

Installation Instructions

Project:

Location:

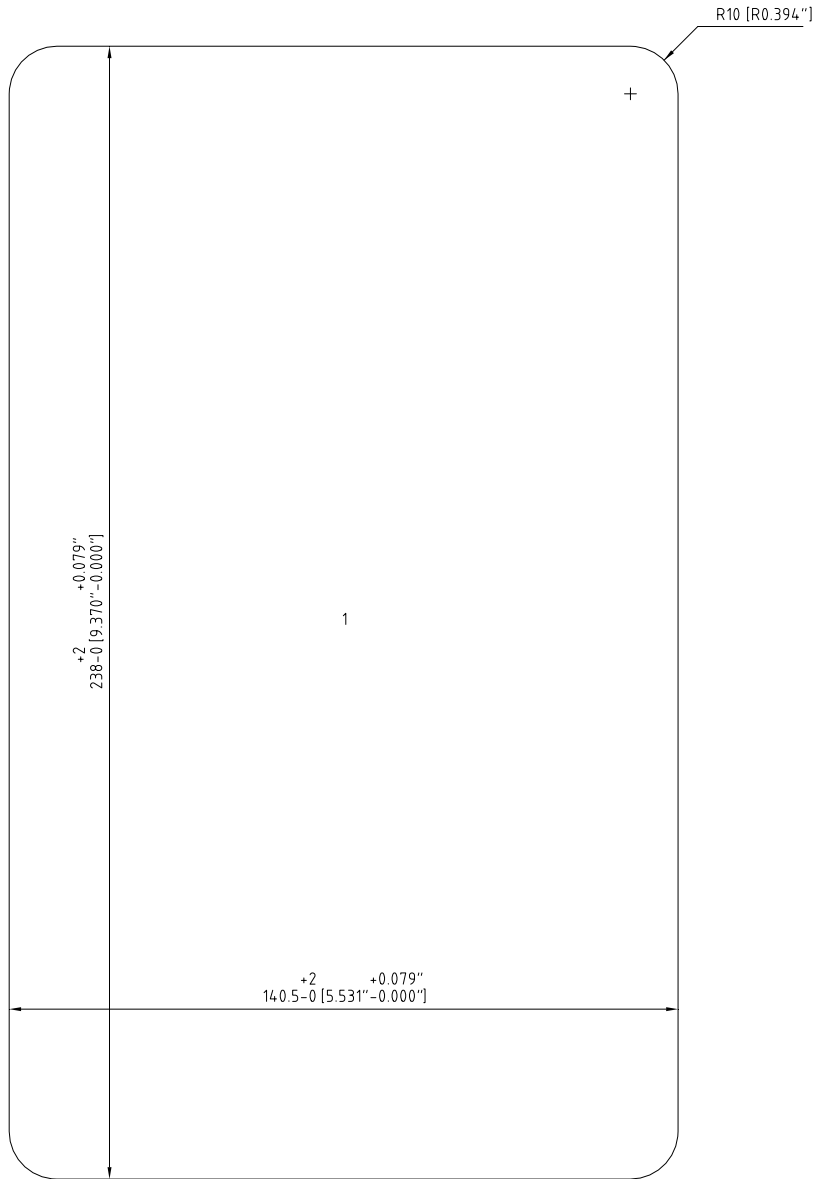
Transit: S 6*1

Solution: S 6x1 AISI316

Print date: 2020-08-28

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Cutout Detail

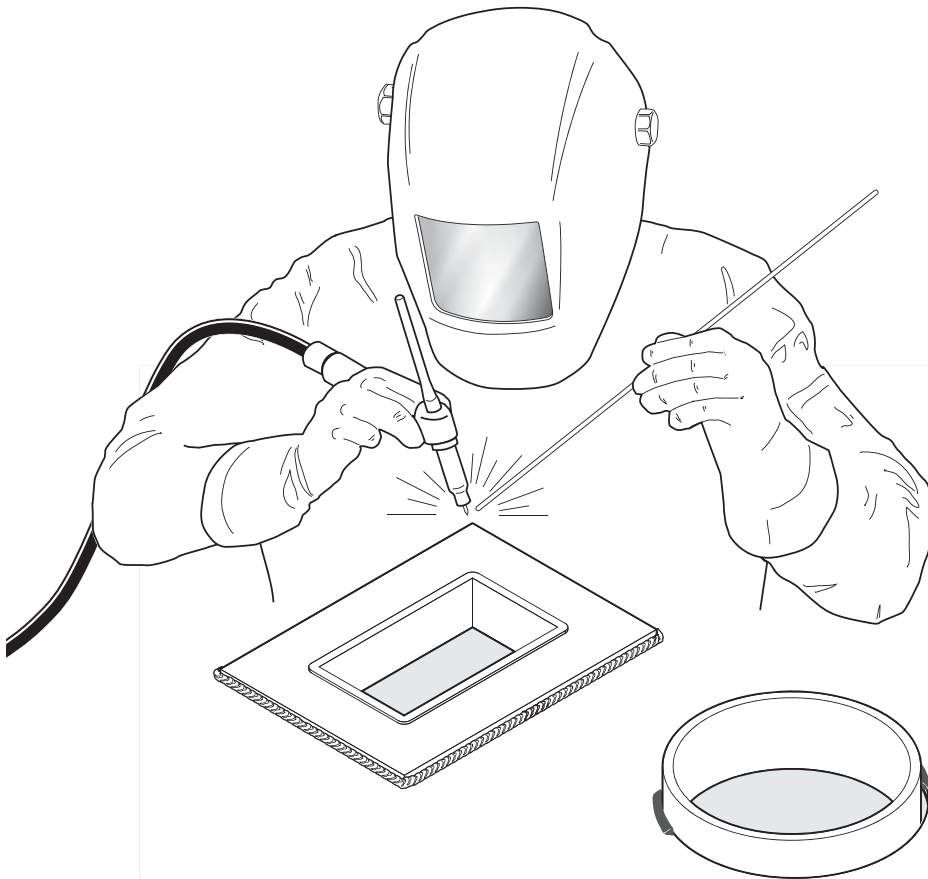
Frame: S 6x1 AISI316 Solution: 1

Item	Qty	Roxtec Packing Material	mm []	Roxtec Art No	Weight Kg [lb]
Responsible yube	Created Date 2020-08-28	Modify Date 2020-08-28	Project 台灣大哥大 Location/ Sublocation	TotWeight 4.4 [9.70]	Sheet No
Format	Client	NTS	Transit name S 6*1 框架	1/1	Rev
Drawing number					



DESCRIPTION AND APPLICATION GUIDELINES

Roxtec welding guidelines



Prepared for: Roxtec International AB
Date: 2016-06-07
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Abstract

This guideline is a help for the welding responsible to produce a welding procedure specification (WPS). This can be unique for every site due to local requirements and regulations.

Personnel competence recommendations

For reliable and high quality results, welders are recommended to be qualified according to the latest editions of AWS D1.1, ISO 9606-1 2013, ISO 9606-2 2004 or other authorized system.

Welding methods described in the guideline

- Shielded metal arc welding (SMAW)
- Flux core arc welding (FCAW)
- Gas tungsten arc welding (GTAW)

Welding consumables

Welding consumables are to be chosen depending on the materials that shall be welded together. Shall be handled and treated according to instructions from manufacturer of consumables.

