



# SINGLE AXIS TRACKER SYSTEM

## Installation Manual

### **STANDARD MANUAL**

This is standard manual. It shall be customized for each project during the design phase. Copyright ©2024, Zilo Solar Pty Ltd. All rights reserved. This is a preliminary document subject to revision.



# Version Control

REV	DATE	DESCRIPTION	REVISED	APPROVED
1	20/02/2024	INITIAL DOCUMENT		

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# Overview

ST-1P stands as a distributed horizontal single-axis tracking system developed by Zilo, featuring distinct drive systems for individual rows, allowing independent control for each row. Employing the “astronomical algorithm and closed-loop control” method, the system automatically tracks the sun, enhancing the overall power generation of the photovoltaic power plant. This results in an increased power generation capacity of up to 20% when compared to fixed racking systems.

It's essential to note that the installation instruction manual pertains specifically to this project. The information regarding installation tasks and labor in this manual serves as a reference and should be re-evaluated based on the local labor situation. Prior to installation, carefully review and consult this instruction manual. Execute the installation in strict accordance with the provided guidelines, prioritizing safety and compliance with relevant local safety regulations.

**The operators who will conduct the installation should follow the following rules:**

Adhere to all building codes, encompassing both local and national regulations, which may supersede the guidelines outlined in this manual. Verify the appropriateness of products like Zilo for specific installations and environmental conditions. Utilize the specialized tools provided by Zilo, operated by qualified professionals. Zilo disclaims responsibility for any repercussions resulting from the use of incorrect tools.

For recycling, follow local regulations. To uninstall, adhere to the prescribed installation procedure. Ensure a minimum of two skilled solar panel operators for the installation process. Entrust the installation of electrical equipment to certified electricians.





# Installation Tool & Debugging tool-PV

This section provides a breakdown of the Zilo Solar Mounting Systems and its components. Upon delivery of the system, check to ensure that all parts and components adhere to the BOM and project specific drawings. Any items missing or damaged must be notified to Zilo Solar Mounting Systems Australia Pty Ltd immediately.



**M4/M6/M8/M10/  
M12/M16/M18/M20**  
Outer hex wrench



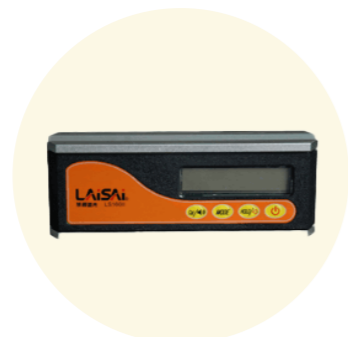
**M10/M12/M16/  
M18/M20**  
Torque wrench



**M10/M12/M16/  
M18/M20**  
Electric Auto-wrench



Multimeter



Inclinometer



30in Monkey wrench



Slash pliers



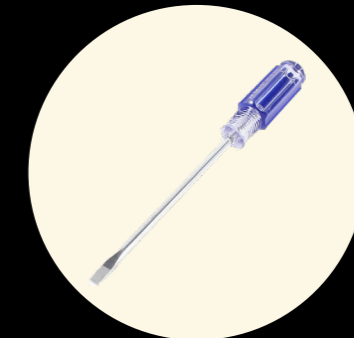
Line clamps



Peeling pliers



Controller debugging cable



Straight Screwdriver





# Product list- Single Row

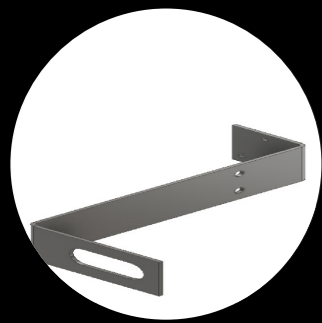
An overview of the bill of materials for Zilo Solar mounting system can be seen below. Please note that some components can vary depending on project-specific requirements.



**WIND SENSOR POST**  
Single Row : 1 pc



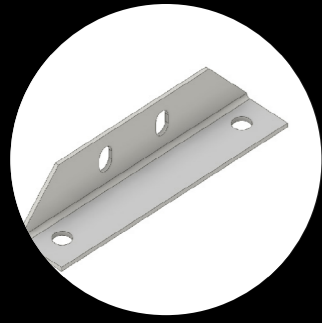
**BRACKET FOR 7IN SLEW DRIVE**  
Single Row: 2 pc



**ANTENNAE SUPPORT**  
Single Row: 1 pc



**C150X80X25X3.00-DRI-L2466-STANDARD PILLAR**  
Single Row: 8 pc



**BEARING ANCHOR D130**  
Single Row: 16 pc



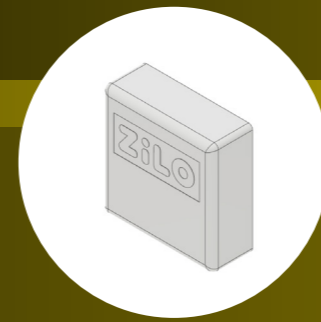
**CABLE PV1-F-1 2.5 BLACK**  
Single Row: 16 pc



**BEARING D130-UPE**  
Single Row: 16 pc



**CABLE PV1-F-1 2.5 RED**  
Single Row: 1 pc



**CAP FOR TORQUE TUBE-130**  
Single Row: 2 pc



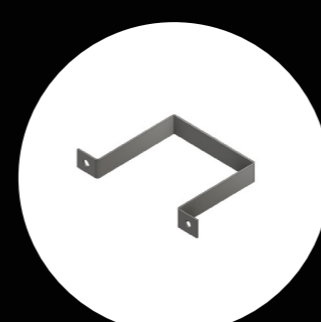
**COMMUNICATION BOX BRACKET**  
Single Row: 2 pc



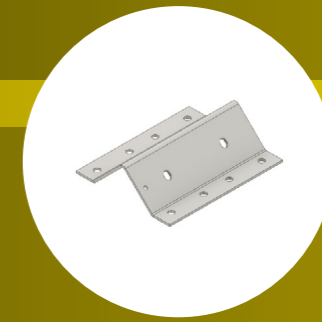
**COMMUNICATION BOX**  
Single Row: 1 pc



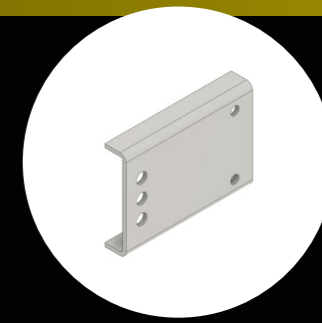
**CONTROL BOX**  
Single Row: 1 pc



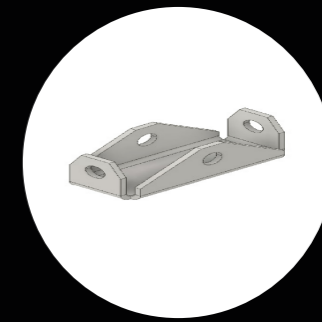
**CONTROLLER BRACKET**  
Single Row: 2 pc



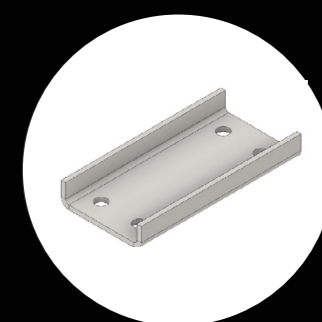
**COUPLER D130XT5**  
Single Row: 8 pc



**DAMPER BRACKET-T6-HDG**  
Single Row: 4 pc



**DAMPER FIX SUPPORT-1P-T6-HDG**  
Single Row: 2 pc

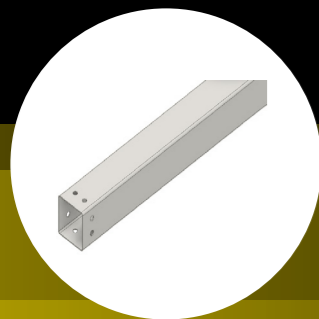


**DAMPER LEVER ARM ANCHOR D130-T6-HDG**  
Single Row: 2 pc



**DAMPER**  
Single Row: 2 pc

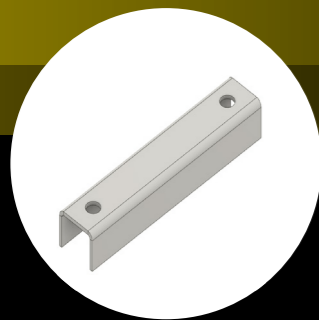




**DRIVE TORQUE TUBE**  
Single Row: 2 pc



**SLEW DRIVE VED7**  
Single Row: 1 pc



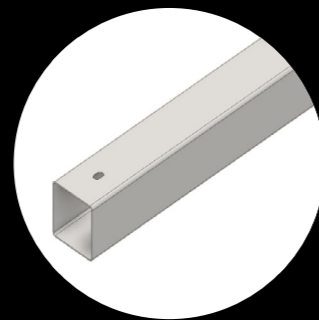
**HOOP FOR BRACE**  
Single Row: 50 pc



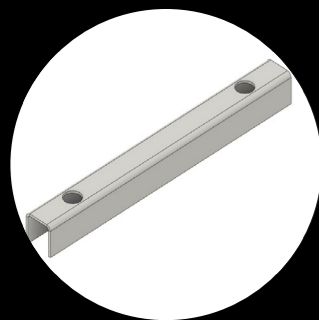
**SP CONNECTOR**  
Tracker: 8 pc



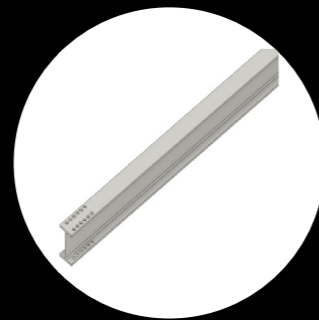
**LEVER ARM FOR DAMPER  
R330-D130-T6-HDG**  
Single Row: 2 pc



**TORQUE TUBE**  
Single Row: 2 pc



**OM PURLIN STIFFENER**  
Single Row: 50 pc



**W148X100X6X9-DRI-  
L2766-DRIVE PILLAR N**  
Single Row: 1 pc



**PURLIN**  
Tracker: 50 pc




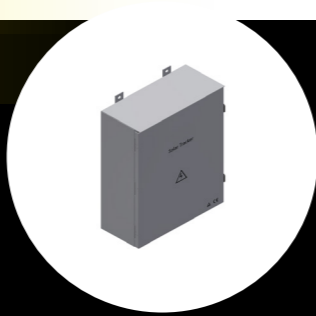
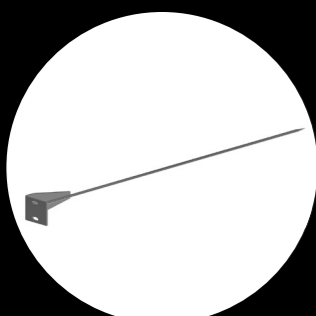

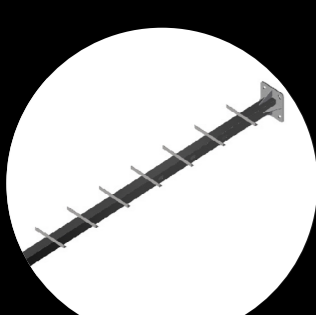


**WIND SENSOR BRACKET**  
Tracker: 1 pc





# Product List: Wind Speed Sensor & Communication Box

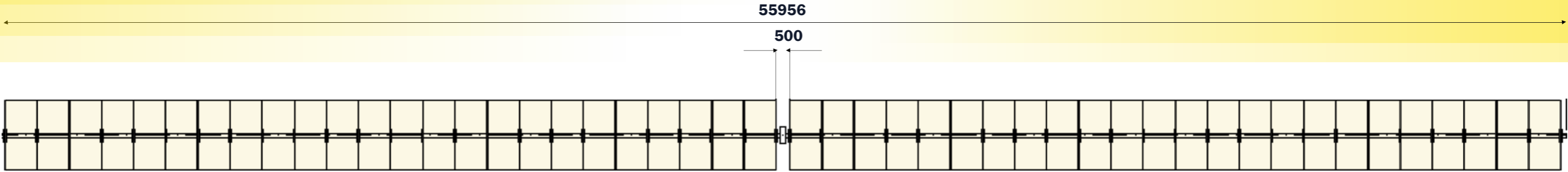
An overview of the bill of materials for Wind speed sensor and communication box can be seen below. Please note that some components can vary depending on project-specific requirements.

	<b>COMMUNICATION BOX BRACKET</b> Tracker: 2 pc		<b>COMMUNICATION BOX WIRELESS</b> Tracker: 1 pc
	<b>AIR TERMINATION</b> Tracker: 1 pc		<b>WIND SENSOR BRACKET</b> Tracker: 1 pc
	<b>WIND SENSOR POST L4000</b> Tracker: 1 pc		<b>HEX BOLT ASSY</b> Tracker: 4 Sets
	<b>U BOLT ASSY</b> <b>M10*133*150+2FW+25W+2NUT</b> Tracker: 2 Sets		

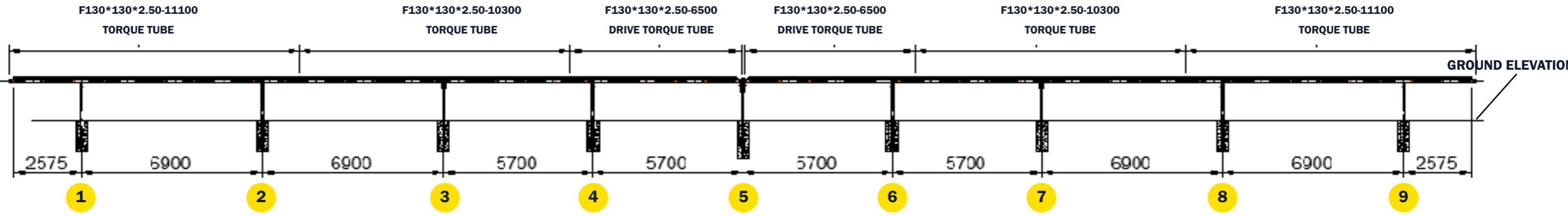
Model	Pre-tightening torque
M8	14-17 N.m
M10	30-35 N.m/ 35-40 N.m
M12	70-85N.m
M16	180-21N.m/100-150 N.m
M18	240-290N.m
M20	240-290N.m



