

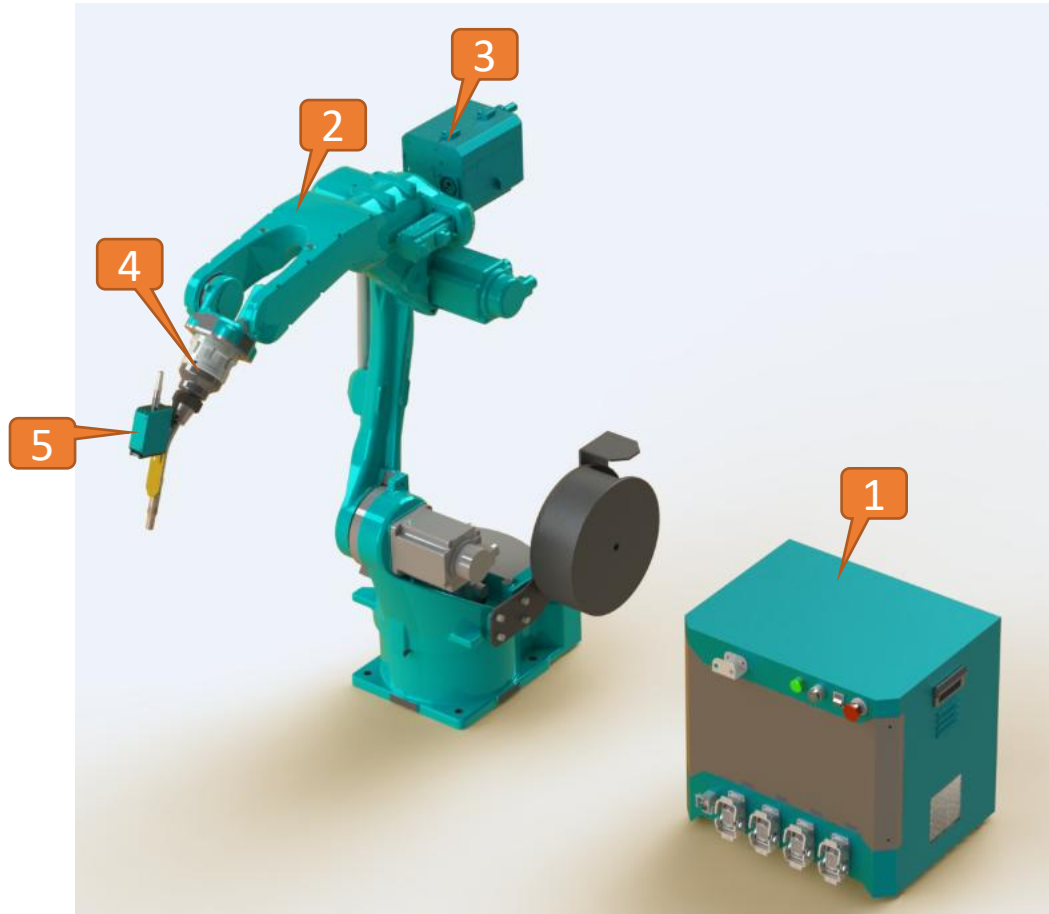
# Vision robot and pipeline application scenarios

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# Visual robot product introduction



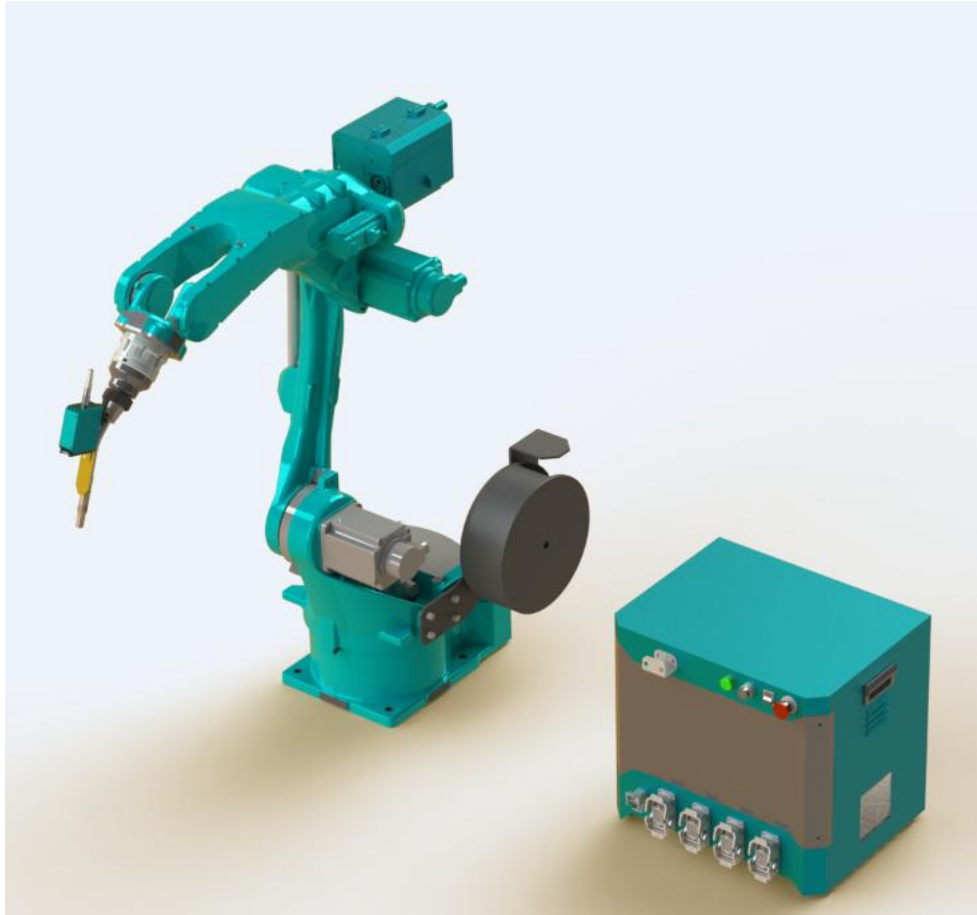
# What is a vision robot?



**Vision robot definition:** an integrated robot product that includes vision sensors and vision control modules. Based on vision master control, this robot product can realize parametric programming and realize fast switching of model library, so as to respond to various welding scenarios quickly and conveniently.

**Hardware components:** 1. Robot and vision control integrated cabinet;  
2. Robot body; 3. Wire feeder; 4. Anti-collision device and welding torch; 5. Vision sensors.

