

ALUMINUM MAST – 10 METER

W20-4

That strong and rugged mast is placed on a swiveling bearing in the mast base which must be rooted in a concrete foundation. The standard high is 10 m with three stainless steel span ropes. An instrument carrier at the top for two wind sensors is standard. Other instrument carriers can be delivered optional. The mast will be delivered in segments with flanges. To service the wind sensors, at the top of the mast, the mast can be swiveling down by using counterweights (option /CW) for easy bending down. The whole mast is made from aluminum and the screws are made from stainless steel. The surface can be delivered anodized or lacquered e.g. as option security painted in red and white. (option /RW)

The mast base must be placed into a concrete foundation. Further options are an obstruction light (option /OL) at the top of the mast and the lightning protection (option /LP) which must be used together with a suitable grounding of the mast according to the local conditions.

Free configurable options of the aluminum mast: W20-4/.../...

W20-4	- 10 m swiveling mast (alternative length according customers requirement possible)
... LP	- lightning protection (grounding by local electrician)
...CW	- counterweight for easy handling of bending down
...RW	- security painted in red and white
...OL	- obstruction light at the top of mast

Preconfigured adapted version for airports: W20-4/A:

This mast of 10 m height is security painted in red and white and equipped with:

- a crossarm for wind speed sensor W20-1 and wind direction sensor W20-2,
- 3 pcs. span ropes,
- a lightning protection,
- an obstruction light for mounting at the top of the mast and
- a counterweight for easy handling of bending down

Specifications of mast W20-4:





Height	:	standard: 10 m (alternative height possible: e.g. 6 m)
Connection	:	by flanges (e.g. 6 m mast can be rivet without flanges)
Diameter of the tube	:	120 mm
Wall thickness	:	standard: 3 mm (5 mm on special request possible)
Cross bar at the top	:	for wind sensors W20, length 1.30 m
Rigging	:	by 3 pcs. 4 mm span ropes made from stainless steel
Mast weight without counterweights:		approx. 60 kg (at 3 mm) resp. 80 kg (at 5 mm)
with span ropes and lightning protection		
Weight of counterweights	:	up to 6 x 15 kg
Material	:	aluminum
Surface	:	anodized or lacquered
Required foundations	:	concrete socket for mast
		concrete groundings for span ropes
Optional attachments	:	see above and cross arms for further sensors

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Components, functions and installation of the instrument mast W20-4/A

1. Components, functions and installation of the instrument mast W20-4/A







1.1 Part list for 10 m mast W20-4/A

no	type	pieces
1	3 m mast segment with holes for upper and lower mast bearing 	1
2	3 m mast segment 	1
3	3 m mast segment eyed for 3 pcs. tensioning ropes 	1
4	1 m mast segment 	1
connection parts:		
	Allen screw M6x30 DIN912-A2	36
	washer A6,4 DIN125-A2	72
	self-locking nut M6 DIN985-A2	36

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5	mast base A 2.0 m	1
	connection parts:	
	Allen screws M6x20 DIN912-A2 to install the Outstation AST16-2 at the mast base	4
	Allen screws M6x20 DIN912-A2 to install the holes to connect the uninterruptible power supply box at the mast base	4
		
6	mast base B 2.5 m	1
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7	mast stop (pre-mounted by factory)	1
	connection parts:	
	Allen screw M6x20 DIN912-A2	6
	washer A6,4 DIN125-A2	12
	nut M6 DIN934-A2	6
<hr/>		
8	upper mast bearing A	1
	connection parts:	
	bearing bush	1
	Allen screw M4x10 DIN912-A2	2
	hexagon bolt M12x180 DIN931-A2	1
	washer A13 DIN125-A2	2
	self-locking nut M12 DIN985-A2	1
		
<hr/>		
9	lower mast bearing B	1
	connection parts:	
	bearing bush	1
	Allen screw M4x10 DIN912-A2	2
	hexagon bolt M12x180 DIN931-A2	1
	washer A13 DIN125-A2	2
	self-locking nut M12 DIN985-A2	1
		
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10	Instrument cross arm No. W20-3	1
	connection parts:	
	end caps	2
	hexagon bolt M6x55 DIN933-A2	2
	washer A6,4 DIN125-A2	2
	nut M6 DIN934-A2	2

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11	mast lid with Allen screw M8x80 DIN912-A2 upper support for lightning rod upper lightning rod segment with bending support for obstruction light obstruction light		1 2 1 1 1 1
12	11 m cable for obstruction light		1
13	lightning rod, 3 m lenght		3
14	lower lightning rod, 0,5 m lenght		1
15	lightning rod connectors 		4
16	axis for counter weights connection parts: nut M30 DIN934-A2 washer A31 DIN125-A2		1 3 2
17	counterweight (15kg)		6
18	anchor chain 60cm / 6 mm diameter		3
19	tensioning rope with turnbuckle and terminal		3
20	screwed flange PG16 (pre-mounted at the mast base A)		2
21	cable protection tube		1

1.2 Mounting instructions for the 10m mast W20-4/A

The mast consists of three tubes of 3 m length each and one tube of 1 m length. It is equipped with flanges for easy assembling. In the final stage the assembled 10 m mast tube is fixed between the mast bases and tensioned by three pcs. 4 mm stainless steel ropes. Furthermore, the counter weight for easy handling of bending down, the lightning protection and the obstruction light are installed.

Necessary tools and equipment for mounting (not included):

- allen keys 3 mm, 6mm
- yaw spanner 10 mm, 17mm, 19 mm
- nut driver 19 mm
- pipe wrench

General hints:

- it is recommended to install the mast by two persons, but with one person only possible
- use grease on all threads and nuts (against corrosion and seizing up)

First arrangements:

- unpacking all parts and remove the outer cover
- check for completeness of all parts (*see List 1 above*)

Arranging of the mast base:

- the mast base (*consisting of part 5 to 9*), is delivered preassembled
- if not, assemble the mast base according to the drawing “*Mast fig. No. 2*”
- dig a hole with the dimensions 1 m x 1 m x 0.5 m depth and cement the pre-mounted mast base according to the drawing “*Mast fig. No. 3*” up to the maximal depth of the mast bases which is marked on the mast base A (Part 5) and mast base B (Part 6) by red marking lines at 40 cm



- do not remove the upper mast bearing A (Part 8) and lower mast bearing B (Part 9), before the concrete is ready
- the socket looks 10 cm out of the surface like the 3 foundations for the tensioning ropes

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Assembling of the mast tubes (*Part 1 to Part 4*):

