OSE 3D Printer Workbench

Release 0.1.0

G Roques

Jun 13, 2020

MAIN TOOLBAR

1 Add Frame 3

2 Add Axis 5

3 Add Heated Bed 7

4 Add Extruder 9

5 Generate Cut List 11

6 Make Angle Frame Connector 13

7 Including Move and Rotate Tools 15

8 ose3dprinter 19

9 Indices and tables 33

Python Module Index 35

Index 37

A FreeCAD workbench for designing 3D printers by Open Source Ecology for Distributive Enterprise.

For more information on codebase conventions and patterns, see the OSE Workbench Platform.

CHAPTER

ONE

ADD FRAME

The **Add Frame** tool adds a Frame to the **active** document.

You can use this to begin designing a D3D Pro printer of any size or axis configuration.

1.1 Custom Properties

Name	Type	Default Value	Description
Has Corners	`Bool`	False	Whether the frame has 3d printed corners or not.
Size	`Length`	304.8 mm	Size or dimension of cubic frame.
Thickness	`Length`	3.175 mm	Thickness of frame.
Width	`Length`	38.1 mm	Width of frame.

1.2 Attaching Axes to the Frame

See Add Axis for details on how to attach axes to the frame.

> **Warning:** In order to attach axes to the frame, the frame must **not** be rotated.

1.3 See Also

- D3D Frame

CHAPTER

TWO

ADD AXIS

There a three tools in the main toolbar to add a Axis, or Universal Axis object in different orientations to the **active** document:

1. Add X Axis
2. Add Y Axis
3. Add Z Axis

2.1 Custom Properties

Name	Type	Default Value	Description
Carriage Position	`Percent`	50	Position of carriage relative to available rod.
Length	`Length`	304.8 mm	Length of axis corresponds to rod length.
Orientation	`String`	x	Orientation of axis: X, Y, or Z.
Rod Diameter	`Length`	8 mm	Diameter of rod.
Side	`String`	top	Which side the bottom of the axis faces.

2.2 Attaching Axes to the Frame

You may attach axes to the frame by selecting one of it's outer faces, and then clicking a button in the main toolbar to add a axis.

Only certain axes can be attached to certain faces or sides of the frame based on it's orientation.

Axis Orientation	Attachable Side(s)
X	Top
Y	Left, Right
Z	Front, Rear

Note: You cannot attach an axis to the **Bottom** face or side of the frame.

The axis-frame attachment logic assumes the frame is **not** rotated, and determines whether the user is attaching the axis to the appropriate side of the frame based on whether the selected face is parallel to the XY, YZ, or XZ plane.

Tip: See the **Report View** for attachment troubleshooting.

CHAPTER

THREE

ADD HEATED BED

The **Add Heated Bed** tool adds a heated bed to the **active** document.

3.1 Custom Properties

Name	Type	Default Value	Description
Size	`Length`	203.2 mm	Size or dimension of heated bed.

3.2 Centering Heated Bed to Frame & Elevating to Z Axes

1. Hold-down `Ctrl` key for selecting multiple objects
2. Select one Z axis
3. Select the Frame
4. Click the **Add Heated Bed** button on the main toolbar

3.3 See Also

- D3D Heated Bed
- Heated Bed

CHAPTER

FOUR

ADD EXTRUDER

The **Add Extruder** tool adds an extruder to the **active** document.

4.1 Attaching Extruder to X Axis Carriage

An extruder can be attached to the carriage of the top X axis by selecting the top face of the carriage, and then clicking the **Add Extruder** button in the main toolbar.

4.2 See Also

- D3D Extruder
- File:Simpleextruderassy.fcstd
- File:Finalextruder.png

CHAPTER

FIVE

GENERATE CUT LIST

There are two options in the main menu to generate a cut list:

1. Copy Cut List to Clipboard
2. Save Cut List as CSV

Both options generate a cut list with the following:

- **Rods** for axes, heated bed, and spool holder
- **Angled bars** to construct a frame with 3d printable corners

5.1 How it Works

Each option queries the **active** document for Axis objects and the Frame object in order to determine the rods and angled bars for the cut list.

5.1.1 Determining Rod Quantity

- **2** X Axis Rods are added for every X Axis object
- **2** Y Axis Rods are added or every Y Axis object
- **2** Z Axis Rods are added for every Z Axis object
- **3** Spool Holder Rods are added based on the existence of a Frame object
- **2** Heated Bed Rods are added for every pair of Z Axis objects

5.1.2 Determining Rod Length

- X Axis Rod Length is adjusted by **adding 4 inches**
- Y Axis Rod Length corresponds with `Length` of the axis in the document
- Z Axis Rod Length is adjusted by **subtracting 1 inch**
- Length of Heated Bed Rods and **1** Spool Holder Rod are equal to the length of the Frame
- Length of **2** Spool Holder Rods are equal to the length of the Frame **minus 1 inch** (similar to Z axis rods)

5.1.3 Determining Angled Bar Quantity

- **12** Angled Bars are added based on the existence of a Frame object

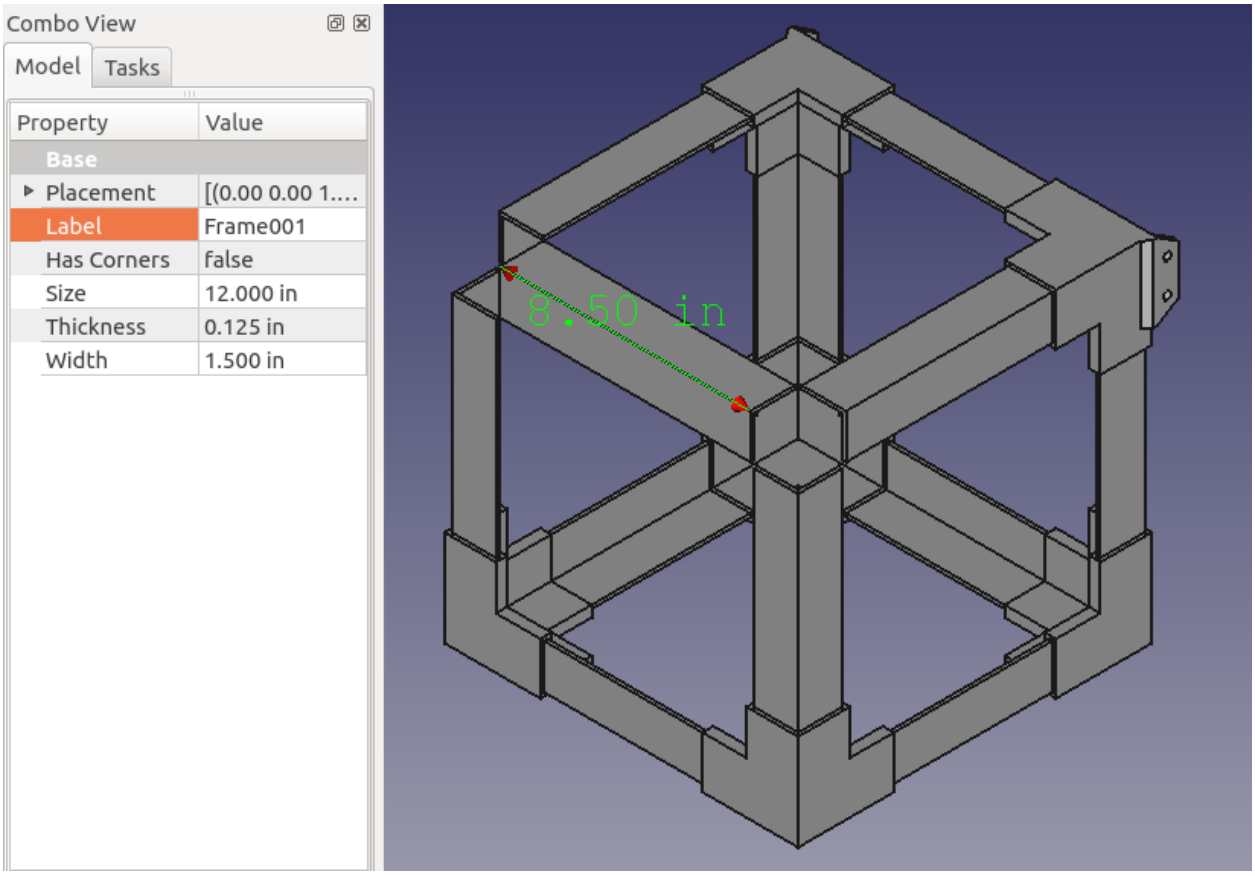
5.1.4 Determining Angled Bar Length

Angled bar length is calculated from the following formula:

```
Frame.Size - ((Frame.Width + (Frame.Thickness * 2)) * 2)
```