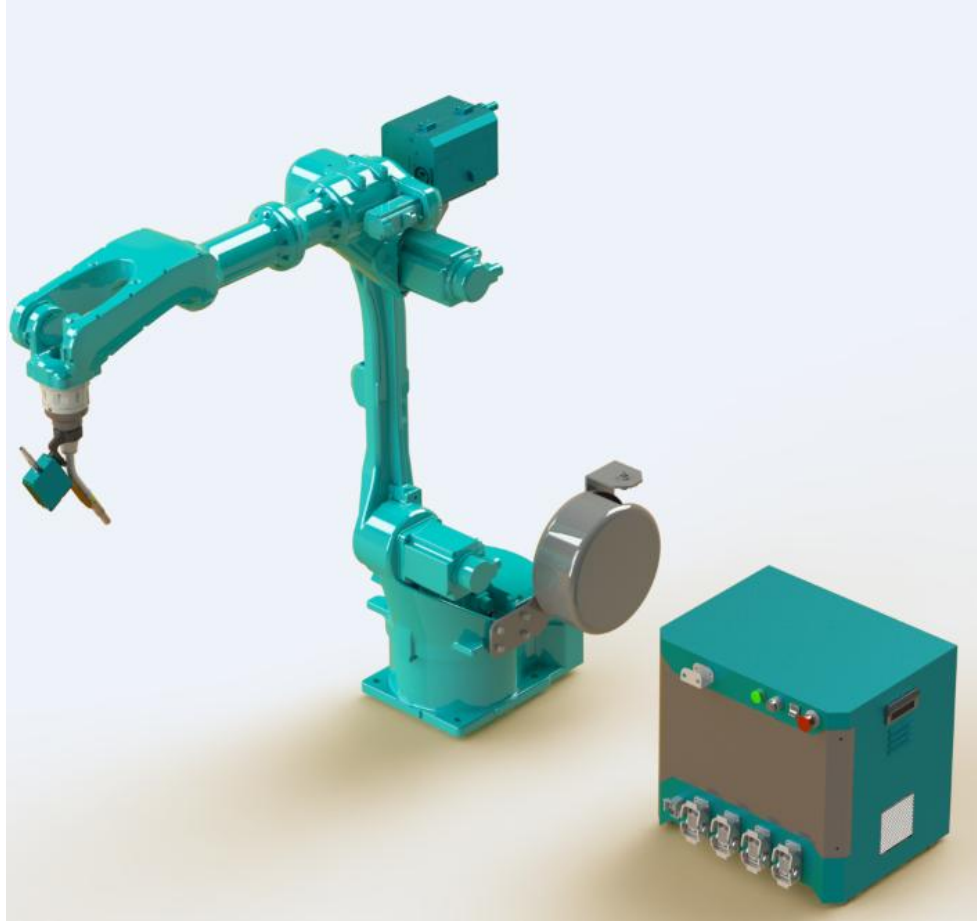
# Visual robot body optional model description



SA10-1440 Vision Robot: Welding intelligent robot with vision scanning module, supporting 3 external axis linkage

6轴
1440
10KG
J1、J2轴IP56 ( J3、J4、J5、J6轴IP67 )
落地式/支架式/倒挂式
4.5KVA
标配16进/16出24VDC
焊接电流350A/500A(内置中空防撞焊枪)
176KG
±0.05
±160°
+80°至-145°
+145°至-75°
±190°
+50°至-210°
±220°
209°/s
199°/s
209°/s
314°/s
272°/s
1353°/s
焊接专用 ( 气保、氩弧、激光、铝、不锈钢、碳钢 )

# 视觉机器人本体可选型号说明




SA12-2010 Vision Robot: Welding intelligent robot with vision scanning module, supporting 3 external axis linkage

6轴
2010
12KG
J1、J2轴IP56 (J3、J4、J5、J6轴IP67)
落地式/支架式/倒挂式
4.5KVA
标配16进/16出24VDC
焊接电流350A/500A(内置中空防撞焊枪)
186KG
±0.08
±160°
+80°至-145°
+145°至-75°
±190°
+50°至-210°
±220°
179°/s
179°/s
162°/s
315°/s
276°/s
1356°/s
焊接专用 ( 气保、氩弧、激光、铝、不锈钢、碳钢 )

# Vision sensor optional

系列	SA-LA300	
型号	SA-LA300-411	SA-LA300-611
产品实物		
工作距离(mm)	300±15	
相机数量(pcs)	1	
激光波长(nm)	450(Blue)	638(Red)
激光等级	II, III R	
视野范围(mm)	76@300mm	
测量范围(mm)	±70@300mm	
垂直分辨率(mm)	0.09	
水平分辨率(mm)	0.12	
Z线性精度	0.09%	
Z重复精度	0.12	
通讯接口	RJ45/RS485	
最大点数(点)	1280	
扫描速率(FPS)	60	
工作电压(V)	DC 12	
工作功率(W)	4.4	
产品重量(Kg)	0.45	
产品尺寸(mm)	110*34*90	
工作温度(°C)	0-55	
存储温度(°C)	-20-70	
防护等级	IP65	



系列	SA-LA185	
型号	SA-LA185-411	SA-LA185-611
产品实物		
工作距离(mm)	185±10	
相机数量(pcs)	1	
激光波长(nm)	450(Blue)	638(Red)
激光等级	II, III R	
视野范围(mm)	150/185/203	
测量范围(mm)	36	
垂直分辨率(mm)	0.10	
水平分辨率(mm)	0.15	
Z线性精度	0.10%	
Z重复精度	0.10	
通讯接口	RJ45/RS485	
最大点数(点)	1280	
扫描速率(FPS)	60	
工作电压(V)	DC 12	
工作功率(W)	4.4	
产品重量(Kg)	0.45	
产品尺寸(mm)	77*34*100	
工作温度(°C)	0-55	
存储温度(°C)	-20-70	
防护等级	IP65	