- put the four mast segments in the correct order according the markings on each segment
- **Attention!** For the position of the mast tubes please take attention to remark on “Mast Fig. No. 1”, because the mast can be erected from this side only
Furthermore, consider the following important points for the correct position of all segments before assembling with the Allen screws:
 - the cross arm (resp. its holes in segment part 1) must be parallel to the holes of the upper and lower mast bearing
 - the 7 eyebolts for the lightning rods on all 4 segments must be on the same side to put the copper lightning rods through them
- **Attention!** Please consider Mast fig. No. 5: the sensor cables and the cable of the obstruction light should be arranged inside of the mast tubes before the segments can be flanged
- at first put the 3 m mast segment (*Part 1*) which is equipped with holes for the upper and lower mast bearings near the cemented base
- as next the 3 m mast segment (*Part 2*)
- then the 3 m mast segment which is eyed for 3 pcs. tensioning rope (*Part 3*)
- at last the 1 m mast segment (*Part 4*)

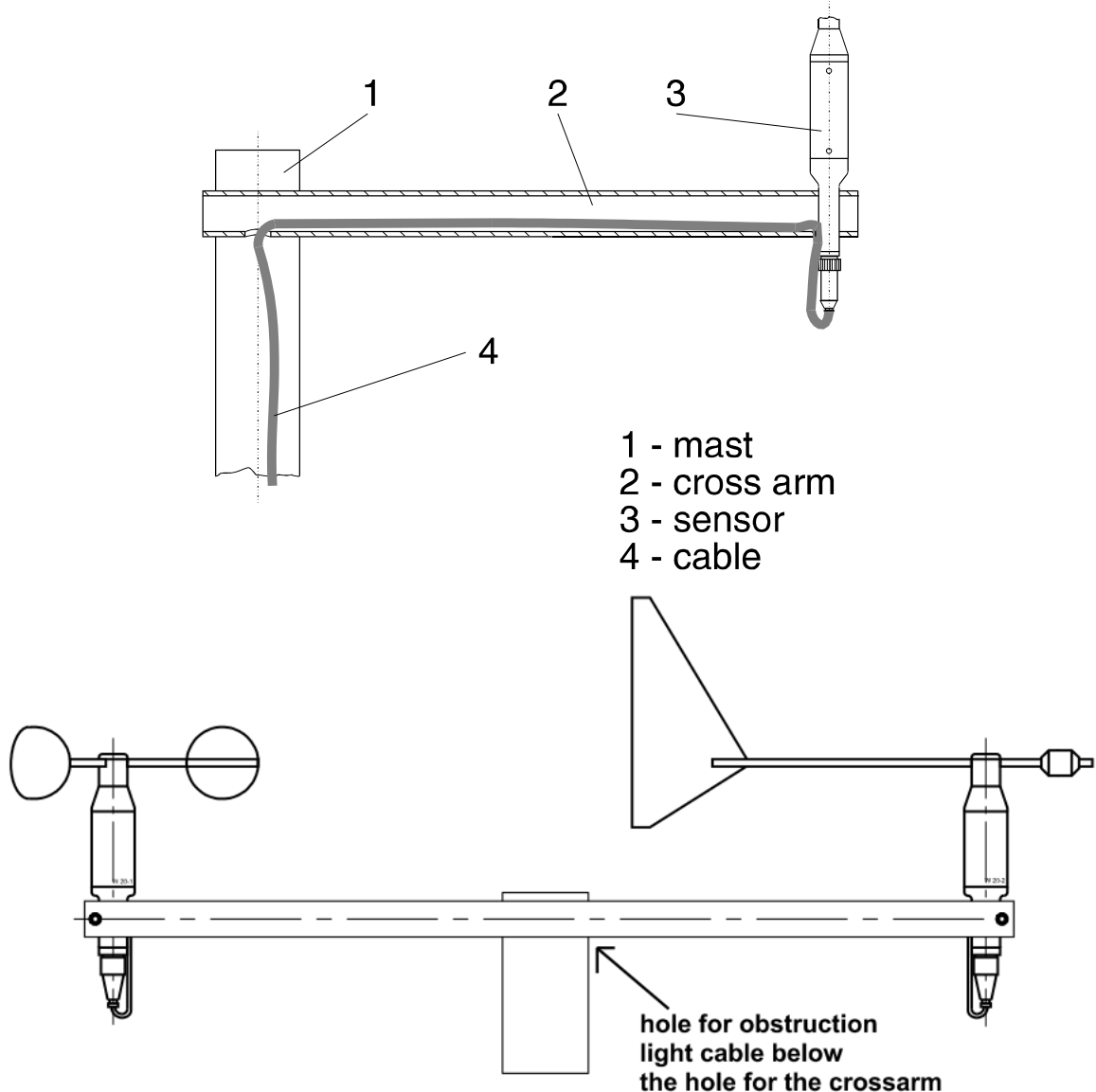
- pull the sensor cables and the cable for the obstruction light (*Part 12*) through the 1 m mast segment “top” (*Part 4.*) and fix the cable-ends with the sockets with a knot at the holes for the cross-arm
- pull the all cables through the next 3 m mast segment (*Part 3*) and then through the 3 m mast segment (*Part 2*)
- finally pull the cables through the 3 m mast segment (*Part 1*) and pull the end of the cables through the hole with thread PG16
 - use:
 - 36 pcs Allen screws M6x30 DIN912-A2 with some grease,
 - 72 pcs. washers A6,4 DIN125-A2,
 - 36 pcs. self-locking nuts M6 DIN985-A2



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Mounting the instrument cross-arm (*Part 10*):
(only in connection with AMS16-W and AMS16-WP)

