

1 Precautions 注意事项



NOTE

This document aims to providing simple and distinctive guidelines for hardware installation. For details on the installation operation steps, refer to the *Installation Guide* delivered in the form of CD-ROM along with the equipment.

本手册用于为设备硬件安装提供简明快捷的操作指导，如需参考安装操作步骤的详细完整描述，请参阅随设备发货的光盘中的《安装指南》。

IMPORTANT NOTE:

FCC Radiation Exposure Statement:

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 710cm between the radiator & your body.



DANGER

Thunderstorm 雷雨

High voltage and AC operations, or operations on an iron tower and a mast on a thunderstorm day are prohibited.

严禁在雷雨天气下进行高压、交流电，及铁塔、桅杆作业。



DANGER

Working at Heights 高空作业

When working at heights, prevent objects from falling down.

高空作业时，注意防止物体坠落。



DANGER

Hoisting Heavy Objects 吊装重物

When heavy objects are hoisted, do not stand or walk under the boom or the objects.

吊装重物时，严禁在吊臂、吊装物正下方走动。



CAUTION

Microwave 微波

Strong radio frequency can harm the human body. Do not stay too close to the antenna in the emitting direction of the antenna when the microwave communication equipment is working. Before installing or maintaining an antenna on the iron tower or the mast installed with more than one antenna, avoid the strong radiation from the other antennas.

高强度射频信号有害人体健康。在微波通信设备正常工作时，人员应避免在天线发射方向上离天线太近。特别是在装有多个天线的铁塔、桅杆上对某一天线进行近端安装、维护等操作时，避免受到其他天线的强辐射。



CAUTION

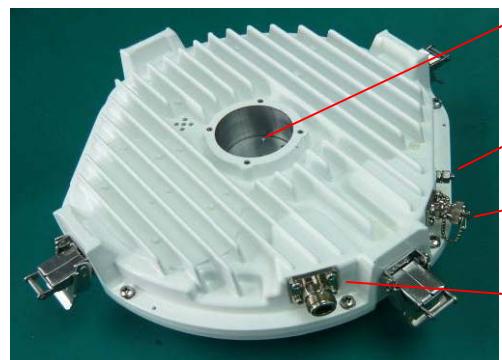
IF Cable 中频电缆

Before installing or removing an IF cable, turn off the ODU power switch.

