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Assembly instruction

Metal Oxide Surge Arresters PEXLIM and PEXLINK

Hitachi Energy

Safety information

Key to the signs

	This sign is a visual notice to avoid mistakes which can result in damage of the material and/or no function of the surge arrester. Read the text carefully and if you don't understand do not proceed.
	Serious material damage, severe personal injury and/or death can be the result of not following the information given at this sign. Read the text carefully and if you don't understand do not proceed.
	The bolt of the given size shall be tightened with a torque wrench to the specified value.

Important information

The following instruction is valid for PEXLIM R, Q, P, and PEXLINK transmission line arresters including non-catalogue arresters with the following additional suffix letters:

E = Non-standard electrical data
H = Inverted mounting
L = Line surge arrester

Serious material damage, severe personal injury and/or death can be the result of not following this instruction. Therefore, the personnel responsible for the installation of the equipment shall read and follow the instruction carefully.

Handling and maintenance of all the surge arresters described in this instruction must be done by personnel trained for this type of work.

WARNING!

All work related to the surge arresters shall be made with disconnected and earthed conductors. Follow all regulations and rules stated by international and national safety regulations.
Normally, surge arresters operate at a high voltage. Therefore, they must be handled and installed by qualified personnel.

Storage

In all cases and with consideration to specific local conditions, appropriate steps must be taken to ensure the equipment and packaging is stored in such a way as to protect it from damage or deterioration.

Table of contents

This manual covers both PEXLIM and PEXLINK Surge arresters. An X in the respective column above indicates which section should be followed for each type. An (X) in brackets indicates the section to be followed when an accessory is to be installed.

1. Introduction

1.1 Sequence of assembly

The respective procedure in the tables below should be followed for safe and correct installation of the surge arresters

PEXLIM

Order	Procedure	Section
1	Inspection upon arrival.	1.2
2	Prepare before installation	1.3 - 1.4
3	Lift out the surge arrester from the case.	3
4	Adjust the line terminals.	4
5	Assemble the grading rings.	5.1 - 5.2
6	Assemble the grading ring on the surge arrester. Lift the top unit on the second unit if there is a two-unit surge arrester.	6.1 - 6.3
7	Lift the surge arrester on structure and anchored it. If a insulating base and/or EXCOUNT-II should be assembled see section 7.2 instead.	7.1 (7.2)
8	Connect the line and earth conductors. If a surge counter (EXCOUNT-C or other) should be installed see section 8.5.	8.1 - 8.4 (8.5)

PEXLINK

Order	Procedure	Section
1	Inspection upon arrival.	1.2
2	Prepare before installation	1.3
3	Lift out the surge arrester from the case.	3
5	Assemble the grading rings.	5.1 - 5.2
6	Assemble the grading ring on the PEXLINK surge arrester. Lift the top unit on the second unit if there is a two-unit surge arrester.	6.1 - 6.3
7	Assembly the terminal and links.	9.1
8	Assembly of disconnecting device. If a EXCOUNT-II should be installed see section 9.3 instead.	9.2 (9.3)
9	Install the PEXLINK surge arrester on the transmission line.	-

Multi-unit arresters must be erected with their units in correct order, see section 2.2 on page 6 and 6.1 on page 12.
The instruction must be followed in correct order to prevent problems during assembly. In the case where an arrester is not supplied with an insulating base and/or surge counter, the paragraphs dealing with these accessories may be disregarded.

1.2 Inspection upon arrival

Upon arrival it is important that the cases are inspected and the contents checked against the packing list which is attached to each case. Any shortage or damage should be reported immediately to the insurance and/or Hitachi Energy representative; latest within 30 days from the arrival of goods at site. Hitachi Energy cannot take responsibility for shortages or damages not reported within this time period.

If the contents are to be stored for a long period of time prior to installation they must be repacked and preferably stored dry and indoors. However, outdoor storage is acceptable for the arresters themselves.

1.3 Tools for assembly

Special instruments or tools are not required for assembly and erection of the surge arrester. It is recommended to assemble all details of a complete arrester before mounting it on the structure.

1.4 Vertical or inverted istallation

Surge arresters have an insulator with an alternating shed profile, see figure 1.4.1. The surge arrester shall be mounted such that the shed form points downwards so that water can easily run off the insulator.

Should the surge arrester be incorrectly mounted upside down, then rainwater will collect in the inverted sheds, leading to a risk for flashover and subsequent short-circuit.

Surge arresters specifically intended for inverted mounting have a ”H” at the end of the type designation, see the below example, and must always be inverted mounted, see figure 1.4.4.

PEXLIM Q072-YV072H

Surge arresters without ”H” in the type designation must always be upright mounted, see figure 1.4.3.

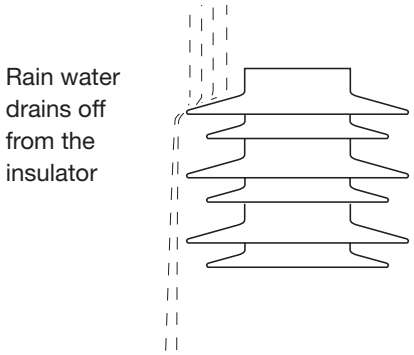


Figure 1.4.1
Ensure that shed profile points downwards to avoid collection of rainwater on the insulator

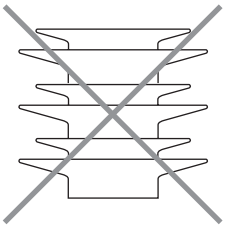


Figure 1.4.2
WARNING!
Incorrect direction of the sheds

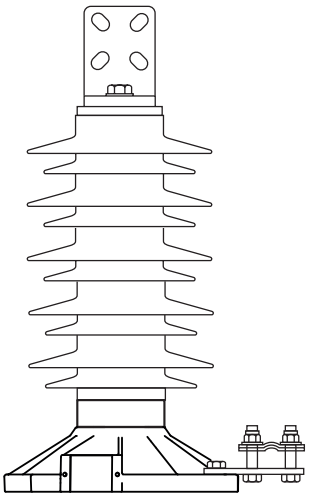


Figure 1.4.3
Surge arrester for upright mounting (note direction of sheds)

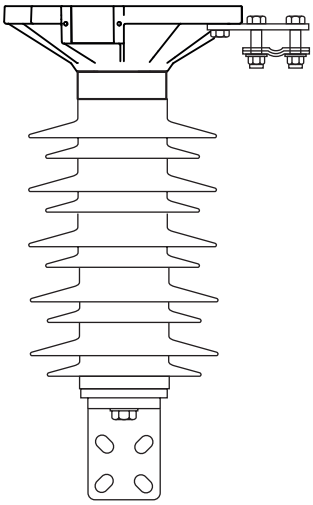


Figure 1.4.4
Surge arrester for inverted mounting (note direction of sheds)

2. Rating plates

2.1 Location of rating plates

See figure 2.1.1 to 2.1.3 for location of the rating plate on respective surge arrester types.

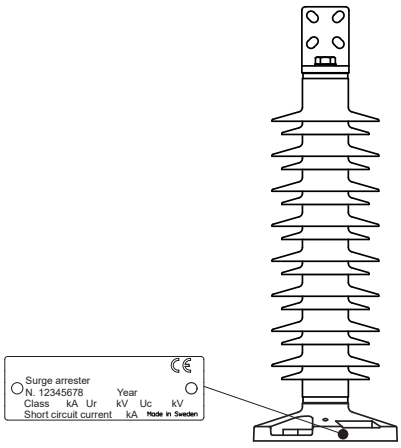


Figure 2.1.1
PEXLIM P-Y and R surge arrester

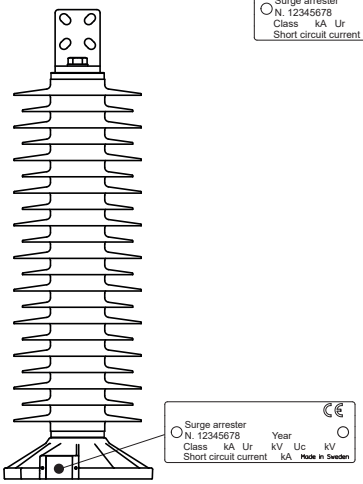


Figure 2.1.2
PEXLIM Q, P-X and P-Z surge arrester

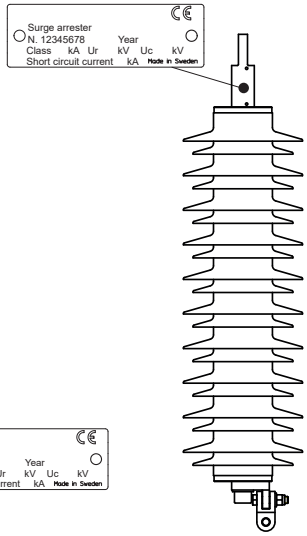


Figure 2.1.3
PEXLINK surge arrester

2.2 Relative position of arrester units

Two-unit arresters must be erected with their units in the correct order.All units in one arrester have the same serial number with a consecutive suffix number to identify their position, i.e. top unit = N. XXXXXXX/1, bottom unit = N. XXXXXXX/2.

