

# INSTALLATION MANUAL

**HUBER+SUHNER AG**  
Fiber Optics  
**MASTERLINE Ultimate Hybrid**  
DOC-0000692201 Rev B

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## MASTERLINE Ultimate Hybrid

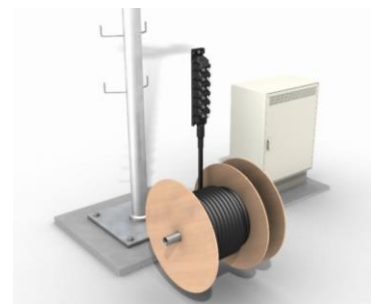
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### INSTALLATION OF RRH SIDE OF ASSEMBLY

#### Step 1

Mount the cable spool onto suitable de-reeling equipment. Start unwinding side where the MLUH connector head is located (picture to the right). Do not pull side where pulling tube is attached. Make sure, that the spool can turn freely when unspooling.



#### Step 2

Remove the MLUH connector head from the mounting bracket by unscrewing the two fixing screws. Screws are retained by integral retaining washers.



#### Step 3

Secure the mounting bracket with hose clamps (when fitting to a pole/mast) or screws (when fitting to a wall).

Various mounting slots provided for different pole diameters.

**Comment:** Take length of break-out and jumpers in consideration when the bracket is positioned on the mast.



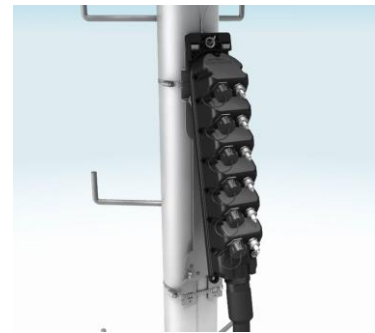
**Step 4** Rig a rope to allow cable assembly to be hoisted up. Fit carabiner through pulling eye.

- Pull Assembly up the mast.

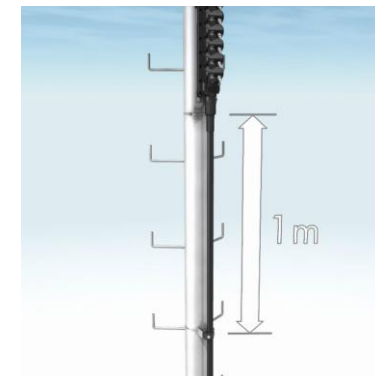
Important:  
Only use pulling eye on MLUH connector head or hoisting grip if provided.



**Step 5** Hook-in MLUH head at mounting bracket and secure with retained screws.

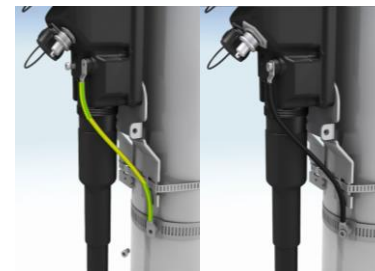


**Step 6** Fix cable to the mast using suitable clamps. Recommended spacing between clamps is 1 m. Clamps should be applied to hybrid cable starting from a point 1 m below the housing proceeding down to the bottom of the mast.



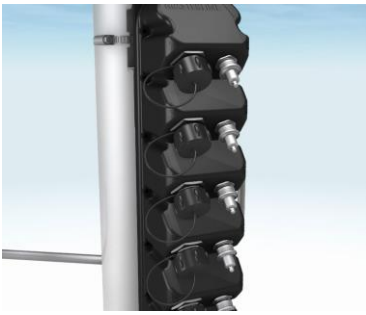




**Step 7** Earth assembly to the mast using an earth link. Recommendation is 16mm<sup>2</sup>/6AWG with M8 lugs.



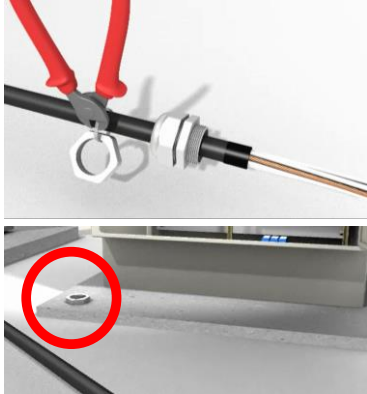
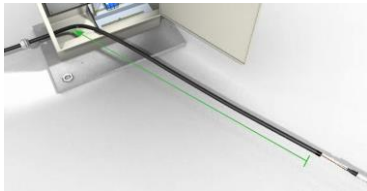
NOTE: the earthing cable can also come in black.

