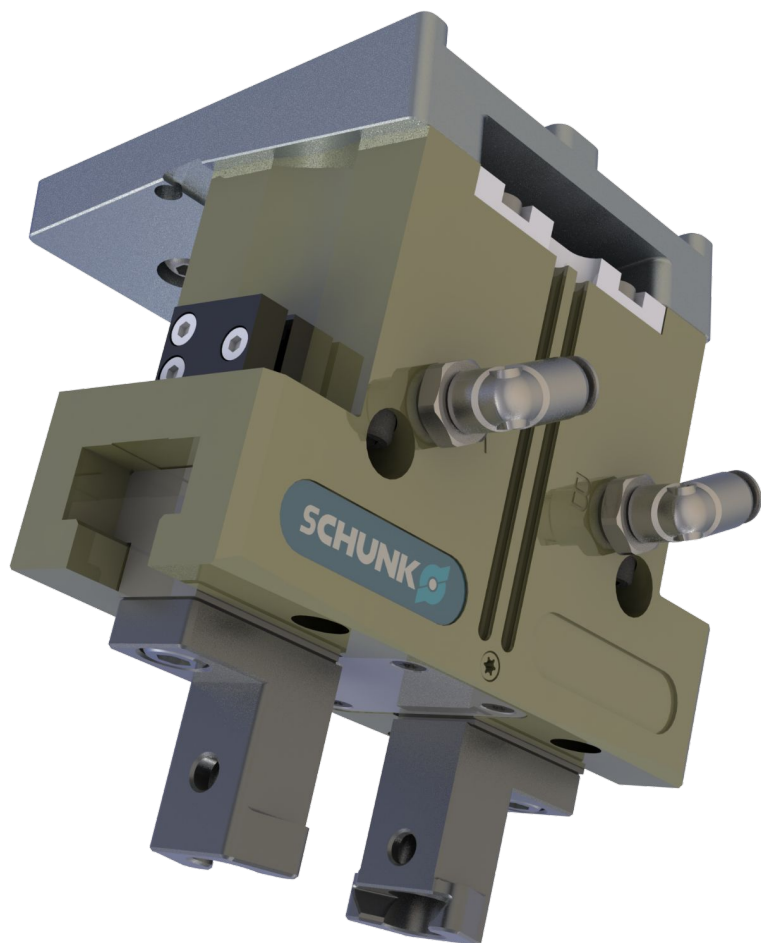


V E R S A **B U I L T**



ZPS Gripper Manual

Overview, Robot Install, and Max Payload

Table of Contents

<u>Section 1</u>	<u>Safety Warnings</u>
<u>Section 2</u>	<u>ZPS Gripper Overview</u>
<u>Section 3</u>	<u>ZPS Gripper to Robot Installation</u>
<u>Section 4</u>	<u>ZPS Gripper TCP, COG, Max Payload</u>

Safety Warnings

DANGER: VersaBuilt makes industrial machine tool automation components designed to be operated by trained personnel only. Machine tool automation components may move suddenly and without warning. Serious or fatal crushing injuries can occur from contact with the robot, gripper or vises.

Before deploying VersaBuilt industrial machine tool automation components, a safety risk assessment must be completed in accordance with local, state and/or federal requirements.

VersaBuilt industrial machine tool automation components should only be used by trained operators.

Read and understand the VersaBuilt Lathe Automation System Safety Manual before proceeding

ZPS Gripper

Section 2

ZPS Gripper

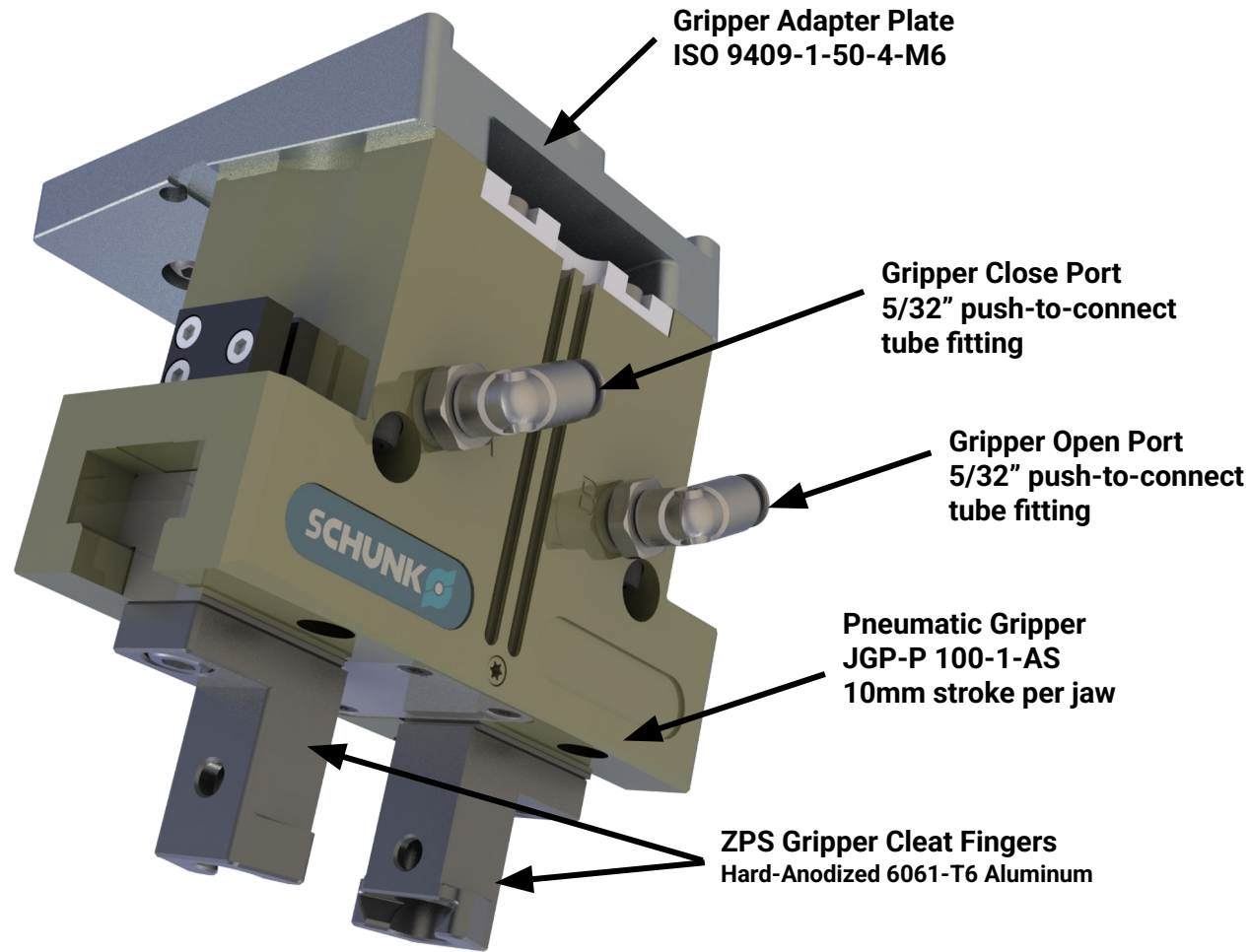
ZPS Grippers are center actuating grippers, Vertical Mill and Horizontal Mill applications, loading and unloading vises and pallets with ZPS Cleats attached. The Gripper to Cleat interface is a VersaBuilt design and requires VersaBuilt components.

ZPS Gripper

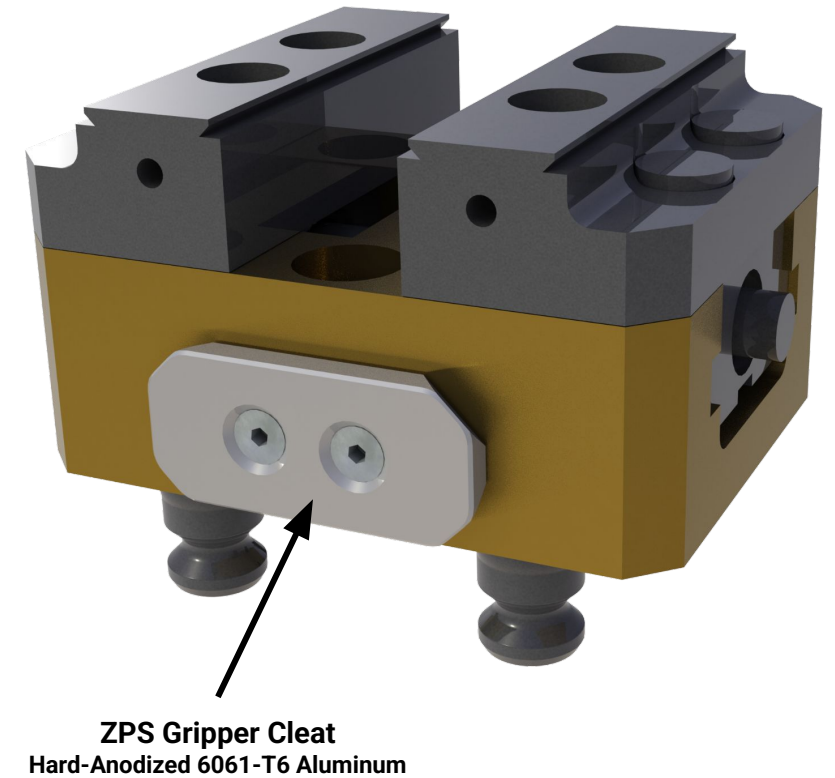
- 1.44 kg
- Pneumatic, centering actuator
- 265 lbf at 94 psi

ZPS Gripper and ZPS Cleat

ZPS Gripper

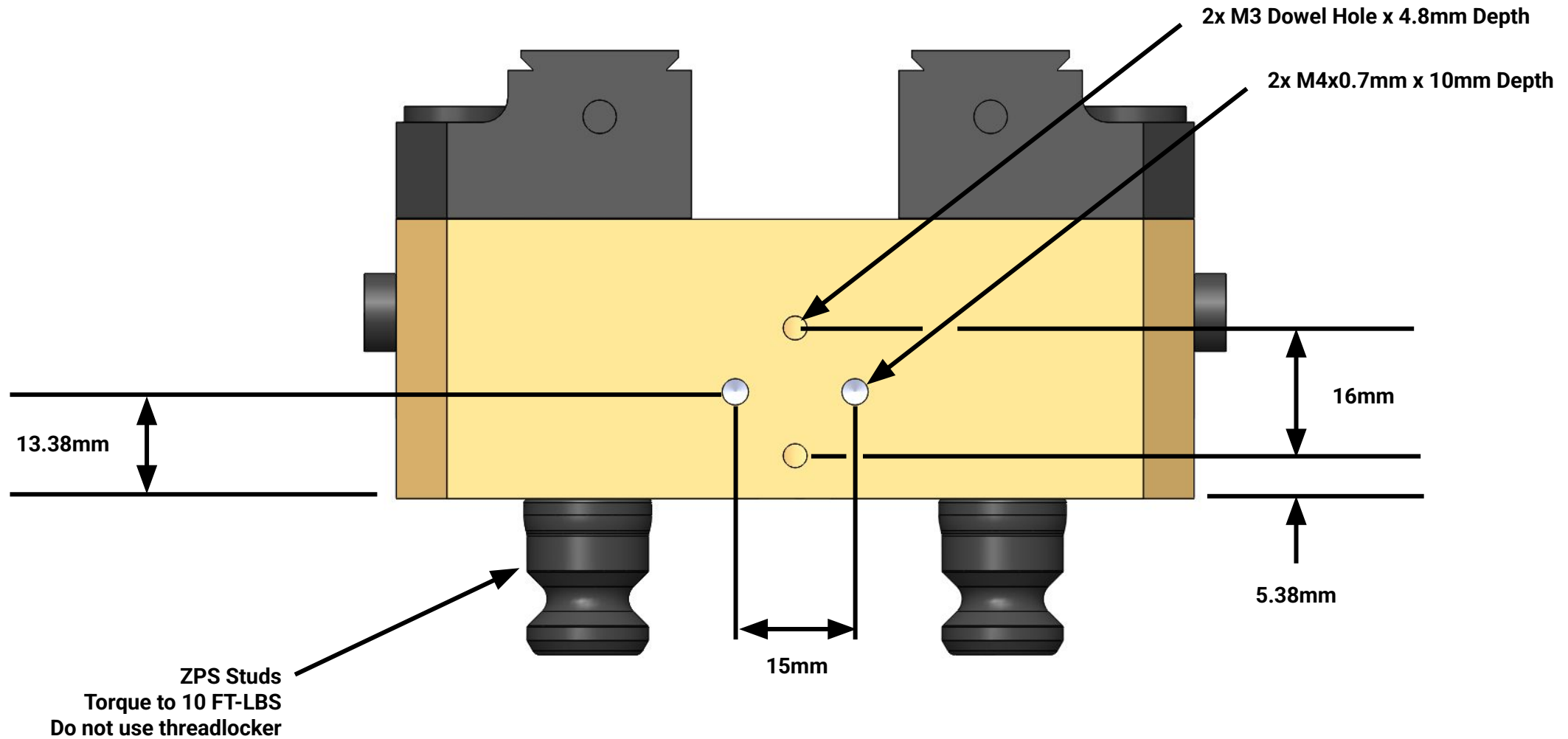


ZPS Cleat



Max Part + Vise/Pallet Weight = CRX Robot Type payload limits

ZPS Cleat Mounting Detail



Specifications

Clamping Force - Schunk JGP-P 100-1-AS

Air Pressure (psi)	Gripper Clamp Force* (N)	Gripper Clamp Force* (lbf)
20	250	56
30	375	84
40	501	113
50	626	141
60	751	169
70	876	197
80	1001	225
90	1126	253
94.3 (6.5 Bar) *max rated pressure	1180	265
100	1251	281
110	1376	309

