

Date	Prepared by	Approved by	Document nos	Revision
5 Mar 2020	Ray Ling	Patrick Yeo	MS-12H90-IM-001	0

## **INSTRUCTION MANUAL MS-12H90**

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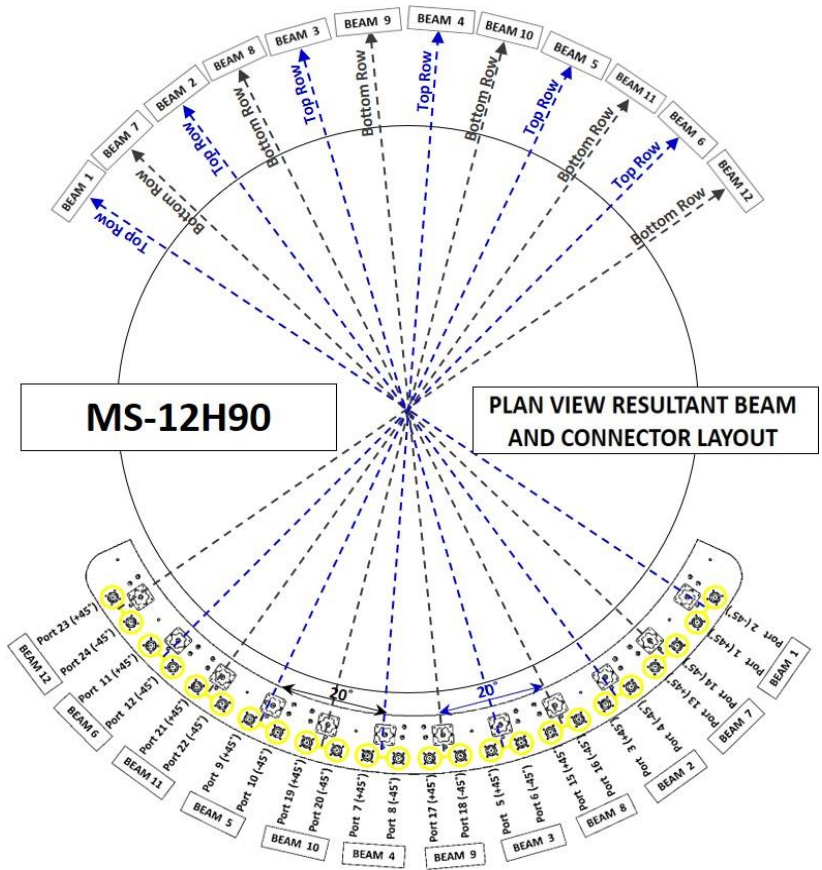
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#### **Revision History:**

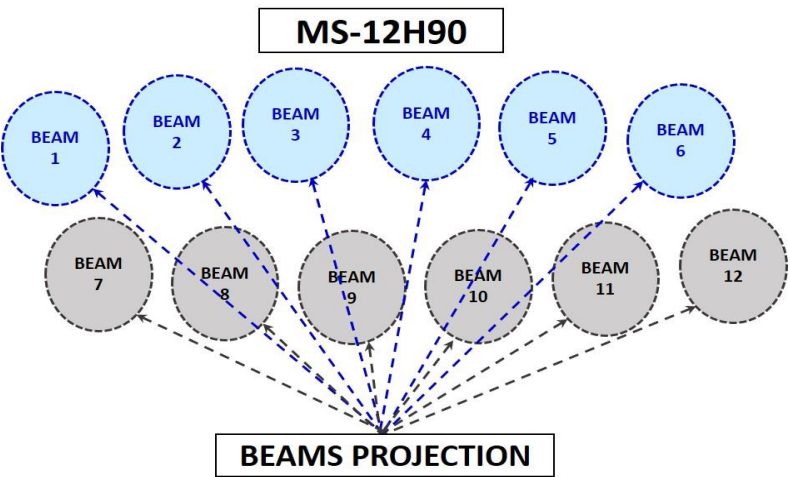
Date	Description	Revised by	Revision nos.