Welding quality levels for imperfections of the frame

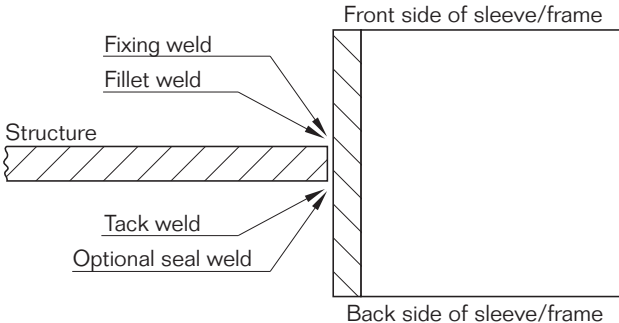
Roxtec frames manufactured in mild steel and stainless steel are welded according to EN-ISO 5817 Min Class C. Aluminum frames are welded according to EN-ISO 10042 Min Class C.

Requirements after welding

The Roxtec system is certified for pressure up to 6 bar. Therefore we recommend undestructive testing of the welds such as liquid penetrant, ultrasonic testing and magnetic particle testing. The dimensions should be according to the table on page 9 to obtain optimal performance of the transit.

Legend

Location of various welds between structure and sleeve/frame.



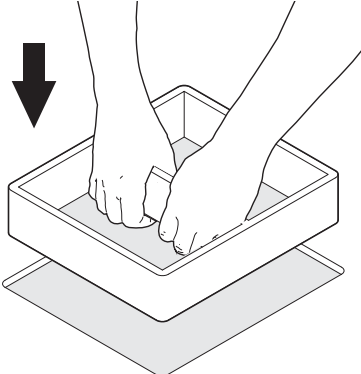
Contents

- 1. Aperture and buttering 4
 - 1.1 For frames without flange 4
 - 1.2 For frames with flange 4
- 2. Positioning and fixing 5
 - 2.1 Positioning..... 5
 - 2.2 Fixing 5
- 3. Tack weld..... 6
- 4. Fillet weld 7
 - 4.1 Weld passes – Frames/sleeves without flange 8
 - 4.2 Weld passes – Frames/sleeves with flange 8
- 5. Measuring..... 9
- 6. SO (openable weld frame) 10
 - 6.1 SO frames..... 10
 - 6.2 Dimensions 10
- 7. SFO (openable weld frame with flange)..... 11
 - 7.1 SFO frames 11
 - 7.2 Dimensions 11
 - 7.3 Procedure – single frame 12
 - 7.4 Procedure – combination frame 13
- 8. Caution! 14
 - 8.1 Intermittent welds..... 14
 - 8.2 Exceeding the recommended weld size..... 14
 - 8.3 Weld pass 14