# 1 X 48 Tracker Scenario Overview Chart



ZST-1P 48 @0 DEGREES VERTICAL VIEW



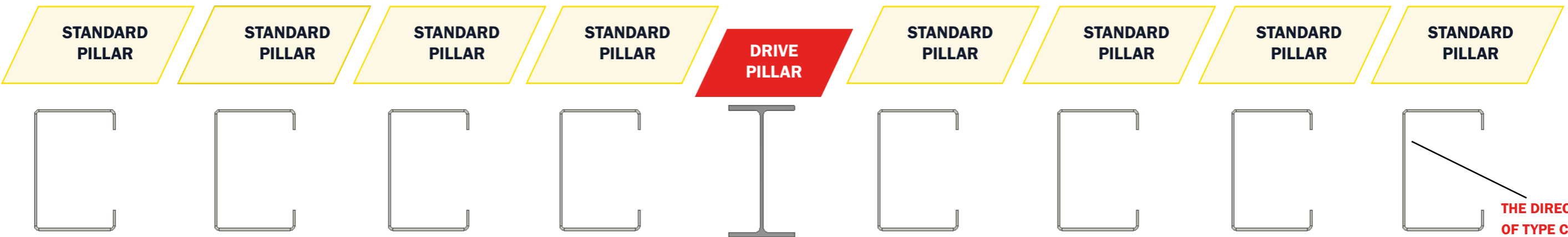
DAMPER

DRIVE

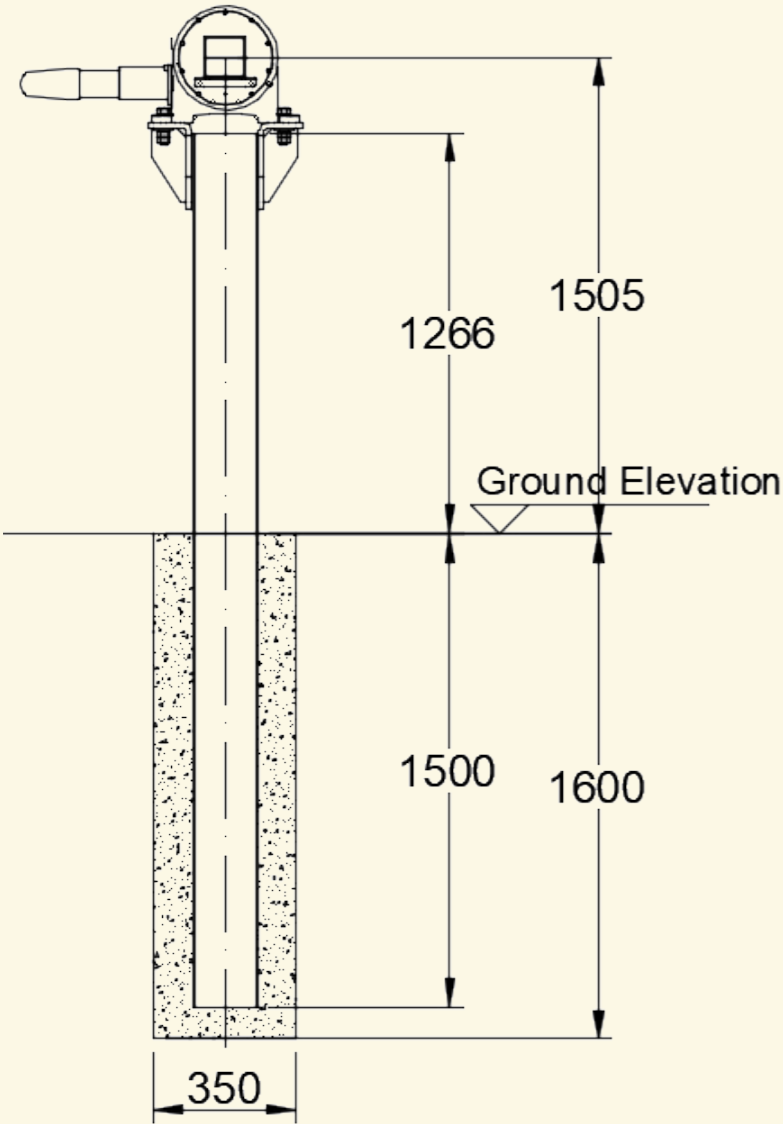
DAMPER

Note: See engineering drawings for detailed drawings

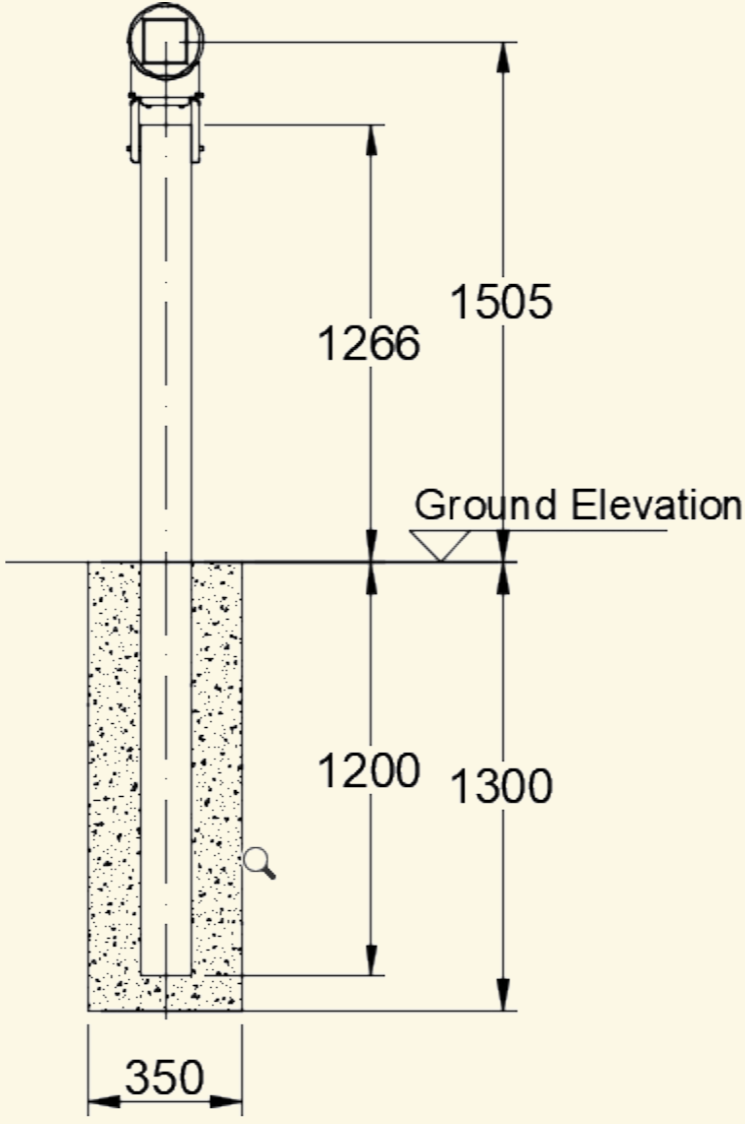
ZST-1P 48 @0 DEGREES ELEVATION VIEW



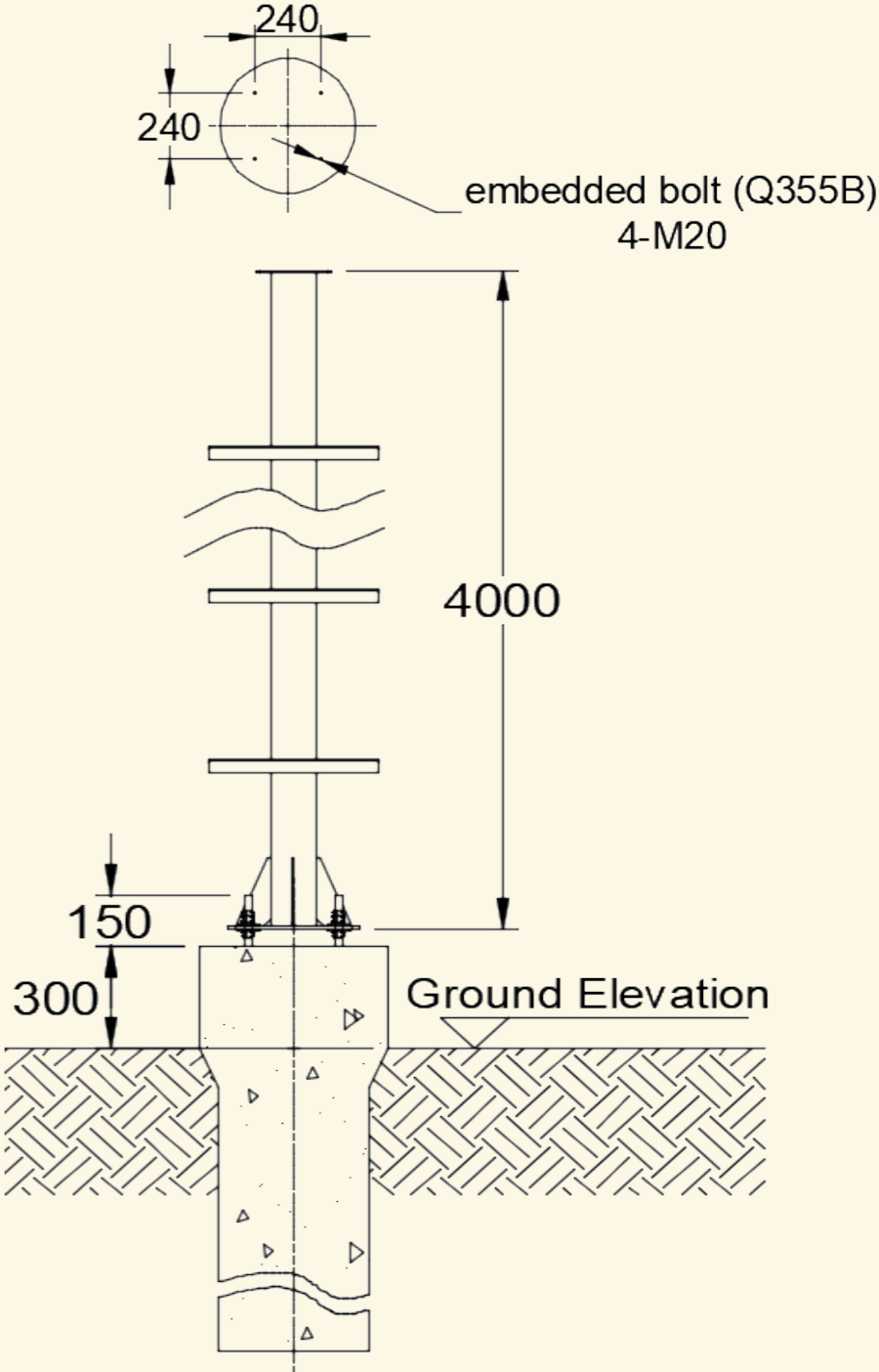
# Pillar Foundation



**DRIVE  
PILLAR**



**STANDARD  
PILLAR**

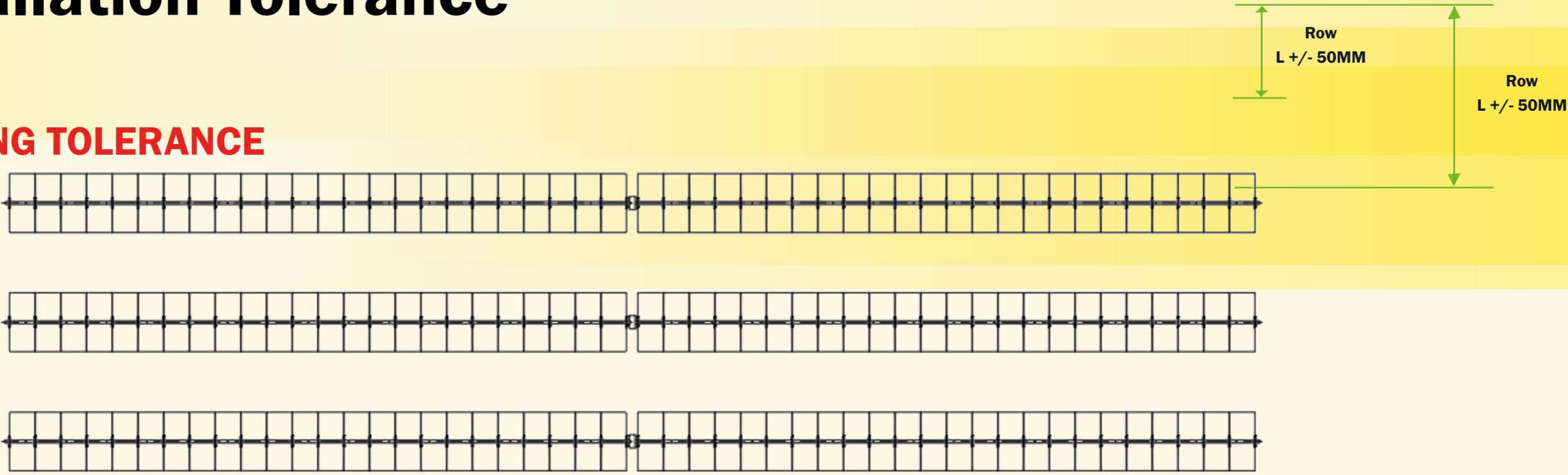


**WIND SENSOR  
POST**

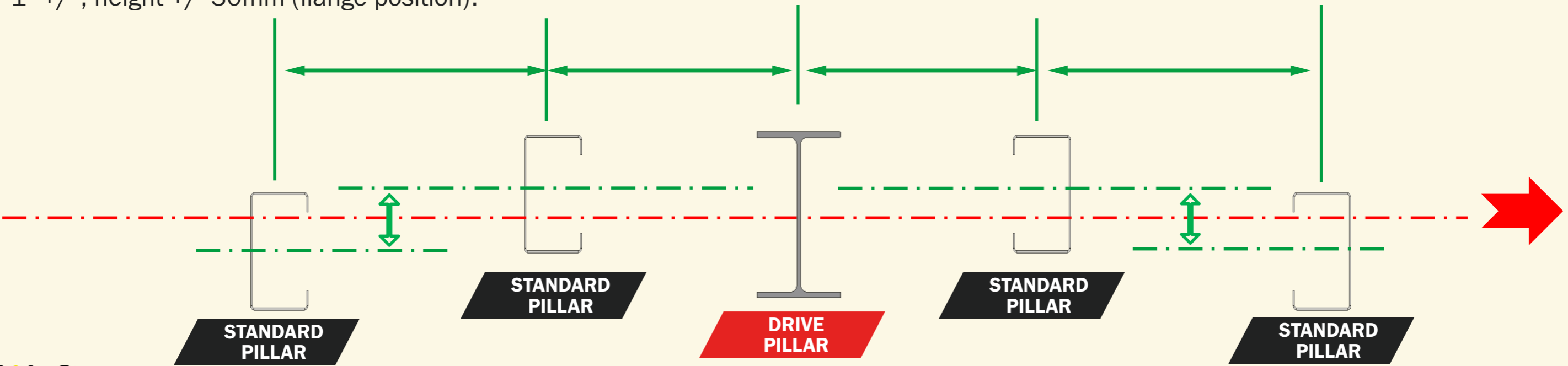


# Pillar Installation Tolerance

## A. PILLAR SPACING TOLERANCE



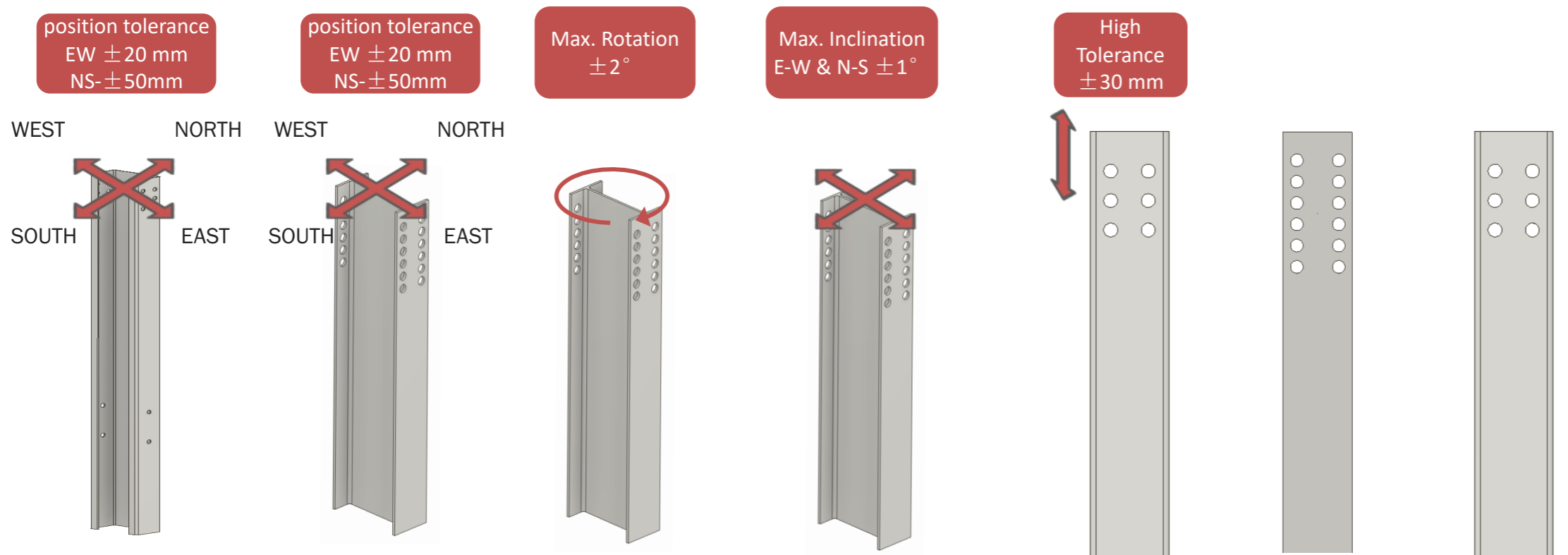
- Pillar spacing adjustment, to drive pillar as the benchmark to adjust both sides of the pillar.
- Allowable errors in construction: east-west straightness of pillar top 20mm +/-, north-south spacing 50mm +/-, perpendicularity 1° +/-, height +/- 30mm (flange position).



# Pillar Installation Tolerance

## 2. PILLAR TOLERANCE

- Pillar height adjustment, to drive pillar as the benchmark, adjust both sides of the pillar.
- The Standard pillar is flush with the drive pillar height.



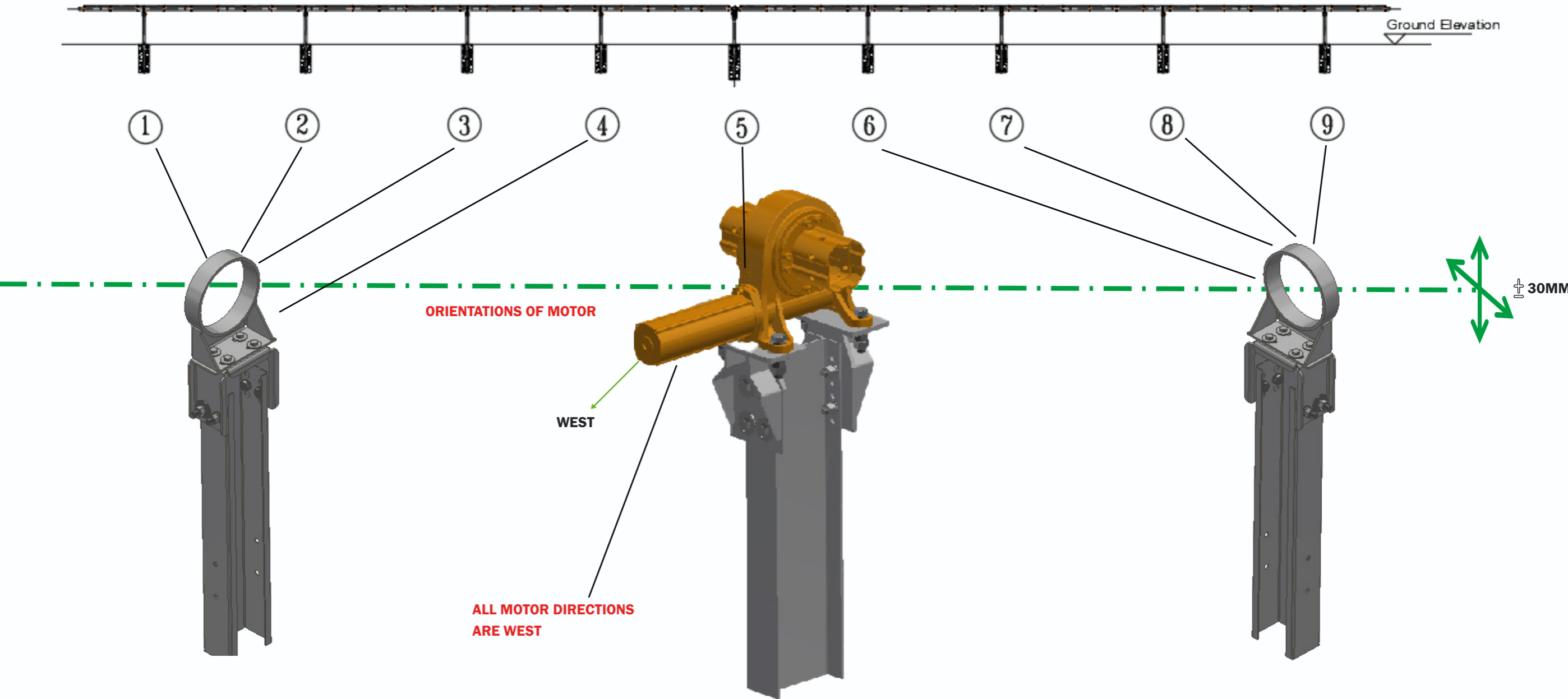
**STANDARD PILLAR**   **DRIVE PILLAR**   **DRIVE PILLAR**   **DRIVE PILLAR**   **STANDARD PILLAR**   **DRIVE PILLAR**   **STANDARD PILLAR**