1.00 BEAMS & CONNECTORS:

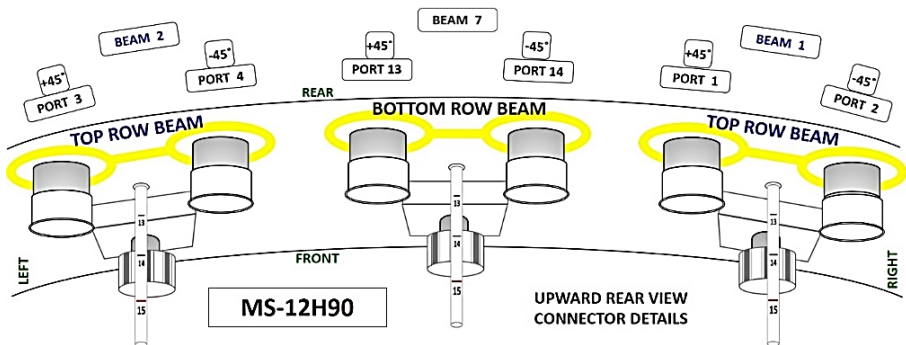
1.10 Plan View Resultant Beam And Connector Layout



1.11 Beams Projection



1.20 Connector Detail



1.30 Connector Ports Table

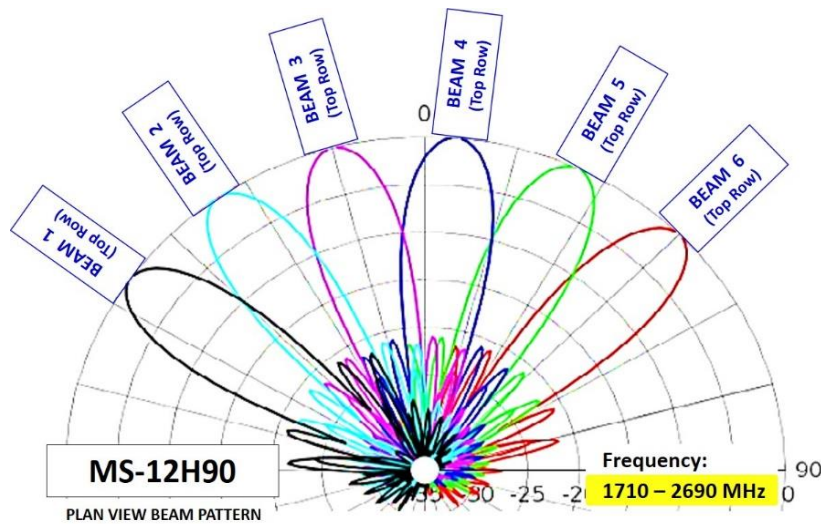
Top Row Beams	BEAM 5		BEAM 4		BEAM 3		BEAM 2		BEAM 1	
	Port 11 (+45°)	Port 12 (-45°)	Port 9 (+45°)	Port 10 (-45°)	Port 8 (+45°)	Port 5 (-45°)	Port 3 (+45°)	Port 4 (-45°)	Port 1 (+45°)	Port 2 (-45°)

Bottom Row Beams	BEAM 11		BEAM 10		BEAM 9		BEAM 8		BEAM 7	
	Port 23 (+45°)	Port 24 (-45°)	Port 19 (+45°)	Port 20 (-45°)	Port 17 (+45°)	Port 18 (-45°)	Port 15 (+45°)	Port 16 (-45°)	Port 13 (+45°)	Port 14 (-45°)