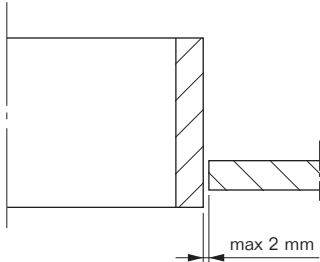
1. Aperture and buttering

1.1 For frames without flange

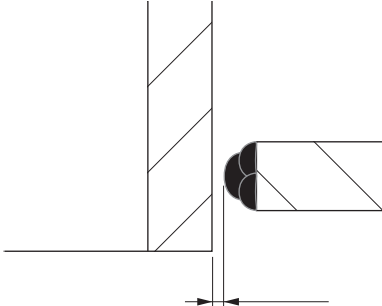
Make the aperture as close to the frame outer dimension as possible to avoid large root gaps. Max allowed total root gap before welding is 2 mm. Larger gaps must be buttered to avoid deformation of the frame. The buttering shall not be made on the frame.



Measure the aperture using the frame.



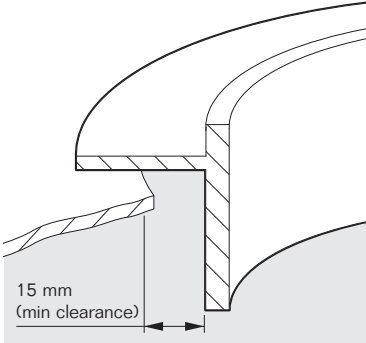
Maximum total root gap for fillet weld.



Buttering of aperture shall be performed on the structure.

1.2 For frames with flange

Make the aperture considering the minimum clearance of 15 mm. The edge of the aperture should be placed at the center of the flange of the frame.

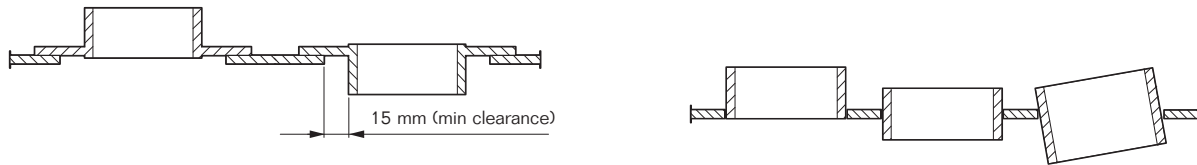


Position of frame with flange into an aperture.

2. Positioning and fixing

The frame or sleeve can be centered or fixed in a corner of the aperture at any depth or angle. It is important not to exceed the maximum allowed root gap also when welding the frame in an angle. Frames and sleeves with flange must cover the aperture in full. Check fire certification with regard to allowed positioning.

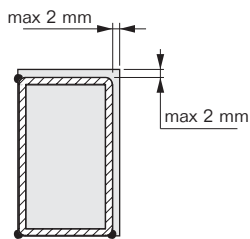
2.1 Positioning



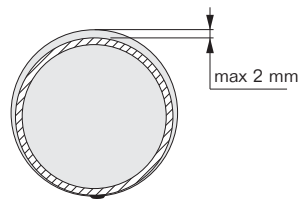
For flanged frames/sleeves a 15 mm clearance is required.

2.2 Fixing

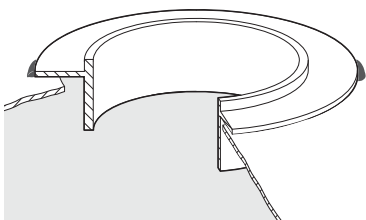
The frame can be centered or fixed in a corner of the aperture at any depth. The maximum allowed root gap is 2 mm to prevent heat deflection.



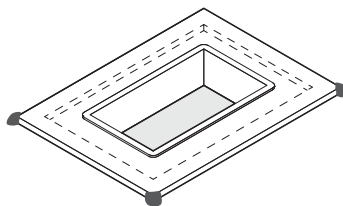
Fixing of rectangular frame without flange.



Fixing of sleeve without flange.



Fixing of sleeve with flange.

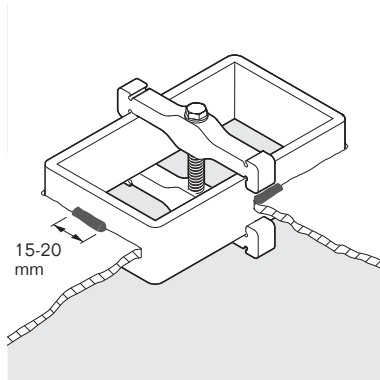


Fixing of rectangular frame with flange.

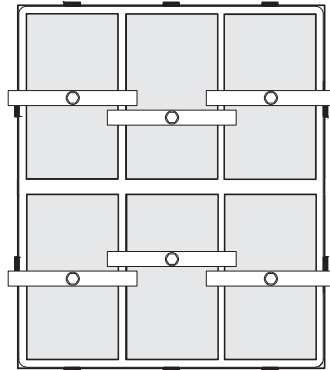
3. Tack weld

Apply tack welds with a length of 15-20 mm on the back side at the corners and in the center of every opening of the flange. Use an appropriate tool to clamp the frame in tolerance during the whole welding process to avoid heat deflection. Do not remove the tool until the frame has a temperature below 50°C. Clamping is only required at the side openings and in the center of a x3 combination frame.

