

Deep Manufacture Basic Process and Common Equipment Used of CCA Busbar

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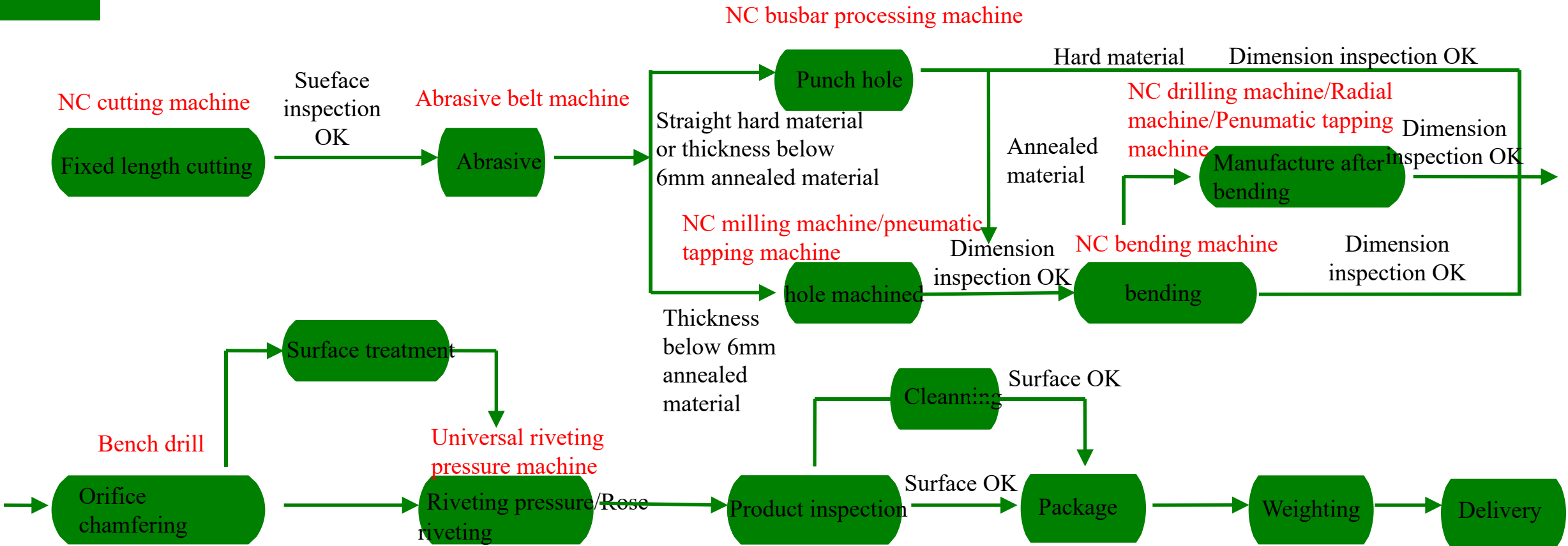
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Catalogue

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Deep manufacture basic process of CCA busbar



Common equipments used:

Equipments name		Processing content
NC sawing machine		Cutting kinds of fixed dimension busbar
NC cutting machine		Cutting kinds of fixed dimension busbar
Abrasive belt grinding machine		Grinding
NC milling machine		Drill hole、 milling hole
Machining centre		Drill hole、 milling hole
NC busbar processing machine		Punch round hole、 square hole
NC bending machine		Bending
Pneumatic tapping machine		Tapping
Bench drill		Orifice chamfering
Radial drilling machine		Drilling and reaming
Universal riveting pressure machine		Riveting pressure and rose riveting



Common equipments used:

2.1NC sawing machine

Used for cutting kinds of fixed dimension length of CCA busbar.