# Recommended welding machine (also suitable for other brands)



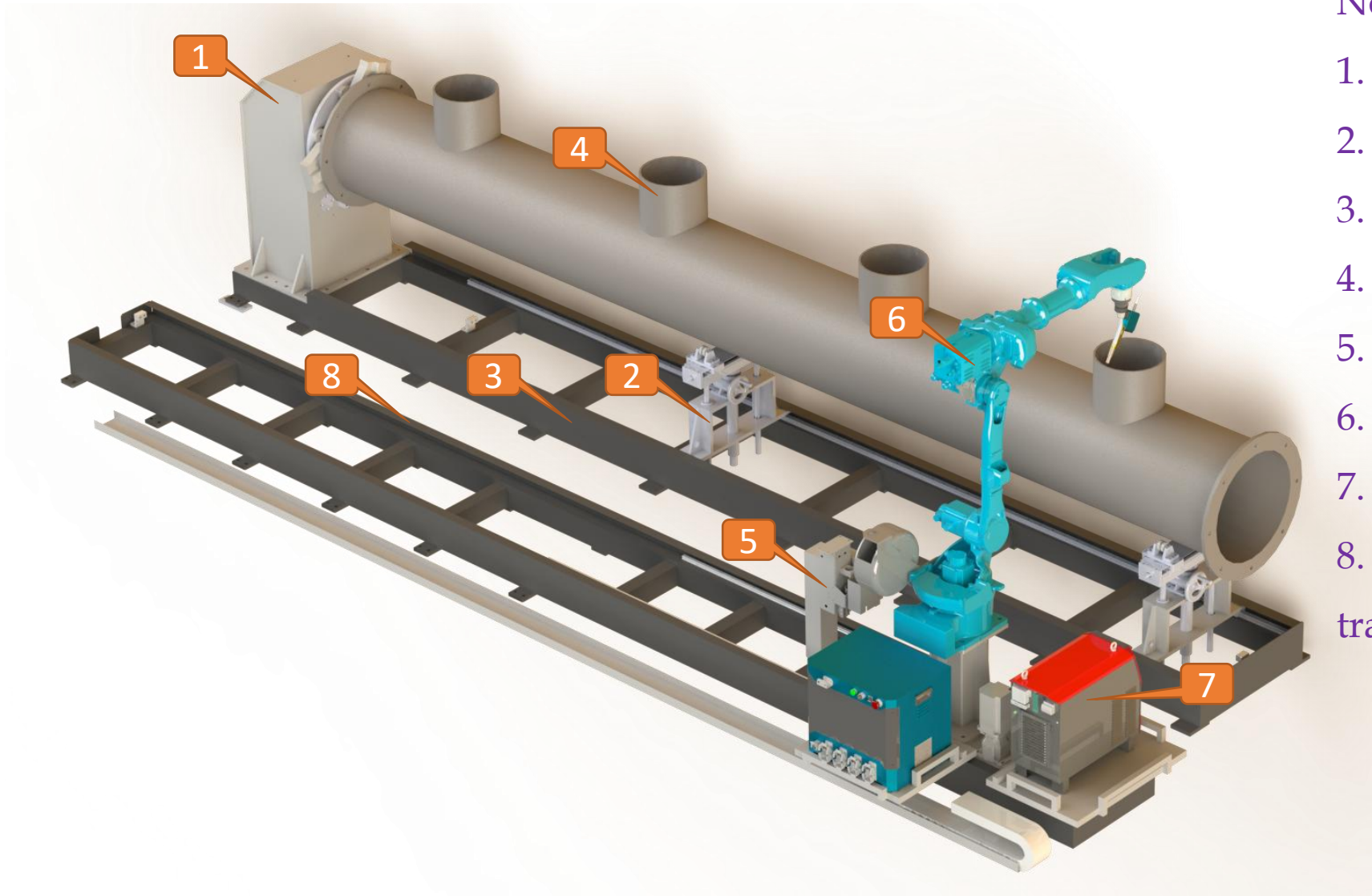
range of Megmet

熔化极气体保护焊机	碳钢	不锈钢	铝合金	硅青铜	铝青铜	直流	标准脉冲	短弧脉冲 Thunder Fusion™ (1)	平滑短路过渡 Tranquil Fusion™ (2)	高速间断焊 Leaping Fusion™ (3)	高频脉动能 量控制 Clean Fusion™ (4)	临界脉冲 高速焊 QPT (5)	金属粉 芯(直 流/脉 冲)
Ehave CM500H/500/400/350	●					●							
Artzen CM500C	●					●							
Artzen CM500/400/350 II	●					●							
Artzen PM500/400F II	●			○	○	●	●						
Artzen PM500/400N II	●	●		○	○	●	●						
Artzen PM500/400A <sub>o</sub> II	●	●	●	○	○	●	●						
Artzen Plus 500/400/350D	●	●				●			●	○			
Artzen Plus 500/400/350P	●	●				●	●	●	●	○	○		
Artzen Plus 500/400/350Q	●	●	●			●	●	●	●	●	●		
Dex DM3000	●	●				●							
Dex DM3000S	●	●				●							
Dex PM3000	●	●	●			●	●					○	
Dex PM3000S	●	●	●			●	●					○	
Dex PM3000Q	●	●	●			●	●					●	●
Dex PM3000QS	●	●	●			●	●					●	●

# Introduction to pipeline application scenarios



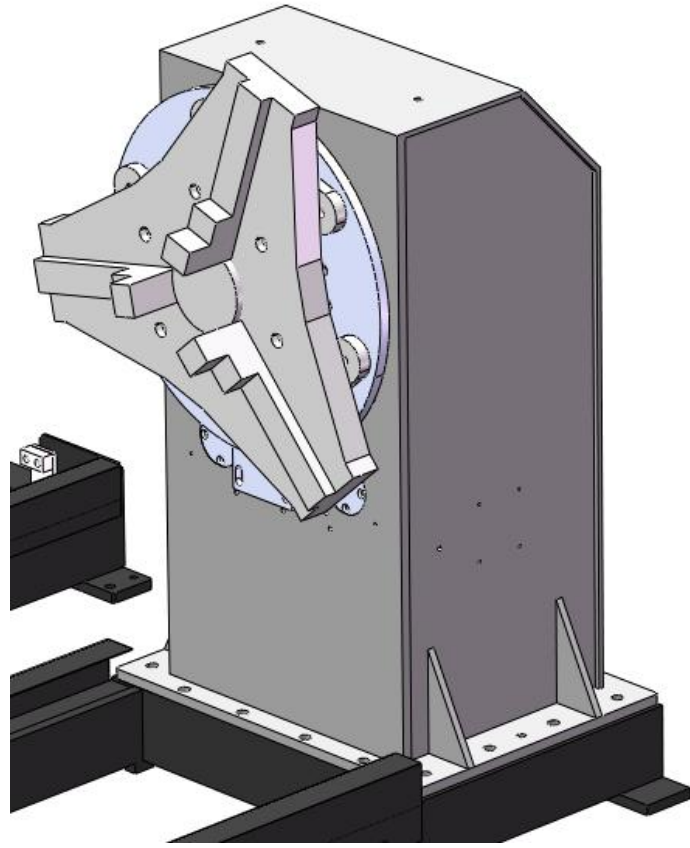
# Pipe welding standard workstation hardware composition



Notes:

1. Single-axis positioner;
2. Pipeline support structure;
3. Support structure slide rail;
4. Welding parts;
5. Gun cleaner;
6. Vision robot;
7. Welding machine power supply;
8. The robot moves the ground track