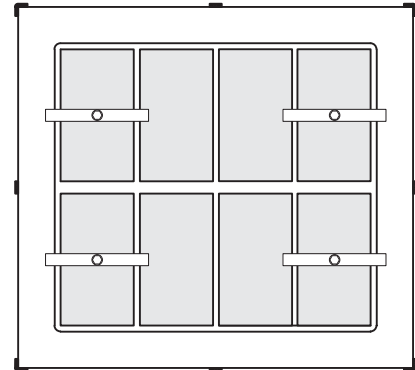
Note: If the fillet weld is applied on only one side the tacking must be made on the opposite side.



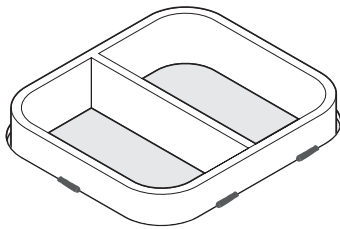
Clamp tool applied on a rectangular frame without flange.



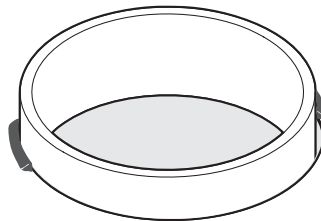
Tack weld of a rectangular combination frame without flange.



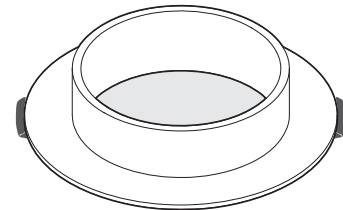
Tack weld of a rectangular combination frame with flange.



Tack welded rectangular frame without flange.



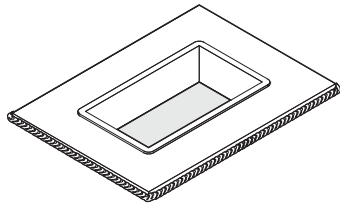
Tack weld of a sleeve without flange.



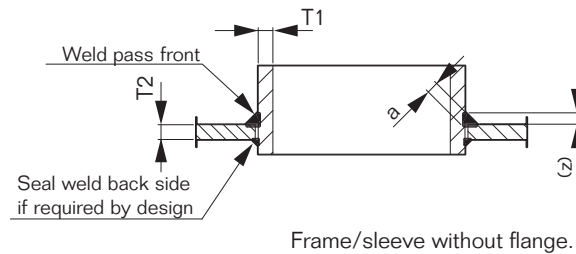
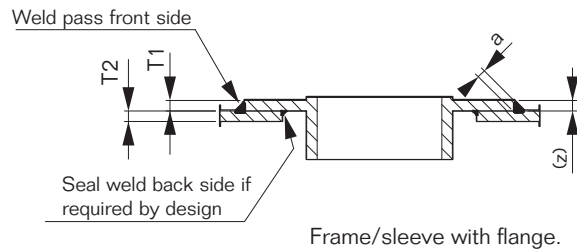
Tack weld of a sleeve with flange.

4. Fillet and seal weld

- Apply the fillet weld on the front side with an interpass temperature below 150°C for stainless steel and below 250°C for mild steel or aluminum. The weld runs shall not exceed 150 mm/weld pass.
- Grind off the tack welds on the back side before applying the optional seal weld.



Note: The optional seal weld is for corrosion protection only and not mandatory unless specified by the design.



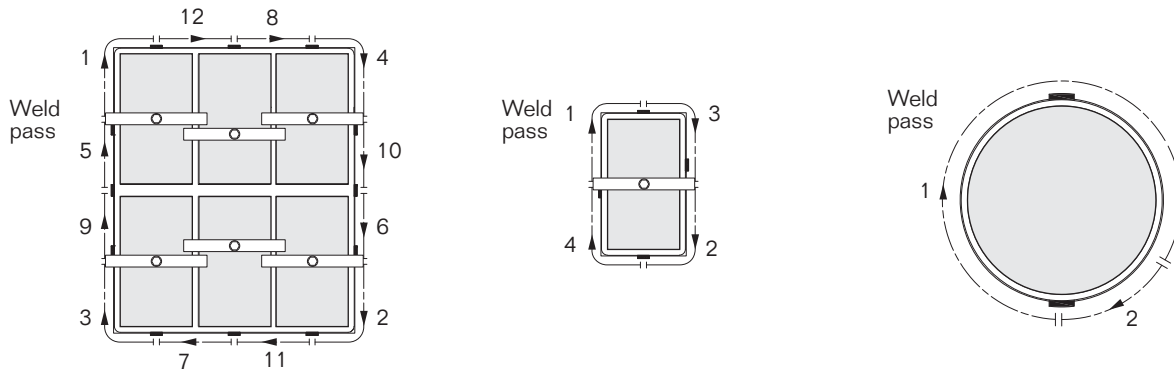
Weld sizes				Max heat input (kJ/mm)		
Frame thickness T1	Structure thickness T2	Fillet weld size (max)	Seal weld size (max)	Mild steel	Stainless steel	Aluminum
5-6	3<T2<12	a3 (z4)	a3 (z4)	1.5	1.1	2.5
10-12	≤6	a4 (z5)	a3 (z4)	1.5	1.1	2.5
10-12	>6	a5 (z7)	a3 (z4)	1.5	1.1	2.5