For example, a 12 in frame with a 1.5 in `Width` and 0.125 in `Thickness` could have **8.5 in** angled bars.

```
12 in - ((1.5 in + (0.125 in * 2)) * 2) = 8.5 in
```

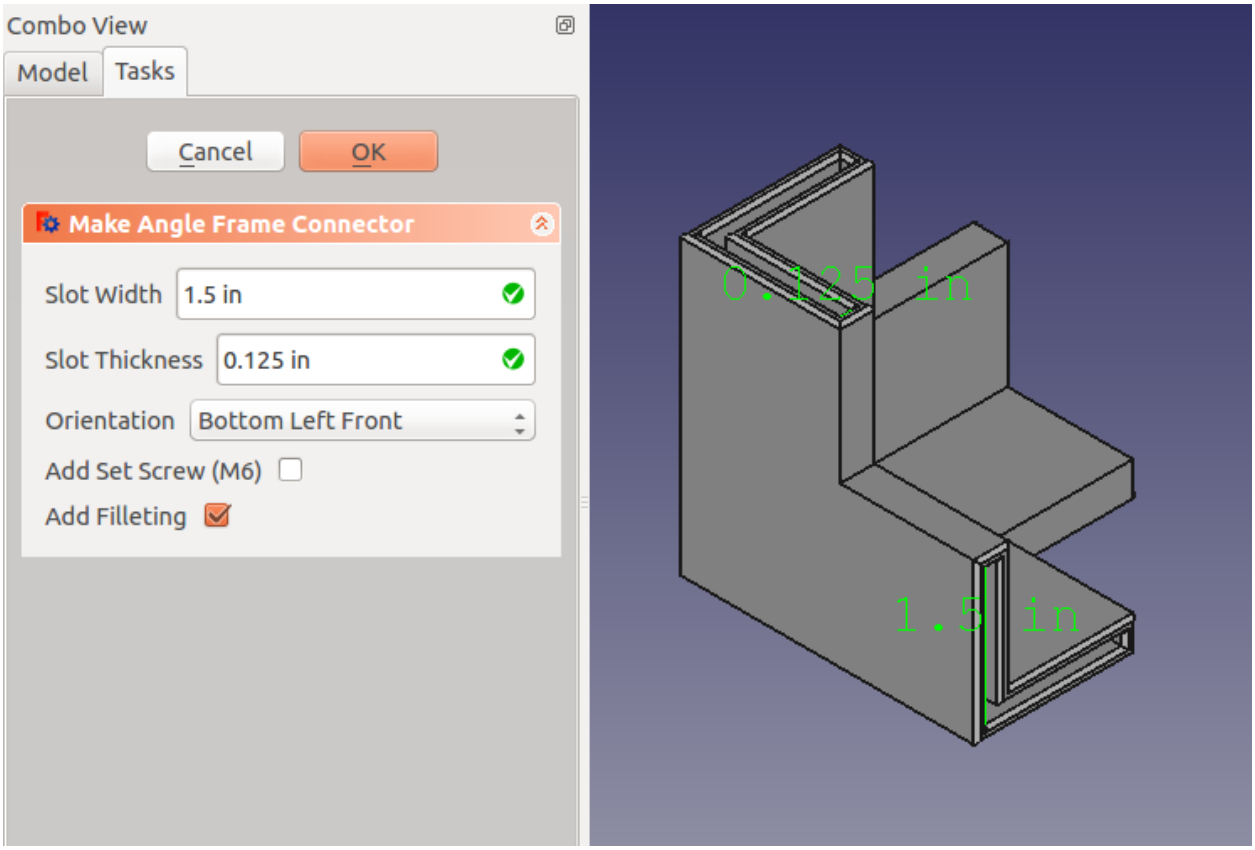


CHAPTER

SIX

MAKE ANGLE FRAME CONNECTOR

The **Make Angle Frame Connector** tool makes a 3D-printable Angle Frame Connector with the specified **parameters** entered from the Task Panel.



6.1 Parameters

Slot Width Width of three inner slots.

Slot Thickness Thickness of three inner slots.

Orientation One of eight possible corners of the frame.

Add Set Screw Whether to add a set screw mechanism.

Useful for larger frames when worried about slips or frame mis-alignment.

> **Attention:** Assumes **M6** set-screw and nut.

Add Filleting Whether to round edges of three inner slots.

> **Tip:** Makes inserting angled bars later a little easier.