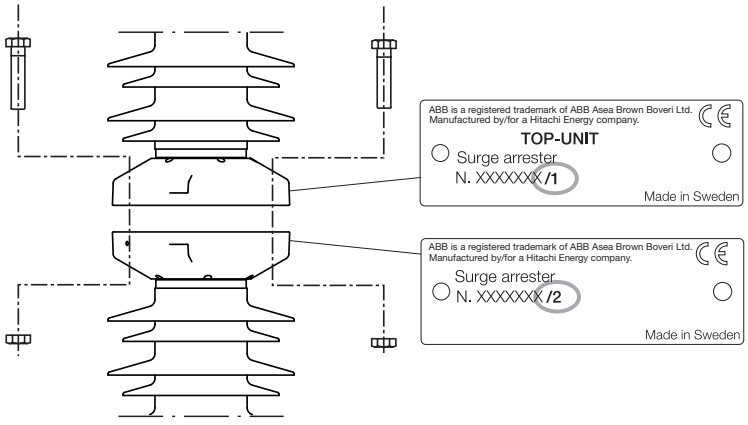


Figure 2.2.1
Plate with serial number on the flanges

3. Lifting

3.1 Lifting the Surge arrester

Lift the Surge arrester by the line terminal or the flange. Use of shackles or lifting eye bolts is recommended. See figure 3.1 to 3.4 (for PEXLINK see figure 3.5)

Table 3.1

	PEXLIM R	PEXLIM Q	PEXLIM P-X	PEXLIM P-Z	PEXLIM P-Y	PEXLINK
Typical weight of the smallest to the largest surge arrester.	15 - 33 kg	18 - 129 kg	19 - 148 kg	19 - 160 kg	54 - 247 kg	14 - 130 kg

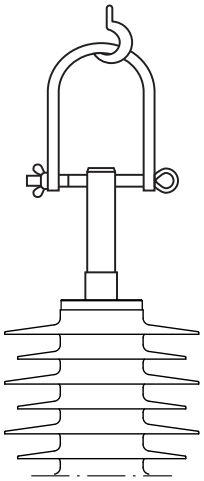


Figure 3.1
Lifting with shackles mounted on the line terminal with Ø11 hole

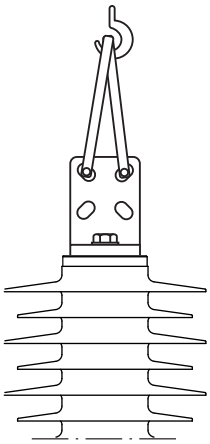


Figure 3.2
Lifting with slings mounted on the line terminal

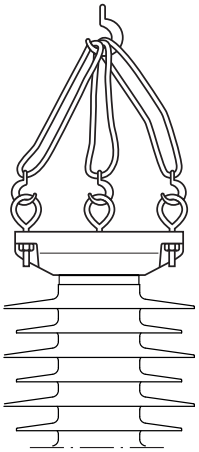


Figure 3.3
Lifting the joint flange with lifting eye bolts and lifting slings

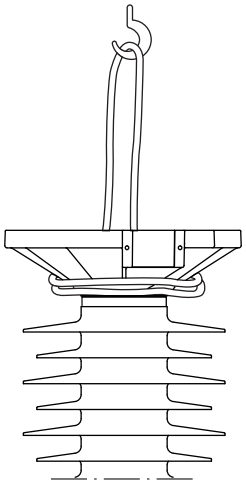


Figure 3.4
Lifting the base with lifting slings (prefered lifting arrangement for inverted mounting)

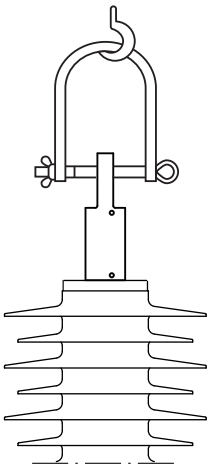


Figure 3.5
Lifting the PEXLINK surge arrester with shackles mounted on the line terminal with Ø20 hole

Do NOT lift the surge arrester by its insulator!

Be careful so that the arrester units do not hit anything during lifting!

Keep the lifting slings in place until the completely assembled arrester is securely anchored to the structure.

4. Line terminal

4.1 Adjusting the pre-assembled line terminal

Adjust the line terminal to desired position. Ensure that metal contact surfaces on the arrester unit, line terminal and holder for grading ring (when applicable) are free from dirt and grease. Line terminal with clamp: when the line conductor is to be connected, assemble the clamp according to the assembly instruction delivered with it.

Recommended tightening torque is: PEXLIM R 100 Nm, PEXLIM Q, P 150 Nm (M20)

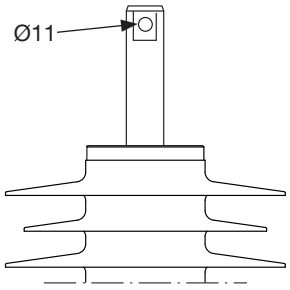


Figure 4.1
Adjustment of
1HSA410 000-N, -P

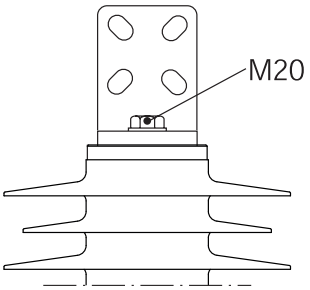


Figure 4.2
Adjustment of
1HSA410 000-L, -M

PEXLIM R — 100 Nm M20

PEXLIM Q, P — 150 Nm M20

5. Grading ring

5.1 Grading ring arrangement

When a grading ring is supplied, it must be fitted to the arrester. Otherwise the corect performance is not guaranteed. If the surge arrester has a grading ring, assemble the stays with the ring/rings according to the table 5.1.1 and the figures in paragraph 5.2. The recommended tightening torque for M10 screws is 33 Nm.

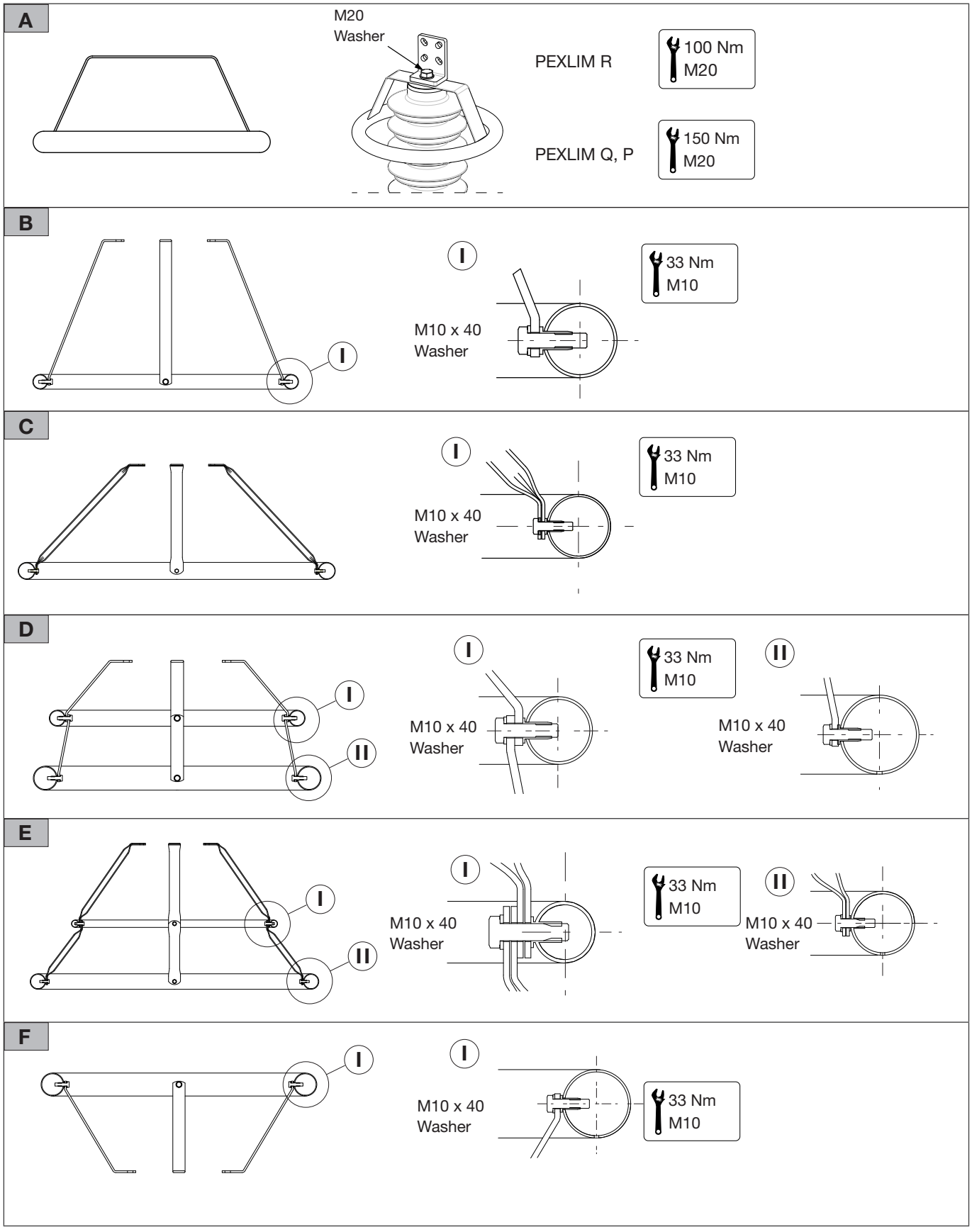
For inverted installation, the Surge arrester has a ”H” added to the end of the type designation shown in the table below. For PEXLINK, the Surge arrester has a ”L” added to the end of the type designation shown in the table below.

Table 5.1.1 Grading ring arrangement
The letters in the table refer to the figures on the next page. Types where grading rings are included.