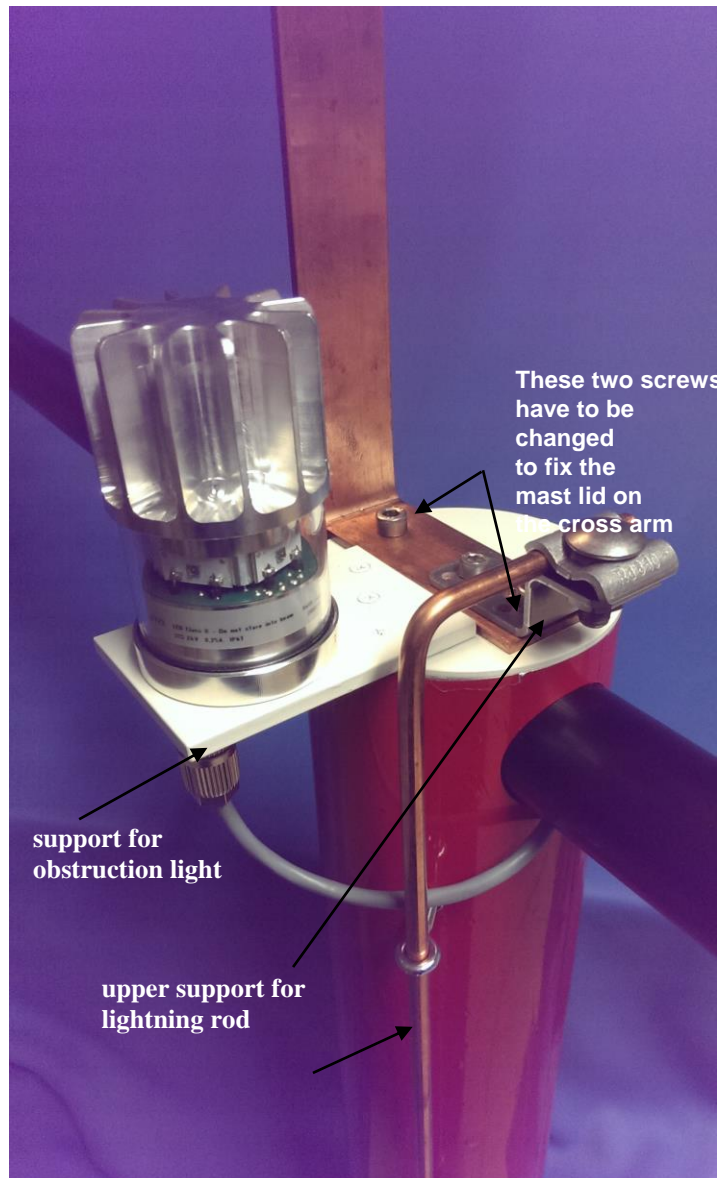
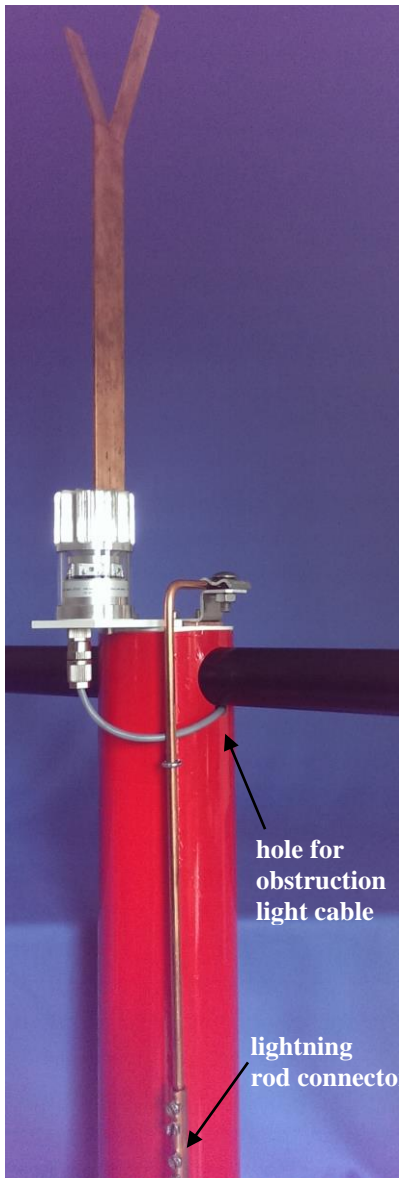
- remove the screws and end-caps from the cross-arm
- push cross-arm through the holes in mast-top and turn the hole in the middle of the cross-arm upside to insert the sockets of the sensor-cables
- insert the two sensor cables with sockets according to the drawing below when the middle hole shows upside
- next turn the hole in middle of cross-arm to mast base
- push the obstruction light cable through the little hole under one of the cross-arm holes



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Attachment of obstruction light / lightning rod and mast lid (Part 11):

- these components are preassembled for easy installation
- remove the two Nuts M8 DIN934-A2 from the both long screws (these nuts two screws are only for transportation)
- make a 180° rotation of the copper upper lightning rod segment, so the rod can be insert in the upper eyelet of the 1 m mast segment (*Part 4*)
- insert the mast lid on the top of the upper mast segment (*Part 4*)
- fix the mast-lid with the two Allen screws M8x80 DIN912-A2 in the holes of the cross arm (*Part 10*)
- fix the mounting of the upper lightning rod segment with a 17 mm yaw spanner
- remove the cap on the underside of the obstruction light and plug the obstruction light cable on the thread
- add the end-caps of the cross arm with screws, nuts and washers but do not tighten the nuts before the sensors are in their final position



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Attachment of the lightning rod

- put the 3 pcs. lightning rod of 3 m length (*item 13*) each and the lightning rod of 0,5 m length (*item 14 for the lowest point of the mast*) through the eyelets of the mast segments and connect them by using the delivered lightning rod connectors (*item 15*)



- the grounding of the mast must be done by your local electrician

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Installation of assembled mast tube on the mast base:

- when concrete with the mast base is cured completely, remove the two hexagon bolts M12x180 DIN931-A2 and the bearing bushes (*Part 8 and Part 9*) of the pre-mounted mast base
- remove one Allen clamp-screw M4x10 DIN912-A2 from the bearing bush A (*Part 8*) and from bearing bush B (*Part 9*)
- insert both bearing bushes (*Part 8 and 9*) into the mast segment (*Part 1*) and attach the prior removed Allen clamp-screws M4x10 DIN912-A2



(picture: surface colour can be different)

- take the mast to the mast base and connect them by using the upper holes and the upper hexagon bolt M12x180 DIN931-A2, the two washers A13 DIN125-A2 and the self-locking nut M12 DIN985-A2
- please consider, that the synthetic washers must be on both sides of the bearing bushes between the mast bases



(picture: surface colour can be different)

- tighten the upper Allen clamp-screws M4x10 DIN912-A2
- attach the M12 nut but do not tighten it! This will be done after erection of the mast

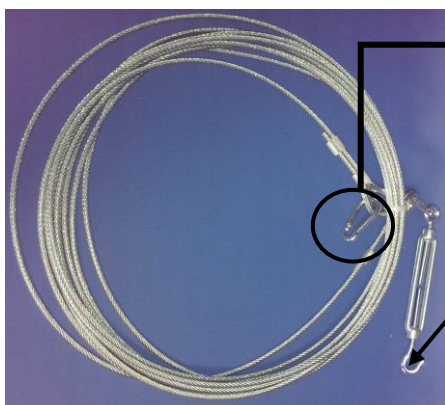
Installation of the sensors:

- put a stand or chair below the 1 m mast segment, so that the sensors can not touch the surface during the following montage procedure
- attach the wind speed sensor No. W20-1 and the wind direction sensor No. W20-2 at the cross arm (*Part 10*)
- for adjusting the wind direction sensor W20-2 to north: see chapter **Fehler! Verweisquelle konnte nicht gefunden werden.**
- tighten the hexagon clamp-bolts M6x55 DIN933-A2 on the cross arm to fix both sensors
- insert the cable-sockets into the sensor-plugs and tighten the coupling nuts
- **Attention!** The cables are identical, but they are marked from factory to make easier the wiring at the outstation

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Installation of tensioning ropes

- dig three holes (dimensions 0.4 m x 0.4 m x 0.4 m deep) and cement the the stay-chain according to the drawing “*Mast fig. No. 4*”
- the socket looks 10 cm out of the surface like the mast foundation
- the anchor chain is 20 cm cemented and 40 cm out of it
- it is important to comply with the dimensions given in this drawing, because the tensioning ropes are predefined for these distances from factory
- attach the three tensioning ropes (*Part 19*) on the eyed mast segment by using the spring hooks



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Installation of counterweight and turn up of the mast:

- put the axis for counter weights (*Part 16*) through the both holes of the 3 m mast segment (*part 1*) which are located below the lower mast bearing B (*Part 9*) see *Mast fig. No. 7*

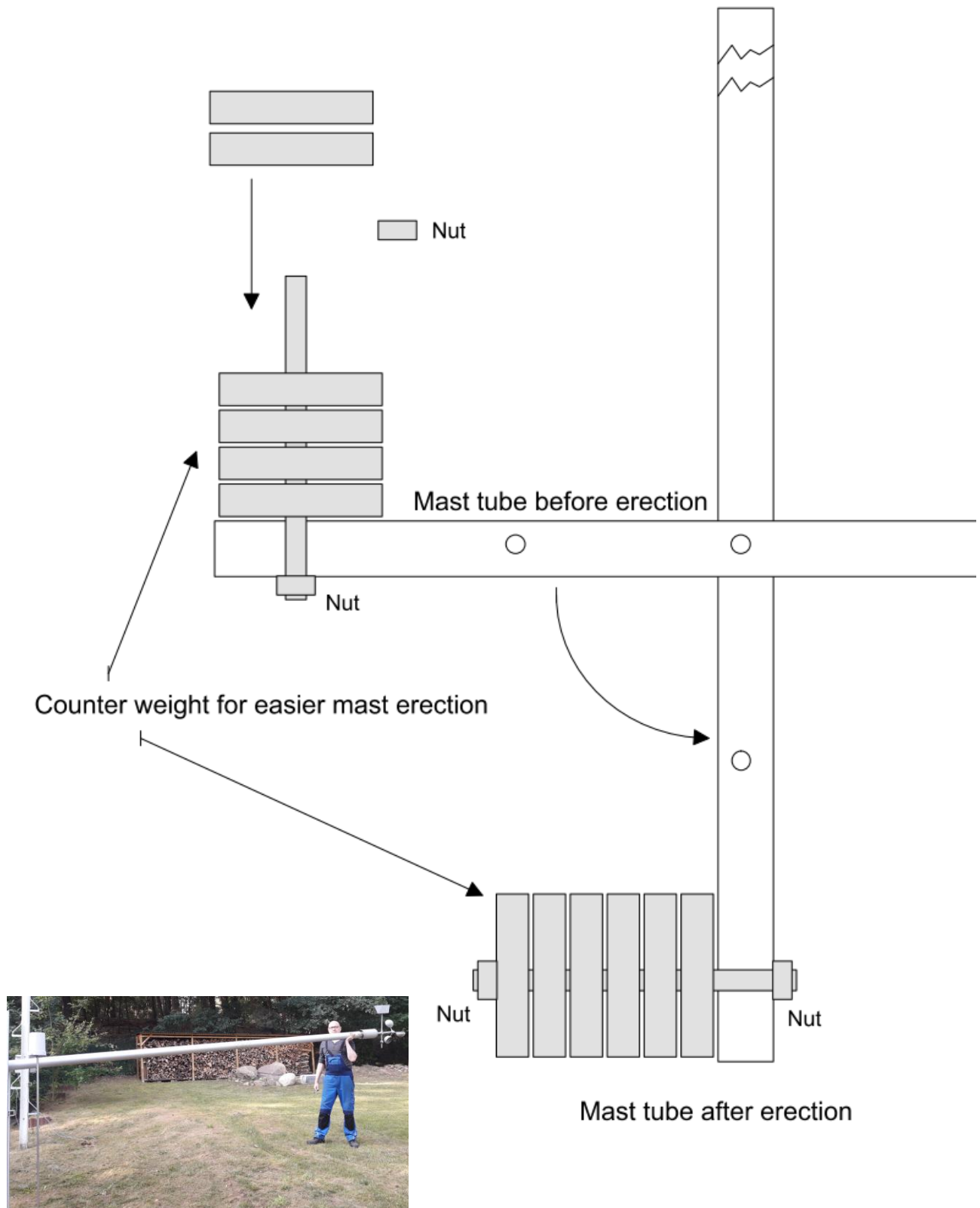


- fix the axis with nuts M30 DIN934-A2 and washer A31 DIN125-A2 on both sides of the mast, by using a pipe wrench or large yaw spanner
- put the 6 pcs. counterweight (15kg each) (*Part 17*) step by step on the axis and fix them by a nut M30 DIN934-A2



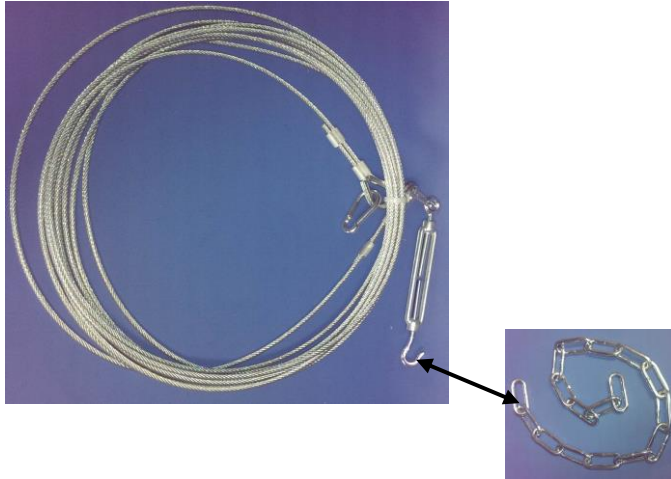
- **Attention!** the mast-top can lift from the surface
- the counterweights will facilitate the raising of the mast
- when the mast is in vertical position, push the hexagon bolt M12x180 DIN 931-A2 in the lower mast bearing
- please take care, that the synthetic washers are on both sides of the bearing bushes between the mast bases
- grease the thread and attach the nut M12 DIN984-A2 and fix them
- finally fix the hexagon bolt M12x180 DIN931-A2 at the upper bearing bush (*Part 8*)
- pull the 3 cables through the tube which can be put into the screwed flange PG16 (*Part 20*) of the mast segment and the screwed flange of the mast base A after mast erection
- flange all 4 segments of the mast together