6.2 See Also

- FreeCAD Wiki - Export to STL or OBJ

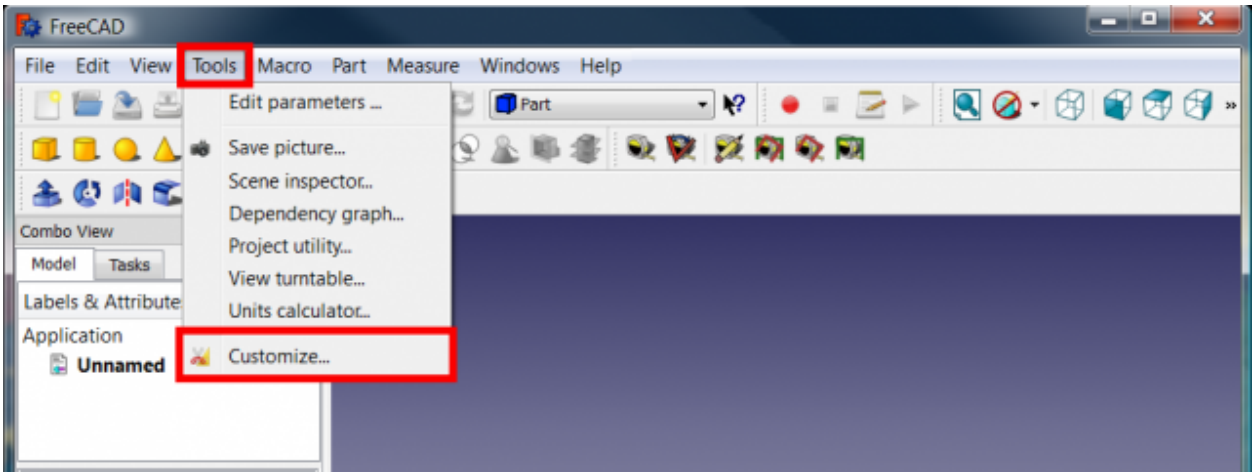
CHAPTER

SEVEN

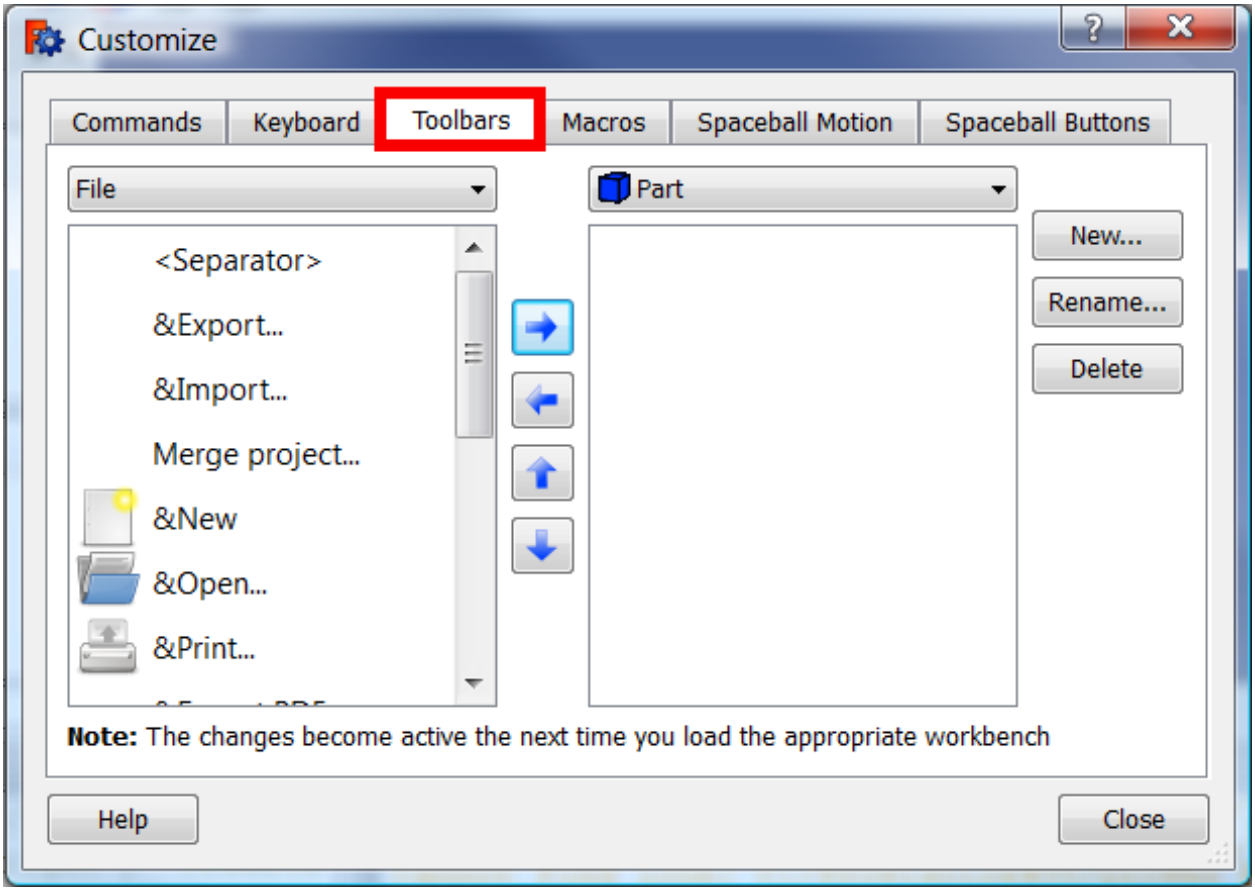
INCLUDING MOVE AND ROTATE TOOLS

This document covers how to include the **Move** and **Rotate** functions of the **Draft Workbench**.

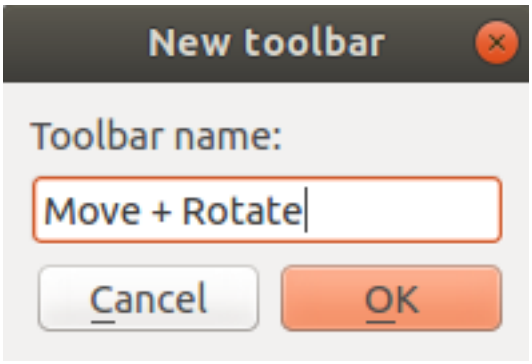
1. Load the Draft Workbench by selecting it from the workbench dropdown.
2. Select **Tools**, and then **Customize** from the Main menu.



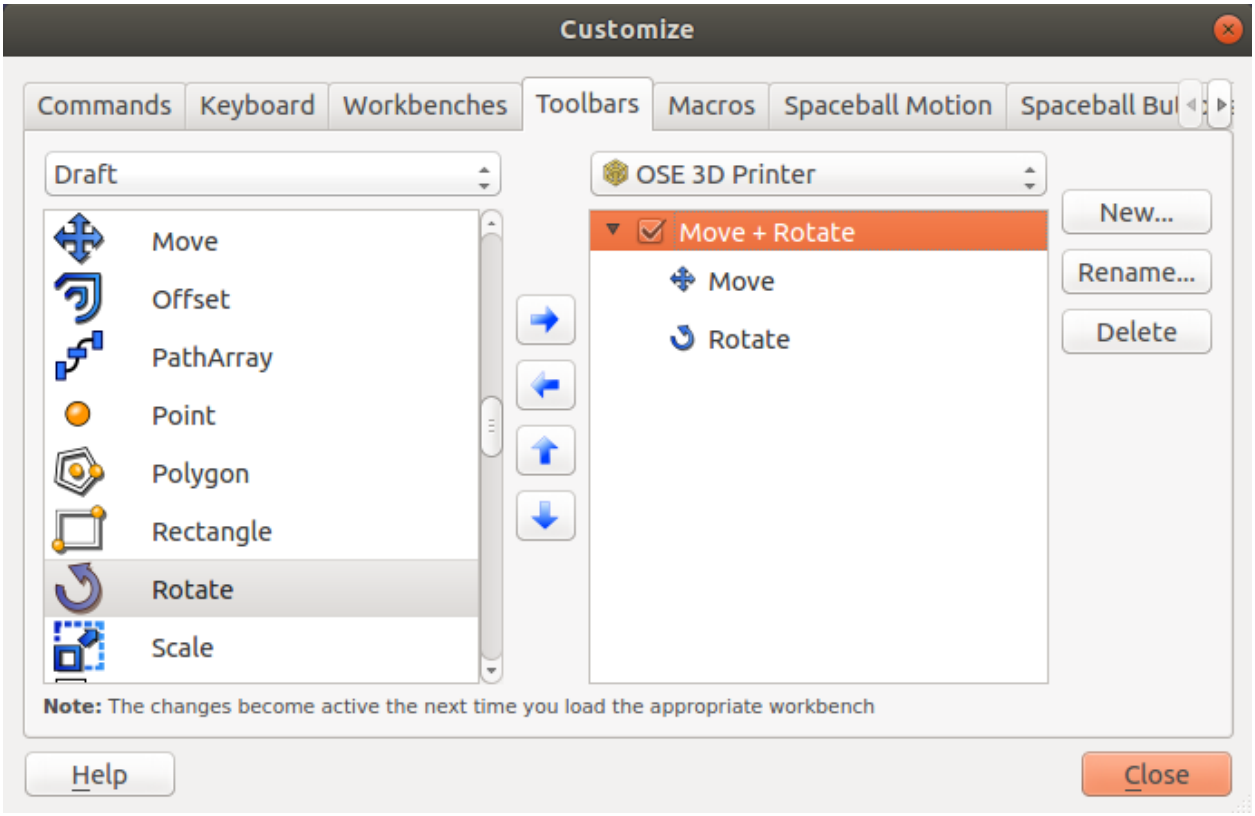
3. Next, select the **Toolbars** tab.



4. Select **OSE 3D Printer** from the dropdown in the right pane.
5. Click the **New...** button.
6. Name the toolbar **Move + Rotate**, and click **OK**.



7. Select the **Draft** workbench from the dropdown in the left pane.
8. Find the **Move** and **Rotate** tools and use the **Move right** button, or right arrow to add them to the **Move + Rotate** toolbar.



9. You should now have the **Move** and **Rotate** tools alongside the OSE 3D Printer tools.

See Also

Customize Toolbars on the FreeCAD Wiki.

CHAPTER

EIGHT

OSE3DPRINTER

The `ose3dprinter` package is:

- Independent of the `freecad.ose3dprinter` package
- Must not know about the FreeCAD GUI (i.e. `FreeCADGui` or `Gui`)
- Executable from a command-line context

8.1 ose3dprinter.attachment

Attachment functions to make 3D Printer parts appear attached to each other.

8.1.1 ose3dprinter.attachment.get_axis_frame_attachment_kwargs

get_axis_frame_attachment_kwargs

get_axis_frame_attachment_kwargs(*frame*, *selected_frame_face*, *axis_orientation*)

Get the length, placement, and origin translation offset for creating a axis object attached to a selected frame face.

get_default_axis_creation_kwargs

get_default_axis_creation_kwargs(*axis_orientation*)

get_placement_strategy

get_placement_strategy(*face_side*)

8.1.2 ose3dprinter.attachment.get_extruder_axis_attachment_kwargs

get_extruder_axis_attachment_kwargs

get_extruder_axis_attachment_kwargs(*axis*, *selected_axis_face*)

8.1.3 ose3dprinter.attachment.get_heated_bed_frame_axis_attachment_kwargs

get_heated_bed_frame_axis_attachment_kwargs

get_heated_bed_frame_axis_attachment_kwargs(*frame*, *axis*)

8.2 ose3dprinter.model

Models for 3D Printer parts.