Product type	Type Designation	See 5.2	Product type	Type Designation	See 5.2
PEXLIM R-Y	R090-YH123	A	**PEXLIM P-Z**	P180-ZH245 — P228-ZH245	A
	R090-YV123 — R096-YV123	A		P180-ZV245 — P228-ZV245	B
	R108-YH145	A		P216-ZH300 — P276-ZH300	B
	R108-YV145	A		P216-ZV300 — P240-ZV300	E
	R132-YH170 — R144-YH170	A		P258-ZV300 — P276-ZV300	B
PEXLIM Q-Y	Q180-YH245 — Q228-YH245	A		P258-ZH362 — P288-ZH362	E
	Q180-YV245 — Q228-YV245	B		P258-ZV362 — P288-ZV362	C
	Q216-YH300 — Q276-YH300	B		P360-ZH420	A
	Q216-YV300 — Q240-YV300	D		P330-ZV420 — P390-ZV420	A
	Q258-YV300 — Q276-YV300	C		P396-ZV420	A
	Q258-YH362 — Q276-YH362	E	**PEXLIM P-Y**	P228-YH300 — P276-YH300	B
	Q288-YH362	C		P228-YV300 — P276-YV300	B
	Q258-YV362 — Q288-YV362	E		P258-YM362 — P276-YM362	E
	Q330-YH420 — Q360-YH420	C		P258-YH362 — P288-YH362	E
	Q330-YV420 — Q396-YV420	E		P258-YV362 — P288-YV362	E
PEXLIM P-X	P132-XH170 — P150-XH170	A		P330-YH420 — P360-YH420	C
	P132-XV170 — P192-XV170	A		P378-YH420 — P396-YH420	E
	P180-XM245 — P192-XM245	A		P330-YV420 — P396-YV420	E
	P180-XH245 — P228-XH245	A		P396-YH550 — P444-YH550	E, F
	P180-XV245 — P228-XV245	B			
	P210-XV245 — P228-XV245	B			
	P216-XH300 — P276-XH300	B			
	P216-XV300 — P276-XV300	B			
	P258-XH362 — P276-XH362	E			
	P288-XH362	D			
	P258-XV362 — P288-XV362	E			
	P330-XH420 — P360-XH420	C			

5.2 Grading ring assembly

Assemble the grading ring according to the applicable arrester type designation in table 5.1.1. See also paragraph 5.3 on next page for orientation of grading ring with drainage holes.



5.3 Grading rings with drainage holes

Assemble the grading ring according to the applicable arrester type designation in table 5.1.1.

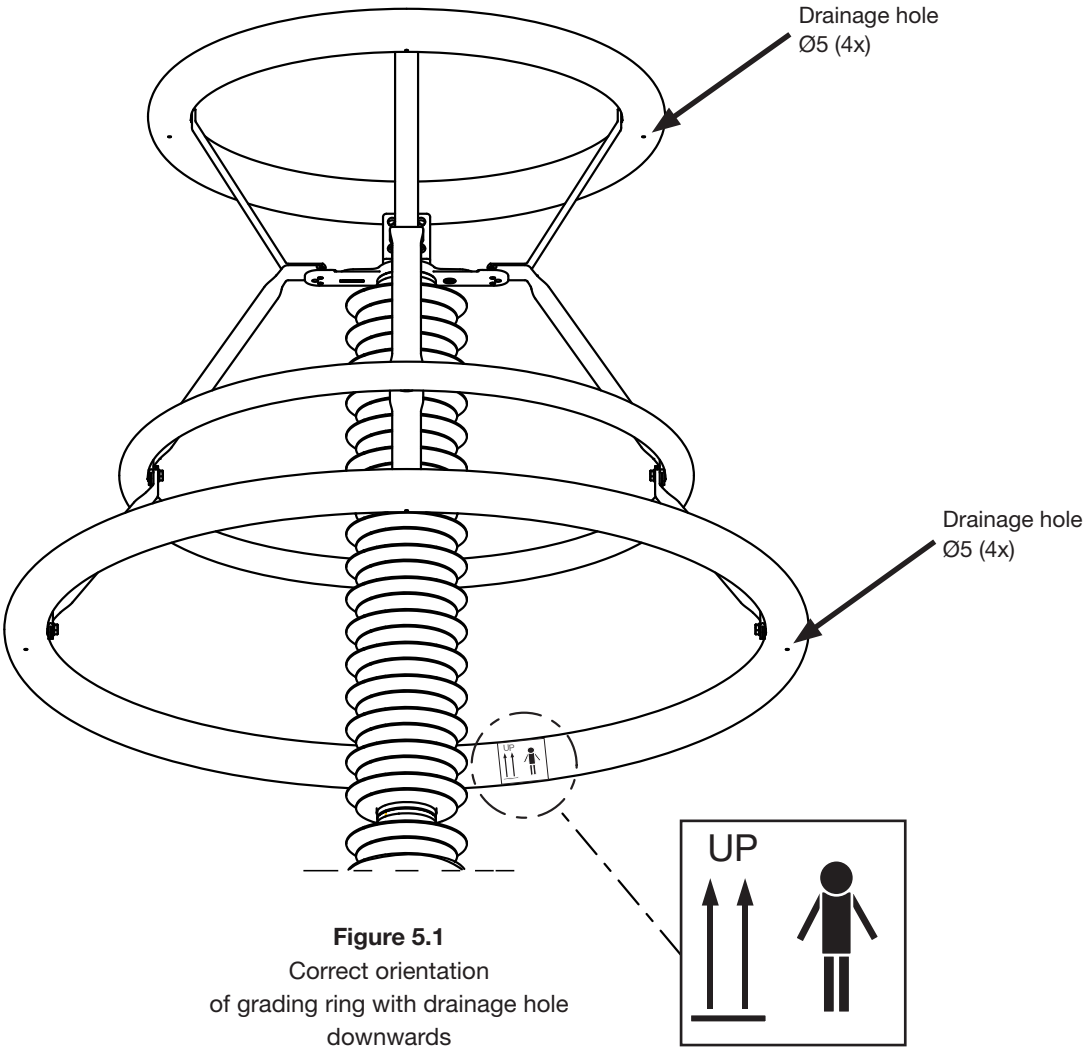


Figure 5.1
Correct orientation
of grading ring with drainage hole
downwards

NOTE! Surge arrrester with grading ring arrangement C to F: drainage hole must always be oriented downwards.

Table 5.3.1
The letters refer to the figures on page 10

Grading ring arrangement	View	Drainage hole	View	Drainage hole
C	Ⓘ	x	Ⓘ	-
D	Ⓘ	-	Ⓘ	x
E	Ⓘ	-	Ⓘ	x
F	Ⓘ	x	Ⓘ	-

6. Assembly of units and grading rings

6.1 Find your surge arrester

Standard PEXLIM and PEXLINK surge arresters are built up of either one unit (table 6.1.1) or two units (table 6.1.2). Find your arrester from the respective table below and follow the reference located at the bottom of the table.

For inverted installation the surge arrester has a ”H” added to the end of the type designation shown in the tables below. For PEXLINK, the surge arrester has a ”L” added to the end of the type designation shown in the table below.

Table 6.1.2
SINGLE-UNIT SURGE ARRESTERS

PEXLIM R-Y		PEXLIM Q-Y		PEXLIM P-X		PEXLIM P-Z	
Rxxx-YV024	Rxxx-YH145	Qxxx-YV024	Qxxx-YH145	Pxxx-XV012	Pxxx-XH145	Pxxx-ZV024	Pxxx-ZH145
Rxxx-YV036	Rxxx-YV145	Qxxx-YV036	Qxxx-YV145	Pxxx-XV024	Pxxx-XV145	Pxxx-ZV036	Pxxx-ZV145
Rxxx-YV052	Rxxx-YN145	Qxxx-YV052	Qxxx-YN145	Pxxx-XV036	Pxxx-XN145	Pxxx-ZV052	Pxxx-ZN145
Rxxx-YN052	Rxxx-YH170	Qxxx-YN052	Qxxx-YH170	Pxxx-XV052	Pxxx-XH170	Pxxx-ZN052	Pxxx-ZH170
Rxxx-YH072	Rxxx-YN170	Qxxx-YV072	Qxxx-YV170	Pxxx-XN052	Pxxx-XV170	Pxxx-ZV072	Pxxx-ZV170
Rxxx-YV072	Rxxx-ZV072	Qxxx-YN072	Qxxx-YN170	Pxxx-XV072	Pxxx-XN170	Pxxx-ZN072	Pxxx-ZN170
Rxxx-YN072	Rxxx-ZV100	Qxxx-YH100	Qxxx-YH245	Pxxx-XN072	Pxxx-XM245	Pxxx-ZH100	Pxxx-ZH245
Rxxx-YV100	Rxxx-ZV123	Qxxx-YV100	Qxxx-YV245	Pxxx-XV100	Pxxx-XH245	Pxxx-ZV100	Pxxx-ZV245
Rxxx-YN100	Rxxx-ZV145	Qxxx-YN100	Qxxx-YN245	Pxxx-XN100	Pxxx-XN245	Pxxx-ZN100	Pxxx-ZN245
Rxxx-YH123		Qxxx-YH123	Q216-YH300	Pxxx-XH123		Pxxx-ZH123	P216-ZH300
Rxxx-YV123		Qxxx-YV123	Q240-YH300	Pxxx-XV123		Pxxx-ZV123	P240-ZH300
Rxxx-YN123		Qxxx-YN123		Pxxx-XN123		Pxxx-ZN123	

PEXLIM P-Y	
P228-YH300	P240-YH300

For assembly of grading rings, please refer to section 6.2 on page 13.