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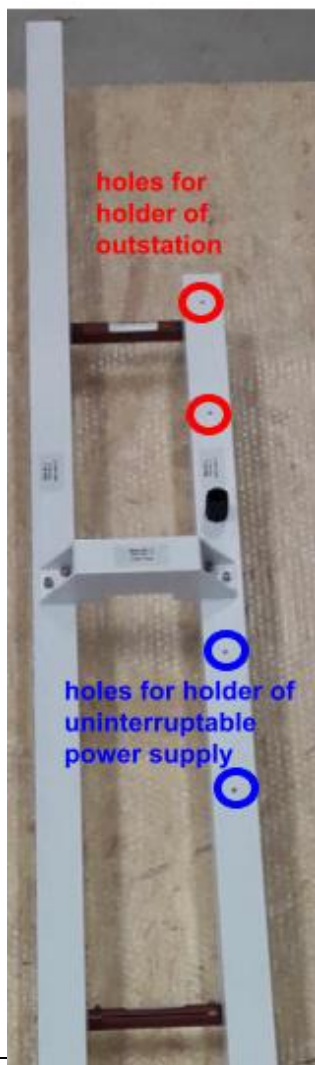
Fixing of the three tensioning ropes

- fix the three tensioning ropes at the anchor chains which are cemented in the three sockets and tighten them with the turnbuckles (*see Mast fig. No. 8*)



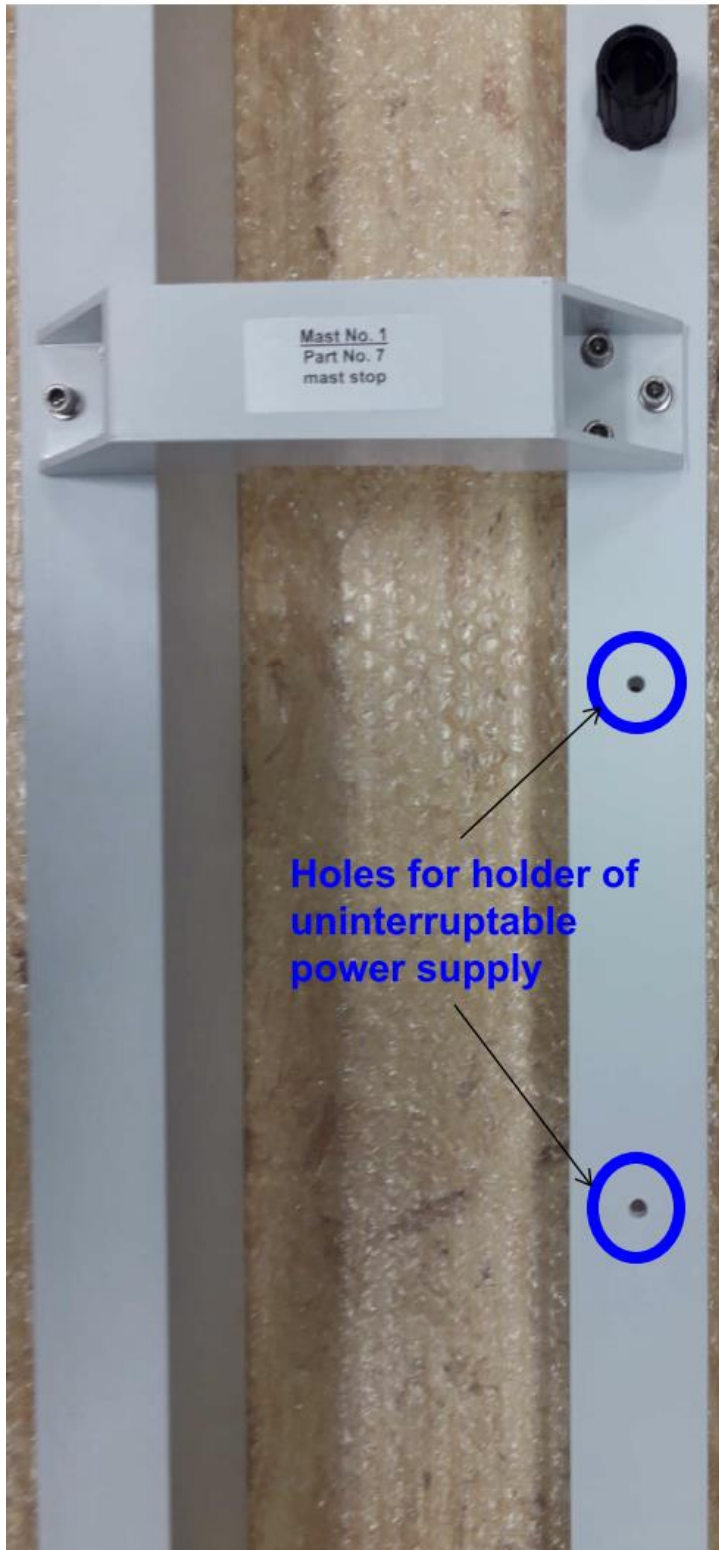
Installation of Outstation AST16-2 (only in connection with AMS16-W and AMS16-WP)

- fix the outstation on the mast base A (length 2.0 m) by using the 4 Allen screws M6x16 DIN912-A2 (screws are attached at the holder of the outstation)



Installation of the uninterruptible power supply (in case of order)

- fix the uninterruptible power supply box below the outstation on the mast base A (length 2.0 m) by using the 4 Allen screws M6x20 DIN912-A2 (screws are attached at the holder of the uninterruptible power supply)



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Installation of the cable of the obstruction light

- connect the cable of the obstruction light in the Outstation according the drawing with the clamps 7, 9 and 10 (1 and 2 are already connected by factory)

blue cable (- input) connect to 2
red cable (+ input) connect to 1
(both, done by factory)