8.2.1 ose3dprinter.model.axis

axis_model

class AxisModel(*obj, length=304.8, carriage_position=50, orientation='x', side='top', placement=Placement [Pos=(0,0,0), Yaw-Pitch-Roll=(0,0,0)], origin_translation_offset=Vector (0.0, 0.0, 0.0)*)

Bases: `osecore.app.model.Model`

Encapsulates the data (i.e. topography and shape) for a Axis, and is separate from the "view" or GUI representation.

Type = 'OSEAxis'

calculate_carriage_box_x()

calculate_top_of_carriage_box_for_z_axis()

execute(*obj*)

Called on document recompute

is_x()

Return whether or not this axis is a X axis.

This assumes the axis is parallel to the XY, YZ, or XZ planes, and not rotated in a weird diagonal or skewed way.

Returns Whether this axis is a X axis.

Return type bool

is_y()

Return whether or not this axis is a Y axis.

This assumes the axis is parallel to the XY, YZ, or XZ planes, and not rotated in a weird diagonal or skewed way.

Returns Whether this axis is a Y axis.

Return type bool

is_z()

Return whether or not this axis is a Z axis.

This assumes the axis is parallel to the XY, YZ, or XZ planes, and not rotated in a weird diagonal or skewed way.

Returns Whether this axis is a Z axis.

Return type bool

8.2.2 ose3dprinter.model.extruder

extruder_model

class ExtruderModel(*obj, placement=Placement [Pos=(0,0,0), Yaw-Pitch-Roll=(0,0,0)], origin_translation_offset=Vector (0.0, 0.0, 0.0)*)

Bases: `osecore.app.model.Model`

Encapsulates the data (i.e. topography and shape) for a Extruder, and is separate from the "view" or GUI representation.

Based on: https://wiki.opensourceecology.org/wiki/File:Simpleextruderassy.fcstd

See: https://wiki.opensourceecology.org/wiki/File:Finalextruder.png

Type = 'OSEExtruder'

execute(*obj*)

Called on document recompute

8.2.3 ose3dprinter.model.frame

ose3dprinter.model.frame.get_face_side

between_bounds

between_bounds(*value*, *lower_bound*, *upper_bound*)

face_side_strategy

class FaceSideStrategy

Bases: `abc.ABC`

get_face_side(*frame*, *face*)

face_side_strategy_factory

class FaceSideStrategyFactory

Bases: `object`

static create(*axis_orientation*)

get_face_side

get_face_side(*frame*, *face*, *axis_orientation*)

x_axis_face_side_strategy

class XAxisFaceSideStrategy
Bases: *ose3dprinter.model.frame.get_face_side.face_side_strategy.FaceSideStrategy*

y_axis_face_side_strategy

class YAxisFaceSideStrategy
Bases: *ose3dprinter.model.frame.get_face_side.face_side_strategy.FaceSideStrategy*

z_axis_face_side_strategy

class ZAxisFaceSideStrategy
Bases: *ose3dprinter.model.frame.get_face_side.face_side_strategy.FaceSideStrategy*

ose3dprinter.model.frame.get_faces_for_side

filter_faces_parallel_to_plane

filter_faces_parallel_to_plane(*faces*, *plane*)

get_faces_for_side

get_faces_for_side(*frame*, *side*)
Gets a dictionary of outer faces of the frame by their Side.

Parameters **frame** (*Document Object*) – Frame object

Returns Dictionary where the keys are a Side, and value is a Face

Return type dict

get_faces_for_side_of_cnc_cut_frame

get_faces_for_side_of_cnc_cut_frame(*cnc_cut_frame*, *side*)

get_faces_for_side_of_frame_with_corners

get_axis_orientation(*side*)

get_faces_for_side_of_frame_with_corners(*frame_with_corners*, *side*)
TODO: Doesn't include faces of angle frame connector tabs

Parameters

- **frame_with_corners** (*Document object*) – Frame object with HasCorners property = True

- **side** (*See Side enum.*) – Side of frame.

Returns List of faces within bound of side for a frame with corners.

Return type List[Part.Faces]

ose3dprinter.model.frame.get_outer_faces

get_outer_faces

get_outer_faces(*frame*)
Get outer faces of a frame.

get_outer_faces_of_cnc_cut_frame

get_outer_faces_of_cnc_cut_frame(*cnc_cut_frame*)
Get outer faces of a frame constructed by cutting six sheets with a CNC machine.

Assumes the 6 largest faces are the outer faces of the frame.

get_outer_faces_of_frame_with_corners

get_outer_faces_of_frame_with_corners(*frame_with_corners*)

sort_faces_by_area_descending

sort_faces_by_area_descending(*faces*)

frame_model

class FrameModel(*obj, size=304.8, width=38.1, thickness=3.175, has_corners=False, placement=Placement [Pos=(0,0,0), Yaw-Pitch-Roll=(0,0,0)], origin_translation_offset=Vector (0.0, 0.0, 0.0)*)
Bases: `osecore.app.model.Model`

Encapsulates the data (i.e. topography and shape) for a Frame, and is separate from the "view" or GUI representation.

See D3D Frame on the Open Source Ecology Wiki: https://wiki.opensourceecology.org/wiki/D3D_Frame

Type = 'OSEFrame'

property XMax

property XMin

property YMax

property YMin

property ZMax

property ZMin

property distance_between_axis_side_mount_holes

execute(*obj*)
Called on document recompute

get_face_side(*face*, *axis_orientation*)

get_faces_for_side(*side*)

get_outer_faces()

8.2.4 ose3dprinter.model.heated_bed

heated_bed_model

class HeatedBedModel(*obj, placement=Placement [Pos=(0,0,0), Yaw-Pitch-Roll=(0,0,0)], origin_translation_offset=Vector (0.0, 0.0, 0.0)*)
Bases: `osecore.app.model.Model`

Encapsulates the data (i.e. topography and shape) for a Heated Bed, and is separate from the "view" or GUI representation.

Type = 'OSEHeatedBed'

execute(*obj*)
Called on document recompute

8.3 ose3dprinter.part

Parts for 3D Printer.

8.3.1 ose3dprinter.part.axis

axis

class Axis
Bases: `object`

classmethod calculate_carriage_box_x(*rod_length*, *carriage_position*)

carriage_box_width = 52

classmethod cut_holes_in_motor_side_box(*motor_side_box*, *box_height*, *motor_box_length*)

distance_between_hole_and_inner_motor_side = 12.59

distance_between_holes = 22.44

classmethod distance_between_idler_side_holes_and_outer_edge()

classmethod distance_between_inner_motor_side_holes_and_outer_edge()

hole_radius = 3.39

idler_box_length = 66

idler_box_width = 26

classmethod make(*rod_length: float*, *rod_radius: float*, *carriage_position: int*, *orientation: str*, *side: str*, *initial_placement: Base.Placement*, *origin_translation_offset: Base.Vector*) → Part.Compound

motor_box_width = 59.5

x_distance_between_holes = 23.36

get_placement(*orientation*, *side*, *box_height*, *length*, *motor_box_length*)

8.3.2 ose3dprinter.part.extruder

cooling_and_sensor_mount

class CoolingAndSensorMount

Bases: object

Cooling and Sensor mount for extruder, and sensor itself.

