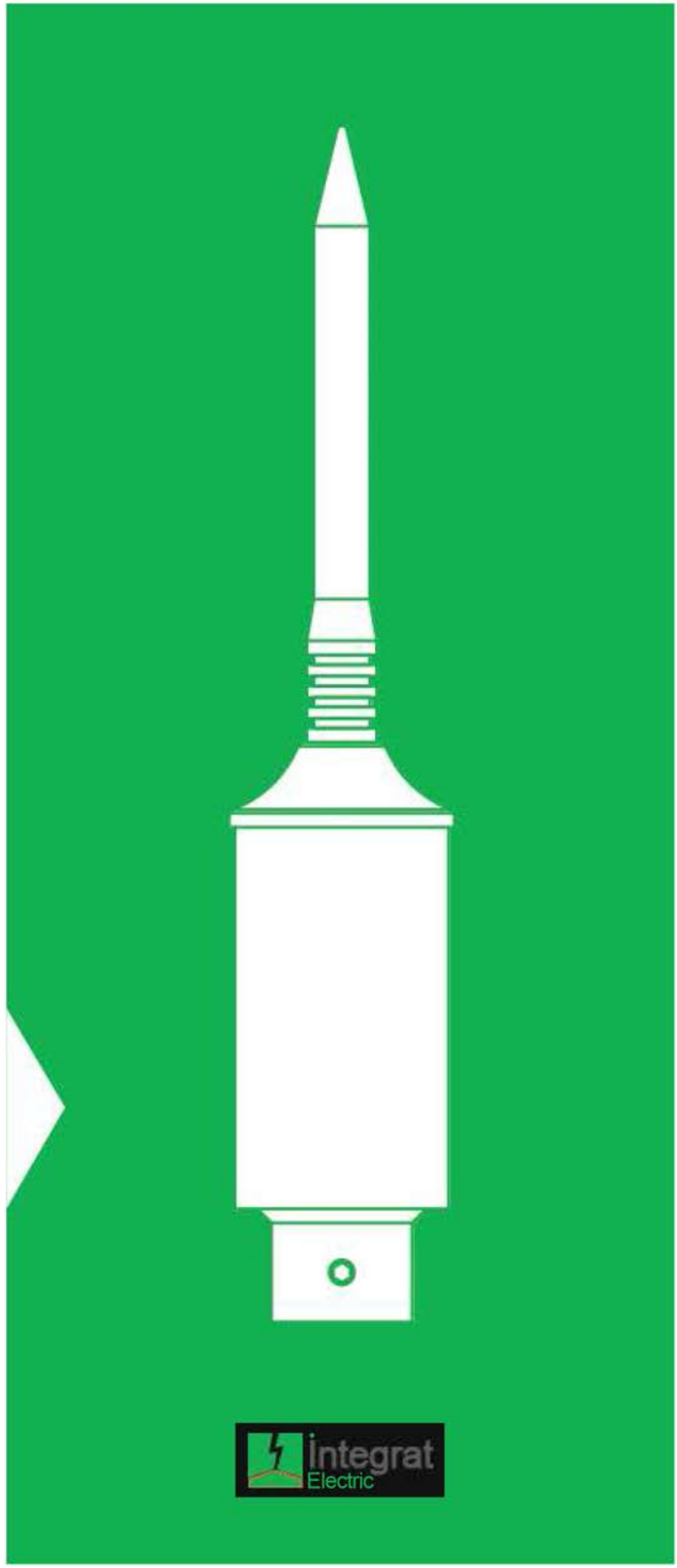
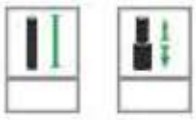
Sistem de captare **PDA**



PARATRAZNET PDA



CATARG



SISTEM DE FIXARE



EVALUAREA RISCULUI

Necesitatea instalarii unui sistem de protectie impotriva trasnetului si Nivelul de protectie se face conform Standardele de Protectie Impotriva Trasnetului.

Se compara frecventa anuala a trasnetelor acceptate,
cu probabilitatea loviturii de trasnet pe structura de protejat. Raportul dintre acesti doi factori indica daca sistemul de protectie este necesar si nivelul de protectie. Aceasta valoare depinde de mai multi factori cuprinsi intr-un tabel, ca tipul structurii si continutul ei, desi uneori pot fi luati in considerare alti factori care sa imbunatateasca nivelul de protectie, marind eficacitatea sistemului de protectie rezultat din calcule.

Protectia impotriva trasnetului este necesara in urmatoarele cazuri:

- Orice instalatie sau utilaj care este folosit in procesul muncii.
- Concentrare mare de persoane.
- Productie continua sau servicii publice.
- Zone cu o densitate crescuta a trasnetelor.
- Cladiri foarte inalte sau izolate.
- Cladiri care contin materiale explozive sau inflamabile.
- Cladiri ce contin patrimonii de neinlocuit.
- Cladiri sau structuri al caror factor de risc, calculat in conformitate cu Standardul, determina nevoia unui Sistem de Protectie impotriva Trasnetului cu un anumit nivel de protectie.

- Raza de protectie NIVEL I
- Raza de protectie NIVEL II
- Raza de protectie NIVEL III-IV



Nivelul de Protectie este asociat cu probabilitatea acceptata a loviturii de trasnet pe o structura.

Nivelul de protectie I ia in considerare conditii mai restrictive si mai sigure pentru paratrasnete, (considera scazuta raza de protectie pentru paratrasnete), permitand si captarea trasnetelor de curent asociat mai mic.

Un nivel de protectie mai putin restrictiv **(nivel III sau IV)** va putea capta trasnetul cu un curent asociat ridicat, dar un flash (ramificatie) cu un curent asociat slab poate evita Sistemul de Protectie impotriva Trasnetului si lovi structura.

LEGISLATIE SI STANDARDE

Aptitudinea unei instalatii de a realiza functia sa protectoare este asigurata, daca se respecta ultimele reglementari in vigoare, privind protectia contra trasnetului.

Norme de Protectie Impotriva Trasnetului

NF C 17 102	Protectia impotriva Trasnetului cu Paratrasnete cu Dispozitiv de Amorsare
UNE 21186	.
Seria IEC/EN 62305	Protectia impotriva Trasnetului cu tije si retele de captare.
Seria EN 50164	Componente de Protectie Impotriva Trasnetului.
Seria BS EN 62561	Componente ale sistemelor de Protectie Impotriva Trasnetului.
Ghid practic BIP 2118	Protectie impotriva trasnetului. Un ghid britanic pentru aplicarea practica a BS EN 62305.
Alte standarde	De obicei, in fiecare tara exista coduri care pot fi asociate cu sistemele de protectie: - Codul National Electric - Codul National pentru Constructii

Este ferm recomandat ca exigentele sistemelor de protectie sa corespunda cu normele nationale obligatorii.

Seria IEC/EN 61663	Protectie impotriva trasnetului. Linii de telecomunicatii.
BS EN 2591-214	Seria aerospatiala. Elemente de conexiune electrica si optica. Metode de testare. Lovituri de trasnet, impuls de curent si tensiune.
BS EN 3841-308	Seria aerospatiala. Disjunctoare - Metode de testare. Trasnetul.
BS EN 50468	Cerinta de rezistibilitate la supratensiuni si supracurenti datorita trasnetelor pentru echipamente ce au porturi de telecomunicatii.
BS EN 50289	Cabluri de Comunicatii. Specificatii pentru metode de testare. Metode de testare. Trasnetul.
BS EN 60076-4	Transformatoare de putere. Ghid pentru testarea la impulsul de trasnet. Transformatoare de putere si bobine de inductanta.
IEC / TR 61400-24	Sisteme de turbine eoliene. Protectie Impotriva Trasnetului.
IEC / TR 60479-4	Efectele curentului de trasnet asupra oamenilor si animalelor. Efectele loviturilor de trasnet asupra oamenilor si animalelor.

NORME GENERALE DE INSTALARE

Instalarea paratrasnetelor cu dispozitiv de amorsare se face dupa norme relevante NFC 17102, UNE 21186 sau similare

Raza paratrasnetelor cu dispozitiv de amorsare este determinata de inaltimea (h) relativ la aria de protejat, de avansul de amorsare si de Nivelul de protectie. Tabelul urmator arata razele de protectie ale paratrasnetului cu dispozitiv de amorsare.

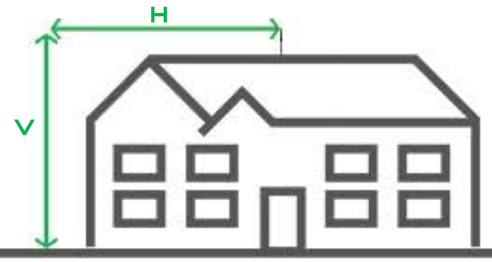
Paratrasnetul trebuie instalat la cel putin 2 metri deasupra oricarui element din aria de protejat.

Raze de protectie (RP) in metri
pentru 3 si 4 niveluri de protectie

4 NIV (CTE, ...)	**NIVEL I**					**NIVEL II**					**NIVEL III**					**NIVEL IV**				
3 NIV (UNE 21186, NFC 17102,..)	**NIVEL I**										**NIVEL II**					**NIVEL III**				
h	10	8	6	4	2	10	8	6	4	2	10	8	6	4	2	10	8	6	4	2
+15	34	33	32	25	13	40	39	38	30	15	49	47	46	36	18	56	64	52	41	20
+30	49	49	48	38	19	57	56	55	44	22	66	65	64	51	25	75	73	72	57	28
+45	64	64	63	51	25	72	72	71	57	28	83	82	81	64	32	92	91	90	72	36
+60	79	79	79	63	31	88	87	87	69	35	99	98	97	78	39	109	108	107	85	43

Fiecare paratrasnet trebuie conectat la priza de pamantare folosind un conductor de coborare, preferinta pe pereti exteriori sau pe structura.

Sunt necesari doi sau mai multi conductori cand:
H = 28 m
H > V



Conductorul de coborare trebuie instalat astfel incat traseul sa fie cat mai scurt si mai drept posibil, evitand devierile bruste sau sectiuni ascendente. Proximitatea si incrucisarea cu linii electrice trebuie de asemenea sa fie evitata pe cat posibil.

Cand traseul exterior este impracticabil, conductorul de coborare se poate instala in interiorul structurii, intr-un canal neinflamabil cu o sectiune de minim 2000 mm2. Totusi, managerul de proiect trebuie sa stie ca in acest caz, este redusa eficienta sistemului de protectie impotriva trasnetului, mentenanta este dificila, si riscurile defectelor datorate supratensiunilor sunt mai mari.

Numarul elementelor de fixare poate fi determinat considerand 3 fixari la un metru.

Conductorii de coborare trebuie sa fie protejati de lovituri accidentale, prin instalarea in tuburi de protectie, pana la o inaltime de 2 m, de la nivelul solului.

Instalarea unui contor de lovituri de trasnet, este recomandata pentru a permite verificarea si operatiile de mentenanta care sunt esentiale pentru orice sistem de protectie impotriva trasnetului.

Conductorul de coborare trebuie sa fie instalat, la cel putin 3 metri distanta, fata de tevile de gaz.

Se va realiza o priza de pamant, pentru fiecare conductor de coborare.

METODA SFEREI FICTIVE

Calculul volumului protejat de paratraznet, Conform SR62305.

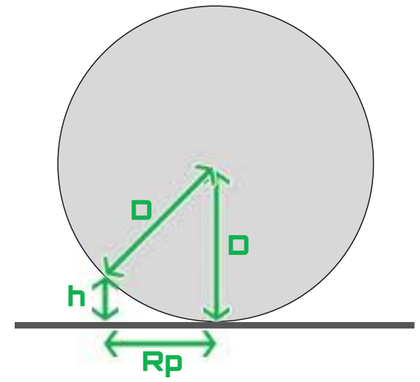
D = 20 m Nivel de protectie **I**
D = 30 m Nivel de protectie **II**
D = 45 m Nivel de protectie **III**
D = 60 m Nivel de protectie **IV**

METODA SFEREI FICTIVE

Se bazeaza pe un model electrogeometric care presupune ca liderul descendent care va lovi structura de protejat, are forma unei sfere fictive de raza D.

Punctele in care aceasta sfera atinge structura trebuie prevazute cu paratrasnete.

Raza de protectie (Rp) poate fi definita dupa cum se arata in figura si formula: Rp=2·D·h-h2



COBORARE SI IMPAMANTARE

Norme generale de instalare, Conform I 7/2011 si I 20/2000

Fiecare PDA este legat la pământ prin cel putin două coborâri.

Este interzisă utilizarea cablurilor coaxiale izolate drept conductoare de coborâre.

În cazul în care se utilizează un contor de lovituri de trăsnet, acesta trebuie amplasat pe conductorul de coborâre cel mai scurt úi deasupra piesei de separatie.

Dacă se utilizează coborâri naturale, PDA se leagă la partea superioară direct la structura metalică, iar aceasta se leagă la partea inferioară la priza de pământ.

Fiecare coborâre a PDA trebuie să aibă cel putin o legătură la o priză de pământ.

Prizele de pământ artificiale sunt din:
- conductoare care se dispun radial-orizontal, de mari dimensiuni (7-8 m lungime) îngropate la cel putin 50 cm adâncime, dar nu mai putin de adâncimea de îngheG a solului.
- mai multi electrozi verticali cu lungimea totală de minimum 6 m dispuúi în linie sau triunghi, distantati între ei la o distantă cel putin egală cu lungimea electrozilor legati între ei. Se recomandă forma triunghiulară pentru electrozii verticali.