# Main Structure Installation

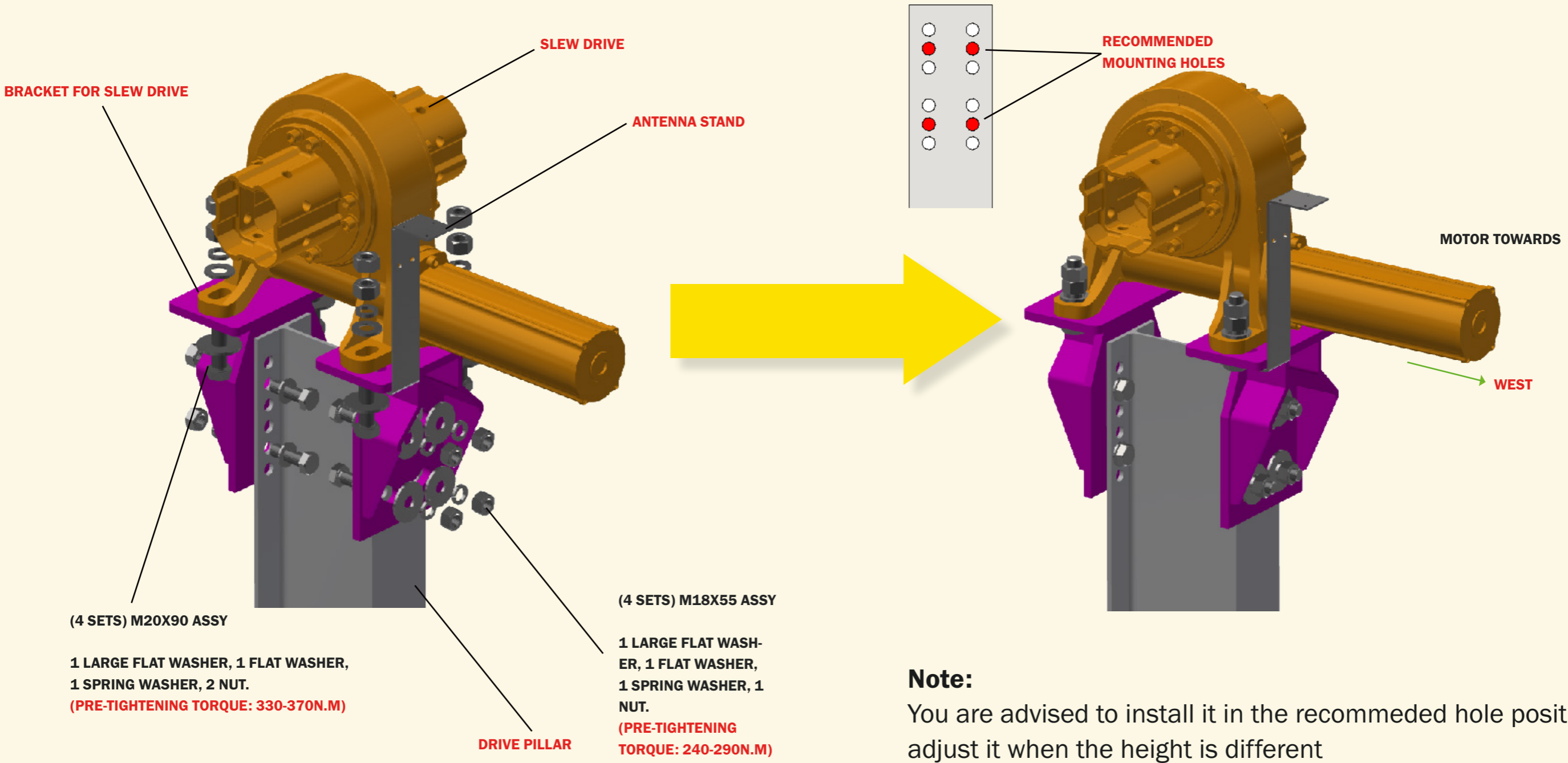
## 1. Arrangement Diagram of Pillar





# Main Structure Installation

## 2. Bracket for Slew drive and Slew Drive Installation

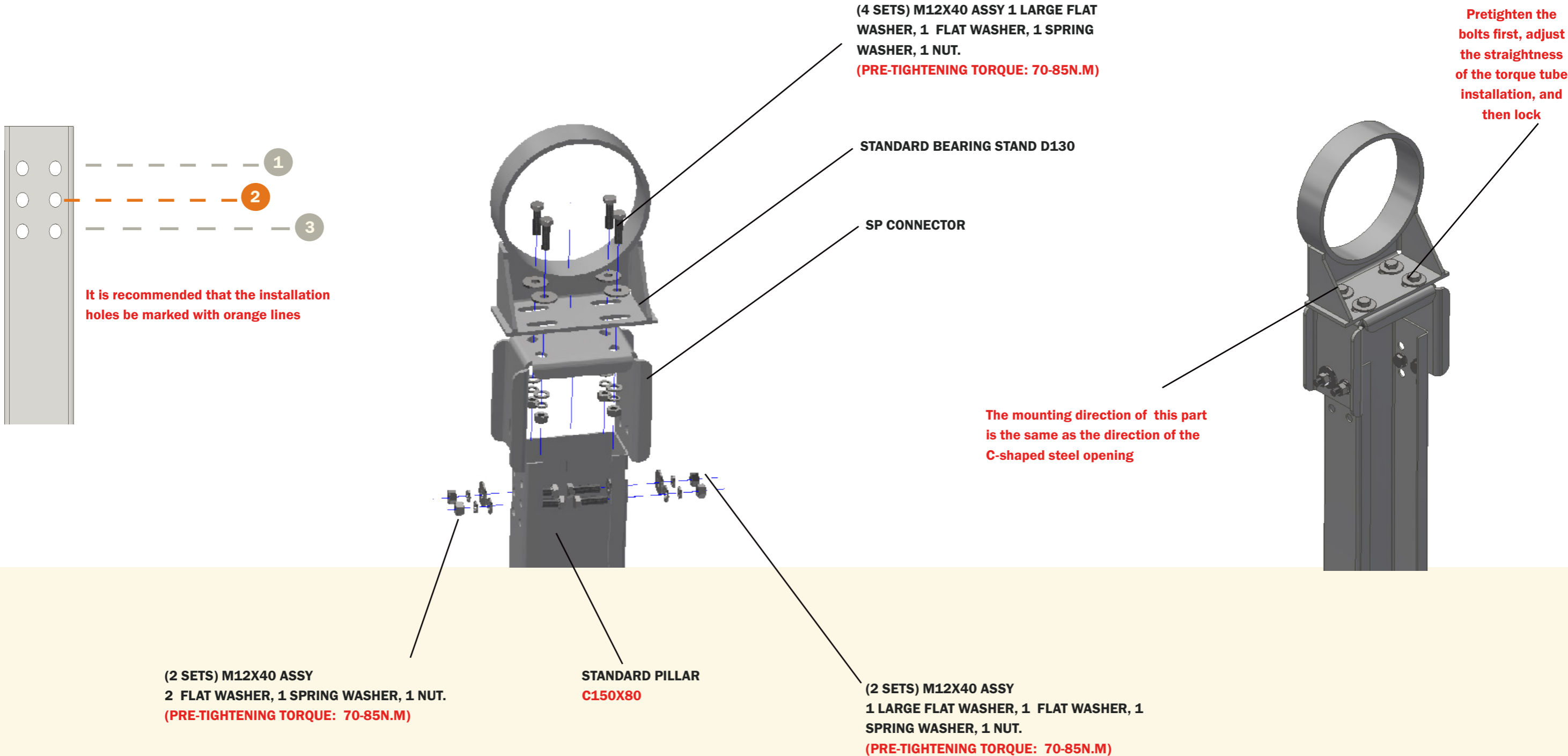


**Note:**  
You are advised to install it in the recommended hole position and adjust it when the height is different



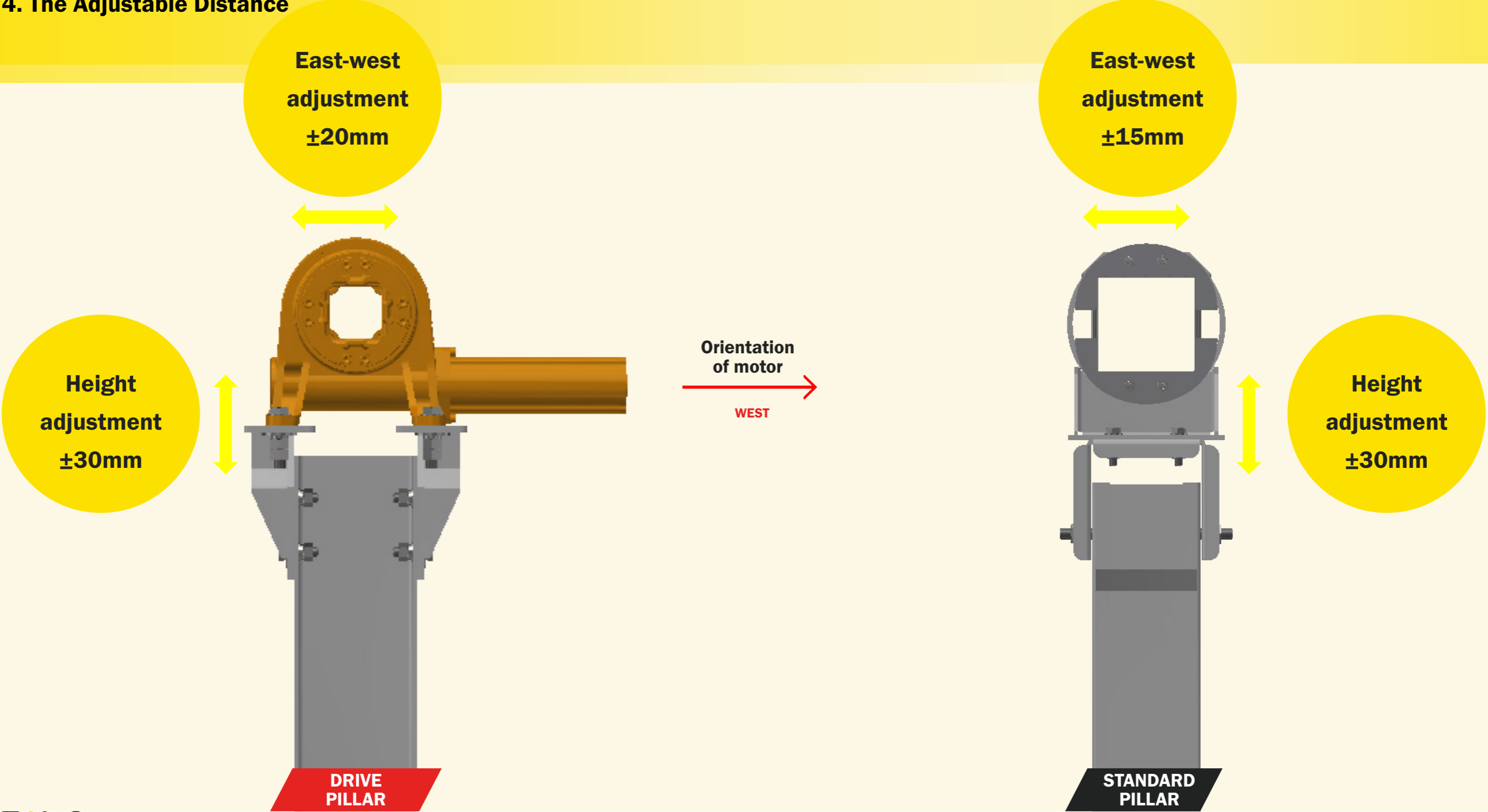
# Main Structure Installation

## 3. SP Connector and Standard Bearing Stand Installation



# Main Structure Installation

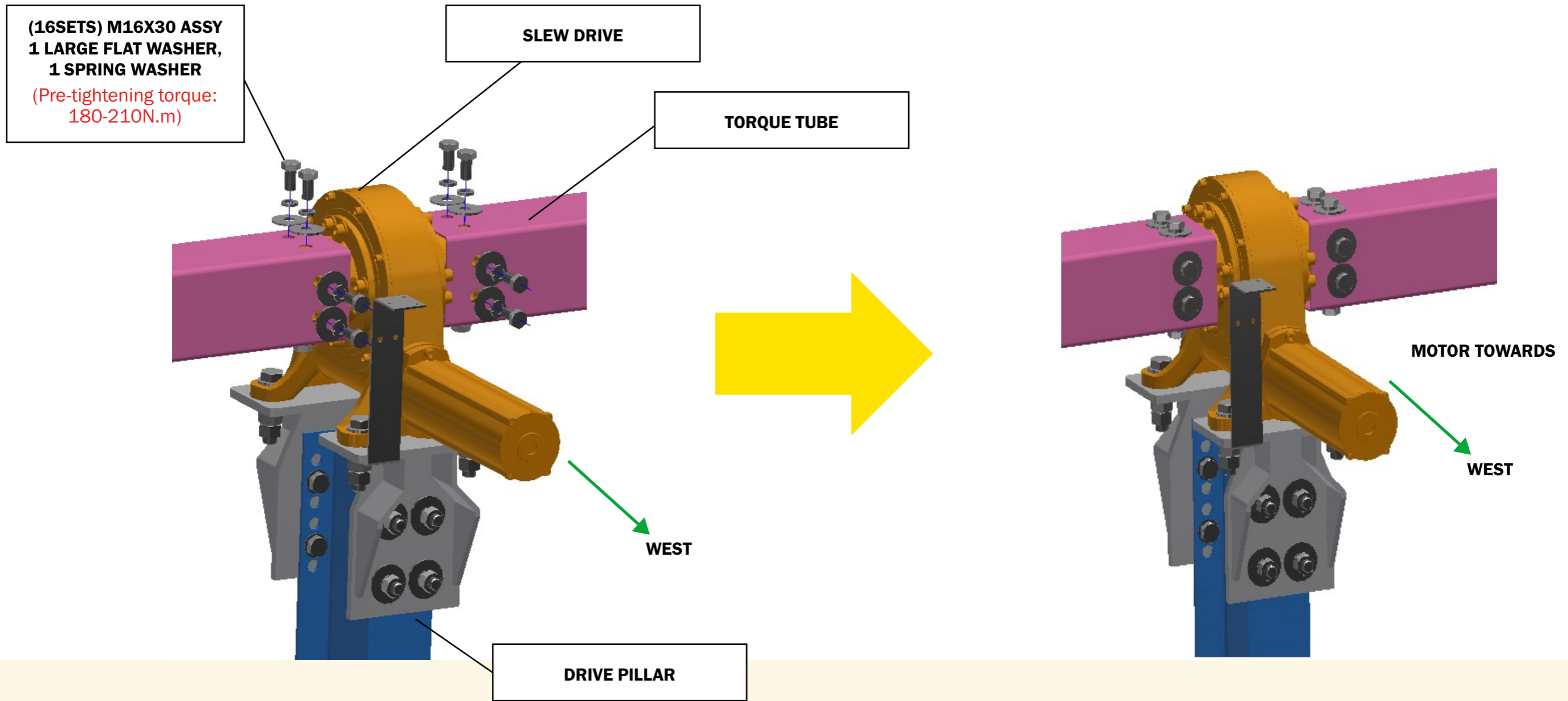
## 4. The Adjustable Distance





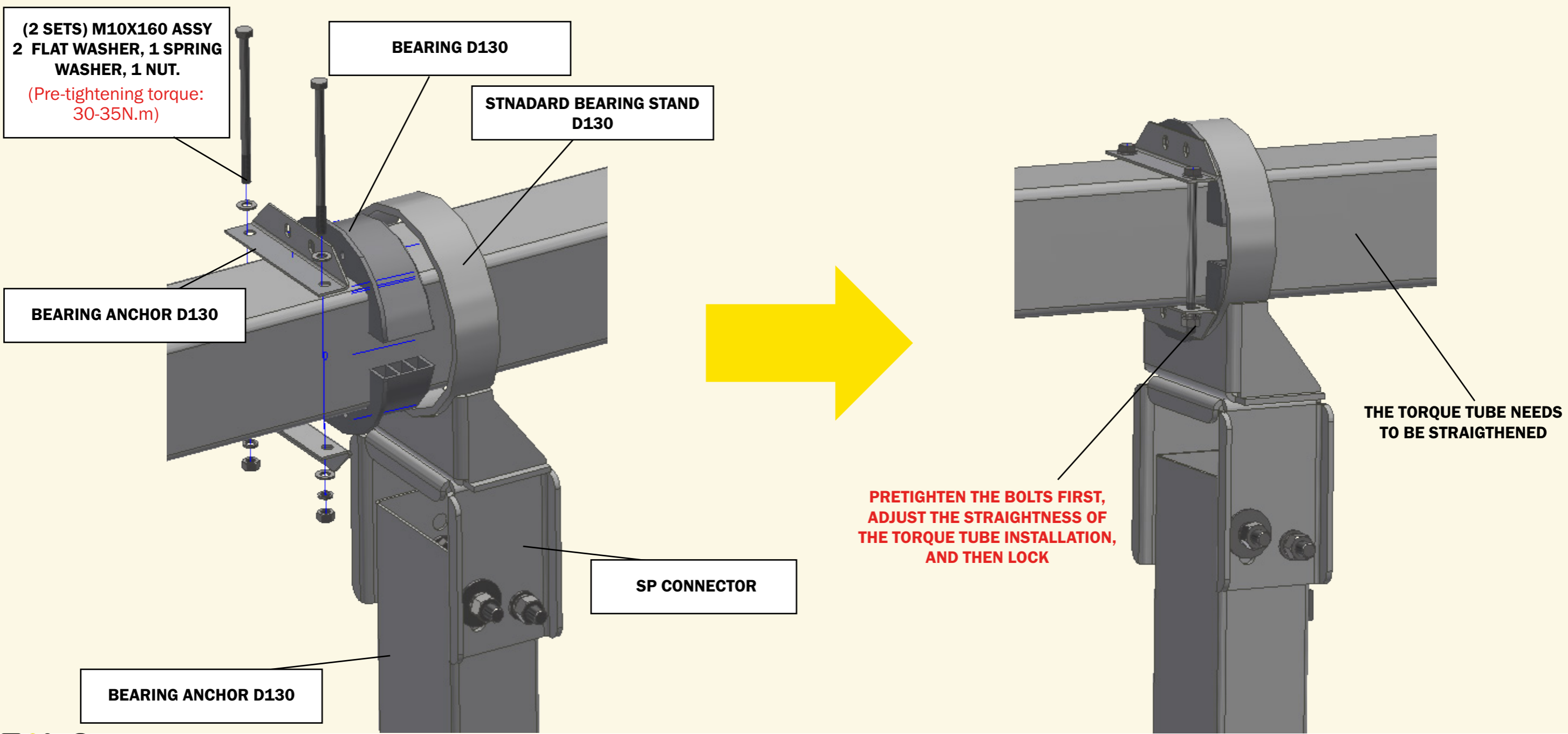
# Main Structure Installation

## 5. The Torque Tube Installation



# Main Structure Installation

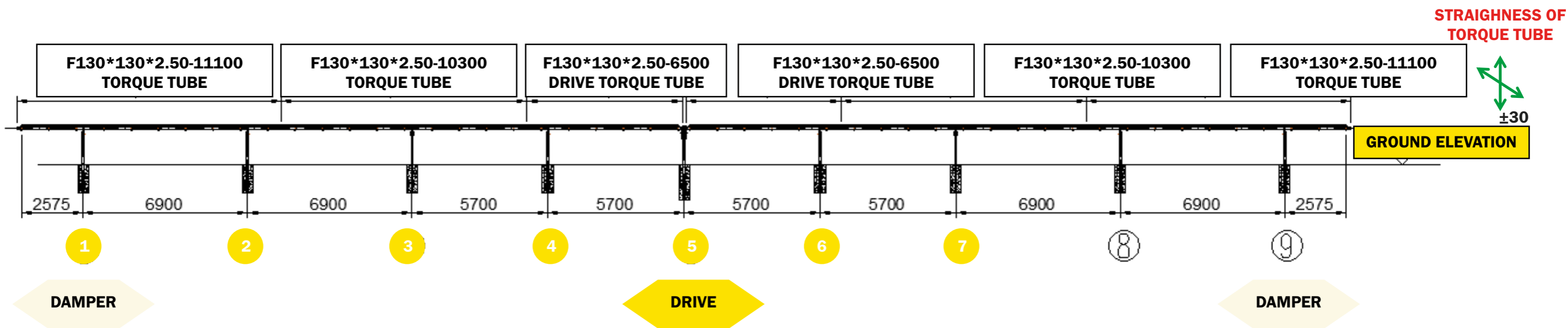
## 6. Bearing & Bearing Plate Installation





# Main Structure Installation

## 7. Position of Coupler

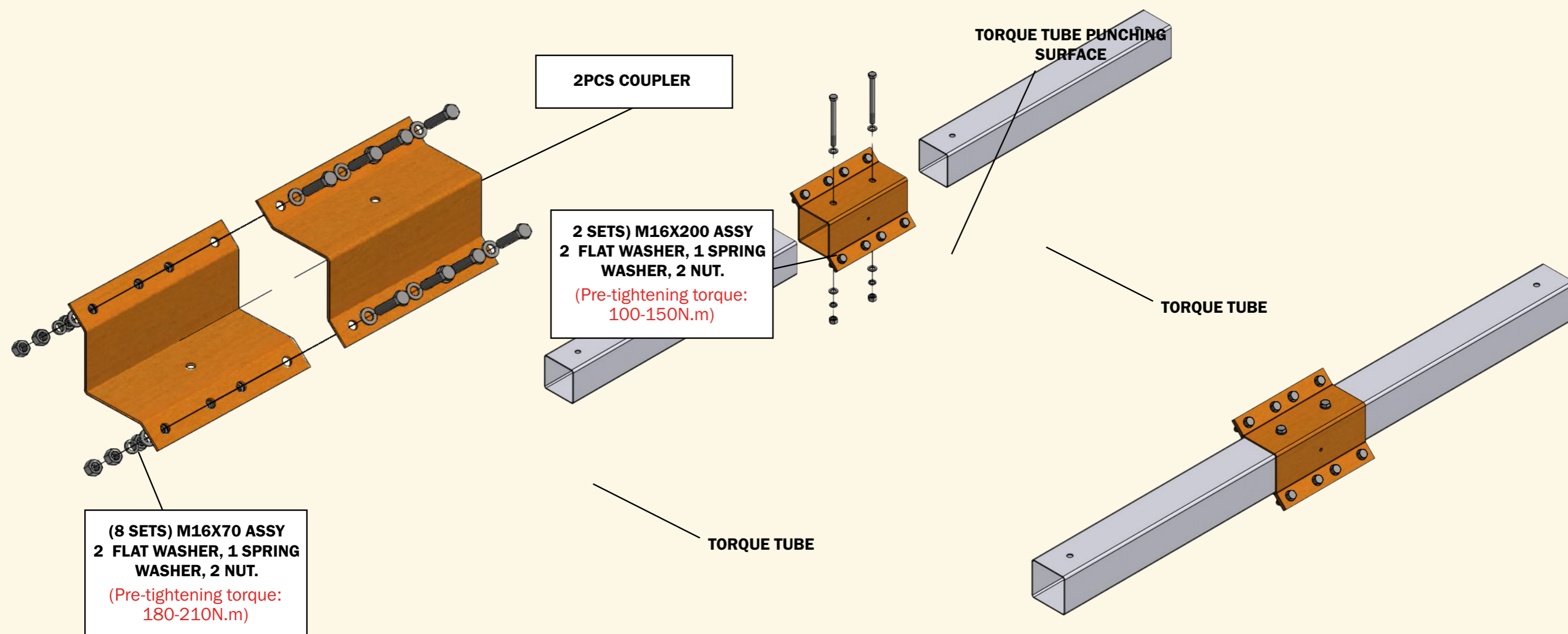


ZILO SINGLE AXIS TRACKER-1P48 @0 DEGREE ELEVATION VIEW

Insufficient straightness of the torque tube will affect the normal operation of the tracker

# Main Structure Installation

## 8. Coupler Installation



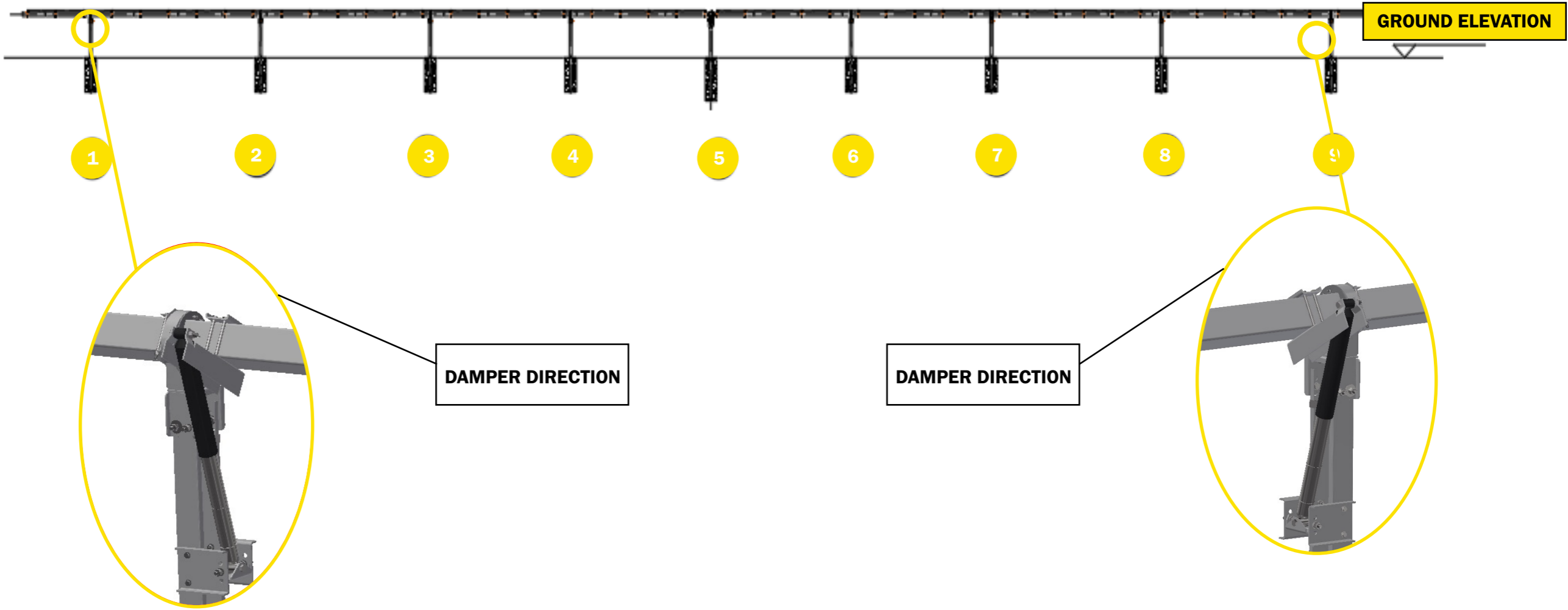
### NOTE:

The Torque Tube punching surface of the torque tube must face the same side; otherwise, it cannot be installed



# Main Structure Installation

## 7. POSITION AND QUANTITY OF DAMPERS



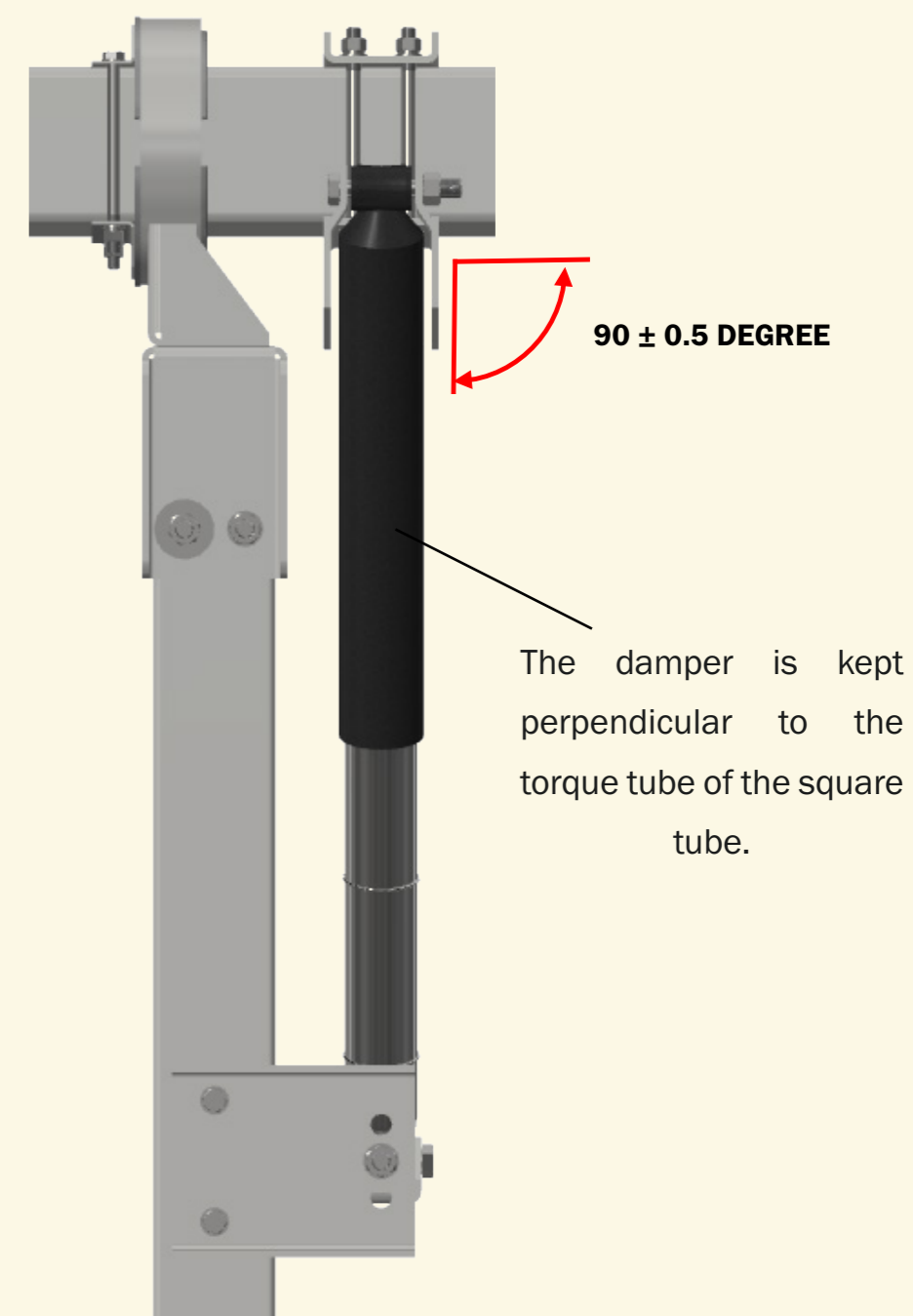
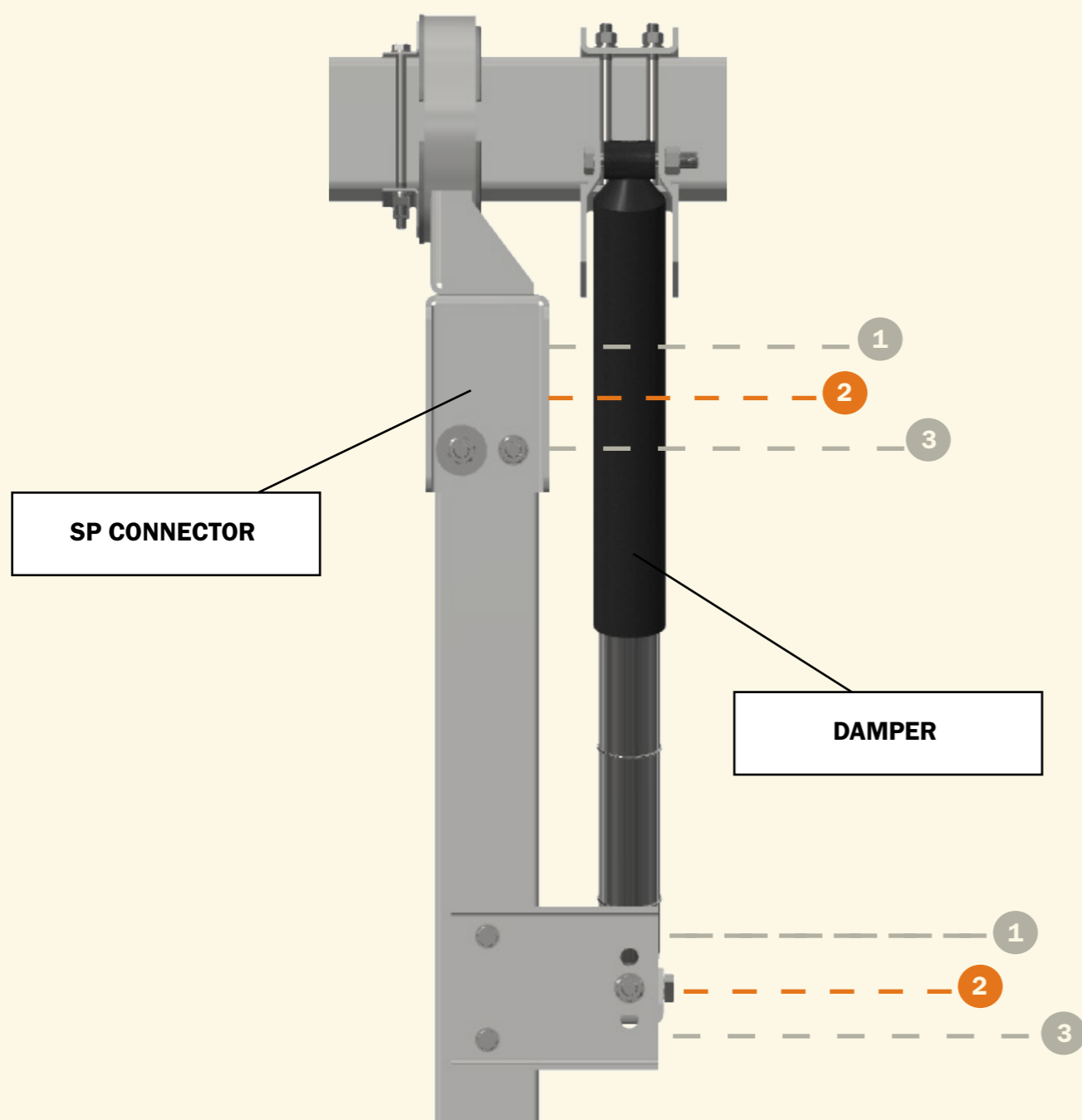
**NOTE:**  
 Dampers are installed on the inside of the pillar, the left damper is installed on the right, and the right damper is installed on the left.

# Main Structure Installation

## 10. INSTALLATION POSITION OF DAMPERS

### NOTE:

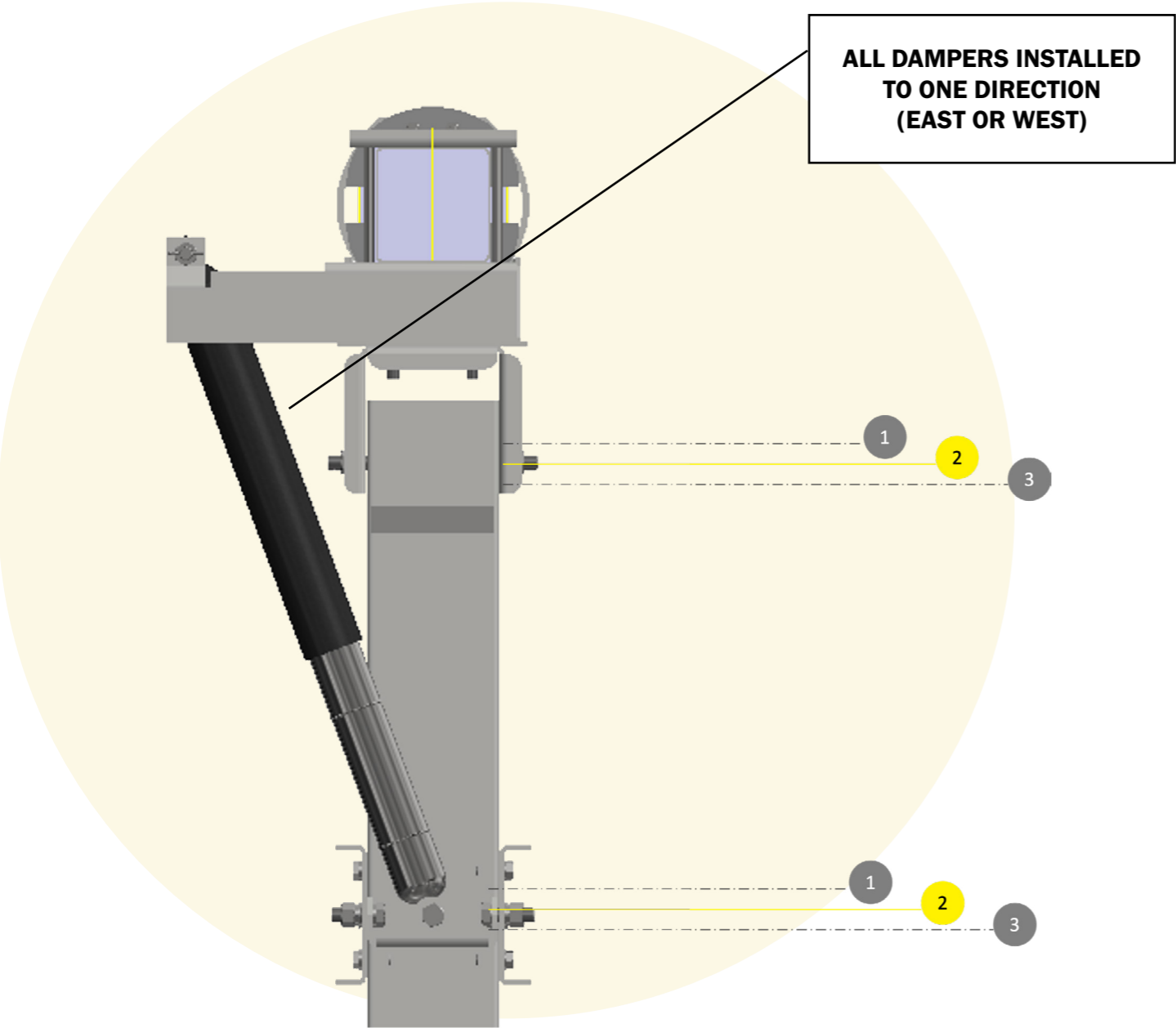
- Select the mounting holes inside and outside the damper mounting bracket according to the adjustment holes of the ordinary pillar connectors (Install the same number of holes above and below)
- It is recommended that the installation holes be at the orange mark line (2 holes)
- When installing the damper support, it should be adjusted parallel to the square





# Main Structure Installation

## Installation Direction of Dampers



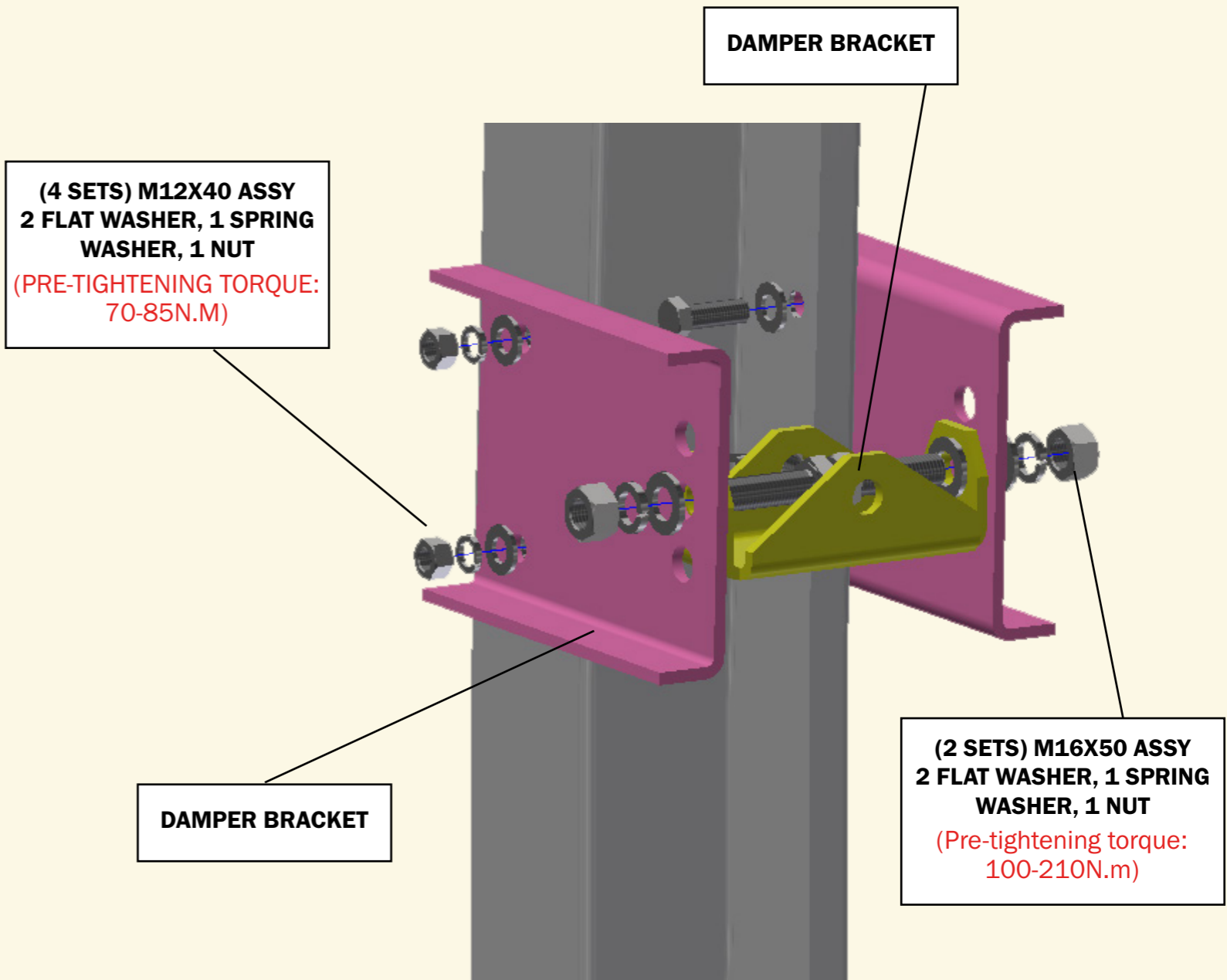
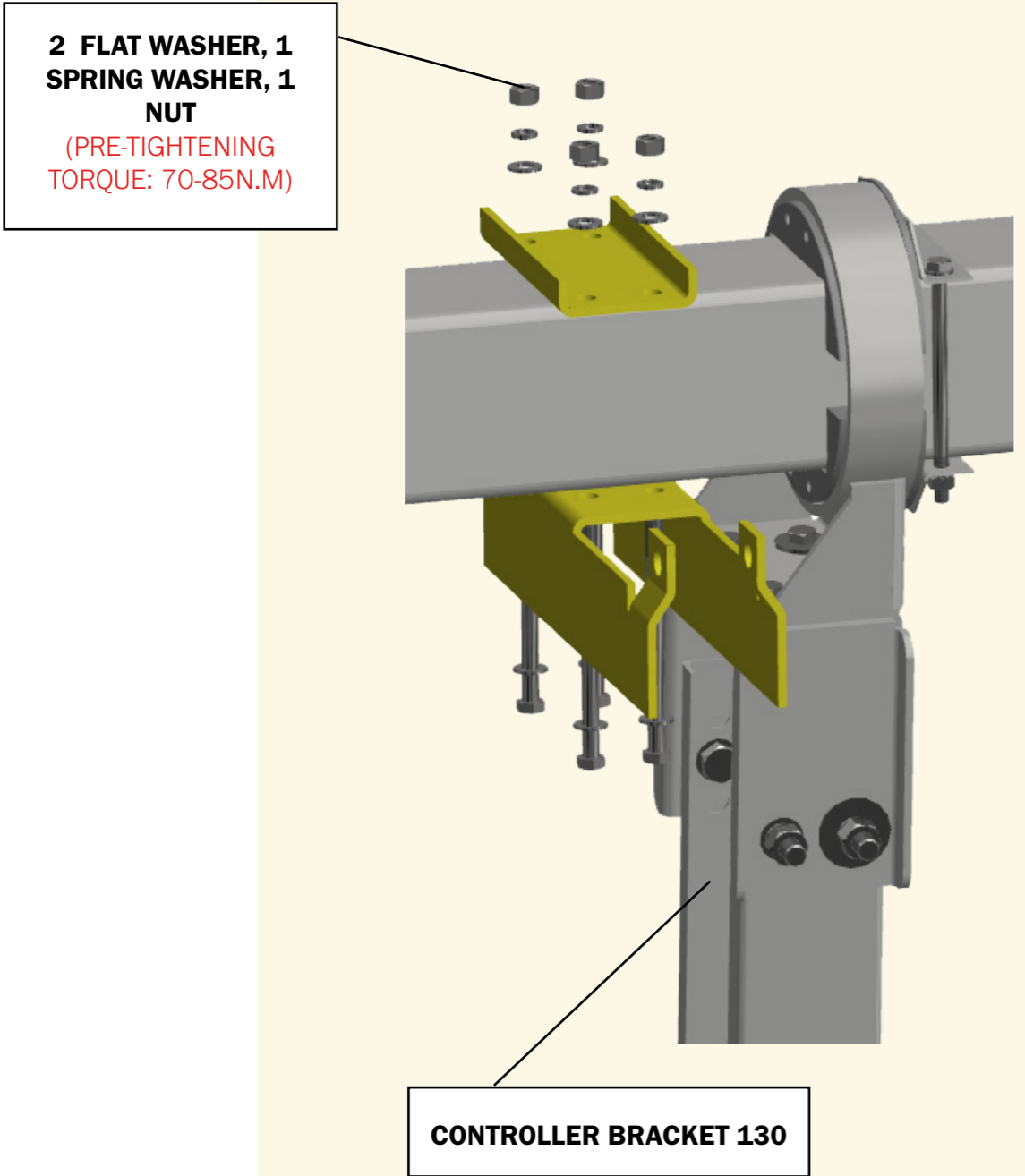
**Note:**

Select the damper mounting hole position on the damper bracket according to the adjusting hole position of the standard bearing stand.