The main equipments and function display

2.2 NC sawing machine



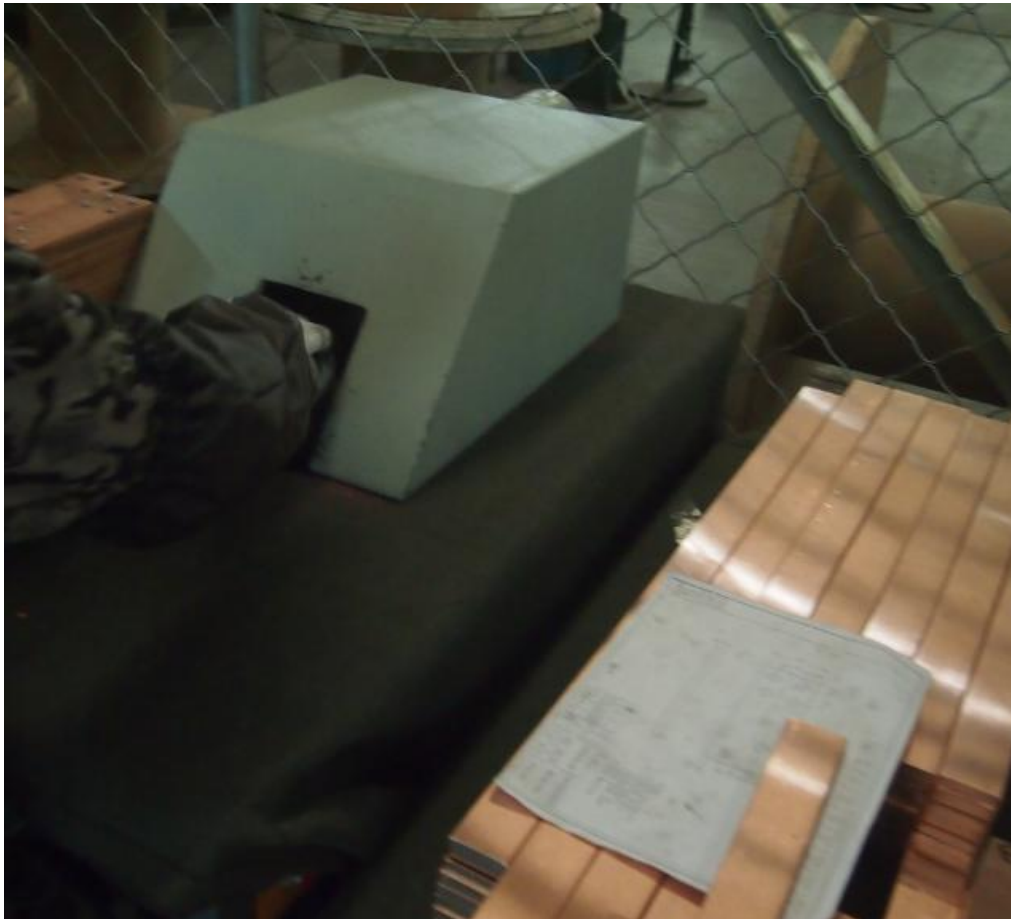
Used for cutting large quantities of fixed dimension length of CCA busbar



The main equipments and function display

2.3 Abrasive belt grinding machine

Headface treatment effect



The main equipments and function display

2.4 NC busbar processing machine

Used for punching hole of straight busbar(round hole, square hole, waist type hole), or under permission situation for punching or blanking hole of annealed busbar.Detailed processing way to see 《the horizontal continuous casting of CCA busbar selection processing handbook》 in item 4.2.



2.4.1: Attention of hole machining:

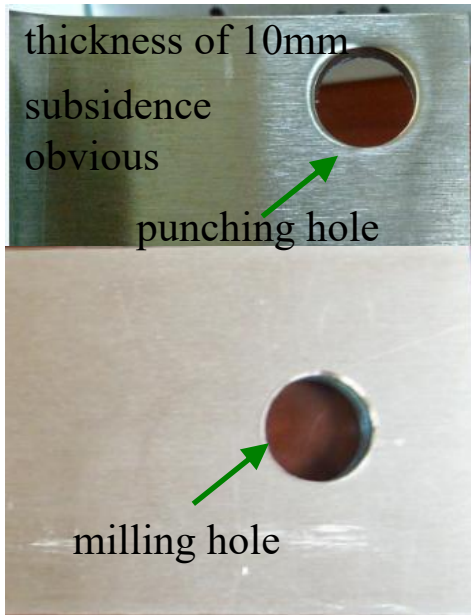
The main equipments of hole machining are NC busbar processing machine, milling ,punching and drilling machine.

1.NC busbar processing machine: high processing efficiency, but influenced by the degree of subsidence of punching, its adaptability is usually applied to hard straight busbar or thickness below 6mm of annealed busbar.