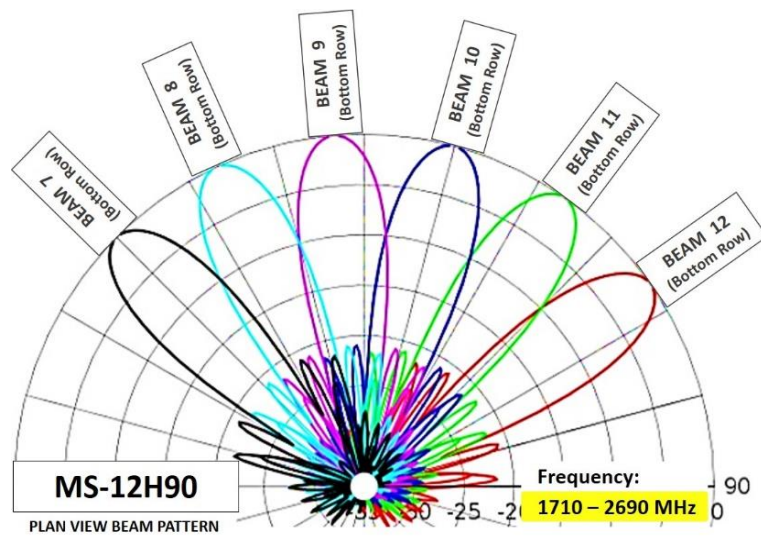
## 2.00 PATTERN DIAGRAM

### 2.10 Plan View Beam Pattern:

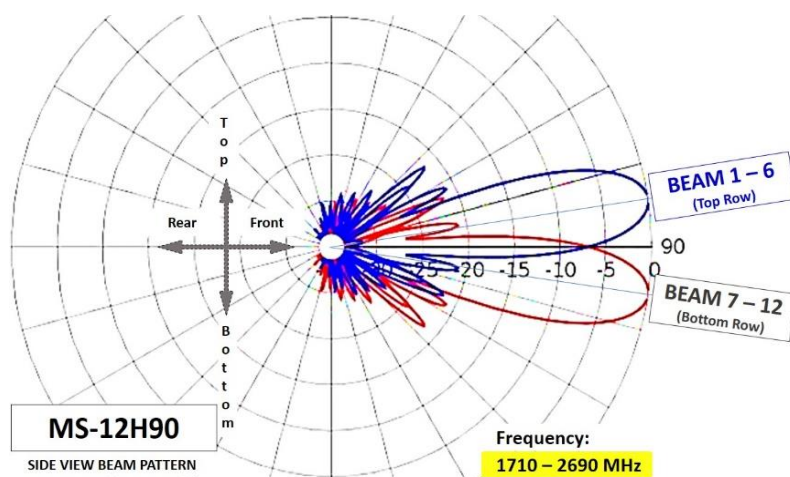
#### 2.11 Top Row Beam 1 - 6 Frequency: 1710 - 2690 MHz