Power supply in
the Outstation
AST16-2



Obstruction light

connection of obstruction light cable:

two coloured yellow/green cable = earthing
connect to 7

black cable (- input) connect to 9

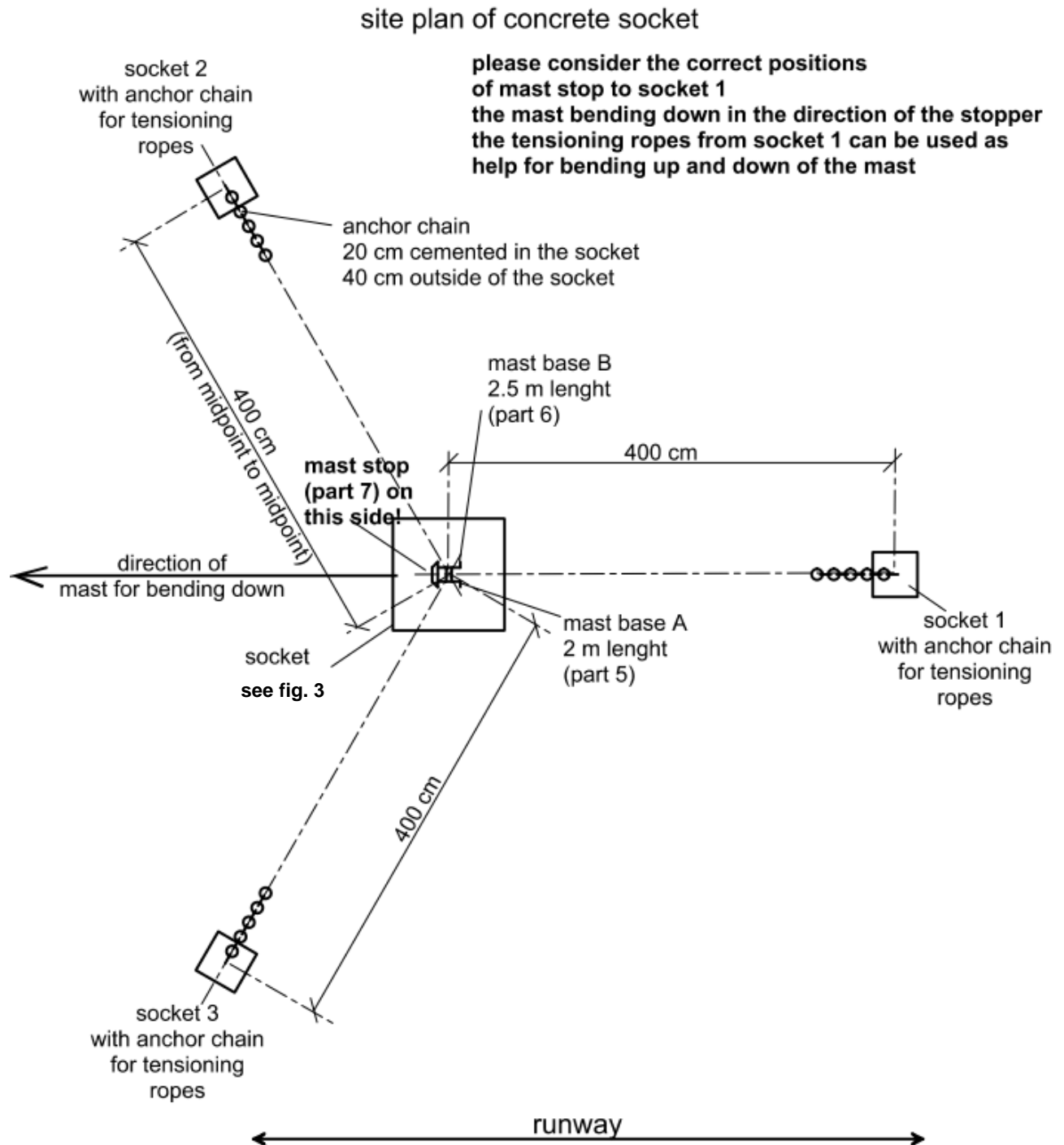
yellow marked cable (+ input) connect to 10

The mounting of the mast is complete now!

Important: Before bending the mast down for maintenance of sensors, loosen the nut of the mast screw at upper bearing bush (*Part 8*) and remove the lower mast hexagon screw.

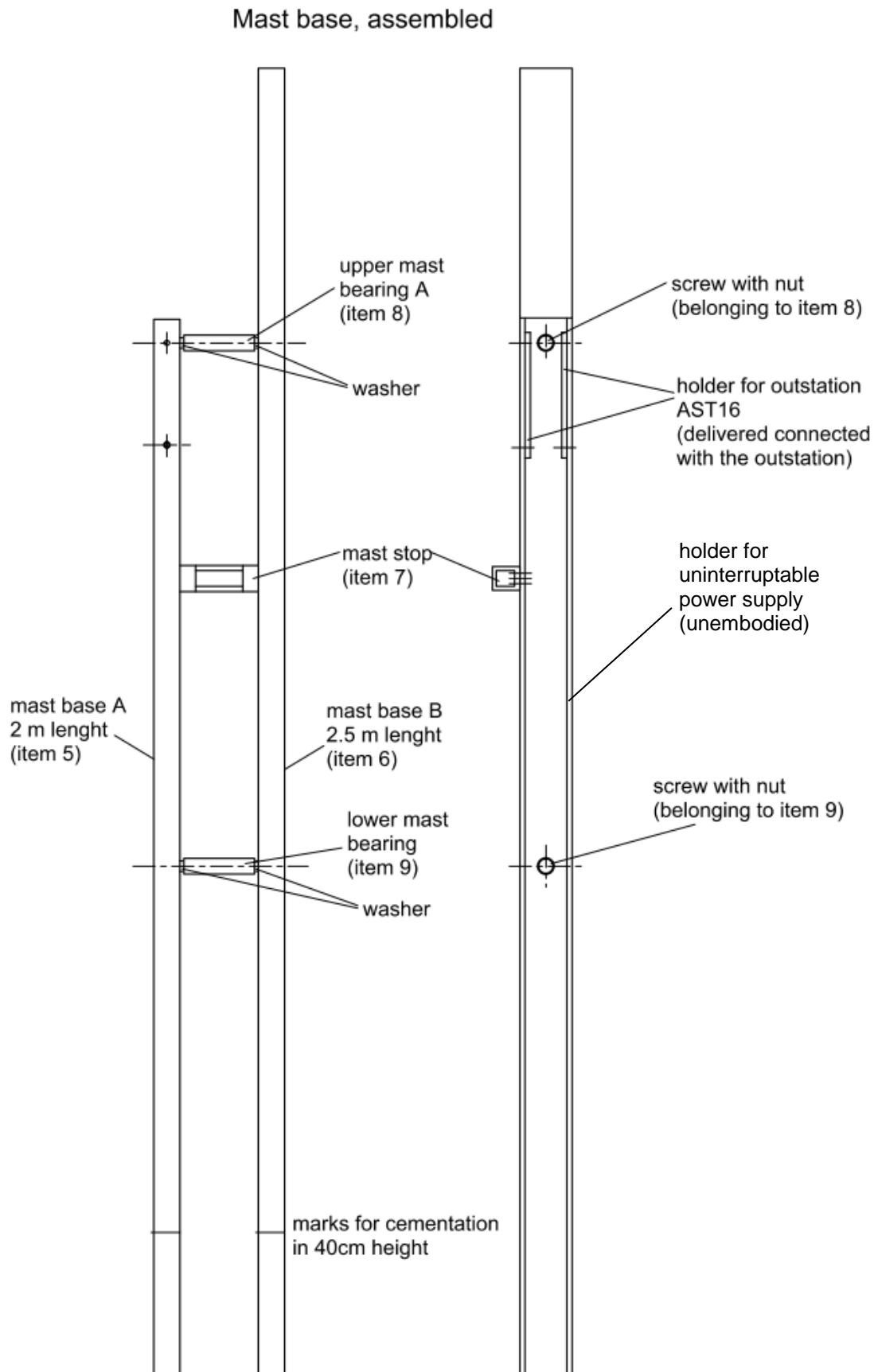
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Mast Fig. 1 Ground-plan for instrument mast W20-4/A