2.Milling and drilling machine: used for having requirements of subsidence and hole machining after bending, because bending products adopt annealed busbar, when thickness is above 6mm, the degree of subsidence of punching will rise, milling and drilling machine for processing is suggested. (shown in fig 1) 。

3.When annealed busbar is used for punching hole, overlap and riveting nut installation must be considered. It must fit: ①when it's punched on the opposite side, there isn't subsidence between overlap busbar (shown in fig 2) ; ②punched hole is used for riveting, the hole round needn't to be orifice chamfering (shown in fig 3) .

picture of punching hole in annealed busbar



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Fig 1

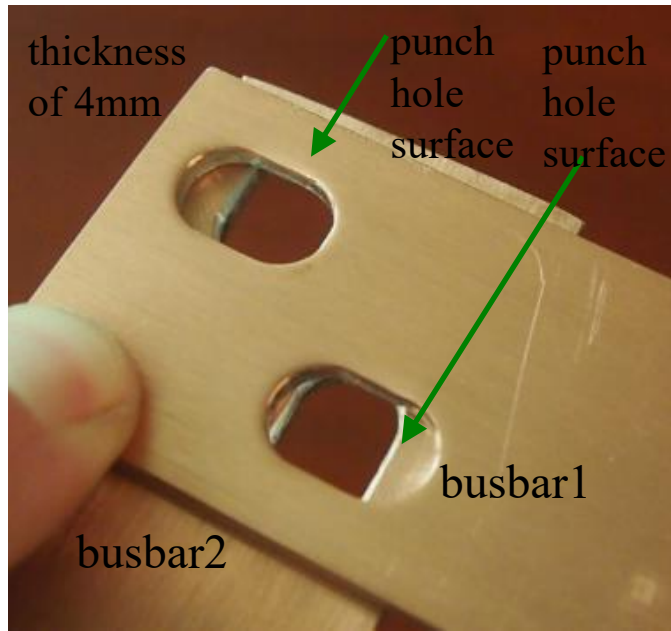


Fig 2 (picture of overlap)

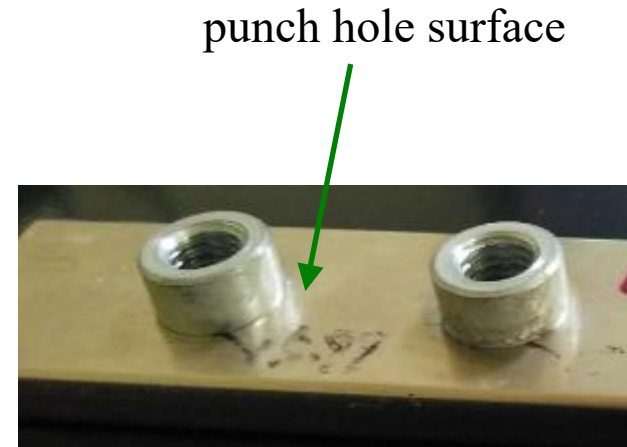


Fig 3

The main equipments and function display

2.5: NC milling machine machine centre

Used for kinds of hole machining before bending and special jobs with milling processing after bending.

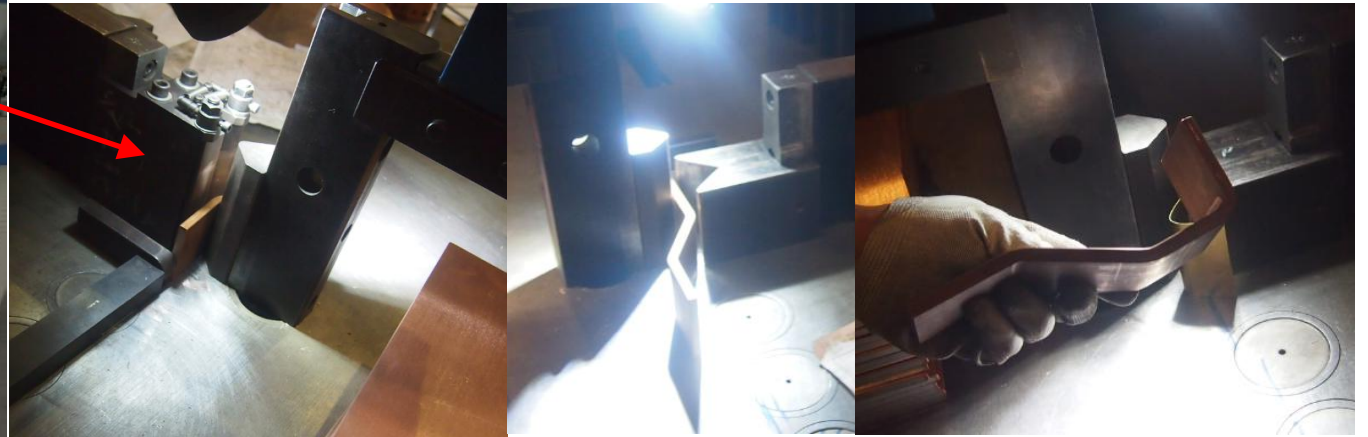
Attention: when you drill hole , you must keep the bit sharp. if the bit is chose to the copper layer, the speet must be slowly to avoid making more extrusion to damage the hole around of the combination layer, One other attention is that there should be a plate under the busbar to avoid dangling to damage the combination layer.