Gripping force is the arithmetic sum of the individual force applied to each jaw

Gripper to Robot Installation

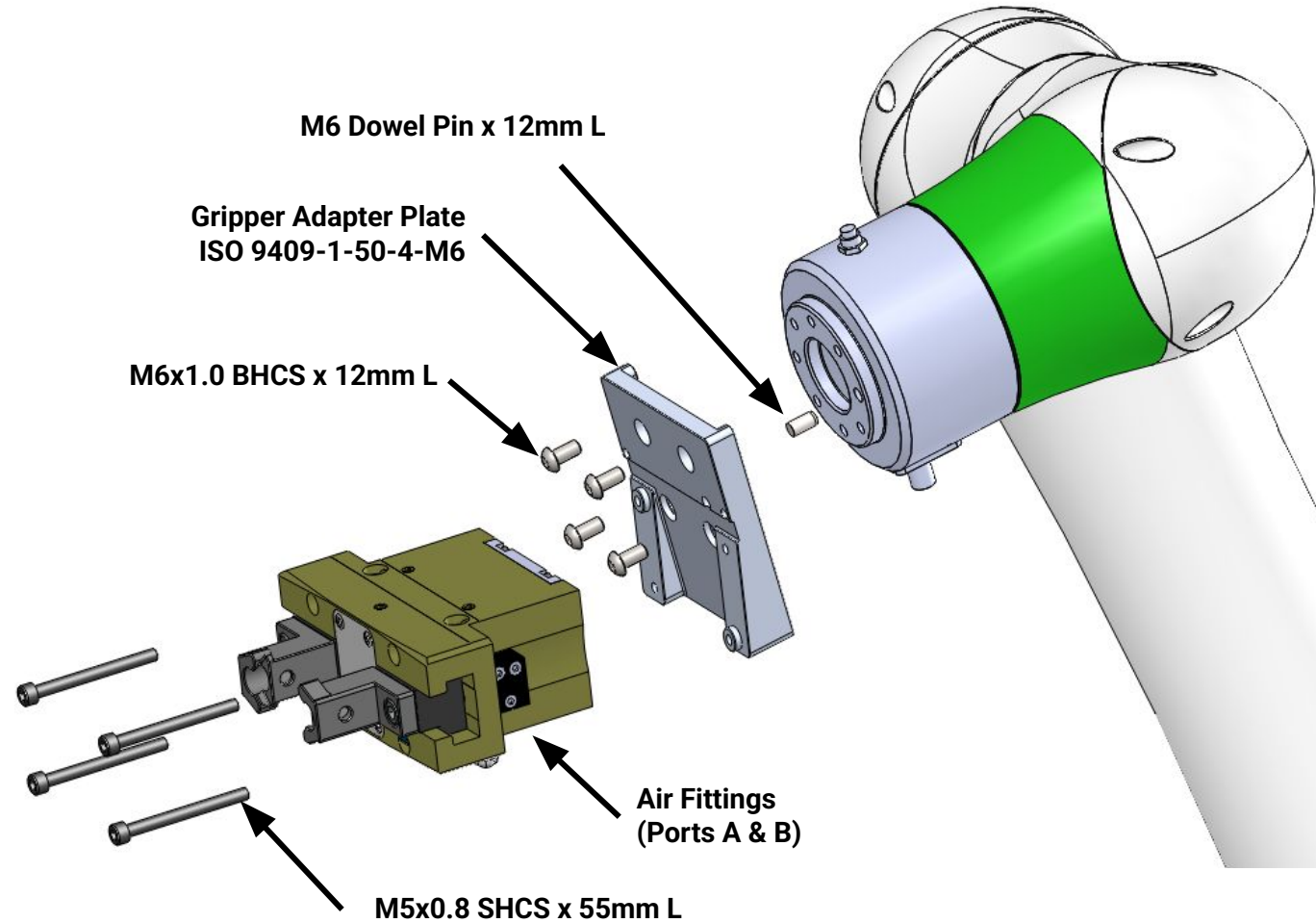
Section 3

Install ZPS Gripper

1. **Power up the robot** and using the VSC interface Home page, select Home > Table Home
2. Use free drive to position robot for easy gripper attachment
3. Add medium strength threadlocker to fasteners during assembly
4. Attach the Gripper Assembly to the robot:

Align the assembly with the M6 dowel pin to mating features on the robot end of arm

Secure the adapter plate with QTY: 4 M6 Button Head Screws and the actuator with QTY: 4 M5 Socket Head Screws



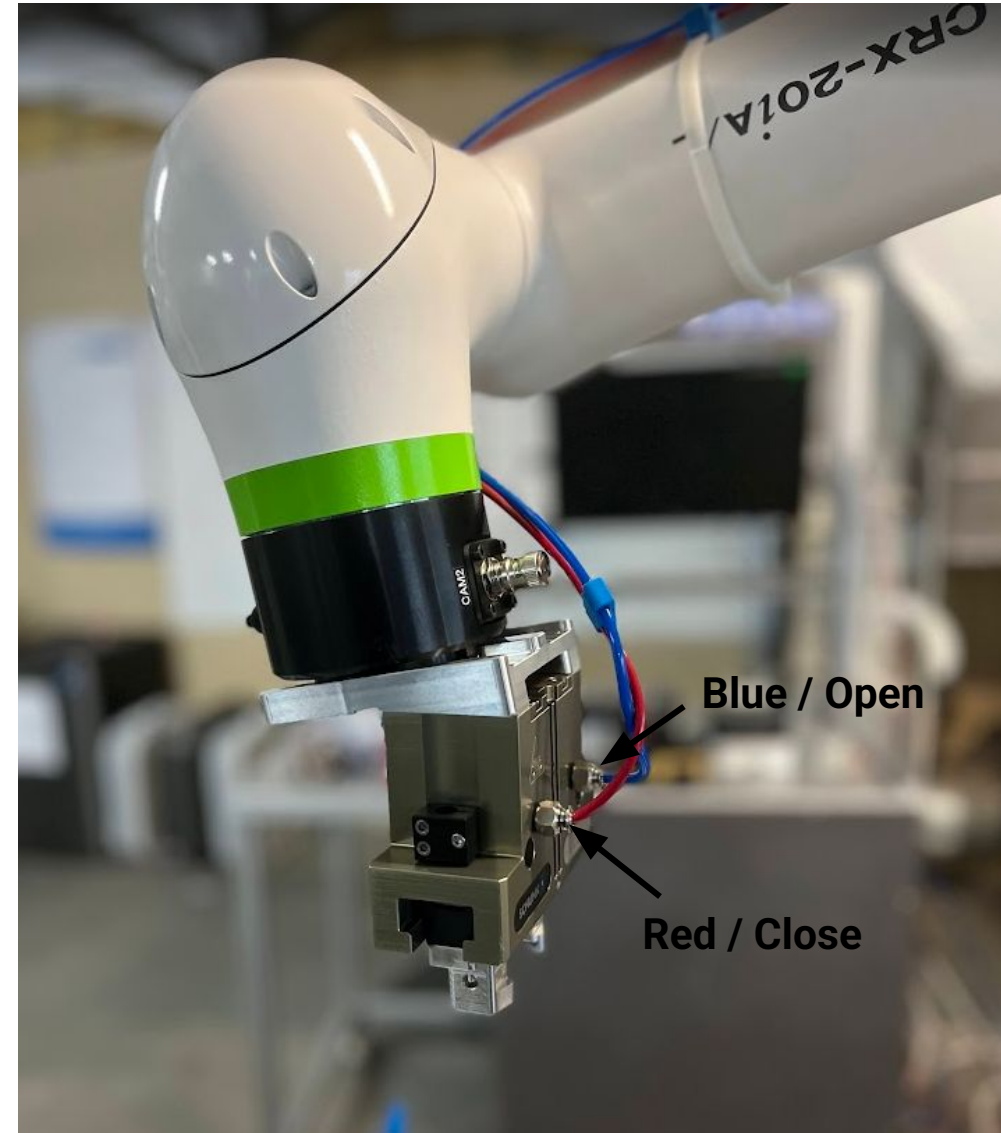
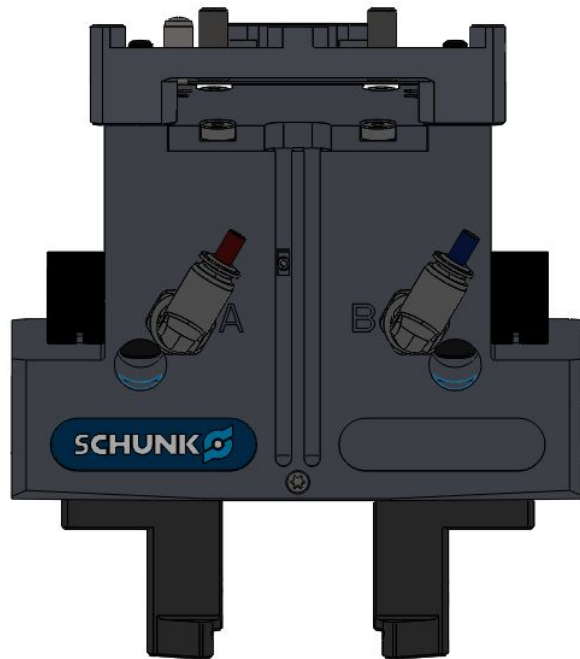
Pneumatics for DuoGrip Gripper

Refer to the following manuals for Tube routing:

- Automation System Pneumatics Manual
- Robot Gripper Tube Routing Manual

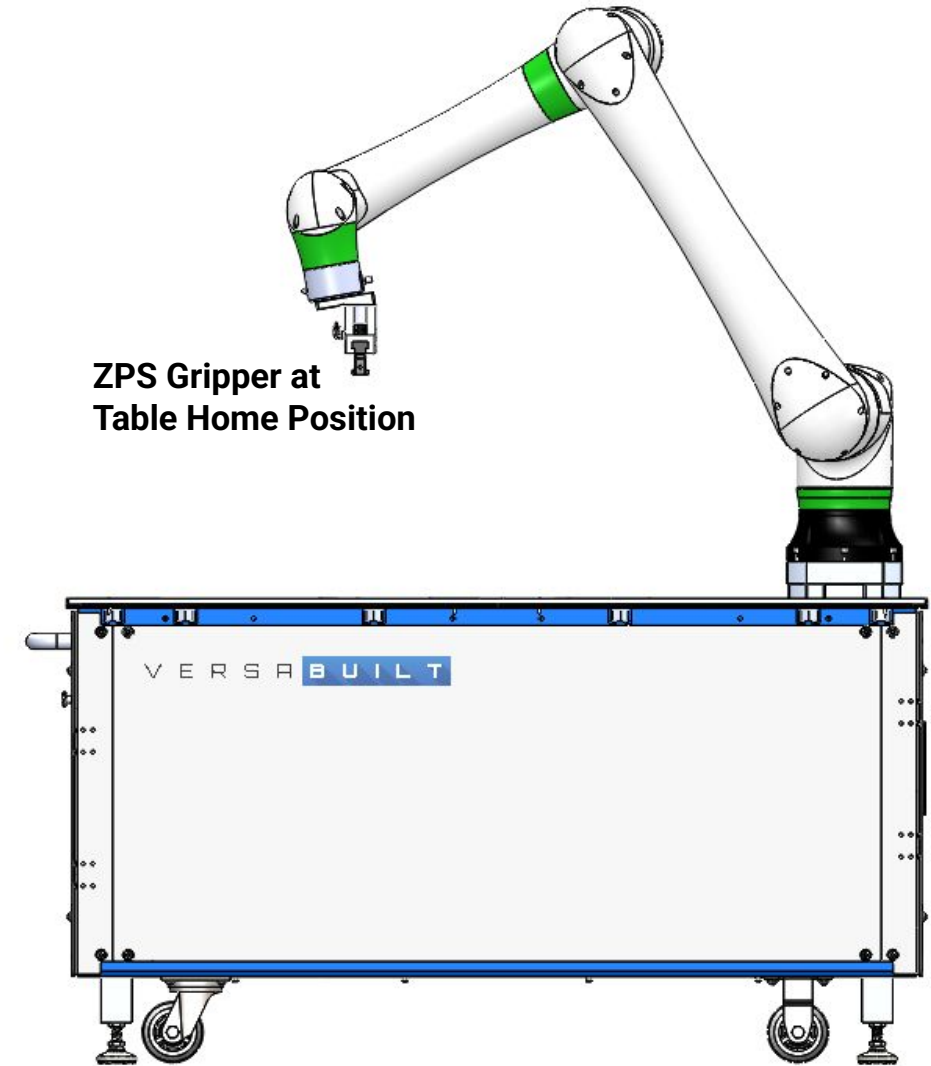
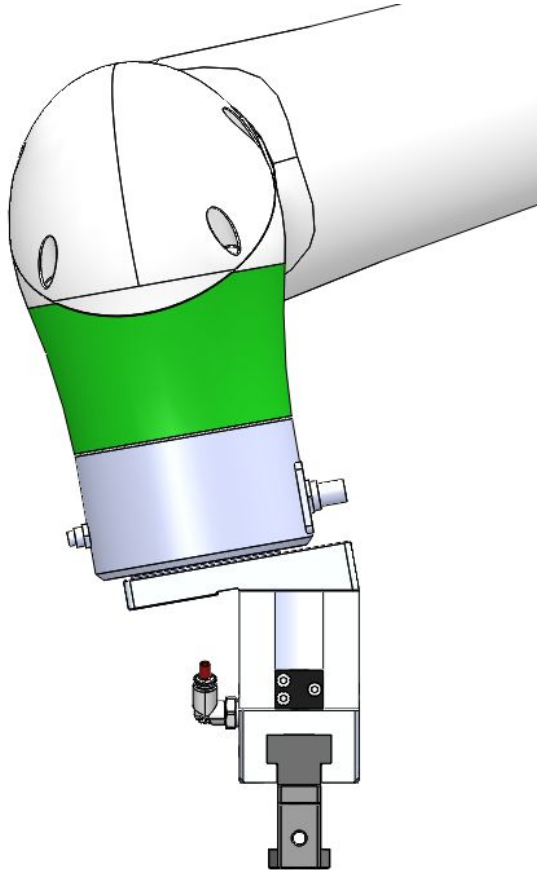
There are 2 air lines for DuoGrip Grippers:

- Port A - 5/32" Red - Gripper Close
- Port B - 5/32" Blue - Gripper Open



ZPS Gripper Orientation

- Attach ZPS Gripper with Dowel Pin to properly clock the gripper orientation
- Verify correct position
 - With VSC user interface, move the robot to Table Home
 - Orientation must match images on this page



Gripper TCP, COG, Max Payload

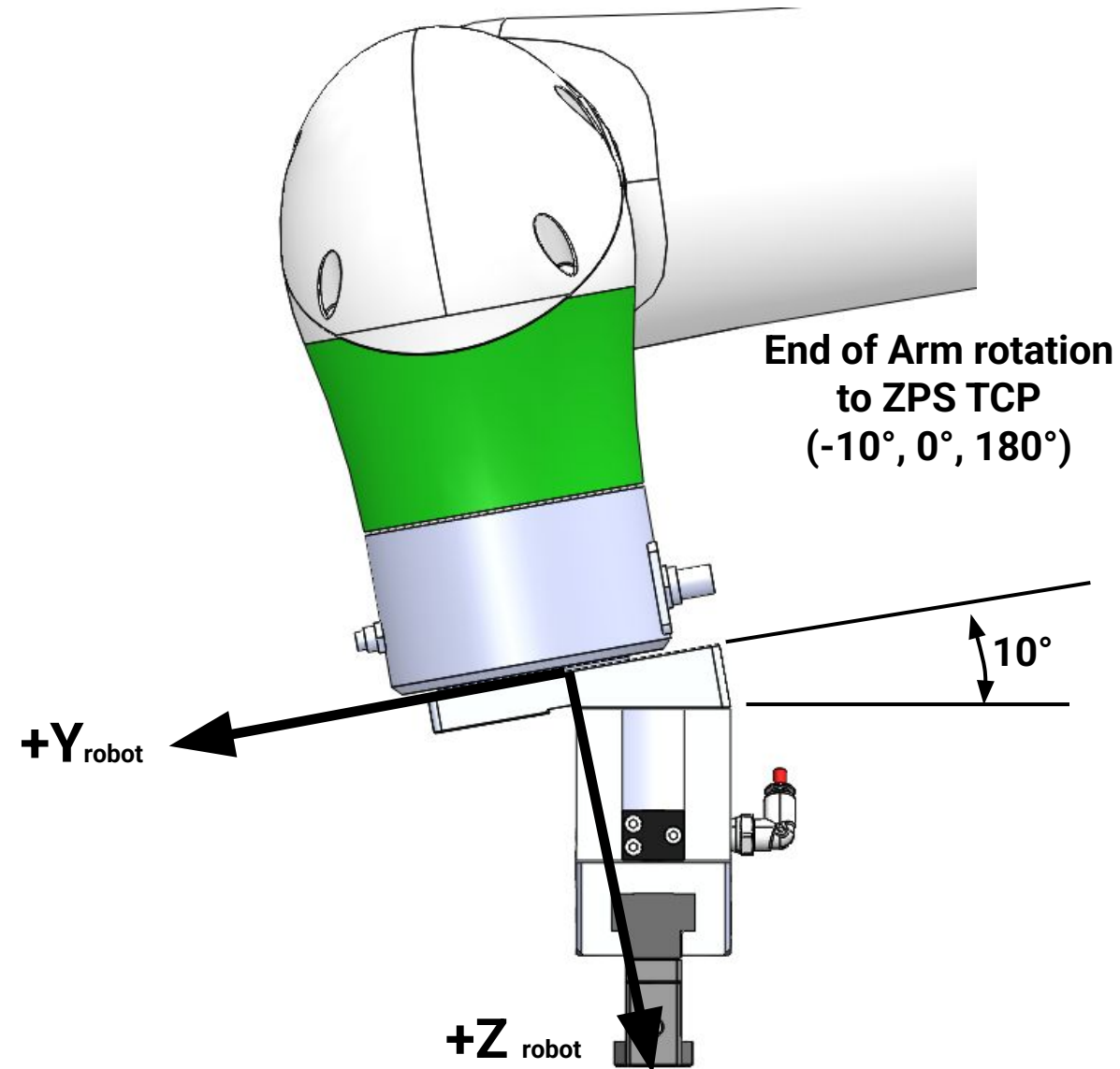
Section 4

Max Payload per Robot Model

Max part weight per Robot Model

CRX-10iaL - 5.0 kg (11.0 lbs)

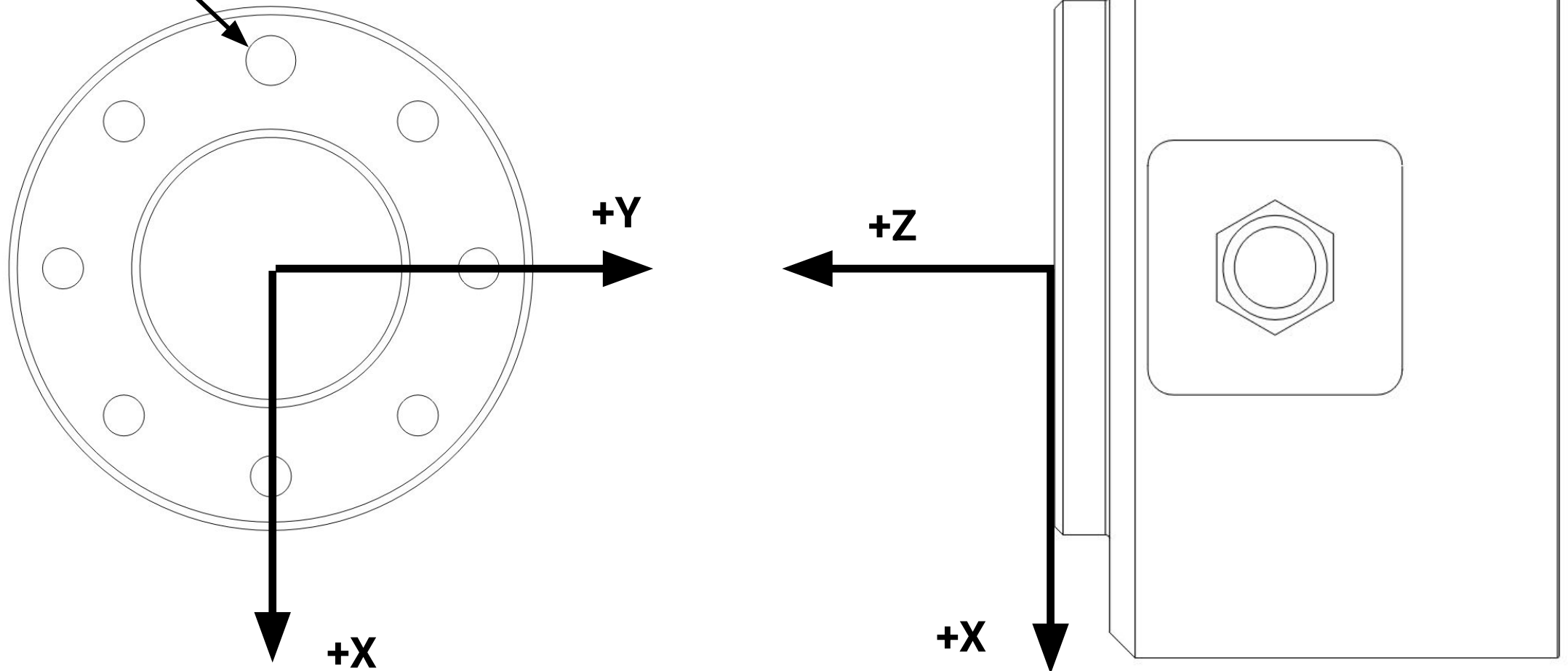
CRX-20iaL - 13.2 kg (29 lbs)



Tool Center Point (TCP)

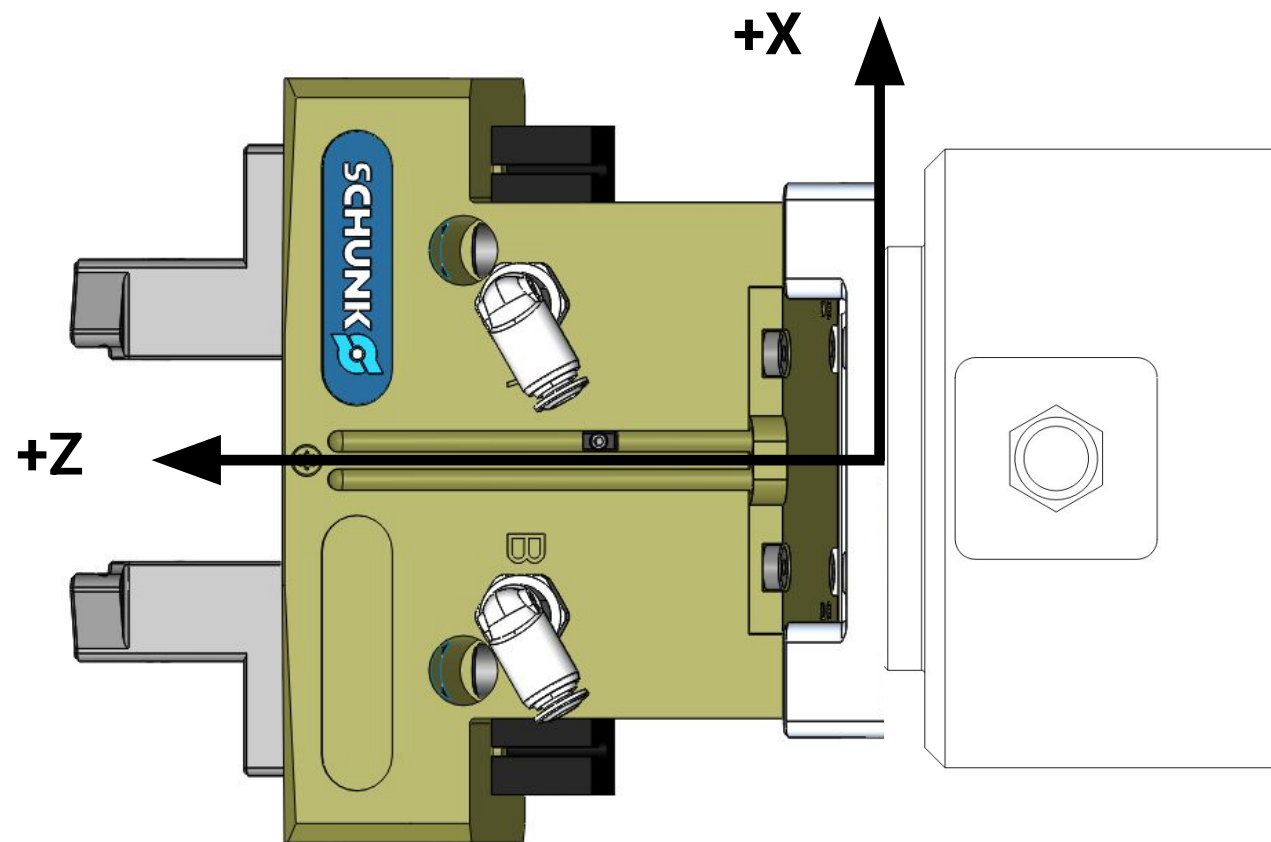
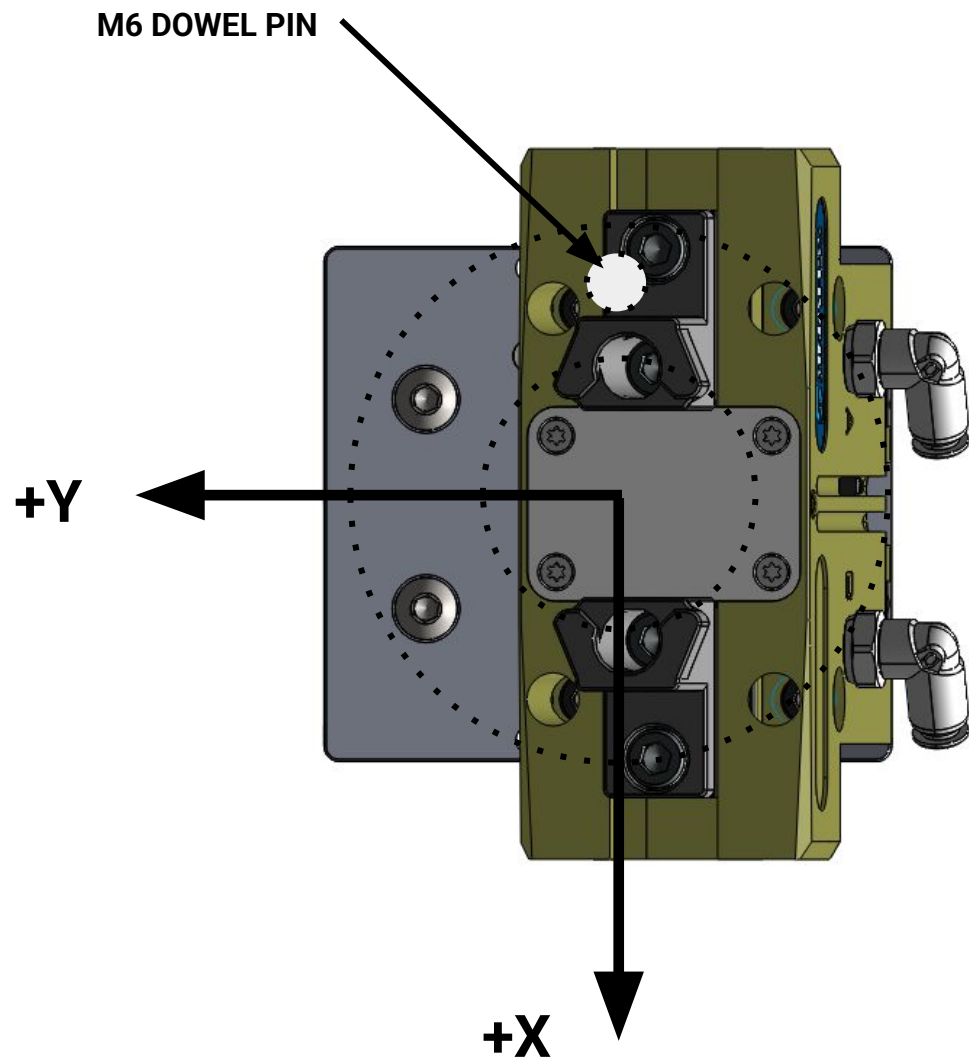
M6 DOWEL PIN