015IE PDA Integra Electric 15µs
030IE PDA Integra Electric 30µs
045IE PDA Integra Electric 45µs
060IE PDA Integra Electric 60µs

101C Catarg simplu 2 ml, Φ33.7mm
102C Catarg simplu 3 ml, Φ33.7mm
103C Catarg simplu 4 ml, Φ33.7mm

105C Catarg simplu ancorabil 3 ml, Φ33.7mm
106C Catarg simplu ancorabil 4 ml, Φ33.7mm
107C Catarg simplu ancorabil 5 ml, Φ33.7mm

108C Catarg baza 3 ml, Φ 48.3mm
109C Catarg varf L=1,5 ml, Φ33.7mm
110C Catarg varf L=2 ml, Φ33.7mm
111C Catarg varf L=2,5 ml, Φ33.7mm
112C Catarg varf L=3 ml, Φ33.7mm
113C Catarg varf L=3,5 ml, Φ33.7mm
114C Catarg varf L=4 ml, Φ33.7mm
115C Catarg varf L=4,5 ml, Φ33.7mm

2011SO Consola cu talpa orizontala 150mm (catarg simplu), Φ33.7mm
2012SO Consola cu talpa orizontala 250mm (catarg simplu), Φ33.7mm
2013SO Consola cu talpa orizontala 350mm (catarg simplu), Φ33.7mm
2021SV Consola cu talpa verticala 150mm (catarg simplu), Φ33.7mm
2022SV Consola cu talpa verticala 250mm (catarg simplu), Φ33.7mm
2023SV Consola cu talpa verticala 350mm (catarg simplu), Φ33.7mm
2031SO Consola cu talpa orizontala 150mm (catarg baza), Φ 48.3mm
2032SO Consola cu talpa orizontala 250mm (catarg baza), Φ 48.3mm
2033SO Consola cu talpa orizontala 350mm (catarg baza), Φ 48.3mm
2041SV Consola cu talpa verticala 150mm (catarg baza), Φ 48.3mm
2042SV Consola cu talpa verticala 250mm (catarg baza), Φ 48.3mm
2042SV Consola cu talpa verticala 350mm (catarg baza), Φ 48.3mm

205S Consola catarg izolant

301T Trepied pentru terasa simplu

301T Trepied pentru terasa pliabil

303T Suport coama cu talpi ondulate
304T Suport coama cu talpi drepte

001A Adaptor cu doua coborari, Φ33.7mm

0021A Piesa de centrare coborare, Φ33.7mm
0022A Piesa de centrare coborare, Φ48.3mm

003A Piesa de ancorare

004A Piesa de jonctiune



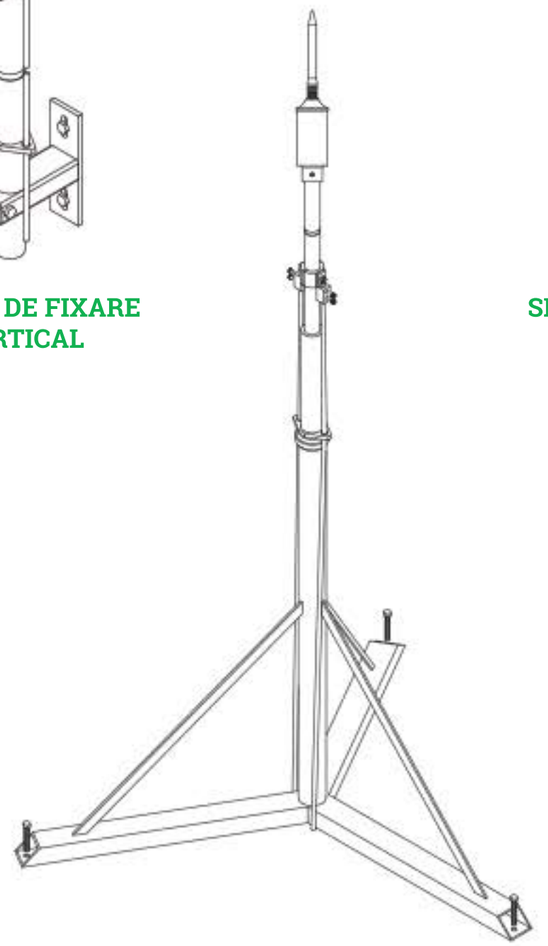
SISTEM DE FIXARE VERTICAL



SISTEM DE FIXARE GRINDA LEMN



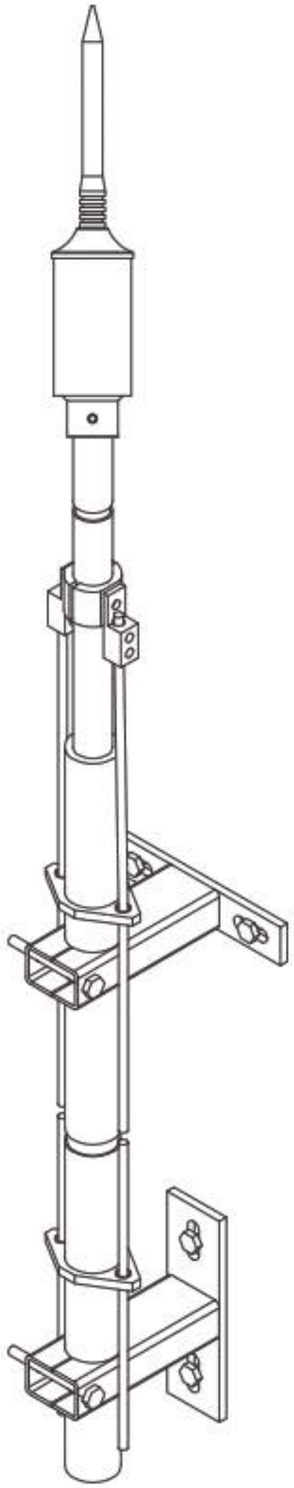
SISTEM DE FIXARE TURLA BISERICA



SISTEM DE FIXARE ORIZONTAL

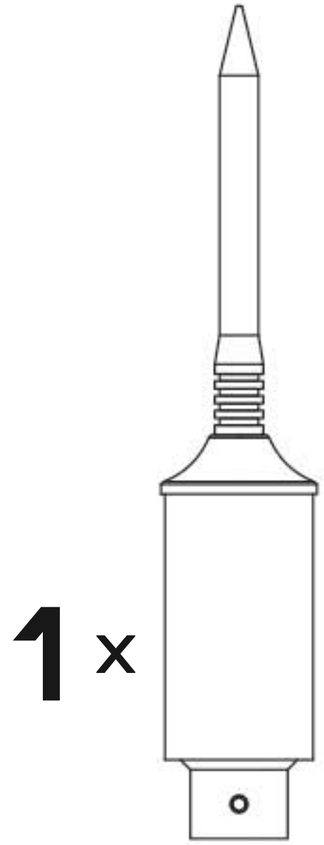


SISTEM DE FIXARE COAMA ACOPERIS



* Pentru catarg mai mare de 4m
se recomannda 3 console.

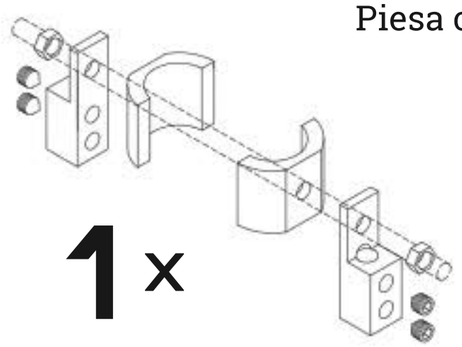
SISTEM DE FIXARE VERTICAL



1 x

PDA Integrat Electric

015IE - 060IE



1 x

Adaptor doua coborari

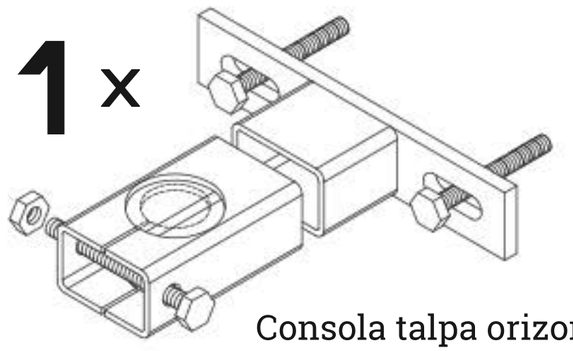
001A



2 x

Piesa centrare coborare

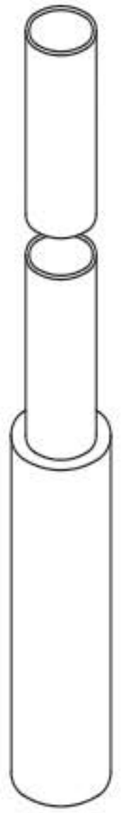
0021A - 0022A



1 x

Consola talpa orizontala

2011SO - 2042SV



1 x

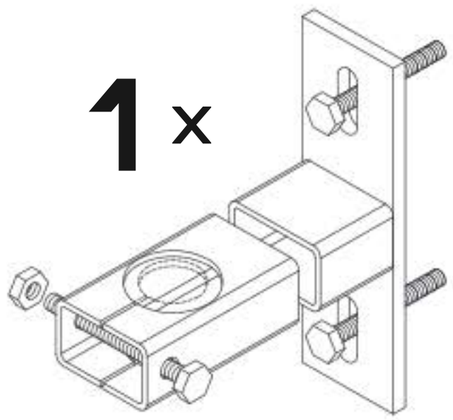
Catarg simplu / telescopic

101C - 115C



2 x

Conductor coborare

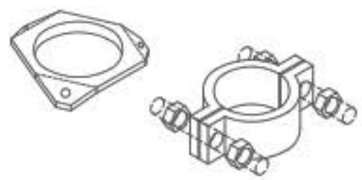


1 x

Consola talpa verticala

2011SO - 2042SV

Optional

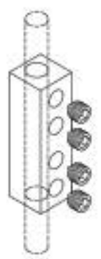


1 x

Piesa ancorare catarg + opritor

003A

* Recomandat pentru catarg mai mare de 5 m.
** Trebuie conectata la impamantare.

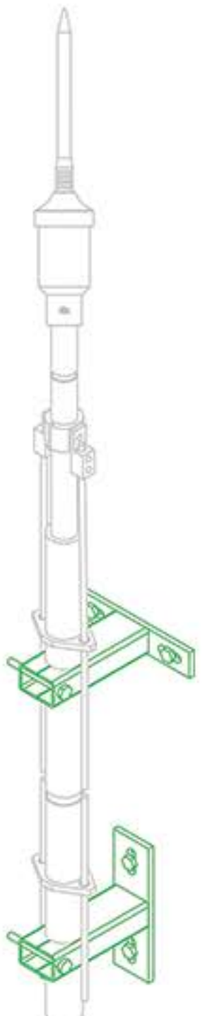


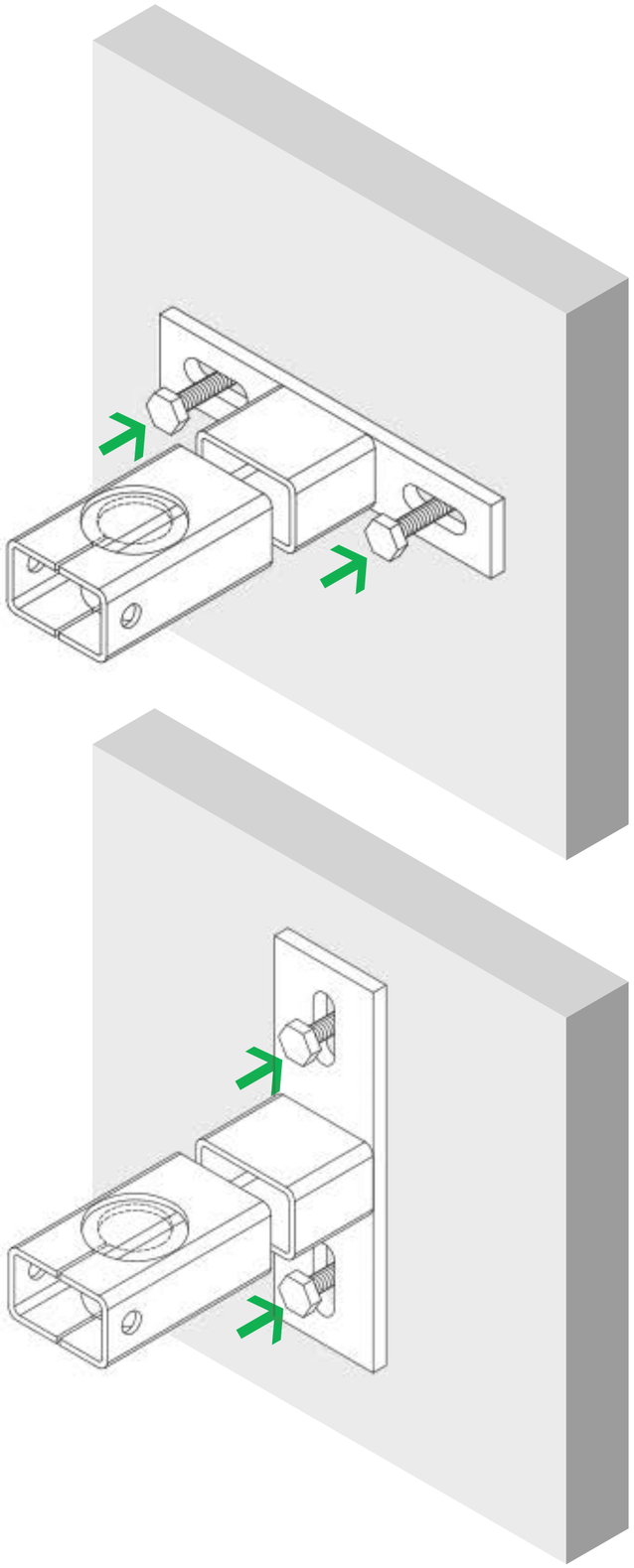
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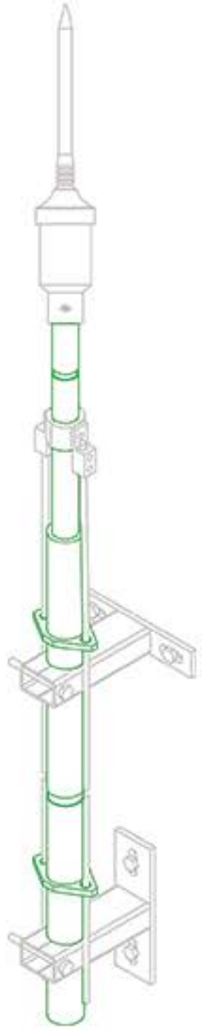
Piesa jonctiune