The main equipments and function display

2.6: NC bending machine

With the development of mold,NC bending machine can bend most types of processing, When little distance or special type bending are met, you could design special mold according to drawings, Detailed processing way to see 《the horizontal continuous casting of CCA busbar selection processing handbook》 in item 4.3.



2.6.1: Busbar bending notes

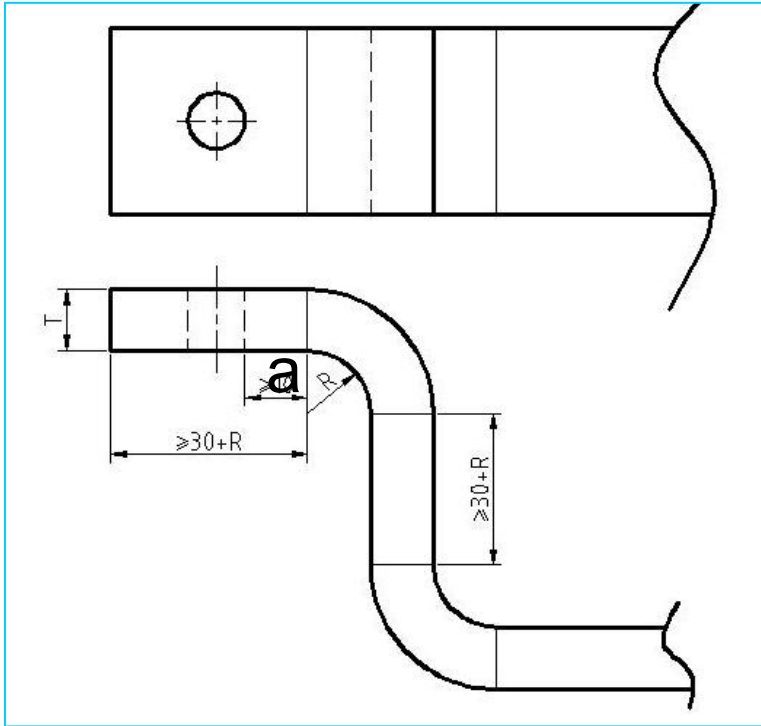


Fig.1

Pay attention to the following conditions:

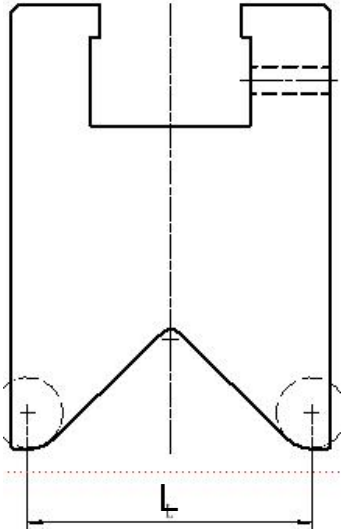
All the holes and other shape in front of the busbar did not bend as far as possible to complete, in order to improve the efficiency, but need to meet first (1).

(1) The *a* size of the figure 1. is according to the different bending die, different manufacturers use different concave and convex die, to form different bending *R*, which affect security dimension *a* value.

According to our mould and bending, usually $a = 1.5 * T$, and appropriate to add or subtract according to the actual bending, the greater *T*, *R* is larger, need to add appropriately *a* value; The smaller *T*, *R* is smaller, need to subtract appropriately *a* value.

(2) In the design inevitably there will be a value does not meet the safety distance, then only the first busbar to bend, again on the nc milling or drilling hole processing.

Bending mould using classification			
Thickness (mm)	Concave die	Convex die (L)	Note
3---4	R3/R4	Ordinary L30 or L30 plate without creasing	
4---5	R4/R5	L45 plate without creasing	
3---5	R10---R15		
6	R6--R10	L45 plate without creasing	
8	R8 / R10	L60 plate without creasing	
8	R15	L70 plate without creasing	
10	R10 / R15	L70 plate without creasing	
12	R12 / R15	L90 plate without creasing	



The main equipments and function display

2.7: Radial drilling machine, pneumatic tapping machine, drilling, tapping



The main equipments and function display

2.8: Bench drill

Edge of orifice and various groove for chamfering processing, artifacts surrounding deburring work at the same time, to facilitate the assembly of finished product follow-up; except the bottom hole of pressure riveting or rosing riveting nut, riveting pressure surface orifice chamfer is not permitted.