#### 2.12 Bottom Row Beam 7 -12 Frequency: 1710 - 2690 MHz

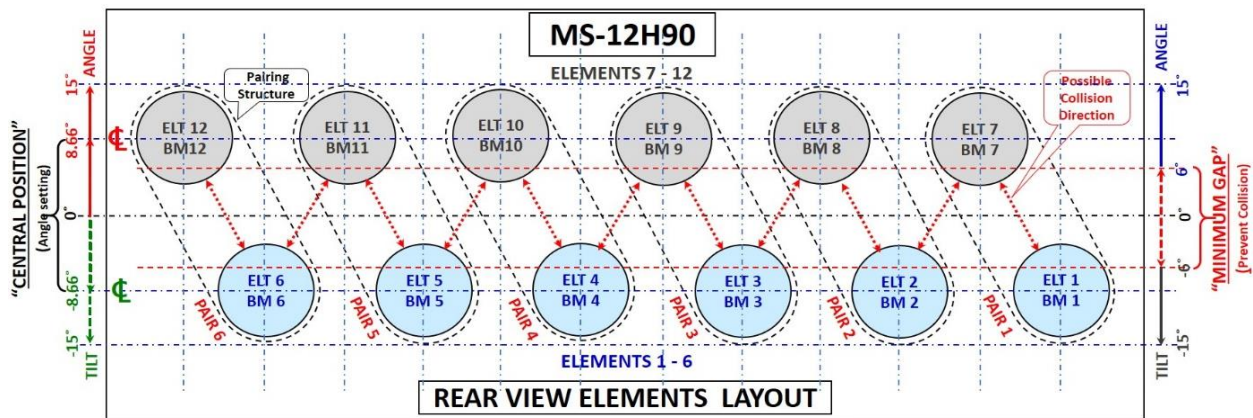


### 2.20 Side View Beam Pattern:

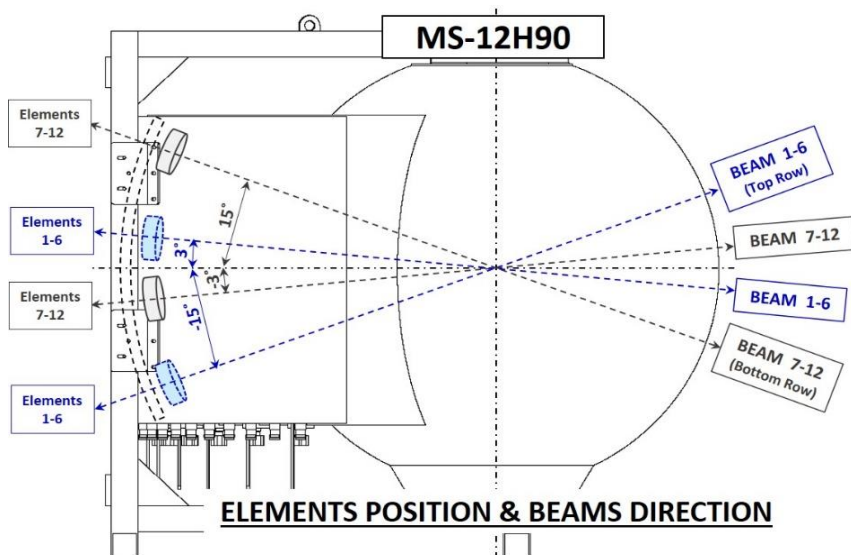


### 3.00 STRUCTURE & CONFIGURATIONS

#### 3.10 Emitting Elements Structure

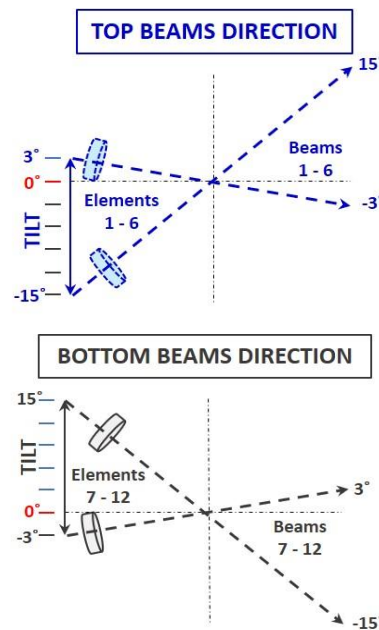
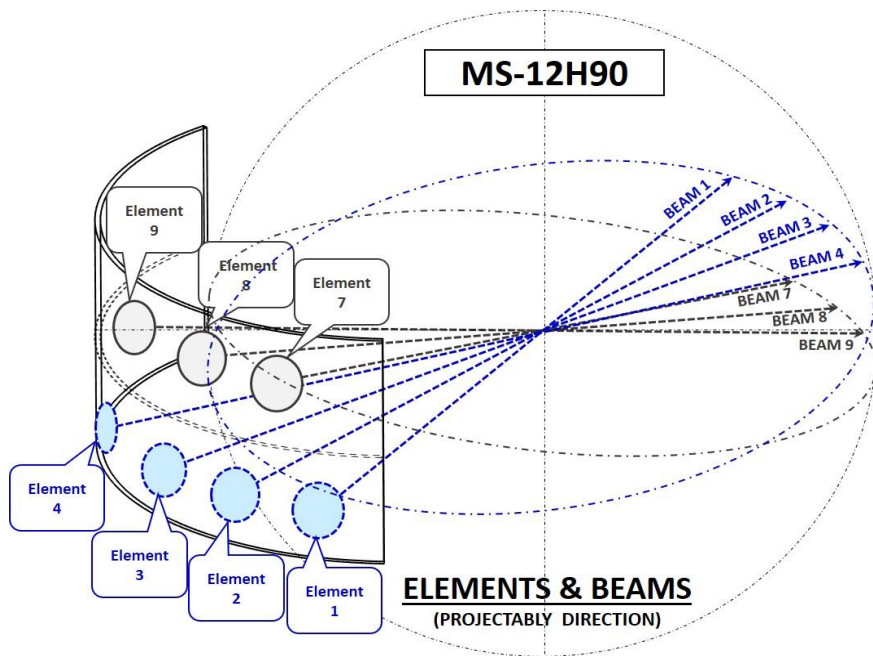