Based on: https://wiki.opensourceecology.org/wiki/File:ExtruderActiveCoolingAndSensor.FCStd

See: https://wiki.opensourceecology.org/images/thumb/d/dd/Secondxtruderpart.png/120px-Secondxtruderpart.png

Sensor: https://wiki.opensourceecology.org/images/thumb/9/9e/8mmsensor.jpg/120px-8mmsensor.jpg

classmethod make(*slanted_side_width*, *main_part_length*, *main_part_bottom_base_overhang_width*)

vent_box_width = 5

make_cooling_and_sensor_slanted_side(*thickness*, *length*)

20

| | 55 | | 19

——-

| 7

87

make_sensor_and_sensor_holder(*sensor_holder_box_width*, *sensor_holder_box_height*)

/——- | O | ——-

extruder

class Extruder

Bases: object

static make(*placement*, *origin_translation_offset*)

make_motor()

main_extruder_part

class MainExtruderPart

Bases: object

Main extruder part

Based on: https://wiki.opensourceecology.org/wiki/File:Mainextruderpart.fcstd

See: https://wiki.opensourceecology.org/wiki/File:Mainextruderpart.png

base_height = 7

classmethod make(*width*, *length*, *bottom_base_overhang_width*)

make_slanted_side(*width_or_thickness*, *height*)

25.25

| | 50 | | |

| 28.27

|

51.10

8.3.3 ose3dprinter.part.frame

angle_frame_connector

class AngleFrameConnector

Bases: object

Encapsulates the data (i.e. topography and shape) for an Angle Frame Connector, and is separate from the "view" or GUI representation.

An angle frame connector is made up of three brackets.

axis_side_mount_length = 27.75

axis_side_mount_width = 5

classmethod calculate_bracket_length(*width*, *thickness*)

classmethod calculate_bracket_width(*thickness*)

classmethod calculate_y_axis_overhang_distance()

classmethod distance_between_axis_side_mount_holes_and_frame()

classmethod make(*width*, *thickness*, *corner='bottom_left_front'*, *with_set_screw=False*, *with_filleting=False*)

Make an angle frame connector.

Parameters

- **width** (*float*) – Width of the angled frame.
- **thickness** (*float*) – Thickness of the angled frame.
- **corner** (*str, optional*) – Which corner to orient the angle frame connector to. Defaults to bottom left front corner.

- **with_set_screw** (*bool*) – Whether to include set screw mechanism.
- **with_filleting** (*bool*) – Whether to include filleting.

Returns an angle frame connector

Return type Part.Shape

cut_screw_screw(*bracket*, *width*, *height*, *thickness*, *set_screw_block_width*)

cut_set_screw_hole(*bracket*, *height*, *thickness*, *cylinder*)

fillet_bracket(*bracket*, *height*)

find_top_wires_parallel_to_xy_plane(*bracket*, *height*)

fuse_nut_ramps_to_bracket(*bracket*, *thickness*, *set_screw_cutout_length*, *set_screw_cutout_width*, *ramp_height*)

Fuse nut ramps to bracket so nut doesn't spin when tightening screw.

| |__

Parameters

- **bracket** (*Part.Shape*) – Bracket
- **set_screw_cutout_length** (*float*) – Length of set screw cutout
- **set_screw_cutout_width** (*float*) – Width of set screw cutout

get_angle_frame_connector_placement(*corner*, *length*)

get_inner_points(*width*, *thickness*)

get_is_top_shape(*height*)

get_outer_points(*width*, *thickness*, *set_screw_block_width*, *with_set_screw*)

get_placement_by_corner(*length*)

is_wire_parallel_to_xy_plane(*wire*)

make_angle_connector_corner(*bracket_length*, *bracket_width*)

make_cylinder(*radius*, *height*)

make_set_screw_cutout(*length*, *nut_height*, *height*)

Make set screw cutout in the shape of a pentagon, or home plate in baseball.

make_tri_bracket(*width*, *height*, *thickness*, *with_set_screw=False*, *with_filleting=False*)

Make tri-bracket.

Three tri-brackets make up the angle frame connector.

Parameters

- **width** (*float*) – Width of bracket.
- **height** (*float*) – Height of bracket.
- **thickness** (*float*) – Thickness of bracket
- **with_set_screw** (*bool*) – Whether to include set screw mechanism.
- **with_filleting** (*bool*) – Whether to include filleting.

angled_bar

class AngledBar
Bases: object

static make(*length*, *width*, *thickness*, *orientation='bottom_front_flat'*)
Make an angled bar with bottom-left-most corner in the origin (0, 0, 0)

Parameters

- **length** (*float*) – Length of angled bar.
- **width** (*float*) – Width of angled bar. after an inner sheet is cut out of the center.
- **thickness** (*float*) – Thickness of angled bar.
- **orientation** (*str*) – Orientation of angled bar. Must be one of AngledBarOrientation. Defaults to AngledBarOrientation.BOTTOM_FRONT_FLAT.

Returns An angled bar.

Return type Part.Shape

fuse_parts(**parts*)

get_angled_bar_placement(*orientation*, *length*, *width*)

get_placement_by_orientation(*length*, *width*)

angled_bar_frame

class AngledBarFrame
Bases: object

Frame made from 12 angled bars connected by angle frame connectors.

static make(*side*, *width*, *thickness*)
Make a frame from from 12 angled bars connected by angle frame connectors. No welding or epoxy required, and the frame can be disassembled.

Parameters

- **side** (*float*) – Side or dimension of frame from one corner to the opposite corner.
- **width** (*float*) – Width of angled bar.
- **thickness** (*float*) – Thickness of each angled bar.

Returns A frame made up of angled bars, connected by angle frame connectors.

Return type Part.Shape

make_bottom_or_top_of_angled_frame(*bar_length*, *width*, *thickness*, *bar_orientations*, *corners*, *bracket_length*, *rear_translation*, *rear_bar_translation*)

angled_bar_orientation

class AngledBarOrientation
Bases: object

Represents the orientation for one edge of an angled bar frame.

BOTTOM_FRONT_FLAT = 'bottom_front_flat'

BOTTOM_LEFT_FLAT = 'bottom_left_flat'

BOTTOM_REAR_FLAT = 'bottom_rear_flat'

BOTTOM_RIGHT_FLAT = 'bottom_right_flat'

FRONT_LEFT_UPRIGHT = 'front_left_upright'

FRONT_RIGHT_UPRIGHT = 'front_right_upright'

REAR_LEFT_UPRIGHT = 'rear_left_upright'

REAR_RIGHT_UPRIGHT = 'rear_right_upright'

TOP_FRONT_FLAT = 'top_front_flat'

TOP_LEFT_FLAT = 'top_left_flat'

TOP_REAR_FLAT = 'top_rear_flat'

TOP_RIGHT_FLAT = 'top_right_flat'

axis_side_mount

class AxisSideMount
Bases: object

TODO: Rename to TopAngleFrameConnectorTab?

attachment_overlap = 10.22

classmethod calculate_distance_between_holes_and_connector(*length*)

classmethod calculate_overhang_distance(*length*)

distance_between_hole_and_outer_edge = 9.38554

height = 65.2

hole_radius = 3.39

classmethod make(*width*, *length*, *top_corner*)
Returns which side of the angle frame connector to add the axis mount to.

Parameters

- **width** (*float*) – Width of axis side mount.
- **top_corner** (*str*) – A top corner: top left front, top right front, top left rear, or top right rear.

Returns Axis side mount

Return type Part.Shape

classmethod make_slanted_edge(*slanted_edge_distance*, *width*)

| | |___

classmethod make_trapezoid_tab(*width*, *length*, *attachment_overlap*)

/ / / |_____|

get_placement(*top_corner*, *height*, *attachment_overlap*)

get_placement_by_top_corner(*height*, *attachment_overlap*)

cnc_cut_frame

class CNCCutFrame

Bases: `object`

static make(*side*, *width*, *sheet_thickness*)

Make a frame from flat sheets cut by a CNC machine, then welded or epoxied together.

This approach works best with welding.

See Also: https://wiki.opensourceecology.org/wiki/D3D_Frame

Parameters

- **side** (*float*) – Dimension of one side of a cubic sheet.
- **width** (*float*) – Width of outer sheet, after an inner sheet is cut out of the center.
- **sheet_thickness** (*float*) – Thickness of each sheet.

Returns A frame "welded" together from eight CNC cut sheets.

Return type Part.Shape

make_sheet(*side*, *width*, *thickness*)

Make one side of the frame or "sheet".

_____ |
_____	

|_____|

A sheet is a cubic plane of metal with dimensions specified by *side*, thickness specified by *thickness*, and inner sheet cut out of the center, leaving the outer width with a dimension specified by *width*.