在安装、拆除中频电缆前，必须关闭ODU的电源输出开关。

1 Interfaces
接口

ODU with the waveguide interface
波导接口ODU



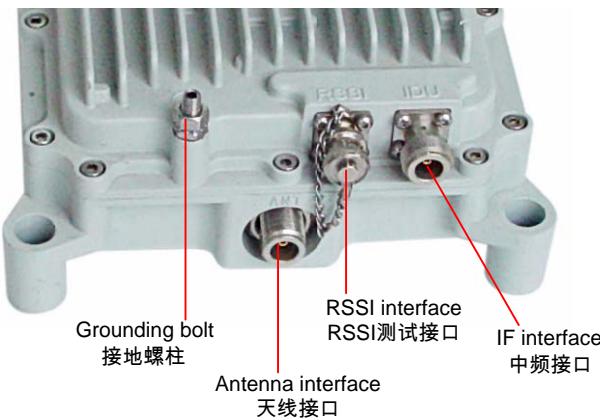
Antenna interface
天线接口

Grounding bolt
接地螺柱

RSSI interface
RSSI测试接口

IF interface
中频接口

ODU with the coaxial interface
同轴接口ODU



Grounding bolt
接地螺柱

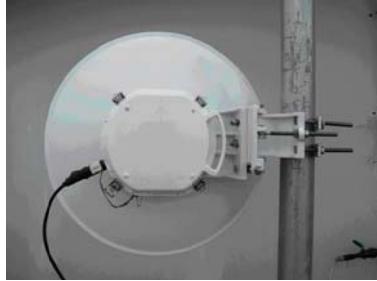
Antenna interface
天线接口

RSSI interface
RSSI测试接口

IF interface
中频接口

2 Appearance After ODU Installation - on One Single-Polarized Antenna
安装效果 - 在一面单极化天线上

One ODU installed on one antenna
(direct mount)
1个ODU配置1面天线（直扣式安装）



Two ODUs installed on one antenna
(direct mount)
2个ODU配置1面天线（直扣式安装）

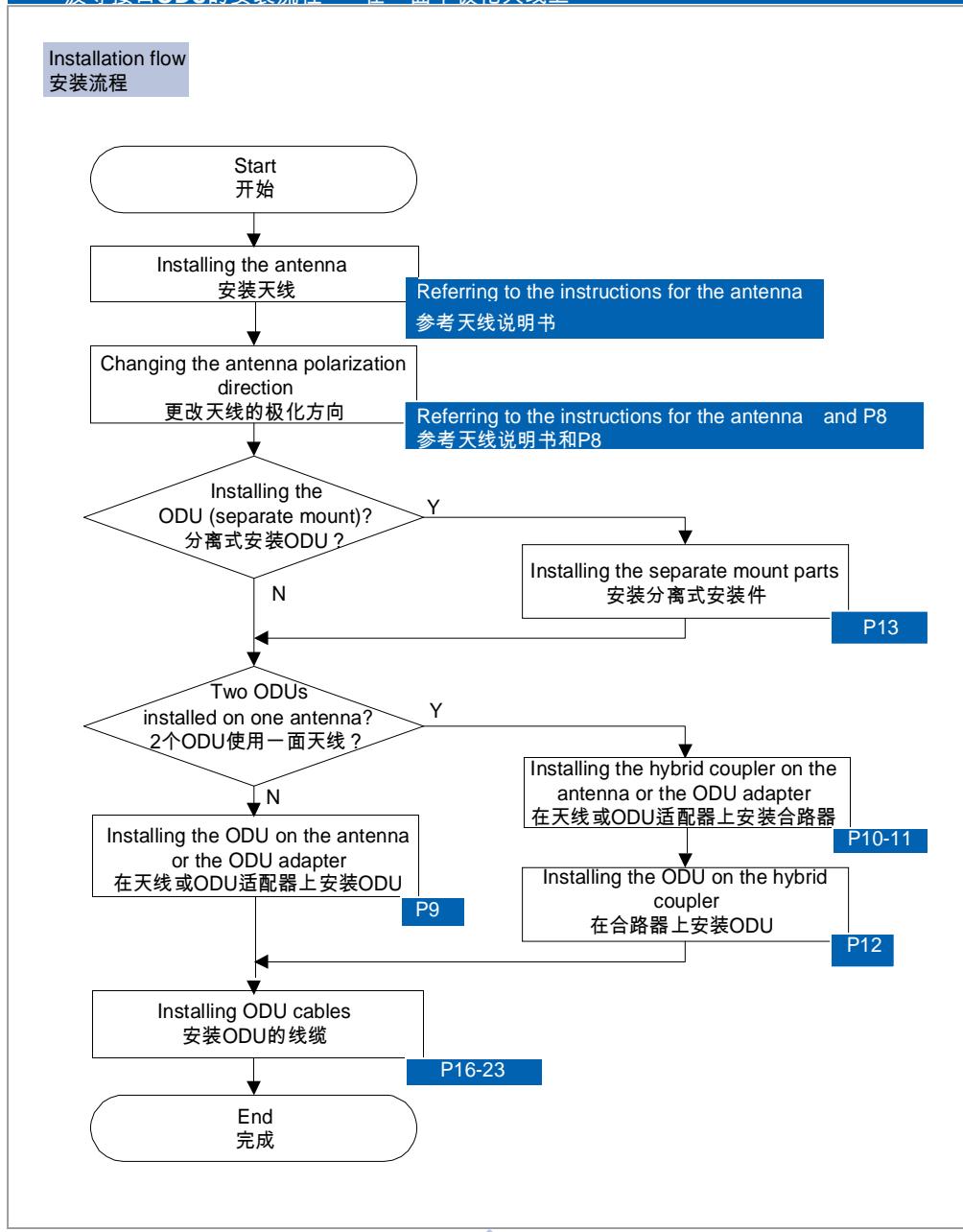


One ODU installed on one antenna
(separate mount)
1个ODU配置1面天线（分离式安装）



Installation FLow 安装流程

1 Flow of Installing the ODU with the Waveguide Interface - on One Single-Polarized Antenna 波导接口ODU的安装流程 - 在一面单极化天线上

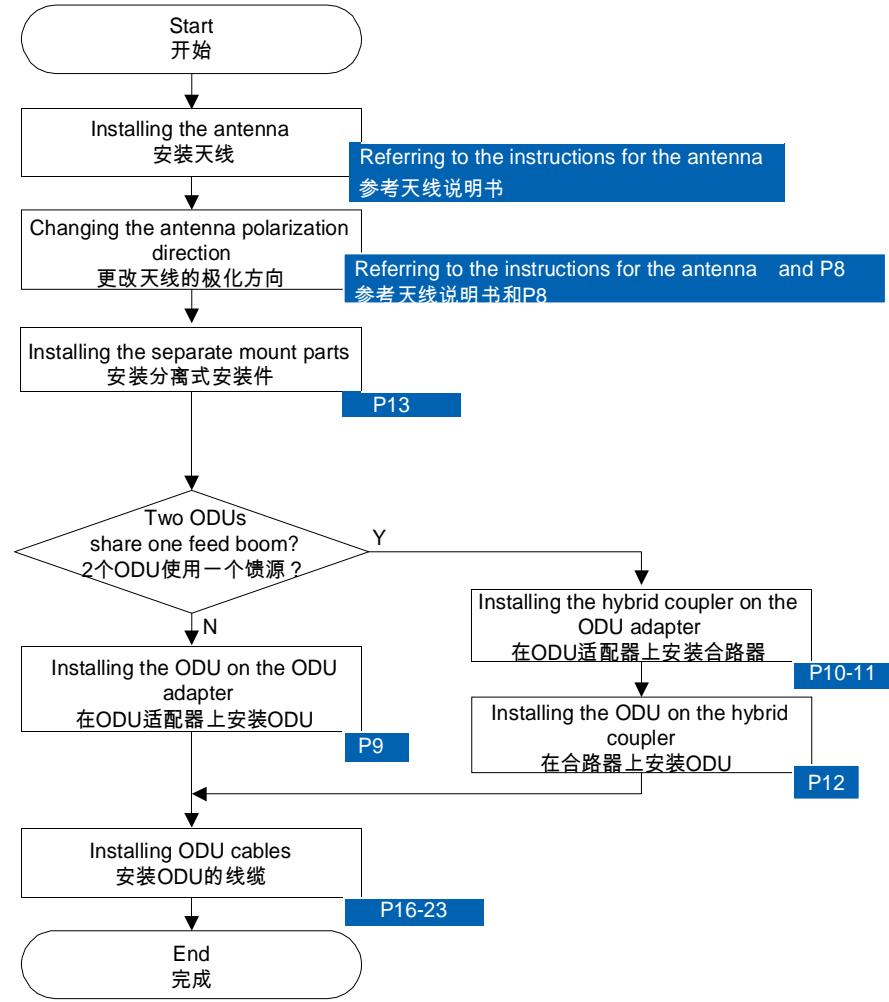


Installation FLow 安装流程

2

Flow of Installing the ODU with the Waveguide Interface -
on One Dual-Polarized Antenna
波导接口ODU的安装流程 - 在一面双极化天线上

