

CATALOGUE

ON

Medium Voltage Outdoor Disconnectors



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1. Introduction

Off-load disconnecter type ON represents many years of experience in medium voltage lines operation. Together with disconnecter ON ABB provides its customers reliability, possibility to work in various climatic condition and in various types of networks. ON disconnectors can be operated either manually or by electric motor (also remote controlled). It allows to work as sectionalizer in distribution network.

2. Features

Simple design and service.

- Compact design
- High mechanical endurance
- High electric parameters
- High quality porcelain insulators
- Connection to fixed terminals
- Operates both in vertical and horizontal position
- Optional earthing switches from both sides
- Operating devices: manual or motor
- Single and three pole versions

3. Application

One - and three – pole disconnectors are designed for closing and opening not loaded electrical circuits in outdoor A.C. networks. In open position disconnectors form visible and safe isolating distance which disconnects circuit from voltage on the output side. Optional integrated earth switches are intended for earthing previously disconnected electrical network.

4. Working conditions

The disconnectors type ONI...–2 i ONIII...–2 together with manual or motor drives can be mounted in outdoor substations or network in following the climatic conditions:

- ambient temperature:
 - maximum +40°C
 - average (within 24 h) +35°C
 - minimum – 50°C
- Altitude above sea level do 1000 m
- Wind pressure do 700 Pa

Special versions of disconnectors designed to work in different climatic conditions or additional operation requirements has to be agreed with producer on the quoting stage.

5. Design and operation

The outdoor disconnectors type ONI –2 i ONIII 2 are vertical break switches. The base of disconnecter is a steel frame in which there is installed (in bearings) the operating shaft ended with operating lever. Disconnector's shaft from both sides is ended with the knurling, which allows easy connection of lever with the drive. The operating lever can be rotated every 10 degrees within full turn. Support porcelain isolators with moving and unmoving contacts are fixed into the base. Between moving and unmoving contacts there is a line contact and its proper pressure is achieved via the pressure springs. Contacts and terminal are silvered. The disconnector's moving contacts are connected via isolating rods to operating shaft. Rotation move of shaft is carried over via rods on moving contacts putting them in motion within perpendicular to a base plane. Full operating angle of shaft is 102°.

The construction of disconnectors type ONIII –2 allowed mounting up earthing switches which can be mounted on moving contact side (the up earthing switches) or on unmoving contact side (the down earthing switches). Between operating shaft of disconnector and operating shaft of earthing switch there is mechanical interlocking ensuring proper sequence of connection. Disconnectors are suitable for working in horizontal or vertical position and have clamps suitable for connect flat buses mounted in parallel to the base.

Disconnectors and earthing switches can be controlled by separate manual operating devices type NN or motor type UEMC50 Operating devices are coupled with disconnector by adjustable pipe rod.

6. Designation of switch

Designation of disconnectors type

ON	III	30	W	/	8	UD	-	2
Disconnector's type	Number of poles I – 1 pole III – 3 poles	Rated voltage 20 – 24 kV 30 – 36 kV	Creepage distance of insulators – 460 mm (24 kV) – 610 mm (36 kV) W – 900 mm (36 kV)		Prąd znamionowy ciągły 4 – 400 A 8 – 800 A 12 – 1250 A 16 – 1600 A 20 – 2000 A	Earthing switch type UD – lower earthing switch UG – upper earthing switch		Construction version

7. Technical data

Electrical parameters

Table 1: Three poles disconnector's parameters
Basic parameters

	ONIII 20/4-2	ONIII 20/8-2	ONIII 20/12-2	ONIII 30/4-2	ONIII 30/8-2	ONIII 30W/4-2	ONIII 30W/8-2	ONIII 30W/16-2	ONIII 30W/20-2
Parameters									
Rated Voltage [kV]	24	24	24	36	36	36	36	36	36
Rated power frequency withstand voltage to earth and between phases [kV]	55	55	55	75	75	75	75	75	75
Rated power frequency withstand voltage across the isolating distance [kV]	75	75	75	100	100	100	100	100	100
Rated lightning impulse withstand voltage to earth end between phases. [kV]	125	125	125	170	170	170	170	170	170
Rated lightning impulse withstand voltage across the isolating distance [kV]	145	145	145	195	195	195	195	195	195
Insulators creepage distance [mm]	460	460	460	610	610	900	900	900	900
Rated current [A]	400	800	1250	400	800	400	800	1600	2000
Disconnector rated peak withstand current [kA]	50	50	50	50	50	50	50	63	63
Disconnector rated short-time withstand current 1 s [kA]	20	20	20	20	20	20	20	25	25
Earthing switch	UD – lower earthing switch; or UG – upper earthing switch*								
Earthing switch rated peak withstand current [kA]	50	50	50	50	50	50	50	63	63
Earthing switch rated short-time withstand current 1 s [kA]	20	20	20	20	20	20	20	25	25
Rated frequency [Hz]	50/60								
Mechanical endurance [close /open]	1000								
Weight [kg]									
Without earthing switch	80	80	80	105	105	125	125	130	130
With earthing switch	90	90	90	120	120	140	140	150	150

* earthing switch from both side on request

Table 2: Single pole disconnector's parameters
Basic parameters

	ONI 20/4-2	ONI 20/8-2	ONI 20/12-2	ONI 30/4-2	ONI 30/8-2	ONI 30W/4-2	ONI 30W/8-2	ONI 30W/16-2	ONI 30W/20-2
Parameters									
Rated Voltage [kV]	24	24	24	36	36	36	36	36	36
Rated power frequency withstand voltage to earth and between phases [kV]	55	55	55	75	75	75	75	75	75
Rated power frequency withstand voltage across the isolating distance [kV]	75	75	75	100	100	100	100	100	100
Rated lighting impulse withstand voltage to earth end between phases. [kV]	125	125	125	170	170	170	170	170	170
Rated lighting impulse withstand voltage across the isolating distance [kV]	145	145	145	195	195	195	195	195	195
Insulators creepage distance [mm]	460	460	460	610	610	900	900	900	900
Rated current [A]	400	800	1250	400	800	400	800	1600	2000
Disconnecter rated peak withstand current [kA]	50	50	50	50	50	50	50	63	63
Disconnecter rated short-time withstand current 1 s [kA]	20	20	20	20	20	20	20	25	25
Earthing switch	NONE								
Rated frequency [Hz]	50/60								
Mechanical endurance [close /open]	1000								
Weight [kg]	27	27		35	35	45			

7.1 Altitude

The insulating property of air decreases as the altitude increases, therefore this must always be taken into account for external insulation of the apparatus.

The phenomenon must always be taken into consideration during the design stage of the insulating components of apparatus to be installed over 1000 m above sea level.