# Partial component parameter



Applicable material: carbon steel, stainless steel

Applicable pipe diameter: DN150-600

Chuck form: three-jaw self-centering chuck

clamping mode: automatic centering, manual  
clamping

Rated speed:  $36^\circ /s$

deceleration ratio: 171

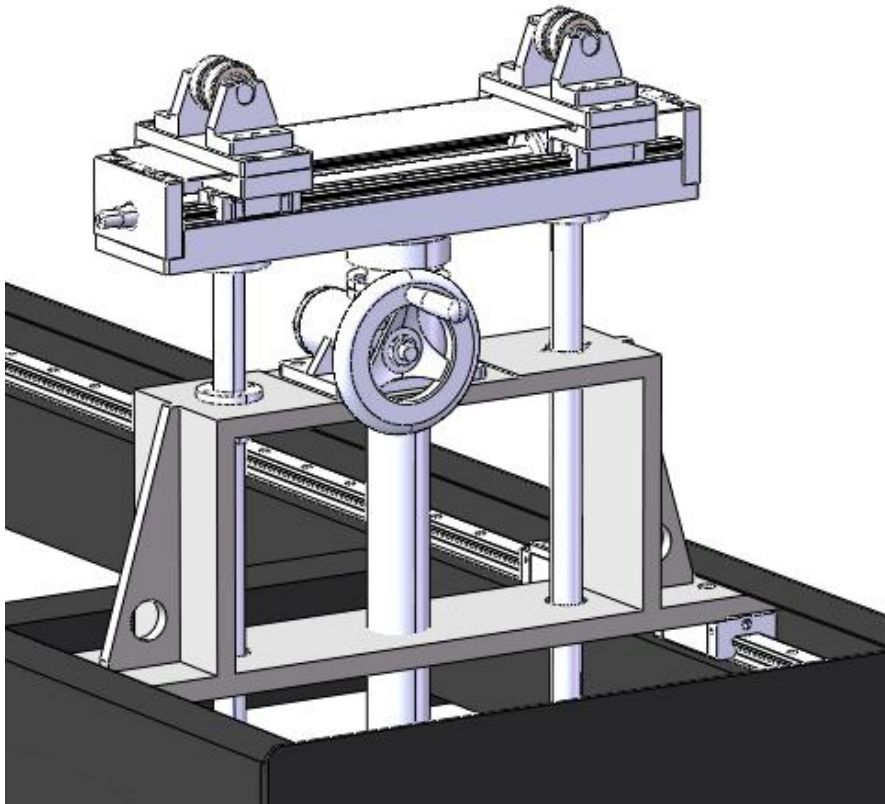
Positioning accuracy:  $\pm 0.1^\circ$

Payload: 2000KG

Drive mode: robot supporting servo motor drive

**This parameter table is designed for standard workstations, if the customer's workpiece size exceeds this range, you can request custom hardware structure and software model!**

## Partial component parameter



Applicable material: carbon steel, stainless steel

Applicable pipe diameter: DN150-600

Number of cars: 2

Payload: 1500KG

Track form: Light rail

Track length: 5.5m

car lifting: can be lifted to adapt to different pipe diameter

Trolley move: can be moved manually along the track to accommodate different lengths of pipe

# Software interface description

The screenshot shows a software interface for a welding workstation. The title bar reads "焊接工作站【用户:0000】". The interface is divided into several functional areas:

- Secondary menu:** A horizontal bar at the top left containing icons for "系统参数设置" (System Parameter Settings), "模型设置" (Model Settings), "机械臂控制" (Mechanical Arm Control), "系统权限管理" (System Permission Management), and "帮助文档" (Help Documents).
- Hardware Status:** A bar at the top right titled "硬件运行状态" (Hardware Running Status) with icons for "机器人" (Robot), "相机" (Camera), and "检测状态" (Detection Status).
- Image display:** A large black area on the left labeled "扫描影像" (Scan Image) for displaying the scanned workpiece.
- Job selection:** A table in the center-left for selecting tasks. The table has columns for "编号" (ID), "作业名称" (Job Name), and "模型名称" (Model Name).

编号	作业名称	模型名称
1	T1 相贯线焊接作业	M1 相贯线(左边)
2	T2 相贯线焊接作业(斜管)	M2 相贯线(右边)安全位置
3	T3 12	M3 马鞍线示教位置(直管)
4		M4 相贯线直管焊接
5		M7 11
6		
7		
- Model selection:** A table on the right for selecting models, with columns for "编号" (ID) and "模型名称" (Model Name).

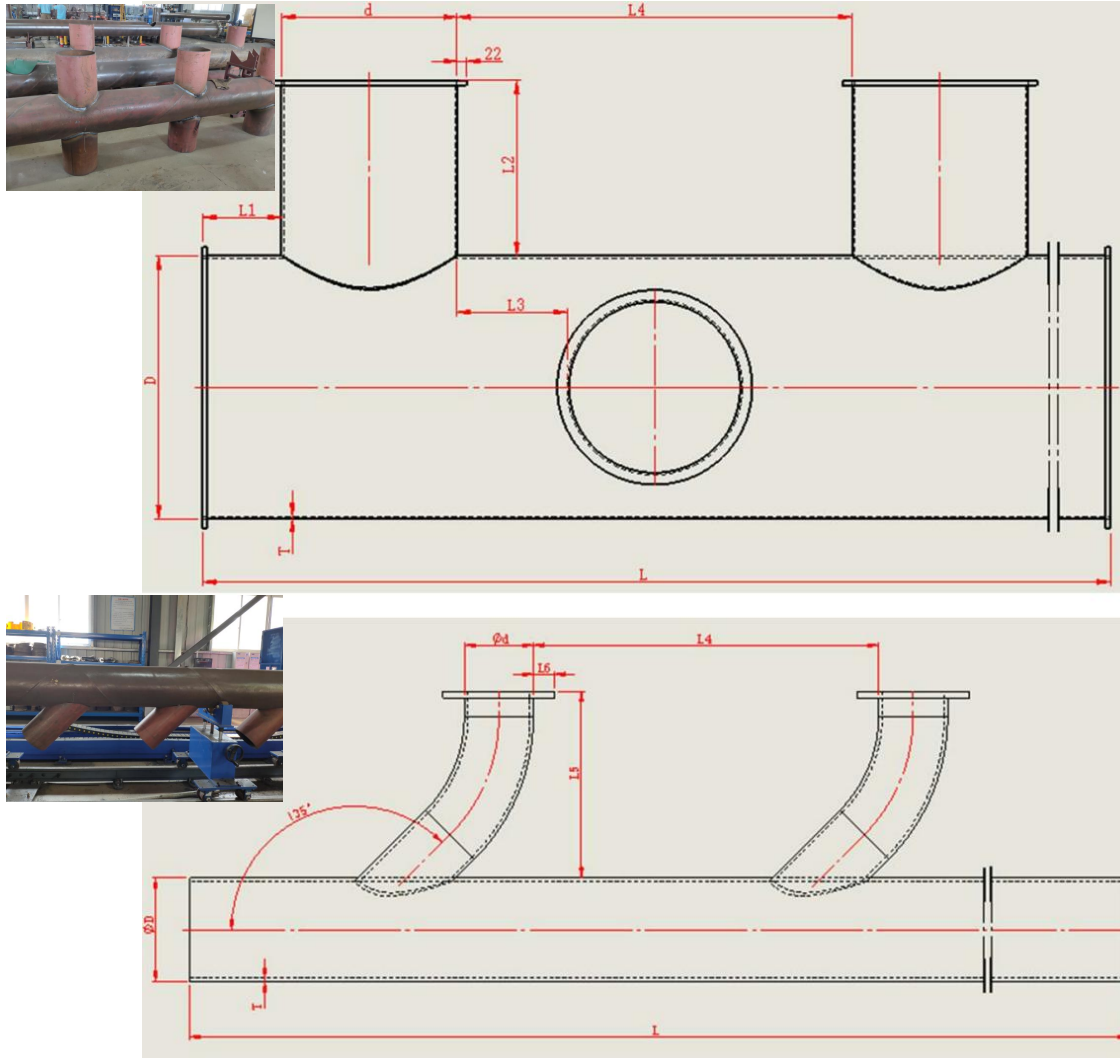
编号	模型名称
1	M1 相贯线(左边)
2	M2 相贯线(右边)安全位置
3	M3 马鞍线示教位置(直管)
4	M4 相贯线直管焊接
5	M7 11
6	
7	
- 3D display:** A placeholder area on the right labeled "工件图片" (Workpiece Image) for the 3D model.
- Status scroll:** A scrollable log at the bottom left showing system messages and user actions, such as "[2022-11-08 14:46:59:301] 【SystemParam】 获取焊缝动作的模板库模板图成功: 0004".
- Parameter setting:** A section at the bottom center for "工件参数输入" (Workpiece Parameter Input) with fields for "管道距离" (Pipe Distance), "管道高度" (Pipe Height), "支管直径" (Branch Diameter), and "主管直径" (Main Diameter), along with a "设置" (Settings) button.
- Visual parameter:** A section at the bottom right for "任务参数选择" (Task Parameter Selection) with a "曝光值" (Exposure Value) field and checkboxes for "是否模拟焊接" (Whether to simulate welding) and "相贯线只焊第二条" (Weld only the second line of the intersection line).
- Execution controls:** A section at the bottom right with buttons for "开始任务" (Start Task), "停止任务" (Stop Task), and "紧急停止" (Emergency Stop).