Parameters

- **side** (*float*) – Dimension of one side of the cubic sheet.
- **width** (*float*) – Width of outer sheet, after an inner sheet is cut out of the center.
- **thickness** (*float*) – Thickness of the sheet.

Returns A sheet, or one side of a frame.

Return type Part.Shape

corner

class Corner
Bases: object

Represents corners of a cube. TODO: Rename to CubeCorner?

BOTTOM_LEFT_FRONT = 'bottom_left_front'

BOTTOM_LEFT_REAR = 'bottom_left_rear'

BOTTOM_RIGHT_FRONT = 'bottom_right_front'

BOTTOM_RIGHT_REAR = 'bottom_right_rear'

TOP_LEFT_FRONT = 'top_left_front'

TOP_LEFT_REAR = 'top_left_rear'

TOP_RIGHT_FRONT = 'top_right_front'

TOP_RIGHT_REAR = 'top_right_rear'

is_top_corner(*corner*)
Returns whether a corner is a top corner.

Parameters **corner** (*str*) – A corner.

Returns Whether the corner is a top corner or not.

Return type bool

8.3.4 ose3dprinter.part.heated_bed

heated_bed

class HeatedBed
Bases: object

static make(*size*, *placement*, *origin_translation_offset*)

CHAPTER

NINE

INDICES AND TABLES

- genindex
- modindex
- search

PYTHON MODULE INDEX

O

ose3dprinter, 19
ose3dprinter.attachment, 19
ose3dprinter.attachment.get_axis_frame_attachment_kwargs, 19
ose3dprinter.attachment.get_axis_frame_attachment_kwargs.get_axis_frame_attachment_kwargs, 19
ose3dprinter.attachment.get_axis_frame_attachment_kwargs.get_default_axis_creation_kwargs, 19
ose3dprinter.attachment.get_axis_frame_attachment_kwargs.get_placement_strategy, 19
ose3dprinter.attachment.get_extruder_axis_attachment_kwargs, 19
ose3dprinter.attachment.get_extruder_axis_attachment_kwargs.get_extruder_axis_attachment_kwargs, 19
ose3dprinter.attachment.get_heated_bed_frame_axis_attachment_kwargs, 20
ose3dprinter.attachment.get_heated_bed_frame_axis_attachment_kwargs.get_heated_bed_frame_axis_attachment_kwargs, 20
ose3dprinter.model, 20
ose3dprinter.model.axis, 20
ose3dprinter.model.axis.axis_model, 20
ose3dprinter.model.extruder, 21
ose3dprinter.model.extruder.extruder_model, 21
ose3dprinter.model.frame, 21
ose3dprinter.model.frame.frame_model, 23
ose3dprinter.model.frame.get_face_side, 21
ose3dprinter.model.frame.get_face_side.between_bounds, 21
ose3dprinter.model.frame.get_face_side.face_side_strategy, 21
ose3dprinter.model.frame.get_face_side.face_side_strategy_factory, 21
ose3dprinter.model.frame.get_face_side.get_face_side, 21
ose3dprinter.model.frame.get_face_side.x_axis_face_side_strategy, 22
ose3dprinter.model.frame.get_face_side.y_axis_face_side_strategy, 22
ose3dprinter.model.frame.get_face_side.z_axis_face_side_strategy, 22
ose3dprinter.model.frame.get_faces_for_side, 22
ose3dprinter.model.frame.get_faces_for_side.filter_faces_for_side_strategy, 22
ose3dprinter.model.frame.get_faces_for_side.get_face_side_strategy, 22
ose3dprinter.model.frame.get_faces_for_side.get_face_side_strategy_factory, 22
ose3dprinter.model.frame.get_faces_for_side.get_faces_for_side_strategy, 22
ose3dprinter.model.frame.get_outer_faces, 23
ose3dprinter.model.frame.get_outer_faces.get_outer_faces_strategy, 23
ose3dprinter.model.frame.get_outer_faces.get_outer_faces_strategy_factory, 23
ose3dprinter.model.frame.get_outer_faces.get_outer_faces_strategy.get_heated_bed_frame_axis_attachment_kwargs, 23
ose3dprinter.model.frame.get_outer_faces.get_outer_faces_strategy.sort_faces, 23
ose3dprinter.model.heated_bed, 24
ose3dprinter.model.heated_bed.heated_bed_model, 24
ose3dprinter.part, 24
ose3dprinter.part.axis, 24
ose3dprinter.part.axis.axis, 24
ose3dprinter.part.extruder, 25
ose3dprinter.part.extruder.cooling_and_sensor_mount_part, 25
ose3dprinter.part.extruder.extruder, 25
ose3dprinter.part.extruder.main_extruder_part, 26
ose3dprinter.part.frame, 26
ose3dprinter.part.frame.angle_frame_connector, 26
ose3dprinter.part.frame.angled_bar, 28
ose3dprinter.part.frame.angled_bar_frame, 28
ose3dprinter.part.frame.angled_bar_orientation, 29

ose3dprinter.part.frame.axis_side_mount, 29
ose3dprinter.part.frame.cnc_cut_frame, 30
ose3dprinter.part.frame.corner, 31
ose3dprinter.part.heated_bed, 31
ose3dprinter.part.heated_bed.heated_bed, 31

INDEX

A

AngledBar (*class in ose3dprinter.part.frame.angled_bar*), 28
AngledBarFrame (*class in ose3dprinter.part.frame.angled_bar_frame*), 28
AngledBarOrientation (*class in ose3dprinter.part.frame.angled_bar_orientation*), 29
AngleFrameConnector (*class in ose3dprinter.part.frame.angle_frame_connector*), 26
attachment_overlap (*AxisSideMount attribute*), 29
Axis (*class in ose3dprinter.part.axis.axis*), 24
axis_side_mount_length (*AngleFrameConnector attribute*), 26
axis_side_mount_width (*AngleFrameConnector attribute*), 26
AxisModel (*class in ose3dprinter.model.axis.axis_model*), 20
AxisSideMount (*class in ose3dprinter.part.frame.axis_side_mount*), 29

B

base_height (*MainExtruderPart attribute*), 26
between_bounds() (*in module ose3dprinter.model.frame.get_face_side.between_bounds*), 21
BOTTOM_FRONT_FLAT (*AngledBarOrientation attribute*), 29
BOTTOM_LEFT_FLAT (*AngledBarOrientation attribute*), 29
BOTTOM_LEFT_FRONT (*Corner attribute*), 31
BOTTOM_LEFT_REAR (*Corner attribute*), 31
BOTTOM_REAR_FLAT (*AngledBarOrientation attribute*), 29
BOTTOM_RIGHT_FLAT (*AngledBarOrientation attribute*), 29
BOTTOM_RIGHT_FRONT (*Corner attribute*), 31
BOTTOM_RIGHT_REAR (*Corner attribute*), 31

C

calculate_bracket_length() (*AngleFrameConnector class method*), 26
calculate_bracket_width() (*AngleFrameConnector class method*), 26
calculate_carriage_box_x() (*Axis class method*), 24
calculate_carriage_box_x() (*AxisModel method*), 20
calculate_distance_between_holes_and_connector() (*AxisSideMount class method*), 29
calculate_overhang_distance() (*AxisSideMount class method*), 29
calculate_top_of_carriage_box_for_z_axis() (*AxisModel method*), 20
calculate_y_axis_overhang_distance() (*AngleFrameConnector class method*), 26
carriage_box_width (*Axis attribute*), 24
CNCCutFrame (*class in ose3dprinter.part.frame.cnc_cut_frame*), 30
CoolingAndSensorMount (*class in ose3dprinter.part.extruder.cooling_and_sensor_mount*), 25
Corner (*class in ose3dprinter.part.frame.corner*), 31
create() (*FaceSideStrategyFactory static method*), 21
create_holes_in_motor_side_box() (*Axis class method*), 24
cut_screw_screw() (*in module ose3dprinter.part.frame.angle_frame_connector*), 27
cut_set_screw_hole() (*in module ose3dprinter.part.frame.angle_frame_connector*), 27