In this case a correction coefficient described in IEC 62271-1 must be considered.

For given altitude parameter Ka should be read from the diagram on right,

(or calculated from formula

$$K_a = e^{m(H-1000)/8150} \quad m=1).$$

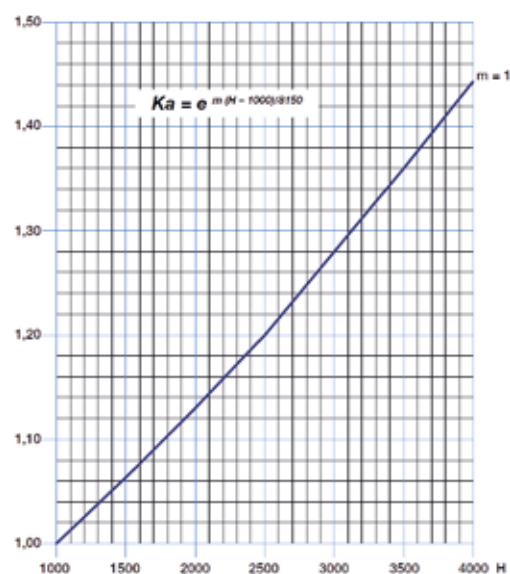
Calculate required voltage withstand on altitude H according formula:

$$U_H = K_a * U_d$$

U_H – voltage withstand on altitude H (H>1000 m)

U_d – voltage withstand on altitude <1000 m)

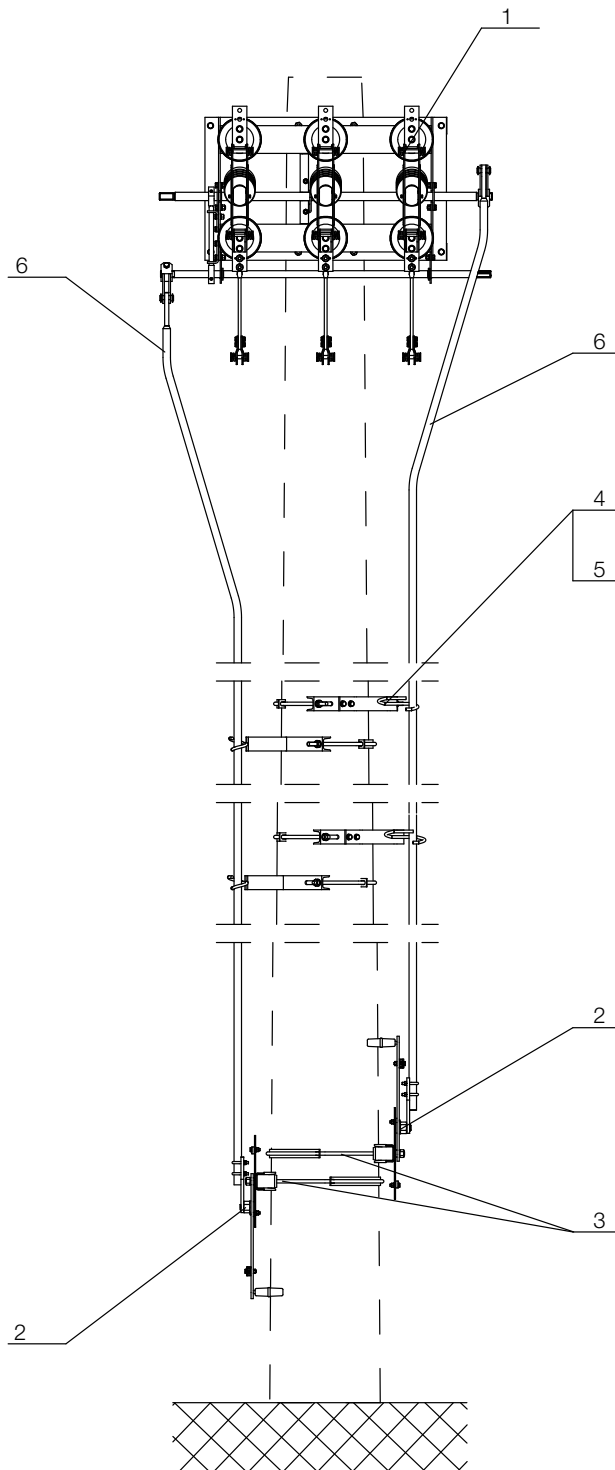
Based on that select apparatus fulfilling calculated parameters.



- 01 Disconnecter
- 02 Manual drive
- 03 Drive fixing
- 04 Rod's support
- 05 Rods

8. Accessories

Disconnecter ON III 20 UD with accessories



8.1 Manual drives

NN Manual drives dedicated for outdoor disconnector type ON:

- NN2 basic manual drive
- NN1 manual drive with auxiliary contacts (details point 9)

8.2 Motor drives

Disconnecter ON can be controlled by UEMC50 motor drive. Technical details of UEMC50 can be found in UEMC50's catalogue.



8.3 Rods and rod's support

Optionally rod's can be delivered together with disconnector. Standard length of rods is 4 x 1,5m. In the set with rods, 2 rod's supports are delivered

8.4 Disconnector fixing

Taking into account high variety of installation arrangements ABB is not delivering fixing accessories for disconnector.

8.5 Drive fixing

Few standard variants are available for square or circular pillars.

9. Manual drives type NN

9.1 Construction and operating principle

The manual operating mechanism NN1 is operated by means of hand lever, which can be locked in its two end positions using a padlock. Rotation angle of manual lever about 190 ° causing reciprocating movement of the rod. Working stroke of rod is changable (104, 142, 186 mm.).

Position indication is placed on manual lever.

Manual drive has two positions:

- closed/open
- open/earthed (in case of earthing switch)

9.2 Parameter

Parameter	NN1	NN2
Maximum force of manual-operate	300 N	
Stroke of operating rod	104/142/186 mm	
Rotation angle of operating lever	188°	
Weight	12 kg	7 kg
Protection degree of enclosure	IP 43	-
Technical data of auxiliary contacts PS-0		
Number of auxiliary contacts	6-12	-
Direct current switching capacity at 220 V:		
– no inductive circuit	5 A	-
Nominal current	10 A	-

9.3 NN2

NN2 is a basic 2-position manual drive.



9.3 .1 Accessories

For manual drive fixing for pillar can be supplied.

9.4 NN1

NN1 is 2-position manual drive, with box for auxiliary equipment.



9.4.1 Configurable accessories for NN1:

a) Auxiliary contacts:

- 3 NO + 3 NC
- 5 NO + 5 NC
- 6 NO + 6 NC

Changover of contacts is realized by mechanical connection with lever's shaft. Point of switching is adjustable in full angle range of operating shaft.

b) Electric interlock type NO5 (option).