Table 6.1.2
TWO-UNIT SURGE ARRESTERS

PEXLIM R-Y	PEXLIM Q-Y	PEXLIM P-X	PEXLIM P-Z	PEXLIM P-Y
	Q258-YH300 - Q276-YH300	Pxxx-XV245	P258-ZH300 - P276-ZH300	P258-YH300 - P276-YH300
	Qxxx-YV300	Pxxx-XH300	Pxxx-ZV300	Pxxx-YV300
	Qxxx-YH362	Pxxx-XV300	Pxxx-ZH362	Pxxx-YM362
	Qxxx-YV362	Pxxx-XH362	Pxxx-ZV362	Pxxx-YH362
	Qxxx-YH420	Pxxx-XV362	Pxxx-XV362	Pxxx-YV362
	Qxxx-YV420	Pxxx-XH420	Pxxx-XH420	Pxxx-YH420
			Pxxx-ZH420	
			Pxxx-ZV420	

For assembly of grading rings and units, please refer to section 6.3 on page 14.

6.2 Assembly of one-unit surge arrester

PEXLIM

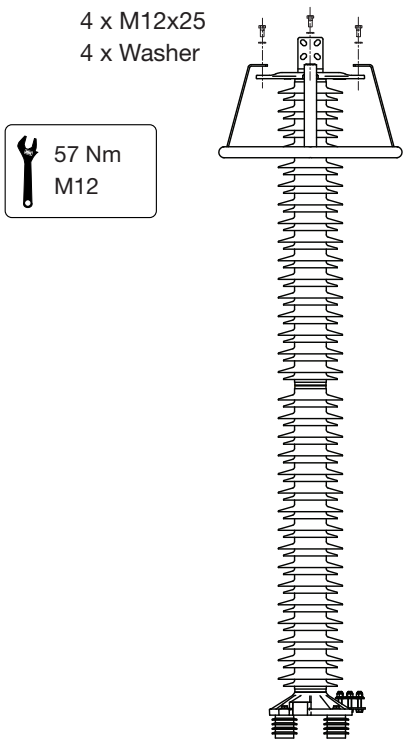


Figure 6.2.1
PEXLIM surge arrester for vertical upright mounting

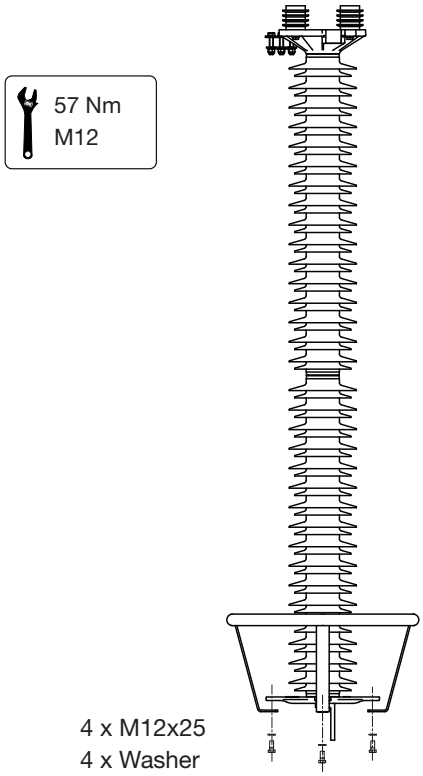


Figure 6.2.2
PEXLIM surge arrester for inverted mounting

PEXLINK

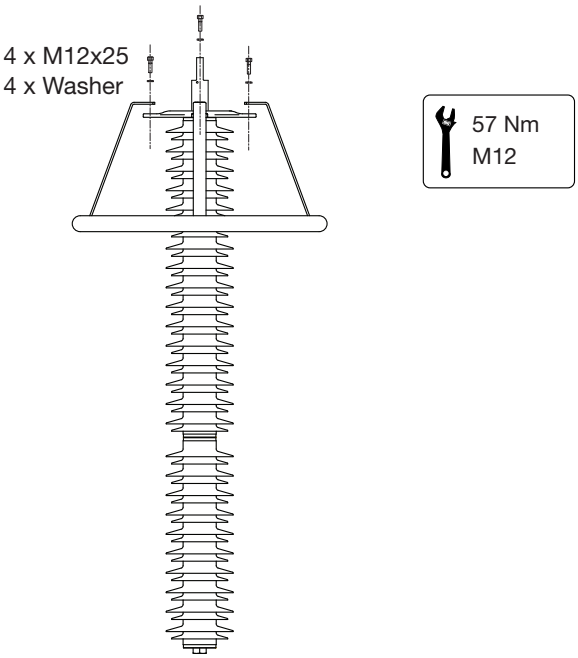


Figure 6.2.3
PEXLINK surge arrester with pre-assembled coupling at bottom

6.3 Assembly of two-unit surge arrester

PEXLIM

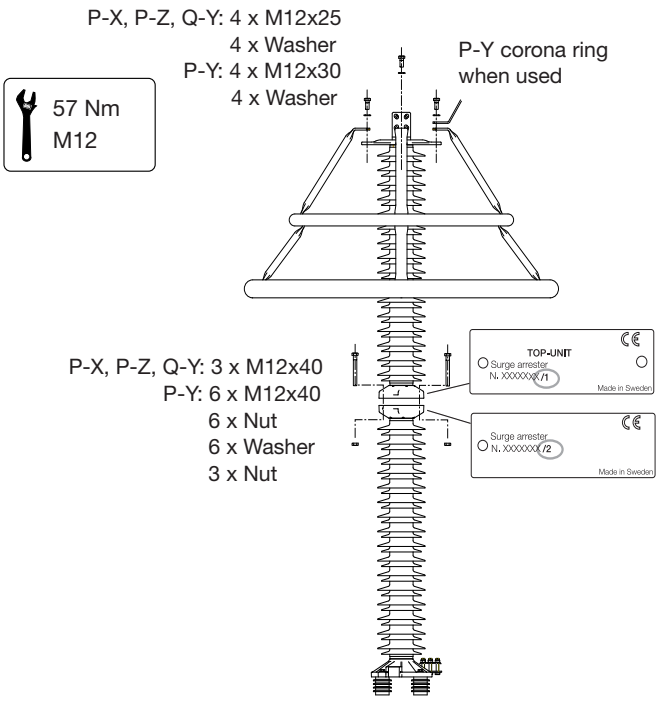


Figure 6.3.1
PEXLIM surge arrester for vertical upright mounting

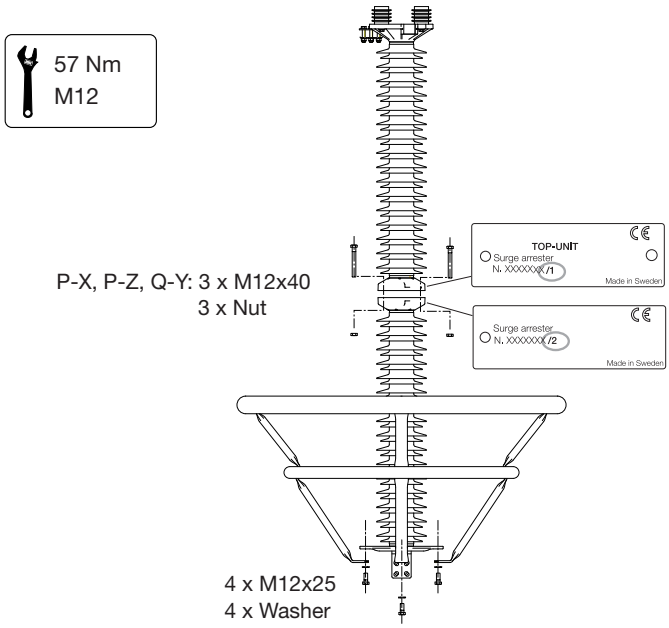


Figure 6.3.2
PEXLIM surge arrester for inverted mounting

PEXLINK

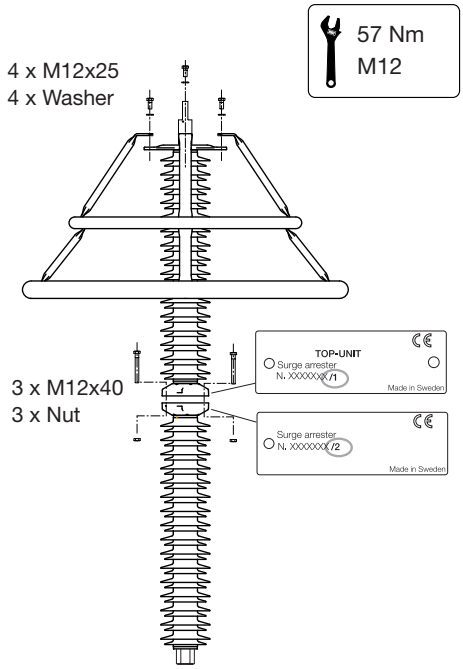


Figure 6.3.3
PEXLINK surge arrester with pre-assembled coupling at bottom

Use caution when tightening bolts with tools that come in contact with the insulator to avoid damaging the soft housing material.

7. Installation on structure

7.1 Installation on structure without insulating base

This section covers installation of PEXLIM surge arrester on a structure without insulating base. For installation on a structure with insulating base see paragraph 7.2.

Ensure that the distances between the drilling holes in the structure are according to the corresponding figure below. PEXLIM R has the possibility to use two different drilling plans; either the drilling plan in figure 7.1.2 or the alternative drilling plan in figure 7.1.1. PEXLIM Q, P-X and P-Z have only the drilling plan in figure 7.1.1. PEXLIM P-Y has the possibiity to use two different drilling plans, either the drilling plan in figure 7.1.3 or the alternative drilling plan in figure 7.1.4.

Note the lifting instructions in section 3 on page 7 before undertaking installation. Anchoring bolts and nuts are not provided with the arrester. Ensure that the chosen bolts have sufficient mechanical strength, to handle the loads described in paragraph 8.1 on page 18.