$$Q = \frac{k \times U \times I \times 60}{v \times 1000}$$

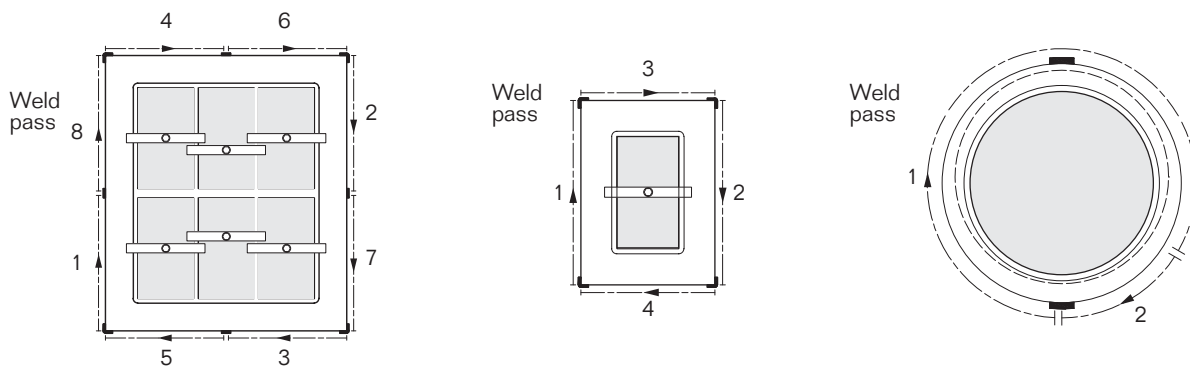
Q = Heat input [KJ/mm]
 U = Voltage [V]
 I = Current [A]
 v = Welding speed [mm/min]
 k = Thermal efficiency [dimensionless]

Welding method	Thermal efficiency
SMAW (shielded metal arc)	1.0
GMAW (gas metal arc)	0.8
GTAW (gas tungsten arc)	0.6

4.1 Weld passes – Frames/sleeves without flange

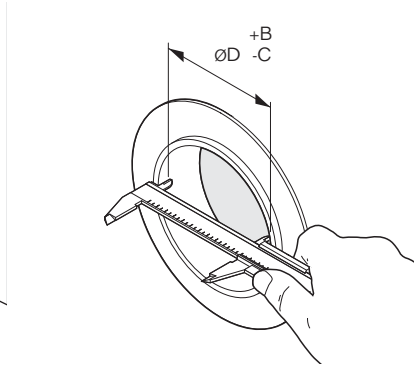
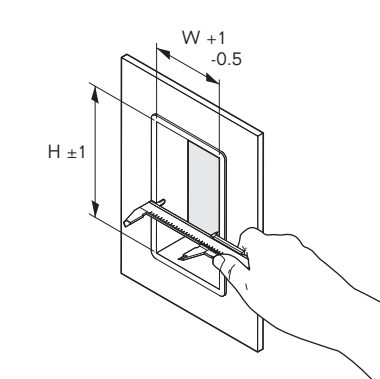


4.2 Weld passes – Frames/sleeves with flange



5. Measuring

Measure 10 mm into the frame depth on the front and back side in accordance with the table. The measurements are to be made with a frame or sleeve temperature below 50°C.



Frame dimensions		
Size	H (mm)	W (mm)
1	101	60
2	101	120
3	159.5	60
4	159.5	120
5	218	60
6	218	120
7	278	60
8	278	120

Sleeve dimensions		
Size Ø D	B (mm)	C (mm)
23	1	0
25	1	0
31	1	0
43	2	0
50	2	0
68	2	0
70	2	0
75	2	0
100	2	0
125	2	0
150	2	0
175	2	0

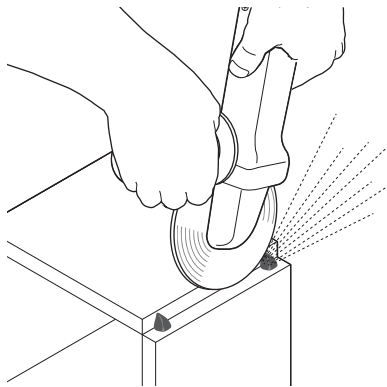
Sleeve dimensions		
Size Ø D	B (mm)	C (mm)
200	3	0
225	3	0
250	3	0
300	3	0
350	3	0
400	3	0
450	3	0
500	3	0
550	3	0
600	3	0
644	3	0

6. SO, Openable frames

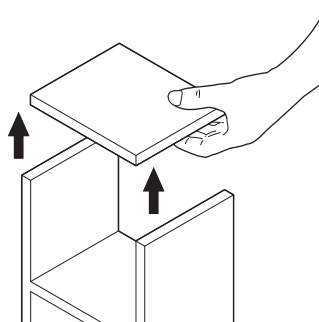
Openable frames intended for retrofit are recommended to be installed by welders qualified according to the latest edition of AWS D1.1, ISO 9606-1 2013, ISO 9606-2 2004 or other authorized system. It is important to achieve a gas-tight weld and secure that the burn through is well controlled preferably by backing.