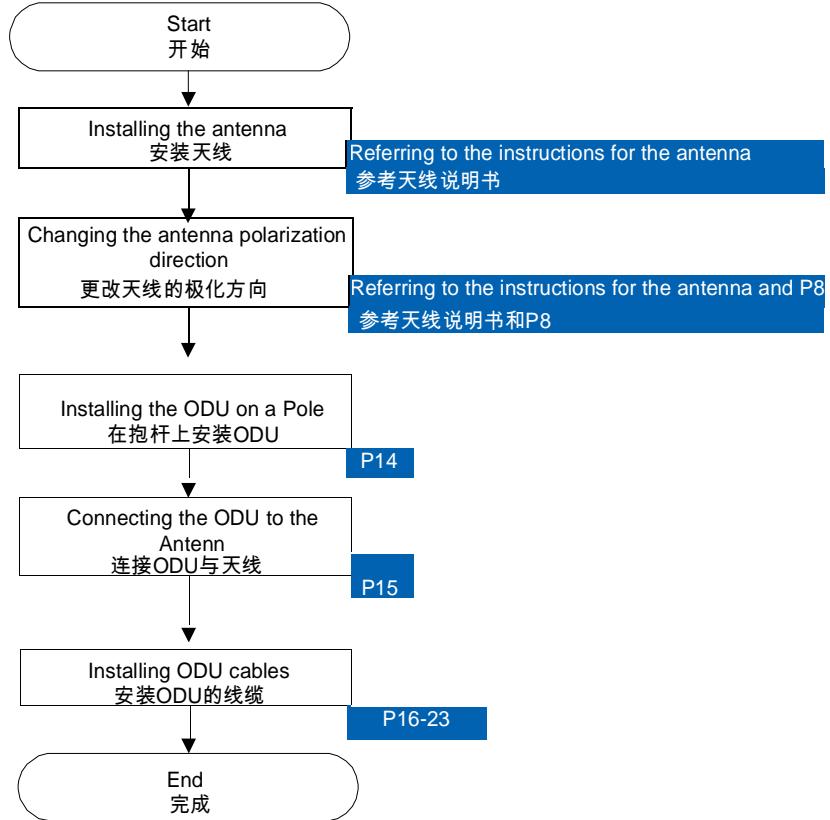
Installation flow
安装流程



Installation FLow 安装流程

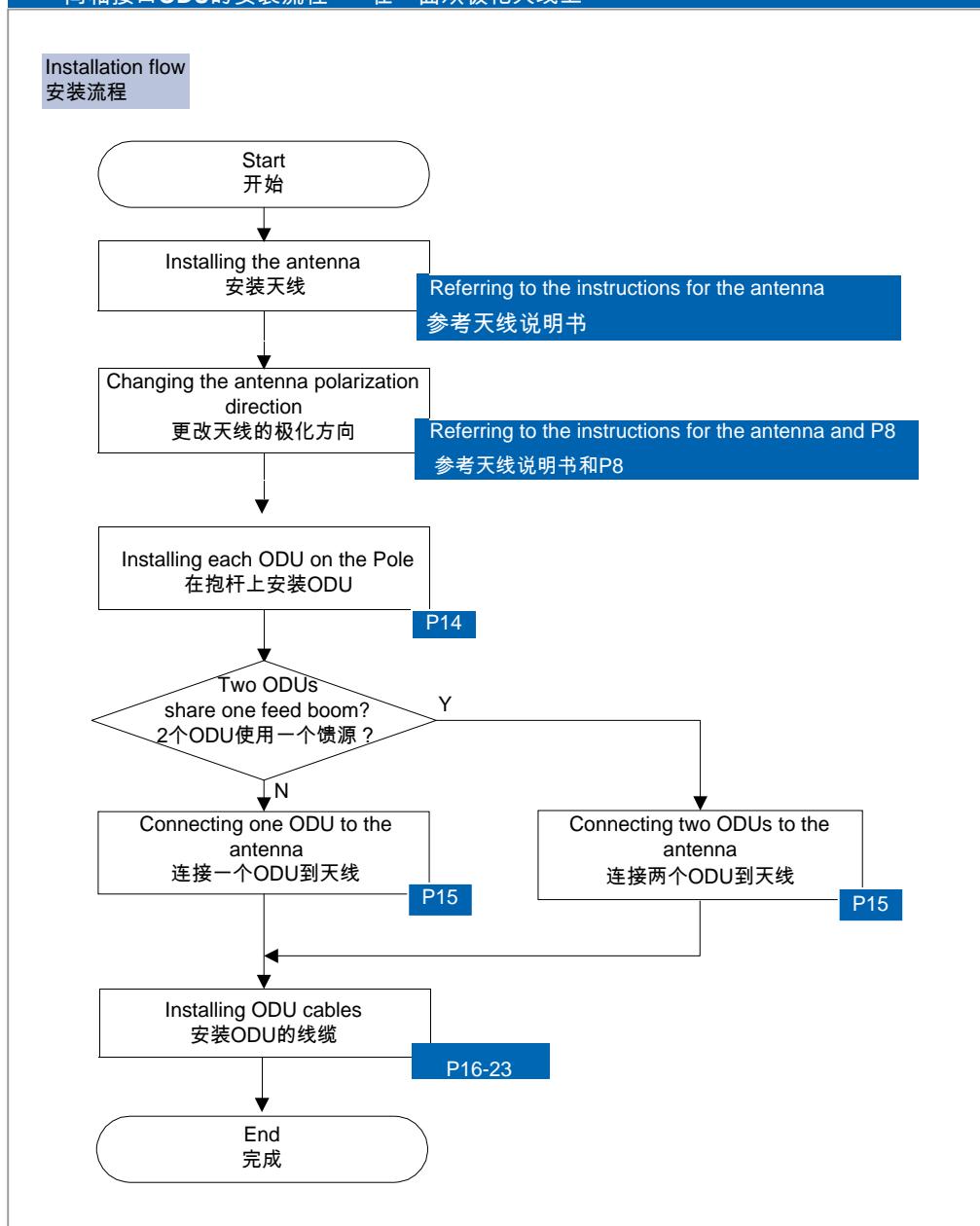
Flow of Installing the ODU with the Coaxial Interface -
on One Single-Polarized Antenna
同轴接口ODU的安装流程 - 在一面单极化天线上

Installation flow 安装流程



Installation FLow 安装流程

4 Flow of Installing the ODU with the Coaxial Interface - on One Dual-Polarized Antenna 同轴接口ODU的安装流程 - 在一面双极化天线上



Changing the Antenna Polarization Direction 更改天线的极化方向

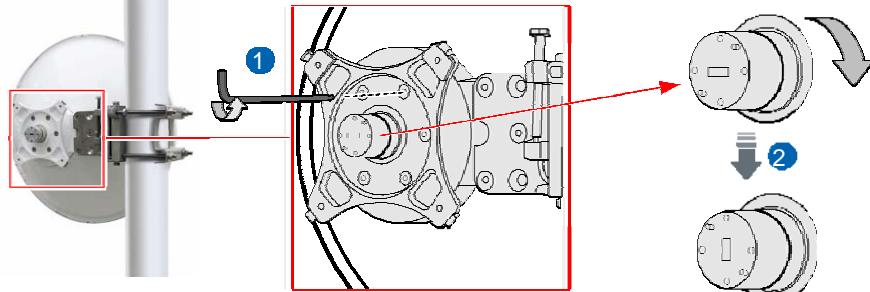
1 Changing the Antenna Polarization Direction 更改天线的极化方向

⚠ CAUTION

The antennas are available in multiple types. This procedure for changing the antenna polarization direction is provided for reference only. In actual installation, follow the instructions packed with the antenna.