FANUC CRX EOAT AXES ORIENTATION
ISO 9409-1-50-4-M6



Tool Center Point (TCP) - Orientation

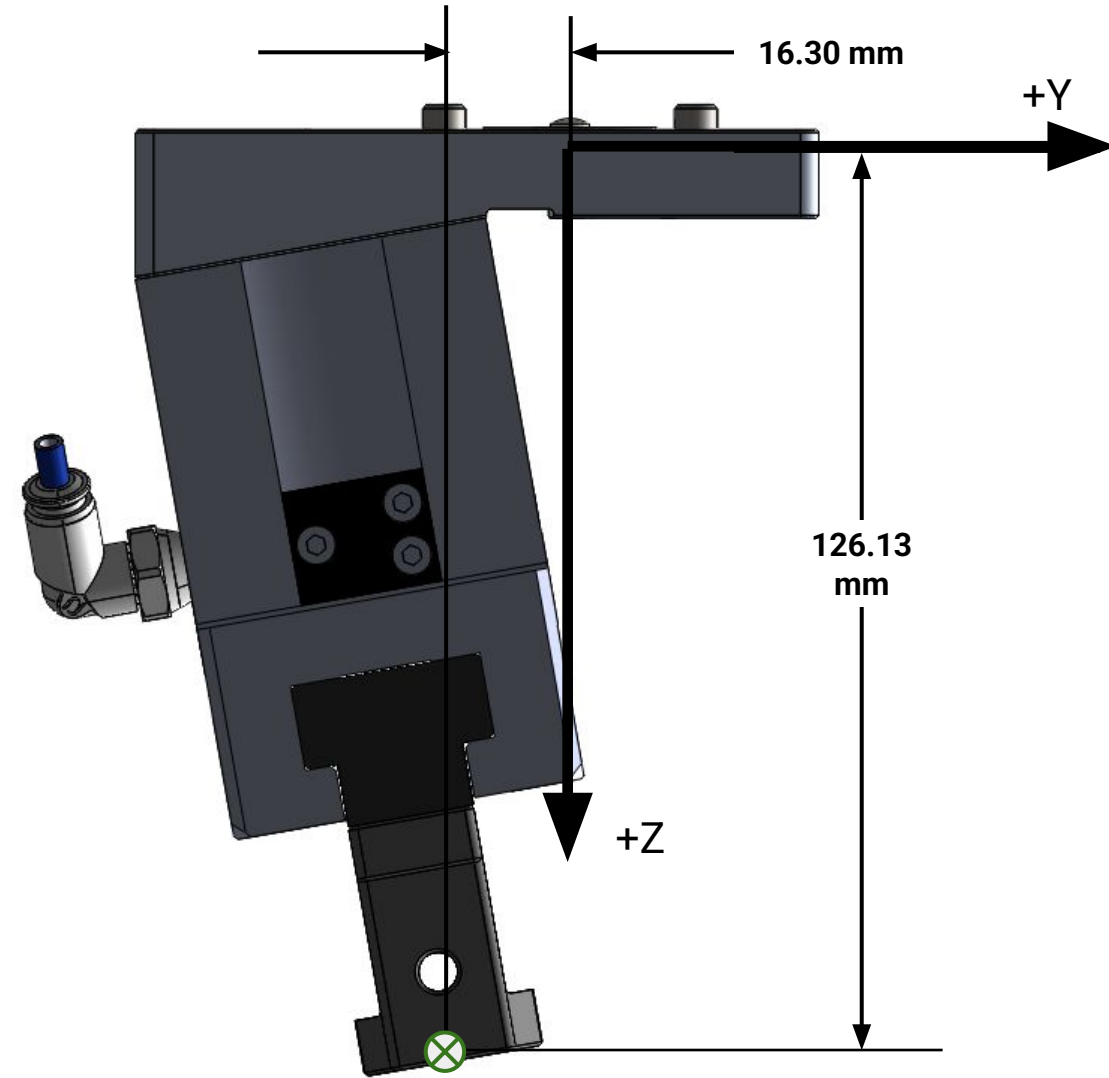
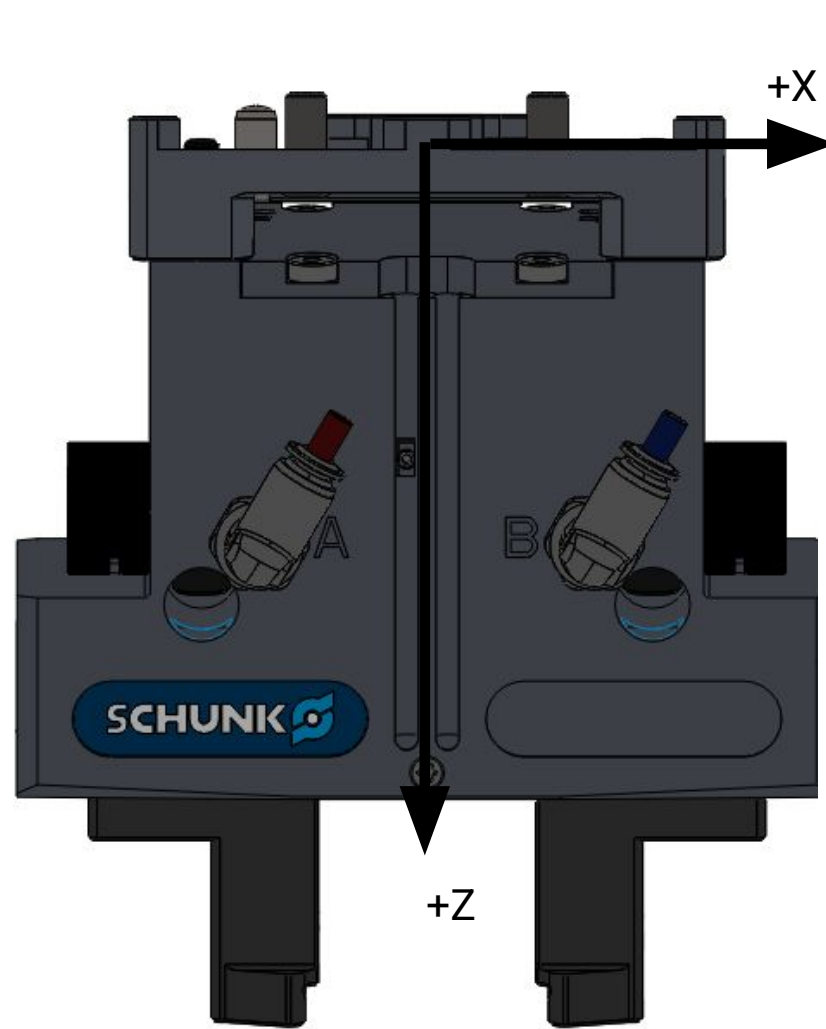
FANUC CRX EOAT AXES ORIENTATION
ISO 9409-1-50-4-M6



Tool Center Point (TCP) - Gripper Fingers

TCP Location:

Distance from robot end of arm to center z-surface of gripper fingers engaging with cleat



Tool Center Point
(mm)

TCP = 0.00, -16.30, +126.13

Tool Center Point (TCP) - V52-V75100X Vise

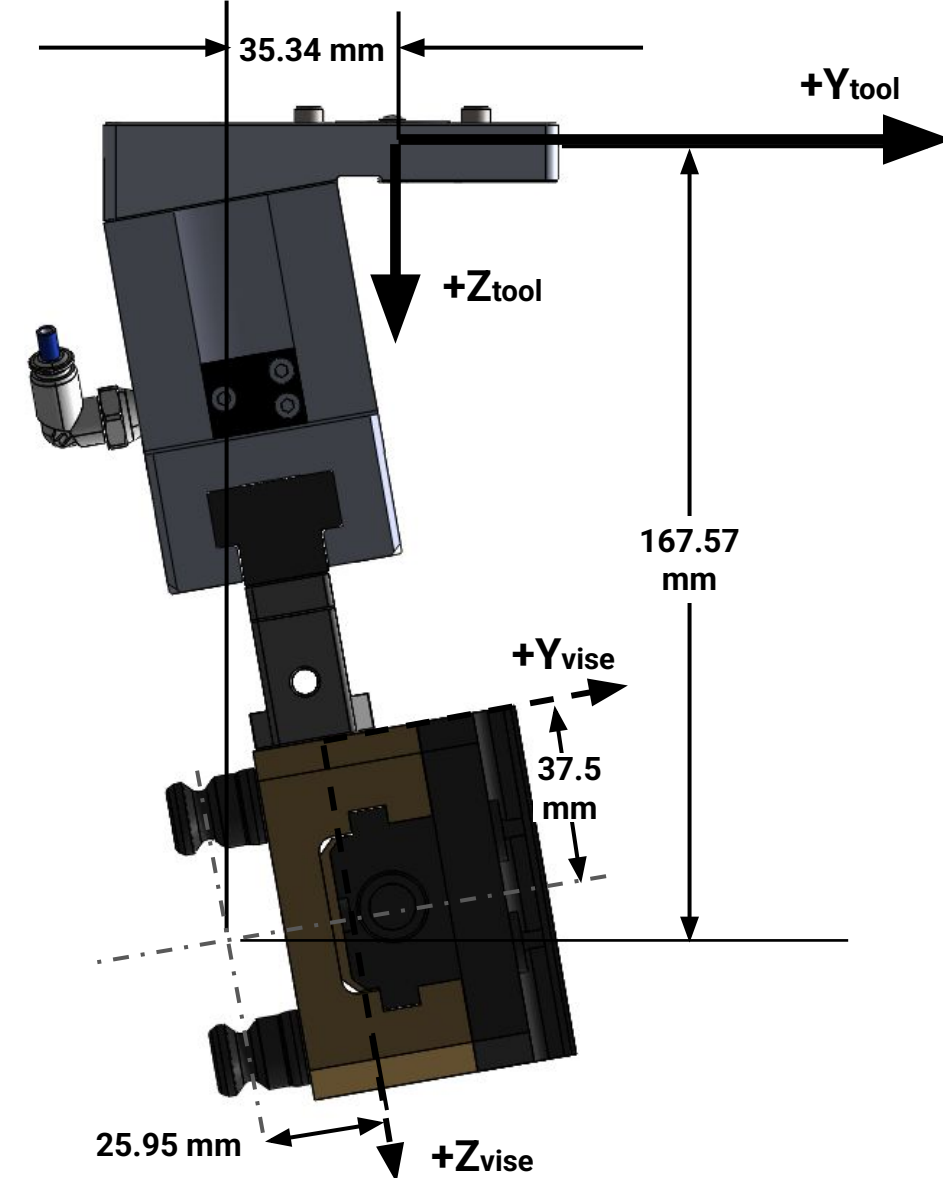
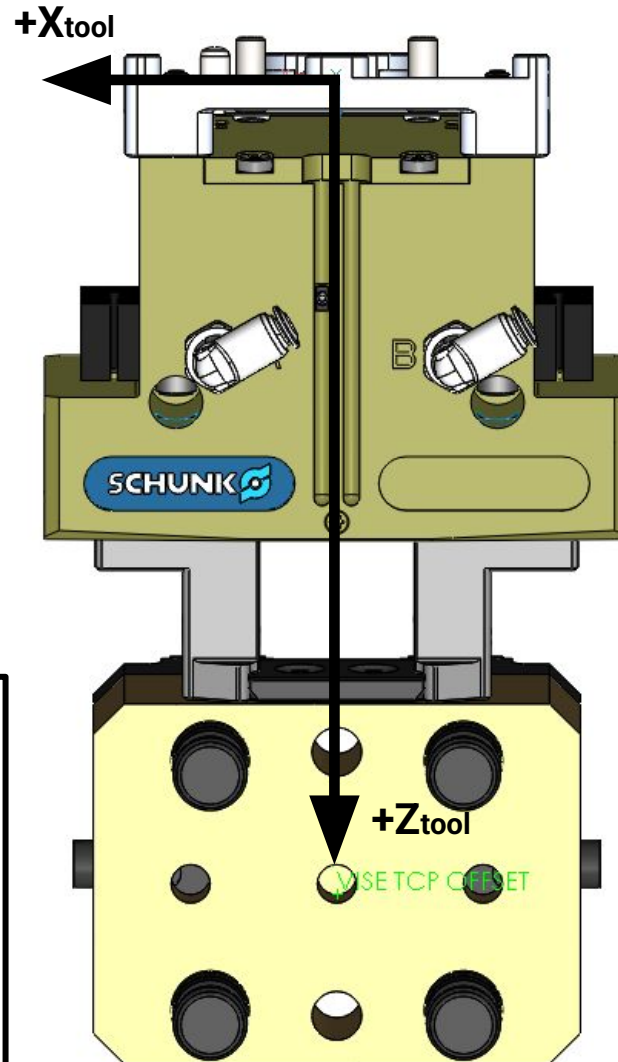
Workholding Configuration Definition:

- **Weight:** Mass of Pallet/Vise without part(s)
- **TCP:**
 - X,Y,Z location from center of cleat at face of pallet/vise to center of chuck interface **i.e., Gripper TCP to the center of vise/chuck interface
 - X,Y,Z directions are shown in the figure to the right, e.g., $+Y_{vise}$, $+Z_{vise}$

Tool Center Point V52-V75100X 5th Axis Vise

Weight = 2.55 kg

TCP X = +0.00 mm
TCP Y = -25.95 mm
TCP Z = +37.50 mm



Tool Center Point (TCP) - V52-V75100X Vise

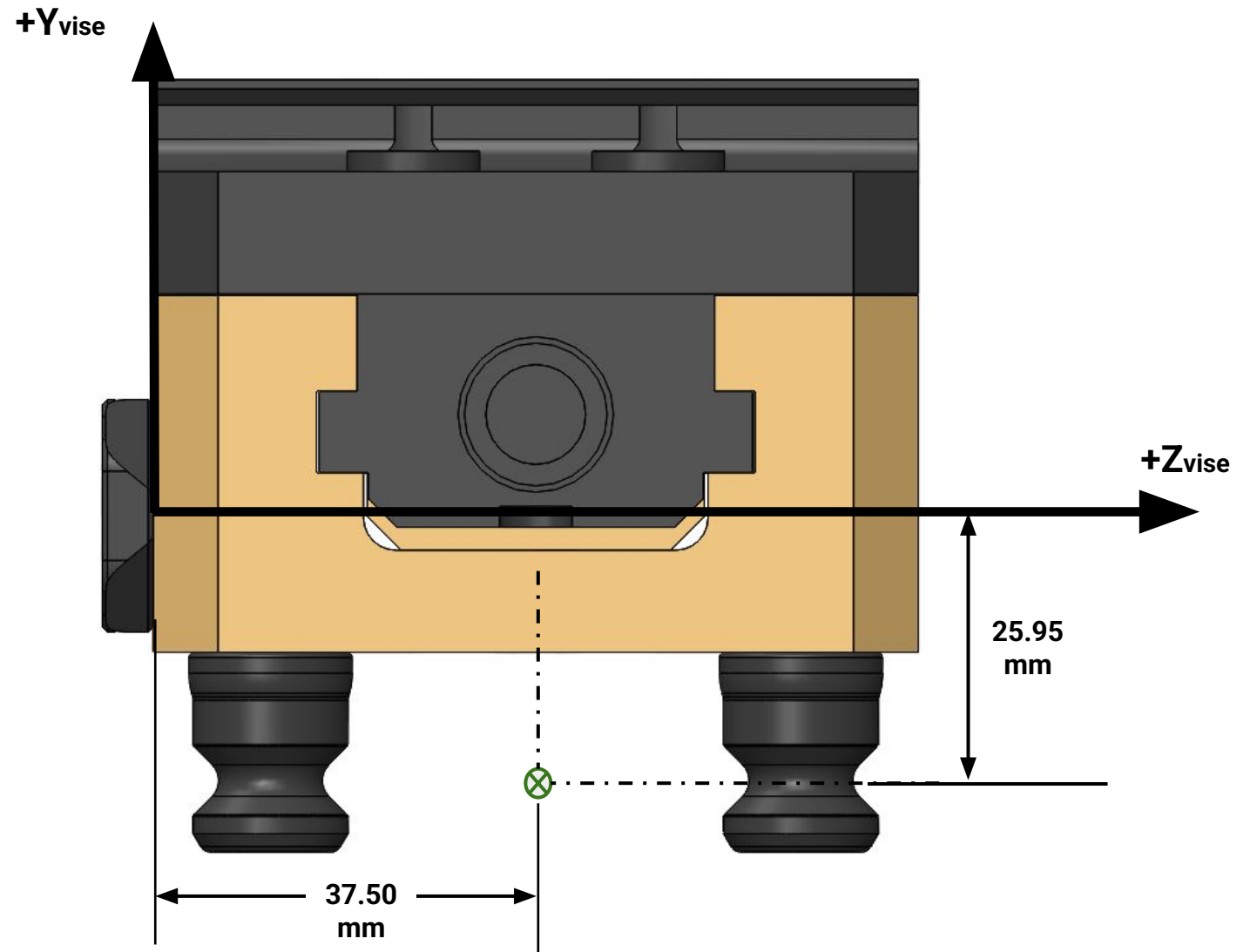
Workholding Configuration Definition:

- **Weight:** Mass of Pallet/Vise without part(s)
- **TCP:**
 - X,Y,Z location from center of cleat at face of pallet/vise to center of chuck interface **i.e., Gripper TCP to the center of vise/chuck interface
 - X,Y,Z directions are shown in the figure to the right, e.g., +Y_{vise}, +Z_{vise}

Tool Center Point V52-V75100X 5th Axis Vise

Weight = 2.55 kg

TCP X = +0.00 mm
TCP Y = -25.95 mm
TCP Z = +37.50 mm



Tool Center Point (TCP) - Haas ZPS 1.0" x 5.25" SQ Pallet

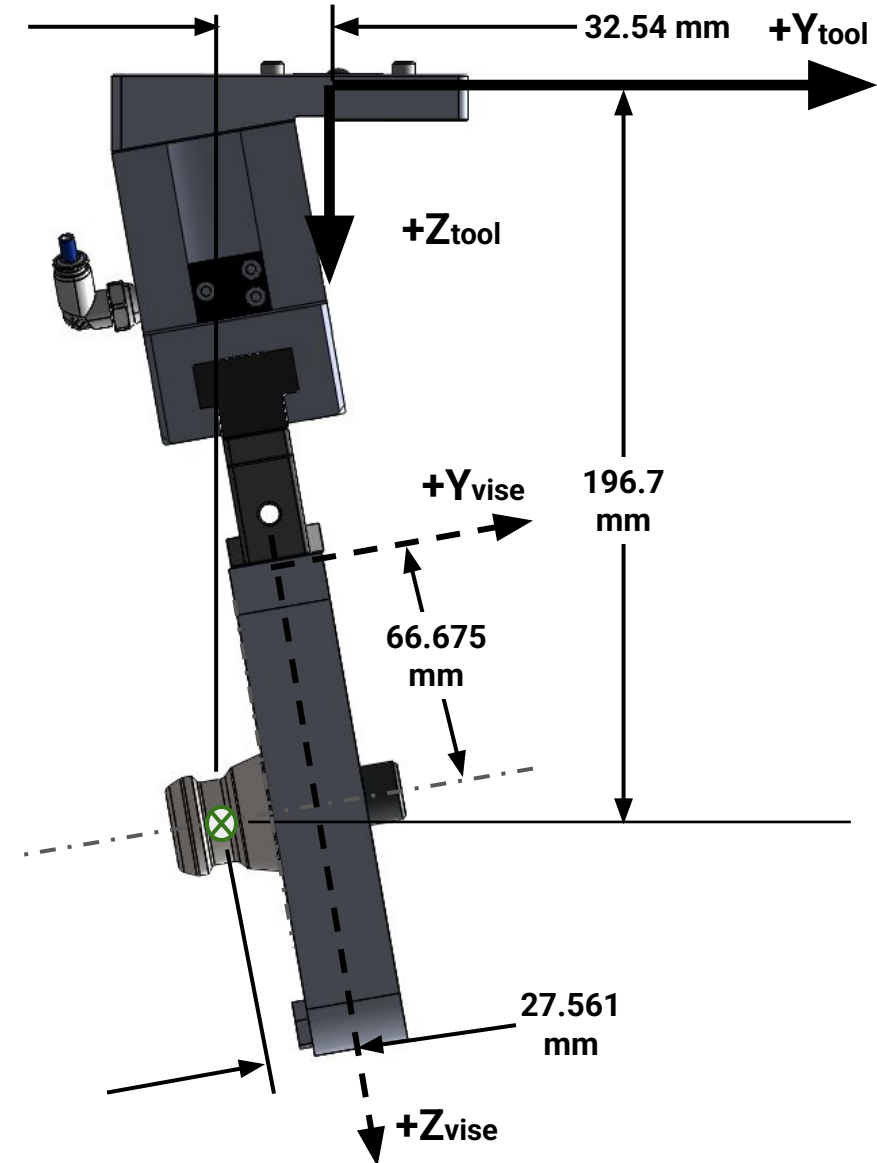
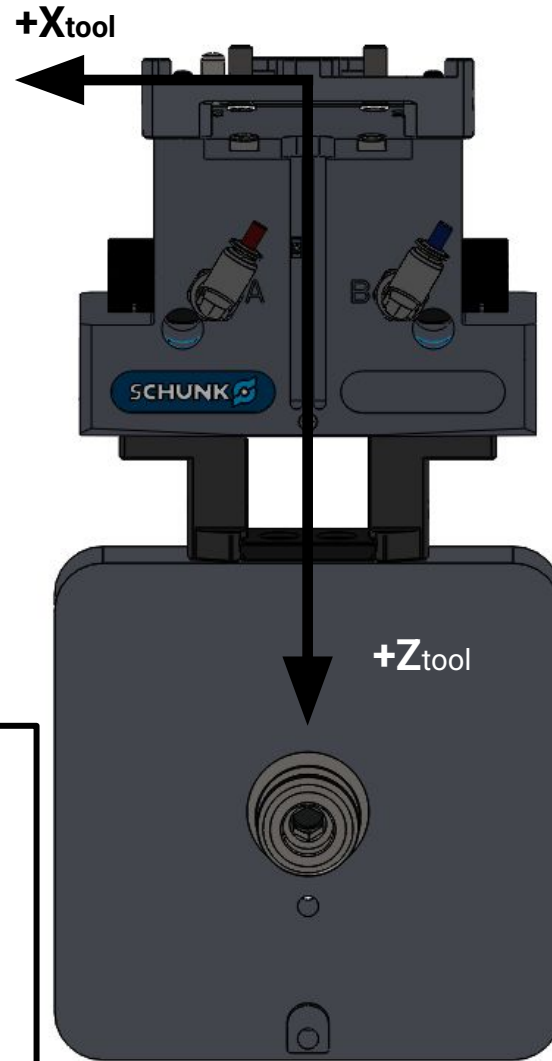
Workholding Configuration Definition:

- **Weight:**
 - Mass of Pallet/Vise without part(s)
- **TCP:**
 - X,Y,Z location from center of cleat at face of pallet/vise to center of chuck interface *i.e., Gripper TCP to the center of vise/chuck interface
 - X,Y,Z directions are shown in the figure to the right, e.g., $+Y_{vise}$, $+Z_{vise}$

Tool Center Point
Haas ZPS w/ 1" x 5.25" SQ

Weight = 1.35 kg

TCP X = +0.000 mm
TCP Y = -27.561 mm
TCP Z = +66.675 mm



Tool Center Point (TCP) - Haas ZPS 1.0" x 5.25" SQ Pallet

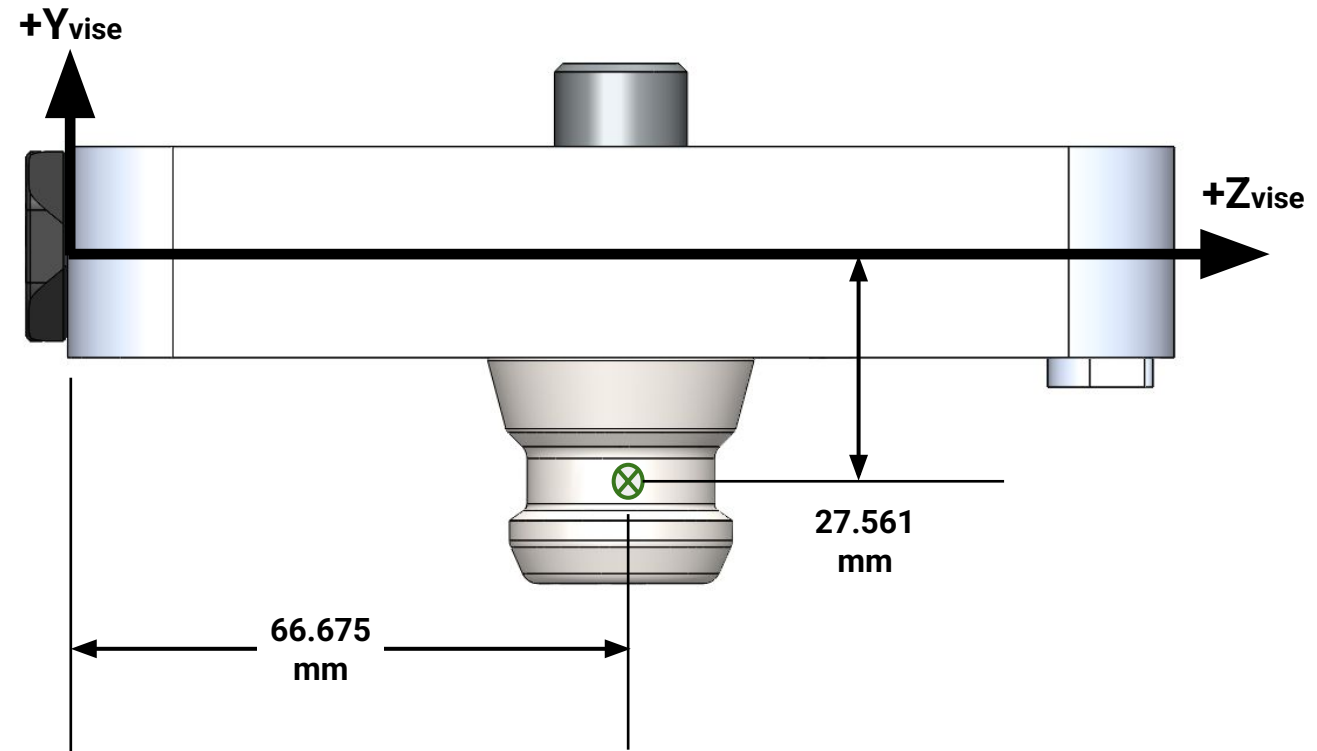
Workholding Configuration Definition:

- **Weight:**
 - Mass of Pallet/Vise without part(s)
- **TCP:**
 - X,Y,Z location from center of cleat at face of pallet/vise to center of chuck interface *i.e., *Gripper TCP to the center of vise/chuck interface*
 - X,Y,Z directions are shown in the figure to the right, e.g., **+Y_{vise}**, **+Z_{vise}**

Tool Center Point
Haas ZPS w/ 1" x 5.25" SQ

Weight = 1.35 kg

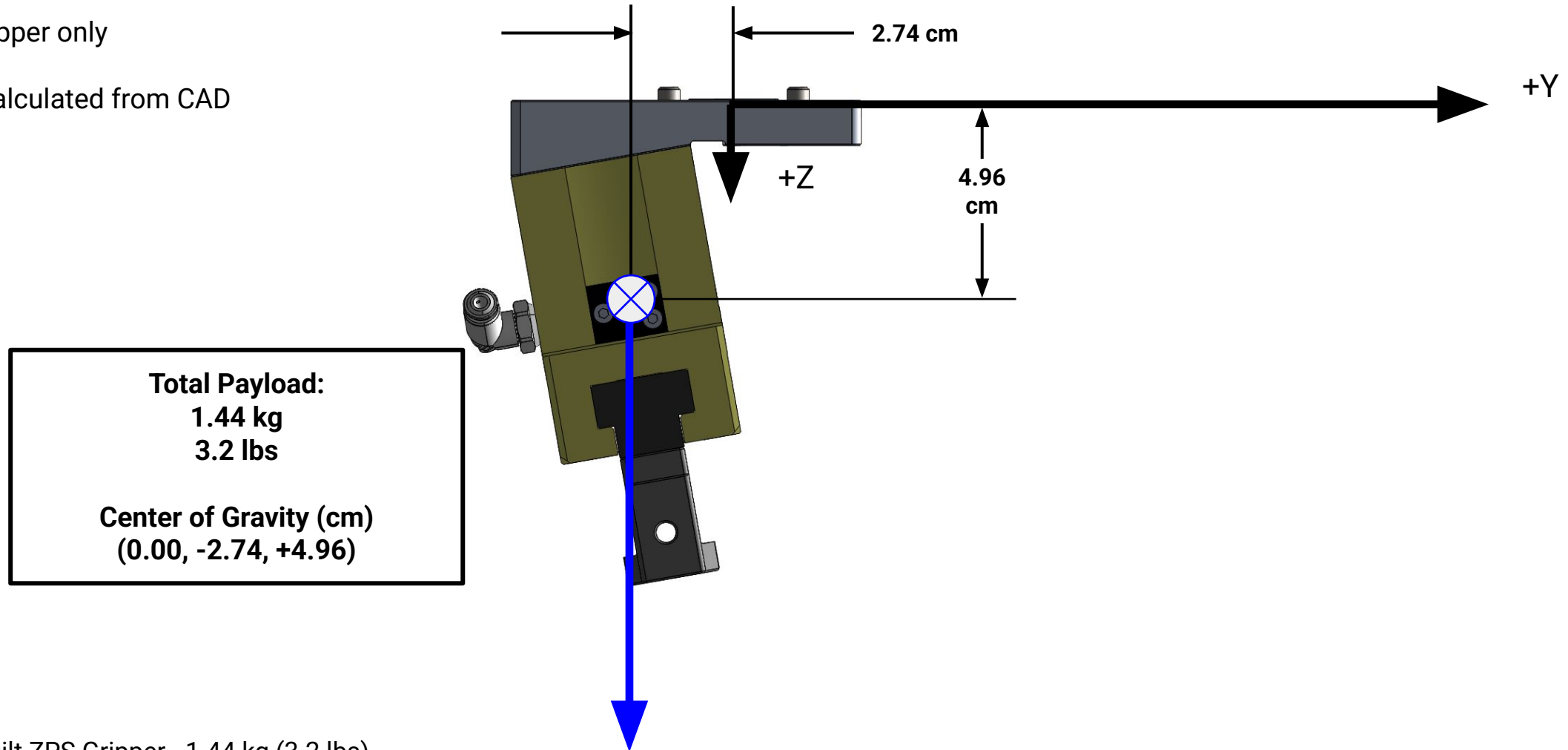
TCP X = +0.000 mm
TCP Y = -27.561 mm
TCP Z = +66.675 mm



Center of Gravity - Empty Gripper

ZPS Gripper only

*COG calculated from CAD



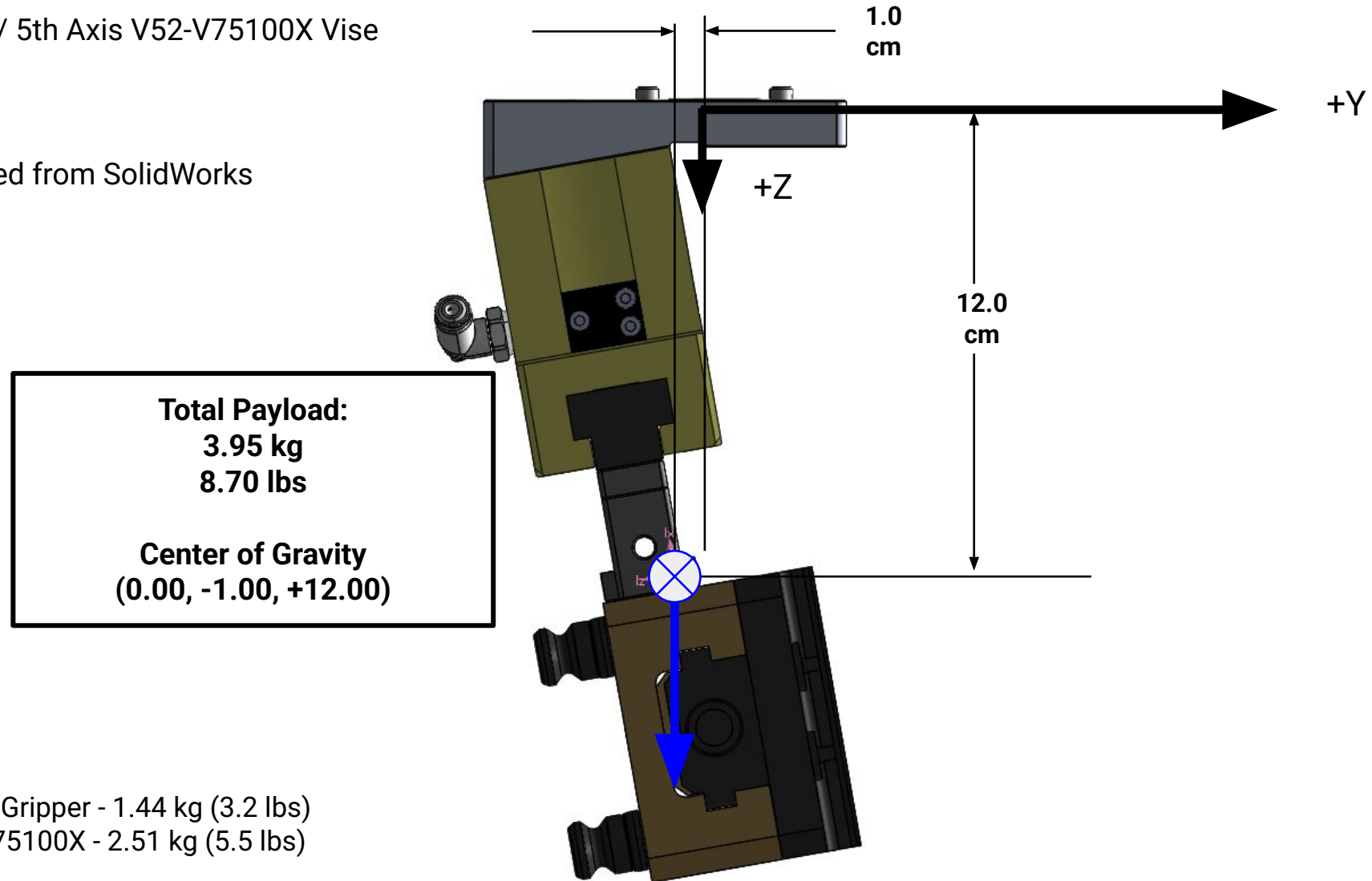
VersaBuilt ZPS Gripper - 1.44 kg (3.2 lbs)

Center of Gravity - Gripper w/ Empty 5th Axis 52mm Vise

ZPS Gripper w/ 5th Axis V52-V75100X Vise

Empty Vise

*COG calculated from SolidWorks



VersaBuilt ZPS Gripper - 1.44 kg (3.2 lbs)
5th Axis P/N V75100X - 2.51 kg (5.5 lbs)

Center of Gravity - Gripper w/ Empty Haas ZPS Pallet

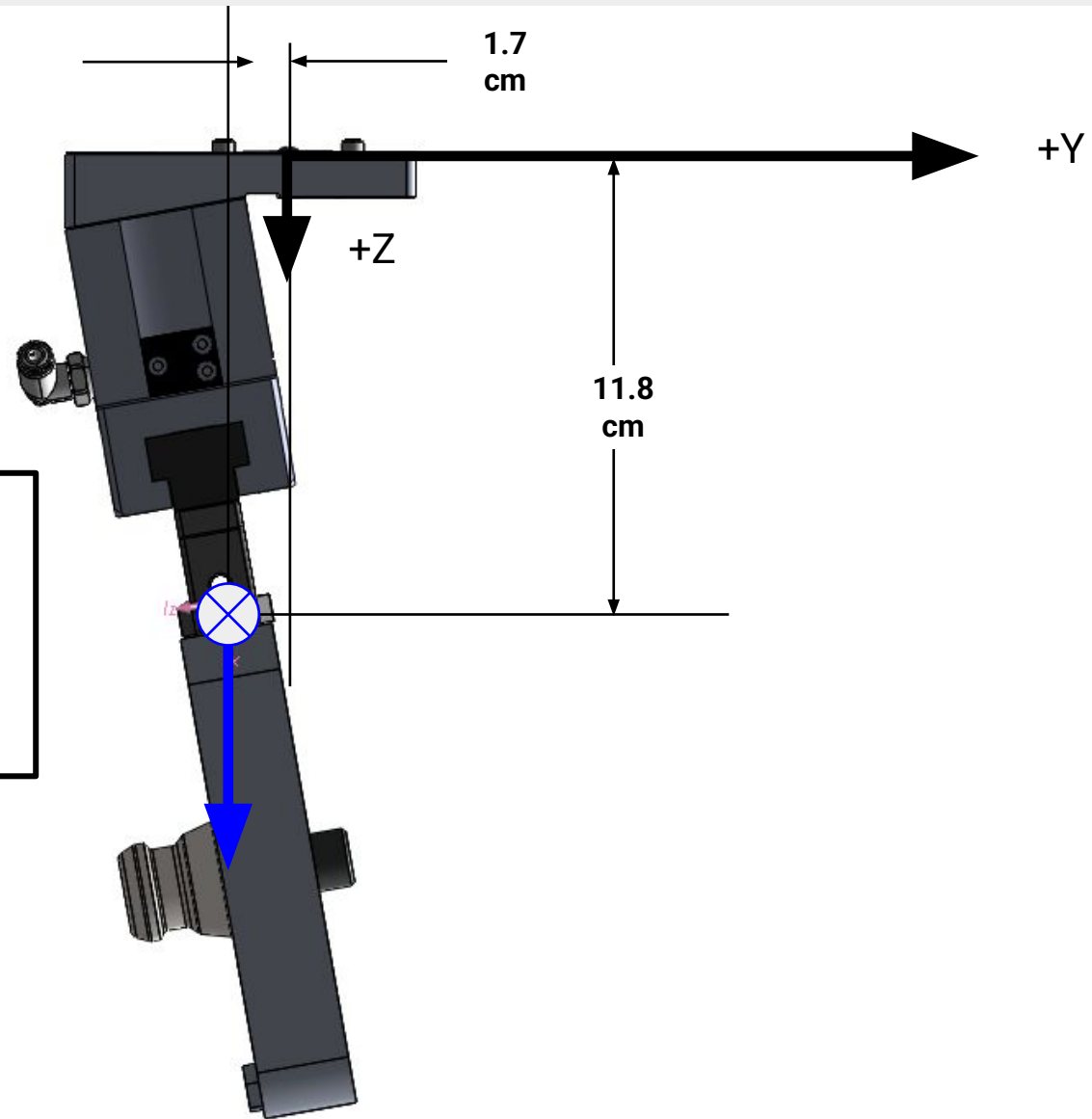
ZPS Gripper w/ 5th Axis V52-V75100X Vise