Operating voltage:

24, 110, 125, 220 VDC,
110, 230 VAC.

In case lack of voltage it is not possible to operate the manual drive.

c) Anticondensation heater with thermostat (option):

110 VDC/VAC
220 VDC/VAC

It prevents condensation of water in enclosure

10. Standards

Disconnectors ON III i ON I are designed and produced according IEC standards.

11. Ordering

Following data has to be given with the order:

- disconnector type

Accessories:

- drive type and additional equipment
- rod's length
- drive's fixing to the pole

In case of question contact your ABB representative.

— Disconnector ON types Three poles disconnectors

Type	Rated voltage	Rated current	Insulators creepege distance
ONIII 20/4-2	24 kV	400 A	460 mm
ONIII 20/8-2	24 kV	800 A	460 mm
ONIII 20/12-2	24 kV	1250 A	460 mm
ONIII 30/4-2	36 kV	400 A	610 mm
ONIII 30/8-2	36 kV	800 A	610 mm
ONIII 30W/4-2	36 kV	400 A	900 mm
ONIII 30W/8-2	36 kV	800 A	900 mm
ONIII 30W/16-2	36 kV	1600 A	900 mm
ONIII 30W/20-2	36 kV	2000 A	900 mm

Three poles disconnectors with upper earthing switch

Type	Rated voltage	Rated current	Insulators creepege distance
ONIII 20/4UG-2	24 kV	400 A	460 mm
ONIII 20/8UG-2	24 kV	800 A	460 mm
ONIII 20/12UG-2	24 kV	1250 A	460 mm
ONIII 30/4UG-2	36 kV	400 A	610 mm
ONIII 30/8UG-2	36 kV	800 A	610 mm
ONIII 30W/4UG-2	36 kV	400 A	900 mm
ONIII 30W/8UG-2	36 kV	800 A	900 mm
ONIII 30W/16UG-2	36 kV	1600 A	900 mm
ONIII 30W/20UG-2	36 kV	2000 A	900 mm

Three poles disconnectors with lower earthing switch

Type	Rated voltage	Rated current	Insulators creepege distance
ONIII 20/4UD-2	24 kV	400 A	460 mm
ONIII 20/8UD-2	24 kV	800 A	460 mm
ONIII 20/12UD-2	24 kV	1250 A	460 mm
ONIII 30/4UD-2	36 kV	400 A	610 mm
ONIII 30/8UD-2	36 kV	800 A	610 mm
ONIII 30W/4UD-2	36 kV	400 A	900 mm
ONIII 30W/8UD-2	36 kV	800 A	900 mm
ONIII 30W/16UD-2	36 kV	1600 A	900 mm
ONIII 30W/20UD-2	36 kV	2000 A	900 mm

Single pole disconnectors

Type	Rated voltage	Rated current	Insulators creepege distance
ONI 20/4-2	24 kV	400 A	460 mm
ONI 20/8-2	24 kV	800 A	460 mm
ONI 20/12-2	24 kV	1250 A	460 mm
ONI 30/4-2	36 kV	400 A	610 mm
ONI 30/8-2	36 kV	800 A	610 mm
ONI 30W/4-2	36 kV	400 A	900 mm
ONI 30W/8-2	36 kV	800 A	900 mm
ONI 30W/16-2	36 kV	1600 A	900 mm
ONI 30W/20-2	36 kV	2000 A	900 mm

12. Spare parts

All accessories and additional equipment ordered not in set with disconnectors are treated as spare parts. These orders are served by Service department.

When ordering following data has to be delivered:

Disconnector type and serial number

Type of the pole/installation

Available spare parts:

- Accessories from point 8
- Manual drives
- Insulators
- Operating levers
- Earthing switches