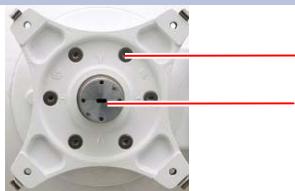
由于天线有多种类型，这里所描述的更改方法仅作安装参考，不一定适用于实际情况。实际安装过程中应以天线附件中的安装说明书为准。

Changing the polarization direction of the antenna 更改天线的极化方向



- ① Loosen the fastening screws to allow the feed boom to rotate freely.
拧松馈源固定螺钉，使馈源可以旋转。
- ② Rotate the feed boom 90 degrees to the left or right.
将馈源向左或向右旋转90度。
- ③ Tighten the fixing screws and apply glue around the screws.
重新拧紧馈源固定螺钉，并在馈源螺钉处涂抹螺钉胶。

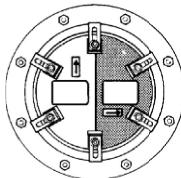
Single-polarized antenna-vertically polarized
单极化天线-垂直极化



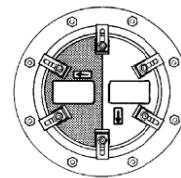
Single-polarized antenna-horizontally polarized
单极化天线-水平极化



Dual-polarized antenna-the feed boom
on the left is vertically polarized
双极化天线-左半侧馈源为垂直极化



Dual-polarized antenna-the feed boom
on the left is horizontally polarized
双极化天线-左半侧馈源为水平极化



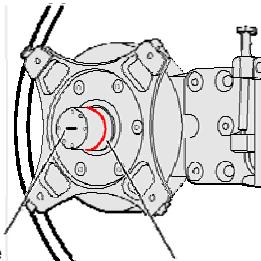
Installing the ODU with the Waveguide Interface 安装波导接口的ODU

1 Installing the ODU on the Antenna or the ODU Adapter 在天线或ODU适配器上安装ODU

NOTE

The following describes the procedure for installing the ODU on the antenna. The procedure for installing the ODU on the ODU adapter is similar.
这里介绍在天线上安装ODU的方法。在ODU适配器上安装ODU的方法与此相类似。

Applying the appropriate lubricant 涂上润滑剂

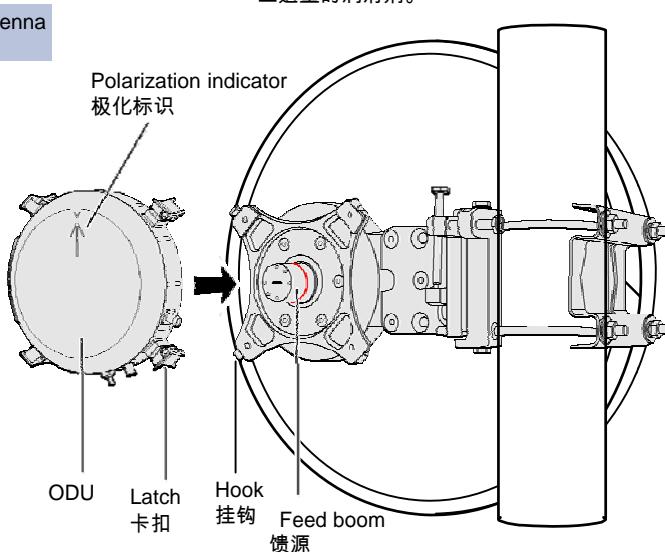


Remove the protective caps.
取下防尘帽。

Apply the appropriate quantity of lubricant on the gasket of the feed boom and the surface of the waveguide near the gasket.
在馈源密封圈及密封圈附近的波导表面涂上适量的润滑剂。

Installing the ODU on the antenna 在天线上安装ODU

Vertical polarization 垂直极化	↑
Horizontal polarization 水平极化	→



- ① Keep the polarization indicator on the ODU pointing to the polarization direction of the antenna.
保持ODU上所刻的极化标识箭头的指向和天线极化方向一致。
- ② Install the ODU onto the antenna. The IF port of the ODU should face downwards.
将ODU扣装在天线上，注意ODU的中频接口应该朝下。
- ③ Close the four latches cornerwise.
按对角线的顺序，依次扣住4个卡扣。

2 Installing the Hybrid Coupler on the Antenna or the ODU Adapter 在天线或ODU适配器上安装合路器

NOTE

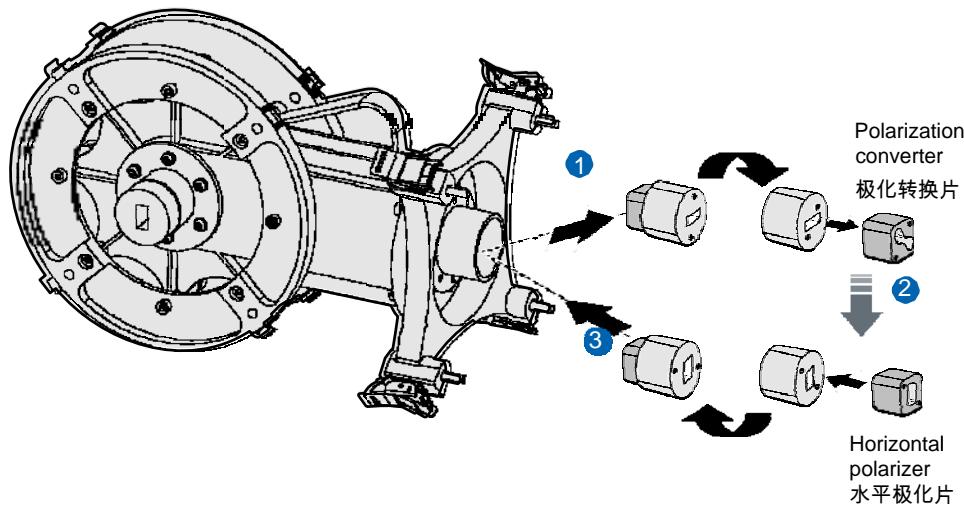
The following describes the procedure for installing the hybrid coupler on the antenna. The procedure for installing the hybrid coupler on the ODU adapter is similar.