004A

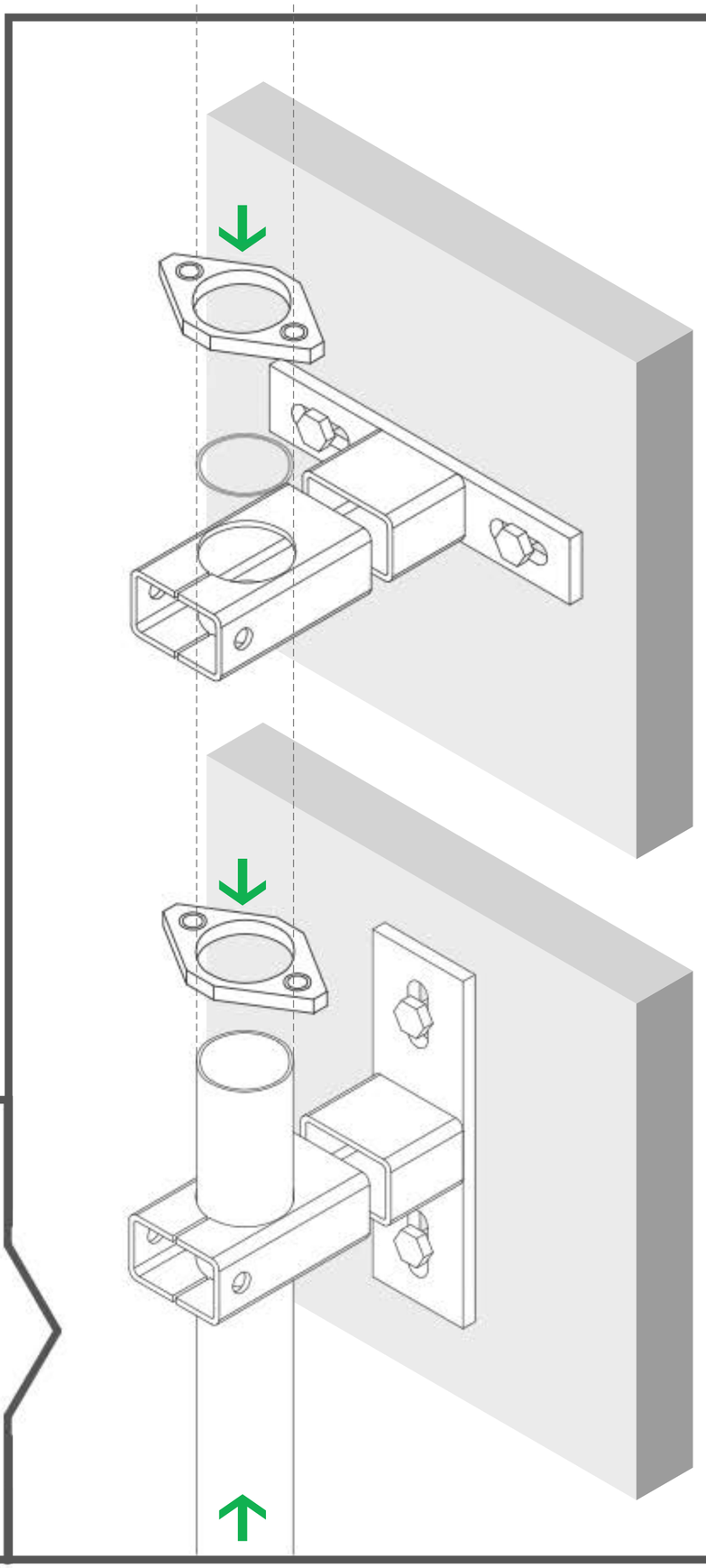
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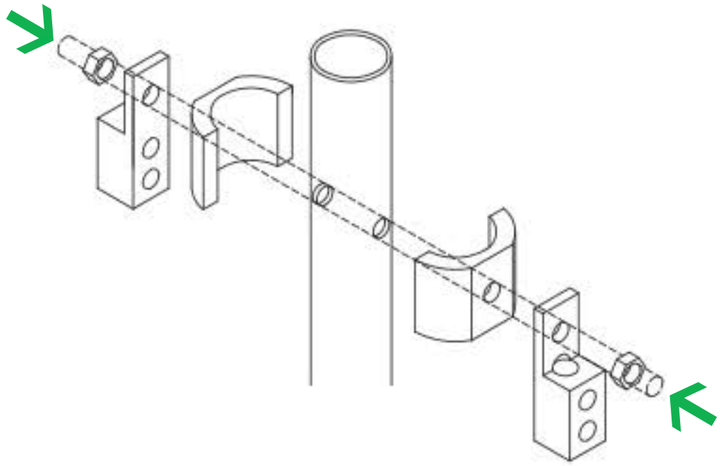


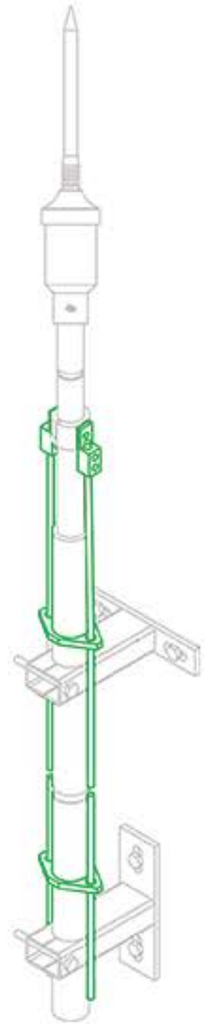


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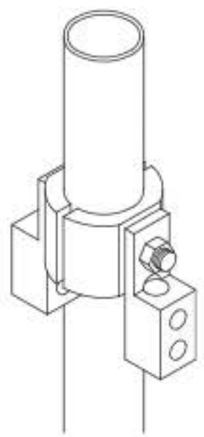


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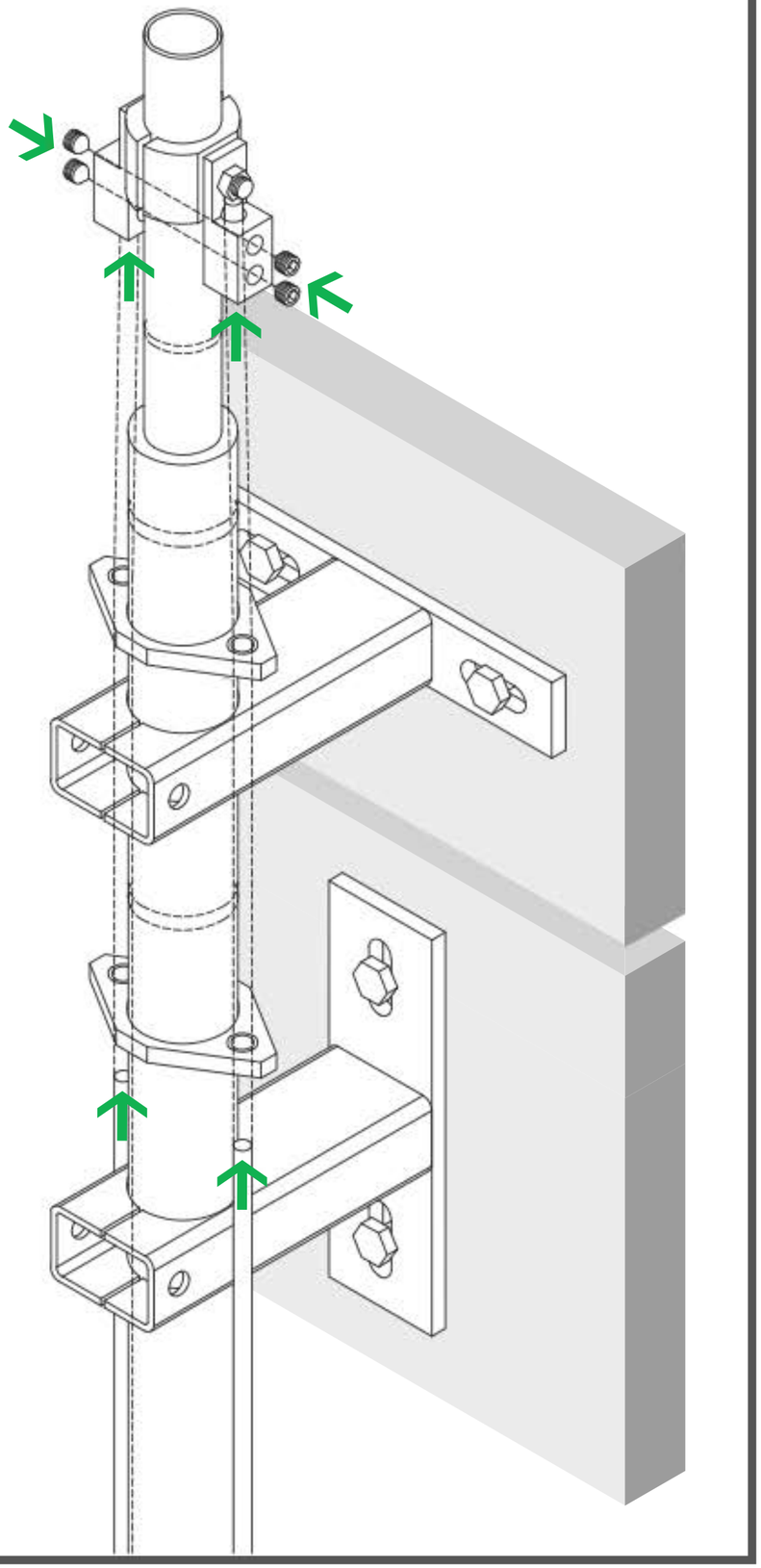