It is recommended that the installation holes be marked orange.

# Main Structure Installation

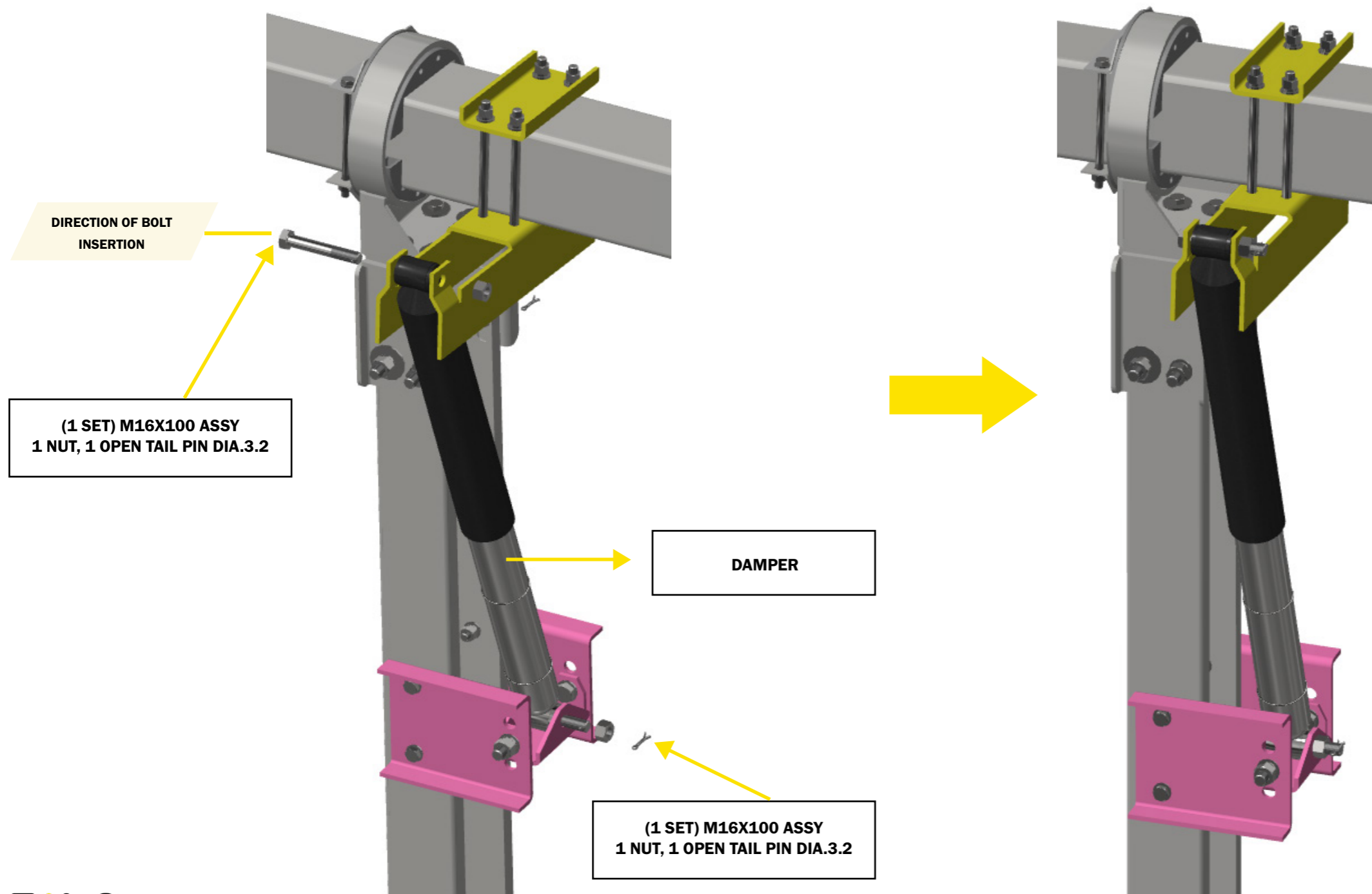
## Lever Arm for Damper and Damper Fix Bracket are Installation





# Main Structure Installation

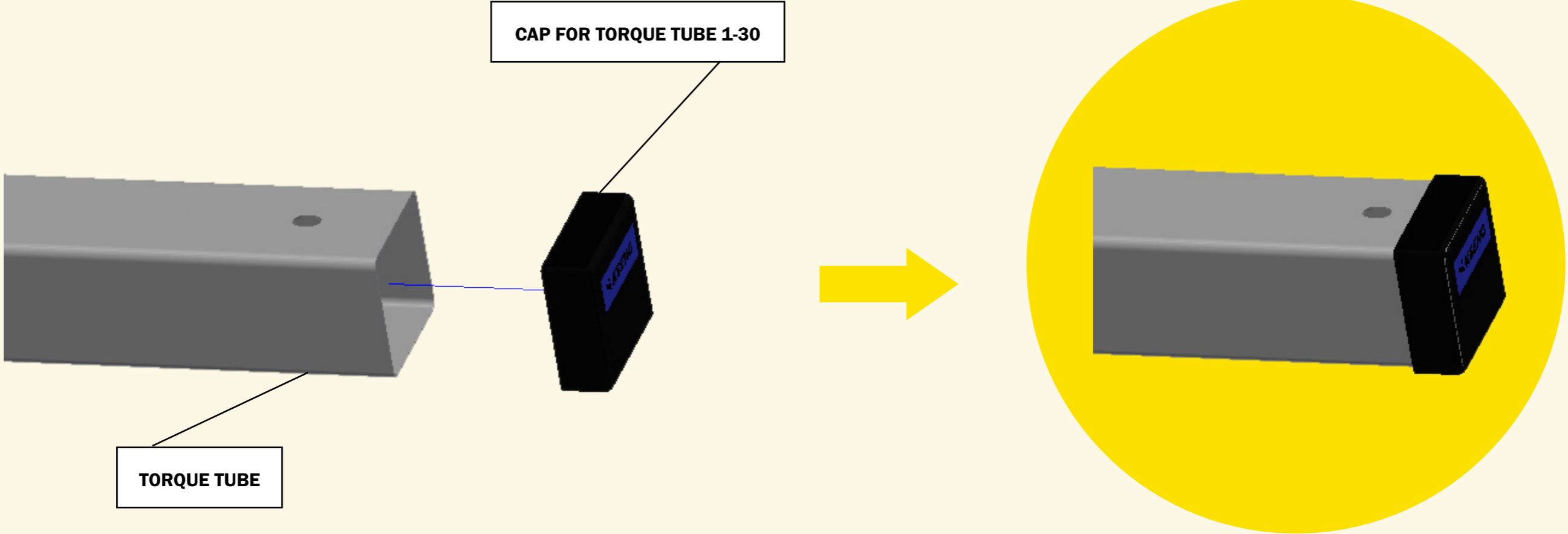
## Damper Installation





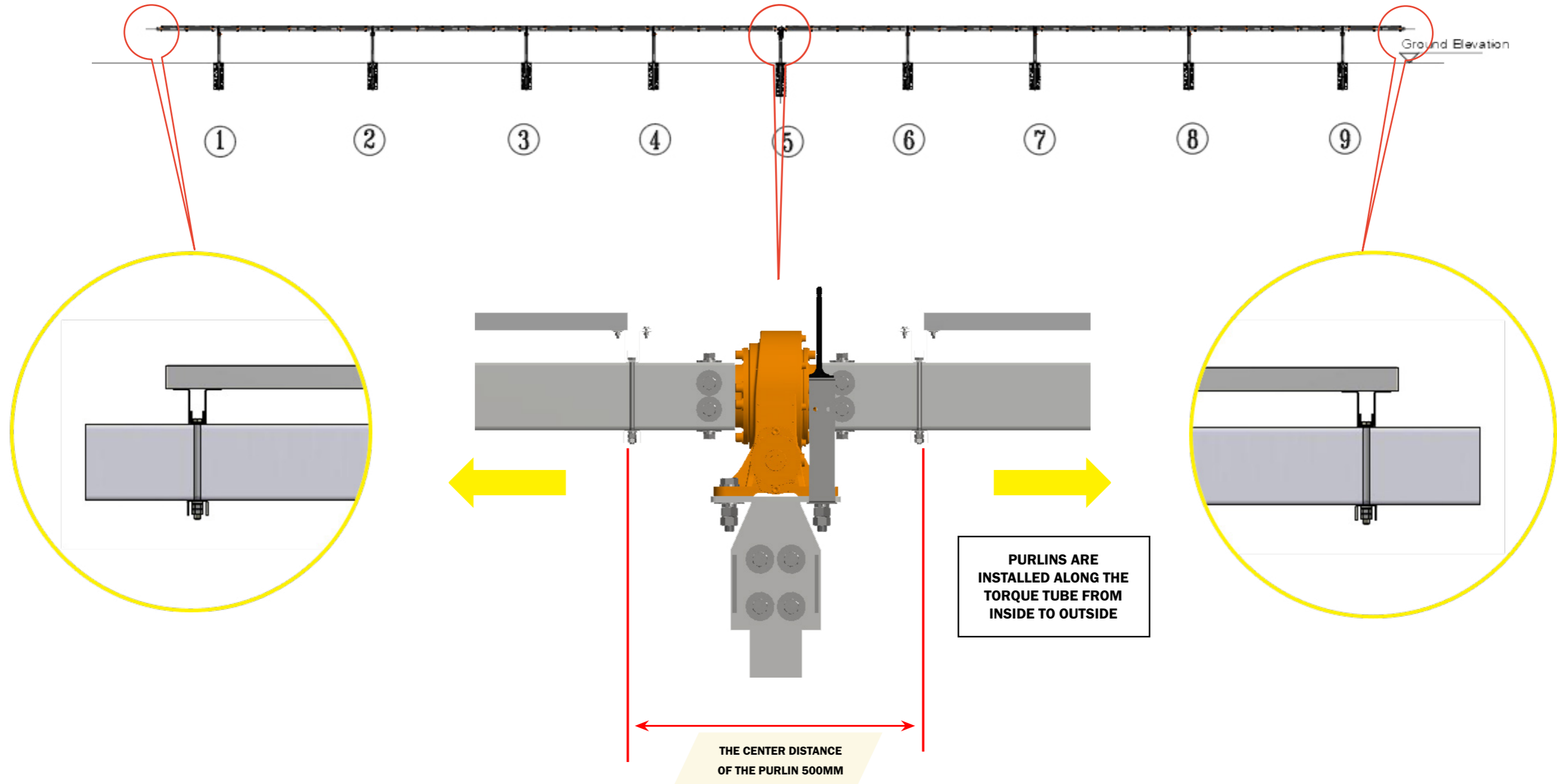
# Main Structure Installation

## Cap for Torque Tube Installation



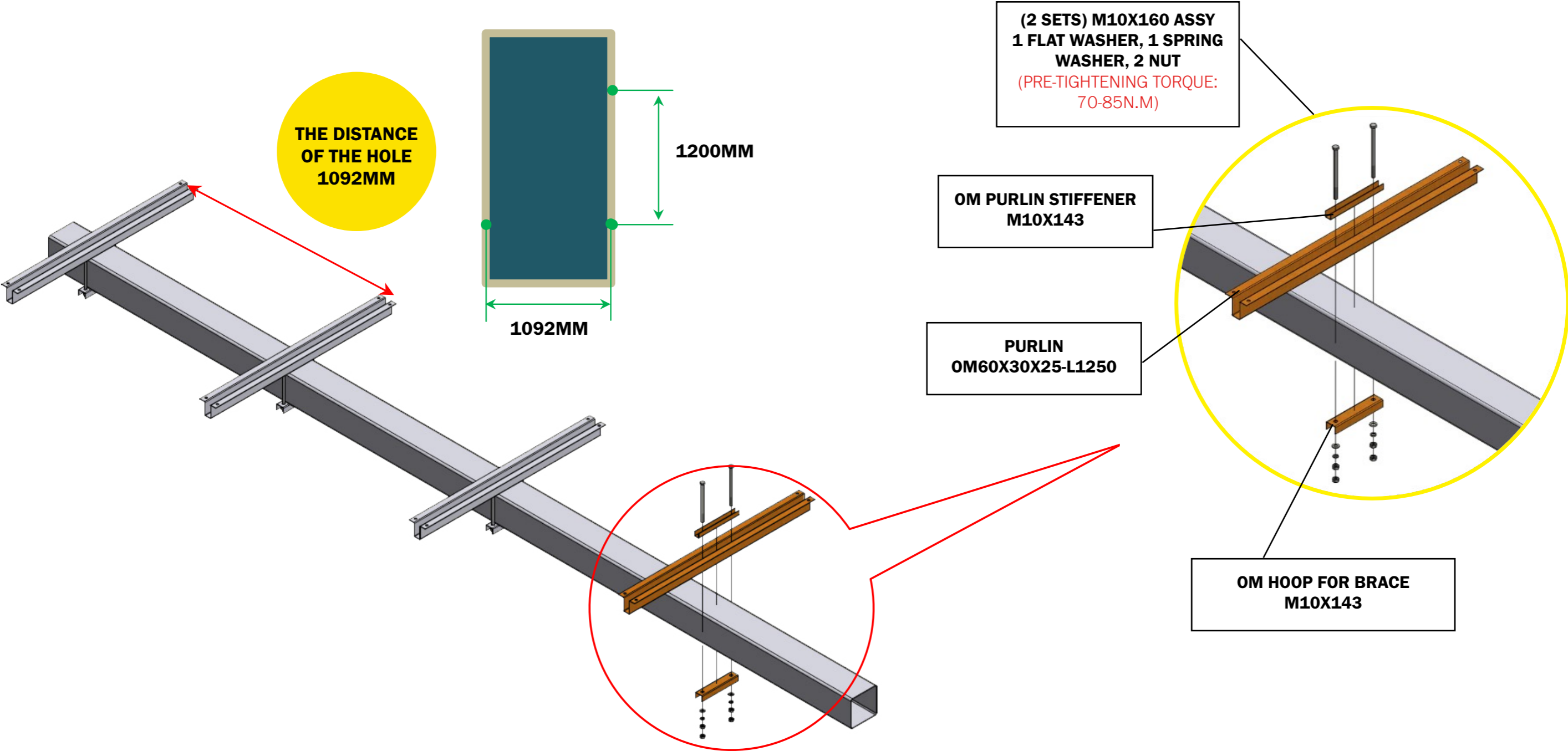
# Purlin and PV Modules Installation

## 1. Detail of Purlin



# Purlin and PV Modules Installation

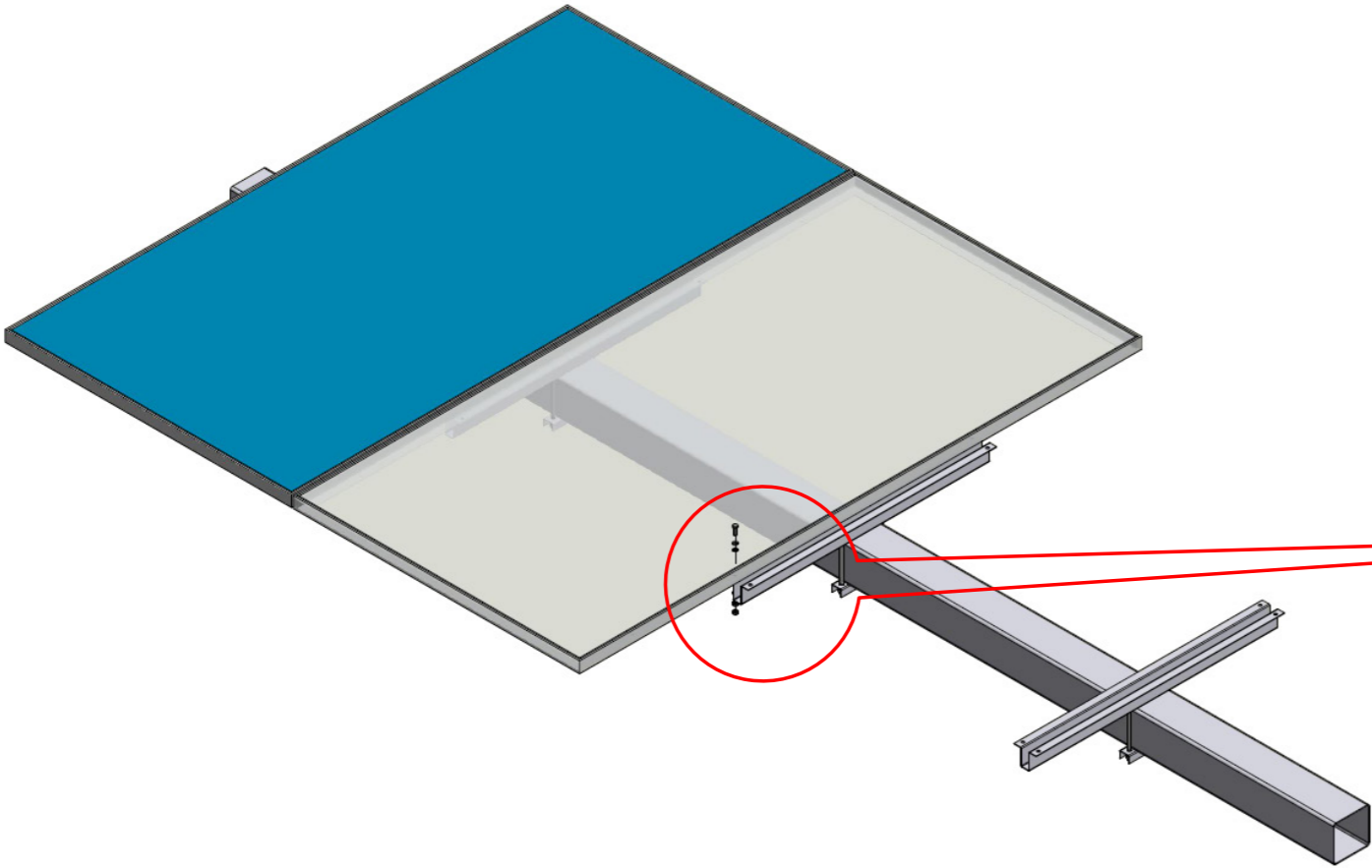
## 2. Purlin Placement and Purlin Installation