当前选择作业: 当前未选择

当前选择任务模型: 当前未选择

当前任务执行状态: 当前无任务执行

# Intersecting line /Saddle range



NO	Des.	Tab	Parameter values	material
1	Main outside diameter	D	$\Phi 159-630\text{mm}$	Carbon steel, galvanized pipe, stainless steel pipe, etc
2	Branch pipe outside diameter	d	$\Phi 108-426\text{mm}$	
3	Pipe wall thickness	T	3-14mm	
4	Distance of branch from end	L1	$\geq 400\text{mm}$	
5	Straight branch pipe height	L2	70-480 mm	
6	Branch pipe (antiplane)	L3	$\geq 250\text{mm}$	
7	Branch pipe (oneplane)	L4	$\geq 900\text{mm}$	
8	Diagonal branch height	L5	$\leq 500\text{mm}$	
9	Side flange width	L6	$\leq 62\text{mm}$	
10	Main length	L	300-6000	

This parameter table is designed for standard workstations, if the customer's workpiece size exceeds this range, you can request custom hardware structure and software model!

# Casing work fit range



<u>No</u>	<u>Name</u>	<u>tab</u>	<u>Parameter value</u>	<u>material</u>
1	pipe OD		Φ159-630mm	Carbon steel, galvanized pipe, stainless steel pipe, etc
2	Casing piece		No requirement, as long as the diameter is not greater than the height of the positioner	

**This parameter table is designed for standard workstations, if the customer's workpiece size exceeds this range, you can request custom hardware structure and software model!**

# Pipe-flange fitting range



<u>No</u>	<u>Name</u>	<u>tab</u>	<u>Parameter value</u>	<u>material</u>
1	pipe OD		Φ159-630mm	Carbon steel, galvanized pipe, stainless steel pipe, etc
2	flange		no	

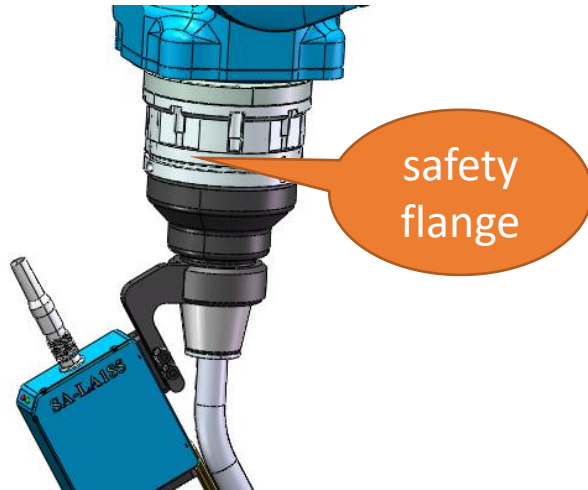
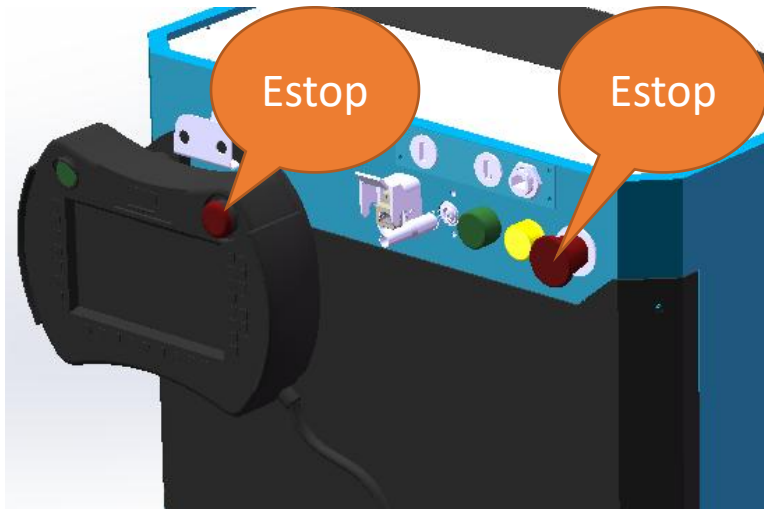
**This parameter table is designed for standard workstations, if the customer's workpiece size exceeds this range, you can request custom hardware structure and software model!**

# Pipe-flange fitting range



<u>No</u>	<u>Name</u>	<u>tab</u>	<u>Parameter value</u>	<u>material</u>
1	pipe OD		Φ159-630mm	Carbon steel, galvanized pipe, stainless steel pipe, etc
2	Casing piece		No requirement, as long as the diameter is not greater than the height of the positioner	