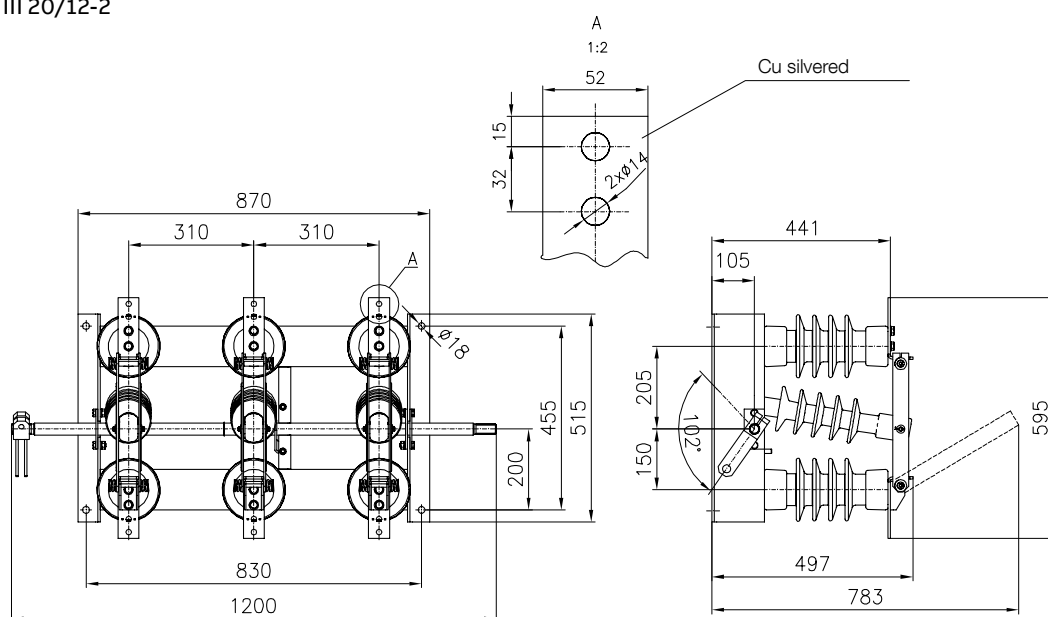
13. Dimension drawings

13.1 1YMR711017

ON III 20/4-2

ON III 20/8-2

ON III 20/12-2

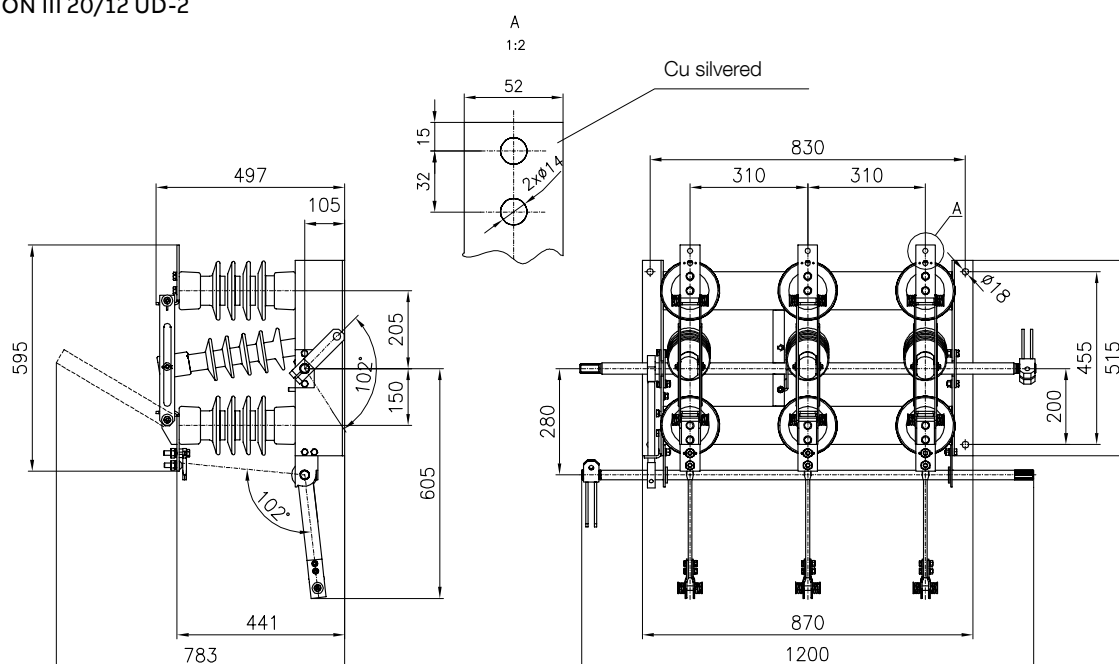


13.2 1YMR711018

ON III 20/4 UD-2

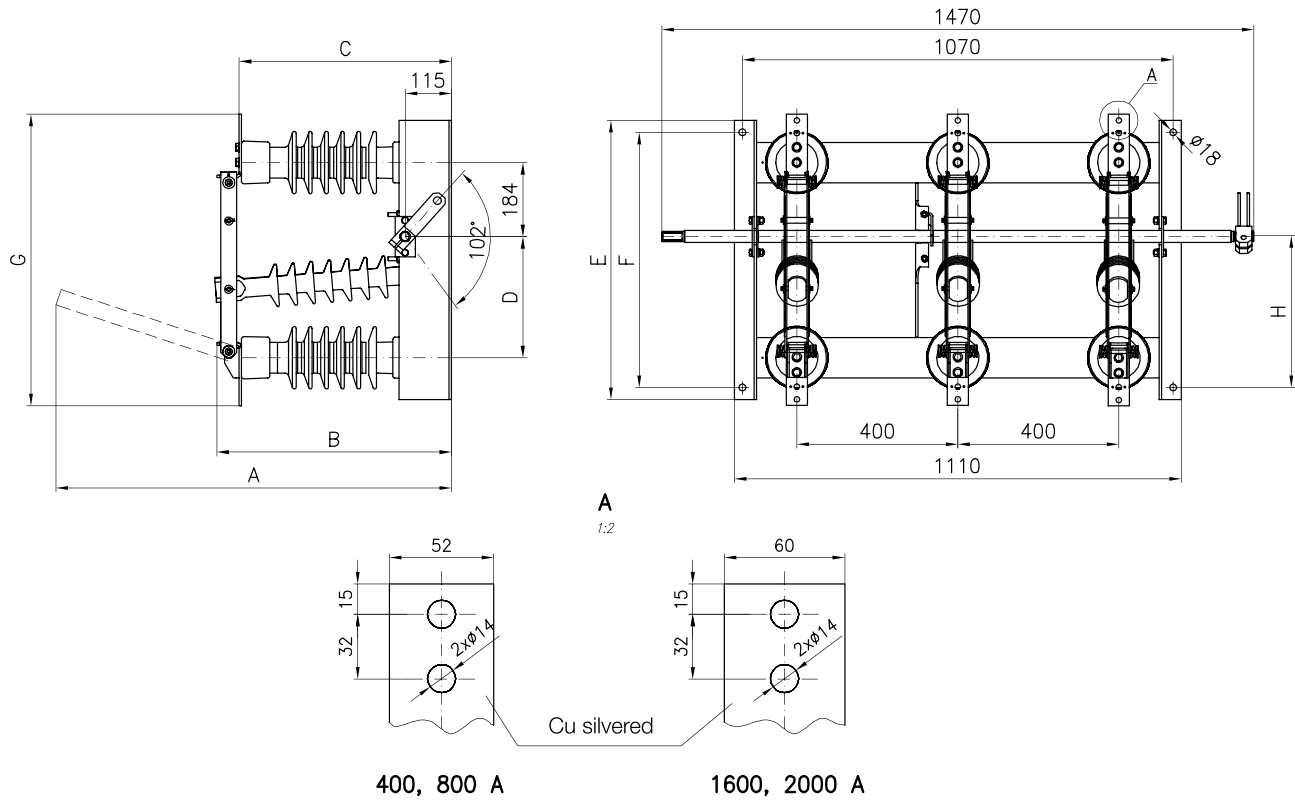
ON III 20/8 UD-2

ON III 20/12 UD-2



13.4 1YMR711027

- ON III 30/4-2
- ON III 30/8-2
- ON III 30 W/4-2
- ON III 30 W/8-2
- ON III 30 W/16-2
- ON III 30 W/20-2



ONIII 30W/16-2; ONIII 30W/20-2	1020	626	550	301	694	634	725	375
ONIII 30W/4-2; ONIII 30W/8-2	1000	602	546	301	694	634	725	375
ONIII 30/4-2; ONIII 30/8-2	981	583	527	301	694	634	725	375
Typ	A	B	C	D	E	F	G	H