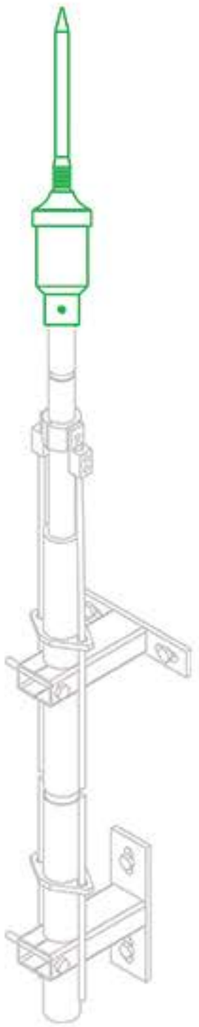


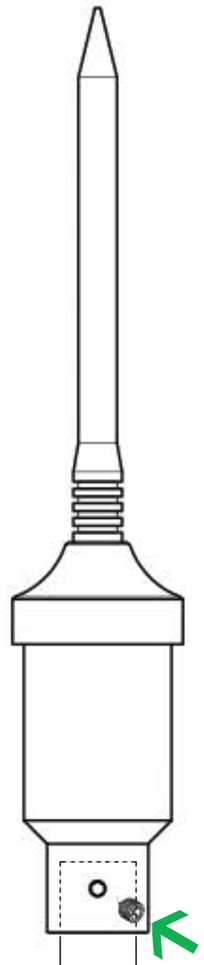


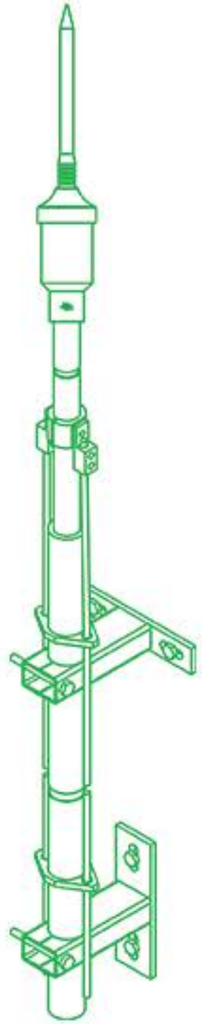
4



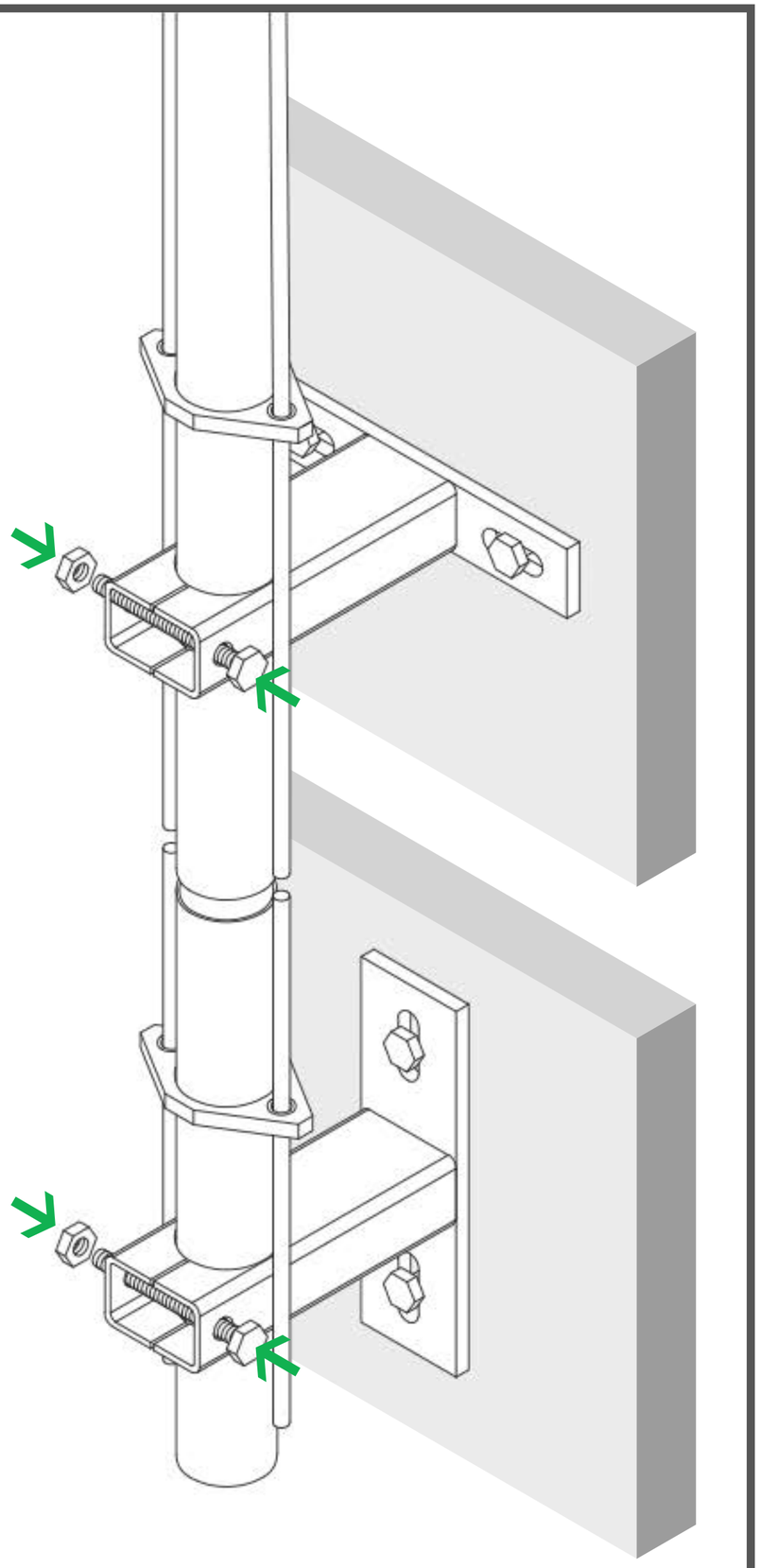
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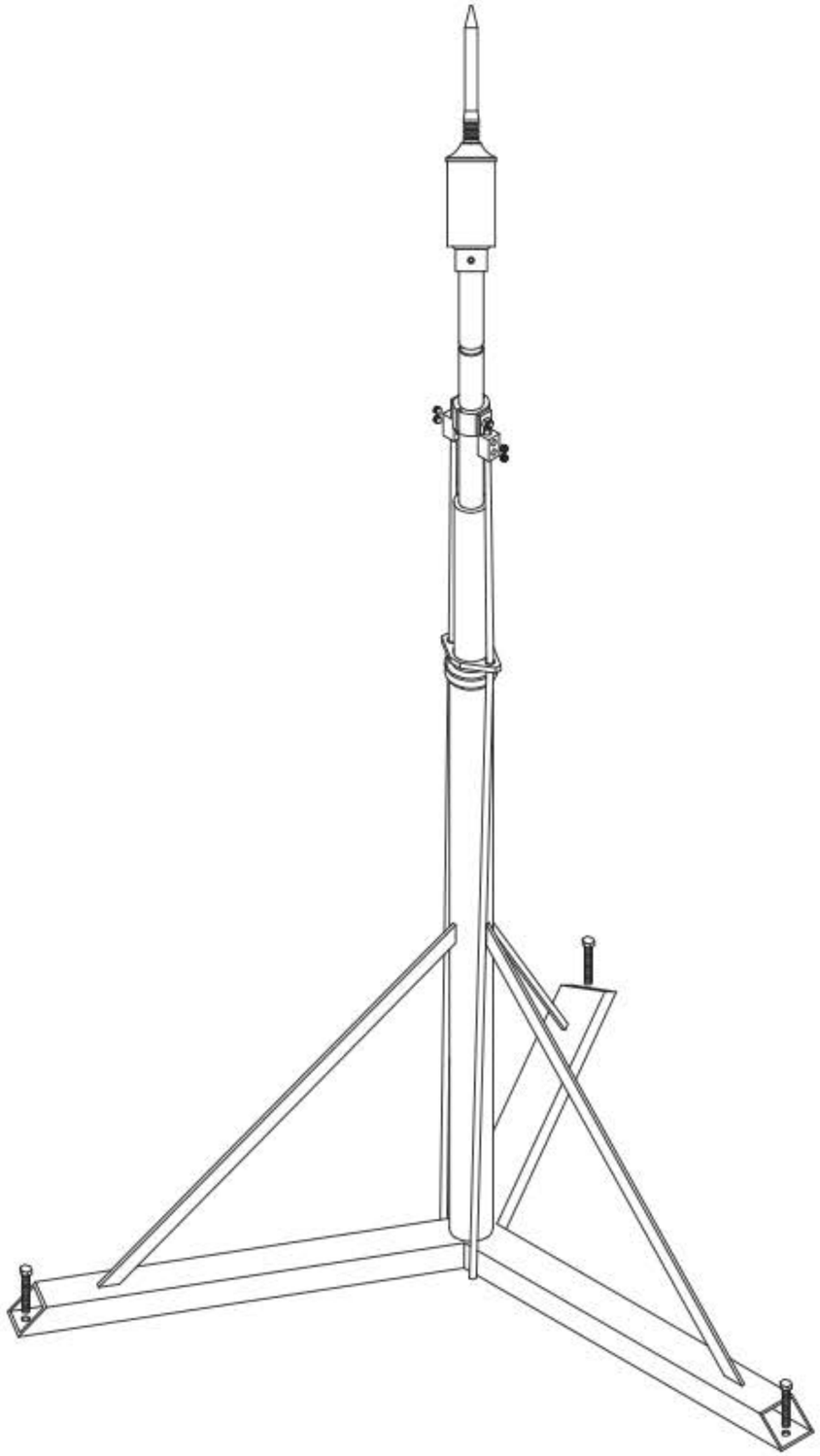




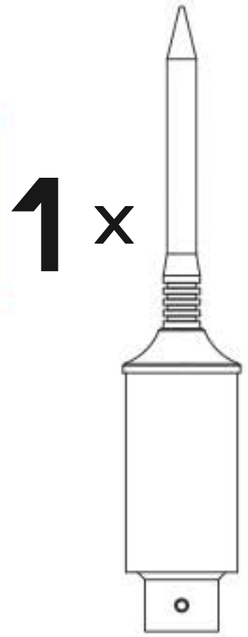


6





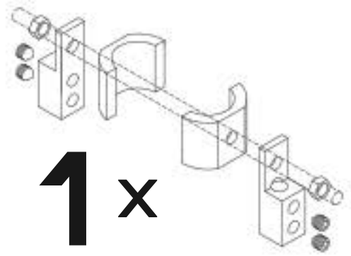
SISTEM DE FIXARE ORIZONTAL



1 x

PDA Integrat Electric

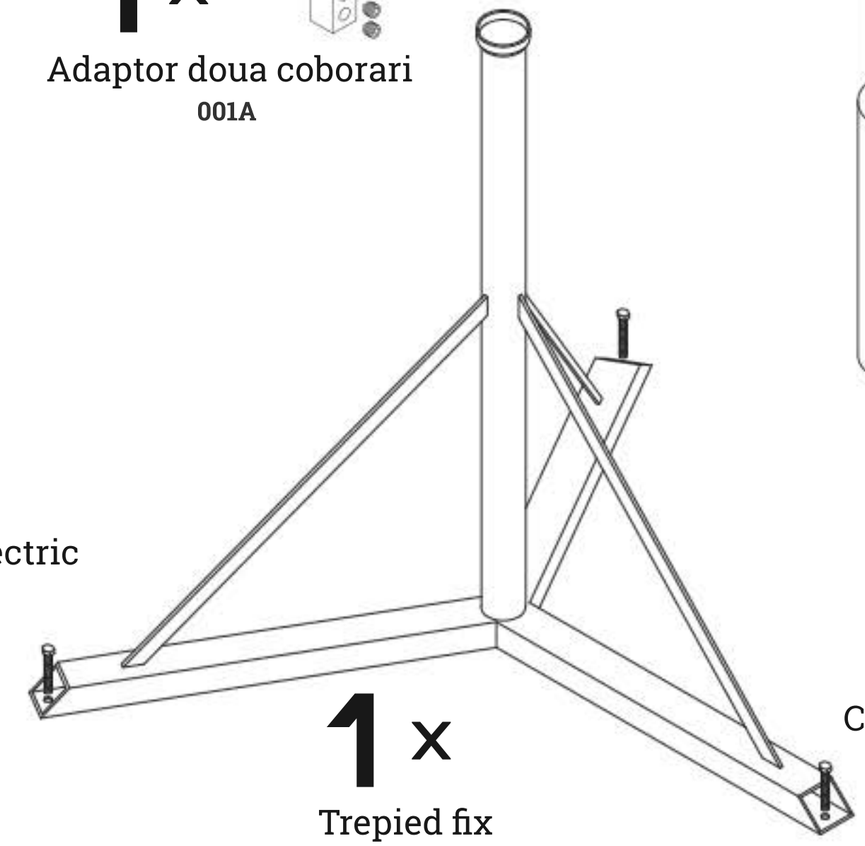
015IE - 060IE



1 x

Adaptor doua coborari

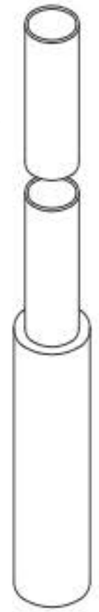
001A



1 x

Trepied fix

301T



1 x

Catarg simplu

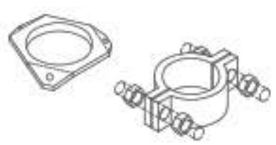
101C - 115C



2 x

Conductor coborare

Optional



1 x

Piesa ancorare catarg + opritor

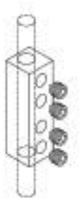
003A



1 x

Piesa centrare coborare

0021A - 0022A



1 x

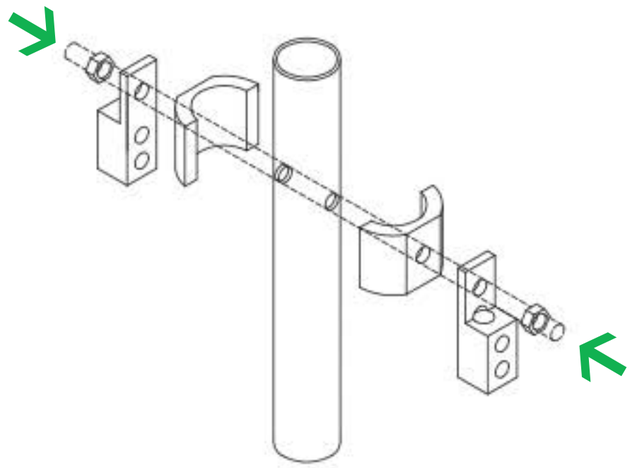
Piesa jonctiune

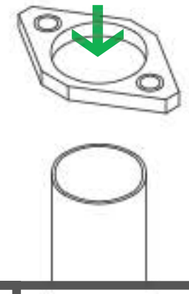
004A

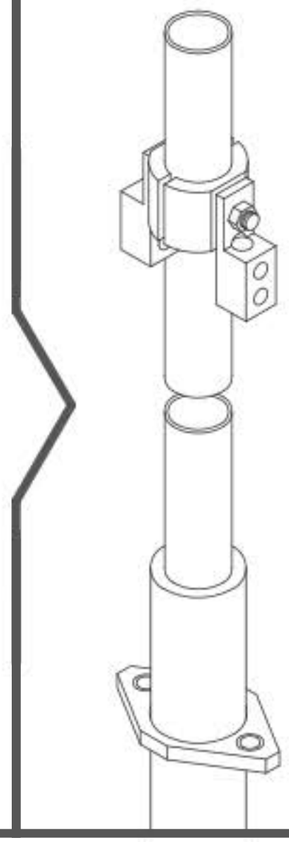
* Recomandat pentru catarg mai mare de 5 m.
** Trebuie conectata la impamantare.

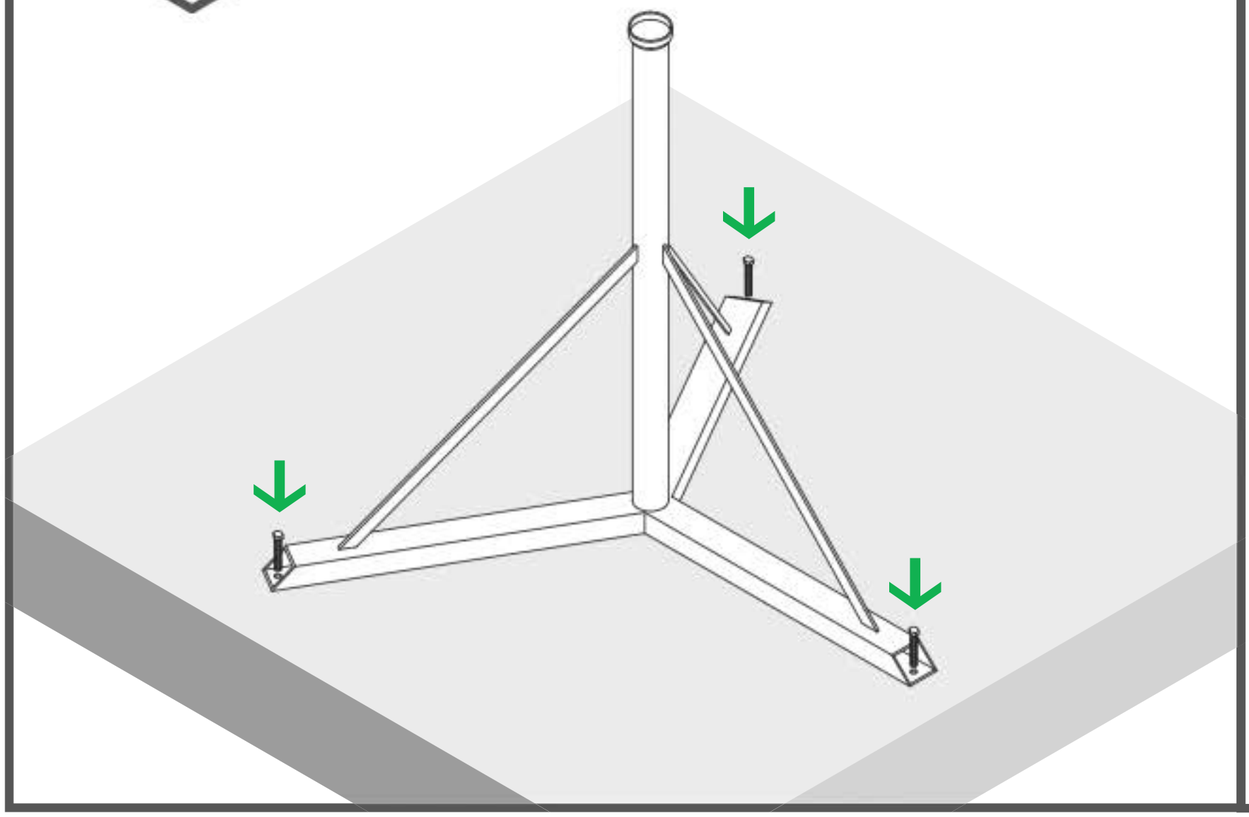
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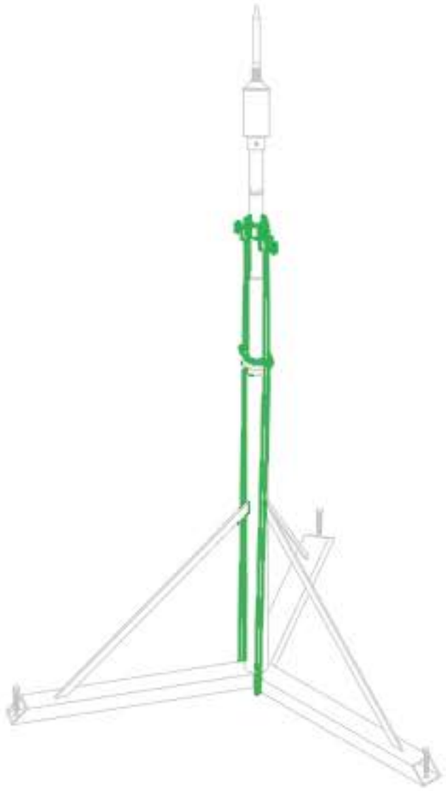