6.1 SO frames

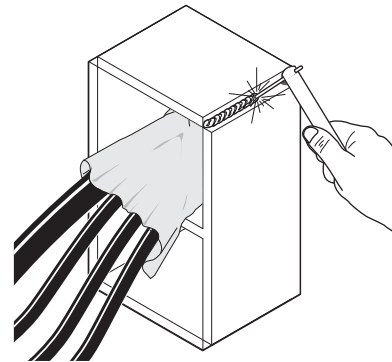
Weld the frame parts together before fixing it to the structure. Make sure to keep the geometrical tolerances. After assembly the SO frame is welded following the normal routine for a rectangular frame without flange with fixing, buttering and fillet weld. See table on page 7 for appropriate heat input.



Grind off the fixing welds.

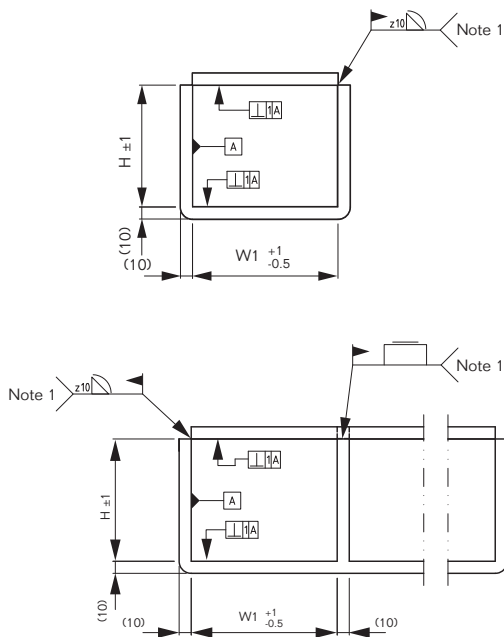


Remove frame part.



Protect cables during welding.

6.2 Dimensions after welding



SO frame opening

Size	H1 (mm)	W1 (mm)
1x1	101	60
2x1	101	120
3x1	159.5	60
4x1	159.5	120
5x1	218	60
6x1	218	120
7x1	278	60
8x1	278	120

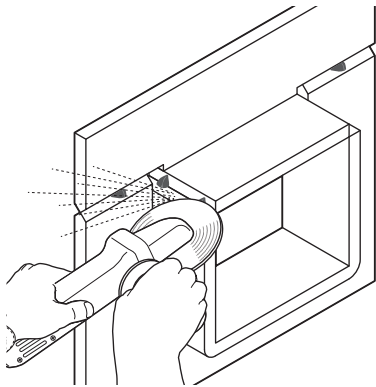
Note 1: Min 20% burn through of total weld length. Max R1 on all inner corners.

7. SFO, Openable frames with flange

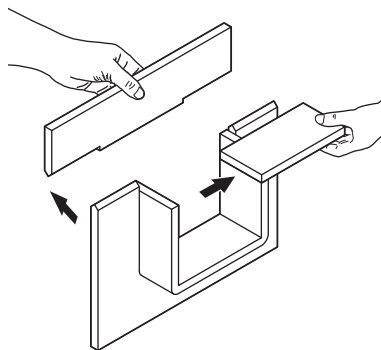
Openable frames intended for retrofit are recommended to be installed by welders qualified according to the latest edition of AWS D1.1, ISO 9606-1 2013, ISO 9606-2 2004 or other authorized system. It is important to achieve a gas-tight weld and secure that the burn through is well controlled preferably by backing.

7.1 SFO frames

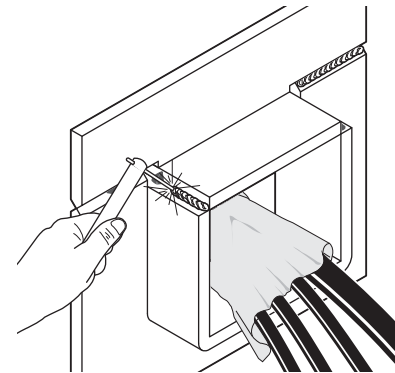
Weld the frame parts together before fixing it to the structure. Make sure to keep the geometrical tolerances. After assembly the SFO frame is welded following the normal routine for a rectangular frame with flange with fixing, buttering and fillet weld. See table on page 7 for appropriate heat input.



Grind off the fixing welds.

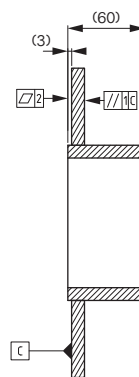
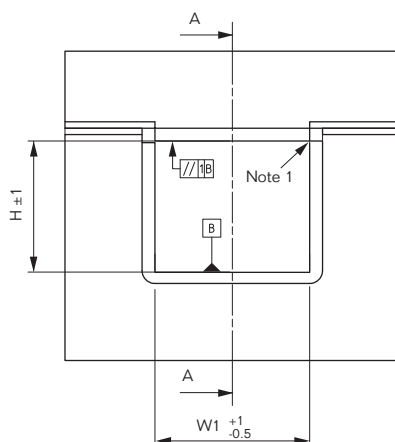


Remove frame parts.