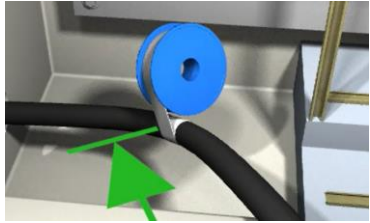

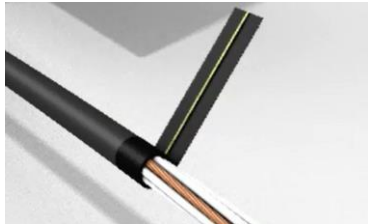
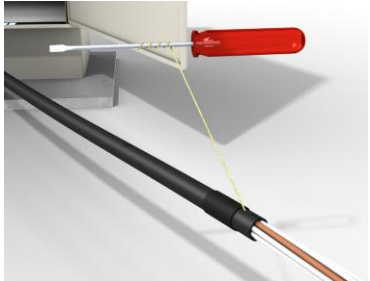



**Step 8** The remote radios are connected with fiber optic jumpers, which are terminated with Q-ODC plug connectors and RRH compatible interfaces. The power jumpers are terminated with a rugged circular plastic plug connector and are blunt cut on the RRH side.




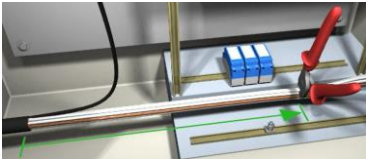
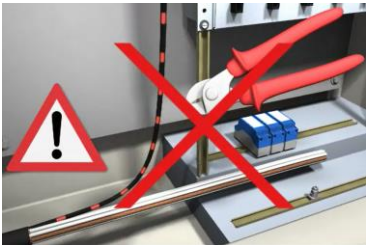
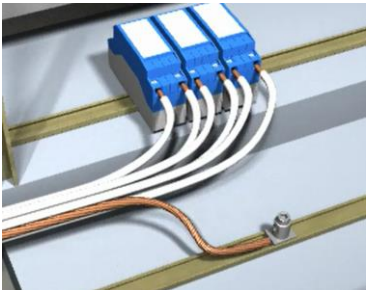
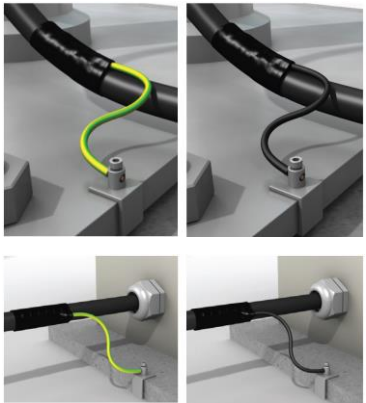
<p><b>Step 9</b></p>	<p>Comment: All connectors (fiber optic and power) are protected with water proof (IP67) dust caps. Therefore the MLUH can be installed and left at the mast for later installation of jumpers.</p>	
<p><b>Step 10</b></p>	<p>Connect power jumper on left side of connector head by aligning keyways and secure using integral retaining nut (3 RRH shown connected in picture).</p> <p>NOTE: The power jumper and power tail on connector head need to be aligned in the right keying position. The jumper then needs to be screwed onto the tail until a "click" sound is heard.</p>	
<p><b>Step 11</b></p>	<p>Connect FO jumper on right side of connector head by aligning keyway and secure by pushing to latch mechanism (3 RRH shown connected in picture).</p>	
<p><b>Step 12</b></p>	<p>If required a protective cover can be easily fitted over MLUH connector head.</p>	
<p><b>Step 13</b></p>	<p>Ensure smooth routing of all cables from connector head to RRH equipment using suitable cable clamps not cable ties.</p>	






BASE STATION END OF ASSEMBLY		
<b>Step 1</b>	<p>After unwinding the whole assembly from the reel, while handling the assembly make sure to leave the pulling tube as long as possible on the assembly.                      Pulling tube ensures IP65 and gives protection to the FO and DC tails inside.</p>	
<b>Step 2</b>	<p>To remove protective tube hold tube and loosen gland nut. Do NOT twist the tube at any stage of removal. Pull tube off to reveal the tails within.</p>	
<b>Step 3</b>	<p>Remove gland nut from cable and keep it safe.</p>	
<b>Step 4</b>	<p>Feed tails through cabinet/cabin.</p>	

<b>Step 5</b>	Mark the "strip-back point" using tape.	
<b>Step 6</b>	Feed gland nut over cable to secure to cable entry gland if required.	
<b>Step 7</b>	Unwind black tape at cable butt to reveal rip cord. This cord is used to open the cable jacket and gain access to the cable elements within.	
<b>Step 8</b>	Use a screwdriver (or similar) to cut the cable jacket back to the "strip-back point" marked using the tape.	
<b>Step 9</b>	Remove cable jacket carefully.	