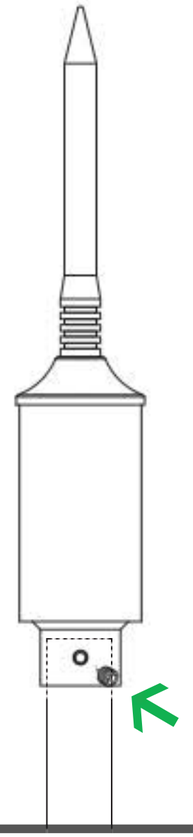


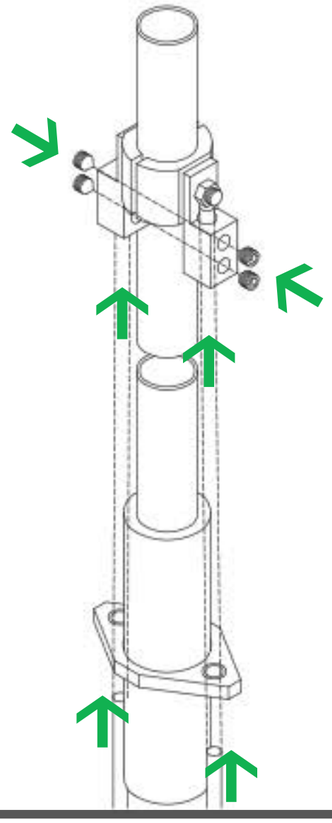
2



3

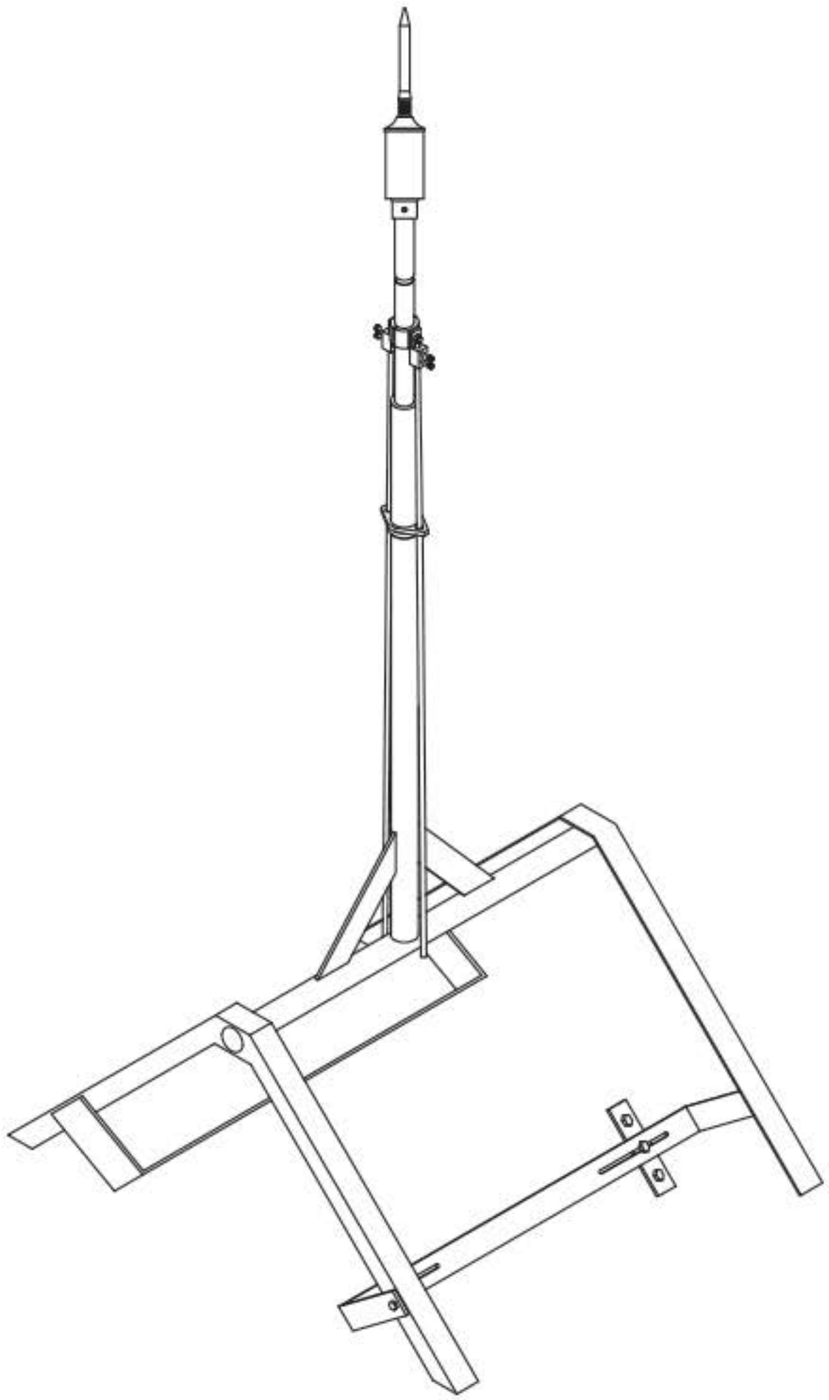






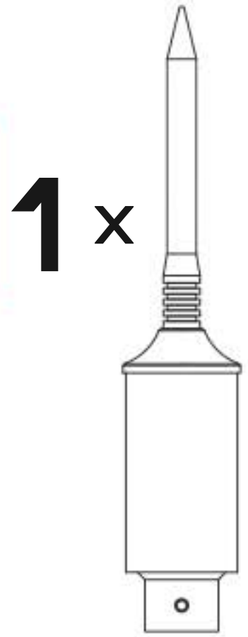
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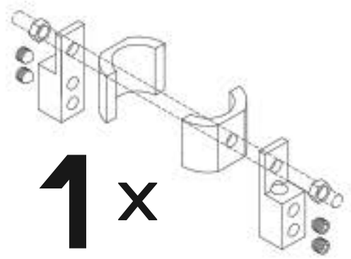
SISTEM DE FIXARE COAMA ACOPERIS

1 x



PDA Integrat Electric

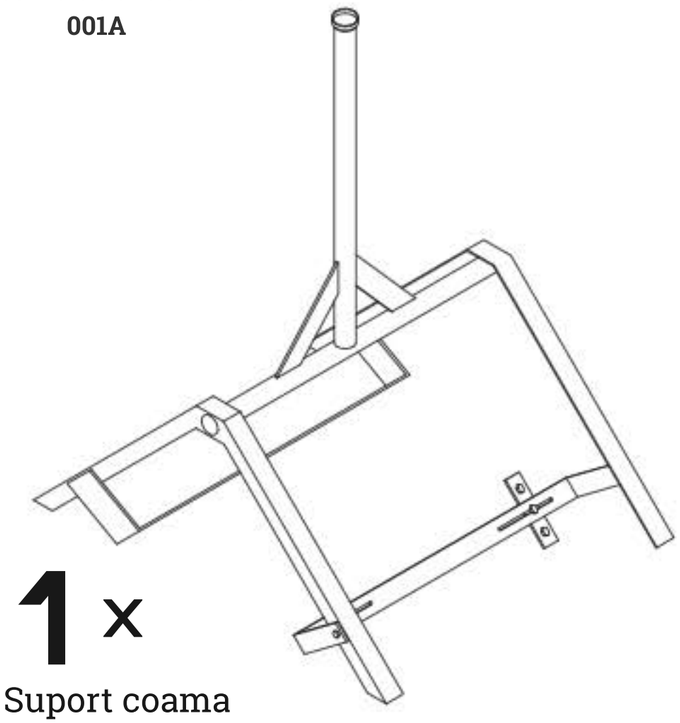
015IE - 060IE



1 x

Adaptor doua coborari

001A



1 x

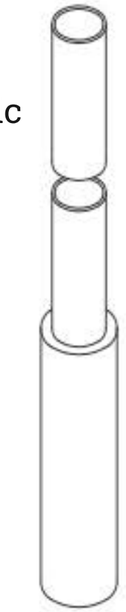
Suport coama

303T - 303T

1 x

Catarg telescopic

101C - 115C



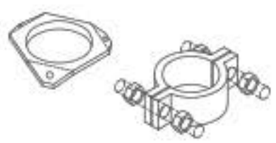


2 x

Conductor coborare

Optional

1 x



Piesa ancorare catarg + opritor

003A

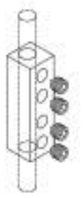
1 x



Piesa centrare coborare

0021A - 0022A

1 x



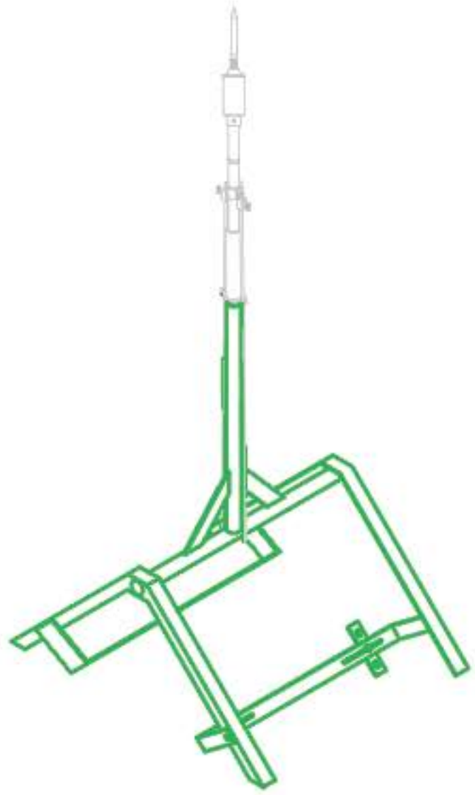
Piesa jonctiune

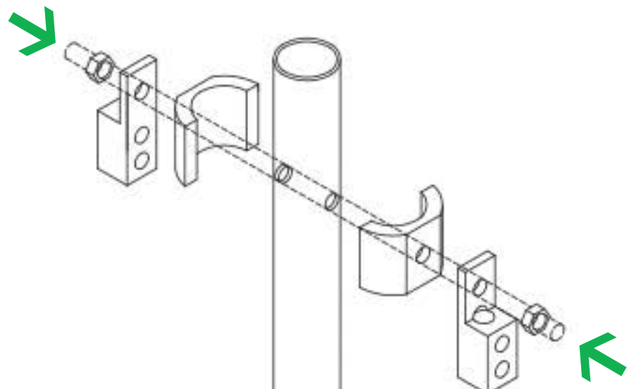
004A

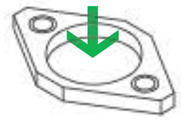
* Recomandat pentru catarg mai mare de 5 m.

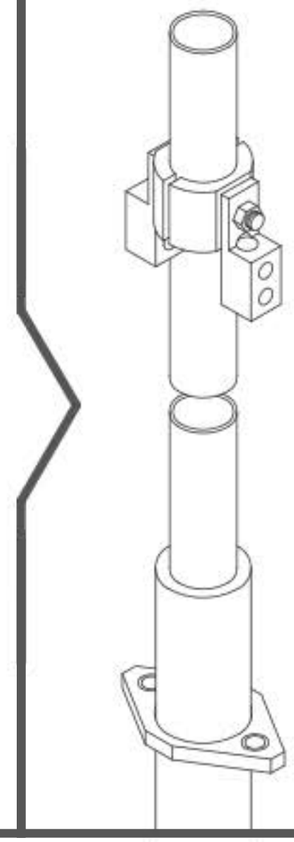
** Trebuie conectata la impamantare.

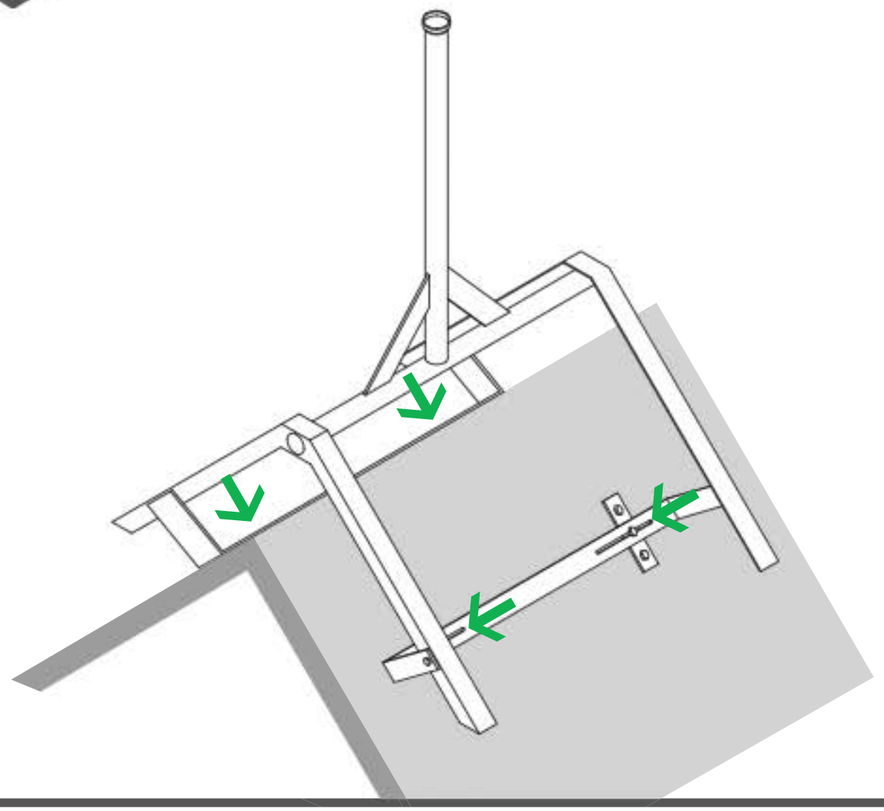
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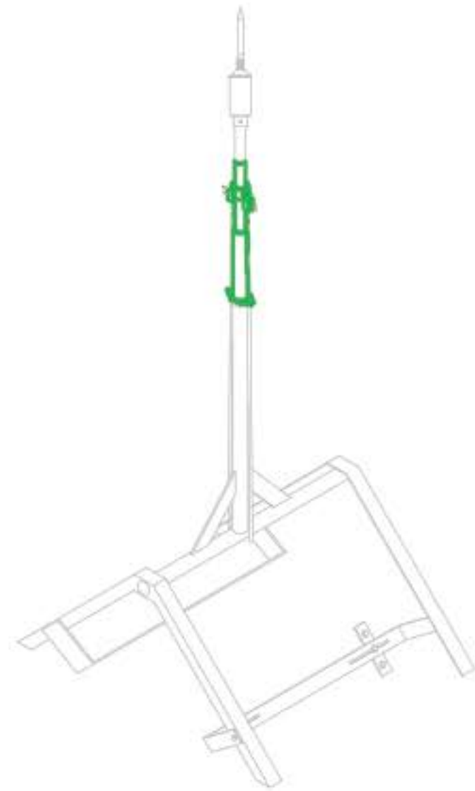