Empty Vise

*COG calculated from SolidWorks

Total Payload:
2.80 kg
6.2 lbs

Center of Gravity
(0.00, -1.70, +11.80)



VersaBuilt ZPS Gripper - 1.44 kg (3.2 lbs)
5.75 SQ Haas ZPS Pallet - 1.36 kg (3.0 lbs)

CRX-10iaL Max Payload

B-84194EN/01

3. BASIC SPECIFICATIONS

3.4

WRIST LOAD CONDITIONS

Source:

Fanuc Manual B-84194EN/01
3. BASIC SPECIFICATIONS
3.4 WRIST LOAD CONDITIONS

ZPS Gripper w/ 5th Axis Vise,
Holding 6.5" tall part that is 5 kg (11 lbs)
Total mass = 8.9 kg (19.6 lbs)
COG 0.00, -6.9, +13.0

ZPS Gripper with empty 5th Axis Vise
Total mass = 3.95 kg (8.7 lbs)
COG 0.00, +1.00, +12.00

ZPS Gripper
Total mass = 1.44 kg (3.2 lbs)

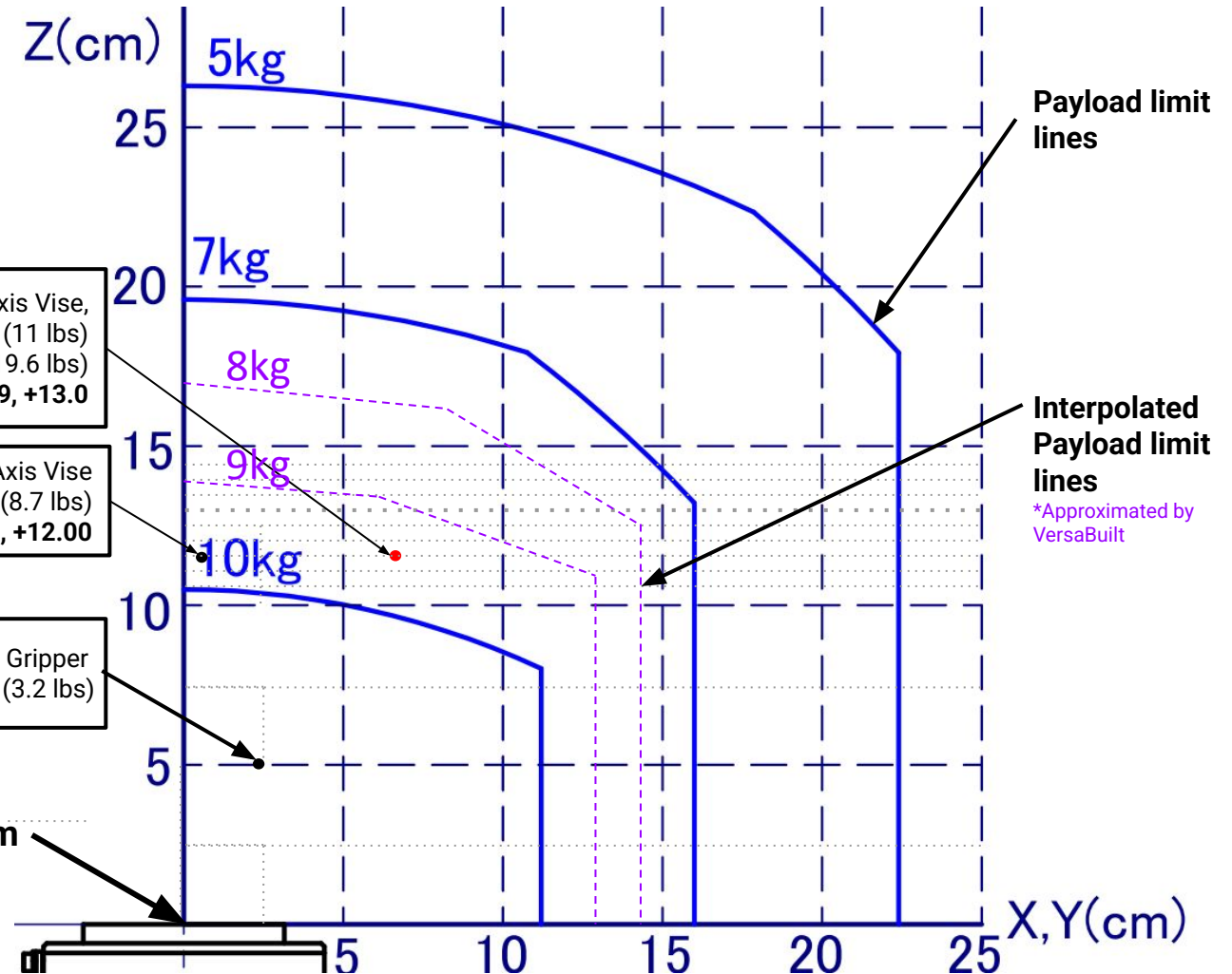
Approximate total payload limit = 9 kg (19.8 lbs)

VersaBuilt Schunk ZPS Gripper = 1.44 kg (3.2 lbs)

5th Axis P/N V75100X = 2.5 kg (5.5 lbs)

Total Vise & Gripper Payload = 3.95 kg (8.7 lbs)

Max part weight = 5 kg (11lbs)



CRX-10iaL Max Payload

ZPS Gripper w/ 5th Axis V52-V75100X Vise

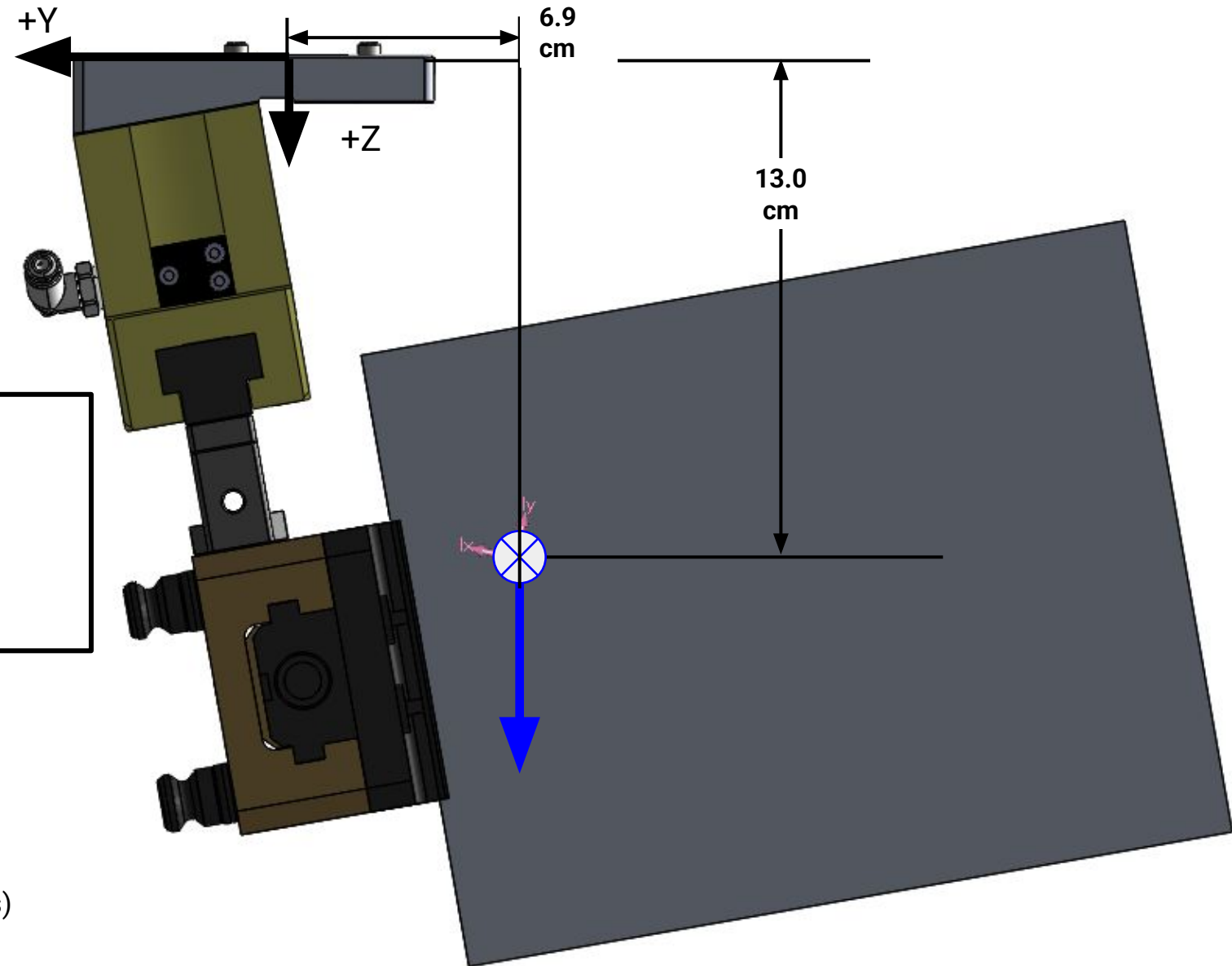
Holding 5 kg part

*COG calculated from CAD

Total Payload:
8.9 kg
19.6 lbs

Center of Gravity
(0.00, -6.90, +13.0)

VersaBuilt ZPS Gripper - 1.44 kg (3.2 lbs)
5th Axis P/N V75100X - 2.51 kg (5.5 lbs)
Aluminum Billet 2.125 x 6.50 x 8.125 - 5 kg (11lbs)



CRX-20iaL Max Payload

B-84194EN/01

3. BASIC SPECIFICATIONS

3.4 WRIST LOAD CONDITIONS

Source:

Fanuc Manual B-84194EN/01
3. BASIC SPECIFICATIONS
3.4 WRIST LOAD CONDITIONS

Z(cm)

ZPS Schunk Gripper w/ 5th Axis Vise,
Holding 8.5" tall part that is 13 kg (8.6lbs)
Total mass = 17 kg (37.5 lbs)
COG 0.00, -10.7, +13.25

End of Arm

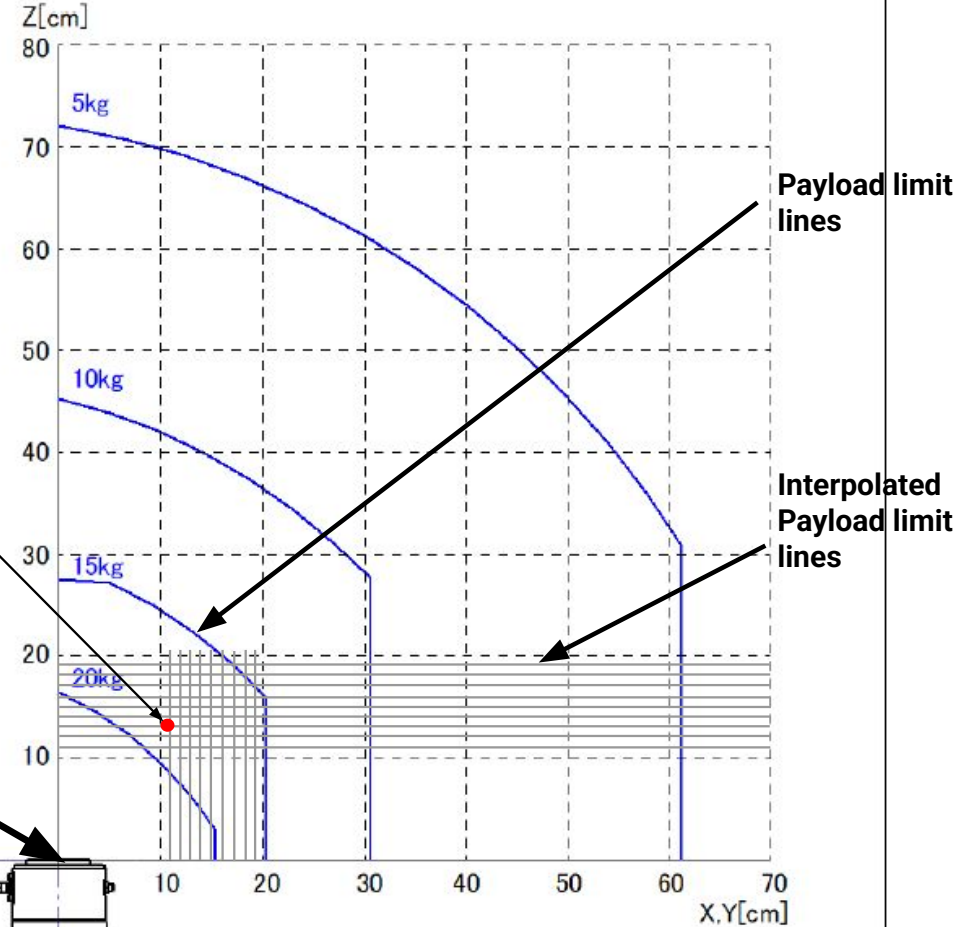


Fig. 3.4 (e) Wrist load diagram (CRX-20iA/L)