13.5 1YMR711028

ON III 30/4 UD-2

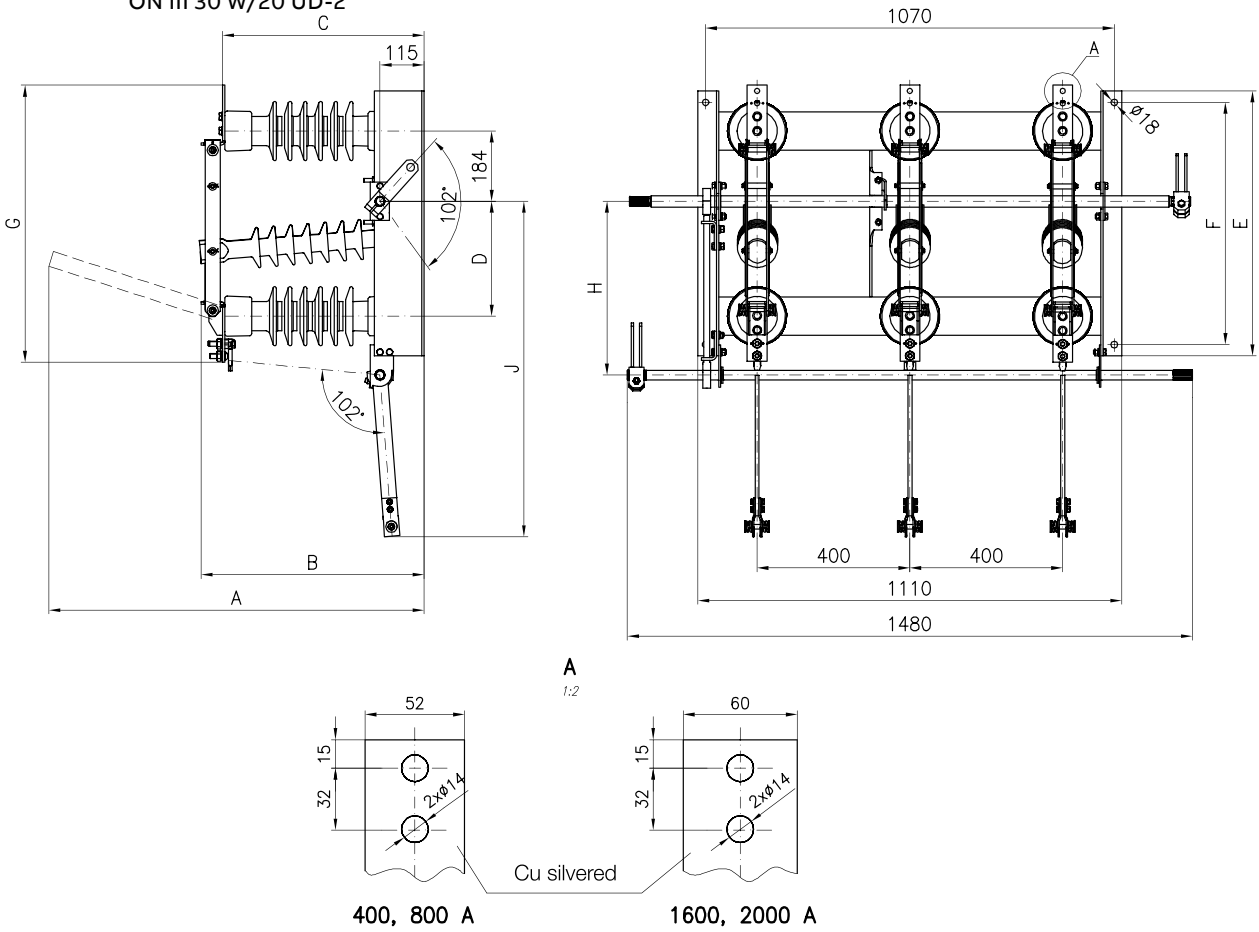
ON III 30/8 UD-2

ON III 30 W/16 UD-2

ON III 30 W/20 UD-2

ON III 30 W/4 UD-2

ON III 30 W/8 UD-2



ONIII 30W/16UD-2; ONIII 30W/20UD-2	1020	626	550	301	694	634	725	455	886
ONIII 30W/4UD-2; ONIII 30W/8UD-2	1000	602	546	301	694	634	725	455	886
ONIII 30/4UD-2; ONIII 30/8UD-2	981	583	527	301	694	634	725	455	867
Typ	A	B	C	D	E	F	G	H	J