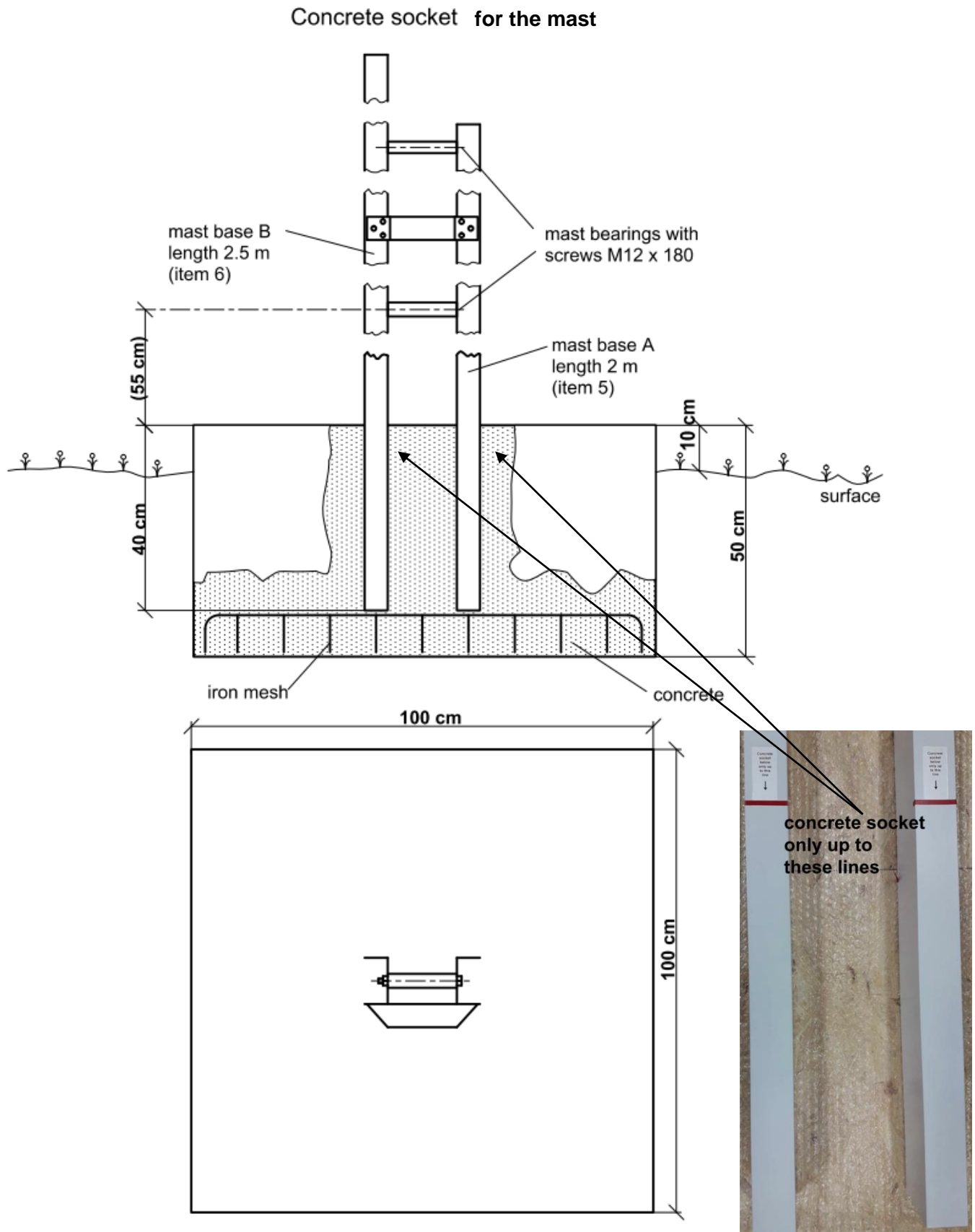
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Mast fig. No. 2