# Safety set

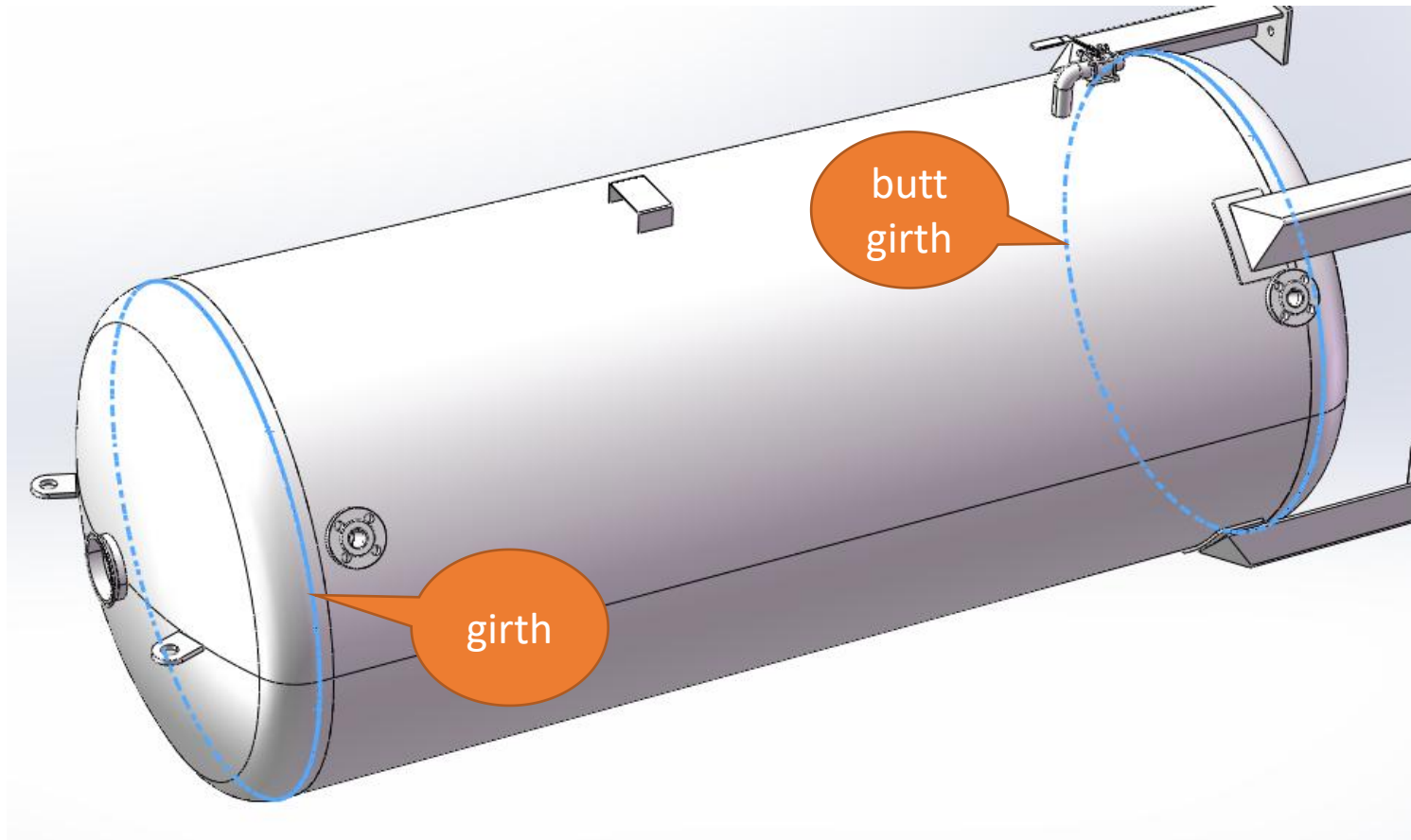


1. Set the safety limit switch on the ground rail, and can set the working limit position;
2. The equipment is equipped with reliable safety protection, emergency stop button, grounding and safety device to prevent equipment damage and personal injury caused by misoperation or accidents, and with abnormal fault automatic shutdown function;
3. The robot contains safety collision flange, which can prevent collision damage caused by misoperation;
4. When the device is abnormal, the software includes abnormal alarm function.

# Customer scenario analysis



# Type 1



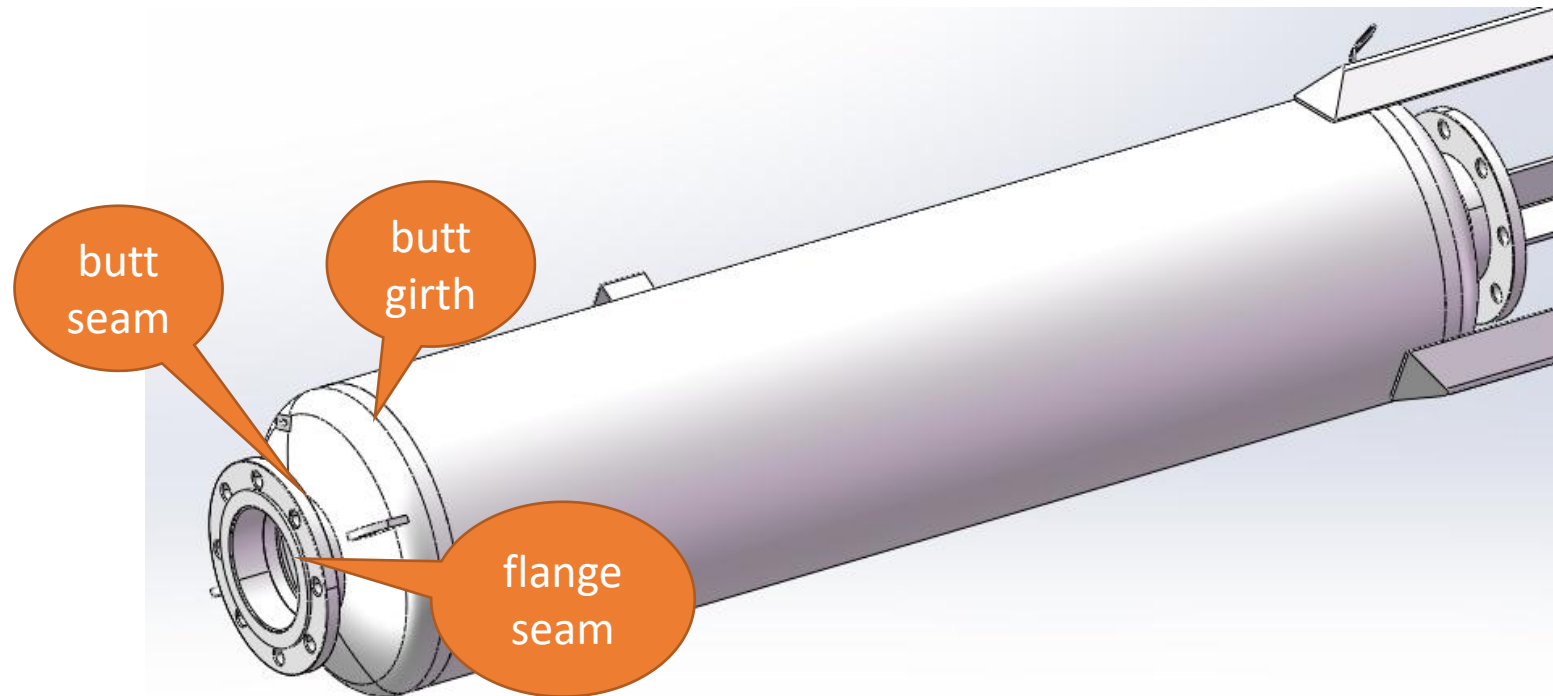
Automated part analysis:

1. Butt welds at both ends;

Risk point analysis:

Because the butt weld gap of stainless steel tank is very small, if the butt gap is less than 0.3mm, the vision will not be recognized

## Type 2



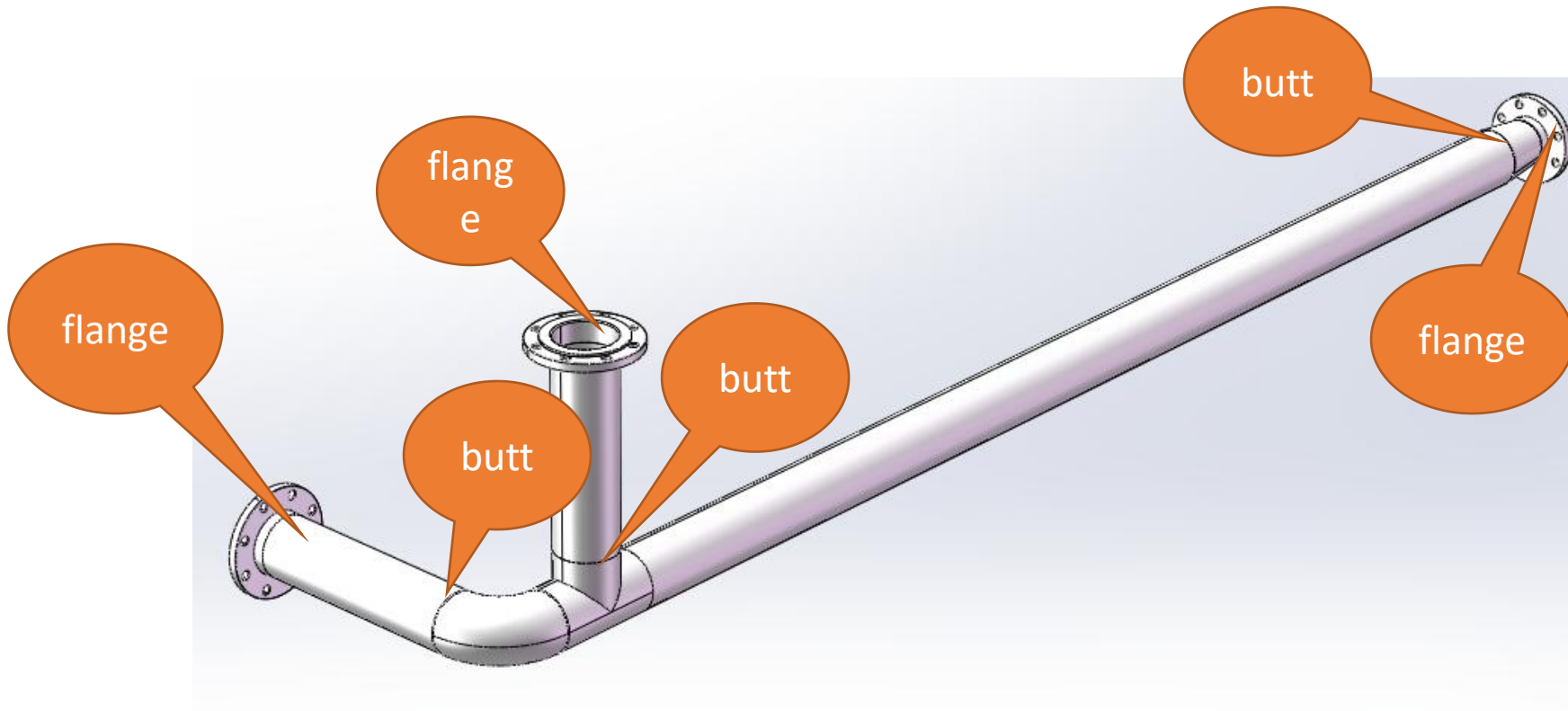
Automated part analysis:

1. Butt welds at both ends;
2. Flange weld;

Risk point analysis:

Because the butt weld gap of stainless steel tank is very small, if the butt gap is less than 0.3mm, the vision will not be recognized