Fit the arrester to the structure and the earth terminal to the flange according to figure 7.1.5 .

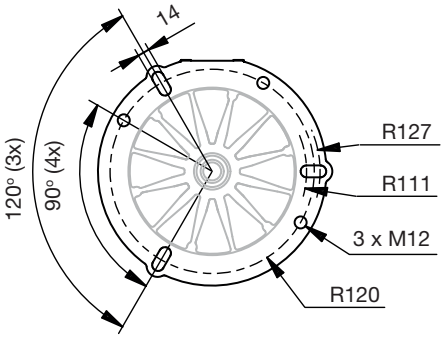


Figure 7.1.1
Drilling plan for PEXLIM Q, P-X and P-Z
(alternative drilling plan for PEXLIM R)

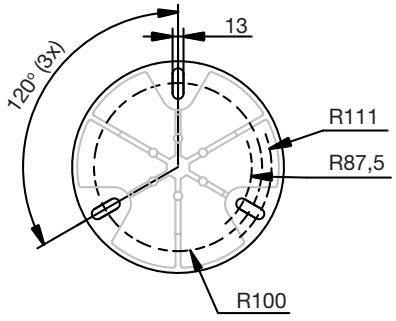


Figure 7.1.2
Drilling plan for PEXLIM R
(alternative drilling plan in figure 7.1.1)

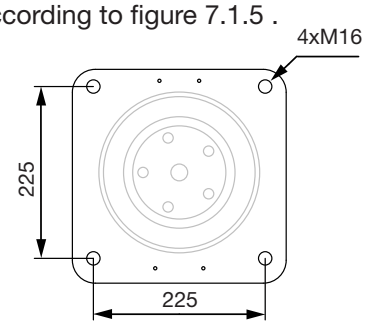


Figure 7.1.3
Drilling plan for PEXLIM P-Y
(alternative drilling plan in figure 7.1.4)

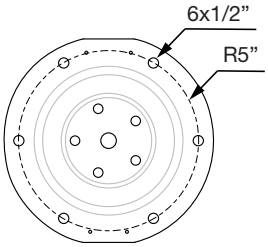


Figure 7.1.4
Drilling plan for PEXLIM P-Y
(alternative drilling plan in figure 7.1.3)

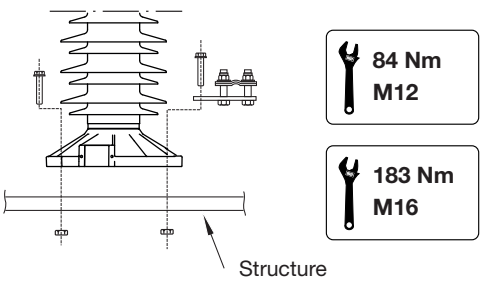


Figure 7.1.5
Assembly of earth terminal and
installation on structure

7.2 Installation on structure with insulating base

This instruction covers insulating base 1HSA430000-A, -B, -C, -D -H and -J. See separate instruction for other types. 1HSA430000-B is identical to -A and 1HSA430000-D is identical to -C, respectively, except that the bolts used are UNC-type. If you have purchased -B or -D, please use the bolts size indicated in brackets. Insulating base 1HSA430000-H is for use with the standard PEXLIM R and includes three insulating blocks instead of four.

Insulating base from other manufacturer
In the case where another insulating base is to be fitted, the installation instructions included with the delivery shall be followed.

Drilling plan
Ensure that the distances between the drilling holes in the structure are according the corresponding figure below. PEXLIM R has the possibility to use two different drilling plans; either the drilling plan in figure 7.2.2 or the alternative drilling plan in figure 7.2.1. PEXLIM Q, P-X and PEXLIM P-Z only have the drilling plan in figure 7.2.1. PEXLIM P-Y has the possibility to use two different drilling plans, either the drilling plan in figure 7.2.3 or the alternative drilling plan in figure 7.2.4

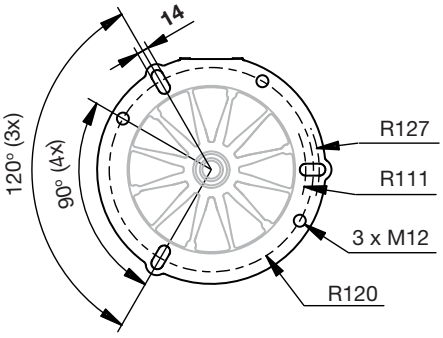


Figure 7.2.1
Drilling plan for
PEXLIM Q, P-X and P-Z
(alternative drilling plan for PEXLIM R)

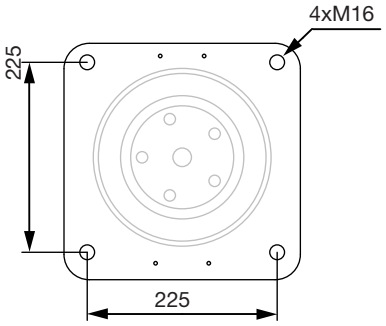


Figure 7.2.3
Drilling plan for PEXLIM P-Y
(alternative drilling plan in figure 7.2.4)

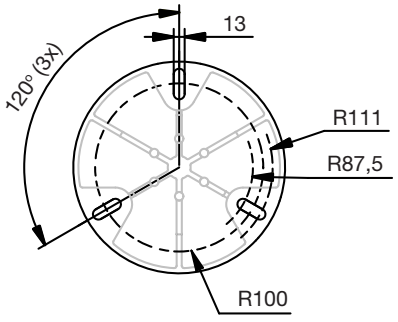


Figure 7.2.2
Drilling plan for PEXLIM R
(alternative drilling plan in figure 7.2.1)

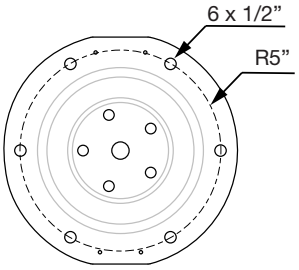


Figure 7.2.4
Drilling plan for PEXLIM P-Y
(alternative drilling plan in figure 7.2.3)

Earth terminal, EXCOUNT-II or EXCOUNT-III probe

As per the below figures, a longer bolt my be used to fix the earth terminal or mount the surge arrester monitor EXCOUNT-II on the flange. Since the bolt sets are used for different applications sometimes not all bolts are used. Recommended tightening torque is as indicated.

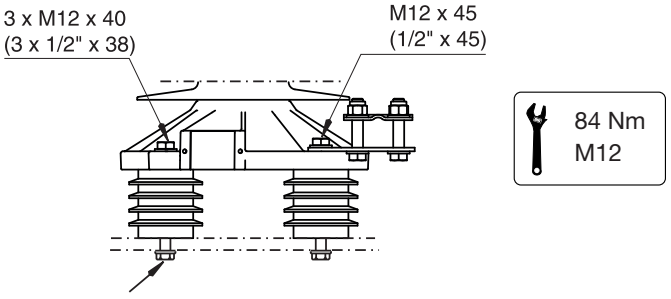


Figure 7.2.5
PEXLIM R, Q, P-X and P-Z with earth terminal and/or surge counter EXCOUNT-C and EXCOUNT-I

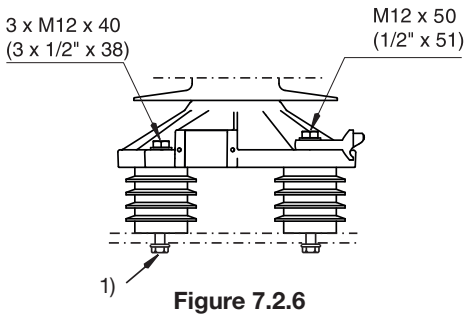


Figure 7.2.6
PEXLIM R, Q, P-X and P-Z with diagnostic indicator EXCOUNT-II

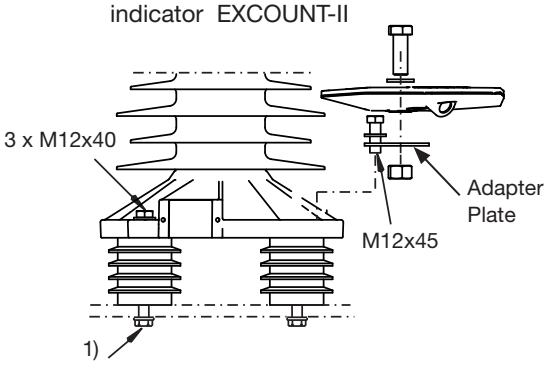


Figure 7.2.7
PEXLIM R, Q, P-X and P-Z with field probe to Online Surge arrester monitor EXCOUNT-III

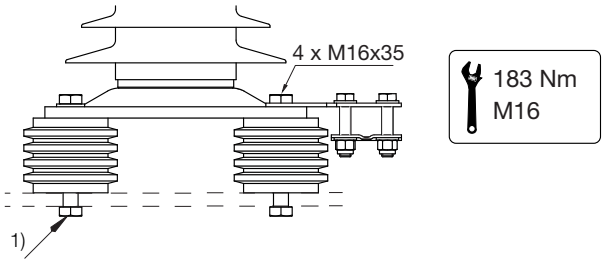


Figure 7.2.8
PEXLIM P-Y with earth terminal and/or surge counter EXCOUNT-C and EXCOUNT-I

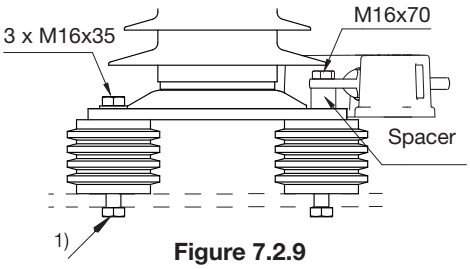


Figure 7.2.9
PEXLIM P-Y with diagnostic indicator EXCOUNT-II

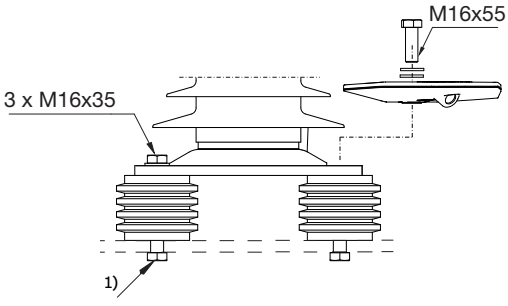


Figure 7.2.10
PEXLIM P-Y with field probe to Online surge arrester monitor EXCOUNT-III

1) Requirements on M16 / M12 (1/2”) bolts for installation to structure:
These bolts are not supplied with the arrester.
Recommended tightening torque: Acc. to strength class.
Strength class: 8.8 or higher
Material: Hot dip galvanized steel or waxed stainless steel.
Required threaded grip length: 15 to 20 mm.
A washer shall be placed under the bolts head.