这里介绍在天线上安装合路器的方法。在ODU适配器上安装合路器的方法与此相类似。

CAUTION

- The hybrid couplers are available in multiple types. This procedure for installing the hybrid coupler is provided for reference only. In actual installation, follow the instructions packed with the hybrid coupler.
由于合路器有多种型号，这里所描述的安装合路器的方法仅供参考，不一定适用于实际情况。
实际安装过程中应以合路器附件中的安装说明书为准。
- By default, the hybrid coupler applies vertical polarization. If horizontal polarization is required, change the polarization direction of the hybrid coupler.
合路器默认为垂直极化。只有当天线为水平极化时，才需要更改合路器的极化方向。

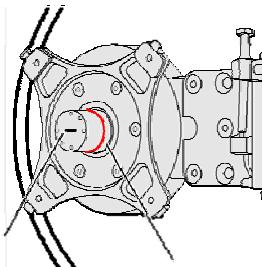
Replacing the polarization converter with a horizontal polarizer
用水平极化片替换极化转换片



- ① Remove the polarization component.
取出极化部件。
- ② Replace the polarization converter with a horizontal polarizer.
用水平极化片替换极化转换片。
- ③ Install the polarization component. Ensure that the arrow on the polarization component points to the H mark on the hybrid coupler.
将极化部件装回合路器的天线接口。注意安装极化部件时，极化部件的箭头应该指向合路器上的“H”标记。

2 Installing the Hybrid Coupler on the Antenna or the ODU Adapter (Continued)
在天线或ODU适配器上安装合路器(续)

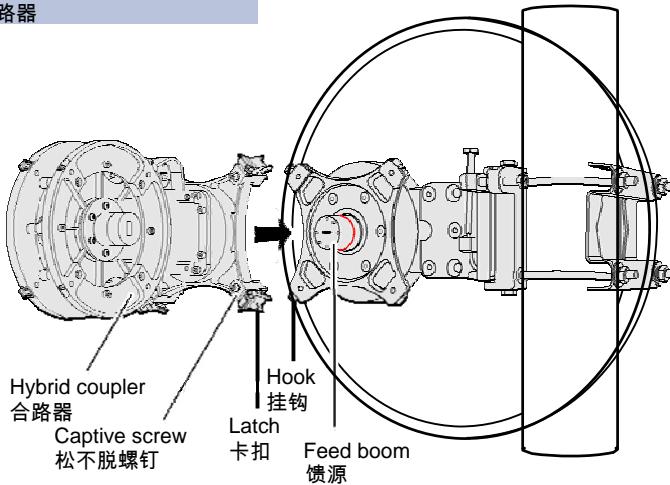
Applying the appropriate lubricant
涂上润滑剂



Remove the protective caps.
取下防尘帽。

Apply the appropriate quantity of lubricant on the gasket of the feed boom and the surface of the waveguide near the gasket.
在馈源密封圈及密封圈附近的波导表面涂上适量的润滑剂。

Installing the hybrid coupler on the antenna
在天线上安装合路器

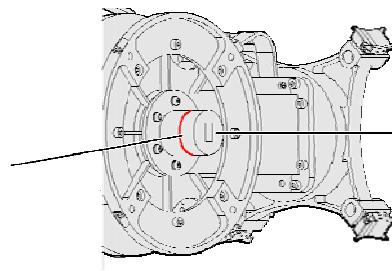


- 1 Apply appropriate anti-seize grease to the four captive screws of the hybrid coupler.
将合路器的4个松不脱螺钉涂上适量的防锈死润滑剂。
- 2 Keep the hybrid coupler in the upward direction.
保持合路器为正向。
- 3 Install the hybrid coupler onto the antenna.
将合路器扣装在天线上。
- 4 Close the four latches cornerwise.
按对角线的顺序，依次扣住4个卡扣。
- 5 Screw in the four captive screws about 70% and tighten them cornerwise.
将合路器的4个松不脱螺钉都拧入约70%后，按对角线的顺序，依次拧紧螺钉。

3 Installing the ODU on the Hybrid Coupler
在合路器上安装ODU

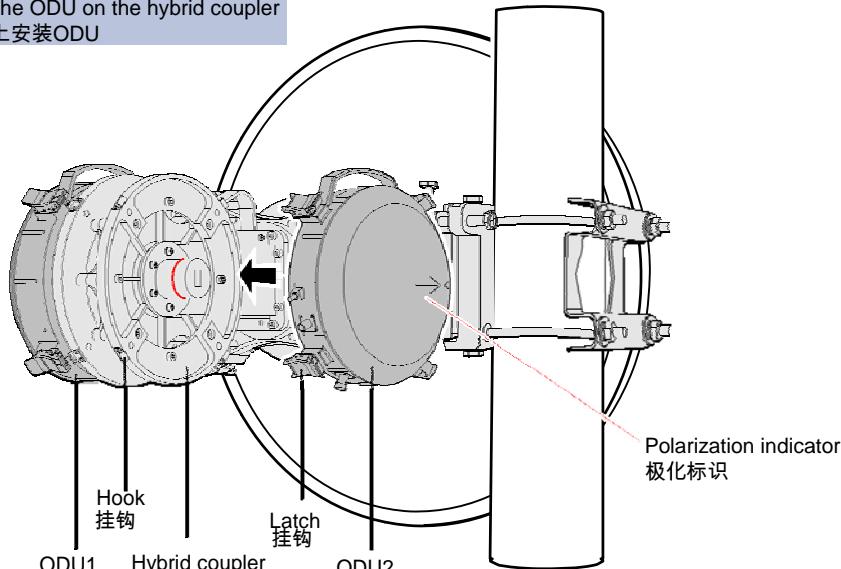
Applying the appropriate lubricant
涂上润滑剂

Apply the appropriate quantity of lubricant on the gasket of the feed boom and the surface of the waveguide near the gasket.
在馈源密封圈及密封圈附近的波导表面涂上适量的润滑剂。



Remove the protective caps.
取下防尘帽。

Installing the ODU on the hybrid coupler
在合路器上安装ODU



CAUTION

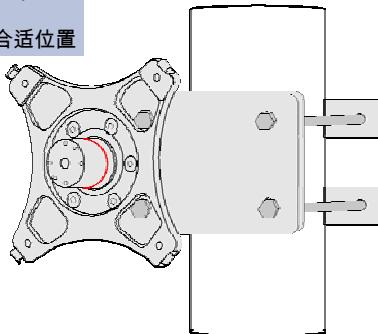
Two ODU interfaces are available on the hybrid coupler. The main ODU must be installed on the MAIN interface of the hybrid coupler and the standby ODU must be installed on the STD BY interface of the hybrid coupler.