#### 3.20 Elements Position & Beam Direction

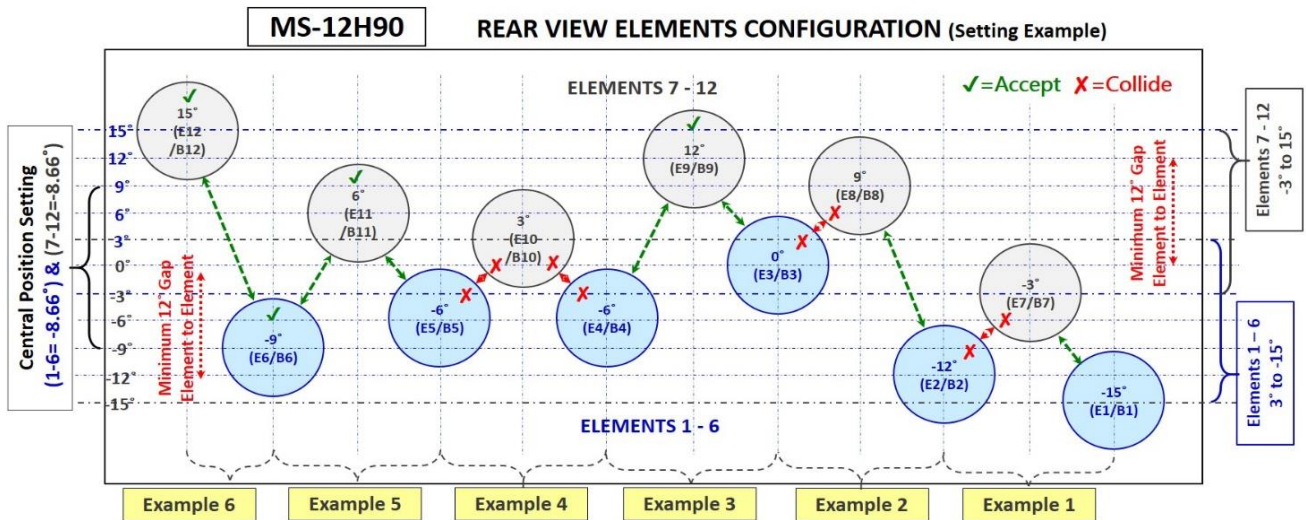


Setting	Min. Tilt	Max Tilt
Beams 7 - 12	-3°	+15°
Beams 1 - 6	-15°	+3°

#### 3.30 Elements & Beams Projectably Direction



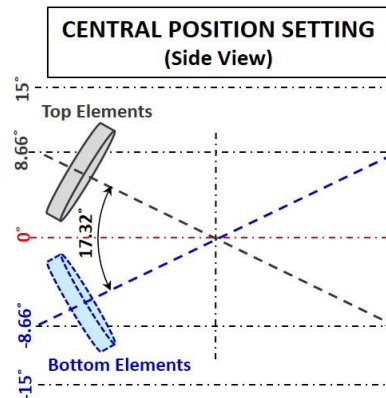
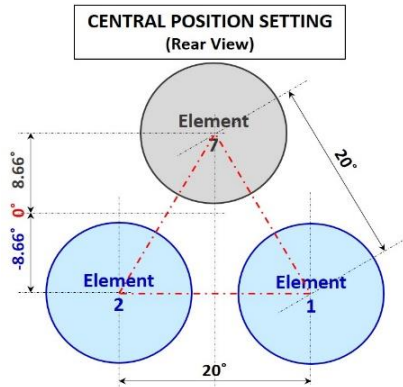
### 3.40 Rear View Elements Setting Configuration (Example)



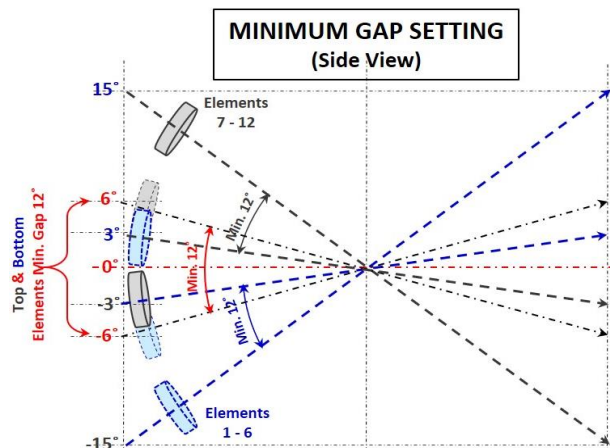
### 3.41 Configuration Table for Accept or Collide (Example)

Example	Example 6	Example 5		Example 4		Example 3		Example 2		Example 1		Example
Element 12/Beam 12	Element 11/Beam 11		Element 10/Beam 10		Element 9/Beam 9		Element 8/Beam 8		Element 7/Beam 7		E/B nos	
15°	6°		3°		12°		9°		-3°		Set at	
E/B nos	Element 6/Beam 6		Element 5/Beam 5		Element 4/Beam 4		Element 3/Beam 3		Element 2/Beam 2		Element 1/Beam 1	
Set at	-9°		-6°		-6°		0°		-12°		-15°	
Angle Δ	24°	15°	12°	9°	9°	18°	12°	9°	21°	9°	12°	Angle Δ
Accp/Coll	✓	✓	✓	✗	✗	✓	✓	✗	✓	✗	✓	Accp/Coll