8. Connection of conductors

8.1 Mechanical load of the surge arrester

The bending moment (in Nm) acting at the base of a surge arrester is that resulting from the vector sum of all possible loads (eg. line conductor load, wind load, arrester weight, earthquake, etc) in the direction perpendicular to the arrester axis.

PEXLIM surge arresters are dimensioned to withstand bending moments according to table 8.1.1. To obtain the best protection performance, the arresters must be connected with as short connectors as possible to both line and earth. However the mechanical aspects must be taken into consideration. Terminals with clamps accept conductors of diameter in the range 8-34 mm.

The PEXLIM design may present a visible deflection at normal load. It is recommended to connect the line conductor vertically to further reduce the mechanical stresses.

Table 8.1.1

Service loading	PEXLIM R-Y	PEXLIM Q-Y PEXLIM P-X	PEXLIM P-Z	PEXLIM P-Y
Specified long-term load (SLL)	1000 Nm	2500 Nm	3000 Nm	6000 Nm
Specified short-term load (SSL)	1600 Nm	4000 Nm	6000 Nm	9000 Nm
Definitions as per IEC 60099-4				

8.2 Connection of the conductor

Connection of the conductor must be done correctly. The conductor must be fixed edge to edge with the clamp, see figure 8.2.1 and 8.2.2 below.

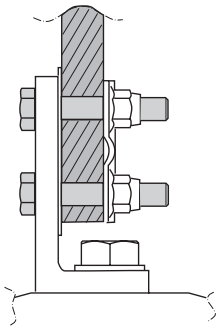


Figure 8.2.1
Correct
installation

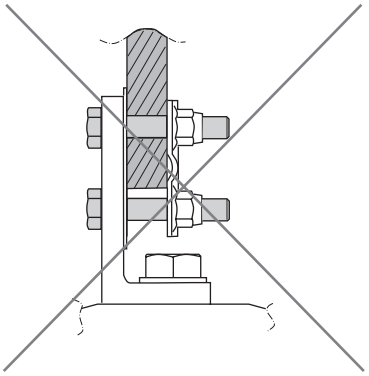


Figure 8.2.2
Warning!
Faulty connection

Compatible conductor material

All earth terminals are compatible with both copper and aluminium conductors.

Line terminal 1HSA410000-P is manufactured from stainless steel and 1HSA410000-M is aluminium together with a stainless steel clamp and spacer. These terminals are thus suitable for use with both aluminium and copper conductors.

Line terminals 1HSA410000-L and -N are manufactured of aluminium. In the case where these are used together with copper conductors, preventative measures must be taken to avoid direct contact between aluminium and copper which could lead to bi-metallic corrosion.

8.3 Connection of the conductor to the line terminal

Connect the line conductor to the line terminal in such way that the permissible static loading together with steady wind load does not exceed the maximum value according to table 8.1.1 on page 18.

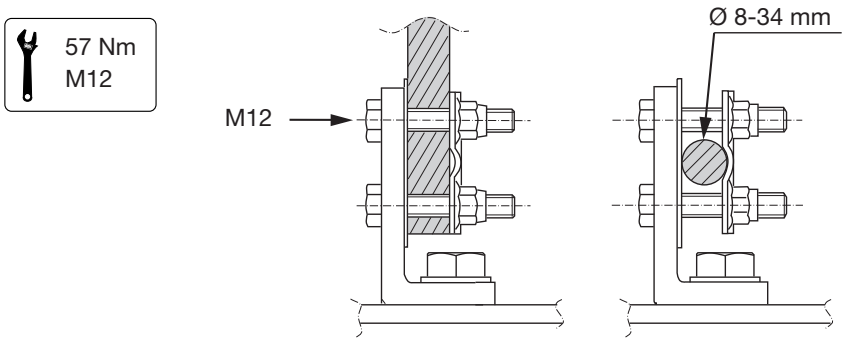


Figure 8.3.1
Connection of single line conductor
can be done from top or side.

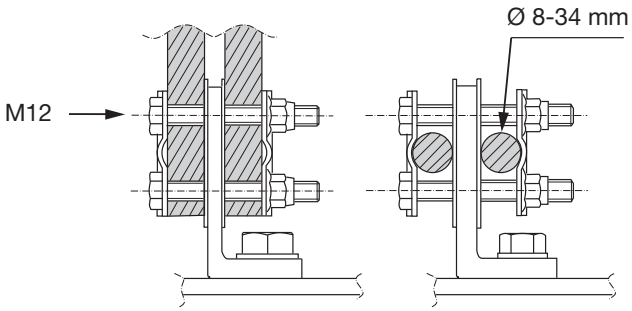


Figure 8.3.2
Connection of double line conductor
can be done from top or side.

8.4 Connection of the conductor to the earth terminal

For installation of surge counter in series with the earth conductor, please see paragraph 8.5 on page 22.

The earth conductor cross section shall be chosen in accordance with local regulations and earth fault current requirements. For assembly of earth terminal to flange, see figure 7.1.5 on page 15. For assembly of clamp see figure 8.4.1.

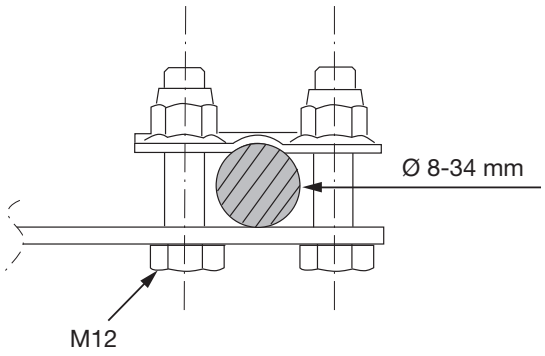


Figure 8.4.1
Earth terminal

8.5 Installation of surge counter

For installation of surge arrester monitor EXCOUNT-II and EXCOUNT-III, see section 7.2 on pages 17/18 together with the separate assembly instruction included with the delivery.

For installation of a surge counter EXCOUNT-C, EXCOUNT-I or surge counter from another manufacturer, ensure that:

- The arrester is insulated from the structure by an insulating base with a LIWV of at least 15 kV or equal to that of the conductor between the surge arrester and the surge counter (see below), whichever is the greater.

- The length of the conductor between the arrester and the surge counter is to be minimum 0.5 m when a clip-on CT is to be used for control measurements of leakage current. The maximum length shall not exceed 3 m in the case of the insulating base and conductor having a LIWV of 15 kV. Longer lengths up to 10 m could be used with an insulating base having suitably higher LIWV, see table 8.5. The insulated base and conductor shall then be insulated for 5xL kV (LIWV), where L is the conductor length in meters. Preferably, the total length between arrester earth terminal and grounding point (L+B in figure 8.5.1 and 8.5.2) should be considered in fulfilling the same requirement to avoid a flashover by the LIWV as described above being exceeded. Note that connection leads should always be kept as short as possible as longer leads result in a disadvantage from a protection point of view since inductance is added in series with the arrester.

- **Specifics for EXCOUNT-I**
  The conductor from the earth terminal of the counter to connection with the grounded support stand (point A in figure 8.5.1) on to which the counter is attached (or similar support) shall not exceed 0,5 m. For example, length B as shown in figure 8.5.1. The earth conductor may be extended from the connection point at the support to any ”earth point” if the support itself, due to local requirements, is not considered as sufficiently grounded. However a flashover of the arrester base may occur if the length (L+B in figure 8.5.1) exceeds the value in table 8.5 and the counter may be damaged if the length B exceeds 0.5 m.

- **Specifics for EXCOUNT-C**
  Since the earth conductor is normally a single continuous piece, the total length from the earth terminal of the arrester to the grounding point (length L+B in figure 8.5.2) shall be the defining criteria for maximum length and minimum LIWV as described above. The length (B in figure 8.5.2) from the counter to earth or an intermediate grounding point shall not exceed 3m. The earth conductor may be extended from an intermediate connection point (A in figure 8.5.2) at the support to any ”earth point” if the support itself, due to local requirements, is not considered as sufficiently grounded. In the event an intermediate connection is used between the arrester and counter, eg optional conductor kit 1HSA448427-A, then the same criteria as for EXCOUNT-I shall otherwise apply, except that the length B may be up to 3 m.

- The surge counter is to be installed according to the included assembly instruction.