合路器上有2个ODU接口。主用ODU必须安装在合路器上标识为“MAIN”的主用接口，备用ODU必须安装在合路器上标识为“STD BY”的备用接口。

- ① Keep the polarization indicator on the ODU pointing to the horizontal direction. Install the ODU onto the hybrid coupler. The IF port of the ODU should face downwards.
保持ODU上所刻的极化标识箭头指向水平方向,将ODU扣装在合路器上。注意ODU的中频接口应朝下。
- ② Close the four latches cornerwise.
按对角线的顺序，依次扣住4个卡扣。

4 Installing the Separate Mount Parts 安装分离式安装件

Installing the ODU adapter onto a proper position on the antenna pole
将ODU适配器安装到天线抱杆上的合适位置



Installing the flexible waveguide
安装软波导

Frequency band 频段	Maximum twist degree 最大扭曲角	Minimum E-bend radius E面最小弯曲半径	Minimum H-bend radius H面最小弯曲半径
7/8 GHz	249°	76 mm	152 mm
11 GHz	280°	64 mm	127 mm
13 GHz	330°	64 mm	115 mm
15 GHz	405°	52 mm	102 mm
18/23/26/32/38 GHz	465°	38 mm	76 mm

Keep the direction of the waveguide cavity of the flexible waveguide consistent with that of the adapter, and fix the flexible waveguide in a proper position.

保持软波导与适配器的波导腔方向一致，并将软波导固定到合适位置。



CAUTION

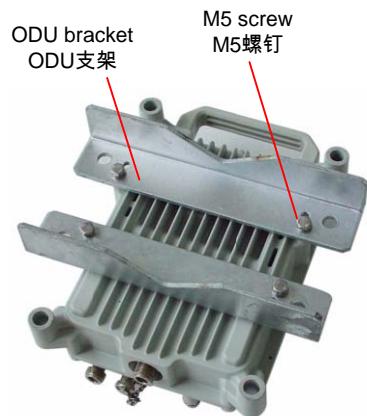
The flexible waveguide can be bent only within its maximum twist angle and at the larger area side. The E-bend radius and H-bend radius cannot be smaller than the minimum bending radius.
扭曲软波导时不能超过其最大扭曲角，E面和H面的弯曲半径均不得小于其最小弯曲半径。

In the case of separate installation, the antenna must provide the standard flange interface. If the existing interface is not a flange interface, convert the interface type according to the antenna instruction.

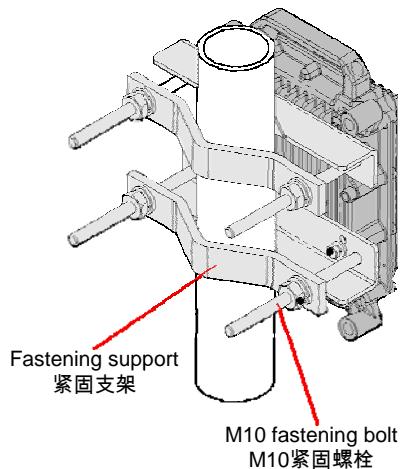
分离式安装时，天线必须提供标准的法兰接口。如果接口不是法兰接口，请根据天线说明书转换接口类型。

1 Installing the ODU on a Pole
在抱杆上安装ODU

Installing the ODU onto the ODU bracket
将ODU安装到ODU支架上



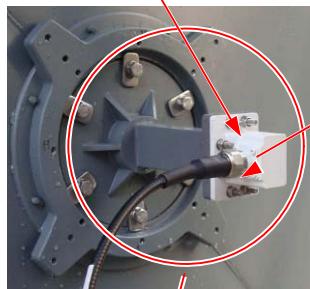
Installing the ODU on the pole
安装ODU到抱杆上



2 Connecting the ODU and the Antenna
连接ODU与天线

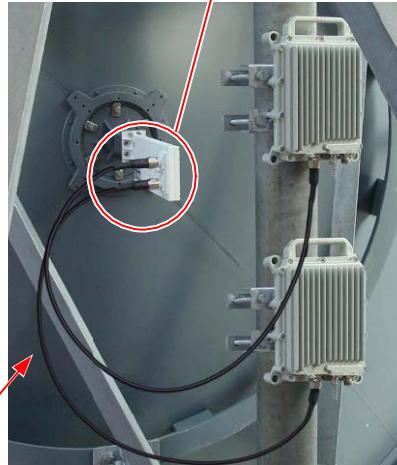
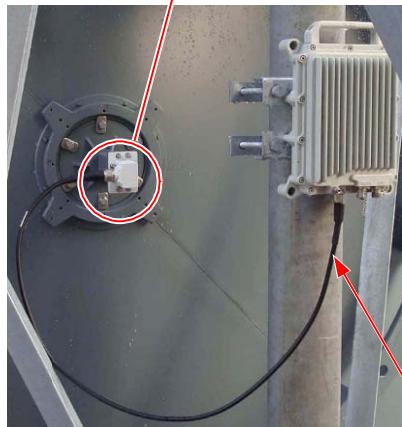
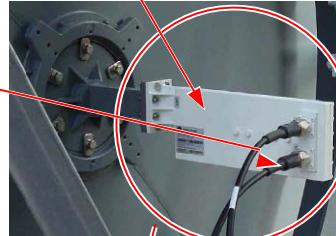
Connecting one ODU to the Antenna
连接1个ODU到天线

Installing the waveguide-to-coaxial converter
安装波导/同轴变换器



Connecting two ODUs to the Antenna
连接2个ODU到天线

Installing the hybrid coupler
安装合路器



Connecting the RF cable and Waterproofing the connectors
连接射频电缆并对接头做防水处理。

Binding the RF cable onto the pole or antenna support
将射频电缆就近绑扎到抱杆或天线支架上。

1 Installing the ODU PGND Cable
安装ODU保护地线

Installing the ODU PGND cable
安装ODU保护地线



Remove the anticorrosion paint and oxidizing layer at the grounding point before the installation.

安装前先去除接地点处的防锈漆和氧化层。

Foot of the clip
固定夹底座。

ODU PGND cable
ODU保护地线



Installing ODU Cables 安装ODU电缆

Lightning Arrester and Its PGND Cable (Optional) 雷器的保护地线(可选)

NOTE



This operation is required only when the radio site needs to be configured with the lightning arrester.

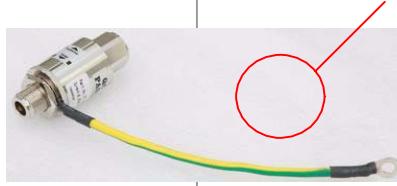
如果站点配置有避雷器，才需要执行此步骤。

Installing the lightning arrester and its PGND cable

安装避雷器及避雷器的保护地线

Install the grounding cable of the lightning arrester to the "Surge" end of the lightning arrester and fasten it using a nut and a spring washer.