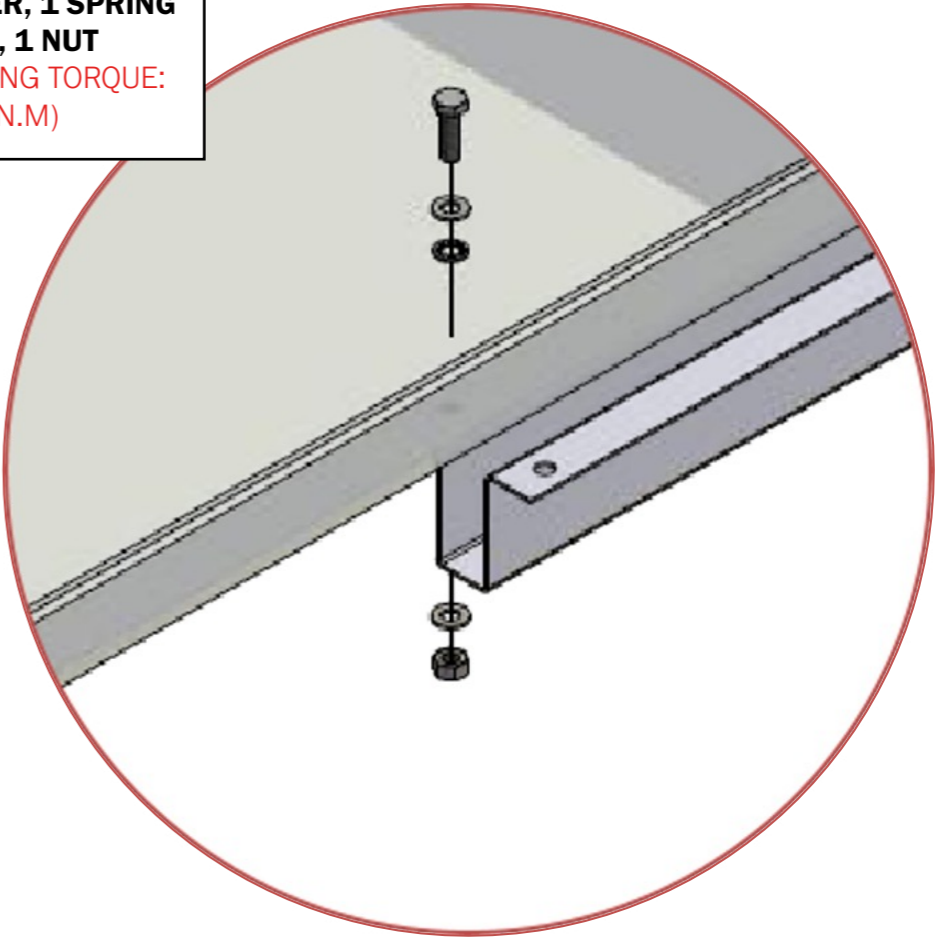


# Purlin and PV Modules Installation

## 3. PV Modules Installation



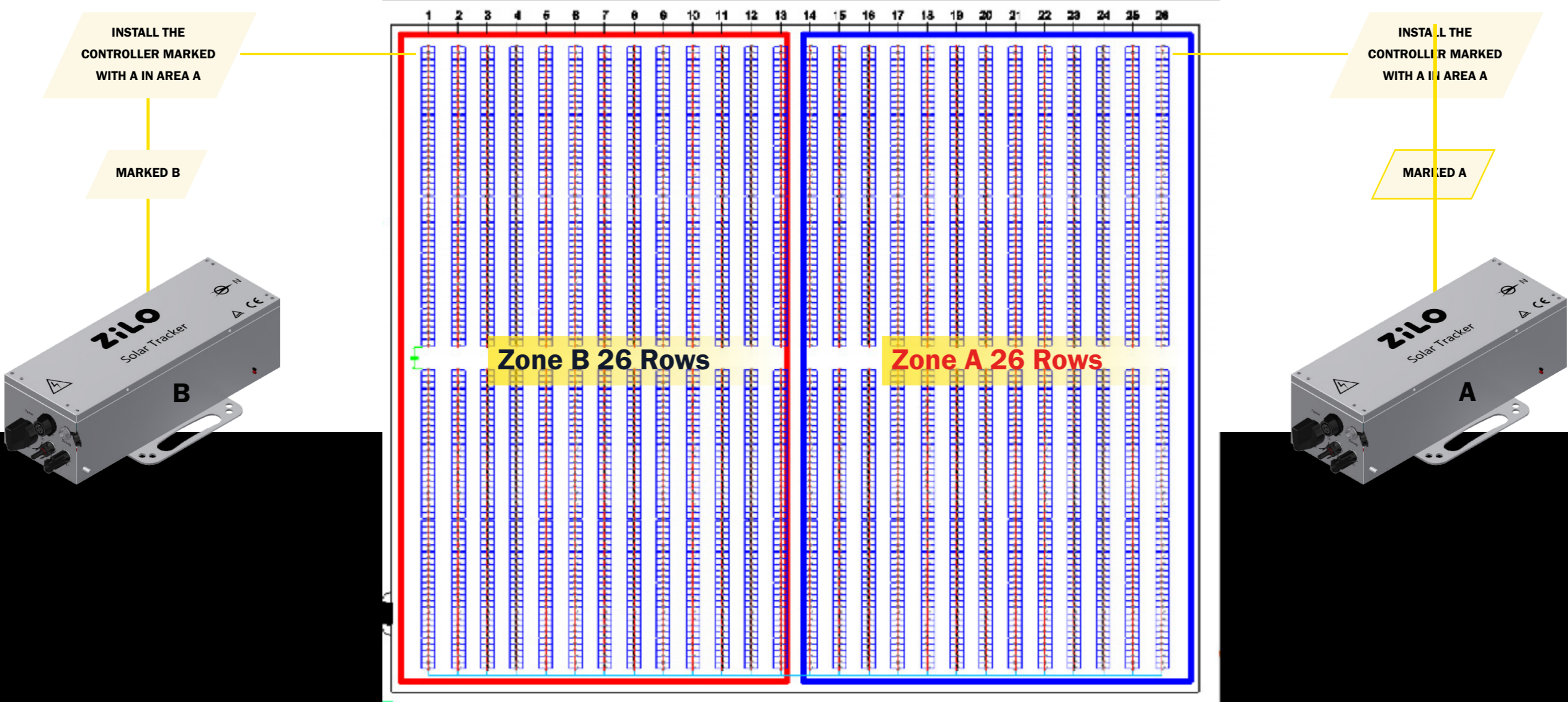
**(4 SETS) M8X20 ASSY  
2 FLAT WASHER, 1 SPRING  
WASHER, 1 NUT**  
(PRE-TIGHTENING TORQUE:  
14-17N.M)



# Control Box Installation- Zone A, Zone B

## Installation Positions for Control Box Installation

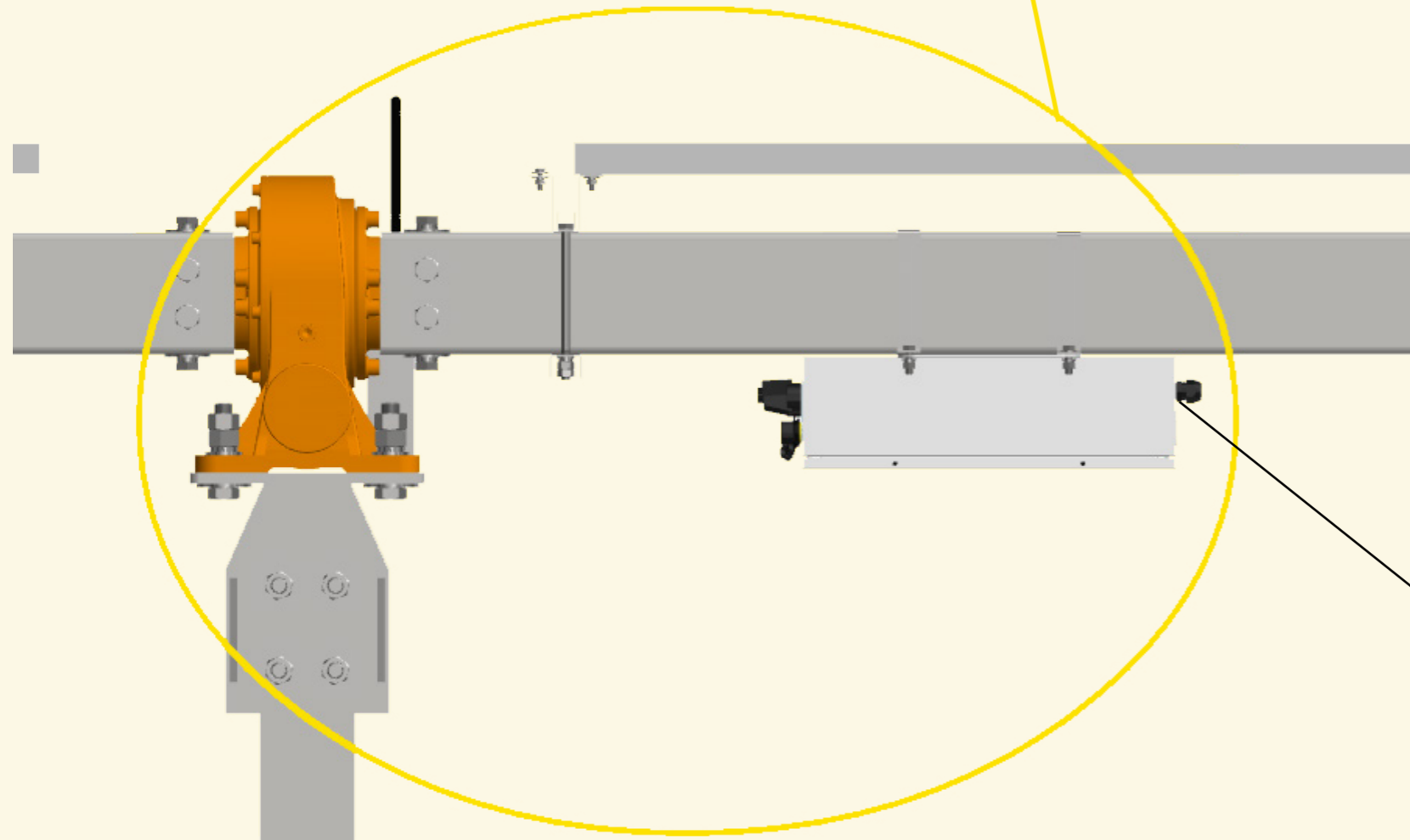
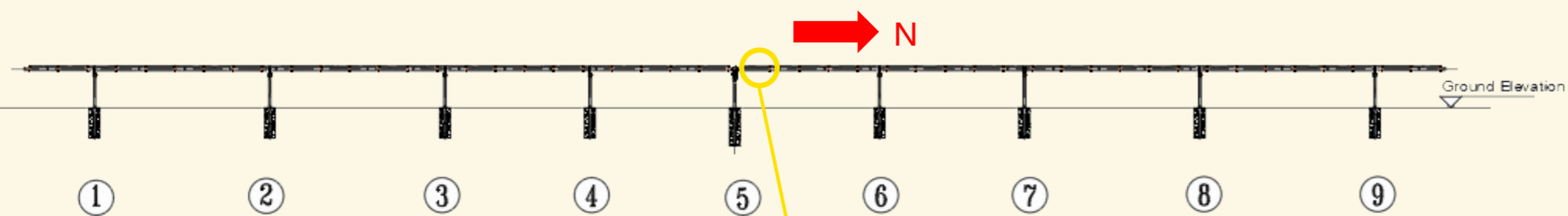
- Install the controller marked with A in zone A
- Install the controller marked with B in zone B
- The direction of the control box must point north



**Designed & Engineered in Australia**

# Control Box Installation

## 1. Position of Control Box



CONTROL BOX FACING NORTH MARK

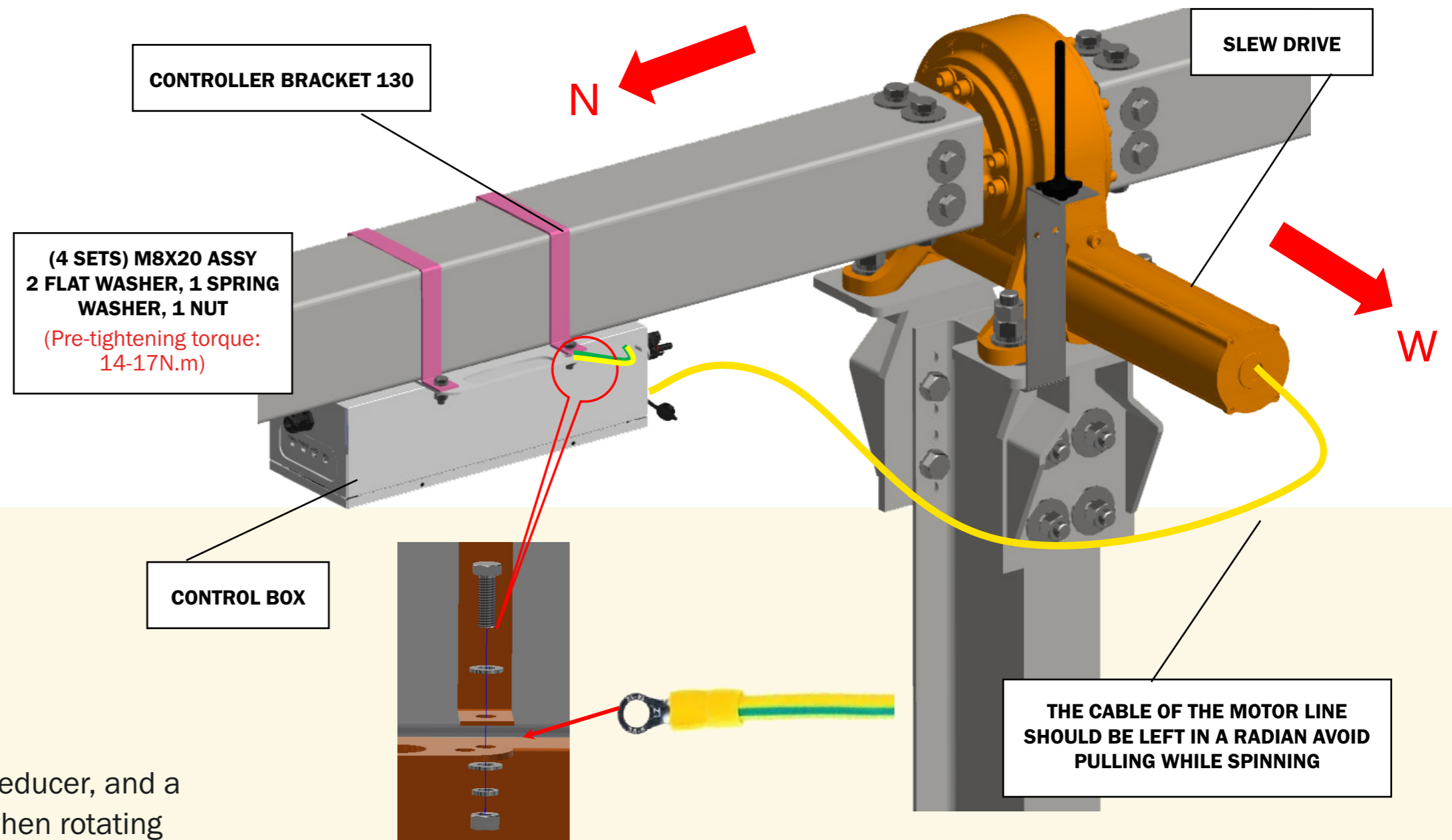
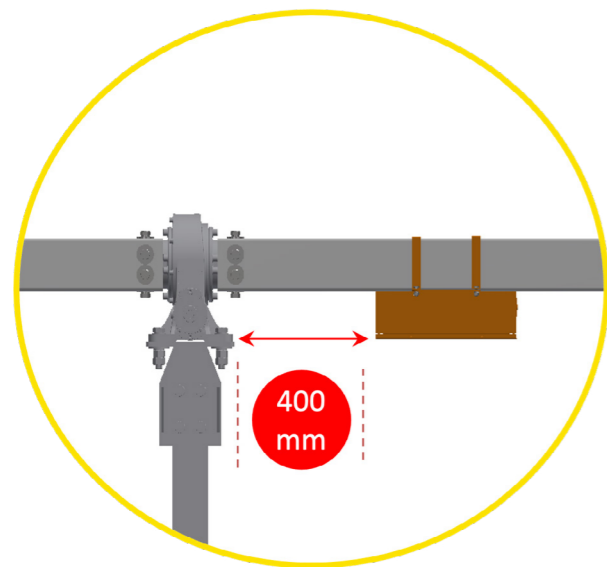


CONTROL BOX



# Control Box Installation

## 2. Control Box Installation and Wiring of Motor

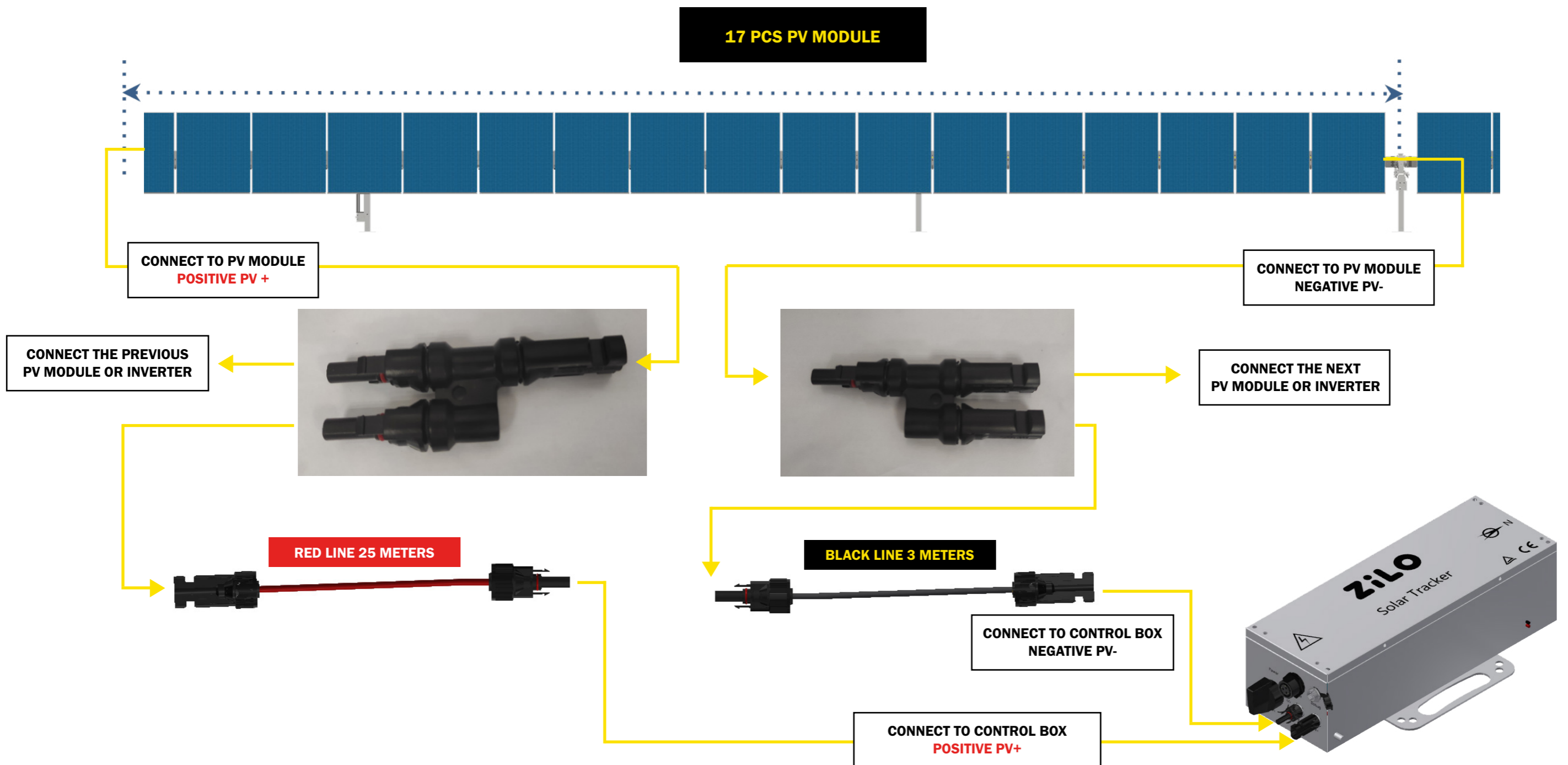


**NOTE:**

The cable of the motor is close to the reducer, and a radian should be left to avoid pulling when rotating

