

# INSTALLATION MANUAL

**HUBER+SUHNER AG**  
Fiber Optics  
**MASTERLINE Extreme Hybrid**  
DOC-0000692200 Rev B

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## MASTERLINE Extreme Hybrid

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### RRH END OF ASSEMBLY

#### Step 1

Mount the cable spool onto suitable de-reeling equipment. Start unwinding side where the braided tube is attached (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

Rig a rope to allow cable assembly to be hoisted up. Feed the rope through the loop in the braided tube and down onto the cable hoist.

→ Pull Assembly up the mast.

**Important:** NEVER pull on the divider or the breakout (Fiber optic or power itself), only pull on the hybrid cable below the divider using cable hoist.



#### Step 3







Remove cable tie from braided tube end to get access to the housing.





→ Once the divider is at the desired height and position, proceed to the next step. Do **NOT** yet fix it to the mast.



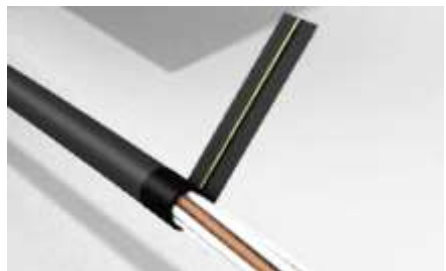


**Comment:** Take length of break-out and jumpers in consideration when the divider is positioned on the mast.



<p><b>Step 4</b></p>	<p>Inspect condition of assembly especially the housing. If any damage is detected do not install.</p>	
<p><b>Step 5</b></p>	<p>Fix housing to mast using mounting adapter. Be careful not to damage it by over-tightening the clamp. Only fix with tube clamps, as indicated in picture. For 6/7 configuration it is ideal to locate the band under the molded lip on the enclosure.</p>	
<p><b>Step 6</b></p>	<p>Fix cable to the mast using suitable clamps. Recommended spacing between clamps is 1m. Clamps should be applied to hybrid cable starting from a point 1m below the housing proceeding down to the bottom of the mast.</p>	
<p><b>Step 7</b></p>	<p>Earth assembly to the mast using an earth link. Recommendation is 16mm<sup>2</sup>/6AWG with M8 lugs.</p> <p>NOTE: the earthing cable can also come in black.</p>	
<p><b>Step 8</b></p>	<p>Connect DC tails to relevant RRH as specified by the RRH manufacturer. FO and DC tails are numbered to aid identification. Images 3 and 4 show pre-terminated DC jumpers connected to the MLEH DC tails.</p>	




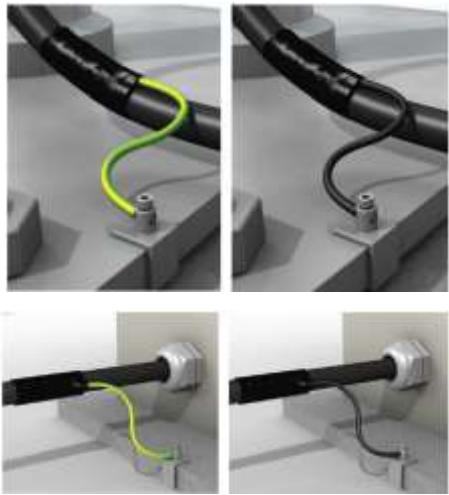
<p><b>Step 9</b></p>	<p><b>Comment:</b> All connectors (fiber optic and power) are protected with water proof (IP67) dust caps. Therefore the MLE hybrid can be installed and left at the mast for later installation of jumpers.</p>	
<p><b>Step 10</b></p>	<p>Do NOT use cable ties to secure FO or DC tail as these may cause damage.</p>	
<p><b>Step 11</b></p>	<p>Remove protective cap from FO tail ready to connect RRH Jumper.              → Do NOT clean Q-ODC before connecting them together. Q-ODCs are factory cleaned and verified to ensure optimal performance. Cleaning during installation potentially decreases performance.</p>	
<p><b>Step 12</b></p>	<p>Connect FO jumper to FO tails by aligning keyway and secure by pushing to latch mechanism.</p>	
<p><b>Step 13</b></p>	<p>Connect power jumper to power tail by aligning keyways and secure using integral retaining nut.               Note: The power jumper and power tail 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 14</b></p>	<p>Connect FO and DC tails with RRH jumper.</p>	






<b>BASE STATION END OF ASSEMBLY</b>		
<p><b>Step 1</b></p>	<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>	
<p><b>Step 2</b></p>	<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>	
<p><b>Step 3</b></p>	<p>Remove gland nut from cable and keep it safe.</p>	
<p><b>Step 4</b></p>	<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.	

<p><b>Step 10</b></p>	<p>Unwrap copper tape from cable using gloves due to potential sharp edges up to the "strip-back point".</p>	
<p><b>Step 11</b></p>	<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>	
<p><b>Step 12</b></p>	<p>Carefully unwind the fibre optic cable element from the DC tails and from a loop to separate it.</p>	
<p><b>Step 13</b></p>	<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>	
<p><b>Step 14</b></p>	<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>	

<b>Step 20</b>	<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>	
<b>Step 21</b>	<p>Release snap-lock fastener using a screwdriver.</p>	
<b>Step 22</b>	<p>Carefully remove protective tube to gain access to fibre optic tails.</p>	
<b>Step 23</b>	<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>	
<b>Step 24</b>	<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	RRH	RRH End		Base Station End	BBU
	Connector PIN		Connector PIN			Connector PIN			
	Q-ODC/ODC-2	ODC-4	LC			Q-ODC/ODC-2	ODC-4	LC	
1	1	1	B	1	7	1	1	B	13
	2	2	A			2	2	A	
	-	3	B	2		-	3	B	14
	-	4	A			-	4	A	
2	1	1	B	3	8	1	1	B	15
	2	2	A			2	2	A	
	-	3	B	4		-	3	B	16
	-	4	A			-	4	A	
3	1	1	B	5	9	1	1	B	17
	2	2	A			2	2	A	
	-	3	B	6		-	3	B	18
	-	4	A			-	4	A	
4	1	1	B	7	10	1	1	B	19
	2	2	A			2	2	A	
	-	3	B	8		-	3	B	20
	-	4	A			-	4	A	
5	1	1	B	9	11	1	1	B	21
	2	2	A			2	2	A	
	-	3	B	10		-	3	B	22
	-	4	A			-	4	A	
6	1	1	B	11	12	1	1	B	23
	2	2	A			2	2	A	
	-	3	B	12		-	3	B	24
	-	4	A			-	4	A	

**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				
7	-48V	Brown	Black	Black	13-White	13-Red/White
	0V	Blue	Grey	White	14-White	14-Green/White
	Ground	Common drain				
8	-48V	Brown	Black	Black	15-White	15-Blue/White
	0V	Blue	Grey	White	16-White	16-Black/Red
	Ground	Common drain				
9	-48V	Brown	Black	Black	17-White	17-White/Red
	0V	Blue	Grey	White	18-White	18-Orange/Red
	Ground	Common drain				
10	-48V	Brown	Black	Black	19-White	-
	0V	Blue	Grey	White	20-White	-
	Ground	Common drain				