D

distance_between_axis_side_mount_holes() (*FrameModel property*), 23
distance_between_axis_side_mount_holes_and_frame() (*AngleFrameConnector class method*), 26
distance_between_hole_and_inner_motor_side (*Axis attribute*), 24

distance_between_hole_and_outer_edge (*AxisSideMount attribute*), 29
distance_between_holes (*Axis attribute*), 24
distance_between_idler_side_holes_and_outer_edge (*Axis class method*), 24
distance_between_inner_motor_side_holes_and_outer_edge (*Axis class method*), 24

E

execute() (*AxisModel method*), 20
execute() (*ExtruderModel method*), 21
execute() (*FrameModel method*), 23
execute() (*HeatedBedModel method*), 24
Extruder (*class in ose3dprinter.part.extruder.extruder*), 25
ExtruderModel (*class in ose3dprinter.model.extruder.extruder_model*), 21

F

FaceSideStrategy (*class in ose3dprinter.model.frame.get_face_side.face_side_strategy*), 21
FaceSideStrategyFactory (*class in ose3dprinter.model.frame.get_face_side.face_side_strategy_factory*), 21
fillet_bracket() (*in module ose3dprinter.part.frame.angle_frame_connector*), 27
filter_faces_parallel_to_plane() (*in module ose3dprinter.model.frame.get_faces_for_side.filter_faces_parallel_to_plane*), 22
find_top_wires_parallel_to_xy_plane() (*in module ose3dprinter.part.frame.angle_frame_connector*), 27
FrameModel (*class in ose3dprinter.model.frame.frame_model*), 23
FRONT_LEFT_UPRIGHT (*AngledBarOrientation attribute*), 29
FRONT_RIGHT_UPRIGHT (*AngledBarOrientation attribute*), 29
fuse_nut_ramps_to_bracket() (*in module ose3dprinter.part.frame.angle_frame_connector*), 27
fuse_parts() (*in module ose3dprinter.part.frame.angled_bar*), 28

G

get_angle_frame_connector_placement() (*in module ose3dprinter.part.frame.angle_frame_connector*), 27
get_angled_bar_placement() (*in module ose3dprinter.part.frame.angled_bar*), 28
get_axis_frame_attachment_kwargs() (*in module ose3dprinter.attachment.get_axis_frame_attachment_kwa*), 19
get_axis_orientation() (*in module ose3dprinter.model.frame.get_faces_for_side.get_faces_for_side_*), 22
get_default_axis_creation_kwargs() (*in module ose3dprinter.attachment.get_axis_frame_attachment_kwa*), 19
get_extruder_axis_attachment_kwargs() (*in module ose3dprinter.attachment.get_extruder_axis_attachmen*), 19
get_face_side() (*FaceSideStrategy method*), 21
get_face_side() (*FrameModel method*), 24
get_face_side() (*in module ose3dprinter.model.frame.get_face_side.get_face_side*), 21
get_faces_for_side() (*FrameModel method*), 24
get_faces_for_side() (*in module ose3dprinter.model.frame.get_faces_for_side.get_faces_for_side*), 22
get_faces_for_side_of_cnc_cut_frame() (*in module ose3dprinter.model.frame.get_faces_for_side.get_faces*), 22
get_faces_for_side_of_frame_with_corners() (*in module ose3dprinter.model.frame.get_faces_for_side.get_faces*), 22
get_heated_bed_frame_axis_attachment_kwargs() (*in module ose3dprinter.attachment.get_heated_bed_frame_axis_*), 20
get_inner_points() (*in module ose3dprinter.part.frame.angle_frame_connector*), 27
get_is_top_shape() (*in module ose3dprinter.part.frame.angle_frame_connector*), 27
get_outer_faces() (*FrameModel method*), 24
get_outer_faces() (*in module ose3dprinter.model.frame.get_outer_faces.get_outer_faces*), 23
get_outer_faces_of_cnc_cut_frame() (*in module ose3dprinter.model.frame.get_outer_faces.get_outer_face*), 23
get_outer_faces_of_frame_with_corners() (*in module ose3dprinter.model.frame.get_outer_faces.get_outer_f*), 23
get_outer_points() (*in module ose3dprinter.part.frame.angle_frame_connector*), 27
get_placement() (*in module ose3dprinter.part.axis.axis*), 25
get_placement() (*in module ose3dprinter.part.frame.axis_side_mount*), 30

get_placement_by_corner() (*in module ose3dprinter.part.frame.angle_frame_connector*), 27
get_placement_by_orientation() (*in module ose3dprinter.part.frame.angled_bar*), 28
get_placement_by_top_corner() (*in module ose3dprinter.part.frame.axis_side_mount*), 30
get_placement_strategy() (*in module ose3dprinter.attachment.get_axis_frame_attachment_always_get_placement_strategy*), 19

H

HeatedBed (*class in ose3dprinter.part.heated_bed.heated_bed*), 31
HeatedBedModel (*class in ose3dprinter.model.heated_bed.heated_bed_model*), 24
height (*AxisSideMount attribute*), 29
hole_radius (*Axis attribute*), 24
hole_radius (*AxisSideMount attribute*), 29

I

idler_box_length (*Axis attribute*), 24
idler_box_width (*Axis attribute*), 24
is_top_corner() (*in module ose3dprinter.part.frame.corner*), 31
is_wire_parallel_to_xy_plane() (*in module ose3dprinter.part.frame.angle_frame_connector*), 27
is_x() (*AxisModel method*), 20
is_y() (*AxisModel method*), 20
is_z() (*AxisModel method*), 20

M

MainExtruderPart (*class in ose3dprinter.part.extruder.main_extruder_part*), 26
make() (*AngledBar static method*), 28
make() (*AngledBarFrame static method*), 28
make() (*AngleFrameConnector class method*), 26
make() (*Axis class method*), 24
make() (*AxisSideMount class method*), 29
make() (*CNCCutFrame static method*), 30
make() (*CoolingAndSensorMount class method*), 25
make() (*Extruder static method*), 25
make() (*HeatedBed static method*), 31
make() (*MainExtruderPart class method*), 26
make_angle_connector_corner() (*in module ose3dprinter.part.frame.angle_frame_connector*), 27
make_bottom_or_top_of_angled_frame() (*in module ose3dprinter.part.frame.angled_bar_frame*), 28
make_cooling_and_sensor_slanted_side() (*in module ose3dprinter.part.extruder.cooling_and_sensor_mount*), 25
make_cylinder() (*in module ose3dprinter.part.frame.angle_frame_connector*), 27
make_motor() (*in module ose3dprinter.part.extruder.extruder*), 25
make_sensor_holder() (*in module ose3dprinter.part.extruder.cooling_and_sensor_mount*), 25
make_set_screw_cutout() (*in module ose3dprinter.part.frame.angle_frame_connector*), 27
make_sheet() (*in module ose3dprinter.part.frame.cnc_cut_frame*), 30
make_slanted_edge() (*AxisSideMount class method*), 29
make_slanted_side() (*in module ose3dprinter.part.extruder.main_extruder_part*), 26
make_trapezoid_tab() (*AxisSideMount class method*), 30
make_tri_bracket() (*in module ose3dprinter.part.frame.angle_frame_connector*), 27
module
    ose3dprinter, 19
    ose3dprinter.attachment, 19
    ose3dprinter.attachment.get_axis_frame_attachme 19
    ose3dprinter.attachment.get_axis_frame_attachme 19
    ose3dprinter.attachment.get_axis_frame_attachme 19
    ose3dprinter.attachment.get_axis_frame_attachme 19
    ose3dprinter.attachment.get_extruder_axis_attac 19
    ose3dprinter.attachment.get_extruder_axis_attac 19
    ose3dprinter.attachment.get_heated_bed_frame_ax 20
    ose3dprinter.attachment.get_heated_bed_frame_ax 20
    ose3dprinter.model, 20
    ose3dprinter.model.axis, 20
    ose3dprinter.model.axis.axis_model, 20
    ose3dprinter.model.extruder, 21
    ose3dprinter.model.extruder.extruder_model, 21
    ose3dprinter.model.frame, 21