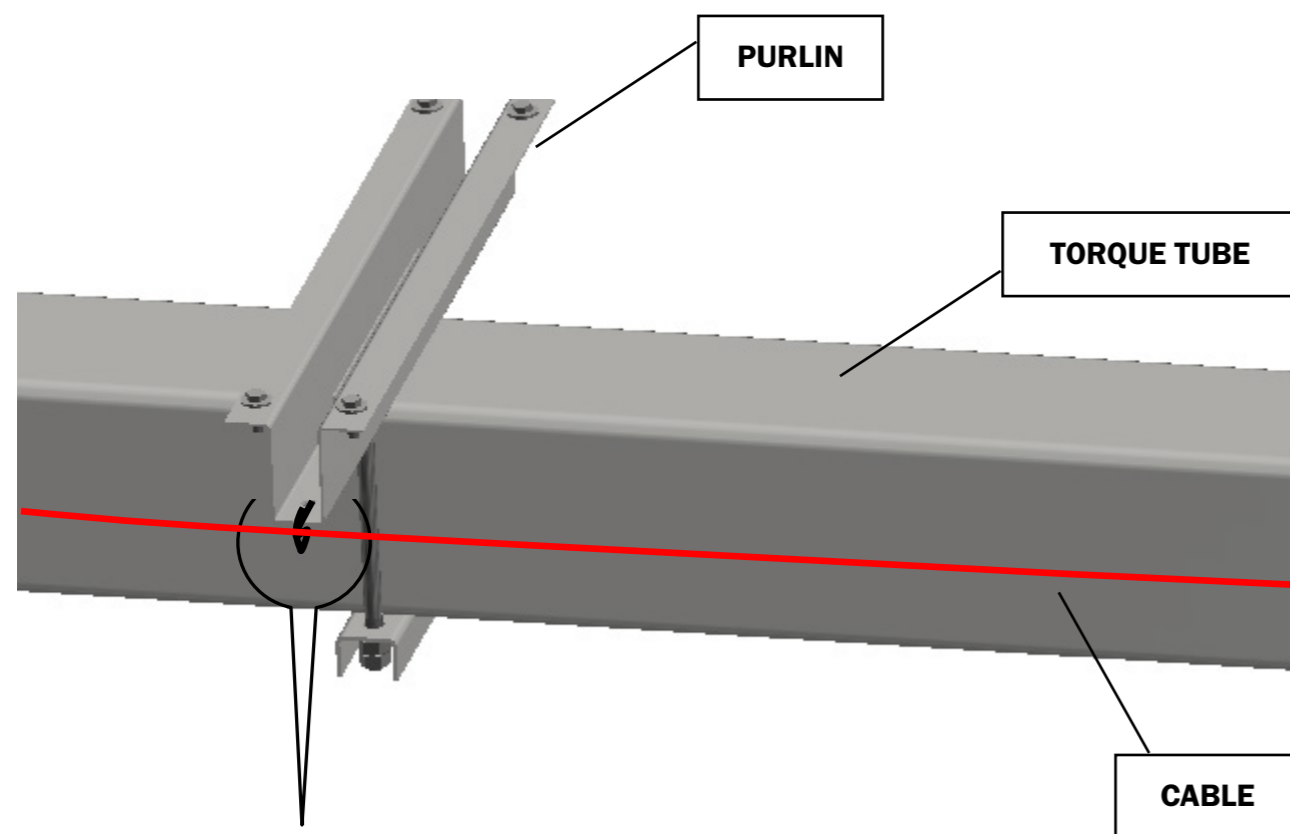
# Control Box Installation

## 3. Wiring of Control Box-PV Power Supply

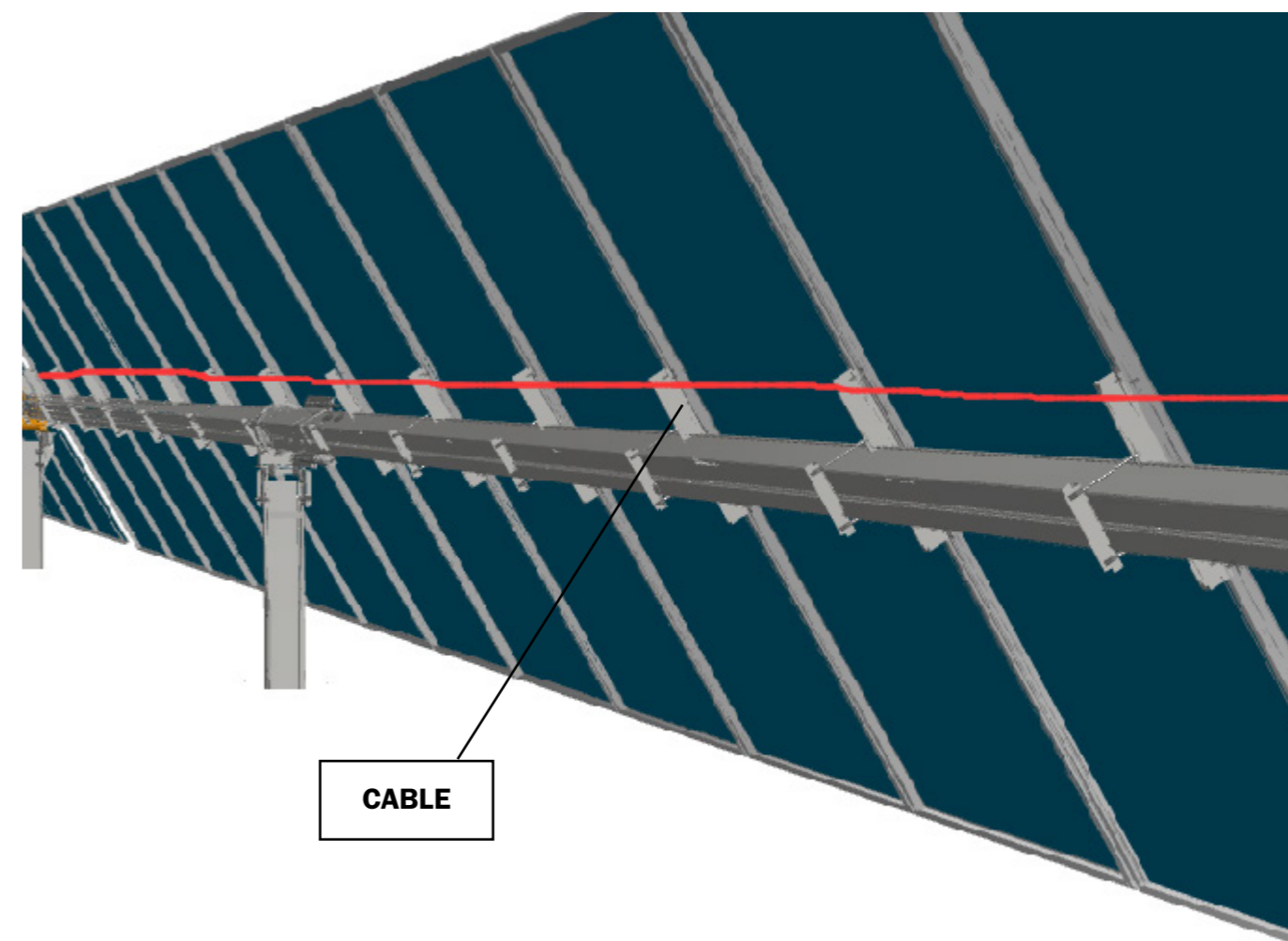


# Control Box Installation

## 4. Recommended cable installation points



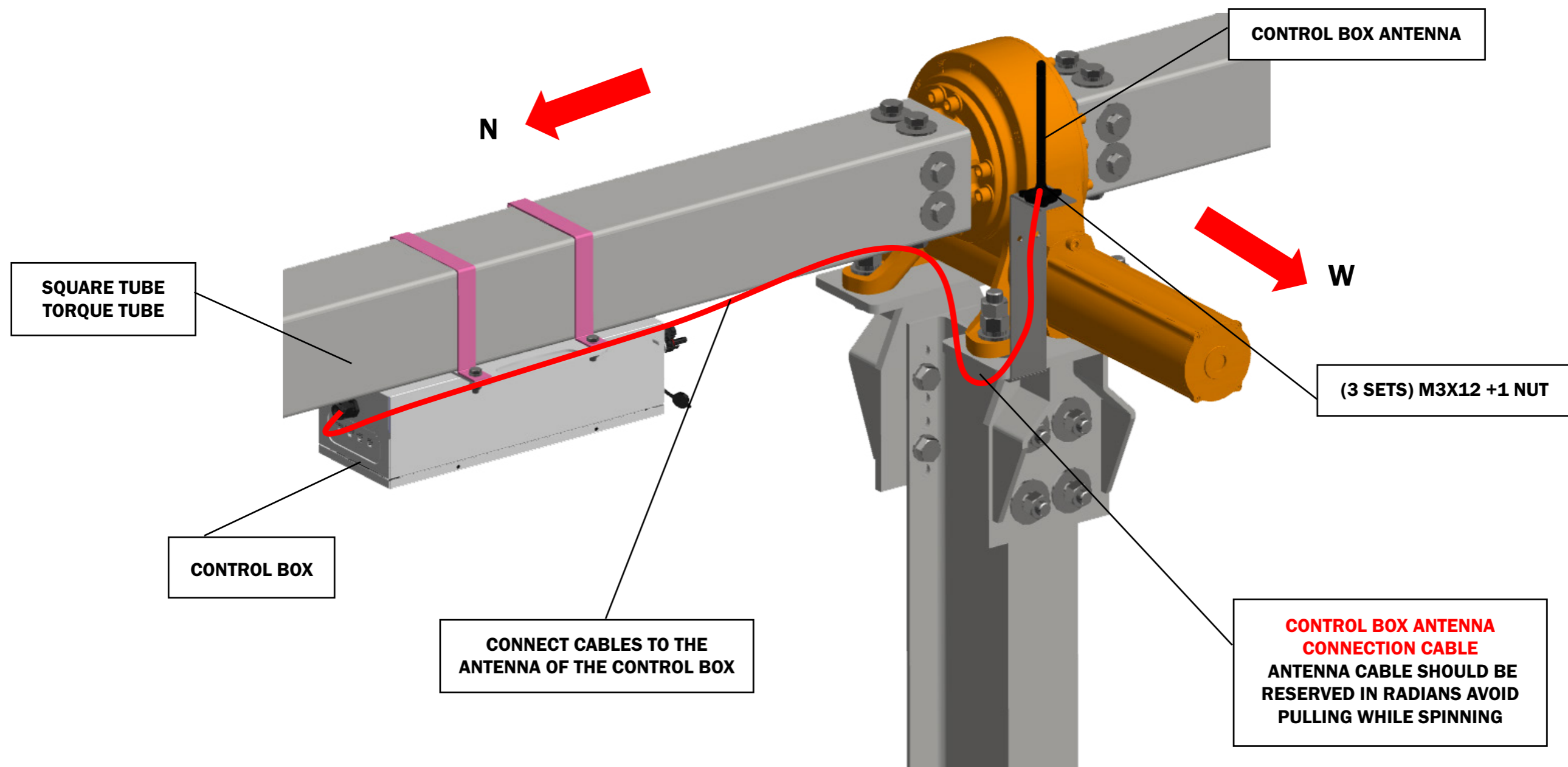
The cable is tied to the bottom of the purlin through a hole at the outermost end of the purlin to avoid friction between the cable and the bearing stand





# Control Box Installation

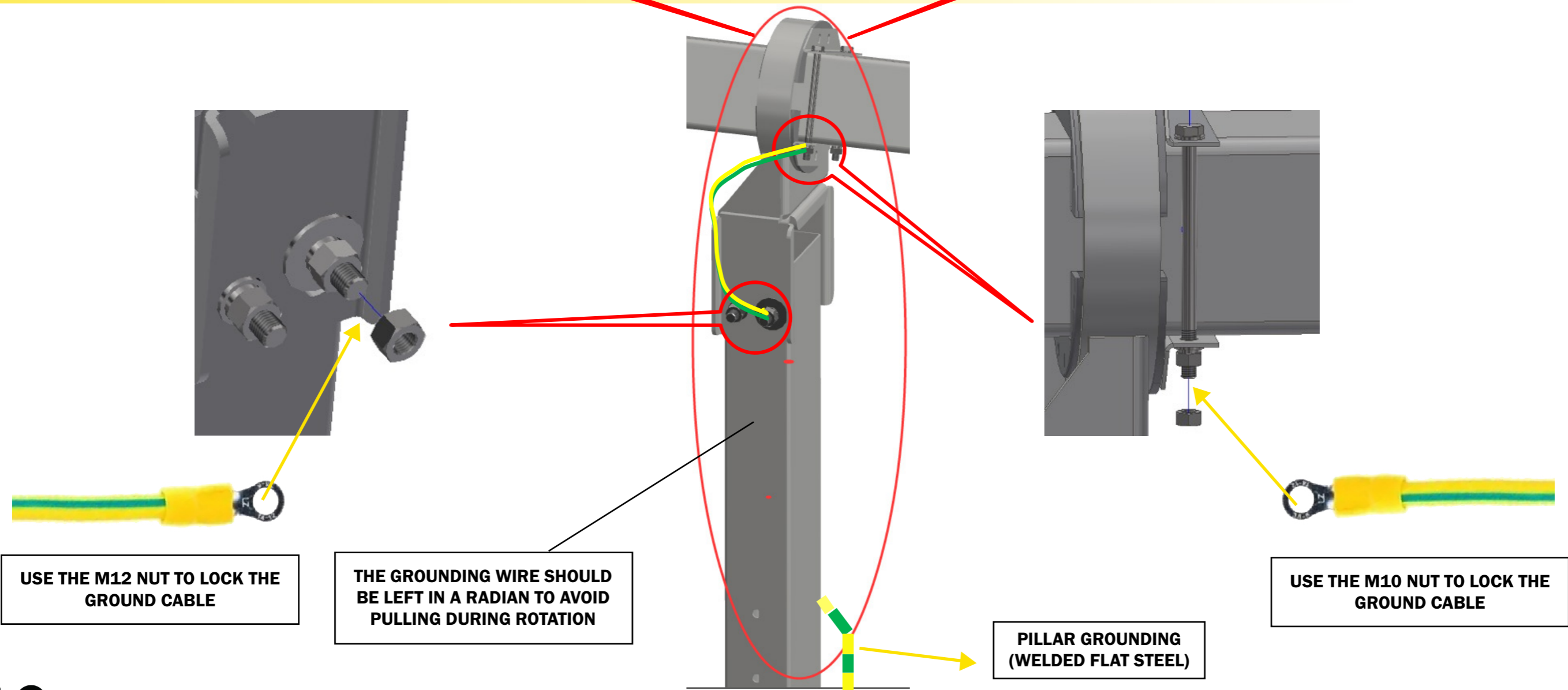
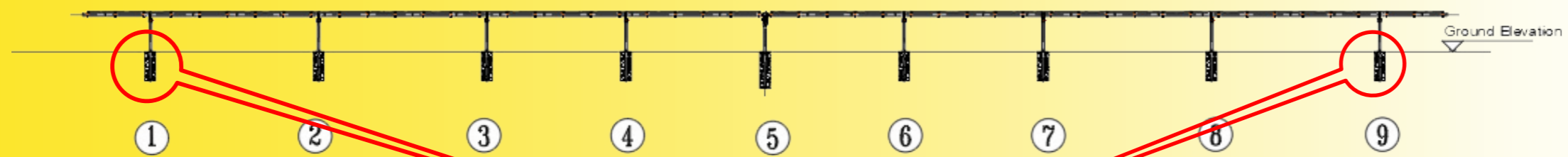
## 5. Control Box Antenna Installation



**NOTE:**

The antenna cable is close to the reducer, and it should be left with a radian to avoid pulling when rotating

# Grounding of Tracker





# Grounding of Tracker



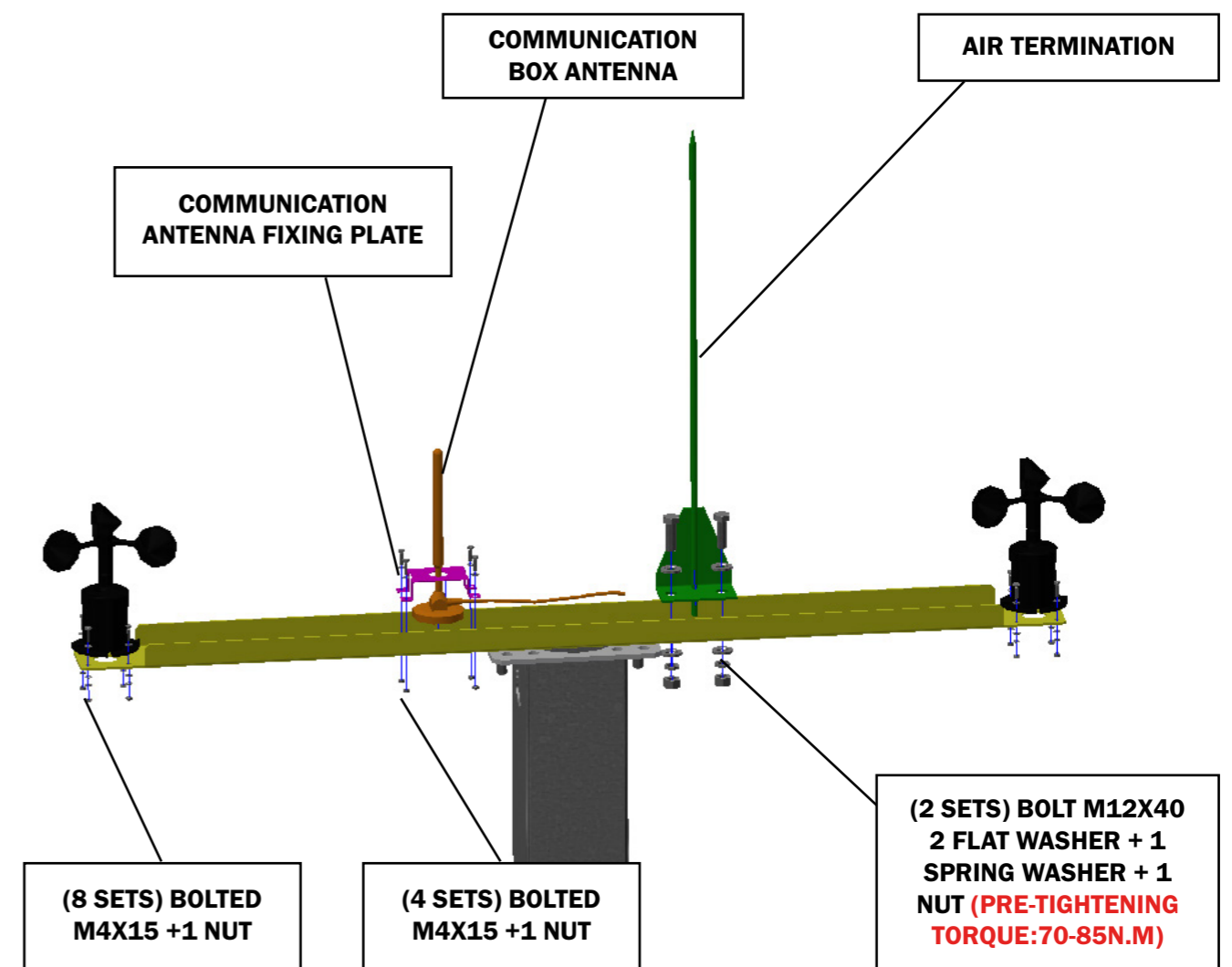
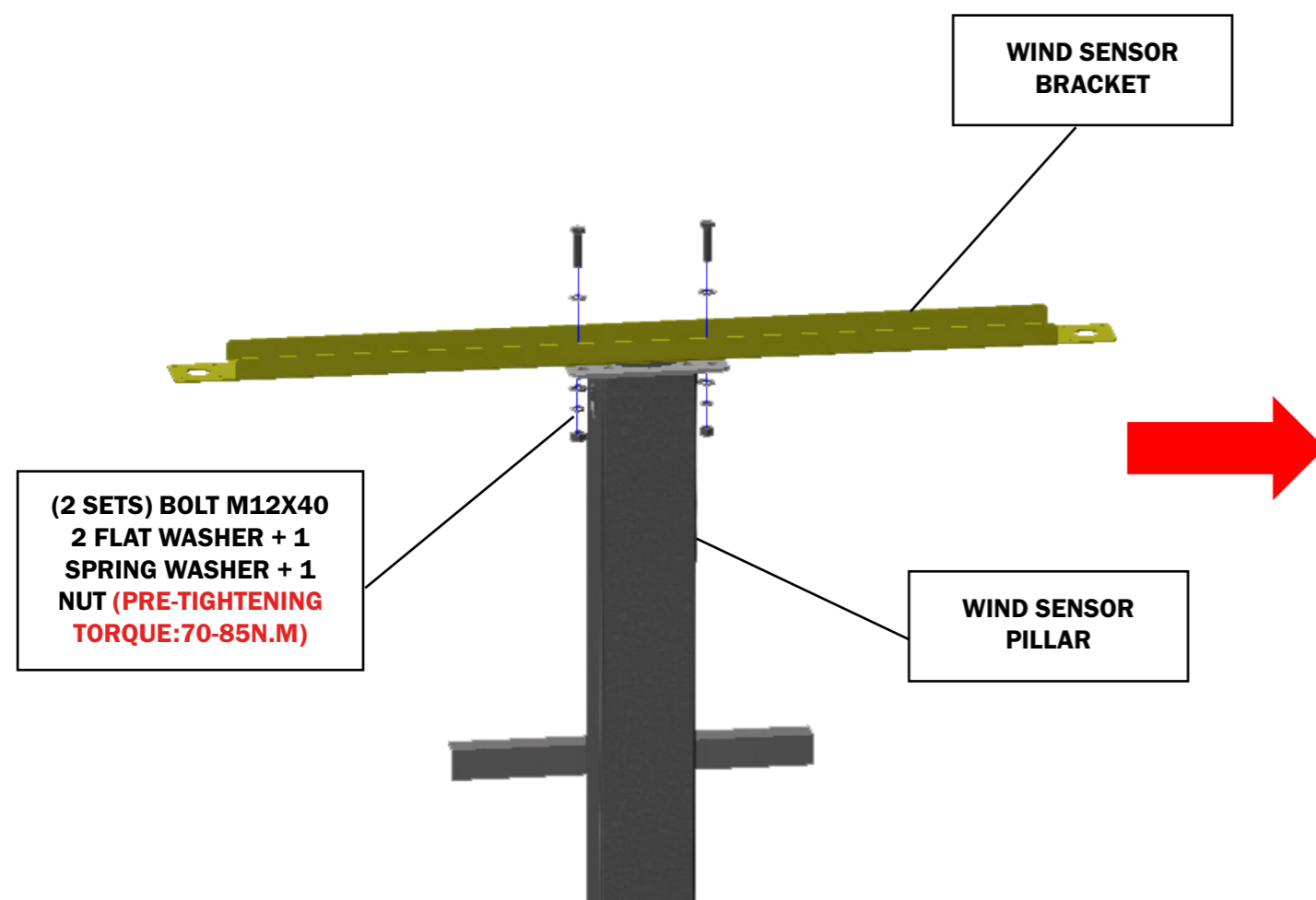
THE GROUNDING WIRE SHOULD BE LEFT IN A RADIANT TO AVOID PULLING DURING ROTATION