Approximate total payload limit = 17.0 kg (37.5 lbs)

VersaBuilt Schunk ZPS Gripper = 1.31 kg (2.9 lbs)
5th Axis P/N V75100X = 2.5 kg (5.5 lbs)
Total Vise & Gripper Payload = 3.81 kg (8.4 lbs)

Max part weight = 13.2 kg (29 lbs)

CRX-20iaL Payload Example

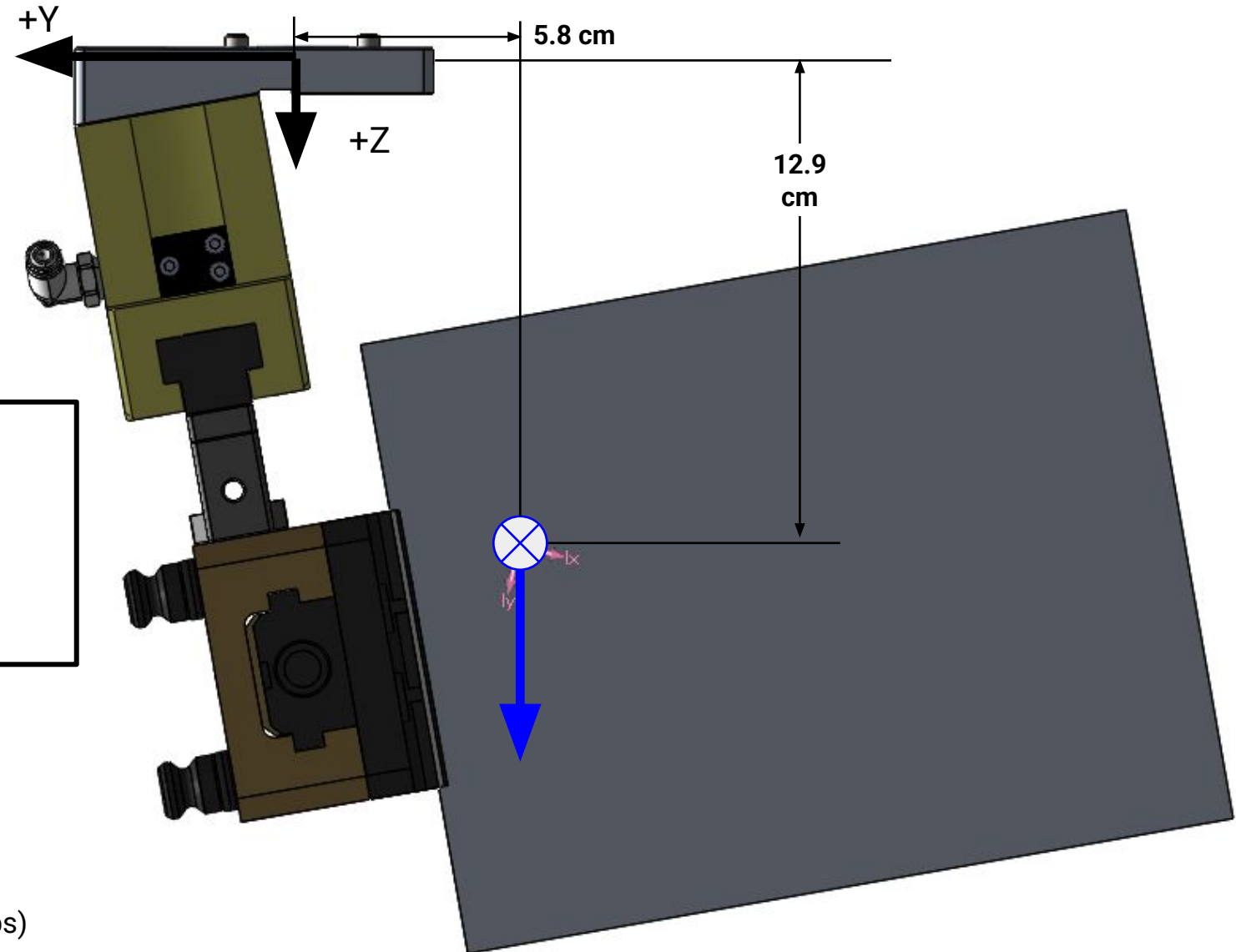
ZPS Gripper w/ 5th Axis V52-V75100X Vise

Holding 3.58 kg (7.9 lb) part, 8.19" tall

*COG calculated from CAD

Total Payload:
7.5 kg
16.6 lbs

Center of Gravity (cm)
(0.00, -5.8, +12.9)



VersaBuilt ZPS Gripper - 1.44 kg (3.2 lbs)

5th Axis P/N V75100X - 2.51 kg (5.5 lbs)

Aluminum Billet 1.50 x 6.50 x 8.19 - 3.58 kg (7.9lbs)

CRX-20iaL Max Payload Example

ZPS Gripper w/ 5th Axis V52-V75100X Vise

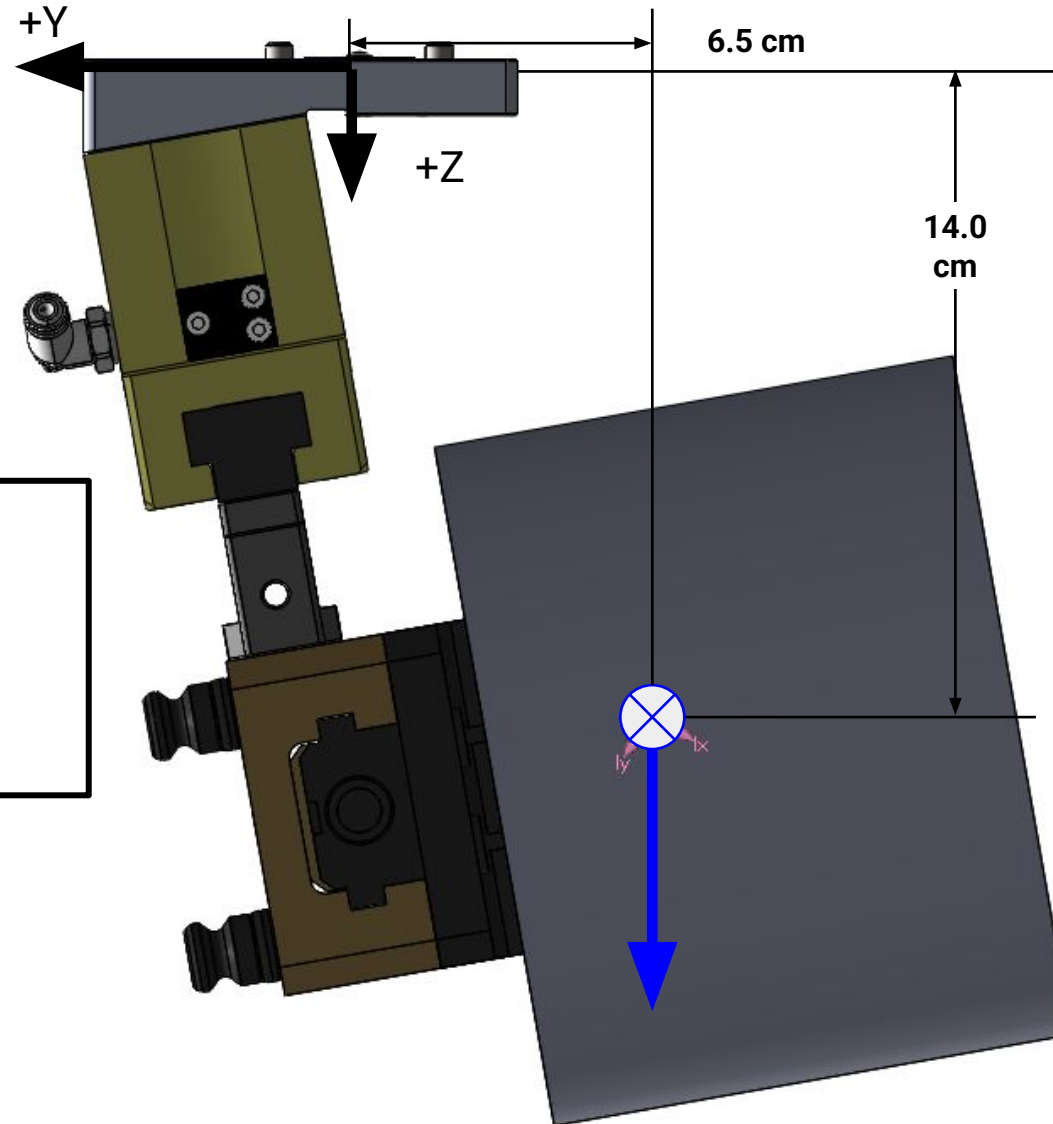
Holding 13 kg (28.7lbs) part, 4.58" tall

*COG calculated from CAD

Total Payload:
16.97 kg
37.4 lbs

Center of Gravity (cm)
(0.00, -6.5, +14.0)

VersaBuilt ZPS Gripper - 1.44 kg (3.2 lbs)
5th Axis P/N V75100X - 2.51 kg (5.5 lbs)
Steel Billet 4.58" H - 13 kg (28.7lbs)



CRX-20iaL Max Payload

ZPS Gripper w/ 5th Axis V52-V75100X Vise

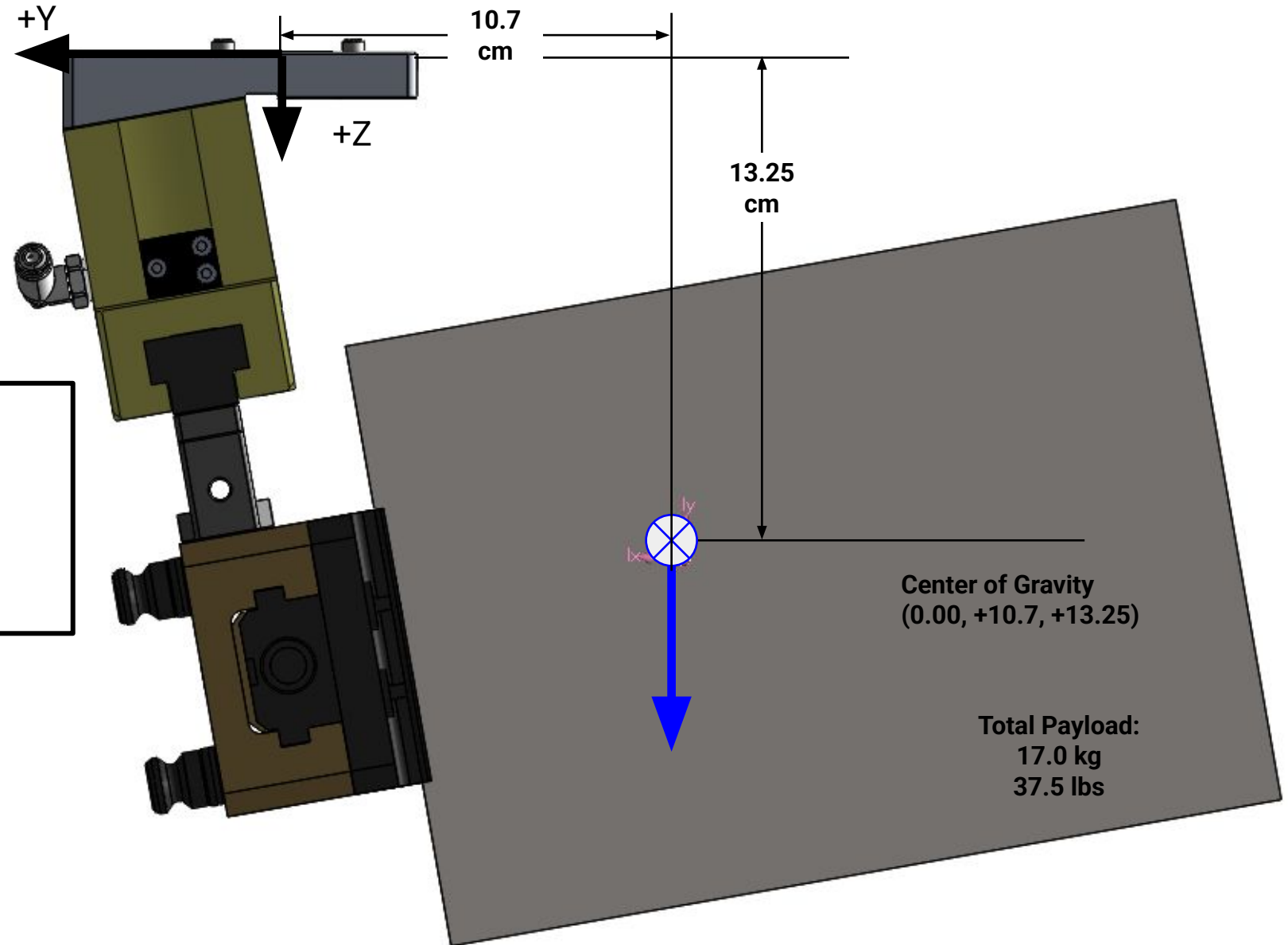
Holding 17 kg part

*COG calculated from CAD

Total Payload:
17 kg
37.5 lbs

Center of Gravity
(0.00, -10.70, +13.25)

VersaBuilt ZPS Gripper - 1.44 kg (3.2 lbs)
5th Axis P/N V75100X - 2.51 kg (5.5 lbs)
Steel Billet 9.0" H - 13 kg (28lbs)



V E R S A **B U I L T**