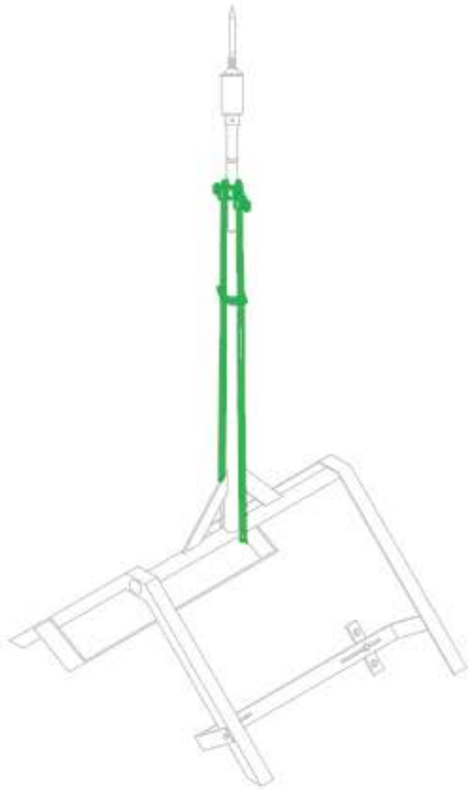


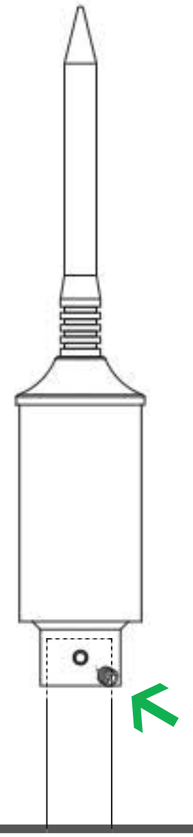


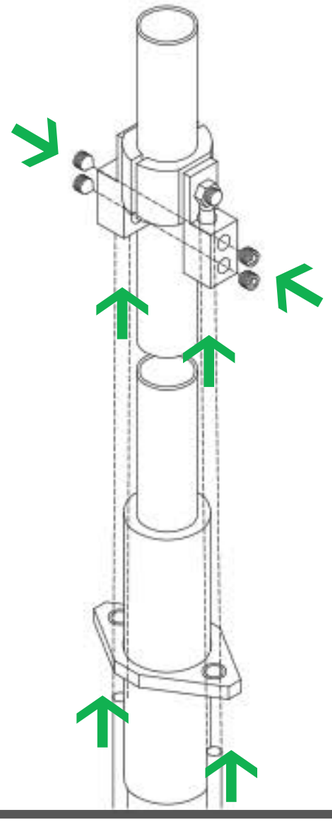
2



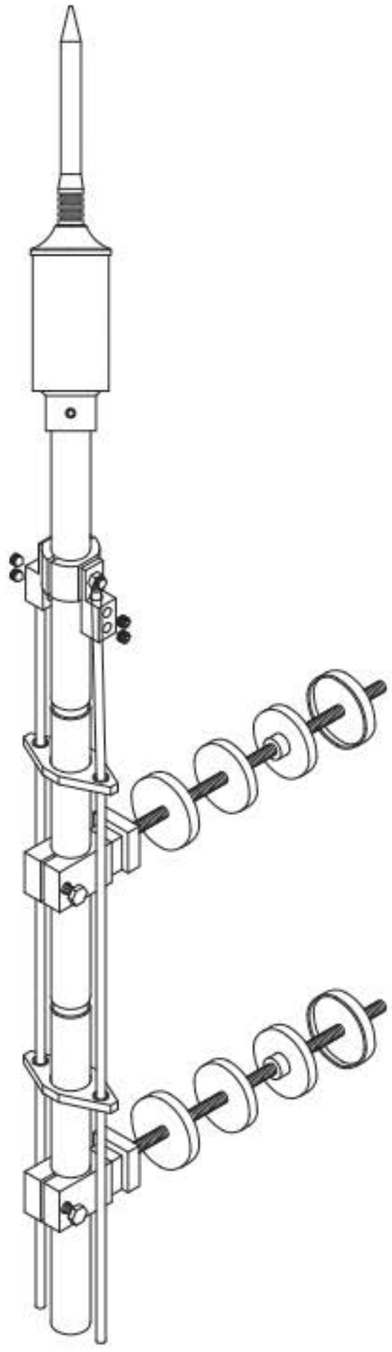
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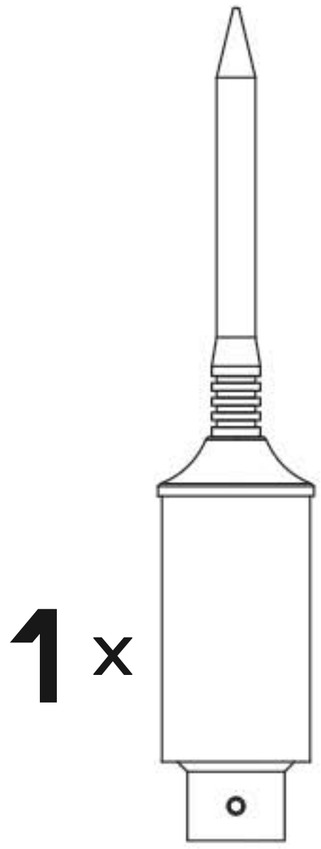


4



* Pentru catarg mai mare de 4m
se recomannda 3 console.

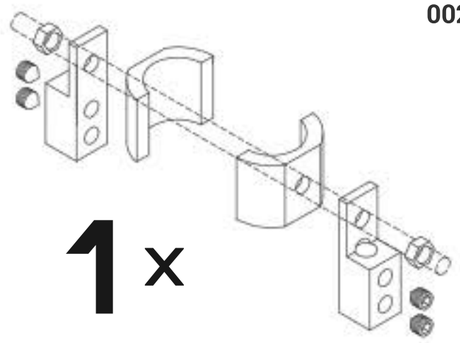
SISTEM DE FIXARE GRINDA LEMN



1 x

PDA Integrat Electric

015IE - 060IE

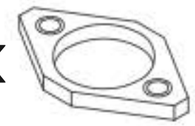


1 x

Adaptor doua coborari

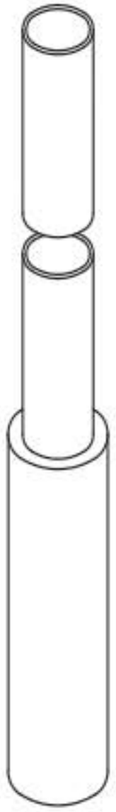
001A

2 x



Piesa centrare coborare

0021A - 0022A



1 x

Catarg simplu / telescopic

101C - 115C

2 x

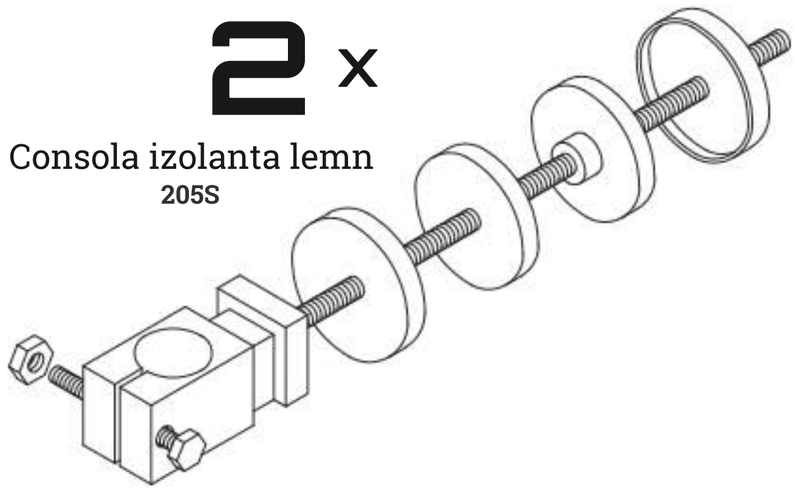


Conductor coborare

2 x

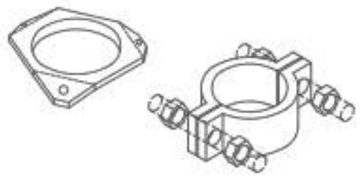
Consola izolanta lemn

205S



Optional

1 x

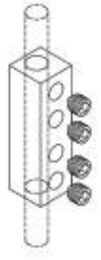


Piesa ancorare catarg + opritor

003A

* Recomandat pentru catarg mai mare de 5 m.
** Trebuie conectata la impamantare.