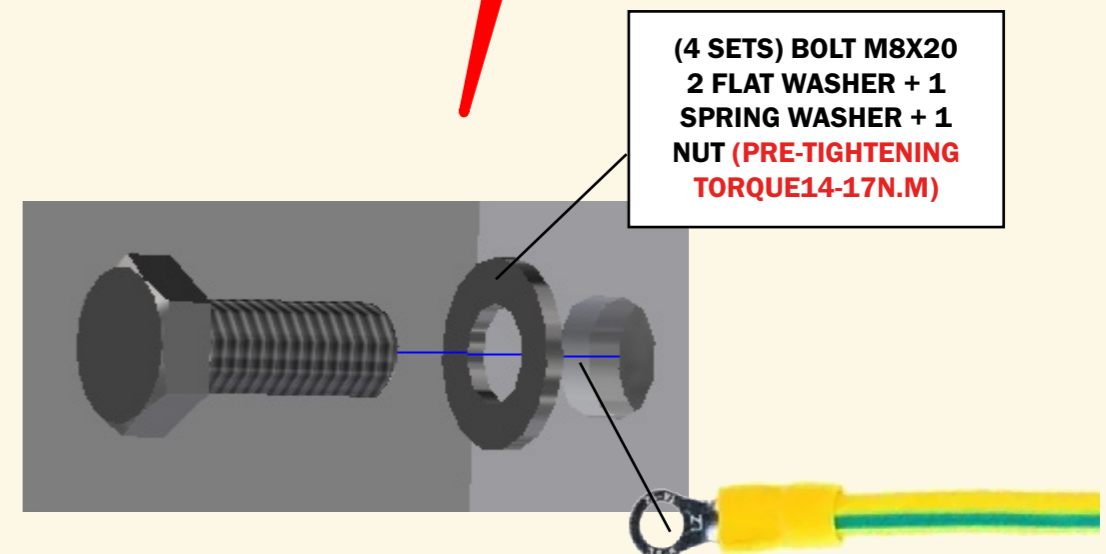
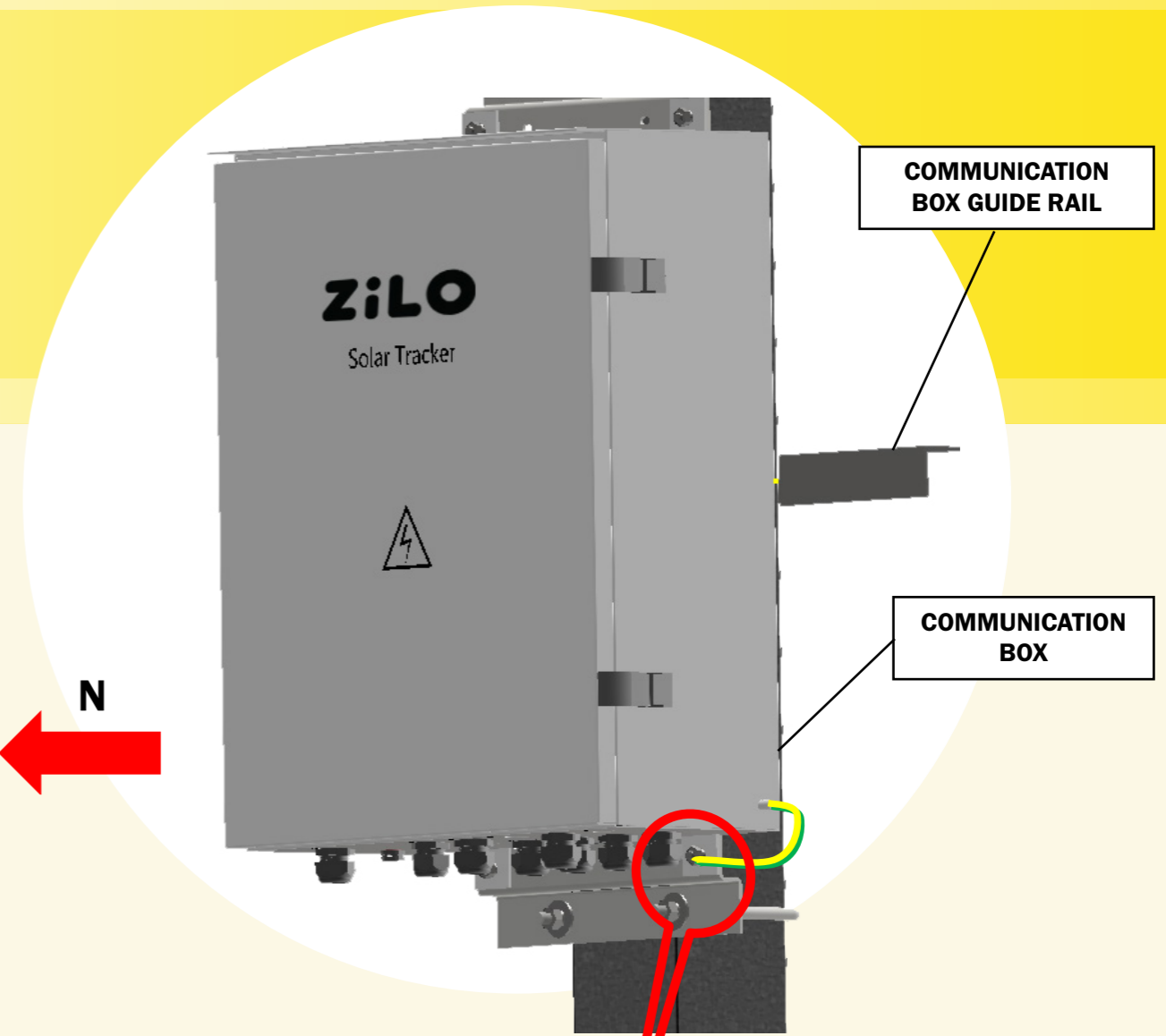
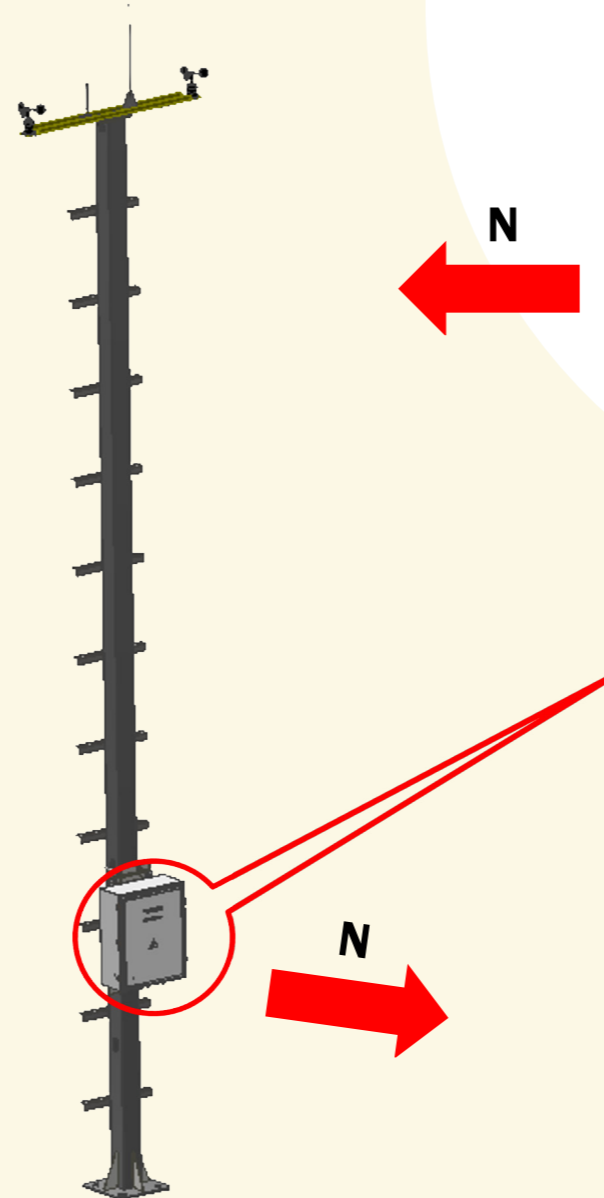
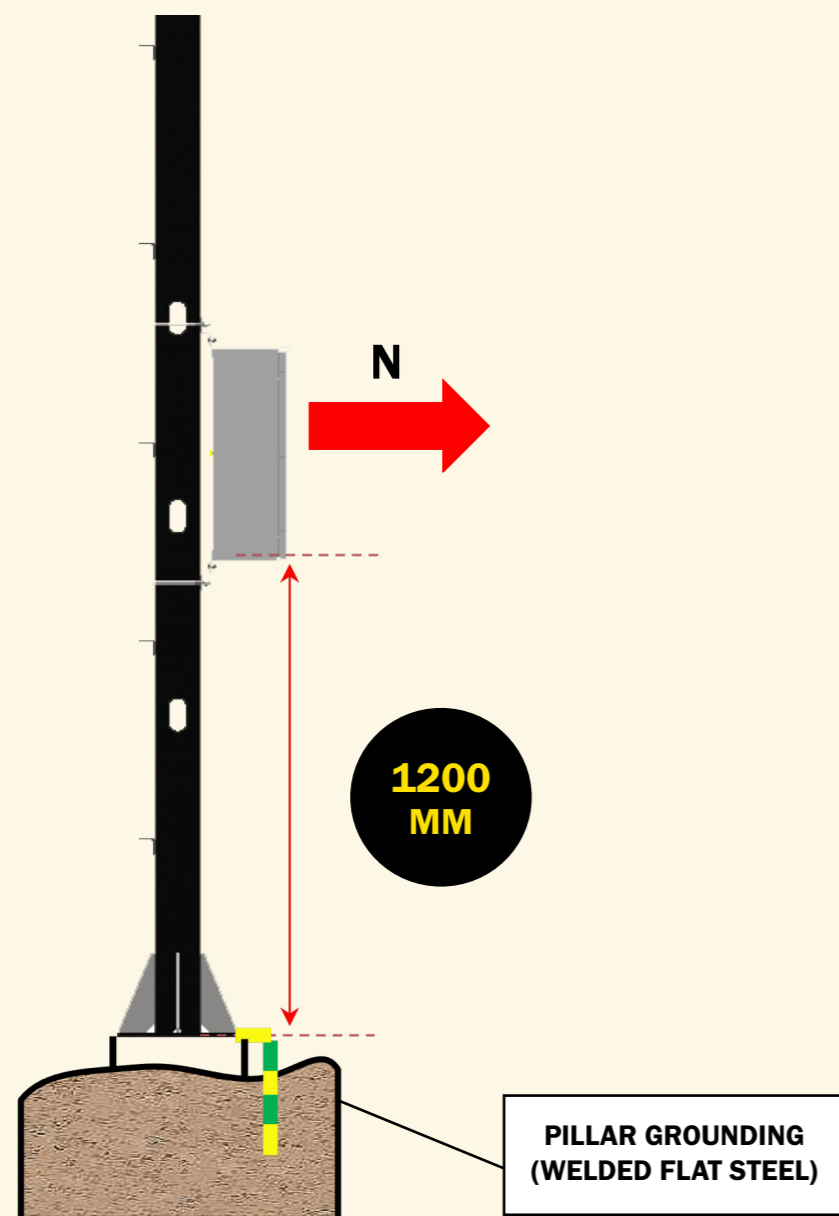
# Wind Speed Sensor and Communication Box Installation

Installation of wind speed sensor support and wind speed sensor



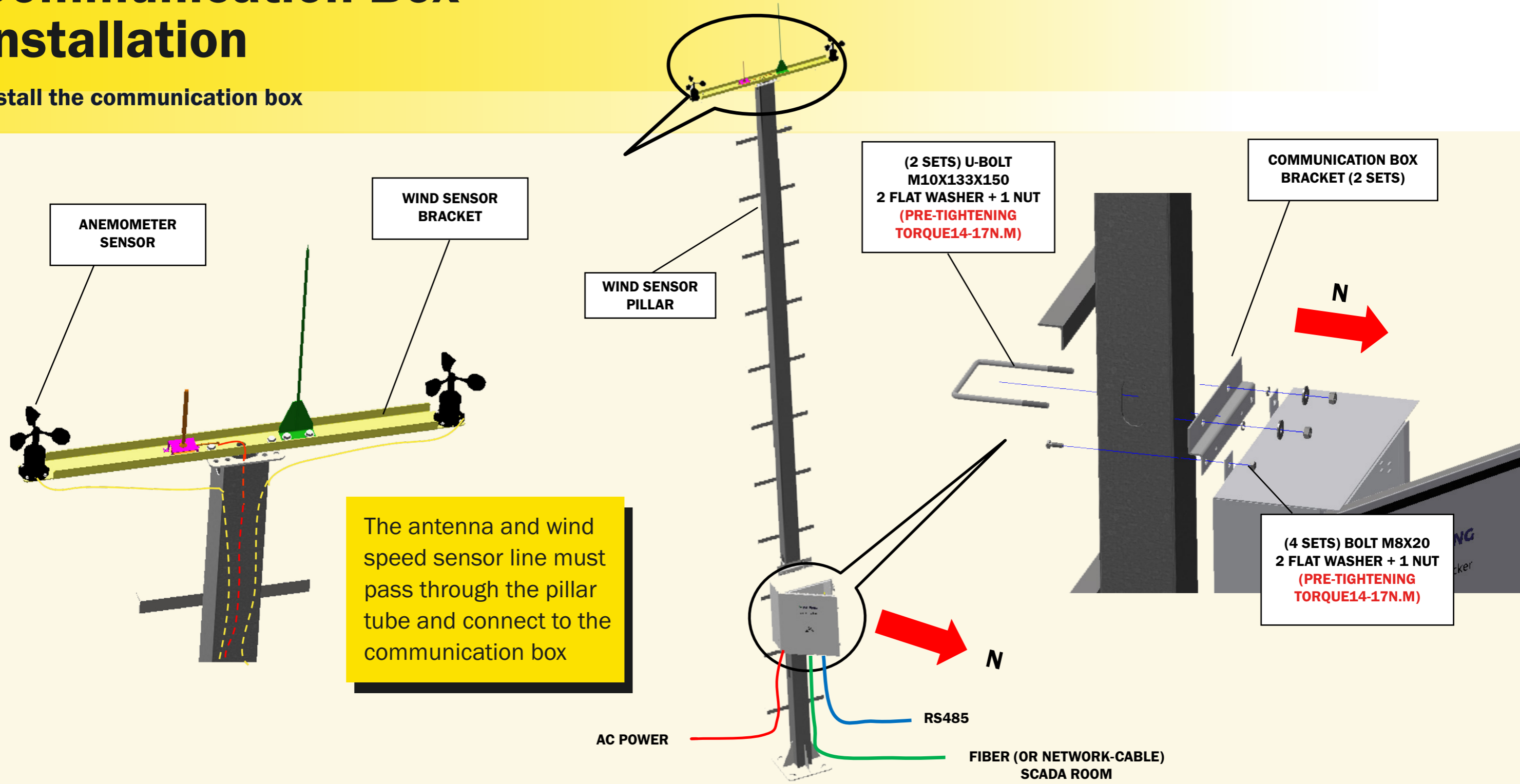
# Wind Speed Sensor and Communication Box Installation

Installation of wind speed sensor support and wind speed sensor



# Wind Speed Sensor and Communication Box Installation

Install the communication box



The antenna and wind speed sensor line must pass through the pillar tube and connect to the communication box



# Installation Positions for Wind Sensor Pillar

Install the communication box

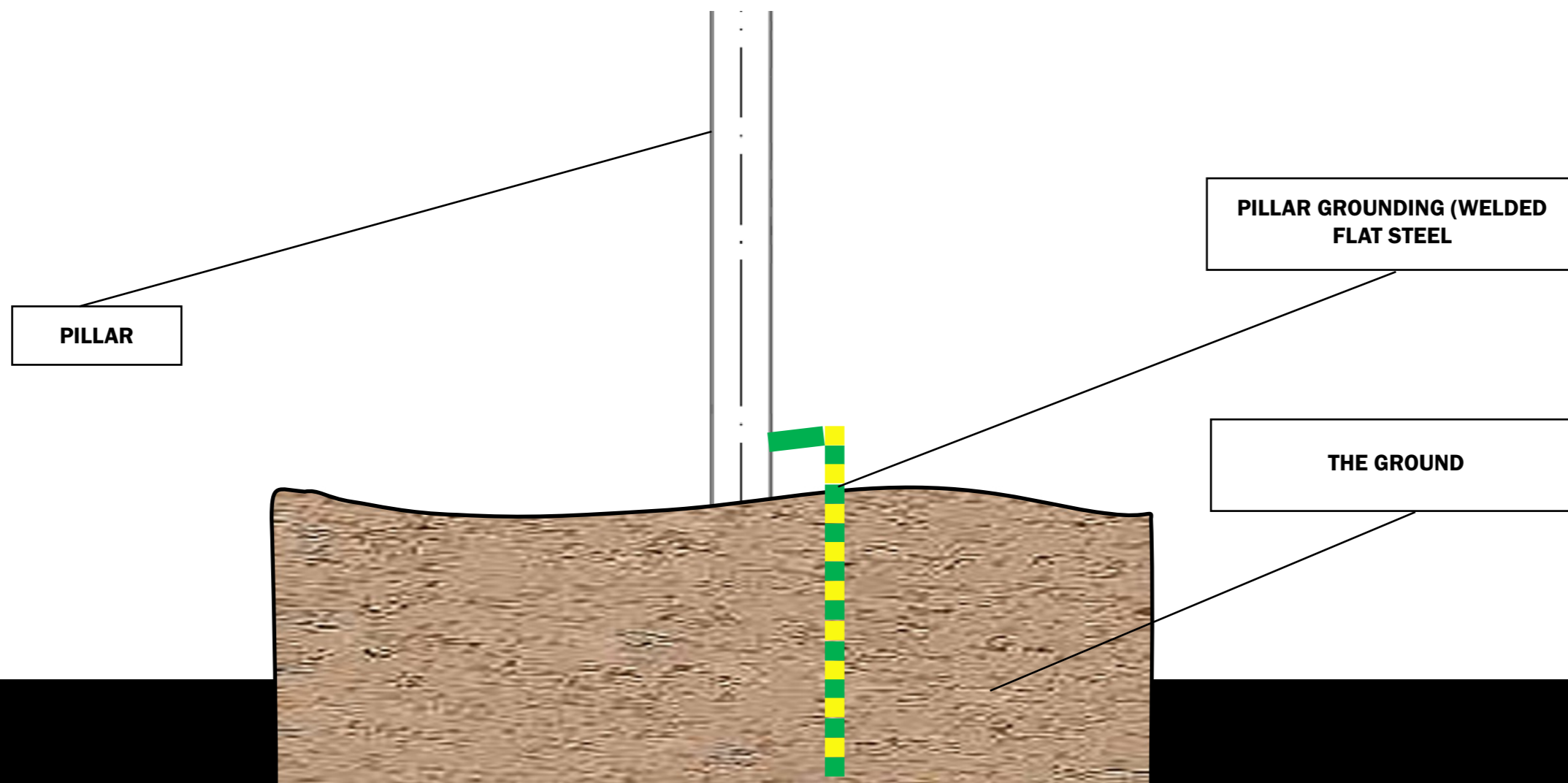


## Note: Installation Positions for Wind Sensor Pillar

The first consideration is to install wind sensitive locations (such as the periphery of the array) to sensitively sense the project wind speed;

Then consider the location close to the project array, convenient for later debugging operation and maintenance; Finally, consider the convenience of access to power.

# Grounding of Pillar 1, Pillar 9, Wind Sensor Post





# ZiLO

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## SOLAR MOUNTING SYSTEMS

**ZILO ENERGY AUSTRALIA PTY LTD**

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