<b>Step 10</b>	<p>Unwrap copper tape from cable using gloves due to potential sharp edges up to the "strip-back point".</p>	
<b>Step 11</b>	<p>Make sure not to leave any sharp edges where the copper foil goes under the jacket: carefully remove excess foil with pin-nosed pliers and then cover it with tape.</p>	
<b>Step 12</b>	<p>Carefully unwind the fibre optic cable element from the DC tails and from a loop to separate it.</p>	
<b>Step 13</b>	<p>During this process (at any stage) ensure the fibre optics are not kinked where they exit the cable butt.</p> <p>Use tape to protect the FO cable against overbending.</p>	
<b>Step 14</b>	<p>Once fiber optic cable is separated from DC wires, attach it temporarily to base station to keep it secure and clean.</p>	



<p><b>Step 15</b></p>	<p>Tighten cable gland to secure cable and ensure IP protection.</p>	
<p><b>Step 16</b></p>	<p>Measure (twice) the required DC tail length and cut them.</p>	
<p><b>Step 17</b></p>	<p>DO NOT CUT AT ANY STAGE THE FIBRE OPTIC ELEMENT</p>	
<p><b>Step 18</b></p>	<p>Route DC cable element to their respective termination points and connect.</p> <p>Route earth wire to earth bonding point and connect.</p>	
<p><b>Step 19</b></p>	<p>If earthing is required outside cabinet/cabin use universal grounding kit and follow separate instructions.</p> <p>NOTE: the earthing cable can also come in black.</p>	

<p><b>Step 20</b></p>	<p>Store any fibre optic cable over-length inside base station by using cable over-length storage box which can be mounted on a wall, panel or mounted horizontally within an equipment rack.</p>	
<p><b>Step 21</b></p>	<p>Release snap-lock fastener using a screwdriver.</p>	
<p><b>Step 22</b></p>	<p>Carefully remove protective tube to gain access to fibre optic tails.</p>	
<p><b>Step 23</b></p>	<p>Route fibre optic tails carefully and following a smooth route to their respective connection points. Remove dust caps of LC connectors and plug into equipment.</p>	
<p><b>Step 24</b></p>	<p>Do NOT clean LC before connecting them to the equipment. LCs are factory cleaned and verified to ensure optimal performance. Cleaning during installation potentially decreases performance.</p>	



**FIBRE OPTIC ALLOCATION**

RRH	RRH End			Base Station End	BBU
	Connector PIN			Connector PIN	
	Q-ODC/ODC-2	ODC-4	Q-ODC 12	LC	
1	1	1	1	B	1
	2	2	2	A	
	-	3	3	B	2
	-	4	4	A	
	-	-	5	B	3
	-	-	6	A	
	-	-	7	B	4
	-	-	8	A	
	-	-	9	B	5
	-	-	10	A	
	-	-	11	B	6
	-	-	12	A	
2	1	1	1	B	7
	2	2	2	A	
	-	3	3	B	8
	-	4	4	A	
	-	-	5	B	9
	-	-	6	A	
	-	-	7	B	10
	-	-	8	A	
	-	-	9	B	11
	-	-	10	A	
	-	-	11	B	12
	-	-	12	A	
3	1	1	1	B	13
	2	2	2	A	
	-	3	3	B	14
	-	4	4	A	
	-	-	5	B	15
	-	-	6	A	
	-	-	7	B	16
	-	-	8	A	
	-	-	9	B	17
	-	-	10	A	
	-	-	11	B	18
	-	-	12	A	

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**POWER CODING**

RRH	RRH End				Base Station End	
	Wire color				Wire color	
		EU	EU	US	EU	US
1	-48V	Brown	Black	Black	1-White	1-Black
	0V	Blue	Grey	White	2-White	2-White
	Ground	Common drain				
2	-48V	Brown	Black	Black	3-White	3-Red
	0V	Blue	Grey	White	4-White	4-Green
	Ground	Common drain				
3	-48V	Brown	Black	Black	5-White	5-Orange
	0V	Blue	Grey	White	6-White	6-Blue
	Ground	Common drain				
4	-48V	Brown	Black	Black	7-White	7-White/Black
	0V	Blue	Grey	White	8-White	8-Red/Black
	Ground	Common drain				
5	-48V	Brown	Black	Black	9-White	9-Green/Black
	0V	Blue	Grey	White	10-White	10-Orange/Black
	Ground	Common drain				
6	-48V	Brown	Black	Black	11-White	11-Blue/Black
	0V	Blue	Grey	White	12-White	12-Black/White
	Ground	Common drain				