Protect cables during welding.

7.2 Dimensions after welding

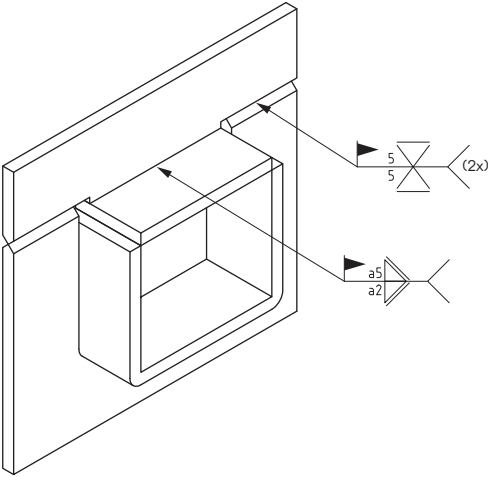
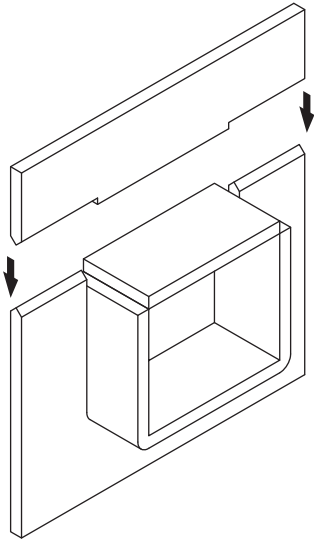
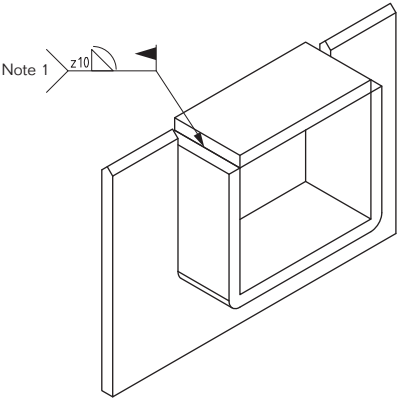
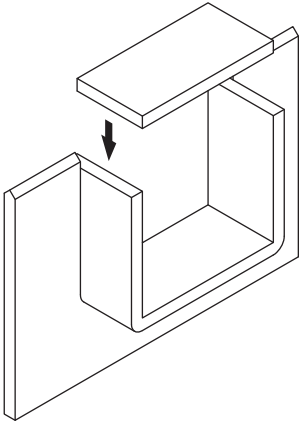


SFO frame opening

Size	H1 (mm)	W1 (mm)
1x1	101	60
2x1	101	120
3x1	159.5	60
4x1	159.5	120
5x1	218	60
6x1	218	120
7x1	278	60
8x1	278	120

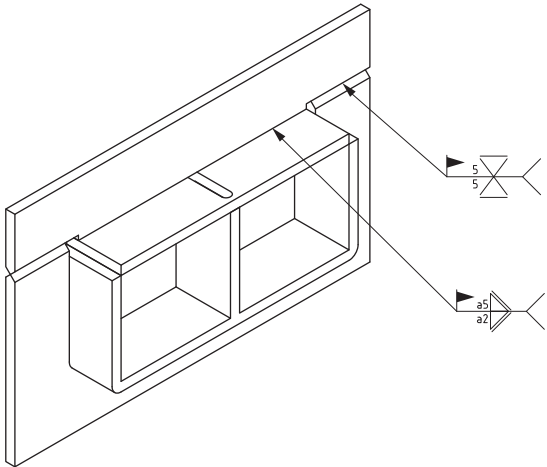
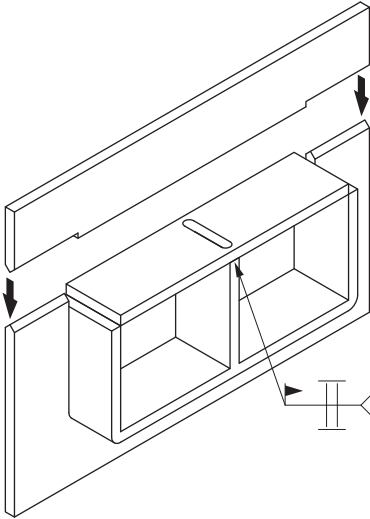
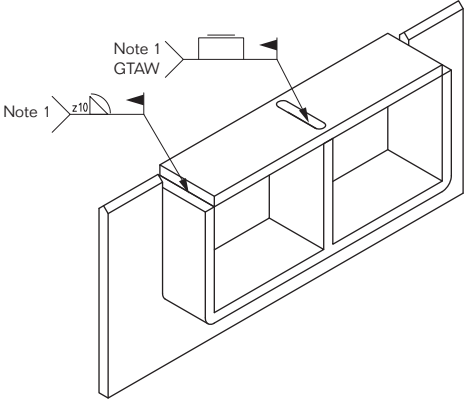
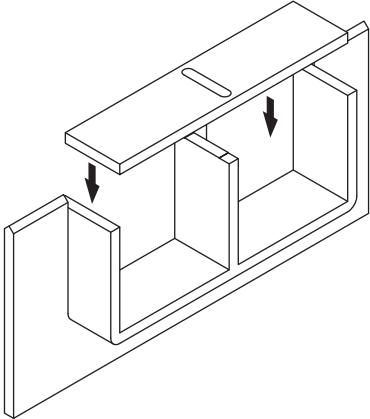
Note 1: Min 20% burn through of total weld length. Max R1 on all inner corners.