13.6 1YMR711029

ON III 30/4 UG-2

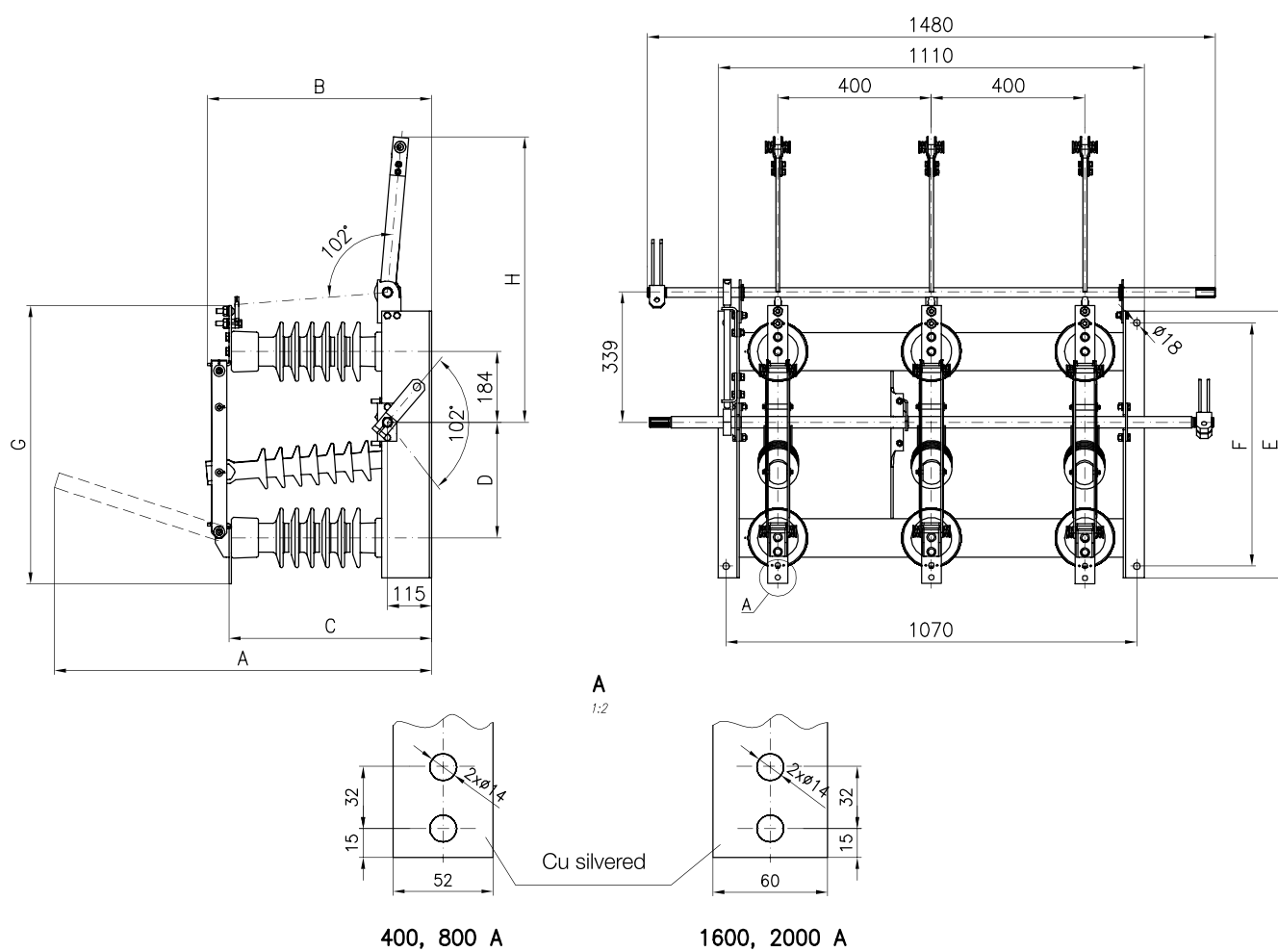
ON III 30 W/4 UG-2

ON III 30/8 UG-2

ON III 30 W/8 UG-2

ON III 30 W/16 UG-2

ON III 30 W/20 UG-2



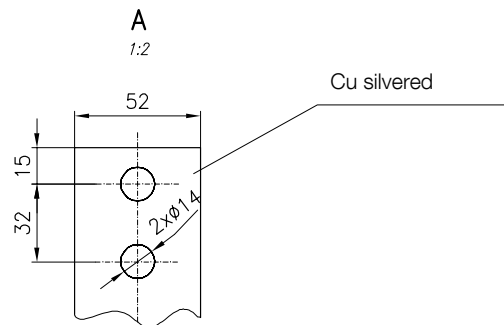
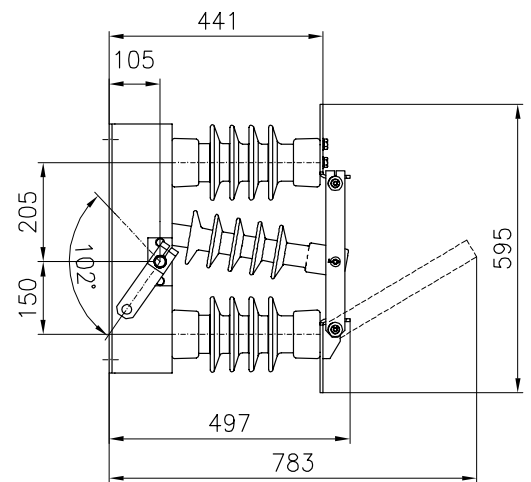
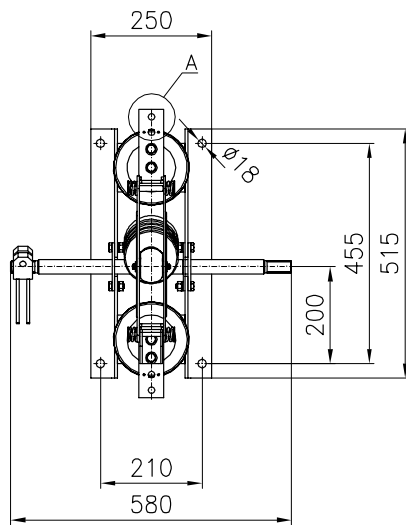
ONIII 30W/16UG-2; ONIII 30W/20UG-2	1020	626	550	301	694	634	725	769
ONIII 30W/4UG-2; ONIII 30W/8UG-2	1000	602	546	301	694	634	725	769
ONIII 30/4UG-2; ONIII 30/8UG-2	981	583	527	301	694	634	725	750
Typ	A	B	C	D	E	F	G	H