Table 8.5

Standard Hitachi Energy Insulated base	Maximum length L *)
1HSA430 000-A, -B	10 m
1HSA430 000-C, -D	10 m
1HSA430 000-H, -J	10 m
1HSA430 000-P, -V	3 m

*) On the condition the connecting conductor has at least LIWV = 5xL kV

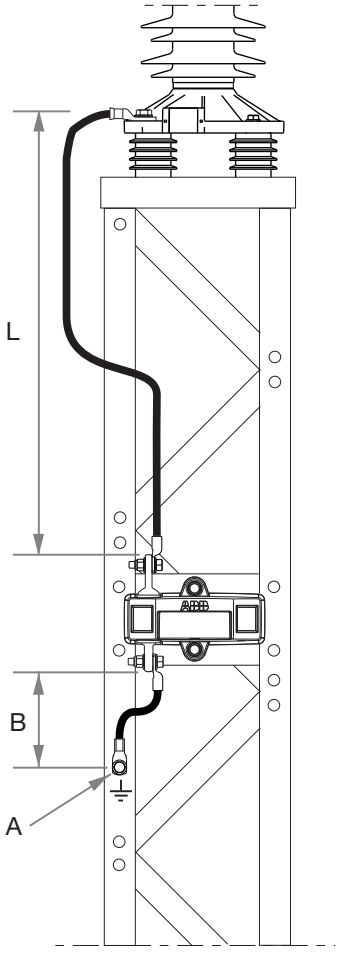


Figure 8.5.1

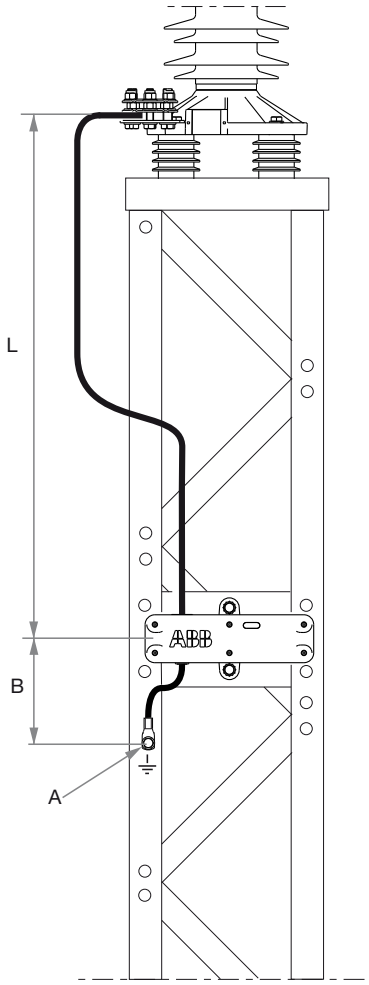


Figure 8.5.2

9. Assembly of PEXLINK

9.1 Assembly of terminal and links

The following details for assembly of PEXLINK applies to the common installation alternatives and is included here for information only unless otherwise stated. In the event that a separate installation instruction is supplied with the actual delivery, this shall always take precedence.

The terminal is pre-assembled from the factory. Fit the suspension clamp and the clevis link together with the terminal, see figure 9.1.1. If a shunt should also be installed, follow figure 9.1.2 instead.

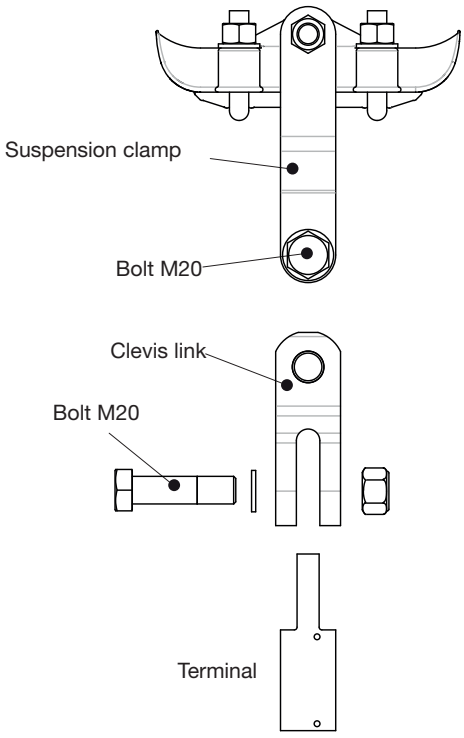


Figure 9.1.1
Terminal link without shunt

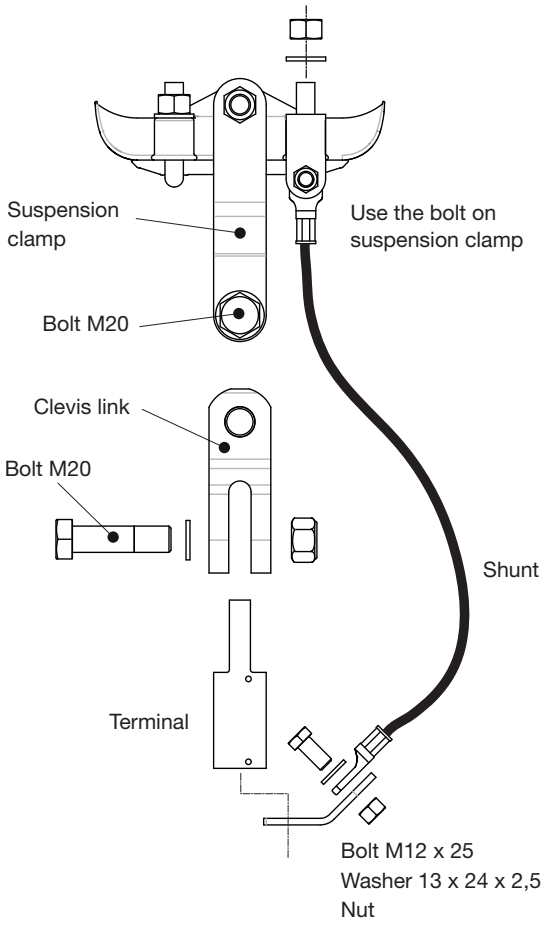
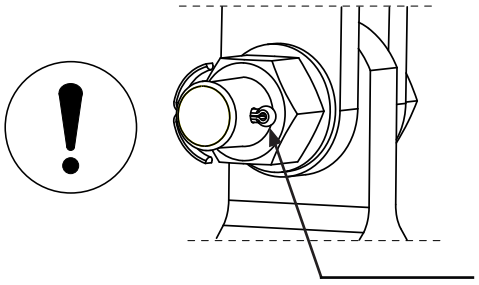


Figure 9.1.2
Terminal link with shunt



When tightening the bolt in clevis link the following conditions shall be met:
Bolt and nut M20 in clevis link shall be firmly fastened in clevislink, but shall allow the clevis link to rotate in the line terminal.

Make sure that all cotter pins are mounted and secured correctly.

9.2 Assembly of disconnecting device

If the PEXLINK transmission line arrester should be installed with EXCOUNT-II, please also refer to the instructions according to section 9.3 on the next page.

Assemble the disconnecting device to the pre-assembled coupling, figure 9.2.1. Maximum load of the disconnecting device is given in the table 9.2.1. The dimension of the earth cable is recommended to be at least 70 mm^2 (flexible copper).

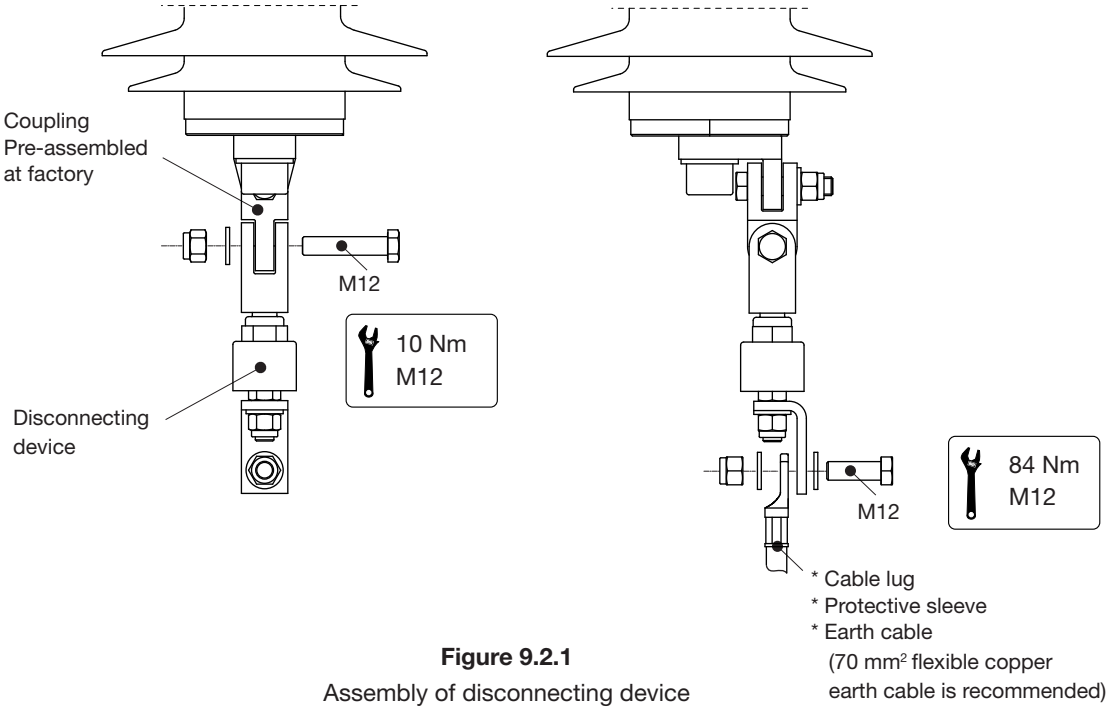


Figure 9.2.1
Assembly of disconnecting device and earth cable to coupling
* Items not supplied unless specifically stated at order

Table 9.2.1

Maximum load allowed for disconnecting device:	
Max. bending force:	1000 Nm
Max. tensile force:	2400 Nm

9.3 Assembly of EXOUNT-II

Assemble the EXCOUNT-II sensor to the pre-assembled coupling, figure 9.3.1. For more information about assembly of the disconnecting device, please also refer to the instructions according to section 9.2 on the previous page.