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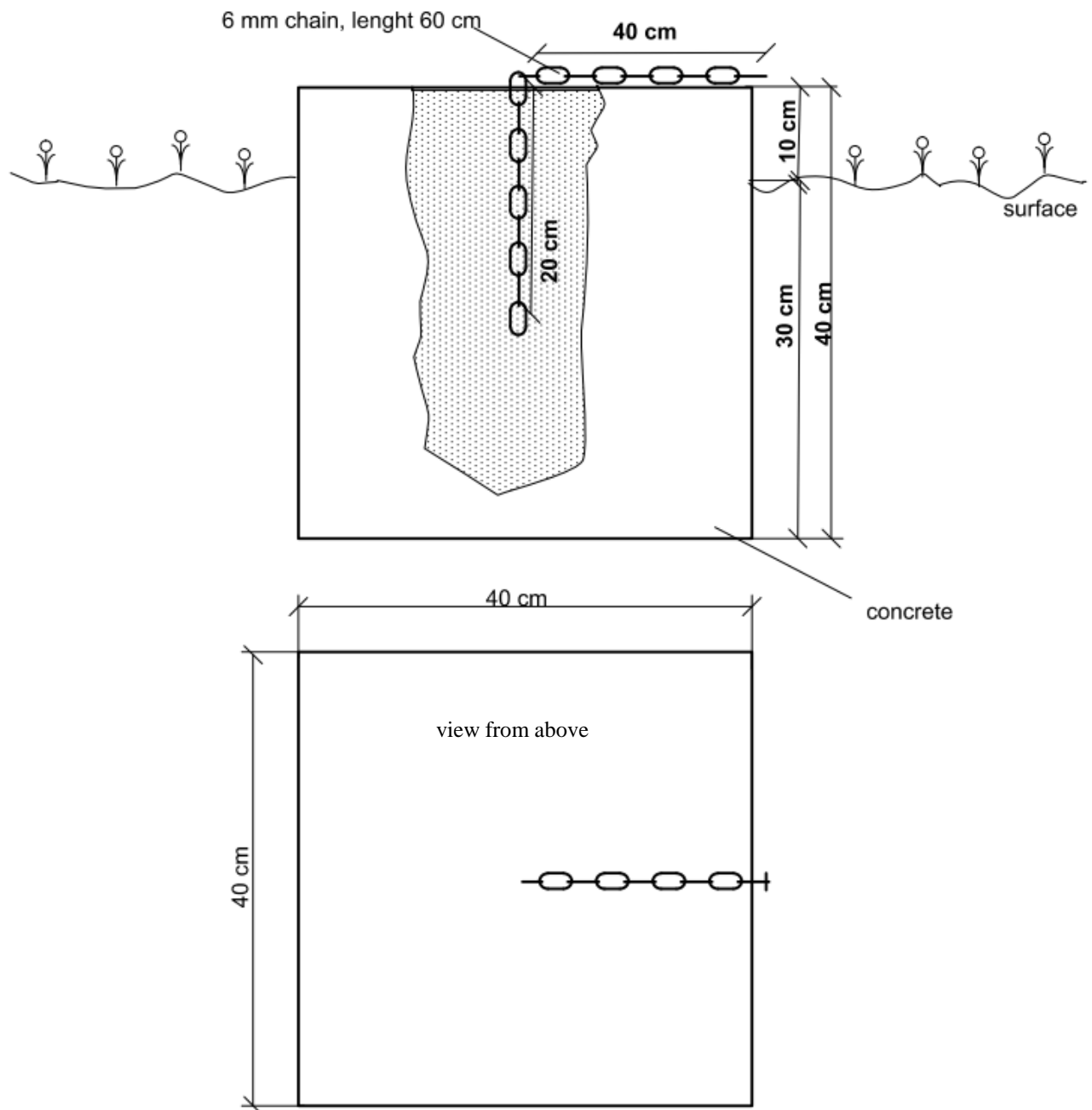
Mast fig. No. 3



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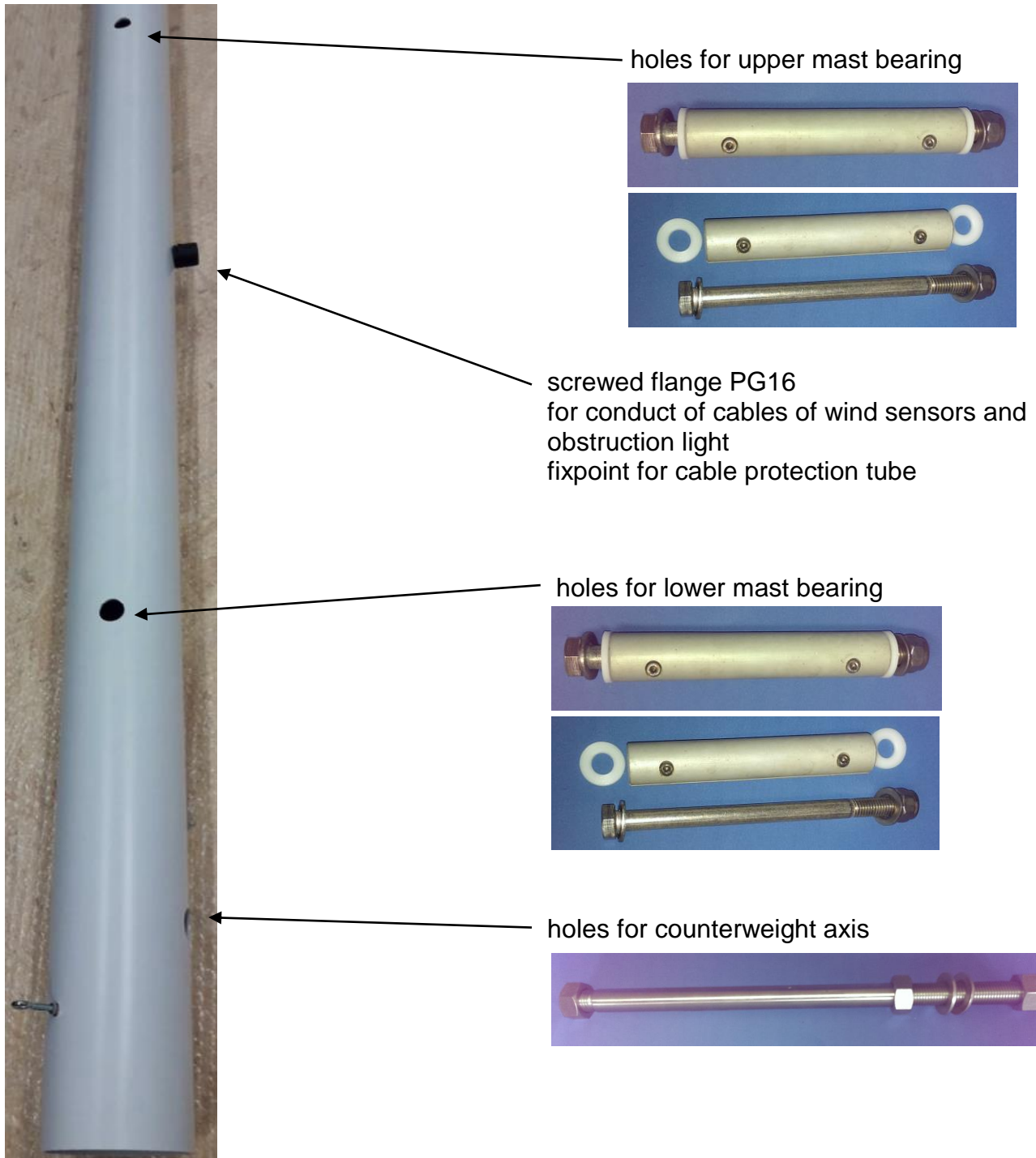
Mast fig. No. 4

3 pcs. Concrete socket with anchor chain for fixing tensioning ropes



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Mast Fig. No. 7 - 3 m mast segment with holes
for upper and lower mast bearing, counterweight and screwed flange



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