### 3.50 Central Position Setting

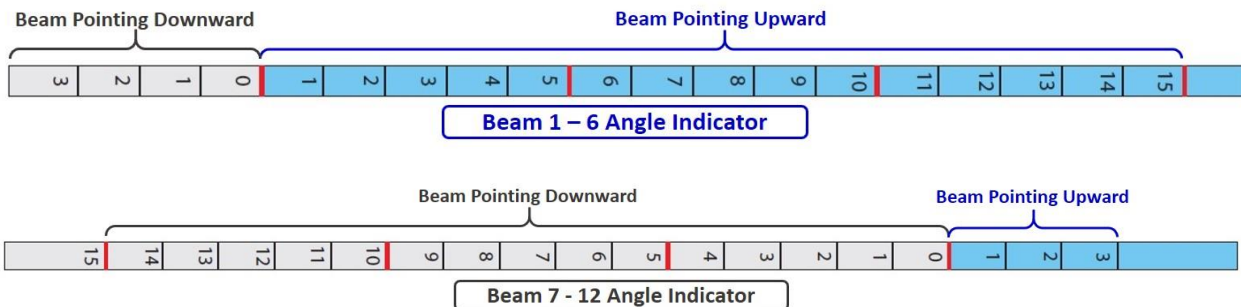
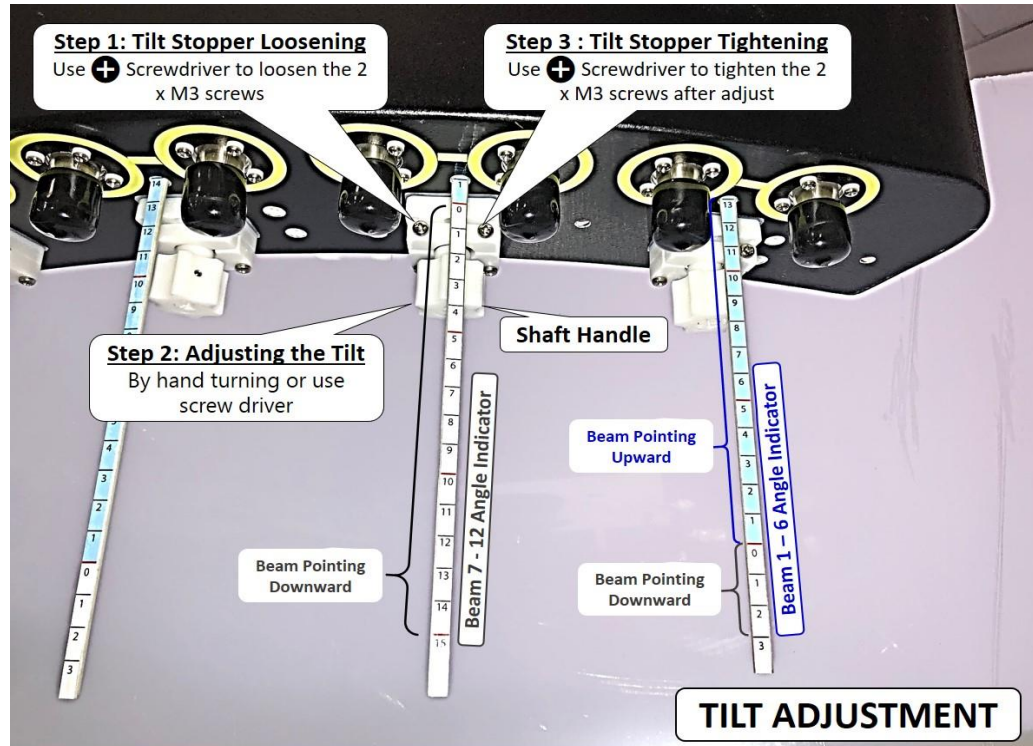


### 3.60 Minimum Gap Setting



## 4.00 MANUAL TILT ADJUSTMENT

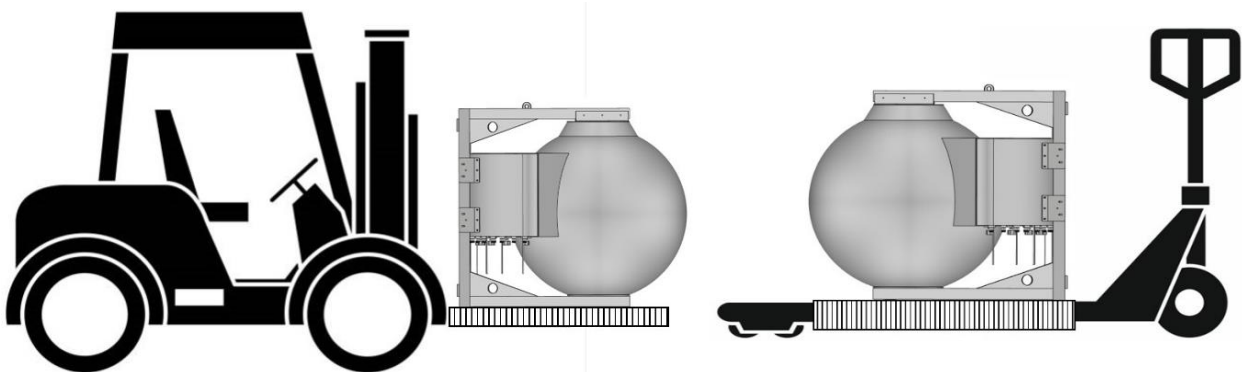
Step 1: Tilt Stopper Loosening. Step 2: Adjusting the Tilt. Step 3: Tilt Stopper Tightening.