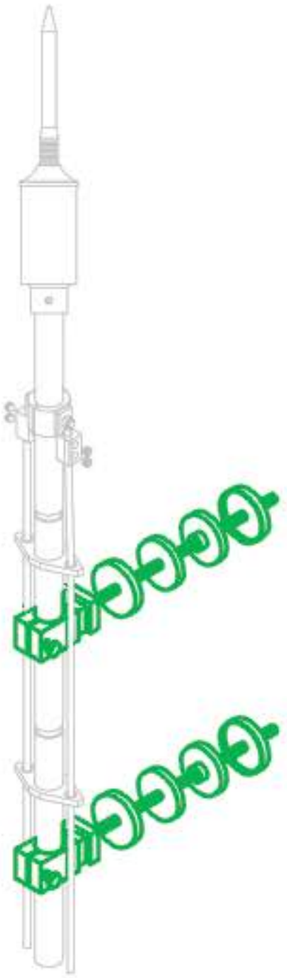
1 x

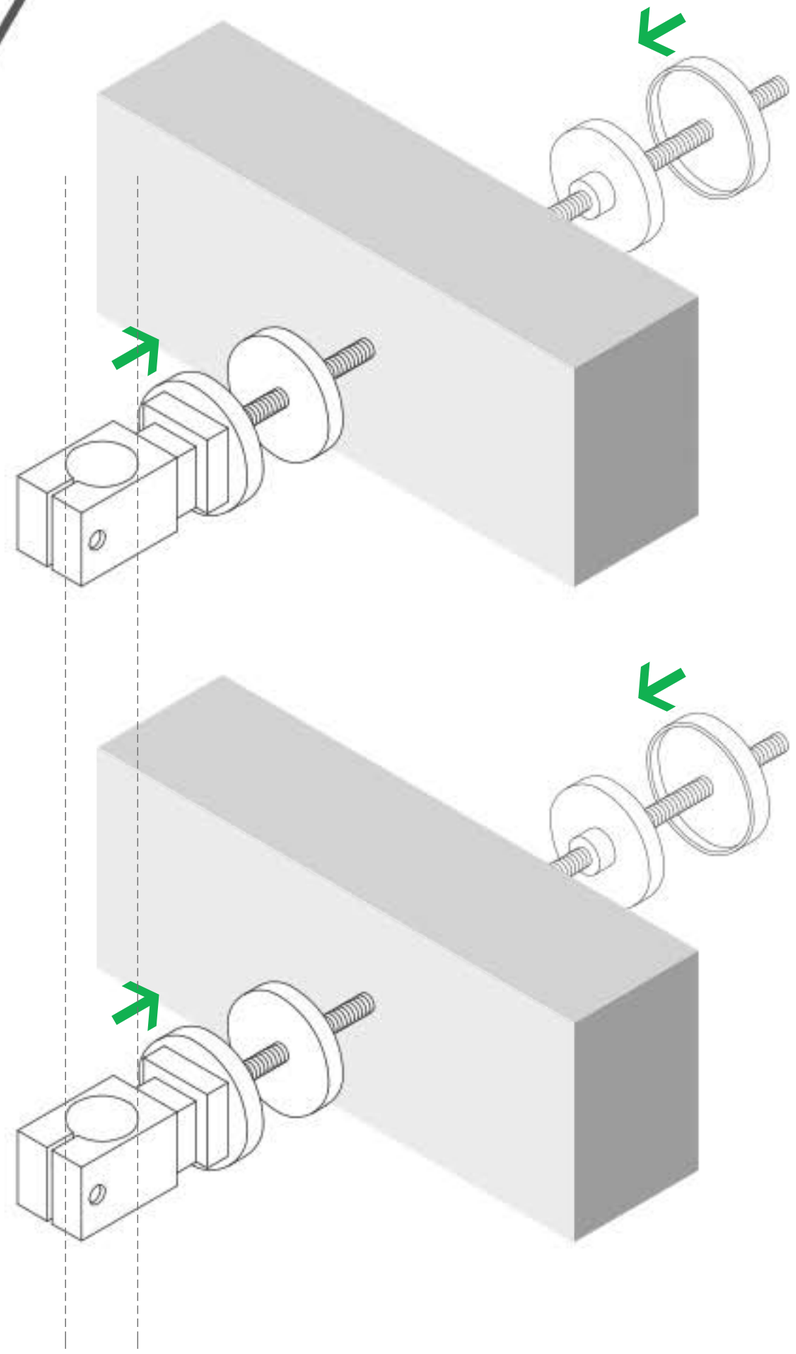


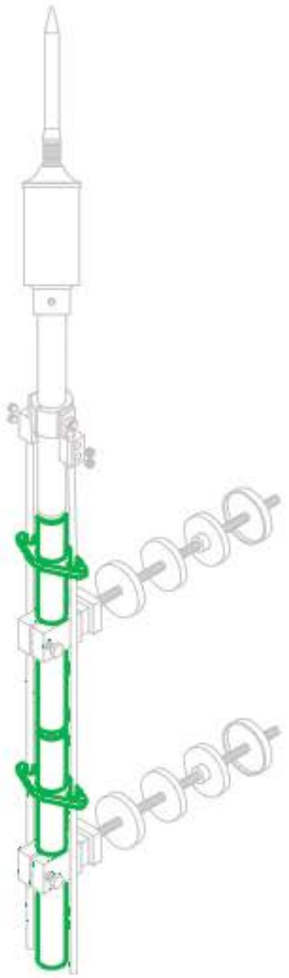
Piesa jonctiune

004A

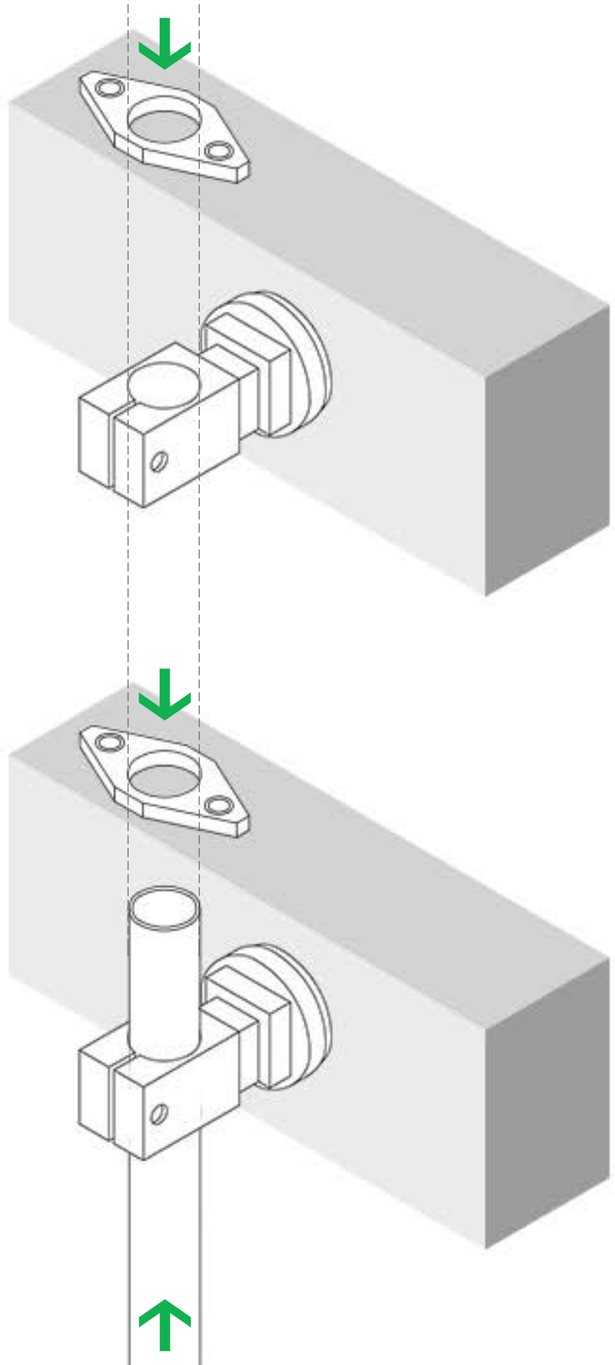
1



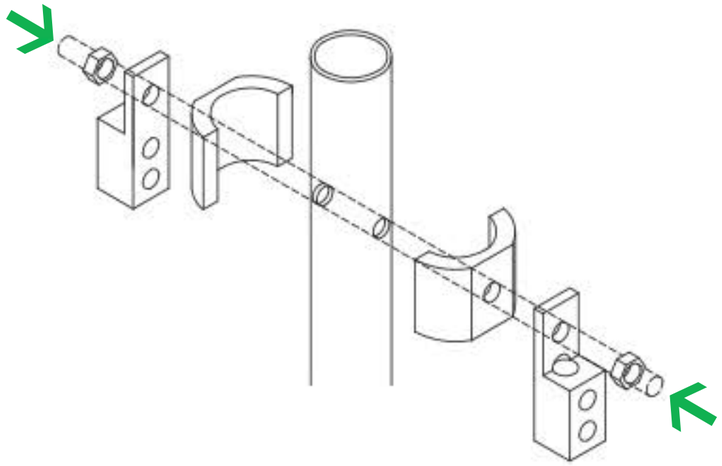


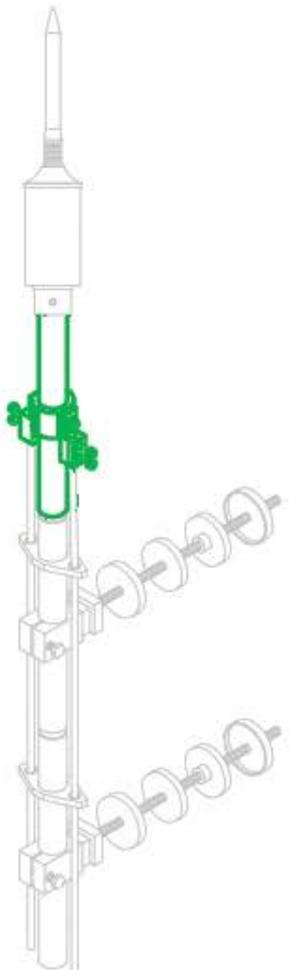


2

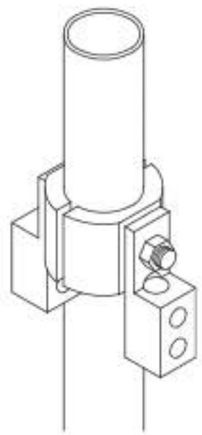


3

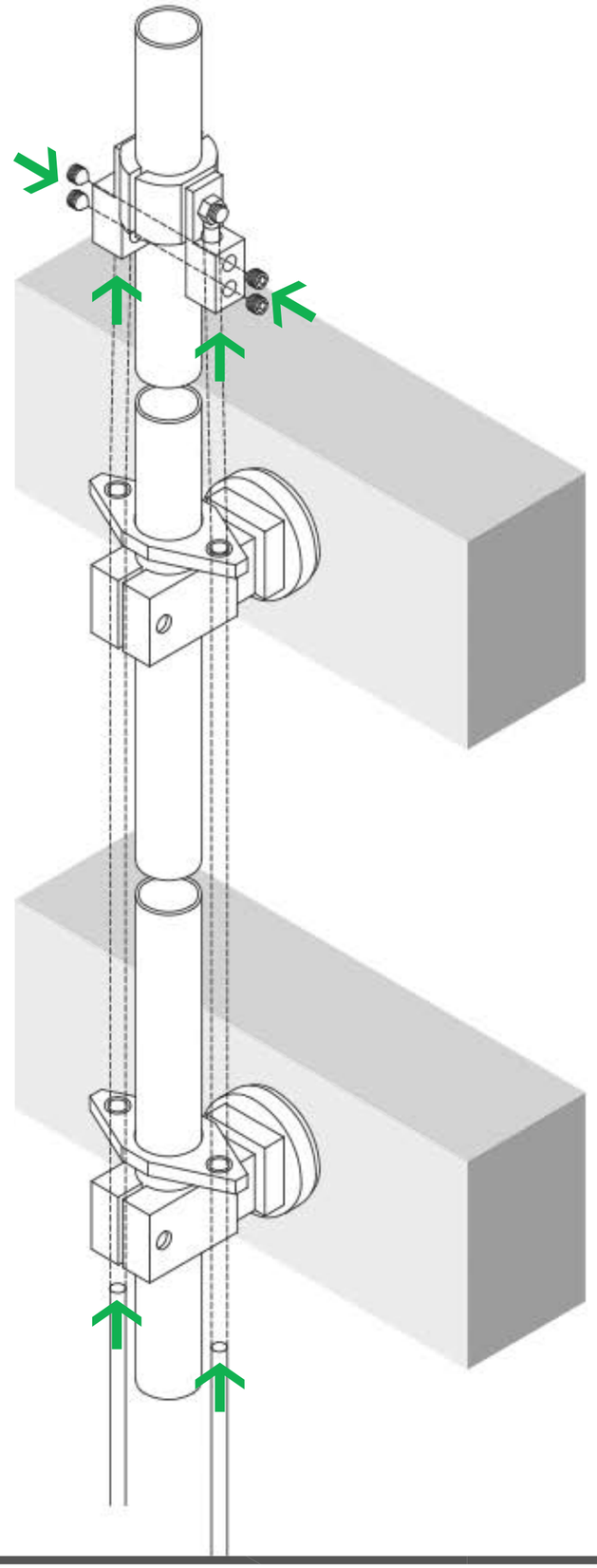






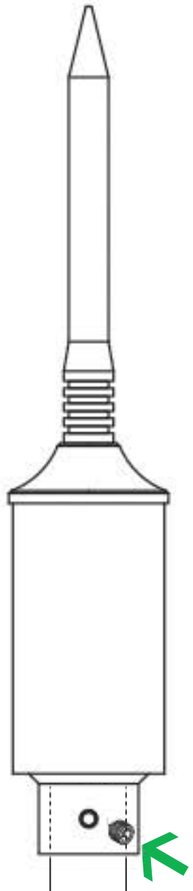


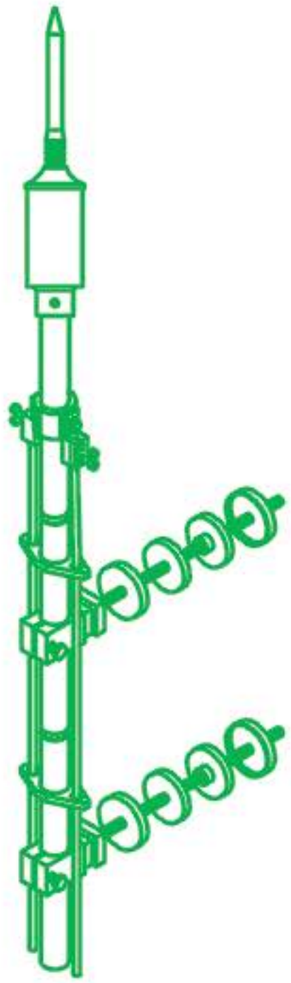
4



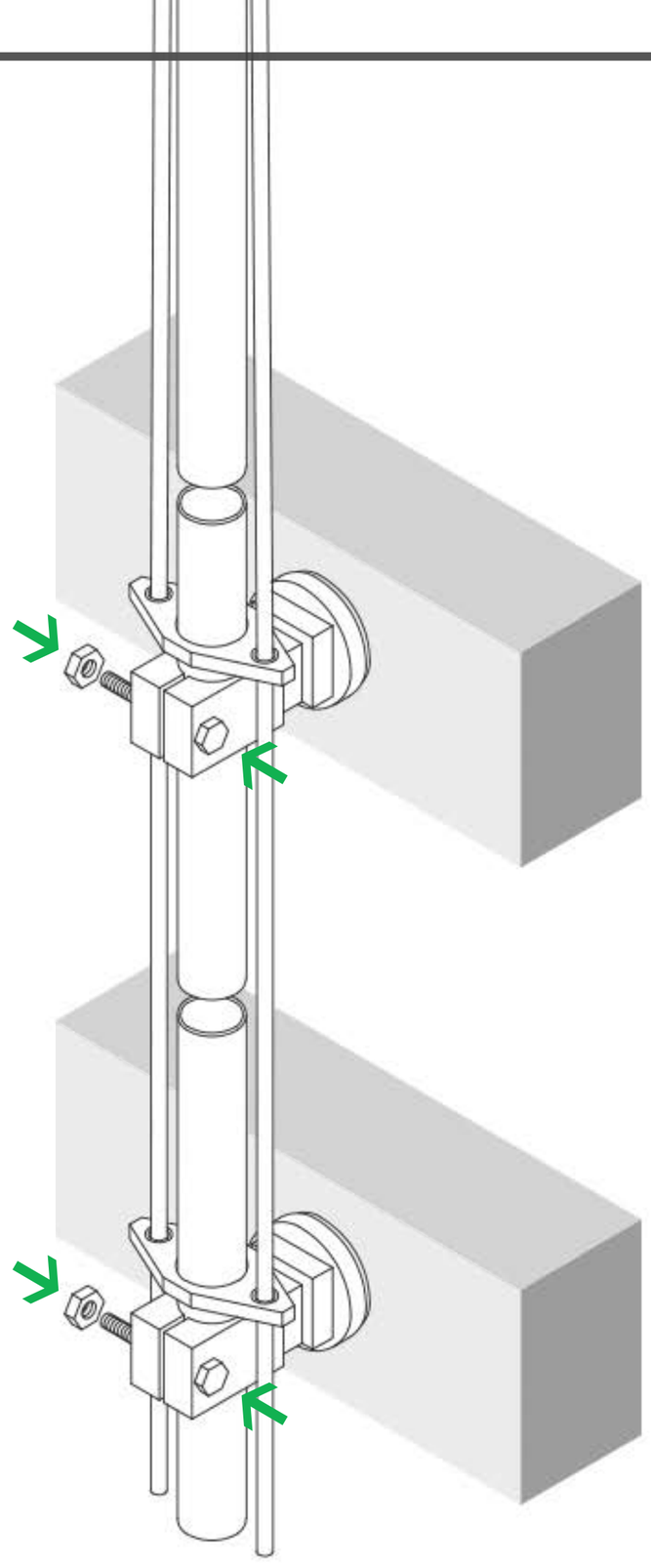
5







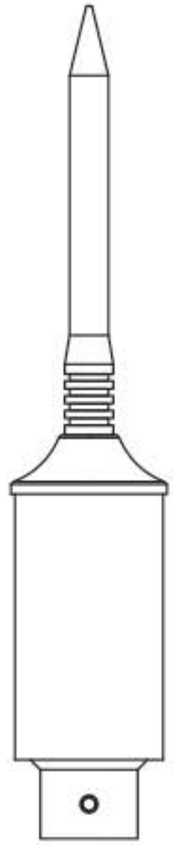
6





* Pentru catarg mai mare de 4m
se recomannda 3 console.

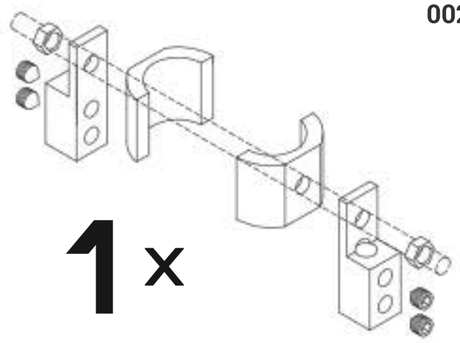
SISTEM DE FIXARE TURLA BISERICA



1 x

PDA Integrat Electric

015IE - 060IE



1 x

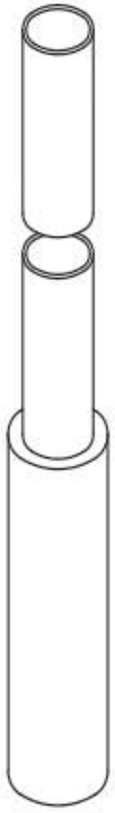
Adaptor doua coborari

001A

2 x 

Piesa centrare coborare

0021A - 0022A



1 x

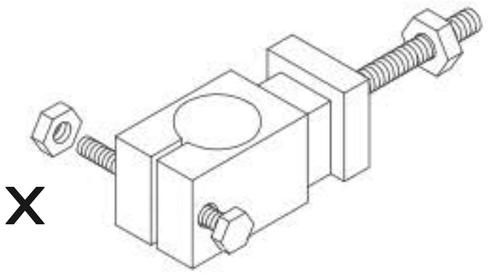
Catarg simplu / telescopic

101C - 115C



2 x

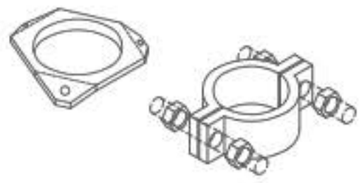
Conductor coborare

2 x 

Consola metalica

205S

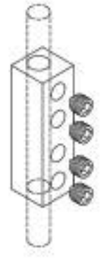
Optional

1 x 

Piesa ancorare catarg + opritor

003A

* Recomandat pentru catarg mai mare de 5 m.
** Trebuie conectata la impamantare.