ose3dprinter.model.frame.frame_model, 23
ose3dprinter.model.frame.get_face_side, 21
ose3dprinter.model.frame.get_face_side.between_bounds, 21
ose3dprinter.model.frame.get_face_side.face_side_strategy, 21
ose3dprinter.model.frame.get_face_side.face_side_strategy_factory, 21
ose3dprinter.model.frame.get_face_side.get_face_side, 21
ose3dprinter.model.frame.get_face_side.x_axis_face_side_strategy, 22
ose3dprinter.model.frame.get_face_side.y_axis_face_side_strategy, 22
ose3dprinter.model.frame.get_face_side.z_axis_face_side_strategy, 22
ose3dprinter.model.frame.get_faces_for_side, 22
ose3dprinter.model.frame.get_faces_for_side.filter_faces_parallel_to_plane, 22
ose3dprinter.model.frame.get_faces_for_side.get_faces_for_side, 22
ose3dprinter.model.frame.get_faces_for_side.get_faces_for_side_of_cnc_cut_frame, 22
ose3dprinter.model.frame.get_faces_for_side.get_faces_for_side_of_frame_with_corners, 22
ose3dprinter.model.frame.get_outer_faces, 23
ose3dprinter.model.frame.get_outer_faces.get_outer_faces, 23
ose3dprinter.model.frame.get_outer_faces.get_outer_faces_of_cnc_cut_frame, 23
ose3dprinter.model.frame.get_outer_faces.get_outer_faces_of_frame_with_corners, 23
ose3dprinter.model.frame.get_outer_faces.sort_faces_by_area_descending, 23
ose3dprinter.model.heated_bed, 24
ose3dprinter.model.heated_bed.heated_bed_model, 24
ose3dprinter.part, 24
ose3dprinter.part.axis, 24
ose3dprinter.part.axis.axis, 24
ose3dprinter.part.extruder, 25
ose3dprinter.part.extruder.cooling_and_sensor_mount, 25
ose3dprinter.part.extruder.extruder, 25
ose3dprinter.part.extruder.main_extruder_part, 26
ose3dprinter.part.frame, 26
ose3dprinter.part.frame.angle_frame_connector, 26
ose3dprinter.part.frame.angled_bar, 28
ose3dprinter.part.frame.angled_bar_frame, 28
ose3dprinter.part.frame.angled_bar_orientation, 29
ose3dprinter.part.frame.axis_side_mount, 29
ose3dprinter.part.frame.cnc_cut_frame, 30
ose3dprinter.part.frame.corner, 31
ose3dprinter.part.heated_bed, 31
ose3dprinter.part.heated_bed.heated_bed, 31
module_axis_width (Axis attribute), 25

O

ose3dprinter
module, 19
ose3dprinter.attachment
module, 19
ose3dprinter.attachment.get_axis_frame_attachment_h
module, 19
ose3dprinter.attachment.get_axis_frame_attachment_h
module, 19
ose3dprinter.attachment.get_axis_frame_attachment_h
module, 19
ose3dprinter.attachment.get_axis_frame_attachment_h
module, 19
ose3dprinter.attachment.get_axis_frame_attachment_h
module, 19
ose3dprinter.attachment.get_extruder_axis_attachmen
module, 19
ose3dprinter.attachment.get_extruder_axis_attachmen
module, 19
ose3dprinter.attachment.get_heated_bed_frame_axis_a
module, 20
ose3dprinter.attachment.get_heated_bed_frame_axis_a
module, 20
ose3dprinter.model
module, 20
ose3dprinter.model.axis
module, 20
ose3dprinter.model.axis.axis_model
module, 20
ose3dprinter.model.extruder
module, 21
ose3dprinter.model.extruder.extruder_model
module, 21
ose3dprinter.model.frame
module, 21
ose3dprinter.model.frame.frame_model
module, 23
ose3dprinter.model.frame.get_face_side
module, 21
ose3dprinter.model.frame.get_face_side.between_boun

module, 21
ose3dprinter.model.frame.get_face_side.face3_identifier
module, 21
ose3dprinter.model.frame.get_face_side.face3_identifier_strategy
module, 21
ose3dprinter.model.frame.get_face_side.get_face_side
module, 21
ose3dprinter.model.frame.get_face_side.x_axis_face_side_strategy
module, 22
ose3dprinter.model.frame.get_face_side.y_axis_face_side_strategy
module, 22
ose3dprinter.model.frame.get_face_side.z_axis_face_side_strategy
module, 22
ose3dprinter.model.frame.get_faces_for_side
module, 22
ose3dprinter.model.frame.get_faces_for_side.faces_for_side_interface
module, 22
ose3dprinter.model.frame.get_faces_for_side.faces_for_side_strategy
module, 22
ose3dprinter.model.frame.get_faces_for_side.get_faces_for_side
module, 22
ose3dprinter.model.frame.get_outer_faces
module, 23
ose3dprinter.model.frame.get_outer_faces.get_outer_faces
module, 23
ose3dprinter.model.frame.get_outer_faces.get_outer_faces_of_cnc_cut_frame
module, 23
ose3dprinter.model.frame.get_outer_faces.get_outer_faces_of_frame_with_corners
module, 23
ose3dprinter.model.frame.get_outer_faces.sort_faces_by_area_descending
module, 23
ose3dprinter.model.heated_bed
module, 24
ose3dprinter.model.heated_bed.heated_bed_model
module, 24
ose3dprinter.part
module, 24
ose3dprinter.part.axis
module, 24
ose3dprinter.part.axis.axis
module, 24
ose3dprinter.part.extruder
module, 25
ose3dprinter.part.extruder.cooling_and_sensor_mount
module, 25
ose3dprinter.part.extruder.extruder
module, 25
ose3dprinter.part.extruder.main_extruder_part
module, 26
ose3dprinter.part.frame
module, 26
ose3dprinter.part.frame.angle_frame_connector
module, 26
ose3dprinter.part.frame.angled_bar
module, 28
ose3dprinter.part.frame.angled_bar_frame
module, 28
ose3dprinter.part.frame.angled_bar_orientation
module, 29
ose3dprinter.part.frame.axis_side_mount
module, 29
ose3dprinter.part.frame.cnc_cut_frame
module, 30
ose3dprinter.part.frame.corner
module, 31
ose3dprinter.part.heated_bed
module, 31
ose3dprinter.part.heated_bed.heated_bed
module, 31

R

REAR_LEFT_UPRIGHT (*AngledBarOrientation attribute*), 29
REAR_RIGHT_UPRIGHT (*AngledBarOrientation attribute*), 29

S

sort_faces_by_area_descending() (*in module ose3dprinter.model.frame.get_outer_faces.sort_faces_by_area_descending*), 23

T

TOP_FRONT_FLAT (*AngledBarOrientation attribute*), 29
TOP_LEFT_FLAT (*AngledBarOrientation attribute*), 29
TOP_LEFT_FRONT (*Corner attribute*), 31
TOP_LEFT_REAR (*Corner attribute*), 31
TOP_REAR_FLAT (*AngledBarOrientation attribute*), 29
TOP_RIGHT_FLAT (*AngledBarOrientation attribute*), 29
TOP_RIGHT_FRONT (*Corner attribute*), 31
TOP_RIGHT_REAR (*Corner attribute*), 31
Type (*AxisModel attribute*), 20
Type (*ExtruderModel attribute*), 21
Type (*FrameModel attribute*), 23
Type (*HeatedBedModel attribute*), 24

V

vent_box_width (*CoolingAndSensorMount attribute*), 25

X

x_distance_between_holes (*Axis attribute*), 25
XAxisFaceSideStrategy (*class in ose3dprinter.model.frame.get_face_side.x_axis_face_side_strategy*), 22

XMax() (*FrameModel property*), 23
XMin() (*FrameModel property*), 23

Y

YAxisFaceSideStrategy (*class in ose3dprinter.model.frame.get_face_side.y_axis_face_side_strategy*), 22
YMax() (*FrameModel property*), 23
YMin() (*FrameModel property*), 23

Z

ZAxisFaceSideStrategy (*class in ose3dprinter.model.frame.get_face_side.z_axis_face_side_strategy*), 22
ZMax() (*FrameModel property*), 23
ZMin() (*FrameModel property*), 23