将避雷器的保护地线安装到避雷器的浪涌端，用螺帽和弹性垫片拧紧。



Fix the grounding cable of the lightning arrester and the PGND cable of the ODU to the grounding stud of the ODU.
避雷器地线与ODU保护地线一起紧固在ODU的接地螺柱上。

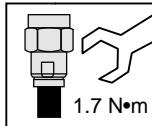


3 Installing the IF Cable - without the Lightning Arrester 安装中频电缆 - 不使用避雷器时

⚠ CAUTION

- Bind the IF cable first to prevent its type-N connector from being pulled.
必须先绑扎好电缆，避免中频电缆的N型连接器受到拉扯。
- Take waterproof measures (waterproof curves) for the part of the IF cable below the ODU and the part of the IF cable outside the IDU room.
入室前及在ODU下方，中频电缆应做避水弯。

Installing the IF cable 安装中频电缆



Waterproofing
防水处理



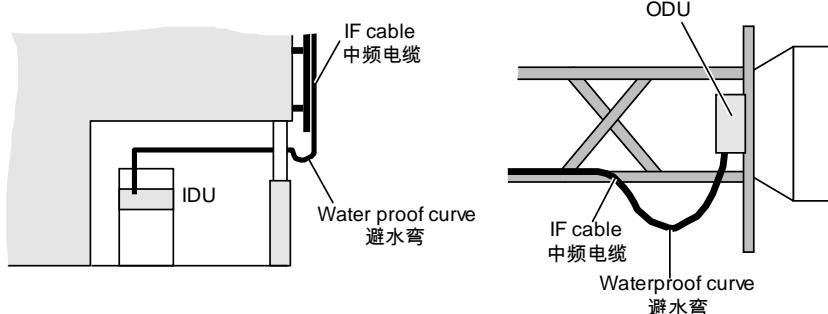
IF cable 中频电缆

IF jumper 中频跳线

- If the equipment is configured with the IF 1+1 protection, the IF cable of the main ODU must be connected to the IF jumper of the working IF board, and the IF cable of the standby ODU must be connected to the IF jumper of the protection IF board.
如果设备配置有中频 1+1 保护，则主用 ODU 的中频电缆连接主用中频板的中频跳线，备用 ODU 的中频电缆连接备用中频板的中频跳线。
- If the IFX boards that provide the XPIIC function are used, the IF cable of the ODU that applies the vertical polarization must be connected to the IF jumper of the IFX board that processes vertically polarized waves, and the IF cable of the ODU that applies the horizontal polarization must be connected to the IF jumper of the IFX board that processes horizontally polarized waves.
如果中频板为使用 XPIIC 功能的 IFX 板，则垂直极化 ODU 的中频电缆连接处理垂直极化波的 IFX 板的中频跳线，水平极化 ODU 的中频电缆连接处理水平极化波的 IFX 板的中频跳线。

3 Installing the IF Cable - Making Waterproof Curves
安装中频电缆 - 制作避水弯

Making waterproof curves
制作避水弯



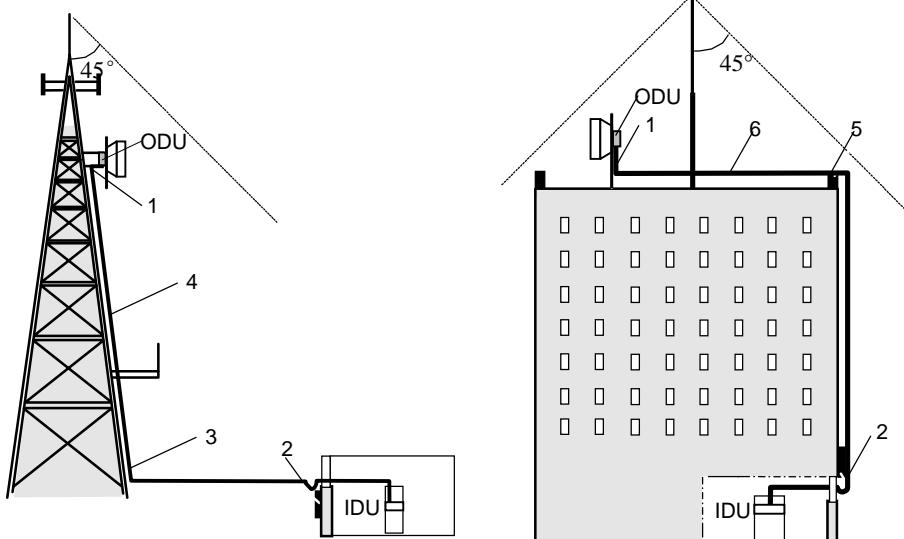
TIP

Coil the IF cable into a circle with a diameter of 0.6 m and bind it onto the mast after the IF cable passes the waterproof curve under the ODU for future adjustment of the antenna position.

在ODU下方的避水弯后，应该把中频电缆盘一个直径0.6m的圈并绑扎在抱杆上,以备调整天线位置时使用。

4 Grounding the IF Cable - Grounding Points 中频电缆的接地 - 接地点

Grounding points of the IF cable
中频电缆接地点



- 1 The place about one meter away from the IF interface of the ODU
距离ODU中频接口1m左右范围内
- 2 The place about 0.5 to 1 meter away from the cable entry of equipment room or outdoor cabinet
入室电缆窗口外侧或室外机柜外侧0.5m ~ 1m左右的范围内
- 3 The place on the roof edge about one meter away from the turning point of the wiring ladder
离开塔体引至室外走线架前1m左右范围内
- 4 The middle point of the cable (when the cable is longer than 60 meters)
塔上电缆的中部 (塔上电缆长度超过60m)
- 5 The place on the roof edge about one meter away from the turning point of the wiring ladder
(when the horizontal portion of the cable on the roof-top is longer than 30 meters)
在楼顶边沿距走线梯折弯前1m左右范围内 (电缆在楼顶水平走线超过30m)
- 6 The middle point of the horizontal portion of the cable (when the horizontal portion on the roof-top is longer than 60 meters)
水平走线的中部 (电缆在楼顶水平走线超过60m)