7.3 Procedure – single frame



Note 1: Min 20% burn through of total weld length. Max R1 on all inner corners.

7.4 Procedure – combination frame



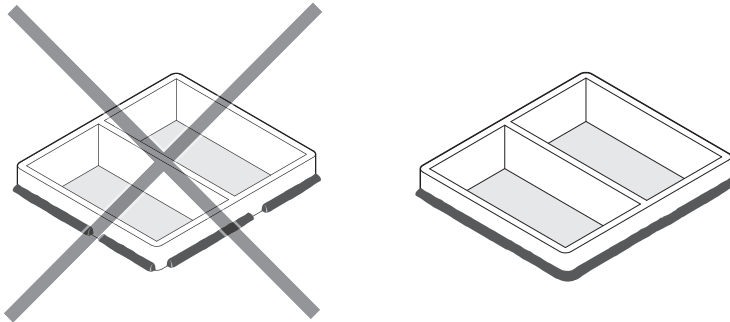
Note 1: Min 20% bum through of total weld length. Max R1 on all inner corners.

8. Caution!

Even though the guideline is an help to make safe welds it is important to be aware of potential errors that can lead to system failure. Below sections are examples of errors that can occur during welding.

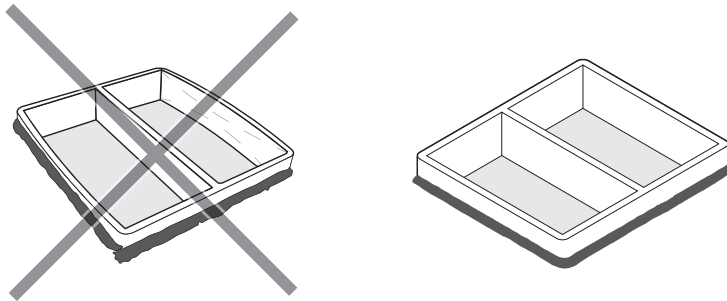
8.1 Intermittent welds

Make sure to overlap weld seams.



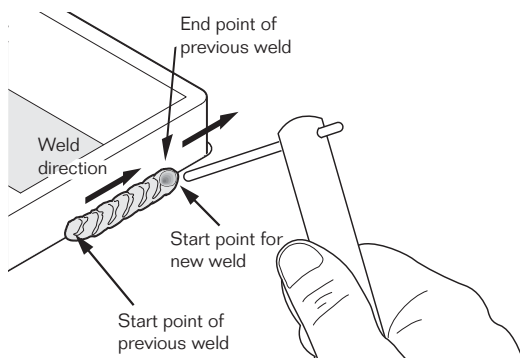
8.2 Exceeding the recommended weld size

Excessive welding or too large heat input can cause the frame to deflect and thereby increase the packing space, lowering the compression in the sealing system.



8.3 Weld pass

Start a new weld seam from an end point of a previous weld.



DISCLAIMER

"The Roxtec cable entry sealing system ("the Roxtec system") is a modular-based system of sealing products consisting of different components. Each and every one of the components is necessary for the best performance of the Roxtec system. The Roxtec system has been certified to resist a number of different hazards. Any such certification, and the ability of the Roxtec system to resist such hazards, is dependent on all components that are installed as a part of the Roxtec system. Thus, the certification is not valid and does not apply unless all components installed as part of the Roxtec system are manufactured by or under license from Roxtec ("authorized manufacturer"). Roxtec gives no performance guarantee with respect to the Roxtec system, unless (I) all components installed as part of the Roxtec system are manufactured by an authorized manufacturer and (II) the purchaser is in compliance with (a), and (b), below.

(a) During storage, the Roxtec system or part thereof, shall be kept indoors in its original packaging at room temperature.

(b) Installation shall be carried out in accordance with Roxtec installation instructions in effect from time to time.

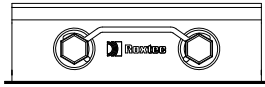
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



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Pos	Cable ID	Name	Cable Type	Cable Category	OD (mm) [T]	Module Type
						
	MODULE WITH PIPE	MODULE WITH CABLE	SPARE MODULE	SOLID MODULE		
Responsible		Created Date	Modify Date	Project		Lot/Weight
yube		2020-08-28	2020-08-28	台灣大哥大 Location/ Sublocation		4.4 [9.70]
Format		Client	Transit name		Sheet No	
		NTS	S 6*1 框架		1/1	
Client		Drawing number		Rev		