The main equipments and function display

2.9: Universal riveting machine

Universal riveting machine work on the full specifications of the riveting work, specific pressure riveting requirments see *Selection Guide & Machining Manual for Copper Clad Aluminum (CCA) Busbar Manufactured by Continuous-casting and Rolling* in item 4.4

Pressure riveting nut

Rose riveting nut

Pressure riveting screw



2.9.1: Pressure riveting operation points for attention

Copper clad aluminum busbar pressure riveting after installation requirements busbar surface without distortion,inside installation without aluminum residue, the installation surface pretreatment to remove burrs, shall not be chamfering, to ensure that the pressure riveting intensity.

Rose riveting nut bottom hole	
Specifications	Bottom hole size/mm
NZ-M5	$\Phi 8^{+0.1}$
NZ-M6	$\Phi 9^{+0.1}$
NZ-M8	$\Phi 11^{+0.1}$
NZ-M10	$\Phi 14^{+0.1}$
NZ-M12	$\Phi 16^{+0.1}$

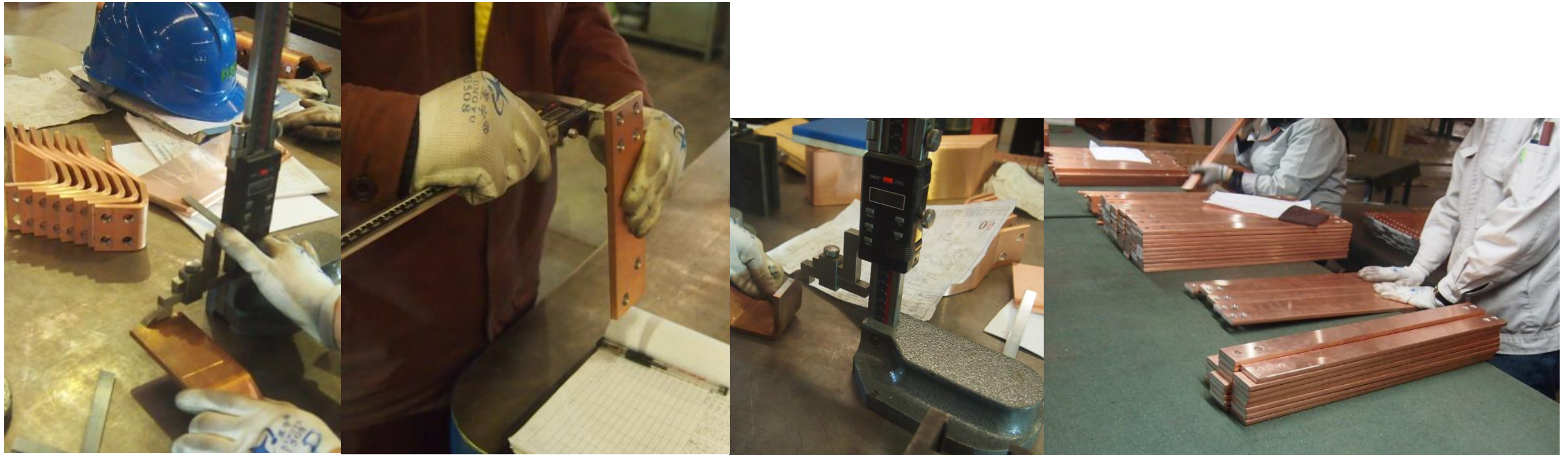
Pressure riveting nut bottom hole	
Specifications	Bottom hole size/mm
S-M4-2	$\Phi 5.5 \pm 0.05$
S-M5-2	$\Phi 6.4 \pm 0.05$
S-M6-2	$\Phi 8.8 \pm 0.05$
S-M8-2	$\Phi 10.5 \pm 0.05$
S-M10-2	$\Phi 14 \pm 0.05$
S-M12-2	$\Phi 16.5 \pm 0.05$

Above the bottom hole, please reference

The main equipments and function display

2.10: Quality inspection

The processing of each production process to conduct quality inspection, including dimension, appearance quality, plating quality, pressure riveting, and so on



3: Packing, weighing



4: Delivery or transfer

Part 4





Thanks

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