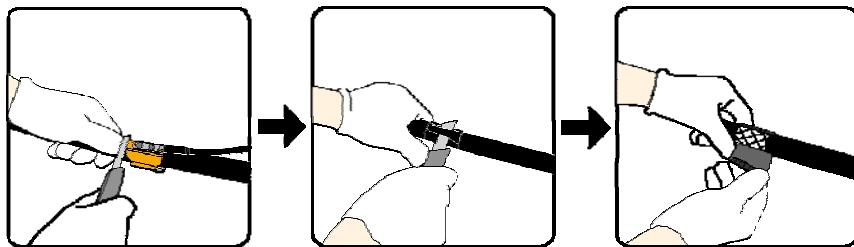


CAUTION

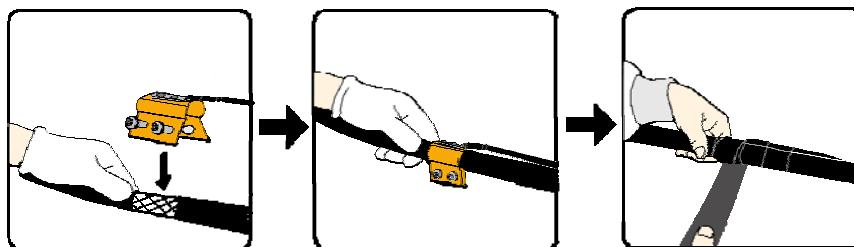
The grounding point depends on the installation mode and the length of the IF cable.
Generally, the IF cable should be grounded to a minimum of three points. When the IF cable is longer than 60 meters, add a grounding point for every extra 30 meters.
接地点与安装方式、中频电缆长度有密切关系。通常情况下，中频电缆至少应三点接地，如果中频电缆长度超过60m，则每多30m需要增加一个接地点。

4 Grounding the IF Cable - Installing the Grounding Clip 中频电缆的接地 - 安装接地夹

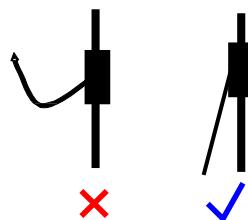
Selecting the installation position of the grounding clip and stripping off the cable sheath
选定接地夹安装位置，剥掉中频电缆外皮



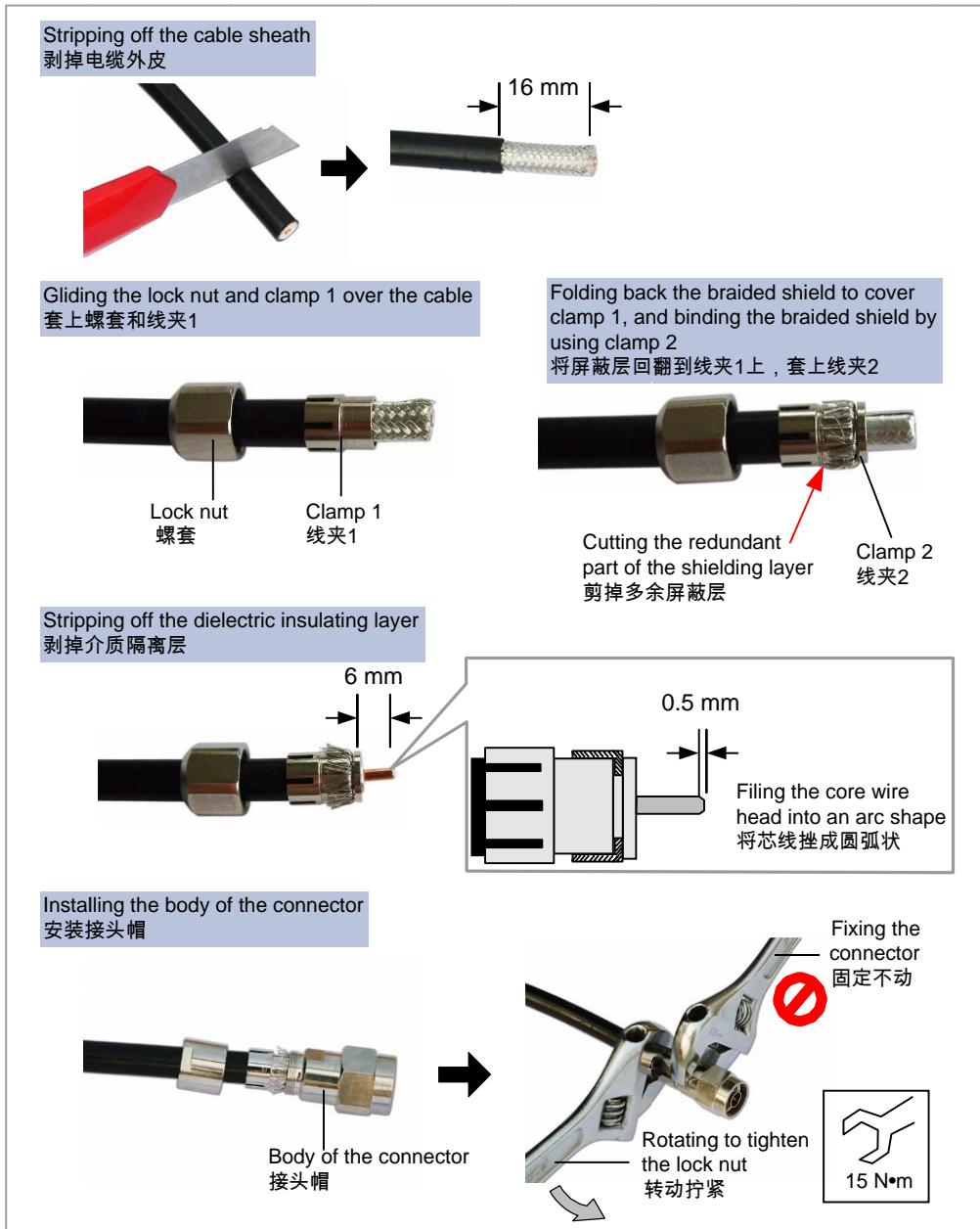
Fixing the grounding clip and waterproofing it
固定接地夹并做防水处理



The angle resulting from the grounding wire of the clip and the IF cable should not be larger than 15 degrees. When the IF cable is vertically routed, the grounding wire of the clip should be led downwards.
避雷接地夹接线与电缆夹角不大于15°。在电缆垂直布线时，接地夹引向应由上往下。



1 Terminating the IF Cable with Connectors 制作中频电缆接头



2 Waterproofing Outdoor Connectors 室外接头防水处理

Wrapping a layer of PVC tape
缠绕一层PVC胶带



PVC tape
PVC胶带

Wrapping three layers of
waterproof insulation tape
缠绕三层防水绝缘胶带



Waterproof insulation tape
防水绝缘胶带

Wrapping three layers of PVC tape over the
waterproof insulation tape
在防水绝缘胶带的外缠绕三层PVC胶带



Using the outdoor bundling strap to
bind the PVC tape tight at both ends
在两端用室外专用扎带将PVC胶带扎紧

