Default Support Style
This drop down enables you to choose whether you want fine, medium or coarse supports for your build.

7 Ok/Cancel
Select to confirm the selection or Cancel and return to the previous screen.

8 Dental
Select this to open the dental drop down and see the range of functionality you want to enable and disable.
If you need support or assistance with QuantAM software please contact Renishaw:

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