## 5.00 TRANSPORTATION / INSTALLATION

### 5.10 Transportation (From Point to Point)

Strictly comply to the local authority and regulatory on Workplace Safety and Health Control and Measure when moving and transporting of large or heavy equipment. Appropriate material handling machine should be used. **(Risk Assessment applies for Forklift or Pallet Truck Lifting)**

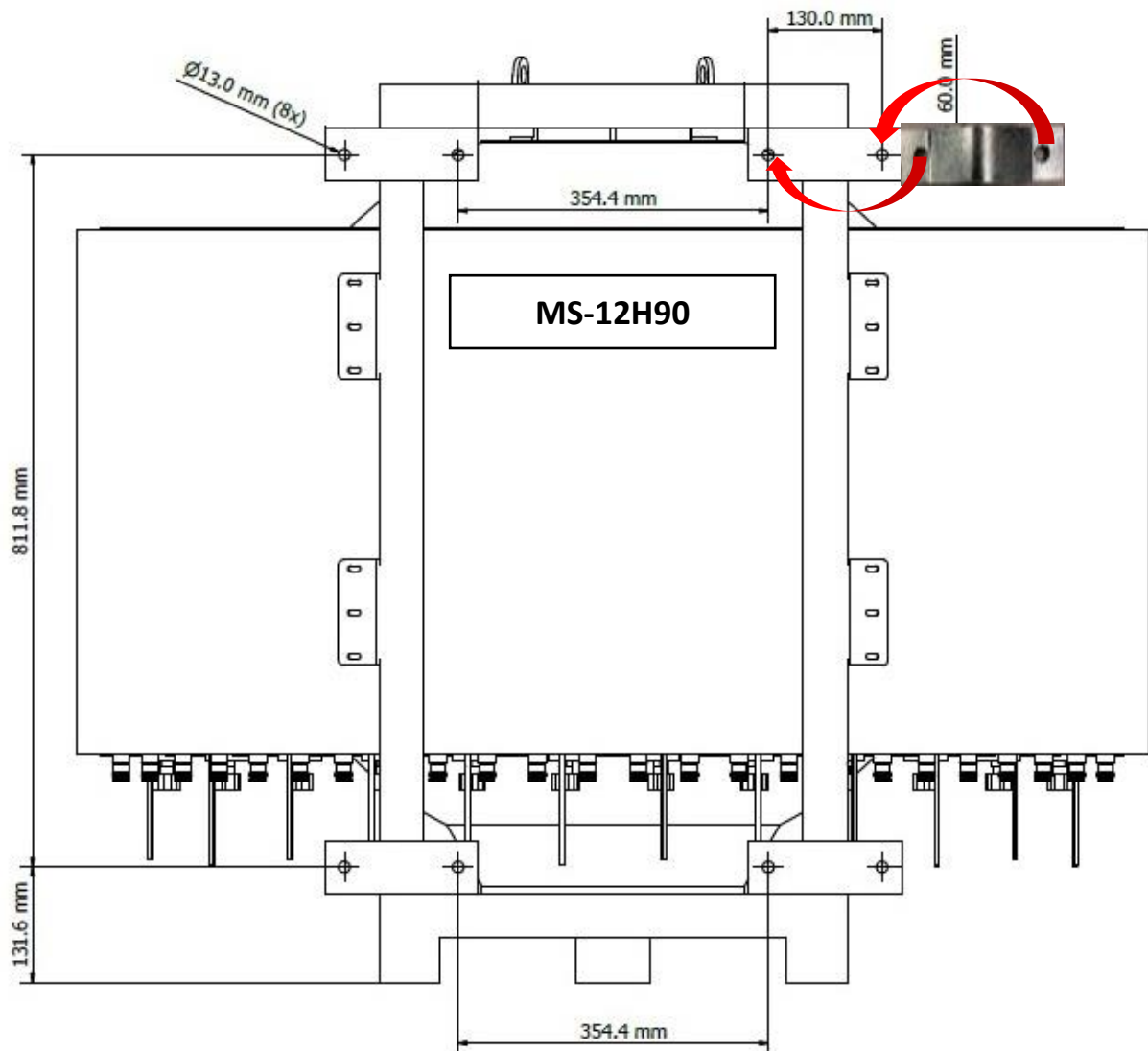


## 5.20 Bracket Mounting

Lens Size (Model)	Bracket Qty (pc)	Bolt & Nuts Size	Bolts Set (pc)
MS-XXX180 Lens	6	M14 x 15cm	12
MS-XXXX 60,90,120 Lens	4	M12 x 15cm	8



Tighten to the pole with Bolt & Nuts Sets



### **Important Notes:**

End User is required to CUSTOM-MAKE the additional supporting bracket and tighten it to the existing Antenna bracket to meet the deployment needs.