## Type 3



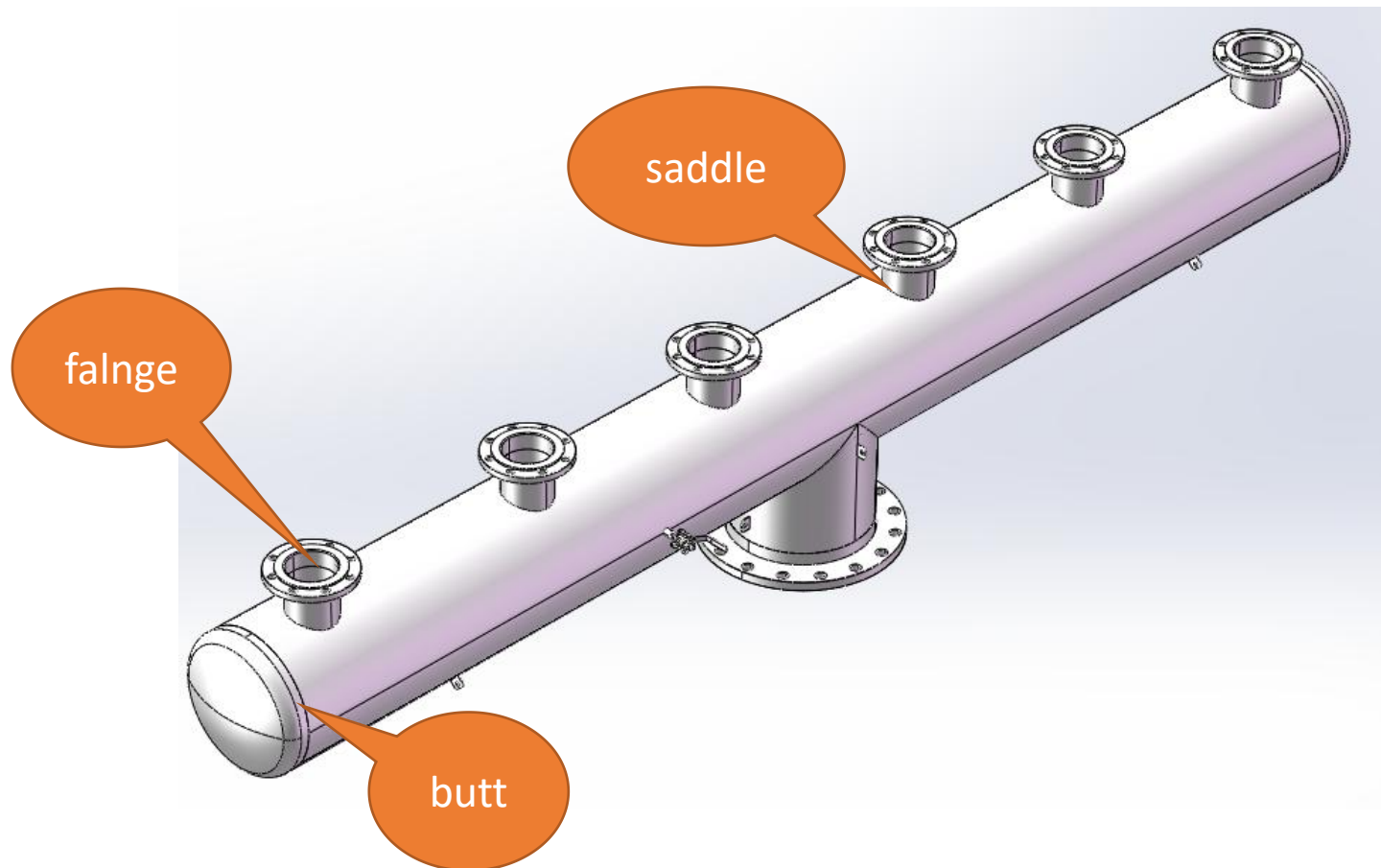
Automated part analysis:

1. Butt weld;
2. Flange weld;

Risk point analysis:

Because the butt weld gap of stainless steel tank is very small, if the butt gap is less than 0.3mm, the vision will not be recognized

## Type 4



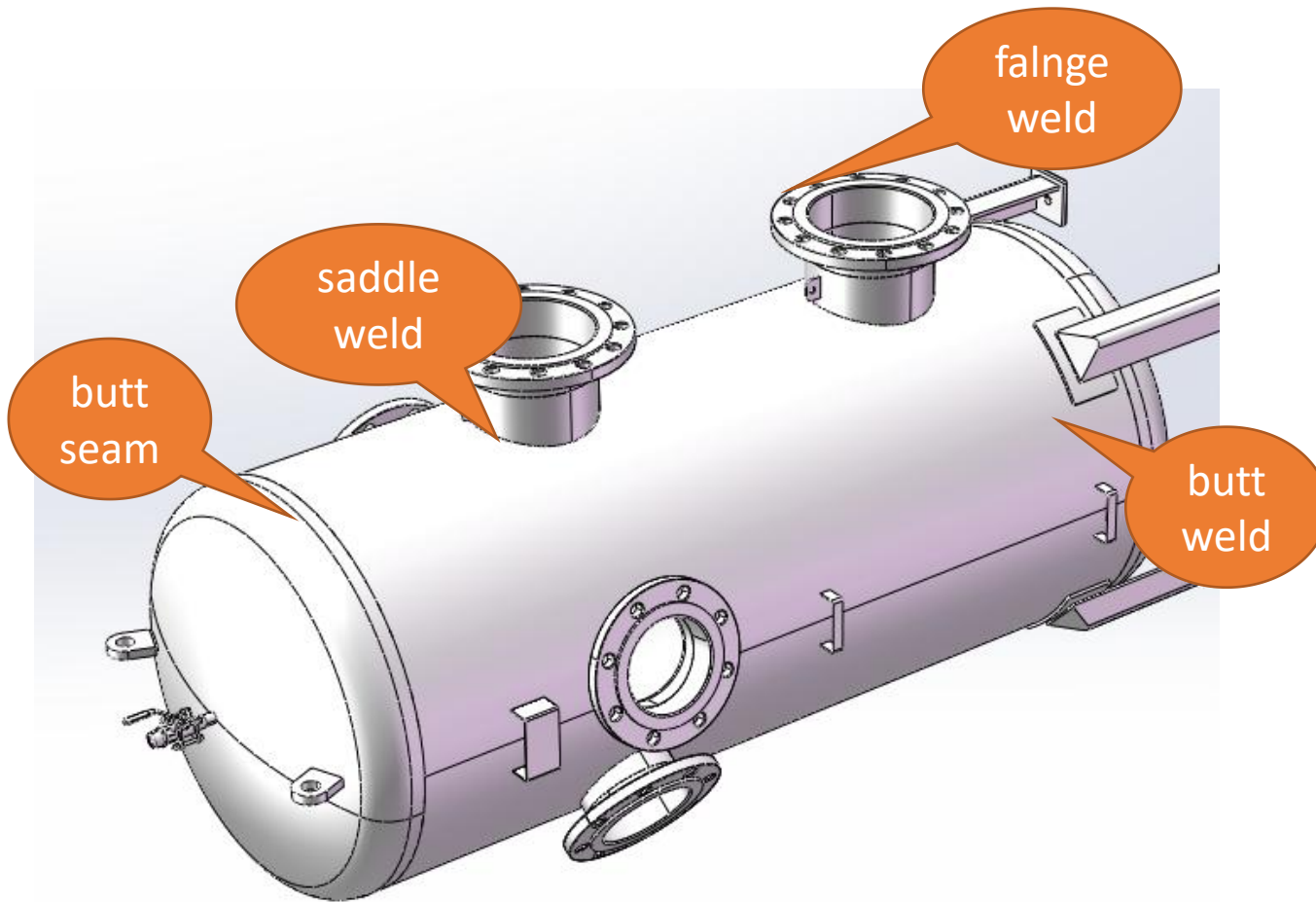
Automated part analysis:

1. Butt weld;
2. Flange weld;
3. Pipe intersecting line

Risk point analysis:

Because the butt weld gap of stainless steel tank is very small, if the butt gap is less than 0.3mm, the vision will not be recognized

## Type 5



Automated part analysis:

1. Butt weld;
2. Flange weld;
3. Intersecting lines of large and small tubes;

Risk point analysis:

1. Because the seam of the butt weld of the stainless steel tank is very small, if the butt seam is less than 0.3mm, the vision will not be recognized;
2. Because the branch pipe is too short, if there is a flange, it may interfere with the welding torch.

**Thank you for your attention!**

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