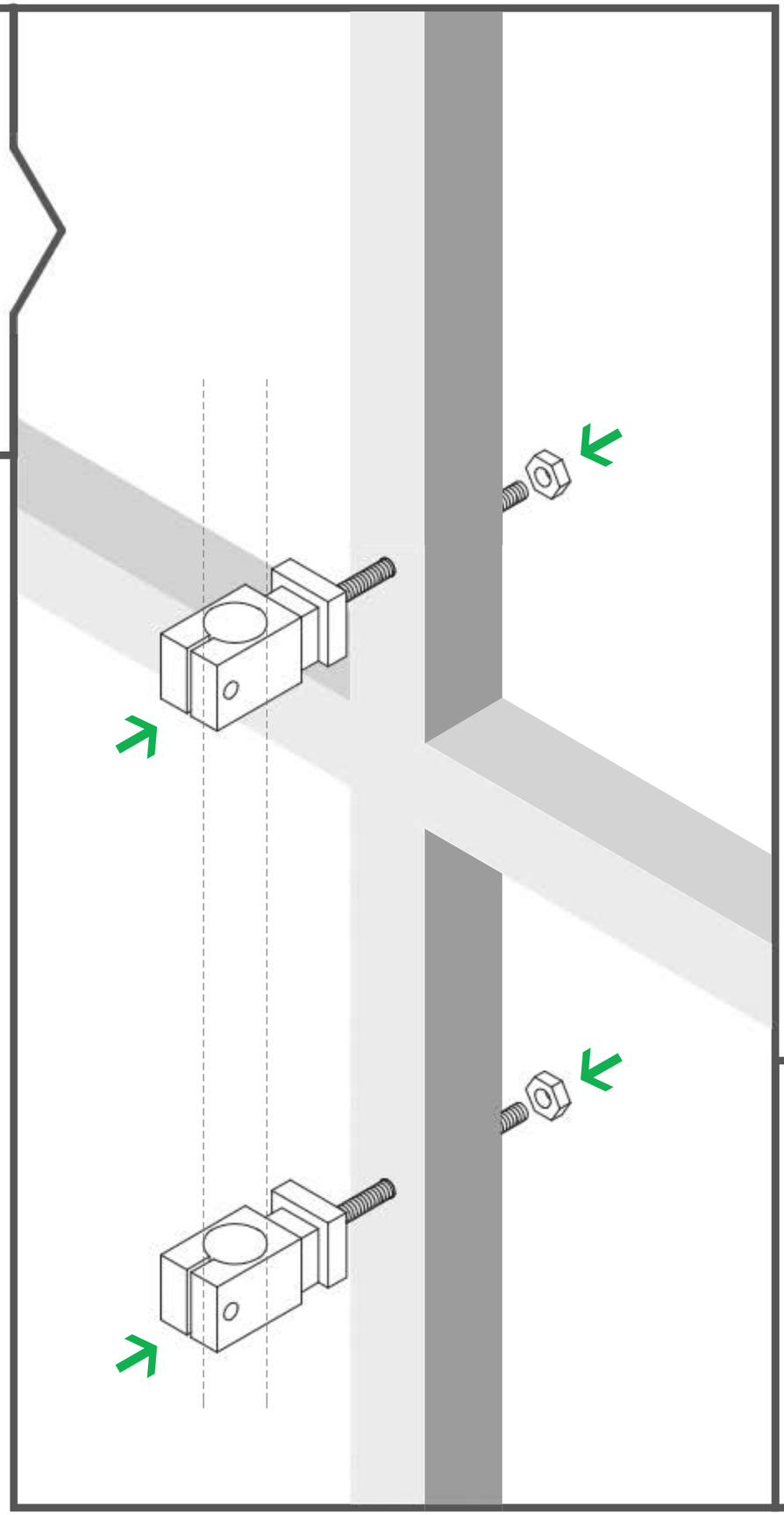
1 x 

Piesa jonctiune

004A

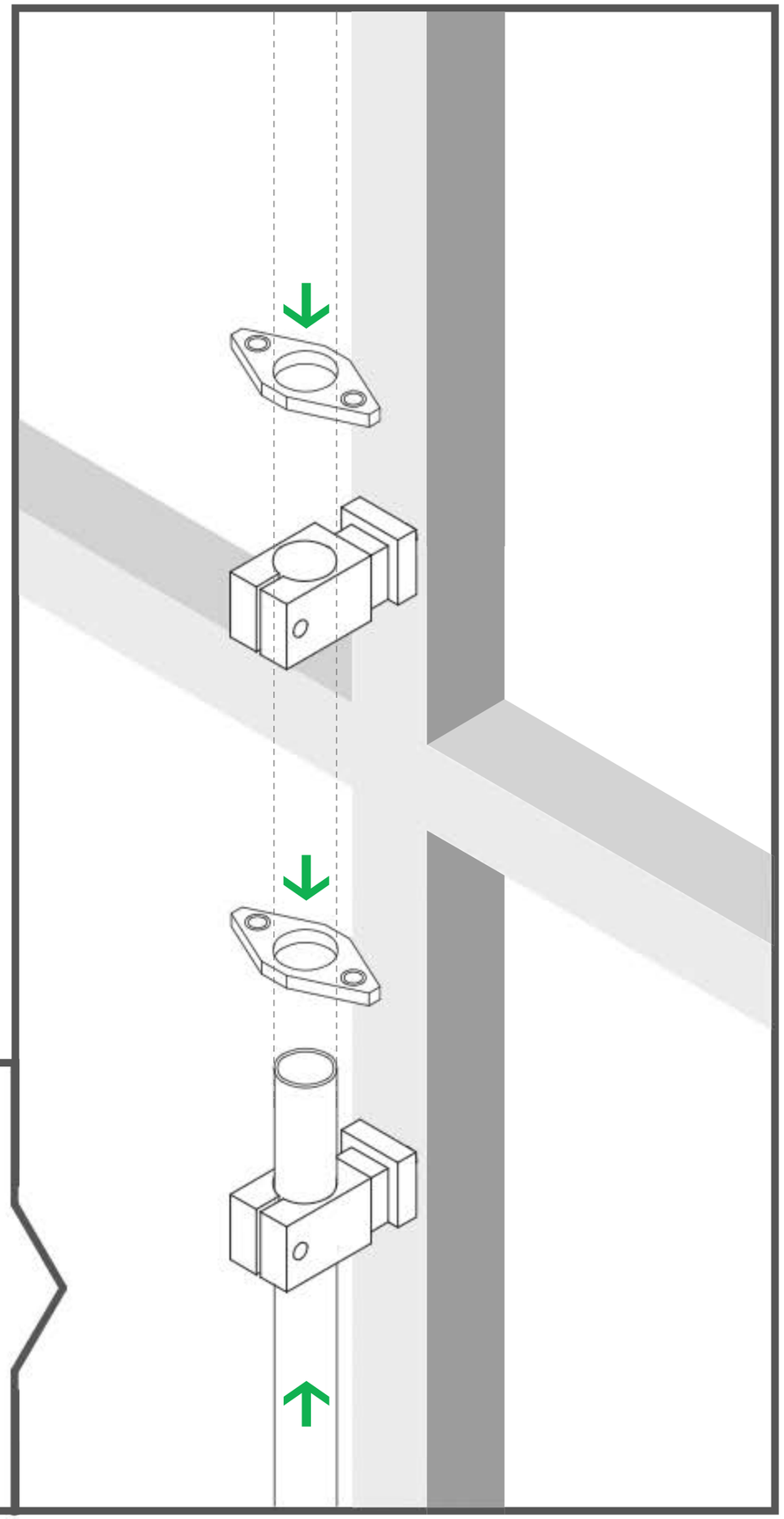
1



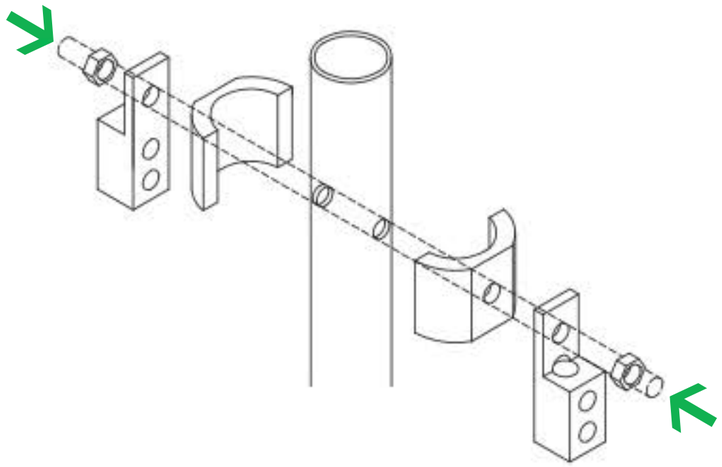




2

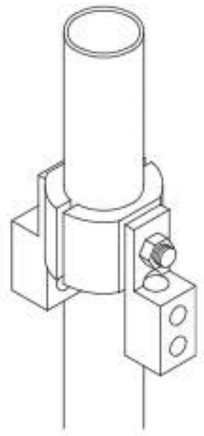


3

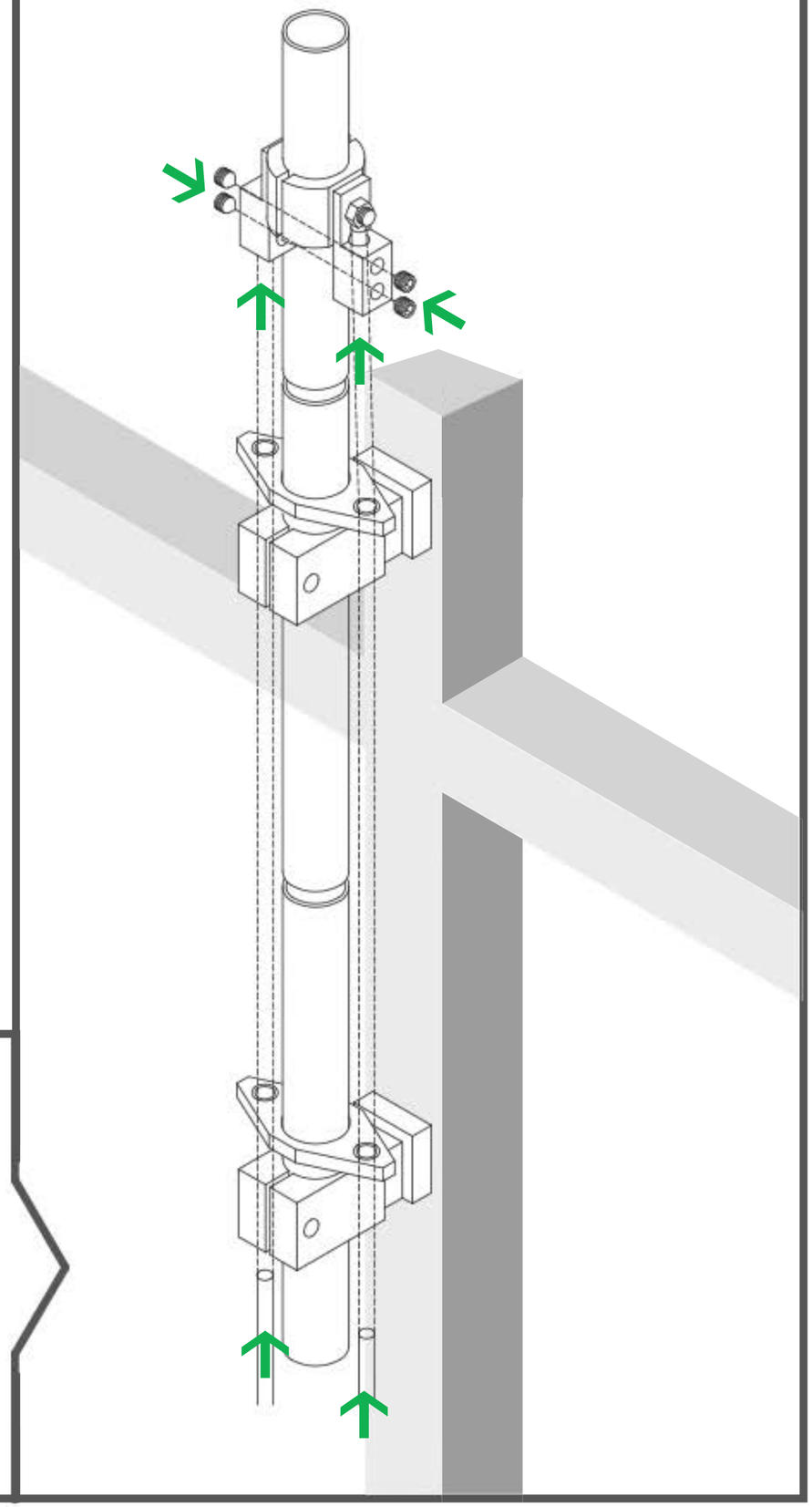






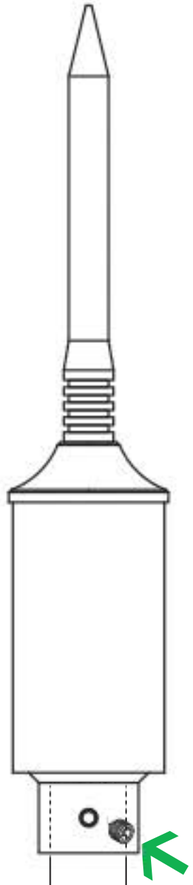


4



5







6