13.7 1YMR710002

ON I 20/4-2

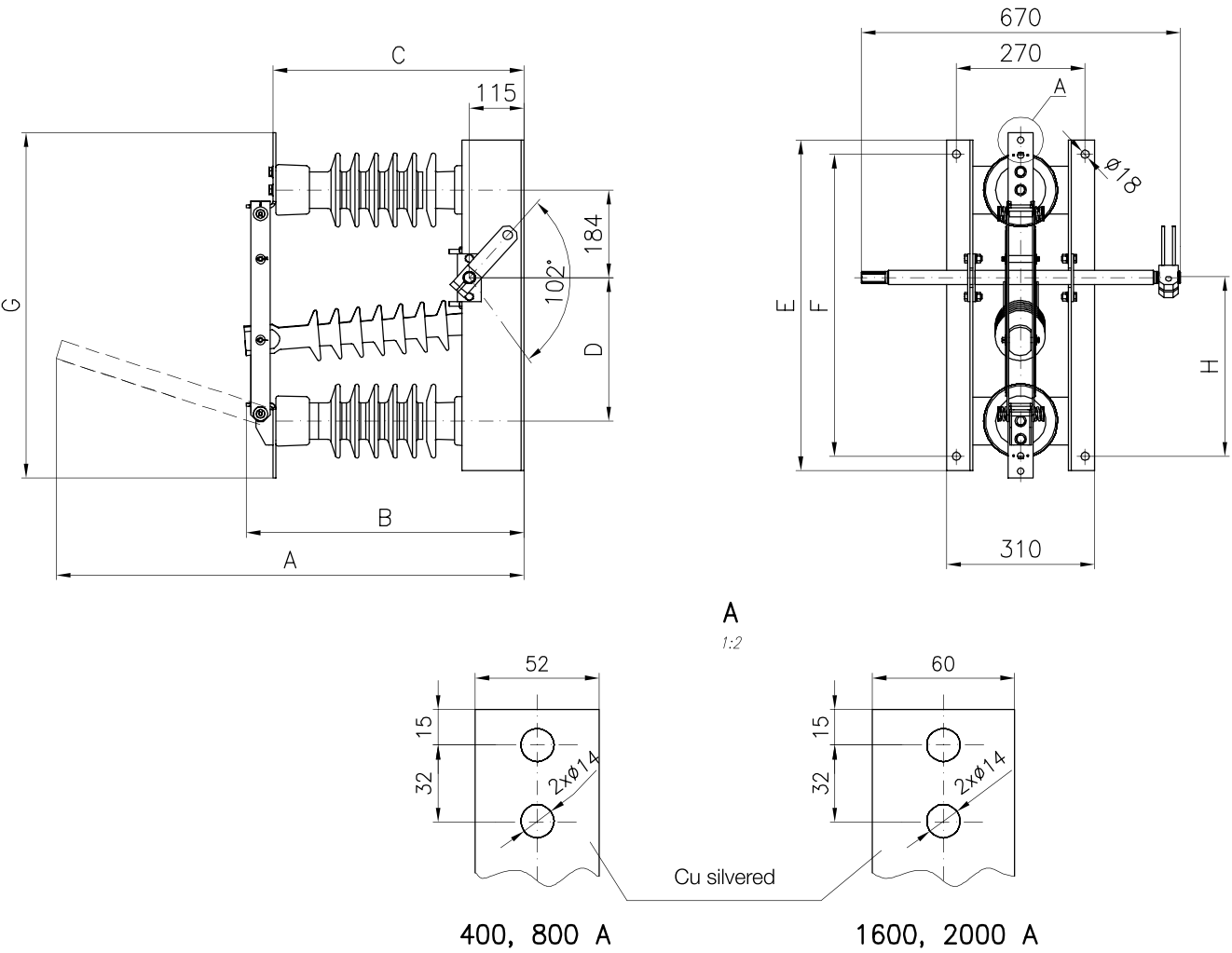
ON I 20/8-2

ON I 20/12-2

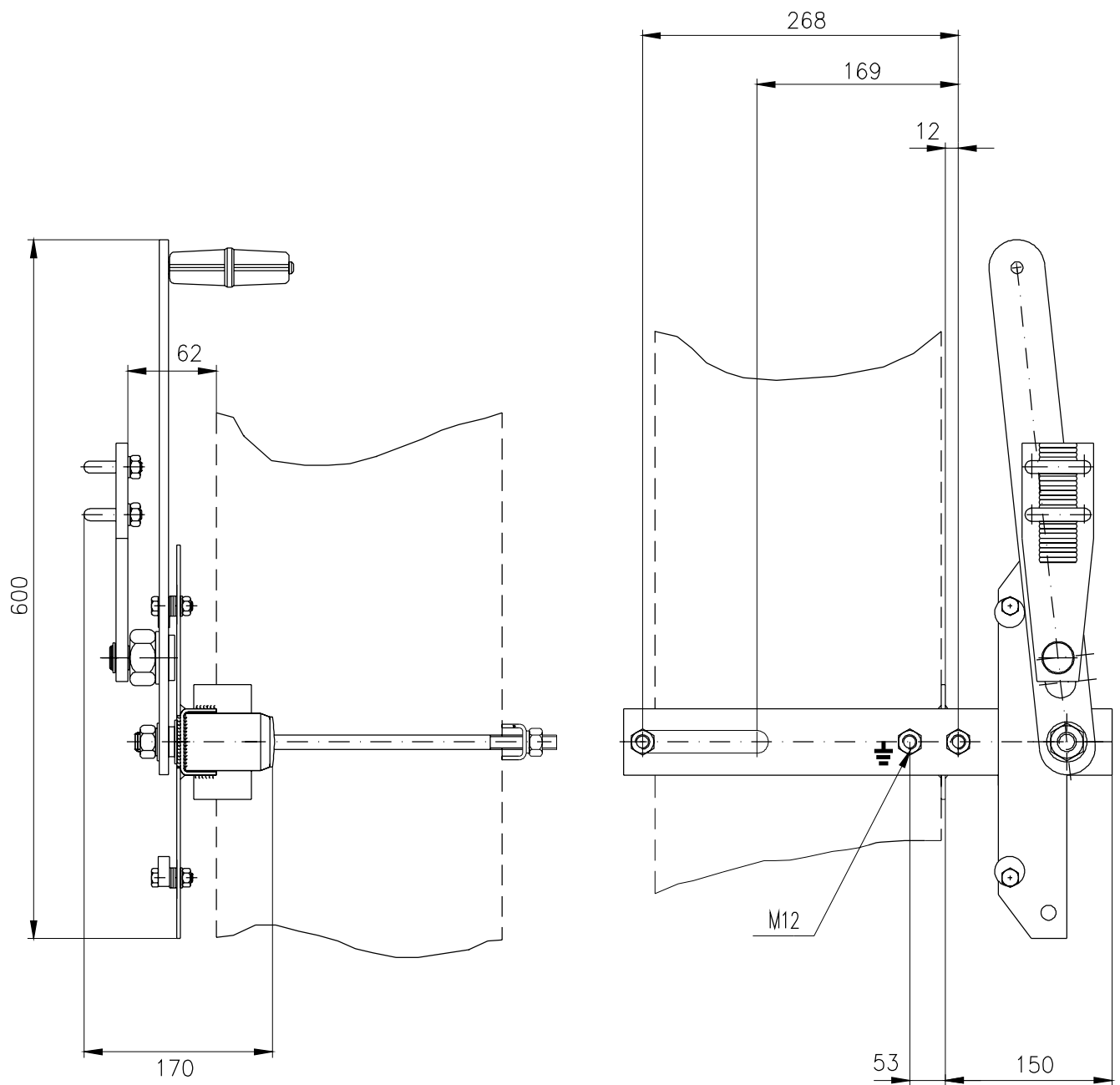


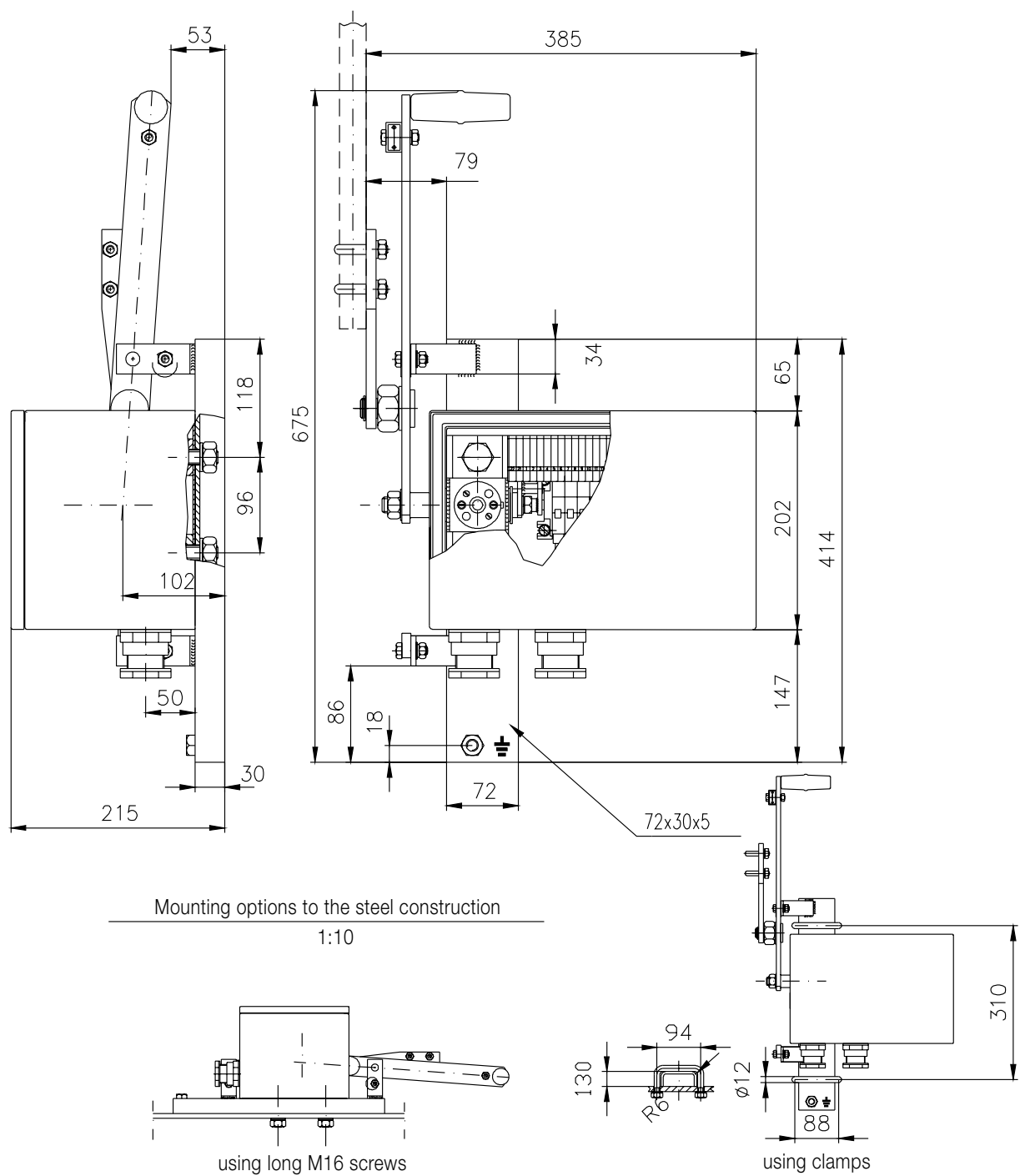
13.8 1YMR710005

- ON I 30/4-2
- ON I 30/8-2
- ON I 30 W/4-2
- ON I 30 W/8-2
- ON I 30 W/16-2
- ON I 30 W/20-2



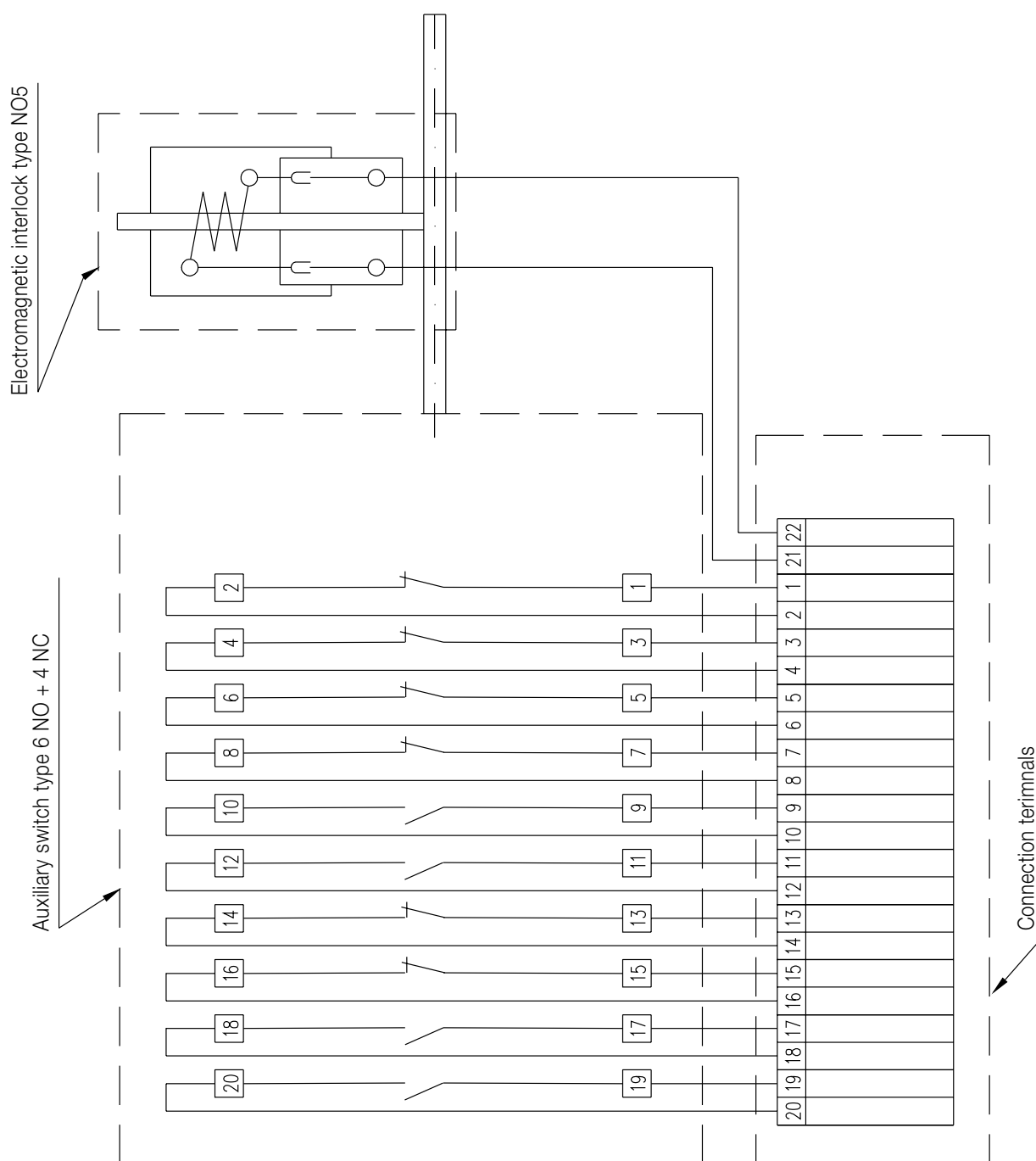
ON I 30W/16-2; ON I 30W/20-2	1020	626	550	301	694	634	725	375
ON I 30W/4-2; ON I 30W/8-2	1000	602	546	301	694	634	725	375
ON I 30/4-2; ON I 30/8-2	981	583	527	301	694	634	725	375
Typ	A	B	C	D	E	F	G	H

13.9 Manual drive type NN2

13.10 Manual drive type NN1

13.11 Medium Voltage Outdoor Disconnectors

1. PS-O contacts' position in lower position of hand lever
2. In all contacts user can select NO or NC function





Notes

A series of horizontal dotted lines for taking notes.

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