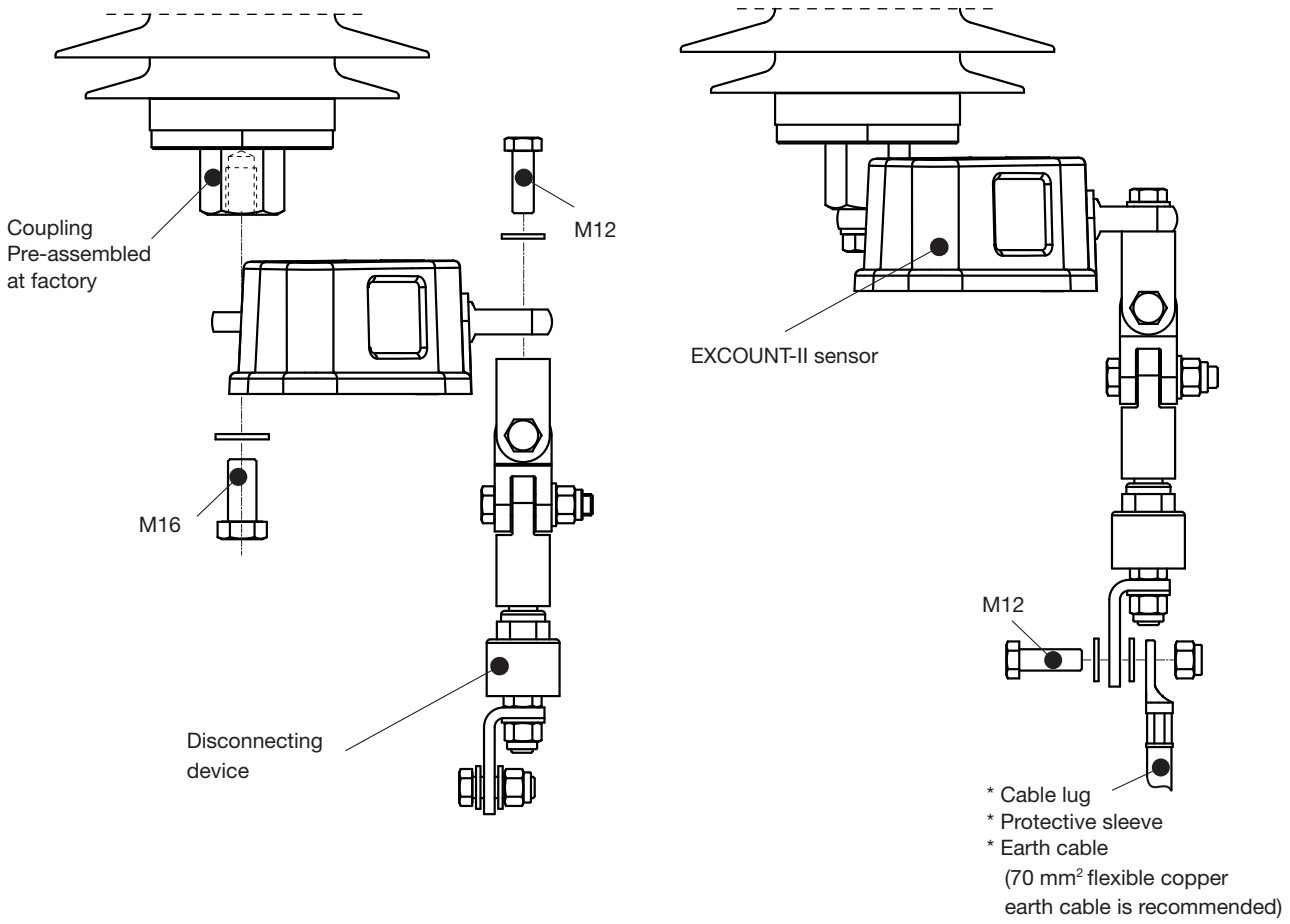


Figure 9.3.1
Assembly of EXCOUNT-II on PEXLINK with coupling

* Items not supplied unless specifically stated at order

84 Nm
M12

183 Nm
M16

10. Maintenance

10.1 Maintenance and checking

A properly chosen and installed PEXLIM surge arrester is maintenance free during its lifetime, when operating under normal operating conditions. However, the tightening torques on terminals shall be checked and, if necessary, adjusted to the correct value at inspections of the plant. A properly chosen arrester means that both its electrical capability as well as its mechanical design correspond to the service conditions of the actual network.

Cleaning

PEXLIM arresters do not require any cleaning of the external surfaces for their lifetime. The surface may appear to be dirty, but this is of no significance.

Should, for any reason, the arresters be subjected to live washing observe the following in addition to normal precautions for live washing:

- Arrester insulators usually have shorter flashover distances than other insulators for the same system voltage, which means higher risk for external flashover during washing.
- Arresters must be spray-washed evenly in order to avoid overheating.
- Do not use water under high pressure, otherwise the soft silicone housing may be damaged.

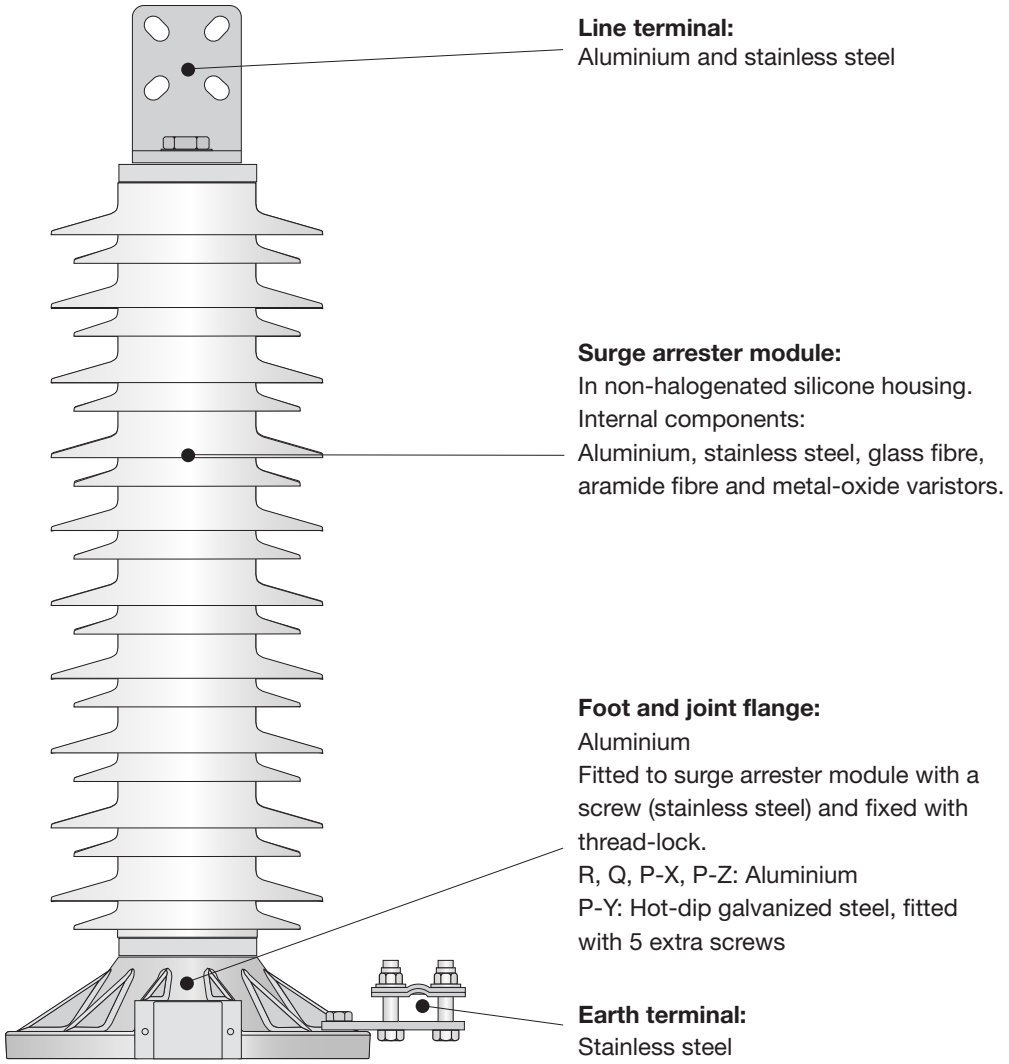
General

Should a routine check be desired, the only reliable method is to periodically measure the resistive component of the leakage current. For this purpose, use of Leakage Current Monitor, LCM, or Hitachi Energy surge arrester monitor, EXCOUNT-II is recommended. For description of the LCM/EXCOUNT-II and measurement procedures, please refer to the relevant catalogues.

11. Disposal

11.1 Disposal of the surge arrester

When the surge arrester is taken out of service due to age or in case of an arrester overload, its components shall be disposed of according to local regulations. Each surge arrester module is moulded in a silicone housing which is completely bonded to the internal components. This makes full disassembly difficult for separate disposal. The composition of the arrester is shown in the figure below.



NOTES

Additional information
We reserve the right to make technical changes or modify the contents of this document without prior notice. With regard to purchase orders, the agreed particulars shall prevail. Hitachi Energy Ltd. does not accept any responsibility whatsoever for potential errors or possible lack of information in this document.

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