### 5.30 Installation using a crane

Strictly comply to the local authority and regulatory on Workplace Safety and Health Control and Measure when performing lifting of large or heavy equipment, appropriate material handling machine should be used and only certified personnel should perform the task. **(Risk Assessment requirement applies for both Up-Lifting and Down-Lifting.)**

### 5.31 Lifting the Antenna

The antenna has 2 hook points installed on the top frame (located slightly behind the center of the sphere). These hooks are designed at the center of gravity point of the antenna. A cable, rope can be securely fastened to the hooks and the antenna can be lifted using a crane as pictured below.

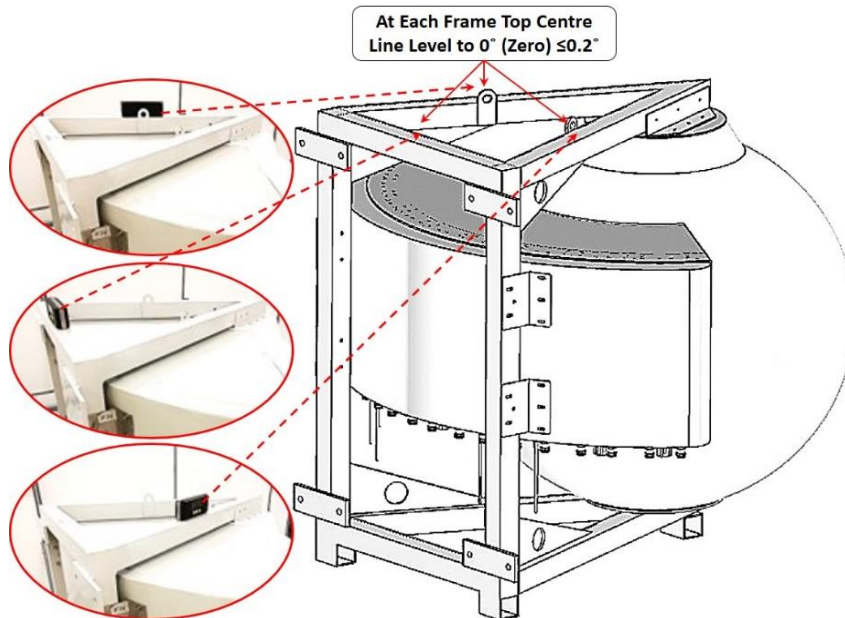


#### 5.40 Antenna Installation

With reference to **Item 5.2 Bracket Mounting Procedure**, End user is required to Custom-Make the additional supporting bracket and tighten it to the existing Antenna bracket to meet the deployment needs.

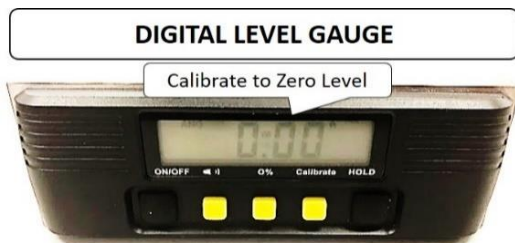
#### 5.41 Antenna Leveling

After the Antenna is mounted to the bracket, it is required to be adjusted to 0° (Zero Degree) with  $\leq 0.2^\circ$  on 3 sides of the frame top level. (Rear, Right & Left=As shown in picture)



**ANTENNA LEVELING ADJUSTMENT (AFTER INSTALLATION)**

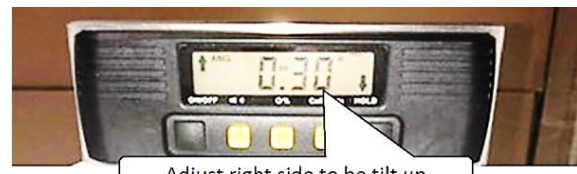
#### 5.42 Digital Level Gauge Calibration



#### 5.43 Adjustment Requirement



**ANTENNA LEVELING ACCEPTED**



**REQUIRE ADJUSTMENT**